

FCC Test Report

Apple Inc
Model: A3403



In accordance with FCC 47 CFR Part 15E
(5 GHz WLAN)

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

FCC ID: BCGA3403

COMMERCIAL-IN-CONFIDENCE

Document 75961394-91 Issue 01

SIGNATURE

| NAME | JOB TITLE | RESPONSIBLE FOR | ISSUE DATE |
|----------------|-------------|----------------------|-----------------|
| James O'Reilly | RF Engineer | Authorised Signatory | 15-October-2024 |

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. The sample tested was found to comply with the requirements defined in the applied rules.

| RESPONSIBLE FOR | NAME | DATE | SIGNATURE |
|-------------------|----------------|-----------------|-----------|
| Report Generation | Lauren Walters | 15-October-2024 | |

FCC Accreditation
492497/UK2010 Octagon House, Fareham Test Laboratory
553713/UK2026 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 for the tests detailed in section 1.3.



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| 3 | Measurement Uncertainty | 545 |



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 | 15-October-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 |
| Start of Test | 26-August-2024 |
| Finish of Test | 12-October-2024 |
| Name of Engineer(s) | Ahmed Al Derdiri, Colin Brain, Elliot Callender, Marius Vasii, Manohar Thota, Feda Hussein, Thomas Biddlecombe, Ioan-Alexandru Bogatu, 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 is shown below.

| Section | Specification Clause | Test Description | Result | Comments/Base Standard |
|------------------------------------|------------------------|---|--------|---|
| 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 | Restricted Band Edges | Pass | ANSI C63.10 (2020) |
| 2.2 | 15.407 (a) | Emission Bandwidth | Pass | ANSI C63.10 (2020) KDB 789033 D02 v02r01 |
| 2.3 | 15.407 (a) | Maximum Conducted Output Power | Pass | ANSI C63.10 (2020) KDB 662911 D01 v02r01 |
| 2.4 | 15.407 (a) | Maximum Conducted Power Spectral Density | Pass | ANSI C63.10 (2020) KDB 662911 D01 v02r01 |
| 2.5 | 15.407 (b) | Authorised Band Edges | Pass | ANSI C63.10 (2020) |
| 2.6 | 15.209 and 15.407 (b) | Spurious Radiated Emissions | Pass | ANSI C63.4 (2014) ANSI C63.10 (2020) |
| 2.7 | 15.407 (h)(2)(iii)(iv) | 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 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 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 (5150-5850 MHz: 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 + 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.

1.4.4 Antenna Gain Table

| Antenna Port | Frequency Range (MHz) | Peak Gain (dBi) | Conducted Cable Loss (dB) |
|--------------|-----------------------|-----------------|---------------------------|
| Core 0 | 5150 to 5250 | 5.7 | 1.07 |
| | 5250 to 5350 | 5.7 | 1.07 |
| | 5470 to 5725 | 4.5 | 1.17 |
| | 5725 to 5850 | 5.9 | 1.18 |
| Core 1 | 5150 to 5250 | 3.3 | 1.07 |
| | 5250 to 5350 | 5.4 | 1.07 |
| | 5470 to 5725 | 3.8 | 1.17 |
| | 5725 to 5850 | 4.9 | 1.18 |

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: A3403 | | | |
|---------------|------------------|------------------|-----------------------|
| Serial Number | Hardware Version | Software Version | Firmware |
| LJHWNW3N9XQ | REV1.0 | 24A32190v | 23.30.16 |
| JF4T7PYJ66 | REV1.0 | 24A32191s | 23.30.16 |
| C57342PMXW | REV1.0 | 24B2056 | 23.10.889.3 |
| M7J9X1XPGD | REV1.0 | 24A32190v | 23.30.16 |
| MFC9RJC40F | REV1.0 | 24B13a | 23.10.876.0.41.51.158 |

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: A3403, Serial Number: LJHNW3N9XQ | | | |
| 0 | As supplied by the customer | Not Applicable | Not Applicable |
| Model: A3403, Serial Number: JF4T7PYJ66 | | | |
| 0 | As supplied by the customer | Not Applicable | Not Applicable |
| Model: A3403, Serial Number: M7J9X1XPGD | | | |
| 0 | As supplied by the customer | Not Applicable | Not Applicable |
| Model: A3403, Serial Number: MFC9RJC40F | | | |
| 0 | As supplied by the customer | Not Applicable | Not Applicable |
| Model: A3403, Serial Number: C57342PMXW | | | |
| 0 | As supplied by the customer | Not Applicable | Not Applicable |

Table 5

1.8 Test Location

TÜV SÜD conducted the following tests at our Octagon House Test Laboratory.

| Test Name | Name of Engineer(s) | Accreditation |
|--|---------------------|---------------|
| Configuration and Mode: 5 GHz WLAN | | |
| Emission Bandwidth | Thomas Biddlecombe | UKAS |
| Maximum Conducted Output Power | Thomas Biddlecombe | UKAS |
| Maximum Conducted Power Spectral Density | Thomas Biddlecombe | UKAS |

Table 6

Office Address:

TÜV SÜD
 Octagon House
 Concorde Way
 Fareham
 Hampshire
 PO15 5RL
 United Kingdom



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, Colin Brain, Elliot Callender, Marius Vasii and Manohar Thota | UKAS |
| Emission Bandwidth | Feda Hussein | UKAS |
| Maximum Conducted Output Power | Feda Hussein | UKAS |
| Maximum Conducted Power Spectral Density | Feda Hussein | UKAS |
| Authorised Band Edges | Ahmed Al Derdiri, Colin Brain, Elliot Callender, Marius Vasii and Manohar Thota | UKAS |
| Spurious Radiated Emissions | Ahmed Al Derdiri, Elliot Callender, Ioan-Alexandru Bogatu and Morsalin Hossain | UKAS |
| Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period | Stefan Gilfedder | UKAS |

Table 7

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

2.1.2 Equipment Under Test and Modification State

A3403, S/N: LJHNNW3N9XQ - Modification State 0
A3403, S/N: JF4T7PYJ66 - Modification State 0

2.1.3 Date of Test

03-September-2024 to 27-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 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 | 21.8 - 23.1 °C |
| Relative Humidity | 44.0 - 59.3 % |



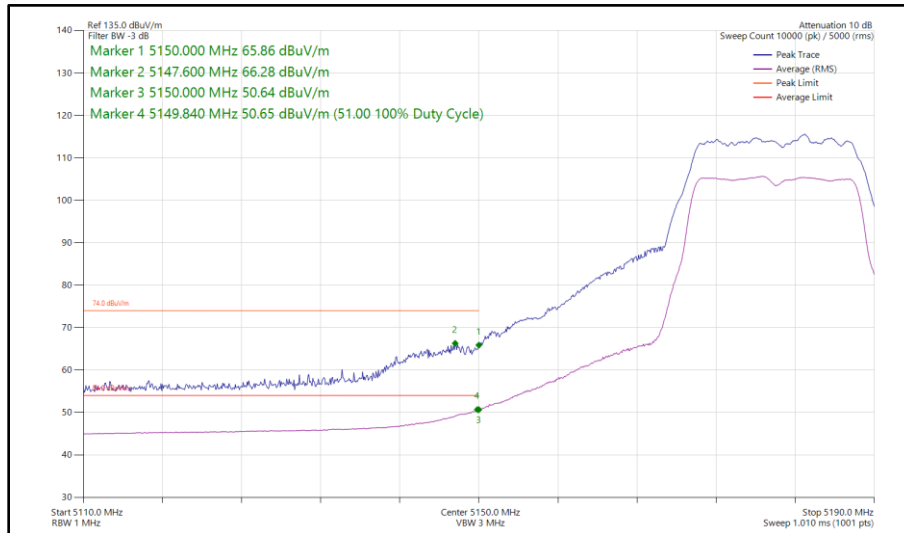
2.1.6 Test Results

5 GHz WLAN

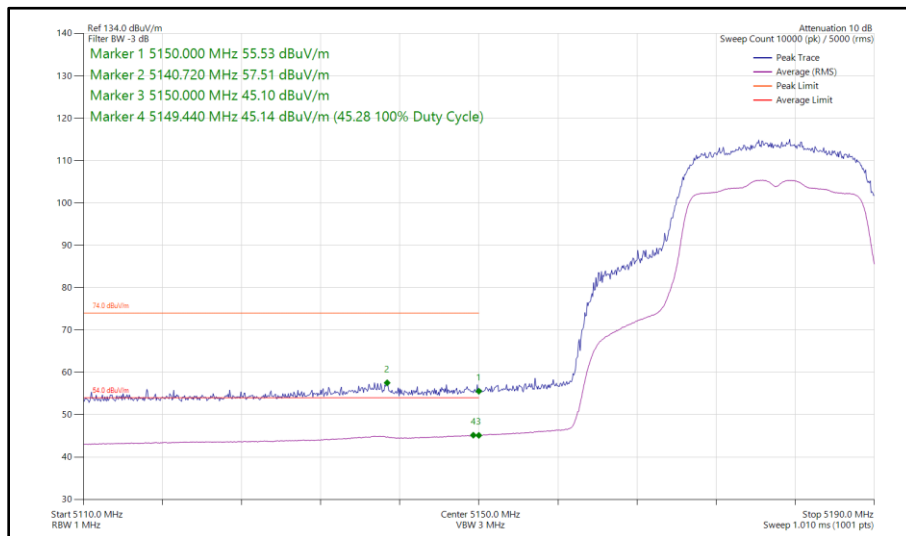
20 MHz Bandwidth - Core 0 (SISO)

| 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 | 54 Mbps | - | - | 5180 | 5150 | 66.28 | 51.00 |
| 802.11n HT20 | MCS 2 | - | - | 5180 | 5150 | 57.51 | 45.28 |
| 802.11ax HE20 | MCS 2x1 | SU | - | 5180 | 5150 | 59.00 | 45.85 |
| 802.11ax HE20 | MCS 11x1 | 106 | 53 | 5180 | 5150 | 56.04 | 44.07 |
| 802.11a | 54 Mbps | - | - | 5320 | 5350 | 65.49 | 50.50 |
| 802.11n HT20 | MCS 2 | - | - | 5320 | 5350 | 60.61 | 47.82 |
| 802.11ax HE20 | MCS 2x1 | SU | - | 5320 | 5350 | 62.39 | 48.96 |
| 802.11ax HE20 | MCS 11x1 | 52 | 40 | 5320 | 5350 | 57.23 | 45.26 |
| 802.11a | 54 Mbps | - | - | 5500 | 5460 | 63.39 | 47.90 |
| 802.11n HT20 | MCS 2 | - | - | 5500 | 5460 | 60.64 | 47.72 |
| 802.11ax HE20 | MCS 2x1 | SU | - | 5500 | 5460 | 60.41 | 47.13 |
| 802.11ax HE20 | MCS 11x1 | 106 | 53 | 5500 | 5460 | 57.17 | 44.70 |

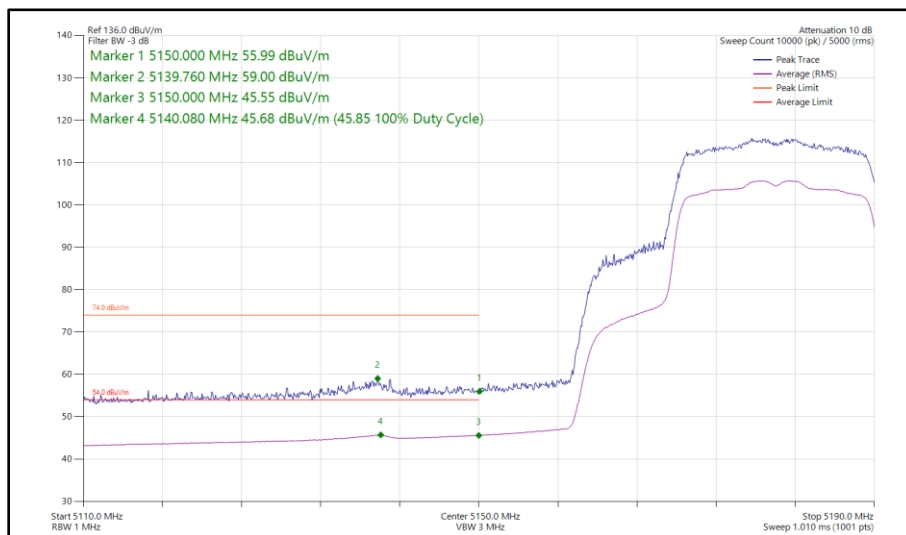
Table 8 - SISO Restricted Band Edge Results



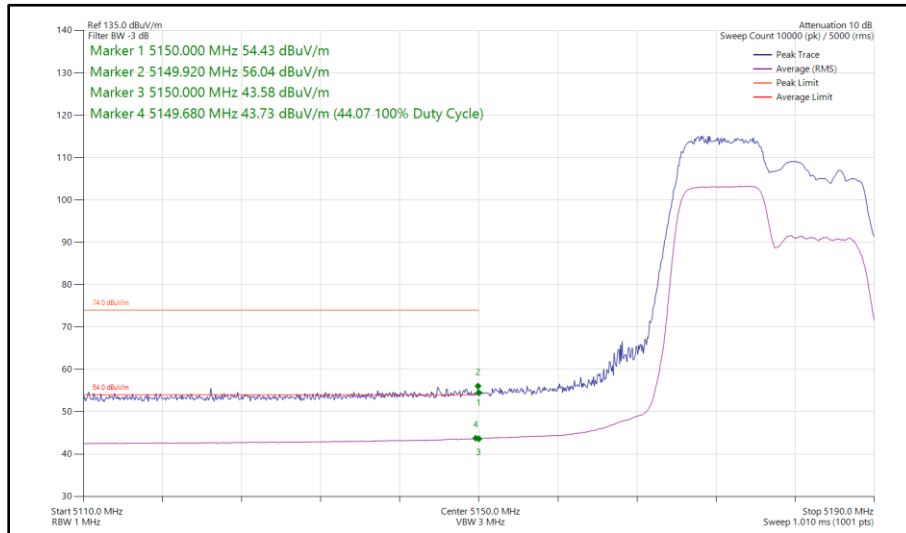
**Figure 1 - 802.11a, SISO, Core 0 - 5180 MHz
 Band Edge Frequency 5150 MHz**



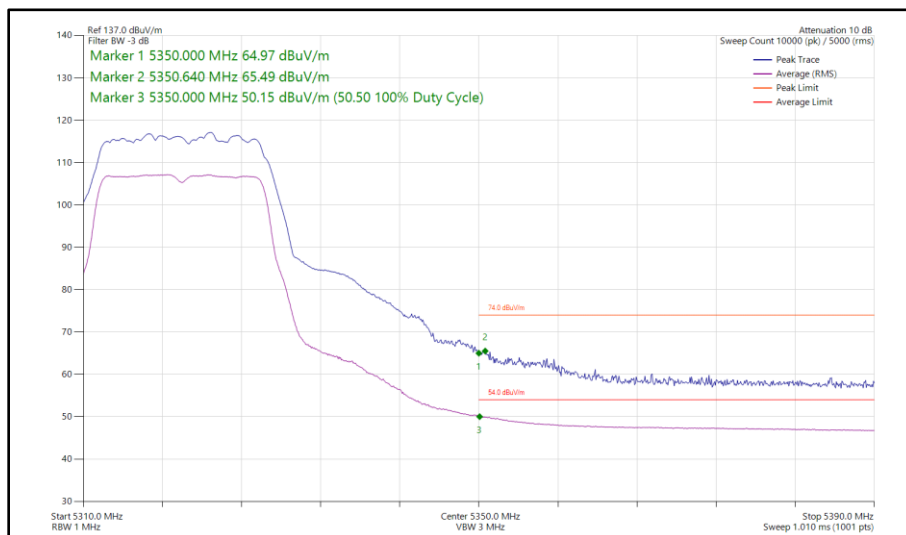
**Figure 2 - 802.11n HT20, SISO, Core 0 - 5180 MHz
Band Edge Frequency 5150 MHz**



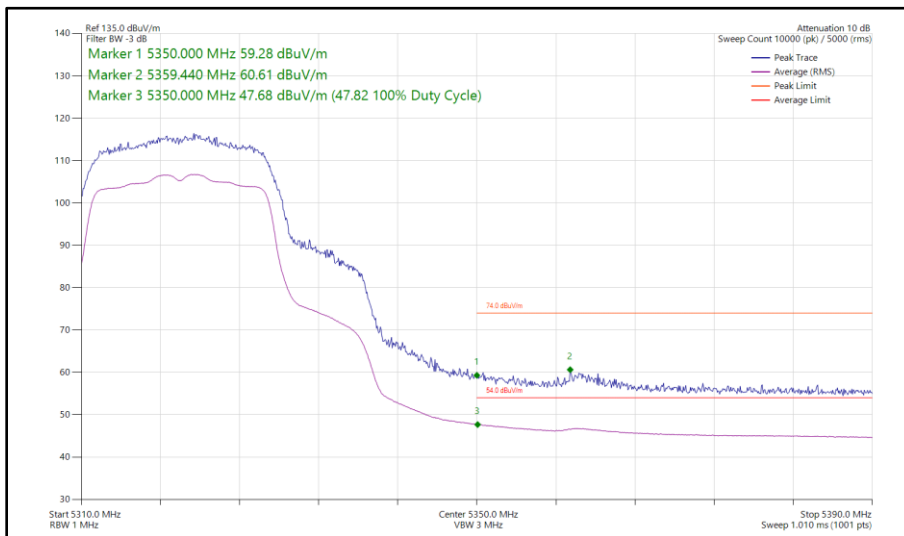
**Figure 3 - 802.11ax HE20, SU, SISO, Core 0 - 5180 MHz
Band Edge Frequency 5150 MHz**



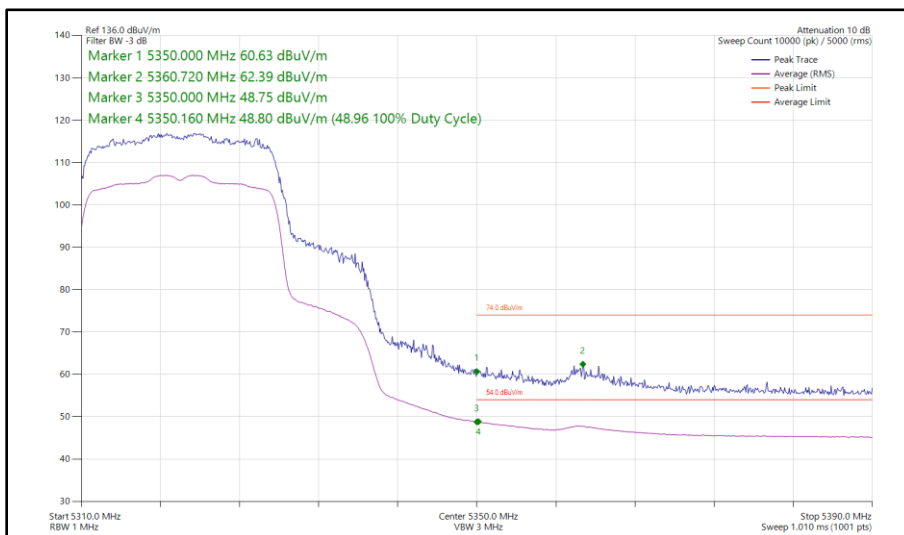
**Figure 4 - 802.11ax HE20, RU 106-53, SISO, Core 0 - 5180 MHz
Band Edge Frequency 5150 MHz**



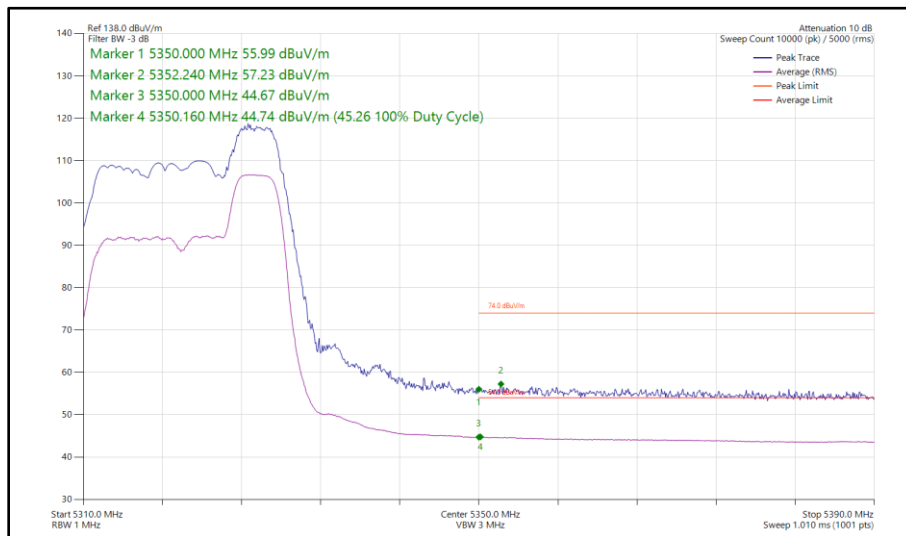
**Figure 5 - 802.11a, SISO, Core 0 - 5320 MHz
Band Edge Frequency 5350 MHz**



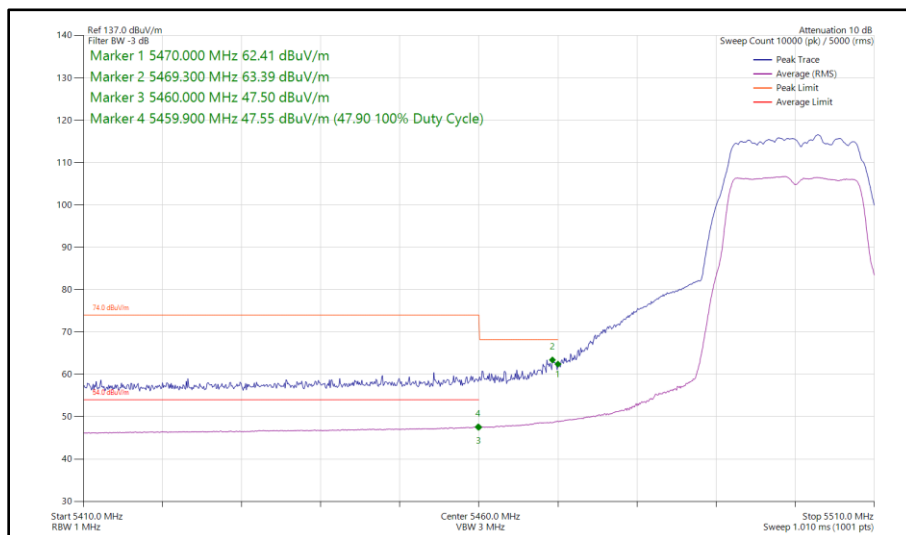
**Figure 6 - 802.11n HT20, SISO, Core 0 - 5320 MHz
Band Edge Frequency 5350 MHz**



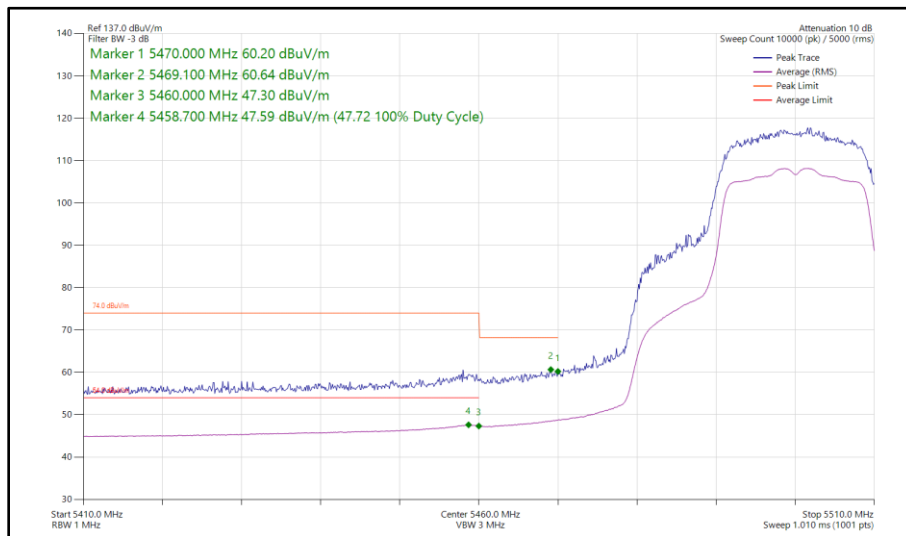
**Figure 7 - 802.11ax HE20, SU, SISO, Core 0 - 5320 MHz
Band Edge Frequency 5350 MHz**



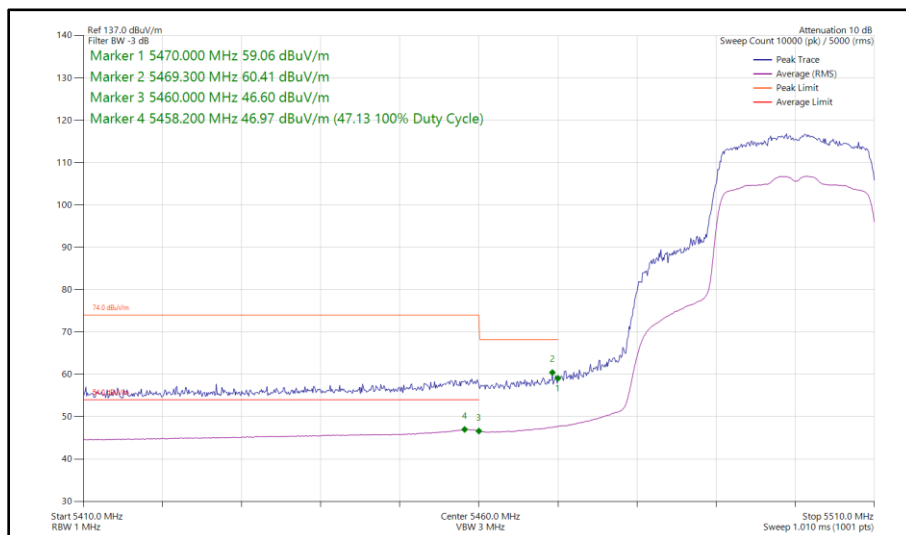
**Figure 8 - 802.11ax HE20, RU 52-40, SISO, Core 0 - 5320 MHz
Band Edge Frequency 5350 MHz**



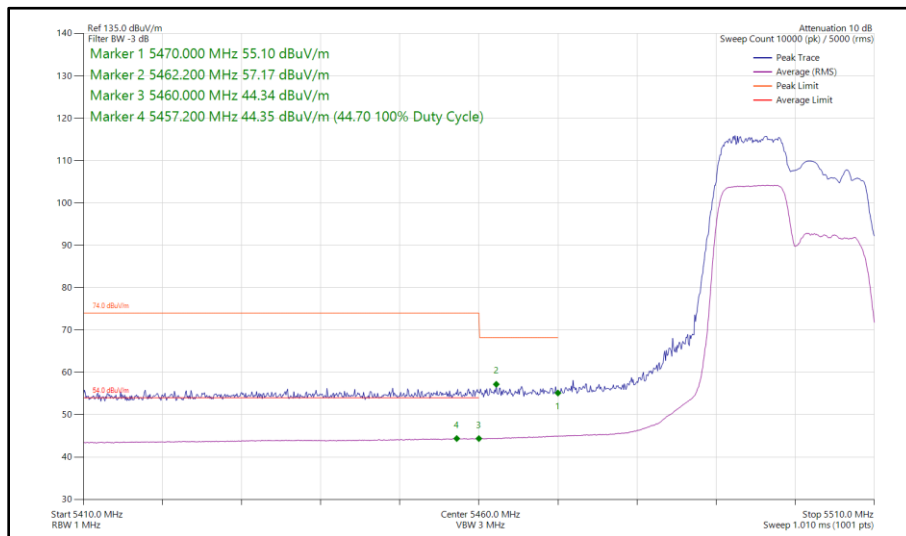
**Figure 9 - 802.11a, SISO, Core 0 - 5500 MHz
Band Edge Frequency 5460 MHz**



**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**



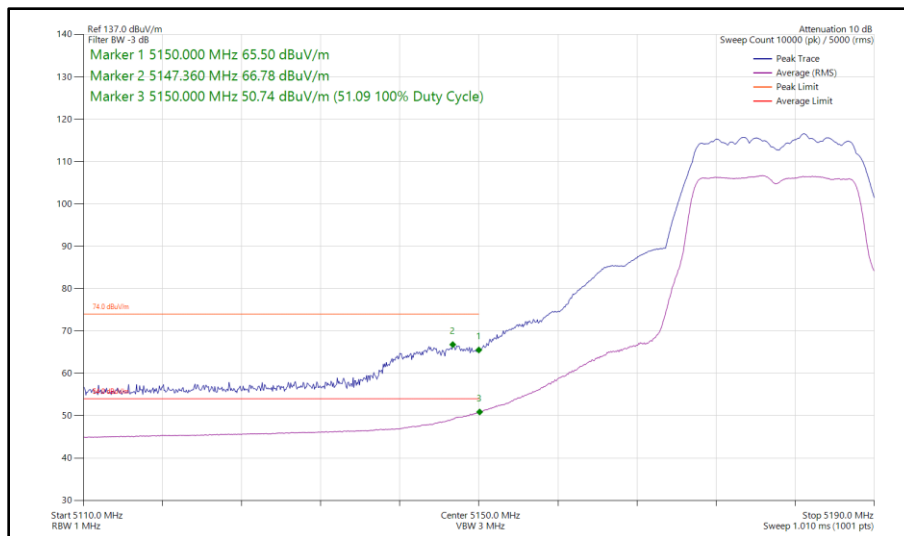
**Figure 12 - 802.11ax HE20, RU 106-53, SISO, Core 0 - 5500 MHz
Band Edge Frequency 5460 MHz**



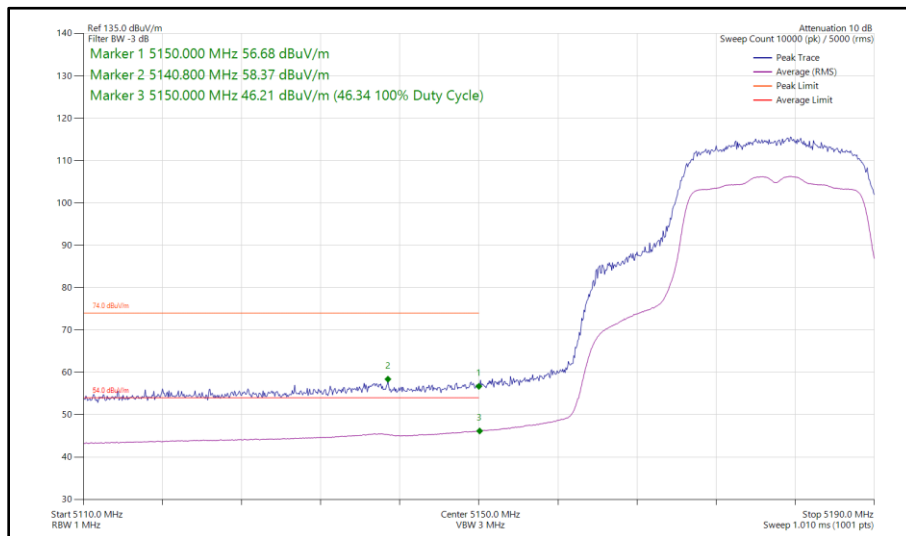
20 MHz Bandwidth - Core 1 (SISO)

| 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 | 54 Mbps | - | - | 5180 | 5150 | 66.78 | 51.09 |
| 802.11n HT20 | MCS 2 | - | - | 5180 | 5150 | 58.37 | 46.34 |
| 802.11ax HE20 | MCS 2x1 | SU | - | 5180 | 5150 | 58.67 | 46.69 |
| 802.11ax HE20 | MCS 11x1 | 106 | 54 | 5180 | 5150 | 56.21 | 44.58 |
| 802.11a | 54 Mbps | - | - | 5320 | 5350 | 65.97 | 51.40 |
| 802.11n HT20 | MCS 2 | - | - | 5320 | 5350 | 58.78 | 47.13 |
| 802.11ax HE20 | MCS 2x1 | SU | - | 5320 | 5350 | 60.30 | 47.19 |
| 802.11ax HE20 | MCS 11x1 | 52 | 40 | 5320 | 5350 | 56.52 | 45.00 |
| 802.11a | 54 Mbps | - | - | 5500 | 5460 | 63.65 | 47.73 |
| 802.11n HT20 | MCS 2 | - | - | 5500 | 5460 | 59.35 | 46.42 |
| 802.11ax HE20 | MCS 2x1 | SU | - | 5500 | 5460 | 59.57 | 46.70 |
| 802.11ax HE20 | MCS 11x1 | 52 | 37 | 5500 | 5460 | 56.89 | 45.11 |

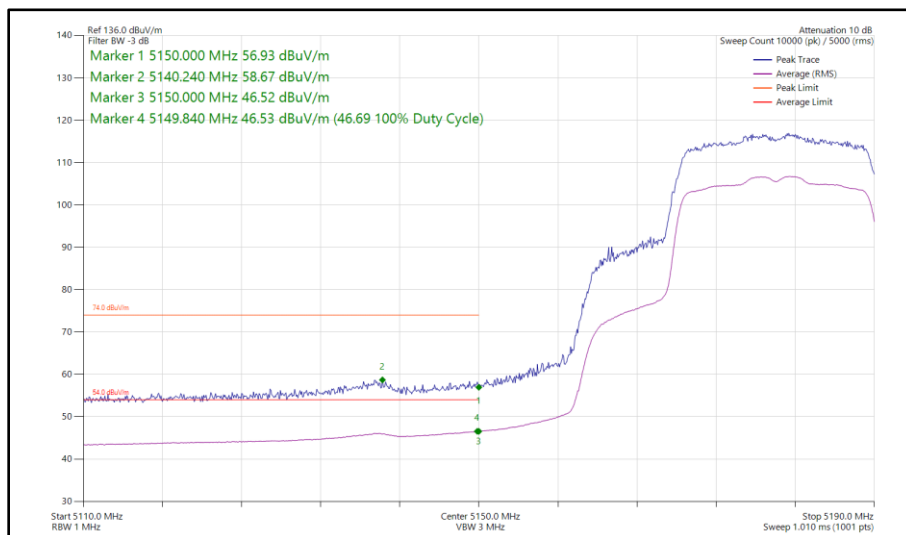
Table 9 - SISO Restricted Band Edge Results



**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**

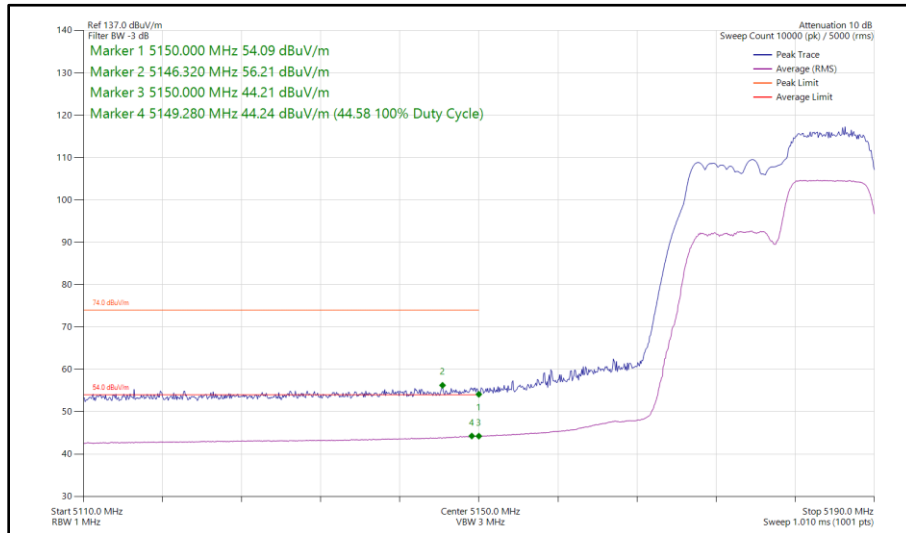


Figure 16 - 802.11ax HE20, RU 106-54, SISO, Core 1 - 5180 MHz
Band Edge Frequency 5150 MHz

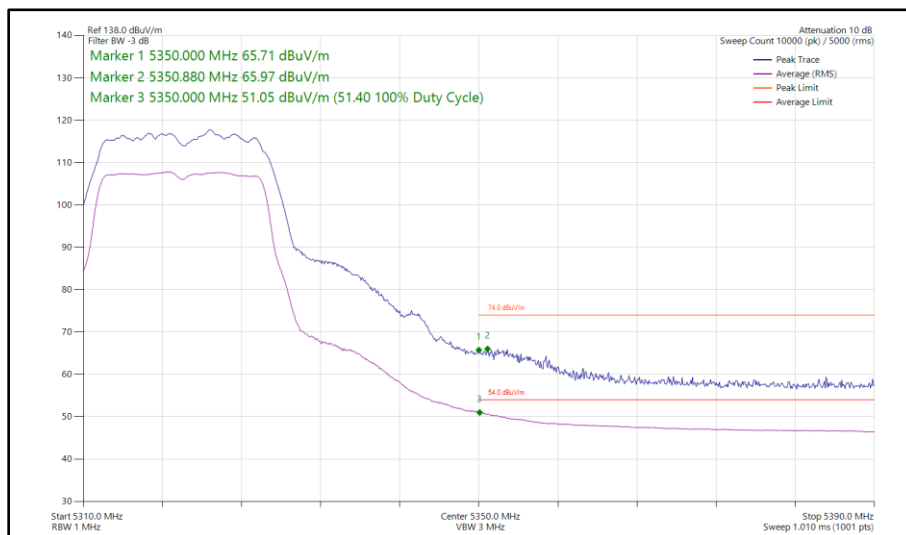
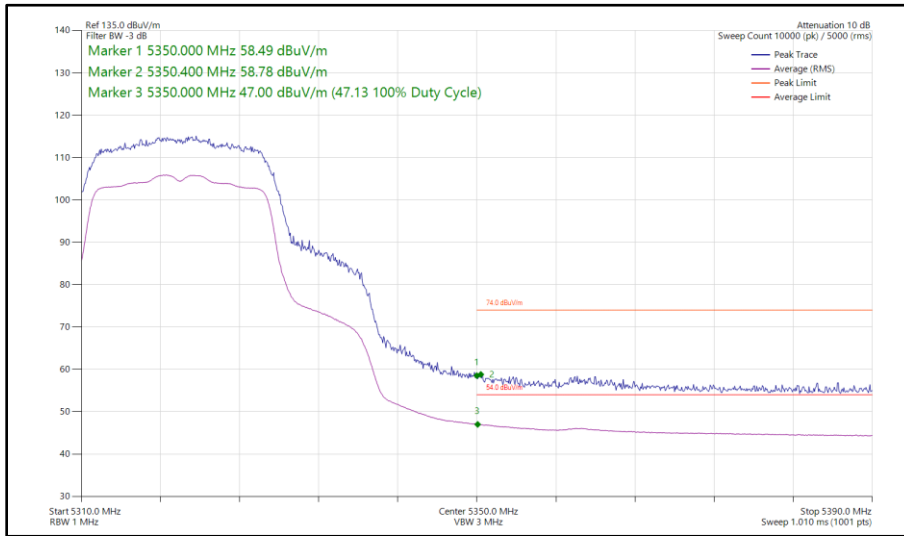
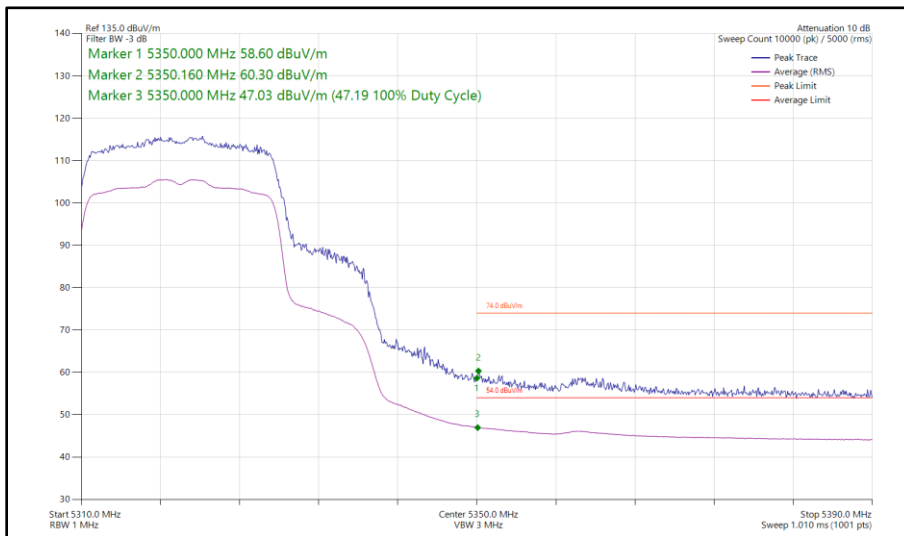


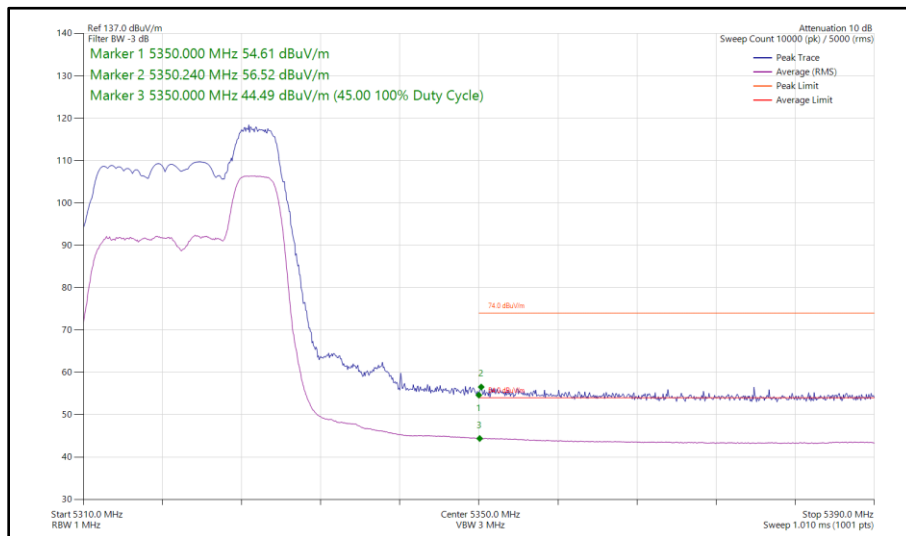
Figure 17 - 802.11a, SISO, Core 1 - 5320 MHz
Band Edge Frequency 5350 MHz



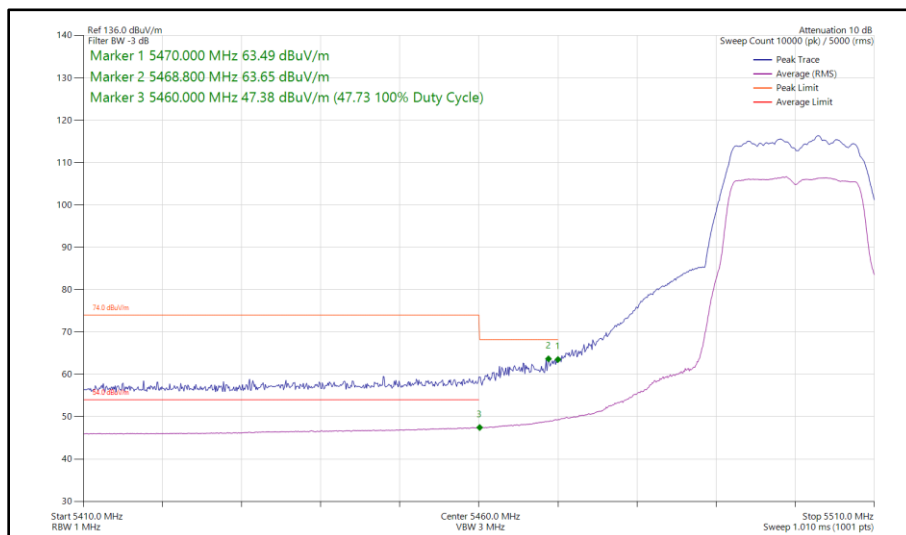
**Figure 18 - 802.11n HT20, SISO, Core 1 - 5320 MHz
Band Edge Frequency 5350 MHz**



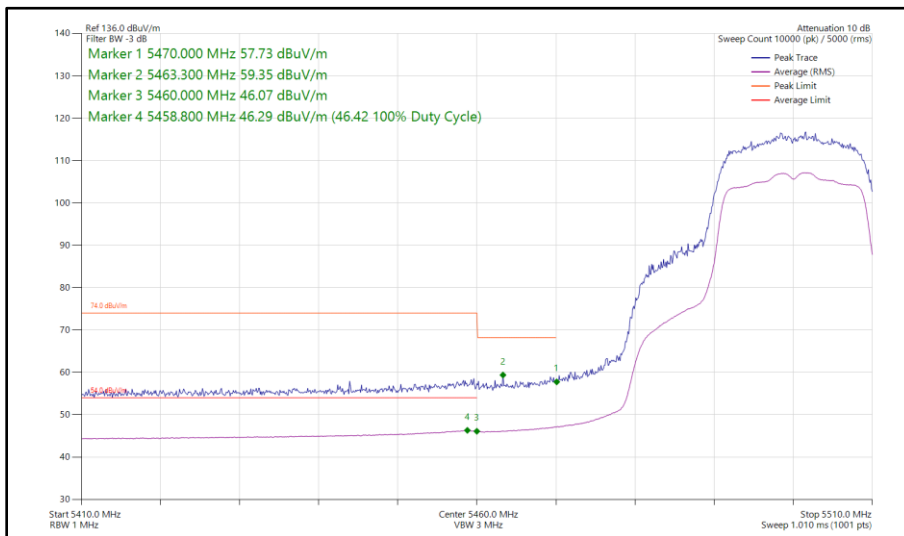
**Figure 19 - 802.11ax HE20, SU, SISO, Core 1 - 5320 MHz
Band Edge Frequency 5350 MHz**



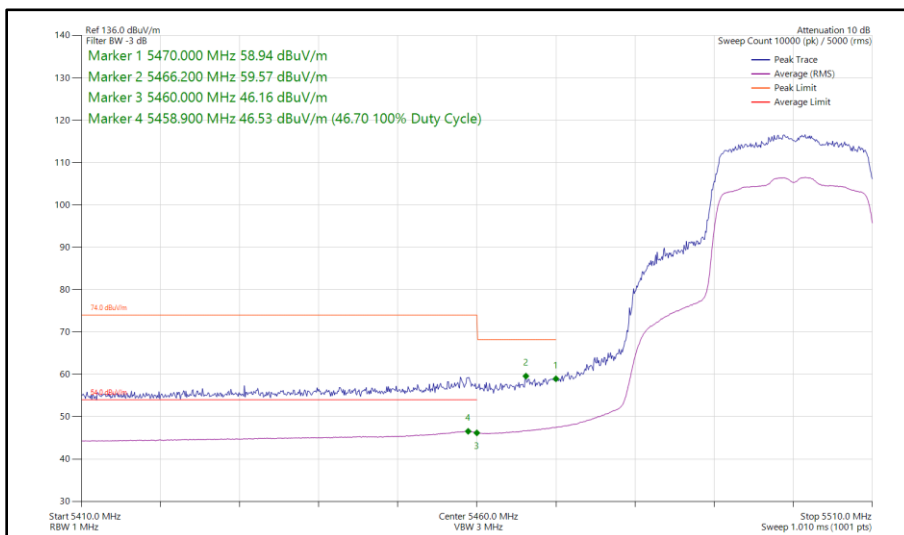
**Figure 20 - 802.11ax HE20, RU 52-40, SISO, Core 1 - 5320 MHz
Band Edge Frequency 5350 MHz**



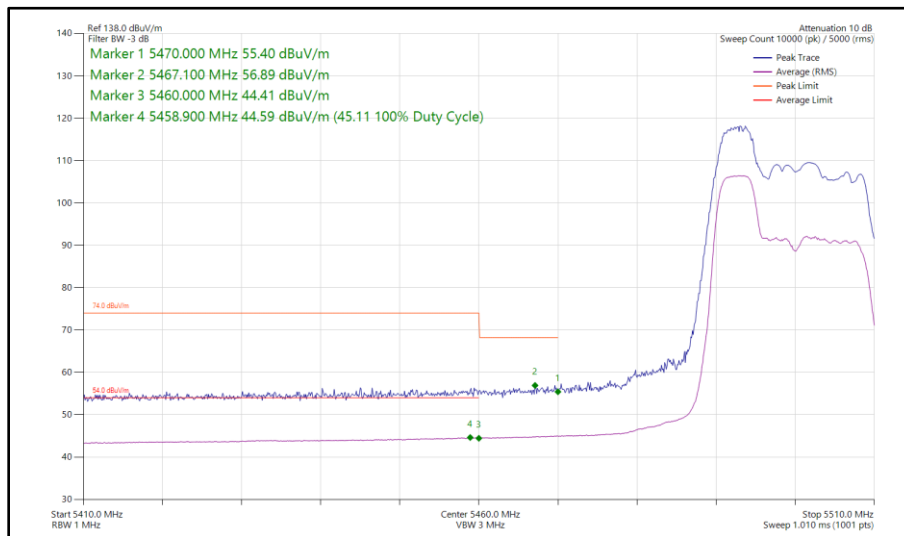
**Figure 21 - 802.11a, SISO, Core 1 - 5500 MHz
Band Edge Frequency 5460 MHz**



**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 52-37, SISO, Core 1 - 5500 MHz
Band Edge Frequency 5460 MHz**



20 MHz Bandwidth - Core 0 - Core 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 | 59.69 | 46.29 |
| 802.11ax HE20 | MCS 11x1 | SU | - | 5180 | 5150 | 60.53 | 46.51 |
| 802.11ax HE20 | MCS 11x1 | 106 | 54 | 5180 | 5150 | 55.56 | 44.12 |
| 802.11n HT20 | MCS 7 | - | - | 5320 | 5350 | 59.45 | 47.26 |
| 802.11ax HE20 | MCS 11x1 | SU | - | 5320 | 5350 | 61.76 | 47.38 |
| 802.11ax HE20 | MCS 11x1 | 106 | 53 | 5320 | 5350 | 57.05 | 45.11 |
| 802.11n HT20 | MCS 4 | - | - | 5500 | 5460 | 60.07 | 47.29 |
| 802.11ax HE20 | MCS 4x1 | SU | - | 5500 | 5460 | 60.71 | 47.49 |
| 802.11ax HE20 | MCS 11x1 | 106 | 54 | 5500 | 5460 | 59.46 | 45.30 |

Table 10 - CDD Restricted Band Edge Results

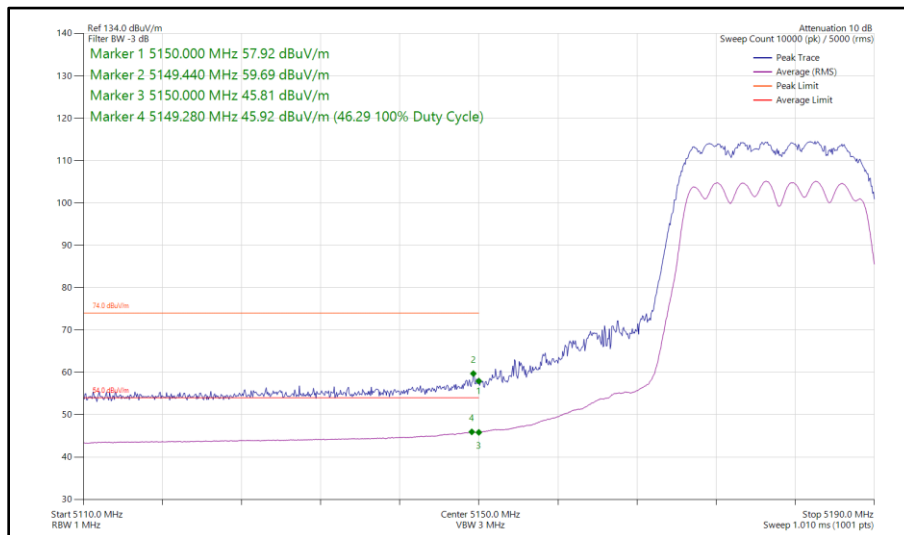
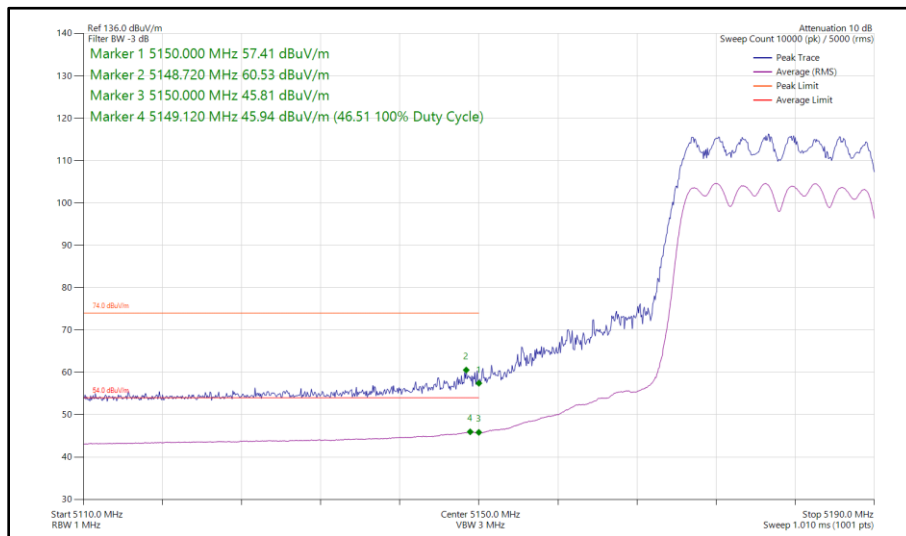
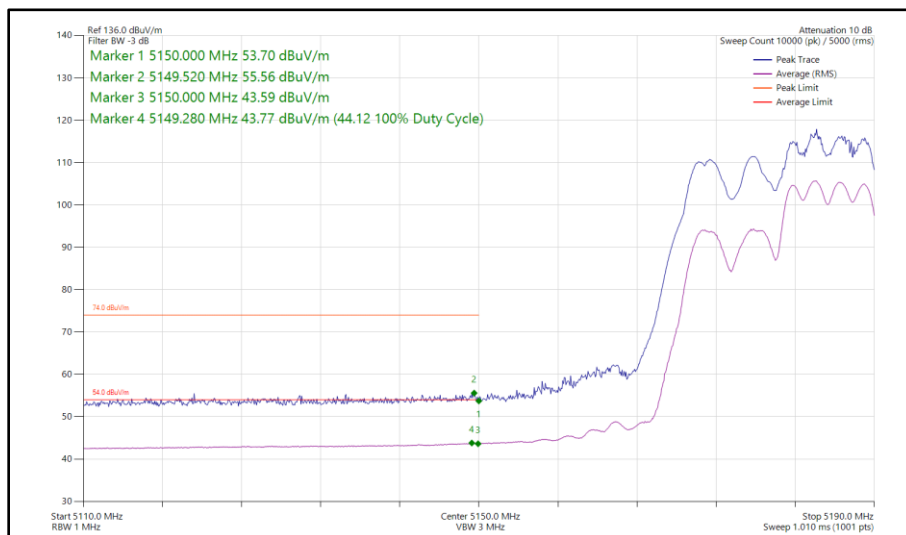


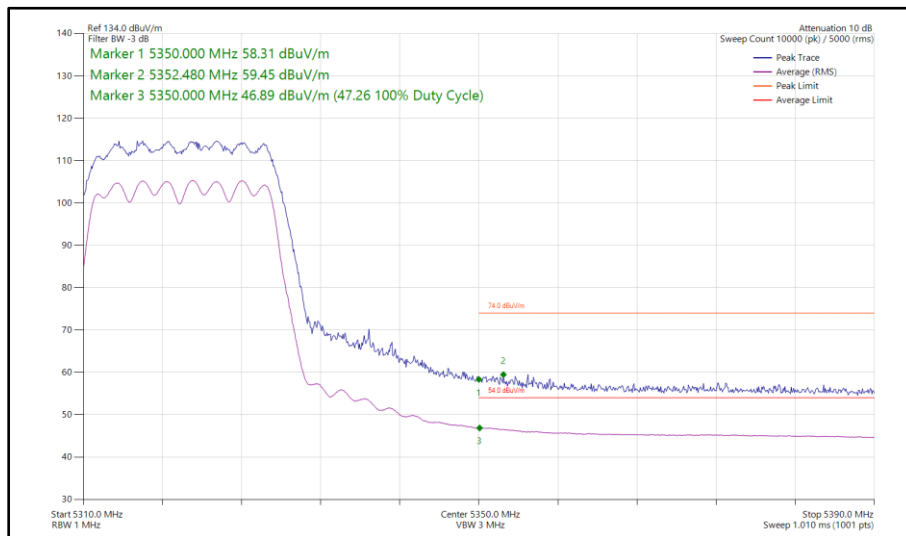
Figure 25 - 802.11n HT20, CDD, Core 0 - Core 1 - 5180 MHz
 Band Edge Frequency 5150 MHz



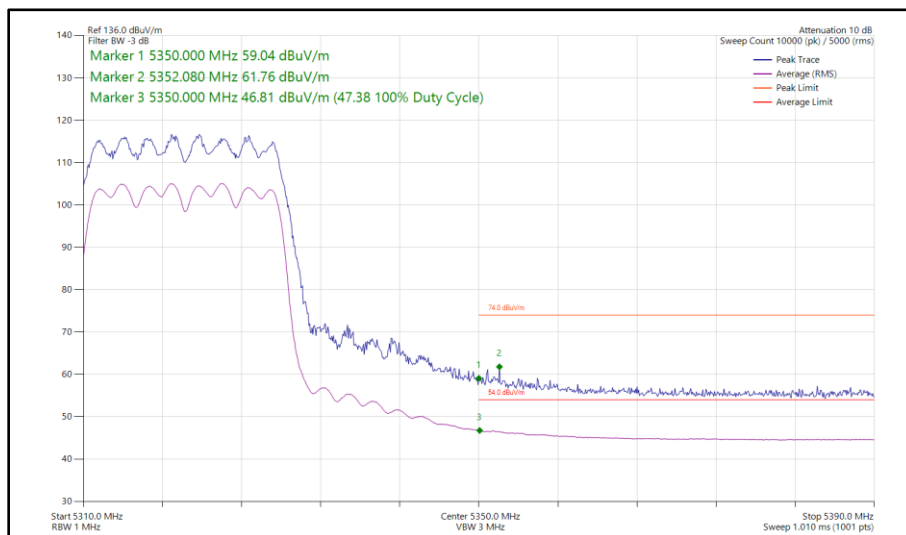
**Figure 26 - 802.11ax HE20, SU, CDD, Core 0 - Core 1 - 5180 MHz
Band Edge Frequency 5150 MHz**



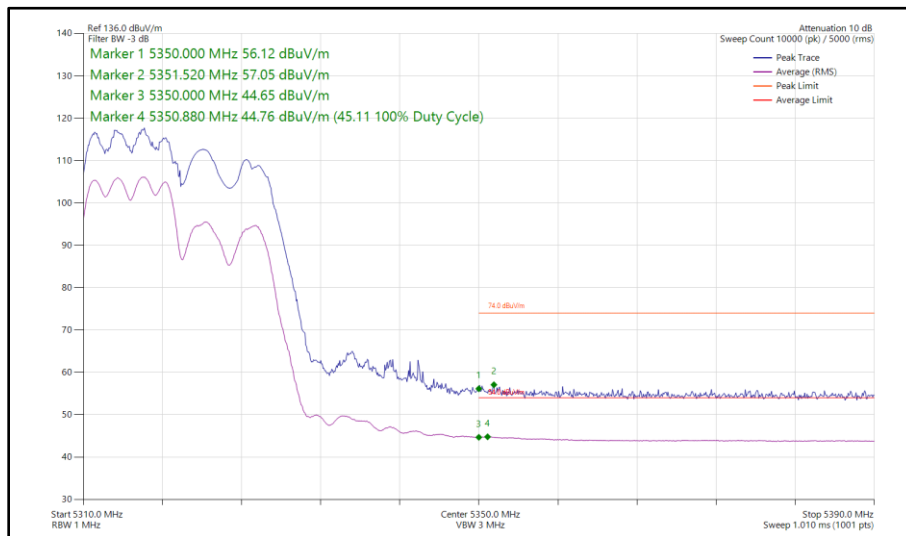
**Figure 27 - 802.11ax HE20, RU 106-54, CDD, Core 0 - Core 1 - 5180 MHz
Band Edge Frequency 5150 MHz**



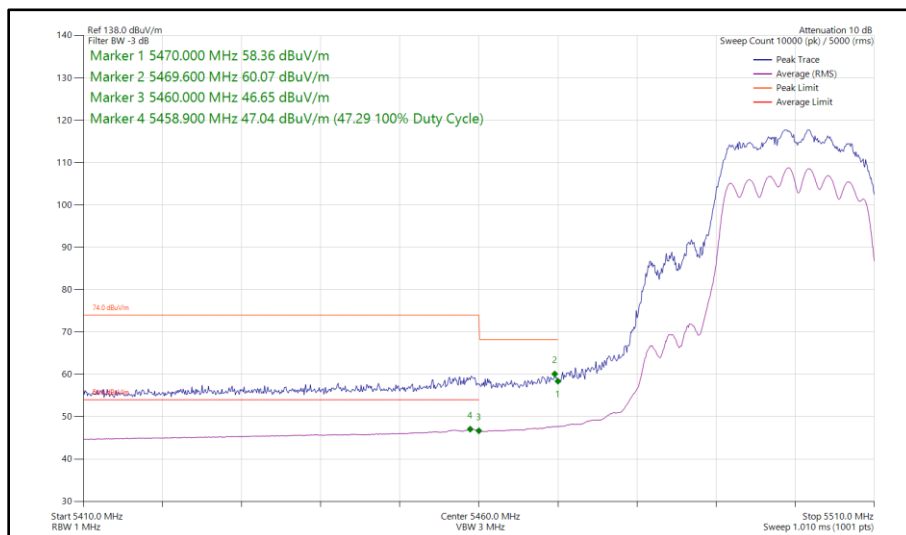
**Figure 28 - 802.11n HT20, CDD, Core 0 - Core 1 - 5320 MHz
Band Edge Frequency 5350 MHz**



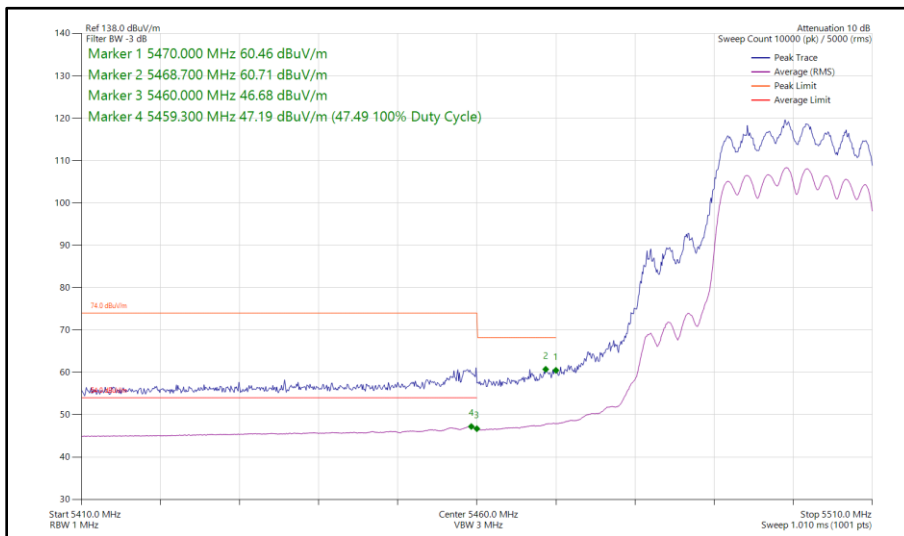
**Figure 29 - 802.11ax HE20, SU, CDD, Core 0 - Core 1 - 5320 MHz
Band Edge Frequency 5350 MHz**



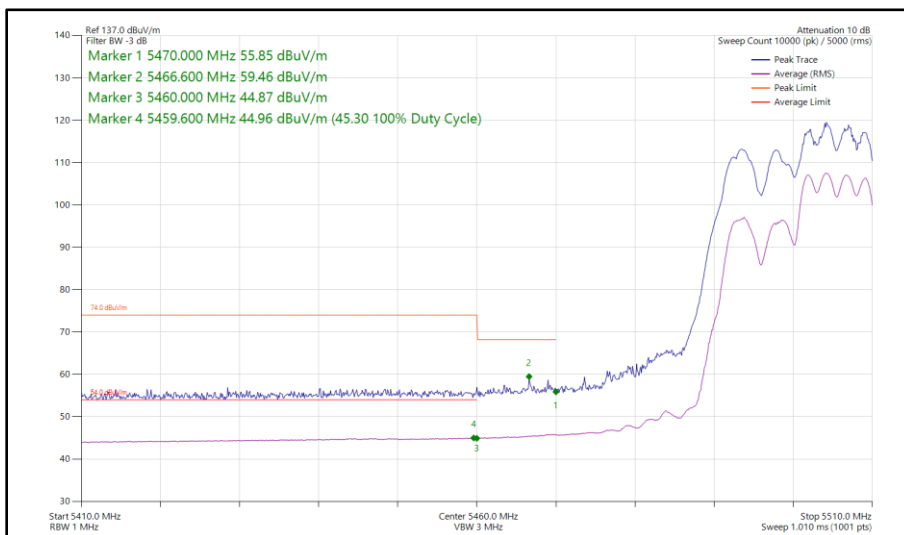
**Figure 30 - 802.11ax HE20, RU 106-53, CDD, Core 0 - Core 1 - 5320 MHz
Band Edge Frequency 5350 MHz**



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



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



**Figure 33 - 802.11ax HE20, RU 106-54, CDD, Core 0 - Core 1 - 5500 MHz
Band Edge Frequency 5460 MHz**



20 MHz Bandwidth - Core 0 - Core 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 | 68.75 | 51.14 |
| 802.11ax HE20 | MCS 11x2 | SU | - | 5180 | 5150 | 60.22 | 46.84 |
| 802.11ax HE20 | MCS 11x2 | 106 | 54 | 5180 | 5150 | 56.32 | 44.81 |
| 802.11n HT20 | MCS 7 | - | - | 5320 | 5350 | 69.32 | 50.62 |
| 802.11ax HE20 | MCS 11x2 | SU | - | 5320 | 5350 | 61.15 | 48.47 |
| 802.11ax HE20 | MCS 11x2 | 106 | 53 | 5320 | 5350 | 59.77 | 46.57 |
| 802.11n HT20 | MCS 7 | - | - | 5500 | 5460 | 62.92 | 48.42 |
| 802.11ax HE20 | MCS 2x2 | SU | - | 5500 | 5460 | 62.20 | 48.17 |
| 802.11ax HE20 | MCS 11x2 | 106 | 53 | 5500 | 5460 | 58.42 | 45.86 |

Table 11 - SDM Restricted Band Edge Results

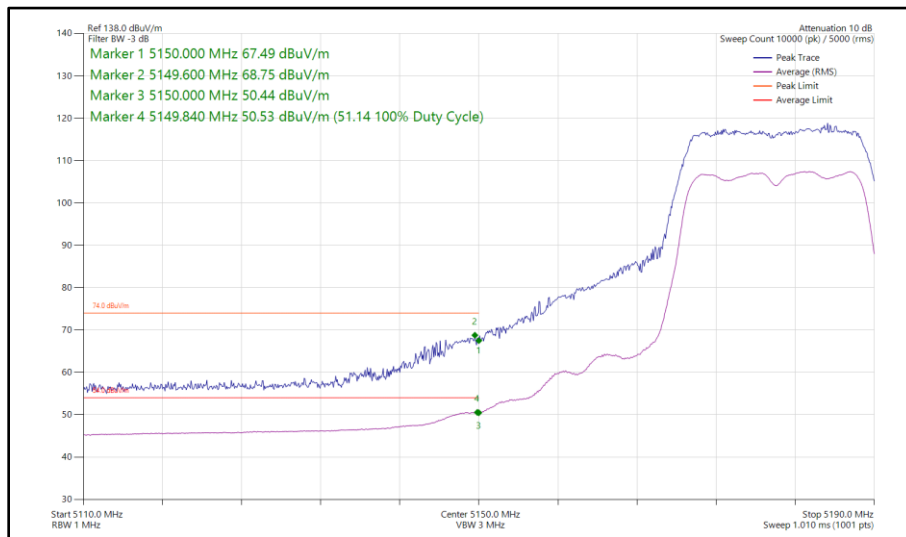
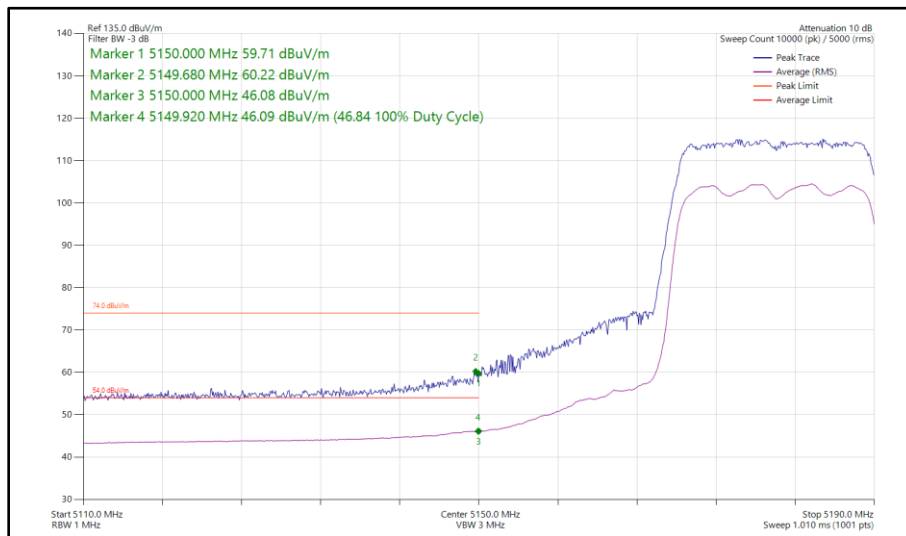
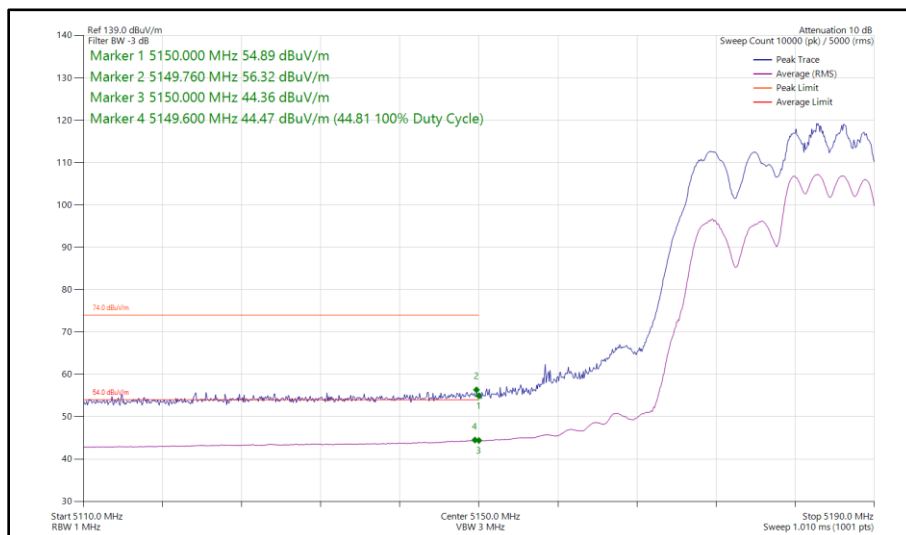


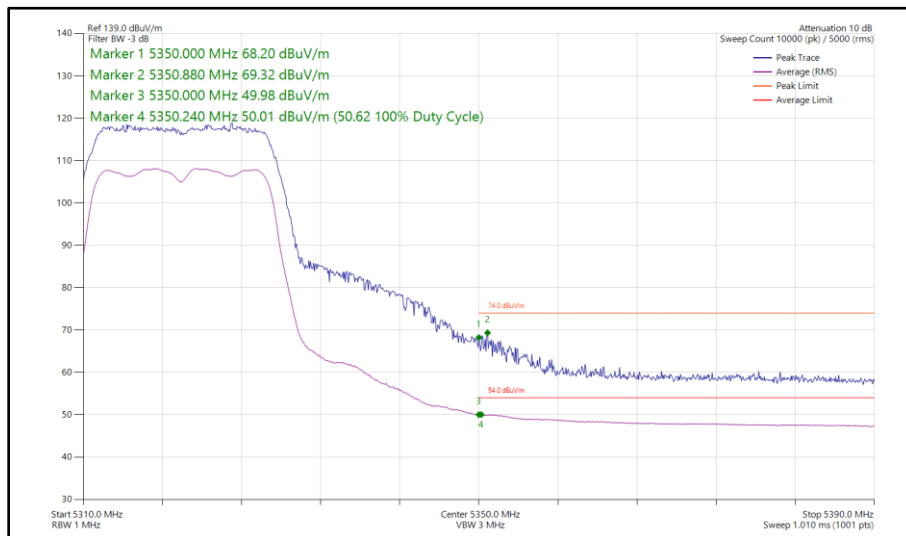
Figure 34 - 802.11n HT20, SDM, Core 0 - Core 1 - 5180 MHz
 Band Edge Frequency 5150 MHz



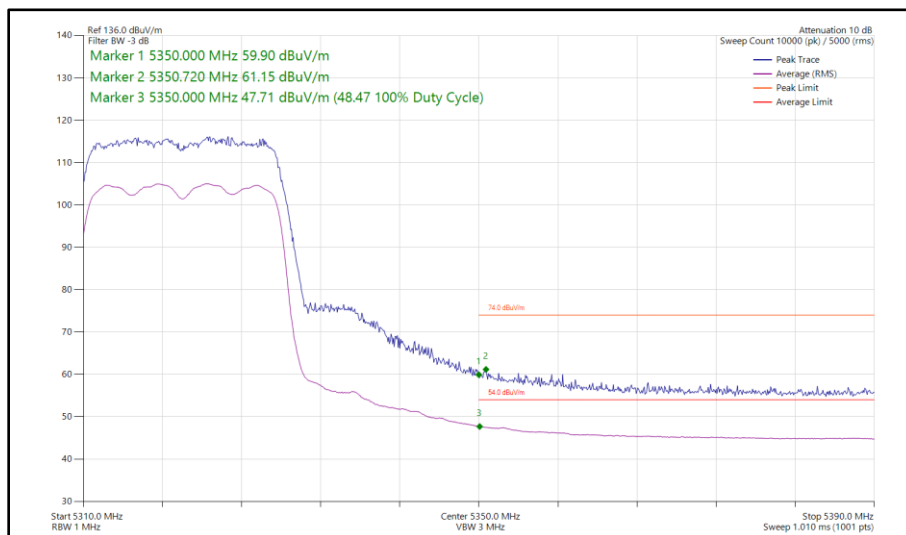
**Figure 35 - 802.11ax HE20, SU, SDM, Core 0 - Core 1 - 5180 MHz
Band Edge Frequency 5150 MHz**



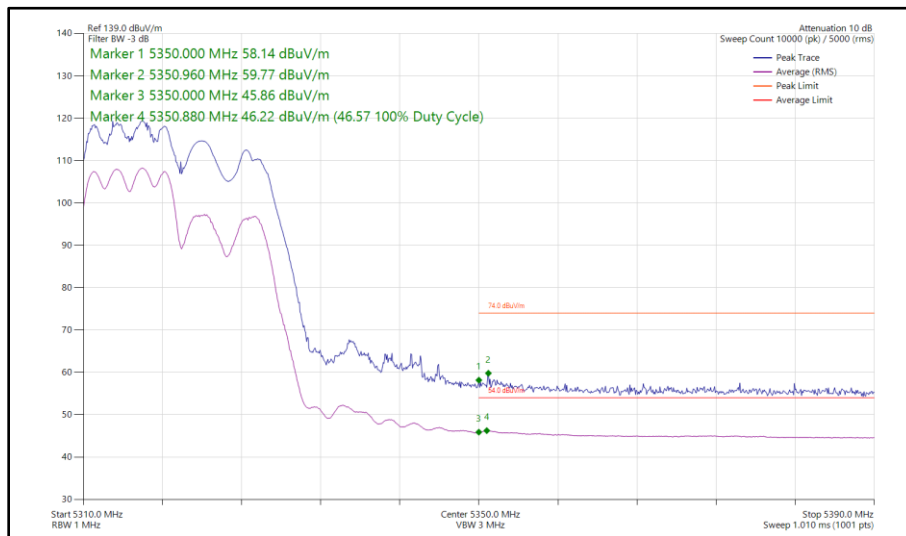
**Figure 36 - 802.11ax HE20, RU 106-54, SDM, Core 0 - Core 1 - 5180 MHz
Band Edge Frequency 5150 MHz**



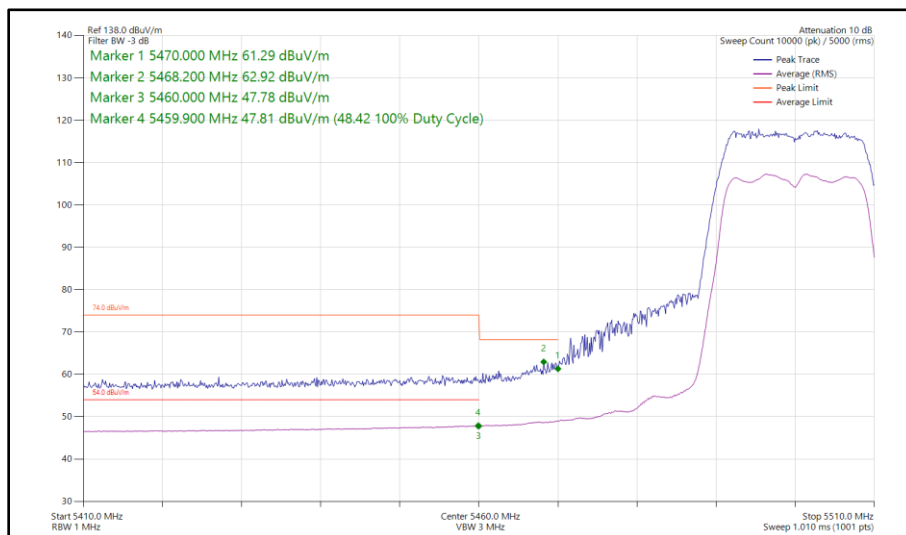
**Figure 37 - 802.11n HT20, SDM, Core 0 - Core 1 - 5320 MHz
Band Edge Frequency 5350 MHz**



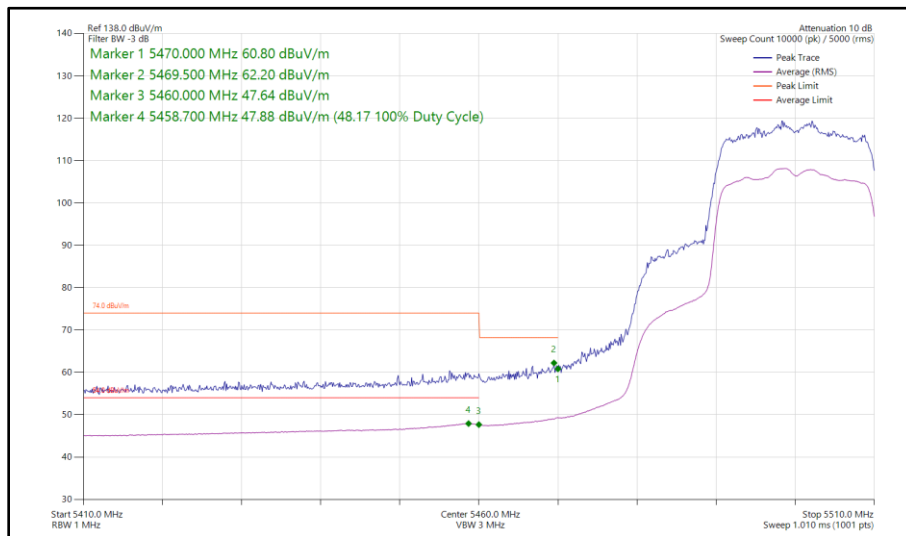
**Figure 38 - 802.11ax HE20, SU, SDM, Core 0 - Core 1 - 5320 MHz
Band Edge Frequency 5350 MHz**



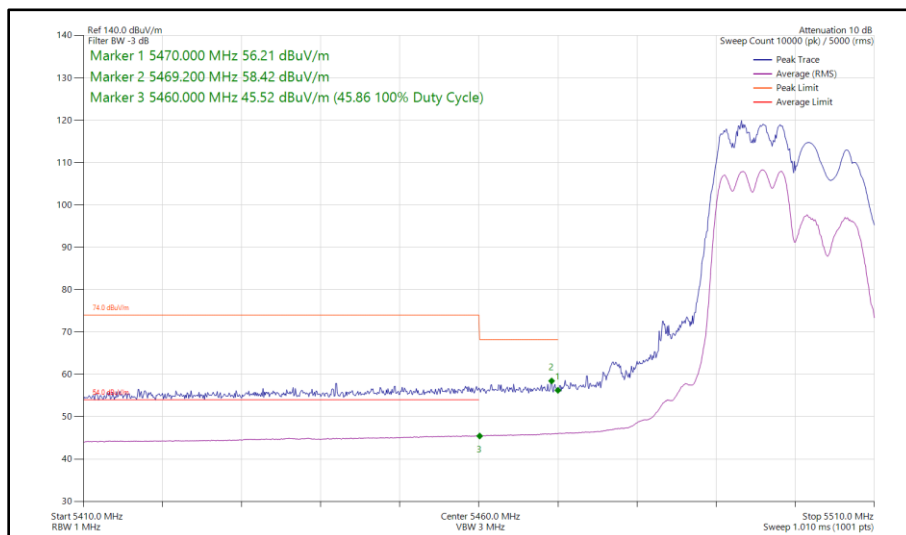
**Figure 39 - 802.11ax HE20, RU 106-53, SDM, Core 0 - Core 1 - 5320 MHz
Band Edge Frequency 5350 MHz**



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



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



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



20 MHz Bandwidth - Core 0 - Core 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 4x1 | - | - | 5180 | 5150 | 59.31 | 45.78 |
| 802.11ac VHT20 | MCS 7x1 | - | - | 5320 | 5350 | 59.06 | 46.82 |
| 802.11ac VHT20 | MCS 4x1 | - | - | 5500 | 5460 | 60.18 | 47.34 |

Table 12 - TxBF Restricted Band Edge Results

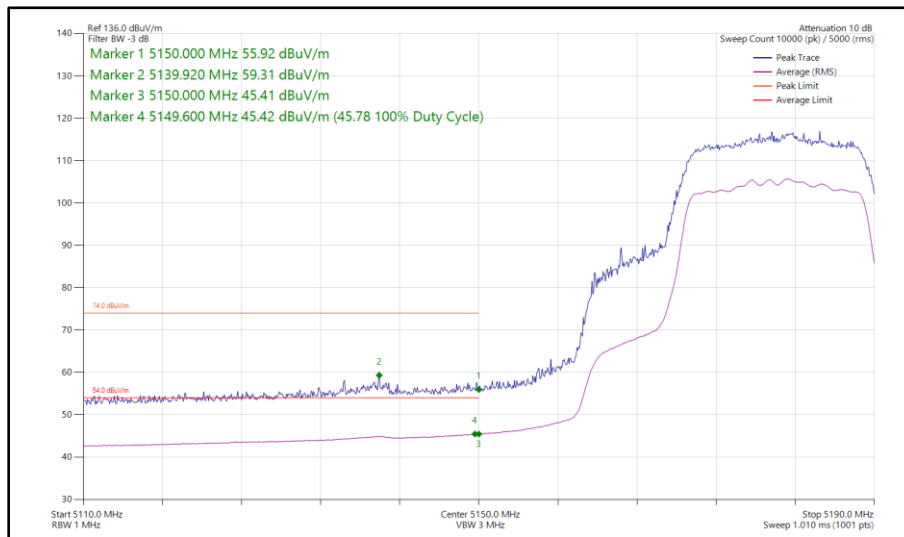


Figure 43 - 802.11ac VHT20, TxBF, Core 0 - Core 1 - 5180 MHz
 Band Edge Frequency 5150 MHz

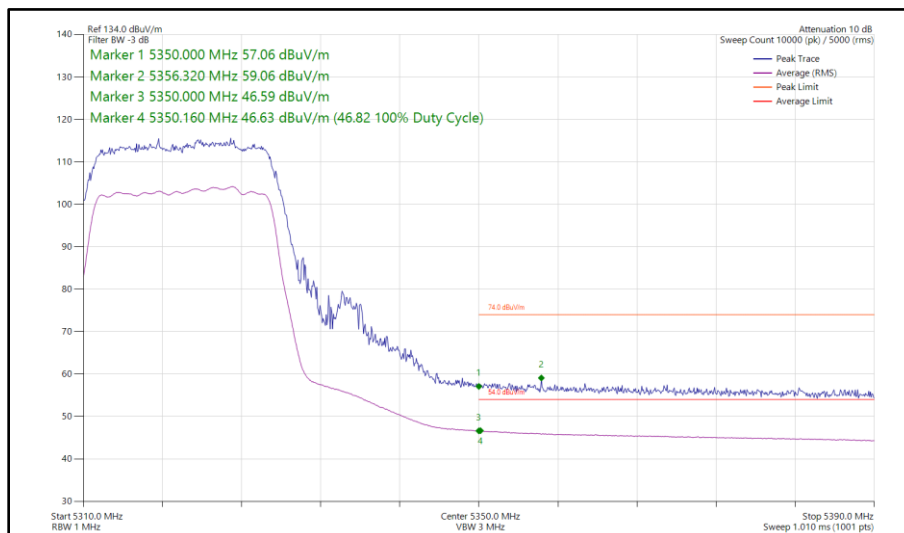
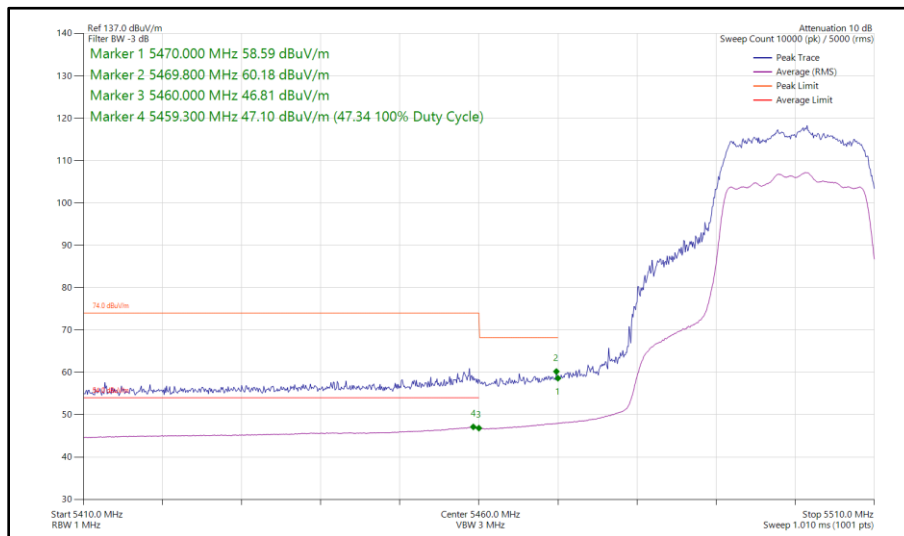


Figure 44 - 802.11ac VHT20, TxBF, Core 0 - Core 1 - 5320 MHz
 Band Edge Frequency 5350 MHz



**Figure 45 - 802.11ac VHT20, TxBF, Core 0 - Core 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 4 | - | - | 5190 | 5150 | 55.88 | 44.69 |
| 802.11ax HE40 | MCS 2x1 | SU | - | 5190 | 5150 | 56.09 | 44.55 |
| 802.11ax HE40 | MCS 11x1 | 106 | 56 | 5190 | 5150 | 58.46 | 44.32 |
| 802.11n HT40 | MCS 2 | - | - | 5310 | 5350 | 60.76 | 49.27 |
| 802.11ax HE40 | MCS 2x1 | SU | - | 5310 | 5350 | 62.85 | 49.93 |
| 802.11ax HE40 | MCS 11x1 | 106 | 53 | 5310 | 5350 | 63.68 | 47.37 |
| 802.11n HT40 | MCS 2 | - | - | 5510 | 5460 | 60.74 | 46.56 |
| 802.11ax HE40 | MCS 4x1 | SU | - | 5510 | 5460 | 61.95 | 46.91 |
| 802.11ax HE40 | MCS 11x1 | 52 | 44 | 5510 | 5460 | 59.48 | 45.47 |

Table 13 - SISO Restricted Band Edge Results

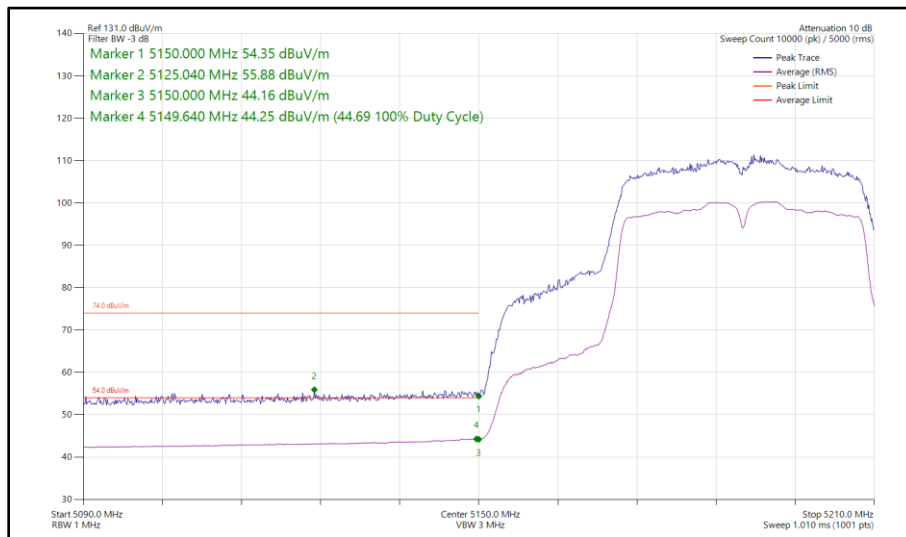
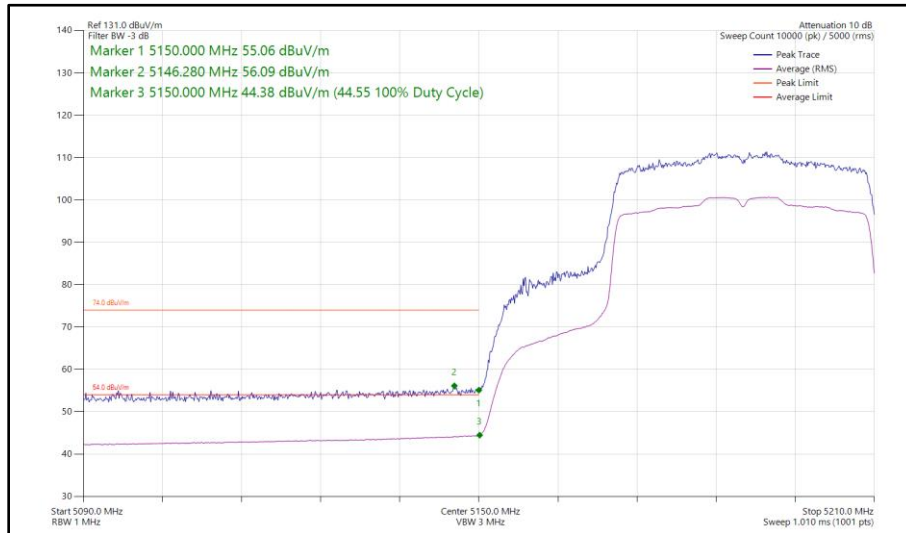
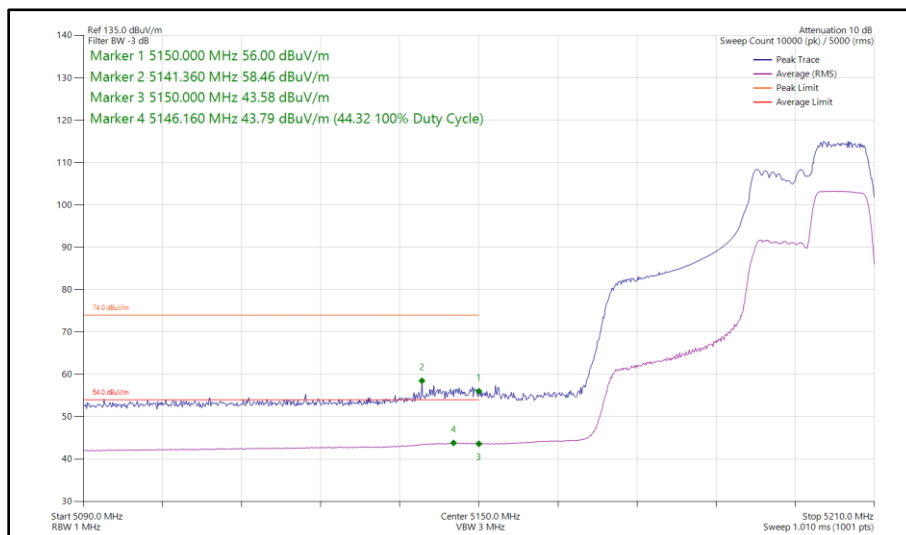


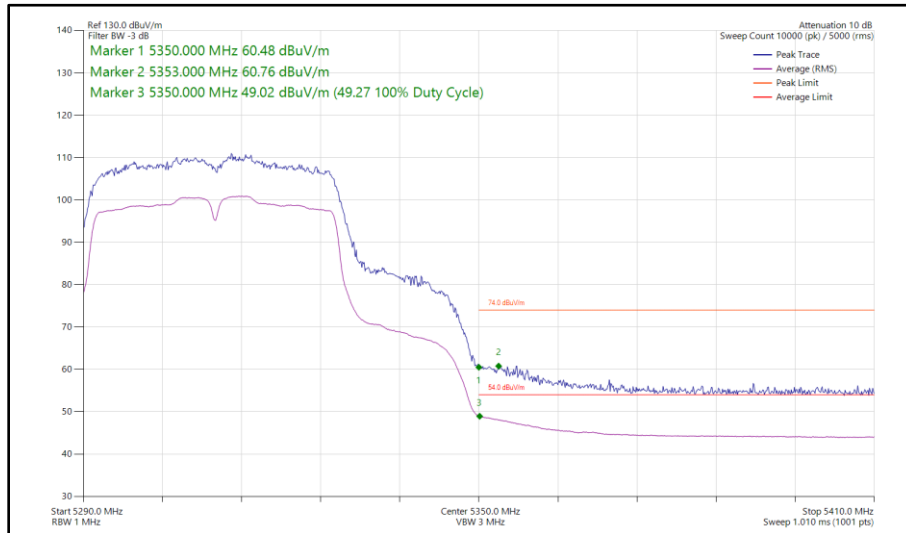
Figure 46 - 802.11n HT40, SISO, Core 0 - 5190 MHz
 Band Edge Frequency 5150 MHz



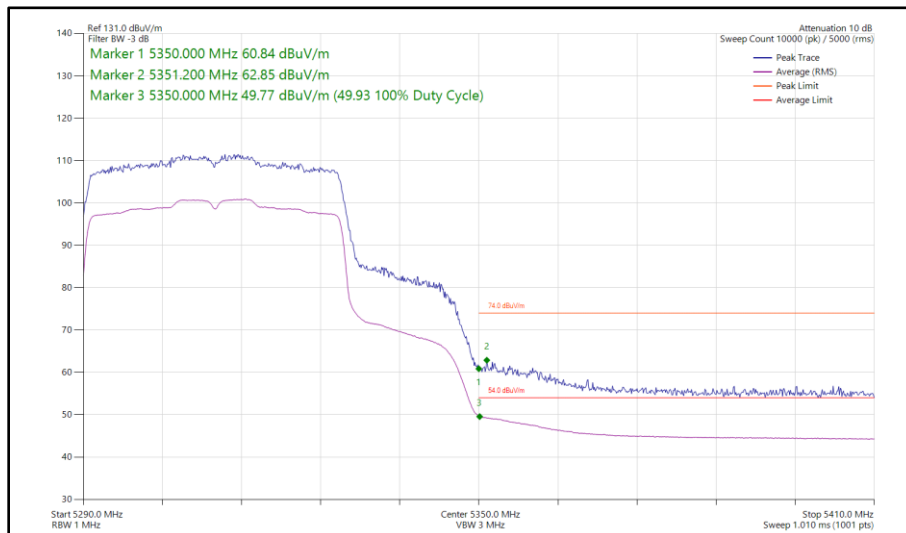
**Figure 47 - 802.11ax HE40, SU, SISO, Core 0 - 5190 MHz
Band Edge Frequency 5150 MHz**



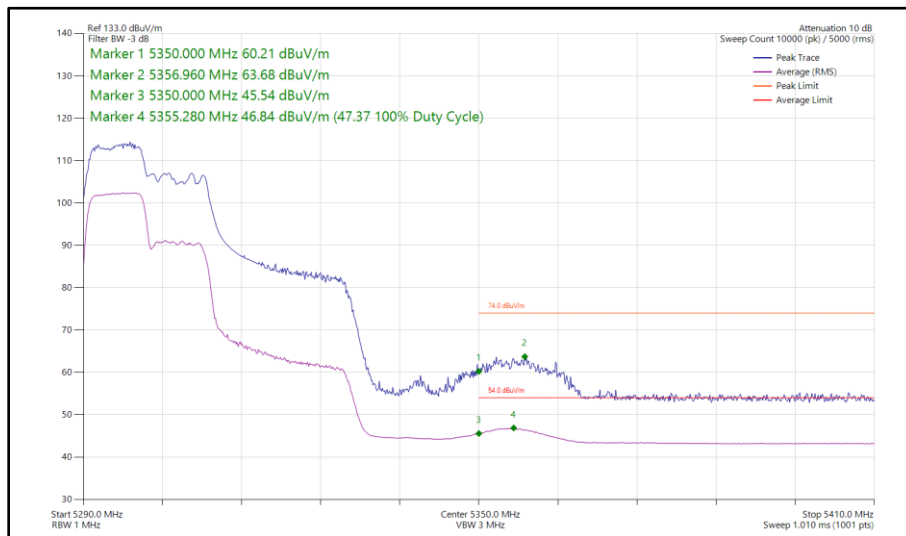
**Figure 48 - 802.11ax HE40, RU 106-56, SISO, Core 0 - 5190 MHz
Band Edge Frequency 5150 MHz**



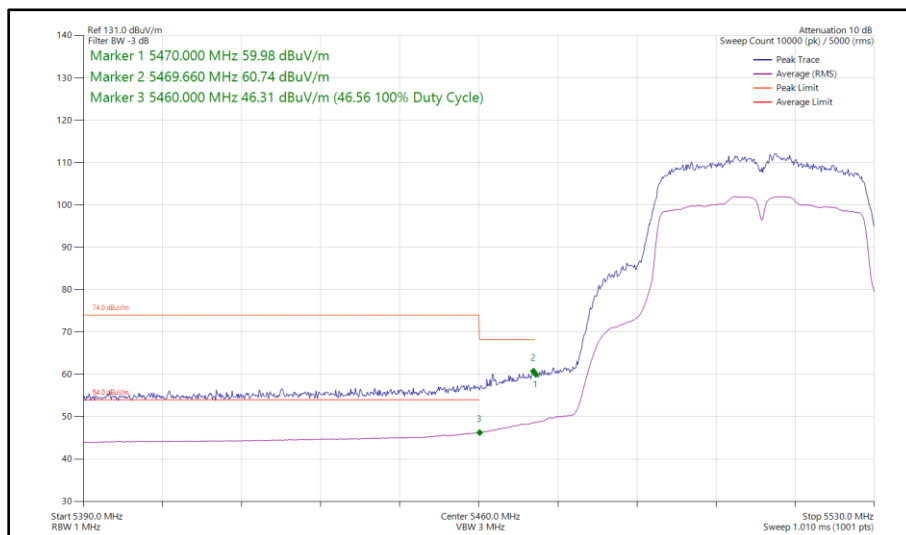
**Figure 49 - 802.11n HT40, SISO, Core 0 - 5310 MHz
Band Edge Frequency 5350 MHz**



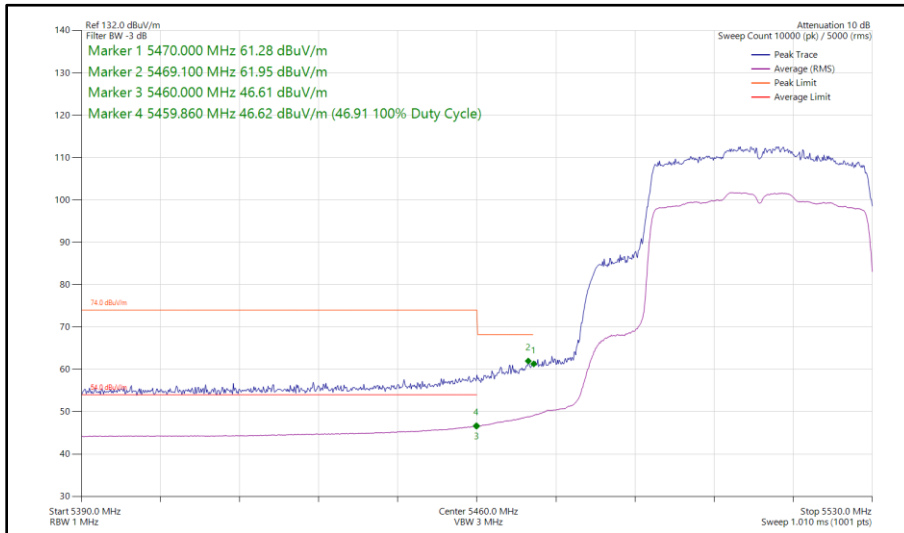
**Figure 50 - 802.11ax HE40, SU, SISO, Core 0 - 5310 MHz
Band Edge Frequency 5350 MHz**



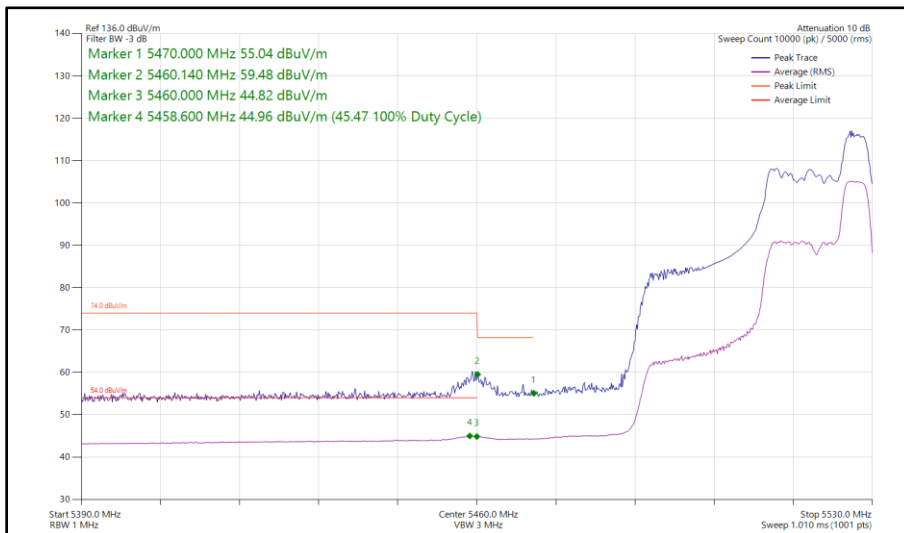
**Figure 51 - 802.11ax HE40, RU 106-53, SISO, Core 0 - 5310 MHz
Band Edge Frequency 5350 MHz**



**Figure 52 - 802.11n HT40, SISO, Core 0 - 5510 MHz
Band Edge Frequency 5460 MHz**



**Figure 53 - 802.11ax HE40, SU, SISO, Core 0 - 5510 MHz
Band Edge Frequency 5460 MHz**



**Figure 54 - 802.11ax HE40, RU 52-44, 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 | 57.28 | 45.89 |
| 802.11ax HE40 | MCS 2x1 | SU | - | 5190 | 5150 | 58.33 | 46.86 |
| 802.11ax HE40 | MCS 11x1 | 106 | 56 | 5190 | 5150 | 57.96 | 44.59 |
| 802.11n HT40 | MCS 4 | - | - | 5310 | 5350 | 58.70 | 46.82 |
| 802.11ax HE40 | MCS 2x1 | SU | - | 5310 | 5350 | 59.93 | 48.18 |
| 802.11ax HE40 | MCS 11x1 | 52 | 37 | 5310 | 5350 | 65.34 | 46.04 |
| 802.11n HT40 | MCS 2 | - | - | 5510 | 5460 | 61.51 | 46.44 |
| 802.11ax HE40 | MCS 4x1 | SU | - | 5510 | 5460 | 61.06 | 46.24 |
| 802.11ax HE40 | MCS 11x1 | 106 | 56 | 5510 | 5460 | 58.79 | 45.03 |

Table 14 - SISO Restricted Band Edge Results

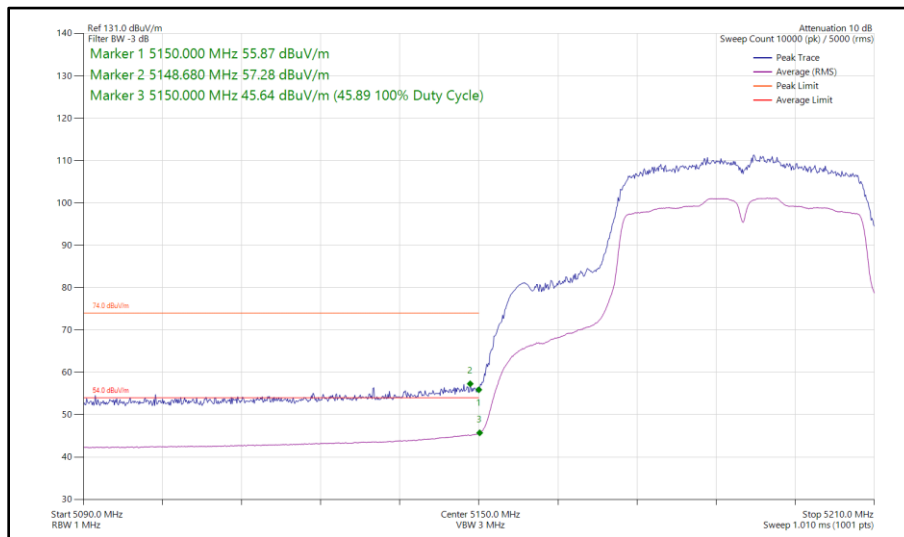
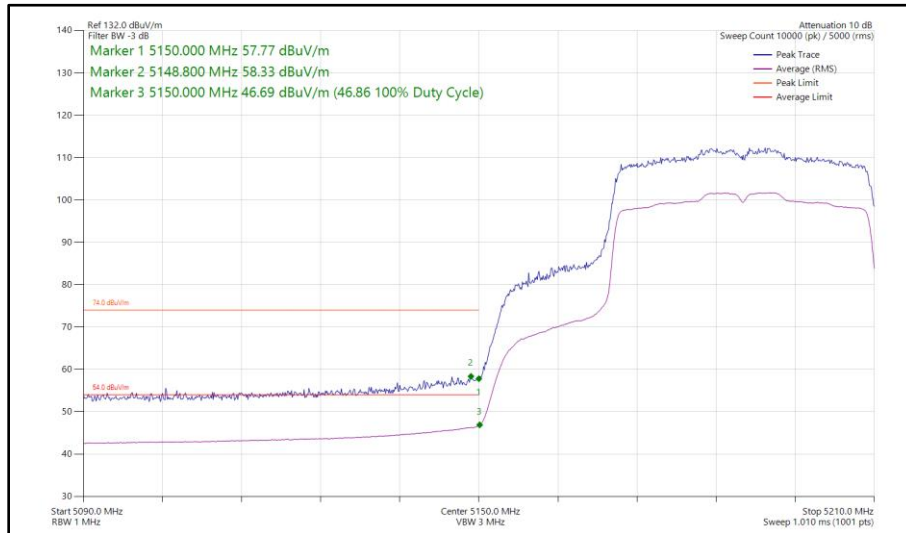
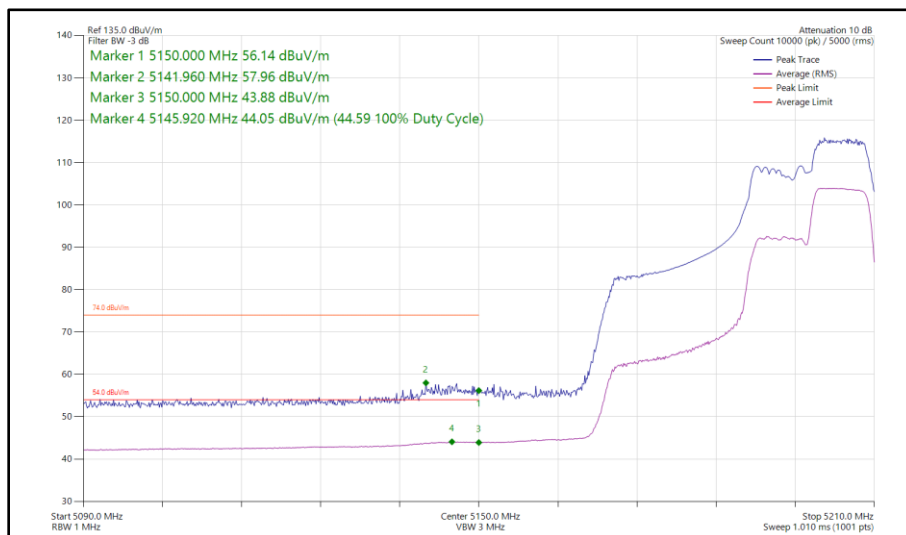


Figure 55 - 802.11n HT40, SISO, Core 1 - 5190 MHz
 Band Edge Frequency 5150 MHz



**Figure 56 - 802.11ax HE40, SU, SISO, Core 1 - 5190 MHz
Band Edge Frequency 5150 MHz**



**Figure 57 - 802.11ax HE40, RU 106-56, SISO, Core 1 - 5190 MHz
Band Edge Frequency 5150 MHz**