

FCC and ISED Test Report

Apple Inc, Model: A2485

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

Prepared for: Apple Inc
One Apple Park Way, Cupertino, California, 95014
USA

FCC ID: BCGA2485 IC: 579C-A2485

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Document 75952054-11 Issue 01



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SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Neil Rousell	Senior Engineer (RF)	Authorised Signatory	17 September 2021

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

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15C, ISED RSS-247 and ISED RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Jaiyanth Balendrarajah	17 September 2021	
Testing	George Porter	17 September 2021	
Testing	Faisal Malyar	17 September 2021	
Testing	Liang Tian	17 September 2021	
Testing	Christopher Bland	17 September 2021	
Testing	Colin Brain	17 September 2021	
Testing	Ahmad Javid	17 September 2021	
Testing	Taha Shafique	17 September 2021	
Testing	Ian Hart	17 September 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: 2020, Issue 5 (04-2018) + A2 (02-2021) for the tests detailed in section 1.3.



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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



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1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	17 September 2021

Table 1

1.2 Introduction

Applicant	Apple Inc
Manufacturer	Apple Inc
Model Number(s)	A2485
Serial Number(s)	HV9QMW620K and CQ2R1P6HF2
Hardware Version(s)	REV1.0
Software Version(s)	HV9QMW620K: 21A102280u CQ2R1P6HF2: 21A102280u
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	0540211248
Date	22-April-2021
Date of Receipt of EUT	31-March-2021 and 16-July-2021
Start of Test	26-June-2021
Finish of Test	23-August-2021
Name of Engineer(s)	Jaiyanth Balendrarajah, George Porter, Faisal Malyar, Colin Brain, Liang Tian, Christopher Bland, Ahmad Javid, Ian Hart, and Taha Shafique
Related Document(s)	ANSI C63.10 (2013) KDB 662911 D01 v02r01



1.3 Brief Summary of Results

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

Section	Specification Clause			Test Description	Result	Comments/Base Standard
	Part 15C	RSS-247	RSS-GEN			
Configuration and Mode: 2.4 GHz WLAN						
-	15.203	-	-	Antenna Requirement	N/T	The devices complies with the provisions of this section, as it uses a permanently attached integral antenna.
2.1	15.205	-	8.10	Restricted Band Edges	Pass	
2.2	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	

Table 2



1.4 Product Information

1.4.1 Technical Description

The Equipment under test (EUT) was a laptop computer with Bluetooth, Bluetooth Low Energy and 802.11 a/b/g/n/ac/ax capabilities in the 2.4 GHz and 5 GHz bands.

1.4.2 Test Modes

The EUT's 2.4 GHz 802.11 radio supports Single Input/Single Output (SISO) and 2x2 MIMO (Multiple Input/Multiple Output). It supports 802.11b and g for SISO and 802.11n and ax at 20 MHz channel bandwidths for SISO and MIMO. 802.11ax supports RU 26/52/106/242.

The EUT uses different output powers per core dependent on how many cores are used. It uses the same conducted power across all cores in any given mode, but due to the different antenna gains the radiated powers per core differs.

After preliminary investigations were performed, the EUT was therefore tested in the following worst-case modes unless otherwise specified:

SISO Modes (Core 1):

- 802.11b 1 Mbps
- 802.11g 12 Mbps (Conducted), 6 Mbps (Radiated)
- 802.11n HT20 MCS2 (Conducted). MCS0 (Radiated)
- 802.11ax HE20 MCS2x1 (Conducted), MCS0x1 (Radiated), SU, RU26, RU52 and RU106

2x2 MIMO Modes (Core 0 + Core 1):

- 802.11n HT20 MCS2 (Conducted), MCS0 (Radiated) - CDD
- 802.11ax HE20 MCS2x1 (Conducted), MCS0x1 (Radiated) - CDD SU, RU26, RU52 and RU106

1.4.3 Test Set-up

For conducted tests the EUT antennas were disconnected and replaced with U.FL to SMA test cables to enable conducted testing on each core. The loss of these test cables were known and compensated for in any conducted measurements.

For all tests, the EUT was put into a continuous transmit test mode with the chipset manufacturer's test commands via a script running in the EUTs terminal application. The EUT then transmitted the required type of packeted 802.11 data frames of fixed length, containing the standard headers and with pseudo-random data content, ensuring the measured signals were representative and contained all the symbols at the highest power control level.

All testing was performed with the EUT powered via a 120 V AC, 60 Hz source.

1.4.4 Antenna Gain Table

Antenna Port	Frequency Range (MHz)	Peak Gain (dBi)	Conducted Cable Loss (dB)
Core 0	2400 to 2480	5.10	1.00
Core 1	2400 to 2480	7.00	1.00

Table 3



1.5 Deviations from the Standard

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

1.6 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: A2485, Serial Number: HV9QMW620K			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A2485, Serial Number: CQ2R1P6HF2			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 4

1.7 Test Location

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

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: 2.4 GHz WLAN		
Restricted Band Edges	Jaiyanth Balendrarajah, Liang Tian, Christopher Bland and Colin Brain	UKAS
Emission Bandwidth	George Porter	UKAS
Maximum Conducted Output Power	George Porter	UKAS
Spurious Radiated Emissions	Faisal Malyar, Ahmad Javid, Ian Hart, Jaiyanth Balendrarajah, and Taha Shafique	UKAS
Authorised Band Edges	Jaiyanth Balendrarajah, Liang Tian, Christopher Bland and Colin Brain,	UKAS
Power Spectral Density	George Porter	UKAS

Table 5

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

A2485, S/N: HV9QMW620K - Modification State 0

2.1.3 Date of Test

26-June-2021 to 07-July-2021

2.1.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.12.2.5.1 or 11.12.2.5.2.

Where duty cycle corrections were required for average results, these are included in the result tables but are not shown on the plots.

The following conversion can be applied to convert from dB μ V/m to μ V/m:
 $10^{(\text{Field Strength in dB}\mu\text{V/m}/20)}$.

Restricted band edge measurements were performed, with the device operating in SISO and MIMO configurations, across the various modes supported by the device.

The measurements displayed within this report, have been limited to those modes (data rates and modulation schemes) which have been shown to be worst case. Further measurements are held on file by TÜV SÜD, and are available if required.

2.1.5 Environmental Conditions

Ambient Temperature	21.4 - 25.4 °C
Relative Humidity	35.6 - 54.6 %



2.1.6 Test Results

2.4 GHz WLAN

Mode	Data Rate /MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11b, Core 1	1 Mbps	-	-	2412	2390.0	55.54	45.98
802.11b, Core 1	1 Mbps	-	-	2462	2483.5	58.82	50.62
802.11b, Core 1	1 Mbps	-	-	2467	2483.5	59.45	50.86
802.11b, Core 1	1 Mbps	-	-	2472	2483.5	63.79	49.89
802.11g, Core 1	54 Mbps	-	-	2412	2390.0	68.26	49.70
802.11g, Core 1	54 Mbps	-	-	2462	2483.5	68.04	49.72
802.11g, Core 1	54 Mbps	-	-	2467	2483.5	65.10	50.86
802.11g, Core 1	54 Mbps	-	-	2472	2483.5	63.01	50.94
802.11n HT20, Core 1	MCS7	-	-	2412	2390.0	68.87	50.91
802.11n HT20, Core 1	MCS7	-	-	2462	2483.5	68.58	50.35
802.11n HT20, Core 1	MCS7	-	-	2467	2483.5	67.32	50.31
802.11n HT20, Core 1	MCS4	-	-	2472	2483.5	65.19	50.70
802.11ax HE20, Core 1	MCS9	SU	-	2412	2390.0	66.60	50.99
802.11ax HE20, Core 1	MCS9	26	0	2412	2390.0	68.53	47.03
802.11ax HE20, Core 1	MCS9	SU	-	2462	2483.5	66.71	50.26
802.11ax HE20, Core 1	MCS9	26	8	2462	2483.5	67.18	47.34
802.11ax HE20, Core 1	MCS9	SU	-	2467	2483.5	67.16	50.60
802.11ax HE20, Core 1	MCS9	26	8	2467	2483.5	68.58	48.68
802.11ax HE20, Core 1	MCS9	SU	-	2472	2483.5	64.85	50.35
802.11ax HE20, Core 1	MCS9	26	8	2472	2483.5	68.39	49.67

Table 6 - SISO Restricted Band Edge Results

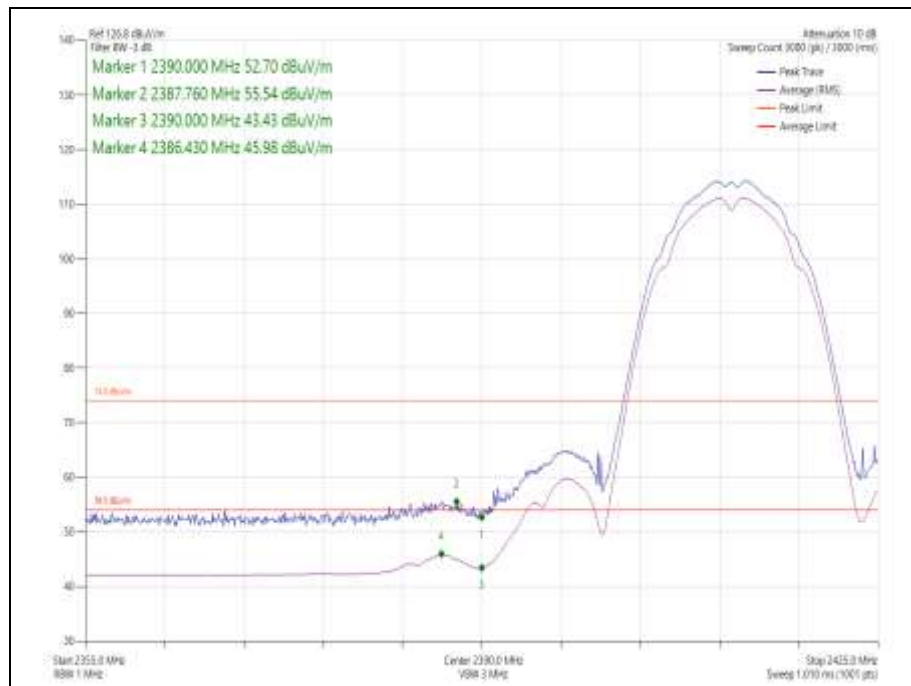


Figure 1 - 802.11b, Core 1 - 2412 MHz, Band Edge Frequency 2390.0 MHz

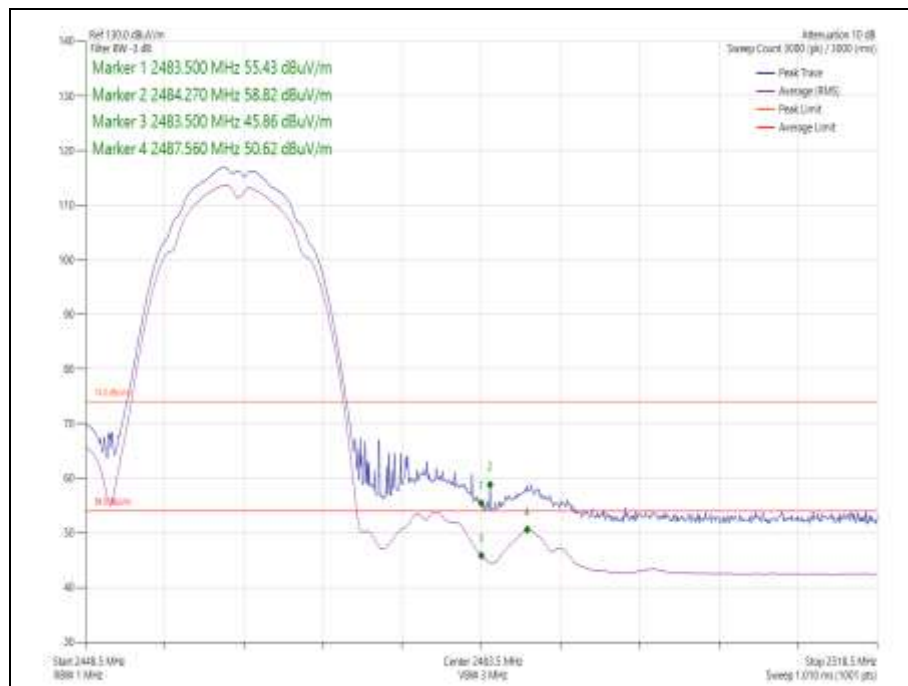


Figure 2 - 802.11b, Core 1 - 2462 MHz, Band Edge Frequency 2483.5 MHz

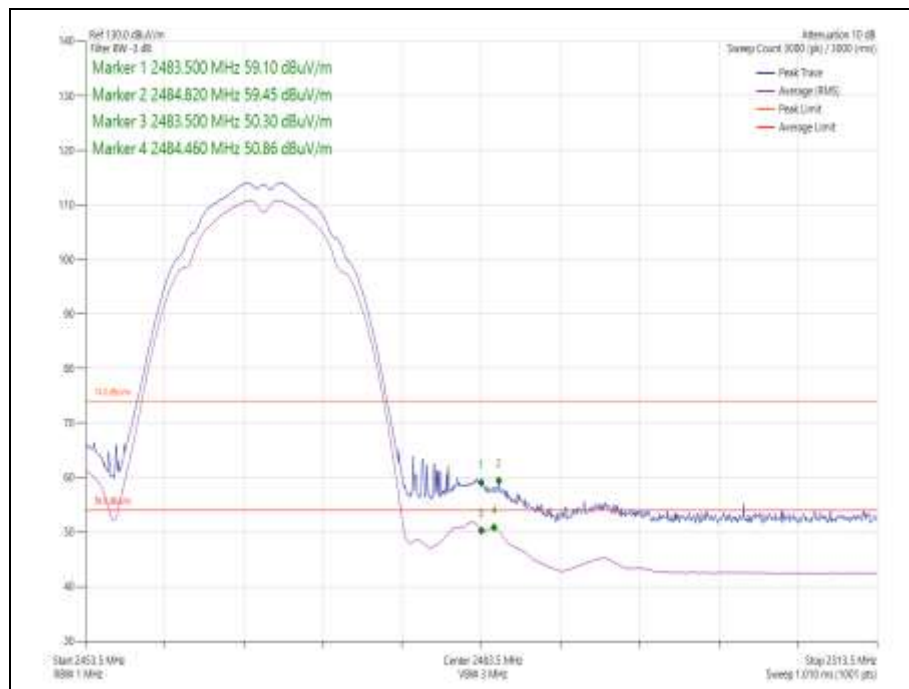


Figure 3 - 802.11b, Core 1 - 2467 MHz, Band Edge Frequency 2483.5 MHz

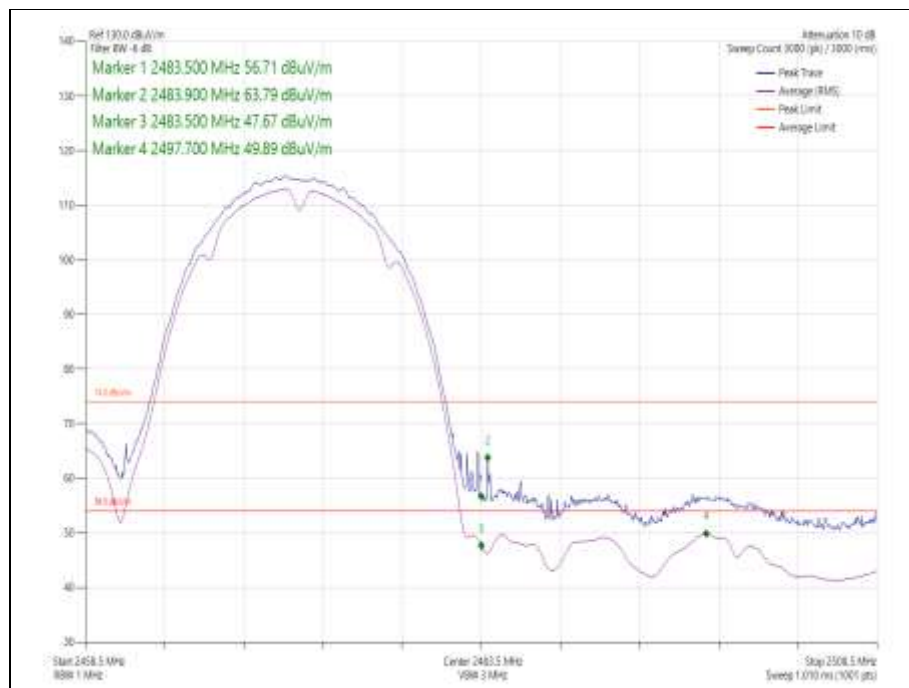


Figure 4 - 802.11b, Core 1 - 2472 MHz, Band Edge Frequency 2483.5 MHz

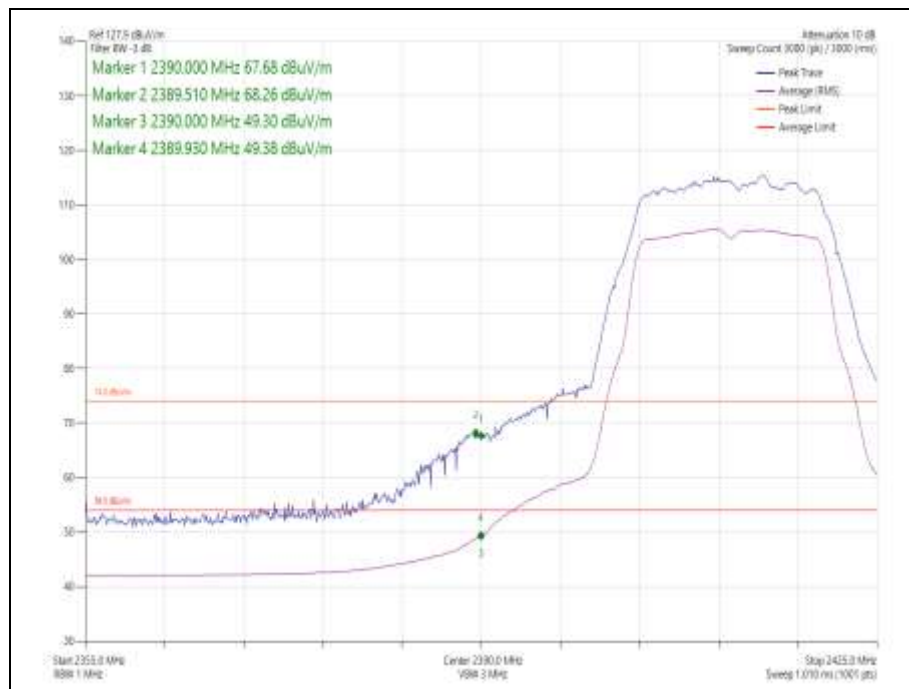


Figure 5 - 802.11g, Core 1 - 2412 MHz, Band Edge Frequency 2390.0 MHz

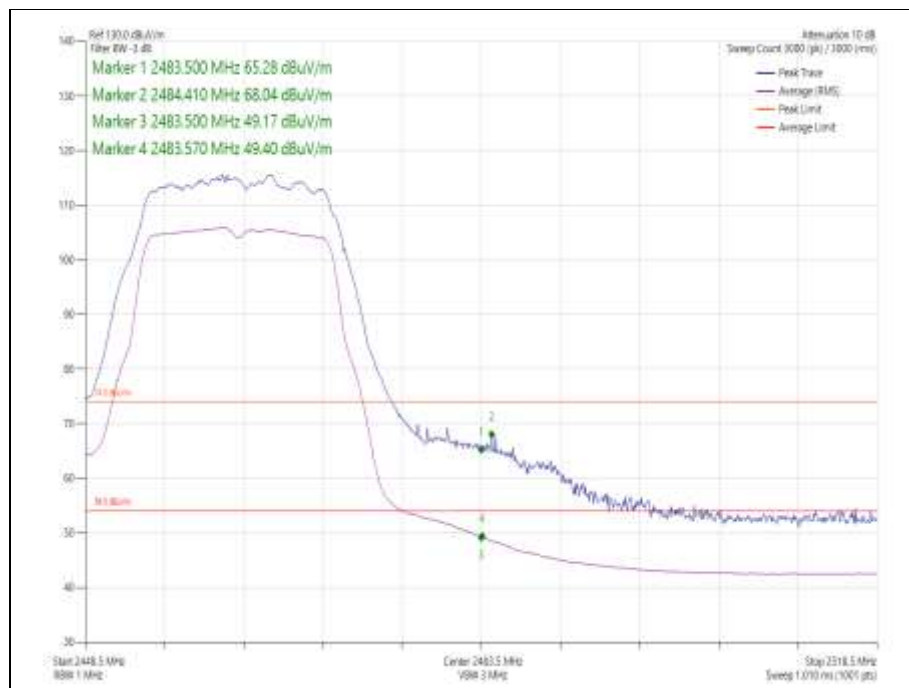


Figure 6 - 802.11g, Core 1 - 2462 MHz, Band Edge Frequency 2483.5 MHz

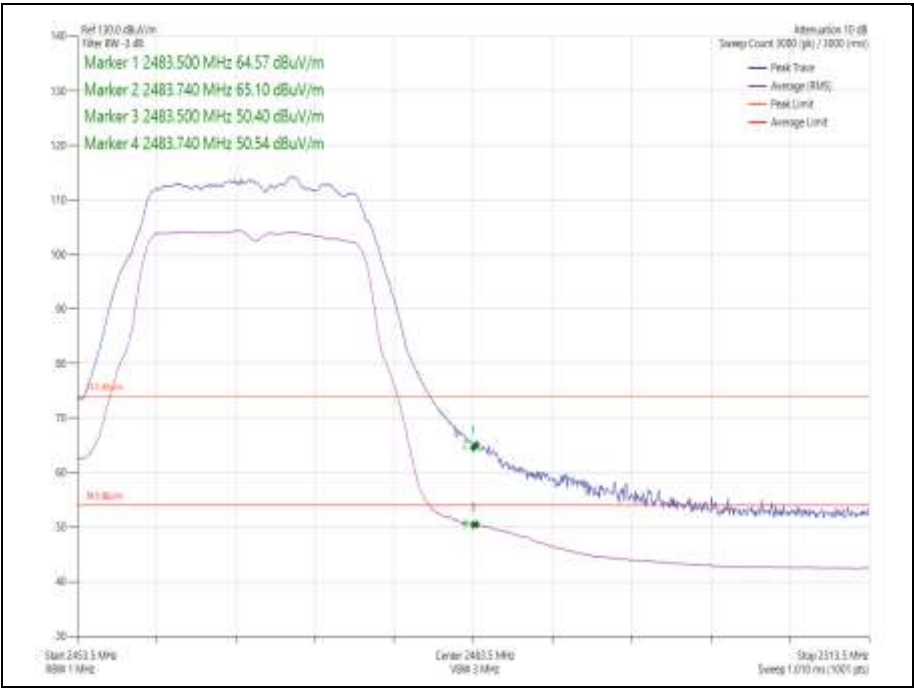


Figure 7 - 802.11g, Core 1 - 2467 MHz, Band Edge Frequency 2483.5 MHz

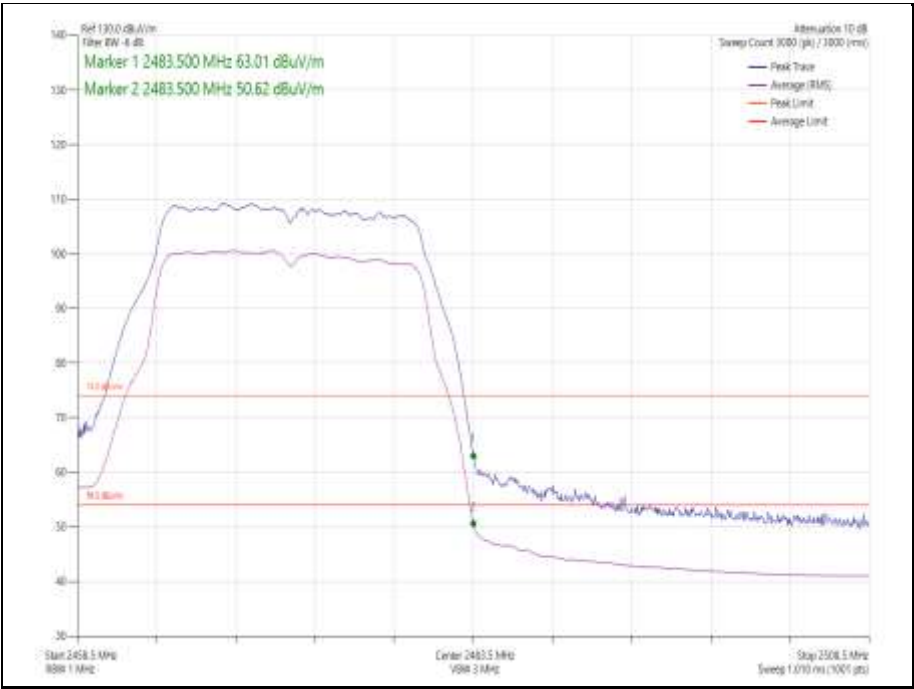


Figure 8 - 802.11g, Core 1 - 2472 MHz, Band Edge Frequency 2483.5 MHz

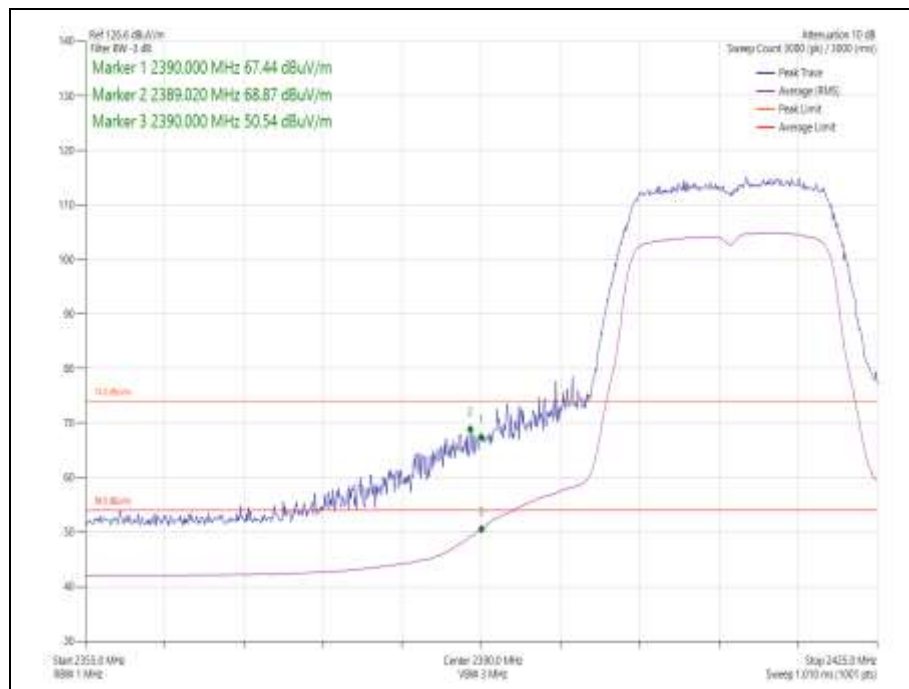


Figure 9 - 802.11n, HT20, Core 1 - 2412 MHz, Band Edge Frequency 2390 MHz

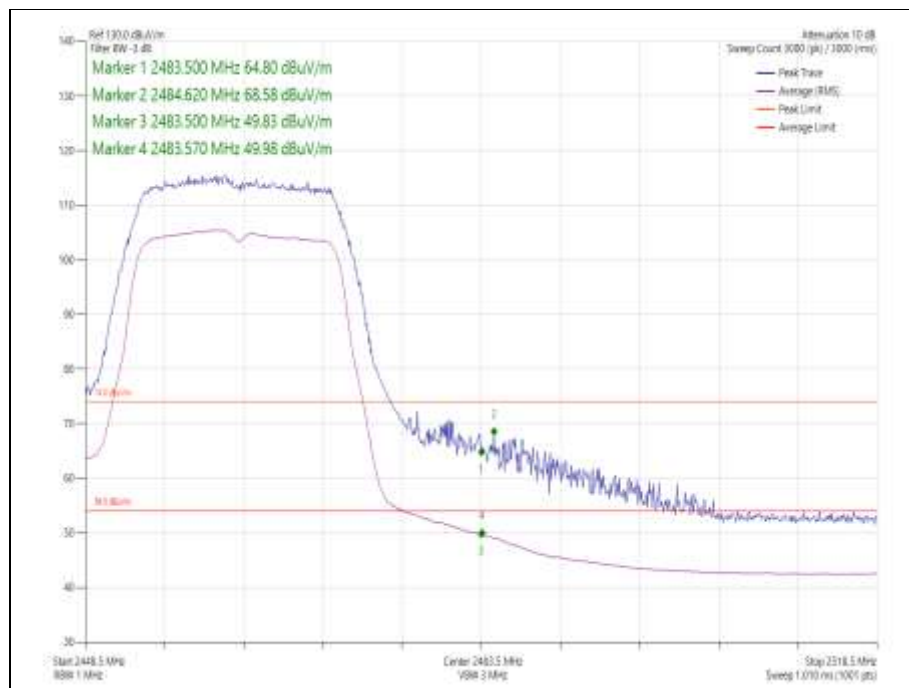


Figure 10 - 802.11n HT20, Core 1 - 2462 MHz, Band Edge Frequency 2483.5 MHz

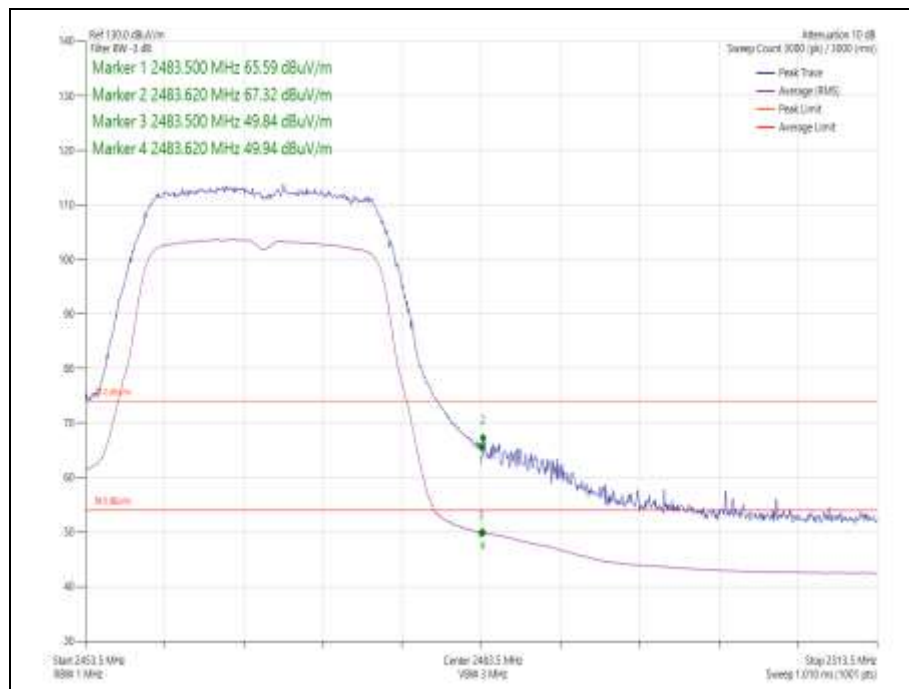


Figure 11 - 802.11n HT20, Core 1 - 2467 MHz, Band Edge Frequency 2483.5 MHz

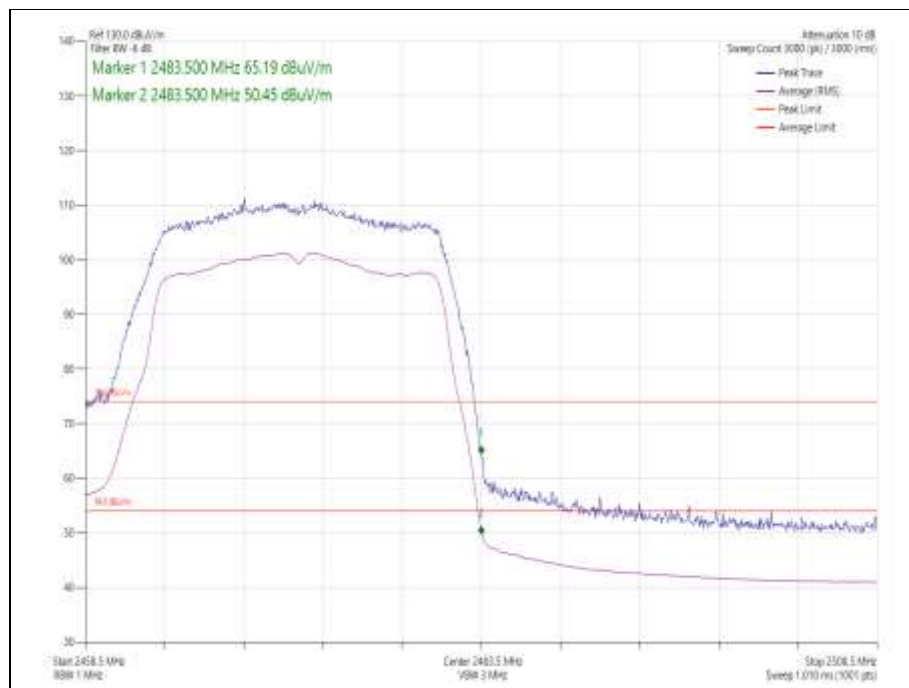


Figure 12 - 802.11n HT20, Core 1 - 2472 MHz, Band Edge Frequency 2483.5 MHz

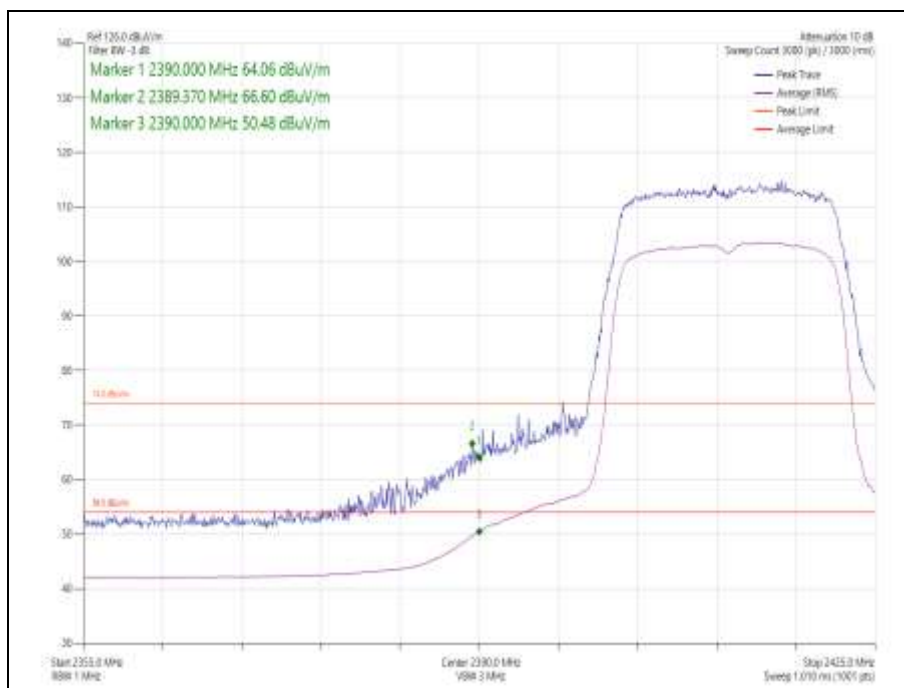


Figure 13 - 802.11ax HE20, Core 1, SU - 2412 MHz, Band Edge Frequency 2390 MHz

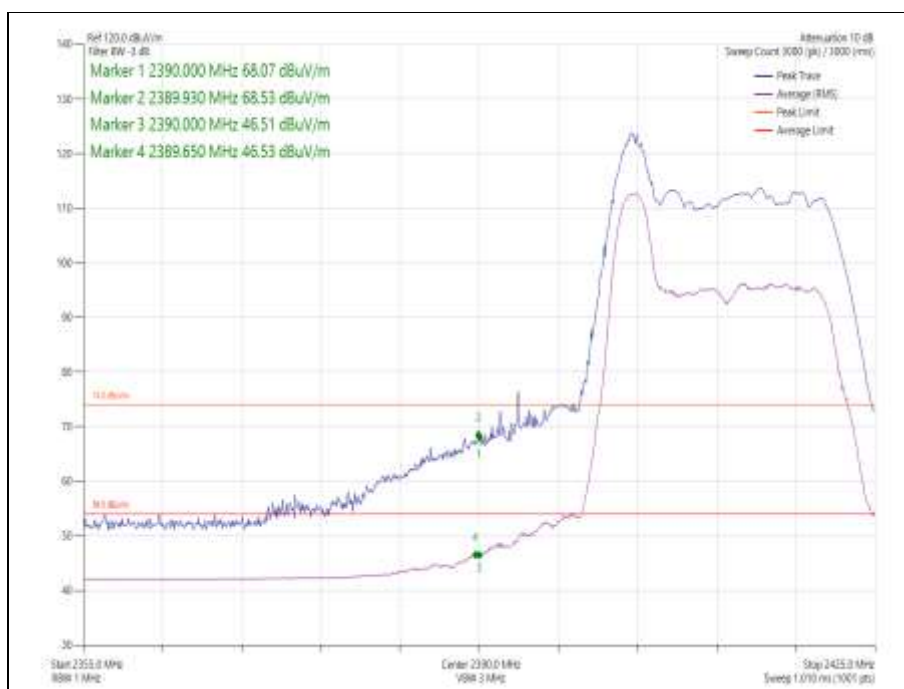


Figure 14 - 802.11ax HE20, Core 1, 26-0 - 2412 MHz, Band Edge Frequency 2390 MHz

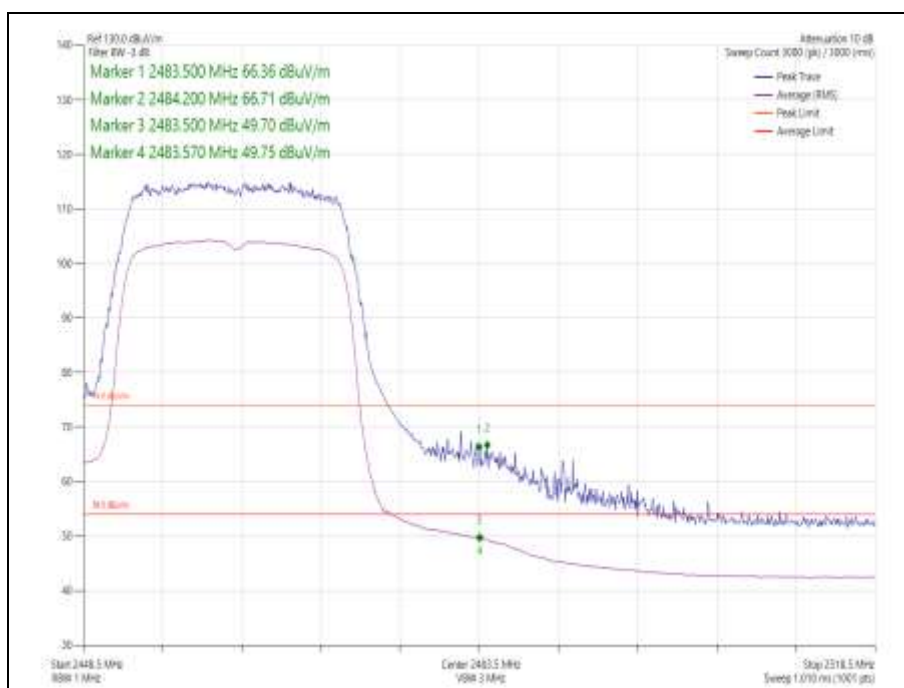


Figure 15 - 802.11ax HE20, Core 1, SU - 2462 MHz, Band Edge Frequency 2483.5 MHz

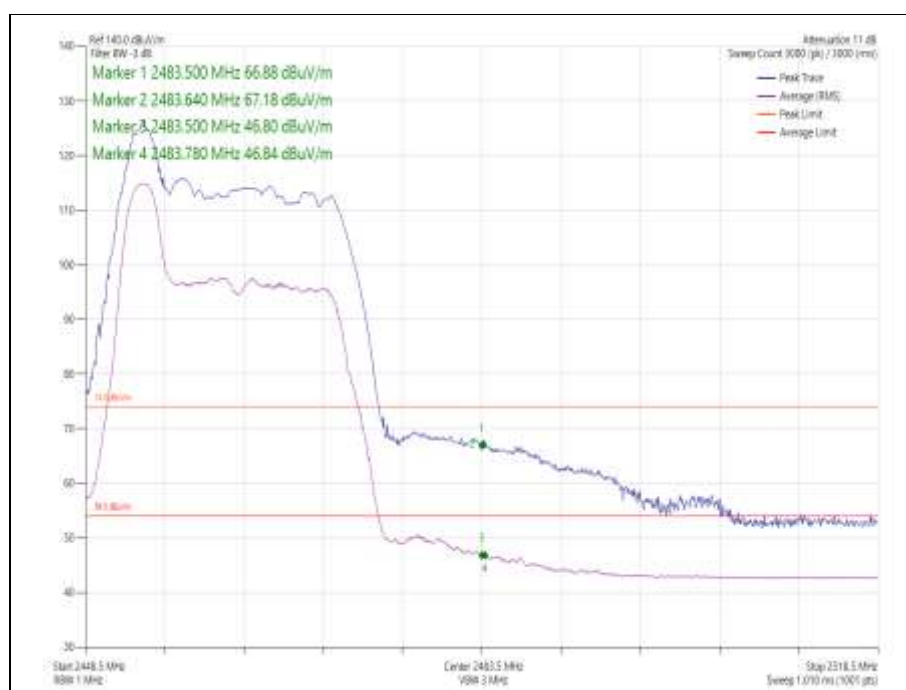


Figure 16 - 802.11ax HE20, Core 1, 26-8 - 2462 MHz, Band Edge Frequency 2483.5 MHz

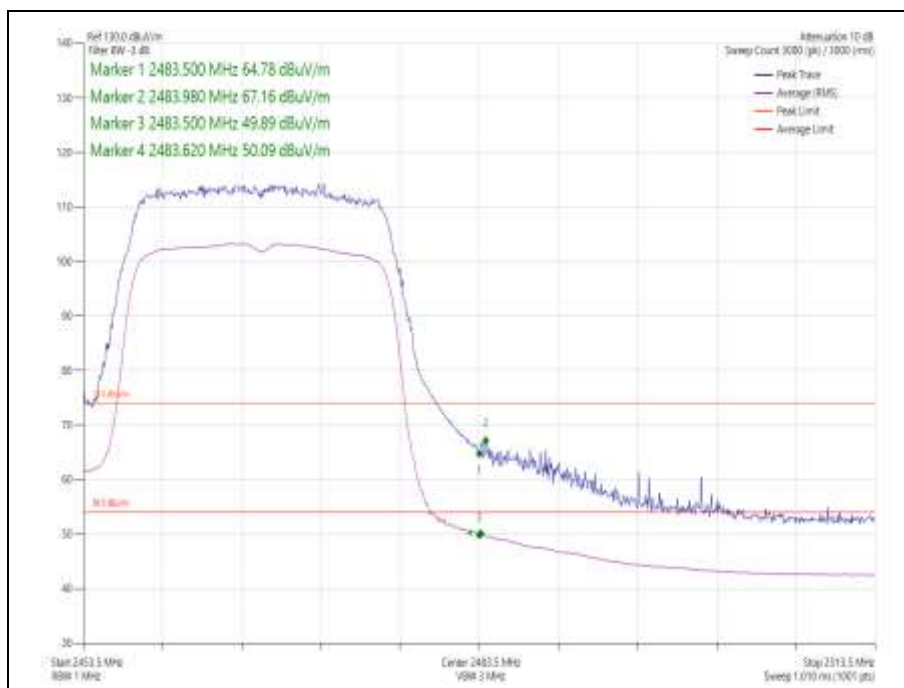


Figure 17 - 802.11ax HE20, Core 1, SU - 2467 MHz, Band Edge Frequency 2483.5 MHz

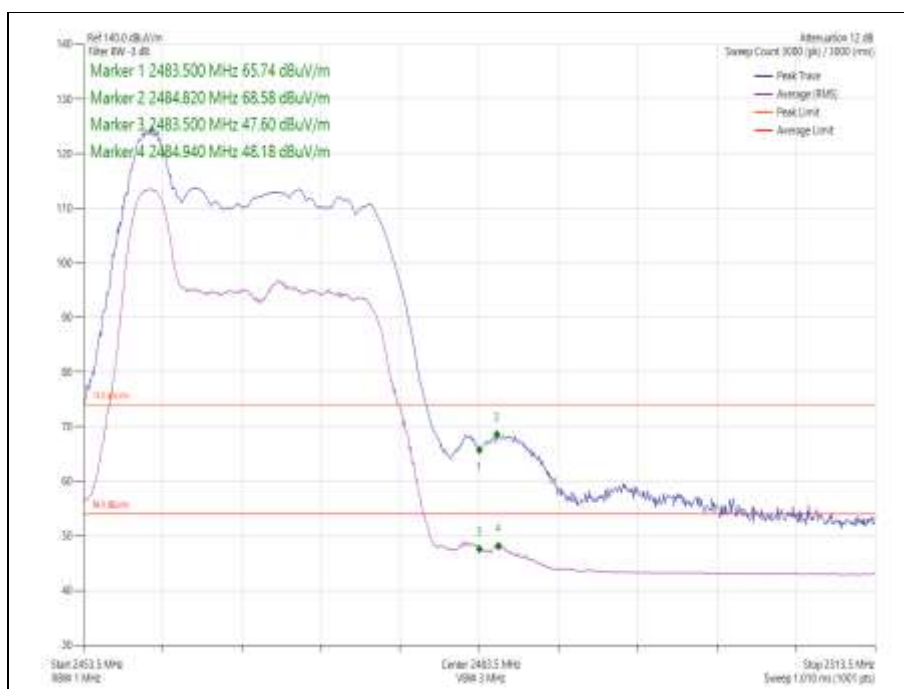


Figure 18 - 802.11ax HE20, Core 1, 26-8 - 2467 MHz, Band Edge Frequency 2483.5 MHz

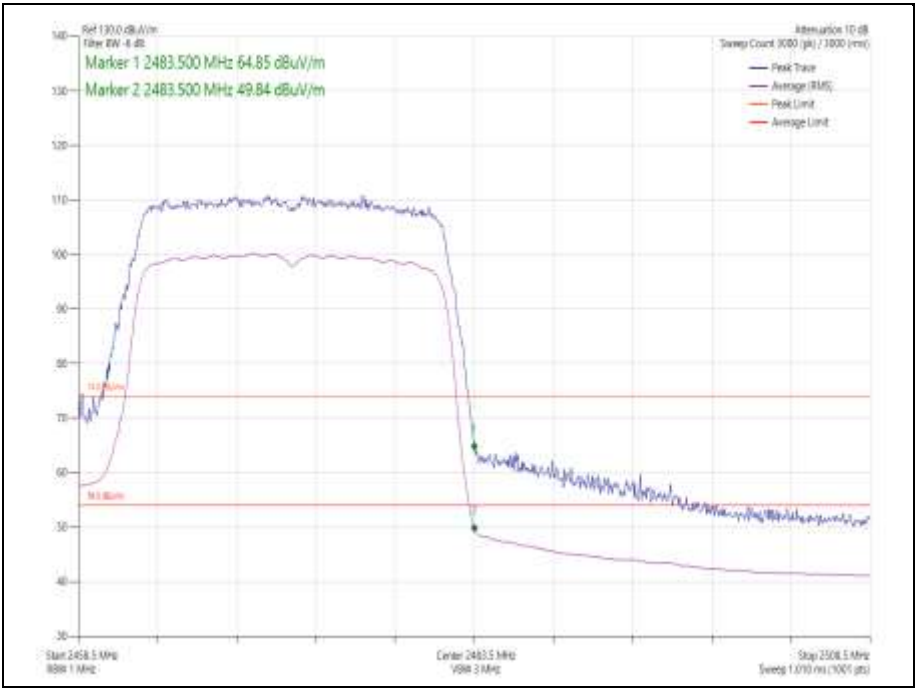


Figure 19 - 802.11ax HE20, Core 1, SU - 2472 MHz, Band Edge Frequency 2483.5 MHz

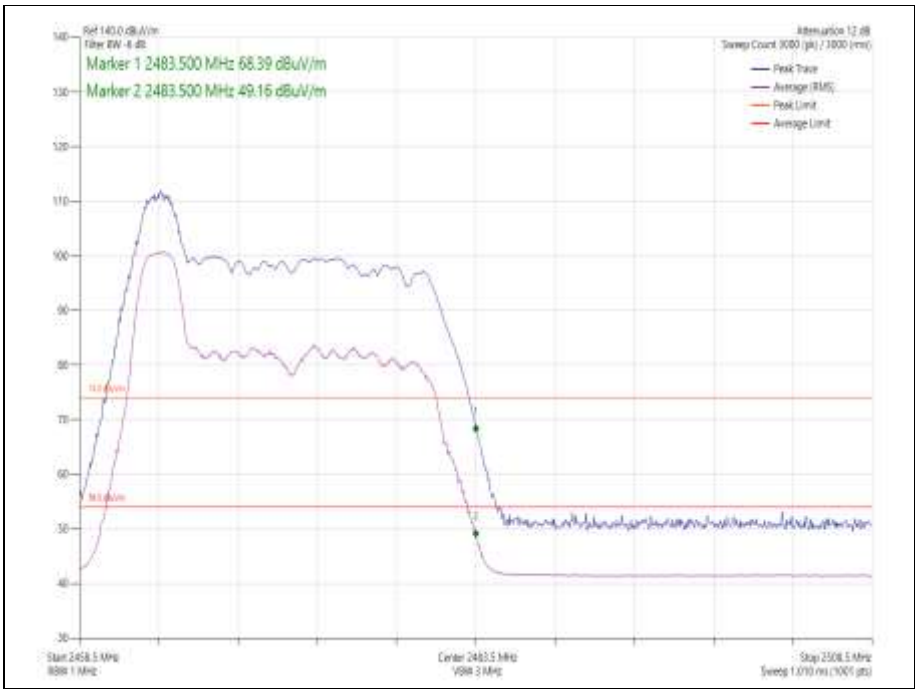


Figure 20 - 802.11ax HE20, Core 1, 26-8 - 2472 MHz, Band Edge Frequency 2483.5 MHz



Mode	Data Rate/MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11n HT20, Core 0-1	MCS7	-	-	2412	2390.0	66.06	50.64
802.11n HT20, Core 0-1	MCS7	-	-	2462	2483.5	65.23	50.75
802.11n HT20, Core 0-1	MCS7	-	-	2467-	2483.5	66.83	50.50
802.11n HT20, Core 0-1	MCS7	-	-	2472	2483.5	64.73	50.52
802.11ax HE20, Core 0-1	MCS9	SU	-	2412	2400.0	65.10	50.66
802.11ax HE20, Core 0-1	MCS9	26	0	2412	2400.0	68.90	48.93
802.11ax HE20, Core 0-1	MCS9	SU	-	2462	2483.5	66.59	50.58
802.11ax HE20, Core 0-1	MCS9	26	8	2462	2483.5	68.72	47.63
802.11ax HE20, Core 0-1	MCS9	SU	-	2467	2483.5	65.85	50.85
802.11ax HE20, Core 0-1	MCS9	26	8	2467	2483.5	68.47	49.33
802.11ax HE20, Core 0-1	MCS9	SU	-	2472	2483.5	65.21	50.30
802.11ax HE20, Core 0-1	MCS9	26	8	2472	2483.5	64.31	45.15

Table 7 – MIMO 2TX Restricted Band Edge Results

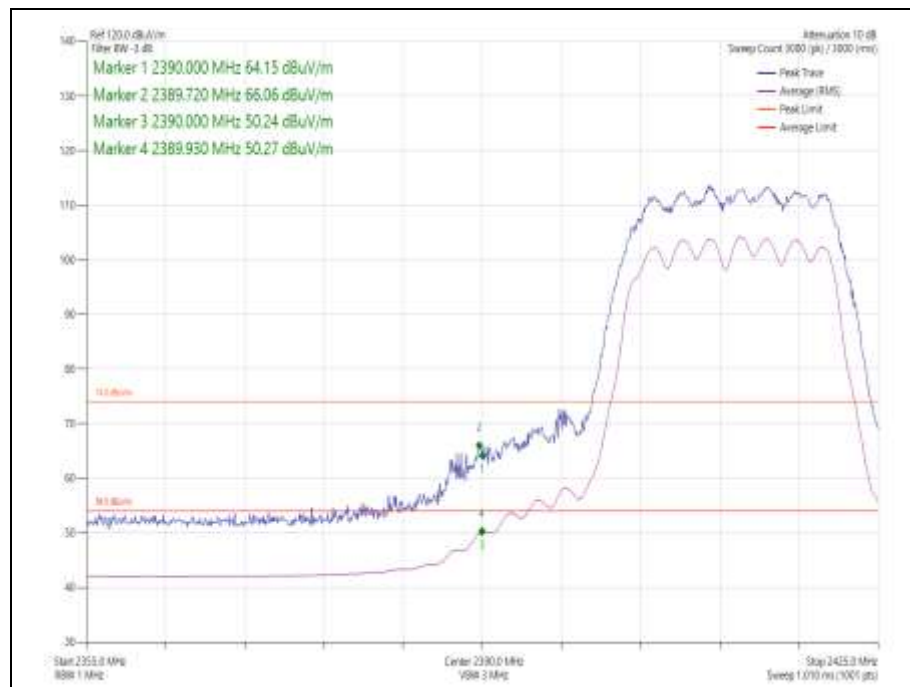


Figure 21 - 802.11n HT20, Core 1-1 - 2412 MHz, Band Edge Frequency 2390 MHz

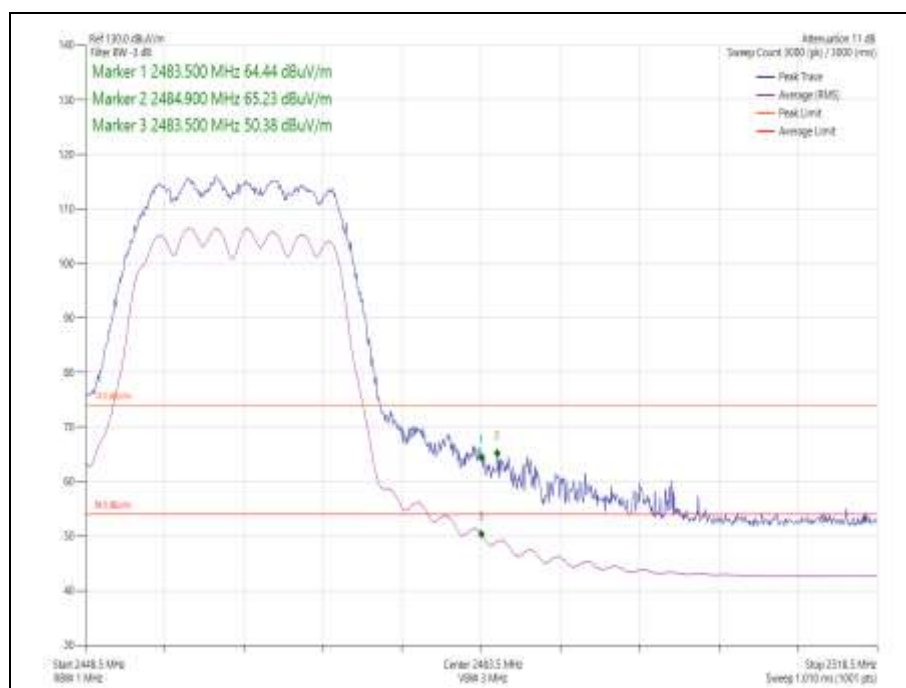


Figure 22 - 802.11n HT20, Core 1-1 - 2462 MHz, Band Edge Frequency 2483.5 MHz

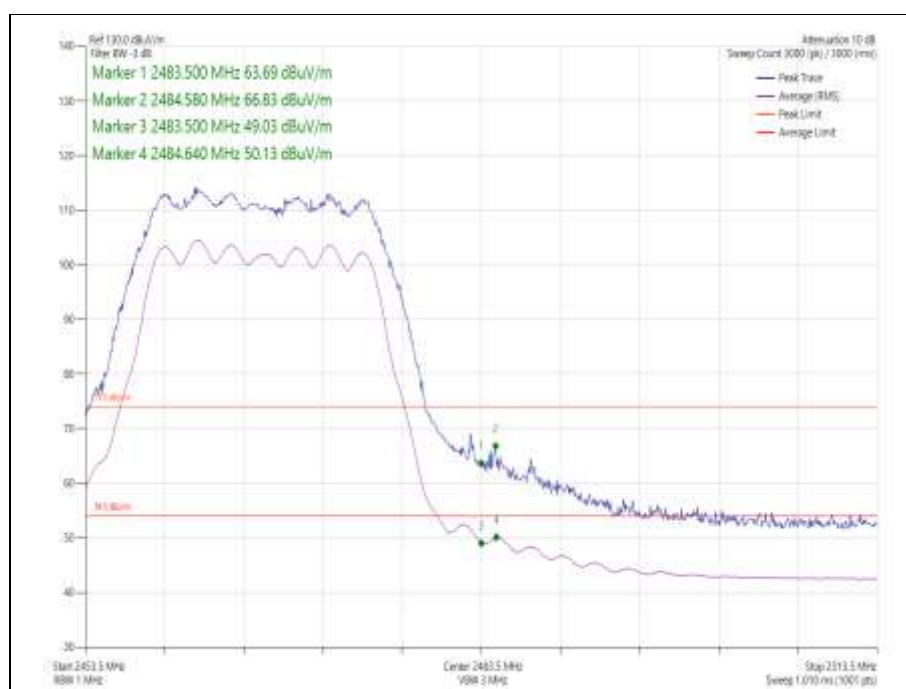


Figure 23 - 802.11n HT20, Core 1-1 - 2467 MHz, Band Edge Frequency 2483.5 MHz

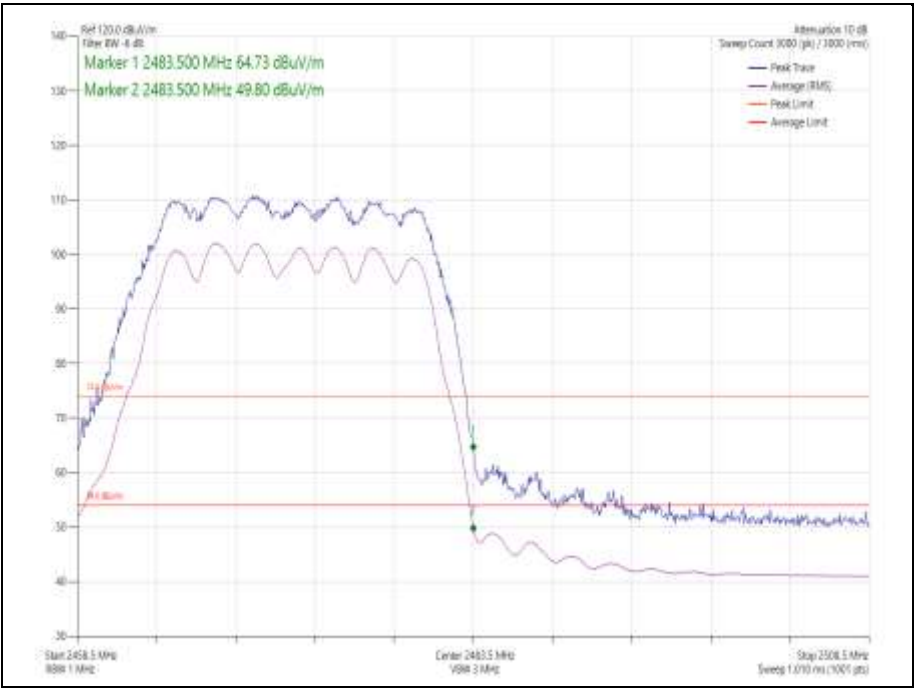


Figure 24 - 802.11n HT20, Core 1-1 - 2472 MHz, Band Edge Frequency 2483.5 MHz

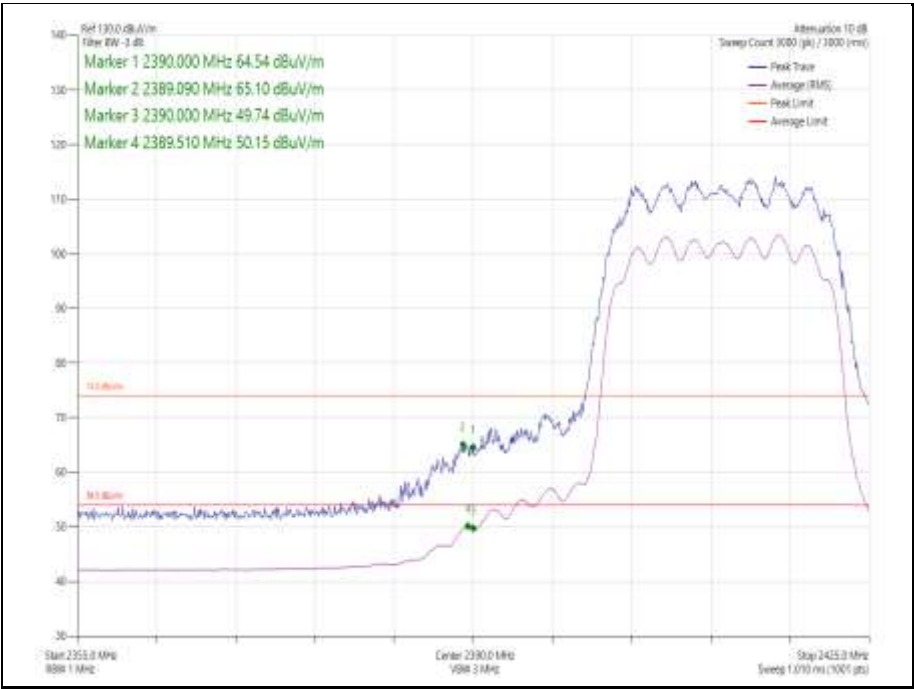


Figure 25 - 802.11ax HE20, Core 1-1, SU - 2412 MHz, Band Edge Frequency 2390 MHz

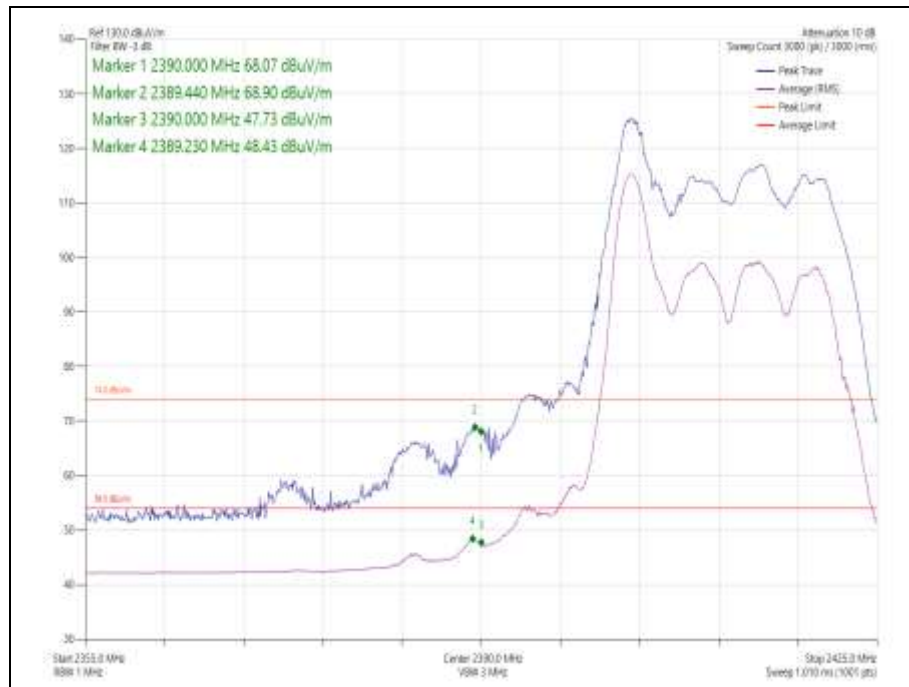


Figure 26 - 802.11ax HE20, Core 1-1, 26-0 - 2412 MHz, Band Edge Frequency 2390 MHz

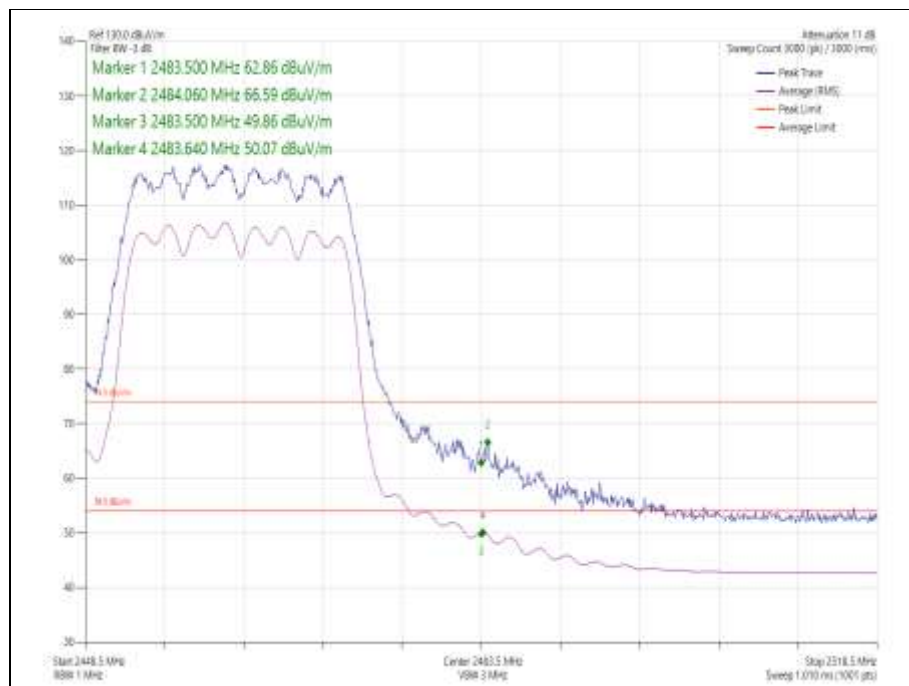


Figure 27 - 802.11ax HE20, Core 1-1, SU - 2462 MHz, Band Edge Frequency 2483.5 MHz

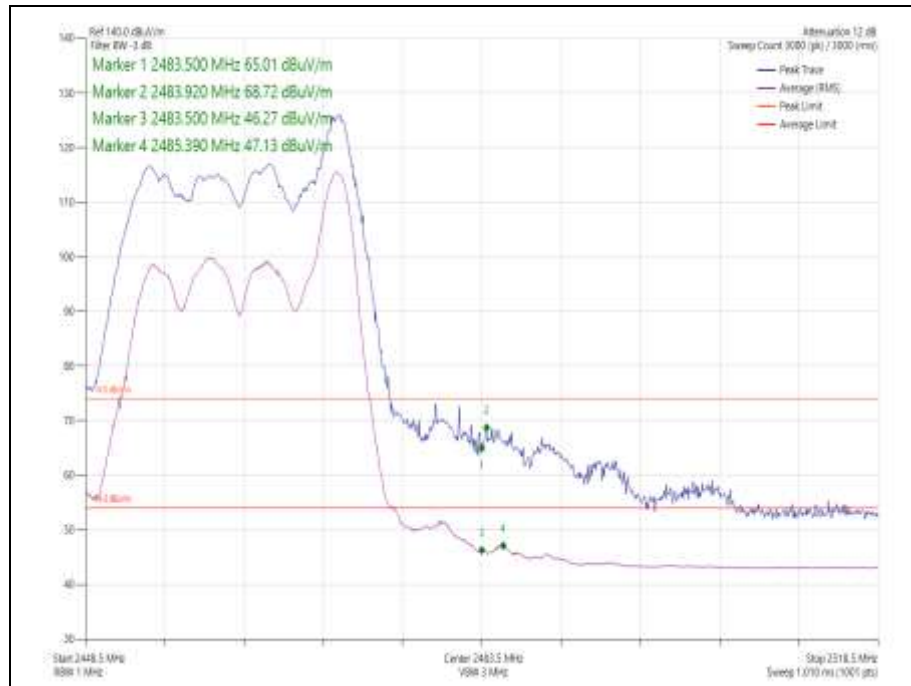


Figure 28 - 802.11ax HE20, Core 1-1, 26-8 - 2462 MHz, Band Edge Frequency 2483.5 MHz

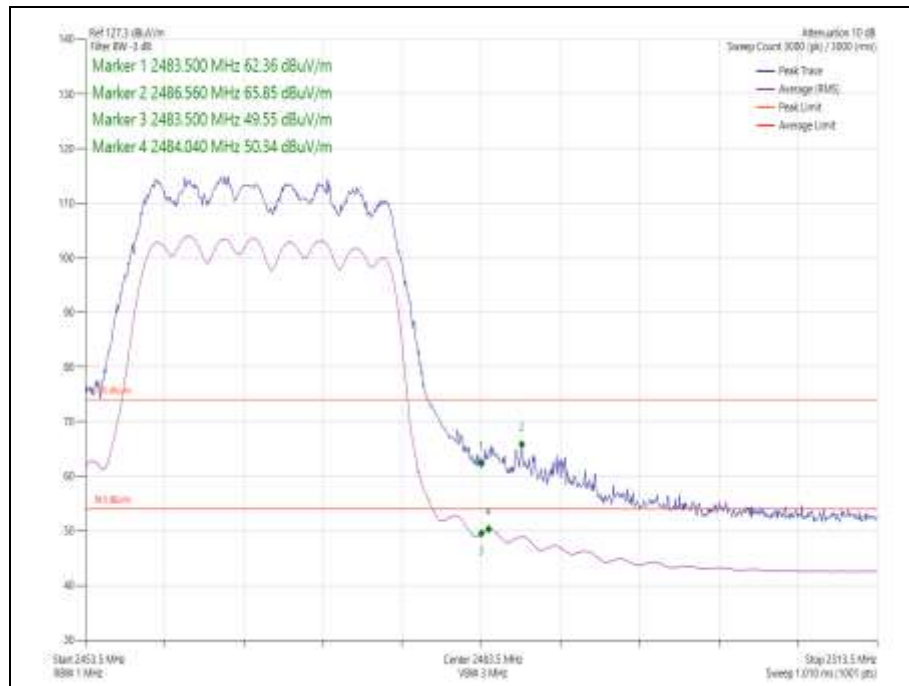


Figure 29 - 802.11ax HE20, Core 1-1, SU - 2467 MHz, Band Edge Frequency 2483.5 MHz

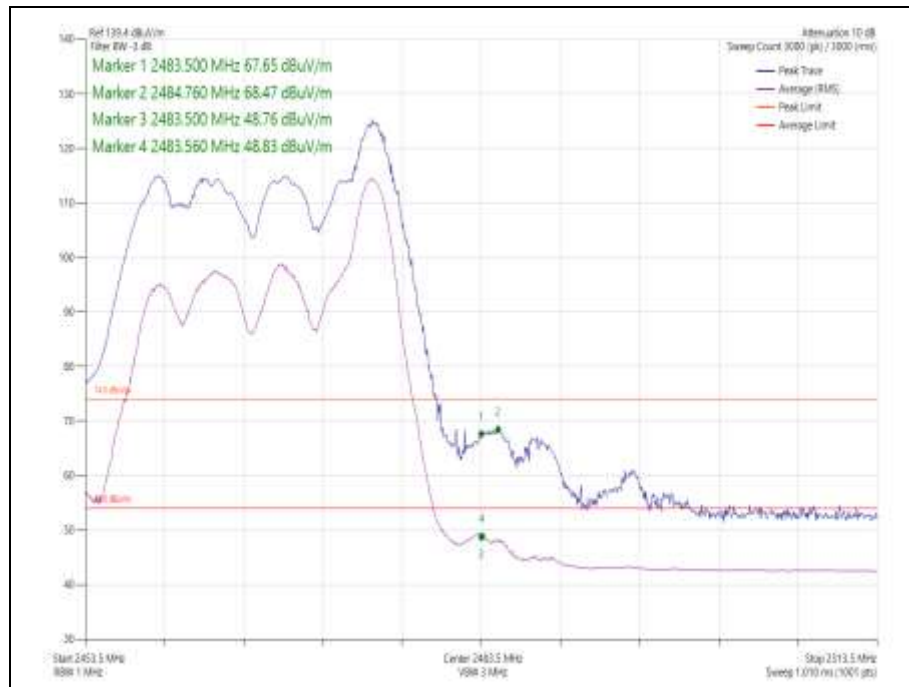


Figure 30 - 802.11ax HE20, Core 1-1, 26-8 - 2467 MHz, Band Edge Frequency 2483.5 MHz

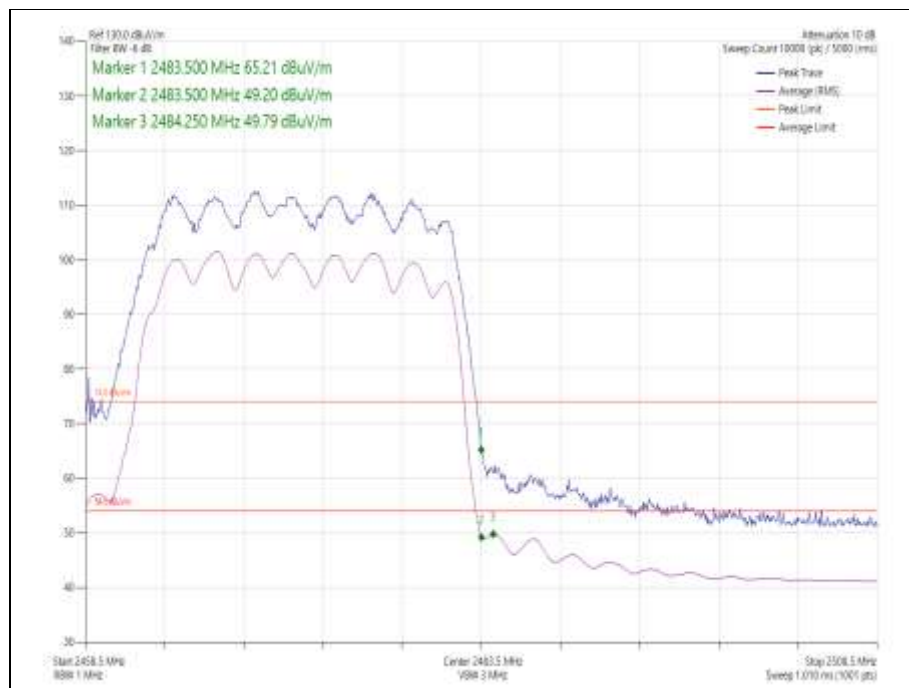


Figure 31 - 802.11ax HE20, Core 1-1, SU - 2472 MHz, Band Edge Frequency 2483.5 MHz

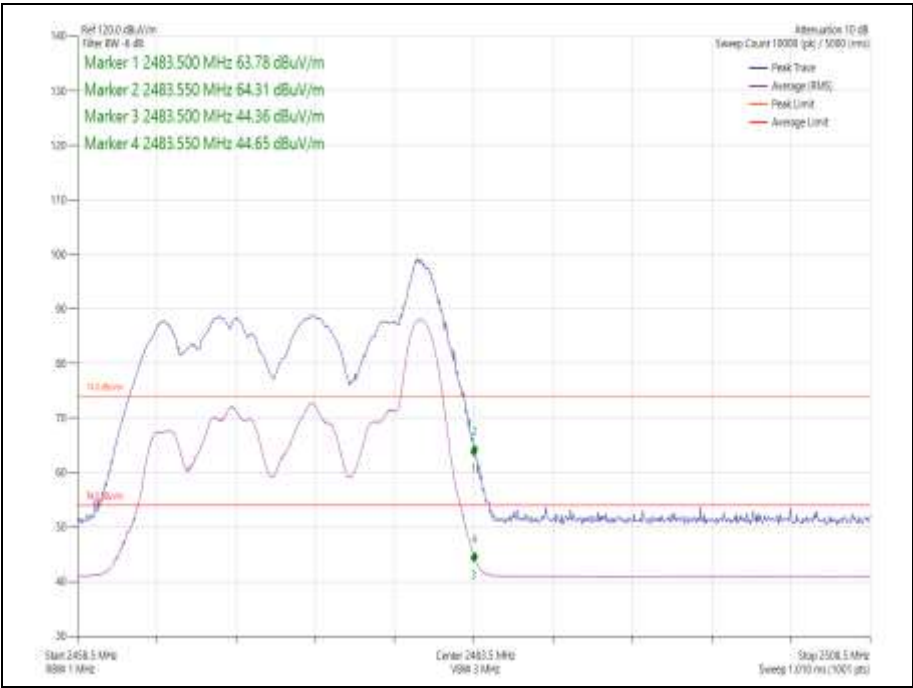


Figure 32 - 802.11ax HE20, Core 1-1, 26-8 - 2472 MHz, Band Edge Frequency 2483.5 MHz



FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 8

ISED RSS-GEN, Limit Clause 8.9

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960*	500

Table 9

*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 RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	01-Apr-2022
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	08-Mar-2022
EmX Emissions Software	TUV SUD	V2.1.11	5125	-	Software
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
2m SMA Cable	Junkosha	MWX221-02000AMSAMS/A	5517	12	09-Apr-2022
8m N-Type Cable	Junkosha	MWX221-08000NMSNMS/B	5520	12	24-Mar-2022

Table 10

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

A2485, S/N: CQ2R1P6HF2 - Modification State 0

2.2.3 Date of Test

23-August-2021

2.2.4 Test Method

This test was performed in accordance with ANSI C63.10, clauses 6.9.3 and 11.8.1.

2.2.5 Environmental Conditions

Ambient Temperature	22.9 °C
Relative Humidity	57.3 %



2.2.6 Test Results

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):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	8.600	-	-	8.600	≥500.0
2442	-	8.160	-	-	8.160	≥500.0
2472	-	8.160	-	-	8.160	≥500.0

Table 11 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	12.720	-	-	12.720	-
2442	-	12.800	-	-	12.800	-
2472	-	12.840	-	-	12.840	-

Table 12 - 99% Bandwidth Results



Figure 33 - Core 1 (B) 2412 MHz (CH1) 99% Bandwidth



Figure 34 - Core 1 (B) 2412 MHz (CH1) 6 dB Bandwidth



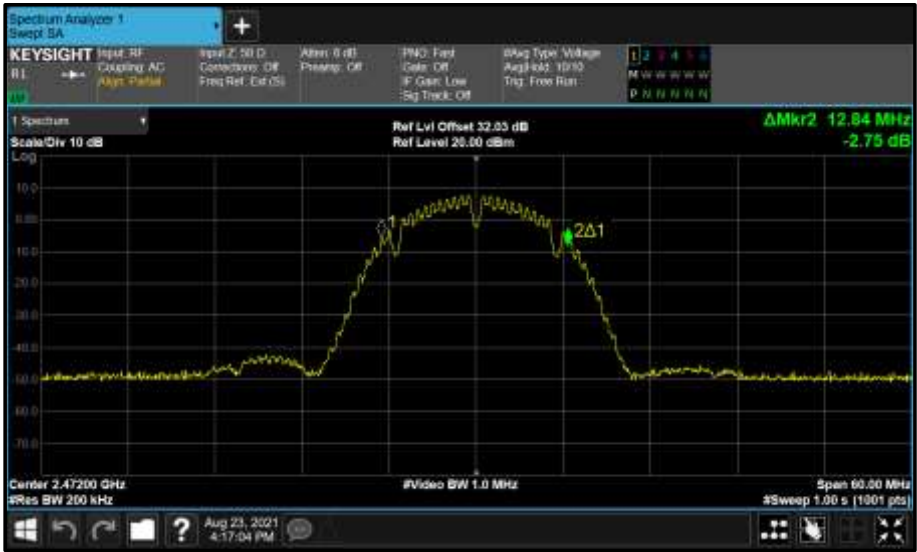


Figure 37 - Core 1 (B) 2472 MHz (CH13) 99% Bandwidth



Figure 38 - Core 1 (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:	802.11g	Duty Cycle (%):	-
Data Rate:	12 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	15.240	-	-	15.240	≥500.0
2442	-	15.240	-	-	15.240	≥500.0
2472	-	15.840	-	-	15.840	≥500.0

Table 13 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	16.560	-	-	16.560	-
2442	-	16.320	-	-	16.320	-
2472	-	16.500	-	-	16.500	-

Table 14 - 99% Bandwidth Results



Figure 39 - Core 1 (B) 2412 MHz (CH1) 99% Bandwidth



Figure 40 - Core 1 (B) 2412 MHz (CH1) 6 dB Bandwidth



Figure 41 - Core 1 (B) 2442 MHz (CH7) 99% Bandwidth





Figure 44 - Core 1 (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:	MCS2	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	16.740	-	-	16.740	≥500.0
2442	-	15.240	-	-	15.240	≥500.0
2472	-	17.400	-	-	17.400	≥500.0

Table 15 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	17.700	-	-	17.700	-
2442	-	17.520	-	-	17.520	-
2472	-	17.700	-	-	17.700	-

Table 16 - 99% Bandwidth Results



Figure 45 - Core 1 (B) 2412 MHz (CH1) 99% Bandwidth



Figure 46 - Core 1 (B) 2412 MHz (CH1) 6 dB Bandwidth



Figure 47 - Core 1 (B) 2442 MHz (CH7) 99% Bandwidth

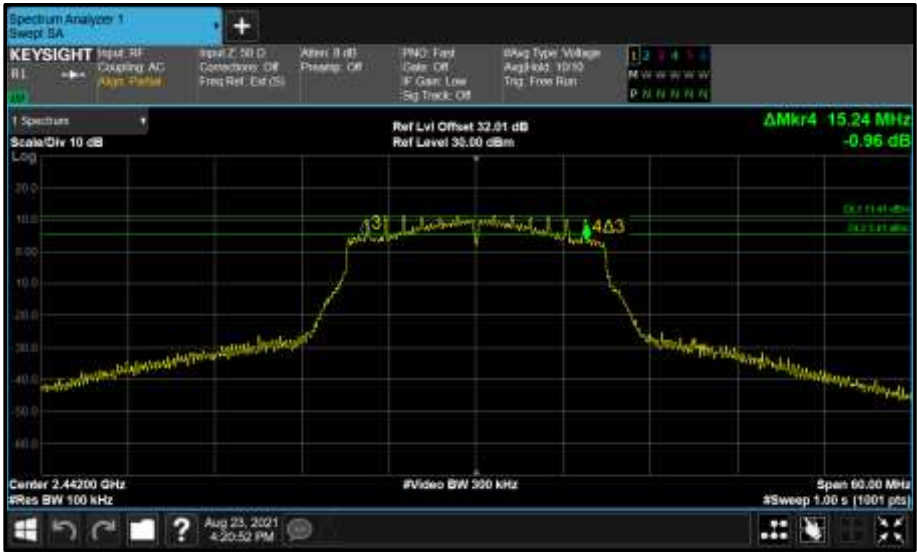


Figure 48 - Core 1 (B) 2442 MHz (CH7) 6 dB Bandwidth



Figure 49 - Core 1 (B) 2472 MHz (CH13) 99% Bandwidth



Figure 50 - Core 1 (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:	MCS2	DCCF (dB):	-
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	-
Active Port(s):	A+B (Core 0 + Core 1)	Active Chain(s):	0+1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	17.040	16.680	-	-	16.680	≥500.0
2442	15.240	15.300	-	-	15.240	≥500.0
2472	16.680	17.700	-	-	16.680	≥500.0

Table 17 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	17.700	17.700	-	-	17.700	-
2442	17.520	17.520	-	-	17.520	-
2472	17.640	17.640	-	-	17.640	-

Table 18 - 99% Bandwidth Results



Figure 51 - Core 0 (A) 2412 MHz (CH1) 99% Bandwidth



Figure 52 - Core 0 (A) 2412 MHz (CH1) 6 dB Bandwidth



Figure 53 - Core 1 (B) 2412 MHz (CH1) 99% Bandwidth



Figure 54 - Core 1 (B) 2412 MHz (CH1) 6 dB Bandwidth



Figure 55 - Core 0 (A) 2442 MHz (CH7) 99% Bandwidth



Figure 56 - Core 0 (A) 2442 MHz (CH7) 6 dB Bandwidth



Figure 57 - Core 1 (B) 2442 MHz (CH7) 99% Bandwidth

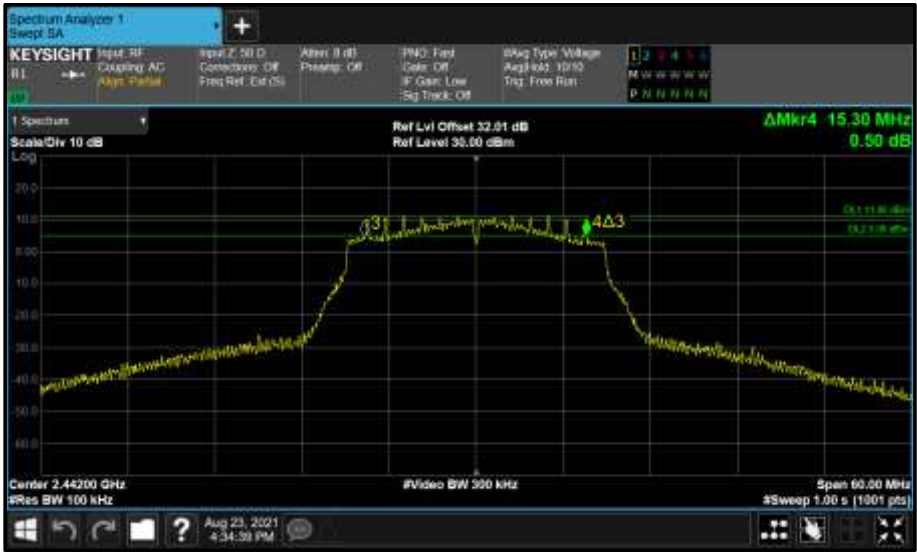


Figure 58 - Core 1 (B) 2442 MHz (CH7) 6 dB Bandwidth



Figure 59 - Core 0 (A) 2472 MHz (CH13) 99% Bandwidth

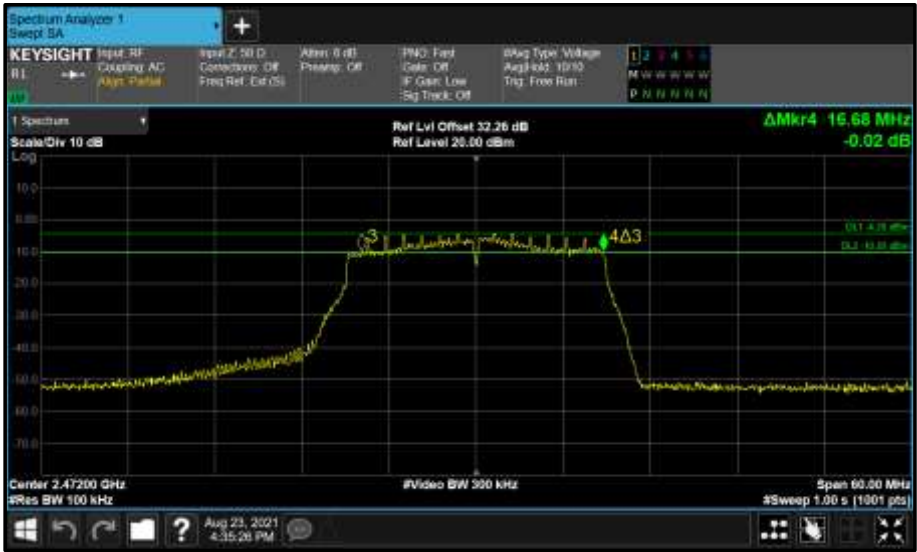


Figure 60 - Core 0 (A) 2472 MHz (CH13) 6 dB Bandwidth

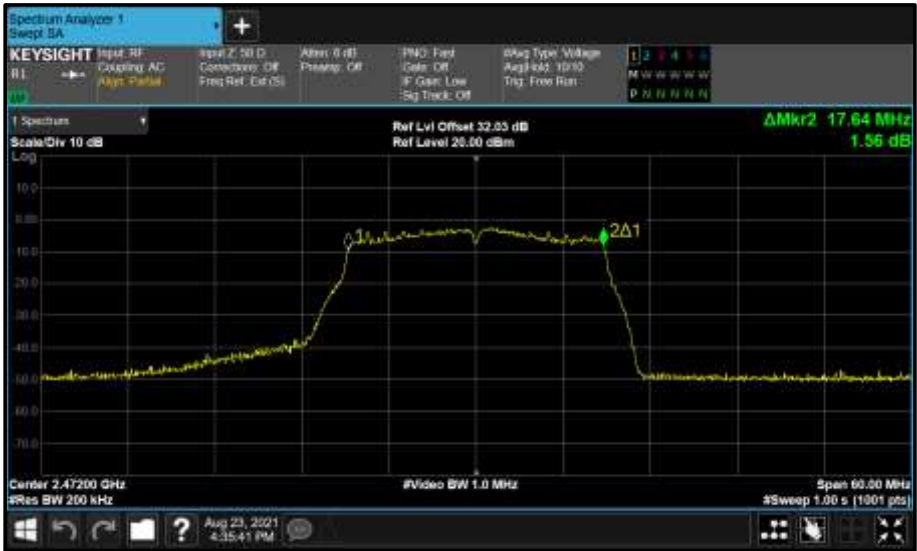


Figure 61 - Core 1 (B) 2472 MHz (CH13) 99% Bandwidth



Figure 62 - Core 1 (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:	802.11ax HE20 SU	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	17.520	-	-	17.520	≥500.0
2442	-	18.780	-	-	18.780	≥500.0
2472	-	19.020	-	-	19.020	≥500.0

Table 19 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	18.840	-	-	18.840	-
2442	-	18.840	-	-	18.840	-
2472	-	18.900	-	-	18.900	-

Table 20 - 99% Bandwidth Results



Figure 63 - Core 1 (B) 2412 MHz (CH1) 99% Bandwidth

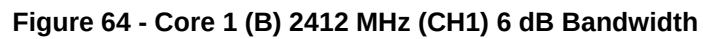




Figure 66 - Core 1 (B) 2442 MHz (CH7) 6 dB Bandwidth



Figure 67 - Core 1 (B) 2472 MHz (CH13) 99% Bandwidth



Figure 68 - Core 1 (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:	802.11ax HE20 SU	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	-
Active Port(s):	A+B (Core 0 + Core 1)	Active Chain(s):	0+1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	17.760	16.080	-	-	16.080	≥500.0
2442	19.020	18.780	-	-	18.780	≥500.0
2472	18.840	18.960	-	-	18.840	≥500.0

Table 21 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	18.840	18.840	-	-	18.840	-
2442	18.840	18.840	-	-	18.840	-
2472	18.900	18.900	-	-	18.900	-

Table 22 - 99% Bandwidth Results



Figure 69 - Core 0 (A) 2412 MHz (CH1) 99% Bandwidth



Figure 70 - Core 0 (A) 2412 MHz (CH1) 6 dB Bandwidth



Figure 71 - Core 1 (B) 2412 MHz (CH1) 99% Bandwidth



Figure 72 - Core 1 (B) 2412 MHz (CH1) 6 dB Bandwidth



Figure 73 - Core 0 (A) 2442 MHz (CH7) 99% Bandwidth



Figure 74 - Core 0 (A) 2442 MHz (CH7) 6 dB Bandwidth

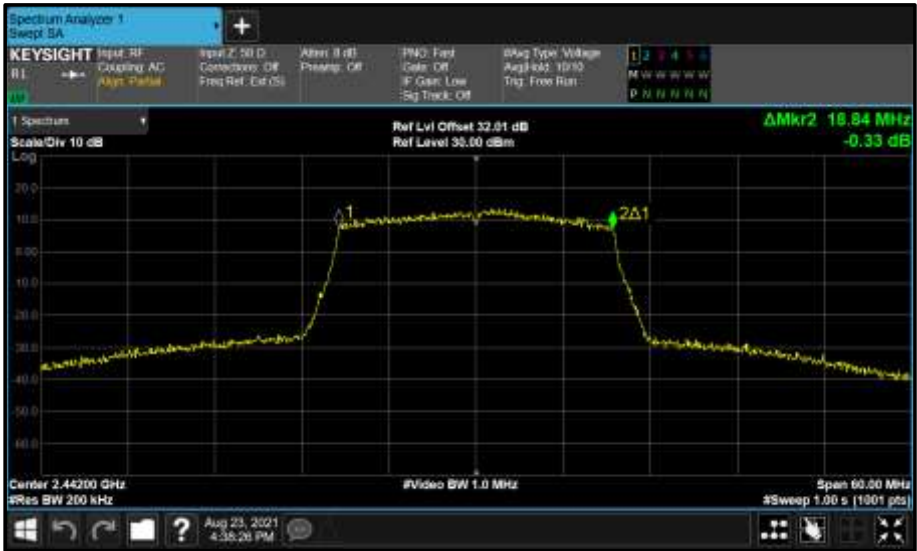


Figure 75 - Core 1 (B) 2442 MHz (CH7) 99% Bandwidth



Figure 76 - Core 1 (B) 2442 MHz (CH7) 6 dB Bandwidth

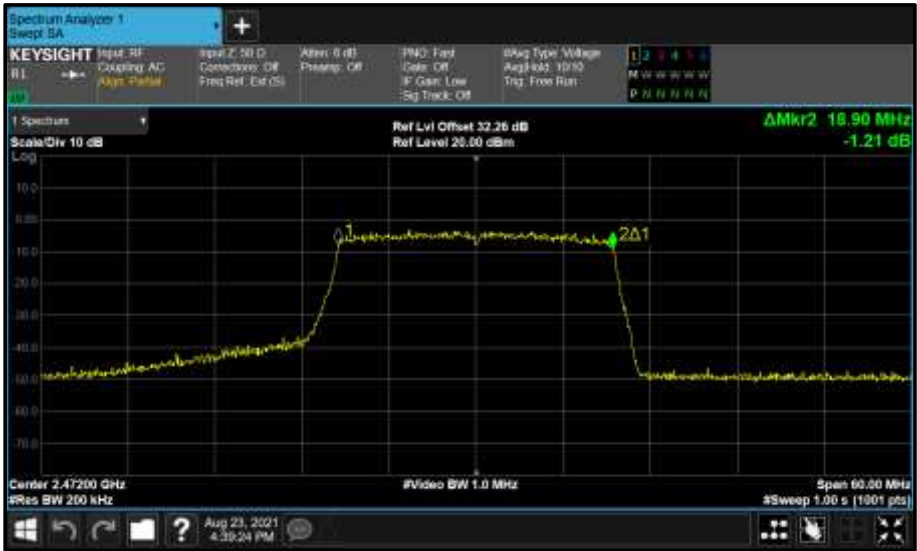


Figure 77 - Core 0 (A) 2472 MHz (CH13) 99% Bandwidth



Figure 78 - Core 0 (A) 2472 MHz (CH13) 6 dB Bandwidth

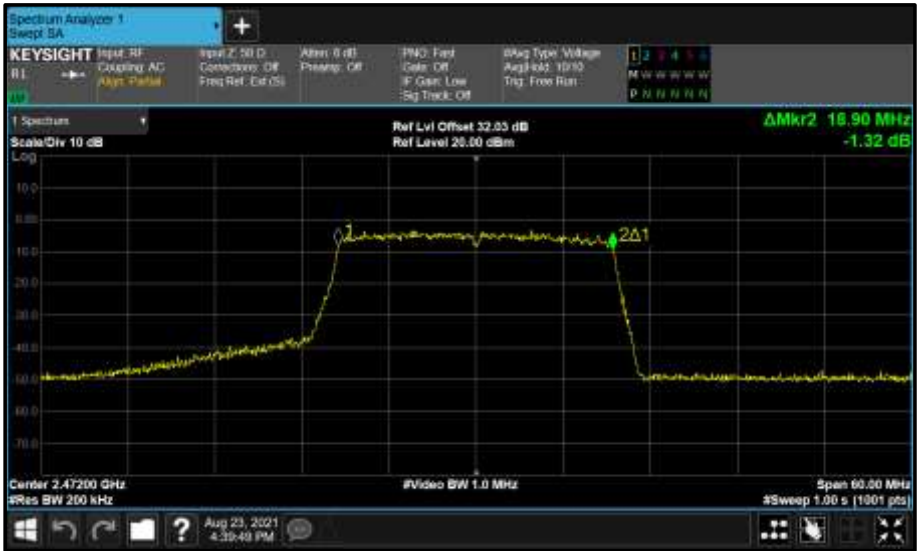


Figure 79 - Core 1 (B) 2472 MHz (CH13) 99% Bandwidth



Figure 80 - Core 1 (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:	802.11ax HE20 RU26	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	14.580	-	-	14.580	≥500.0
2442	-	2.160	-	-	2.160	≥500.0
2472	-	2.160	-	-	2.160	≥500.0

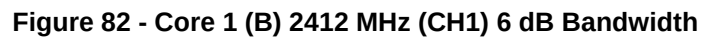
Table 23 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	18.420	-	-	18.420	-
2442	-	18.360	-	-	18.360	-
2472	-	18.660	-	-	18.660	-

Table 24 - 99% Bandwidth Results



Figure 81 - Core 1 (B) 2412 MHz (CH1) 99% Bandwidth



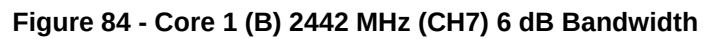




Figure 86 - Core 1 (B) 2472 MHz (CH13) 6 dB Bandwidth



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:	802.11ax HE20 RU26	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	-
Active Port(s):	A+B (Core 0 + Core 1)	Active Chain(s):	0+1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	2.160	17.100	-	-	2.160	≥500.0
2442	2.160	2.160	-	-	2.160	≥500.0
2472	2.160	15.840	-	-	2.160	≥500.0

Table 25 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	18.420	18.360	-	-	18.360	-
2442	18.360	18.360	-	-	18.360	-
2472	18.660	18.420	-	-	18.420	-

Table 26 - 99% Bandwidth Results



Figure 87 - Core 0 (A) 2412 MHz (CH1) 99% Bandwidth



Figure 88 - Core 0 (A) 2412 MHz (CH1) 6 dB Bandwidth



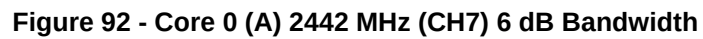
Figure 89 - Core 1 (B) 2412 MHz (CH1) 99% Bandwidth



Figure 90 - Core 1 (B) 2412 MHz (CH1) 6 dB Bandwidth



Figure 91 - Core 0 (A) 2442 MHz (CH7) 99% Bandwidth



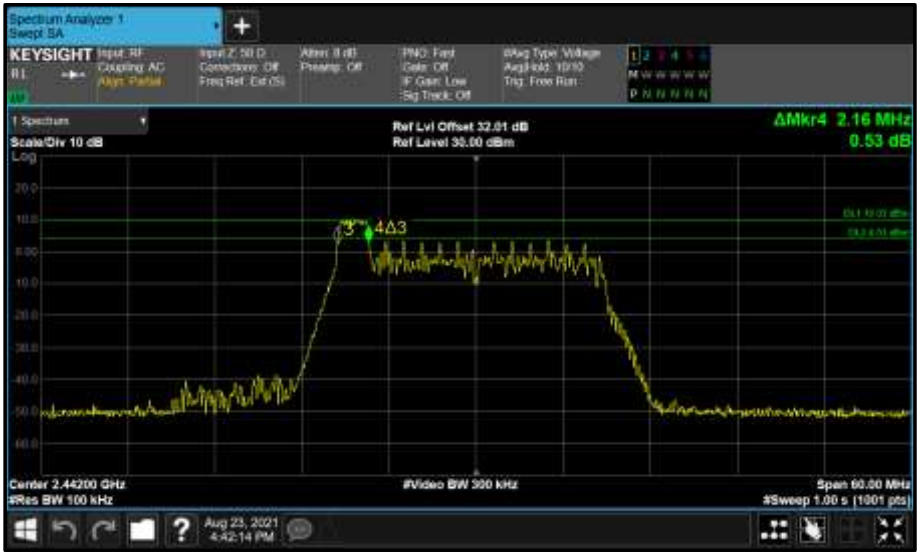


Figure 94 - Core 1 (B) 2442 MHz (CH7) 6 dB Bandwidth

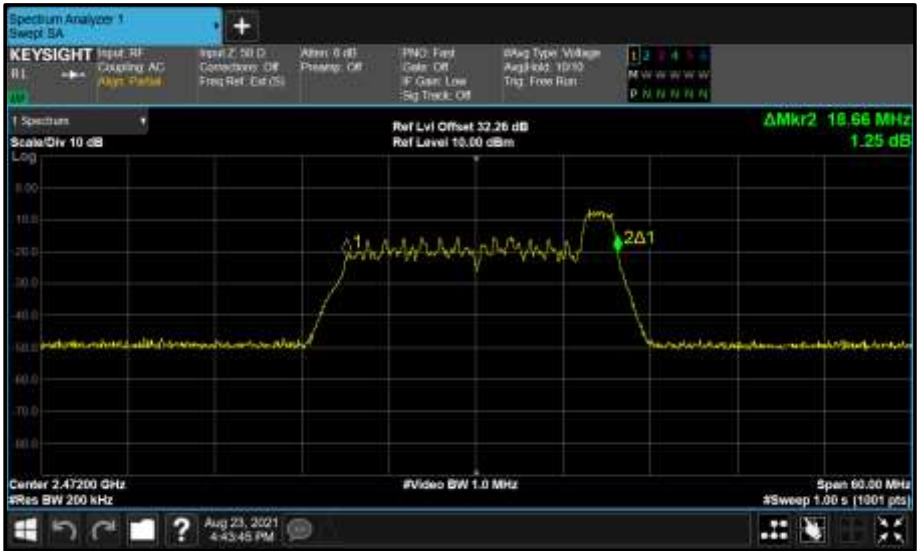


Figure 95 - Core 0 (A) 2472 MHz (CH13) 99% Bandwidth



Figure 96 - Core 0 (A) 2472 MHz (CH13) 6 dB Bandwidth



Figure 97 - Core 1 (B) 2472 MHz (CH13) 99% Bandwidth

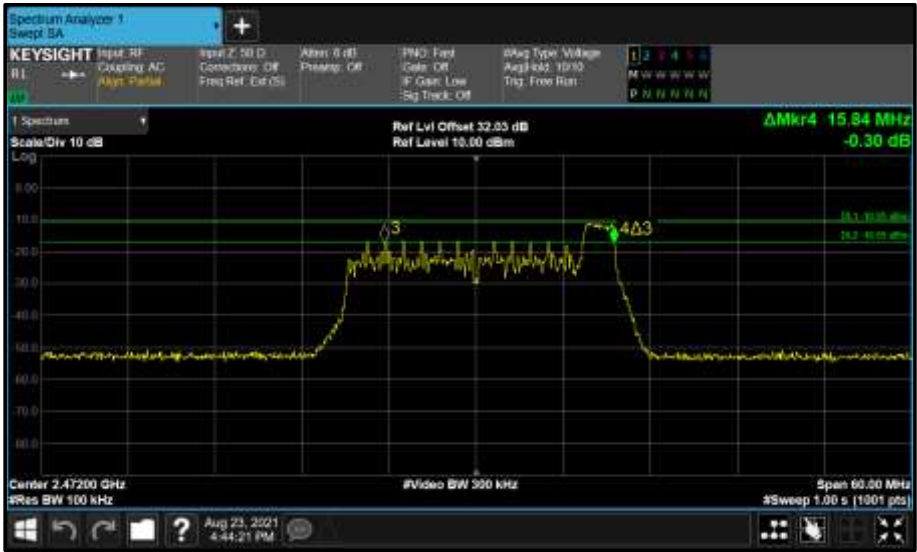


Figure 98 - Core 1 (B) 2472 MHz (CH13) 6 dB Bandwidth



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:	802.11ax HE20 RU52	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	17.100	-	-	17.100	≥500.0
2442	-	17.100	-	-	17.100	≥500.0
2472	-	17.100	-	-	17.100	≥500.0

Table 27 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	18.240	-	-	18.240	-
2442	-	18.180	-	-	18.180	-
2472	-	18.540	-	-	18.540	-

Table 28 - 99% Bandwidth Results



Figure 99 - Core 1 (B) 2412 MHz (CH1) 99% Bandwidth



Figure 100 - Core 1 (B) 2412 MHz (CH1) 6 dB Bandwidth



Figure 101 - Core 1 (B) 2442 MHz (CH7) 99% Bandwidth



Figure 102 - Core 1 (B) 2442 MHz (CH7) 6 dB Bandwidth

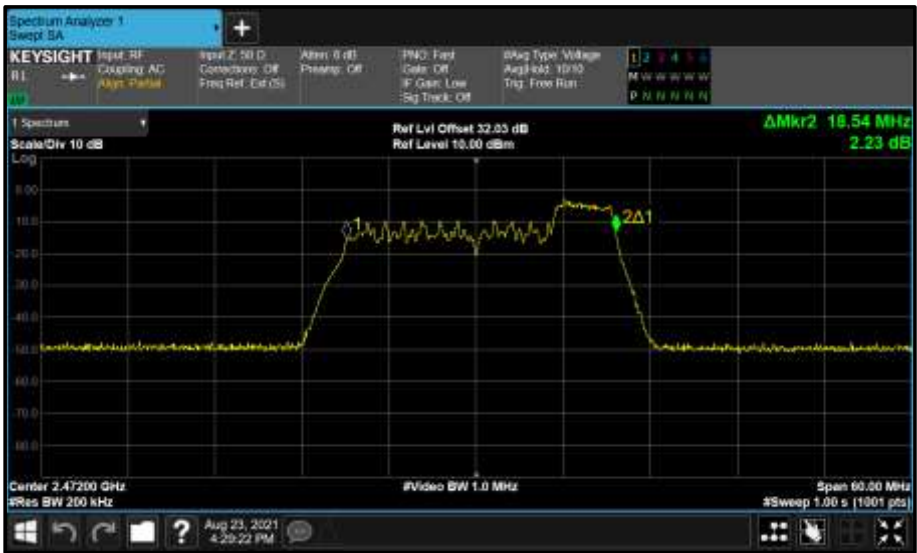


Figure 103 - Core 1 (B) 2472 MHz (CH13) 99% Bandwidth



Figure 104 - Core 1 (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:	802.11ax HE20 RU52	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	-
Active Port(s):	A+B (Core 0 + Core 1)	Active Chain(s):	0+1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	17.160	17.100	-	-	17.100	≥500.0
2442	17.100	17.100	-	-	17.100	≥500.0
2472	17.100	17.100	-	-	17.100	≥500.0

Table 29 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	18.180	18.180	-	-	18.180	-
2442	18.180	18.120	-	-	18.120	-
2472	18.540	18.240	-	-	18.240	-

Table 30 - 99% Bandwidth Results



Figure 105 - Core 0 (A) 2412 MHz (CH1) 99% Bandwidth



Figure 106 - Core 0 (A) 2412 MHz (CH1) 6 dB Bandwidth



Figure 107 - Core 1 (B) 2412 MHz (CH1) 99% Bandwidth



Figure 108 - Core 1 (B) 2412 MHz (CH1) 6 dB Bandwidth



Figure 109 - Core 0 (A) 2442 MHz (CH7) 99% Bandwidth



Figure 110 - Core 0 (A) 2442 MHz (CH7) 6 dB Bandwidth



Figure 111 - Core 1 (B) 2442 MHz (CH7) 99% Bandwidth



Figure 112 - Core 1 (B) 2442 MHz (CH7) 6 dB Bandwidth



Figure 113 - Core 0 (A) 2472 MHz (CH13) 99% Bandwidth





Figure 116 - Core 1 (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:	802.11ax HE20 RU106	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	17.220	-	-	17.220	≥500.0
2442	-	17.220	-	-	17.220	≥500.0
2472	-	17.220	-	-	17.220	≥500.0

Table 31 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	-	18.180	-	-	18.180	-
2442	-	18.120	-	-	18.120	-
2472	-	18.480	-	-	18.480	-

Table 32 - 99% Bandwidth Results



Figure 117 - Core 1 (B) 2412 MHz (CH1) 99% Bandwidth



Figure 118 - Core 1 (B) 2412 MHz (CH1) 6 dB Bandwidth



Figure 119 - Core 1 (B) 2442 MHz (CH7) 99% Bandwidth

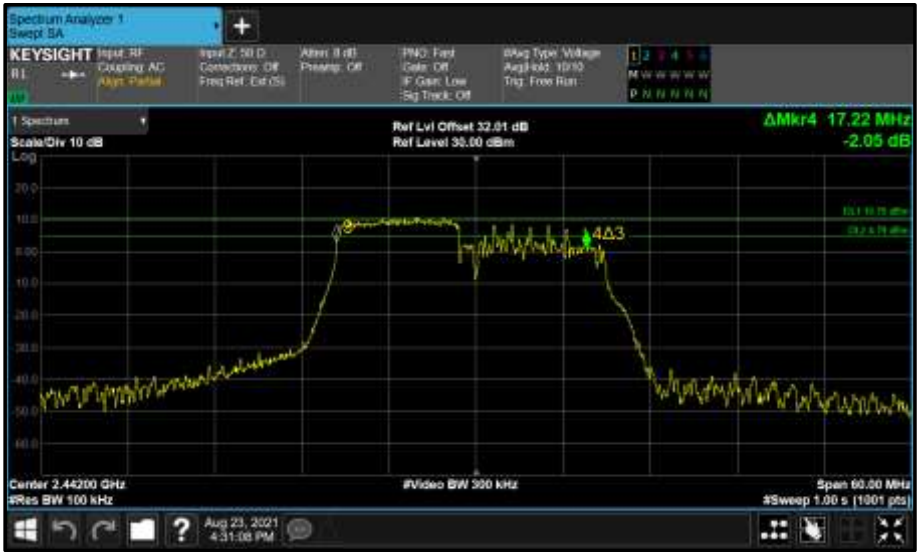


Figure 120 - Core 1 (B) 2442 MHz (CH7) 6 dB Bandwidth

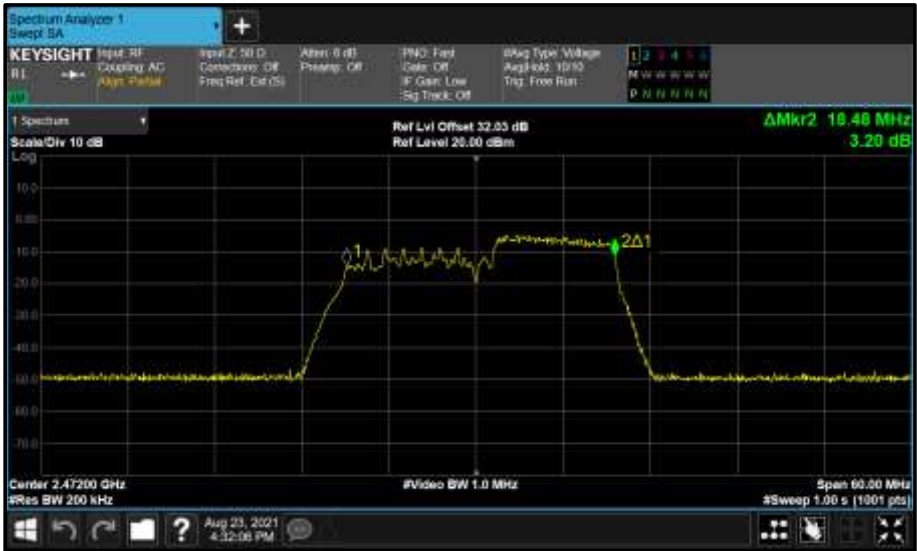


Figure 121 - Core 1 (B) 2472 MHz (CH13) 99% Bandwidth



Figure 122 - Core 1 (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:	802.11ax HE20 RU106	Duty Cycle (%):	-
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	-
Active Port(s):	A+B (Core 0 + Core 1)	Active Chain(s):	0+1

Test Frequency (MHz)	6 dB Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	17.160	17.220	-	-	17.160	≥500.0
2442	17.220	17.220	-	-	17.220	≥500.0
2472	17.220	17.220	-	-	17.220	≥500.0

Table 33 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)					Limit (kHz)
	A	B	C	D	Minimum	
2412	18.180	18.060	-	-	18.060	-
2442	18.180	18.060	-	-	18.060	-
2472	18.480	18.240	-	-	18.240	-

Table 34 - 99% Bandwidth Results



Figure 123 - Core 0 (A) 2412 MHz (CH1) 99% Bandwidth

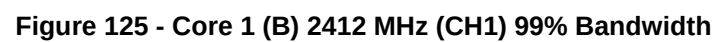
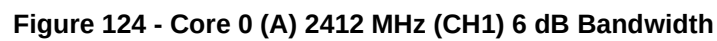




Figure 126 - Core 1 (B) 2412 MHz (CH1) 6 dB Bandwidth



Figure 127 - Core 0 (A) 2442 MHz (CH7) 99% Bandwidth



Figure 128 - Core 0 (A) 2442 MHz (CH7) 6 dB Bandwidth



Figure 129 - Core 1 (B) 2442 MHz (CH7) 99% Bandwidth



Figure 130 - Core 1 (B) 2442 MHz (CH7) 6 dB Bandwidth



Figure 131 - Core 0 (A) 2472 MHz (CH13) 99% Bandwidth





Figure 134 - Core 1 (B) 2472 MHz (CH13) 6 dB Bandwidth

FCC 47 CFR Part 15, Limit Clause 15.247(a)(2) and ISSED 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
Multimeter	Iso-tech	IDM101	2421	12	30-Oct-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
AC Programmable Power Supply	iTech	IT7324	5225	-	O/P Mon
MXA Signal Analyser	Keysight Technologies	N9020B	5528	24	04-Mar-2022
Signal Commissioning Unit	TUV SUD	SCU001	5546	12	16-Apr-2022

Table 35

O/P Mon – Output Monitored using calibrated equipment



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

A2485, S/N: CQ2R1P6HF2 - Modification State 0

2.3.3 Date of Test

23-August-2021

2.3.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 11.9.2.3.2 Method AVGPM-G

MIMO output port summing was performed in accordance with KDB 662911 D01. For the CDD results, the Directional Gain was calculated in accordance with clause F)2)f)(ii) using the calculations from F)2)f)(i) with worst-case individual gain and an array gain of zero.

2.3.5 Environmental Conditions

Ambient Temperature	22.9 °C
Relative Humidity	57.3 %



2.3.6 Test Results

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 11.9.2.3.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11b	Duty Cycle (%):	98.8
Data Rate:	1 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	7.00
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	-	20.69	-	-	-	29.00	-8.31
2442	-	22.35	-	-	-	29.00	-6.65
2472	-	15.50	-	-	-	29.00	-13.50

Table 36 - FCC Maximum Conducted (average) 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	-	20.69	-	-	-	30.00	-9.31	27.69	36.00	-8.31
2442	-	22.35	-	-	-	30.00	-7.65	29.35	36.00	-6.65
2472	-	15.50	-	-	-	30.00	-14.50	22.50	36.00	-13.50

Table 37 - ISED Maximum Conducted (average) 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 11.9.2.3.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11g	Duty Cycle (%):	97.5
Data Rate:	12 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	7.00
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	-	17.25	-	-	-	29.00	-11.75
2442	-	22.35	-	-	-	29.00	-6.65
2472	-	7.93	-	-	-	29.00	-21.07

Table 38 - FCC Maximum Conducted (average) 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	-	17.25	-	-	-	30.00	-12.75	24.25	36.00	-11.75
2442	-	22.35	-	-	-	30.00	-7.65	29.35	36.00	-6.65
2472	-	7.93	-	-	-	30.00	-22.07	14.93	36.00	-21.07

Table 39 - ISFD Maximum Conducted (average) 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 11.9.2.3.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11n HT20	Duty Cycle (%):	96.5
Modulation Coding Scheme:	MCS2	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	7.00
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	-	16.58	-	-	-	29.00	-12.42
2442	-	22.24	-	-	-	29.00	-6.76
2472	-	7.34	-	-	-	29.00	-21.66

Table 40 - FCC Maximum Conducted (average) 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	-	16.58	-	-	-	30.00	-13.42	23.58	36.00	-12.42
2442	-	22.24	-	-	-	30.00	-7.76	29.24	36.00	-6.76
2472	-	7.34	-	-	-	30.00	-22.66	14.34	36.00	-21.66

Table 41 - ISFD Maximum Conducted (average) 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 11.9.2.3.2
Additional Reference(s):	662911 D01 v02r01 F)2)f(i), 662911 D01 v02r01 E)1)		

DUT Configuration			
Mode:	802.11n HT20	Duty Cycle (%):	96.4
Modulation Coding Scheme:	MCS2	DCCF (dB):	-
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	7.00
Active Port(s):	A+B (Core 0 + Core 1)	Active Chain(s):	0+1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	15.66	15.60	-	-	18.64	29.00	-10.36
2442	21.97	22.19	-	-	25.09	29.00	-3.91
2472	6.92	6.76	-	-	9.85	29.00	-19.15

Table 42 - FCC Maximum Conducted (average) 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	15.66	15.60	-	-	18.64	30.00	-11.36	25.64	36.00	-10.36
2442	21.97	22.19	-	-	25.09	30.00	-4.91	32.09	36.00	-3.91
2472	6.92	6.76	-	-	9.85	30.00	-20.15	16.85	36.00	-19.15

Table 43 - ISFD Maximum Conducted (average) 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 11.9.2.3.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE20 SU	Duty Cycle (%):	95.7
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	7.00
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	-	15.75	-	-	-	29.00	-13.25
2442	-	22.34	-	-	-	29.00	-6.66
2472	-	6.67	-	-	-	29.00	-22.33

Table 44 - FCC Maximum Conducted (average) 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	-	15.75	-	-	-	30.00	-14.25	22.75	36.00	-13.25
2442	-	22.34	-	-	-	30.00	-7.66	29.34	36.00	-6.66
2472	-	6.67	-	-	-	30.00	-23.33	13.67	36.00	-22.33

Table 45 - ISSED Maximum Conducted (average) 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 11.9.2.3.2
Additional Reference(s):	662911 D01 v02r01 F)2)f(i), 662911 D01 v02r01 E)1)		

DUT Configuration			
Mode:	802.11ax HE20 SU	Duty Cycle (%):	95.7
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	7.00
Active Port(s):	A+B (Core 0 + Core 1)	Active Chain(s):	0+1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	15.00	15.22	-	-	18.10	29.00	-10.90
2442	21.76	21.83	-	-	24.80	29.00	-4.20
2472	6.00	5.64	-	-	8.82	29.00	-20.18

Table 46 - FCC Maximum Conducted (average) 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	15.00	15.22	-	-	18.10	30.00	-11.90	25.10	36.00	-10.90
2442	21.76	21.83	-	-	24.80	30.00	-5.20	31.80	36.00	-4.20
2472	6.00	5.64	-	-	8.82	30.00	-21.18	15.82	36.00	-20.18

Table 47 - ISSED Maximum Conducted (average) 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 11.9.2.3.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE20 RU26	Duty Cycle (%):	96.6
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	7.00
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	-	14.22	-	-	-	29.00	-14.78
2442	-	14.48	-	-	-	29.00	-14.52
2472	-	-3.28	-	-	-	29.00	-32.28

Table 48 - FCC Maximum Conducted (average) 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	-	14.22	-	-	-	30.00	-15.78	21.22	36.00	-14.78
2442	-	14.48	-	-	-	30.00	-15.52	21.48	36.00	-14.52
2472	-	-3.28	-	-	-	30.00	-33.28	3.72	36.00	-32.28

Table 49 - ISSED Maximum Conducted (average) 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 11.9.2.3.2
Additional Reference(s):	662911 D01 v02r01 F)2)f(i), 662911 D01 v02r01 E)1)		

DUT Configuration			
Mode:	802.11ax HE20 RU26	Duty Cycle (%):	96.5
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	7.00
Active Port(s):	A+B (Core 0 + Core 1)	Active Chain(s):	0+1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	14.30	14.21	-	-	17.27	29.00	-11.73
2442	14.26	14.35	-	-	17.31	29.00	-11.69
2472	-6.37	-6.03	-	-	-3.19	29.00	-32.19

Table 50 - FCC Maximum Conducted (average) 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	14.30	14.21	-	-	17.27	30.00	-12.73	24.27	36.00	-11.73
2442	14.26	14.35	-	-	17.31	30.00	-12.69	24.31	36.00	-11.69
2472	-6.37	-6.03	-	-	-3.19	30.00	-33.19	3.81	36.00	-32.19

Table 51 - ISSED Maximum Conducted (average) 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 11.9.2.3.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE20 RU52	Duty Cycle (%):	96.3
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	7.00
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	-	17.24	-	-	-	29.00	-11.76
2442	-	17.35	-	-	-	29.00	-11.65
2472	-	-0.21	-	-	-	29.00	-29.21

Table 52 - FCC Maximum Conducted (average) 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	-	17.24	-	-	-	30.00	-12.76	24.24	36.00	-11.76
2442	-	17.35	-	-	-	30.00	-12.65	24.35	36.00	-11.65
2472	-	-0.21	-	-	-	30.00	-30.21	6.79	36.00	-29.21

Table 53 - ISSED Maximum Conducted (average) 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 11.9.2.3.2
Additional Reference(s):	662911 D01 v02r01 F)2)f(i), 662911 D01 v02r01 E)1)		

DUT Configuration			
Mode:	802.11ax HE20 RU52	Duty Cycle (%):	96.3
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	7.00
Active Port(s):	A+B (Core 0 + Core 1)	Active Chain(s):	0+1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	17.39	17.26	-	-	20.28	29.00	-8.72
2442	17.00	17.38	-	-	20.21	29.00	-8.79
2472	-0.37	-0.20	-	-	2.70	29.00	-26.30

Table 54 - FCC Maximum Conducted (average) 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	17.39	17.26	-	-	20.28	30.00	-9.72	27.28	36.00	-8.72
2442	17.00	17.38	-	-	20.21	30.00	-9.79	27.21	36.00	-8.79
2472	-0.37	-0.20	-	-	2.70	30.00	-27.30	9.70	36.00	-26.30

Table 55 - ISFD Maximum Conducted (average) 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 11.9.2.3.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11ax HE20 RU106	Duty Cycle (%):	97.8
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	7.00
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	-	18.80	-	-	-	29.00	-10.20
2442	-	20.43	-	-	-	29.00	-8.57
2472	-	1.19	-	-	-	29.00	-27.81

Table 56 - FCC Maximum Conducted (average) 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	-	18.80	-	-	-	30.00	-11.20	25.80	36.00	-10.20
2442	-	20.43	-	-	-	30.00	-9.57	27.43	36.00	-8.57
2472	-	1.19	-	-	-	30.00	-28.81	8.19	36.00	-27.81

Table 57 - ISFD Maximum Conducted (average) 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 11.9.2.3.2
Additional Reference(s):	662911 D01 v02r01 F)2)f(i), 662911 D01 v02r01 E)1)		

DUT Configuration			
Mode:	802.11ax HE20 RU106	Duty Cycle (%):	97.7
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	-
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	7.00
Active Port(s):	A+B (Core 0 + Core 1)	Active Chain(s):	0+1

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2412	17.57	17.11	-	-	20.35	29.00	-8.65
2442	20.00	20.28	-	-	23.15	29.00	-5.85
2472	-0.12	-0.07	-	-	2.88	29.00	-26.12

Table 58 - FCC Maximum Conducted (average) 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	17.57	17.11	-	-	20.35	30.00	-9.65	27.35	36.00	-8.65
2442	20.00	20.28	-	-	23.15	30.00	-6.85	30.15	36.00	-5.85
2472	-0.12	-0.07	-	-	2.88	30.00	-27.12	9.88	36.00	-26.12

Table 59 - ISFD Maximum Conducted (average) 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
Multimeter	Iso-tech	IDM101	2421	12	30-Oct-2021
Hygrometer	Rotronic	I-1000	3220	12	16-Oct-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
AC Programmable Power Supply	iTech	IT7324	5225	-	O/P Mon
Signal Commissioning Unit	TUV SUD	SCU001	5546	12	16-Apr-2022

Table 60

O/P Mon – Output Monitored using calibrated equipment



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

A2485, S/N: HV9QMW620K - Modification State 0

2.4.3 Date of Test

19-July-2021 to 28-July-2021

2.4.4 Test Method

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

In the 30 MHz to 1 GHz range pre-scans were only performed on the main radio mid channel (2437 MHz).

The plots shown are the characterization of the EUT. The limits on the plots represent the most stringent case for restricted bands, (54/74 dBuV/m @ 3m and 64/84 dBuV/m @ 1m) when compared to 20 dBc (Peak) and 30 dBc (Average) 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 $\mu\text{V/m}$:
 $10^{(\text{Field Strength in dBuV/m} / 20)}$.

Above 18 GHz, the measurement distance was reduced to 1 m. The limit line was increased by $20 \cdot \text{LOG}(3/1) = 9.54$ dB.

Spurious Radiated Emissions measurements were performed, with the device operating in MIMO 2TX during tests on the Main Radio, as this was defined as worst case.

2.4.5 Example Test Setup Diagram

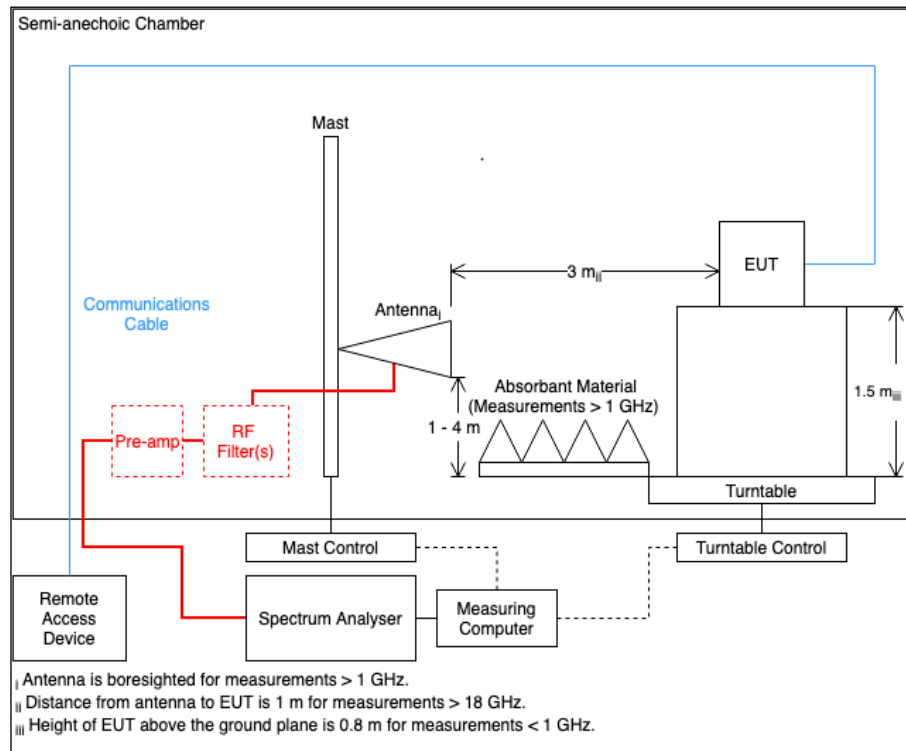


Figure 135

2.4.6 Environmental Conditions

Ambient Temperature	21.0 - 23.3 °C
Relative Humidity	39.2 - 63.0 %

2.4.7 Test Results

2.4 GHz WLAN

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

Table 61 - 2412 MHz (CH1), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

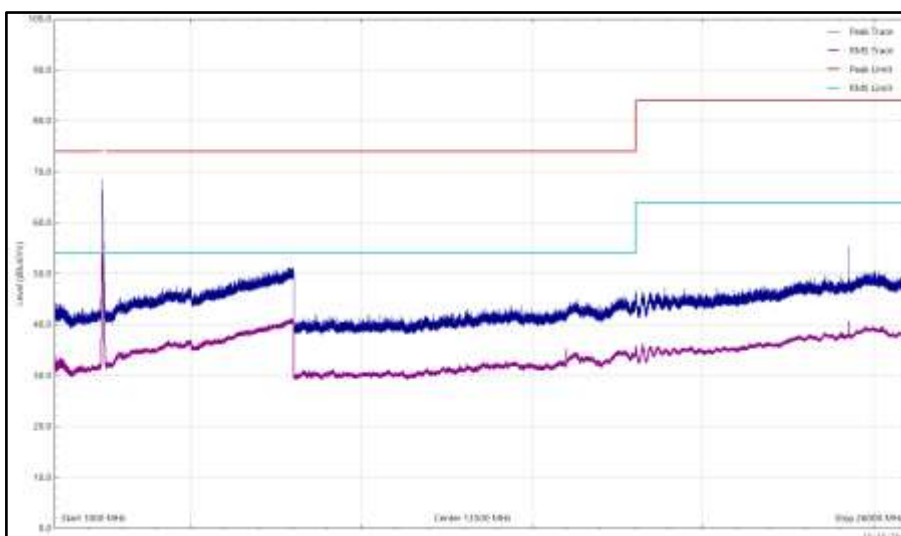


Figure 136 - 2412 MHz (CH1), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal

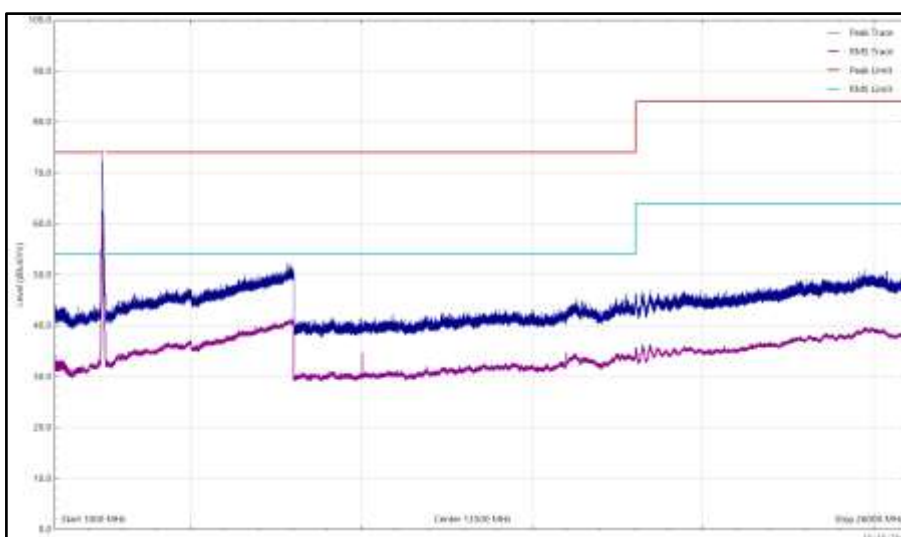


Figure 137 - 2412 MHz (CH1), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical

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

Table 62 - 2437 MHz (CH6), HT20, CDD, Core 0 + Core 1, 30 MHz to 26 GHz

*No emissions found within 10 dB of the limit.

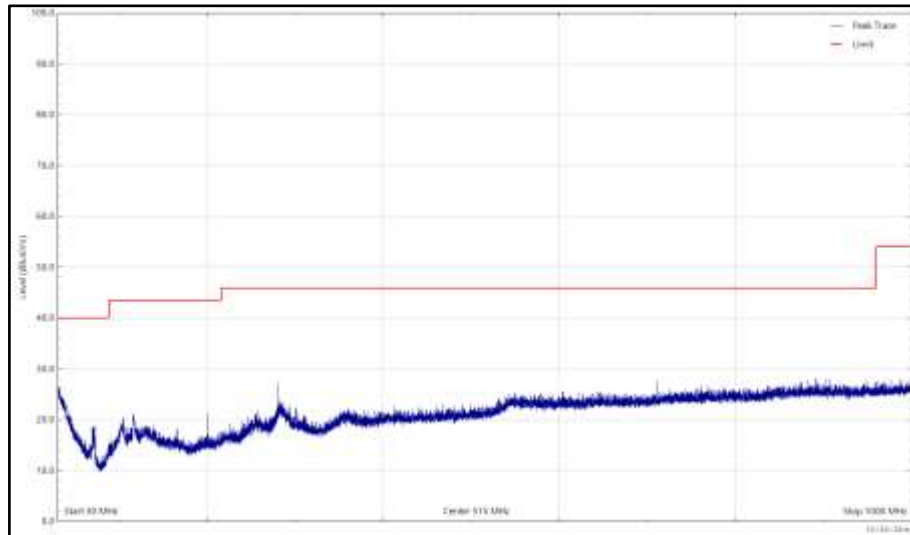


Figure 138 - 2437 MHz (CH6), HT20, CDD, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

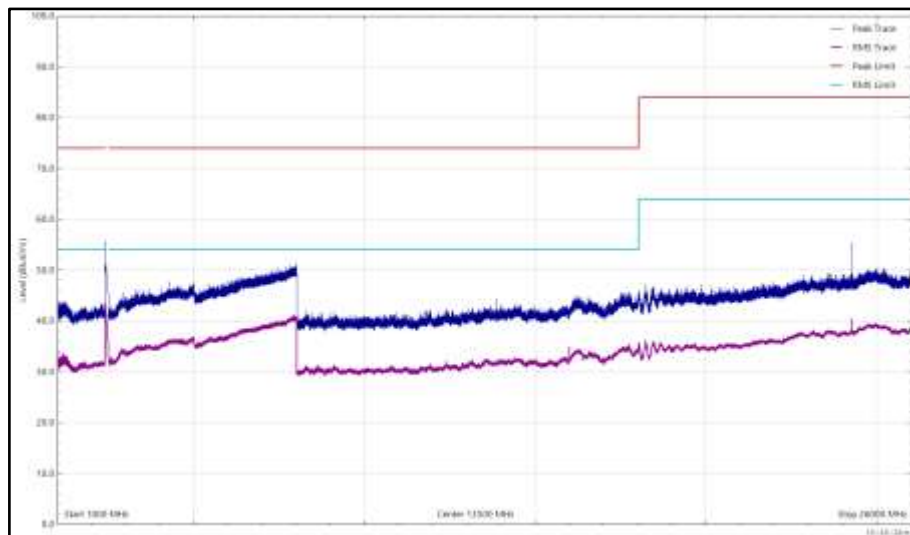


Figure 139 - 2437 MHz (CH6), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal

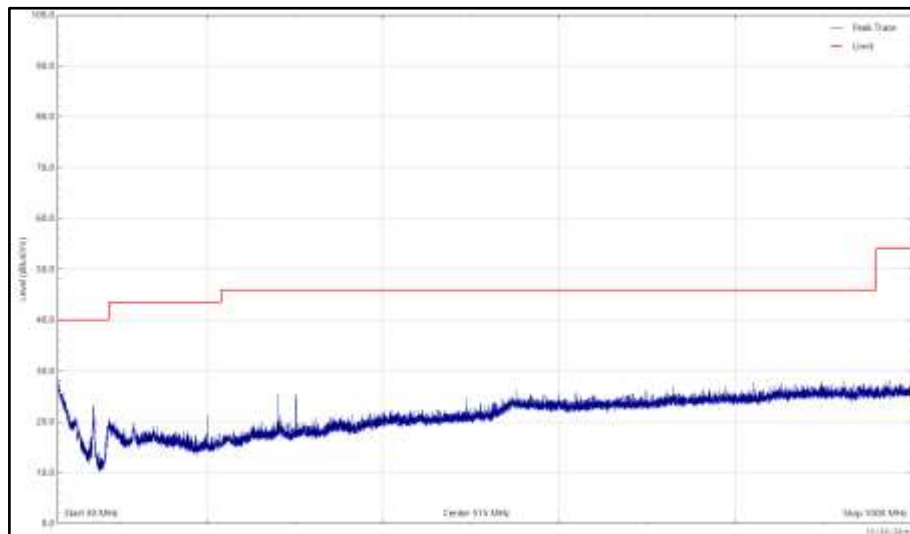


Figure 140 - 2437 MHz (CH6), HT20, CDD, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

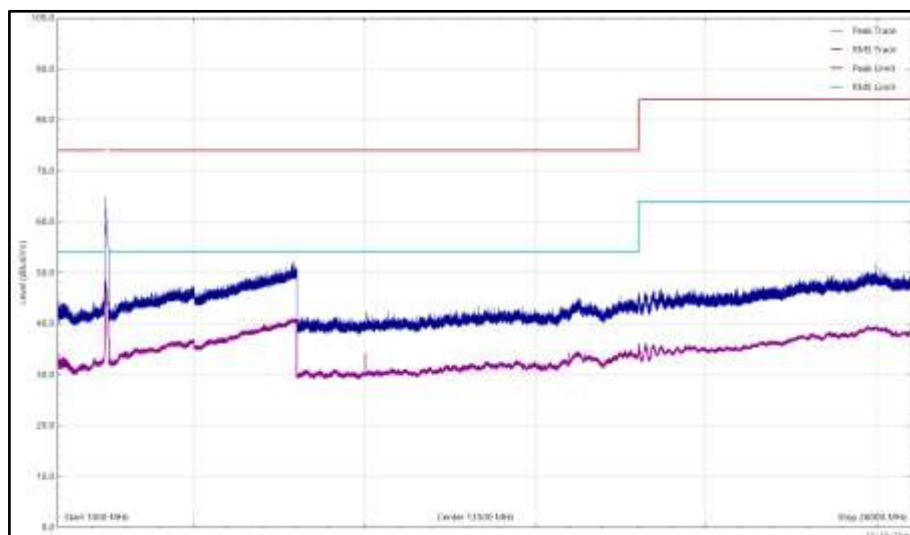


Figure 141 - 2437 MHz (CH6), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical

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

Table 63 - 2472 MHz (CH13), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

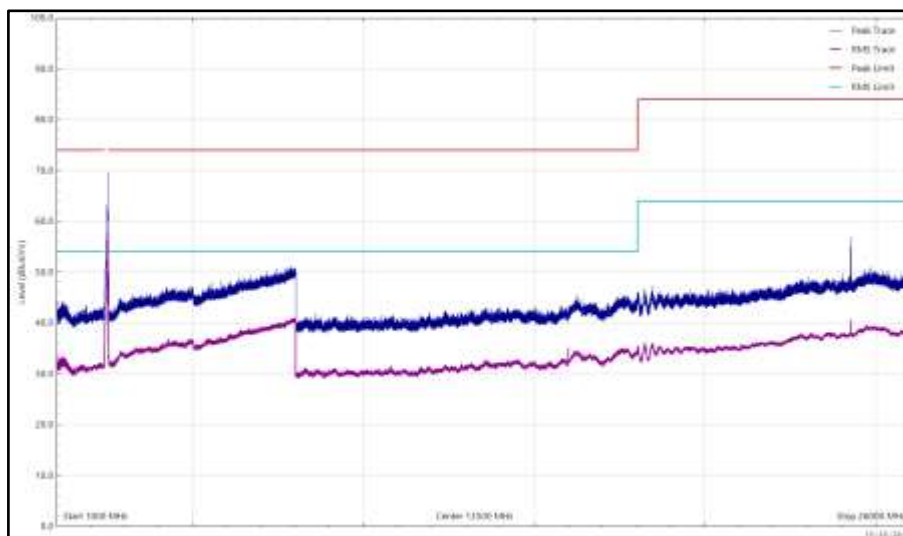


Figure 142 - 2472 MHz (CH13), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal

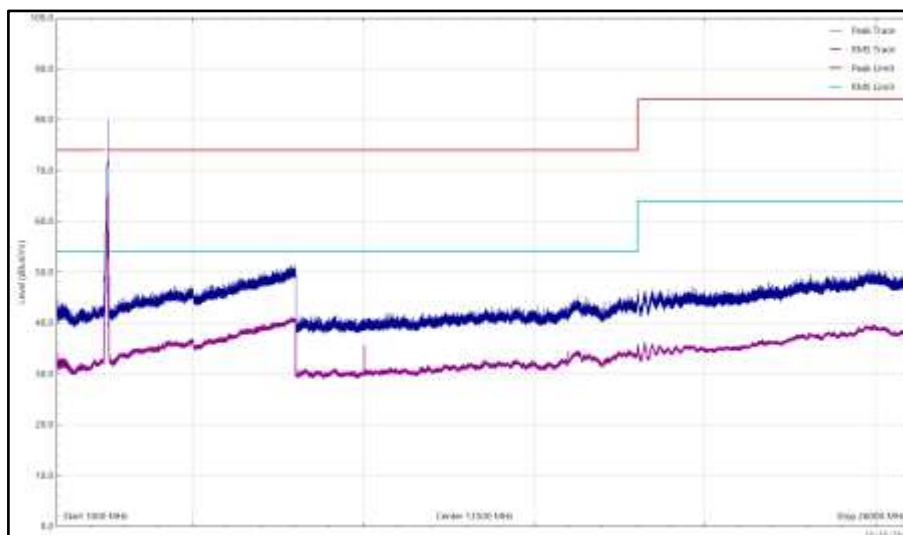


Figure 143 - 2472 MHz (CH13), HT20, CDD, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical



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

Table 64 - 2412 MHz (CH1), 802.11g, Core 0, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

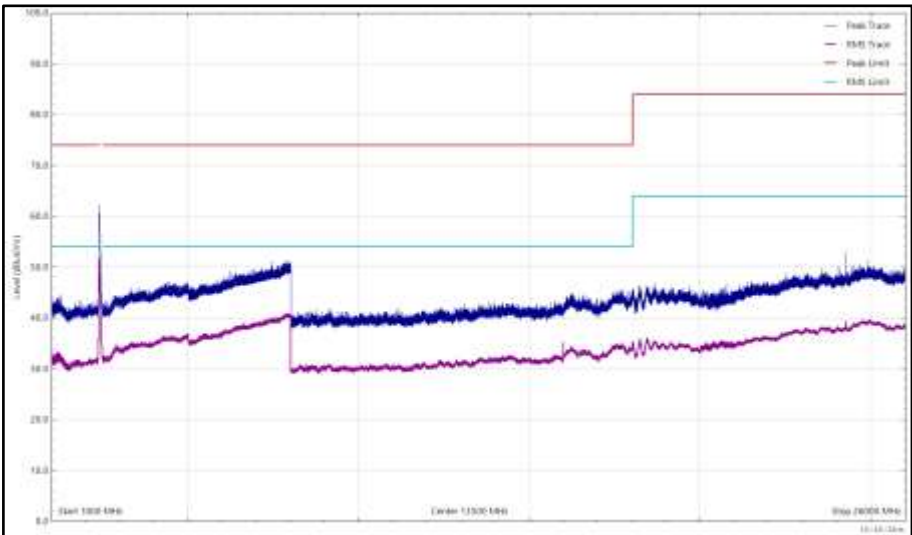


Figure 144 - 2412 MHz (CH1), 802.11g, Core 0, 1 GHz to 26 GHz, Horizontal

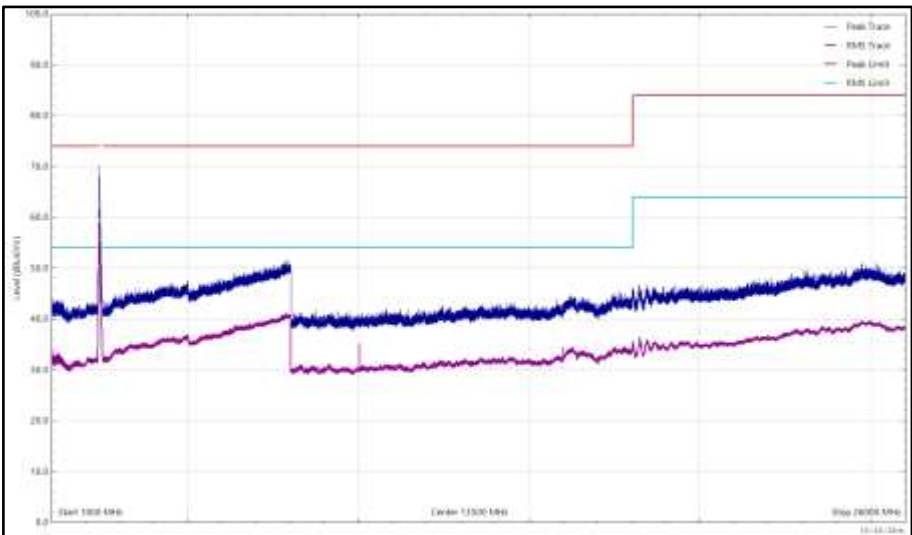


Figure 145 - 2412 MHz (CH1), 802.11g, Core 0, 1 GHz to 26 GHz, Vertical

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
280.004	26.2	46.0	-19.8	Q-Peak	120	103	Horizontal

Table 65 - 2437 MHz (CH6), 802.11g, Core 0, 30 MHz to 26 GHz

No other emissions found within 10 dB of the limit.

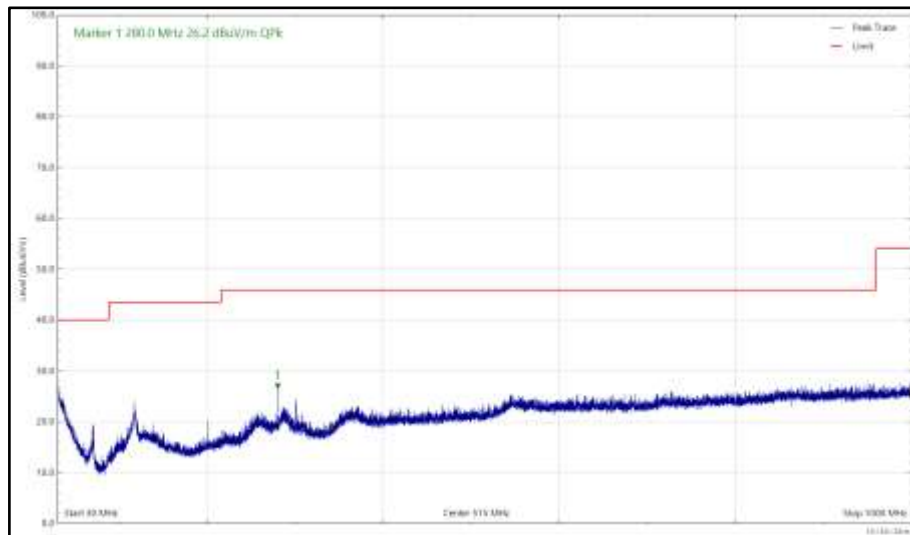


Figure 146 - 2437 MHz (CH6), 802.11g, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

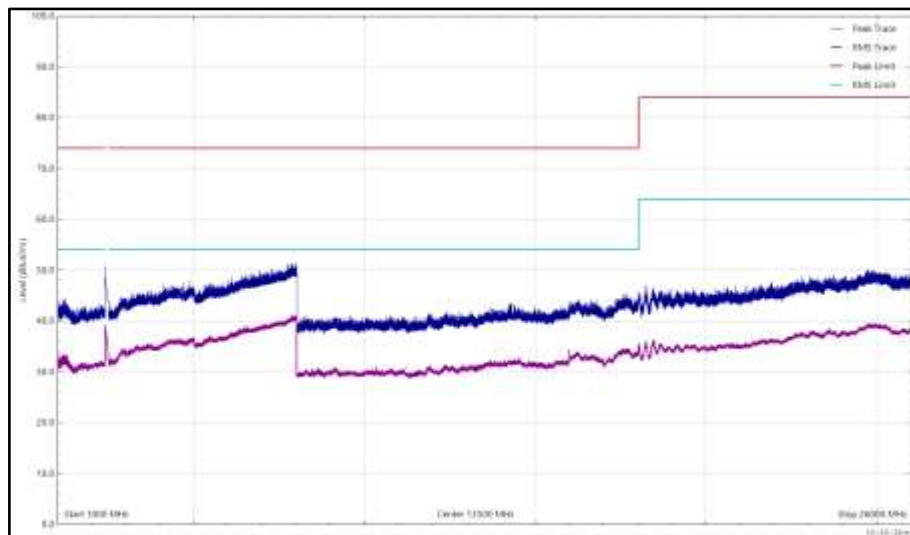


Figure 147 - 2437 MHz (CH6), 802.11g, Core 0, 1 GHz to 26 GHz, Horizontal

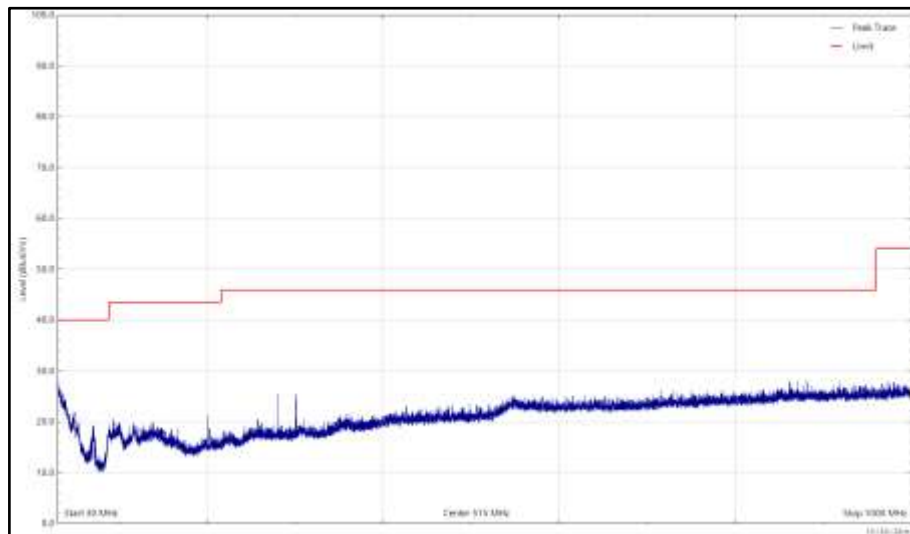


Figure 148 - 2437 MHz (CH6), 802.11g, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

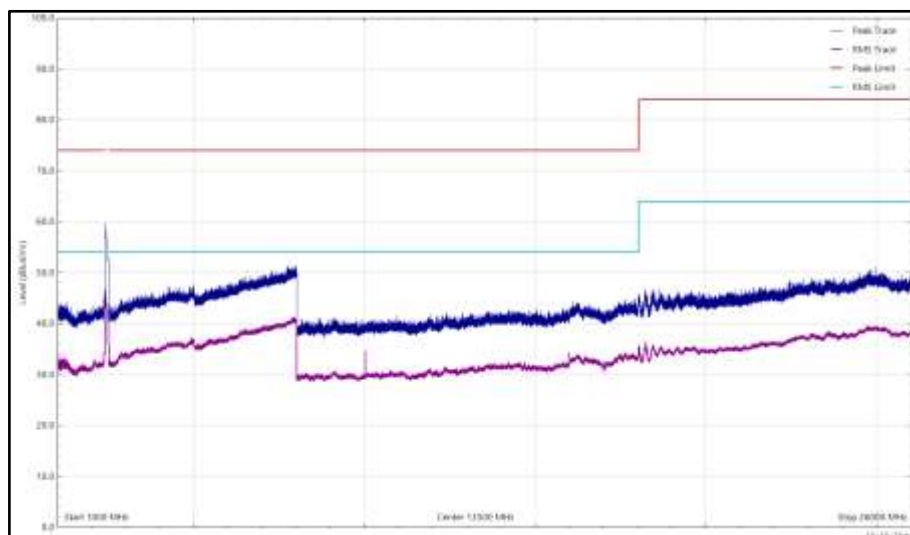


Figure 149 - 2437 MHz (CH6), 802.11g, Core 0, 1 GHz to 26 GHz, Vertical



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

Table 66 - 2472 MHz (CH13), 802.11g, Core 0, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

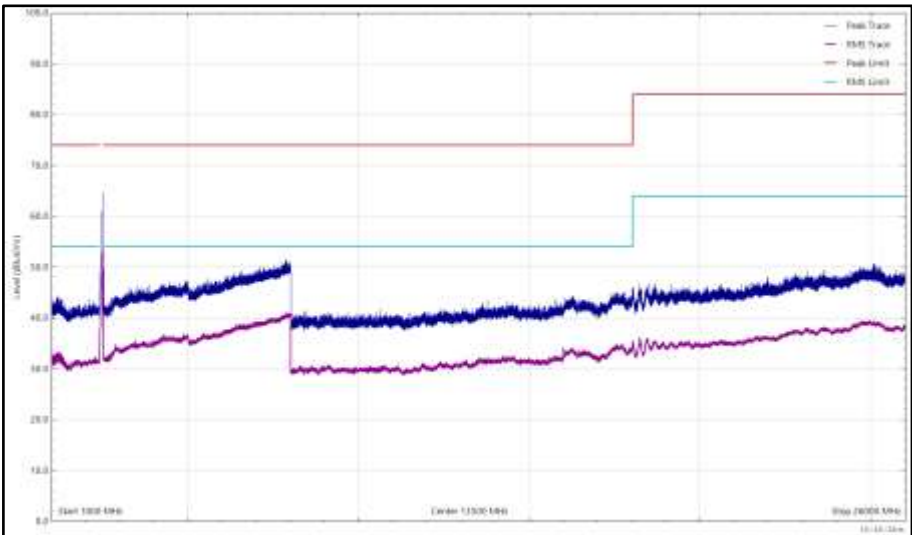


Figure 150 - 2472 MHz (CH13), 802.11g, Core 0, 1 GHz to 26 GHz, Horizontal

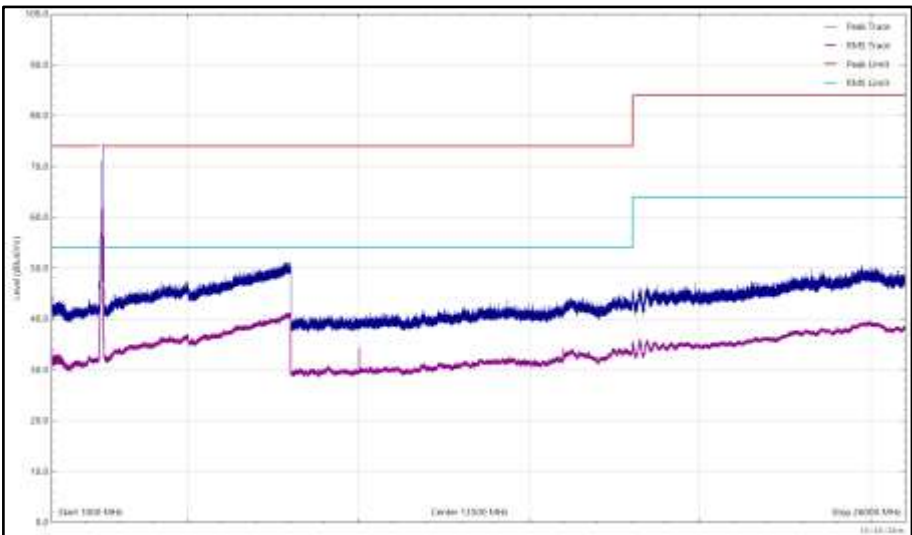


Figure 151 - 2472 MHz (CH13), 802.11g, Core 0, 1 GHz to 26 GHz, Vertical



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

Table 67 - 2412 MHz (CH1), 802.11g, Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

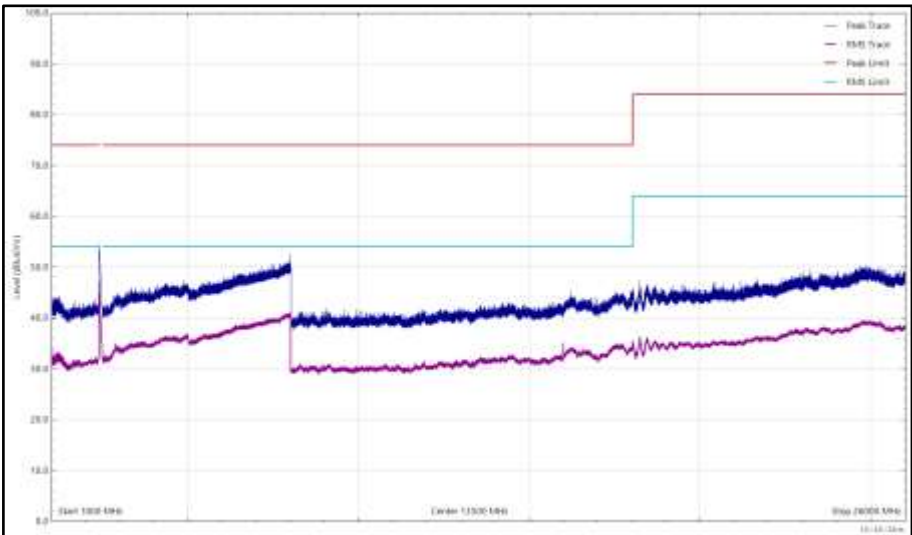


Figure 152 - 2412 MHz (CH1), 802.11g, Core 1, 1 GHz to 26 GHz, Horizontal

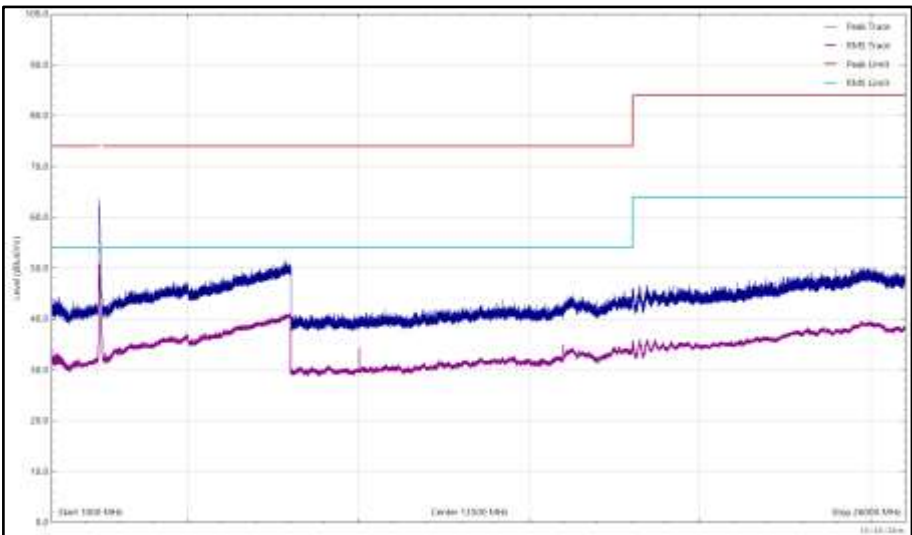


Figure 153 - 2412 MHz (CH1), 802.11g, Core 1, 1 GHz to 26 GHz, Vertical

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
280.006	26.4	46.0	-19.6	Q-Peak	114	110	Horizontal

Table 68 - 2437 MHz (CH6), 802.11g, Core 1, 30 MHz to 26 GHz

No other emissions found within 10 dB of the limit.

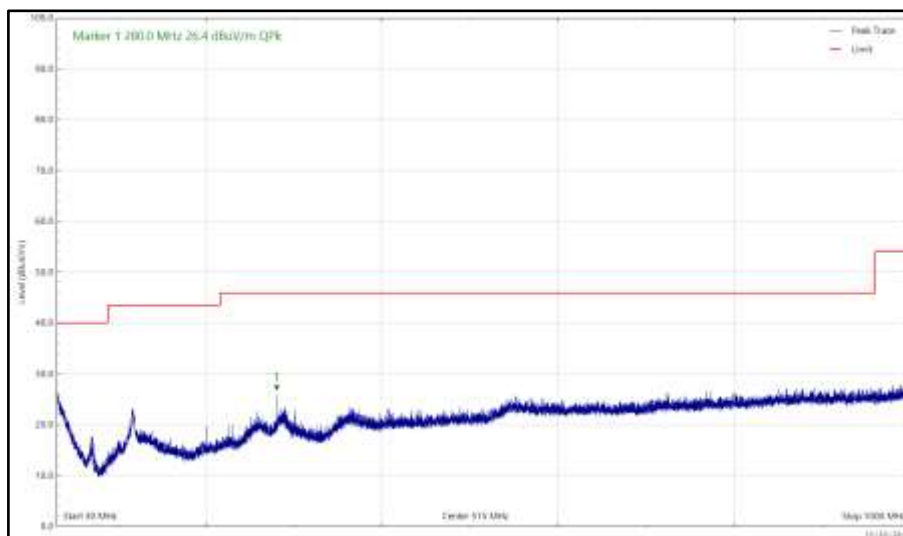


Figure 154 - 2437 MHz (CH6), 802.11g, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

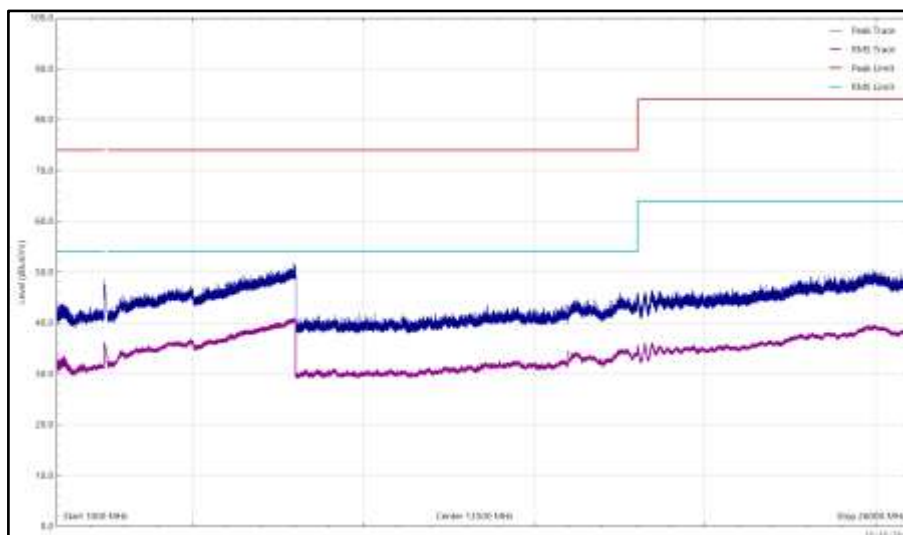


Figure 155 - 2437 MHz (CH6), 802.11g, Core 1, 1 GHz to 26 GHz, Horizontal

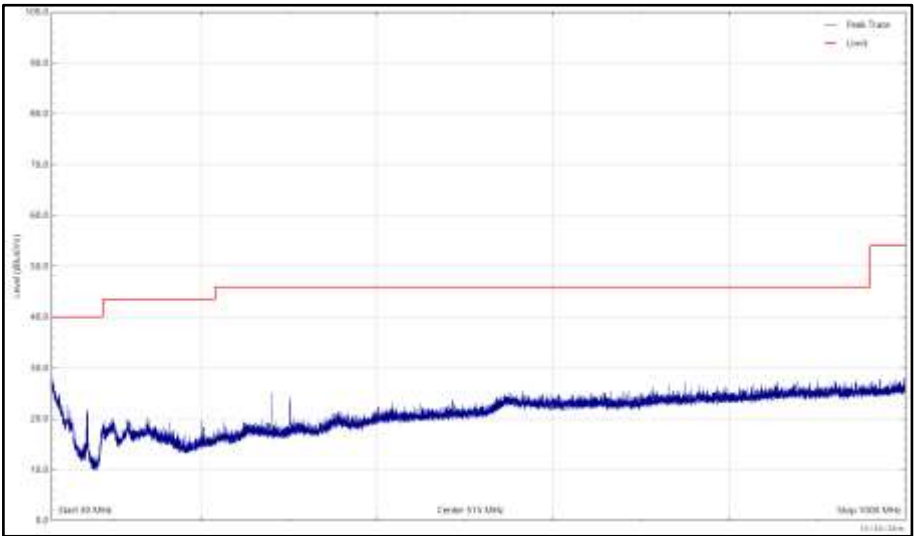


Figure 156 - 2437 MHz (CH6), 802.11g, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

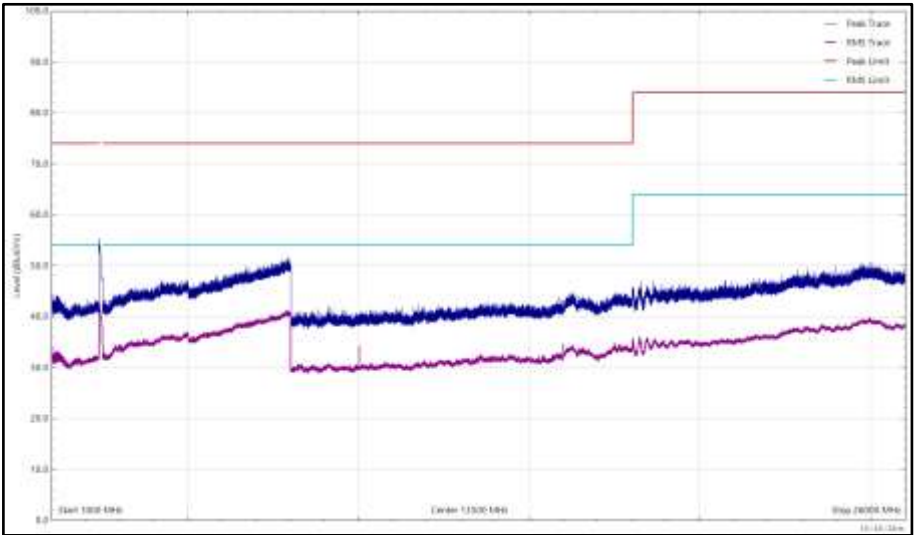


Figure 157 - 2437 MHz (CH6), 802.11g, Core 1, 1 GHz to 26 GHz, Vertical



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

Table 69 - 2472 MHz (CH13), 802.11g, Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

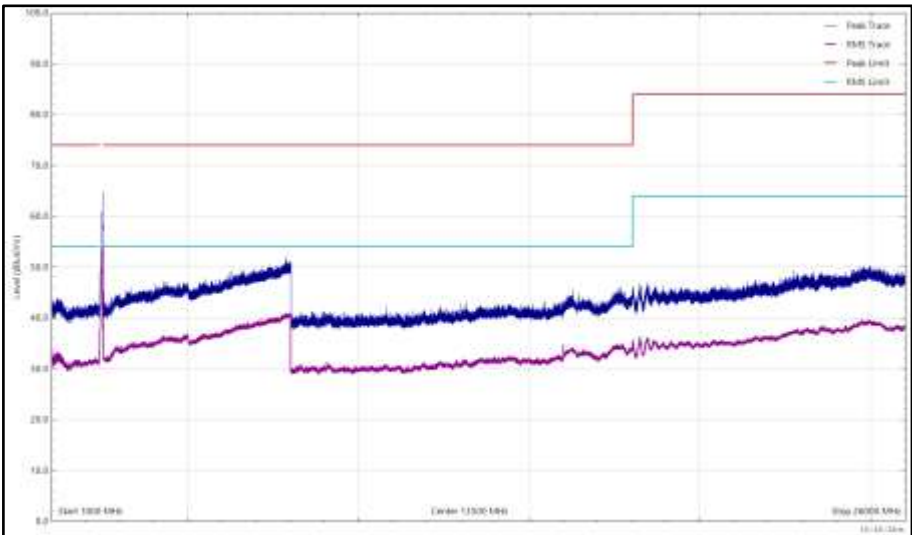


Figure 158 - 2472 MHz (CH13), 802.11g, Core 1, 1 GHz to 26 GHz, Horizontal

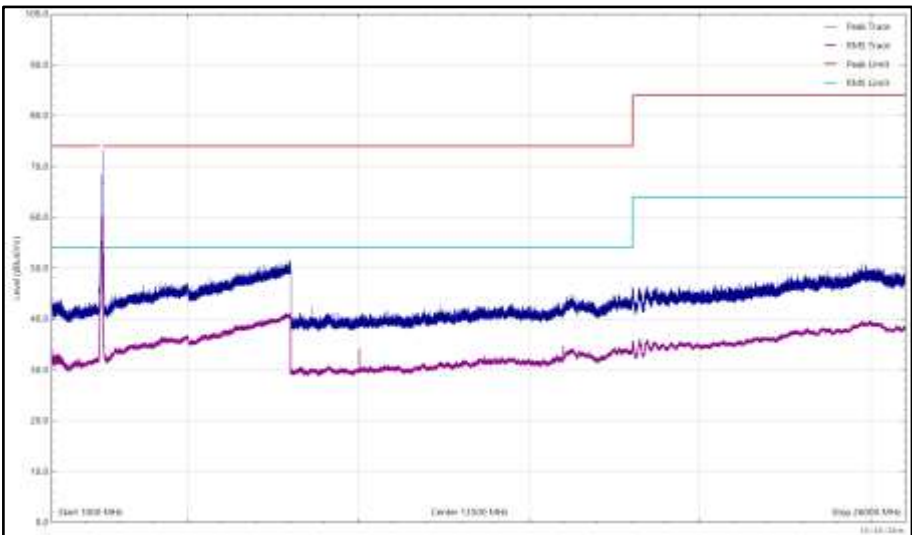


Figure 159 - 2472 MHz (CH13), 802.11g, Core 1, 1 GHz to 26 GHz, Vertical

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

Table 70 - 2412 MHz (CH1), 802.11b, Core 0, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

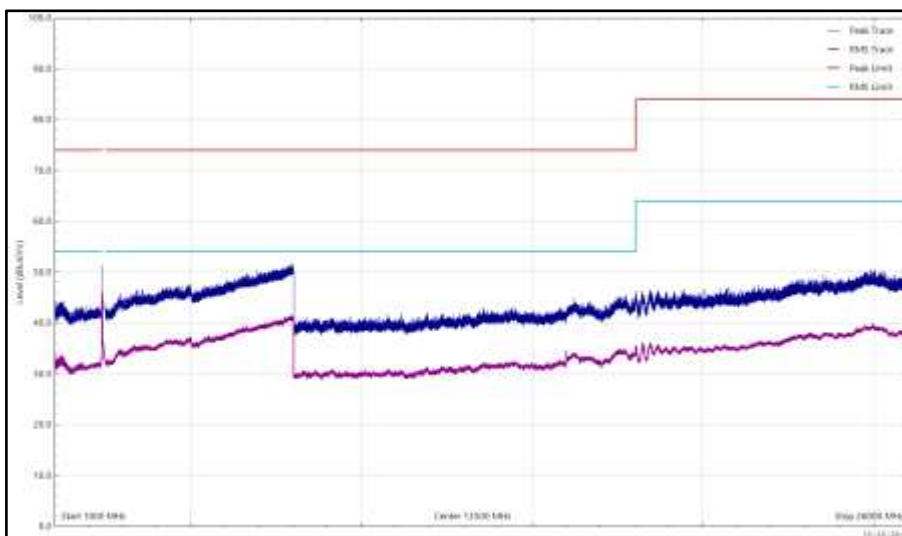


Figure 160 - 2412 MHz (CH1), 802.11b, Core 0, 1 GHz to 26 GHz, Horizontal

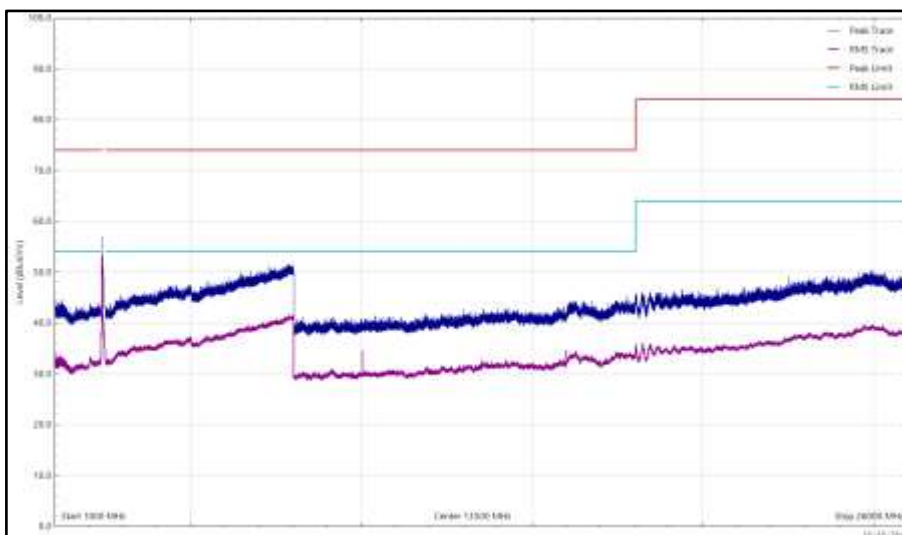


Figure 161 - 2412 MHz (CH1), 802.11b, Core 0, 1 GHz to 26 GHz, Vertical

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
280.002	26.5	46.0	-19.5	Q-Peak	113	109	Horizontal

Table 71 - 2437 MHz (CH6), 802.11b, Core 0, 30 MHz to 26 GHz

No other emissions found within 10 dB of the limit.

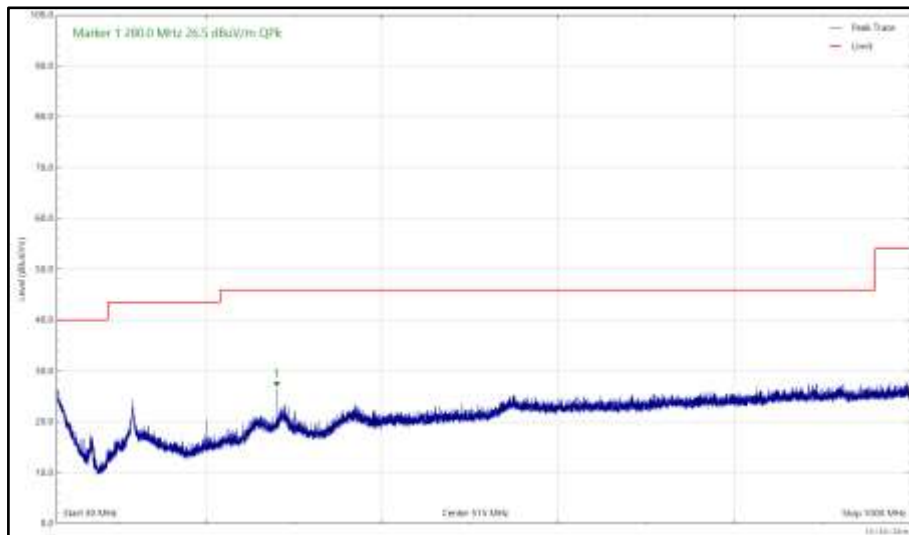


Figure 162 - 2437 MHz (CH6), 802.11b, Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

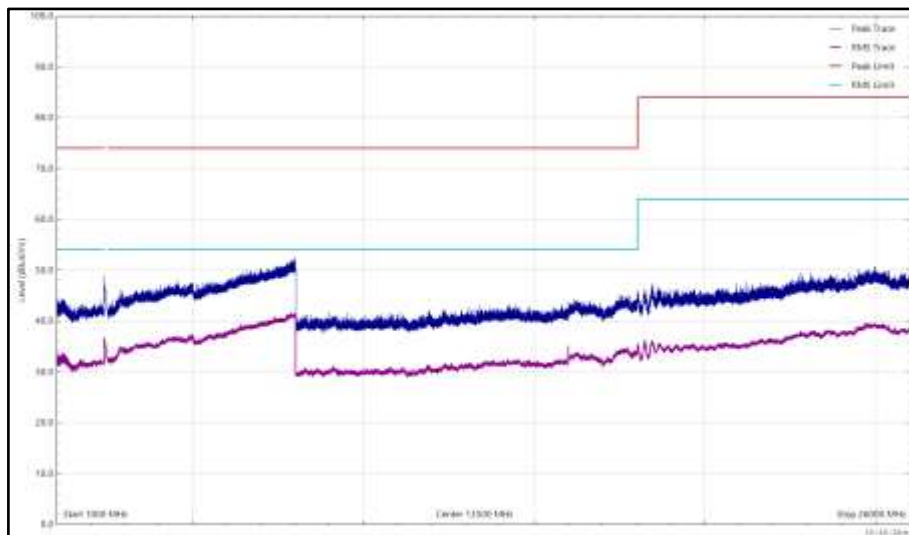


Figure 163 - 2437 MHz (CH6), 802.11b, Core 0, 1 GHz to 26 GHz, Horizontal

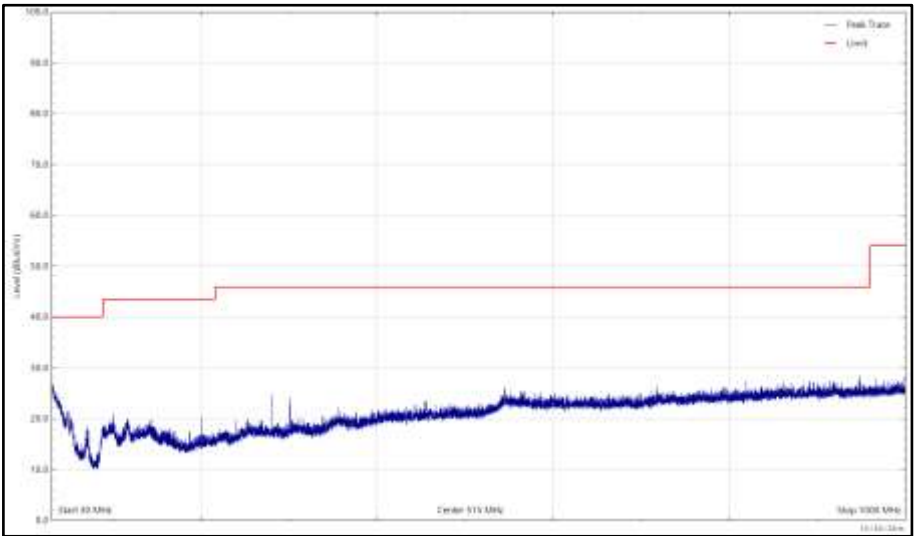


Figure 164 - 2437 MHz (CH6), 802.11b, Core 0, 30 MHz to 1 GHz, Vertical (Peak)

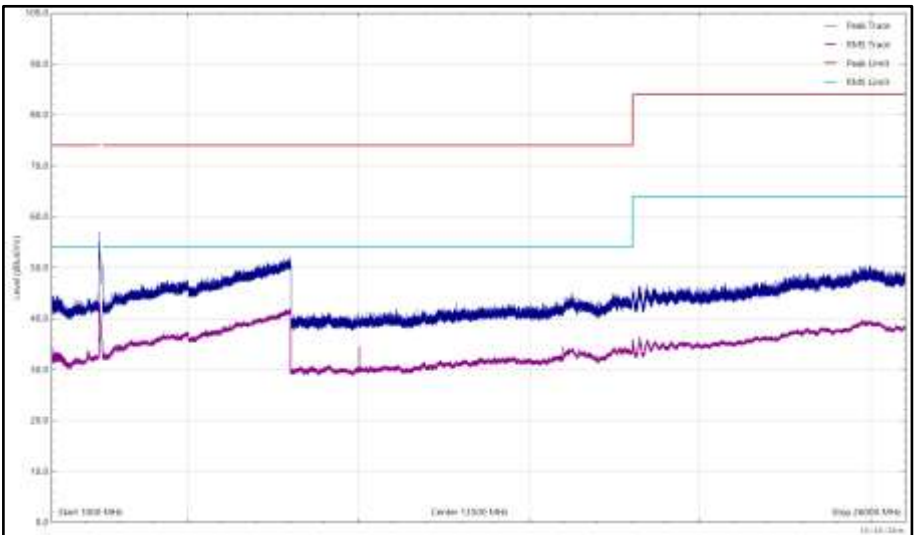


Figure 165 - 2437 MHz (CH6), 802.11b, Core 0, 1 GHz to 26 GHz, Vertical



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

Table 72 - 2472 MHz (CH13), 802.11b, Core 0, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

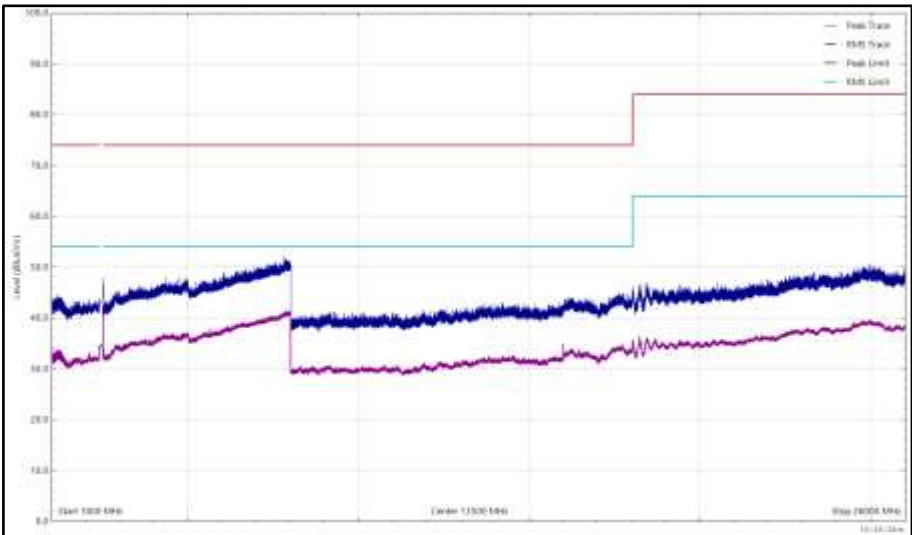


Figure 166 - 2472 MHz (CH13), 802.11b, Core 0, 1 GHz to 26 GHz, Horizontal

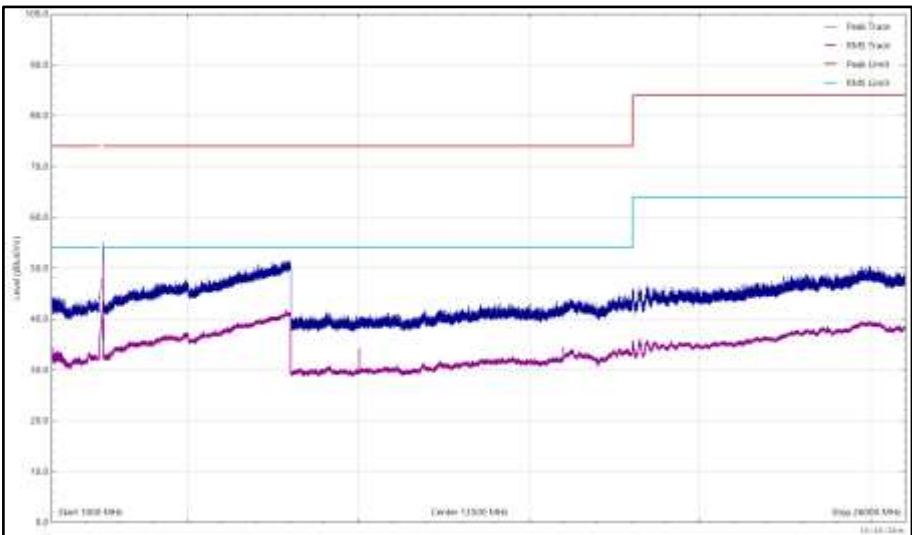


Figure 167 - 2472 MHz (CH13), 802.11b, Core 0, 1 GHz to 26 GHz, Vertical



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

Table 73 - 2412 MHz (CH1), 802.11b, Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

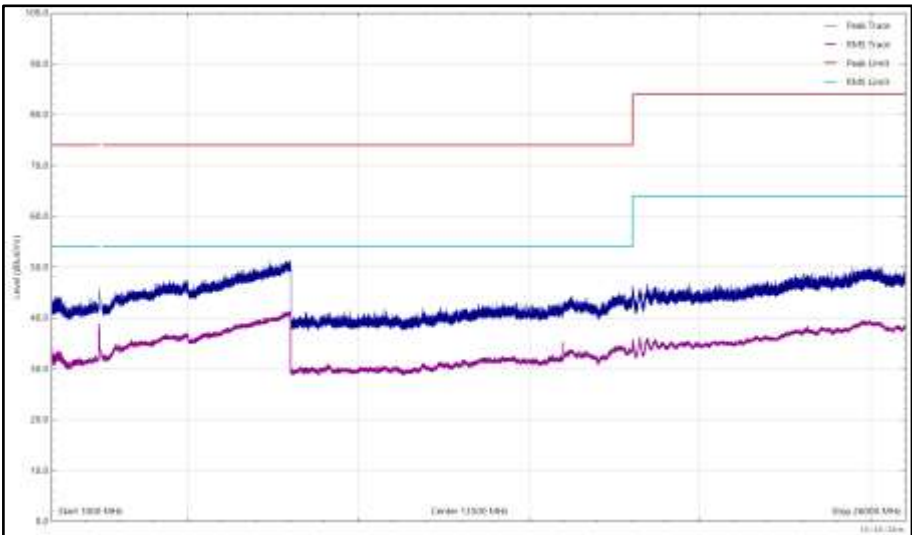


Figure 168 - 2412 MHz (CH1), 802.11b, Core 1, 1 GHz to 26 GHz, Horizontal

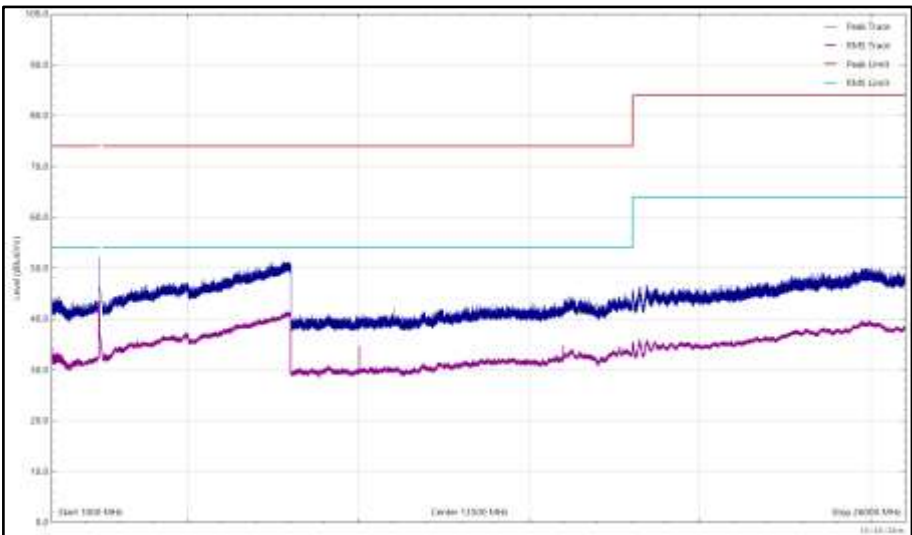


Figure 169 - 2412 MHz (CH1), 802.11b, Core 1, 1 GHz to 26 GHz, Vertical

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
280.013	26.0	46.0	-20.0	Q-Peak	99	110	Horizontal

Table 74 - 2437 MHz (CH6), 802.11b, Core 1, 30 MHz to 26 GHz

No other emissions found within 10 dB of the limit.

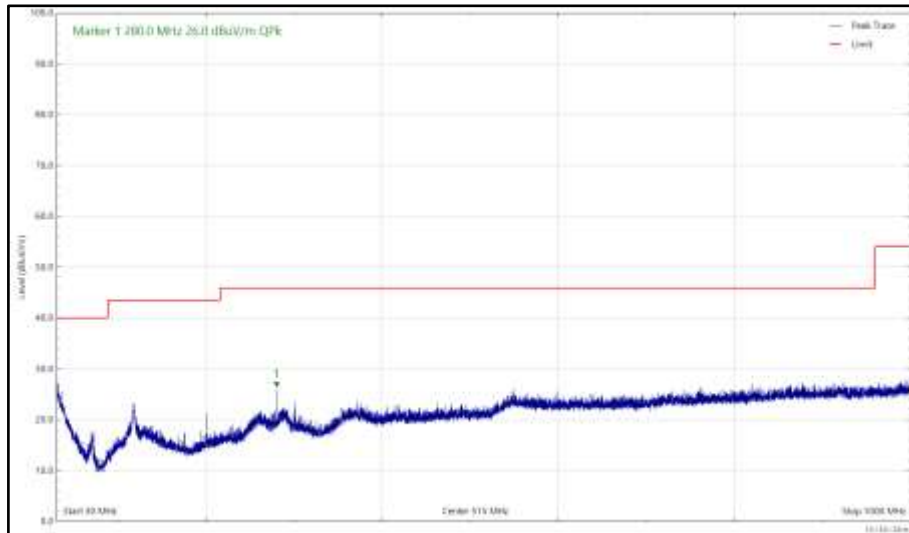


Figure 170 - 2437 MHz (CH6), 802.11b, Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

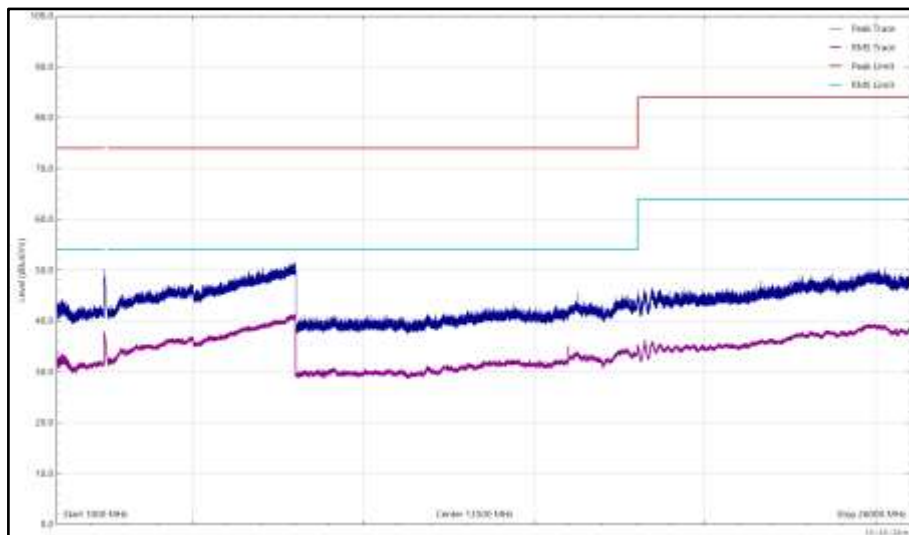


Figure 171 - 2437 MHz (CH6), 802.11b, Core 1, 1 GHz to 26 GHz, Horizontal

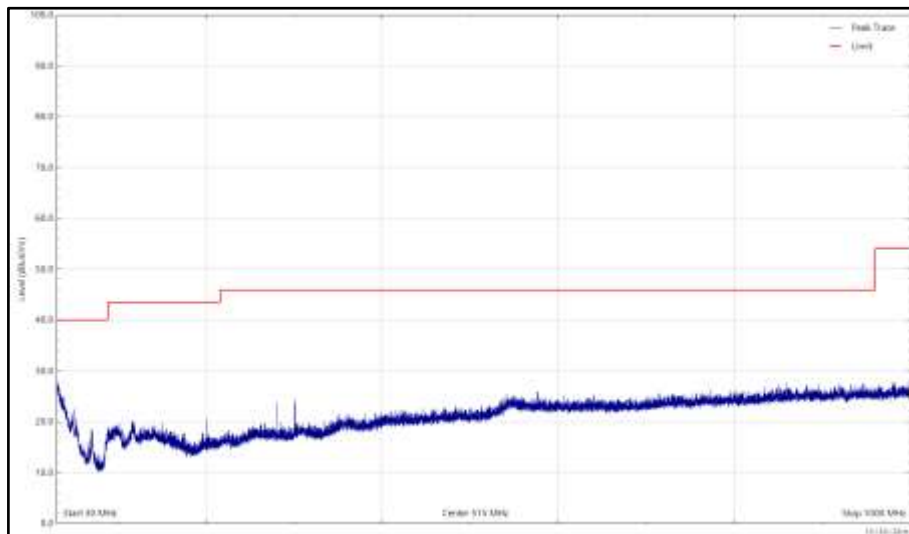


Figure 172 - 2437 MHz (CH6), 802.11b, Core 1, 30 MHz to 1 GHz, Vertical (Peak)

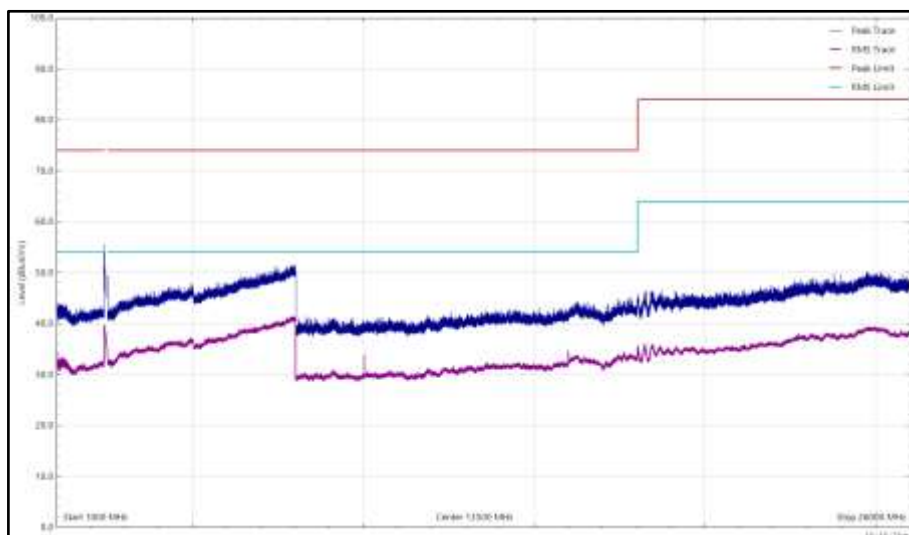


Figure 173 - 2437 MHz (CH6), 802.11b, Core 1, 1 GHz to 26 GHz, Vertical



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

Table 75 - 2472 MHz (CH13), 802.11b, Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

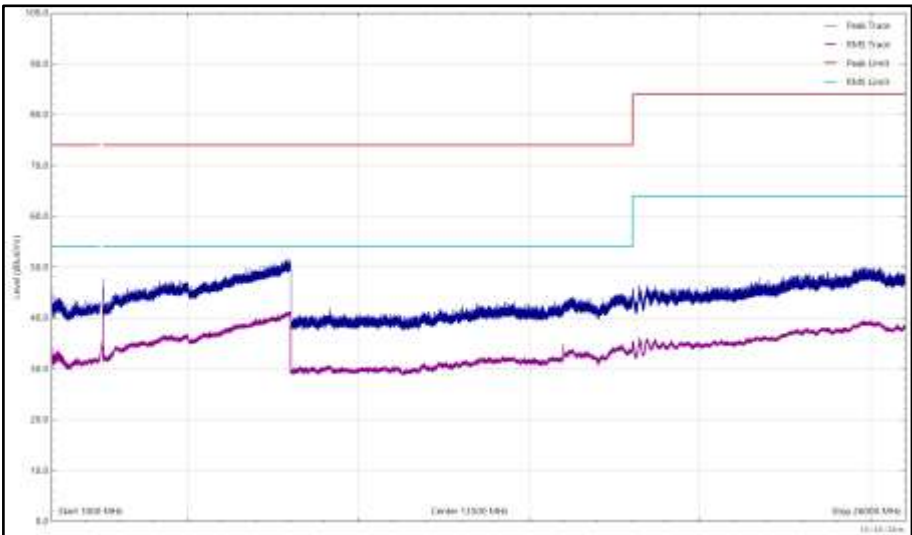


Figure 174 - 2472 MHz (CH13), 802.11b, Core 1, 1 GHz to 26 GHz, Horizontal

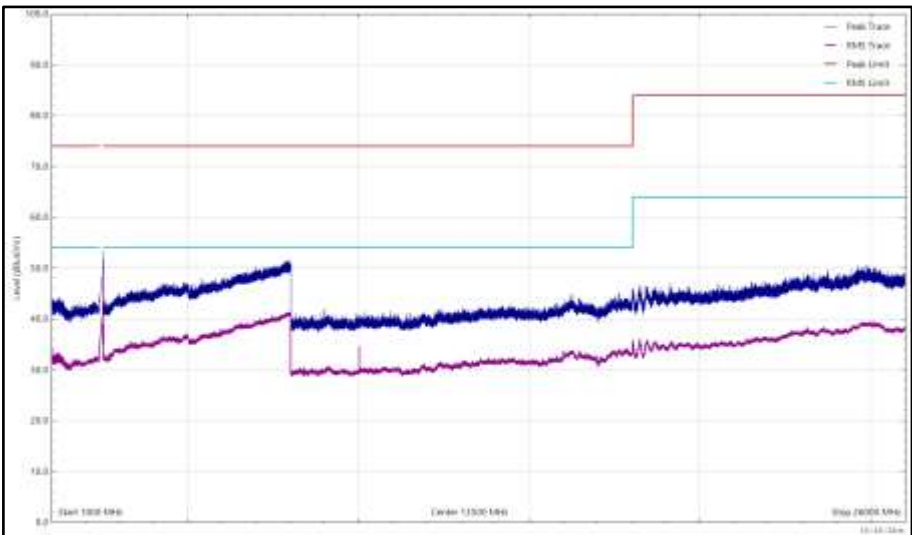


Figure 175 - 2472 MHz (CH13), 802.11b, Core 1, 1 GHz to 26 GHz, Vertical

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

Table 76 - 2412 MHz (CH1), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

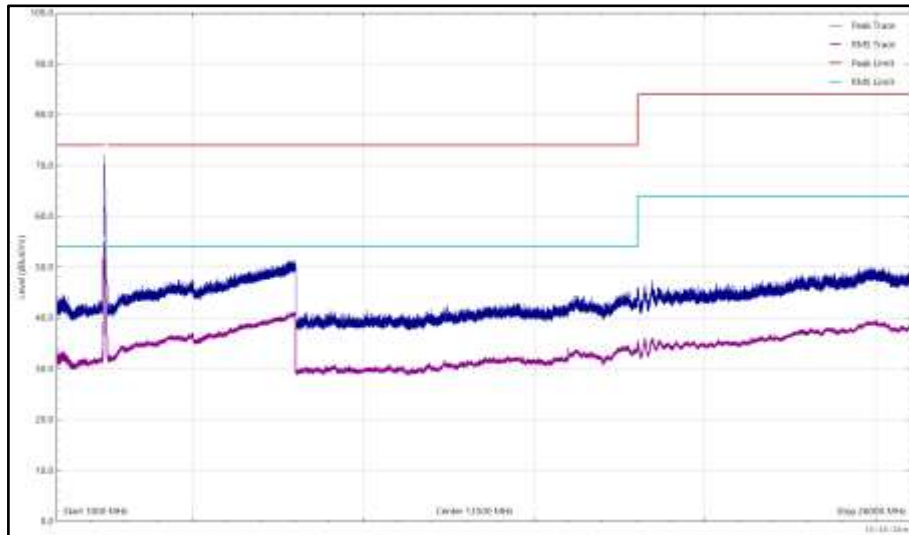


Figure 176 - 2412 MHz (CH1), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal

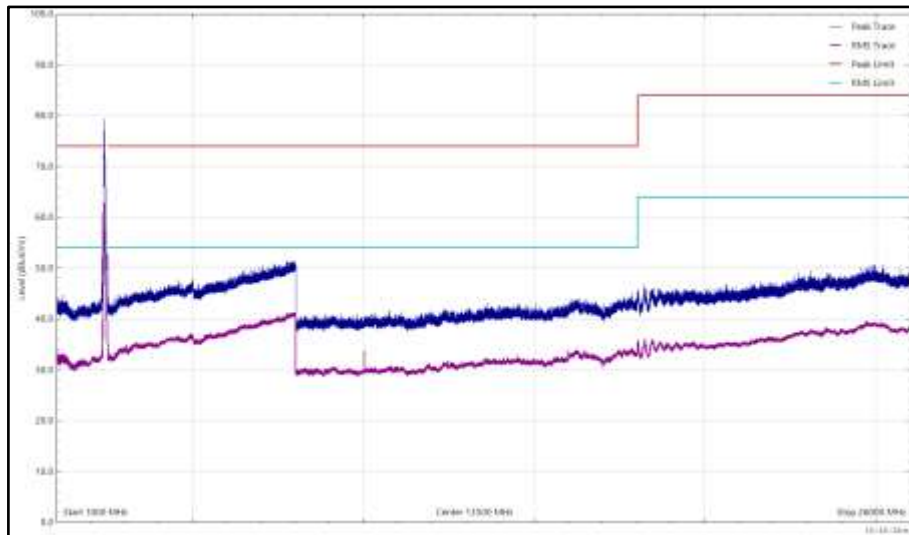


Figure 177 - 2412 MHz (CH1), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
279.996	26.3	46.0	-19.7	Q-Peak	121	114	Horizontal
2375.871	61.4	74.0	-12.6	Peak	7	335	Vertical

Table 77 - 2437 MHz (CH6), HE20, RU26-0, Core 0 + Core 1, 30 MHz to 26 GHz

No other emissions found within 10 dB of the limit.

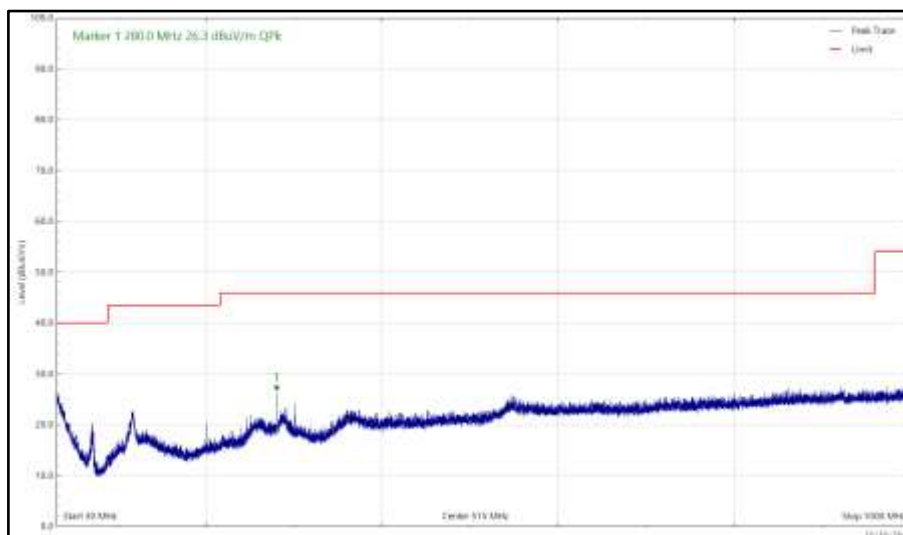


Figure 178 - 2437 MHz (CH6), HE20, RU26-0, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

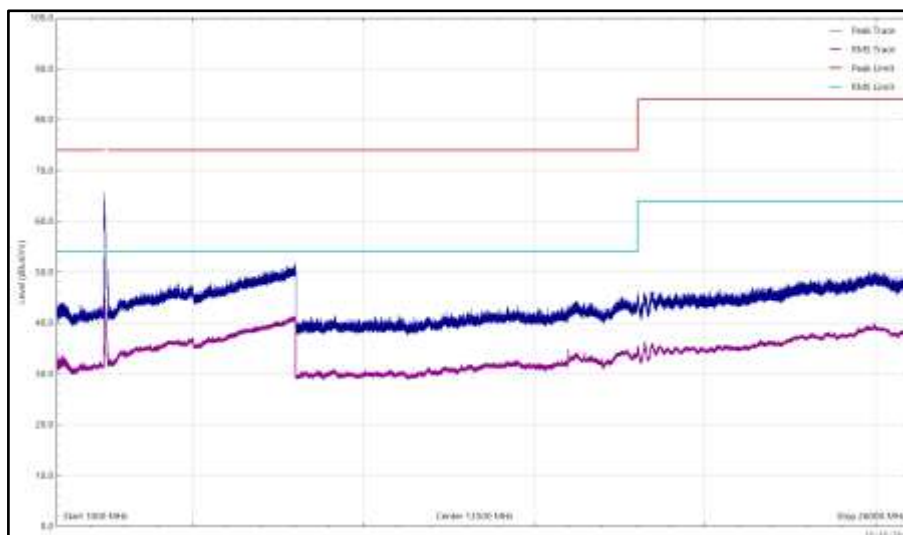


Figure 179 - 2437 MHz (CH6), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal

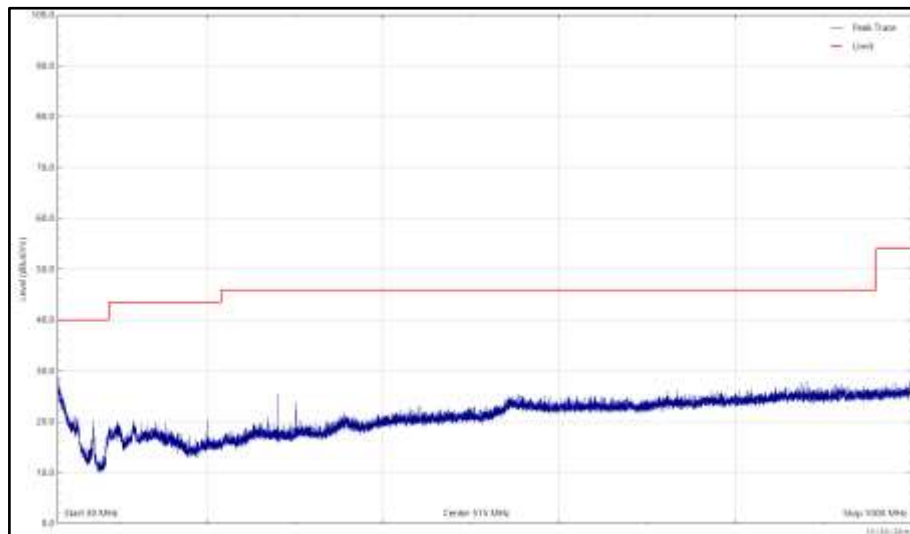


Figure 180 - 2437 MHz (CH6), HE20, RU26-0, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

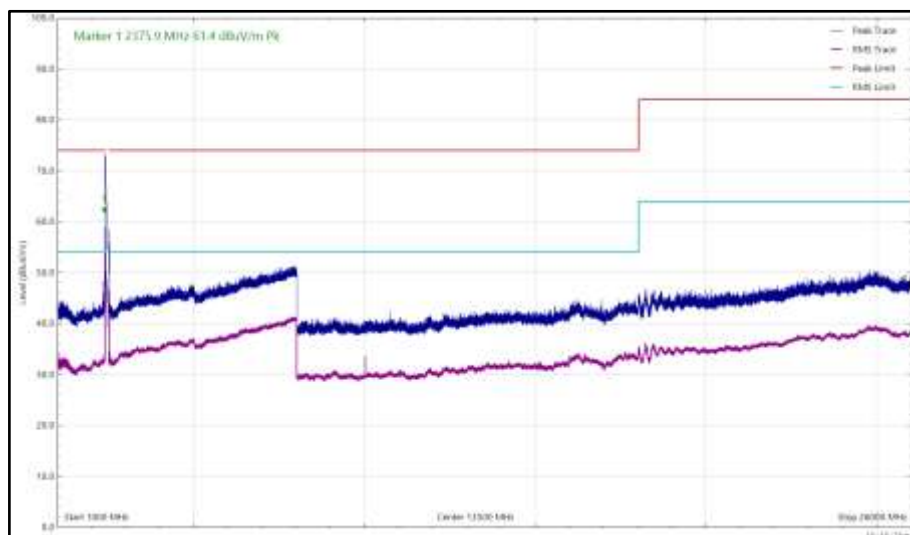


Figure 181 - 2437 MHz (CH6), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical

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

Table 78 - 2472 MHz (CH13), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

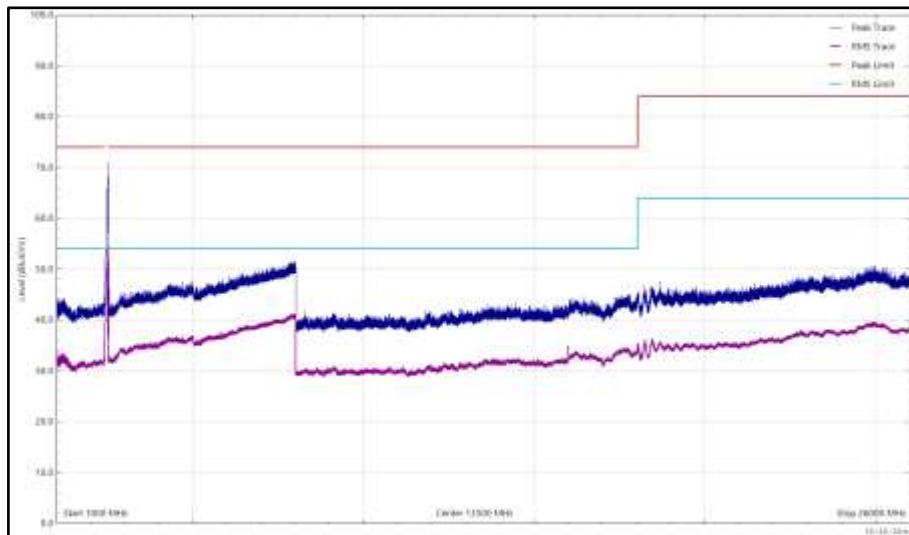


Figure 182 - 2472 MHz (CH13), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal

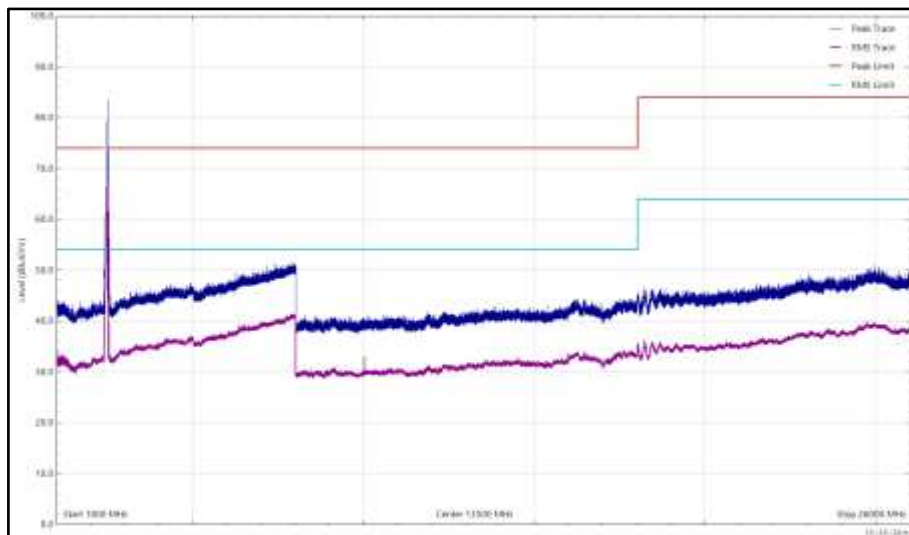


Figure 183 - 2472 MHz (CH13), HE20, RU26-0, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical



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 RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Antenna with permanent attenuator (Bilog)	Chase	CBL6143	2904	24	30-Sep-2021
True RMS Multimeter	Fluke	179	4007	12	29-Oct-2021
Band Reject Filter - 2.425 GHz	Wainwright	WRCGV14-2390-2400-2450-2460-50SS	5066	12	12-Oct-2021
Band Reject Filter - 2.4585 GHz	Wainwright	WRCGV14-2423.5-2433.5-2483.5-2493.5-50SS	5068	12	12-Oct-2021
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	08-Mar-2022
Cable (18 GHz)	Rosenberger	LU7-071-1000	5102	12	12-Oct-2021
Cable (18 GHz)	Rosenberger	LU7-071-1000	5103	12	12-Oct-2021
EmX Emissions Software	TUV SUD	V2.1.11	5125	-	Software
Screened Room (11)	Rainford	Rainford	5136	36	01-Nov-2021
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
Horn Antenna (1-10GHz)	Schwarzbeck	BBHA 9120 B	5215	12	01-Apr-2022
DRG Horn Antenna (7.5-18GHz)	Schwarzbeck	HWRD750	5216	12	01-Apr-2022
Pre Amp 1 - 26.5 GHz	Agilent Technologies	8449B	5445	12	06-May-2022
2m SMA Cable	Junkosha	MWX221-02000AMSAMS/A	5518	12	09-Apr-2022
8m N Type Cable	Junkosha	MWX221-08000NMSNMS/B	5522	12	24-Mar-2022
2m K Type Cable	Junkosha	MWX241-02000KMSKMS/A	5524	12	24-Mar-2022
3 GHz High pass Filter	Wainwright	WHKX12-2580-3000-18000-80SS	5547	12	07-May-2022
1200 MHz Low Pass Filter (02)	Mini-Circuits	VLF-1200+	5560	12	24-May-2022
8 - 18 GHz Amplifier	Wright Technologies	APS06-0061	5595	12	25-Aug-2021
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB 40	5604	12	08-Sep-2021
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	5609	12	14-Oct-2021

Table 79

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



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

A2485, S/N: HV9QMW620K - Modification State 0

2.5.3 Date of Test

26-June-2021 to 07-July-2021

2.5.4 Test Method

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

Authorised band edge measurements were performed with the device operating in SISO and MIMO configurations across the various modes supported by the device.

Since compliance with the power limits in section 2.1 was shown by RMS averaging across all symbols in the signalling alphabet, a 30 dBc limit rather than 20 dBc limit was applied in accordance with FCC 47 CFR Part 15.247(d) and RSS-247 clause 5.5.

The measurements displayed within this report, have been limited to those modes (data rates and modulation schemes) which have been shown to be worst case. Further measurements are held on file by TÜV SÜD, and are available if required.

2.5.5 Environmental Conditions

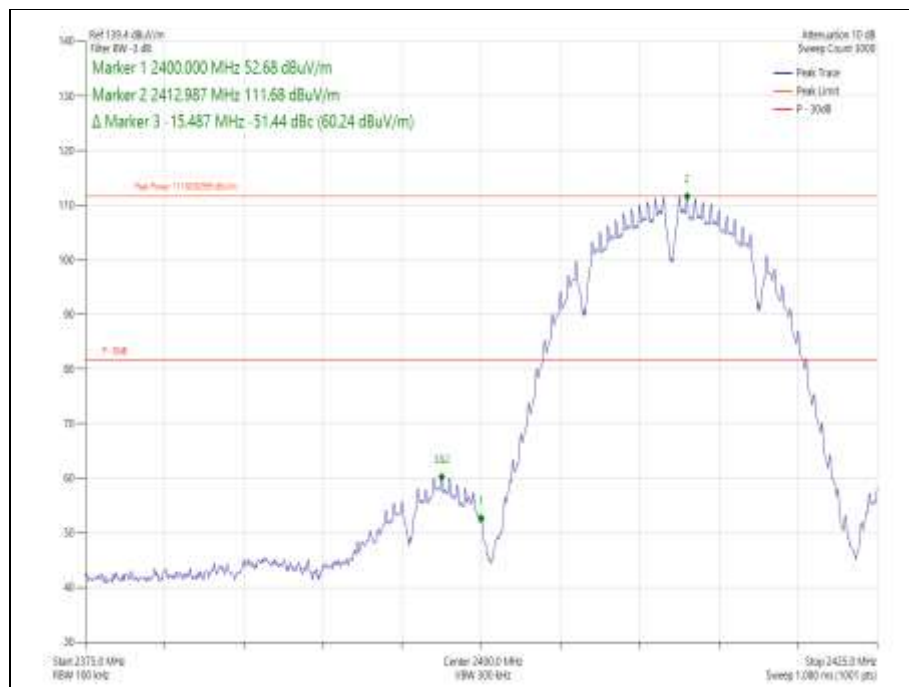
Ambient Temperature	21.4 - 23.2 °C
Relative Humidity	46.6 - 58.3 %

2.5.6 Test Results

2.4 GHz WLAN

Mode	Data Rate /MCS	Resource size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
802.11b, Core 1	1 Mbps	-	-	2412	2400	-51.44
802.11g, Core 1	54 Mbps	-	-	2412	2400	-35.57
802.11n HT20, Core 1	MCS4	-	-	2412	2400	-35.10
802.11ax HE20, Core 1	MCS9	SU	-	2412	2400	-35.12
802.11ax HE20, Core 1	MCS9	26	0	2412	2400	-40.80

Table 80 - SISO Authorised Band Edge Results



**Figure 184 - 802.11b, Core 1 - 2412 MHz
Band Edge Frequency 2400 MHz**

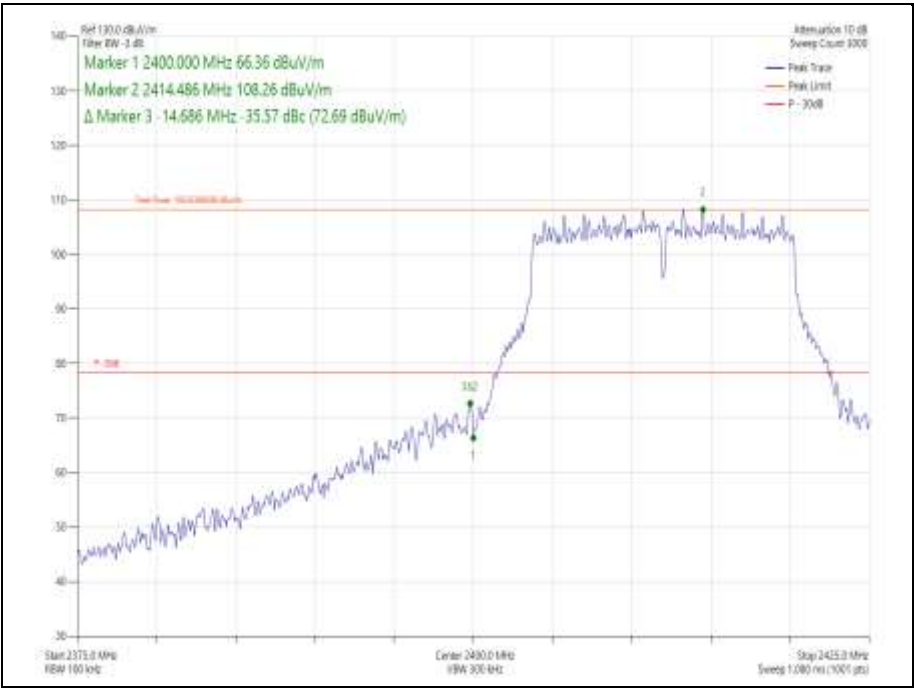


Figure 185- 802.11g, Core 1 - 2412 MHz
Band Edge Frequency 2400 MHz

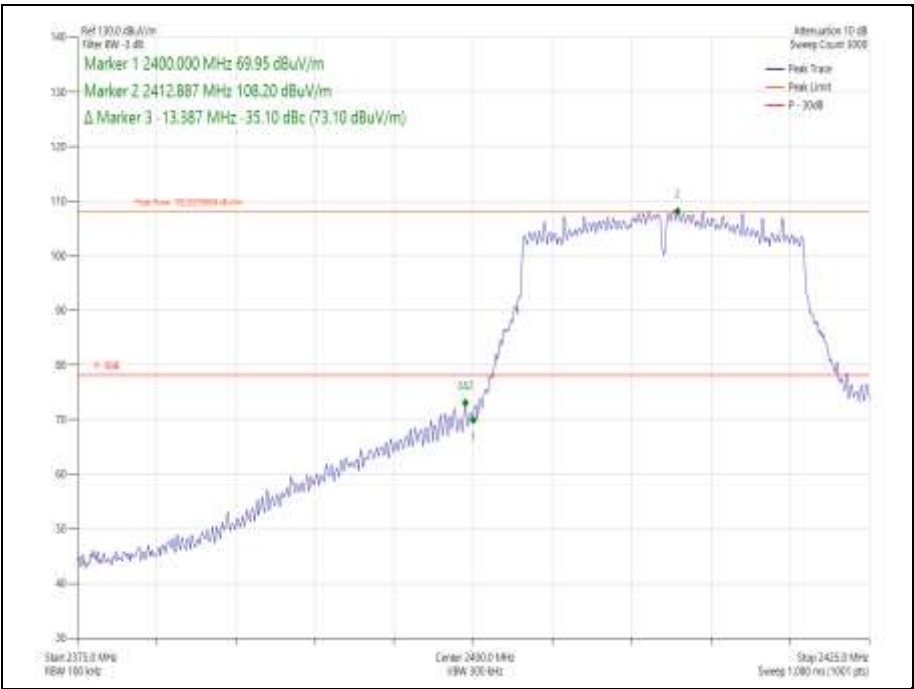


Figure 186- 802.11n HT20, Core 1 - 2412 MHz
Band Edge Frequency 2400 MHz

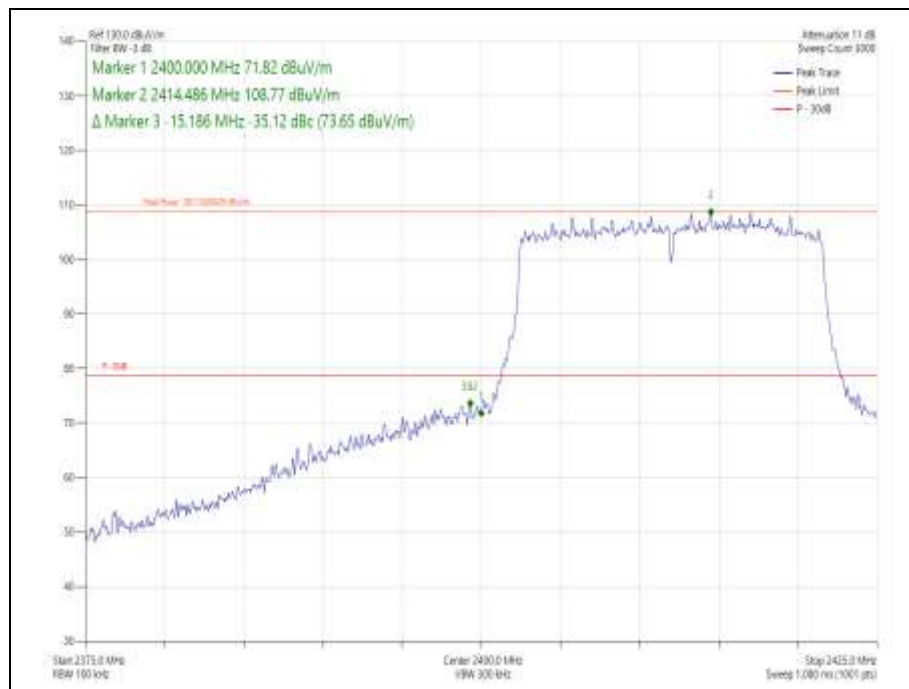


Figure 187- 802.11ax HE20, Core 1, SU - 2412 MHz
Band Edge Frequency 2400 MHz

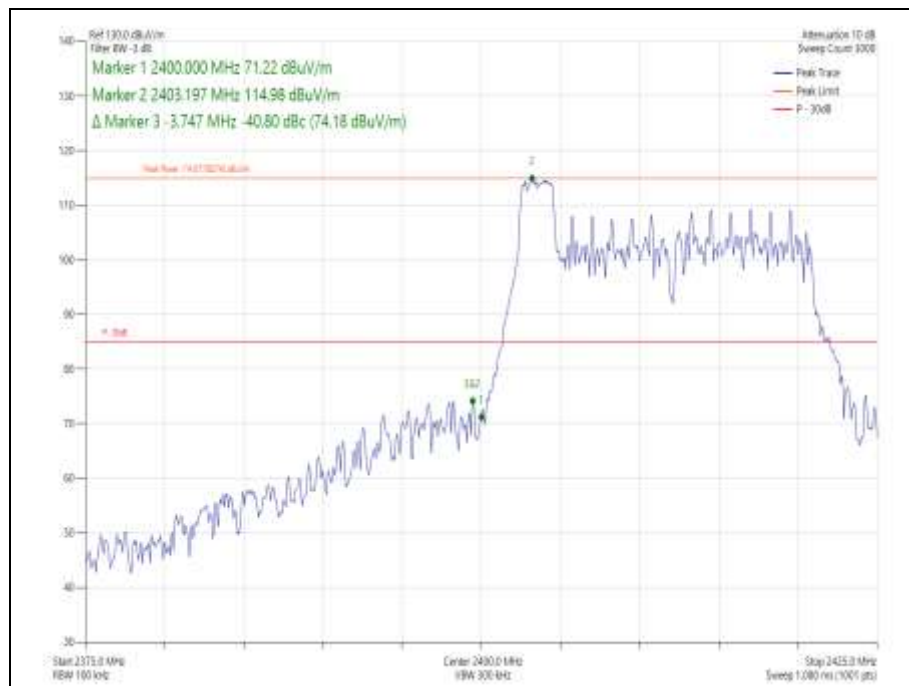
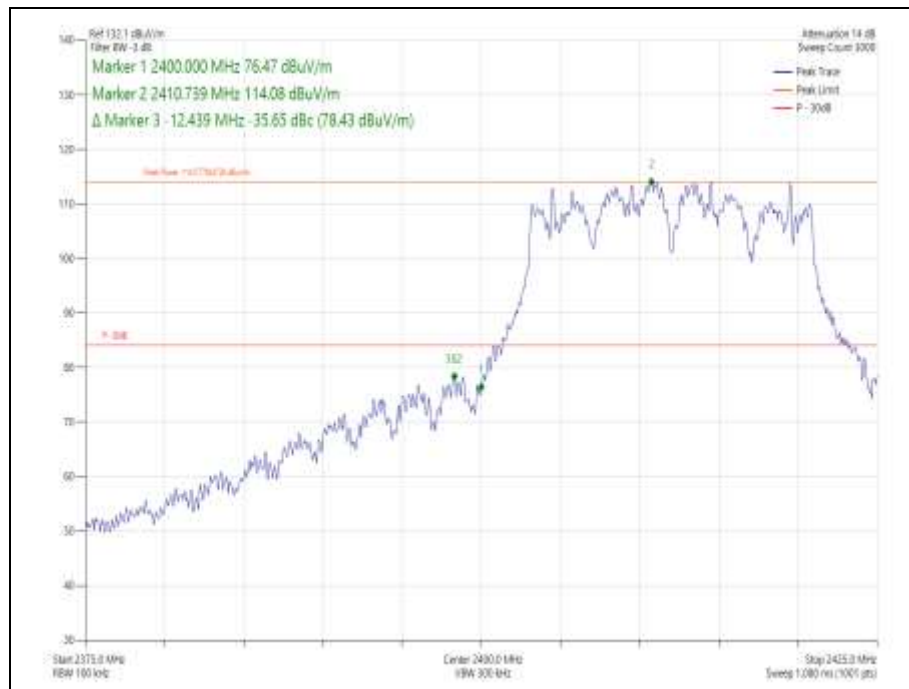


Figure 188- 802.11ax HE20, Core 1, 26-0 - 2412 MHz
Band Edge Frequency 2400 MHz

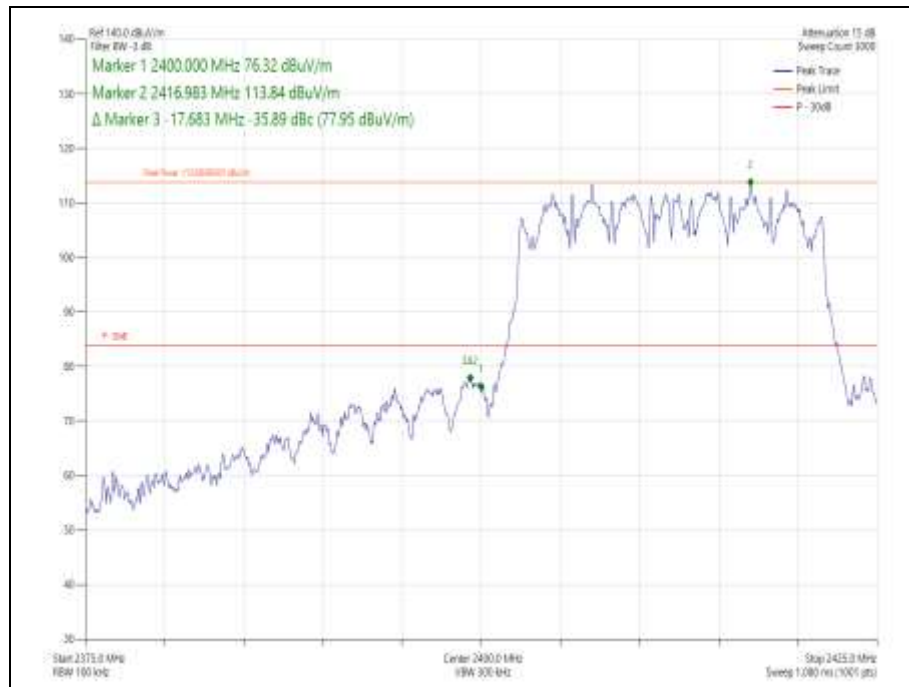


Mode	Data Rate /MCS	Resource size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
802.11n HT20, Cores 0-1	MCS4	-	-	2412	2400	-35.65
802.11ax HE20, Cores 0 -1	MCS9	SU	-	2412	2400	-35.89
802.11ax HE20, Cores 0 -1	MCS9	26	0	2412	2400	-39.72

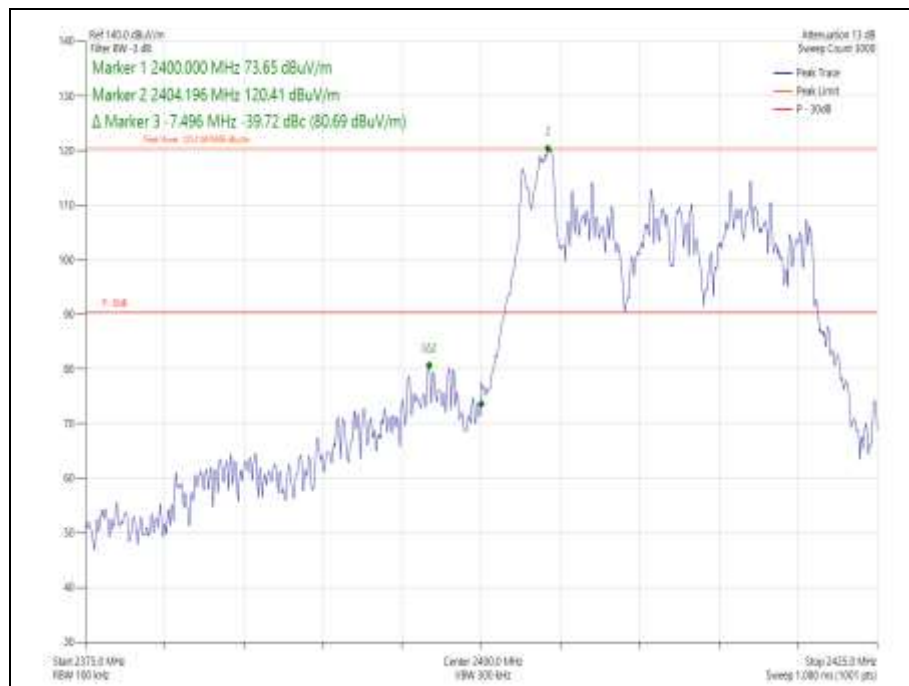
Table 81 - MIMO 2TX Authorised Band Edge Results



**Figure 189 - 802.11n HT20, Cores 0-1 - 2412 MHz
Band Edge Frequency 2400 MHz**



**Figure 190- 802.11ax HE20, Cores 0-1, SU - 2412 MHz
Band Edge Frequency 2400 MHz**



**Figure 191- 802.11ax HE20, Cores 0-1, 26-0 - 2412 MHz
Band Edge Frequency 2400 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 RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	01-Apr-2022
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	08-Mar-2022
EmX Emissions Software	TUV SUD	V2.1.11	5125	-	Software
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
2m SMA Cable	Junkosha	MWX221-02000AMSAMS/A	5517	12	09-Apr-2022
8m N Type Cable	Junkosha	MWX221-08000NMSNMS/B	5520	12	24-Mar-2022

Table 82

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

A2485, S/N: CQ2R1P6HF2 - Modification State 0

2.6.3 Date of Test

23-August-2021

2.6.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.10.5 (AVGPSD-2).

Where the EUT duty cycle was < 98 % and repeatable within 2%, the spectrum analyser was set to trace (power) averaging and a duty cycle correction was added as calculated in the result tables below.

MIMO output port summing was performed in accordance with KDB 662911 D01. For the CDD results, the Directional Gain was calculated in accordance with the equation given in clause F)2)f)(ii) summed for a single spatial stream.

2.6.5 Environmental Conditions

Ambient Temperature	22.9 °C
Relative Humidity	57.3 %



2.6.6 Test Results

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 11.10.5
Additional Reference(s):	-		
Note(s):	DCCF was added to the spectrum analyser reference level offset.		

DUT Configuration			
Mode:	802.11b	Duty Cycle (%):	98.8
Data Rate:	1 Mbps	DCCF (dB):	0.05
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2412	100.0	-	4.14	-	-	-	8.00	-3.86
2442	100.0	-	5.87	-	-	-	8.00	-2.13
2472	100.0	-	-1.21	-	-	-	8.00	-9.21

Table 83 - 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 11.10.5
Additional Reference(s):	-		
Note(s):	DCCF was added to the spectrum analyser reference level offset.		

DUT Configuration			
Mode:	802.11g	Duty Cycle (%):	97.5
Data Rate:	12 Mbps	DCCF (dB):	0.11
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2412	100.0	-	-0.90	-	-	-	8.00	-8.90
2442	100.0	-	4.49	-	-	-	8.00	-3.52
2472	100.0	-	-10.59	-	-	-	8.00	-18.59

Table 84 - 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 11.10.5
Additional Reference(s):	-		
Note(s):	DCCF was added to the spectrum analyser reference level offset.		

DUT Configuration			
Mode:	802.11n HT20	Duty Cycle (%):	96.5
Modulation Coding Scheme:	MCS2	DCCF (dB):	0.16
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2412	100.0	-	-1.55	-	-	-	8.00	-9.55
2442	100.0	-	3.94	-	-	-	8.00	-4.07
2472	100.0	-	-11.44	-	-	-	8.00	-19.44

Table 85 - 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 11.10.5
Additional Reference(s):	662911 D01 v02r01 E)2)b)		
Note(s):	DCCF was added to the spectrum analyser reference level offset.		

DUT Configuration			
Mode:	802.11n HT20	Duty Cycle (%):	96.4
Modulation Coding Scheme:	MCS2	DCCF (dB):	0.16
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	-
Active Port(s):	A+B (Core 0 + Core 1)	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	100.0	-3.10	-3.33	-	-	-0.20	8.00	-8.20
2442	100.0	4.28	4.11	-	-	7.20	8.00	-0.80
2472	100.0	-11.40	-11.92	-	-	-8.64	8.00	-16.64

Table 86 - 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 11.10.5
Additional Reference(s):	-		
Note(s):	DCCF was added to the spectrum analyser reference level offset.		

DUT Configuration			
Mode:	802.11ax HE20 SU	Duty Cycle (%):	95.7
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	0.19
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2412	100.0	-	-2.72	-	-	-	8.00	-10.72
2442	100.0	-	3.01	-	-	-	8.00	-4.99
2472	100.0	-	-13.89	-	-	-	8.00	-21.89

Table 87 - 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 11.10.5
Additional Reference(s):	662911 D01 v02r01 E)2)b)		
Note(s):	DCCF was added to the spectrum analyser reference level offset.		

DUT Configuration			
Mode:	802.11ax HE20 SU	Duty Cycle (%):	95.7
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	0.19
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	-
Active Port(s):	A+B (Core 0 + Core 1)	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	100.0	-4.54	-4.39	-	-	-1.45	8.00	-9.45
2442	100.0	2.07	2.10	-	-	5.09	8.00	-2.91
2472	100.0	-14.53	-14.47	-	-	-11.49	8.00	-19.49

Table 88 - 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 11.10.5
Additional Reference(s):	-		
Note(s):	DCCF was added to the spectrum analyser reference level offset.		

DUT Configuration			
Mode:	802.11ax HE20 RU26	Duty Cycle (%):	96.6
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	0.15
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2412	100.0	-	1.65	-	-	-	8.00	-6.36
2442	100.0	-	2.07	-	-	-	8.00	-5.93
2472	100.0	-	-15.41	-	-	-	8.00	-23.41

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 11.10.5
Additional Reference(s):	662911 D01 v02r01 E)2)b)		
Note(s):	DCCF was added to the spectrum analyser reference level offset.		

DUT Configuration			
Mode:	802.11ax HE20 RU26	Duty Cycle (%):	96.5
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	0.15
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	-
Active Port(s):	A+B (Core 0 + Core 1)	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	100.0	2.05	2.16	-	-	5.12	8.00	-2.88
2442	100.0	1.92	2.07	-	-	5.00	8.00	-3.00
2472	100.0	-19.03	-18.29	-	-	-15.63	8.00	-23.63

Table 90 - 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 11.10.5
Additional Reference(s):	-		
Note(s):	DCCF was added to the spectrum analyser reference level offset.		

DUT Configuration			
Mode:	802.11ax HE20 RU52	Duty Cycle (%):	96.3
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	0.16
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2412	100.0	-	2.10	-	-	-	8.00	-5.90
2442	100.0	-	2.62	-	-	-	8.00	-5.39
2472	100.0	-	-15.12	-	-	-	8.00	-23.12

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 11.10.5
Additional Reference(s):	662911 D01 v02r01 E)2)b)		
Note(s):	DCCF was added to the spectrum analyser reference level offset.		

DUT Configuration			
Mode:	802.11ax HE20 RU52	Duty Cycle (%):	96.3
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	0.16
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	-
Active Port(s):	A+B (Core 0 + Core 1)	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	100.0	2.20	2.17	-	-	5.20	8.00	-2.80
2442	100.0	1.65	2.50	-	-	5.10	8.00	-2.90
2472	100.0	-15.51	-15.11	-	-	-12.30	8.00	-20.30

Table 92 - 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 11.10.5
Additional Reference(s):	-		
Note(s):	DCCF was added to the spectrum analyser reference level offset.		

DUT Configuration			
Mode:	802.11ax HE20 RU106	Duty Cycle (%):	97.8
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	0.10
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2412	100.0	-	1.29	-	-	-	8.00	-6.72
2442	100.0	-	2.11	-	-	-	8.00	-5.89
2472	100.0	-	-16.66	-	-	-	8.00	-24.66

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 11.10.5
Additional Reference(s):	662911 D01 v02r01 E)2)b)		
Note(s):	DCCF was added to the spectrum analyser reference level offset.		

DUT Configuration			
Mode:	802.11ax HE20 RU106	Duty Cycle (%):	97.7
Modulation Coding Scheme:	MCS2x1	DCCF (dB):	0.10
Antenna Configuration:	MIMO CDD	Peak Antenna Gain (dBi):	-
Active Port(s):	A+B (Core 0 + Core 1)	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	100.0	-0.12	-0.28	-	-	2.81	8.00	-5.19
2442	100.0	2.02	2.54	-	-	5.30	8.00	-2.70
2472	100.0	-18.00	-17.65	-	-	-14.81	8.00	-22.81

Table 94 - 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
Multimeter	Iso-tech	IDM101	2421	12	30-Oct-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
AC Programmable Power Supply	iTech	IT7324	5225	-	O/P Mon
MXA Signal Analyser	Keysight Technologies	N9020B	5528	24	04-Mar-2022
Signal Commissioning Unit	TUV SUD	SCU001	5546	12	16-Apr-2022

Table 95

O/P Mon – Output Monitored using calibrated equipment



3 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Restricted Band Edges	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Emission Bandwidth	± 271.419 kHz
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 96

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.