



RF Test Report

Standard(s): FCC Part 15 Subpart 15.247,
RSS-247 Issue 4:2025
Unlicensed Intentional Radiators

Issued To: Ecobee Inc
207 Queens Quay Suite 600,
Toronto, ON M5J 1A7
Canada

Product Name: Smart Thermostat
Model: ECB601/ECB501
FCC ID: WR92025AA2060G
IC: 7981A-2025AA2060G

Report No. ML302480B-RF01 (DSS – FHSS)
Date of Issue: February 18, 2026

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Amir Emami, Project Engineer

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TRRF_FCC-ICES-247-DTS_v1

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1. Revision History

Project No. & Revision	Report Date	Initials	Description
ML302480B-RF00 (DSS – FHSS)	January 12, 2026	MX	Initial Release
ML302480B-RF01 (DSS – FHSS)	February 18, 2026	MX	Update FCC ID and IC number.

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	LDS Antenna on Plastic Frame -2.05 dBi
15.247(a)(1)	RSS-247 5.1	Emission Bandwidth	Pass	Not Specified for device operating in 2400 – 2483.5 MHz Band
15.247(a)(1)	RSS-247 5.1	Channel Carrier Frequency Separation	Pass	$\Delta f \geq \text{MAX} \{25 \text{ kHz}, BW_{20\text{dB}}\}$
15.247(a)(1)	RSS-247 5.1	Number of Hopping Channels	Pass	$N_{\text{ch}} \geq 75$
15.247(a)(1)	RSS-247 5.1	Time of Occupancy (Dwell Time)	Pass	$t_{\text{ch}} \leq 0.4 \text{ s}$ for $T = 0.4 N_{\text{ch}} \text{ s}$
15.247(b)	RSS-247 5.4	Peak Conducted Output Power	Pass	< 1 Watt
15.247(d)	RSS-247 5.5	Spurious Conducted Out of Band Emissions	Pass	< 20dBc
15.247(d)/ 15.209	RSS-GEN 8.9 (Table 5 & 6)	Transmitter Spurious Radiated Emissions	Pass	---
15.207	RSS-GEN (Table 4)	Power Line Conducted Emissions	Pass	--

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 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 4:2025	Digital Transmission Systems, Frequency Hopping Systems and Licence-Exempt Local Area Network Devices in 902-928 MHz, 2400-2483.5 MHz, 5150-5350 MHz, and 5470-5895 MHz bands
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 C63.10:2020	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	Ecobee Inc
Address	207 Queens Quay Suite 600, Toronto, ON M5J 1A7 Canada
Contact	John Russomanno
Email	john@ecobee.com

3.2 Device Under Test (DUT)

3.2.1 DUT Information

DUT Name	Smart Thermostat
DUT Model(s)	ECB601/ECB501
Serial Number	Production Sample
Power Source (AC / DC / Battery)	AC
Input Voltage (V) or Range	24Vac
Frequency (Hz) or Range	60Hz
Mode(s) of Operation	Continuous transmission
Connectors Available on DUT	Standard thermostat connections
Transmitter Information	
FCC ID	WR92025AA2060G
IC	7981A-2025AA2060G
Technology Used	FHSS
Operating Frequency	2402 – 2480 MHz
Modulation Type	GFSK for 1 Mbps, $\pi/4$ -DQPSK for 2 Mbps
Number of Channels	79
Antenna Manufacturer	Custom – LDS Antenna on Plastic Frame
Antenna Model	N/A
Antenna Type	Custom type
Antenna Gain	-2.05 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 smart thermostat; it contains 2400 – 2483.5 MHz DTS (802.11 b/g/n and BLE), 2400 – 2483.5 MHz FHSS (Bluetooth Classic), 5150-5250 MHz, and 5725-5850 MHz transmitters on one chip, and a 920 – 928 MHz FHSS/Hybrid transmitter on second chip.

This report documents the compliance of the Bluetooth Classic 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 setting: 12 dBm (Peak)
- Channels:
 - o 0 (low, 2402 MHz),
 - o 38 (mid, 2440 MHz)
 - o 78 (high, 2480 MHz)
- Packet Type: Random
- Data rate: 1 Mbps and 2 Mbps

During all radiated emission measurements, the DUT was mounted in its normal orientation. See Test Setup Photos for axis details.

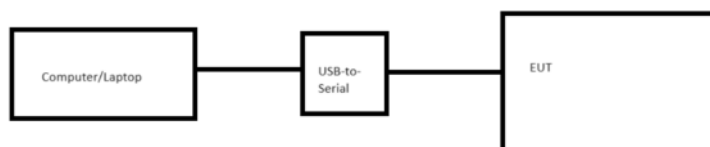


Figure 1 – Configuration Block Diagram

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

3.3.2 Support Equipment

Device	Manufacturer	Model	S/N
Custom USB Interface	Ecobee	--	---

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: September 3&4, 2025
Temperature (°C) 25.4 / 24.5
Relative Humidity (%) 41.0 / 33.5
Barometric Pressure (kPa) 97.2 / 97.0

Initials: MX

During this test, the transmitter's 20 dB and 99% emission bandwidth will be examined and verify that the upper and lower frequency are always kept within the working frequency range band.

4.1.1 Limits

Systems using frequency hopping techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands with maximum allowable 20 dB bandwidth, specified in FCC 15.247 (a)(1) and RSS-247 Section 5.1, summarized below:

Frequency Band	Maximum 20 dB Bandwidth Limit	
	$P_{\text{max-pk}} \leq 1 \text{ W}$	
902–928 MHz	$BW_{20\text{dB}} \leq 250 \text{ kHz}$	$250 \text{ kHz} < BW_{20\text{dB}} \leq 500 \text{ kHz}$ Provide: $P_{\text{max-pk}} \leq 0.25 \text{ W}$ $t_{\text{ch}} \leq 0.4 \text{ s for } T = 10 \text{ s}$
2400–2483.5 MHz	Max. $BW_{20\text{dB}}$ not specified	
5725–5850 MHz	$BW_{20\text{dB}} \leq 1 \text{ MHz}$	

*Note: FCC 15.247 and RSS-247 did not explicitly specify a maximum 20 dB bandwidth for FHSS operating in the 2400–2483.5 MHz band. The maximum 20 dB bandwidth is implicitly limited by the minimum number of hopping channels; i.e., the 20 dB bandwidth multiplied by minimum number of channels shall be within the 2400–2483.5 MHz band.

For 2400–2483.5 MHz band, the minimum number of channels specified is 15 channels. Thus, the maximum 20 dB bandwidth shall be less than 5.5 MHz (83.5 MHz/15).

99% bandwidth limit is not specified but is required for certification application.

4.1.2 Test Procedure

Tested according to ANSI C63.10 Section 6.9.2 for 20 dB bandwidth and Section 6.9.3 for 99% bandwidth.

For 20 dB Emission 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 2 to 5 times the occupied bandwidth.

- d) Detector: Peak
- e) 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 20 dB relative to the maximum level measured in the fundamental emission.

For 99% Emission Bandwidth:

- a) Set RBW in the range of 1% to 5% of the actual occupied bandwidth.
- b) Set VBW $\geq [3 \times \text{RBW}]$.
- c) Span set to 1.5 to 5 times the occupied bandwidth.
- d) Detector: Peak
- e) Use the 99% power bandwidth function of the instrument to measure bandwidth.

4.1.3 Test Results

The EUT passed.

1 MBPS				
20 dB & 99% Bandwidth				
Frequency (MHz)	20 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Bandwidth Limit (MHz)	Test Result
2402	1.000	0.89	--	Pass
2440	1.010	0.89	--	Pass
2480	1.020	0.89	--	Pass

2 MBPS				
20 dB & 99% Bandwidth				
Frequency (MHz)	20 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Bandwidth Limit (MHz)	Test Result
2402	1.320	1.19	--	Pass
2440	1.330	1.19	--	Pass
2480	1.320	1.19	--	Pass

4.1.3.1. 1 MBPS Plots

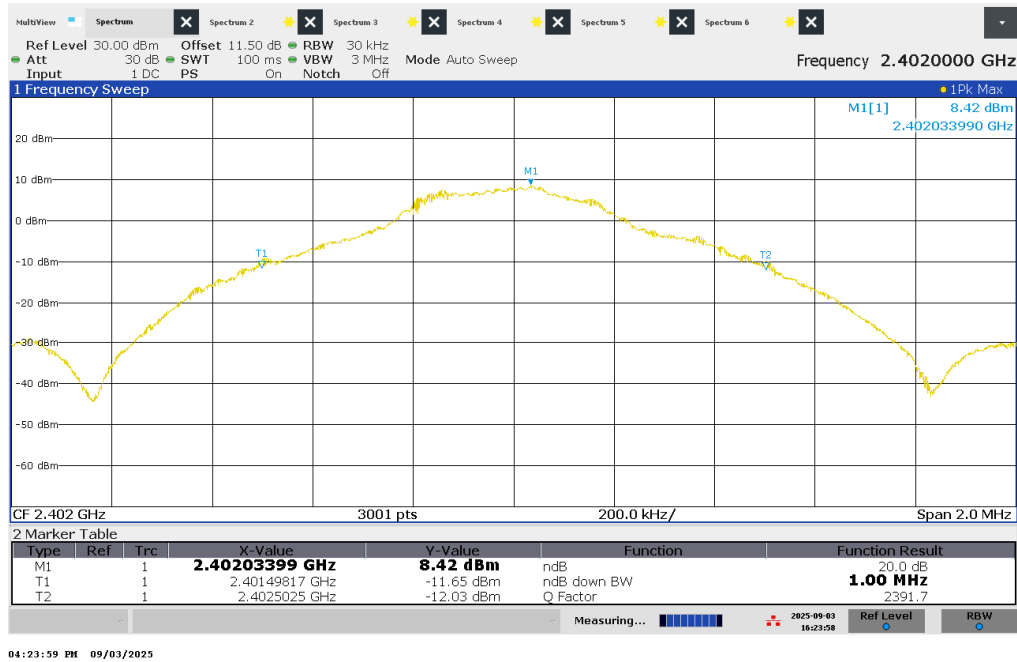


Figure 2 – 20dB Bandwidth – 2402 MHz

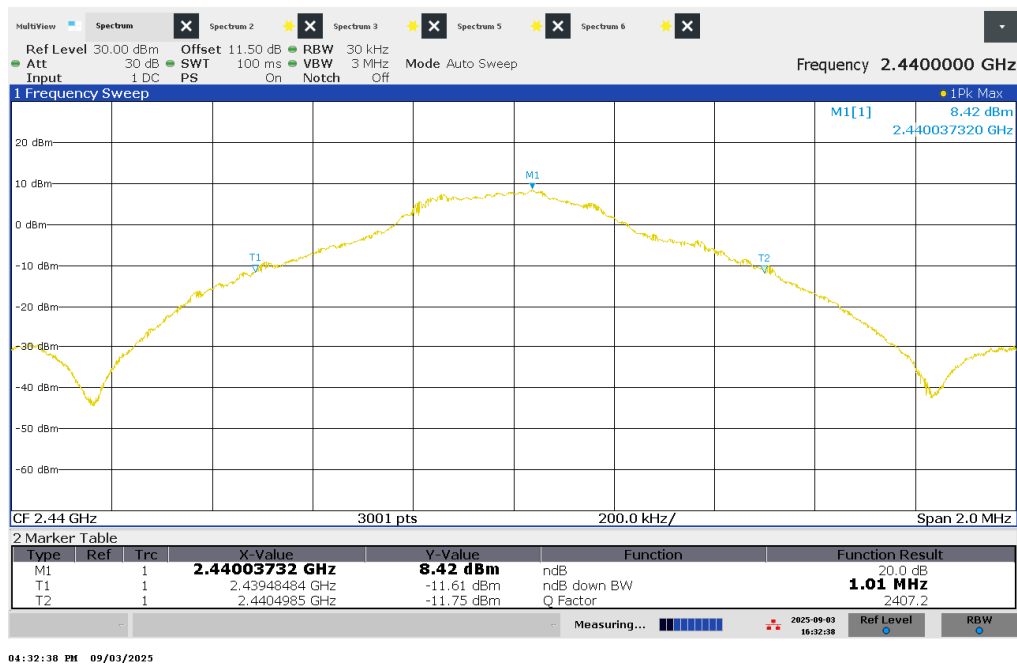


Figure 3 – 20dB Bandwidth – 2440 MHz

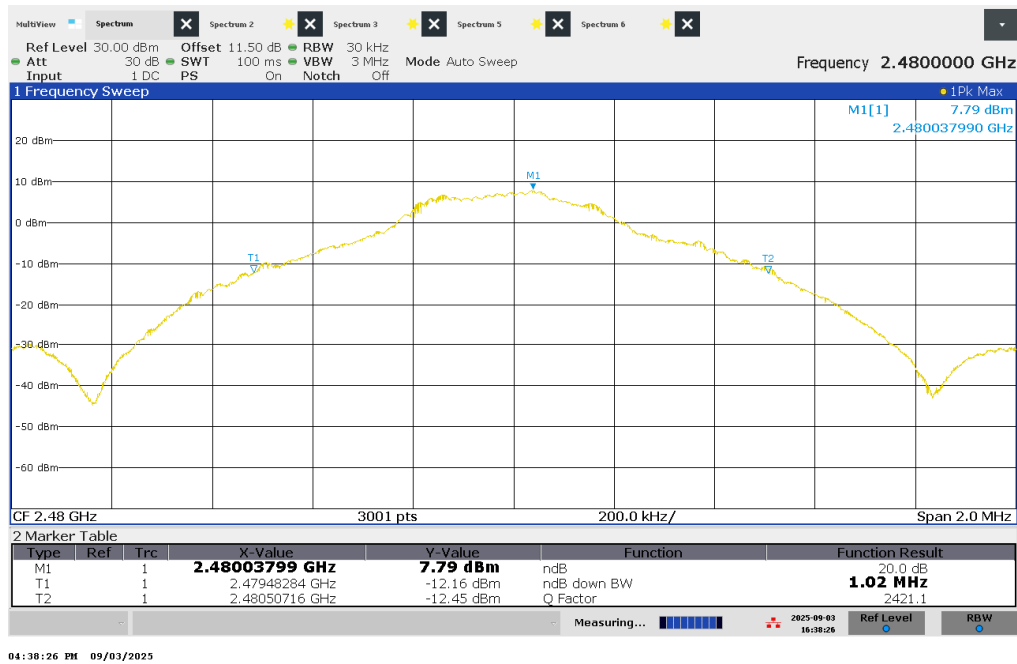


Figure 4 – 20dB Bandwidth – 2480 MHz

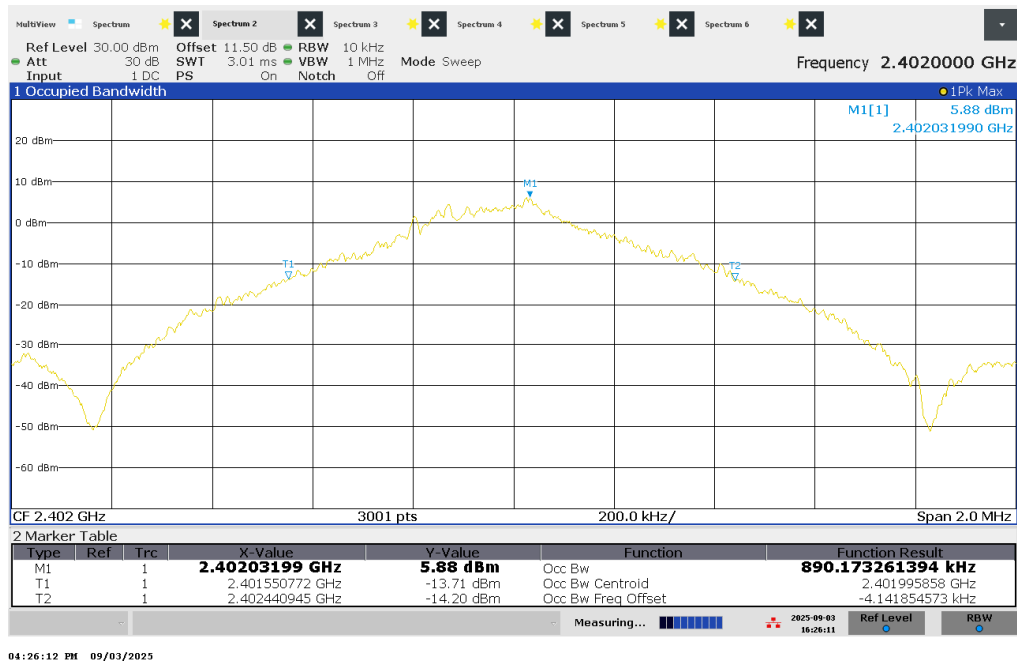


Figure 5 – 99% Bandwidth – 2402 MHz

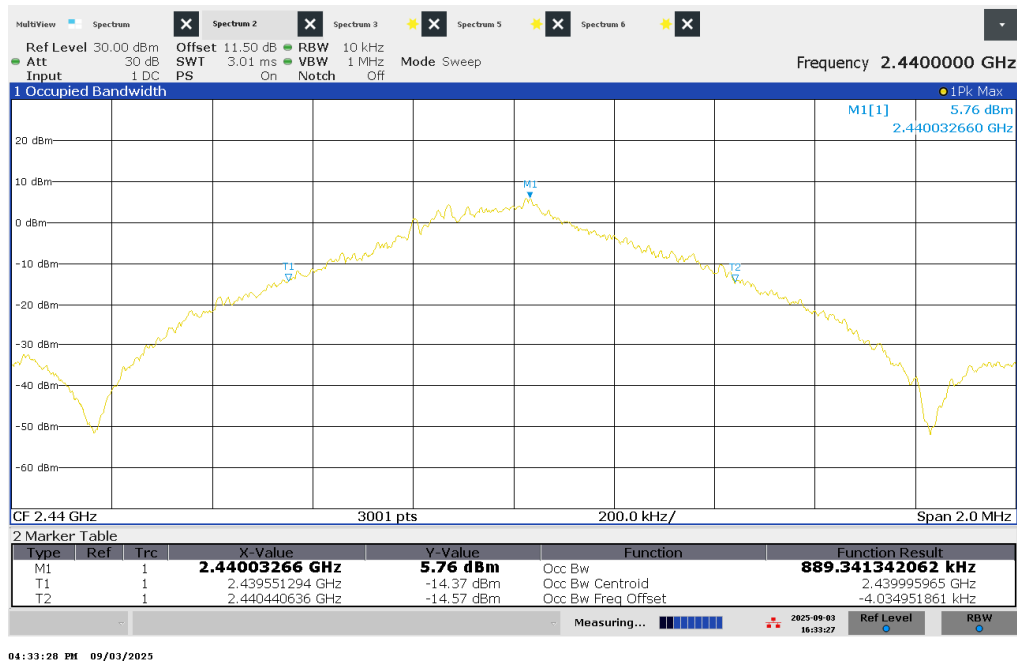


Figure 6 – 99% Bandwidth – 2440 MHz

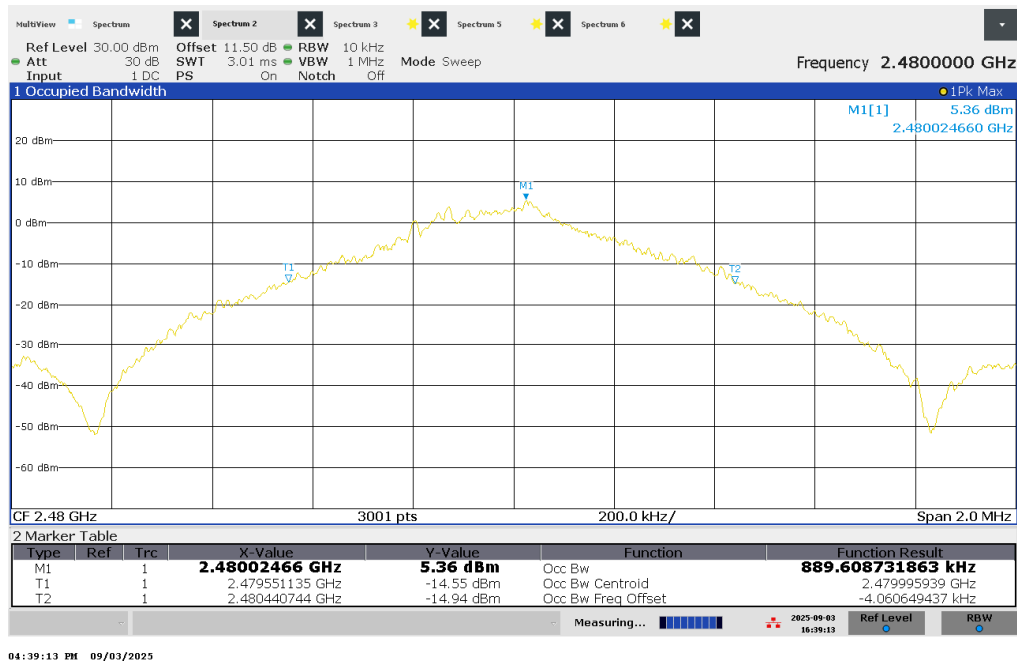


Figure 7 – 99% Bandwidth – 2480 MHz

4.1.3.2. 2 MBPS Plots

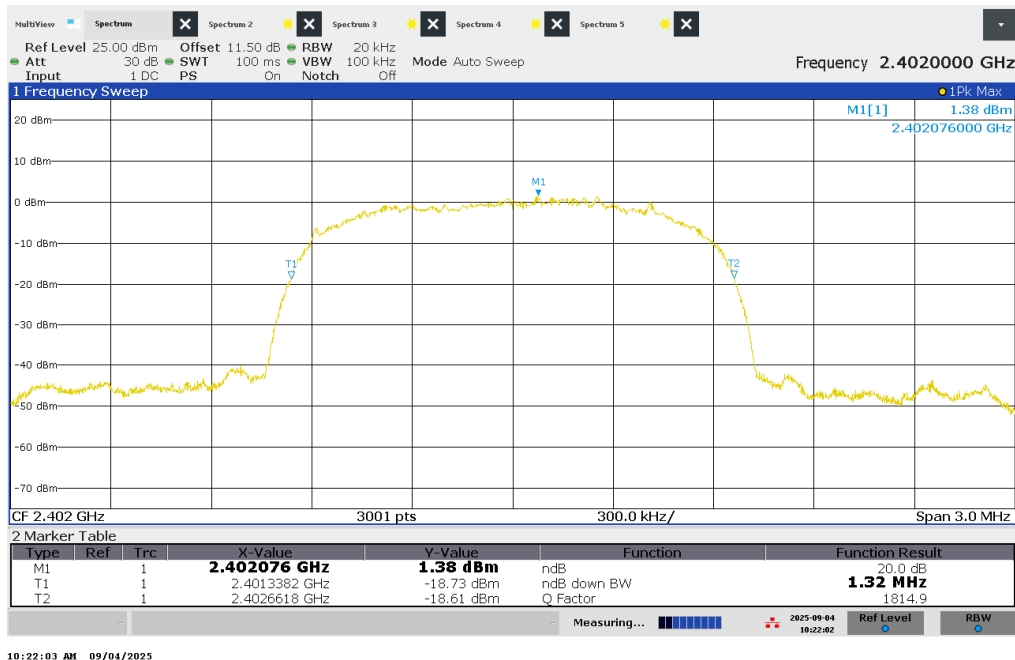


Figure 8 – 20dB Bandwidth – 2402 MHz

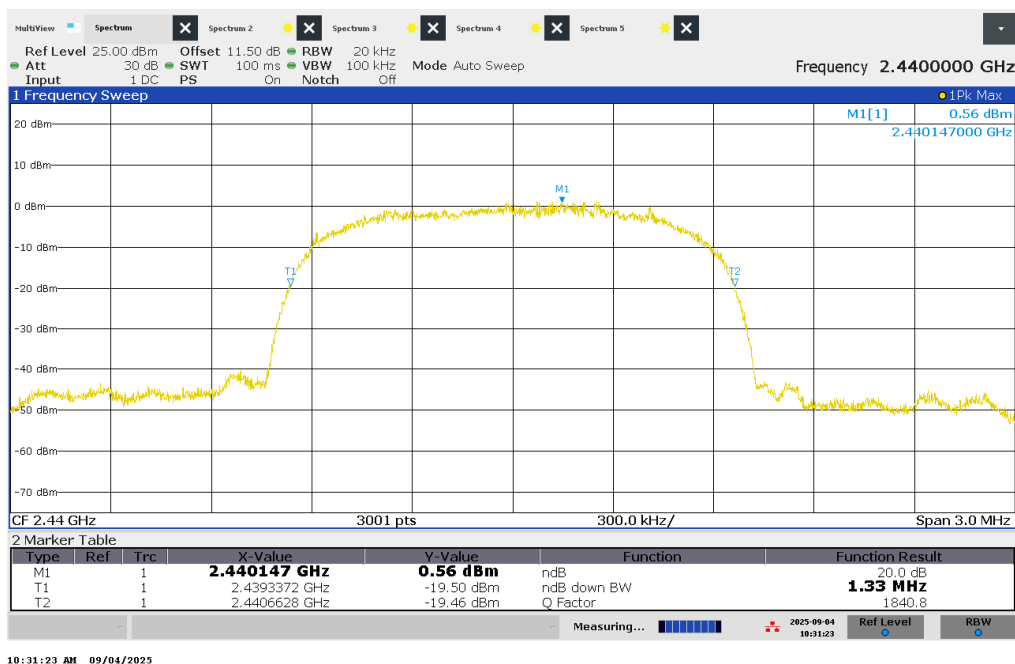


Figure 9 – 20dB Bandwidth – 2440 MHz

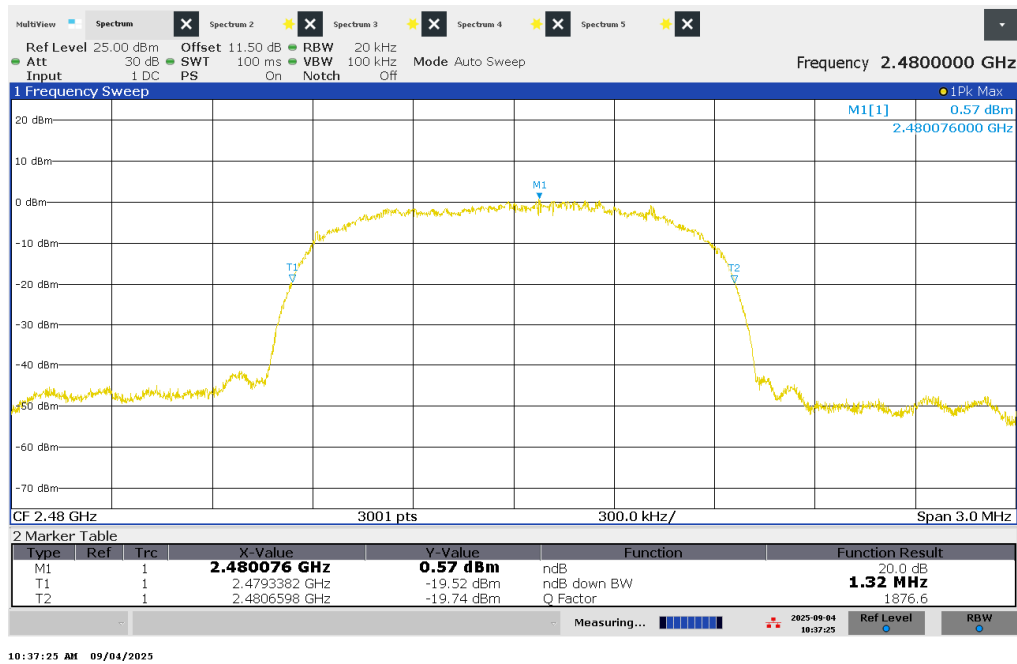


Figure 10 – 20dB Bandwidth – 2480 MHz

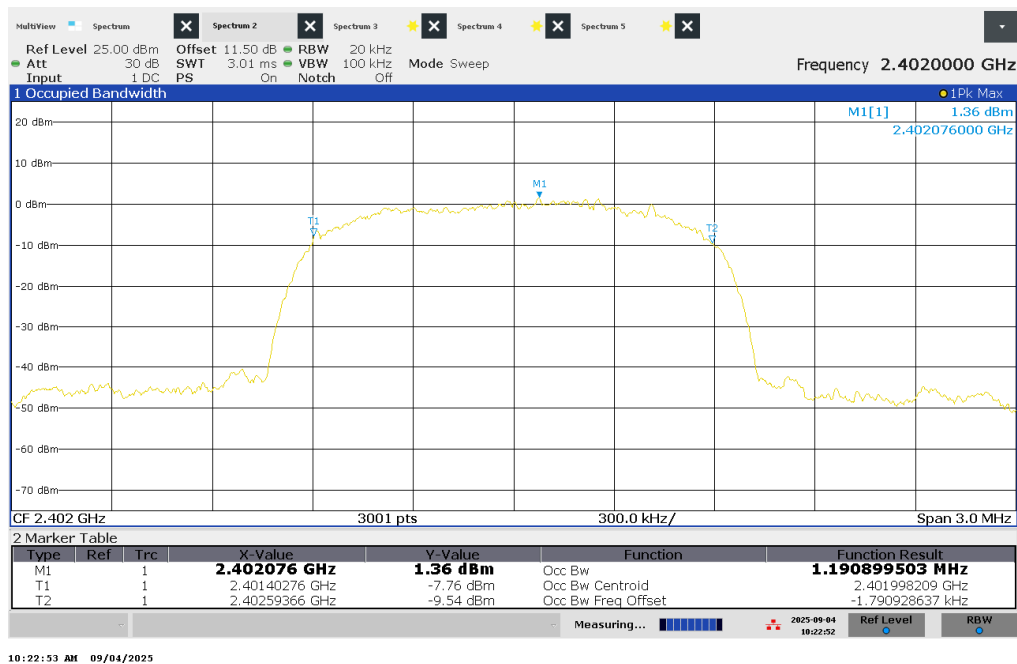


Figure 11 – 99% Bandwidth – 2402 MHz

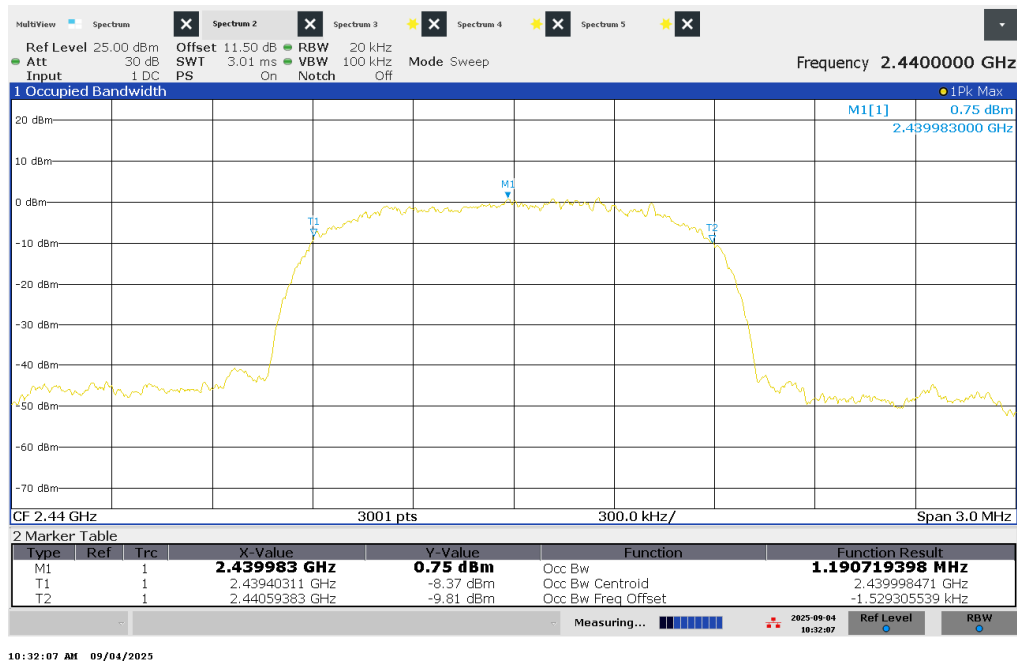


Figure 12 – 99% Bandwidth – 2440 MHz

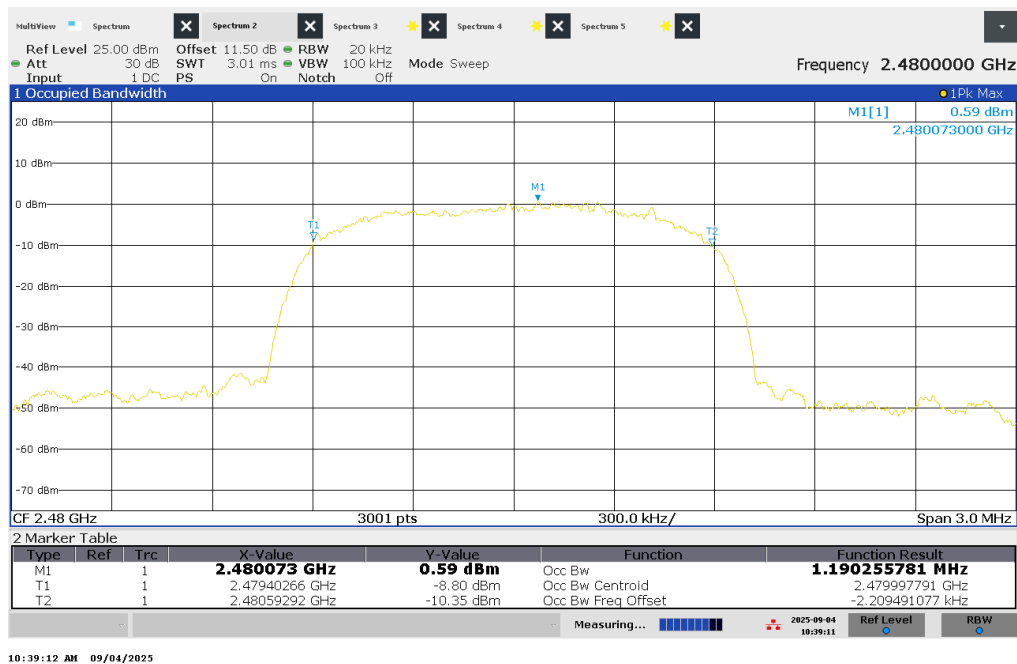


Figure 13 – 99% Bandwidth – 2480 MHz

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 Channel Carrier Frequency Separation

Test Date: September 3&4, 2025
Temperature (°C) 25.4 / 24.5
Relative Humidity (%) 41.0 / 33.5
Barometric Pressure (kPa) 97.2 / 97.0

Initials: MX

During this test, the channel carrier frequency separation of the transmitter will be examined. This specification facilitates the prevention of data corruption while also indirectly limiting the power density of a transmitter which enable other transmitters to coexist in the same frequency band.

4.2.1 Limits

Systems using frequency hopping techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands with minimum allowable channel carrier frequency separation - Δf , specified in FCC 15.247 (a)(1) and RSS-247 Section 5.1, summarized below:

Frequency Band	Minimum Channel Separation	
	$P_{\text{max-pk}} \leq 1 \text{ W}$	
902–928 MHz	$\Delta f \geq \text{MAX} \{25 \text{ kHz}, BW_{20\text{dB}}\}$ Provided: $BW_{20\text{dB}} \leq 250 \text{ kHz}$	$\Delta f \geq \text{MAX} \{25 \text{ kHz}, BW_{20\text{dB}}\}$ Provided: $P_{\text{max-pk}} \leq 0.25 \text{ W}$ $250 \text{ kHz} \leq BW_{20\text{dB}} \leq 500 \text{ kHz}$
2400–2483.5 MHz	$\Delta f \geq \text{MAX} \{25 \text{ kHz}, BW_{20\text{dB}}\}$ Provide: $N_{\text{ch}} \geq 75$	$\Delta f \geq [\text{MAX} \{25 \text{ kHz}, \frac{2}{3}BW_{20\text{dB}}\}]$ OR $\text{MAX} \{25 \text{ kHz}, BW_{20\text{dB}}\}$ Provide: $N_{\text{ch}} \geq 15$ $P_{\text{max-pk}} \leq 0.125 \text{ W}$
5725–5850 MHz	$\Delta f \geq \text{MAX} \{25 \text{ kHz}, BW_{20\text{dB}}\}$ Provided: $BW_{20\text{dB}} \leq 1 \text{ MHz}$	

Note 1: The maximum power of the transmitter is less than 10 mW. The $P_{\text{max-pk}} \leq 0.125 \text{ W}$ limit applies to the FHSS. The greater of the two-thirds of the 20 dB BW or 25 kHz are the applicable channel separation limit. The largest 20 dB BW of the system was measured to be 1.02 MHz for 1 MBPS and 1.32 MHz for 2 MBPS, therefore the two-thirds of the 20 dB BW limit are 0.68 MHz and 0.88 MHz respectively.

4.2.2 Test Procedure

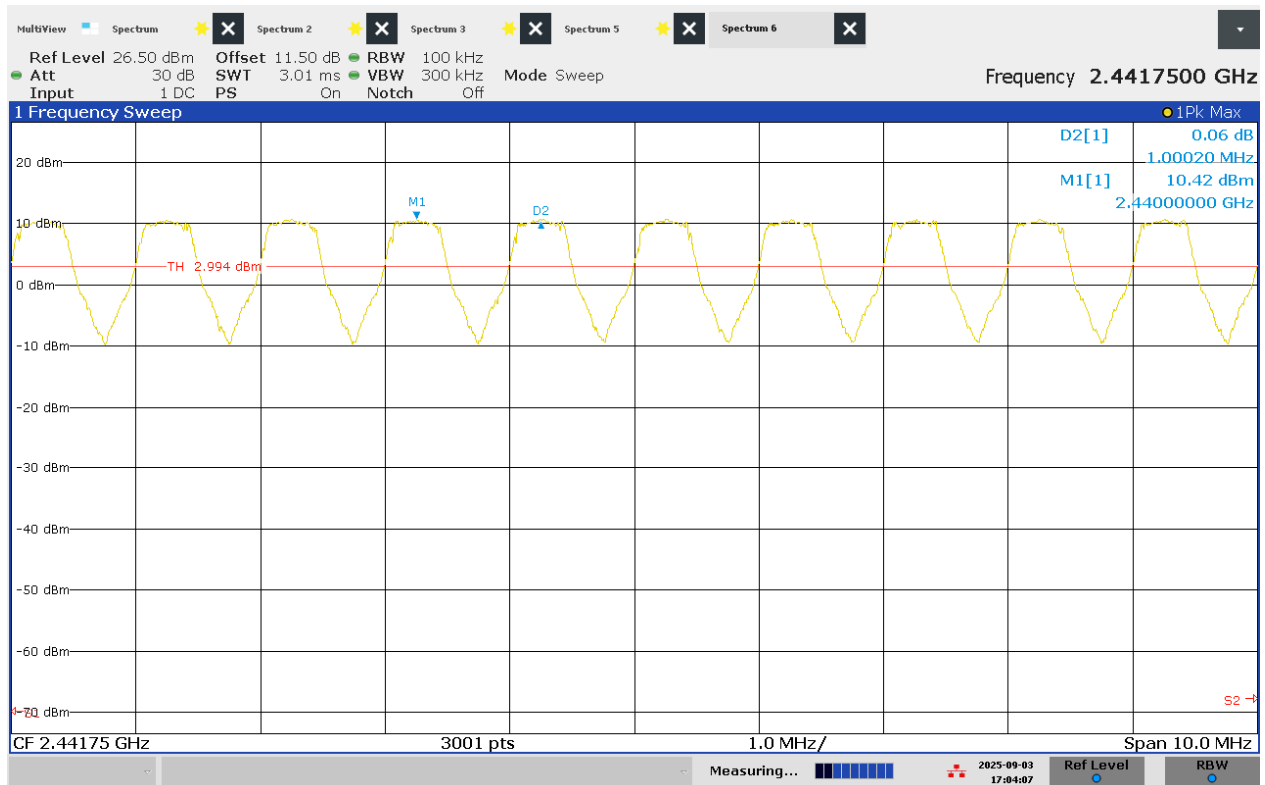
Tested according to ANSI C63.10 Section 7.8.2.

For Channel Carrier Frequency Separation

- Set RBW approximately to 30% of the channel spacing; adjust as necessary to identify the center of each channel.
- Set VBW $\geq$ RBW.
- Detector: Peak
- Span set to wide enough to capture at least two adjacent channels

4.2.3 Test Results

The DUT met the minimum channel separation limit. The channel separation is 1.0 MHz for both data rates which is larger than two-thirds of the 20 dB BW limit of 0.88 MHz.



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Figure 14 – Channel Separation – 1 MBPS

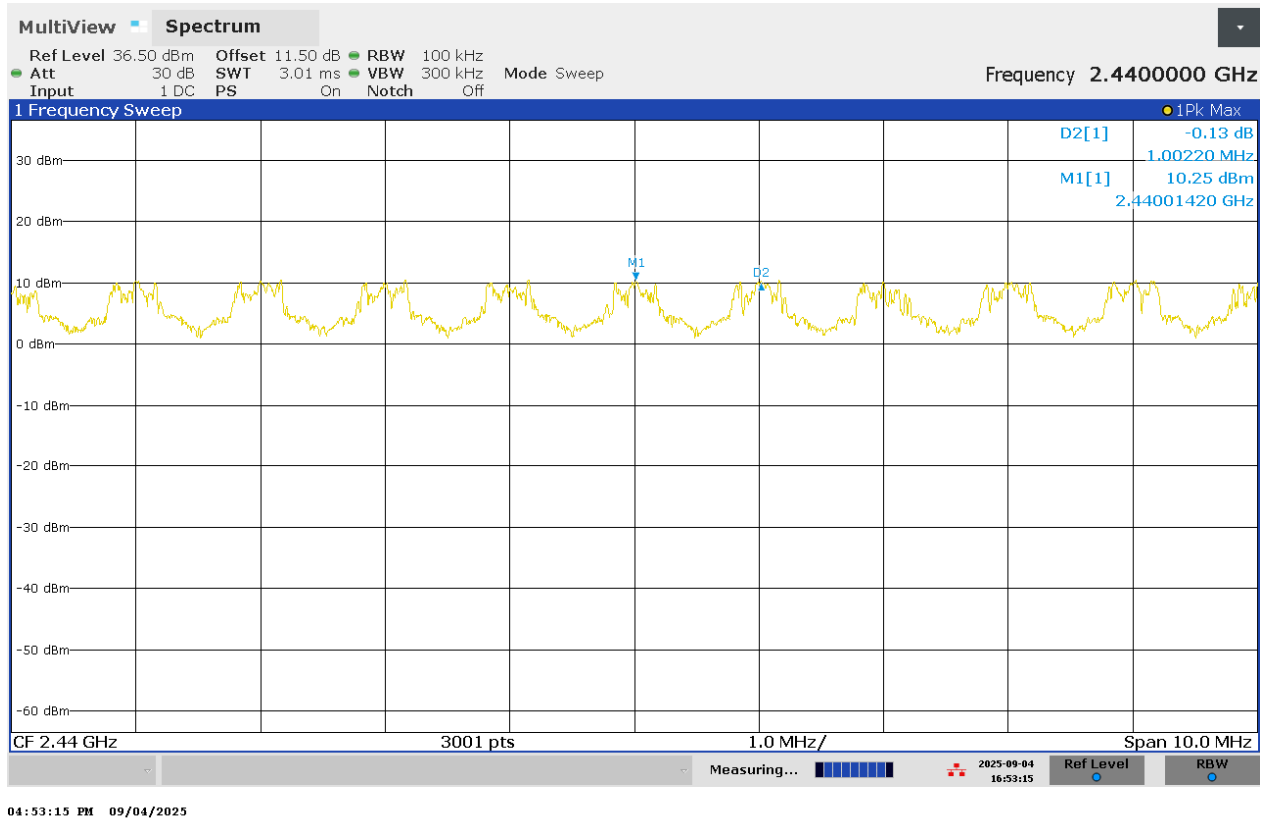


Figure 15 – Channel Separation – 2 MBPS

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 Number of Hopping Channels

Test Date: September 3 & 4, 2025
Temperature (°C) 25.4 / 24.5
Relative Humidity (%) 41.0 / 33.5
Barometric Pressure (kPa) 97.2 / 97.0

Initials: MX

During this test, the Number of Hopping Channels of the transmitter will be examined. This specification limits the power density of a transmitter which enable other transmitters to coexist in the same frequency band.

4.3.1 Limits

Systems using frequency hopping techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands with minimum Number of Hopping Channels - N_{ch} , specified in FCC 15.247 (a)(1) and RSS-247 Section 5.1, summarized below:

Frequency Band	Minimum Number of Hopping Channels	
	$P_{\max\text{-pk}} \leq 1 \text{ W}$	
902–928 MHz	$N_{ch} \geq 50$	$25 \leq N_{ch} < 50$ Provided: $P_{\max\text{-pk}} \leq 0.25 \text{ W}$ $250 \text{ kHz} < BW_{20\text{dB}} \leq 500 \text{ kHz}$
2400–2483.5 MHz	$N_{ch} \geq 75$	$N_{ch} \geq 15$ Provided: $P_{\max\text{-pk}} \leq 0.125 \text{ W}$
5725–5850 MHz	$N_{ch} \geq 75$	

The DUT's operates in the 2400–2483.5 MHz band; its maximum power is less than 0.125 W. The applicable limit is therefore, $N_{ch} \geq 15$.

4.3.2 Test Procedure

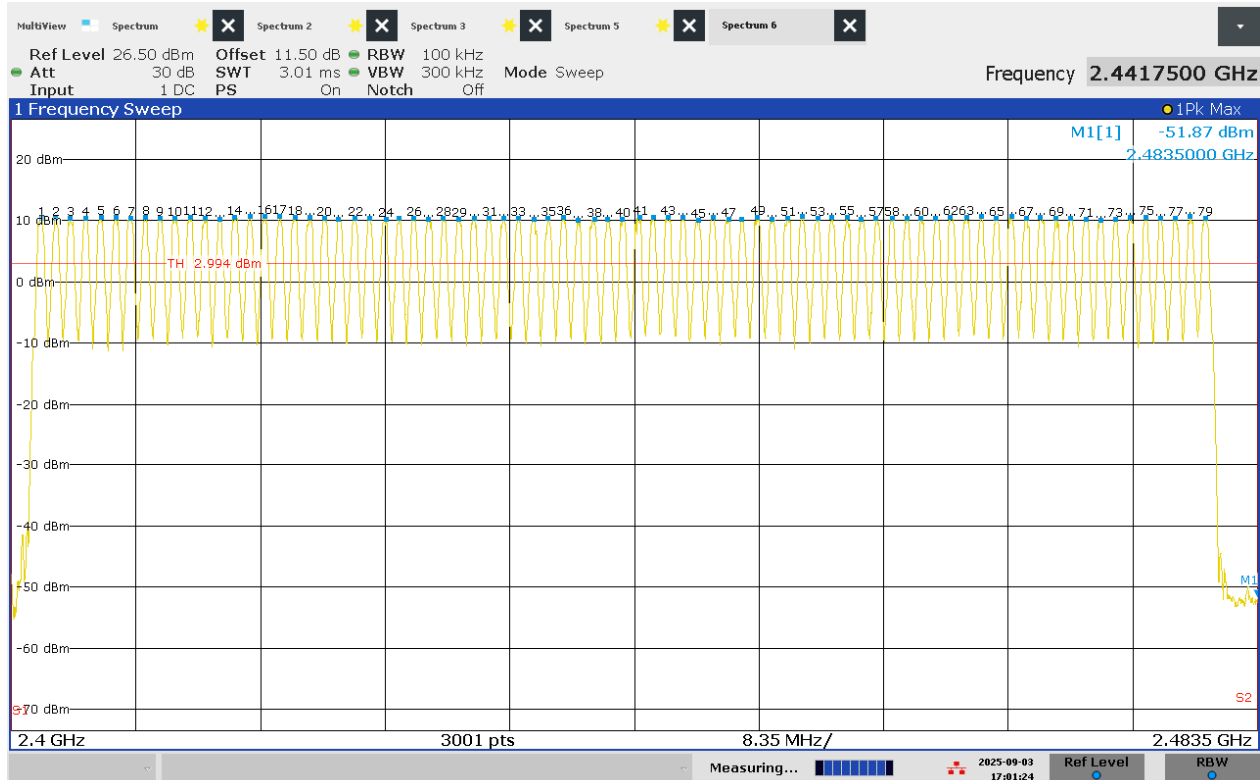
Tested according to ANSI C63.10 Section 7.8.3.

For Number of Hopping Channels

- Set RBW less than 30% of the channel spacing or 20 dB bandwidth, whichever is smaller; adjust as necessary to identify each channel.
- Set VBW $\geq$ RBW.
- Detector: Peak
- Span set to wide enough to capture the whole band; maybe necessary to divide the band into multiple spans if individual channels is not clearly seen.

4.3.3 Test Results

The DUT met the minimum number of channels requirement. The number of channels the device occupies is 79 channels.



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Figure 16 – Number of Hopping Channels – 1 MBPS

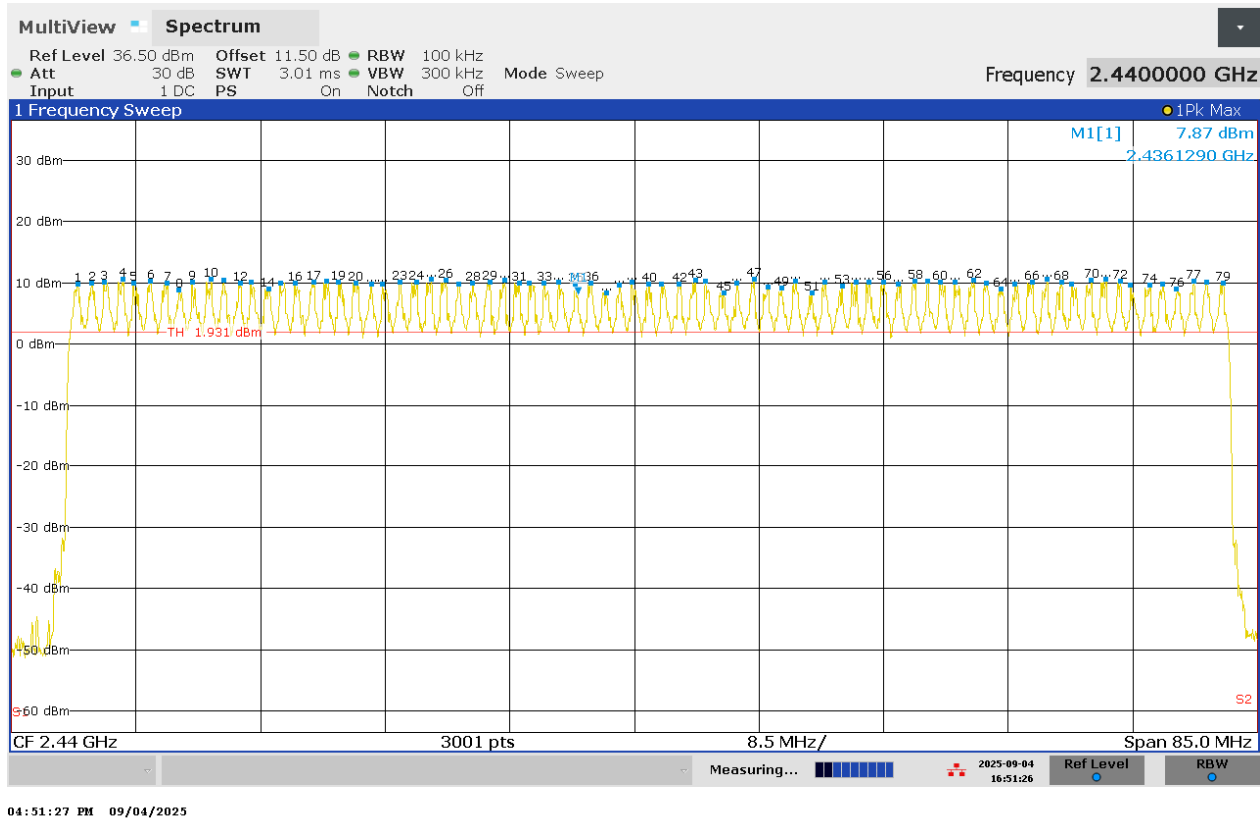


Figure 17 – Number of Hopping Channels – 2 MBPS

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 Time of Occupancy (Dwell Time)

Test Date: September 3 & 4, 2025
Temperature (°C) 25.4 / 24.5
Relative Humidity (%) 41.0 / 33.5
Barometric Pressure (kPa) 97.2 / 97.0

Initials: MX

During this test, the Time of Occupancy for each channel of the transmitter will be examined. This specification limits the time a channel is occupied which enable other transmitter to coexist in the same frequency band.

4.4.1 Limits

Systems using frequency hopping techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands with maximum Time of Occupancy for each channel - t_{ch} , specified in FCC 15.247 (a)(1) and RSS-247 Section 5.1, summarized below:

Frequency Band	Maximum Time of Occupancy	
	$P_{\max\text{-pk}} \leq 1 \text{ W}$	
902–928 MHz	$t_{ch} \leq 0.4 \text{ s for } T = 20 \text{ s}$ Provide: $N_{ch} \geq 50$ $BW_{20\text{dB}} \leq 250 \text{ kHz}$	$t_{ch} \leq 0.4 \text{ s for } T = 10 \text{ s}$ Provided: $P_{\max\text{-pk}} \leq 0.25 \text{ W}$ $250 \text{ kHz} < BW_{20\text{dB}} \leq 500 \text{ kHz}$
2400–2483.5 MHz	$t_{ch} \leq 0.4 \text{ s for } T = 0.4 N_{ch} \text{ s}$	
5725–5850 MHz	$t_{ch} \leq 0.4 \text{ s for } T = 30 \text{ s}$	

The DUT's operates in the 2400–2483.5 MHz band. The applicable limit is therefore, $t_{ch} \leq 0.4 \text{ s for } T = 20 \text{ s}$.

4.4.2 Test Procedure

Tested according to ANSI C63.10 Section 7.8.4.

For Dwell Time per Hop

- Set RBW less than channel spacing
- Detector: Peak
- Span: Zero span, centered on a hopping channel
- Sweep: Single
- Sweep Time: long enough to capture start and end of a transmission

For Number of Hop

- a) Sweep Time: long enough to capture at least 2 hops
- b) The number of hops within T is calculated from the number of hops on the channel divided by the Sweep Time multiplied by T

The Time of Occupancy is calculated by multiplying the dwell time per hop by the number of hops in T.

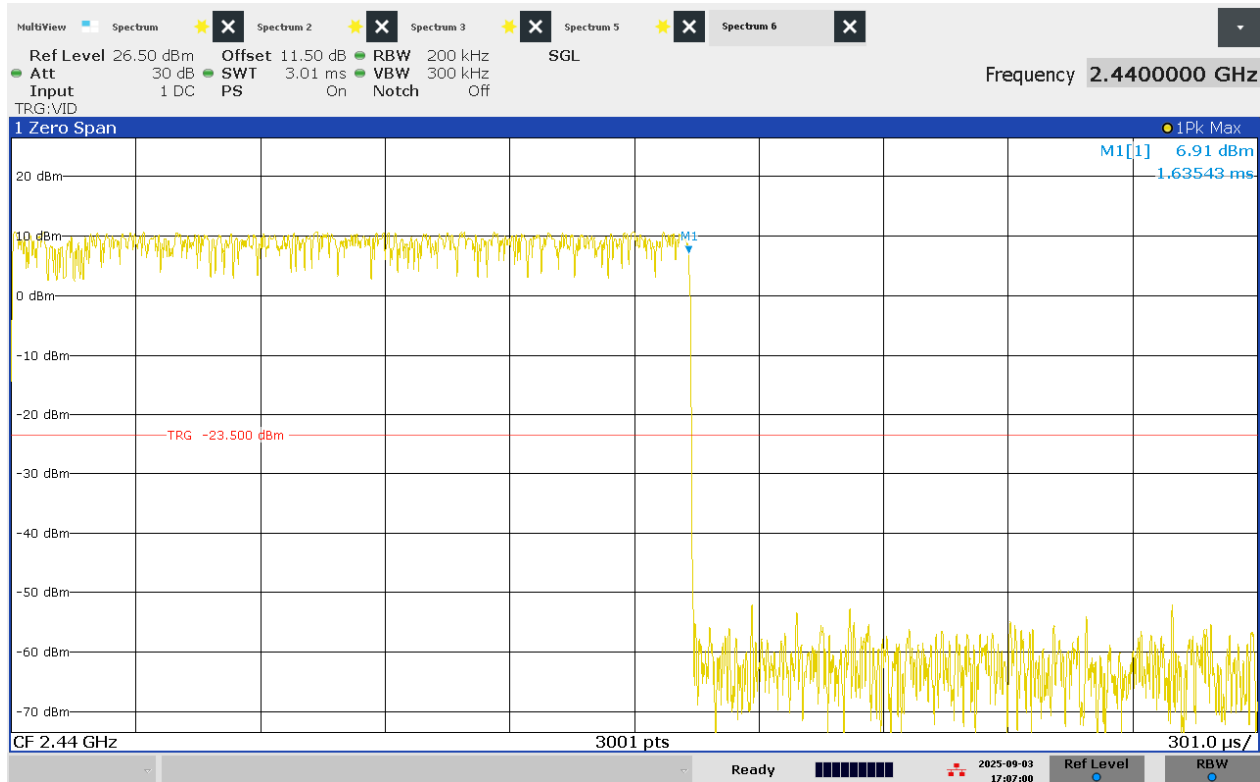
4.4.3 Test Results

The EUT passed the requirements.

Notes:

1. In normal mode, hopping rate is 1600 hops/s with 6 slots in 79 hopping channels. With channel hopping rate (1600/6/79) in an Observation Time (0.4 x 79) seconds. The number of hops per Observation Time is $(1600/6/79) \times (0.4 \times 79) = 106.67$ hops.
2. In AFH mode, hopping rate is 800 hops/s with 6 slots in 20 hopping channels. With channel hopping rate of (800/6/20) in an Observation Time (0.4 x 20) seconds. The number of hops per Observation Time is $(800/6/20) \times (0.4 \times 20) = 53.33$ hops.
3. The average Channel Occupancy Time = number of hops per Observation Time x package transmit time per hop

The EUT has an average occupancy of $106.67 \times 1.6 \text{ ms} = 0.17 \text{ s}$ for normal mode and $53.33 \times 1.6 \text{ ms} = 0.09 \text{ s}$ for AFH mode within 0.4 s. This is under the 0.4 sec limit.



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Figure 18 – Dwell Time per Hop – 1 MBPS

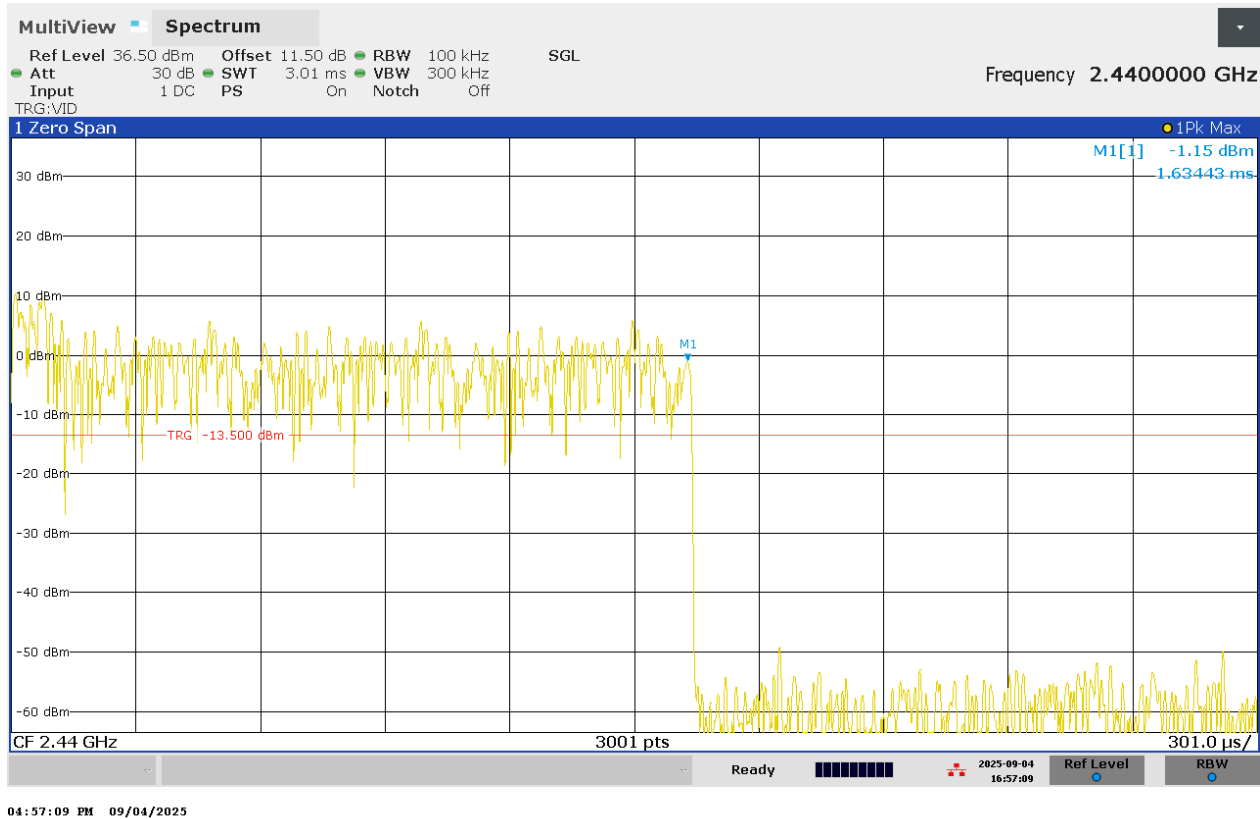


Figure 19 – Number of Hops per Sweep Time

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 Output Power

Test Date: September 3 & 4, 2025
Temperature (°C) 25.4 / 24.5
Relative Humidity (%) 41.0 / 33.5
Barometric Pressure (kPa) 97.2 / 97.0

Initials: MX

4.5.1 Limits

Systems using frequency hopping techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands with maximum peak conducted power, specified in FCC 15.247 (b) and RSS-247 Section 5.4, summarized below:

Frequency Band	Maximum Peak Conducted Power	
902–928 MHz	$P_{\text{max-pk}} \leq 1 \text{ W}$	$P_{\text{max-pk}} \leq 0.25 \text{ W}$
	Provided: $N_{\text{ch}} \geq 50$	Provided: $25 \leq N_{\text{ch}} < 50$
2400–2483.5 MHz	$P_{\text{max-pk}} \leq 1 \text{ W}$	$P_{\text{max-pk}} \leq 0.125 \text{ W}$
	Provided: $N_{\text{ch}} \geq 75$	Provided: $N_{\text{ch}} \geq 15$
5725–5850 MHz	$P_{\text{max-pk}} \leq 1 \text{ W}$	
	Provided: $N_{\text{ch}} \geq 75$	

4.5.2 Test Procedure

Tested according to ANSI C63.10 Section 7.8.5.

For Peak Conducted Output Power

- Set RBW > 20 dB emission bandwidth
- Set VBW ≥ RBW
- Detector: Peak
- Span: Approximately 5 times 20 dB emission bandwidth
- Trace: Max-hold

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.

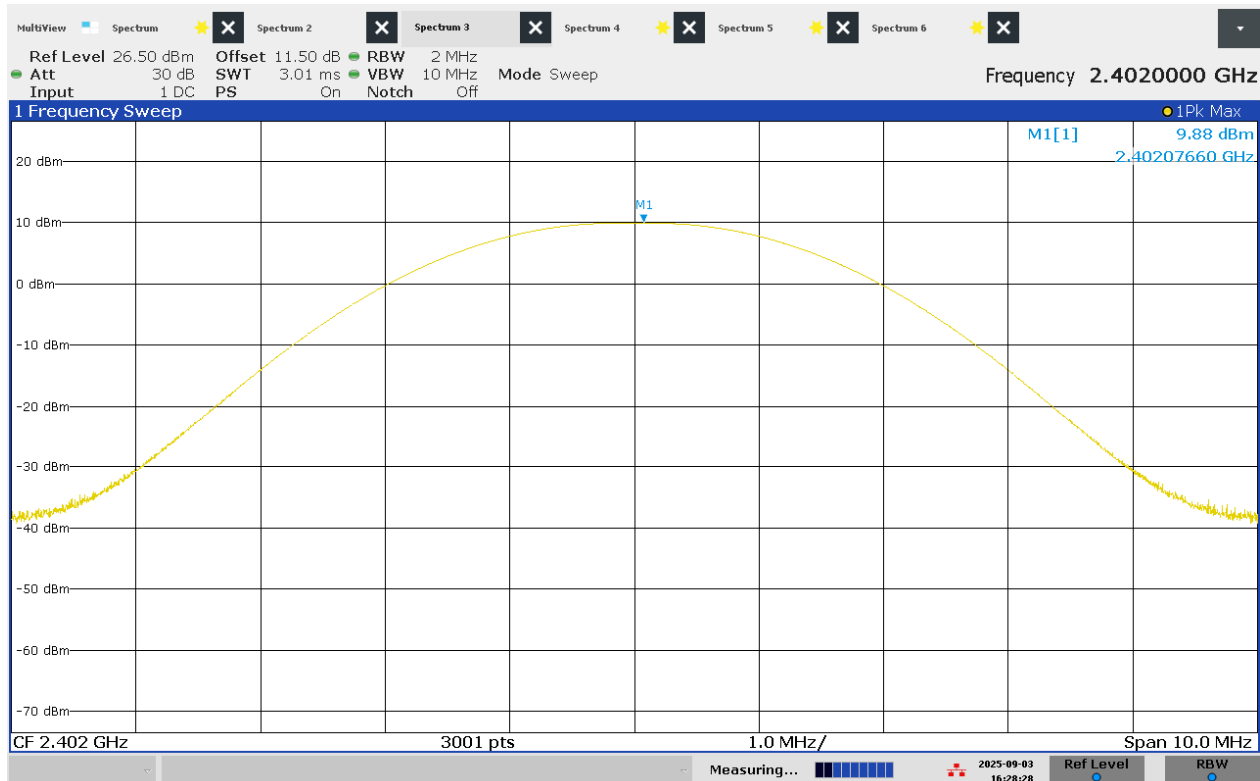
4.5.3 Test Results

The EUT meets power limits of 0.125W. The EUT meets $N_{ch} \geq 15$ condition.

1 MBPS						
Channel	Frequency (MHz)	Peak Power (dBm)	Peak Power (mW)	Peak Power (W)	Limit (W)	Test Result
Low	2402	9.88	9.73	0.0097	0.125	Pass
Mid	2440	9.73	9.40	0.0094	0.125	Pass
High	2480	9.18	8.28	0.0083	0.125	Pass

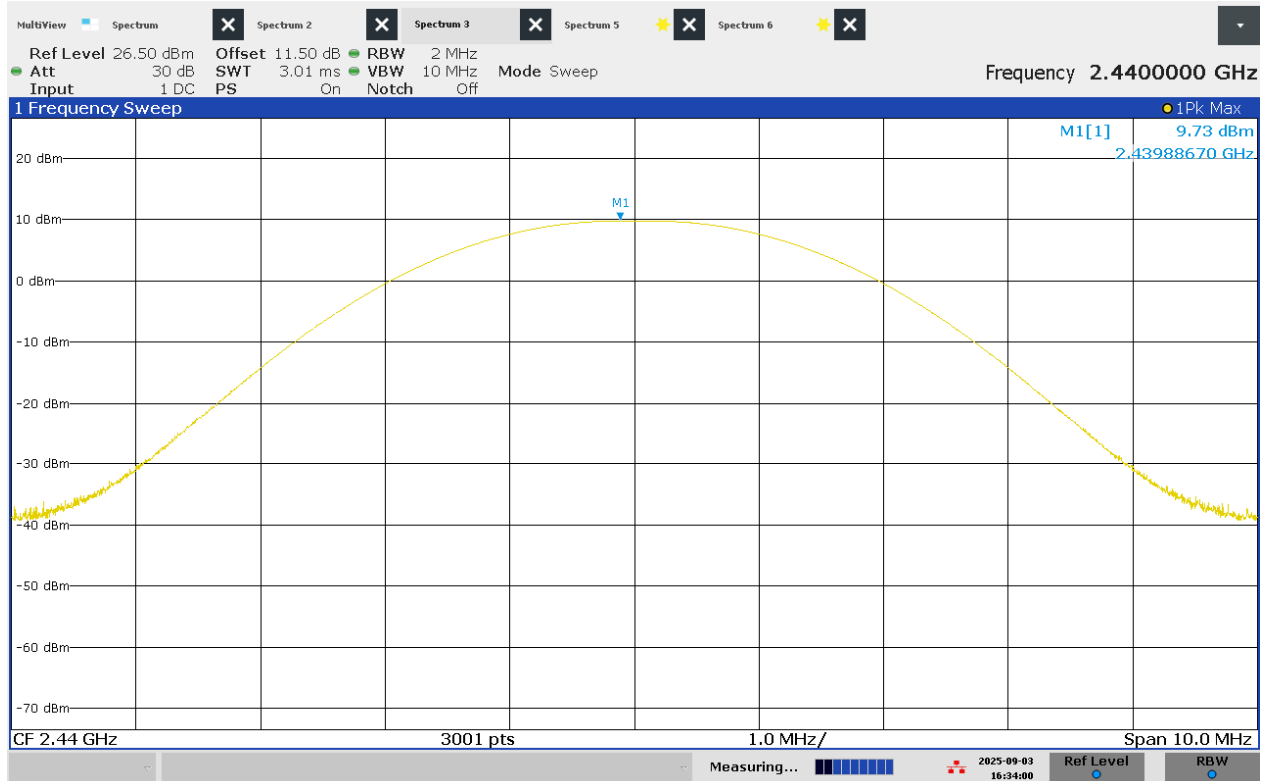
2 MBPS						
Channel	Frequency (MHz)	Peak Power (dBm)	Peak Power (mW)	Peak Power (W)	Limit (W)	Test Result
Low	2402	9.51	8.93	0.0089	0.125	Pass
Mid	2440	9.37	8.65	0.0086	0.125	Pass
High	2480	8.84	7.66	0.0077	0.125	Pass

4.5.3.1. 1 MBPS



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Figure 20 – Peak Power - Low Channel



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Figure 21 – Peak Power - Mid Channel

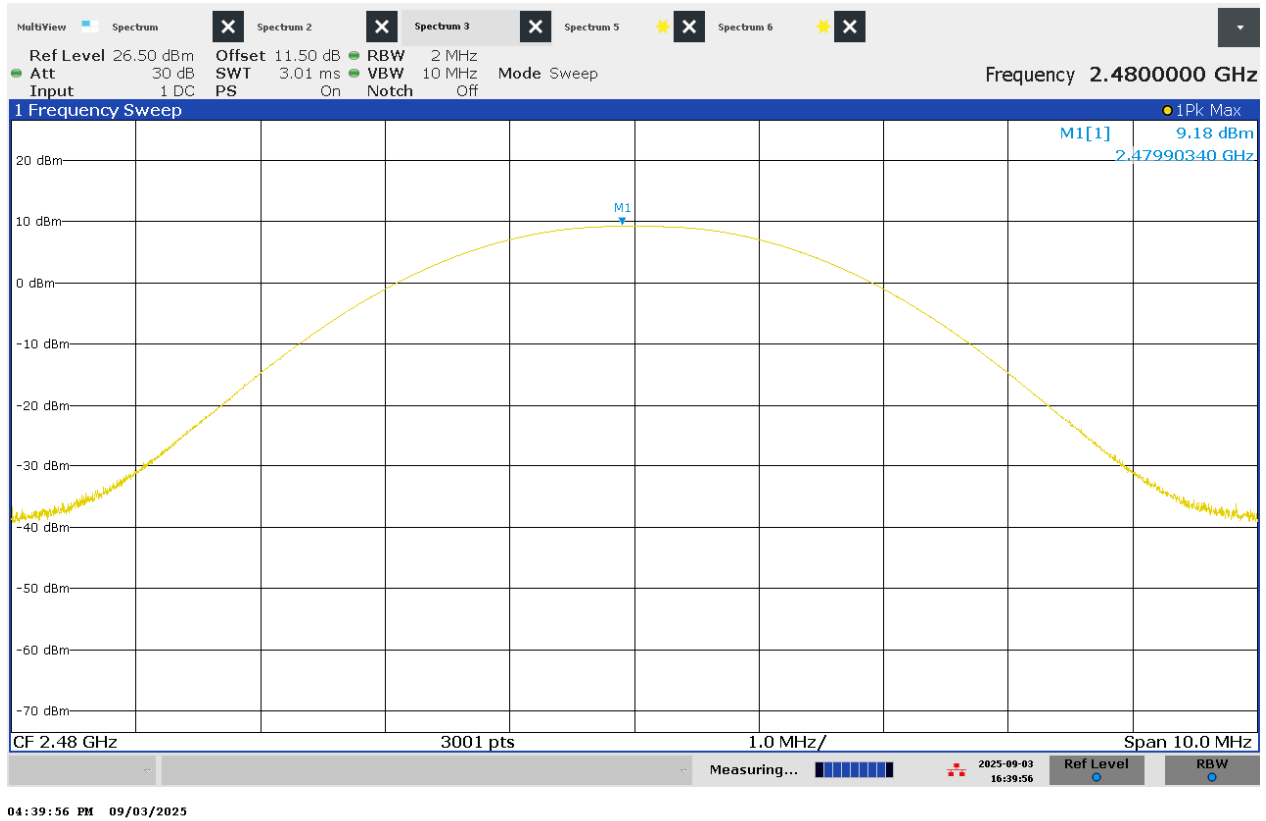
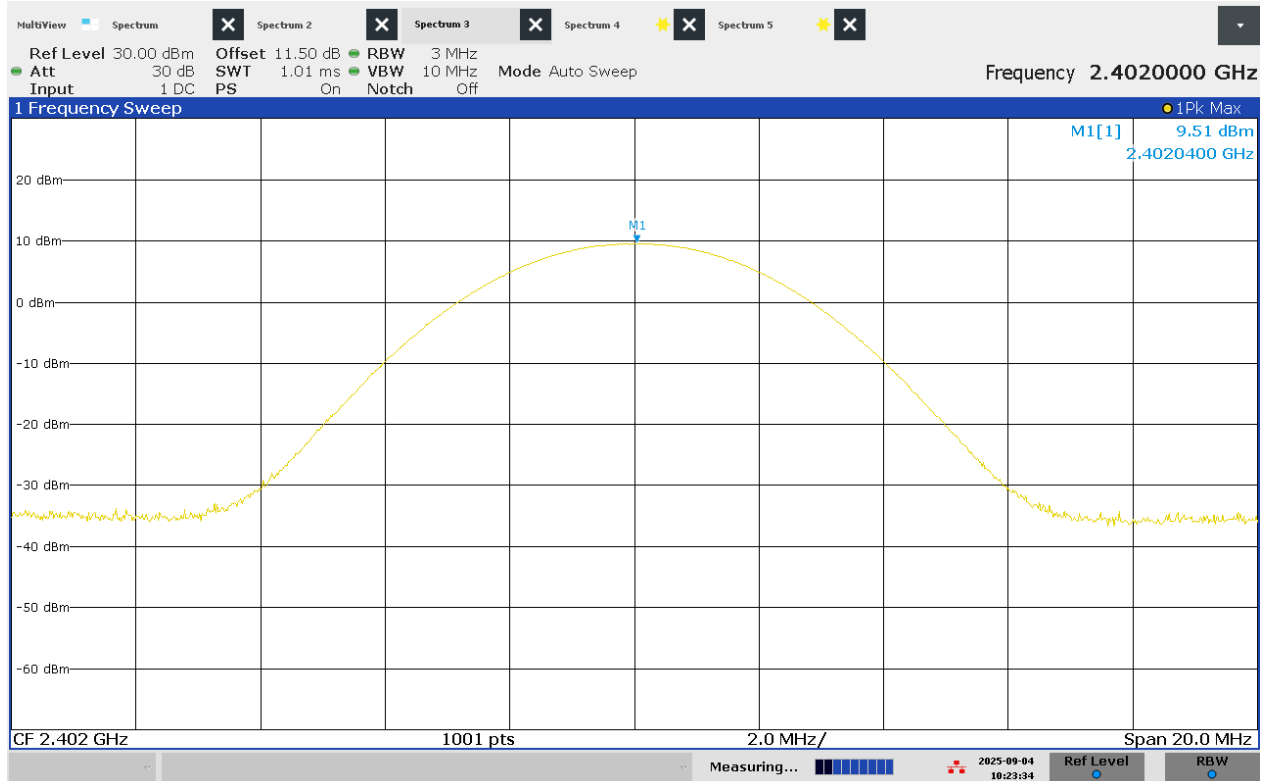


Figure 22 – Peak Power - High Channel

4.5.3.2. 2 MBPS



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Figure 23 – Peak Power - Low Channel

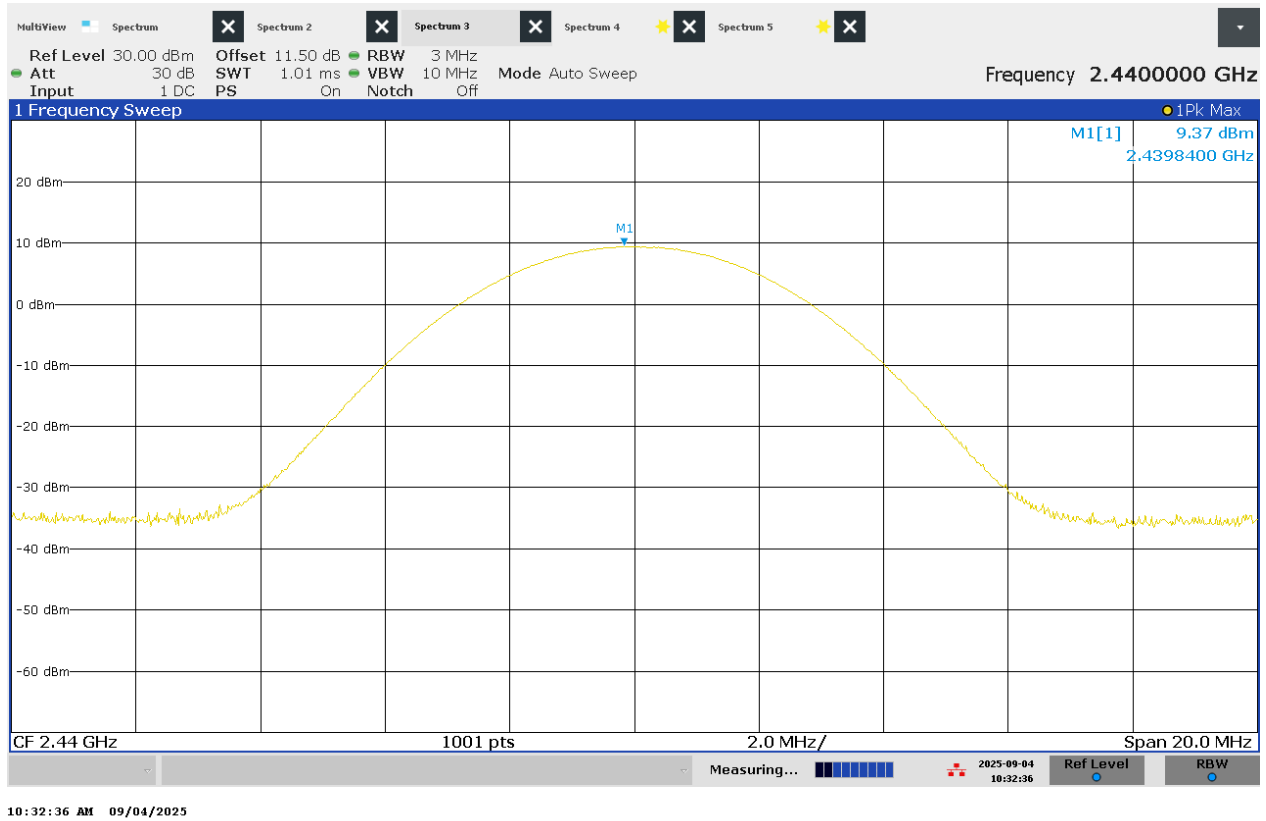


Figure 24 – Peak Power - Mid Channel



Figure 25 – Peak Power - High Channel

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_115	10dB Attenuator	Fairview Microwave	SA18E-10	NCR	NCR

4.6 Conducted Spurious Emissions (-20dBc)

Test Date:	September 3 & 4, 2025
Temperature (°C)	25.4 / 24.5
Relative Humidity (%)	41.0 / 33.5
Barometric Pressure (kPa)	97.2 / 97.0

Initials: MX

4.6.1 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.

4.6.2 Test Procedure

Tested according to ANSI C63.10 Section 7.8.7

Conducted Band-edge testing is performed with hopping disabled and enabled.

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 20 dB emission 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.

4.6.3 Test Results

The DUT met the 20dB below carrier requirement for out of band emissions.

1 MBPS			
Channel	Frequency (MHz)	Peak PSD w/ RBW=100 kHz (dBm)	20 dBc Limit (dBm)
Low	2402	9.71	-10.29
Mid	2440	9.61	-10.39
High	2480	9.0	-11.0

2 MBPS			
Channel	Frequency (MHz)	Peak PSD w/ RBW=100 kHz (dBm)	20 dBc Limit (dBm)
Low	2402	6.14	-13.86
Mid	2440	5.95	-14.05
High	2480	5.24	-14.76

4.6.3.1. 1 MBPS

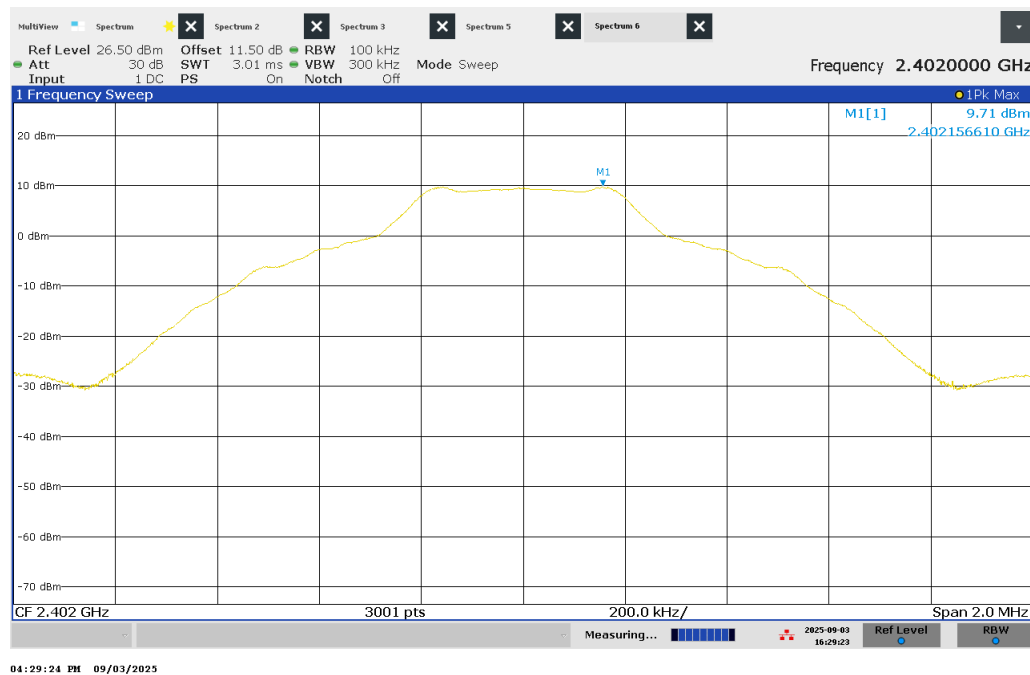


Figure 26 – -20dBc Reference Level - Low Channel

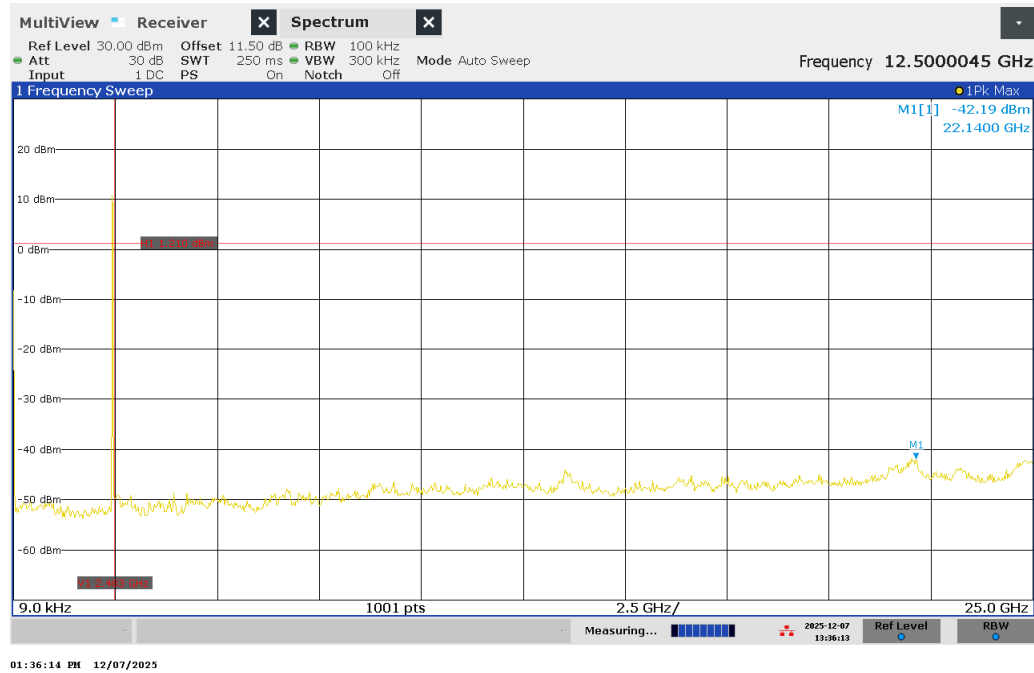


Figure 27 – -20dBc with Low Channel

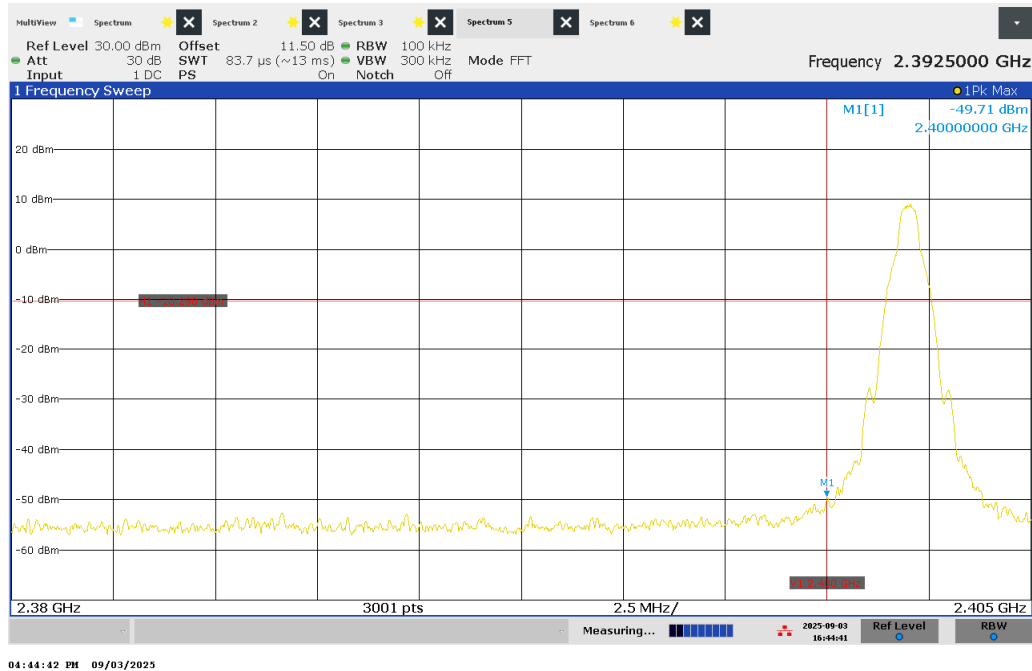


Figure 28 – -20dBc Band Edge - Low Channel (Hoping Disabled)

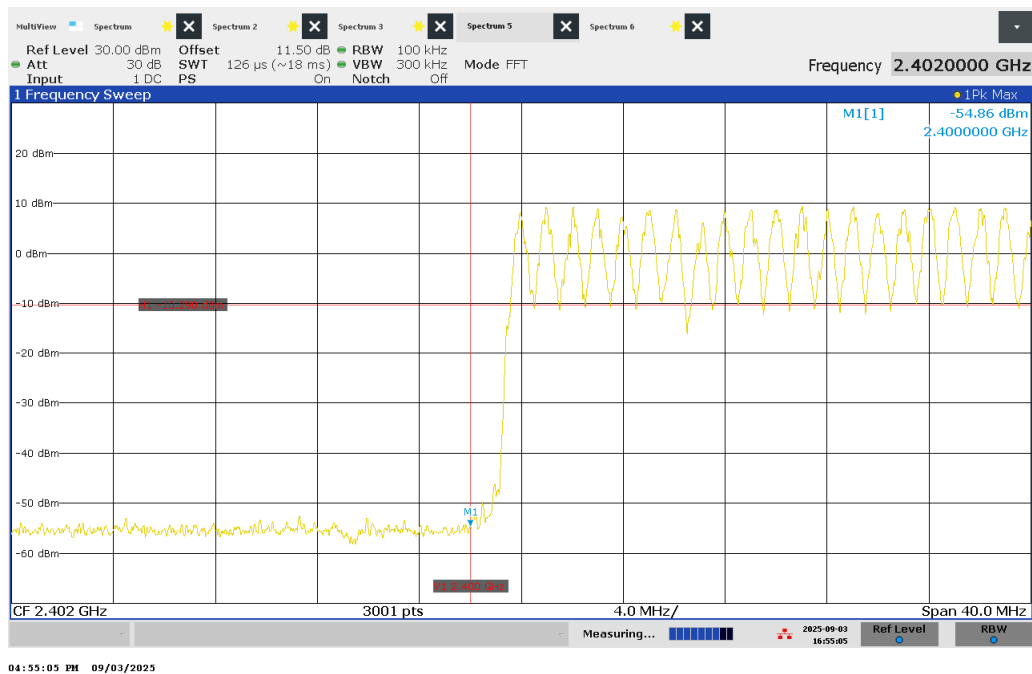


Figure 29 – -20dBc Band Edge - Low Channel (Hoping Enabled)



Figure 30 – -20dBc Band Edge - High Channel (Hopping Disabled)

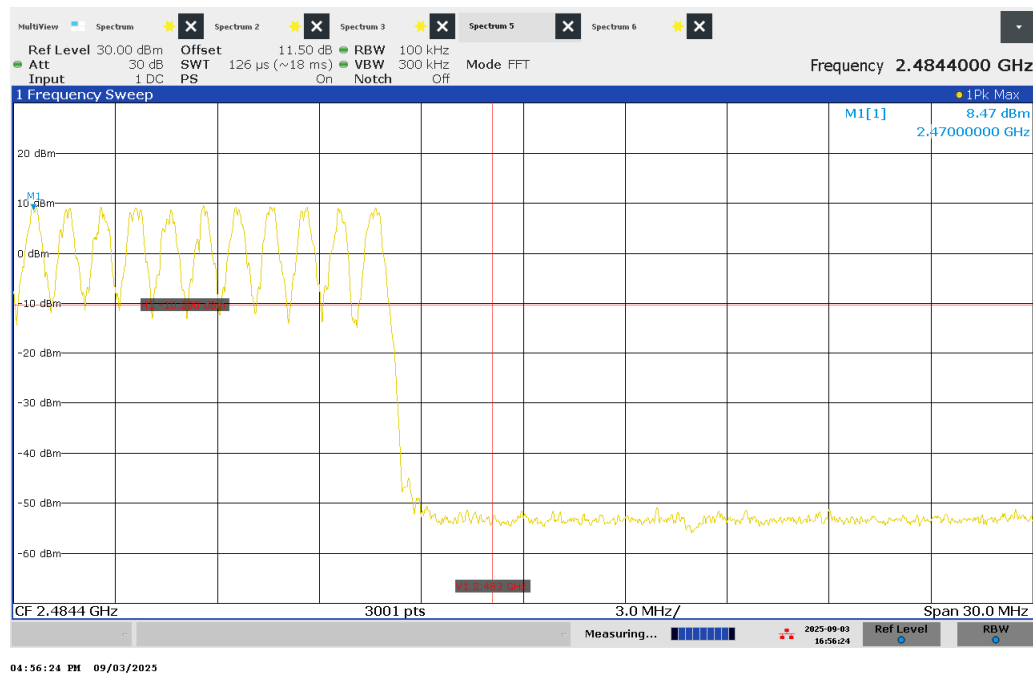


Figure 31 – -20dBc Band Edge - High Channel (Hopping Enabled)

4.6.3.2. 2 MBPS

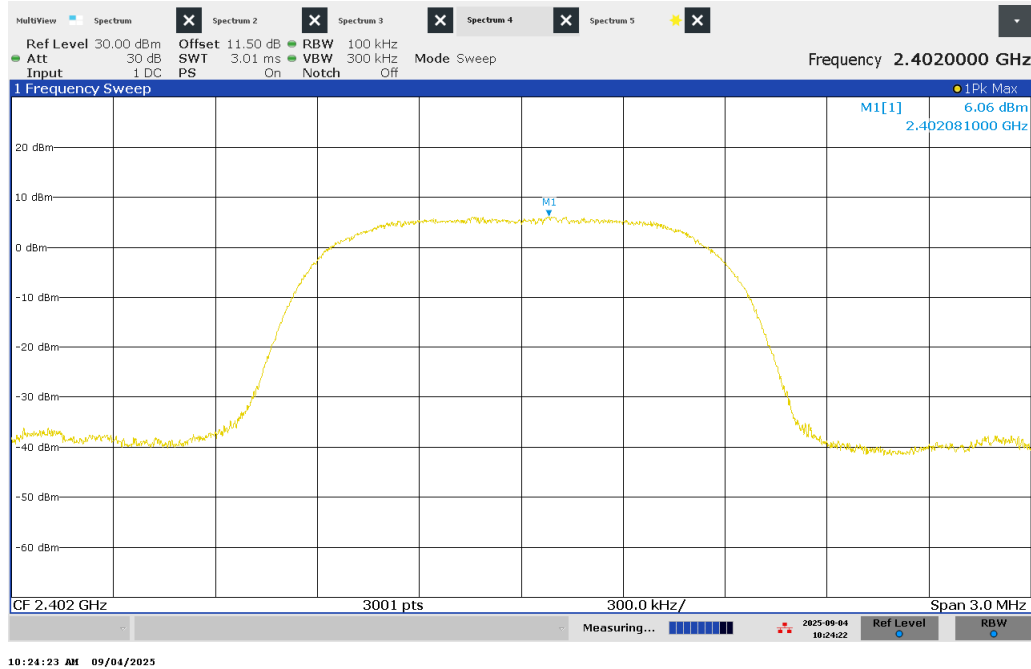


Figure 32 – -20dBc Reference Level - Low Channel

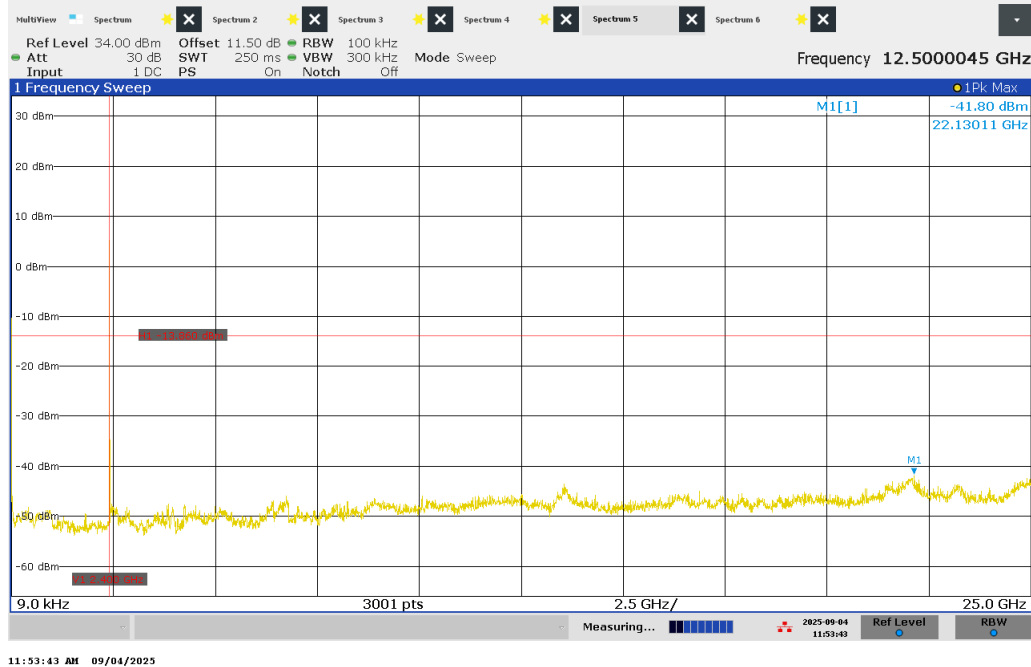


Figure 33 – -20dBc with Low Channel

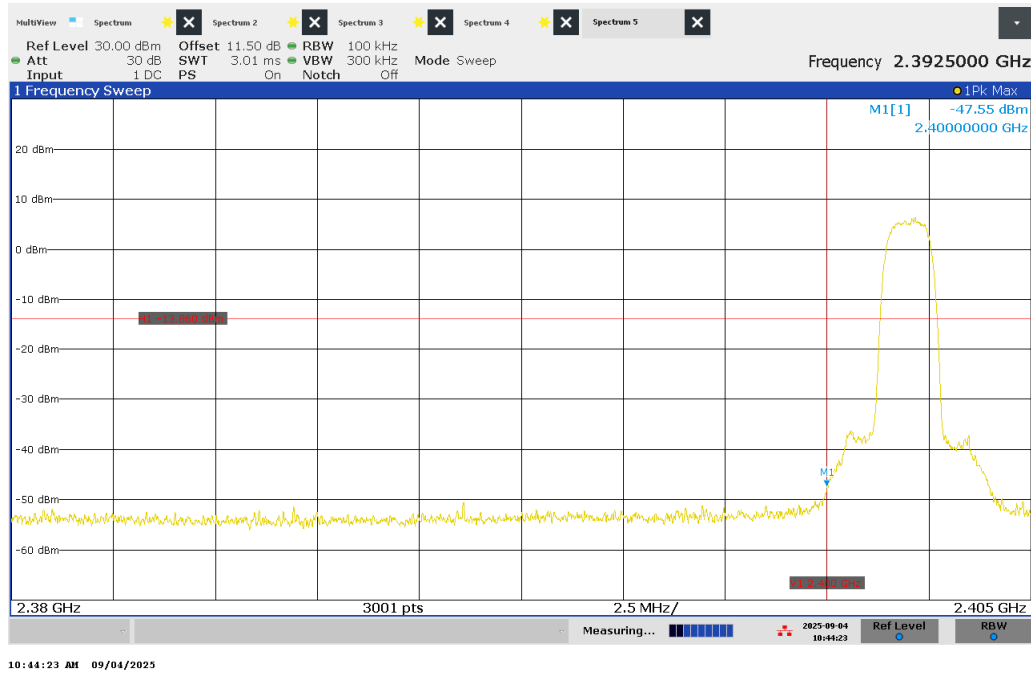


Figure 34 – -20dBc Band Edge - Low Channel (Hoping Disabled)

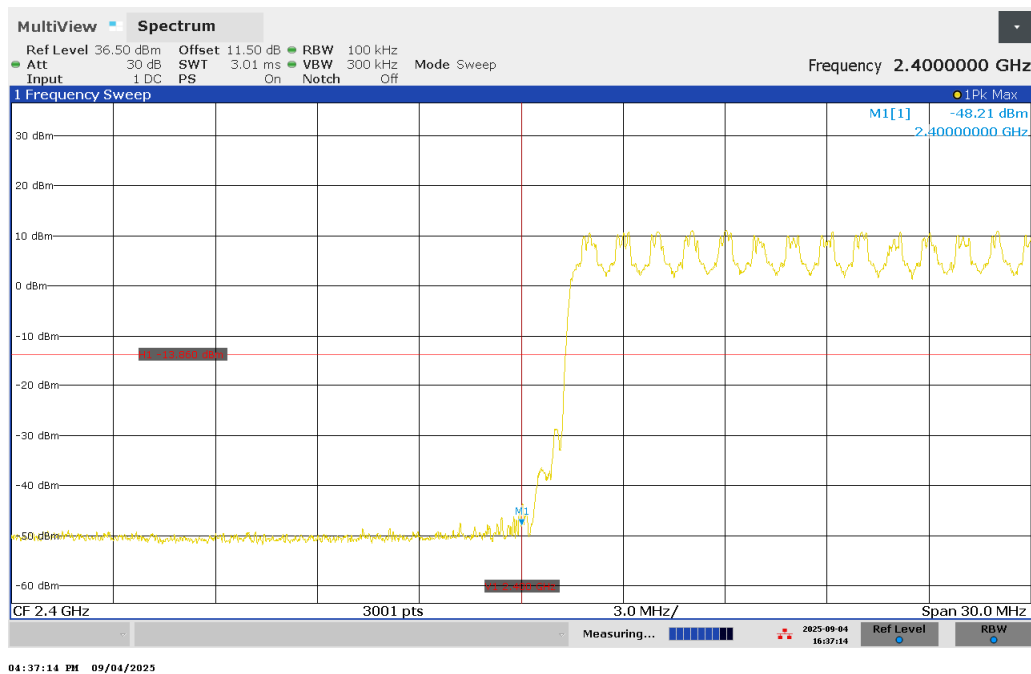


Figure 35 – -20dBc Band Edge - Low Channel (Hoping Enabled)

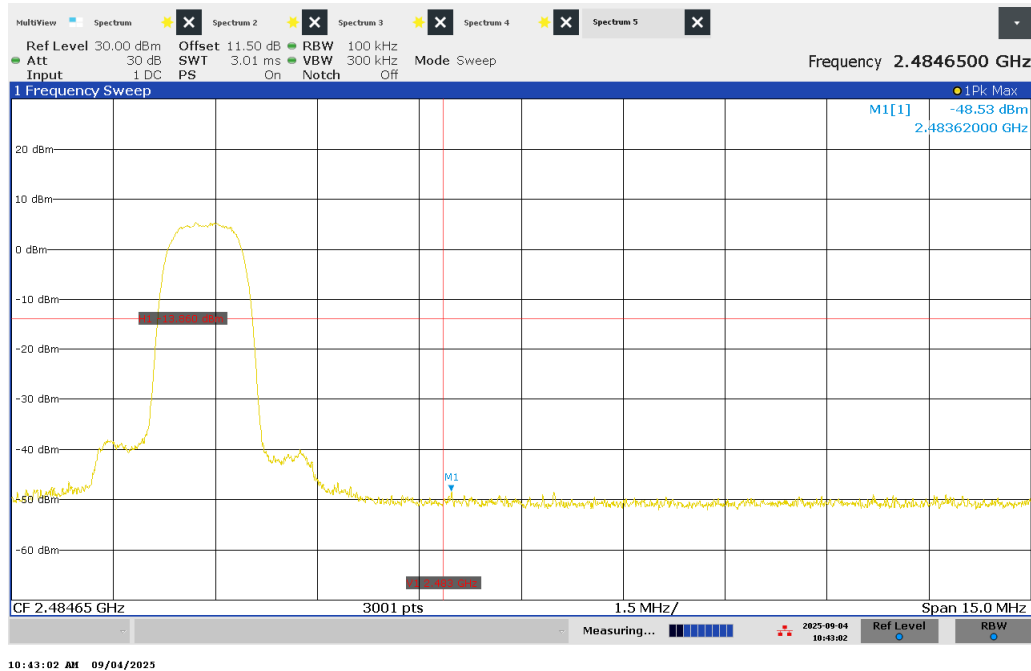


Figure 36 – -20dBc Band Edge - High Channel (Hopping Disabled)

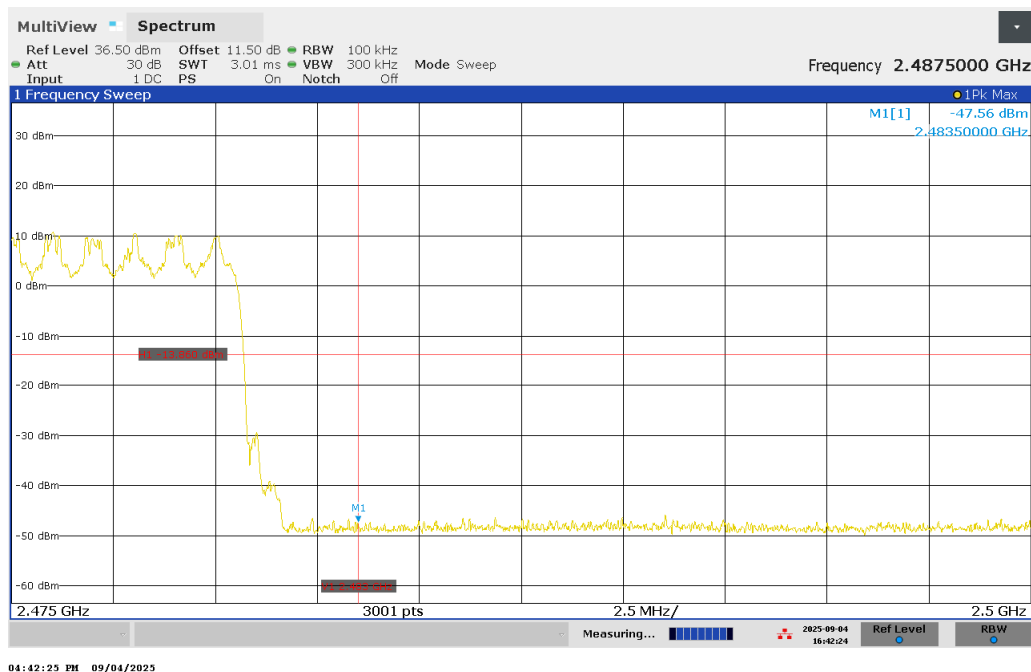


Figure 37 – -20dBc Band Edge - High Channel (Hopping Enabled)

4.6.4 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

4.7 Transmitter Spurious Radiated Emissions

Test Date: August 20, 2025
Temperature (°C) 25.8
Relative Humidity (%) 50.5
Barometric Pressure (kPa) 97.9

Initials: MX

4.7.1 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 C63.4 Section 4.2, 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.

4.7.2 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.

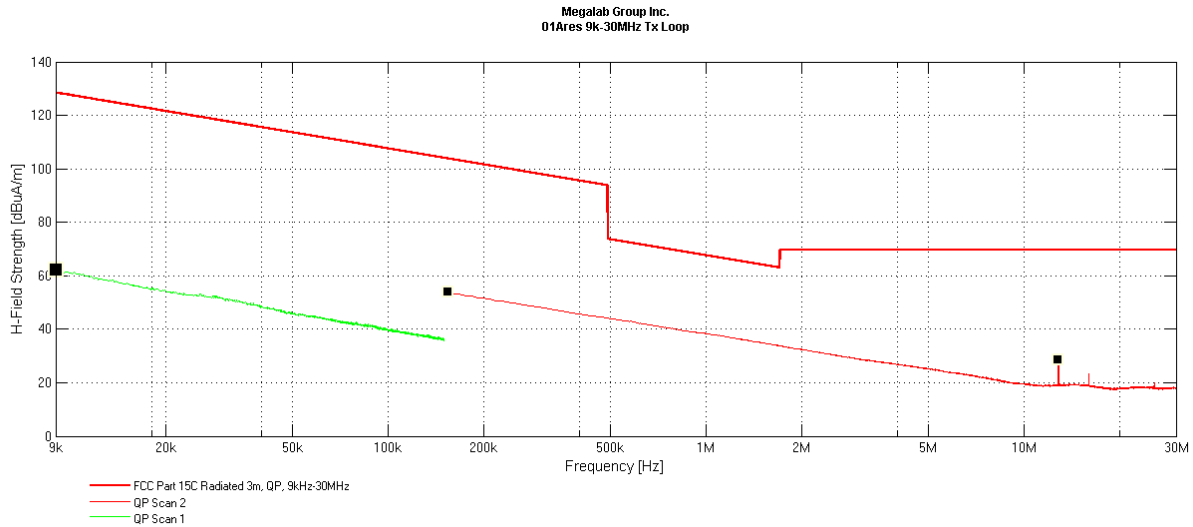
To determine the emission characteristics of the DUT, exploratory radiated emission scans were made while rotating the turntable 0° to 360° and using a Peak detector. The results were recorded in graphical form.

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.

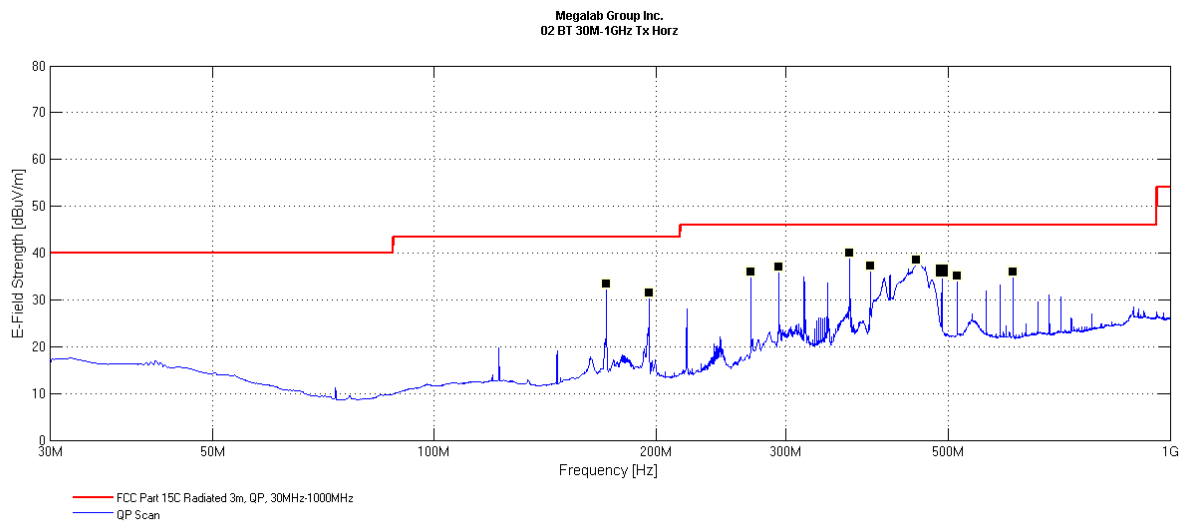
4.7.3 Test Results

Range:	9kHz to 30 MHz	Tx Frequency	2402 MHz
Test Voltage:	24Vac 60Hz	Antenna Polarization	XZ-Plane



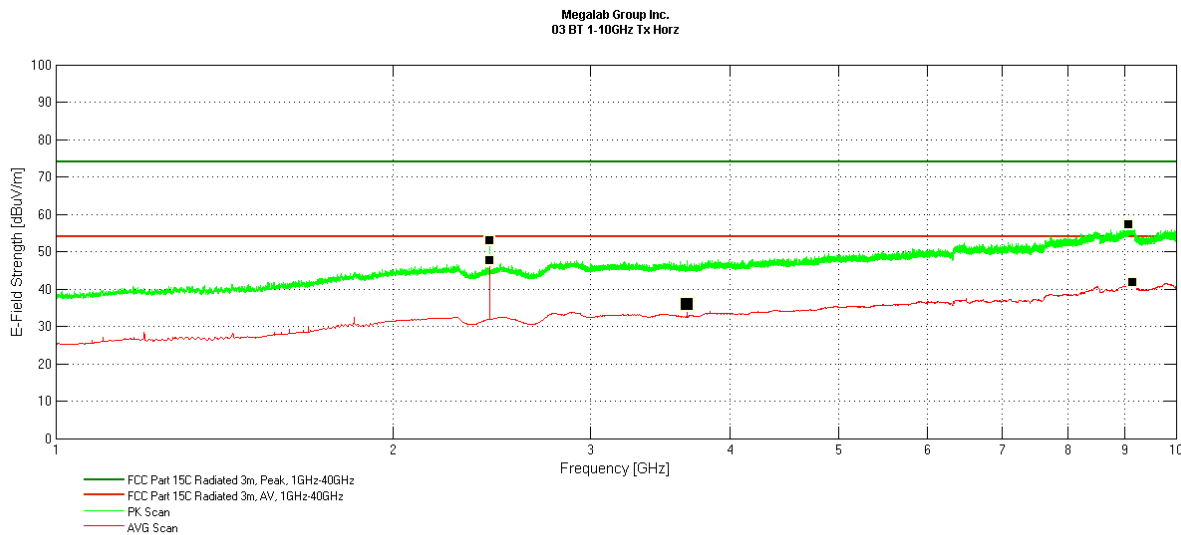
Remark: Quasi-Peak Emission Plot

Range:	30MHz to 1GHz	Tx Frequency	2402 MHz
Test Voltage:	24Vac 60Hz	Antenna Polarization	Horizontal



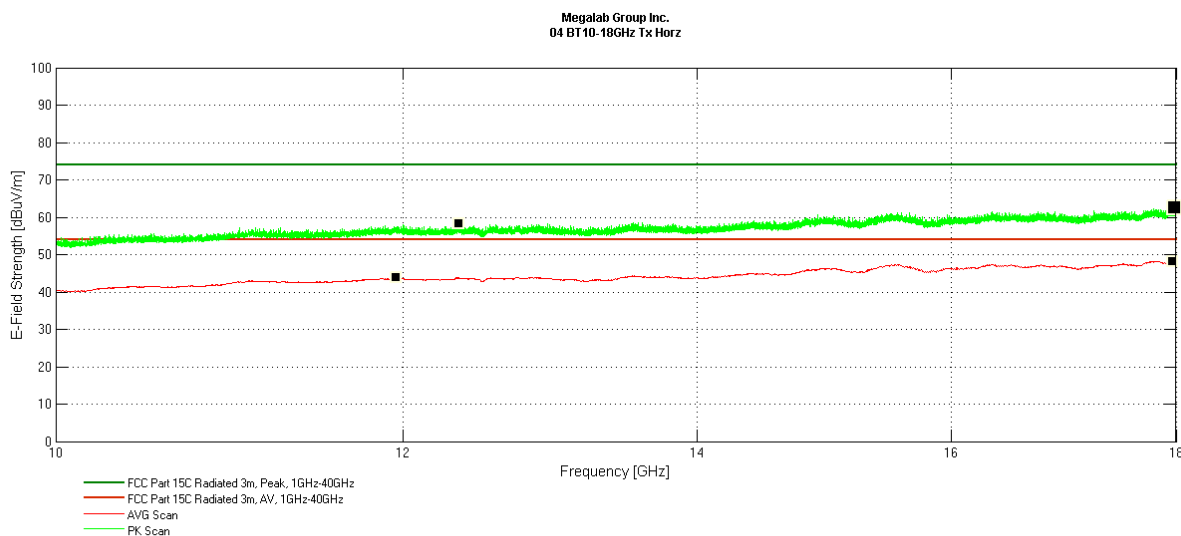
Remark: - Quasi-Peak Emission Plot

Range:	1GHz to 10GHz	Tx Frequency	2402 MHz
Test Voltage:	24Vac 60Hz	Antenna Polarization	Horizontal



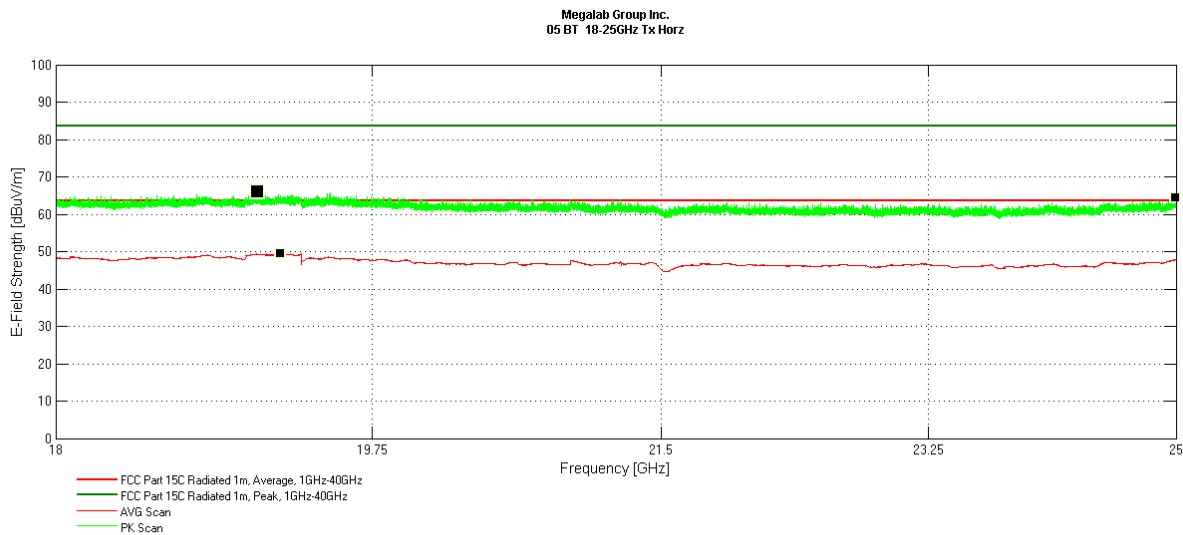
Remark: - **Peak** and **Average** Emission Plot
- A notch filter was used to filter out the fundamental

Range:	10 GHz to 18GHz	Tx Frequency	2402 MHz
Test Voltage:	24Vac 60Hz	Antenna Polarization	Horizontal



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

Range:	18 GHz to 25GHz	Tx Frequency	2402 MHz
Test Voltage:	24Vac 60Hz	Antenna Polarization	Horizontal



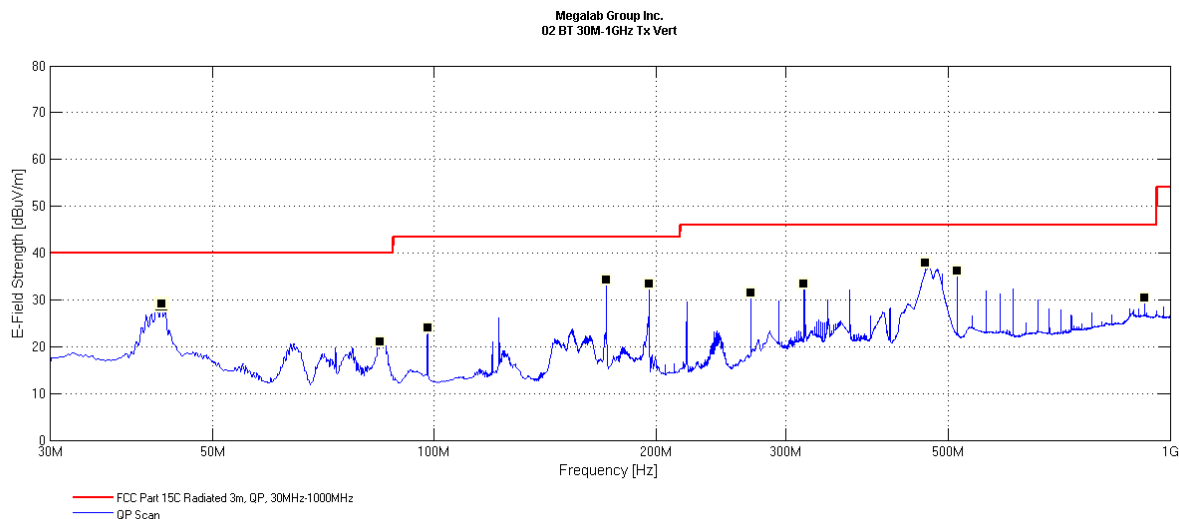
Operator: admin
Last Data Update: 2025-08-21 16:09:09

Project: Ecobee_Ares2_ML302480_BT.S64

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

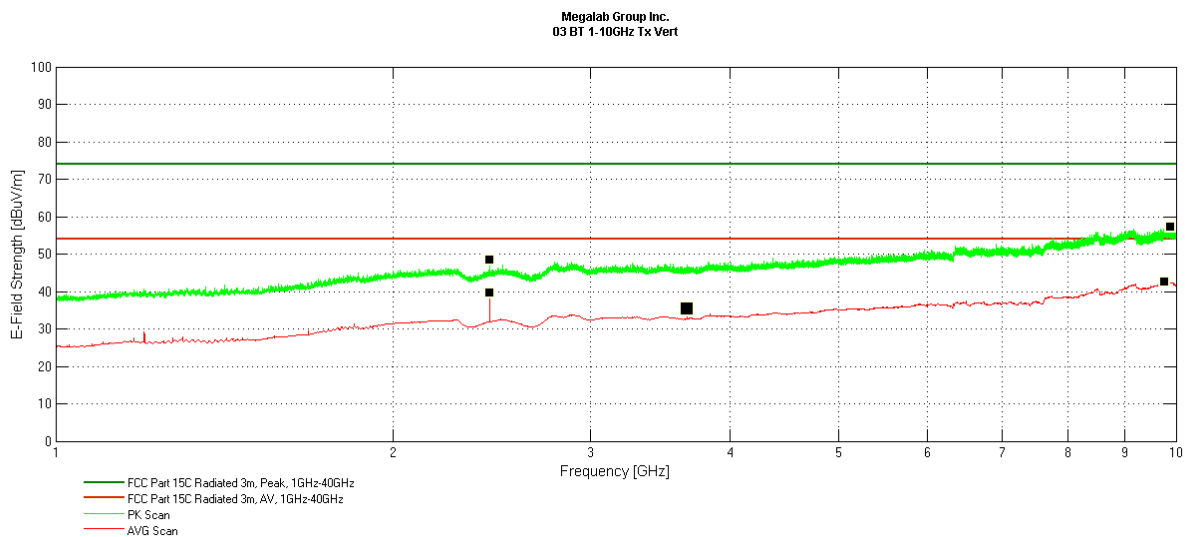
Horizontal Antenna Polarization							
Frequency (MHz)	Detector	Reading (dBμV)	Correction Factor (dB/m)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Test Result
367.25	QP	58.23	-18.31	39.92	46.00	6.08	Pass
452.30	QP	54.96	-16.47	38.49	46.00	7.51	Pass
391.65	QP	54.67	-17.43	37.24	46.00	8.76	Pass
293.80	QP	57.19	-20.24	36.95	46.00	9.05	Pass
489.65	QP	51.76	-15.68	36.08	46.00	9.92	Pass
612.05	QP	49.94	-13.92	36.02	46.00	9.98	Pass

Range:	30MHz to 1GHz	Tx Frequency	2402 MHz
Test Voltage:	24Vac 60Hz	Antenna Polarization	Vertical



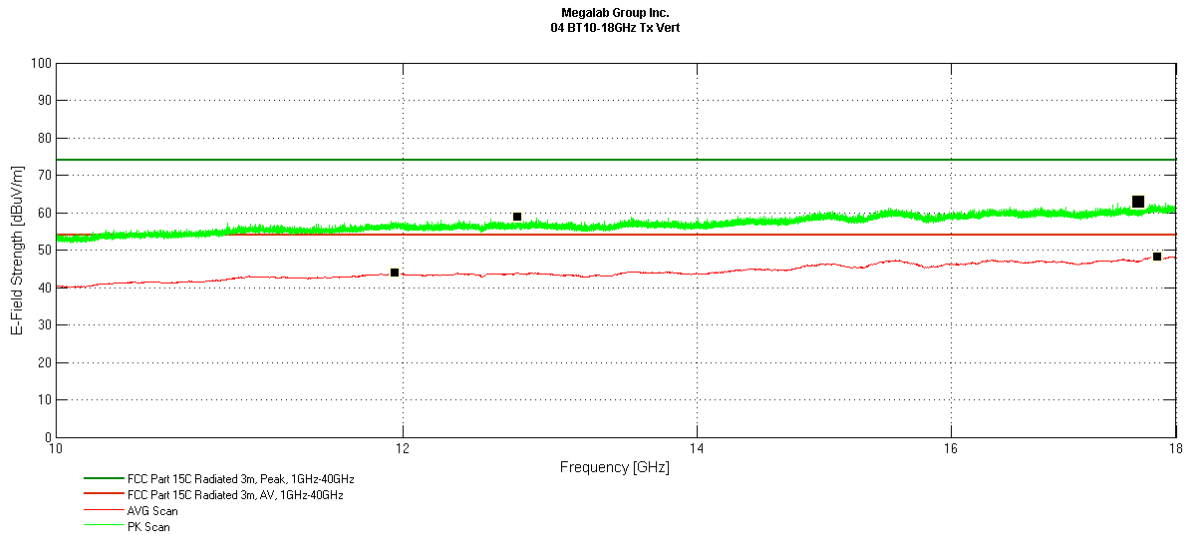
Remark: - Quasi-Peak Emission Plot

Range:	1GHz to 10GHz	Tx Frequency	2402 MHz
Test Voltage:	24Vac 60Hz	Antenna Polarization	Vertical



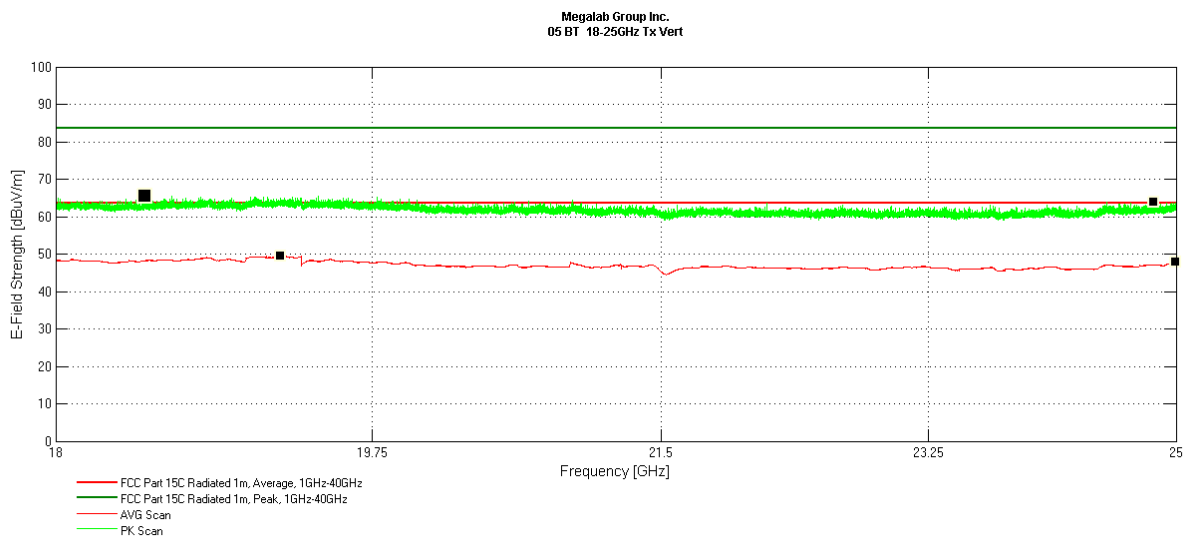
Remark: - **Peak** and **Average** Emission Plot
- A band pass filter was used to filter out the fundamental

Range:	10GHz to 18GHz	Tx Frequency	2402 MHz
Test Voltage:	24Vac 60Hz	Antenna Polarization	Vertical



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

Range:	18GHz to 25GHz	Tx Frequency	2402 MHz
Test Voltage:	24Vac 60Hz	Antenna Polarization	Vertical



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

Worst case position: Angle: 0 Deg
Height: 151 cm

Frequency (MHz)	Detector	Reading (dB μ V)	Correction Factor (dB/m)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Test Result
465.10	QP	53.93	-16.02	37.91	46.00	8.09	Pass
171.40	QP	58.05	-23.76	34.29	43.50	9.21	Pass
514.05	QP	51.33	-15.21	36.12	46.00	9.88	Pass
195.80	QP	56.62	-23.23	33.39	43.50	10.11	Pass
42.60	QP	48.35	-19.27	29.08	40.00	10.92	Pass
42.55	QP	48.16	-19.26	28.90	40.00	11.10	Pass
318.15	QP	52.85	-19.57	33.28	46.00	12.72	Pass
269.25	QP	52.15	-20.71	31.44	46.00	14.56	Pass

4.7.4 Test Equipment List

Equipment ID	Description	Manufacturer	Model	Calibration Date	Calibration Due
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

4.8 Lower and Upper Band Edges

Test Date:	August 18, 2025
Temperature (°C)	26.1
Relative Humidity (%)	29.3
Barometric Pressure (kPa)	98.6

Initials: MX

4.8.1 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).

4.8.2 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.

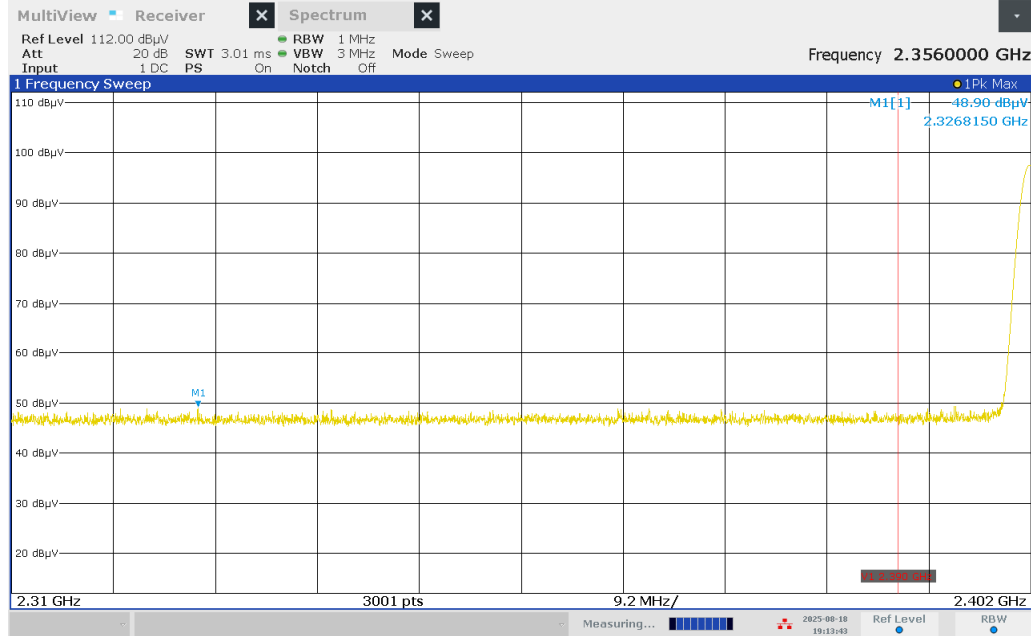
The radiated band edge measurements were made with the DUT in normal operation position.

4.8.3 Test Results – 1 MBPS

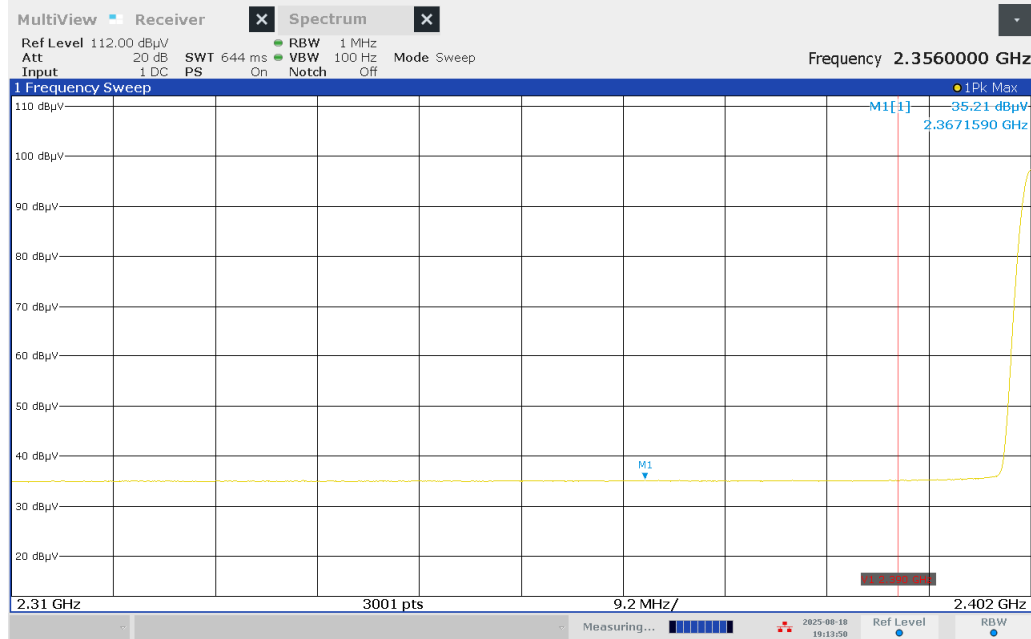
The DUT met the band edge requirements. Peak output power for low, mid and high channels were measured and the Plots Section below contains the maximum radiated emission levels captured on the spectrum analyzer at the band edges. The Final Measurements Section contains the final results with the correction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

4.8.3.1. Plots

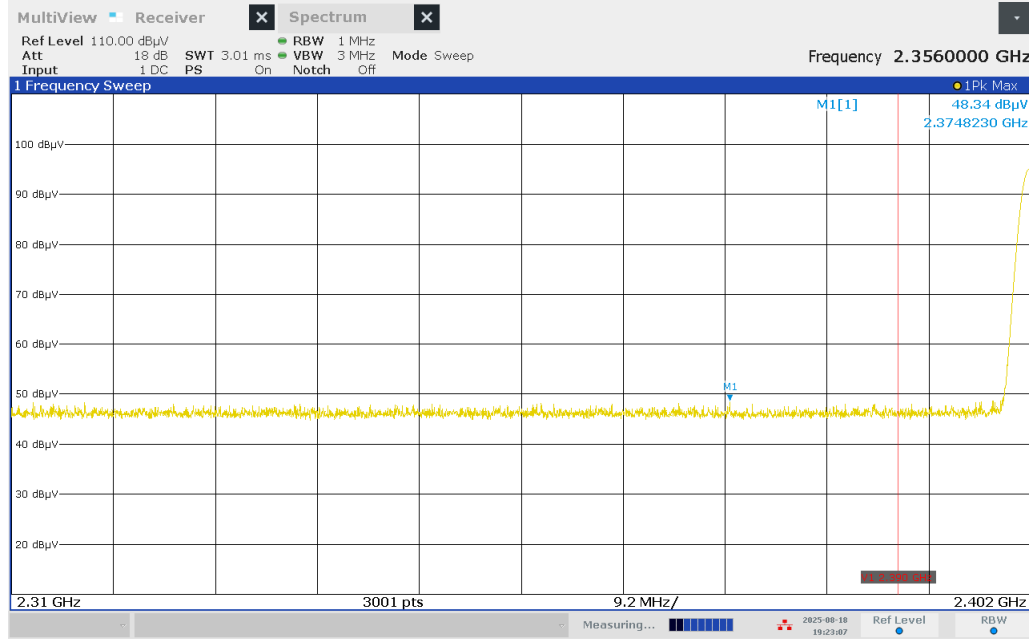
Tx Frequency	Low Channel	Antenna Polarization	Horizontal	Emission	Peak
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Tx Frequency	Low Channel	Antenna Polarization	Horizontal	Emission	Average
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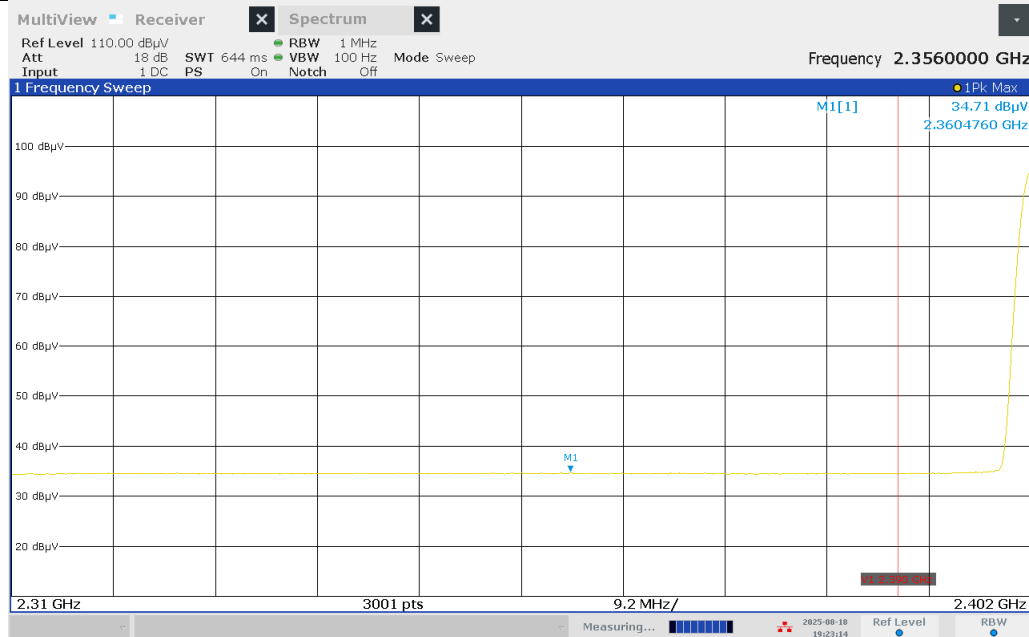


Tx Frequency	Low Channel	Antenna Polarization	Vertical	Emission	Peak
--------------	-------------	----------------------	----------	----------	------



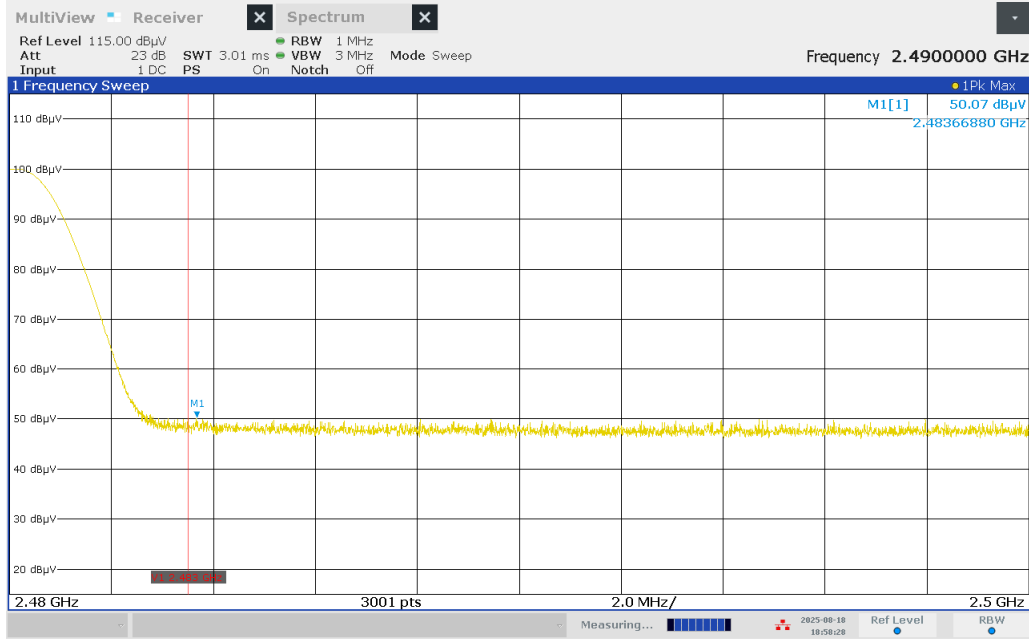
07:23:08 PM 08/18/2025

Tx Frequency	Low Channel	Antenna Polarization	Vertical	Emission	Average
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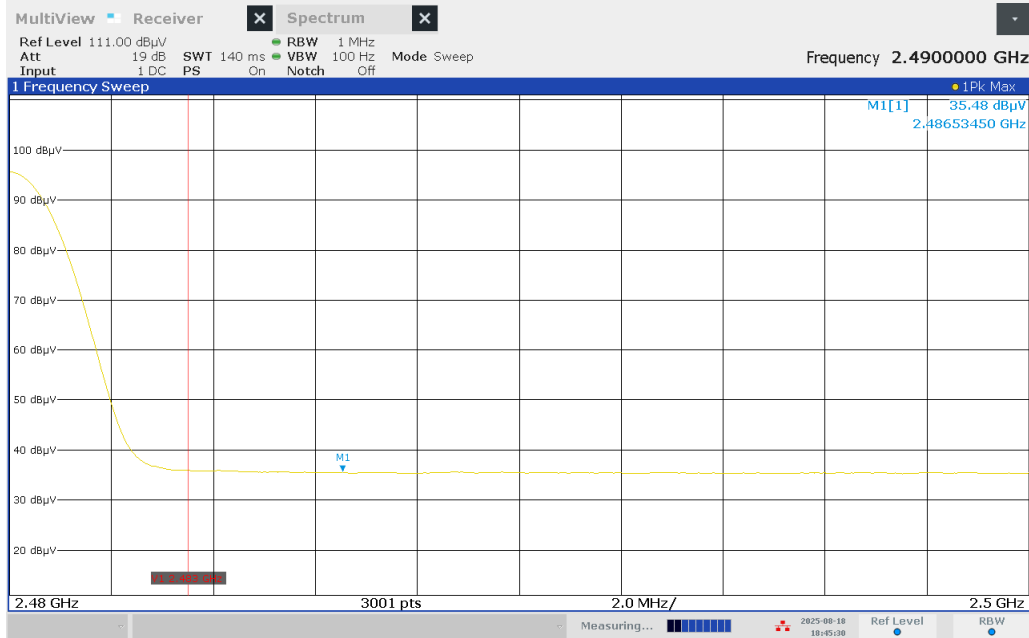
07:23:15 PM 08/18/2025

Tx Frequency	High Channel	Antenna Polarization	Horizontal	Emission	Peak
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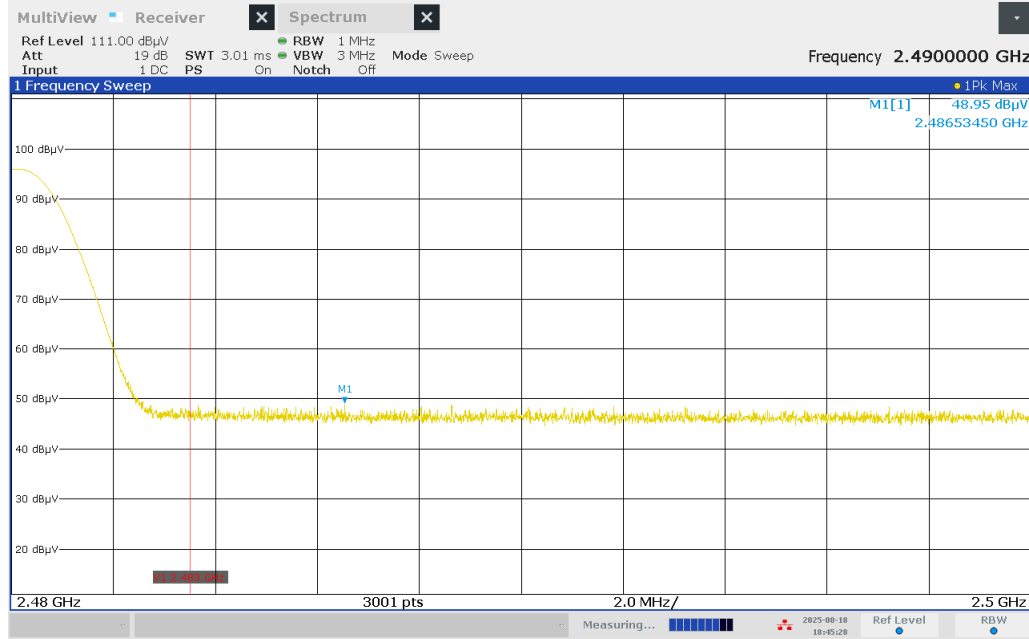
06:58:29 PM 08/18/2025

Tx Frequency	High Channel	Antenna Polarization	Horizontal	Emission	Average
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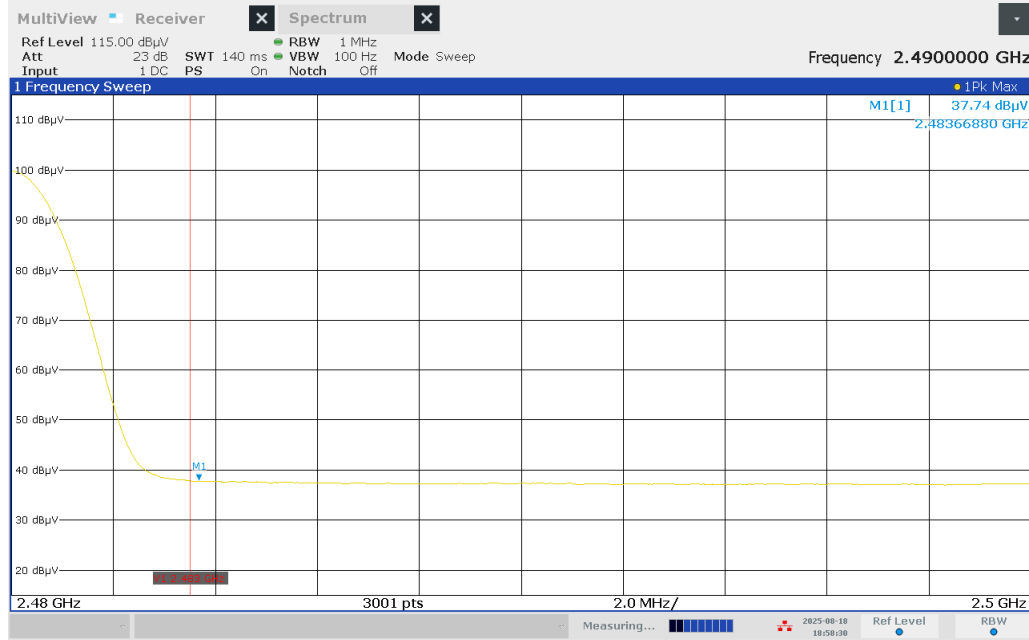


06:45:31 PM 08/18/2025

Tx Frequency	High Channel	Antenna Polarization	Vertical	Emission	Peak
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Tx Frequency	High Channel	Antenna Polarization	Vertical	Emission	Average
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4.8.3.2. Final Measurements

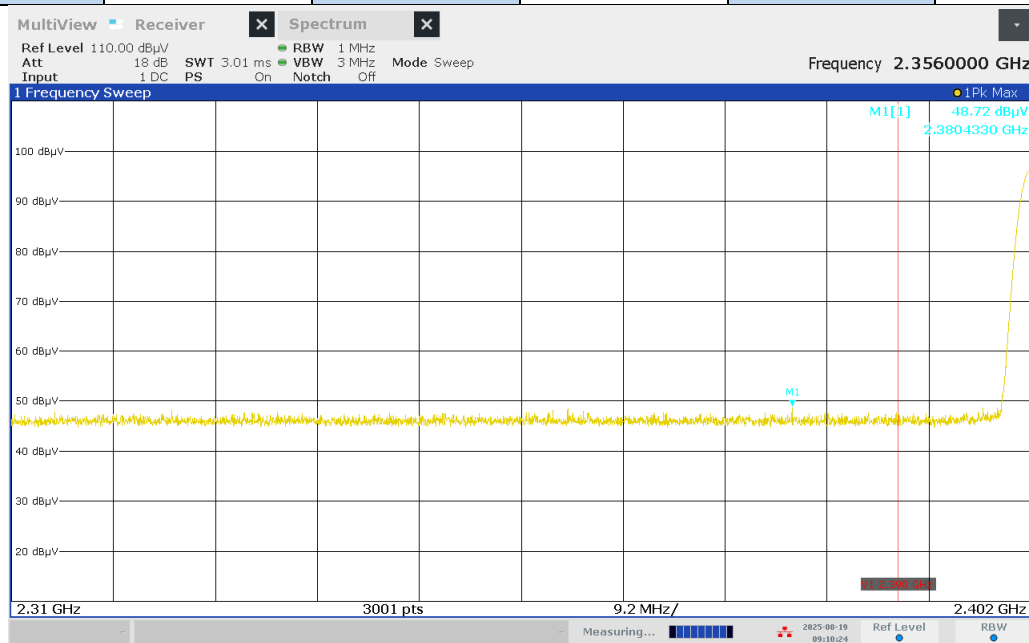
Frequency (MHz)	Detector	Antenna Polarity	Reading (dBμV)	Antenna Factor (dB/m)	Cable Factor (dB)	Attenuator (dB)	Pre-Amp Gain (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Test Result
Low Channel											
BLE - 1 MBPS											
2402	PEAK	Horz	97.5	32.1	6.8	10.0	-41.6	104.8			Pass
2402	AVG	Horz	97.2	32.1	6.8	10.0	-41.6	104.5			Pass
2402	PEAK	Vert	95.2	32.1	6.8	10.0	-41.6	102.4			Pass
2402	AVG	Vert	94.9	32.1	6.8	10.0	-41.6	102.1			Pass
2326.8	PEAK	Horz	48.9	31.8	6.8	10.0	-41.5	56.0	74.0	18.0	Pass
2367.2	AVG	Horz	35.2	31.9	6.8	10.0	-41.6	42.4	54.0	11.6	Pass
2374.8	PEAK	Vert	48.3	32.0	6.8	10.0	-41.6	55.5	74.0	18.5	Pass
2360.5	AVG	Vert	34.7	31.9	6.8	10.0	-41.5	41.8	54.0	12.2	Pass
High Channel											
BLE - 1 MBPS											
2480	PEAK	Horz	100.1	32.4	6.9	10.0	-41.7	107.7			Pass
2480	AVG	Horz	99.9	32.4	6.9	10.0	-41.7	107.5			Pass
2480	PEAK	Vert	96.0	32.4	6.9	10.0	-41.7	103.6			Pass
2480	AVG	Vert	96.0	32.4	6.9	10.0	-41.7	103.6			Pass
2483.7	PEAK	Horz	50.1	32.4	6.9	10.0	-41.7	57.6	74.0	16.4	Pass
2483.7	AVG	Horz	37.7	32.4	6.9	10.0	-41.7	45.3	54.0	8.7	Pass
2486.5	PEAK	Vert	49.0	32.4	6.9	10.0	-41.7	56.5	74.0	17.5	Pass
2486.5	AVG	Vert	35.5	32.4	6.9	10.0	-41.7	43.0	54.0	11.0	Pass

4.8.4 Test Results – 2 MBPS

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.

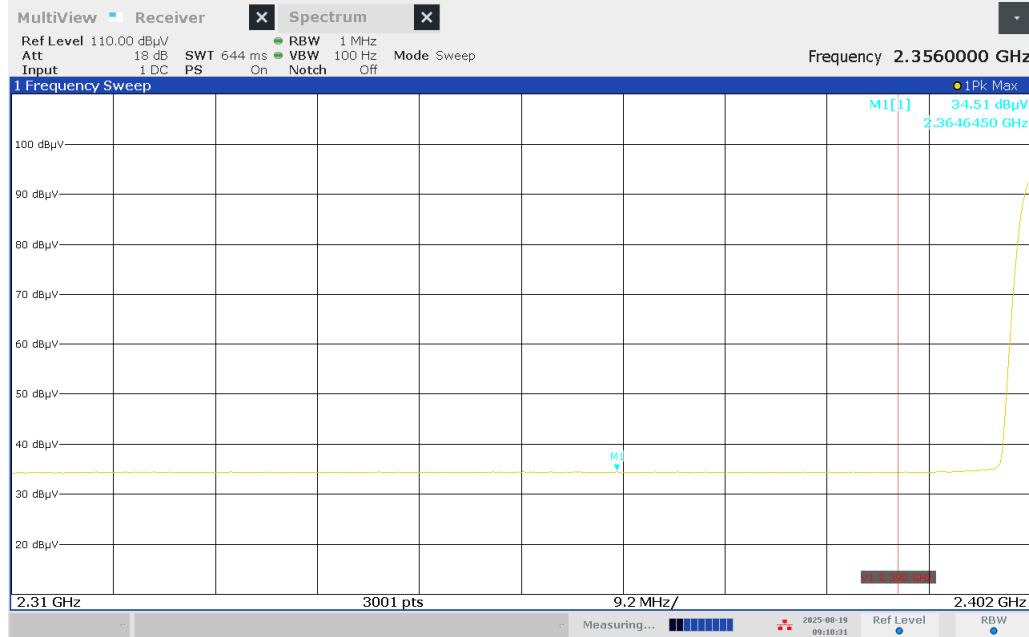
4.8.4.1. Plots

Tx Frequency	Low Channel	Antenna Polarization	Horizontal	Emission	Peak
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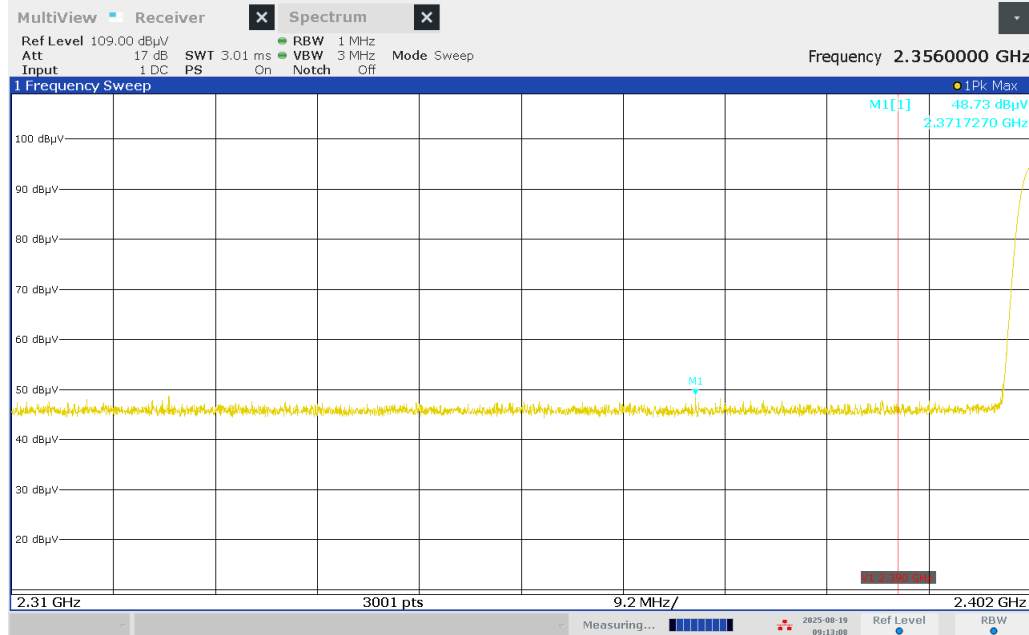
09:10:24 AM 08/19/2025

Tx Frequency	Low Channel	Antenna Polarization	Horizontal	Emission	Average
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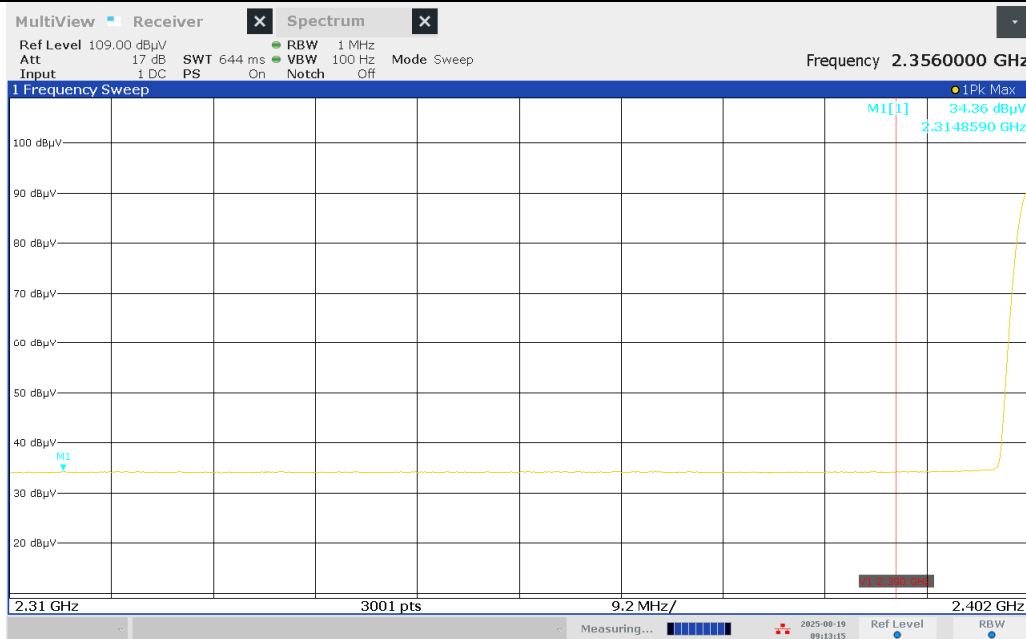
09:10:31 AM 08/19/2025

Tx Frequency	Low Channel	Antenna Polarization	Vertical	Emission	Peak
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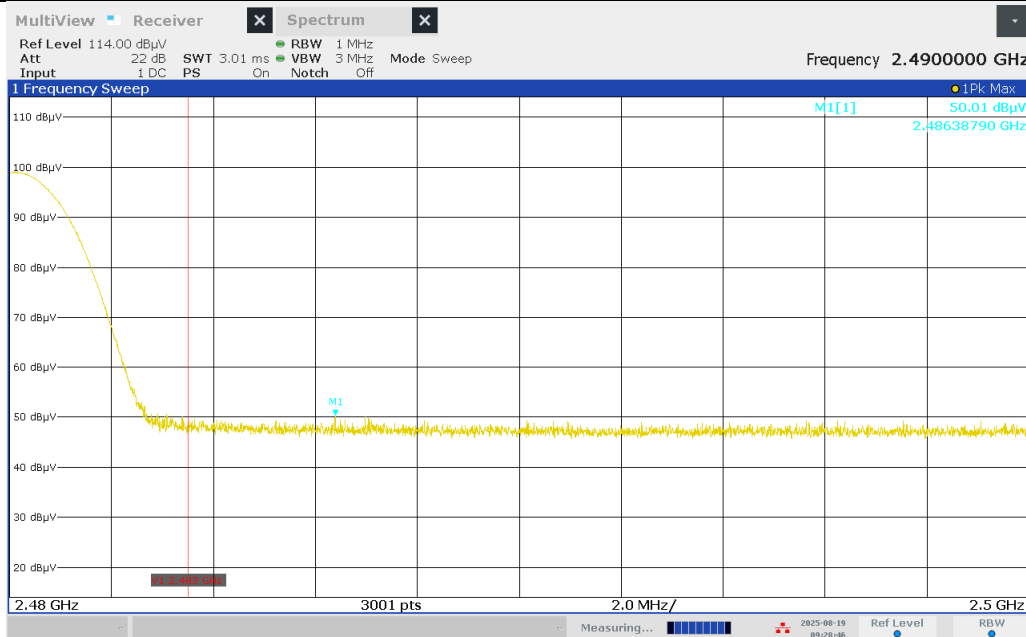
09:13:08 AM 08/19/2025

Tx Frequency	Low Channel	Antenna Polarization	Vertical	Emission	Average
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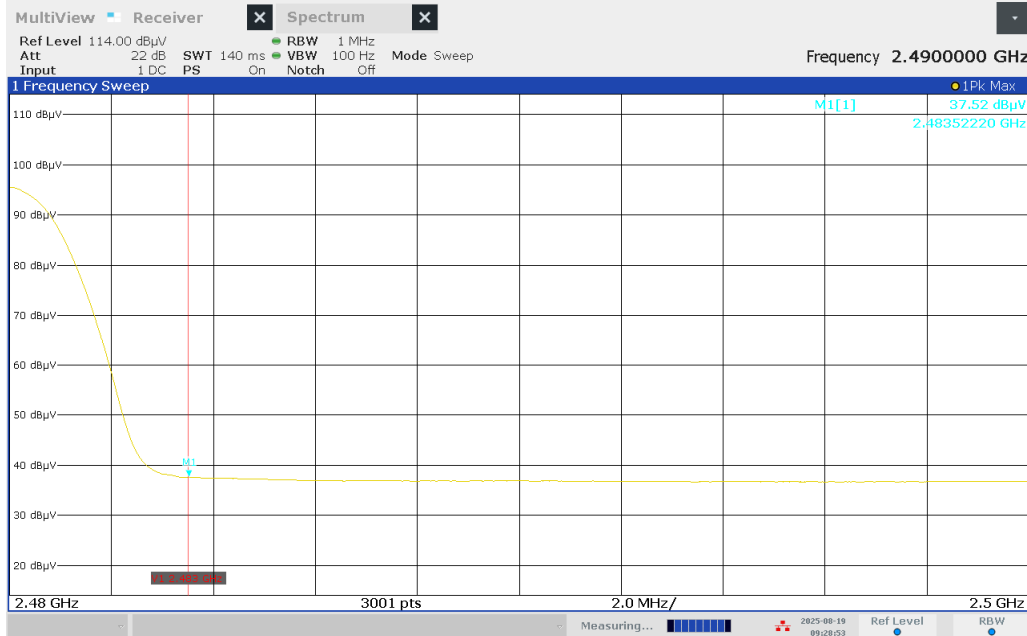
09:13:15 AM 08/19/2025

Tx Frequency	High Channel	Antenna Polarization	Horizontal	Emission	Peak
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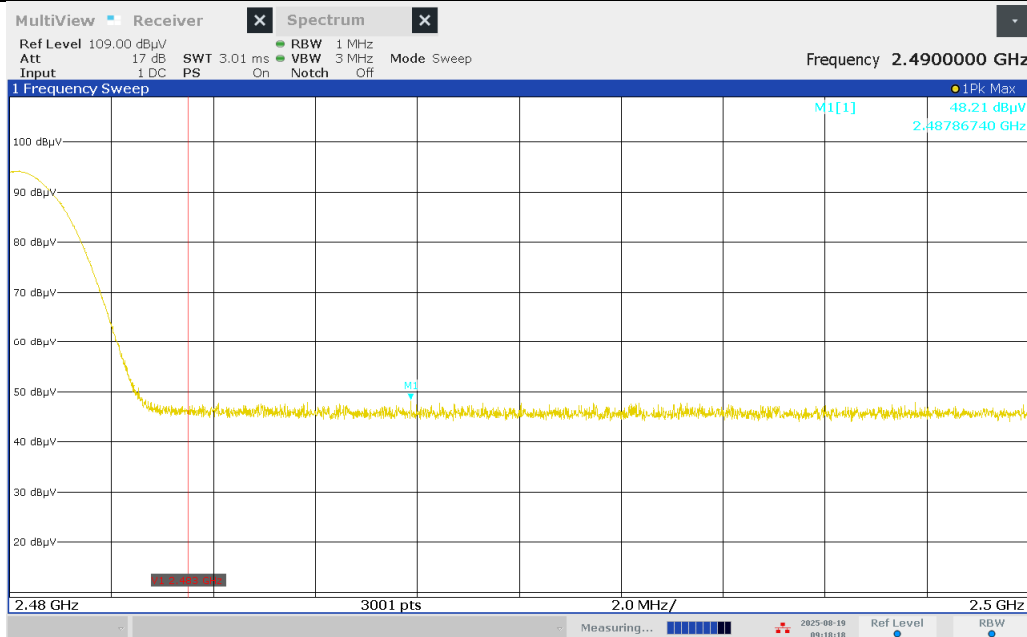
09:28:46 AM 08/19/2025

Tx Frequency	High Channel	Antenna Polarization	Horizontal	Emission	Average
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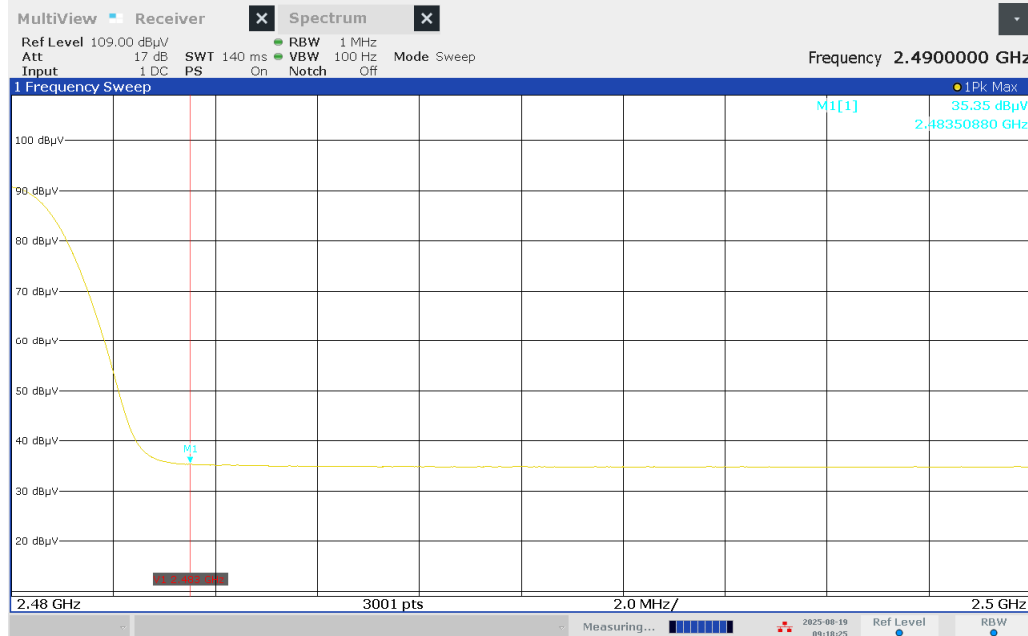
09:28:53 AM 08/19/2025

Tx Frequency	High Channel	Antenna Polarization	Vertical	Emission	Peak
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09:18:18 AM 08/19/2025

Tx Frequency	High Channel	Antenna Polarization	Vertical	Emission	Average
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09:18:25 AM 08/19/2025

4.8.4.2. 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											
BLE - 2 MBPS											
2402	PEAK	Horz	96.2	32.1	6.8	10.0	-41.6	103.4			Pass
2402	AVG	Horz	92.6	32.1	6.8	10.0	-41.6	99.8			Pass
2402	PEAK	Vert	94.3	32.1	6.8	10.0	-41.6	101.5			Pass
2402	AVG	Vert	90.6	32.1	6.8	10.0	-41.6	97.9			Pass
2380.4	PEAK	Horz	48.7	32.0	6.8	10.0	-41.6	56.0	74.0	18.0	Pass
2364.6	AVG	Horz	34.5	31.9	6.8	10.0	-41.6	41.6	54.0	12.4	Pass
2371.7	PEAK	Vert	48.7	31.9	6.8	10.0	-41.6	55.9	74.0	18.1	Pass
2314.9	AVG	Vert	34.4	31.8	6.8	10.0	-41.5	41.5	54.0	12.5	Pass
High Channel											
BLE - 2 MBPS											
2480	PEAK	Horz	99.2	32.4	6.9	10.0	-41.7	106.8			Pass
2480	AVG	Horz	95.5	32.4	6.9	10.0	-41.7	103.1			Pass
2480	PEAK	Vert	94.4	32.4	6.9	10.0	-41.7	102.0			Pass
2480	AVG	Vert	90.7	32.4	6.9	10.0	-41.7	98.3			Pass
2486.4	PEAK	Horz	50.0	32.4	6.9	10.0	-41.7	57.6	74.0	16.4	Pass
2483.5	AVG	Horz	37.5	32.4	6.9	10.0	-41.7	45.1	54.0	8.9	Pass
2487.9	PEAK	Vert	48.2	32.4	6.9	10.0	-41.7	55.8	74.0	18.2	Pass
2483.5	AVG	Vert	35.3	32.4	6.9	10.0	-41.7	42.9	54.0	11.1	Pass

4.8.5 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

4.9 Power Line Conducted Emissions

Test Date: May 13, 2024
Temperature (°C) 21.1
Relative Humidity (%) 54.7
Barometric Pressure (kPa) 100.8

Initials: MX

The conducted emission test is to measure radio-frequency (RF) signals and noise emitted from electrical and electronic devices in the frequency range of 150kHz to 30MHz.

4.9.1 Limits

Base Standard(s): FCC Subpart B 15.207 and RSS-GEN Section 8.8.

Frequency Range (MHz)	Coupling Device	Detector Type / Bandwidth	Limit (dBμV)
0.15 to 0.50	LISN	Quasi-Peak / 9kHz	66 to 56*
0.50 to 5			56
5 to 30			60
0.15 to 0.50	LISN	Average / 9kHz	56 to 46*
0.50 to 5			46
5 to 30			50

* Decreases linearly with the logarithm of the frequency

As per ANSI C63.4 Section 4.2, if the Peak or Quasi-Peak detector measurements do not exceed the Average limits, then the DUT is considered to have passed the requirements.

4.9.2 Test Procedure

Tested according to ANSI C63.10 Section 6.2.

Conducted emissions were measured on the DUT's power port via an Artificial Mains Network (AMN), also known as Line Impedance Stabilization Network (LISN), and maximum conducted emissions are checked on all the DUT's AC lines in the frequency range of 150kHz to 30MHz. All other support equipment were powered via another LISN. The LISNs provide 50Ω/50μH of coupling impedance for the measuring receiver.

To determine the emission characteristics of the DUT, the conducted emission scans were made using a Peak detector and the results were recorded in graphical form.

For each suspected emission, final measurements of the DUT conducted emissions were made with the Quasi-Peak or Average detector as defined in the limits table above.

For Table-Top Equipment, the device under test is configured on a 0.8m high non-conductive table above the reference ground plane and 0.4m away from the vertical reference ground plane.

4.9.3 Setup Diagram

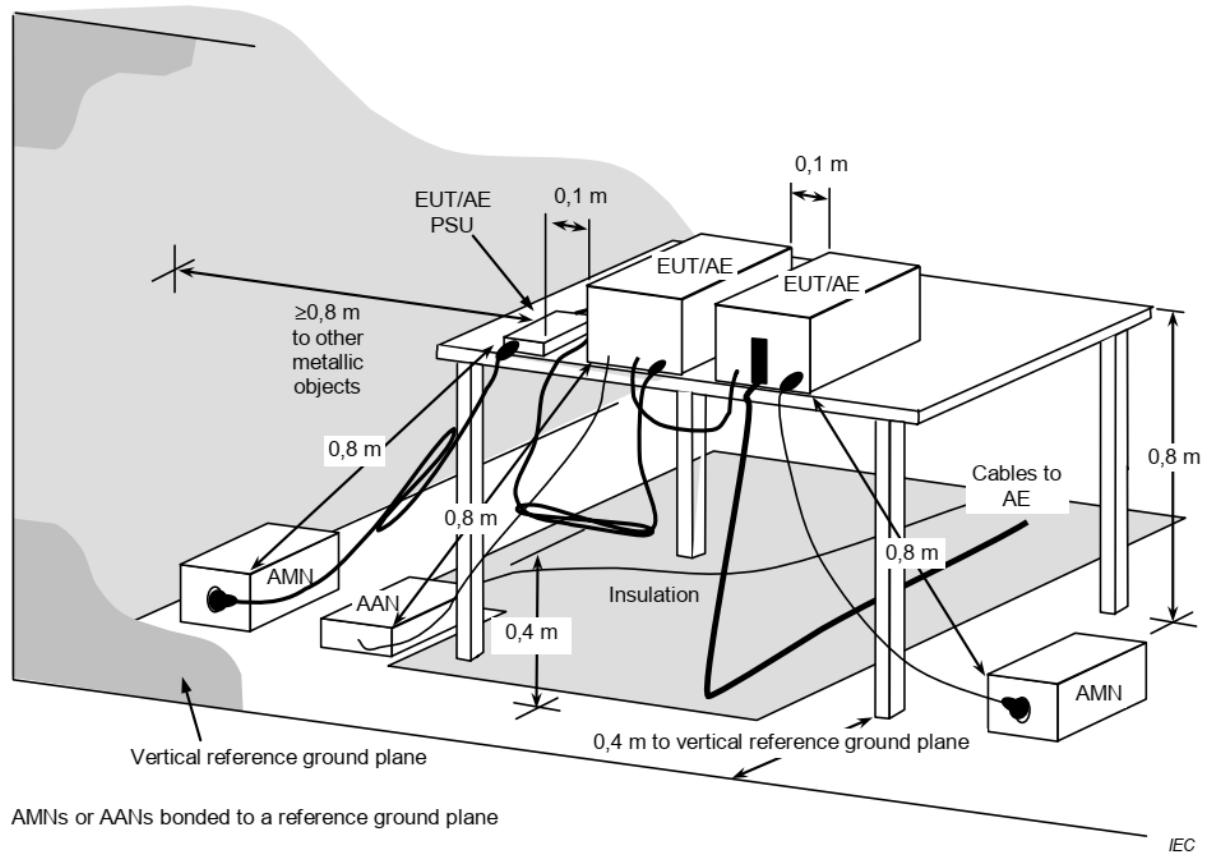
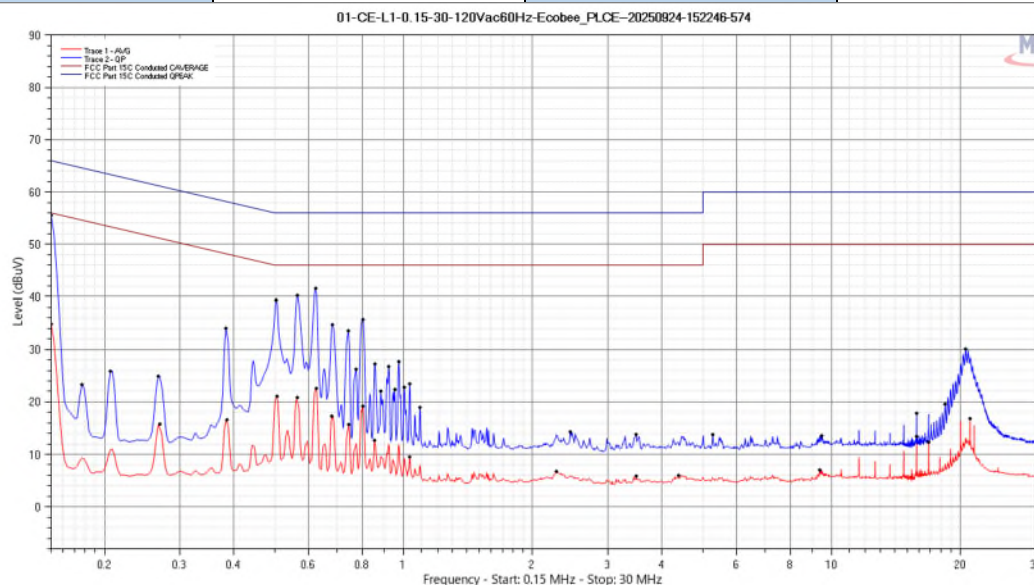


Figure 38 – Sample Measurement Arrangement for DUT

4.9.4 Test Results

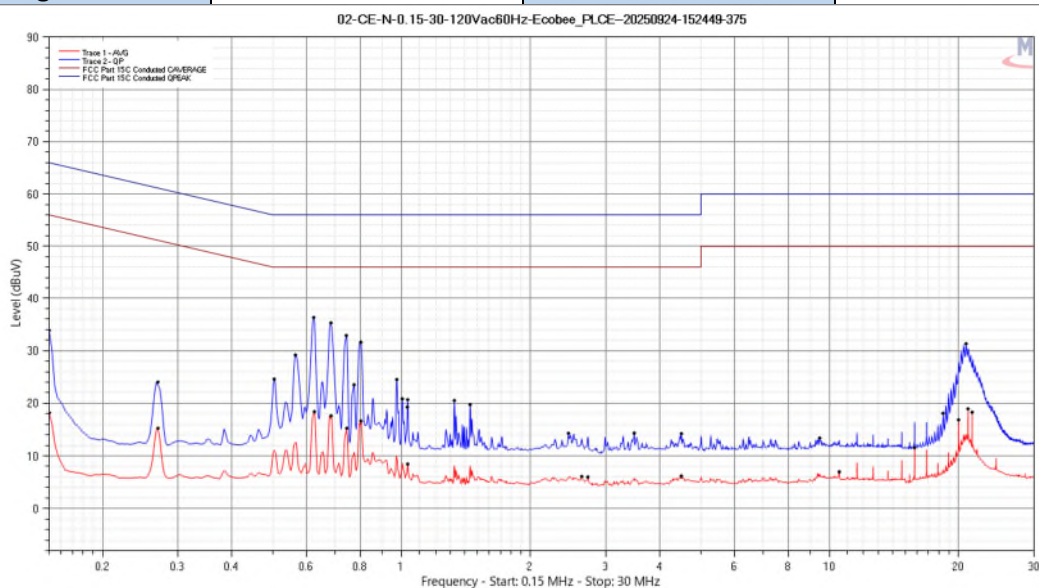
Range:	150kHz to 30MHz	DUT	BLE
Test Voltage:	120Vac 60Hz	Phase	Line



Remark: Quasi-Peak and Average Emission Plot

Line 1							
Frequency (MHz)	Detector	Reading (dBuV)	Correction Factor (dB)	Emissions Level (dBuV)	Limit (dBuV)	Margin (dB)	Test Result
0.15	CAVG	24.74	10.11	34.85	56	21.15	Pass
0.625	CAVG	12.5	10.08	22.58	46	23.42	Pass
0.505	CAVG	11.02	10.08	21.10	46	24.90	Pass
0.15	QP	45.45	10.11	55.56	66	10.44	Pass
0.622	QP	31.48	10.08	41.56	56	14.44	Pass
0.564	QP	30.15	10.08	40.23	56	15.77	Pass
0.503	QP	29.3	10.08	39.38	56	16.62	Pass
0.802	QP	25.63	10.08	35.71	56	20.29	Pass
0.681	QP	24.65	10.08	34.73	56	21.27	Pass

Range:	150kHz to 30MHz	DUT	BLE
Test Voltage:	120Vac 60Hz	Phase	Neutral



Remark: Peak Emission Plot

Neutral							
Frequency (MHz)	Detector	Reading (dBuV)	Correction Factor (dB)	Emissions Level (dBuV)	Limit (dBuV)	Margin (dB)	Test Result
0.625	CAVG	8.33	10.08	18.41	46	27.59	Pass
0.683	CAVG	7.55	10.08	17.63	46	28.37	Pass
0.802	CAVG	6.55	10.08	16.63	46	29.37	Pass
0.622	QP	26.23	10.08	36.31	56	19.69	Pass
0.683	QP	25.21	10.08	35.29	56	20.71	Pass
0.742	QP	22.79	10.08	32.87	56	23.13	Pass
0.802	QP	21.54	10.08	31.62	56	24.38	Pass
0.564	QP	19.09	10.08	29.17	56	26.83	Pass
20.807	QP	21.02	10.3	31.32	60	28.68	Pass

4.9.5 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_61	LISN	FCC	50/250-16-2-01	Jan 16, 2024	Jan 16, 2026
EQ_EMC_44	Transient Limiter (10dB)	Com-Power	LIT-930A	NCR	NCR
EQ_EMC_84	RF Cable	Times Microwave	LMR-400	NCR	NCR
EQ_EMC_195	Emissions Software	Megalab Group	Electro V2.5	NCR	NCR

----- End of Test Report -----