

FCC and ISED Test Report

XYZ Reality Ltd

Controller, Model: XYZ-22-02

In accordance with FCC 47 CFR Part 15C, ISED
RSS-247 and ISED RSS-GEN
(2.4 GHz Proprietary)

Prepared for: XYZ Reality Ltd
Unit G0, G02, 338-346, Goswell Road
Angel, Clerkenwell
EC1V 7LQ, UNITED KINGDOM

FCC ID: 2A3C5XYZ2202

IC: 28181-XYZ222

COMMERCIAL-IN-CONFIDENCE

Document 75954477-04 Issue 01



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SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Steve Marshall	Senior Engineer	Authorised Signatory	14 April 2022

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 15C, ISED RSS-247 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	Graeme Lawler	14 April 2022	
Testing	Paul Dickson	14 April 2022	

FCC Accreditation
90987 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 15C: 2020, ISED RSS-247: Issue 2 (02-2017) and ISED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021) for the tests detailed in section 1.3.



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ACCREDITATION

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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	14-April-2022

Table 1

1.2 Introduction

Applicant	XYZ Reality Ltd
Manufacturer	XYZ Reality Ltd
Model Number(s)	XYZ-22-02
Serial Number(s)	220012
Hardware Version(s)	v02
Software Version(s)	v01.19
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15C: 2020 ISED RSS-247: Issue 2 (02-2017) ISED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021)
Order Number	XYZ0265
Date	07-February-2022
Date of Receipt of EUT	25-February-2022
Start of Test	01-March-2022
Finish of Test	03-March-2022
Name of Engineer(s)	Graeme Lawler and Paul Dickson
Related Document(s)	ANSI C63.10 (2013)



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C, ISSED RSS-247 and ISSED RSS-GEN is shown below.

Section	Specification Clause			Test Description	Result	Comments/Base Standard
	Part 15C	RSS-247	RSS-GEN			
Configuration and Mode: 2.4 GHz proprietary device						
2.1	15.205	3.3	8.10	Restricted Band Edges	Pass	
2.2	15.247 (d) and 15.209	3.3 and 5.5	6.13 and 8.9	Spurious Radiated Emissions	Pass	
2.3	15.247 (d)	5.5	-	Authorised Band Edges	Pass	

Table 2



1.4 Application Form

Equipment Description

Technical Description: (Please provide a brief description of the intended use of the equipment including the technologies the product supports)	Handheld device for interacting with augmented reality	
Manufacturer:	XYZ Reality Ltd	
Model:	XYZ-22-02	
Part Number:	XYZ-22-01	
Hardware Version:	v02	
Software Version:	v01.19	
FCC ID of the product under test – see guidance here	2A3C5XYZ2202	
IC ID of the product under test – see guidance here	28181-XYZ222	

Table 3

Intentional Radiators

Technology	Proprietary ISM 2.4GHz					
Frequency Range (MHz to MHz)	2402-2480					
Conducted Declared Output Power (dBm)	0					
Antenna Gain (dBi)	2.8					
Supported Bandwidth(s) (MHz) (e.g 1 MHz, 20 MHz, 40 MHz)	1 MHz					
Modulation Scheme(s) (e.g GFSK, QPSK etc)	GFSK / DQPSK					
ITU Emission Designator (see guidance here) (not mandatory for Part 15 devices)	1M00F1D					
Bottom Frequency (MHz)	2402					
Middle Frequency (MHz)	2440					
Top Frequency (MHz)	2480					

Table 4

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	
Lowest frequency generated or used in the device or on which the device operates or tunes	
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:		V
Extreme upper voltage:		V
Extreme lower voltage:		V
Max current:		A

Table 7

Battery Power Source

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

Table 8

Charging

Can the EUT transmit whilst being charged	Yes ☐ No ☒
---	---

Table 9

Temperature

Minimum temperature:	0	°C
Maximum temperature:	40	°C

Table 10



Cable Loss

Adapter Cable Loss (Conducted sample)	1.3	dB
--	-----	----

Table 11

Antenna Characteristics

Antenna connector ☒			State impedance	50	Ohm
Temporary antenna connector ☐			State impedance		Ohm
Integral antenna ☒	Type:	Flexi	Gain	2.8	dBi
External antenna ☐	Type:		Gain		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 ☐					

Table 12

Ancillaries (if applicable)

Manufacturer:		Part Number:	
Model:		Country of Origin:	

Table 13

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

Name: Dave Williams

Position held: Director of Engineering, DitroniX Ltd

Date: 31st January 2022



1.5 Product Information

1.5.1 Technical Description

Handheld device for interacting with augmented reality.

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: XYZ-22-02, Serial Number: 220012			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 14

1.8 Test Location

TÜV SÜD conducted the following tests at our Fareham Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: 2.4 GHz proprietary device		
Restricted Band Edges	Graeme Lawler	UKAS
Spurious Radiated Emissions	Paul Dickson and Graeme Lawler	UKAS
Authorised Band Edges	Graeme Lawler	UKAS

Table 15

Office Address:

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



2 Test Details

2.1 Restricted Band Edges

2.1.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.205
ISED RSS-247, Clause 3.3
ISED RSS-GEN, Clause 8.10

2.1.2 Equipment Under Test and Modification State

XYZ-22-02, S/N: 220012 - Modification State 0

2.1.3 Date of Test

01-March-2022

2.1.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 6.10.5.

Plots for average measurements were taken in accordance with ANSI C63.10, clause 4.1.4.2.3. These are shown for information purposes and were used to determine the worst-case measurement point. Final average measurements were then taken in accordance with ANSI C63.10, clause 4.1.4.2.2, using a CISPR average detector, to obtain the measurement result recorded in the test results tables.

The following conversion can be applied to convert from dB μ V/m to μ V/m:

$10^{(\text{Field Strength in dB}\mu\text{V/m}/20)}$.

2.1.5 Environmental Conditions

Ambient Temperature	20.9 °C
Relative Humidity	41.9 %

2.1.6 Test Results

2.4 GHz proprietary device

Mode	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dB μ V/m)	Average Level (dB μ V/m)
Static	2402	2390	52.86	40.00
Static	2480	2483.5	60.08	40.85

Table 16

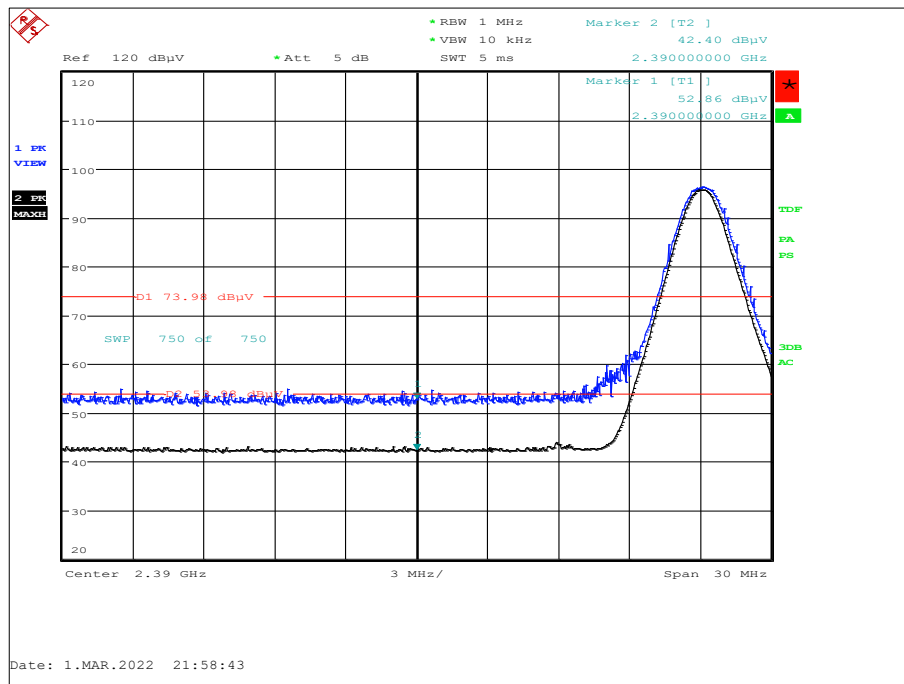


Figure 1 - 2402 MHz - Band Edge Frequency 2390 MHz

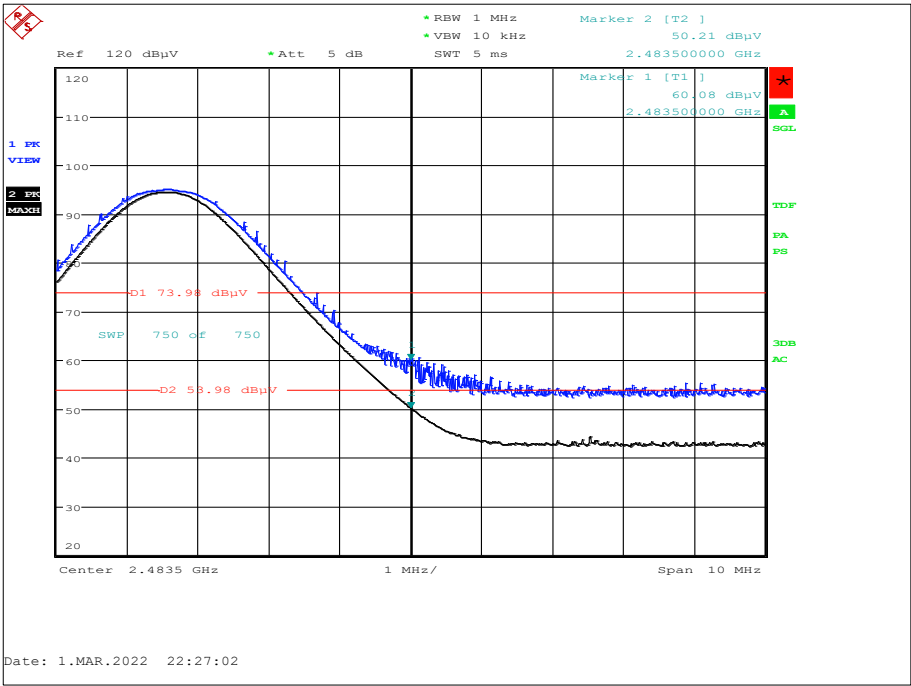


Figure 2 - 2480 MHz - Band Edge Frequency 2483.5 MHz

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength (μV/m at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 17

ISED RSS-GEN, Limit Clause 8.9

Frequency (MHz)	Field Strength (μV/m at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960*	500

Table 18

*Unless otherwise specified, for all frequencies greater than 1 GHz, the radiated emission limits for licence-exempt radio apparatus stated in applicable RSSs (including RSS-Gen) are based on measurements using a linear average detector function having a minimum resolution bandwidth of 1 MHz. If an average limit is specified for the EUT, then the peak emission shall also be measured with instrumentation properly adjusted for such factors as pulse desensitization to ensure the peak emission is less than 20 dB above the average limit.



2.1.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 12.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Test Receiver	Rohde & Schwarz	ESU40	3506	12	18-Mar-2022
Cable (K-Type to K-Type, 2 m)	Scott Cables	KPS-1501-2000-KPS	4526	6	06-Mar-2022
Cable (N-Type to N-Type, 8 m)	Teledyne	PR90-088-8MTR	5450	6	08-Mar-2022
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	31-Mar-2022
Antenna (DRG, 1 GHz to 10 GHz)	Schwarzbeck	BBHA 9120 B	5611	12	15-Oct-2022
Turntable & Mast Controller	Maturo Gmbh	NCD/498/2799.01	5612	-	TU
Tilt Antenna Mast	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
Screened Room (12)	MVG	EMC-3	5621	36	11-Aug-2023

Table 19

TU - Traceability Unscheduled



2.2 Spurious Radiated Emissions

2.2.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (d) and 15.209
ISED RSS-247, Clause 3.3 and 5.5
ISED RSS-GEN, Clause, 6.13 and 8.9

2.2.2 Equipment Under Test and Modification State

XYZ-22-02, S/N: 220012 - Modification State 0

2.2.3 Date of Test

01-March-2022 to 03-March-2022

2.2.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 6.3, 6.5 and 6.6.

For frequencies > 1 GHz, plots for average measurements were taken in accordance with ANSI C63.10, clause 4.1.4.2.3 to characterize the EUT. Where emissions were detected, final average measurements were taken in accordance with ANSI C63.10, clause 4.1.4.2.2.

The EUT was placed on the non-conducting platform in a manner typical of a normal installation. As the EUT was considered mobile/portable and therefore reasonable to be used in multiple planes, pre-scans were performed with the EUT orientated in X, Y and Z planes with reference to the ground plane.

The plots shown are the characterisation of the EUT. The limits on the plots represent the most stringent case for restricted bands, (74/54 dBuV/m) when compared to 20 dBc outside restricted bands. The limits shown have been used as a threshold to determine where further measurements are necessary. Where results are within 10 dB of the limits shown on the plots, further investigation was carried out and reported in results tables.

The following conversion can be applied to convert from dBuV/m to uV/m:

$10^{(\text{Field Strength in dBuV/m}/20)}$.

At a measurement distance of 1 meter the limit line was increased by $20 \cdot \text{LOG}(3/1) = 9.54$ dB.

Where formal measurements have been necessary, the results have been presented in the emissions table.

2.2.5 Example Test Setup Diagram

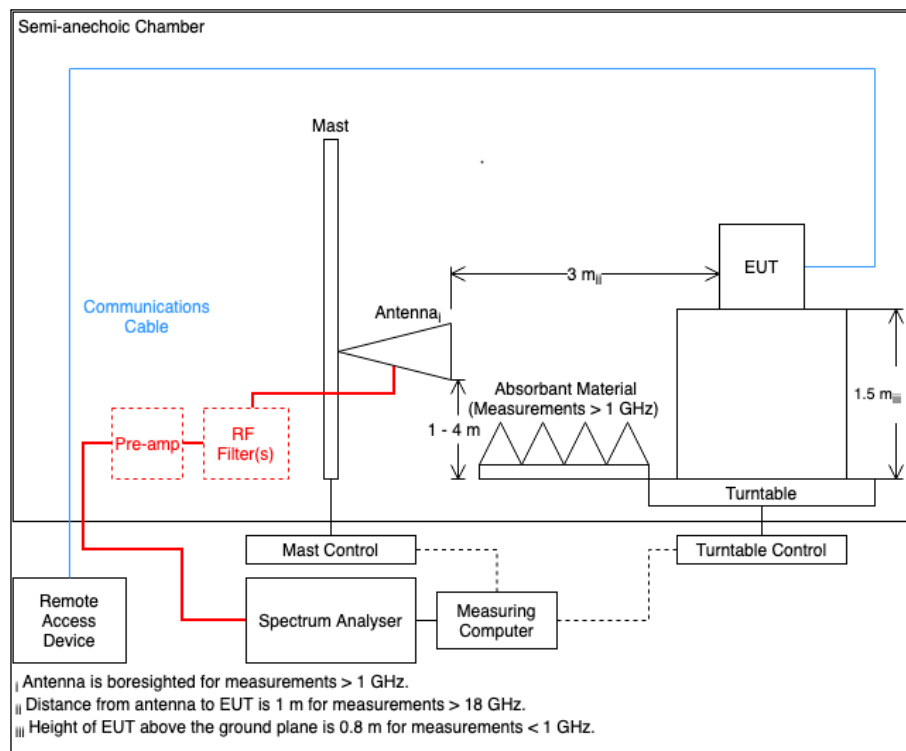


Figure 3

2.2.6 Environmental Conditions

Ambient Temperature	18.8 - 20.9 °C
Relative Humidity	43.2 - 43.4 %

2.2.7 Test Results

2.4 GHz proprietary device

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
37.630	29.3	40.0	-10.7	Q-Peak	211	107	Vertical
73.011	21.9	40.0	-18.1	Q-Peak	237	100	Vertical
137.828	26.4	43.5	-17.2	Q-Peak	233	100	Vertical
149.971	31.9	43.5	-11.6	Q-Peak	351	104	Vertical
172.649	18.0	43.5	-25.5	Q-Peak	298	104	Vertical

Table 20 - Proprietary - X, 2402 MHz, 30 MHz to 25 GHz

No other emissions found within 10 dB of the limit.

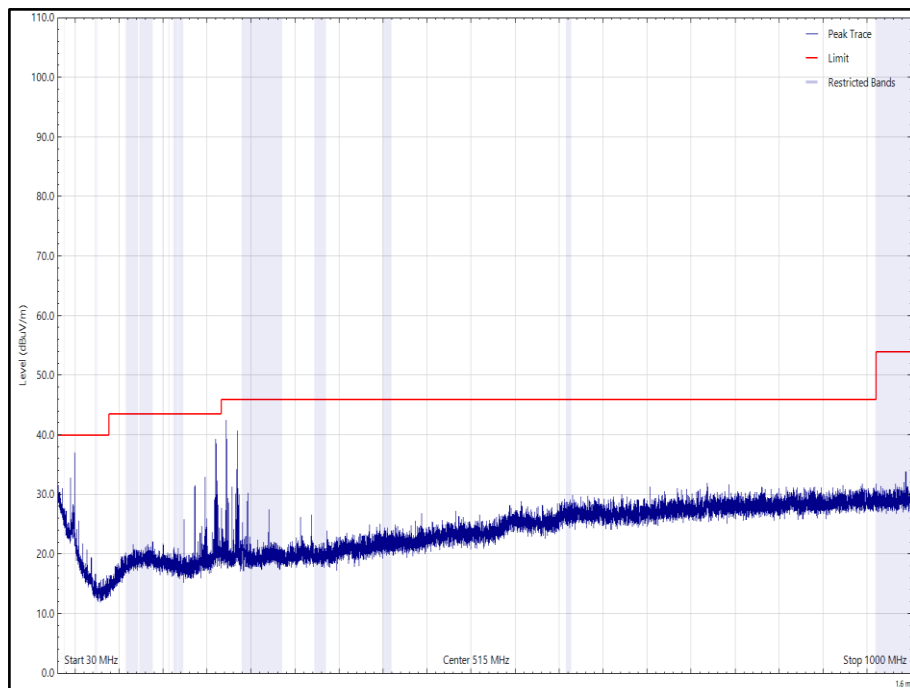


Figure 4 - Proprietary - X, 2402 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

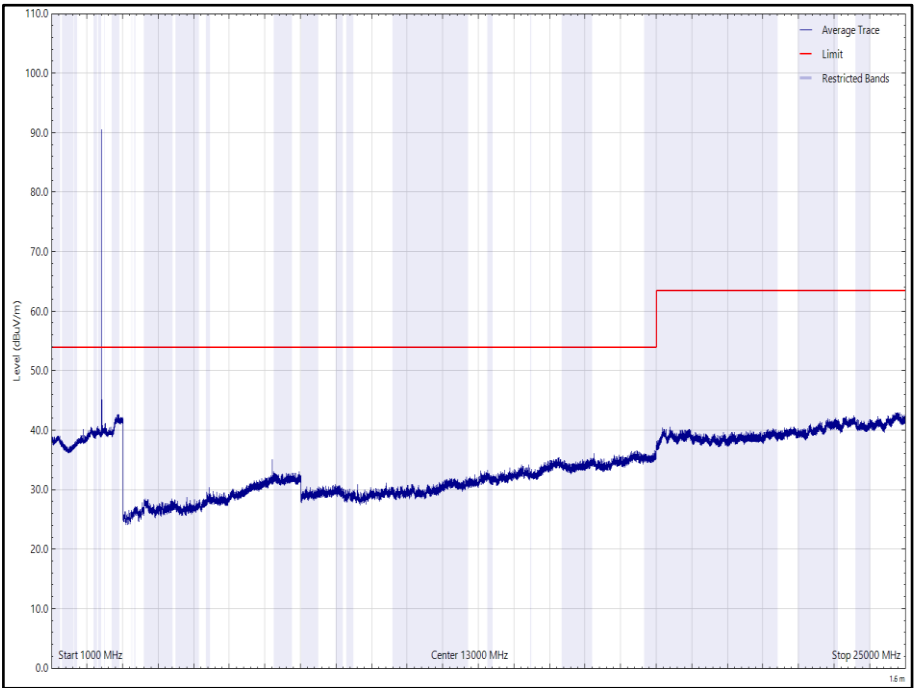


Figure 5 - Proprietary - X, 2402 MHz, 1 GHz to 25 GHz, Horizontal (Average)

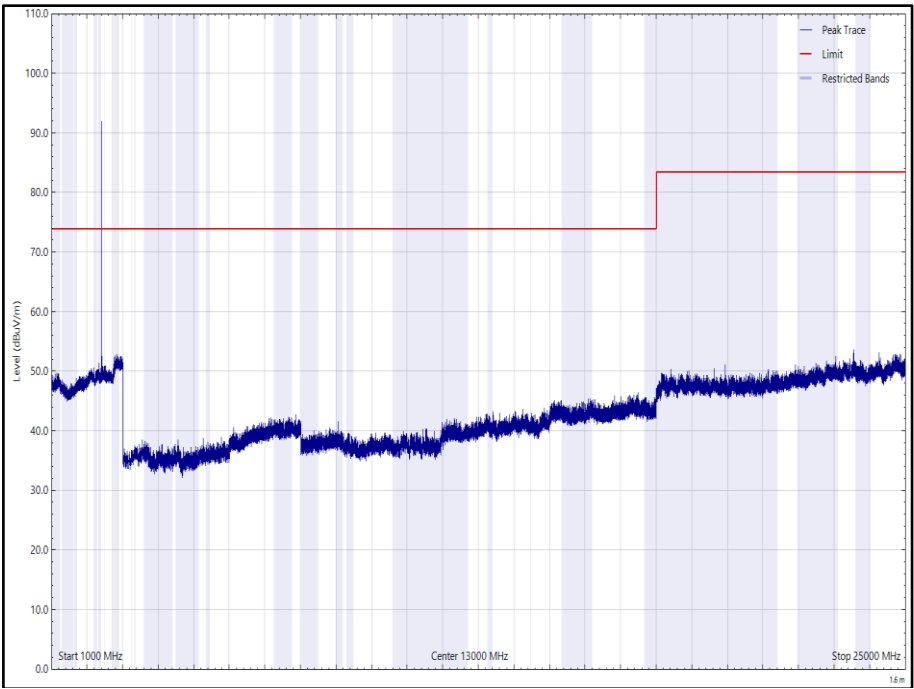


Figure 6 - Proprietary - X, 2402 MHz, 1 GHz to 25 GHz, Horizontal (Peak)

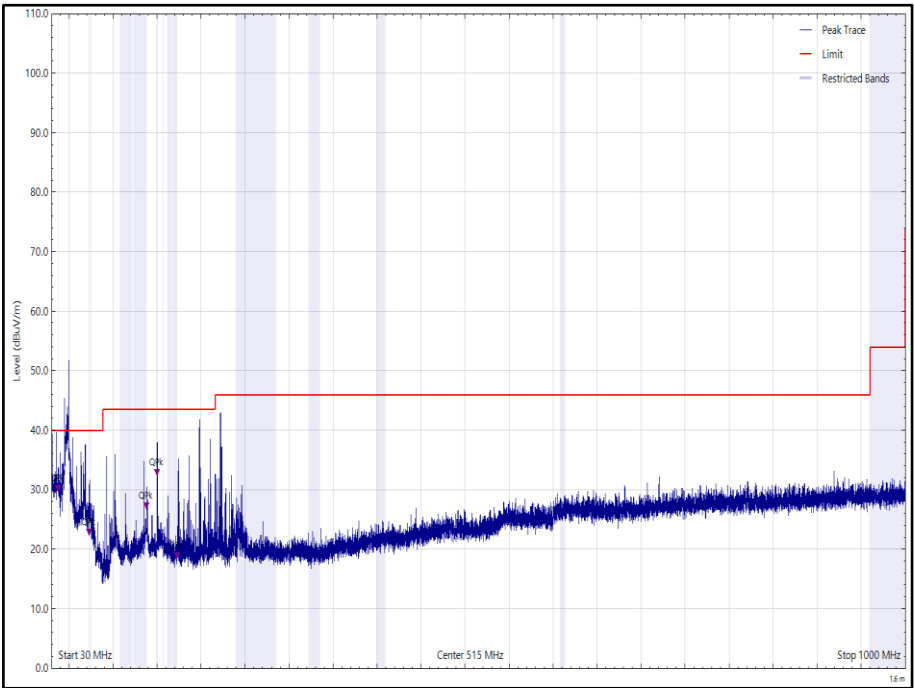


Figure 7 - Proprietary - X, 2402 MHz, 30 MHz to 1 GHz, Vertical (Peak)

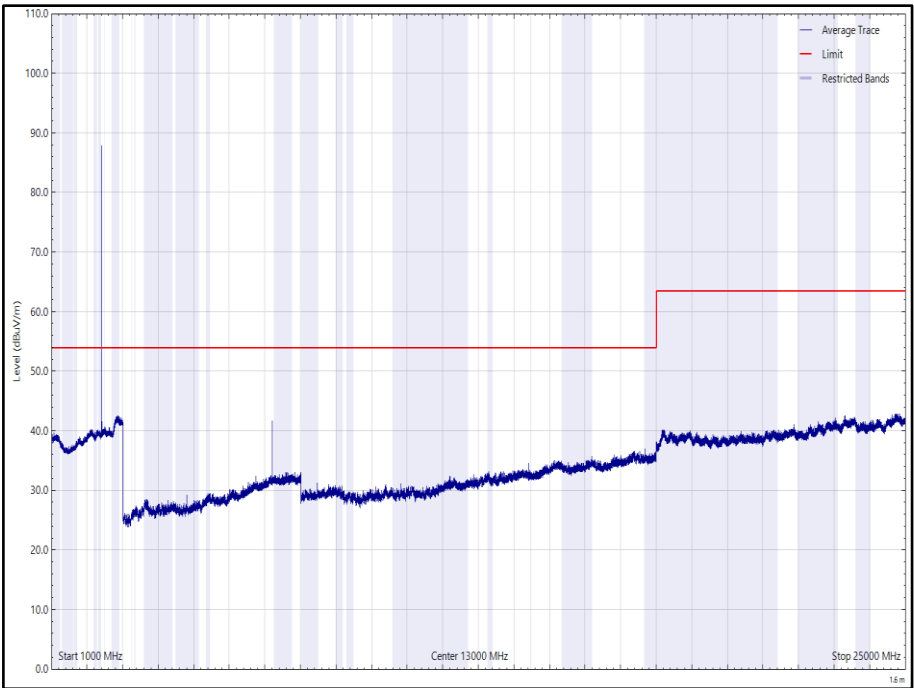


Figure 8 - Proprietary - X, 2402 MHz, 1 GHz to 25 GHz, Vertical (Average)

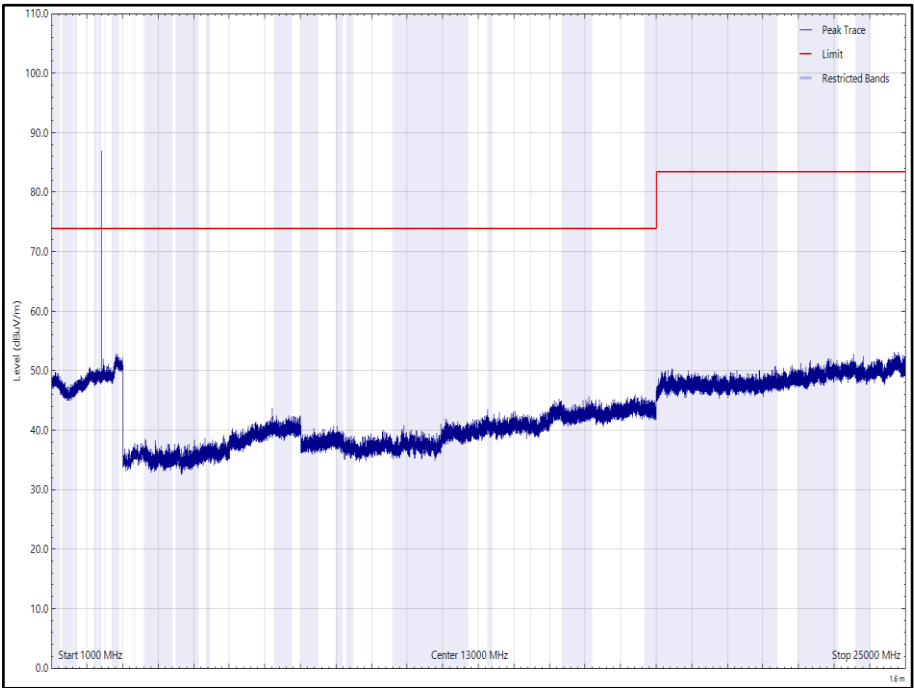


Figure 9 - Proprietary - X, 2402 MHz, 1 GHz to 25 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
37.532	29.2	40.0	-10.8	Q-Peak	209	100	Vertical
73.007	21.3	40.0	-18.7	Q-Peak	94	100	Vertical
137.841	27.8	43.5	-15.7	Q-Peak	311	103	Vertical
150.002	32.3	43.5	-11.3	Q-Peak	328	101	Vertical
172.863	17.6	43.5	-25.9	Q-Peak	360	100	Vertical

Table 21 - Proprietary - X, 2440 MHz, 30 MHz to 25 GHz

No other emissions found within 10 dB of the limit.

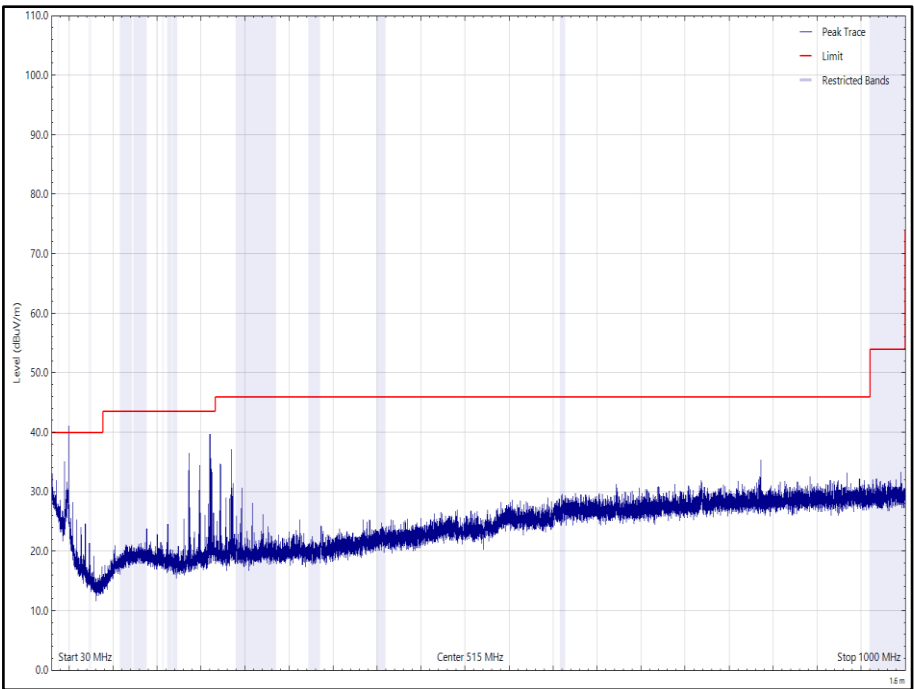


Figure 10 - Proprietary - X, 2440 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

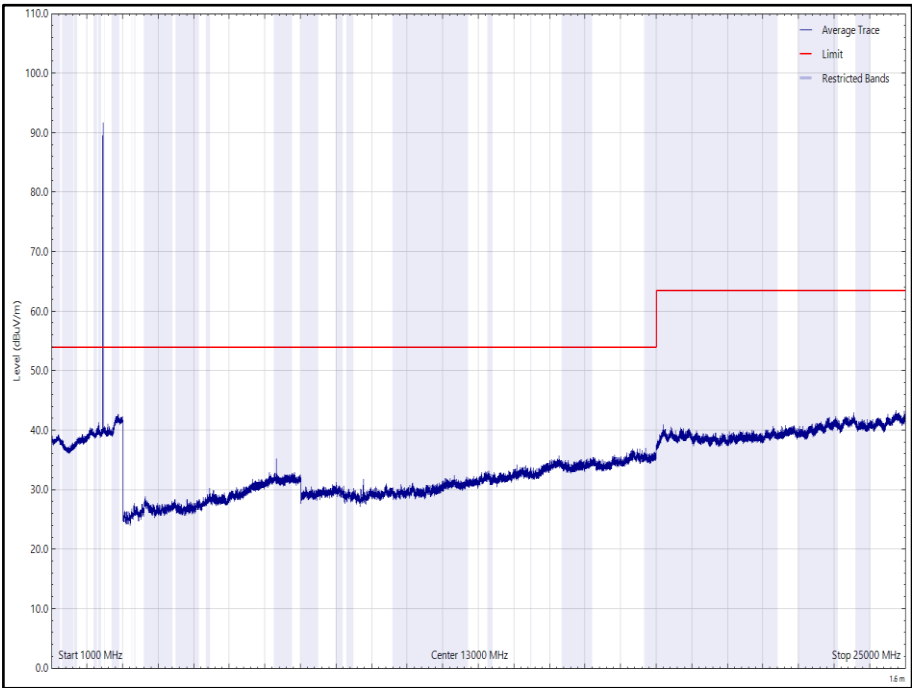


Figure 11 - Proprietary - X, 2440 MHz, 1 GHz to 25 GHz, Horizontal (Average)

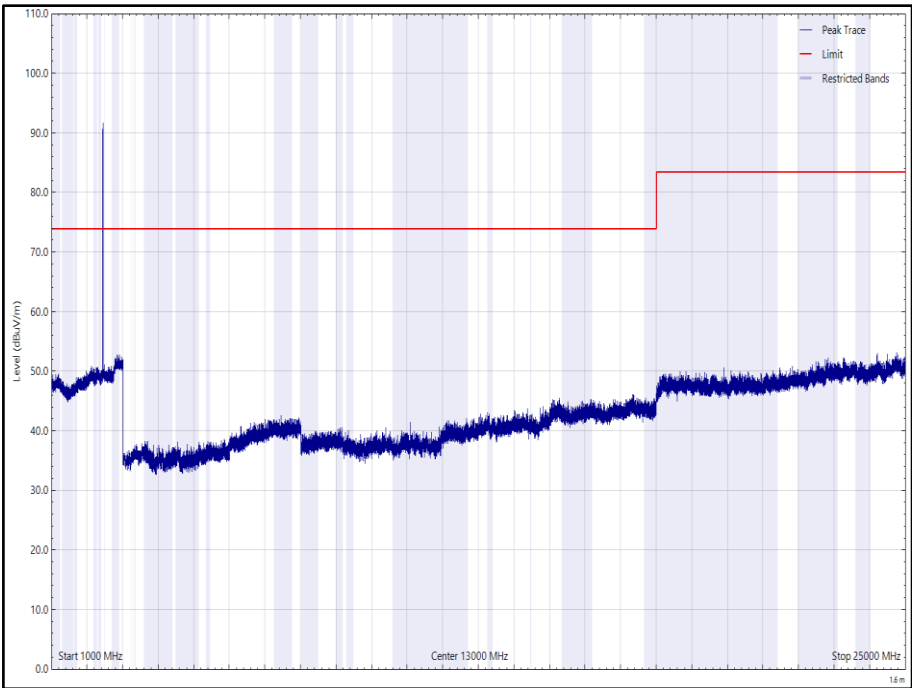


Figure 12 - Proprietary - X, 2440 MHz, 1 GHz to 25 GHz, Horizontal (Peak)

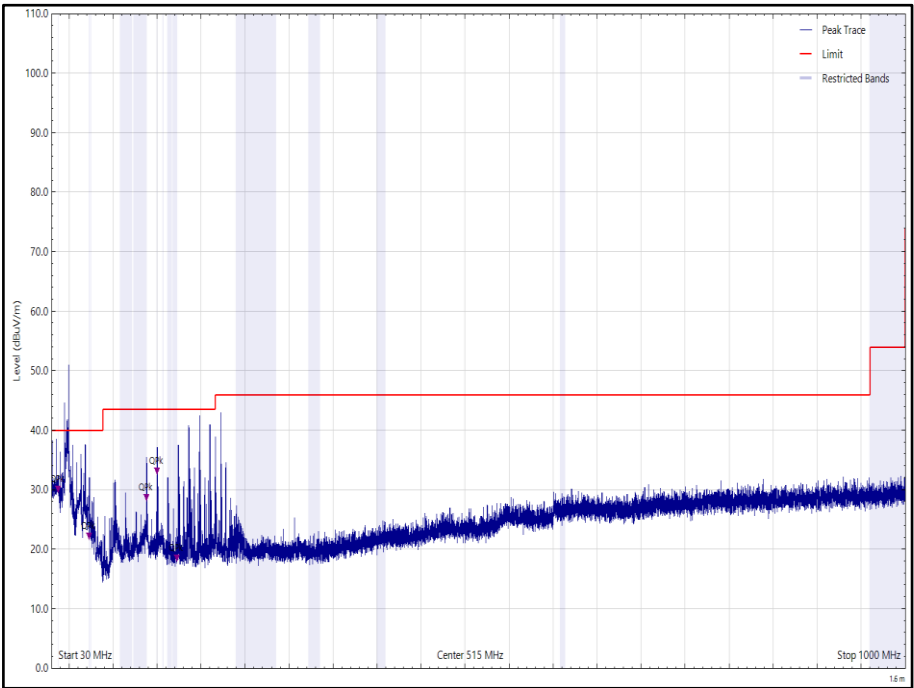


Figure 13 - Proprietary - X, 2440 MHz, 30 MHz to 1 GHz, Vertical (Peak)

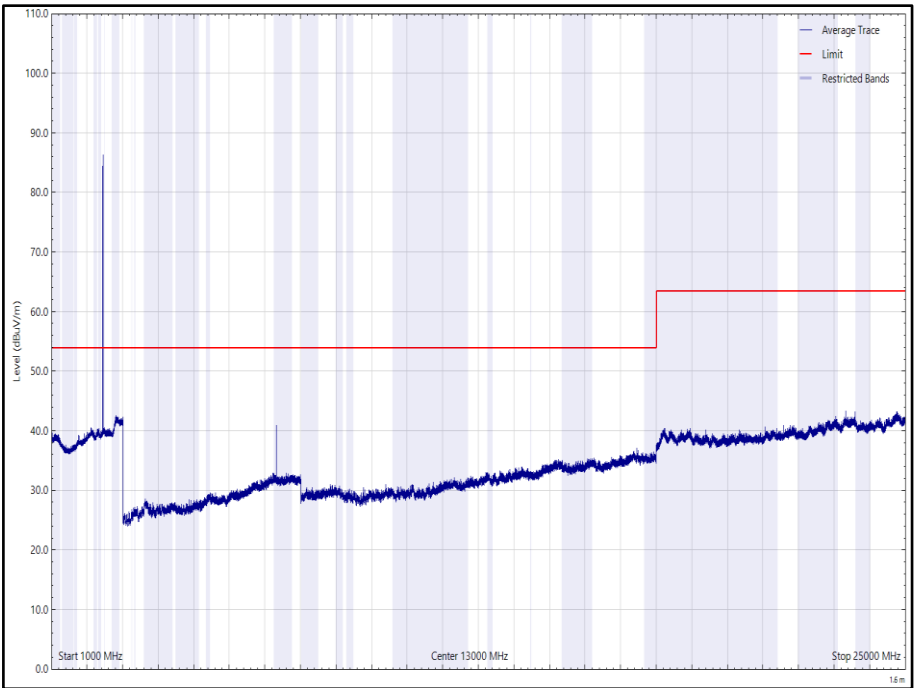


Figure 14 - Proprietary - X, 2440 MHz, 1 GHz to 25 GHz, Vertical (Average)

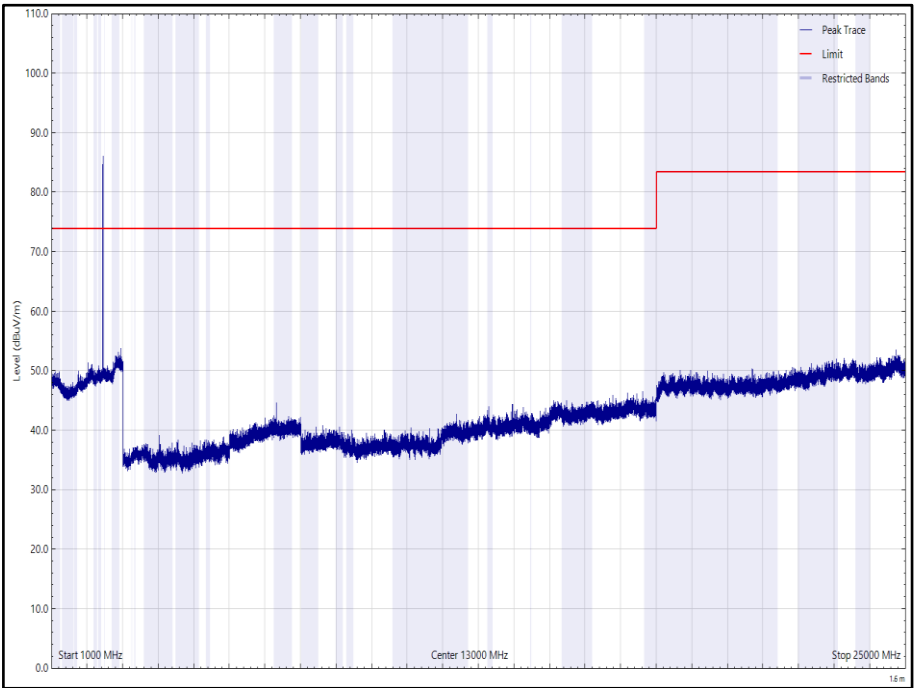


Figure 15 - Proprietary - X, 2440 MHz, 1 GHz to 25 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
37.568	27.4	40.0	-12.6	Q-Peak	279	100	Vertical
37.875	22.4	40.0	-17.7	Q-Peak	35	100	Horizontal
73.006	23.2	40.0	-16.8	Q-Peak	256	100	Vertical
137.784	24.4	43.5	-19.2	Q-Peak	241	100	Vertical
149.926	31.4	43.5	-12.1	Q-Peak	350	100	Vertical
162.026	29.8	43.5	-13.7	Q-Peak	339	100	Vertical

Table 22 - Proprietary - X, 2480 MHz, 30 MHz to 25 GHz

No other emissions found within 10 dB of the limit.

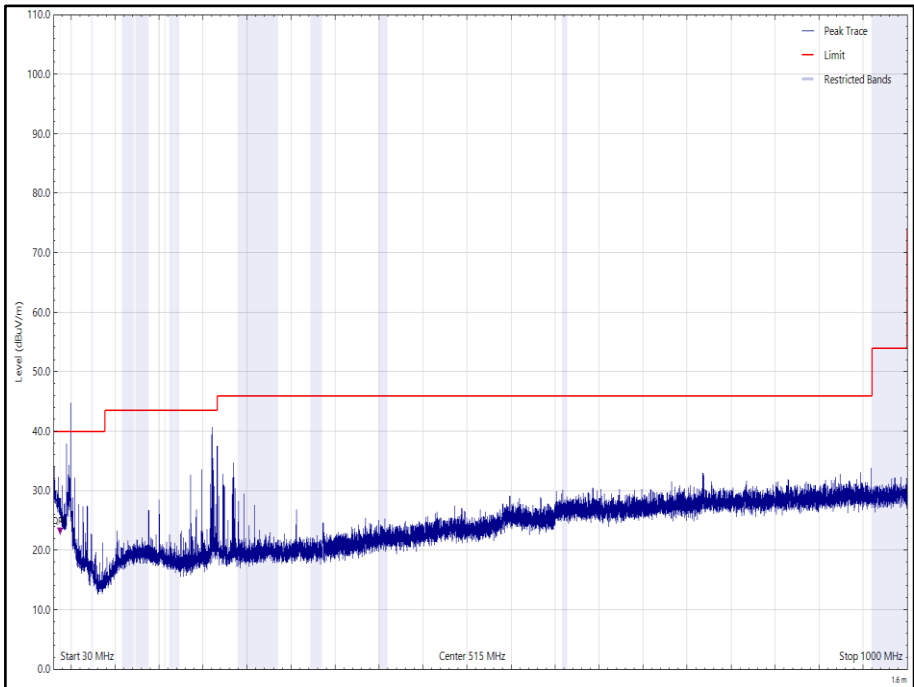


Figure 16 - Proprietary - X, 2480 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

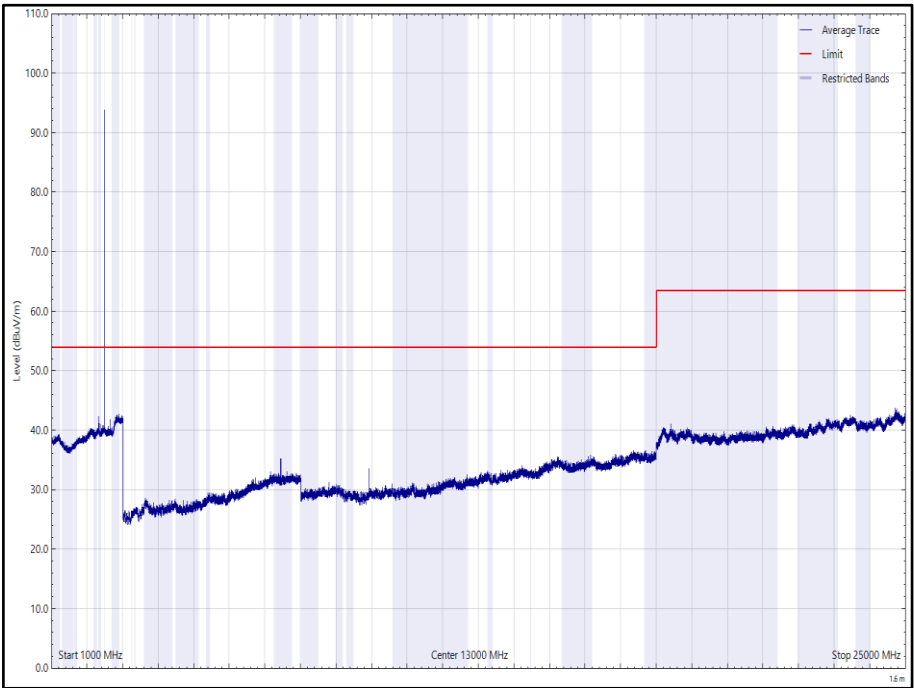


Figure 17 - Proprietary - X, 2480 MHz, 1 GHz to 25 GHz, Horizontal (Average)

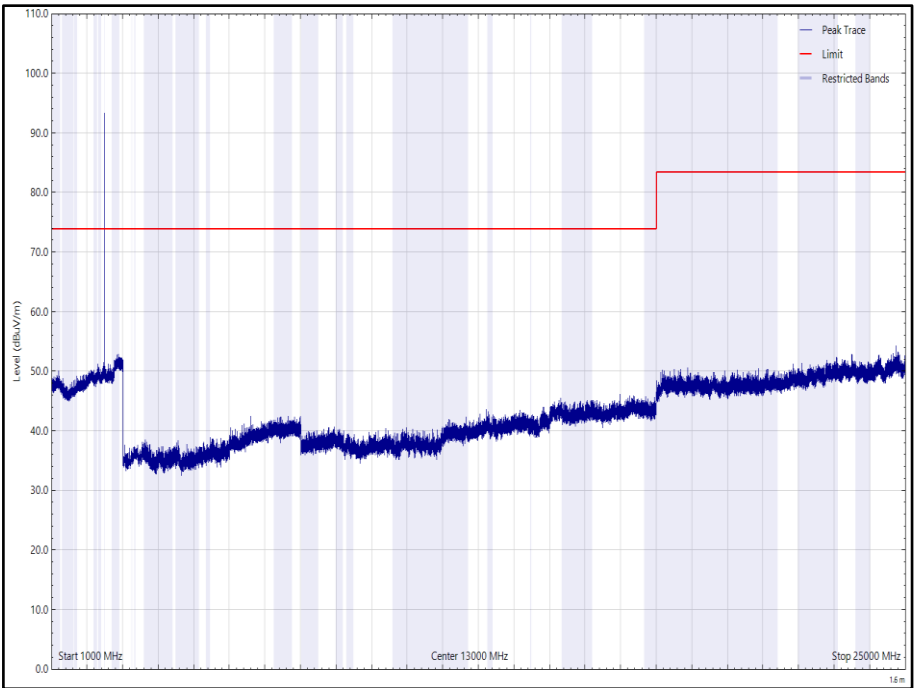


Figure 18 - Proprietary - X, 2480 MHz, 1 GHz to 25 GHz, Horizontal (Peak)

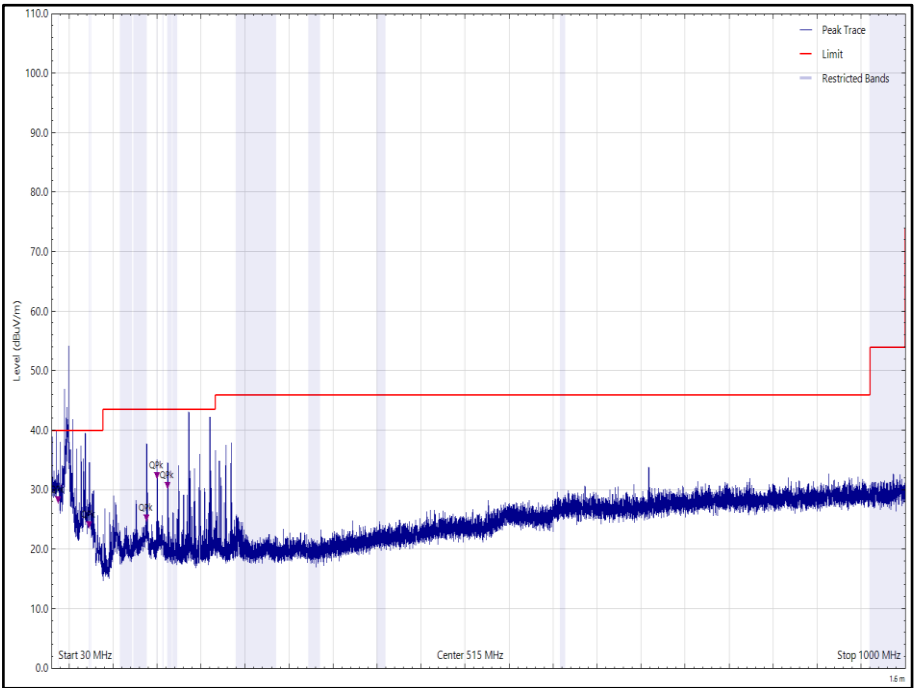


Figure 19 - Proprietary - X, 2480 MHz, 30 MHz to 1 GHz, Vertical (Peak)

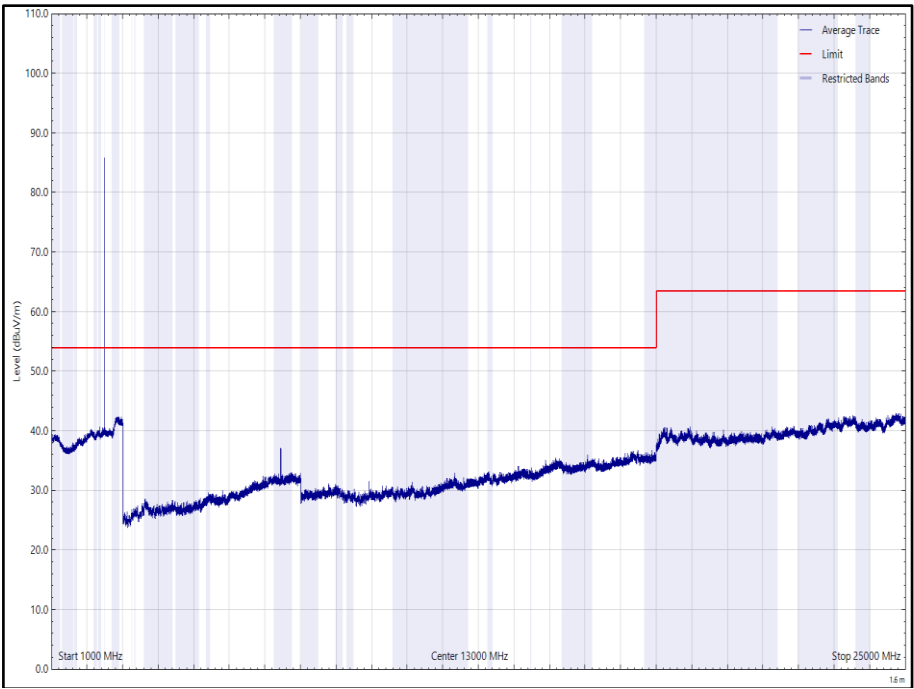


Figure 20 - Proprietary - X, 2480 MHz, 1 GHz to 25 GHz, Vertical (Average)

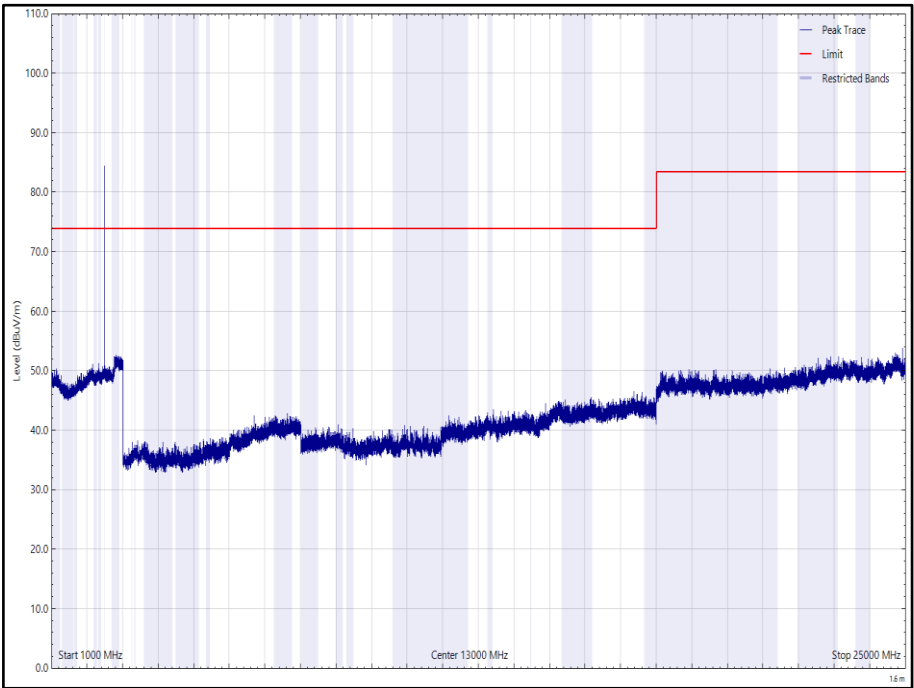


Figure 21 - Proprietary - X, 2480 MHz, 1 GHz to 25 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
37.643	30.8	40.0	-9.2	Q-Peak	292	102	Vertical
73.003	23.7	40.0	-16.3	Q-Peak	337	110	Vertical
137.993	30.3	43.5	-13.2	Q-Peak	210	100	Vertical
149.948	32.3	43.5	-11.3	Q-Peak	227	100	Vertical
162.091	29.3	43.5	-14.2	Q-Peak	147	100	Vertical

Table 23 - Proprietary - Y, 2402 MHz, 30 MHz to 25 GHz

No other emissions found within 6 dB of the limit.

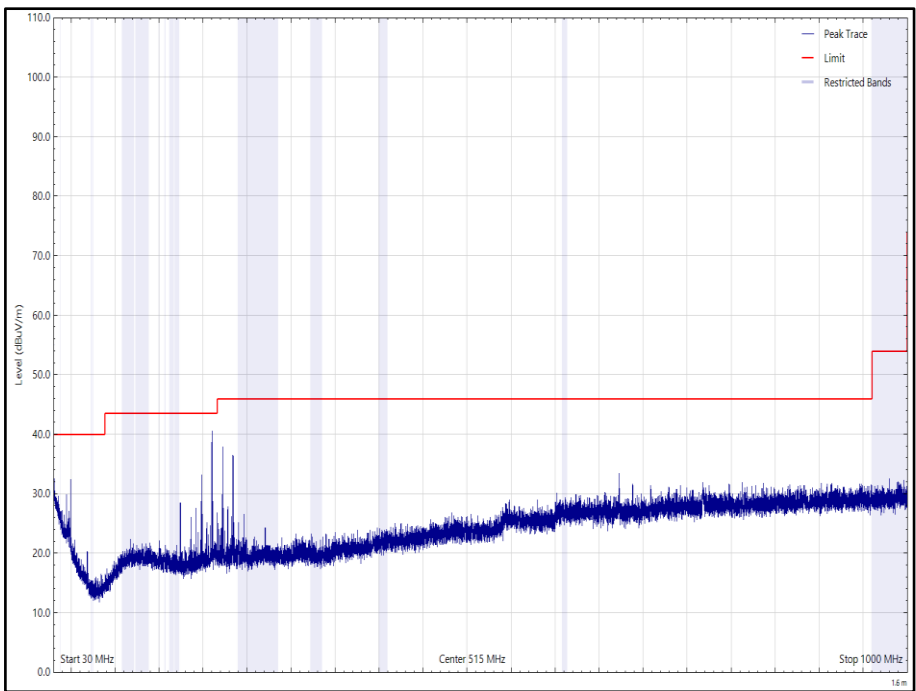


Figure 22 - Proprietary - Y, 2402 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

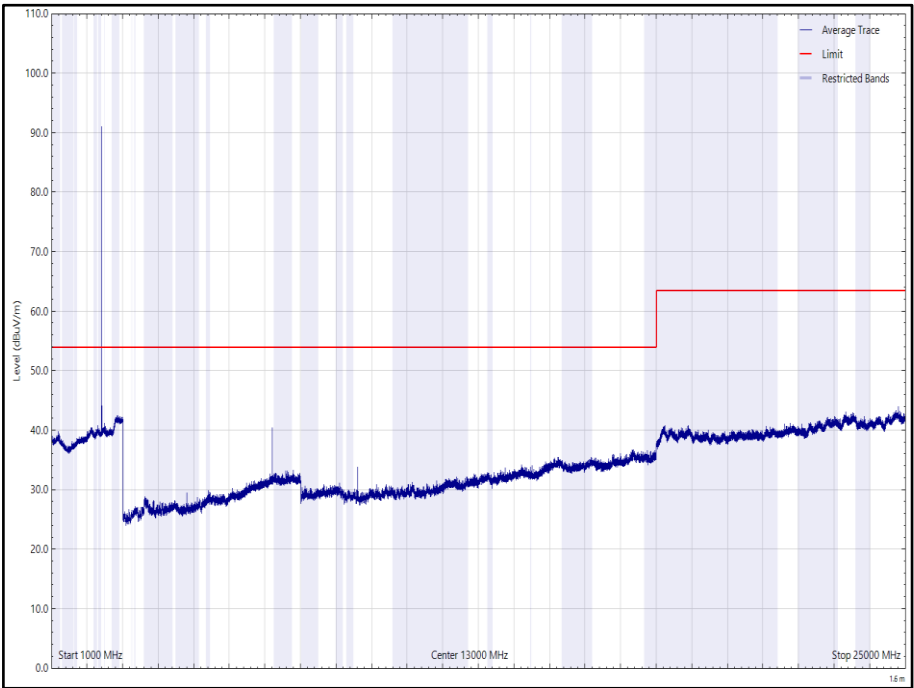


Figure 23 - Proprietary - Y, 2402 MHz, 1 GHz to 25 GHz, Horizontal (Average)

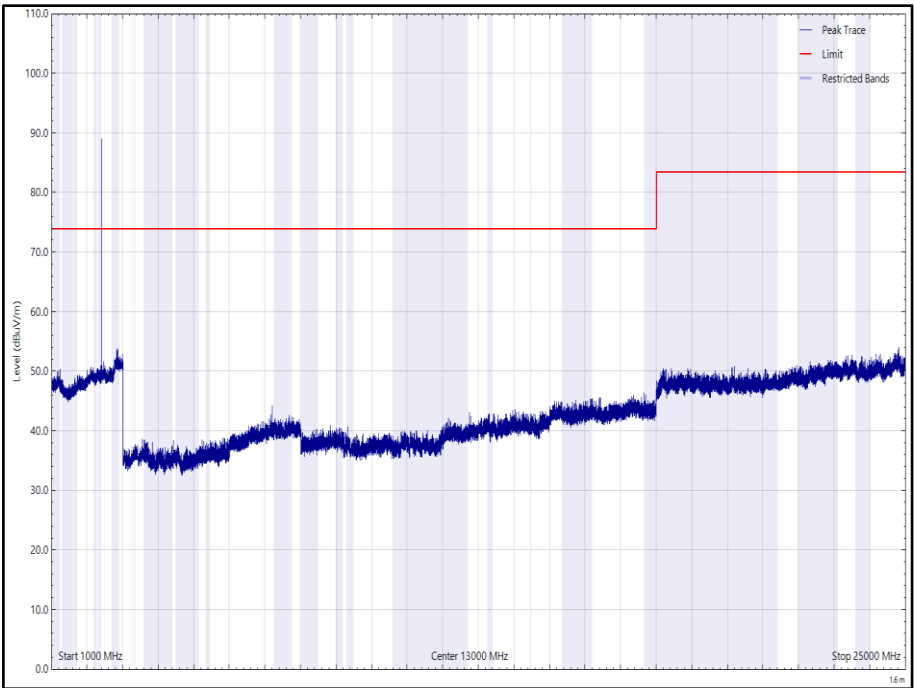


Figure 24 - Proprietary - Y, 2402 MHz, 1 GHz to 25 GHz, Horizontal (Peak)

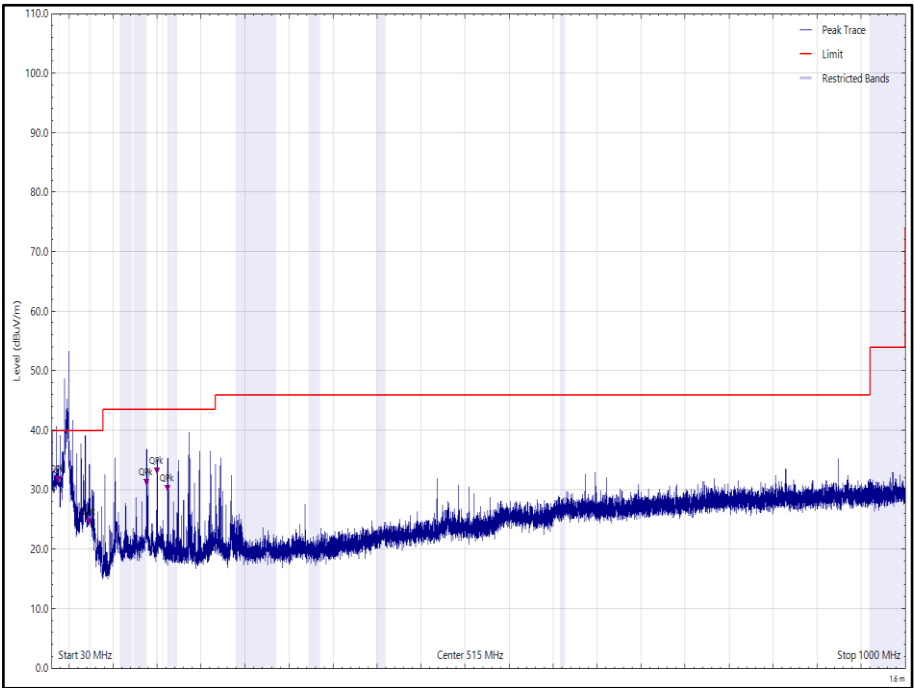


Figure 25 - Proprietary - Y, 2402 MHz, 30 MHz to 1 GHz, Vertical (Peak)

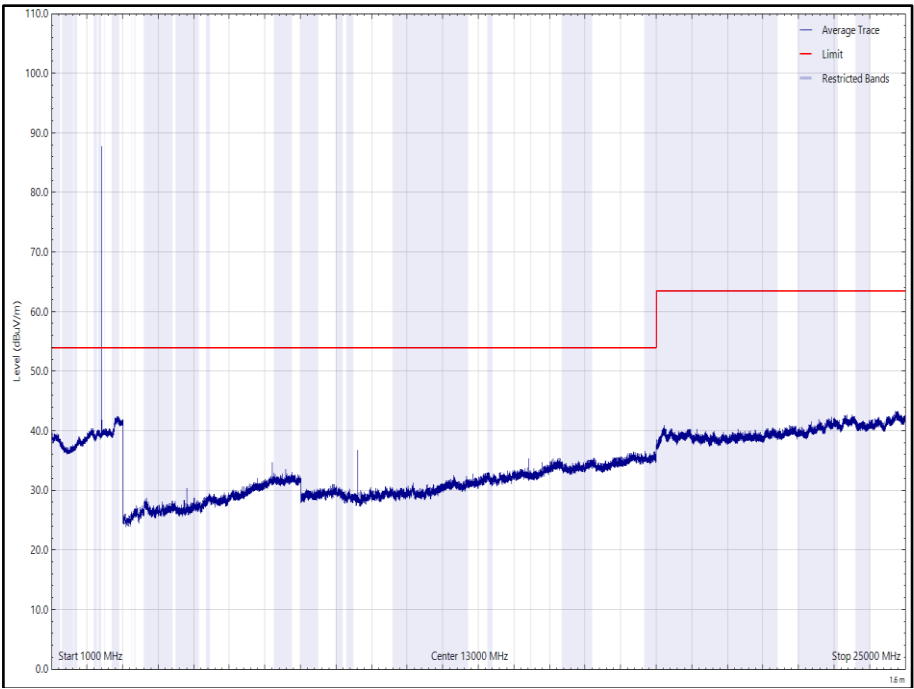


Figure 26 - Proprietary - Y, 2402 MHz, 1 GHz to 25 GHz, Vertical (Average)

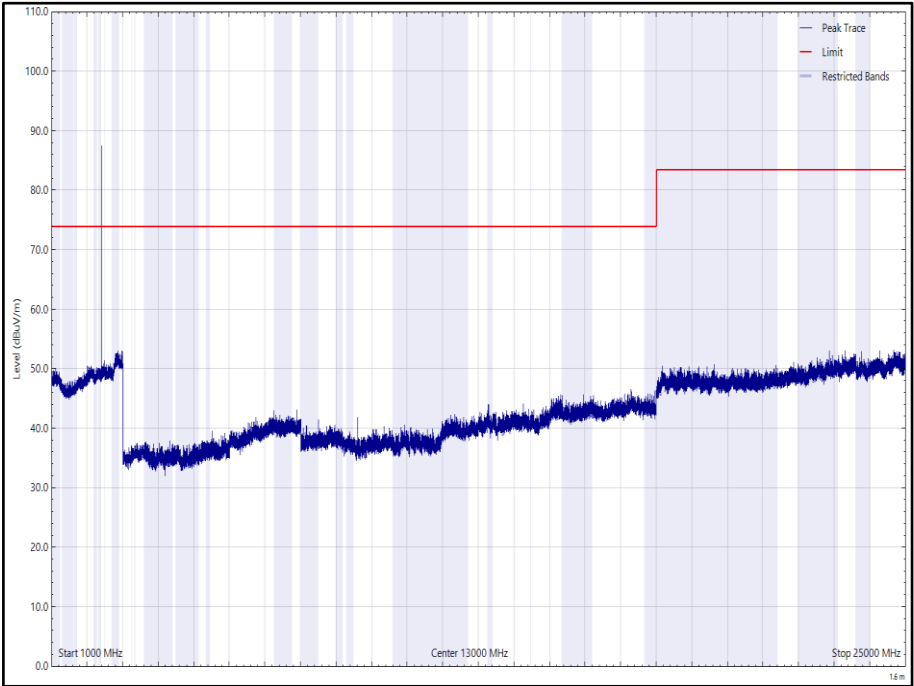


Figure 27 - Proprietary - Y, 2402 MHz, 1 GHz to 25 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
37.665	29.8	40.0	-10.2	Q-Peak	360	100	Vertical
73.011	22.3	40.0	-17.7	Q-Peak	240	153	Vertical
150.000	32.9	43.5	-10.6	Q-Peak	226	100	Vertical
162.226	23.5	43.5	-20.0	Q-Peak	326	100	Vertical
172.820	17.7	43.5	-25.8	Q-Peak	166	102	Vertical

Table 24 - Proprietary - Y, 2440 MHz, 30 MHz to 25 GHz

No other emissions found within 6 dB of the limit.

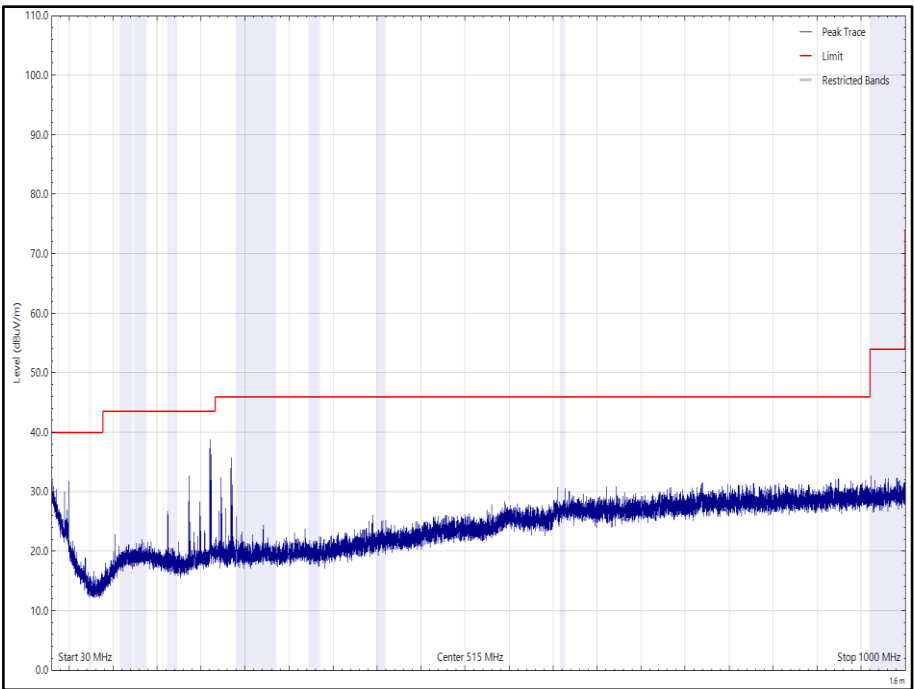


Figure 28 - Proprietary - Y, 2440 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

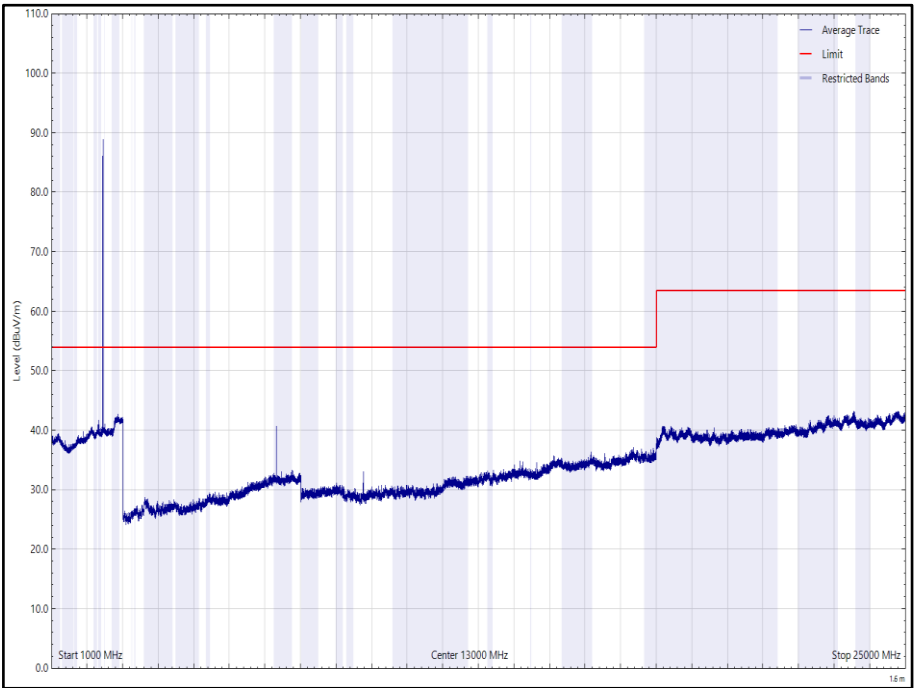


Figure 29 - Proprietary - Y, 2440 MHz, 1 GHz to 25 GHz, Horizontal (Average)

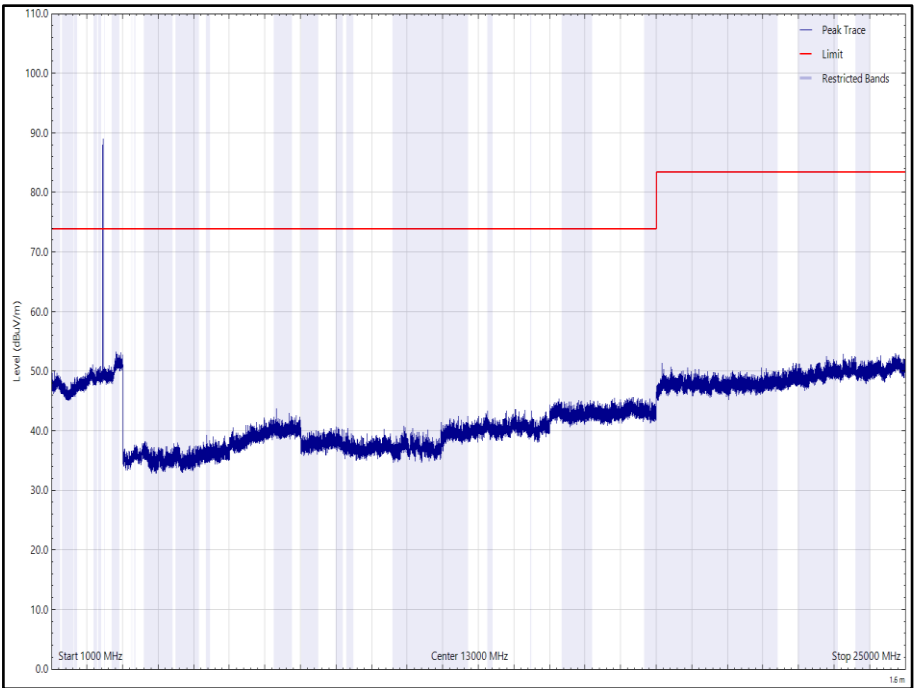


Figure 30 - Proprietary - Y, 2440 MHz, 1 GHz to 25 GHz, Horizontal (Peak)

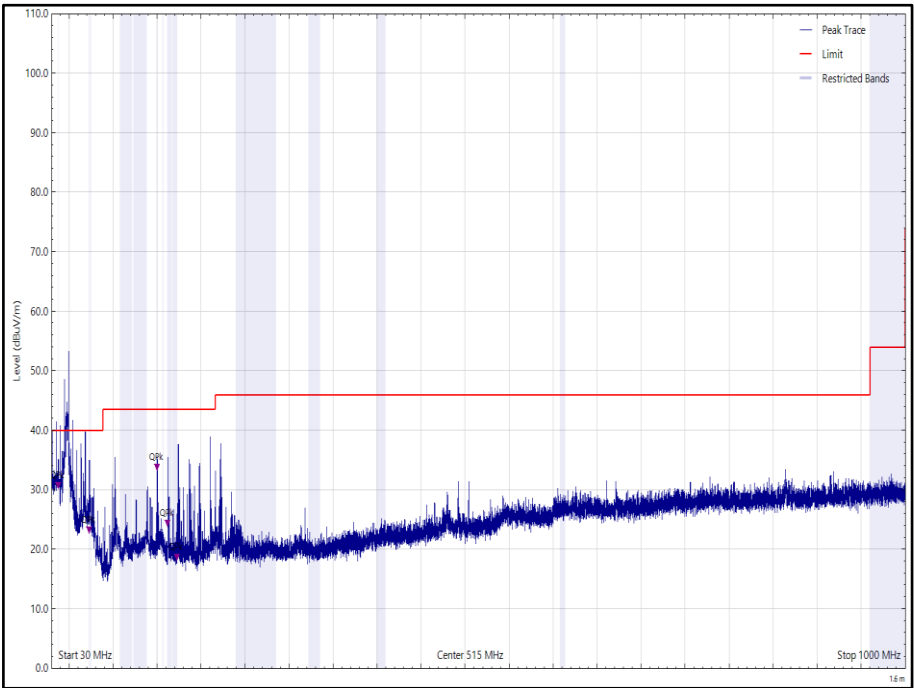


Figure 31 - Proprietary - Y, 2440 MHz, 30 MHz to 1 GHz, Vertical (Peak)

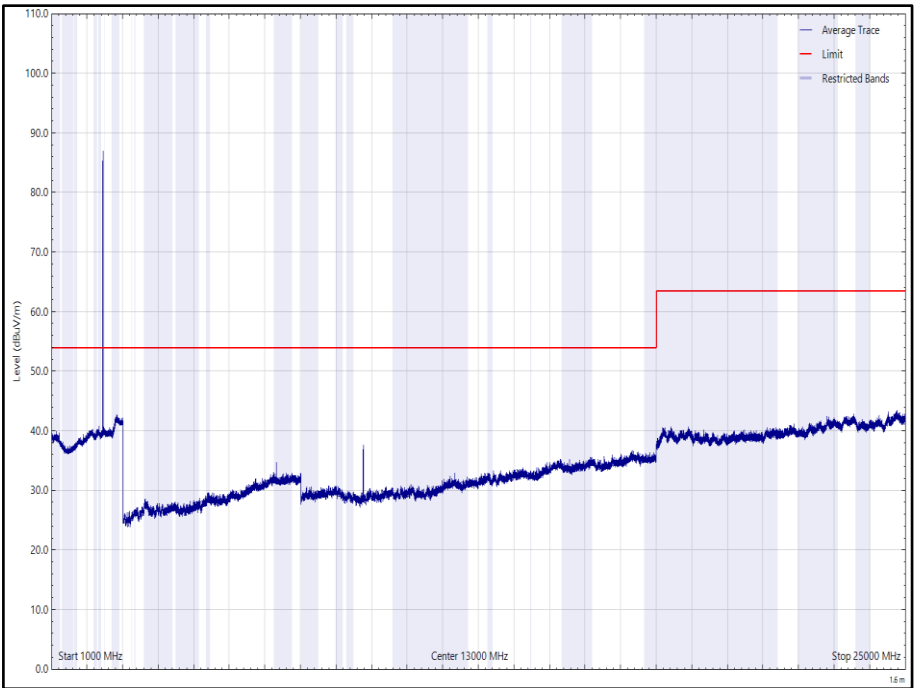


Figure 32 - Proprietary - Y, 2440 MHz, 1 GHz to 25 GHz, Vertical (Average)

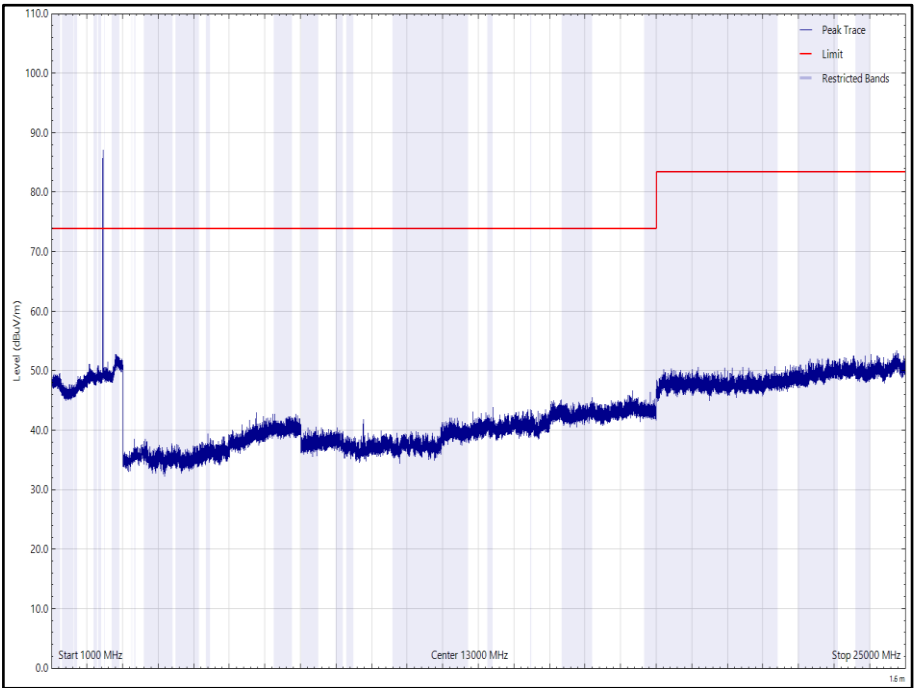


Figure 33 - Proprietary - Y, 2440 MHz, 1 GHz to 25 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
37.526	28.4	40.0	-11.6	Q-Peak	308	100	Vertical
73.013	22.0	40.0	-18.0	Q-Peak	319	100	Vertical
149.914	31.5	43.5	-12.0	Q-Peak	239	100	Vertical
162.190	24.6	43.5	-19.0	Q-Peak	63	100	Vertical
172.234	17.0	43.5	-26.5	Q-Peak	78	100	Vertical

Table 25 - Proprietary - Y, 2480 MHz, 30 MHz to 25 GHz

No other emissions found within 6 dB of the limit.

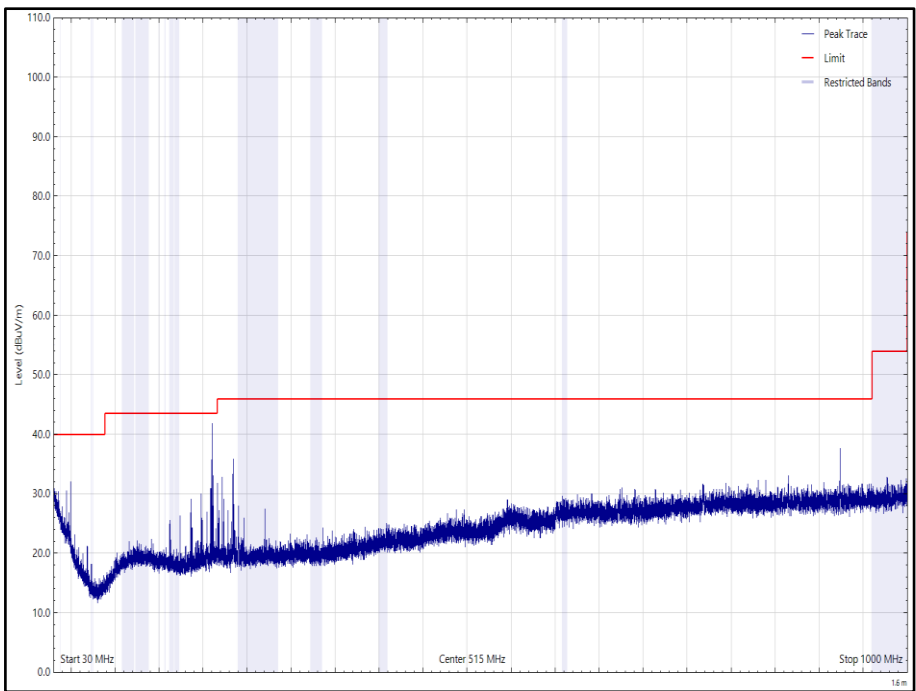


Figure 34 - Proprietary - Y, 2480 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

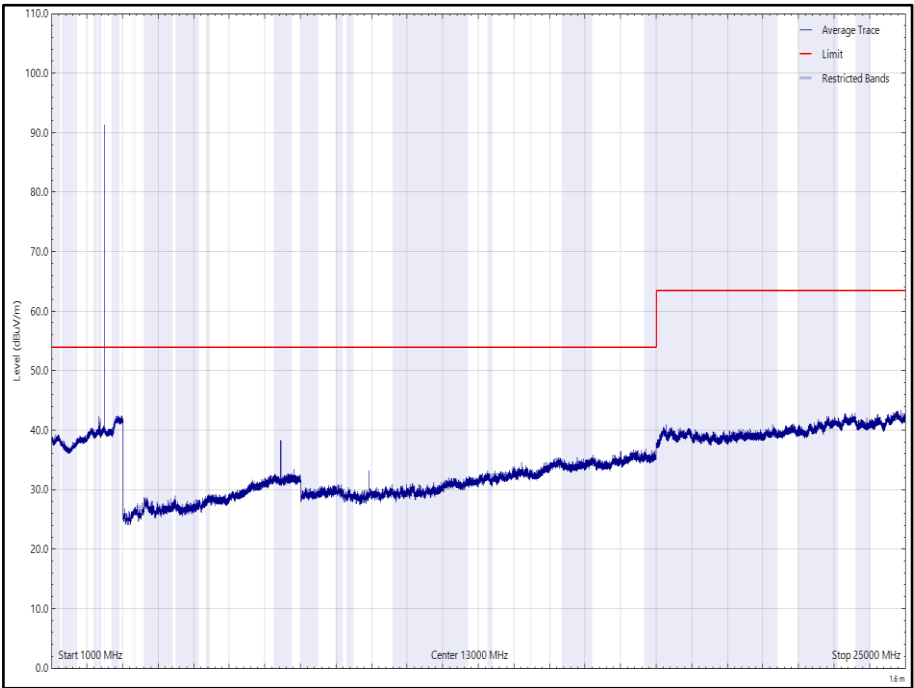


Figure 35 - Proprietary - Y, 2480 MHz, 1 GHz to 25 GHz, Horizontal (Average)

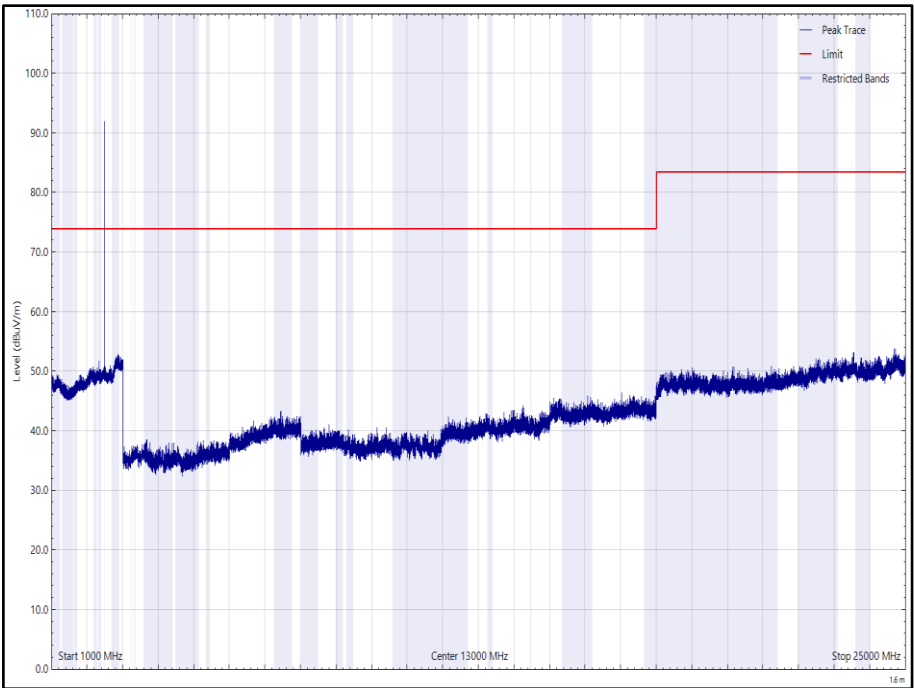


Figure 36 - Proprietary - Y, 2480 MHz, 1 GHz to 25 GHz, Horizontal (Peak)

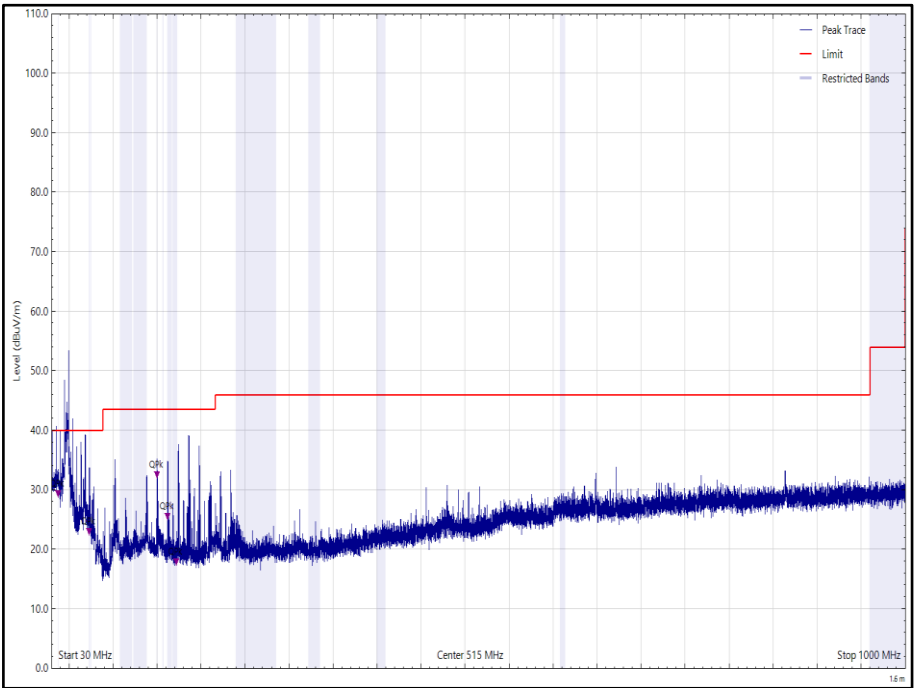


Figure 37 - Proprietary - Y, 2480 MHz, 30 MHz to 1 GHz, Vertical (Peak)

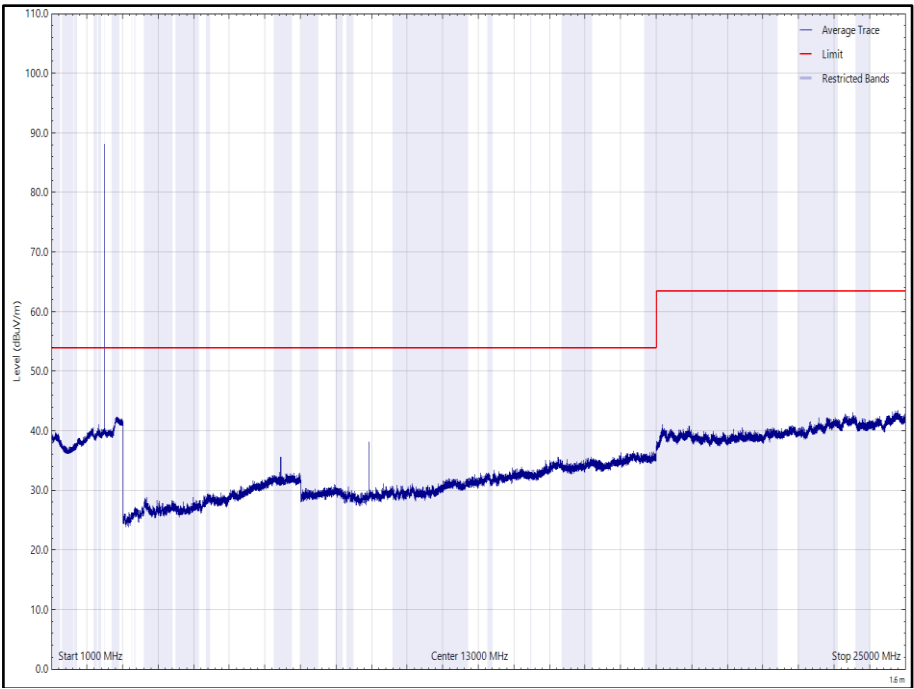


Figure 38 - Proprietary - Y, 2480 MHz, 1 GHz to 25 GHz, Vertical (Average)

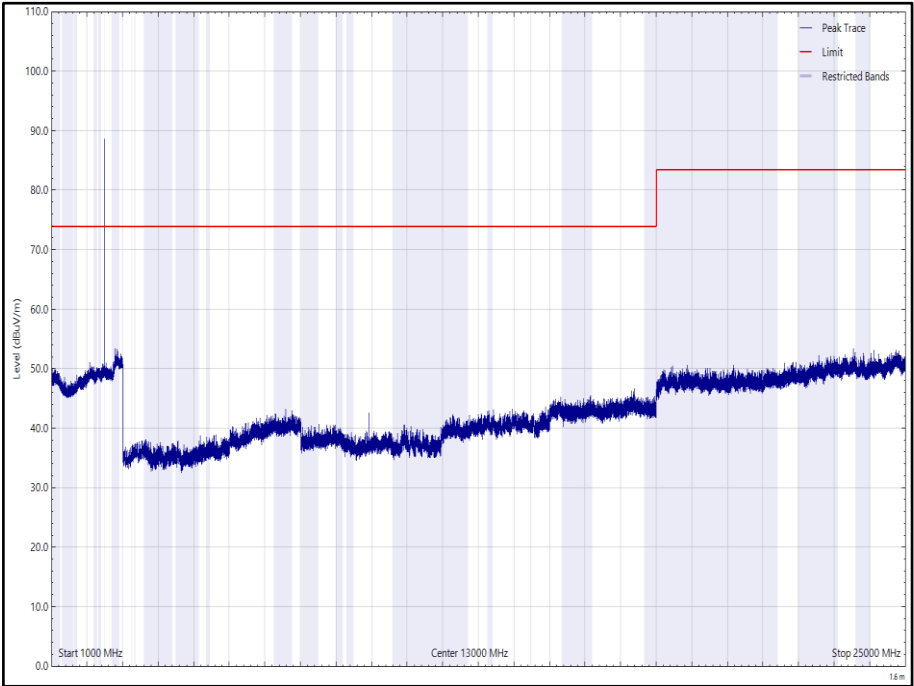


Figure 39 - Proprietary - Y, 2480 MHz, 1 GHz to 25 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
37.631	30.1	40.0	-9.9	Q-Peak	299	100	Vertical
73.003	22.2	40.0	-17.8	Q-Peak	221	167	Vertical
137.896	30.0	43.5	-13.5	Q-Peak	285	100	Vertical
149.974	33.7	43.5	-9.8	Q-Peak	250	100	Vertical
162.083	30.4	43.5	-13.1	Q-Peak	260	100	Vertical

Table 26 - Proprietary - Z, 2402 MHz, 30 MHz to 25 GHz

No other emissions found within 6 dB of the limit.

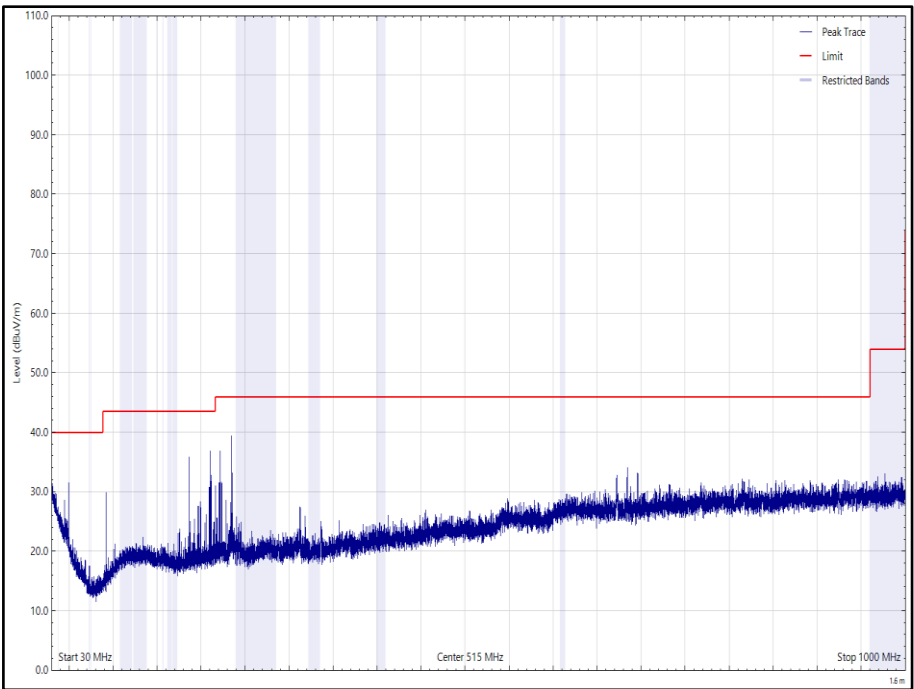


Figure 40 - Proprietary - Z, 2402 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

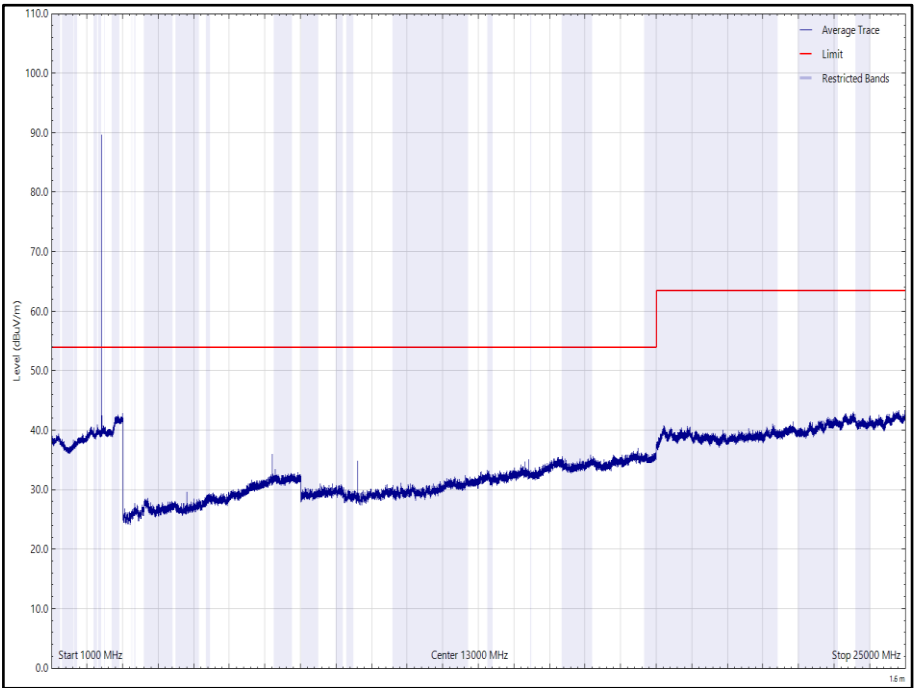


Figure 41 - Proprietary - Z, 2402 MHz, 1 GHz to 25 GHz, Horizontal (Average)

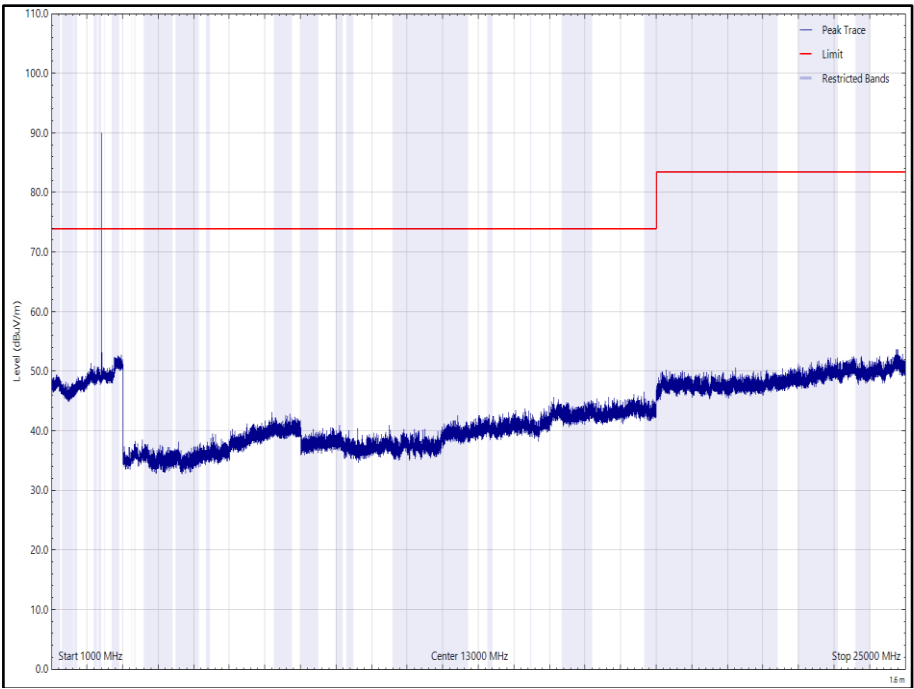


Figure 42 - Proprietary - Z, 2402 MHz, 1 GHz to 25 GHz, Horizontal (Peak)

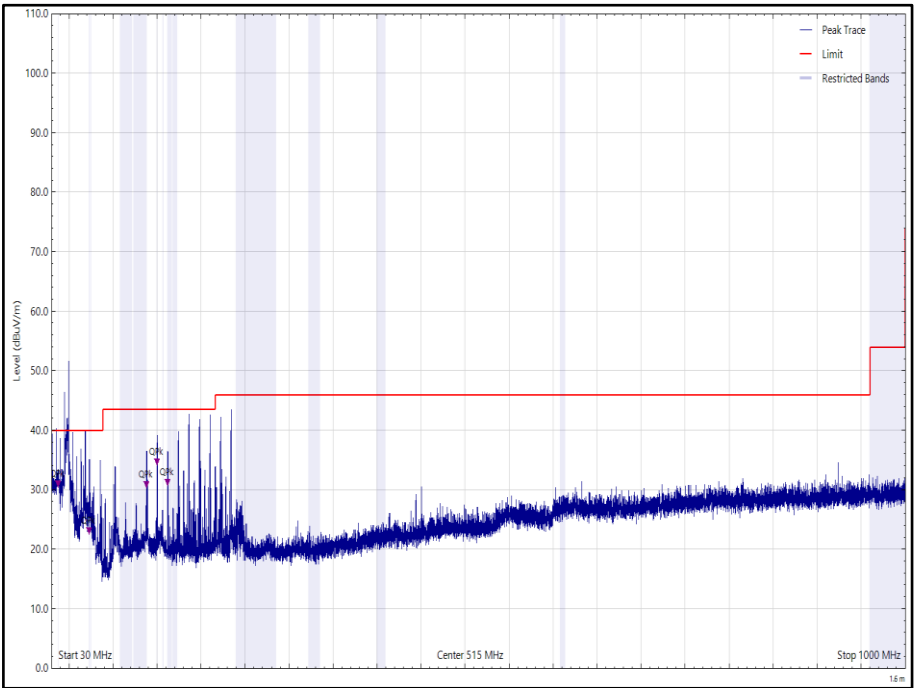


Figure 43 - Proprietary - Z, 2402 MHz, 30 MHz to 1 GHz, Vertical (Peak)

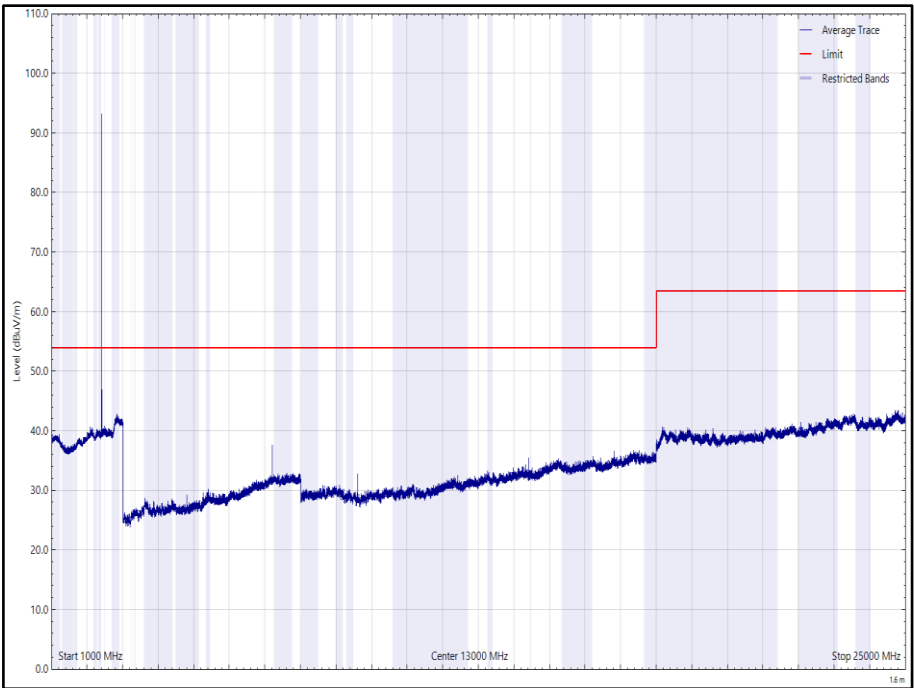


Figure 44 - Proprietary - Z, 2402 MHz, 1 GHz to 25 GHz, Vertical (Average)

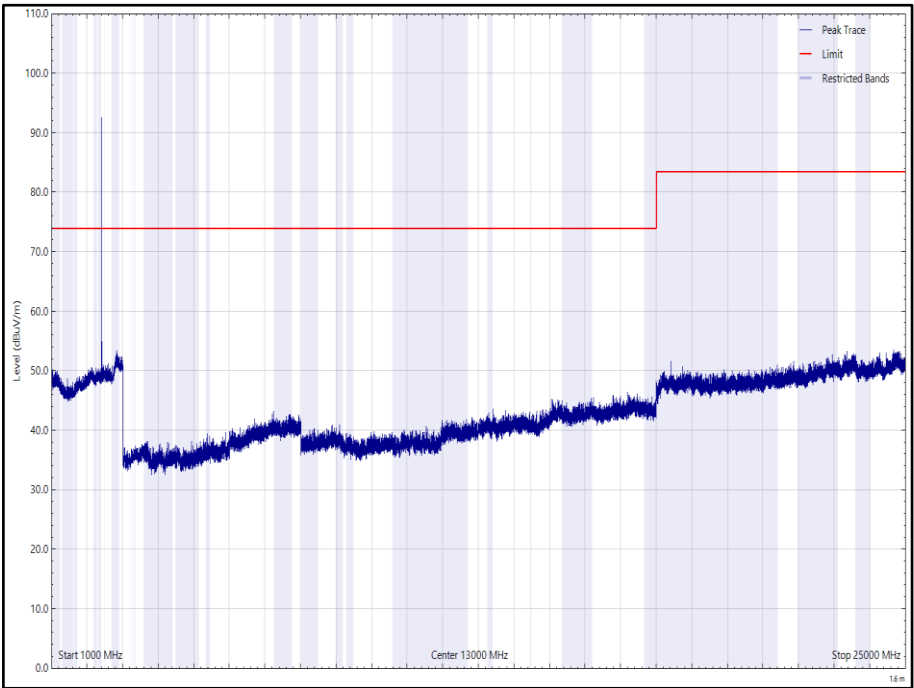


Figure 45 - Proprietary - Z, 2402 MHz, 1 GHz to 25 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
37.648	29.6	40.0	-10.4	Q-Peak	104	100	Vertical
73.038	20.8	40.0	-19.2	Q-Peak	145	100	Vertical
137.986	32.5	43.5	-11.1	Q-Peak	290	100	Vertical
149.909	32.2	43.5	-11.3	Q-Peak	278	100	Vertical
172.859	18.3	43.5	-25.2	Q-Peak	200	100	Vertical

Table 27 - Proprietary - Z, 2440 MHz, 30 MHz to 25 GHz

No other emissions found within 10 dB of the limit.

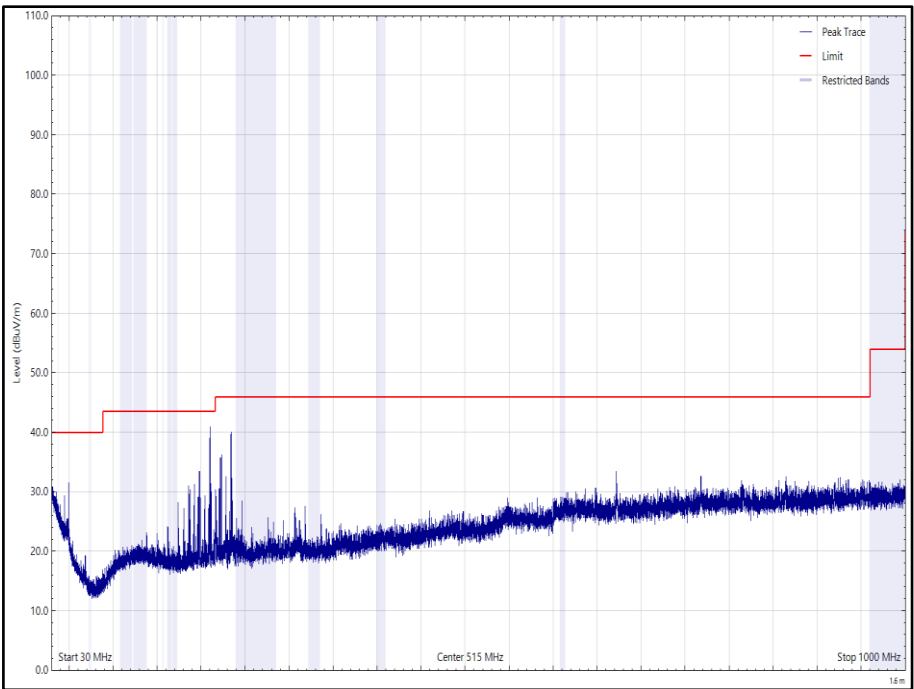


Figure 46 - Proprietary - Z, 2440 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

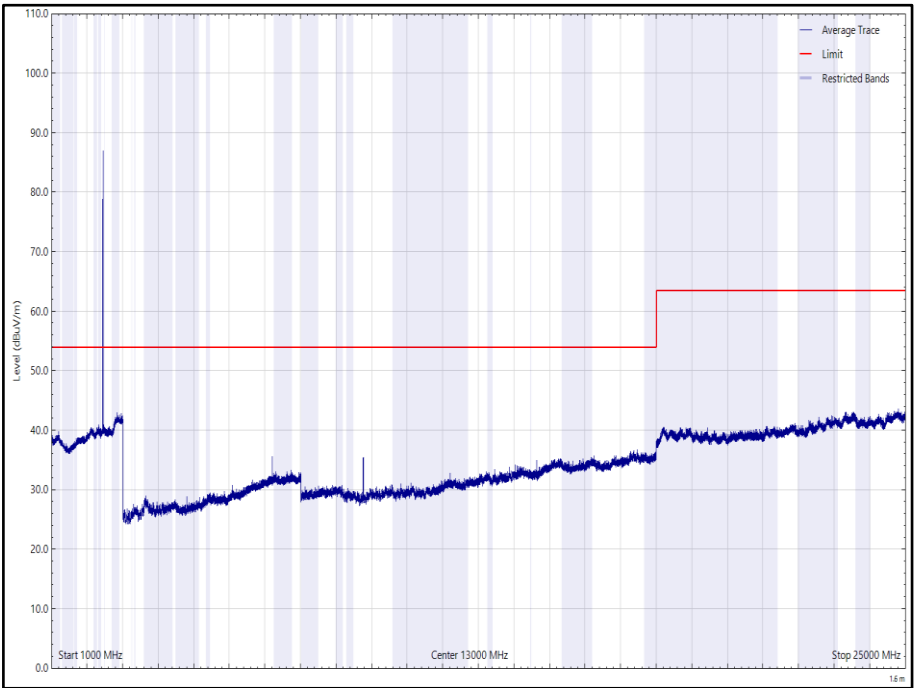


Figure 47 - Proprietary - Z, 2440 MHz, 1 GHz to 25 GHz, Horizontal (Average)

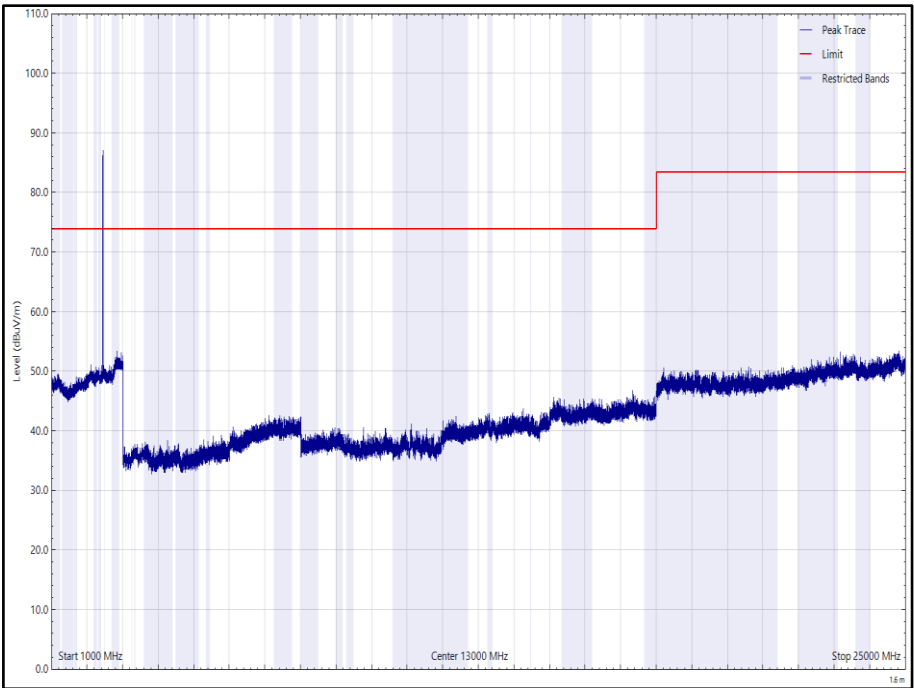


Figure 48 - Proprietary - Z, 2440 MHz, 1 GHz to 25 GHz, Horizontal (Peak)

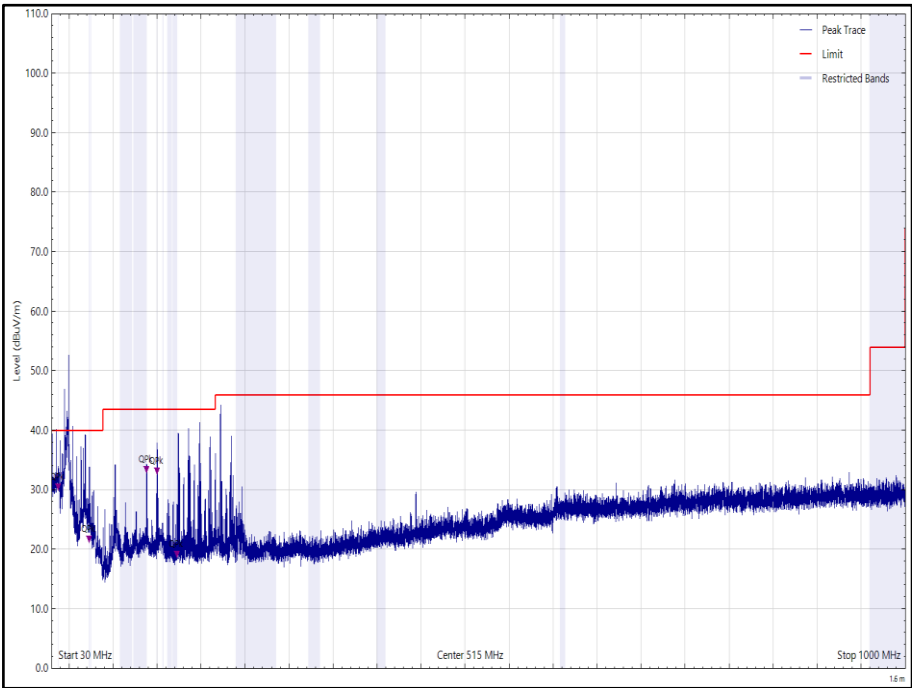


Figure 49 - Proprietary - Z, 2440 MHz, 30 MHz to 1 GHz, Vertical (Peak)

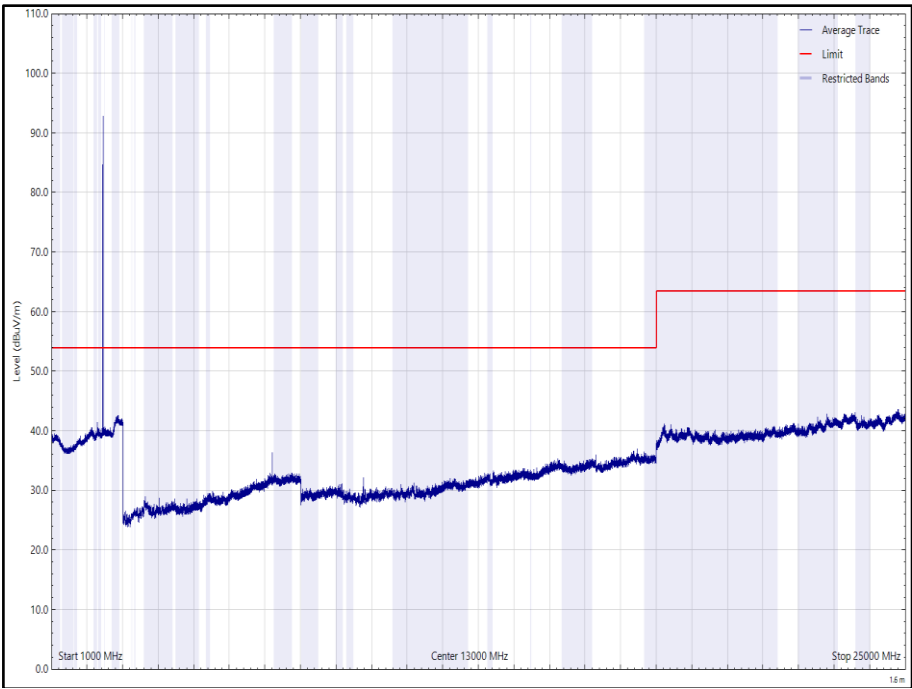


Figure 50 - Proprietary - Z, 2440 MHz, 1 GHz to 25 GHz, Vertical (Average)

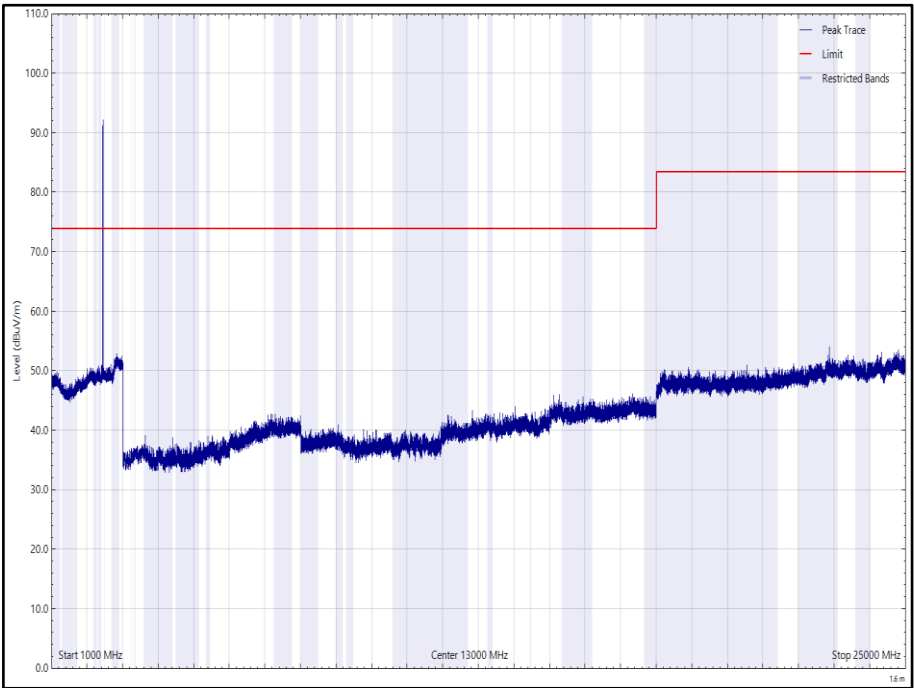


Figure 51 - Proprietary - Z, 2440 MHz, 1 GHz to 25 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
37.635	30.2	40.0	-9.8	Q-Peak	335	100	Vertical
73.018	20.7	40.0	-19.3	Q-Peak	214	101	Vertical
137.985	30.3	43.5	-13.2	Q-Peak	203	100	Vertical
149.933	33.0	43.5	-10.5	Q-Peak	271	100	Vertical
162.015	31.8	43.5	-11.7	Q-Peak	243	100	Vertical

Table 28 - Proprietary - Z, 2480 MHz, 30 MHz to 25 GHz

No other emissions found within 10 dB of the limit.

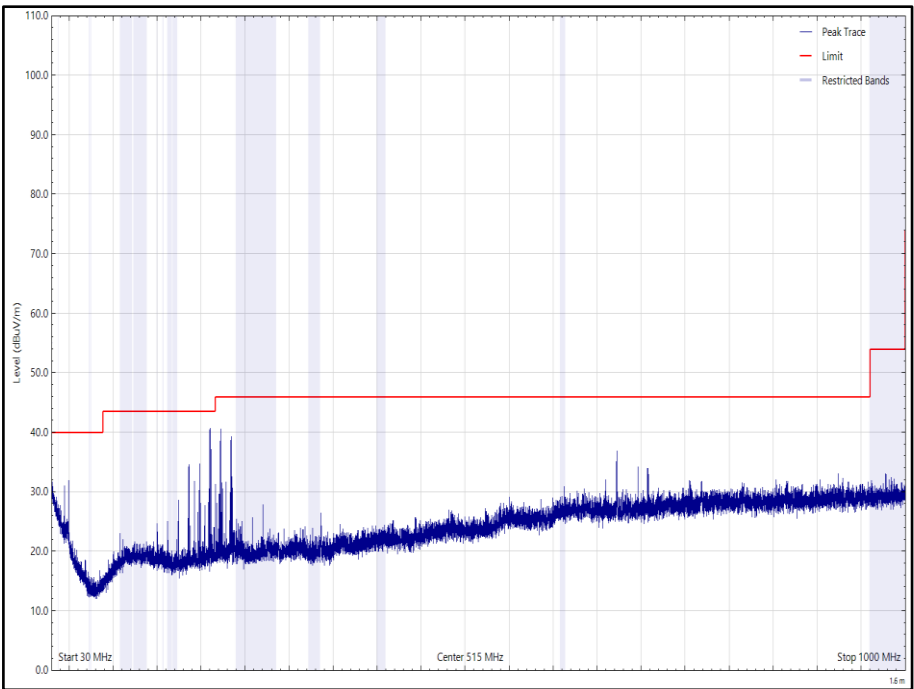


Figure 52 - Proprietary - Z, 2480 MHz, 30 MHz to 1 GHz, Horizontal (Peak)

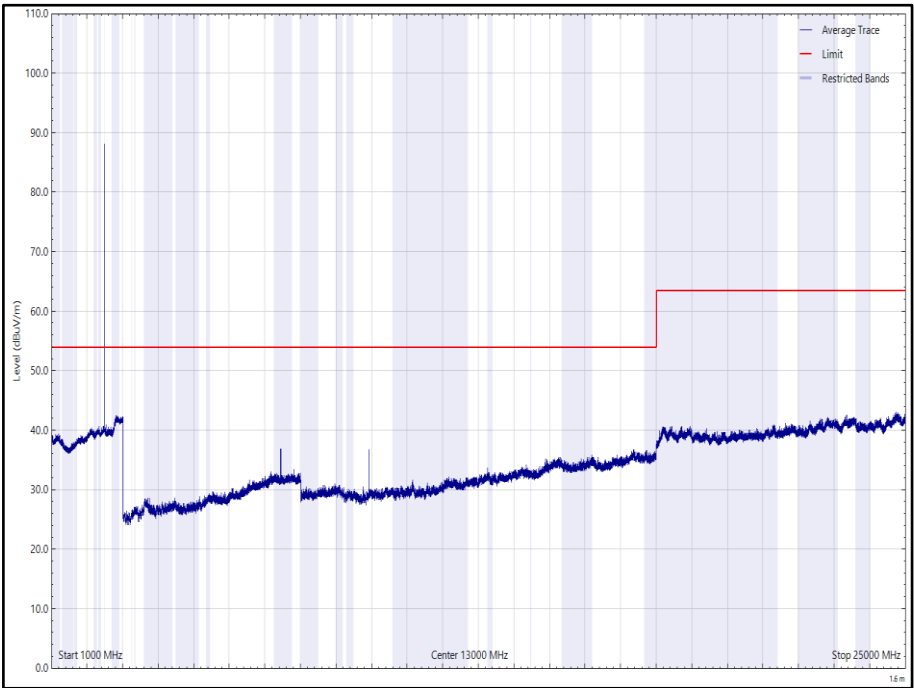


Figure 53 - Proprietary - Z, 2480 MHz, 1 GHz to 25 GHz, Horizontal (Average)

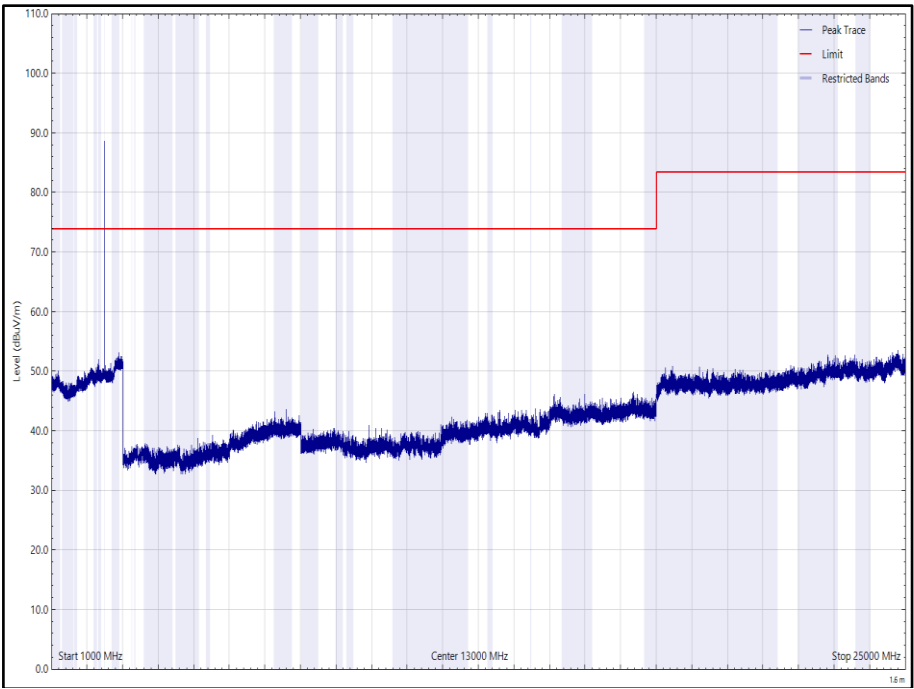


Figure 54 - Proprietary - Z, 2480 MHz, 1 GHz to 25 GHz, Horizontal (Peak)

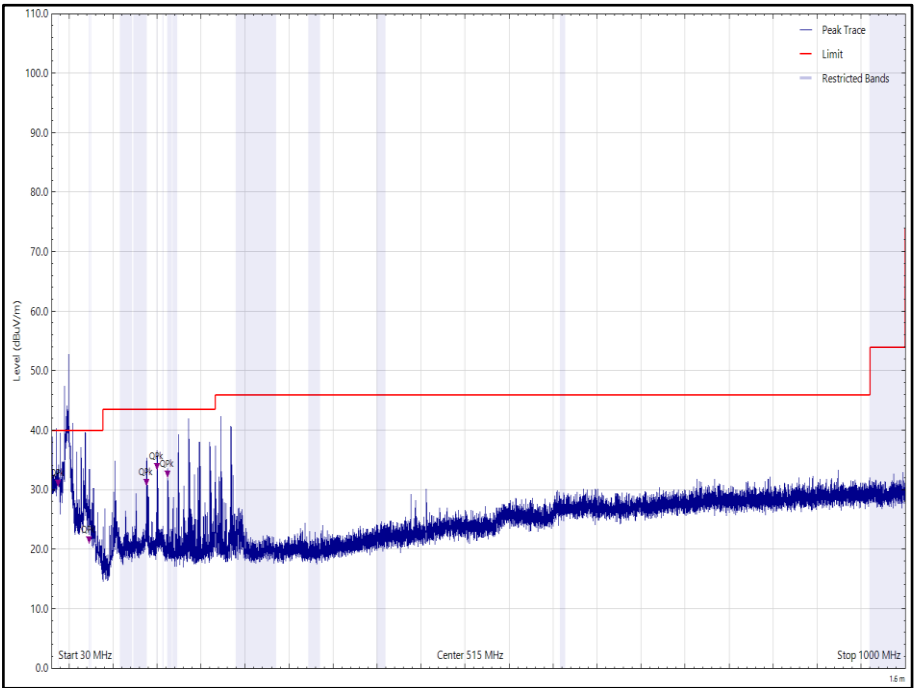


Figure 55 - Proprietary - Z, 2480 MHz, 30 MHz to 1 GHz, Vertical (Peak)

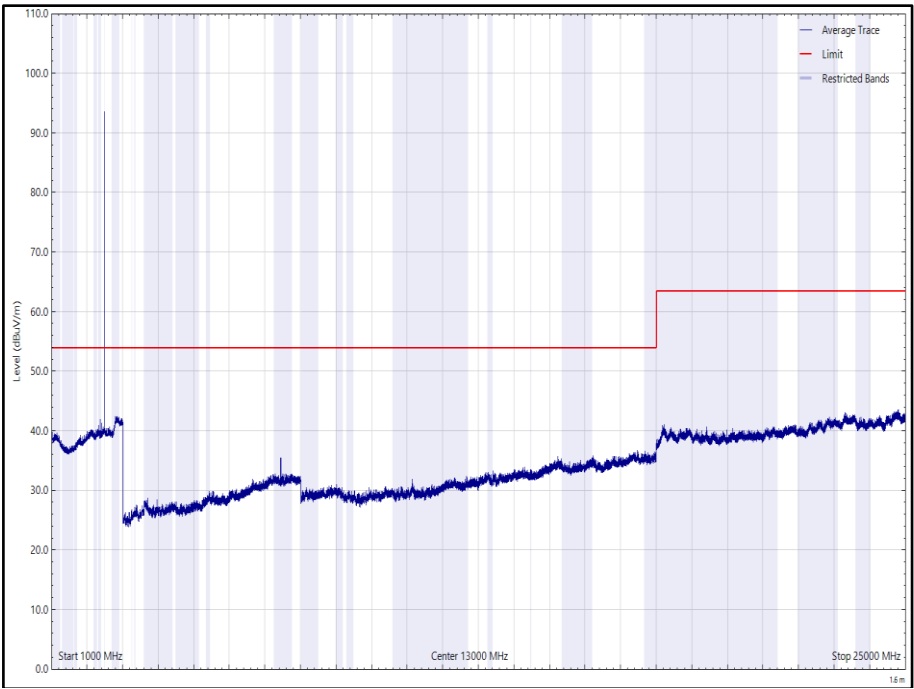


Figure 56 - Proprietary - Z, 2480 MHz, 1 GHz to 25 GHz, Vertical (Average)

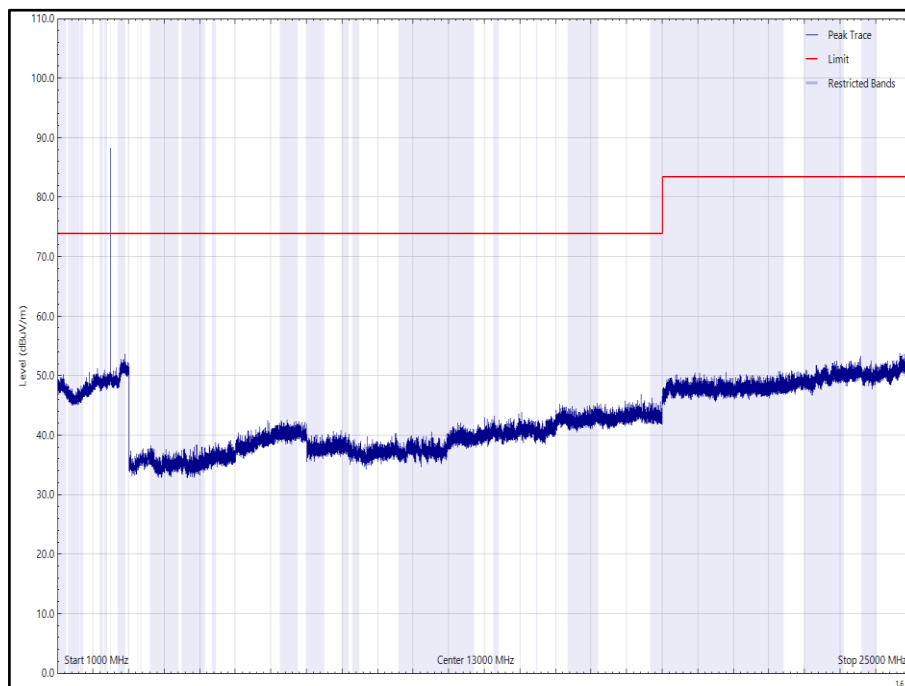


Figure 57 - Proprietary - Z, 2480 MHz, 1 GHz to 25 GHz, Vertical (Peak)

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in 15.209(a)

ISED RSS-247, Limit Clause 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

In addition, radiated emissions which fall in the restricted bands, as defined in RSS-GEN, clause 8.10, must also comply with the radiated emission limits specified in RSS-GEN clause 8.9.



2.2.8 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 12.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Pre-Amplifier (8 GHz to 18 GHz)	Phase One	PS04-0086	1533	12	21-Feb-2023
Test Receiver	Rohde & Schwarz	ESU40	3506	12	18-Mar-2022
Cable (K-Type to K-Type, 2 m)	Scott Cables	KPS-1501-2000-KPS	4526	6	06-Mar-2022
Cable (N-Type to N-Type, 1 m)	Rosenberger	LU7-036-1000	5031	12	23-Jul-2022
Emissions Software	TUV SUD	EmX V2.1.11	5125	-	Software
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	5217	12	25-Jan-2023
Preamplifier (30dB 18-40GHz)	Schwarzbeck	BBV 9721	5218	12	25-Jan-2023
Pre-Amplifier (1 GHz to 18 GHz)	Schwarzbeck	BBV 9718 C	5350	12	22-Sep-2022
Cable (N-Type to N-Type, 8 m)	Teledyne	PR90-088-8MTR	5450	6	08-Mar-2022
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	31-Mar-2022
3 GHz High pass Filter	Wainwright	WHKX12-2580-3000-18000-80SS	5548	12	07-May-2022
Antenna (DRG, 7.5 GHz to 18 GHz)	Schwarzbeck	HWRD750	5610	12	15-Oct-2022
Antenna (DRG, 1 GHz to 10 GHz)	Schwarzbeck	BBHA 9120 B	5611	12	15-Oct-2022
Turntable & Mast Controller	Maturo Gmbh	NCD/498/2799.01	5612	-	TU
Tilt Antenna Mast	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
Antenna (Bi-Log, 30 MHz to 1 GHz)	Teseq	CBL6111D	5615	24	16-Oct-2022
Screened Room (12)	MVG	EMC-3	5621	36	11-Aug-2023

Table 29

TU - Traceability Unscheduled



2.3 Authorised Band Edges

2.3.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (d)
ISED RSS-247, Clause 5.5

2.3.2 Equipment Under Test and Modification State

XYZ-22-02, S/N: 220012 - Modification State 0

2.3.3 Date of Test

01-March-2022

2.3.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.10.4.

2.3.5 Environmental Conditions

Ambient Temperature	20.9 °C
Relative Humidity	43.4 %

2.3.6 Test Results

2.4 GHz proprietary device

Mode	Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
Static	2402	2400	-48.54
Static	2480	2483.5	-49.60
Hopping	N/A	2400	-50.24
Hopping	N/A	2483.5	-51.63

Table 30

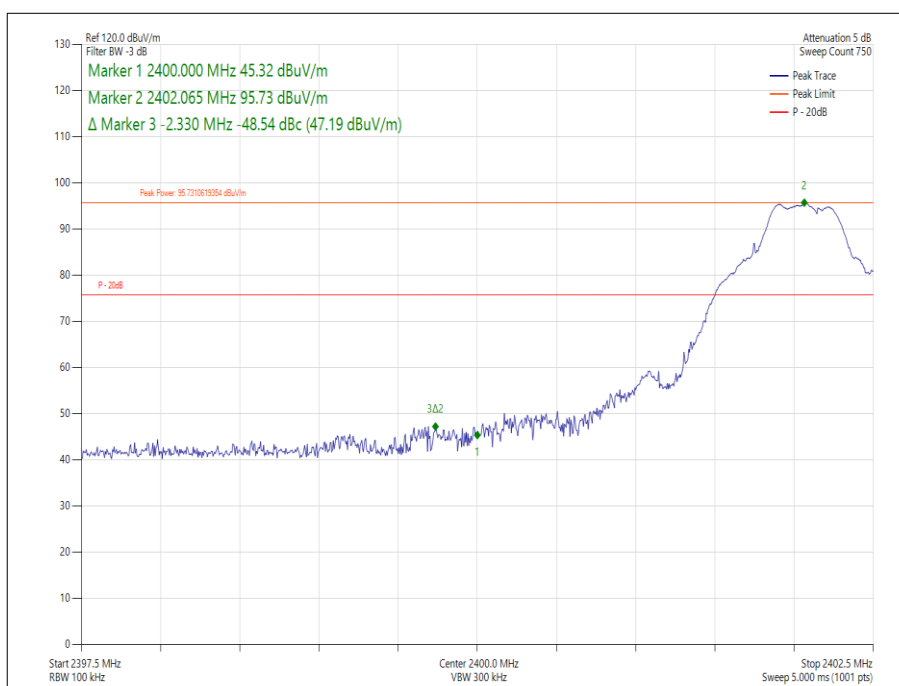


Figure 67 - Static, 2402 MHz - Measured Frequency 2400 MHz

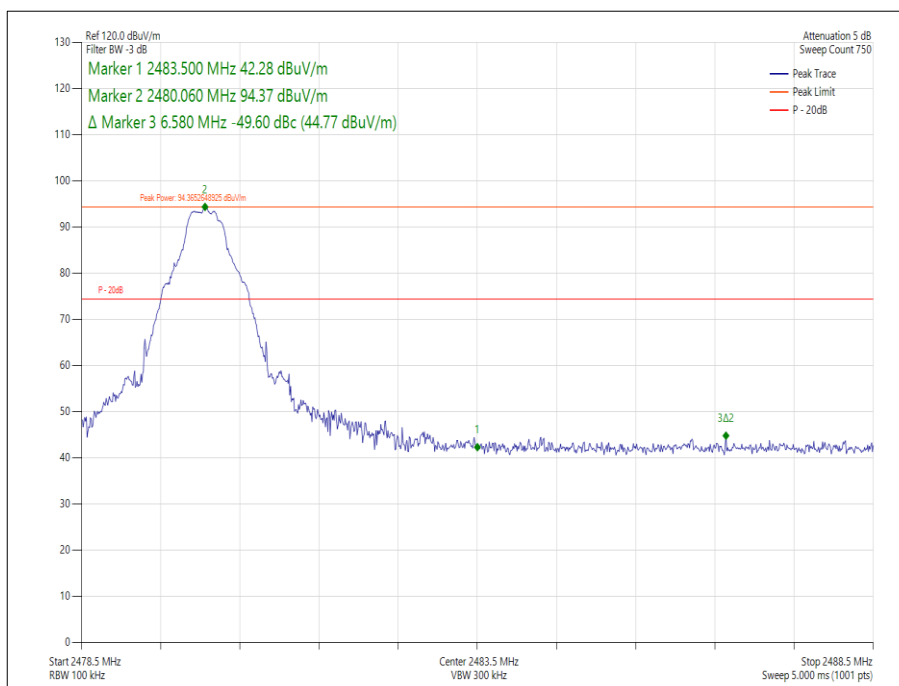


Figure 68 - Static, 2480 MHz - Measured Frequency 2483.5 MHz

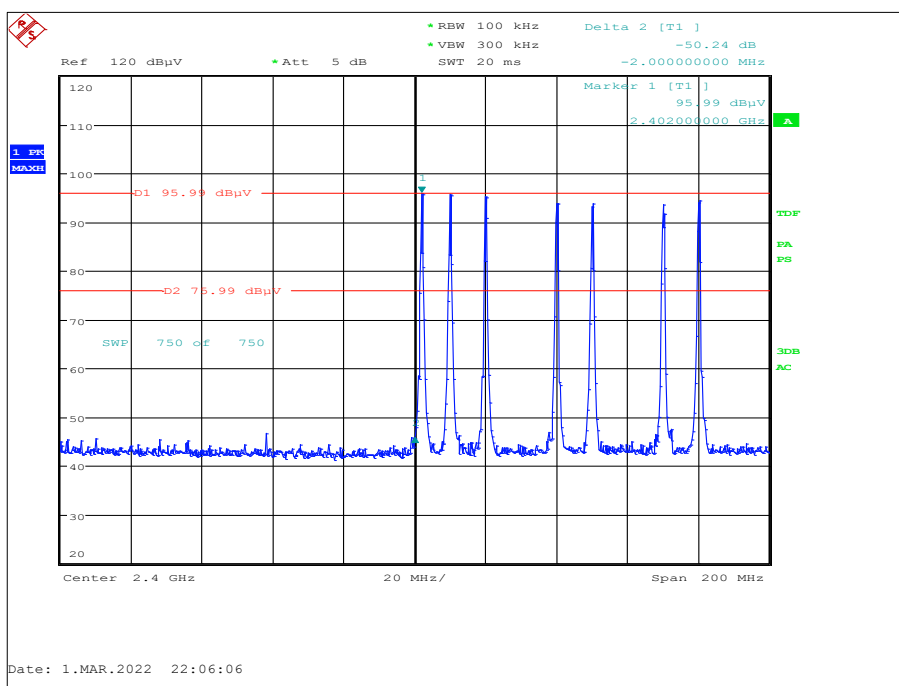


Figure 69 - Hopping - Measured Frequency 2400 MHz

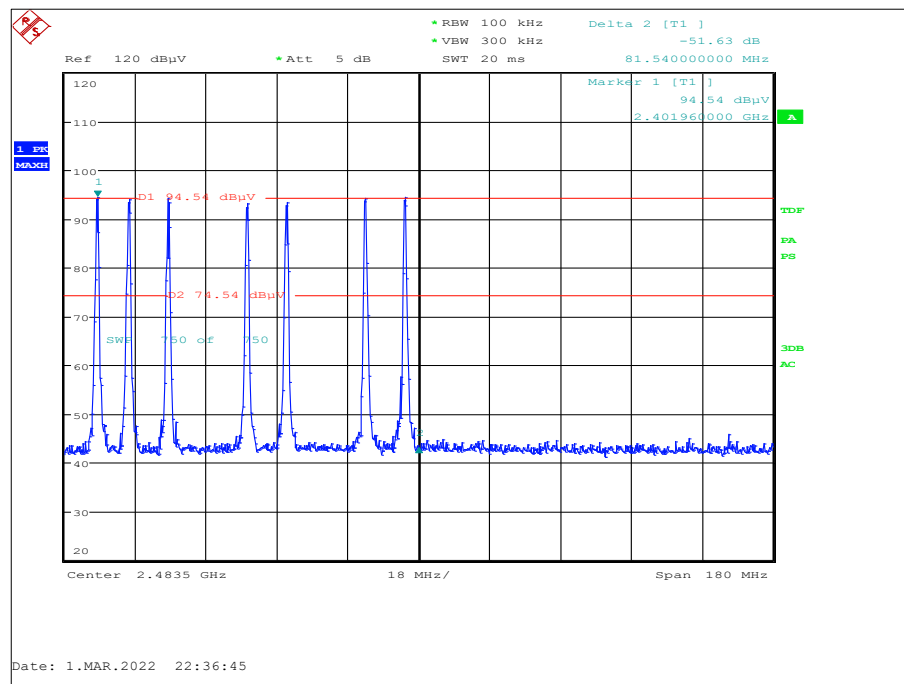


Figure 70 – Hopping - Measured Frequency 2483.5 MHz

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

ISED RSS-247, Limit Clause 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.



2.3.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 12.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Test Receiver	Rohde & Schwarz	ESU40	3506	12	18-Mar-2022
Cable (K-Type to K-Type, 2 m)	Scott Cables	KPS-1501-2000-KPS	4526	6	06-Mar-2022
Emissions Software	TUV SUD	EmX V2.1.11	5125	-	Software
Cable (N-Type to N-Type, 8 m)	Teledyne	PR90-088-8MTR	5450	6	08-Mar-2022
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	31-Mar-2022
Antenna (DRG, 1 GHz to 10 GHz)	Schwarzbeck	BBHA 9120 B	5611	12	15-Oct-2022
Turntable & Mast Controller	Maturo Gmbh	NCD/498/2799.01	5612	-	TU
Tilt Antenna Mast	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
Screened Room (12)	MVG	EMC-3	5621	36	11-Aug-2023

Table 31

TU - Traceability Unscheduled

3 Photographs

3.1 Test Setup Photographs

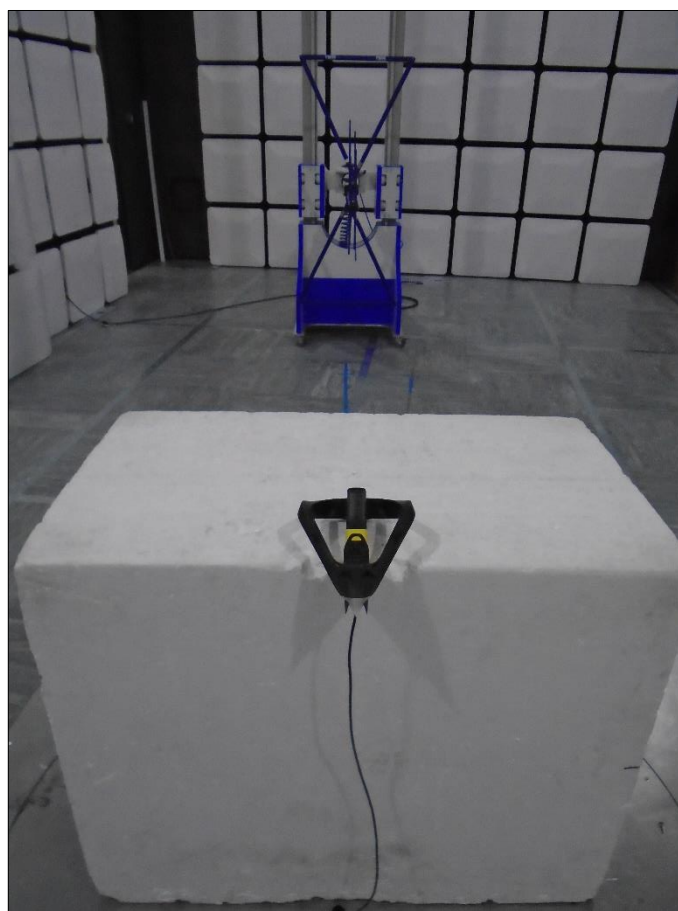


Figure 58 - Test Setup - 30 MHz to 1 GHz - X Orientation

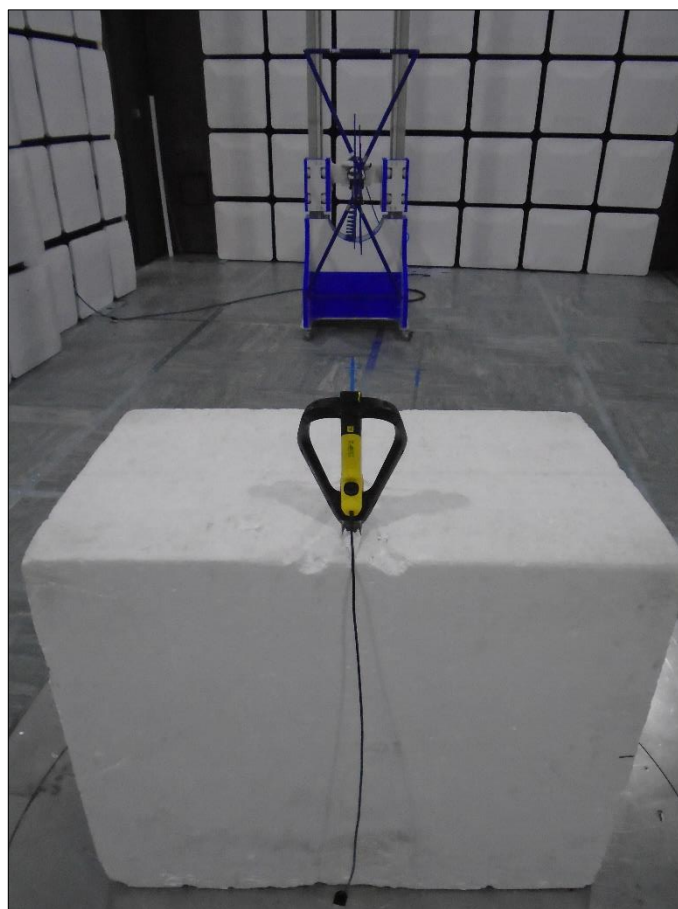


Figure 59 - Test Setup - 30 MHz to 1 GHz - Y Orientation

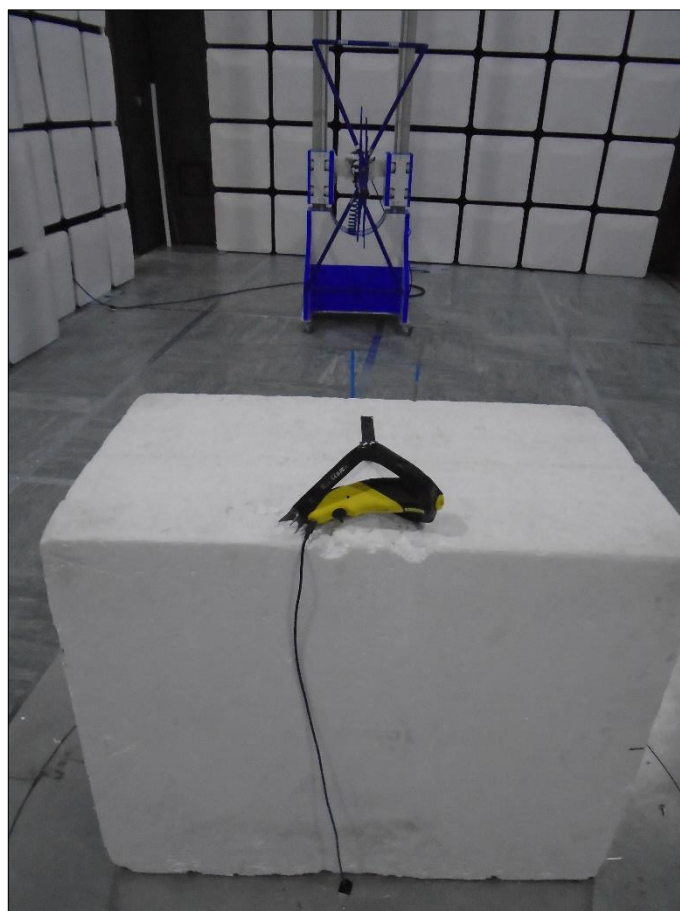


Figure 60 - Test Setup - 30 MHz to 1 GHz - Z Orientation



Figure 61 - Test Setup - 1 GHz to 18 GHz - X Orientation



Figure 62 - Test Setup - 1 GHz to 18 GHz - Y Orientation

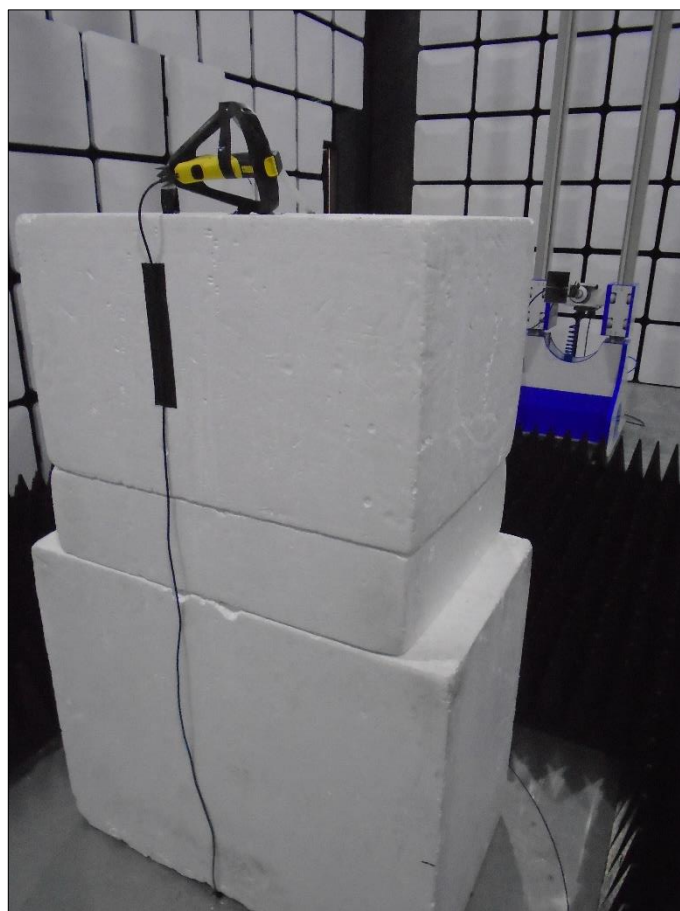


Figure 63 - Test Setup - 1 GHz to 18 GHz - Z Orientation



Figure 64 - Test Setup - 18 GHz to 25 GHz - X Orientation



Figure 65 - Test Setup - 18 GHz to 25 GHz - Y Orientation



Figure 66 - Test Setup - 18 GHz to 25 GHz - Z Orientation



4 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Restricted Band Edges	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Spurious Radiated Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Authorised Band Edges	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB

Table 32

Measurement Uncertainty Decision Rule – Accuracy Method

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115:2007, Clause 4.4.3 and 4.5.1. (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.