

FCC and ISED Test Report

XYZ Reality Limited
Model: Atom Hard Hat

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

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



Add value.
Inspire trust.

FCC ID: 2A3C5-TBA

IC: Not Applicable

COMMERCIAL-IN-CONFIDENCE

Document 75952587-14 Issue 01

SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Steve Marshall	Senior Engineer	Authorised Signatory	15 December 2021

Signatures in this approval box have checked this document in line with the requirements of TUV SUD 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	Daniel Cameron	15 December 2021	
Testing	Graeme Lawler	15 December 2021	

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.



DISCLAIMER AND COPYRIGHT

This non-binding report has been prepared by TÜV SÜD with all reasonable skill and care. The document is confidential to the potential Client and TÜV SÜD. No part of this document may be reproduced without the prior written approval of TÜV SÜD. © 2021 TÜV SÜD. This report relates only to the actual item/items tested.

ACCREDITATION

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation. Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).

TÜV SÜD
is a trading name of TÜV SÜD Ltd
Registered in Scotland at East Kilbride,
Glasgow G75 0QF, United Kingdom
Registered number: SC215164

TÜV SÜD Ltd is a
TÜV SÜD Group Company

Phone: +44 (0) 1489 558100
Fax: +44 (0) 1489 558101
www.tuvsud.com/en

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



Contents

1	Report Summary	2
1.1	Report Modification Record.....	2
1.2	Introduction.....	2
1.3	Brief Summary of Results	3
1.4	Application Form	5
1.5	Product Information	8
1.6	Deviations from the Standard.....	8
1.7	EUT Modification Record	8
1.8	Test Location	9
2	Test Details	10
2.1	Restricted Band Edges.....	10
2.2	Emission Bandwidth	24
2.3	Maximum Conducted Output Power	72
2.4	Spurious Radiated Emissions	84
2.5	Authorised Band Edges	186
2.6	Power Spectral Density	196
3	Photographs	204
3.1	Test Setup Photographs	204
4	Measurement Uncertainty	213



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	15-December-2021

Table 1

1.2 Introduction

Applicant	XYZ Reality Limited
Manufacturer	XYZ Reality Limited
Model Number(s)	Atom Hard Hat
Serial Number(s)	Not serialised (Storix-ID 599374-18) and Not serialised (Storix-ID 599374-99)
Hardware Version(s)	Not Applicable
Software Version(s)	Windows Certification Build
Number of Samples Tested	2
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	XYZ0179
Date	21-June-2021
Date of Receipt of EUT	06-September-2021
Start of Test	07-September-2021
Finish of Test	24-October-2021
Name of Engineer(s)	Daniel Cameron and Graeme Lawler
Related Document(s)	KDB 662911 D01 V02r01 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: 802.11b - 2.4 GHz WLAN						
-	15.203	-	-	Antenna Requirement	N/T	The device complies with the provisions of this section, as it uses permanently attached integral antennas.
2.1	15.205	-	8.10	Restricted Band Edges	Pass	
2.1	15.247 (a)(2)	5.2	6.7	Emission Bandwidth	Pass	
2.3	15.247 (b)	5.4	6.12	Maximum Conducted Output Power	Pass	
2.4	15.247 (d) and 15.209	3.3 and 5.5	6.13 and 8.9	Spurious Radiated Emissions	Pass	
2.5	15.247 (d)	5.5	-	Authorised Band Edges	Pass	
2.6	15.247 (e)	5.2	6.12	Power Spectral Density	Pass	
Configuration and Mode: 802.11g - 2.4 GHz WLAN						
2.2	15.205	-	8.10	Restricted Band Edges	Pass	
2.1	15.247 (a)(2)	5.2	6.7	Emission Bandwidth	Pass	
2.3	15.247 (b)	5.4	6.12	Maximum Conducted Output Power	Pass	
2.4	15.247 (d) and 15.209	3.3 and 5.5	6.13 and 8.9	Spurious Radiated Emissions	Pass	
2.5	15.247 (d)	5.5	-	Authorised Band Edges	Pass	
2.6	15.247 (e)	5.2	6.12	Power Spectral Density	Pass	
Configuration and Mode: 802.11n (20 MHz Bandwidth) - 2.4 GHz WLAN						
2.2	15.205	-	8.10	Restricted Band Edges	Pass	
2.1	15.247 (a)(2)	5.4	6.7	Emission Bandwidth	Pass	
2.3	15.247 (b)	5.4	6.12	Maximum Conducted Output Power	Pass	



2.4	15.247 (d) and 15.209	3.3 and 5.5	6.13 and 8.9	Spurious Radiated Emissions	Pass	
2.5	15.247 (d)	5.5	-	Authorised Band Edges	Pass	
2.6	15.247 (e)	5.2	6.12	Power Spectral Density	Pass	
Configuration and Mode: 802.11n (40 MHz Bandwidth) - 2.4 GHz WLAN						
2.2	15.205	-	8.10	Restricted Band Edges	Pass	
2.1	15.247 (a)(2)	5.2	6.7	Emission Bandwidth	Pass	
2.3	15.247 (b)	5.4	6.12	Maximum Conducted Output Power	Pass	
2.5	15.247 (d)	5.5	-	Authorised Band Edges	Pass	
2.6	15.247 (e)	5.2	6.12	Power Spectral Density	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)	Protective hard Hat with integrated eye protection and augmented reality
Manufacturer:	XYZ Reality Ltd
Model:	Atom Hard Hat
Part Number:	XYZ-12-01
Hardware Version:	Not Applicable
Software Version:	Windows Certification Build
FCC ID of the product under test – see guidance here	2A3C5-TBA (contains FCC ID PD992260NG)
IC ID of the product under test – see guidance here	N/A (Contains IC 1000M-9260NG)

Table 3

Intentional Radiators

Technology	Bluetooth	BLE	WLAN 2.4 GHz	Proprietary ISM 2.4GHz
Frequency Range (MHz to MHz)	2402-2480	2402-2480	2412-2472	2402-2480
Conducted Declared Output Power (dBm)	5	5	19	0
Antenna Gain (dBi)	2.8	2.8	2.8	2.8
Supported Bandwidth(s) (MHz) (e.g 1 MHz, 20 MHz, 40 MHz)	1	1	20 / 40	840
Modulation Scheme(s) (e.g GFSK, QPSK etc)	GFSK / $\pi/4$ DQPSK / 8-DPSK	GFSK	OFDM / OFDM-HT / CCK	GFSK / DQPSK
ITU Emission Designator (see guidance here) (not mandatory for Part 15 devices)	1M00F1D	1M00F1D	20M3D1W / 40M3D1W	1M00F1D
Bottom Frequency (MHz)	2402	2402	2412	2402
Middle Frequency (MHz)	2441	2440	2437	2440
Top Frequency (MHz)	2480	2480	2472	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:	Flexible	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: 04 November 2021



1.5 Product Information

1.5.1 Technical Description

Protective hard hat with integrated eye protection and 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: Atom Hard Hat, Serial Number: Not serialised (Storix-ID 599374-18)			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: Atom Hard Hat, Serial Number: Not serialised (Storix-ID 599374-99)			
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: 802.11b - 2.4 GHz WLAN		
Emission Bandwidth	Daniel Cameron	UKAS
Restricted Band Edges	Graeme Lawler	UKAS
Maximum Conducted Output Power	Daniel Cameron	UKAS
Spurious Radiated Emissions	Graeme Lawler	UKAS
Authorised Band Edges	Graeme Lawler	UKAS
Power Spectral Density	Daniel Cameron	UKAS
Configuration and Mode: 802.11g - 2.4 GHz WLAN		
Restricted Band Edges	Graeme Lawler	UKAS
Emission Bandwidth	Daniel Cameron	UKAS
Maximum Conducted Output Power	Daniel Cameron	UKAS
Spurious Radiated Emissions	Graeme Lawler	UKAS
Authorised Band Edges	Graeme Lawler	UKAS
Power Spectral Density	Daniel Cameron	UKAS
Configuration and Mode: 802.11n (20 MHz Bandwidth) - 2.4 GHz WLAN		
Restricted Band Edges	Graeme Lawler	UKAS
Emission Bandwidth	Daniel Cameron	UKAS
Maximum Conducted Output Power	Daniel Cameron	UKAS
Spurious Radiated Emissions	Graeme Lawler	UKAS
Authorised Band Edges	Graeme Lawler	UKAS
Power Spectral Density	Daniel Cameron	UKAS
Configuration and Mode: 802.11n (40 MHz Bandwidth) - 2.4 GHz WLAN		
Restricted Band Edges	Graeme Lawler	UKAS
Emission Bandwidth	Daniel Cameron	UKAS
Maximum Conducted Output Power	Daniel Cameron	UKAS
Authorised Band Edges	Graeme Lawler	UKAS
Power Spectral Density	Daniel Cameron	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-GEN, Clause 8.10

2.1.2 Equipment Under Test and Modification State

Atom Hard Hat, S/N: Not serialised (Storix-ID 599374-18) - Modification State 0

2.1.3 Date of Test

08-September-2021 to 24-October-2021

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 4.1.4.2.5. 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 11.12.2.5.2 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	20.7-21.1 °C
Relative Humidity	42.9-56.3 %



2.1.6 Test Results

802.11b - 2.4 GHz WLAN

Mode	Data Rate/MCS	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11b (2Tx)	1 Mbps	2412	2390	59.35	49.63
802.11b (2Tx)	1 Mbps	2462	2483.5	61.09	51.54
802.11b (2Tx)	1 Mbps	2467	2483.5	60.20	51.40
802.11b (2Tx)	1 Mbps	2472	2483.5	59.66	49.78

Table 16

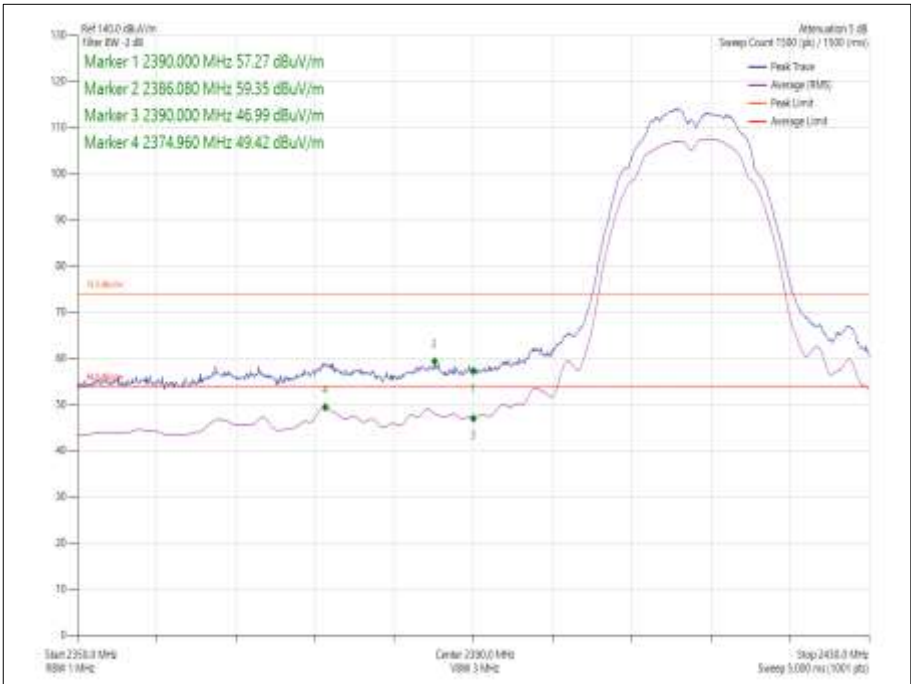


Figure 1 - 1 Mbps - 2412 MHz - Measured Frequency 2390 MHz

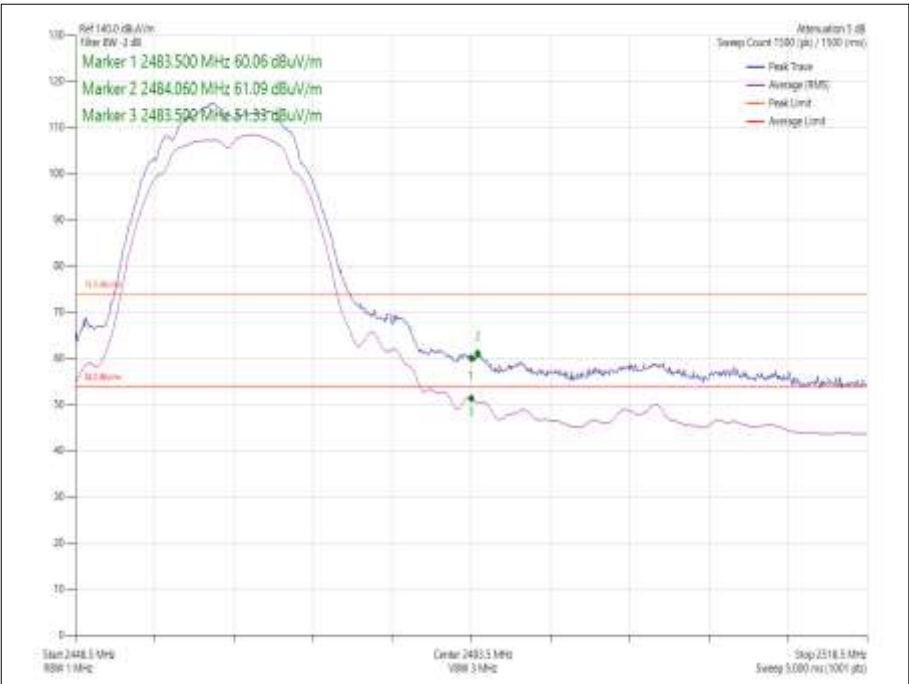


Figure 2 - 1 Mbps - 2462 MHz - Measured Frequency 2483.5 MHz

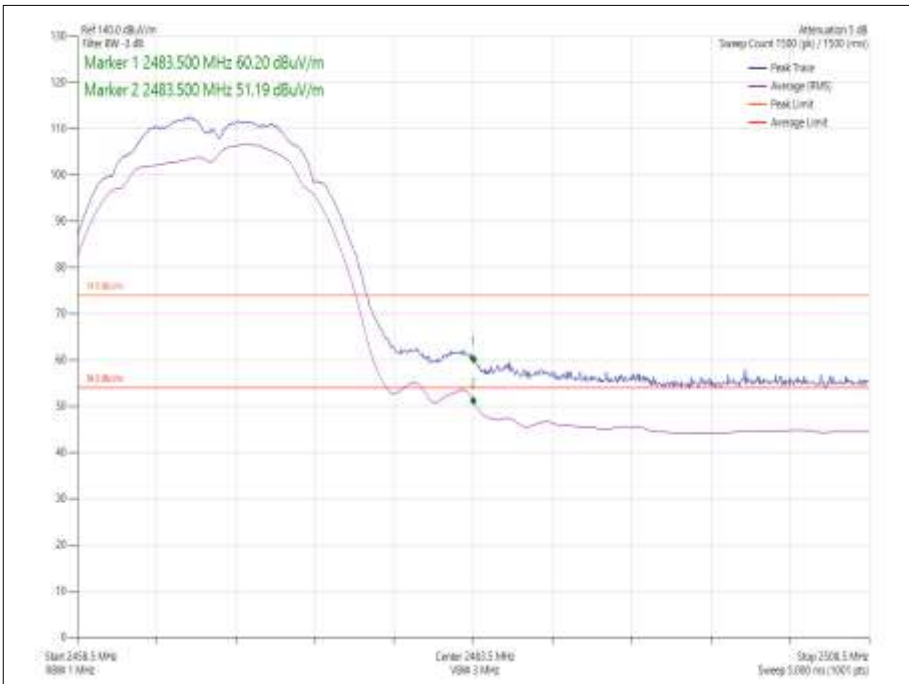


Figure 3 - 1 Mbps - 2467 MHz - Measured Frequency 2483.5 MHz

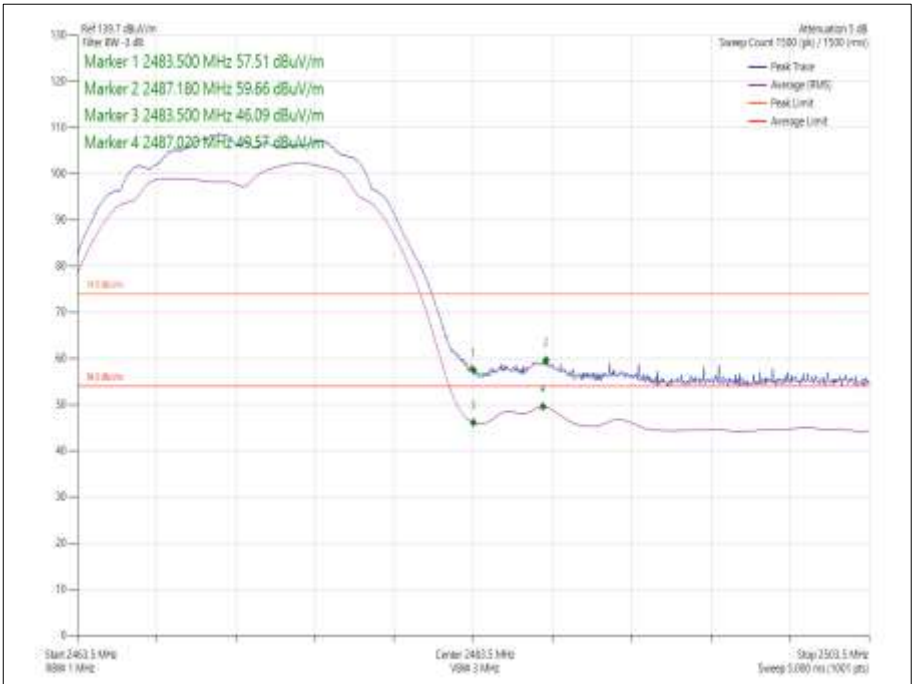


Figure 4 - 1 Mbps - 2472 MHz - Measured Frequency 2483.5 MHz

802.11g - 2.4 GHz WLAN

Mode	Data Rate/MCS	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11g (2Tx)	6 Mbps	2412	2390	61.65	48.37
802.11g (2Tx)	6 Mbps	2462	2483.5	61.20	48.35
802.11g (2Tx)	6 Mbps	2467	2483.5	62.06	49.01
802.11g (2Tx)	6 Mbps	2472	2483.5	67.82	53.11

Table 17

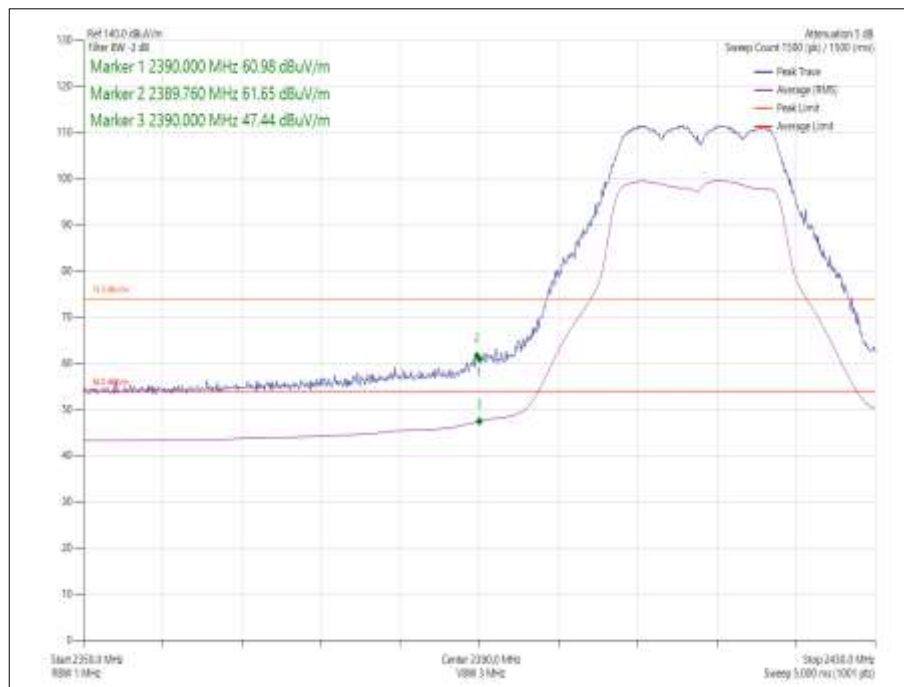


Figure 5 - 6 Mbps - 2412 MHz - Measured Frequency 2390 MHz

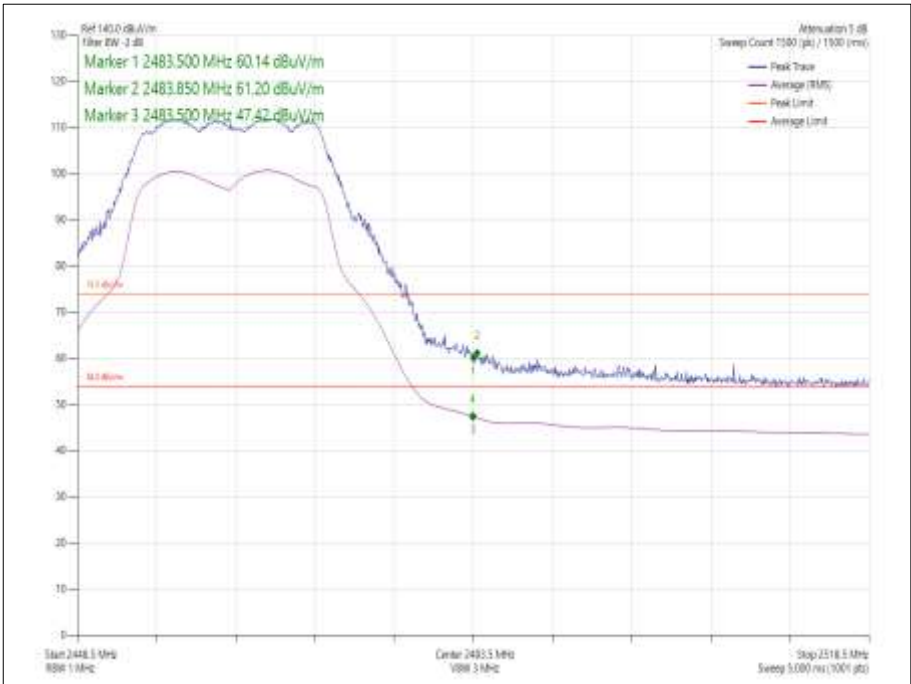


Figure 6 - 6 Mbps - 2462 MHz - Measured Frequency 2483.5 MHz

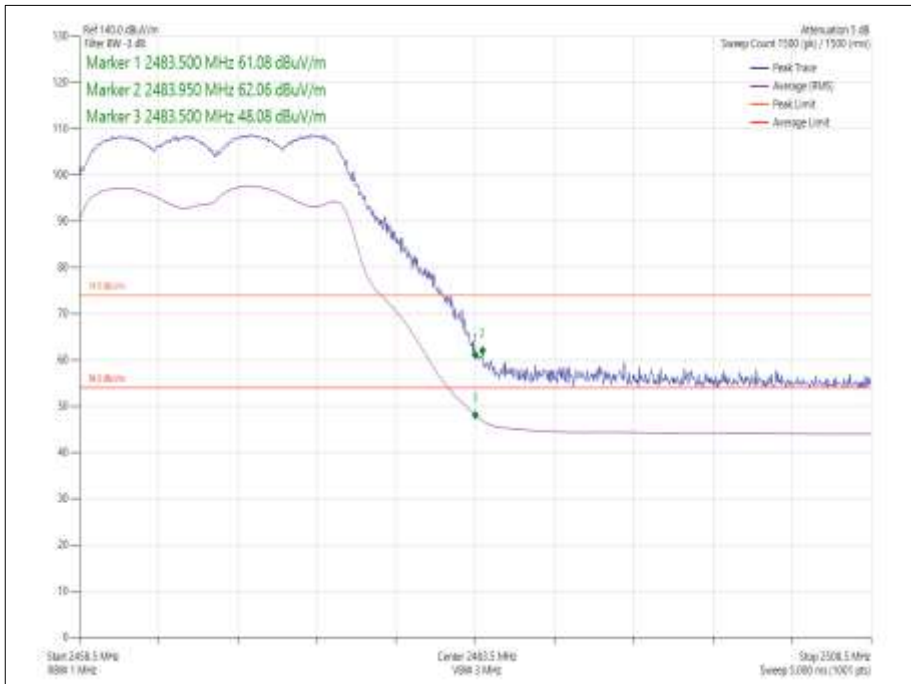


Figure 7 - 6 Mbps - 2467 MHz - Measured Frequency 2483.5 MHz

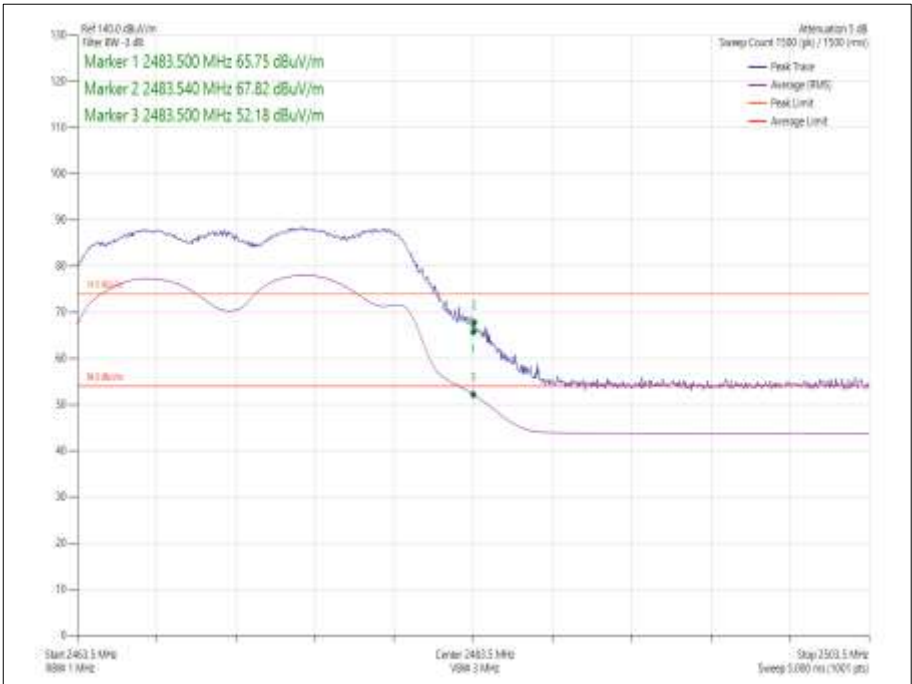


Figure 8 - 6 Mbps - 2472 MHz - Measured Frequency 2483.5 MHz



802.11n (20 MHz Bandwidth) - 2.4 GHz WLAN

Mode	Data Rate/MCS	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
HT20 (2Tx MIMO)	MCS0	2412	2390	63.61	49.59
HT20 (2Tx MIMO)	MCS0	2462	2483.5	63.98	48.53
HT20 (2Tx MIMO)	MCS0	2467	2483.5	65.39	48.31
HT20 (2Tx MIMO)	MCS0	2472	2483.5	67.81	53.18

Table 18

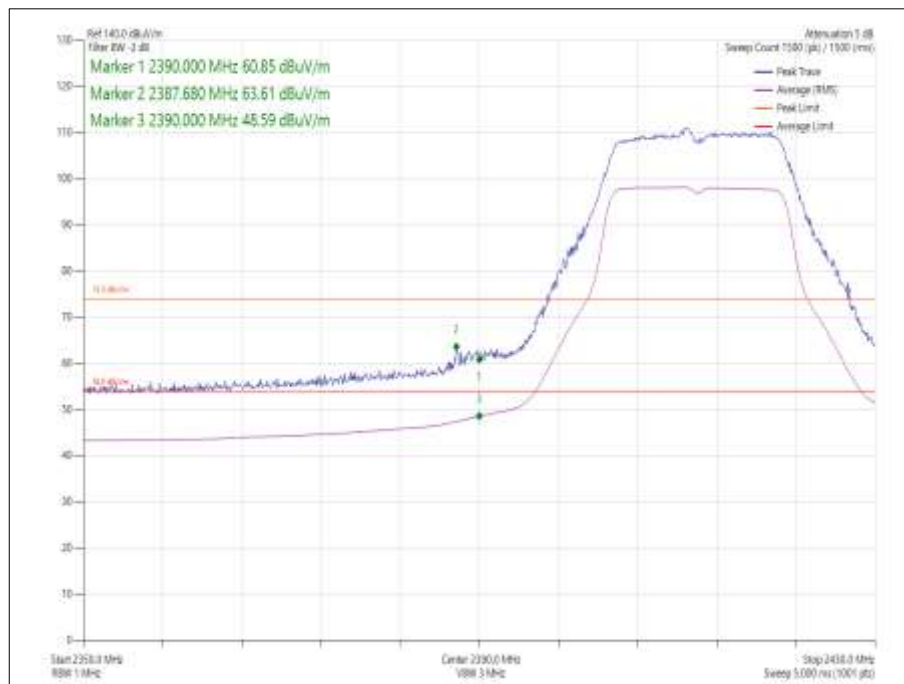


Figure 9 - MCS0 - 2412 MHz - Measured Frequency 2390 MHz

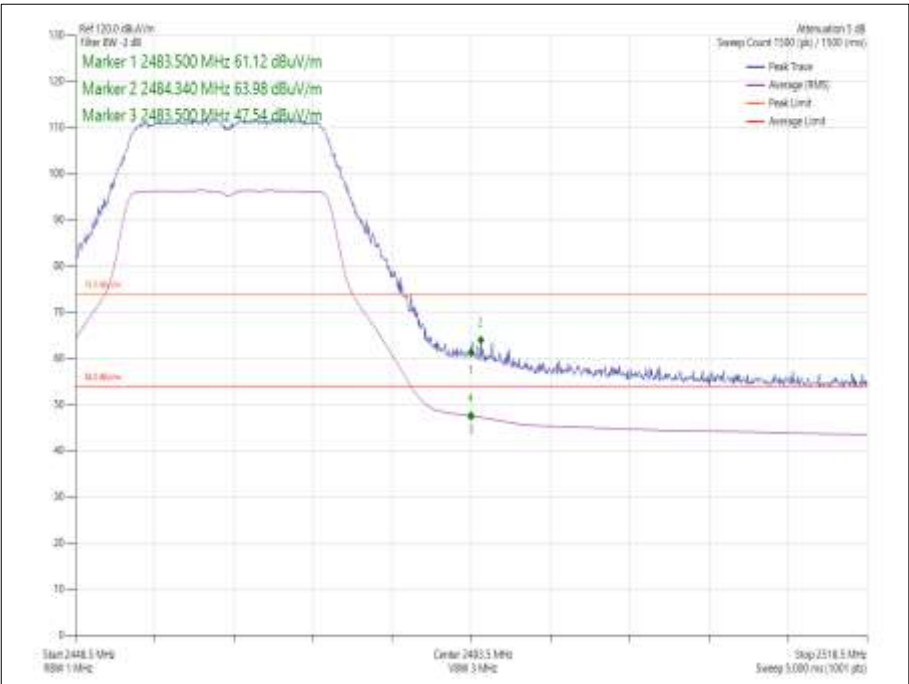


Figure 10 - MCS0 - 2462 MHz - Measured Frequency 2483.5 MHz

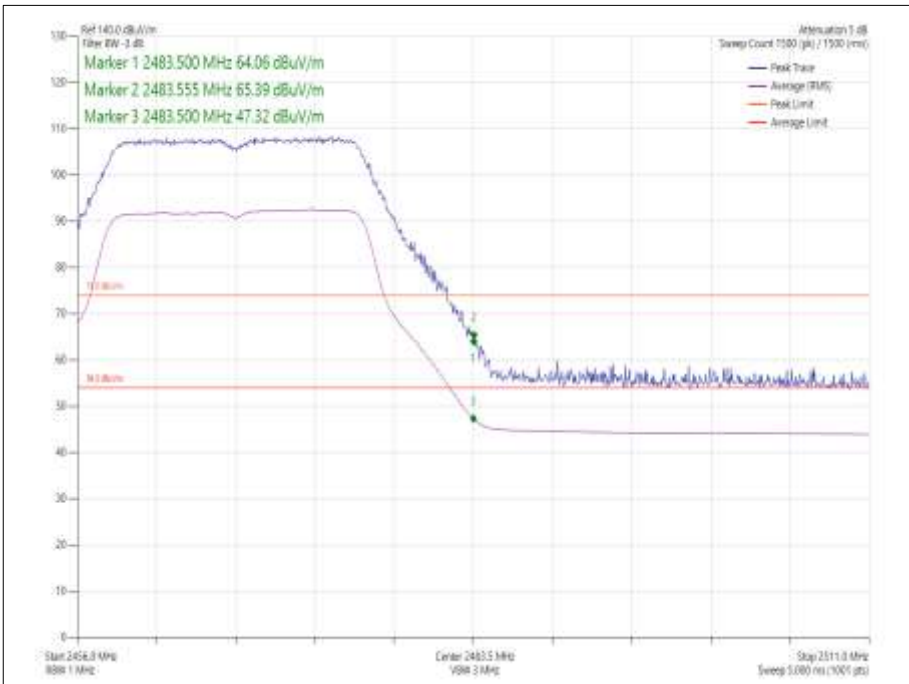


Figure 11 - MCS0 - 2462 MHz - Measured Frequency 2483.5 MHz

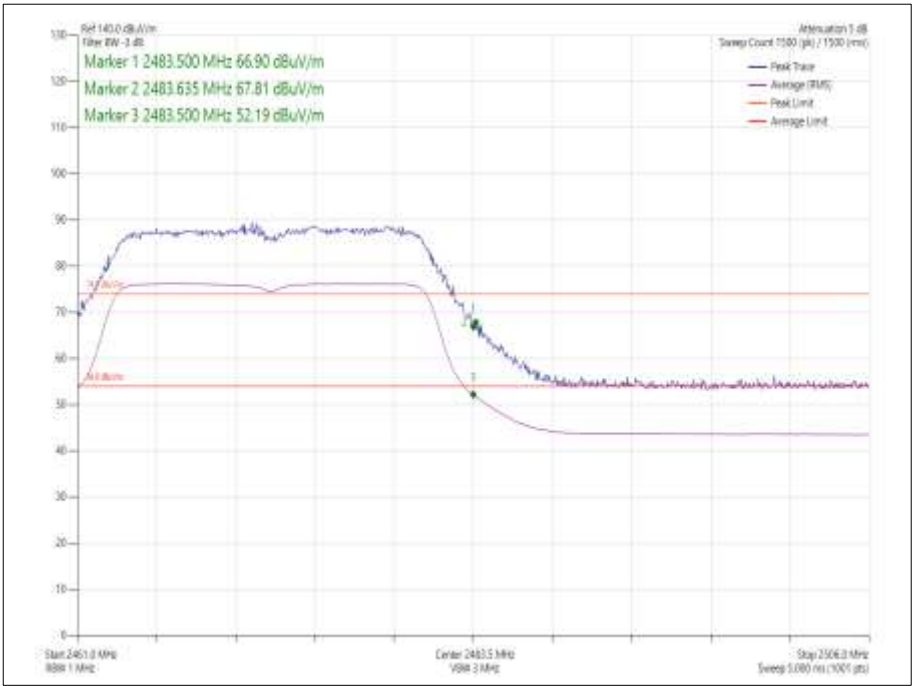


Figure 12 - MCS0 - 2462 MHz - Measured Frequency 2483.5 MHz



802.11n (40 MHz Bandwidth) - 2.4 GHz WLAN

Mode	Data Rate/MCS	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
HT40 (2Tx MIMO)	MCS0	2422	2390	59.60	47.27
HT40 (2Tx MIMO)	MCS0	2452	2483.5	60.12	47.44
HT40 (2Tx MIMO)	MCS0	2457	2483.5	64.52	50.06
HT40 (2Tx MIMO)	MCS0	2462	2483.5	69.64	49.64

Table 19

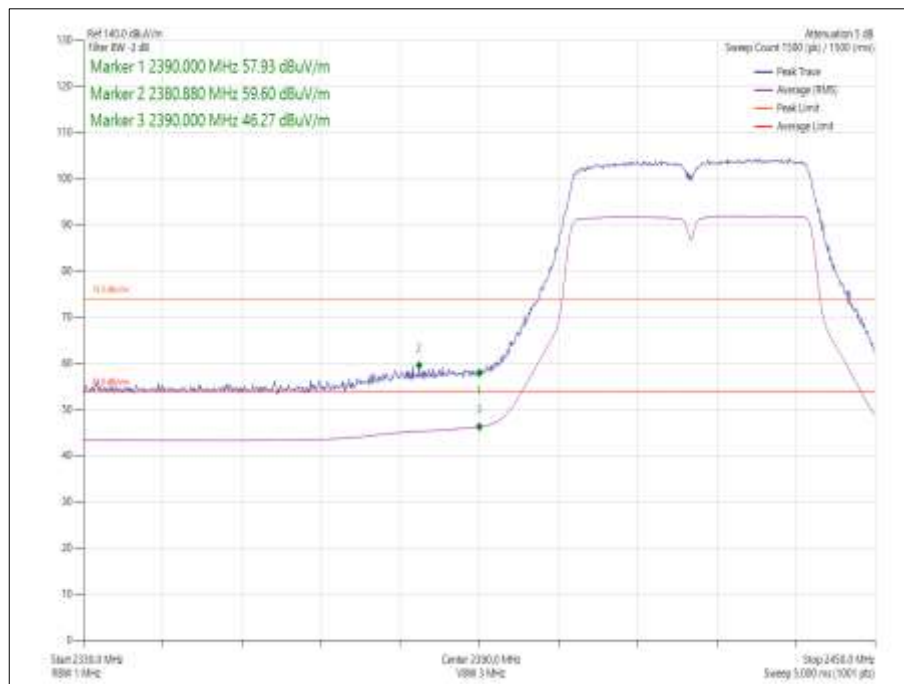


Figure 13 - MCS0 - 2422 MHz - Measured Frequency 2390 MHz

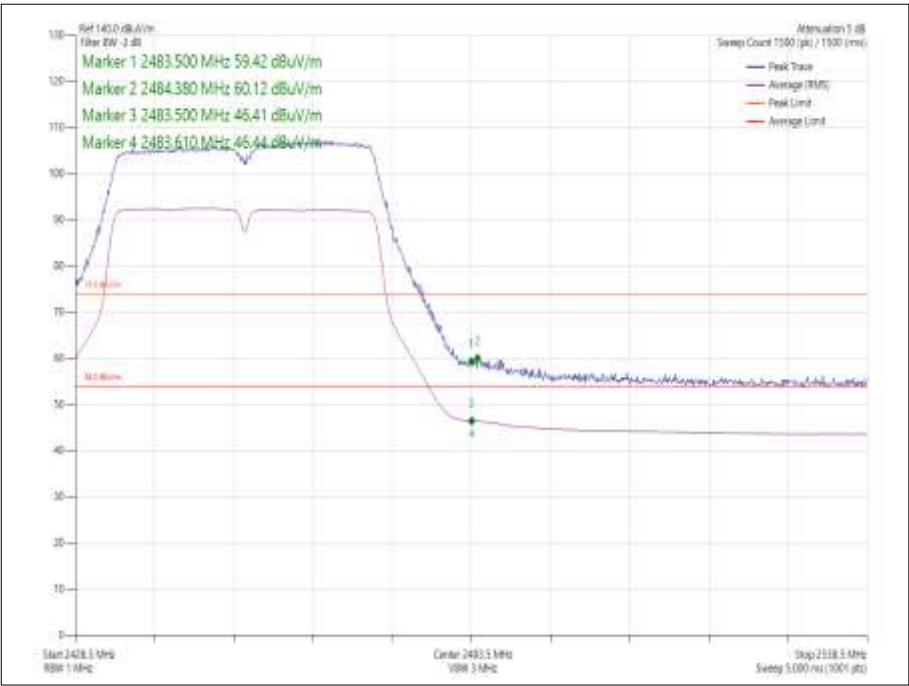


Figure 14 - MCS0 - 2452 MHz - Measured Frequency 2483.5 MHz

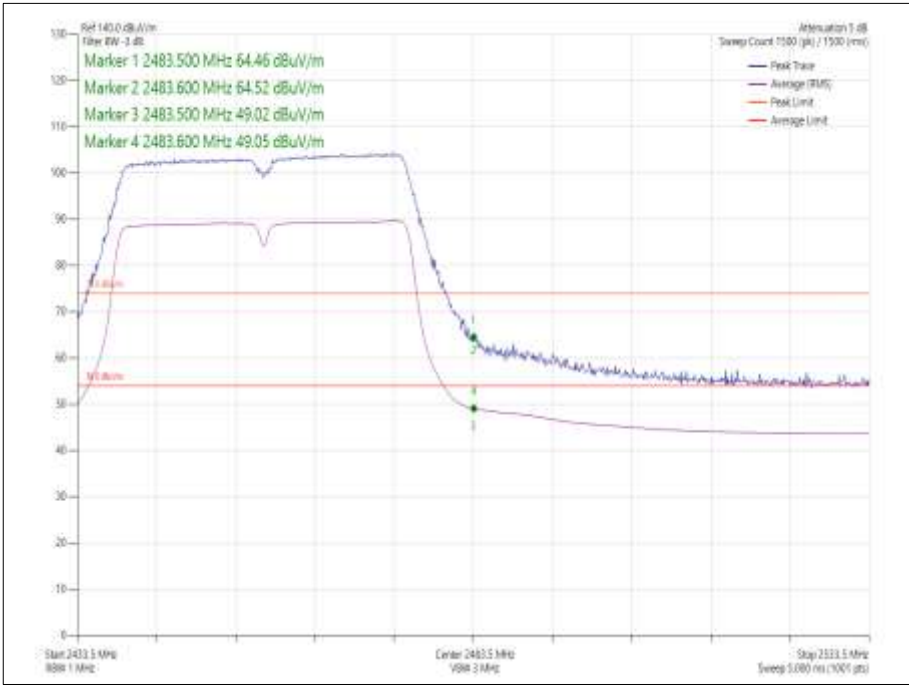


Figure 15 - MCS0 - 2457 MHz - Measured Frequency 2483.5 MHz

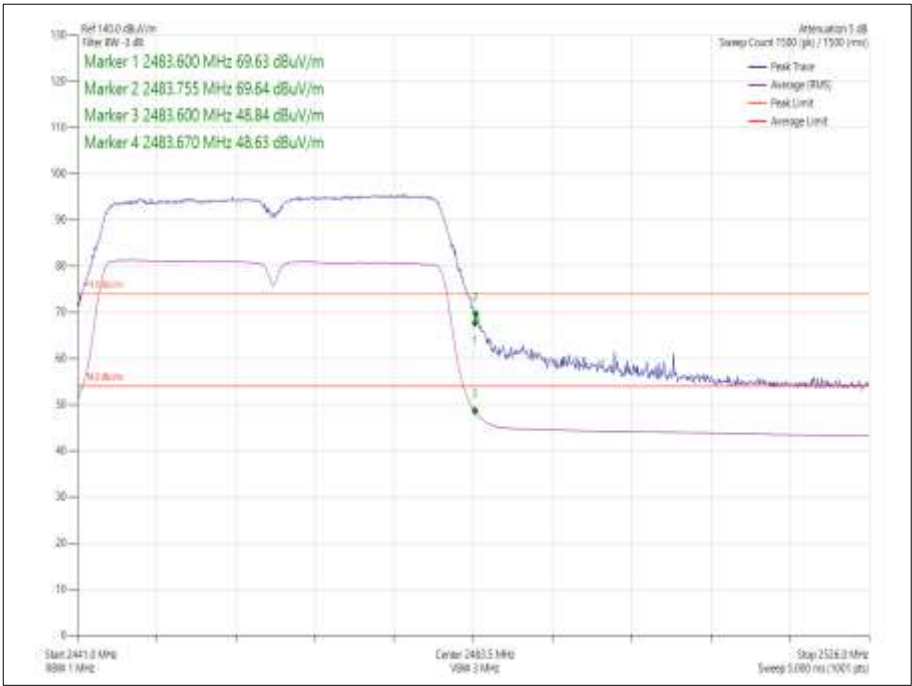


Figure 16 - MCS0 - 2452 MHz - Measured Frequency 2483.5 MHz

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 20

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 21

*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
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	18-Mar-2022
EmX Emissions Software	TUV SUD	V2.1.11	5125	-	Software
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5428	12	15-Oct-2021
8 Meter Cable	Teledyne	PR90-088-8MTR	5450	6	08-Mar-2022
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	31-Mar-2022
Broadband Horn Antenna (1-10 GHz)	Schwarzbeck	BBHA 9120 B	5611	12	22-Sep-2021
Turntable & Mast Controller	Maturo Gmbh	NCD/498/2799.01	5612	-	TU
Tilt Antenna Mast TAM 4.0-P	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
3m Semi Anechoic Chamber	MVG	EMC-3	5621	36	11-Aug-2023

Table 22

TU - Traceability Unscheduled



2.2 Emission Bandwidth

2.2.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (a)(2)
ISED RSS-247, Clause 5.2
ISED RSS-GEN, Clause 6.7

2.2.2 Equipment Under Test and Modification State

Atom Hard Hat, S/N: Not serialised (Storix-ID 599374-99) - Modification State 0

2.2.3 Date of Test

23-September-2021

2.2.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.8.1 for 6 dB bandwidth and 6.9.3 for 99% occupied bandwidth measurements.

2.2.5 Environmental Conditions

Ambient Temperature	21.6 °C
Relative Humidity	56.0 %



2.2.6 Test Results

802.11b - 2.4 GHz WLAN

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (a)(2) RSS-247 5.2 a)	Test Method(s):	C63.10 6.9.3 C63.10 11.8.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11b	Duty Cycle (%):	-
Data Rate:	1 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (A)	Active Chain(s):	0

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	10.200	-	-	-	10.200	≥500.0
2442	10.200	-	-	-	10.200	≥500.0
2472	10.200	-	-	-	10.200	≥500.0

Table 23 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	13.680	-	-	-	13.680	-
2442	13.800	-	-	-	13.800	-
2472	13.440	-	-	-	13.440	-

Table 24 - 99% Bandwidth Results





Figure 19 - A (A) 2442 MHz (CH7) 99% Bandwidth

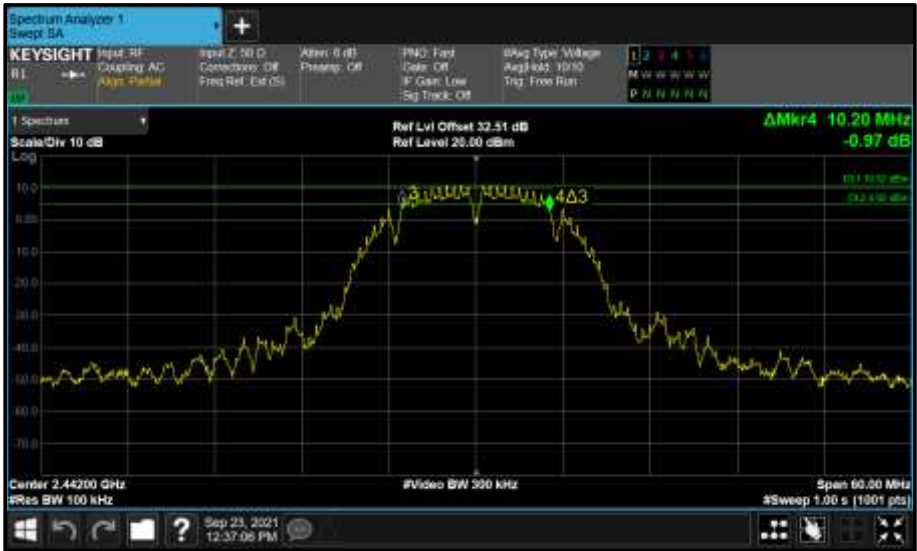


Figure 20 - A (A) 2442 MHz (CH7) 6 dB Bandwidth





Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (a)(2) RSS-247 5.2 a)	Test Method(s):	C63.10 6.9.3 C63.10 11.8.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11b	Duty Cycle (%):	-
Data Rate:	1 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (B)	Active Chain(s):	1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	10.200	-	-	10.200	≥500.0
2442	-	10.200	-	-	10.200	≥500.0
2472	-	10.200	-	-	10.200	≥500.0

Table 25 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	13.620	-	-	13.620	-
2442	-	13.680	-	-	13.680	-
2472	-	13.440	-	-	13.440	-

Table 26 - 99% Bandwidth Results

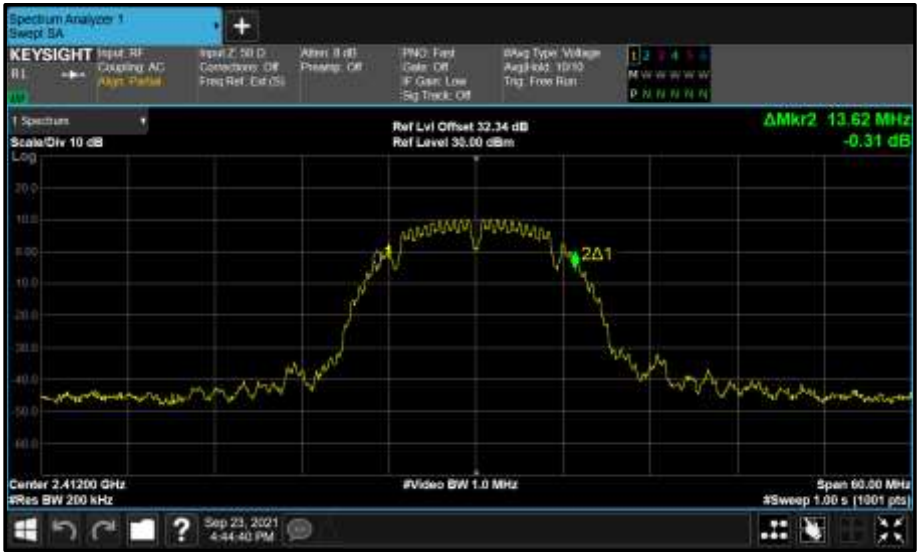


Figure 23 - B (B) 2412 MHz (CH1) 99% Bandwidth



Figure 24 - B (B) 2412 MHz (CH1) 6 dB Bandwidth



Figure 25 - B (B) 2442 MHz (CH7) 99% Bandwidth

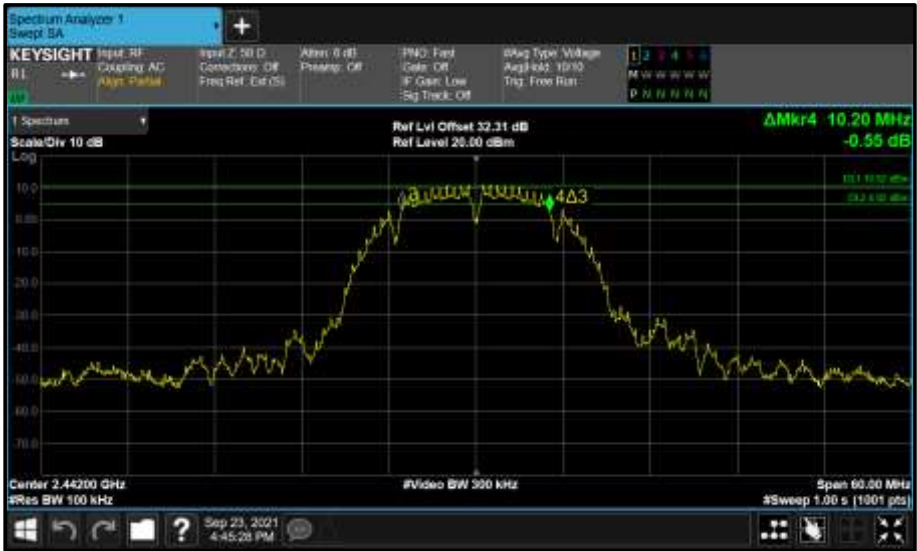


Figure 26 - B (B) 2442 MHz (CH7) 6 dB Bandwidth





802.11g - 2.4 GHz WLAN

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (a)(2) RSS-247 5.2 a)	Test Method(s):	C63.10 6.9.3 C63.10 11.8.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11g	Duty Cycle (%):	-
Data Rate:	6 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (A)	Active Chain(s):	0

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	16.440	-	-	-	16.440	≥500.0
2442	16.480	-	-	-	16.480	≥500.0
2472	16.440	-	-	-	16.440	≥500.0

Table 27 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	16.920	-	-	-	16.920	-
2442	19.120	-	-	-	19.120	-
2472	17.100	-	-	-	17.100	-

Table 28 - 99% Bandwidth Results

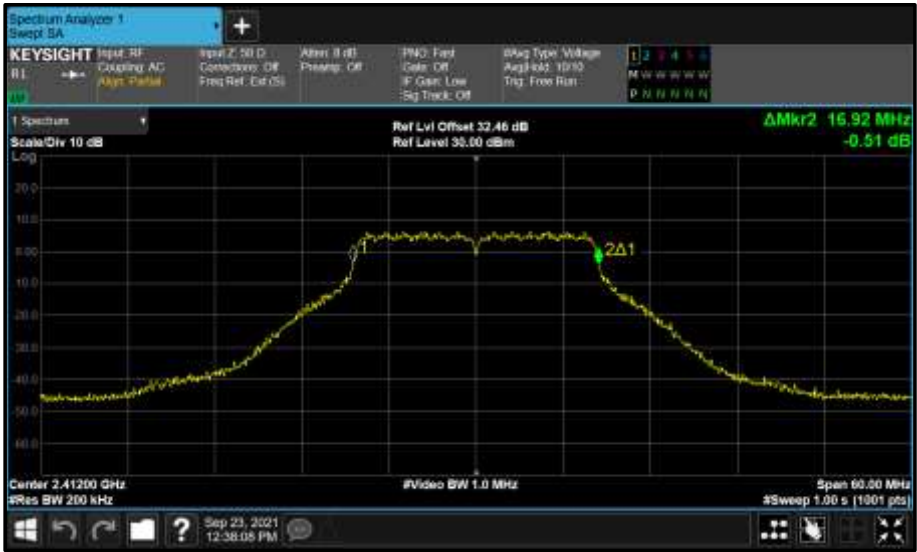


Figure 29 - A (A) 2412 MHz (CH1) 99% Bandwidth

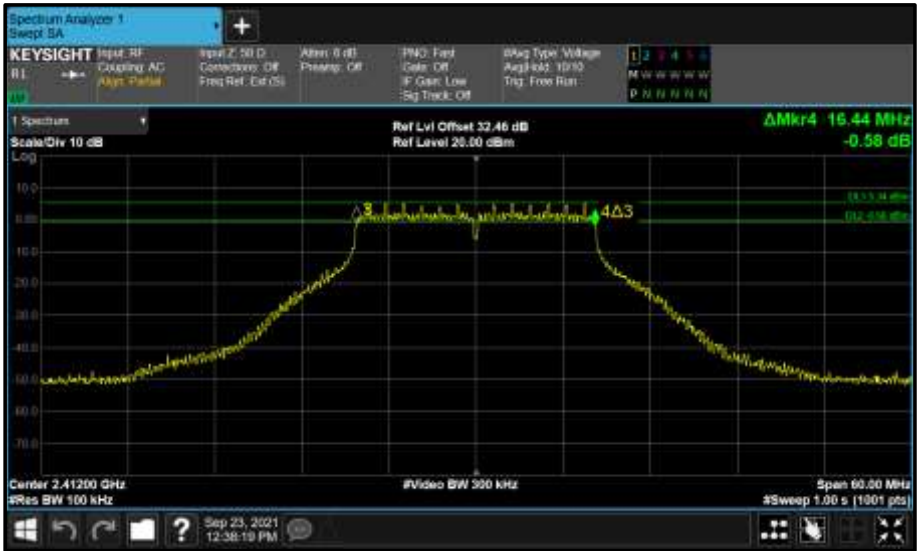


Figure 30 - A (A) 2412 MHz (CH1) 6 dB Bandwidth



Figure 31 - A (A) 2442 MHz (CH7) 99% Bandwidth

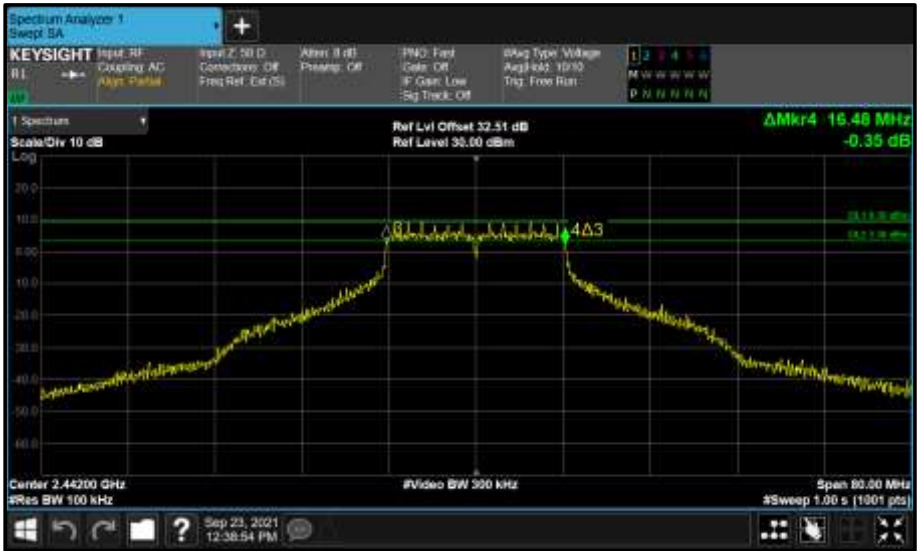


Figure 32 - A (A) 2442 MHz (CH7) 6 dB Bandwidth



Figure 33 - A (A) 2472 MHz (CH13) 99% Bandwidth



Figure 34 - A (A) 2472 MHz (CH13) 6 dB Bandwidth



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (a)(2) RSS-247 5.2 a)	Test Method(s):	C63.10 6.9.3 C63.10 11.8.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11g	Duty Cycle (%):	-
Data Rate:	6 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (B)	Active Chain(s):	1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	16.440	-	-	16.440	≥500.0
2442	-	16.480	-	-	16.480	≥500.0
2472	-	16.440	-	-	16.440	≥500.0

Table 29 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	16.860	-	-	16.860	-
2442	-	17.760	-	-	17.760	-
2472	-	17.100	-	-	17.100	-

Table 30 - 99% Bandwidth Results

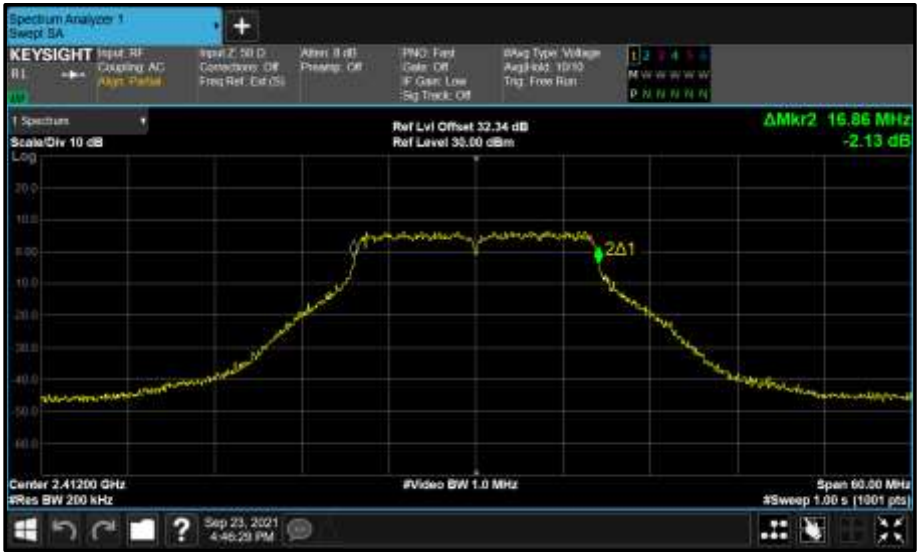


Figure 35 - B (B) 2412 MHz (CH1) 99% Bandwidth

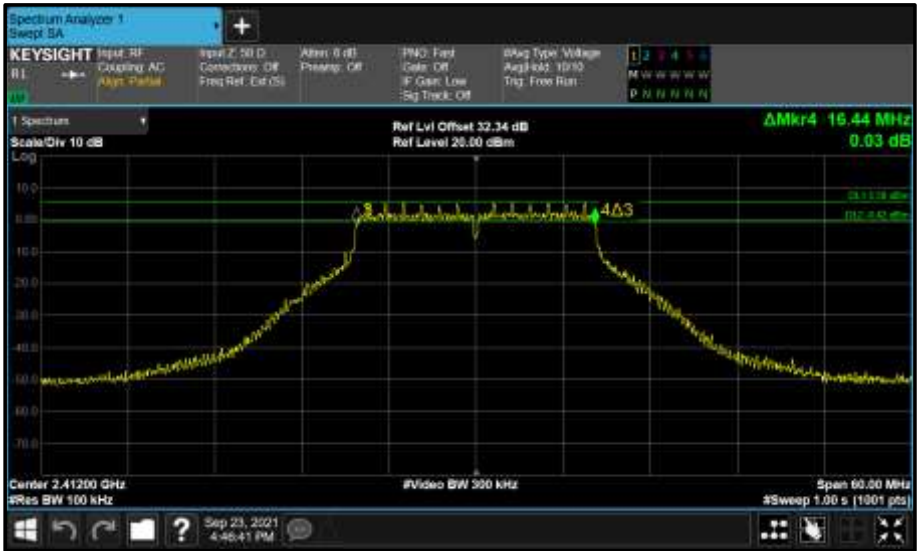


Figure 36 - B (B) 2412 MHz (CH1) 6 dB Bandwidth

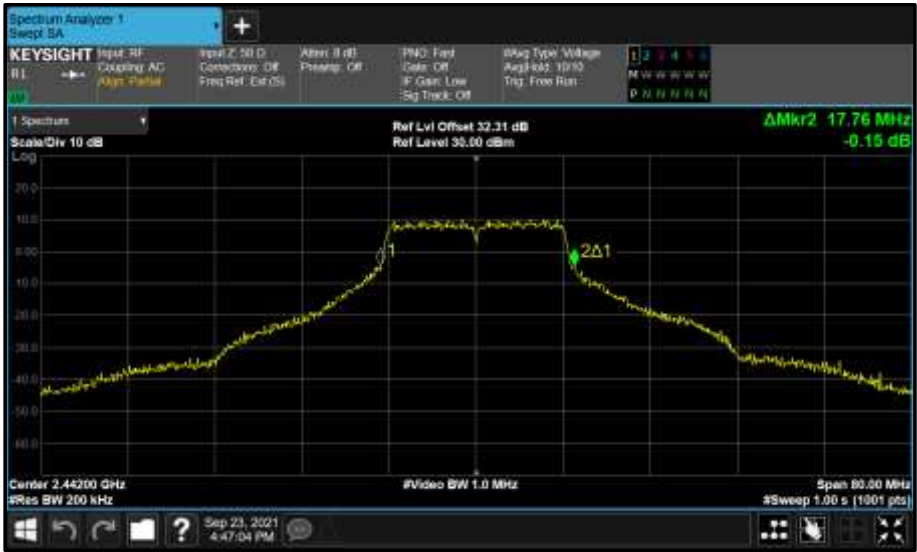


Figure 37 - B (B) 2442 MHz (CH7) 99% Bandwidth

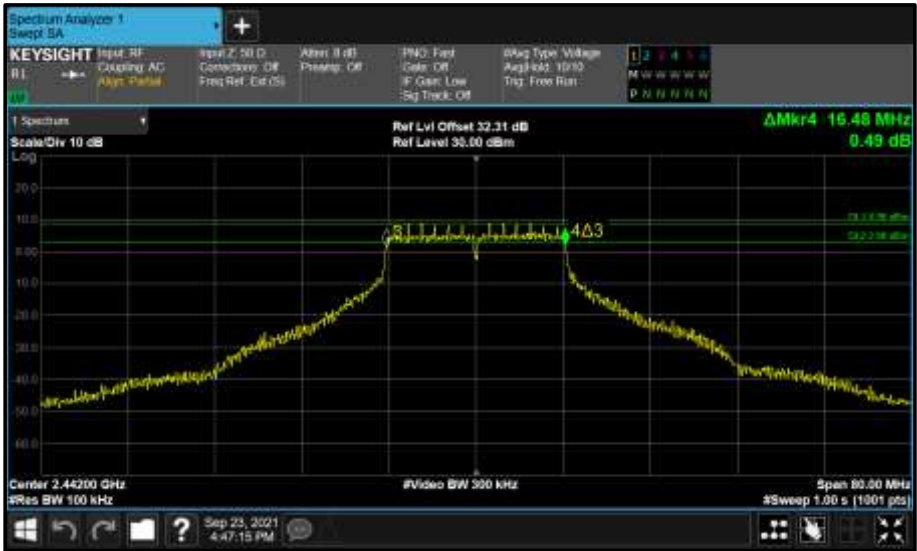


Figure 38 - B (B) 2442 MHz (CH7) 6 dB Bandwidth



Figure 39 - B (B) 2472 MHz (CH13) 99% Bandwidth

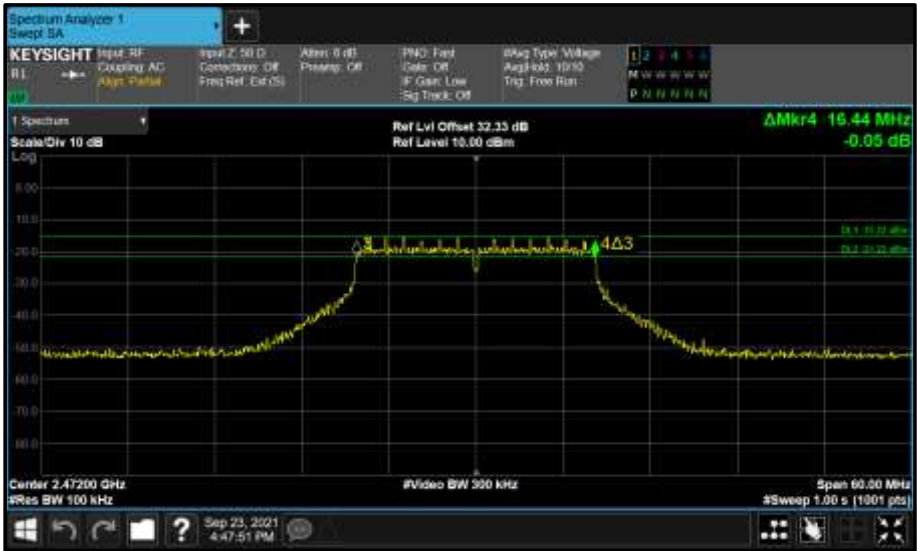


Figure 40 - B (B) 2472 MHz (CH13) 6 dB Bandwidth



802.11n (20 MHz Bandwidth) - 2.4 GHz WLAN

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (a)(2) RSS-247 5.2 a)	Test Method(s):	C63.10 6.9.3 C63.10 11.8.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11n HT20	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS0	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (A)	Active Chain(s):	0

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	17.700	-	-	-	17.700	≥500.0
2442	17.760	-	-	-	17.760	≥500.0
2472	17.640	-	-	-	17.640	≥500.0

Table 31 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	17.940	-	-	-	17.940	-
2442	19.280	-	-	-	19.280	-
2472	18.120	-	-	-	18.120	-

Table 32 - 99% Bandwidth Results

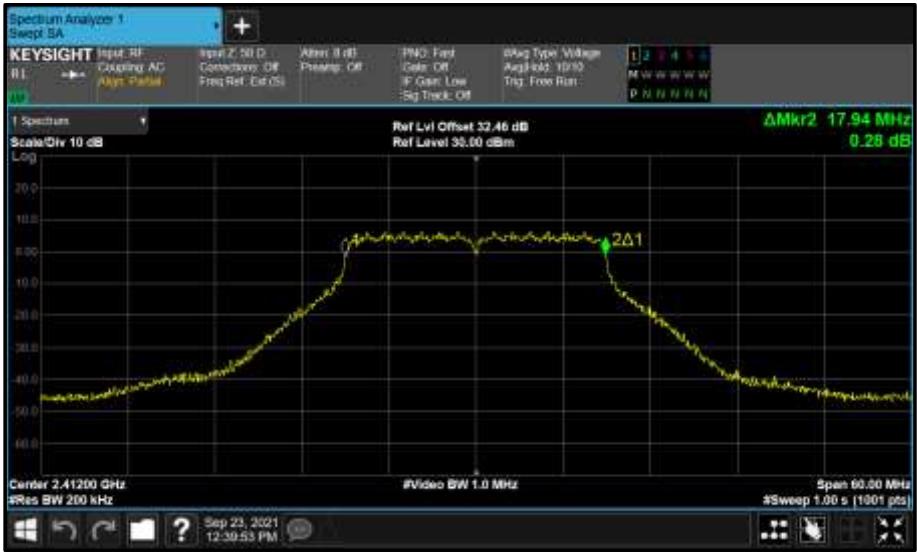


Figure 41 - A (A) 2412 MHz (CH1) 99% Bandwidth

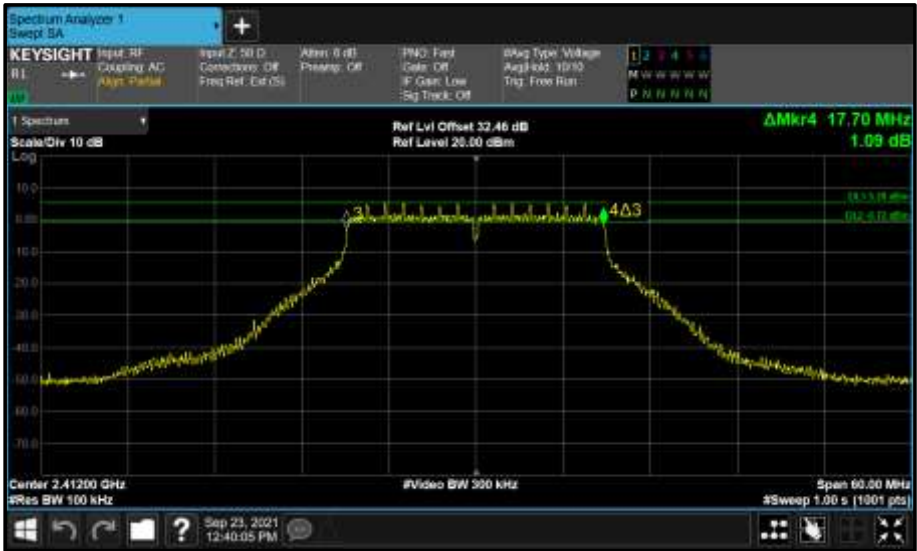


Figure 42 - A (A) 2412 MHz (CH1) 6 dB Bandwidth



Figure 43 - A (A) 2442 MHz (CH7) 99% Bandwidth

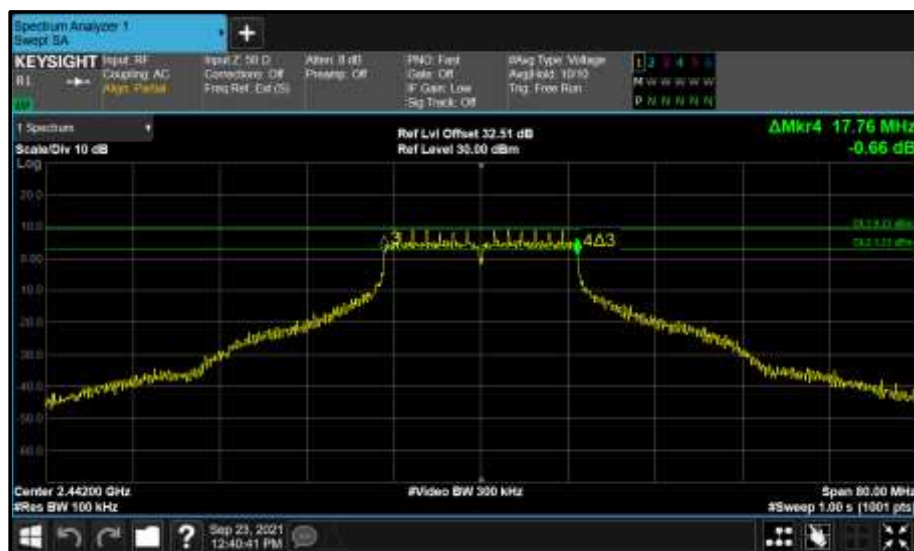


Figure 44 - A (A) 2442 MHz (CH7) 6 dB Bandwidth

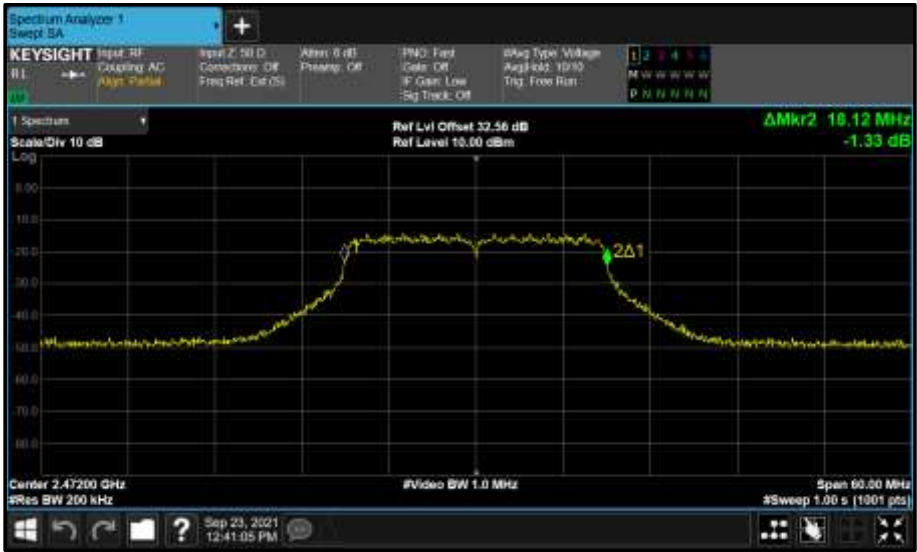


Figure 45 - A (A) 2472 MHz (CH13) 99% Bandwidth

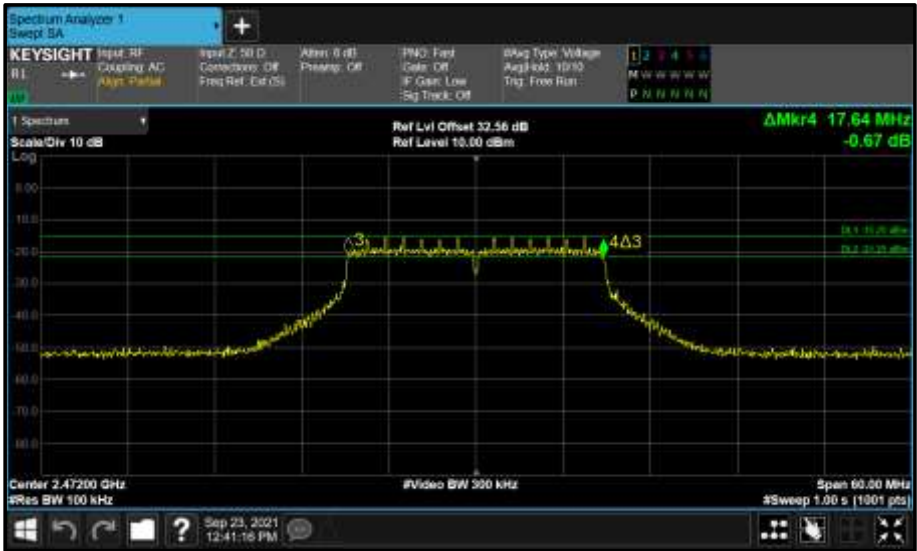


Figure 46 - A (A) 2472 MHz (CH13) 6 dB Bandwidth



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (a)(2) RSS-247 5.2 a)	Test Method(s):	C63.10 6.9.3 C63.10 11.8.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11n HT20	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS0	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (B)	Active Chain(s):	1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	17.640	-	-	17.640	≥500.0
2442	-	17.760	-	-	17.760	≥500.0
2472	-	17.640	-	-	17.640	≥500.0

Table 33 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	18.000	-	-	18.000	-
2442	-	18.400	-	-	18.400	-
2472	-	18.120	-	-	18.120	-

Table 34 - 99% Bandwidth Results

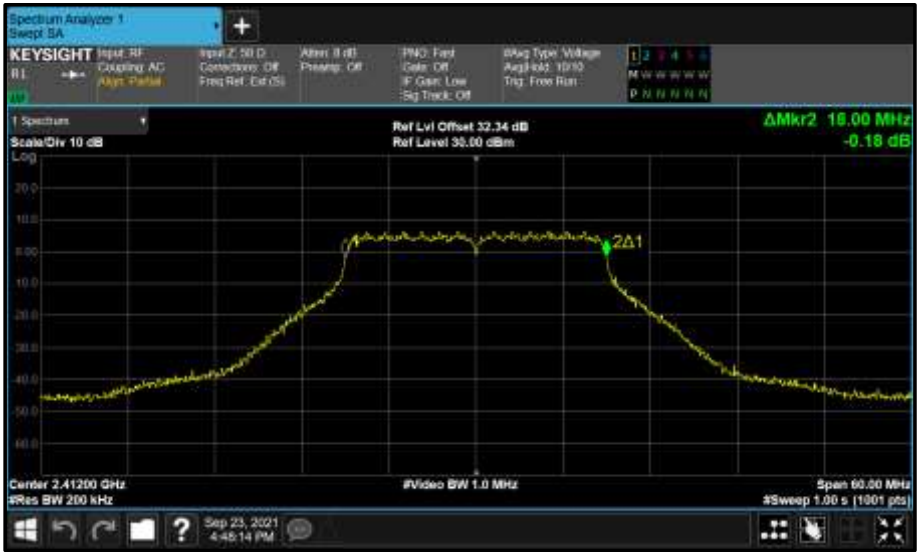


Figure 47 - B (B) 2412 MHz (CH1) 99% Bandwidth

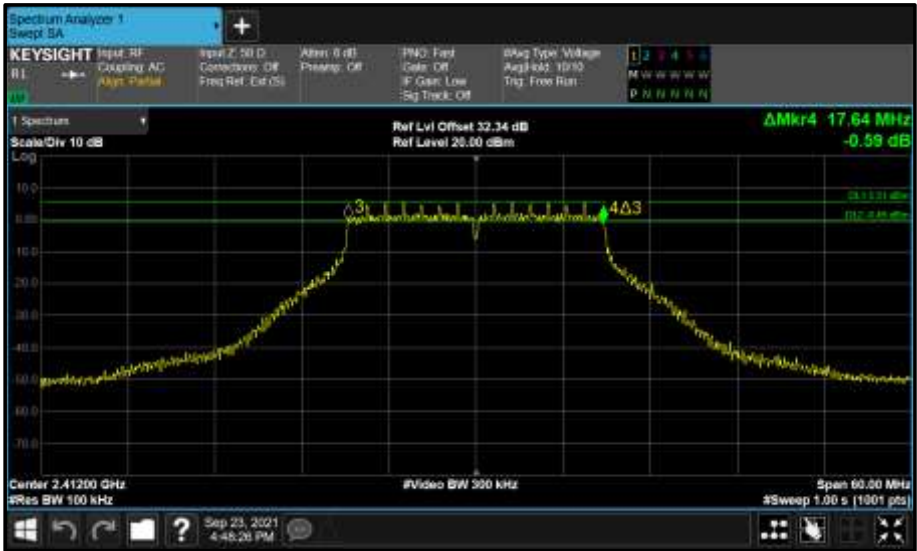


Figure 48 - B (B) 2412 MHz (CH1) 6 dB Bandwidth

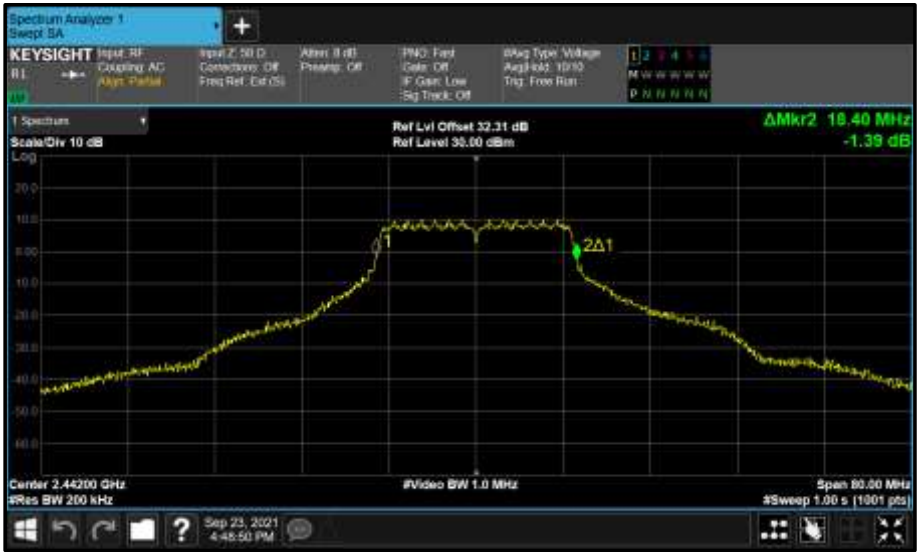


Figure 49 - B (B) 2442 MHz (CH7) 99% Bandwidth

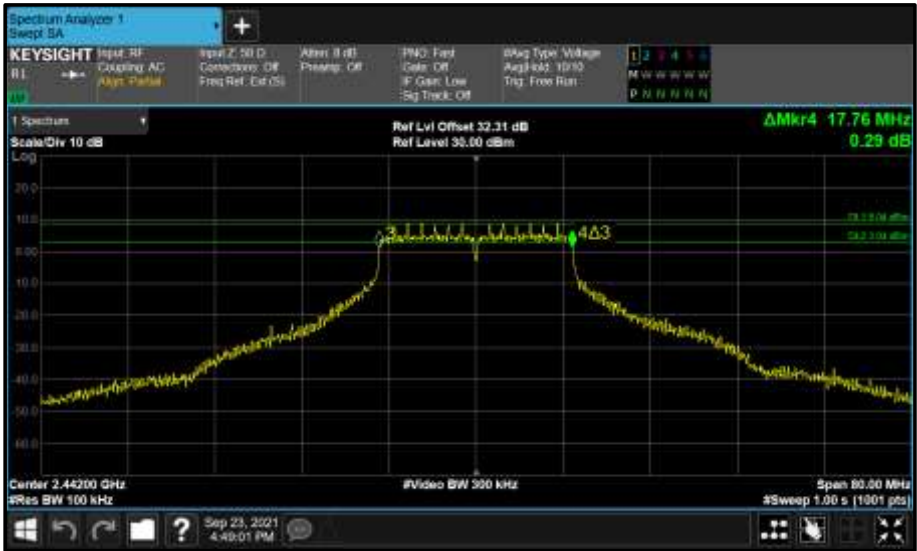


Figure 50 - B (B) 2442 MHz (CH7) 6 dB Bandwidth

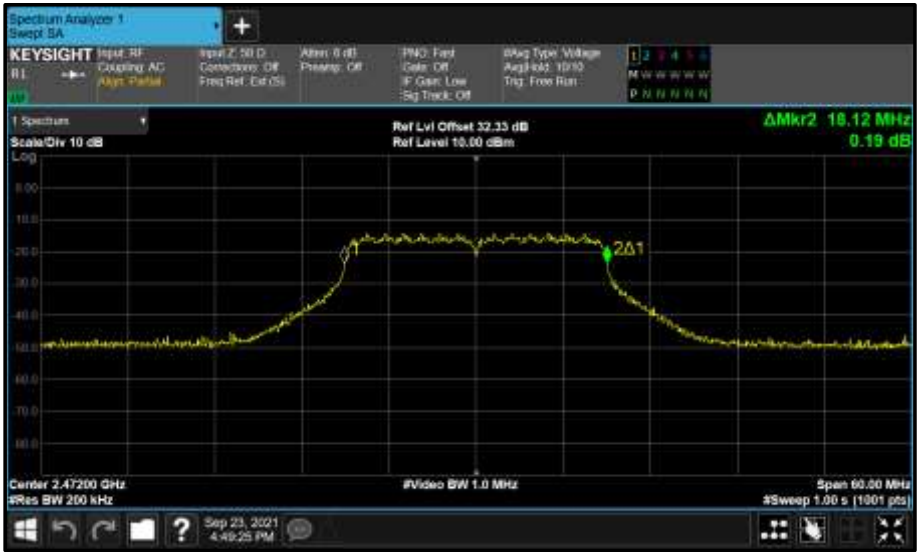


Figure 51 - B (B) 2472 MHz (CH13) 99% Bandwidth

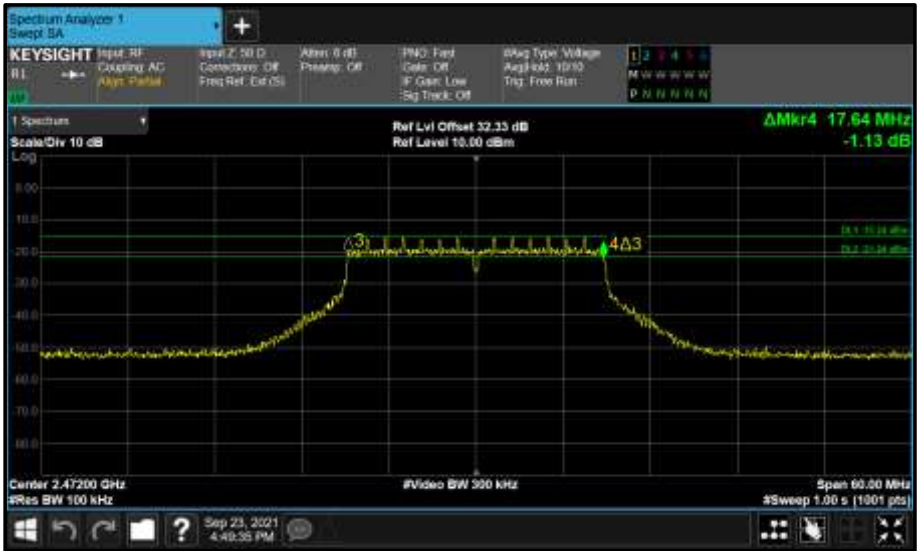


Figure 52 - B (B) 2472 MHz (CH13) 6 dB Bandwidth



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (a)(2) RSS-247 5.2 a)	Test Method(s):	C63.10 6.9.3 C63.10 11.8.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11n HT20	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS0	DCCF (dB):	-
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	-
Active Port(s):	A+B (A + B)	Active Chain(s):	0+1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	17.700	17.640	-	-	17.640	≥500.0
2442	17.640	17.640	-	-	17.640	≥500.0
2472	17.700	17.640	-	-	17.640	≥500.0

Table 35 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	17.940	17.940	-	-	17.940	-
2442	17.940	18.000	-	-	17.940	-
2472	18.120	18.180	-	-	18.120	-

Table 36 - 99% Bandwidth Results



Figure 53 - A (A) 2412 MHz (CH1) 99% Bandwidth

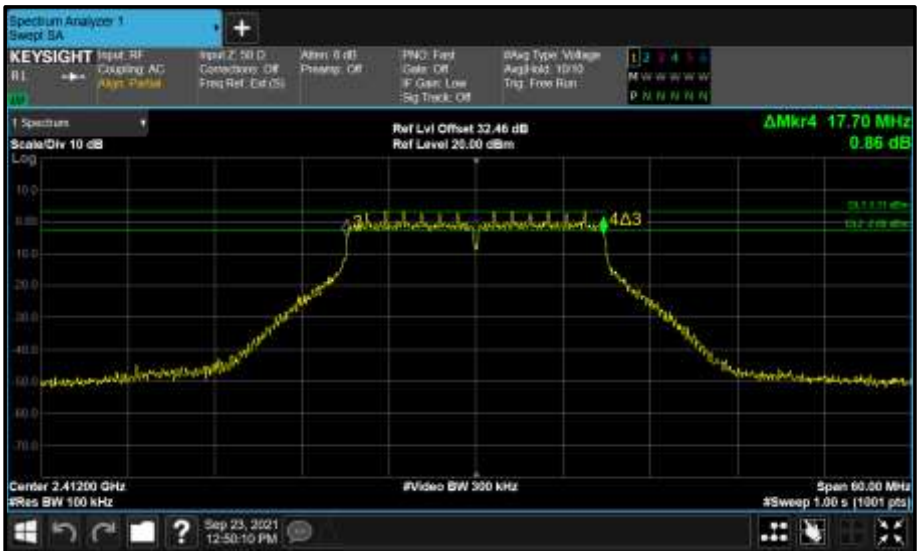


Figure 54 - A (A) 2412 MHz (CH1) 6 dB Bandwidth



Figure 55 - B (B) 2412 MHz (CH1) 99% Bandwidth

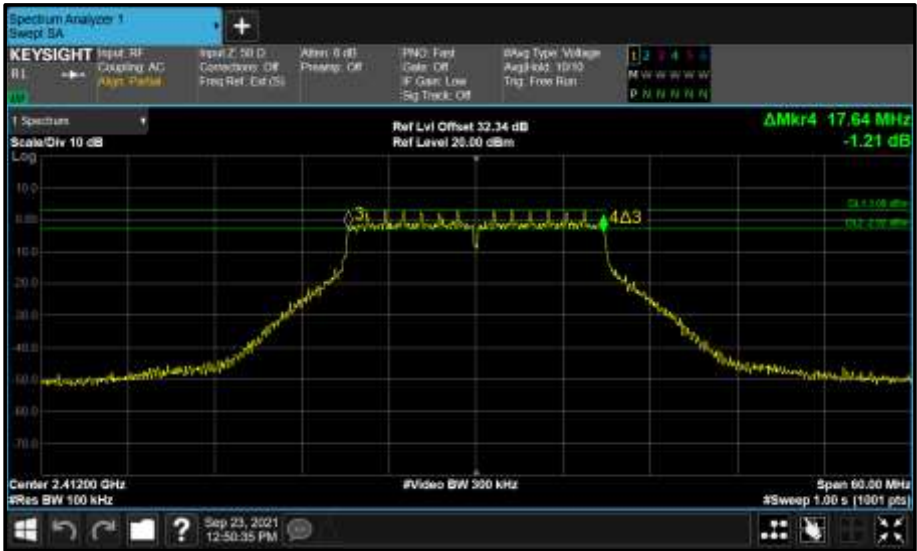


Figure 56 - B (B) 2412 MHz (CH1) 6 dB Bandwidth



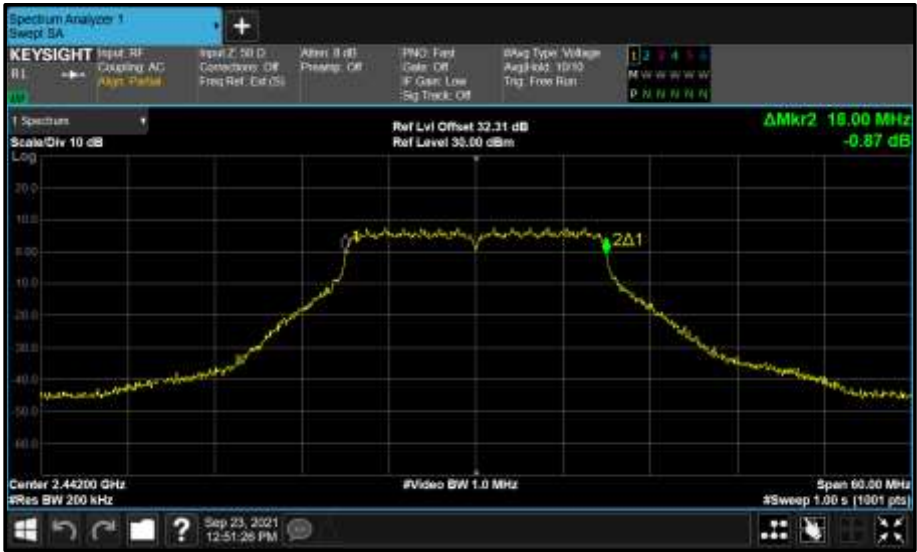


Figure 59 - B (B) 2442 MHz (CH7) 99% Bandwidth

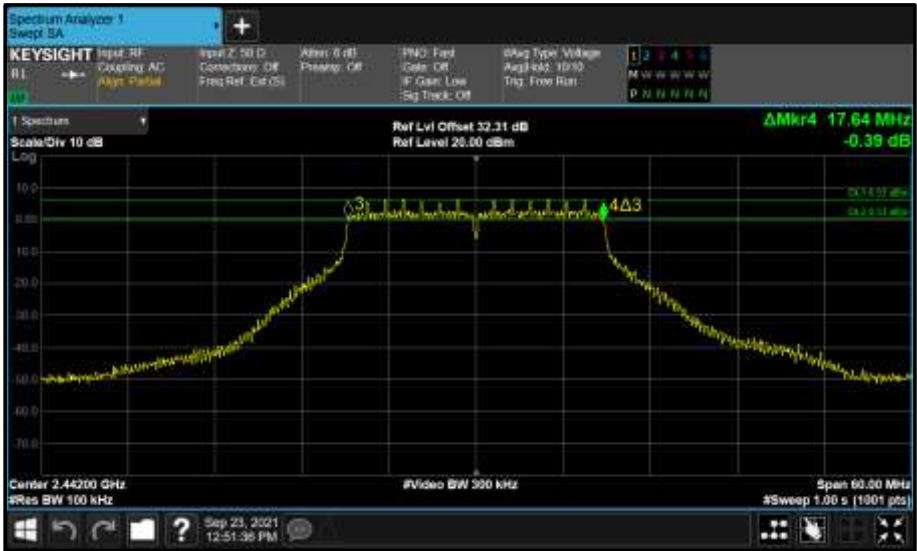


Figure 60 - B (B) 2442 MHz (CH7) 6 dB Bandwidth



Figure 61 - A (A) 2472 MHz (CH13) 99% Bandwidth

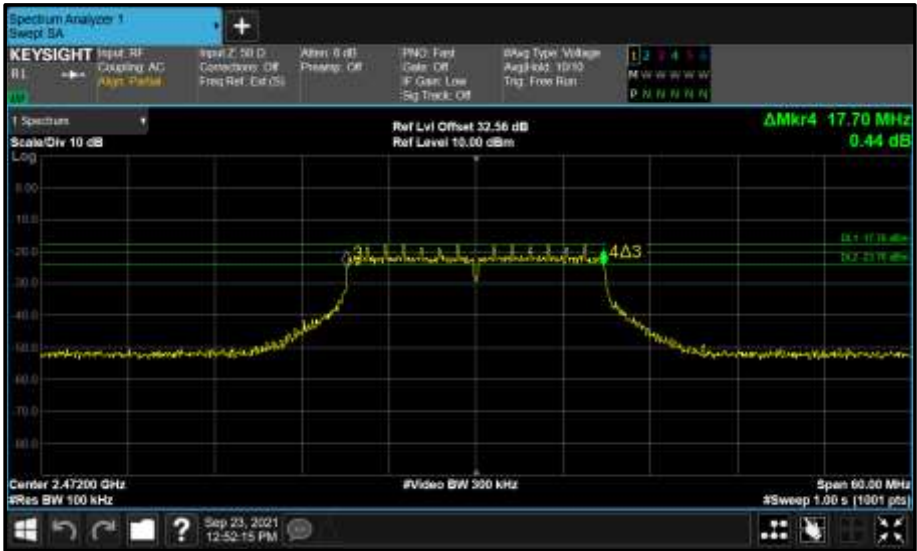


Figure 62 - A (A) 2472 MHz (CH13) 6 dB Bandwidth



Figure 63 - B (B) 2472 MHz (CH13) 99% Bandwidth

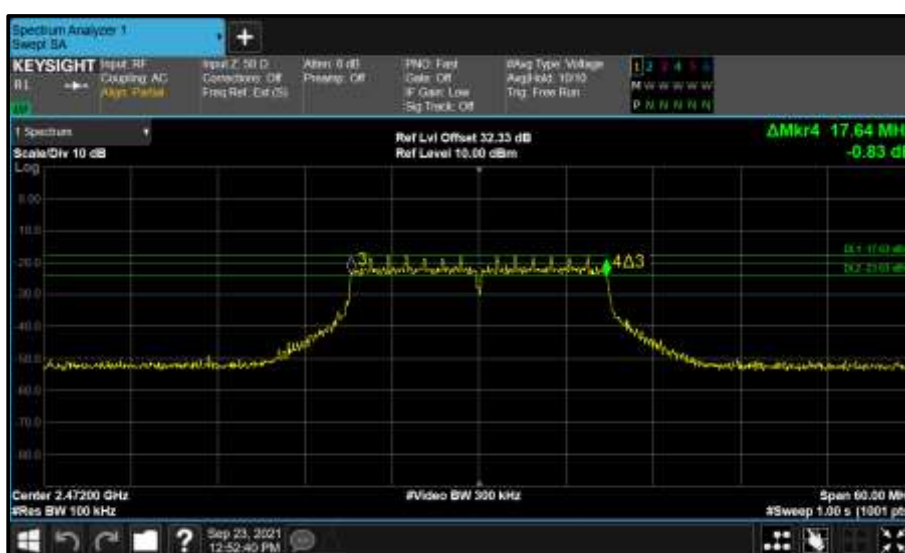


Figure 64 - B (B) 2472 MHz (CH13) 6 dB Bandwidth



802.11n (40 MHz Bandwidth) - 2.4 GHz WLAN

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (a)(2) RSS-247 5.2 a)	Test Method(s):	C63.10 6.9.3 C63.10 11.8.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11n HT40	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS0	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (A)	Active Chain(s):	0

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2422	36.480	-	-	-	36.480	≥500.0
2442	36.480	-	-	-	36.480	≥500.0
2462	36.480	-	-	-	36.480	≥500.0

Table 37 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2422	36.600	-	-	-	36.600	-
2442	36.600	-	-	-	36.600	-
2462	36.600	-	-	-	36.600	-

Table 38 - 99% Bandwidth Results

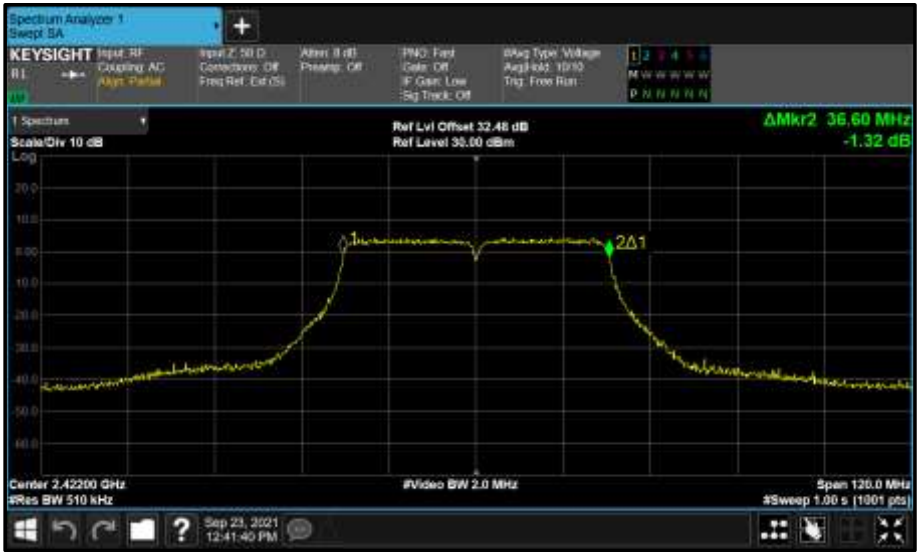


Figure 65 - A (A) 2422 MHz (CH3) 99% Bandwidth

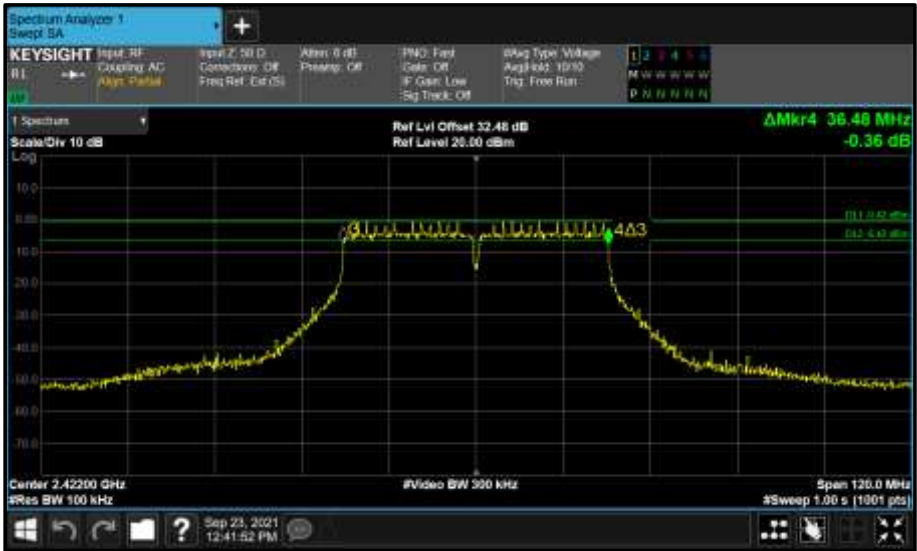


Figure 66 - A (A) 2422 MHz (CH3) 6 dB Bandwidth

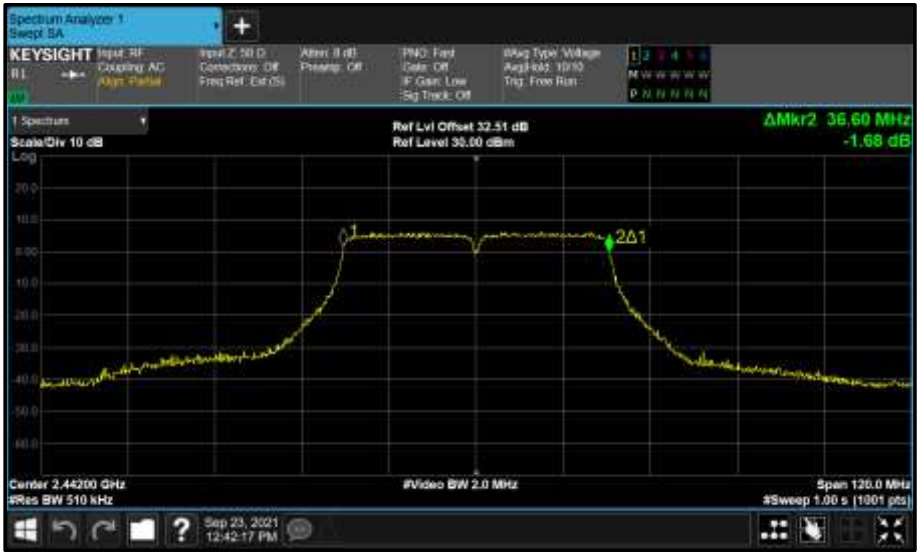


Figure 67 - A (A) 2442 MHz (CH7) 99% Bandwidth

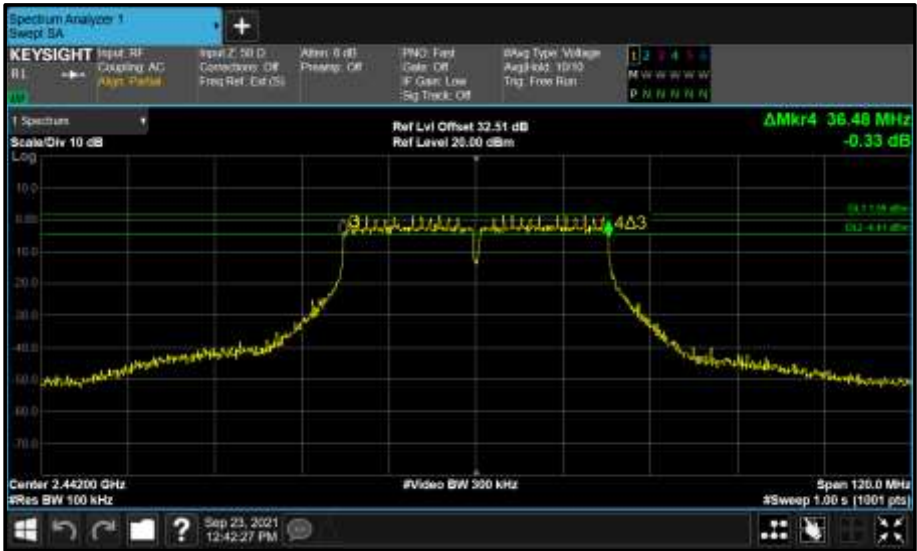


Figure 68 - A (A) 2442 MHz (CH7) 6 dB Bandwidth



Figure 69 - A (A) 2462 MHz (CH11) 99% Bandwidth



Figure 70 - A (A) 2462 MHz (CH11) 6 dB Bandwidth



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (a)(2) RSS-247 5.2 a)	Test Method(s):	C63.10 6.9.3 C63.10 11.8.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11n HT40	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS0	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (B)	Active Chain(s):	1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2422	-	36.480	-	-	36.480	≥500.0
2442	-	36.480	-	-	36.480	≥500.0
2462	-	36.480	-	-	36.480	≥500.0

Table 39 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2422	-	36.480	-	-	36.480	-
2442	-	36.480	-	-	36.480	-
2462	-	36.480	-	-	36.480	-

Table 40 - 99% Bandwidth Results



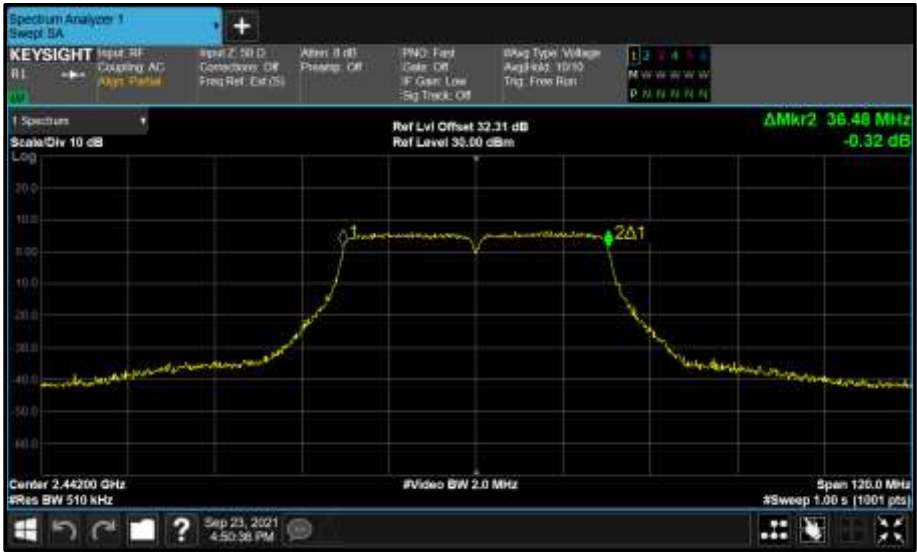


Figure 73 - B (B) 2442 MHz (CH7) 99% Bandwidth

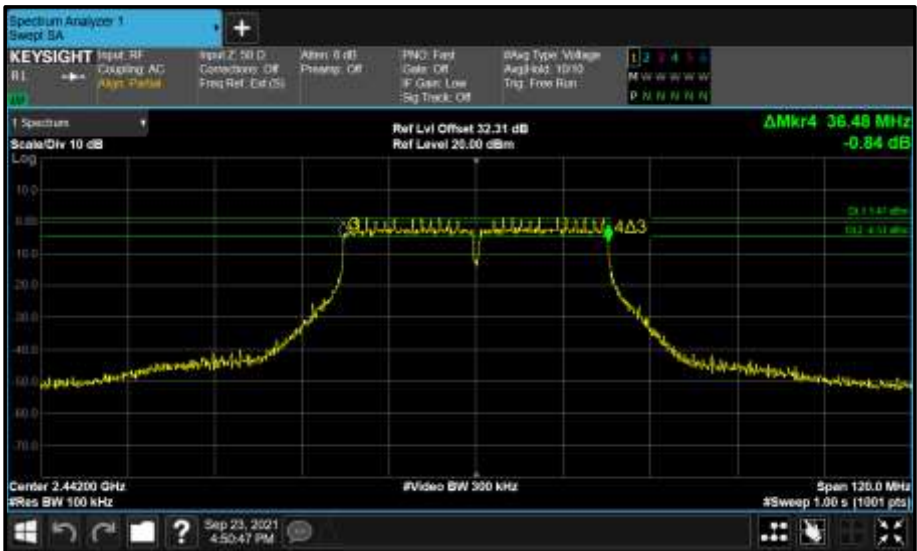


Figure 74 - B (B) 2442 MHz (CH7) 6 dB Bandwidth



Figure 75 - B (B) 2462 MHz (CH11) 99% Bandwidth



Figure 76 - B (B) 2462 MHz (CH11) 6 dB Bandwidth



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (a)(2) RSS-247 5.2 a)	Test Method(s):	C63.10 6.9.3 C63.10 11.8.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11n HT40	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS0	DCCF (dB):	-
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	-
Active Port(s):	A+B (A + B)	Active Chain(s):	0+1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2422	36.480	36.480	-	-	36.480	≥500.0
2442	36.480	36.480	-	-	36.480	≥500.0
2462	36.480	36.480	-	-	36.480	≥500.0

Table 41 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2422	36.600	36.480	-	-	36.480	-
2442	36.600	36.480	-	-	36.480	-
2462	36.600	36.480	-	-	36.480	-

Table 42 - 99% Bandwidth Results

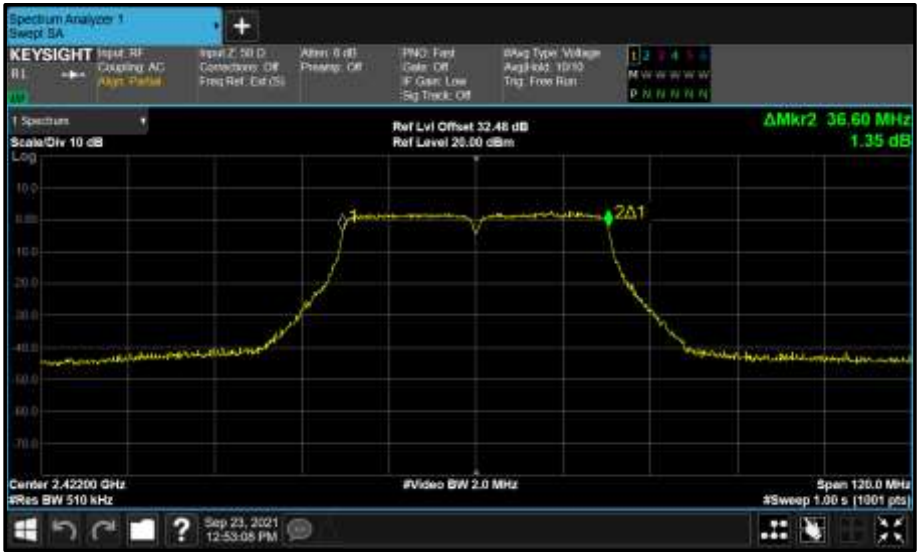


Figure 77 - A (A) 2422 MHz (CH3) 99% Bandwidth

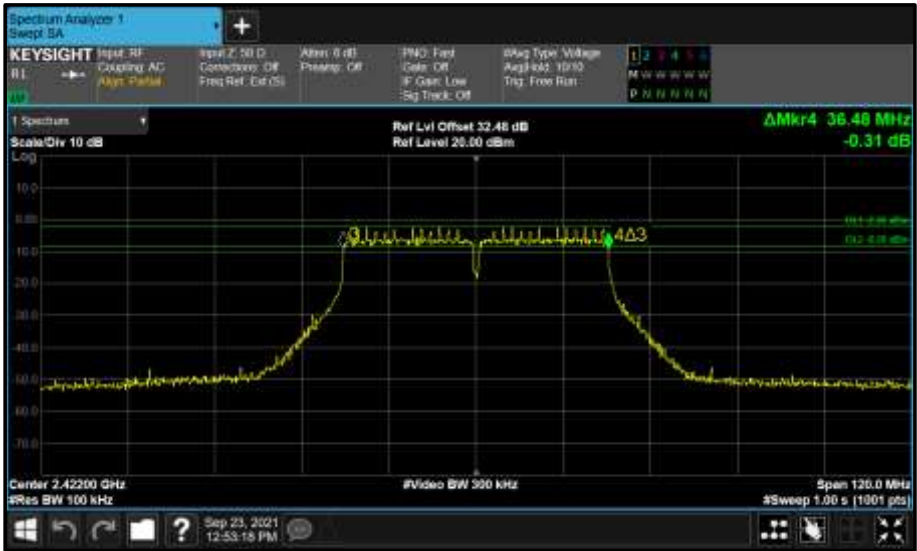


Figure 78 - A (A) 2422 MHz (CH3) 6 dB Bandwidth

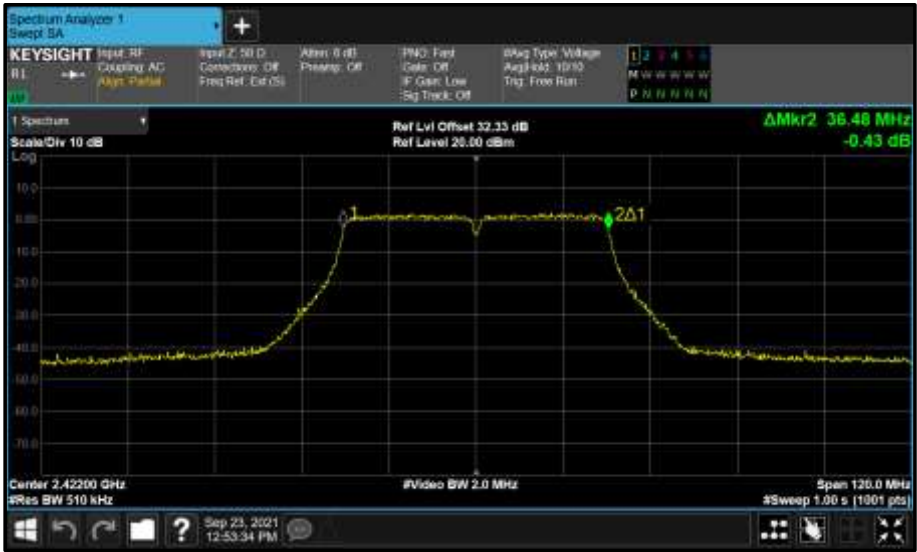


Figure 79 - B (B) 2422 MHz (CH3) 99% Bandwidth

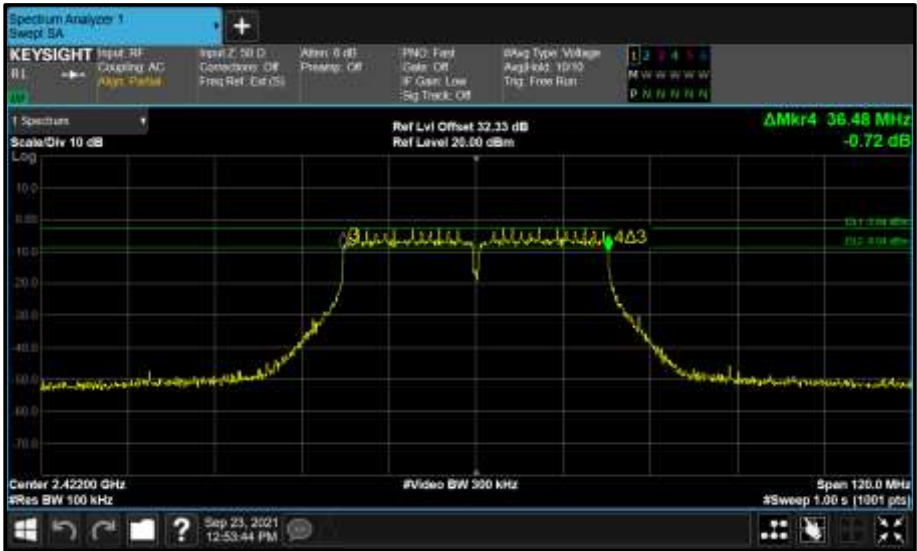


Figure 80 - B (B) 2422 MHz (CH3) 6 dB Bandwidth

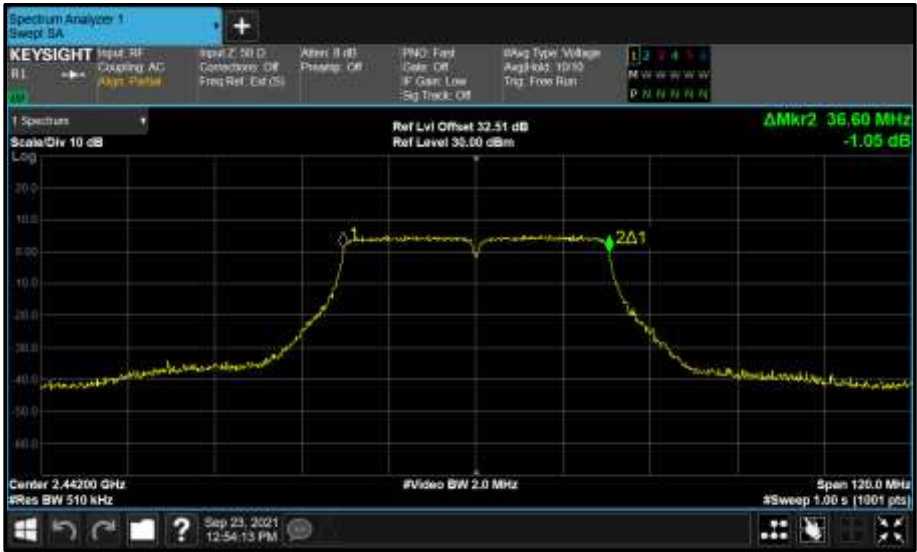


Figure 81 - A (A) 2442 MHz (CH7) 99% Bandwidth

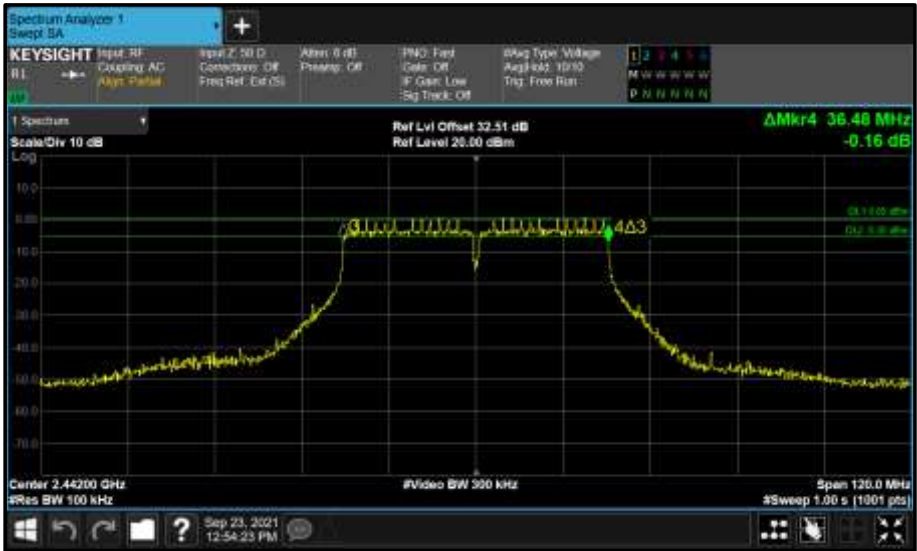


Figure 82 - A (A) 2442 MHz (CH7) 6 dB Bandwidth

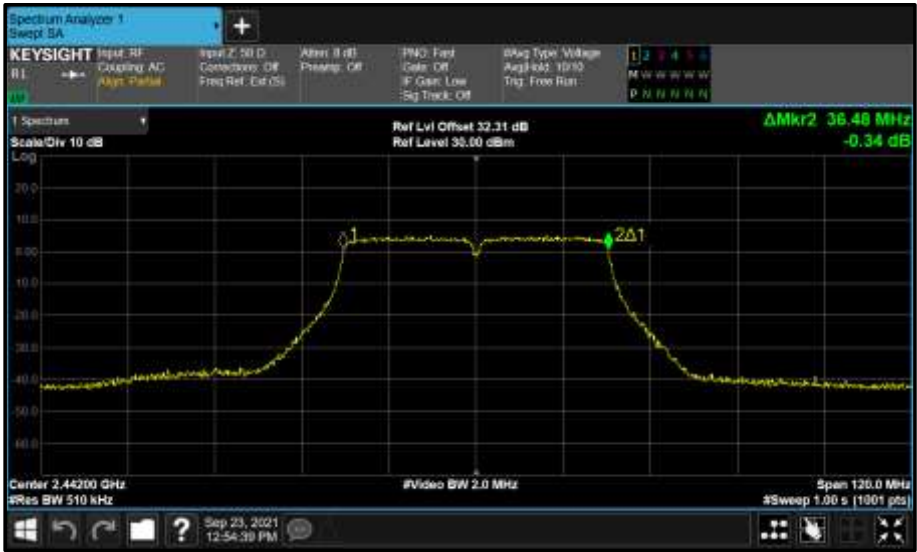


Figure 83 - B (B) 2442 MHz (CH7) 99% Bandwidth

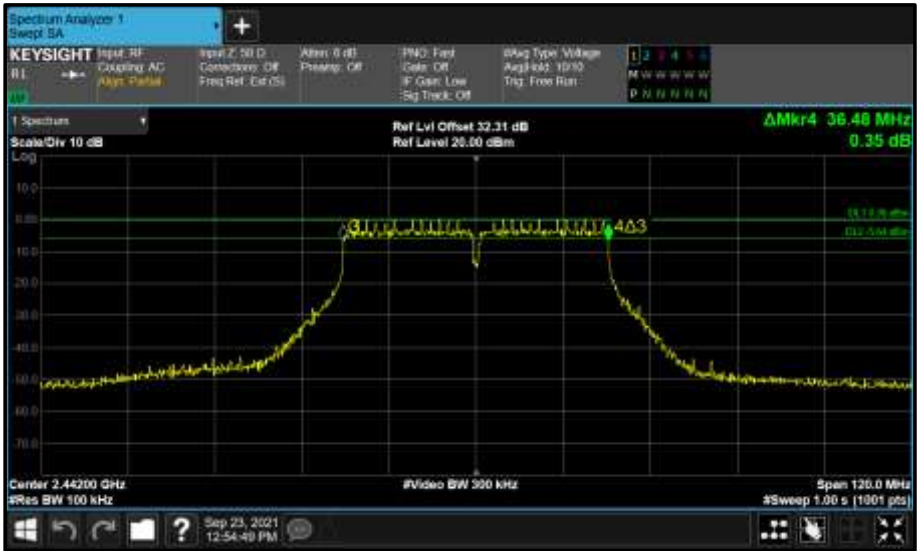


Figure 84 - B (B) 2442 MHz (CH7) 6 dB Bandwidth



Figure 85 - A (A) 2462 MHz (CH11) 99% Bandwidth

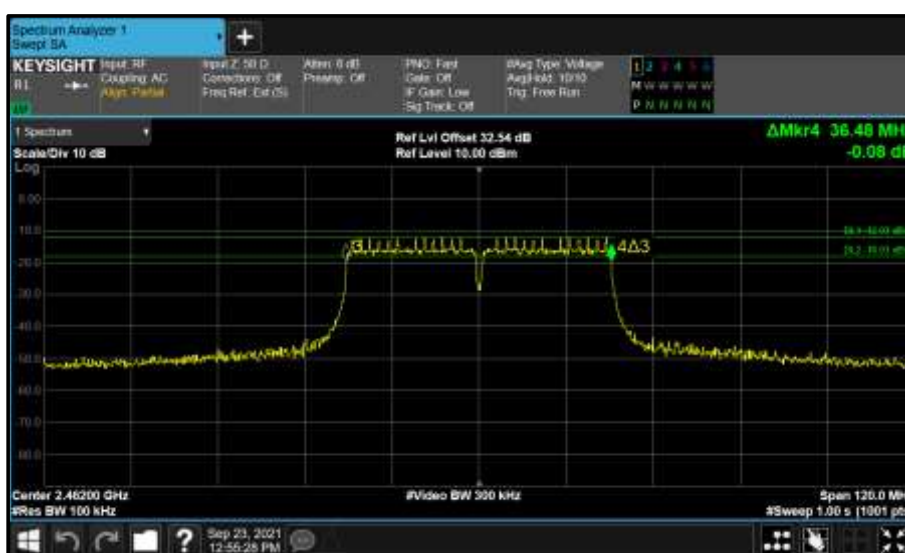


Figure 86 - A (A) 2462 MHz (CH11) 6 dB Bandwidth



Figure 87 - B (B) 2462 MHz (CH11) 99% Bandwidth

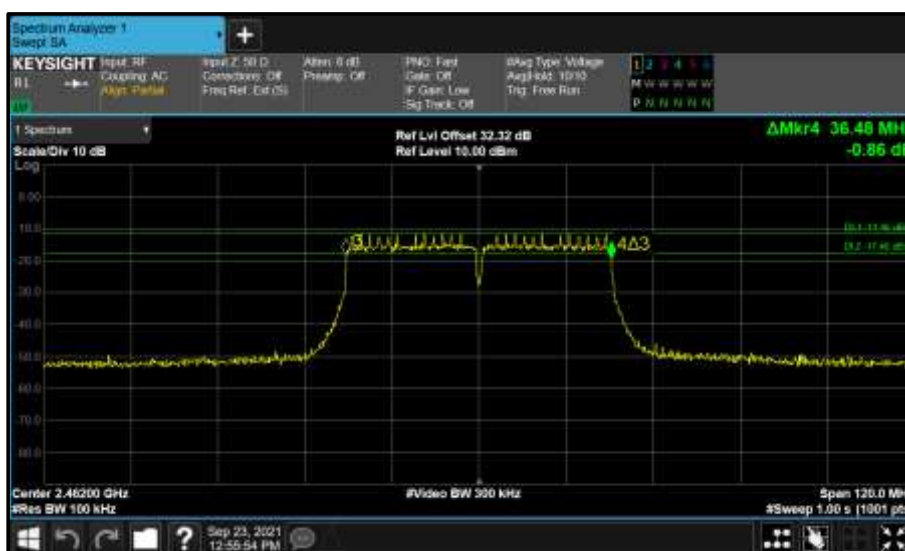


Figure 88 - B (B) 2462 MHz (CH11) 6 dB Bandwidth

FCC 47 CFR Part 15, Limit Clause 15.247(a)(2) and ISED RSS-247, Clause 5.2(a)

The minimum 6 dB Bandwidth shall be at least 500 kHz.



2.2.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	03-Dec-2021
Hygrometer	Rotronic	I-1000	3220	12	16-Oct-2021
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	03-Dec-2021
Climatic Chamber	Aralab	FitoTerm 300E45	4823	12	12-Apr-2022
MXA Signal Analyser	Keysight Technologies	N9020B	5528	24	04-Mar-2022
Signal Commissioning Unit	TUV SUD	SCU001	5546	12	16-Apr-2022

Table 43



2.3 Maximum Conducted Output Power

2.3.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (b)
ISED RSS-247, Clause 5.4
ISED RSS-GEN, Clause 6.12

2.3.2 Equipment Under Test and Modification State

Atom Hard Hat, S/N: Not serialised (Storix-ID 599374-99) - Modification State 0

2.3.3 Date of Test

23-September-2021

2.3.4 Test Method

The test was performed in accordance with ANSI C63.10 clause 11.9.1.3 (PKPM1).

2.3.5 Environmental Conditions

Ambient Temperature	21.6 °C
Relative Humidity	56.0 %



2.3.6 Test Results

802.11b - 2.4 GHz WLAN

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.3.
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11b	Duty Cycle (%):	96.5
Data Rate:	1 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	2.80
Active Port(s):	A (A)	Active Chain(s):	0

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	21.97	-	-	-	-	30.00	-8.03
2442	22.74	-	-	-	-	30.00	-7.26
2472	17.50	-	-	-	-	30.00	-12.50

Table 44 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2412	21.97	-	-	-	-	30.00	-8.03	24.77	36.00	-11.23
2442	22.74	-	-	-	-	30.00	-7.26	25.54	36.00	-10.46
2472	17.50	-	-	-	-	30.00	-12.50	20.30	36.00	-15.70

Table 45 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.3
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11b	Duty Cycle (%):	96.5
Data Rate:	1 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	2.80
Active Port(s):	B (B)	Active Chain(s):	1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	-	21.83	-	-	-	30.00	-8.17
2442	-	22.62	-	-	-	30.00	-7.38
2472	-	16.89	-	-	-	30.00	-13.11

Table 46 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2412	-	21.83	-	-	-	30.00	-8.17	24.63	36.00	-11.37
2442	-	22.62	-	-	-	30.00	-7.38	25.42	36.00	-10.58
2472	-	16.89	-	-	-	30.00	-13.11	19.69	36.00	-16.31

Table 47 - ISSED Maximum Conducted (peak) Output Power Results



802.11g - 2.4 GHz WLAN

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.3
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11g	Duty Cycle (%):	97.4
Data Rate:	6 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	2.80
Active Port(s):	A (A)	Active Chain(s):	0

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	21.64	-	-	-	-	30.00	-8.36
2442	23.50	-	-	-	-	30.00	-6.50
2472	1.88	-	-	-	-	30.00	-28.12

Table 48 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2412	21.64	-	-	-	-	30.00	-8.36	24.44	36.00	-11.56
2442	23.50	-	-	-	-	30.00	-6.50	26.30	36.00	-9.70
2472	1.88	-	-	-	-	30.00	-28.12	4.68	36.00	-31.32

Table 49 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.3
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11g	Duty Cycle (%):	80.4
Data Rate:	6 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	2.80
Active Port(s):	B (B)	Active Chain(s):	1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	-	21.87	-	-	-	30.00	-8.13
2442	-	23.82	-	-	-	30.00	-6.18
2472	-	1.13	-	-	-	30.00	-28.87

Table 50 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2412	-	21.87	-	-	-	30.00	-8.13	24.67	36.00	-11.33
2442	-	23.82	-	-	-	30.00	-6.18	26.62	36.00	-9.38
2472	-	1.13	-	-	-	30.00	-28.87	3.93	36.00	-32.07

Table 51 - ISM Maximum Conducted (peak) Output Power Results



802.11n (20 MHz Bandwidth) - 2.4 GHz WLAN

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.3
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11n HT20	Duty Cycle (%):	79.4
Modulation Coding Scheme:	MCS0	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	2.80
Active Port(s):	A (A)	Active Chain(s):	0

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	21.83	-	-	-	-	30.00	-8.17
2442	23.86	-	-	-	-	30.00	-6.14
2472	1.99	-	-	-	-	30.00	-28.01

Table 52 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2412	21.83	-	-	-	-	30.00	-8.17	24.63	36.00	-11.37
2442	23.86	-	-	-	-	30.00	-6.14	26.66	36.00	-9.34
2472	1.99	-	-	-	-	30.00	-28.01	4.79	36.00	-31.21

Table 53 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.3
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11n HT20	Duty Cycle (%):	79.4
Modulation Coding Scheme:	MCS0	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	2.80
Active Port(s):	B (B)	Active Chain(s):	1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	-	21.86	-	-	-	30.00	-8.14
2442	-	23.93	-	-	-	30.00	-6.07
2472	-	1.45	-	-	-	30.00	-28.55

Table 54 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2412	-	21.86	-	-	-	30.00	-8.14	24.66	36.00	-11.34
2442	-	23.93	-	-	-	30.00	-6.07	26.73	36.00	-9.27
2472	-	1.45	-	-	-	30.00	-28.55	4.25	36.00	-31.75

Table 55 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.3
Additional Reference(s):	662911 D01 v02r01 F)2)f)(i), 662911 D01 v02r01 E)1)		

DUT Configuration			
Mode:	802.11n HT20	Duty Cycle (%):	79.3
Modulation Coding Scheme:	MCS0	DCCF (dB):	-
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	2.80
Active Port(s):	A+B (A + B)	Active Chain(s):	0+1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	20.26	19.70	-	-	23.00	30.00	-7.00
2442	22.66	22.58	-	-	25.61	30.00	-4.39
2472	-0.25	-0.99	-	-	2.36	30.00	-27.64

Table 56 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2412	20.26	19.70	-	-	23.00	30.00	-7.00	25.80	36.00	-10.20
2442	22.66	22.58	-	-	25.61	30.00	-4.39	28.41	36.00	-7.59
2472	-0.25	-0.99	-	-	2.36	30.00	-27.64	5.16	36.00	-30.84

Table 57 - ISSED Maximum Conducted (peak) Output Power Results



802.11n (40 MHz Bandwidth) - 2.4 GHz WLAN

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.3
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11n HT40	Duty Cycle (%):	79.0
Modulation Coding Scheme:	MCS0	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	2.80
Active Port(s):	A (A)	Active Chain(s):	0

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2422	19.86	-	-	-	-	30.00	-10.14
2442	21.82	-	-	-	-	30.00	-8.18
2462	12.00	-	-	-	-	30.00	-18.00

Table 58 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2422	19.86	-	-	-	-	30.00	-10.14	22.66	36.00	-13.34
2442	21.82	-	-	-	-	30.00	-8.18	24.62	36.00	-11.38
2462	12.00	-	-	-	-	30.00	-18.00	14.80	36.00	-21.20

Table 59 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.3
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11n HT40	Duty Cycle (%):	79.0
Modulation Coding Scheme:	MCS0	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	2.80
Active Port(s):	B (B)	Active Chain(s):	1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2422	-	19.21	-	-	-	30.00	-10.79
2442	-	21.86	-	-	-	30.00	-8.14
2462	-	12.26	-	-	-	30.00	-17.74

Table 60 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2422	-	19.21	-	-	-	30.00	-10.79	22.01	36.00	-13.99
2442	-	21.86	-	-	-	30.00	-8.14	24.66	36.00	-11.34
2462	-	12.26	-	-	-	30.00	-17.74	15.06	36.00	-20.94

Table 61 - ISED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.3
Additional Reference(s):	662911 D01 v02r01 F)2)f(i), 662911 D01 v02r01 E)1)		

DUT Configuration			
Mode:	802.11n HT40	Duty Cycle (%):	78.9
Modulation Coding Scheme:	MCS0	DCCF (dB):	-
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	2.80
Active Port(s):	A+B (A + B)	Active Chain(s):	0+1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2422	18.18	17.90	-	-	21.02	30.00	-8.98
2442	20.97	20.78	-	-	23.88	30.00	-6.12
2462	11.31	11.52	-	-	14.29	30.00	-15.71

Table 62 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2422	18.18	17.90	-	-	21.02	30.00	-8.98	23.82	36.00	-12.18
2442	20.97	20.78	-	-	23.88	30.00	-6.12	26.68	36.00	-9.32
2462	11.31	11.52	-	-	14.29	30.00	-15.71	17.09	36.00	-18.91

Table 63 - ISED Maximum Conducted (peak) Output Power Results

FCC 47 CFR Part 15, Limit Clause 15.247 (b)(3)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

ISED RSS-247, Limit Clause 5.4 (b)

For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e) of the specification.



2.3.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	03-Dec-2021
Hygrometer	Rotronic	I-1000	3220	12	16-Oct-2021
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	03-Dec-2021
Climatic Chamber	Aralab	FitoTerm 300E45	4823	12	12-Apr-2022
USB Power Sensor	Boonton	RTP5006	5184	12	19-Apr-2022
USB Power Sensor	Boonton	RTP5006	5187	12	19-Apr-2022
Signal Commissioning Unit	TUV SUD	SCU001	5546	12	16-Apr-2022

Table 64



2.4 Spurious Radiated Emissions

2.4.1 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

2.4.2 Equipment Under Test and Modification State

Atom Hard Hat, S/N: Not serialised (Storix-ID 599374-18) - Modification State 0

2.4.3 Date of Test

07-September-2021 to 27-September-2021

2.4.4 Test Method

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

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

For frequencies > 1 GHz, plots for average measurements were taken in accordance with ANSI C63.10, clause 4.1.4.2.5 to characterize the EUT. Where emissions were detected, final average measurements were taken in accordance with ANSI C63.10, clause 11.12.2.5.2.

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.

2.4.5 Example Test Setup Diagram

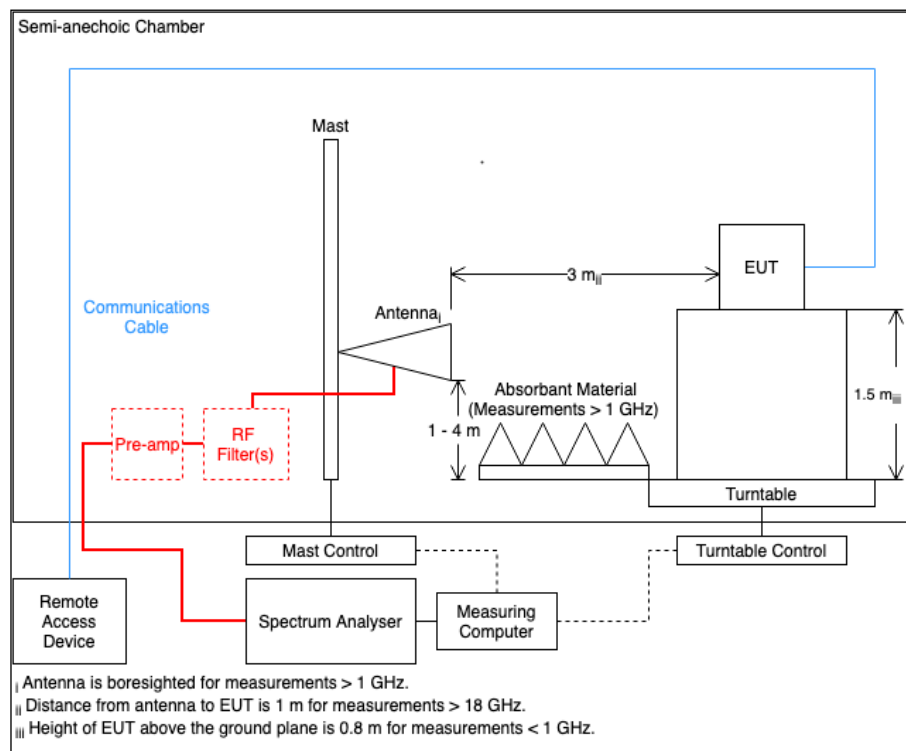


Figure 89

2.4.6 Environmental Conditions

Ambient Temperature	18.4 - 21.1 °C
Relative Humidity	53.6 - 68.4 %



2.4.7 Test Results

802.11b - 2.4 GHz WLAN

Testing was performed on the configurations and Data Rate which resulted in the highest conducted output power and highest power spectral density as stated in ANSI C63.10, clause 5.6.2.2 (b). The Data Rate used during testing was 1 Mbps. The EUT was configured to transmit simultaneously at maximum output power on both antenna ports.

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
37.644	34.07	40.00	5.93	Q-Peak	89	100	Vertical	Z
74.788	32.94	40.00	7.06	Q-Peak	89	101	Vertical	X
74.971	30.93	40.00	9.07	Q-Peak	151	161	Vertical	Y
75.062	30.48	40.00	9.52	Q-Peak	40	165	Vertical	Z
167.998	35.58	43.52	7.94	Q-Peak	270	148	Horizontal	Z
168.017	36.97	43.52	6.55	Q-Peak	360	100	Vertical	Z
170.543	34.96	43.52	8.56	Q-Peak	351	102	Vertical	X
170.590	35.89	43.52	7.63	Q-Peak	54	191	Horizontal	Y
249.997	39.44	46.02	6.58	Q-Peak	260	100	Vertical	Y
250.061	37.48	46.02	8.54	Q-Peak	235	100	Vertical	Z
253.763	41.90	46.02	4.12	Q-Peak	250	100	Horizontal	Y
253.791	38.35	46.02	7.67	Q-Peak	355	102	Horizontal	X
262.058	38.23	46.02	7.79	Q-Peak	360	100	Horizontal	X
330.963	37.64	46.02	8.38	Q-Peak	235	100	Horizontal	Z
332.824	40.60	46.02	5.42	Q-Peak	299	145	Vertical	Z
611.501	37.13	46.02	8.89	Q-Peak	130	100	Vertical	X
611.585	36.49	46.02	9.53	Q-Peak	210	124	Horizontal	Y

Table 65 - 2412 MHz, 30 MHz to 1 GHz

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

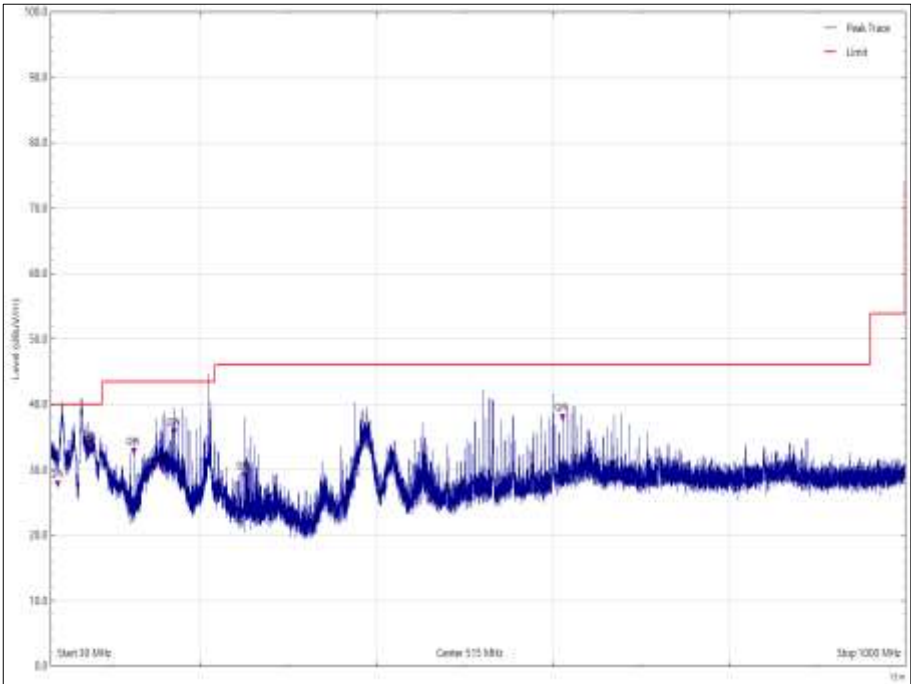


Figure 90 - 2412 MHz, 30 MHz to 1 GHz, Vertical, X Orientation

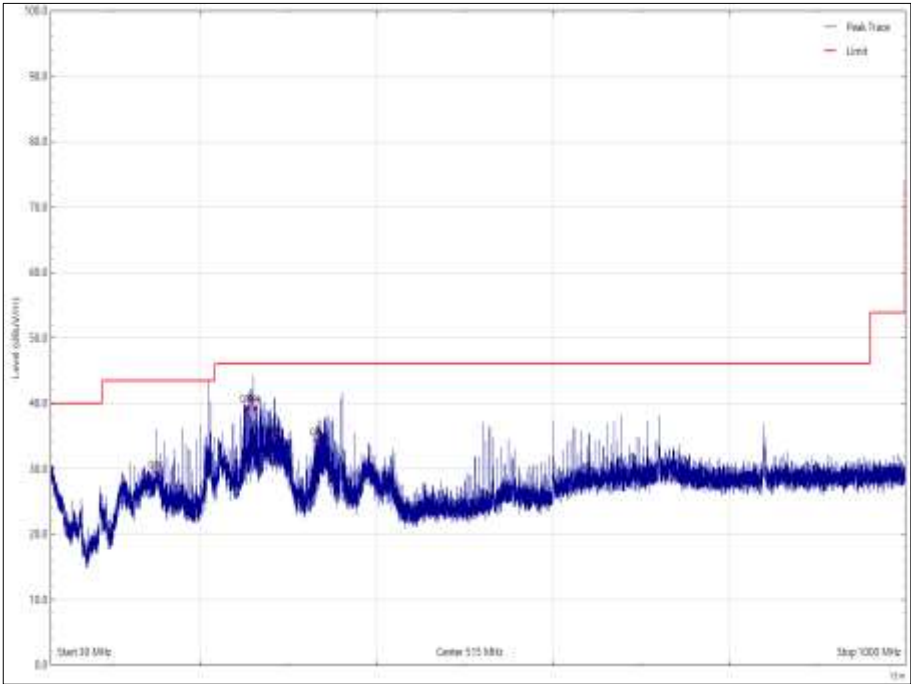


Figure 91 - 2412 MHz, 30 MHz to 1 GHz, Horizontal, X Orientation

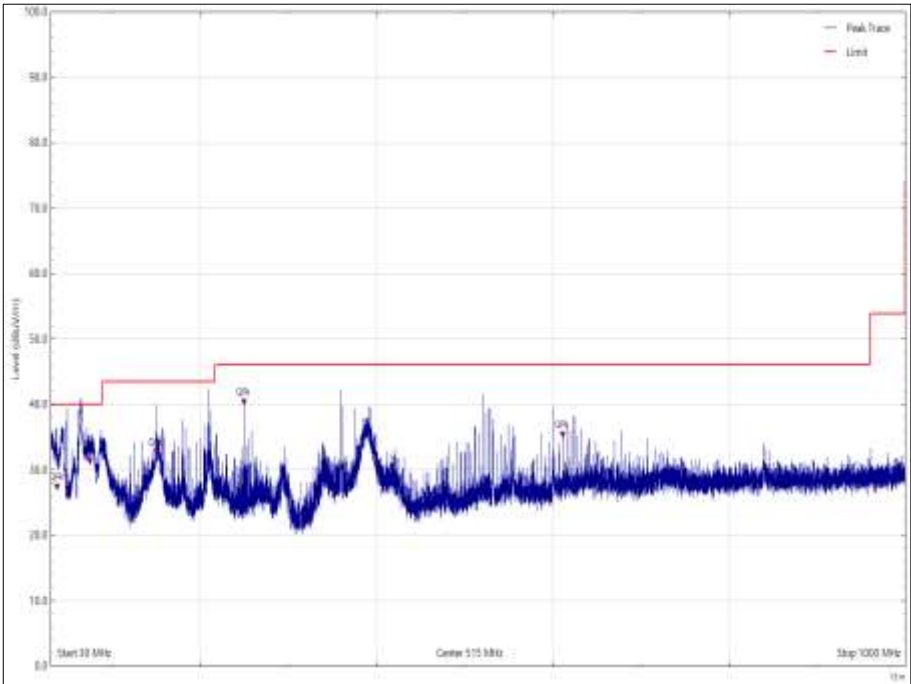


Figure 92 - 2412 MHz, 30 MHz to 1 GHz, Vertical, Y Orientation

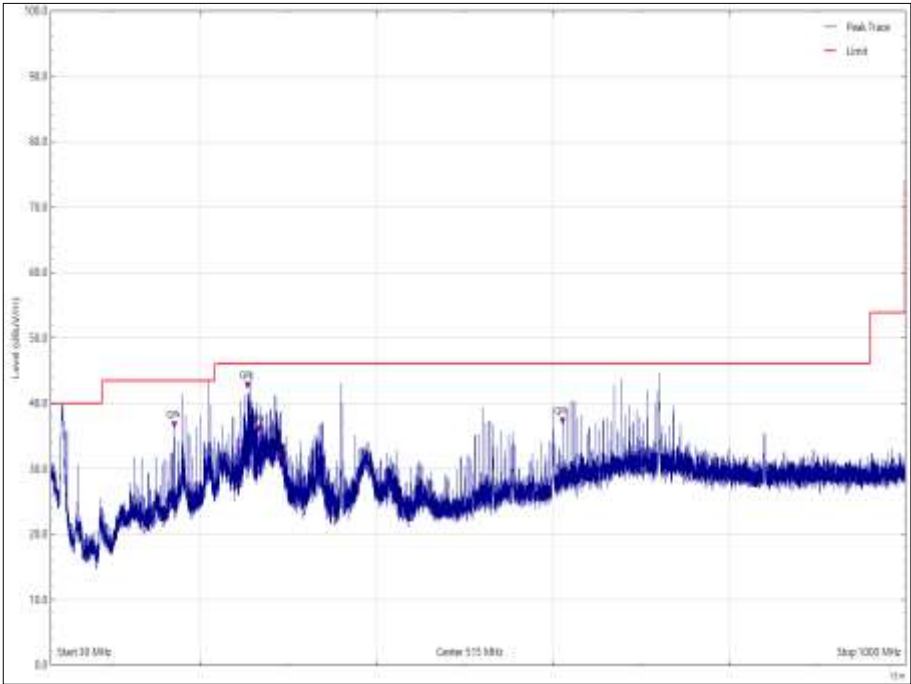


Figure 93 - 2412 MHz, 30 MHz to 1 GHz, Horizontal, Y Orientation

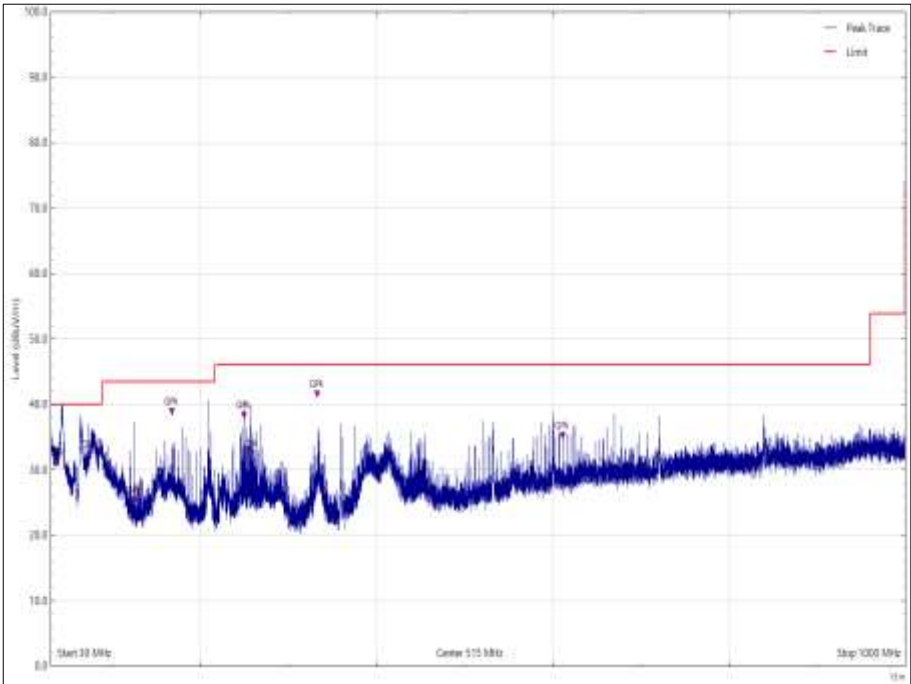


Figure 94 - 2412 MHz, 30 MHz to 1 GHz, Vertical, Z Orientation

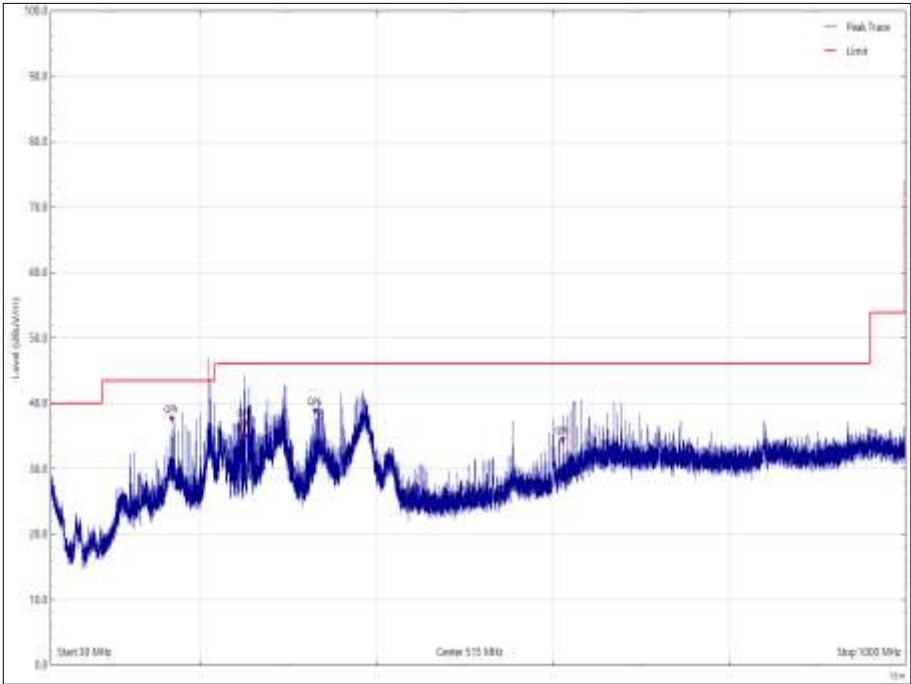


Figure 95 - 2412 MHz, 30 MHz to 1 GHz, Horizontal, Z Orientation



Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
4823.980	47.79	53.98	6.19	Average	350	100	Vertical	Z
7234.810	49.32	53.98	4.33	Average	288	131	Vertical	Z
7234.830	46.88	53.98	7.10	Average	265	144	Horizontal	Z
7234.979	47.55	53.98	6.43	Average	180	100	Vertical	X

Table 66 - 2412 MHz, 1 GHz to 25 GHz

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

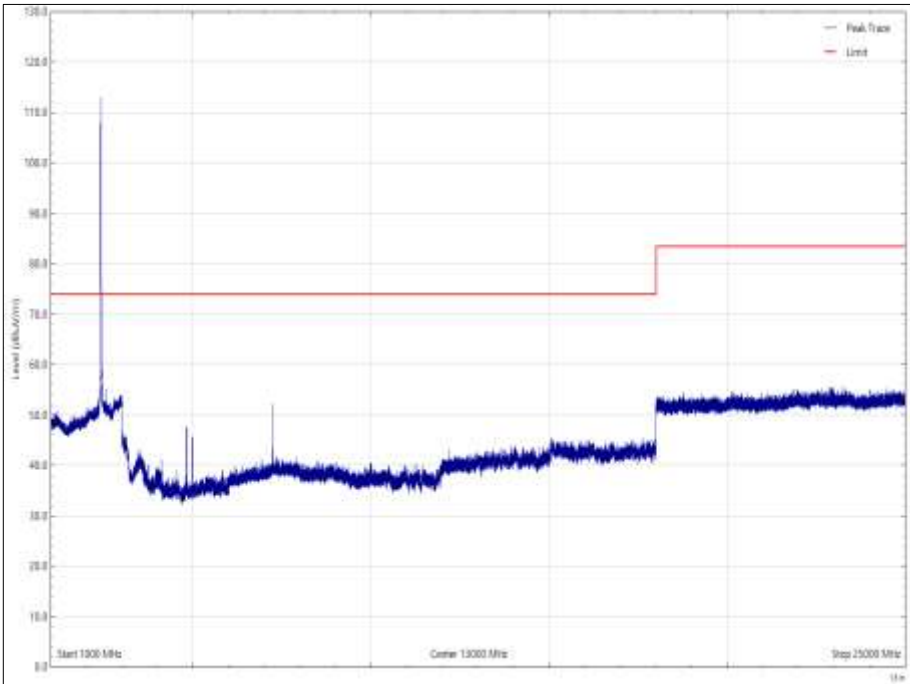


Figure 96 - 2412 MHz, 1 GHz to 25 GHz, Vertical, X Orientation - Peak

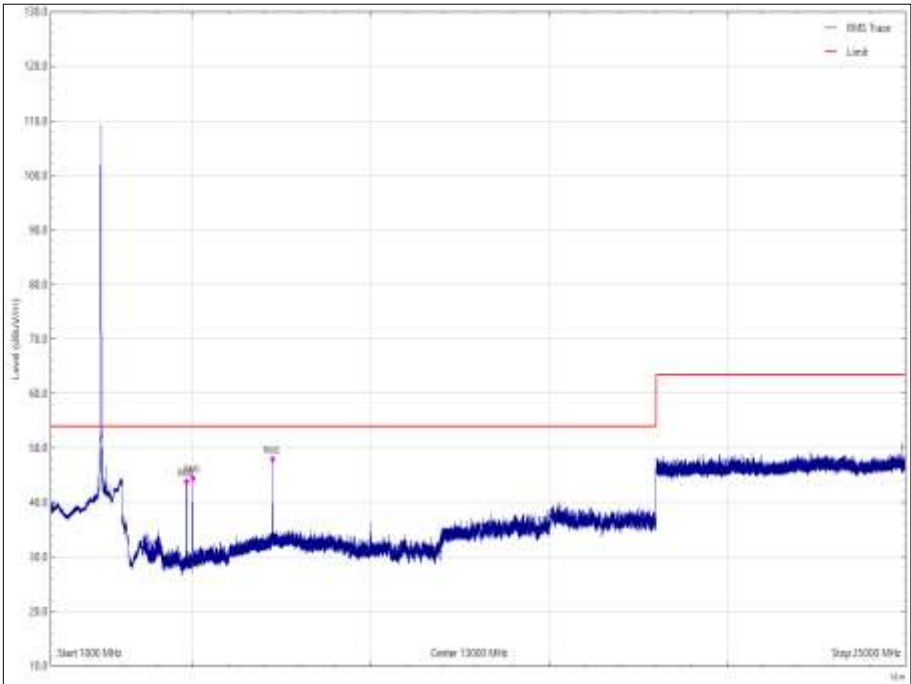


Figure 97 - 2412 MHz, 1 GHz to 25 GHz, Vertical, X Orientation - Average

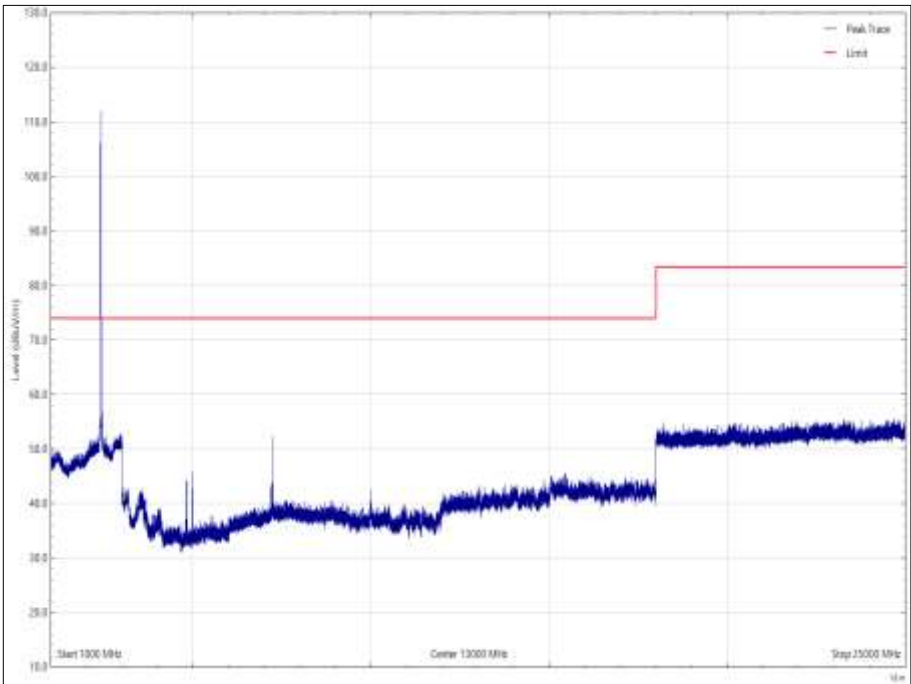


Figure 98 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, X Orientation - Peak

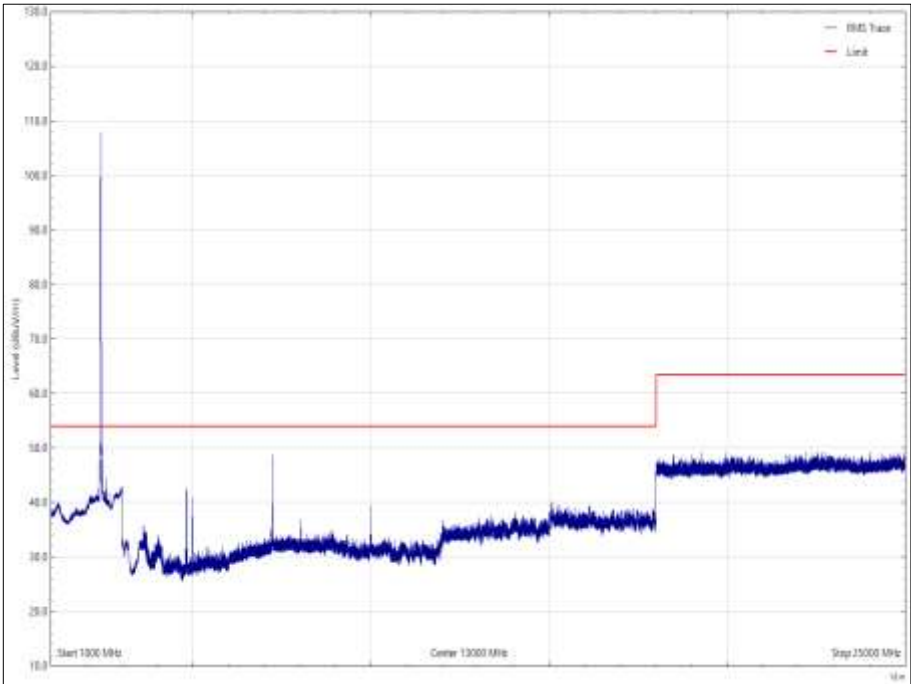


Figure 99 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, X Orientation - Average

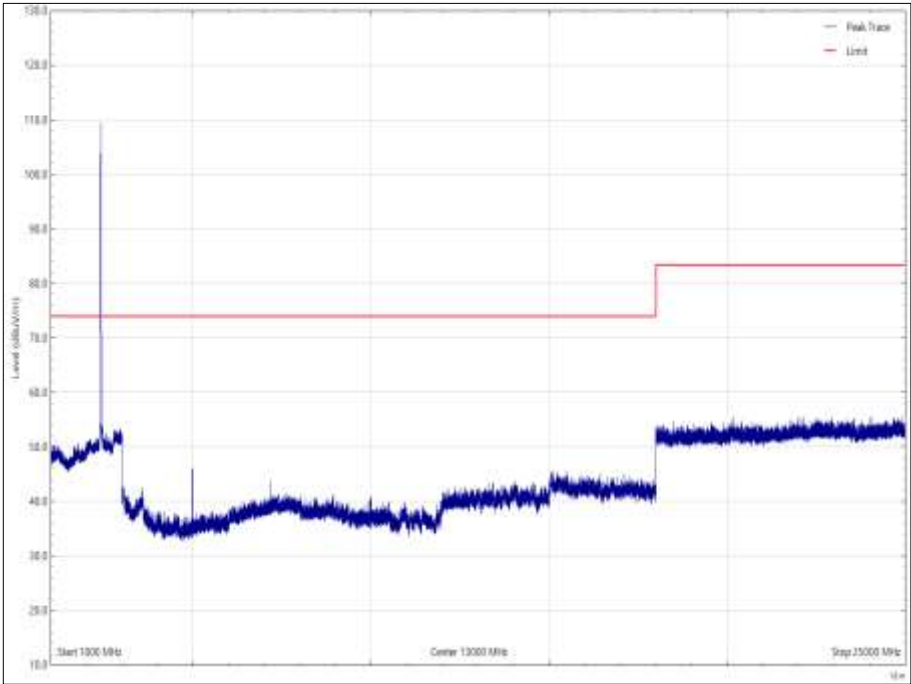


Figure 100 - 2412 MHz, 1 GHz to 25 GHz, Vertical, Y Orientation - Peak

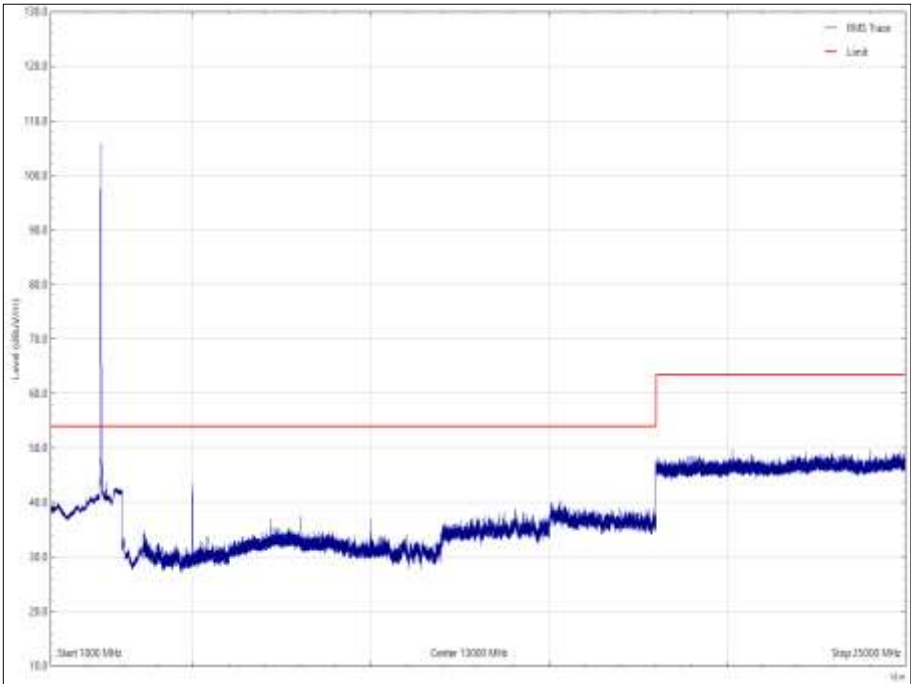


Figure 101 - 2412 MHz, 1 GHz to 25 GHz, Vertical, Y Orientation - Average

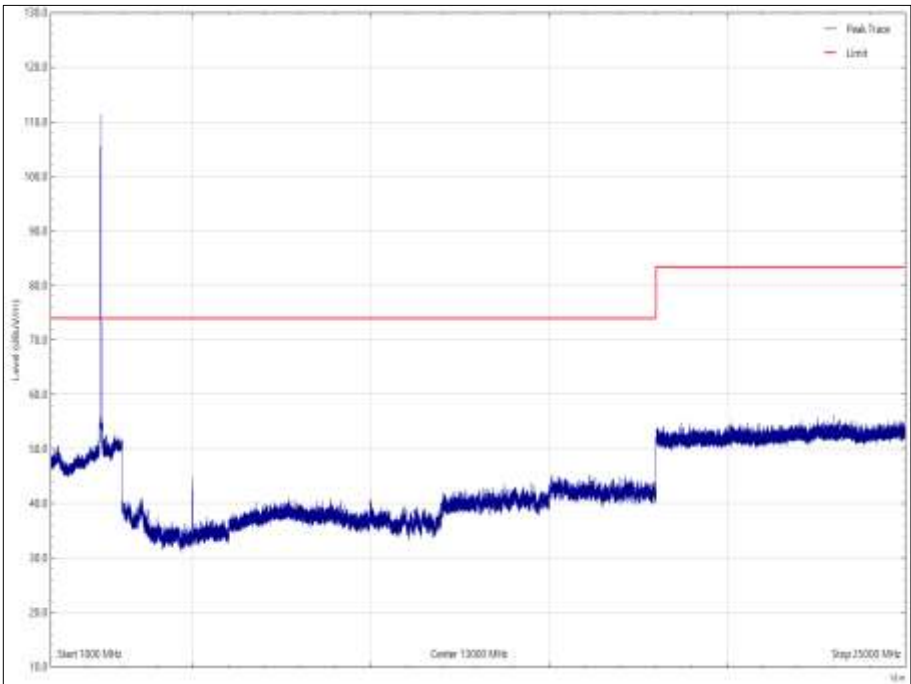


Figure 102 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, Y Orientation - Peak

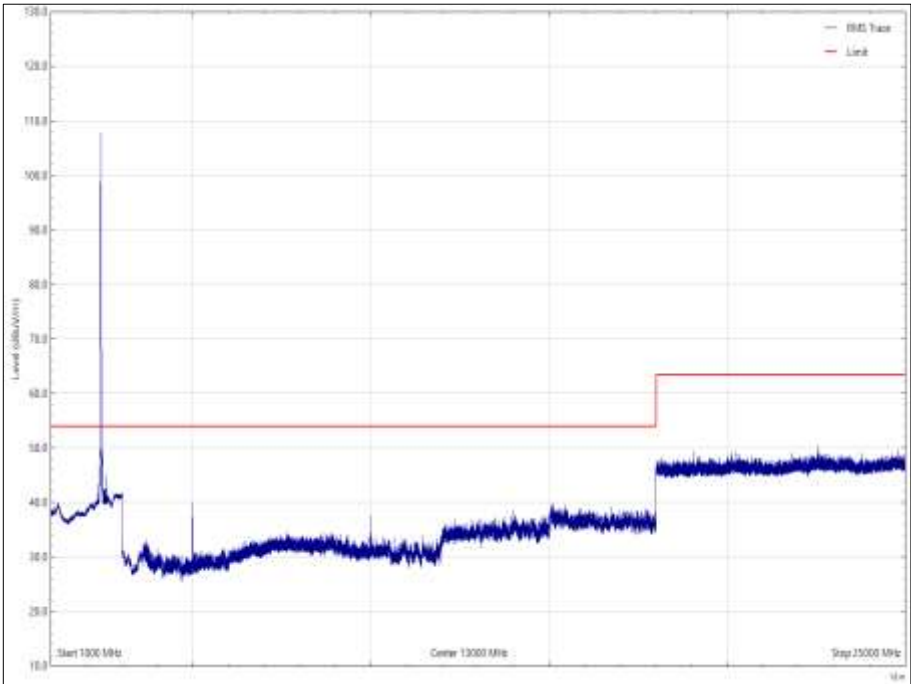


Figure 103 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, Y Orientation - Average

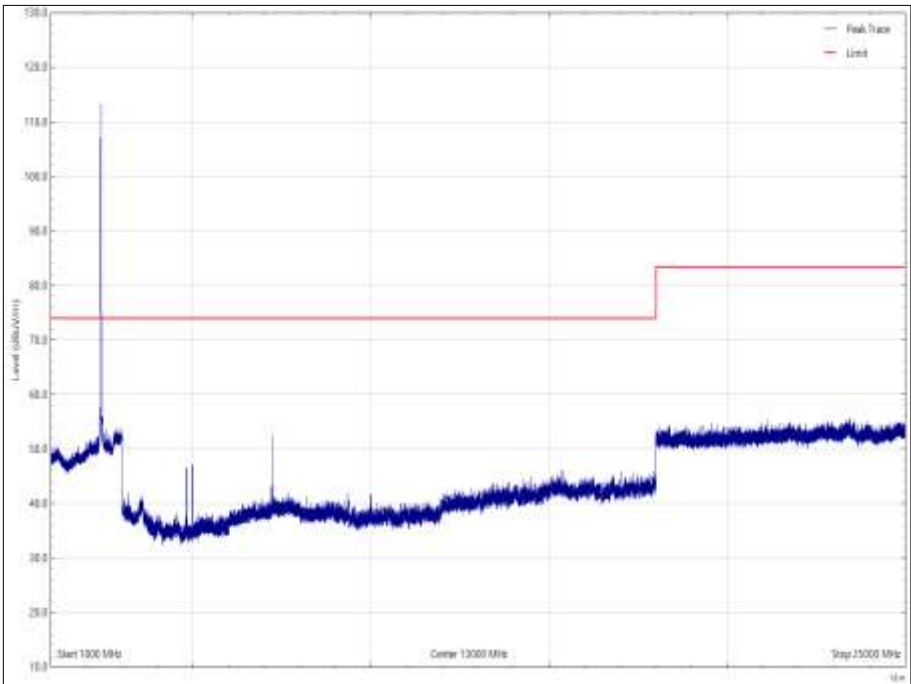


Figure 104 - 2412 MHz, 1 GHz to 25 GHz, Vertical, Z Orientation - Peak

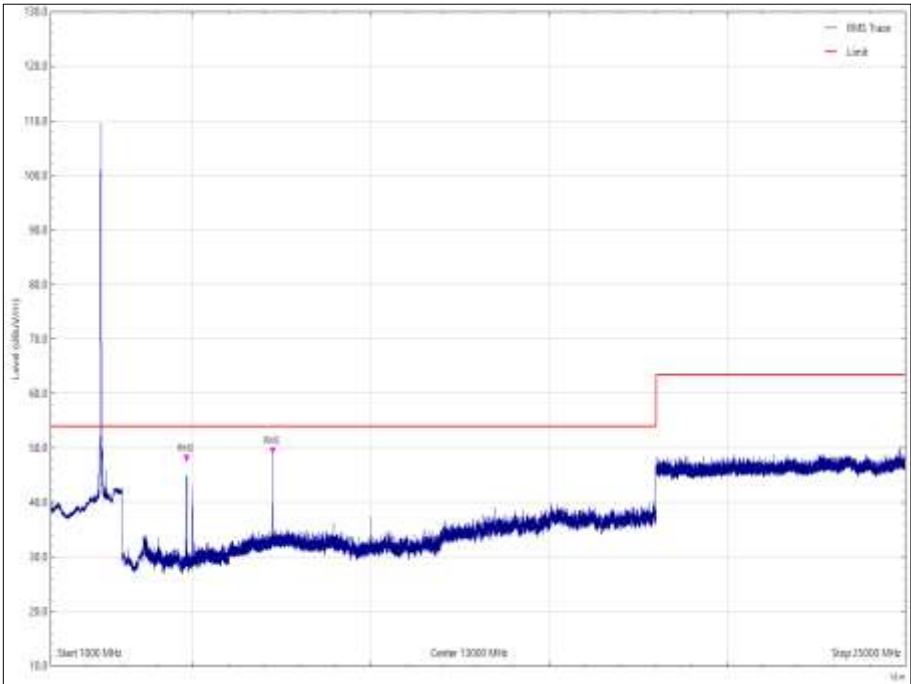


Figure 105 - 2412 MHz, 1 GHz to 25 GHz, Vertical, Z Orientation - Average

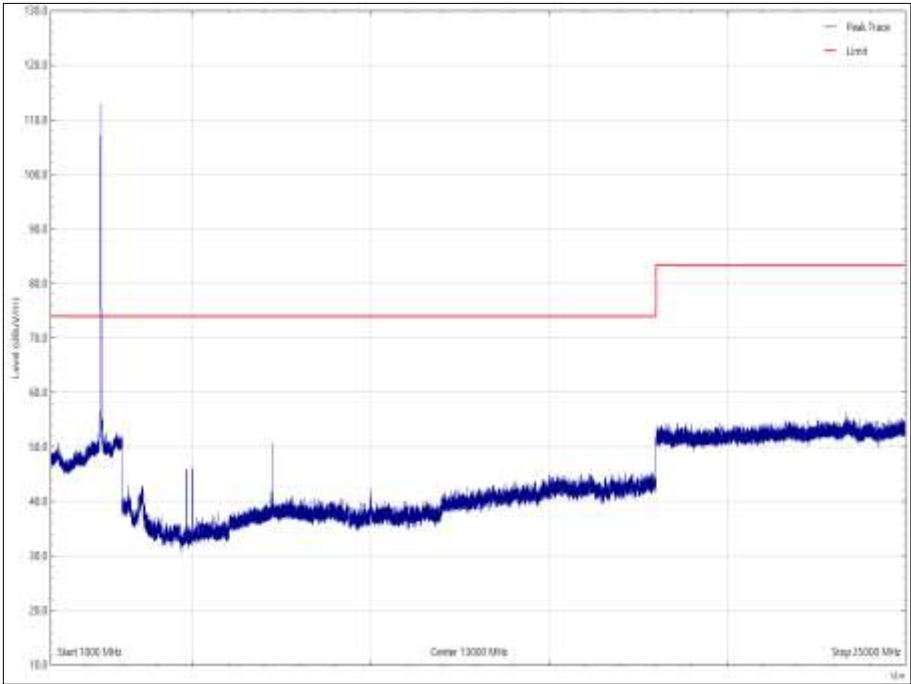


Figure 106 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, Z Orientation - Peak

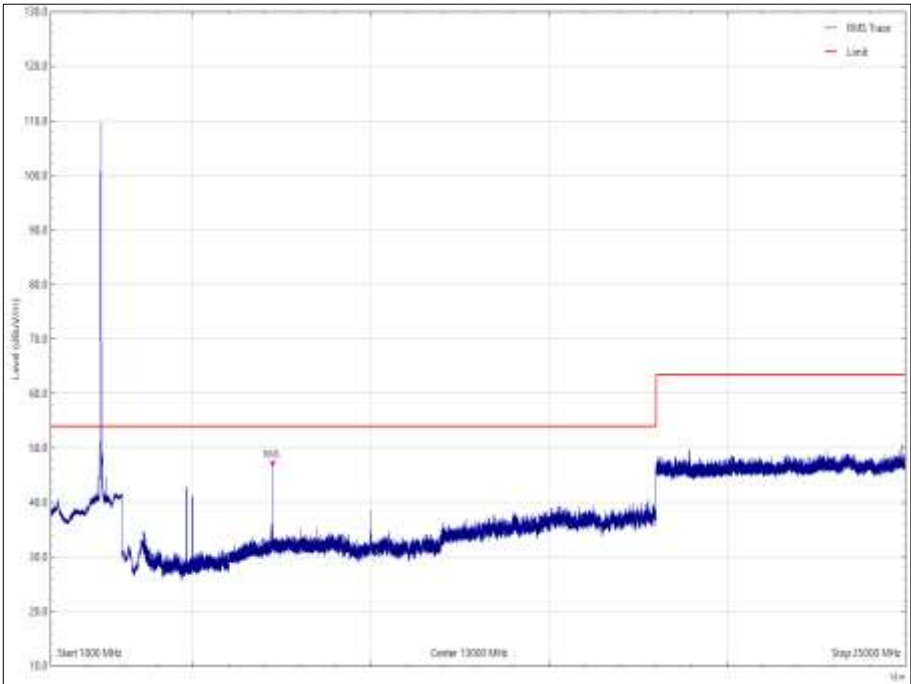


Figure 107 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, Z Orientation - Average

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
74.296	31.75	40.00	8.25	Q-Peak	75	142	Vertical	X
74.915	33.40	40.00	6.60	Q-Peak	10	106	Vertical	Z
166.380	33.62	43.52	9.90	Q-Peak	30	101	Vertical	X
168.010	37.08	43.52	6.44	Q-Peak	343	100	Vertical	Z
168.010	35.68	43.52	7.84	Q-Peak	270	141	Horizontal	Z
249.968	37.83	46.02	8.19	Q-Peak	239	100	Vertical	Z
250.026	38.24	46.02	7.78	Q-Peak	241	100	Vertical	Y
253.704	36.68	46.02	9.34	Q-Peak	0	103	Horizontal	X
253.855	36.78	46.02	9.24	Q-Peak	265	107	Horizontal	Y
331.073	37.21	46.02	8.81	Q-Peak	233	100	Horizontal	Z
332.748	39.78	46.02	6.24	Q-Peak	305	142	Vertical	Z
611.487	36.38	46.02	9.64	Q-Peak	133	100	Vertical	X
611.553	40.96	46.02	5.06	Q-Peak	216	120	Horizontal	Y

Table 67 - 2437 MHz, 30 MHz to 1 GHz

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

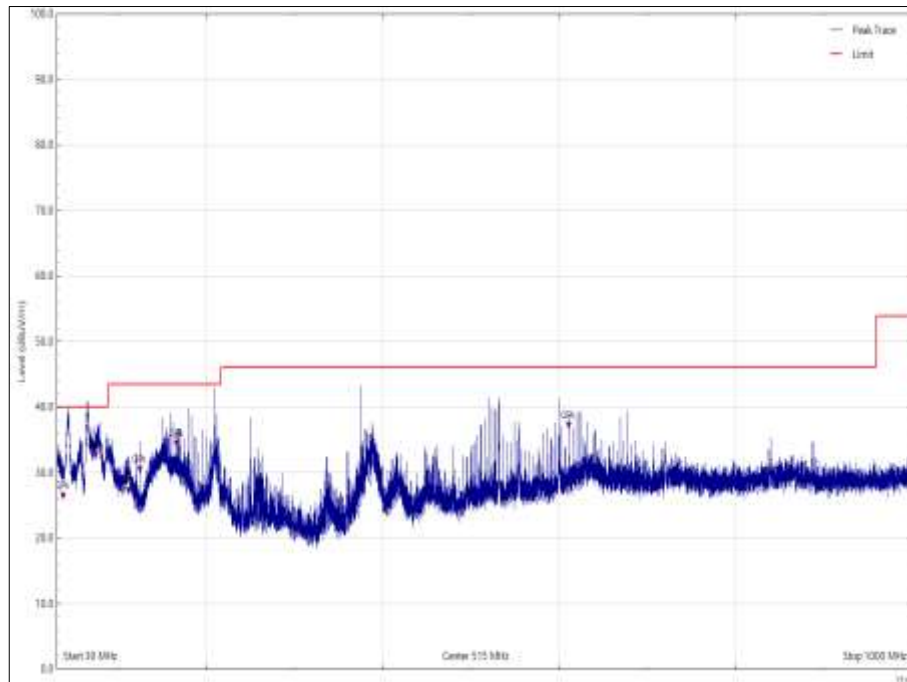


Figure 108 - 2437 MHz, 30 MHz to 1 GHz, Vertical, X Orientation

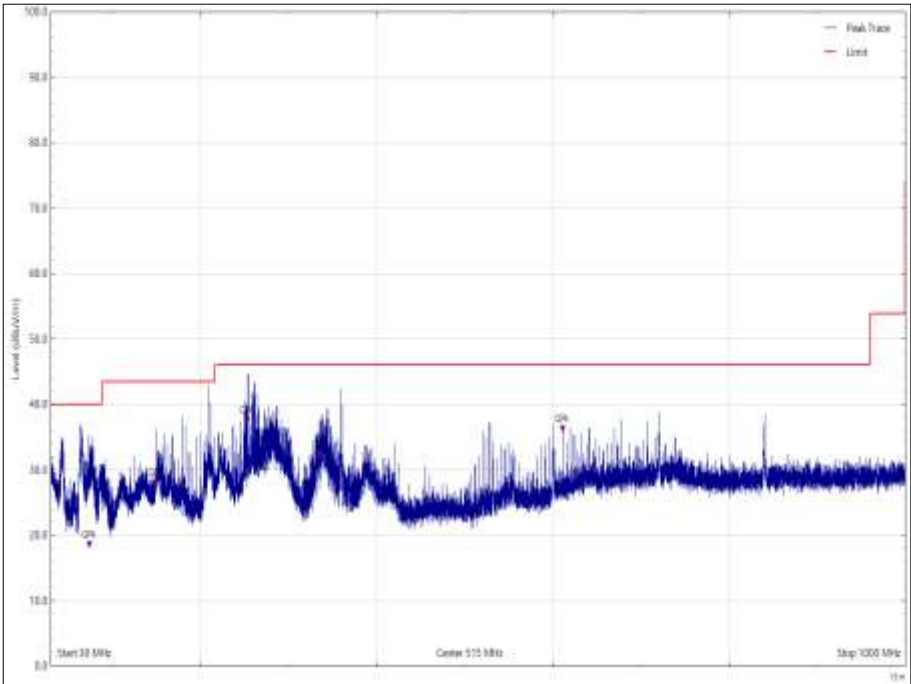


Figure 109 - 2437 MHz, 30 MHz to 1 GHz, Horizontal, X Orientation

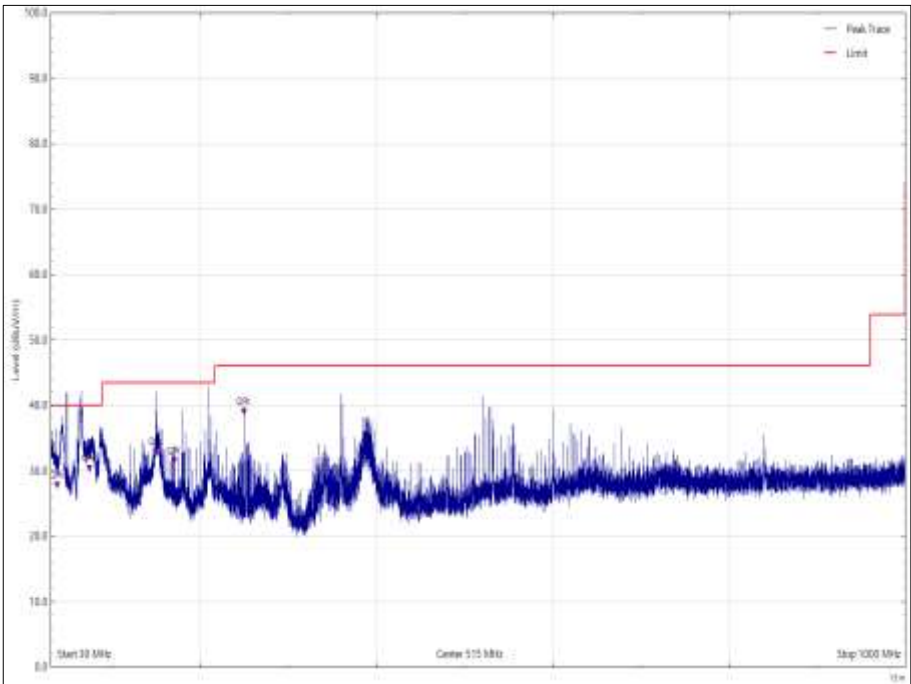


Figure 110 - 2437 MHz, 30 MHz to 1 GHz, Vertical, Y Orientation

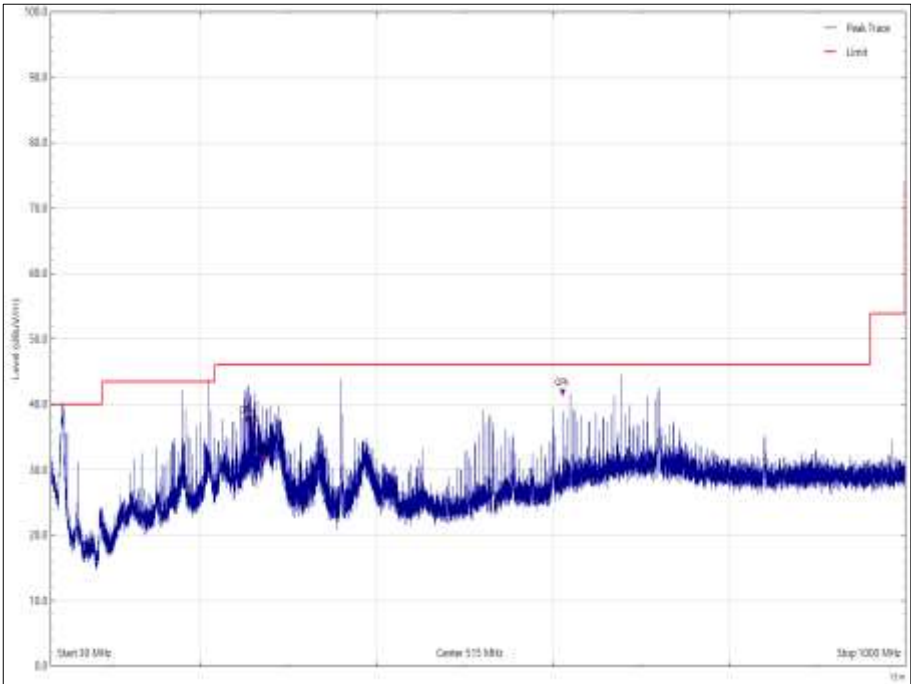


Figure 111 - 2437 MHz, 30 MHz to 1 GHz, Horizontal, Y Orientation

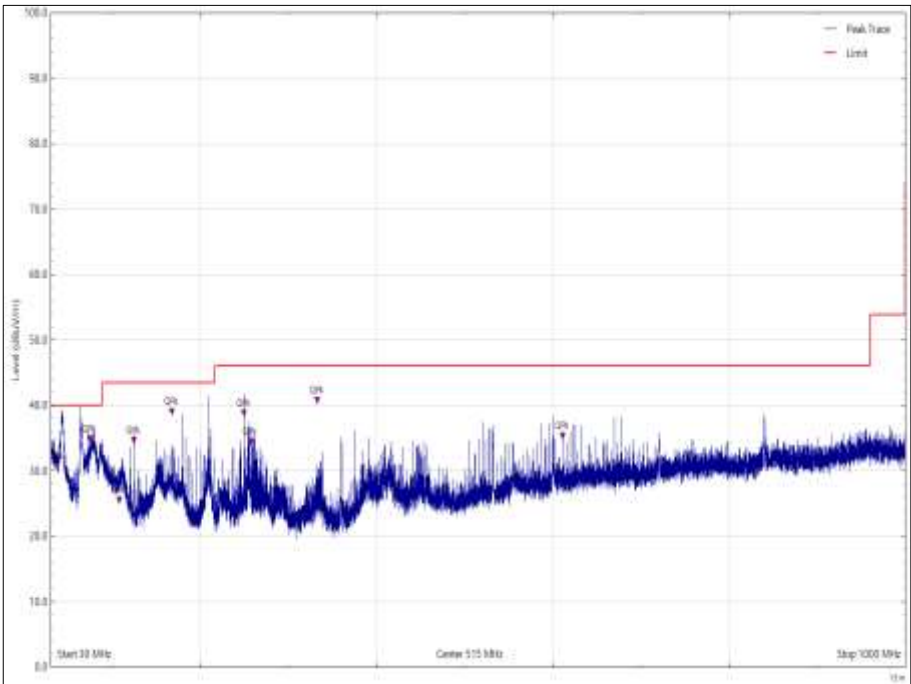


Figure 112 - 2437 MHz, 30 MHz to 1 GHz, Vertical, Z Orientation

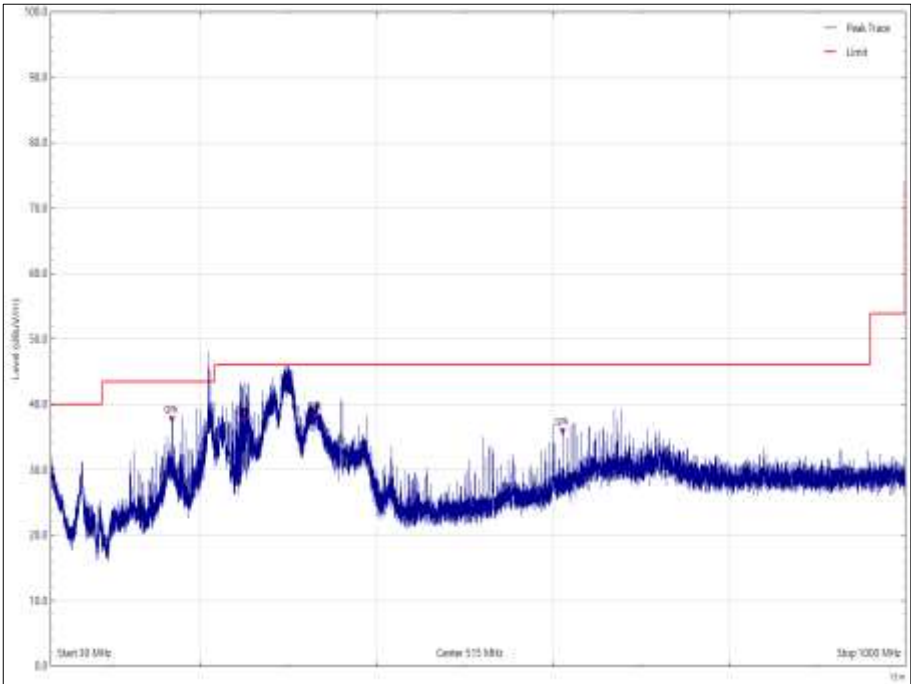


Figure 113 - 2437 MHz, 30 MHz to 1 GHz, Horizontal, Z Orientation

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
4873.999	49.23	53.98	4.75	Average	175	132	Vertical	Y
4874.003	50.28	53.98	3.70	Average	323	301	Horizontal	Z
4874.005	47.88	53.98	6.10	Average	133	155	Vertical	X
4874.023	49.30	53.98	4.68	Average	279	114	Vertical	Z
4874.055	46.80	53.98	7.18	Average	97	100	Horizontal	X
4874.081	49.23	53.98	4.75	Average	258	100	Horizontal	Y
7309.877	50.68	53.98	3.30	Average	285	234	Vertical	Z
7309.940	51.23	53.98	2.75	Average	285	158	Horizontal	Y
7311.914	50.85	53.98	3.13	Average	303	100	Horizontal	Z
7312.054	50.67	53.98	3.31	Average	33	154	Horizontal	X
7312.234	51.66	53.98	2.32	Average	179	135	Vertical	X

Table 68 - 2437 MHz - 1 GHz to 25 GHz

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

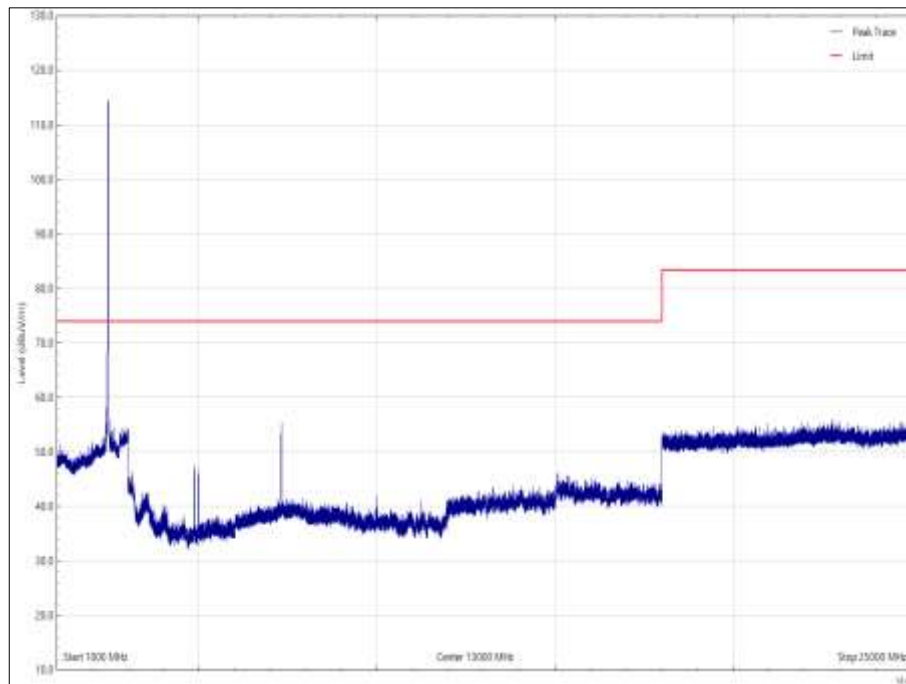


Figure 114 - 2437 MHz - 1 GHz to 25 GHz, Vertical, X Orientation - Peak

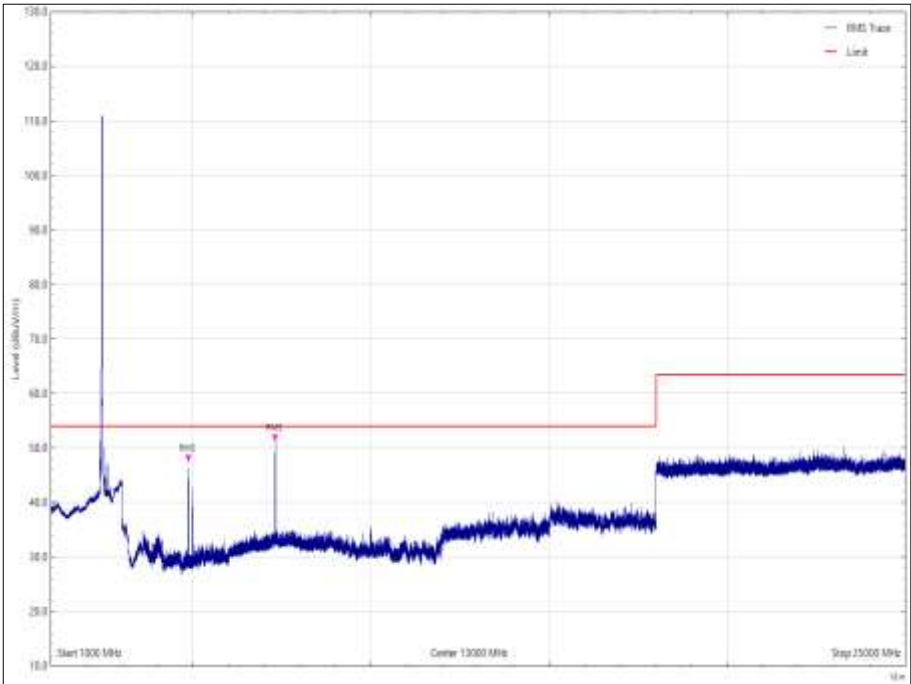


Figure 115 - 2437 MHz - 1 GHz to 25 GHz, Vertical, X Orientation - Average

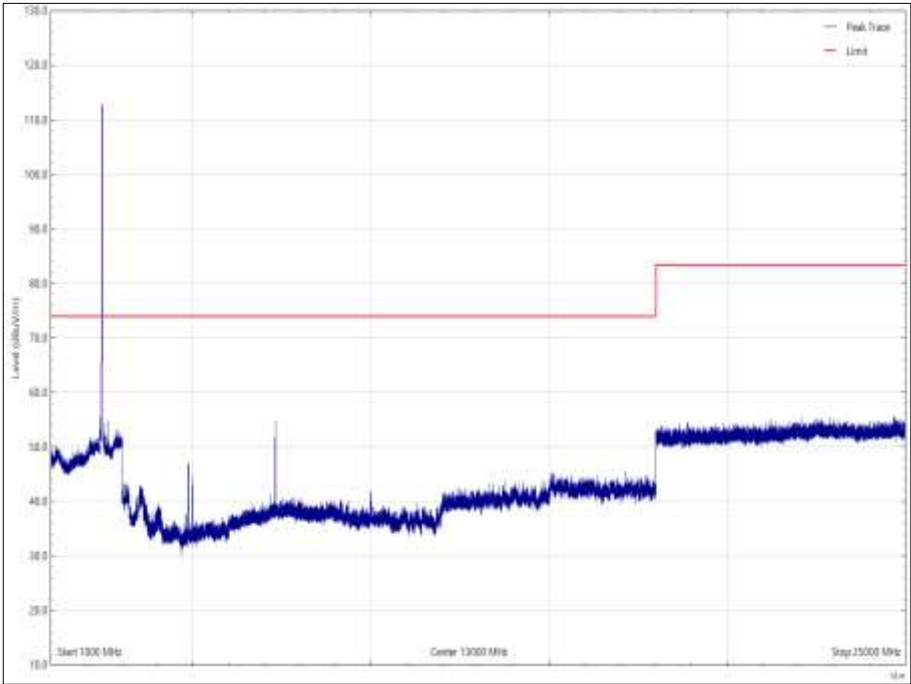


Figure 116 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, X Orientation - Peak

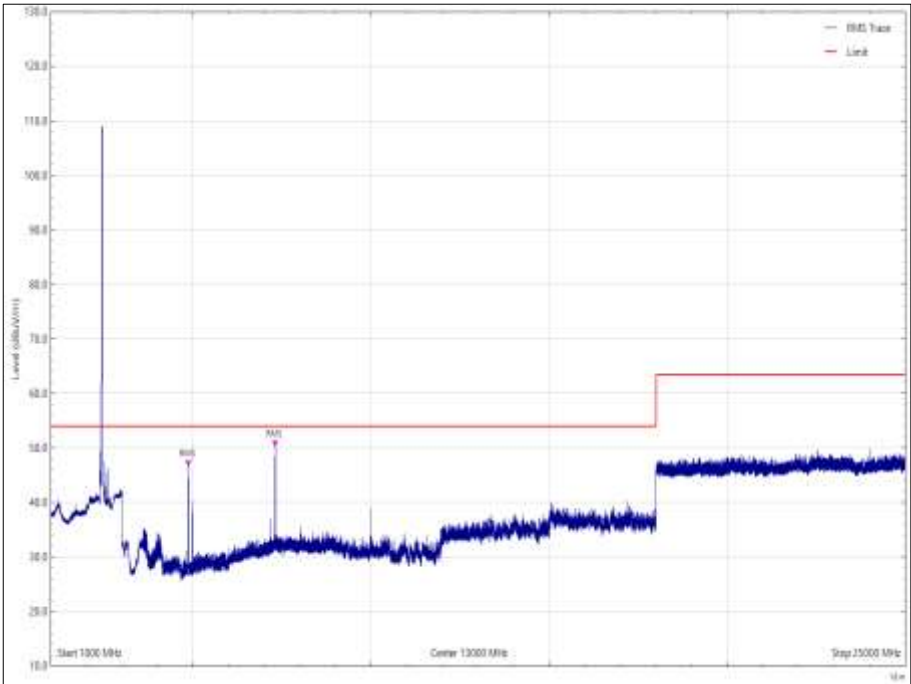


Figure 117 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, X Orientation - Average

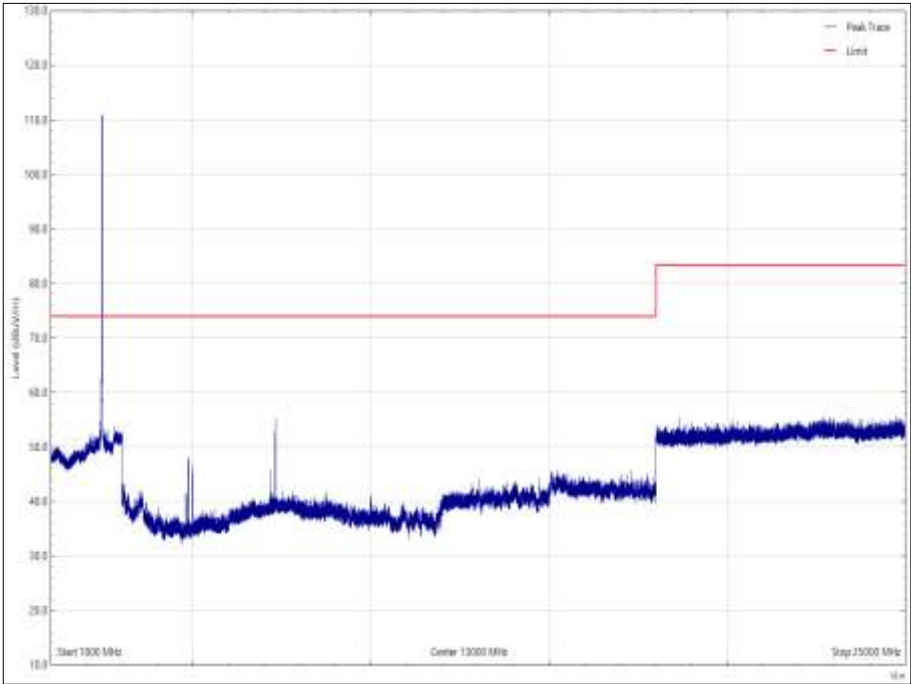


Figure 118 - 2437 MHz - 1 GHz to 25 GHz, Vertical, Y Orientation - Peak

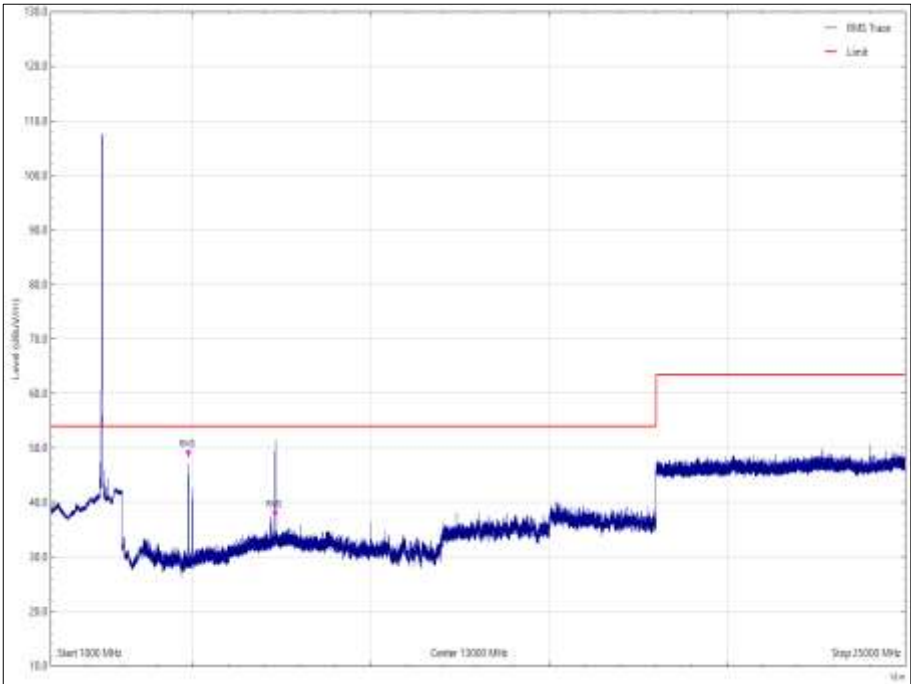


Figure 119 - 2437 MHz - 1 GHz to 25 GHz, Vertical, Y Orientation - Average

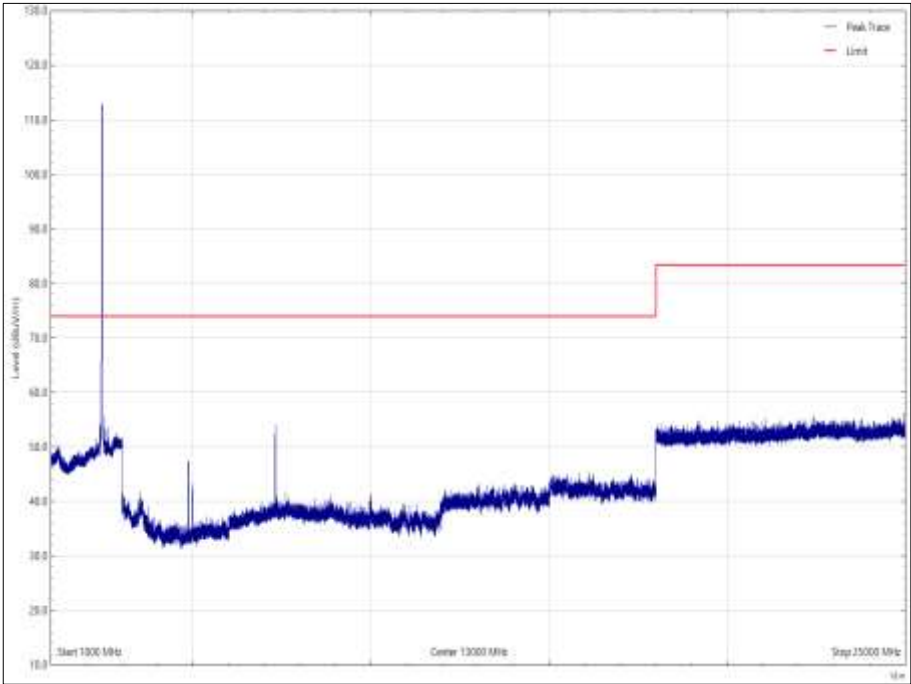


Figure 120 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, Y Orientation - Peak

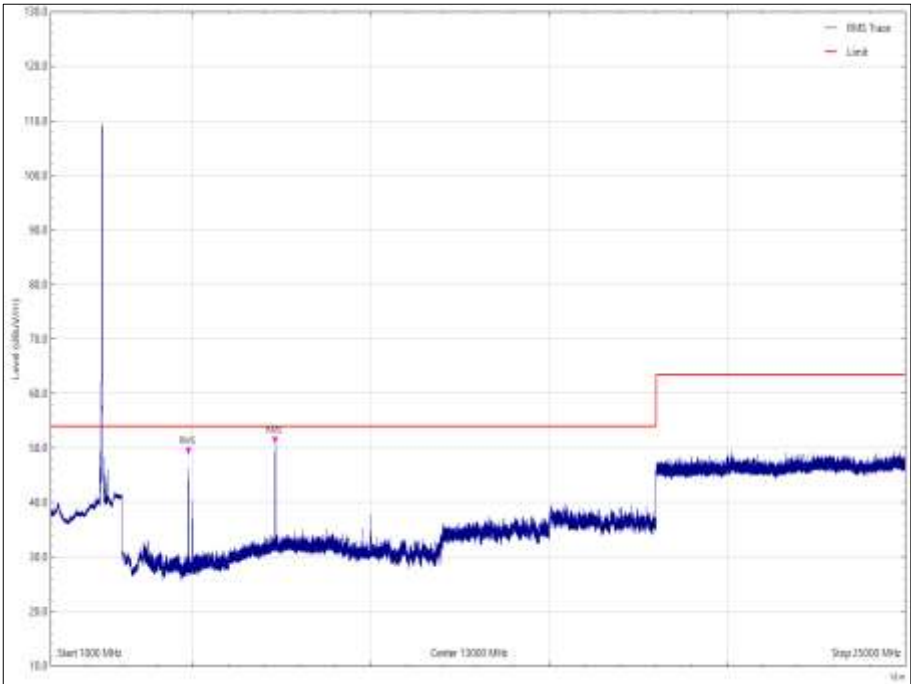


Figure 121 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, Y Orientation - Average

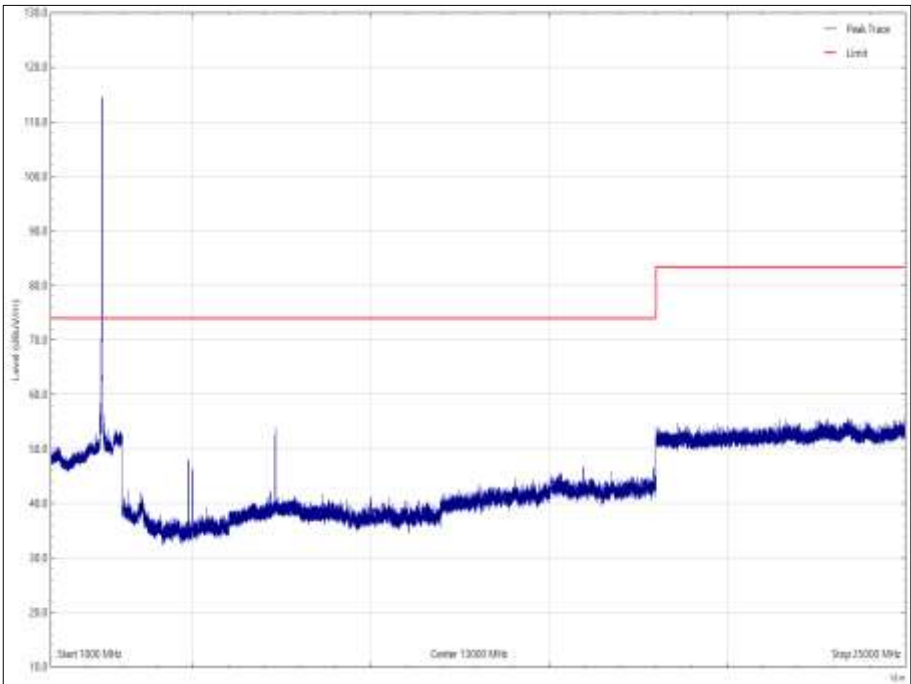


Figure 122 - 2437 MHz - 1 GHz to 25 GHz, Vertical, Z Orientation - Peak

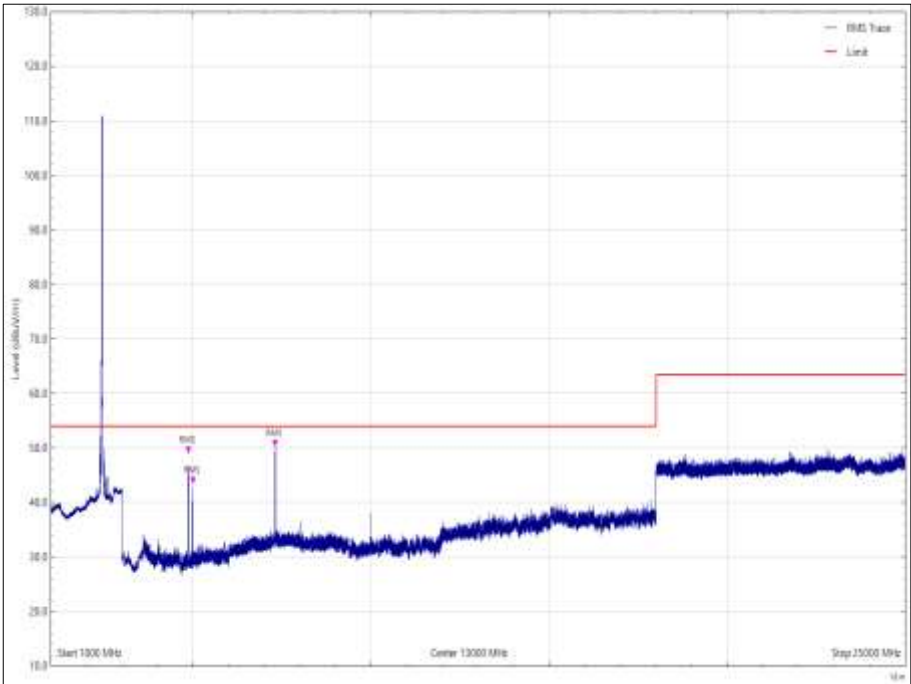


Figure 123 - 2437 MHz - 1 GHz to 25 GHz, Vertical, Z Orientation - Average

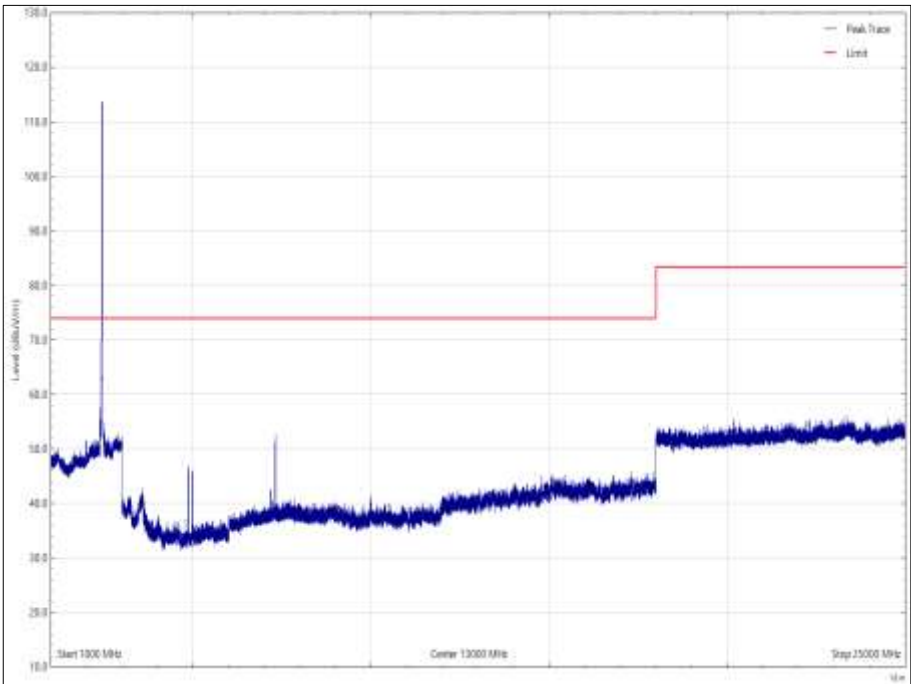


Figure 124 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, Z Orientation - Peak

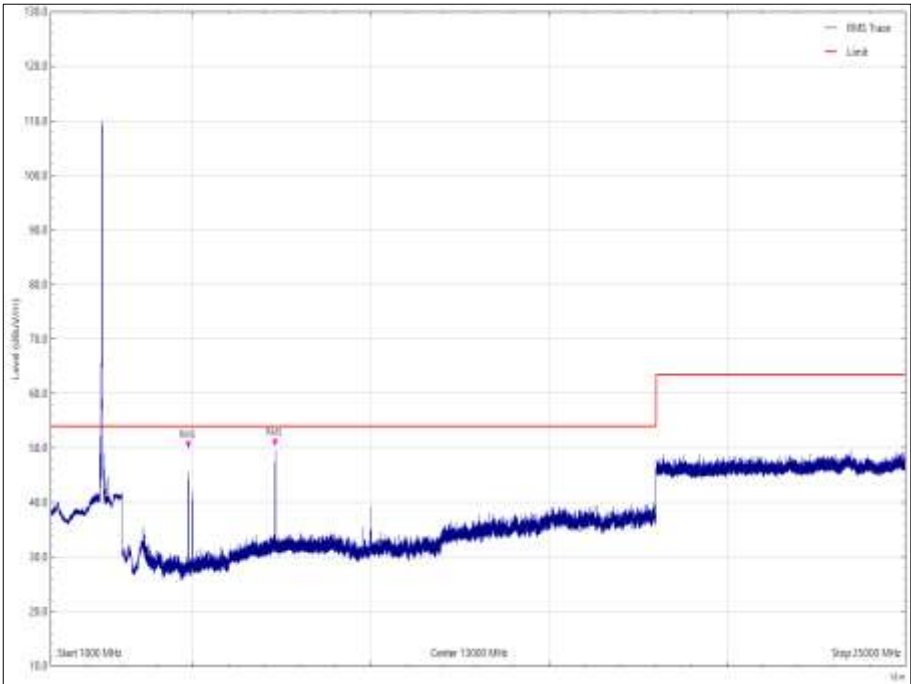


Figure 125 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, Z Orientation - Average

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
73.052	31.84	40.00	8.16	Q-Peak	110	152	Vertical	Y
74.167	31.18	40.00	8.82	Q-Peak	98	100	Vertical	X
75.161	33.85	40.00	6.15	Q-Peak	158	108	Vertical	Z
162.227	36.23	43.52	7.29	Q-Peak	255	100	Vertical	X
168.053	34.70	43.52	8.82	Q-Peak	350	100	Vertical	Z
170.557	35.33	43.52	8.19	Q-Peak	350	100	Vertical	X
170.564	37.30	43.52	6.22	Q-Peak	44	140	Horizontal	Y
245.472	36.22	46.02	9.80	Q-Peak	1	100	Horizontal	X
249.581	39.74	46.02	6.28	Q-Peak	254	100	Horizontal	Y
249.961	37.25	46.02	8.77	Q-Peak	267	100	Vertical	Y
249.962	36.54	46.02	9.48	Q-Peak	227	100	Vertical	Z
253.749	41.93	46.02	4.09	Q-Peak	279	100	Horizontal	Y
253.786	40.04	46.02	5.98	Q-Peak	0	100	Horizontal	X
277.663	39.62	46.02	6.40	Q-Peak	253	110	Horizontal	Z
332.851	39.02	46.02	7.00	Q-Peak	304	153	Vertical	Z
611.500	36.91	46.02	9.11	Q-Peak	124	100	Vertical	X
611.520	36.03	46.02	9.99	Q-Peak	96	110	Horizontal	Z

Table 69 - 2462 MHz, 30 MHz to 1 GHz

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

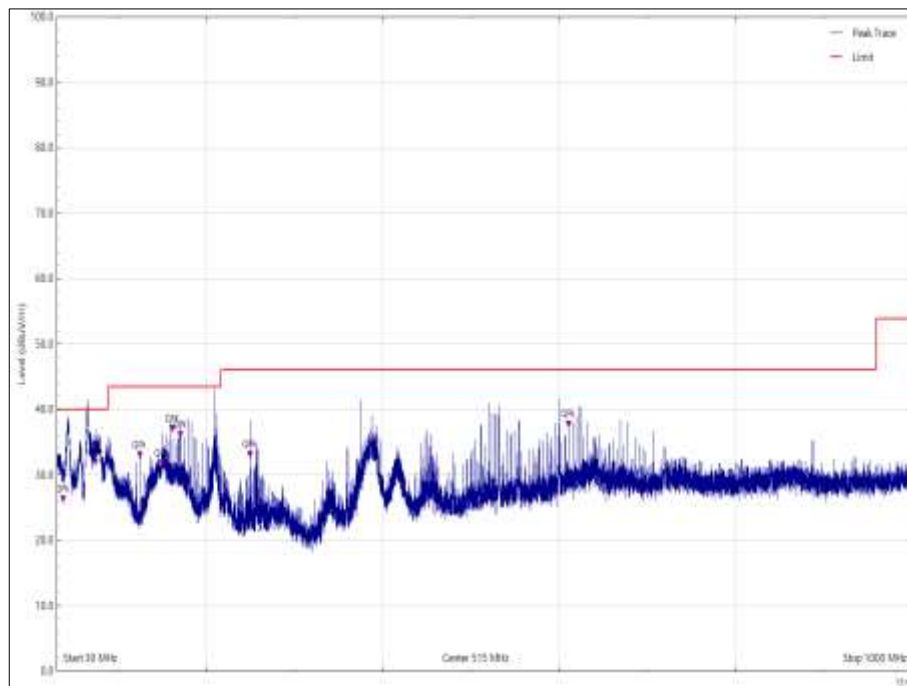


Figure 126 - 2462 MHz, 30 MHz to 1 GHz, Vertical, X Orientation

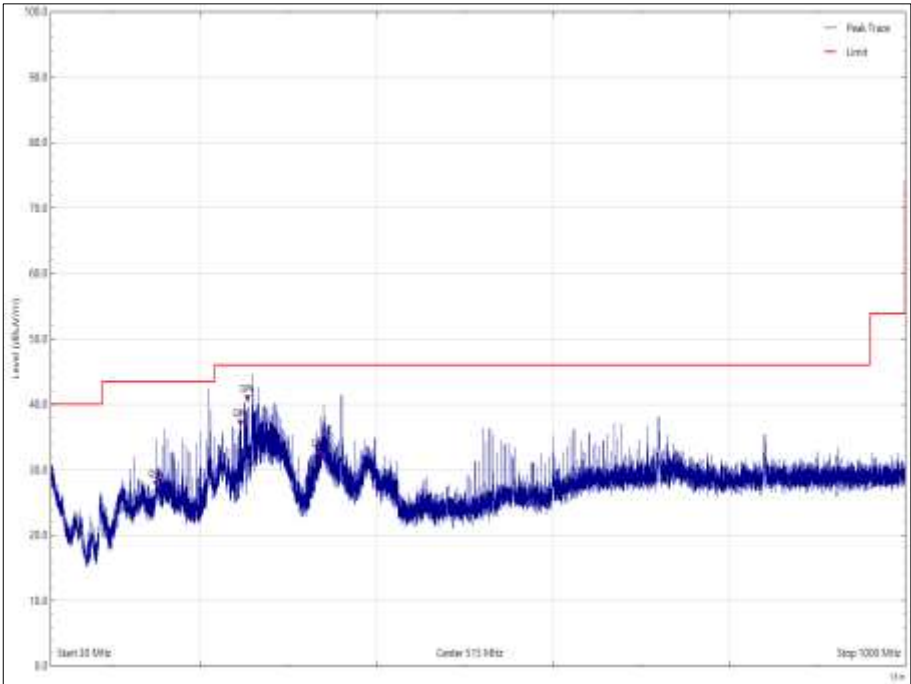


Figure 127 - 2462 MHz, 30 MHz to 1 GHz, Horizontal, X Orientation

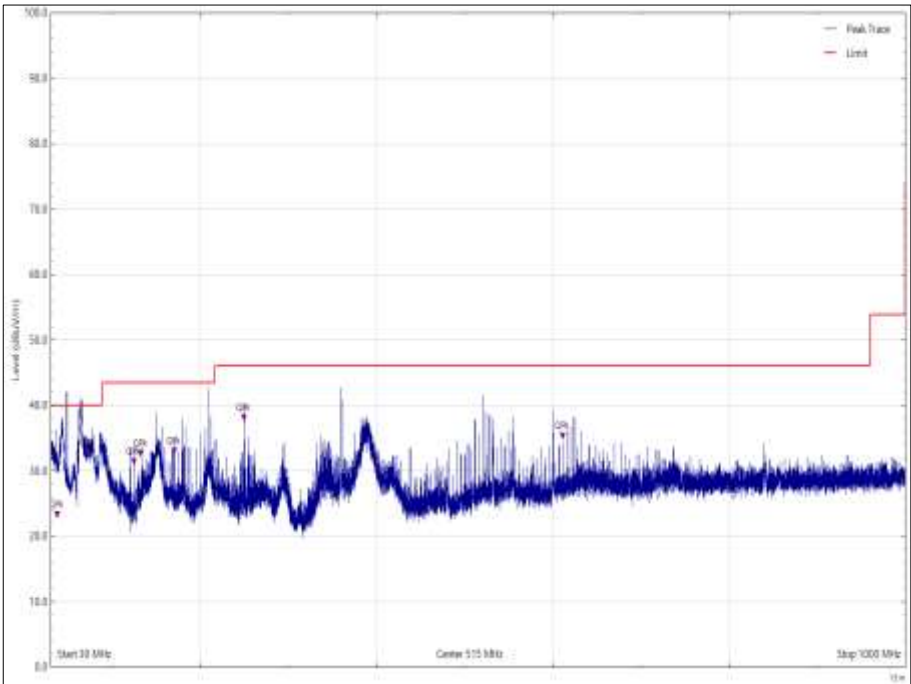


Figure 128 - 2462 MHz, 30 MHz to 1 GHz, Vertical, Y Orientation

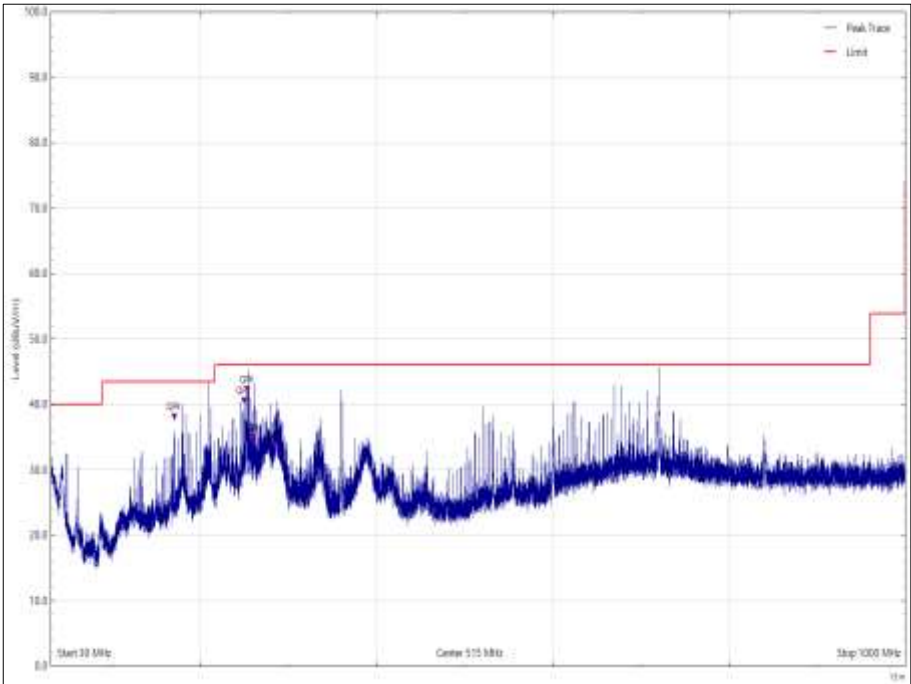


Figure 129 - 2462 MHz, 30 MHz to 1 GHz, Horizontal, Y Orientation

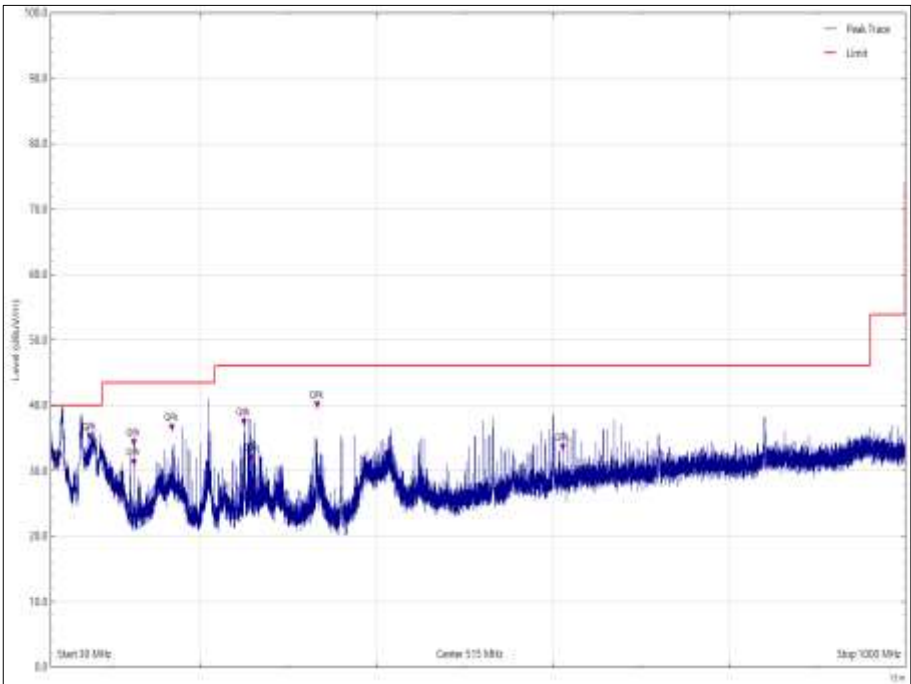


Figure 130 - 2462 MHz, 30 MHz to 1 GHz, Vertical, Z Orientation

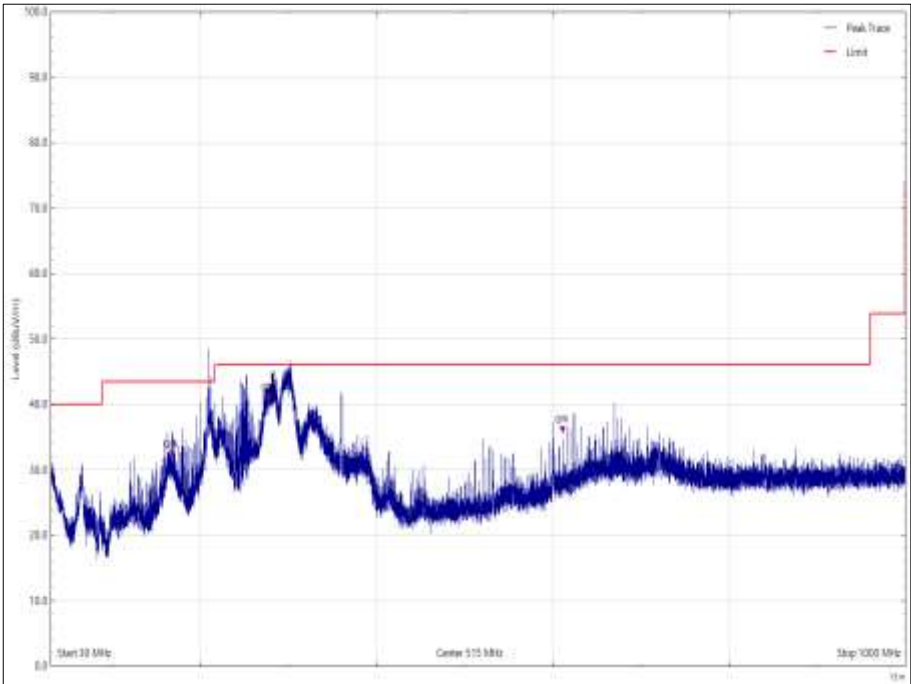


Figure 131 - 2462 MHz, 30 MHz to 1 GHz, Horizontal, Z Orientation

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
4923.999	47.04	53.98	6.94	Average	142	113	Horizontal	X
4924.020	48.07	53.98	5.91	Average	278	100	Vertical	Z
4924.022	47.08	53.98	6.90	Average	135	146	Vertical	X
4924.030	46.71	53.98	7.27	Average	233	149	Vertical	Y
4924.035	46.81	53.98	7.17	Average	255	124	Horizontal	Y
7383.540	49.57	53.98	4.41	Average	0	121	Vertical	Z
7384.979	49.88	53.98	4.10	Average	295	163	Vertical	Y
7385.049	51.40	53.98	2.58	Average	180	231	Vertical	X
7385.051	50.41	53.98	3.57	Average	32	148	Horizontal	X
7385.163	49.46	53.98	4.52	Average	285	168	Horizontal	Y
7386.941	49.28	53.98	4.70	Average	304	234	Horizontal	Z

Table 70 - 2462 MHz - 1 GHz to 25 GHz

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

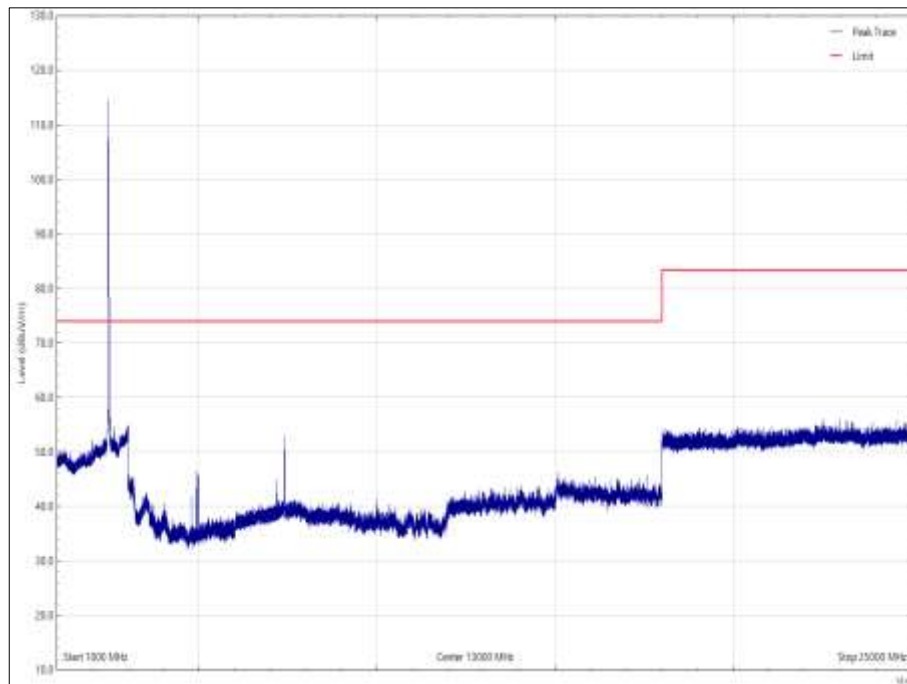


Figure 132 - 2462 MHz - 1 GHz to 25 GHz, Vertical, X Orientation - Peak

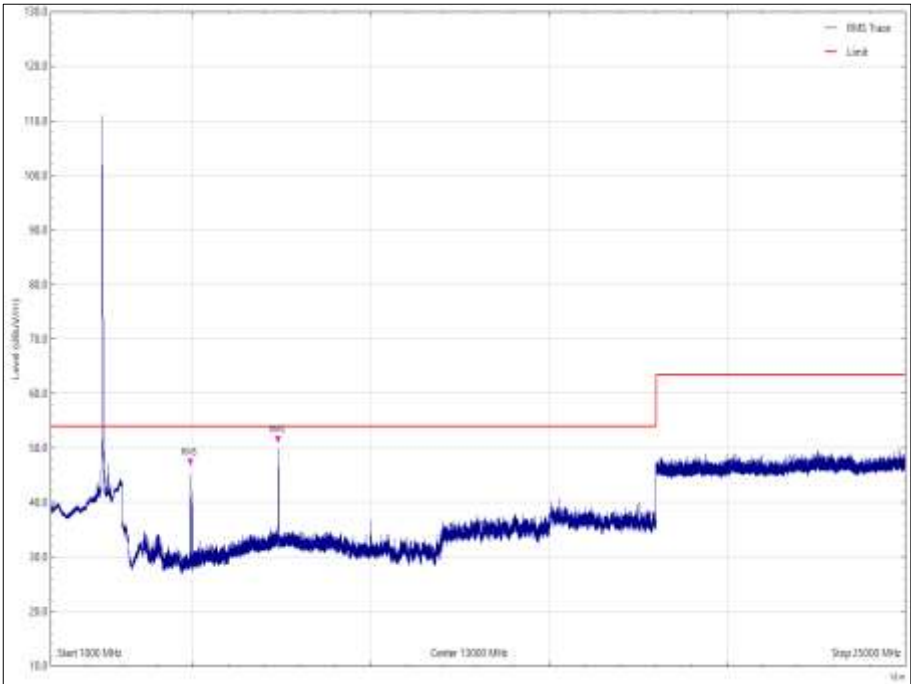


Figure 133 - 2462 MHz - 1 GHz to 25 GHz, Vertical, X Orientation - Average

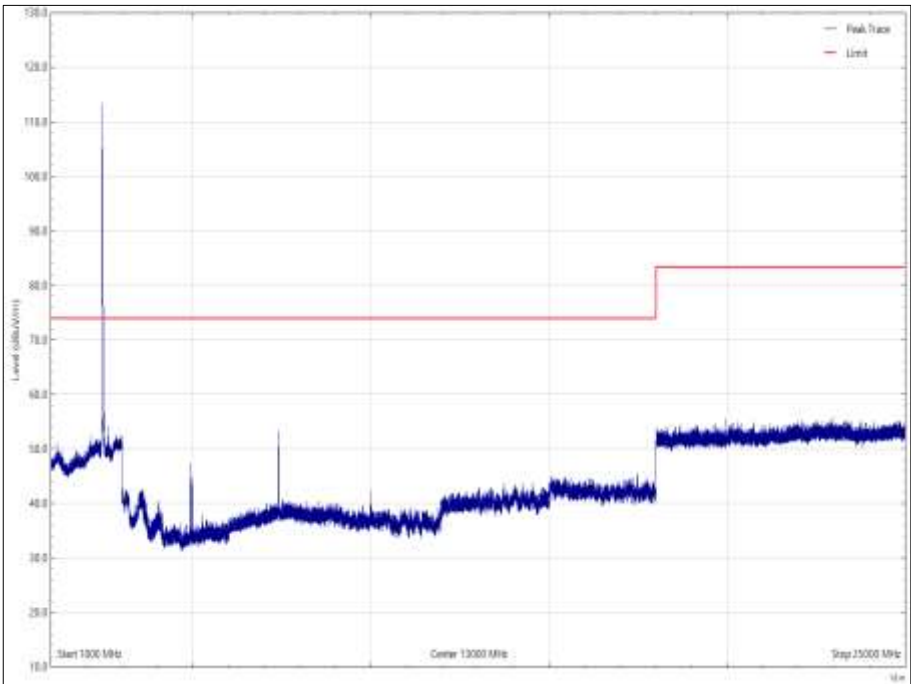


Figure 134 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, X Orientation - Peak

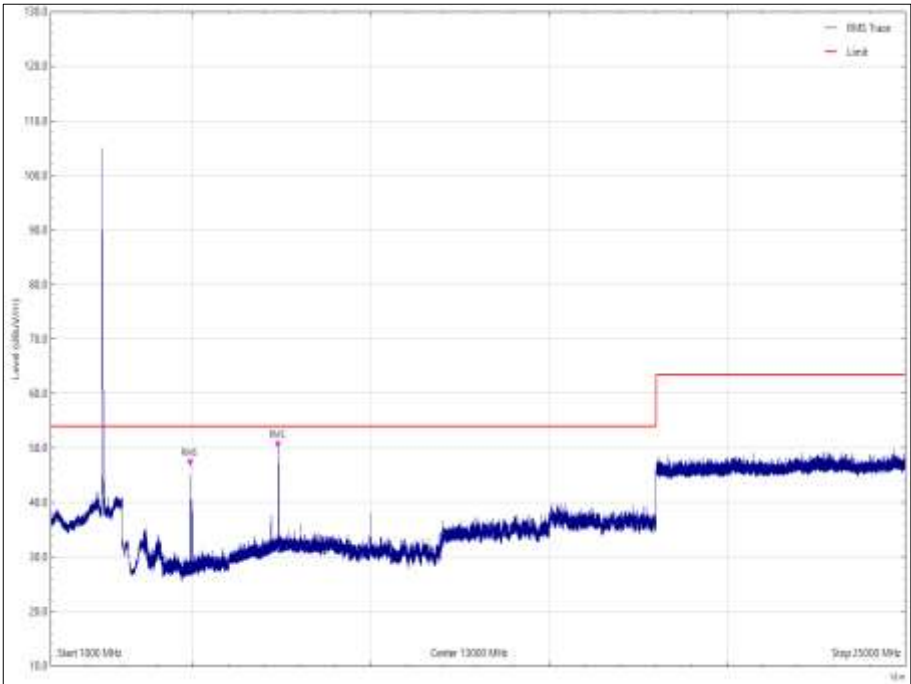


Figure 135 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, X Orientation - Average

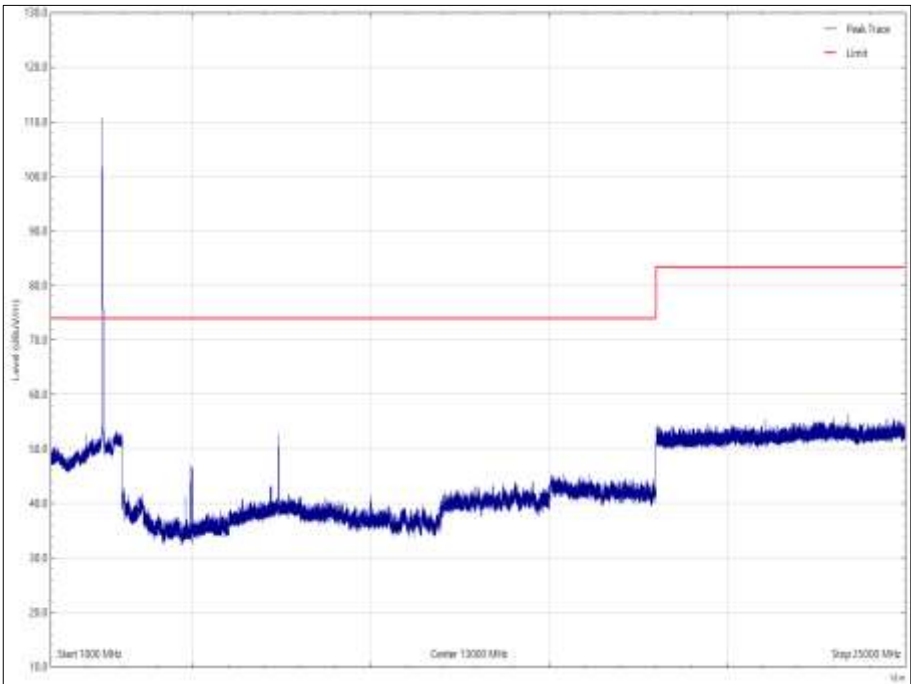


Figure 136 - 2462 MHz - 1 GHz to 25 GHz, Vertical, Y Orientation - Peak

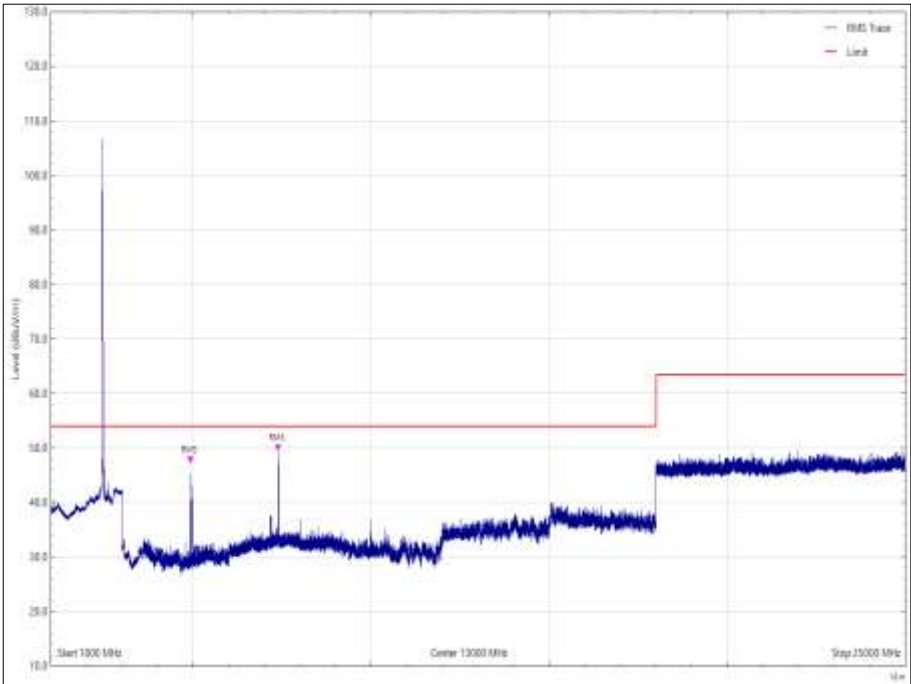


Figure 137 - 2462 MHz - 1 GHz to 25 GHz, Vertical, Y Orientation - Average

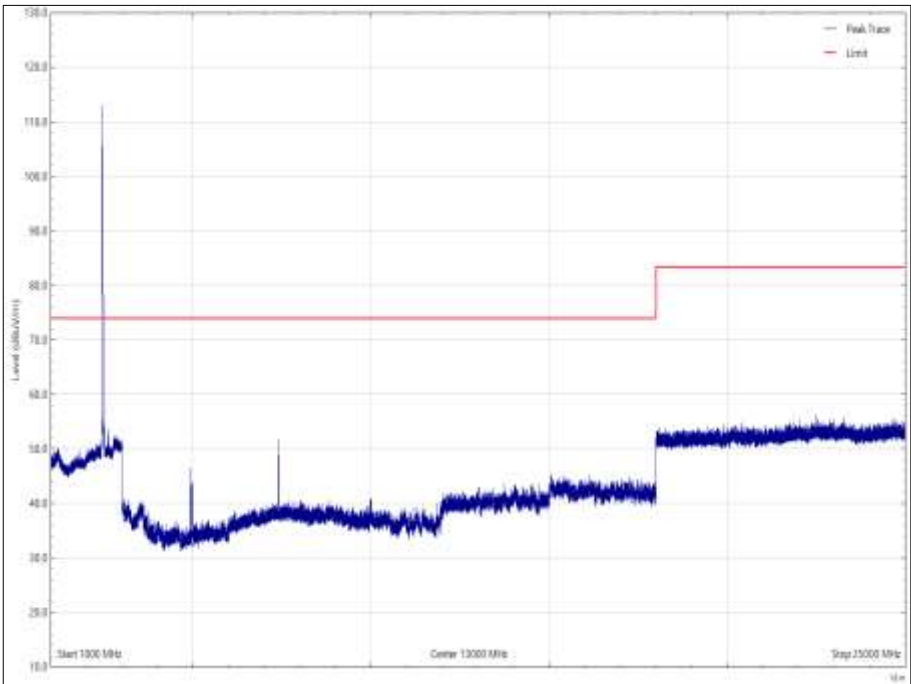


Figure 138 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, Y Orientation - Peak

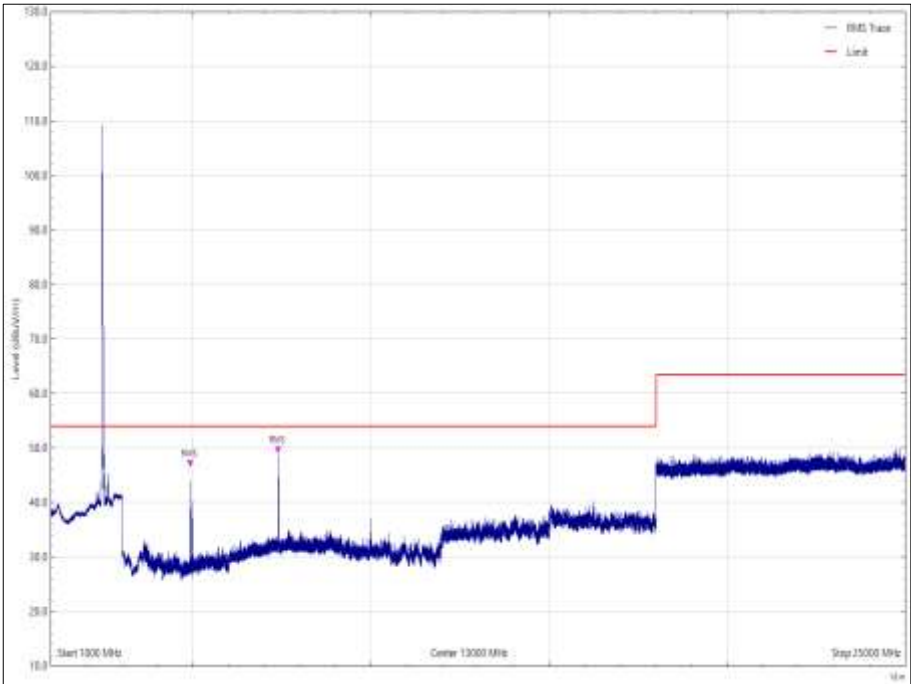


Figure 139 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, Y Orientation - Average

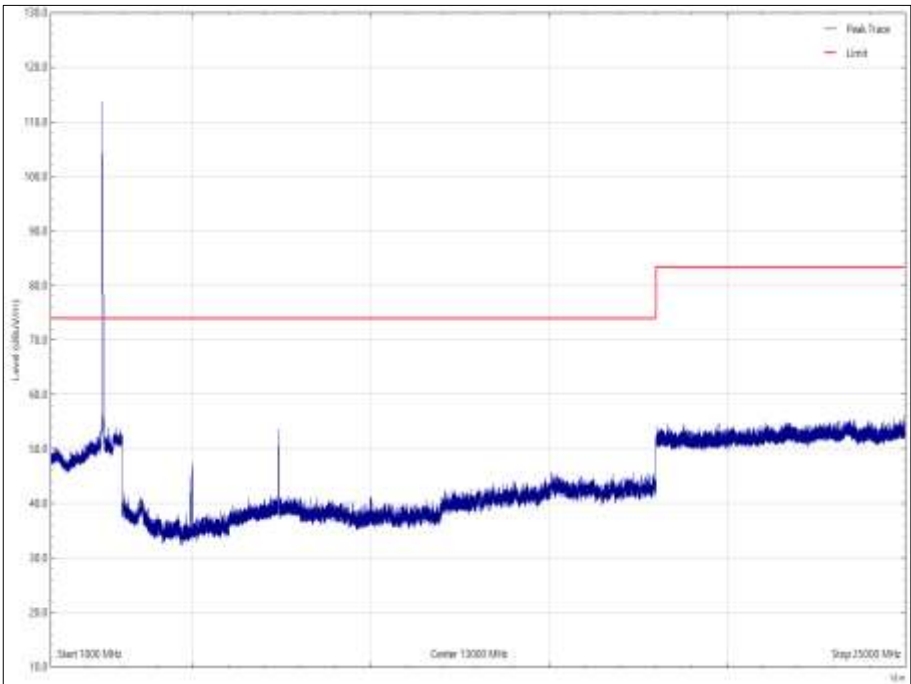


Figure 140 - 2462 MHz - 1 GHz to 25 GHz, Vertical, Z Orientation - Peak

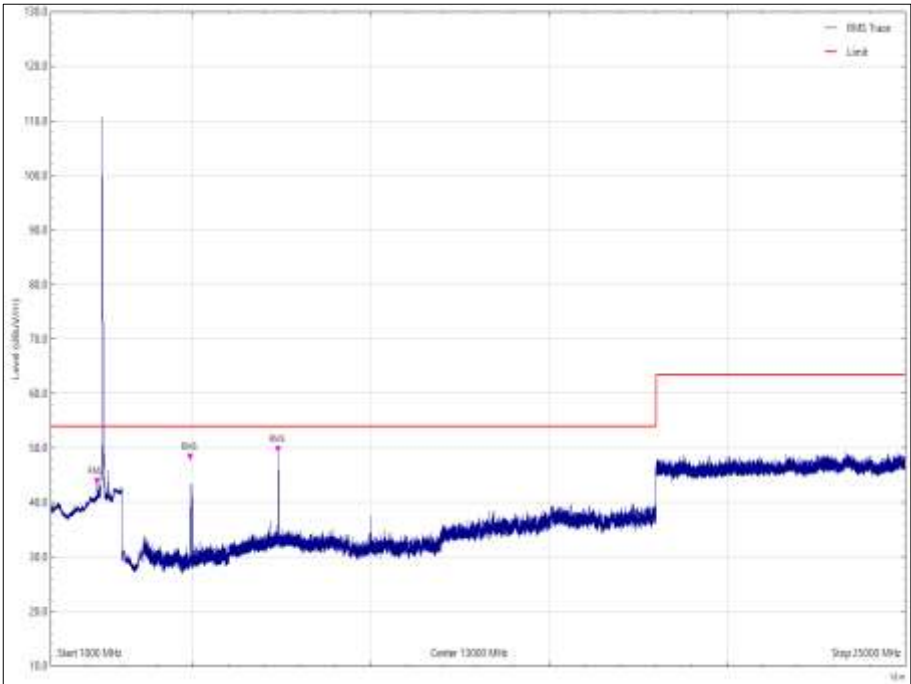


Figure 141 - 2462 MHz - 1 GHz to 25 GHz, Vertical, Z Orientation - Average

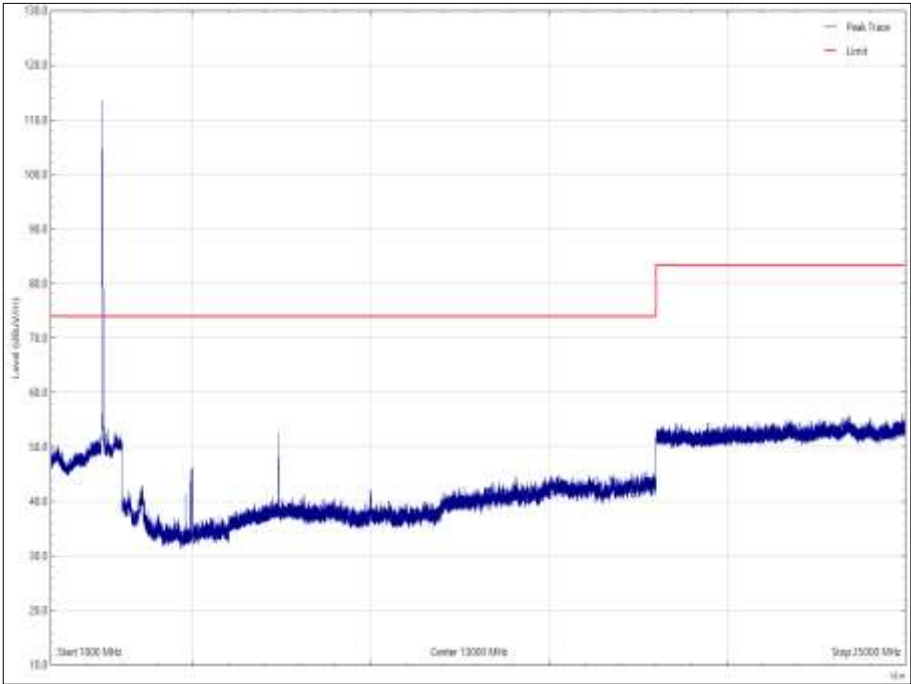


Figure 142 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, Z Orientation - Peak

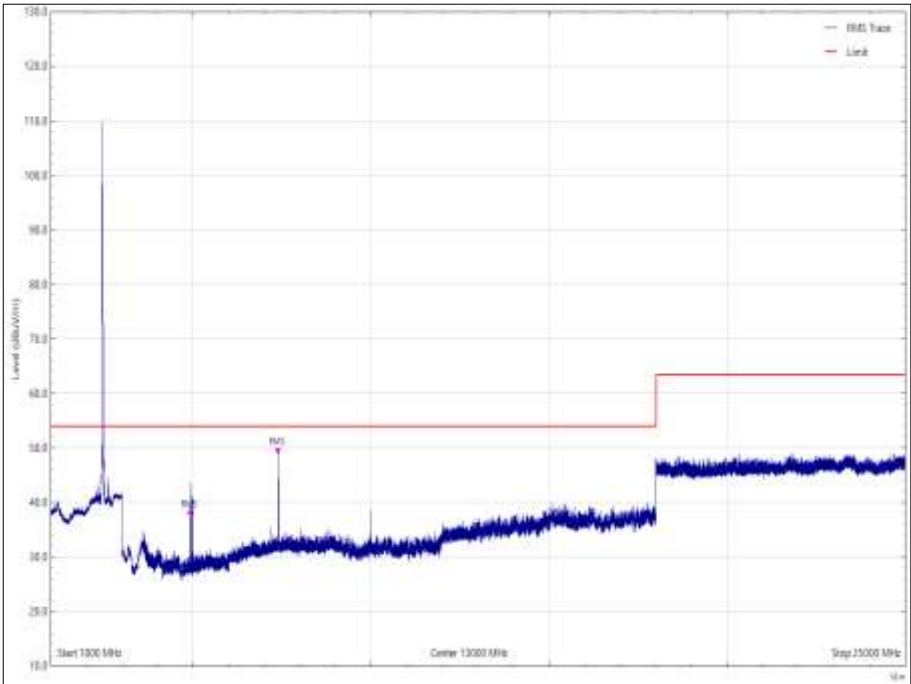


Figure 143 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, Z Orientation - Average

802.11g - 2.4 GHz WLAN

Testing was performed on the configurations and Data Rate which resulted in the highest conducted output power and highest power spectral density as stated in ANSI C63.10, clause 5.6.2.2 (b). The Data Rate used during testing was 6 Mbps. The EUT was configured to transmit simultaneously at maximum output power on both antenna ports.

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
74.086	31.64	40.00	8.36	Q-Peak	109	147	Vertical	X
75.158	32.57	40.00	7.43	Q-Peak	245	100	Vertical	Z
125.005	33.56	43.52	9.96	Q-Peak	10	100	Vertical	Z
167.952	34.86	43.52	8.66	Q-Peak	43	100	Vertical	Z
167.974	34.26	43.52	9.26	Q-Peak	305	100	Vertical	X
245.423	37.72	46.02	8.30	Q-Peak	349	104	Horizontal	X
249.997	38.44	46.02	7.58	Q-Peak	236	103	Vertical	Z
253.797	41.44	46.02	4.58	Q-Peak	274	110	Horizontal	Y
332.849	36.93	46.02	9.09	Q-Peak	306	136	Vertical	Z
611.502	36.82	46.02	9.20	Q-Peak	14	100	Vertical	X
611.522	37.47	46.02	8.55	Q-Peak	48	113	Horizontal	Z

Table 71 - 2412 MHz, 30 MHz to 1 GHz

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

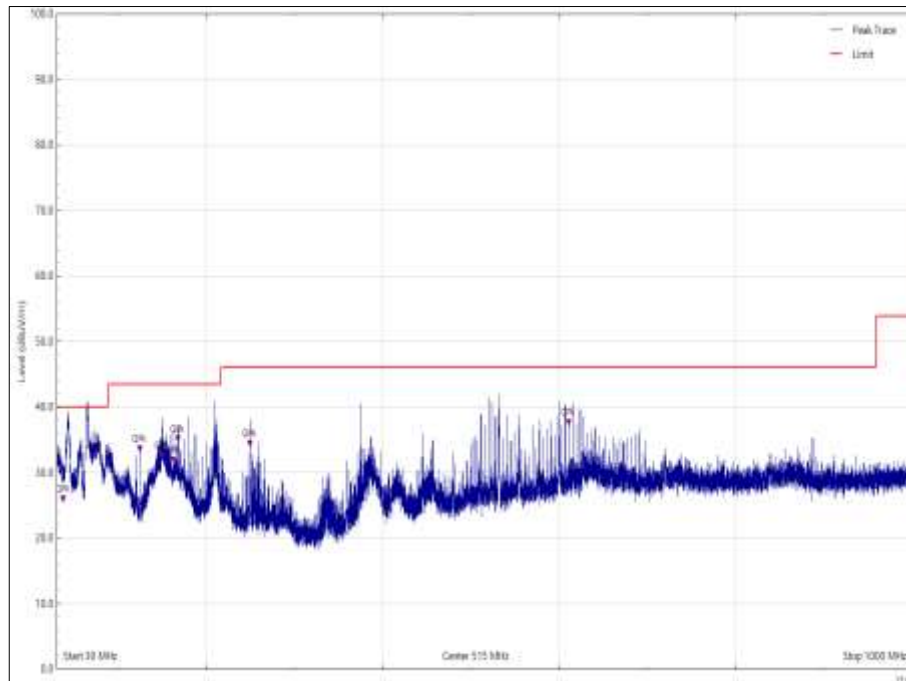


Figure 144 - 2412 MHz, 30 MHz to 1 GHz, Vertical, X Orientation

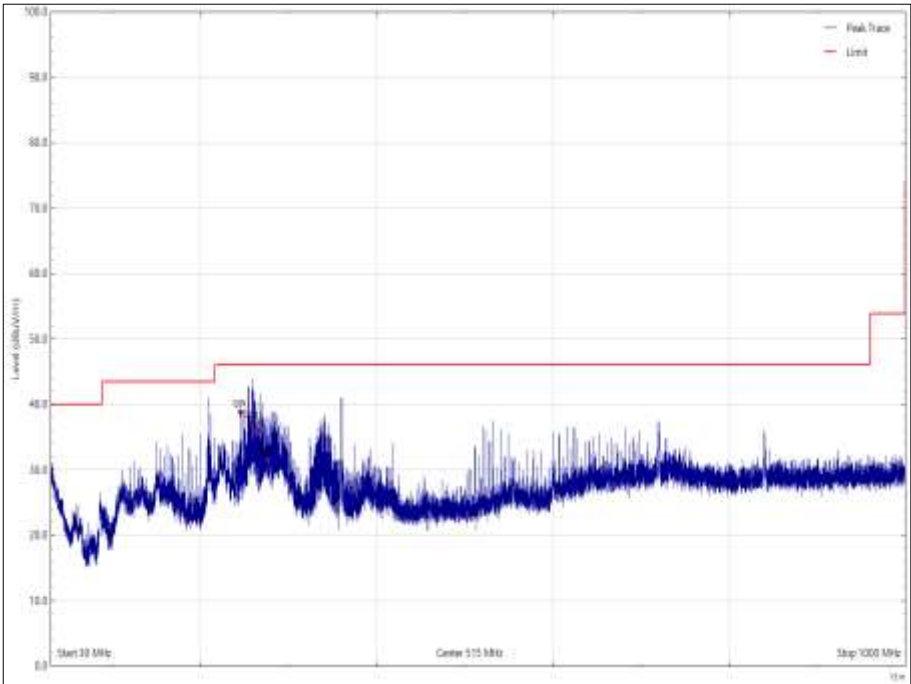


Figure 145 - 2412 MHz, 30 MHz to 1 GHz, Horizontal, X Orientation

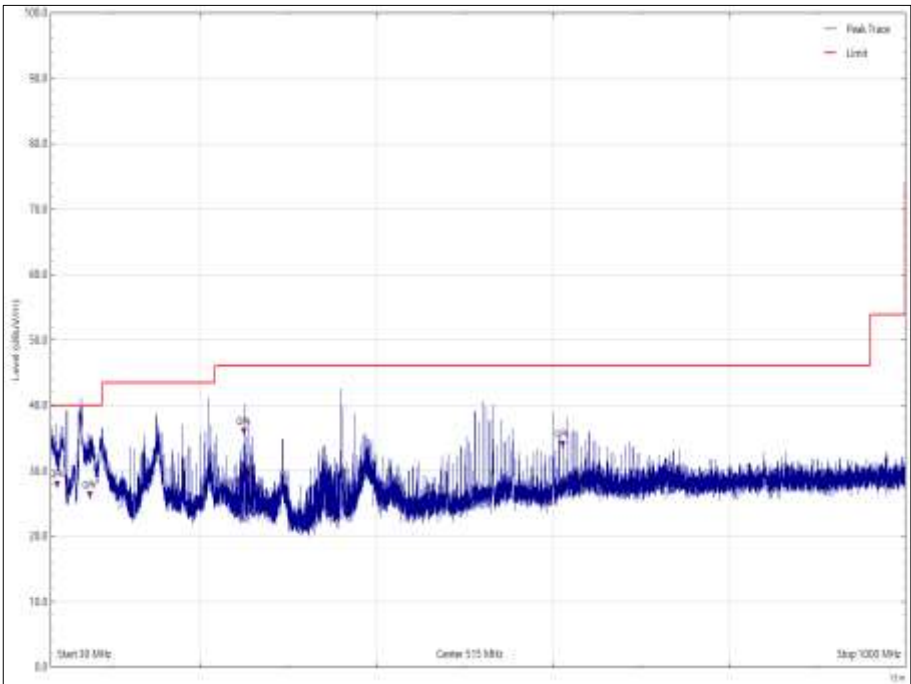


Figure 146 - 2412 MHz, 30 MHz to 1 GHz, Vertical, Y Orientation

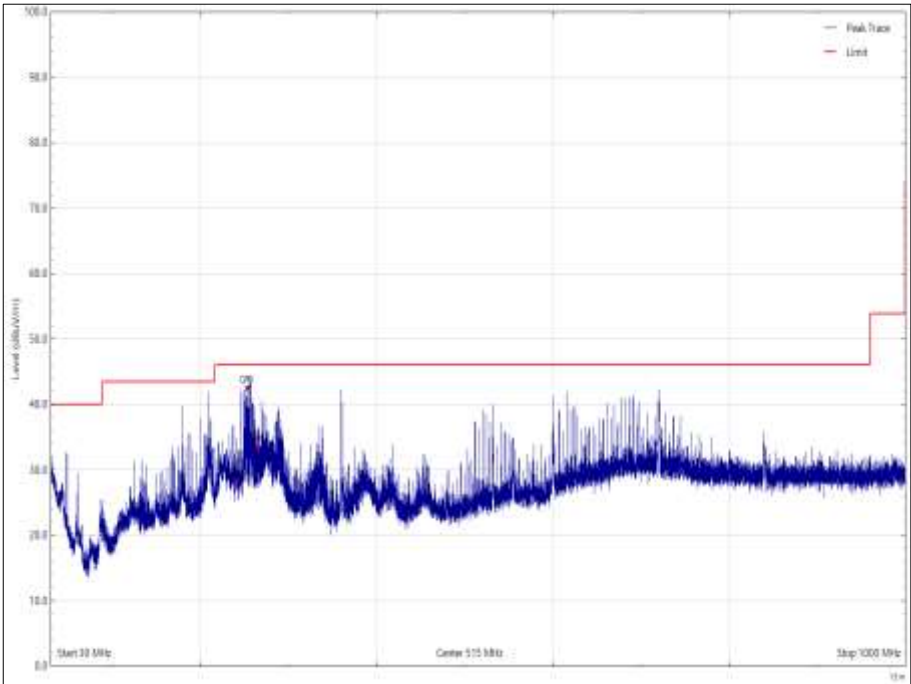


Figure 147 - 2412 MHz, 30 MHz to 1 GHz, Horizontal, Y Orientation

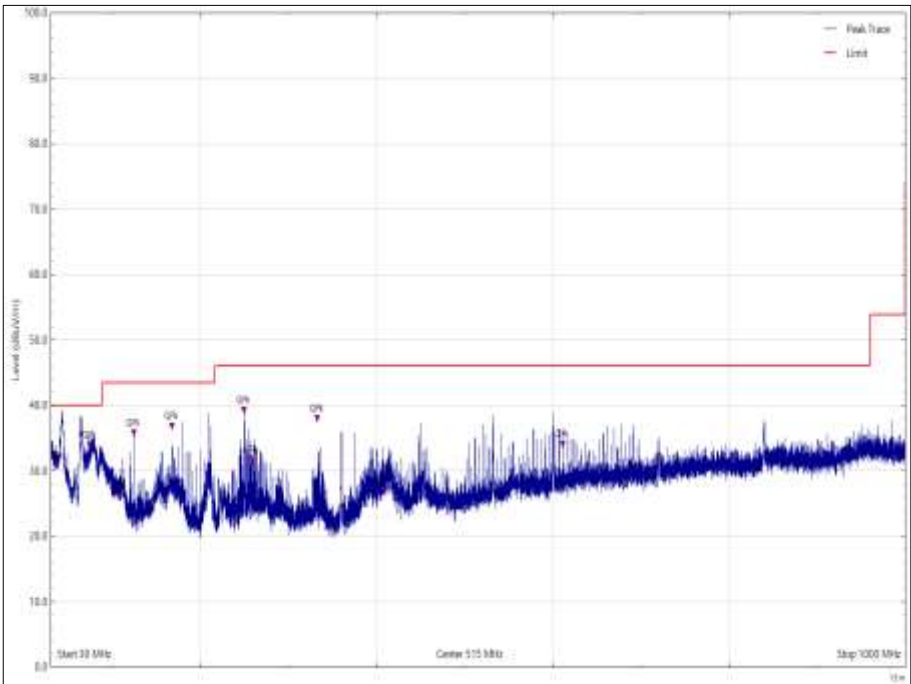


Figure 148 - 2412 MHz, 30 MHz to 1 GHz, Vertical, Z Orientation

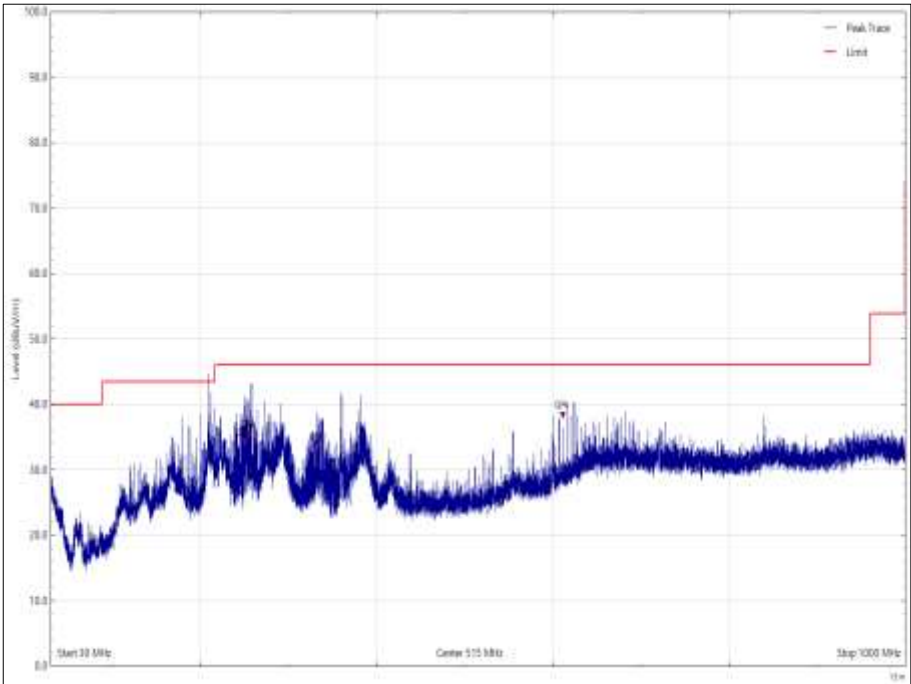


Figure 149 - 2412 MHz, 30 MHz to 1 GHz, Horizontal, Z Orientation



Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
4999.758	45.77	53.98	8.21	Average	19	125	Vertical	Z

Table 72 - 2412 MHz, 1 GHz to 25 GHz

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

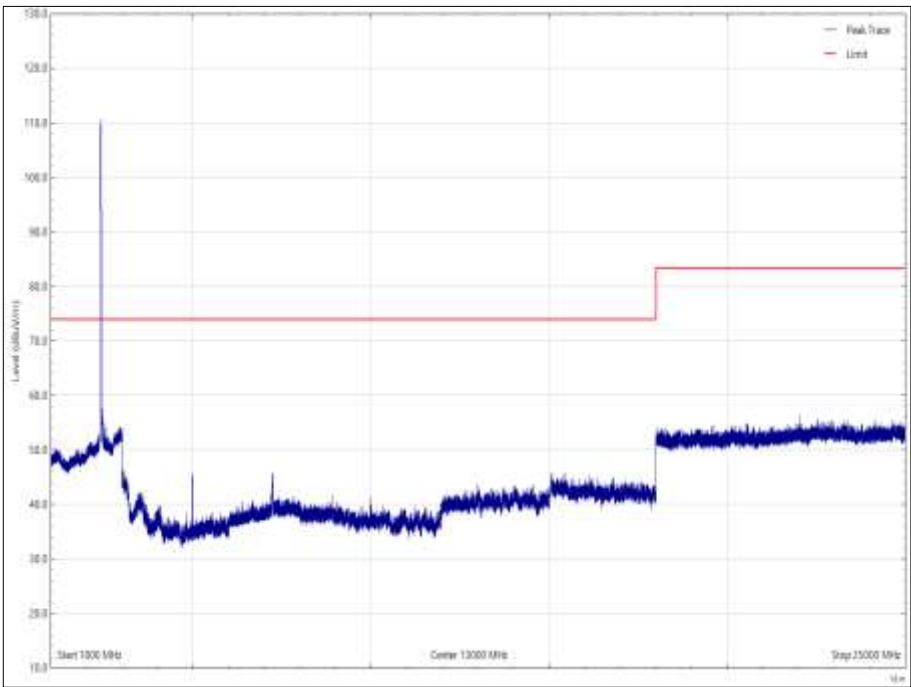


Figure 150 - 2412 MHz, 1 GHz to 25 GHz, Vertical, X Orientation - Peak

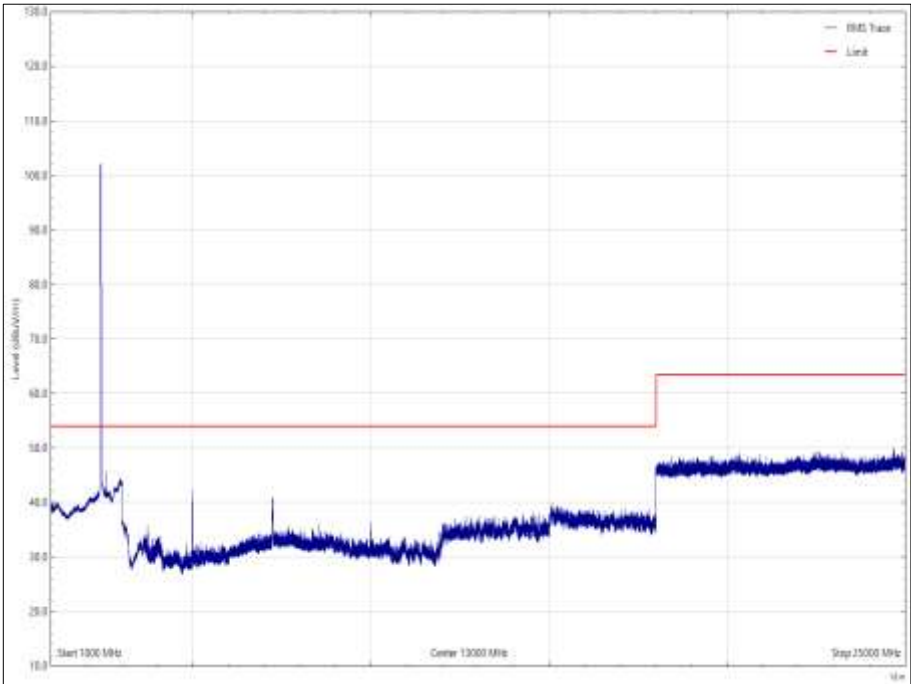


Figure 151 - 2412 MHz, 1 GHz to 25 GHz, Vertical, X Orientation - Average

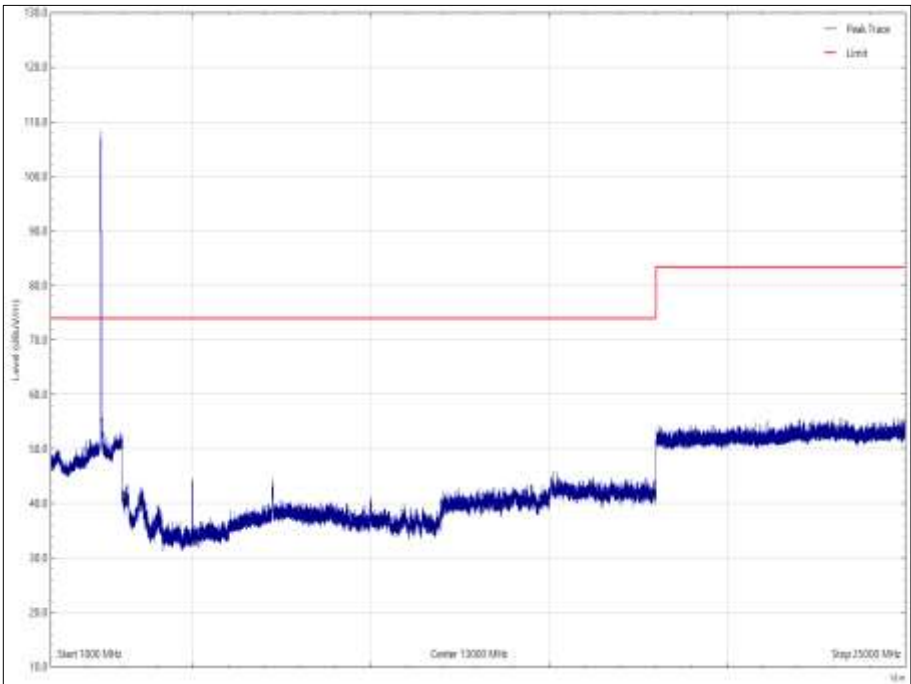


Figure 152 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, X Orientation - Peak

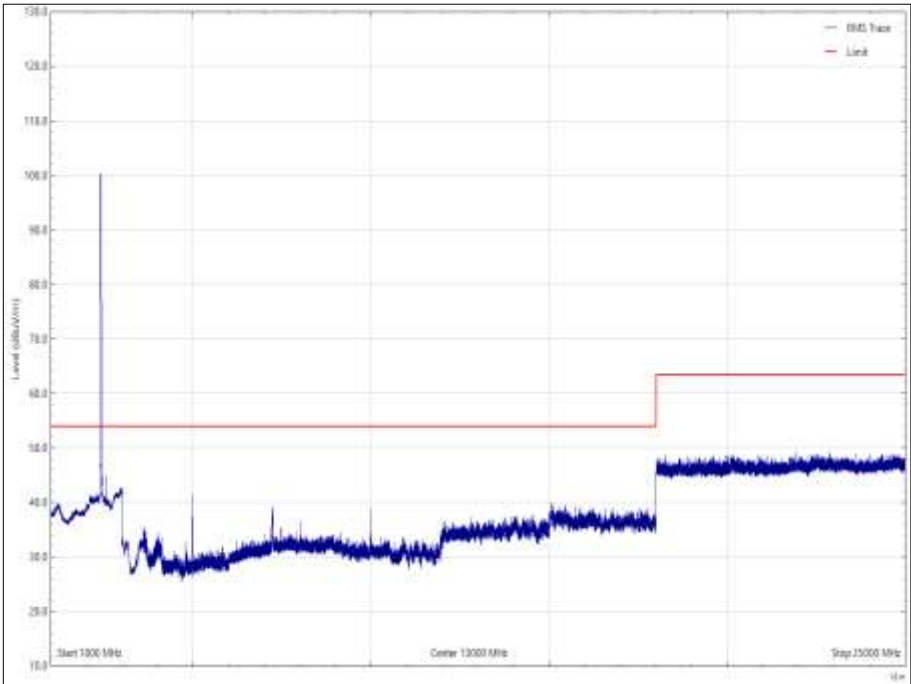


Figure 153 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, X Orientation - Average

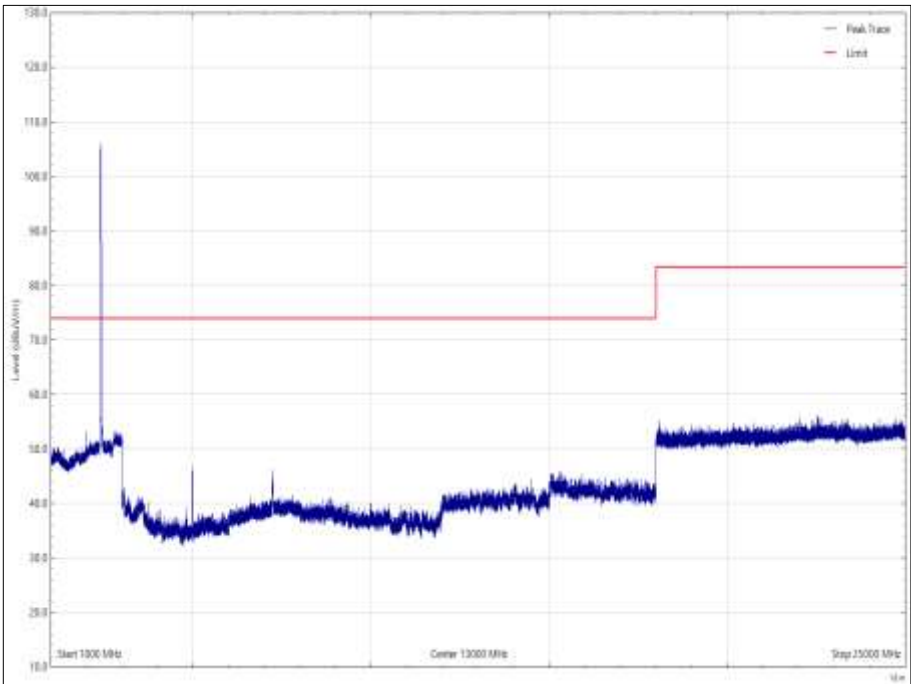


Figure 154 - 2412 MHz, 1 GHz to 25 GHz, Vertical, Y Orientation - Peak

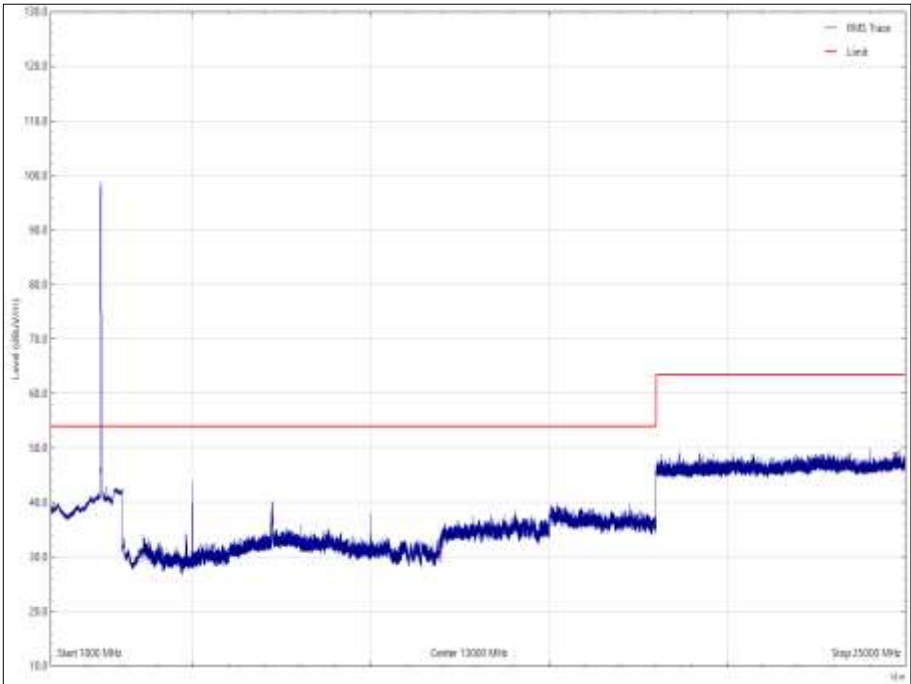


Figure 155 - 2412 MHz, 1 GHz to 25 GHz, Vertical, Y Orientation - Average

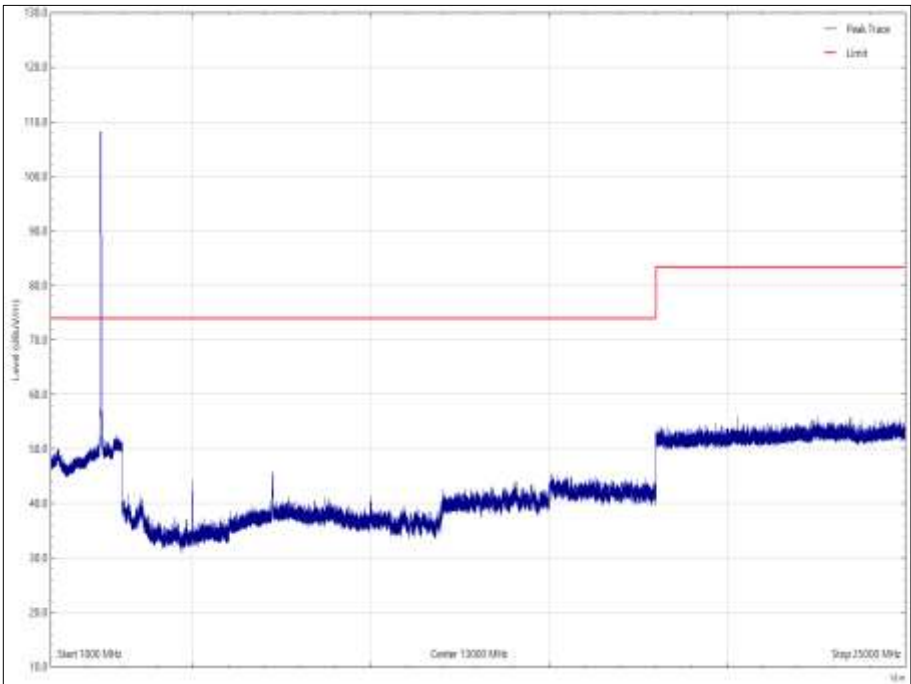


Figure 156 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, Y Orientation - Peak

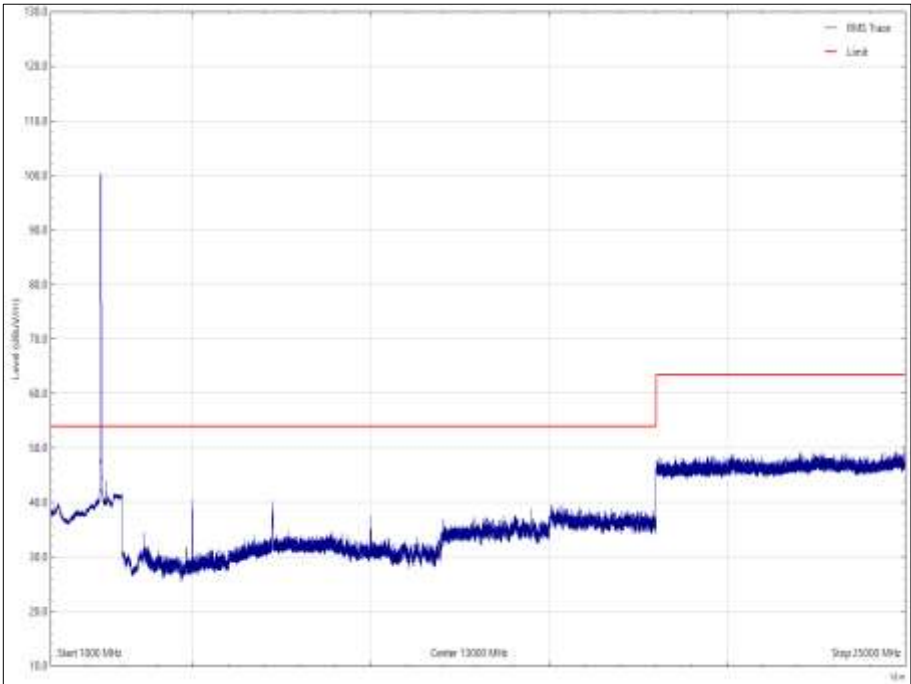


Figure 157 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, Y Orientation - Average

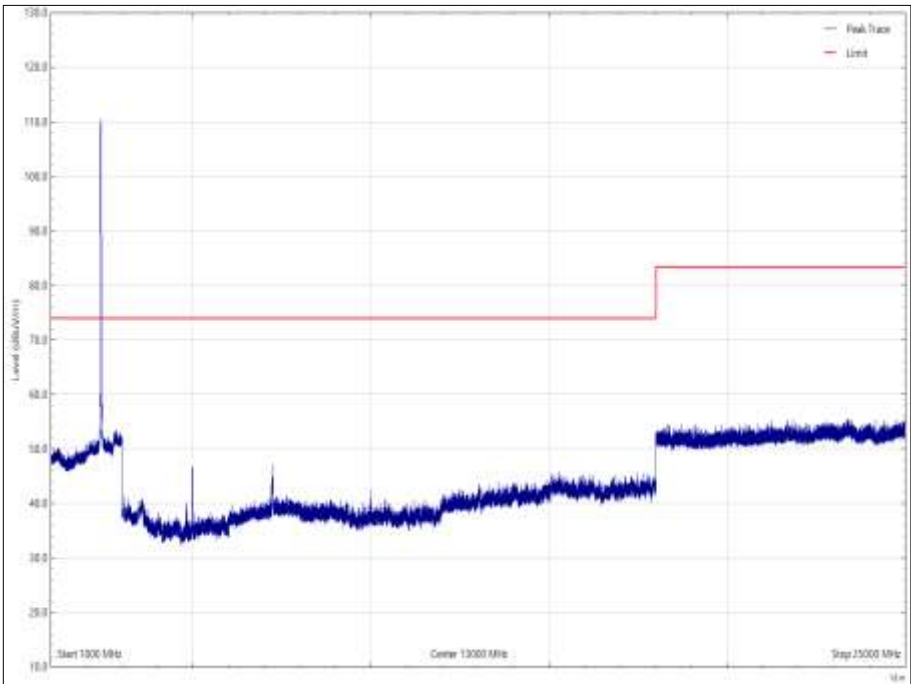


Figure 158 - 2412 MHz, 1 GHz to 25 GHz, Vertical, Z Orientation - Peak

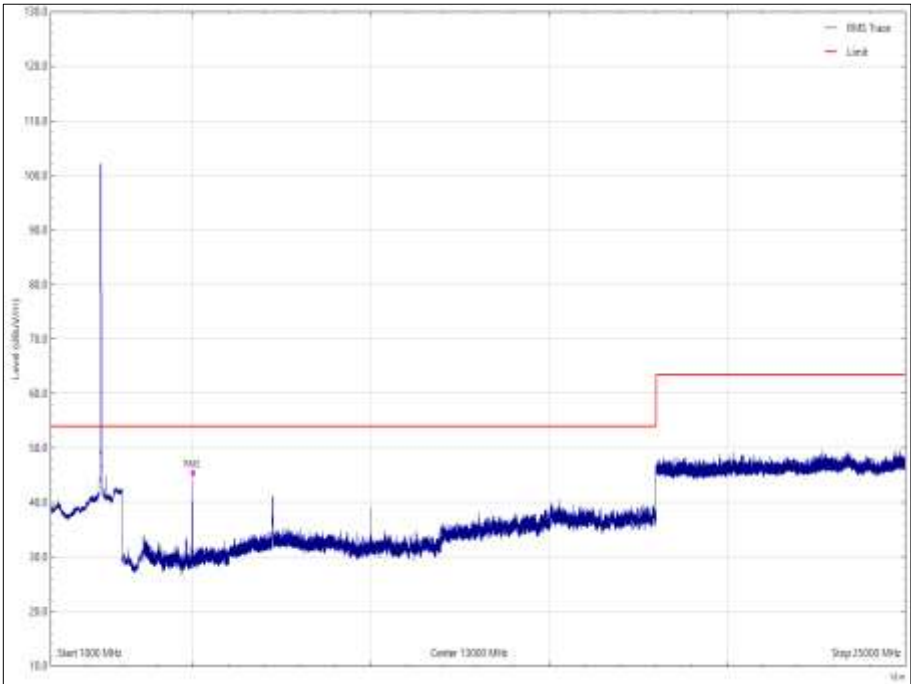


Figure 159 - 2412 MHz, 1 GHz to 25 GHz, Vertical, Z Orientation - Average

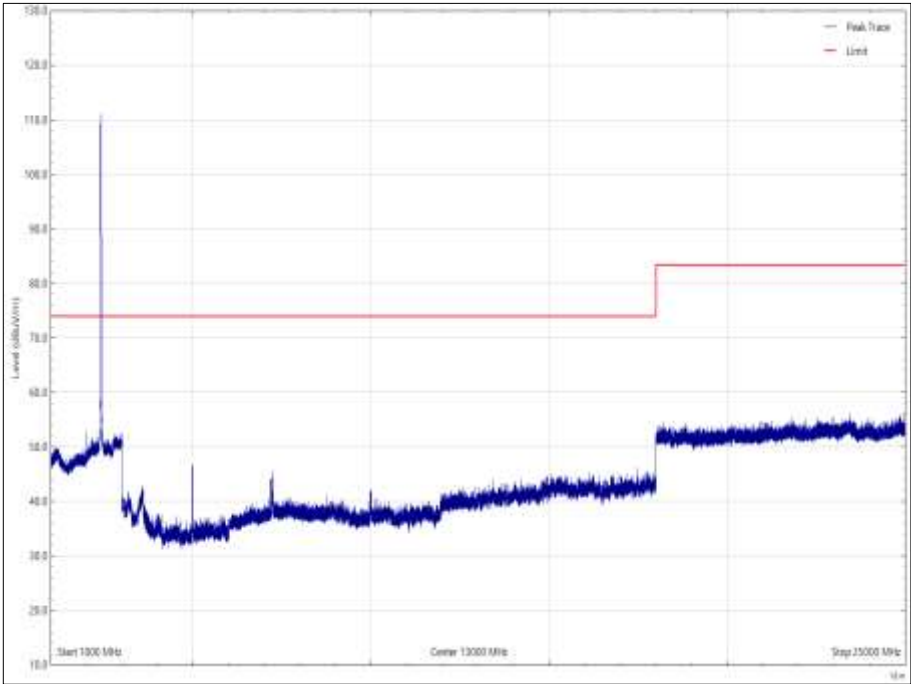


Figure 160 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, Z Orientation - Peak

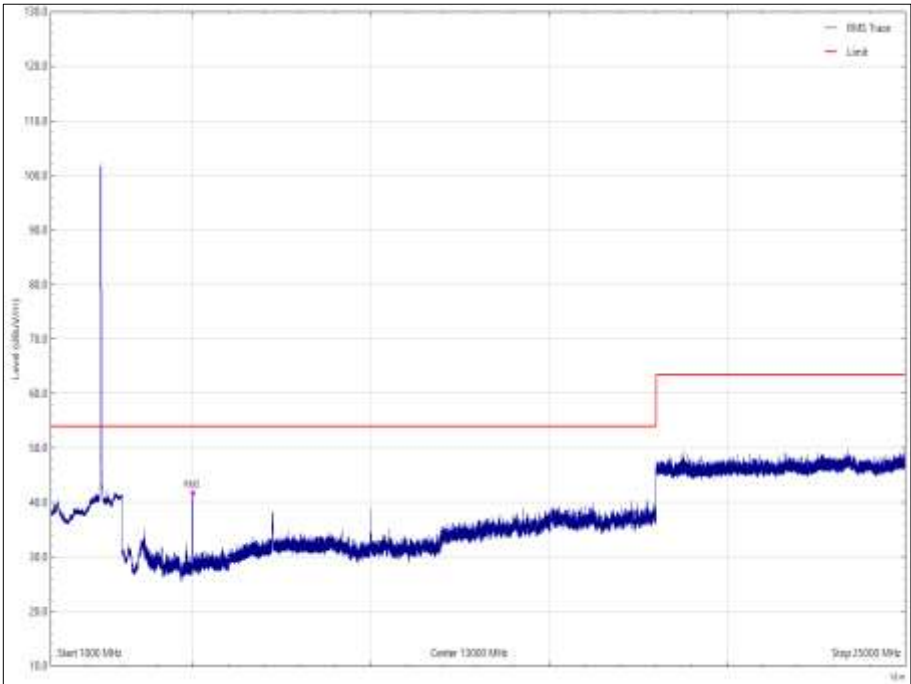


Figure 161 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, Z Orientation - Average



Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
73.224	31.49	40.00	8.51	Q-Peak	68	158	Vertical	Y
74.566	31.81	40.00	8.79	Q-Peak	98	100	Vertical	X
74.936	30.65	40.00	9.35	Q-Peak	73	100	Vertical	Z
125.016	35.73	43.52	7.79	Q-Peak	152	100	Vertical	Z
132.714	33.74	43.52	9.78	Q-Peak	223	255	Horizontal	Z
162.232	35.76	43.52	7.76	Q-Peak	64	170	Horizontal	X
162.233	35.89	43.52	7.63	Q-Peak	226	110	Vertical	X
170.543	35.49	43.52	8.03	Q-Peak	42	217	Horizontal	Y
170.563	34.83	43.52	8.69	Q-Peak	297	100	Vertical	X
250.005	39.33	46.02	6.69	Q-Peak	244	100	Vertical	Y
250.010	41.22	46.02	4.80	Q-Peak	273	100	Vertical	Z
253.765	39.39	46.02	6.63	Q-Peak	350	100	Horizontal	X
253.790	40.21	46.02	5.81	Q-Peak	281	100	Horizontal	Y
260.113	36.93	46.02	9.09	Q-Peak	2	100	Horizontal	X
283.410	38.13	46.02	7.89	Q-Peak	3	100	Horizontal	X
611.506	37.23	46.02	8.79	Q-Peak	37	101	Horizontal	Z
611.534	37.34	46.02	8.68	Q-Peak	25	100	Vertical	X
611.548	40.43	46.02	5.49	Q-Peak	208	125	Horizontal	Y

Table 73 - 2437 MHz, 30 MHz to 1 GHz

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

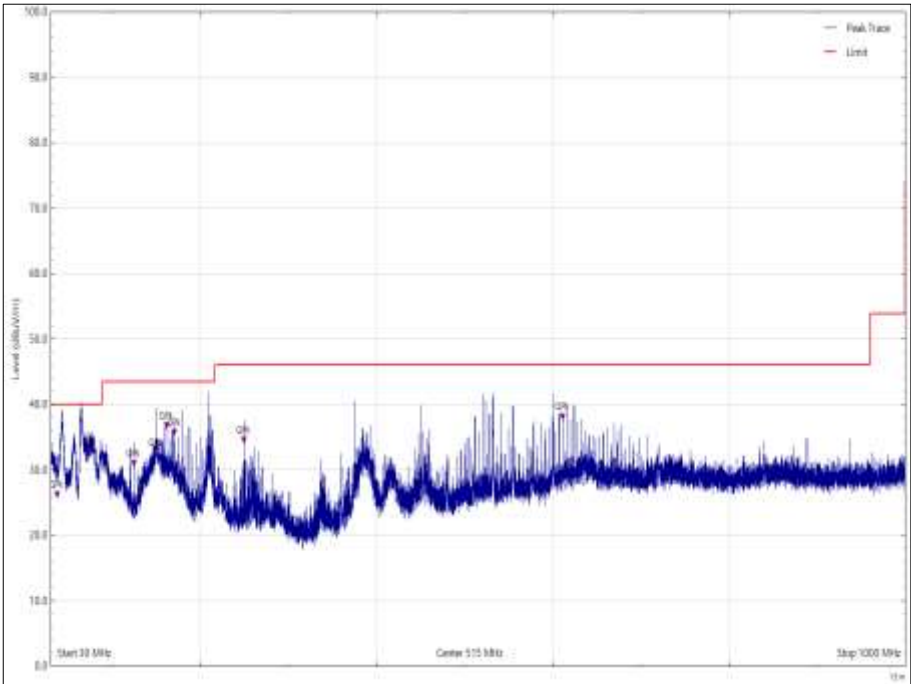


Figure 162 - 2437 MHz, 30 MHz to 1 GHz, Vertical, X Orientation

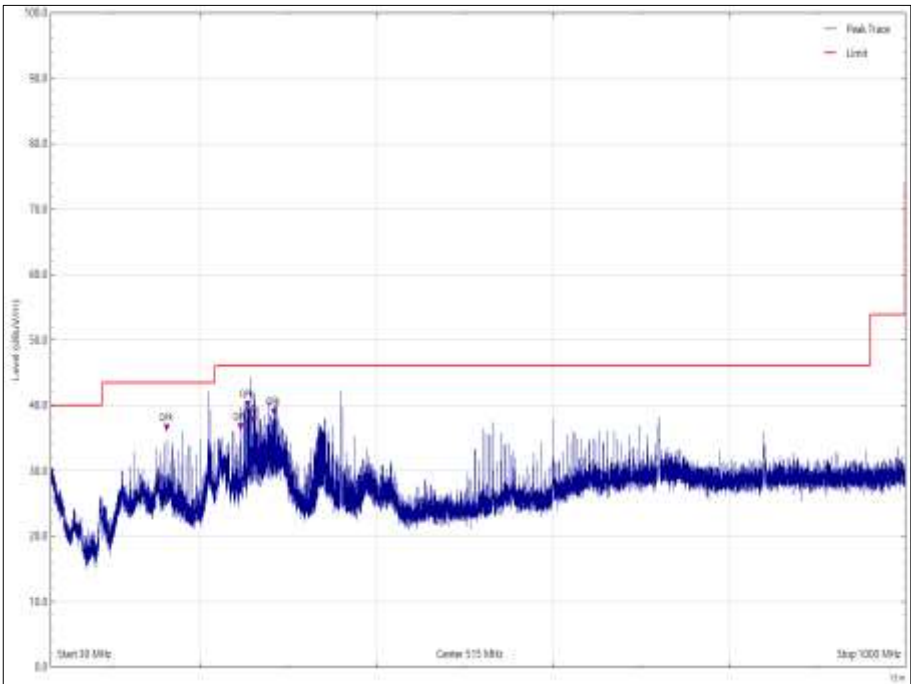


Figure 163 - 2437 MHz, 30 MHz to 1 GHz, Horizontal, X Orientation

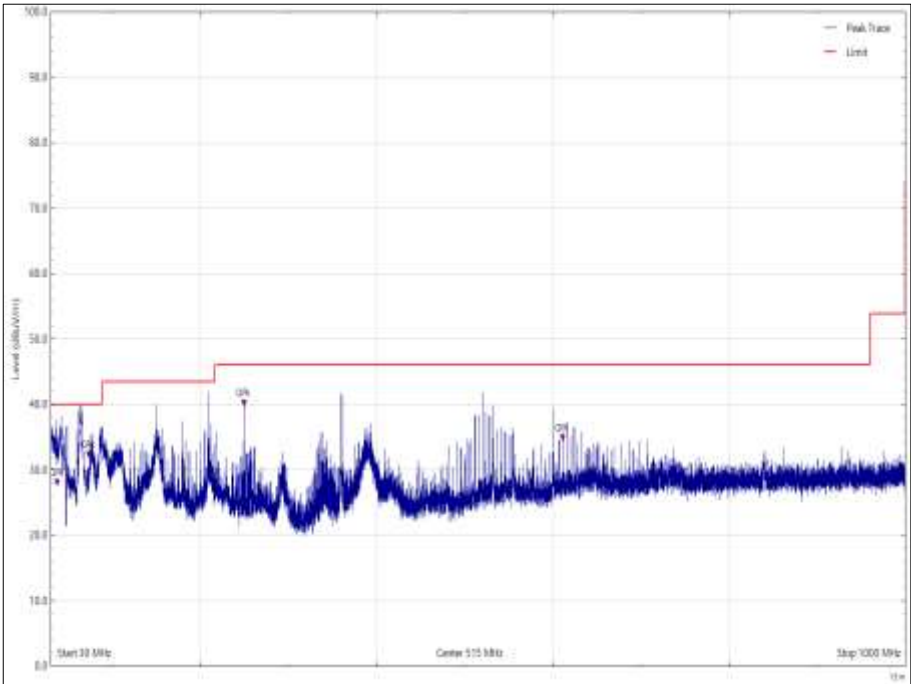


Figure 164 - 2437 MHz, 30 MHz to 1 GHz, Vertical, Y Orientation

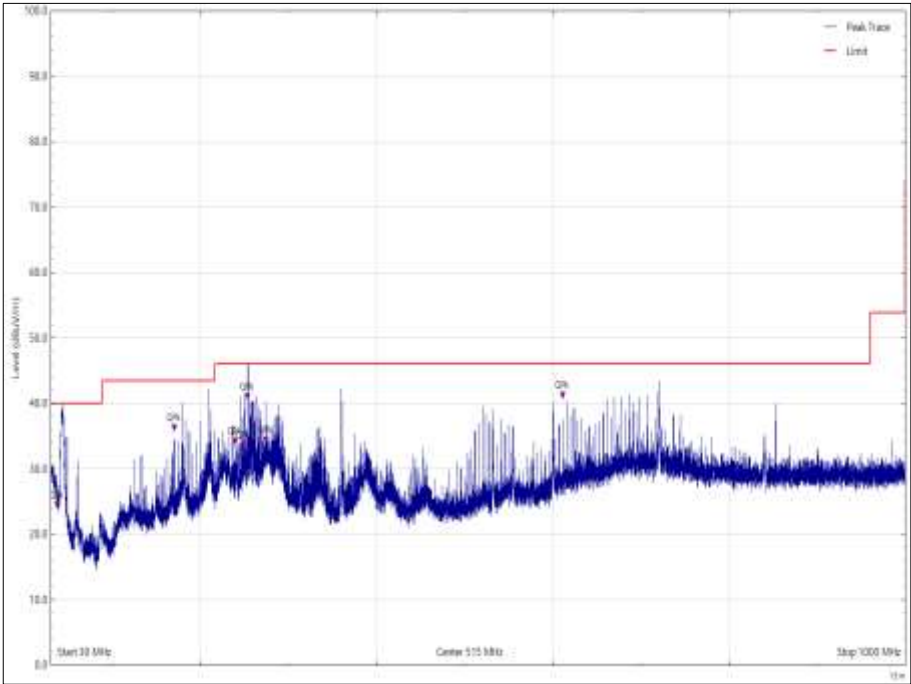


Figure 165 - 2437 MHz, 30 MHz to 1 GHz, Horizontal, Y Orientation

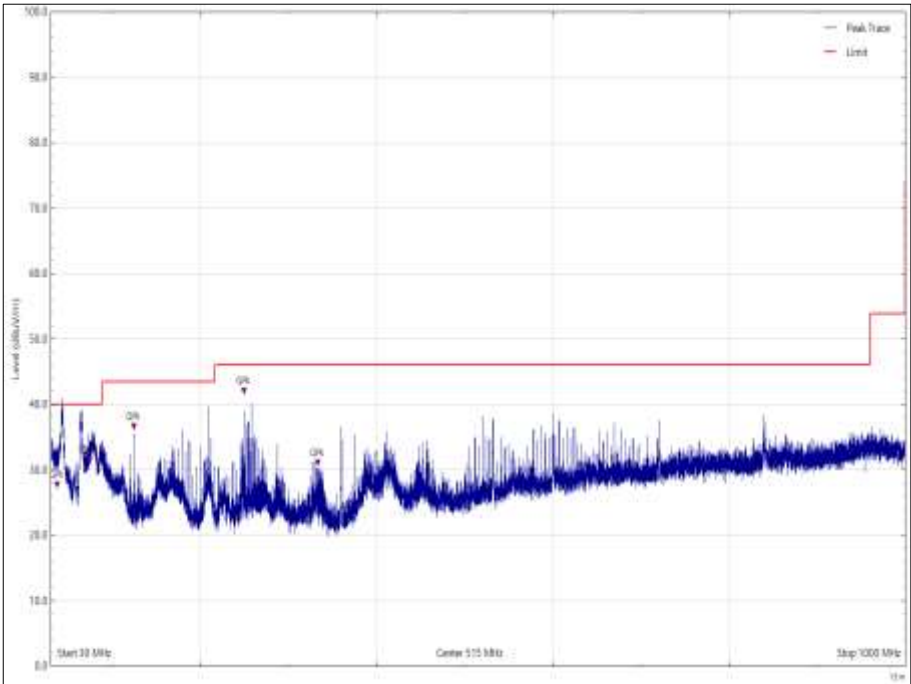


Figure 166 - 2437 MHz, 30 MHz to 1 GHz, Vertical, Z Orientation

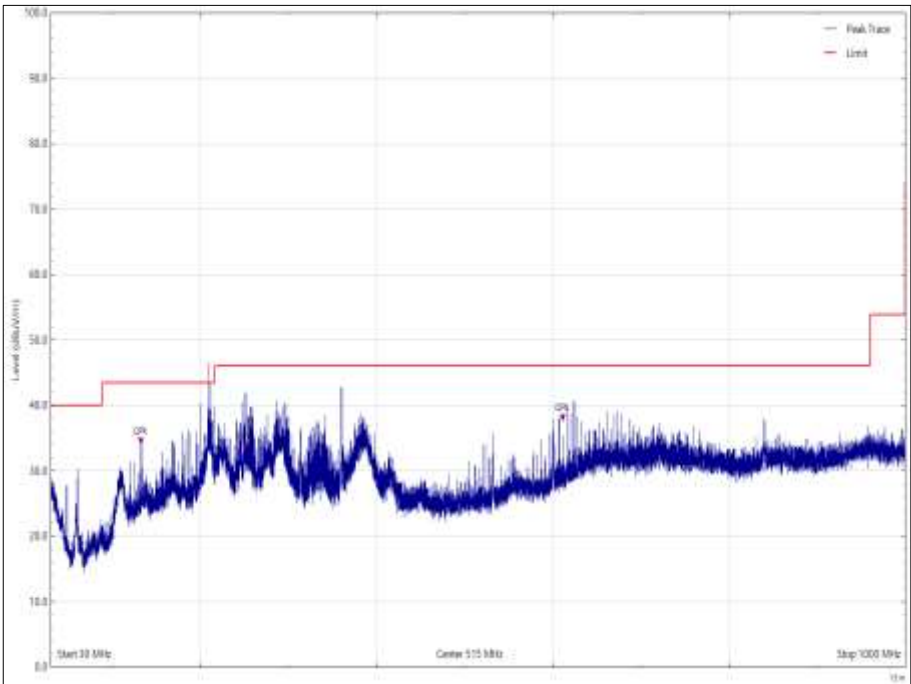


Figure 167 - 2437 MHz, 30 MHz to 1 GHz, Horizontal, Z Orientation



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

Table 74 - 2437 MHz - 1 GHz to 25 GHz

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

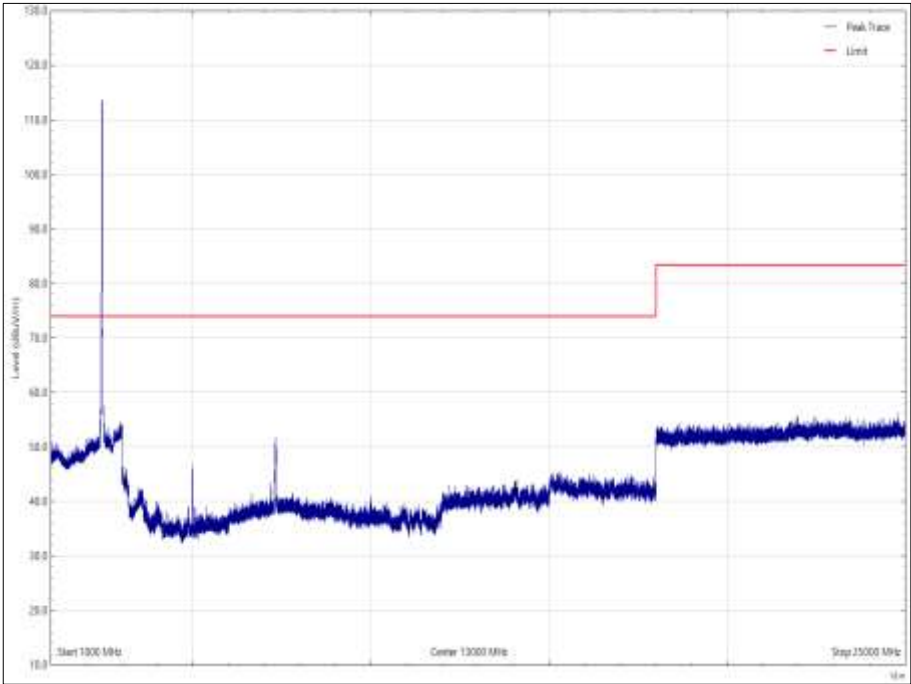


Figure 168 - 2437 MHz - 1 GHz to 25 GHz, Vertical, X Orientation - Peak

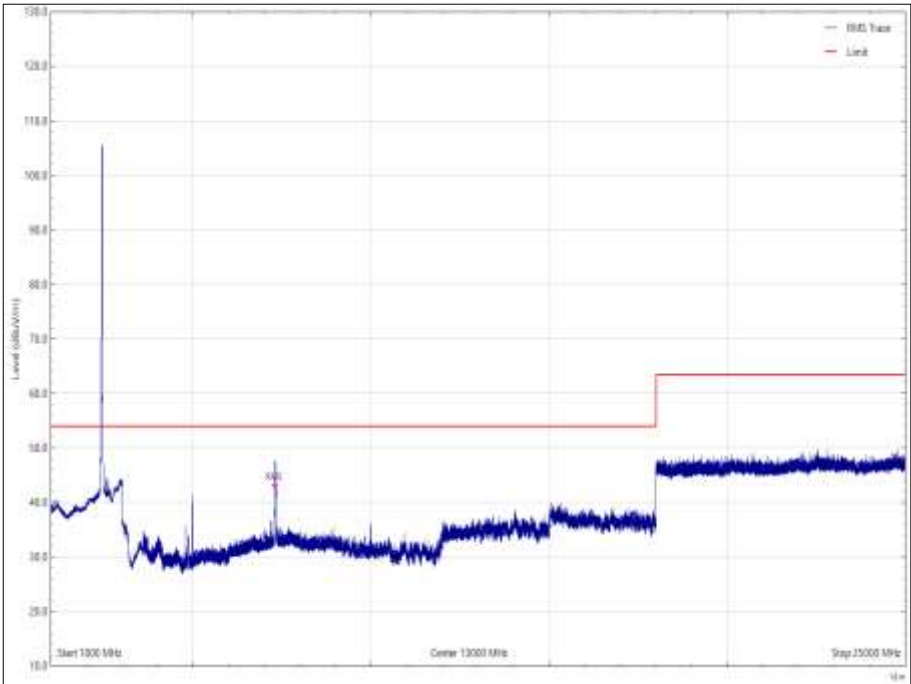


Figure 169 - 2437 MHz - 1 GHz to 25 GHz, Vertical, X Orientation - Average

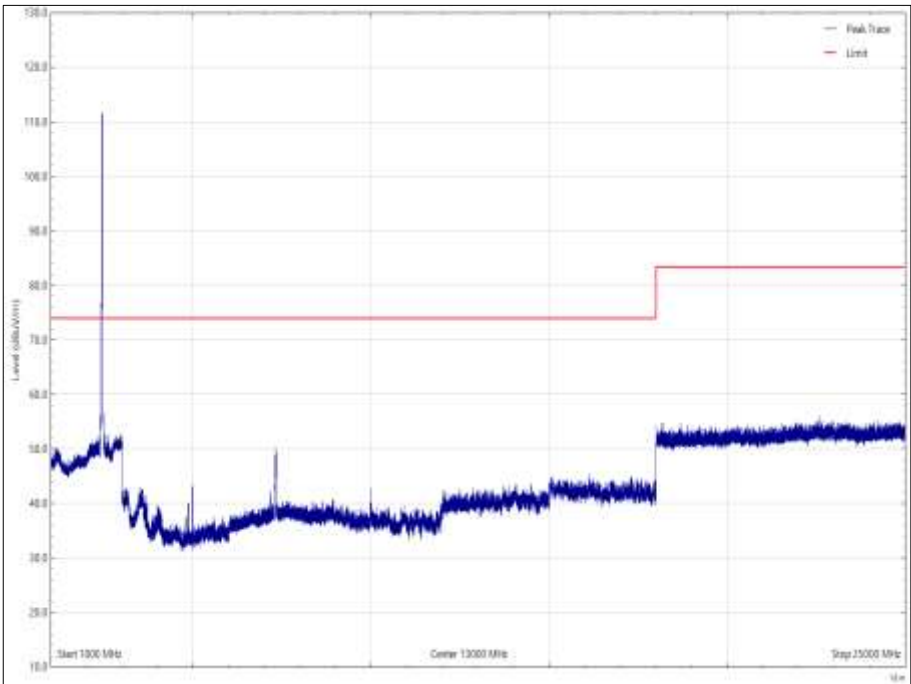


Figure 170 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, X Orientation - Peak

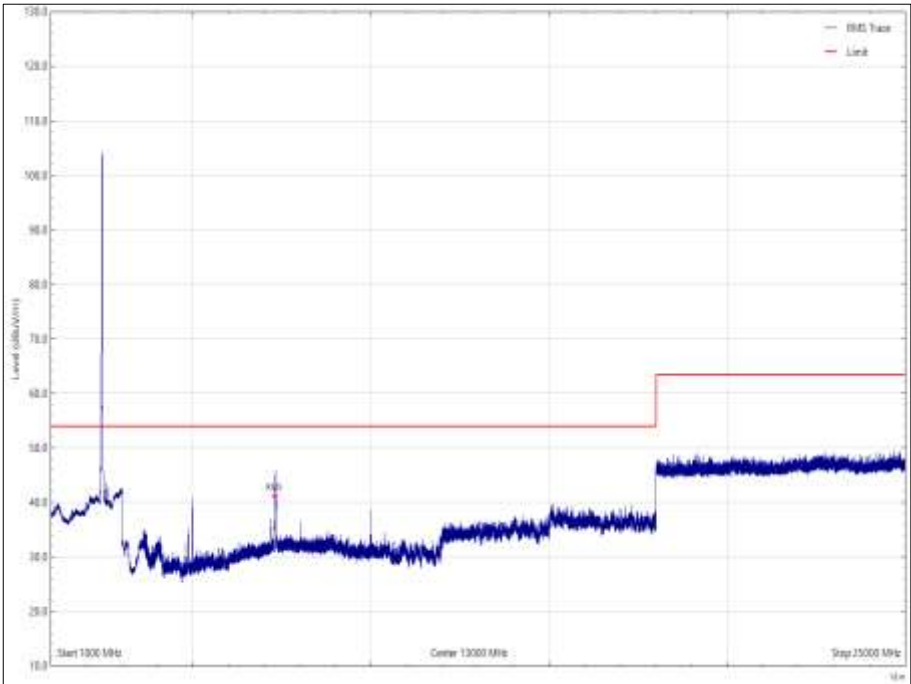


Figure 171 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, X Orientation - Average

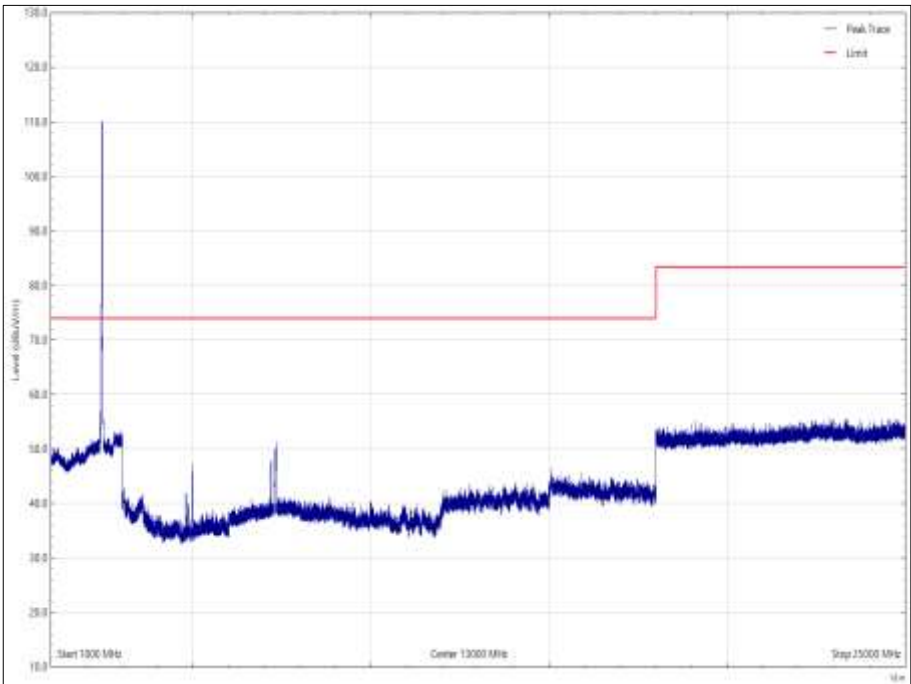


Figure 172 - 2437 MHz - 1 GHz to 25 GHz, Vertical, Y Orientation - Peak

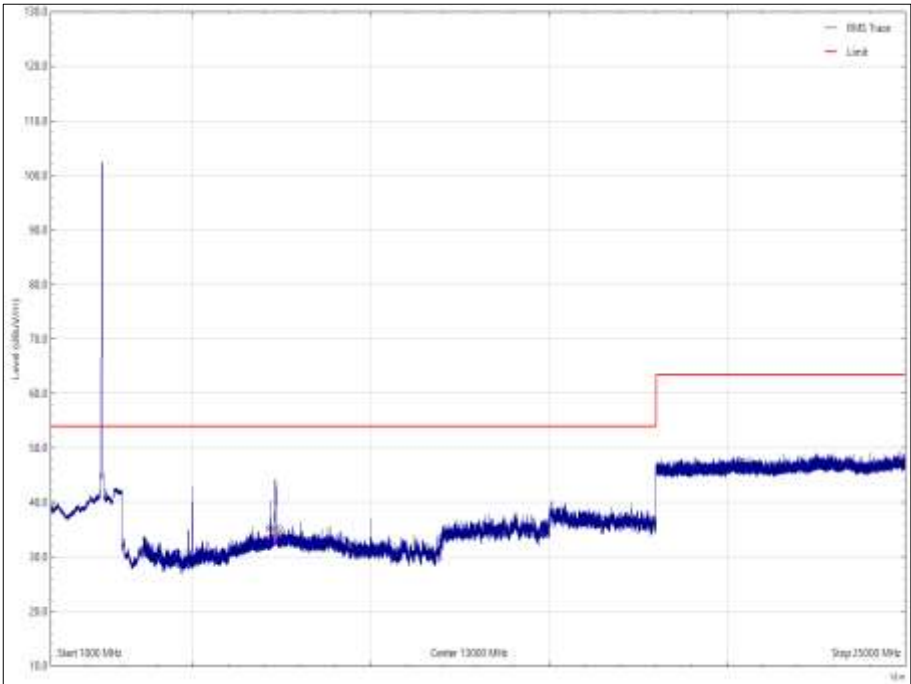


Figure 173 - 2437 MHz - 1 GHz to 25 GHz, Vertical, Y Orientation - Average

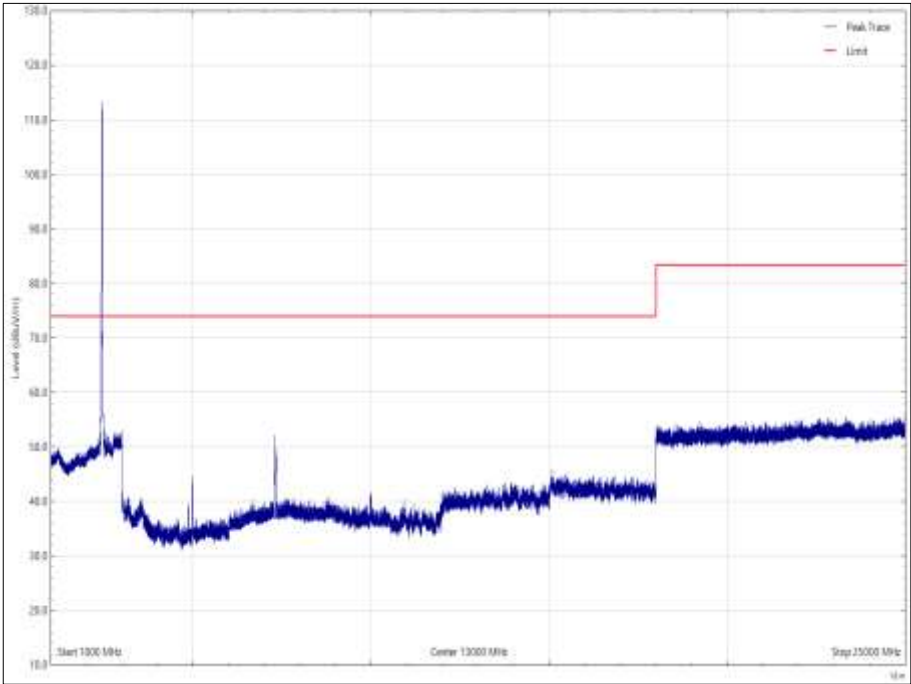


Figure 174 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, Y Orientation - Peak

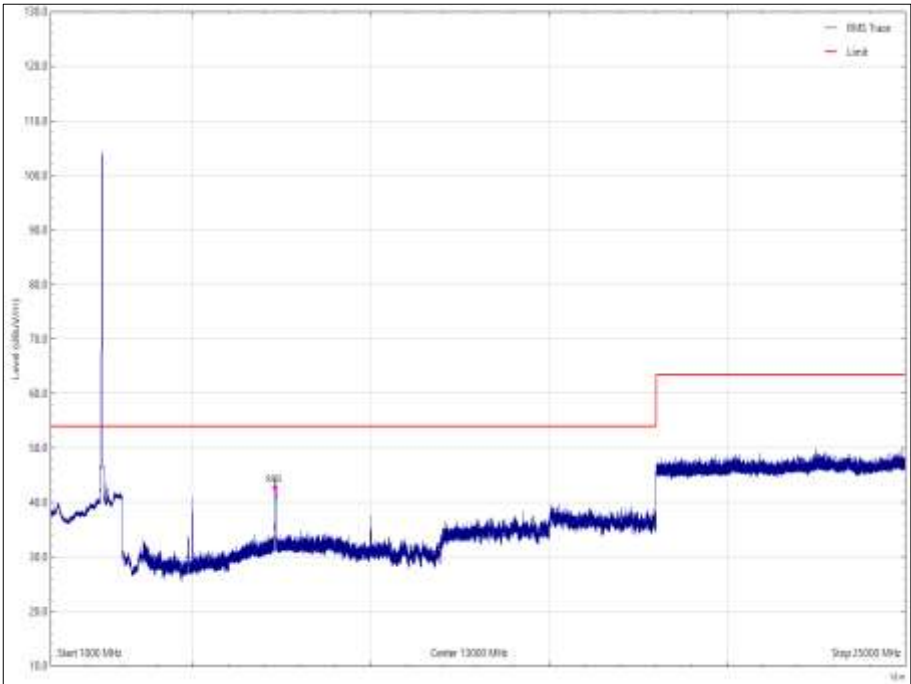


Figure 175 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, Y Orientation - Average

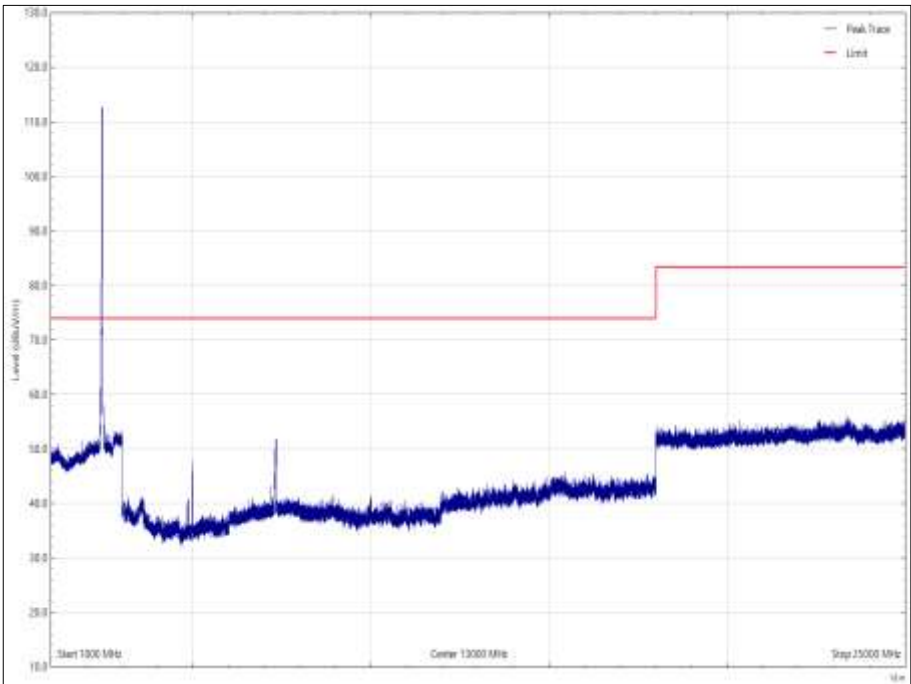


Figure 176 - 2437 MHz - 1 GHz to 25 GHz, Vertical, Z Orientation - Peak

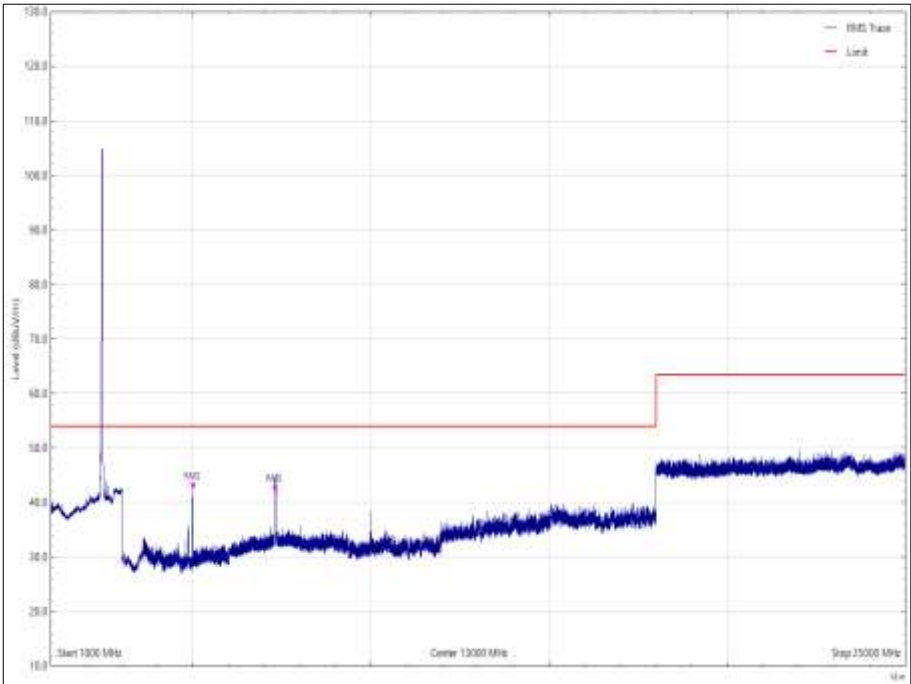


Figure 177 - 2437 MHz - 1 GHz to 25 GHz, Vertical, Z Orientation - Average

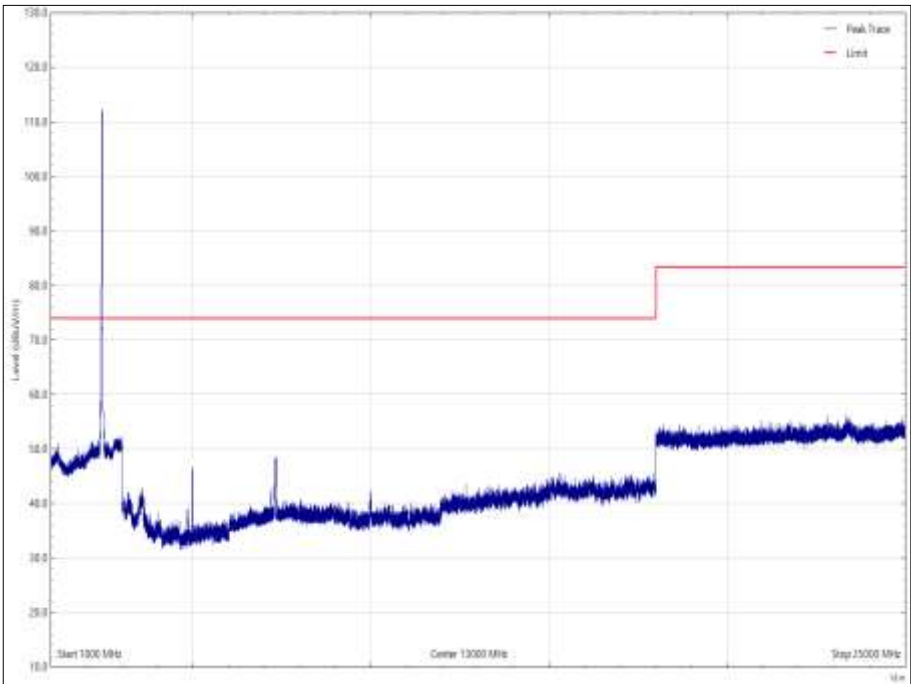


Figure 178 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, Z Orientation - Peak

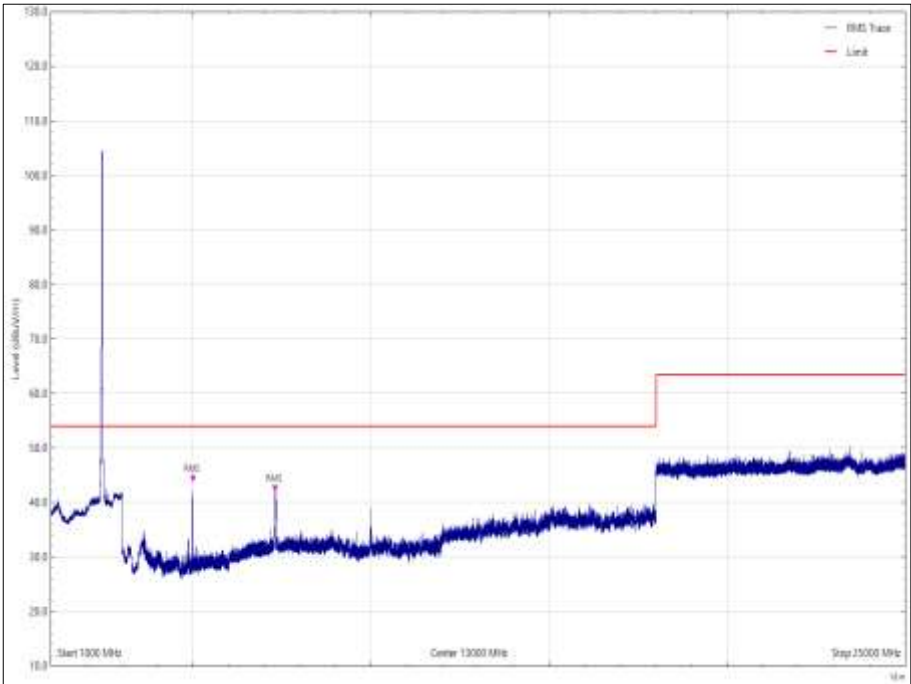


Figure 179 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, Z Orientation - Average

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
74.053	31.00	40.00	9.00	Q-Peak	132	100	Vertical	X
74.109	32.45	40.00	7.55	Q-Peak	163	132	Vertical	X
125.000	34.90	43.52	8.62	Q-Peak	180	100	Vertical	Z
132.804	34.43	43.52	9.09	Q-Peak	211	178	Horizontal	Z
162.222	35.95	43.52	7.57	Q-Peak	55	207	Horizontal	X
178.856	36.91	43.52	6.61	Q-Peak	314	102	Vertical	X
249.999	37.02	46.02	9.00	Q-Peak	189	100	Vertical	X
250.000	40.13	40.13	0.00	Q-Peak	252	100	Vertical	Y
250.029	39.57	46.02	6.45	Q-Peak	222	100	Vertical	Z
254.629	36.05	46.02	9.97	Q-Peak	262	103	Horizontal	Y
256.793	36.39	46.02	9.63	Q-Peak	10	100	Horizontal	X
267.638	36.02	46.02	10.00	Q-Peak	14	100	Horizontal	X
274.532	36.93	46.02	9.09	Q-Peak	7	100	Horizontal	X
332.753	37.10	46.02	8.92	Q-Peak	112	100	Horizontal	X
611.508	37.08	46.02	8.94	Q-Peak	141	100	Vertical	X
611.541	41.31	46.02	4.71	Q-Peak	219	124	Horizontal	Y

Table 75 - 2462 MHz, 30 MHz to 1 GHz

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

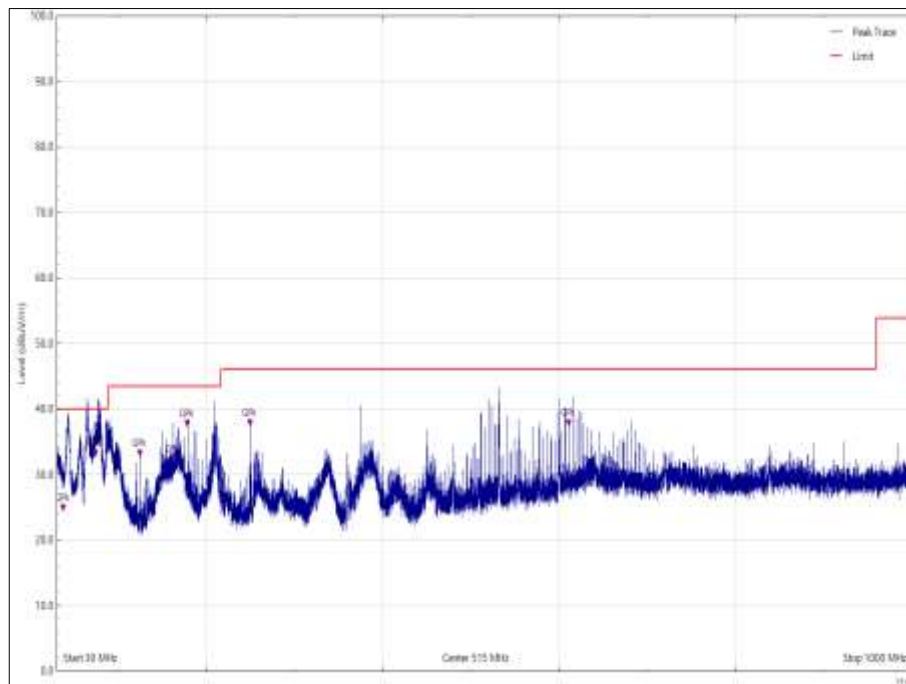


Figure 180 - 2462 MHz, 30 MHz to 1 GHz, Vertical, X Orientation

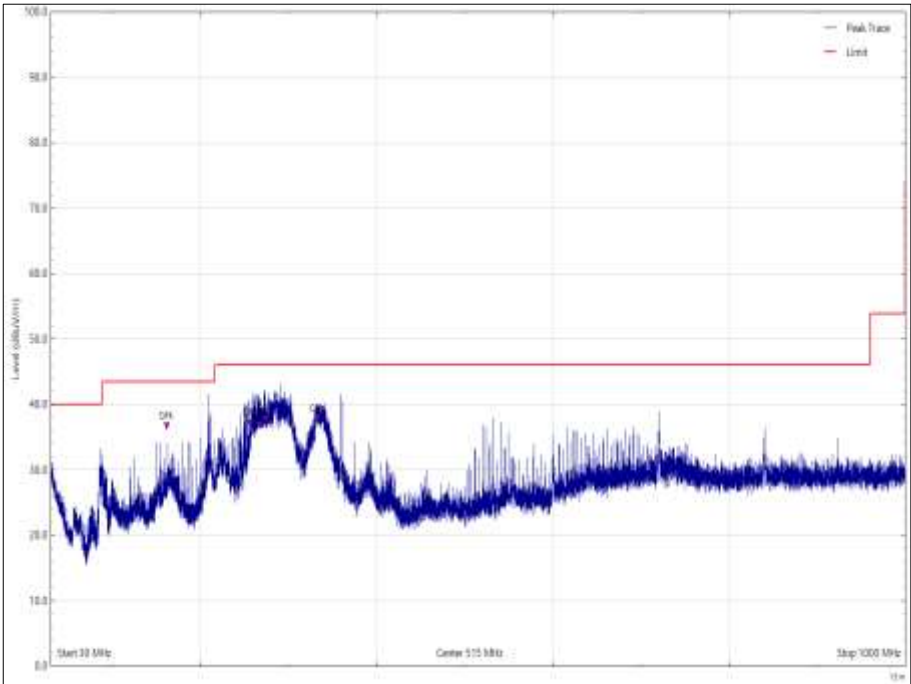


Figure 181 - 2462 MHz, 30 MHz to 1 GHz, Horizontal, X Orientation

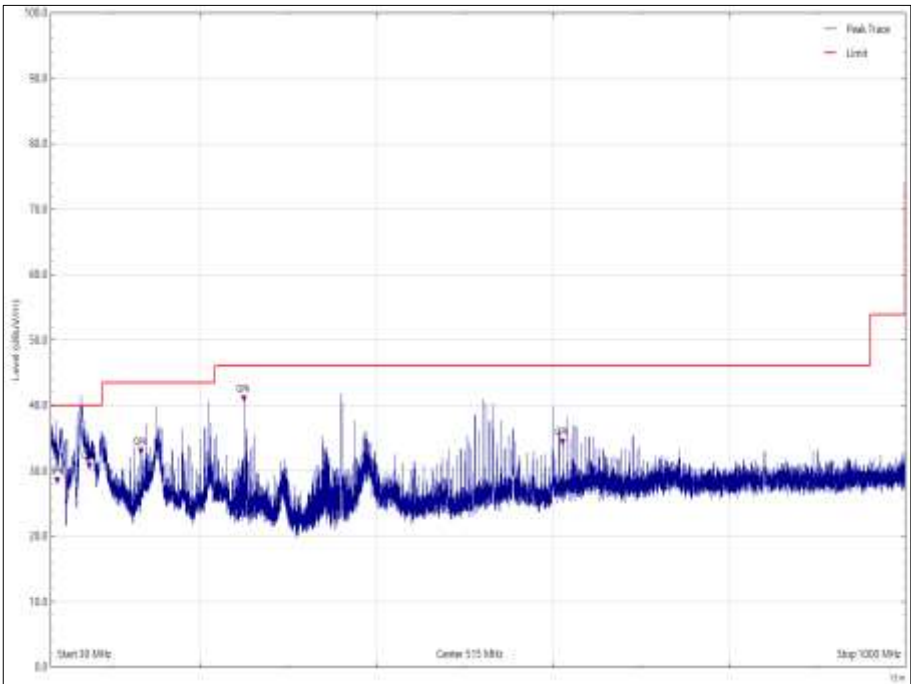


Figure 182 - 2462 MHz, 30 MHz to 1 GHz, Vertical, Y Orientation

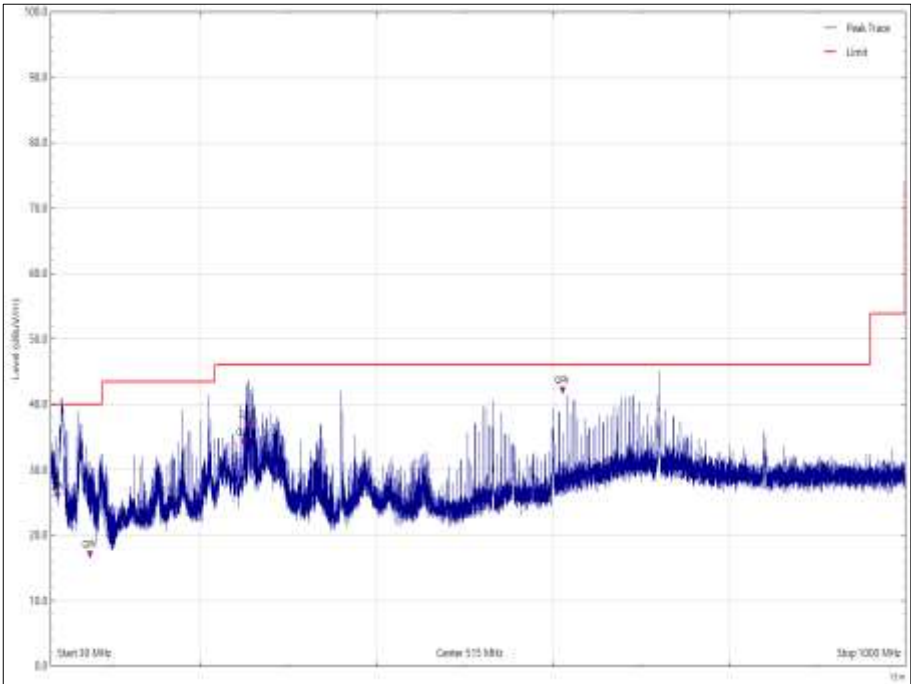


Figure 183 - 2462 MHz, 30 MHz to 1 GHz, Horizontal, Y Orientation

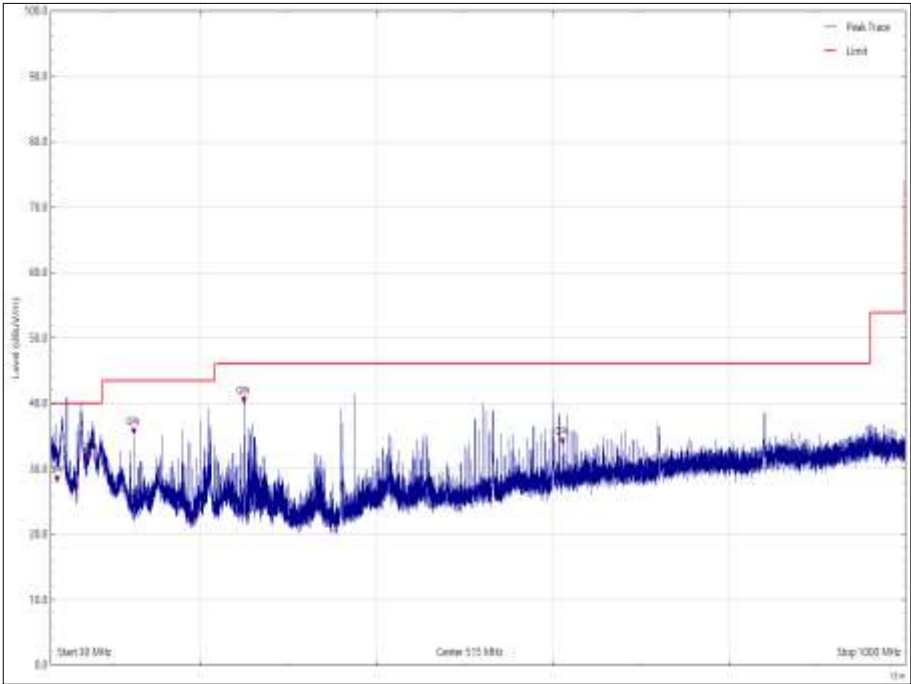


Figure 184 - 2462 MHz, 30 MHz to 1 GHz, Vertical, Z Orientation

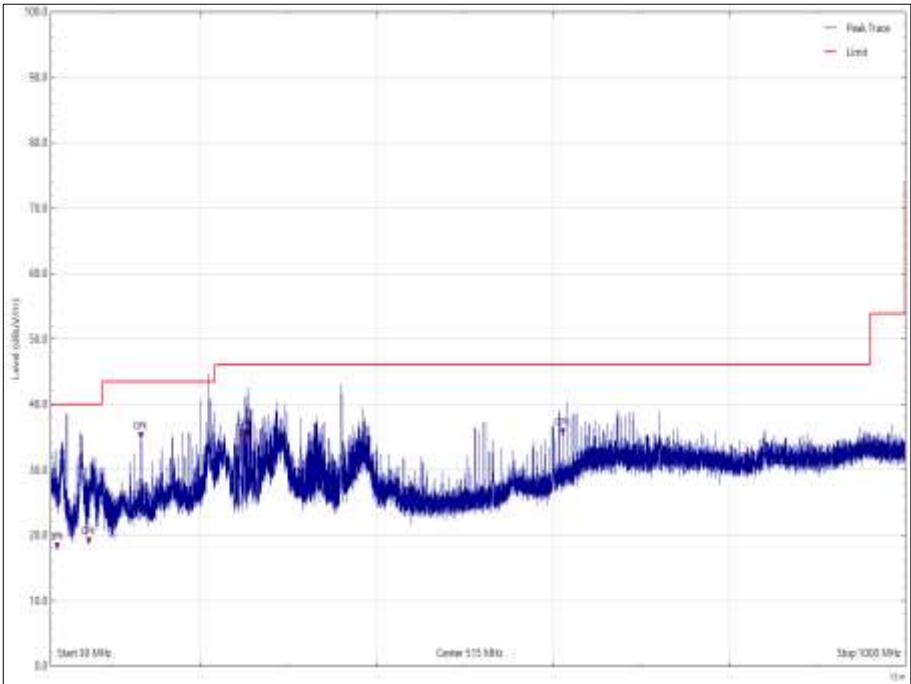


Figure 185 - 2462 MHz, 30 MHz to 1 GHz, Horizontal, Z Orientation



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

Table 76 - 2462 MHz - 1 GHz to 25 GHz

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

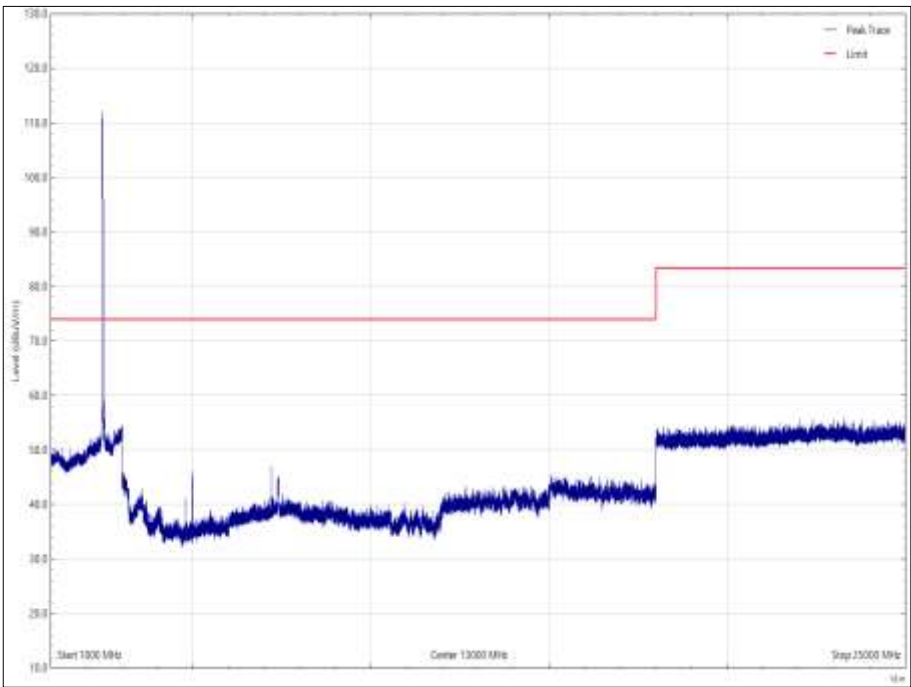


Figure 186 - 2462 MHz - 1 GHz to 25 GHz, Vertical, X Orientation - Peak

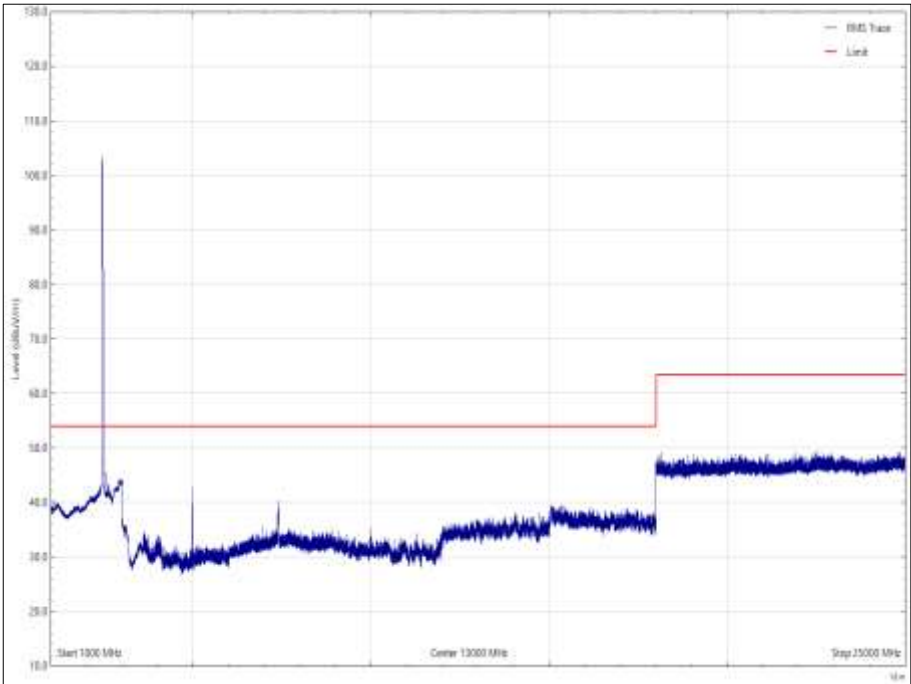


Figure 187 - 2462 MHz - 1 GHz to 25 GHz, Vertical, X Orientation - Average

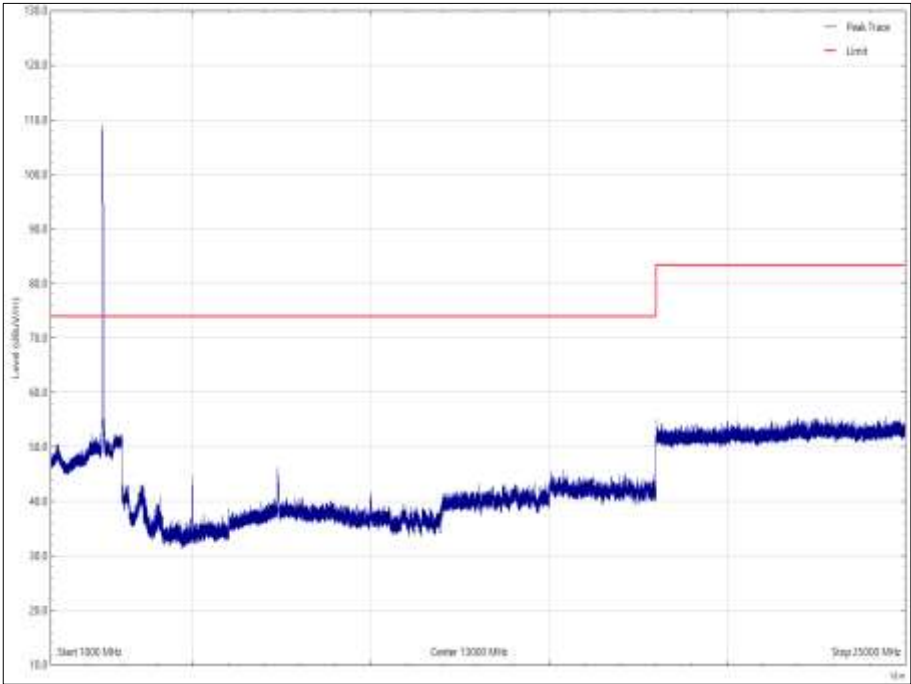


Figure 188 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, X Orientation - Peak

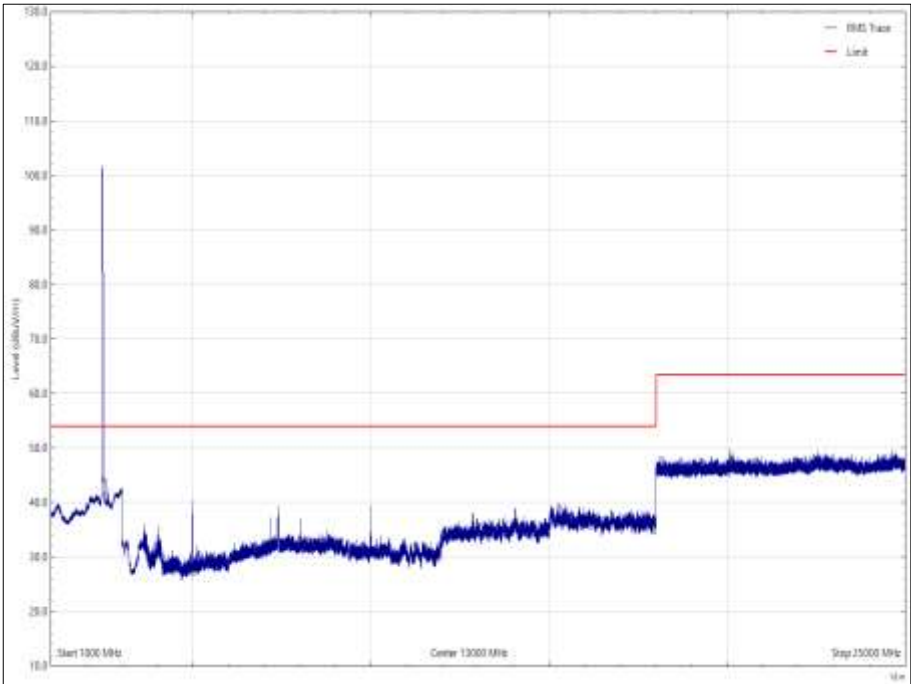


Figure 189 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, X Orientation - Average

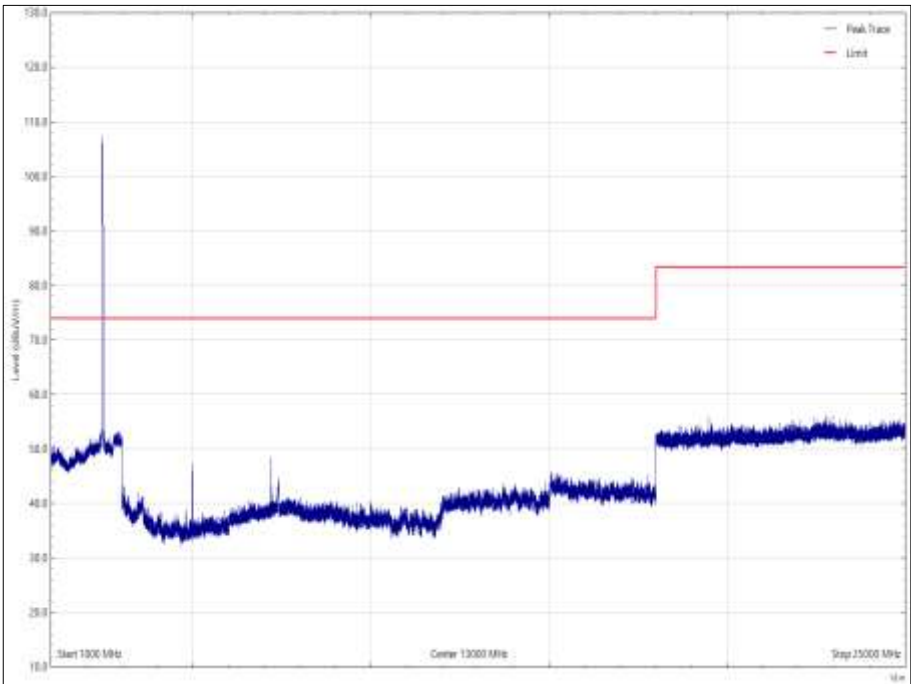


Figure 190 - 2462 MHz - 1 GHz to 25 GHz, Vertical, Y Orientation - Peak

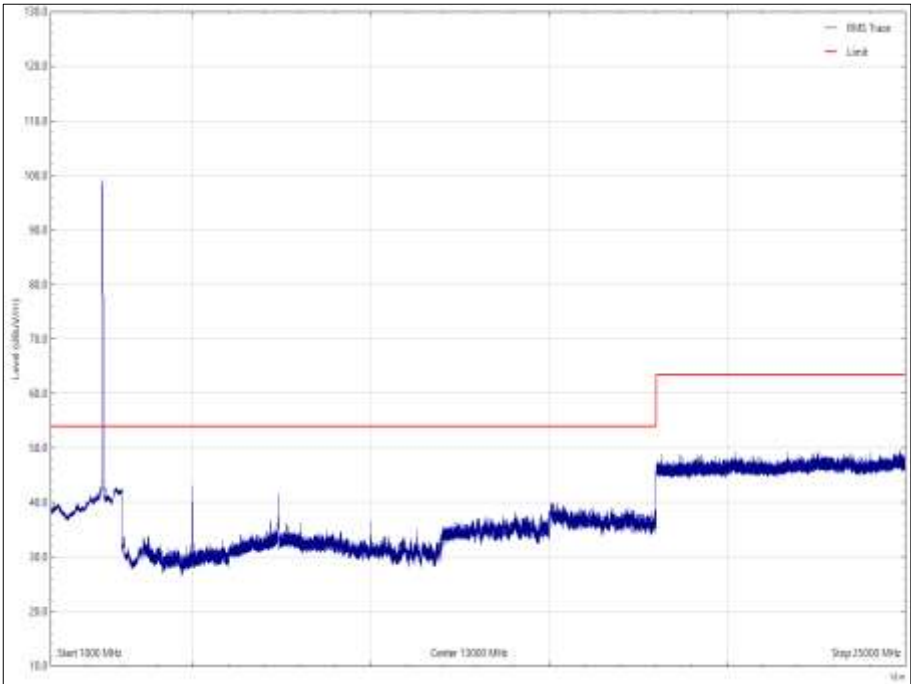


Figure 191 - 2462 MHz - 1 GHz to 25 GHz, Vertical, Y Orientation - Average

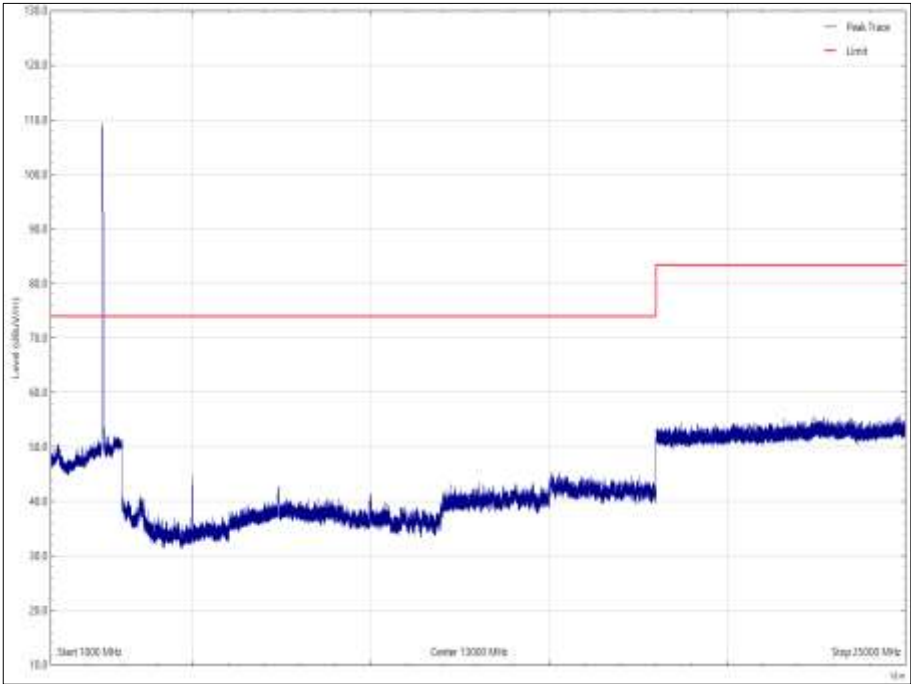


Figure 192 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, Y Orientation - Peak

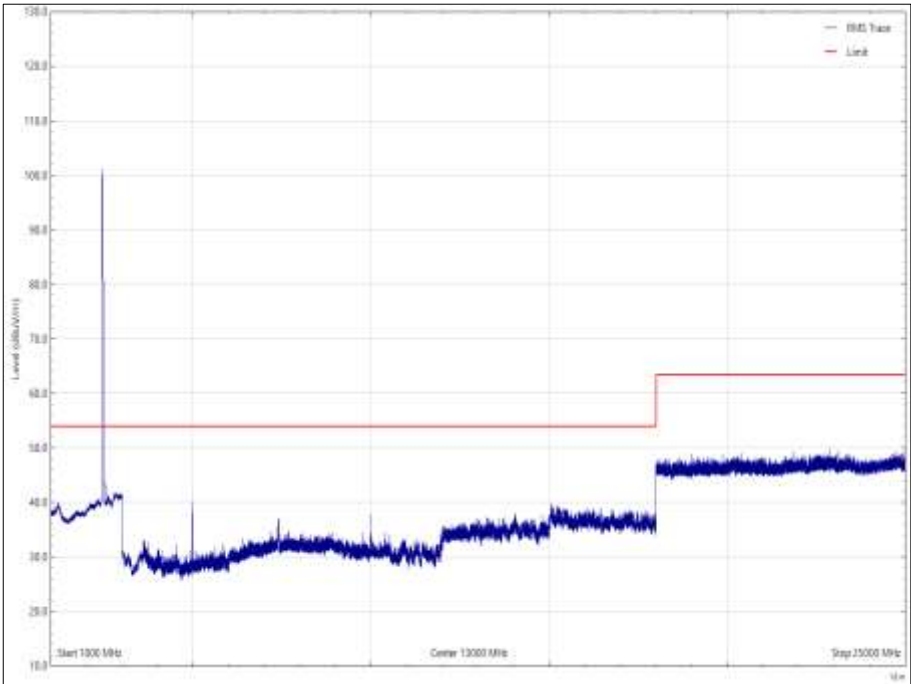


Figure 193 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, Y Orientation - Average

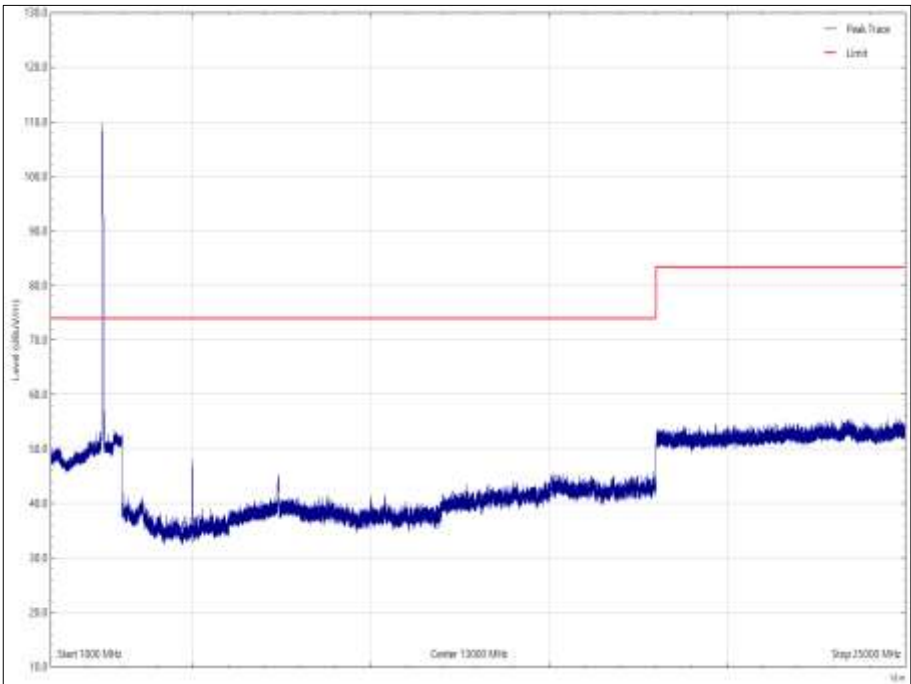


Figure 194 - 2462 MHz - 1 GHz to 25 GHz, Vertical, Z Orientation - Peak

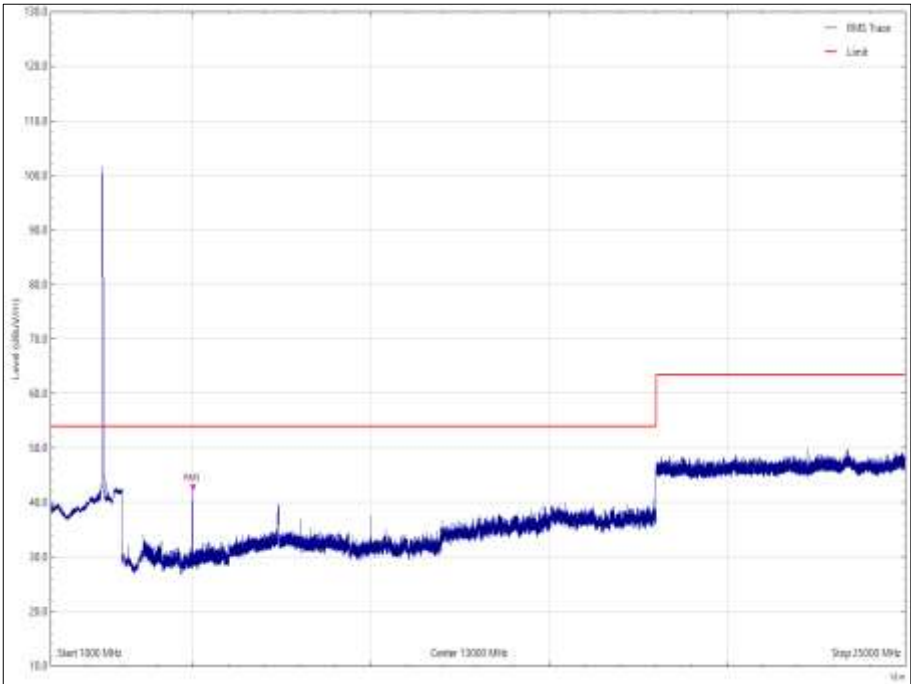


Figure 195 - 2462 MHz - 1 GHz to 25 GHz, Vertical, Z Orientation - Average

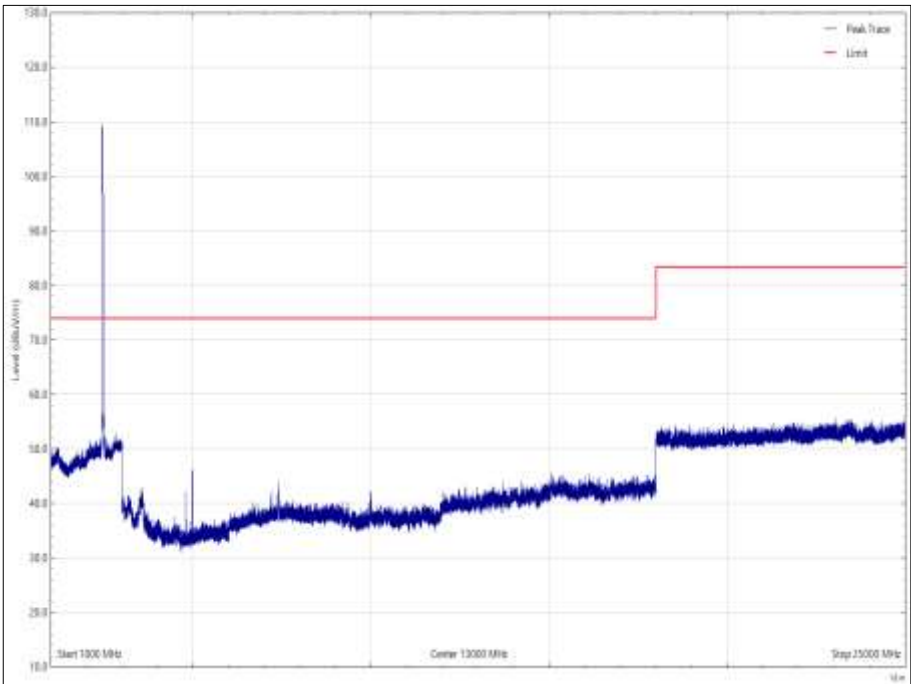


Figure 196 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, Z Orientation - Peak

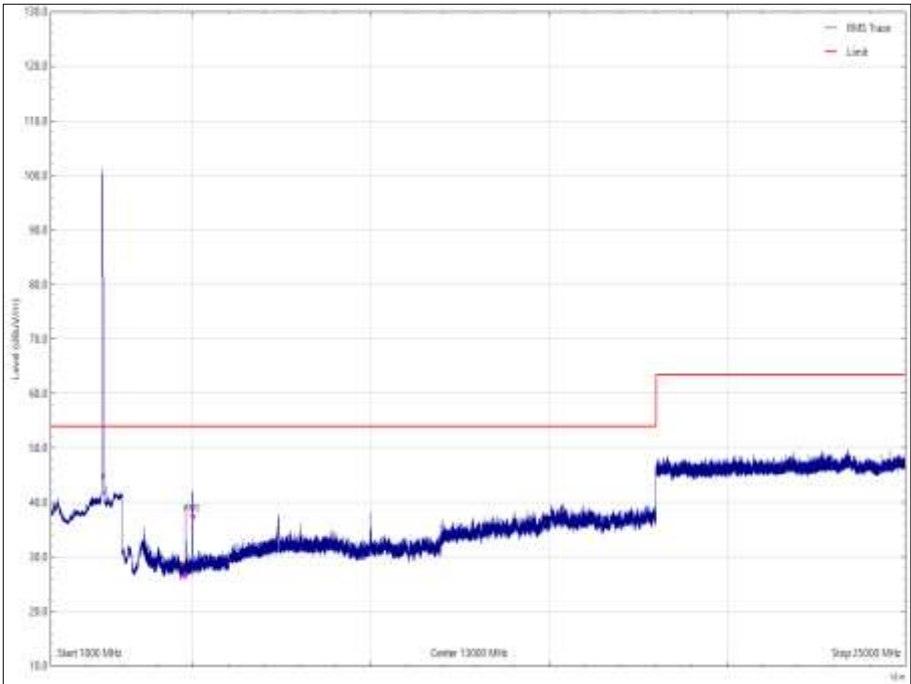


Figure 197 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, Z Orientation - Average



802.11n (20 MHz Bandwidth) - 2.4 GHz WLAN

Testing was performed on the configurations and modulation coding scheme which resulted in the highest conducted output power and highest power spectral density as stated in ANSI C63.10, clause 5.6.2.2 (b). The modulation coding scheme used during testing was MCS0. The EUT was configured in MIMO mode for simultaneous transmission on both antenna ports.

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
74.430	31.91	40.00	8.09	Q-Peak	350	100	Vertical	X
74.453	31.25	40.00	8.75	Q-Peak	125	141	Vertical	Z
74.935	32.68	40.00	7.72	Q-Peak	84	161	Vertical	Y
114.313	36.47	43.52	7.05	Q-Peak	230	100	Vertical	X
115.467	40.97	43.52	2.55	Q-Peak	55	258	Horizontal	X
119.981	34.05	43.52	9.47	Q-Peak	231	100	Vertical	X
125.016	34.49	43.52	9.03	Q-Peak	192	100	Vertical	Z
166.403	34.77	43.52	8.77	Q-Peak	8	100	Vertical	X
249.637	36.43	46.02	9.59	Q-Peak	275	100	Horizontal	Y
249.963	40.45	46.02	5.57	Q-Peak	237	100	Vertical	Z
249.977	36.29	46.02	9.73	Q-Peak	0	100	Horizontal	Z
249.997	40.06	46.02	5.96	Q-Peak	218	100	Vertical	Y
250.016	38.22	46.02	7.80	Q-Peak	214	100	Vertical	X
255.458	36.53	46.02	9.49	Q-Peak	250	100	Horizontal	Y
257.146	36.17	46.02	9.85	Q-Peak	196	100	Horizontal	X
257.886	37.85	46.02	8.17	Q-Peak	0	100	Horizontal	X
332.284	37.24	46.02	8.78	Q-Peak	260	110	Horizontal	Y
611.505	36.83	46.02	9.19	Q-Peak	176	215	Horizontal	X
611.506	37.38	46.02	8.64	Q-Peak	40	115	Horizontal	Z
611.510	39.24	46.02	6.78	Q-Peak	175	100	Vertical	X
611.521	36.29	46.02	9.73	Q-Peak	149	100	Vertical	Z
611.549	40.37	46.02	5.65	Q-Peak	211	124	Horizontal	Y

Table 77 - 2412 MHz, 30 MHz to 1 GHz

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

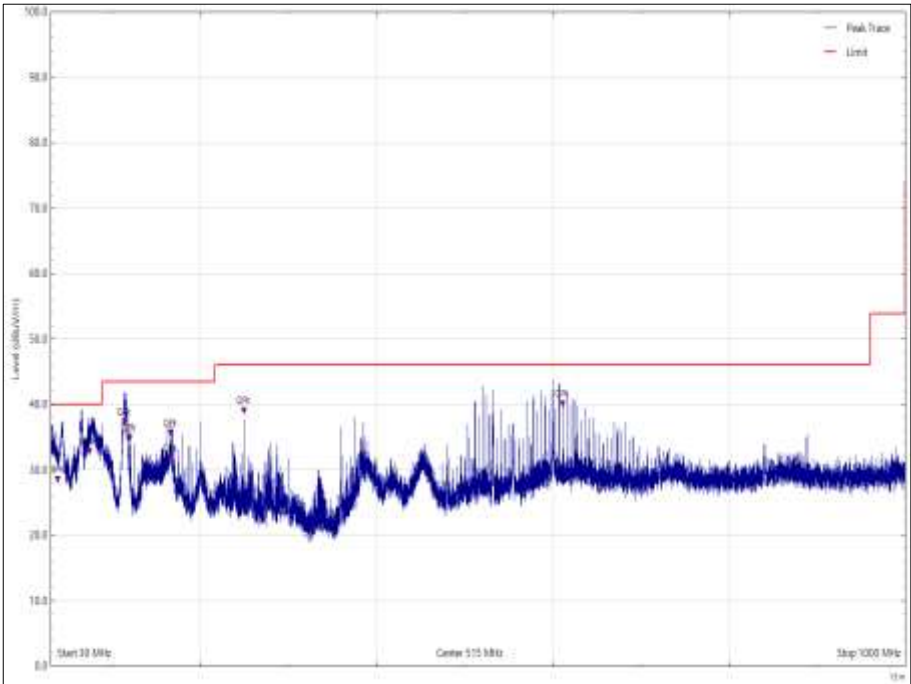


Figure 198 - 2412 MHz, 30 MHz to 1 GHz, Vertical, X Orientation

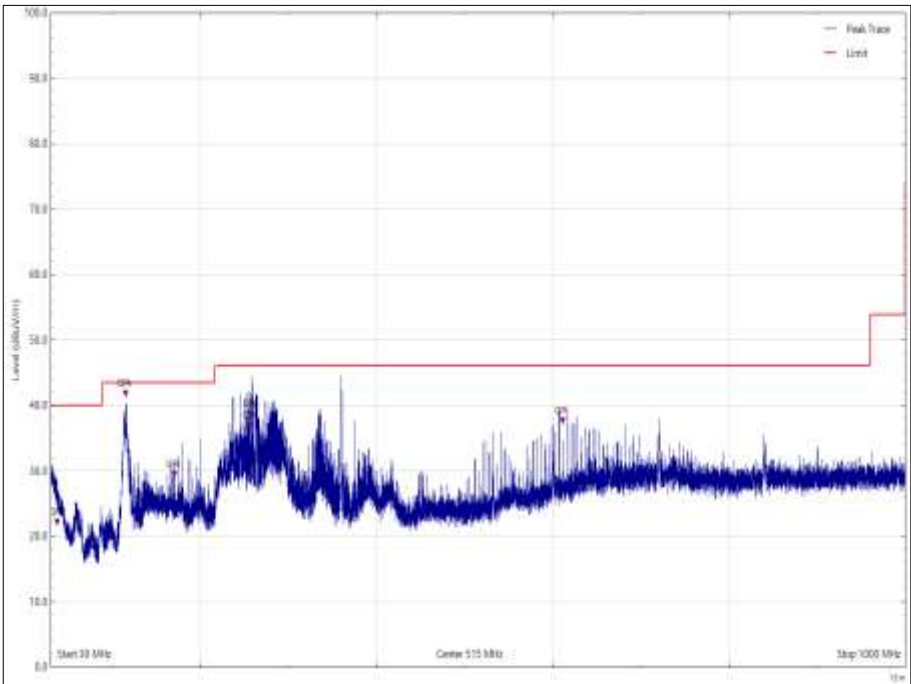


Figure 199 - 2412 MHz, 30 MHz to 1 GHz, Horizontal, X Orientation

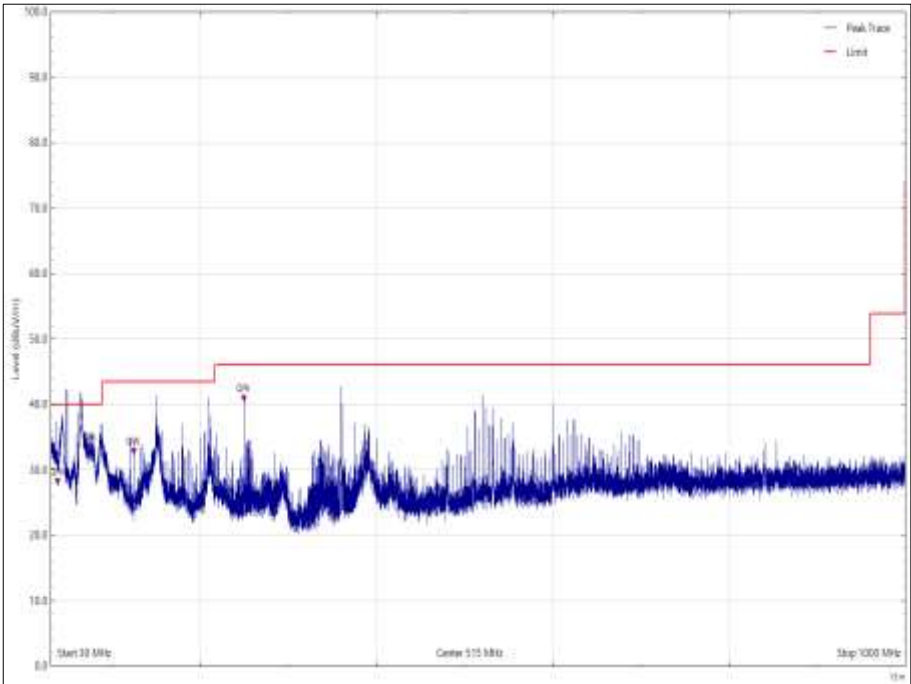


Figure 200 - 2412 MHz, 30 MHz to 1 GHz, Vertical, Y Orientation

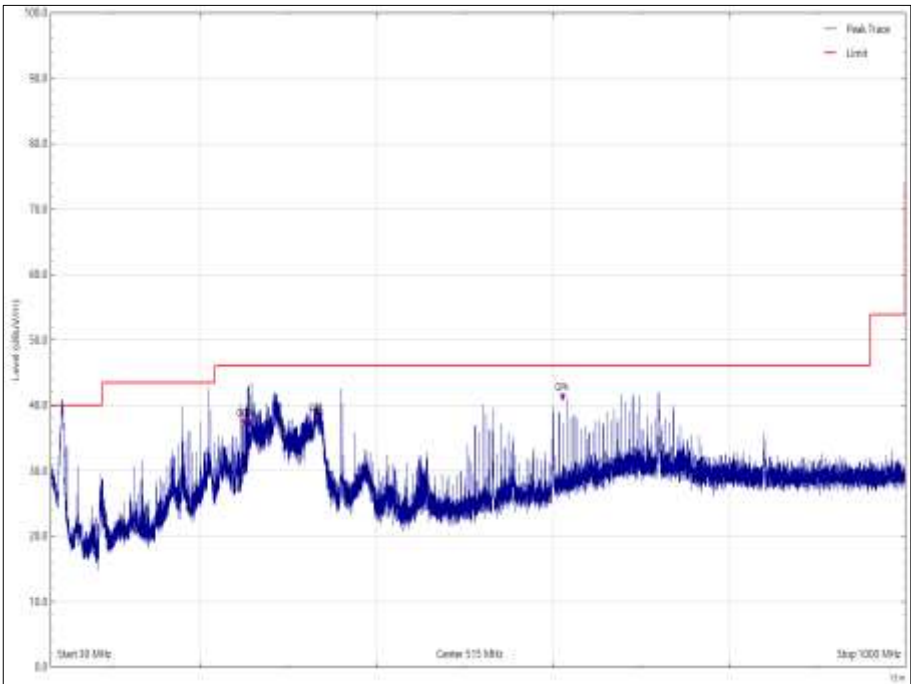


Figure 201 - 2412 MHz, 30 MHz to 1 GHz, Horizontal, Y Orientation

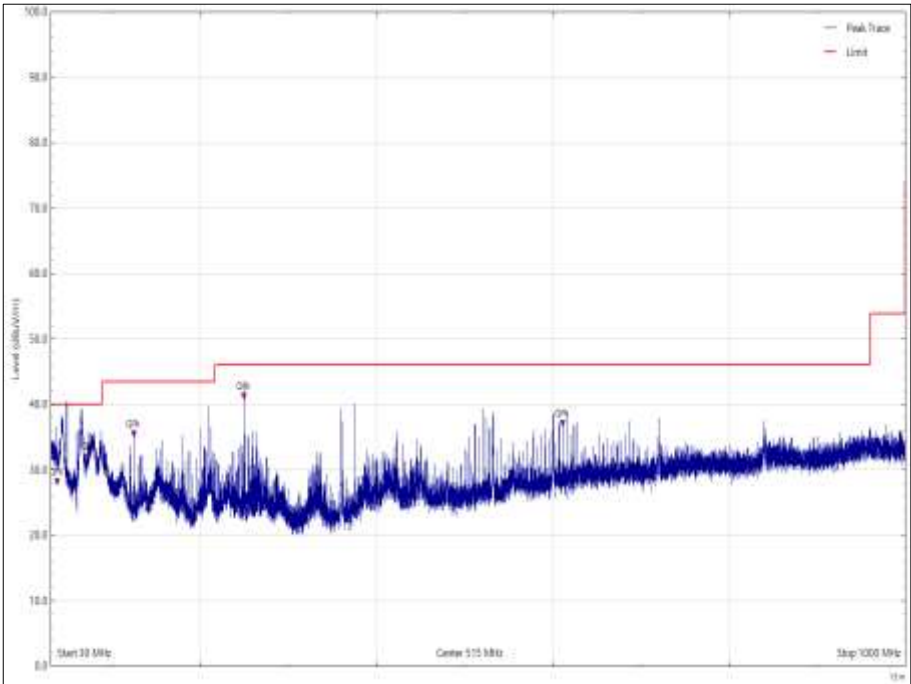


Figure 202 - 2412 MHz, 30 MHz to 1 GHz, Vertical, Z Orientation

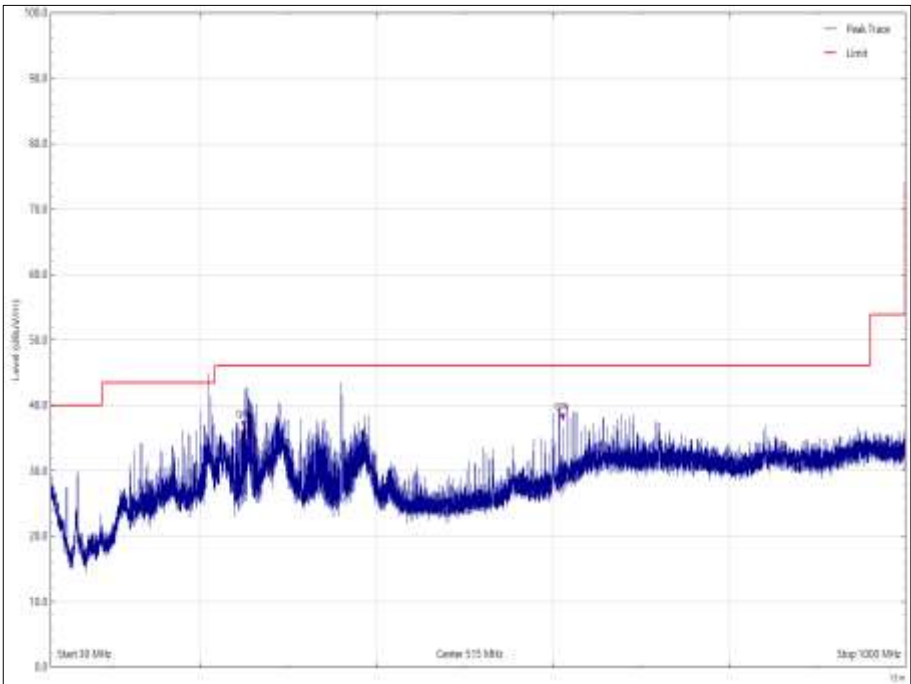


Figure 203 - 2412 MHz, 30 MHz to 1 GHz, Horizontal, Z Orientation



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

Table 78 - 2412 MHz, 1 GHz to 25 GHz

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

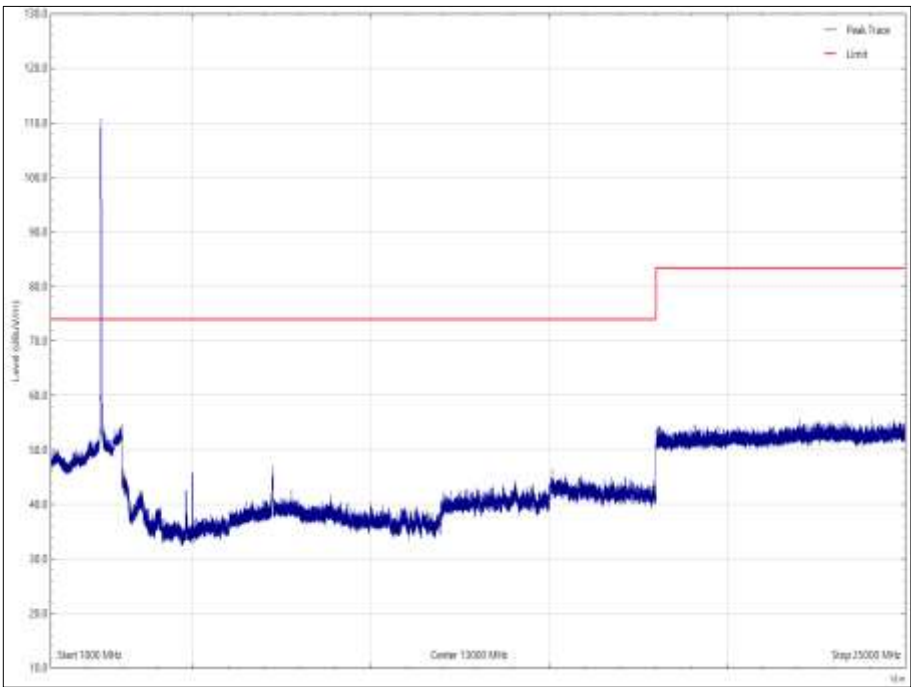


Figure 204 - 2412 MHz, 1 GHz to 25 GHz, Vertical, X Orientation - Peak

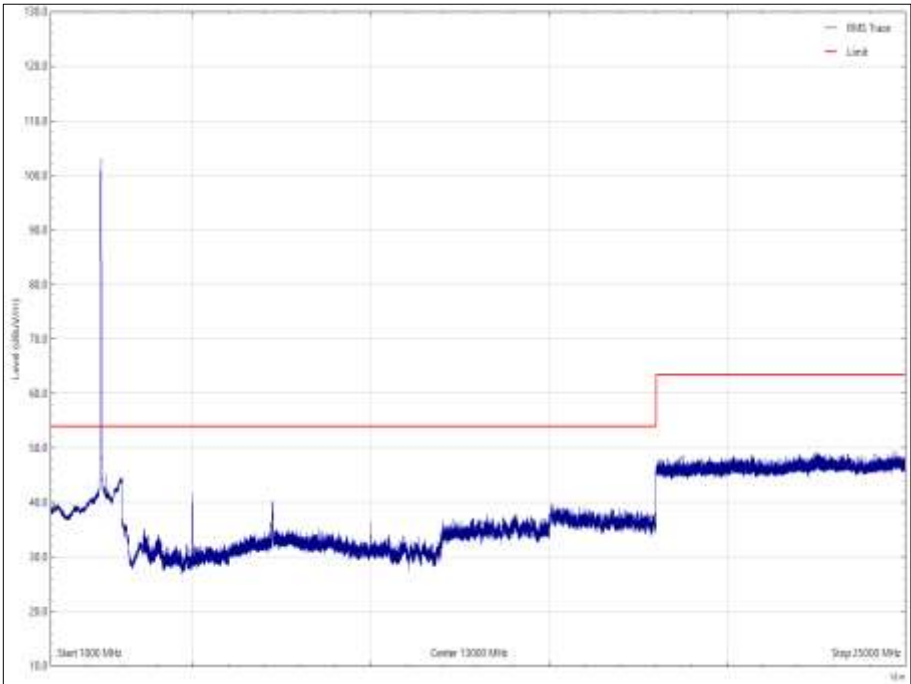


Figure 205 - 2412 MHz, 1 GHz to 25 GHz, Vertical, X Orientation - Average

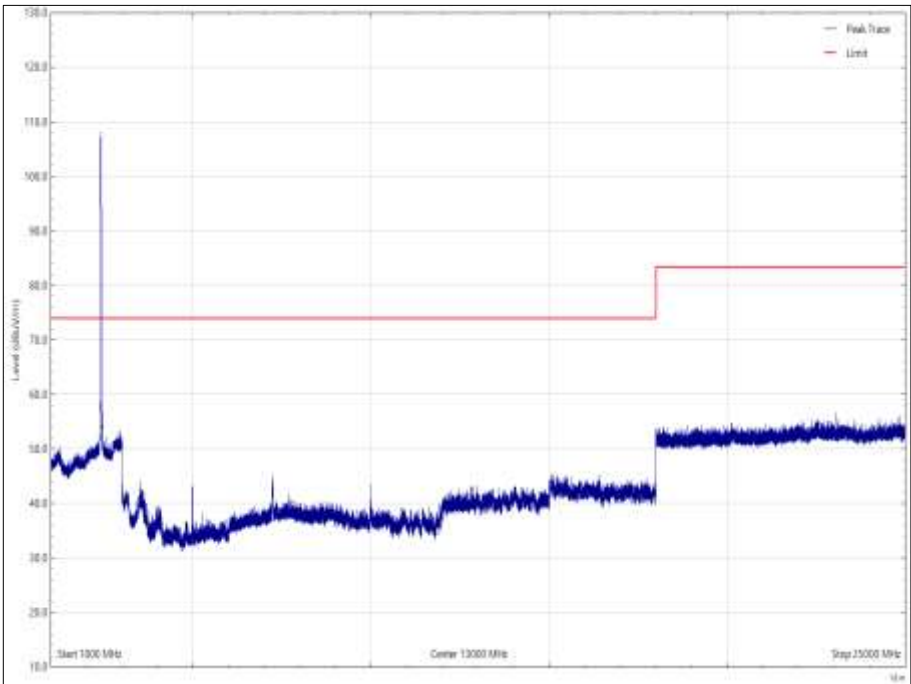


Figure 206 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, X Orientation - Peak

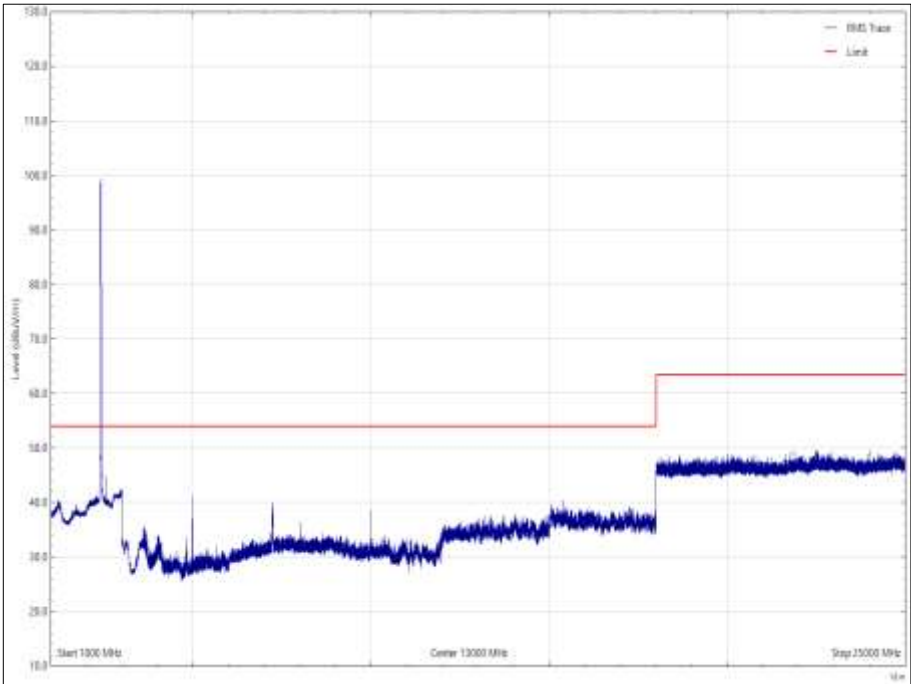


Figure 207 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, X Orientation - Average

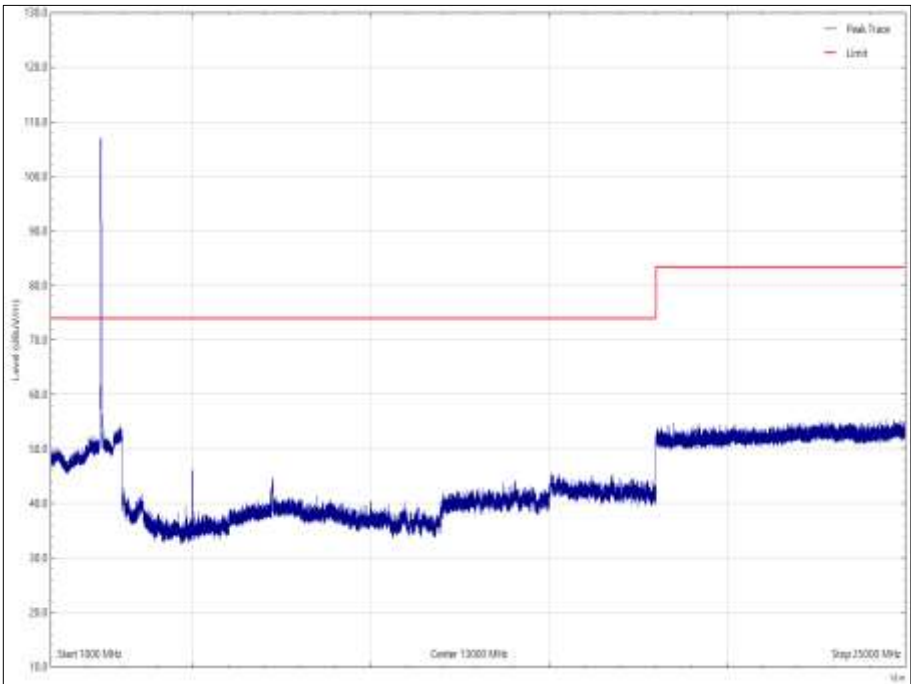


Figure 208 - 2412 MHz, 1 GHz to 25 GHz, Vertical, Y Orientation - Peak

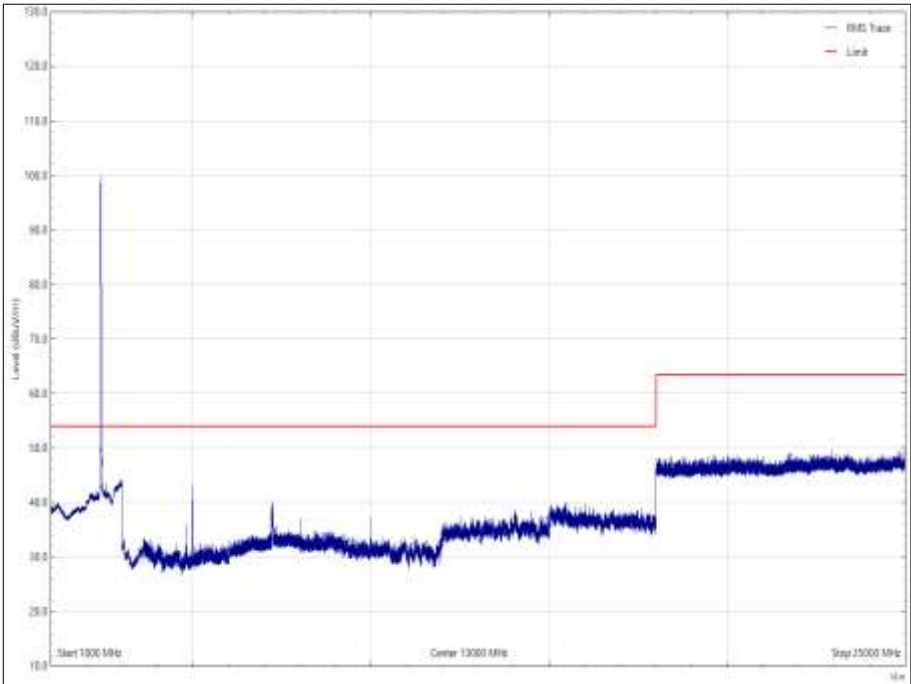


Figure 209 - 2412 MHz, 1 GHz to 25 GHz, Vertical, Y Orientation - Average

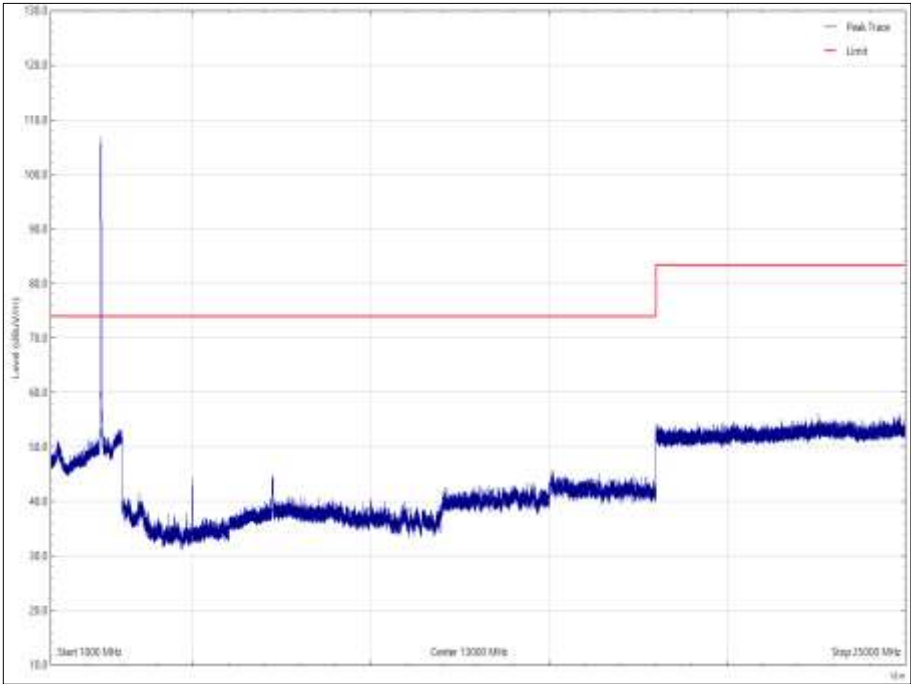


Figure 210 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, Y Orientation - Peak

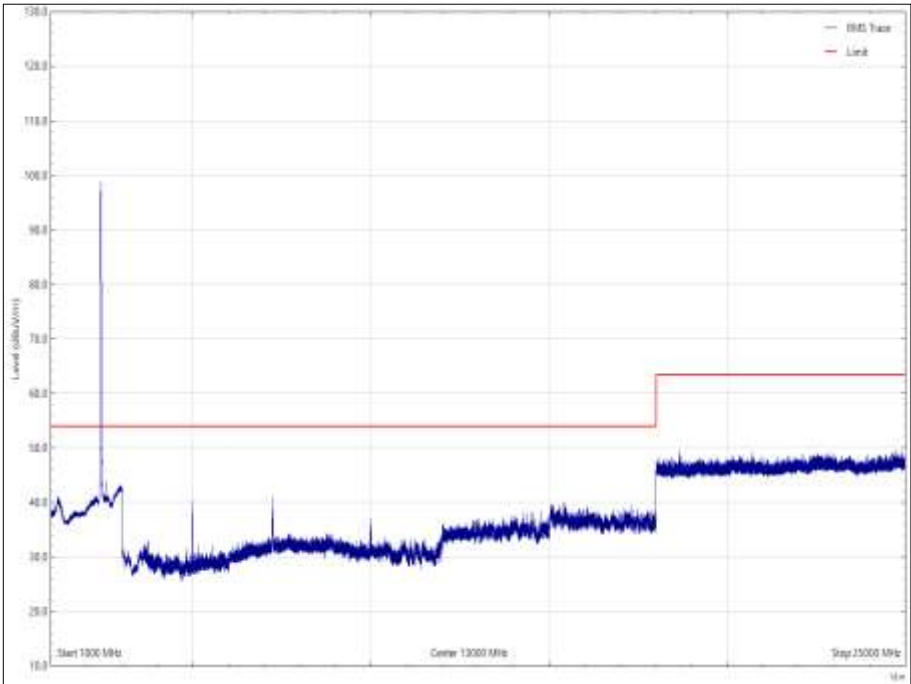


Figure 211 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, Y Orientation - Average

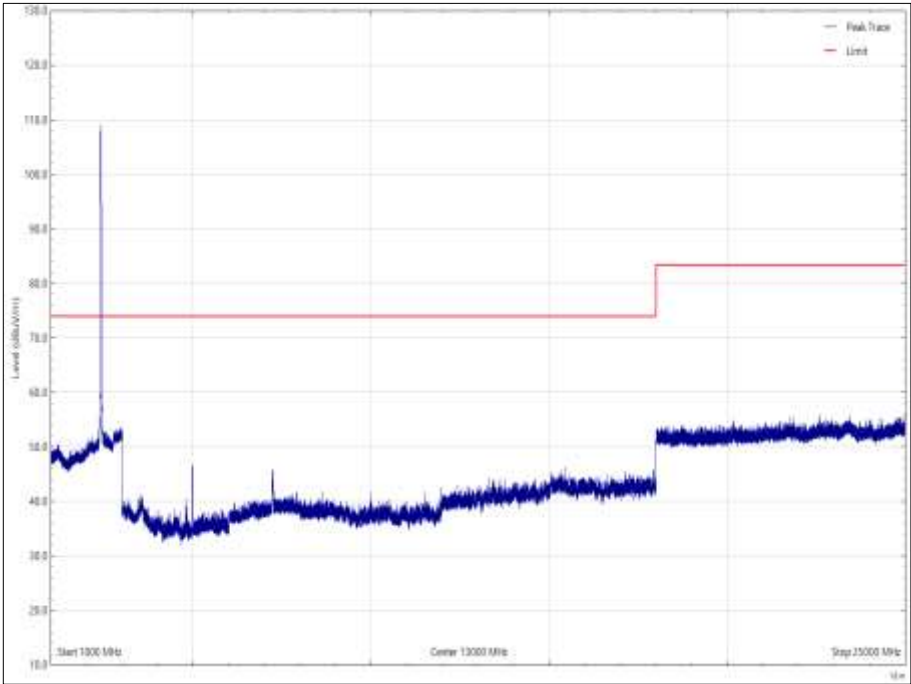


Figure 212 - 2412 MHz, 1 GHz to 25 GHz, Vertical, Z Orientation - Peak

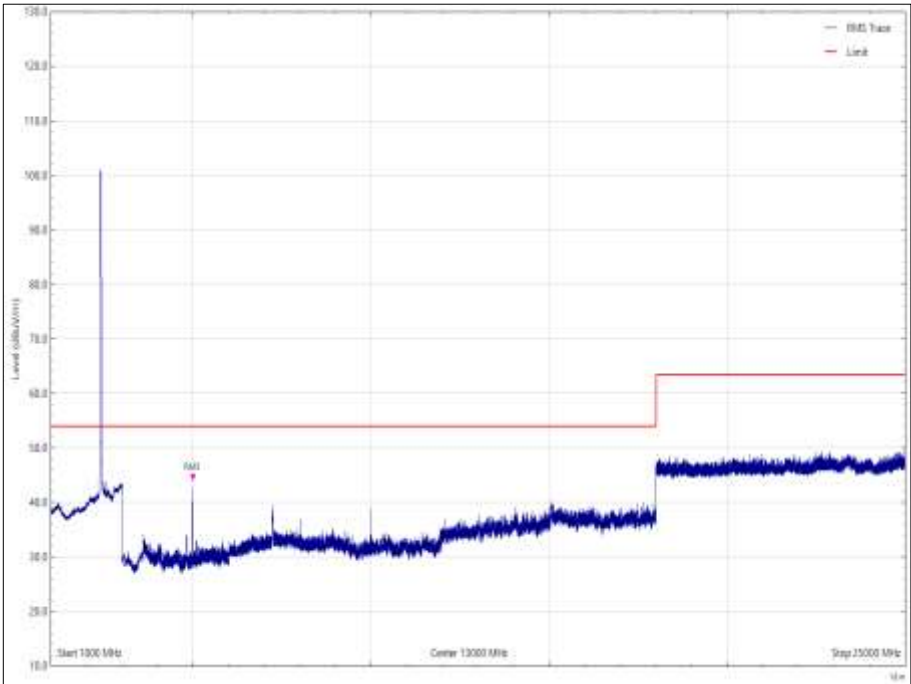


Figure 213 - 2412 MHz, 1 GHz to 25 GHz, Vertical, Z Orientation - Average

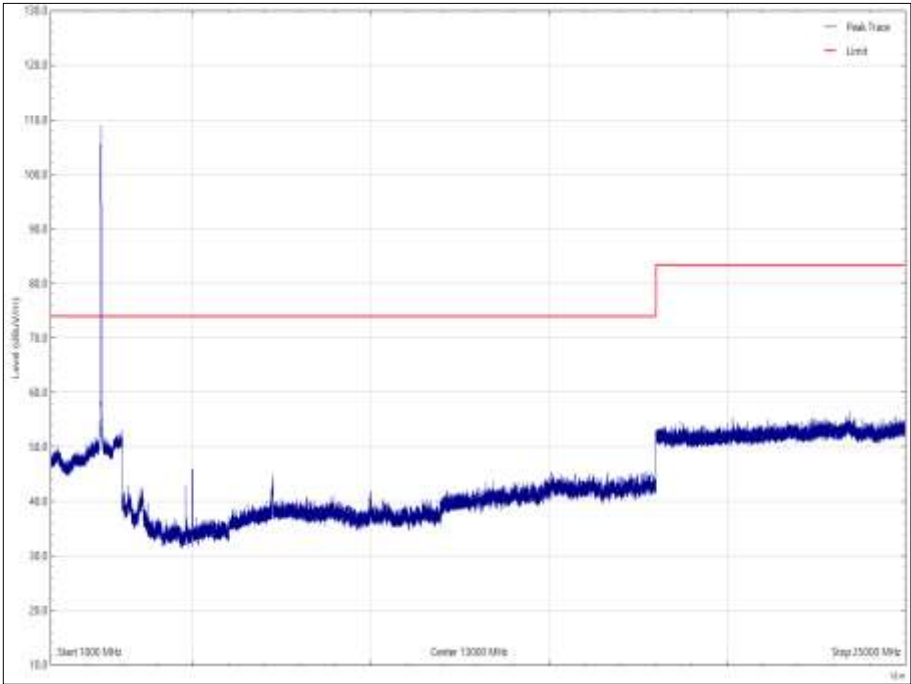


Figure 214 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, Z Orientation - Peak

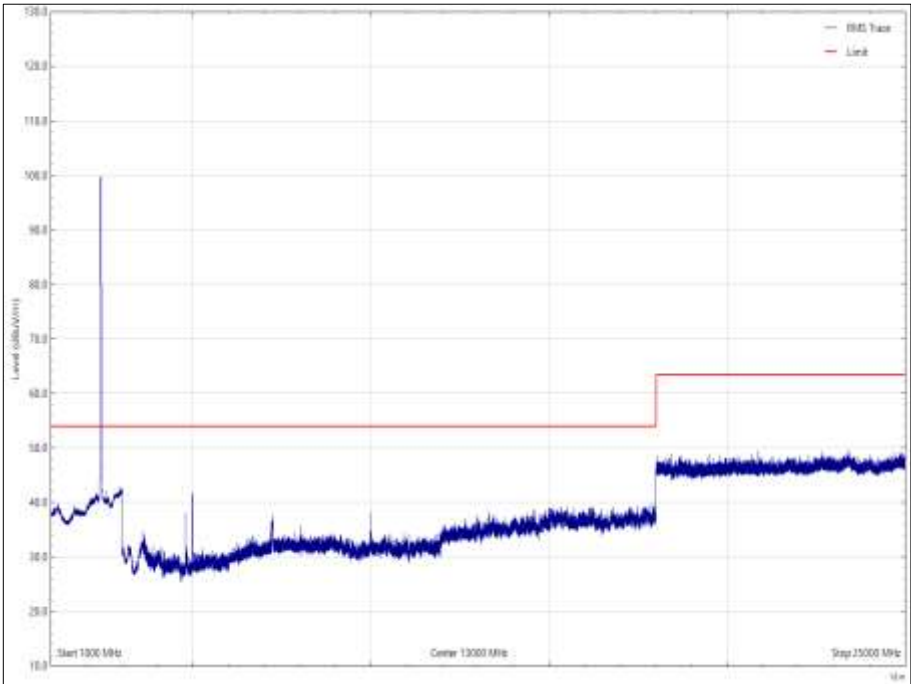


Figure 215 - 2412 MHz, 1 GHz to 25 GHz, Horizontal, Z Orientation - Average



Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
74.381	31.50	40.00	8.80	Q-Peak	162	100	Vertical	X
74.763	31.53	40.00	8.77	Q-Peak	121	110	Vertical	Z
74.811	33.08	40.00	6.92	Q-Peak	84	161	Vertical	Y
114.149	39.64	43.52	3.88	Q-Peak	56	100	Vertical	X
114.236	39.19	43.52	4.33	Q-Peak	56	253	Horizontal	X
125.004	35.28	43.52	8.24	Q-Peak	208	100	Vertical	Z
132.689	35.62	43.52	7.90	Q-Peak	207	182	Horizontal	Z
149.153	34.91	43.52	8.61	Q-Peak	259	108	Vertical	Y
168.034	33.57	43.52	9.95	Q-Peak	333	100	Vertical	X
170.561	36.25	43.52	7.27	Q-Peak	33	225	Horizontal	Y
170.564	34.19	43.52	9.23	Q-Peak	131	145	Horizontal	X
249.980	36.81	46.02	9.21	Q-Peak	6	102	Horizontal	Z
250.011	40.26	46.02	5.76	Q-Peak	297	100	Vertical	Y
250.015	41.36	46.02	4.66	Q-Peak	237	100	Vertical	Z
256.759	36.39	46.02	9.63	Q-Peak	262	100	Horizontal	Y
257.917	40.48	46.02	5.54	Q-Peak	187	108	Horizontal	X
331.328	37.50	46.02	8.52	Q-Peak	249	100	Horizontal	Y
332.711	39.28	46.02	6.74	Q-Peak	209	145	Vertical	Y
611.496	36.77	46.02	9.25	Q-Peak	40	110	Horizontal	Z
611.513	36.51	46.02	9.51	Q-Peak	147	100	Vertical	Z
611.535	38.17	46.02	7.85	Q-Peak	196	113	Horizontal	Y
611.537	38.86	46.02	7.16	Q-Peak	169	100	Vertical	X

Table 79 - 2437 MHz, 30 MHz to 1 GHz

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

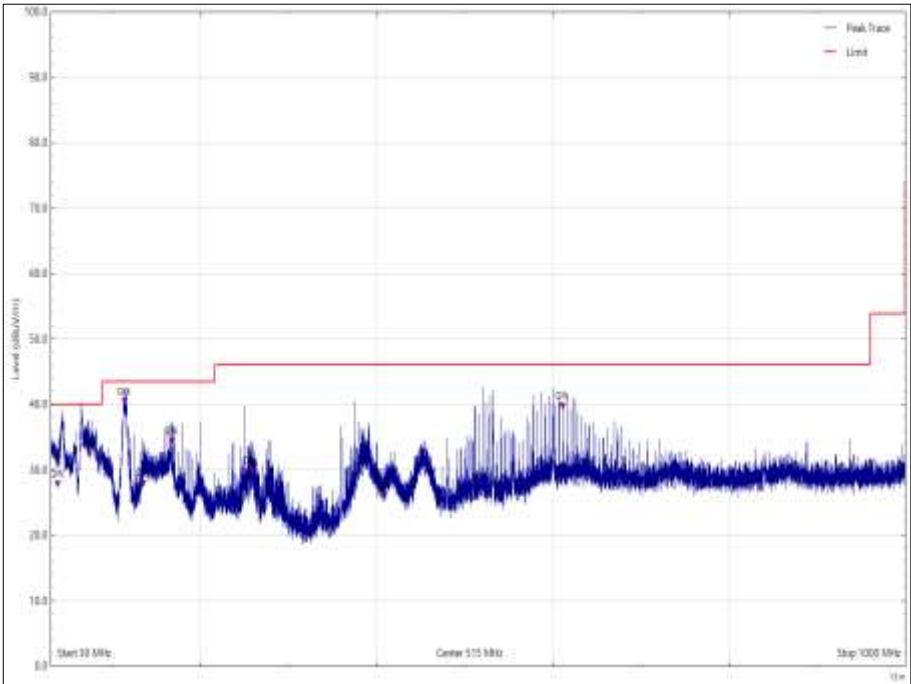


Figure 216 - 2437 MHz, 30 MHz to 1 GHz, Vertical, X Orientation

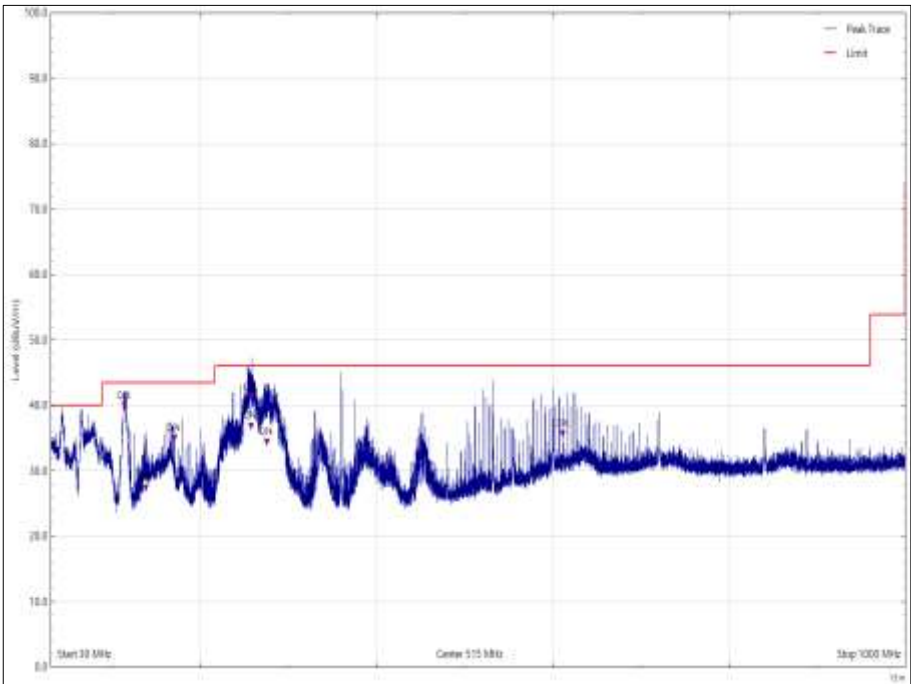


Figure 217 - 2437 MHz, 30 MHz to 1 GHz, Horizontal, X Orientation

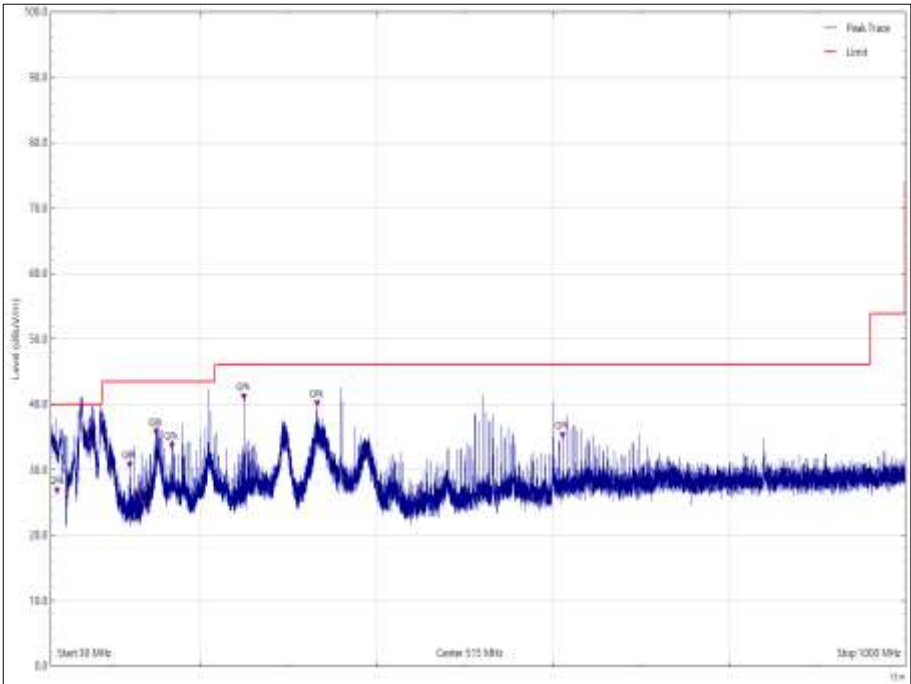


Figure 218 - 2437 MHz, 30 MHz to 1 GHz, Vertical, Y Orientation

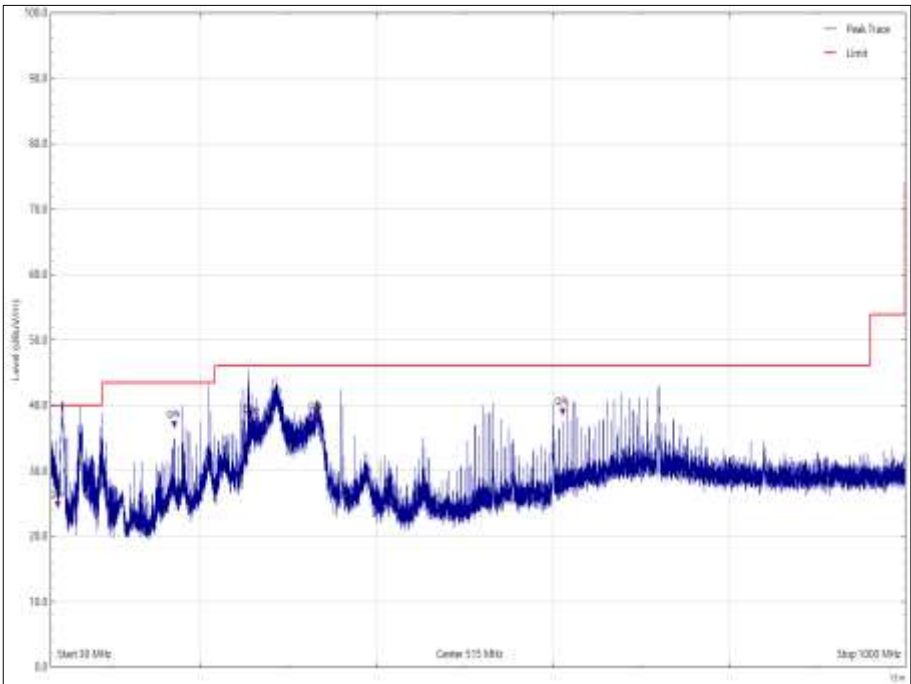


Figure 219 - 2437 MHz, 30 MHz to 1 GHz, Horizontal, Y Orientation

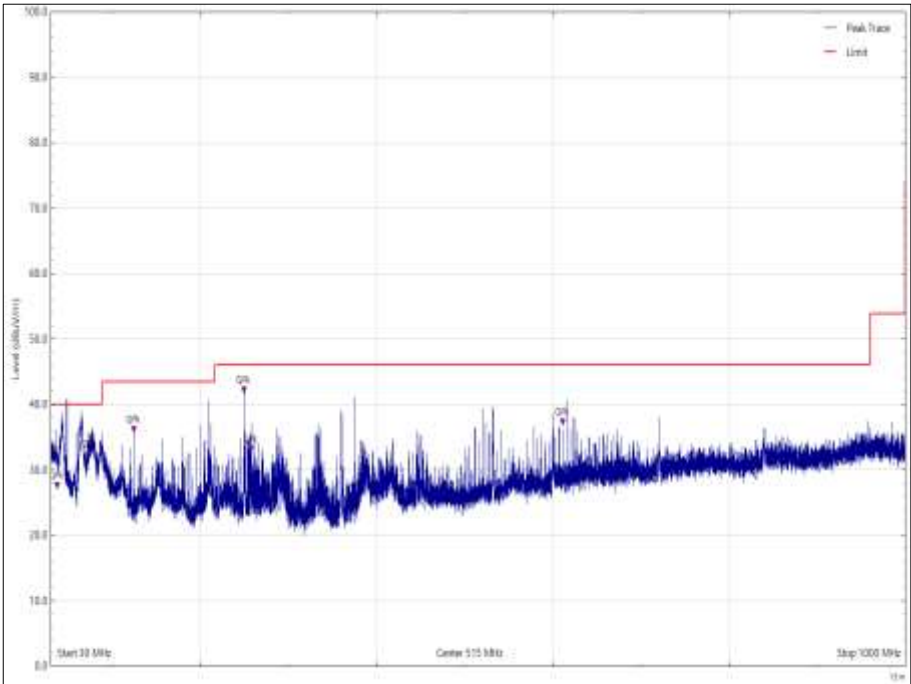


Figure 220 - 2437 MHz, 30 MHz to 1 GHz, Vertical, Z Orientation

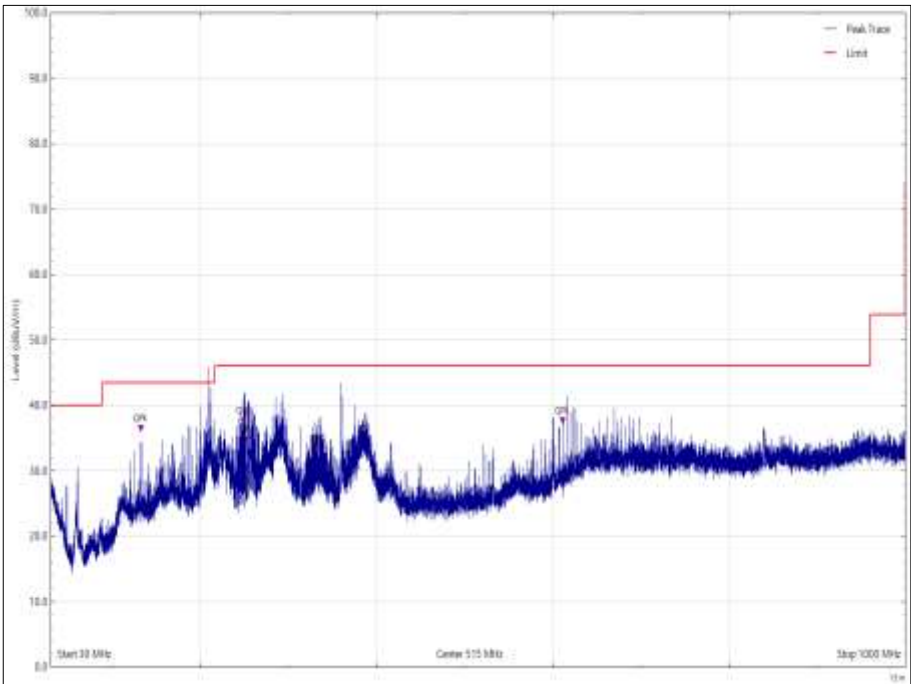


Figure 221 - 2437 MHz, 30 MHz to 1 GHz, Horizontal, Z Orientation



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

Table 80 - 2437 MHz - 1 GHz to 25 GHz

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

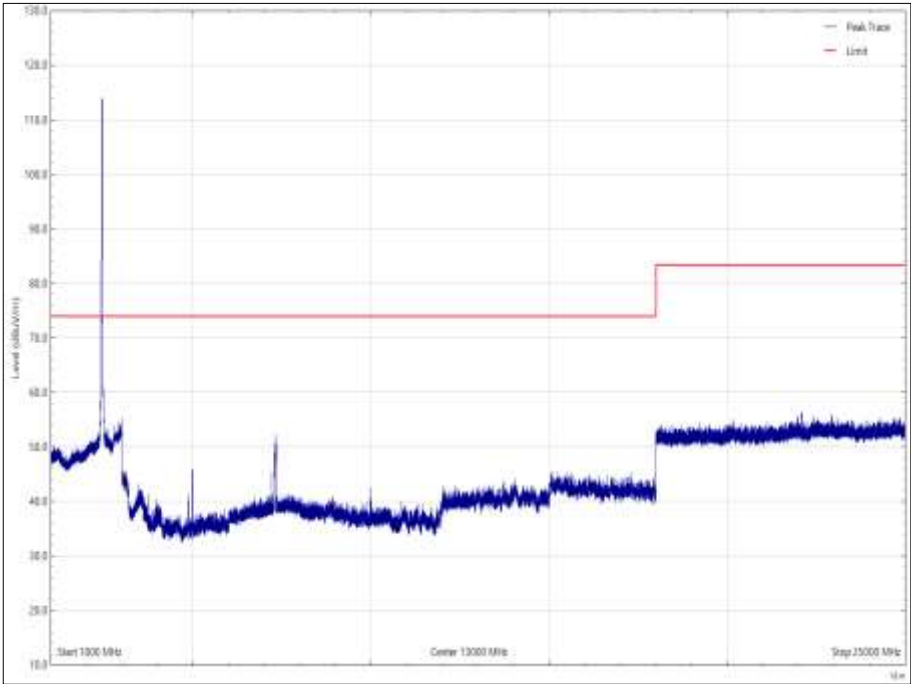


Figure 222 - 2437 MHz - 1 GHz to 25 GHz, Vertical, X Orientation - Peak

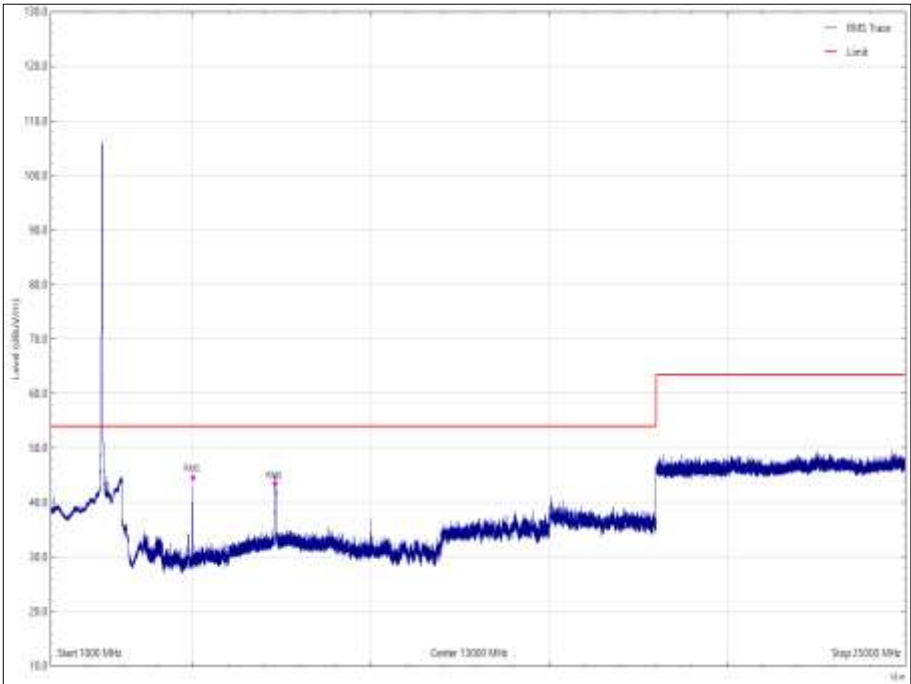


Figure 223 - 2437 MHz - 1 GHz to 25 GHz, Vertical, X Orientation - Average

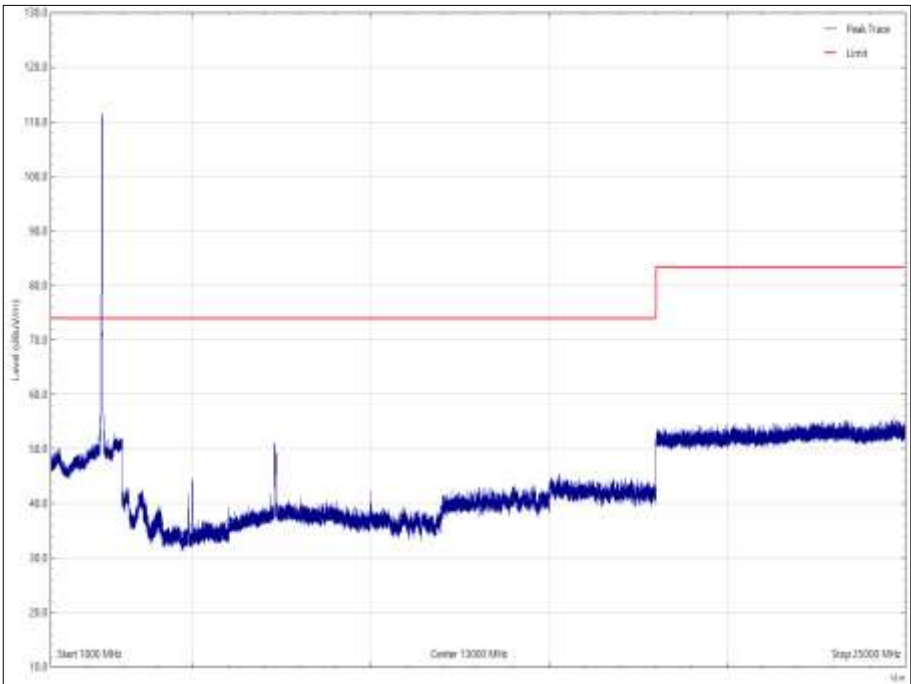


Figure 224 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, X Orientation - Peak

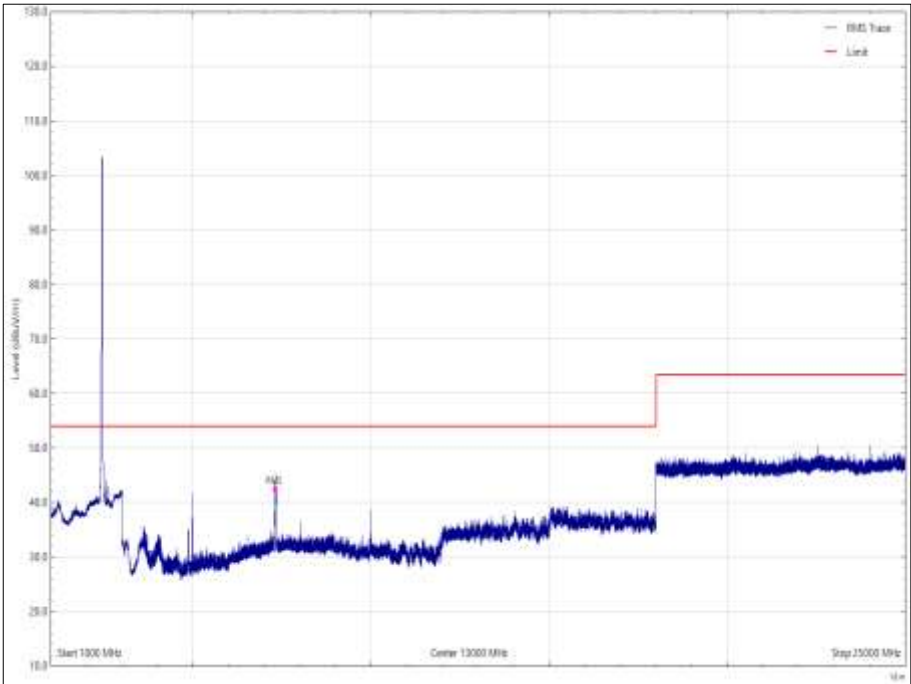


Figure 225 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, X Orientation - Average

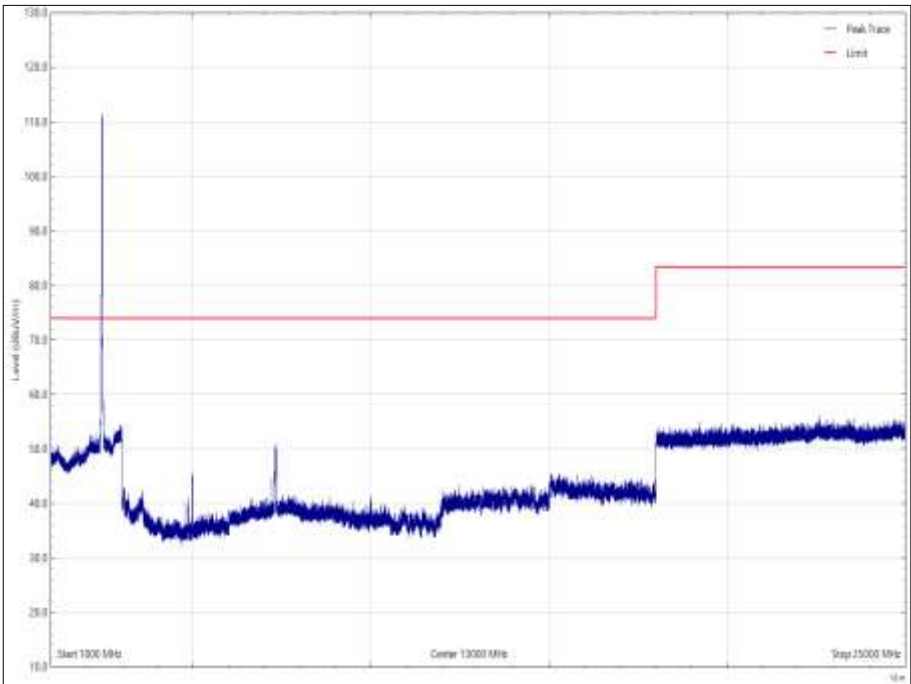


Figure 226 - 2437 MHz - 1 GHz to 25 GHz, Vertical, Y Orientation - Peak

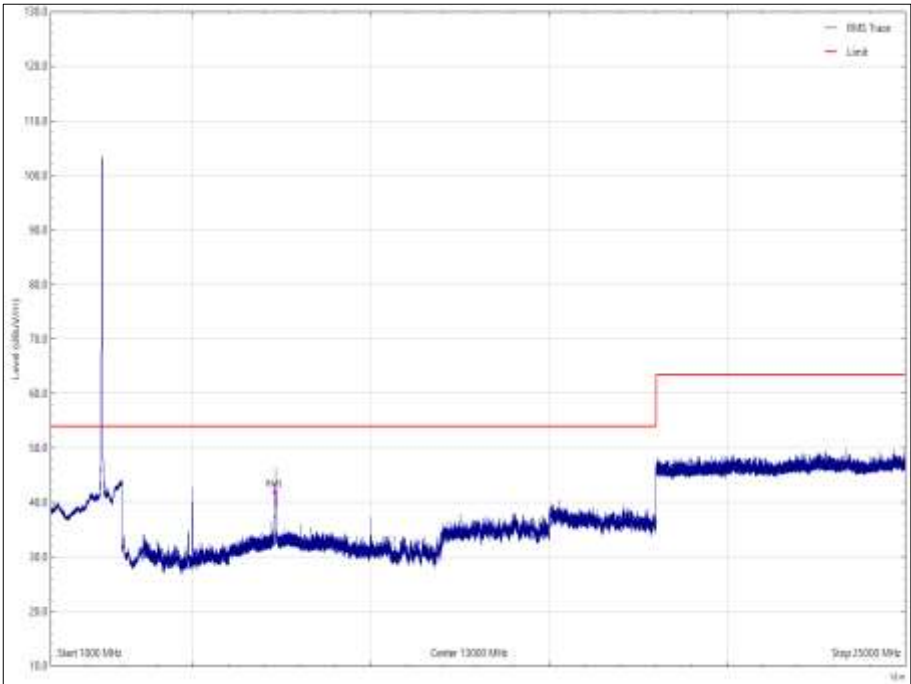


Figure 227 - 2437 MHz - 1 GHz to 25 GHz, Vertical, Y Orientation - Average

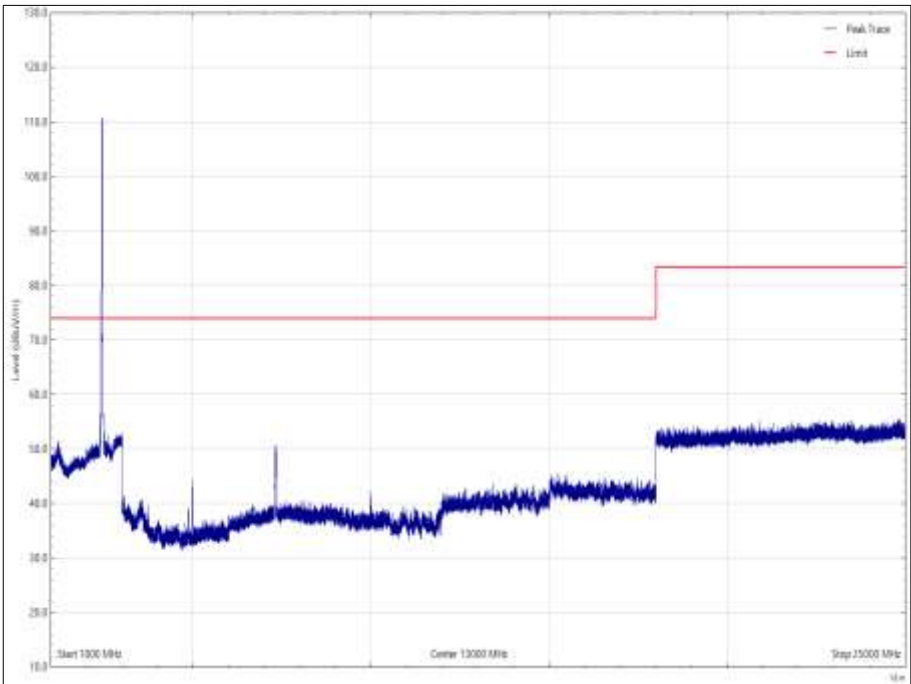


Figure 228 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, Y Orientation - Peak

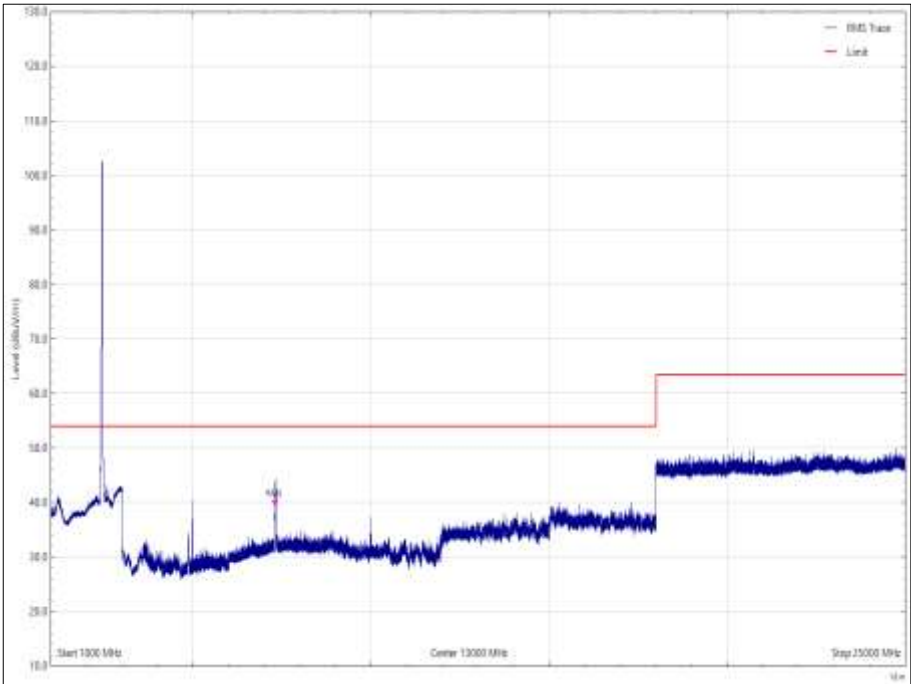


Figure 229 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, Y Orientation - Average

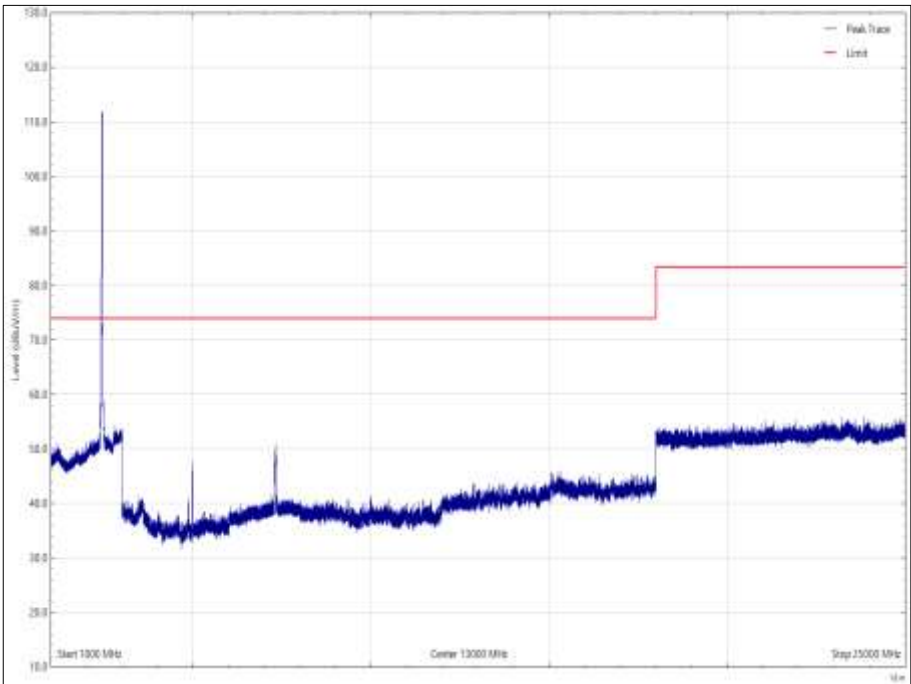


Figure 230 - 2437 MHz - 1 GHz to 25 GHz, Vertical, Z Orientation - Peak

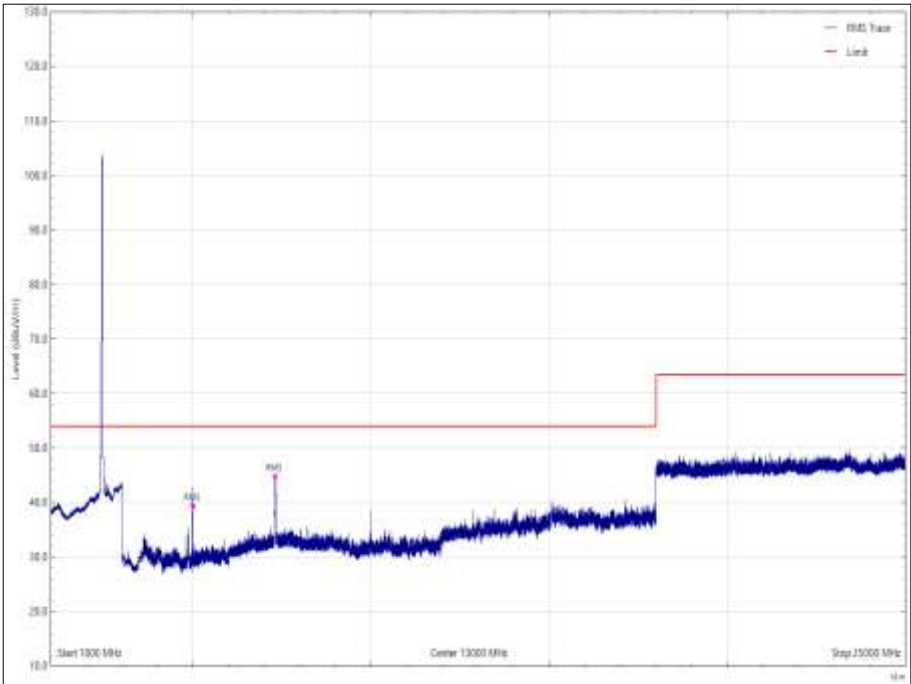


Figure 231 - 2437 MHz - 1 GHz to 25 GHz, Vertical, Z Orientation - Average

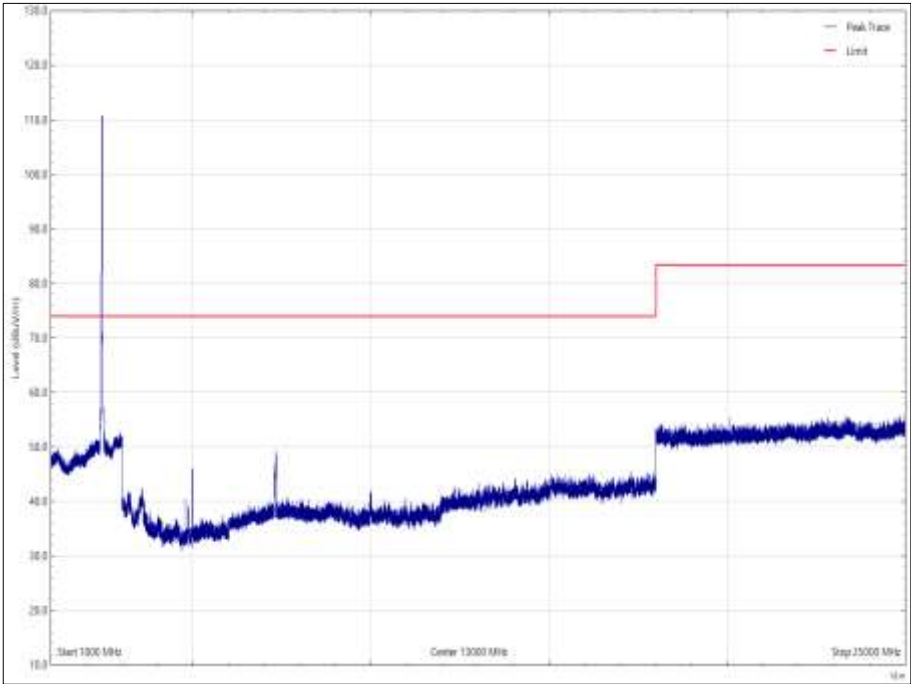


Figure 232 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, Z Orientation - Peak

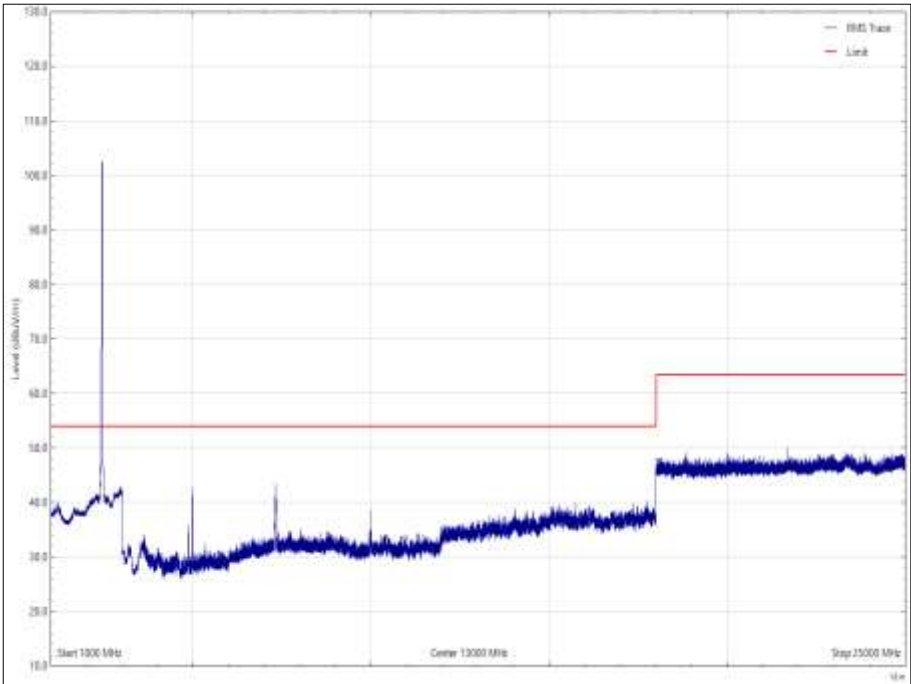


Figure 233 - 2437 MHz - 1 GHz to 25 GHz, Horizontal, Z Orientation - Average

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
73.781	31.27	40.00	8.73	Q-Peak	198	100	Vertical	X
74.608	31.95	40.00	8.05	Q-Peak	91	153	Vertical	Y
74.773	31.44	40.00	8.56	Q-Peak	117	122	Vertical	Z
114.819	40.29	43.52	3.23	Q-Peak	50	278	Horizontal	X
124.986	35.05	43.52	8.47	Q-Peak	210	101	Vertical	Z
132.760	36.32	43.52	7.20	Q-Peak	211	174	Horizontal	Z
167.986	35.43	43.52	8.09	Q-Peak	0	100	Vertical	X
249.979	37.56	46.02	8.46	Q-Peak	232	110	Vertical	X
249.996	40.72	46.02	5.30	Q-Peak	248	100	Vertical	Y
249.996	42.14	46.02	3.88	Q-Peak	247	100	Vertical	Z
256.662	36.99	46.02	9.03	Q-Peak	277	100	Horizontal	Y
284.368	40.08	46.02	5.94	Q-Peak	241	109	Horizontal	Y
332.794	39.65	46.02	6.37	Q-Peak	221	165	Vertical	Y
611.510	39.13	46.02	6.89	Q-Peak	175	101	Vertical	X
611.526	41.46	46.02	4.56	Q-Peak	217	138	Vertical	Y
611.537	36.11	46.02	9.91	Q-Peak	20	106	Vertical	Z

Table 81 - 2462 MHz, 30 MHz to 1 GHz

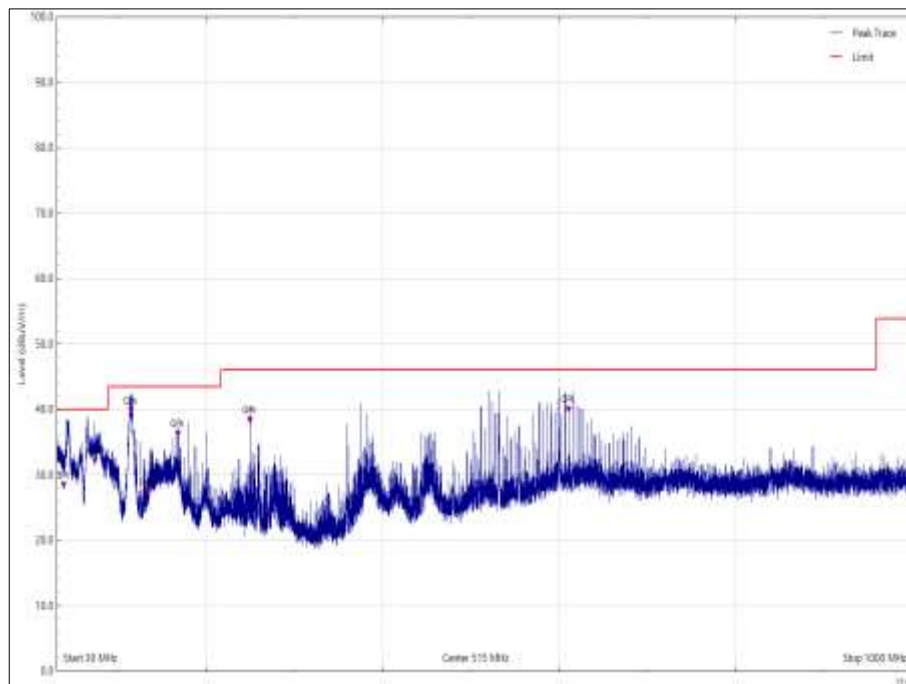


Figure 234 - 2462 MHz, 30 MHz to 1 GHz, Vertical, X Orientation

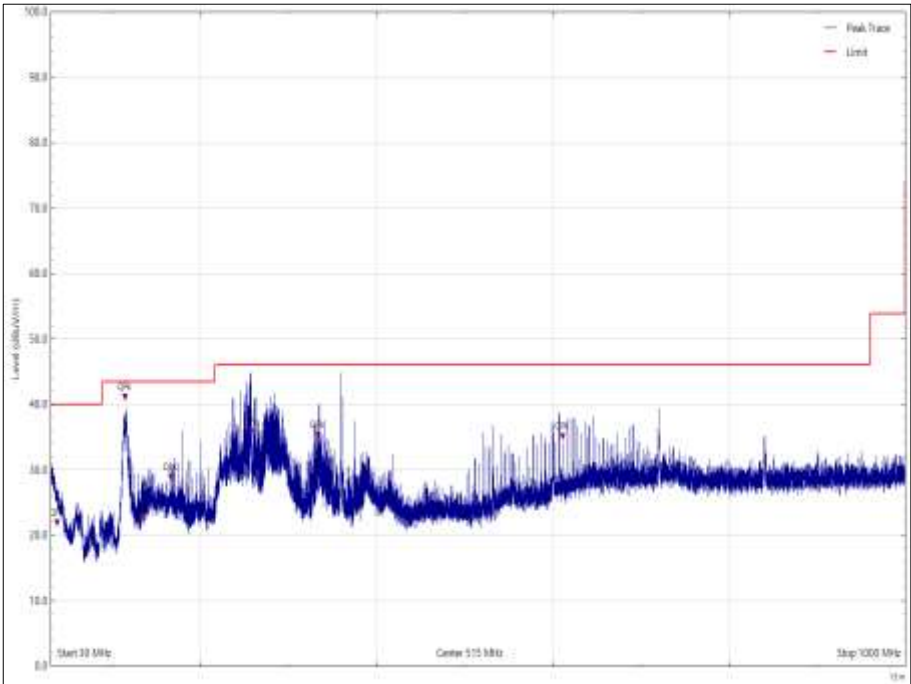


Figure 235 - 2462 MHz, 30 MHz to 1 GHz, Horizontal, X Orientation

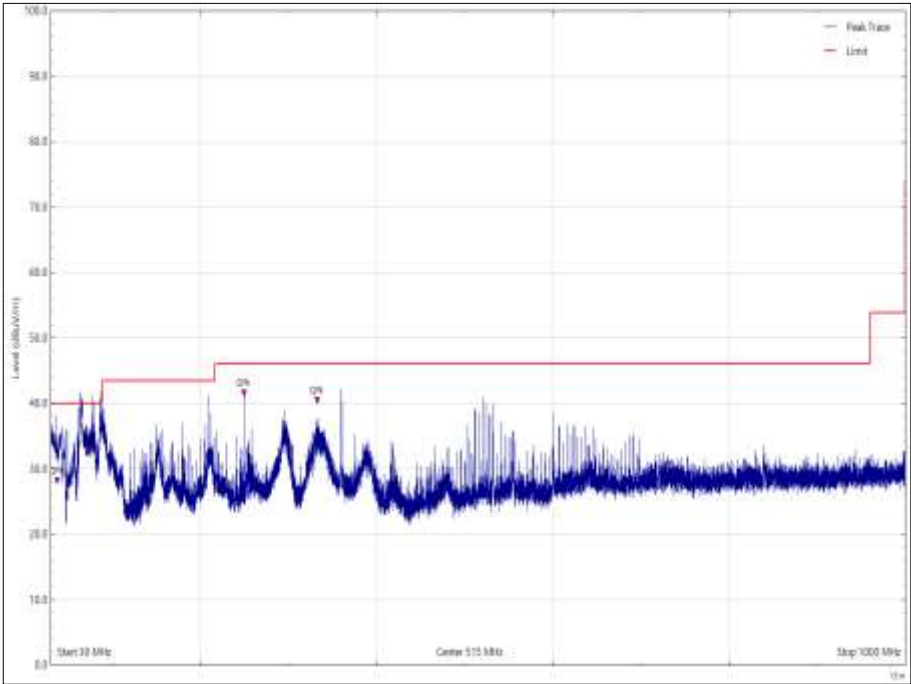


Figure 236 - 2462 MHz, 30 MHz to 1 GHz, Vertical, Y Orientation

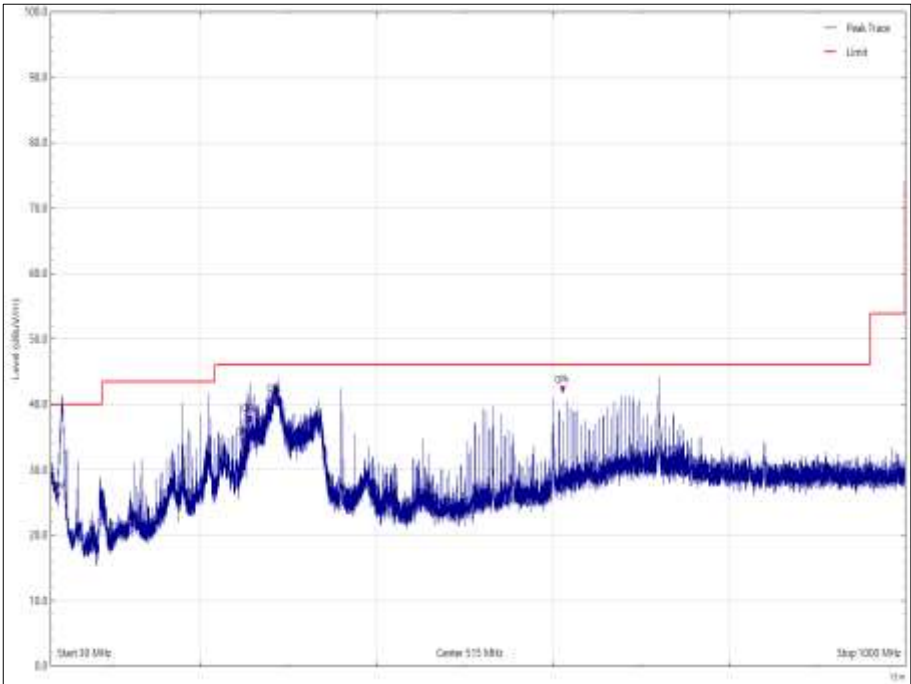


Figure 237 - 2462 MHz, 30 MHz to 1 GHz, Horizontal, Y Orientation

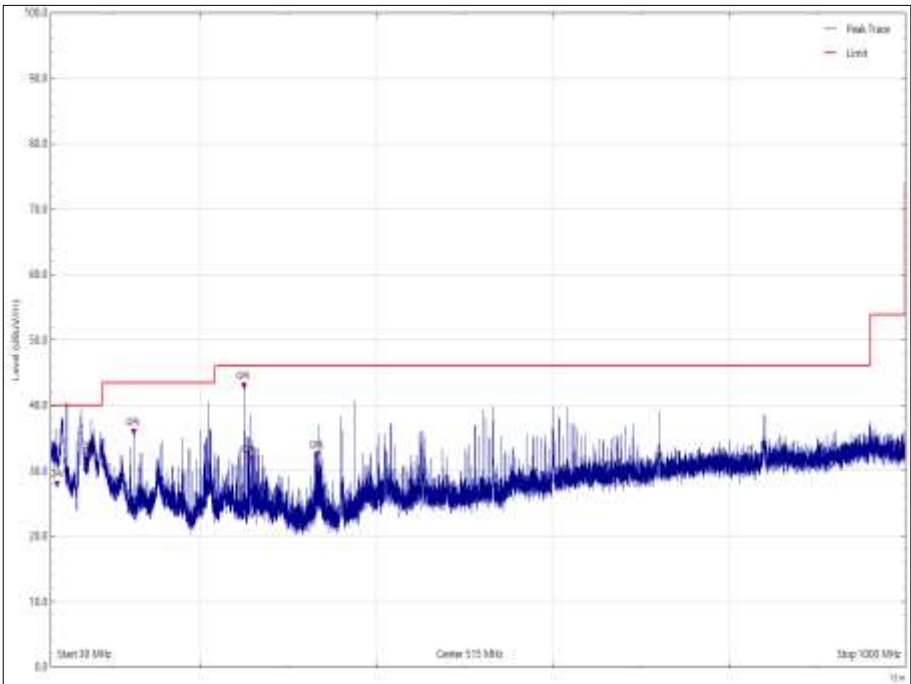


Figure 238 - 2462 MHz, 30 MHz to 1 GHz, Vertical, Z Orientation

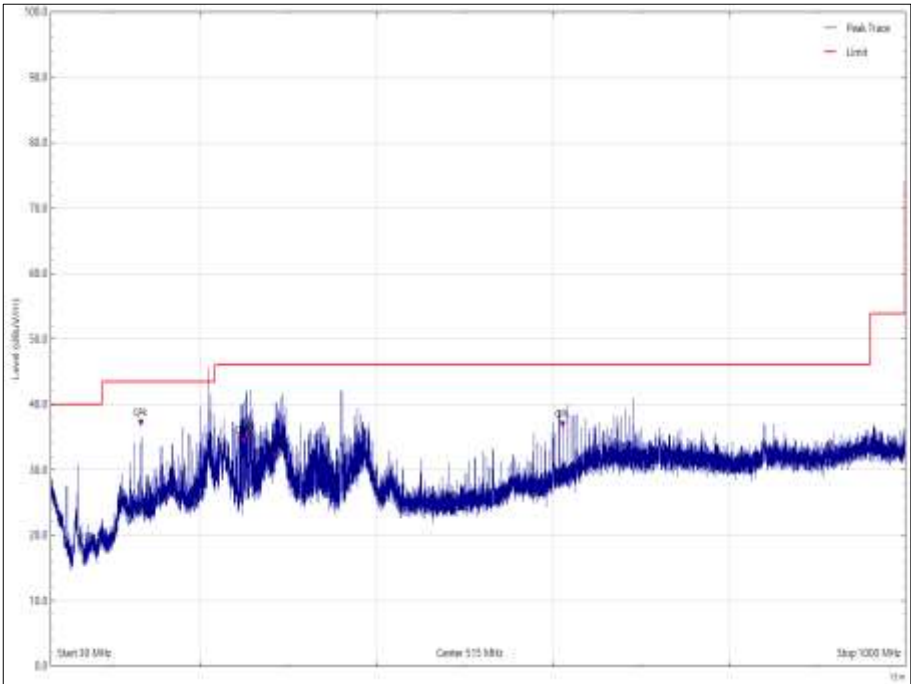


Figure 239 - 2462 MHz, 30 MHz to 1 GHz, Horizontal, Z Orientation



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

Table 82 - 2462 MHz - 1 GHz to 25 GHz

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

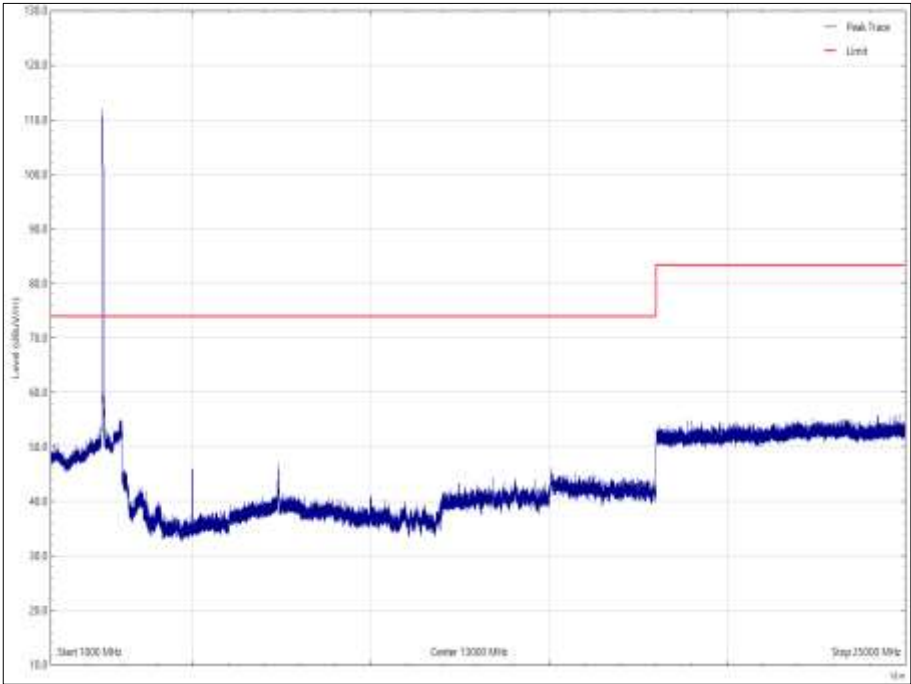


Figure 240 - 2462 MHz - 1 GHz to 25 GHz, Vertical, X Orientation - Peak

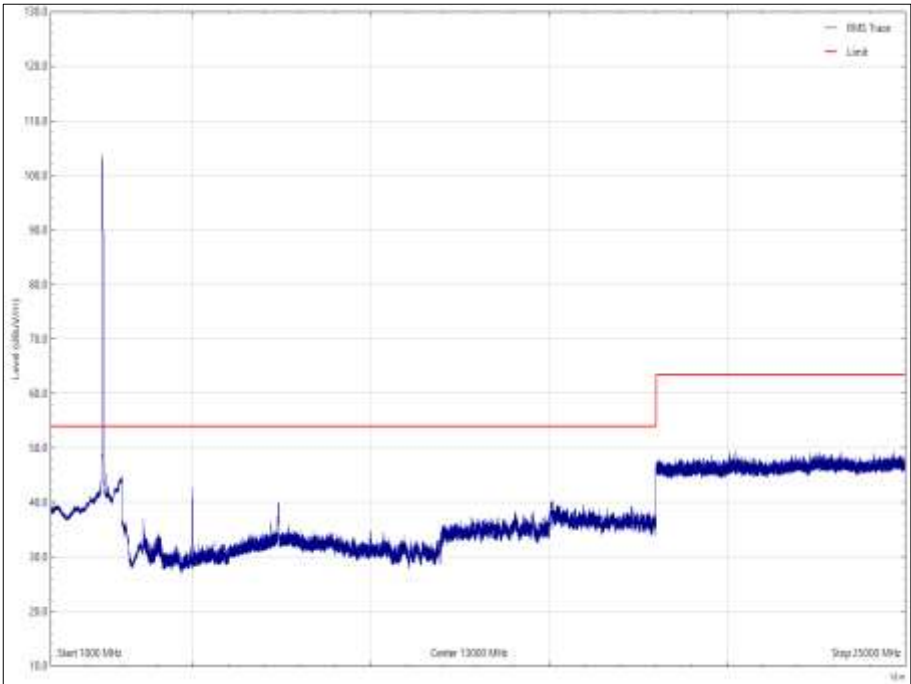


Figure 241 - 2462 MHz - 1 GHz to 25 GHz, Vertical, X Orientation - Average

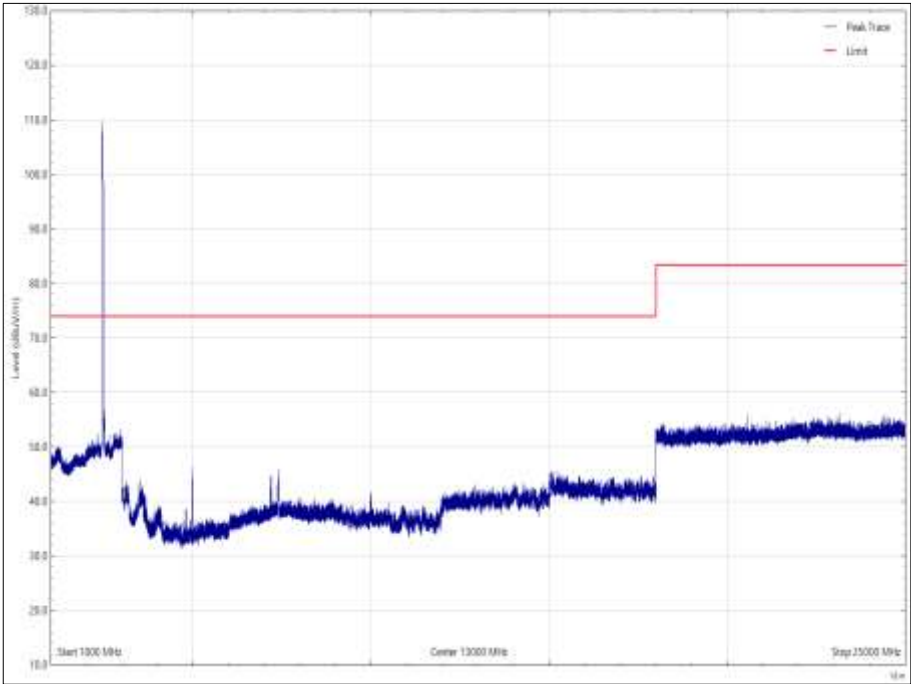


Figure 242 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, X Orientation - Peak

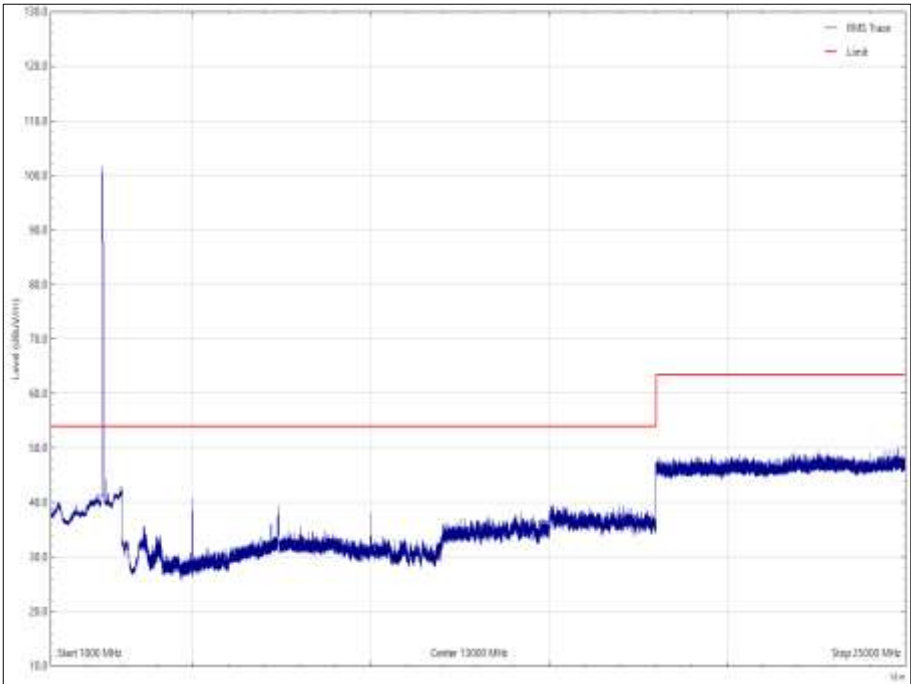


Figure 243 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, X Orientation - Average

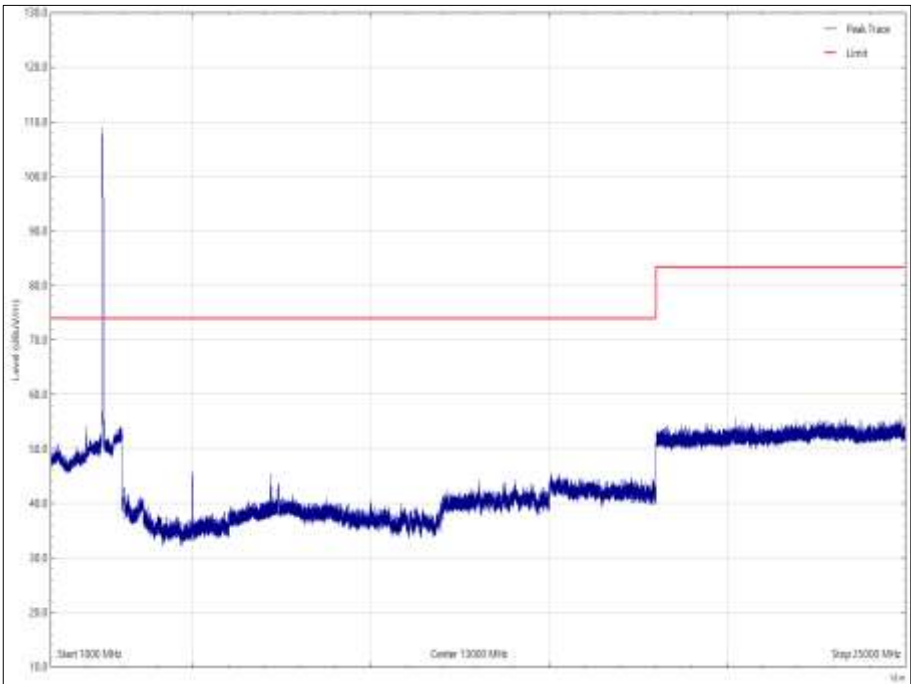


Figure 244 - 2462 MHz - 1 GHz to 25 GHz, Vertical, Y Orientation - Peak

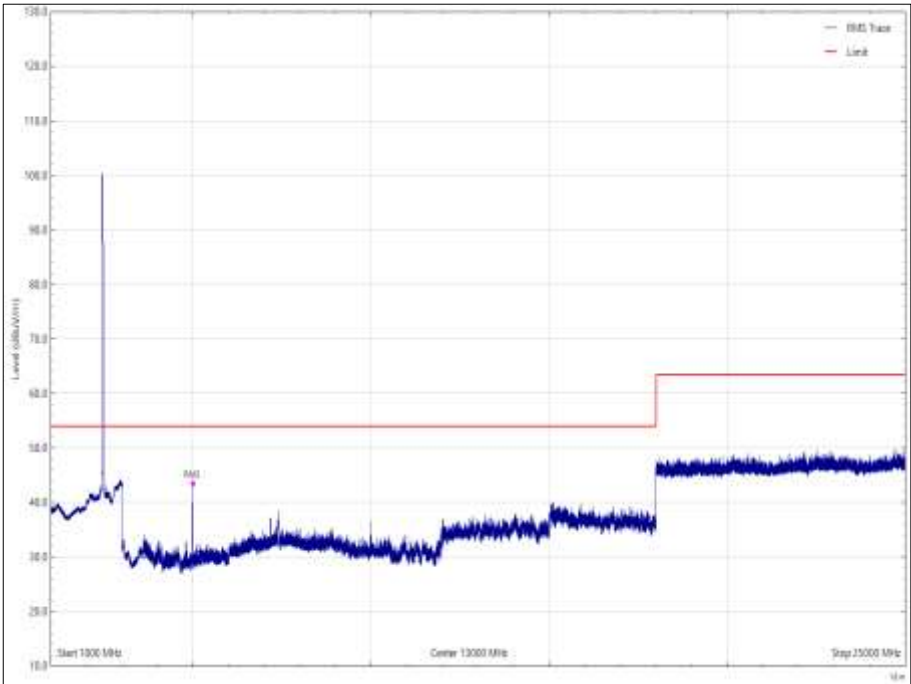


Figure 245 - 2462 MHz - 1 GHz to 25 GHz, Vertical, Y Orientation - Average

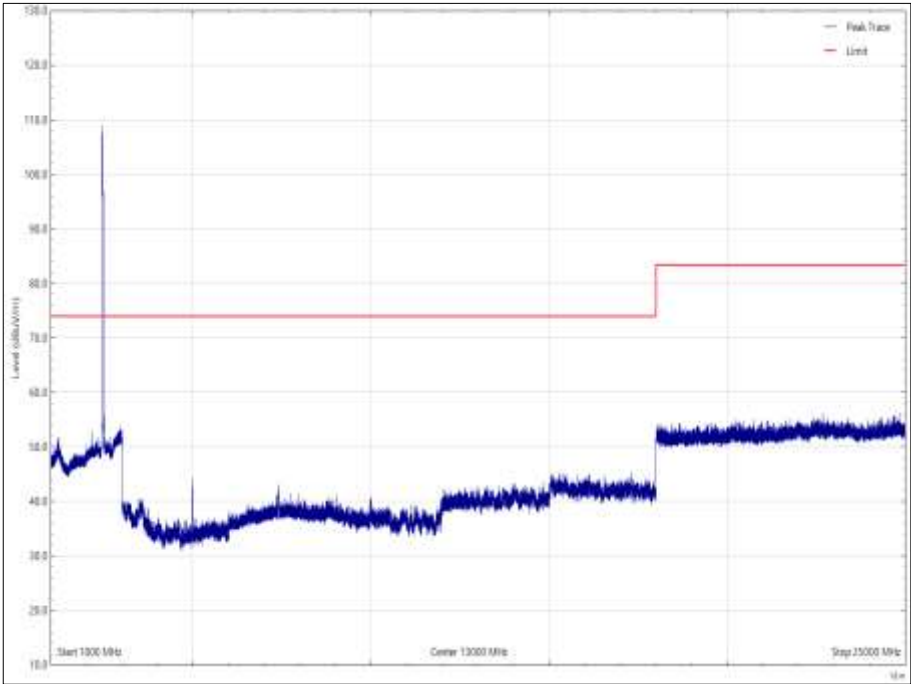


Figure 246 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, Y Orientation - Peak

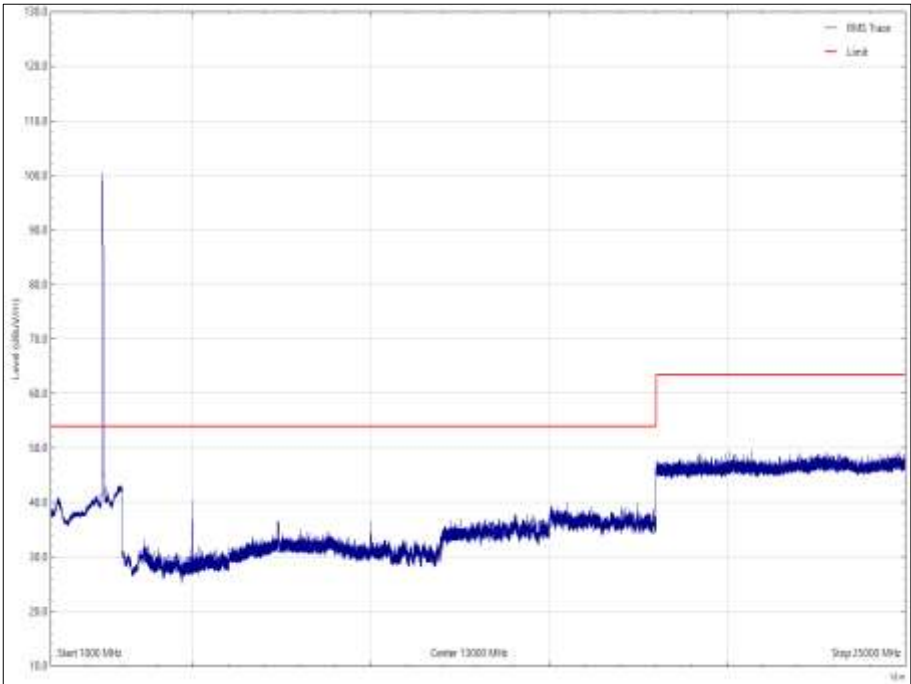


Figure 247 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, Y Orientation - Average

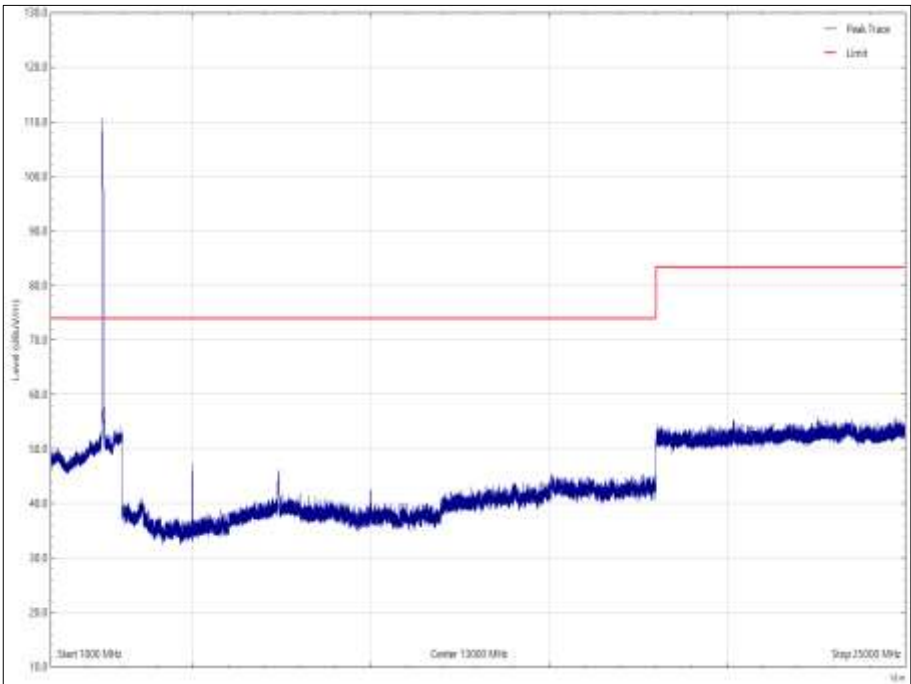


Figure 248 - 2462 MHz - 1 GHz to 25 GHz, Vertical, Z Orientation - Peak

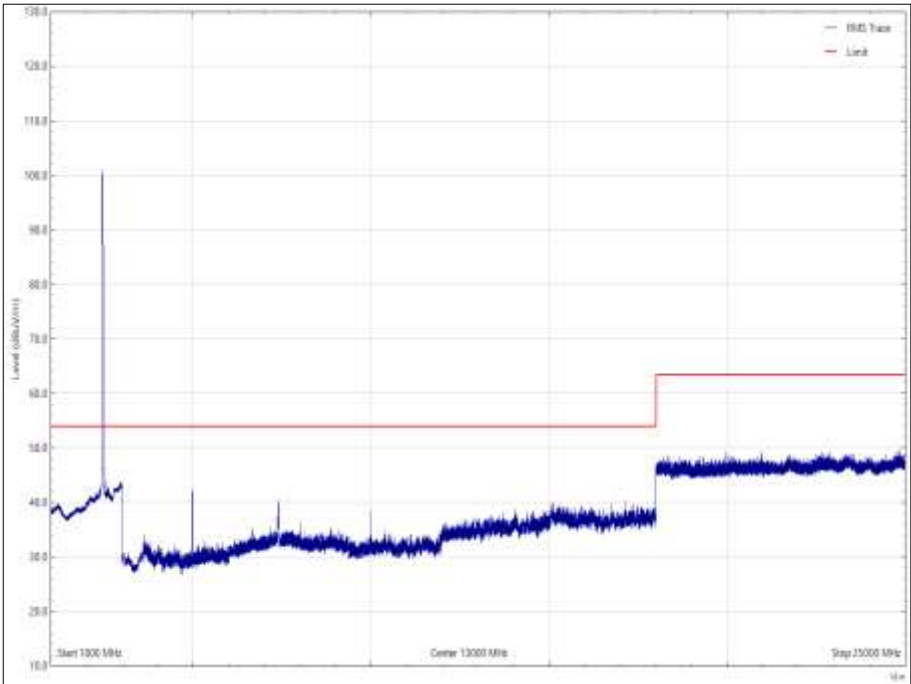


Figure 249 - 2462 MHz - 1 GHz to 25 GHz, Vertical, Z Orientation - Average

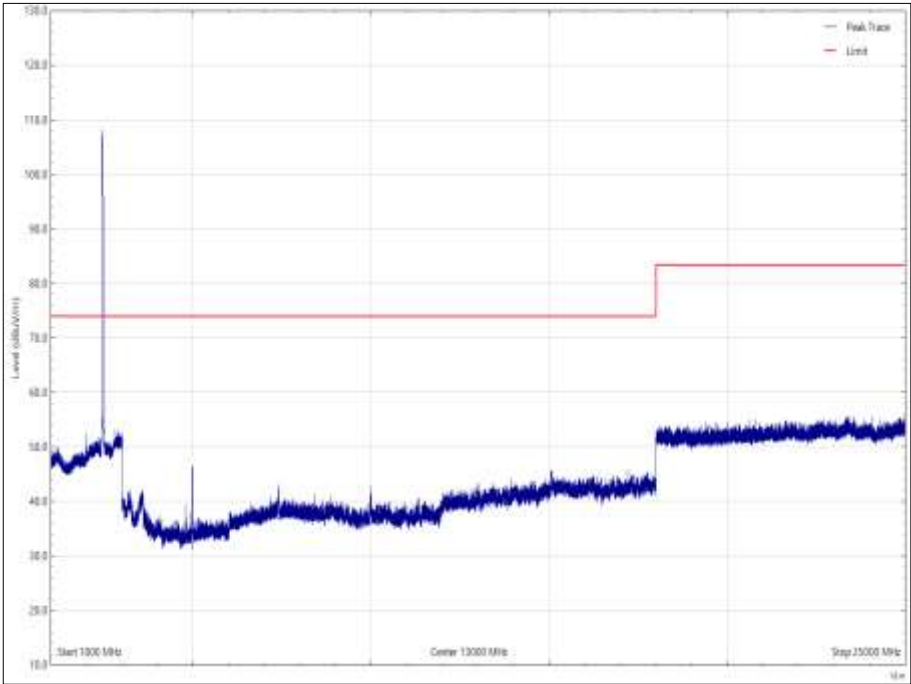


Figure 250 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, Z Orientation - Peak

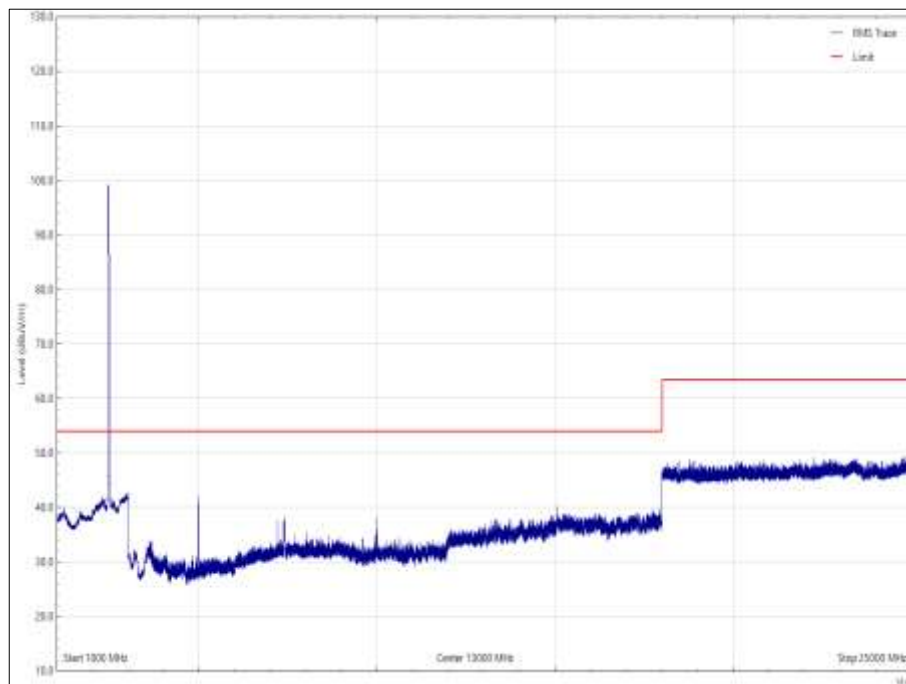


Figure 251 - 2462 MHz - 1 GHz to 25 GHz, Horizontal, Z Orientation - Average

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.



2.4.8 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
Antenna 18-40GHz (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	27-Jul-2022
Antenna with permanent attenuator (Bilog)	Schaffner	CBL6143	287	24	14-Oct-2022
Pre-Amplifier, (8 GHz to 18 GHz)	Phase One	PS04-0086	1533	12	05-Feb-2022
18GHz - 40GHz Pre-Amplifier	Phase One	PS04-0087	1534	12	02-Aug-2022
Comb Generator	Schaffner	RSG1000	3034	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	18-Mar-2022
Cable 1503 2M 2.92(P)m 2.92(P)m	Rhophase	KPS-1503A-2000-KPS	4293	12	16-Nov-2021
Cable (18 GHz)	Rosenberger	LU7-036-1000	5031	12	23-Jul-2022
EmX Emissions Software	TUV SUD	V2.1.11	5125	-	Software
Preamplifier (30dB 1GHz to 18GHz)	Schwarzbeck	BBV 9718 C	5350	12	21-Sep-2021
Preamplifier (30dB 1GHz to 18GHz)	Schwarzbeck	BBV 9718 C	5350	12	22-Sep-2022
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5428	12	15-Oct-2021
8 Meter Cable	Teledyne	PR90-088-8MTR	5450	6	08-Mar-2022
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	31-Mar-2022
1m K-Type Cable	Junkosha	MWX241-01000KMSKMS/A	5511	12	09-Apr-2022
3 GHz High pass Filter	Wainwright	WHKX12-2580-3000-18000-80SS	5548	12	07-May-2022
DRG Horn Antenna (7.5-18GHz)	Schwarzbeck	HWRD750	5610	12	22-Sep-2021
Broadband Horn Antenna (1-10 GHz)	Schwarzbeck	BBHA 9120 B	5611	12	22-Sep-2021
Turntable & Mast Controller	Maturo Gmbh	NCD/498/2799.01	5612	-	TU
Tilt Antenna Mast TAM 4.0-P	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
CBL 6111D 30-1000MHz Bi-Log Antenna	Teseq	CBL6111D	5615	24	16-Oct-2022
3m Semi Anechoic Chamber	MVG	EMC-3	5621	36	11-Aug-2023

Table 83

TU - Traceability Unscheduled



2.5 Authorised Band Edges

2.5.1 Specification Reference

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

2.5.2 Equipment Under Test and Modification State

Atom Hard Hat, S/N: Not serialised (Storix-ID 599374-18) - Modification State 0

2.5.3 Date of Test

08-September-2021

2.5.4 Test Method

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

2.5.5 Environmental Conditions

Ambient Temperature	21.1 °C
Relative Humidity	56.3 %



2.5.6 Test Results

802.11b - 2.4 GHz WLAN

Mode	Data Rate/MCS	Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
802.11b (2Tx)	1 Mbps	2412	2400	-47.22
802.11b (2Tx)	1 Mbps	2462	2483.5	-56.75

Table 84

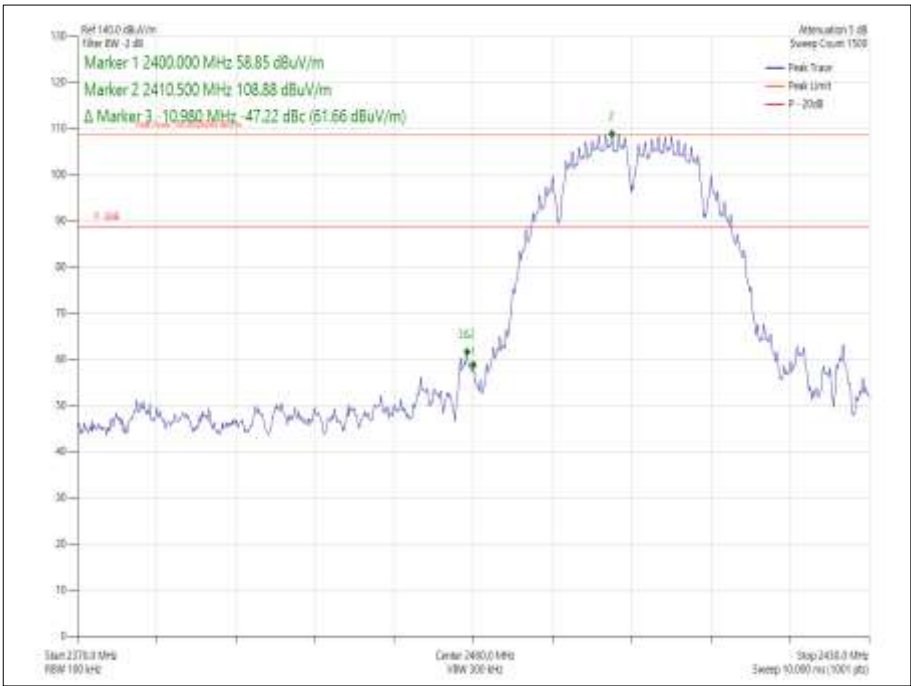
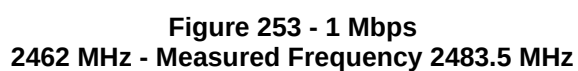


Figure 252 - 1 Mbps
2412 MHz - Measured Frequency 2400 MHz





802.11g - 2.4 GHz WLAN

Mode	Data Rate/MCS	Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
802.11g (2Tx)	6 Mbps	2412	2400	-31.12
802.11g (2Tx)	6 Mbps	2462	2483.5	-53.42

Table 85

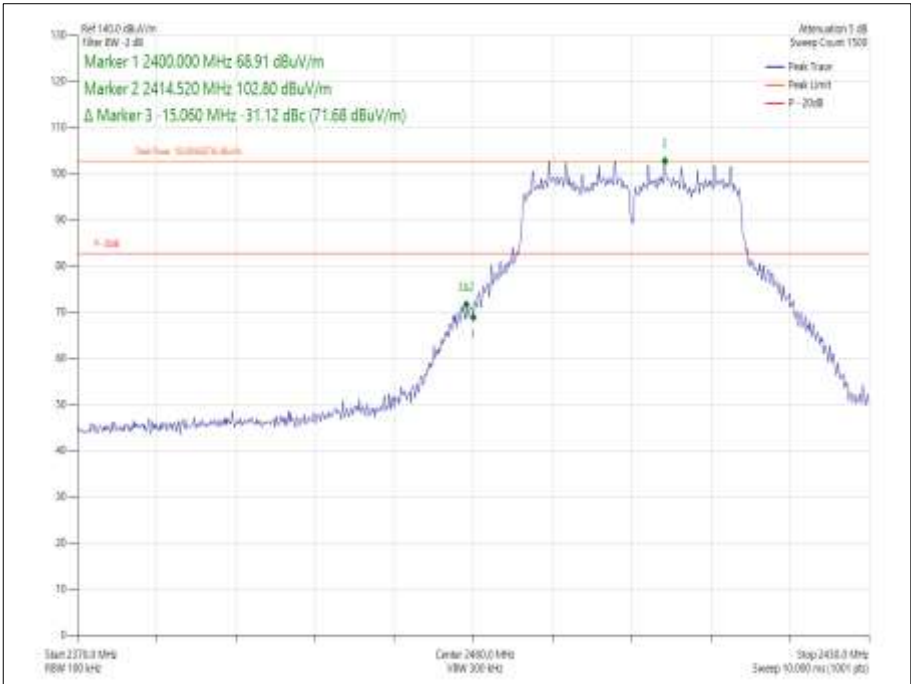


Figure 254 - 6 Mbps
2412 MHz - Measured Frequency 2400 MHz

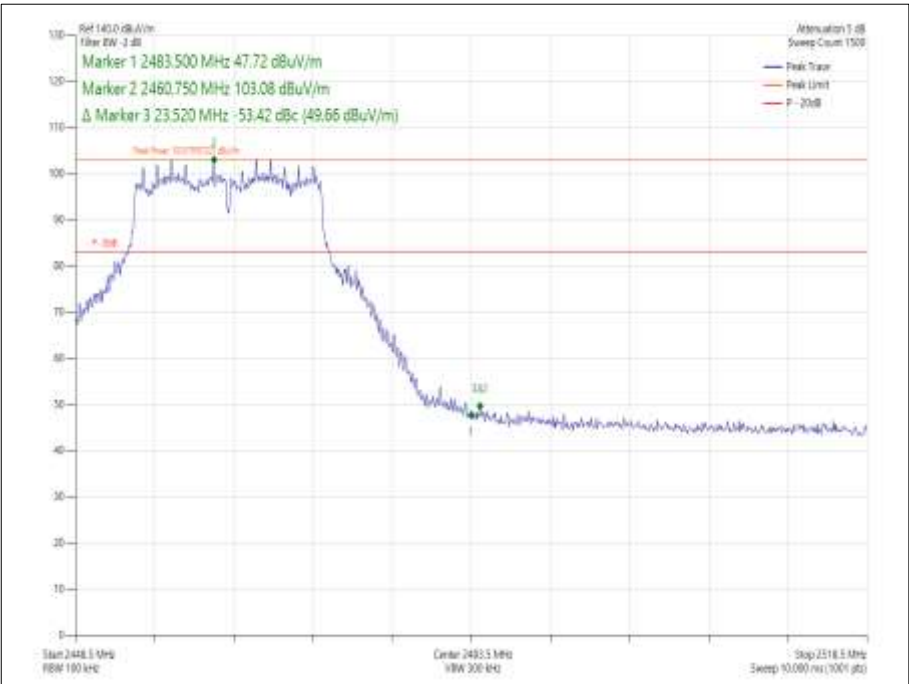


Figure 255 - 6 Mbps
2462 MHz - Measured Frequency 2483.5 MHz



802.11n (20 MHz Bandwidth) - 2.4 GHz WLAN

Mode	Data Rate/MCS	Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
HT20 (2Tx MIMO)	MCS0	2412	2400	-29.72
HT20 (2Tx MIMO)	MCS0	2462	2483.5	-53.37

Table 86

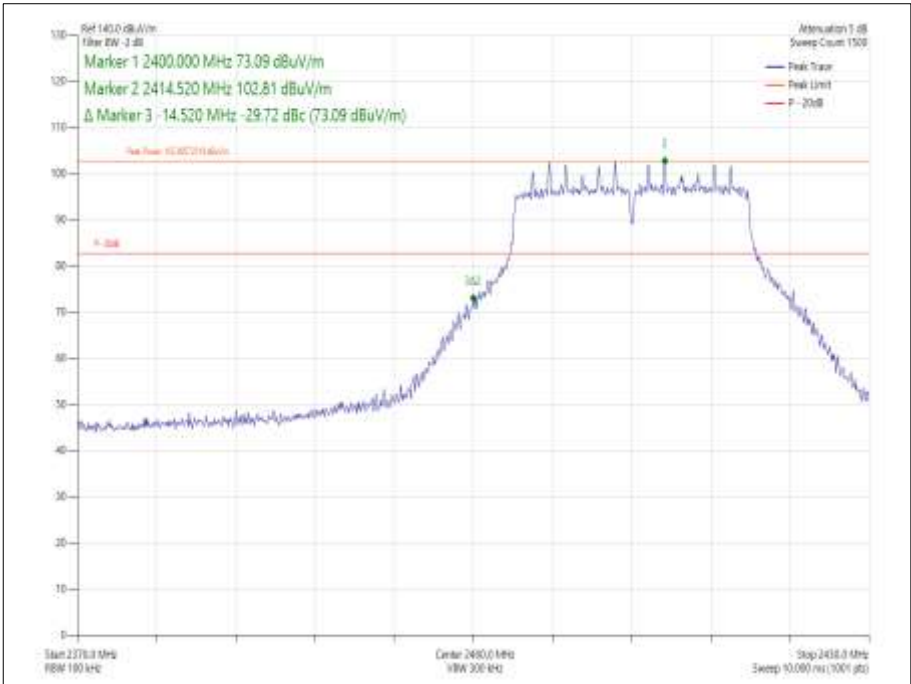


Figure 256 - MCS0
2412 MHz - Measured Frequency 2400 MHz

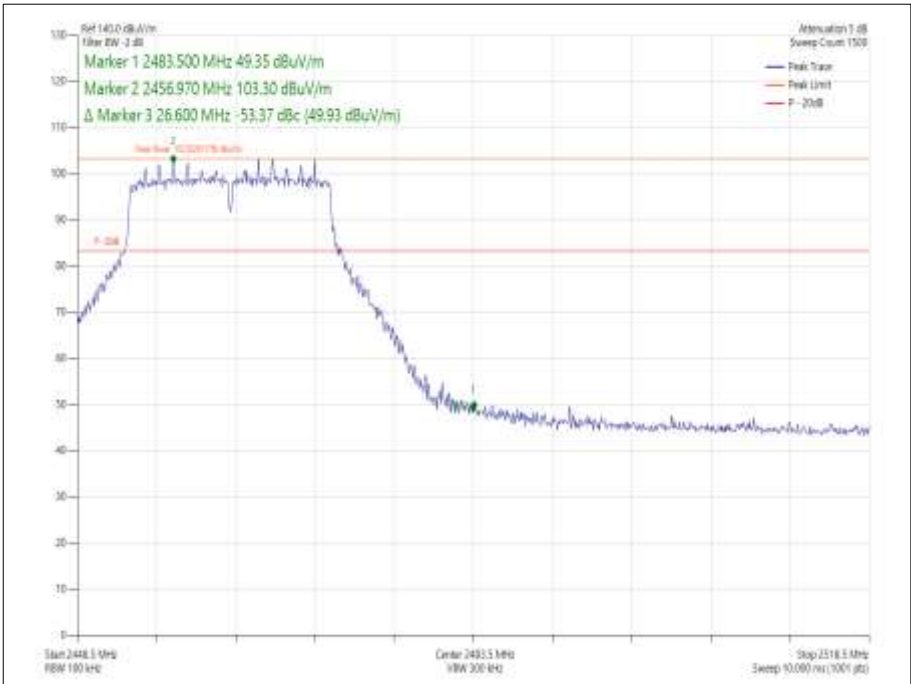


Figure 257 - MCS0
2462 MHz - Measured Frequency 2483.5 MHz



802.11n (40 MHz Bandwidth) - 2.4 GHz WLAN

Mode	Data Rate/MCS	Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
HT40 (2Tx MIMO)	MCS0	2422	2400	-29.04
HT40 (2Tx MIMO)	MCS0	2452	2483.5	-46.07

Table 87

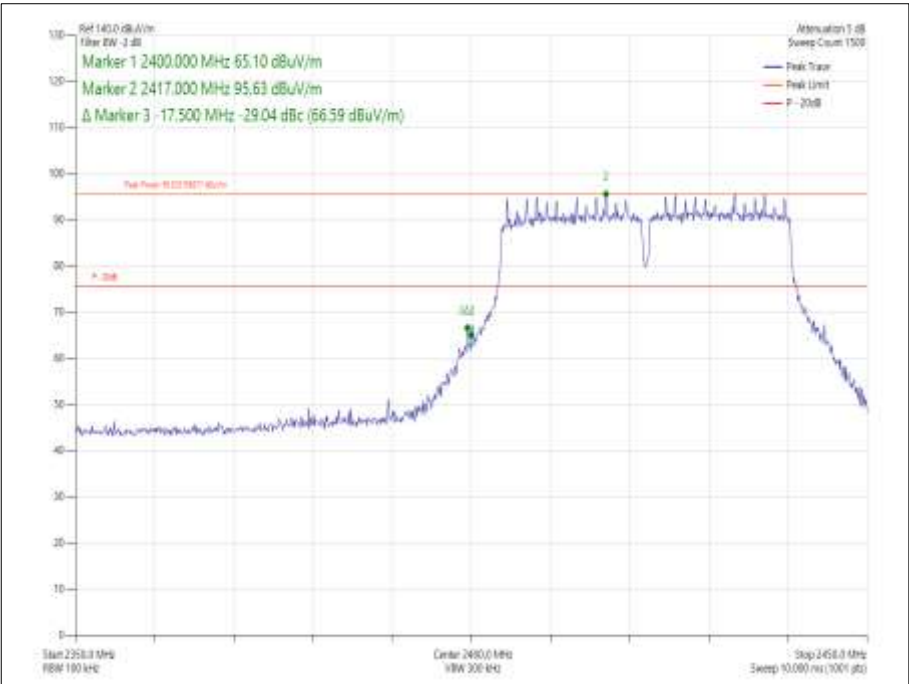


Figure 258 - MCS0
2422 MHz - Measured Frequency 2400 MHz



Figure 259 - MCS0
2452 MHz - 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.



2.5.7 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
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	18-Mar-2022
EmX Emissions Software	TUV SUD	V2.1.11	5125	-	Software
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5428	12	15-Oct-2021
8 Meter Cable	Teledyne	PR90-088-8MTR	5450	6	08-Mar-2022
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	31-Mar-2022
Broadband Horn Antenna (1-10 GHz)	Schwarzbeck	BBHA 9120 B	5611	12	22-Sep-2021
Turntable & Mast Controller	Maturo Gmbh	NCD/498/2799.01	5612	-	TU
Tilt Antenna Mast TAM 4.0-P	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
3m Semi Anechoic Chamber	MVG	EMC-3	5621	36	11-Aug-2023

Table 88

TU - Traceability Unscheduled



2.6 Power Spectral Density

2.6.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (e)
ISED RSS-247, Clause 5.2
ISED RSS-GEN, Clause 6.12

2.6.2 Equipment Under Test and Modification State

Atom Hard Hat, S/N: Not serialised (Storix-ID 599374-99) - Modification State 0

2.6.3 Date of Test

20-October-2021

2.6.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.10.2.

2.6.5 Environmental Conditions

Ambient Temperature	20.8 °C
Relative Humidity	71.0 %



2.6.6 Test Results

802.11b - 2.4 GHz WLAN

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11b	Duty Cycle (%):	96.5
Data Rate:	1 Mbps	DCCF (dB):	0.15
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (A)	Active Chain(s):	0

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2412	3.0	-3.71	-	-	-	-	8.00	-11.71
2442	3.0	-2.63	-	-	-	-	8.00	-10.63
2472	3.0	-8.47	-	-	-	-	8.00	-16.47

Table 89 - Maximum Power Spectral Density Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11b	Duty Cycle (%):	96.5
Data Rate:	1 Mbps	DCCF (dB):	0.15
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (B)	Active Chain(s):	1

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2412	3.0	-	-4.48	-	-	-	8.00	-12.48
2442	3.0	-	-2.82	-	-	-	8.00	-10.82
2472	3.0	-	-9.12	-	-	-	8.00	-17.12

Table 90 - Maximum Power Spectral Density Results



802.11g - 2.4 GHz WLAN

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11g	Duty Cycle (%):	97.4
Data Rate:	6 Mbps	DCCF (dB):	0.12
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (A)	Active Chain(s):	0

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2412	3.0	-9.43	-	-	-	-	8.00	-17.43
2442	3.0	-5.47	-	-	-	-	8.00	-13.47
2472	3.0	-27.68	-	-	-	-	8.00	-35.68

Table 91 - Maximum Power Spectral Density Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11g	Duty Cycle (%):	80.4
Data Rate:	6 Mbps	DCCF (dB):	0.95
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (B)	Active Chain(s):	1

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2412	3.0	-	-9.64	-	-	-	8.00	-17.64
2442	3.0	-	-5.08	-	-	-	8.00	-13.08
2472	3.0	-	-30.05	-	-	-	8.00	-38.05

Table 92 - Maximum Power Spectral Density Results



802.11n (20 MHz Bandwidth) - 2.4 GHz WLAN

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11n HT20	Duty Cycle (%):	79.4
Modulation Coding Scheme:	MCS0	DCCF (dB):	1.00
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (A)	Active Chain(s):	0

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2412	3.0	-10.15	-	-	-	-	8.00	-18.15
2442	3.0	-5.97	-	-	-	-	8.00	-13.97
2472	3.0	-29.26	-	-	-	-	8.00	-37.26

Table 93 - Maximum Power Spectral Density Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11n HT20	Duty Cycle (%):	79.4
Modulation Coding Scheme:	MCS0	DCCF (dB):	1.00
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (B)	Active Chain(s):	1

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2412	3.0	-	-9.33	-	-	-	8.00	-17.33
2442	3.0	-	-6.62	-	-	-	8.00	-14.62
2472	3.0	-	-29.67	-	-	-	8.00	-37.67

Table 94 - Maximum Power Spectral Density Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	662911 D01 v02r01 E)2)b)		

DUT Configuration			
Mode:	802.11n HT20	Duty Cycle (%):	79.3
Modulation Coding Scheme:	MCS0	DCCF (dB):	1.01
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	-
Active Port(s):	A+B (A + B)	Active Chain(s):	0+1

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2412	3.0	-11.53	-11.62	-	-	-8.56	8.00	-16.56
2442	3.0	-8.20	-8.38	-	-	-5.28	8.00	-13.28
2472	3.0	-31.69	-31.87	-	-	-28.77	8.00	-36.77

Table 95 - Maximum Power Spectral Density Results



802.11n (40 MHz Bandwidth) - 2.4 GHz WLAN

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11n HT40	Duty Cycle (%):	79.0
Modulation Coding Scheme:	MCS0	DCCF (dB):	1.03
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	A (A)	Active Chain(s):	0

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2422	3.0	-14.29	-	-	-	-	8.00	-22.29
2442	3.0	-13.12	-	-	-	-	8.00	-21.12
2462	3.0	-25.61	-	-	-	-	8.00	-33.61

Table 96 - Maximum Power Spectral Density Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11n HT40	Duty Cycle (%):	79.0
Modulation Coding Scheme:	MCS0	DCCF (dB):	1.03
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (B)	Active Chain(s):	1

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2422	3.0	-	-13.86	-	-	-	8.00	-21.86
2442	3.0	-	-13.99	-	-	-	8.00	-21.99
2462	3.0	-	-25.20	-	-	-	8.00	-33.20

Table 97 - Maximum Power Spectral Density Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	662911 D01 v02r01 E)2)b)		

DUT Configuration			
Mode:	802.11n HT40	Duty Cycle (%):	78.9
Modulation Coding Scheme:	MCS0	DCCF (dB):	1.03
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	-
Active Port(s):	A+B (A + B)	Active Chain(s):	0+1

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2422	3.0	-16.58	-16.56	-	-	-13.56	8.00	-21.56
2442	3.0	-13.34	-14.55	-	-	-10.89	8.00	-18.89
2462	3.0	-27.45	-27.00	-	-	-24.21	8.00	-32.21

Table 98 - Maximum Power Spectral Density Results

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

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

ISED RSS-247, Limit Clause 5.2(b)

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission



2.6.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	03-Dec-2021
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	03-Dec-2021
Climatic Chamber	Aralab	FitoTerm 300E45	4823	12	12-Apr-2022
Hygropalm Hygrometer	Rotronic	HP21	5264	12	12-Jul-2022
MXA Signal Analyser	Keysight Technologies	N9020B	5528	24	04-Mar-2022
Signal Commissioning Unit	TUV SUD	SCU001	5546	12	16-Apr-2022

Table 99

3 Photographs

3.1 Test Setup Photographs



Figure 260 - Test Setup - 30 MHz to 1 GHz - X Orientation

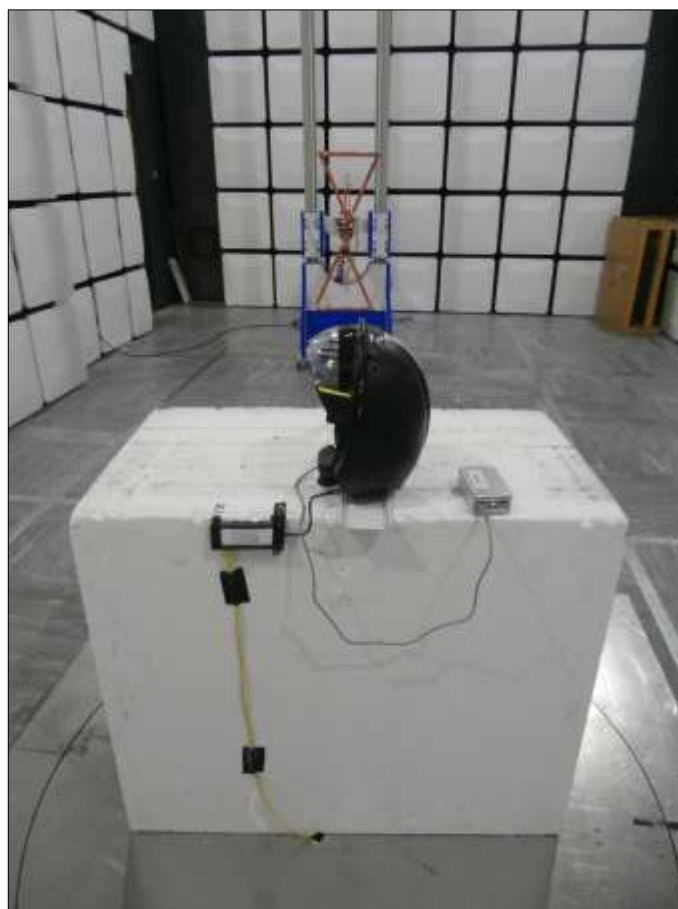


Figure 261 - Test Setup - 30 MHz to 1 GHz - Y Orientation

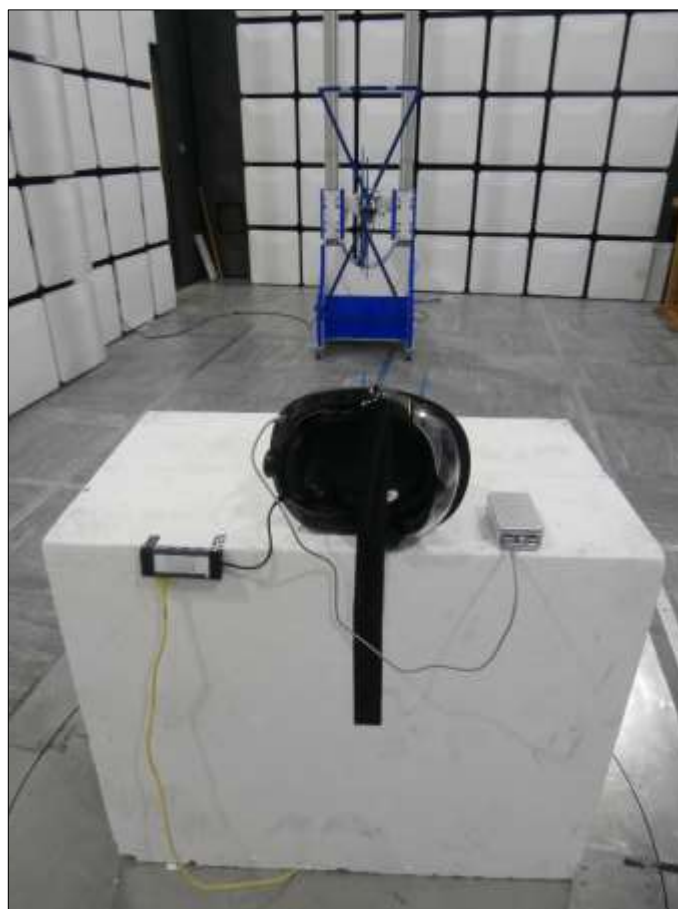


Figure 262 - Test Setup - 30 MHz to 1 GHz - Z Orientation

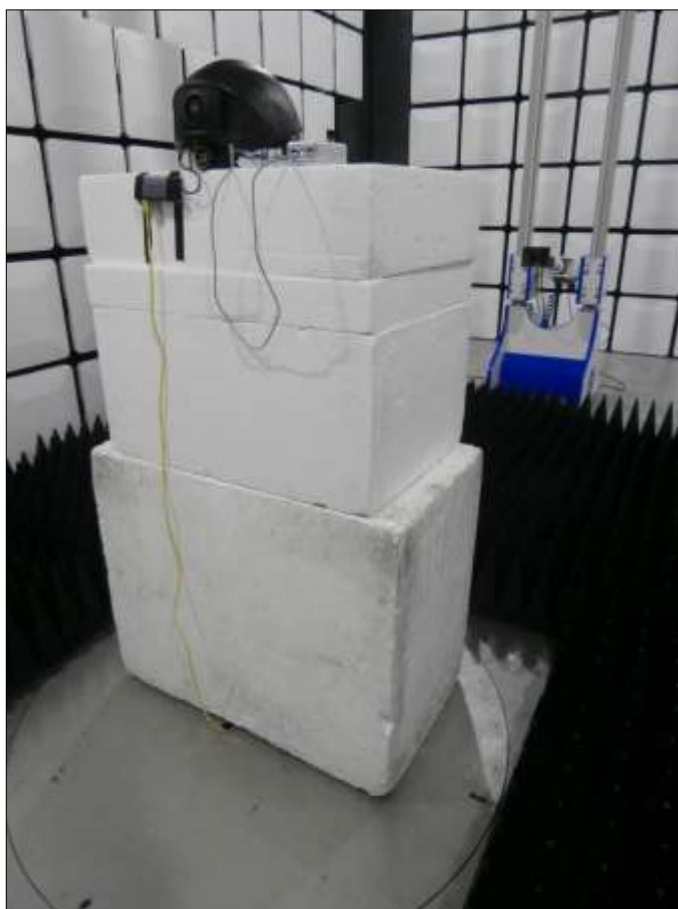


Figure 263 - Test Setup - 1 GHz to 18 GHz - X Orientation



Figure 264 - Test Setup - 1 GHz to 18 GHz - Y Orientation



Figure 265 - Test Setup - 1 GHz to 18 GHz - Z Orientation



Figure 266 - Test Setup - 18 GHz to 25 GHz - X Orientation



Figure 267 - Test Setup - 18 GHz to 25 GHz - Y Orientation



Figure 268 - 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
Emission Bandwidth	± 271.419 kHz
Restricted Band Edges	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Maximum Conducted Output Power	± 3.2 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
Power Spectral Density	± 3.2 dB

Table 100

Measurement Uncertainty Decision Rule

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.