

# 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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United Kingdom

FCC ID: XX6STP8X040X      IC: 8739A-STP8X040X

## COMMERCIAL-IN-CONFIDENCE

Document 75960173-03 Issue 03

### SIGNATURE

A handwritten signature in black ink, appearing to read "S. Marshall".

| 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 | A handwritten signature in black ink, appearing to read "Neil Rousell". |
|                 | Aakash Rawal | 22 January 2025 | A handwritten signature in black ink, appearing to read "Aakash Rawal". |

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<br>FCC 47 CFR Part 90: 2022<br>ISED RSS-119: Issue 12 (05-2015)<br>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:<br><i>(Please provide a brief description of the intended use of the equipment including the technologies the product supports)</i> | 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 – <a href="#">see guidance here</a>   | XX6STP8X040X  |  |                                |
| IC ID of the product under test – <a href="#">see guidance here</a>  | 8739A-STP8X040X   |  |                                |
| Device Category  | Mobile <input type="checkbox"/>   | Portable <input checked="" type="checkbox"/> | Fixed <input type="checkbox"/> |
| Equipment is fitted with an Audio Low Pass Filter  | Yes <input type="checkbox"/>  | No <input checked="" type="checkbox"/>       |                                |

**Table 3**

### Intentional Radiators

| Technology  | TETRA – ISED  | TETRA – ISED  | 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 ( <a href="#">see guidance here</a> ) (not mandatory for Part 15 devices) | 22K0DXW       | 22K0DXW       | 20K0DXW<br>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) <input checked="" type="checkbox"/> |            |
| Class B Digital Device (Use in residential environment only) <input type="checkbox"/>                              |            |

**Table 5**

#### AC Power Source

|  |    |
|--|----|
| AC supply frequency:   | Hz |
| Voltage  | V  |
| Max current:   | A  |
| Single Phase <input type="checkbox"/> Three Phase <input type="checkbox"/> |    |

**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 <input type="checkbox"/> Leclanche <input type="checkbox"/> Lithium <input checked="" type="checkbox"/> Nickel Cadmium <input type="checkbox"/> Lead Acid* <input type="checkbox"/> * <i>(Vehicle regulated)</i> |                |   |
| Other <input type="checkbox"/>  | Please detail: |   |

**Table 8**

#### Charging

|   |   |
|---|---|
| Can the EUT transmit whilst being charged | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
|---|---|

**Table 9**

#### Temperature

|                      |     |    |
|----------------------|-----|----|
| Minimum temperature: | -20 | °C |
| Maximum temperature: | 55  | °C |

**Table 10**



### Cable Loss

|  |  |    |
|--|--|----|
| Adapter Cable Loss<br>(Conducted sample) |  | dB |
|--|--|----|

**Table 11**

### Antenna Characteristics

|   |       |           |                 |      |     |
|---|-------|-----------|-----------------|------|-----|
| Antenna connector <input type="checkbox"/>  |       |           | State impedance |      | Ohm |
| Temporary antenna connector <input type="checkbox"/>  |       |           | State impedance |      | Ohm |
|   |       |           |                 |      |     |
| External antenna <input checked="" type="checkbox"/>  | Type: | 310-00008 | Gain            | 1.77 | dBi |
| External antenna <input checked="" type="checkbox"/>  | Type: | 300-00882 | Gain            | 1.22 | dBi |
| External antenna <input checked="" type="checkbox"/>  | Type: | 300-00883 | Gain            | 1.86 | dBi |
| External antenna <input checked="" type="checkbox"/>  | Type: | 300-00884 | Gain            | 0.67 | dBi |
| For external antenna only:  |       |           |                 |      |     |
| Standard Antenna Jack <input checked="" type="checkbox"/> If yes, describe how user is prohibited from changing antenna (if not professional installed):  |       |           |                 |      |     |
| Equipment is only ever professionally installed <input checked="" type="checkbox"/>   |       |           |                 |      |     |
| Non-standard Antenna Jack <input type="checkbox"/>  |       |           |                 |      |     |
| 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 %  |

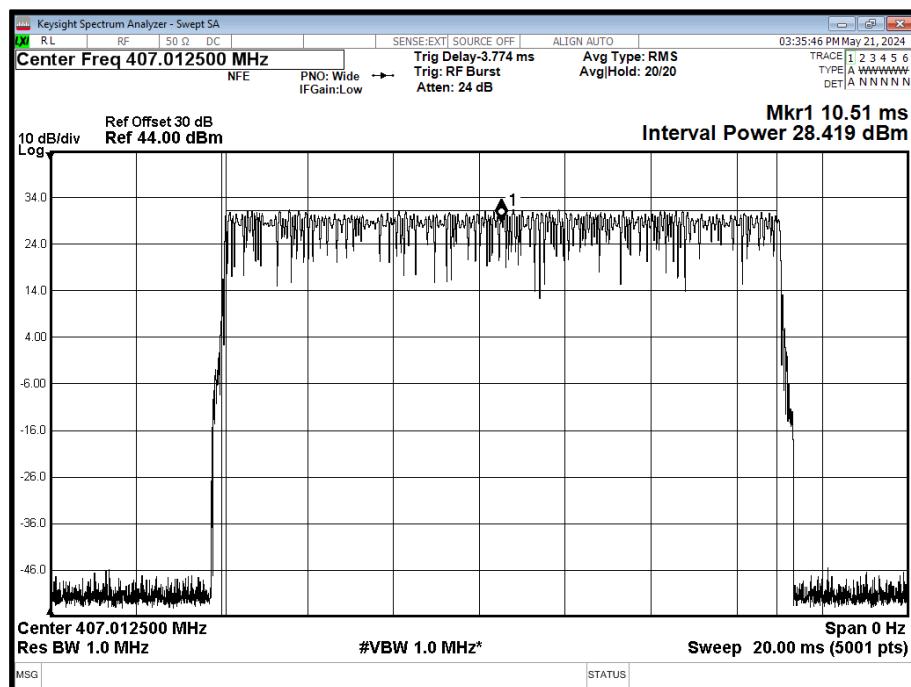


## 2.1.6 Test Results

### 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**

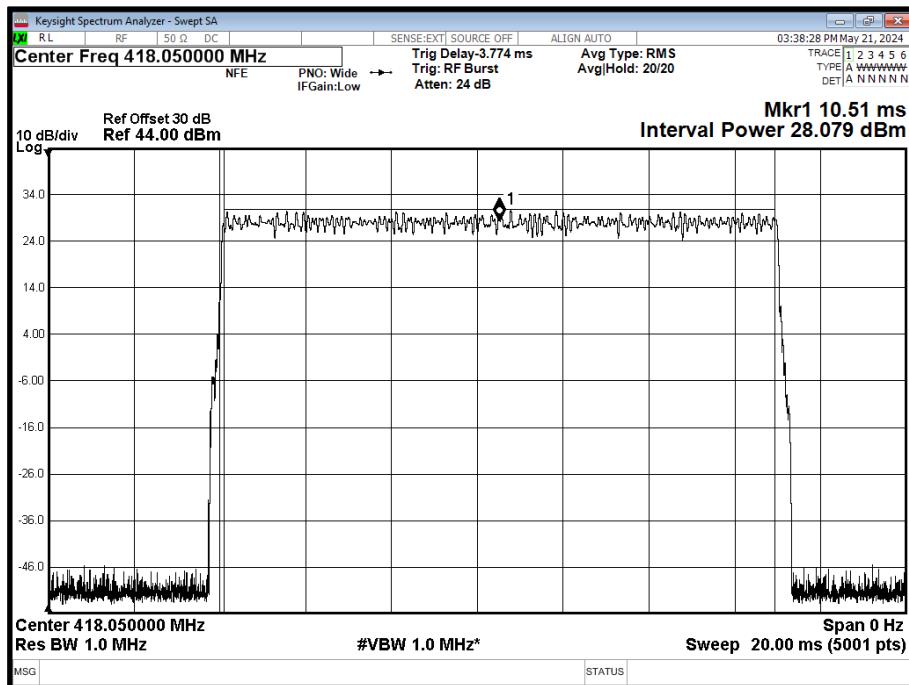


Figure 2 - 418.05 MHz

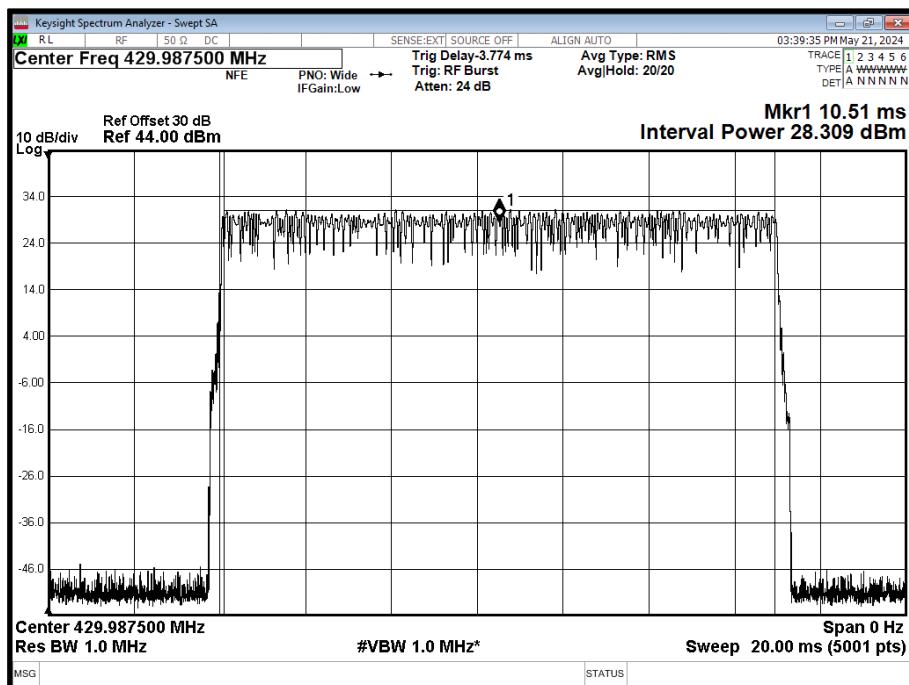


Figure 3 - 429.9875 MHz



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

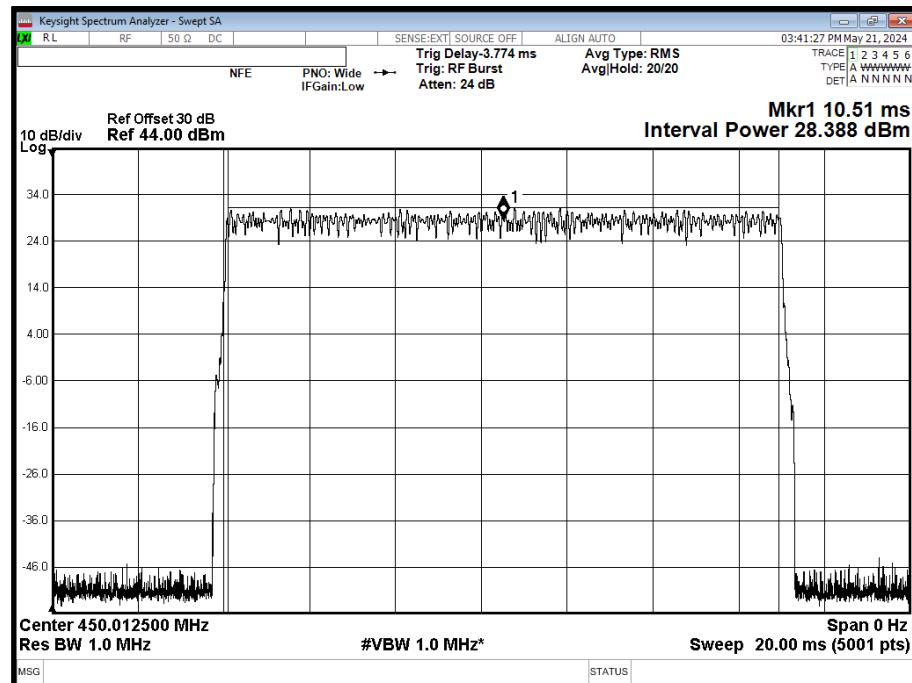


Figure 4 - 450.0125 MHz

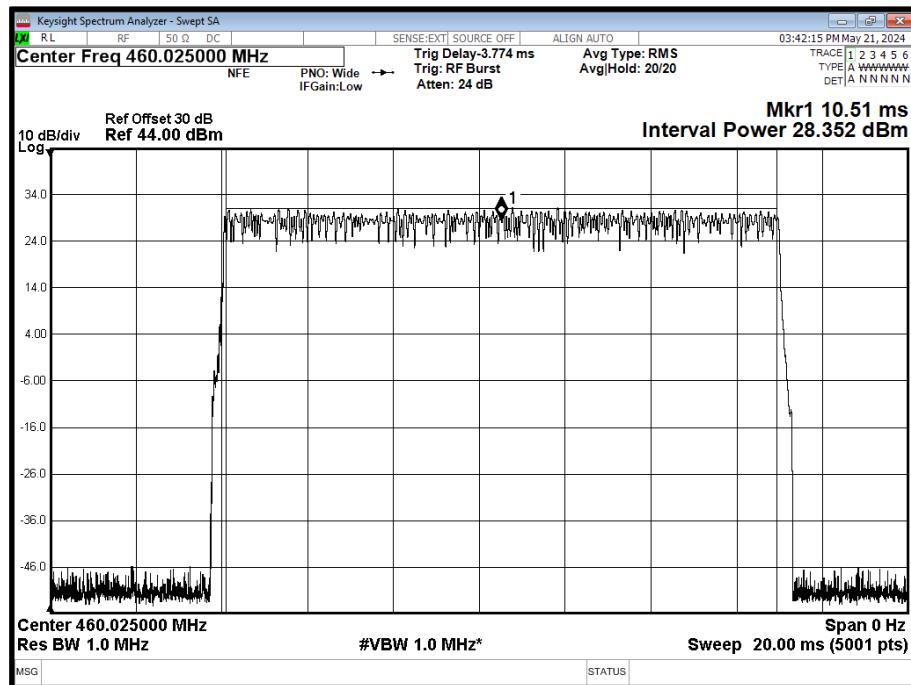


Figure 5 - 460.025 MHz

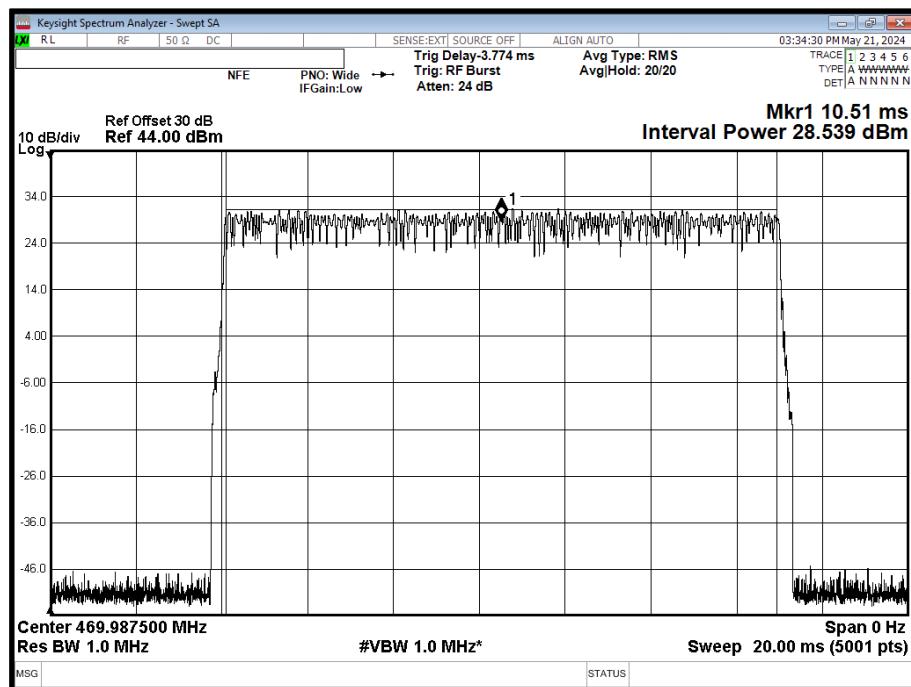


Figure 6 - 469.9875 MHz



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  $\pm 1$  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<br>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 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.

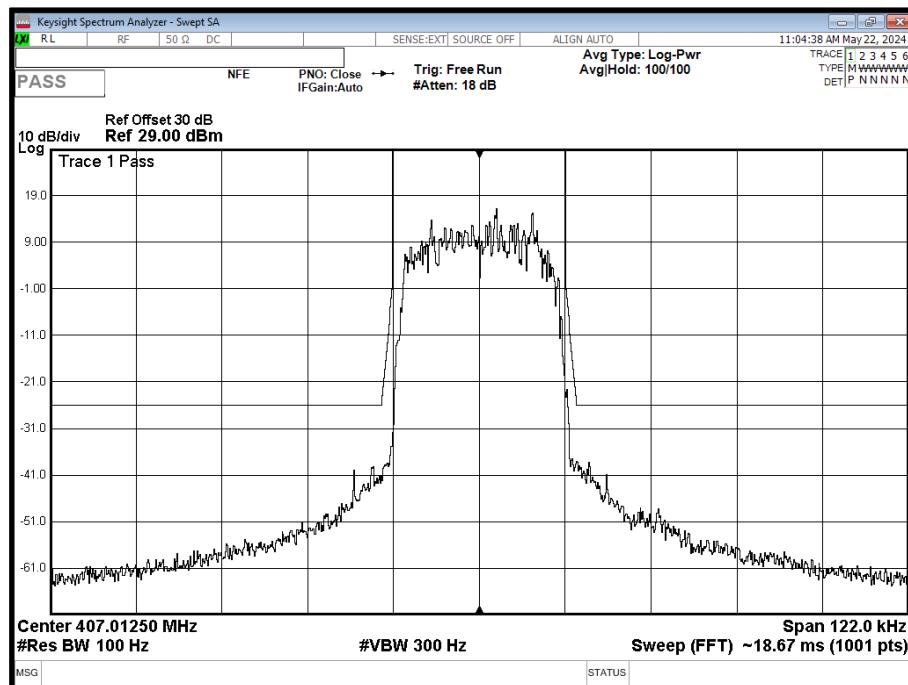


Figure 7 - 407.0125 MHz, Transmitter Mask

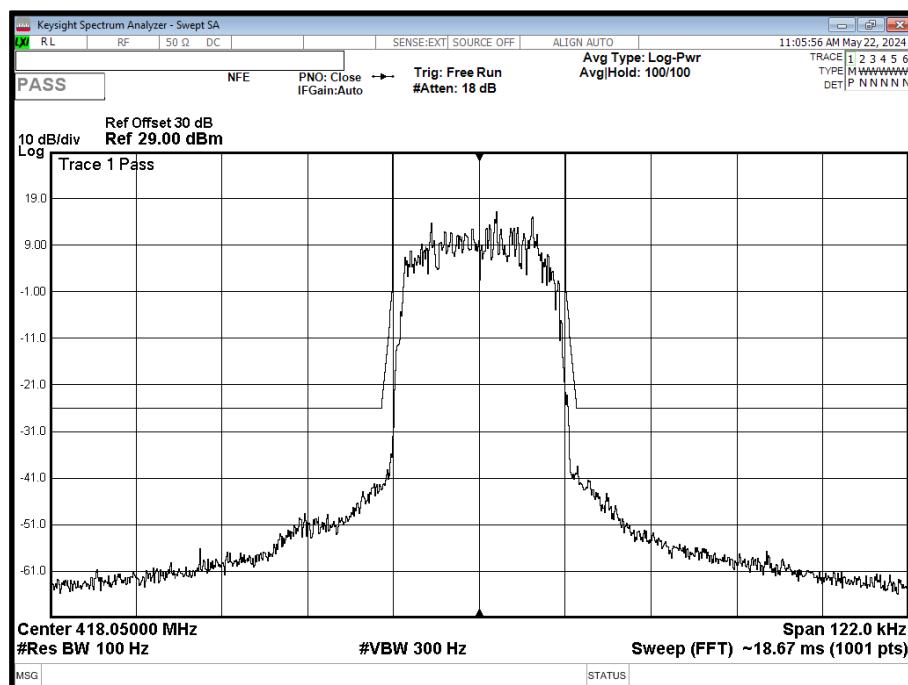


Figure 8 - 418.05 MHz, Transmitter Mask

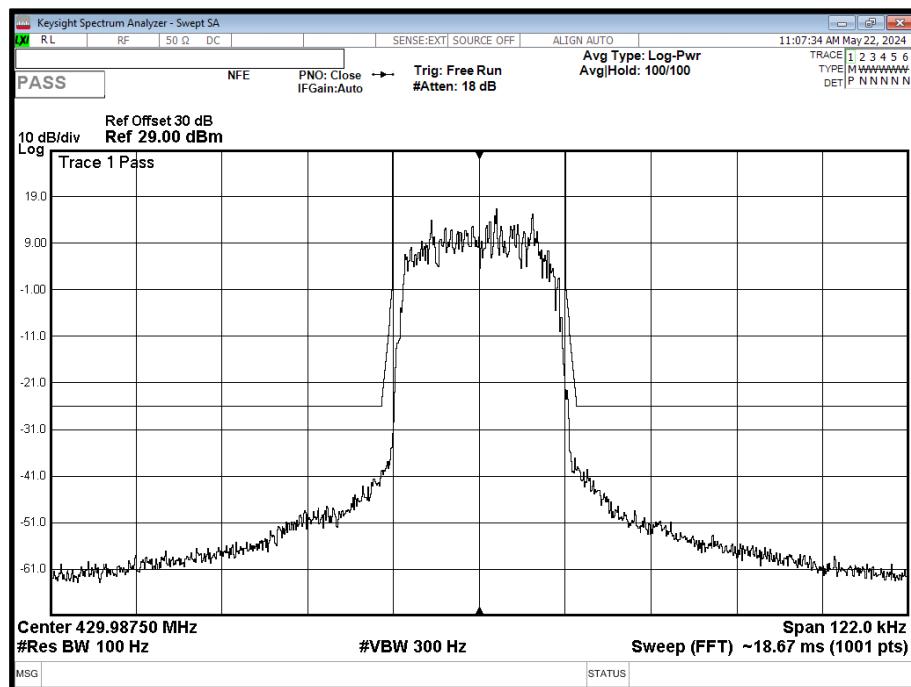


Figure 9 - 429.9875 MHz, Transmitter Mask

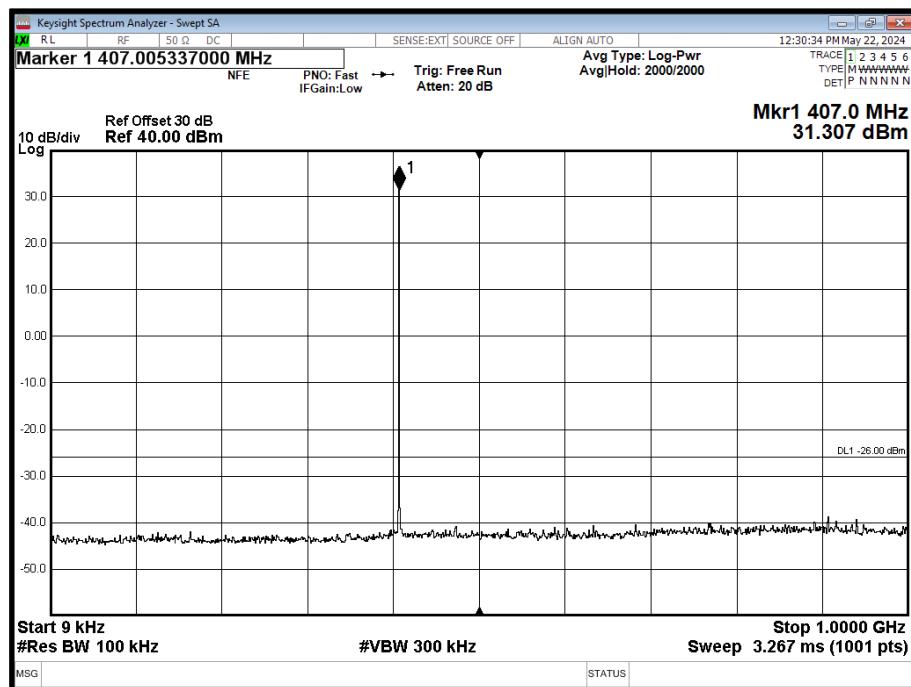
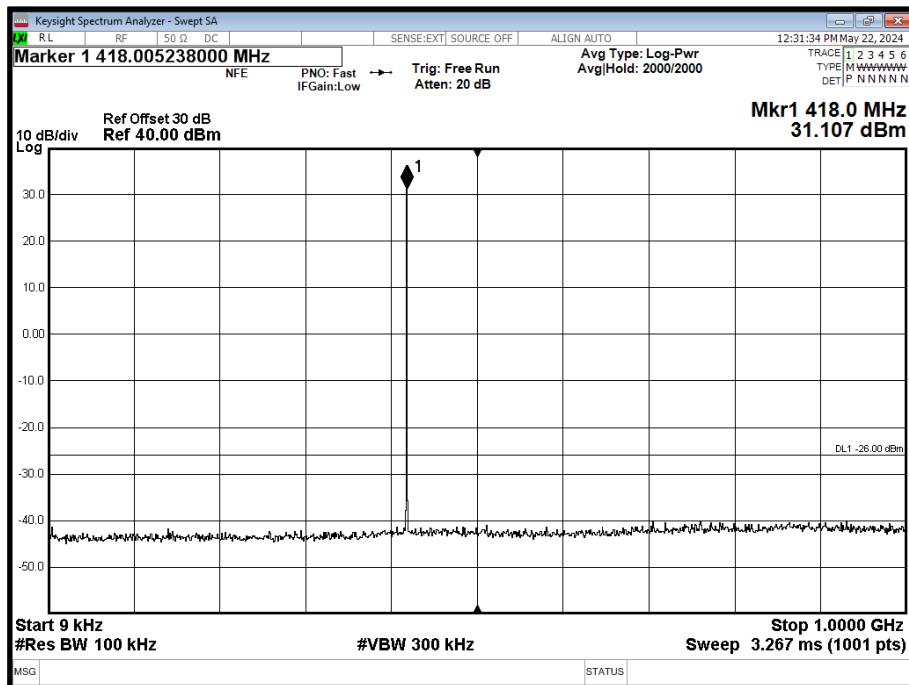
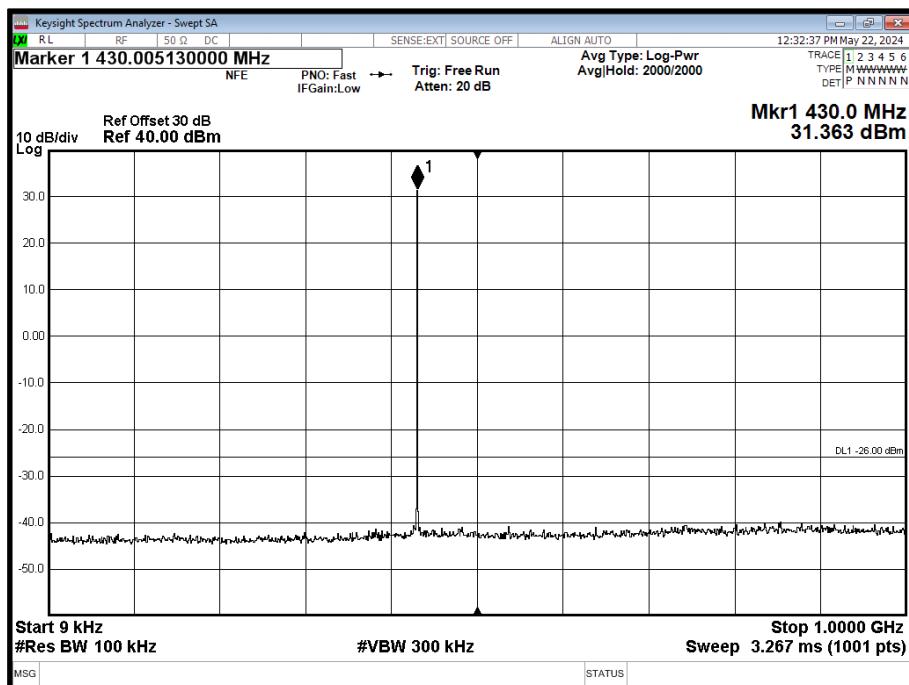


Figure 10 - 407.0125 MHz, 9 kHz to 1 GHz



**Figure 11 - 418.05 MHz, 9 kHz to 1 GHz**



**Figure 12 - 429.9875 MHz - 9 kHz to 1 GHz**

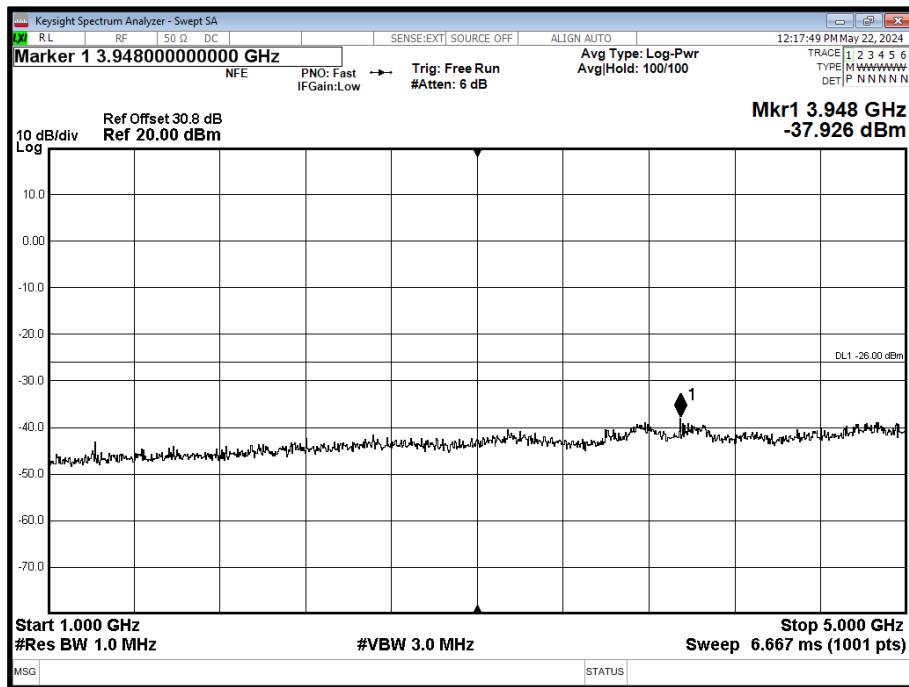


Figure 13 - 407.0125 MHz, 1 GHz to 5 GHz

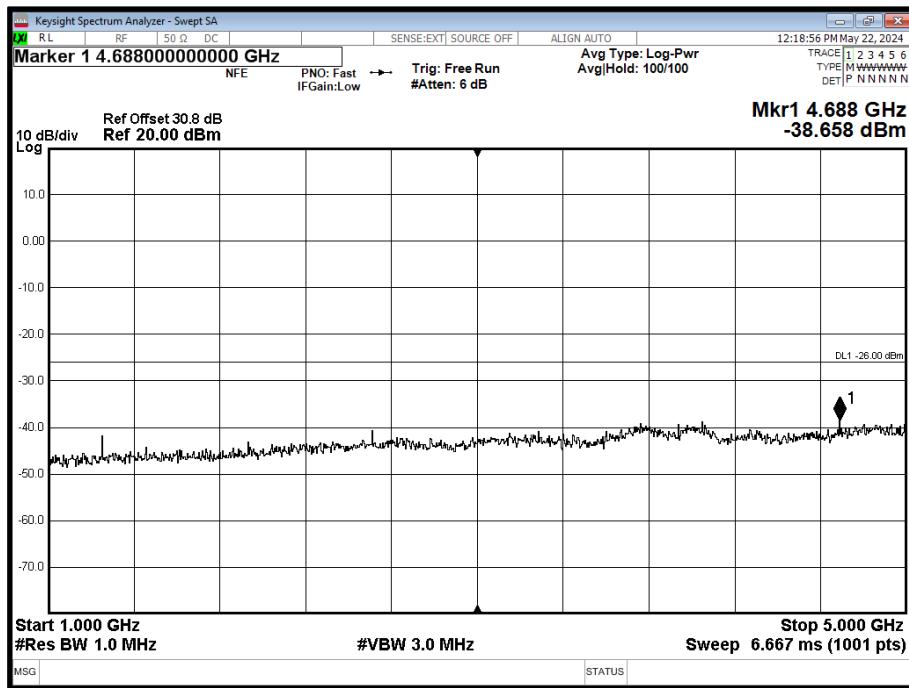


Figure 14 - 418.05 MHz, 1 GHz to 5 GHz

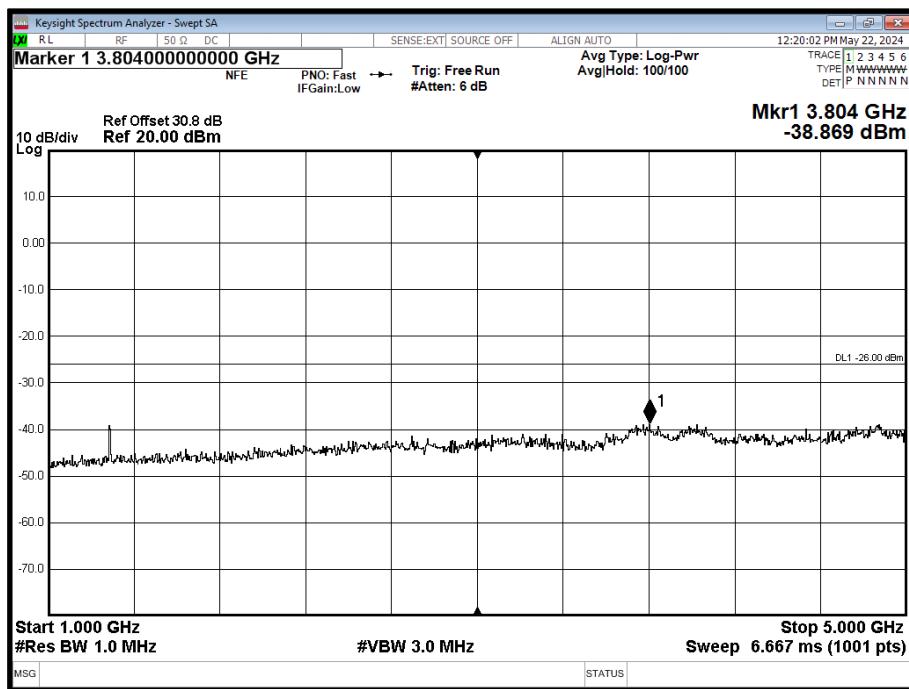


Figure 15 - 429.9875 MHz - 1 GHz to 5 GHz



### TETRA - 450 - 470 MHz - ISED C

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

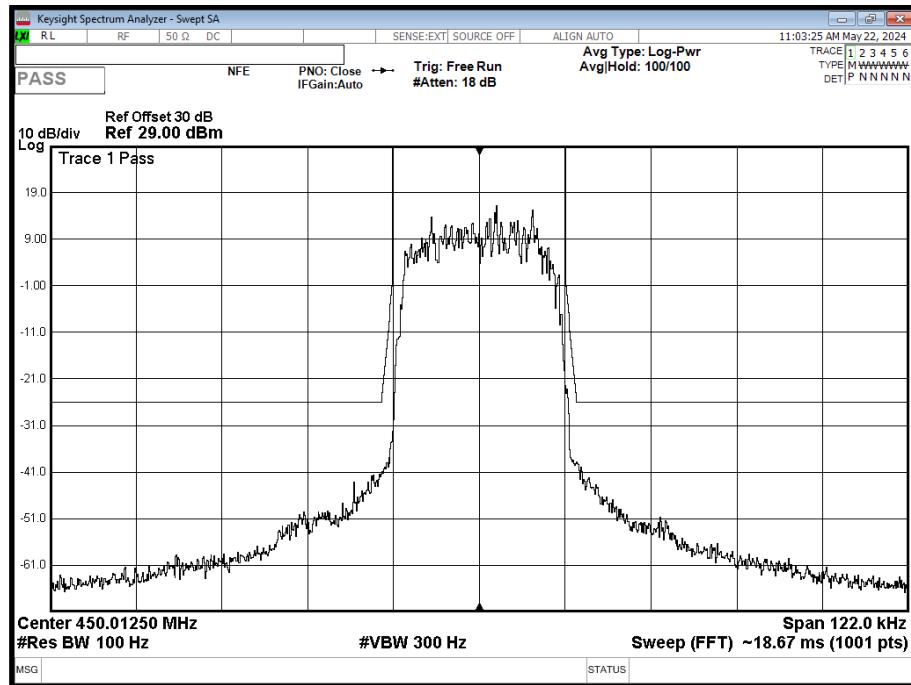


Figure 16 - 450.0125 MHz, Transmitter Mask

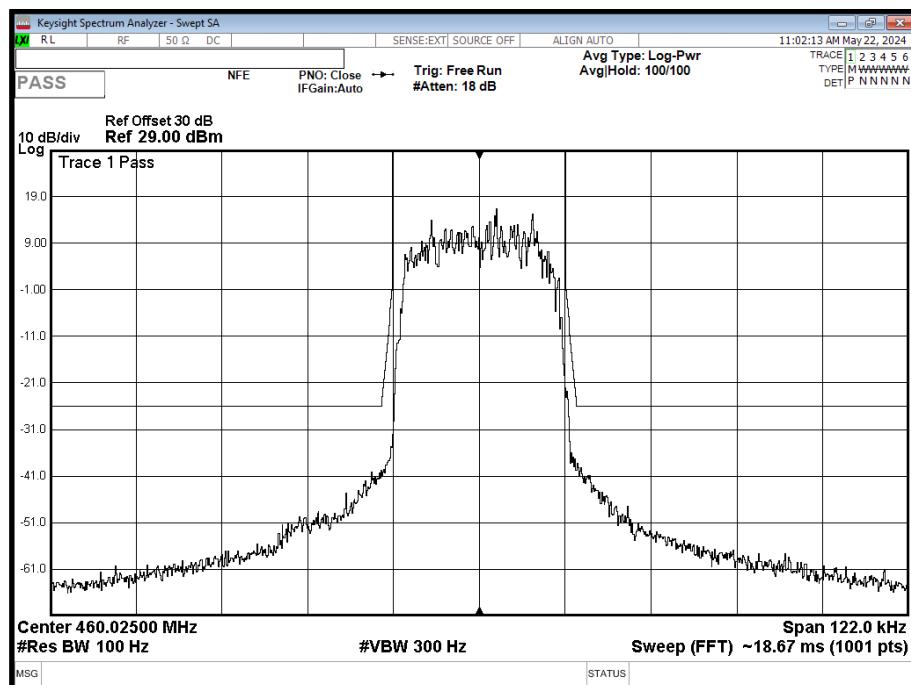


Figure 17 - 460.025 MHz, Transmitter Mask

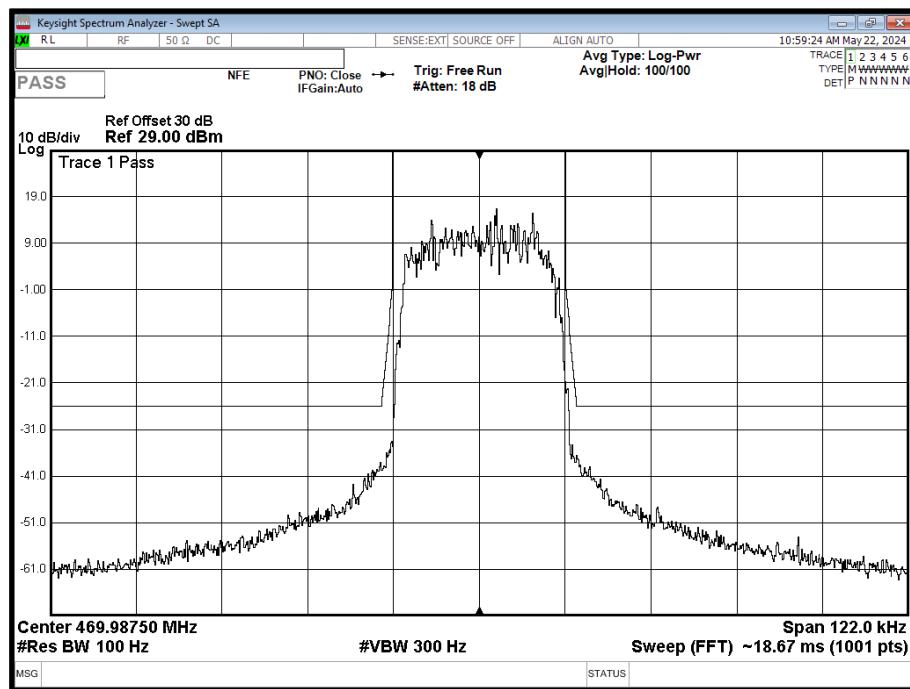


Figure 18 - 469.9875 MHz, Transmitter Mask



### TETRA - 450 - 470 MHz - FCC

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

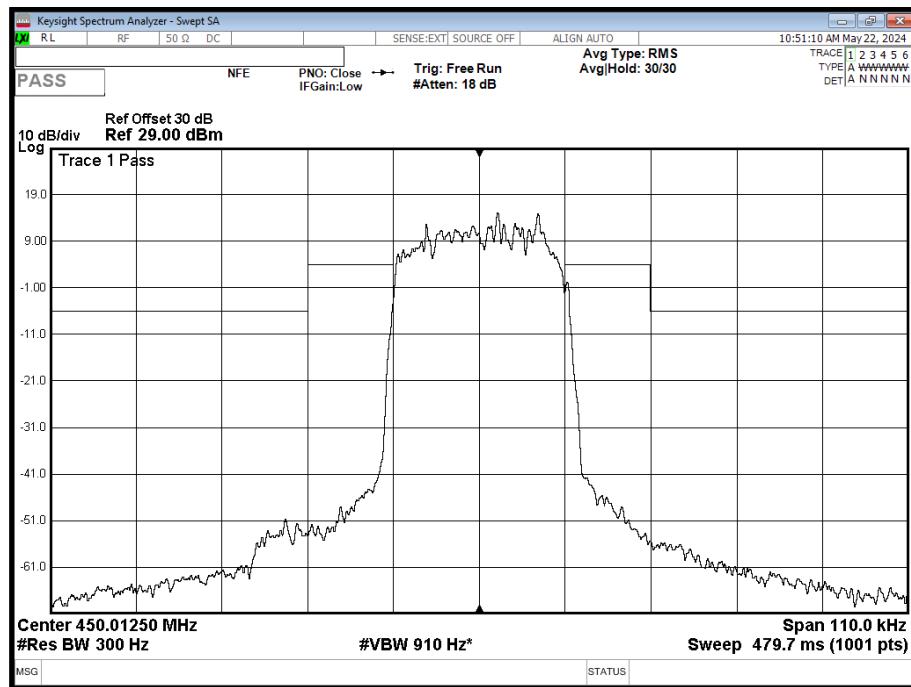


Figure 19 - 450.0125 MHz, Transmitter Mask

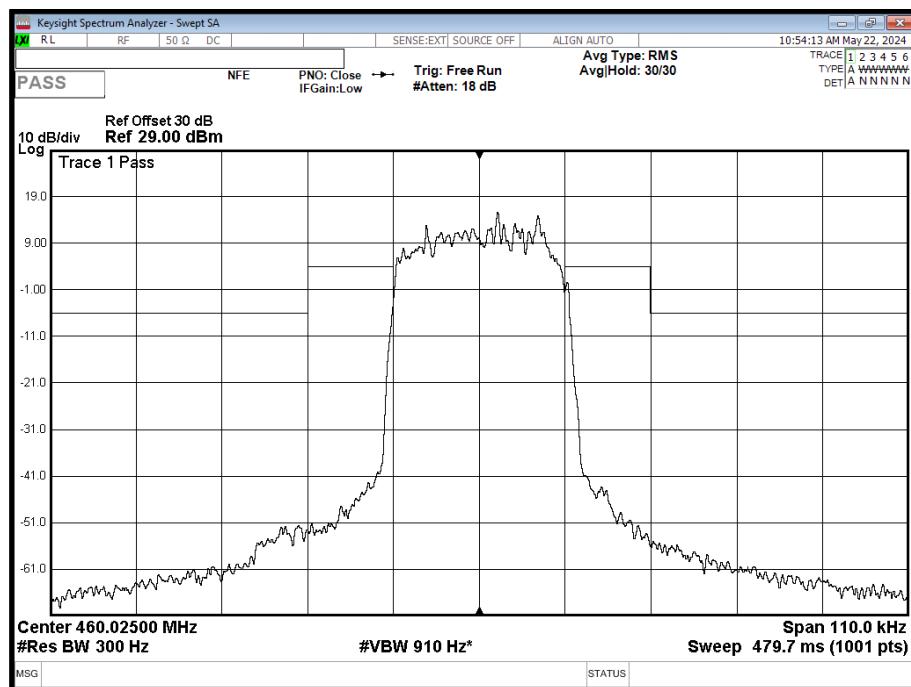


Figure 20 - 460.025 MHz, Transmitter Mask

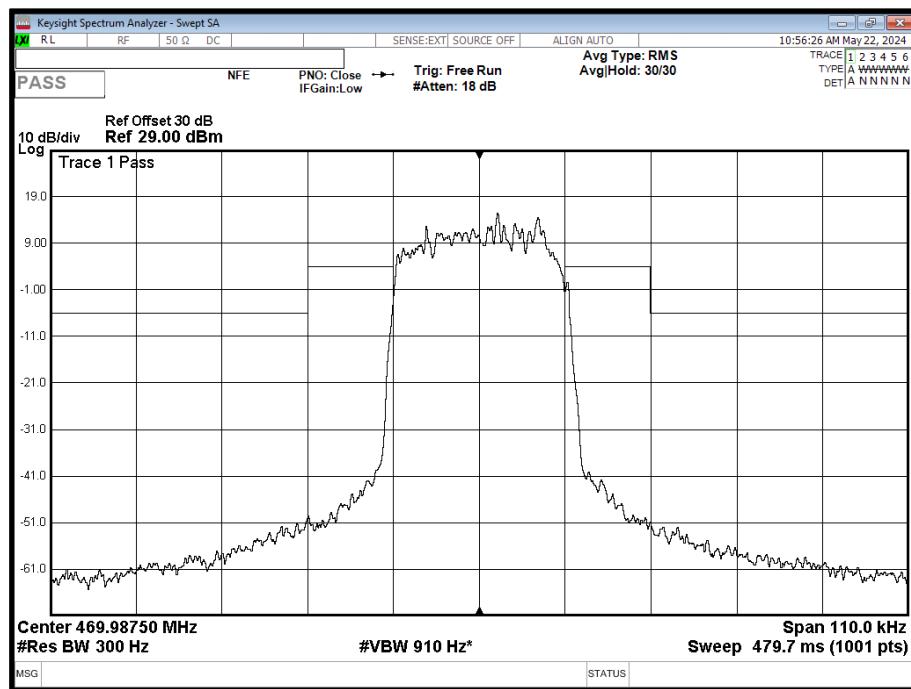


Figure 21 - 469.9875 MHz, Transmitter Mask



### TETRA - 450 - 470 MHz - ISEDC

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

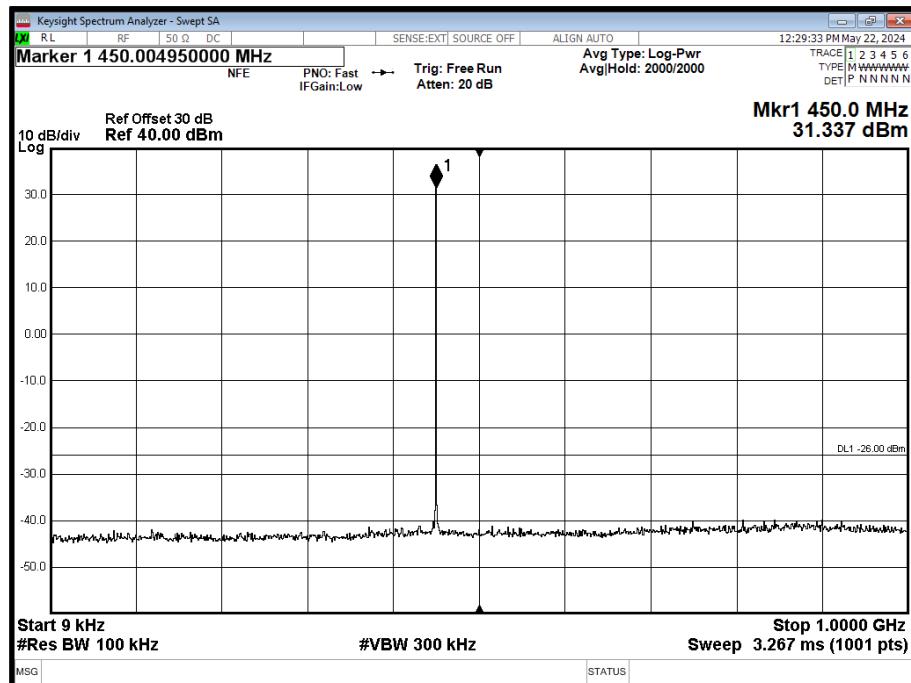


Figure 22 - 450.0125 MHz, 9 kHz to 1 GHz

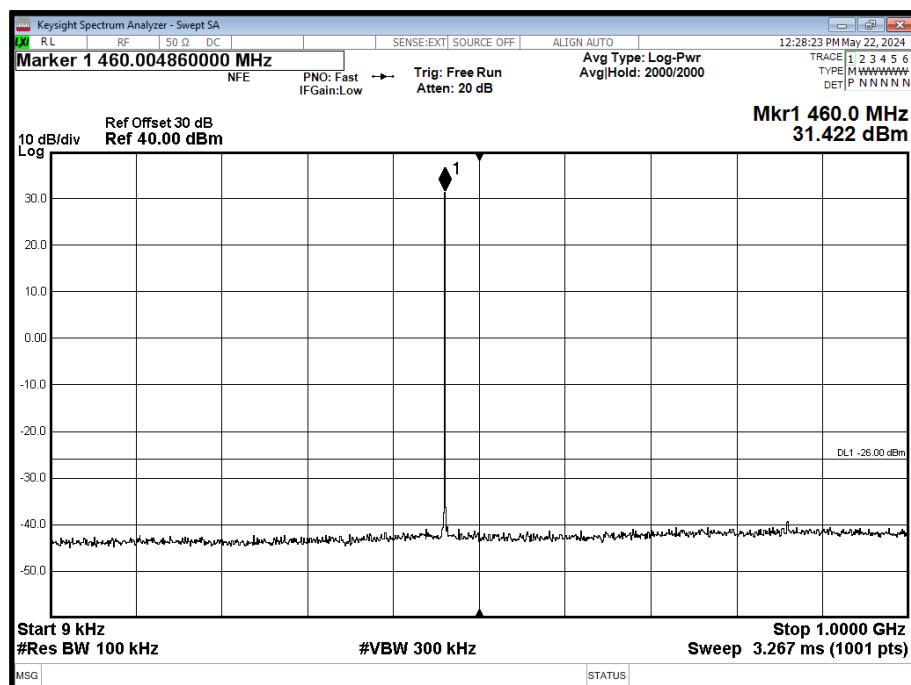


Figure 23 - 460.025 MHz, 9 kHz to 1 GHz

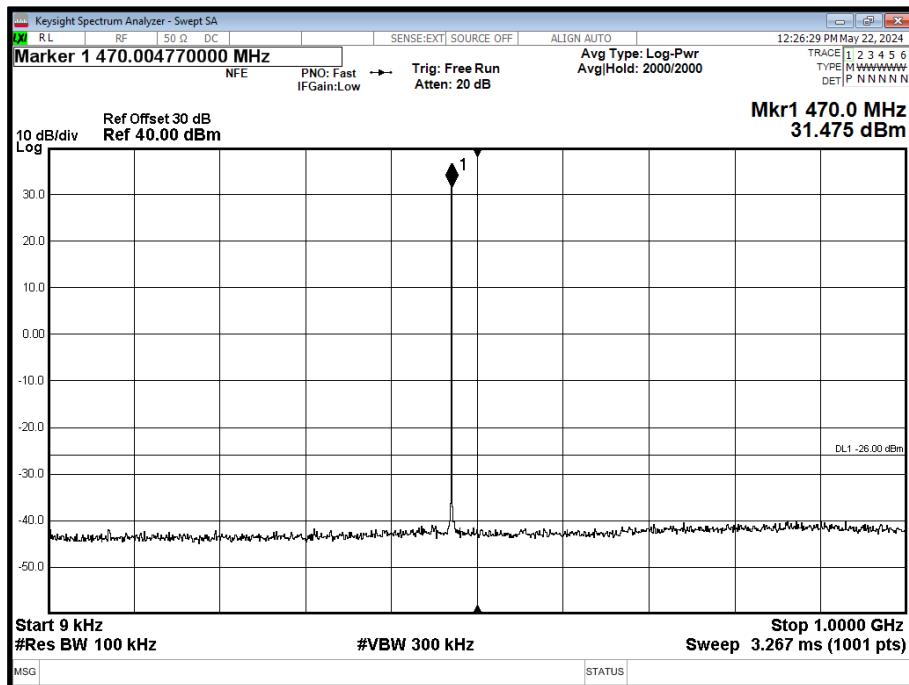


Figure 24 - 469.9875 MHz - 9 kHz to 1 GHz

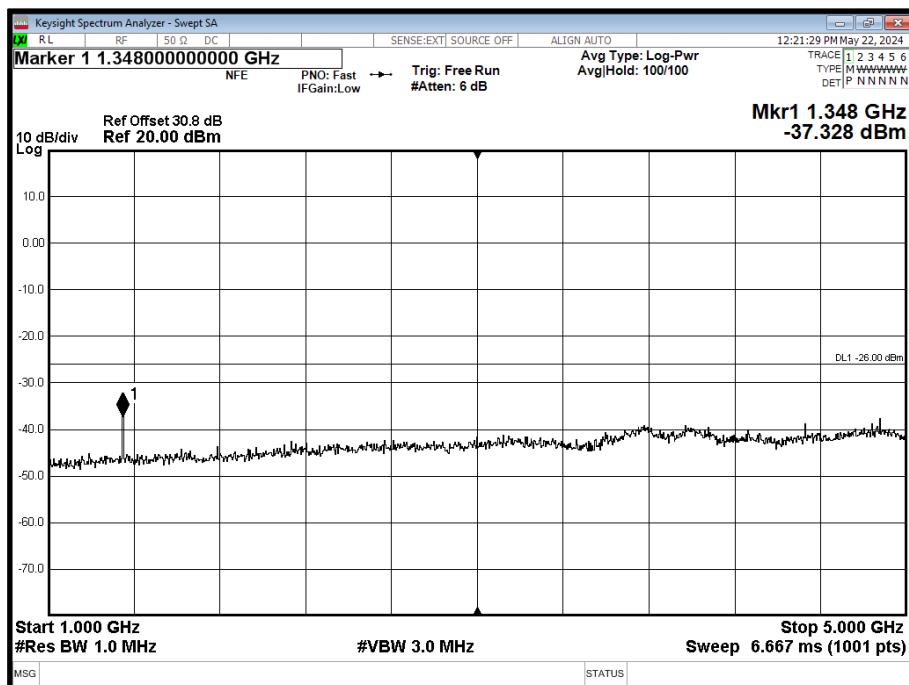


Figure 25 - 450.0125 MHz, 1 GHz to 5 GHz

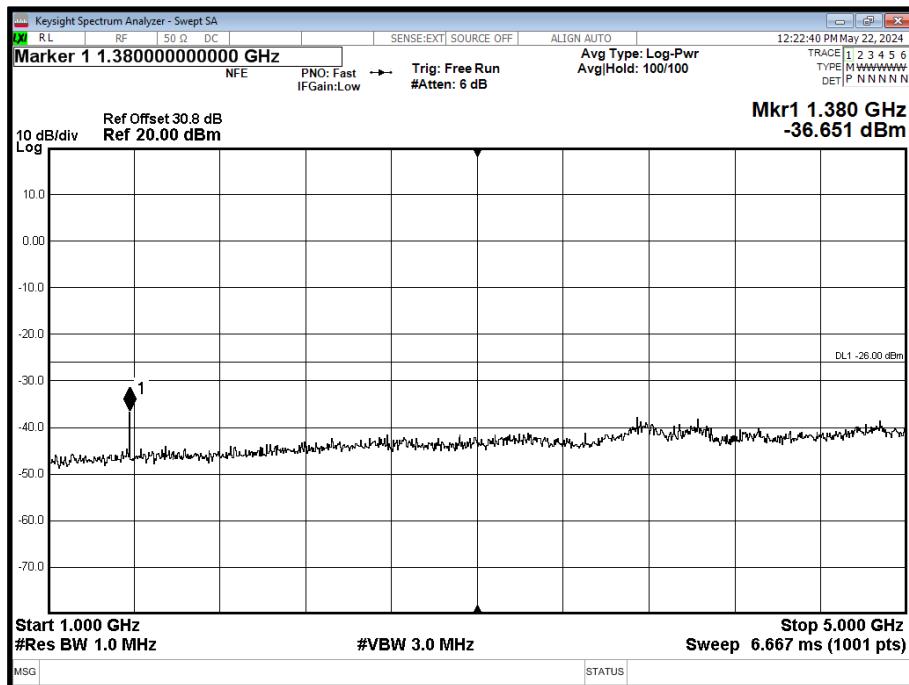


Figure 26 - 460.025 MHz, 1 GHz to 5 GHz

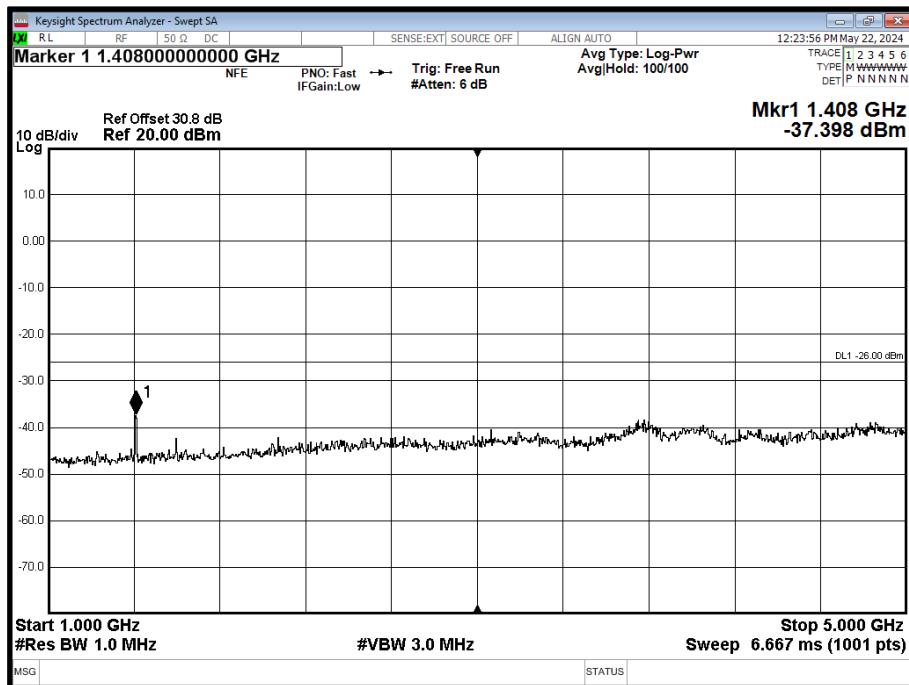


Figure 27 - 469.9875 MHz - 1 GHz to 5 GHz

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:

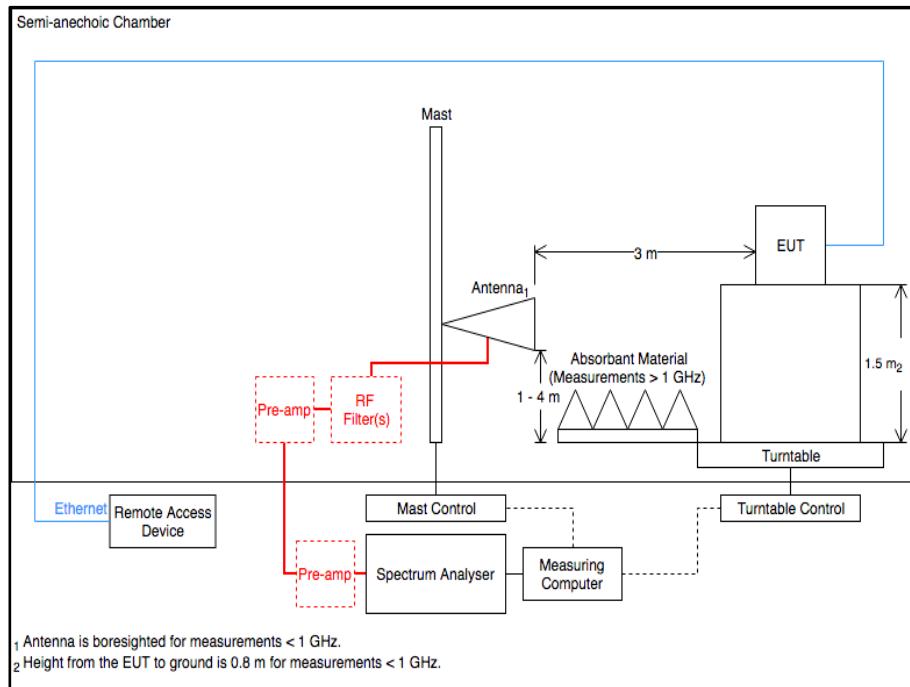
$E (\text{dBuV/m}) + 20\log(d) - 104.8 = \text{EIRP (dBm)}$  where (d) is the measurement distance.

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

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

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 + 10log10(p)" was considered the most stringent limit and therefore has been shown on the plots in the section below.



**Figure 28 - Radiated Emissions Test Setup Diagram**

### 2.3.5 Environmental Conditions

Ambient Temperature 25.5 °C  
Relative Humidity 38.8 %

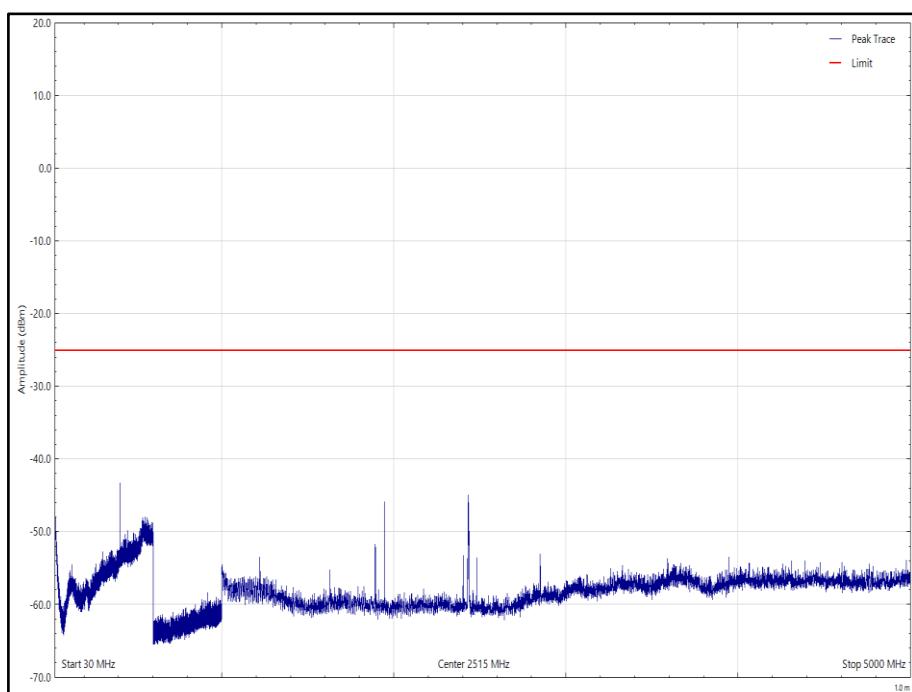
### 2.3.6 Test Results

#### TETRA - 407 - 430 MHz

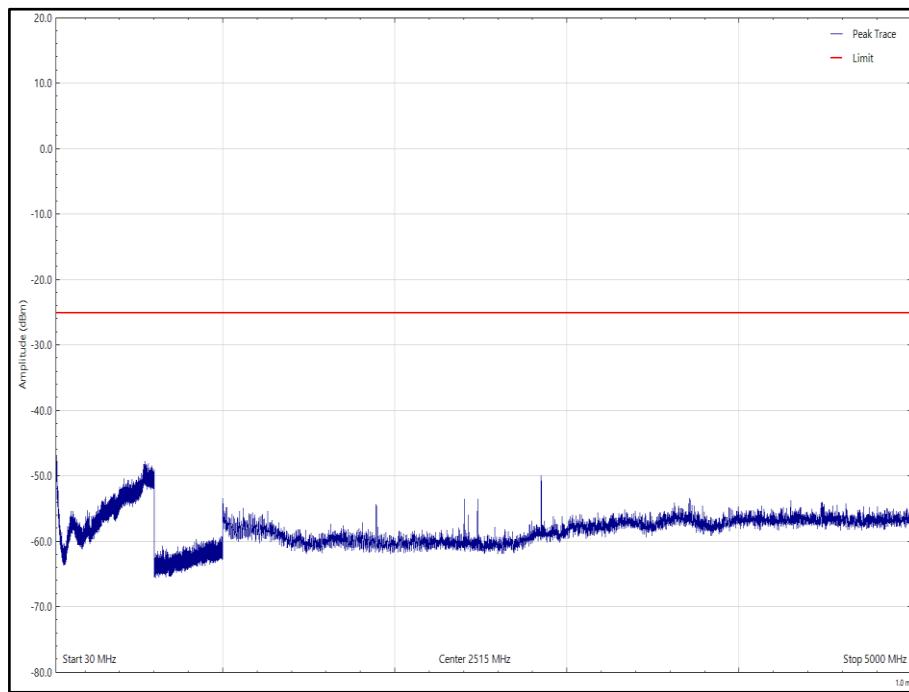
| Frequency (MHz) | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Detector | Angle (°) | Height (cm) | Polarisation | Orientation |
|-----------------|----------------------|----------------------|-------------|----------|-----------|-------------|--------------|-------------|
| *               |                      |                      |             |          |           |             |              |             |

**Table 22 - 407.0125 MHz**

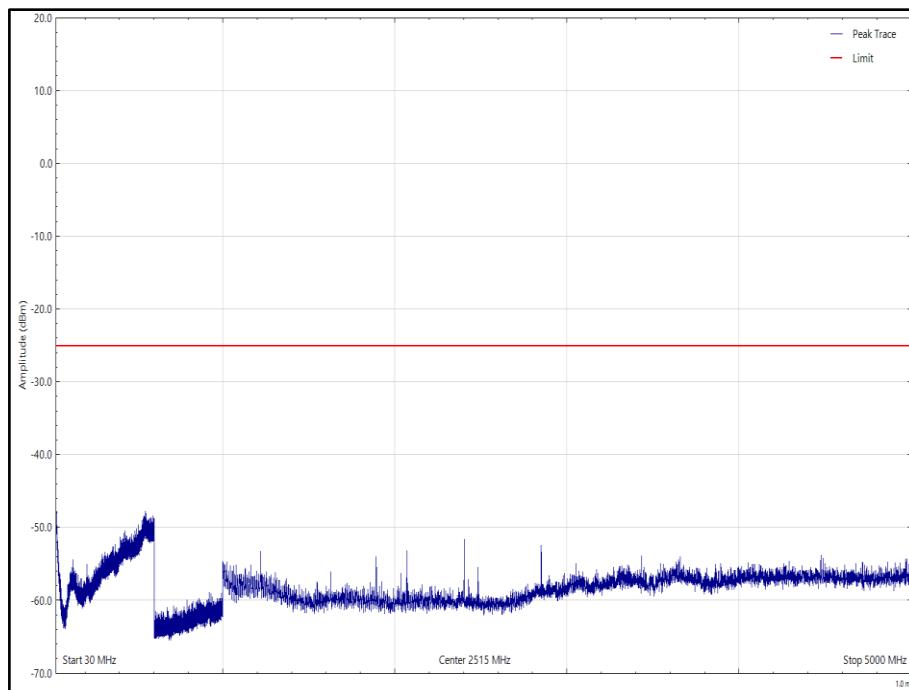
\*No emissions were detected within 10 dB of the limit.



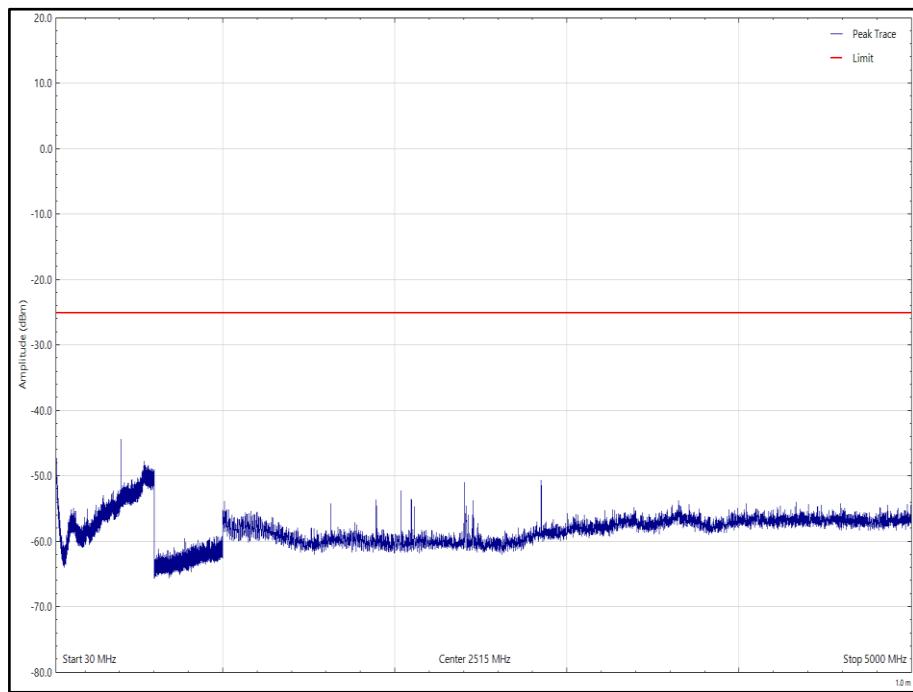
**Figure 29 - 407.0125 MHz, 30 MHz to 5 GHz, EUT Orientation X, Horizontal**



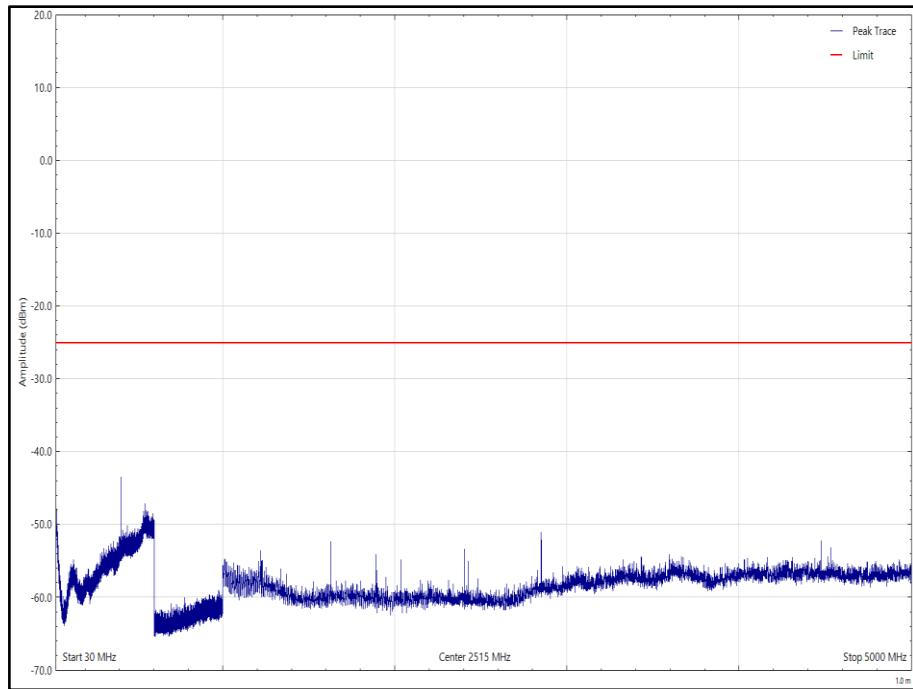
**Figure 30 - 407.0125 MHz, 30 MHz to 5 GHz, EUT Orientation X, Vertical**



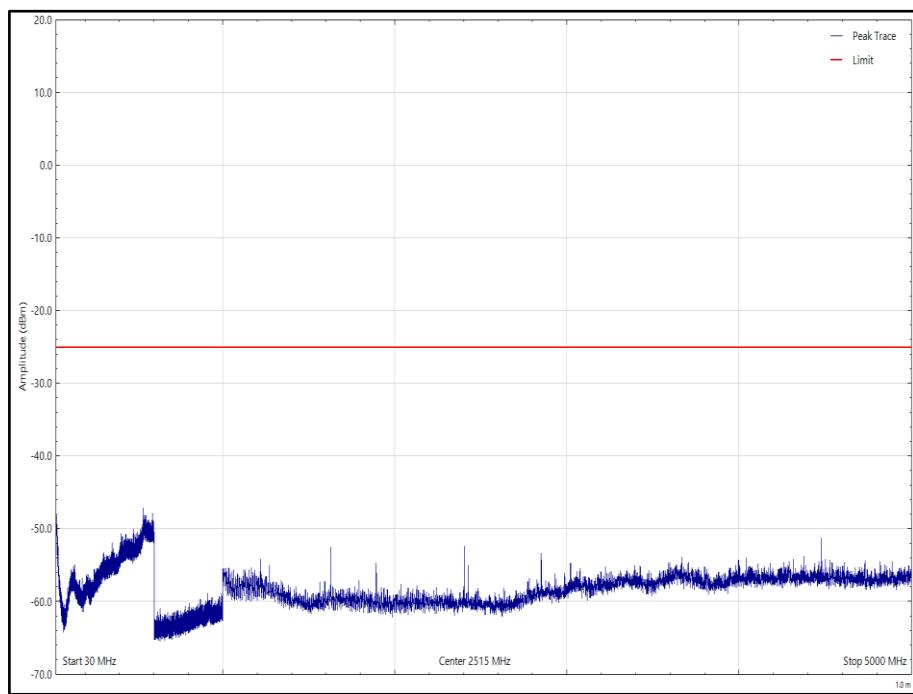
**Figure 31 - 407.0125 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Horizontal**



**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**

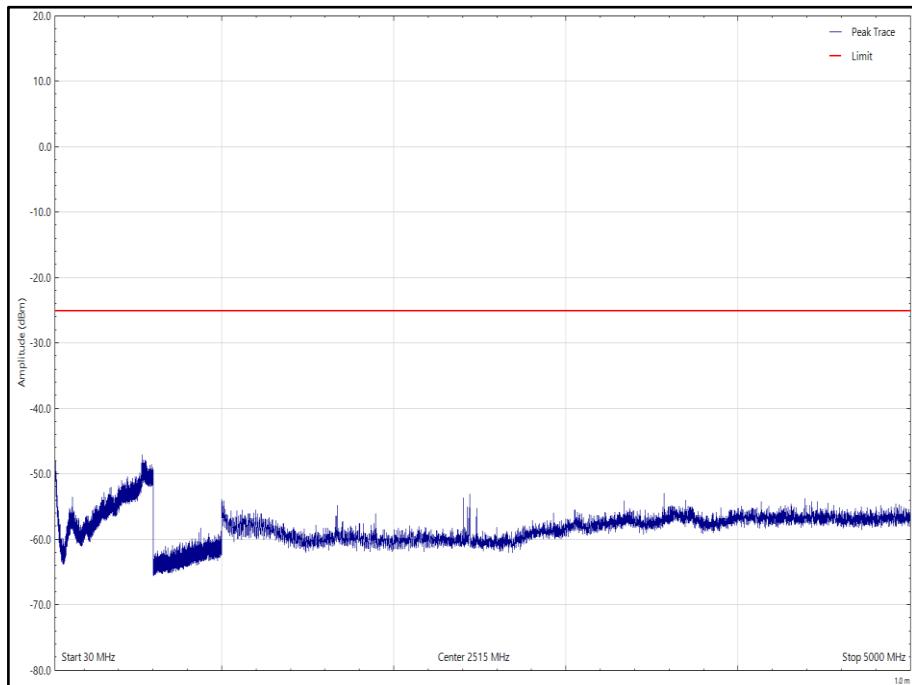


**Figure 34 - 407.0125 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Vertical**

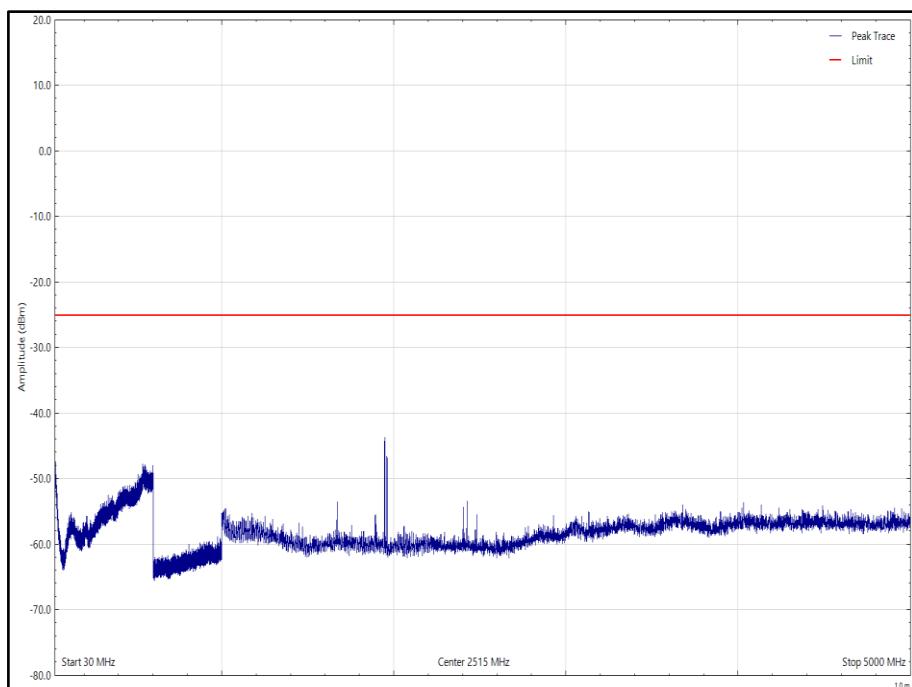
| Frequency (MHz) | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Detector | Angle (°) | Height (cm) | Polarisation | Orientation |
|-----------------|----------------------|----------------------|-------------|----------|-----------|-------------|--------------|-------------|
| *               |                      |                      |             |          |           |             |              |             |

**Table 23 - 418.05 MHz**

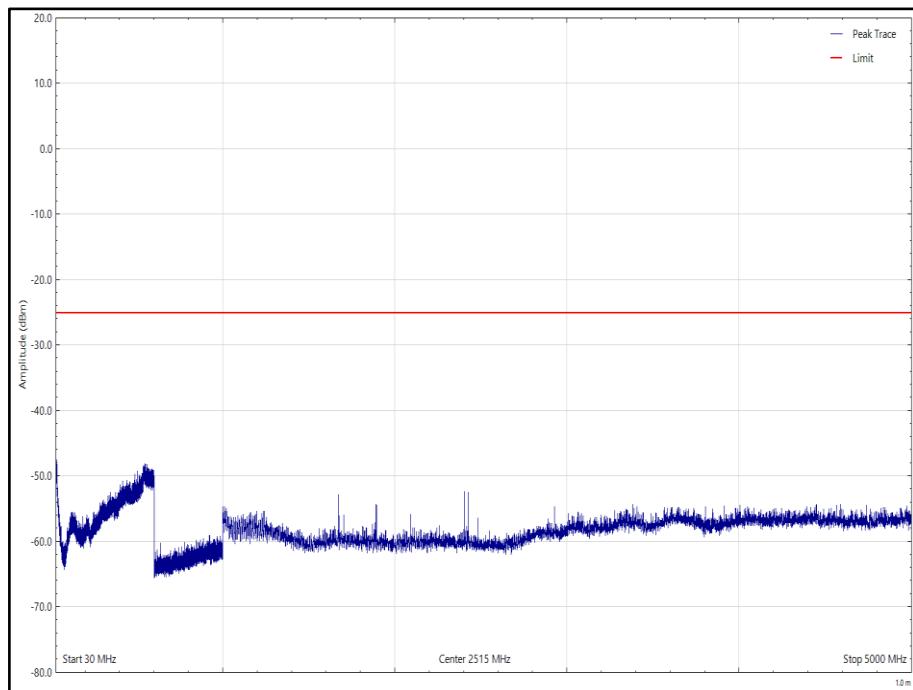
\*No emissions were detected within 10 dB of the limit.



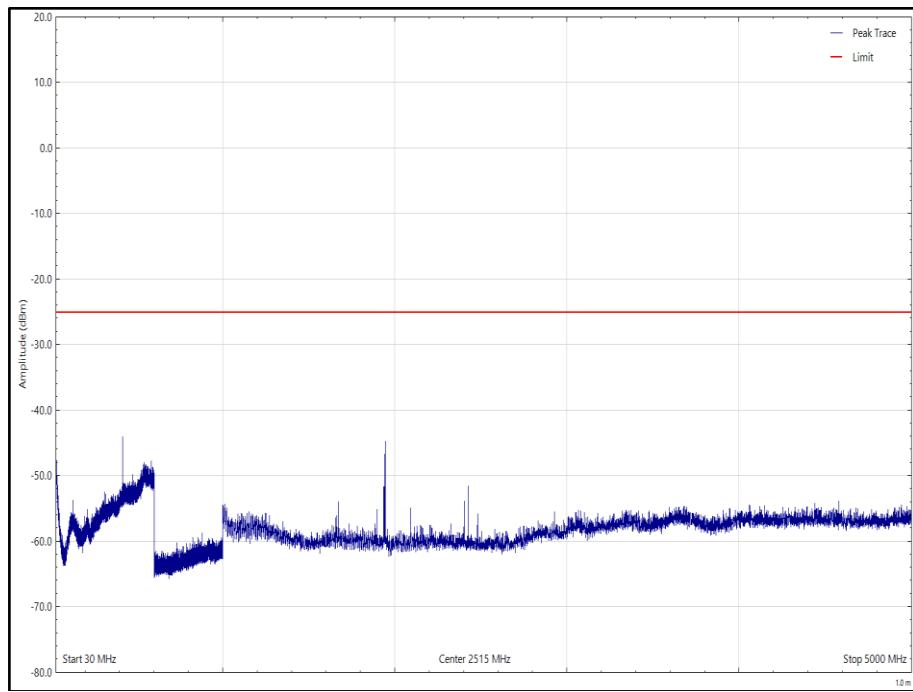
**Figure 35 - 418.05 MHz, 30 MHz to 5 GHz, EUT Orientation X, Horizontal**



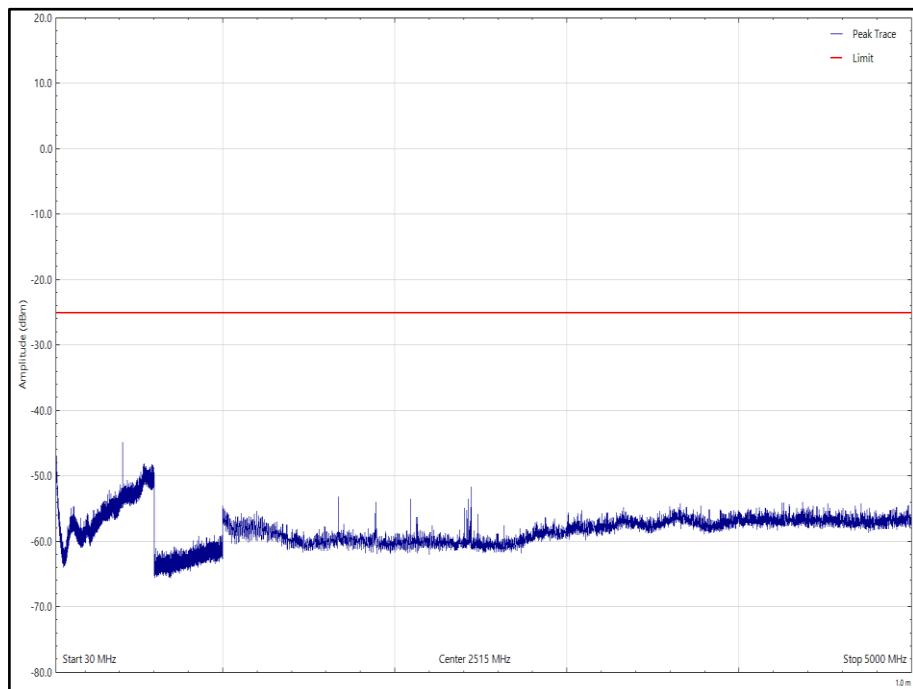
**Figure 36 - 418.05 MHz, 30 MHz to 5 GHz, EUT Orientation X, Vertical**



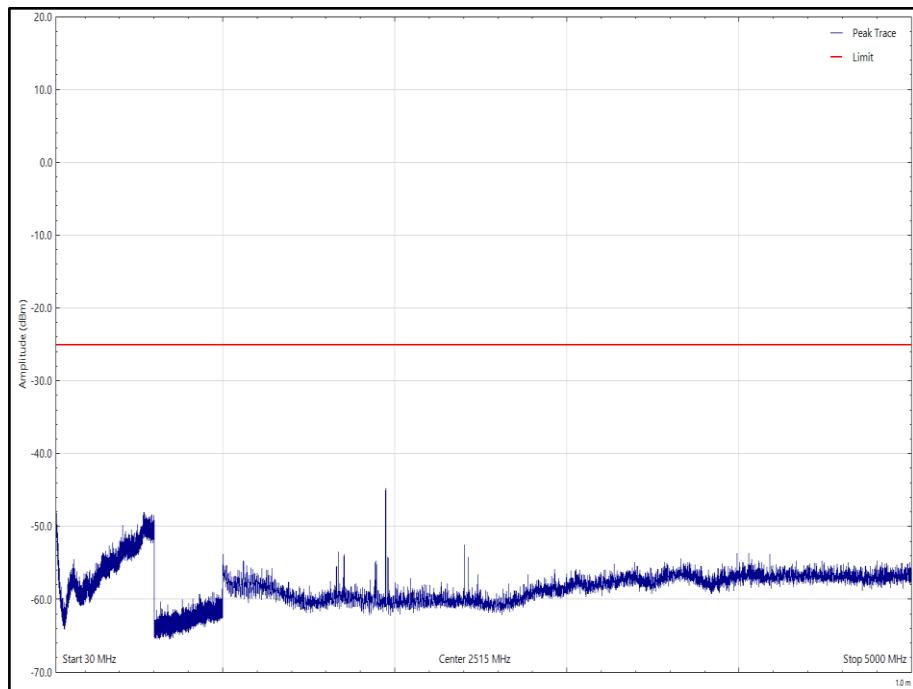
**Figure 37 - 418.05 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Horizontal**



**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**

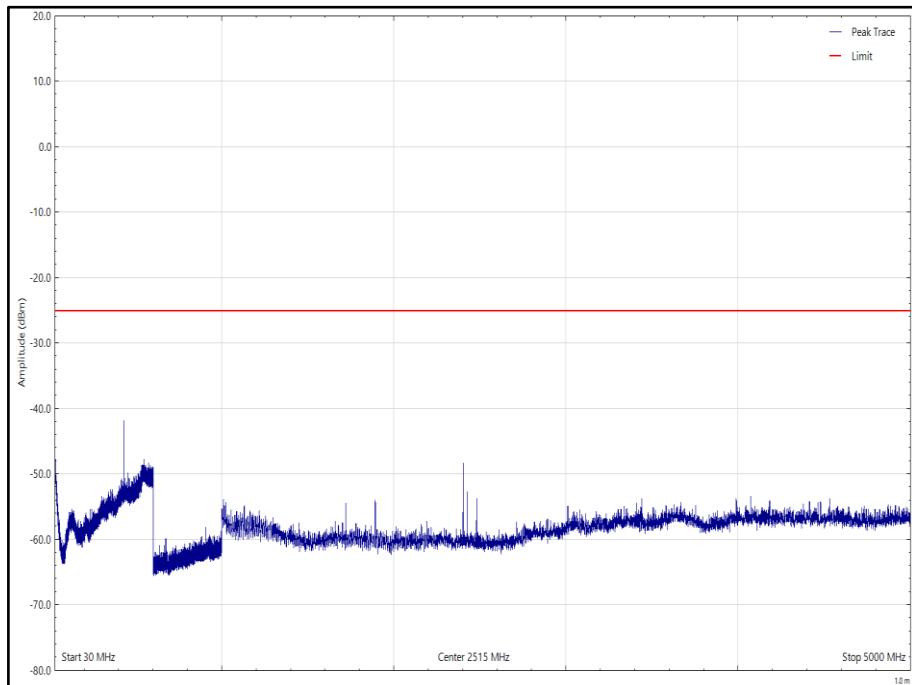


**Figure 40 - 418.05 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Vertical**

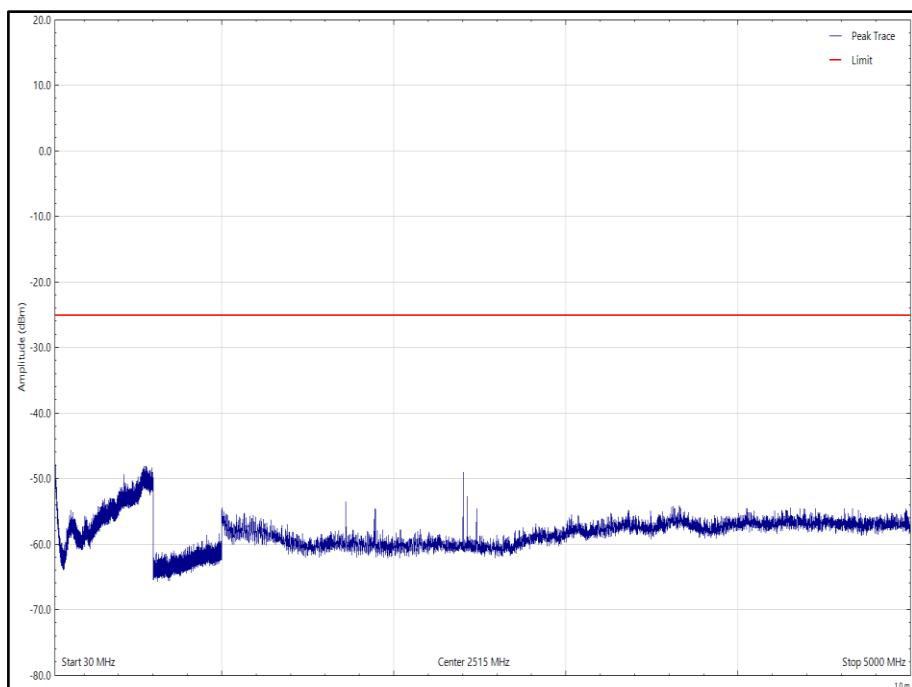
| Frequency (MHz) | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Detector | Angle (°) | Height (cm) | Polarisation | Orientation |
|-----------------|----------------------|----------------------|-------------|----------|-----------|-------------|--------------|-------------|
| *               |                      |                      |             |          |           |             |              |             |

**Table 24 - 429.9875 MHz**

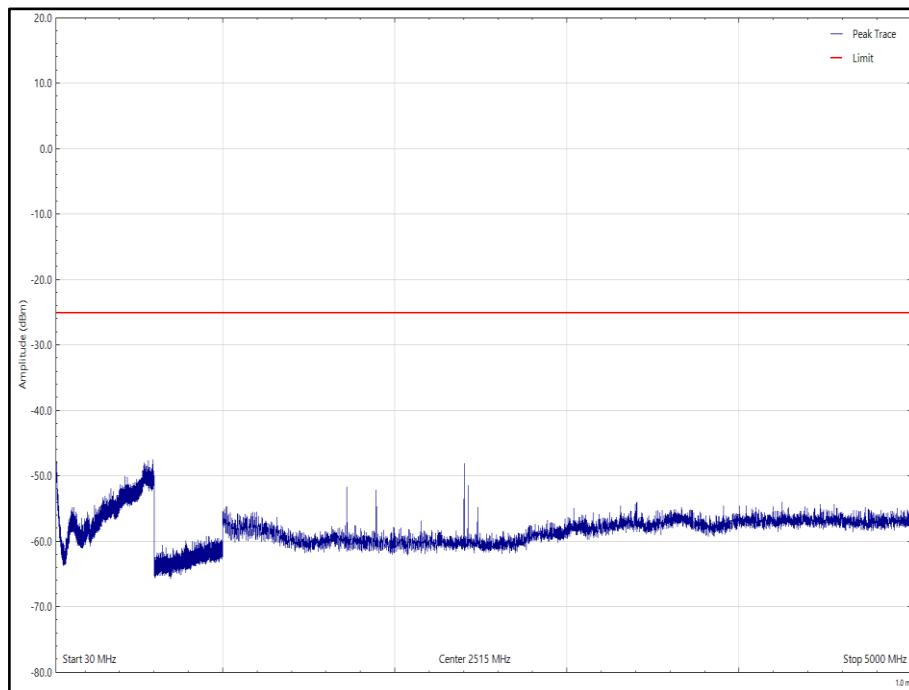
\*No emissions were detected within 10 dB of the limit.



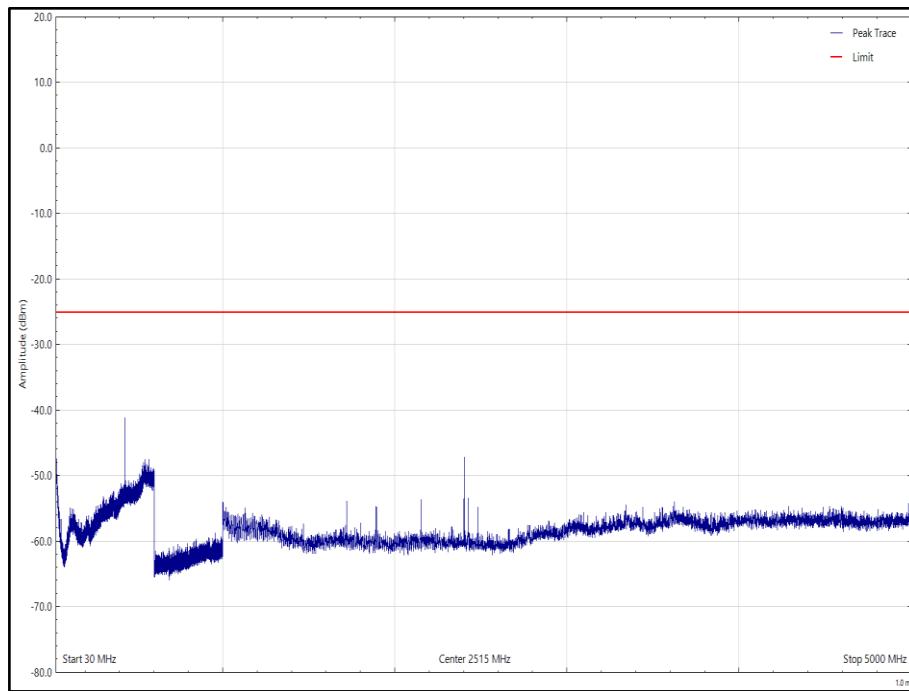
**Figure 41 - 429.9875 MHz, 30 MHz to 5 GHz, EUT Orientation X, Horizontal**



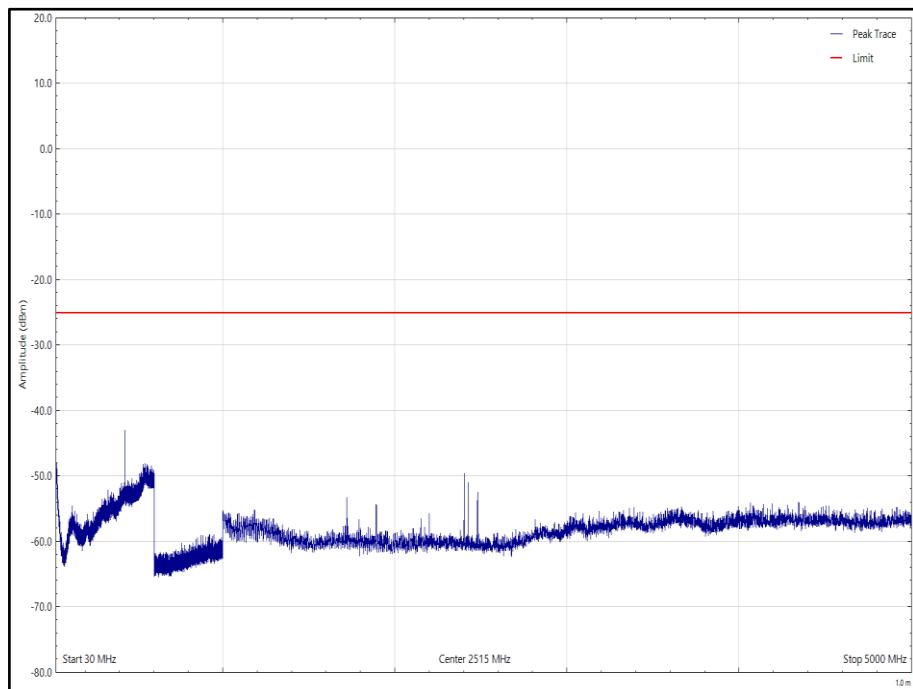
**Figure 42 - 429.9875 MHz, 30 MHz to 5 GHz, EUT Orientation X, Vertical**



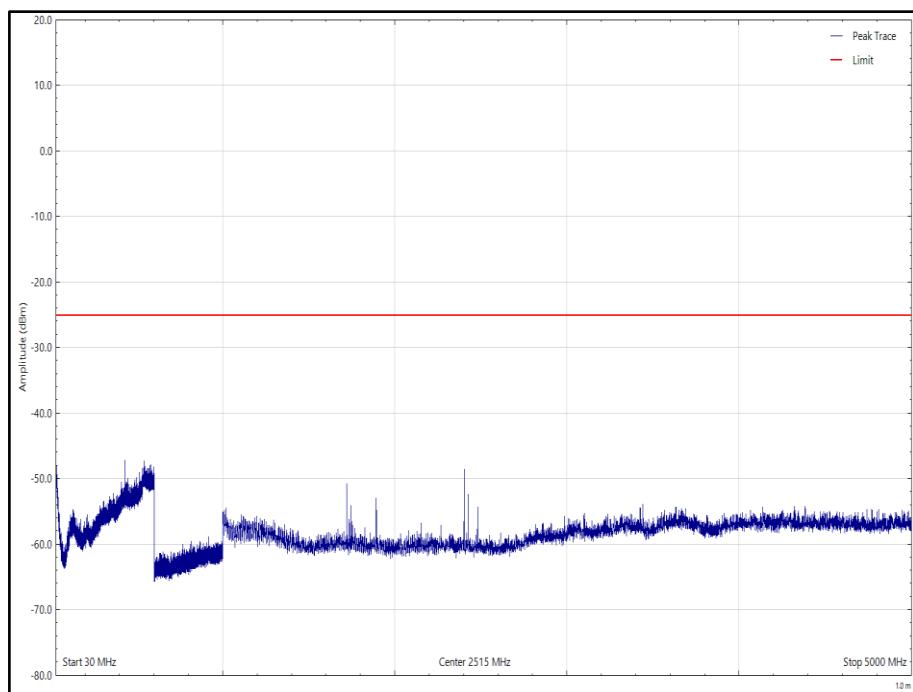
**Figure 43 - 429.9875 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Horizontal**



**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**

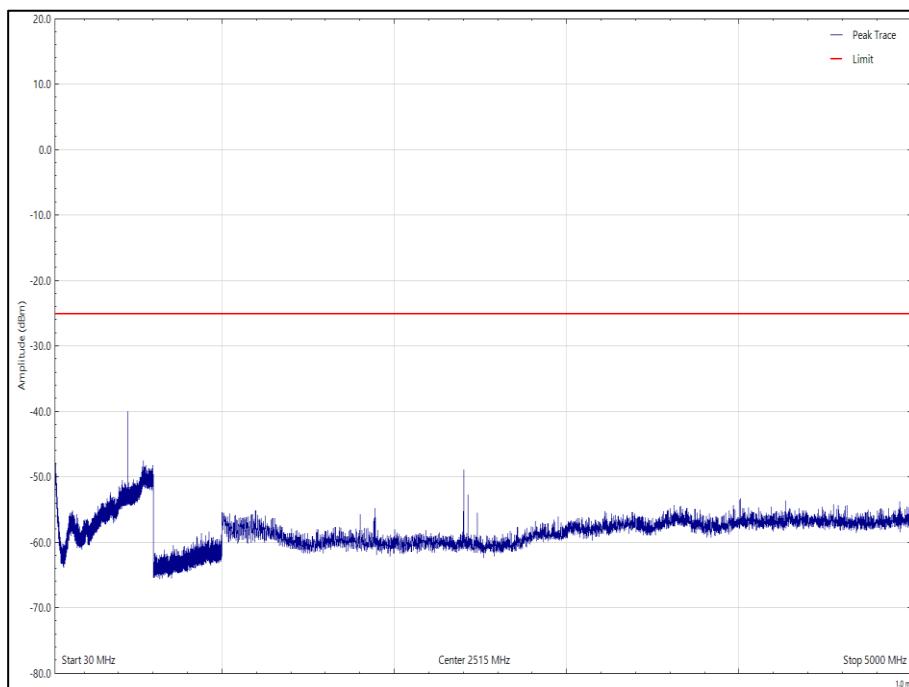


TETRA - 450 - 470 MHz

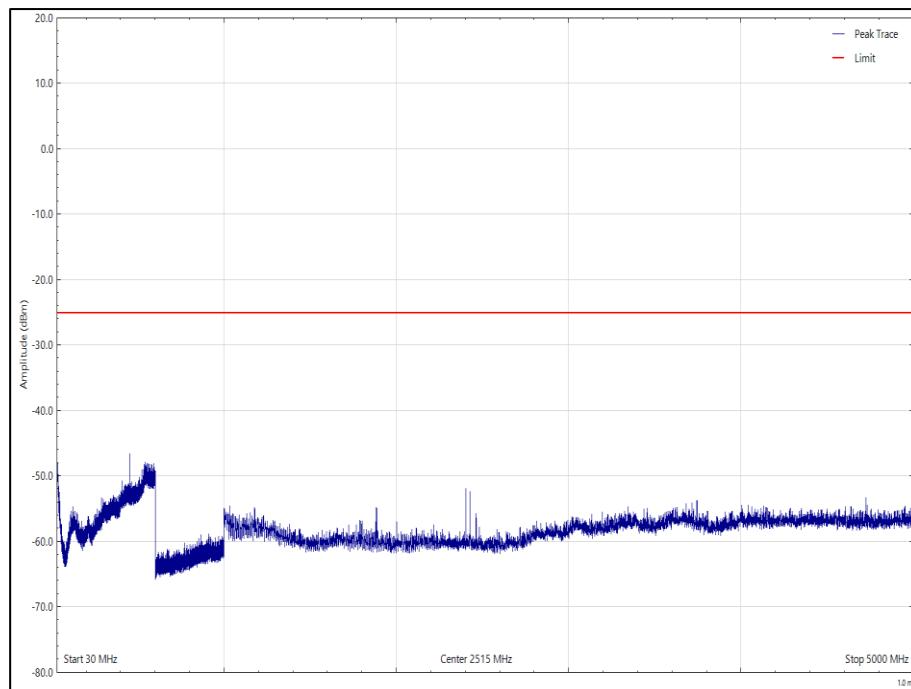
| Frequency (MHz) | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Detector | Angle (°) | Height (cm) | Polarisation | Orientation |
|-----------------|----------------------|----------------------|-------------|----------|-----------|-------------|--------------|-------------|
| *               |                      |                      |             |          |           |             |              |             |

**Table 25 - 450.0125 MHz**

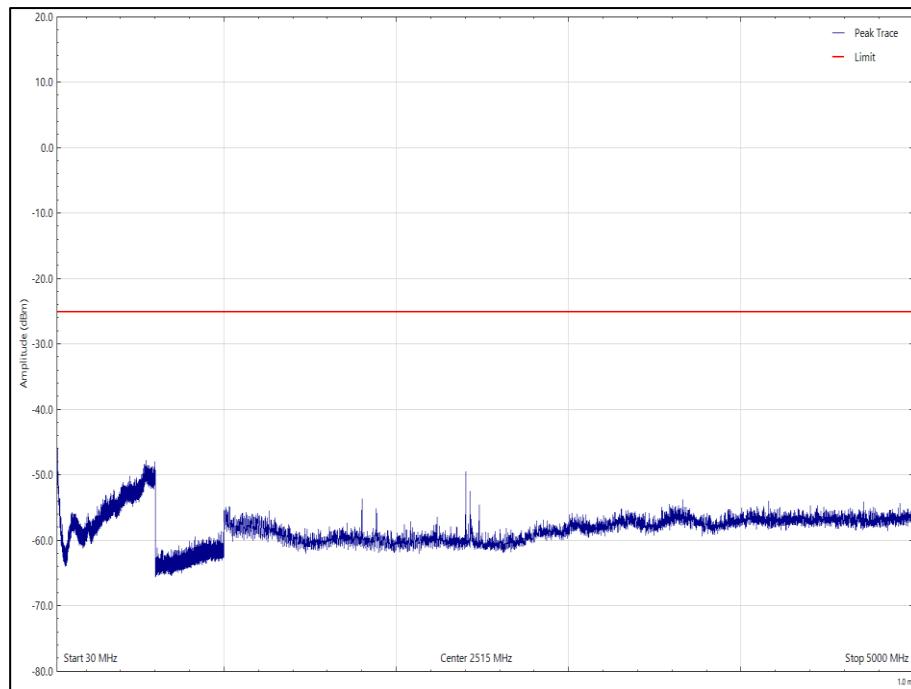
\*No emissions were detected within 10 dB of the limit.



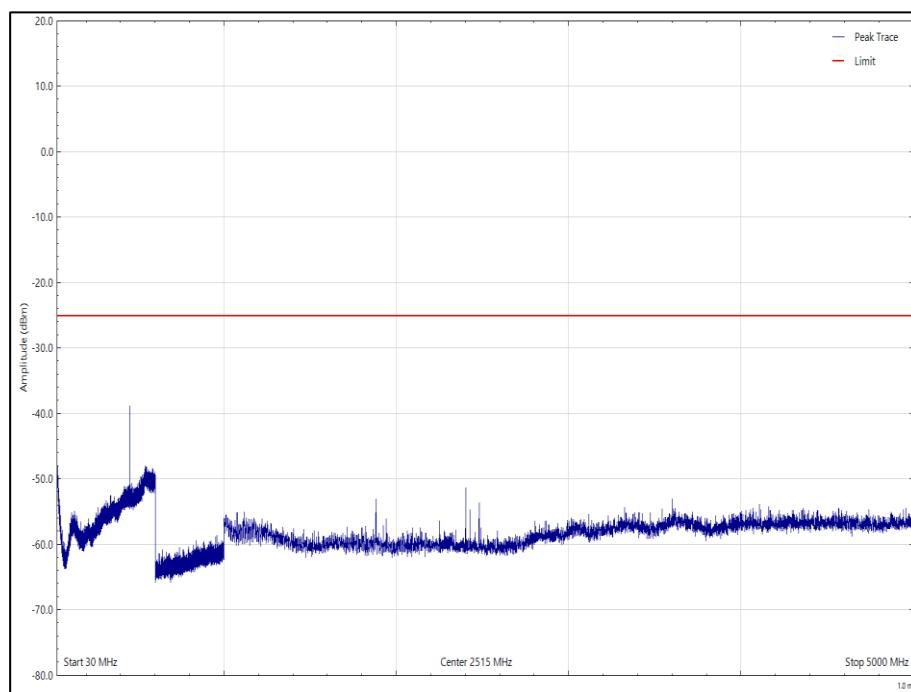
**Figure 47 - 450.0125 MHz, 30 MHz to 5 GHz, EUT Orientation X, Horizontal**



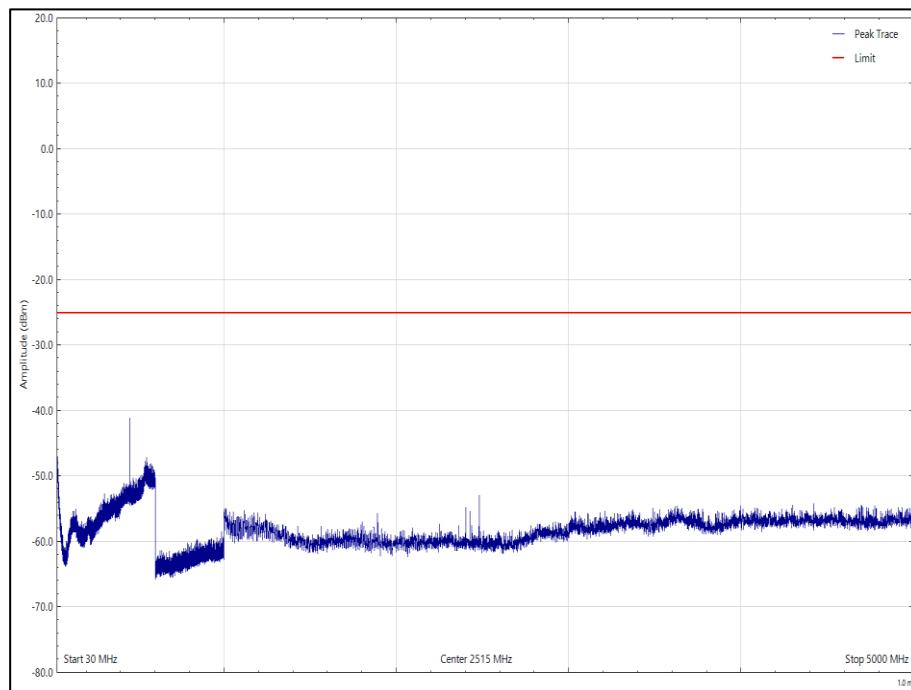
**Figure 48 - 450.0125 MHz, 30 MHz to 5 GHz, EUT Orientation X, Vertical**



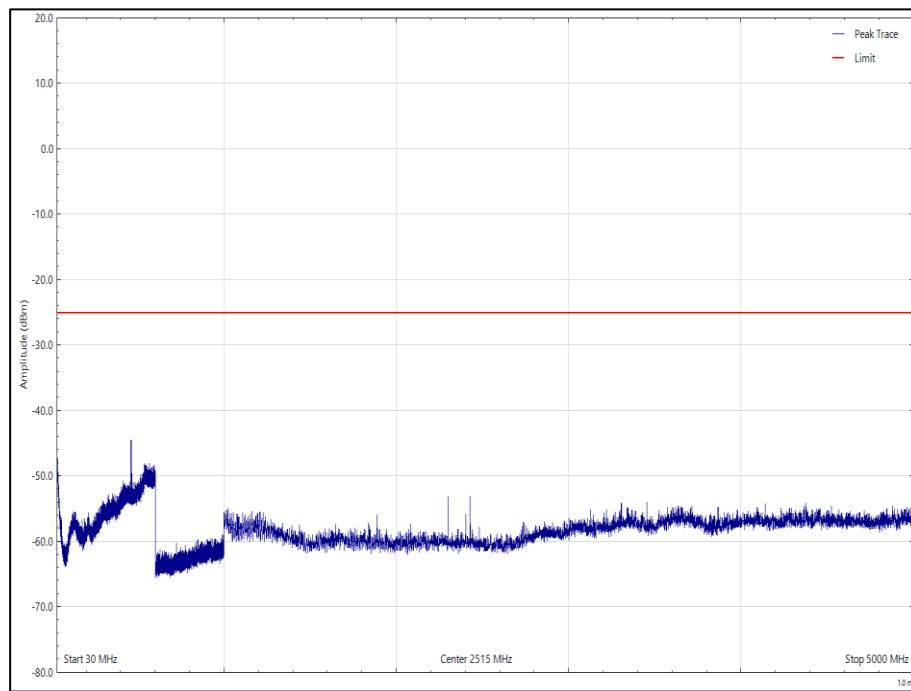
**Figure 49 - 450.0125 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Horizontal**



**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**



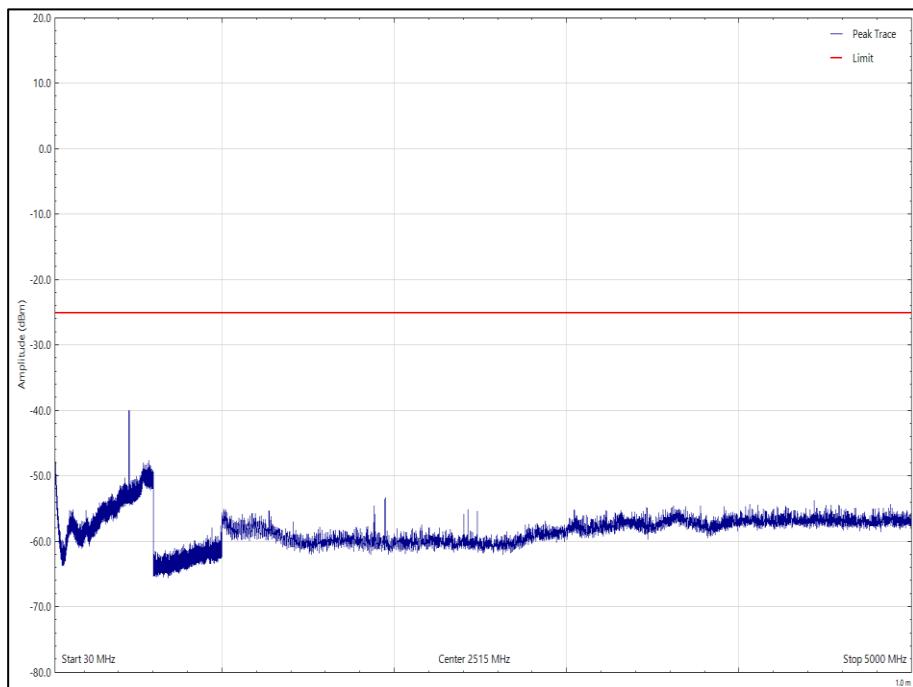
**Figure 52 - 450.0125 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Vertical**



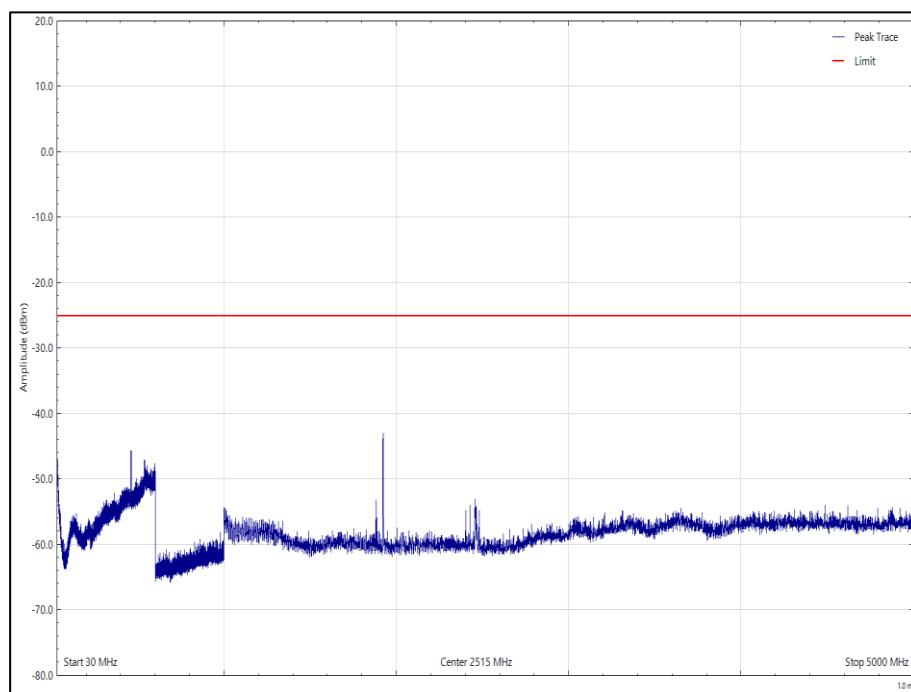
| Frequency (MHz) | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Detector | Angle (°) | Height (cm) | Polarisation | Orientation |
|-----------------|----------------------|----------------------|-------------|----------|-----------|-------------|--------------|-------------|
| *               |                      |                      |             |          |           |             |              |             |

**Table 26 - 460.025 MHz**

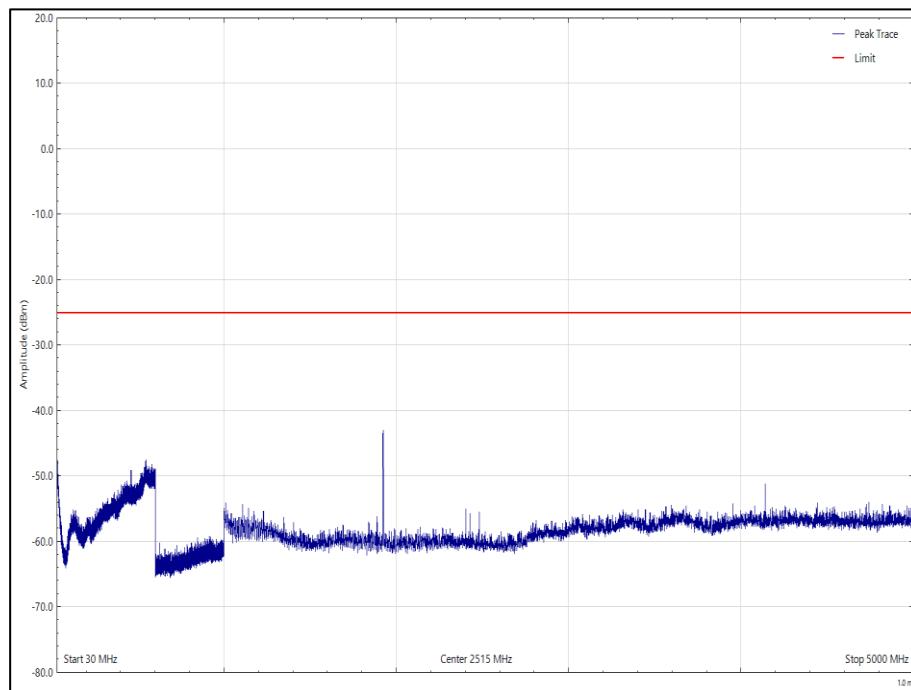
\*No emissions were detected within 10 dB of the limit.



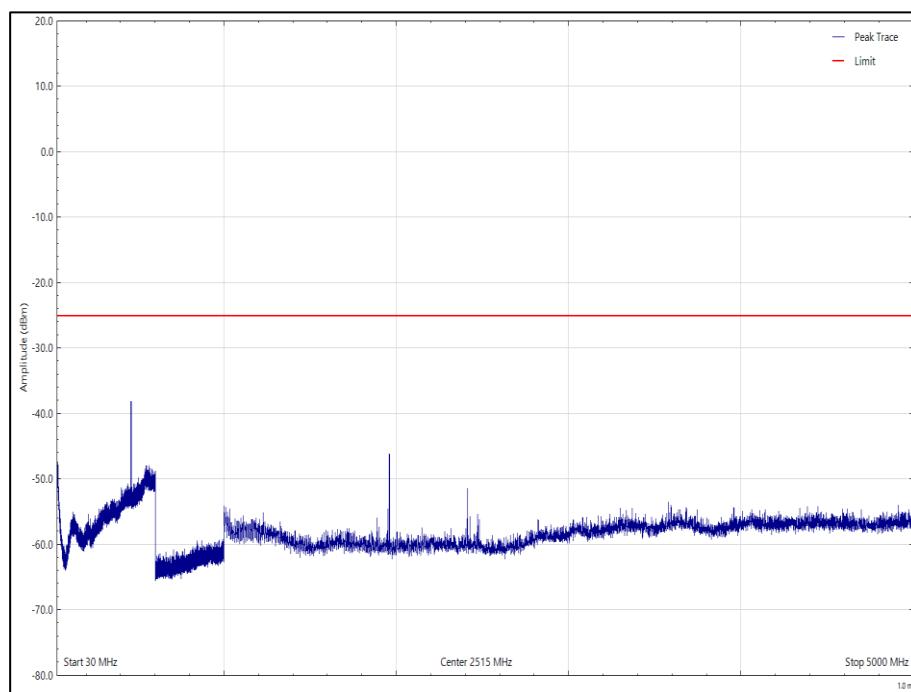
**Figure 53 - 460.025 MHz, 30 MHz to 5 GHz, EUT Orientation X, Horizontal**



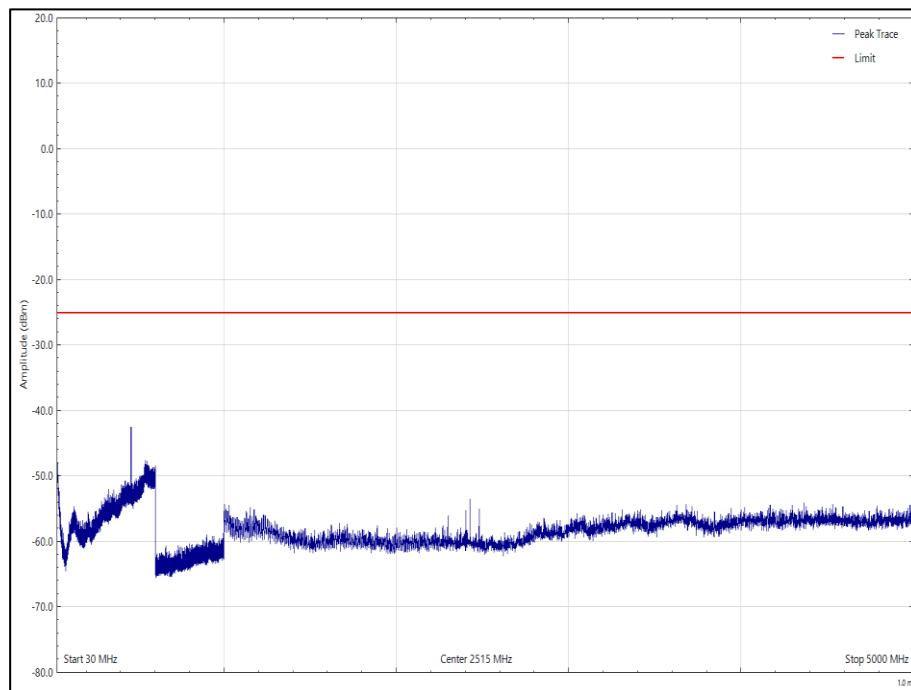
**Figure 54 - 460.025 MHz, 30 MHz to 5 GHz, EUT Orientation X, Vertical**



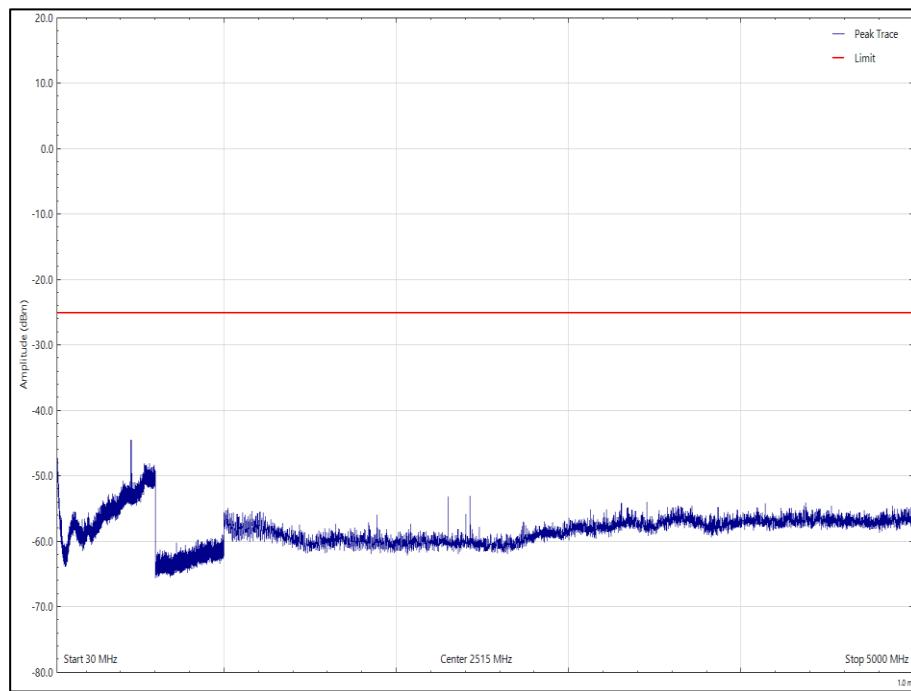
**Figure 55 - 460.025 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Horizontal**



**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**



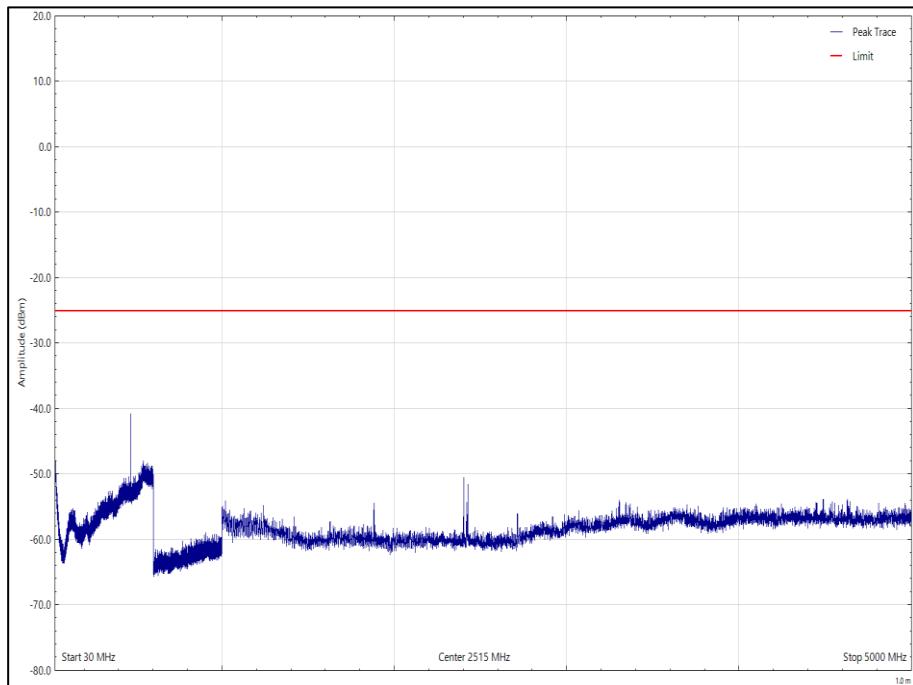
**Figure 58 - 460.025 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Vertical**



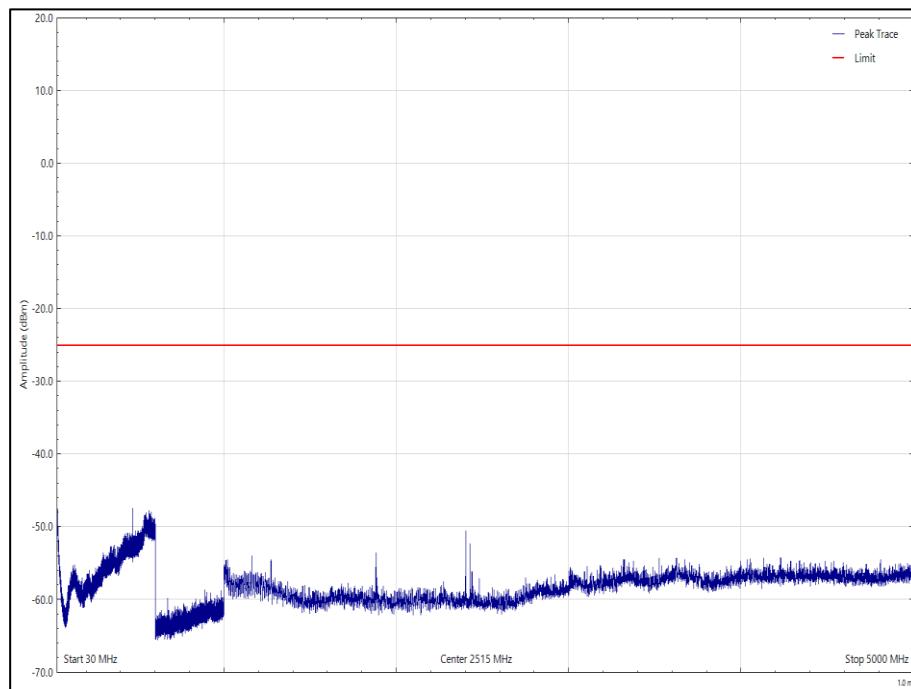
| Frequency (MHz) | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Detector | Angle (°) | Height (cm) | Polarisation | Orientation |
|-----------------|----------------------|----------------------|-------------|----------|-----------|-------------|--------------|-------------|
| *               |                      |                      |             |          |           |             |              |             |

**Table 27 - 469.9875 MHz**

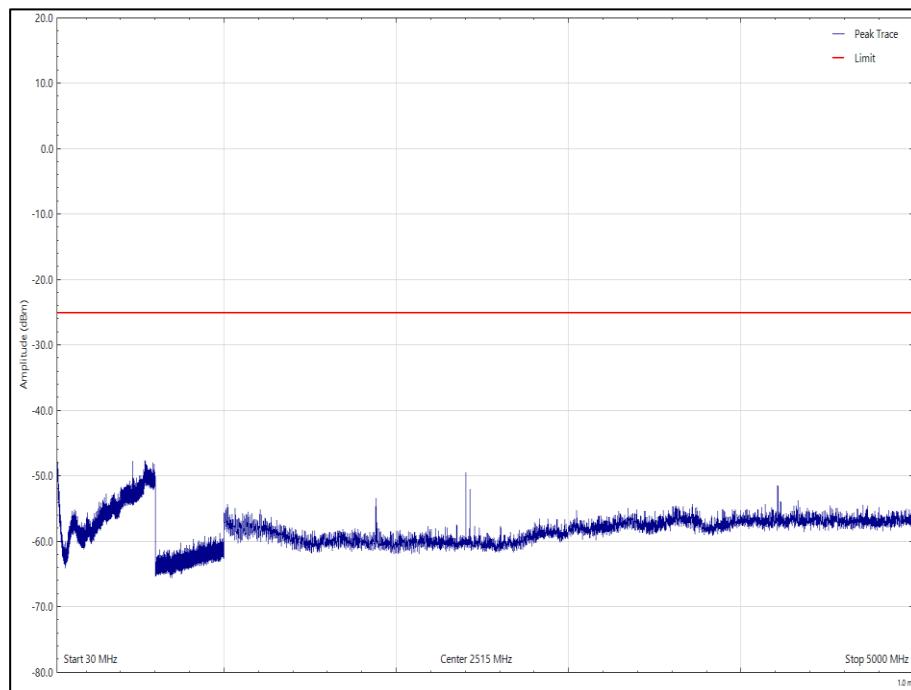
\*No emissions were detected within 10 dB of the limit.



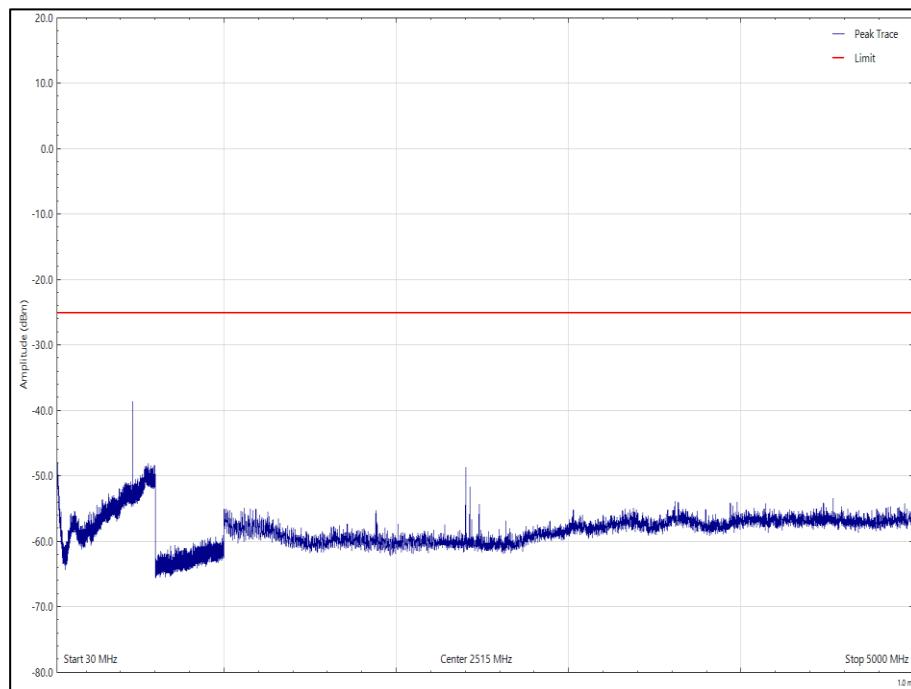
**Figure 59 - 469.9875 MHz, 30 MHz to 5 GHz, EUT Orientation X, Horizontal**



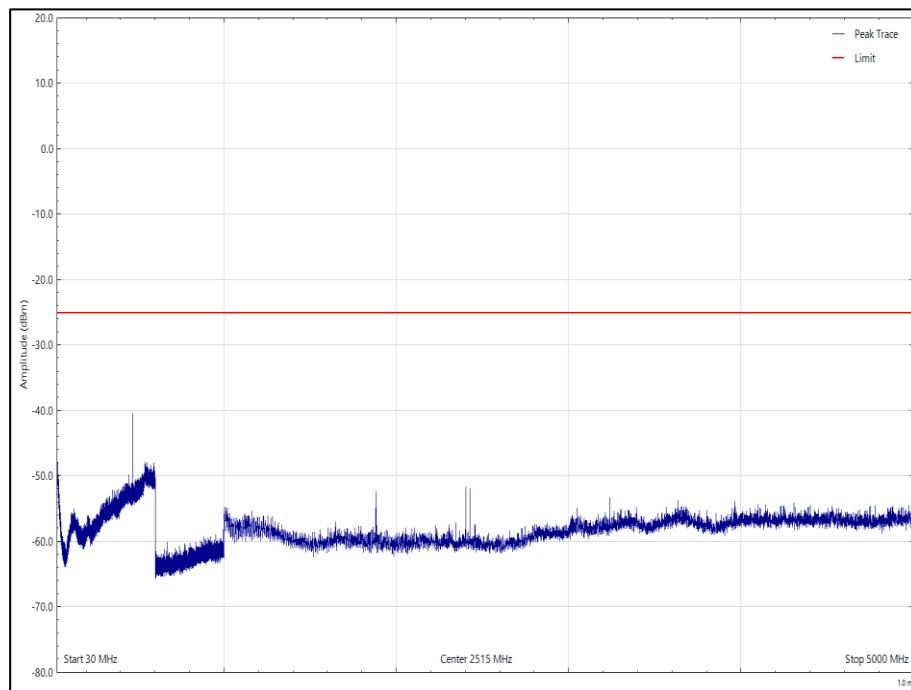
**Figure 60 - 469.9875 MHz, 30 MHz to 5 GHz, EUT Orientation X, Vertical**



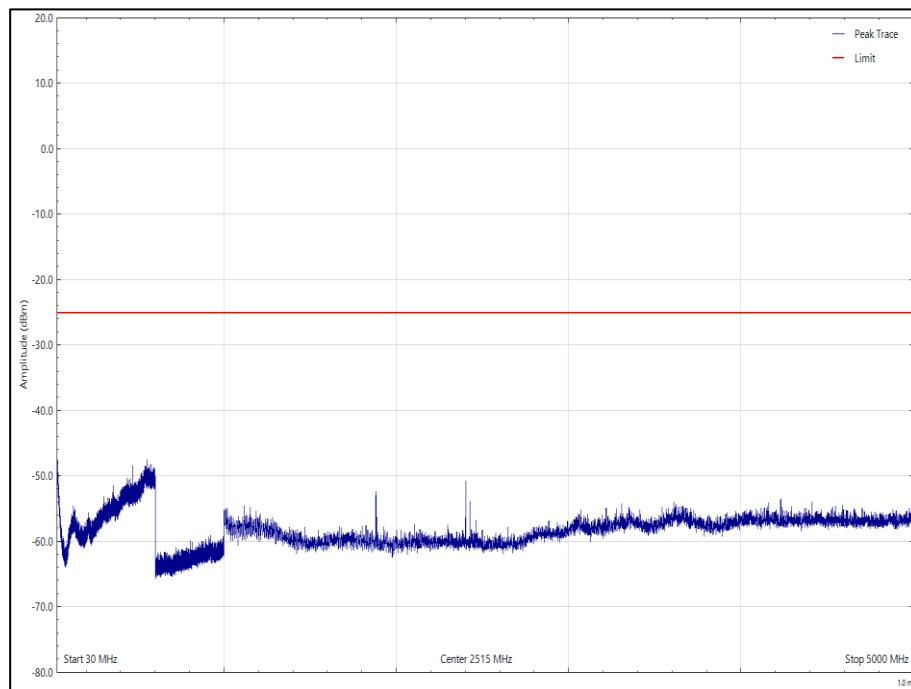
**Figure 61 - 469.9875 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Horizontal**



**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<br>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.