

FCC and ISED Test Report

Apple Inc
Model: A3239

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

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



TUV SUD
Limited
Digitally signed
by TUV SUD
Limited
Date: 2024.10.14
15:56:55 +01'00'

FCC ID: BCGA3239 IC: 579C-A3239

COMMERCIAL-IN-CONFIDENCE

Document 75961400-72 Issue 02

SIGNATURE			
NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Phil Harrison	Chief Engineer	Authorised Signatory	11 October 2024

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

ENGINEERING STATEMENT

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

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Report Generation	Rachael Watkins	11 October 2024	

FCC Accreditation 553713/UK2026 Concorde Park, Fareham Test Laboratory
ISED Accreditation 28798/UK0003 Concorde Park, Fareham Test Laboratory

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15E: 2023, ISSED RSS-247: Issue 3 (2023-08) and ISSED RSS-GEN: Issue 5 (2018-04) + A2 (2021-02) for the tests detailed in section 1.3.

		DISCLAIMER AND COPYRIGHT This non-binding report has been prepared by TUV SUD with all reasonable skill and care. The document is confidential to the potential Client and TUV SUD. No part of this document may be reproduced without the prior written approval of TUV SUD. © 2024 TUV SUD. This report relates only to the actual item/items tested. ACCREDITATION Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation. Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited). Results of tests covered by our Flexible UKAS Accreditation Schedule are marked FS (Flexible Scope).
--	--	---

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

TUV SUD Ltd is a
TUV SUD Group Company

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

TUV SUD
Octagon House
Concorde Way
Fareham
Hampshire PO15 5RL
United Kingdom



Contents

1 Report Summary2

1.1 Report Modification Record.....2

1.2 Introduction.....2

1.3 Brief Summary of Results3

1.4 Product Information4

1.5 Deviations from the Standard.....5

1.6 Identification of the EUT6

1.7 EUT Modification Record7

1.8 Test Location8

2 Test Details9

2.1 Restricted Band Edges.....9

2.2 Emission Bandwidth 107

2.3 Maximum Conducted Output Power 238

2.4 Maximum Conducted Power Spectral Density..... 368

2.5 Authorised Band Edges 473

2.6 Spurious Radiated Emissions 606

2.7 Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period 654

3 Measurement Uncertainty 665



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	10-Oct-2024
2	Added TxBF results	11-Oct-2024

Table 1

1.2 Introduction

Applicant	Apple Inc
Manufacturer	Apple Inc
EUT/Sample Identification	Refer to section 1.6
Test Specification/Issue/Date	FCC 47 CFR Part 15E: 2023 ISED RSS-247: Issue 3 (2023-08) ISED RSS-GEN: Issue 5 (2018-04) + A2 (2021-02)
Start of Test	30-July-2024
Finish of Test	04-October-2024
Name of Engineer(s)	Ahmed Al Derdiri, James Woods, Thomas Randall, Colin Brain, Mahmud Chowdhury, Feda Hussein, Akhil Rajendran Bhaskaran Nair, Ian Hart, Elliot Callender, Manohar Thota, Tony Baby, Morsalin Hossain and Stefan Gilfedder.
Related Document(s)	ANSI C63.4 (2014) ANSI C63.10 (2020) KDB 662911 D01 v02r01 KDB 789033 D02 v02r01 KDB 905462 D02 v02 KDB 905462 D03 v01r02



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15E, ISSED RSS-247 and ISSED 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 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	ANSI C63.10 (2020)
2.2	15.407 (a)	6.2	-	Emission Bandwidth	Pass	ANSI C63.10 (2020)
2.3	15.407 (a)	6.2	-	Maximum Conducted Output Power	Pass	ANSI C63.10 (2020) KDB 662911 D01 v02r01
2.4	15.407 (a)	6.2	-	Maximum Conducted Power Spectral Density	Pass	ANSI C63.10 (2020) KDB 662911 D01 v02r01
2.5	15.407 (b)	6.2	-	Authorised Band Edges	Pass	ANSI C63.10 (2020)
2.6	15.209 and 15.407 (b)	6.2	6.13 and 8.9	Spurious Radiated Emissions	Pass	ANSI C63.4 (2014) ANSI C63.10 (2020)
2.7	15.407 (h)(2)(iii)(iv)	Clause 6.3.2(c)(d)(e)	-	Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period	Pass	KDB 905462 D02 v02 KDB 905462 D03 v01r02

Table 2



1.4 Product Information

1.4.1 Technical Description

The equipment under test (EUT) was a desktop 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 only 20 MHz bandwidth SISO operation. 802.11n supported 20 MHz and 40 MHz bandwidths. 802.11ac and ax supported 20 MHz, 40 MHz, 80 MHz and 160 MHz bandwidths. 802.11n, 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 and additional preliminary investigations were performed to find worst-case operation, the EUT was tested in the following supported transmit modes:

SISO Modes (5150-5350 MHz: Core 0 / 5470-5850 MHz: Core 1):

- 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 + Core 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) and 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.

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

1.4.4 Antenna Gain Table

Antenna Port	Frequency Range (MHz)	Peak Gain (dBi)	Conducted Cable Loss (dB)
Core 0	5150 to 5250	4.0	1.43
	5250 to 5350	4.7	1.42
	5470 to 5725	3.5	1.46
	5725 to 5850	3.1	1.50
Core 1	5150 to 5250	4.0	1.43
	5250 to 5350	4.6	1.42
	5470 to 5725	3.7	1.46
	5725 to 5850	3.3	1.50

Table 3

1.5 Deviations from the Standard

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



1.6 Identification of the EUT

The table below details identification of the EUT(s) that have been used to carry out the testing within this report.

Model: A3239			
Serial Number	Hardware Version	Software Version	Firmware
XX2LT43WT6	REV1.0	24A42521k	23.30.16
F62VWWG2NJ	REV1.0	24A41870n	23.10.819.0.41.51.140
N20P49FFV9	REV1.0	24A42521k	23.30.16
FH9KV30V6N	REV1.0	24A42521k	23.30.16
VGYNW5CQGJ	REV1.0	24A42521k	23.30.16
W46MCWV5JP	REV1.0	24A42521k	23.30.16
JL2G9T9QK5	REV1.0	24A42521k	23.30.16
W673XW7056	REV1.0	24A42521k	23.30.16
D4D3YLHFTQ	REV1.0	24A42521k	23.30.16
N7C7VWDN4T	REV1.0	24A42521k	23.30.16
DLX7VG477R	REV1.0	24A42521d	23.30.16
D21W5XX7VQ	REV1.0	24B2051	23.10.900.4.41.51.165
F94MVK9JK6	REV1.0	24A291	23.10.864.0.41.51.156

Table 4



1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.

The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Model: A3239, Serial Number: N20P49FFV9			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3239, Serial Number: FH9KV30V6N			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3239, Serial Number: VGYNW5CQGJ			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3239, Serial Number: XX2LT43WT6			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3239, Serial Number: W46MCWV5JP			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3239, Serial Number: JL2G9T9QK5			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3239, Serial Number: N7C7VWDN4T			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3239, Serial Number: W673XW7056			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3239, Serial Number: D4D3YLHFTQ			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3239, Serial Number: DLX7VG477R			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3239, Serial Number: D21W5XX7VQ			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3239, Serial Number: F62VWWG2NJ			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3239, Serial Number: F94MVK9JK6			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 5



1.8 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	Ahmed Al Derdiri, James Woods, Thomas Randall and Colin Brain	UKAS
Emission Bandwidth	Mahmud Chowdhury and Feda Hussein	UKAS
Maximum Conducted Output Power	Mahmud Chowdhury and Feda Hussein	UKAS
Maximum Conducted Power Spectral Density	Mahmud Chowdhury and Feda Hussein	UKAS
Authorised Band Edges	Akhil Rajendran Bhaskaran Nair, Ahmed Al Derdiri, James Woods, Thomas Randall and Colin Brain	UKAS
Spurious Radiated Emissions	Ian Hart, Elliot Callender, Manohar Thota, Tony Baby, Morsalin Hossain and Ahmed Al Derdiri	UKAS
Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period	Stefan Gilfedder	UKAS

Table 6

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

A3239, S/N: N20P49FFV9 - Modification State 0
A3239, S/N: VGYNW5CQGJ - Modification State 0
A3239, S/N: W46MCWV5JP - Modification State 0
A3239, S/N: JL2G9T9QK5 - Modification State 0
A3239, S/N: N7C7VWDN4T - Modification State 0
A3239, S/N: D4D3YLHFTQ - Modification State 0
A3239, S/N: F94MVK9JK6 - Modification State 0

2.1.3 Date of Test

30-July-2024 to 06-September-2024

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 the various SISO and MIMO 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	21.5 - 23.9 °C
Relative Humidity	41.2 - 47.2 %

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 (dBμV/m)
802.11a	24 Mbps	-	-	5180	5150	60.99	47.29
802.11n HT20	MCS 4	-	-	5180	5150	60.47	46.41
802.11ax HE20	MCS 11x1	SU	-	5180	5150	64.78	46.09
802.11ax HE20	MCS 11x1	106	54	5180	5150	55.40	44.04
802.11a	24 Mbps	-	-	5320	5350	62.95	48.67
802.11n HT20	MCS 2	-	-	5320	5350	61.87	48.47
802.11ax HE20	MCS 2x1	SU	-	5320	5350	62.05	48.60
802.11ax HE20	MCS 11x1	106	53	5320	5350	59.42	45.64
802.11a	54 Mbps	-	-	5500	5460	58.12	44.57
802.11n HT20	MCS 7	-	-	5500	5460	60.13	44.31
802.11ax HE20	MCS 11x1	SU	-	5500	5460	57.50	44.64
802.11ax HE20	MCS 11x1	106	53	5500	5460	56.90	44.07

Table 7 - SISO Restricted Band Edge Results

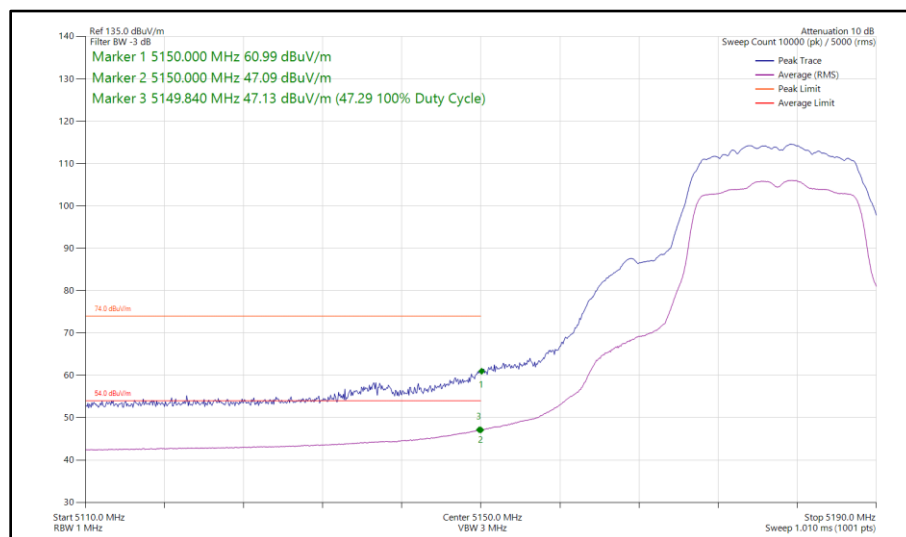


Figure 1 - 802.11a, SISO, Core 0 - 5180 MHz
Band Edge Frequency 5150 MHz

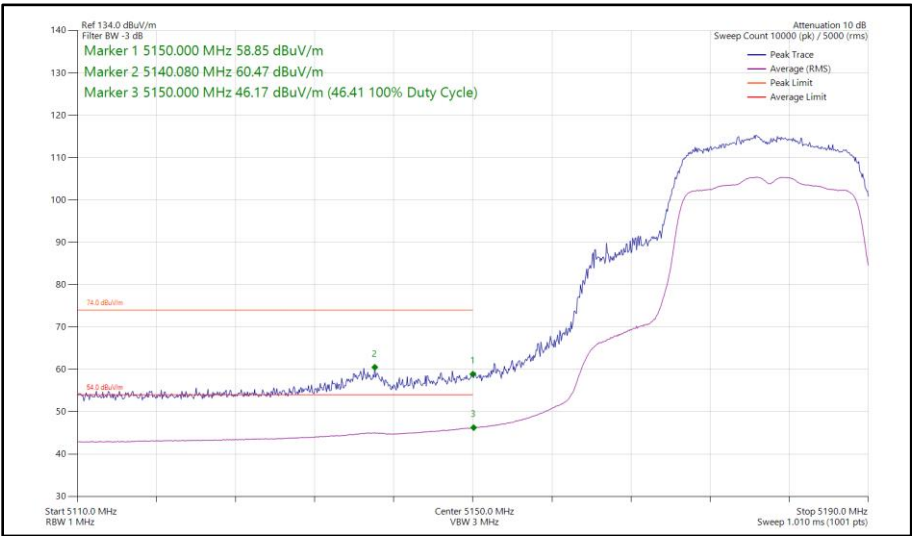


Figure 2 - 802.11n HT20, SISO, Core 0 - 5180 MHz
Band Edge Frequency 5150 MHz

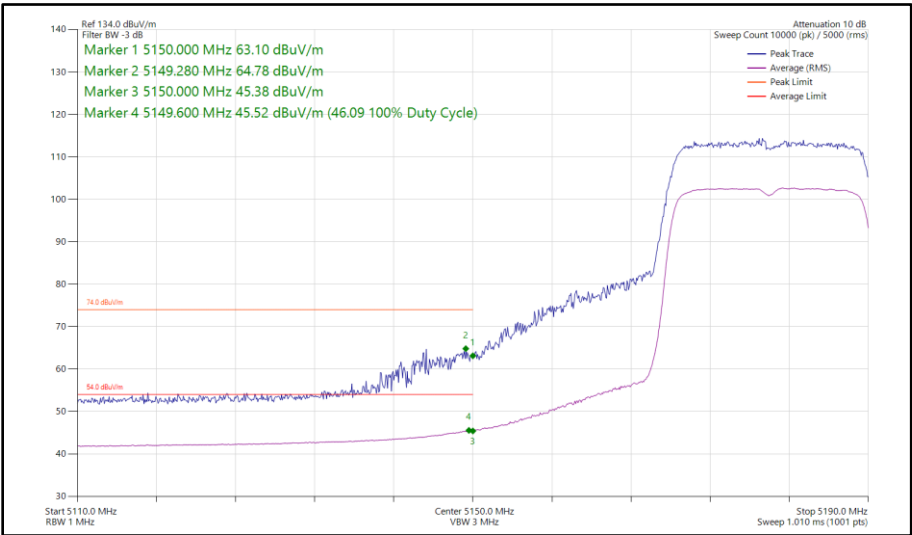


Figure 3 - 802.11ax HE20, SU, SISO, Core 0 - 5180 MHz
Band Edge Frequency 5150 MHz

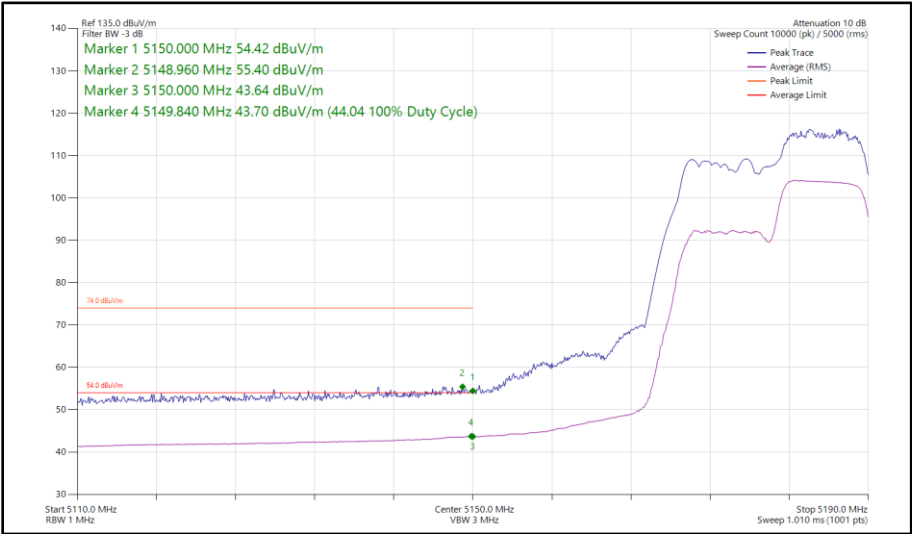


Figure 4 - 802.11ax HE20, RU 106-54, SISO, Core 0 - 5180 MHz
Band Edge Frequency 5150 MHz

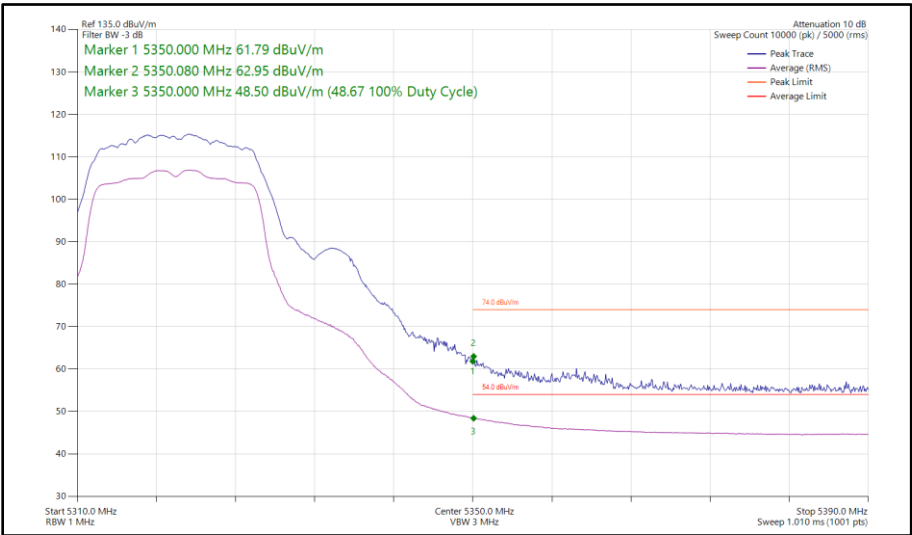


Figure 5 - 802.11a, SISO, Core 0 - 5320 MHz
Band Edge Frequency 5350 MHz

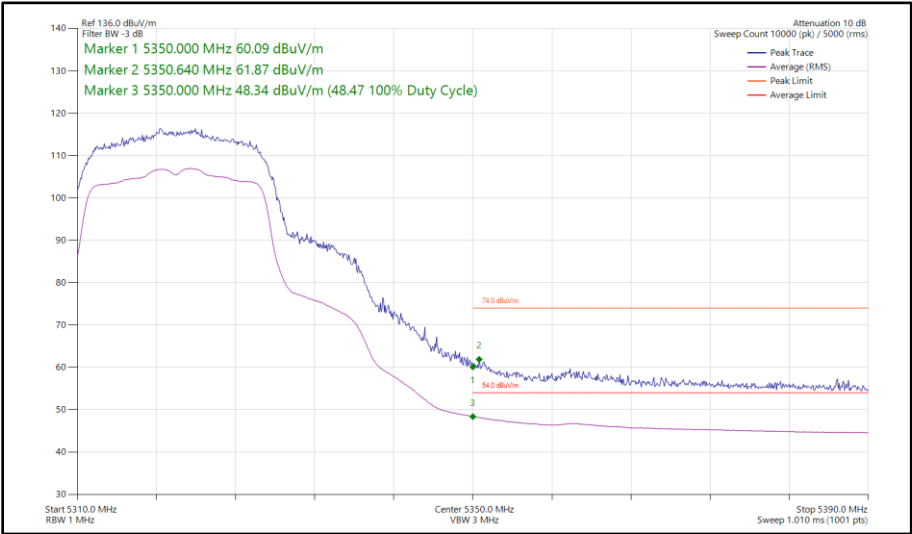


Figure 6 - 802.11n HT20, SISO, Core 0 - 5320 MHz
Band Edge Frequency 5350 MHz

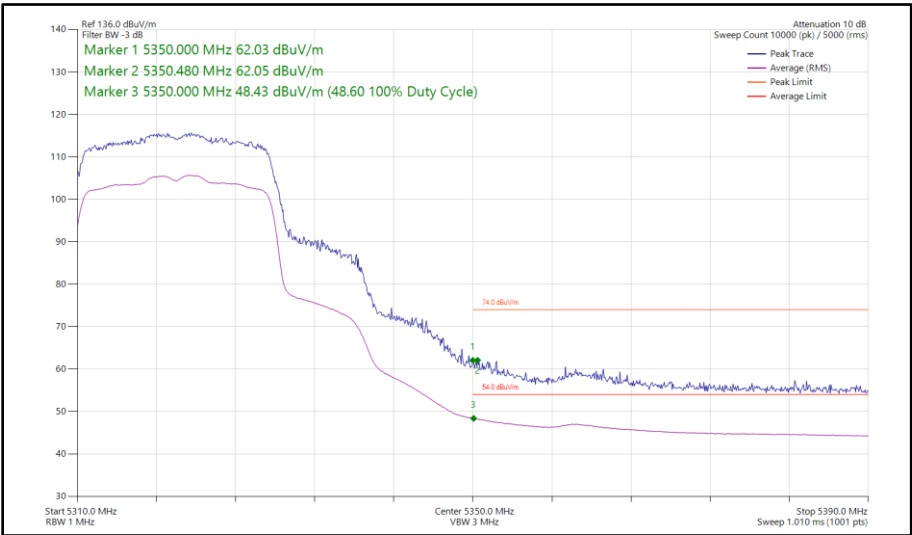


Figure 7 - 802.11ax HE20, SU, SISO, Core 0 - 5320 MHz
Band Edge Frequency 5350 MHz

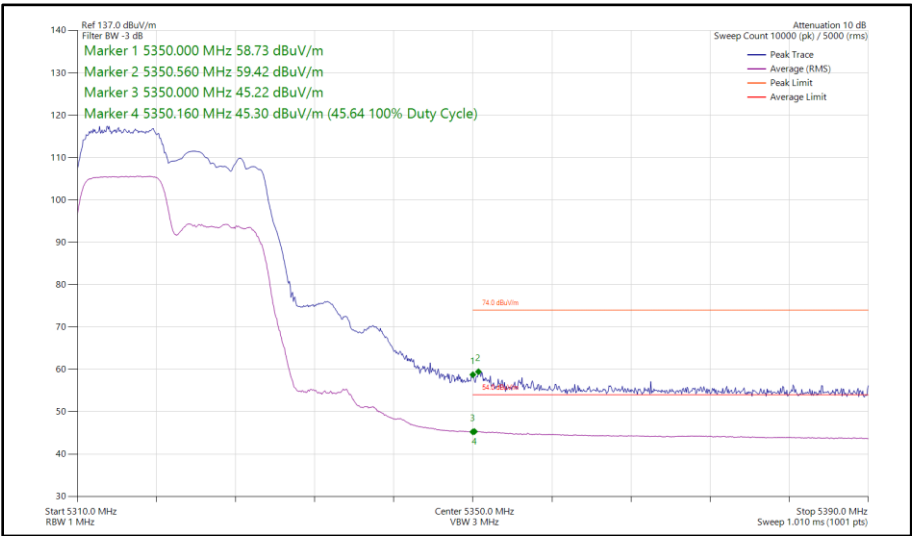


Figure 8 - 802.11ax HE20, RU 106-53, SISO, Core 0 - 5320 MHz
Band Edge Frequency 5350 MHz

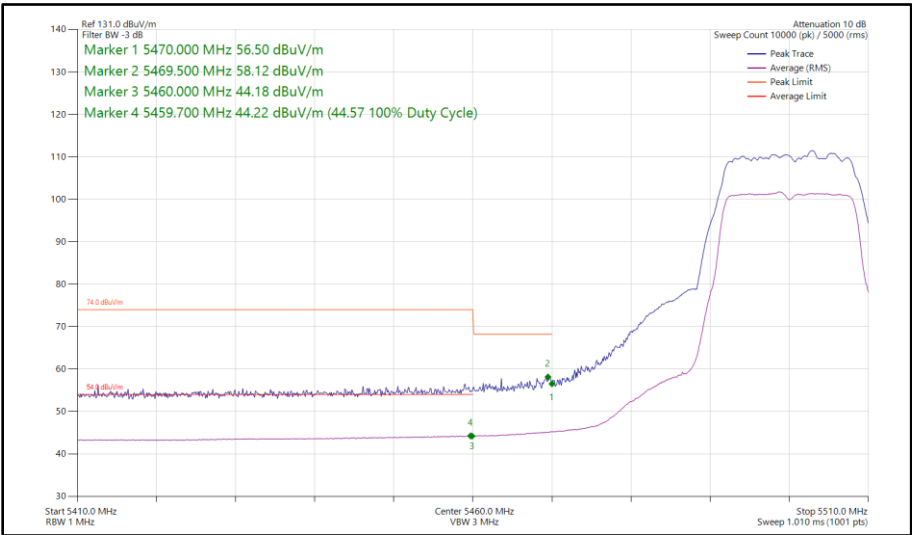


Figure 9 - 802.11a, SISO, Core 0 - 5500 MHz
Band Edge Frequency 5460 MHz

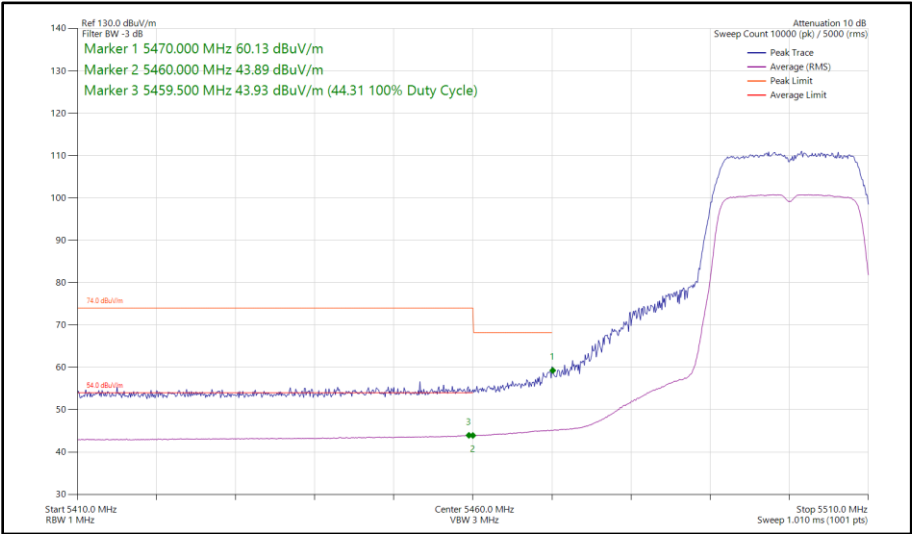


Figure 10 - 802.11n HT20, SISO, Core 0 - 5500 MHz
Band Edge Frequency 5460 MHz

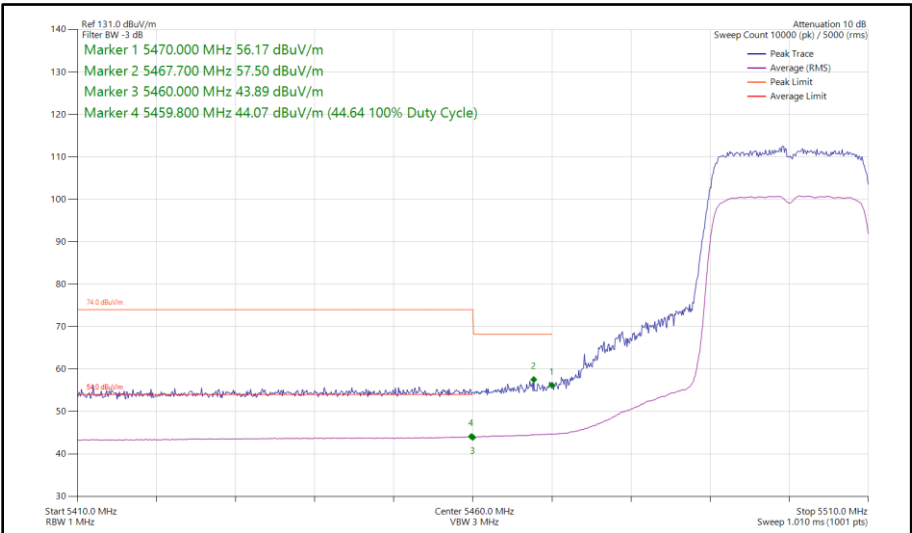


Figure 11 - 802.11ax HE20, SU, SISO, Core 0 - 5500 MHz
Band Edge Frequency 5460 MHz

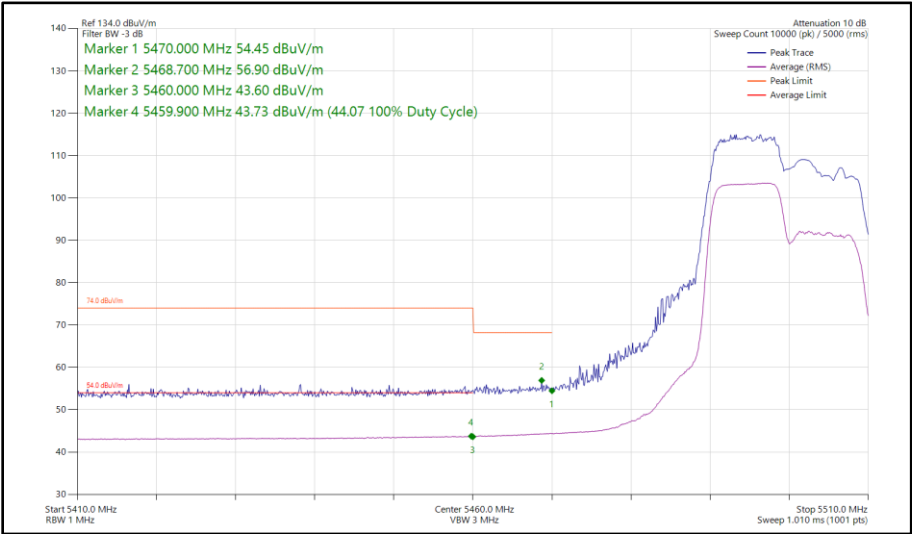


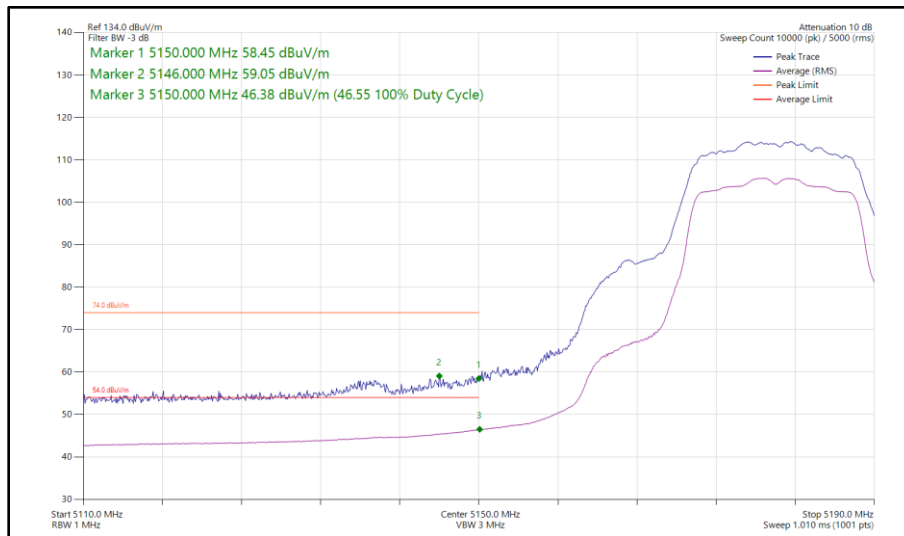
Figure 12 - 802.11ax HE20, RU 106-53, SISO, Core 0 - 5500 MHz
Band Edge Frequency 5460 MHz



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 (dBμV/m)
802.11a	24 Mbps	-	-	5180	5150	59.05	46.55
802.11n HT20	MCS 2	-	-	5180	5150	58.74	46.69
802.11ax HE20	MCS 4x1	SU	-	5180	5150	59.73	46.27
802.11ax HE20	MCS 11x1	106	53	5180	5150	55.53	43.47
802.11a	24 Mbps	-	-	5320	5350	61.78	48.95
802.11n HT20	MCS 4	-	-	5320	5350	65.01	48.90
802.11ax HE20	MCS 2x1	SU	-	5320	5350	61.49	48.33
802.11ax HE20	MCS 11x1	106	53	5320	5350	58.09	45.58
802.11a	54 Mbps	-	-	5500	5460	59.60	45.61
802.11n HT20	MCS 7	-	-	5500	5460	62.73	45.67
802.11ax HE20	MCS 11x1	SU	-	5500	5460	60.88	45.29
802.11ax HE20	MCS 11x1	106	53	5500	5460	56.94	44.61

Table 8 - SISO Restricted Band Edge Results



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

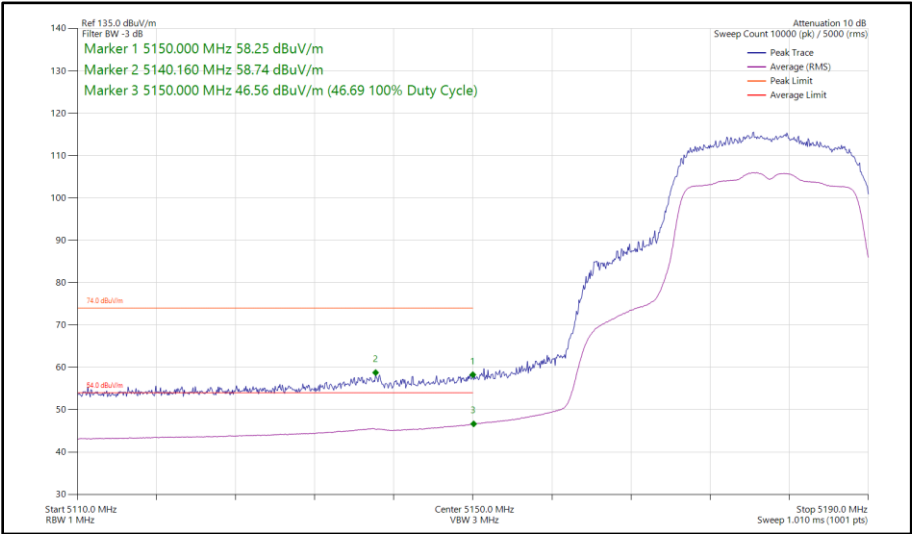


Figure 14 - 802.11n HT20, SISO, Core 1 - 5180 MHz
Band Edge Frequency 5150 MHz

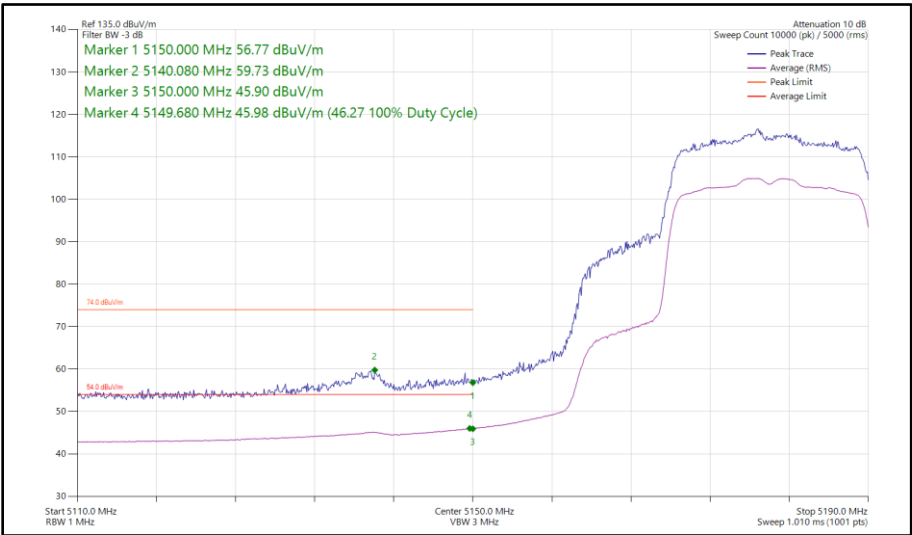


Figure 15 - 802.11ax HE20, SU, SISO, Core 1 - 5180 MHz
Band Edge Frequency 5150 MHz

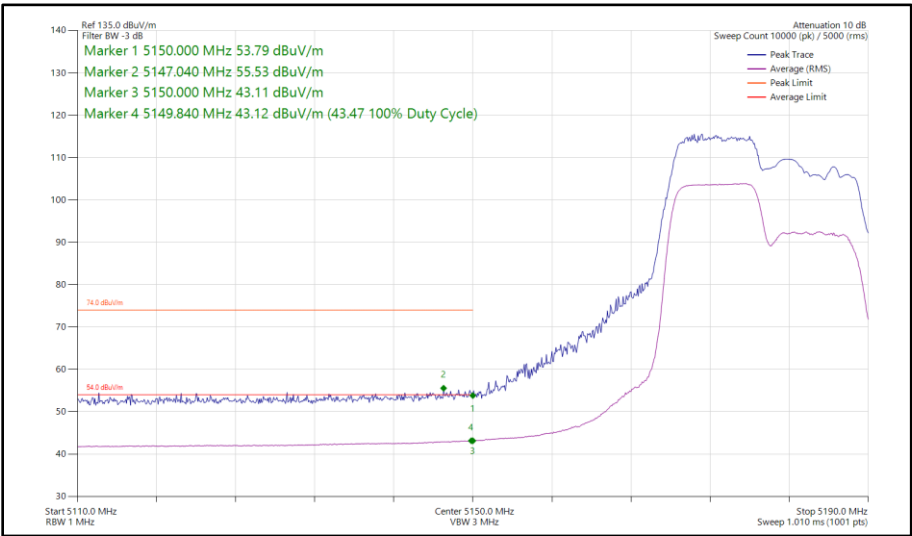


Figure 16 - 802.11ax HE20, RU 106-53, SISO, Core 1 - 5180 MHz
Band Edge Frequency 5150 MHz

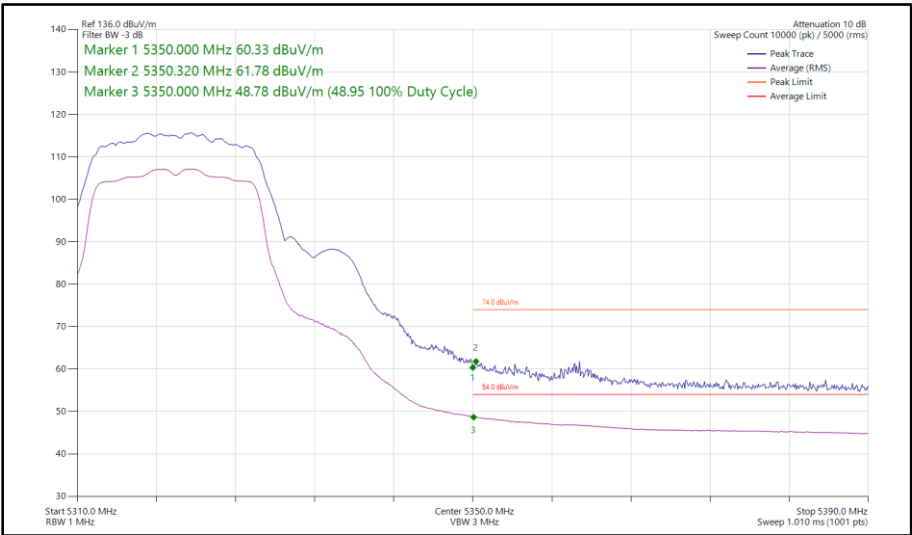


Figure 17 - 802.11a, SISO, Core 1 - 5320 MHz
Band Edge Frequency 5350 MHz

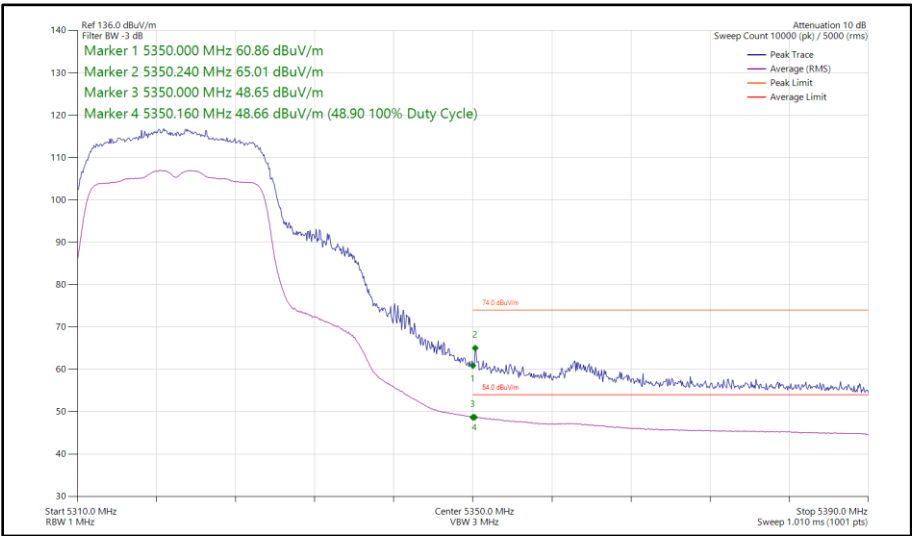


Figure 18 - 802.11n HT20, SISO, Core 1 - 5320 MHz
Band Edge Frequency 5350 MHz

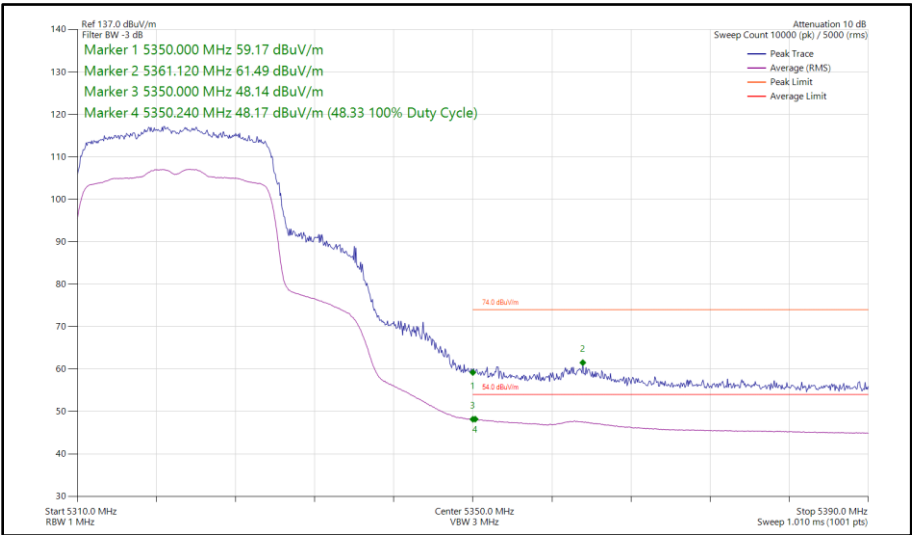


Figure 19 - 802.11ax HE20, SU, SISO, Core 1 - 5320 MHz
Band Edge Frequency 5350 MHz

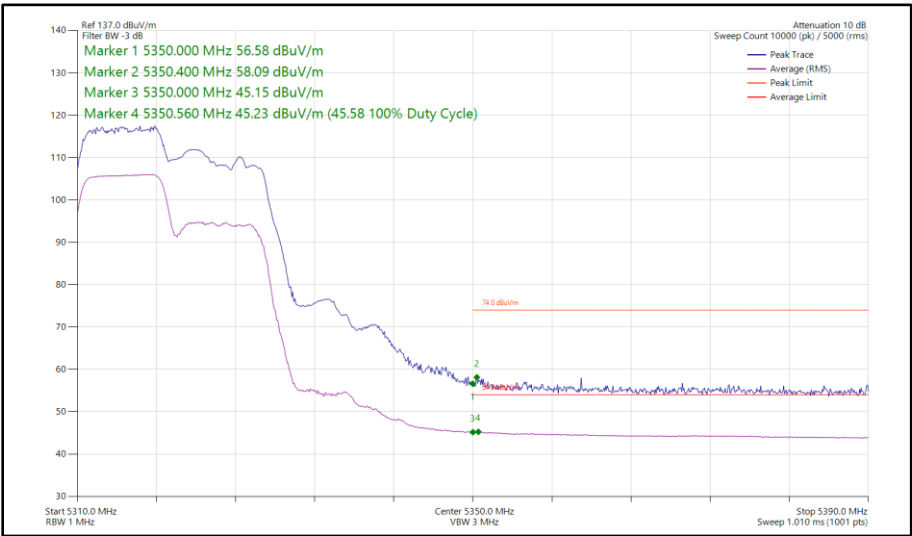


Figure 20 - 802.11ax HE20, RU 106-53, SISO, Core 1 - 5320 MHz
Band Edge Frequency 5350 MHz

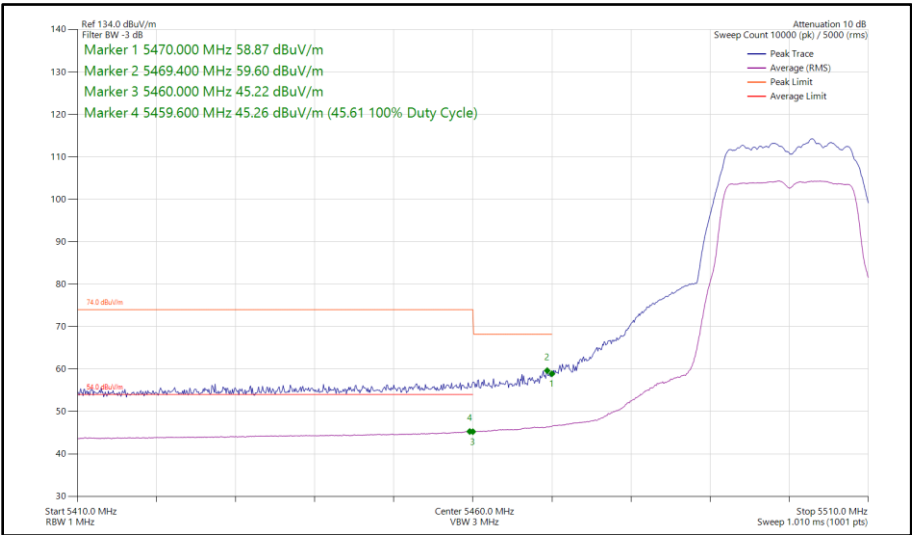


Figure 21 - 802.11a, SISO, Core 1 - 5500 MHz
Band Edge Frequency 5460 MHz

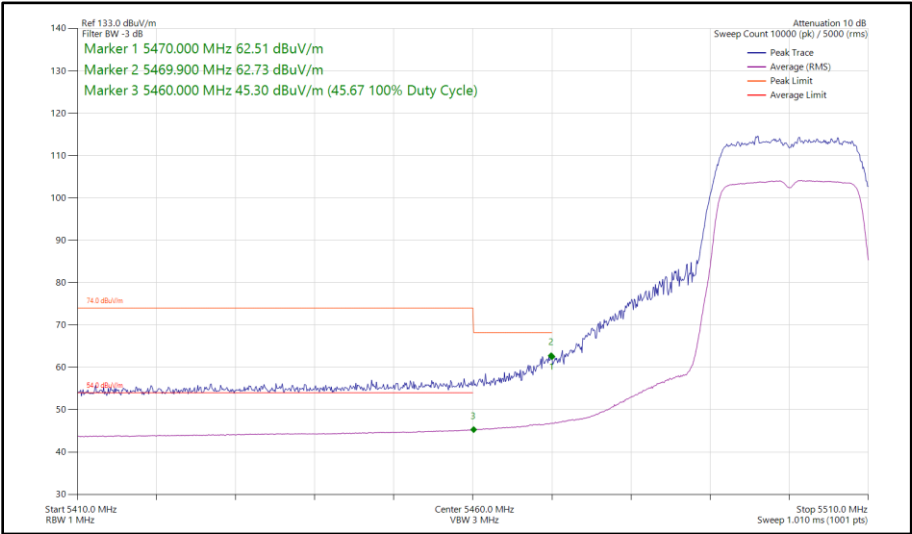


Figure 22 - 802.11n HT20, SISO, Core 1 - 5500 MHz
Band Edge Frequency 5460 MHz

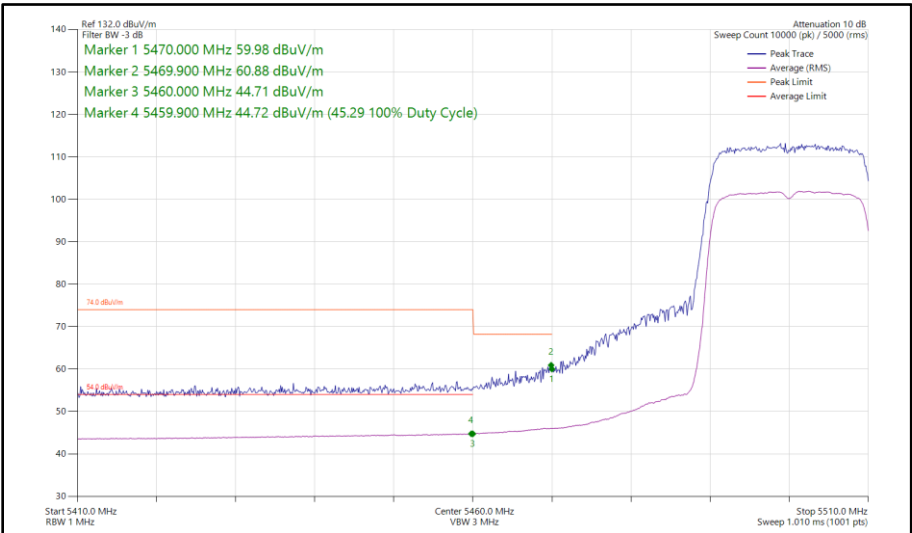


Figure 23 - 802.11ax HE20, SU, SISO, Core 1 - 5500 MHz
Band Edge Frequency 5460 MHz

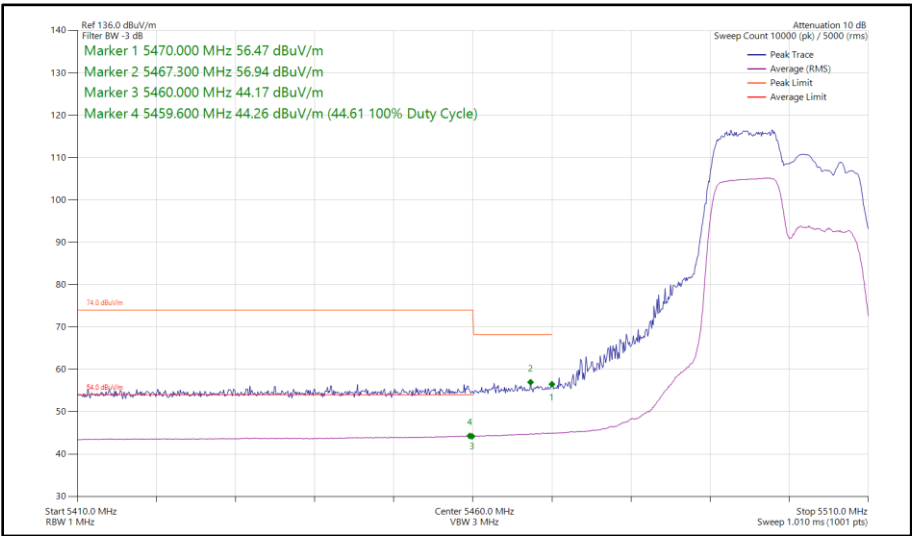


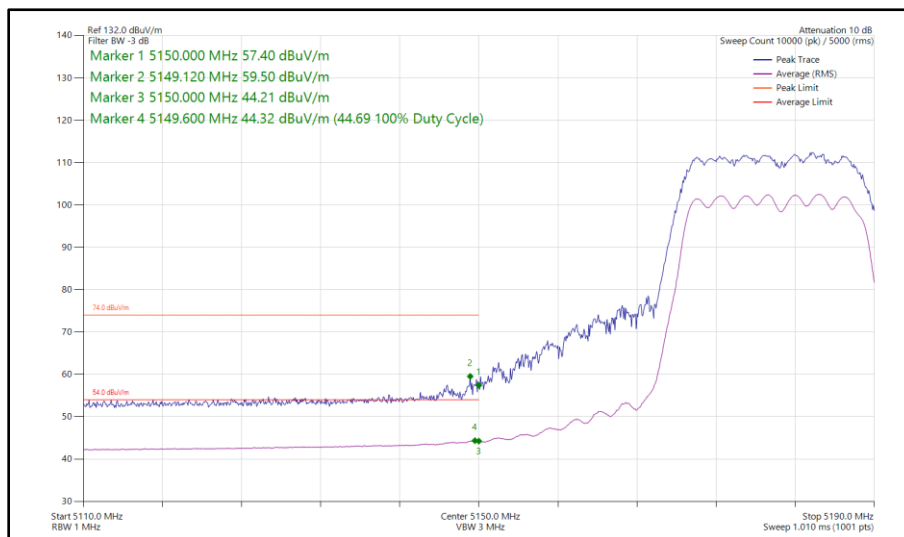
Figure 24 - 802.11ax HE20, RU 106-53, SISO, Core 1 - 5500 MHz
Band Edge Frequency 5460 MHz



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 (dBμV/m)
802.11n HT20	MCS 7	-	-	5180	5150	59.50	44.69
802.11ax HE20	MCS 11x1	SU	-	5180	5150	60.50	45.51
802.11ax HE20	MCS 11x1	106	53	5180	5150	55.12	43.00
802.11n HT20	MCS 7	-	-	5320	5350	61.27	46.02
802.11ax HE20	MCS 11x1	SU	-	5320	5350	60.40	45.80
802.11ax HE20	MCS 11x1	106	54	5320	5350	56.48	44.15
802.11n HT20	MCS 7	-	-	5500	5460	58.82	45.44
802.11ax HE20	MCS 11x1	SU	-	5500	5460	58.63	45.18
802.11ax HE20	MCS 11x1	106	53	5500	5460	57.51	44.85

Table 9 - CDD Restricted Band Edge Results



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

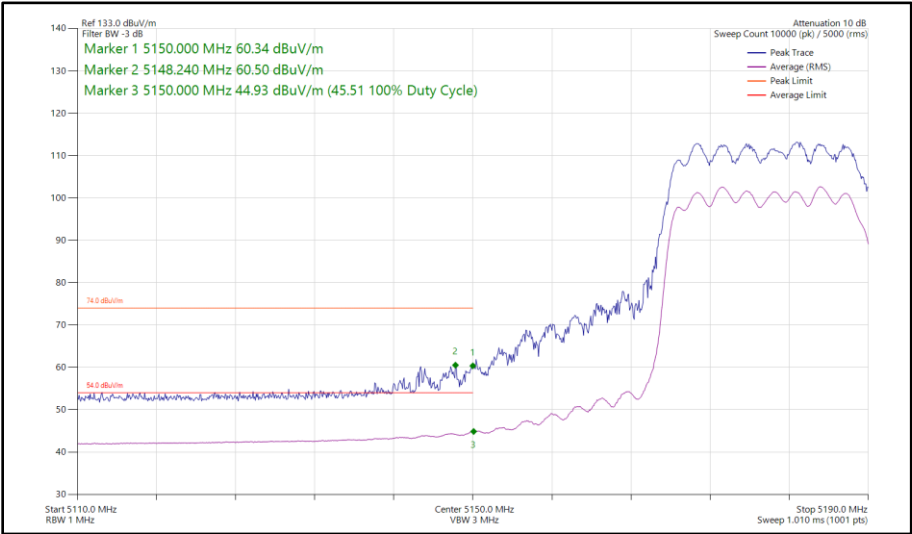


Figure 26 - 802.11ax HE20, SU, CDD, Core 0-1 - 5180 MHz
Band Edge Frequency 5150 MHz

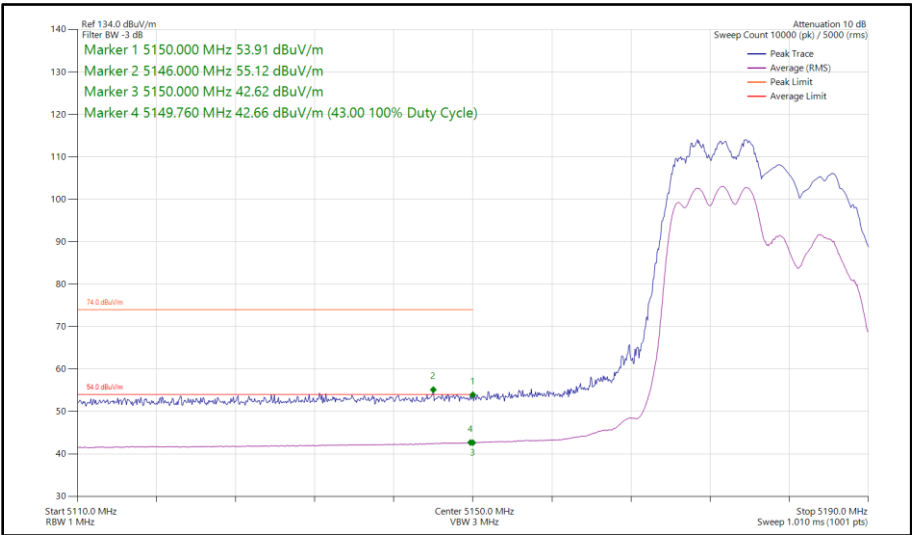


Figure 27 - 802.11ax HE20, RU 106-53, CDD, Core 0-1 - 5180 MHz
Band Edge Frequency 5150 MHz

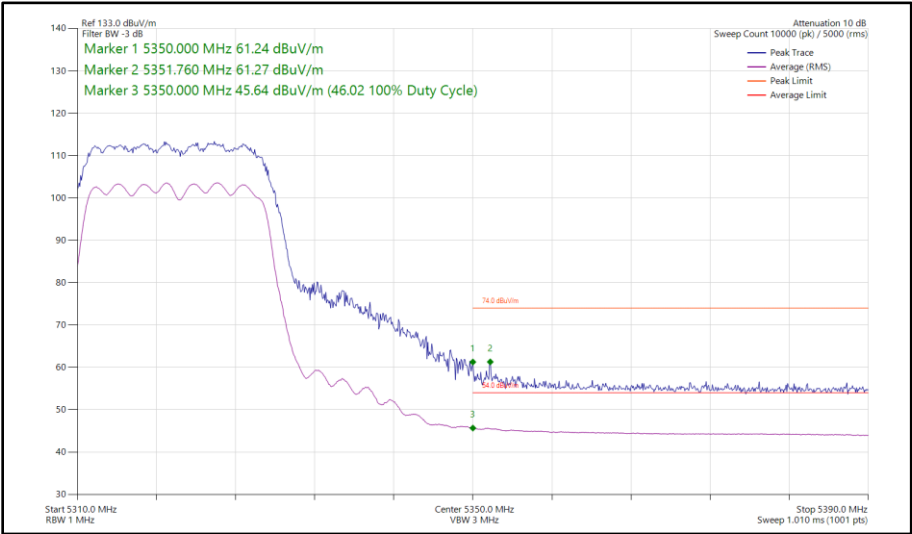


Figure 28 - 802.11n HT20, CDD, Core 0-1 - 5320 MHz
Band Edge Frequency 5350 MHz

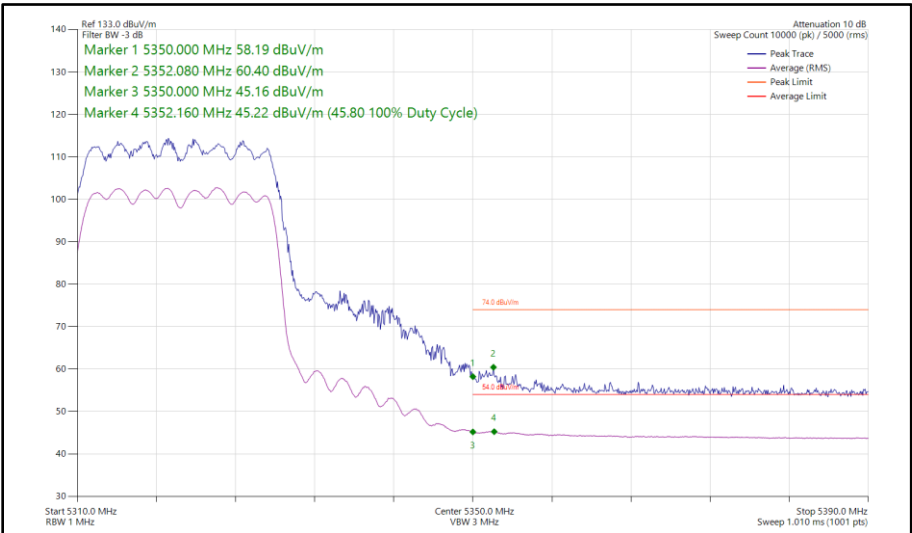


Figure 29 - 802.11ax HE20, SU, CDD, Core 0-1 - 5320 MHz
Band Edge Frequency 5350 MHz

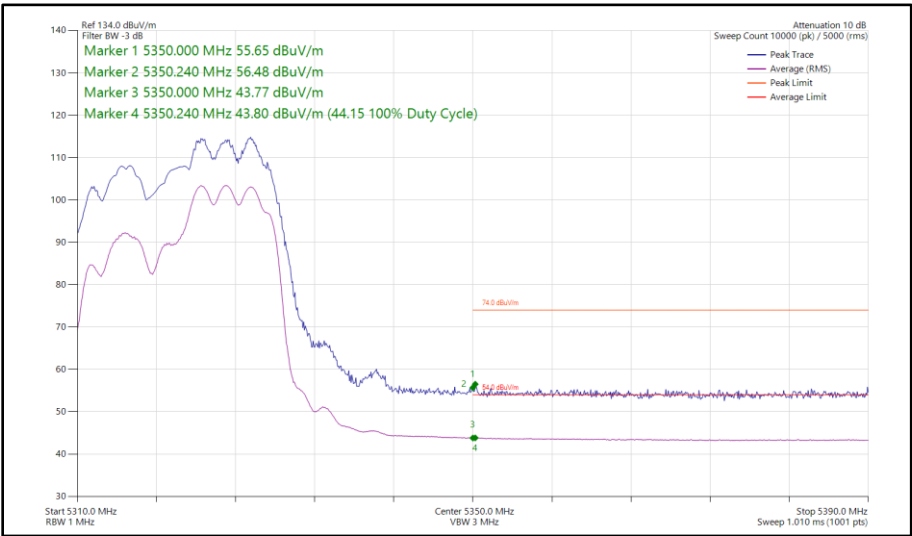


Figure 30 - 802.11ax HE20, RU 106-54, CDD, Core 0-1 - 5320 MHz
Band Edge Frequency 5350 MHz

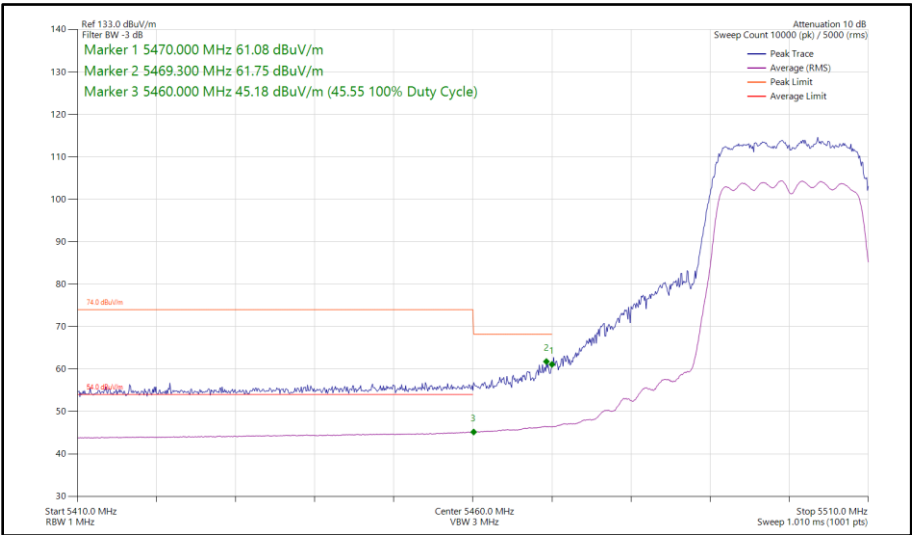


Figure 31 - 802.11n HT20, CDD, Core 0-1 - 5500 MHz
Band Edge Frequency 5460 MHz

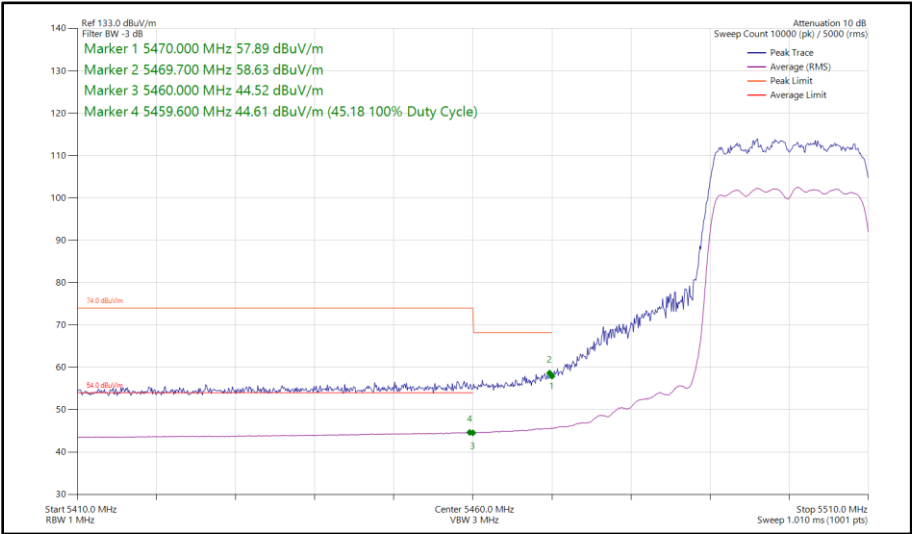


Figure 32 - 802.11ax HE20, SU, CDD, Core 0-1 - 5500 MHz
Band Edge Frequency 5460 MHz

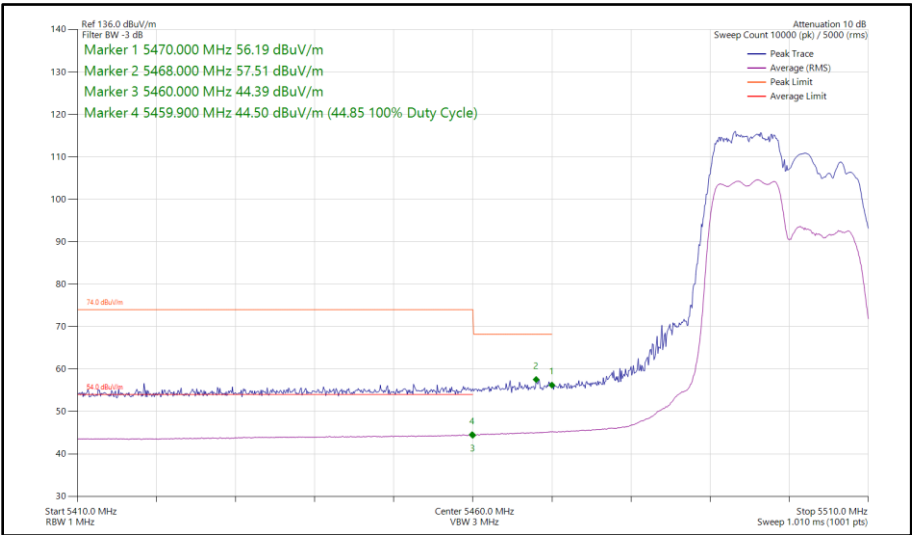


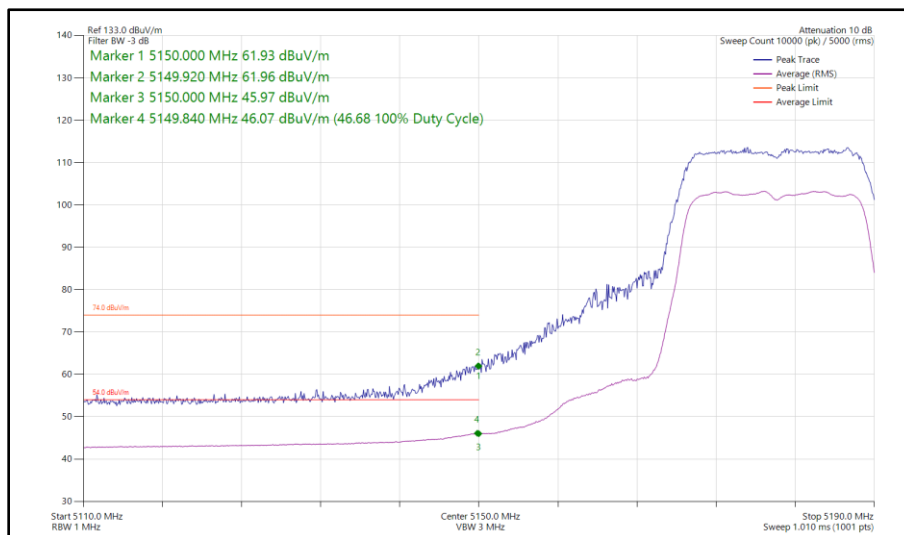
Figure 33 - 802.11ax HE20, RU 106-53, CDD, Core 0-1 - 5500 MHz
Band Edge Frequency 5460 MHz



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 (dBμV/m)
802.11n HT20	MCS 7	-	-	5180	5150	61.96	46.68
802.11ax HE20	MCS 11x2	SU	-	5180	5150	60.68	44.53
802.11ax HE20	MCS 11x2	106	53	5180	5150	54.26	42.61
802.11n HT20	MCS 7	-	-	5320	5350	62.19	47.54
802.11ax HE20	MCS 2x2	SU	-	5320	5350	60.57	47.16
802.11ax HE20	MCS 11x2	106	54	5320	5350	55.93	44.18
802.11n HT20	MCS 7	-	-	5500	5460	58.82	45.44
802.11ax HE20	MCS 2x2	SU	-	5500	5460	57.57	44.80
802.11ax HE20	MCS 11x2	106	54	5500	5460	56.62	44.08

Table 10 - SDM Restricted Band Edge Results



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

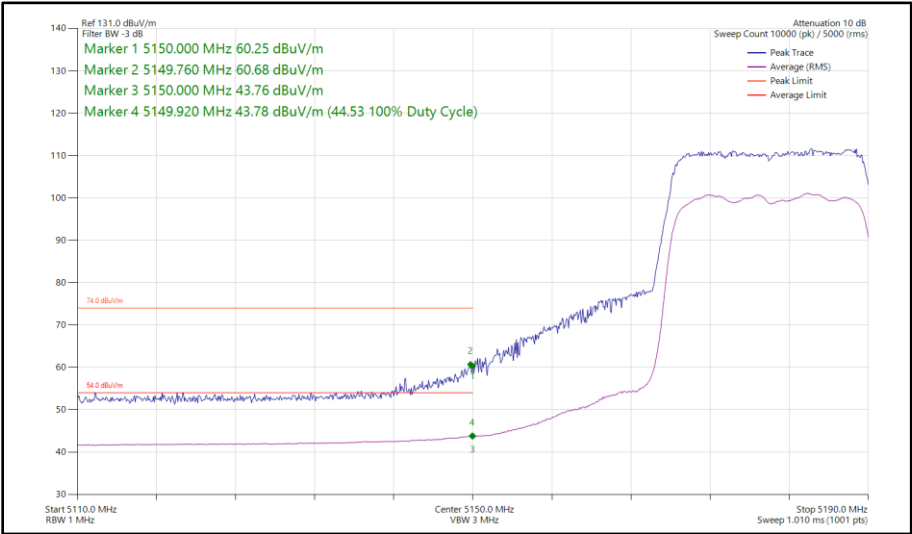


Figure 35 - 802.11ax HE20, SU, SDM, Core 0-1 - 5180 MHz
Band Edge Frequency 5150 MHz

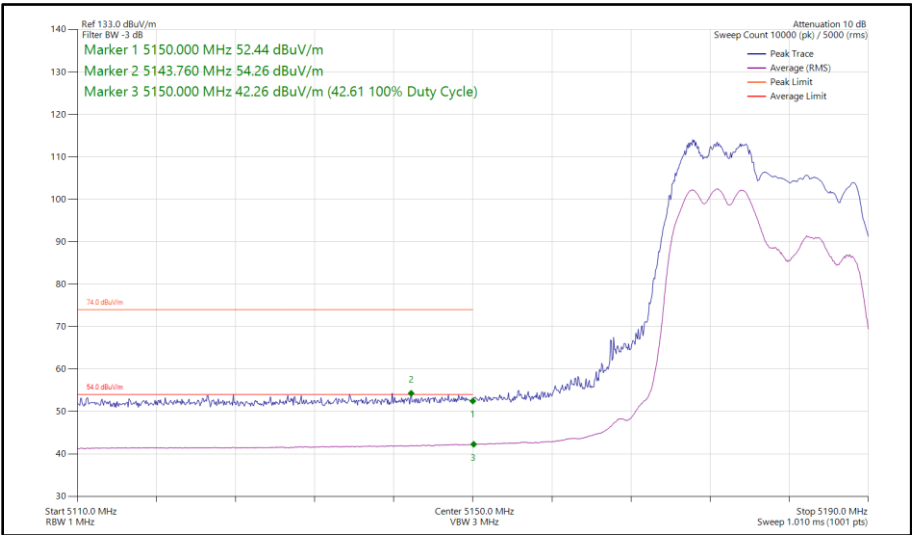


Figure 36 - 802.11ax HE20, RU 106-53, SDM, Core 0-1 - 5180 MHz
Band Edge Frequency 5150 MHz

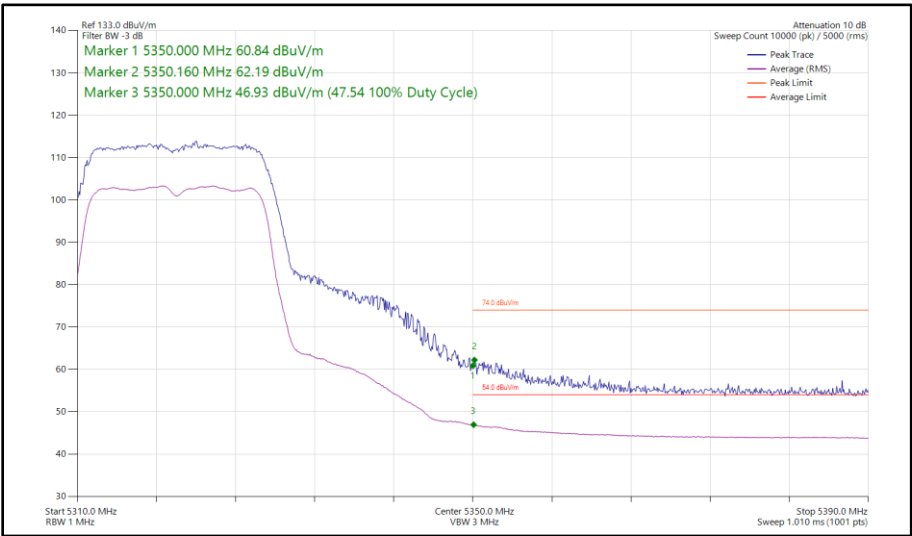


Figure 37 - 802.11n HT20, SDM, Core 0-1 - 5320 MHz
Band Edge Frequency 5350 MHz

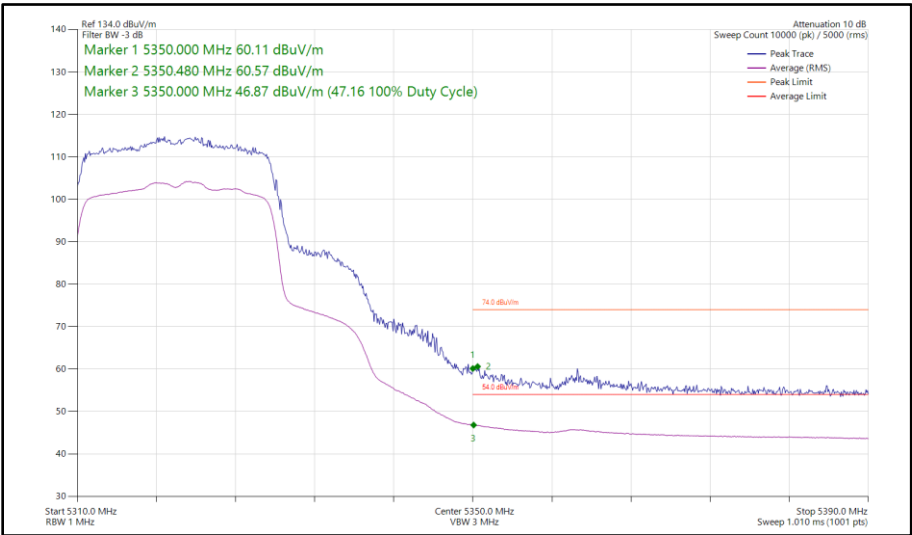


Figure 38 - 802.11ax HE20, SU, SDM, Core 0-1 - 5320 MHz
Band Edge Frequency 5350 MHz

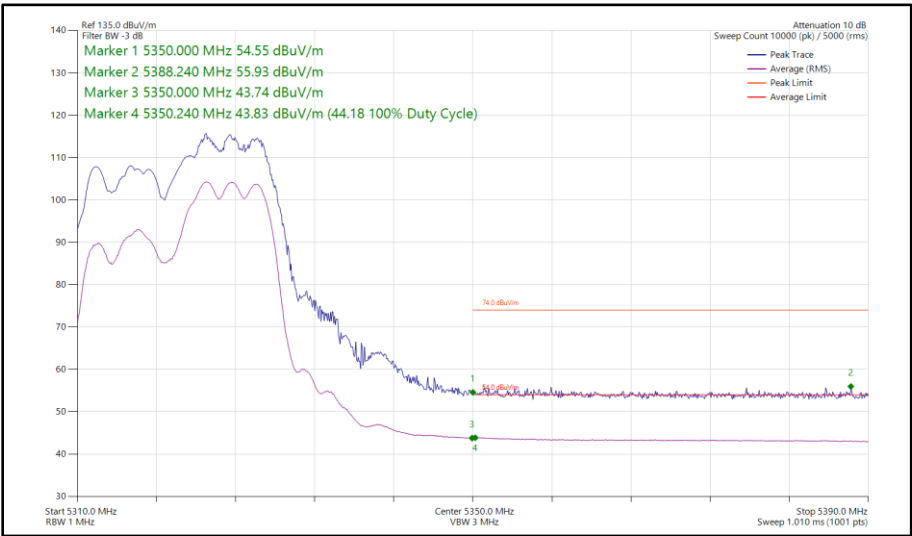


Figure 39 - 802.11ax HE20, RU 106-54, SDM, Core 0-1 - 5320 MHz
Band Edge Frequency 5350 MHz

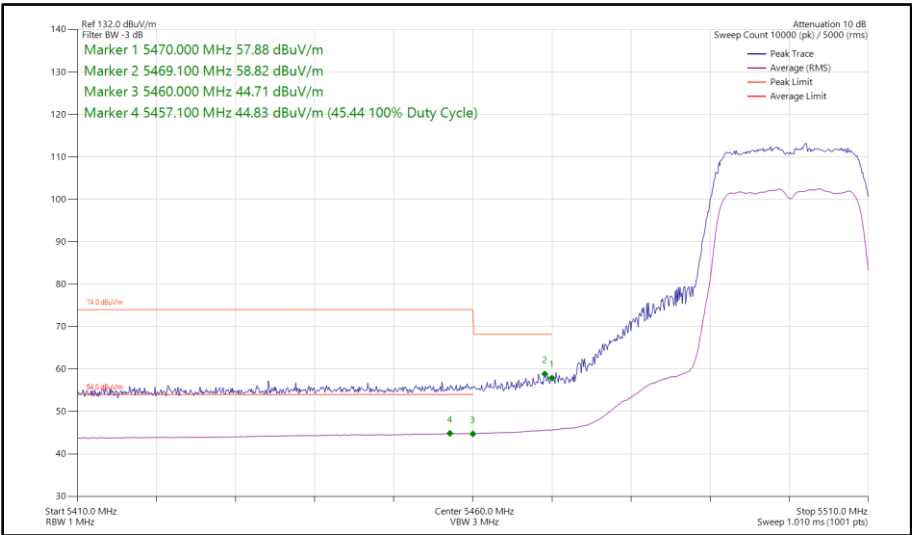


Figure 40 - 802.11n HT20, SDM, Core 0-1 - 5500 MHz
Band Edge Frequency 5460 MHz

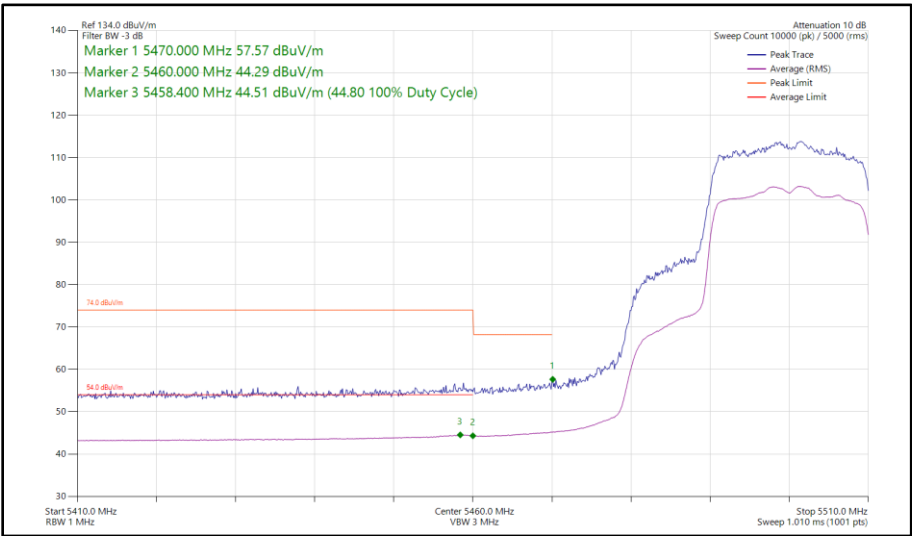


Figure 41 - 802.11ax HE20, SU, SDM, Core 0-1 - 5500 MHz
Band Edge Frequency 5460 MHz

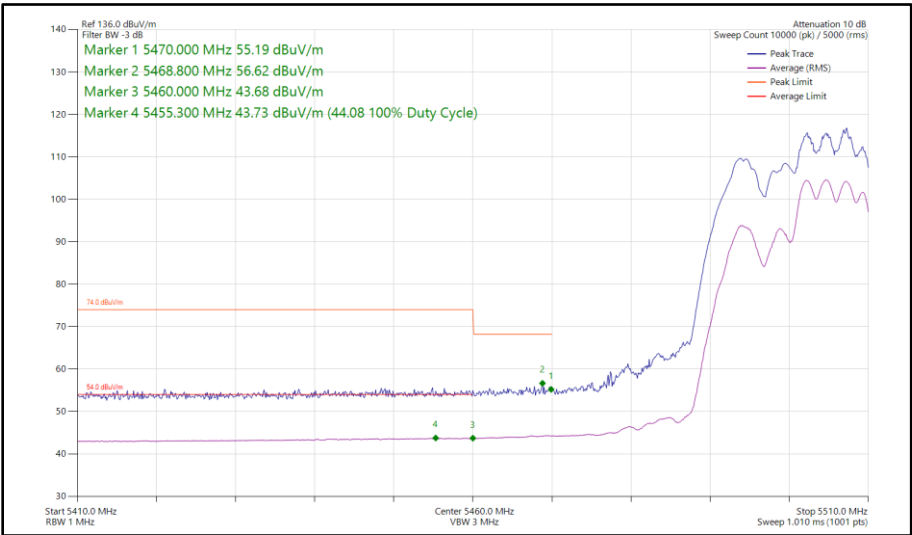


Figure 42 - 802.11ax HE20, RU 106-54, SDM, Core 0-1 - 5500 MHz
Band Edge Frequency 5460 MHz



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 (dBμV/m)
802.11ac VHT20	MCS 7x1	-	-	5180	5150	60.40	43.69
802.11ac VHT20	MCS 2x1	-	-	5320	5350	55.55	44.12
802.11ac VHT20	MCS 2x1	-	-	5500	5460	56.76	44.66

Table 11 - TxBF Restricted Band Edge Results

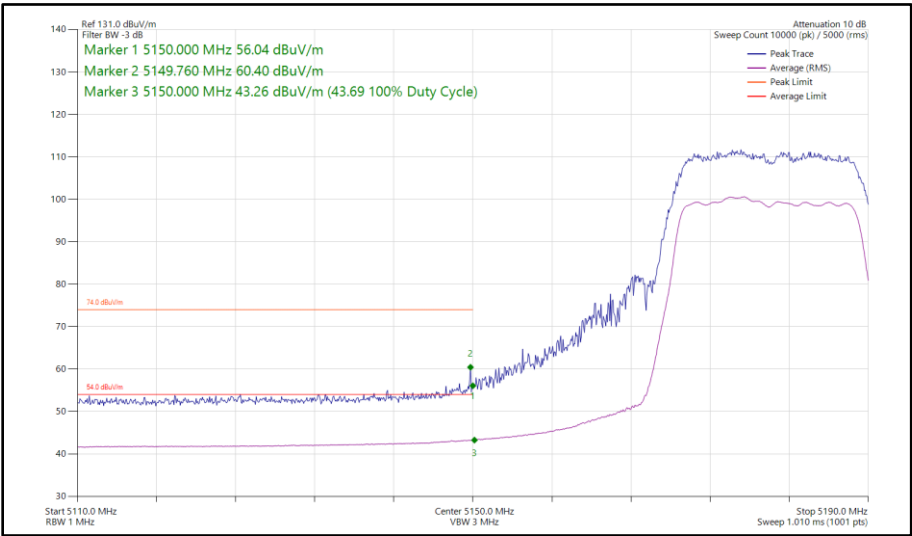


Figure 43 - 802.11ac VHT20, TxBF, Core 0-1 - 5180 MHz
Band Edge Frequency 5150 MHz

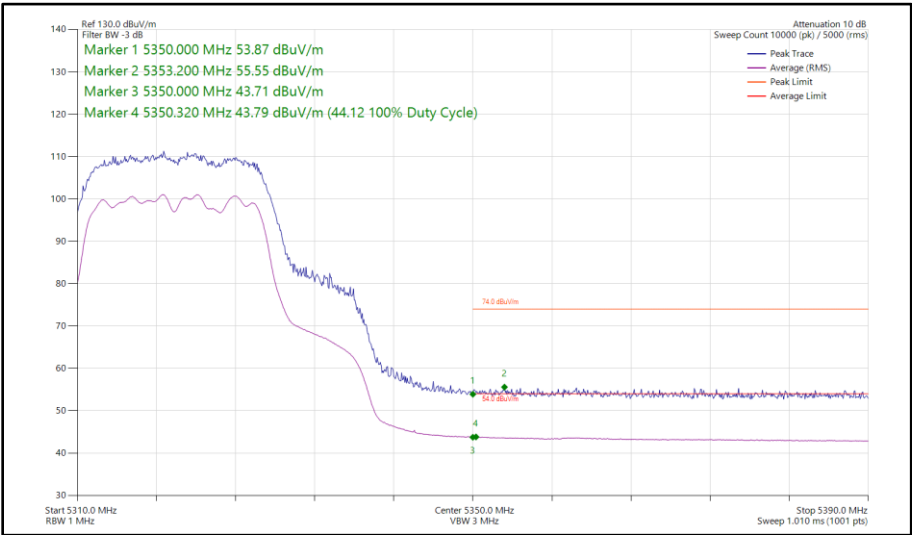
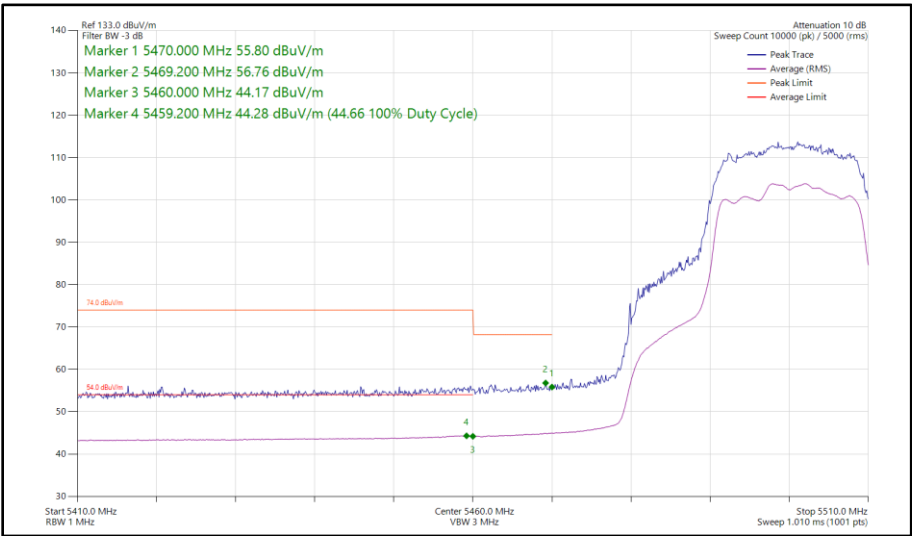


Figure 44 - 802.11ac VHT20, TxBF, Core 0-1 - 5320 MHz
Band Edge Frequency 5350 MHz



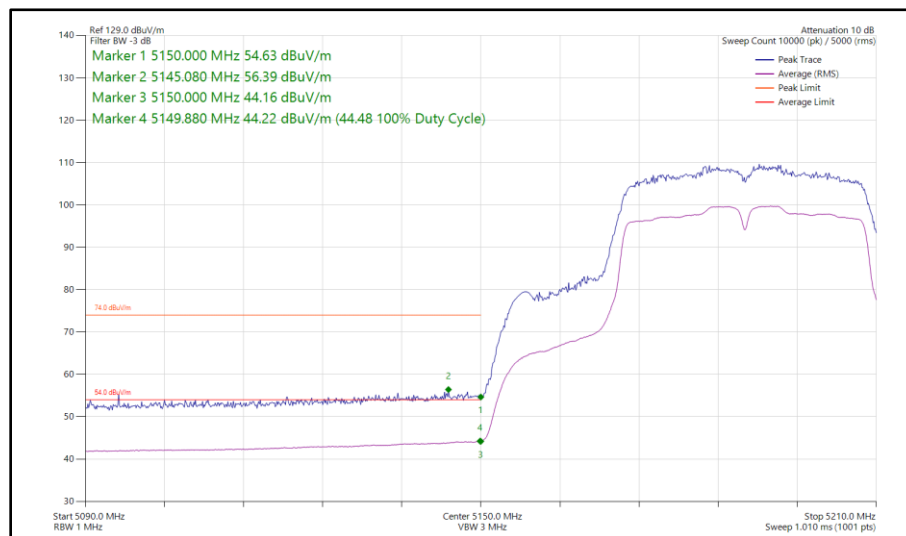
**Figure 45 - 802.11ac VHT20, TxBF, Core 0-1 - 5500 MHz
Band Edge Frequency 5460 MHz**



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 (dBμV/m)
802.11n HT40	MCS 2	-	-	5190	5150	56.39	44.48
802.11ax HE40	MCS 2x1	SU	-	5190	5150	55.19	43.89
802.11ax HE40	MCS 11x1	106	56	5190	5150	56.46	43.75
802.11n HT40	MCS 2	-	-	5270	5350	64.23	51.39
802.11n HT40	MCS 4	-	-	5310	5350	64.98	51.44
802.11ax HE40	MCS 11x1	SU	-	5270	5350	66.95	51.31
802.11ax HE40	MCS 4x1	SU	-	5310	5350	64.90	51.41
802.11ax HE40	MCS 11x1	52	37	5310	5350	68.29	48.68
802.11n HT40	MCS 7	-	-	5510	5460	61.85	45.03
802.11ax HE40	MCS 11x1	SU	-	5510	5460	60.43	44.88
802.11ax HE40	MCS 11x1	106	53	5510	5460	57.77	44.51

Table 12 - SISO Restricted Band Edge Results



**Figure 46 - 802.11n HT40, SISO, Core 0 - 5190 MHz
Band Edge Frequency 5150 MHz**

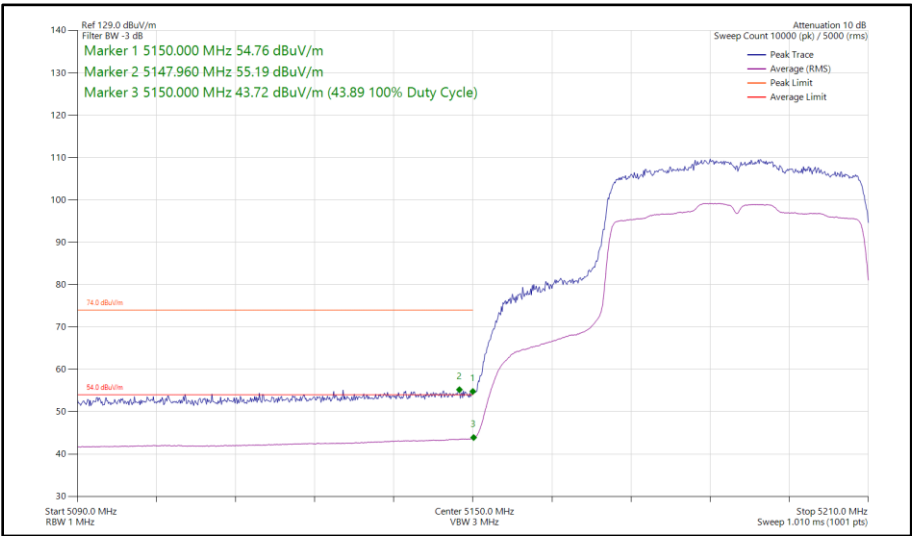


Figure 47 - 802.11ax HE40, SU, SISO, Core 0 - 5190 MHz
Band Edge Frequency 5150 MHz

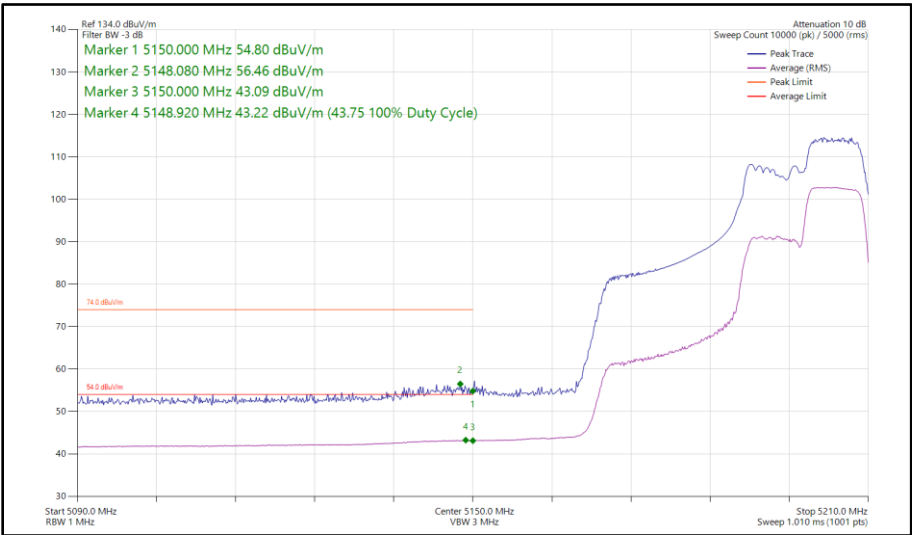


Figure 48 - 802.11ax HE40, RU 106-56, SISO, Core 0 - 5190 MHz
Band Edge Frequency 5150 MHz

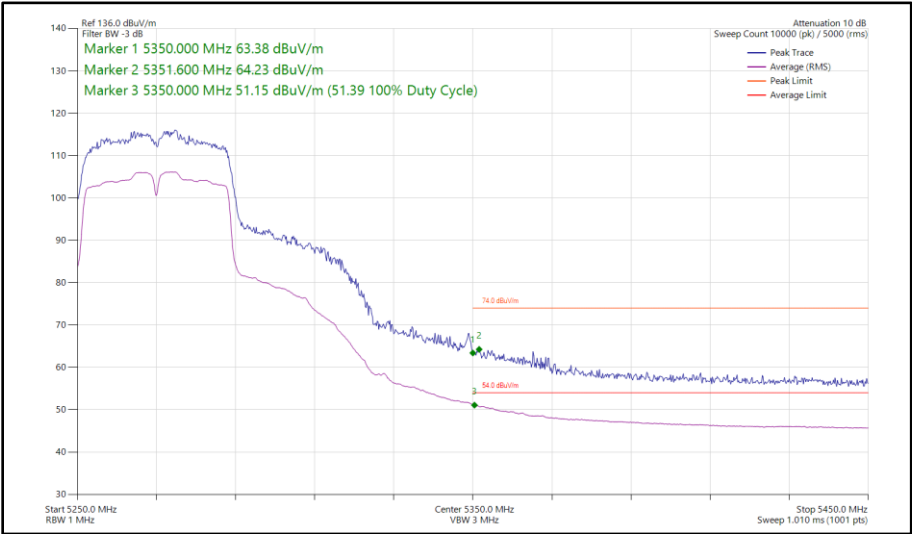


Figure 49 - 802.11n HT40, SISO, Core 0 - 5270 MHz
Band Edge Frequency 5350 MHz

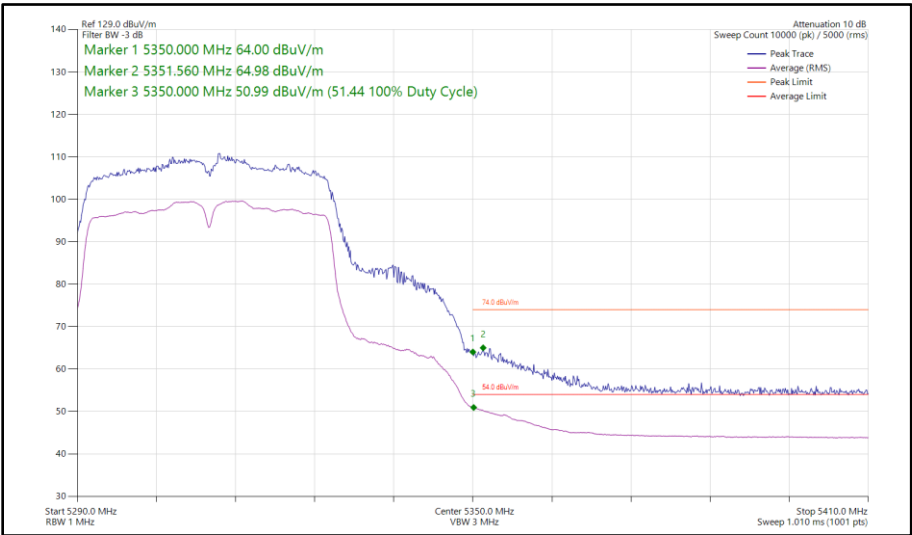


Figure 50 - 802.11n HT40, SISO, Core 0 - 5310 MHz
Band Edge Frequency 5350 MHz

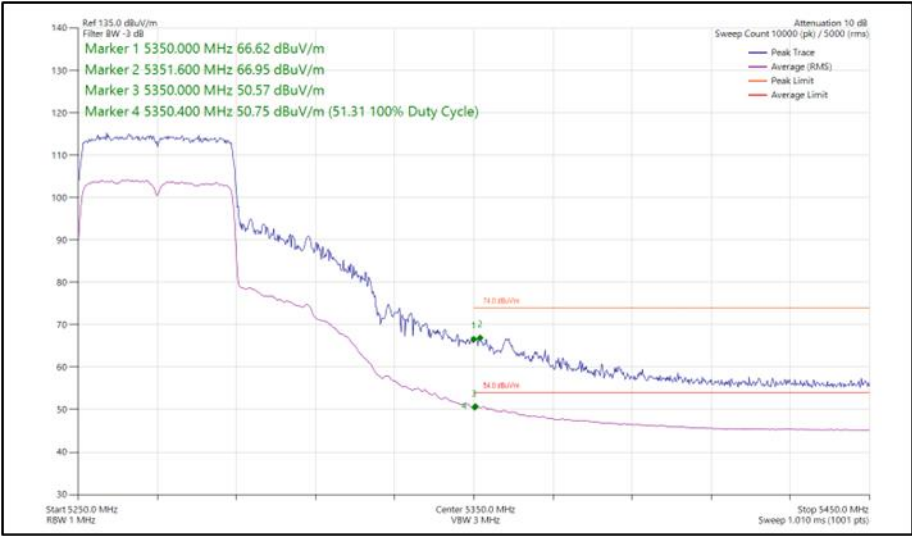


Figure 51 - 802.11ax HE40, SU, SISO, Core 0 - 5270 MHz
Band Edge Frequency 5350 MHz

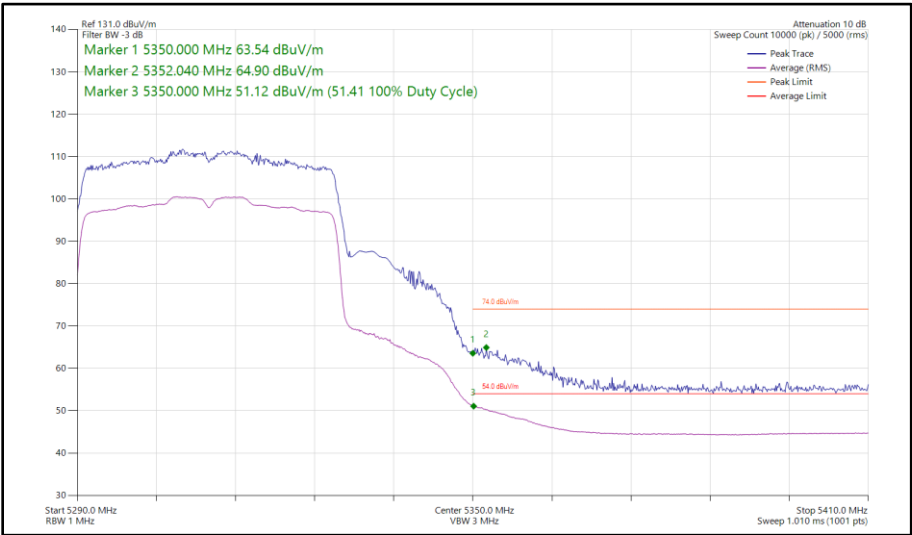


Figure 52 - 802.11ax HE40, SU, SISO, Core 0 - 5310 MHz
Band Edge Frequency 5350 MHz

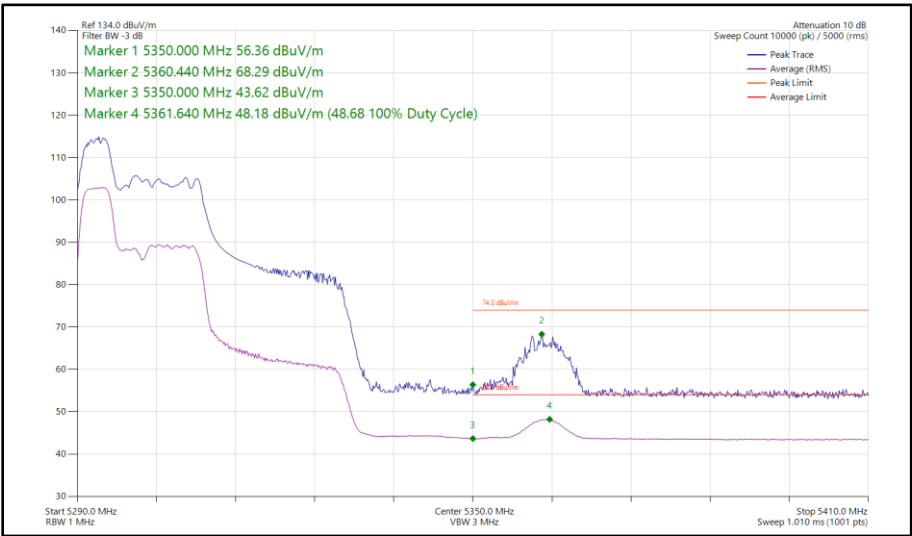


Figure 53 - 802.11ax HE40, RU 52-37, SISO, Core 0 - 5310 MHz
Band Edge Frequency 5350 MHz

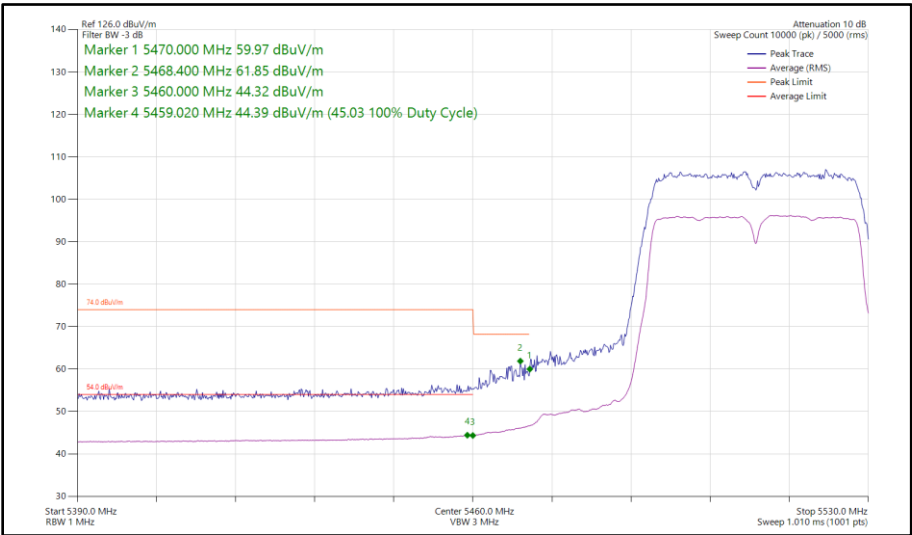


Figure 54 - 802.11n HT40, SISO, Core 0 - 5510 MHz
Band Edge Frequency 5460 MHz

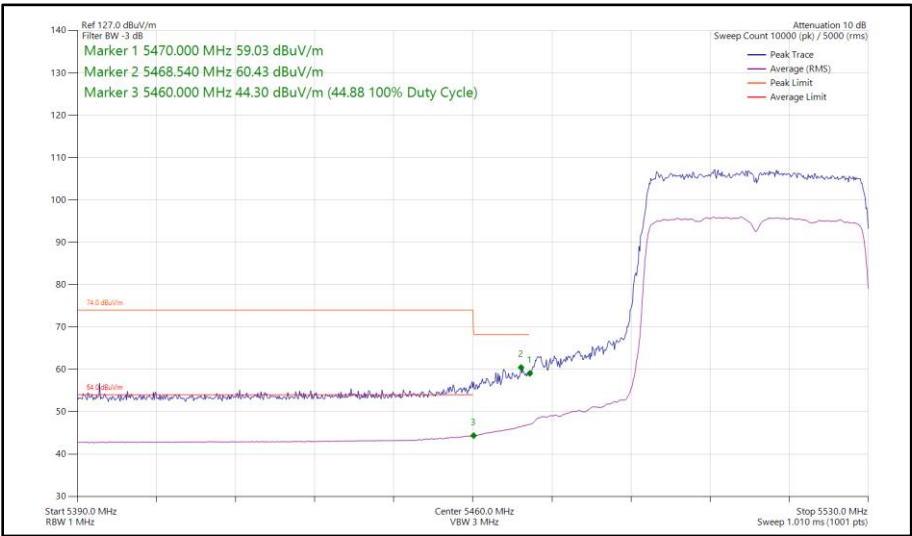


Figure 55 - 802.11ax HE40, SU, SISO, Core 0 - 5510 MHz
Band Edge Frequency 5460 MHz

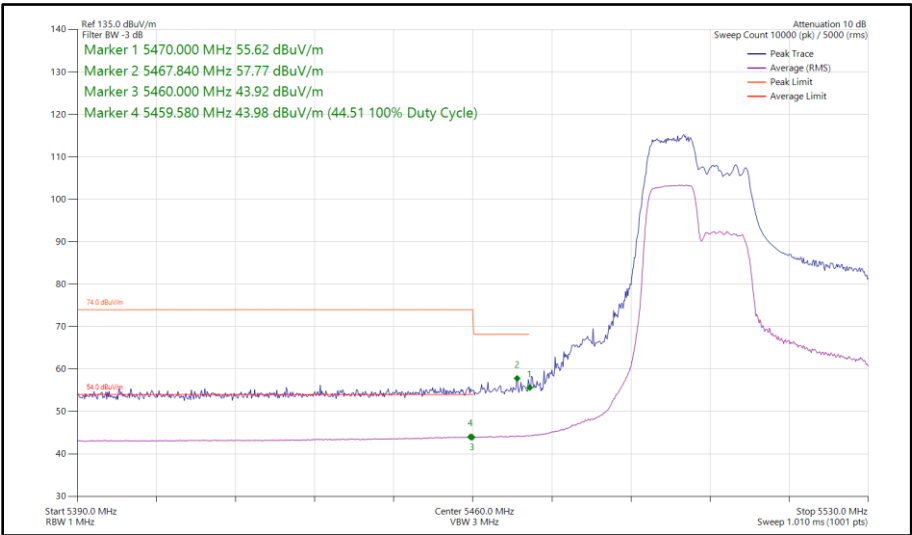


Figure 56 - 802.11ax HE40, RU 106-53, SISO, Core 0 - 5510 MHz
Band Edge Frequency 5460 MHz



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 (dBμV/m)
802.11n HT40	MCS 2	-	-	5190	5150	55.22	43.86
802.11ax HE40	MCS 2x1	SU	-	5190	5150	55.68	43.68
802.11ax HE40	MCS 11x1	106	56	5190	5150	58.23	43.61
802.11n HT40	MCS 7	-	-	5270	5350	66.67	51.42
802.11n HT40	MCS 7	-	-	5310	5350	68.05	51.39
802.11ax HE40	MCS 11x1	SU	-	5270	5350	67.15	51.50
802.11ax HE40	MCS 4x1	SU	-	5310	5350	64.48	51.37
802.11ax HE40	MCS 11x1	52	37	5310	5350	67.24	48.17
802.11n HT40	MCS 7	-	-	5510	5460	61.90	44.88
802.11ax HE40	MCS 2x1	SU	-	5510	5460	59.96	45.31
802.11ax HE40	MCS 11x1	106	53	5510	5460	58.01	44.93

Table 13 - SISO Restricted Band Edge Results

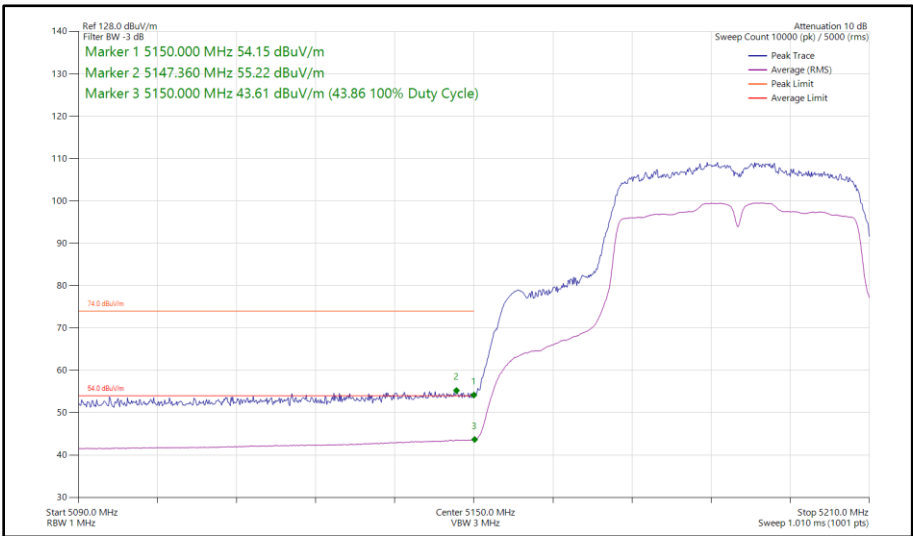


Figure 57 - 802.11n HT40, SISO, Core 1 - 5190 MHz
Band Edge Frequency 5150 MHz