

FCC and ISED Test Report

Apple Inc
Model: A2330

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: BCGA2330 IC: 579C-A2330



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Document 75948763-11 Issue 01

SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Matthew Russell	RF Team Leader	Authorised Signatory	09 June 2020

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	George Porter	09 June 2020	
Testing	Malik Mohammad	09 June 2020	
Testing	Faisal Malyar	09 June 2020	
Testing	Ahmad Javid	09 June 2020	
Testing	Jaiyanth Balendrarajah	09 June 2020	
Testing	Ainsley Jenkins	09 June 2020	

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: 2019, ISED RSS-247: Issue 2 (02-2017) and ISED RSS-GEN: Issue 5 (04-2018) + A1 (03-2019) for the tests detailed in section 1.3.



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1 Report Summary

1.1 Report Modification Record

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

Issue	Description of Change	Date of Issue
1	First Issue	09 June 2020

Table 1

1.2 Introduction

Applicant	Apple Inc
Manufacturer	Apple Inc
Model Number(s)	A2330
Serial Number(s)	C07CG05BPW8V, C07CG081PW8X and C07CG05KPW8V
Hardware Version(s)	REV1.0
Software Version(s)	20A2236b
Number of Samples Tested	3
Test Specification/Issue/Date	FCC 47 CFR Part 15C: 2019 ISED RSS-247: Issue 2 (02-2017) ISED RSS-GEN: Issue 5 (04-2018) + A1 (03-2019)
Order Number	0540201015
Date	07-April-2020
Date of Receipt of EUT	18-March-2020, 08-April-2020 and 28-April-2020
Start of Test	19-March-2020
Finish of Test	13-May-2020
Name of Engineer(s)	George Porter, Malik Mohammad, Faisal Malyar, Ahmad Javid, Jaiyanth Balendrarajah, Ainsley Jenkins and Liang Tian
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						
2.1	15.247 (b)	5.4	6.12	Maximum Conducted Output Power	Pass	ANSI C63.10 (2013) KDB 662911 D01 v02r01
2.2	15.247 (e)	5.2	6.12	Power Spectral Density	Pass	ANSI C63.10 (2013) KDB 662911 D01 v02r01
2.3	15.247 (a)(2)	5.2	6.7	Emission Bandwidth	Pass	ANSI C63.10 (2013)
2.4	15.247 (d) and 15.205	5.5	6.13	Spurious Radiated Emissions	Pass	ANSI C63.10 (2013)
2.5	15.247 (d)	5.5	-	Authorised Band Edges	Pass	ANSI C63.10 (2013)
2.6	15.205	-	8.10	Restricted Band Edges	Pass	ANSI C63.10 (2013)

Table 2



1.4 Product Information

1.4.1 Technical Description

The Equipment Under Test (EUT) was a desktop 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 SISO and 2x2 MIMO. It supports 802.11b and g for SISO and 802.11n and ax at 20 MHz channel bandwidths 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:

- SISO Modes (Core 1):
 - 802.11b 1 Mbps
 - 802.11g 6 Mbps
 - 802.11n HT20 MCS0
 - 802.11ax HE20 MCS0 SU, RU26-0 and RU26-8
- 2x2 MIMO Modes (Core 0+1):
 - 802.11n HT20 MCS0 – CDD
 - 802.11ax HE20 MCS0 CDD SU, RU26-0 and RU-26-8.



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 (2.4GHz WLAN)

2.4 GHz Core 0

Frequency (MHz)	Peak Gain (dBi)	Conducted Cable Loss (dB)
2400 - 2480	0.25	0.7

Table 3

2.4 GHz Core 1

Frequency (MHz)	Peak Gain (dBi)	Conducted Cable Loss (dB)
2400 - 2480	5.00	0.7

Table 4

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: A2330, Serial Number: C07CG081PW8X			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A2330, Serial Number: C07CG05KPW8V			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A2330, Serial Number: C07CG05BPW8V			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 5



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		
Maximum Conducted Output Power	George Porter	UKAS
Power Spectral Density	George Porter	UKAS
Emission Bandwidth	George Porter	UKAS
Spurious Radiated Emissions	Malik Mohammad, Faisal Malyar, Ahmad Javid, Jaiyanth Balendrarajah, Ainsley Jenkins and Liang Tian	UKAS
Authorised Band Edges	Malik Mohammad, Faisal Malyar, Ahmad Javid, Jaiyanth Balendrarajah, Ainsley Jenkins and Liang Tian	UKAS
Restricted Band Edges	Malik Mohammad, Faisal Malyar, Ahmad Javid, Jaiyanth Balendrarajah, Ainsley Jenkins and Liang Tian	UKAS

Table 6

Office Address:

Octagon House
Concorde Way
Segensworth North
Fareham
Hampshire
PO15 5RL
United Kingdom



2 Test Details

2.1 Maximum Conducted Output Power

2.1.1 Specification Reference

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

2.1.2 Equipment Under Test and Modification State

A2330, S/N: C07CG05BPW8V - Modification State 0

2.1.3 Date of Test

20-April-2020 to 13-May-2020

2.1.4 Test Method

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

The output power was verified as being the same from each transmit core, but the antenna gains were not identical, therefore the modes reported for SISO or 2x2 MIMO operation are those giving the highest EIRP and/or lowest conducted limit based on the combination of antennas giving highest total directional gain.

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.

2.1.5 Environmental Conditions

Ambient Temperature	21.8 - 25.2 °C
Relative Humidity	25.7 - 39.7 %



2.1.6 Test Results

2.4 GHz WLAN

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Antenna Directional Gain (dBi)	5.00	5.00	5.00
15.247 Conducted Power Limit (dBm)	30.00	30.00	30.00
RSS-247 Conducted Power Limit (dBm)	30.00	30.00	30.00
Conducted Power (dBm)	19.91	21.78	11.79
RSS-247 EIRP Limit (dBm)	36.00	36.00	36.00
EIRP Power (dBm)	24.91	26.78	16.79

Table 7 - 802.11b / 1 Mbps / SISO / Core 1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Antenna Directional Gain (dBi)	5.00	5.00	5.00
15.247 Conducted Power Limit (dBm)	30.00	30.00	30.00
RSS-247 Conducted Power Limit (dBm)	30.00	30.00	30.00
Conducted Power (dBm)	17.33	21.76	4.31
RSS-247 EIRP Limit (dBm)	36.00	36.00	36.00
EIRP Power (dBm)	22.33	26.76	9.31

Table 8 - 802.11g / 6 Mbps / SISO / Core 1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Antenna Directional Gain (dBi)	5.00	5.00	5.00
15.247 Conducted Power Limit (dBm)	30.00	30.00	30.00
RSS-247 Conducted Power Limit (dBm)	30.00	30.00	30.00
Conducted Power (dBm)	17.22	21.89	4.35
RSS-247 EIRP Limit (dBm)	36.00	36.00	36.00
EIRP Power (dBm)	22.22	26.89	9.35

Table 9 - 802.11n / HT20 MCS0 / SISO / Core 1



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted Power Core 0 (dBm)	14.35	19.44	3.92
Conducted Power Core 1 (dBm)	14.46	19.49	3.70
Antenna Directional Gain (dBi)	5.00	5.00	5.00
15.247 Conducted Power Limit (dBm)	30.00	30.00	30.00
RSS-247 Conducted Power Limit (dBm)	30.00	30.00	30.00
Total Conducted Power (dBm)	17.42	22.48	6.82
RSS-247 EIRP Limit (dBm)	36.00	36.00	36.00
EIRP Power (dBm)	22.42	27.48	11.82

Table 10 - 802.11n / HT20 MCS0 / MIMO CDD / Cores 0+1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Antenna Directional Gain (dBi)	5.00	5.00	5.00
15.247 Conducted Power Limit (dBm)	30.00	30.00	30.00
RSS-247 Conducted Power Limit (dBm)	30.00	30.00	30.00
Conducted Power (dBm)	15.93	21.40	2.84
RSS-247 EIRP Limit (dBm)	36.00	36.00	36.00
EIRP Power (dBm)	20.93	26.40	7.84

Table 11 - 802.11ax / HE20 MCS0x1 / SU / SISO / Core 1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Antenna Directional Gain (dBi)	5.00	5.00	5.00
15.247 Conducted Power Limit (dBm)	30.00	30.00	30.00
RSS-247 Conducted Power Limit (dBm)	30.00	30.00	30.00
Conducted Power (dBm)	13.81	13.95	2.80
RSS-247 EIRP Limit (dBm)	36.00	36.00	36.00
EIRP Power (dBm)	18.81	18.95	7.80

Table 12 - 802.11ax / HE20 MCS0x1 / RU 26-0 / SISO / Core 1



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Antenna Directional Gain (dBi)	5.00	5.00	5.00
15.247 Conducted Power Limit (dBm)	30.00	30.00	30.00
RSS-247 Conducted Power Limit (dBm)	30.00	30.00	30.00
Conducted Power (dBm)	14.00	13.78	2.88
RSS-247 EIRP Limit (dBm)	36.00	36.00	36.00
EIRP Power (dBm)	19.00	18.78	7.88

Table 13 - 802.11ax / HE20 MCS0x1 / RU 26-8 / SISO / Core 1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted Power Core 0 (dBm)	12.83	19.38	2.21
Conducted Power Core 1 (dBm)	12.92	19.18	2.46
Antenna Directional Gain (dBi)	5.00	5.00	5.00
15.247 Conducted Power Limit (dBm)	30.00	30.00	30.00
RSS-247 Conducted Power Limit (dBm)	30.00	30.00	30.00
Total Conducted Power (dBm)	15.89	22.29	5.35
RSS-247 EIRP Limit (dBm)	36.00	36.00	36.00
EIRP Power (dBm)	20.89	27.29	10.35

Table 14 - 802.11ax / HE20 MCS0x1 / SU / MIMO CDD / Cores 0+1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted Power Core 0 (dBm)	12.76	13.68	2.39
Conducted Power Core 1 (dBm)	12.86	13.69	2.38
Antenna Directional Gain (dBi)	5.00	5.00	5.00
15.247 Conducted Power Limit (dBm)	30.00	30.00	30.00
RSS-247 Conducted Power Limit (dBm)	30.00	30.00	30.00
Total Conducted Power (dBm)	15.82	16.70	5.40
RSS-247 EIRP Limit (dBm)	36.00	36.00	36.00
EIRP Power (dBm)	20.82	21.70	10.40

Table 15 - 802.11ax / HE20 MCS0x1 / RU 26-0 / MIMO CDD / Cores 0+1



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted Power Core 0 (dBm)	12.87	13.85	2.27
Conducted Power Core 1 (dBm)	12.80	13.85	2.31
Antenna Directional Gain (dBi)	5.00	5.00	5.00
15.247 Conducted Power Limit (dBm)	30.00	30.00	30.00
RSS-247 Conducted Power Limit (dBm)	30.00	30.00	30.00
Total Conducted Power (dBm)	15.85	16.86	5.30
RSS-247 EIRP Limit (dBm)	36.00	36.00	36.00
EIRP Power (dBm)	20.85	21.86	10.30

Table 16 - 802.11ax / HE20 MCS0x1 / RU 26-8 / MIMO CDD / Cores 0+1

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.



2.1.7 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 Due
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	08-Nov-2020
Multimeter	Iso-tech	IDM101	2424	12	12-Dec-2020
Hygrometer	Rotronic	I-1000	3220	12	25-Sep-2020
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	11-Dec-2020
1800-6000 MHz Power Splitter	Mini-Circuits	ZN2PD-63-S+	4055	-	O/P Mon
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	28-Nov-2020
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	05-May-2020
PXA Signal Analyser	Keysight Technologies	N9030A	4653	12	10-Feb-2021
PXA Signal Analyser	Keysight Technologies	N9030A	4654	12	21-Oct-2020
Power splitter - 2 port	Mini-Circuits	ZN2PD-63-S+	4743	12	23-Sep-2020
Power splitter - 4 port	Mini-Circuits	ZN4PD1-63-S+	4744	12	23-Sep-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5099	12	06-Oct-2020
USB Power Sensor	Boonton	RTP5006	5186	12	28-Nov-2020
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5418	6	12-Jun-2020
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5419	6	12-Jun-2020
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5429	6	13-Jun-2020

Table 17

O/P Mon – Output Monitored using calibrated equipment



2.2 Power Spectral Density

2.2.1 Specification Reference

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

2.2.2 Equipment Under Test and Modification State

A2330, S/N: C07CG05BPW8V - Modification State 0

2.2.3 Date of Test

20-April-2020 to 13-May-2020

2.2.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.10.3 (AVG PSD-1), 11.10.5 (AVG PSD-2) or 11.10.7 (AVG PSD-3).

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 (Method AVG PSD-2). Where the duty cycle was = 98 % the spectrum analyser was set to trace (power) averaging and no duty cycle correction made (Method AVG PSD-1). In all other cases the spectrum analyser trace was set to max hold (Method AVG PSD-3).

The output power was verified as being the same from each transmit core (within negligible tolerances), but the antenna gains were not identical. Therefore, the modes reported here for SISO or 2x2 MIMO operation are those giving the highest EIRP and/or lowest conducted limit based on the combination of antennas giving highest total directional gain.

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 F2)f)(ii) summed for a single spatial stream.

2.2.5 Environmental Conditions

Ambient Temperature	21.5 - 25.2 °C
Relative Humidity	25.7 - 39.7 %



2.2.6 Test Results

2.4 GHz WLAN

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-1.72	0.12	-9.55
Duty Cycle Correction (dB)	N/A SA-1	N/A SA-1	N/A SA-1
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-1.72	0.12	-9.55

Table 18 - 802.11b / 1 Mbps / SISO / Core 1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-4.86	-0.55	-18.31
Duty Cycle Correction (dB)	N/A SA-1	N/A SA-1	N/A SA-1
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-4.86	-0.55	-18.31

Table 19 - 802.11g / 6 Mbps / SISO / Core 1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-5.57	-0.79	-18.70
Duty Cycle Correction (dB)	N/A SA-1	N/A SA-1	N/A SA-1
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-5.57	-0.79	-18.70

Table 20 - 802.11n / HT20 MCS0 / SISO / Core 1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted PSD Core 0 (dBm/30kHz)	-8.54	-3.14	-18.76
Conducted PSD Core 1 (dBm/30kHz)	-8.00	-2.96	-19.04
Duty Cycle Correction (dB)	N/A SA-1	N/A SA-1	N/A SA-1
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-5.25	-0.04	-15.89

Table 21 - 802.11n / HT20 MCS0 / MIMO CDD / Cores 0+1



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-8.41	-3.65	-21.92
Duty Cycle Correction (dB)	N/A SA-1	N/A SA-1	N/A SA-1
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-8.41	-3.65	-21.92

Table 22 - 802.11ax / HE20 MCS0x1 / SU / SISO / Core 1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-3.53	-3.14	-14.25
Duty Cycle Correction (dB)	N/A SA-1	N/A SA-1	N/A SA-1
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-3.53	-3.14	-14.25

Table 23 - 802.11ax / HE20 MCS0x1 / RU 26-0 / SISO / Core 1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Raw Conducted PSD (dBm/30kHz)	-3.53	-3.46	-14.16
Duty Cycle Correction (dB)	N/A SA-1	N/A SA-1	N/A SA-1
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-3.53	-3.46	-14.16

Table 24 - 802.11ax / HE20 MCS0x1 / RU 26-8 / SISO / Core 1



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted PSD Core 0 (dBm/30kHz)	-11.85	-5.28	-22.72
Conducted PSD Core 1 (dBm/30kHz)	-11.37	-6.03	-22.46
Duty Cycle Correction (dB)	N/A SA-1	N/A SA-1	N/A SA-1
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-8.60	-2.63	-19.58

Table 25 - 802.11ax / HE20 MCS0x1 / SU / MIMO CDD / Cores 0+1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted PSD Core 0 (dBm/30kHz)	-4.41	-3.61	-14.95
Conducted PSD Core 1 (dBm/30kHz)	-4.38	-3.53	-15.08
Duty Cycle Correction (dB)	N/A SA-1	N/A SA-1	N/A SA-1
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-1.38	-0.56	-12.01

Table 26 - 802.11ax / HE20 MCS0x1 / RU 26-0 / MIMO CDD / Cores 0+1

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
Conducted PSD Core 0 (dBm/30kHz)	-4.49	-3.55	-14.51
Conducted PSD Core 1 (dBm/30kHz)	-4.66	-3.51	-14.64
Duty Cycle Correction (dB)	N/A SA-1	N/A SA-1	N/A SA-1
15.247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
RSS-247 Conducted PSD Limit (dBm/3kHz)	8.00	8.00	8.00
Conducted PSD Result (dBm/30kHz)	-1.56	-0.52	-11.56

Table 27 - 802.11ax / HE20 MCS0x1 / RU 26-8 / MIMO CDD / Cores 0+1

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



2.2.7 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 Due
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	05-May-2020
Multimeter	Iso-tech	IDM101	2424	12	12-Dec-2020
Hygrometer	Rotronic	I-1000	3220	12	25-Sep-2020
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	11-Dec-2020
1800-6000 MHz Power Splitter	Mini-Circuits	ZN2PD-63-S+	4055	-	O/P Mon
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	28-Nov-2020
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	05-May-2020
PXA Signal Analyser	Keysight Technologies	N9030A	4653	12	10-Feb-2021
PXA Signal Analyser	Keysight Technologies	N9030A	4654	12	21-Oct-2020
Power splitter - 2 port	Mini-Circuits	ZN2PD-63-S+	4743	12	23-Sep-2020
Power splitter - 4 port	Mini-Circuits	ZN4PD1-63-S+	4744	12	23-Sep-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5099	12	06-Oct-2020
USB Power Sensor	Boonton	RTP5006	5186	12	28-Nov-2020
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5418	6	12-Jun-2020
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5419	6	12-Jun-2020
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5429	6	13-Jun-2020

Table 28

O/P Mon – Output Monitored using calibrated equipment



2.3 Emission Bandwidth

2.3.1 Specification Reference

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

2.3.2 Equipment Under Test and Modification State

A2330, S/N: C07CG05BPW8V - Modification State 0

2.3.3 Date of Test

20-April-2020 to 13-May-2020

2.3.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.8.1 for the 6 dB bandwidth and ISED RSS-GEN clause 6.7 for the 99% occupied bandwidth.

For modes of operation using multiple cores, measurements were made on each core but only the worst case results are reported. Worst case was considered as the narrowest results for 6 dB bandwidth and the widest result for 26 dB bandwidth and 99 % occupied bandwidth.

2.3.5 Environmental Conditions

Ambient Temperature	20.5 - 25.2 °C
Relative Humidity	25.2 - 44.1 %



2.3.6 Test Results

2.4 GHz WLAN

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
6 dB Bandwidth (MHz)	7.680	7.680	8.160
99 % Bandwidth (MHz)	12.854	12.953	12.789

Table 29 - 802.11b / 1 Mbps / SISO / Core 1

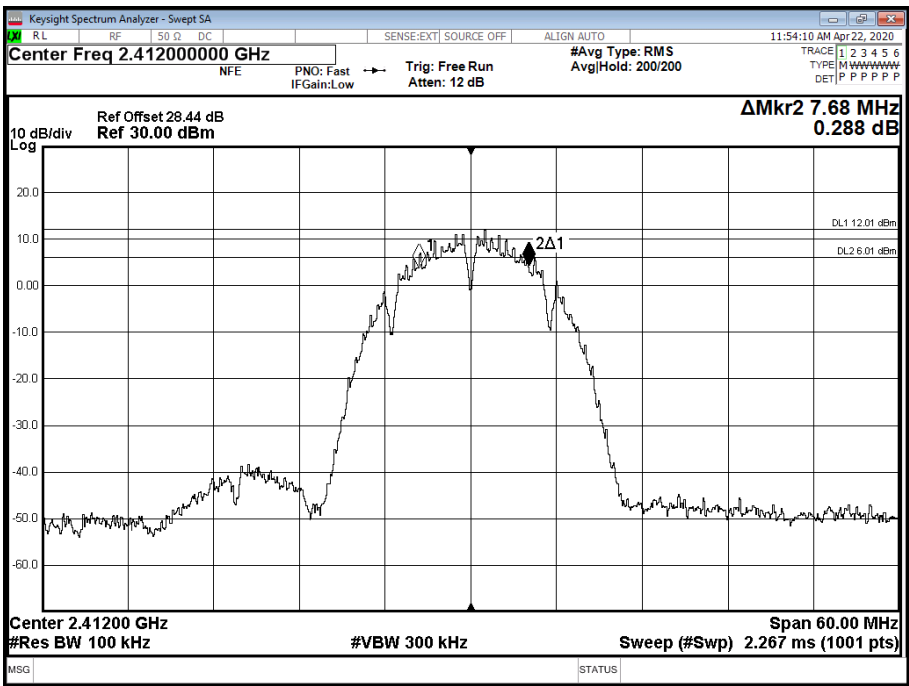


Figure 2 - 2412 MHz - 6 dB DTS Bandwidth

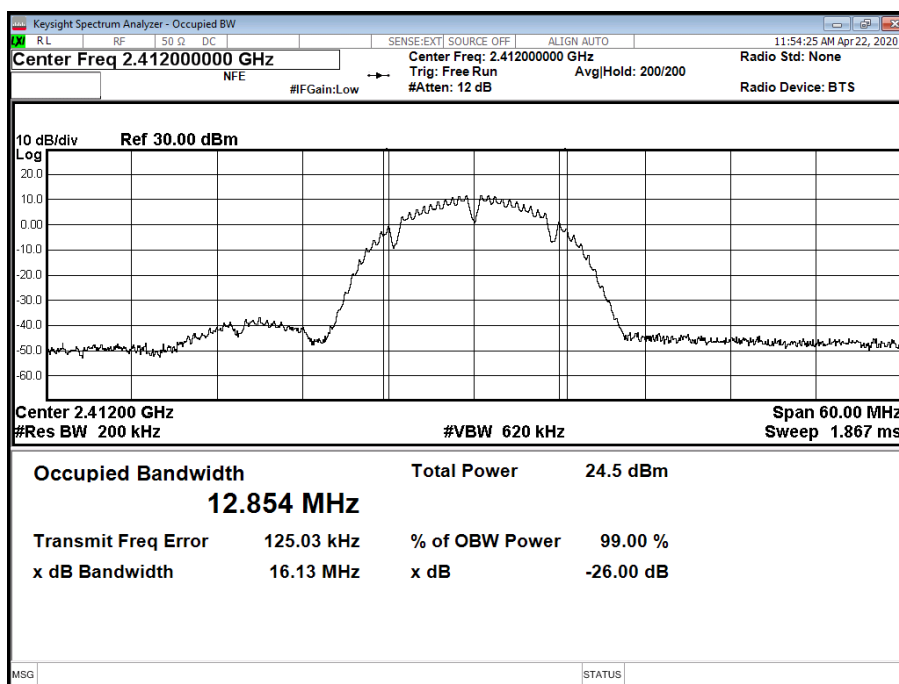


Figure 3 - 2412 MHz - 99 % Occupied Bandwidth

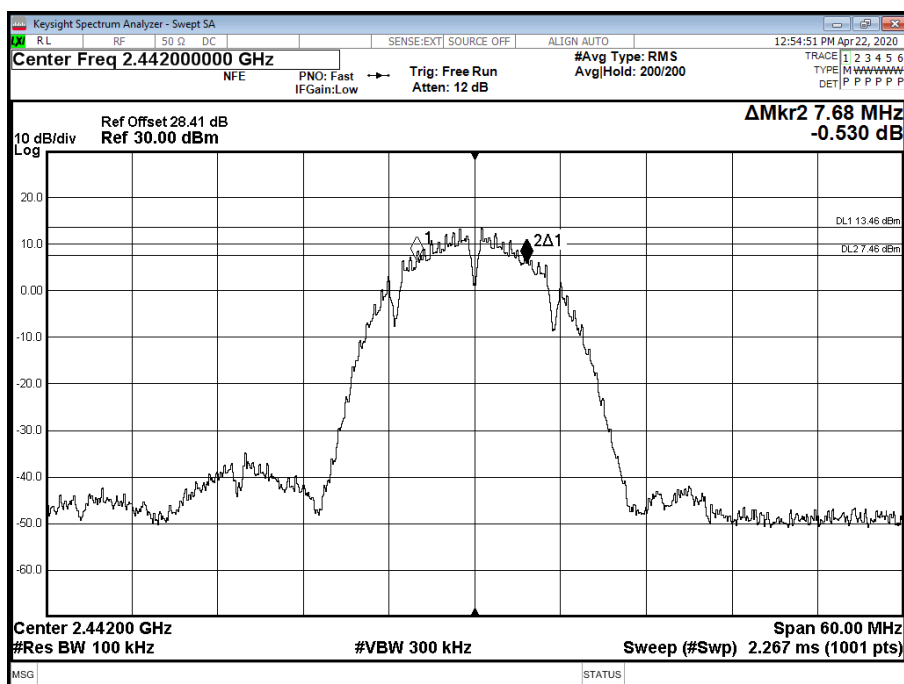


Figure 4 - 2442 MHz - 6 dB DTS Bandwidth

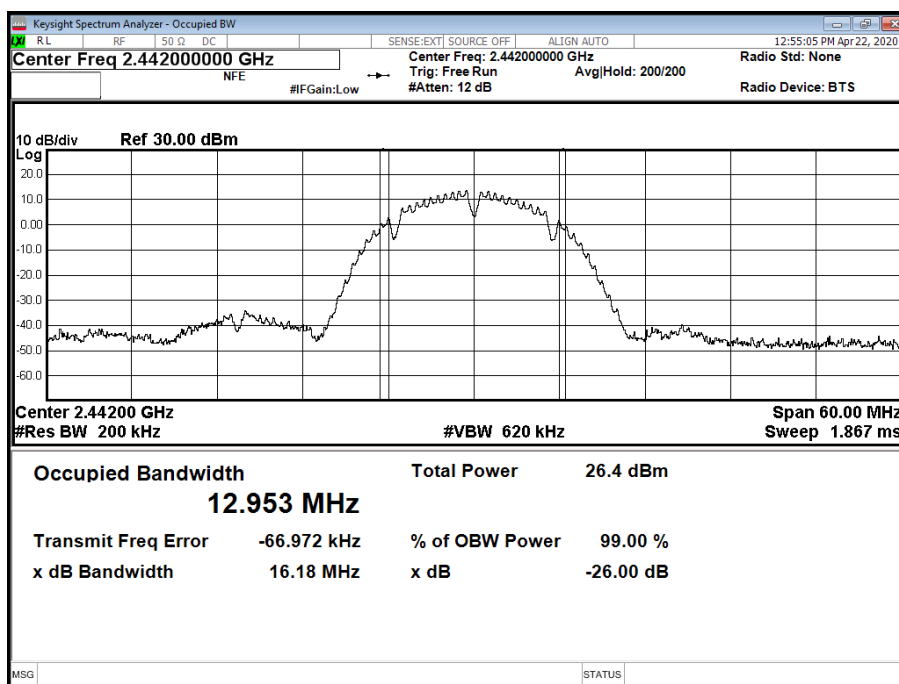


Figure 5 - 2442 MHz - 99 % Occupied Bandwidth

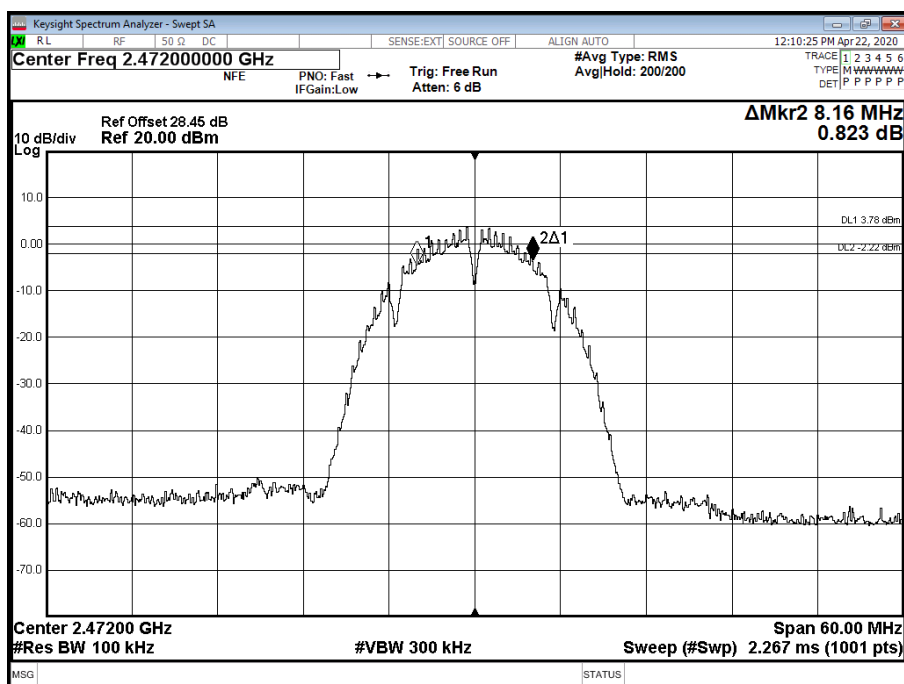


Figure 6 - 2472 MHz - 6 dB DTS Bandwidth

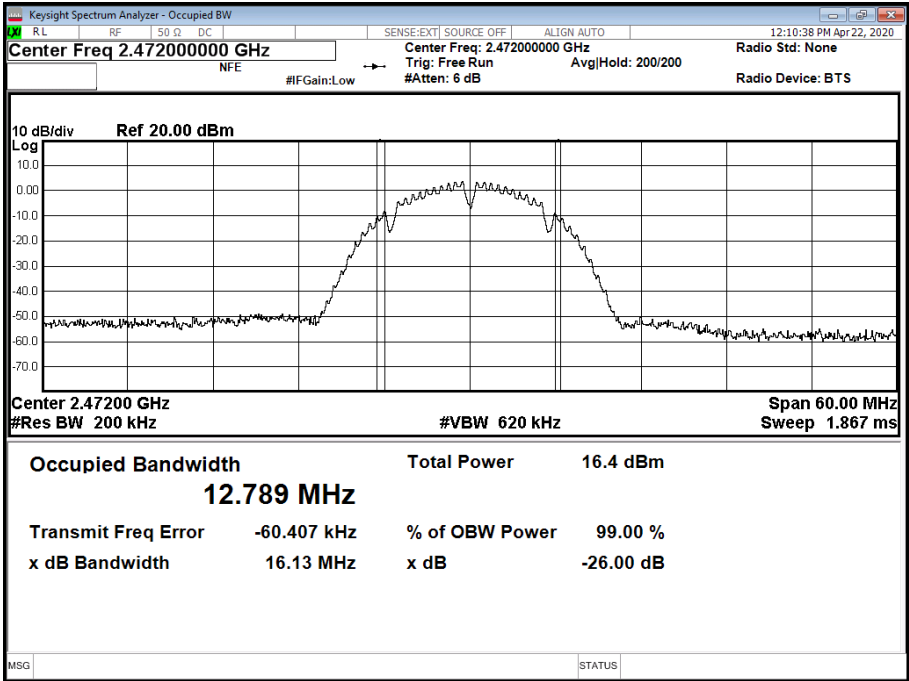


Figure 7 - 2472 MHz - 99 % Occupied Bandwidth

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
6 dB Bandwidth (MHz)	15.240	15.840	15.120
99 % Bandwidth (MHz)	16.339	16.315	16.266

Table 30 - 802.11g / 6 Mbps / SISO / Core 1

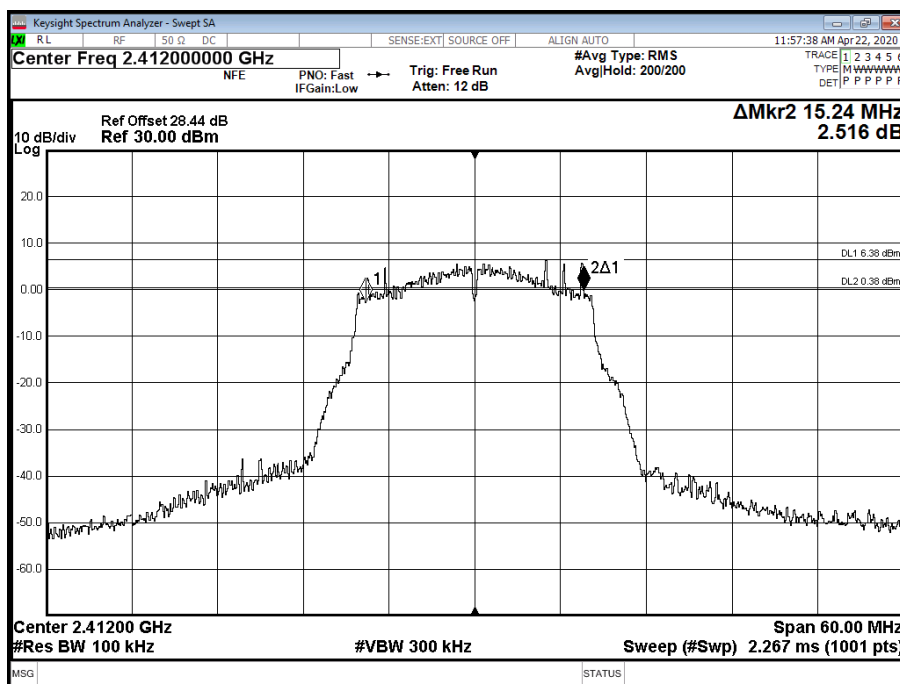


Figure 8 - 2412 MHz - 6 dB DTS Bandwidth

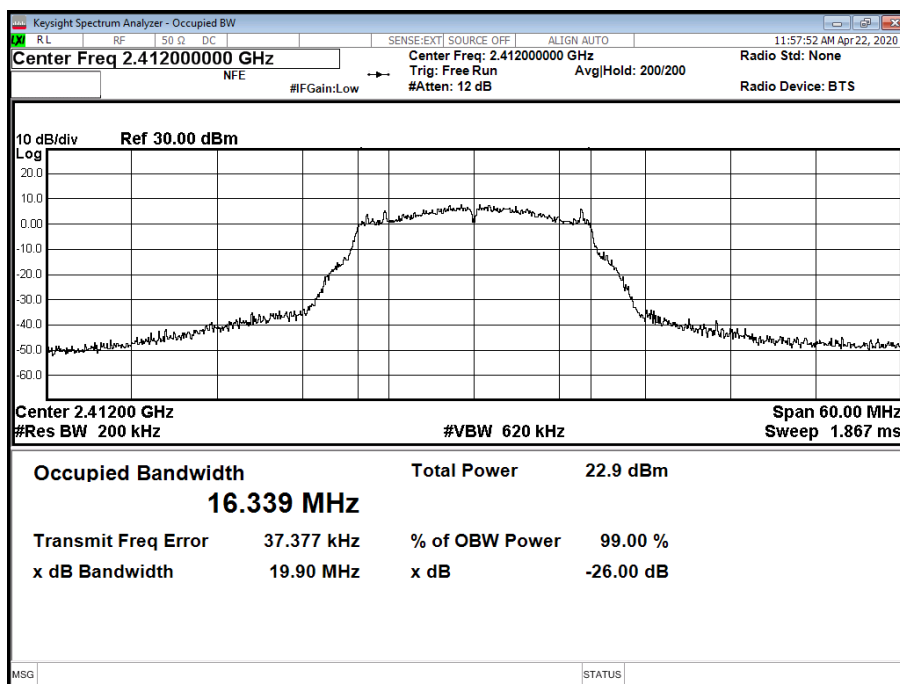


Figure 9 - 2412 MHz - 99 % Occupied Bandwidth

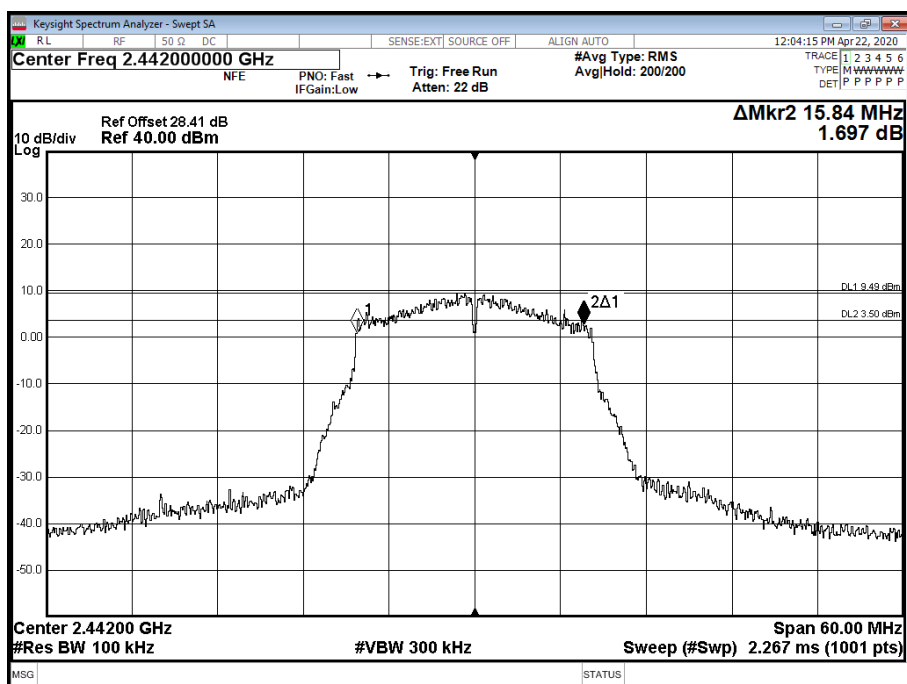


Figure 10 - 2442 MHz - 6 dB DTS Bandwidth

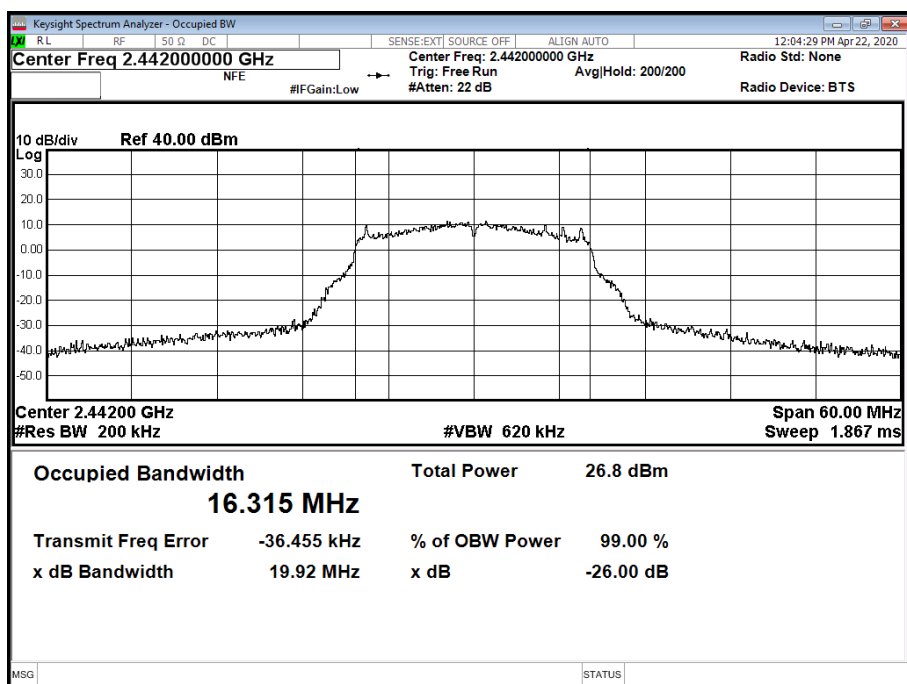


Figure 11 - 2442 MHz - 99 % Occupied Bandwidth

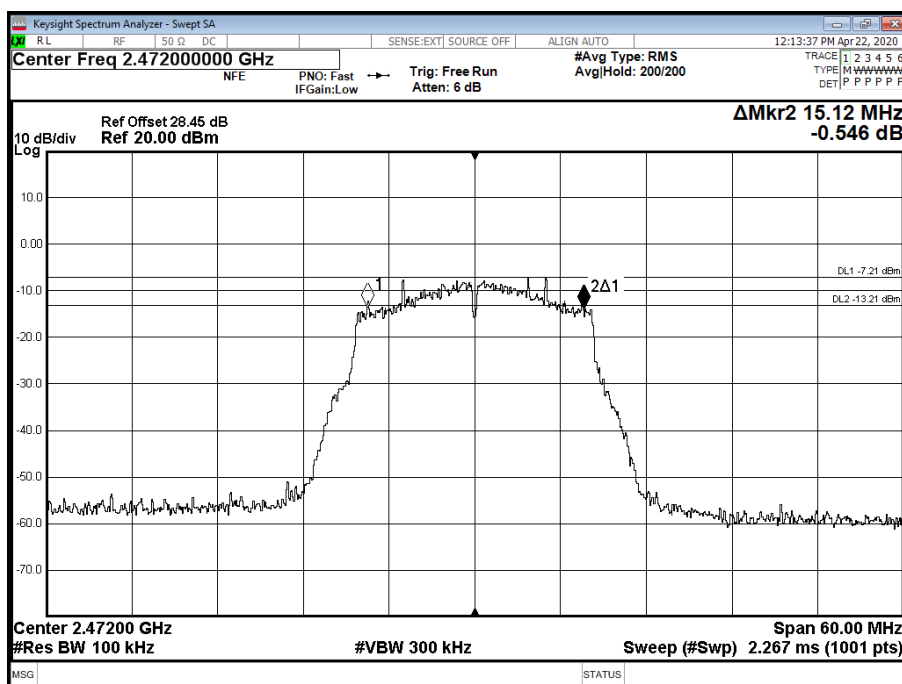


Figure 12 - 2472 MHz - 6 dB DTS Bandwidth

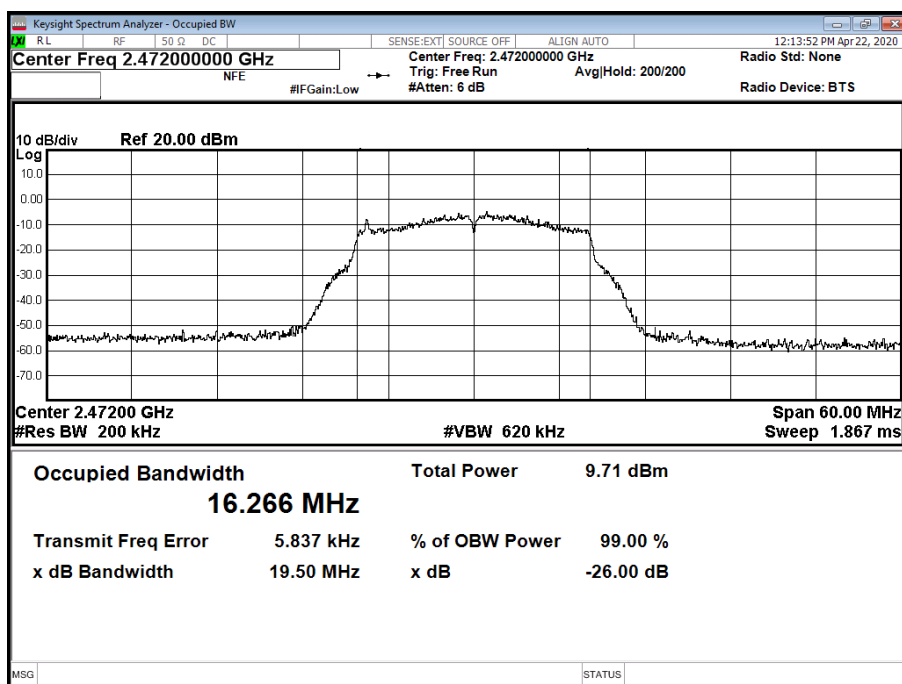


Figure 13 - 2472 MHz - 99 % Occupied Bandwidth

Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
6 dB Bandwidth (MHz)	13.980	15.060	16.080
99 % Bandwidth (MHz)	17.516	17.475	17.455

Table 31 - 802.11n / HT20 MCS0 / SISO / Core 1

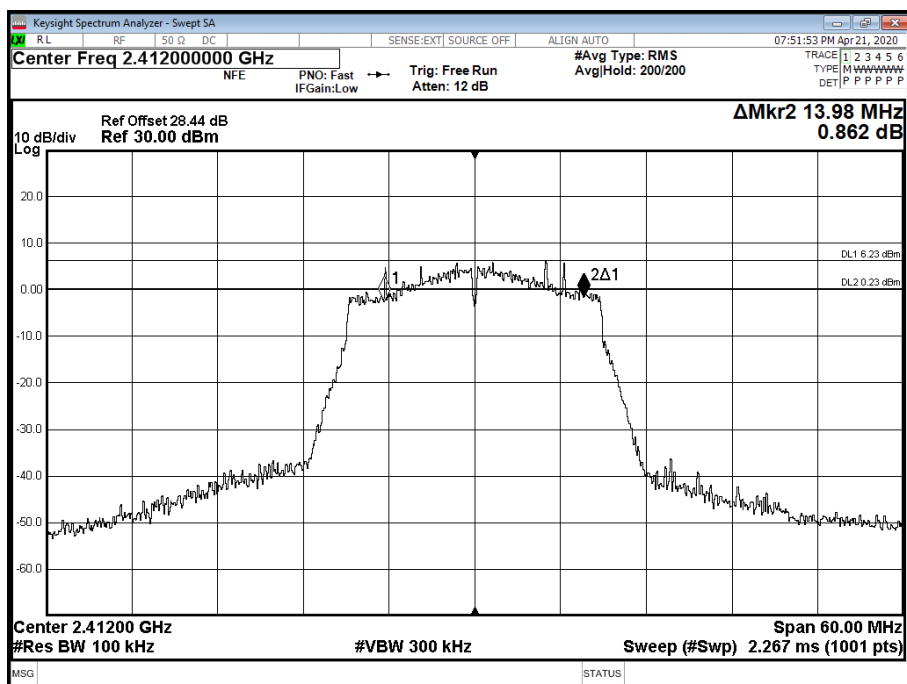


Figure 14 - 2412 MHz - 6 dB DTS Bandwidth

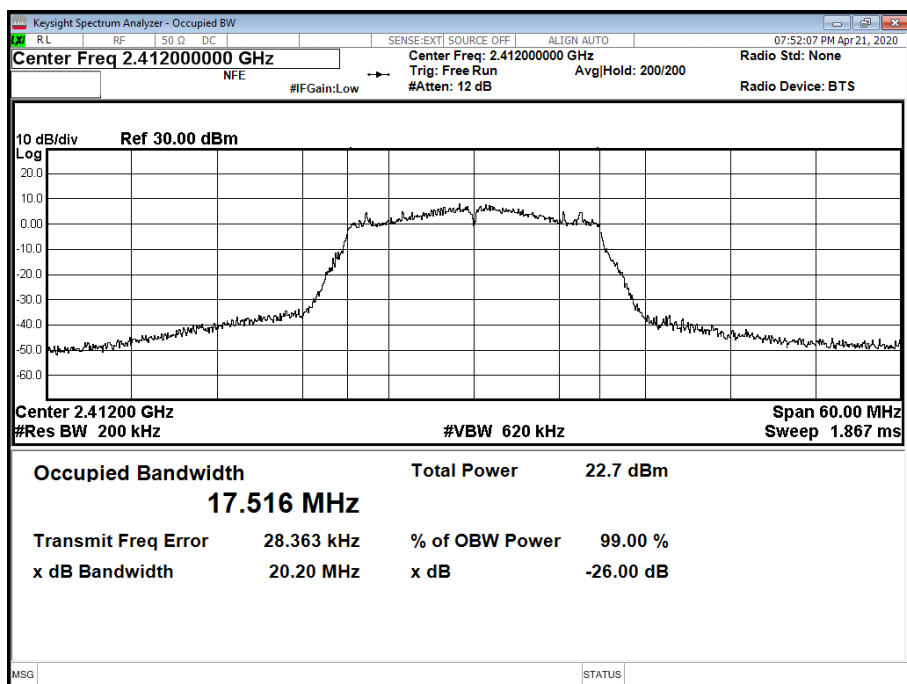


Figure 15 - 2412 MHz - 99 % Occupied Bandwidth

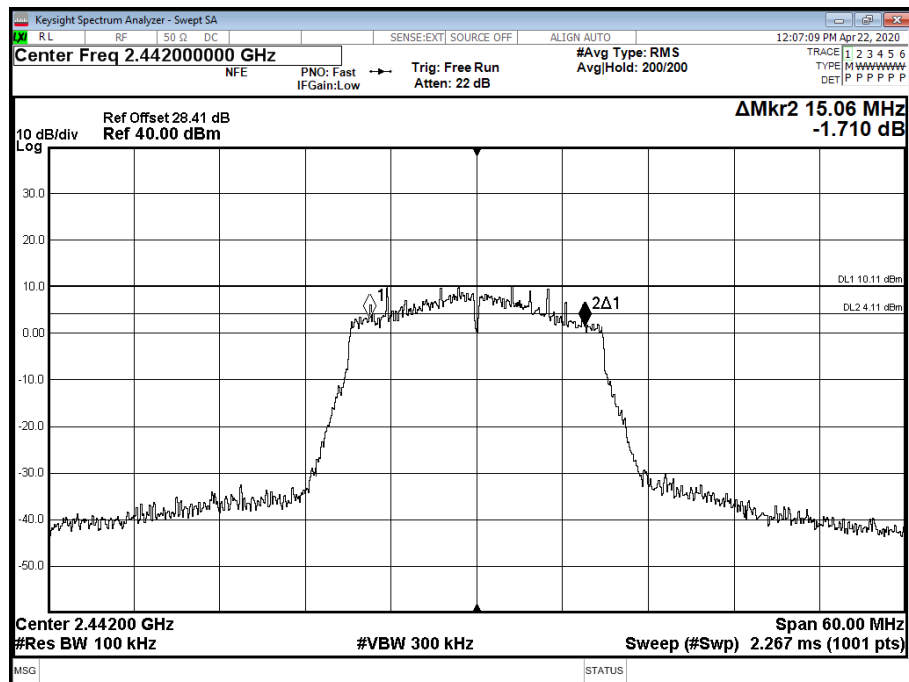


Figure 16 - 2442 MHz - 6 dB DTS Bandwidth

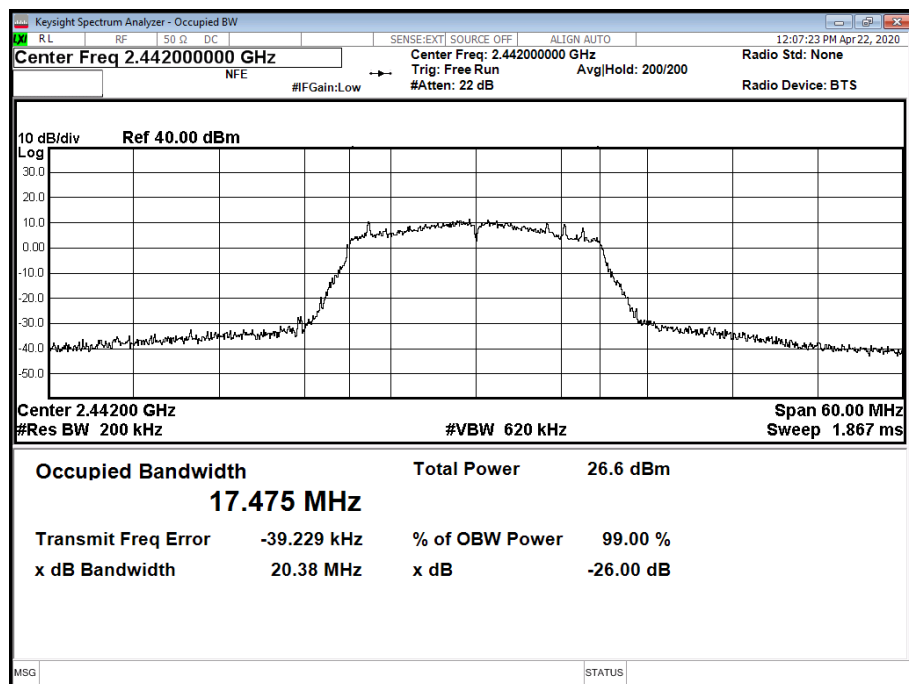


Figure 17 - 2442 MHz - 99 % Occupied Bandwidth

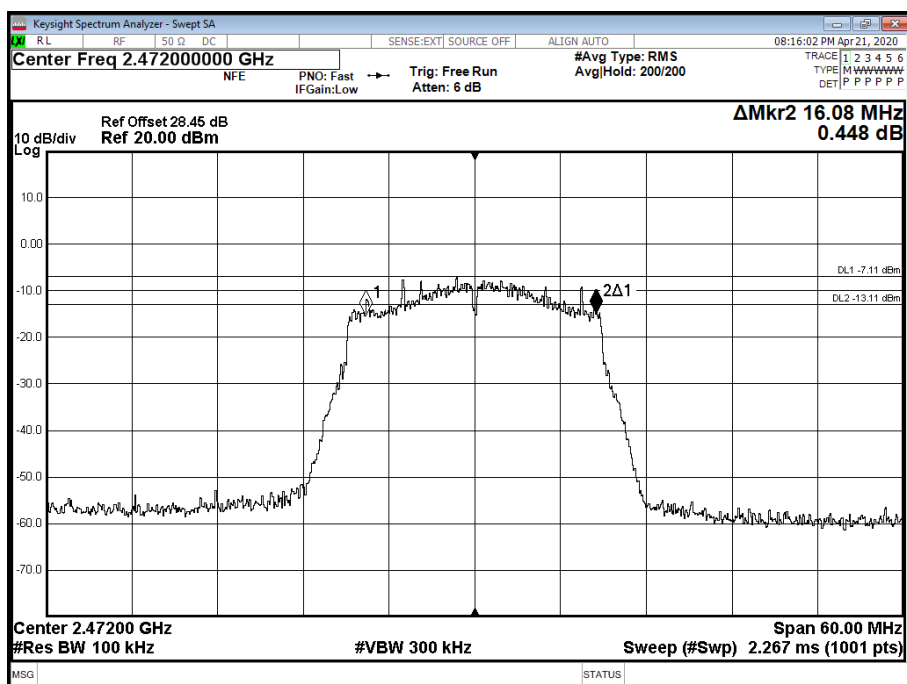


Figure 18 - 2472 MHz - 6 dB DTS Bandwidth

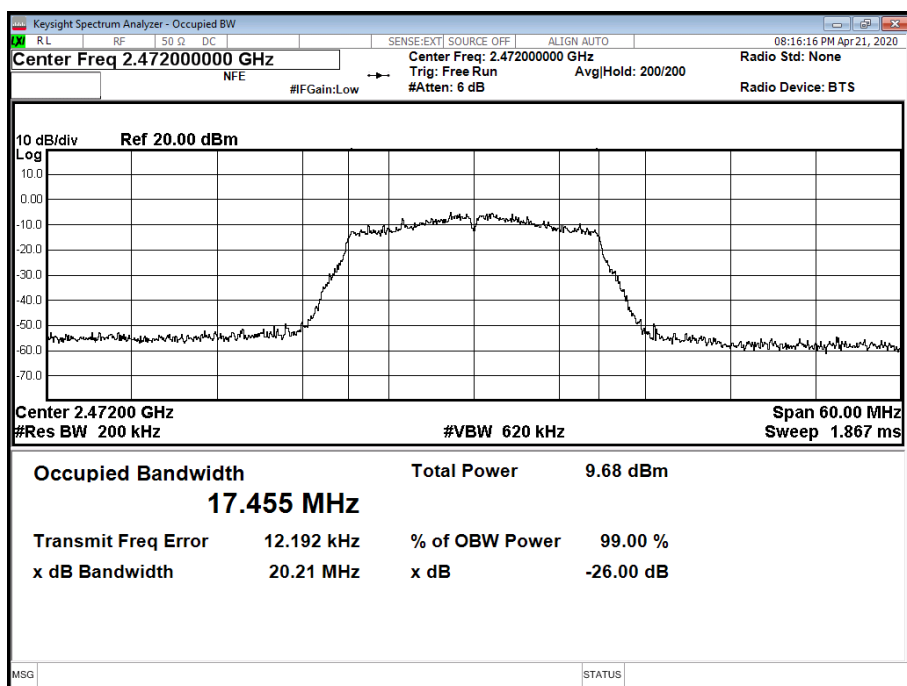


Figure 19 - 2472 MHz - 99 % Occupied Bandwidth



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
6 dB Bandwidth (MHz)	13.860	14.040	15.240
99 % Bandwidth (MHz)	17.493	17.512	17.465

Table 32 - 802.11n / HT20 MCS0 / MIMO CDD / Cores 0+1

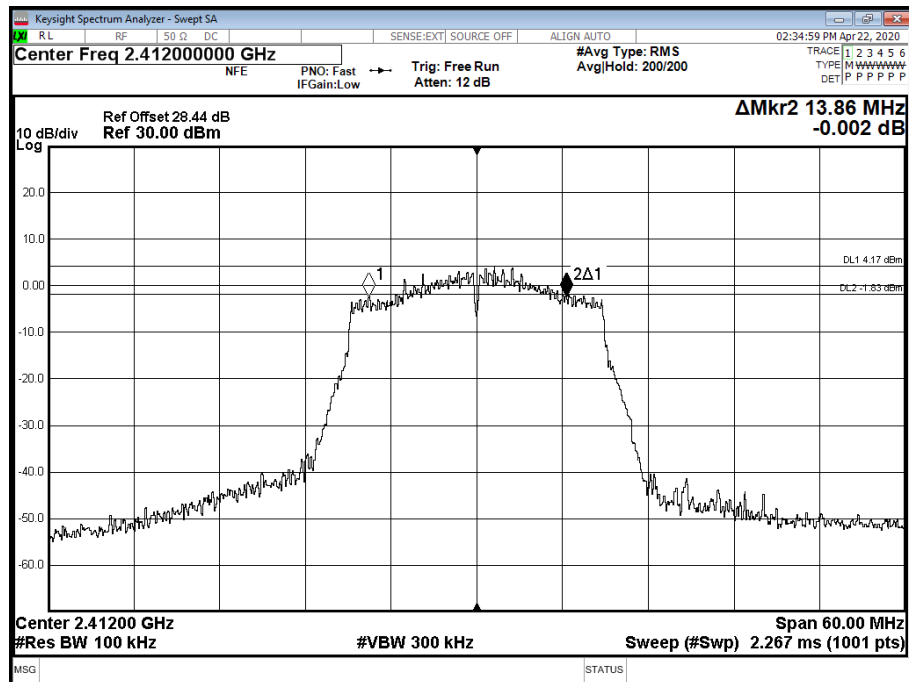


Figure 20 - 2412 MHz - 6 dB DTS Bandwidth

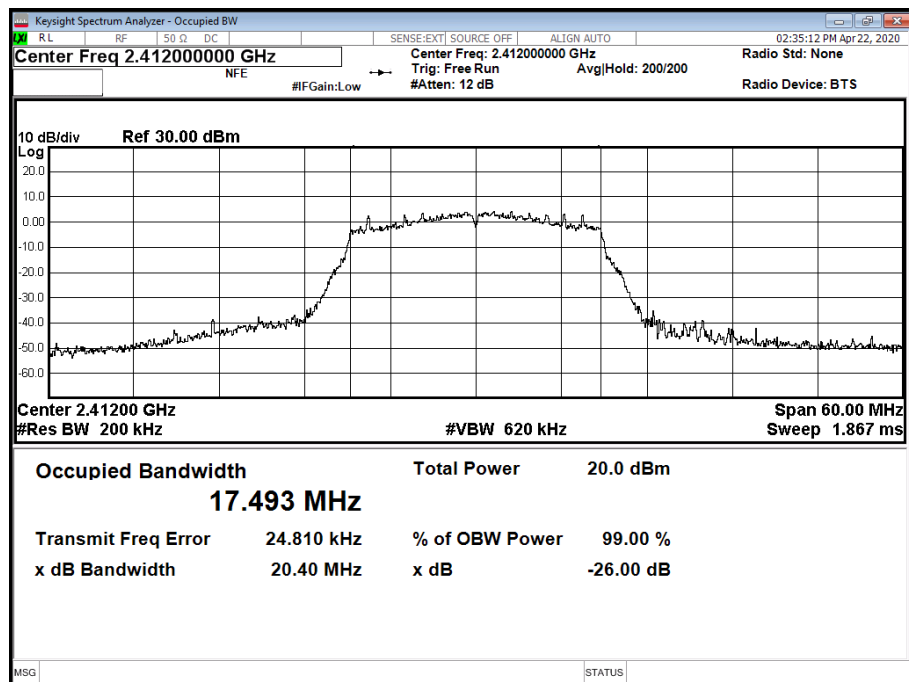


Figure 21 - 2412 MHz - 99 % Occupied Bandwidth

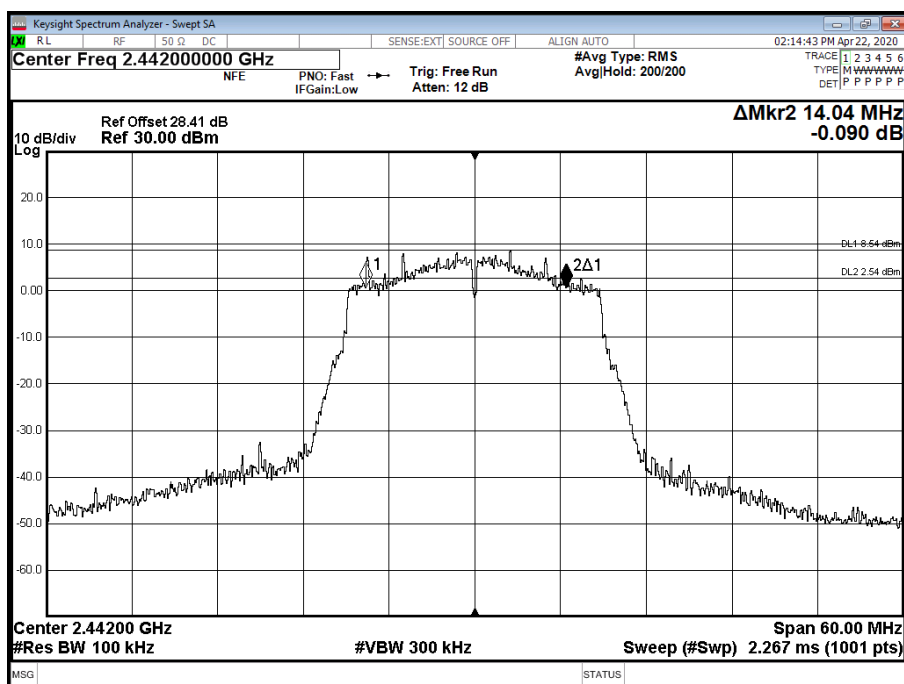


Figure 22 - 2442 MHz - 6 dB DTS Bandwidth

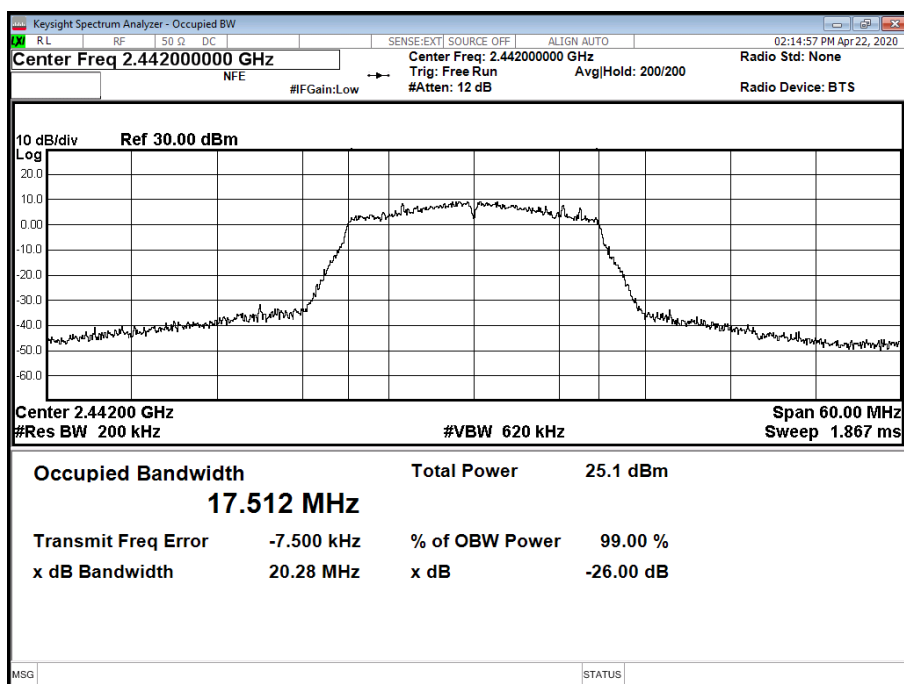


Figure 23 - 2442 MHz - 99 % Occupied Bandwidth

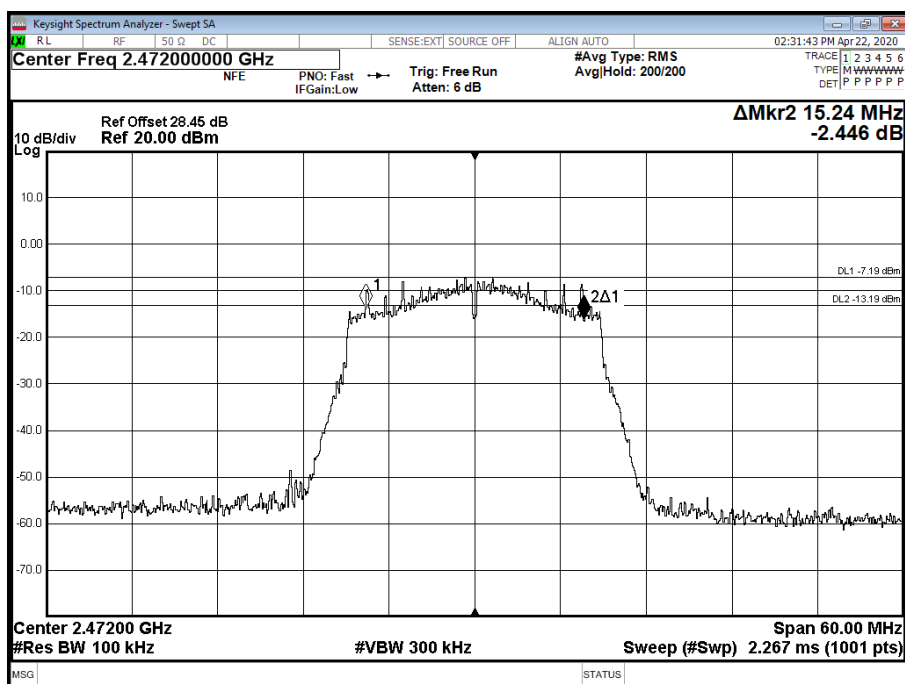


Figure 24 - 2472 MHz - 6 dB DTS Bandwidth

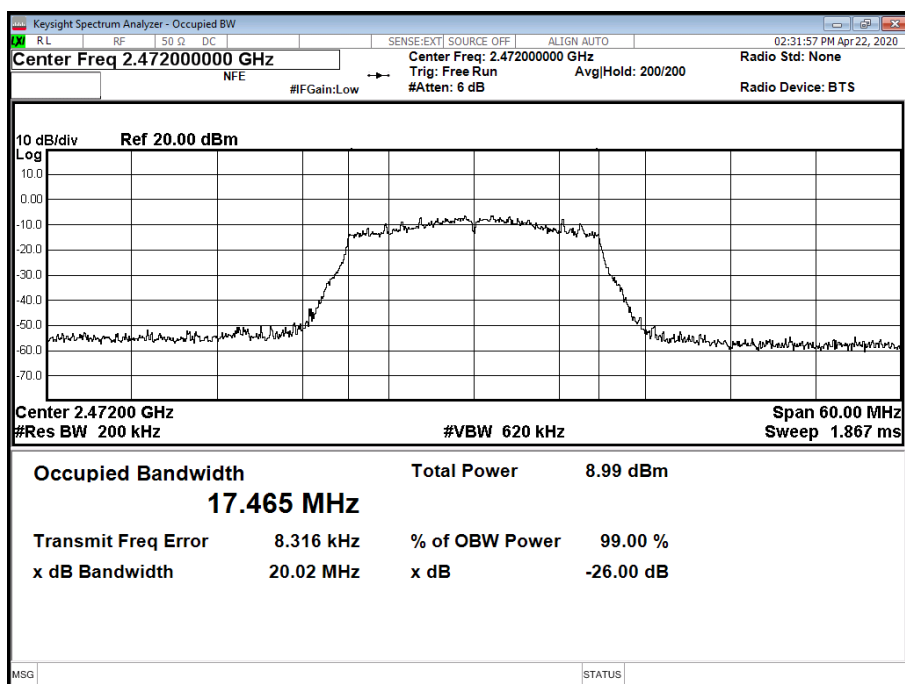


Figure 25 - 2472 MHz - 99 % Occupied Bandwidth



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
6 dB Bandwidth (MHz)	15.660	18.120	15.240
99% Bandwidth (MHz)	18.749	18.834	18.782

Table 33 - 802.11ax / HE20 MCS0x1 / SU / SISO / Core 1

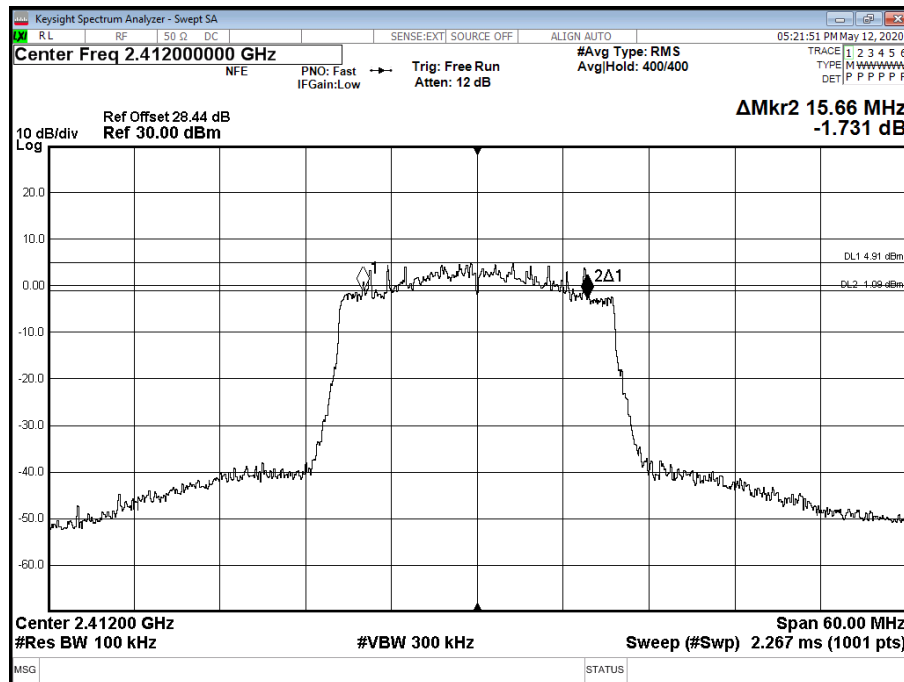


Figure 26 - 2412 MHz - 6 dB DTS Bandwidth

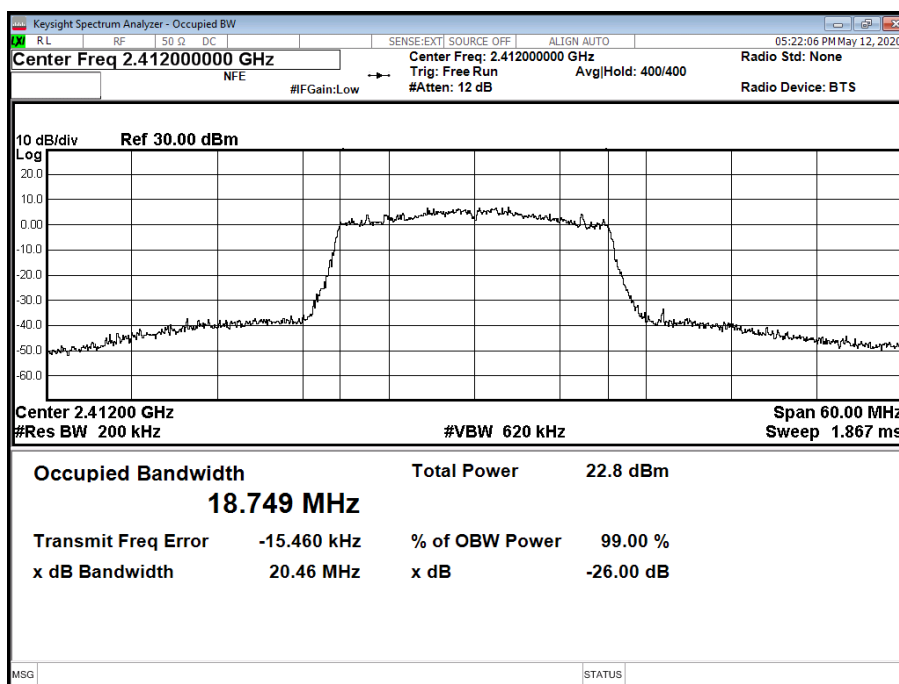


Figure 27 - 2412 MHz - 99% Occupied Bandwidth

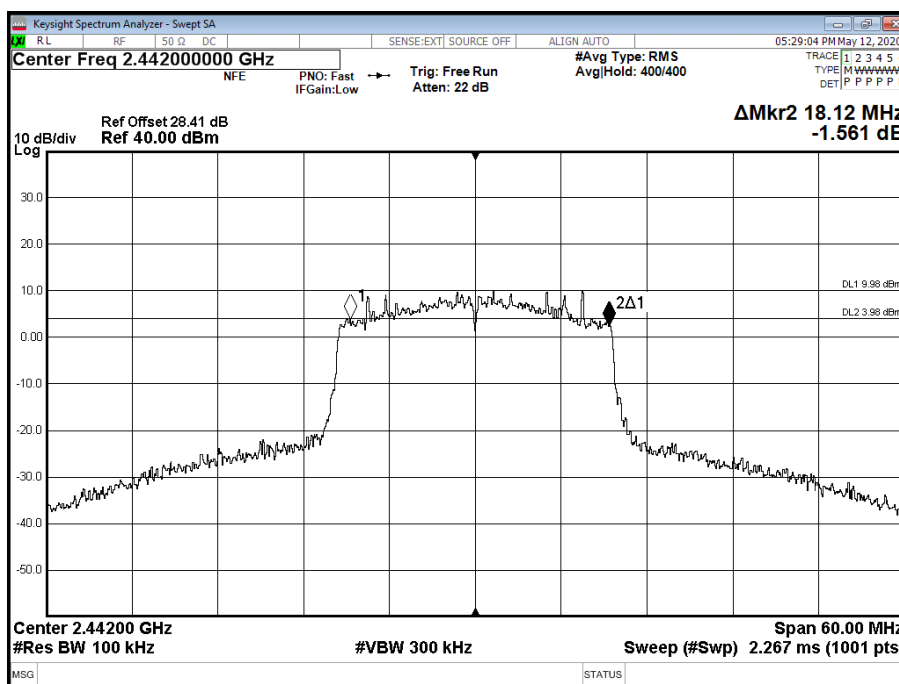
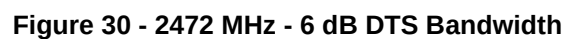


Figure 28 - 2442 MHz - 6 dB DTS Bandwidth



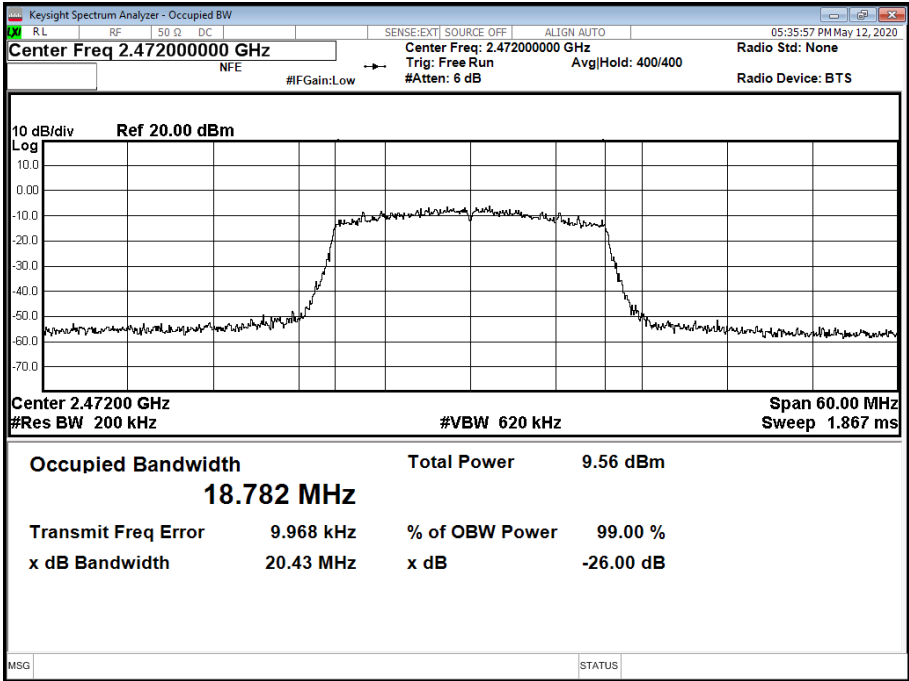


Figure 31 - 2472 MHz - 99% Occupied Bandwidth



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
6 dB Bandwidth (MHz)	17.100	2.160	12.120
99 % Bandwidth (MHz)	18.239	18.199	18.154

Table 34 - 802.11ax / HE20 MCS0x1 / RU 26-0 / SISO / Core 1

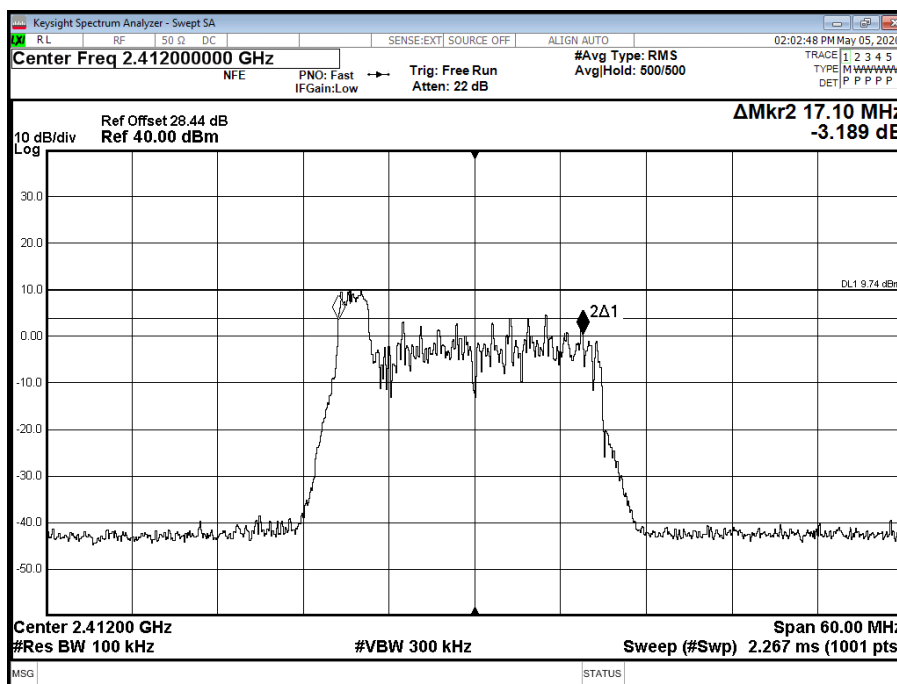


Figure 32 - 2412 MHz - 6 dB DTS Bandwidth

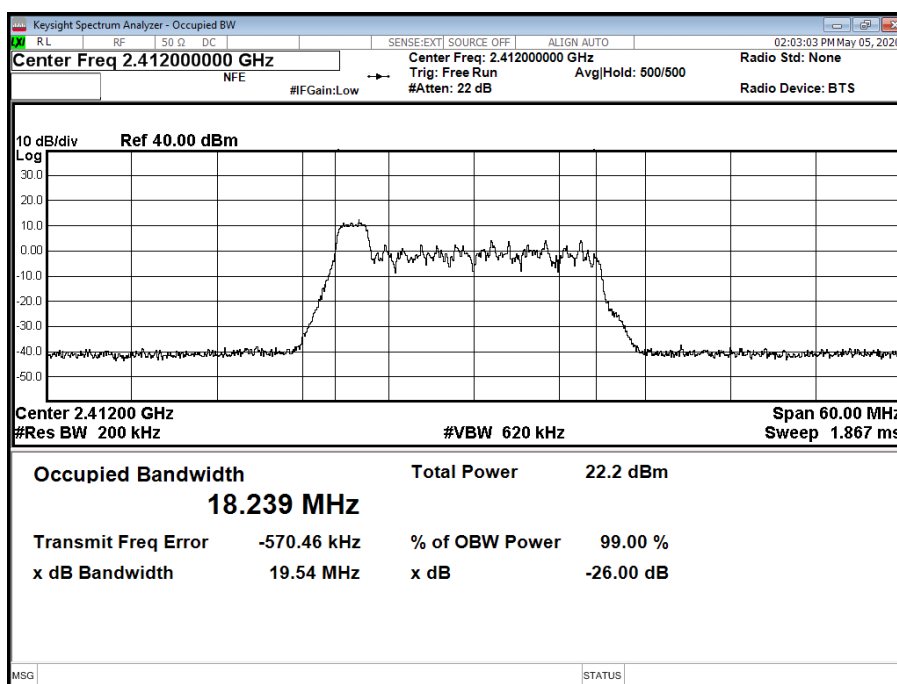


Figure 33 - 2412 MHz - 99 % Occupied Bandwidth

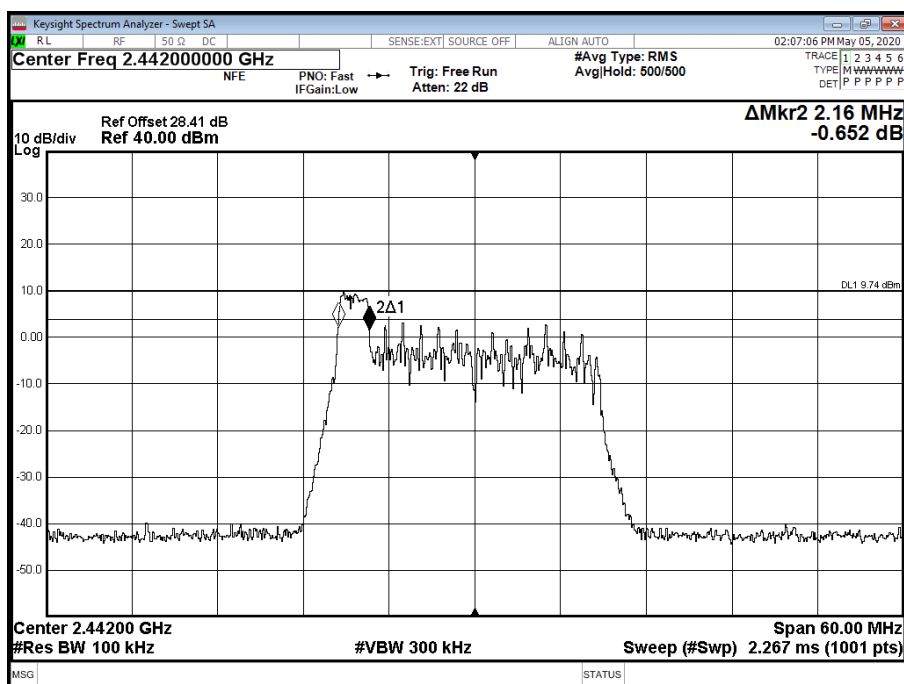


Figure 34 - 2442 MHz - 6 dB DTS Bandwidth

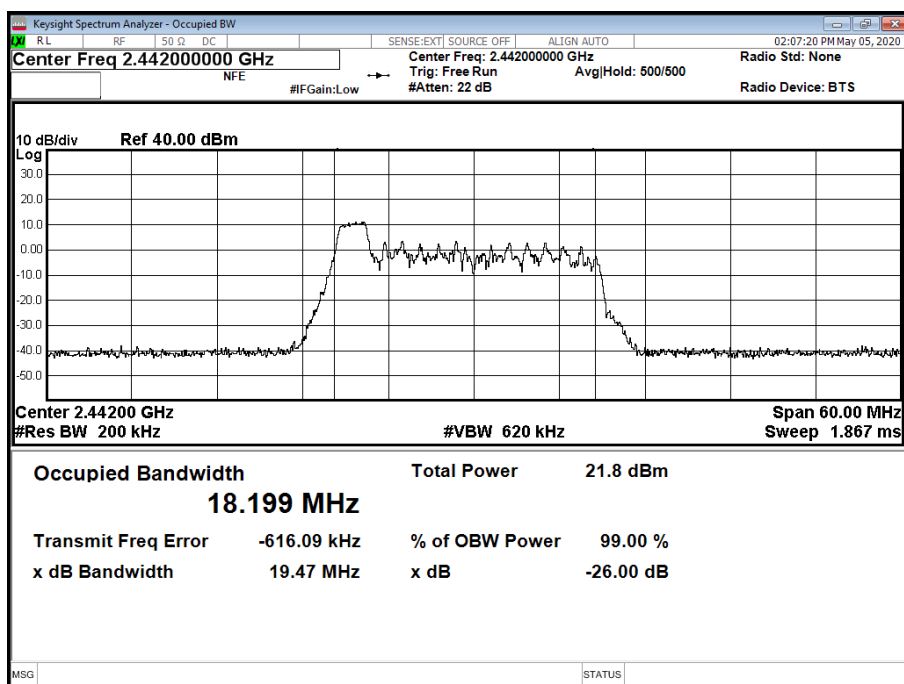


Figure 35 - 2442 MHz - 99 % Occupied Bandwidth

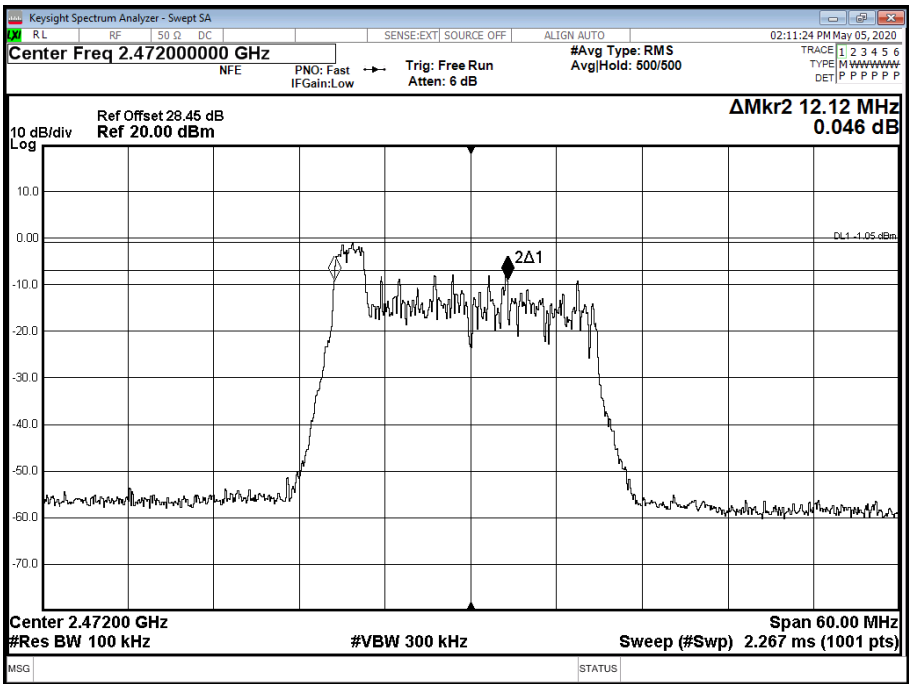


Figure 36 - 2472 MHz - 6 dB DTS Bandwidth

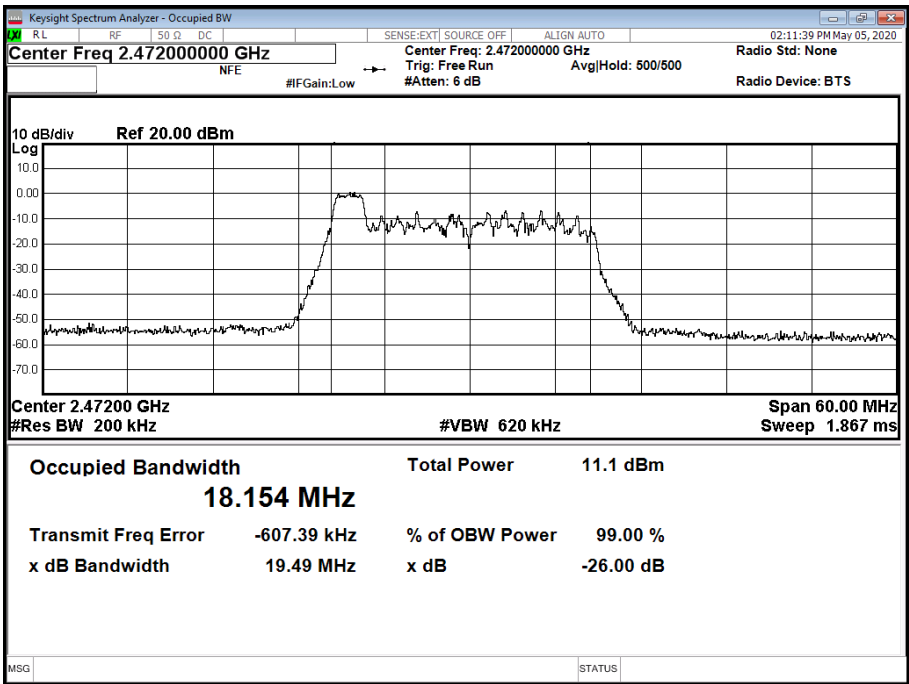


Figure 37 - 2472 MHz - 99 % Occupied Bandwidth



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
6 dB Bandwidth (MHz)	2.160	13.440	7.140
99 % Bandwidth (MHz)	17.928	18.234	18.122

Table 35 - 802.11ax / HE20 MCS0x1 / RU 26-8 / SISO / Core 1

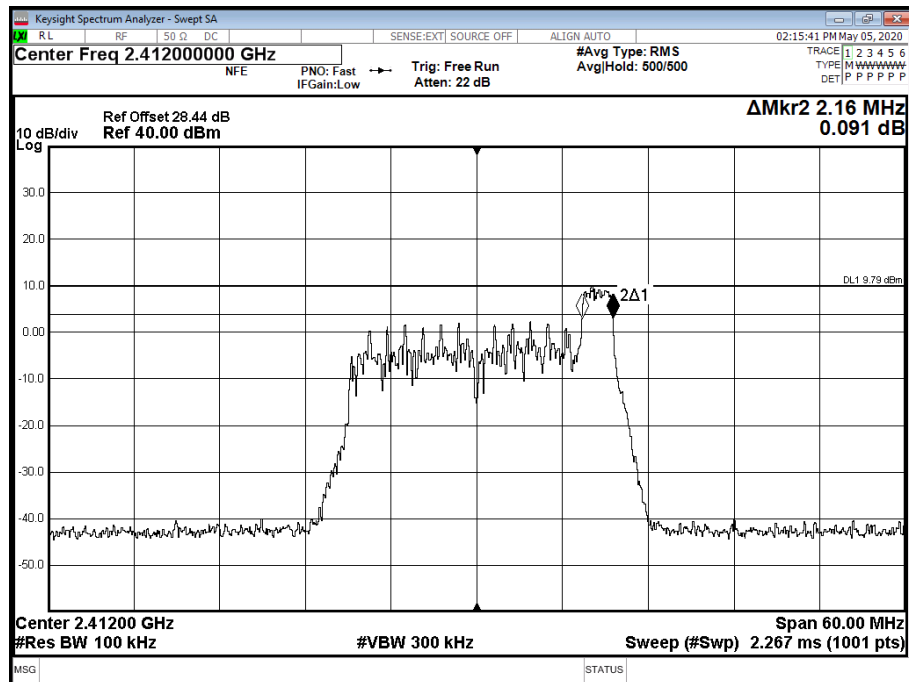


Figure 38 - 2412 MHz - 6 dB DTS Bandwidth

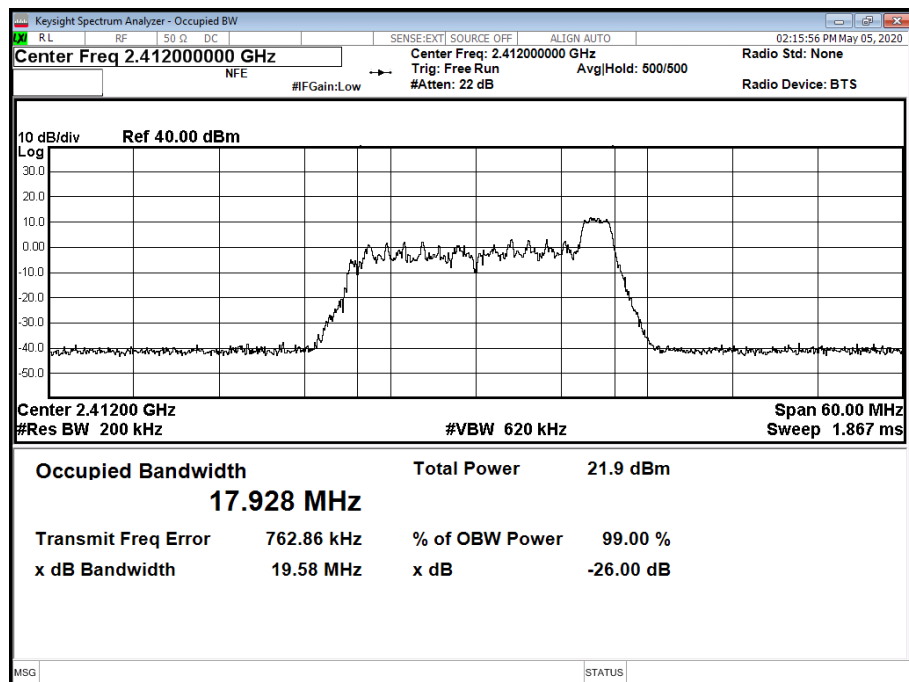


Figure 39 - 2412 MHz - 99 % Occupied Bandwidth

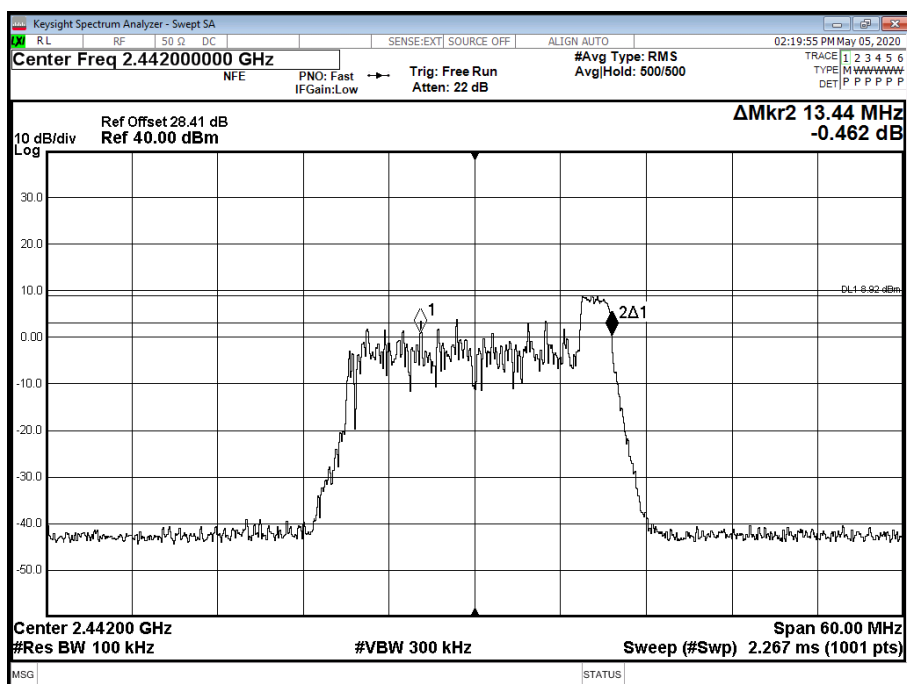


Figure 40 - 2442 MHz - 6 dB DTS Bandwidth

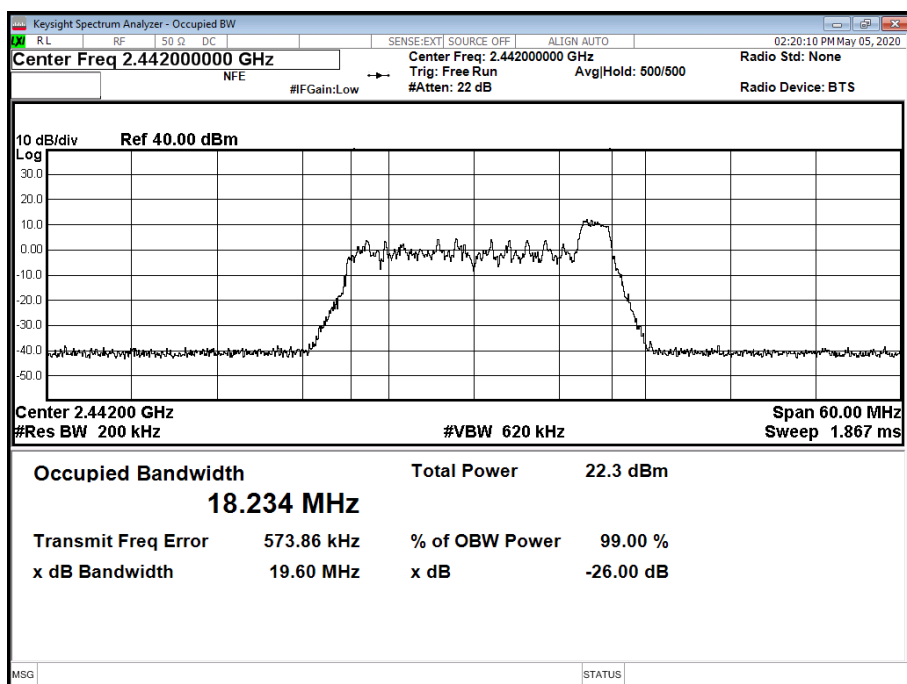


Figure 41 - 2442 MHz - 99 % Occupied Bandwidth

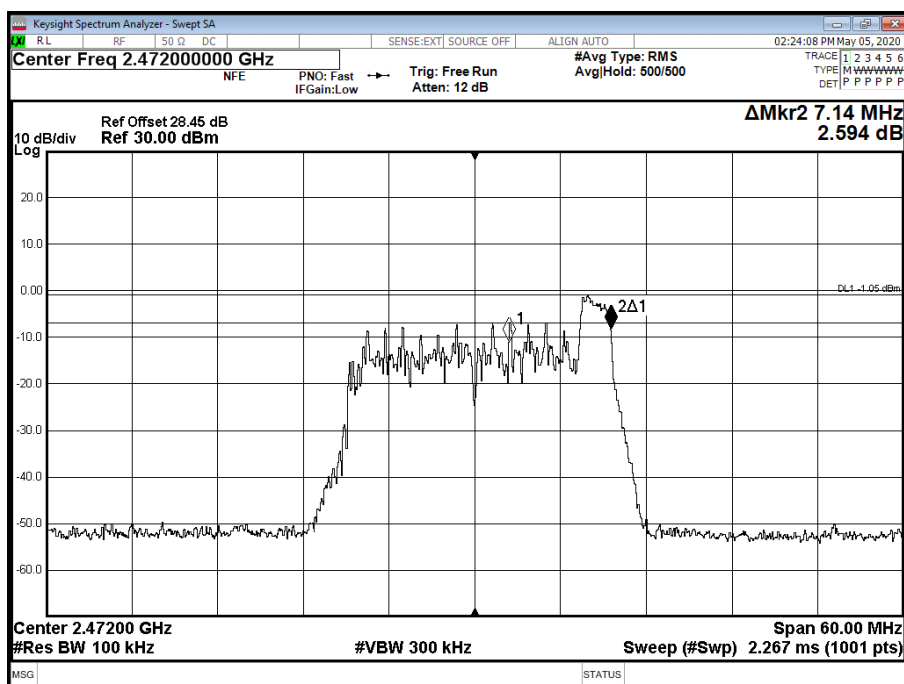


Figure 42 - 2472 MHz - 6 dB DTS Bandwidth

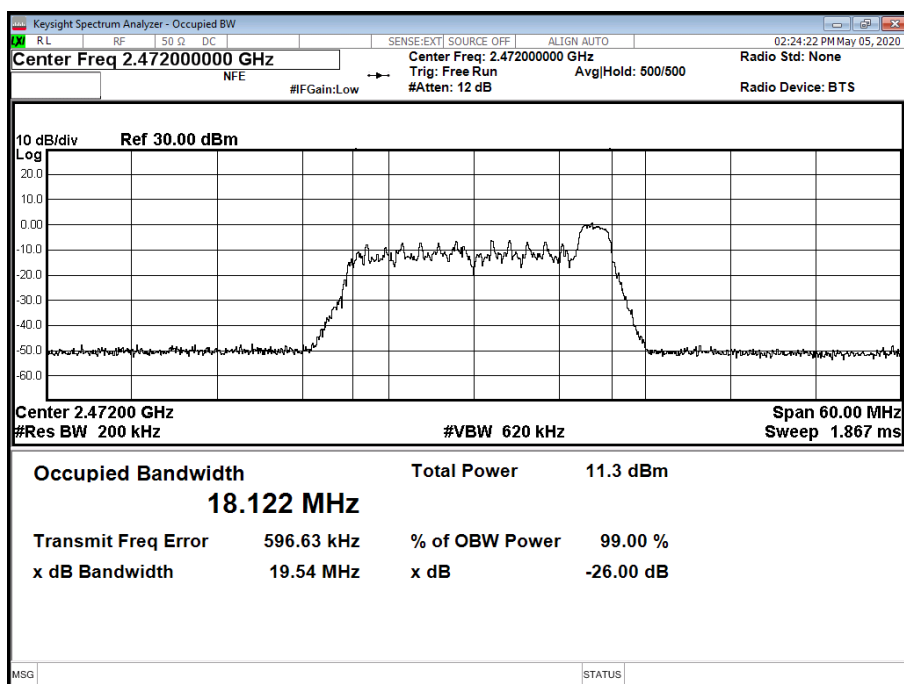


Figure 43 - 2472 MHz - 99 % Occupied Bandwidth



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
6 dB Bandwidth (MHz)	15.240	15.240	15.180
99% Bandwidth (MHz)	18.874	18.812	18.789

Table 36 - 802.11ax / HE20 MCS0x1 / SU / MIMO CDD / Cores 0+1

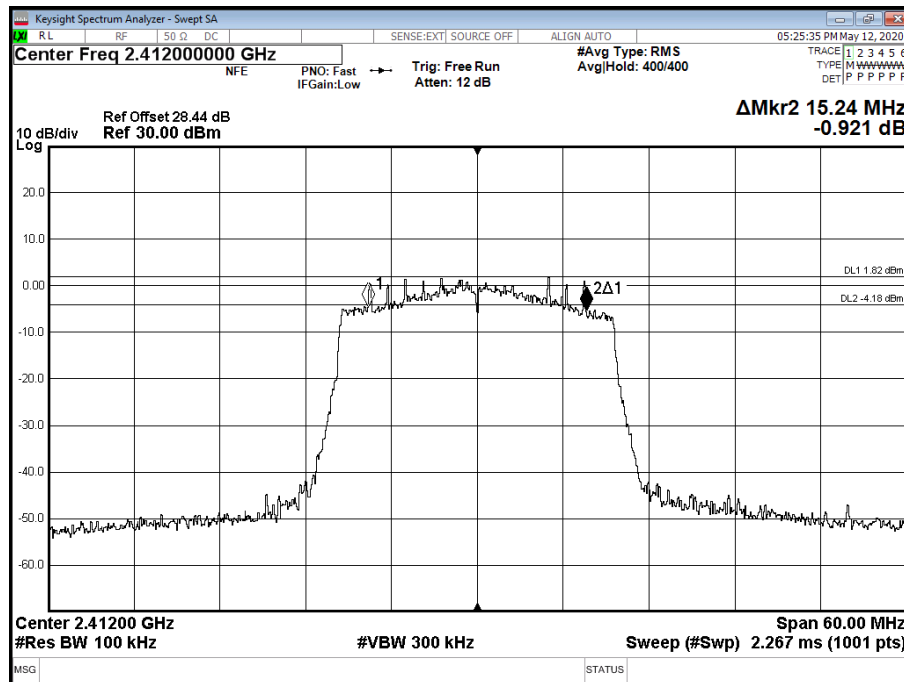


Figure 44 - 2412 MHz - 6 dB DTS Bandwidth

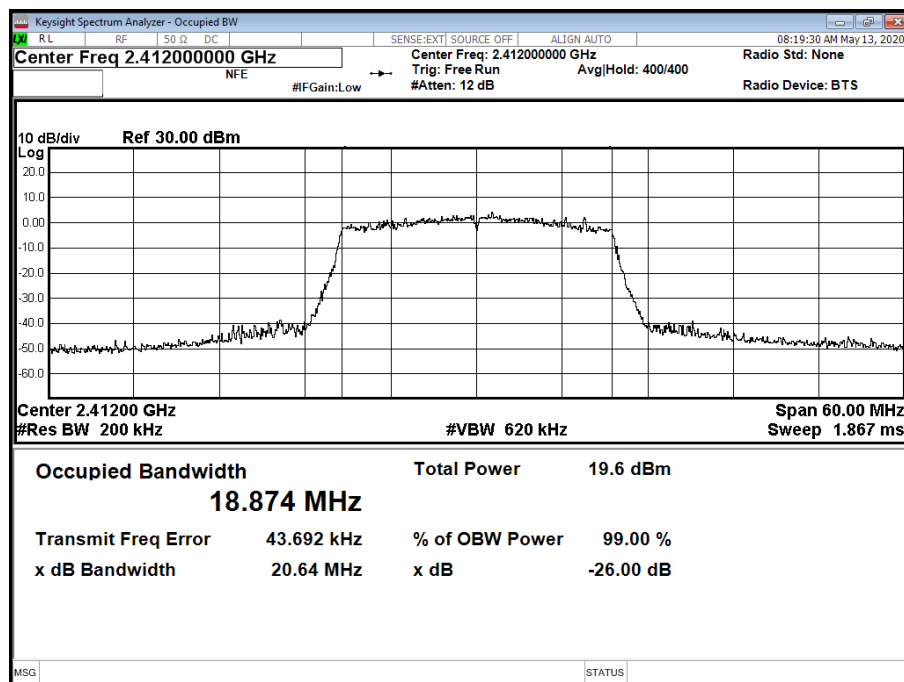


Figure 45 - 2412 MHz - 99% Occupied Bandwidth

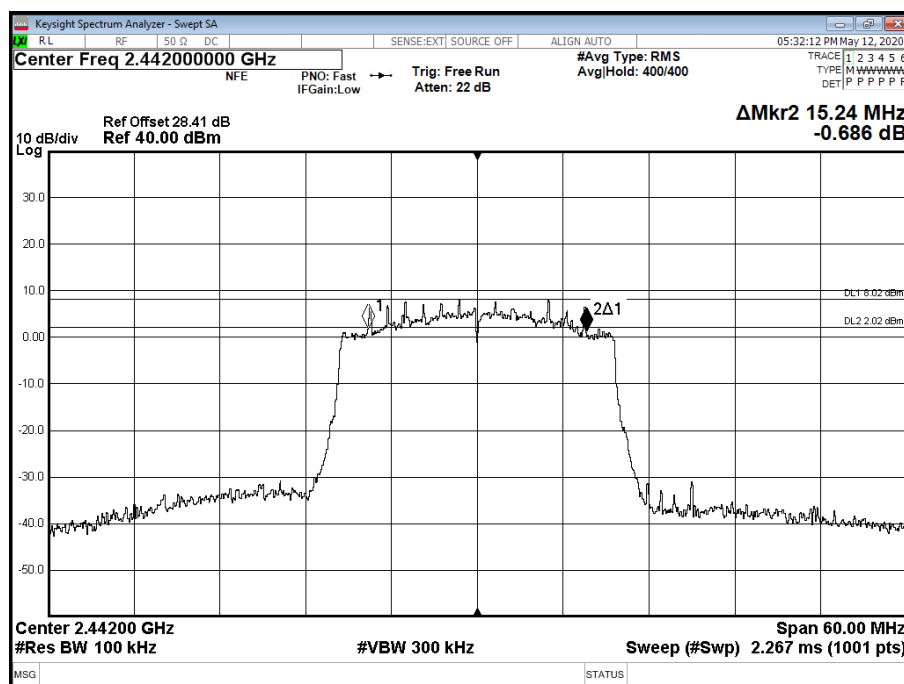


Figure 46 - 2442 MHz - 6 dB DTS Bandwidth

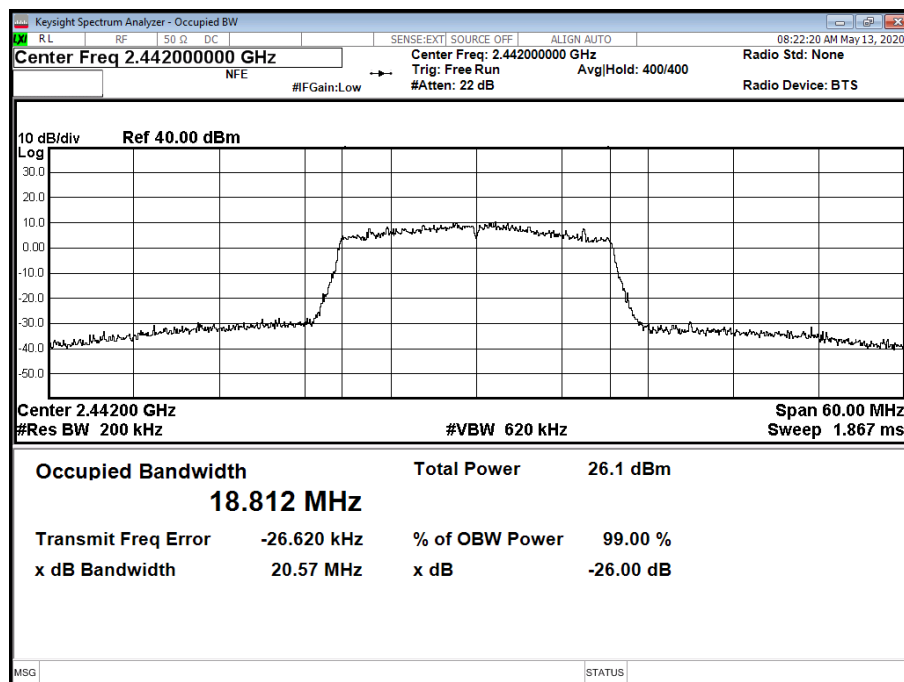


Figure 47 - 2442 MHz - 99% Occupied Bandwidth

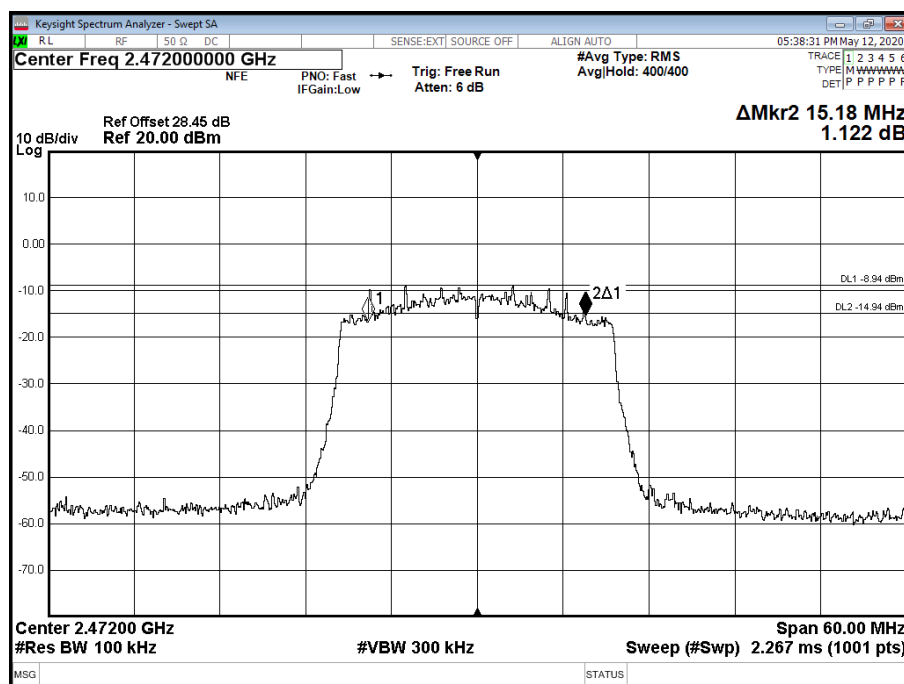


Figure 48 - 2472 MHz - 6 dB DTS Bandwidth

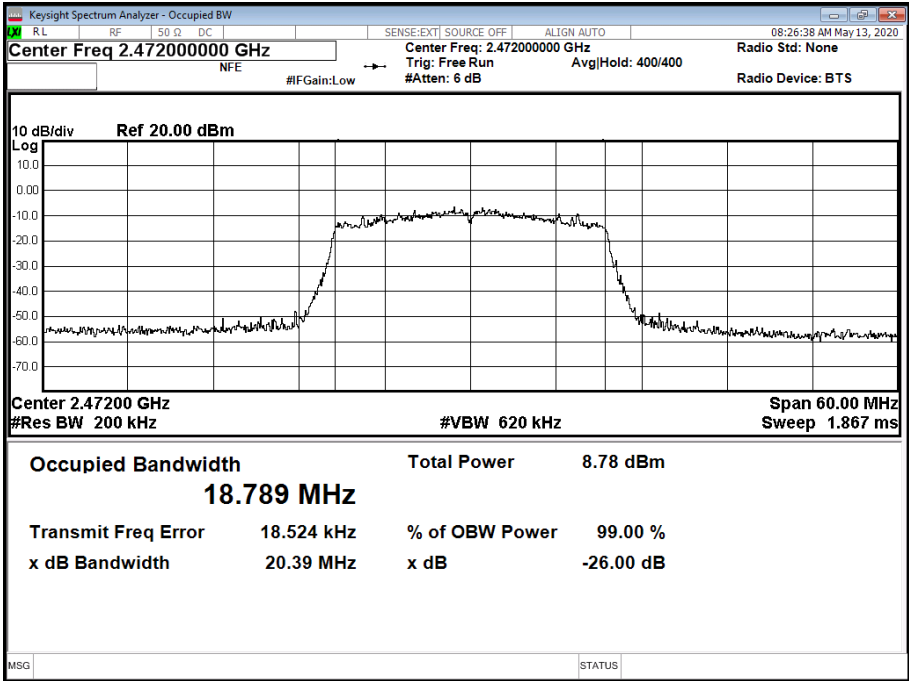


Figure 49 - 2472 MHz - 99% Occupied Bandwidth



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
6 dB Bandwidth (MHz)	17.100	2.220	2.160
99 % Bandwidth (MHz)	18.306	18.134	18.213

Table 37 - 802.11ax / HE20 MCS0x1 / RU 26-0 / MIMO CDD / Cores 0+1

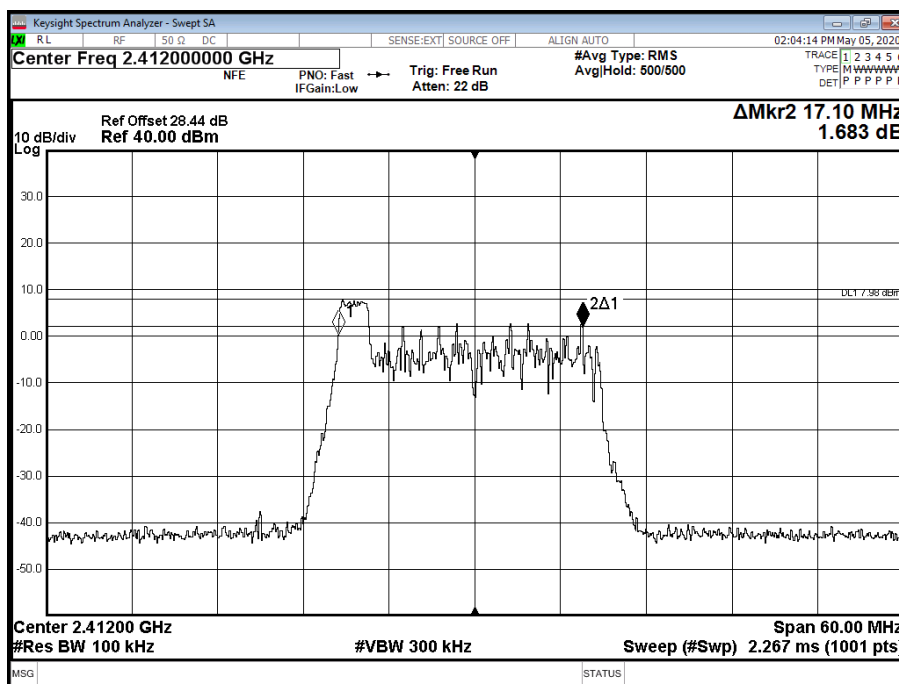


Figure 50 - 2412 MHz - 6 dB DTS Bandwidth

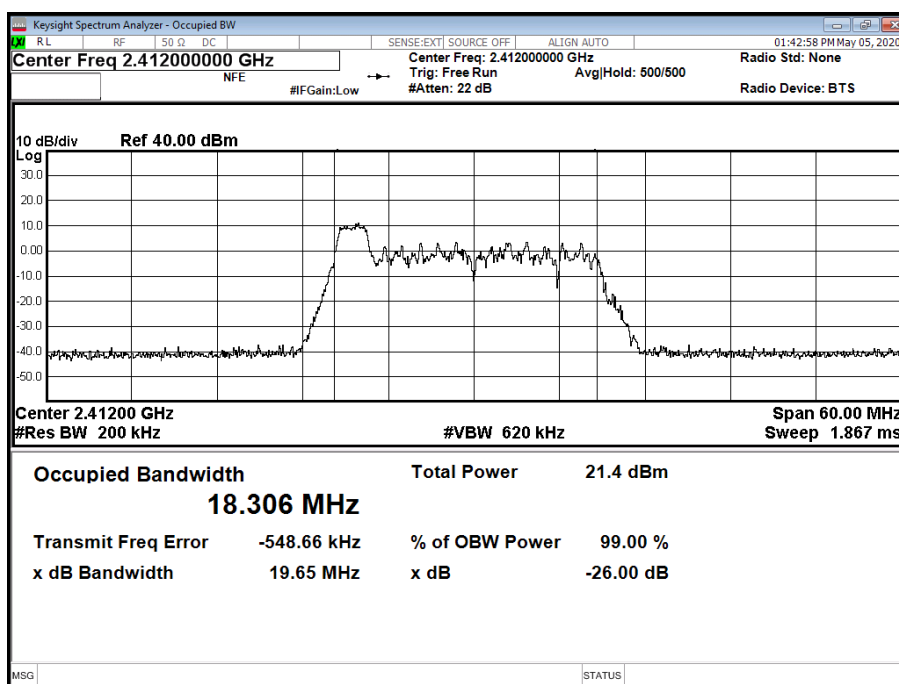


Figure 51 - 2412 MHz - 99 % Occupied Bandwidth

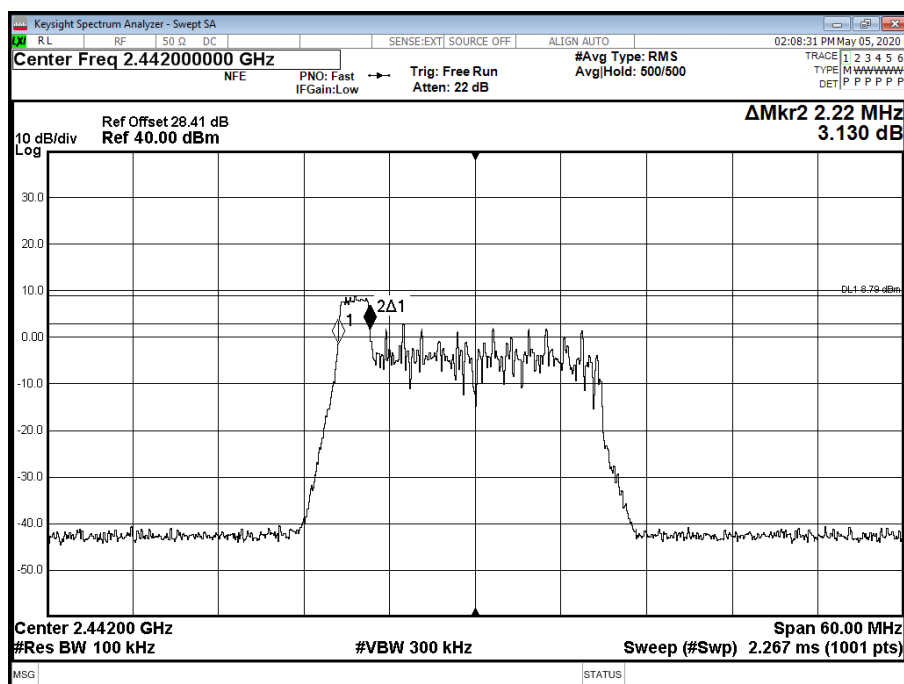


Figure 52 - 2442 MHz - 6 dB DTS Bandwidth

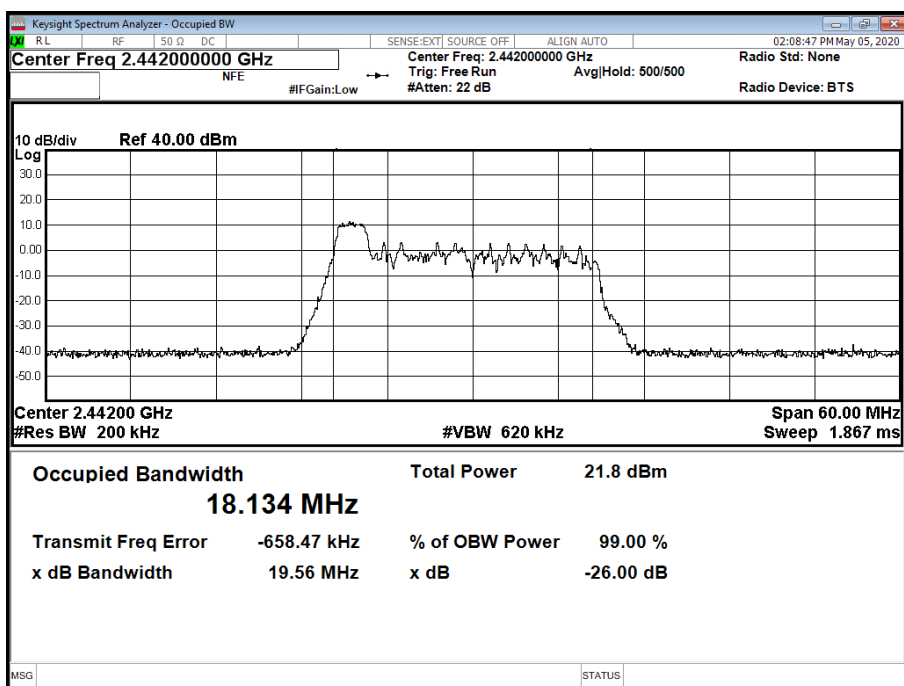


Figure 53 - 2442 MHz - 99 % Occupied Bandwidth

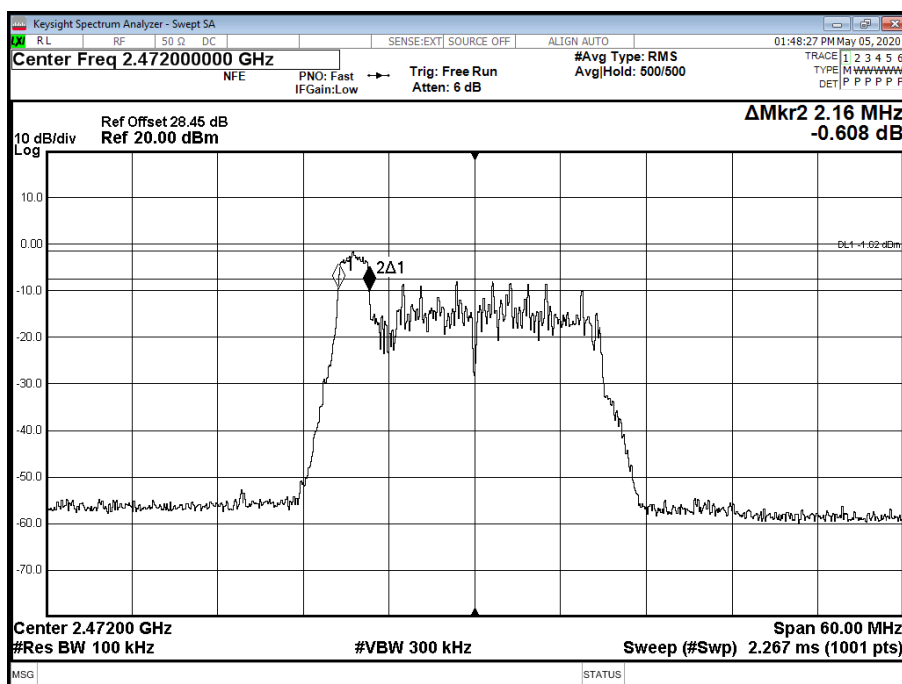


Figure 54 - 2472 MHz - 6 dB DTS Bandwidth

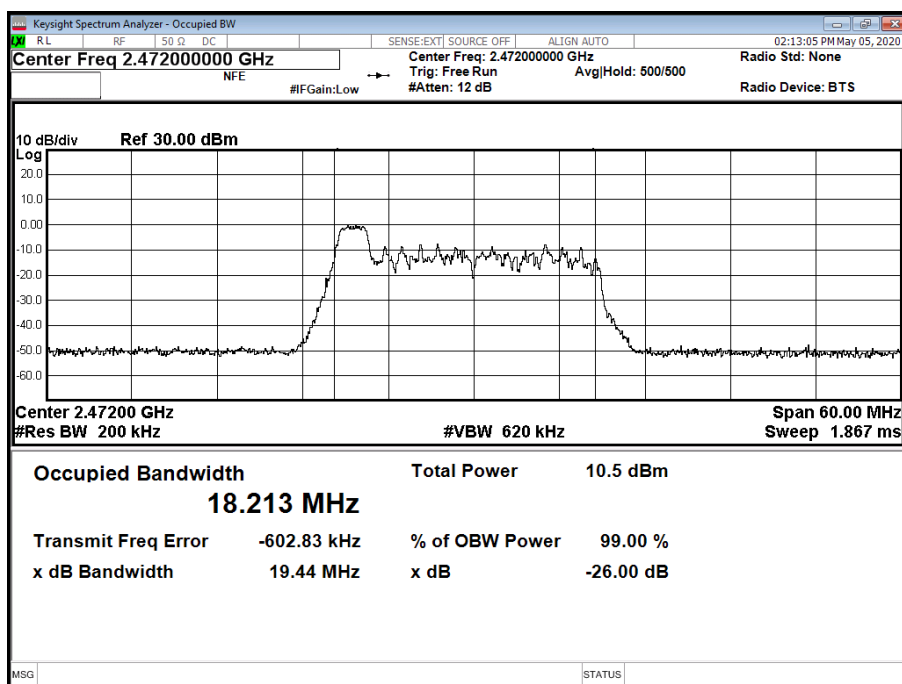


Figure 55 - 2472 MHz - 99 % Occupied Bandwidth



Channel	Bottom	Middle	Top
Frequency (MHz)	2412	2442	2472
6 dB Bandwidth (MHz)	2.160	2.160	7.080
99 % Bandwidth (MHz)	18.323	18.393	18.158

Table 38 - 802.11ax / HE20 MCS0x1 / RU 26-8 / MIMO CDD / Cores 0+1

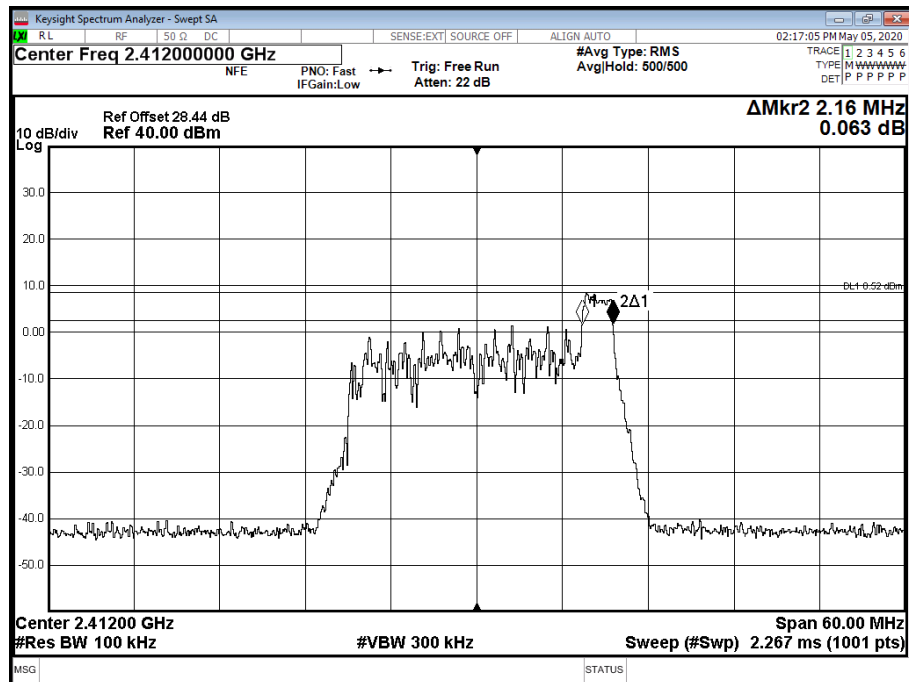


Figure 56 - 2412 MHz - 6 dB DTS Bandwidth

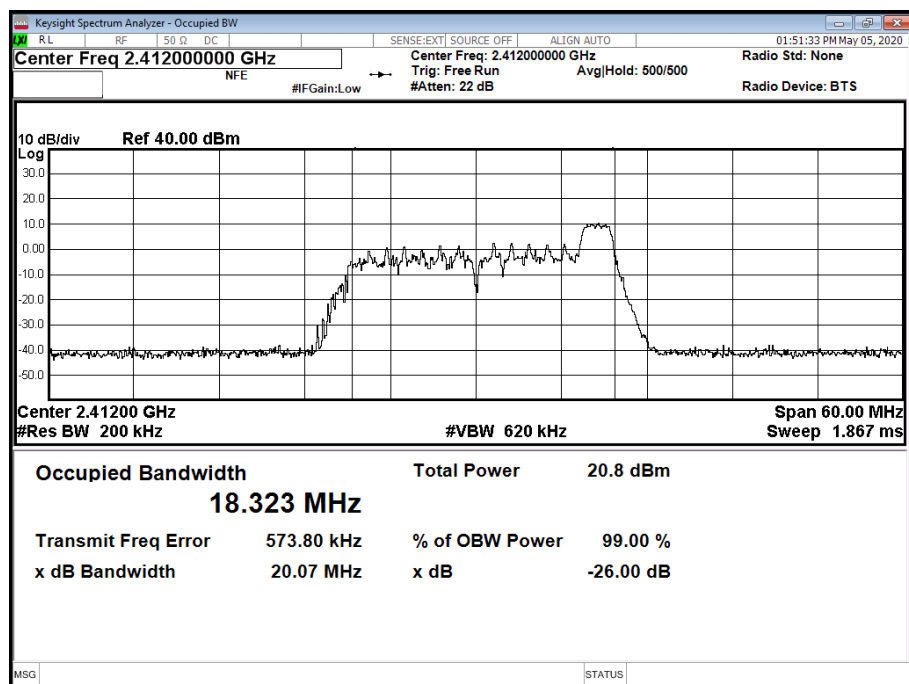


Figure 57 - 2412 MHz - 99 % Occupied Bandwidth

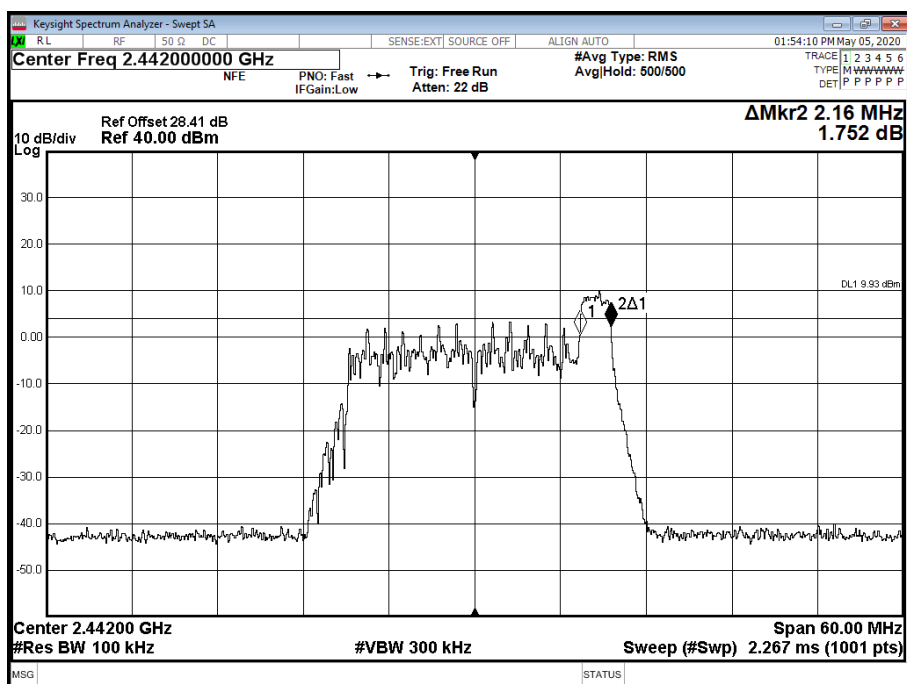


Figure 58 - 2442 MHz - 6 dB DTS Bandwidth

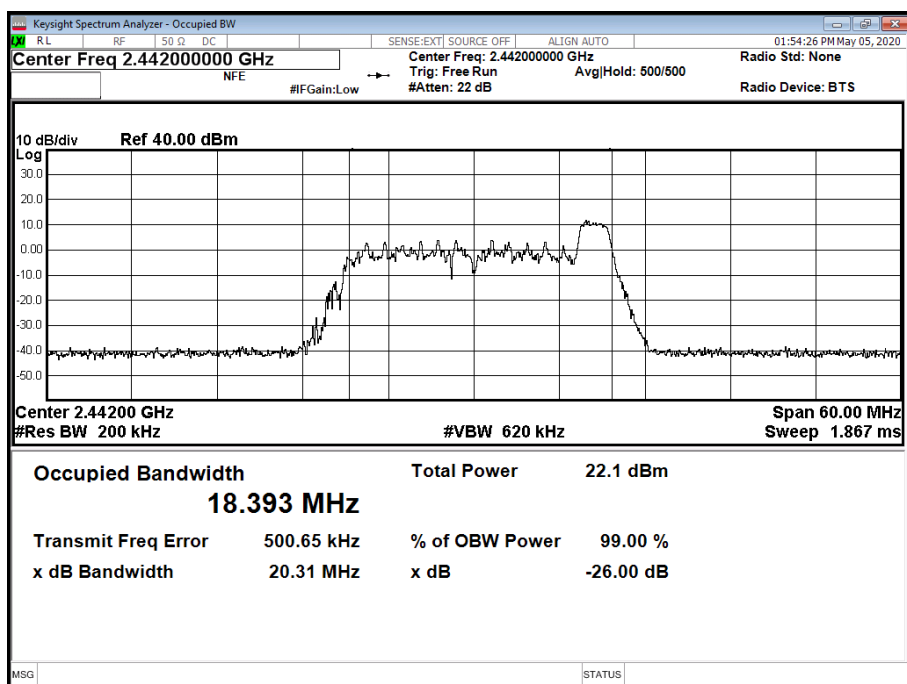


Figure 59 - 2442 MHz - 99 % Occupied Bandwidth

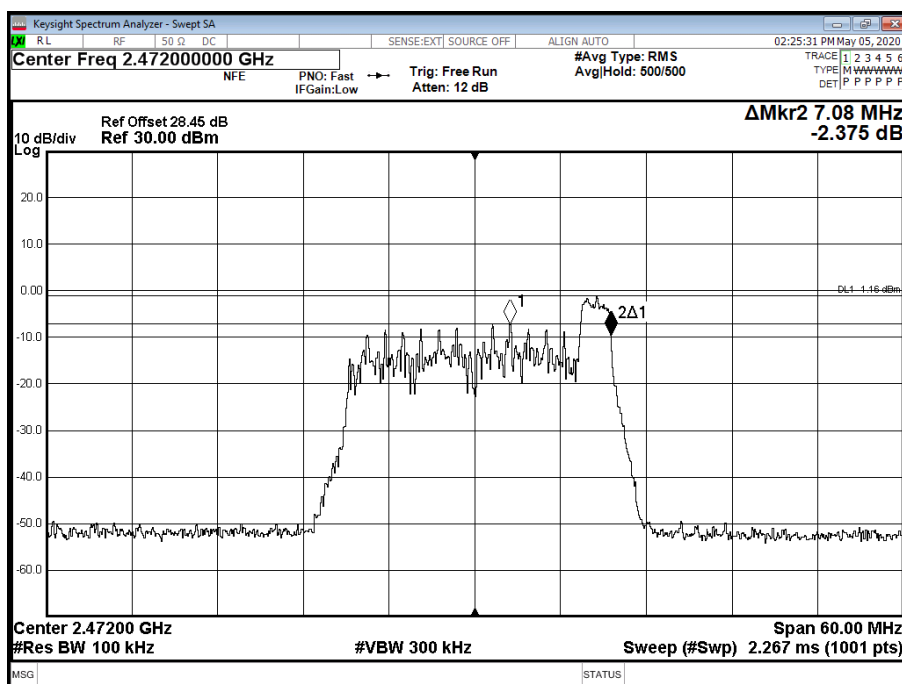


Figure 60 - 2472 MHz - 6 dB DTS Bandwidth

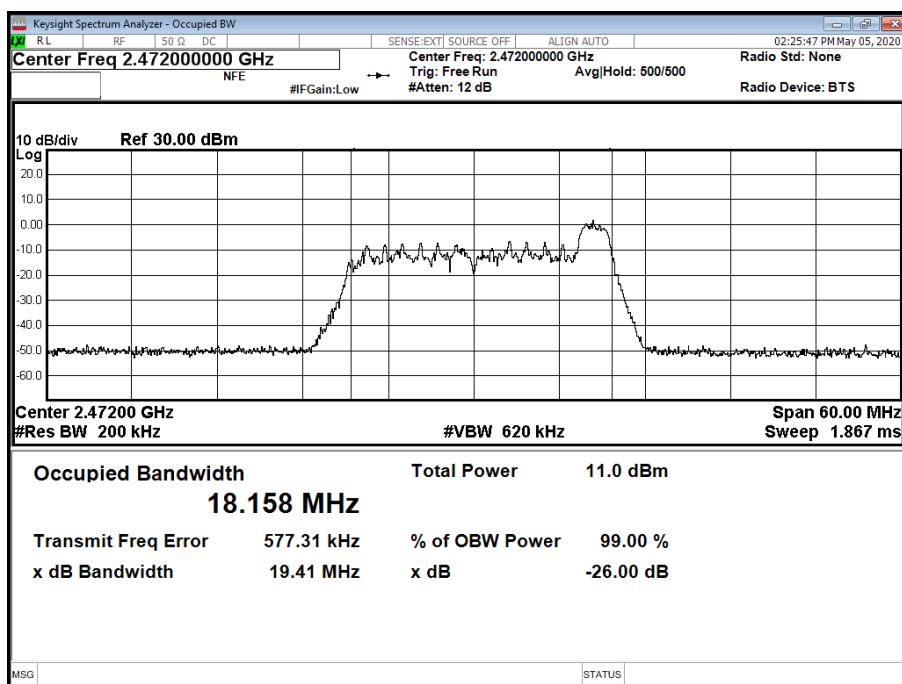


Figure 61 - 2472 MHz - 99 % Occupied Bandwidth

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

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



2.3.7 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 Due
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	05-May-2020
Multimeter	Iso-tech	IDM101	2424	12	12-Dec-2020
Hygrometer	Rotronic	I-1000	3220	12	25-Sep-2020
1800-6000 MHz Power Splitter	Mini-Circuits	ZN2PD-63-S+	4055	-	O/P Mon
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	05-May-2020
PXA Signal Analyser	Keysight Technologies	N9030A	4653	12	10-Feb-2021
PXA Signal Analyser	Keysight Technologies	N9030A	4654	12	21-Oct-2020
Power splitter - 2 port	Mini-Circuits	ZN2PD-63-S+	4743	12	23-Sep-2020
Power splitter - 4 port	Mini-Circuits	ZN4PD1-63-S+	4744	12	23-Sep-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5099	12	06-Oct-2020
USB Power Sensor	Boonton	RTP5006	5186	12	28-Nov-2020
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5418	6	12-Jun-2020
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5419	6	12-Jun-2020
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5429	6	13-Jun-2020

Table 39

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 15.205
ISED RSS-247, Clause 5.5
ISED RSS-GEN, Clause 6.13

2.4.2 Equipment Under Test and Modification State

A2330, S/N: C07CG081PW8X - Modification State 0

2.4.3 Date of Test

12-April-2020 to 06-May-2020

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 middle 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. Only final measurements within 20 dB of the applicable limit are included in the tables below.

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

Spurious Radiated Emissions measurements were performed, with the device operating in SISO (Core 0) HT20, SISO (Core 1) HT20 and MIMO (Core 0-1)(HT20) and MIMO (Core 0-1)(HE20 RU26 index0).

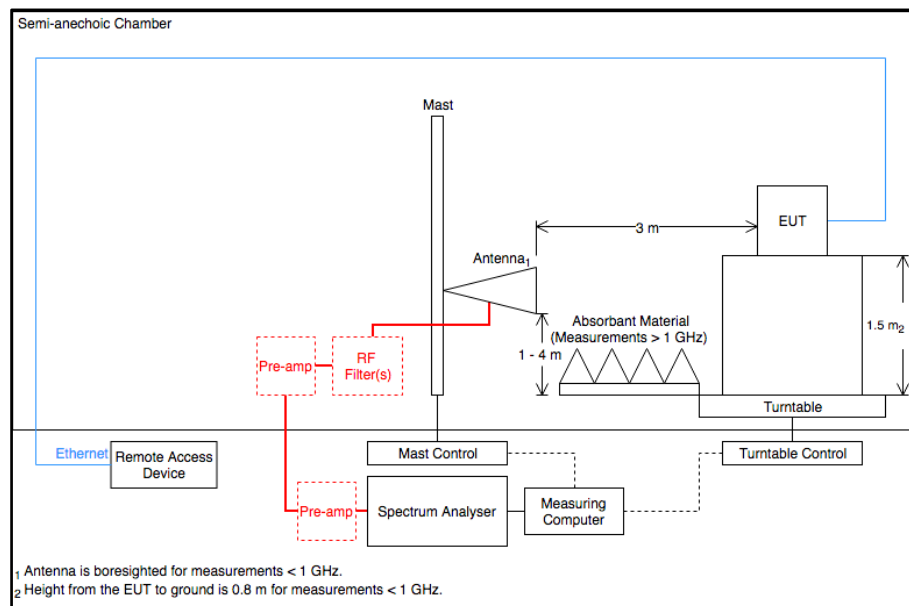


Figure 62 - Radiated Emissions Test Setup Diagram

2.4.5 Environmental Conditions

Ambient Temperature	18.7 - 21.2 °C
Relative Humidity	35.4 - 41.2 %



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 40 - Channel 1 (2412 MHz), HT20 Core 0, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

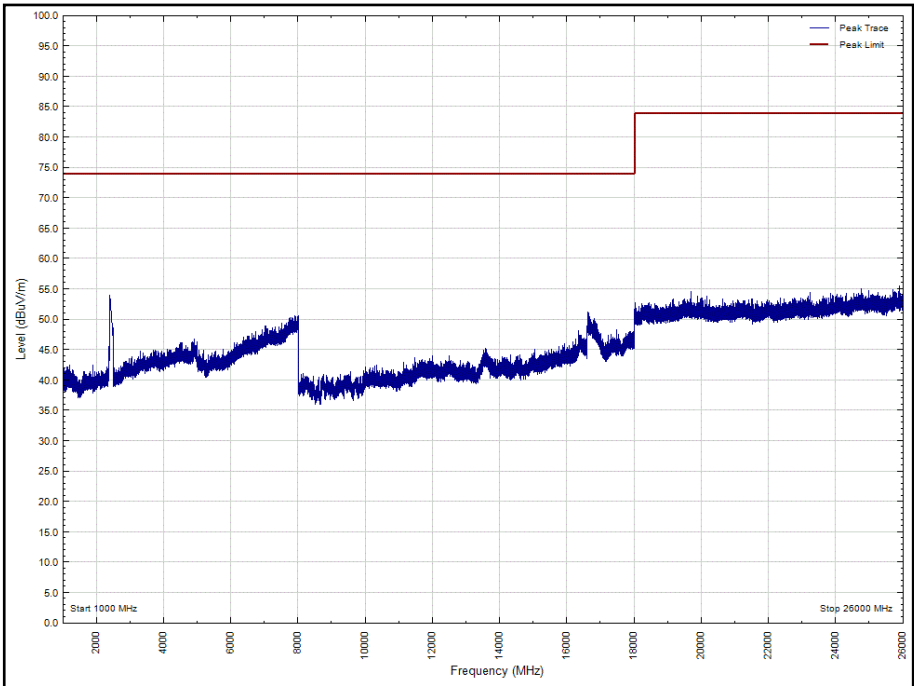


Figure 63 - Channel 1 (2412 MHz), HT20 Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

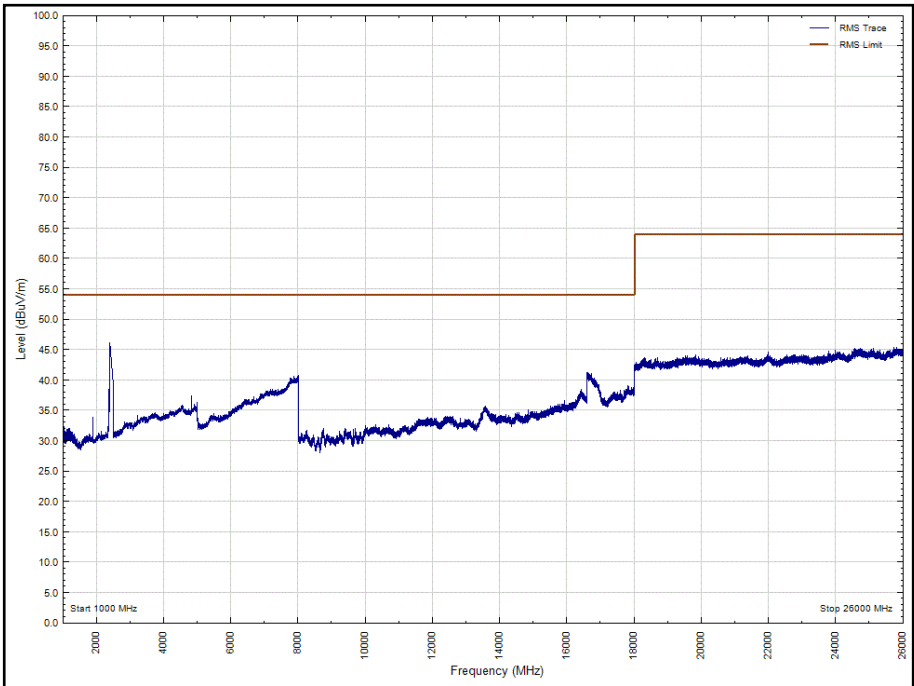


Figure 64 - Channel 1 (2412 MHz), HT20 Core 0, 1 GHz to 26 GHz, Horizontal (Average)

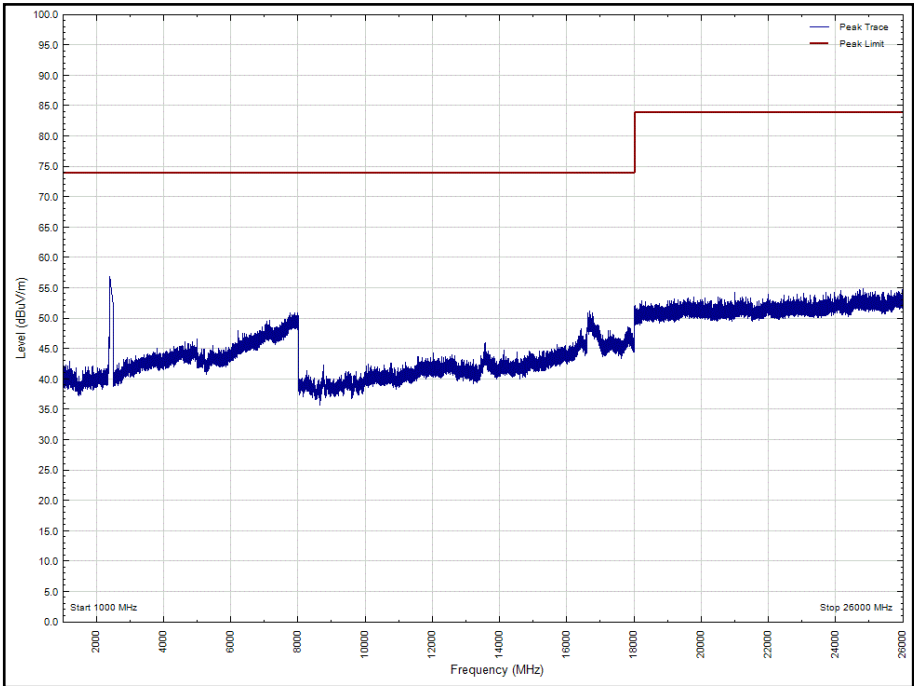


Figure 65 - Channel 1 (2412 MHz), HT20 Core 0, 1 GHz to 26 GHz, Vertical (Peak)

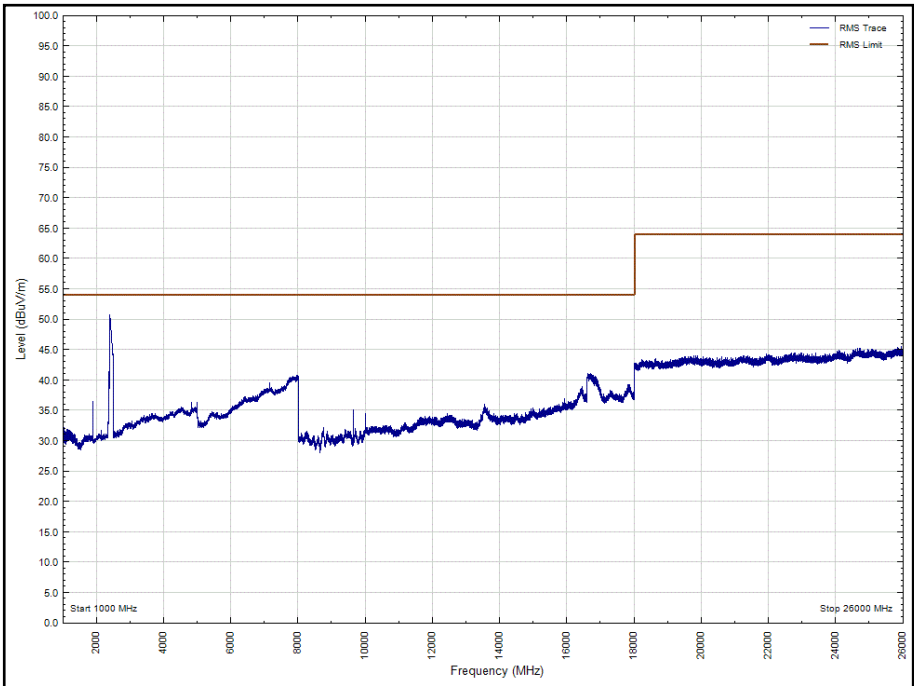


Figure 66 - Channel 1 (2412 MHz), HT20 Core 0, 1 GHz to 26 GHz, Vertical (Average)



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
121.517	18.2	43.5	-25.4	Q-Peak	52	249	Horizontal

Table 41 - Channel 6 (2437 MHz), HT20 Core 0, 30 MHz to 26 GHz

No other emissions found within 10 dB of the limit.

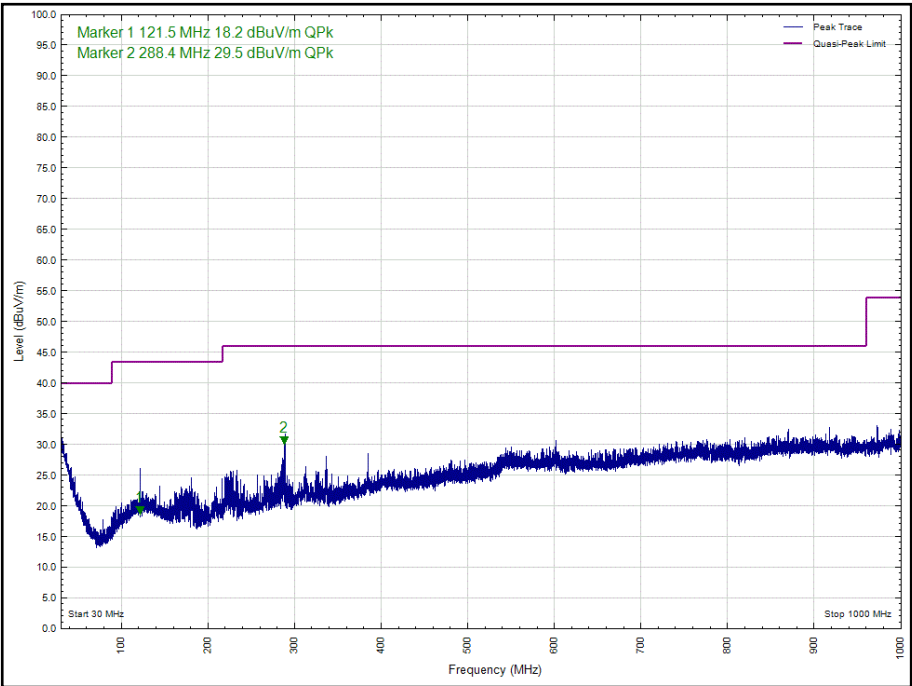


Figure 67 - Channel 6 (2437 MHz), HT20 Core 0, 30 MHz to 1 GHz, Horizontal (Peak)

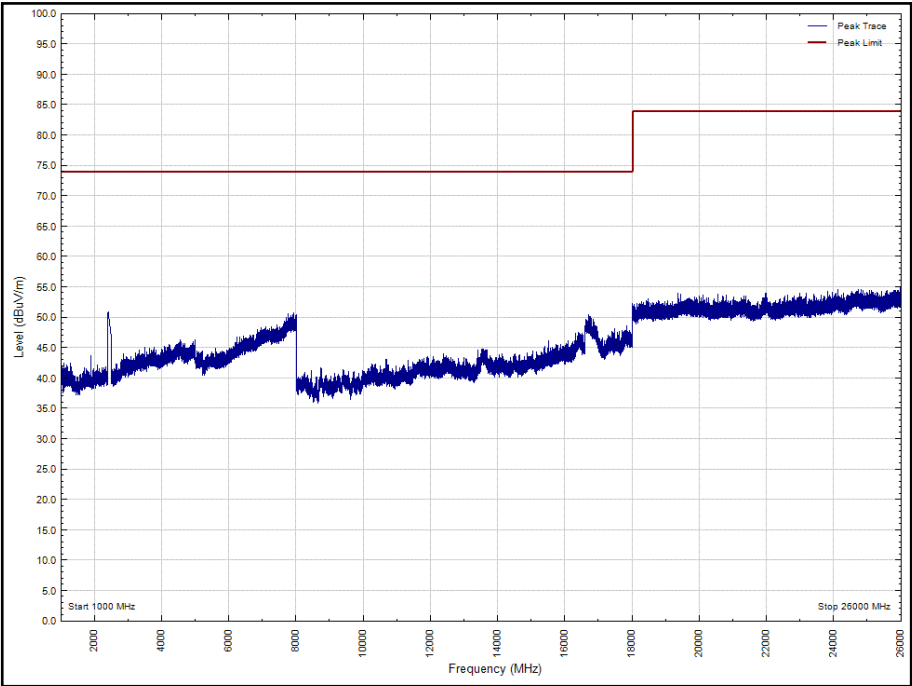


Figure 68 - Channel 6 (2437 MHz), HT20 Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

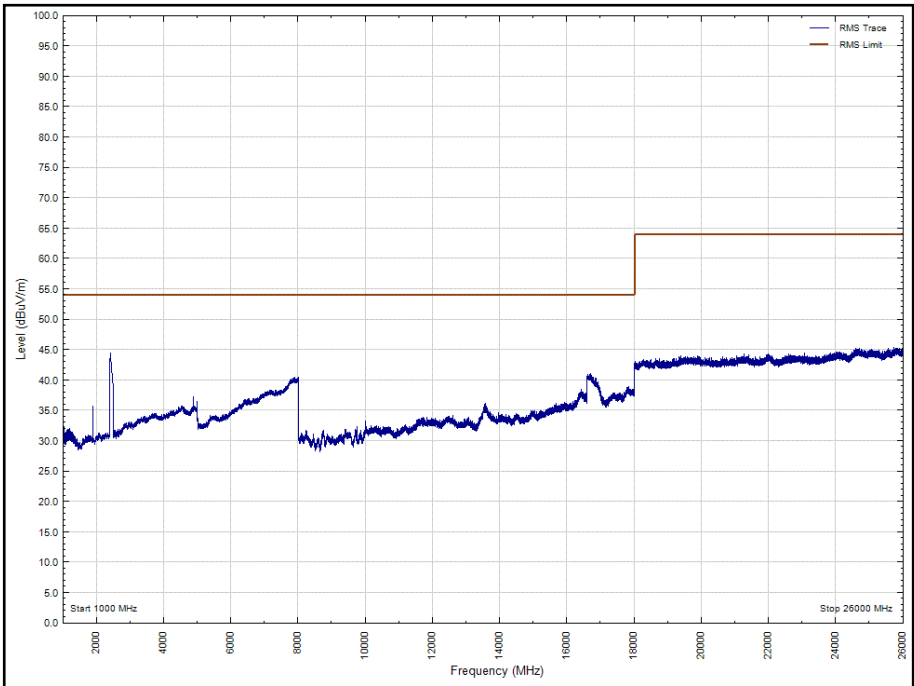


Figure 69 - Channel 6 (2437 MHz), HT20 Core 0, 1 GHz to 26 GHz, Horizontal (Average)

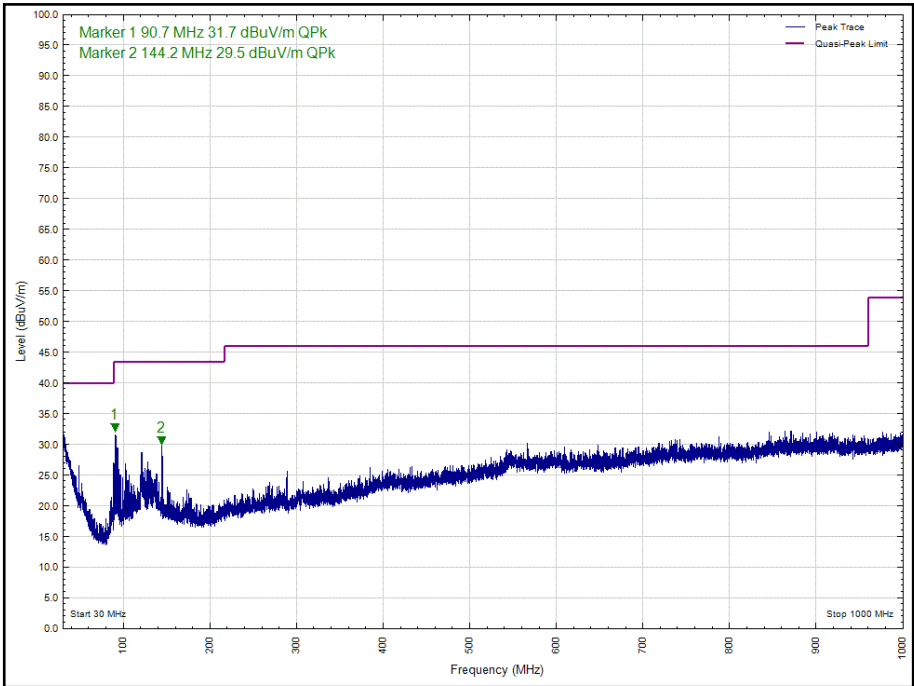


Figure 70 - Channel 6 (2437 MHz), HT20 Core 0, 30 MHz to 1 GHz, Vertical (Peak)

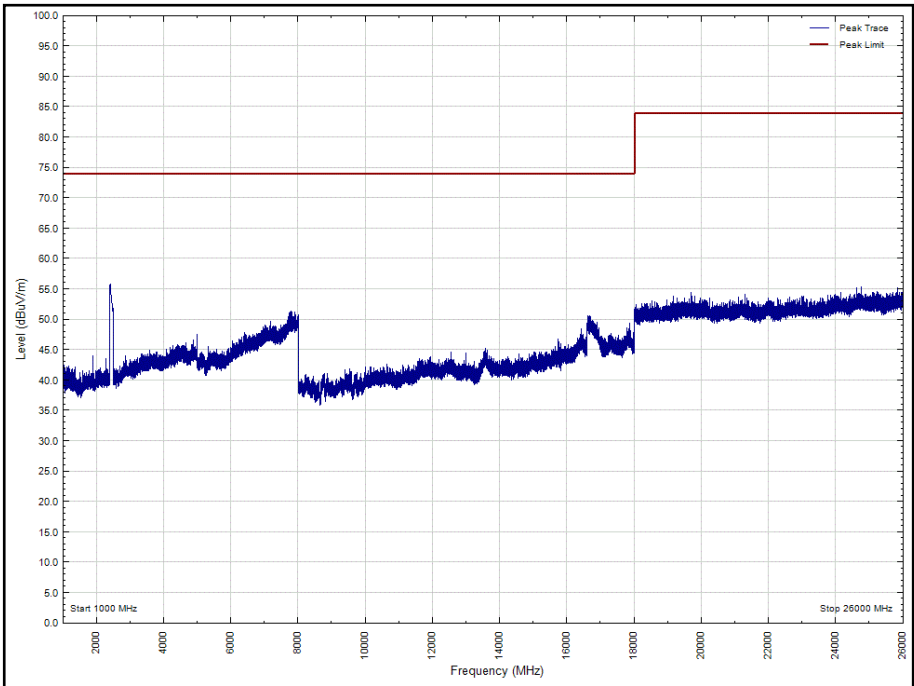


Figure 71 - Channel 6 (2437 MHz), HT20 Core 0, 1 GHz to 26 GHz, Vertical (Peak)

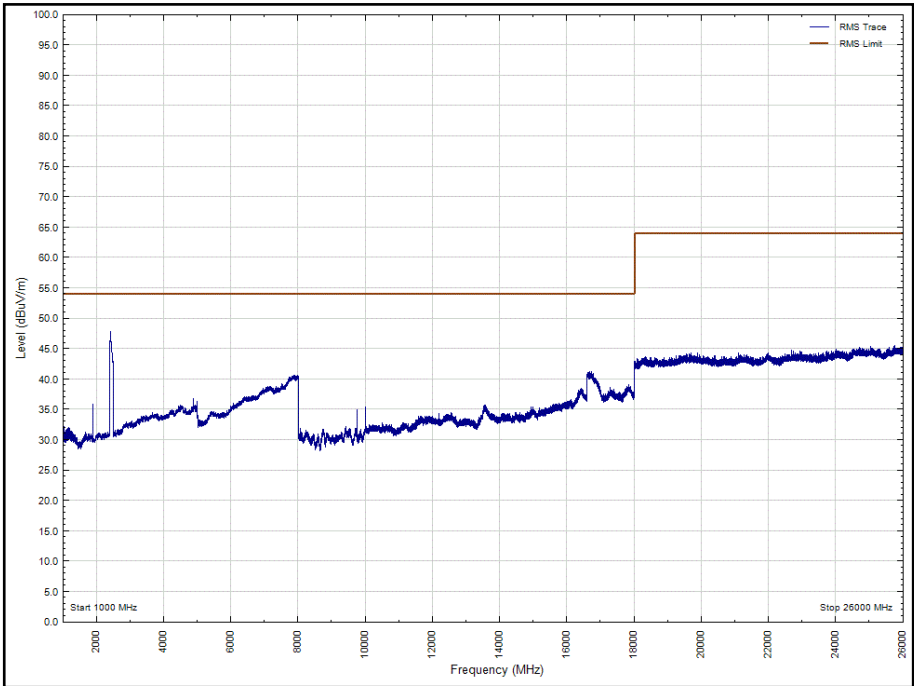


Figure 72 - Channel 6 (2437 MHz), HT20 Core 0, 1 GHz to 26 GHz, Vertical (Average)



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

Table 42 - Channel 13 (2472 MHz), HT20 Core 0, 1 GHz to 26 GHz

* No emissions found within 10 dB of the limit.

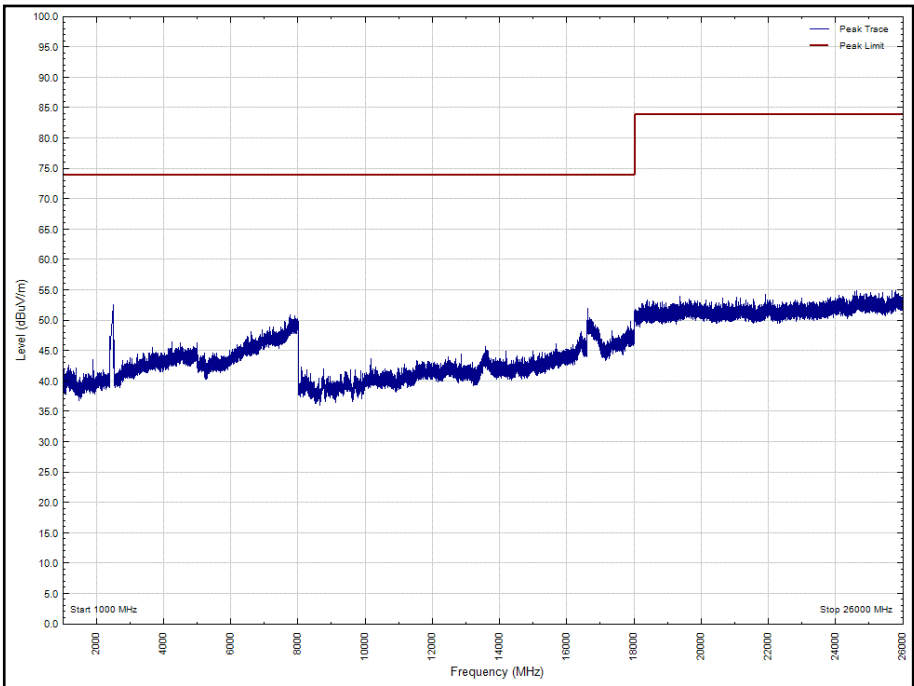


Figure 73 - Channel 13 (2472 MHz), HT20 Core 0, 1 GHz to 26 GHz, Horizontal (Peak)

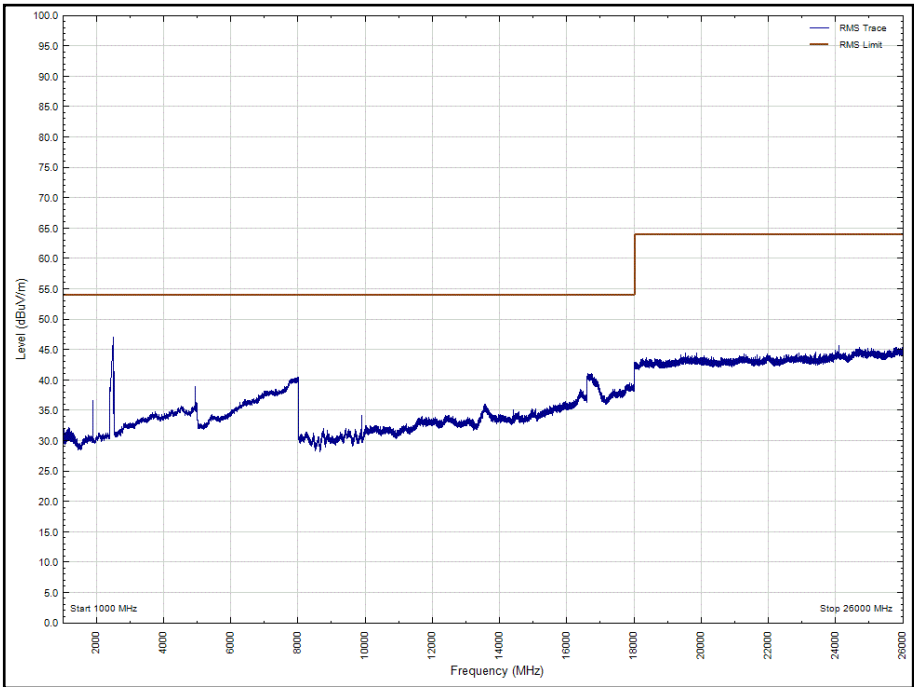


Figure 74 - Channel 13 (2472 MHz), HT20 Core 0, 1 GHz to 26 GHz, Horizontal (Average)

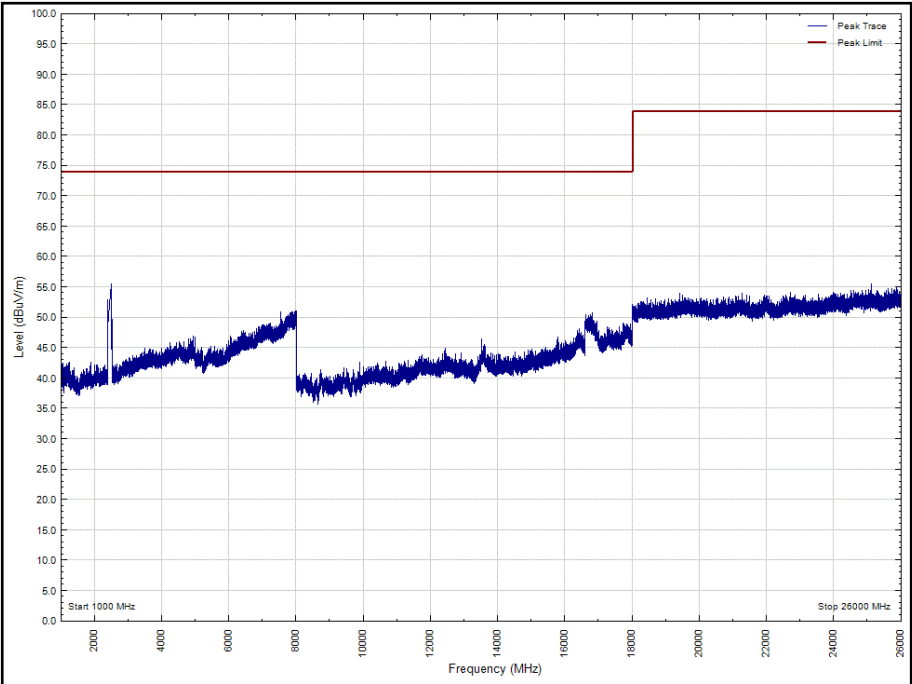


Figure 75 - Channel 13 (2472 MHz), HT20 Core 0, 1 GHz to 26 GHz, Vertical (Peak)

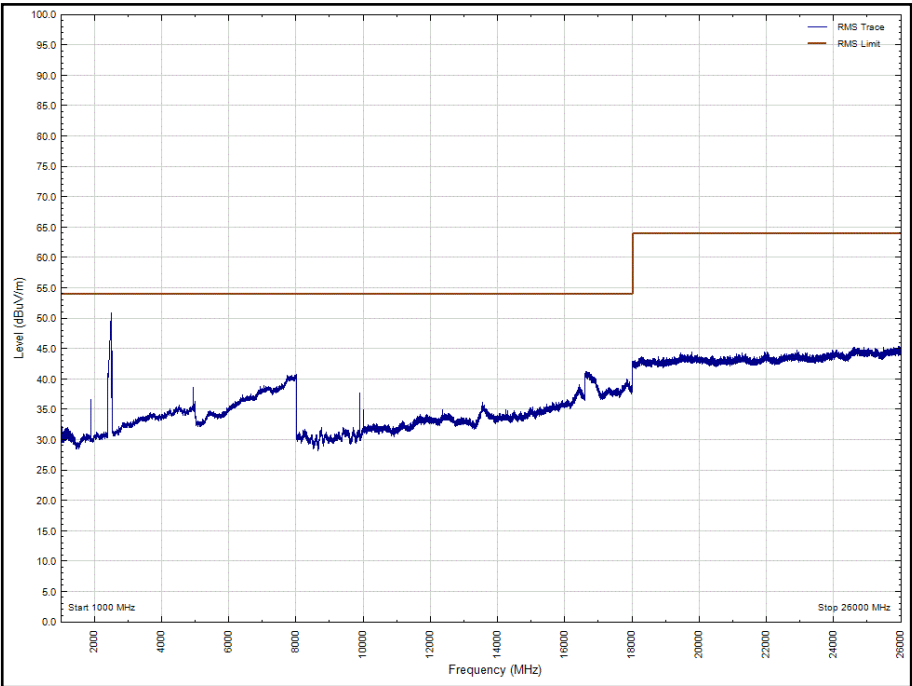


Figure 76 - Channel 13 (2472 MHz), HT20 Core 0, 1 GHz to 26 GHz, Vertical (Average)

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

Table 43 - Channel 1 (2412 MHz), HT20 Core 1, 1 GHz to 26 GHz

* No emissions found within 10 dB of the limit.

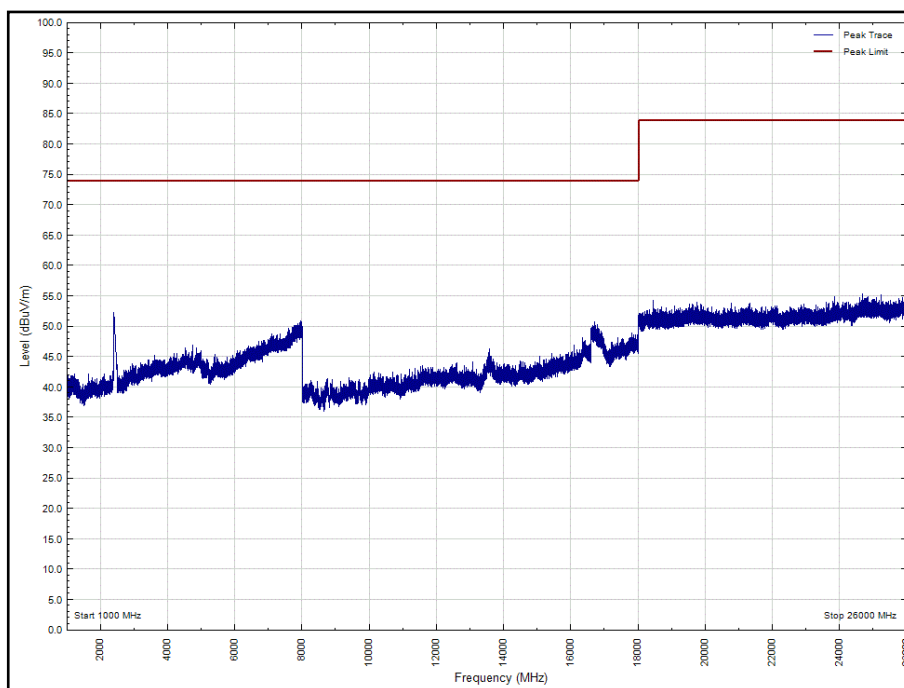


Figure 77 - Channel 1 (2412 MHz), HT20 Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

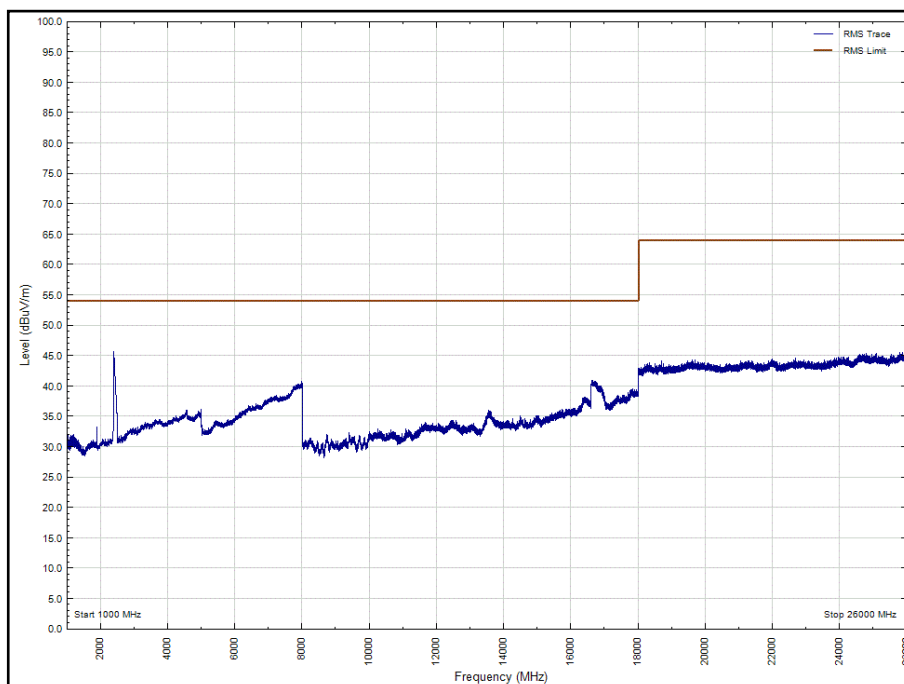


Figure 78 - Channel 1 (2412 MHz), HT20 Core 1, 1 GHz to 26 GHz, Horizontal (Average)

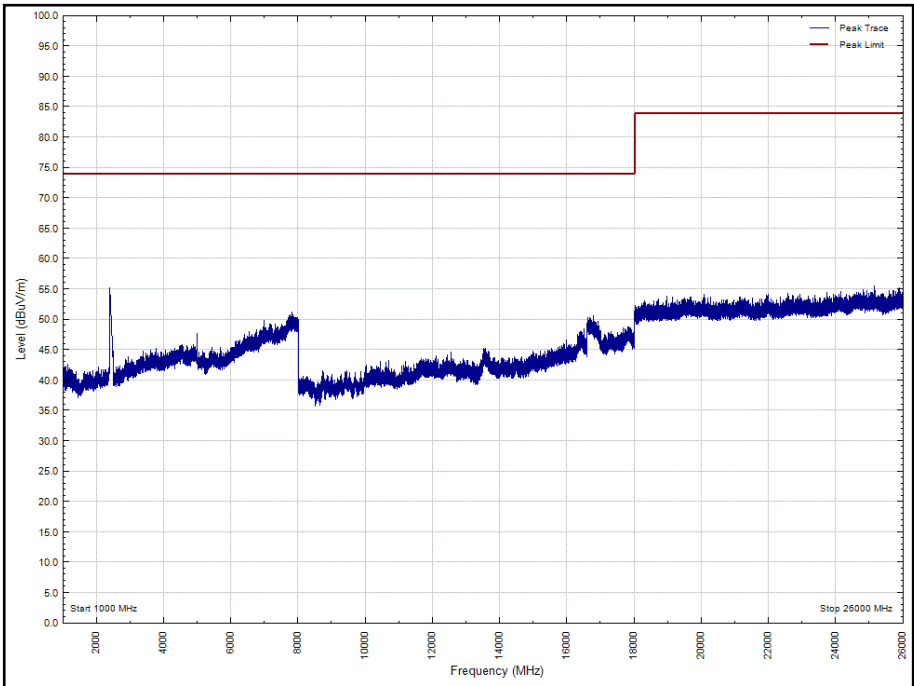


Figure 79 - Channel 1 (2412 MHz), HT20 Core 1, 1 GHz to 26 GHz, Vertical (Peak)

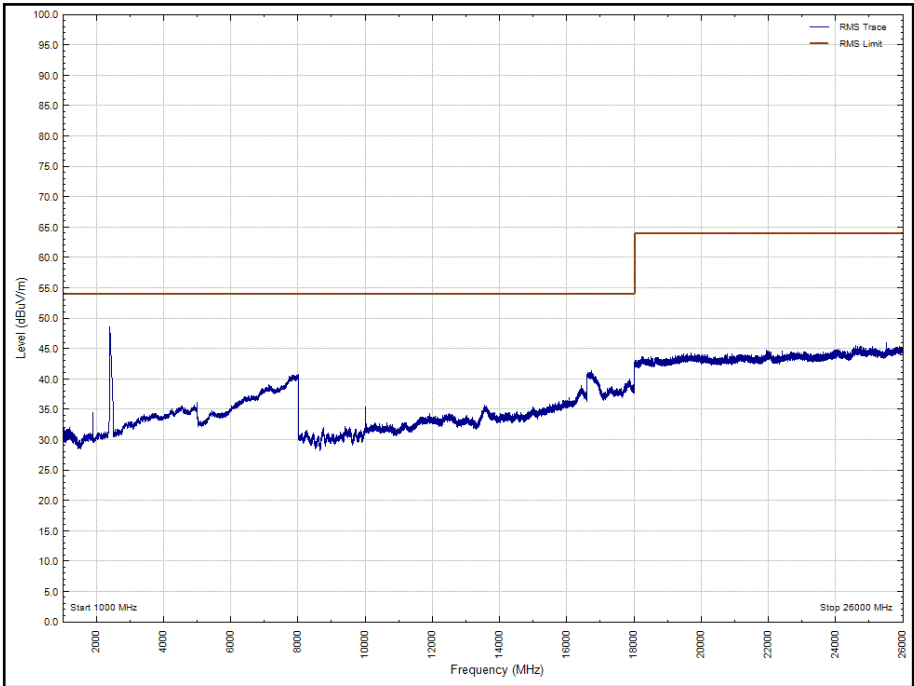


Figure 80 - Channel 1 (2412 MHz), HT20 Core 1, 1 GHz to 26 GHz, Vertical (Average)



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

Table 44 - Channel 6 (2437 MHz), HT20 Core 1, 30 MHz to 26 GHz

*No emissions found within 10 dB of the limit.

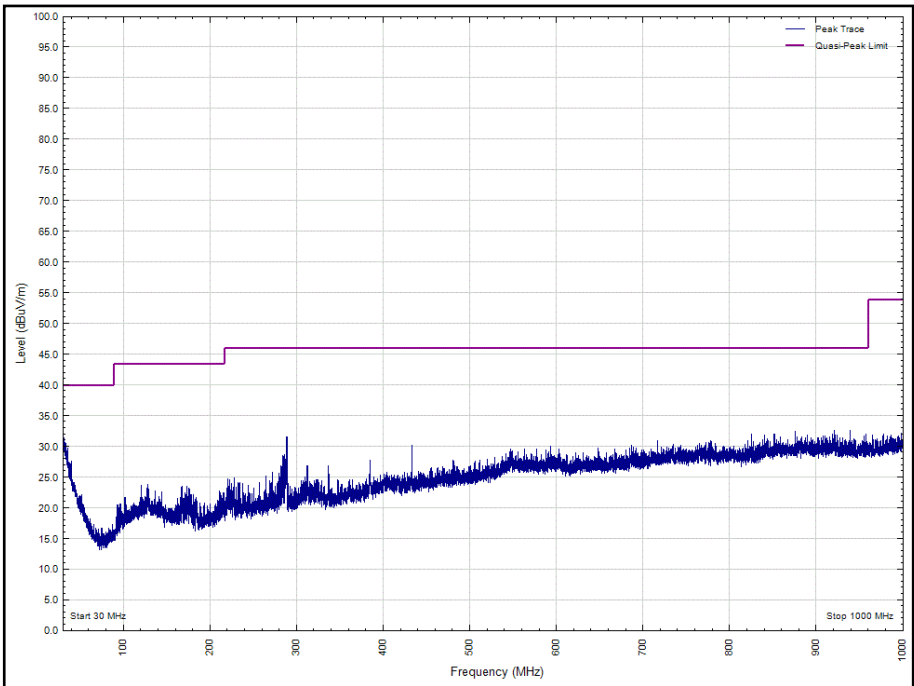


Figure 81 - Channel 6 (2437 MHz), HT20 Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

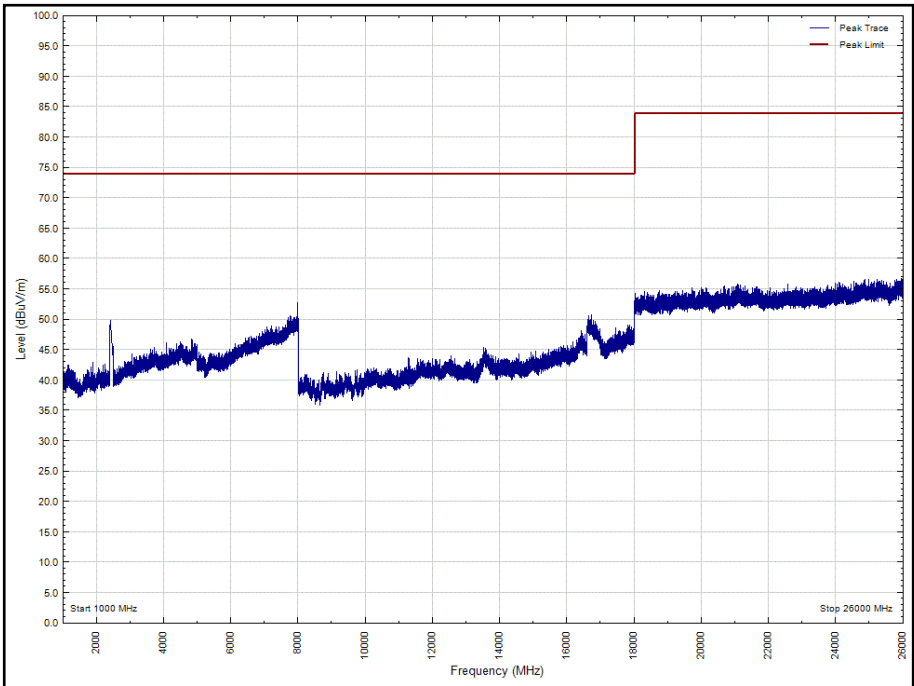


Figure 82 - Channel 6 (2437 MHz), HT20 Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

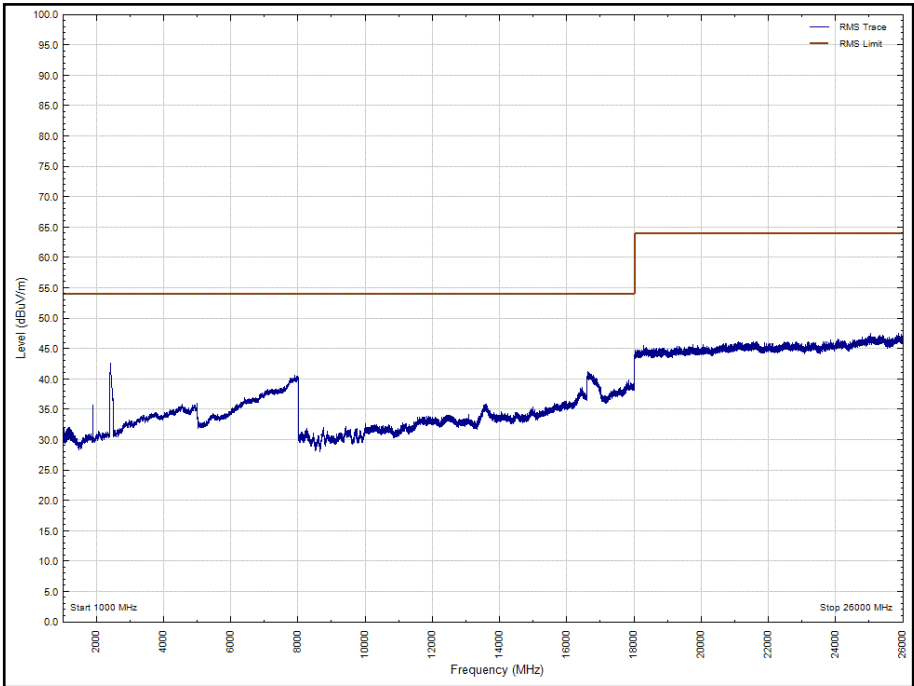


Figure 83 - Channel 6 (2437 MHz), HT20 Core 1, 1 GHz to 26 GHz, Horizontal (Average)

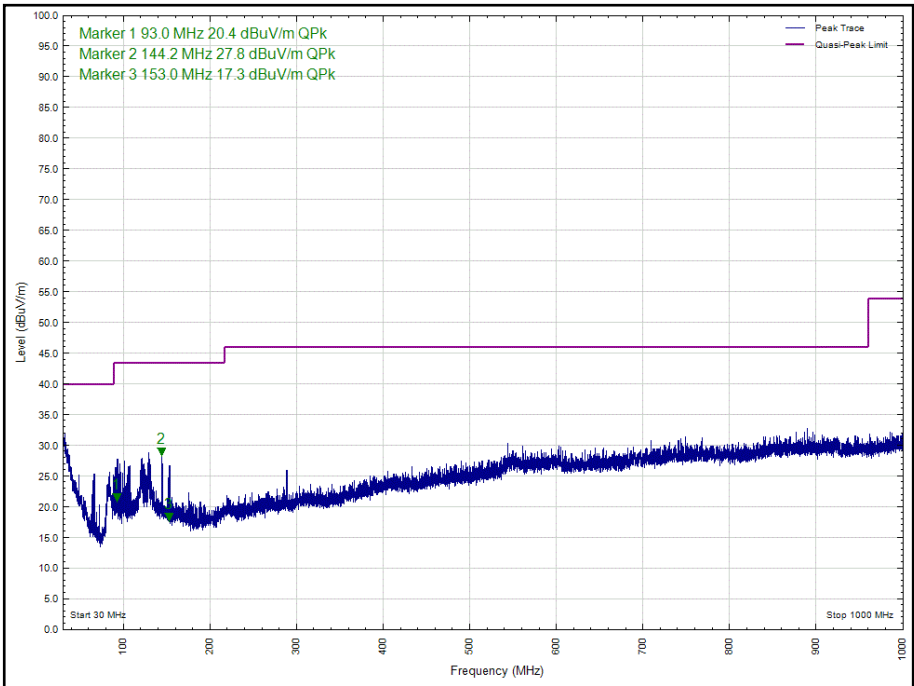


Figure 84 - Channel 6 (2437 MHz), HT20 Core 1, 30 MHz to 1 GHz, Vertical (Peak)

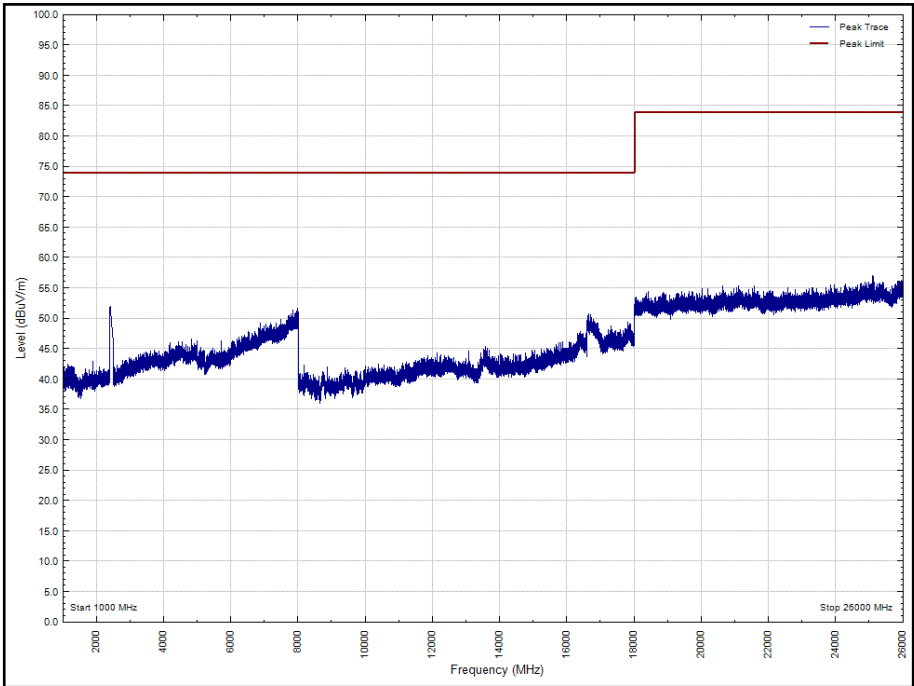


Figure 85 - Channel 6 (2437 MHz), HT20 Core 1, 1 GHz to 26 GHz, Vertical (Peak)

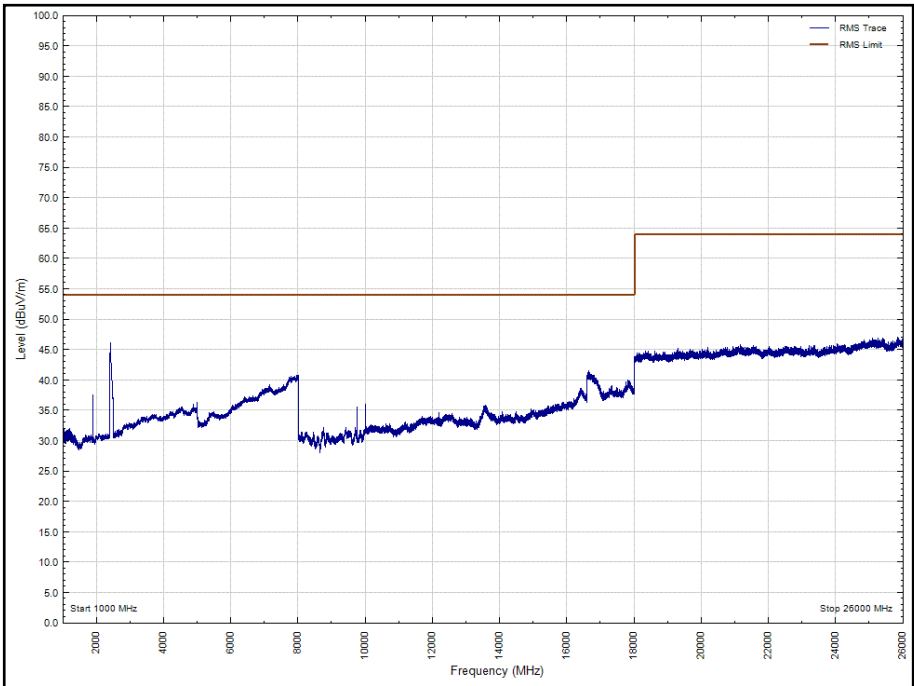


Figure 86 - Channel 6 (2437 MHz), HT20 Core 1, 1 GHz to 26 GHz, Vertical (Average)



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

Table 45 - Channel 13 (2472 MHz), HT20 Core 1, 1 GHz to 26 GHz

* No emissions found within 10 dB of the limit.

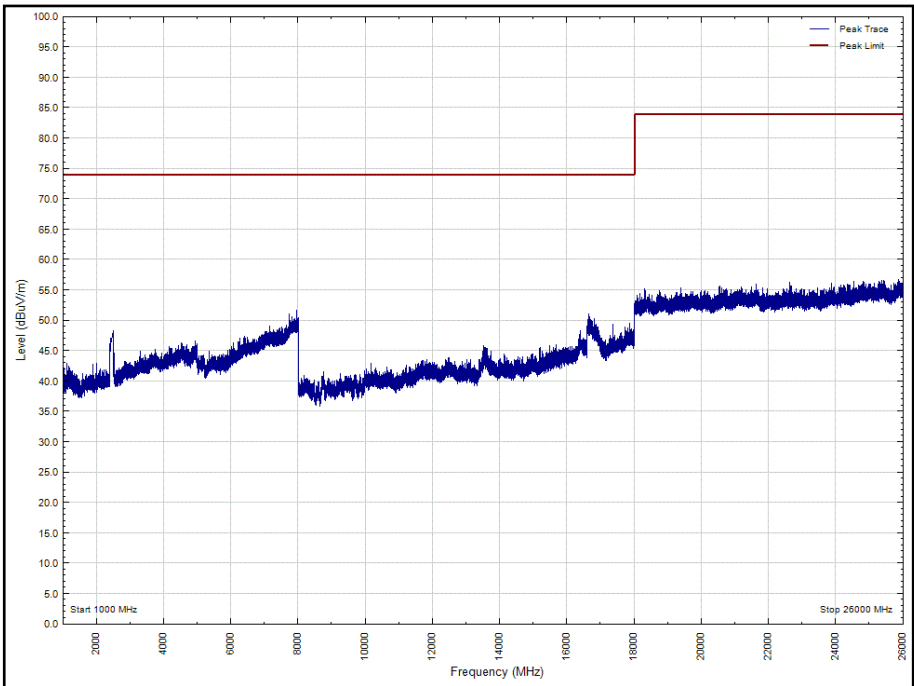


Figure 87 - Channel 13 (2472 MHz), HT20 Core 1, 1 GHz to 26 GHz, Horizontal (Peak)

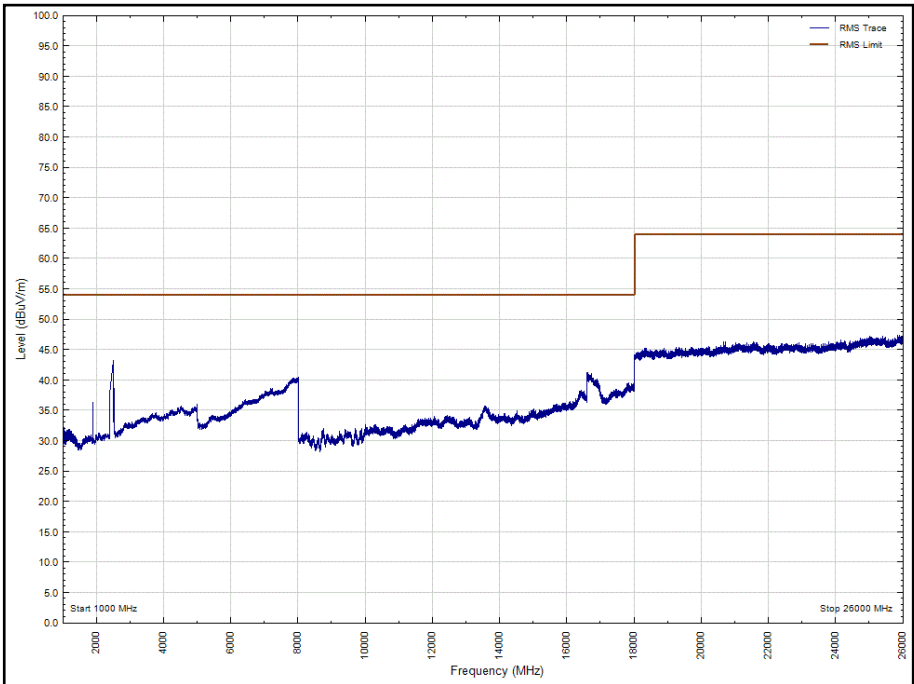


Figure 88 - Channel 13 (2472 MHz), HT20 Core 1, 1 GHz to 26 GHz, Horizontal (Average)

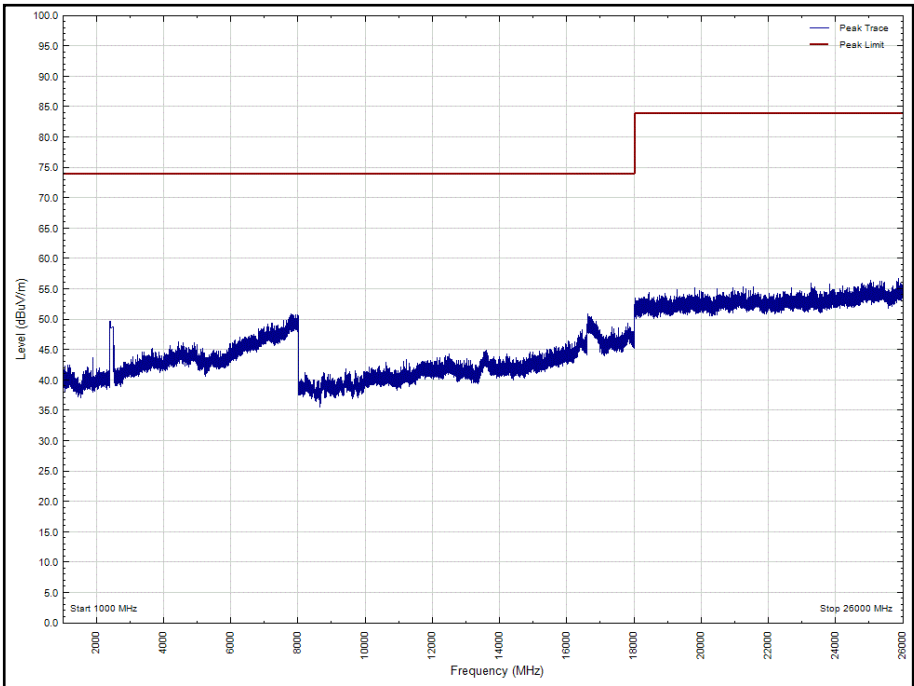


Figure 89 - Channel 13 (2472 MHz), HT20 Core 1, 1 GHz to 26 GHz, Vertical (Peak)

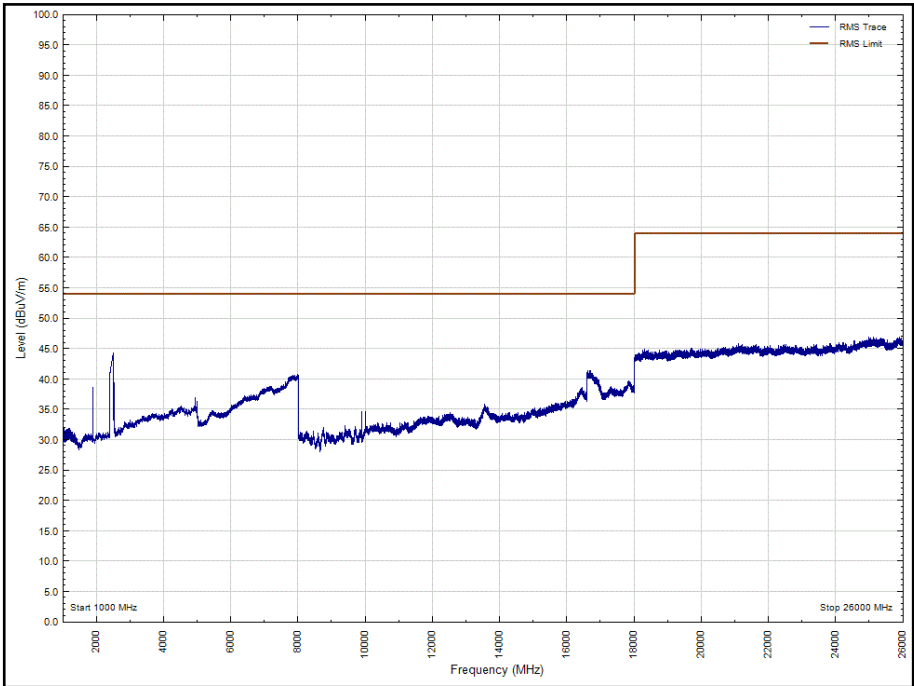


Figure 90 - Channel 13 (2472 MHz), HT20 Core 1, 1 GHz to 26 GHz, Vertical (Average)



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

Table 46 - Channel 1 (2412 MHz), HT20 MIMO CDD, Core 0 - 1, 1 GHz to 26 GHz

* No emissions found within 10 dB of the limit.

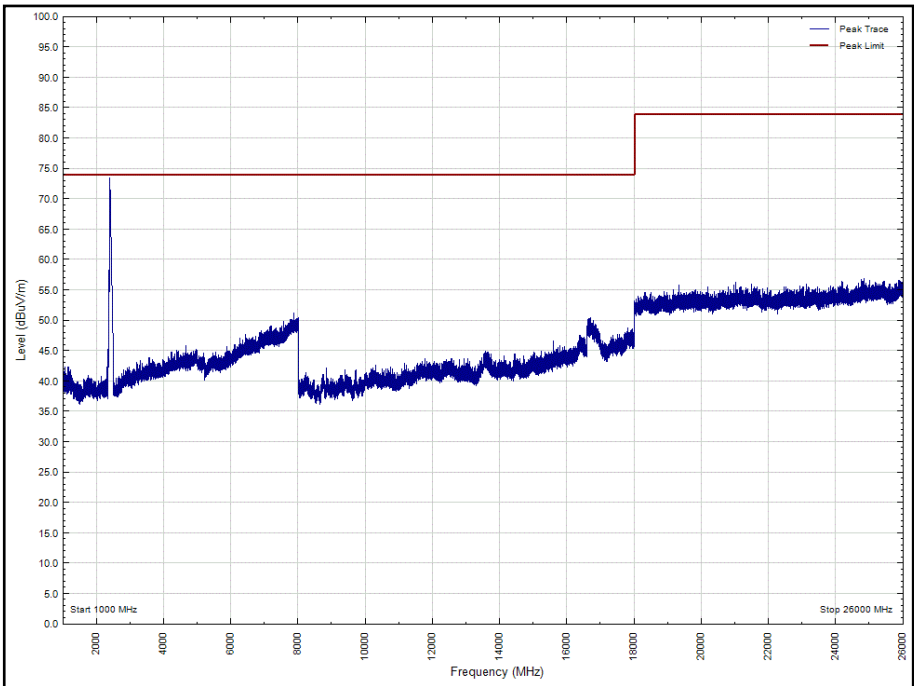


Figure 91 - Channel 1 (2412 MHz), HT20 MIMO CDD, Core 0 - 1, 1 GHz to 26 GHz, Horizontal (Peak)

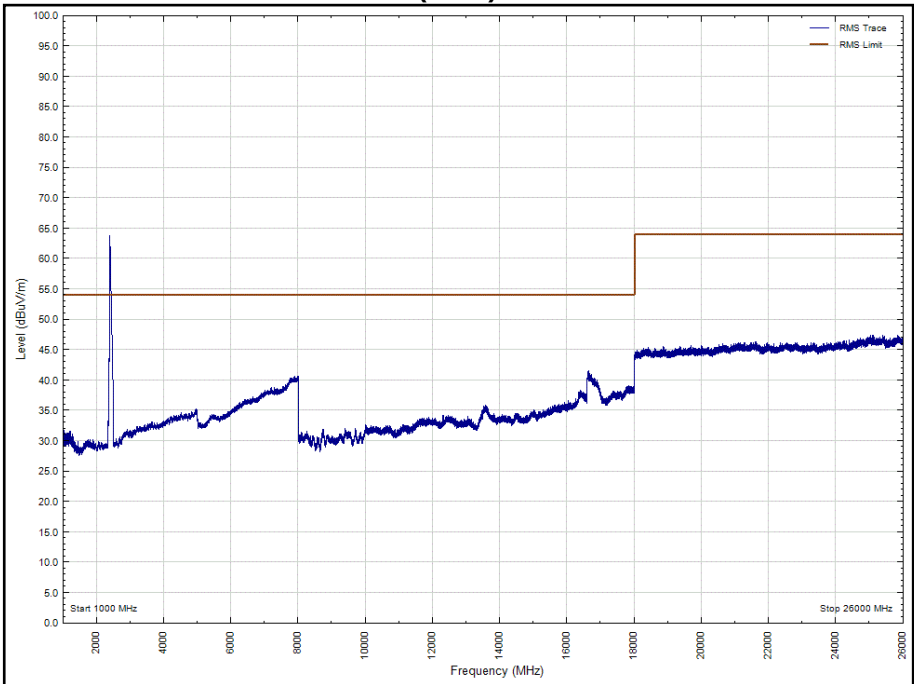


Figure 92 - Channel 1 (2412 MHz), HT20 MIMO CDD, Core 0 - 1, 1 GHz to 26 GHz, Horizontal (Average)

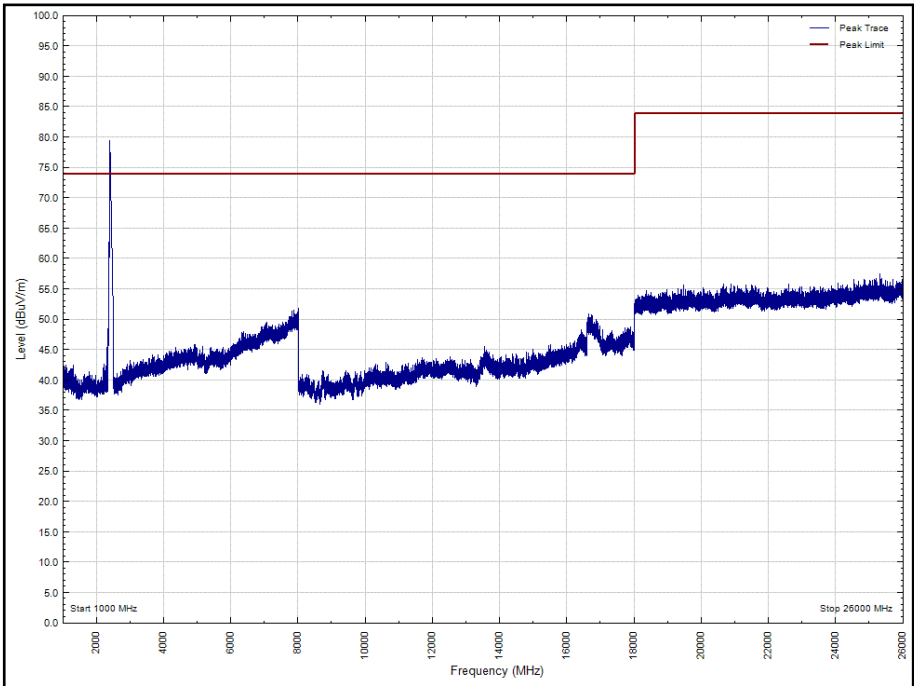


Figure 93 - Channel 1 (2412 MHz), HT20 MIMO CDD, Core 0 - 1, 1 GHz to 26 GHz, Vertical (Peak)

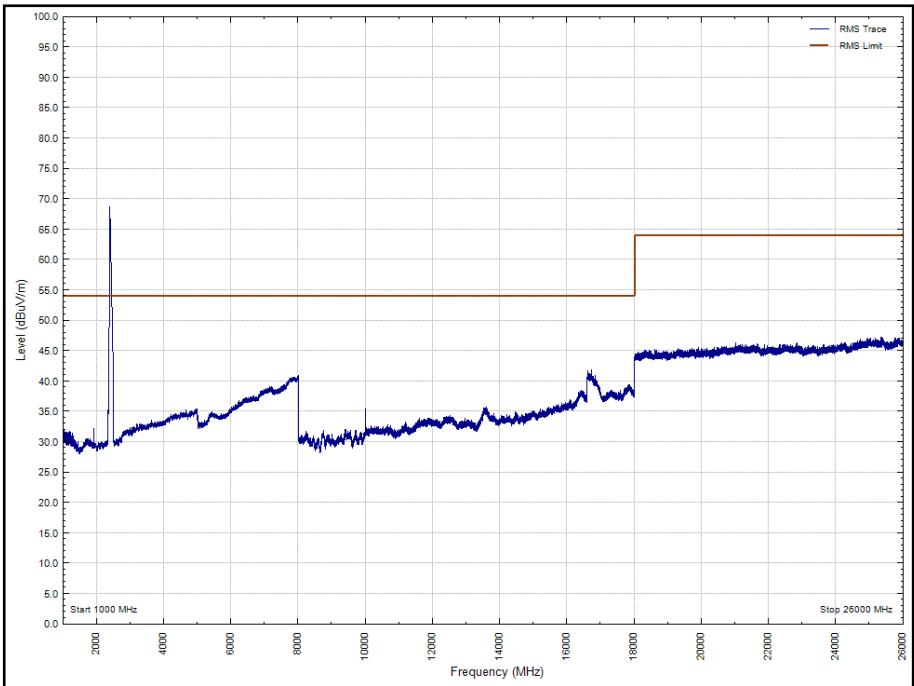


Figure 94 - Channel 1 (2412 MHz), HT20 MIMO CDD, Core 0 - 1, 1 GHz to 26 GHz, Vertical (Average)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
121.486	25.6	43.5	-17.9	Q-Peak	85	100	Vertical
125.995	25.3	43.5	-18.2	Q-Peak	84	100	Vertical

Table 47 - Channel 6 (2437 MHz), HT20 MIMO CDD, Core 0 - 1, 30 MHz to 26 GHz

No other emissions found within 10 dB of the limit.

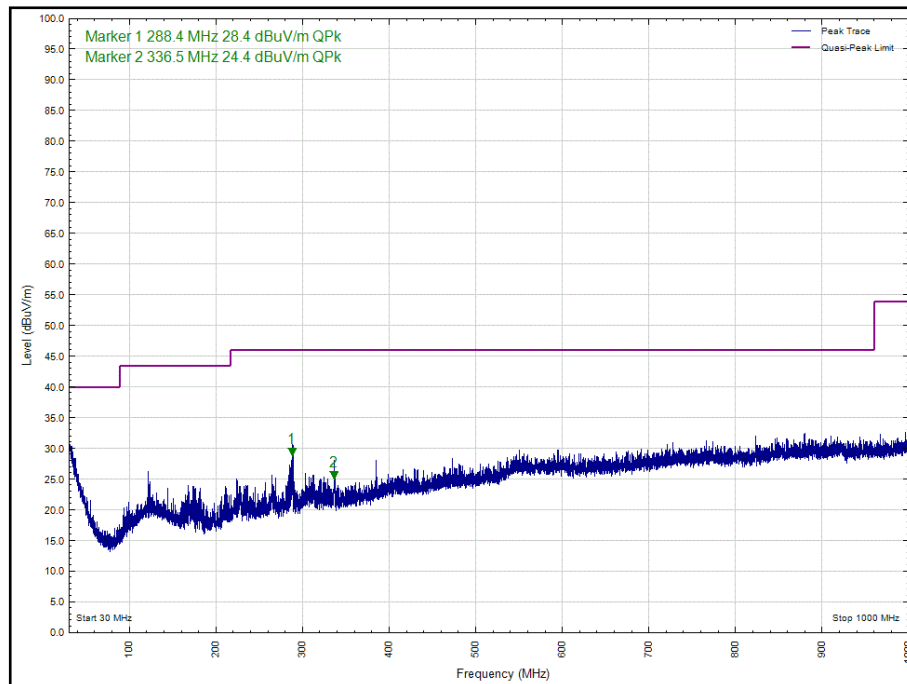


Figure 95 - Channel 6 (2437 MHz), HT20 MIMO CDD, Core 0 - 1, 30 MHz to 1 GHz, Horizontal (Peak)

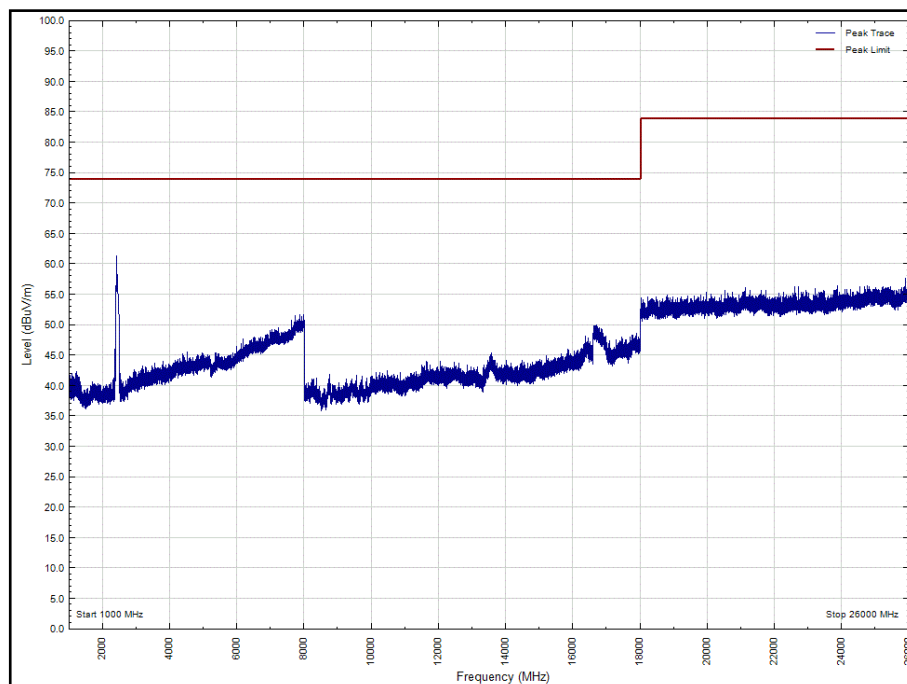


Figure 96 - Channel 6 (2437 MHz), HT20 MIMO CDD, Core 0 - 1, 1 GHz to 26 GHz, Horizontal (Peak)

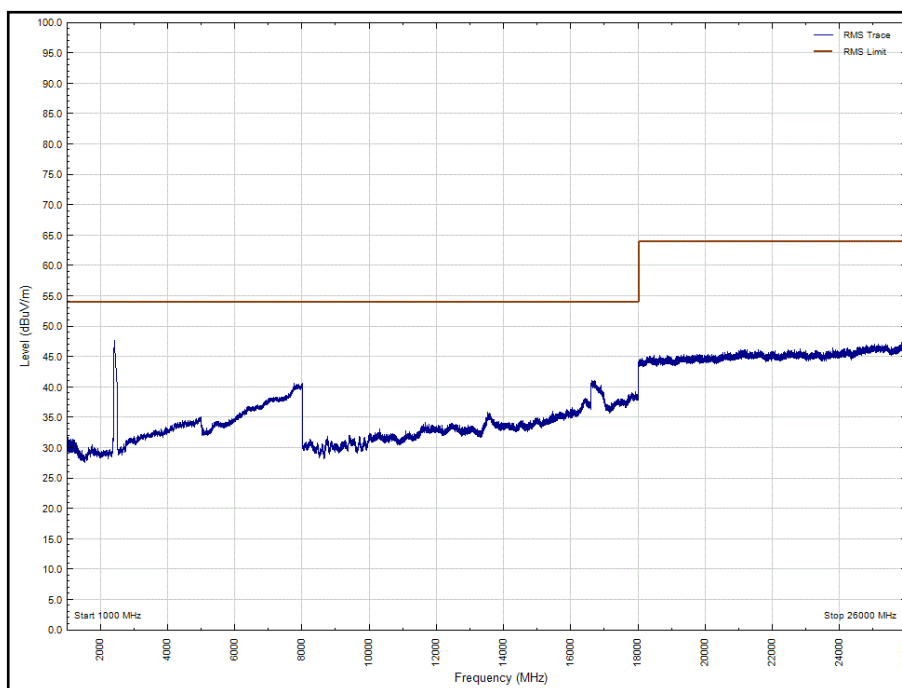


Figure 97 - Channel 6 (2437 MHz), HT20 MIMO CDD, Core 0 - 1, 1 GHz to 26 GHz, Horizontal (Average)

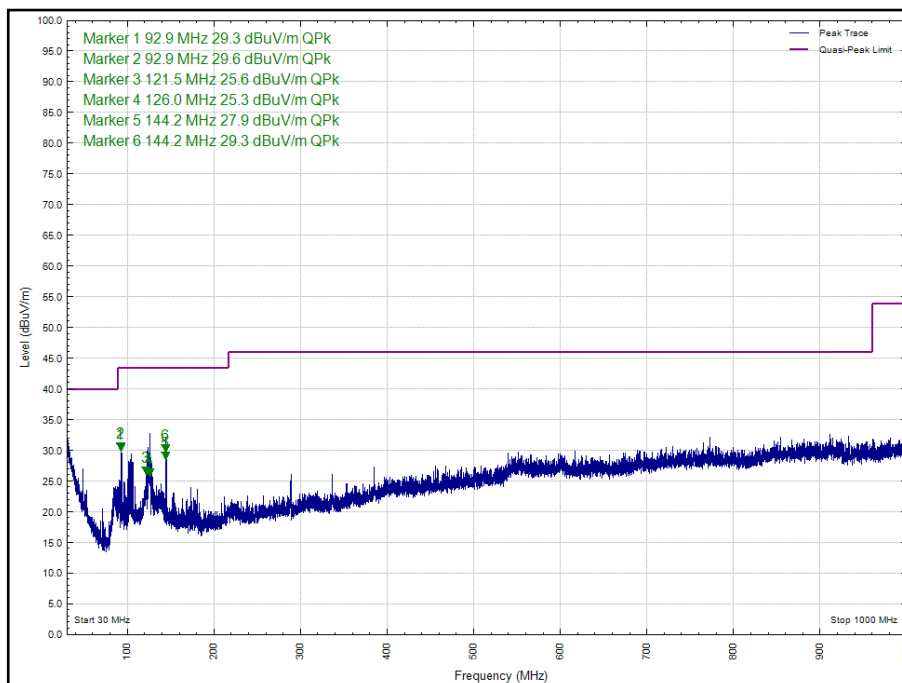


Figure 98 - Channel 6 (2437 MHz), HT20 MIMO CDD, Core 0 - 1, 30 MHz to 1 GHz, Vertical (Peak)

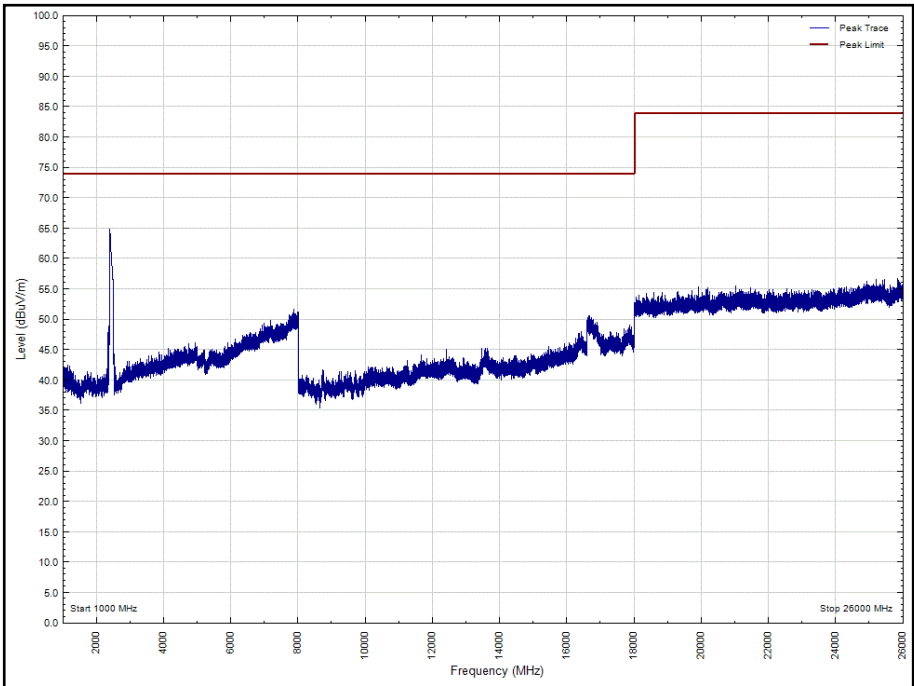


Figure 99 - Channel 6 (2437 MHz), HT20 MIMO CDD, Core 0 - 1, 1 GHz to 26 GHz, Vertical (Peak)

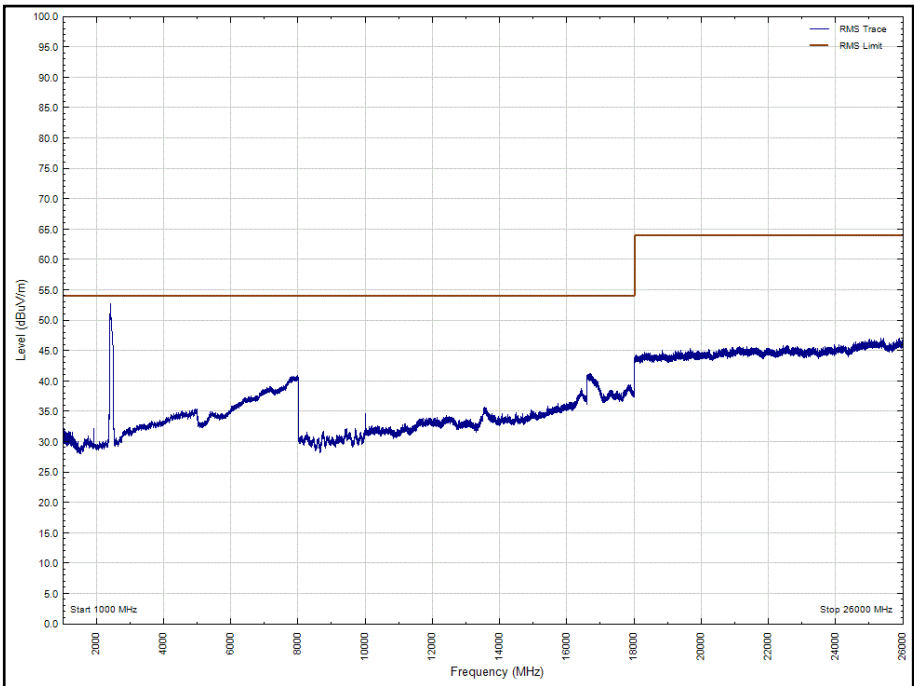


Figure 100 - Channel 6 (2437 MHz), HT20 MIMO CDD, Core 0 - 1, 1 GHz to 26 GHz, Vertical (Average)



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

Table 48 - Channel 13 (2472 MHz), HT20 MIMO CDD, Core 0 - 1, 1 GHz to 26 GHz

* No emissions found within 10 dB of the limit.

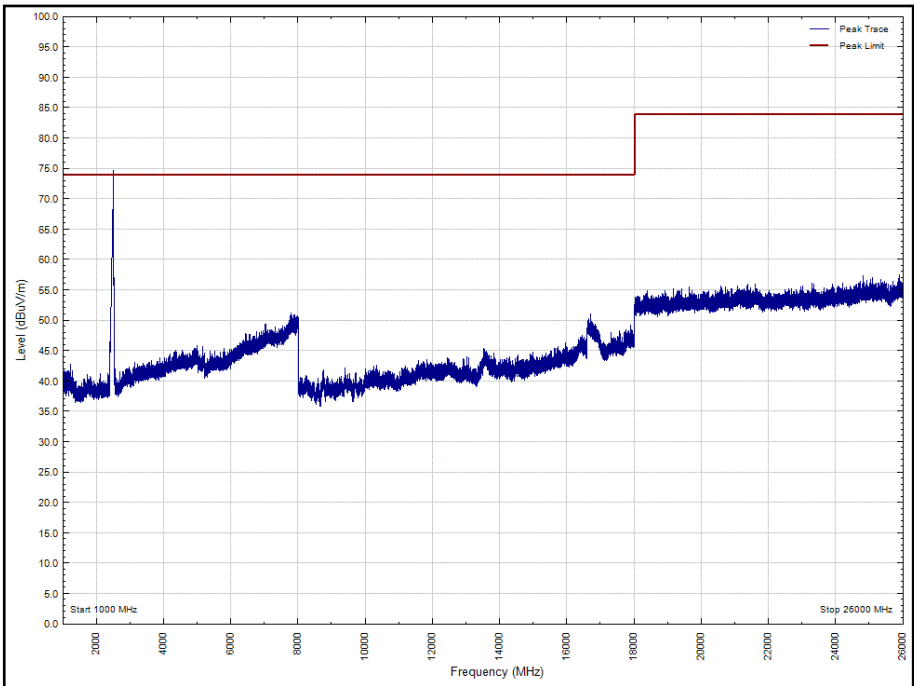


Figure 101 - Channel 13 (2472 MHz), HT20 MIMO CDD, Core 0 - 1, 1 GHz to 26 GHz, Horizontal (Peak)

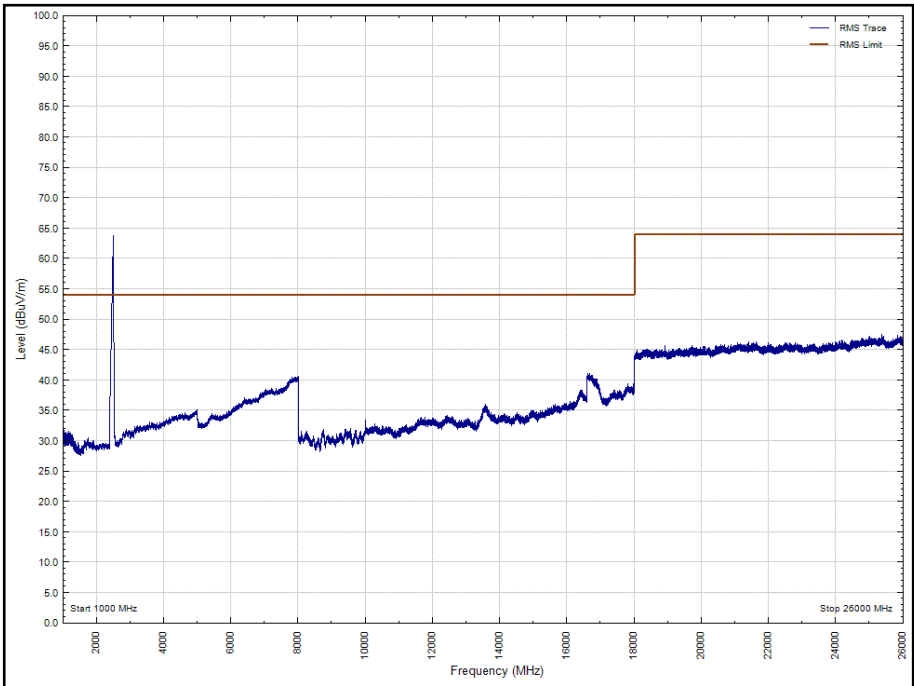


Figure 102 - Channel 13 (2472 MHz), HT20 MIMO CDD, Core 0 - 1, 1 GHz to 26 GHz, Horizontal (Average)

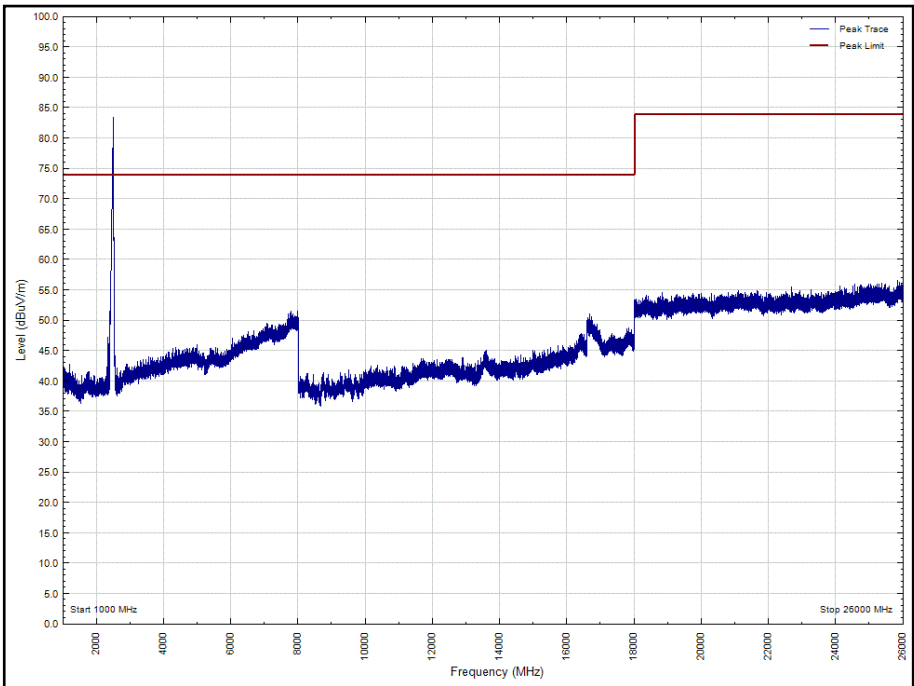


Figure 103 - Channel 13 (2472 MHz), HT20 MIMO CDD, Core 0 - 1, 1 GHz to 26 GHz, Vertical (Peak)

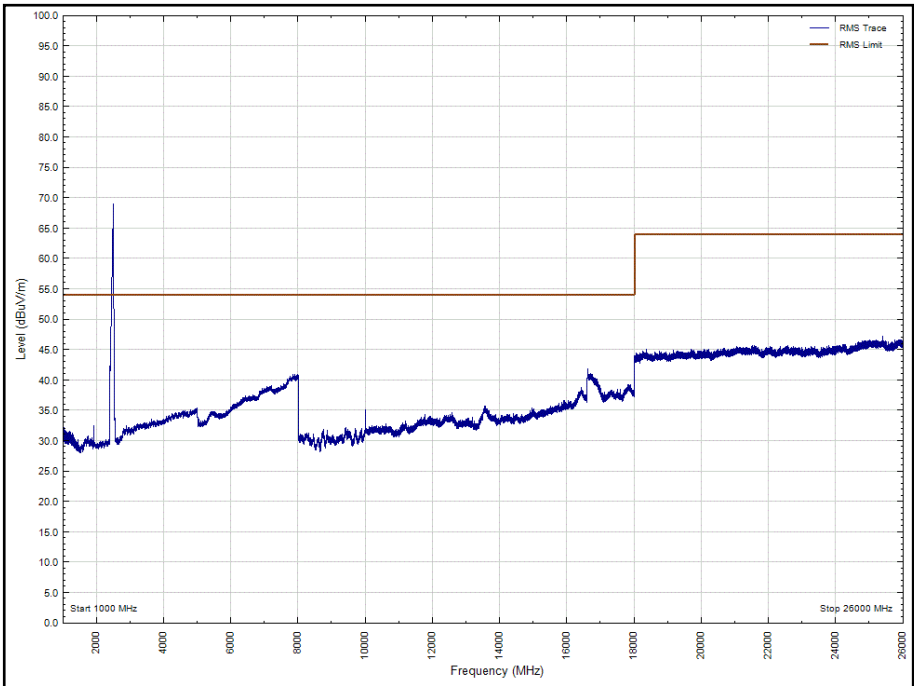


Figure 104 - Channel 13 (2472 MHz), HT20 MIMO CDD, Core 0 - 1, 1 GHz to 26 GHz, Vertical (Average)



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
2207.599	57.0	74.0	-17.0	Peak	140	108	Horizontal
2292.324	33.0	54.0	-21.0	RMS	129	103	Vertical
2312.764	38.7	54.0	-15.3	RMS	140	103	Vertical
2326.171	39.9	54.0	-14.2	RMS	140	224	Vertical

Table 49 - Channel 1 (2412 MHz), HE20 RU 26-0, Core 0 - 1, 1 GHz to 26 GHz

No other emissions found within 10 dB of the limit.

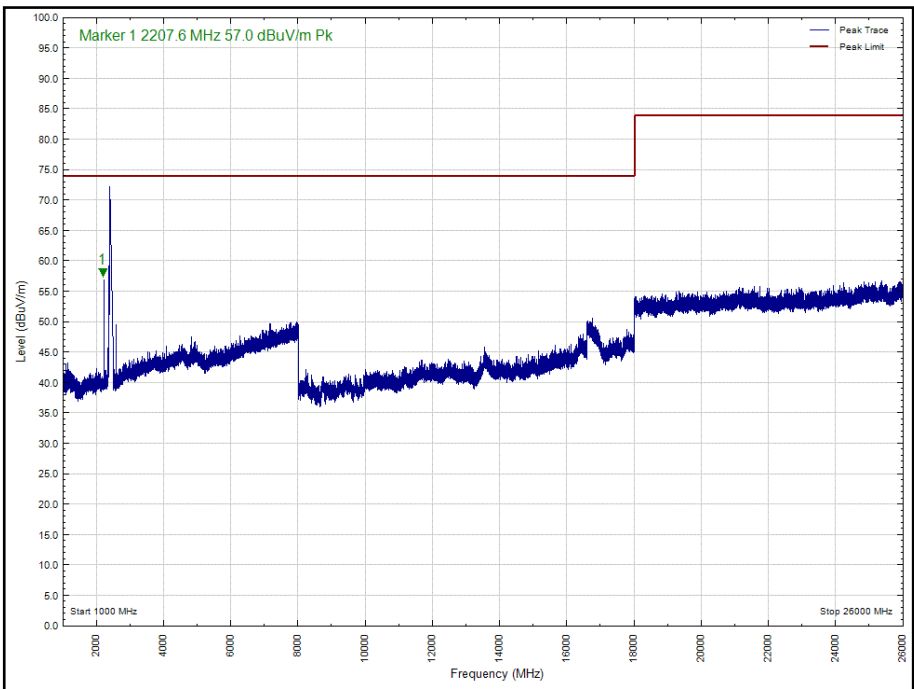


Figure 105 - Channel 1 (2412 MHz), HE20 RU 26-0, Core 0 - 1, 1 GHz to 26 GHz, Horizontal (Peak)

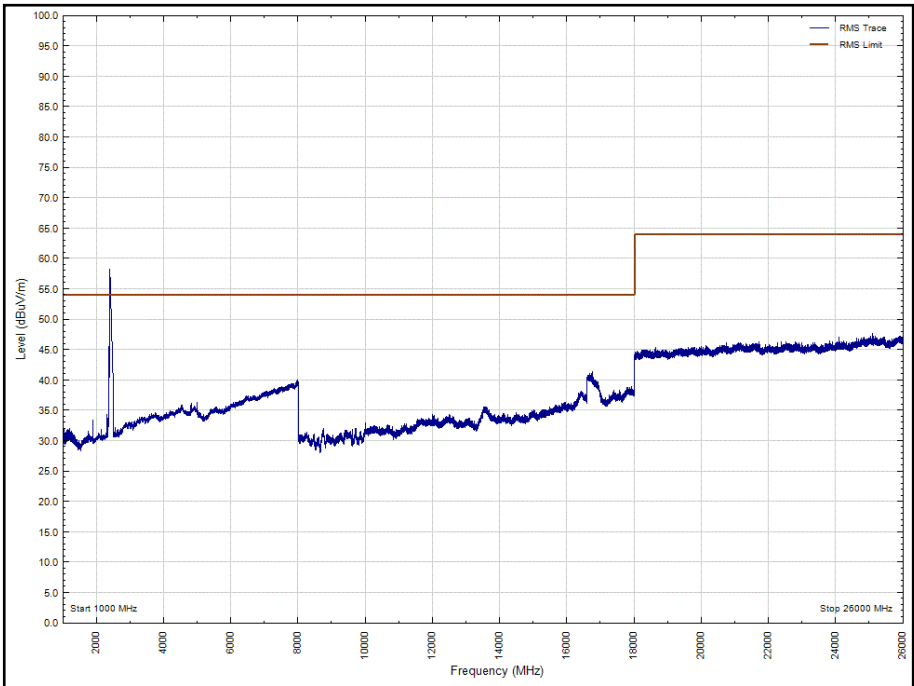


Figure 106 - Channel 1 (2412 MHz), HE20 RU 26-0, Core 0 - 1, 1 GHz to 26 GHz, Horizontal (Average)

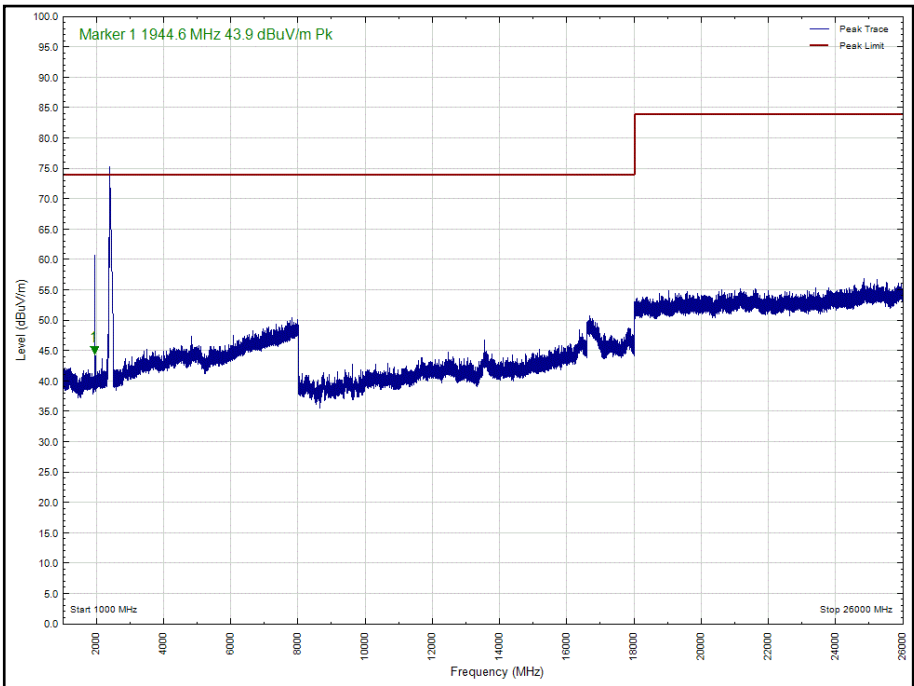


Figure 107 - Channel 1 (2412 MHz), HE20 RU 26-0, Core 0 - 1, 1 GHz to 26 GHz, Vertical (Peak)

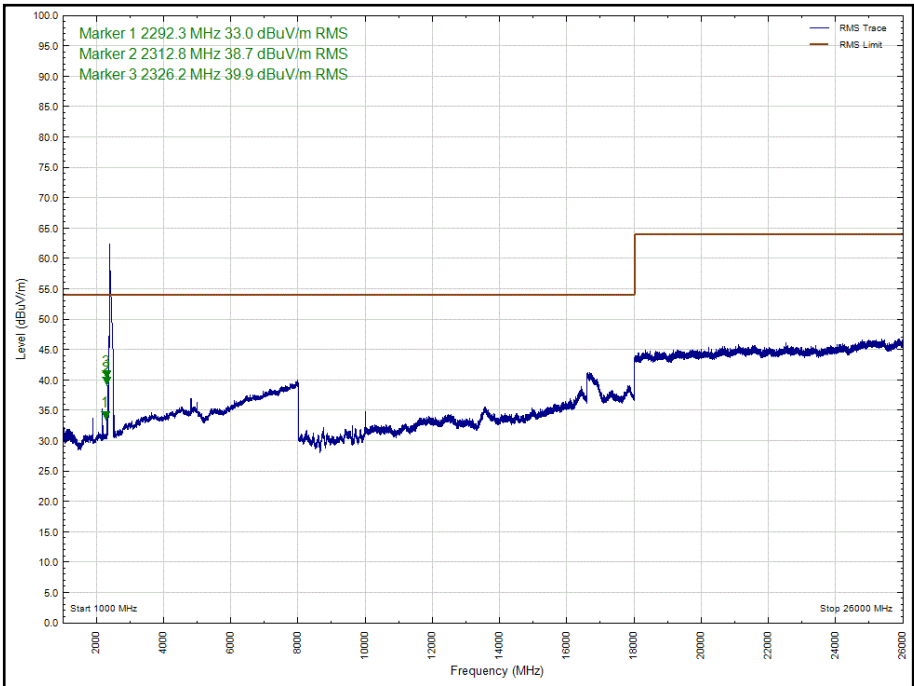


Figure 108 - Channel 1 (2412 MHz), HE20 RU 26-0, Core 0 - 1, 1 GHz to 26 GHz, Vertical (Average)



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

Table 50 - Channel 6 (2437 MHz), HE20 RU 26-0, Core 0 - 1, 30 MHz to 26 GHz

*No emissions found within 10 dB of the limit.

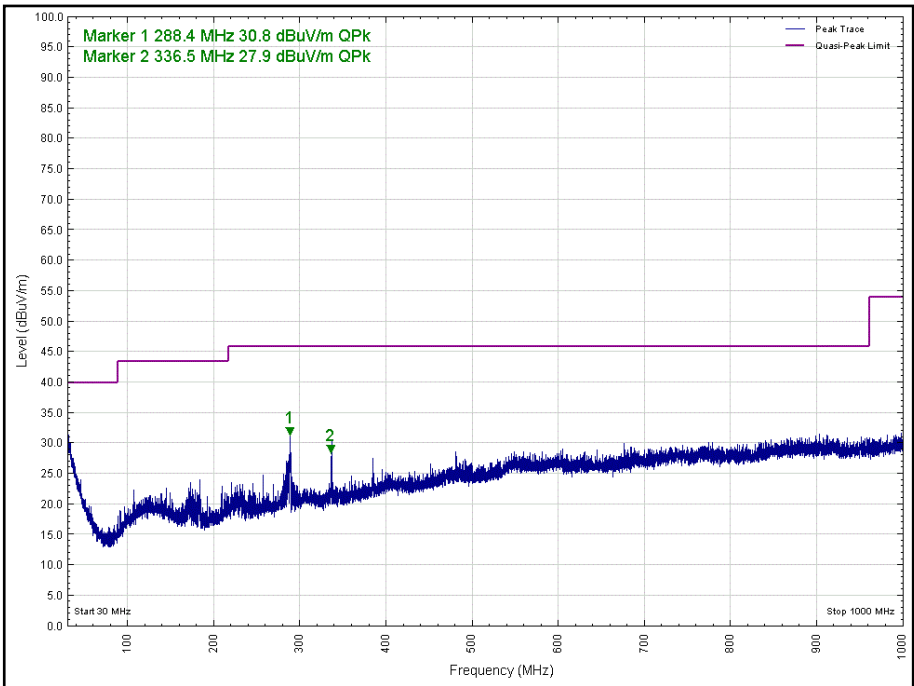


Figure 109 - Channel 6 (2437 MHz), HE20 RU 26-0, Core 0 - 1, 30 MHz to 1 GHz, Horizontal (Peak)

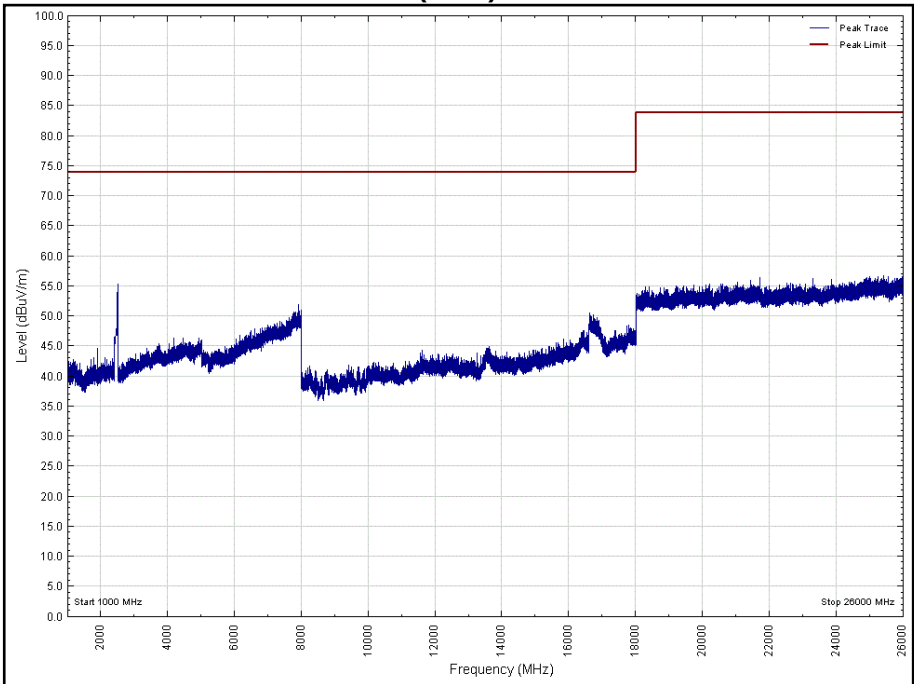


Figure 110 - Channel 6 (2437 MHz), HE20 RU 26-0, Core 0 - 1, 1 GHz to 26 GHz, Horizontal (Peak)

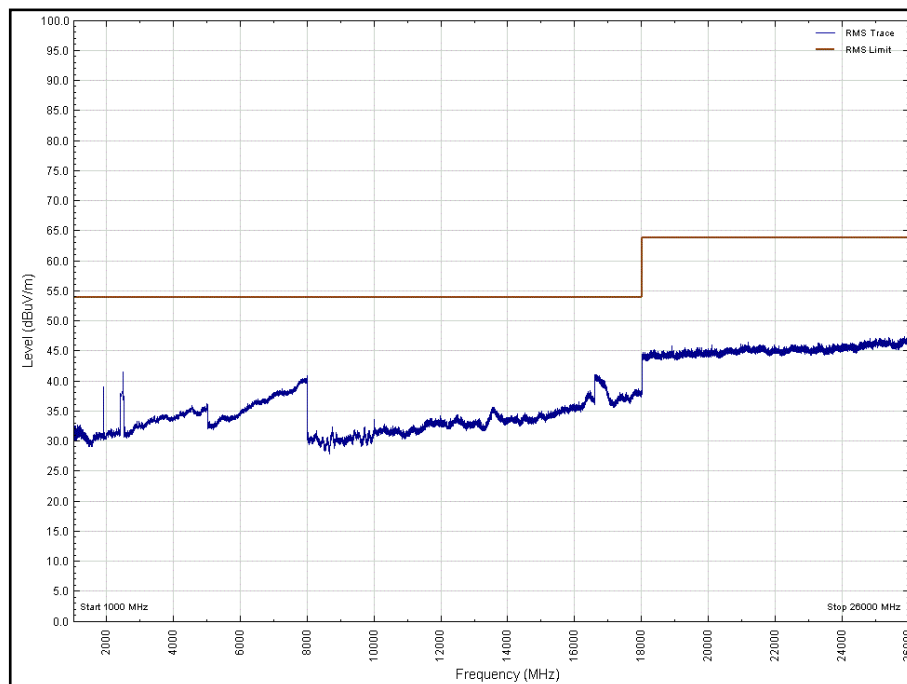


Figure 111 - Channel 6 (2437 MHz), HE20 RU 26-0, Core 0 - 1, 1 GHz to 26 GHz, Horizontal (Average)

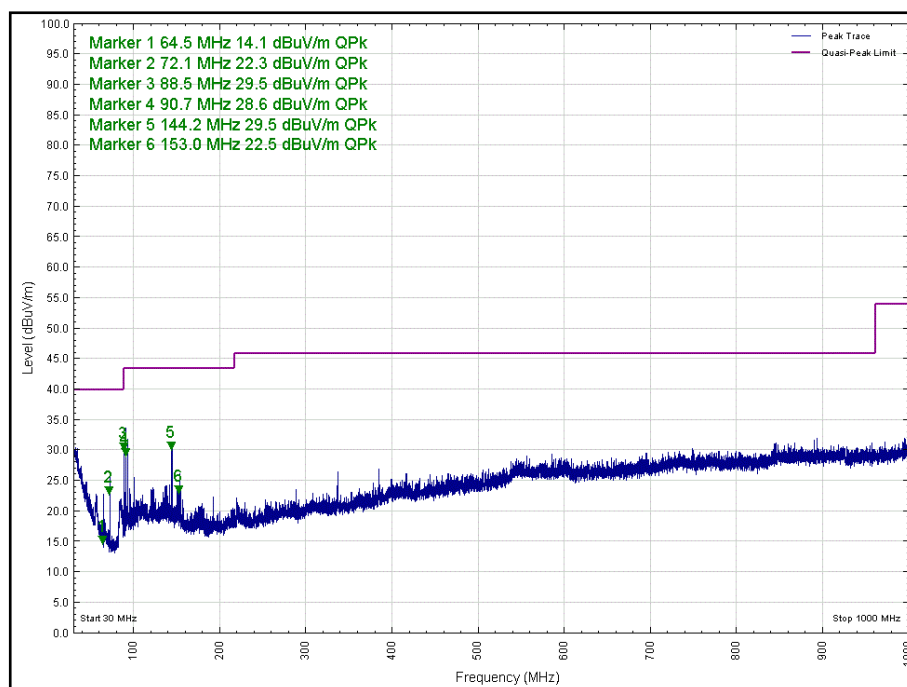


Figure 112 - Channel 6 (2437 MHz), HE20 RU 26-0, Core 0 - 1, 30 MHz to 1 GHz, Vertical (Peak)

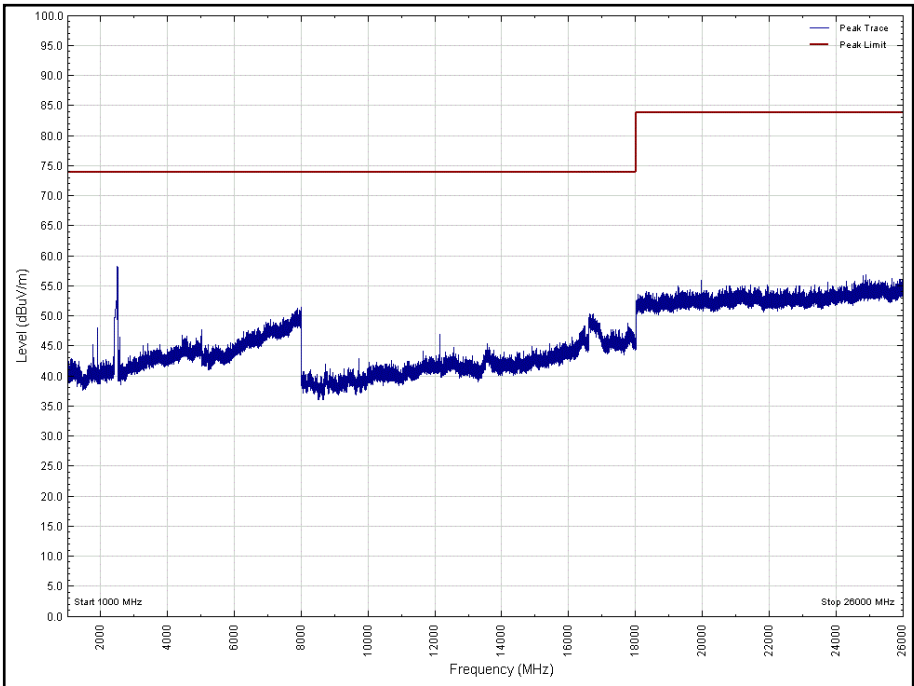


Figure 113 - Channel 6 (2437 MHz), HE20 RU 26-0, Core 0 - 1, 1 GHz to 26 GHz, Vertical (Peak)

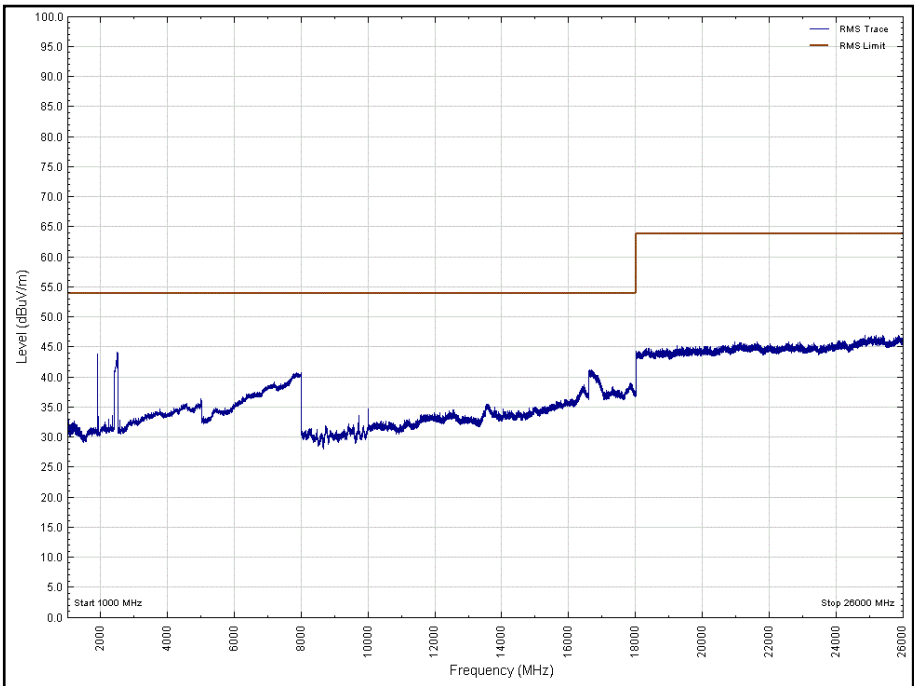


Figure 114 - Channel 6 (2437 MHz), HE20 RU 26-0, Core 0 - 1, 1 GHz to 26 GHz, Vertical (Average)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
2311.890	55.8	74.0	-18.2	Peak	0	100	Vertical
2314.033	30.3	54.0	-23.7	RMS	106	108	Horizontal
2324.599	31.2	54.0	-22.8	RMS	360	104	Vertical
2370.162	38.7	54.0	-15.3	RMS	130	141	Vertical
12318.081	34.7	54.0	-19.3	RMS	157	117	Horizontal
12318.241	35.9	54.0	-18.1	RMS	156	394	Vertical

Table 51 - Channel 13 (2472 MHz), HE20 RU 26-0, Core 0 - 1, 1 GHz to 26 GHz

No other emissions found within 10 dB of the limit.

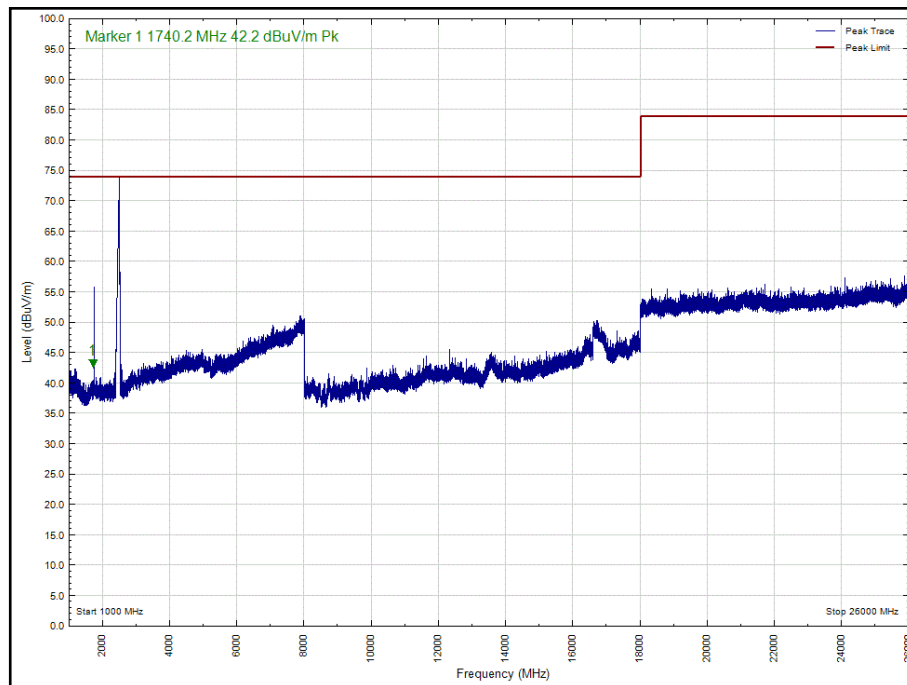


Figure 115 - Channel 13 (2472 MHz), HE20 RU 26-0, Core 0 - 1, 1 GHz to 26 GHz, Horizontal (Peak)

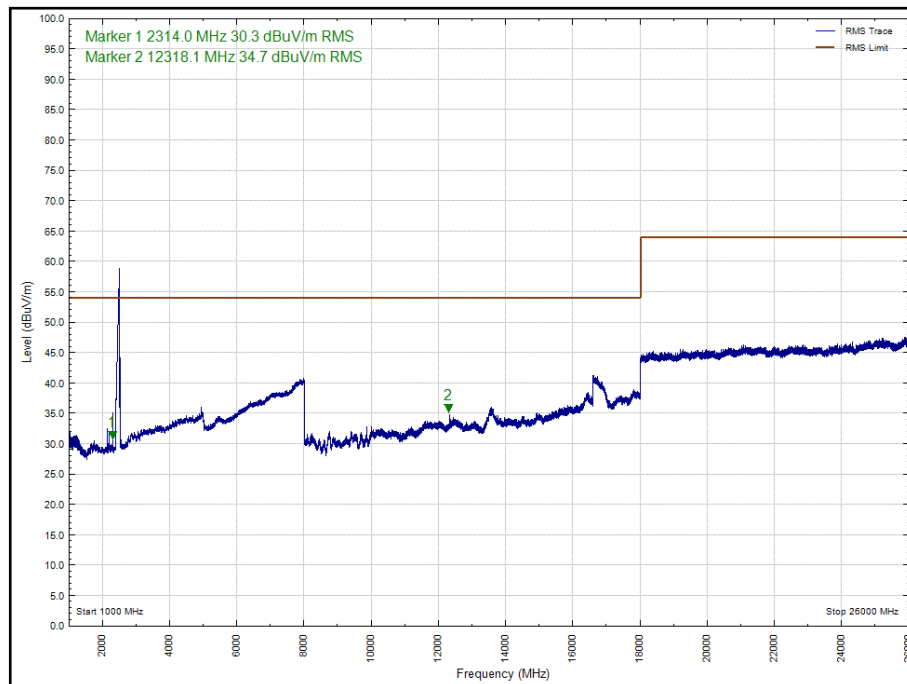


Figure 116 - Channel 13 (2472 MHz), HE20 RU 26-0, Core 0 - 1, 1 GHz to 26 GHz, Horizontal (Average)

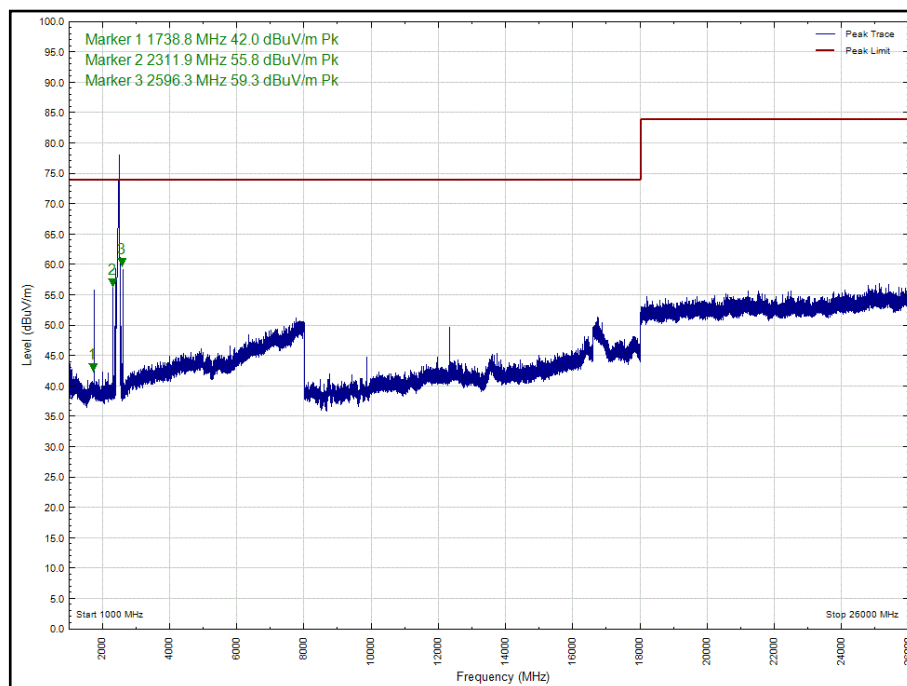


Figure 117 - Channel 13 (2472 MHz), HE20 RU 26-0, Core 0 - 1, 1 GHz to 26 GHz, Vertical (Peak)

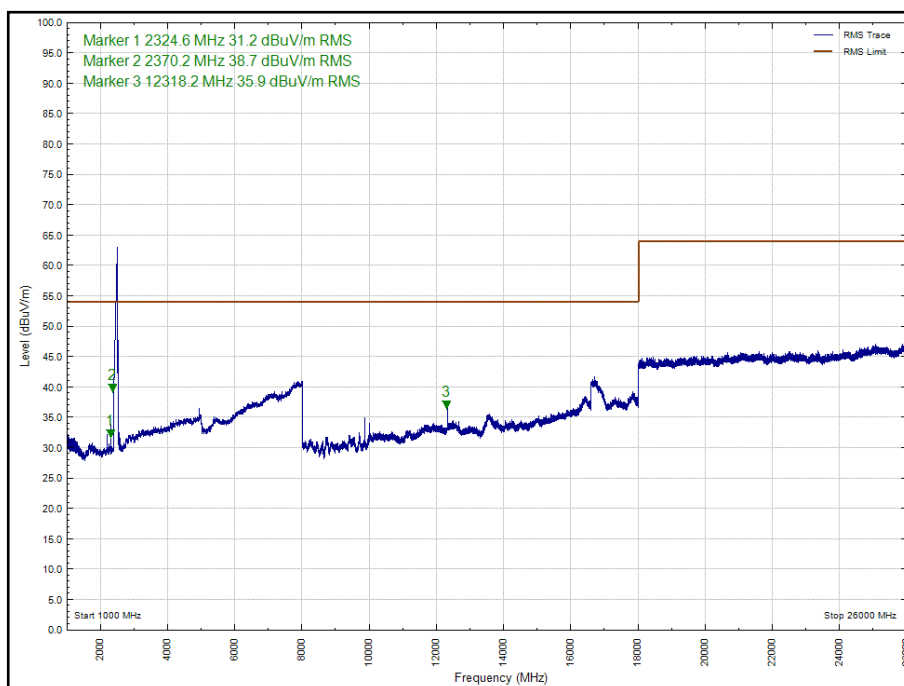


Figure 118 - Channel 13 (2472 MHz), HE20 RU 26-0, Core 0 - 1, 1 GHz to 26 GHz, Vertical (Average)

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

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

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

ISED RSS-247, Limit Clause 5.5

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



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 Due
Antenna with permanent attenuator (Bilog)	Schaffner	CBL6143	287	24	15-May-2020
Filter (High Pass)	Lorch	SHP7-7000-SR	566	12	06-Jun-2020
Pre-Amplifier	Phase One	PS04-0086	1533	12	04-Aug-2020
High Pass Filter (4 GHz)	K&L Microwave	11SH10-4000/X18000-0/0	4599	12	05-Sep-2020
Band Reject Filter - 2.425 GHz	Wainwright	WRCGV14-2390-2400-2450-2460-50SS	5066	12	01-Oct-2020
Band Reject Filter - 2.4585 GHz	Wainwright	WRCGV14-2423.5-2433.5-2483.5-2493.5-50SS	5068	12	01-Oct-2020
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	28-Nov-2020
8m N-Type RF Cable	Teledyne	PR90-088-8MTR	5092	12	06-Dec-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5102	12	06-Oct-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5103	12	06-Oct-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5104	12	09-Dec-2020
Cable (18 GHz)	Rosenberger	LU7-071-2000	5107	12	06-Oct-2020
Screened Room (11)	Rainford	Rainford	5136	36	01-Nov-2021
Mast	Maturo	TAM 4.0-P	5158	-	TU
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	10-Mar-2021
DRG Horn Antenna (7.5-18GHz)	Schwarzbeck	HWRD750	5216	12	10-Mar-2021
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	5217	12	09-Jul-2020
Preamplifier (30dB 18-40GHz)	Schwarzbeck	BBV 9721	5218	12	09-Jul-2020
Pre Amp 1 - 26.5 GHz	Agilent Technologies	8449B	5445	-	O/P Mon

Table 52

TU - Traceability Unscheduled

O/P Mon – Output Monitored Using Calibrated Test 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

A2330, S/N: C07CG081PW8X - Modification State 0
A2330, S/N: C07CG05KPW8V - Modification State 0

2.5.3 Date of Test

19-March-2020 to 26-April-2020

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 signaling alphabet, a 30 dBc limit rather than 20 dBc limit was applied in accordance with FCC 47 CFR Part 15.247 paragraph (d) and RSS-247 section 5.5.

2.5.5 Environmental Conditions

Ambient Temperature 18.7 - 21.2 °C
Relative Humidity 35.4 - 41.2 %

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	-55.06
802.11g, Core 1	6 Mbps	-	-	2412	2400	-45.61
802.11n HT20, Core 1	MCS0	-	-	2412	2400	-42.68
802.11ax HE20, Core 1	MCS0	SU	-	2412	2400	-45.20
802.11ax HE20, Core 1	MCS0	26	0	2412	2400	-48.42

Table 53 - SISO Authorised Band Edge Results

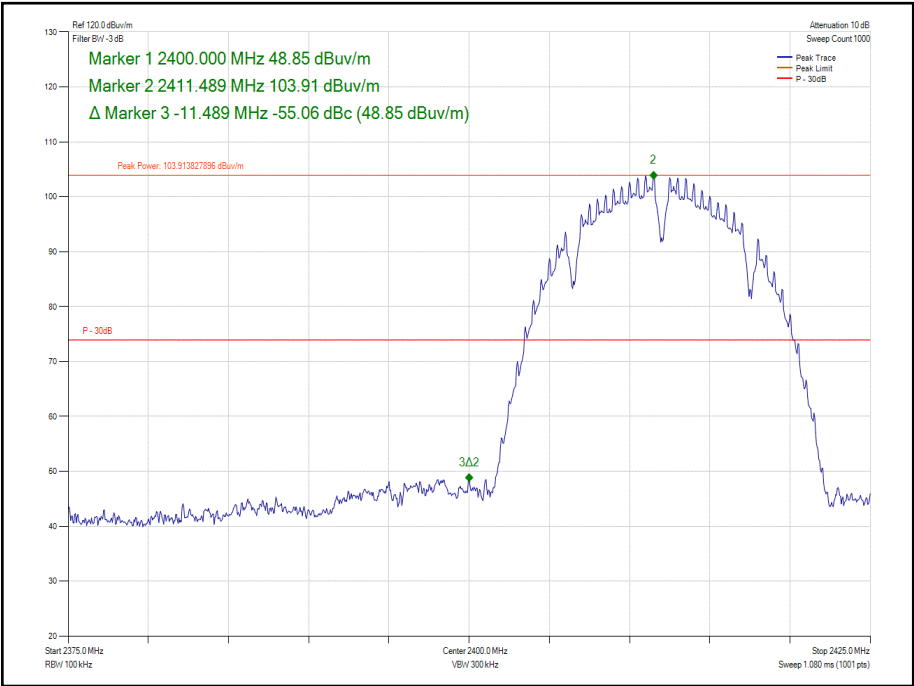


Figure 119 - 802.11b, Core 1- 2412 MHz
Band Edge Frequency 2400 MHz

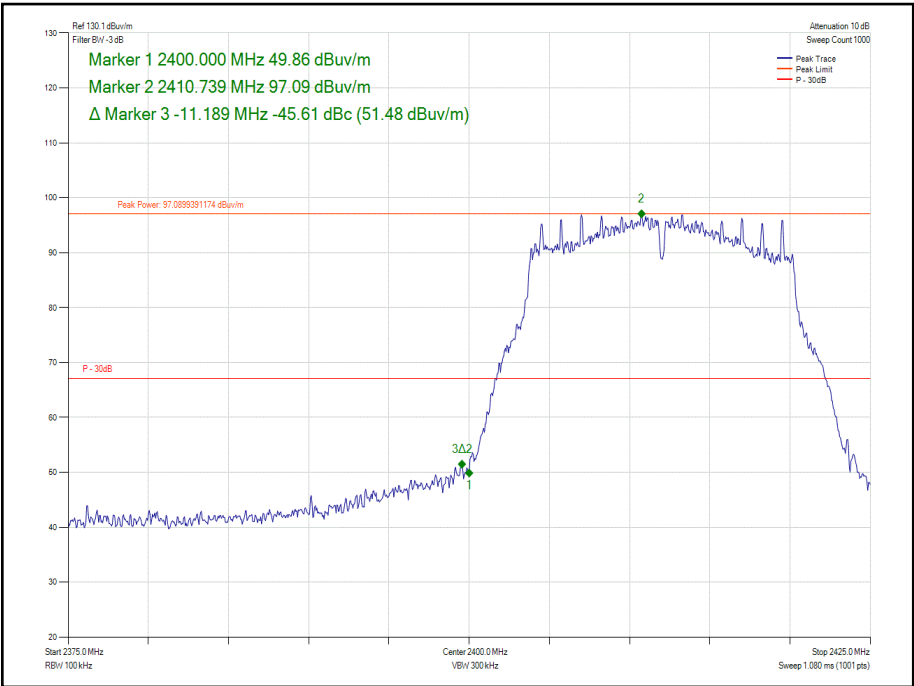


Figure 120- 802.11g, Core 1- 2412 MHz
Band Edge Frequency 2400 MHz

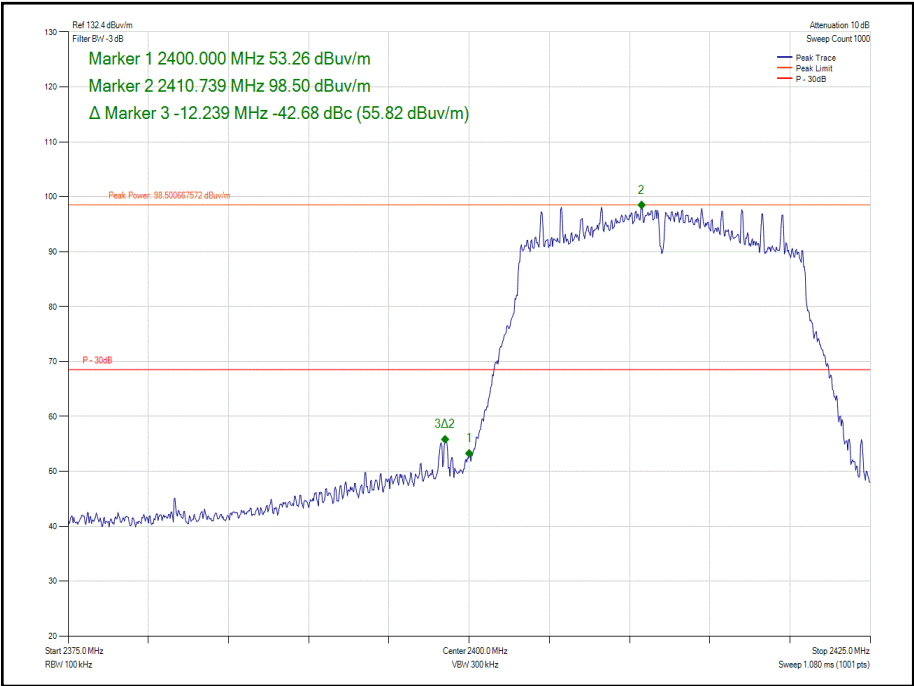


Figure 121- 802.11n HT20, Core 1- 2412 MHz
Band Edge Frequency 2400 MHz

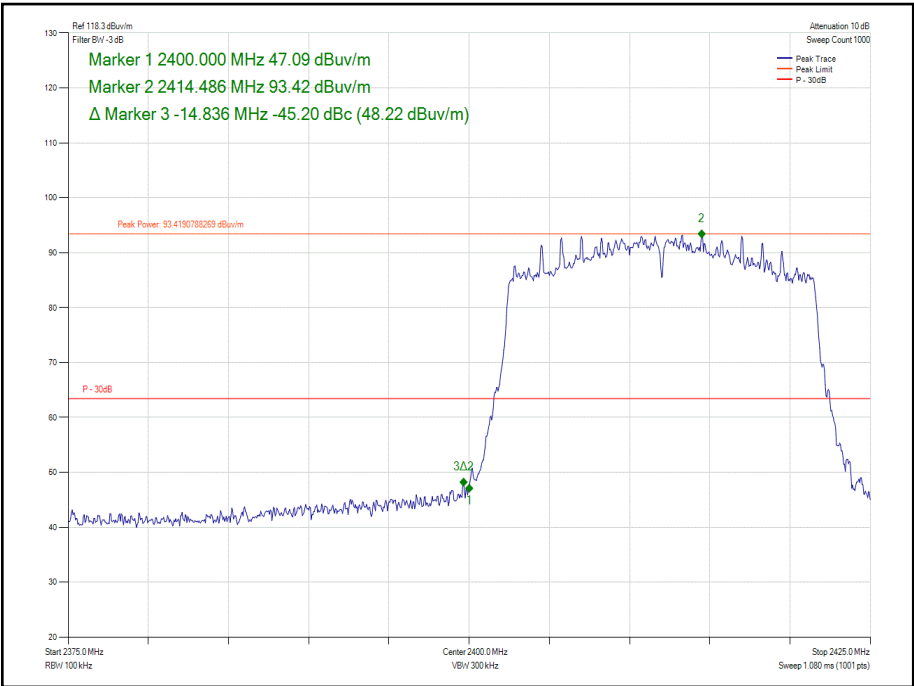


Figure 122- 802.11ax HE20, Core 1, SU - 2412 MHz
Band Edge Frequency 2400 MHz

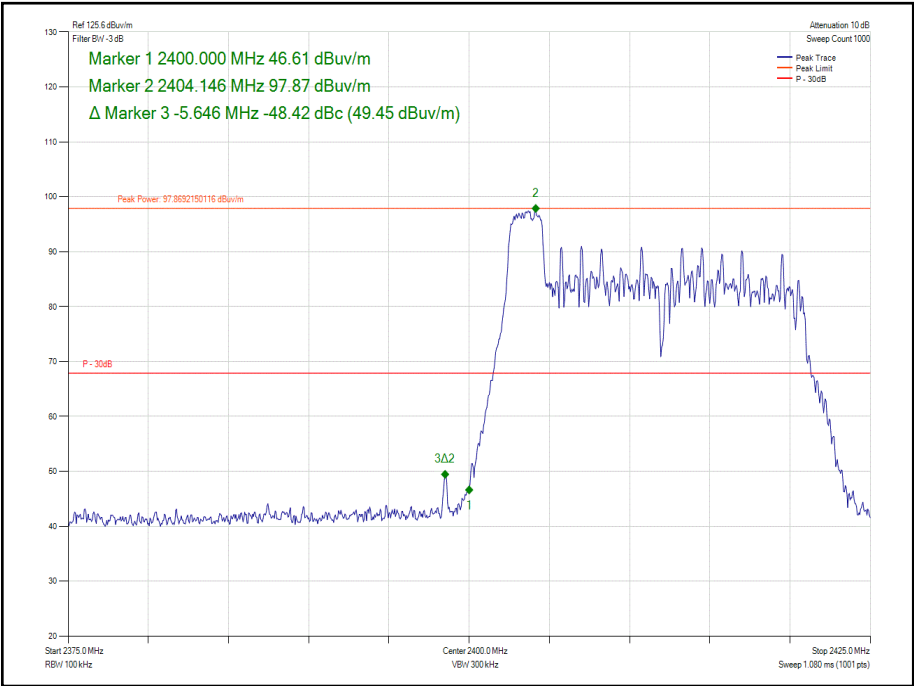


Figure 123- 802.11ax HE20, Core 1, 26-0 - 2412 MHz
Band Edge Frequency 2400 MHz



Mode	Data Rate /MCS	Resource size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
802.11n HT20, Cores 0-1	MCS0	-	-	2412	2400	-44.82
802.11ax HE20, Cores 0 -1	MCS0	SU	-	2412	2400	-45.46
802.11ax HE20, Cores 0 -1	MCS0	26	0	2412	2400	-51.68

Table 54 - MIMO 2TX Authorised Band Edge Results

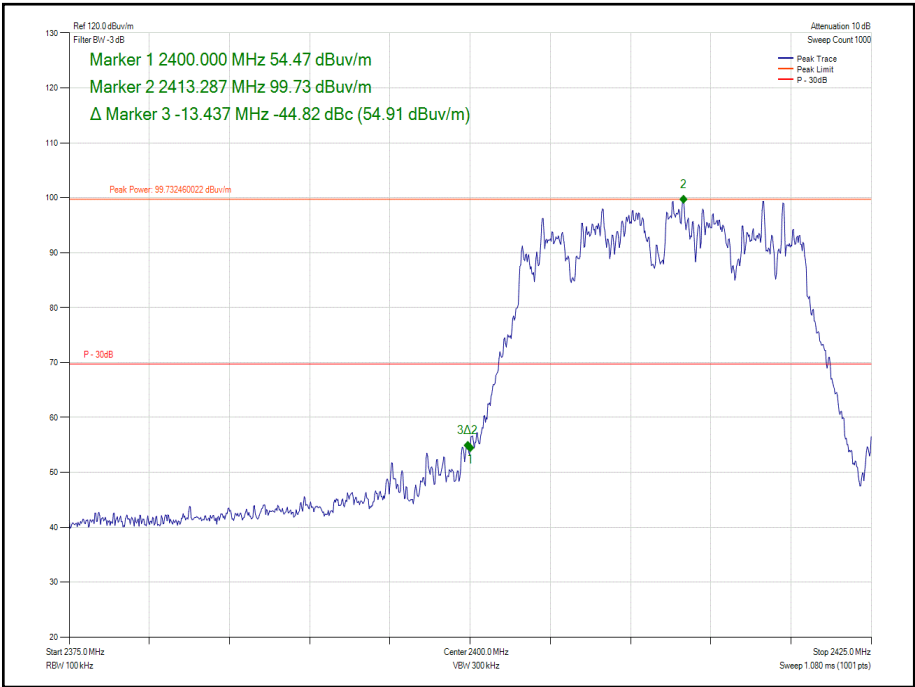
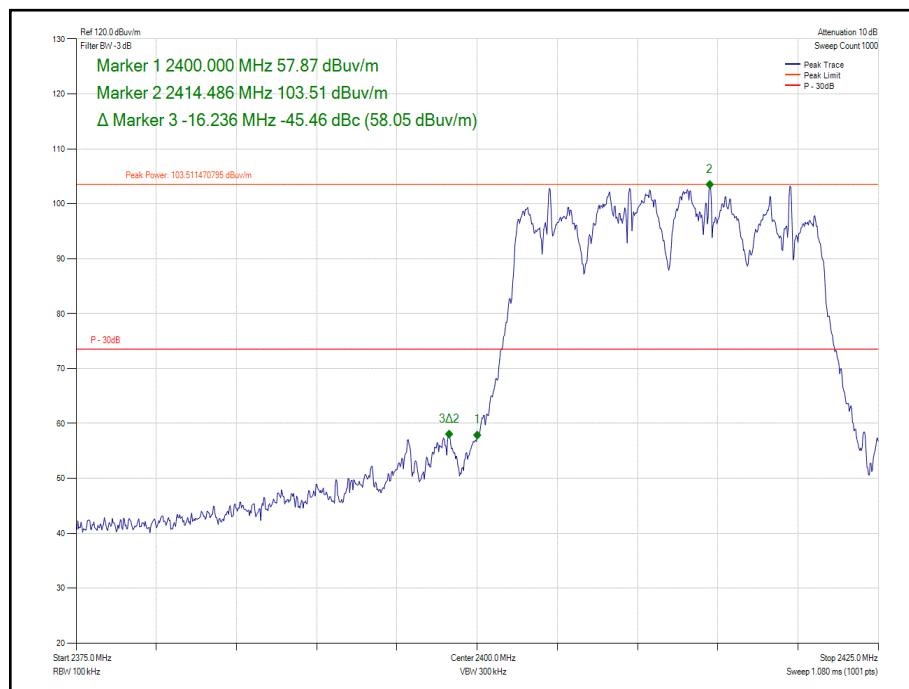
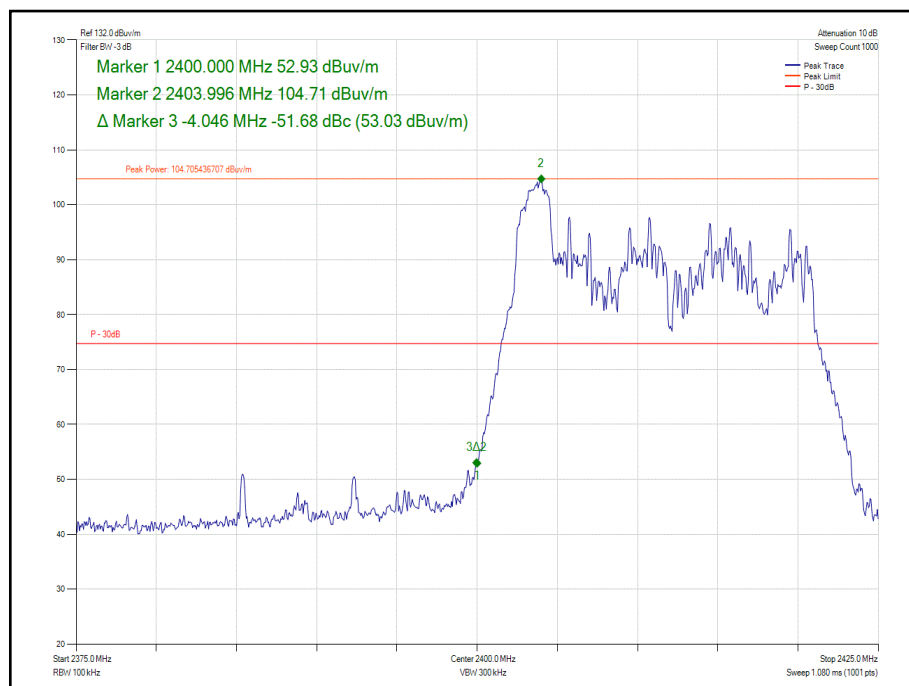


Figure 124 - 802.11n HT20, Cores 0-1 - 2412 MHz
Band Edge Frequency 2400 MHz



**Figure 125- 802.11ax HE20, Cores 0-1, SU - 2412 MHz
Band Edge Frequency 2400 MHz**



**Figure 126- 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 Due
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	07-Aug-2020
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	6	09-Jun-2020
Hygrometer	Rotronic	HP21	4989	12	02-May-2020
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	28-Nov-2020
8m N-Type RF Cable	Teledyne	PR90-088-8MTR	5092	12	06-Dec-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5102	12	06-Oct-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5104	12	09-Dec-2020
Cable (18 GHz)	Rosenberger	LU7-071-2000	5107	12	06-Oct-2020
EmX Emissions Software	TUV SUD	EmX	5125	-	Software
Screened Room (11)	Rainford	Rainford	5136	36	01-Nov-2021
Mast	Maturo	TAM 4.0-P	5158	-	TU
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	10-Mar-2021
Pre Amp 1 - 26.5 GHz	Agilent Technologies	8449B	5445	-	O/P Mon

Table 55

TU - Traceability Unscheduled

O/P Mon – Output Monitored Using Calibrated Test Equipment



2.6 Restricted Band Edges

2.6.1 Specification Reference

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

2.6.2 Equipment Under Test and Modification State

A2330, S/N: C07CG081PW8X - Modification State 0
A2330, S/N: C07CG05KPW8V - Modification State 0

2.6.3 Date of Test

19-March-2020 to 26-April-2020

2.6.4 Test Method

Testing was performed in accordance with ANSI C63.10, clause 6.10.5 and 11.12.1.

Plots for average measurements were taken in accordance with ANSI C63.10, clause 11.12.2.5.2.

The following conversion can be applied to convert from dBμV/m to μV/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.

2.6.5 Environmental Conditions

Ambient Temperature	18.7 - 21.2 °C
Relative Humidity	35.4 - 41.2 %

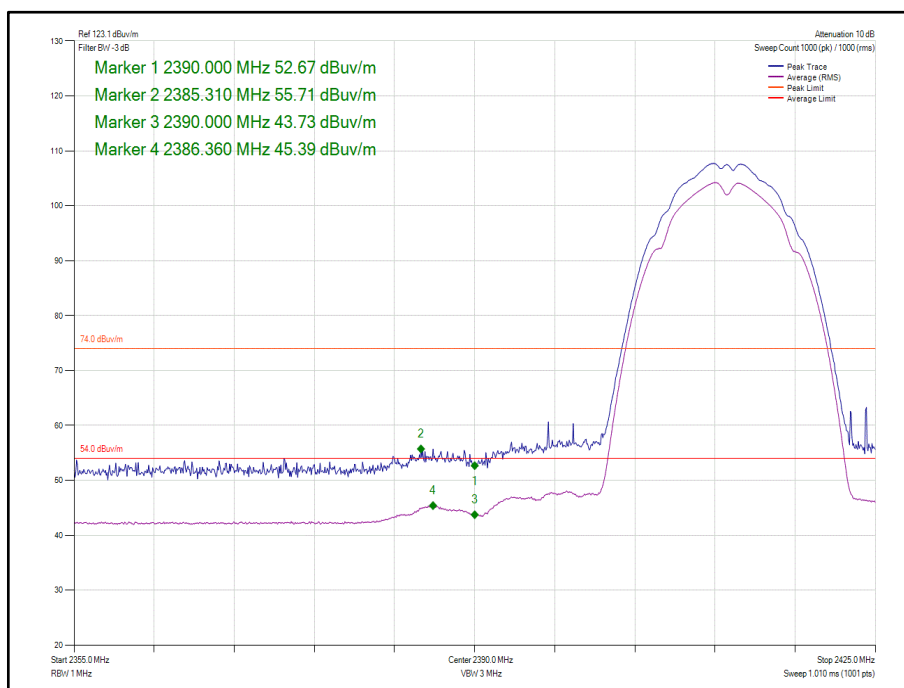


2.6.6 Test Results

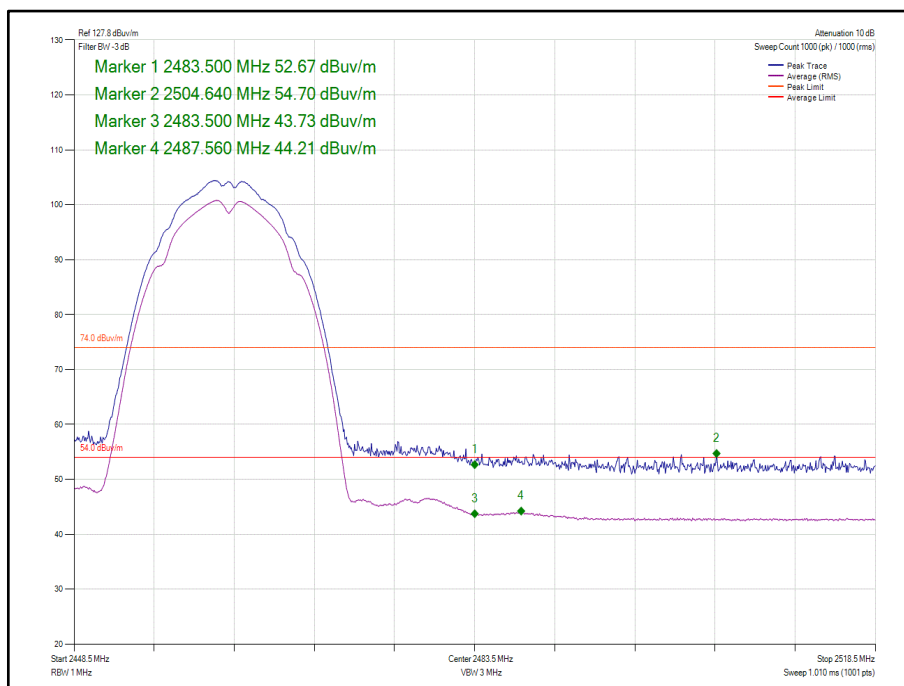
2.4 GHz WLAN

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	55.71	45.39
802.11b, Core 1	1 Mbps	-	-	2462	2483.5	54.70	44.21
802.11b, Core 1	1 Mbps	-	-	2467	2483.5	56.96	46.32
802.11b, Core 1	1 Mbps	-	-	2472	2483.5	56.87	45.19
802.11g, Core 1	6 Mbps	-	-	2412	2390.0	56.58	45.38
802.11g, Core 1	6 Mbps	-	-	2462	2483.5	56.68	44.70
802.11g, Core 1	6 Mbps	-	-	2467	2483.5	59.23	44.70
802.11g, Core 1	6 Mbps	-	-	2472	2483.5	63.74	48.00
802.11n HT20, Core 1	MCS0	-	-	2412	2390.0	60.19	45.96
802.11n HT20, Core 1	MCS0	-	-	2462	2483.5	57.42	45.82
802.11n HT20, Core 1	MCS0	-	-	2467	2483.5	61.32	44.83
802.11n HT20, Core 1	MCS0	-	-	2472	2483.5	64.87	48.56
802.11ax HE20, Core 1	MCS0	SU	-	2412	2400.0	59.95	45.93
802.11ax HE20, Core 1	MCS0	26	0	2412	2400	60.92	42.67
802.11ax HE20, Core 1	MCS0	SU	-	2462	2483.5	55.90	45.08
802.11ax HE20, Core 1	MCS0	26	8	2462	2483.5	60.35	42.45
802.11ax HE20, Core 1	MCS0	SU	-	2467	2483.5	58.11	44.38
802.11ax HE20, Core 1	MCS0	26	8	2467	2483.5	60.42	42.48
802.11ax HE20, Core 1	MCS0	SU	-	2472	2483.5	63.09	45.68
802.11ax HE20, Core 1	MCS0	26	8	2472	2483.5	65.07	46.39

Table 56 - SISO Restricted Band Edge Results



**Figure 127 - 802.11b, Core 1 - 2412 MHz,
Band Edge Frequency 2390.0 MHz**



**Figure 128 - 802.11b, Core 1 - 2462 MHz,
Band Edge Frequency 2483.5 MHz**

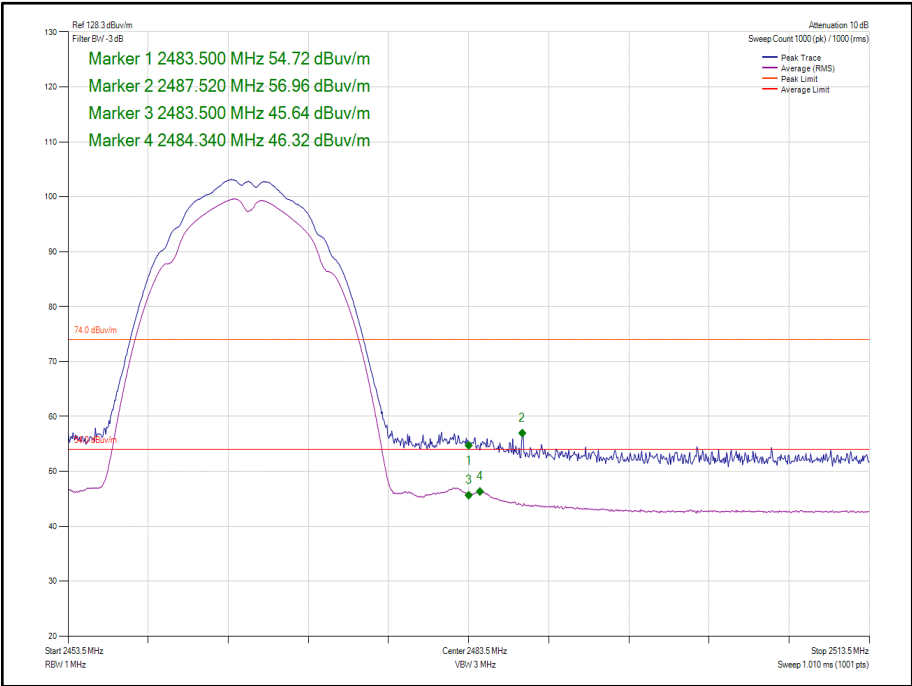


Figure 129 - 802.11b, Core 1 - 2467 MHz,
Band Edge Frequency 2483.5 MHz

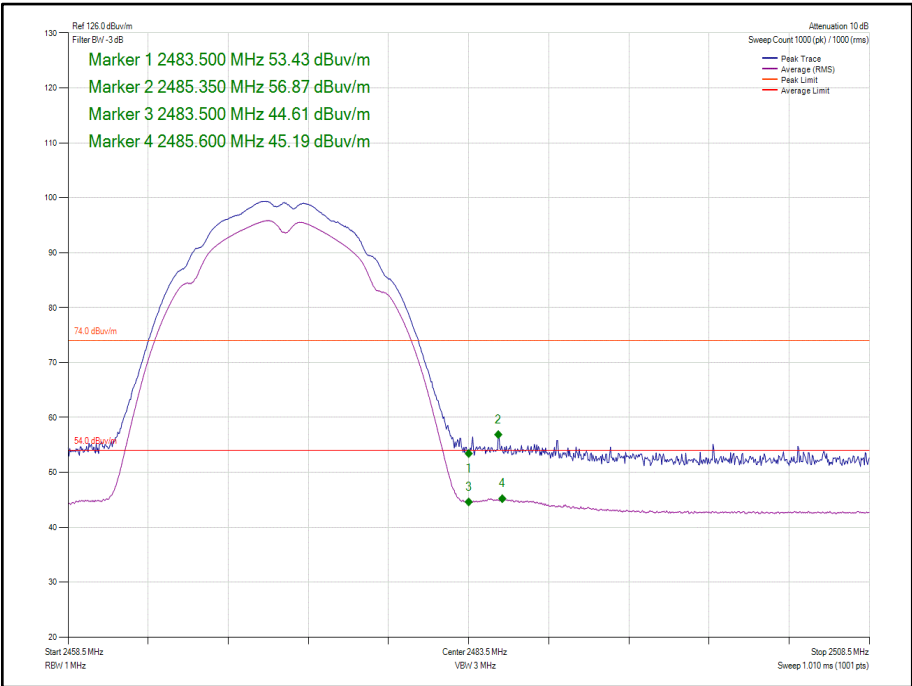
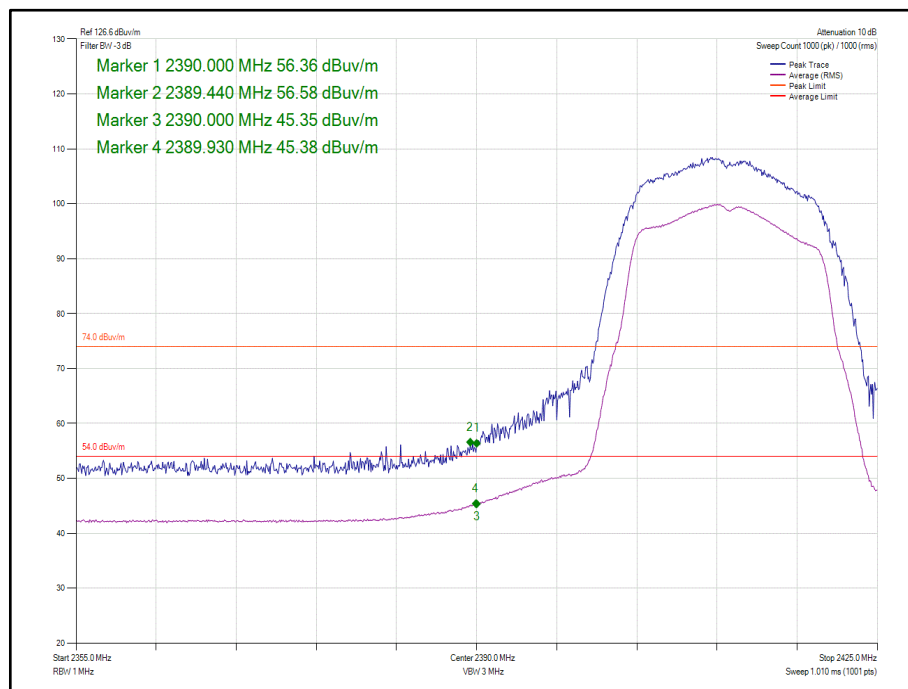
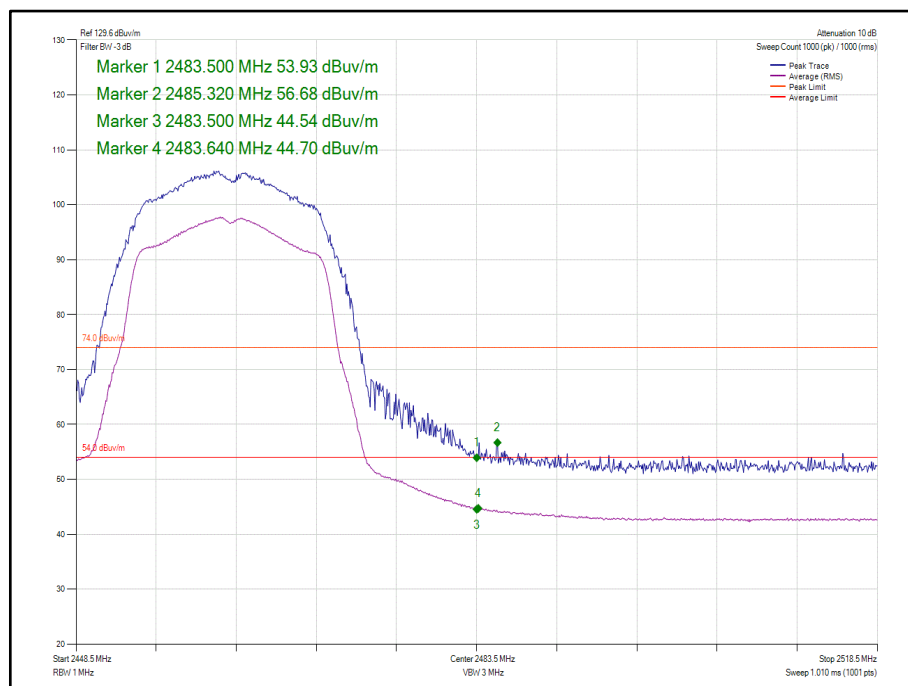


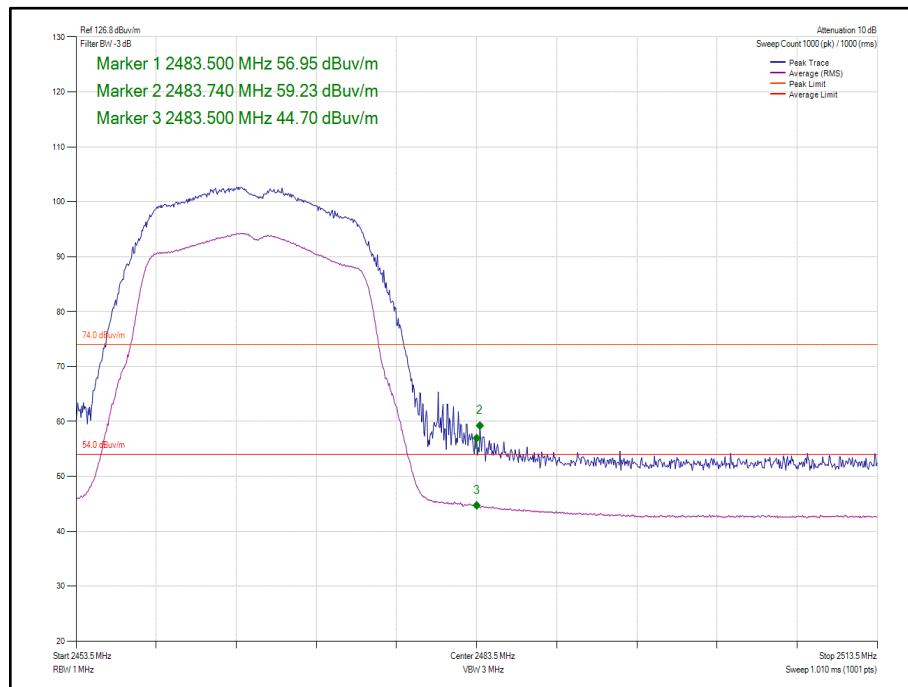
Figure 130 - 802.11b, Core 1 - 2472 MHz,
Band Edge Frequency 2483.5 MHz



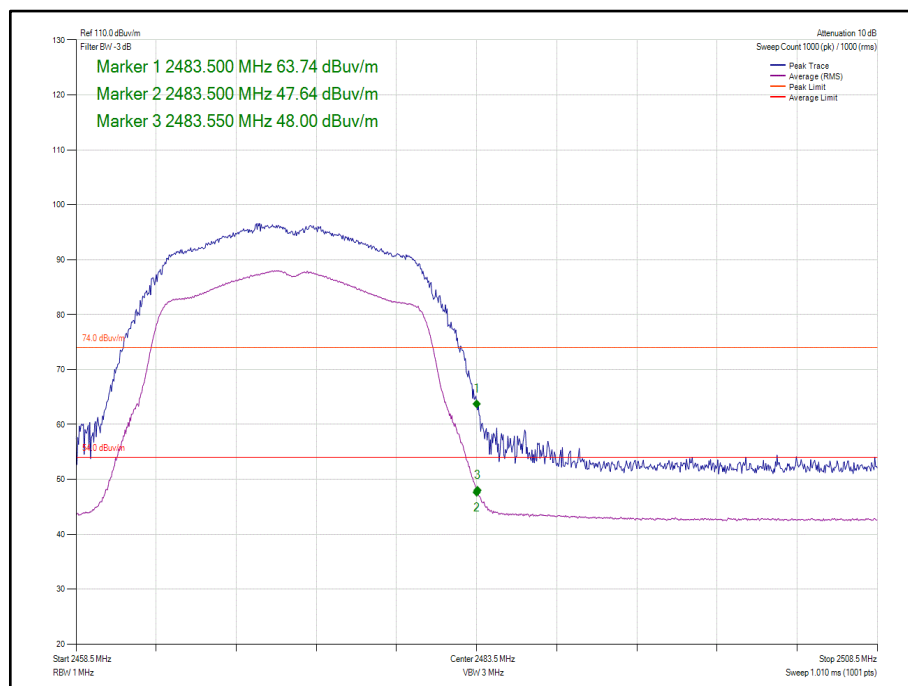
**Figure 131 - 802.11g, Core 1 - 2412 MHz,
Band Edge Frequency 2390.0 MHz**



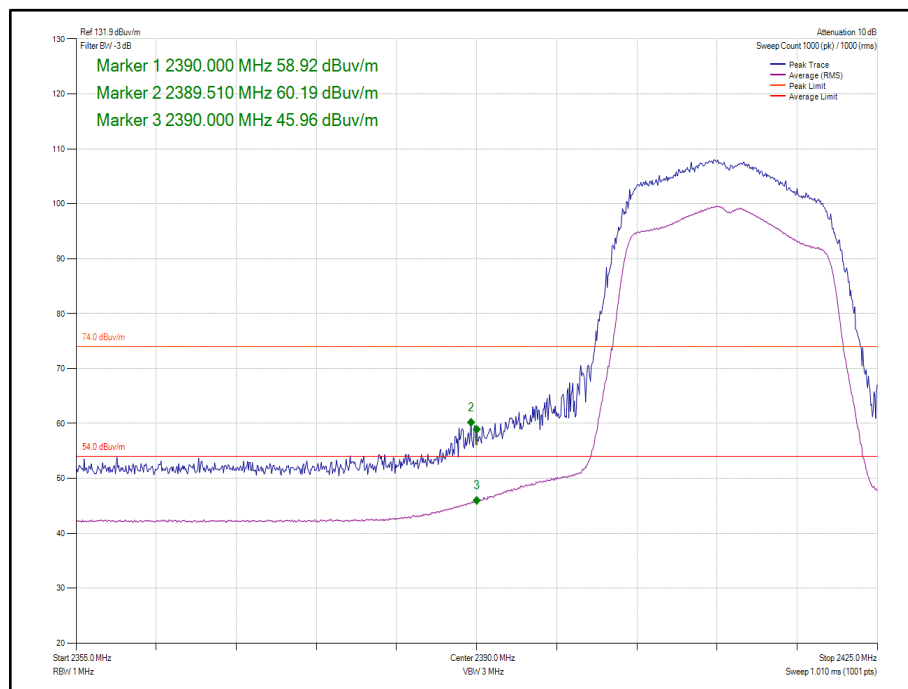
**Figure 132 - 802.11g, Core 1 - 2462 MHz,
Band Edge Frequency 2483.5 MHz**



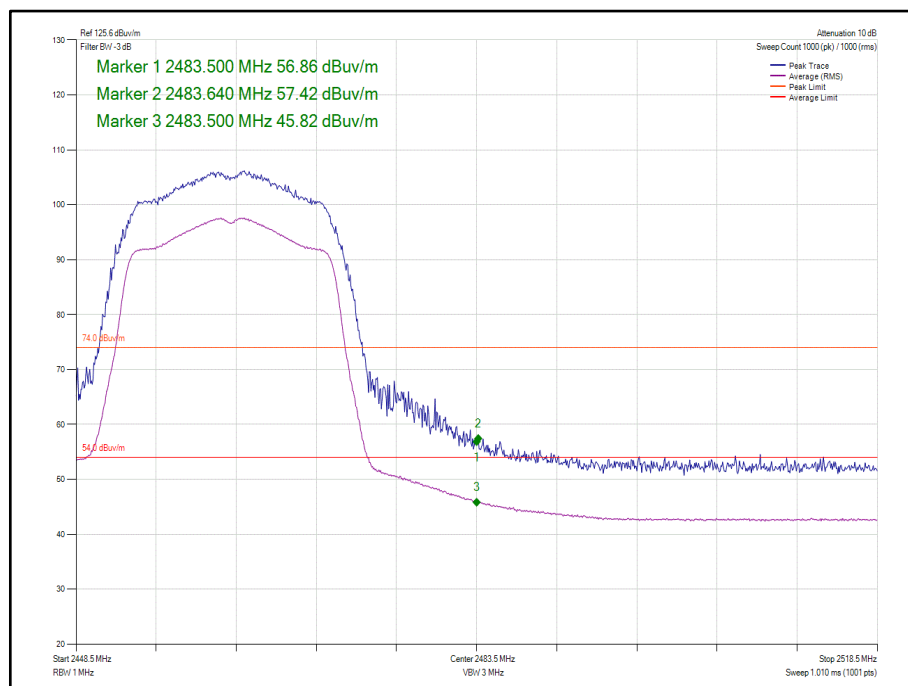
**Figure 133 - 802.11g, Core 1 - 2467 MHz,
Band Edge Frequency 2483.5 MHz**



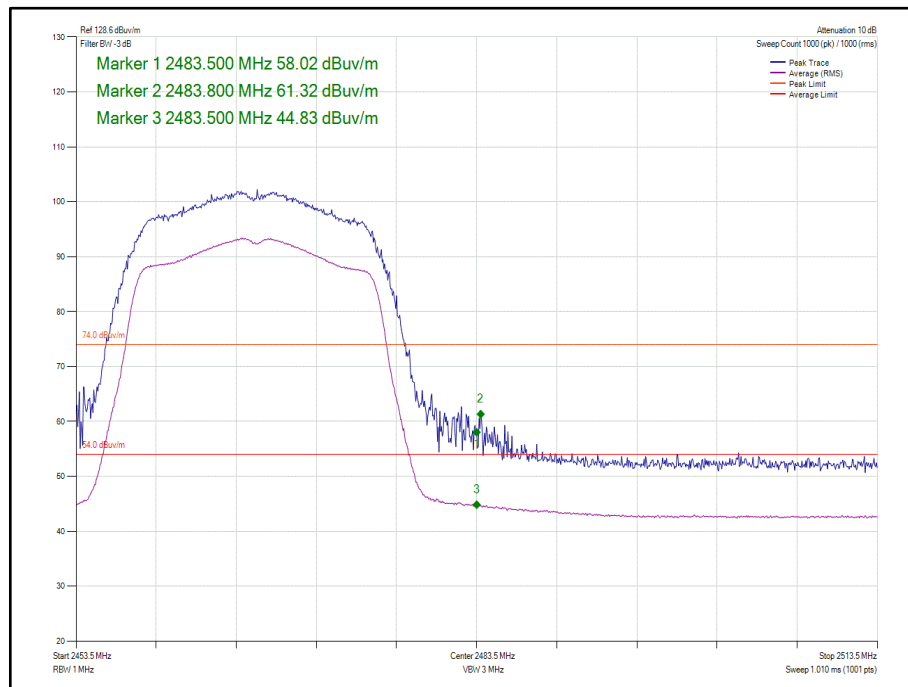
**Figure 134 - 802.11g, Core 1 - 2472 MHz,
Band Edge Frequency 2483.5 MHz**



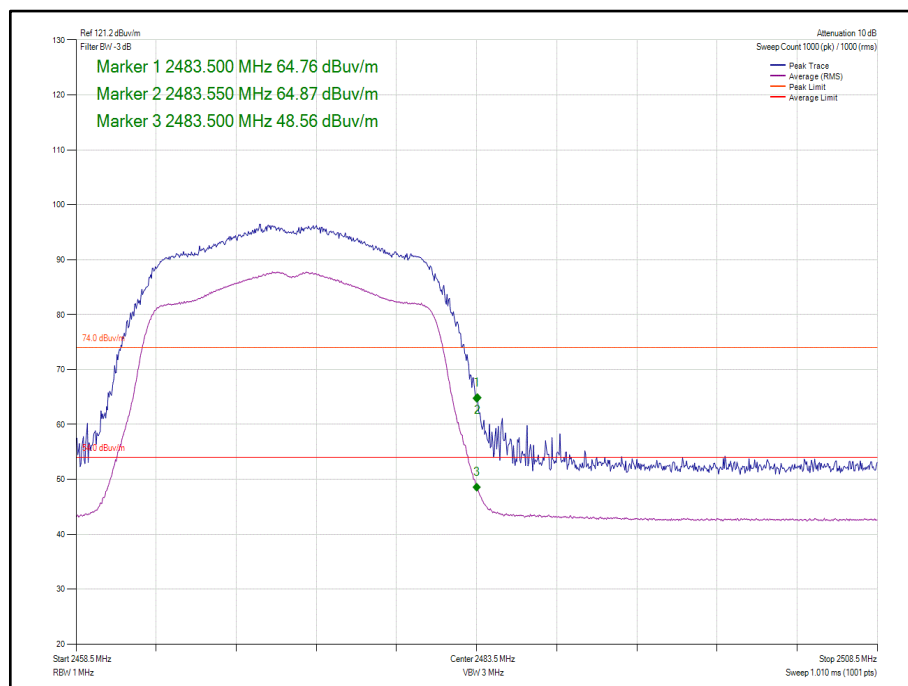
**Figure 135 - 802.11n, HT20, Core 1 - 2412 MHz,
Band Edge Frequency 2390 MHz**



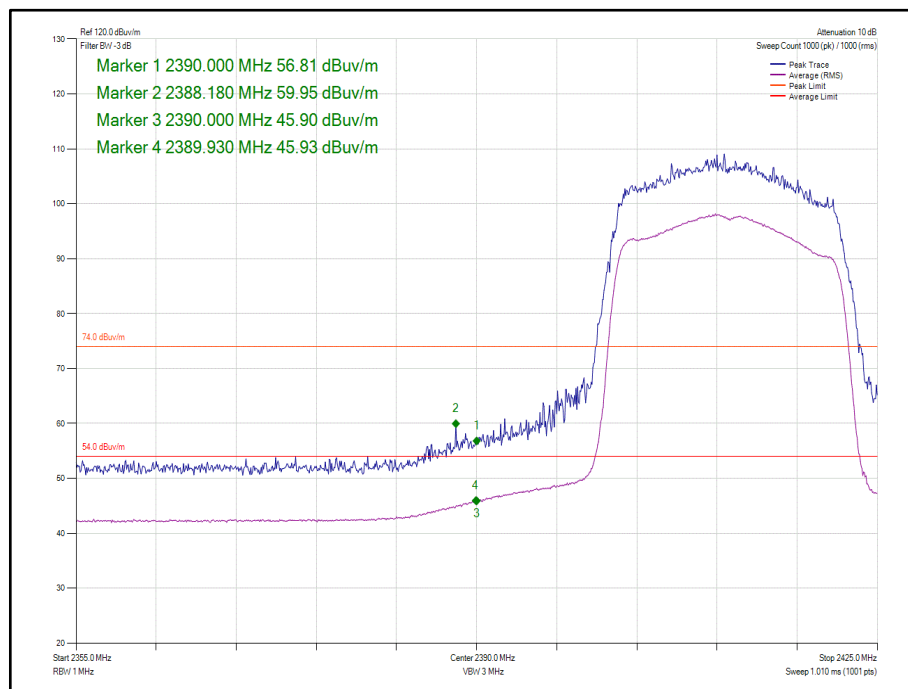
**Figure 136 - 802.11n HT20, Core 1 - 2462 MHz,
Band Edge Frequency 2483.5 MHz**



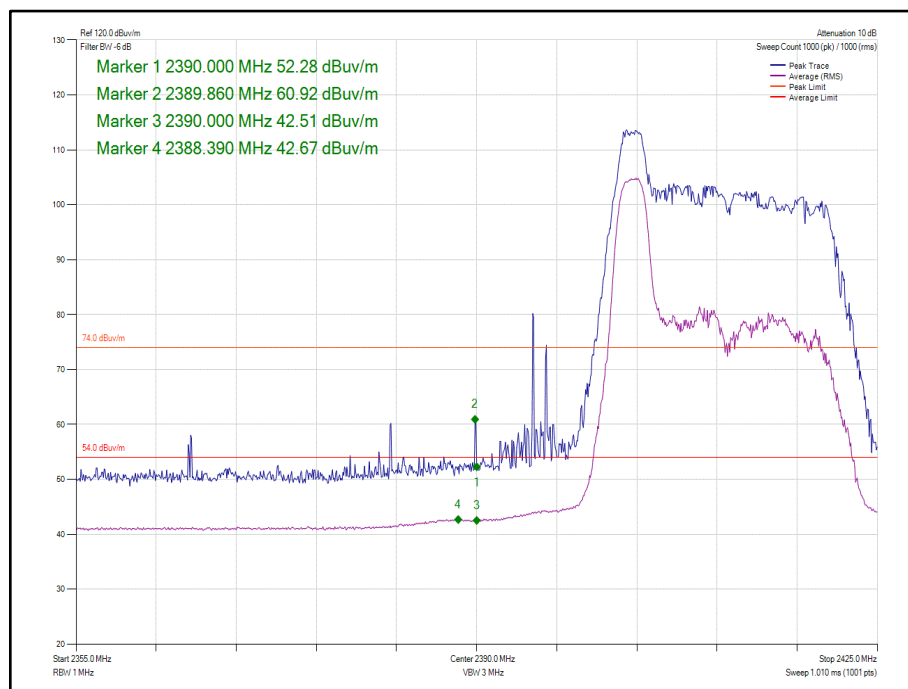
**Figure 137 - 802.11n HT20, Core 1 - 2467 MHz,
Band Edge Frequency 2483.5 MHz**



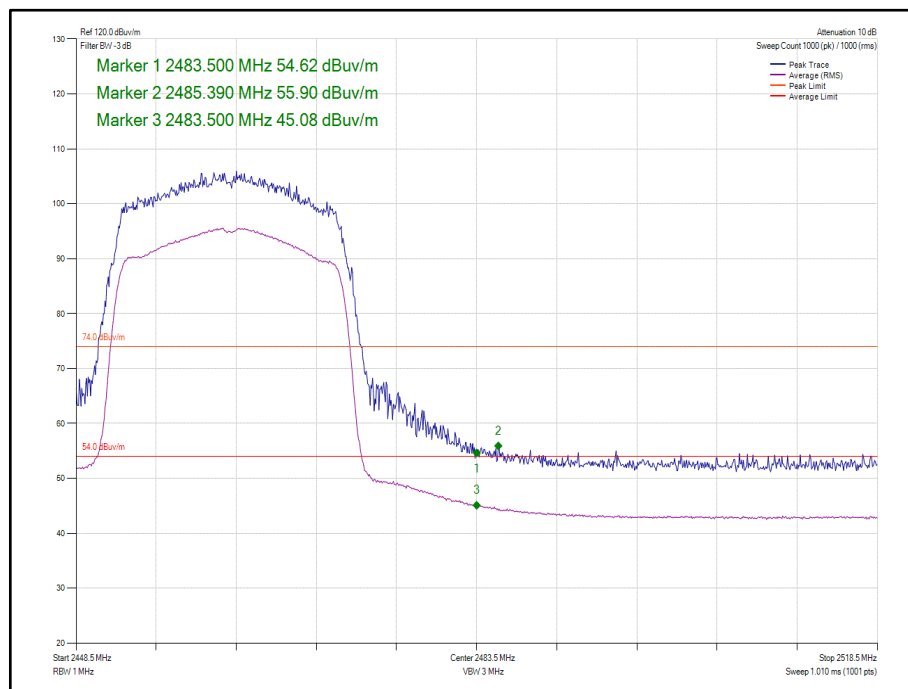
**Figure 138 - 802.11n HT20, Core 1 - 2472 MHz,
Band Edge Frequency 2483.5 MHz**



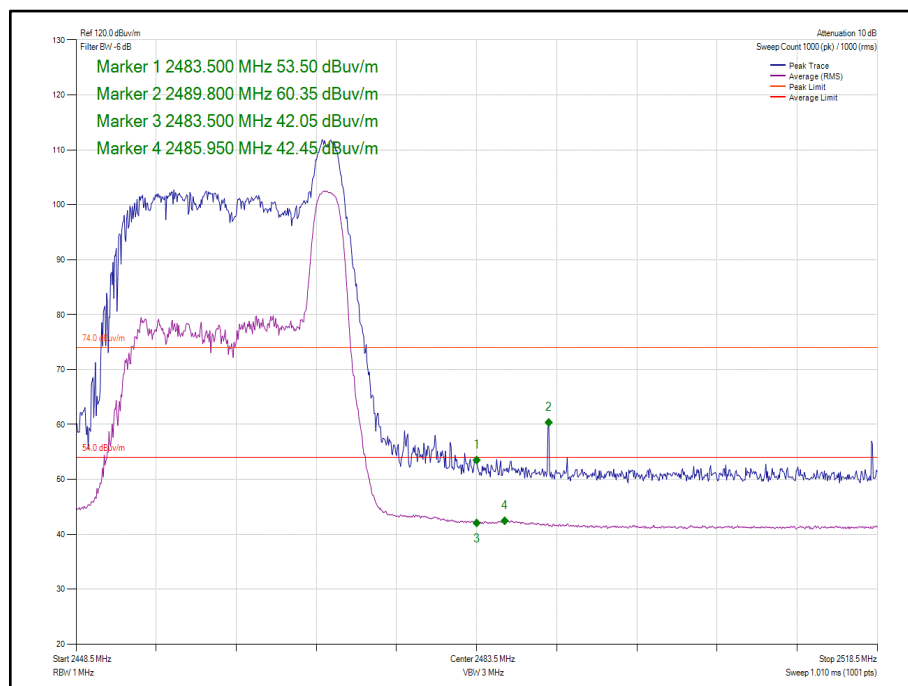
**Figure 139 - 802.11ax HE20, Core 1 SU - 2412 MHz,
Band Edge Frequency 2390 MHz**



**Figure 140 - 802.11ax HE20, Core 1 26-0 - 2412 MHz,
Band Edge Frequency 2390 MHz**



**Figure 141 - 802.11ax HE20, Core 1 SU - 2462 MHz,
Band Edge Frequency 2483.5 MHz**



**Figure 142 - 802.11ax HE20, Core 1 26-8 - 2462 MHz,
Band Edge Frequency 2483.5 MHz**

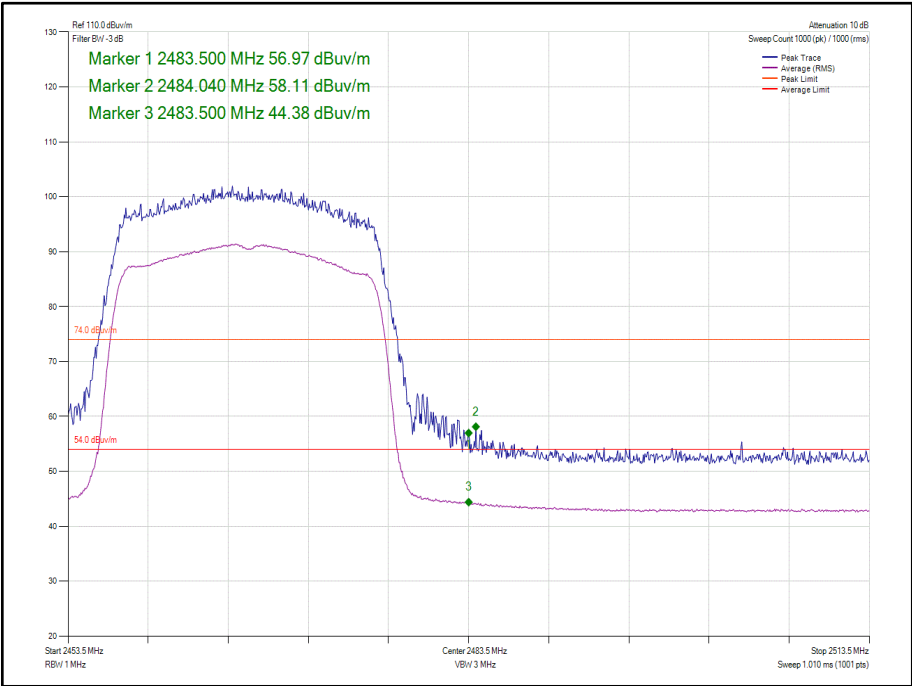


Figure 143 - 802.11ax HE20, Core 1 SU - 2467 MHz,
Band Edge Frequency 2483.5 MHz

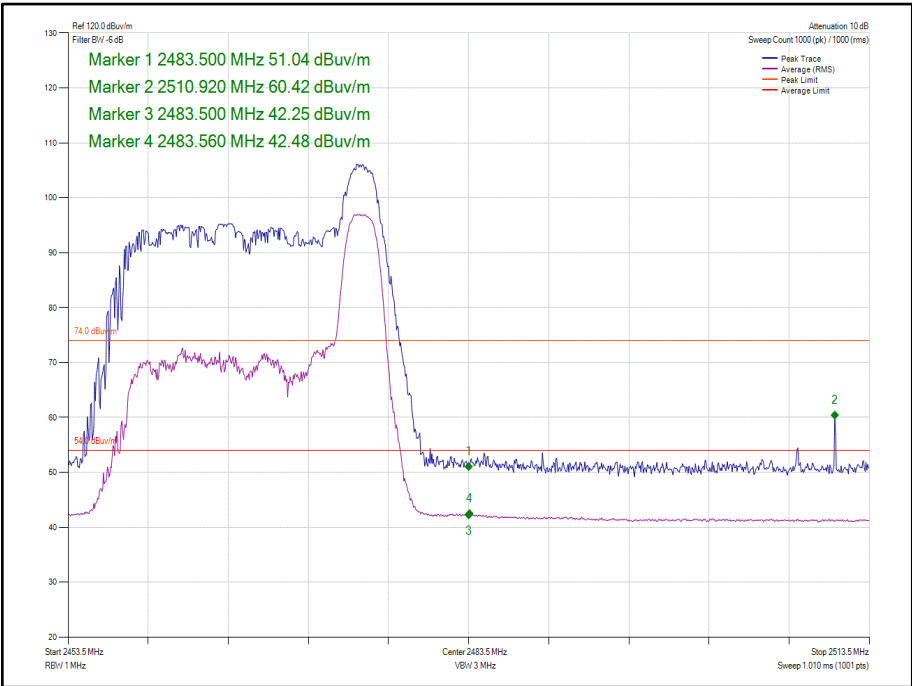


Figure 144 - 802.11ax HE20, Core 1 26-8 - 2467 MHz,
Band Edge Frequency 2483.5 MHz

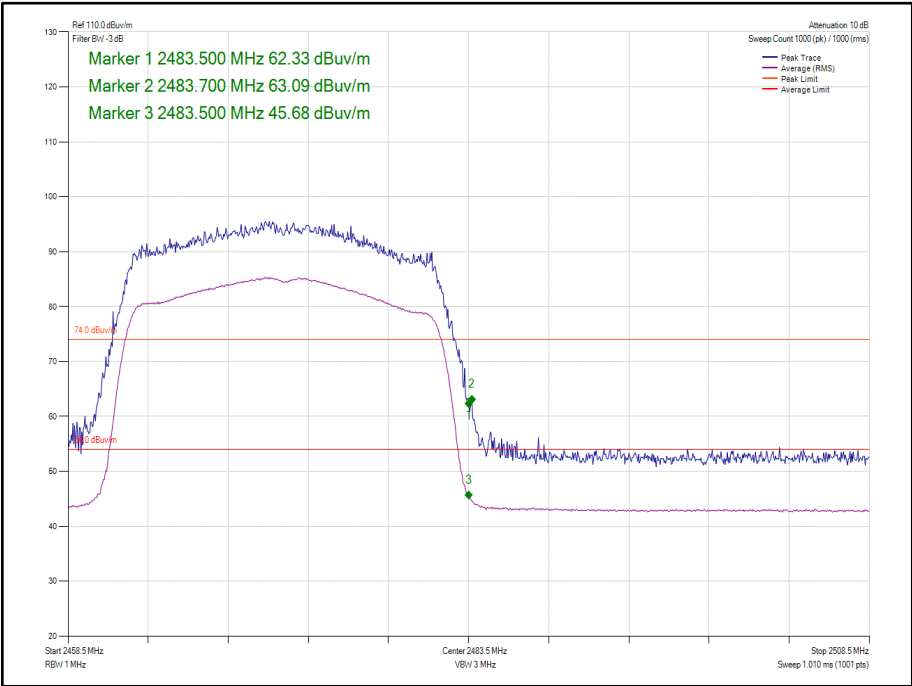


Figure 145 - 802.11ax HE20, Core 1 SU - 2472 MHz,
Band Edge Frequency 2483.5 MHz

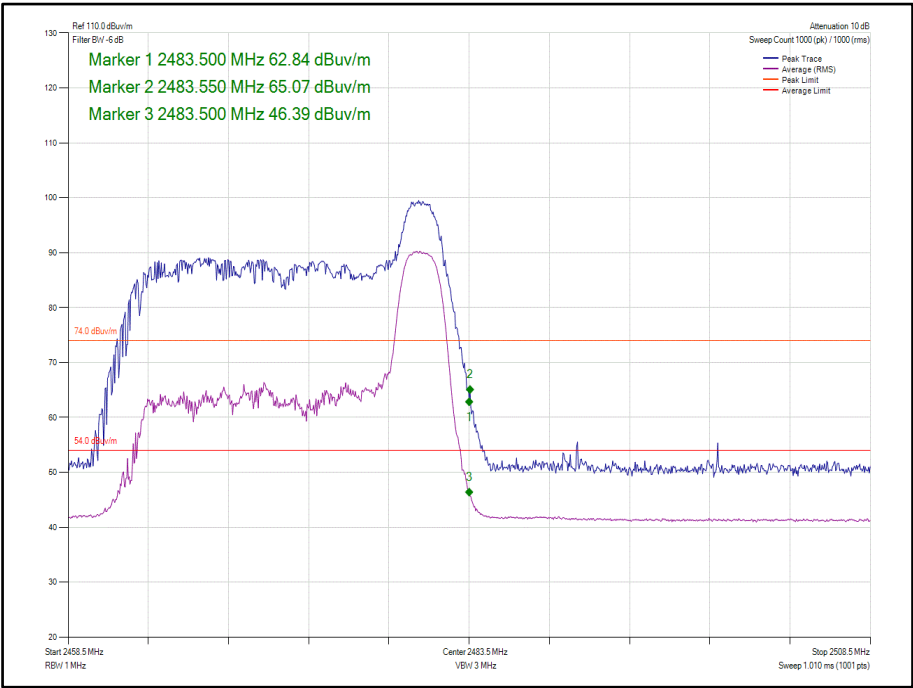


Figure 146 - 802.11ax HE20, Core 1 26-8 - 2472 MHz,
Band Edge Frequency 2483.5 MHz



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	MCS0	-	-	2412	2390.0	58.20	46.14
802.11n HT20, Core 0-1	MCS0	-	-	2462	2483.5	61.68	49.63
802.11n HT20, Core 0-1	MCS0	-	-	2467	2483.5	64.60	47.78
802.11n HT20, Core 0-1	MCS0	-	-	2472	2483.5	66.23	51.43
802.11ax HE20, Core 0-1	MCS0	SU	-	2412	2400.0	60.79	48.08
802.11ax HE20, Core 0-1	MCS0	26	0	2412	2400.0	67.84	45.16
802.11ax HE20, Core 0-1	MCS0	SU	-	2462	2483.5	63.42	51.13
802.11ax HE20, Core 0-1	MCS0	26	8	2462	2483.5	59.04	47.99
802.11ax HE20, Core 0-1	MCS0	SU	-	2467	2483.5	65.79	48.52
802.11ax HE20, Core 0-1	MCS0	26	8	2467	2483.5	62.46	46.18
802.11ax HE20, Core 0-1	MCS0	SU	-	2472	2483.5	67.70	49.29
802.11ax HE20, Core 0-1	MCS0	26	8	2472	2483.5	68.99	50.18

Table 57 – MIMO 2TX Restricted Band Edge Results

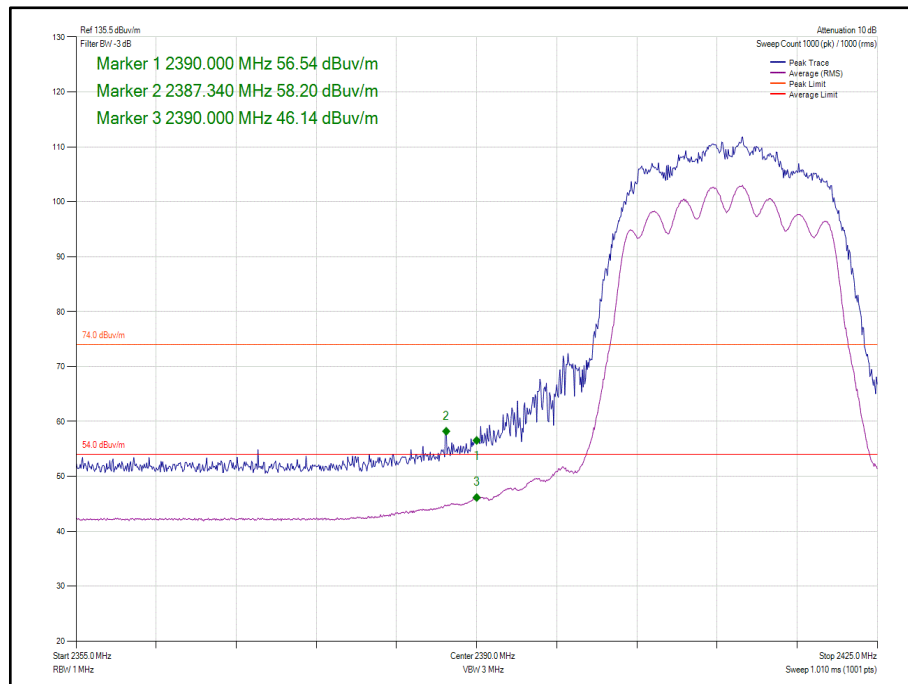
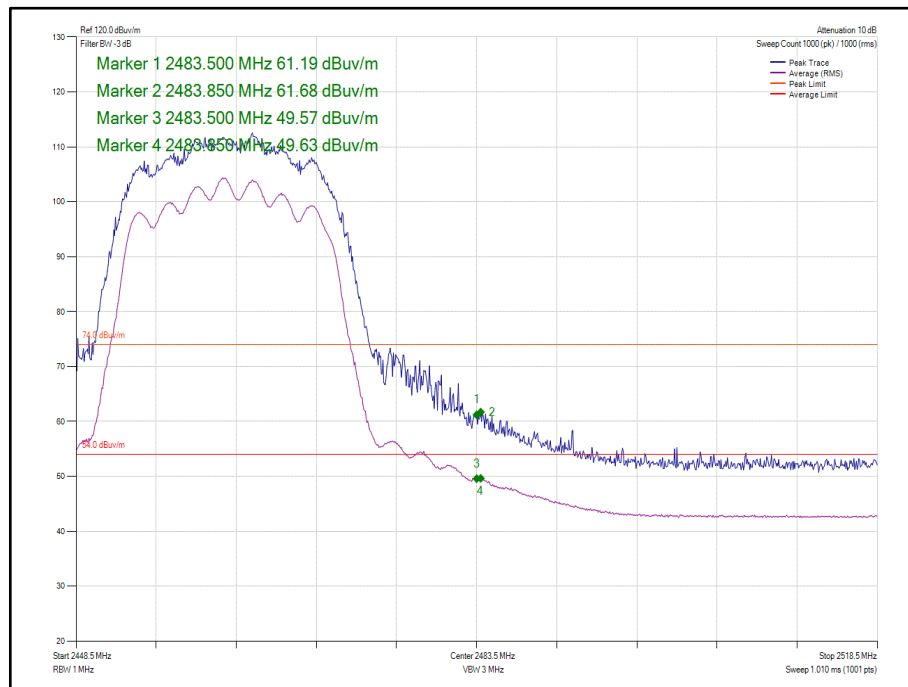
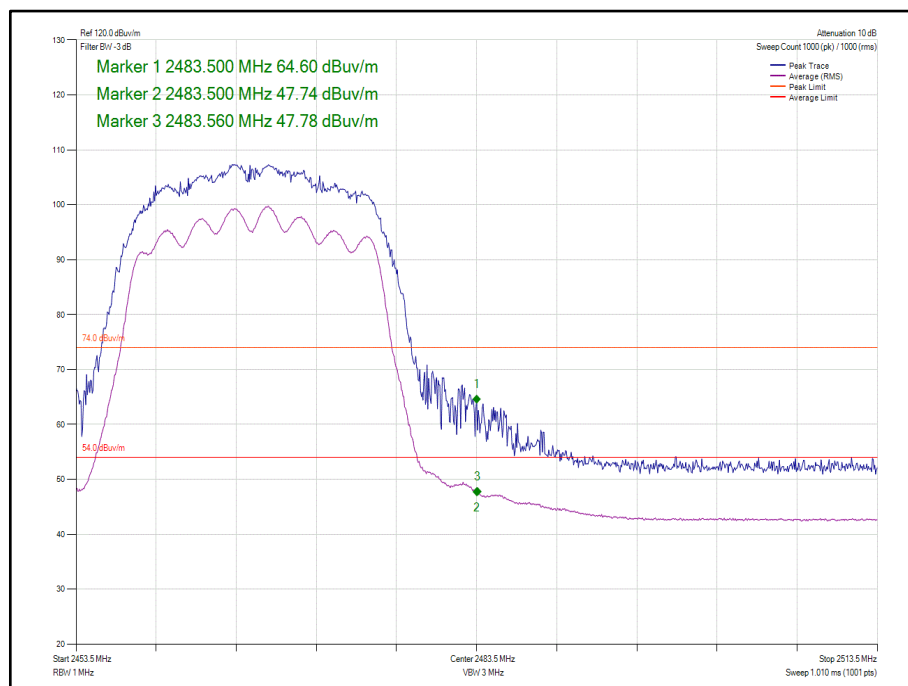


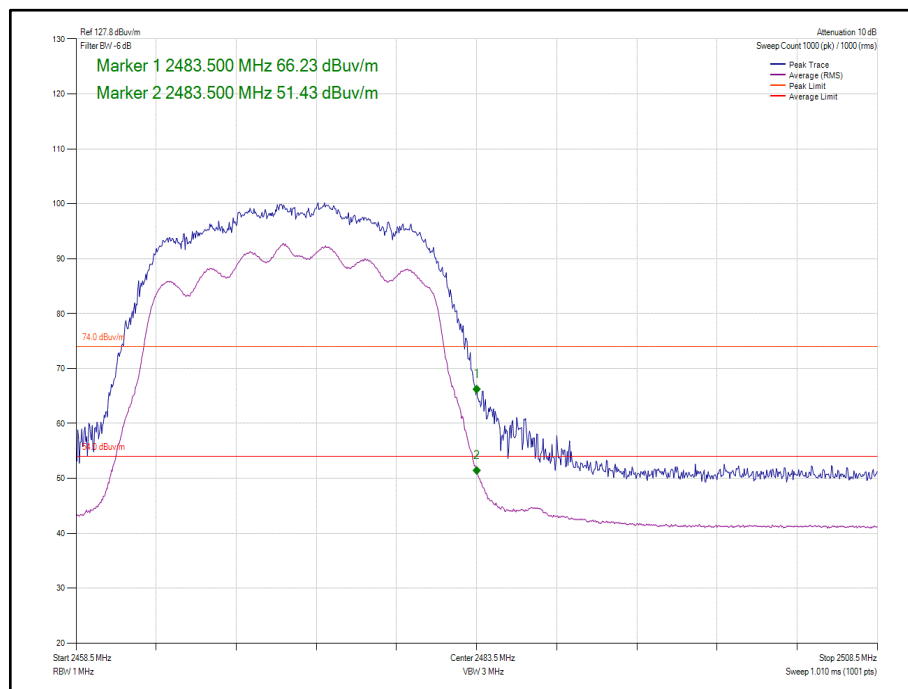
Figure 147 - 802.11n HT20, Core 0-1 - 2412 MHz, Band Edge Frequency 2390 MHz



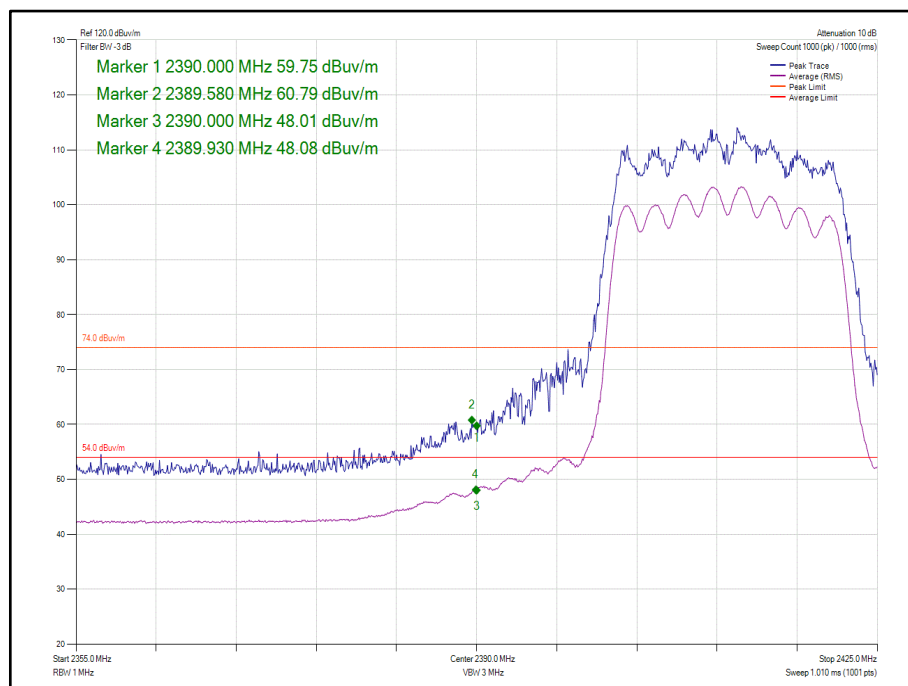
**Figure 148 - 802.11n HT20, Core 0-1 - 2462 MHz,
Band Edge Frequency 2483.5 MHz**



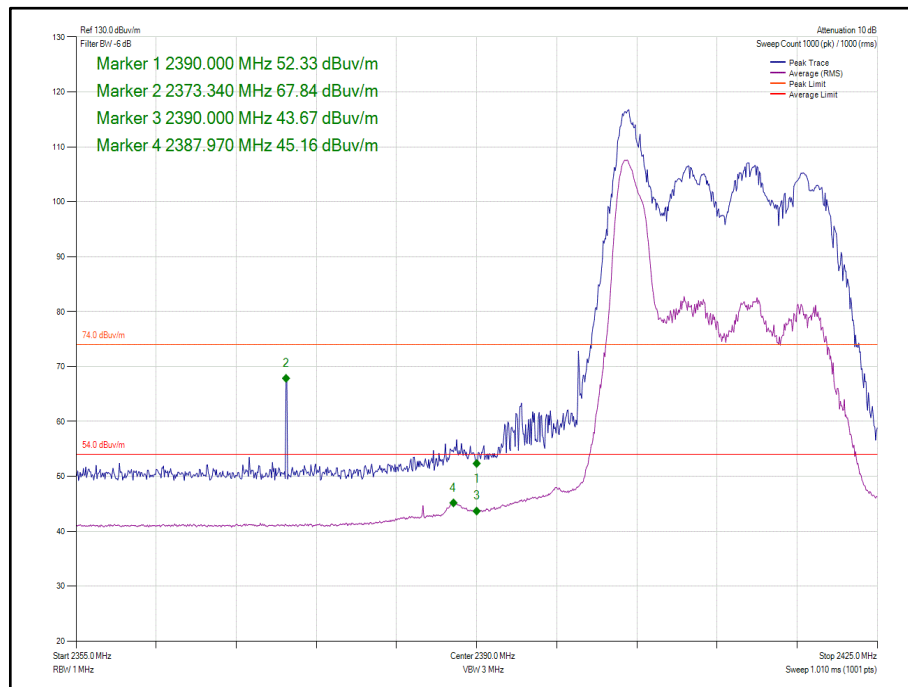
**Figure 149 - 802.11n HT20, Core 0-1 - 2467 MHz,
Band Edge Frequency 2483.5 MHz**



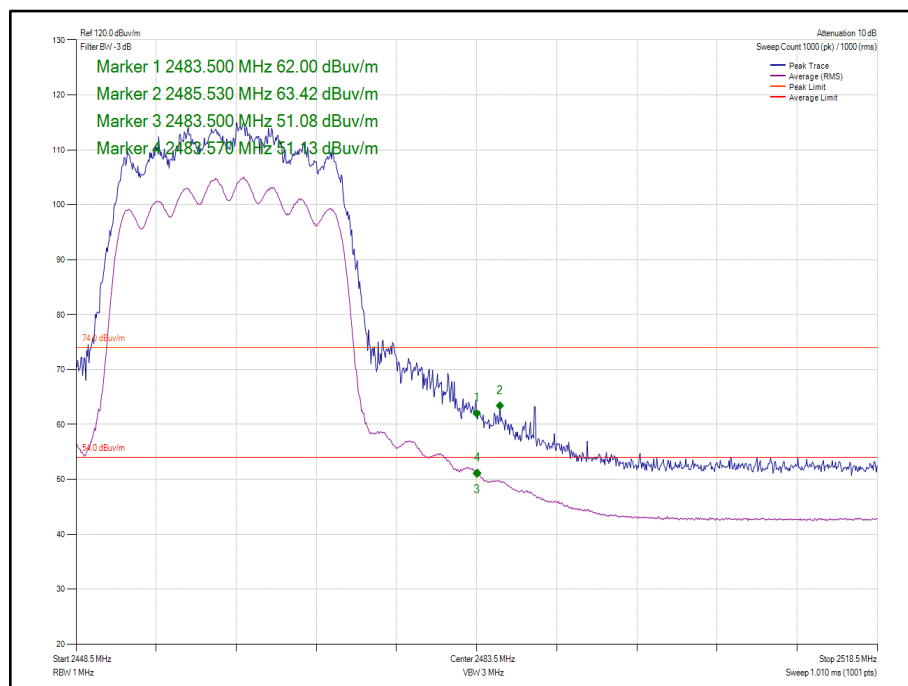
**Figure 150 - 802.11n HT20, Core 0-1 - 2472 MHz,
Band Edge Frequency 2483.5 MHz**



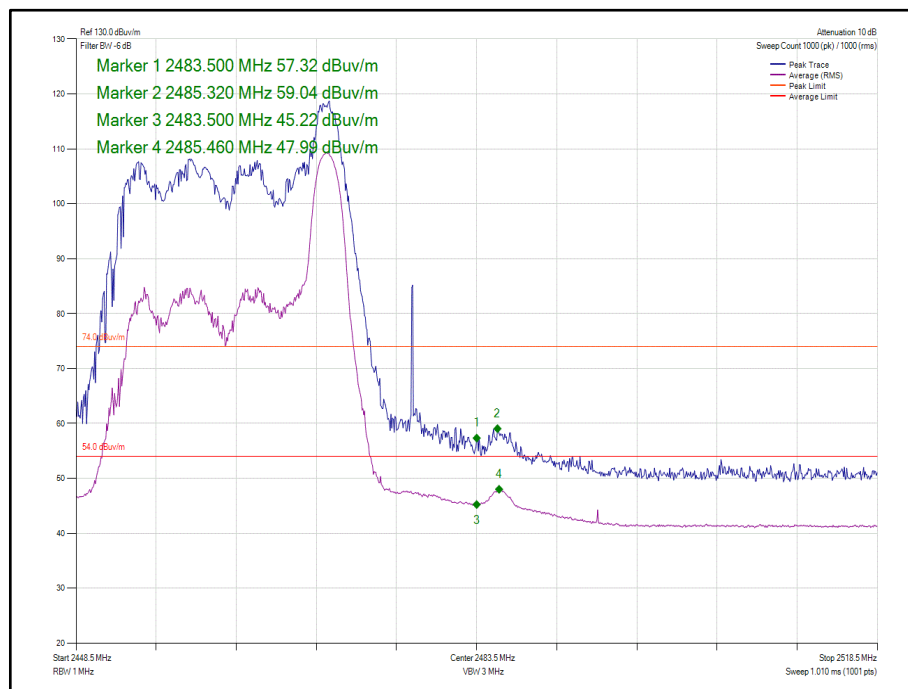
**Figure 151 - 802.11ax HE20, Core 0-1, SU - 2412 MHz,
Band Edge Frequency 2390 MHz**



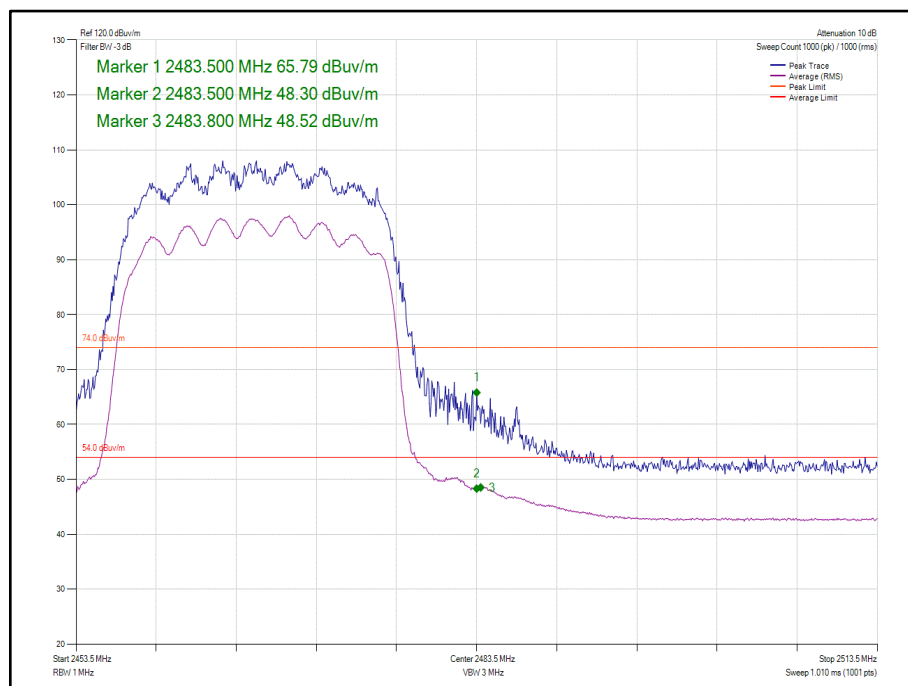
**Figure 152 - 802.11ax HE20, Core 0-1, 26-0 - 2412 MHz,
Band Edge Frequency 2390 MHz**



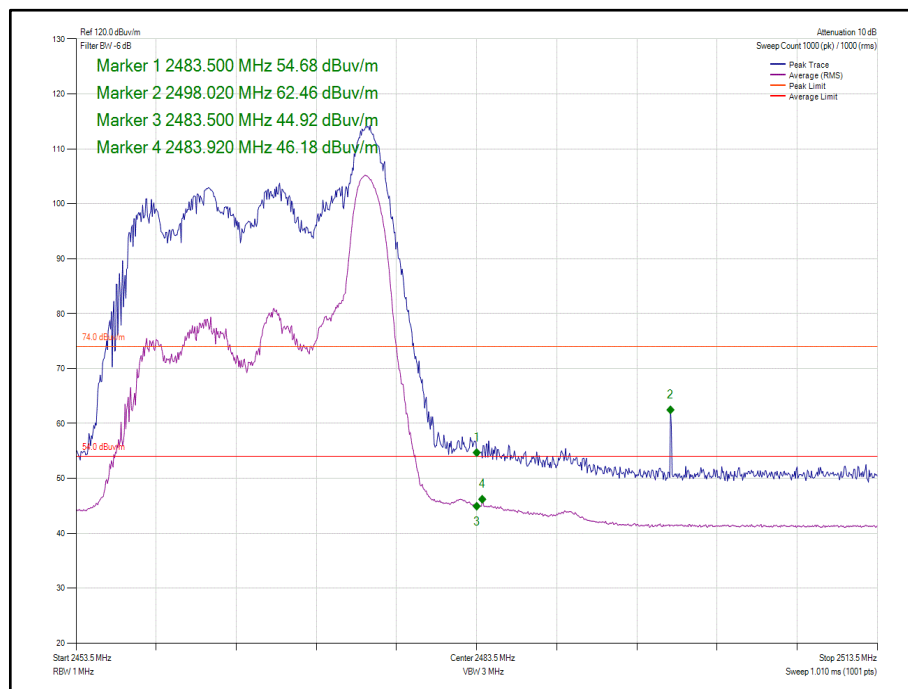
**Figure 153 - 802.11ax HE20, Core 0-1, SU - 2462 MHz,
Band Edge Frequency 2483.5 MHz**



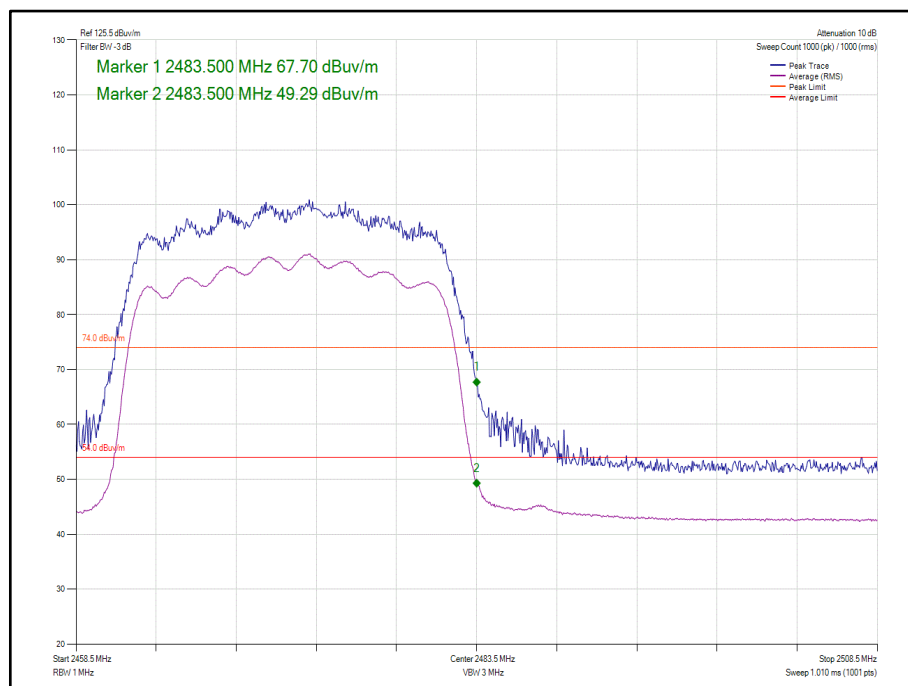
**Figure 154 - 802.11ax HE20, Core 0-1, 26-8 - 2462 MHz,
Band Edge Frequency 2483.5 MHz**



**Figure 155 - 802.11ax HE20, Core 0-1, SU - 2467 MHz,
Band Edge Frequency 2483.5 MHz**



**Figure 156 - 802.11ax HE20, Core 0-1, 26-8 - 2467 MHz,
Band Edge Frequency 2483.5 MHz**



**Figure 157 - 802.11ax HE20, Core 0-1, SU - 2472 MHz,
Band Edge Frequency 2483.5 MHz**

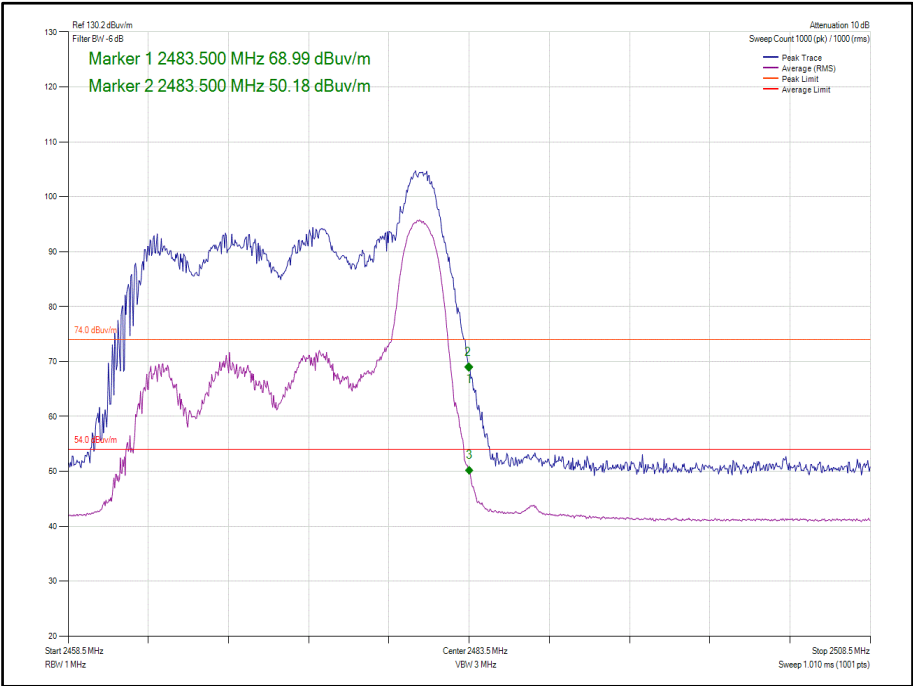


Figure 158 - 802.11ax HE20, Core 0-1, 26-8 - 2472 MHz,
Band Edge Frequency 2483.5 MHz

FCC 47 CFR Part 15, Limit Clause 15.209

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

Table 58

ISED RSS-GEN, Limit Clause 8.9

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

Table 59

*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.



2.6.7 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 Due
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	07-Aug-2020
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	6	09-Jun-2020
Hygrometer	Rotronic	HP21	4989	12	02-May-2020
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	28-Nov-2020
8m N-Type RF Cable	Teledyne	PR90-088-8MTR	5092	12	06-Dec-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5102	12	06-Oct-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5104	12	09-Dec-2020
Cable (18 GHz)	Rosenberger	LU7-071-2000	5107	12	06-Oct-2020
EmX Emissions Software	TUV SUD	EmX	5125	-	Software
Screened Room (11)	Rainford	Rainford	5136	36	01-Nov-2021
Mast	Maturo	TAM 4.0-P	5158	-	TU
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	10-Mar-2021
Pre Amp 1 - 26.5 GHz	Agilent Technologies	8449B	5445	-	O/P Mon

Table 60

TU - Traceability Unscheduled

O/P Mon – Output Monitored Using Calibrated Test Equipment



3 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Maximum Conducted Output Power	± 3.2 dB
Power Spectral Density	± 3.2 dB
Emission Bandwidth	± 37.759 kHz
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
Restricted Band Edges	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB

Table 61

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.