FCC and ISED Test Report

Apple Inc
Model: A2681

In accordance with FCC 47 CFR Part 15E, ISED RSS-247 and ISED RSS-GEN (5 GHz WLAN)

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

FCC ID: BCGA2681 IC: 579C-A2681

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Phil Harrison Digitally signed by Phil Harrison Date: 2022.05.11 15:05:35 +01'00'

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Document 75954421-12 Issue 01

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Phil Harrison	Senior Engineer	Authorised Signatory	04 May 2022

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

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15E, 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
Report Generation	Hollie Marshall	04 May 2022	

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

ISED Accreditation
12669A Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15E: 2020, ISED RSS-247: Issue 2 (2017-02 and ISED RSS-GEN: Issue 5 (2018-04) + A2 (2021-02) 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	04 May 2022

Table 1

1.2 Introduction

Applicant	Apple Inc
Manufacturer	Apple Inc
Model Number(s)	A2681
Serial Number(s)	WDFNWR14Q4, TN4J7KWW5H, DQH576VJ7N, FMWFWQ0N1W, MW4P32N6T0 and T60JJCR4F6
Hardware Version(s)	REV 1.0
Software Version(s)	21F12, 21E71860f, 21E61410w, 21E61410w, 21E71860f and 21F15
Number of Samples Tested	6
Test Specification/Issue/Date	FCC 47 CFR Part 15E: 2020 ISED RSS-247: Issue 2 (2017-02) ISED RSS-GEN: Issue 5 (2018-04) + A2 (2021-02)
Order Number	0540246998
Date of Receipt of EUT	08-February-2022
Start of Test	08-February-2022
Finish of Test	22-April-2022
Name of Engineer(s)	Mohammad Malik, Colin Brain, Ian Hart, Liang Tian, Faisal Malyar, Ahmad Javid, Thomas Biddlecombe, Nandhini Mathivanan and Daniel Cameron
Related Document(s)	ANSI C63.10 (2013) KDB 662911 D01 v02r01 KDB 905462 D02 v02 KDB 789033 D02 v02r01

1.3 Brief Summary of Results

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

Section	Specification Clause			Test Description	Result	Comments/Base Standard
	Part 15E	RSS-247	RSS-GEN			
Configuration and Mode: 5 GHz WLAN						
-	15.203	-	-	Antenna Requirement	N/T	The devices complies with the provisions of this section, as it uses permanently attached antennas
2.1	15.205	-	8.10	Restricted Band Edges	Pass	
2.2	15.407 (a)	6.2	-	Maximum Conducted Output Power	Pass	
2.3	15.407 (a)	6.2	-	Maximum Conducted Power Spectral Density	Pass	
2.4	15.407 (a)	6.2	-	Emission Bandwidth	Pass	
2.5	15.407 (b)	6.2	-	Authorised Band Edges	Pass	
2.6	15.407 (b) and 15.209	6.2 and 6.13	8.9	Spurious Radiated Emissions		
2.7	15.407 (h)(2)(iii)(iv)	6.3.2(c)(d)(e)	-	Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period	Pass	
Configuration and Mode: 5 GHz WLAN - Client to Client						
2.7	15.407 (h)(2)(iii)(iv)	6.3.2(c)(d)(e)	-	Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period	Pass	

Table 2

1.4 Product Information

1.4.1 Technical Description

The equipment under test was an Apple laptop computer with Bluetooth® and IEEE 802.11 a/b/g/n/ac/ax Wi-Fi in the 2.4 GHz and 5 GHz bands.

1.4.2 Test Modes

The EUT's 5 GHz 802.11 radio supported Single Input/Single Output (SISO) and 2x2 MIMO (Multiple Input/Multiple Output) modes. 802.11a supports 20 MHz bandwidth only. 802.11n supported 20 MHz and 40 MHz bandwidths and 802.11ac, and ax supported 20 MHz, 40 MHz and 80 MHz bandwidths.

802.11a mode supported SISO operation only. 802.11n and ac supported SISO, Cyclic Delay Diversity (CDD), Space Division Multiplexing (SDM) and Transmit Beamforming (TxBF) MIMO modes. 802.11ax supported SISO, CDD and SDM modes.

The EUT supported 802.11ax Single User (SU) operation in all bands. 802.11ax Multi-User (MU) was supported, however in U-NII-2A and U-NII-2C bands this was limited to Resource Unit (RU) sizes of 52 subcarriers or greater. In U-NII-1 and U-NII-3 MU modes were additionally supported for 26 subcarriers.

The EUT uses different output powers per core dependent on how many cores are used. The EUT also uses different power tables for Cyclic Delay Diversity (CDD), Space Division Multiplexing (SDM), and transmit beamforming (TxBF) modes. Preliminary results were performed to determine the worst-case modes for testing. 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 differ.

US and CA country codes changed the power table used for U-NII band 1. Therefore U-NII-1 channels were tested using both power settings for each country’s respective limits.

Band edge tests were performed with multiple modulation types, with only the worst-cases reported. After band edge and additional preliminary investigations were performed to find worst-case operation, the EUT was tested in the following modes:

Spurious Radiated Emissions

SISO Mode (5 GHz Core 0):

- 802.11a – 6 Mbps

SISO Mode (5 GHz Core 1):

- 802.11a – 6 Mbps

2x2 MIMO Modes (Core 0+1 for U-NII-1 / 2A / 2C / 3):

- 802.11ac VHT20 – CDD (MCS0),
- 802.11ax HE20 MU RU26, RU52, SU – CDD (MCS0)

Maximum Conducted Output Power/PSD & Emission Bandwidth

SISO Modes (5 GHz Core 0 for U-NII-1 and Core1 for U-NII-2A / 2C / 3):

- 802.11a – 12 Mbps
- 802.11n HT20 – MCS2
- 802.11n HT40 – MCS2
- 802.11ac VHT80 - MCS2x1
- 802.11ax HE20 SU – MCS2x1
- 802.11ax HE40 SU – MCS2x1
- 802.11ax HE80 SU – MCS2x1
- 802.11ax HE20 MU RU26, RU52, RU106 – MCS2x1
- 802.11ax HE40 MU RU26, RU52, RU106 – MCS2x1
- 802.11ax HE80 MU RU26, RU52, RU106 – MCS2x1

2x2 MIMO Modes (Core 0+1 for U-NII-1 / 2A / 2C / 3):

- 802.11n/ac ((V)HT20* - CDD (MCS2), SDM (MCS10) and TxBF (MCS2)
- 802.11n/ac (V)HT40* - CDD (MCS2), SDM (MCS10) and TxBF (MCS2)
- 802.11ac VHT80 – CDD (MCS2x1), SDM (MCS2x1) and TxBF (MCS2x1)
- 802.11ax HE20 SU – CDD (MCS2x1) and SDM (MCS2x2)
- 802.11ax HE40 SU – CDD (MCS2x1) and SDM (MCS2x2)
- 802.11ax HE80 SU – CDD (MCS2x1) and SDM (MCS2x2)
- 802.11ax HE20 MU RU26, RU52, RU106 – CDD (MCS2x1) and SDM (MCS2x2)
- 802.11ax HE40 MU RU26, RU52, RU106 – CDD (MCS2x1) and SDM (MCS2x2)
- 802.11ax HE80 MU RU26, RU52, RU106 – CDD (MCS2x1) and SDM (MCS2x2)

Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period tests were limited to 802.11ac VHT80.

* = 802.11n HT modes were used for CDD and SDM and 802.11ac VHT modes were used for TxBF modes.

Reduced output power is used on the narrower 802.11ax multi-user (MU) modes to meet PSD and Band Edge limits. Therefore, only single user (SU) modes are reported for output power tests since these are always worst-case. All SU modes are reported for PSD and applicable MU modes of RU sizes of 26 to 106 subcarriers.

1.4.3 Test Setup

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 transmit beamforming (TxBF) modes the EUT was set up communicating with a support notebook computer provided by the applicant, configured with custom commands to act as an access point. The test laptop was also set to a low output power (approximately 0 dBm) so in conjunction with the rest of the set-up configuration, would give negligible power at the measuring equipment and would not affect the test result. The support laptop's test network set the channel and bandwidth to which the EUT could connect. The EUT then set up a communications link to the support laptop, operating in normal communications mode but with beamforming modes forced on, with auto rate and TPC disabled via terminal commands so the EUT could be limited to worst-case modes. The EUT transmit duty cycle was then maximized by using iPerf bandwidth testing software to keep the transmit output buffer full and generate more traffic from the EUT to the support laptop than the link could sustain. The EUT therefore could fully operate its beamforming mode but with strictly controlled test parameters.

For all other testing except DFS 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.

The test setup used for DFS is described in the test result section of the present document.

1.4.4 Antenna Gain Table (5 GHz WLAN)

Antenna Port	Frequency Range (MHz)	Peak Gain (dBi)	Conducted Cable Loss (dB)
Core 0	5150 to 5250	6.98	1.50
	5250 to 5350	7.28	1.60
	5470 to 5725	6.70	1.60
	5725 to 5850	5.36	1.60
Core 1	5150 to 5250	5.47	1.50
	5250 to 5350	7.47	1.60
	5470 to 5725	6.78	1.60
	5725 to 5850	7.23	1.60

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: A2681, Serial Number: WDFNWR14Q4			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A2681, Serial Number: TN4J7KWW5H			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A2681, Serial Number: MW4P32N6T0			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A2681, Serial Number: DQH576VJ7N			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A2681, Serial Number: FMWFWQ0N1W			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A2681, Serial Number: T60JJCR4F6			
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: 5 GHz WLAN		
Restricted Band Edges	Mohammad Malik, Colin Brain, Ian Hart, Liang Tian, Faisal Malyar and Ahmad Javid	UKAS
Maximum Conducted Output Power	Thomas Biddlecombe and Daniel Cameron	UKAS
Maximum Conducted Power Spectral Density	Thomas Biddlecombe and Daniel Cameron	UKAS
Emission Bandwidth	Thomas Biddlecombe and Daniel Cameron	UKAS
Authorised Band Edges	Mohammad Malik, Colin Brain, Ian Hart, Liang Tian, Faisal Malyar and Ahmad Javid	UKAS
Spurious Radiated Emissions	Ian Hart, Colin Brain, Mohammad Malik and Faisal Malyar	UKAS
Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period	Nandhini Mathivanan	UKAS
Configuration and Mode: 5 GHz WLAN - Client to Client		
Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period	Nandhini Mathivanan	UKAS

Table 5

Office Address:

TÜV SÜD
Octagon House
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PO15 5RL
United Kingdom

2 Test Details

2.1 Restricted Band Edges

2.1.1 Specification Reference

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

2.1.2 Equipment Under Test and Modification State

A2681, S/N: DQH576VJ7N - Modification State 0
A2681, S/N: FMWFWQ0N1W - Modification State 0

2.1.3 Date of Test

08-February-2022 to 21-February-2022

2.1.4 Test Method

Restricted Band Edge measurements were performed with the device operating in SISO and MIMO modes across the various modes supported by the device.

The measurements displayed within this report have been limited to those modes which have been shown to be worst case.

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

Further measurements are held on file by TÜV SÜD and are available if required.

2.1.5 Environmental Conditions

Ambient Temperature	19.2 - 25.8 °C
Relative Humidity	24.2 - 43.1 %

2.1.6 Test Results

5 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)
802.11a, Core 0	12 Mbps	-	-	5180	5150	63.12	50.94
802.11n HT20, Core 0	MCS 7	-	-	5180	5150	67.89	50.62
802.11ax HE20, Core 0	MCS 2x1	SU	-	5180	5150	63.77	50.82
802.11ax HE20, Core 0	MCS 11x1	26	0	5180	5150	59.78	47.34
802.11a, Core 1	12 Mbps	-	-	5320	5350	63.92	50.99
802.11n HT20, Core 1	MCS 4x1	-	-	5320	5350	64.86	50.80
802.11ax HE20, Core 1	MCS 2x1	SU	-	5320	5350	63.60	50.99
802.11ax HE20, Core1	MCS 11x1	52	40	5320	5350	61.37	48.44
802.11a, Core 1	54 Mbps	-	-	5500	5460	62.49	48.82
802.11n HT20, Core 1	MCS 7x1	-		5500	5460	67.61	49.32
802.11ax HE20, Core 1	MCS 4x1	SU	-	5500	5460	67.16	50.32
802.11ax HE20, Core 1	MCS 11	52	37	5500	5460	57.94	46.51

Table 6 - 20 MHz Bandwidth (SISO) Restricted Band Edge Results

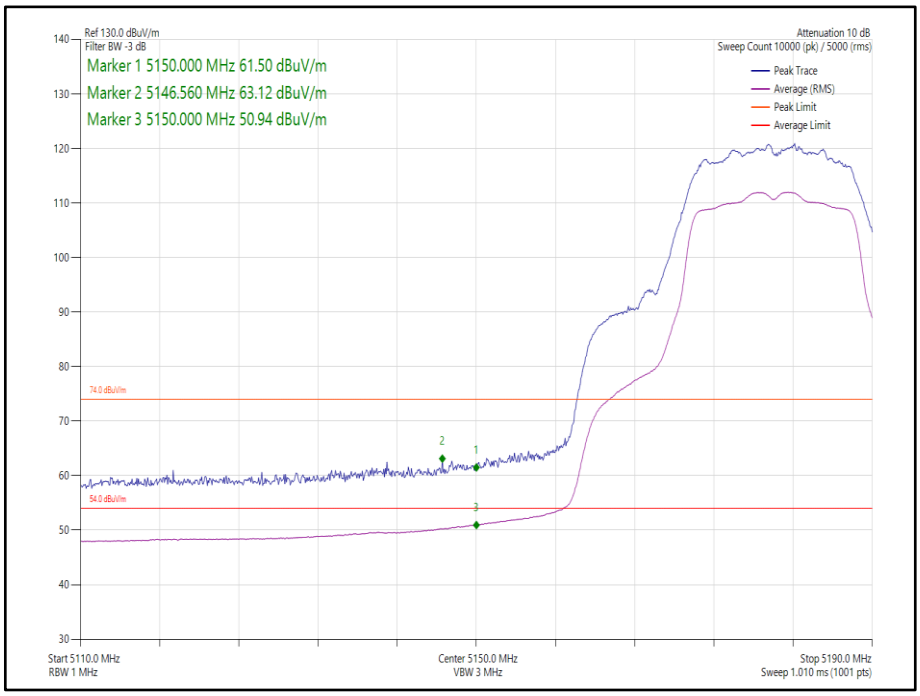

Figure 1 - 802.11a, Core 0 - 5180 MHz, Band Edge Frequency 5150 MHz

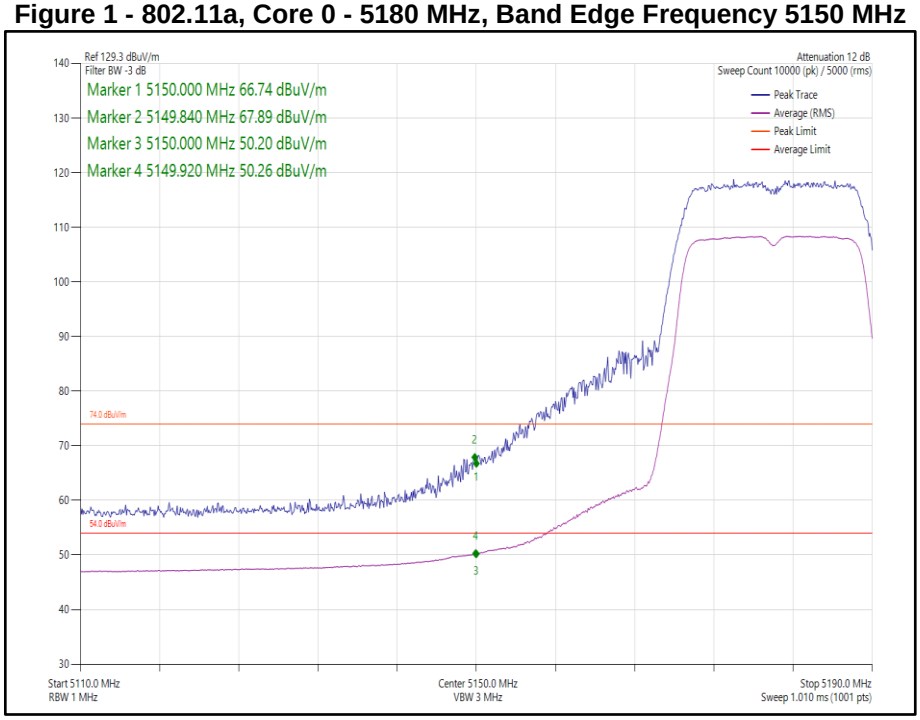

Figure 2 - 802.11n HT20, Core 0 - 5180 MHz, Band Edge Frequency 5150 MHz

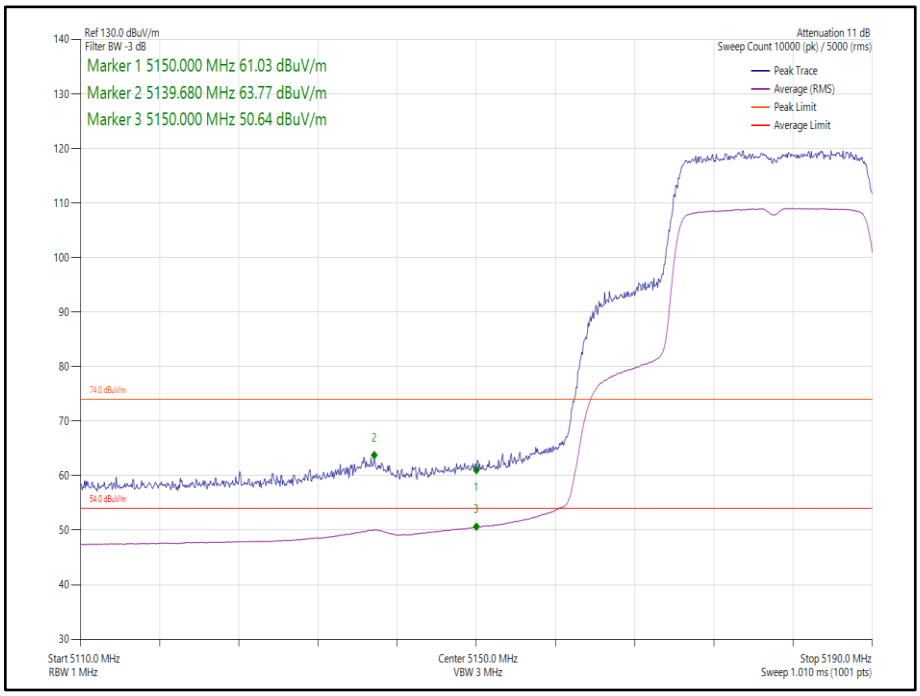

Figure 3 - 802.11ax HE20, Core 0, SU - 5180 MHz, Band Edge Frequency 5150 MHz

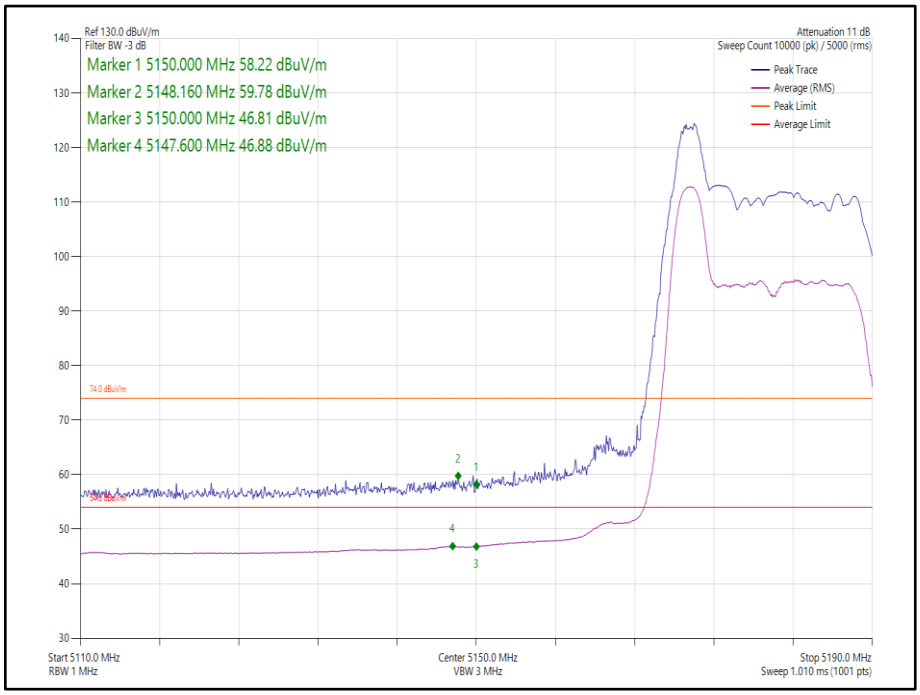

Figure 4 - 802.11ax HE20, Core 0, RU26-0 - 5180 MHz, Band Edge Frequency 5150 MHz

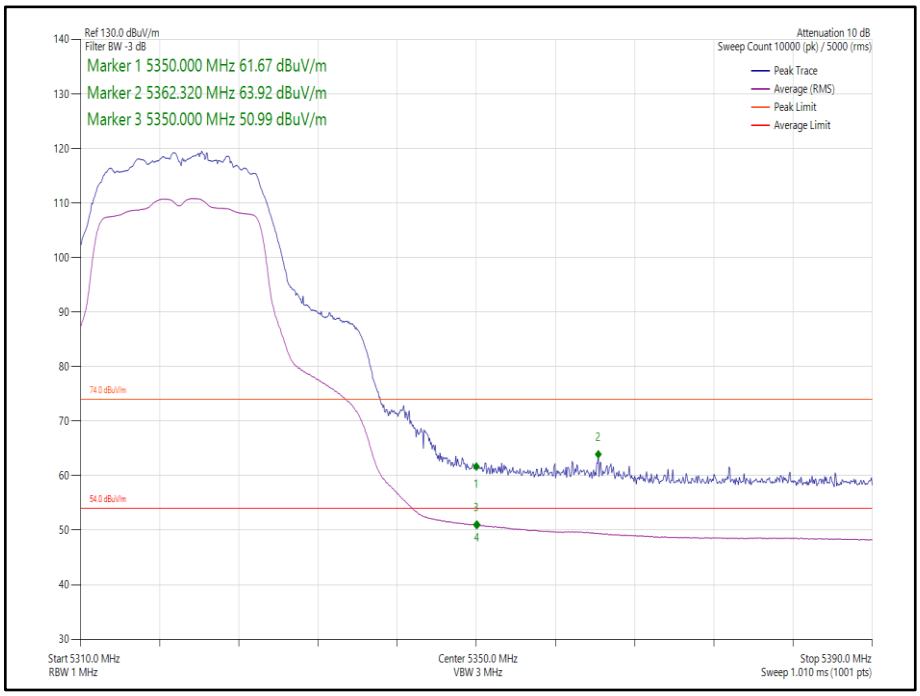

Figure 5 - 802.11a, Core 1 - 5320 MHz, Band Edge Frequency 5350 MHz

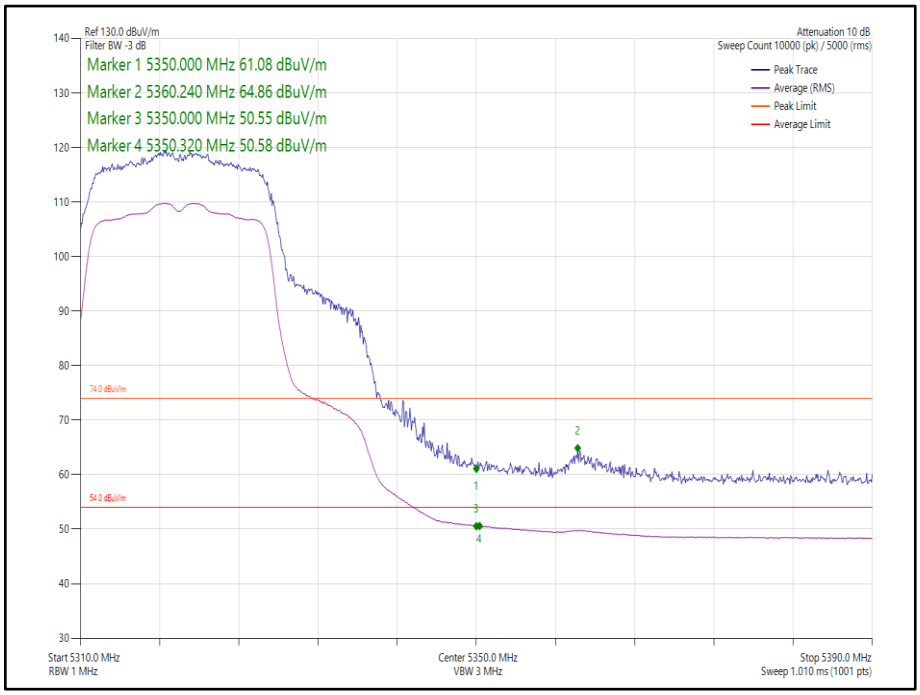

Figure 6 - 802.11n HT20, Core 1 - 5320 MHz, Band Edge Frequency 5350 MHz

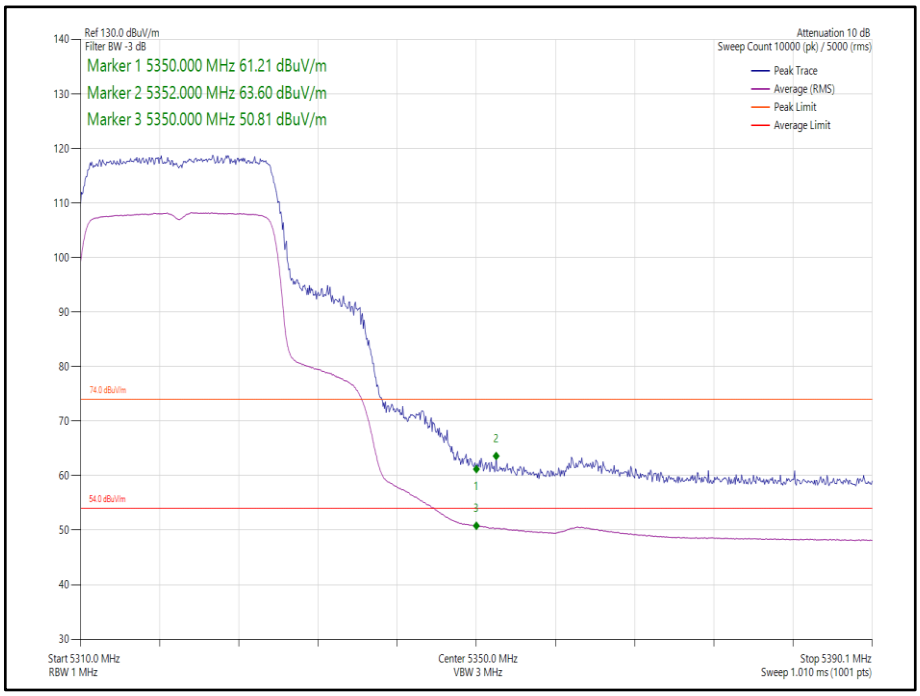

Figure 7 - 802.11ax HE20, Core 1, SU - 5320 MHz, Band Edge Frequency 5350 MHz

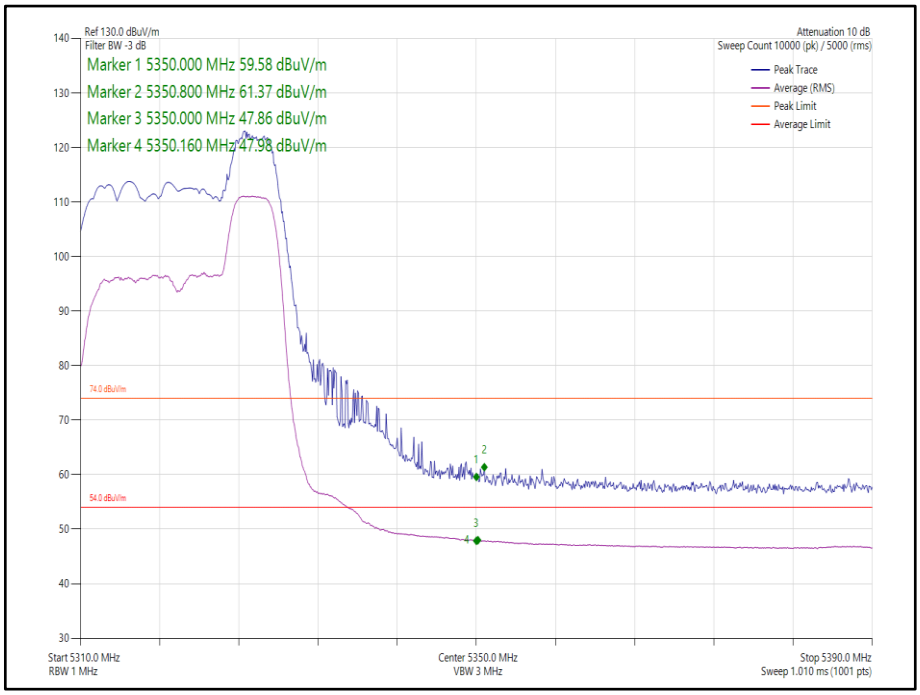

Figure 8 - 802.11ax HE20, Core 1, RU52-40 - 5320 MHz, Band Edge Frequency 5350 MHz

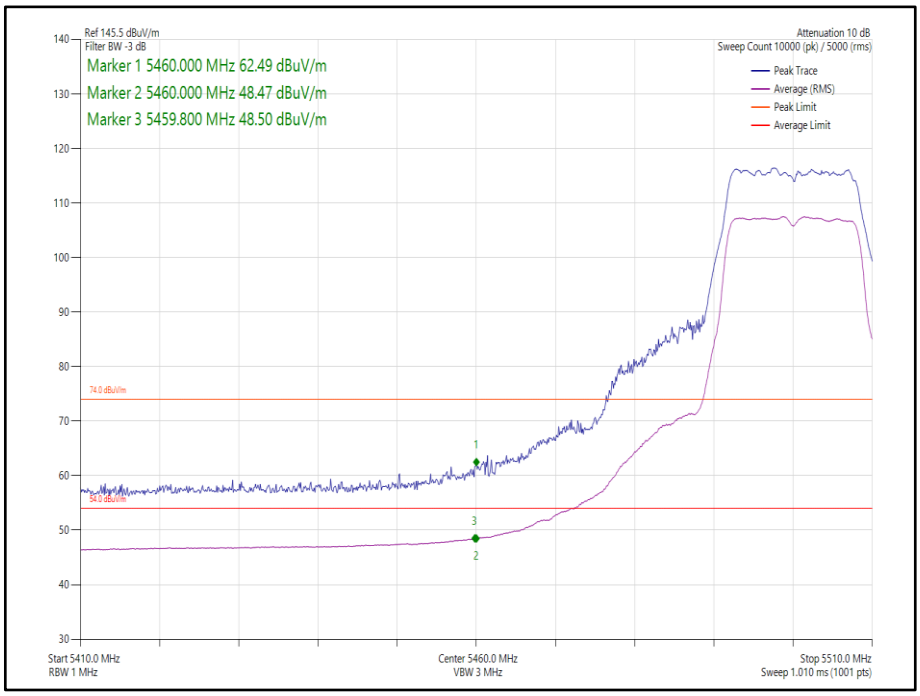

Figure 9 - 802.11a, Core 1 - 5500 MHz, Band Edge Frequency 5460 MHz

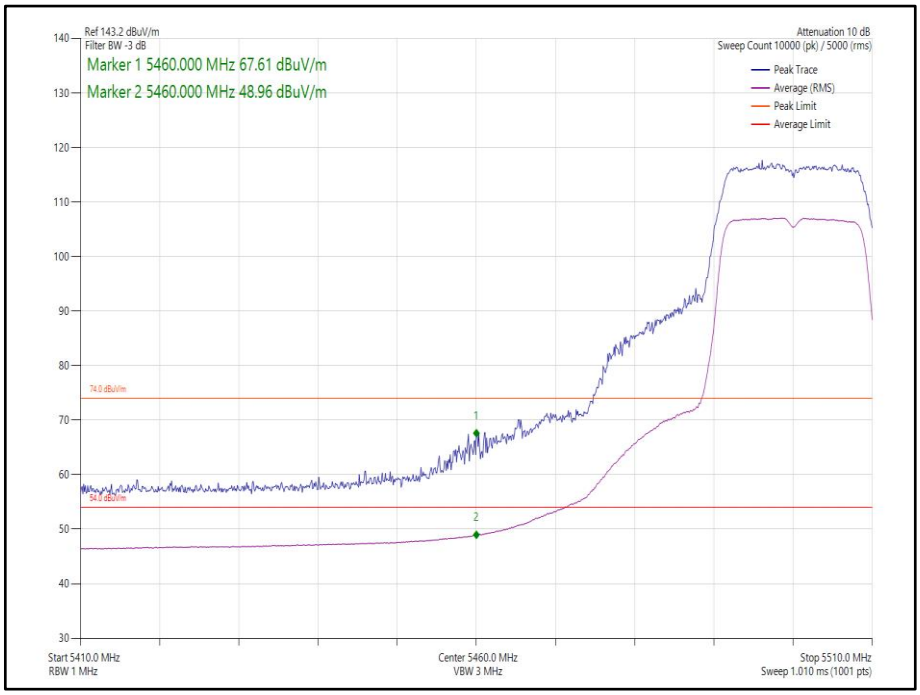

Figure 10 - 802.11n HT20, Core 1 - 5500 MHz, Band Edge Frequency 5460 MHz

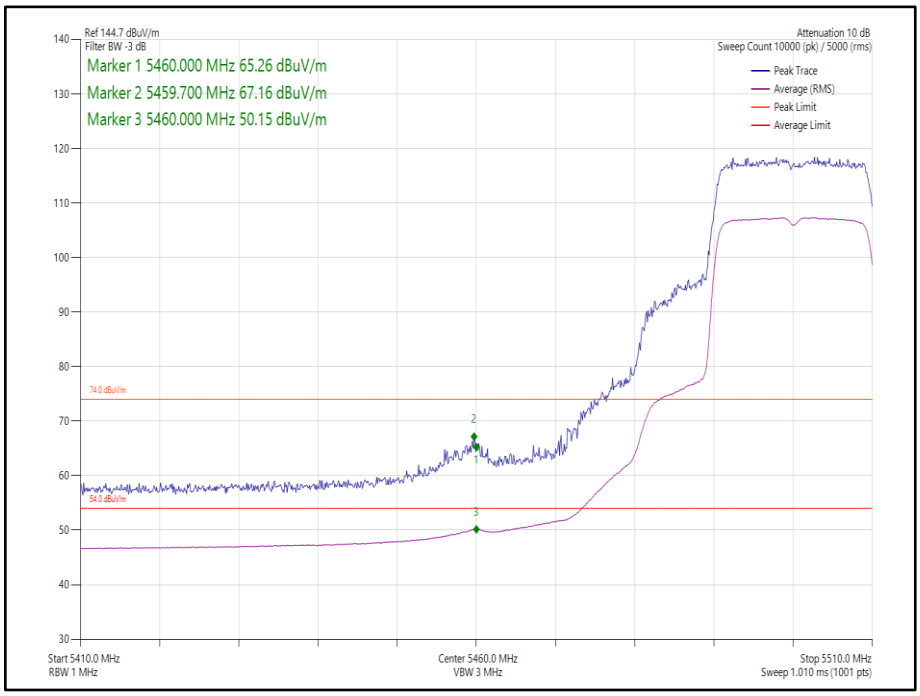

Figure 11 - 802.11ax HE20, Core 1, SU - 5500 MHz, Band Edge Frequency 5460 MHz

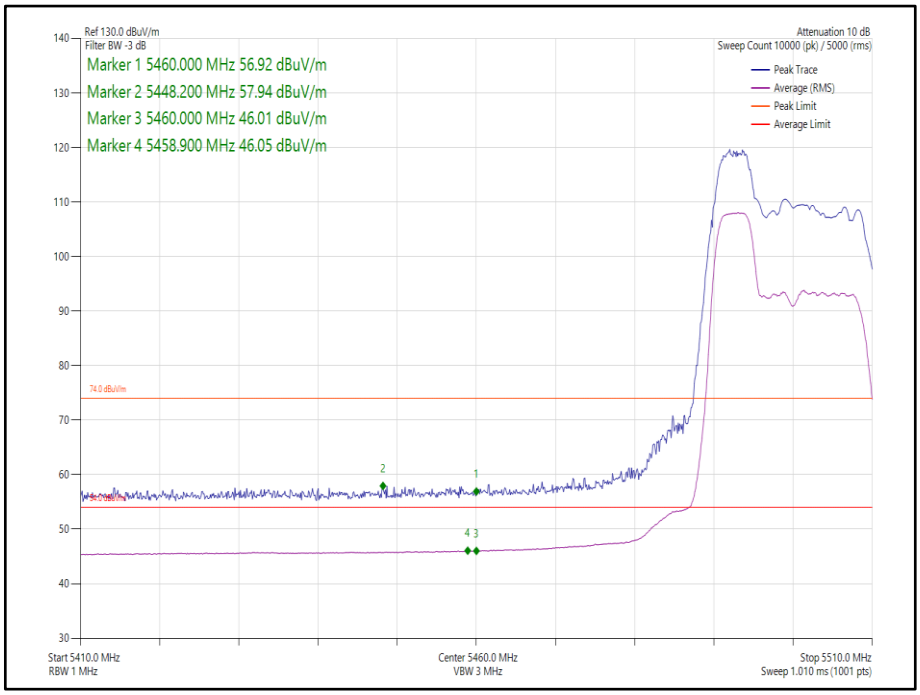

Figure 12 - 802.11ax HE20, Core 1, RU52-37 - 5500 MHz, Band Edge Frequency 5460 MHz

Mode	Modulation Coding Scheme	Resource size	Resource Index	Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBµV/m)
802.11n HT20 CDD, Cores 0-1	MCS 4	-	-	5180	5150	64.84	51.20
802.11n HT20 SDM, Cores 0-1	MCS 12	-	-	5180	5150	64.25	51.31
802.11ax HE20 CDD Cores 0-1	MCS 4x1	SU	-	5180	5150	64.65	51.07
802.11ax HE20 CDD, Cores 0-1	MCS 11x1	26	0	5180	5150	59.00	46.80
802.11ax HE20 SDM, Cores 0-1	MCS 4x2	SU	-	5180	5150	68.69	51.48
802.11ax HE20 SDM, Cores 0-1	MCS 11x2	26	0	5180	5150	59.16	46.58
802.11n HT20 CDD, Cores 0-1	MCS 2	-	-	5320	5350	62.92	50.90
802.11n HT20 SDM, Cores 0-1	MCS 15	-	-	5320	5350	66.68	51.45
802.11ax HE20 CDD, Cores 0-1	MCS 2x1	SU	-	5320	5350	64.09	51.40
802.11ax HE20 CDD, Cores 0-1	MCS 11x1	52	40	5320	5350	62.34	49.48
802.11ax HE20 SDM, Cores 0-1	MCS 2x2	SU	-	5320	5350	63.59	51.37
802.11ax HE20 SDM, Cores 0-1	MCS 11x2	52	40	5320	5350	61.17	49.18
802.11n HT20 CDD, Cores 0-1	MCS 7	-	-	5500	5460	69.24	51.46
802.11n HT20 SDM, Cores 0-1	MCS 15	-	-	5500	5460	66.86	51.39
802.11ax HE20 CDD, Cores 0-1	MCS 11x1	SU	-	5500	5460	68.20	51.45
802.11ax HE20 CDD, Cores 0-1	MCS 11x1	52	37	5500	5460	59.66	47.92
802.11ax HE20 SDM, Cores 0-1	MCS 4x2	SU	-	5500	5460	68.23	51.45
802.11ax HE20 SDM, Cores 0-1	MCS 11x2	52	37	5500	5460	59.61	47.70

Table 7 - 20 MHz Bandwidth (2TX MIMO) Restricted Band Edge Results

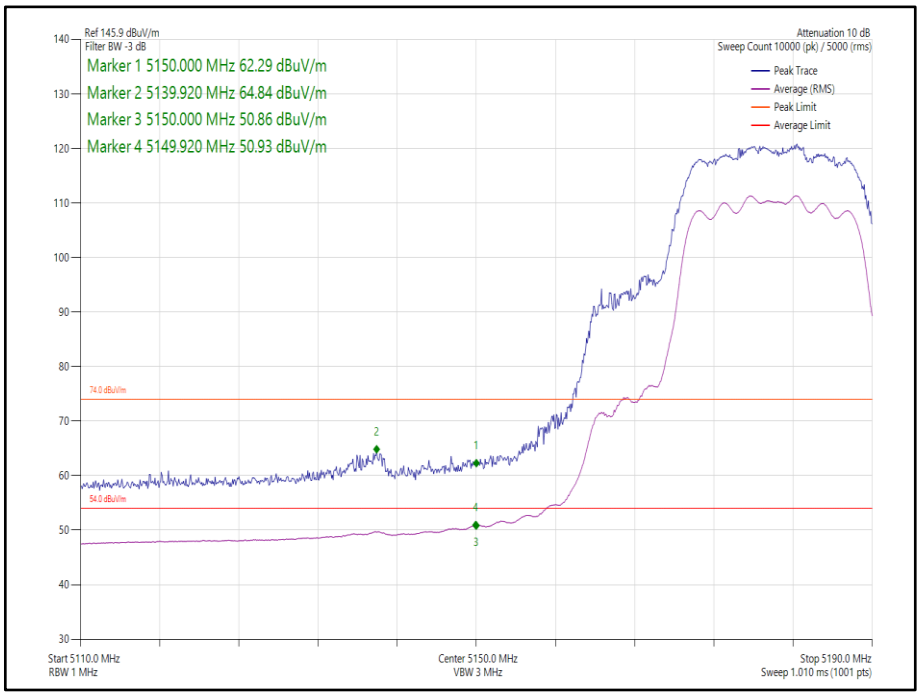

Figure 13 - 802.11n HT20 CDD, Cores 0-1 - 5180 MHz
Band Edge Frequency 5150 MHz

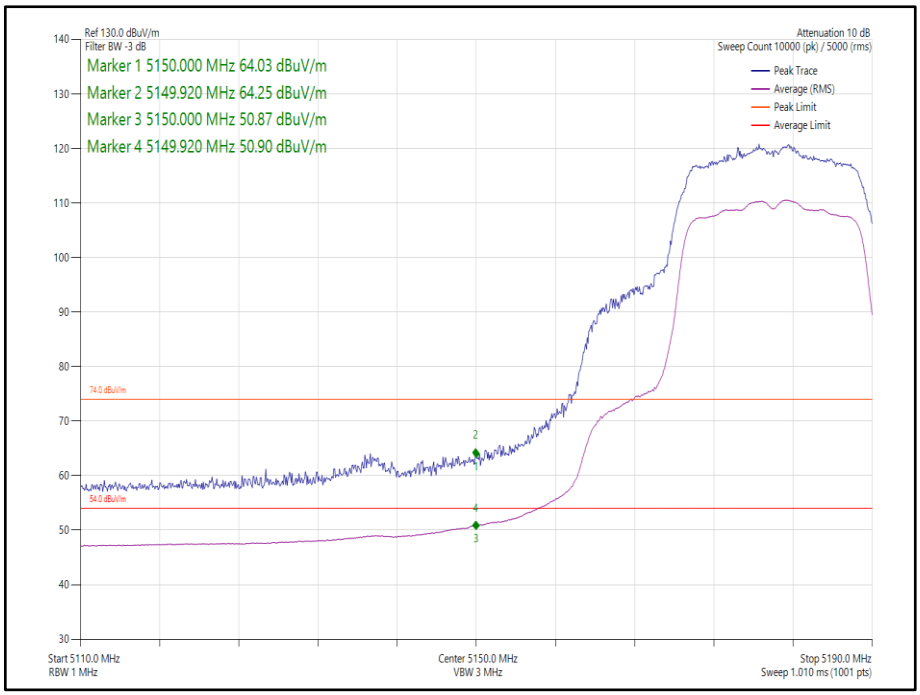

Figure 14 - 802.11n HT20 SDM, Cores 0-1 - 5180 MHz
Band Edge Frequency 5150 MHz

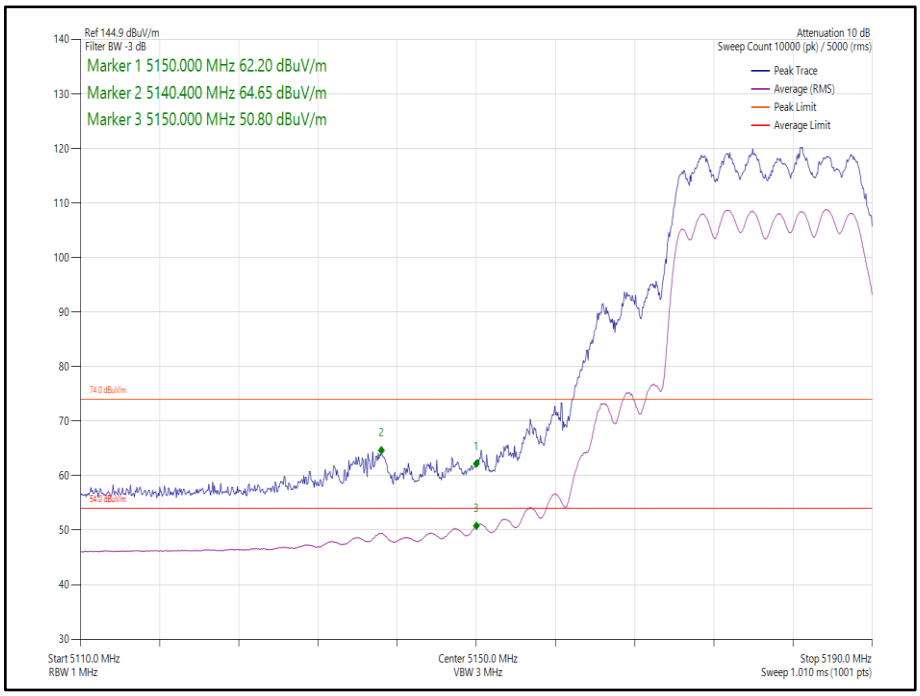

Figure 15 - 802.11ax HE20 CDD, Cores 0-1 SU - 5180 MHz Band Edge Frequency 5150 MHz

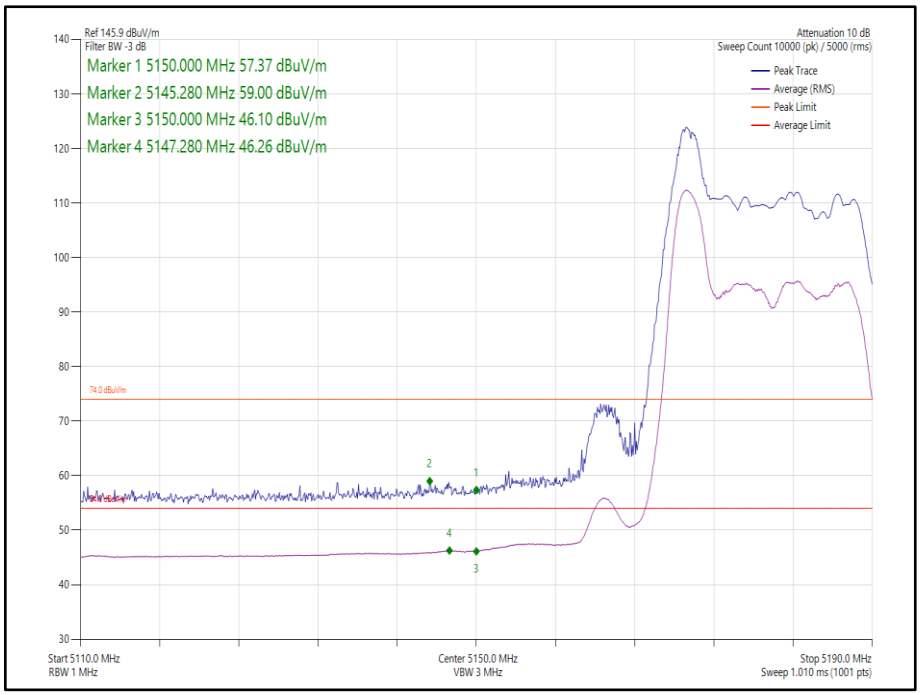

Figure 16 - 802.11ax HE20 CDD, Cores 0-1, RU26-0 - 5180 MHz Band Edge Frequency 5150 MHz

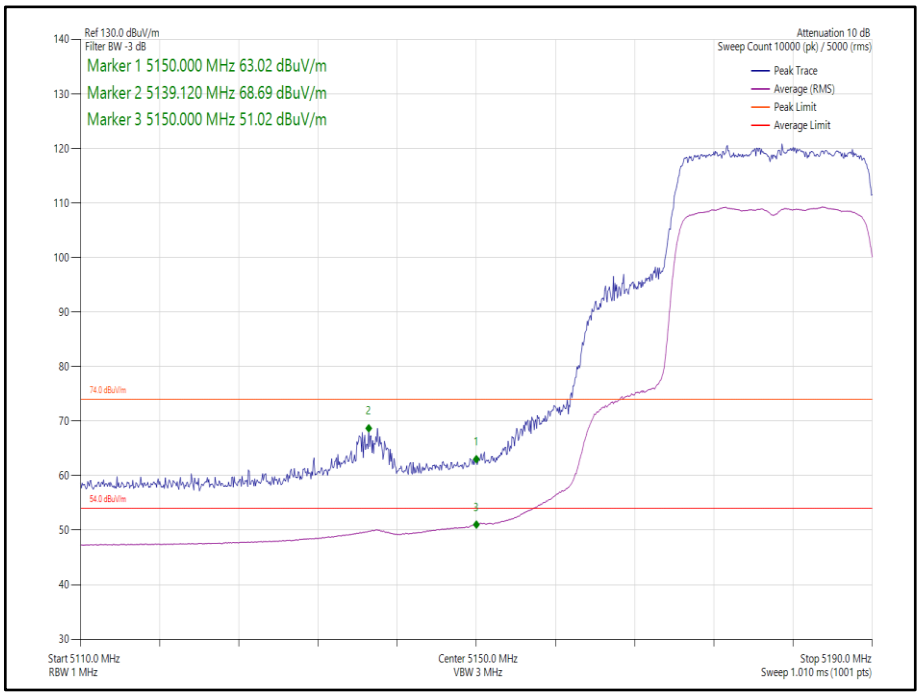

Figure 17 - 802.11ax HE20 SDM, Cores 0-1, SU - 5180 MHz Band Edge Frequency 5150 MHz

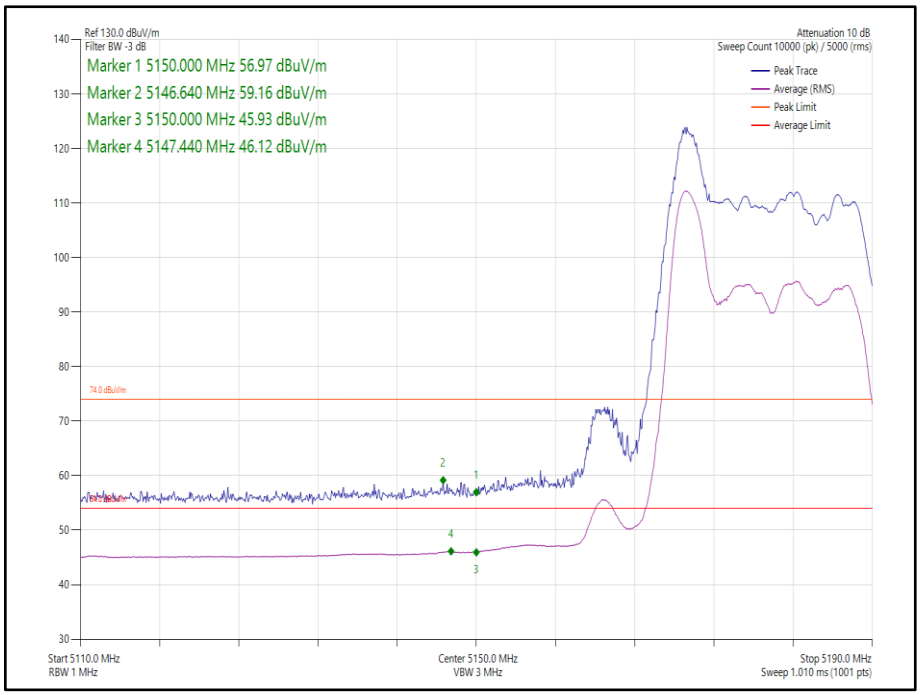

Figure 18 - 802.11ax HE20 SDM, Cores 0-1, RU26-0 - 5180 MHz Band Edge Frequency 5150 MHz

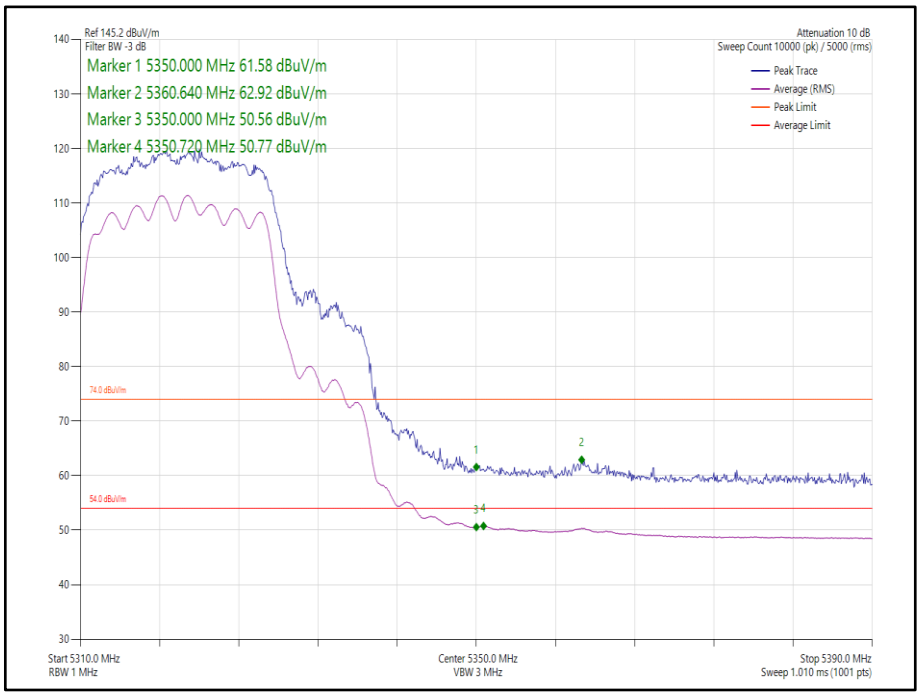

Figure 19 - 802.11n HT20 CDD, Cores 0-1 - 5320 MHz Band Edge Frequency 5350 MHz

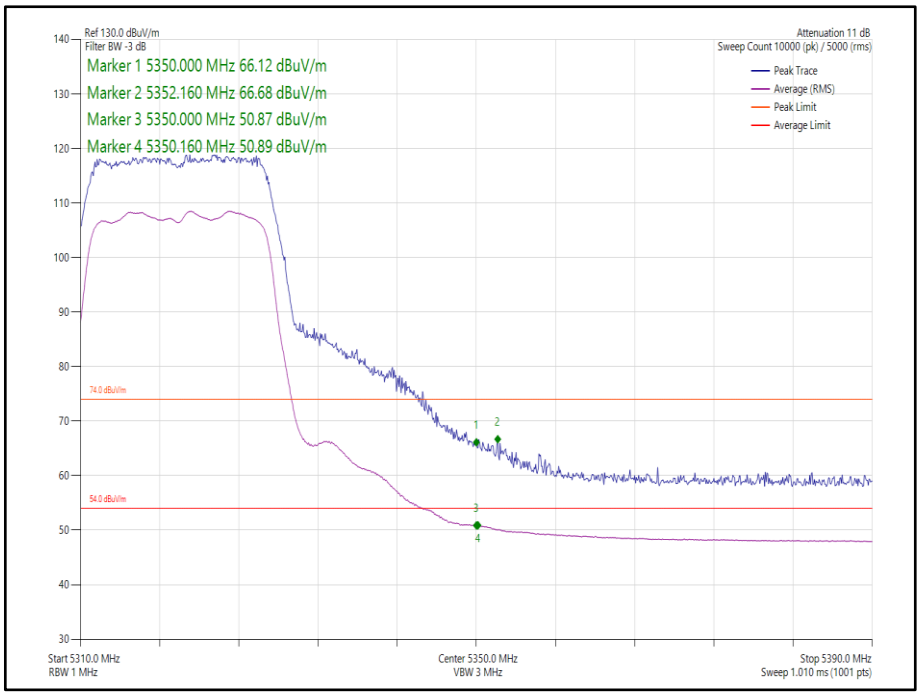

Figure 20 - 802.11n HT20 SDM, Cores 0-1 - 5320 MHz Band Edge Frequency 5350 MHz

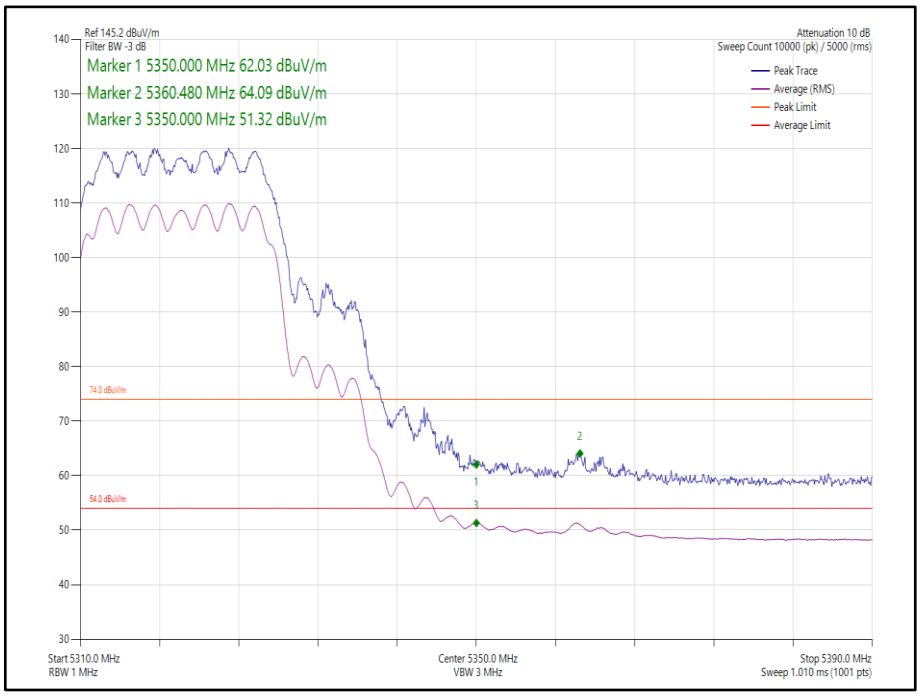

Figure 21 - 802.11ax HE20 CDD, Cores 0-1, SU - 5320 MHz Band Edge Frequency 5350 MHz

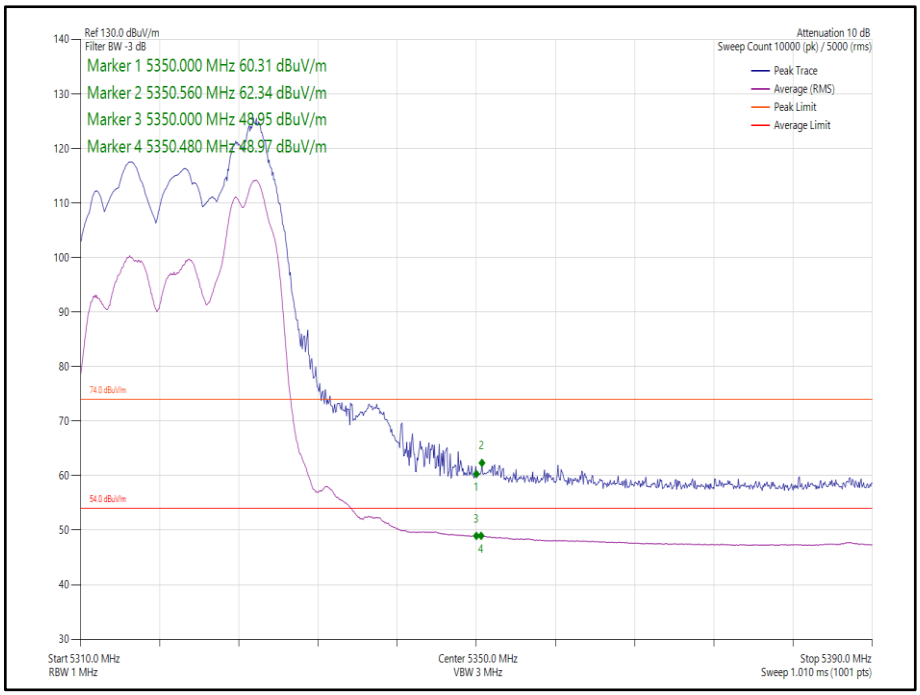

Figure 22 - 802.11ax HE20 CDD, Cores 0-1, RU52-40 - 5320 MHz Band Edge Frequency 5350 MHz

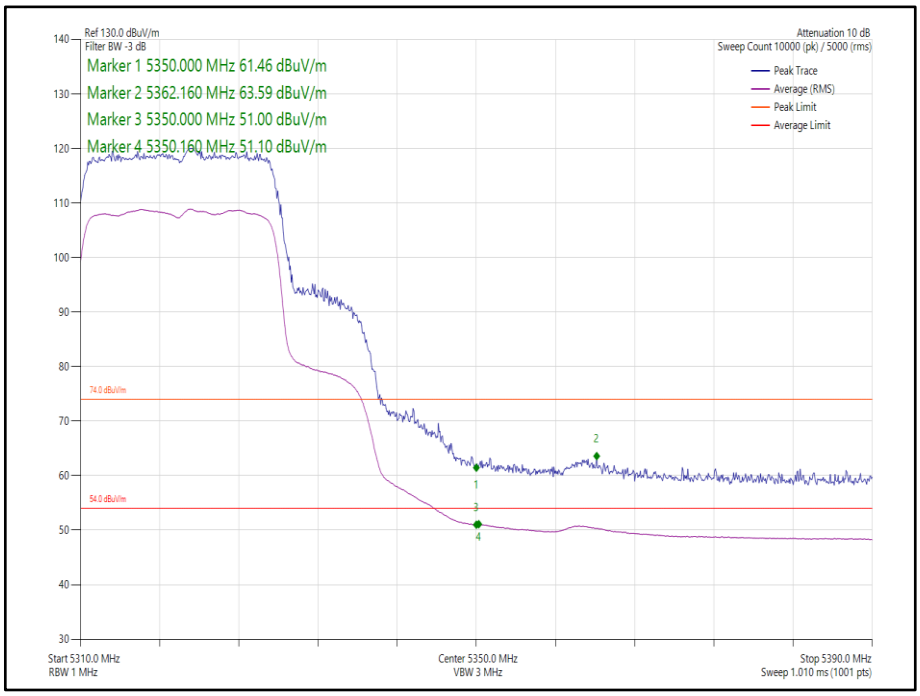

Figure 23 - 802.11ax HE20 SDM, Cores 0-1, SU - 5320 MHz Band Edge Frequency 5350 MHz

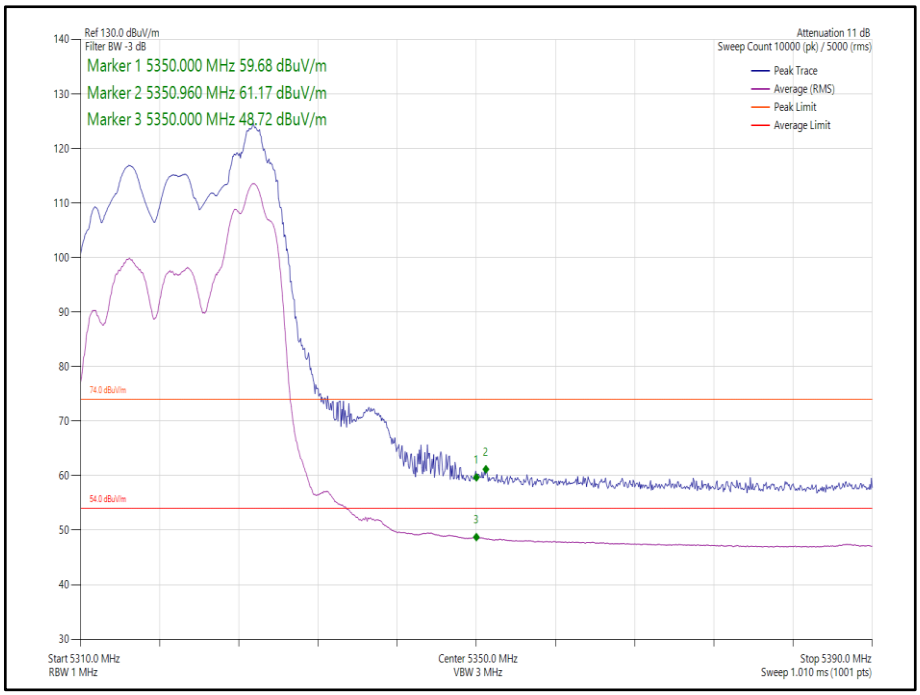

Figure 24 - 802.11ax HE20 SDM, Cores 0-1, RU52-40 - 5320 MHz Band Edge Frequency 5350 MHz

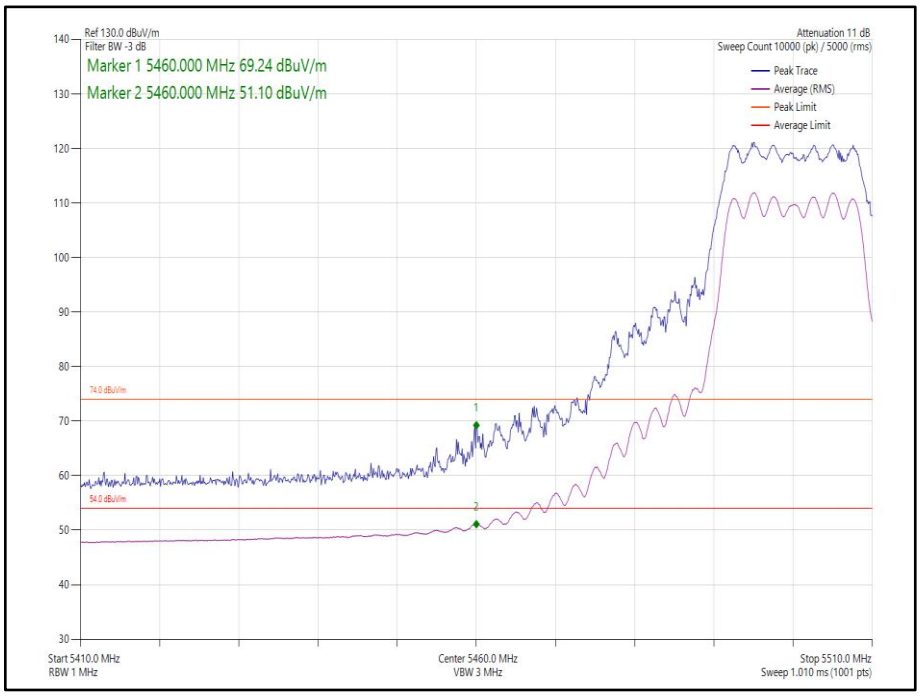

Figure 25 - 802.11n HT20 CDD, Cores 0-1 - 5500 MHz Band Edge Frequency 5460 MHz

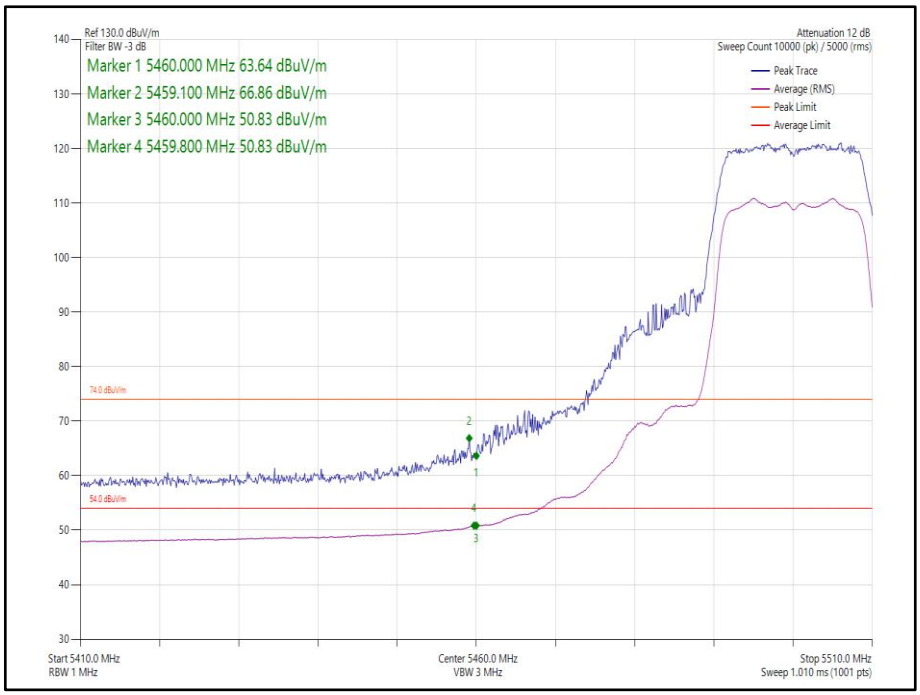

Figure 26 - 802.11n HT20 SDM, Cores 0-1 - 5500 MHz Band Edge Frequency 5460 MHz

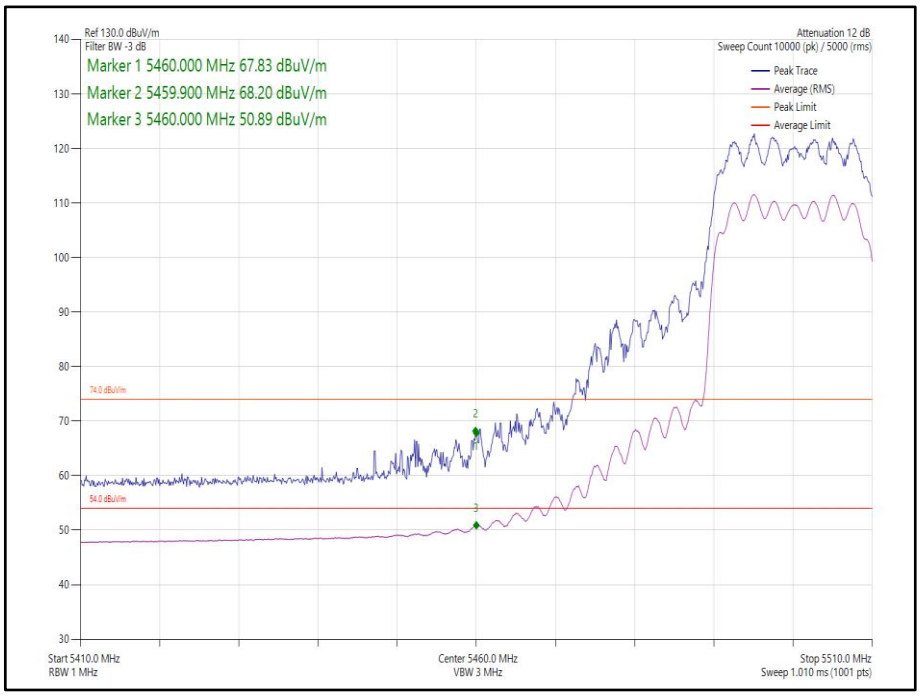

Figure 27 - 802.11ax HE20 CDD, Cores 0-1, SU- 5500 MHz Band Edge Frequency 5460 MHz

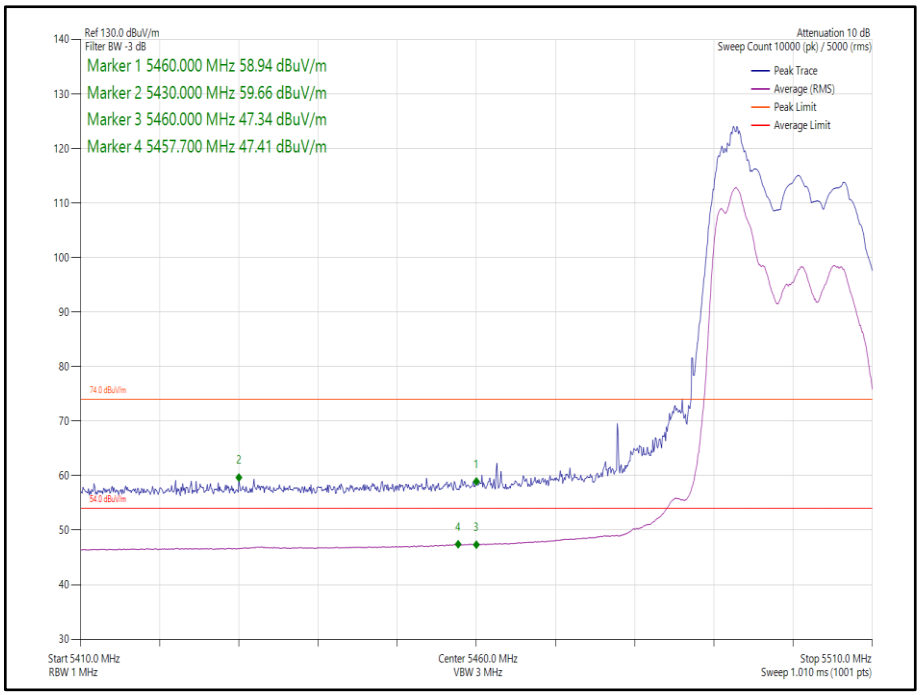

Figure 28 - 802.11ax HE20 CDD, Cores 0-1, RU52-37 - 5500 MHz Band Edge Frequency 5460 MHz

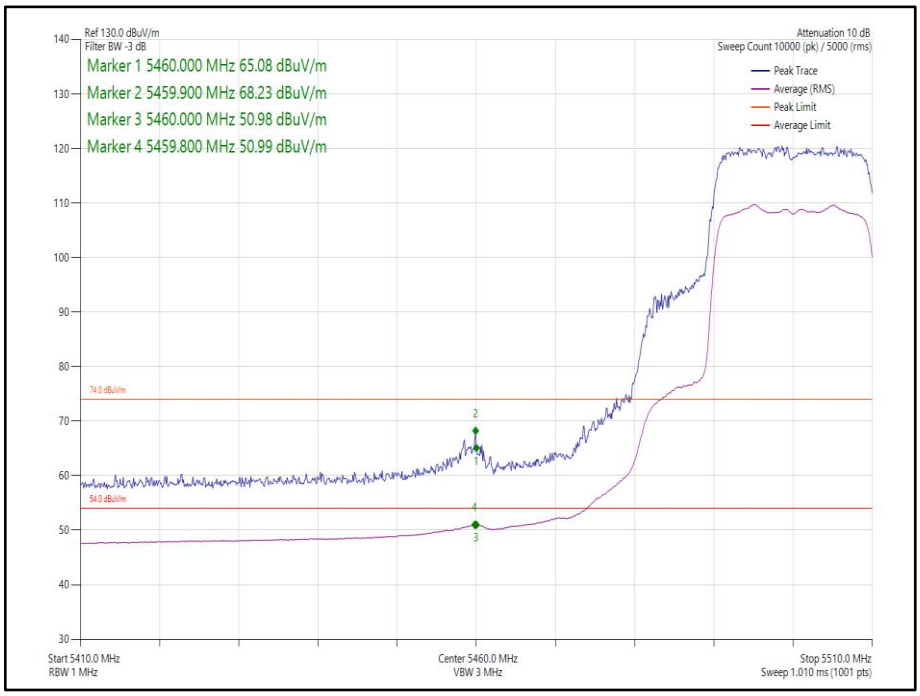

Figure 29 - 802.11ax HE20 SDM, Cores 0-1, SU- 5500 MHz Band Edge Frequency 5460 MHz

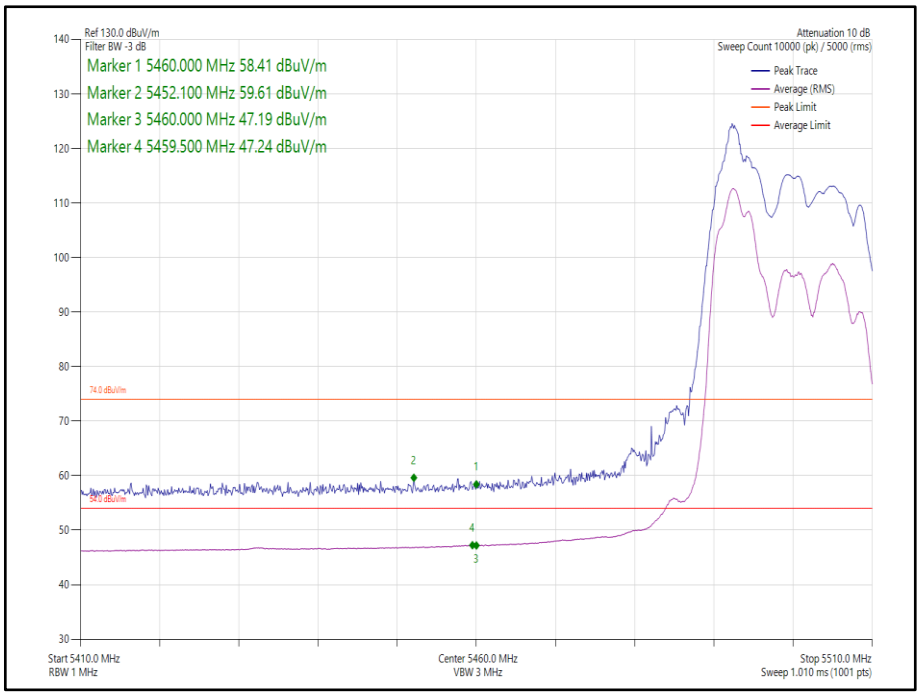

Figure 30 - 802.11ax HE20 SDM, Cores 0-1, RU52-37 - 5500 MHz Band Edge Frequency 5460 MHz

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 HT40, Core 0	MCS 7	-	-	5190	5150	68.19	50.48
802.11ax HE40, Core 0	MCS 4x1	SU	-	5190	5150	62.90	50.78
802.11ax HE40, Core 0	MCS 11x1	26	0	5190	5150	60.59	47.36
802.11n HT40, Core 1	MCS 4	-	-	5310	5350	63.03	50.87
802.11ax HE40, Core 1	MCS 4x1	SU	-	5310	5350	64.19	50.96
802.11ax HE40, Core 1	MCS 11x1	52	44	5310	5350	68.64	48.32
802.11n HT40, Core 1	MCS 2	-		5510	5460	62.95	50.99
802.11ax HE40, Core 1	MCS 2x1	SU	-	5510	5460	66.08	50.98
802.11ax HE40, Core 1	MCS 11x1	52	37	5510	5460	59.80	47.58

Table8 - 40 MHz Bandwidth (SISO) Restricted Band Edge Results

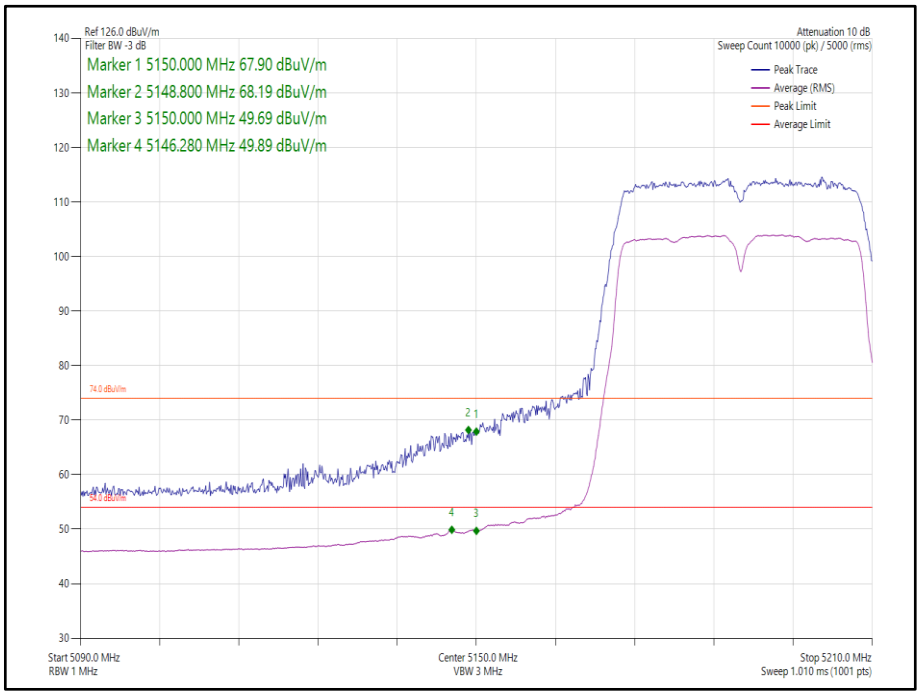

Figure 31 - 802.11n HT40, Core 0 - 5190 MHz Band Edge Frequency 5150 MHz

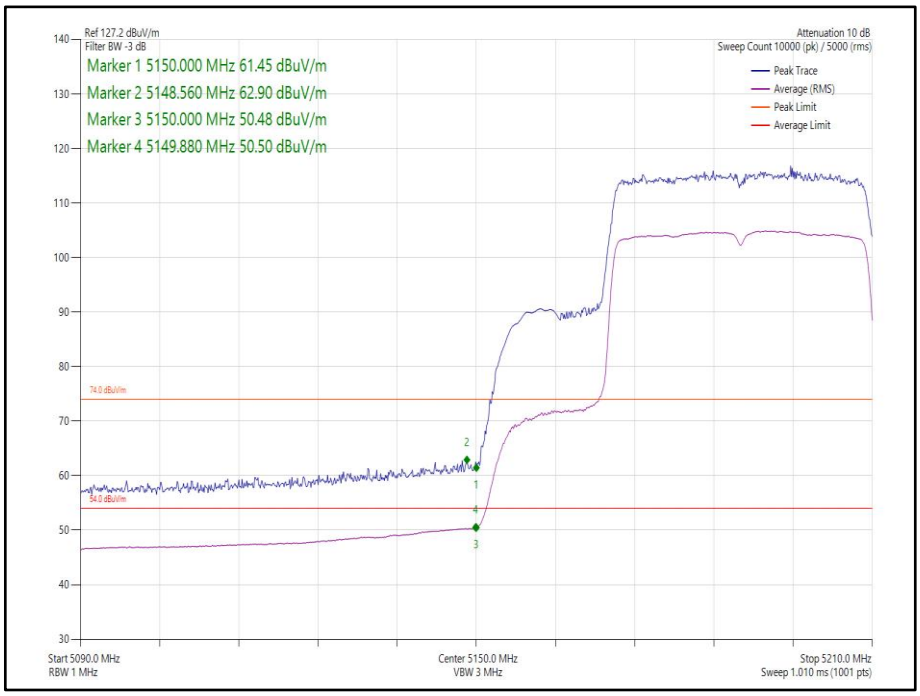

Figure 32 - 802.11ax HE40, Core 0, SU - 5190 MHz
Band Edge Frequency 5150 MHz

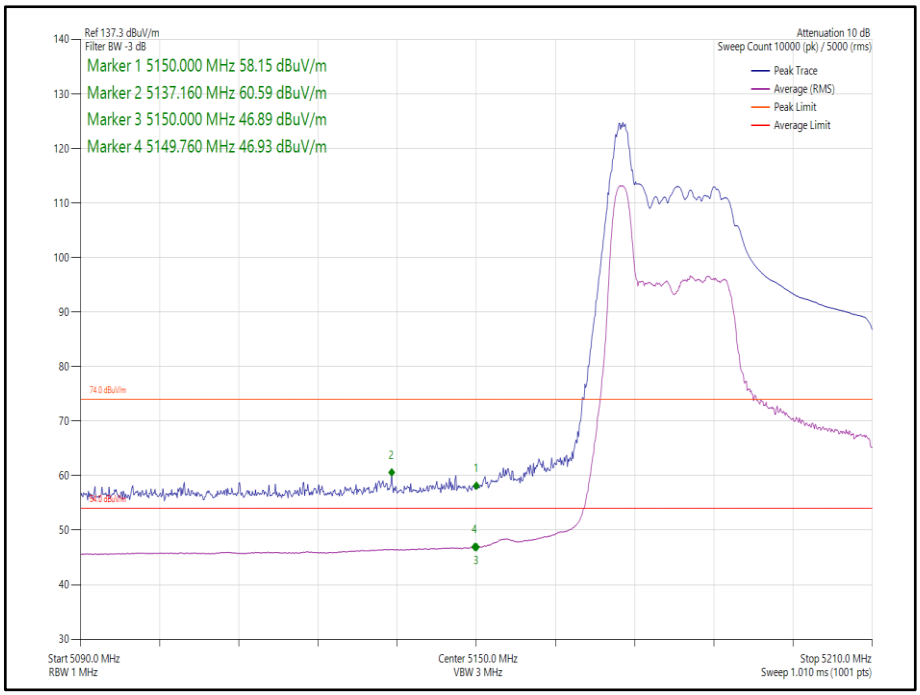

Figure 33 - 802.11ax HE40, Core 0, RU26-0 - 5190 MHz
Band Edge Frequency 5150 MHz

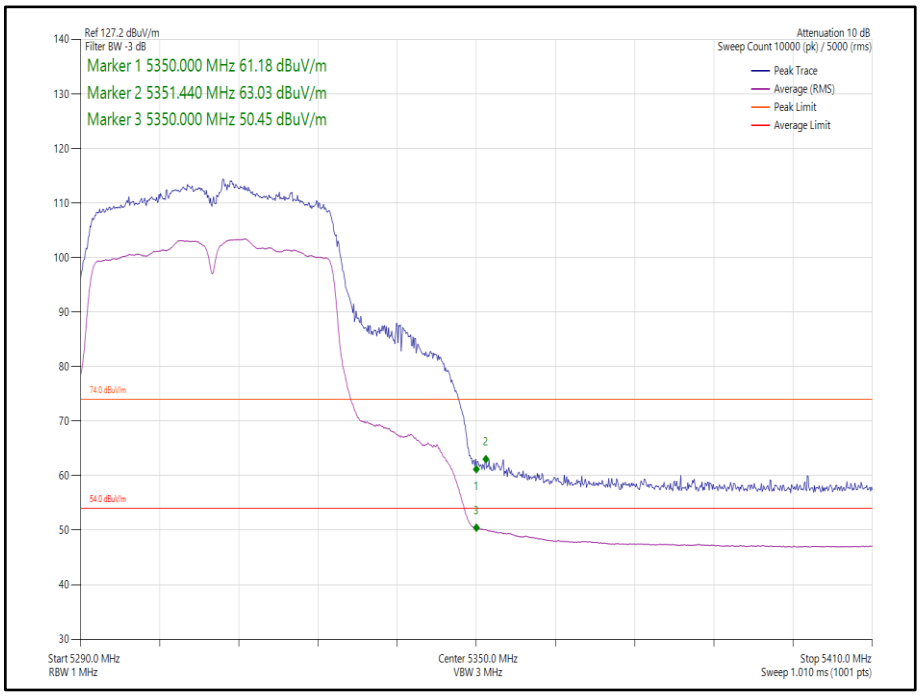

Figure 34 - 802.11n HT40, Core 1 - 5310 MHz
Band Edge Frequency 5350 MHz

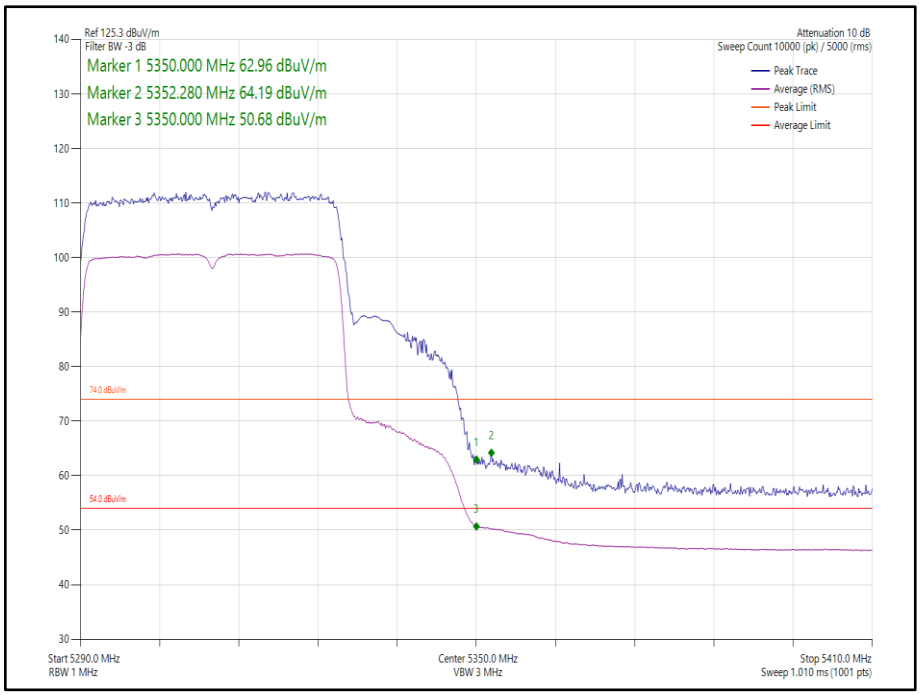

Figure 35 - 802.11ax HE40, Core 1, SU - 5310 MHz
Band Edge Frequency 5350 MHz

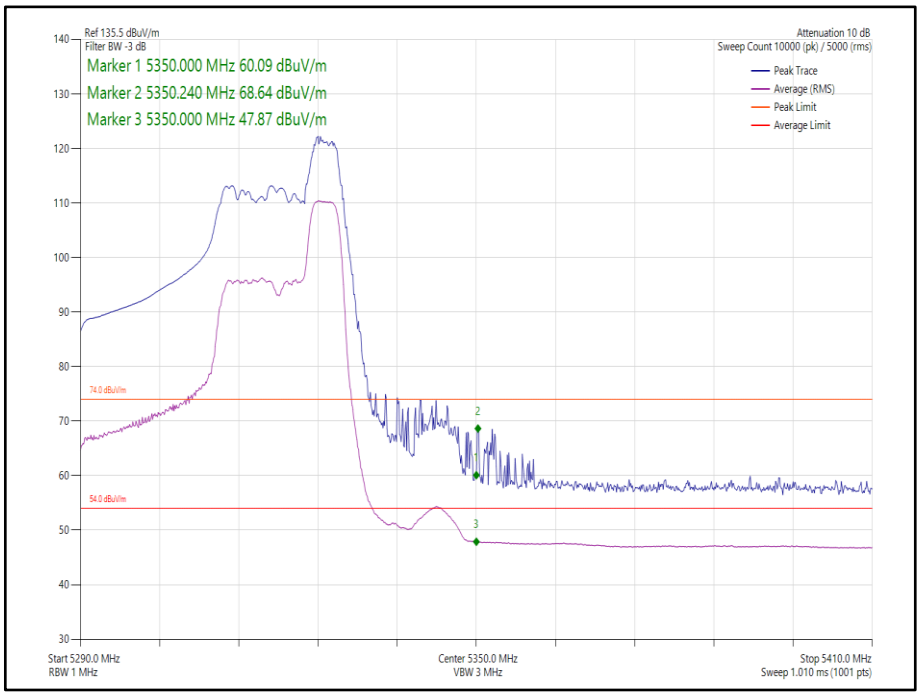

Figure 36 - 802.11ax HE40, Core 1, RU52-44 - 5310 MHz Band Edge Frequency 5350 MHz

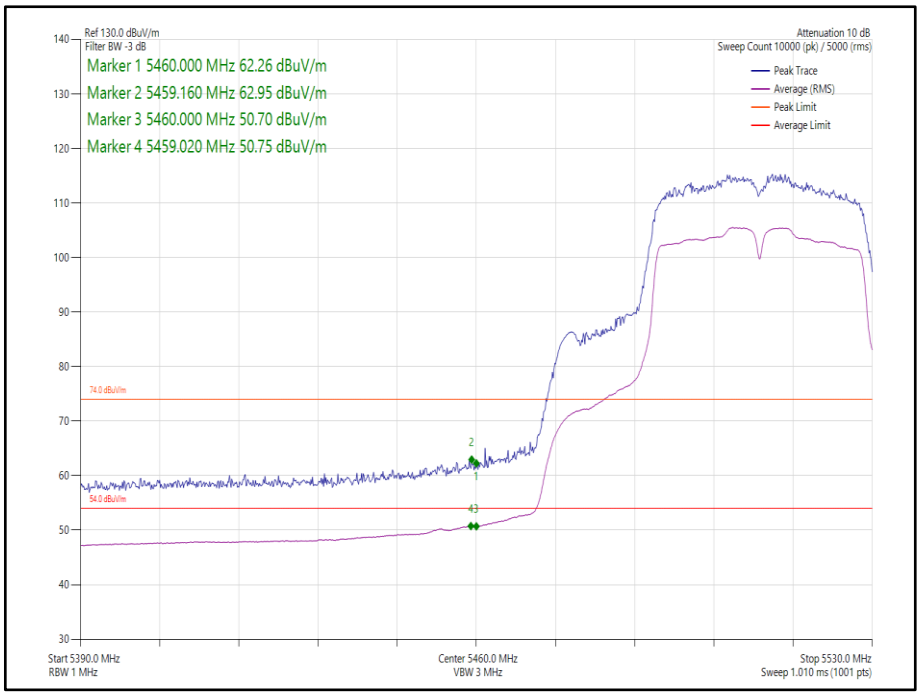

Figure 37 - 802.11n HT40, Core 1 - 5510 MHz Band Edge Frequency 5460 MHz

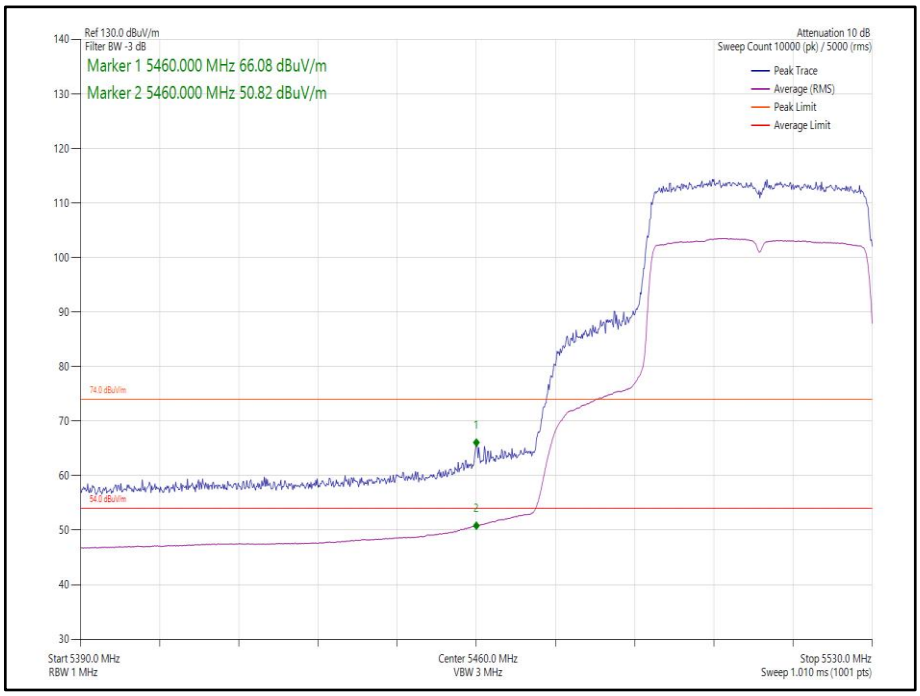

Figure 38 - 802.11ax HE40, Core 1, SU - 5510 MHz Band Edge Frequency 5460 MHz

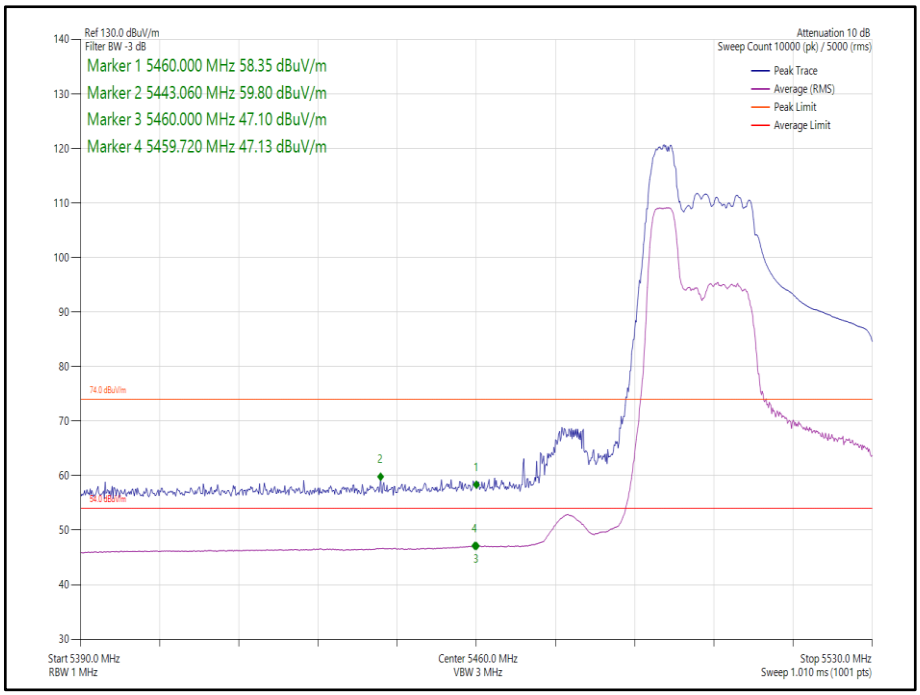

Figure 39 - 802.11ax HE40, Core 1, RU52-37- 5510 MHz Band Edge Frequency 5460 MHz

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 HT40 CDD, Cores 0-1	MCS 2	-	-	5190	5150	62.28	50.75
802.11n HT40 SDM, Cores 0-1	MCS 12	-	-	5190	5150	62.62	50.59
802.11ax HE40 CDD, Cores 0-1	MCS 4x1	SU	-	5190	5150	62.48	50.60
802.11ax HE40 CDD, Cores 0-1	MCS 11x1	26	0	5190	5150	59.89	46.95
802.11ax HE40 SDM, Cores 0-1	MCS 4x2	SU	-	5190	5150	62.61	50.73
802.11ax HE40 SDM, Cores 0-1	MCS 11x2	26	0	5190	5150	59.90	46.79
802.11n HT40 CDD, Cores 0-1	MCS 4	-	-	5310	5350	63.42	50.89
802.11n HT40 SDM, Cores 0-1	MCS 10	-	-	5310	5350	63.67	51.40
802.11ax HE40 CDD, Cores 0-1	MCS 11x1	SU	-	5310	5350	64.19	51.00
802.11ax HE40 CDD, Cores 0-1	MCS 11x1	52	44	5310	5350	68.04	48.61
802.11ax HE40 SDM, Cores 0-1	MCS 11x2	SU	-	5310	5350	65.36	51.11
802.11ax HE40 SDM, Cores 0-1	MCS 11x2	52	44	5310	5350	69.20	49.06
802.11n HT40 CDD, Cores 0-1	MCS 4	-	-	5510	5460	62.12	50.76
802.11n HT40 SDM, Cores 0-1	MCS 10	-	-	5510	5460	62.69	51.38
802.11ax HE40 CDD, Cores 0-1	MCS 2x1	SU	-	5510	5460	62.68	50.96
802.11ax HE40 CDD, Cores 0-1	MCS 11x1	52	37	5510	5460	60.27	47.59
802.11ax HE40 SDM, Cores 0-1	MCS 4x2	SU	-	5510	5460	62.84	51.29
802.11ax HE40 SDM, Cores 0-1	MCS 11x2	52	37	5510	5460	60.44	48.15

Table 9 - 40 MHz Bandwidth (2TX MIMO) Restricted Band Edge Results

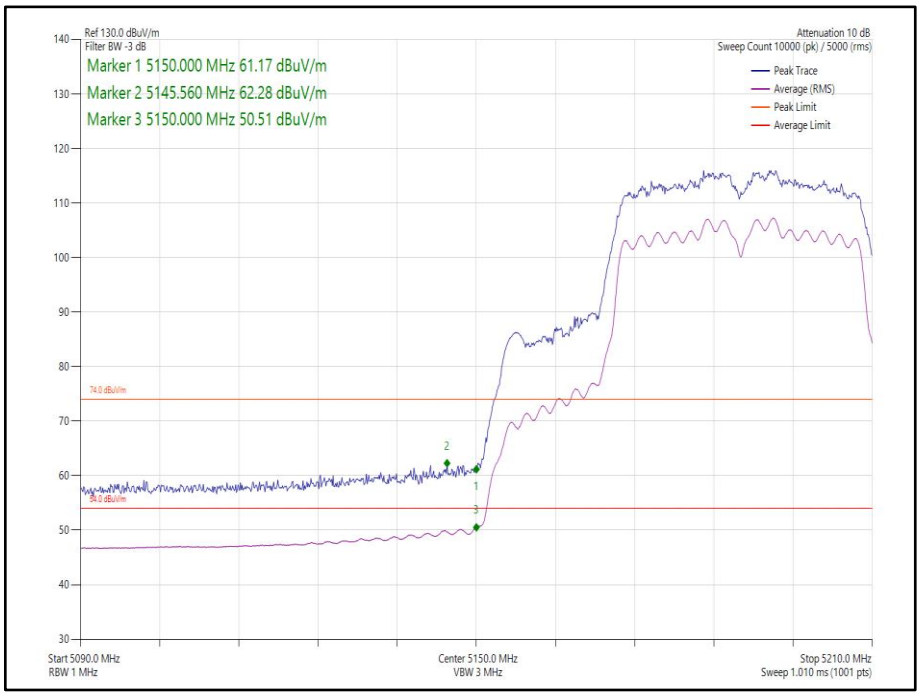

Figure 40 - 802.11n HT40 CDD Cores 0-1 - 5190 MHz
Band Edge Frequency 5150 MHz

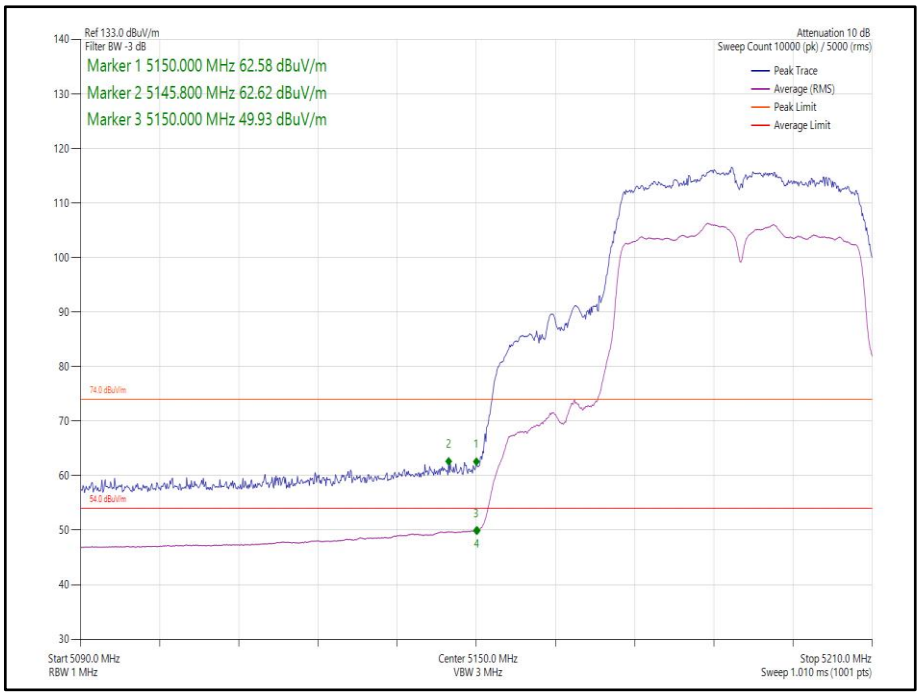

Figure 41 - 802.11n HT40 SDM Cores 0-1 - 5190 MHz
Band Edge Frequency 5150 MHz

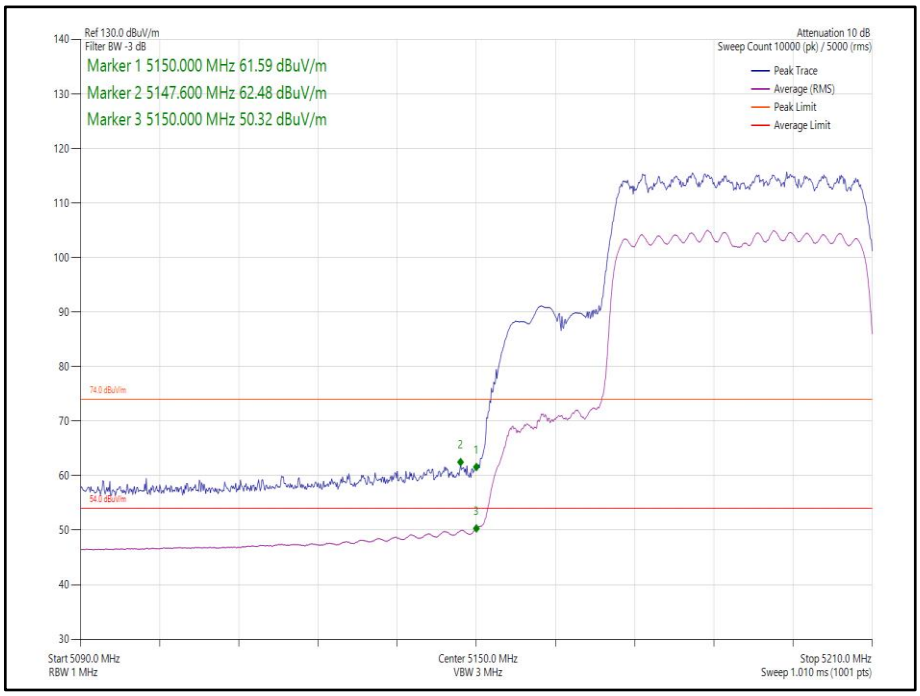

Figure 42 - 802.11ax HE40 CDD, Cores 0-1, SU - 5190 MHz Band Edge Frequency 5150 MHz

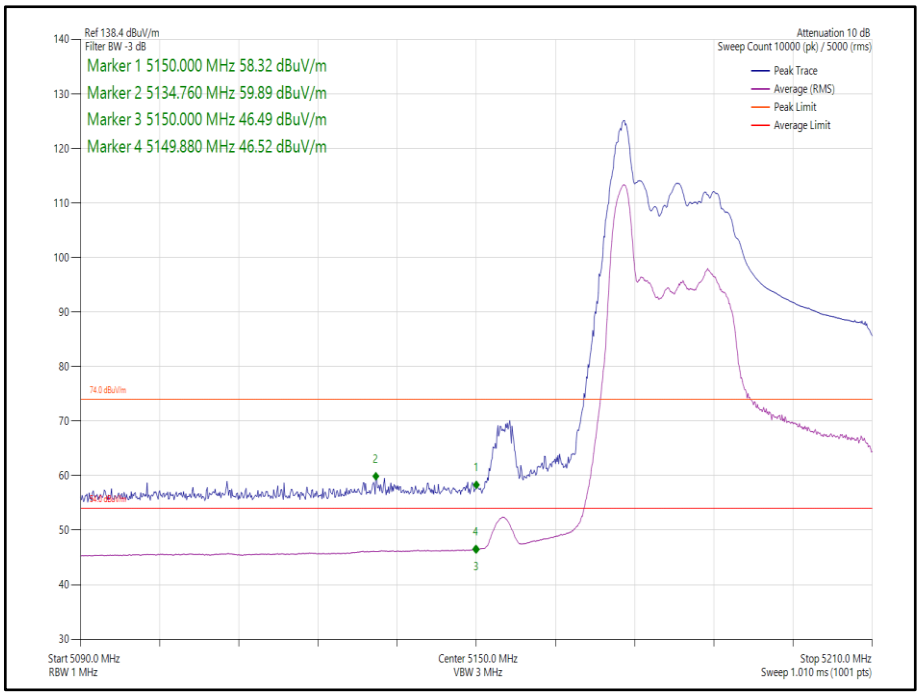

Figure 43 - 802.11ax HE40 CDD, Cores 0-1, RU26-0 - 5190 MHz Band Edge Frequency 5150 MHz

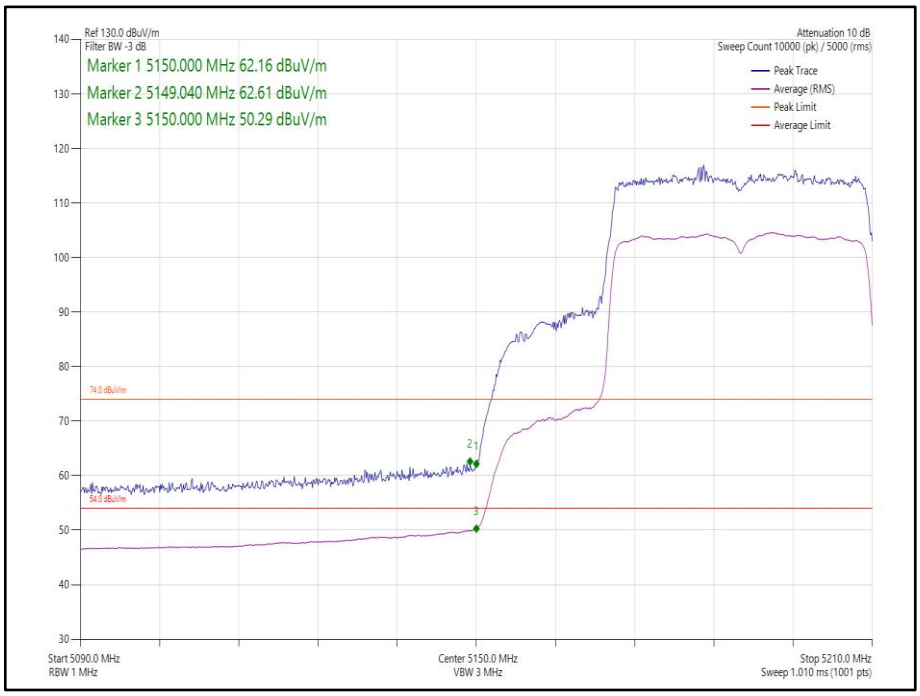

Figure 44 802.11ax HE40 SDM, Cores 0-1, SU - 5190 MHz Band Edge Frequency 5150 MHz

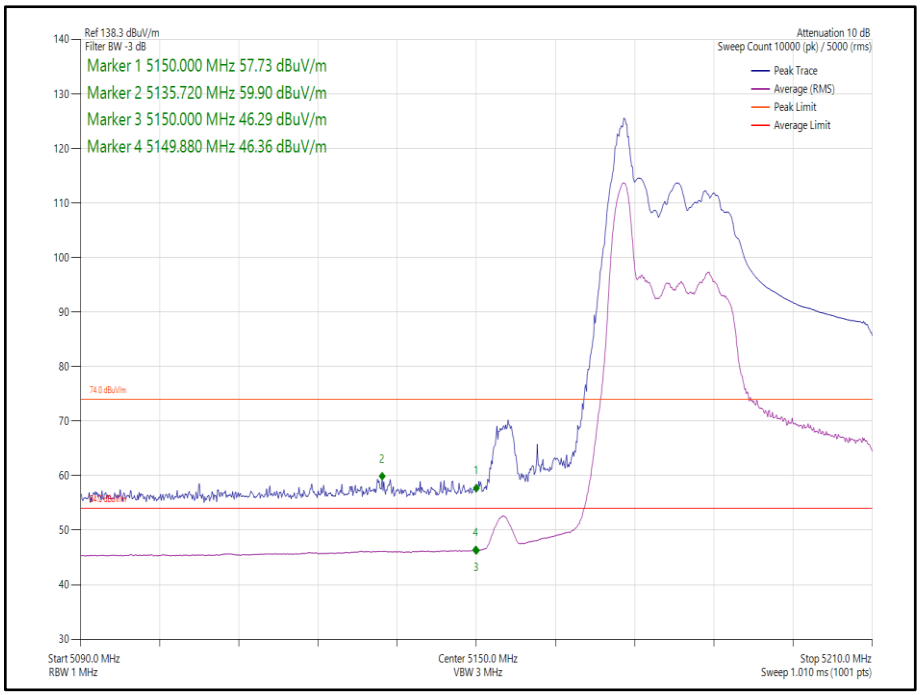

Figure 45 - 802.11ax HE40 SDM, Cores 0-1, RU26-0 - 5190 MHz Band Edge Frequency 5150 MHz

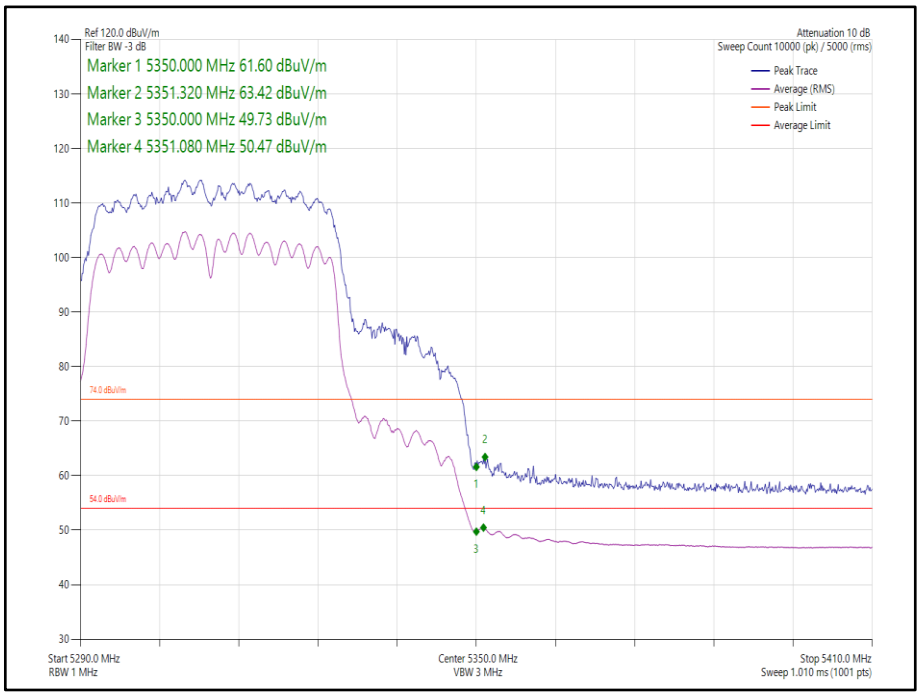

Figure 46 - 802.11n HT40 CDD, Cores 0-1 - 5310 MHz Band Edge Frequency 5350 MHz

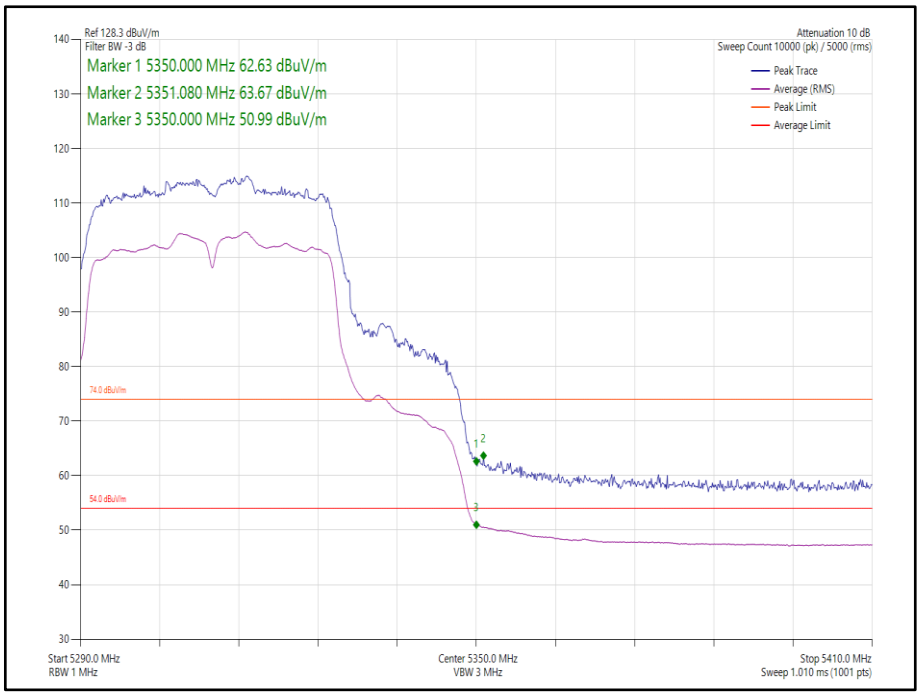

Figure 47 - 802.11n HT40 SDM, Cores 0-1 - 5310 MHz Band Edge Frequency 5350 MHz

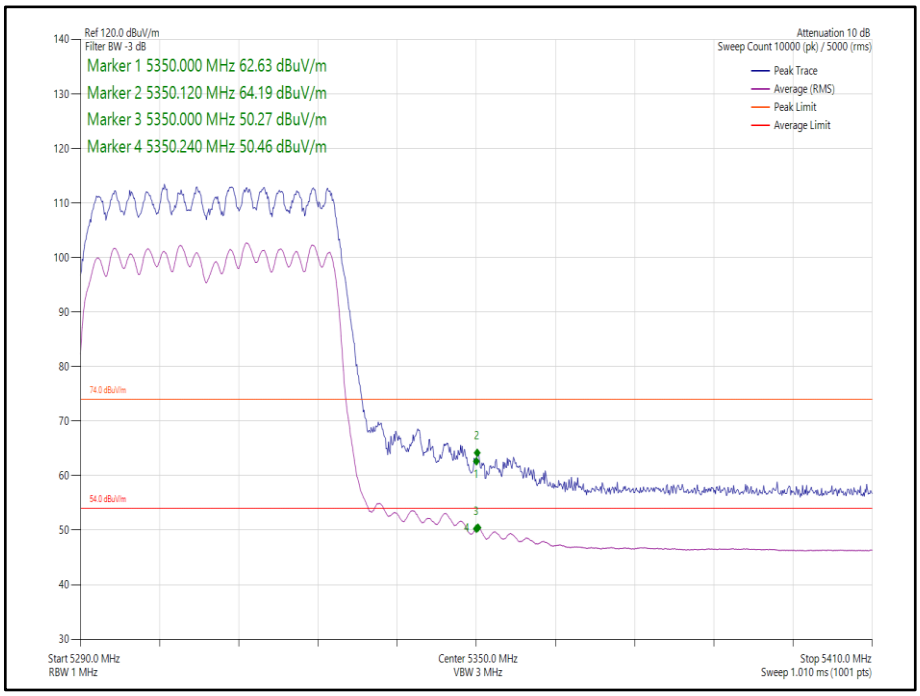

Figure 48 - 802.11ax HE40 CDD, Cores 0-1, SU - 5310 MHz Band Edge Frequency 5350 MHz

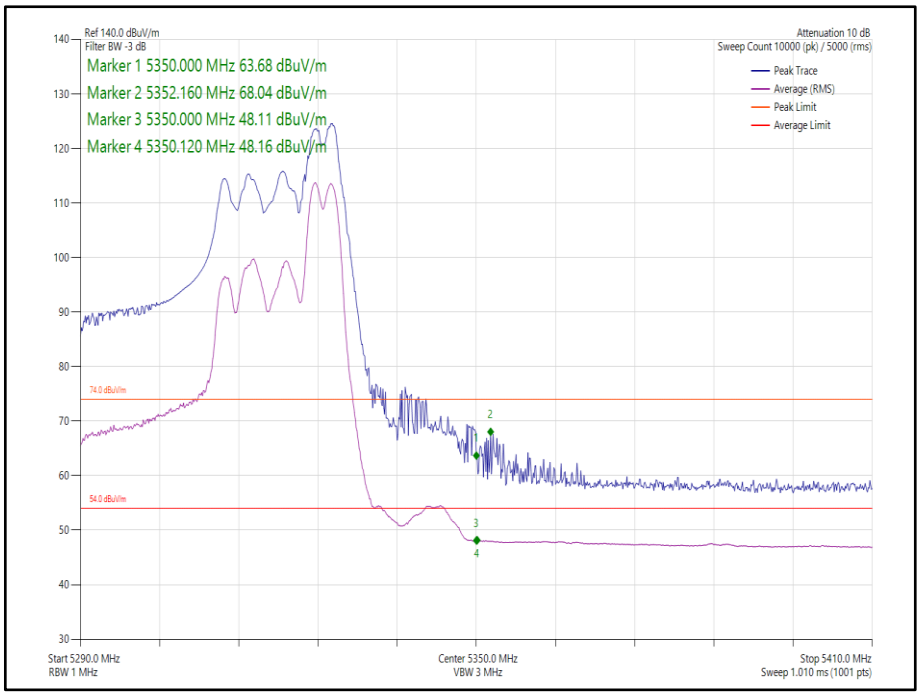

Figure 49 - 802.11ax HE40 CDD, Cores 0-1, RU52-44 - 5310 MHz Band Edge Frequency 5350 MHz

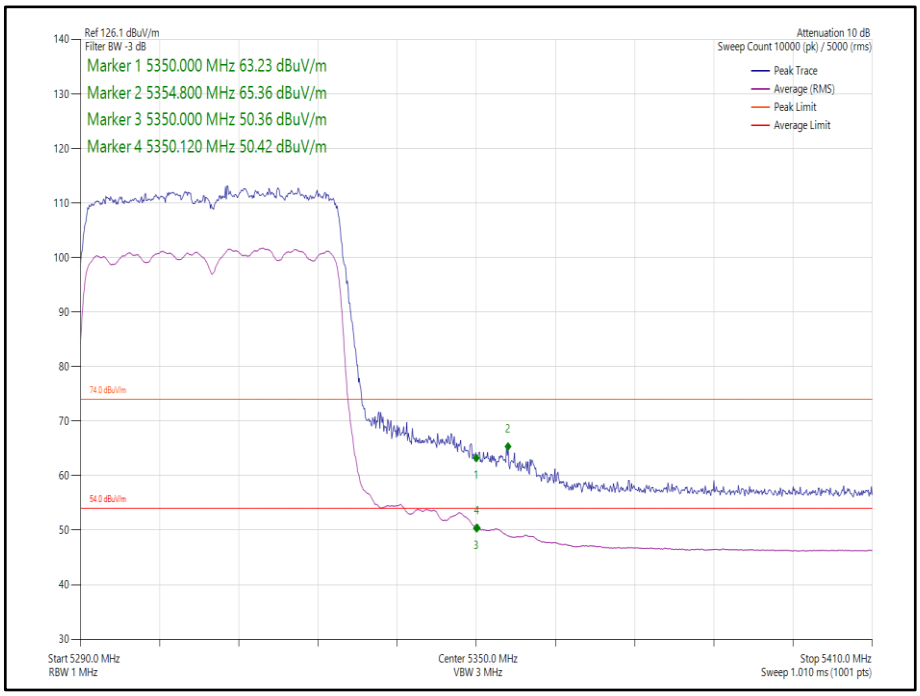

Figure 50 - 802.11ax HE40 SDM, Cores 0-1, SU - 5310 MHz Band Edge Frequency 5350 MHz

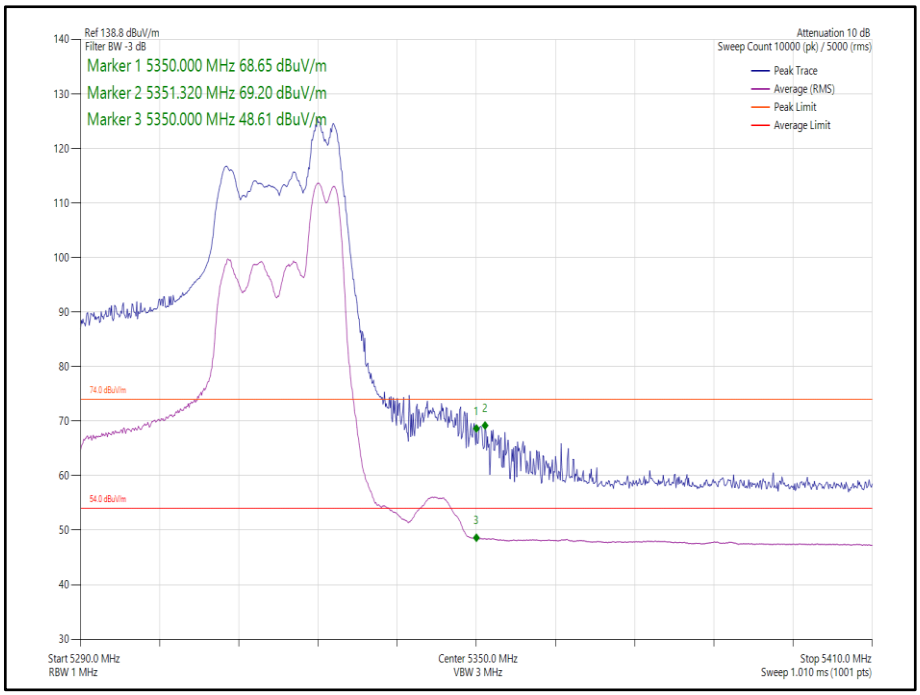

Figure 51 - 802.11ax HE40 SDM, Cores 0-1, RU52-44 5310 MHz Band Edge Frequency 5350 MHz

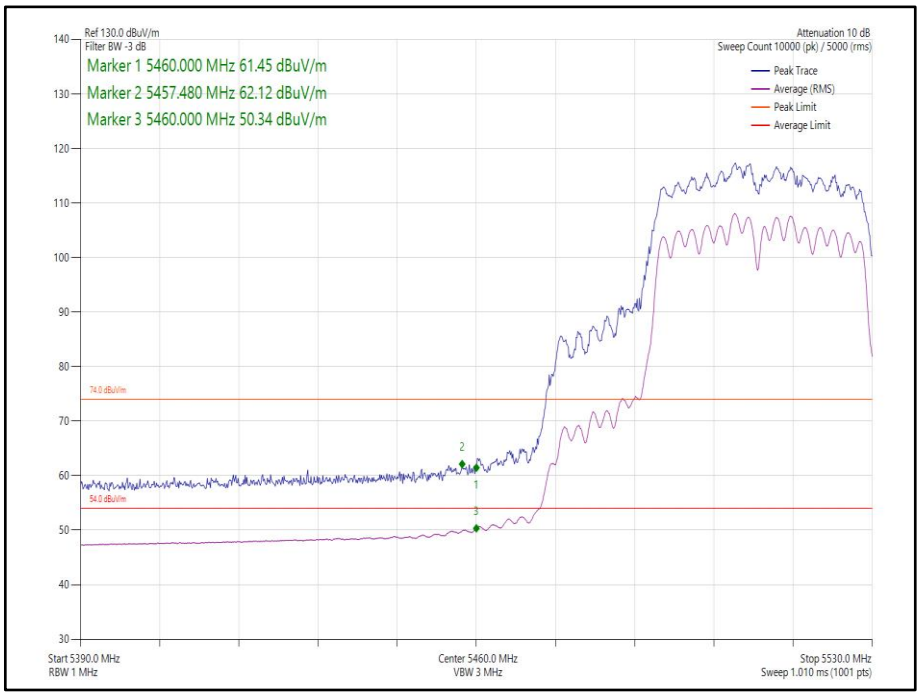

Figure 52 - 802.11n HT40 CDD, Cores 0-1 - 5510 MHz Band Edge Frequency 5460 MHz

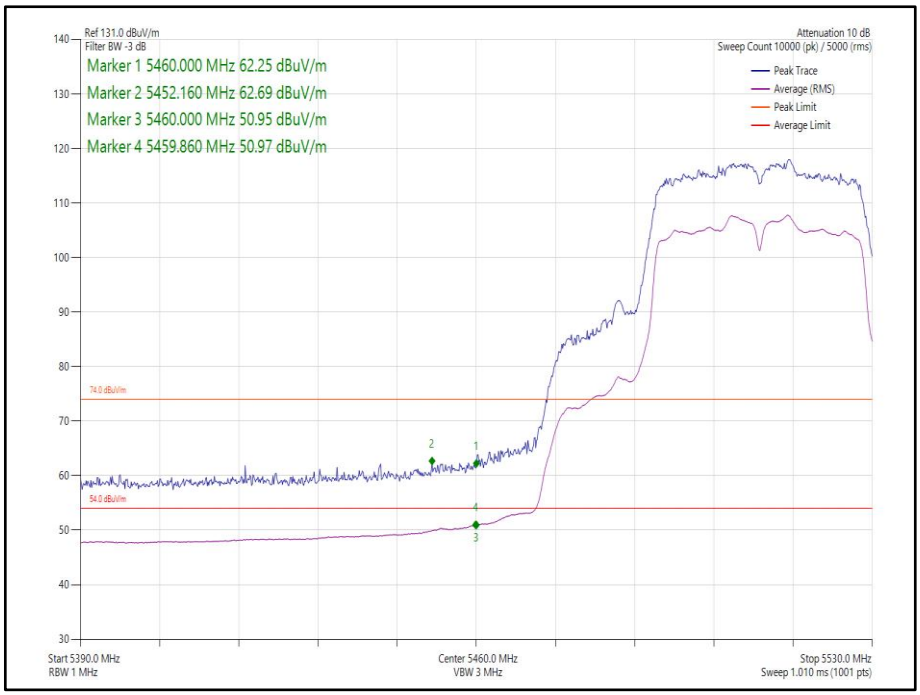

Figure 53 - 802.11n HT40 SDM, Cores 0-1 - 5510 MHz Band Edge Frequency 5460 MHz

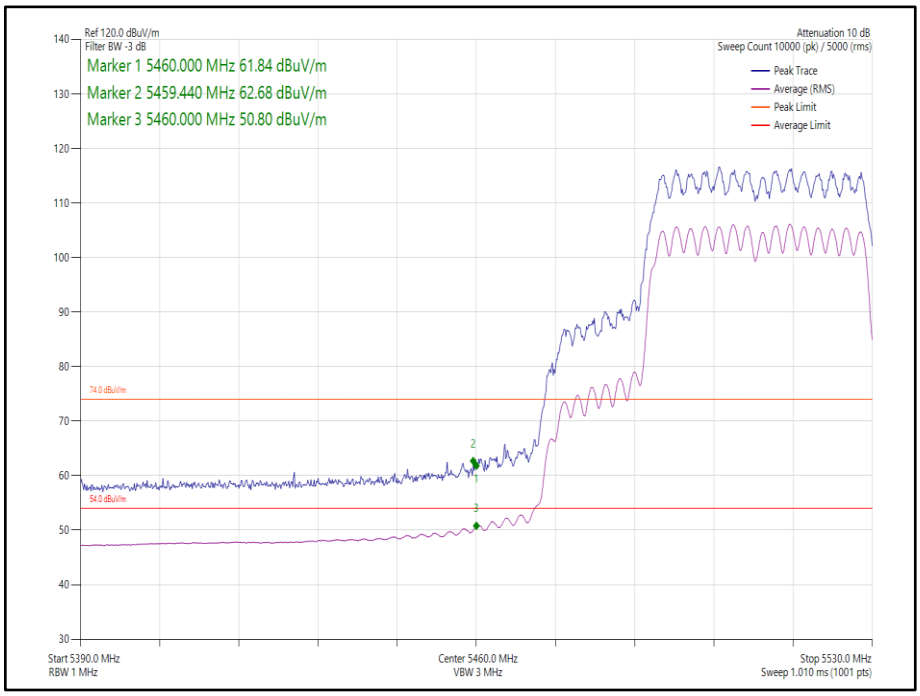

Figure 54 - 802.11ax HE40 CDD, Cores 0-1, SU - 5510 MHz Band Edge Frequency 5460 MHz

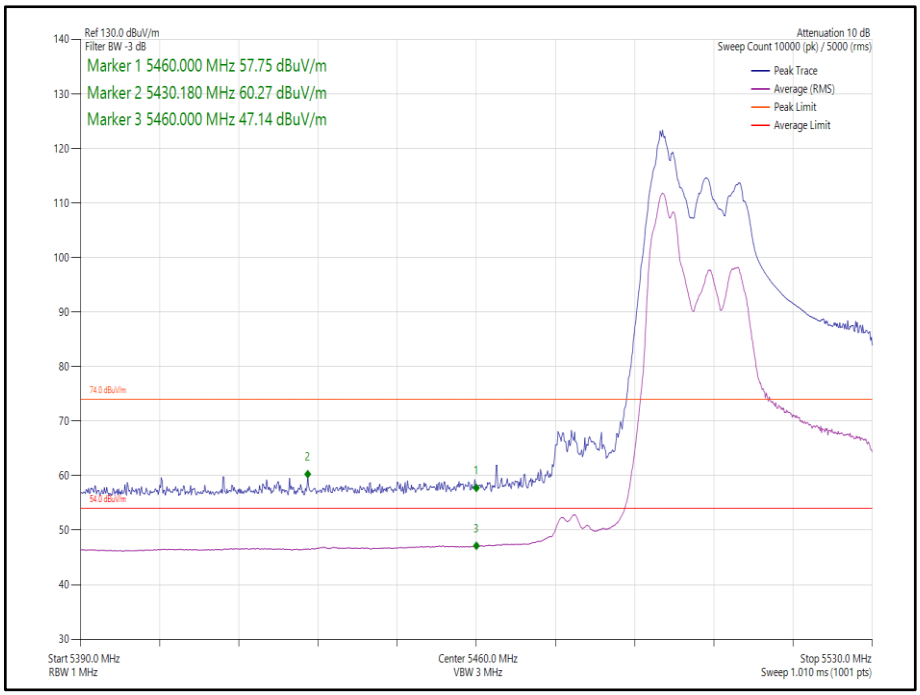

Figure 55 - 802.11ax HE40 CDD, Cores 0-1, RU52-37 - 5510 MHz Band Edge Frequency 5460 MHz

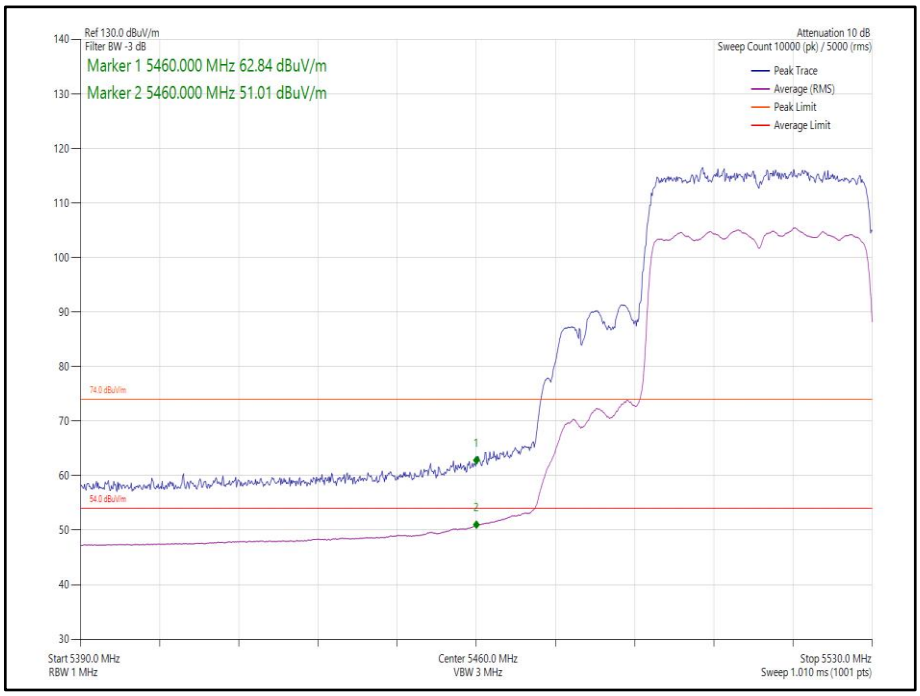

Figure 56 - 802.11ax HE40 SDM, Cores 0-1, SU - 5510 MHz Band Edge Frequency 5460 MHz

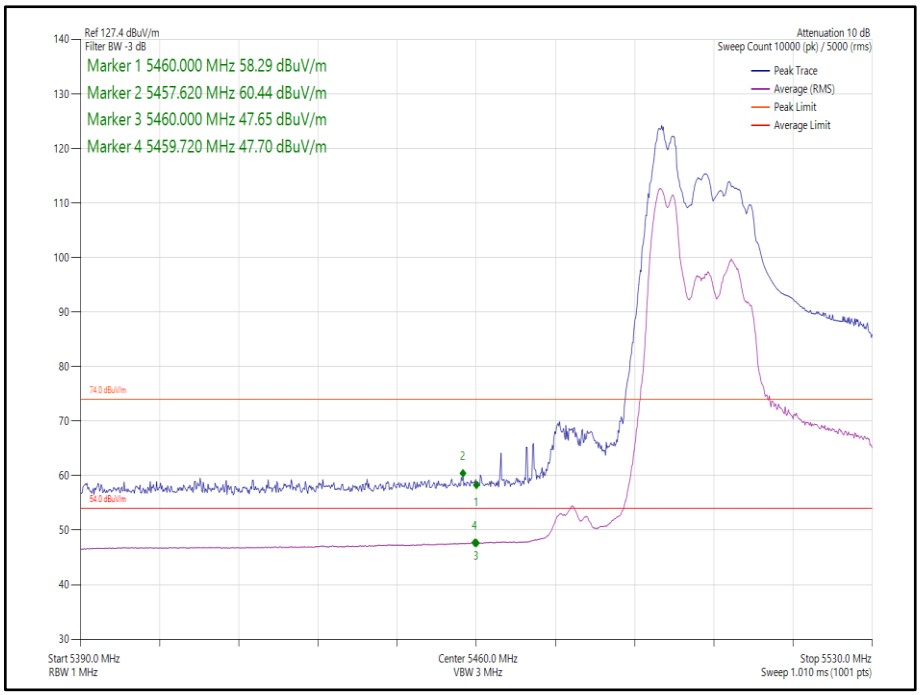

Figure 57 - 802.11ax HE40 SDM, Cores 0-1, RU52-37 - 5510 MHz Band Edge Frequency 5460 MHz

Mode	Data Rate/ MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBµV/m)
802.11ac VHT80, Core 0	MCS 2x1	-	-	5210	5150	62.48	50.96
802.11ax HE80, Core 0	MCS 4x1	SU	-	5210	5150	62.62	50.78
802.11ax HE80, Core 0	MCS 11x1	26	0	5210	5150	61.38	49.63
802.11ac VHT80, Core 1	MCS 8x1	-	-	5290	5350	63.51	50.87
802.11ax HE80, Core 1	MCS 2x1	SU	-	5290	5350	62.64	50.63
802.11ax HE80, Core 1	MCS 11x1	52	52	5290	5350	62.54	50.62
802.11ac VHT80, Core 1	MCS 4x1	-	-	5530	5460	62.50	50.98
802.11ax HE80, Core 1	MCS 11x1	SU	-	5530	5460	63.30	50.80
802.11ax HE80, Core 1	MCS 11x1	52	37	5530	5460	65.74	50.86

Table 10 - 80 MHz Bandwidth (SISO) Restricted Band Edge Results

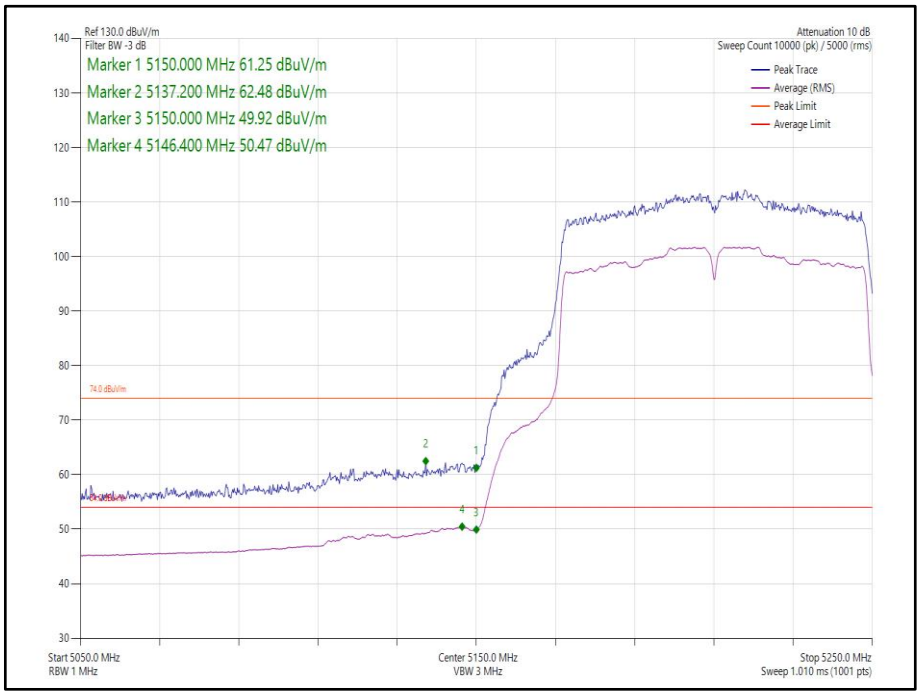

Figure 58 - 802.11ac VHT80, Core 0 - 5210 MHz Band Edge Frequency 5150 MHz

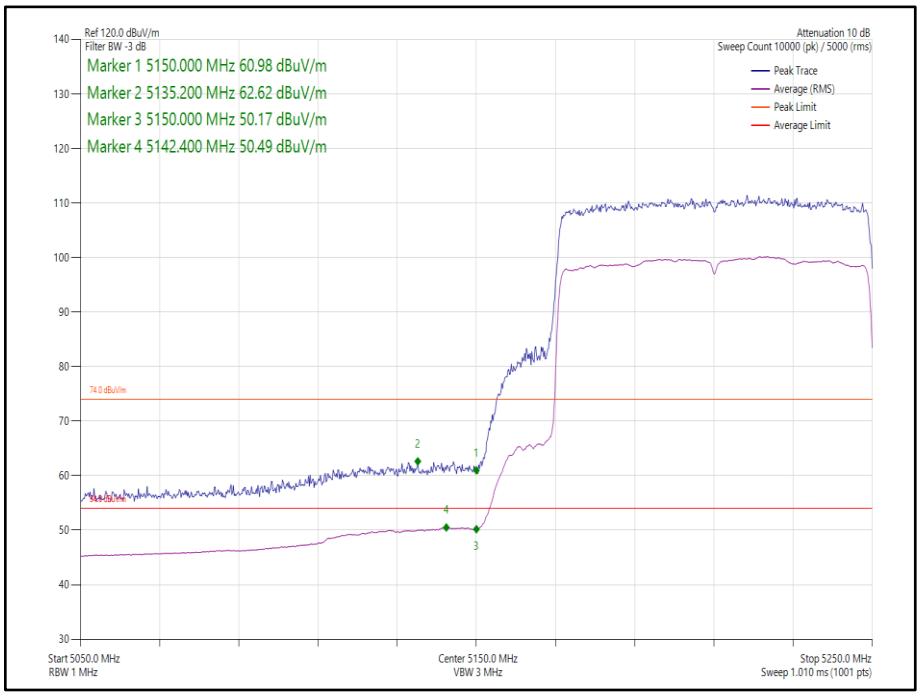

Figure 59 - 802.11ax HE80, Core 0, SU - 5210 MHz
Band Edge Frequency 5150 MHz

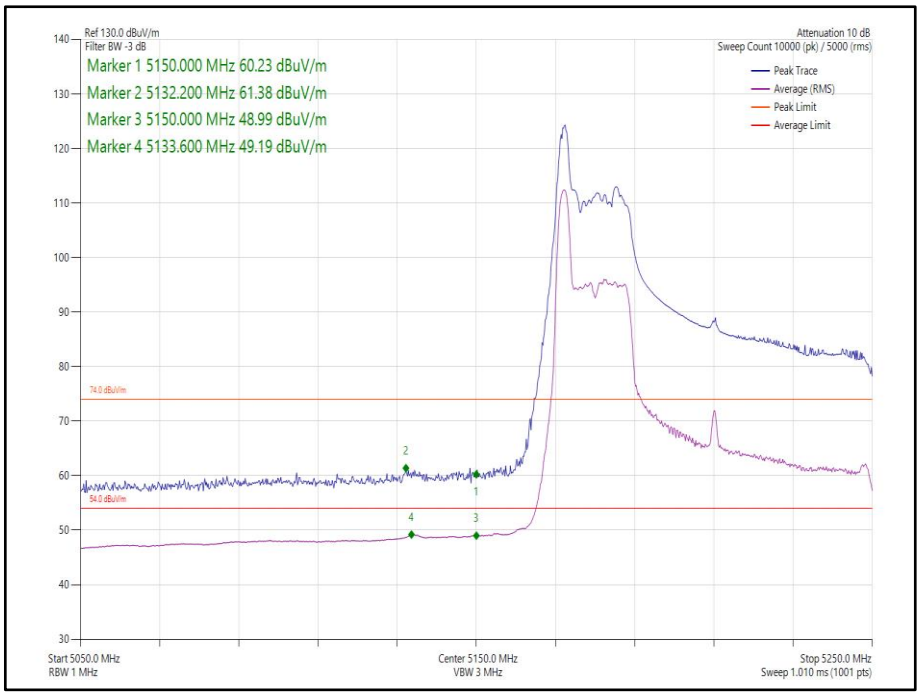

Figure 60 - 802.11ax HE80, Core 0, RU26-0 - 5210 MHz
Band Edge Frequency 5150 MHz