



RF Test Report

Standard(s): FCC Part 15 Subpart 15.247,
RSS-247 Issue 3:2023
Unlicensed Intentional Radiators

Issued To: Generac Power System Inc
S45 W29290 Hwy. 59
Waukesha, Wisconsin 53189
United States

Product Name: Generac PWRcell 2 Gateway
Model: APCBPGN2101
FCC ID: VDEAPCBPGN2101
IC: 8036A-APCBPGN2101

Report No. ML301418-RF01
Date of Issue: February 14, 2025

Report Prepared By:

Reviewed By:

A handwritten signature in black ink, appearing to read "Min Xie".

Min Xie, Sr. EMC/RF Project Engineer

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Amir Emami, Project Engineer

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TRRF_FCC-ICES-247-DTS_v1

Table of Contents

1.	Revision History	3
2.	Summary of Test Results.....	4
2.1	Test Verdict.....	4
2.2	Test Standards	5
2.3	Test Facility	6
3.	General Information	9
3.1	Client Information	9
3.2	Device Under Test (DUT)	9
3.3	Test Setup of DUT	10
3.4	Modifications for Compliance	10
4.	Test Results	11
4.1	Emission Bandwidth	11
4.2	Maximum Conducted Output Power	20
4.3	Power Spectral Density.....	28
4.4	Spurious Antenna Conducted Emissions	36
4.5	Transmitter Spurious Radiated Emissions	46
4.6	Lower and Upper Band Edges.....	58

1. Revision History

Project No. & Revision	Report Date	Initials	Description
ML301418-RF00	January 31, 2025	MX	Initial Release
ML301418-RF01	February 14, 2025	MX	Updated Product name.

NOTE:

- Latest reports marked as a revision replace any previous report and/or report revision issued under the same project number.

2. Summary of Test Results

2.1 Test Verdict

Unless otherwise stated, the test data and results in this test report relate only to the sample(s) tested.

Requirement		Test Type	Result	Remark
FCC	ISED			
15.203 15.247(b)(4)	RSS-247 5.4(d)	Antenna Gain and Requirement	Pass	Isolated Magnetic Dipole 3.3 dBi
15.247(a)(2)	RSS-247 5.2(a)	Emission Bandwidth	Pass	6dB Bandwidth > 500kHz
15.247(b)(3)	RSS-247 5.4(d)	Average Conducted Output Power	Pass	< 1 Watt
15.247(d)	RSS-247 5.5	Spurious Out of Band Emissions	Pass	< 30dBc
15.247(d) 15.209	RSS-GEN 8.9 (Table 5 & 6)	Transmitter Spurious Radiated Emissions	Pass	---
15.205 15.209	RSS-GEN 8.10 (Table 7)	Lower and Upper Band Edges	Pass	Transmitter spurious radiated emissions which fall in the restricted bands
15.247(e)	RSS-247 5.2(b)	Power Spectral Density	Pass	< 8 dBm in 3kHz BW
15.207	RSS-GEN (Table 4)	Power Line Conducted Emissions	N/A	Device is DC powered and is not sold with AC/DC power supply.

2.1.1 Test Verdict Notes and Justifications

The DUT was mounted as in normal usage. See the Test Setup Photos for details.

Antenna details obtained from Antenna Manufacturer's Datasheet.

2.2 Test Standards

Standard	Description
47 CFR FCC Part 15 Subpart C	Code of Federal Regulations – Radio Frequency Devices, Intentional Radiators
FCC KDB 558074:2019	Digital Transmission Systems, measurements and procedures
RSS-247 Issue 3:2023	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
RSS-GEN Issue 5:2021	General Requirements for Compliance of Radio Apparatus
ANSI C63.4:2014	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10:2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
ISO 17025:2017	General Requirements for the Competence of Testing and Calibration Laboratories

2.3 Test Facility

All tests were performed at Megalab Group Inc., located at 150 Addison Hall Circle, Aurora, ON, L4G 3X8, Canada.

The 10-meter semi-anechoic chamber for radiated emission and radiated immunity is designed to handle weights of up to 10,000lb and has power capability of over 100A. The turntable is capable of supporting test devices or systems either floor standing or table top of up to 4 meters wide and 3m tall. Conducted emissions, unless otherwise specified, are performed on a 2.44m x 2.48m ground plane and using a 2.44m x 2.48m vertical ground plane if applicable.

2.3.1 Accreditations

This report does not indicate any product endorsement by any government, accreditation agency, or Megalab Group Inc. Megalab Group Inc. shall have no liability for any deductions, interpretations or generalizations drawn by the client or others from the issued reports. If any opinions or interpretations are expressed in this report, they are outside Megalab Group Inc.'s scope of accreditation and do not necessarily reflect the opinions of Megalab Group Inc., unless otherwise specified.



A2LA (Certificate #5179.02)

Megalab Group Inc. is accredited to ISO/IEC 17025:2017 by the American Association for Laboratory Accreditation (A2LA) with Testing Certificate #5179.02. The laboratories current scope of accreditation can be found as listed on A2LA's website.



Innovation, Science and
Economic Development Canada

ISED

Megalab Group Inc. is registered with and recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.
Company Number: 28697



FCC

Megalab Group Inc. is registered with and recognized by the Federal Communications Commission (FCC) as an accredited testing laboratory.
Registration No. 200040



VCCI

The Semi-anechoic chamber of Megalab Group Inc. is registered with the Regulations for Voluntary Control Council for Interference (VCCI). Registration No.: R-20173, G-20174, C-20132, T-20133.

2.3.2 Measurement Uncertainty

As per ISO/IEC 17025 requirements, an evaluation of the measurement uncertainties associated with the emission test results should be included in the test report.

Where relevant, the following measurement uncertainty levels have been estimated for the tests performed on the DUT as specified in CISPR 16-4-2. The measurement uncertainties given below are based on a coverage factor $k = 2$ which yields approximately a 95% level of confidence for the near-normal distribution typical of most measurement results.

Measurement	Frequency Range	Uncertainty
Conducted Emissions at AC Mains Power Port	150kHz to 30MHz	2.27 dB
Radiated Emissions	30MHz to 1GHz	5.22 dB
	1GHz to 18GHz	4.76 dB

2.3.3 Sample Calculations

Conducted Emissions

$$\begin{aligned}
 \text{Emission Level (dB}\mu\text{V)} &= \text{Read Level (dB}\mu\text{V)} + \text{LISN Factor (dB)} + \text{Attenuation Factor (dB)} + \text{Cable Loss (dB)} \\
 &= 34.8 + 0.1 + 10.0 + 0.2 \\
 &= 45.1
 \end{aligned}$$

$$\begin{aligned}
 \text{Margin (dB)} &= \text{Limit (dB}\mu\text{V)} - \text{Emission Level (dB}\mu\text{V)} \\
 &= 60.0 - 45.1 \\
 &= 14.9
 \end{aligned}$$

Radiated Emissions

$$\begin{aligned}
 \text{Emission Level (dB}\mu\text{V/m)} &= \text{Read Level (dB}\mu\text{V)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Pre-Amp Gain (dB)} \\
 &= 52.4 + 9.4 + 1.3 - 29.2 \\
 &= 33.9
 \end{aligned}$$

$$\begin{aligned}
 \text{Margin (dB)} &= \text{Limit (dB}\mu\text{V/m)} - \text{Emission Level (dB}\mu\text{V/m)} \\
 &= 50.0 - 33.9 \\
 &= 16.1
 \end{aligned}$$

2.3.4 Terms, Definitions and Abbreviations

AE	Auxiliary Equipment
DUT	Device Under Test
DTS	Digital Transmission System
EMC	Electro-Magnetic Compatibility
FHSS	Frequency Hopping Spread Spectrum
ISM	Industrial, Scientific and Medical
LISN	Line Impedance Stabilization Network
N/A	Not Applicable
NCR	No Calibration Required
RF	Radio Frequency
RBW	Resolution Bandwidth
VBW	Video Bandwidth

Auxiliary Equipment/Support Equipment

Equipment needed to exercise and/or monitor the operation of the DUT.

Artificial Mains Network

Network that provides a defined impedance to the DUT at radio frequencies, couples the disturbance voltage to the measuring receiver and decouples the test circuit from the supply mains.

Class A Equipment

Equipment suitable for use in all locations other than those allocated in residential environments and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

Class B Equipment

Equipment suitable for use in all locations, including in residential environments and in establishments directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

Device Under Test

Device or system being evaluated for compliance with the requirements of the Test Standards listed in this report.

Electro-Magnetic Compatibility

Ability of equipment or system to function satisfactorily in its EM environment without introducing intolerable electromagnetic disturbances to anything in that environment.

Electromagnetic Disturbance

Any electromagnetic phenomenon which may degrade the performance of a device, equipment or system.

3. General Information

3.1 Client Information

Company	Generac Power System Inc
Address	S45 W29290 Hwy. 59 Waukesha, Wisconsin 53189 United States
Contact	Jeffrey Jonas
Email	Jeffrey.jonas@generac.com

3.2 Device Under Test (DUT)

3.2.1 DUT Information

DUT Name	Generac PWRcell 2 Gateway
DUT Model(s)	APCBPGN2101
Serial Number	Production samples
Power Source (AC / DC / Battery)	DC
Input Voltage (V) or Range	24V
Frequency (Hz) or Range	DC
Mode(s) of Operation	Continuous transmission, > 98% Duty Cycle
Connectors Available on DUT	RJ45
Transmitter Information	
FCC ID:	VDEAPCBPGN2101
IC:	8036A-APCBPGN2101
Technology Used	802.11 b/g/n
Operating Frequency	2412 MHz to 2462 MHz
Modulation Type	DSSS, OFDM
Number of Channels	11
Antenna Manufacturer	Kyocera Avx
Antenna Model	1003893PT
Antenna Type	Isolated Magnetic Dipole
Antenna Gain	3.3 dBi

Note: Above antenna information is provided by the client. The characteristics and gain are obtained from the Antenna Manufacturer's Data Sheet.

3.2.2 DUT Description

EUT is a communication module which has a 2400 – 2483.5 MHz DTS (802.11 b/g/n) transmitter and another modularly certified.

This report documents the compliance testing of the WIFI transmitter.

3.3 Test Setup of DUT

3.3.1 Configuration

The DUT was configured in a direct test mode with the following parameters

- For all the tests, the DUT was set to transmit continuously with maximum duty cycle
- Output Power: +20 dBm
- Channels:
 - o low, 2412MHz
 - o Mid, 2437MHz
 - o High, 2462MHz

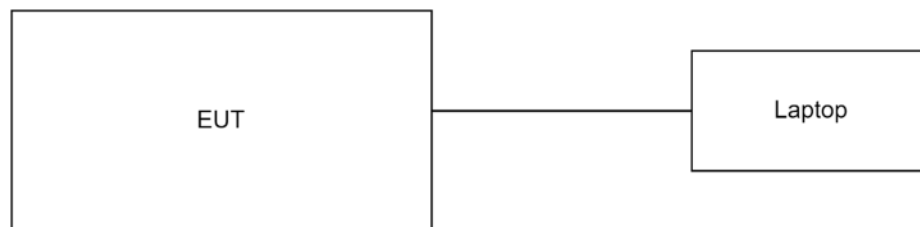


Figure 1 – Configuration Block Diagram

Description of I/O Cables			
Cable Function	Length of Cable (m)	Shielded (Y/N)	Outdoor Use (Y/N)
Ethernet	>3	N	N

3.3.2 Support Equipment

Device	Manufacturer	Model	S/N
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3.4 Modifications for Compliance

No modifications were made to the device under test to comply with the testing requirements.

4. Test Results

4.1 Emission Bandwidth

Test Date:	October 7, 2024
Temperature (°C)	24.7
Relative Humidity (%)	26.3
Barometric Pressure (kPa)	97.6

Initials: MX

4.1.1 Limits

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

4.1.2 Test Procedure

Tested according to ANSI C63.10 Section 11.8 and 6.9.3.

For the 6dB (DTS) Bandwidth:

- Set RBW = 100kHz and VBW $\geq [3 \times \text{RBW}]$.
- Detector = Peak and Trace Mode = Max Hold.
- Sweep = Auto Couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

For the 99% Bandwidth:

- Set RBW in the range of 1% to 5% of the actual occupied bandwidth.
- Set VBW $\geq [3 \times \text{RBW}]$.
- Span set to 1.5 to 5 times the occupied bandwidth.
- Use the 99% power bandwidth function of the instrument to measure bandwidth.

4.1.3 Test Results

The EUT passed. All of the protocols had a minimum measured 6 dB BW of more than 500 kHz.

The 99% of bandwidth of the transmitters for informational purposes. There is no limit specified for 99% bandwidth.

The EUT supports 802.11 b/g/n protocols for 2.4 GHz WIFI. For every protocol, three channels were measured. The 6 dB and 99% bandwidth are documented in the following tables:

802.11 b				
6dB (DTS) & 99% Bandwidth				
Frequency (MHz)	6dB DTS Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	6dB Bandwidth Limit (MHz)	Test Result
2412.0	6.99	12.19	> 0.50	Pass
2437.0	7.97	12.18	> 0.50	Pass
2462.0	7.93	12.18	> 0.50	Pass

802.11 g				
6dB (DTS) & 99% Bandwidth				
Frequency (MHz)	6dB DTS Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	6dB Bandwidth Limit (MHz)	Test Result
2412.0	16.34	16.73	> 0.50	Pass
2437.0	16.34	16.85	> 0.50	Pass
2462.0	16.35	16.85	> 0.50	Pass

802.11 n				
6dB (DTS) & 99% Bandwidth				
Frequency (MHz)	6dB DTS Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	6dB Bandwidth Limit (MHz)	Test Result
2412.0	17.35	17.64	> 0.50	Pass
2437.0	17.37	17.62	> 0.50	Pass
2462.0	17.45	17.64	> 0.50	Pass

4.1.3.1. 802.11 b Plots

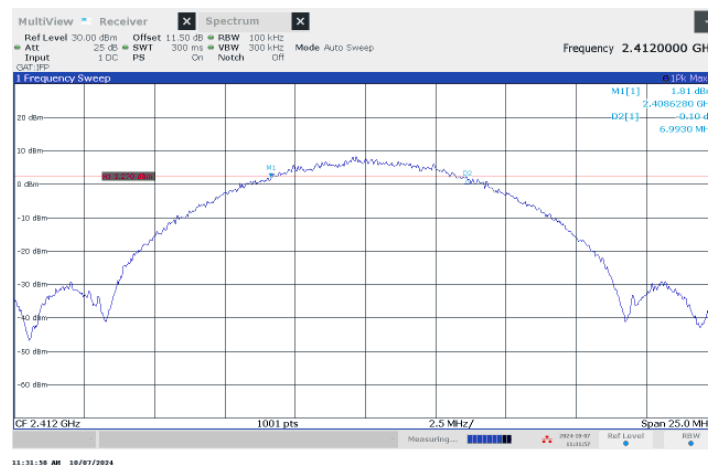


Figure 2 – 6dB Bandwidth – 2412 MHz

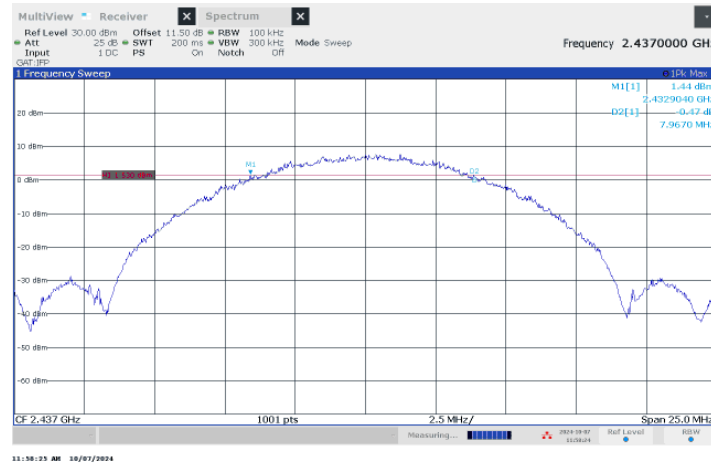


Figure 3 – 6dB Bandwidth – 2437 MHz

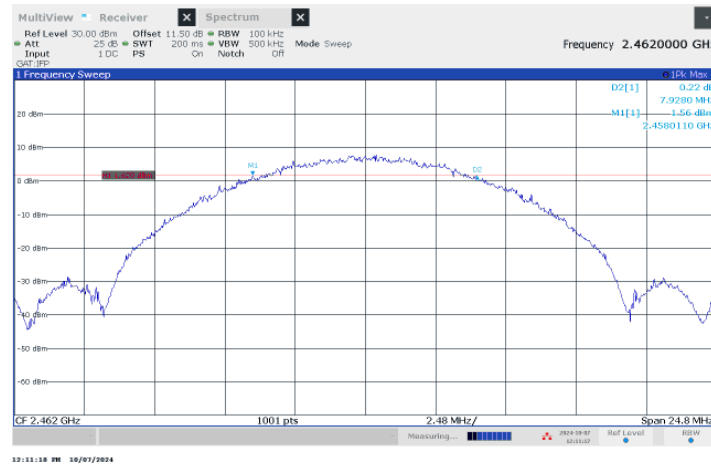


Figure 4 – 6dB Bandwidth – 2462 MHz

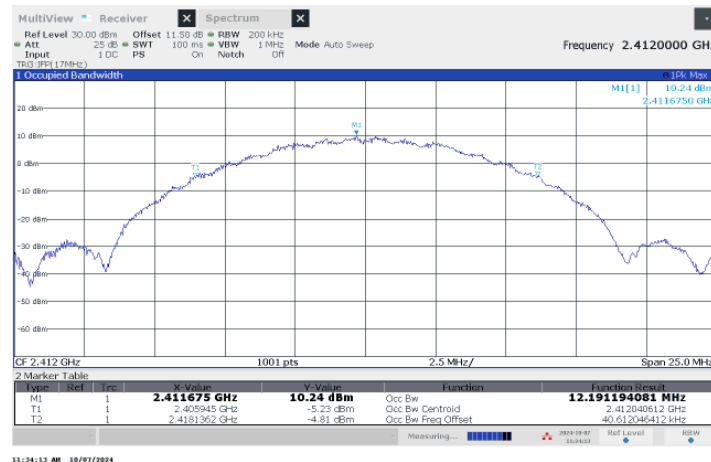


Figure 5 – 99% Bandwidth – 2412 MHz

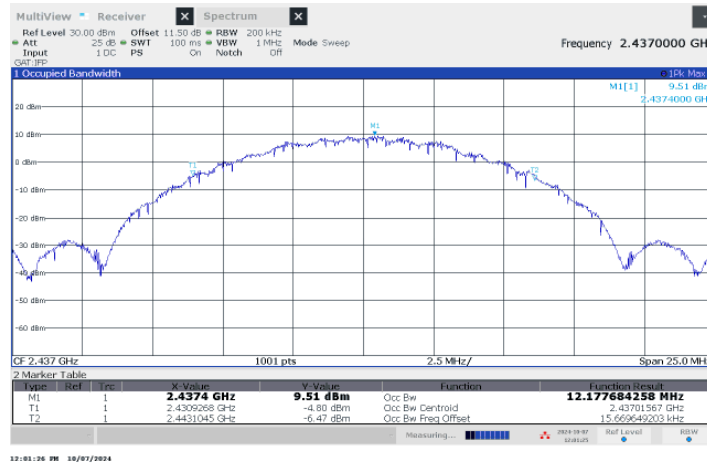


Figure 6 – 99% Bandwidth – 2437 MHz

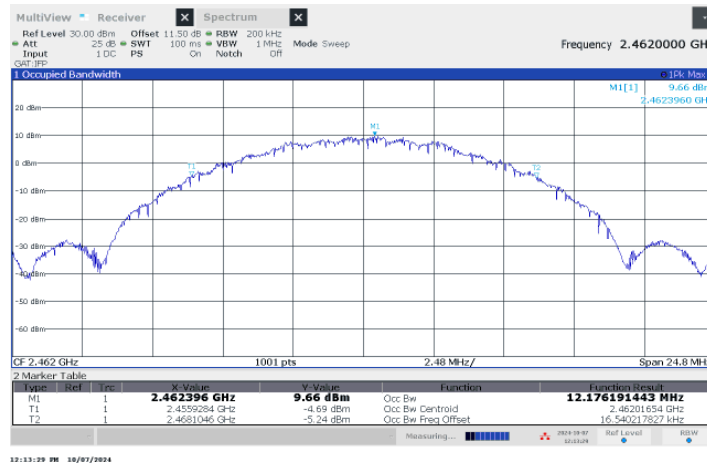


Figure 7 – 99% Bandwidth – 2462 MHz

4.1.3.2. 802.11 g Plots

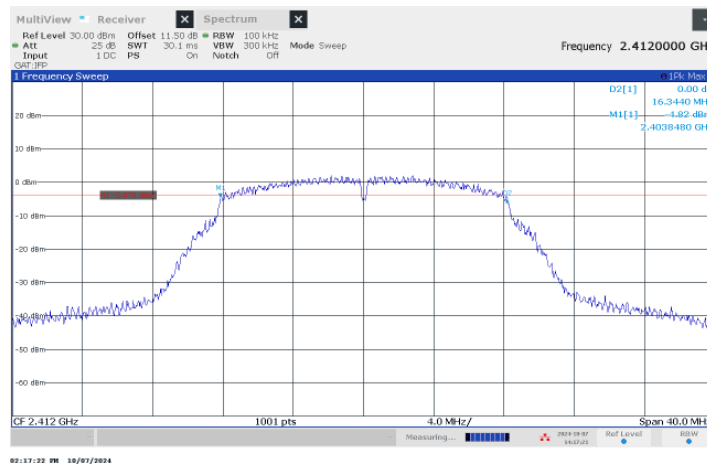


Figure 8 – 6dB Bandwidth – 2412 MHz

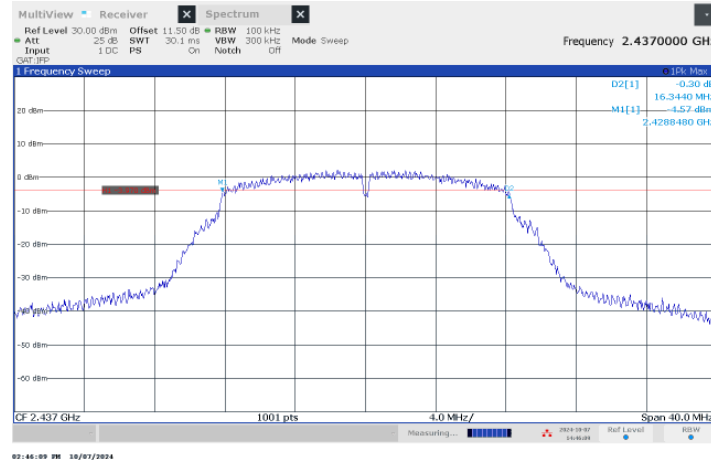


Figure 9 – 6dB Bandwidth – 2437 MHz

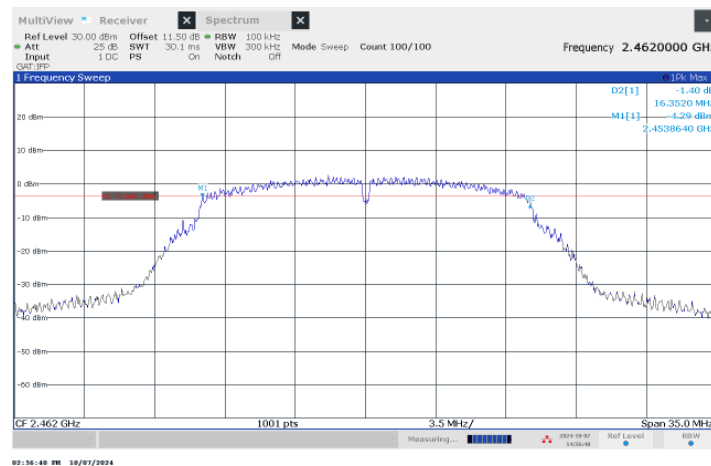


Figure 10 – 6dB Bandwidth – 2462 MHz

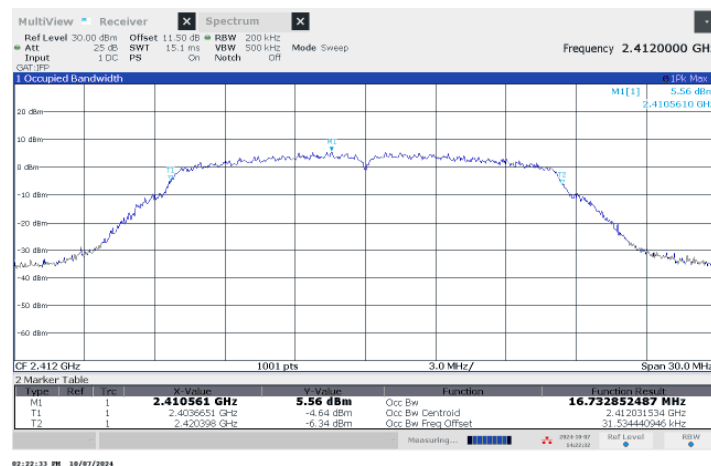


Figure 11 – 99% Bandwidth – 2412 MHz

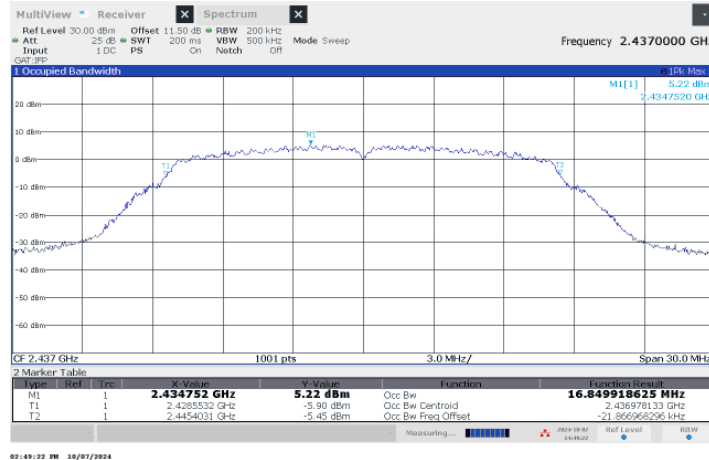


Figure 12 – 99% Bandwidth – 2437 MHz

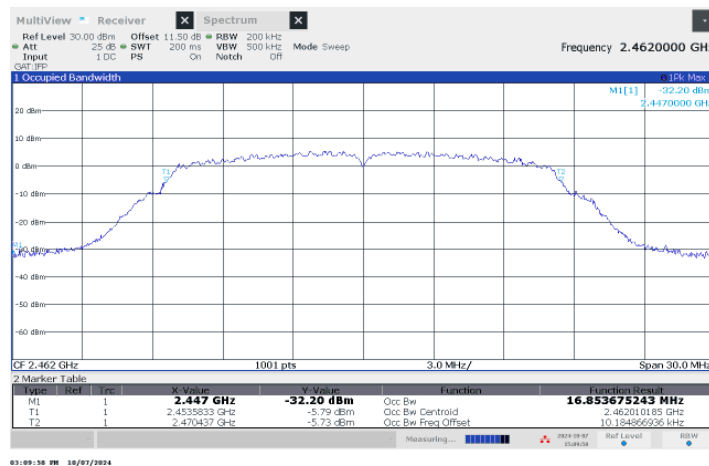


Figure 13 – 99% Bandwidth – 2462 MHz

4.1.3.3. 802.11 n Plots

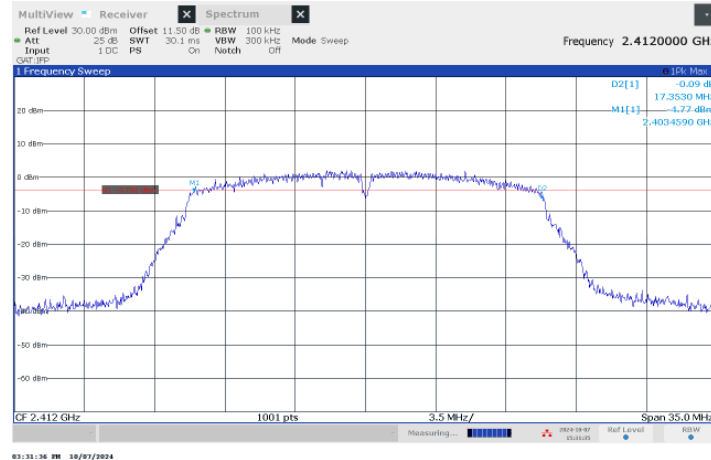


Figure 14 – 6dB Bandwidth – 2412 MHz

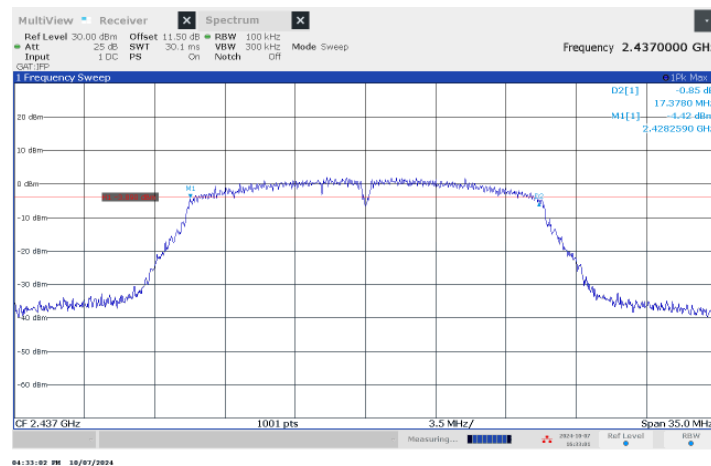


Figure 15 – 6dB Bandwidth – 2437 MHz

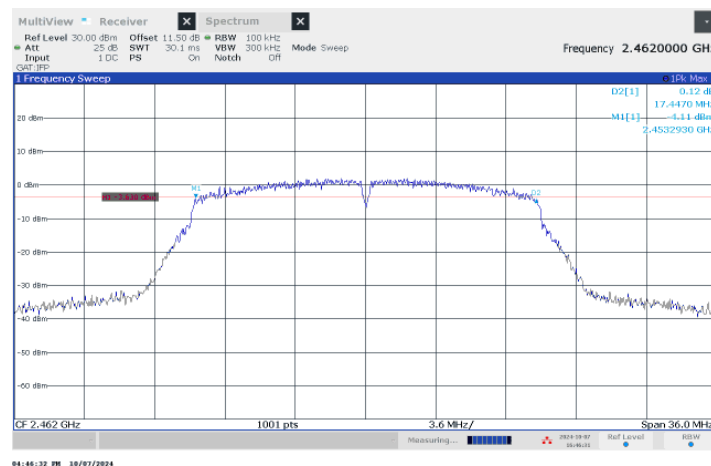


Figure 16 – 6dB Bandwidth – 2462 MHz

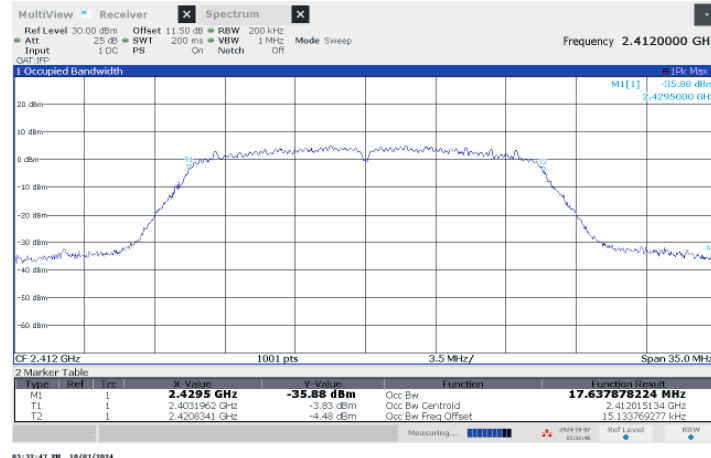


Figure 17 – 99% Bandwidth – 2412 MHz

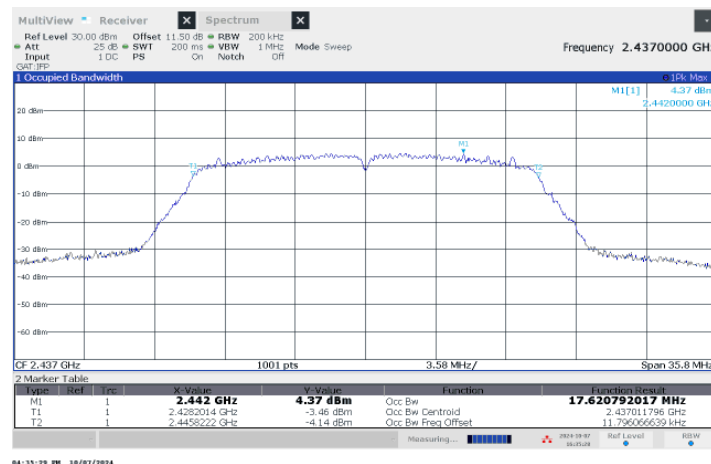


Figure 18 – 99% Bandwidth – 2437 MHz

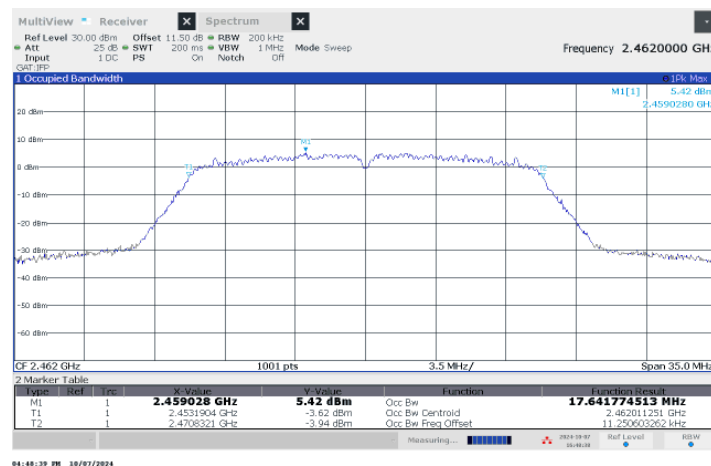


Figure 19 – 99% Bandwidth – 2462 MHz

4.1.4 Test Equipment List

Equipment ID	Description	Manufacturer	Model	Calibration Date	Calibration Due
EQ_EMC_58	EMI Receiver	Rohde & Schwarz	ESW 44	Mar 1, 2024	Mar 1, 2026
EQ_EMC_115	10dB Attenuator	Fairview Microwave	SA18E-10	NCR	NCR

4.2 Maximum Conducted Output Power

Test Date: October 7, 2024
Temperature (°C) 24.7
Relative Humidity (%) 26.3
Barometric Pressure (kPa) 97.6

Initials: MX

4.2.1 Limits

The maximum conducted output power of the intentional radiator shall not exceed 1 Watt (+30dBm) for systems using digital modulation in the 902–928MHz, 2400–2483.5MHz, and 5725–5850MHz bands.

Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level.

4.2.2 Test Procedure

Tested according to ANSI C63.10 Section 11.9.2.

The RF output of the DUT was connected to the spectrum analyzer with sufficient attenuation in front. The total path loss was set as reference offset to correct the final reading.

For Maximum Conducted Output (Average) Power

- Set RBW = 1% to 5% of OBW, not exceeding 1 MHz
- Set VBW $\geq 3 \times$ RBW
- Detector: RMS
- Span: At least 1.5 times the OBW
- Trace: Average
- Average Sweep Count: At least 100 times
- Trace Mode: Single
- Use instrument's band power measurement function to compute power by integrating the spectrum across the OBW.

4.2.3 Test Results

The EUT maximum conducted power is below 30 dBm (1 W).

The EUT supports 802.11 b/g/n protocols for 2.4 GHz WIFI. For each protocol, three channels were measured. Maximum conducted power results are documented in the following tables:

802.11 b					
Channel	Frequency (MHz)	Average Power (dBm)	Average Power (mW)	Limit (dBm)	Test Result
Low	2412	14.67	29.31	30	Pass
Mid	2437	14.62	28.97	30	Pass
High	2462	14.79	30.13	30	Pass

802.11 g					
Channel	Frequency (MHz)	Average Power (dBm)	Average Power (mW)	Limit (dBm)	Test Result
Low	2412	14.62	28.97	30	Pass
Mid	2437	14.69	29.44	30	Pass
High	2462	14.91	30.97	30	Pass

802.11 n					
Channel	Frequency (MHz)	Average Power (dBm)	Average Power (mW)	Limit (dBm)	Test Result
Low	2412	14.69	29.44	30	Pass
Mid	2437	14.66	29.24	30	Pass
High	2462	14.84	30.48	30	Pass

4.2.3.1. 802.11 b Plots

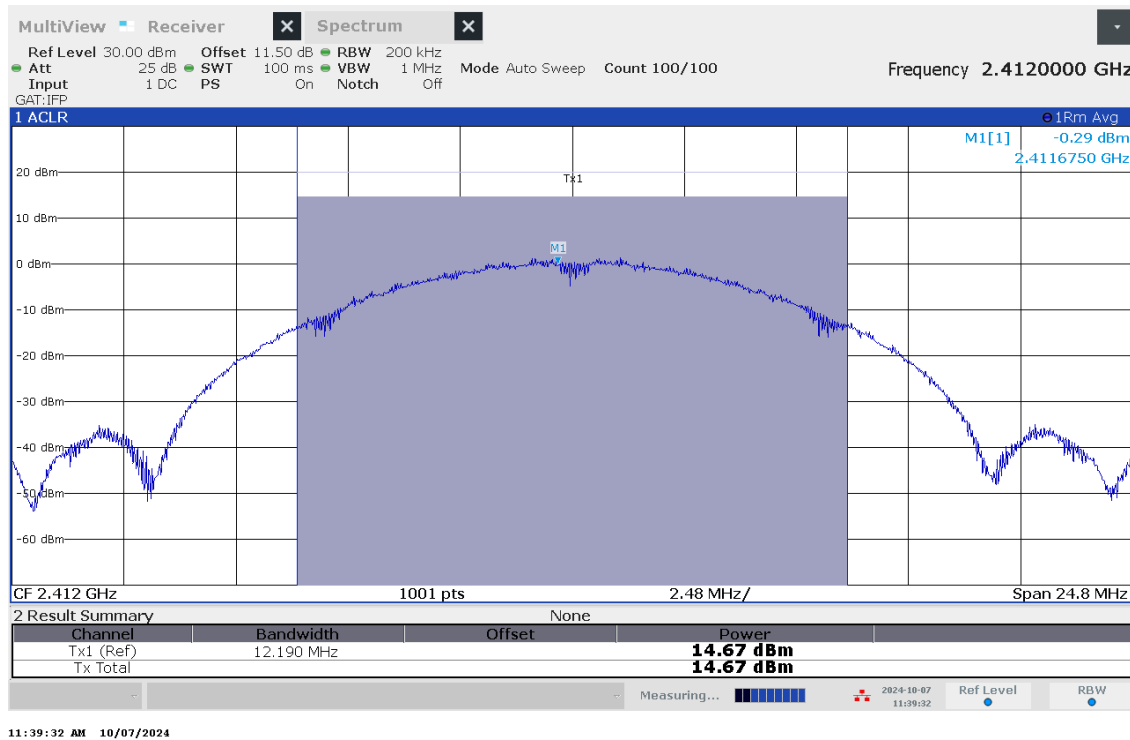


Figure 20 – Average Power - Low Channel

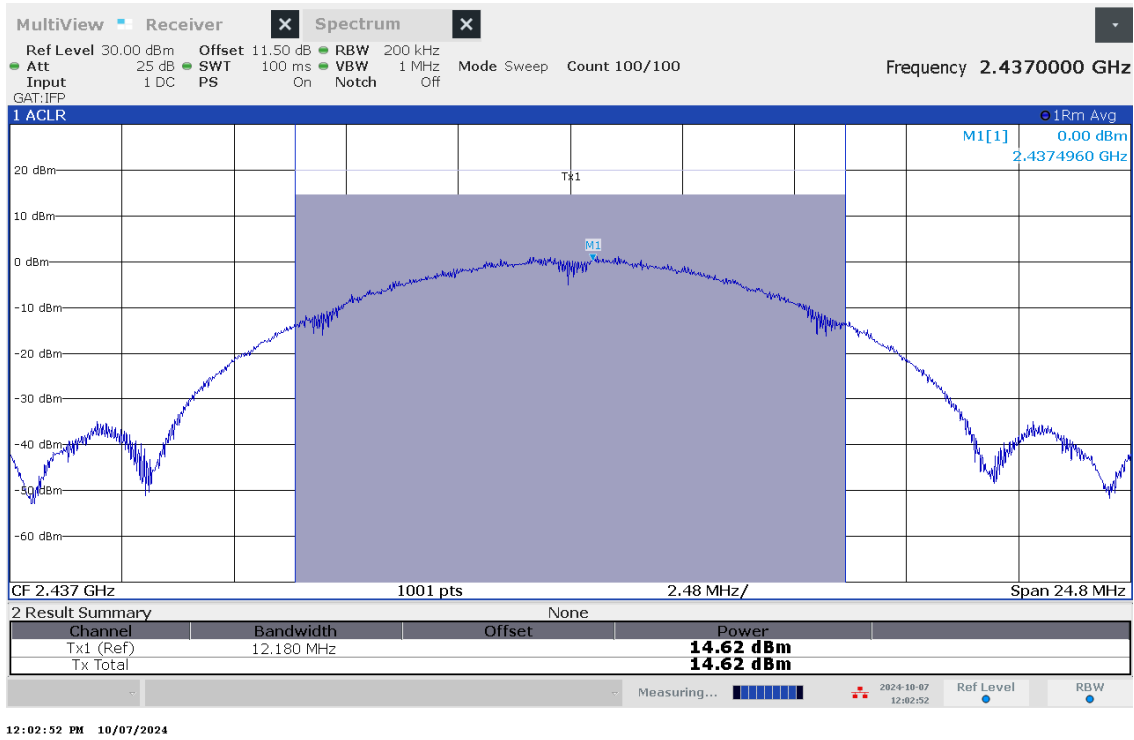


Figure 21 – Average Power - Mid Channel

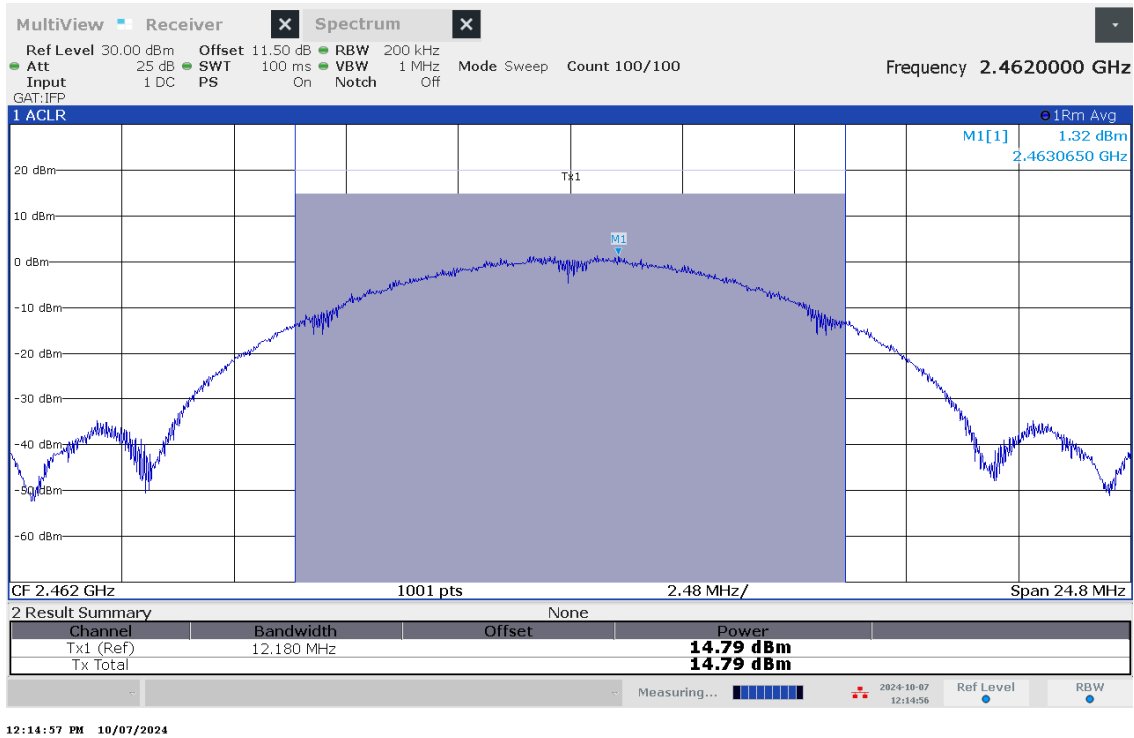


Figure 22 – Average Power - High Channel

4.2.3.2. 802.11 g Plots

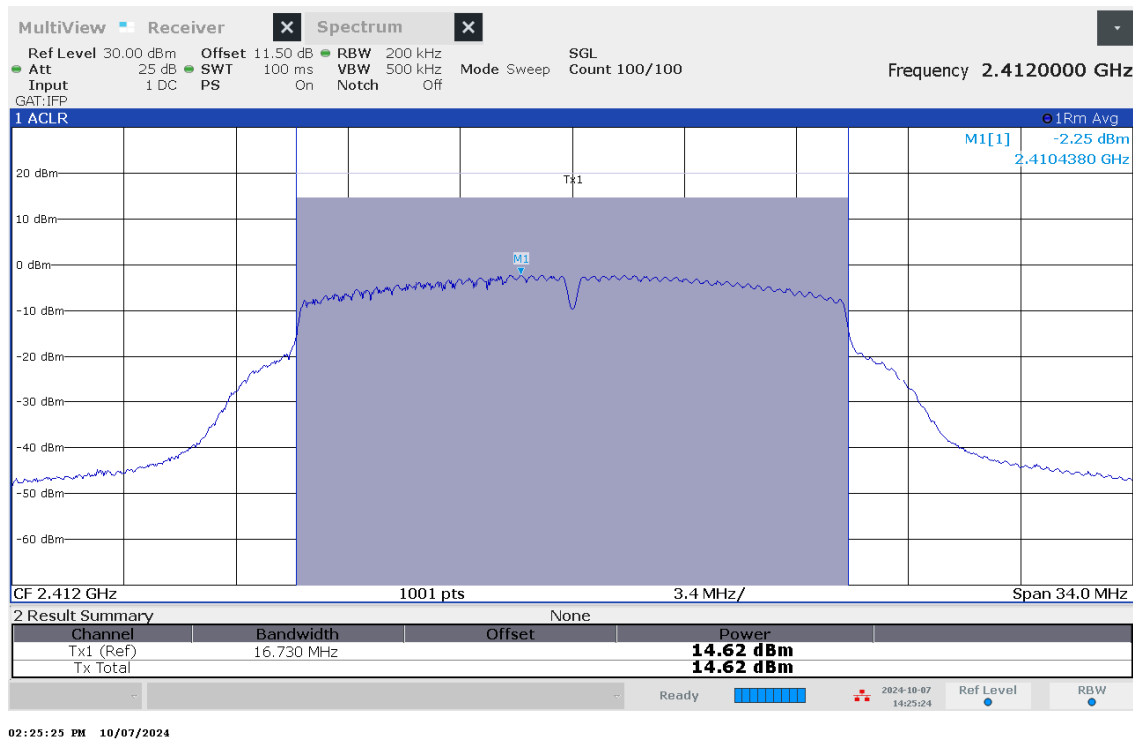


Figure 23 – Average Power - Low Channel

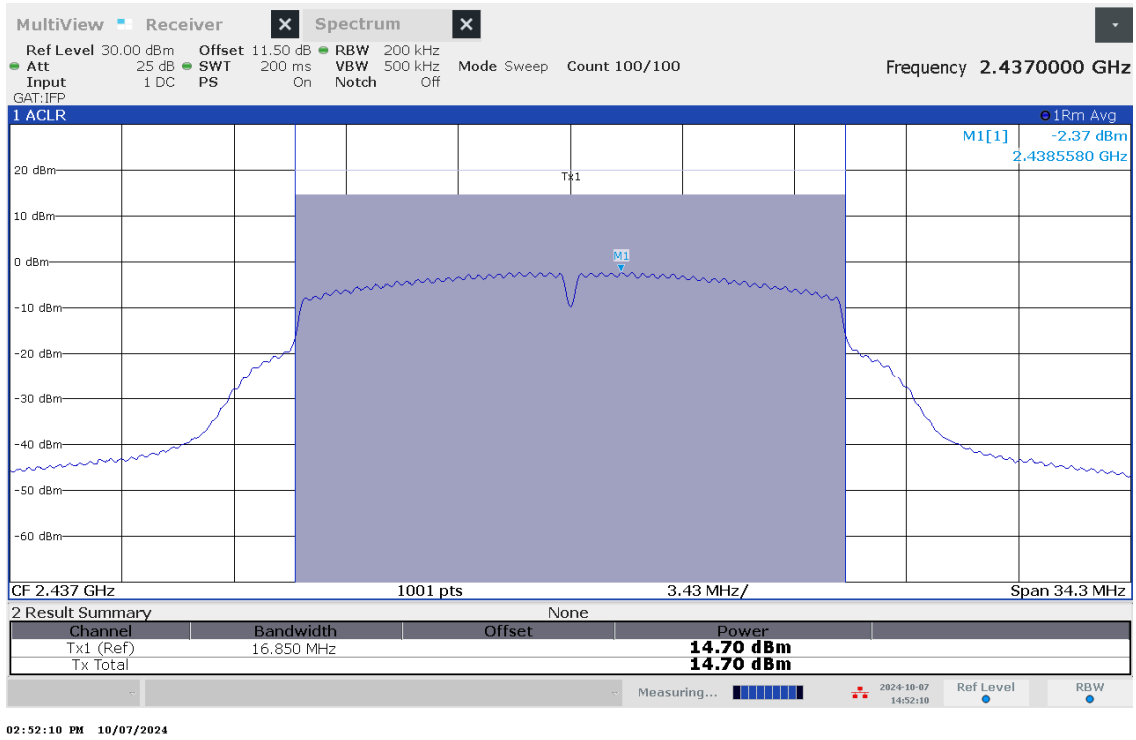


Figure 24 – Average Power - Mid Channel

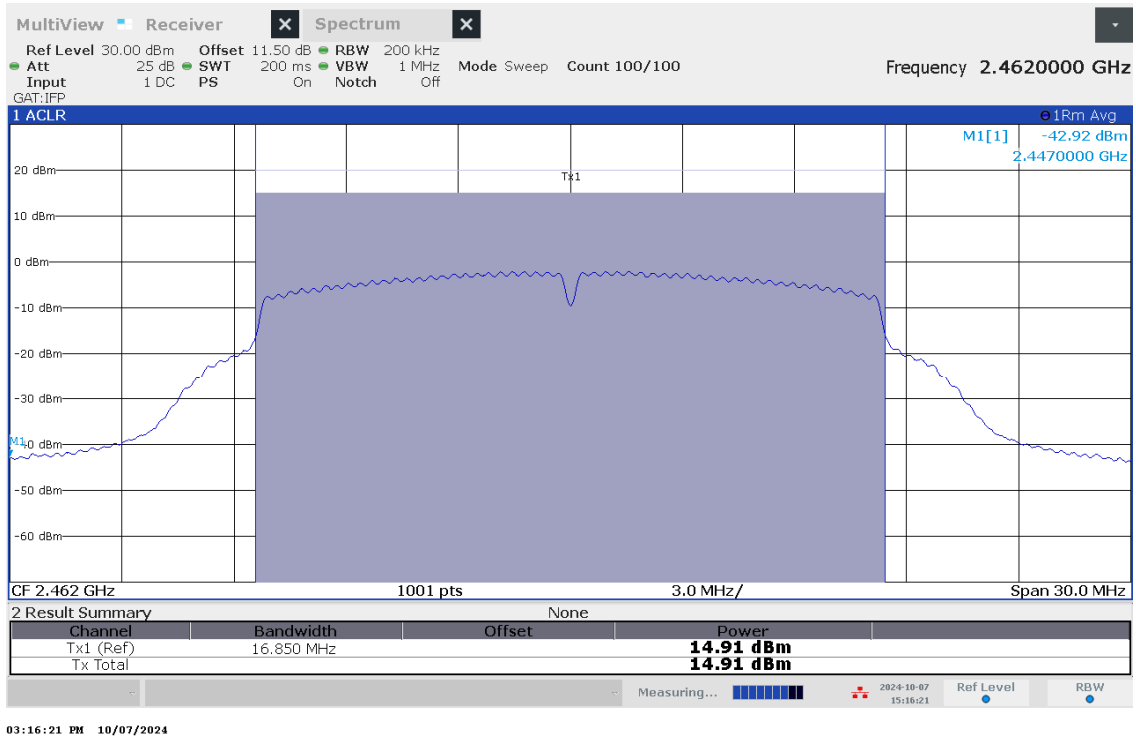


Figure 25 – Average Power - High Channel

4.2.3.3. 802.11 n Plots

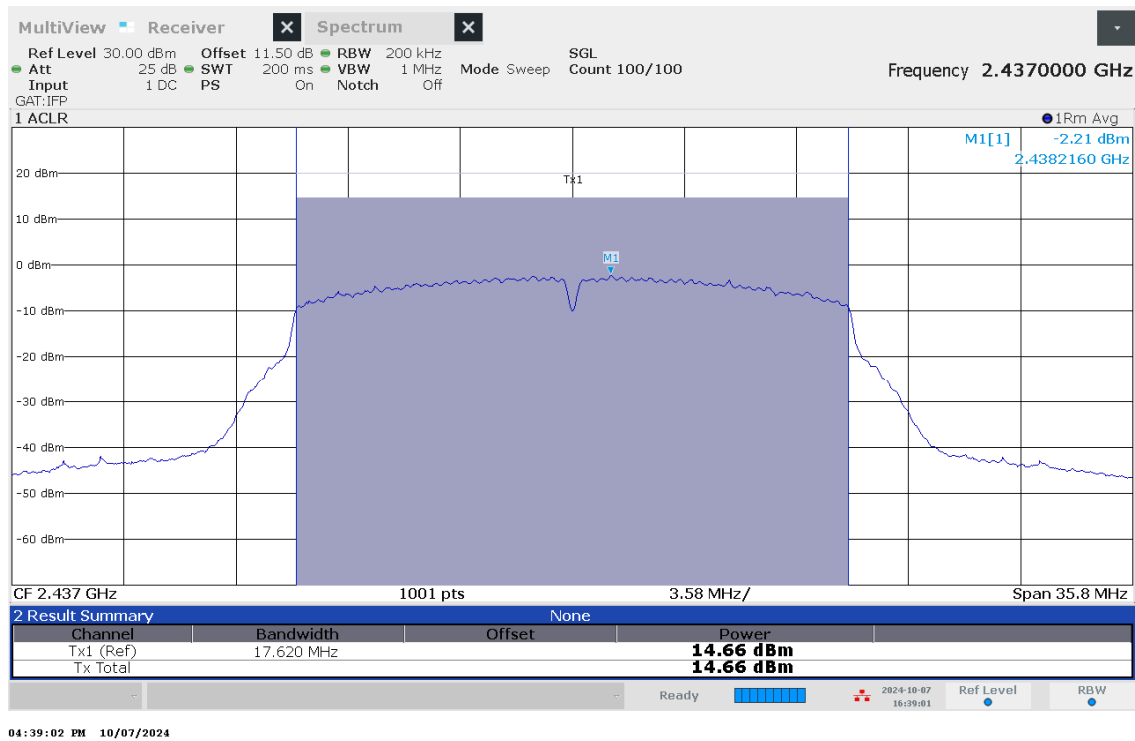


Figure 26 – Average Power - Low Channel

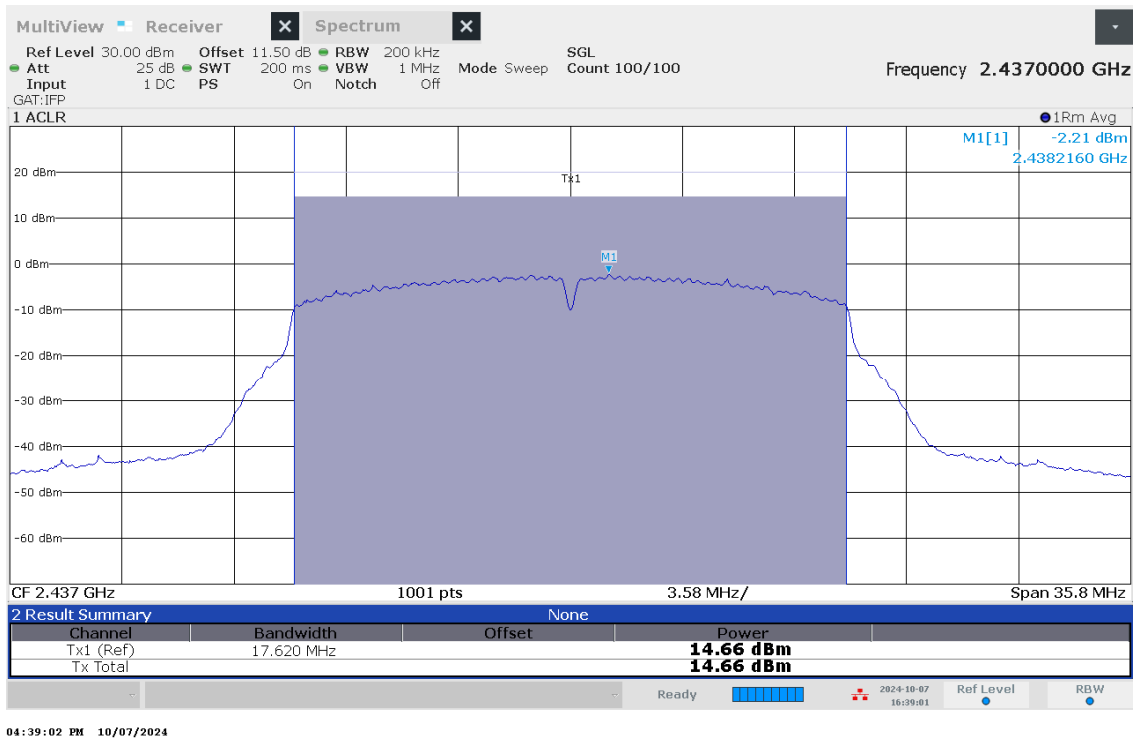


Figure 27 – Average Power - Mid Channel

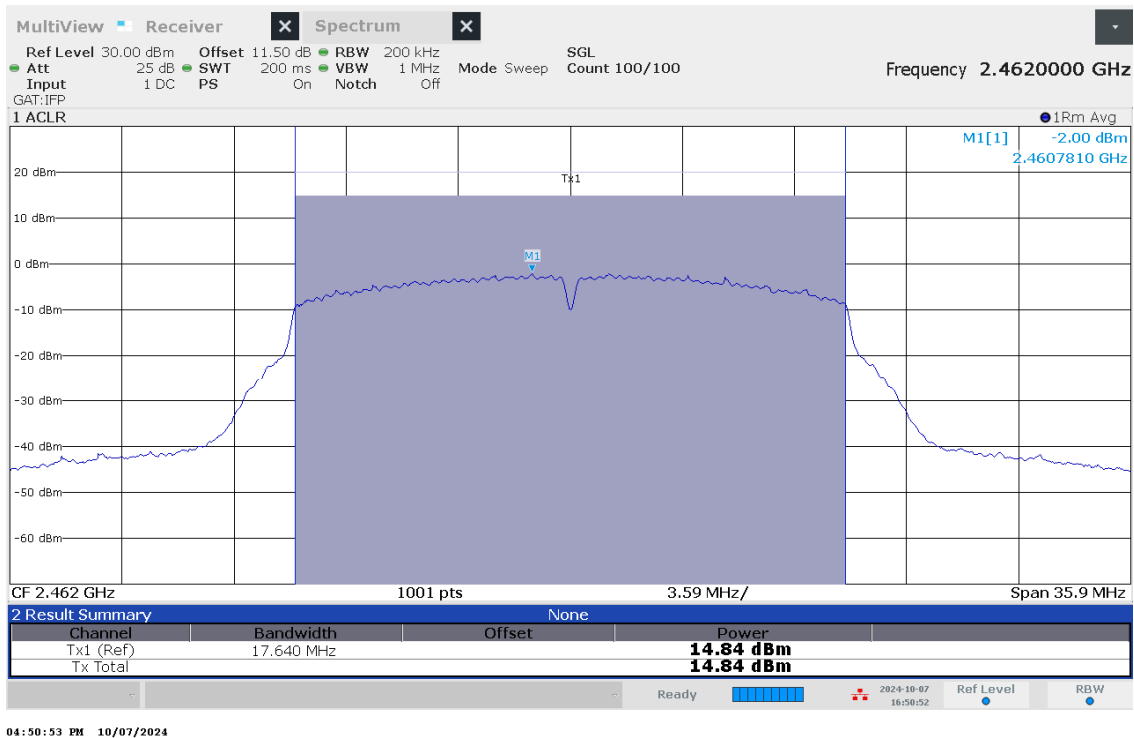


Figure 28 – Average Power - High Channel

4.2.4 Test Equipment List

Equipment ID	Description	Manufacturer	Model	Calibration Date	Calibration Due
EQ_EMC_58	EMI Receiver	Rohde & Schwarz	ESW 44	Mar 1, 2024	Mar 1, 2026
EQ_EMC_115	10dB Attenuator	Fairview Microwave	SA18E-10	NCR	NCR

4.3 Power Spectral Density

Test Date: October 7, 2024
Temperature (°C) 24.7
Relative Humidity (%) 26.3
Barometric Pressure (kPa) 97.6

Initials: MX

4.3.1 Limits

For digitally modulated systems, the power spectral density (PSD) conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.3.2 Test Procedure

Tested according to ANSI C63.10 Section 11.10

- Set RBW = 3kHz and VBW $\geq [3 \times \text{RBW}]$.
- Set Span to 1.5 times the DTS Bandwidth.
- Detector = Peak and Trace Mode = Max Hold.
- Sweep = Auto Couple.
- Use the peak marker function to determine the maximum level.

The RF output of the DUT was connected to the spectrum analyzer with sufficient attenuation in front and the total path loss was set as reference offset to correct the final reading.

4.3.3 Test Results

The DUT meet the 8 dBm/3kHz power spectral density limit.

The DUT was set to transmit at maximum tuned power. The DUT supports 802.11 b/g/n. Three Channels for each mode were measured.

External attenuator and cable loss were accounted for as reference offset in the spectrum analyzer.

The following tables show the peak power spectral density:

802.11 b				
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Test Result
Low	2412	-7.22	8	Pass
Mid	2437	-7.24	8	Pass
High	2462	-7.21	8	Pass

802.11 g				
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Test Result
Low	2412	-9.08	8	Pass
Mid	2437	-9.15	8	Pass
High	2462	-8.08	8	Pass

802.11 n				
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Test Result
Low	2412	-9.52	8	Pass
Mid	2437	-8.92	8	Pass
High	2462	-9.56	8	Pass

4.3.3.1. 802.11 b

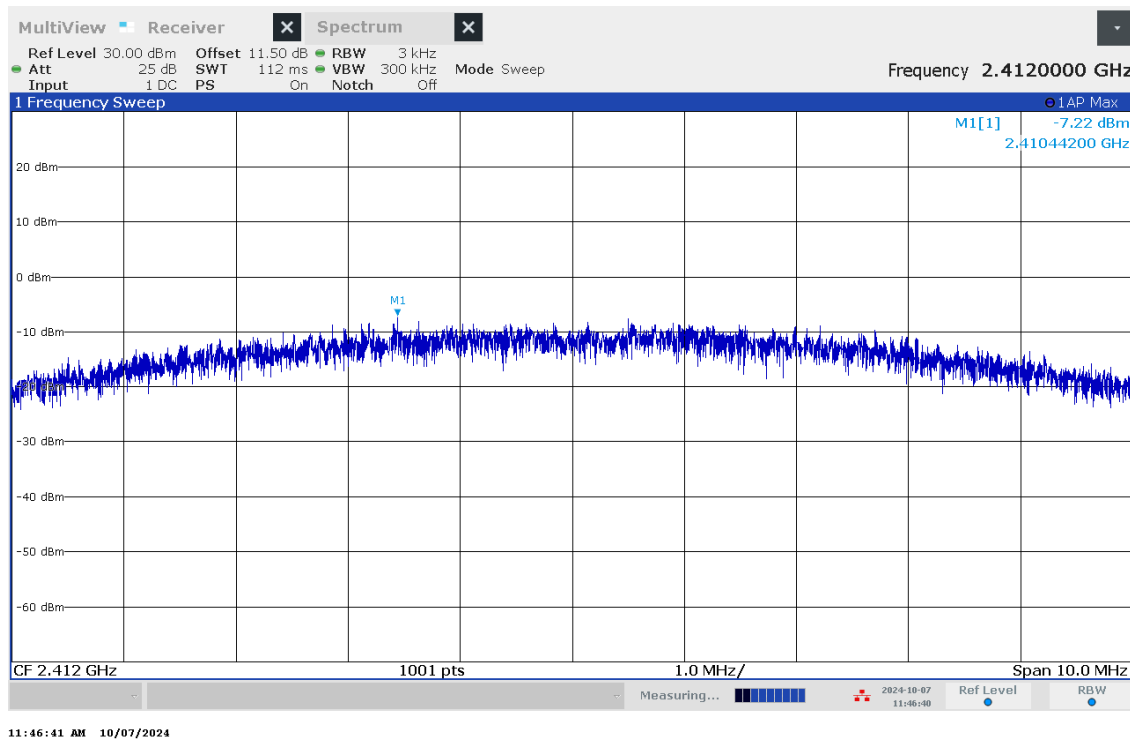


Figure 29 – PSD - Low Channel

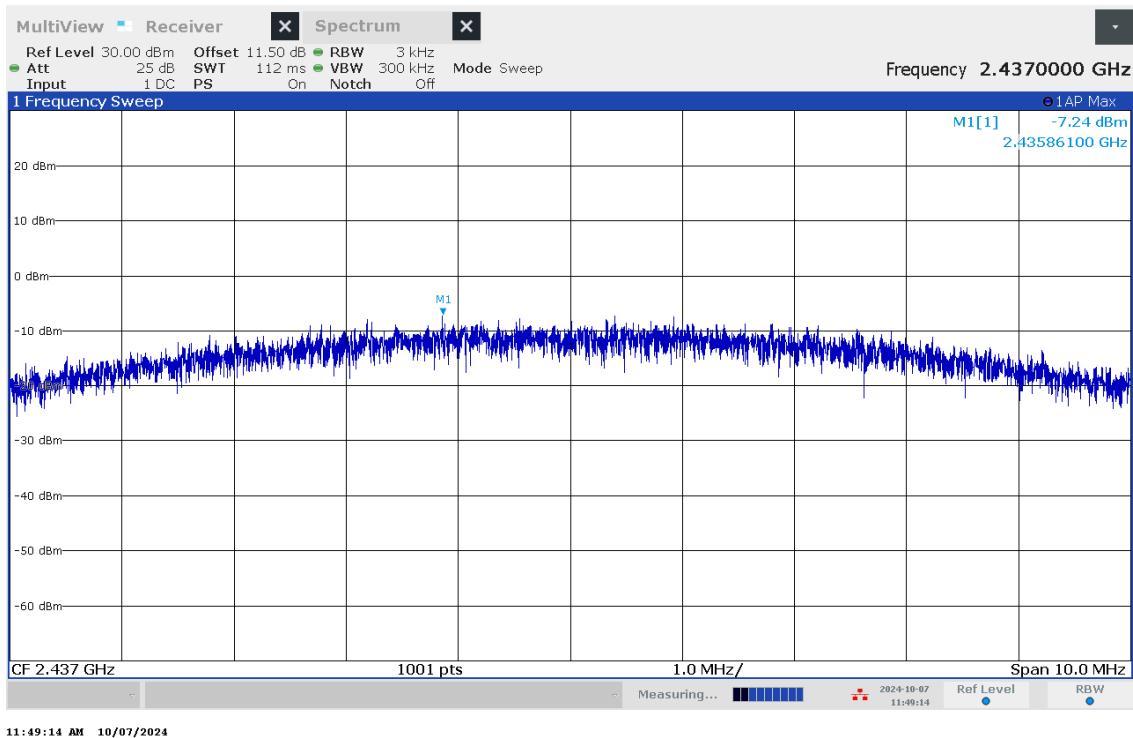


Figure 30 – PSD - Mid Channel

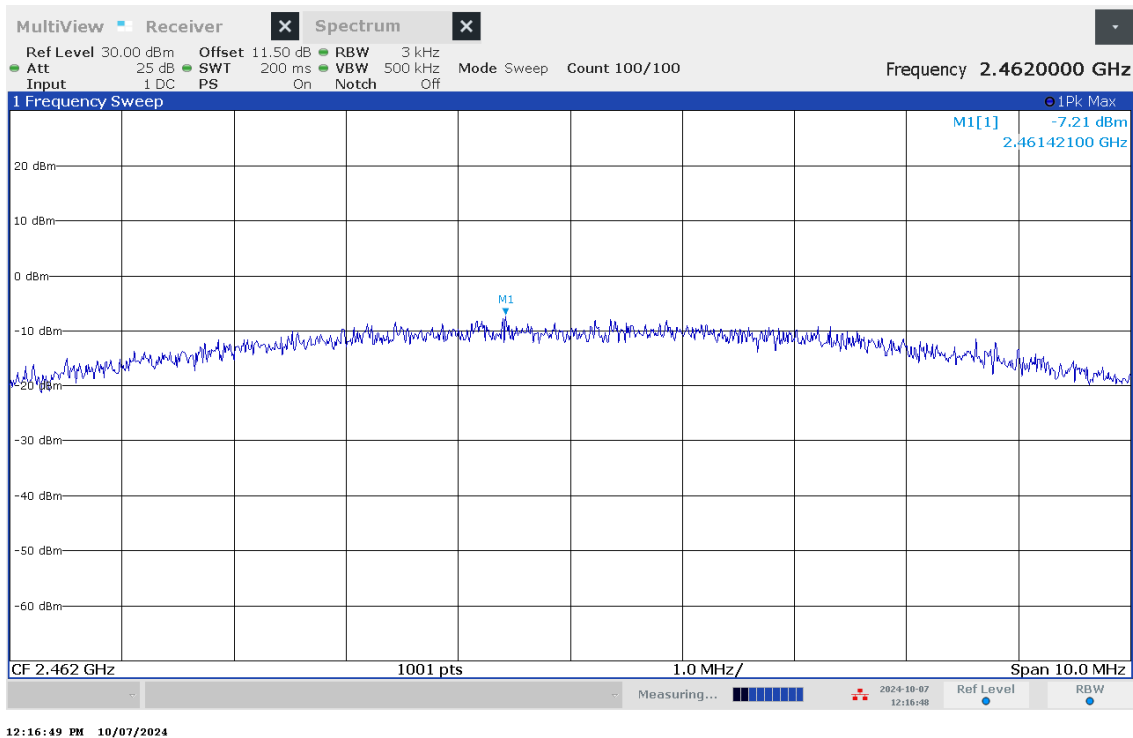


Figure 31 – PSD - High Channel

4.3.3.2. 802.11 g

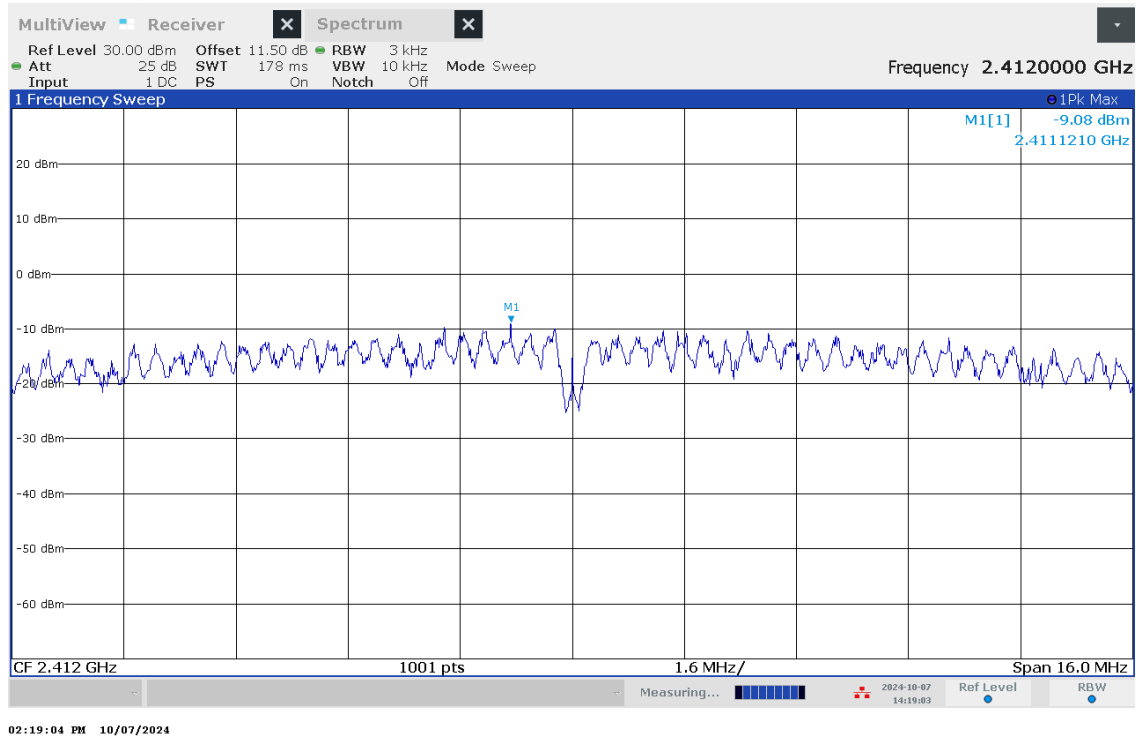


Figure 32 – PSD - Low Channel

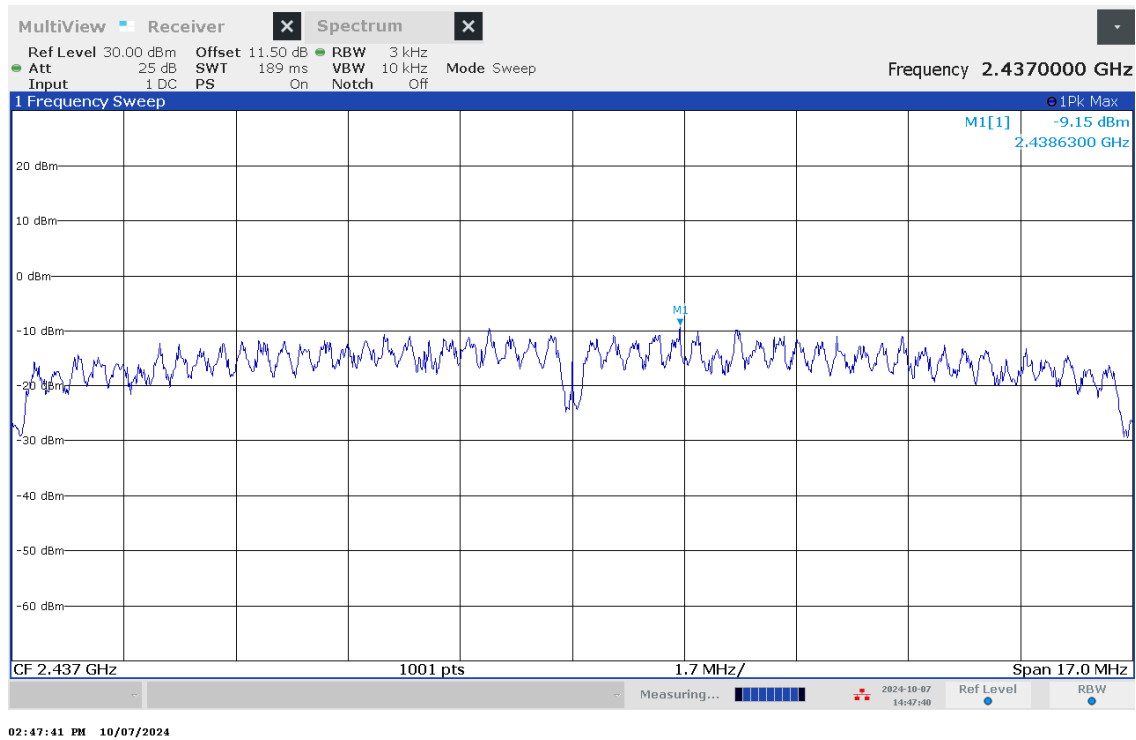


Figure 33 – PSD - Mid Channel

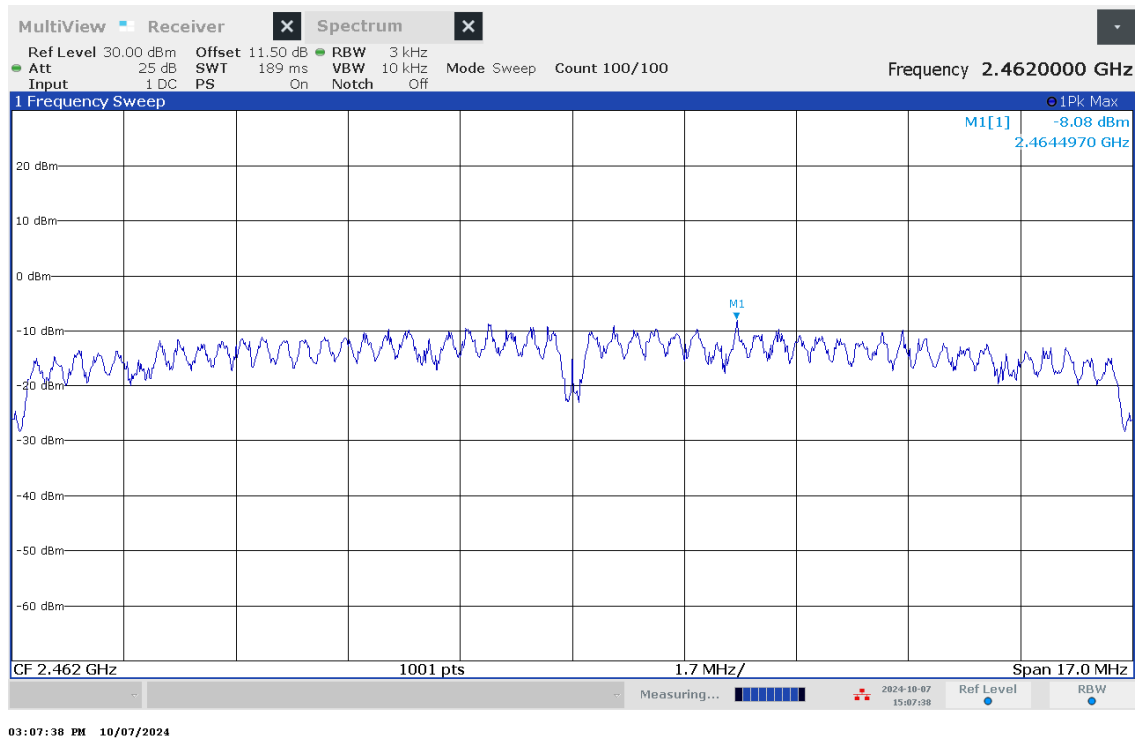
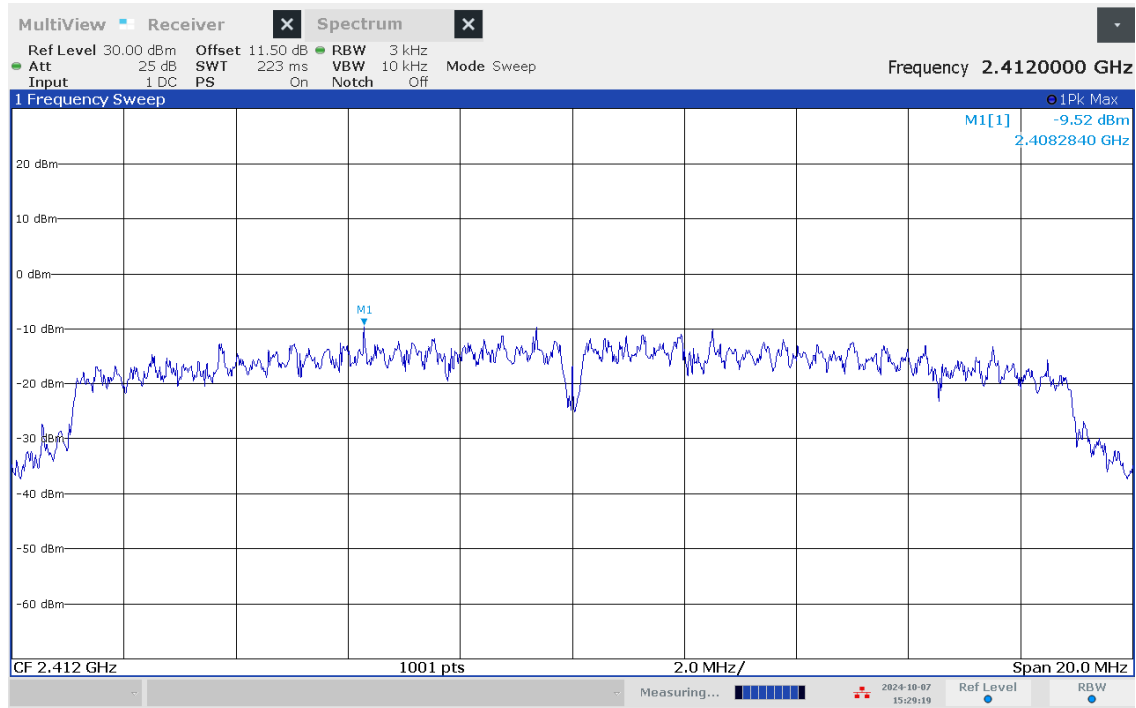


Figure 34 – PSD - High Channel

4.3.3.3. 802.11 n



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Figure 35 – PSD - Low Channel

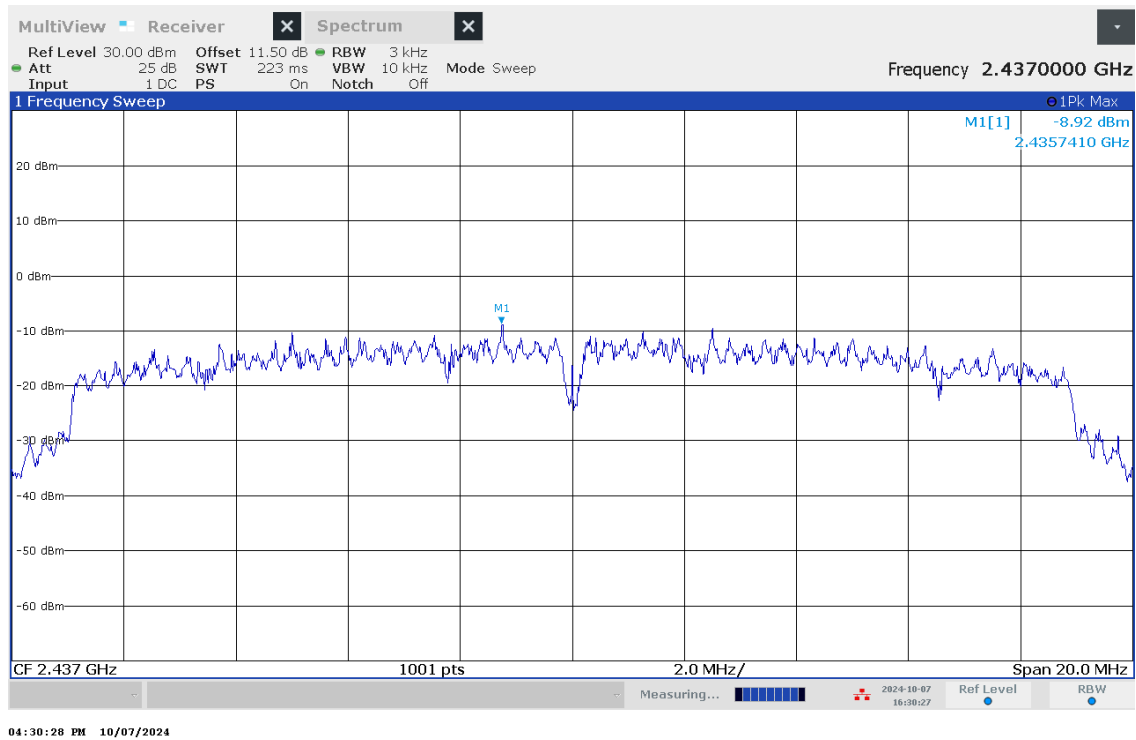


Figure 36 – PSD - Mid Channel

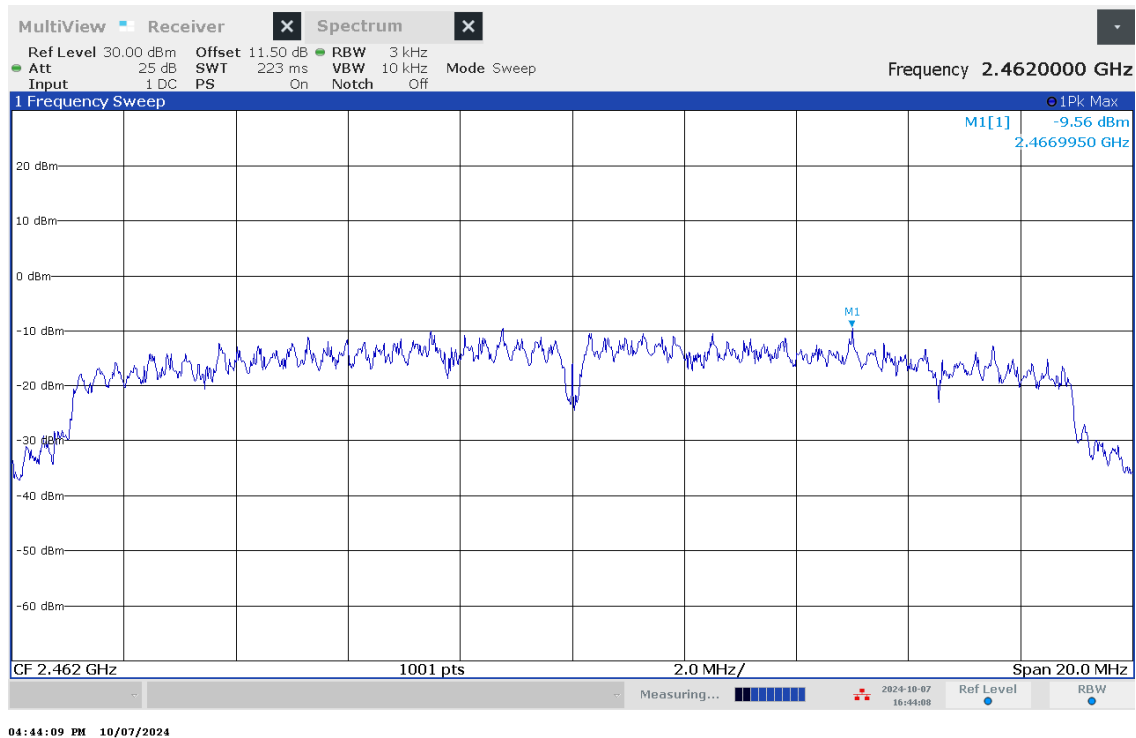


Figure 37 – PSD - High Channel

4.3.4 Test Equipment List

Equipment ID	Description	Manufacturer	Model	Calibration Date	Calibration Due
EQ_EMC_58	EMI Receiver	Rohde & Schwarz	ESW 44	Mar 1, 2024	Mar 1, 2026
EQ_EMC_115	10dB Attenuator	Fairview Microwave	SA18E-10	NCR	NCR

4.4 Spurious Antenna Conducted Emissions

Test Date:	October 7, 2024
Temperature (°C)	24.7
Relative Humidity (%)	26.3
Barometric Pressure (kPa)	97.6

Initials: MX

4.4.1 Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required shall be 30dB instead of 20dB.

4.4.2 Test Procedure

Tested according to ANSI C63.10 Section 11.11

For the reference level measurement:

- Set RBW = 100kHz and VBW $\geq [3 \times \text{RBW}]$.
- Detector = Peak and Trace Mode = Max Hold.
- Sweep = Auto Couple.
- Span set to ≥ 1.5 DTS bandwidth.
- Use the peak marker function to determine the maximum level.

For the out of band emission measurement

- Set the start and stop frequency to encompass the frequency range to be measured.
- Set RBW = 100kHz and VBW $\geq [3 \times \text{RBW}]$.
- Detector = Peak and Trace Mode = Max Hold.
- Sweep = Auto Couple.
- Use the peak marker function to determine the maximum level.

The RF output of the DUT was connected to the spectrum analyzer with sufficient attenuation in front and the total path loss was set as reference offset to correct the final reading.

4.4.3 Test Results

The DUT met the 30dB below carrier requirement for out of band emissions.

The EUT supports 802.11 b/g/n protocols for 2.4 GHz WIFI. For every protocol, three channels were measured. The -30 dBc requirement is shown for the lower band edge at 2.4 GHz in the low band and for the higher band edge at 2.4835 GHz in the high band.

4.4.3.1. 802.11 b

802.11 b			
Channel	Frequency (MHz)	Peak PSD w/ RBW=100 kHz (dBm)	30 dBc Limit (dBm)
Low	2412	8.27	-21.73
Mid	2437	7.53	-22.47
High	2462	7.62	-22.38

The highest peak power in 100 kHz is 8.27 dBm; therefore, the 30 dBc limit is -21.73 dBm.

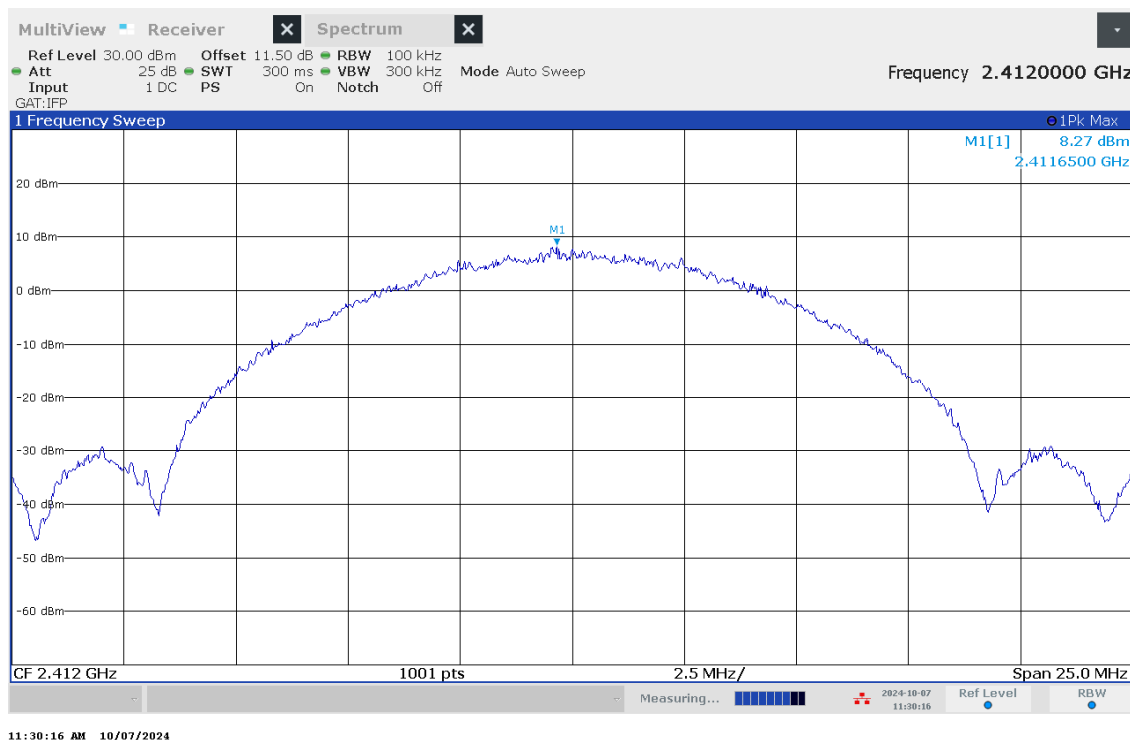


Figure 38 – -30dBc Reference Level - Low Channel

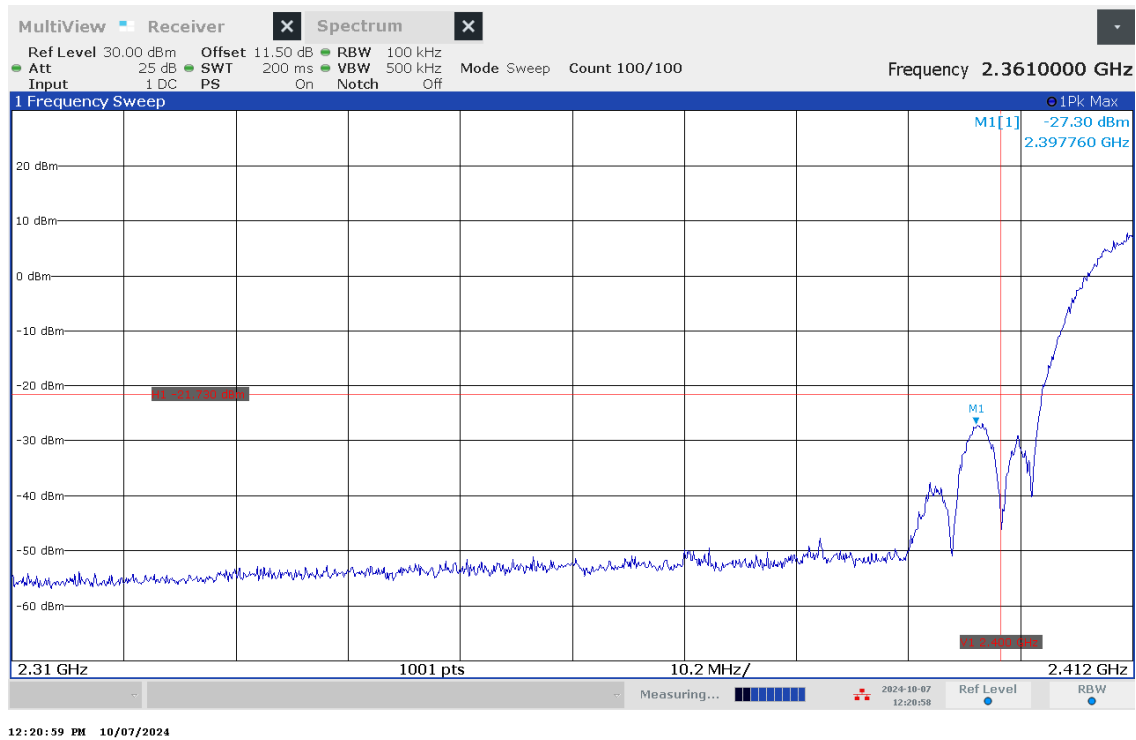


Figure 39 – -30dBc Band Edge - Low Channel

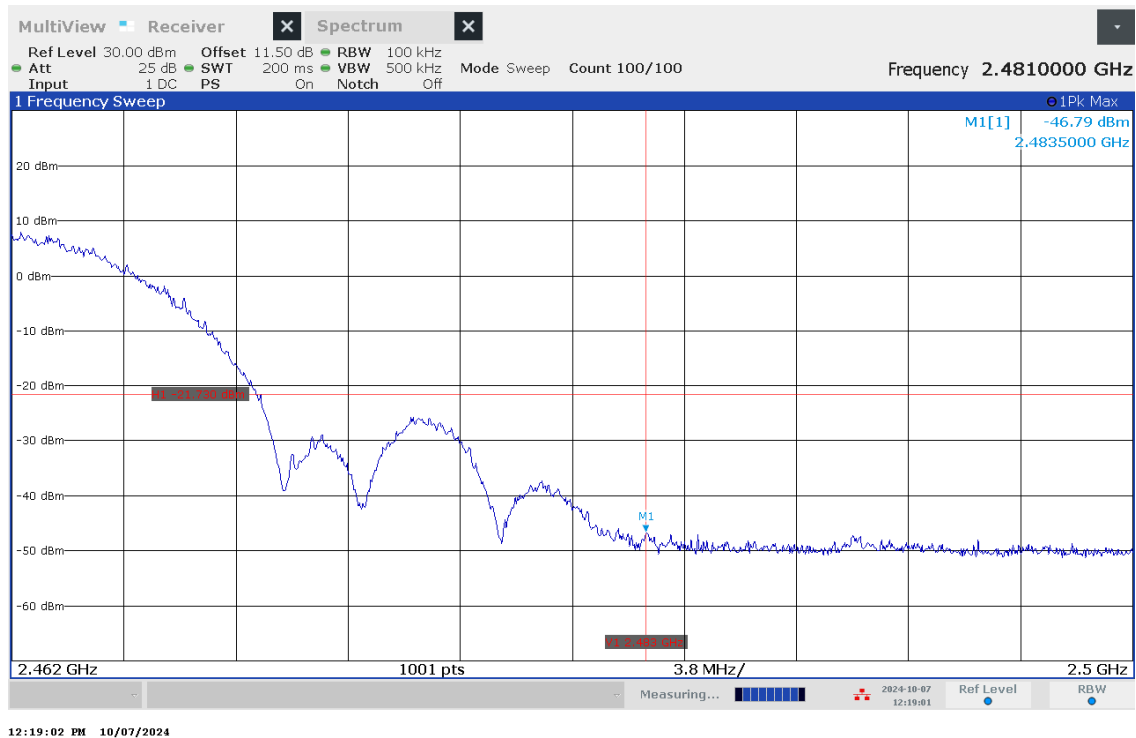


Figure 40 – -30dBc Band Edge - High Channel

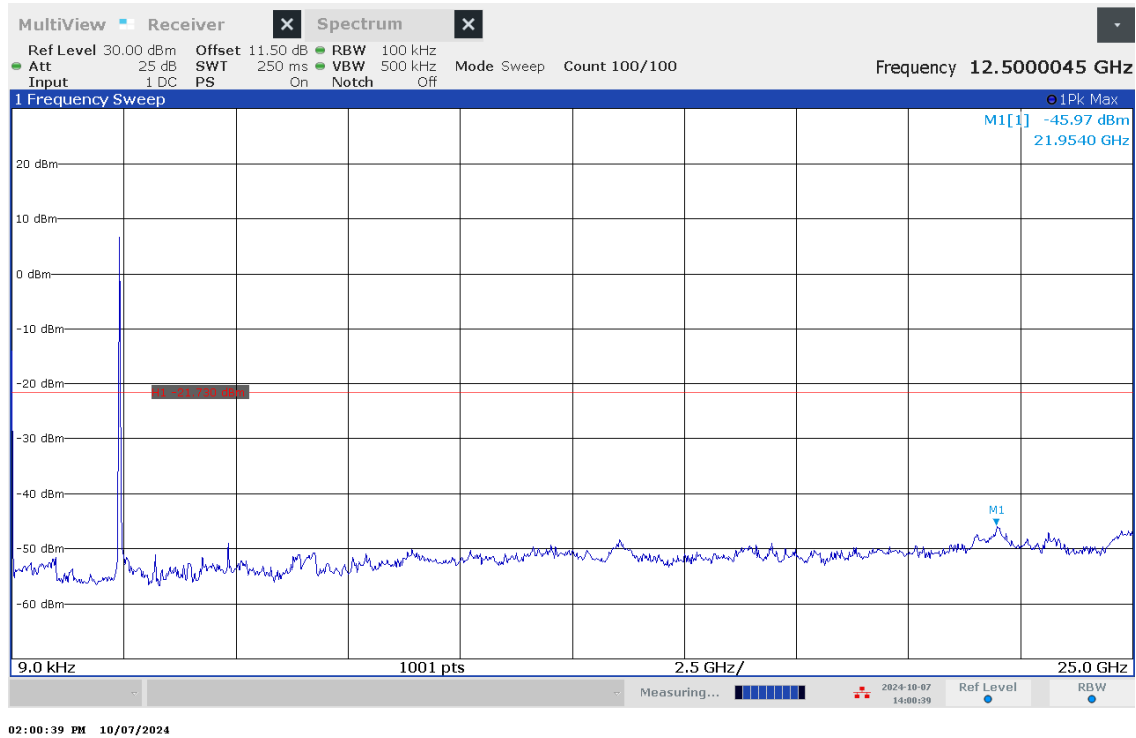


Figure 41 – -30dBc Low Channel 9kHz – 25 GHz

4.4.3.2. 802.11 g

802.11 g			
Channel	Frequency (MHz)	Peak PSD w/ RBW=100 kHz (dBm)	30 dBc Limit (dBm)
Low	2412	2.03	-27.97
Mid	2437	2.00	-28.00
High	2462	2.34	-27.66

The highest peak power in 100 kHz is 2.34 dBm; therefore, the 30 dBc limit is -27.66 dBm.

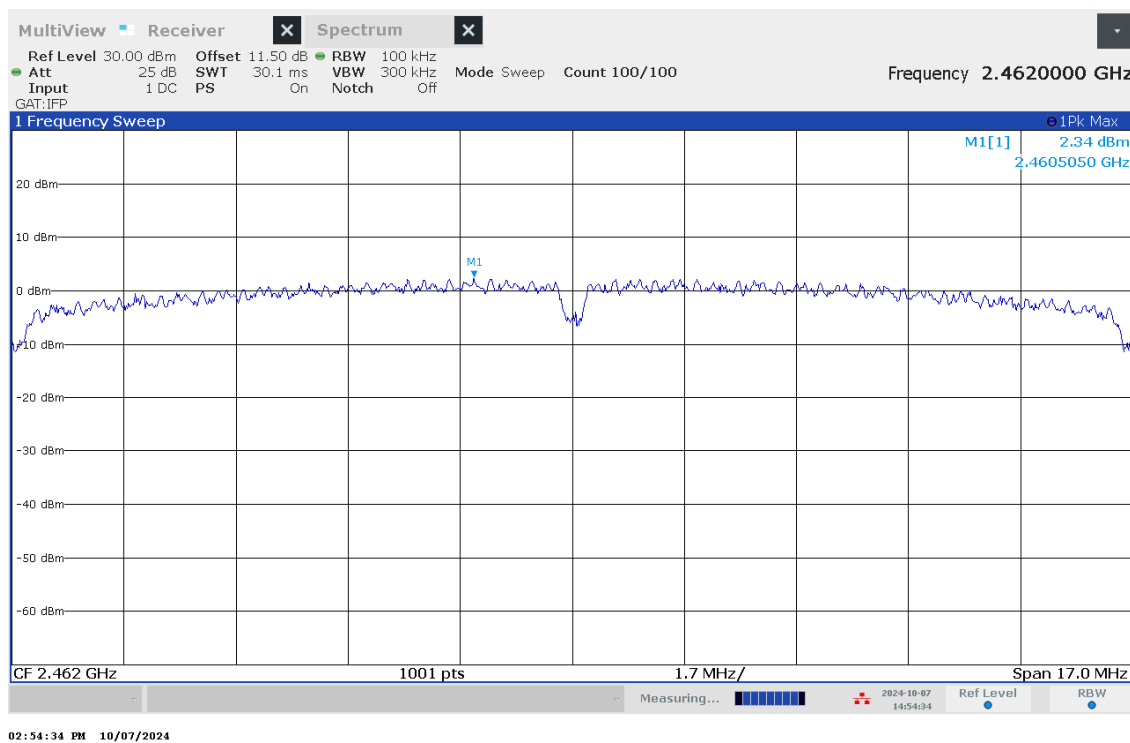


Figure 42 – -30dBc Reference Level - High Channel

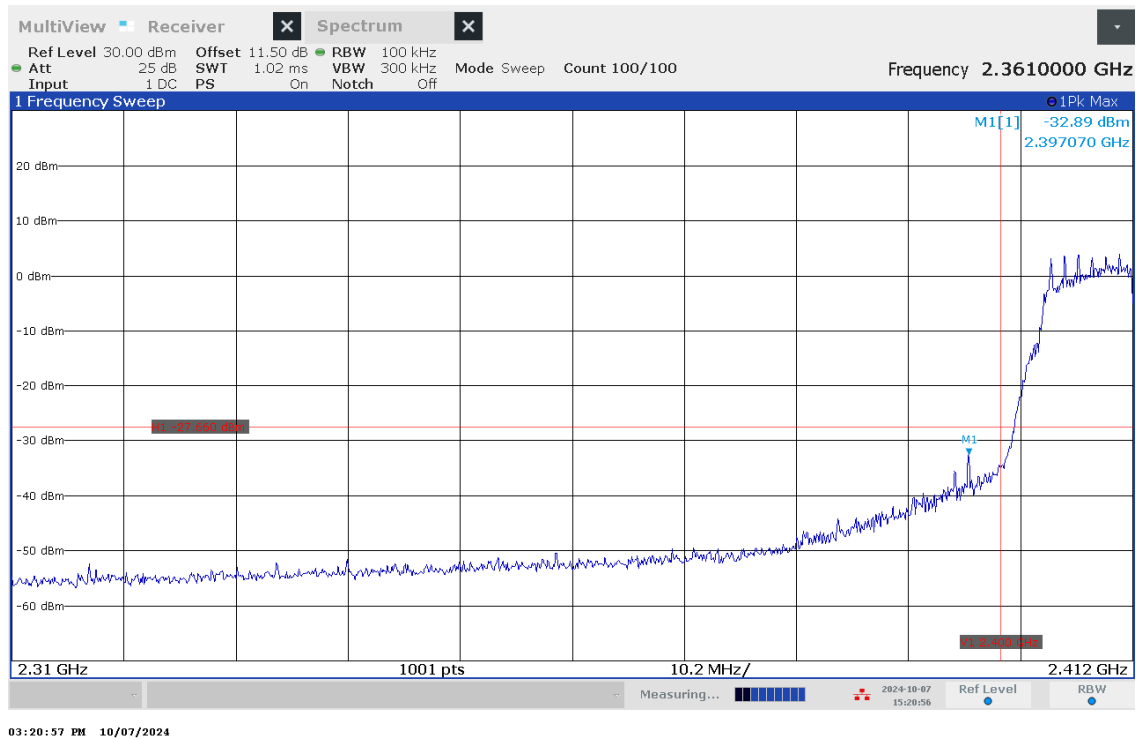


Figure 43 – -30dBc Band Edge - Low Channel

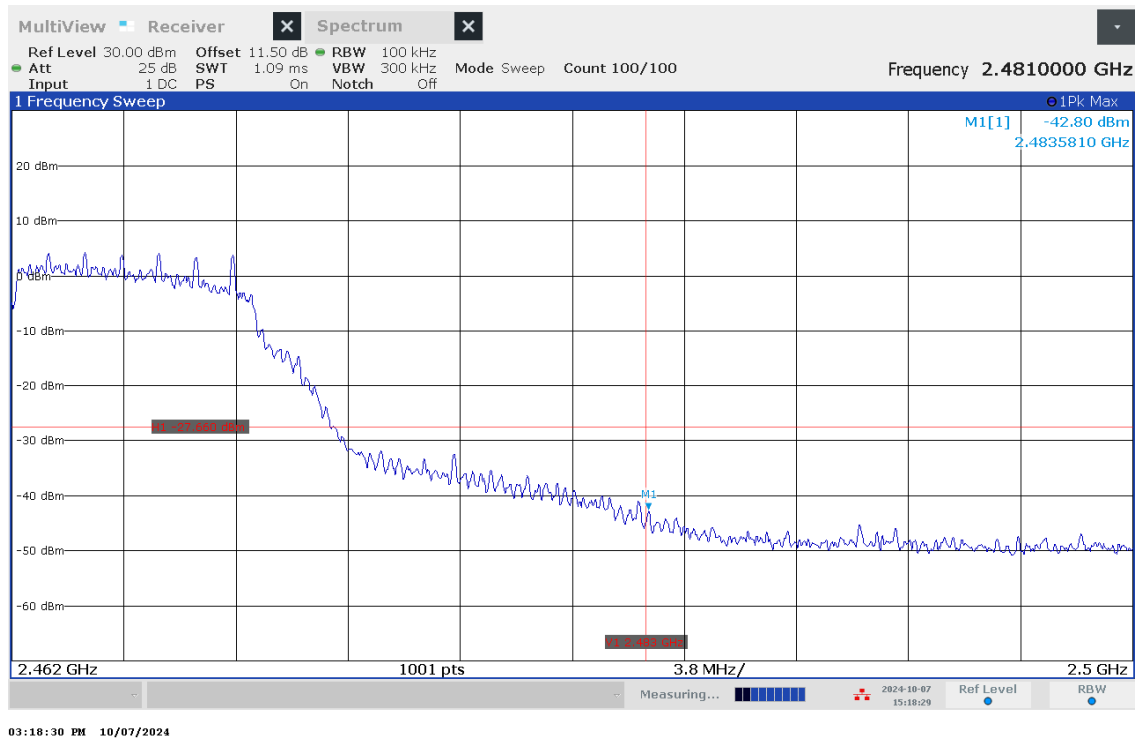
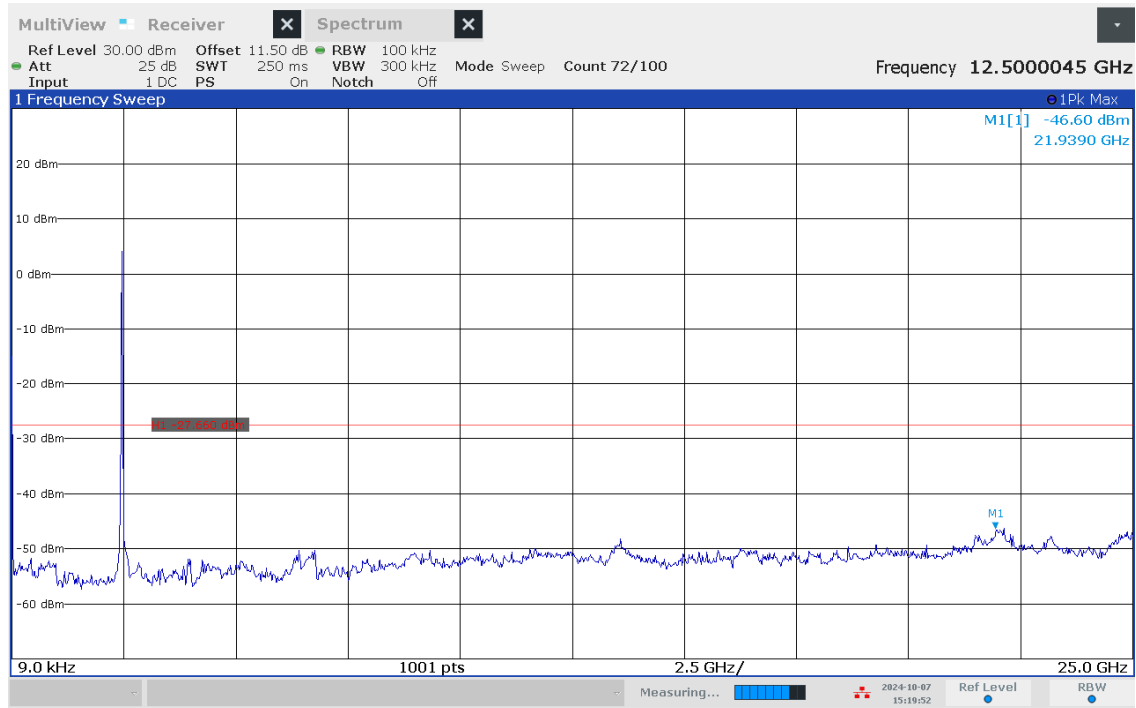


Figure 44 – -30dBc Band Edge - High Channel



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Figure 45 – -30dBc High Channel 9kHz – 25 GHz

4.4.3.3. 802.11 n

802.11 g			
Channel	Frequency (MHz)	Peak PSD w/ RBW=100 kHz (dBm)	30 dBc Limit (dBm)
Low	2412	2.25	-27.75
Mid	2437	2.11	-27.89
High	2462	2.37	-27.63

The highest peak power in 100 kHz is 2.37 dBm; therefore, the 30 dBc limit is -27.63 dBm.

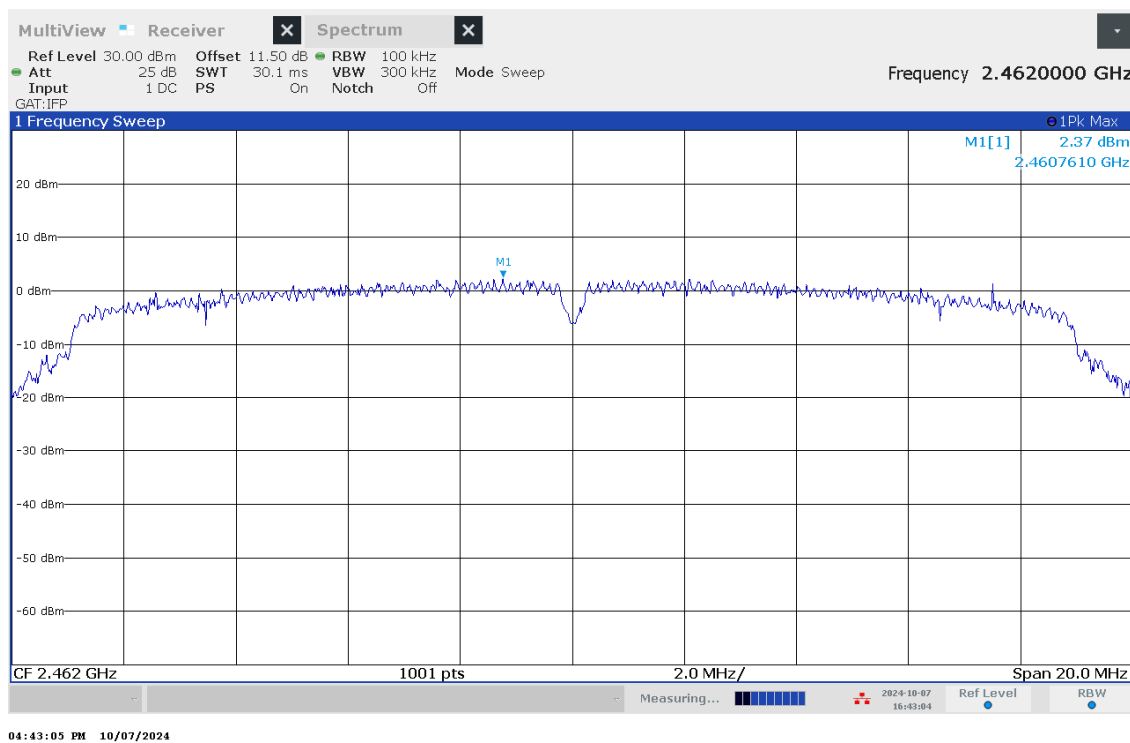


Figure 46 – -30dBc Reference Level - High Channel

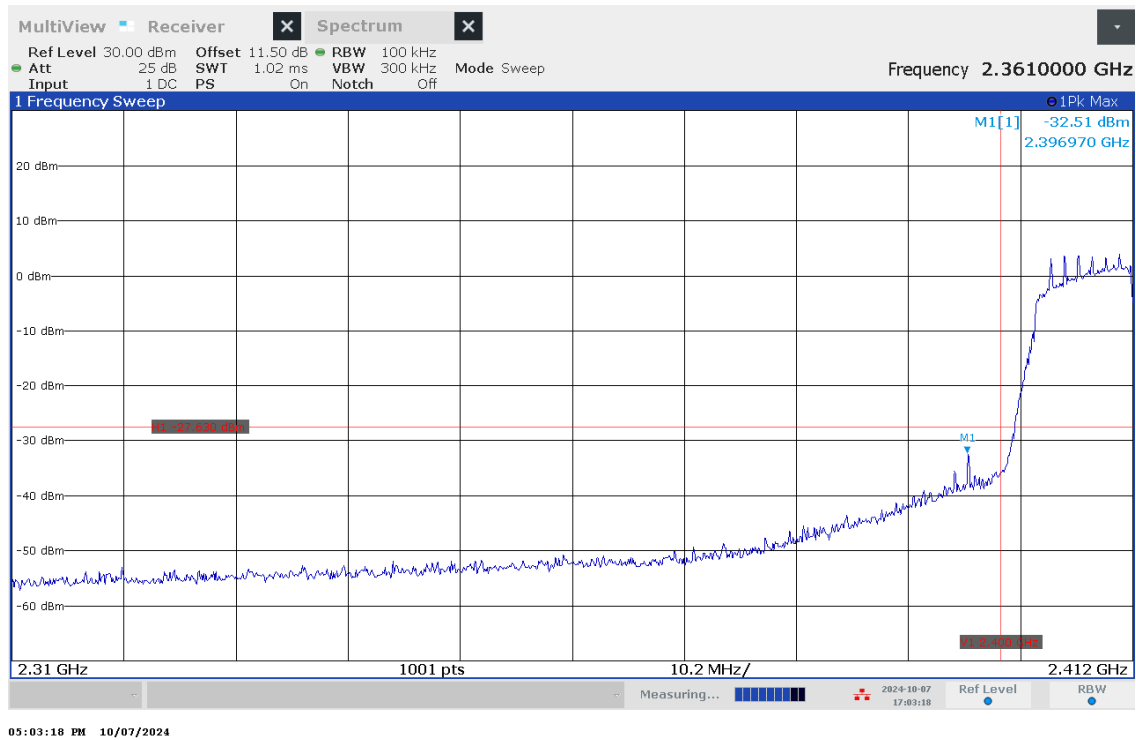


Figure 47 – -30dBc Band Edge - Low Channel

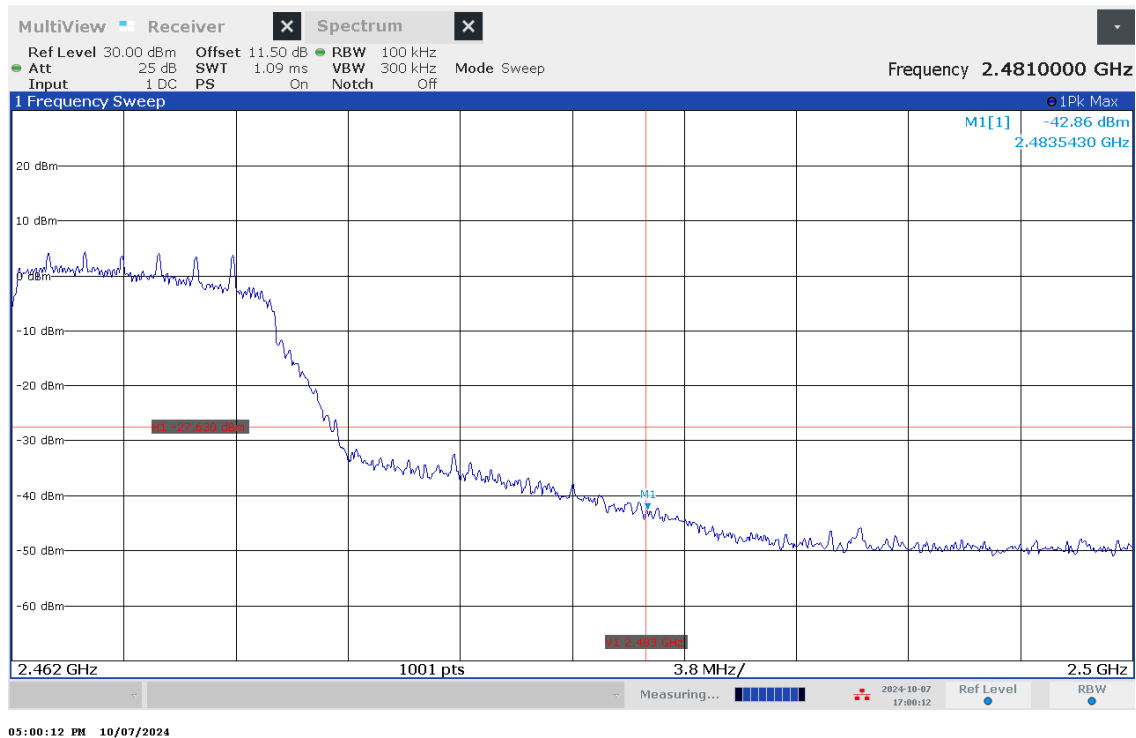


Figure 48 – -30dBc Band Edge - High Channel

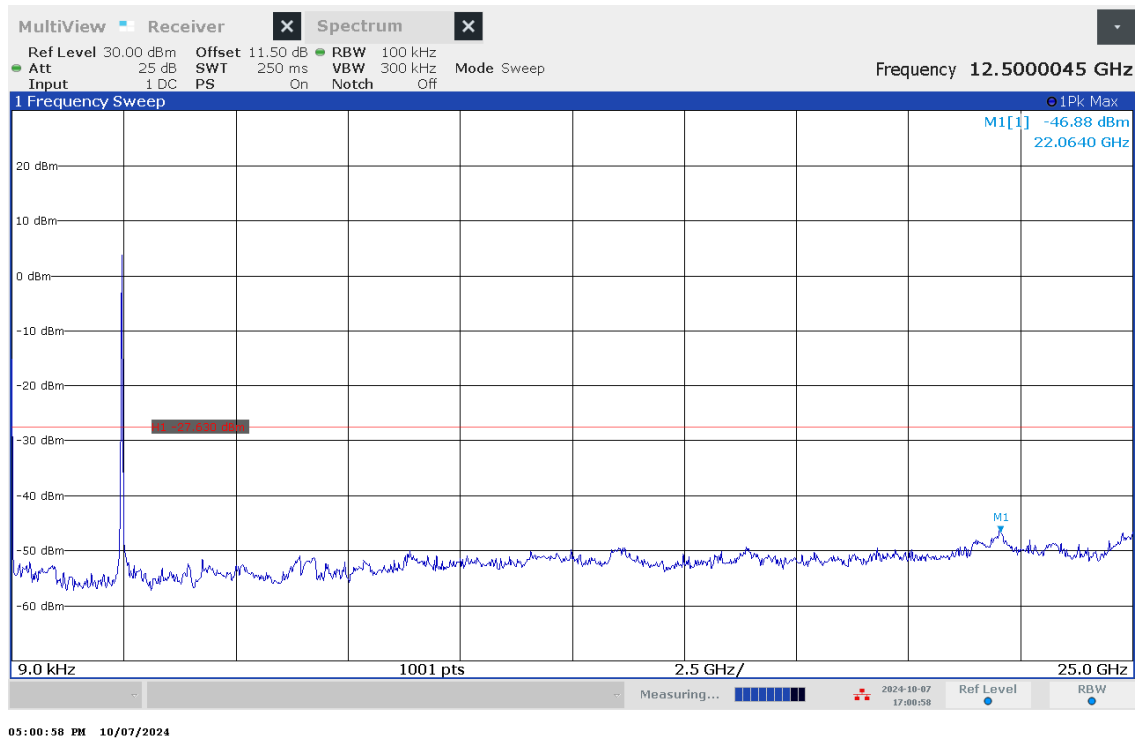


Figure 49 – -30dBc High Channel 9kHz – 25 GHz

4.4.4 Test Equipment List

Equipment ID	Description	Manufacturer	Model	Calibration Date	Calibration Due
EQ_EMC_58	EMI Receiver	Rohde & Schwarz	ESW 44	Mar 1, 2024	Mar 1, 2026
EQ_EMC_115	10dB Attenuator	Fairview Microwave	SA18E-10	NCR	NCR

4.5 Transmitter Spurious Radiated Emissions

Test Date: Oct 01 – 03, 2024
Temperature (°C) 24.9 – 25.6
Relative Humidity (%) 30.1 – 52.1
Barometric Pressure (kPa) 97.5 – 98.0

Initials: MX

4.5.1 Limits

Any radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a), must comply with the general radiated emission limits specified in FCC 15.209(a). Other emissions shall be at least 20dB below the highest level of the intentional transmitter.

Base Standard(s): FCC Subpart C 15.209 and RSS-Gen Section 8.9.

Frequency Range (MHz)	Field Strength Limit		Field Strength at 3m (dBμV/m)	Detector Type / Measurement Bandwidth
	μV/m	Distance		
0.009 – 0.150	2400/F(kHz)	300	128.5 – 104.1	Quasi-Peak‡ / 200Hz
0.150 – 0.490	2400/F(kHz)	300	104.1 – 93.8	Quasi-Peak‡ / 9kHz
0.490 – 1.705	24000/F(kHz)	30	73.8 – 63.0	Quasi-Peak / 9kHz
1.705 – 30	30	30	69.5	Quasi-Peak / 9kHz
30 – 88	100	3	40.0	Quasi-Peak / 120kHz
88 – 216	150	3	43.5	Quasi-Peak / 120kHz
216 – 960	200	3	46.0	Quasi-Peak / 120kHz
960 – 1000	500	3	54.0	Quasi-Peak / 120kHz
Above 1000	500	3	54.0	Average / 1MHz
Above 1000	5000	3	74.0	Peak / 1MHz

‡The emission limits below 1GHz shown in the above table are based on measurements employing a CISPR Quasi-Peak detector except for the frequency bands 9-90 kHz and 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

As per ANSI C63.10 Section 4.1, if the Peak detector measurements do not exceed the Quasi-Peak limits, or Average limits where defined, then the DUT is considered to have passed the requirements.

4.5.2 Test Procedure

Tested according to ANSI C63.10 Section 6.3.

The device under test was setup inside a semi-anechoic chamber with remotely controlled turntable and antenna positioner at a 3m test distance. The DUT was placed on top of a 0.8m high non-conductive table above the reference ground plane for frequencies below 1GHz and 1.5m high for frequencies above 1GHz.

To determine the emission characteristics of the DUT, exploratory radiated emission scans were made while rotating the turntable 0° to 360° and using a Peak detector. The results were recorded in graphical form.

For each suspected emission, final measurements of the DUT radiated emissions with the Quasi-Peak, Average or Peak detector, as defined in the limit tables above, were made with the turntable azimuth rotated 0° to 360° and antenna height varied from 1m to 4m. The antenna was positioned to receive emissions in the vertical and horizontal polarizations such that the maximum radiated emission levels were detected.

As per FCC Part 15.33(a), the DUT was scanned to the 10th harmonic of the highest fundamental frequency.

Testing for 9 kHz – 30 MHz was performed with 3 orthogonal antenna polarities. The worst case results were present in this report.

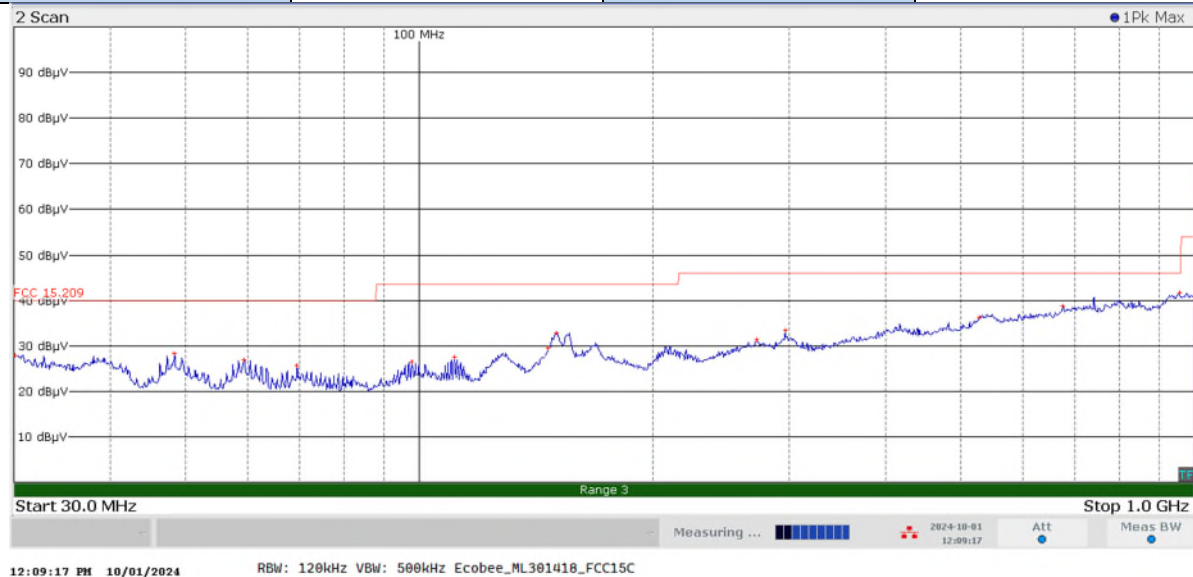
4.5.3 Test Results

Range:	9kHz to 30 MHz	Tx Frequency	2462 MHz
Test Voltage:	24VDC	Antenna Polarization	XZ-Plane



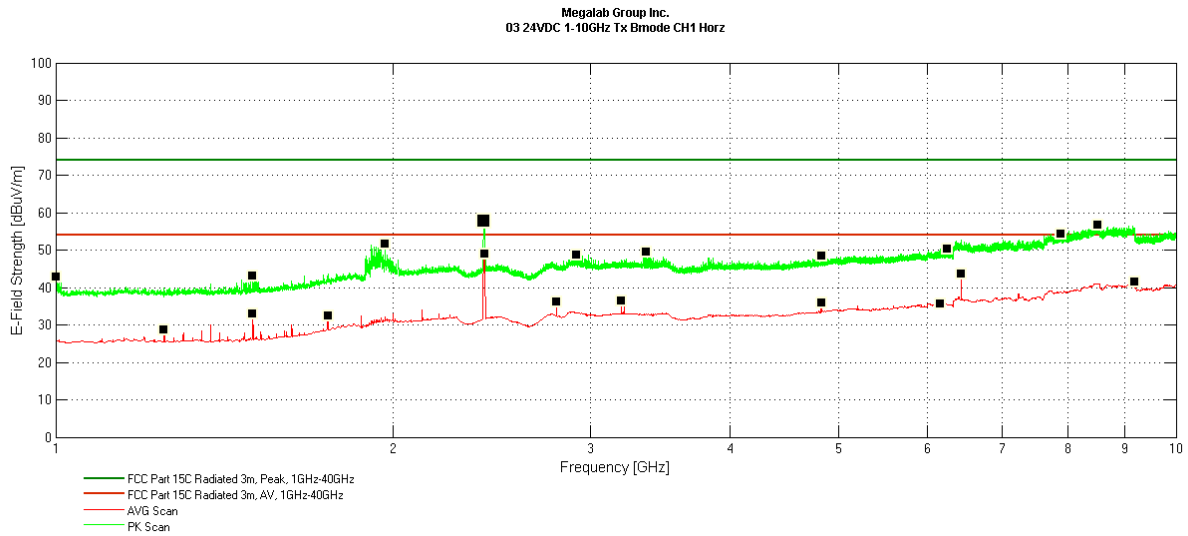
Remark: Quasi-Peak Emission Plot

Range:	30MHz to 1GHz	Tx Frequency	2462 MHz
Test Voltage:	24VDC	Antenna Polarization	Horizontal



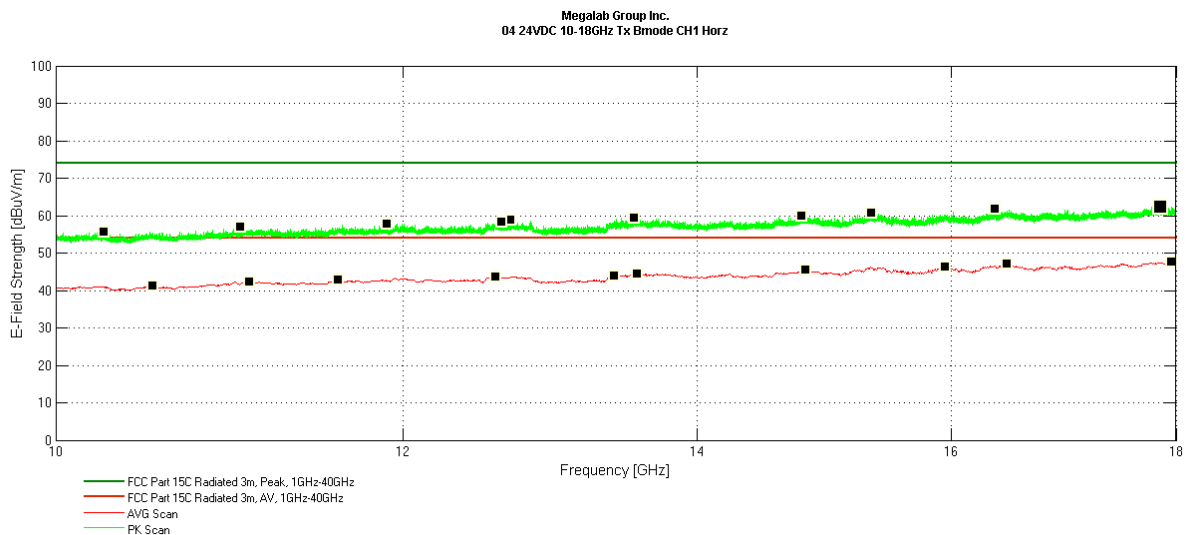
Remark: - Peak Emission Plot
- A Notch filter was used to filter out the fundamental

Range:	1GHz to 10GHz	Tx Frequency	2462 MHz
Test Voltage:	24VDC	Antenna Polarization	Horizontal



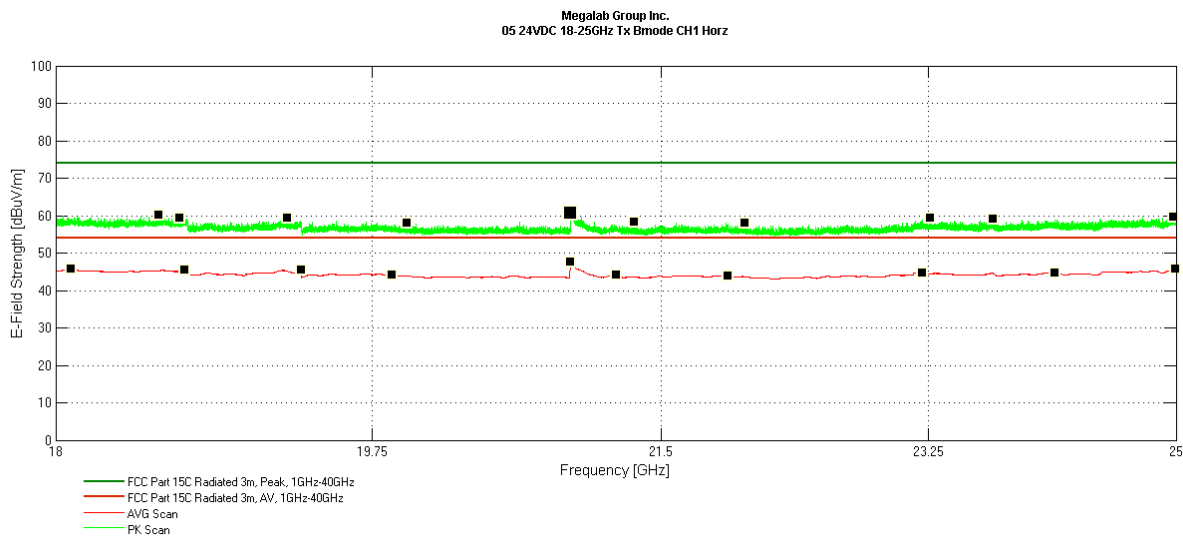
Remark: - **Peak** and **Average** Emission Plot
- A Notch filter was used to filter out the fundamental

Range:	10GHz to 18GHz	Tx Frequency	2462 MHz
Test Voltage:	24VDC	Antenna Polarization	Horizontal



Remark: - **Peak** and **Average** Emission Plot
- A Notch filter was used to filter out the fundamental

Range:	18GHz to 25GHz	Tx Frequency	2462 MHz
Test Voltage:	24VDC	Antenna Polarization	Horizontal



Remark: - **Peak** and **Average** Emission Plot

Horizontal Antenna Polarization							
Frequency (MHz)	Detector	Reading (dBμV)	Correction Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Test Result
956.37	PEAK	41.13	-0.52	41.65	46.0	4.4	Pass
676.5	PEAK	33.95	-4.8	38.75	46.0	7.3	Pass
528.18	PEAK	29.04	-7.31	36.35	46.0	9.7	Pass
150.42	PEAK	13.78	-19.1	32.88	43.5	10.6	Pass
48.36	PEAK	6.36	-21.92	28.28	40.0	11.7	Pass
30.09	PEAK	15.08	-12.92	28.0	40.0	12.0	Pass

Horizontal Antenna Polarization							
Frequency (MHz)	Detector	Reading (dBμV)	Correction Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Test Result
6432.00	AVG	39.4	4.1	43.5	54.0	10.5	Pass
9178.00	AVG	31.8	9.6	41.4	54.0	12.6	Pass
8515.00	PEAK	47.8	8.8	56.6	74.0	17.4	Pass
3200.00	AVG	36.7	-0.5	36.3	54.0	17.7	Pass
2800.00	AVG	37.6	-1.4	36.2	54.0	17.8	Pass

4.5.3.1. 802.11 b (Horizontal Antenna Polarization)

Horizontal Antenna Polarization – Harmonic Emissions							
Frequency (MHz)	Detector	Reading (dBμV)	Correction Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Test Result
Low Channel							
4824	PEAK	46.9	0.9	47.8	74.0	26.2	Pass
4824	AVG	37.2	0.9	38.1	54.0	15.9	Pass
7236	PEAK	45.9	4.4	50.3	74.0	23.7	Pass
7236	AVG	34.6	4.4	39.0	54.0	15.0	Pass
Mid Channel							
4874	PEAK	48.6	1.1	49.7	74.0	24.3	Pass
4874	AVG	36.3	1.1	37.4	54.0	16.6	Pass
7311	PEAK	45.8	4.4	50.2	74.0	23.8	Pass
7311	AVG	35.1	4.4	39.5	54.0	14.5	Pass
High Channel							
4924	PEAK	47.1	1.2	48.4	74.0	25.6	Pass
4924	AVG	37.6	1.2	38.8	54.0	15.2	Pass
7386	PEAK	46.0	4.4	50.4	74.0	23.6	Pass
7386	AVG	35.2	4.4	39.6	54.0	14.4	Pass

4.5.3.2. 802.11 g (Horizontal Antenna Polarization)

Horizontal Antenna Polarization – Harmonic Emissions							
Frequency (MHz)	Detector	Reading (dBμV)	Correction Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Test Result
Low Channel							
4824	PEAK	47.1	0.9	48.0	74.0	26.0	Pass
4824	AVG	37.0	0.9	37.9	54.0	16.1	Pass
7236	PEAK	45.5	4.4	49.9	74.0	24.1	Pass
7236	AVG	34.1	4.4	38.5	54.0	15.5	Pass
Mid Channel							
4874	PEAK	47.9	1.1	48.9	74.0	25.1	Pass
4874	AVG	36.1	1.1	37.2	54.0	16.8	Pass
7311	PEAK	45.7	4.4	50.1	74.0	23.9	Pass
7311	AVG	34.4	4.4	38.7	54.0	15.3	Pass
High Channel							
4924	PEAK	47.2	1.2	48.4	74.0	25.6	Pass
4924	AVG	38.2	1.2	39.4	54.0	14.6	Pass
7386	PEAK	46.6	4.4	51.0	74	23.0	Pass
7386	AVG	35.7	4.4	40.1	54	13.9	Pass

4.5.3.3. 802.11 n (Horizontal Antenna Polarization)

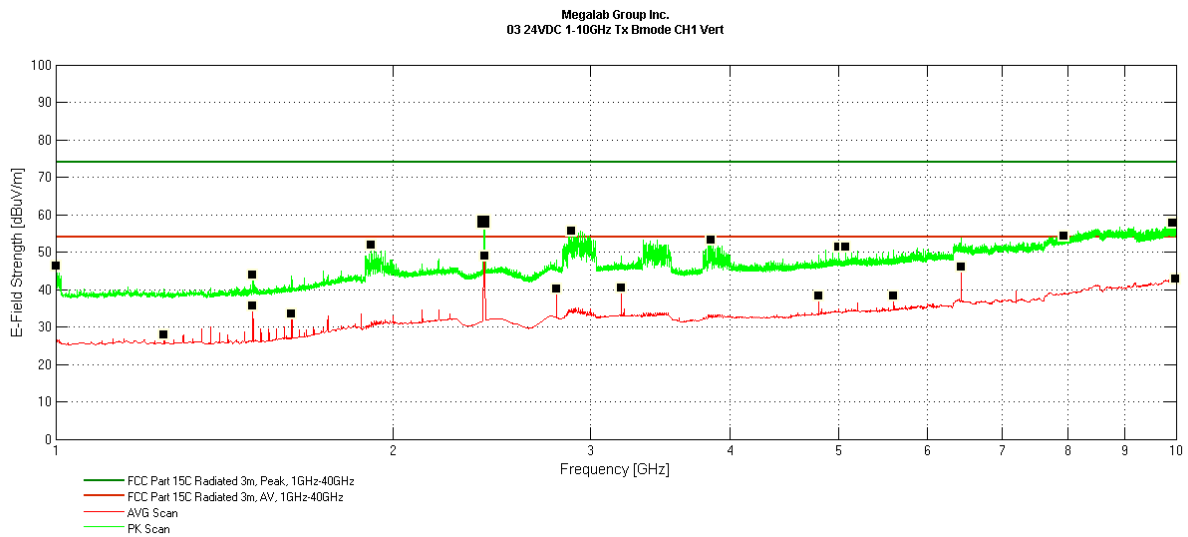
Horizontal Antenna Polarization – Harmonic Emissions							
Frequency (MHz)	Detector	Reading (dBμV)	Correction Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Test Result
Low Channel							
4824	PEAK	46.4	0.9	47.3	74.0	26.7	Pass
4824	AVG	36.3	0.9	37.1	54.0	16.9	Pass
7236	PEAK	45.1	4.4	49.5	74.0	24.5	Pass
7236	AVG	33.7	4.4	38.1	54.0	15.9	Pass
Mid Channel							
4874	PEAK	48.8	1.1	49.9	74.0	24.1	Pass
4874	AVG	36.1	1.1	37.2	54.0	16.8	Pass
7311	PEAK	46.4	4.4	50.7	74.0	23.3	Pass
7311	AVG	35.3	4.4	39.7	54.0	14.3	Pass
High Channel							
4924	PEAK	47.1	1.2	48.4	74.0	25.6	Pass
4924	AVG	38.6	1.2	39.8	54.0	14.2	Pass
7386	PEAK	46.8	4.4	51.2	74	22.8	Pass
7386	AVG	35.4	4.4	39.8	54	14.2	Pass

Range:	30MHz to 1GHz	Tx Frequency	2462 MHz
Test Voltage:	24VDC	Antenna Polarization	Vertical



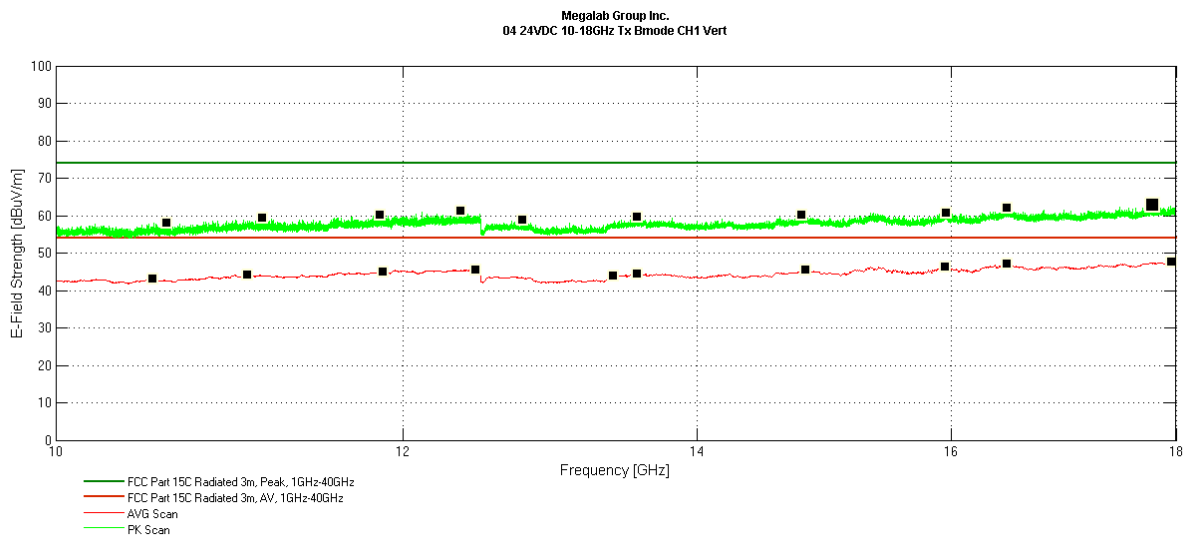
Remark: - Peak Emission Plot
- A Notch filter was used to filter out the fundamental

Range:	1GHz to 10GHz	Tx Frequency	2462 MHz
Test Voltage:	24VDC	Antenna Polarization	Vertical



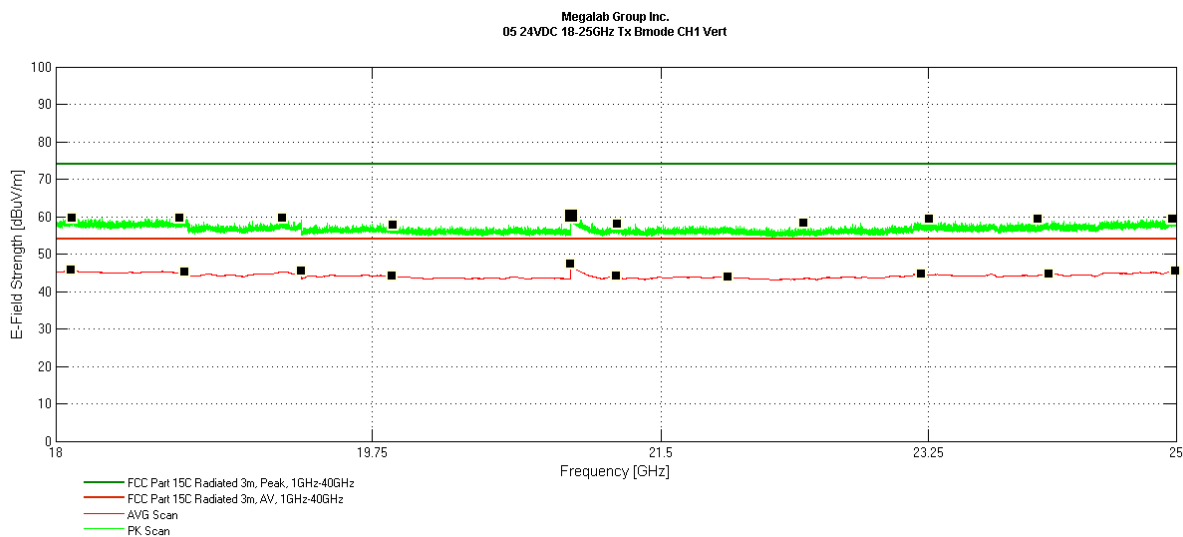
Remark: - **Peak** and **Average** Emission Plot
- A Notch filter was used to filter out the fundamental

Range:	10GHz to 18GHz	Tx Frequency	2462 MHz
Test Voltage:	24VDC	Antenna Polarization	Vertical



Remark: - **Peak** and **Average** Emission Plot
- A Notch filter was used to filter out the fundamental

Range:	18GHz to 25GHz	Tx Frequency	2462 MHz
Test Voltage:	24VDC	Antenna Polarization	Vertical



Remark: **Peak** and **Average** Emission Plot

Vertical Antenna Polarization							
Frequency (MHz)	Detector	Reading (dBμV)	Correction Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Test Result
952.02	PEAK	41.54	-0.55	42.09	46.0	3.9	Pass
695.28	PEAK	34.46	-4.35	38.81	46.0	7.2	Pass
161.01	PEAK	17.21	-18.39	35.6	43.5	7.9	Pass
49.35	PEAK	8.63	-22.15	30.78	40.0	9.2	Pass
525.51	PEAK	28.43	-7.58	36.01	46.0	10.0	Pass
31.02	PEAK	16.17	-13.48	29.65	40.0	10.4	Pass

Vertical Antenna Polarization							
Frequency (MHz)	Detector	Reading (dBμV)	Correction Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Test Result
6432	AVG	41.93	4.05	45.99	54	8.0	Pass
10000	AVG	32.2	10.5	42.7	54	11.3	Pass
3200	AVG	40.95	-0.46	40.49	54	13.5	Pass
2800	AVG	41.46	-1.37	40.09	54	13.9	Pass
5600	AVG	35.38	3.0	38.38	54	15.6	Pass

4.5.3.4. 802.11 b (Vertical Antenna Polarization)

Vertical Antenna Polarization – Harmonic Emissions							
Frequency (MHz)	Detector	Reading (dBμV)	Correction Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Test Result
Low Channel							
4824	PEAK	51.1	0.9	52.0	74.0	22.0	Pass
4824	AVG	40.8	0.9	41.7	54.0	12.3	Pass
7236	PEAK	45.4	4.4	49.8	74.0	24.2	Pass
7236	AVG	34.2	4.4	38.6	54.0	15.4	Pass
Mid Channel							
4874	PEAK	52.5	1.1	53.6	74.0	20.4	Pass
4874	AVG	42.2	1.1	43.3	54.0	10.7	Pass
7311	PEAK	45.7	4.4	50.1	74.0	23.9	Pass
7311	AVG	34.3	4.4	38.7	54.0	15.3	Pass
High Channel							
4924	PEAK	52.5	1.2	53.7	74.0	20.3	Pass
4924	AVG	43.5	1.2	44.7	54.0	9.3	Pass
7386	PEAK	46.0	4.4	50.4	74.0	23.6	Pass
7386	AVG	34.8	4.4	39.2	54.0	14.8	Pass

4.5.3.5. 802.11 g (Vertical Antenna Polarization)

Vertical Antenna Polarization – Harmonic Emissions							
Frequency (MHz)	Detector	Reading (dBμV)	Correction Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Test Result
Low Channel							
4824	PEAK	51.2	0.9	52.1	74.0	21.9	Pass
4824	AVG	40.6	0.9	41.5	54.0	12.5	Pass
7236	PEAK	45.7	4.4	50.1	74.0	23.9	Pass
7236	AVG	34.2	4.4	38.6	54.0	15.4	Pass
Mid Channel							
4874	PEAK	52.3	1.1	53.4	74.0	20.6	Pass
4874	AVG	41.2	1.1	42.3	54.0	11.7	Pass
7311	PEAK	45.5	4.4	49.9	74.0	24.1	Pass
7311	AVG	33.7	4.4	38.1	54.0	15.9	Pass
High Channel							
4924	PEAK	52.8	1.2	54.0	74.0	20.0	Pass
4924	AVG	43.8	1.2	45.0	54.0	9.0	Pass
7386	PEAK	46.1	4.4	50.5	74.0	23.5	Pass
7386	AVG	34.8	4.4	39.3	54.0	14.7	Pass

4.5.3.6. 802.11 n (Vertical Antenna Polarization)

Vertical Antenna Polarization – Harmonic Emissions							
Frequency (MHz)	Detector	Reading (dBμV)	Correction Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Test Result
Low Channel							
4824	PEAK	50.9	0.9	51.8	74.0	22.2	Pass
4824	AVG	40.3	0.9	41.2	54.0	12.8	Pass
7236	PEAK	45.0	4.4	49.4	74.0	24.6	Pass
7236	AVG	33.9	4.4	38.2	54.0	15.8	Pass
Mid Channel							
4874	PEAK	52.6	1.1	53.7	74.0	20.3	Pass
4874	AVG	41.7	1.1	42.8	54.0	11.2	Pass
7311	PEAK	45.6	4.4	50.0	74.0	24.0	Pass
7311	AVG	34.0	4.4	38.4	54.0	15.6	Pass
High Channel							
4924	PEAK	53.1	1.2	54.3	74.0	19.7	Pass
4924	AVG	44.3	1.2	45.5	54.0	8.5	Pass
7386	PEAK	46.1	4.4	50.5	74.0	23.5	Pass
7386	AVG	35.5	4.4	40.0	54.0	14.0	Pass

4.5.4 Test Equipment List

Equipment ID	Description	Manufacturer	Model	Calibration Date	Calibration Due
EQ_EMC_58	EMI Receiver	Rohde & Schwarz	ESW 44	Mar 1, 2024	Mar 1, 2026
EQ_EMC_132	EMI Test Receiver (v6.91.2)	Gauss Instruments	TDEMI X40	Nov 29, 2023	Nov 29, 2025
EQ_EMC_48	Loop Antenna	Com-Power	AL-130R	Apr 9, 2024	Apr 9, 2026
EQ_EMC_59	BiLog Antenna	ETS Lindgren	3142E	Apr 19, 2024	Apr 19, 2026
EQ_EMC_60	Horn Antenna	ETS Lindgren	3117	Apr 9, 2024	Apr 9, 2026
EQ_EMC_56	DRG Horn Antenna 18GHz-40GHz	A.H Systems	SAS-574	Apr 8, 2024	Apr 8, 2026
EQ_EMC_68	6dB Attenuator	Fairview Microwave	SA3NS-06	Apr 19, 2024	Apr 19, 2026
EQ_EMC_85	RF Cable <1GHz	Times Microwave	LMR-400	NCR	NCR
EQ_EMC_75	RF Cable >1GHz	MegaPhase	EMC2	NCR	NCR
EQ_EMC_123	Preamplifier 30MHz-9GHz	RF Bay	EPA-250T	Jan 23, 2024	Jan 23, 2026
EQ_EMC_42	Preamplifier 1GHz-18GHz	Com-Power	PAM-118A	Jan 17, 2024	Jan 17, 2026
EQ_EMC_43	Preamplifier 18GHz-40GHz	Com-Power	PAM-840A	Jan 31, 2024	Jan 31, 2026
EQ_EMC_108	2400 - 2500MHz Notch Filter	Micro-Tronics	BRM50702	NCR	NCR
EQ_EMC_149	Emission Software RE/CE	Gauss Instruments	EMI64k v6.31.2	NCR	NCR

4.6 Lower and Upper Band Edges

Test Date:	October 3, 2024
Temperature (°C)	25.6
Relative Humidity (%)	30.1
Barometric Pressure (kPa)	98.0

Initials: MX

4.6.1 Limits

Any radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a), must comply with the general radiated emission limits specified in FCC 15.209(a).

4.6.2 Test Procedure

Tested according to ANSI C63.10 Section 11.12

The device under test was setup inside a semi-anechoic chamber with remotely controlled turntable and antenna positioner at a 3m test distance. The DUT was placed on top of a 0.8m high non-conductive table above the reference ground plane for frequencies below 1GHz and 1.5m high for frequencies above 1GHz.

For both the lower and upper radiated band edges, the radiated emission was first maximized on the center frequency of the low and high channels with the turntable azimuth rotated 0° to 360° and antenna height varied from 1m to 4m. Once maximized, the start and stop frequency were adjusted to capture that channel's lower and upper band edges inside the restricted bands.

The antenna was positioned to receive emissions in the vertical and horizontal polarizations such that the maximum radiated emission levels were detected.

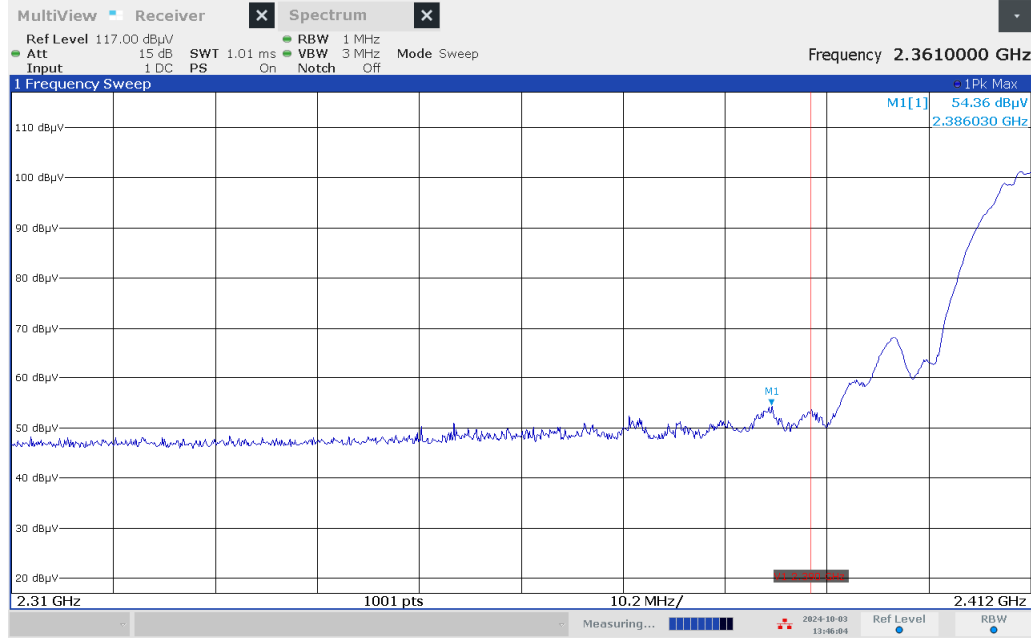
The radiated band edge measurements were made with the DUT in normal operation position.

4.6.3 Test Results – 802.11 b

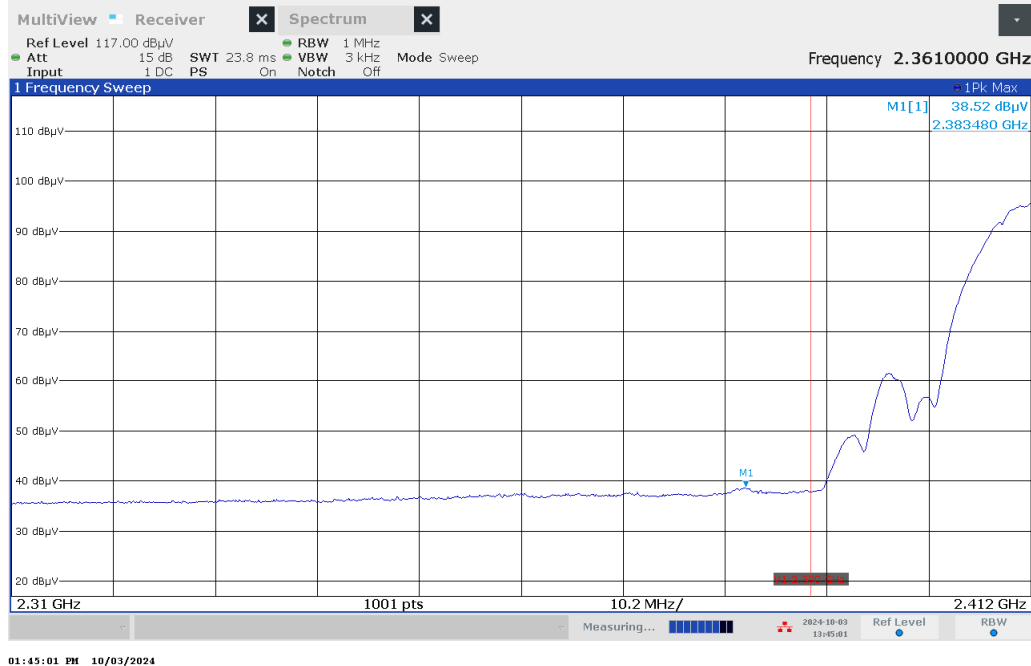
The DUT met the band edge requirements. Peak output power for low, mid and high channels were measured and the Plots Section below contains the maximum radiated emission levels captured on the spectrum analyzer at the band edges. The Final Measurements Section contains the final results with the correction factors added in.

4.6.3.1. Plots

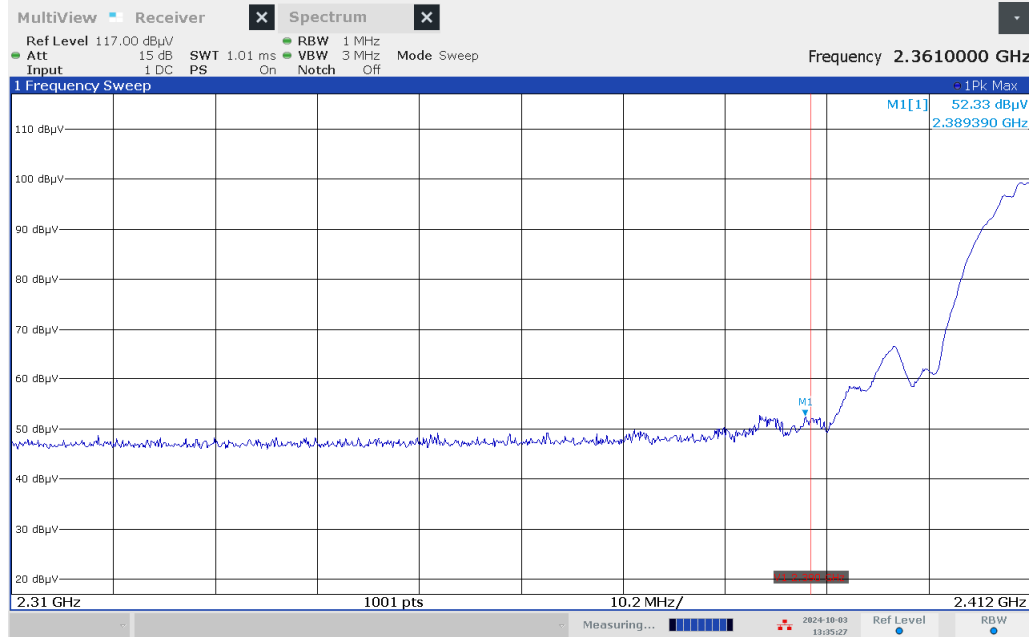
Tx Frequency	Low Channel	Antenna Polarization	Horizontal	Emission	Peak
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Tx Frequency	Low Channel	Antenna Polarization	Horizontal	Emission	Average
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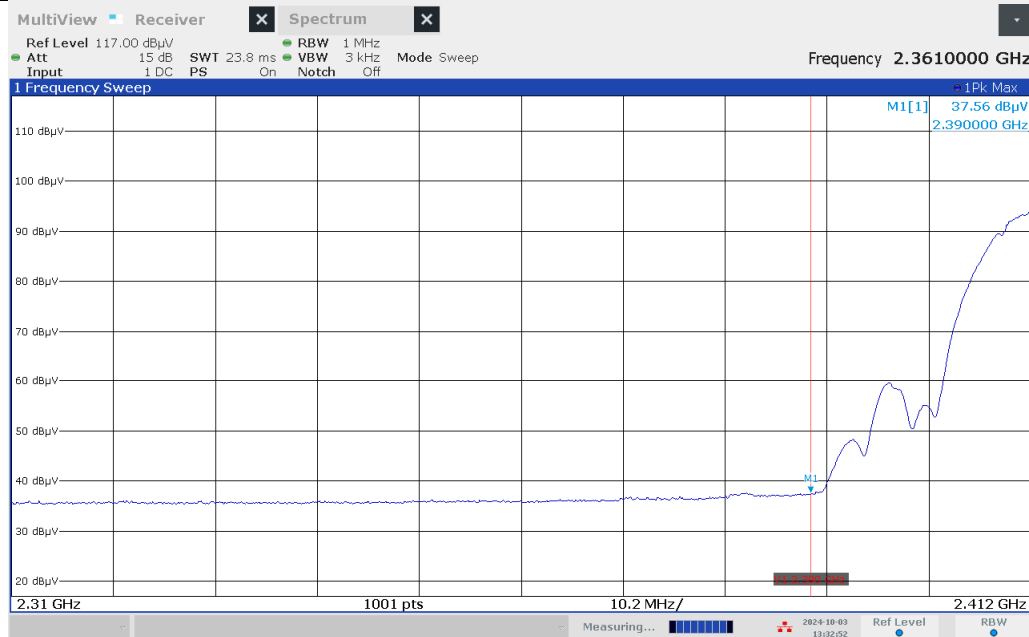


Tx Frequency	Low Channel	Antenna Polarization	Vertical	Emission	Peak
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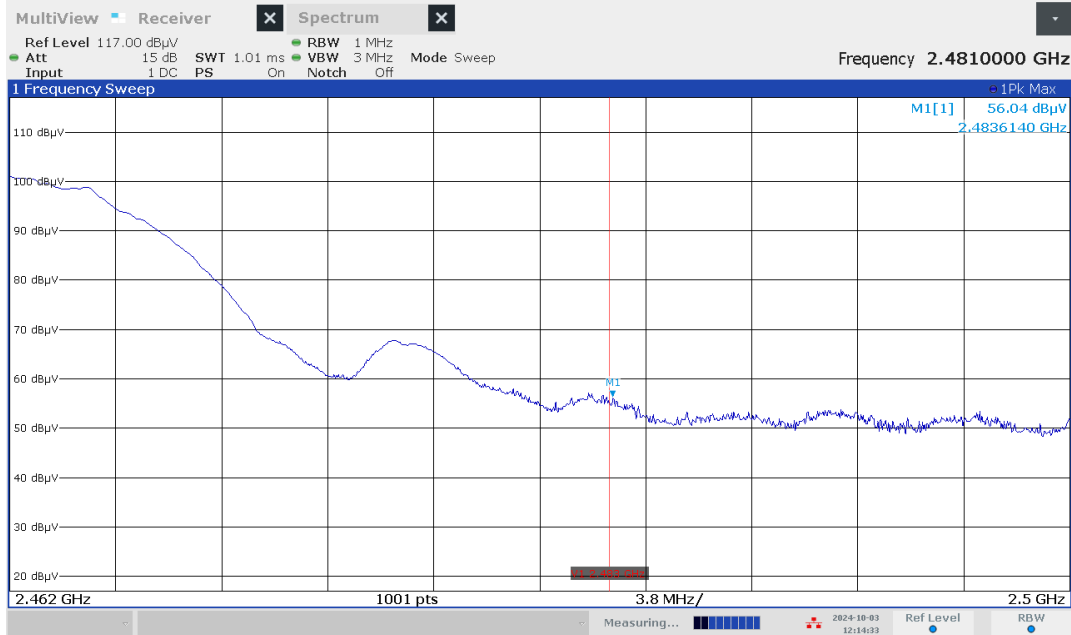
01:35:28 PM 10/03/2024

Tx Frequency	Low Channel	Antenna Polarization	Vertical	Emission	Average
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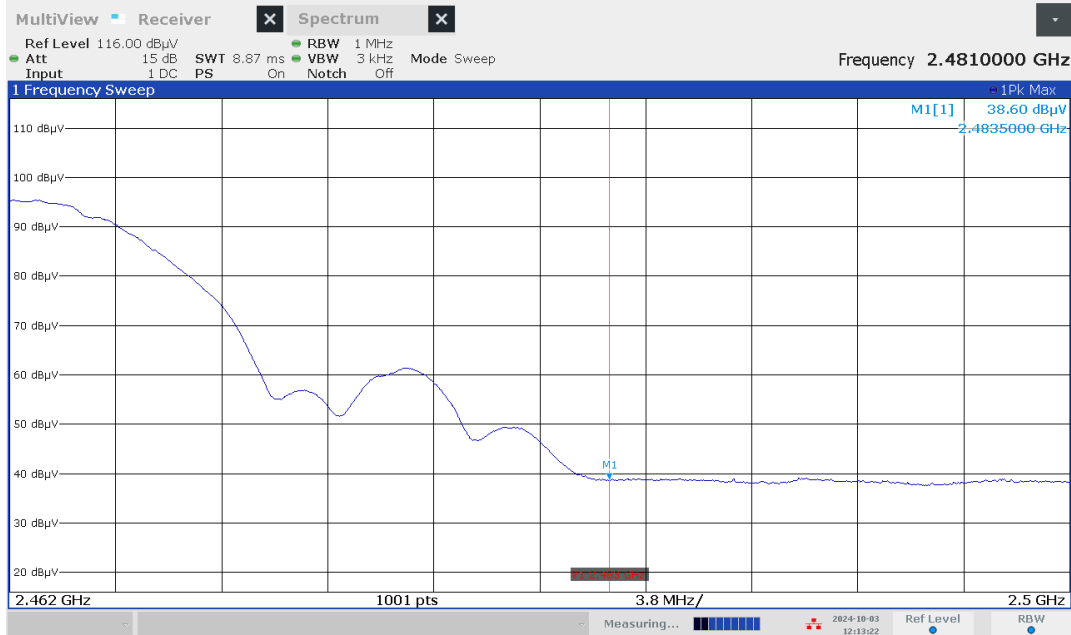


01:32:53 PM 10/03/2024

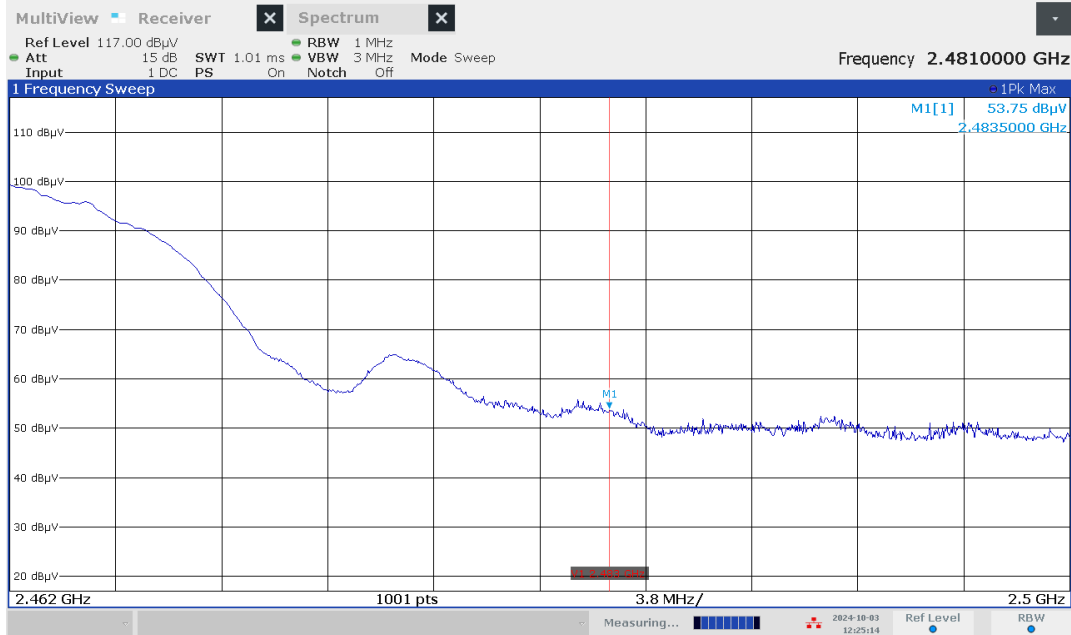
Tx Frequency	High Channel	Antenna Polarization	Horizontal	Emission	Peak
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Tx Frequency	High Channel	Antenna Polarization	Horizontal	Emission	Average
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Tx Frequency	High Channel	Antenna Polarization	Vertical	Emission	Peak
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12:25:14 PM 10/03/2024

Tx Frequency	High Channel	Antenna Polarization	Vertical	Emission	Average
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12:23:06 PM 10/03/2024

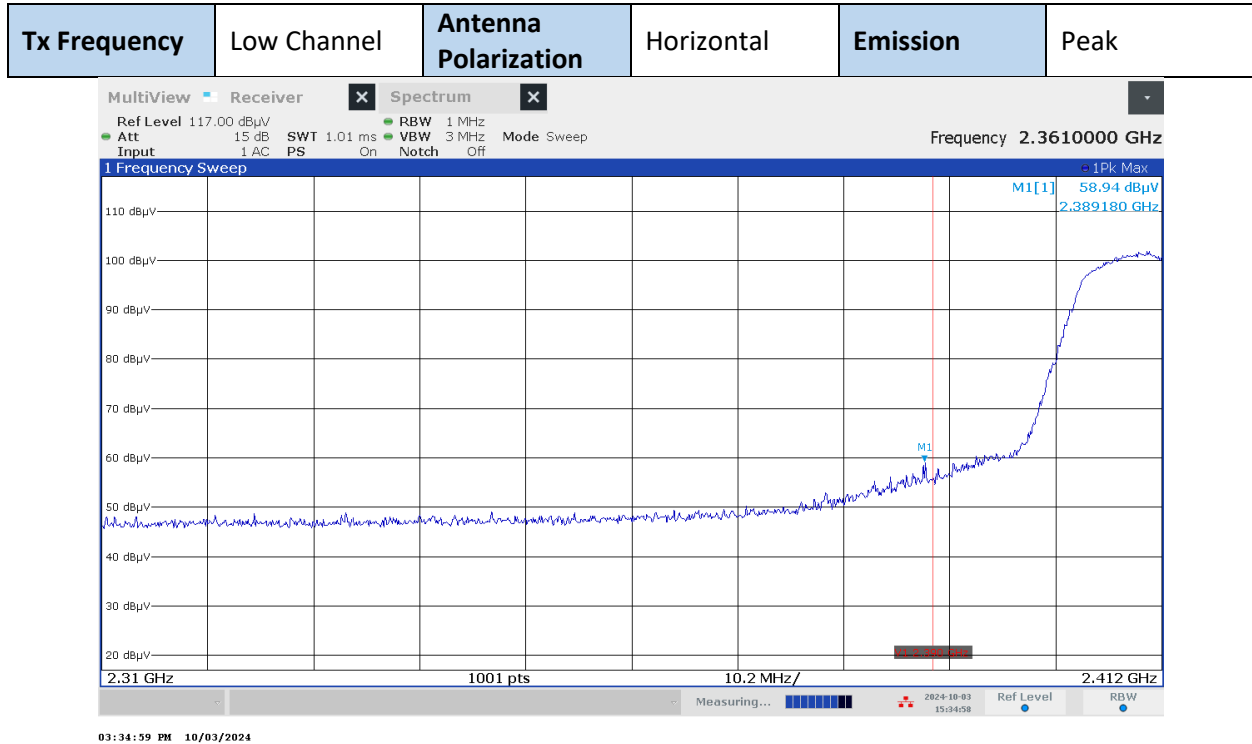
4.6.3.2. Final Measurements

Frequency (MHz)	Detector	Antenna Polarity	Reading (dBμV)	Antenna Factor (dB/m)	Cable Factor (dB)	Attenuator (dB)	Pre-Amp Gain (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Test Result
Low Channel											
B-Mode											
2412	PEAK	Horz	101.1	32.5	6.8	10.0	-41.6	108.8			Pass
2412	AVG	Horz	94.6	32.5	6.8	10.0	-41.6	102.2			Pass
2412	PEAK	Vert	99.6	32.5	6.8	10.0	-41.6	107.3			Pass
2412	AVG	Vert	93.9	32.5	6.8	10.0	-41.6	101.5			Pass
2390	PEAK	Horz	53.8	32.4	6.8	10.0	-41.6	61.5	74.0	12.5	Pass
2390	AVG	Horz	38.5	32.4	6.8	10.0	-41.6	46.2	54.0	7.8	Pass
2390	PEAK	Vert	52.3	32.4	6.8	10.0	-41.6	60.0	74.0	14.0	Pass
2390	AVG	Vert	37.6	32.4	6.8	10.0	-41.6	45.2	54.0	8.8	Pass
High Channel											
B-Mode											
2462	PEAK	Horz	101.1	32.5	6.9	10.0	-41.7	108.8			Pass
2462	AVG	Horz	94.8	32.5	6.9	10.0	-41.7	102.5			Pass
2462	PEAK	Vert	99.3	32.5	6.9	10.0	-41.7	107.1			Pass
2462	AVG	Vert	93.0	32.5	6.9	10.0	-41.7	100.8			Pass
2483.6	PEAK	Horz	56.0	32.6	6.9	10.0	-41.7	63.8	74.0	10.2	Pass
2483.5	AVG	Horz	38.6	32.6	6.9	10.0	-41.7	46.3	54.0	7.7	Pass
2483.6	PEAK	Vert	53.8	32.6	6.9	10.0	-41.7	61.5	74.0	12.5	Pass
2483.5	AVG	Vert	37.8	32.6	6.9	10.0	-41.7	45.6	54.0	8.4	Pass

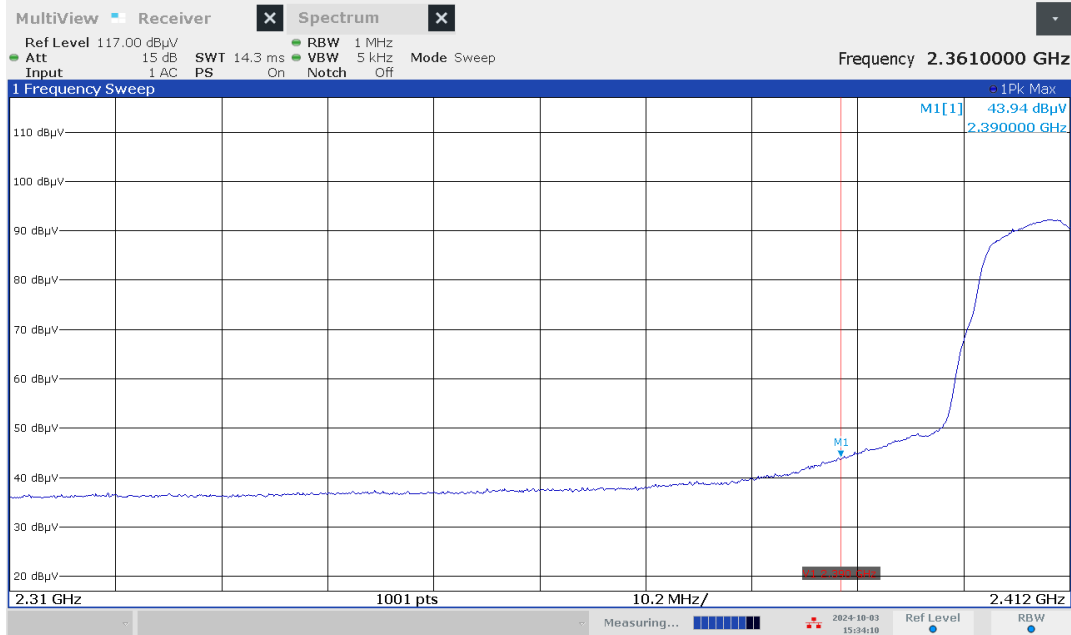
4.6.4 Test Results – 802.11 g

The DUT met the band edge requirements. Peak output power for low, mid and high channels were measured and the Plots Section below contains the maximum radiated emission levels captured on the spectrum analyzer at the band edges. The Final Measurements Section contains the final results with the correction factors added in.

4.6.4.1. Plots

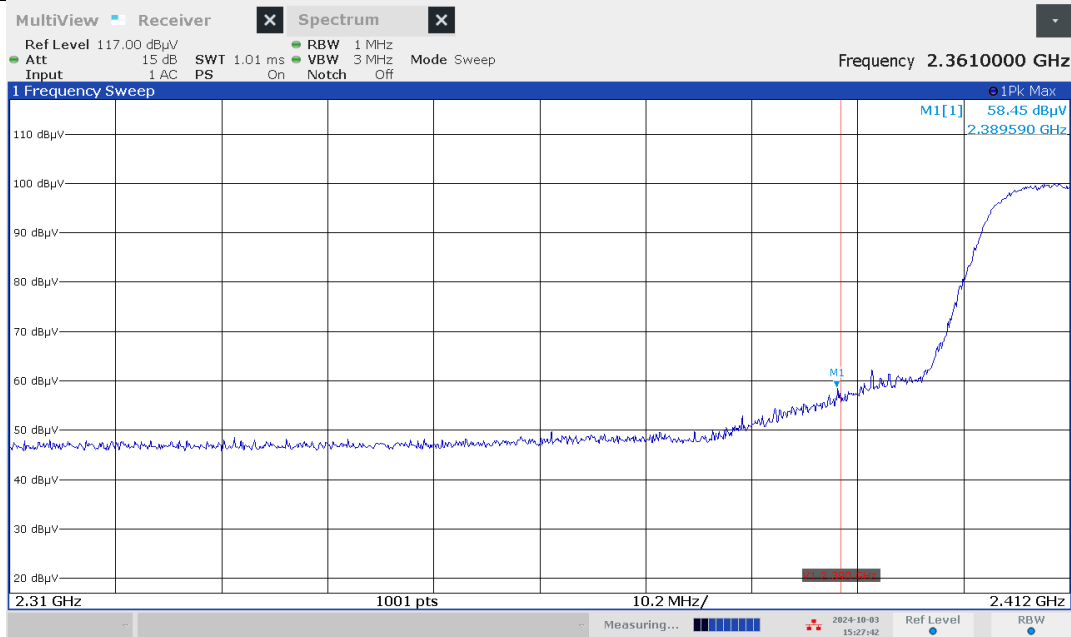


Tx Frequency	Low Channel	Antenna Polarization	Horizontal	Emission	Average
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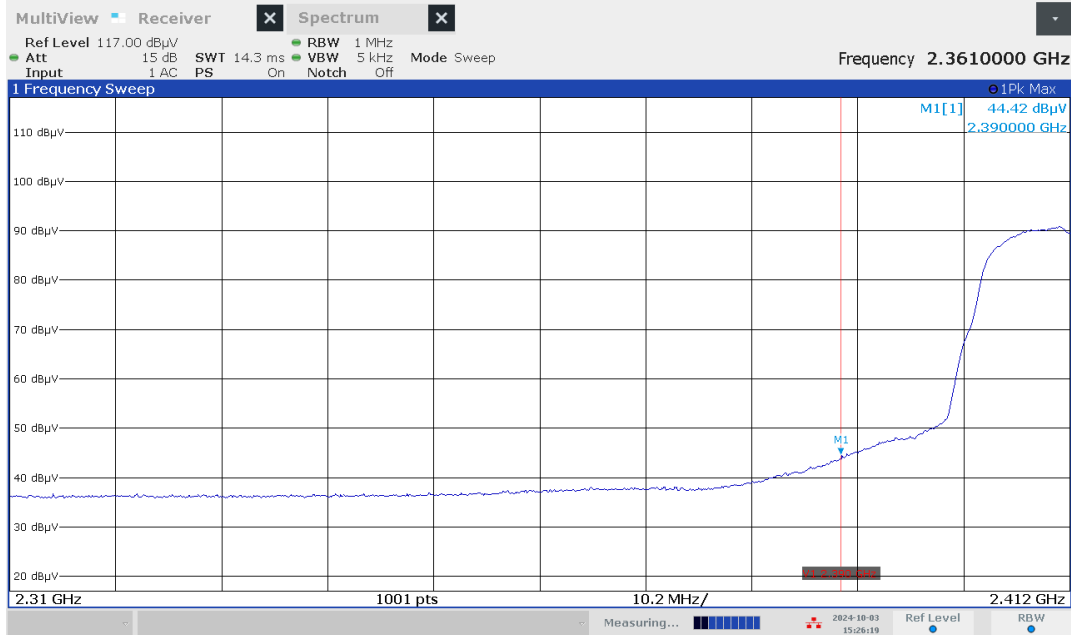
03:34:11 PM 10/03/2024

Tx Frequency	Low Channel	Antenna Polarization	Vertical	Emission	Peak
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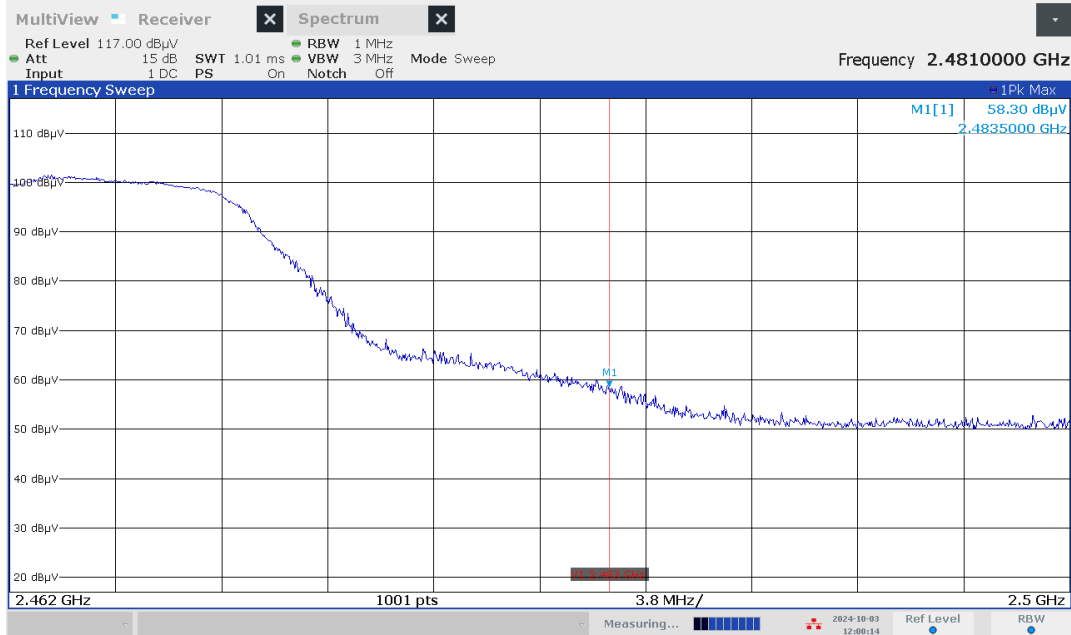
03:27:43 PM 10/03/2024

Tx Frequency	Low Channel	Antenna Polarization	Vertical	Emission	Average
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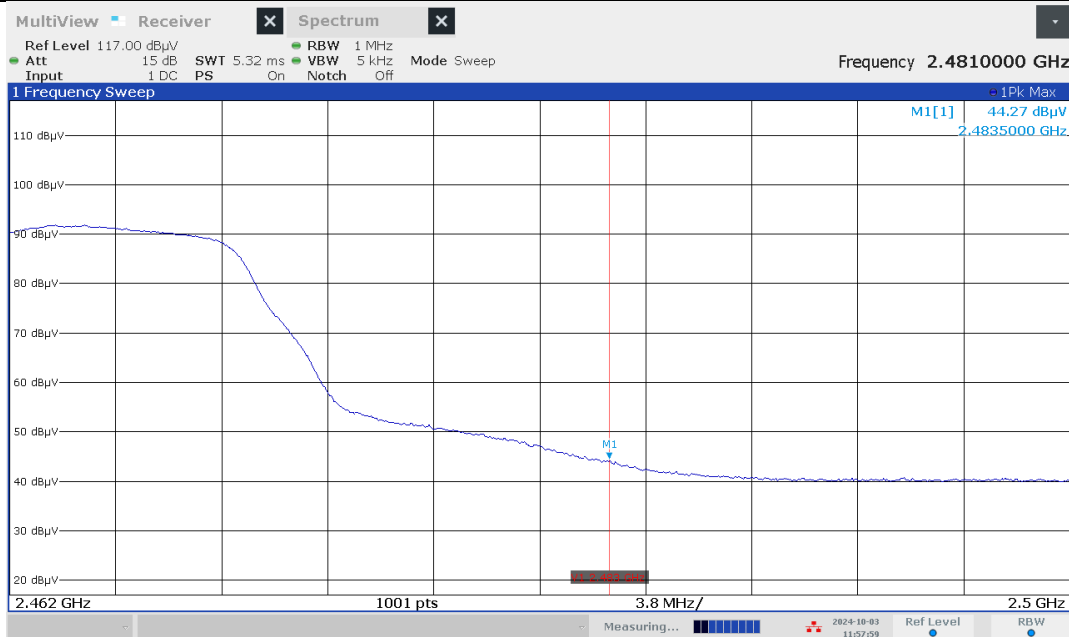
03:26:20 PM 10/03/2024

Tx Frequency	High Channel	Antenna Polarization	Horizontal	Emission	Peak
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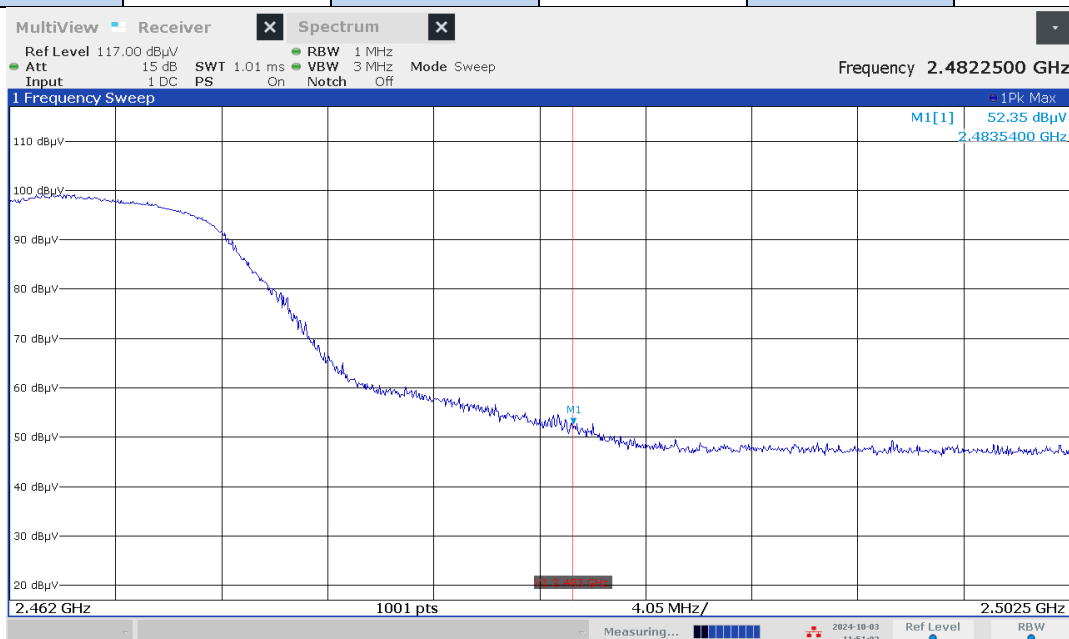
12:00:14 PM 10/03/2024

Tx Frequency	High Channel	Antenna Polarization	Horizontal	Emission	Average
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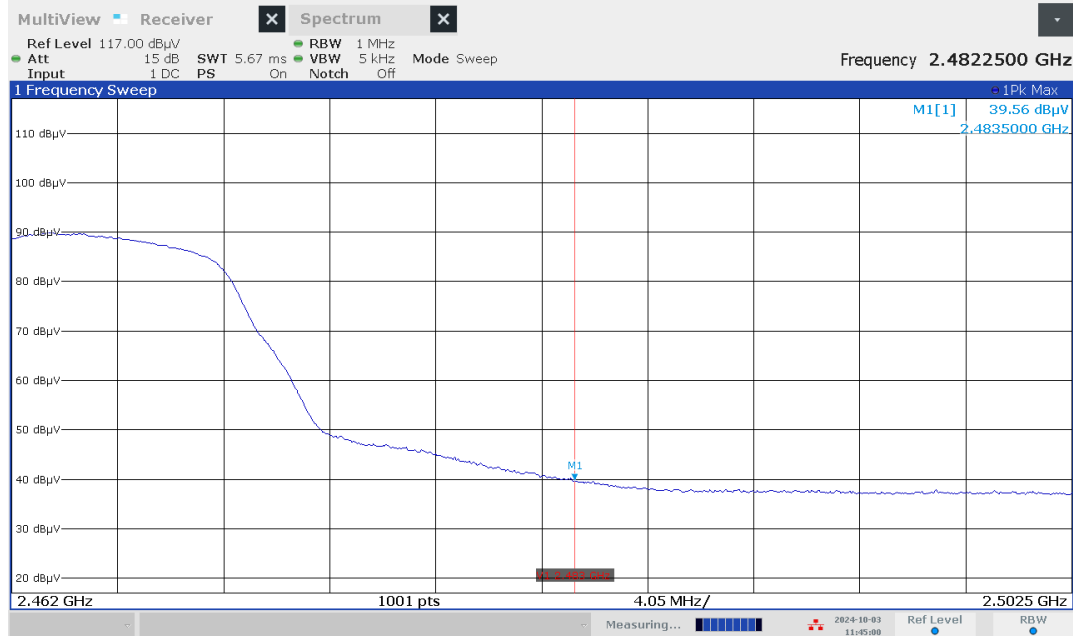
11:58:00 AM 10/03/2024

Tx Frequency	High Channel	Antenna Polarization	Vertical	Emission	Peak
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11:51:04 AM 10/03/2024

Tx Frequency	High Channel	Antenna Polarization	Vertical	Emission	Average
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11:45:00 AM 10/03/2024

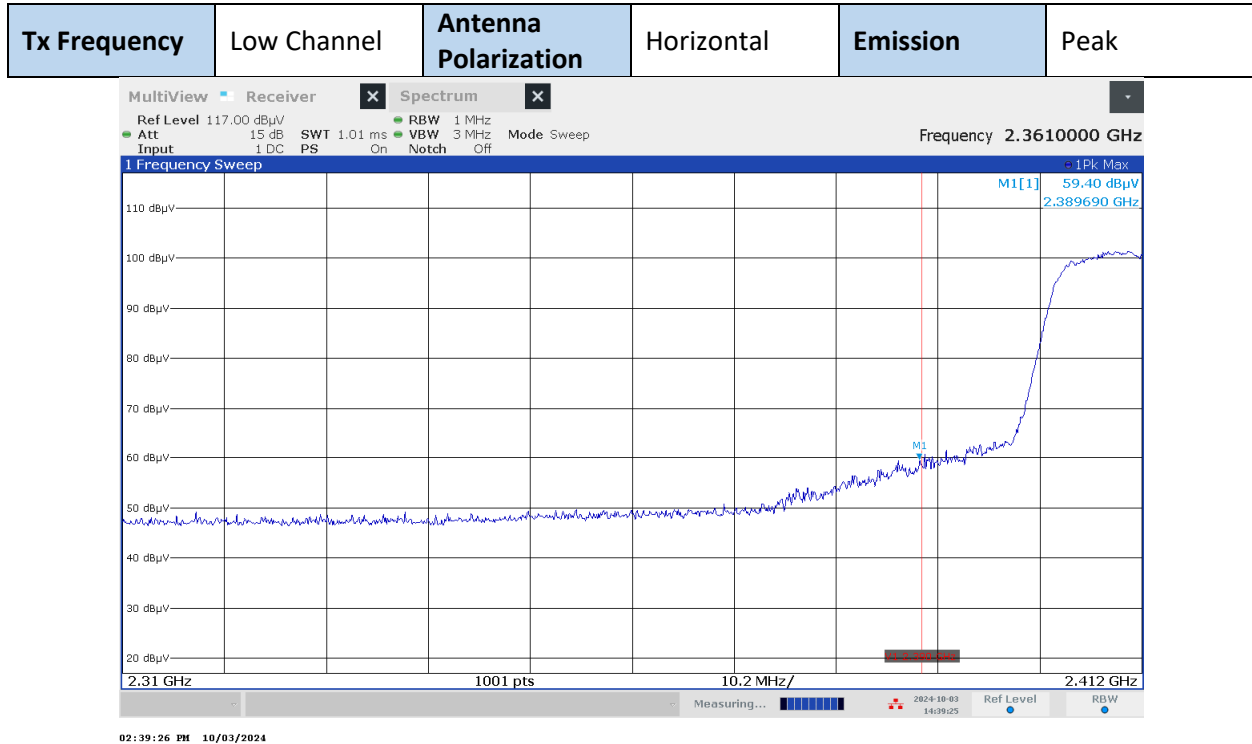
4.6.4.2. Final Measurements

Frequency (MHz)	Detector	Antenna Polarity	Reading (dBμV)	Antenna Factor (dB/m)	Cable Factor (dB)	Attenuator (dB)	Pre-Amp Gain (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Test Result
Low Channel											
G-Mode											
2412	PEAK	Horz	102.0	32.5	6.8	10.0	-41.6	109.6			Pass
2412	AVG	Horz	91.9	32.5	6.8	10.0	-41.6	99.5			Pass
2412	PEAK	Vert	100.5	32.5	6.8	10.0	-41.6	108.2			Pass
2412	AVG	Vert	90.4	32.5	6.8	10.0	-41.6	98.1			Pass
2390	PEAK	Horz	58.9	32.4	6.8	10.0	-41.6	66.6	74.0	7.4	Pass
2390	AVG	Horz	43.9	32.4	6.8	10.0	-41.6	51.6	54.0	2.4	Pass
2390	PEAK	Vert	58.5	32.4	6.8	10.0	-41.6	66.1	74.0	7.9	Pass
2390	AVG	Vert	44.4	32.4	6.8	10.0	-41.6	52.1	54.0	1.9	Pass
High Channel											
G-Mode											
2462	PEAK	Horz	101.5	32.5	6.9	10.0	-41.7	109.3			Pass
2462	AVG	Horz	91.1	32.5	6.9	10.0	-41.7	98.9			Pass
2462	PEAK	Vert	99.6	32.5	6.9	10.0	-41.7	107.4			Pass
2462	AVG	Vert	89.9	32.5	6.9	10.0	-41.7	97.7			Pass
2483.5	PEAK	Horz	58.3	32.6	6.9	10.0	-41.7	66.0	74.0	8.0	Pass
2483.5	AVG	Horz	44.3	32.6	6.9	10.0	-41.7	52.0	54.0	2.0	Pass
2483.5	PEAK	Vert	52.4	32.6	6.9	10.0	-41.7	60.1	74.0	13.9	Pass
2483.5	AVG	Vert	39.6	32.6	6.9	10.0	-41.7	47.3	54.0	6.7	Pass

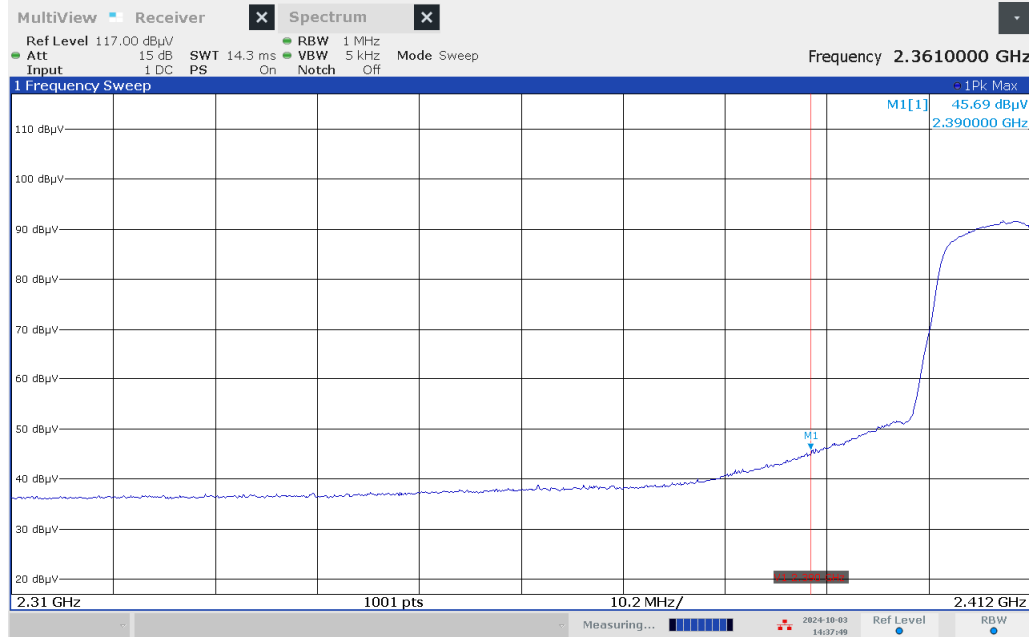
4.6.5 Test Results – 802.11 n

The DUT met the band edge requirements. Peak output power for low, mid and high channels were measured and the Plots Section below contains the maximum radiated emission levels captured on the spectrum analyzer at the band edges. The Final Measurements Section contains the final results with the correction factors added in.

4.6.5.1. Plots

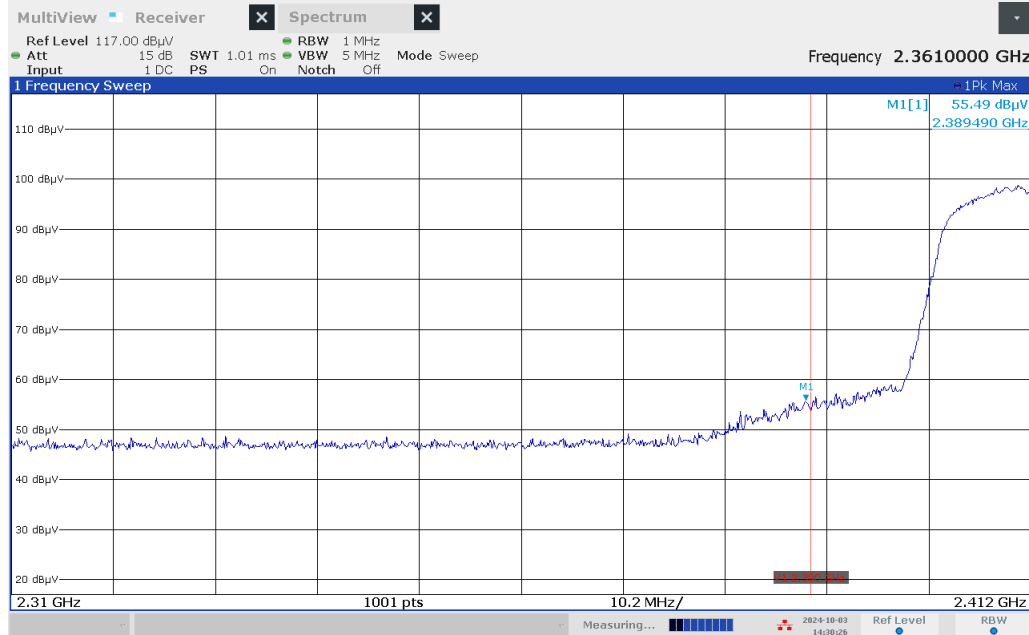


Tx Frequency	Low Channel	Antenna Polarization	Horizontal	Emission	Average
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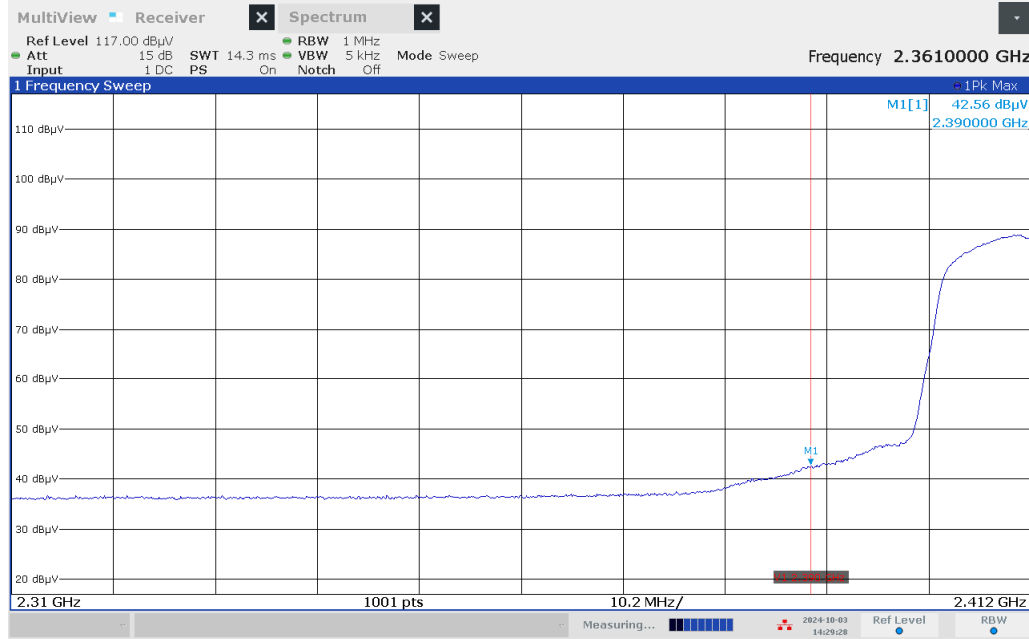
02:37:50 PM 10/03/2024

Tx Frequency	Low Channel	Antenna Polarization	Vertical	Emission	Peak
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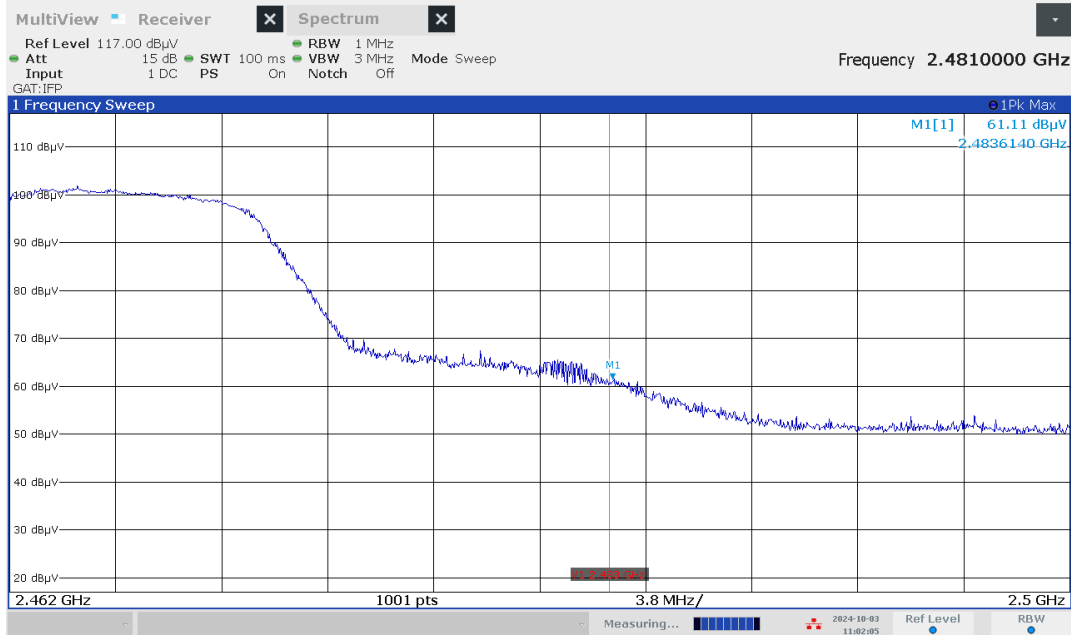
02:38:26 PM 10/03/2024

Tx Frequency	Low Channel	Antenna Polarization	Vertical	Emission	Average
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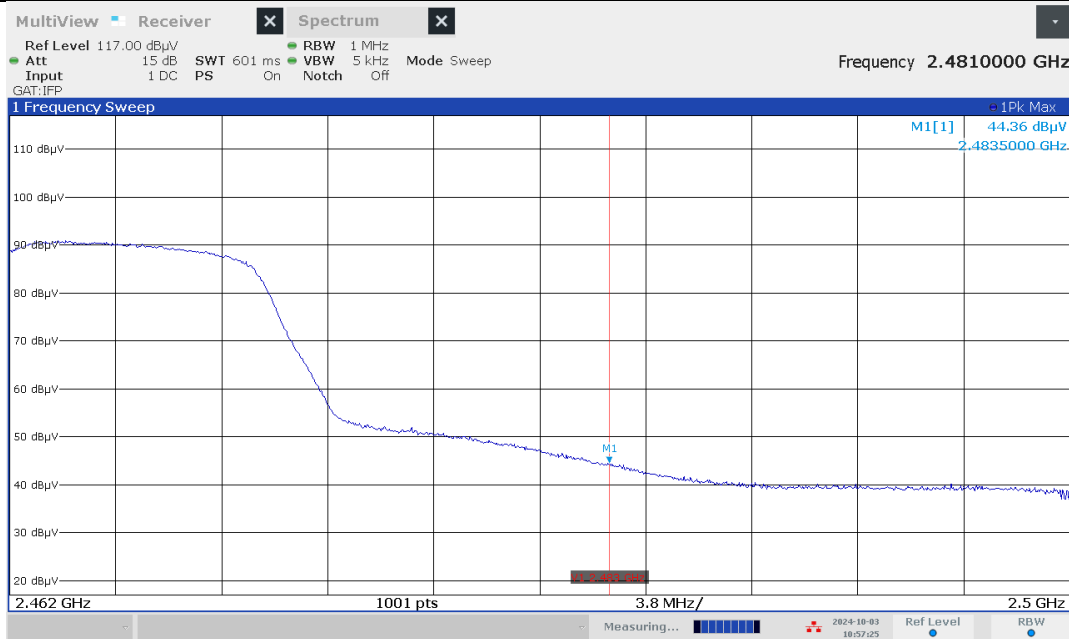
02:29:28 PM 10/03/2024

Tx Frequency	High Channel	Antenna Polarization	Horizontal	Emission	Peak
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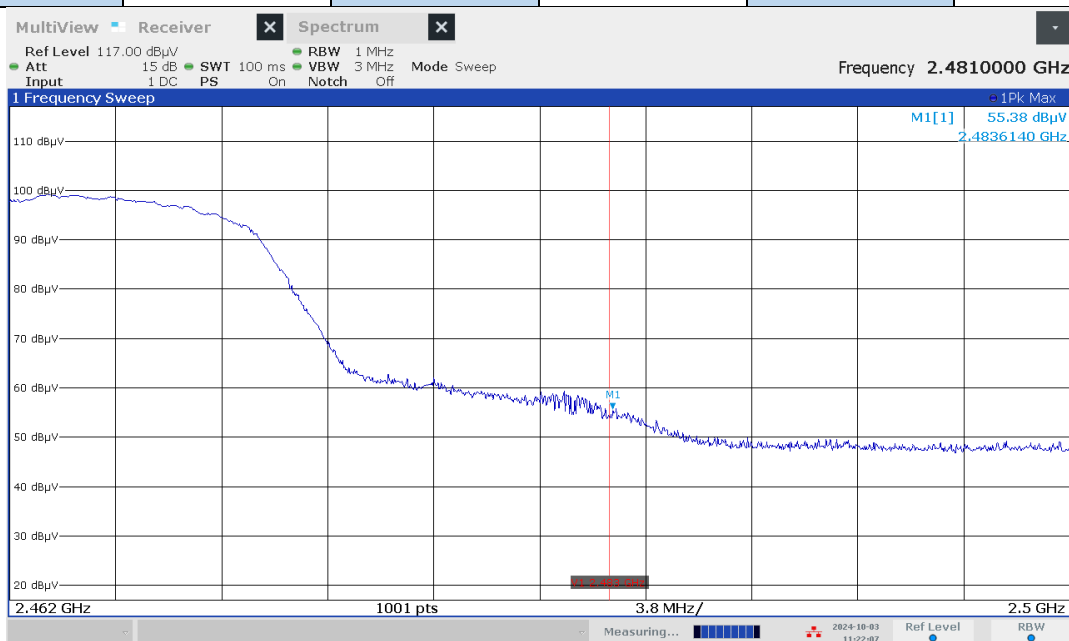
11:02:05 AM 10/03/2024

Tx Frequency	High Channel	Antenna Polarization	Horizontal	Emission	Average
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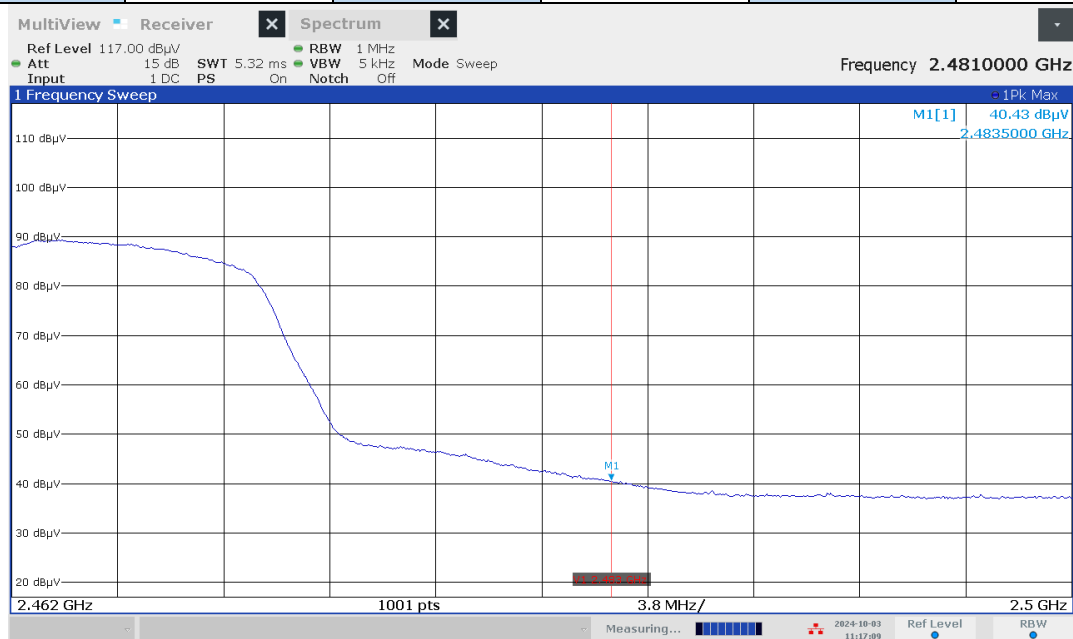
10:57:25 AM 10/03/2024

Tx Frequency	High Channel	Antenna Polarization	Vertical	Emission	Peak
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11:22:08 AM 10/03/2024

Tx Frequency	High Channel	Antenna Polarization	Vertical	Emission	Average
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11:17:10 AM 10/03/2024

4.6.5.2. Final Measurements

Frequency (MHz)	Detector	Antenna Polarity	Reading (dBμV)	Antenna Factor (dB/m)	Cable Factor (dB)	Attenuator (dB)	Pre-Amp Gain (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Test Result
2412	PEAK	Horz	101.8	32.5	6.8	10.0	-41.6	109.5			Pass
2412	AVG	Horz	91.1	32.5	6.8	10.0	-41.6	98.8			Pass
2412	PEAK	Vert	99.9	32.5	6.8	10.0	-41.6	107.5			Pass
2412	AVG	Vert	89.1	32.5	6.8	10.0	-41.6	96.8			Pass
2390	PEAK	Horz	59.4	32.4	6.8	10.0	-41.6	67.1	74.0	6.9	Pass
2390	AVG	Horz	45.7	32.4	6.8	10.0	-41.6	53.4	54.0	0.6	Pass
2390	PEAK	Vert	55.5	32.4	6.8	10.0	-41.6	63.2	74.0	10.8	Pass
2390	AVG	Vert	42.6	32.4	6.8	10.0	-41.6	50.2	54.0	3.8	Pass
2462	PEAK	Horz	101.6	32.5	6.9	10.0	-41.7	109.3			Pass
2462	AVG	Horz	91.1	32.5	6.9	10.0	-41.7	98.8			Pass
2462	PEAK	Vert	99.9	32.5	6.9	10.0	-41.7	107.6			Pass
2462	AVG	Vert	89.2	32.5	6.9	10.0	-41.7	96.9			Pass
2483.5	PEAK	Horz	61.1	32.6	6.9	10.0	-41.7	68.9	74.0	5.1	Pass
2483.5	AVG	Horz	44.4	32.6	6.9	10.0	-41.7	52.1	54.0	1.9	Pass
2483.5	PEAK	Vert	55.4	32.6	6.9	10.0	-41.7	63.1	74.0	10.9	Pass
2483.5	AVG	Vert	40.4	32.6	6.9	10.0	-41.7	48.2	54.0	5.8	Pass

4.6.6 Test Equipment List

Equipment ID	Description	Manufacturer	Model	Calibration Date	Calibration Due
EQ_EMC_58	EMI Receiver	Rohde & Schwarz	ESW 44	Mar 1, 2024	Mar 1, 2026
EQ_EMC_60	Horn Antenna	ETS Lindgren	3117	Apr 9, 2024	Apr 9, 2026
EQ_EMC_75	RF Cable >1GHz	MegaPhase	EMC2	NCR	NCR
EQ_EMC_115	10 dB Attenuator SMA	Fairview Microwave	SA18E-10	NCR	NCR
EQ_EMC_42	Preamplifier 1GHz-18GHz	Com-Power	PAM-118A	Jan 17, 2024	Jan 17, 2026