

FCC Test Report

Apple Inc
Model: A3403



In accordance with FCC 47 CFR Part 15C
(2.4 GHz WLAN)

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

FCC ID: BCGA3403

COMMERCIAL-IN-CONFIDENCE

Document 75961394-88 Issue 01

SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
James O'Reilly	RF Engineer	Authorised Signatory	14 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 15C. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Report Generation	Rachael Watkins	14 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 15C: 2023 for the tests detailed in section 1.3.



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Contents

1	Report Summary	2
1.1	Report Modification Record.....	2
1.2	Introduction.....	2
1.3	Brief Summary of Results	3
1.4	Product Information	4
1.5	Deviations from the Standard.....	5
1.6	Identification of the EUT	5
1.7	EUT Modification Record	5
1.8	Test Location	6
2	Test Details	7
2.1	Restricted Band Edges.....	7
2.2	Emission Bandwidth	38
2.3	Maximum Conducted Output Power	52
2.4	Authorised Band Edges	60
2.5	Spurious Radiated Emissions	70
2.6	Power Spectral Density	100
3	Measurement Uncertainty	109



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	14-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 15C: 2023
Start of Test	26-August-2024
Finish of Test	25-September-2024
Name of Engineer(s)	Ahmed Al Derdiri, Manohar Thota, Thomas Biddlecombe, Elliot Callender and Ioan-Alexandru Bogatu
Related Document(s)	ANSI C63.10 (2020) KDB 662911 D01 v02r01



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: 2.4 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	15.247 (a)(2)	Emission Bandwidth	Pass	ANSI C63.10 (2020)
2.3	15.247 (b)	Maximum Conducted Output Power	Pass	ANSI C63.10 (2020) KDB 662911 D01 v02r01
2.4	15.247 (d)	Authorised Band Edges	Pass	ANSI C63.10 (2020)
2.5	15.209 and 15.247 (d)	Spurious Radiated Emissions	Pass	ANSI C63.10 (2020)
2.6	15.247 (e)	Power Spectral Density	Pass	ANSI C63.10 (2020) KDB 662911 D01 v02r01

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 2.4 GHz 802.11 radio supports SISO (Single Input/Single Output) and 2x2 MIMO (Multiple Input/Multiple Output). It supports 802.11b and g for SISO operation and 802.11n and ax at 20 MHz channel bandwidths for SISO and MIMO. 802.11ax multi-user mode supports RU sizes of 26/52/106/242 subcarriers.

The EUT uses different output powers per core dependent on how many cores are used. It uses the same conducted power across all cores in any given mode, but due to the different antenna gains the radiated powers per core differs.

After preliminary investigations were performed, the EUT was therefore tested in the following worst-case modes unless otherwise specified:

SISO Modes (Core 1):

- 802.11b - 1 Mbps
- 802.11g - 12 Mbps
- 802.11n HT20 - MCS2
- 802.11ax HE20 SU - MCS2x1
- 802.11ax HE20 MU RU26/52/106* - MCS2x1

2x2 MIMO Modes (Core 0 + Core 1):

- 802.11n HT20 - CDD - MCS2
- 802.11ax HE20 SU - CDD - MCS2x1
- 802.11ax HE20 MU RU26/52/106* - CDD - MCS2x1

*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.

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 was known and compensated for in any conducted measurements.

For all tests, the EUT was put into a continuous transmit test mode with the chipset manufacturer's test commands. The EUT then transmitted the required type of packeted 802.11 data frames of fixed length, containing the standard headers and with pseudo-random data content, ensuring the measured signals were representative and contained all the symbols at the highest power control level.

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



1.4.4 Antenna Gain Table

Antenna Port	Frequency Range (MHz)	Peak Gain (dBi)	Conducted Cable Loss (dB)
Core 0	2400 to 2480	3.3	0.71
Core 1	2400 to 2480	6.3	0.71

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
JF4T7PYJ66	REV1.0	24A32191s	23.30.16
LJHNW3N9XQ	REV1.0	24A32190v	23.30.16
M7J9X1XPGD	REV1.0	24A32190v	23.30.16

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

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: 2.4 GHz WLAN		
Emission Bandwidth	Thomas Biddlecombe	UKAS
Maximum Conducted Output Power	Thomas Biddlecombe	UKAS
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: 2.4 GHz WLAN		
Restricted Band Edges	Ahmed Al Derdiri and Manohar Thota	UKAS
Authorised Band Edges	Ahmed Al Derdiri and Manohar Thota	UKAS
Spurious Radiated Emissions	Elliot Callender and Ioan-Alexandru Bogatu	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 15C, Clause 15.205

2.1.2 Equipment Under Test and Modification State

A3403, S/N: JF4T7PYJ66 - Modification State 0

2.1.3 Date of Test

03-September-2024 to 19-September-2024

2.1.4 Test Method

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

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

The following conversion can be applied to convert from dB μ V/m to μ V/m:

$10^{(\text{Field Strength in dB}\mu\text{V/m}/20)}$.

2.1.5 Environmental Conditions

Ambient Temperature 22.3 - 23.2 °C

Relative Humidity 49.0 - 59.3 %



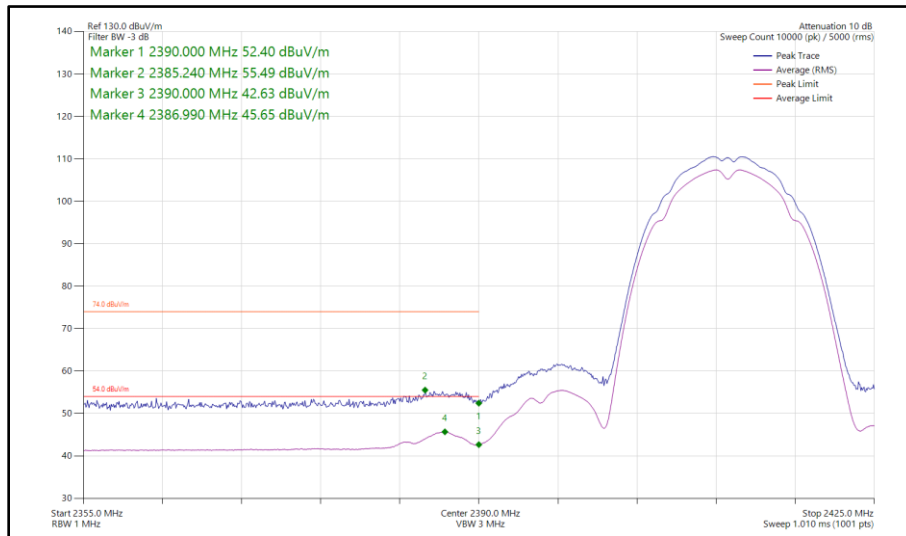
2.1.6 Test Results

2.4 GHz WLAN

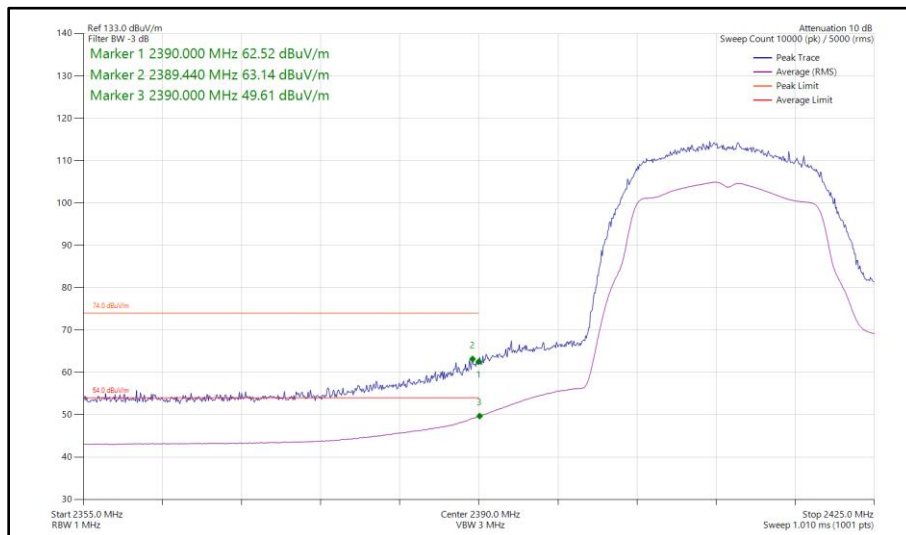
20 MHz Bandwidth - Core 0 (SISO)

Mode	Data Rate/ MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11b	1 Mbps	-	-	2412	2390	55.49	45.65
802.11g	12 Mbps	-	-	2412	2390	63.14	49.61
802.11n HT20	MCS 2	-	-	2412	2390	64.17	49.75
802.11ax HE20	MCS 2x1	SU	-	2412	2390	64.18	50.21
802.11ax HE20	MCS 9x1	106	53	2412	2390	60.94	46.77
802.11b	1 Mbps	-	-	2462	2483.5	55.33	44.45
802.11b	1 Mbps	-	-	2467	2483.5	58.52	48.52
802.11b	1 Mbps	-	-	2472	2483.5	57.53	49.58
802.11g	24 Mbps	-	-	2462	2483.5	64.37	49.62
802.11g	12 Mbps	-	-	2467	2483.5	62.19	49.89
802.11g	24 Mbps	-	-	2472	2483.5	58.49	46.02
802.11n HT20	MCS 4	-	-	2462	2483.5	65.05	50.02
802.11n HT20	MCS 7	-	-	2467	2483.5	63.38	49.84
802.11n HT20	MCS 2	-	-	2472	2483.5	60.81	46.23
802.11ax HE20	MCS 4x1	SU	-	2462	2483.5	65.78	50.31
802.11ax HE20	MCS 9x1	106	54	2462	2483.5	62.13	46.49
802.11ax HE20	MCS 2x1	SU	-	2467	2483.5	62.18	50.03
802.11ax HE20	MCS 9x1	106	54	2467	2483.5	62.17	48.10
802.11ax HE20	MCS 2x1	SU	-	2472	2483.5	59.78	45.40
802.11ax HE20	MCS 9x1	52	40	2472	2483.5	67.36	47.59

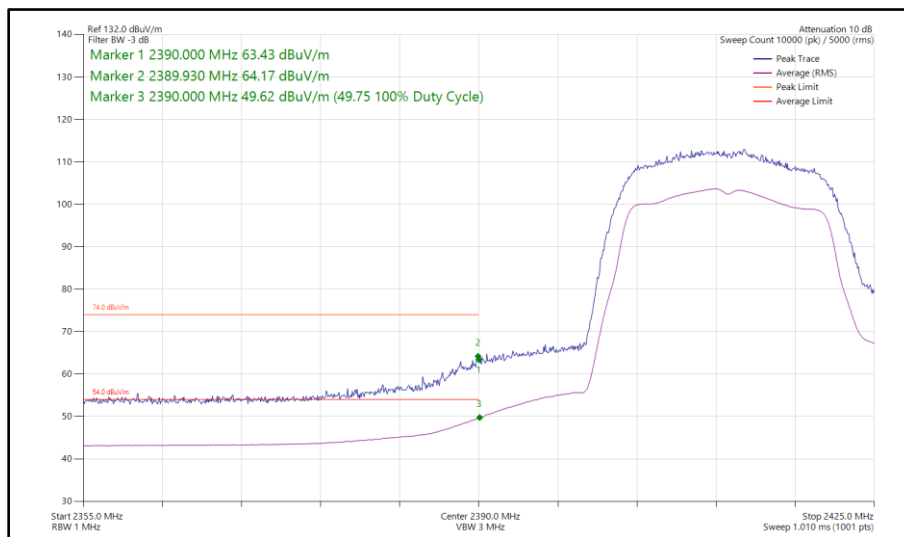
Table 8 - SISO Restricted Band Edge Results



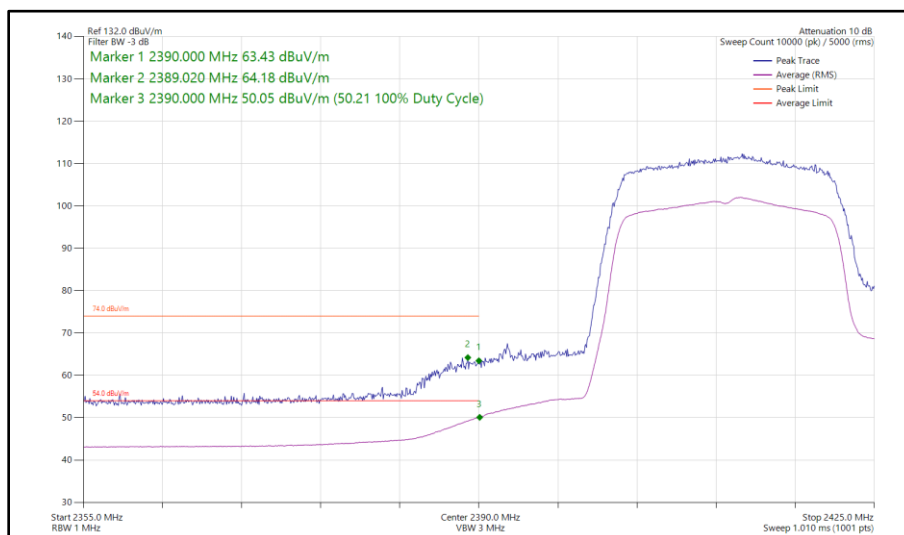
**Figure 1 - 802.11b, SISO, Core 0 - 2412 MHz
Band Edge Frequency 2390 MHz**



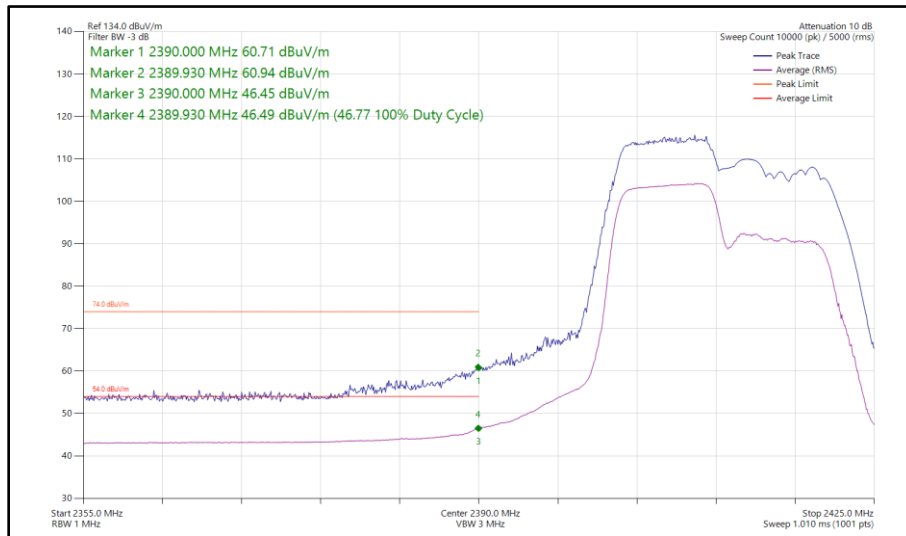
**Figure 2 - 802.11g, SISO, Core 0 - 2412 MHz
Band Edge Frequency 2390 MHz**



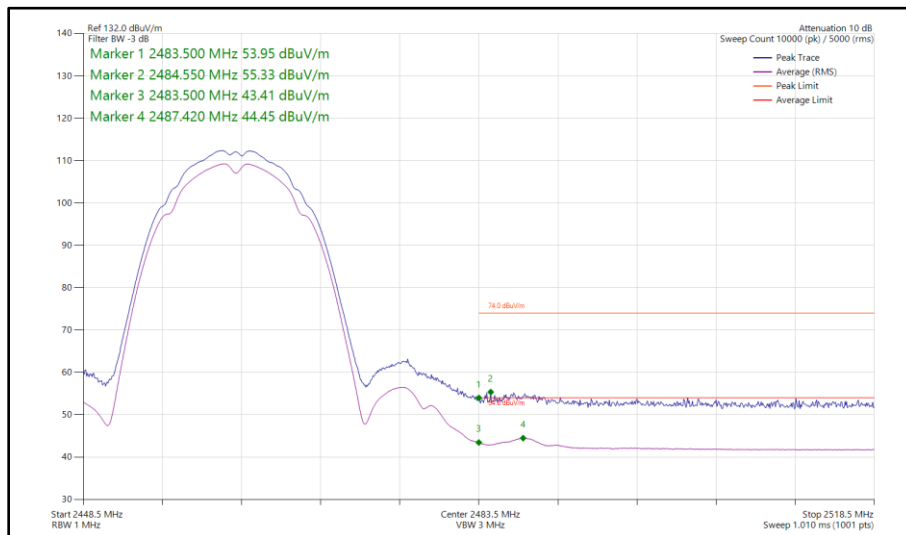
**Figure 3 - 802.11n HT20, SISO, Core 0 - 2412 MHz
Band Edge Frequency 2390 MHz**



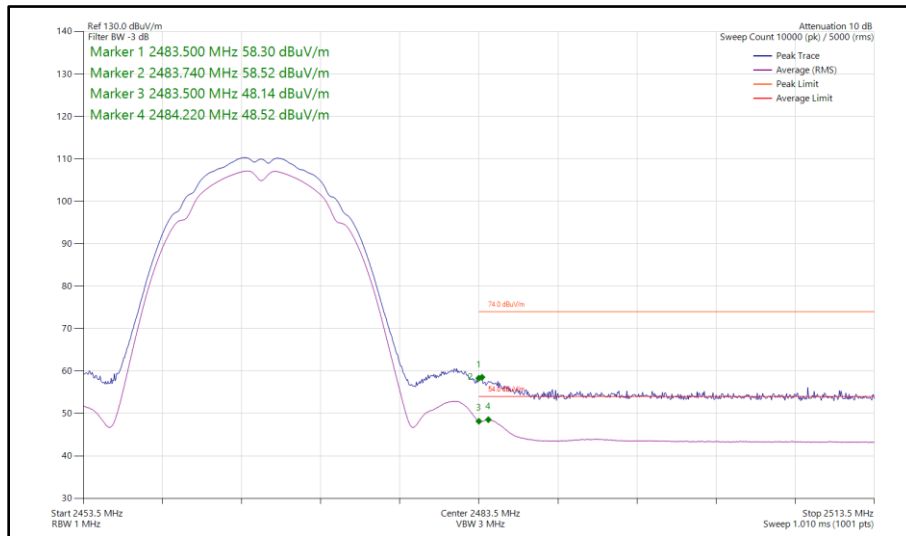
**Figure 4 - 802.11ax HE20, SU, SISO, Core 0 - 2412 MHz
Band Edge Frequency 2390 MHz**



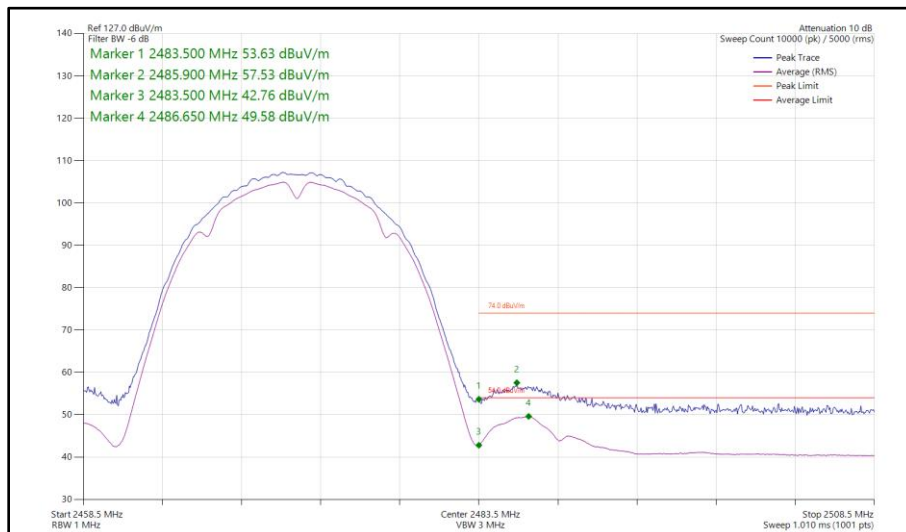
**Figure 5 - 802.11ax HE20, RU 106-53, SISO, Core 0 - 2412 MHz
Band Edge Frequency 2390 MHz**



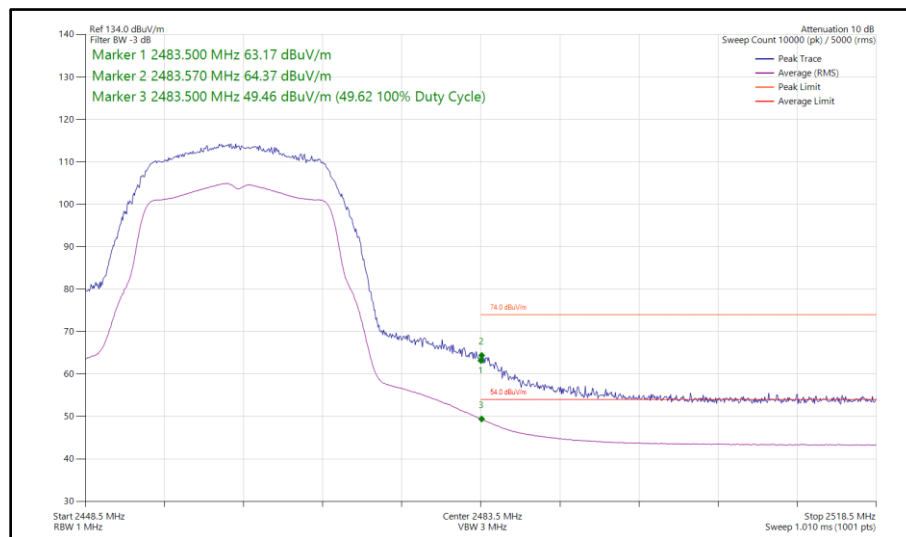
**Figure 6 - 802.11b, SISO, Core 0 - 2462 MHz
Band Edge Frequency 2483.5 MHz**



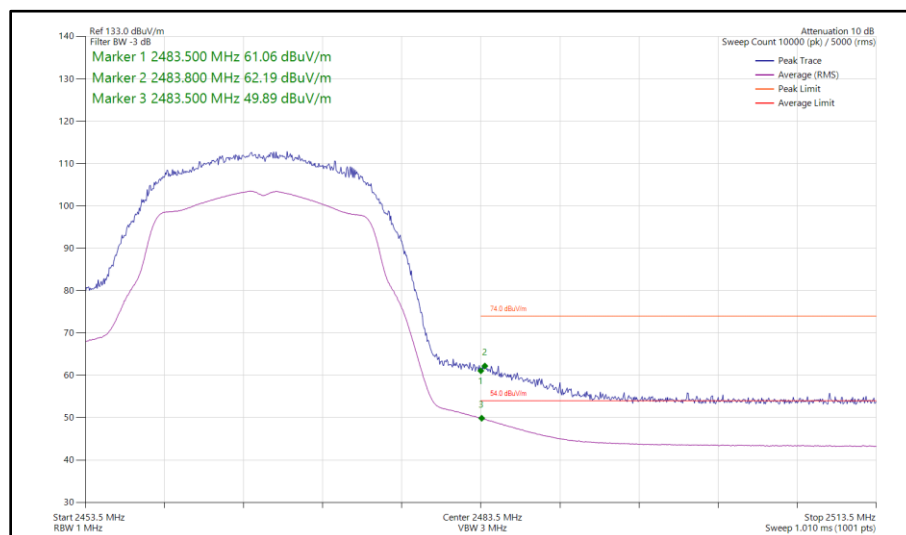
**Figure 7 - 802.11b, SISO, Core 0 - 2467 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 8 - 802.11b, SISO, Core 0 - 2472 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 9 - 802.11g, SISO, Core 0 - 2462 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 10 - 802.11g, SISO, Core 0 - 2467 MHz
Band Edge Frequency 2483.5 MHz**

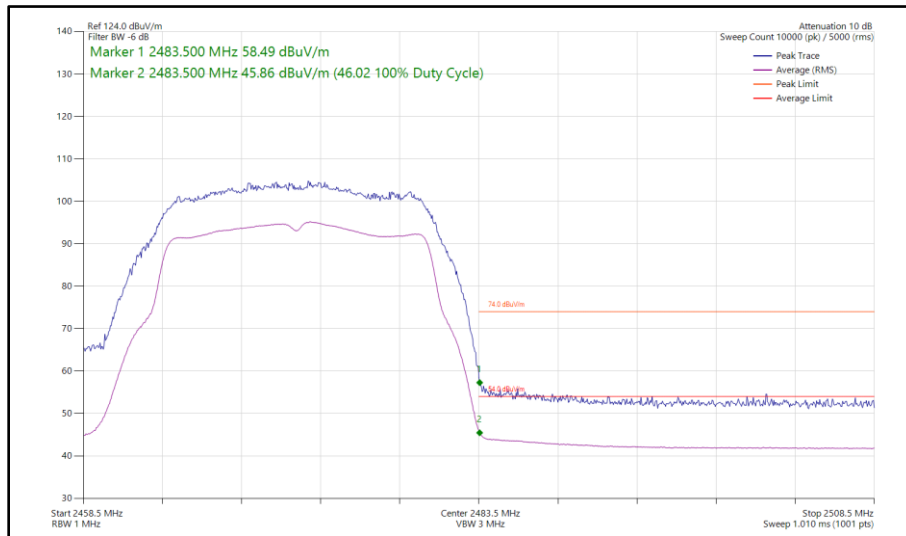


Figure 11 - 802.11g, SISO, Core 0 - 2472 MHz
Band Edge Frequency 2483.5 MHz

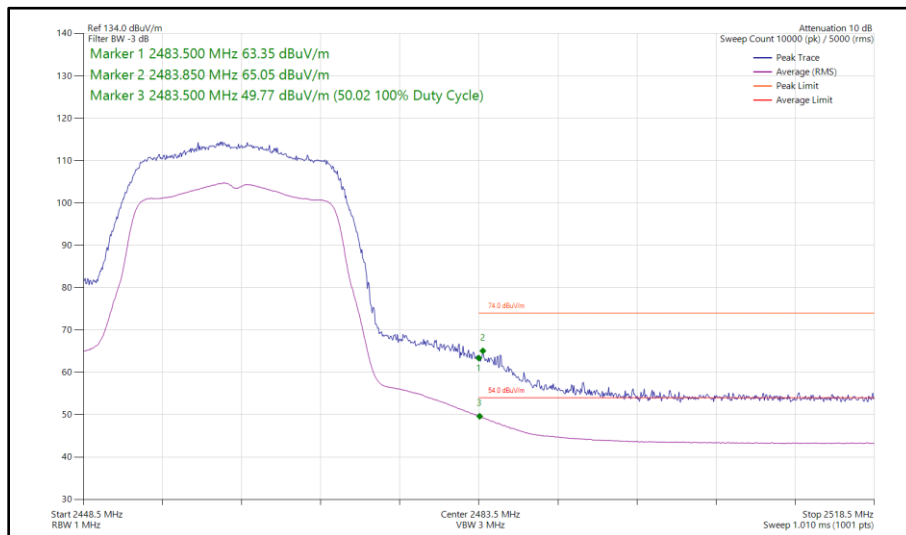
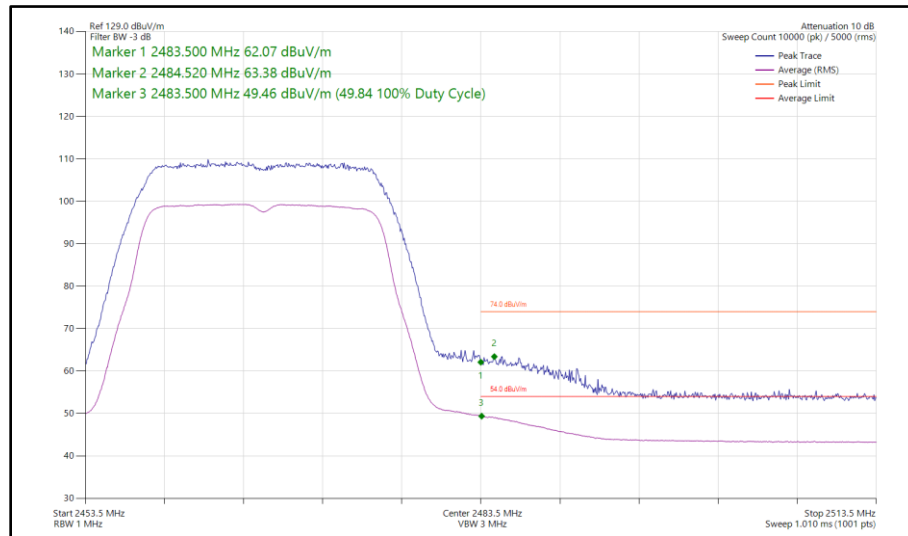
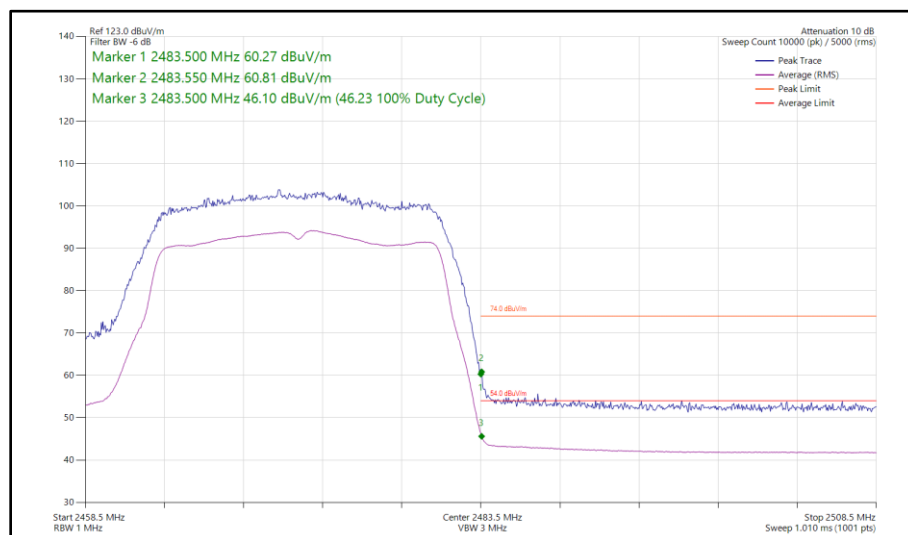


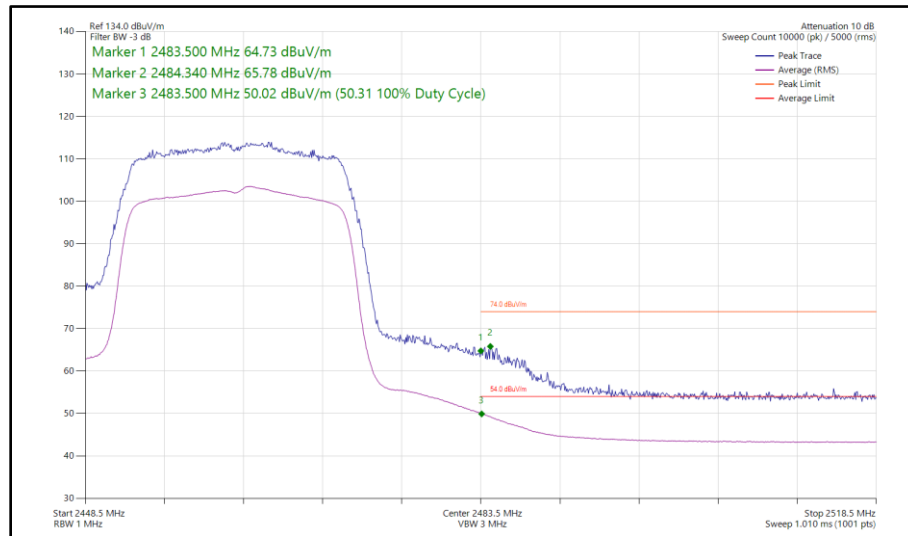
Figure 12 - 802.11n HT20, SISO, Core 0 - 2462 MHz
Band Edge Frequency 2483.5 MHz



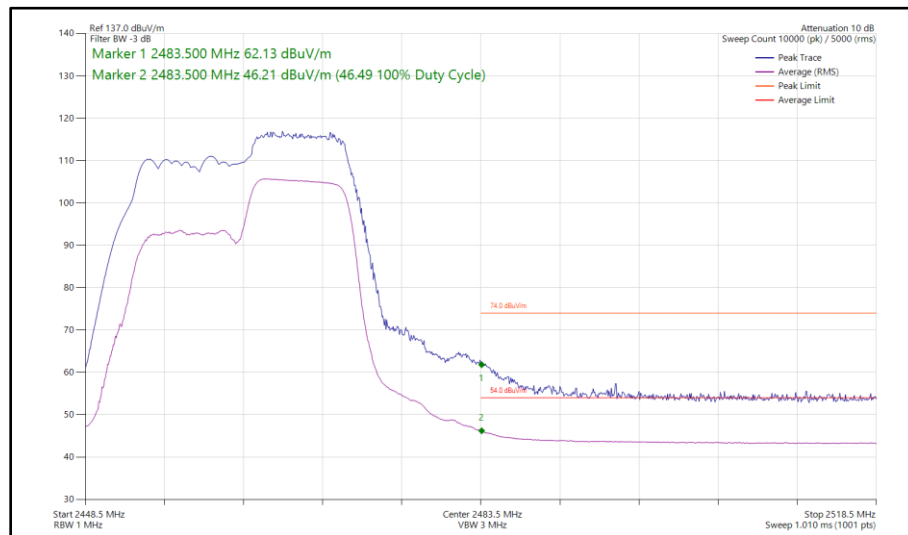
**Figure 13 - 802.11n HT20, SISO, Core 0 - 2467 MHz
Band Edge Frequency 2483.5 MHz**



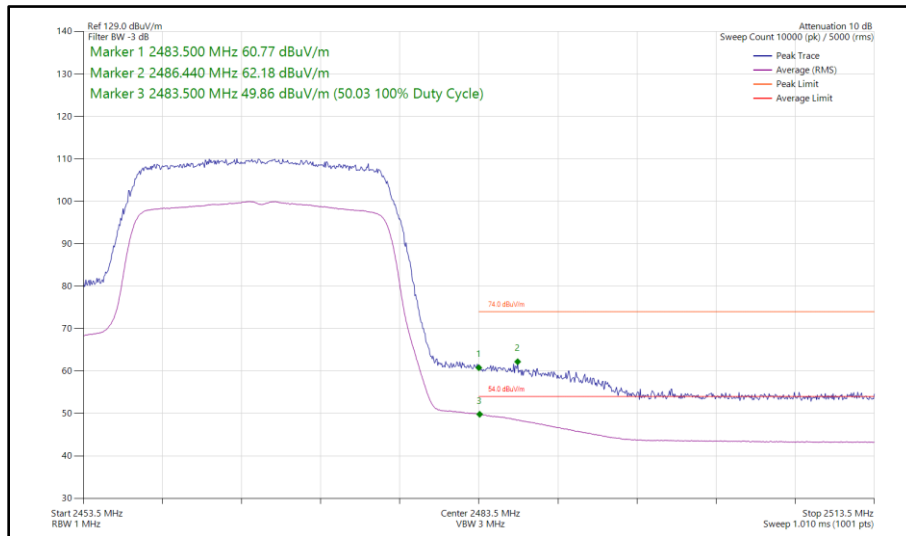
**Figure 14 - 802.11n HT20, SISO, Core 0 - 2472 MHz
Band Edge Frequency 2483.5 MHz**



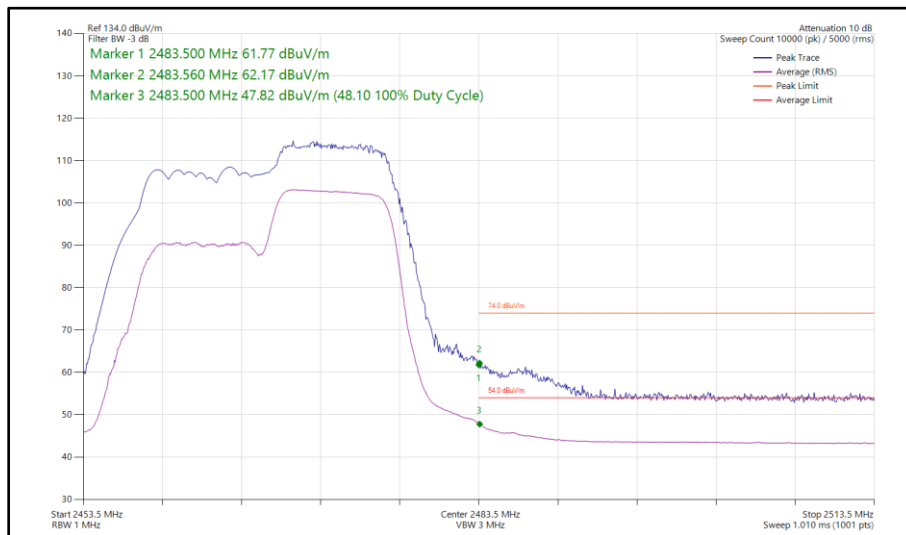
**Figure 15 - 802.11ax HE20, SU, SISO, Core 0 - 2462 MHz
Band Edge Frequency 2483.5 MHz**



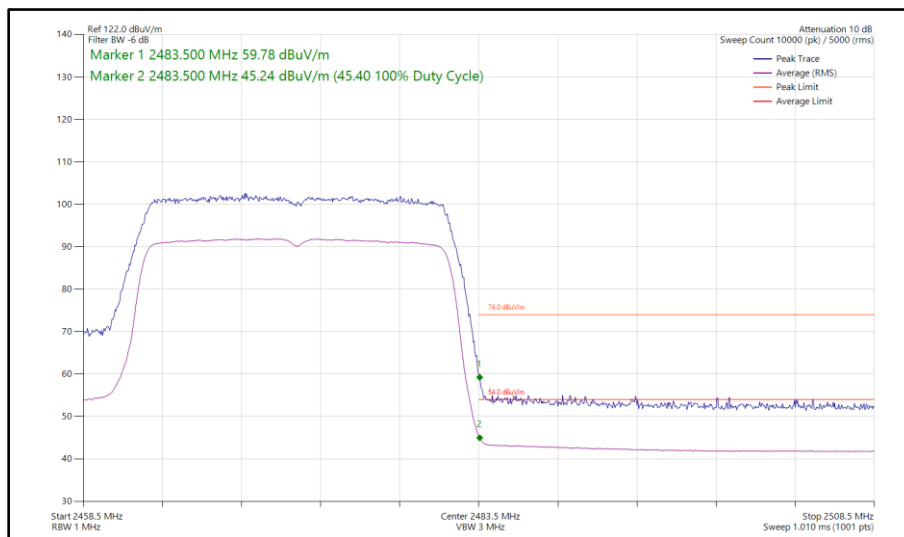
**Figure 16 - 802.11ax HE20, RU 106-54, SISO, Core 0 - 2462 MHz
Band Edge Frequency 2483.5 MHz**



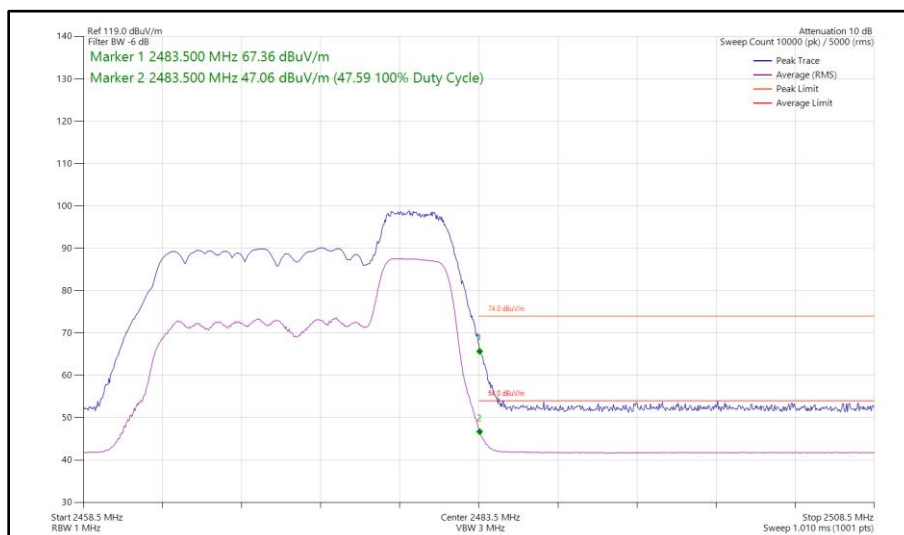
**Figure 17 - 802.11ax HE20, SU, SISO, Core 0 - 2467 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 18 - 802.11ax HE20, RU 106-54, SISO, Core 0 - 2467 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 19 - 802.11ax HE20, SU, SISO, Core 0 - 2472 MHz
Band Edge Frequency 2483.5 MHz**

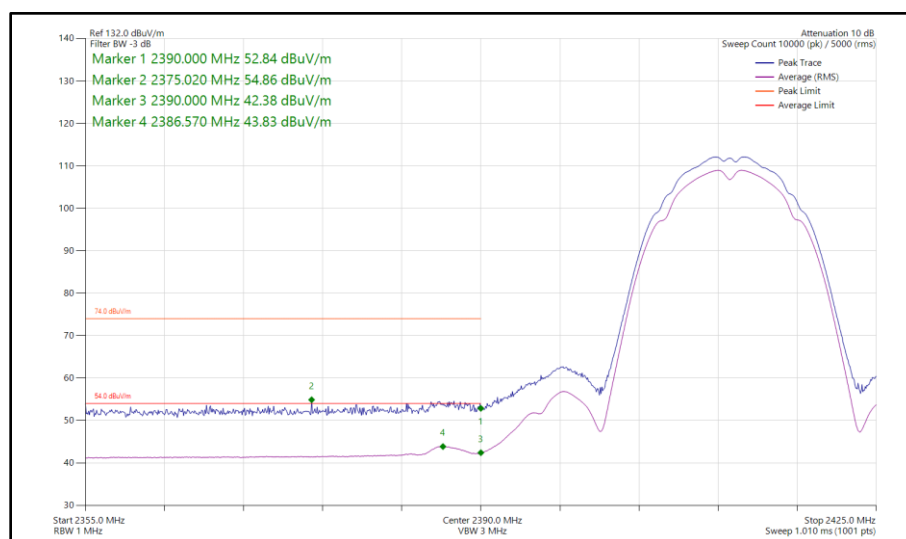


**Figure 20 - 802.11ax HE20, RU 52-40, SISO, Core 0 - 2472 MHz
Band Edge Frequency 2483.5 MHz**

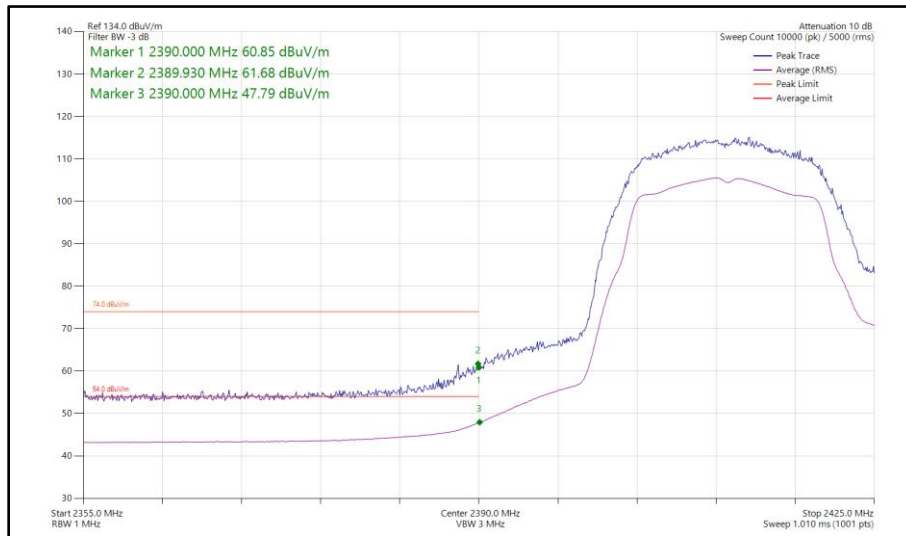
20 MHz Bandwidth - Core 1 (SISO)

Mode	Data Rate/ MCS	Resource Size	Resource Index	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
802.11b	1 Mbps	-	-	2412	2390	54.86	43.83
802.11g	12 Mbps	-	-	2412	2390	61.68	47.79
802.11n HT20	MCS 2	-	-	2412	2390	61.36	48.12
802.11ax HE20	MCS 2x1	SU	-	2412	2390	62.49	48.75
802.11ax HE20	MCS 9x1	106	54	2412	2390	60.86	45.62
802.11b	1 Mbps	-	-	2462	2483.5	56.41	45.33
802.11b	1 Mbps	-	-	2467	2483.5	58.51	48.20
802.11b	1 Mbps	-	-	2472	2483.5	56.32	48.33
802.11g	24 Mbps	-	-	2462	2483.5	63.86	49.18
802.11g	12 Mbps	-	-	2467	2483.5	61.40	49.07
802.11g	12 Mbps	-	-	2472	2483.5	60.30	46.68
802.11n HT20	MCS 4	-	-	2462	2483.5	65.59	49.82
802.11n HT20	MCS 2	-	-	2467	2483.5	59.86	48.12
802.11n HT20	MCS 2	-	-	2472	2483.5	61.38	46.86
802.11ax HE20	MCS 4x1	SU	-	2462	2483.5	65.69	50.15
802.11ax HE20	MCS 9x1	106	54	2462	2483.5	62.89	46.80
802.11ax HE20	MCS 2x1	SU	-	2467	2483.5	60.35	48.05
802.11ax HE20	MCS 9x1	106	54	2467	2483.5	60.38	47.10
802.11ax HE20	MCS 2x1	SU	-	2472	2483.5	59.92	45.42
802.11ax HE20	MCS 9x1	52	40	2472	2483.5	68.34	48.87

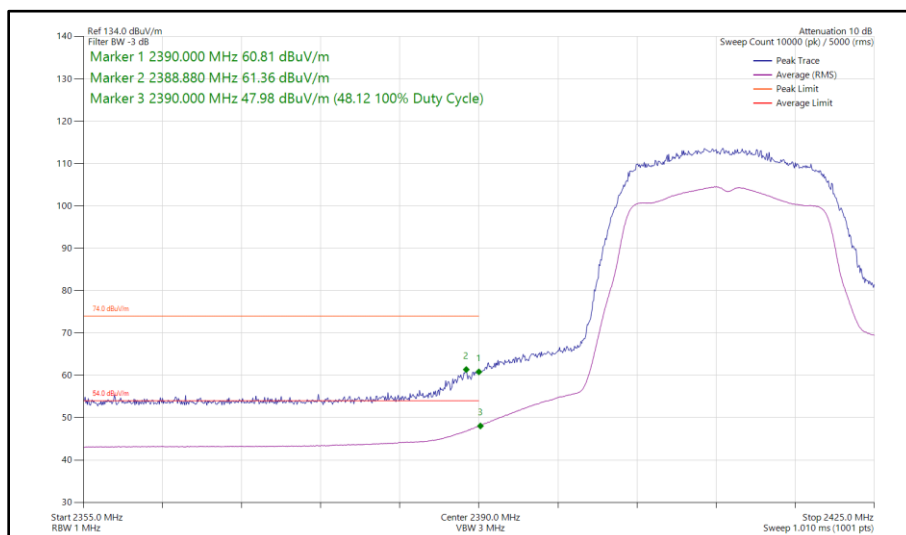
Table 9 - SISO Restricted Band Edge Results



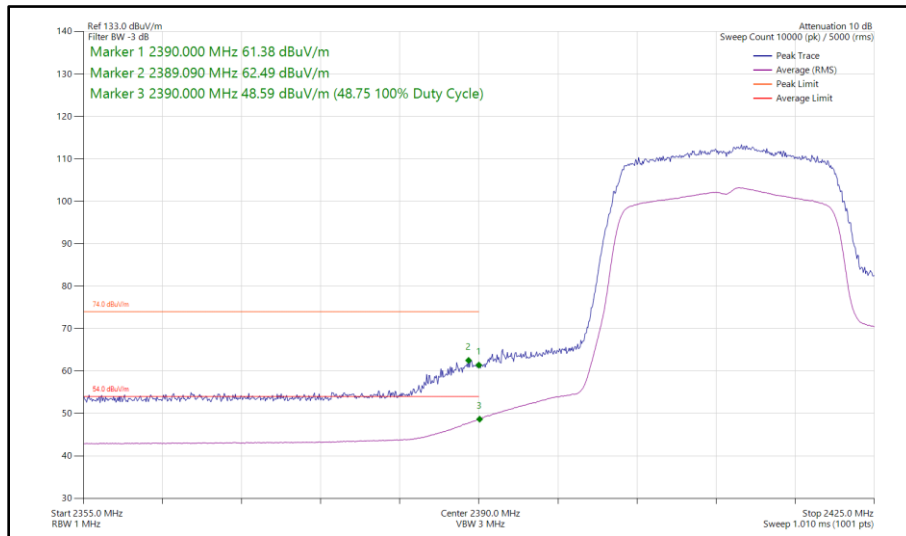
**Figure 21 - 802.11b, SISO, Core 1 - 2412 MHz
Band Edge Frequency 2390 MHz**



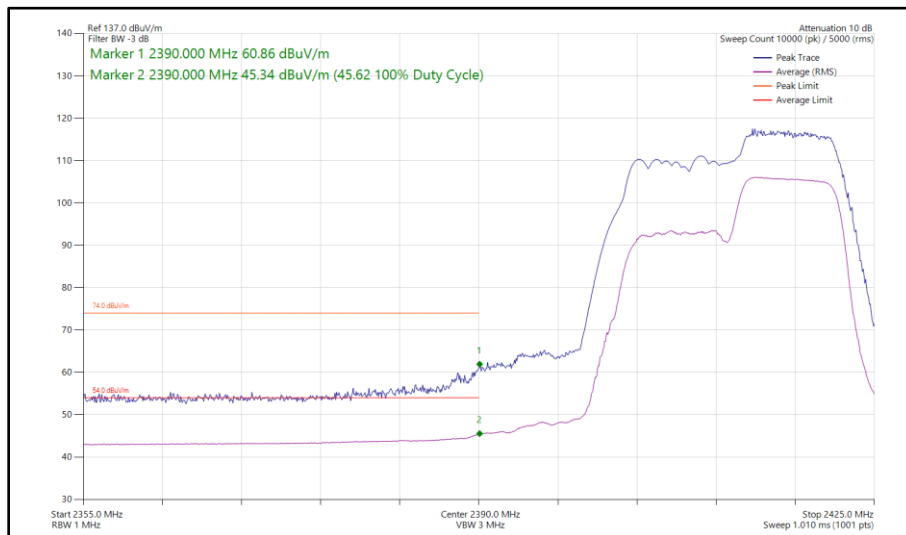
**Figure 22 - 802.11g, SISO, Core 1 - 2412 MHz
Band Edge Frequency 2390 MHz**



**Figure 23 - 802.11n HT20, SISO, Core 1 - 2412 MHz
Band Edge Frequency 2390 MHz**



**Figure 24 - 802.11ax HE20, SU, SISO, Core 1 - 2412 MHz
Band Edge Frequency 2390 MHz**



**Figure 25 - 802.11ax HE20, RU 106-54, SISO, Core 1 - 2412 MHz
Band Edge Frequency 2390 MHz**

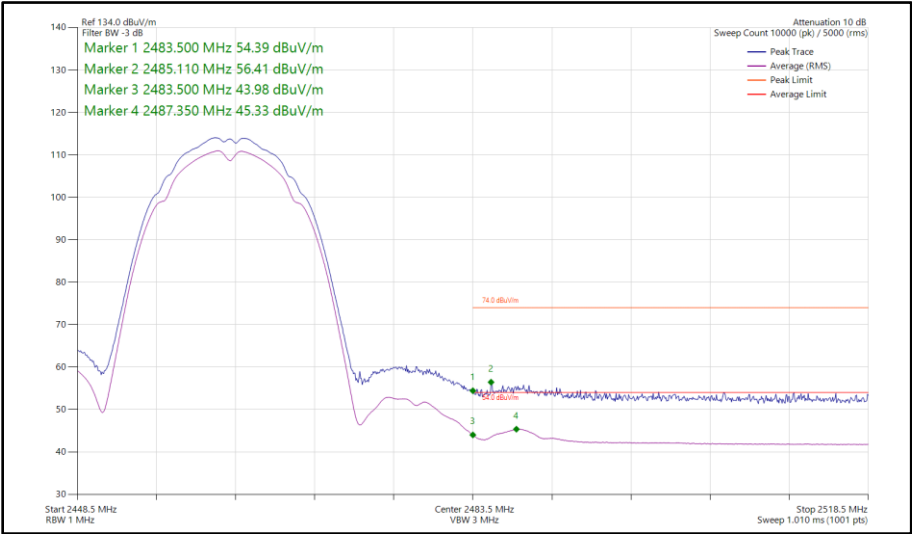


Figure 26 - 802.11b, SISO, Core 1 - 2462 MHz
Band Edge Frequency 2483.5 MHz

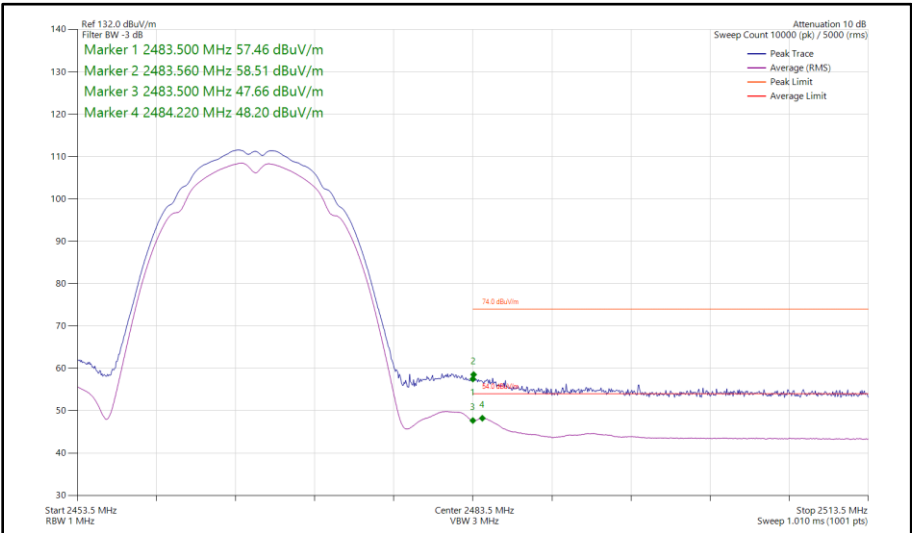
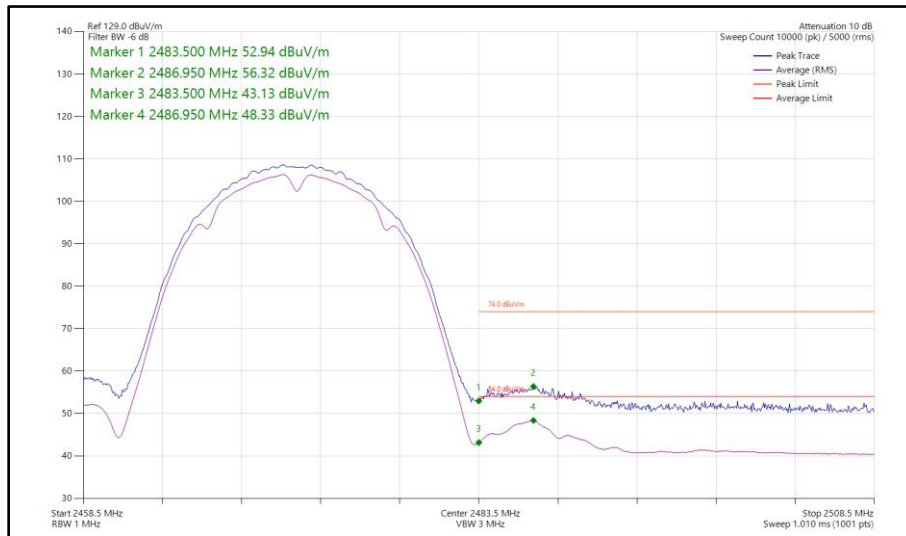
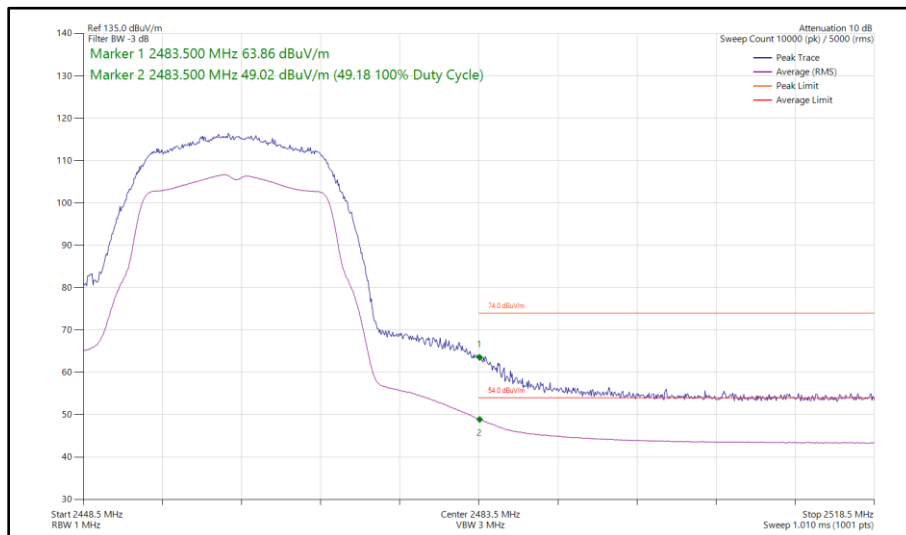


Figure 27 - 802.11b, SISO, Core 1 - 2467 MHz
Band Edge Frequency 2483.5 MHz



**Figure 28 - 802.11b, SISO, Core 1 - 2472 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 29 - 802.11g, SISO, Core 1 - 2462 MHz
Band Edge Frequency 2483.5 MHz**

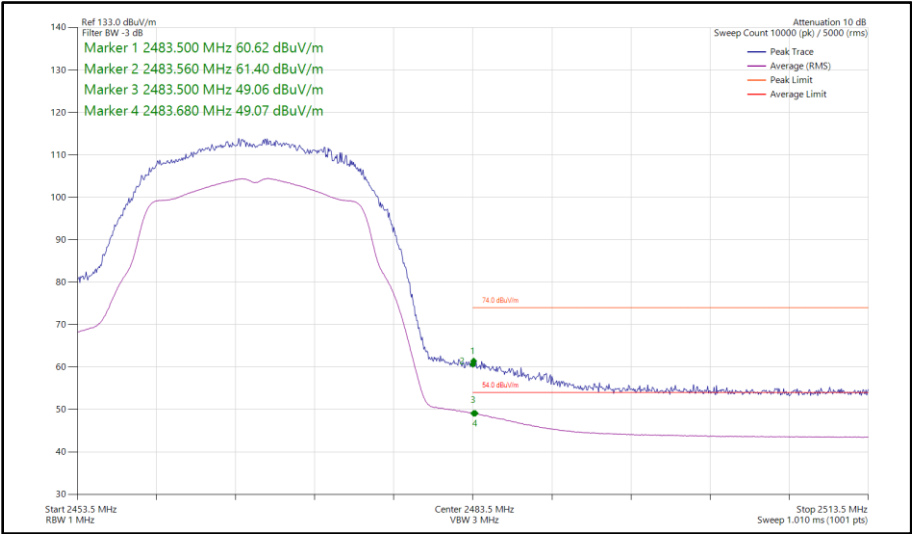


Figure 30 - 802.11g, SISO, Core 1 - 2467 MHz
Band Edge Frequency 2483.5 MHz

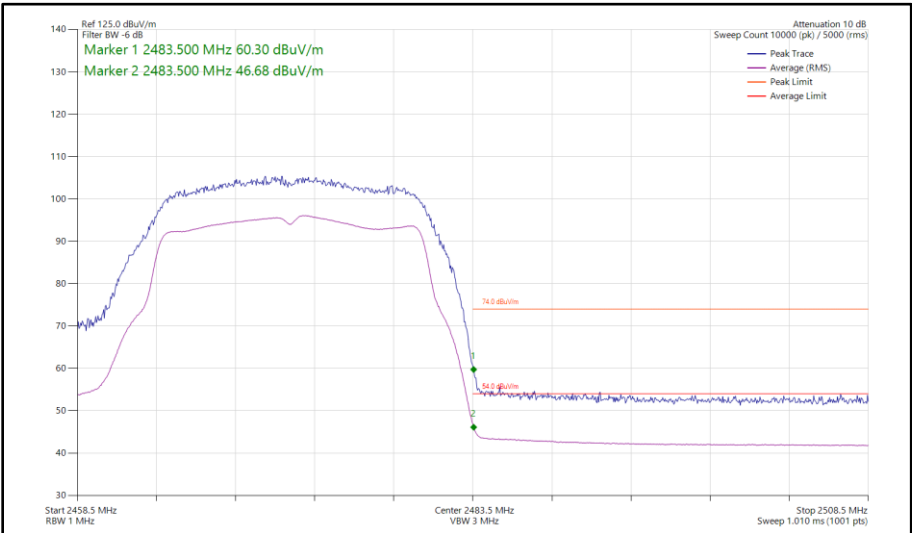


Figure 31 - 802.11g, SISO, Core 1 - 2472 MHz
Band Edge Frequency 2483.5 MHz

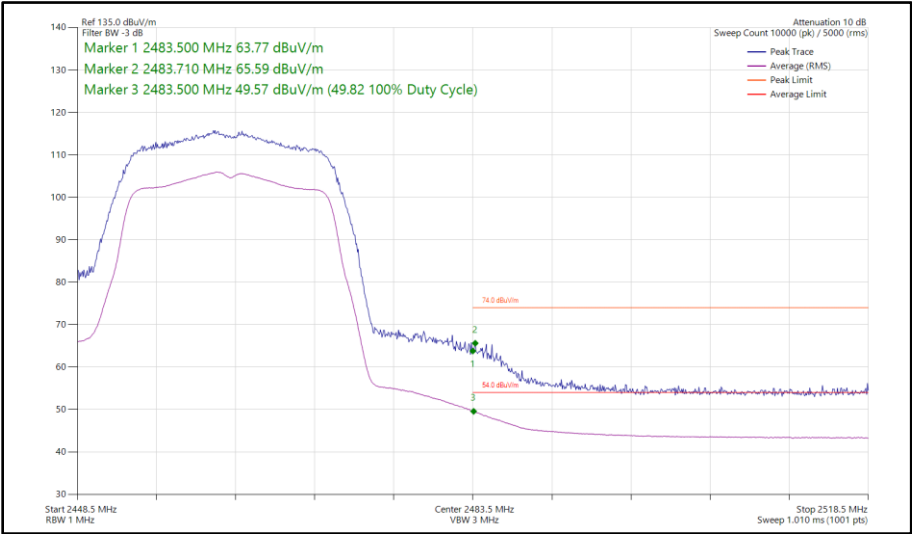


Figure 32 - 802.11n HT20, SISO, Core 1 - 2462 MHz
Band Edge Frequency 2483.5 MHz

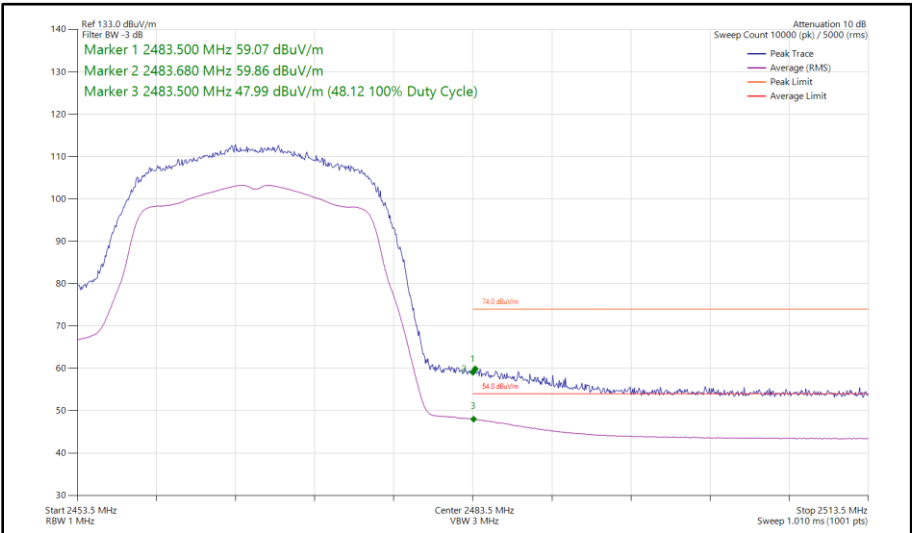
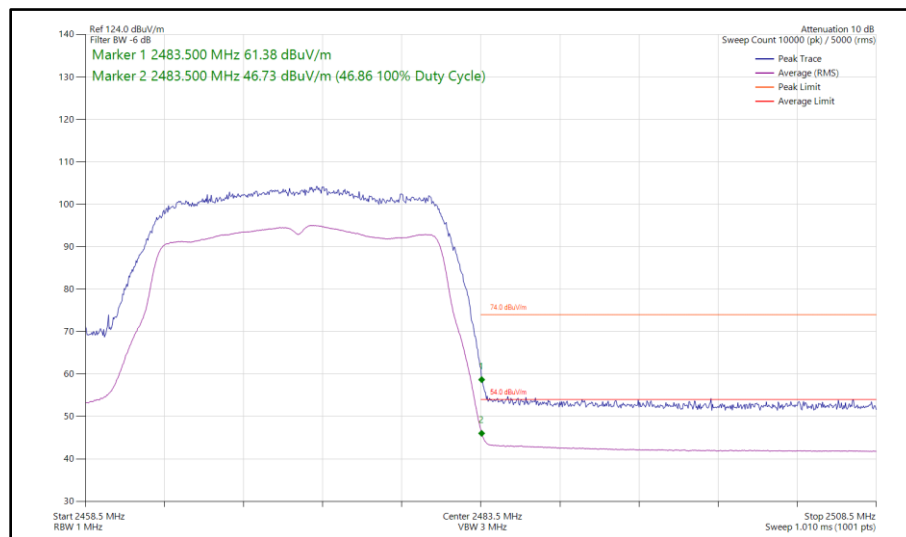
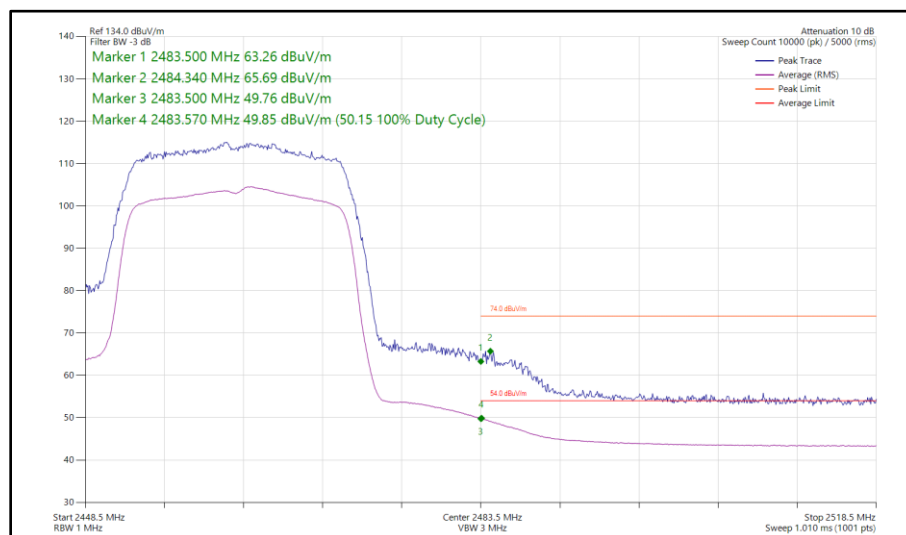


Figure 33 - 802.11n HT20, SISO, Core 1 - 2467 MHz
Band Edge Frequency 2483.5 MHz



**Figure 34 - 802.11n HT20, SISO, Core 1 - 2472 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 35 - 802.11ax HE20, SU, SISO, Core 1 - 2462 MHz
Band Edge Frequency 2483.5 MHz**

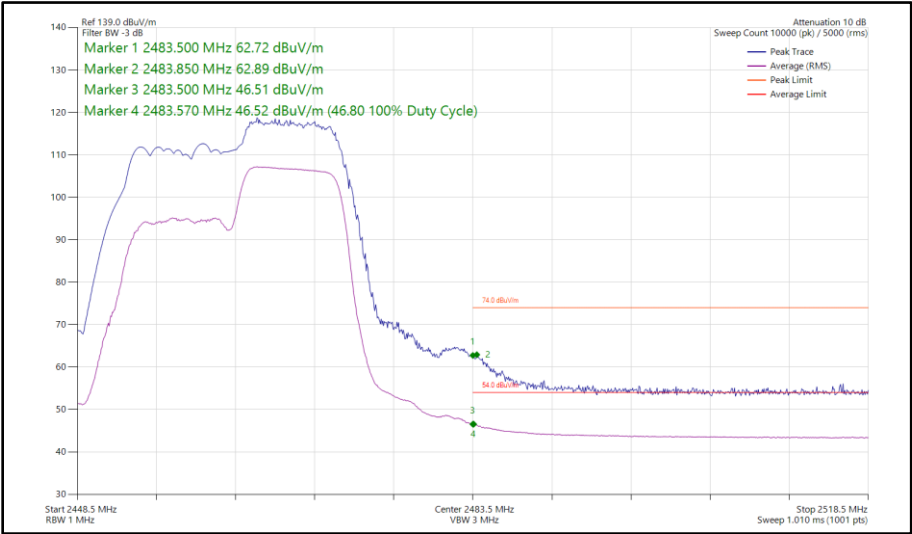


Figure 36 - 802.11ax HE20, RU 106-54, SISO, Core 1 - 2462 MHz
Band Edge Frequency 2483.5 MHz

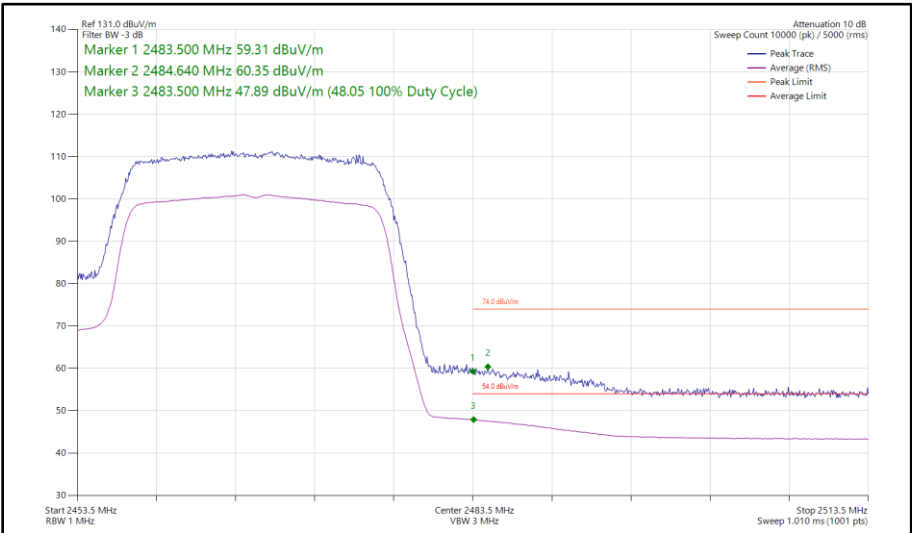
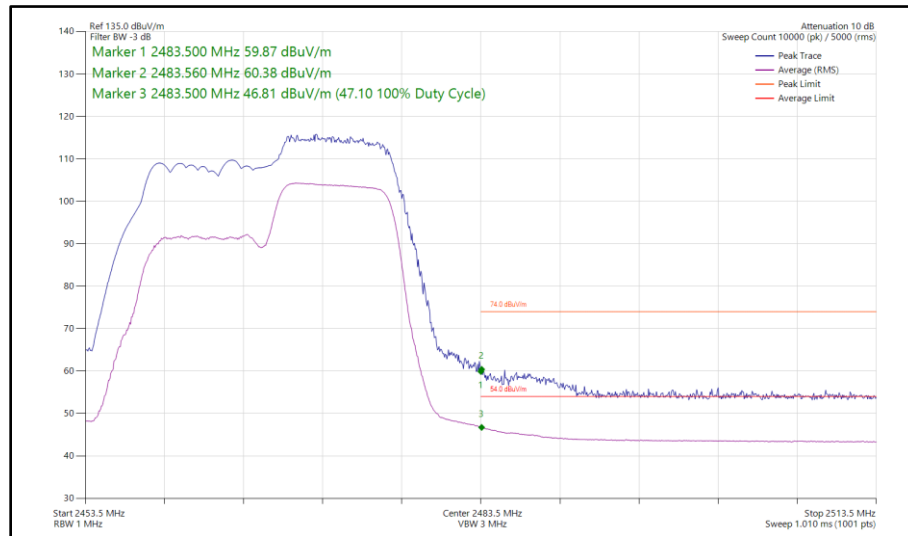
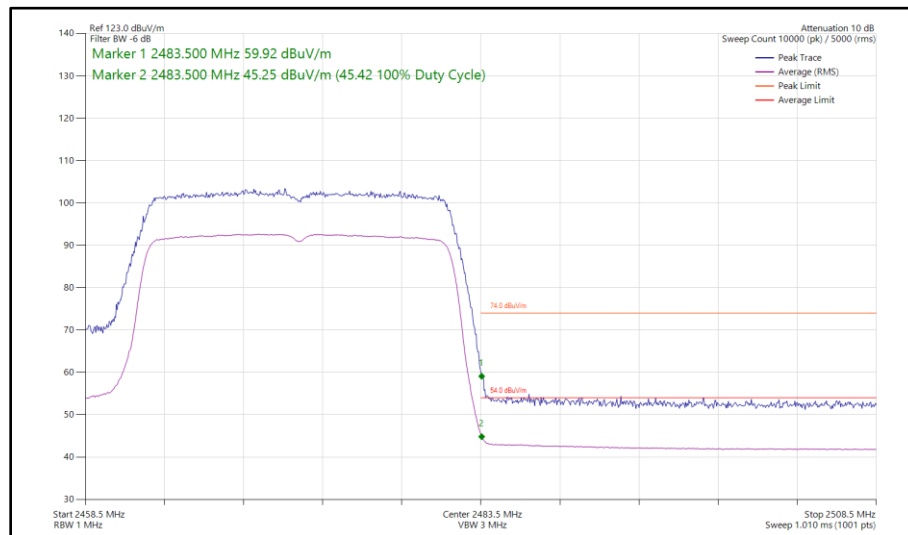


Figure 37 - 802.11ax HE20, SU, SISO, Core 1 - 2467 MHz
Band Edge Frequency 2483.5 MHz



**Figure 38 - 802.11ax HE20, RU 106-54, SISO, Core 1 - 2467 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 39 - 802.11ax HE20, SU, SISO, Core 1 - 2472 MHz
Band Edge Frequency 2483.5 MHz**

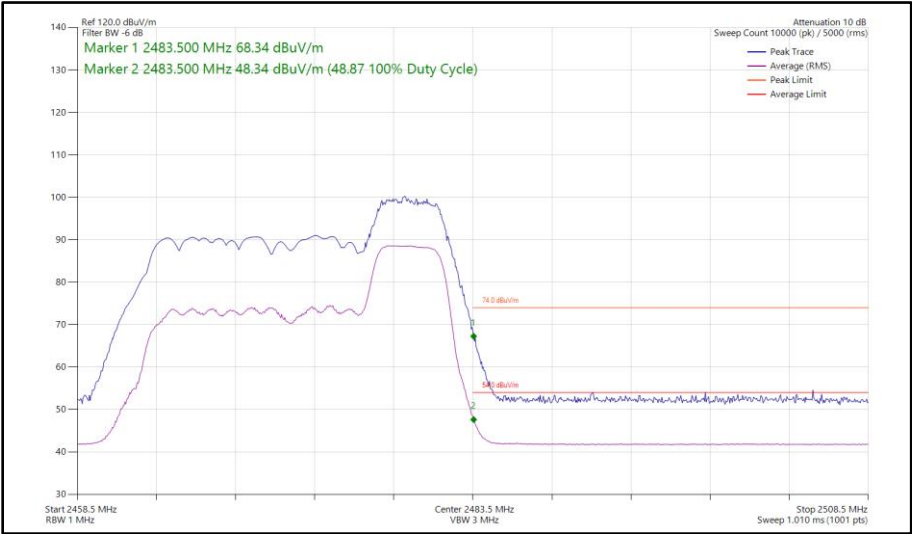
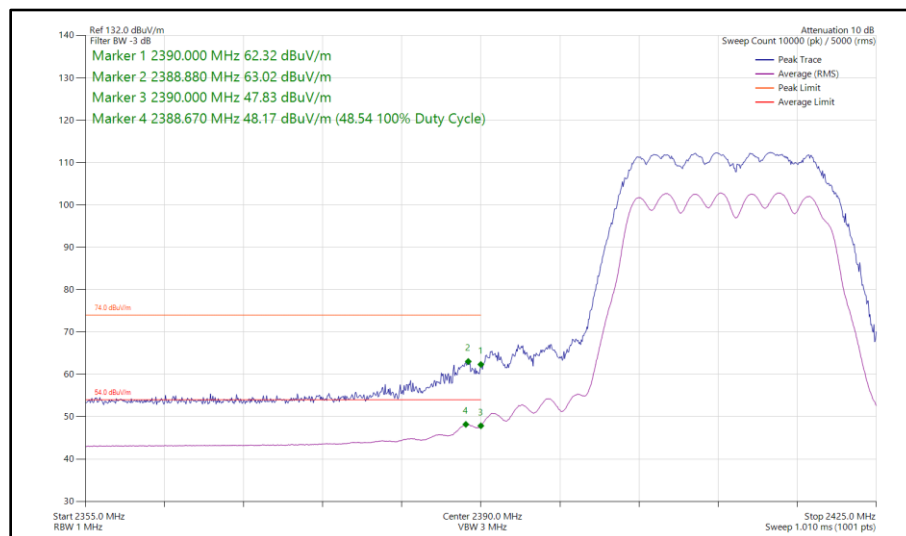


Figure 40 - 802.11ax HE20, RU 52-40, SISO, Core 1 - 2472 MHz
Band Edge Frequency 2483.5 MHz

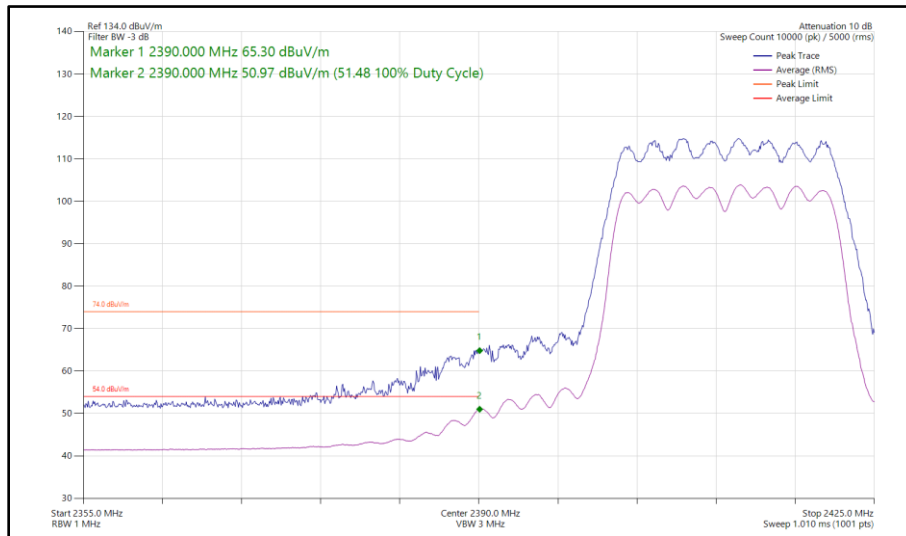
20 MHz Bandwidth - Core 0 - Core 1 (CDD)

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	-	-	2412	2390	63.02	48.54
802.11ax HE20	MCS 9x1	SU	-	2412	2390	65.30	51.48
802.11ax HE20	MCS 9x1	106	53	2412	2390	62.77	46.98
802.11n HT20	MCS 4	-	-	2462	2483.5	63.02	48.96
802.11n HT20	MCS 2	-	-	2467	2483.5	61.03	49.39
802.11n HT20	MCS 4	-	-	2472	2483.5	63.20	48.63
802.11ax HE20	MCS 9x1	SU	-	2462	2483.5	66.95	51.21
802.11ax HE20	MCS 9x1	106	54	2462	2483.5	64.92	48.55
802.11ax HE20	MCS 4x1	SU	-	2467	2483.5	63.08	49.81
802.11ax HE20	MCS 9x1	52	40	2467	2483.5	65.95	48.72
802.11ax HE20	MCS 4x1	SU	-	2472	2483.5	62.88	46.69
802.11ax HE20	MCS 9x1	106	54	2472	2483.5	68.16	46.93

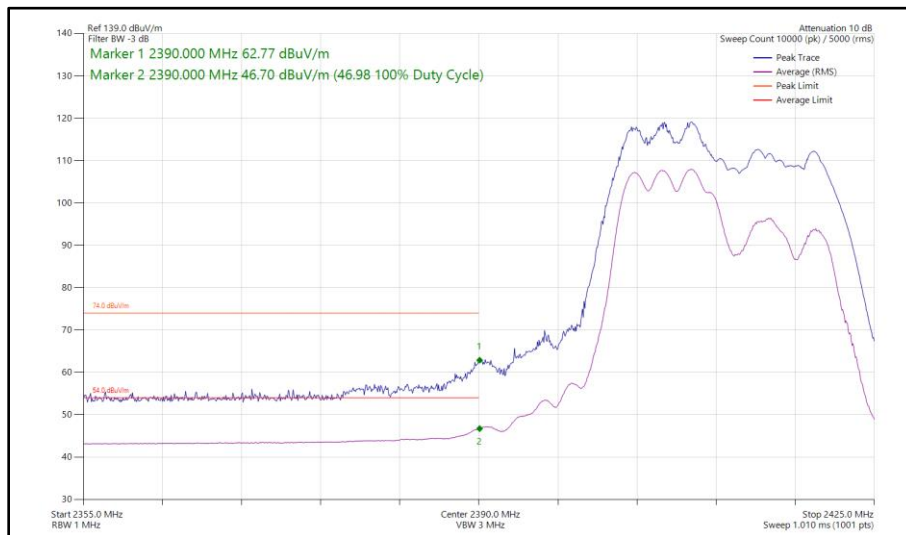
Table 10 - CDD Restricted Band Edge Results



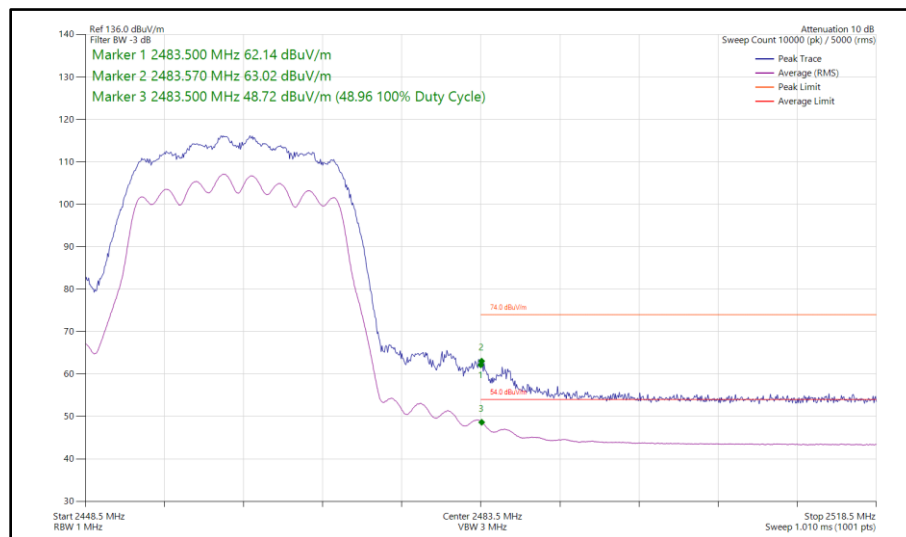
**Figure 41 - 802.11n HT20, CDD, Core 0 - Core 1 - 2412 MHz
Band Edge Frequency 2390 MHz**



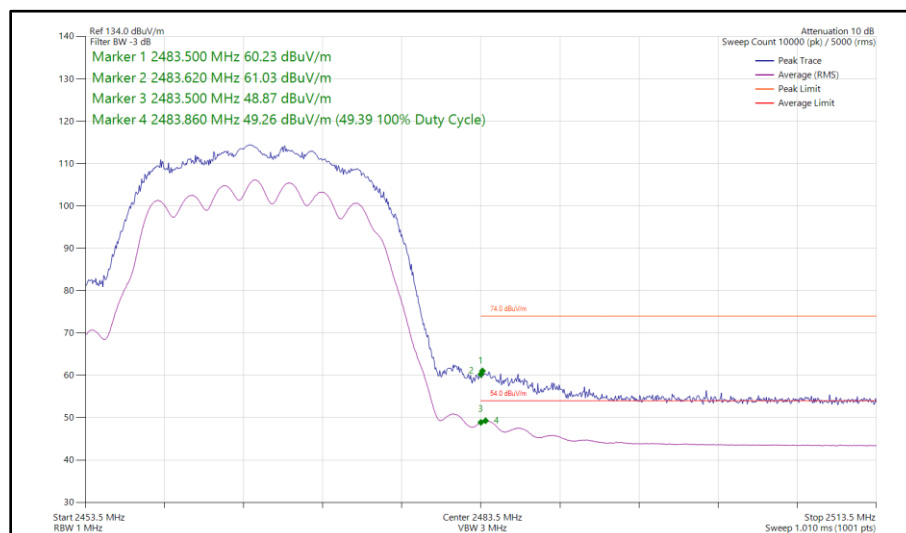
**Figure 42 - 802.11ax HE20, SU, CDD, Core 0 - Core 1 - 2412 MHz
Band Edge Frequency 2390 MHz**



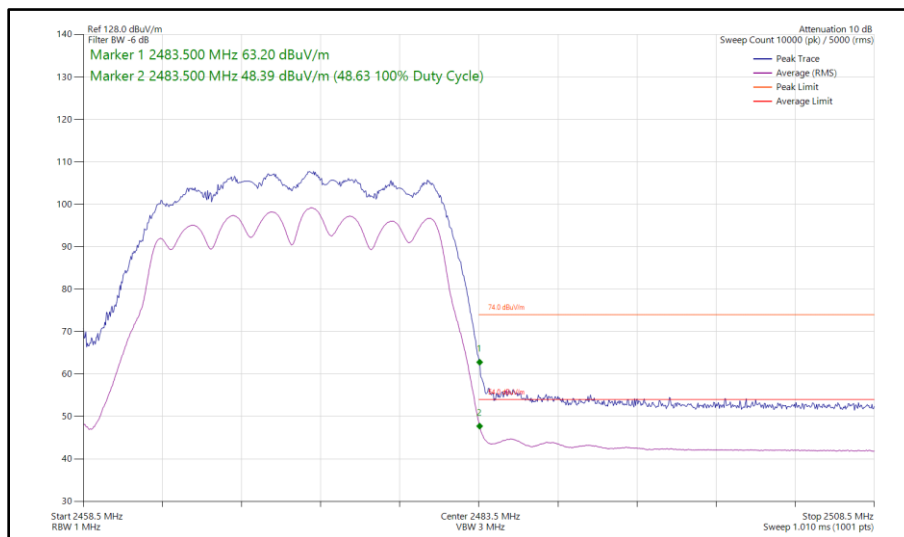
**Figure 43 - 802.11ax HE20, RU 106-53, CDD, Core 0 - Core 1 - 2412 MHz
Band Edge Frequency 2390 MHz**



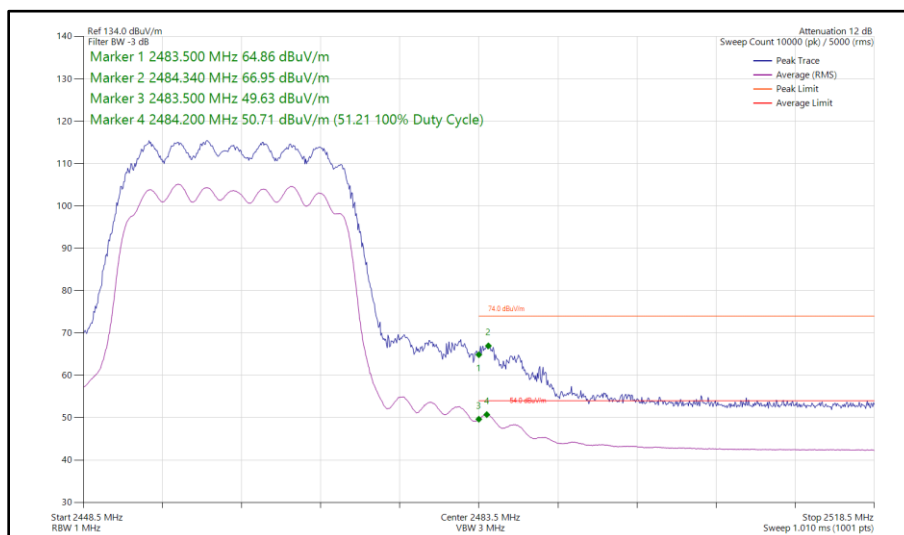
**Figure 44 - 802.11n HT20, CDD, Core 0 - Core 1 - 2462 MHz
Band Edge Frequency 2483.5 MHz**



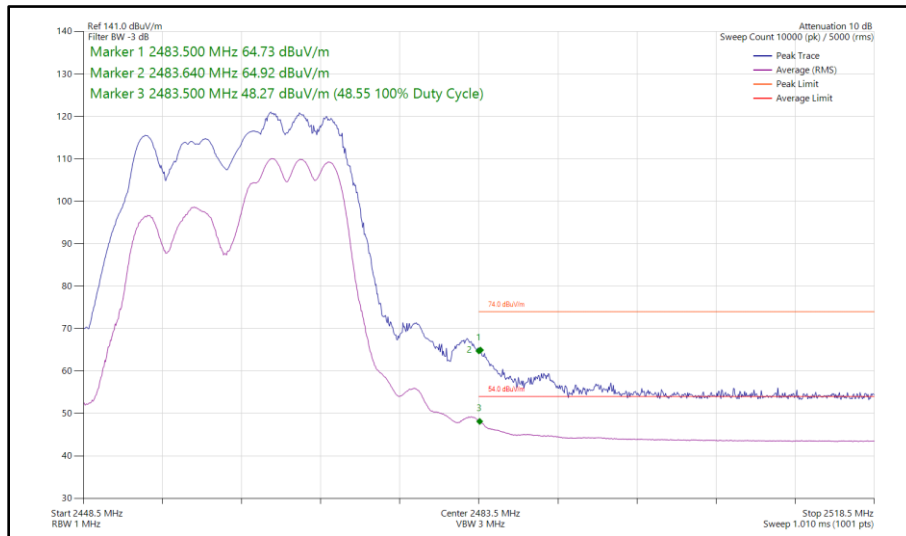
**Figure 45 - 802.11n HT20, CDD, Core 0 - Core 1 - 2467 MHz
Band Edge Frequency 2483.5 MHz**



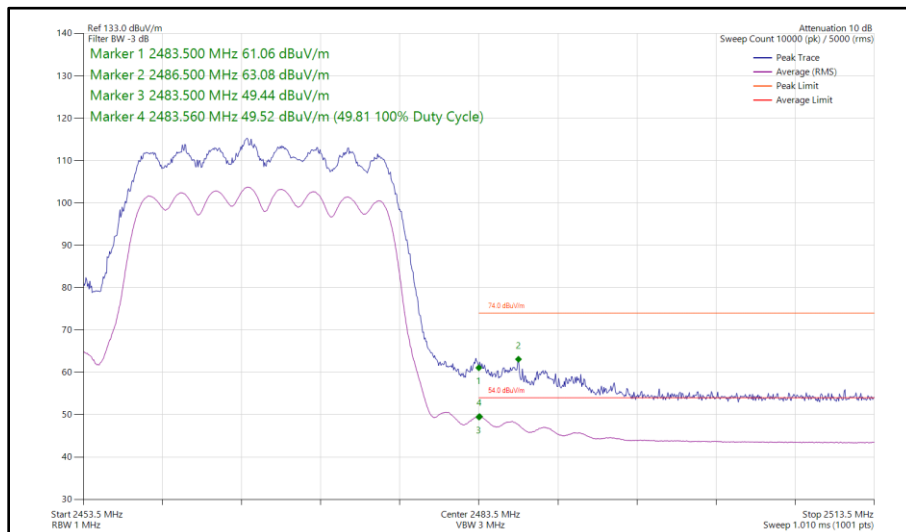
**Figure 46 - 802.11n HT20, CDD, Core 0 - Core 1 - 2472 MHz
Band Edge Frequency 2483.5 MHz**



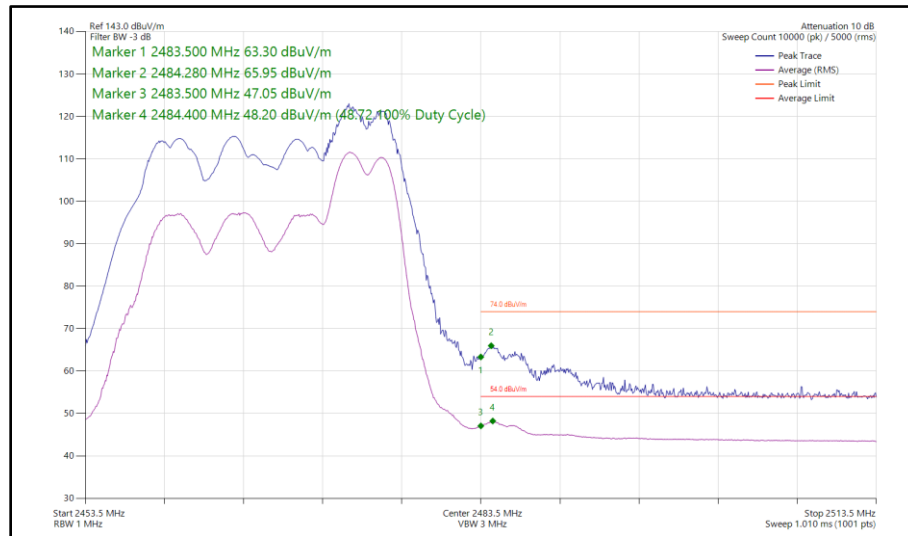
**Figure 47 - 802.11ax HE20, SU, CDD, Core 0 - Core 1 - 2462 MHz
Band Edge Frequency 2483.5 MHz**



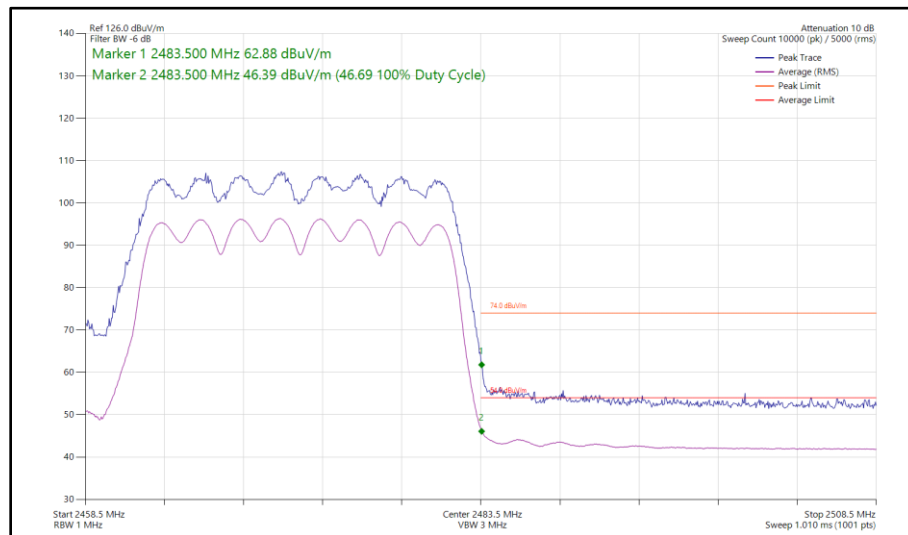
**Figure 48 - 802.11ax HE20, RU 106-54, CDD, Core 0 - Core 1 - 2462 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 49 - 802.11ax HE20, SU, CDD, Core 0 - Core 1 - 2467 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 50 - 802.11ax HE20, RU 52-40, CDD, Core 0 - Core 1 - 2467 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 51 - 802.11ax HE20, SU, CDD, Core 0 - Core 1 - 2472 MHz
Band Edge Frequency 2483.5 MHz**

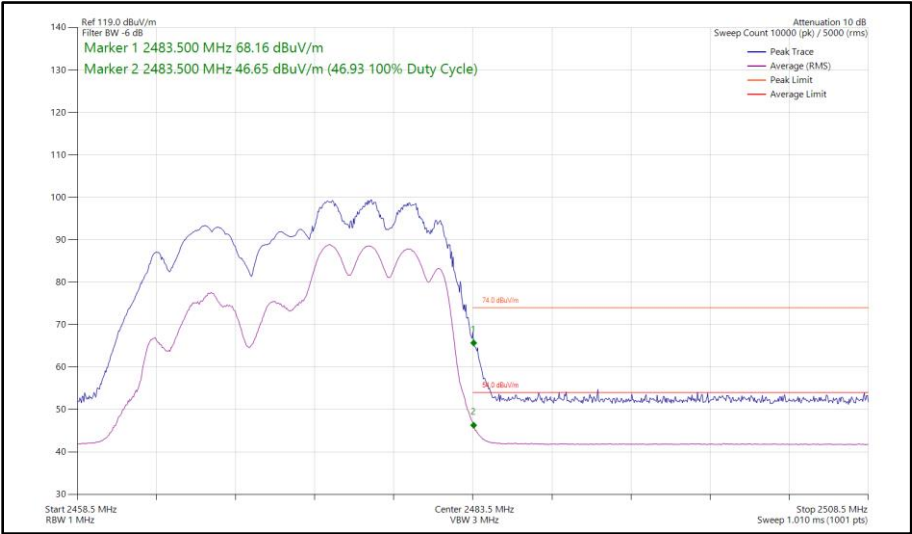


Figure 52 - 802.11ax HE20, RU 106-54, CDD, Core 0 - Core 1 - 2472 MHz
Band Edge Frequency 2483.5 MHz

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 11



2.1.7 Test Location and Test Equipment Used

This test was carried out in RF Chamber 17.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Expiry Date
1500W (300V 12A) AC Power Supply	iTech	IT7324	5957	-	O/P Mon
Emissions Software	TUV SUD	EmX V3.4.2	5125	-	Software
Test Receiver	Rohde & Schwarz	ESW44	5379	12	12-Dec-2024
SAC Switch Unit	TUV SUD	TUV_SSU_001	6144	12	11-Dec-2024
Digital Multimeter	Fluke	115	6146	12	06-Jun-2025
Cable (SMA to SMA 1m)	Junkosha	MWX221-01000AMSAMS/A	6315	12	04-Feb-2025
Humidity and Temperature Meter	R.S Components	1364	6346	12	06-Mar-2025
Horn Antenna (1–8 GHz)	Schwarzbeck	BBHA 9120 B	6457	12	05-May-2025
AC Power Supply	iTech	IT7324	6657	-	O/P Mon
3m Semi-Anechoic Chamber	Albatross Projects	RF Chamber 17	6658	36	28-Jan-2026
Mast and Turntable Controller	Maturo Gmbh	FCU3.0	6659	-	TU
Tilt Antenna Mast	Maturo Gmbh	BAM4.5-P	6660	-	TU
Turntable	Maturo Gmbh	TT1.5SI	6661	-	TU
1m Cable	Junkosha	MWX241-01000AMSAMS/B	6740	12	01-Feb-2025
8m Cable	Junkosha	MWX221-08000AMSAMS/B	6748	12	01-Feb-2025

Table 12

TU - Traceability Unscheduled

O/P Mon - Output Monitored using calibrated equipment



2.2 Emission Bandwidth

2.2.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (a)(2)

2.2.2 Equipment Under Test and Modification State

A3403, S/N: M7J9X1XPGD - Modification State 0

2.2.3 Date of Test

24-September-2024

2.2.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.8.1 for 6 dB BW and 6.9.3 for 99% occupied bandwidth measurements.

2.2.5 Environmental Conditions

Ambient Temperature	22.7 °C
Relative Humidity	59.0 %



2.2.6 Test Results

2.4 GHz WLAN

SISO

Protocol	6 dB Bandwidth (MHz)	
	Minimum	Maximum
802.11b	8.640	9.120
802.11g	15.300	16.200
802.11n HT20	15.300	17.700
802.11ax HE20 SU	18.720	19.080

Table 13 - 6 dB Bandwidth Summary Results - SISO

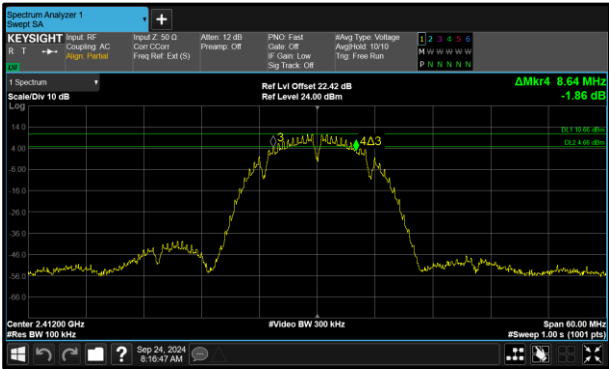


Figure 53 - 802.11b Minimum 6 dB EBW

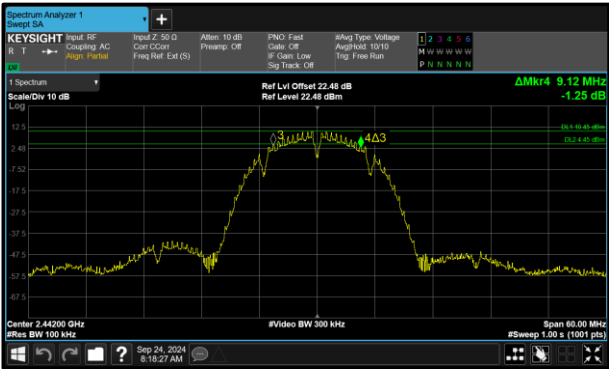


Figure 54 - 802.11b Maximum 6 dB EBW

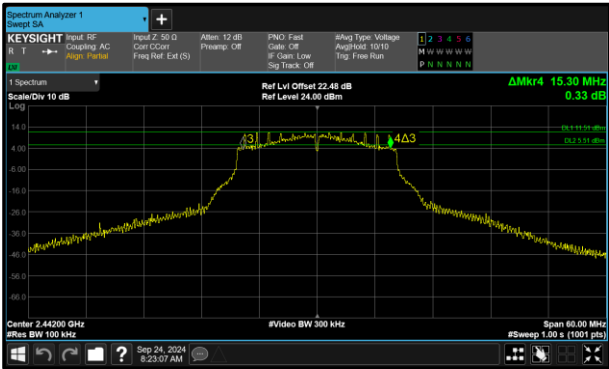


Figure 55 - 802.11g Minimum 6 dB EBW

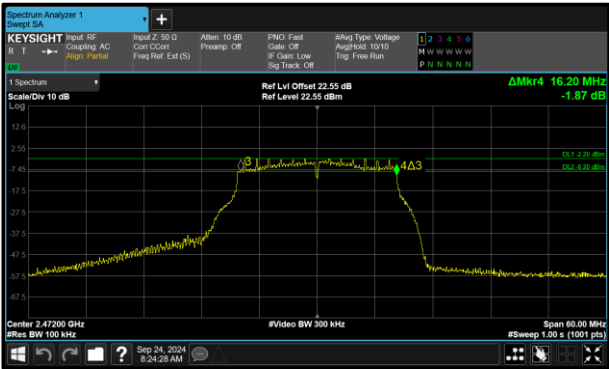


Figure 56 - 802.11g Maximum 6 dB EBW

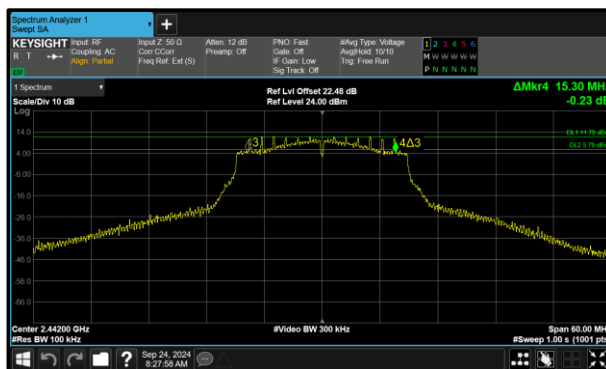


Figure 57 - 802.11n HT20 Minimum 6 dB EBW

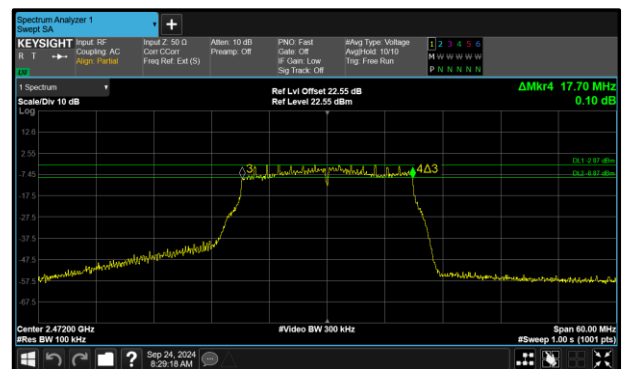


Figure 58 - 802.11n HT20 Maximum 6 dB EBW

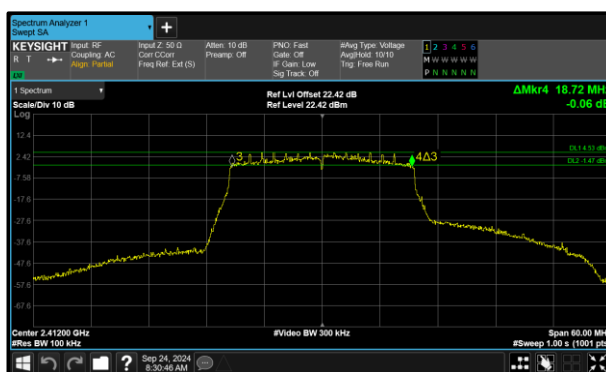


Figure 59 - 802.11ax HE20 SU Minimum 6 dB
EBW



Figure 60 - 802.11ax HE20 SU Maximum 6 dB
EBW



Protocol	99% Bandwidth (MHz)	
	Minimum	Maximum
802.11b	12.900	12.960
802.11g	16.380	16.620
802.11n HT20	17.580	17.700
802.11ax HE20 SU	18.900	18.960

Table 14 - 99% Bandwidth Summary Results - SISO

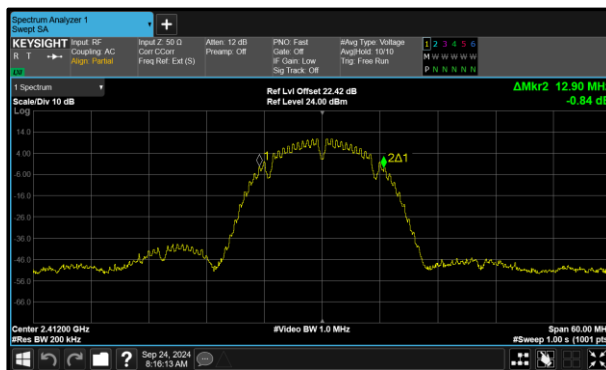


Figure 61 - 802.11b Minimum 99% OBW

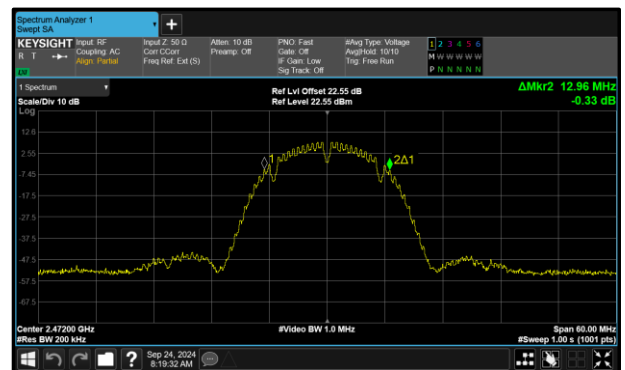


Figure 62 - 802.11b Maximum 99% OBW

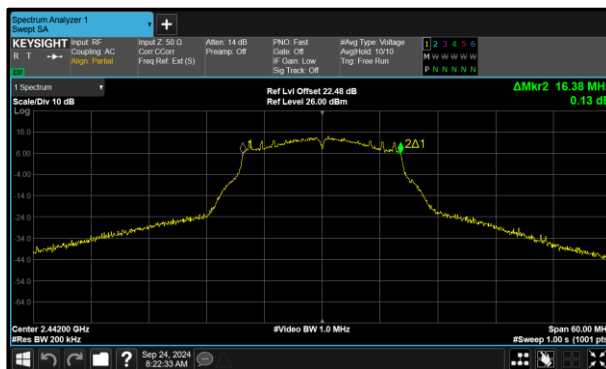


Figure 63 - 802.11g Minimum 99% OBW

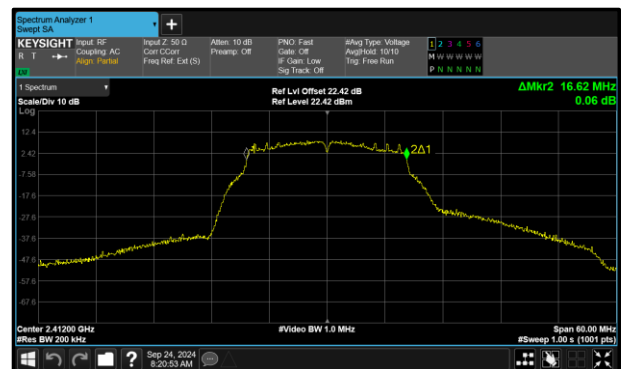


Figure 64 - 802.11g Maximum 99% OBW

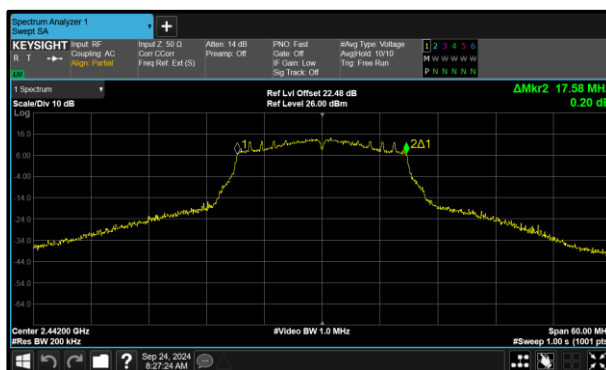


Figure 65 - 802.11n HT20 Minimum 99% OBW

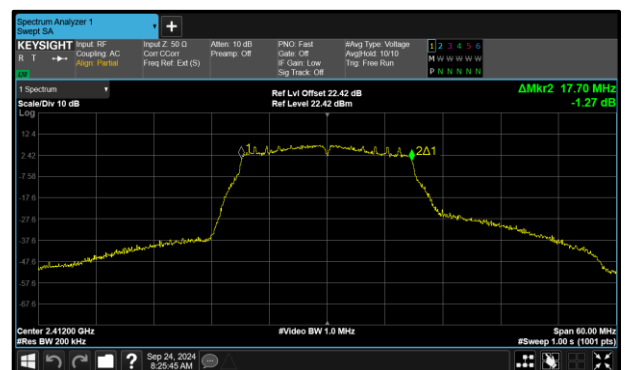


Figure 66 - 802.11n HT20 Maximum 99% OBW

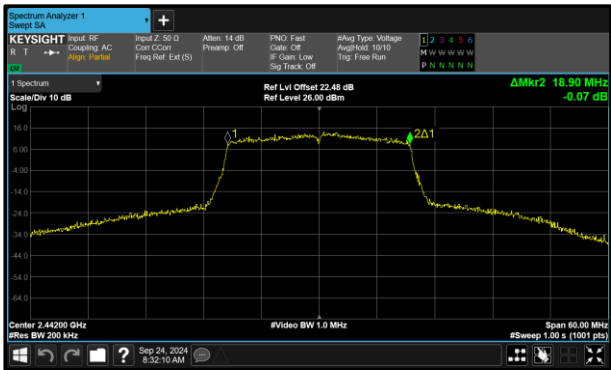


Figure 67 - 802.11ax HE20 SU Minimum 99% OBW

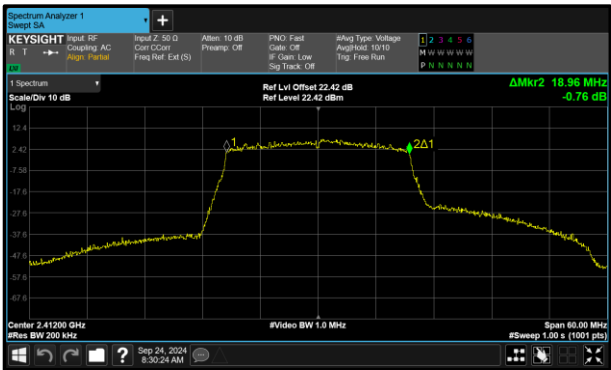


Figure 68 - 802.11ax HE20 SU Maximum 99% OBW



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (a)(2)	Test Method(s):	C63.10 6.9.3 C63.10 11.8.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11b	Duty Cycle (%):	-
Data Rate:	1 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	6 dB Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
2412	-	8.640	-	-	≥500.0
2442	-	9.120	-	-	≥500.0
2472	-	9.120	-	-	≥500.0

Table 15 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
2412	-	12.900	-	-	-
2442	-	12.900	-	-	-
2472	-	12.960	-	-	-

Table 16 - 99% Bandwidth Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (a)(2)	Test Method(s):	C63.10 6.9.3 C63.10 11.8.1
Additional Reference(s):	-		

DUT Configuration			
Mode:	802.11g	Duty Cycle (%):	-
Data Rate:	12 Mbps	DCCF (dB):	-
Antenna Configuration:	SISO	Peak Antenna Gain (dBi):	-
Active Port(s):	B (Core 1)	Active Chain(s):	1

Test Frequency (MHz)	6 dB Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
2412	-	15.840	-	-	≥500.0
2442	-	15.300	-	-	≥500.0
2472	-	16.200	-	-	≥500.0

Table 17 - 6 dB Bandwidth Results

Test Frequency (MHz)	99% Bandwidth (MHz)				Limit (kHz)
	A	B	C	D	
2412	-	16.620	-	-	-
2442	-	16.380	-	-	-
2472	-	16.560	-	-	-

Table 18 - 99% Bandwidth Results