FCC and ISED Test Report

Apple Inc
Model: A2918

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

Add value.
Inspire trust.

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

FCC ID: BCGA2918 IC: 579C-A2918

COMMERCIAL-IN-CONFIDENCE

Document 75957632-24 Issue 01

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Matthew Russell	Chief Engineer	Authorised Signatory	13 June 2023

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	Lauren Walters	13 June 2023	

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: 2021, 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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ACCREDITATION

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Contents

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	13-June-2023

Table 1

1.2 Introduction

Applicant	Apple Inc
Manufacturer	Apple Inc
Model Number(s)	A2918
Serial Number(s)	D5WW0J3220, D2Q3YQPDWP, KJ69CYVW1C, P09T66XTNP and F7MJXMD2XQ
Hardware Version(s)	REV 1.0
Software Version(s)	22E21820r, 22E21820r, 23A11410s, 22E21820r and 23A209a
Number of Samples Tested	5
Test Specification/Issue/Date	FCC 47 CFR Part 15E: 2021 ISED RSS-247: Issue 2 (2017-02) ISED RSS-GEN: Issue 5 (2018-04) + A2 (2021-02)
Start of Test	03-March-2023
Finish of Test	09-May-2023
Name of Engineer(s)	Michael Evans, Morsalin Hossain, Nicolae Mihailiuc, Mustafa Murad, Feda Hussein, Jayvir Makwana, Mahmud Chowdhury, Taha Shafique, Mohammad Malik, Elliot Callender, Ioan-Alexandru Bogatu and Stefan Gilfedder
Related Document(s)	ANSI C63.10 (2020) ANSI C63.10 (2013) KDB 662911 D01 v02r01 KDB 905462 D02 v02 KDB 905462 D03 v01r02 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
	FCC Part 15E	RSS-247	RSS-GEN			
Configuration and Mode: 5 GHz WLAN						
-	15.203	-	-	Antenna Requirement	N/T	The device complies with the provisions of this section, as it uses permanently attached integral antennas.
2.1	15.205	3.3	8.10	Restricted Band Edges	Pass	
2.2	15.407 (a)	6.2	-	Emission Bandwidth	Pass	
2.3	15.407 (a)	6.2	-	Maximum Conducted Output Power	Pass	
2.4	15.407 (a)	6.2	-	Maximum Conducted Power Spectral Density	Pass	
2.5	15.407 (b)	6.2	-	Authorised Band Edges	Pass	
2.6	15.209 and 15.407 (b)	6.2	6.13 and 8.9	Spurious Radiated Emissions	Pass	
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 (EUT) was a portable laptop computer.

1.4.2 Test Modes

The EUT's 5 GHz 802.11 radio supported SISO (Single Input/Single Output) and 2x2 MIMO (Multiple Input/Multiple Output) modes. 802.11a supports 20 MHz bandwidth only. 802.11n supported 20 MHz and 40 MHz bandwidths, 802.11ac and ax supported 20 MHz, 40 MHz, 80 MHz and 160 MHz bandwidths.

802.11a mode supported SISO operation only. 802.11n, ac and ax supported SISO, Cyclic Delay Diversity (CDD) and Space Division Multiplexing (SDM) modes. 802.11n and ac also additionally support Transmit Beamforming (TxBF) mode on 20 MHz, 40 MHz, and 80 MHz bandwidths.

The EUT supported 802.11ax Single User (SU) and Multi-User (MU) with all Resource Unit (RU) sizes from 26 subcarriers, up to the maximum allowed, dependent on channel bandwidth other than in U-NII-2A and U-NII-2C where RU-26 is not supported.

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. 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 testing was performed in all modes with multiple modulation types, with only the worst-case reported. After band edge additional preliminary investigations were performed to find the worst-case mode of operation, the EUT was tested in the following supported transmit modes:

SISO Modes (Core 0):

- 802.11a – 12 Mbps
- 802.11n HT20 – MCS2
- 802.11n HT40 – MCS2
- 802.11ac VHT80 – MCS2x1
- 802.11ac VHT160 – MCS2x1
- 802.11ax HE20 SU – MCS2x1
- 802.11ax HE40 SU – MCS2x1
- 802.11ax HE80 SU – MCS2x1
- 802.11ax HE160 SU – MCS2x1
- 802.11ax HE20 MU RU26/52/106 – MCS2x1

2x2 MIMO Modes (Core 0+1):

- 802.11n/ac (V)HT20 - CDD (MCS2), SDM (MCS10) and TxBF (MCS2x1)
- 802.11n/ac (V)HT40 - CDD (MCS2), SDM (MCS10) and TxBF (MCS2x1)
- 802.11ac VHT80 – CDD (MCS2x1), SDM (MCS2x2) and TxBF (MCS2x1)
- 802.11ac VHT160 – CDD (MCS2x1), SDM (MCS2x2)
- 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 HE160 SU – CDD (MCS2x1) and SDM (MCS2x2)
- 802.11ax HE20 MU RU26/52/106 – CDD (MCS2x1) and SDM (MCS2x2)

*Note: The RU offset for bottom and middle channels were placed in the lowest position and on the top channel, the offset was placed in the upper most position. HT (802.11n) modes were used for CDD and SDM and VHT (802.11ac) modes were used for TxBF.

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 all testing except DFS the EUT was put into a continuous transmit test mode with the chipset manufacturer's test commands. 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

Antenna Port	Frequency Range (MHz)	Peak Gain (dBi)	Conducted Cable Loss (dB)
Core 0	5150 to 5250	6.64	1.07
	5250 to 5350	8.07	1.07
	5470 to 5725	5.72	1.17
	5725 to 5850	5.61	1.18
Core 1	5150 to 5250	4.22	1.07
	5250 to 5350	5.80	1.07
	5470 to 5725	4.43	1.17
	5725 to 5850	4.66	1.18

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: A2918, Serial Number: D2Q3YQPDWP			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A2918, Serial Number: D5WW0J3220			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A2918, Serial Number: P09T66XTNP			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A2918, Serial Number: KJ69CYVW1C			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A2918, Serial Number: F7MJXMD2XQ			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 4

1.7 Test Location

TÜV SÜD conducted the following tests at our Concorde Park Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: 5 GHz WLAN		
Restricted Band Edges	Michael Evans, Morsalin Hossain and Nicolae Mihailiuc	UKAS
Emission Bandwidth	Mustafa Murad, Feda Hussein, Jayvir Makwana and Mahmud Chowdhury	UKAS
Maximum Conducted Output Power	Mustafa Murad, Feda Hussein, Jayvir Makwana and Mahmud Chowdhury	UKAS
Maximum Conducted Power Spectral Density	Feda Hussein, Jayvir Makwana, Mahmud Chowdhury and Mustafa Murad	UKAS
Authorised Band Edges	Michael Evans, Morsalin Hossain and Nicolae Mihailiuc	UKAS
Spurious Radiated Emissions	Taha Shafique, Mohammad Malik, Elliot Callender, Morsalin Hossain, Nicolae Mihailiuc and Ioan-Alexandru Bogatu	UKAS
Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period	Stefan Gilfedder	UKAS
Configuration and Mode: 5 GHz WLAN - Client to Client		
Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period	Stefan Gilfedder	UKAS

Table 5

Office Address:

TÜV SÜD
Concorde Park
Concorde Way
Fareham
Hampshire
PO15 5FG
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-247, Clause 3.3
ISED RSS-GEN, Clause 8.10

2.1.2 Equipment Under Test and Modification State

A2918, S/N: D2Q3YQPDWP - Modification State 0
A2918, S/N: D5WW0J3220 - Modification State 0

2.1.3 Date of Test

03-March-2023 to 22-March-2023

2.1.4 Test Method

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

Restricted Band Edge measurements were performed with the device operating in SISO, MIMO and TxBF, 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.

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

2.1.5 Environmental Conditions

Ambient Temperature	22.9 - 23.2 °C
Relative Humidity	36.5 - 46.5 %

2.1.6 Test Results

5 GHz WLAN

20 MHz Bandwidth - Core 0 (SISO)

Mode	Data Rate/ MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBuV/m)
802.11a	24 Mbps	-	-	5180	5150	65.46	51.07
802.11n HT20	MCS7	-	-	5180	5150	69.46	49.48
802.11ax HE20	MCS4x1	SU	-	5180	5150	66.66	51.34
802.11ax HE20	MCS11x1	106	54	5180	5150	69.23	49.90
802.11a	24 Mbps	-	-	5320	5350	66.66	51.33
802.11n HT20	MCS7	-	-	5320	5350	69.49	51.29
802.11ax HE20	MCS11x1	SU	-	5320	5350	69.34	50.19
802.11ax HE20	MCS11x1	106	53	5320	5350	69.41	50.75
802.11a	54 Mbps	-	-	5500	5460	63.60	46.01
802.11n HT20	MCS2	-	-	5500	5460	63.58	46.57
802.11ax HE20	MCS11x1	SU	-	5500	5460	63.54	44.66
802.11ax HE20	MCS11x1	106	53	5500	5460	63.26	45.63

Table 6 - SISO Restricted Band Edge Results

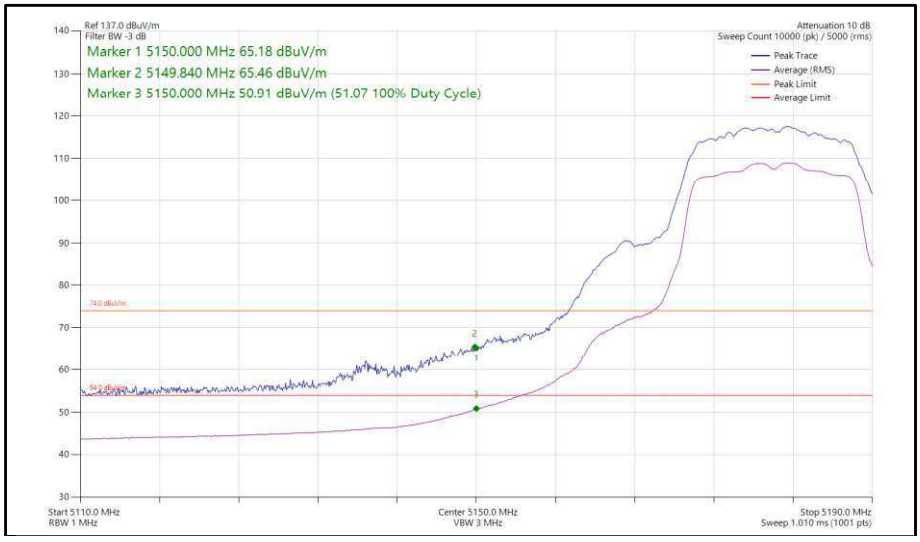

Figure 1 - 802.11a, SISO, Core 0 - 5180 MHz, Band Edge Frequency 5150 MHz

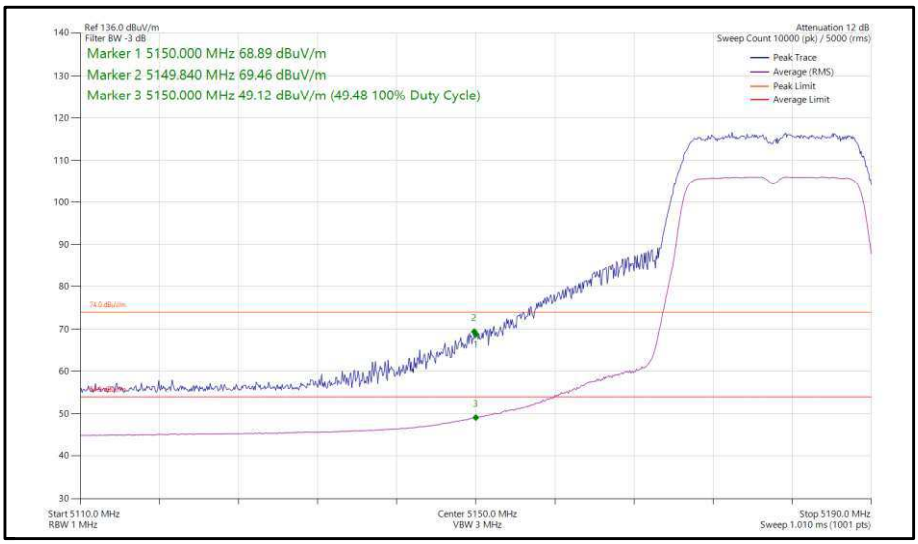

**Figure 2 - 802.11n, HT20, SISO, Core 0 - 5180 MHz,
Band Edge Frequency 5150 MHz**

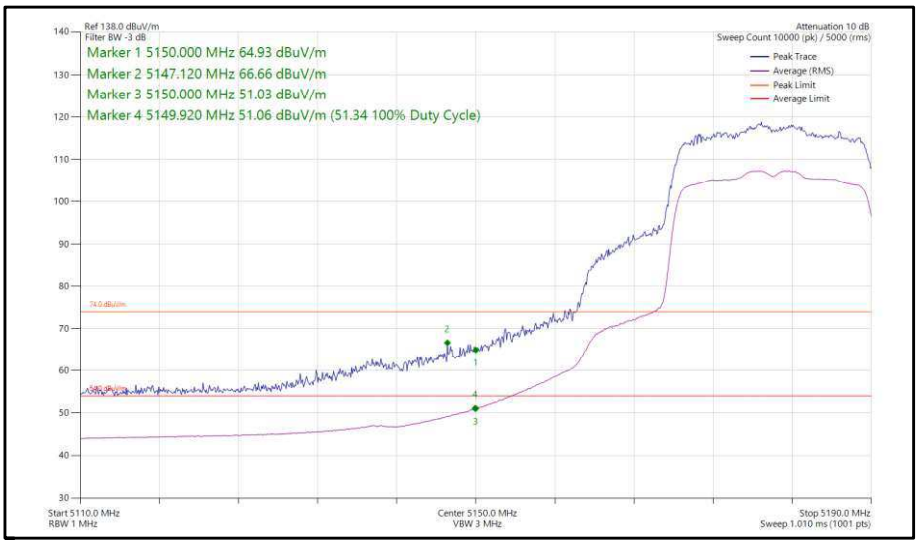

**Figure 3 - 802.11ax, HE20, SU, SISO, Core 0 - 5180 MHz,
Band Edge Frequency 5150 MHz**

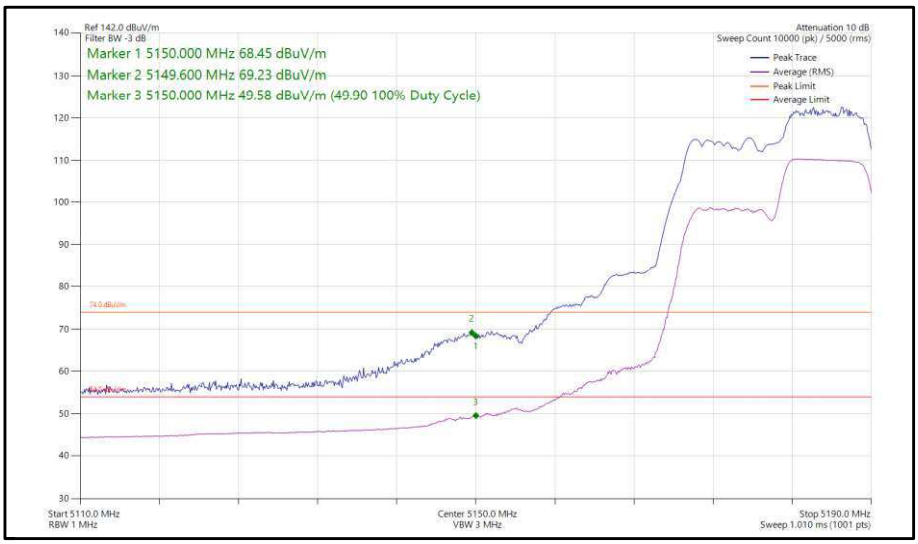

Figure 4 - 802.11ax, HE20, RU 106-54, SISO, Core 0 - 5180 MHz, Band Edge Frequency 5150 MHz

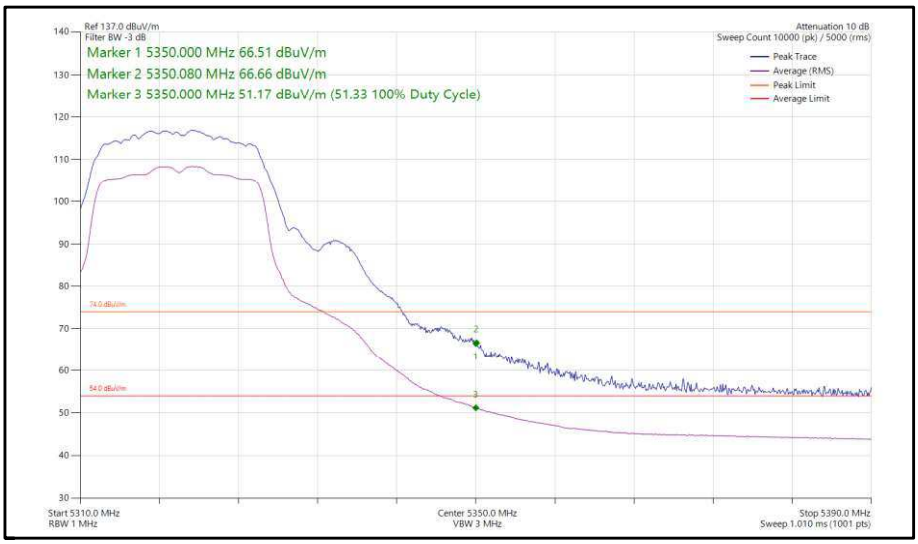

Figure 5 - 802.11a, SISO, Core 0 - 5320 MHz, Band Edge Frequency 5350 MHz

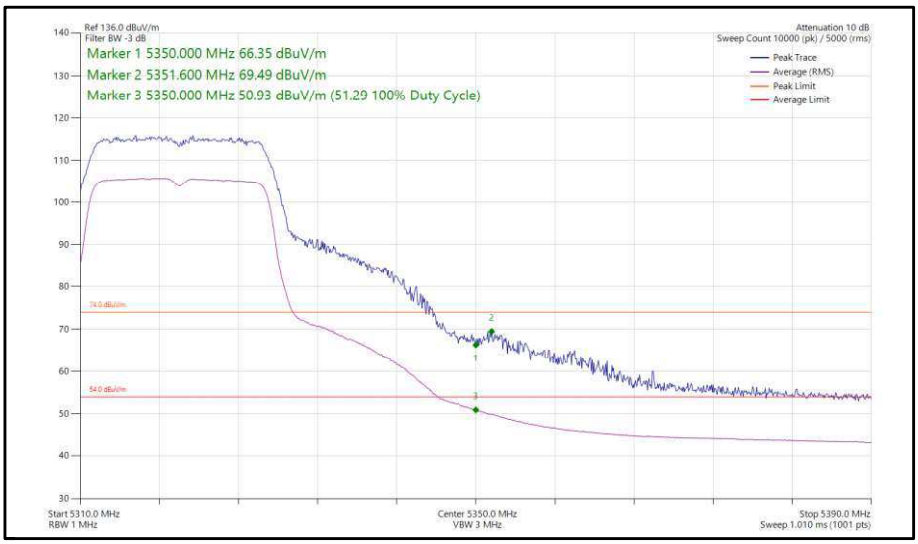

**Figure 6 - 802.11n, HT20, SISO, Core 0 - 5320 MHz,
Band Edge Frequency 5350 MHz**

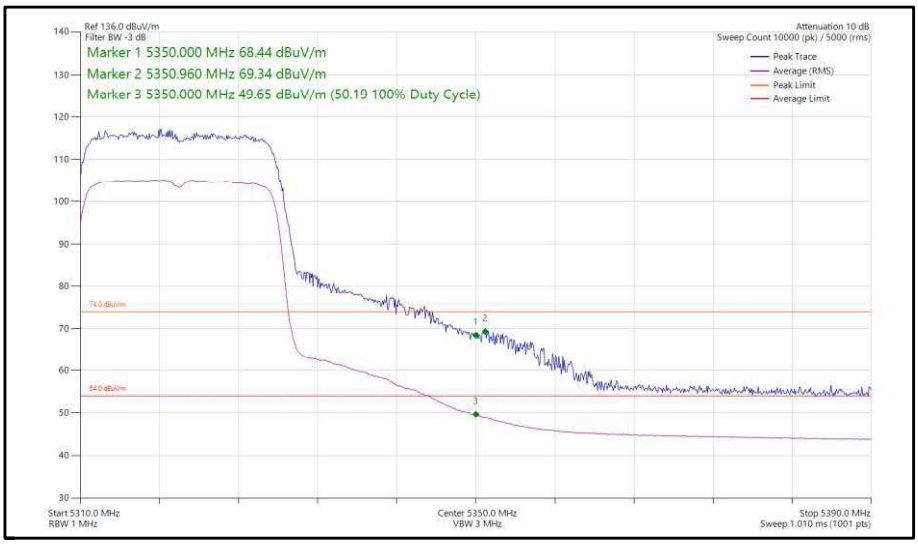

**Figure 7 - 802.11ax, HE20, SU, SISO, Core 0 - 5320 MHz,
Band Edge Frequency 5350 MHz**

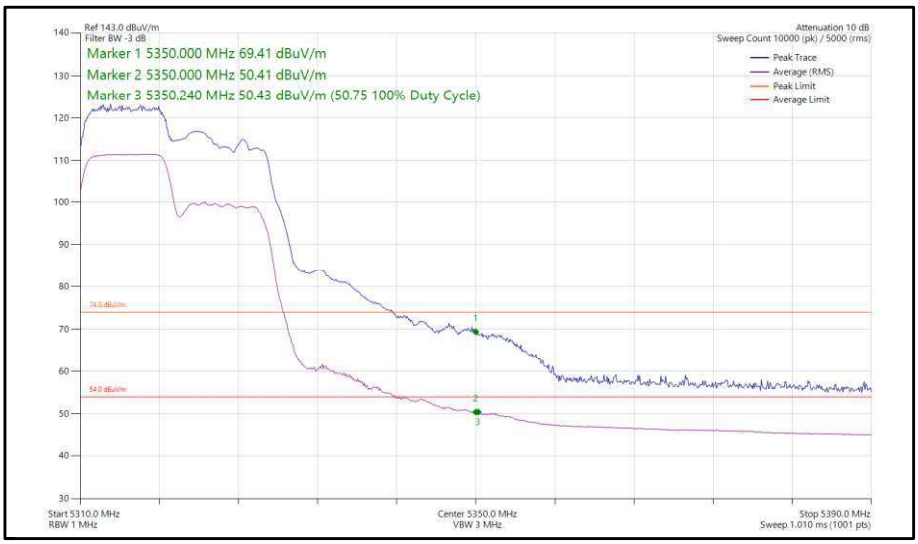

Figure 8 - 802.11ax, HE20, RU 106-53, SISO, Core 0 - 5320 MHz, Band Edge Frequency 5350 MHz

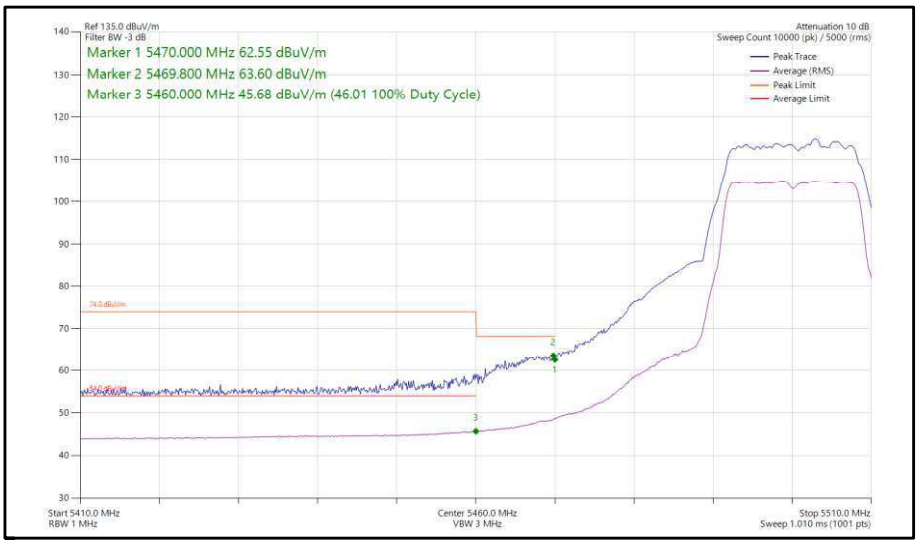

Figure 9 - 802.11a, SISO, Core 0 - 5500 MHz, Band Edge Frequency 5460 MHz

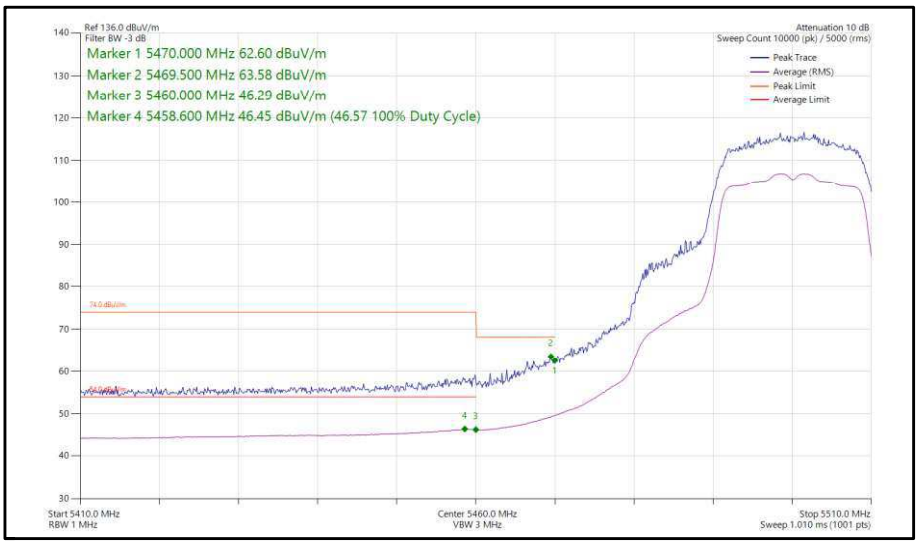

**Figure 10 - 802.11n, HT20, SISO, Core 0 - 5500 MHz,
Band Edge Frequency 5460 MHz**

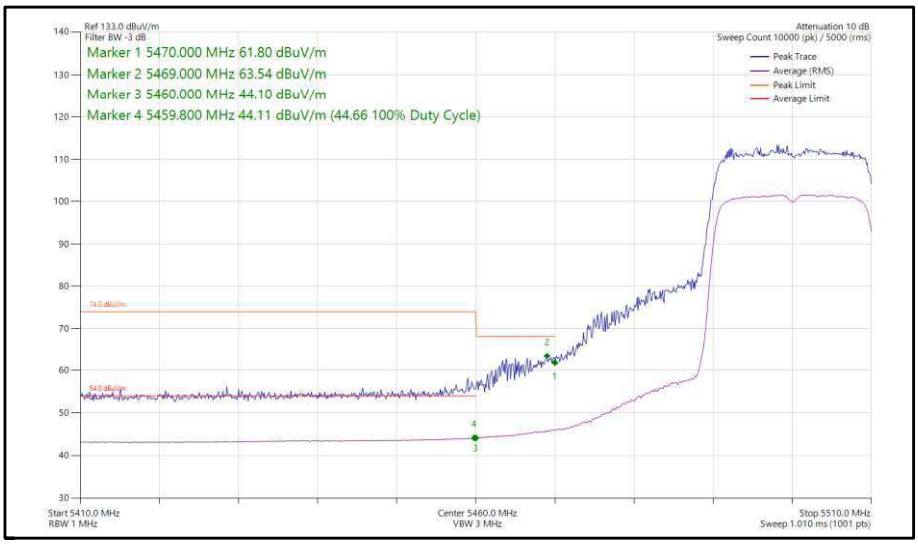

**Figure 11 - 802.11ax, HE20, SU, SISO, Core 0 - 5500 MHz,
Band Edge Frequency 5460 MHz**

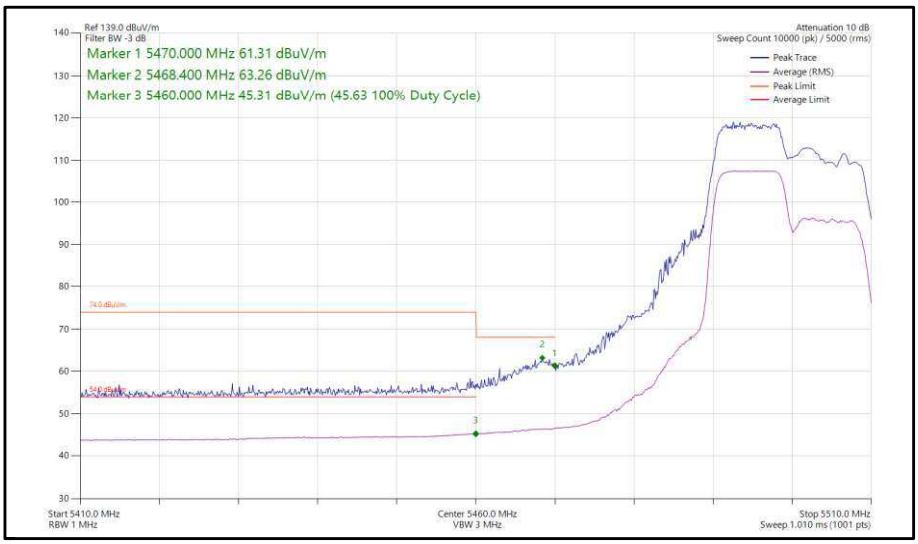

Figure 12 - 802.11ax, HE20, RU 106-53, SISO, Core 0 - 5500 MHz, Band Edge Frequency 5460 MHz

20 MHz Bandwidth - Core 1 (SISO)

Mode	Data Rate/ MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBuV/m)
802.11a	54 Mbps	-	-	5180	5150	66.67	51.45
802.11n HT20	MCS7	-	-	5180	5150	69.25	49.85
802.11ax HE20	MCS11x1	SU	-	5180	5150	69.49	50.92
802.11ax HE20	MCS11x1	106	53	5180	5150	69.25	49.67
802.11a	54 Mbps	-	-	5320	5350	67.04	51.49
802.11n HT20	MCS2	-	-	5320	5350	64.99	51.47
802.11ax HE20	MCS4x1	SU	-	5320	5350	66.61	51.33
802.11ax HE20	MCS11x1	106	54	5320	5350	69.28	50.49
802.11a	12 Mbps	-	-	5500	5460	63.45	46.19
802.11n HT20	MCS7	-	-	5500	5460	63.67	45.02
802.11ax HE20	MCS2x1	SU	-	5500	5460	63.62	46.53
802.11ax HE20	MCS11x1	106	53	5500	5460	63.31	46.79

Table 7 - SISO Restricted Band Edge Results

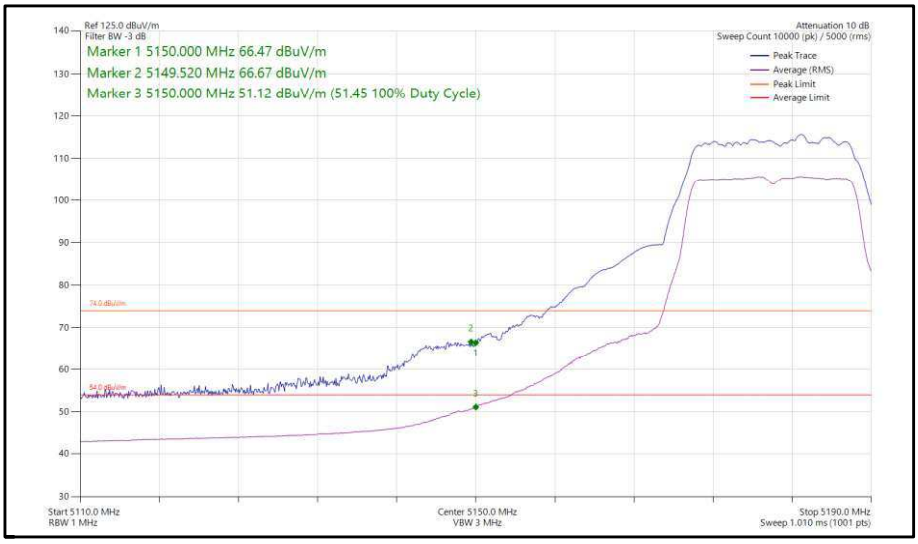

Figure 13 - 802.11a, SISO, Core 1 - 5180 MHz, Band Edge Frequency 5150 MHz

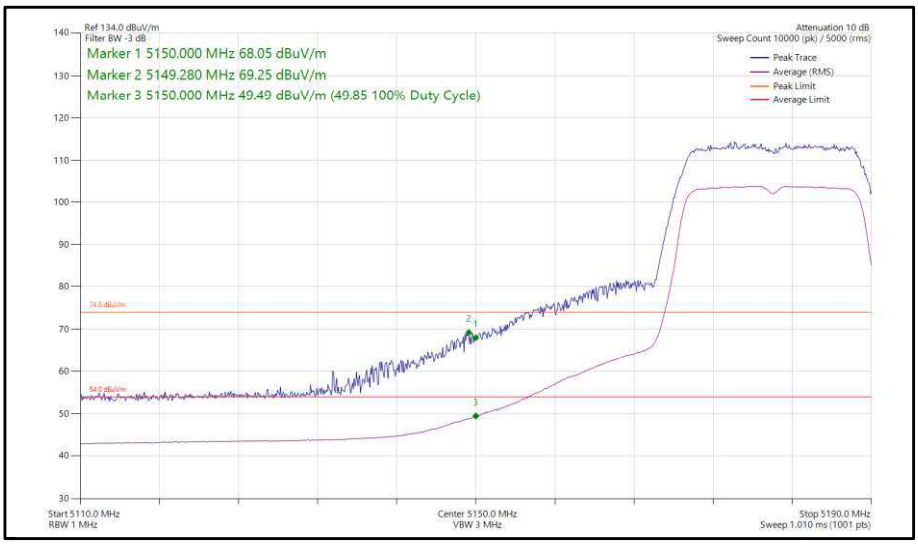

**Figure 14 - 802.11n, HT20, SISO, Core 1 - 5180 MHz,
Band Edge Frequency 5150 MHz**

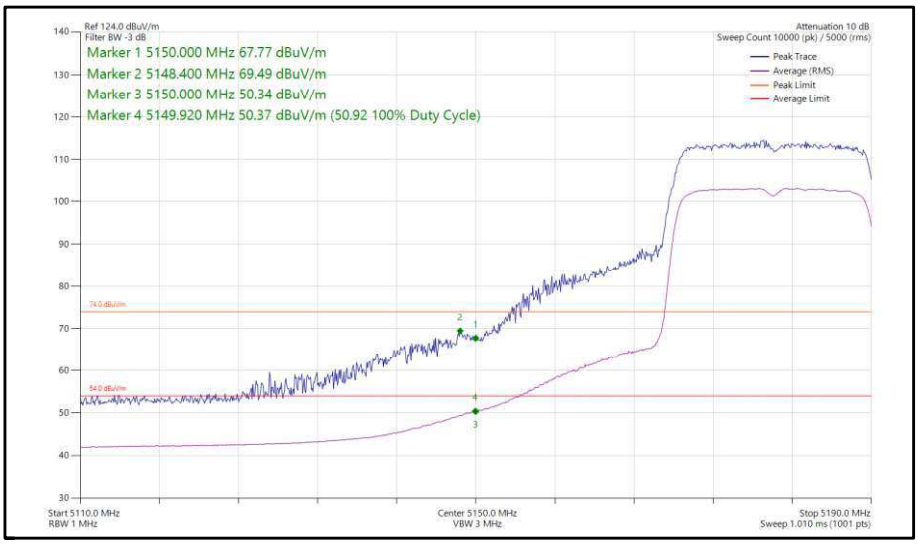

**Figure 15 - 802.11ax, HE20, SU, SISO, Core 1 - 5180 MHz,
Band Edge Frequency 5150 MHz**

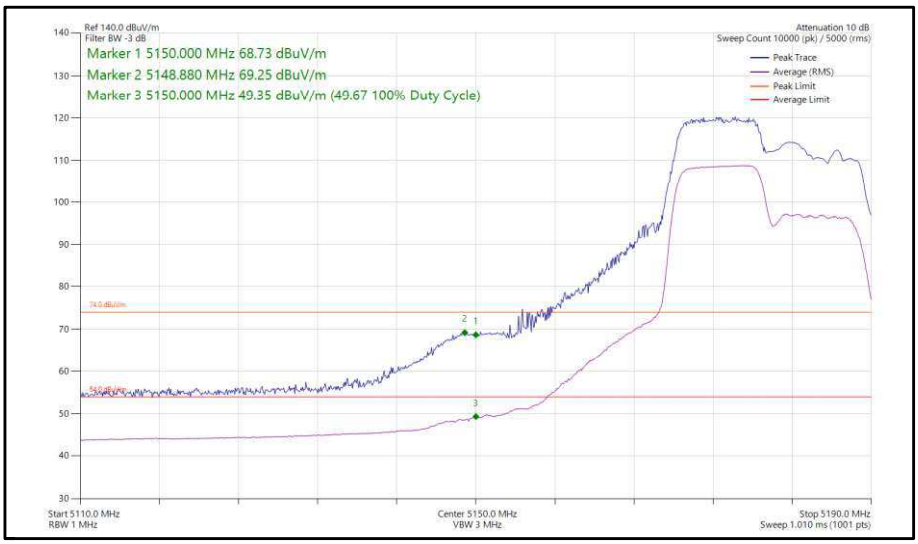

Figure 16 - 802.11ax, HE20, RU 106-53, SISO, Core 1 - 5180 MHz, Band Edge Frequency 5150 MHz

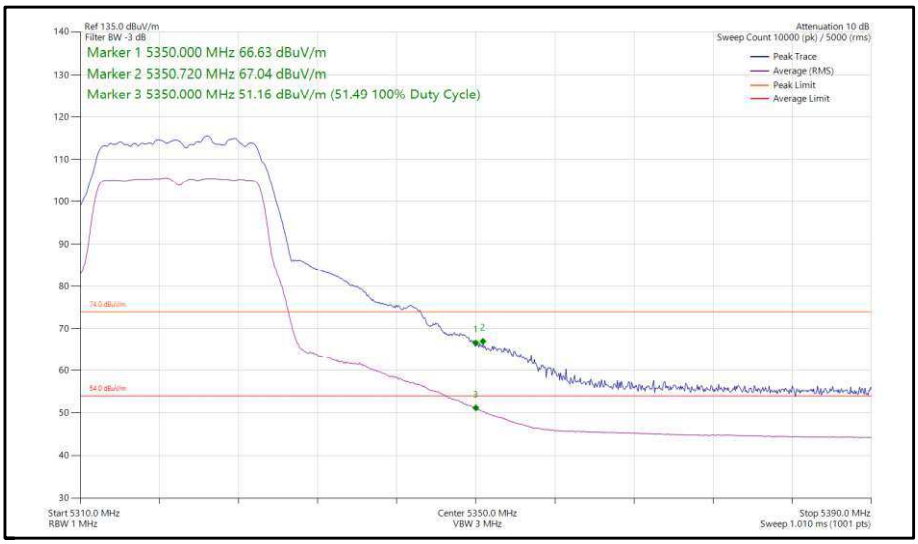

Figure 17 - 802.11a, SISO, Core 1 - 5320 MHz, Band Edge Frequency 5350 MHz

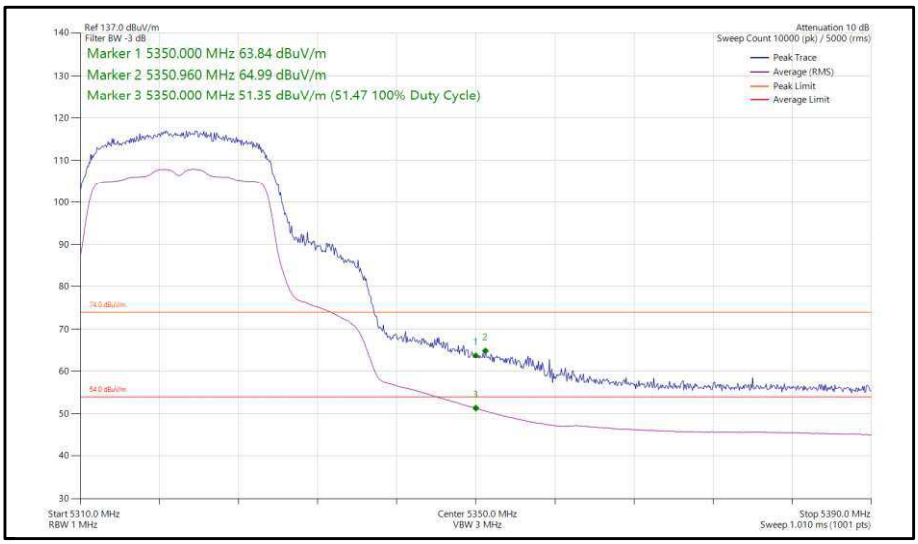

**Figure 18 - 802.11n, HT20, SISO, Core 1 - 5320 MHz,
Band Edge Frequency 5350 MHz**

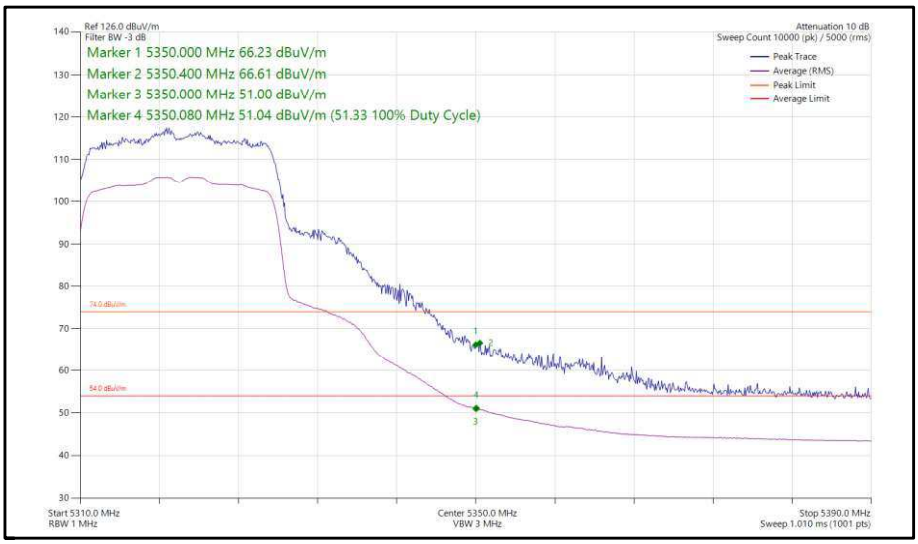

**Figure 19 - 802.11ax, HE20, SU, SISO, Core 1 - 5320 MHz,
Band Edge Frequency 5350 MHz**

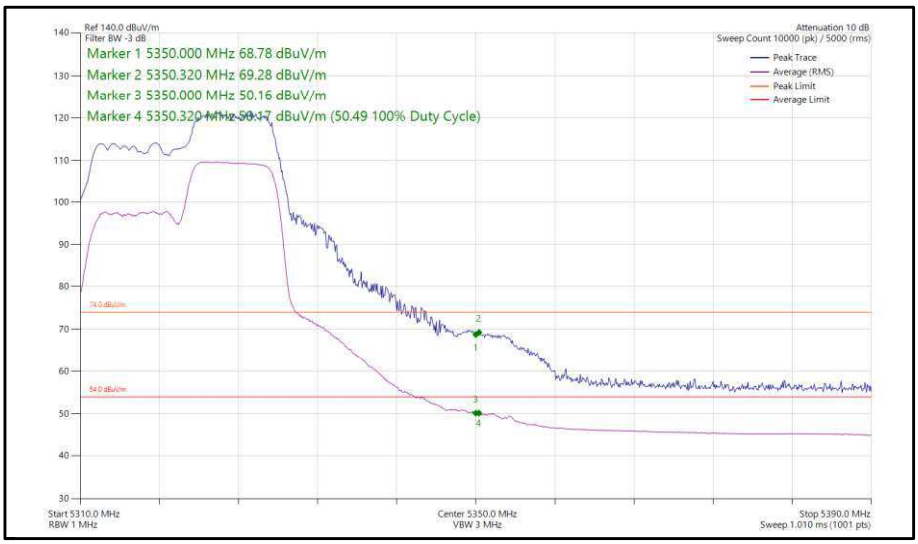

Figure 20 - 802.11ax, HE20, RU 106-54, SISO, Core 1 - 5320 MHz, Band Edge Frequency 5350 MHz

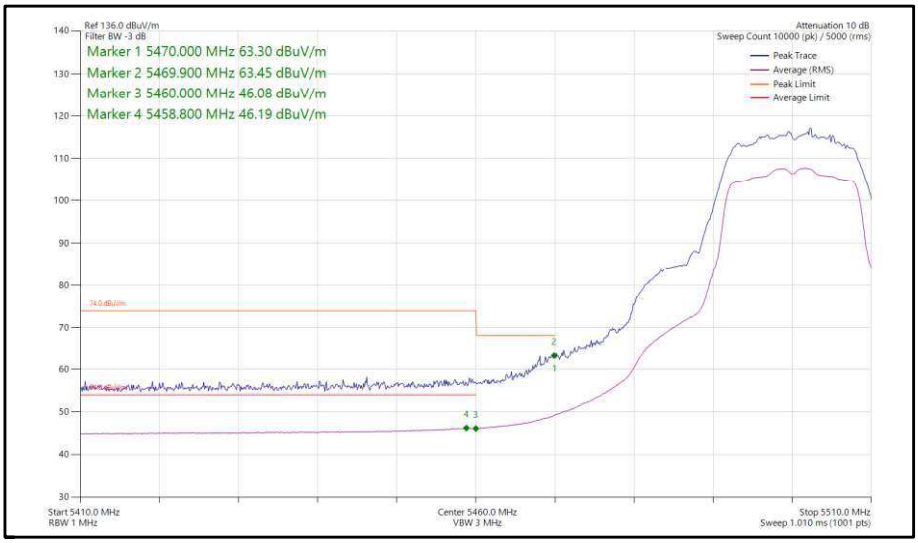

Figure 21 - 802.11a, SISO, Core 1 - 5500 MHz, Band Edge Frequency 5460 MHz

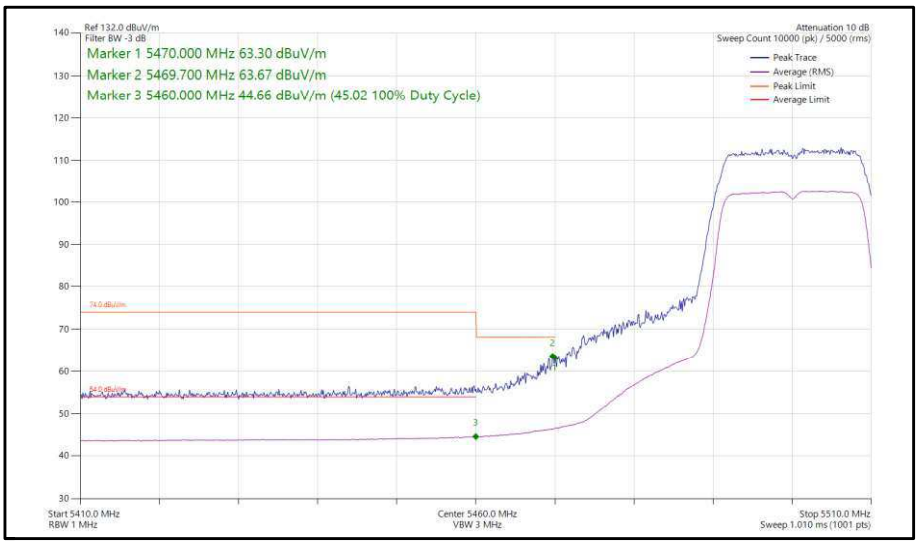

**Figure 22 - 802.11n, HT20, SISO, Core 1 - 5500 MHz,
Band Edge Frequency 5460 MHz**

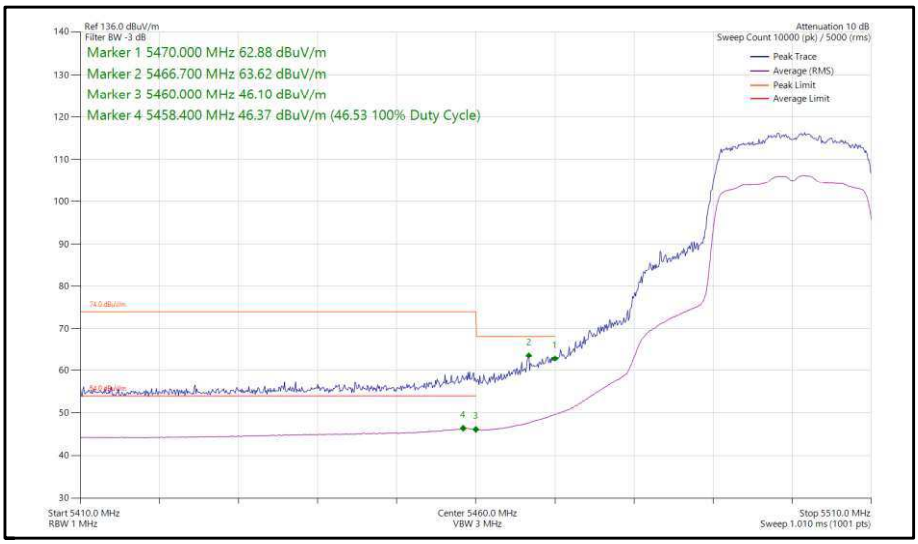

**Figure 23 - 802.11ax, HE20, SU, SISO, Core 1 - 5500 MHz,
Band Edge Frequency 5460 MHz**

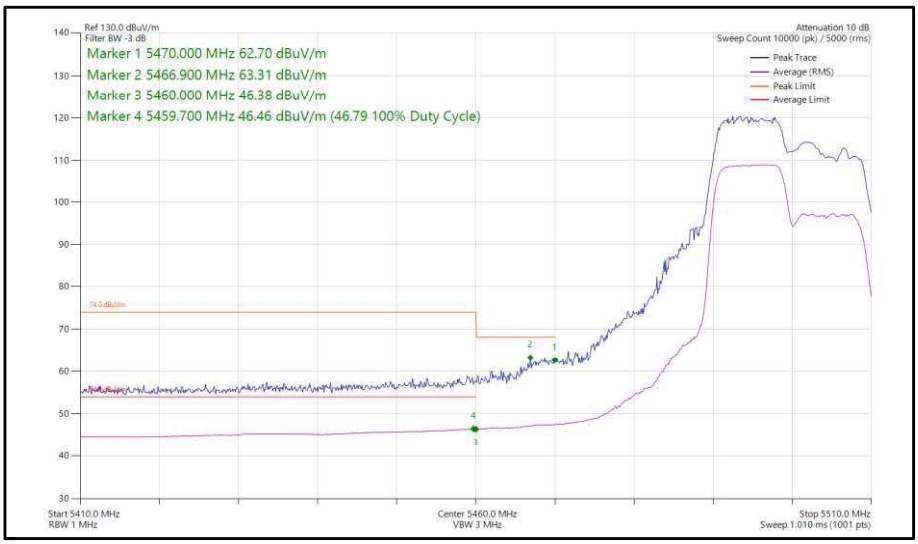

Figure 24 - 802.11ax, HE20, RU 106-53, SISO, Core 1 - 5500 MHz, Band Edge Frequency 5460 MHz

20 MHz Bandwidth - Core 0-1 (CDD)

Mode	Data Rate/ MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBuV/m)
802.11n HT20	MCS4	-	-	5180	5150	66.84	51.50
802.11ax HE20	MCS4x1	SU	-	5180	5150	66.37	51.45
802.11ax HE20	MCS11x1	106	53	5180	5150	69.13	50.61
802.11n HT20	MCS2	-	-	5320	5350	65.25	51.48
802.11ax HE20	MCS4x1	SU	-	5320	5350	66.42	51.39
802.11ax HE20	MCS11x1	106	54	5320	5350	65.20	48.98
802.11n HT20	MCS2	-	-	5500	5460	63.66	50.30
802.11ax HE20	MCS2x1	SU	-	5500	5460	63.67	47.24
802.11ax HE20	MCS11x1	106	53	5500	5460	63.43	47.27

Table 8 - CDD Restricted Band Edge Results

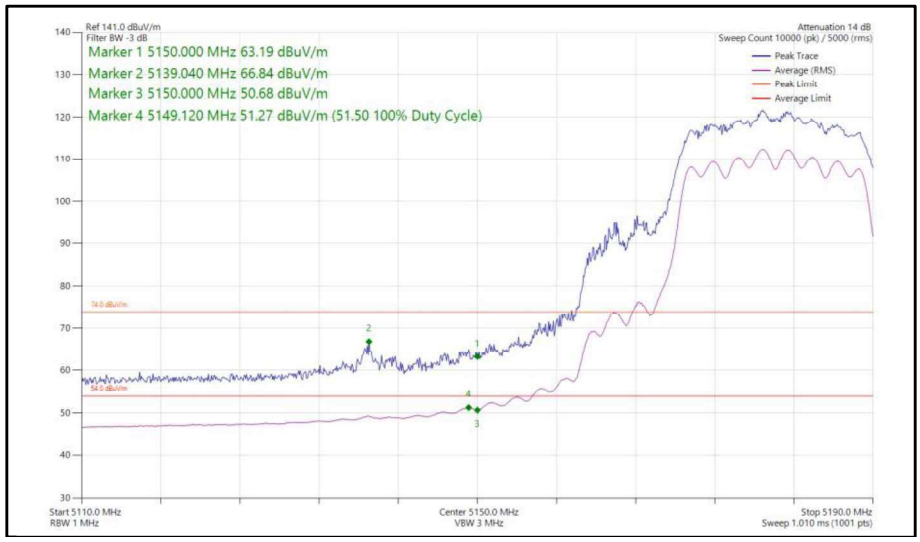

Figure 25 - 802.11n, HT20, CDD, Core 0-1 - 5180 MHz, Band Edge Frequency 5150 MHz

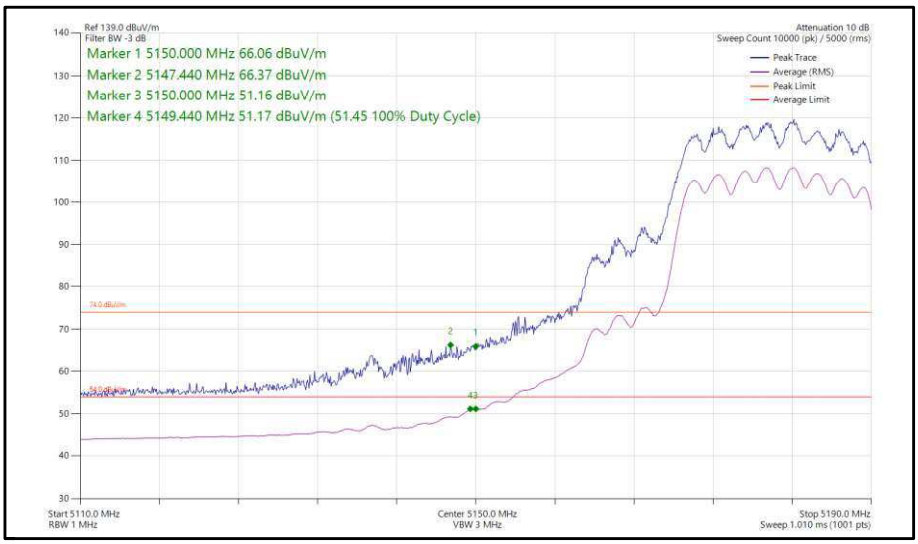

Figure 26 - 802.11ax, HE20, SU, CDD, Core 0-1 - 5180 MHz, Band Edge Frequency 5150 MHz

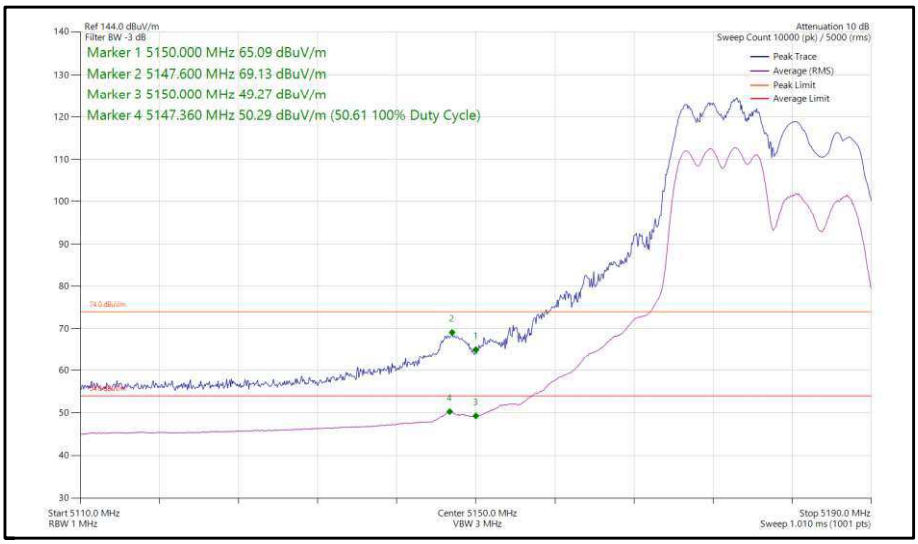

Figure 27 - 802.11ax, HE20, RU 106-53, CDD, Core 0-1 - 5180 MHz, Band Edge Frequency 5150 MHz

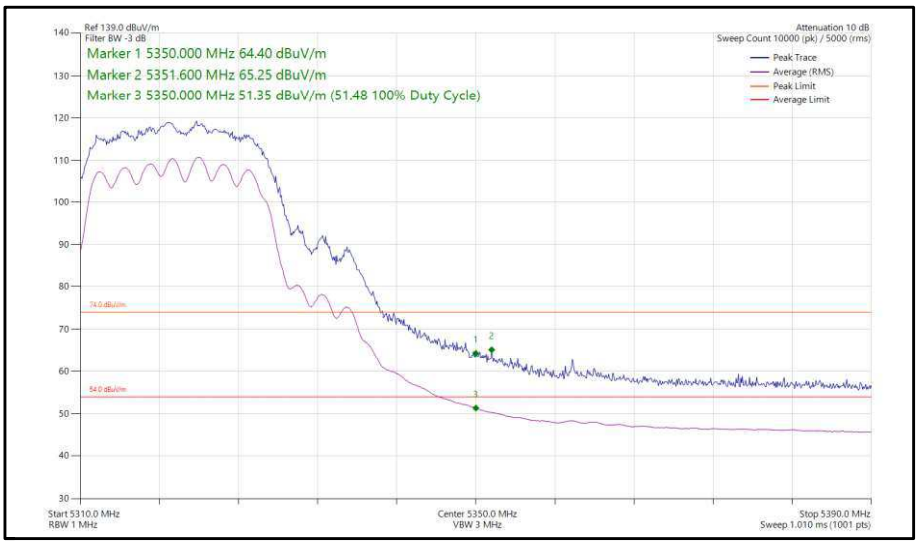

**Figure 28 - 802.11n, HT20, CDD, Core 0-1 - 5320 MHz,
Band Edge Frequency 5350 MHz**

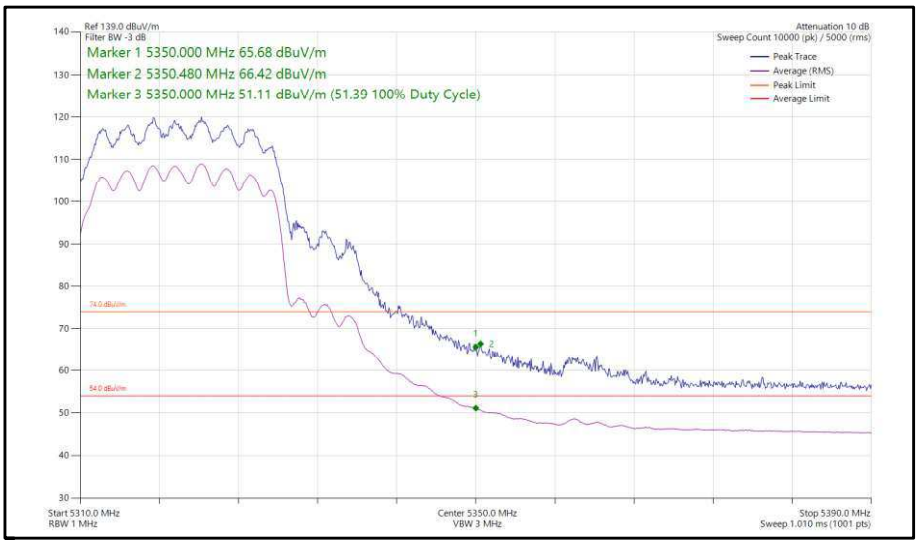

**Figure 29 - 802.11ax, HE20, SU, CDD, Core 0-1 - 5320 MHz,
Band Edge Frequency 5350 MHz**

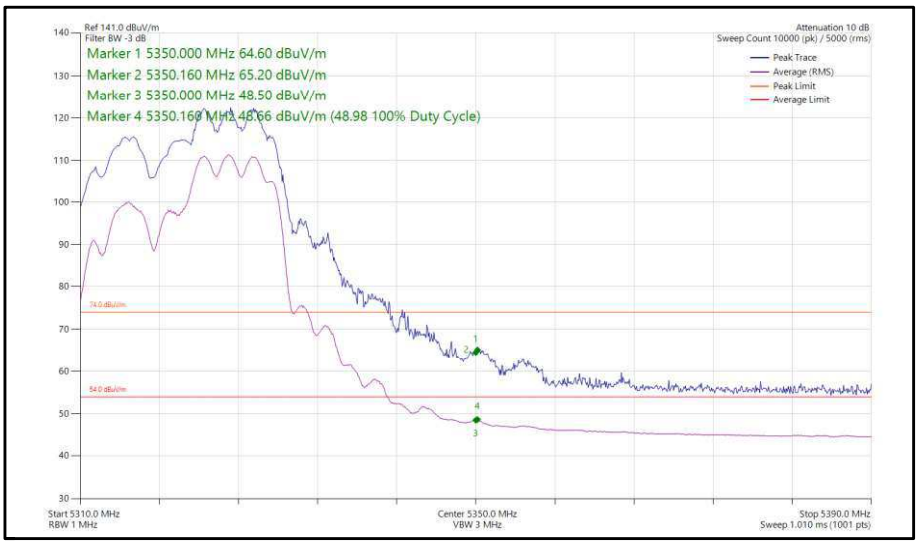

Figure 30 - 802.11ax, HE20, RU 106-54, CDD, Core 0-1 - 5320 MHz, Band Edge Frequency 5350 MHz

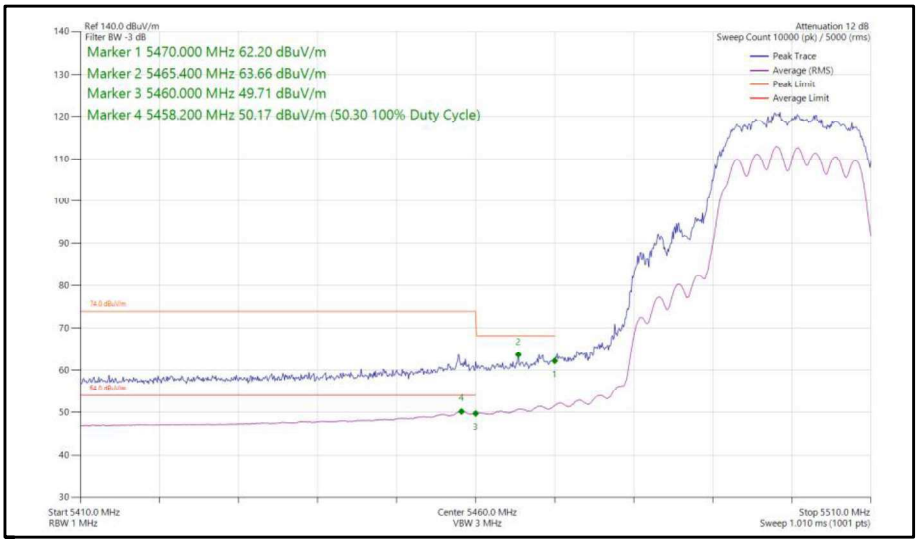

Figure 31 - 802.11n, HT20, CDD, Core 0-1 - 5500 MHz, Band Edge Frequency 5460 MHz

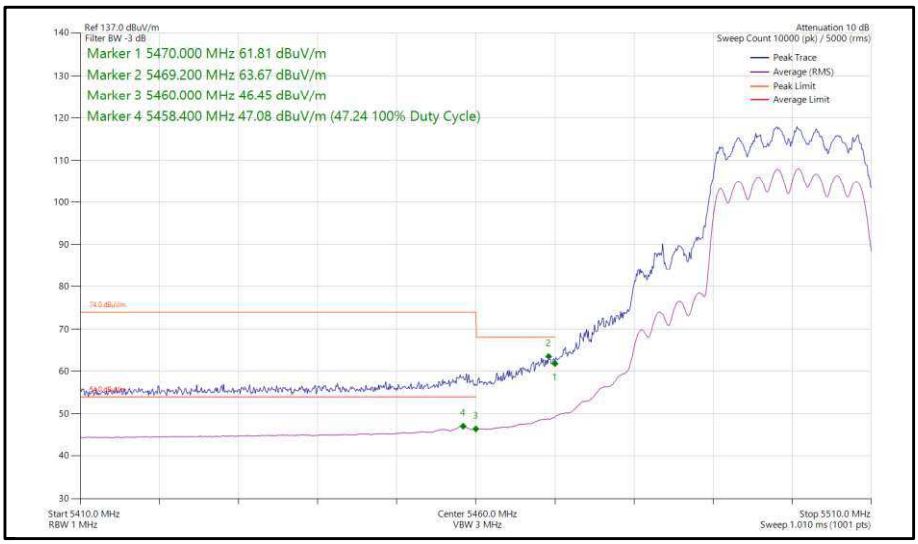

Figure 32 - 802.11ax, HE20, SU, CDD, Core 0-1 - 5500 MHz, Band Edge Frequency 5460 MHz

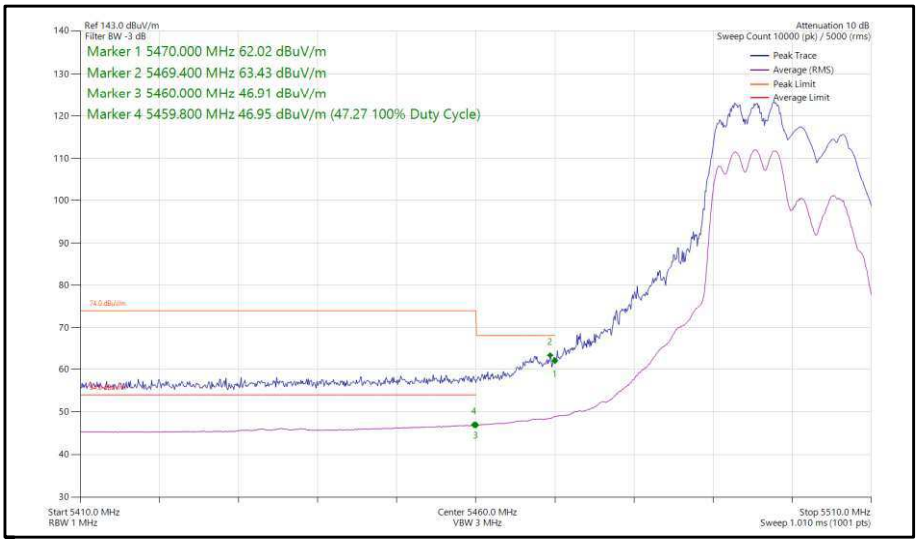

Figure 33 - 802.11ax, HE20, RU 106-53, CDD, Core 0-1 - 5500 MHz, Band Edge Frequency 5460 MHz

20 MHz Bandwidth - Core 0-1 (SDM)

Mode	Data Rate/ MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBuV/m)
802.11n HT20	MCS12	-	-	5180	5150	64.93	51.45
802.11ax HE20	MCS2x2	SU	-	5180	5150	66.24	51.50
802.11ax HE20	MCS11x2	106	53	5180	5150	69.34	51.20
802.11n HT20	MCS12	-	-	5320	5350	68.24	51.43
802.11ax HE20	MCS2x2	SU	-	5320	5350	64.71	51.47
802.11ax HE20	MCS11x2	106	53	5320	5350	69.00	50.64
802.11n HT20	MCS12	-	-	5500	5460	63.63	50.37
802.11ax HE20	MCS4x2	SU	-	5500	5460	63.05	50.87
802.11ax HE20	MCS11x2	106	53	5500	5460	63.56	47.49

Table 9 - SDM Restricted Band Edge Results

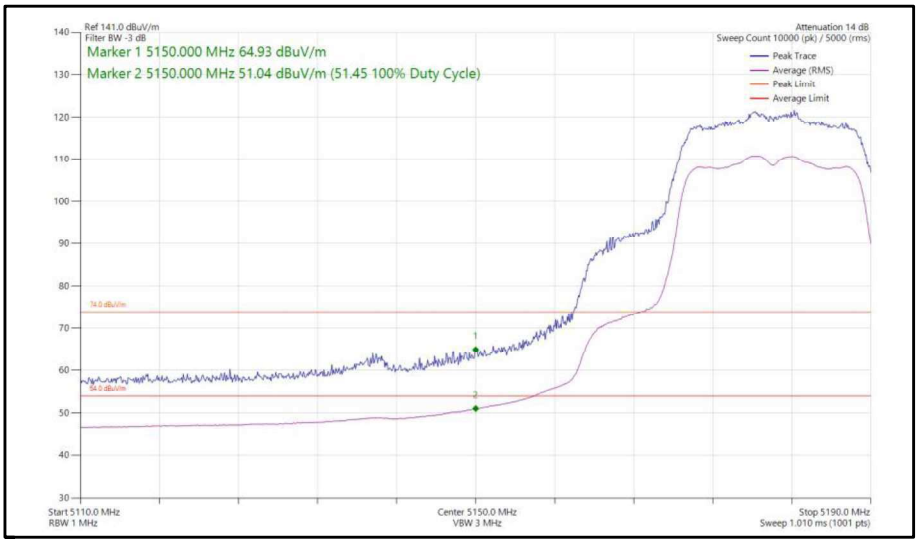

Figure 34 - 802.11n, HT20, SDM, Core 0-1 - 5180 MHz, Band Edge Frequency 5150 MHz

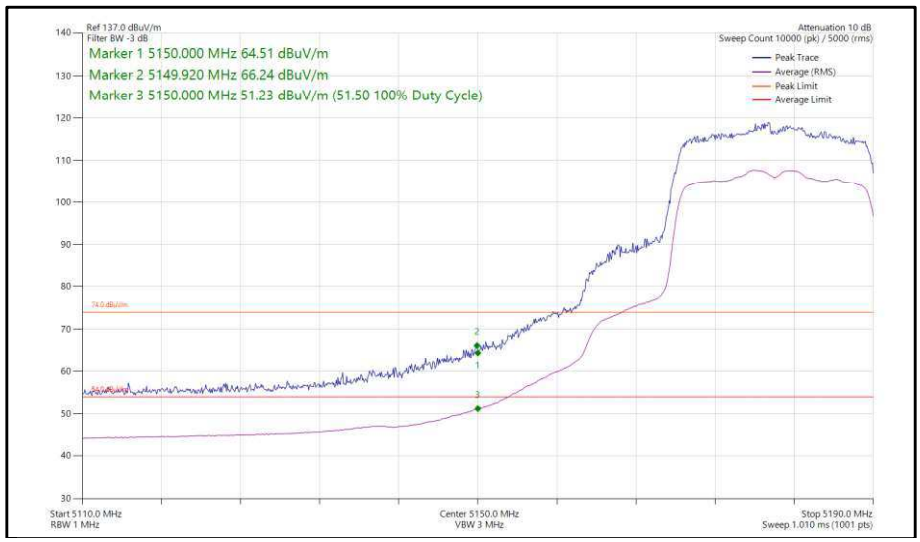

Figure 35 - 802.11ax, HE20, SU, SDM, Core 0-1 - 5180 MHz, Band Edge Frequency 5150 MHz

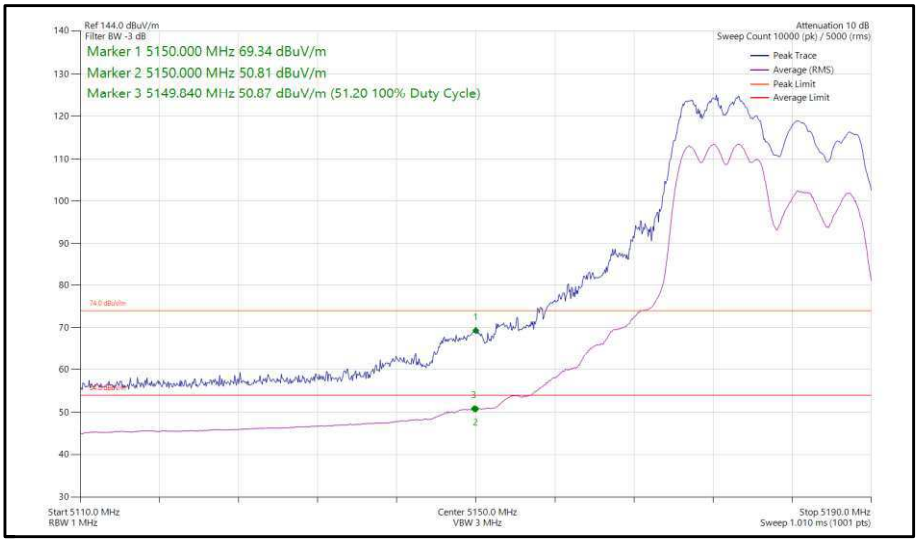

Figure 36 - 802.11ax, HE20, RU 106-53, SDM, Core 0-1 - 5180 MHz, Band Edge Frequency 5150 MHz

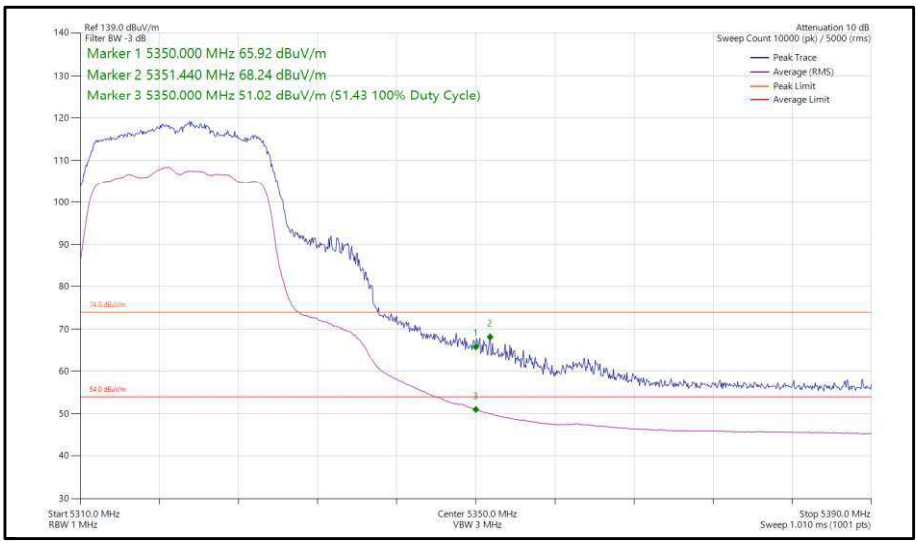

Figure 37 - 802.11n, HT20, SDM, Core 0-1 - 5320 MHz, Band Edge Frequency 5350 MHz

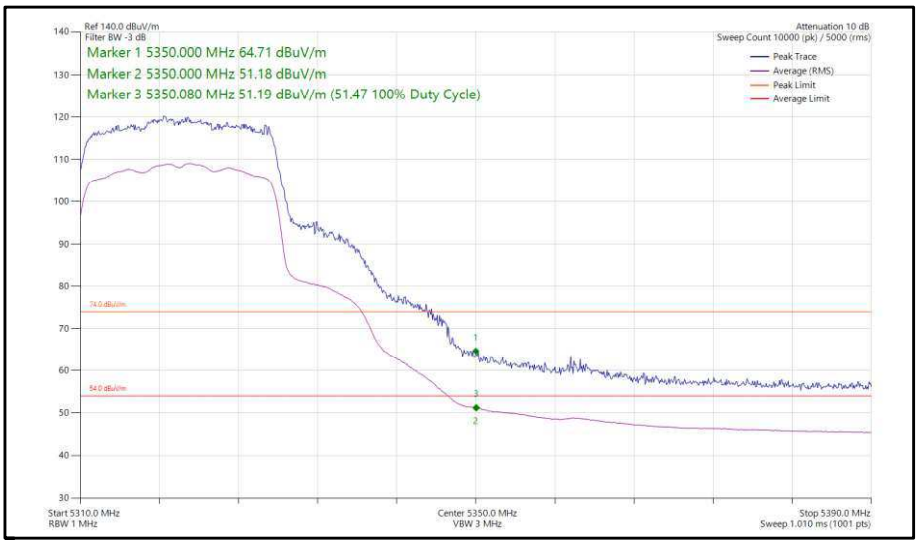

Figure 38 - 802.11ax, HE20, SU, SDM, Core 0-1 - 5320 MHz, Band Edge Frequency 5350 MHz

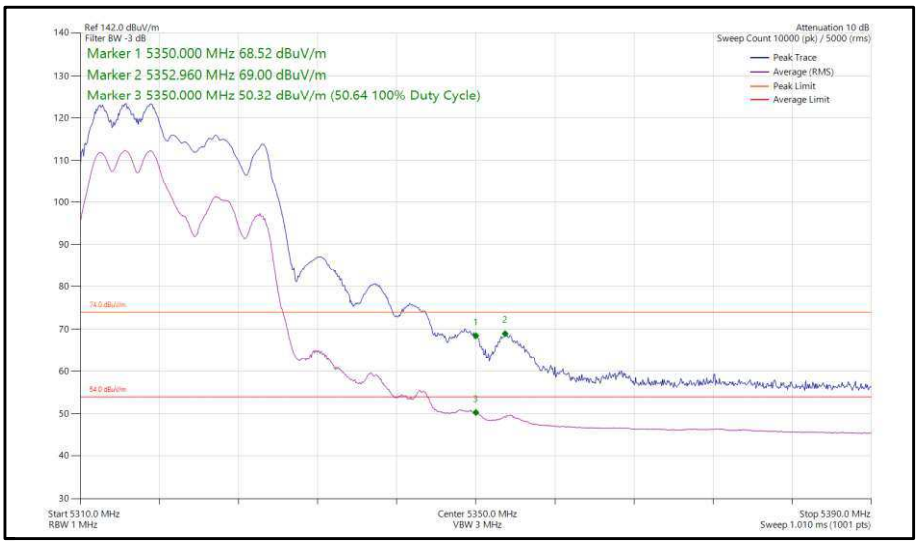

Figure 39 - 802.11ax, HE20, RU 106-53, SDM, Core 0-1 - 5320 MHz, Band Edge Frequency 5350 MHz

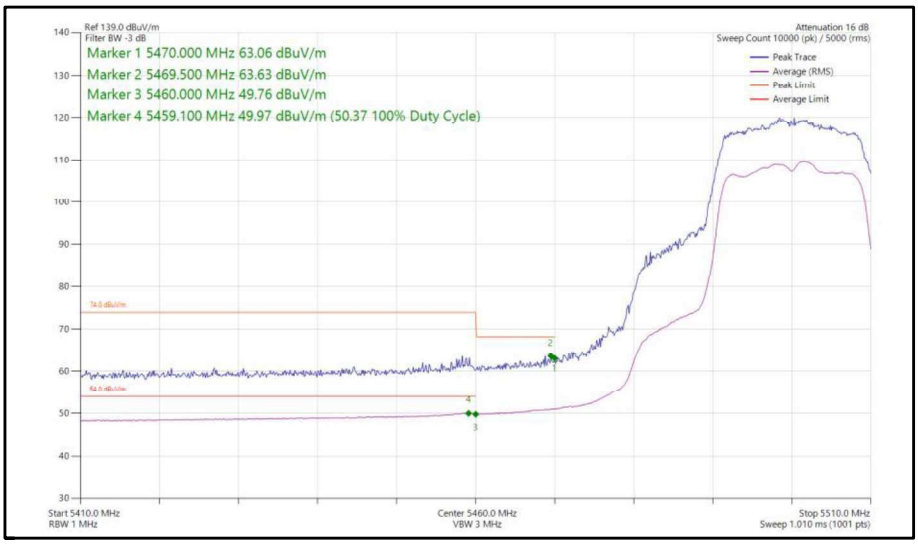

Figure 40 - 802.11n, HT20, SDM, Core 0-1 - 5500 MHz, Band Edge Frequency 5460 MHz

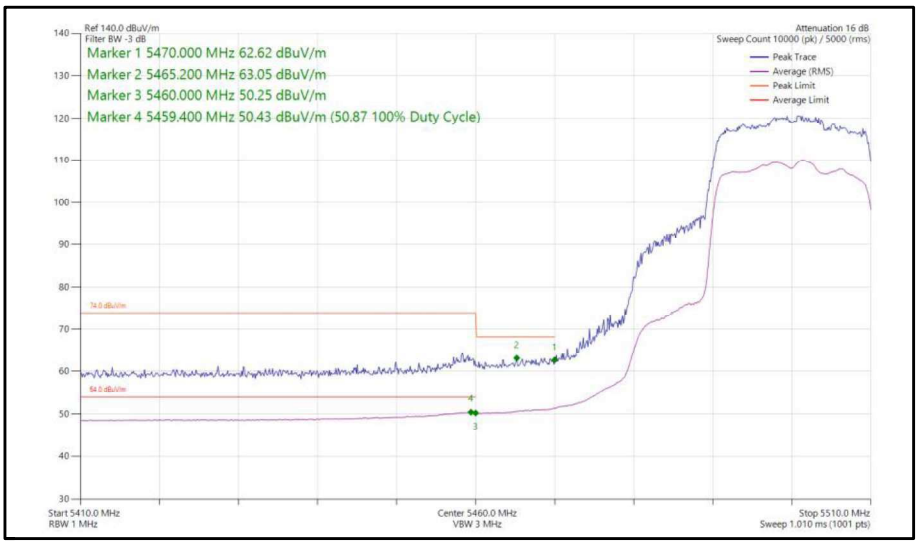

Figure 41 - 802.11ax, HE20, SU, SDM, Core 0-1 - 5500 MHz, Band Edge Frequency 5460 MHz

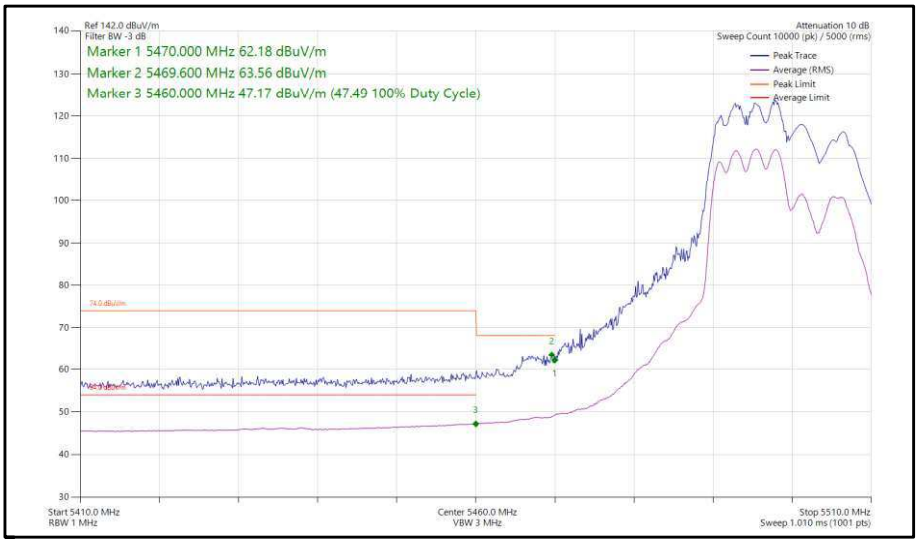

Figure 42 - 802.11ax, HE20, RU 106-53, SDM, Core 0-1 - 5500 MHz, Band Edge Frequency 5460 MHz

20 MHz Bandwidth - Core 0-1 (TxBF)

Mode	Data Rate/ MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBuV/m)
802.11n HT20	MCS4	-	-	5180	5150	69.38	46.26
802.11ax HE20	MCS11x1	SU	-	5180	5150	69.43	49.45
802.11n HT20	MCS4	-	-	5320	5350	67.10	51.02
802.11ax HE20	MCS2x1	SU	-	5320	5350	68.38	51.31
802.11n HT20	MCS2	-	-	5500	5460	63.61	48.41
802.11ax HE20	MCS4x1	SU	-	5500	5460	63.58	46.08

Table 10 - TxBF Restricted Band Edge Results

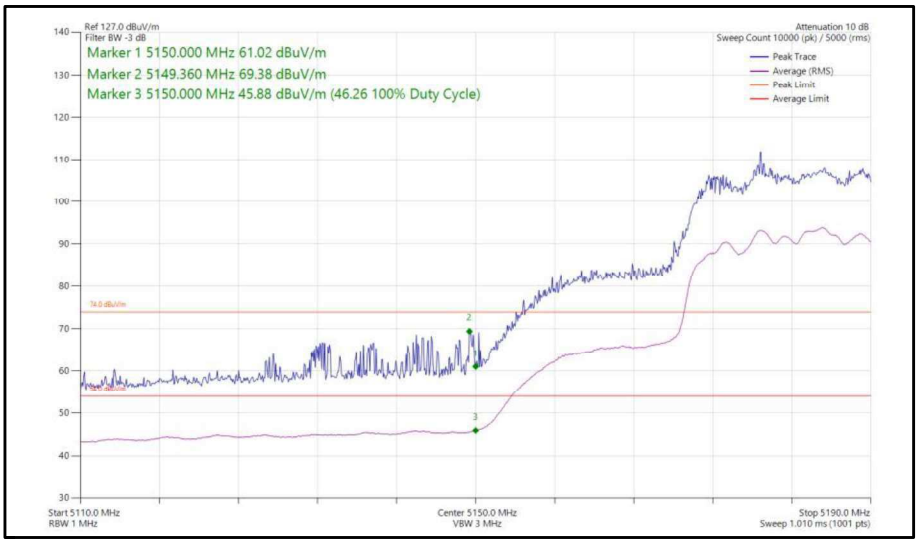

Figure 43 - 802.11n, HT20, TxBF, Core 0-1 - 5180 MHz, Band Edge Frequency 5150 MHz

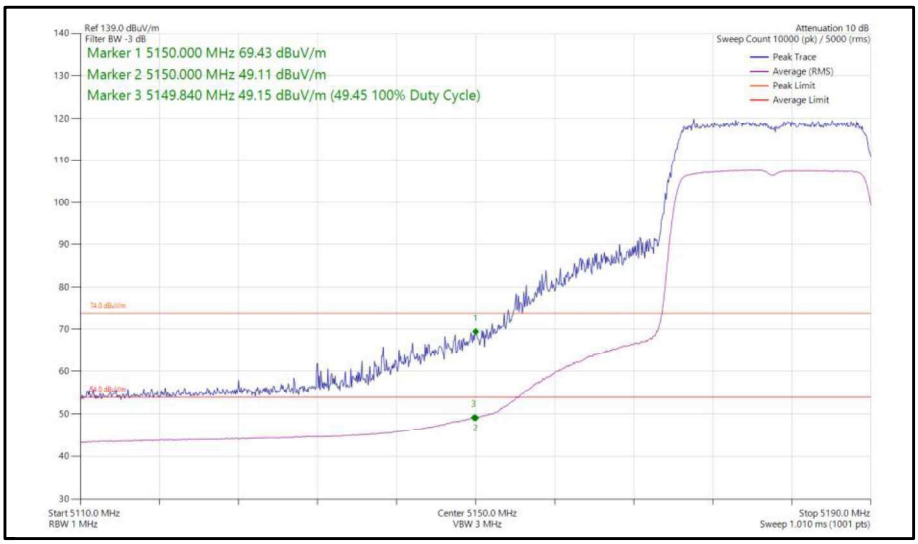

Figure 44 - 802.11ax, HE20, SU, TxBF, Core 0-1 - 5180 MHz, Band Edge Frequency 5150 MHz

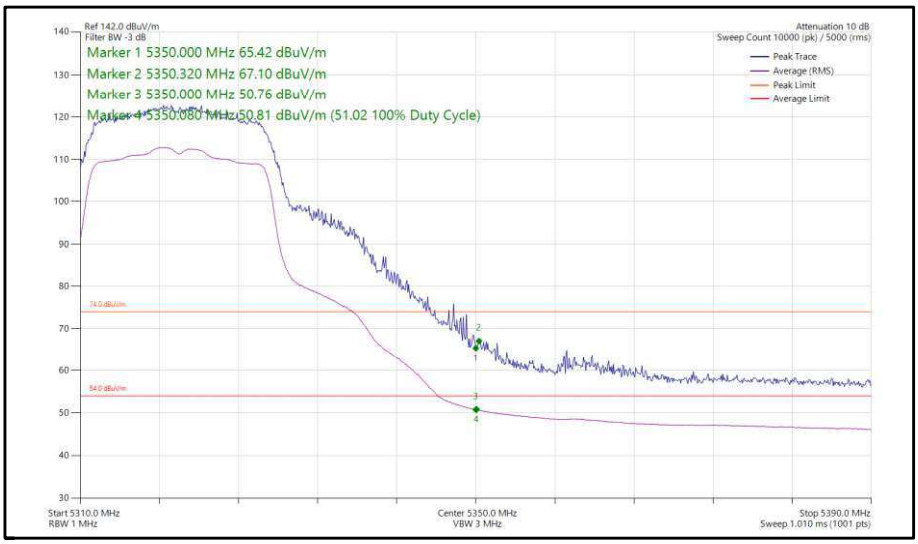

Figure 45 - 802.11n, HT20, TxBF, Core 0-1 - 5320 MHz, Band Edge Frequency 5350 MHz

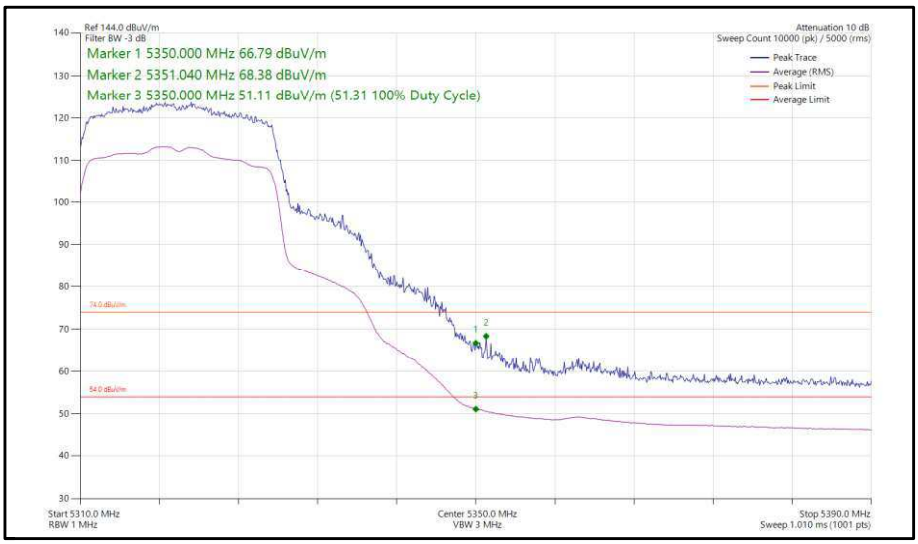

Figure 46 - 802.11ax, HE20, SU, TxBF, Core 0-1 - 5320 MHz, Band Edge Frequency 5350 MHz

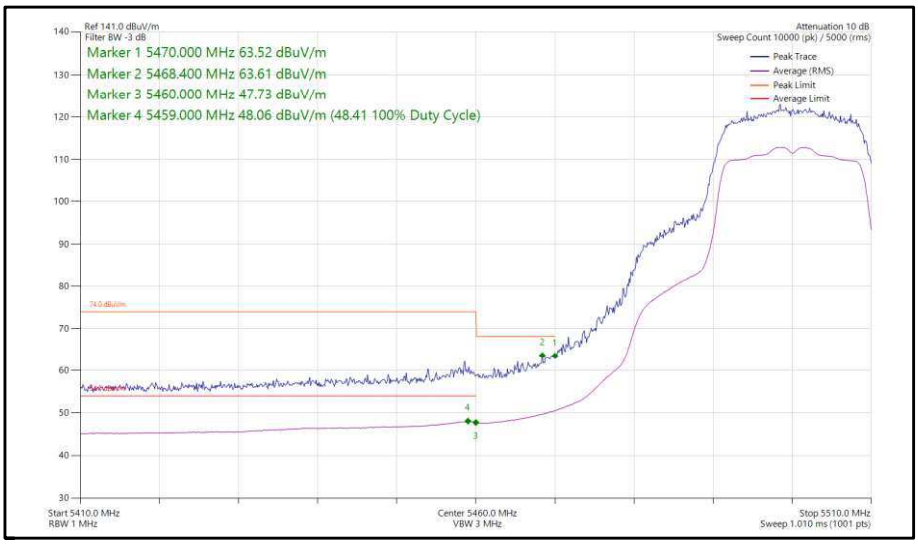

Figure 47 - 802.11n, HT20, TxBF, Core 0-1 - 5500 MHz, Band Edge Frequency 5460 MHz

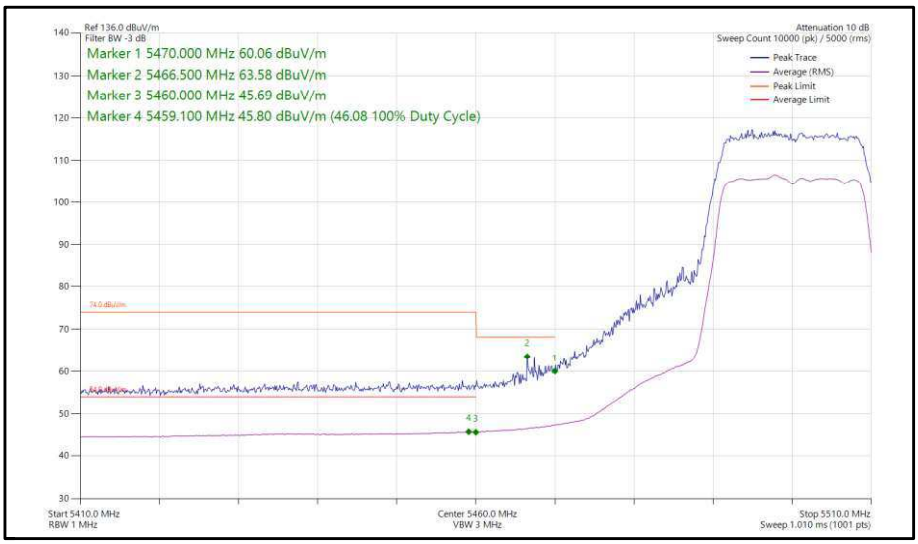

Figure 48 - 802.11ax, HE20, SU, TxBF, Core 0-1 - 5500 MHz, Band Edge Frequency 5460 MHz

40 MHz Bandwidth - Core 0 (SISO)

Mode	Data Rate/ MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBuV/m)
802.11n HT40	MCS2	-	-	5190	5150	64.86	51.47
802.11ax HE40	MCS2x1	SU	-	5190	5150	64.08	51.47
802.11ax HE40	MCS11x1	106	53	5190	5150	68.87	48.69
802.11n HT40	MCS2	-	-	5310	5350	64.97	51.46
802.11ax HE40	MCS4x1	SU	-	5310	5350	64.33	51.49
802.11ax HE40	MCS11x1	52	37	5310	5350	69.47	48.87
802.11n HT40	MCS7	-	-	5510	5460	63.70	44.97
802.11ax HE40	MCS4x1	SU	-	5510	5460	63.60	45.41
802.11ax HE40	MCS11x1	106	53	5510	5460	63.65	45.95

Table 11 - SISO Restricted Band Edge Results

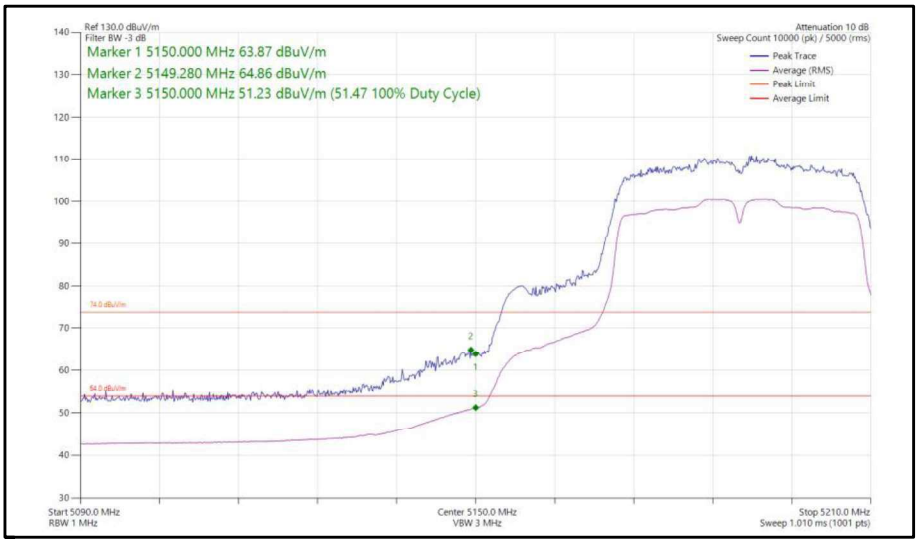

Figure 49 - 802.11n, HT40, SISO, Core 0 - 5190 MHz, Band Edge Frequency 5150 MHz

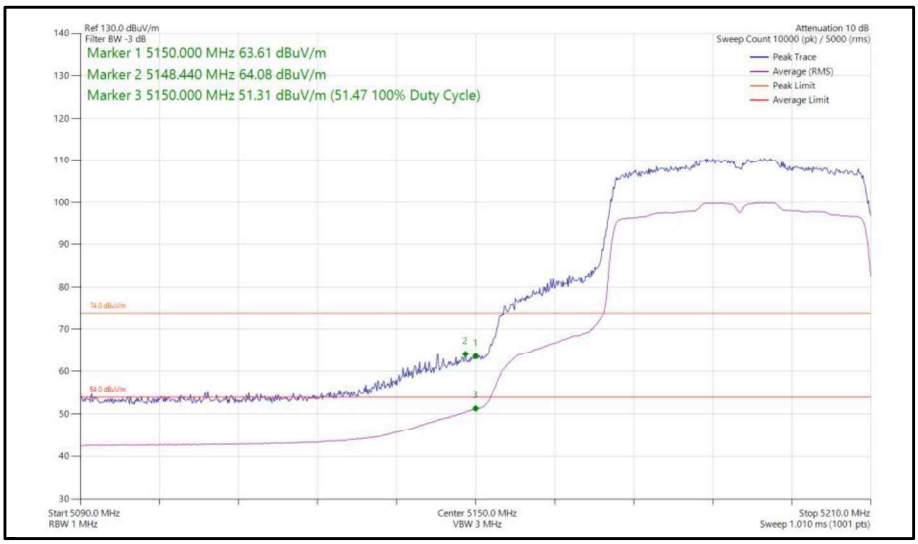

Figure 50 - 802.11ax, HE40, SU, SISO, Core 0 - 5190 MHz, Band Edge Frequency 5150 MHz

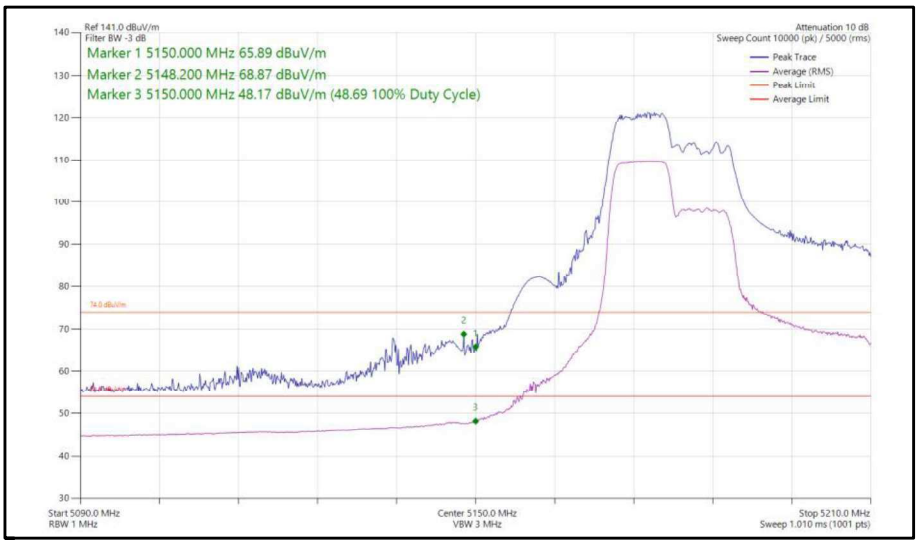

Figure 51 - 802.11ax, HE40, RU 106-53, SISO, Core 0 - 5190 MHz, Band Edge Frequency 5150 MHz

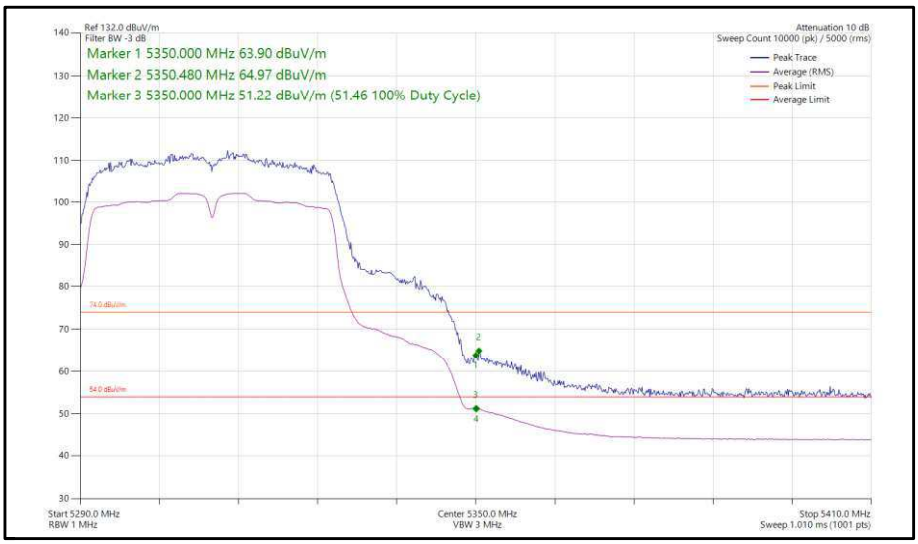

**Figure 52 - 802.11n, HT40, SISO, Core 0 - 5310 MHz,
Band Edge Frequency 5350 MHz**

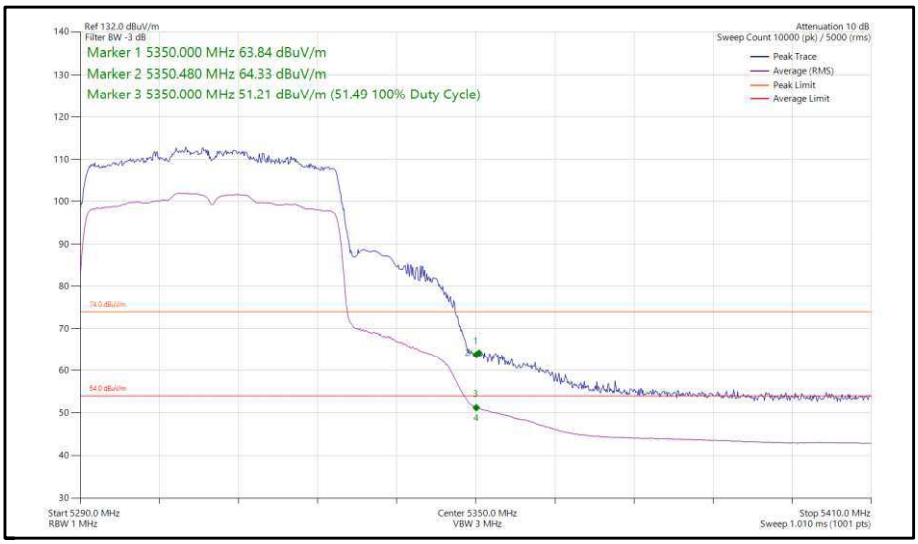

**Figure 53 - 802.11ax, HE40, SU, SISO, Core 0 - 5310 MHz,
Band Edge Frequency 5350 MHz**

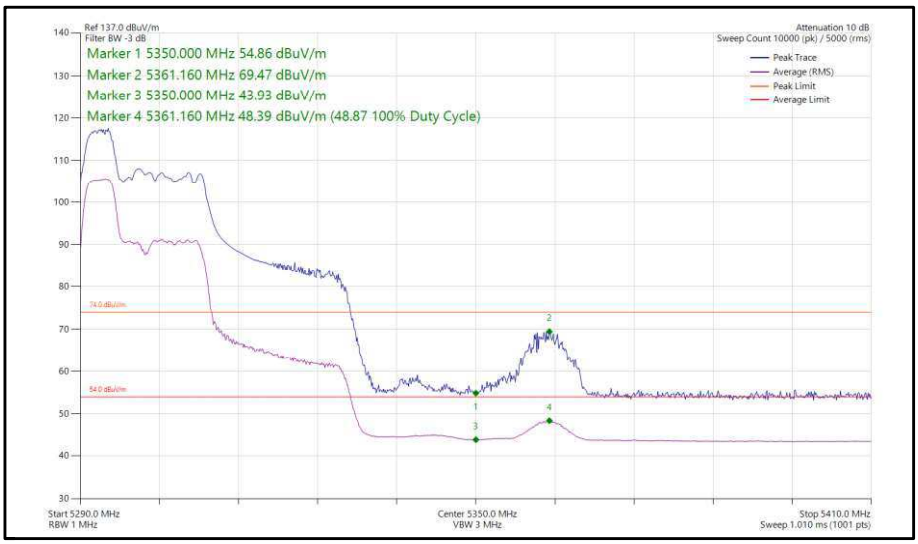

Figure 54 - 802.11ax, HE40, RU 52-37, SISO, Core 0 - 5310 MHz, Band Edge Frequency 5350 MHz

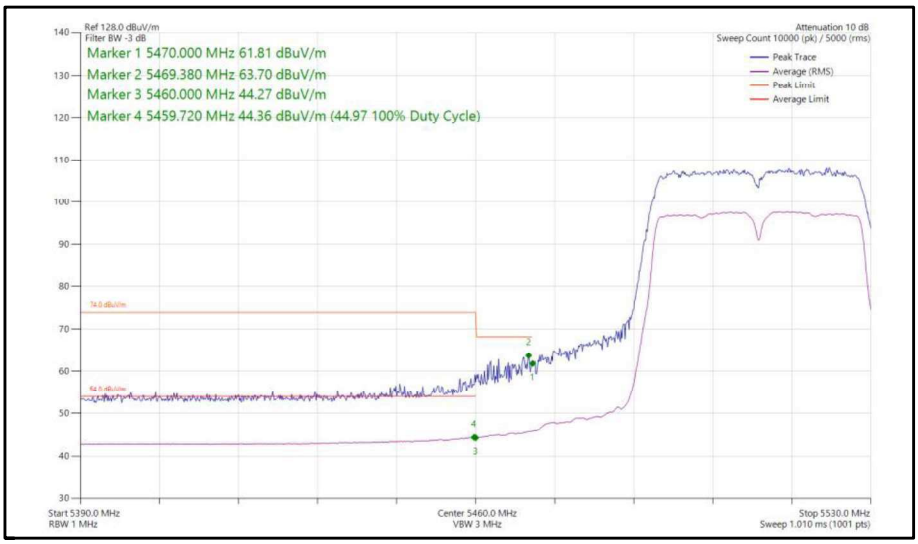

Figure 55 - 802.11n, HT40, SISO, Core 0 - 5510 MHz, Band Edge Frequency 5460 MHz

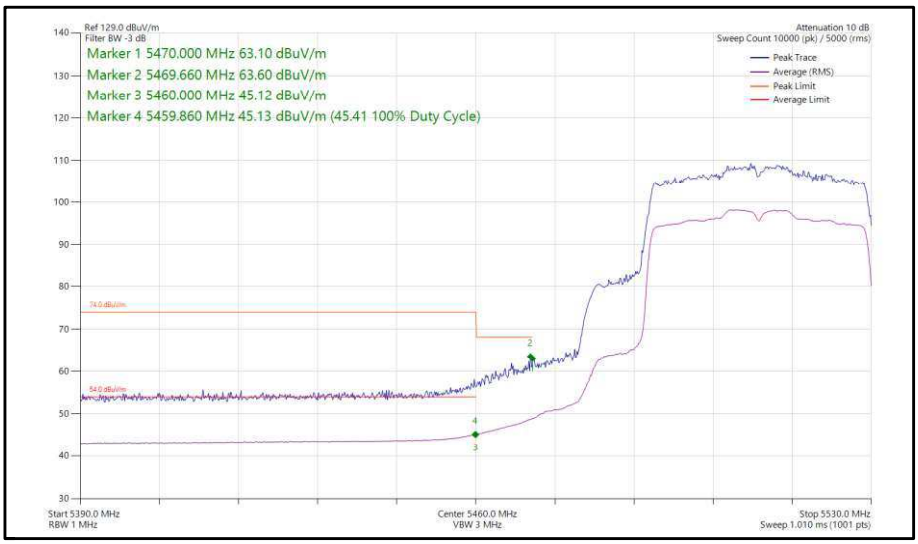

Figure 56 - 802.11ax, HE40, SU, SISO, Core 0 - 5510 MHz, Band Edge Frequency 5460 MHz

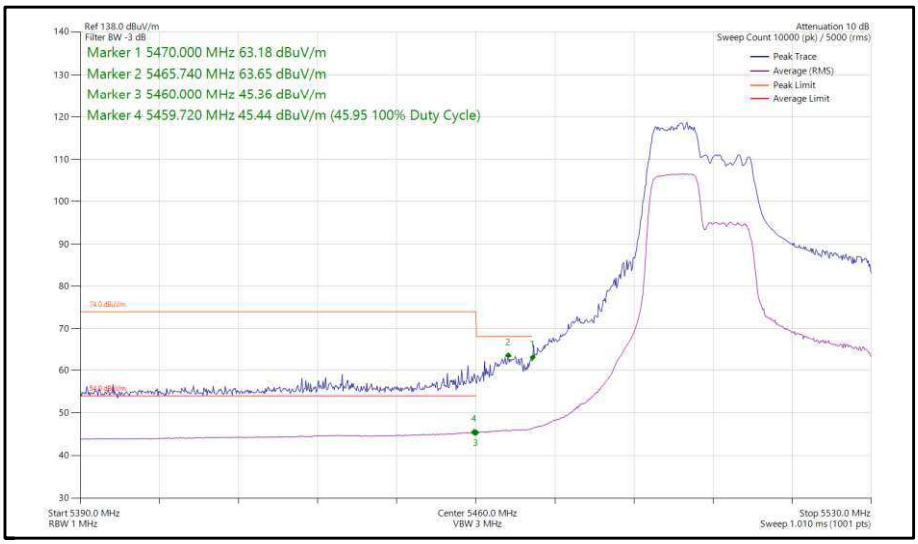

Figure 57 - 802.11ax, HE40, RU 106-53, SISO, Core 0 - 5510 MHz, Band Edge Frequency 5460 MHz

40 MHz Bandwidth - Core 1 (SISO)

Mode	Data Rate/ MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBuV/m)
802.11n HT40	MCS7	-	-	5190	5150	65.34	51.25
802.11ax HE40	MCS4x1	SU	-	5190	5150	65.32	51.38
802.11ax HE40	MCS11x1	52	37	5190	5150	69.12	45.88
802.11n HT40	MCS2	-	-	5310	5350	65.35	51.41
802.11ax HE40	MCS11x1	SU	-	5310	5350	69.50	50.78
802.11ax HE40	MCS11x1	106	56	5310	5350	69.49	47.88
802.11n HT40	MCS4	-	-	5510	5460	63.64	45.74
802.11ax HE40	MCS2x1	SU	-	5510	5460	63.68	48.30
802.11ax HE40	MCS11x1	106	56	5510	5460	63.49	47.84

Table 12 - SISO Restricted Band Edge Results

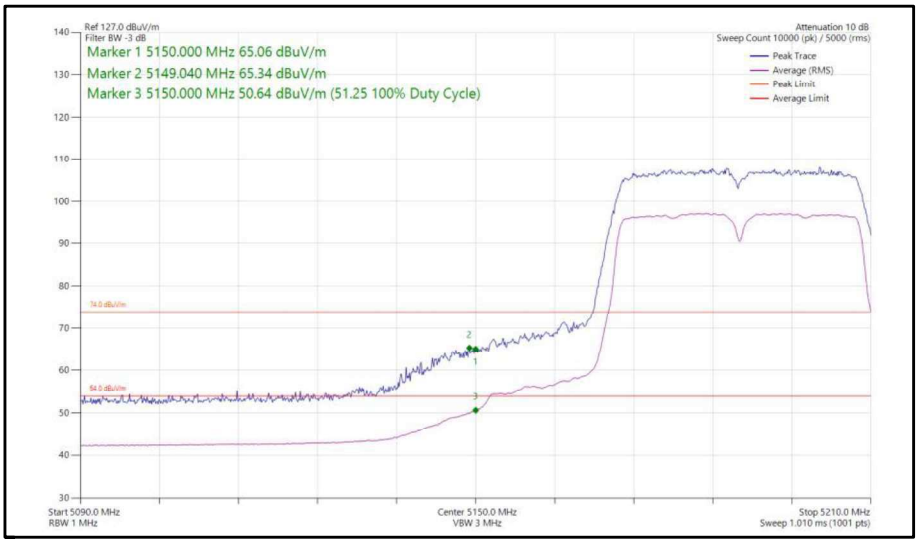

Figure 58 - 802.11n, HT40, SISO, Core 1 - 5190 MHz, Band Edge Frequency 5150 MHz

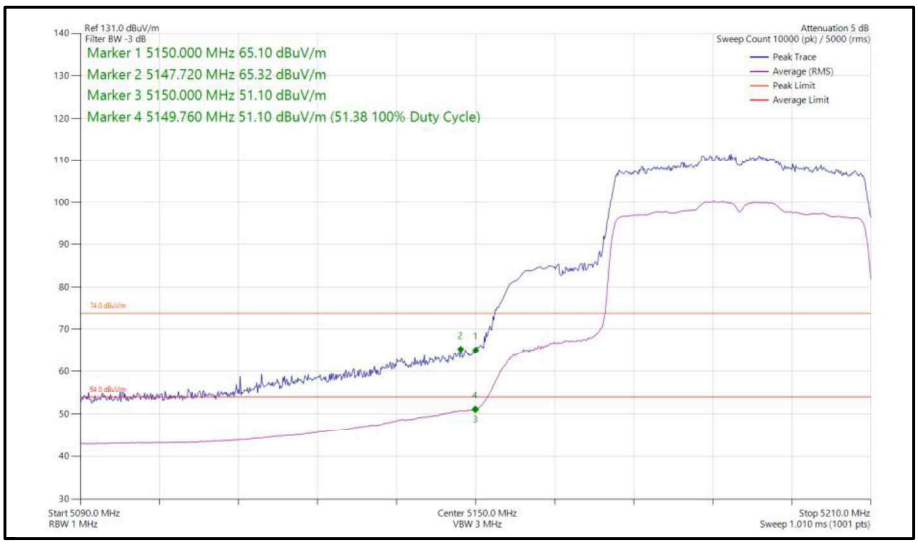

Figure 59 - 802.11ax, HE40, SU, SISO, Core 1 - 5190 MHz, Band Edge Frequency 5150 MHz

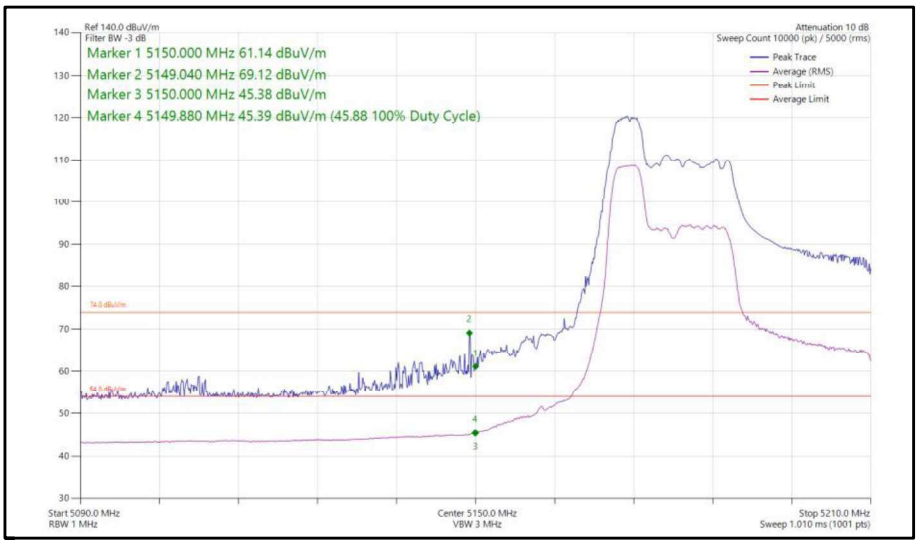

Figure 60 - 802.11ax, HE40, RU 52-37, SISO, Core 1 - 5190 MHz, Band Edge Frequency 5150 MHz

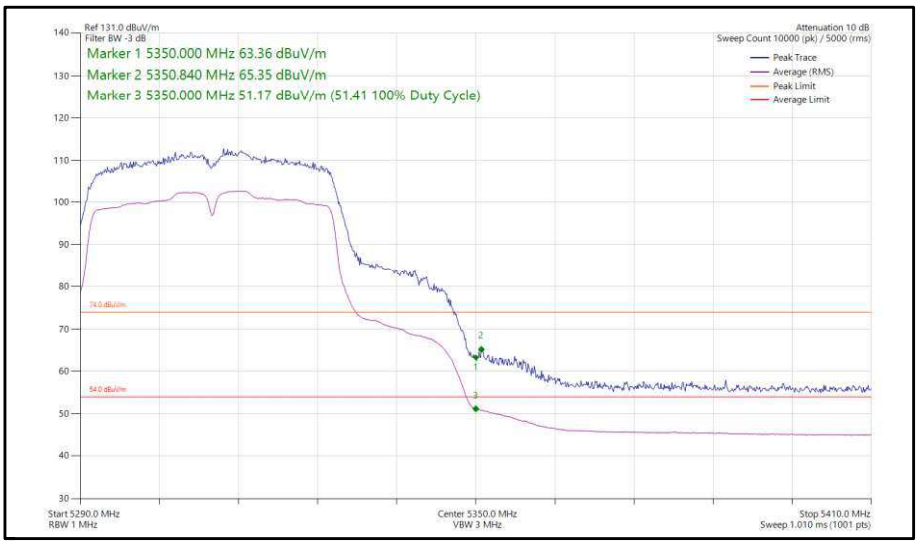

**Figure 61 - 802.11n, HT40, SISO, Core 1 - 5310 MHz,
Band Edge Frequency 5350 MHz**

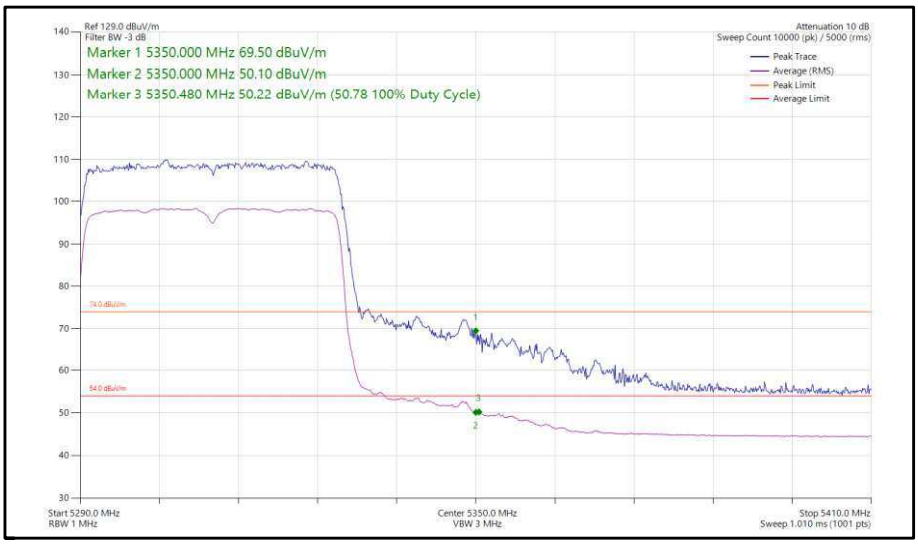

**Figure 62 - 802.11ax, HE40, SU, SISO, Core 1 - 5310 MHz,
Band Edge Frequency 5350 MHz**

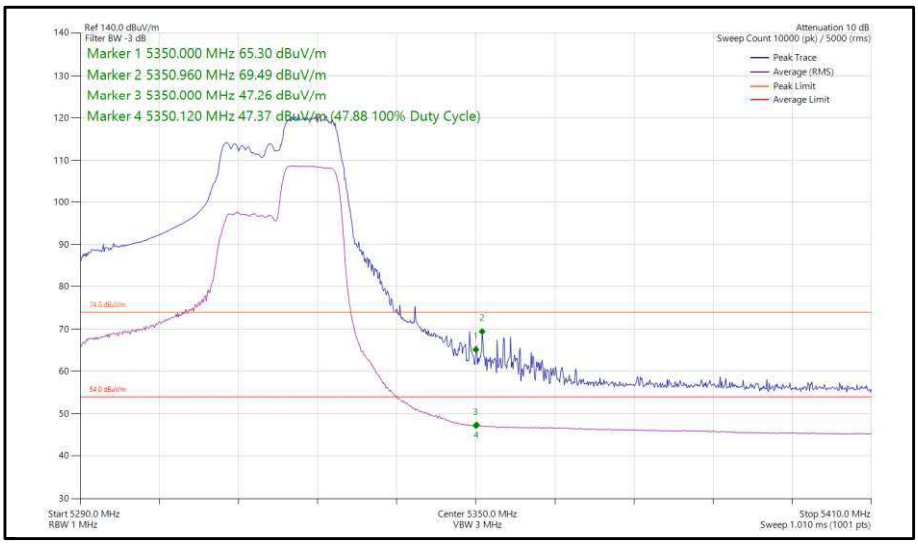

Figure 63 - 802.11ax, HE40, RU 106-56, SISO, Core 1 - 5310 MHz, Band Edge Frequency 5350 MHz

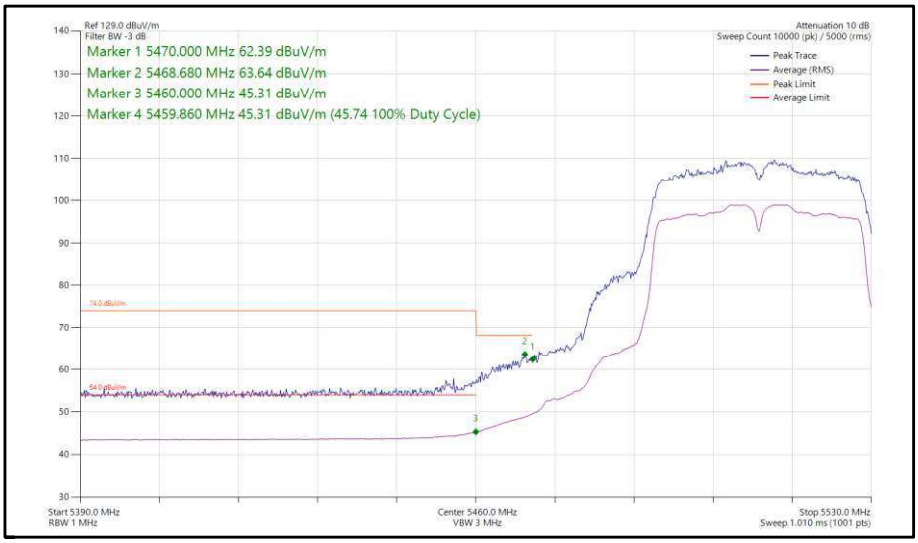

Figure 64 - 802.11n, HT40, SISO, Core 1 - 5510 MHz, Band Edge Frequency 5460 MHz

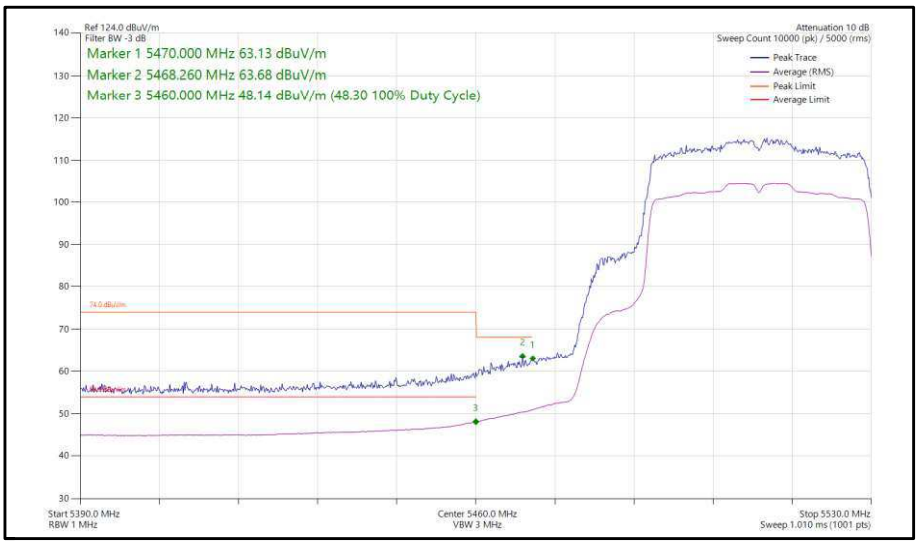

Figure 65 - 802.11ax, HE40, SU, SISO, Core 1 - 5510 MHz, Band Edge Frequency 5460 MHz

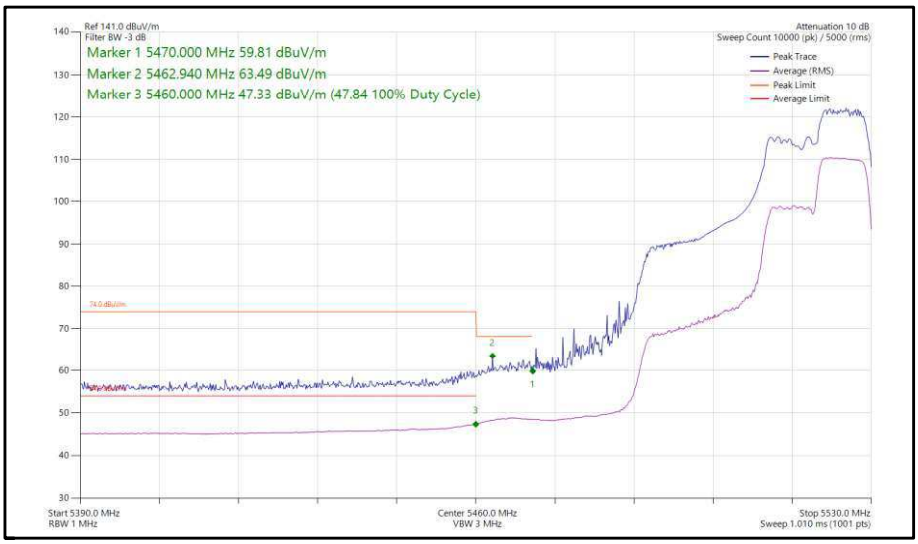

Figure 66 - 802.11ax, HE40, RU 106-56, SISO, Core 1 - 5510 MHz, Band Edge Frequency 5460 MHz

40 MHz Bandwidth - Core 0-1 (CDD)

Mode	Data Rate/ MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBuV/m)
802.11n HT40	MCS7	-	-	5190	5150	69.50	51.15
802.11ax HE40	MCS4x1	SU	-	5190	5150	64.88	51.49
802.11ax HE40	MCS11x1	106	56	5190	5150	64.29	51.12
802.11n HT40	MCS2	-	-	5310	5350	63.44	51.49
802.11ax HE40	MCS4x1	SU	-	5310	5350	63.90	51.30
802.11ax HE40	MCS11x1	52	37	5310	5350	69.31	50.00
802.11n HT40	MCS7	-	-	5510	5460	63.69	45.38
802.11ax HE40	MCS11x1	SU	-	5510	5460	63.65	47.17
802.11ax HE40	MCS11x1	106	53	5510	5460	63.61	49.78

Table 13 - CDD Restricted Band Edge Results

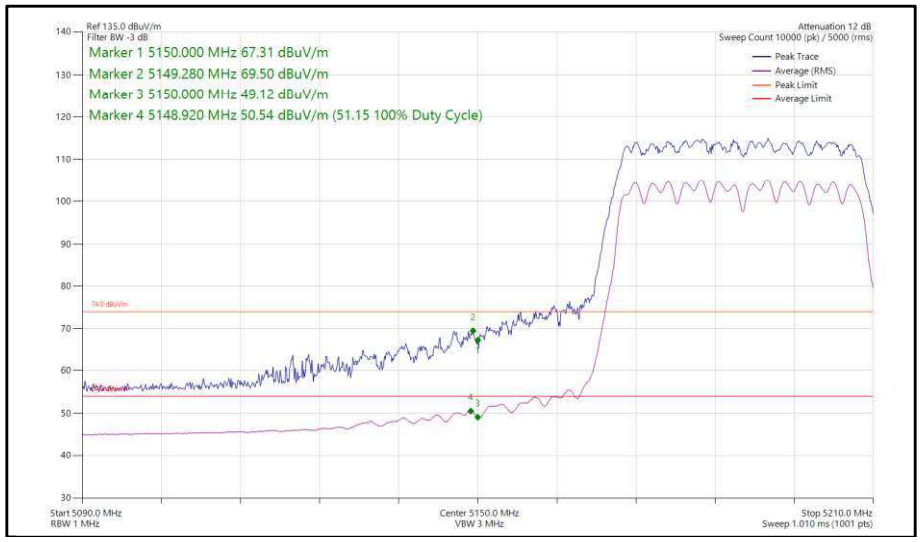

Figure 67 - 802.11n, HT40, CDD, Core 0-1 - 5190 MHz, Band Edge Frequency 5150 MHz

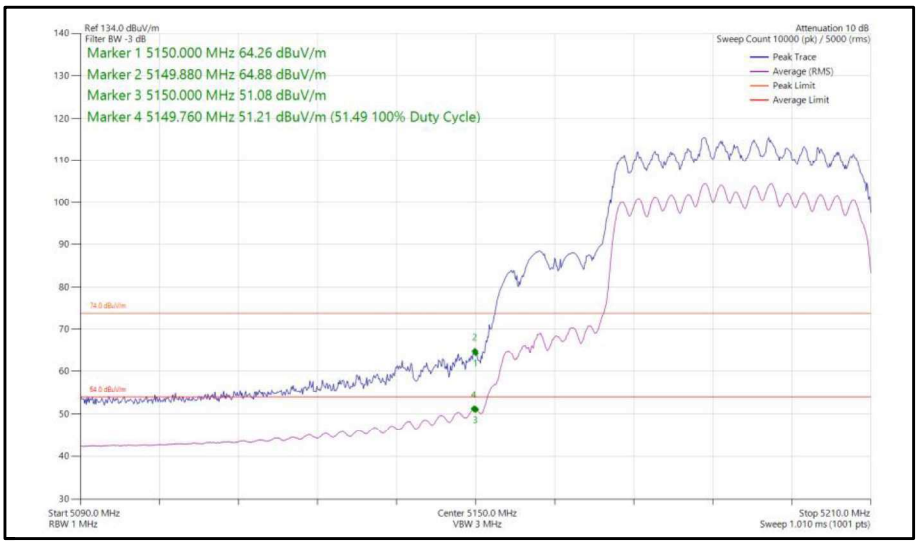

Figure 68 - 802.11ax, HE40, SU, CDD, Core 0-1 - 5190 MHz, Band Edge Frequency 5150 MHz

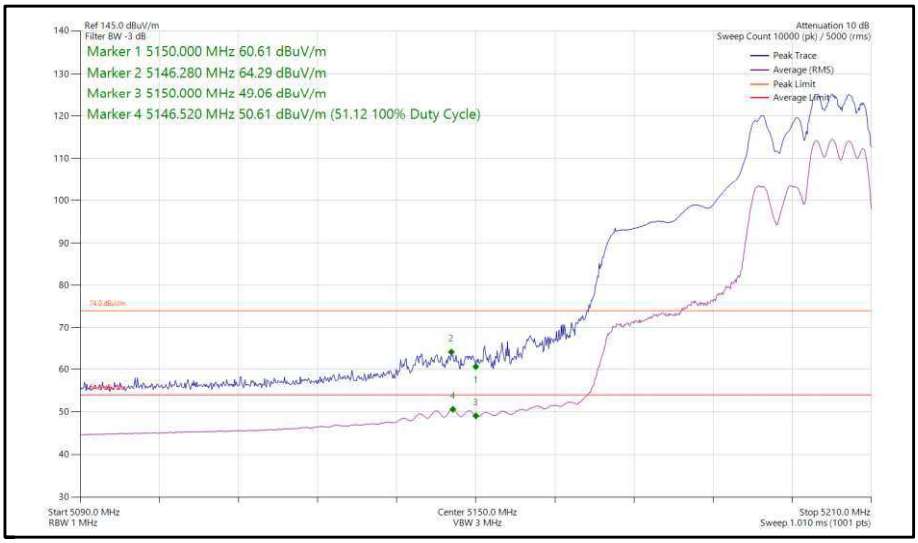

Figure 69 - 802.11ax, HE40, RU 106-56, CDD, Core 0-1 - 5190 MHz, Band Edge Frequency 5150 MHz

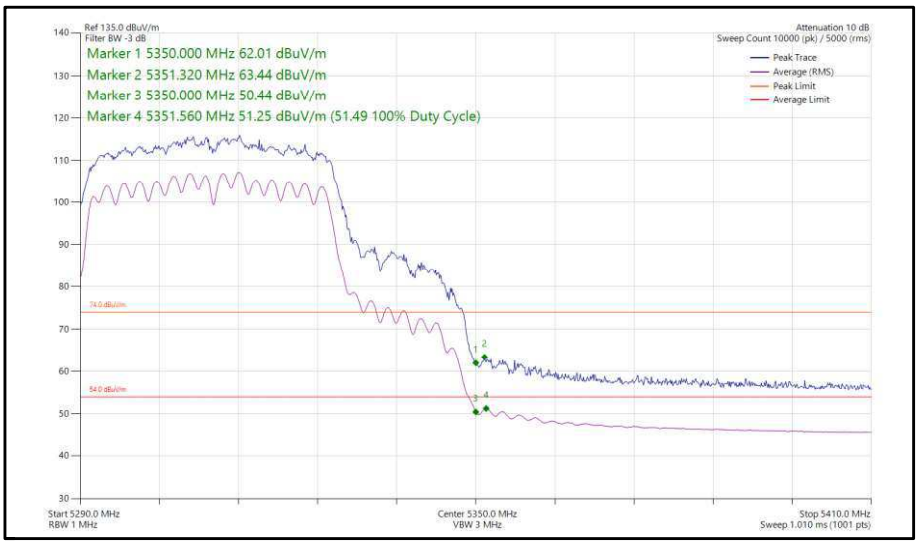

**Figure 70 - 802.11n, HT40, CDD, Core 0-1 - 5310 MHz,
Band Edge Frequency 5350 MHz**

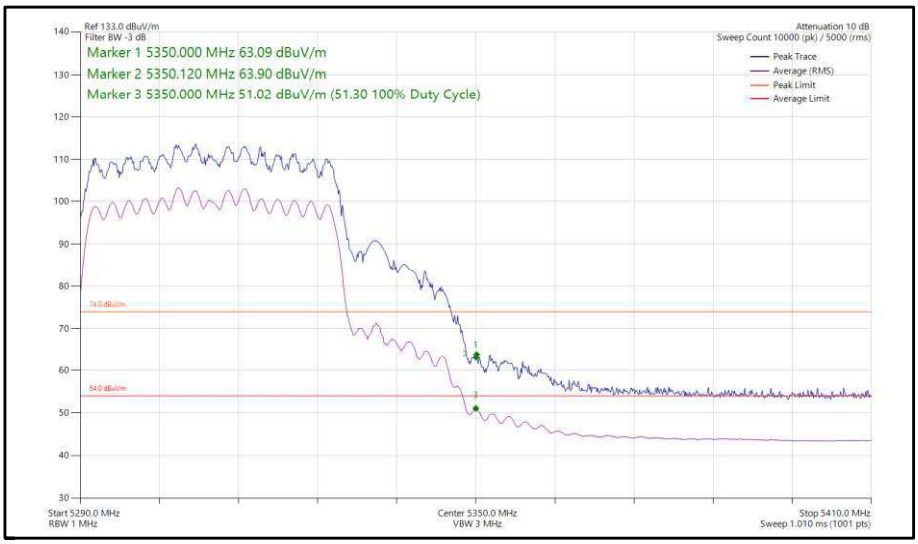

**Figure 71 - 802.11ax, HE40, SU, CDD, Core 0-1 - 5310 MHz,
Band Edge Frequency 5350 MHz**

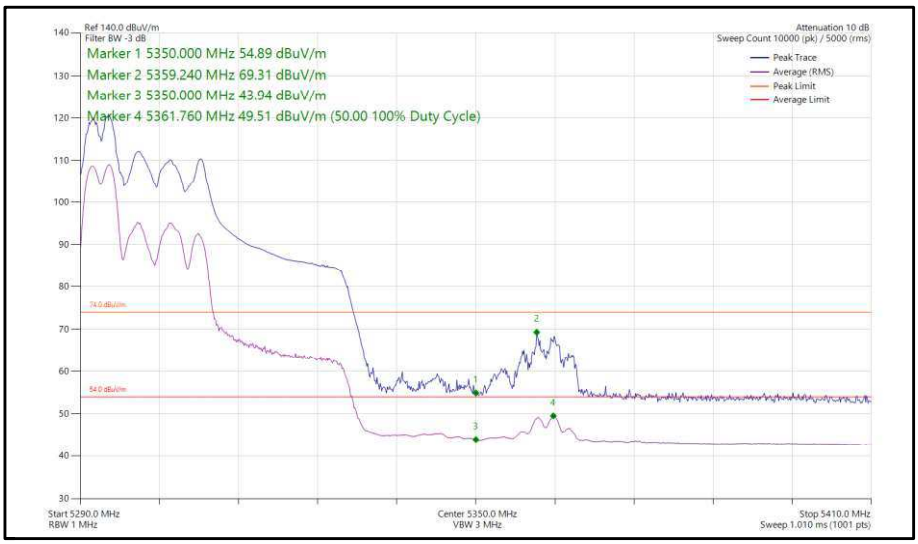

Figure 72 - 802.11ax, HE40, RU 52-37, CDD, Core 0-1 - 5310 MHz, Band Edge Frequency 5350 MHz

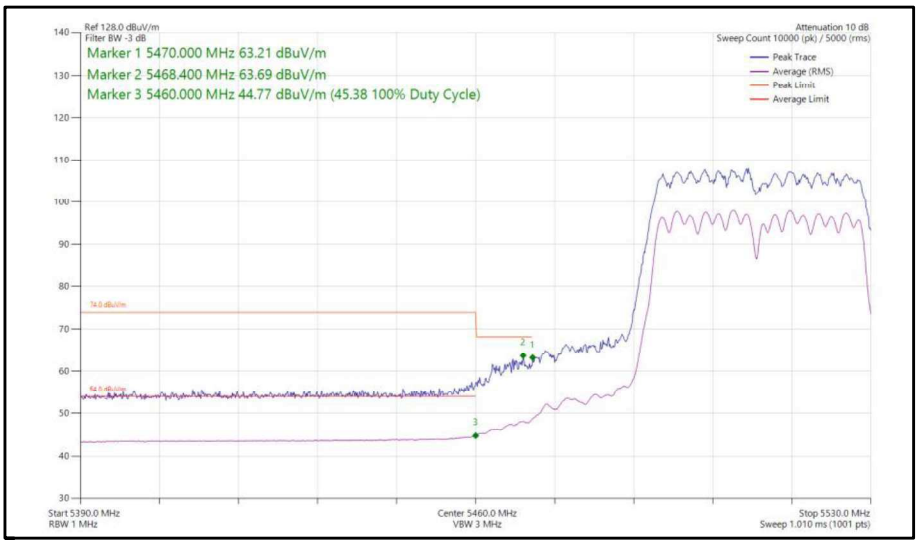

Figure 73 - 802.11n, HT40, CDD, Core 0-1 - 5510 MHz, Band Edge Frequency 5460 MHz

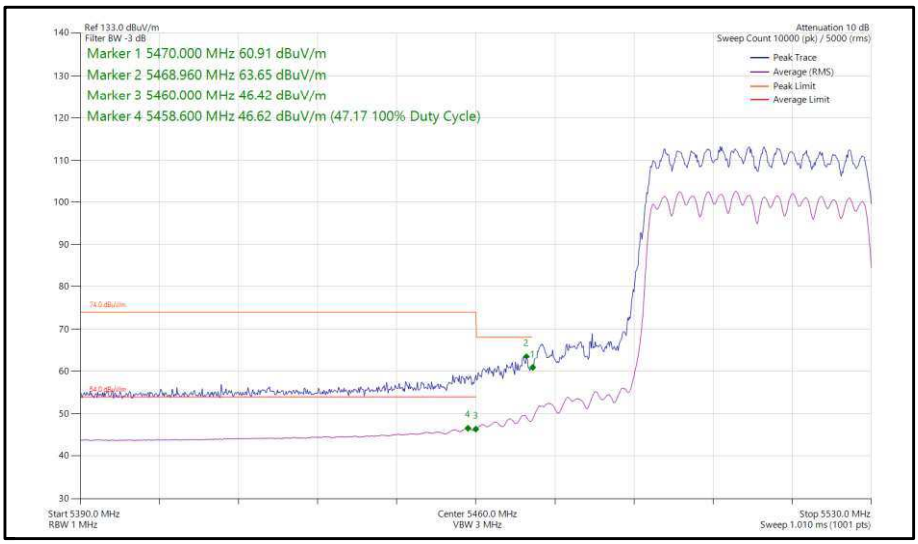

Figure 74 - 802.11ax, HE40, SU, CDD, Core 0-1 - 5510 MHz, Band Edge Frequency 5460 MHz

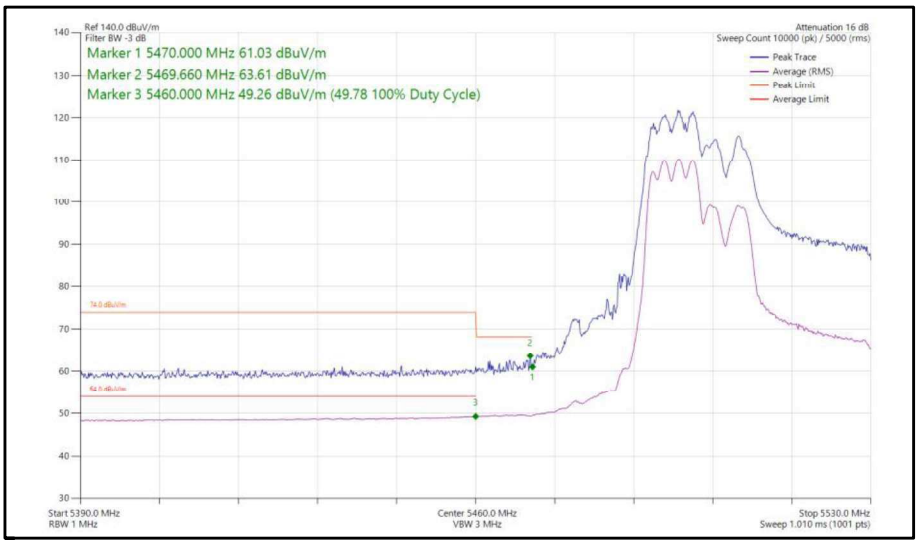

Figure 75 - 802.11ax, HE40, RU 106-53, CDD, Core 0-1 - 5510 MHz, Band Edge Frequency 5460 MHz

40 MHz Bandwidth - Core 0-1 (SDM)

Mode	Data Rate/ MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBuV/m)
802.11n HT40	MCS12	-	-	5190	5150	64.98	51.35
802.11ax HE40	MCS2x2	SU	-	5190	5150	63.09	51.49
802.11ax HE40	MCS11x2	106	56	5190	5150	64.21	51.26
802.11n HT40	MCS12	-	-	5310	5350	64.65	51.50
802.11ax HE40	MCS2x2	SU	-	5310	5350	63.67	51.41
802.11ax HE40	MCS11x2	52	44	5310	5350	69.45	49.08
802.11n HT40	MCS12	-	-	5510	5460	63.49	48.92
802.11ax HE40	MCS11x2	SU	-	5510	5460	63.68	46.99
802.11ax HE40	MCS11x2	106	56	5510	5460	63.62	48.40

Table 14 - SDM Restricted Band Edge Results

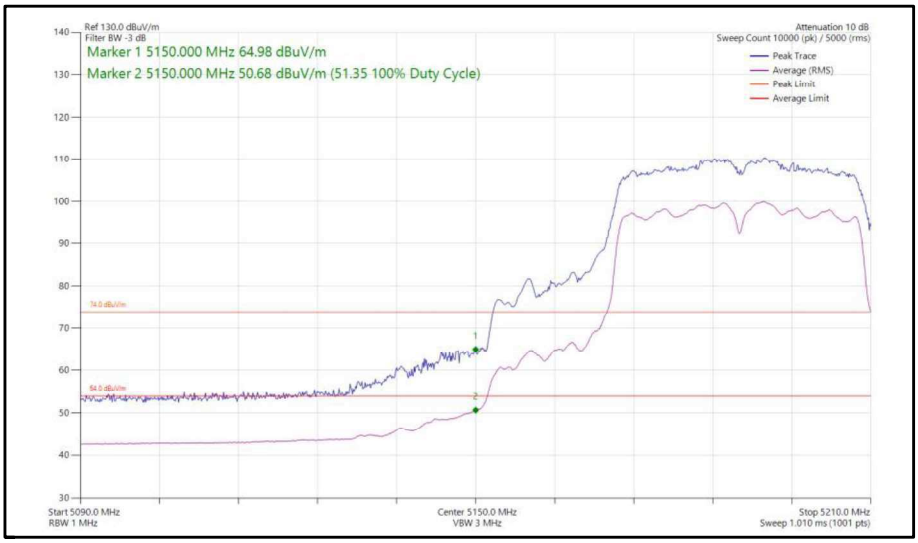

Figure 76 - 802.11n, HT40, SDM, Core 0-1 - 5190 MHz, Band Edge Frequency 5150 MHz

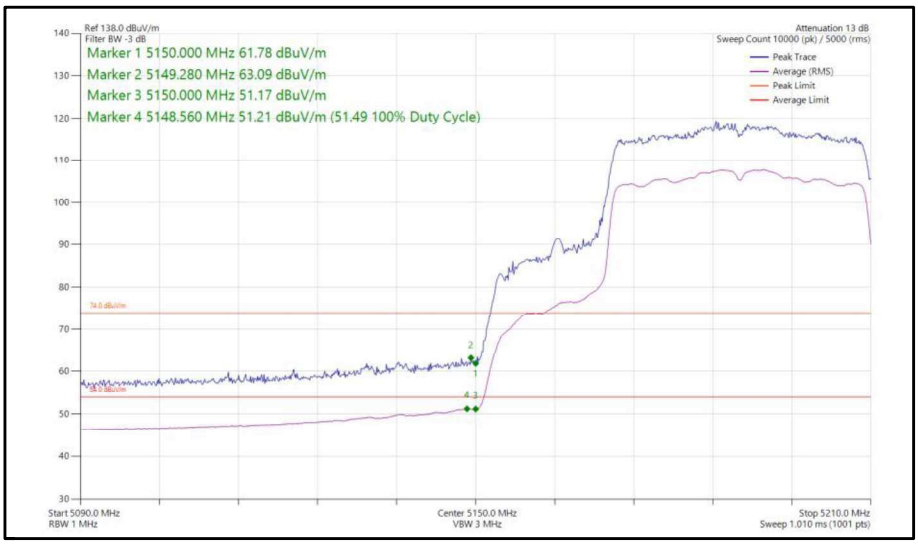

Figure 77 - 802.11ax, HE40, SU, SDM, Core 0-1 - 5190 MHz, Band Edge Frequency 5150 MHz

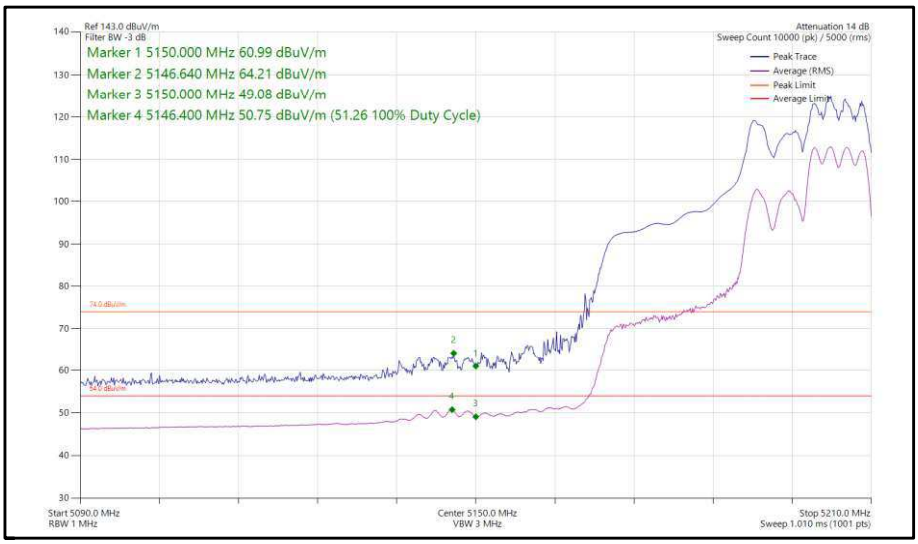

Figure 78 - 802.11ax, HE40, RU 106-56, SDM, Core 0-1 - 5190 MHz, Band Edge Frequency 5150 MHz

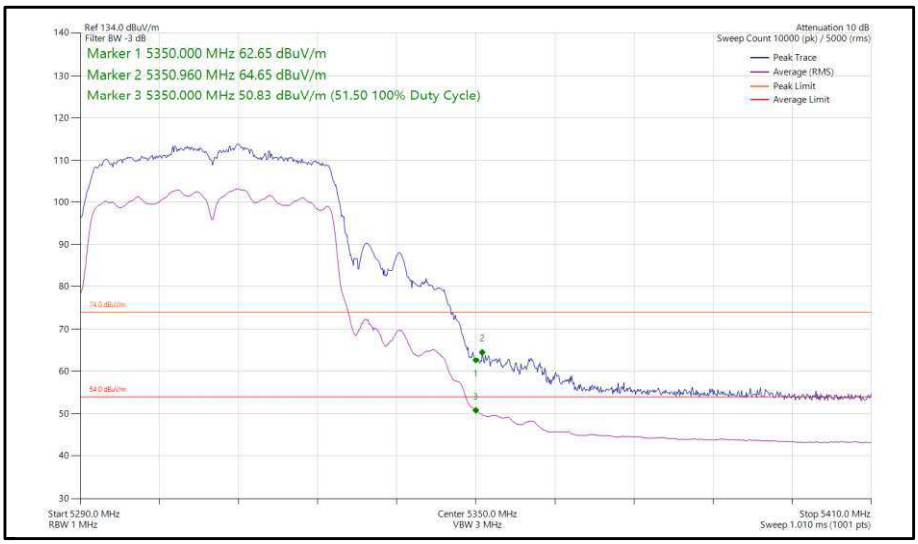

Figure 79 - 802.11n, HT40, SDM, Core 0-1 - 5310 MHz, Band Edge Frequency 5350 MHz

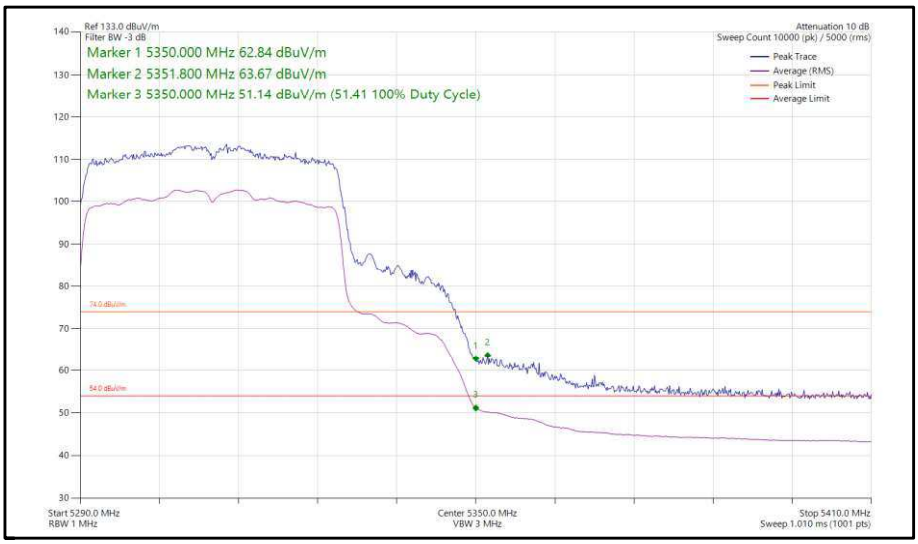

Figure 80 - 802.11ax, HE40, SU, SDM, Core 0-1 - 5310 MHz, Band Edge Frequency 5350 MHz

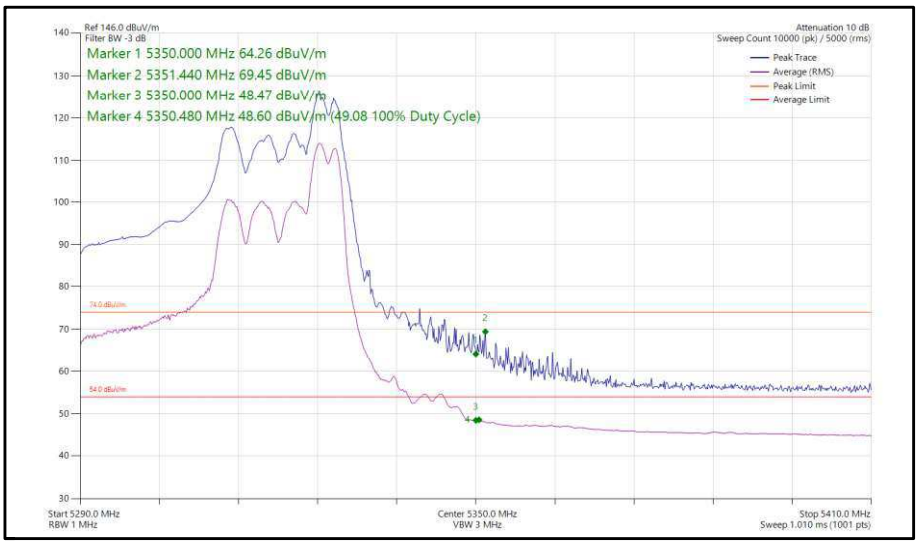

Figure 81 - 802.11ax, HE40, RU 52-44, SDM, Core 0-1 - 5310 MHz, Band Edge Frequency 5350 MHz

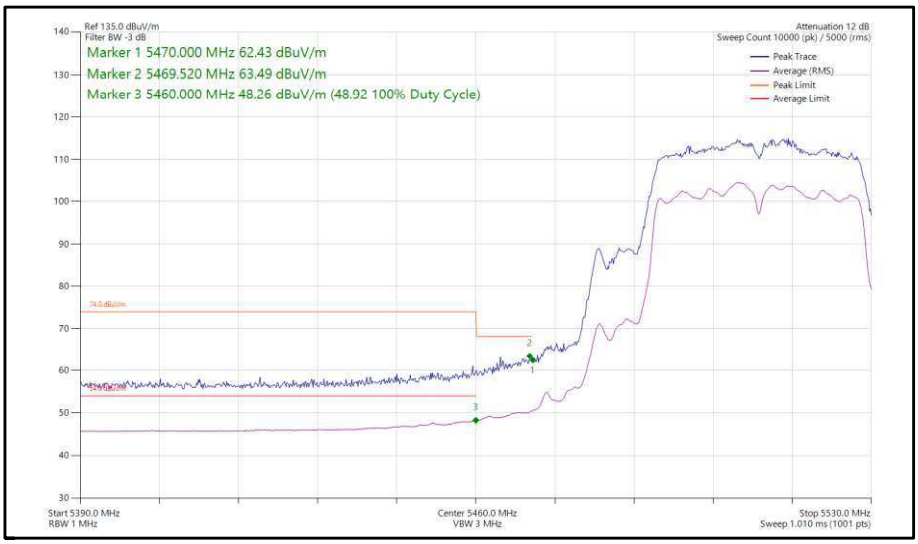

Figure 82 - 802.11n, HT40, SDM, Core 0-1 - 5510 MHz, Band Edge Frequency 5460 MHz

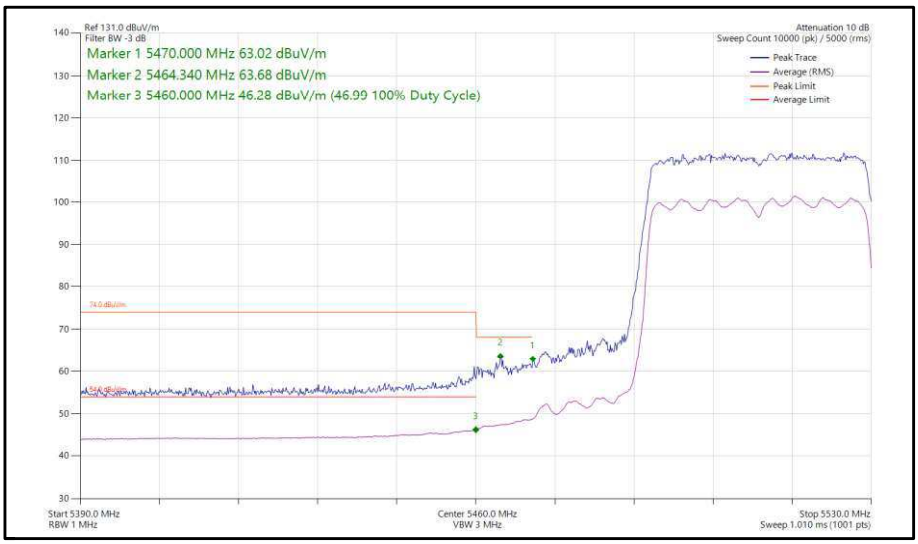

Figure 83 - 802.11ax, HE40, SU, SDM, Core 0-1 - 5510 MHz, Band Edge Frequency 5460 MHz

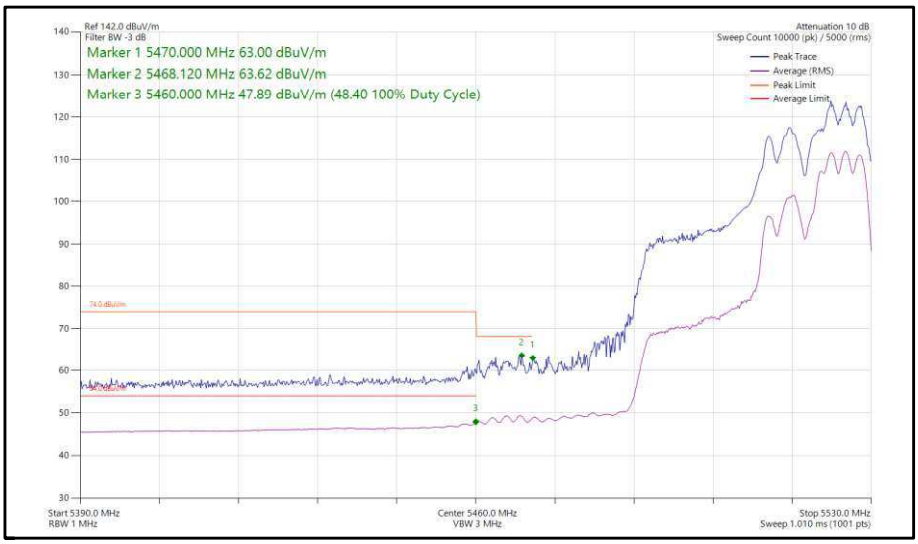

Figure 84 - 802.11ax, HE40, RU 106-56, SDM, Core 0-1 - 5510 MHz, Band Edge Frequency 5460 MHz

40 MHz Bandwidth - Core 0-1 (TxBF)

Mode	Data Rate/ MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBuV/m)
802.11n HT40	MCS4	-	-	5190	5150	64.13	51.22
802.11ax HE40	MCS11x1	SU	-	5190	5150	69.15	51.32
802.11n HT40	MCS4	-	-	5310	5350	65.88	51.37
802.11ax HE40	MCS11x1	SU	-	5310	5350	67.71	50.86
802.11n HT40	MCS4	-	-	5510	5460	63.36	45.74
802.11ac VHT40	MCS2x1	-	-	5510	5460	63.29	46.79
802.11ax HE40	MCS11x1	SU	-	5510	5460	63.39	44.18

Table 15 - TxBF Restricted Band Edge Results

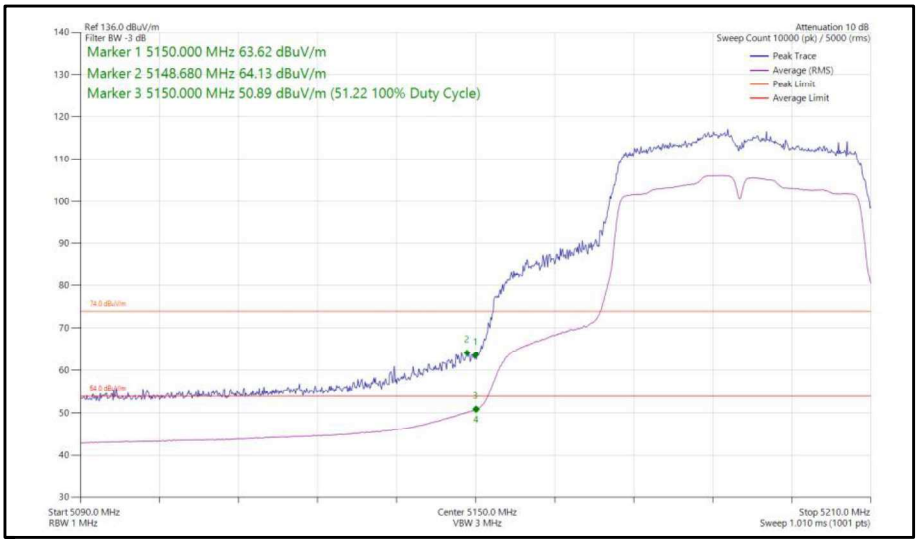

Figure 85 - 802.11n, HT40, TxBF, Core 0-1 - 5190 MHz, Band Edge Frequency 5150 MHz

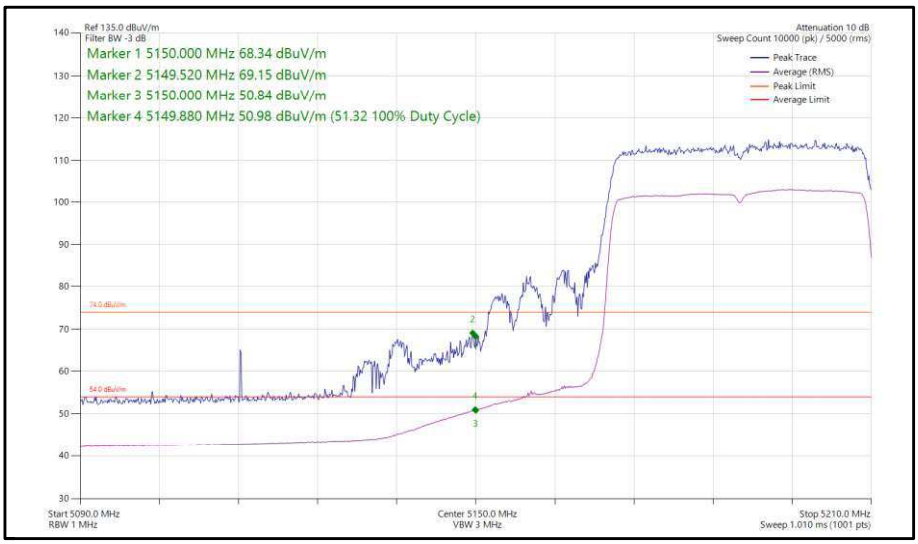

Figure 86 - 802.11ax, HE40, SU, TxBF, Core 0-1 - 5190 MHz, Band Edge Frequency 5150 MHz

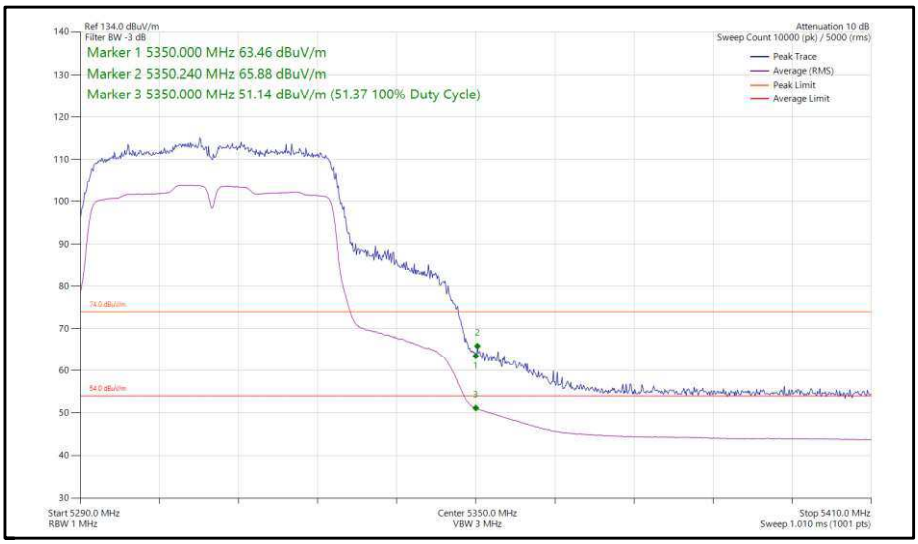

Figure 87 - 802.11n, HT40, TxBF, Core 0-1 - 5310 MHz, Band Edge Frequency 5350 MHz

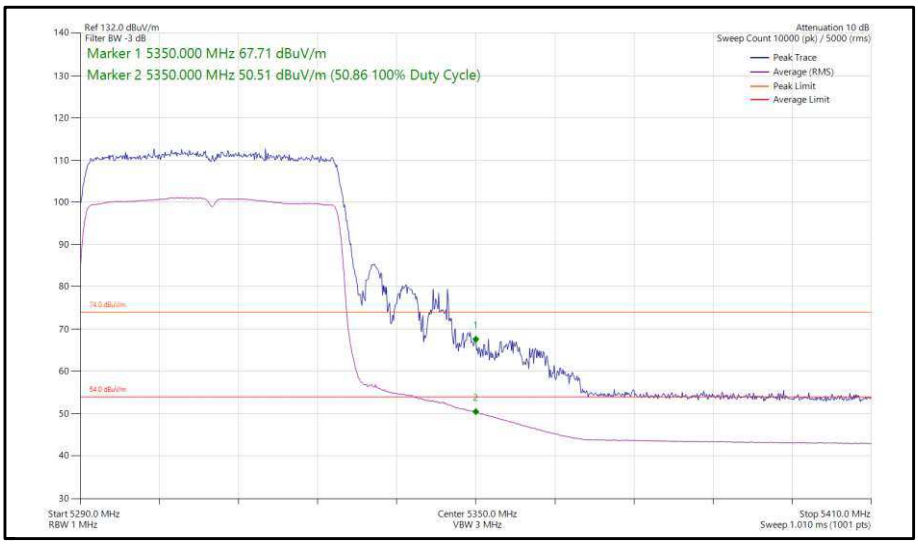

Figure 88 - 802.11ax, HE40, SU, TxBF, Core 0-1 - 5310 MHz, Band Edge Frequency 5350 MHz

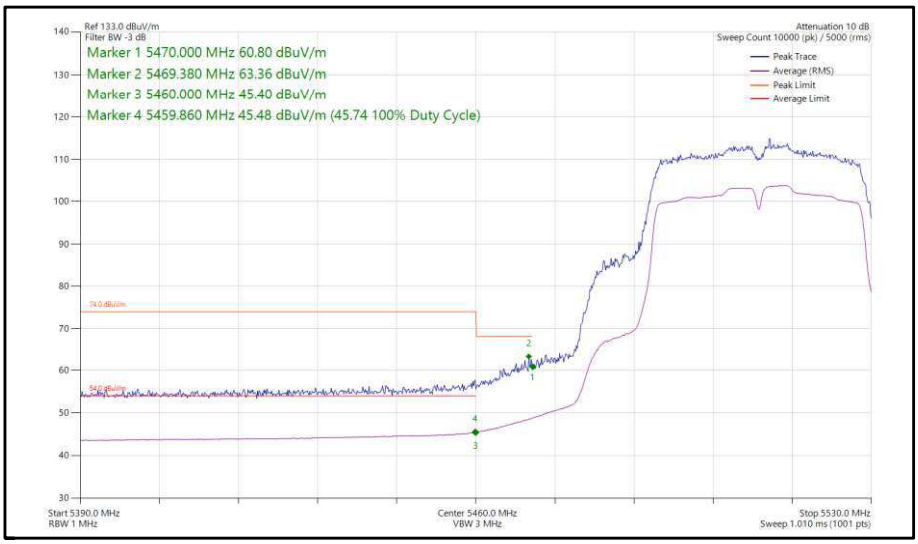

Figure 89 - 802.11n, HT40, TxBF, Core 0-1 - 5510 MHz, Band Edge Frequency 5460 MHz

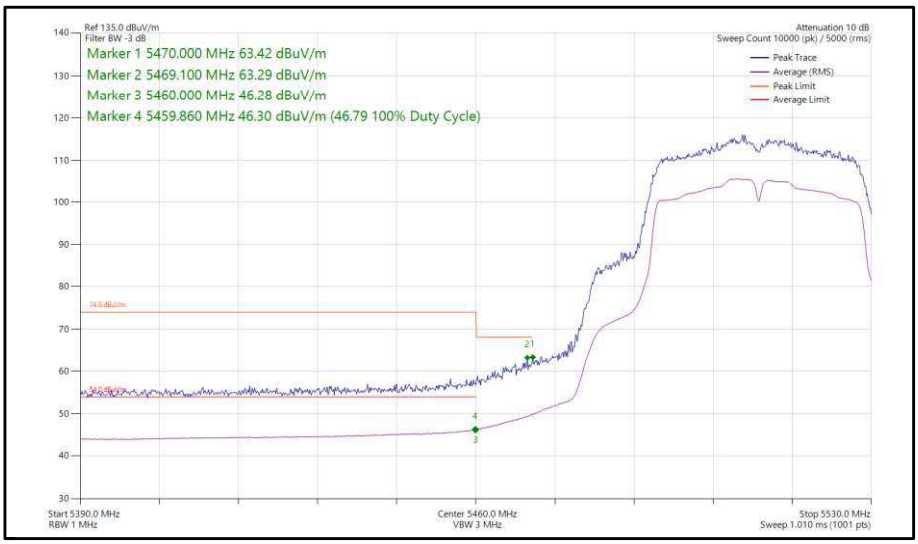

Figure 90 - 802.11ac, VHT40, TxBF, Core 0-1 - 5510 MHz, Band Edge Frequency 5460 MHz

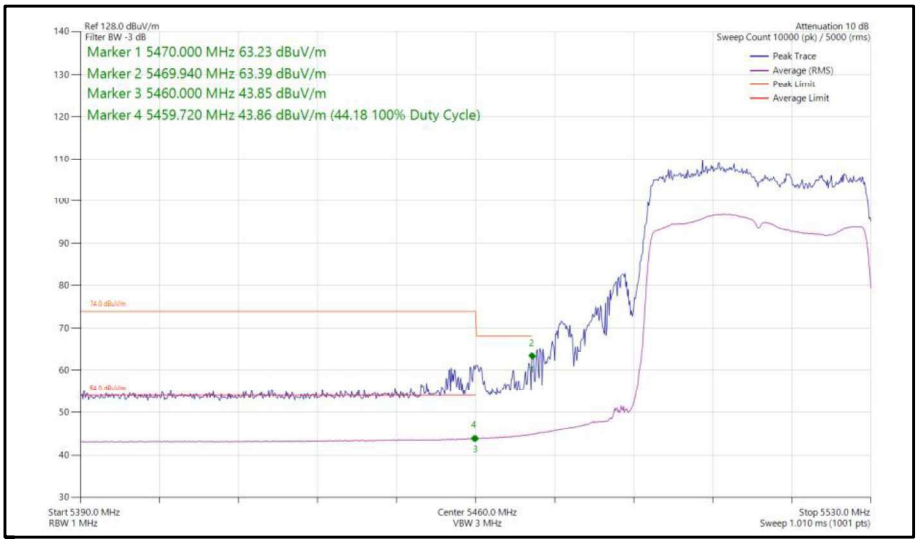

Figure 91 - 802.11ax, HE40, SU, TxBF, Core 0-1 - 5510 MHz, Band Edge Frequency 5460 MHz

80 MHz Bandwidth - Core 0 (SISO)

Mode	Data Rate/ MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBuV/m)
802.11ac VHT80	MCS8x1	-	-	5210	5150	69.33	50.61
802.11ax HE80	MCS4x1	SU	-	5210	5150	63.66	51.43
802.11ax HE80	MCS11x1	106	53	5210	5150	69.32	48.52
802.11ac VHT80	MCS2x1	-	-	5290	5350	63.74	51.47
802.11ax HE80	MCS2x1	SU	-	5290	5350	63.06	51.47
802.11ax HE80	MCS11x1	52	37	5290	5350	69.36	50.96
802.11ac VHT80	MCS4x1	-	-	5530	5460	63.61	51.24
802.11ax HE80	MCS4x1	SU	-	5530	5460	63.66	50.35
802.11ax HE80	MCS11x1	106	53	5530	5460	63.66	48.15

Table 16 - SISO Restricted Band Edge Results

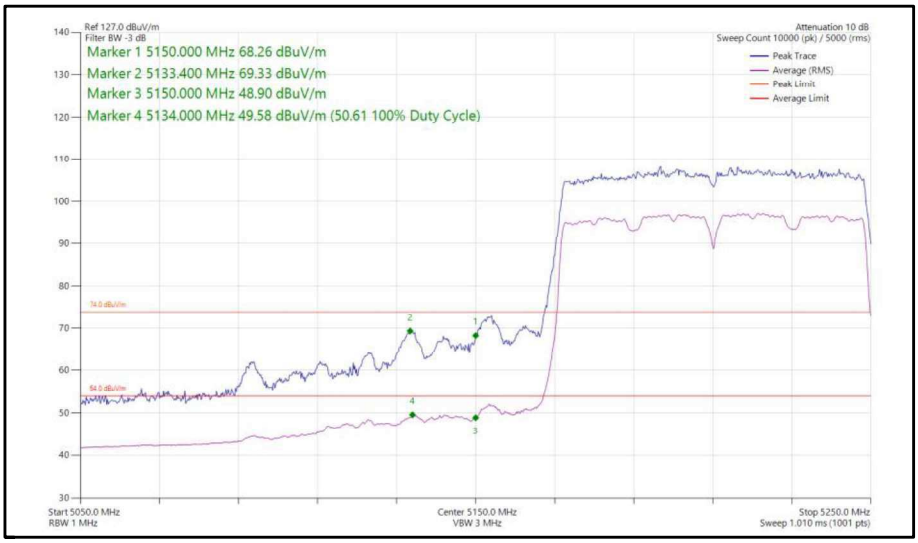

Figure 92 - 802.11ac, VHT80, SISO, Core 0 - 5210 MHz, Band Edge Frequency 5150 MHz

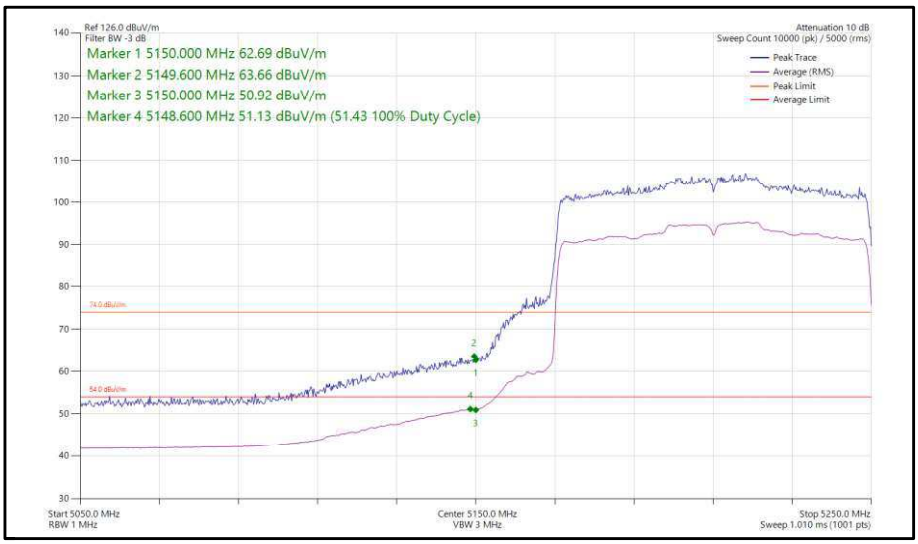

Figure 93 - 802.11ax, HE80, SU, SISO, Core 0 - 5210 MHz, Band Edge Frequency 5150 MHz

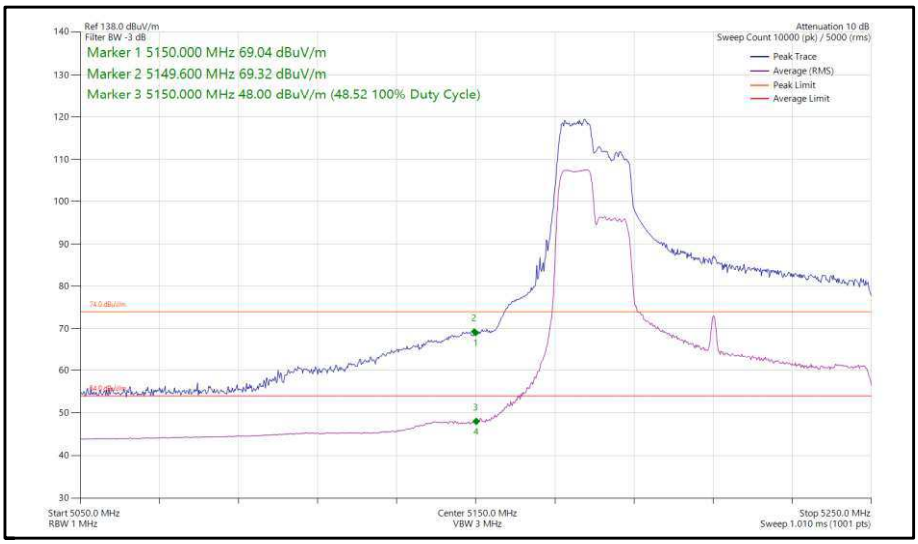

Figure 94 - 802.11ax, HE80, RU 106-53, SISO, Core 0 - 5210 MHz, Band Edge Frequency 5150 MHz

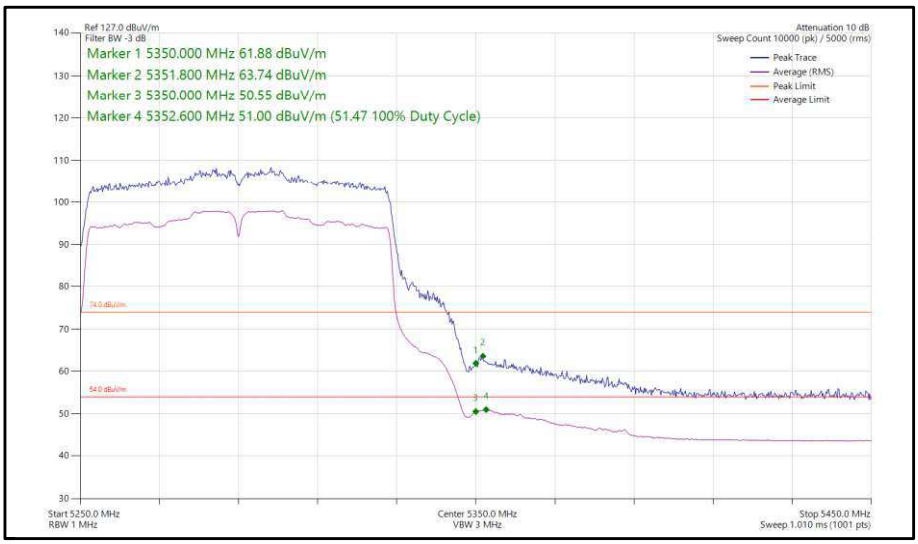

Figure 95 - 802.11ac, VHT80, SISO, Core 0 - 5290 MHz, Band Edge Frequency 5350 MHz

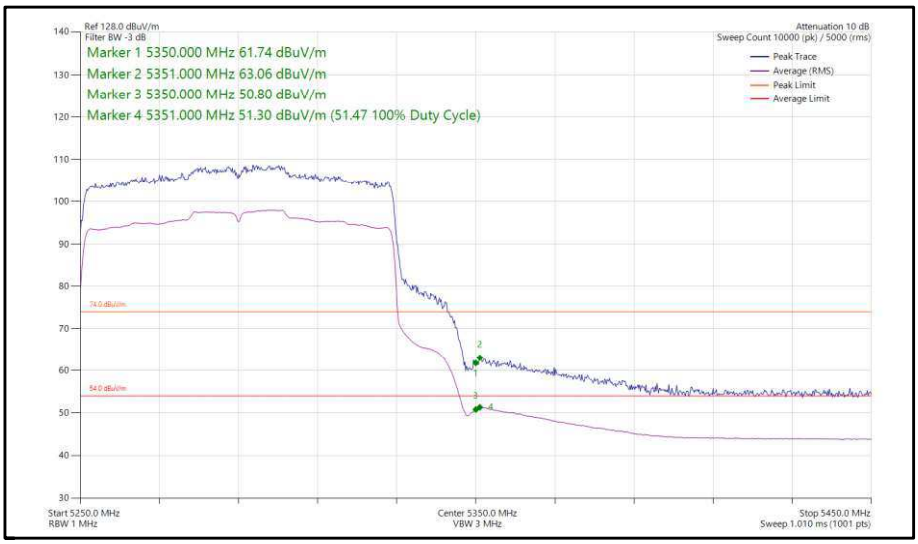

Figure 96 - 802.11ax, HE80, SU, SISO, Core 0 - 5290 MHz, Band Edge Frequency 5350 MHz

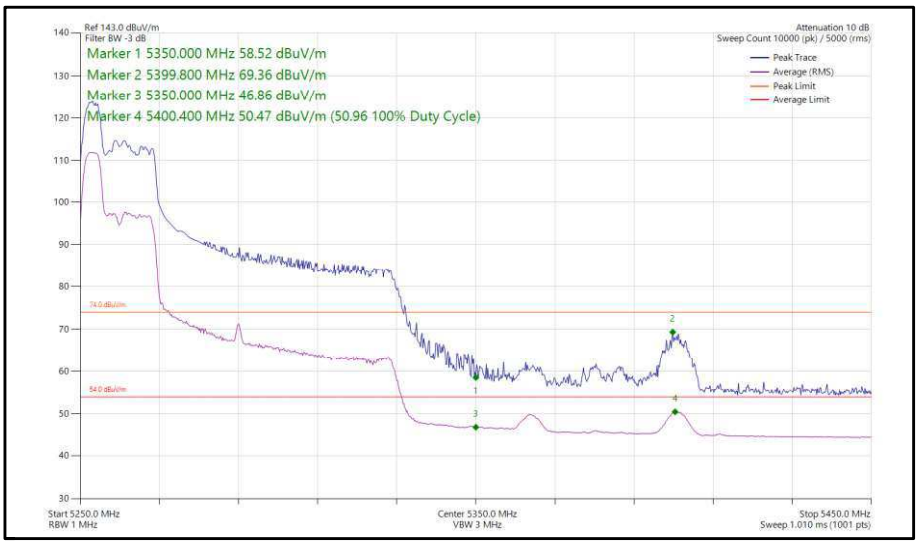

Figure 97 - 802.11ax, HE80, RU 52-37, SISO, Core 0 - 5290 MHz, Band Edge Frequency 5350 MHz

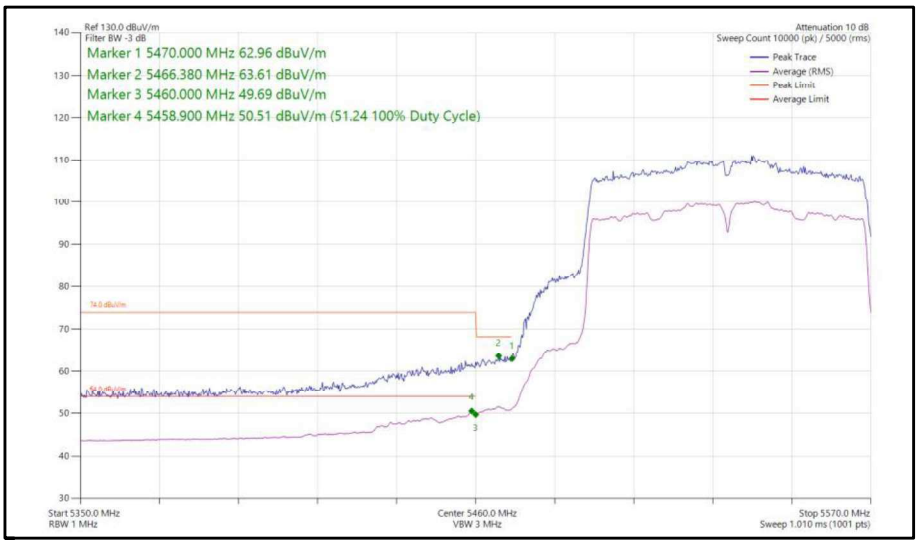

Figure 98 - 802.11ac, VHT80, SISO, Core 0 - 5530 MHz, Band Edge Frequency 5460 MHz

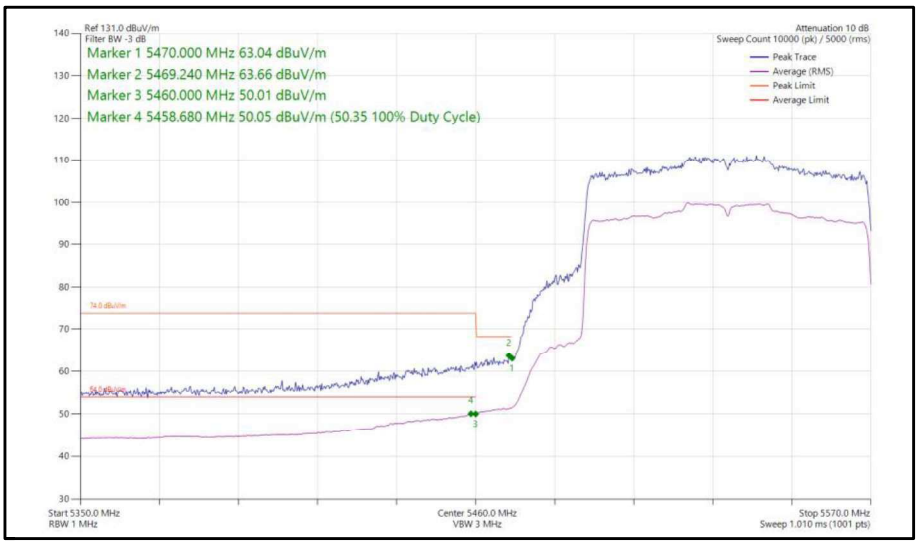

Figure 99 - 802.11ax, HE80, SU, SISO, Core 0 - 5530 MHz, Band Edge Frequency 5460 MHz

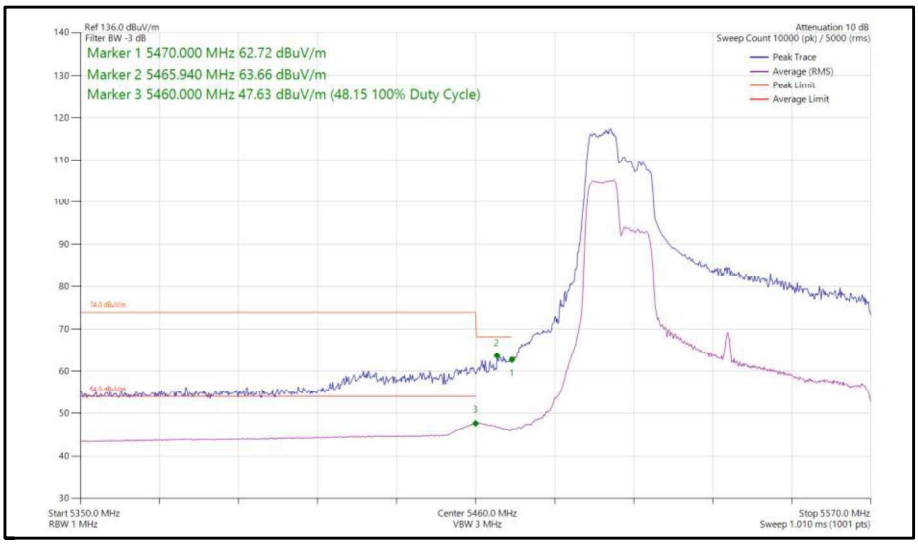

Figure 100 - 802.11ax, HE80, RU 106-53, SISO, Core 0 - 5530 MHz, Band Edge Frequency 5460 MHz

80 MHz Bandwidth - Core 1 (SISO)

Mode	Data Rate/ MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBuV/m)
802.11ac VHT80	MCS2x1	-	-	5210	5150	62.85	51.49
802.11ax HE80	MCS4x1	SU	-	5210	5150	63.27	51.39
802.11ax HE80	MCS11x1	106	53	5210	5150	69.42	48.87
802.11ac VHT80	MCS2x1	-	-	5290	5350	63.62	51.46
802.11ax HE80	MCS4x1	SU	-	5290	5350	63.40	51.33
802.11ax HE80	MCS11x1	52	37	5290	5350	69.41	51.41
802.11ac VHT80	MCS4x1	-	-	5530	5460	63.69	50.11
802.11ax HE80	MCS11x1	SU	-	5530	5460	63.66	48.75
802.11ax HE80	MCS11x1	106	53	5530	5460	63.38	47.41

Table 17 - SISO Restricted Band Edge Results

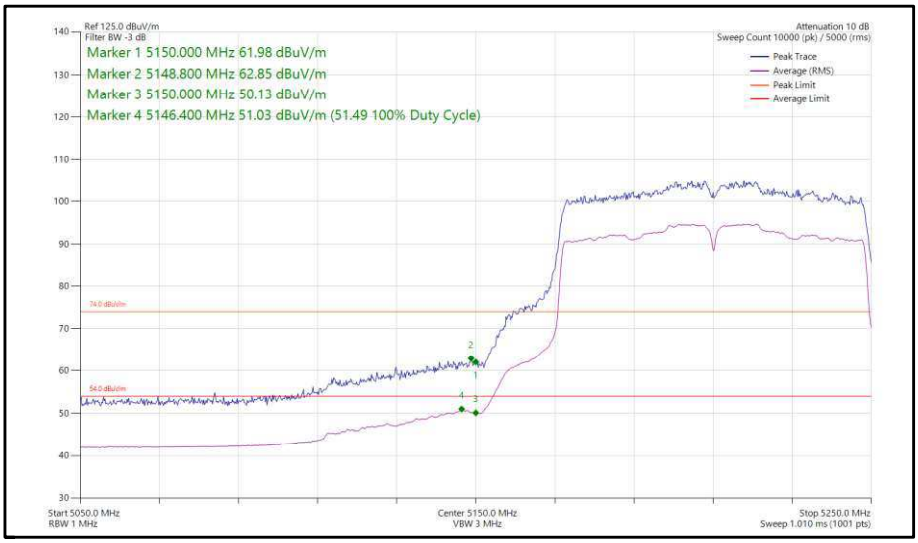

Figure 101 - 802.11ac, VHT80, SISO, Core 1 - 5210 MHz, Band Edge Frequency 5150 MHz