Nemko Korea Co., Ltd.

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FCC & IC EVALUATION REPORT FOR CERTIFICATION

Project No. : NK-24-R-410
Applicant : SOLUM CO., LTD.
4, 5, 6th F, 357, Guseong-ro, Giheung-gu, Yongin-si, Gyeonggi-do, South Korea

Dates of receipt : September 26, 2024
Dates of Issue : March 16, 2025
Test Site :
Nemko Korea Co., Ltd.

FCC ID :	**2AFWNWT10FACNDW0HSM**
IC :	**22800-WT10FACND**
Applicant :	**SOLUM CO., LTD.**
Brand Name :	**SOLUM**
Model:	**WT10FACNDW0HSM**
Additional Model(s):	**WT10FACNDU0HSM** **WT10FACNDW1HSM, WT10FACNDU1HSM** **WT10FACNDW2HSM, WT10FACNDU2HSM** **WT10FACNDW3HSM, WT10FACNDU3HSM**
EUT Type:	**Information Technology Audio Video**
Classification:	**FCC Part 15 Digital Transmission System (DTS)**
Date of Test:	**October 24, 2024 ~ December 27, 2024**
Applied Standard:	**FCC 47 CFR Part 15.247** **RSS-Gen Issue 5, RSS-247 Issue 3**

The device bearing the brand name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. The client should not use it to claim product endorsement by TAF or any government agencies. The test results in the report only apply to the tested sample.

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Tested By : Yonghwan Kim
Test Engineer

Reviewed By : Hoonpyo Lee
Technical Manager

Revision History

Rev.	Issue Date	Revisions	Revised By
00	March 16, 2025	Initial issue	Yonghwan Kim

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1. INTRODUCTION

1.1 Test facility

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2014), the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013) was used in determining radiated and conducted emissions emanating.

These measurement tests were conducted at **Nemko Korea Co., Ltd.**
The site address 165-51, Yurim-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 17042, Rep. of Korea.

1.2 Accreditation and listing

Accreditation type		Accreditation number
FC	CAB Accreditation for DOC	Designation No. KR0026
KOLAS	KOLAS Accredited Lab. (Korea Laboratory Accreditation Scheme)	Registration No. KT155
Industry Canada	Canada IC Registered site	Site No. 29506
VCCI	VCCI registration site(RE/CE/Telecom CE)	Member No. 2118
IECEE CB SCHEME	EMC CBTL	TL124
KC	KCC(RRL)Designated Lab.	Registration No. KR0026

2. EUT INFORMATION & TEST CONDITIONS

2.1 EUT Information

2.1.1 Specifications

EUT Type	Information Technology Audio Video
Model Name	WT10FACNDW0HSM
Frequency of Operation	2 412 MHz to 2 462 MHz : 802.11b,g,n,ac(20 MHz) 2 422 MHz to 2 452 MHz : 802.11n,ac(40 MHz)
Maximum Conducted Output Power	802.11b : 17.58 dBm 802.11g : 21.92 dBm 802.11n(20 MHz) : 22.09 dBm 802.11n(40 MHz) : 22.32 dBm 802.11ac(20 MHz) : 22.10 dBm 802.11ac(40 MHz) : 22.36 dBm
Number of Channels	2 412 MHz to 2 462 MHz : 11 CH 2 422 MHz to 2 452 MHz : 7 CH
Modulations	CCK, BPSK, QPSK, 16QAM, 64QAM, 256QAM
Antenna Gain (peak)	1.12 dBi
Antenna Setup	1TX / 1RX
EUT Rated Voltage	DC 9 V ~ 24 V
EUT Test Voltage	DC 12 V
HVIN (Hardware Version Number)	WT10FACNDW0HSM
FVIN (Firmware Version Identification Number)	V1.1
Remarks	-

2.2 Operation During Test

The EUT is the transceiver which is module supporting the 802.11b/g/n,ac(20 MHz)/n,ac(40 MHz)mode. The Laptop PC was used to control the EUT to transmit the wanted TX channel by the testing program (CMD) and testing command supported by manufacturer.
The operating voltage of EUT was 12 Vdc supplied from AC/DC Adapter.

The EUT was tested at the lowest, middle and the highest channels with the maximum output power in accordance with the manufacturer's specifications. The worst data were recorded in the report.

2.2.1 Table of Test power setting

Frequency [MHz]	Mode	Power setting Level
2 412	802.11b	default
2 437		
2 462		
2 412	802.11g	default
2 437		
2 462		
2 412	802.11n HT20	default
2 437		
2 462		
2 422	802.11n HT40	default
2 437		
2 452		
2 412	802.11ac VHT20	default
2 437		
2 462		
2 422	802.11ac VHT40	default
2 437		
2 452		

2.2.2 Table of Test frequency

Frequency band	Modulation	Test Channel (CH)	Frequency (MHz)
2.4 GHz	802.11b,g,n,ac(20 MHz)	1	2 412
		6	2 437
		11	2 462
	802.11n,ac(40 MHz)	3	2 422
		6	2 437
		9	2 452

2.2.3 Antenna Information

Frequency band	Mode	Data rate	Antenna TX mode	Support CDD	Support MIMO
2.4 GHz	802.11b,g	All	■ 1TX, □ 2TX	□ Yes, ■ No	□ Yes, ■ No
	802.11n (20MHz)	MCS 0~7	■ 1TX, □ 2TX	□ Yes, ■ No	□ Yes, ■ No
	802.11n (40MHz)	MCS 0~7	■ 1TX, □ 2TX	□ Yes, ■ No	□ Yes, ■ No
	802.11ac (20MHz)	NSS1MCS0~ NSS1MCS8	■ 1TX, □ 2TX	□ Yes, ■ No	□ Yes, ■ No
	802.11ac (40MHz)	NSS1MCS0~ NSS1MCS9	■ 1TX, □ 2TX	□ Yes, ■ No	□ Yes, ■ No

2.2.4 Additional Information Related to Testing

The cable and attenuator loss from 30 MHz to 26.5 GHz was reflected in spectrum analyzer with correction factor for all conducted testing.

2.2.5 Worst-case Configuration and Mode

Radiated emission below 1GHz was performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.
Radiated emission above 1GHz was performed with the EUT set to transmit low/mid/high channels.
The emissions (Band-edge & spurious emissions) were investigated in three orthogonal orientations X, Y and Z.
Accordingly, the orientation was determined and tested as shown in the table below:

Test Items	X	Y	Z
Band-edge	O	-	-
Spurious emissions	O	-	-

2.2.6 Additional model covered by this report

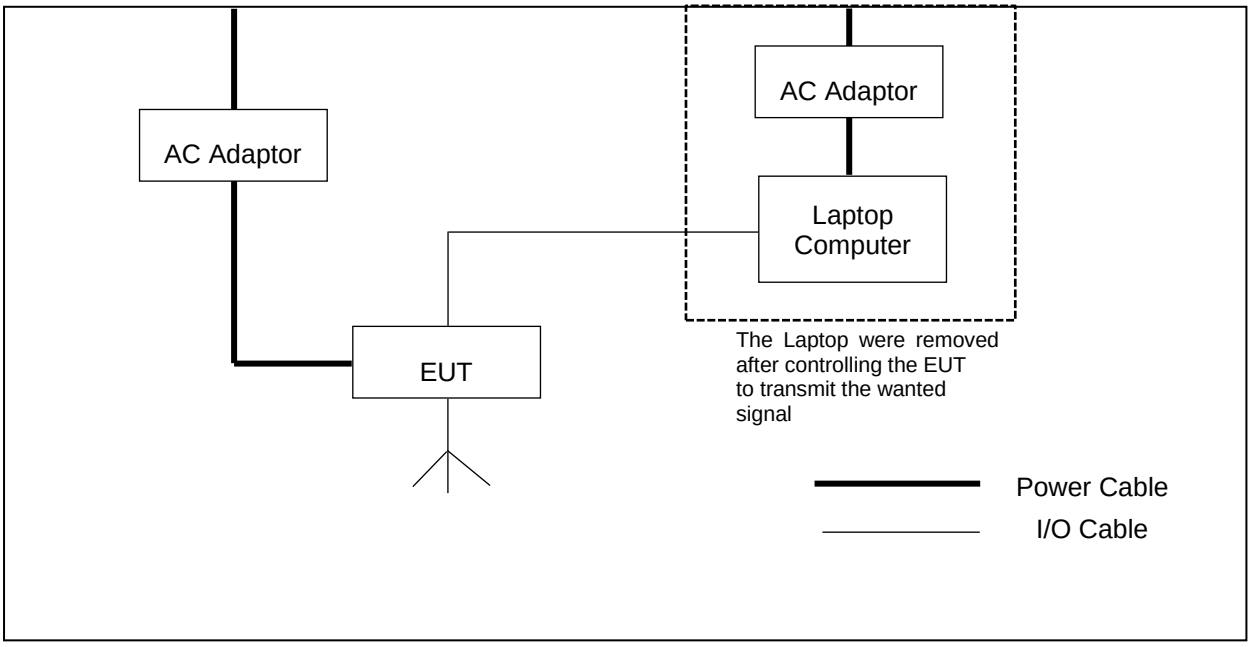
- The variant models shell use electric circuits that are the same as the basic model.
- The difference between basic and variant models are as below table.

<table>
<tr><td colspan="2">Basic model name</td><td colspan="2">Description</td></tr>
<tr><td colspan="2">WT10FACNDW0HSM</td><td colspan="2">Dual display</td></tr>
<tr><td>Variant model name</td><td>Description</td><td>Variant model name</td><td>Description</td></tr>
<tr><td>WT10FACNDU0HSM</td><td rowspan="3">- Dual display
- Purpose for marketing</td><td>WT10FACNDW1HSM</td><td rowspan="3">- Single display
- Purpose for marketing</td></tr>
<tr><td>WT10FACNDW2HSM</td><td>WT10FACNDU1HSM</td></tr>
<tr><td>WT10FACNDU2HSM</td><td>WT10FACNDW3HSM</td></tr>
<tr><td>-</td><td>-</td><td>WT10FACNDU3HSM</td><td></td></tr>
</table>

2.3 Support Equipment

EUT	SOLUM CO., LTD. Model : WT10FACNDW0HSM	S/N: N/A
Laptop Computer	HP Model : G62-355TU	FCC DOC S/N : CNF0489WDT
AC Adapter	HP123 Model : PPP009D	FCC DOC S/N : WBGSV0ACXZH162

2.4 Setup Drawing



3. ANTENNA REQUIREMENTS

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC part 15 and RSS-Gen.

§15.203 of the FCC Rules part 15 Subpart C

: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

RSS-Gen Section 6.8

: The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below)

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.
Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

The transmitter has permanently attached FPC antenna (Internal antenna) inside the EUT case.

Used Antenna	
Model name	2 400 MHz ~ 2 500 MHz
	Max. peak gain (dBi)
WT10FACNDW0HSM	1.12

4. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specification:

Name of Test	FCC Paragraph No.	IC Paragraph No.	Test Limit	Test Condition	Result	Remark
6dB Bandwidth	15.247(a)(2)	RSS-247 (5.2)(a)	> 500 kHz	Conducted	Complies	-
Occupied Bandwidth	-	RSS-Gen (6.7)				
Peak Output Power	15.247(b)(3)	RSS-247 (5.4)(d)	< 1 Watt < 4 Watt(e.i.r.p.)		Complies	-
Power Spectral Density	15.247(e)	RSS-247 (5.2)(b)	< 8 dBm/3 kHz		Complies	-
Band Edge / Conducted Spurious Emission	15.247(d)	RSS-247 (5.5)	≥ 30 dBc		Complies	-
Radiated Spurious Emission	15.205, 15.209	RSS-Gen (8.9),(8.10)	< 74 dBμV/m (PK) < 54 dBμV/m (AV) Radiated limits detailed in 15.209	Radiated	Complies	-
AC Line Conducted Emission	15.207	RSS-Gen (8.8)	FCC 15.207 Limits	Line Conducted	Complies	-

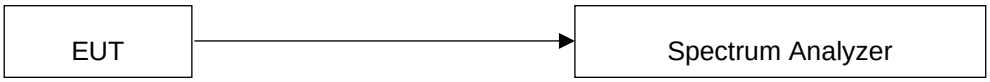
5. TEST METHODOLOGY

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 558074 D01 15.247 Meas Guidance v05r02.
4. RSS-Gen Issue 5
5. RSS-247 Issue 3
6. ANSI C63.10-2013.

6. DESCRIPTION OF TESTS

6.1 6 dB Bandwidth / Occupied Bandwidth

Test Setup



Test Measurement Method

ANSI C63.10-2013, Section 11.8.2 Option 2
KDB 558074 D01 v05r02, Section 8.2
RSS-Gen section 6.7

Test Procedure

- 6 dB Bandwidth (DTS Chanel Bandwidth)
EUTs 6 dB bandwidth is measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level.
The spectrum analyzer setting is as follows.
RBW = 100 kHz
VBW > 3 x RBW
Detector = Peak
Trace mode = max hold
Sweep = auto couple
Allow trace to fully stabilize.
The bandwidth measurement function on the spectrum analyzer is used to measure the 6 dB bandwidth.

6.2 Maximum Peak Conducted Output Power

Test Setup

Test Measurement Method

ANSI C63.10-2013, Section 11.9.1.3
KDB 558074 D01 v05r02, Section 8.3.1.3

Test Procedure

EUTs Maximum Peak Conducted Output Power is measured at low, middle, high channels with a Power meter connected to the antenna terminal while the EUTs operating at its maximum power control level.

6.3 Power Spectral Density

Test Setup

Test Measurement Method

ANSI C63.10-2013, Section 11.10.2 Method PKPSD
KDB 558074 D01 v05r02, Section 8.4

Test Procedure

EUTs Power Spectral Density is measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level.
The spectrum analyzer setting is as follows.
Center frequency = DTS channel center frequency
Span = 1.5 times the DTS channel bandwidth
RBW ≥ 3 kHz
VBW ≥ 3 x RBW
Detector = peak
Sweep time = auto couple
Trace mode = max hold
Allow the trace to stabilize.
The peak search function on the spectrum analyzer is used to determine the maximum amplitude level within the RBW.

6.4 Band Edge / Conducted Spurious Emissions

Test Setup

Test Measurement Method

ANSI C63.10-2013, Section 11.11.3
KDB 558074 D01 v05r02, Section 8.5, Section 8.7.2

Test Procedure

EUTs Conducted spurious emissions are measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level. The spectrum analyzer setting is as follows.

1) Reference Level
Center frequency = DTS channel center frequency
Span ≥ 1.5 x DTS bandwidth
RBW = 100 kHz
VBW ≥ 3 x RBW
Detector = peak
Sweep time = auto couple
Trace mode = max hold
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum PSD level.
Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

2) Unwanted Emissions
Set the center frequency and span to encompass frequency range to be measured.
RBW = 100 kHz
VBW ≥ 3 x RBW
Detector = peak
Sweep time = auto couple
Trace mode = max hold
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum amplitude level.

6.5 Radiated Emissions

Test Measurement Method

ANSI C63.10-2013, Section 6.6.4.3, Section 11.11, Section 11.12
KDB 558074 D01 v05r02, Section 8.6, Section 8.7

Test Procedure

The measurement was performed at the test site that is specified in accordance with ANSI C63.10-2013. The spurious emission was scanned from 9 kHz to 30 MHz using Loop Antenna and 30 to 1000 MHz using Trilog broadband test antenna. Above 1 GHz, Horn antenna was used.
For emissions testing at below 1GHz, The test equipment was placed on turntable with 0.8 m above ground. For emission measurements above 1 GHz, The test equipment was placed on turntable with 1.5 m above ground. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The EUT, cable, wire arrangement and mode of operation that has the highest amplitude relative to the limit was selected. Then, the turn table was rotated from 0˚ to 360˚ and an antenna mast was moved from 1 m to 4 m height to maximize the suspected highest amplitude signal. The final maximized level was recorded.

At frequencies below 1000 MHz, measurements performed using the CISPR quasi-peak detection. At frequencies above 1000 MHz, measurements performed using the peak and average measurement procedures described in ANSI 63.10-2013 section 11.12. Peak emission levels were measured by setting the analyzer RBW = 1 MHz, VBW = 3 MHz, Detector = Peak, Trace mode = max hold. Average emission levels were measured by setting the analyzer RBW = 1 MHz, VBW = 10 kHz, Detector = Peak, Trace mode = max hold. Allow max hold to run for at least 50 times (1/duty cycle) traces.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100	3
88–216	150	3
216–960	200	3
Above 960	500	3

Radiated Emissions Limits per 47 CFR 15.209(a) & RSS-Gen (8.9)

6.6 AC Line Conducted Emissions

Test Measurement Method

ANSI C63.10-2013, Section 6.2

Test Procedure

The Line conducted emission test facility is located inside a 4 x 7 x 2.5 meter shielded enclosure.
It is manufactured by EM engineering. The shielding effectiveness of the shielded room is in accordance with MIL-STD-285 or NSA 65-6. A 1 m x 1.5 m wooden table 0.8 m height is placed 0.4 m away from the vertical wall and 1.5 m away from the side of wall of the shielded room. Rohde & Schwarz (ENV216) of the 50 ohm/50 µH Line Impedance Stabilization Network (LISN) are bonded to the shielded room. The EUT is powered from the Rohde & Schwarz LISN. Power to the LISNs are filtered by high-current high insertion loss Power line filters. The purpose of filter is to attenuate ambient signal interference and this filter is also bonded to shielded enclosure. All electrical cables are shielded by tinned copper zipper tubing with inner diameter of 1 / 2 ”. If DC power device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the LISNs, All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1 meter length. Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT. The spectrum was scanned from 150 kHz to 30 MHz with 200 msec sweep time. The frequency producing the maximum level was re-examined using the EMI test receiver. (Rohde & Schwarz ESR3). The detector functions were set to CISPR quasi-peak mode & average mode. The bandwidth of receiver was set to 9 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission. Each emission was maximized by; switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux AC outlet, if applicable; whichever determined the worst case emission.
Each EME reported was calibrated using the R&S signal generator.

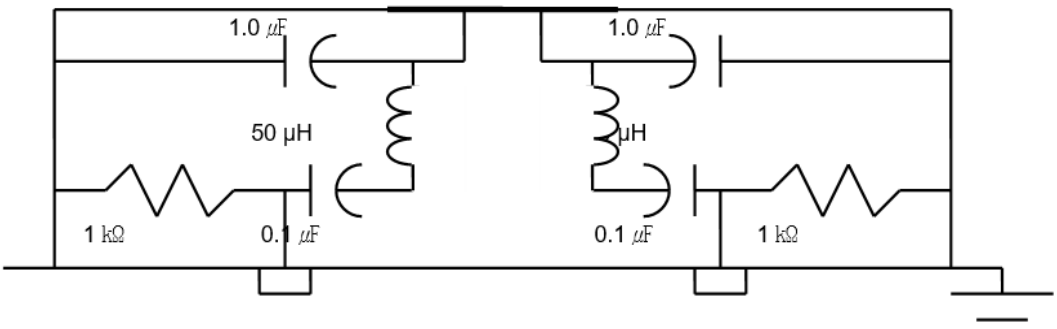


Fig. 2. LISN Schematic Diagram

7. TEST DATA

7.1 6 dB Bandwidth / Occupied Bandwidth

FCC §15.247(a)(2)
RSS-247 (5.2)(a), RSS-Gen (6.7)

Test Mode : Set to Lowest channel, Middle channel and Highest channel

Result

- 6 dB Bandwidth

Mode	Channel No.	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Bandwidth Limit (kHz)
802.11b	1	2 412	8.07	500
	6	2 437	7.58	500
	11	2 462	8.07	500
802.11g	1	2 412	16.34	500
	6	2 437	16.34	500
	11	2 462	16.34	500
802.11n(20M)	1	2 412	17.58	500
	6	2 437	17.58	500
	11	2 462	17.57	500
802.11n(40M)	3	2 422	36.32	500
	6	2 437	36.33	500
	9	2 452	36.32	500
802.11ac(20M)	1	2 412	17.58	500
	6	2 437	17.57	500
	11	2 462	17.57	500
802.11ac(40M)	3	2 422	36.33	500
	6	2 437	36.34	500
	9	2 452	36.32	500

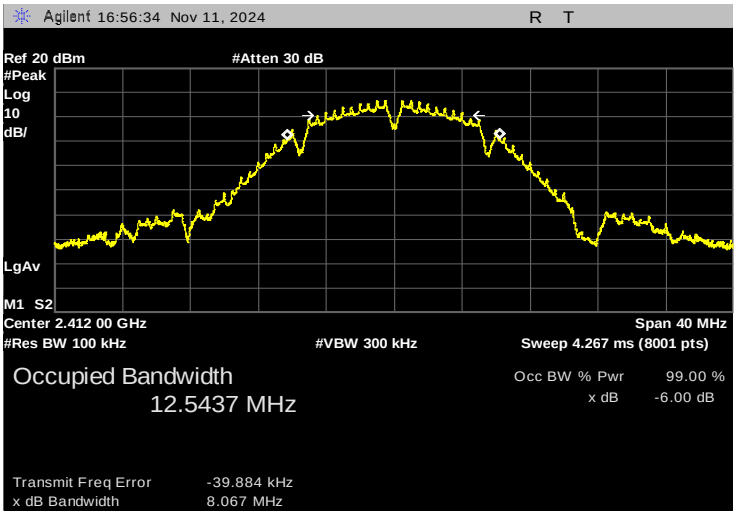
- Occupied Bandwidth

Mode	Channel No.	Frequency (MHz)	Occupied Bandwidth (MHz)	Limit (MHz)
802.11b	1	2 412	12.54	-
	6	2 437	12.44	-
	11	2 462	12.48	-
802.11g	1	2 412	16.54	-
	6	2 437	16.55	-
	11	2 462	16.55	-
802.11n(20M)	1	2 412	17.78	-
	6	2 437	17.77	-
	11	2 462	17.78	-
802.11n(40M)	3	2 422	36.22	-
	6	2 437	36.23	-
	9	2 452	36.21	-
802.11ac(20M)	1	2 412	17.75	-
	6	2 437	17.75	-
	11	2 462	17.75	-
802.11ac(40M)	3	2 422	36.22	-
	6	2 437	36.21	-
	9	2 452	36.21	-

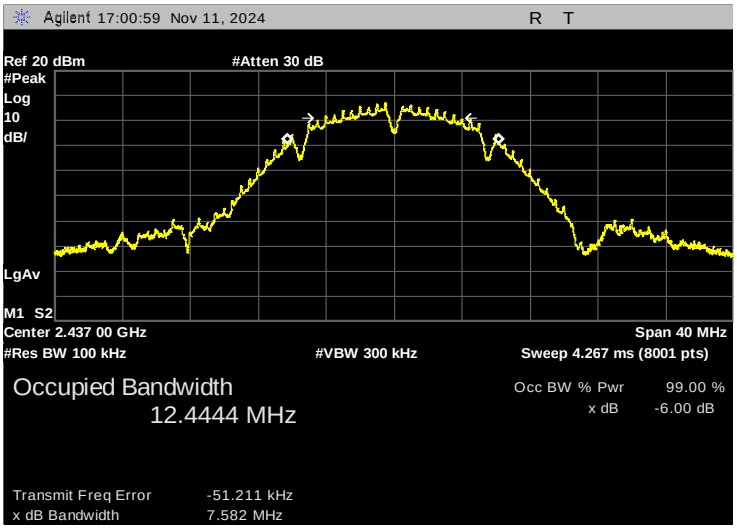
PLOTS OF EMISSIONS

802.11b mode_6dB Bandwidth, Occupied Bandwidth

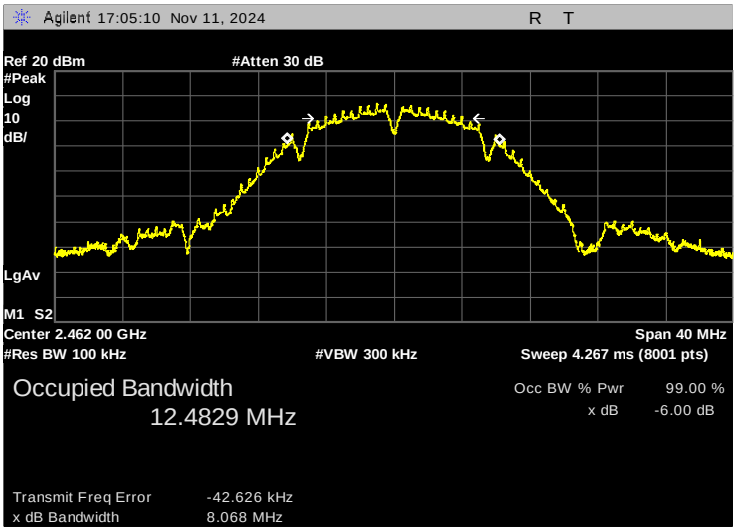
Lowest Channel (2 412 MHz)



Middle Channel (2 437 MHz)

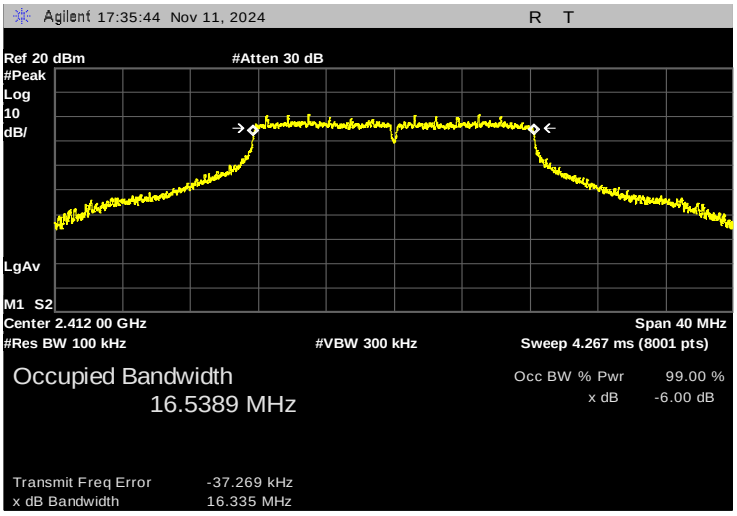


Highest Channel (2 462 MHz)

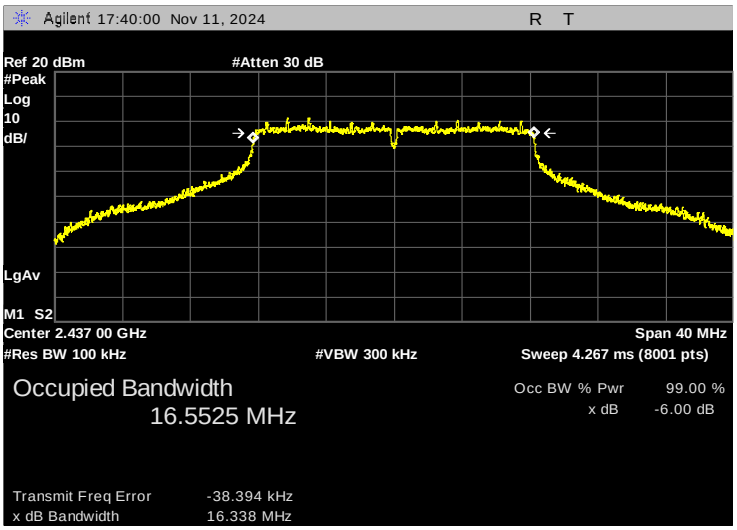


802.11g mode_6dB Bandwidth, Occupied Bandwidth

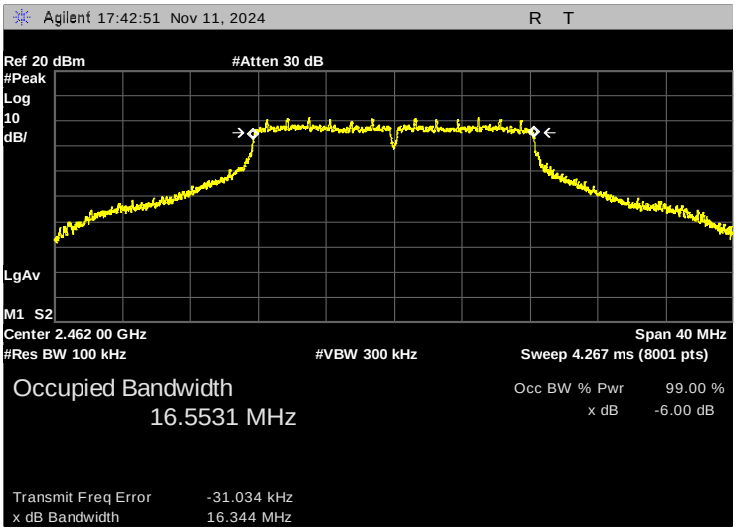
Lowest Channel (2 412 MHz)



Middle Channel (2 437 MHz)

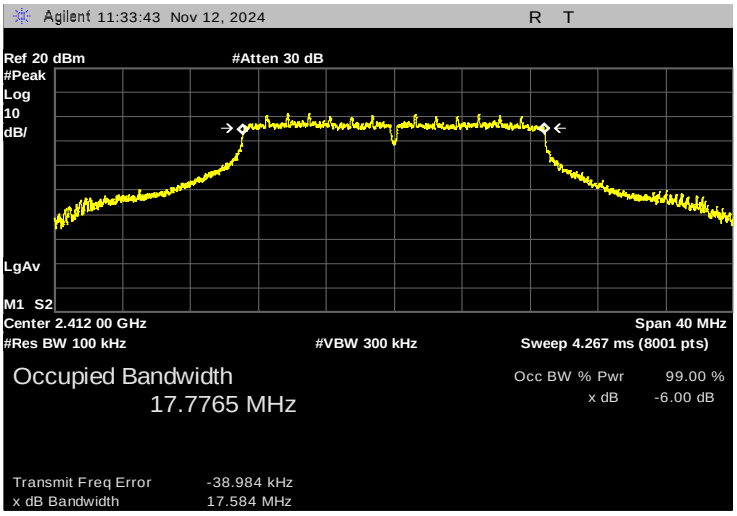


Highest Channel (2 462 MHz)

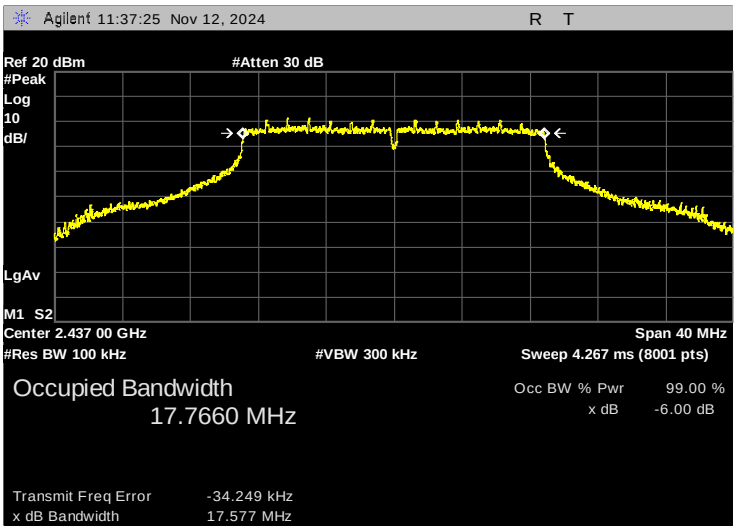


802.11n(20 MHz) mode_6dB Bandwidth, Occupied Bandwidth

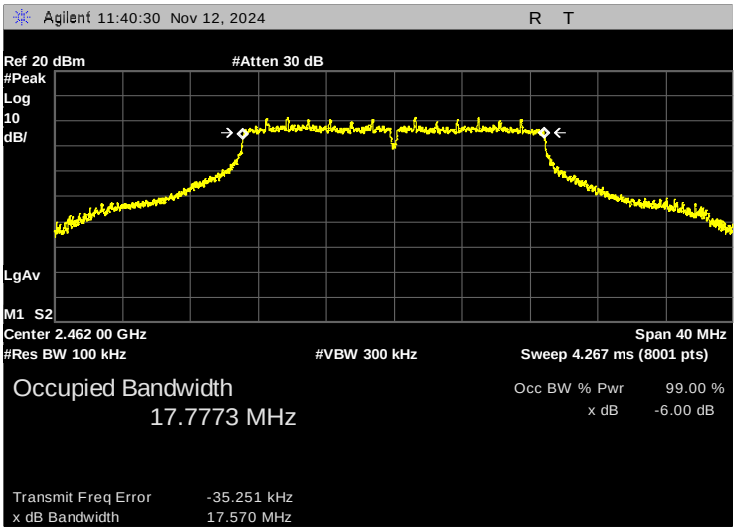
Lowest Channel (2 412 MHz)



Middle Channel (2 437 MHz)

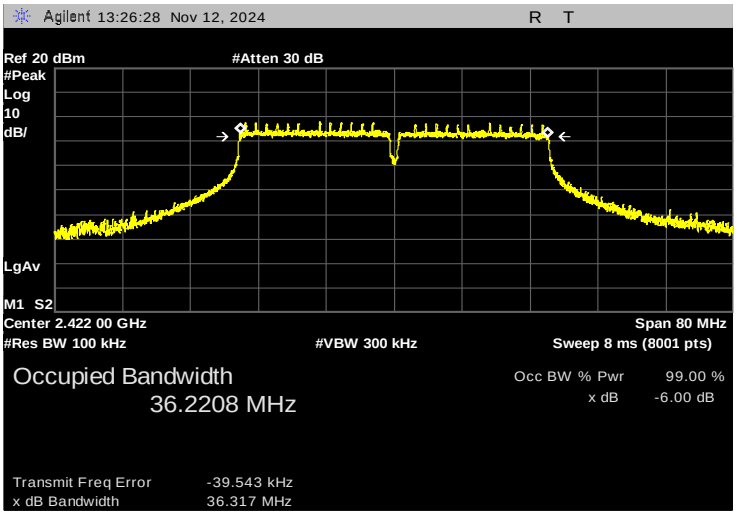


Highest Channel (2 462 MHz)

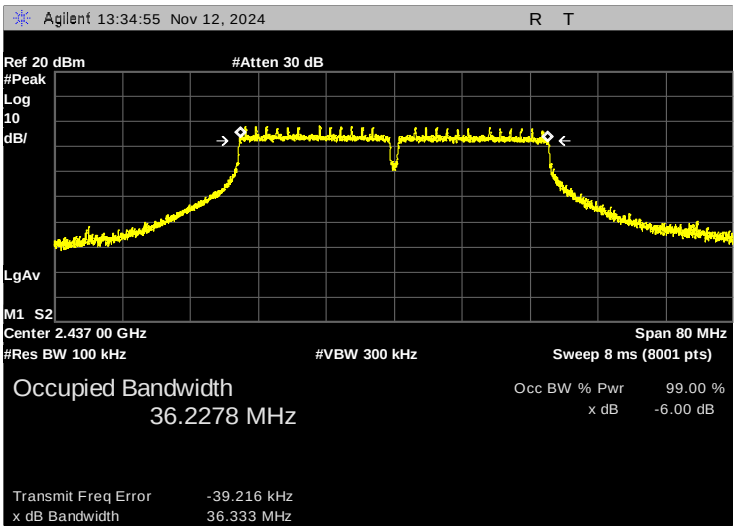


802.11n(40 MHz) mode_6dB Bandwidth, Occupied Bandwidth

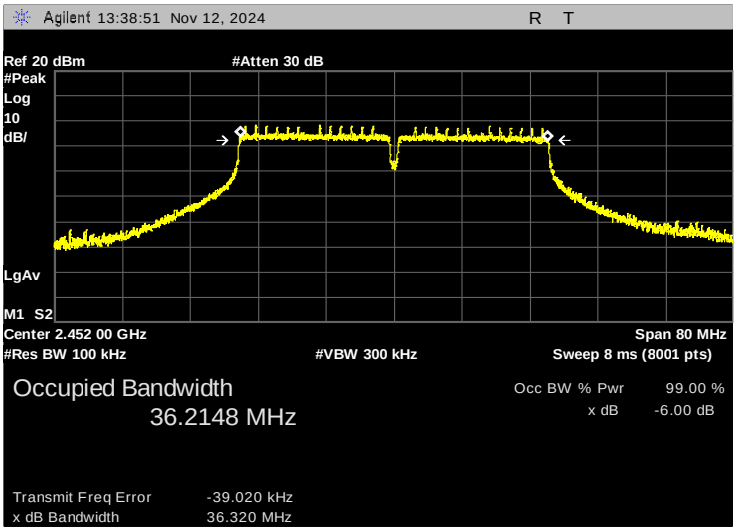
Lowest Channel (2 422 MHz)



Middle Channel (2 437 MHz)

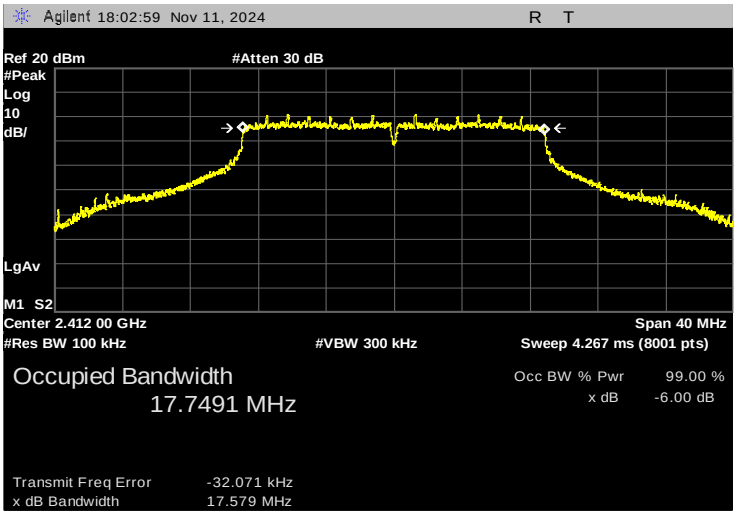


Highest Channel (2 452 MHz)

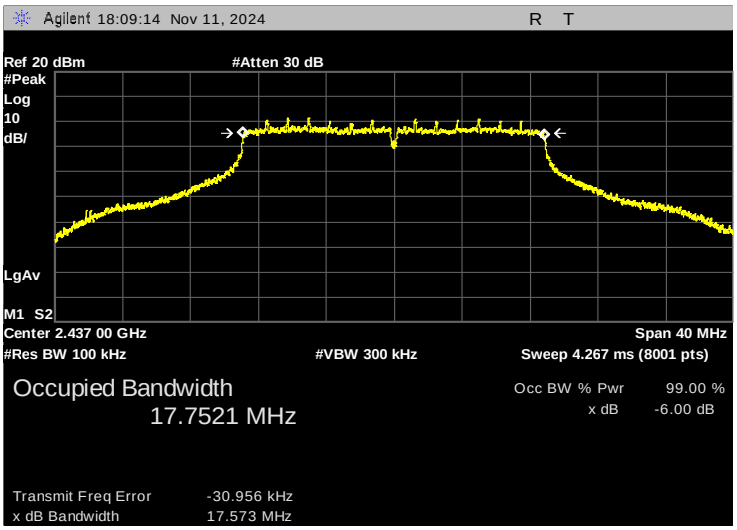


802.11ac(20 MHz) mode_6dB Bandwidth, Occupied Bandwidth

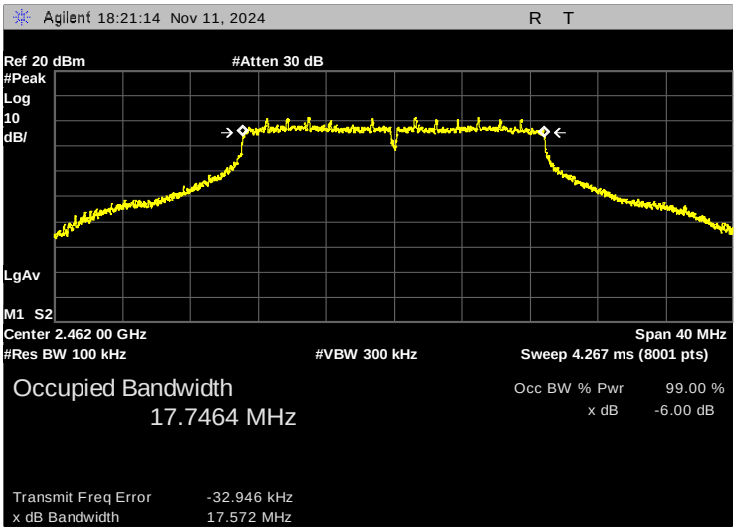
Lowest Channel (2 412 MHz)



Middle Channel (2 437 MHz)

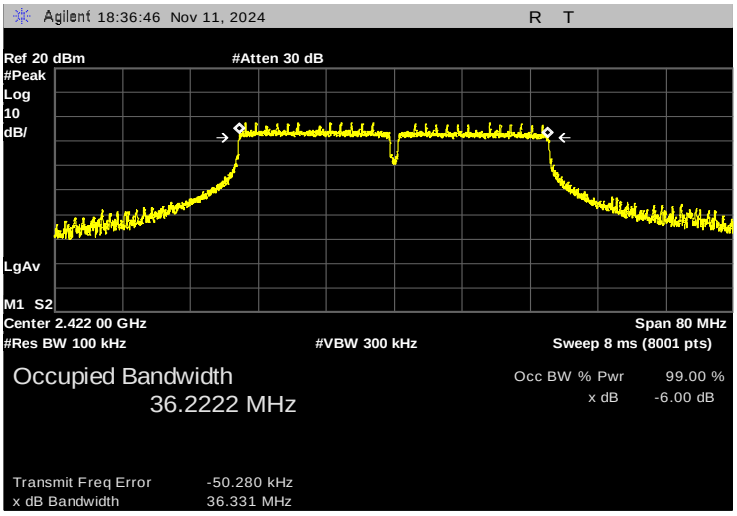


Highest Channel (2 462 MHz)

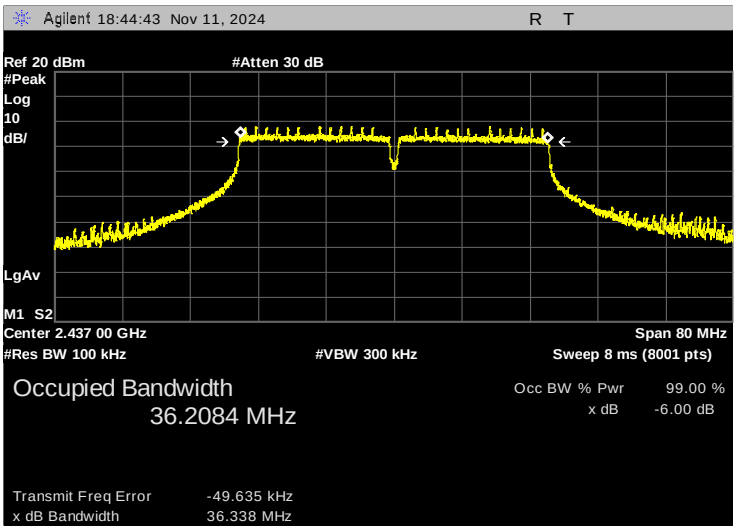


802.11ac(40 MHz) mode_6dB Bandwidth, Occupied Bandwidth

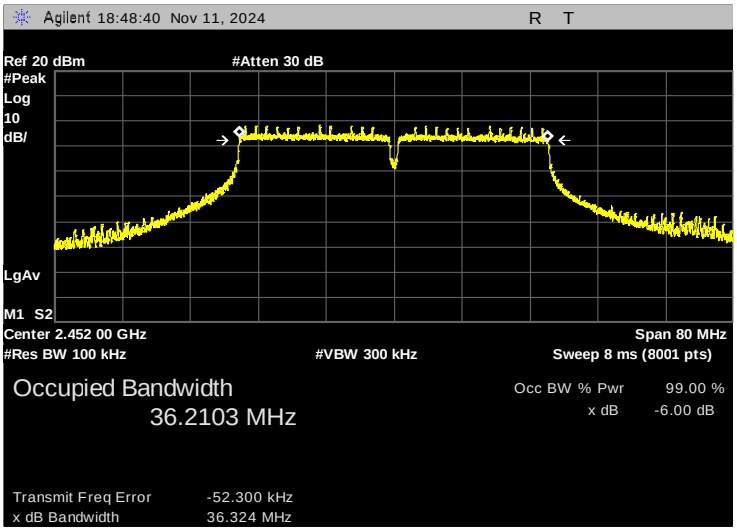
Lowest Channel (2 422 MHz)



Middle Channel (2 437 MHz)



Highest Channel (2 452 MHz)



7.2 Maximum Peak Conducted Output Power and E.I.R.P

FCC §15.247(b)(3)
RSS-247(5.4)(d)

Test Mode : Set to Lowest channel, Middle channel and Highest channel

Result

802.11b mode

Ch	Frequency (MHz)	Maximum Conducted Power (dBm)	Limit (dBm)	e.i.r.p. (dBm)	e.i.r.p Limit (dBm)
1	2 412	17.36	30.00	18.48	36.00
6	2 437	17.45	30.00	18.57	36.00
11	2 462	17.58	30.00	18.70	36.00

802.11g mode

Ch	Frequency (MHz)	Maximum Conducted Power (dBm)	Limit (dBm)	e.i.r.p. (dBm)	e.i.r.p Limit (dBm)
1	2 412	21.24	30.00	22.36	36.00
6	2 437	21.77	30.00	22.89	36.00
11	2 462	21.92	30.00	23.04	36.00

802.11n(20 MHz) mode

Ch	Frequency (MHz)	Maximum Conducted Power (dBm)	Limit (dBm)	e.i.r.p. (dBm)	e.i.r.p Limit (dBm)
1	2 412	21.29	30.00	22.41	36.00
6	2 437	21.81	30.00	22.93	36.00
11	2 462	22.09	30.00	23.21	36.00

802.11n(40 MHz) mode

Ch	Frequency (MHz)	Maximum Conducted Power (dBm)	Limit (dBm)	e.i.r.p. (dBm)	e.i.r.p Limit (dBm)
3	2 422	21.48	30.00	22.60	36.00
6	2 437	22.18	30.00	23.30	36.00
9	2 452	22.32	30.00	23.44	36.00

802.11ac(20 MHz) mode

Ch	Frequency (MHz)	Maximum Conducted Power (dBm)	Limit (dBm)	e.i.r.p. (dBm)	e.i.r.p Limit (dBm)
1	2 412	21.30	30.00	22.42	36.00
6	2 437	21.98	30.00	23.10	36.00
11	2 462	22.10	30.00	23.22	36.00

802.11ac(40 MHz) mode

Ch	Frequency (MHz)	Maximum Conducted Power (dBm)	Limit (dBm)	e.i.r.p. (dBm)	e.i.r.p Limit (dBm)
3	2 422	21.61	30.00	22.73	36.00
6	2 437	22.26	30.00	23.38	36.00
9	2 452	22.36	30.00	23.48	36.00

Notes:
1. The following equation was used for spectrum offset :
   Spectrum offset (dB) = Attenuator (dB) + Cable Loss (dB) + SMA Type Connector Loss (dB)
2. e.i.r.p. (dBm) = Peak output power (dBm) + ANT gain (dBi)

7.3 Power Spectral Density

FCC §15.247(e)
RSS-247(5.2)(b)

Test Mode : Set to Lowest channel, Middle channel and Highest channel

Result

802.11b mode

Ch	Frequency (MHz)	Measured PSD (dBm/30kHz)	Limit (dBm/3kHz)	Margin (dB)
1	2 412	6.67	8.00	1.33
6	2 437	6.74	8.00	1.26
11	2 462	6.80	8.00	1.20

802.11g mode

Ch	Frequency (MHz)	Measured PSD (dBm/30kHz)	Limit (dBm/3kHz)	Margin (dB)
1	2 412	-3.39	8.00	11.39
6	2 437	-3.12	8.00	11.12
11	2 462	-3.02	8.00	11.02

802.11n(20 MHz) mode

Ch	Frequency (MHz)	Measured PSD (dBm/30kHz)	Limit (dBm/3kHz)	Margin (dB)
1	2 412	-3.87	8.00	11.87
6	2 437	-3.71	8.00	11.71
11	2 462	-3.43	8.00	11.43

802.11n(40 MHz) mode

Ch	Frequency (MHz)	Measured PSD (dBm/30kHz)	Limit (dBm/3kHz)	Margin (dB)
3	2 422	-7.25	8.00	15.25
6	2 437	-6.94	8.00	14.94
9	2 452	-6.77	8.00	14.77

802.11ac(20 MHz) mode

Ch	Frequency (MHz)	Measured PSD (dBm/30kHz)	Limit (dBm/3kHz)	Margin (dB)
1	2 412	-2.92	8.00	10.92
6	2 437	-2.81	8.00	10.81
11	2 462	-2.61	8.00	10.61

802.11ac(40 MHz) mode

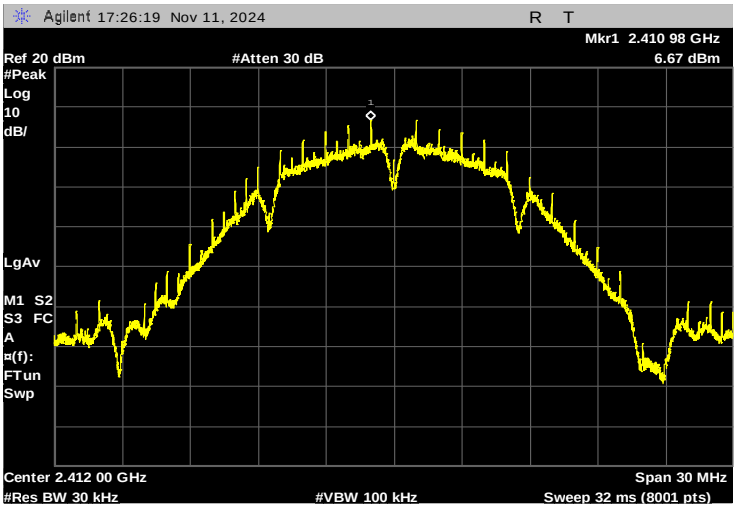
Ch	Frequency (MHz)	Measured PSD (dBm/30kHz)	Limit (dBm/3kHz)	Margin (dB)
3	2 422	-6.93	8.00	14.93
6	2 437	-6.58	8.00	14.58
9	2 452	-6.50	8.00	14.50

Notes:
1. The following equation was used for spectrum offset:
   Spectrum offset (dB) = Attenuator (dB) + Cable Loss (dB) + SMA Type Connector Loss (dB)
2. Measured at worst 30 kHz RBW.

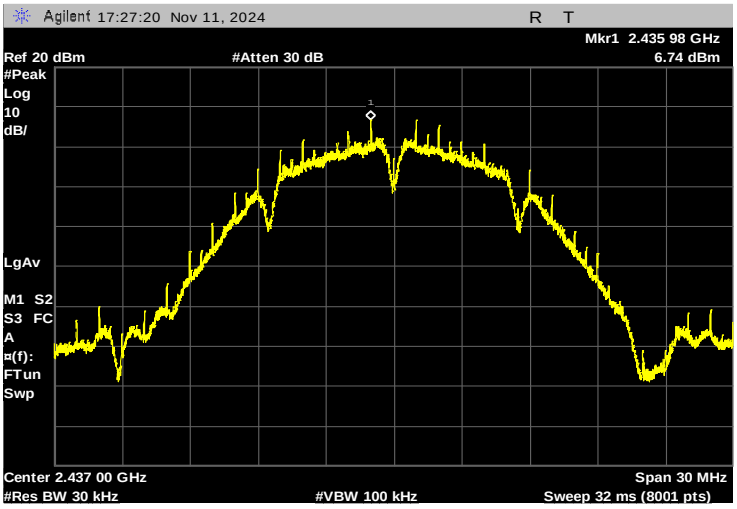
PLOTS OF EMISSIONS

802.11b mode

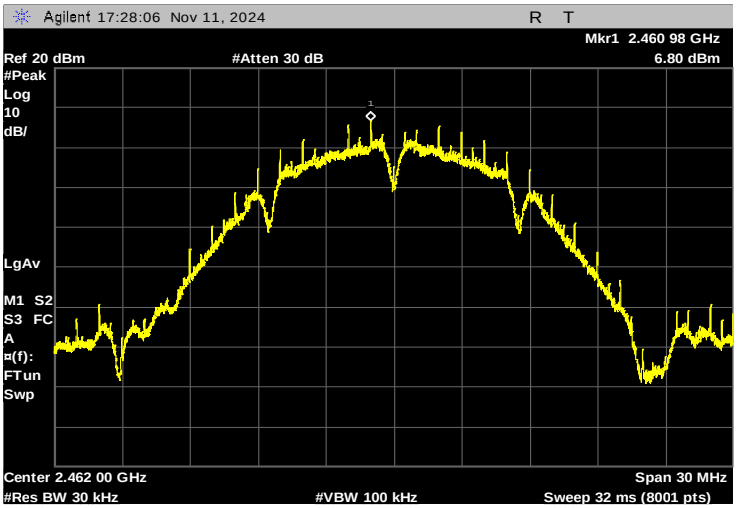
Lowest Channel (2 412 MHz)



Middle Channel (2 437 MHz)

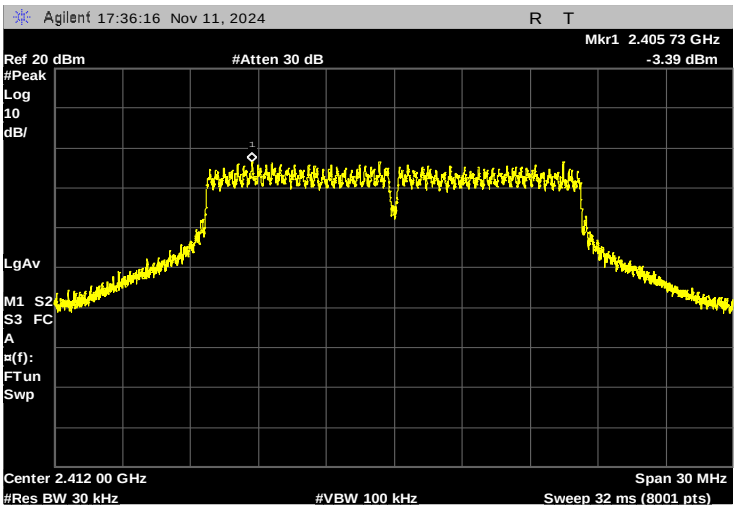


Highest Channel (2 462 MHz)

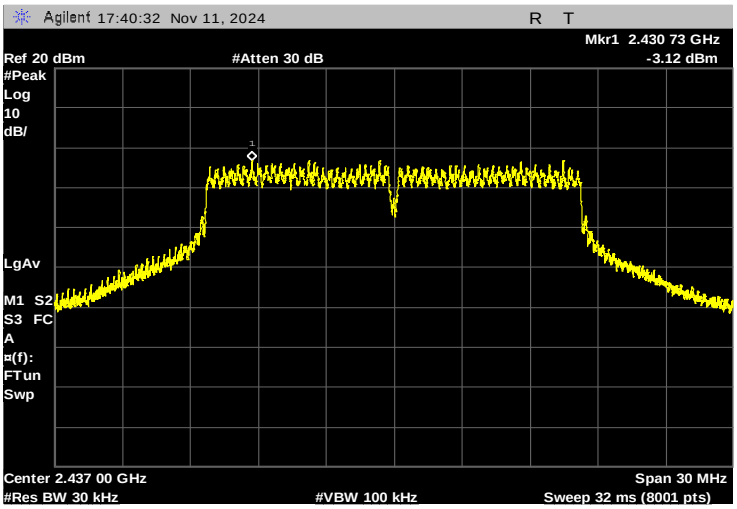


802.11g mode

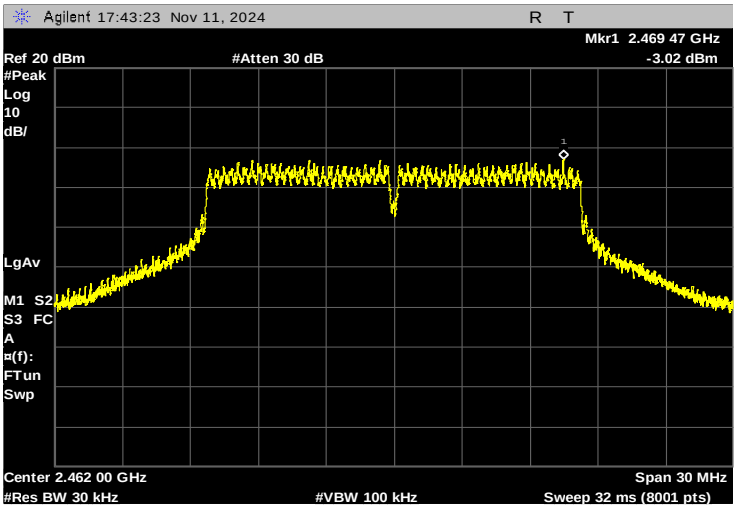
Lowest Channel (2 412 MHz)



Middle Channel (2 437 MHz)

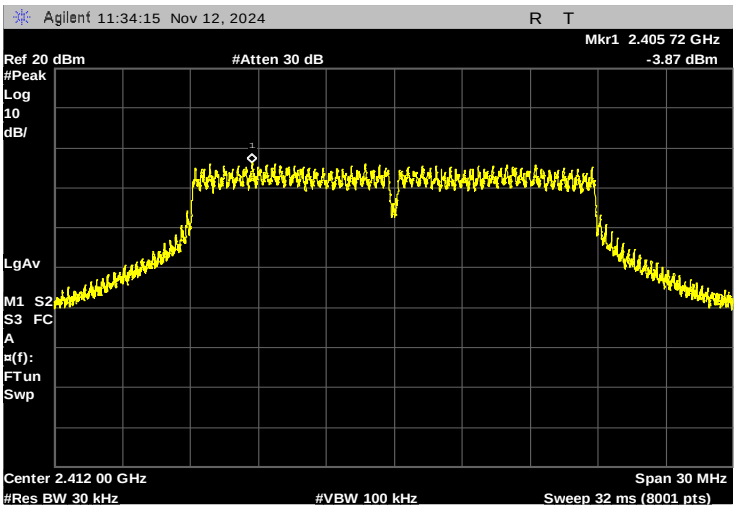


Highest Channel (2 462 MHz)

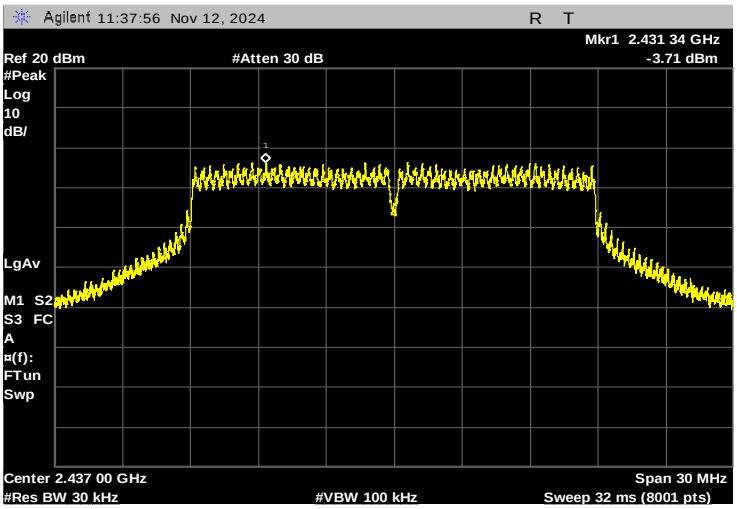


802.11n(20 MHz) mode

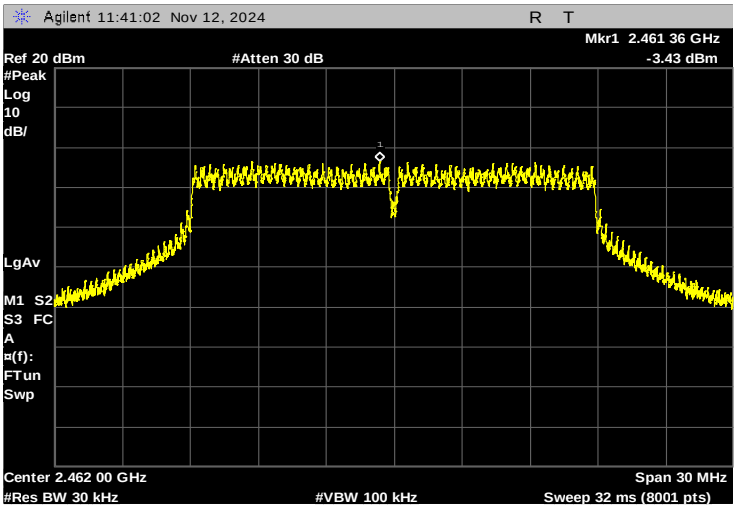
Lowest Channel (2 412 MHz)



Middle Channel (2 437 MHz)

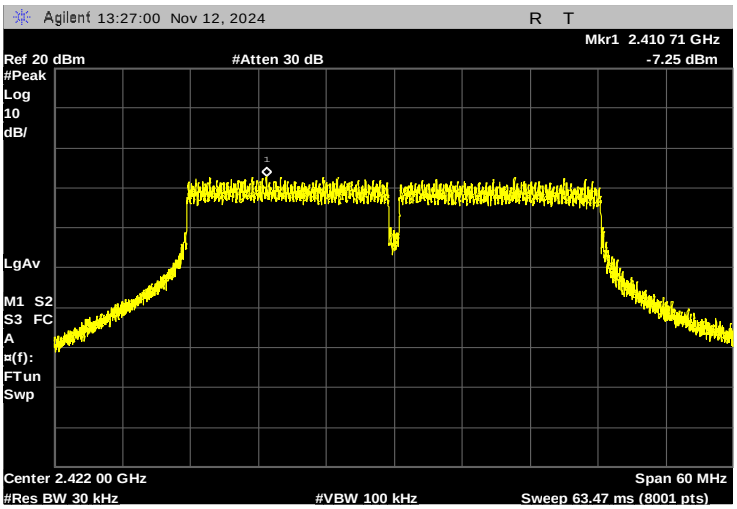


Highest Channel (2 462 MHz)

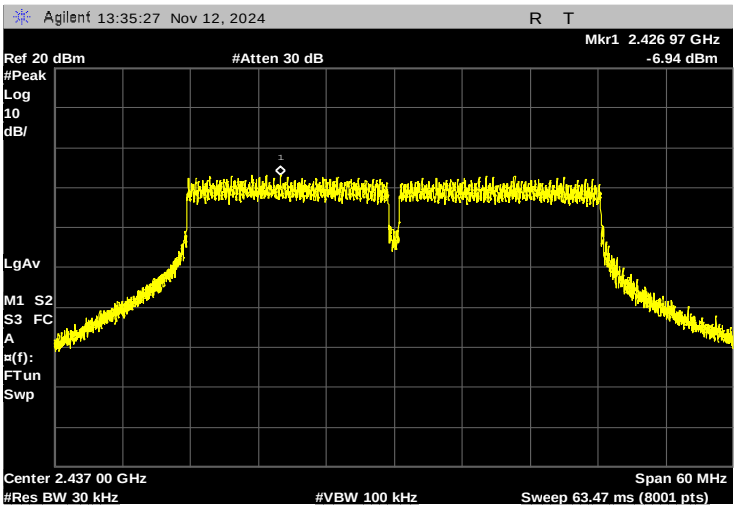


802.11n(40 MHz) mode

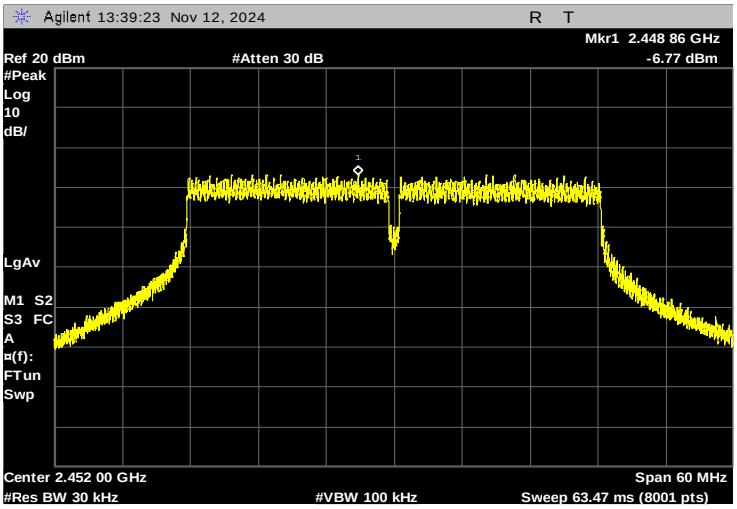
Lowest Channel (2 422 MHz)



Middle Channel (2 437 MHz)

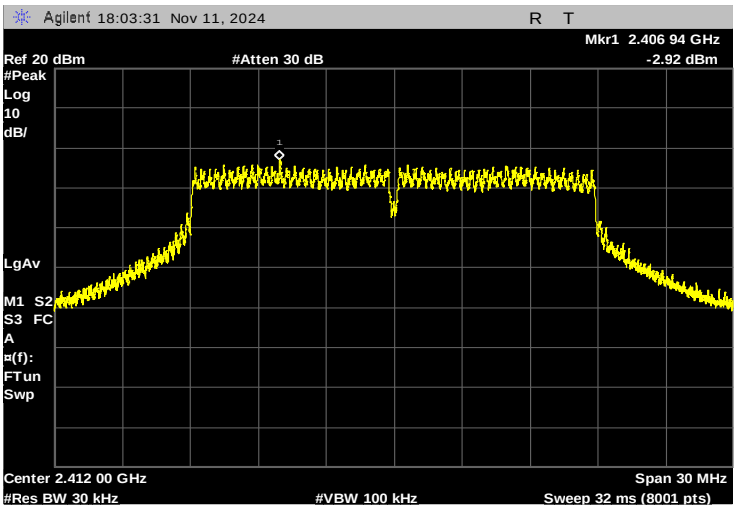


Highest Channel (2 452 MHz)

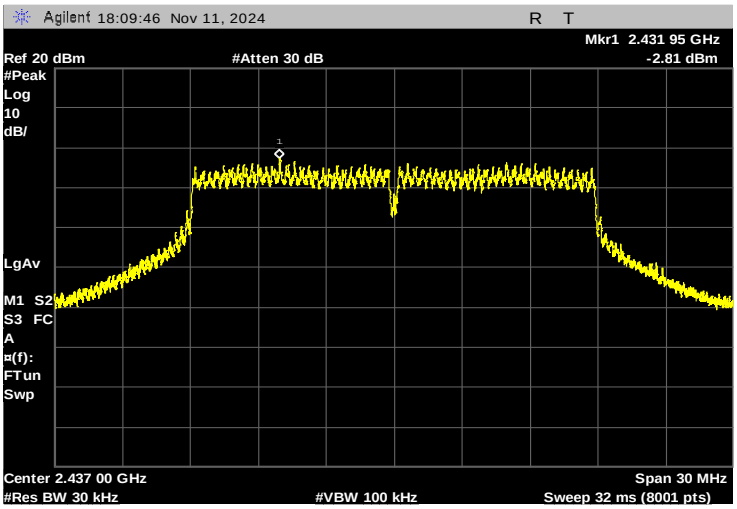


802.11ac(20 MHz) mode

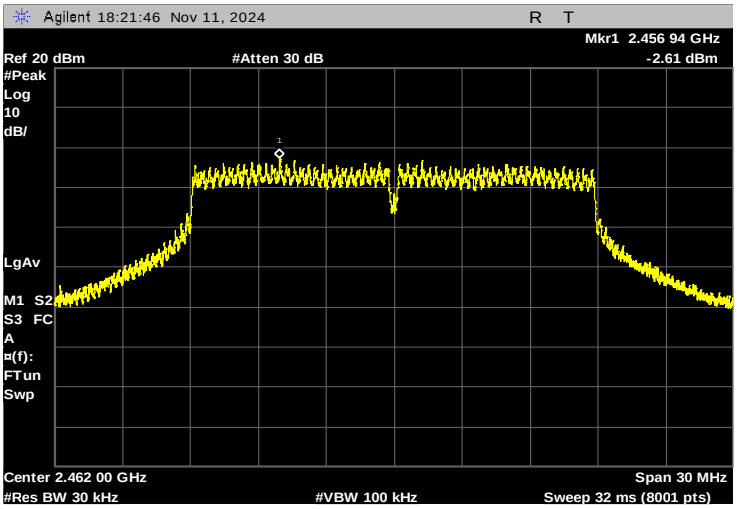
Lowest Channel (2 412 MHz)



Middle Channel (2 437 MHz)

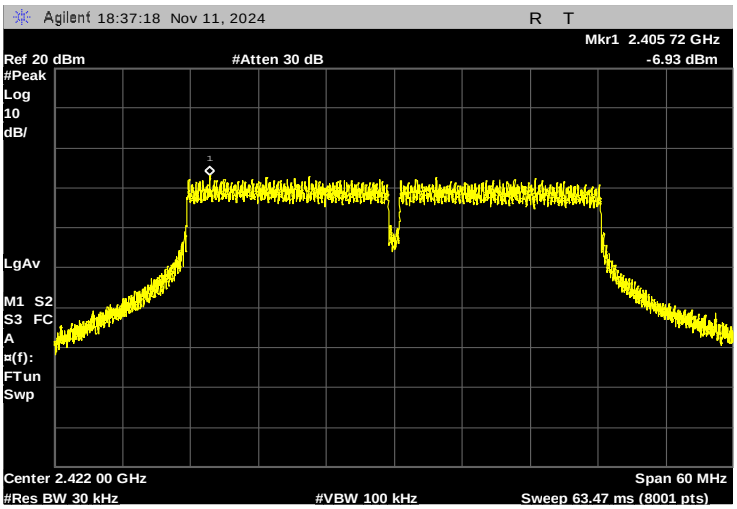


Highest Channel (2 462 MHz)

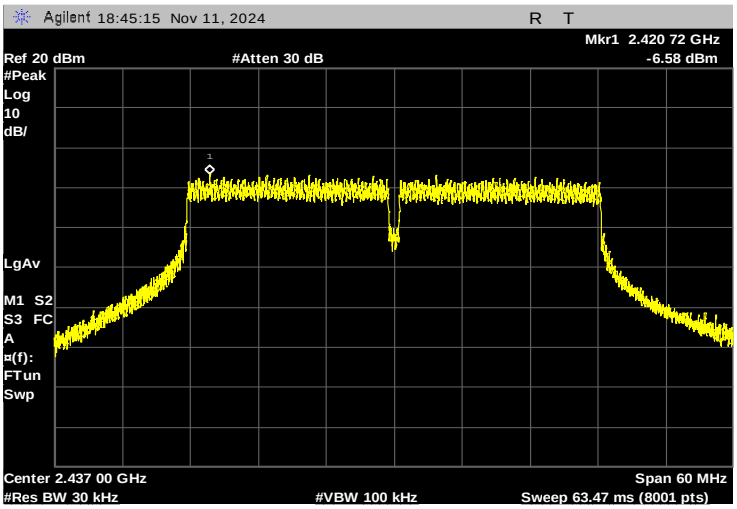


802.11ac(40 MHz) mode

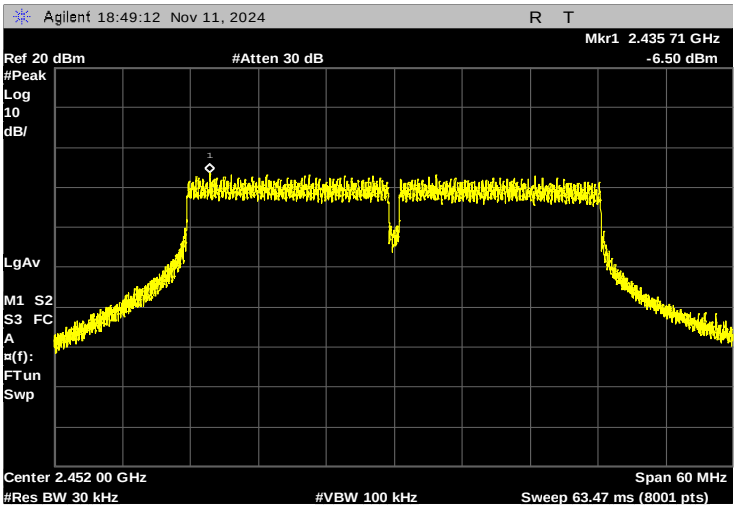
Lowest Channel (2 422 MHz)



Middle Channel (2 437 MHz)



Highest Channel (2 452 MHz)



7.4 Band Edge / Conducted Spurious Emissions

FCC §15.247(d)
RSS-247(5.5)

Test Mode : Set to Lowest channel, Middle channel and Highest channel

Result

802.11b mode

Channel	Frequency (MHz)	Reference Level (dBm/100kHz)	Conducted Spurious Emissions (dBc)	Limit (dBc)
1	2 412	6.69	More than 20 dBc	20
6	2 437	6.75	More than 20 dBc	20
11	2 462	7.12	More than 20 dBc	20

802.11g mode

Channel	Frequency (MHz)	Reference Level (dBm/100kHz)	Conducted Spurious Emissions (dBc)	Limit (dBc)
1	2 412	1.28	More than 20 dBc	20
6	2 437	1.34	More than 20 dBc	20
11	2 462	1.58	More than 20 dBc	20

802.11n(20 MHz) mode

Channel	Frequency (MHz)	Reference Level (dBm/100kHz)	Conducted Spurious Emissions (dBc)	Limit (dBc)
1	2 412	1.33	More than 20 dBc	20
6	2 437	1.46	More than 20 dBc	20
11	2 462	1.63	More than 20 dBc	20

802.11n(40 MHz) mode

Channel	Frequency (MHz)	Reference Level (dBm/100kHz)	Conducted Spurious Emissions (dBc)	Limit (dBc)
3	2 422	-2.26	More than 20 dBc	20
6	2 437	-1.81	More than 20 dBc	20
9	2 452	-1.70	More than 20 dBc	20

802.11ac(20 MHz) mode

Channel	Frequency (MHz)	Reference Level (dBm/100kHz)	Conducted Spurious Emissions (dBc)	Limit (dBc)
1	2 412	1.32	More than 20 dBc	20
6	2 437	1.27	More than 20 dBc	20
11	2 462	1.59	More than 20 dBc	20

802.11ac(40 MHz) mode

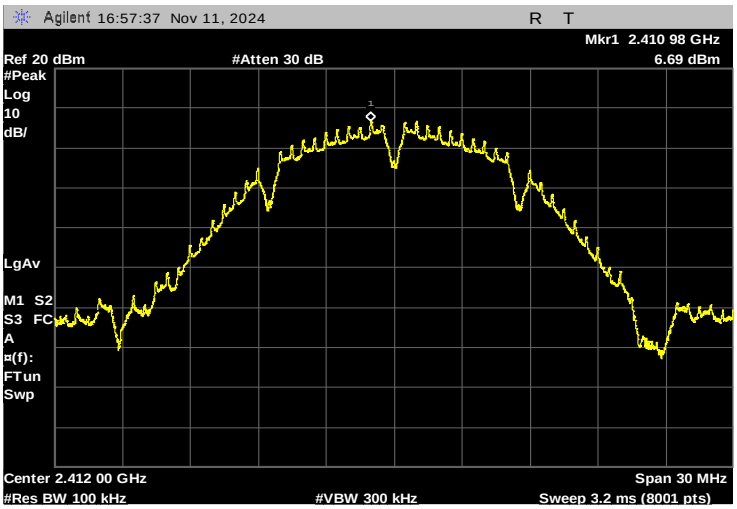
Channel	Frequency (MHz)	Reference Level (dBm/100kHz)	Conducted Spurious Emissions (dBc)	Limit (dBc)
3	2 422	-2.21	More than 20 dBc	20
6	2 437	-1.84	More than 20 dBc	20
9	2 452	-1.68	More than 20 dBc	20

Notes:
The cable and attenuator loss from 30 MHz to 26.5 GHz was reflected in spectrum analyzer with correction factor for the spurious emissions test.

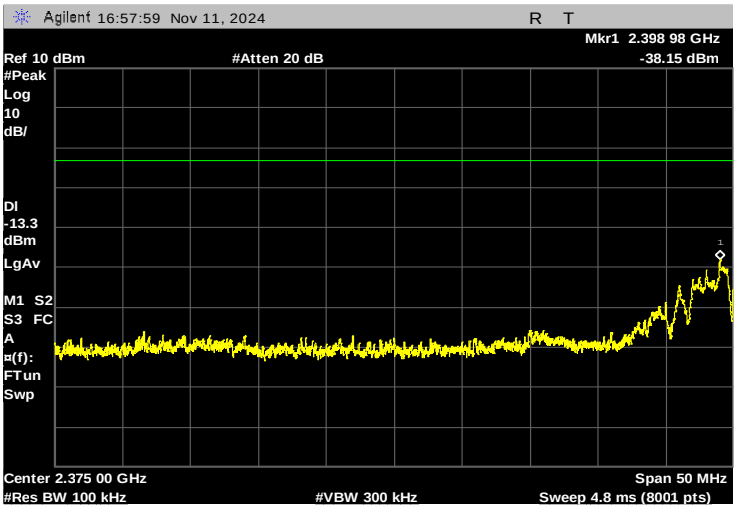
PLOTS OF EMISSIONS

802.11b mode

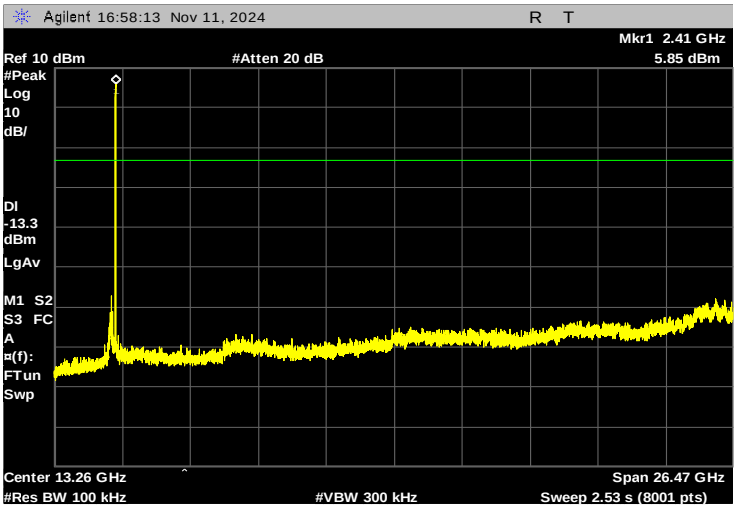
Reference Level, Lowest Channel (2 412 MHz)



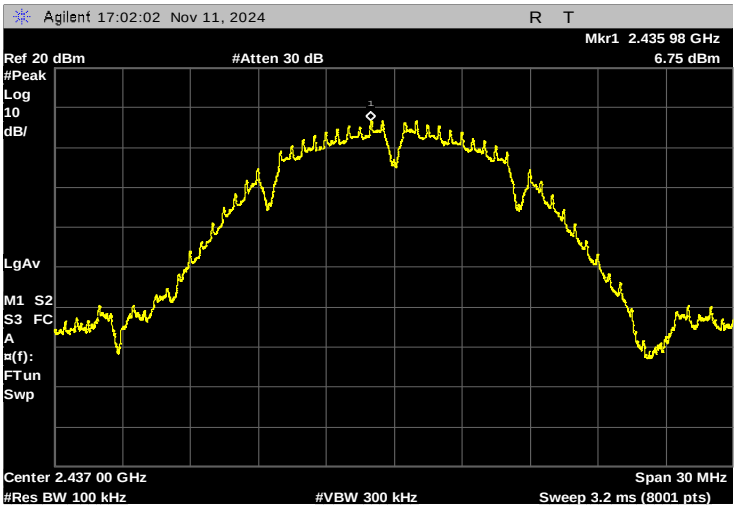
Band Edge, Lowest Channel (2 412 MHz)



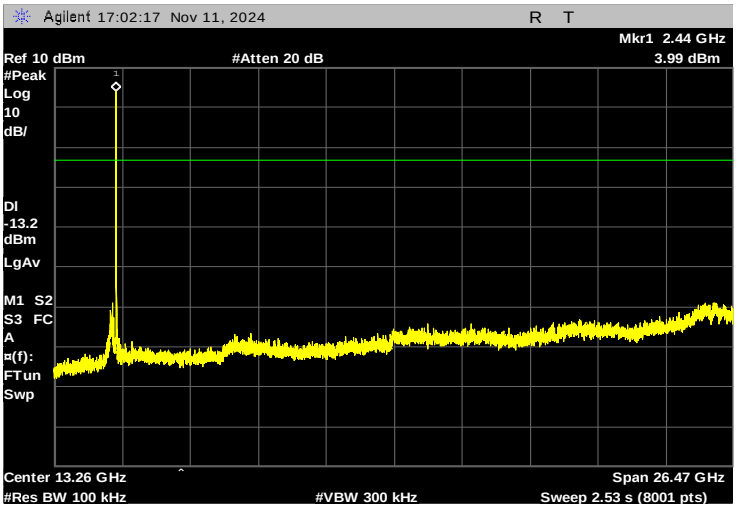
Conducted Spurious Emissions, Lowest Channel (2 412 MHz)



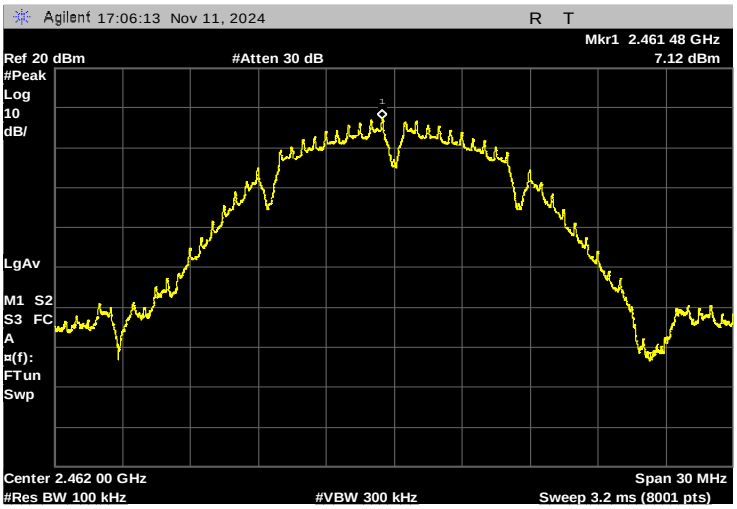
Reference Level, Middle Channel (2 437 MHz)



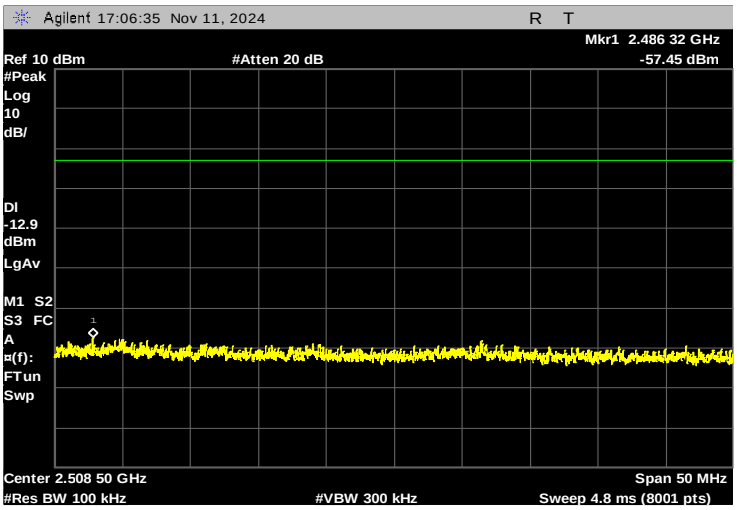
Conducted Spurious Emissions, Middle Channel (2 437 MHz)



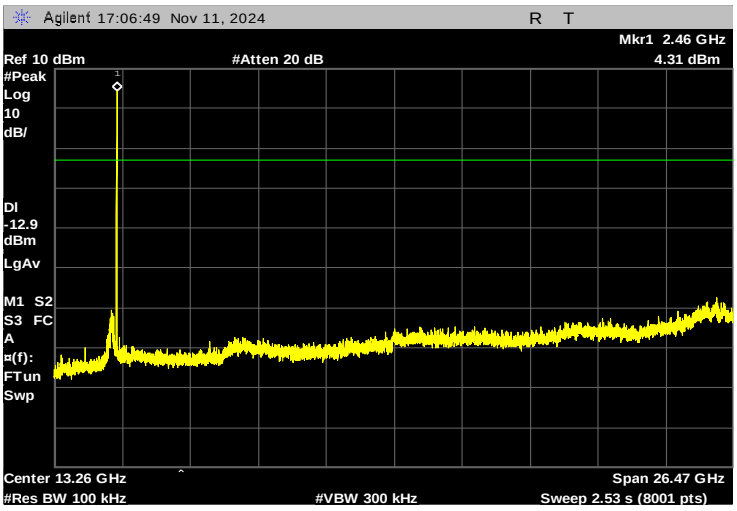
Reference Level, Highest Channel (2 462 MHz)



Band Edge, Highest Channel (2 462 MHz)

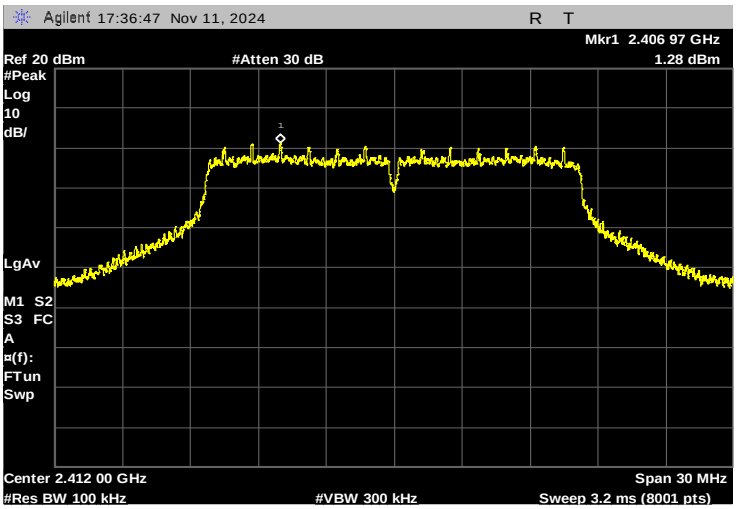


Conducted Spurious Emissions, Highest Channel (2 462 MHz)

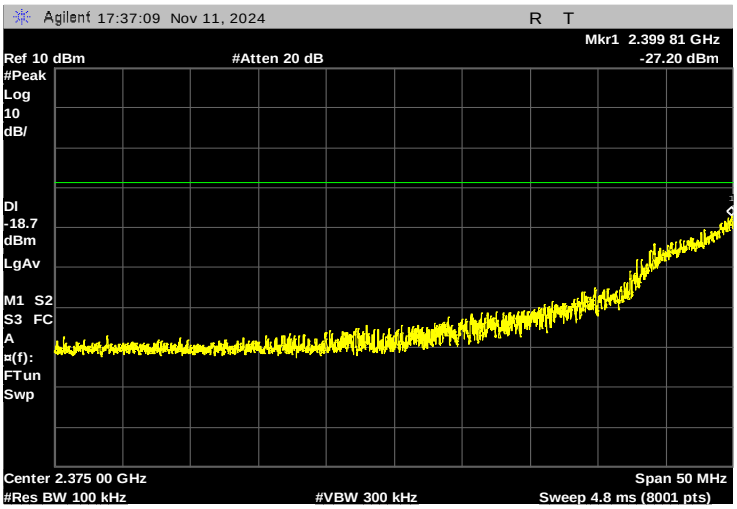


802.11g mode

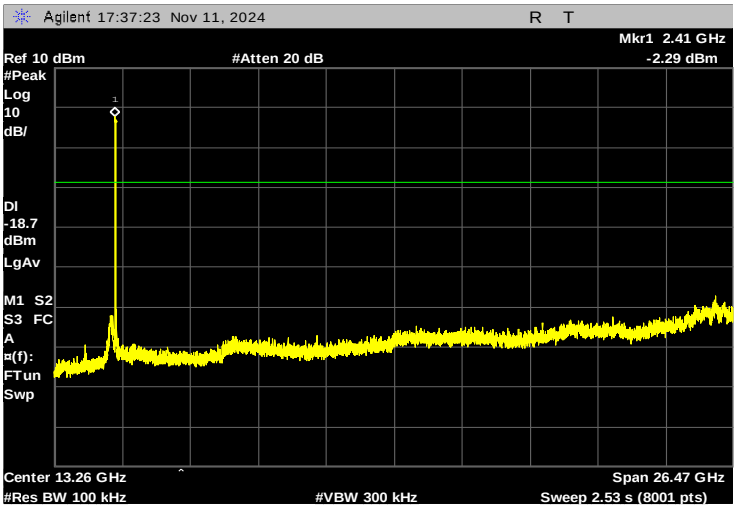
Reference Level, Lowest Channel (2 412 MHz)



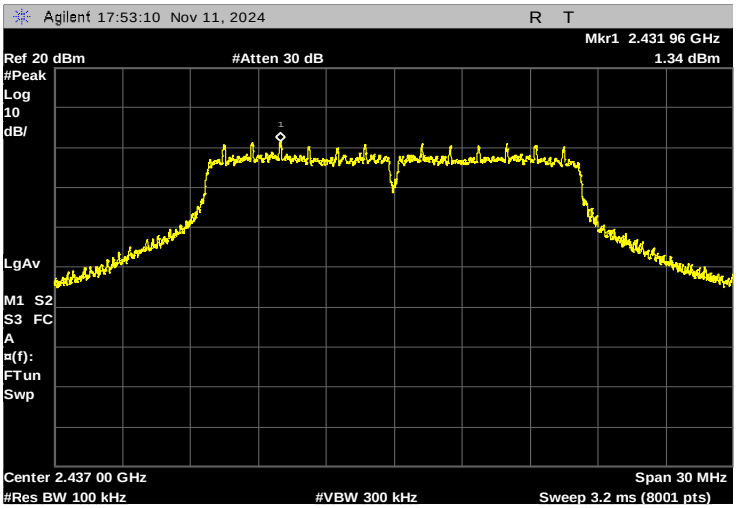
Band Edge, Lowest Channel (2 412 MHz)



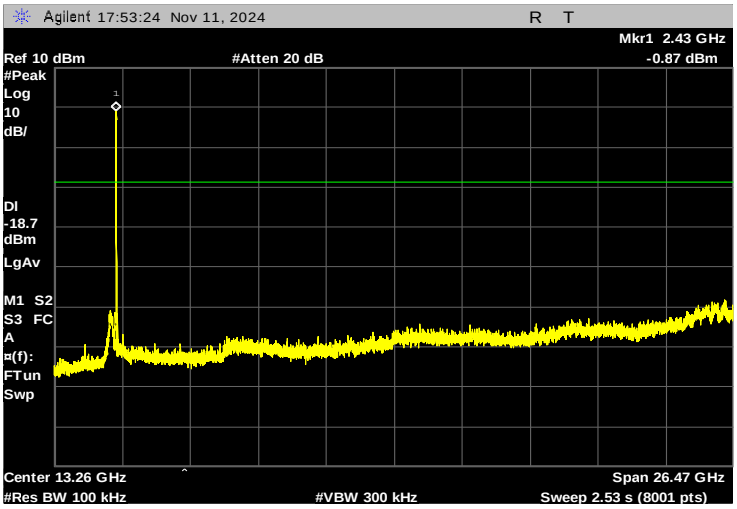
Conducted Spurious Emissions, Lowest Channel (2 412 MHz)



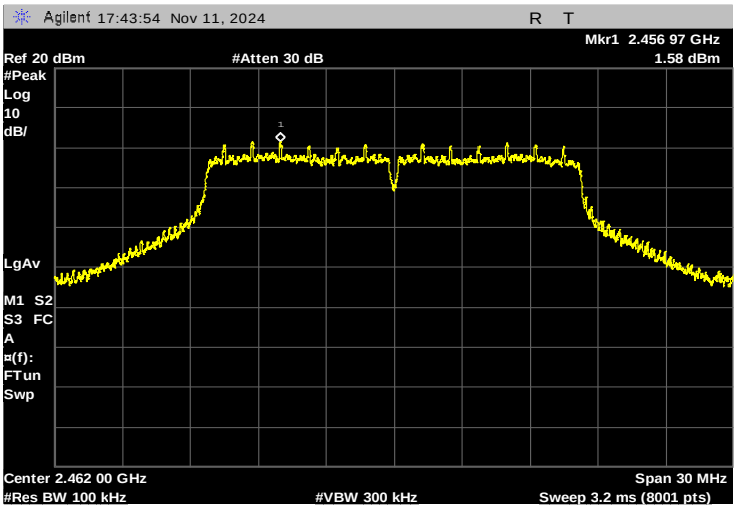
Reference Level, Middle Channel (2 437 MHz)



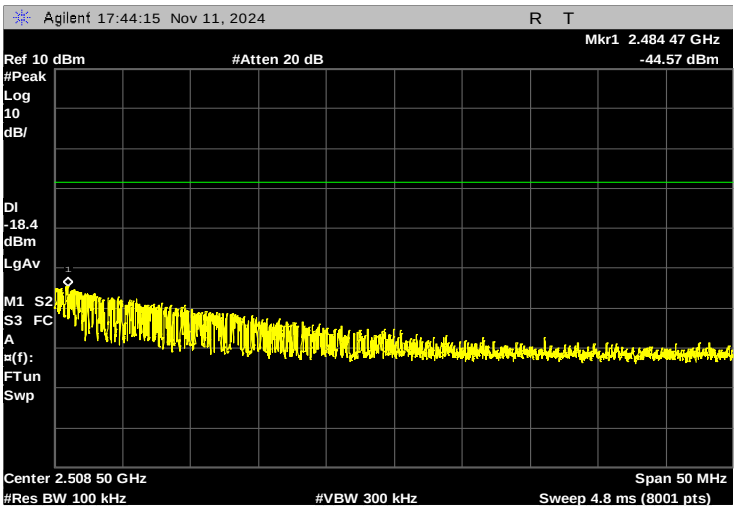
Conducted Spurious Emissions, Middle Channel (2 437 MHz)



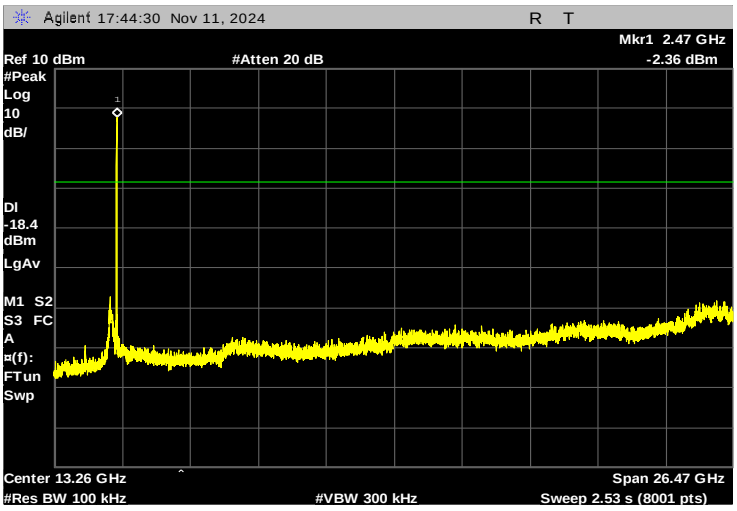
Reference Level, Highest Channel (2 462 MHz)



Band Edge, Highest Channel (2 462 MHz)

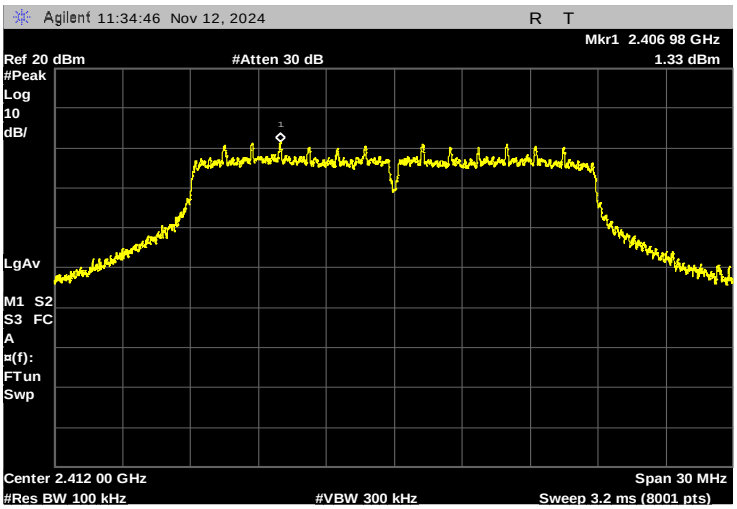


Conducted Spurious Emissions, Highest Channel (2 462 MHz)

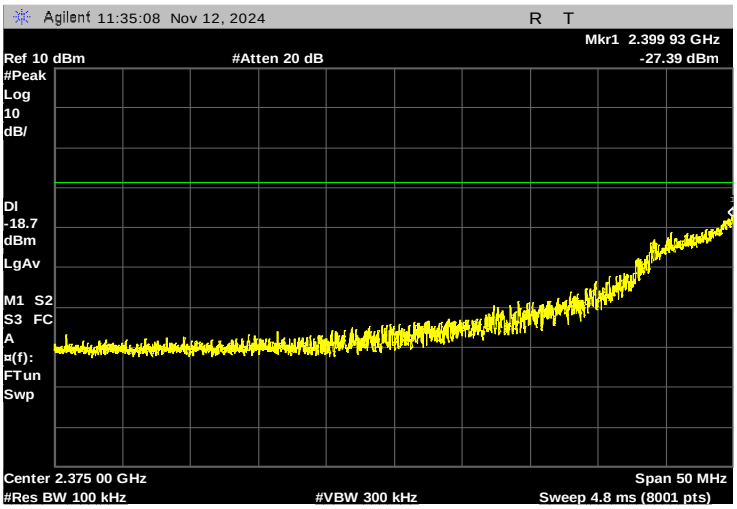


802.11n(20 MHz) mode

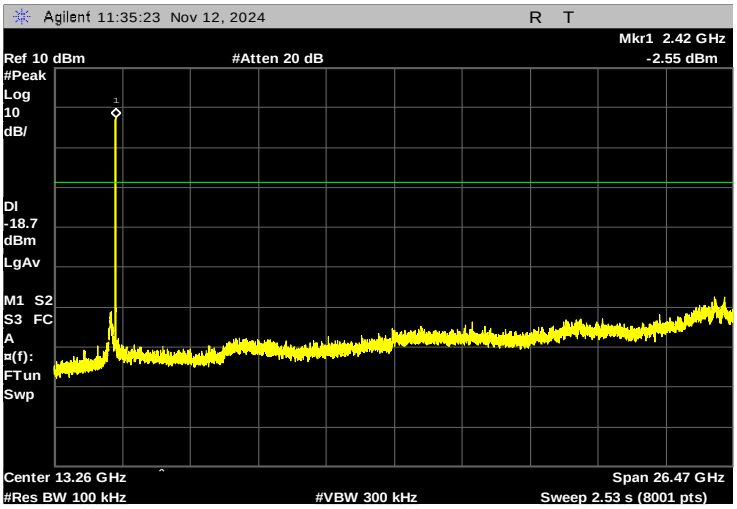
Reference Level, Lowest Channel (2 412 MHz)



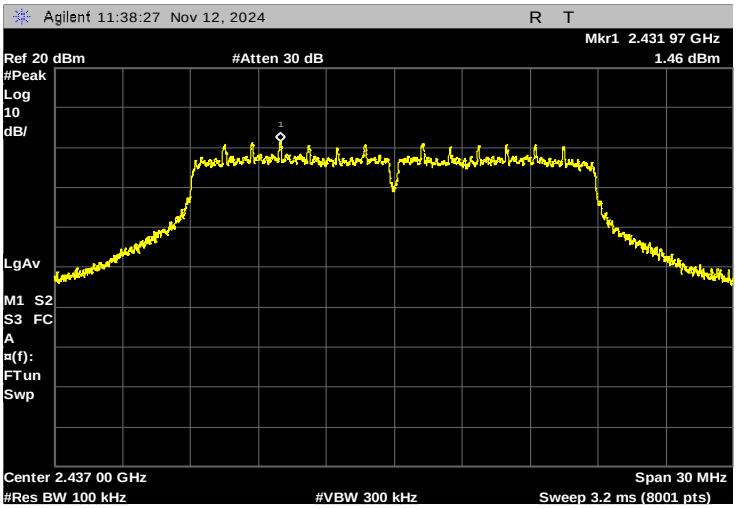
Band Edge, Lowest Channel (2 412 MHz)



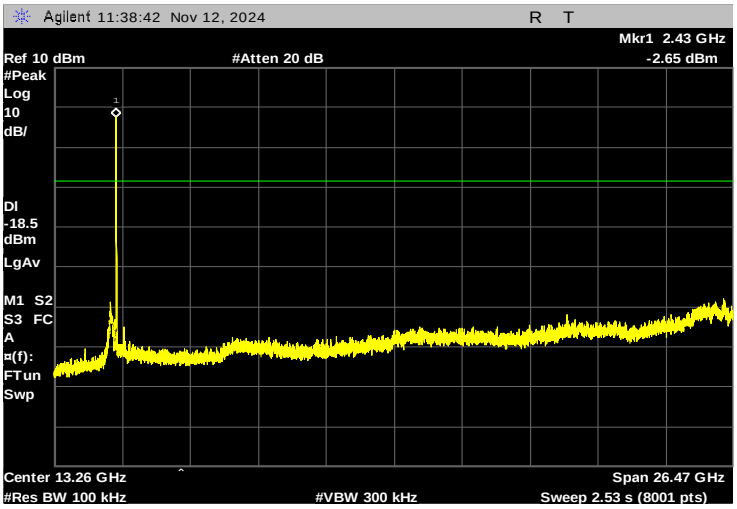
Conducted Spurious Emissions, Lowest Channel (2 412 MHz)



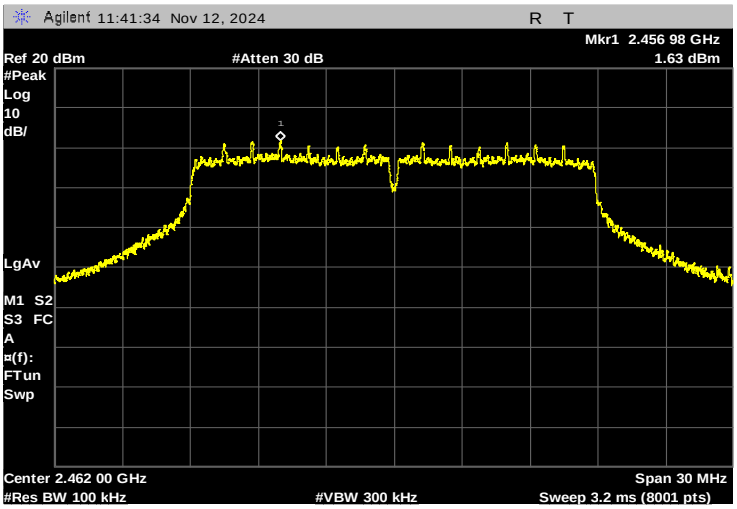
Reference Level, Middle Channel (2 437 MHz)



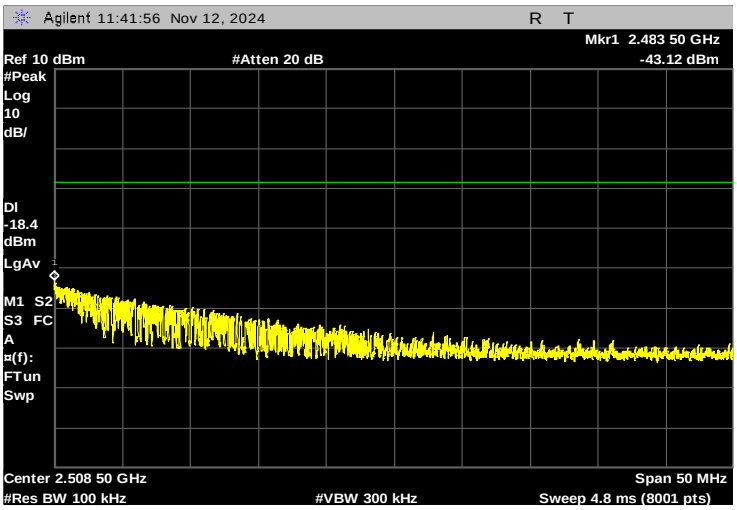
Conducted Spurious Emissions, Middle Channel (2 437 MHz)



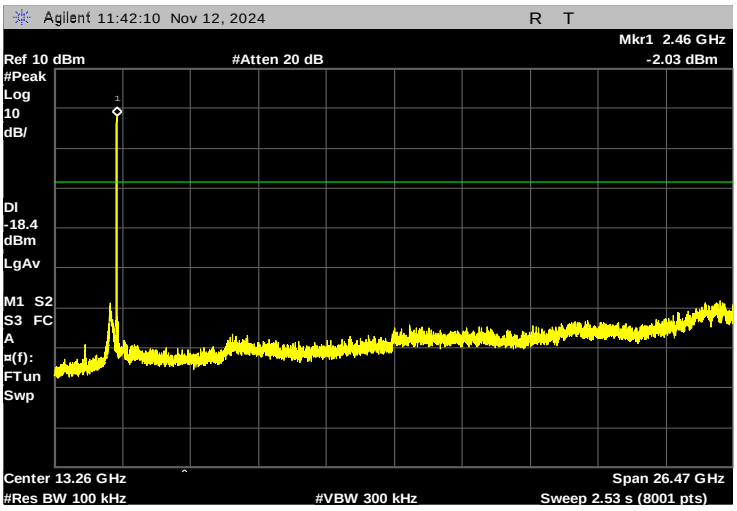
Reference Level, Highest Channel (2 462 MHz)



Band Edge, Highest Channel (2 462 MHz)

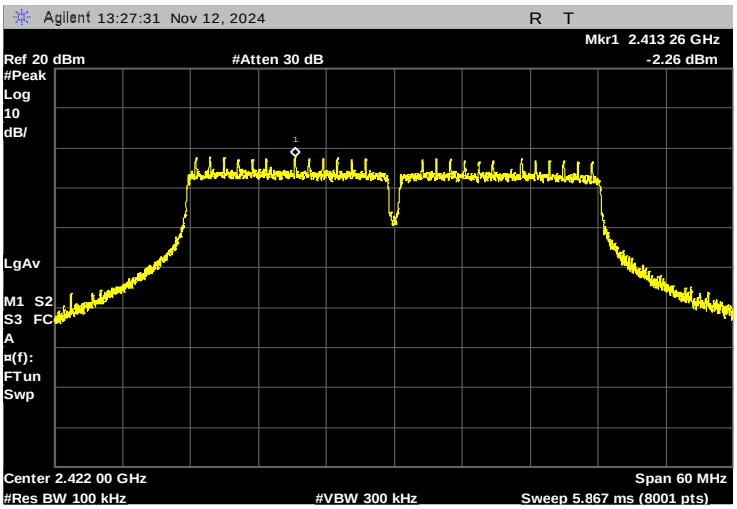


Conducted Spurious Emissions, Highest Channel (2 462 MHz)

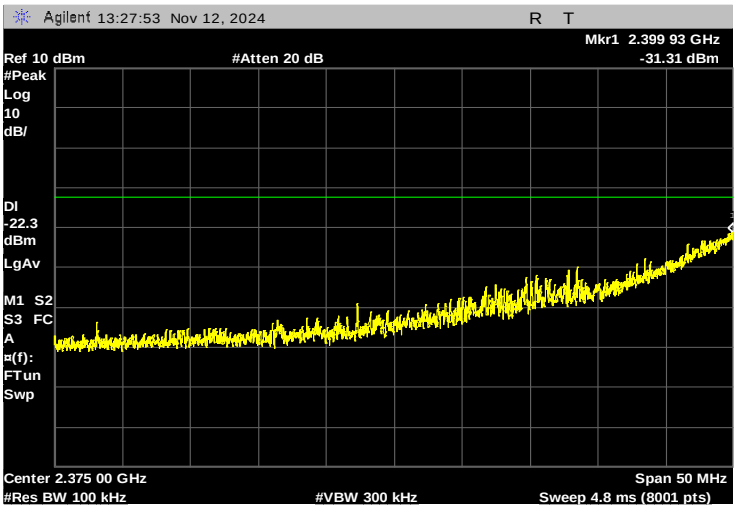


802.11n(40 MHz) mode

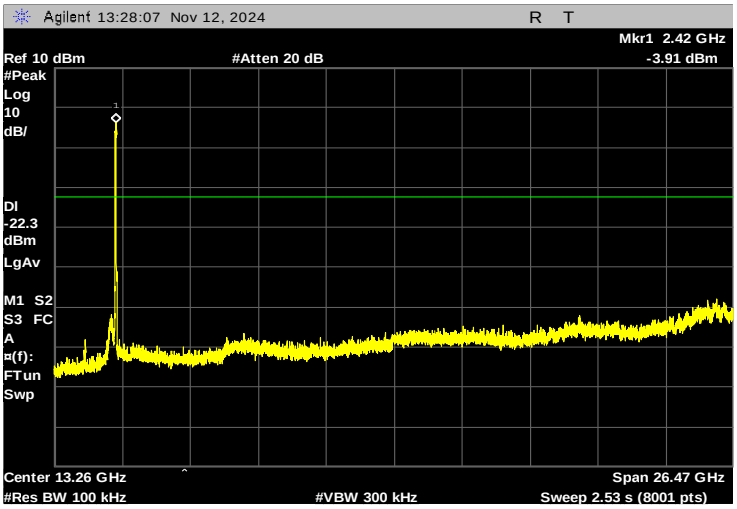
Reference Level, Lowest Channel (2 422 MHz)



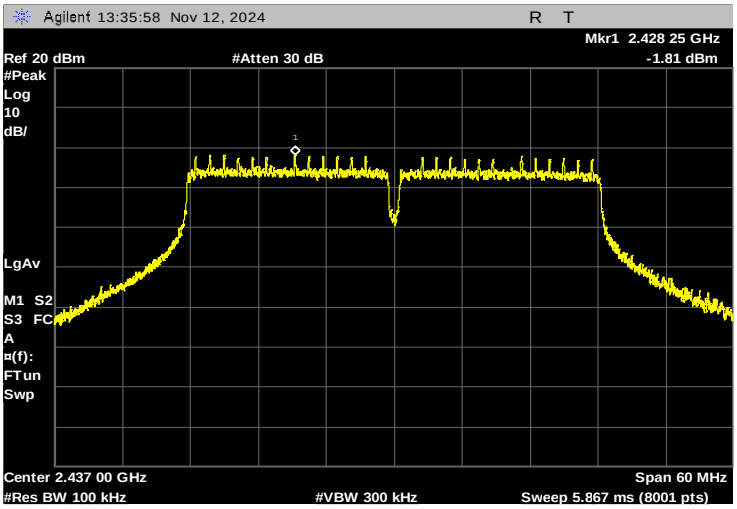
Band Edge, Lowest Channel (2 422 MHz)



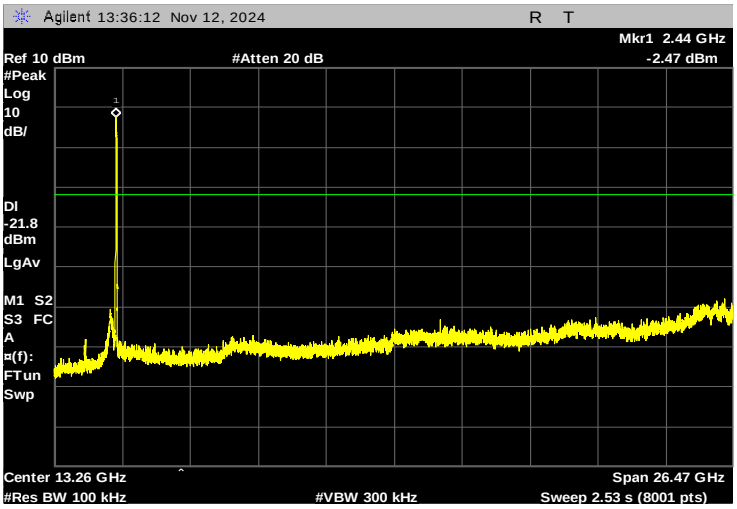
Conducted Spurious Emissions, Lowest Channel (2 422 MHz)



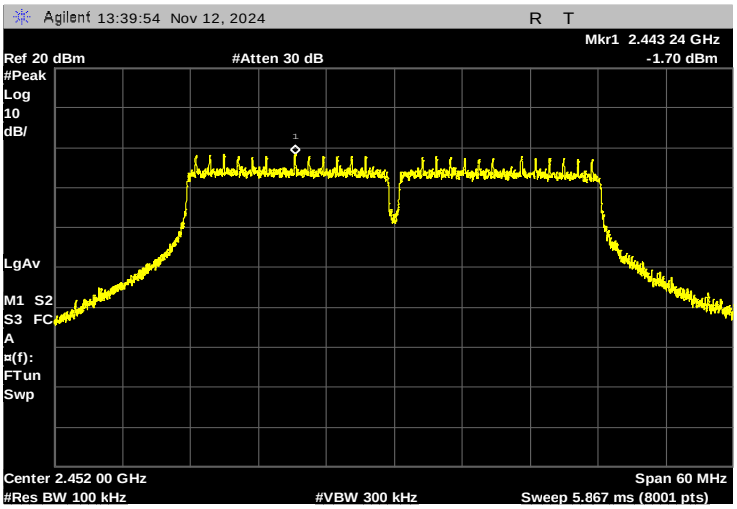
Reference Level, Middle Channel (2 437 MHz)



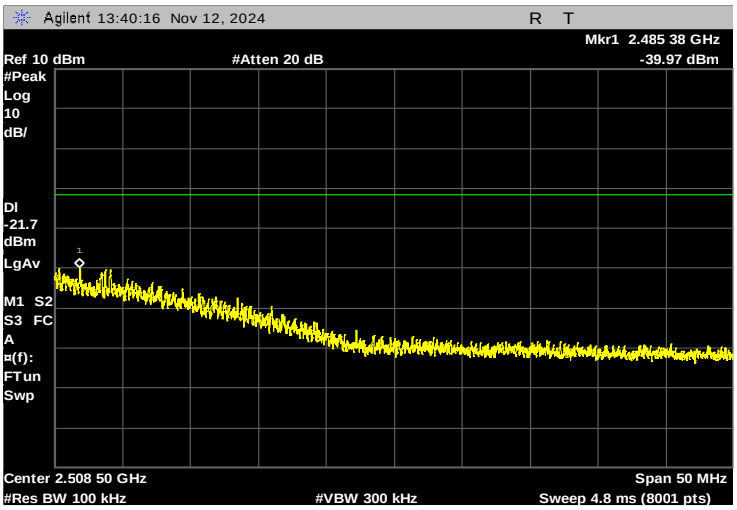
Conducted Spurious Emissions, Middle Channel (2 437 MHz)



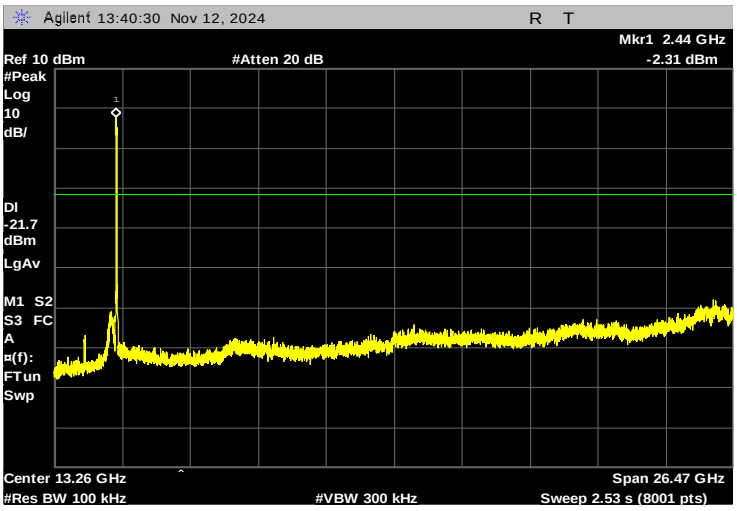
Reference Level, Highest Channel (2 452 MHz)



Band Edge, Highest Channel (2 452 MHz)

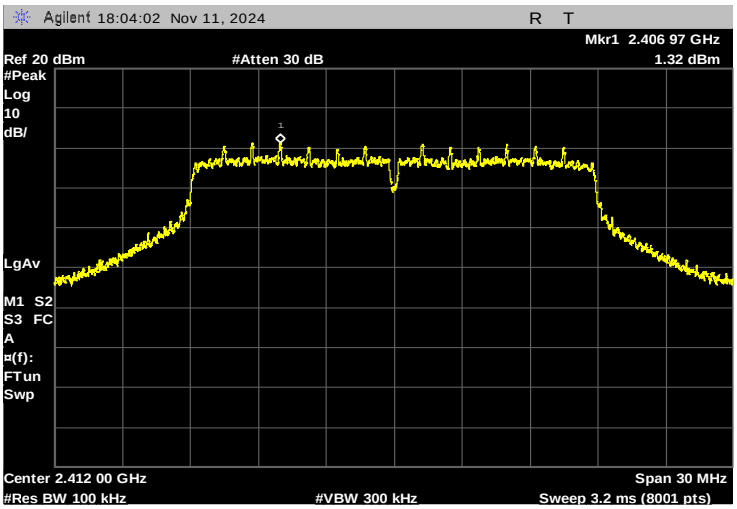


Conducted Spurious Emissions, Highest Channel (2 452 MHz)

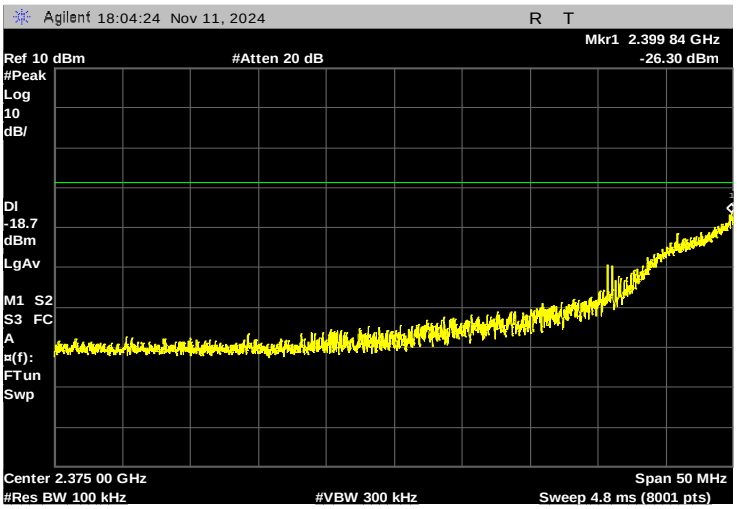


802.11ac(20 MHz) mode

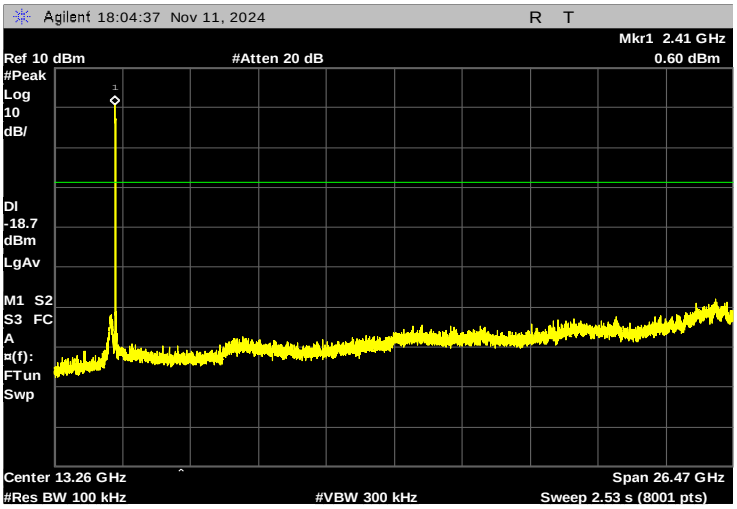
Reference Level, Lowest Channel (2 412 MHz)



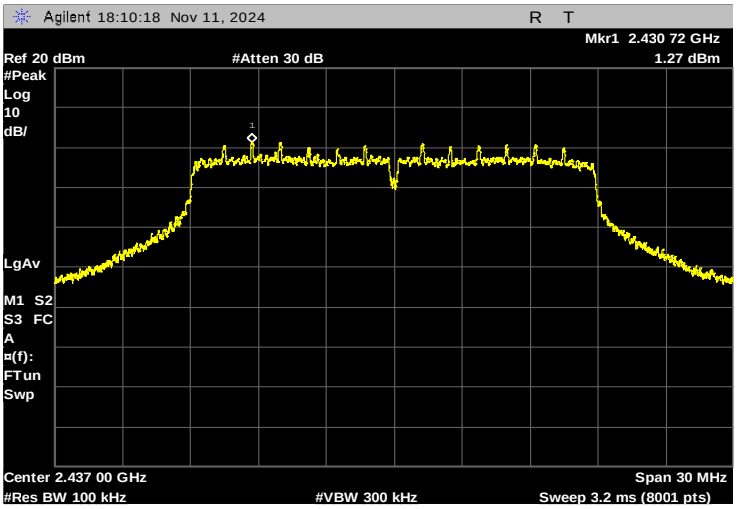
Band Edge, Lowest Channel (2 412 MHz)



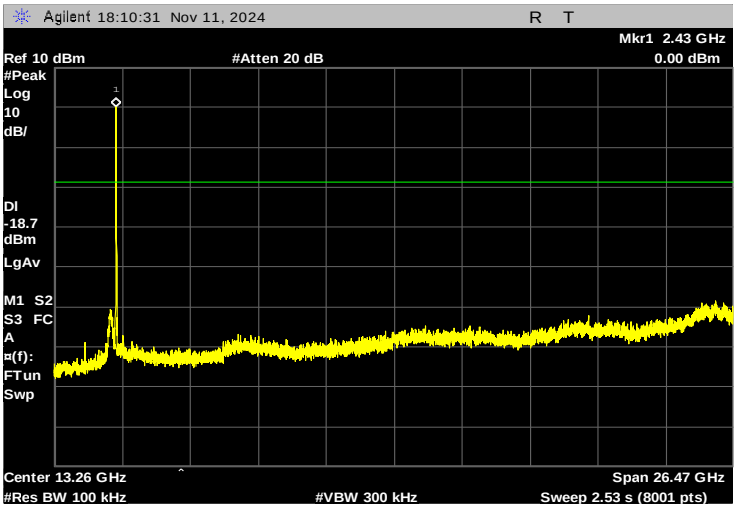
Conducted Spurious Emissions, Lowest Channel (2 412 MHz)



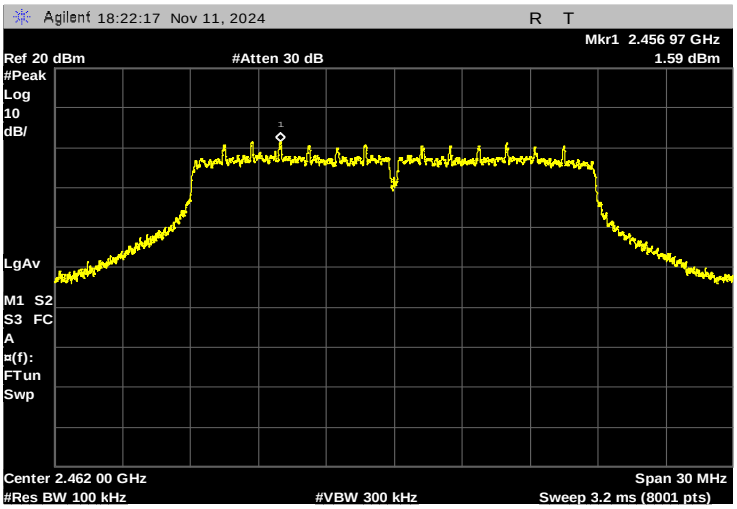
Reference Level, Middle Channel (2 437 MHz)



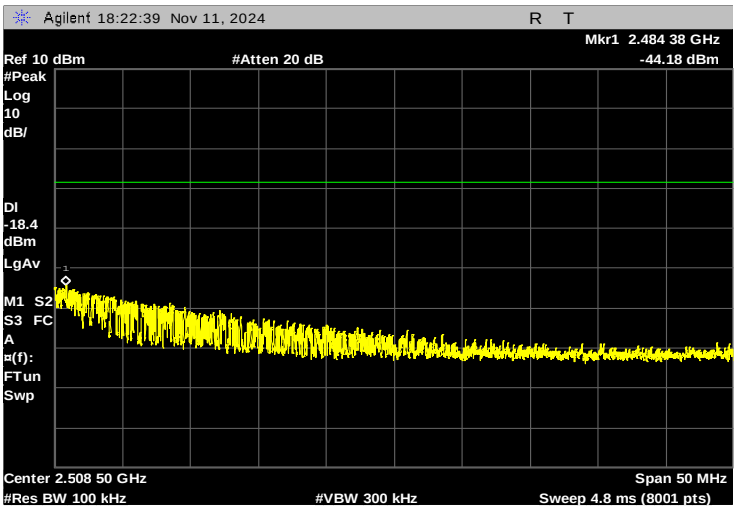
Conducted Spurious Emissions, Middle Channel (2 437 MHz)



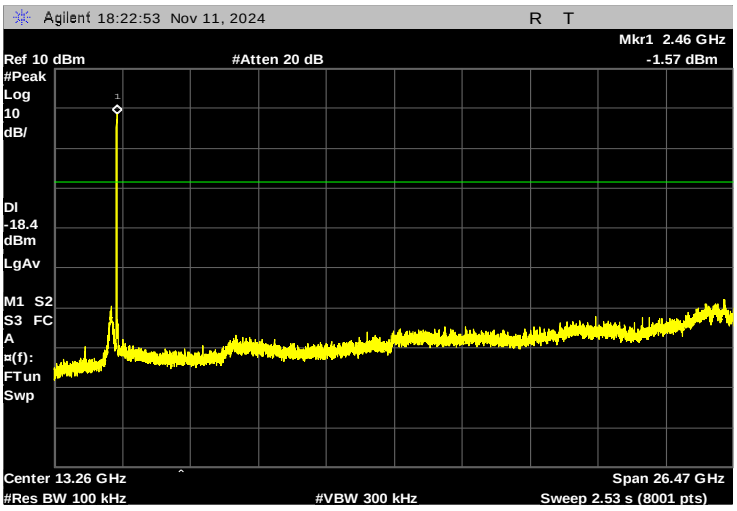
Reference Level, Highest Channel (2 462 MHz)



Band Edge, Highest Channel (2 462 MHz)

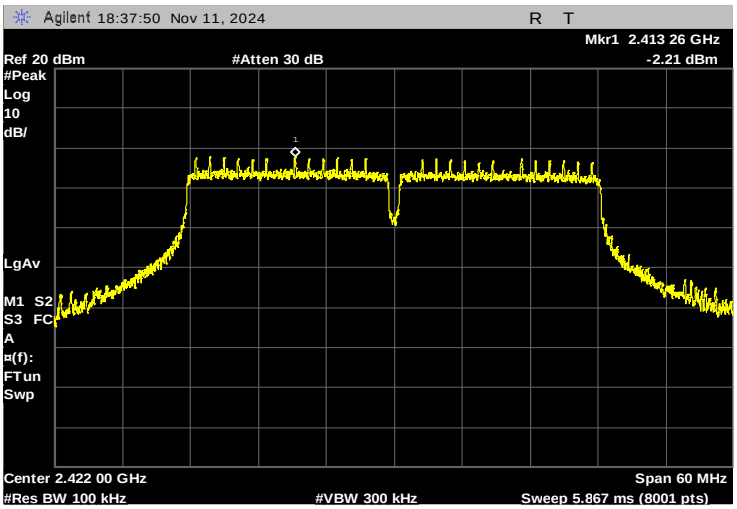


Conducted Spurious Emissions, Highest Channel (2 462 MHz)

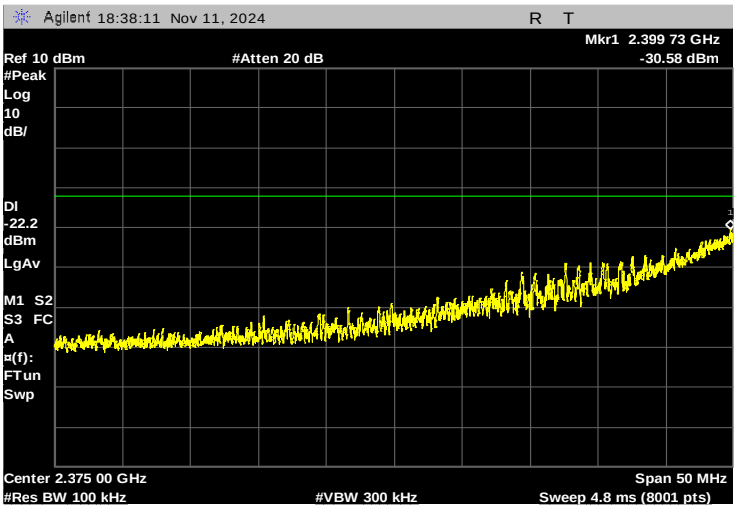


802.11ac(40 MHz) mode

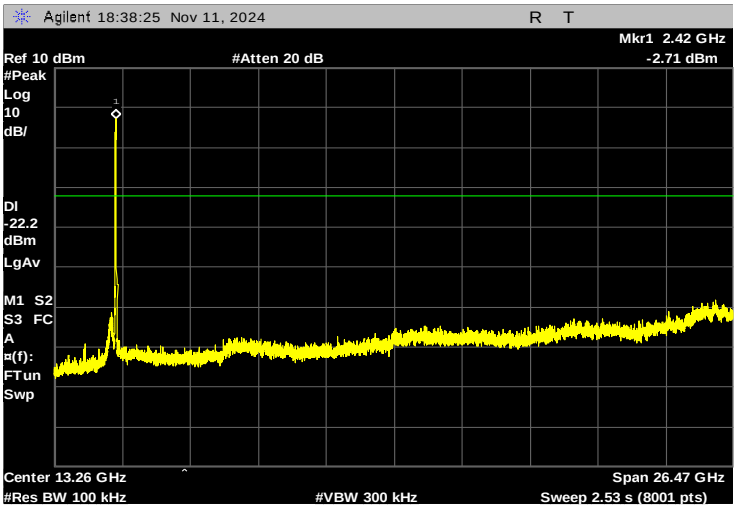
Reference Level, Lowest Channel (2 422 MHz)



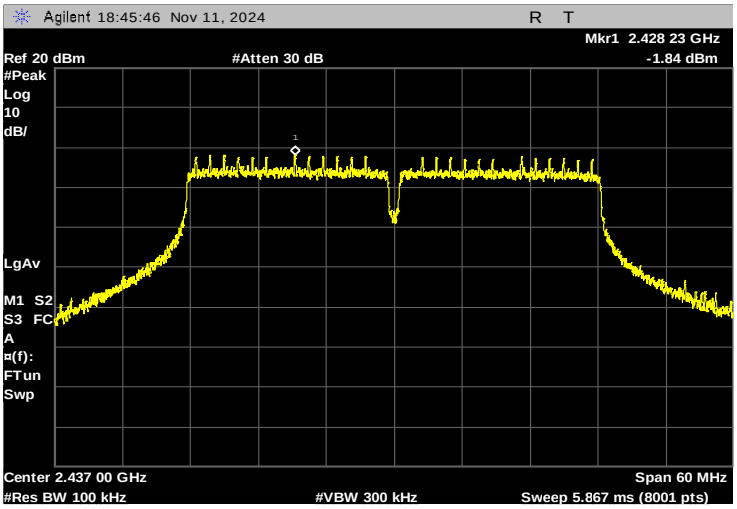
Band Edge, Lowest Channel (2 422 MHz)



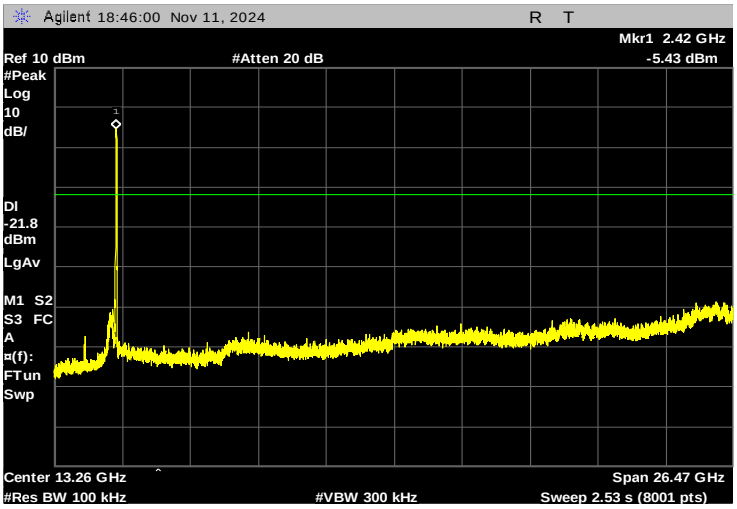
Conducted Spurious Emissions, Lowest Channel (2 422 MHz)



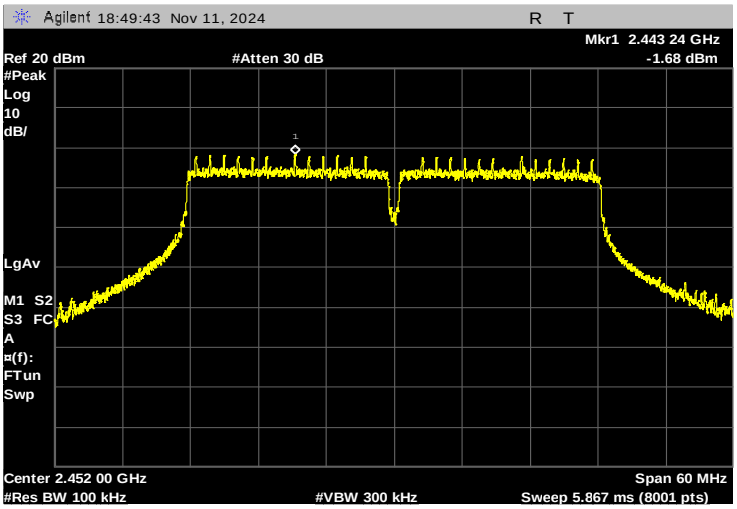
Reference Level, Middle Channel (2 437 MHz)



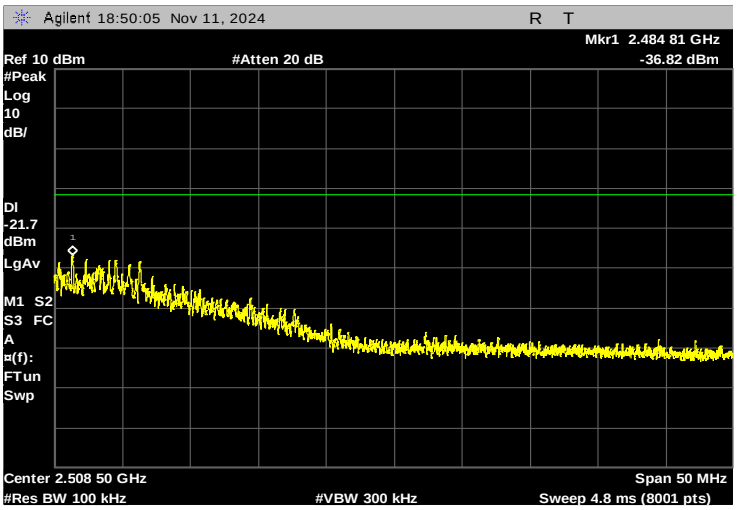
Conducted Spurious Emissions, Middle Channel (2 437 MHz)



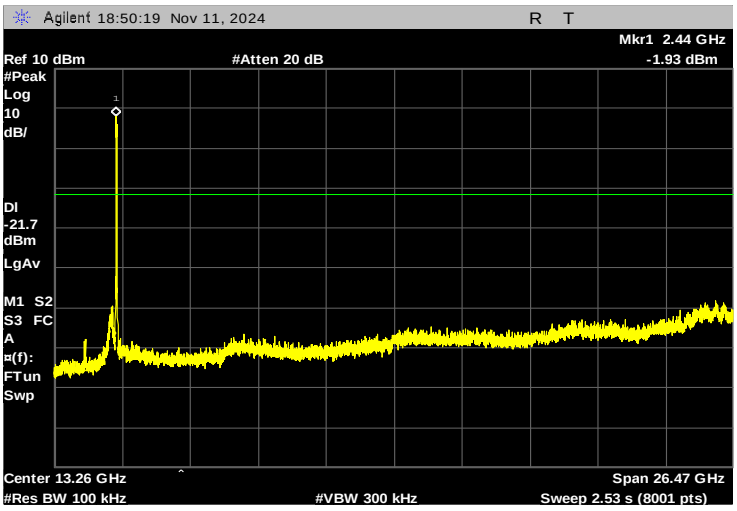
Reference Level, Highest Channel (2 452 MHz)



Band Edge, Highest Channel (2 452 MHz)



Conducted Spurious Emissions, Highest Channel (2 452 MHz)



7.5 Radiated Spurious Emissions

FCC §15.205, §15.209, §15.247(d)
RSS-Gen (8.9),(8.10)

Test Mode : Set to Lowest channel, Middle channel and Highest channel

Result

802.11 b mode

Lowest channel *(2 412 MHz)*

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4 824.00	47.39	V	PK	3.6	50.99	74.00	23.01
4 823.90	44.79	V	AV	3.6	48.39	54.00	5.61
7 235.90	41.42	V	PK	12.1	53.52	74.00	20.48
7 235.20	36.19	V	AV	12.1	48.29	54.00	5.71

Middle channel *(2 437 MHz)*

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4 873.95	46.89	V	PK	3.8	50.69	74.00	23.31
4 873.95	44.59	V	AV	3.8	48.39	54.00	5.61
7 309.50	40.52	V	PK	12.4	52.92	74.00	21.08
7 311.75	32.38	V	AV	12.4	44.78	54.00	9.22

Highest channel *(2 462 MHz)*

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4 923.95	49.64	V	PK	4.0	53.64	74.00	20.36
4 923.95	47.31	V	AV	4.0	51.31	54.00	2.69
7 385.90	40.63	V	PK	12.9	53.53	74.00	20.47
7 385.25	35.74	V	AV	12.9	48.64	54.00	5.36

802.11 g mode

Lowest channel *(2 412 MHz)*

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2 248.35	58.80	H	PK	-5.3	53.50	74.00	20.50
2 254.89	50.80	H	AV	-5.3	45.50	54.00	8.50
7 235.20	37.47	H	PK	12.1	49.57	74.00	24.43
7 234.25	28.17	V	AV	12.1	40.27	54.00	13.73
9 646.40	36.43	V	PK	15.9	52.33	74.00	21.67
9 647.85	27.00	V	AV	15.9	42.90	54.00	11.10

Middle channel *(2 437 MHz)*

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2 273.86	58.67	H	PK	-5.3	53.37	74.00	20.63
2 274.53	49.22	H	AV	-5.3	43.92	54.00	10.08
7 310.90	39.94	V	PK	12.4	52.34	74.00	21.66
7 308.85	31.65	V	AV	12.4	44.05	54.00	9.95
9 747.35	38.03	V	PK	16.6	54.63	74.00	19.37
9 747.85	31.15	V	AV	16.6	47.75	54.00	6.25

Highest channel *(2 462 MHz)*

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2 254.91	59.72	H	PK	-5.3	54.42	74.00	19.58
2 252.15	50.15	H	AV	-5.3	44.85	54.00	9.15
4 921.90	44.15	V	PK	3.9	48.05	74.00	25.95
4 923.25	35.58	V	AV	4.0	39.58	54.00	14.42
7 388.35	40.65	V	PK	12.9	53.55	74.00	20.45
7 387.80	30.97	V	AV	12.9	43.87	54.00	10.13

802.11 ac(20 MHz) mode

Lowest channel *(2 412 MHz)*

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2 255.32	54.24	H	PK	-5.3	48.94	74.00	25.06
2 256.37	46.45	H	AV	-5.3	41.15	54.00	12.85
7 236.90	38.52	V	PK	12.1	50.62	74.00	23.38
7 233.65	29.25	V	AV	12.1	41.35	54.00	12.65
9 647.65	37.03	H	PK	15.9	52.93	74.00	21.07
9 647.75	27.94	V	AV	15.9	43.84	54.00	10.16

Middle channel *(2 437 MHz)*

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2 276.44	55.87	H	PK	-5.3	50.57	74.00	23.43
2 272.69	47.27	H	AV	-5.3	41.97	54.00	12.03
7 311.60	38.62	V	PK	12.4	51.02	74.00	22.98
7 306.15	30.08	V	AV	12.4	42.48	54.00	11.52
9 751.80	36.74	V	PK	16.6	53.34	74.00	20.66
9 747.90	26.85	V	AV	16.6	43.45	54.00	10.55

Highest channel *(2 462 MHz)*

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2 260.33	56.75	H	PK	-5.3	51.45	74.00	22.55
2 255.00	49.00	H	AV	-5.3	43.70	54.00	10.30
4 920.90	42.15	V	PK	3.9	46.05	74.00	27.95
4 921.80	33.10	V	AV	3.9	37.00	54.00	17.00
7 382.70	38.44	V	PK	12.9	51.34	74.00	22.66
7 382.80	28.58	V	AV	12.9	41.48	54.00	12.52

802.11 ac(40 MHz) mode

Lowest channel *(2 422 MHz)*

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2 252.19	57.01	H	PK	-5.3	51.71	74.00	22.29
2 252.91	48.33	H	AV	-5.3	43.03	54.00	10.97
7 267.20	38.88	V	PK	12.2	51.08	74.00	22.92
7 264.00	28.07	V	AV	12.2	40.27	54.00	13.73
9 687.70	37.32	V	PK	16.2	53.52	74.00	20.48
9 688.00	29.80	V	AV	16.2	46.00	54.00	8.00

Middle channel *(2 437 MHz)*

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2 267.63	56.27	H	PK	-5.3	50.97	74.00	23.03
2 267.01	48.80	H	AV	-5.3	43.50	54.00	10.50
7 308.70	39.48	V	PK	12.4	51.88	74.00	22.12
7 313.20	28.06	V	AV	12.4	40.46	54.00	13.54
9 748.20	37.82	V	PK	16.6	54.42	74.00	19.58
9 747.90	28.95	V	AV	16.6	45.55	54.00	8.45

Highest channel *(2 452 MHz)*

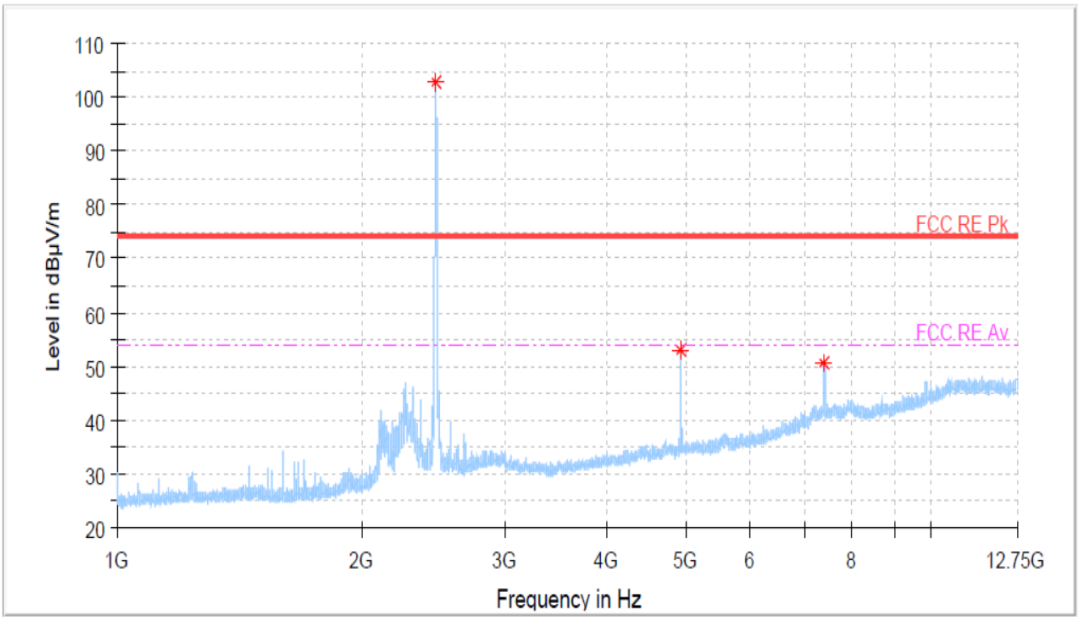
Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2 279.76	55.99	H	PK	-5.3	50.69	74.00	23.31
2 280.77	48.78	H	AV	-5.3	43.48	54.00	10.52
7 352.30	39.45	V	PK	12.6	52.05	74.00	21.95
7 348.50	28.76	V	AV	12.6	41.36	54.00	12.64
9 808.10	36.18	V	PK	16.6	52.78	74.00	21.22
9 808.10	28.43	V	AV	16.6	45.03	54.00	8.97

Notes:
1. *Pol. : H = Horizontal, V = Vertical, Mode : PK = Peak, AV = Average
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. Nothing detected above 18GHz
4. Other spurious was under 20 dB below Fundamental.
5. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, vertical polarization.
6. Peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
7. Average emissions were measured using RBW = 1 MHz, VBW = 10 kHz, Detector = Peak.
8. The spectrum was measured from 1 GHz to 10th harmonic and the worst-case emissions were reported.

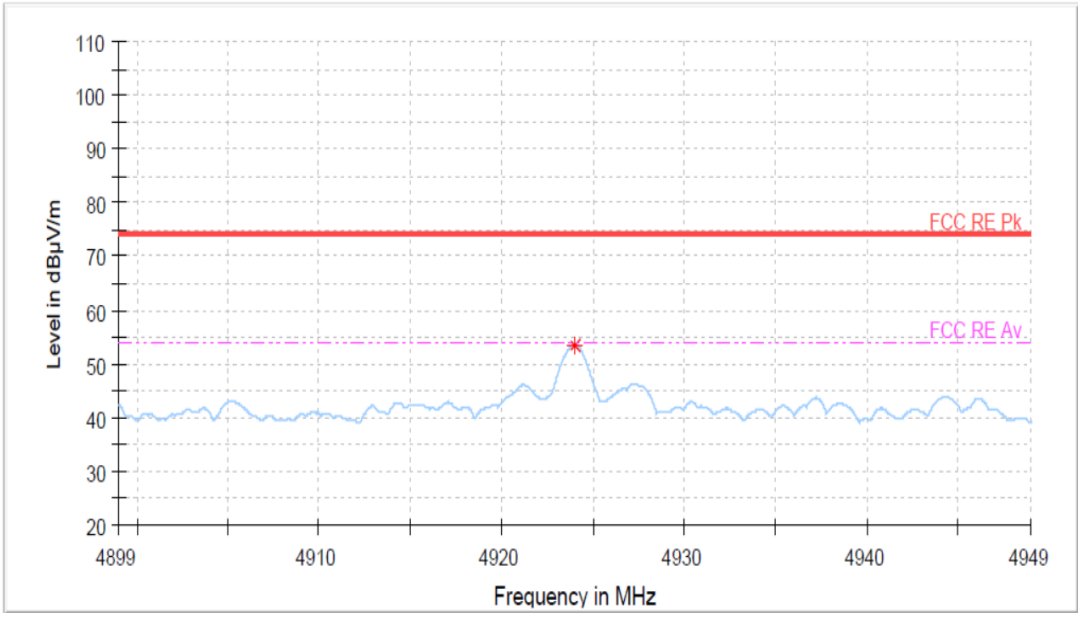
PLOTS OF EMISSIONS

Worst Case

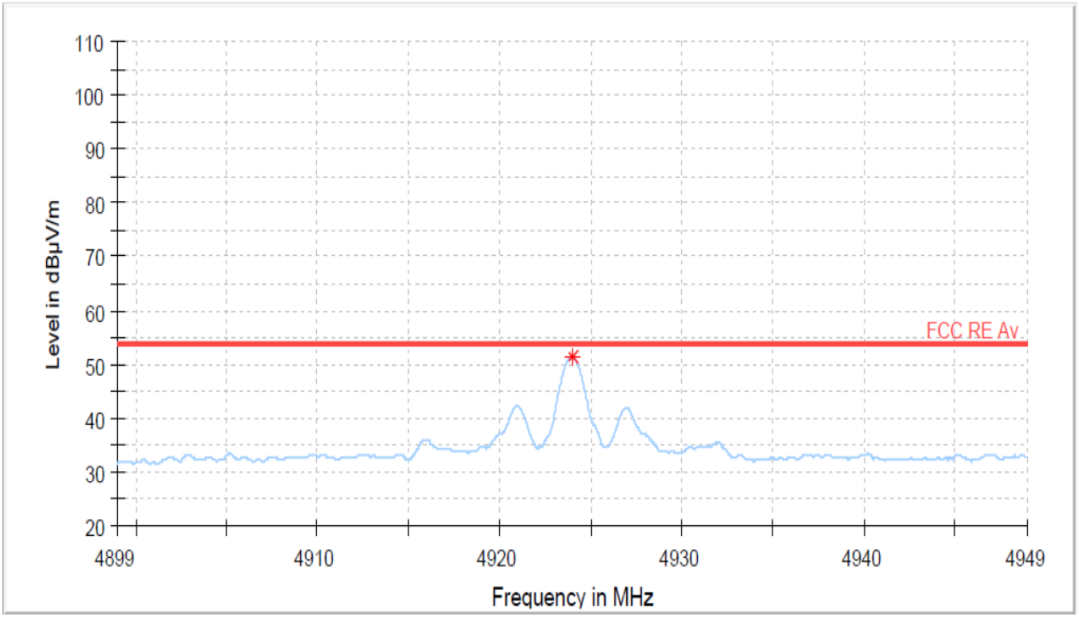
802.11 b mode Highest Channel (2 462 MHz) : 1 GHz to 12.75 GHz_Peak



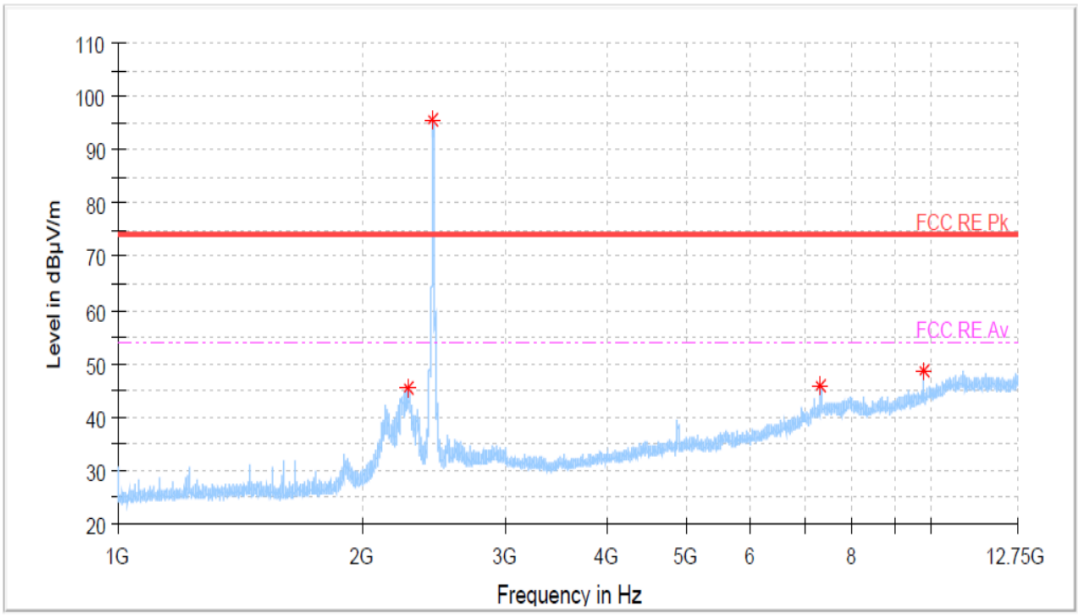
802.11 b mode Highest Channel (2 462 MHz) : 4 924 MHz Zoom scan_Peak



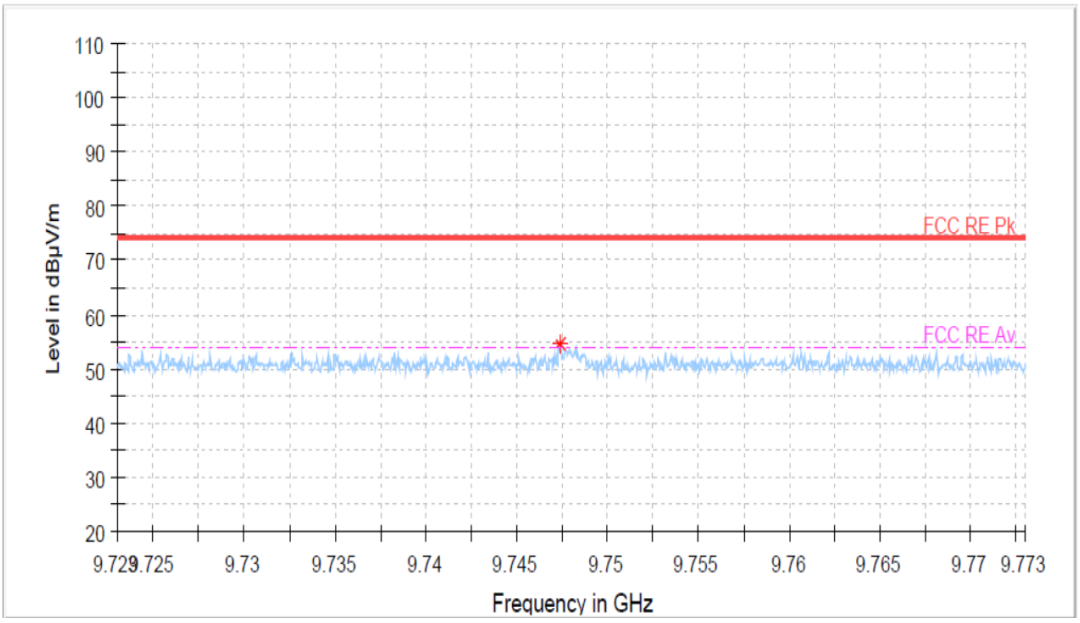
802.11 b mode Highest Channel (2 462 MHz) : 4 924 MHz Zoom scan_Average



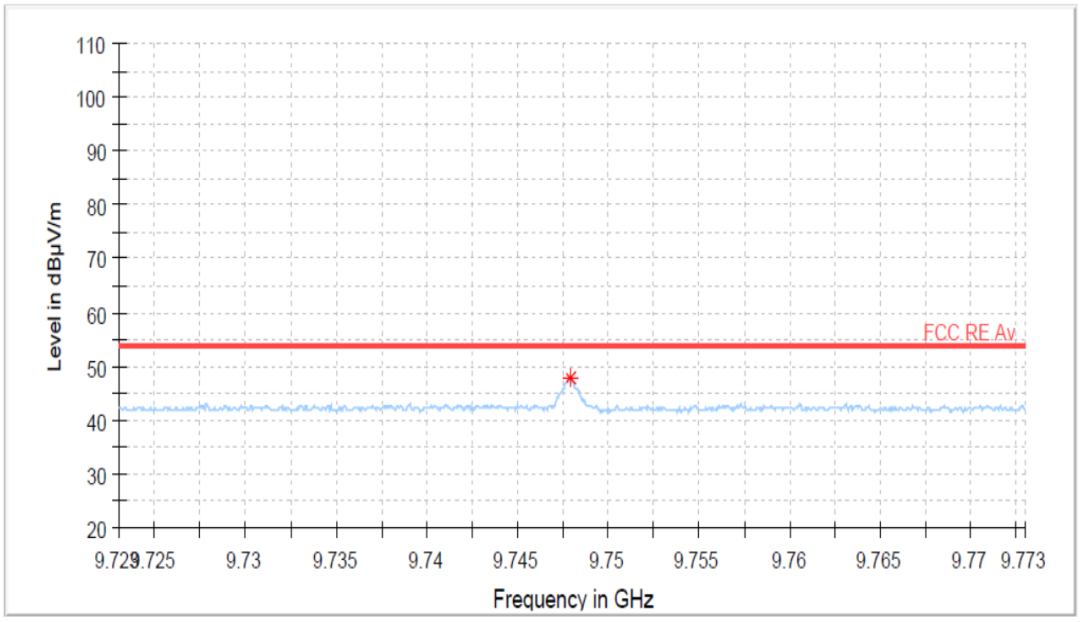
802.11 g mode Middle channel (2 437 MHz) : 1 GHz to 12.75 GHz_Peak



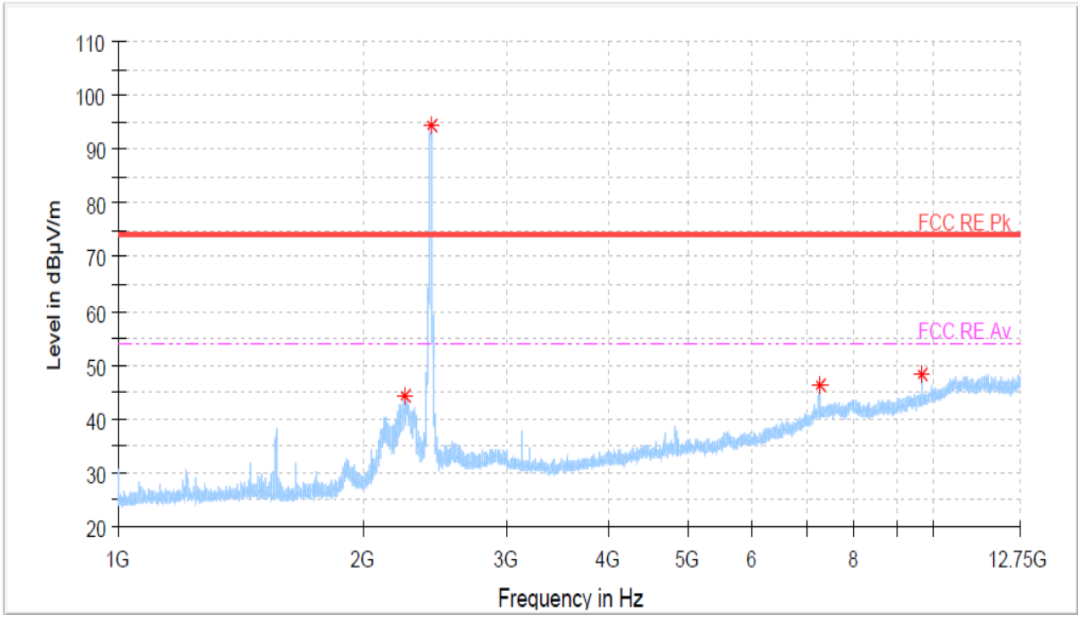
802.11 g mode Middle channel (2 437 MHz) : 9 748 MHz Zoom scan_Peak



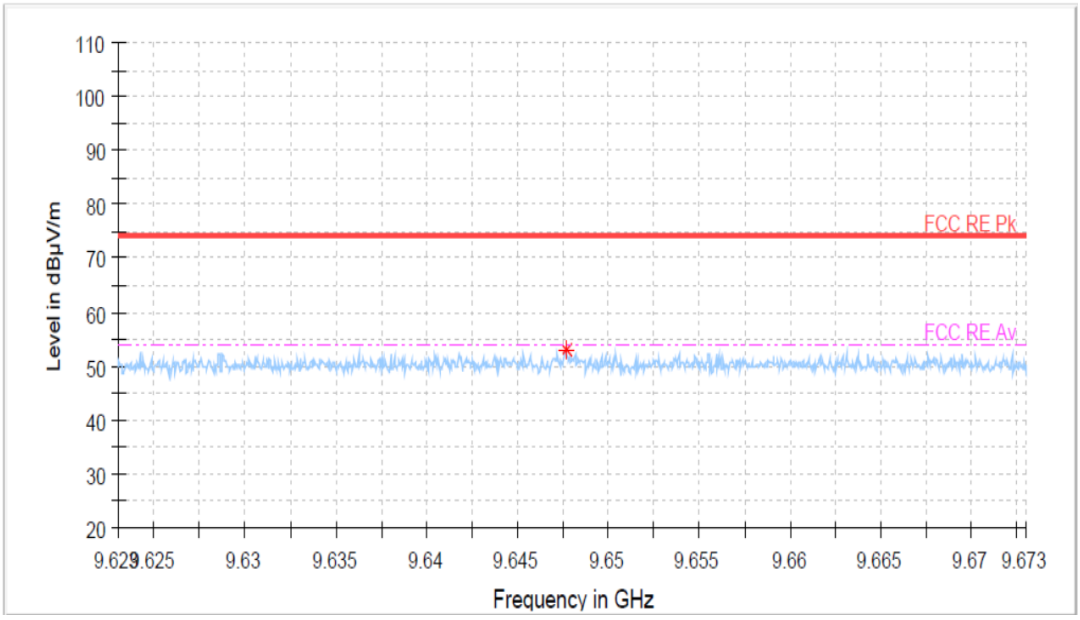
802.11 g mode Middle channel (2 437 MHz) : 9 748 MHz Zoom scan_Average



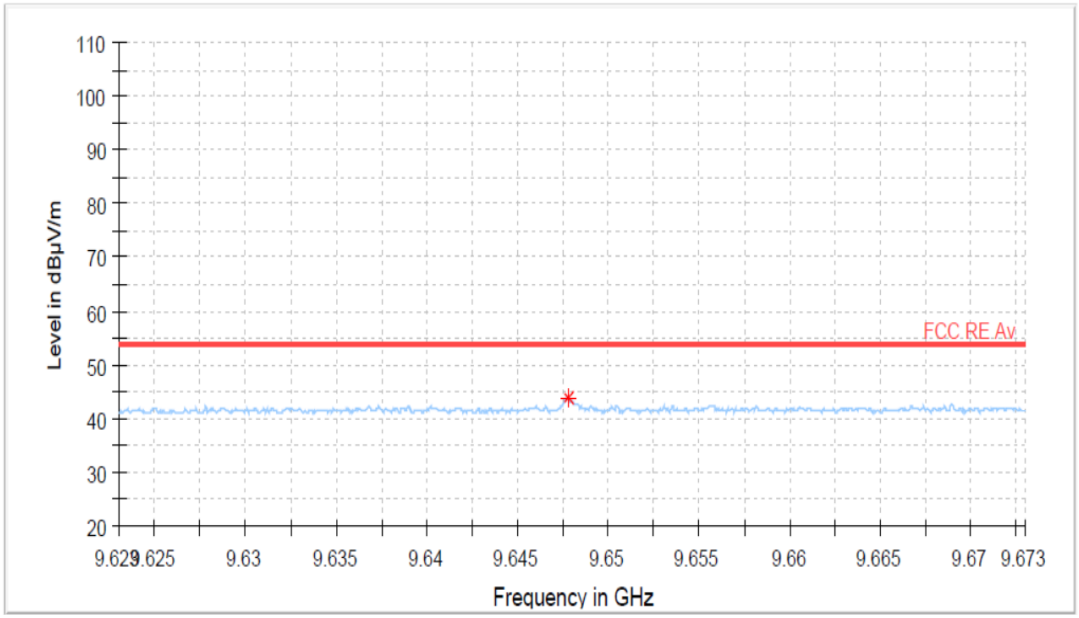
802.11 ac20 mode Lowest channel (2 412 MHz) : 1 GHz to 12.75 GHz_Peak



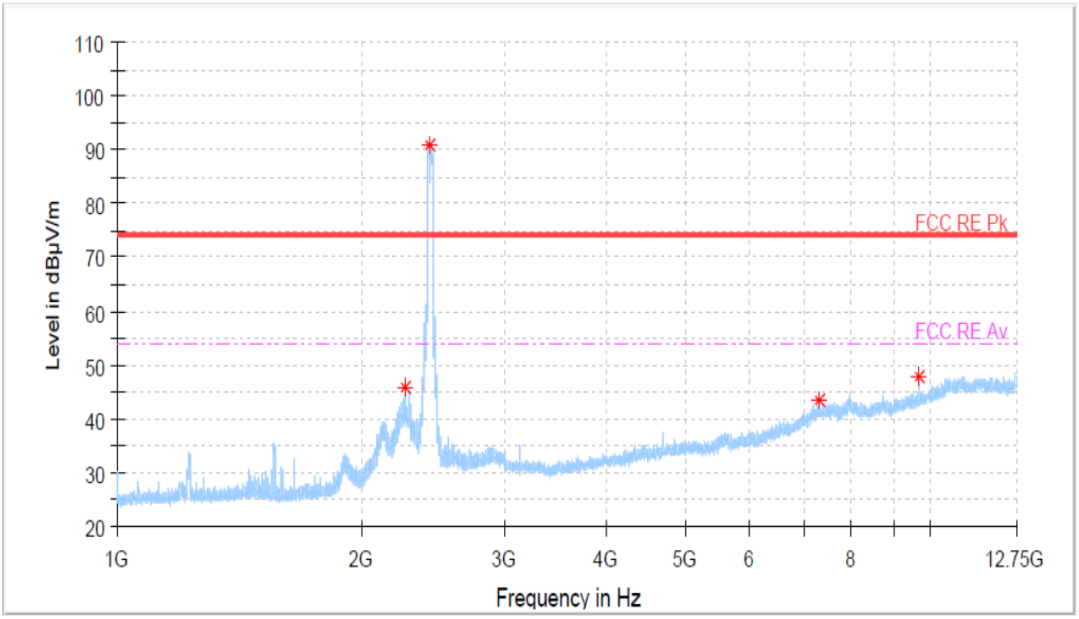
802.11 ac20 mode Lowest channel (2 412 MHz) : 9 648 MHz Zoom scan_Peak



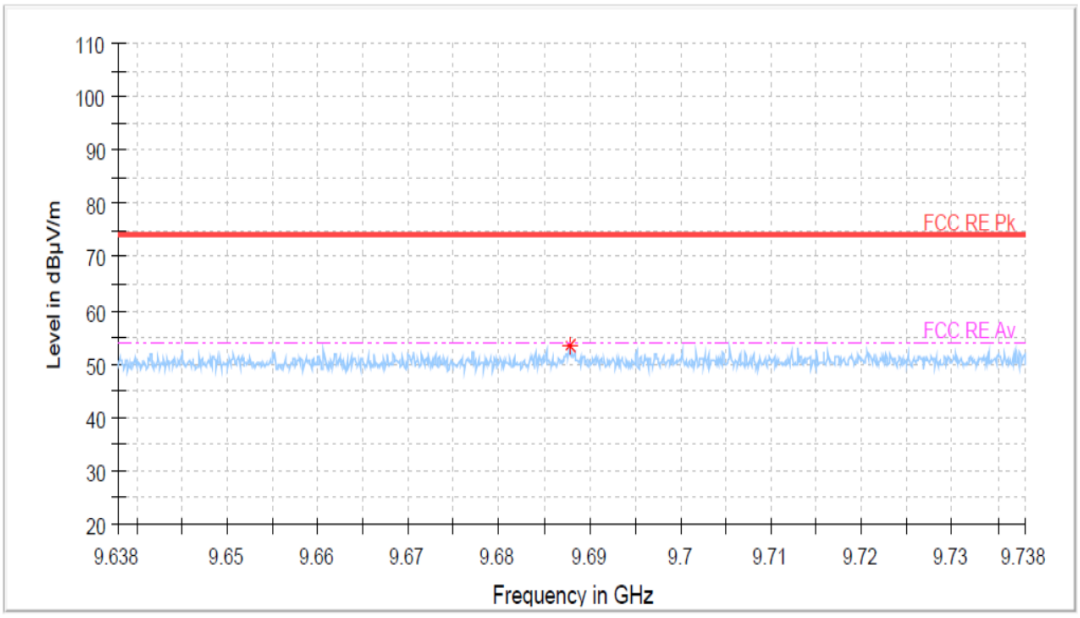
802.11 ac20 mode Lowest channel (2 412 MHz) : 9 648 MHz Zoom scan_Average



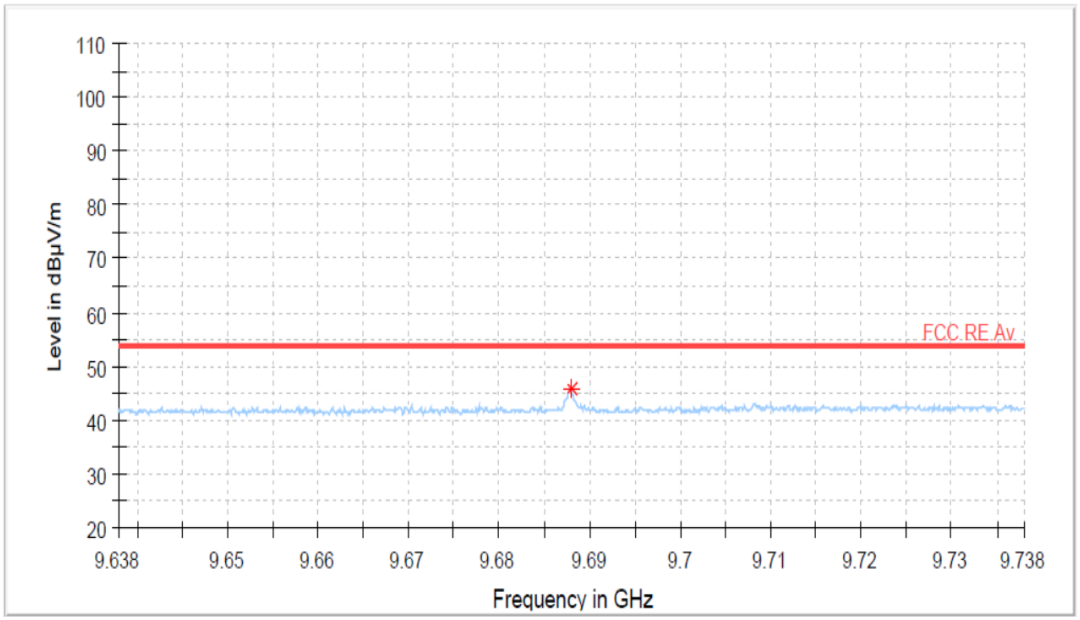
802.11 ac40 mode Lowest channel (2 422 MHz) : 1 GHz to 12.75 GHz_Peak



802.11 ac40 mode Lowest channel (2 422 MHz) : 9 688 MHz Zoom scan_Peak



802.11 ac40 mode Lowest channel (2 422 MHz) : 9 688 MHz Zoom scan_Average



7.6 Radiated Band Edge

FCC §15.205, §15.209
RSS-Gen (8.9),(8.10)

Test Mode : Set to Lowest channel and Highest channel

Result

802.11 b mode

Lowest Channel (2 412 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2 385.73	53.37	V	PK	-5.4	47.97	74.00	26.03
2 385.73	53.37	V	AV	-5.4	47.97	54.00	6.03
2 390.00	48.20	V	PK	-5.4	42.80	74.00	31.20
2 390.00	48.20	V	AV	-5.4	42.80	54.00	11.20

Highest Channel (2 462 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2 483.50	48.70	H	PK	-5.3	43.40	74.00	30.60
2 483.50	48.70	H	AV	-5.3	43.40	54.00	10.60
2 489.20	51.68	H	PK	-5.4	46.28	74.00	27.72
2 489.20	51.68	H	AV	-5.4	46.28	54.00	7.72

802.11 g mode

Lowest Channel (2 412 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2 389.09	69.67	H	PK	-5.4	64.27	74.00	9.73
2 389.73	52.30	H	AV	-5.4	46.90	54.00	7.10
2 390.00	64.30	H	PK	-5.4	58.90	74.00	15.10
2 390.00	50.73	H	AV	-5.4	45.33	54.00	8.67

Highest Channel (2 462 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2 483.50	67.55	H	PK	-5.3	62.25	74.00	11.75
2 483.50	56.47	H	AV	-5.3	51.17	54.00	2.83
2 483.86	73.21	H	PK	-5.3	67.91	74.00	6.09
2 483.77	56.81	H	AV	-5.3	51.51	54.00	2.49

802.11 ac(20 MHz) mode

Lowest Channel (2 412 MHz)

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2 389.98	72.41	H	PK	-5.4	67.01	74.00	6.99
2 389.92	55.99	H	AV	-5.4	50.59	54.00	3.41
2 390.00	68.55	H	PK	-5.4	63.15	74.00	10.85
2 390.00	55.13	H	AV	-5.4	49.73	54.00	4.27

Highest Channel (2 462 MHz)

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2 483.50	70.96	H	PK	-5.3	65.66	74.00	8.34
2 483.50	57.29	H	AV	-5.3	51.99	54.00	2.01
2 485.31	76.00	H	PK	-5.3	70.70	74.00	3.30
2 483.61	57.30	H	AV	-5.3	52.00	54.00	2.00

802.11 ac(40 MHz) mode

Lowest Channel (2 422 MHz)

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2 385.65	75.46	H	PK	-5.4	70.06	74.00	3.94
2 388.83	56.85	H	AV	-5.4	51.45	54.00	2.55
2 390.00	70.62	H	PK	-5.4	65.22	74.00	8.78
2 390.00	56.57	H	AV	-5.4	51.17	54.00	2.83

Highest Channel (2 452 MHz)

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	Mode*	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2 483.50	65.90	H	PK	-5.3	60.60	74.00	13.40
2 483.50	53.45	H	AV	-5.3	48.15	54.00	5.85
2 485.19	72.37	H	PK	-5.3	67.07	74.00	6.93
2 483.90	54.51	H	AV	-5.3	49.21	54.00	4.79

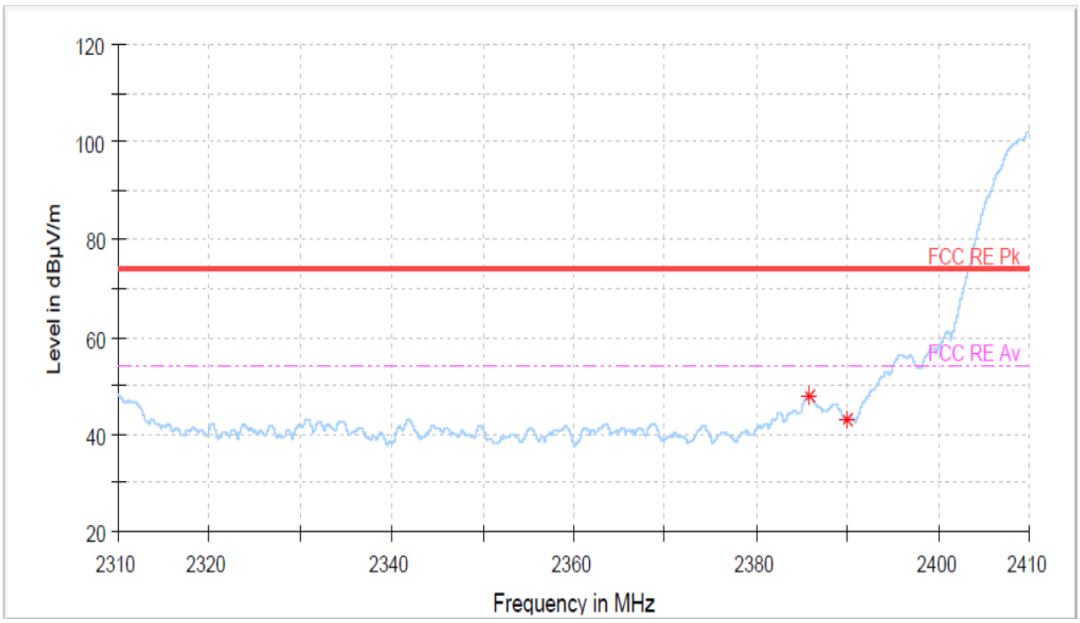
Notes:

1. *Pol. : H = Horizontal, V = Vertical, Mode : PK = Peak, AV = Average
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. Other spurious was under 20 dB below Fundamental.
4. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, vertical polarization.
5. Peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
6. Average emissions were measured using RBW = 1 MHz, VBW = 10 kHz, Detector = Peak.

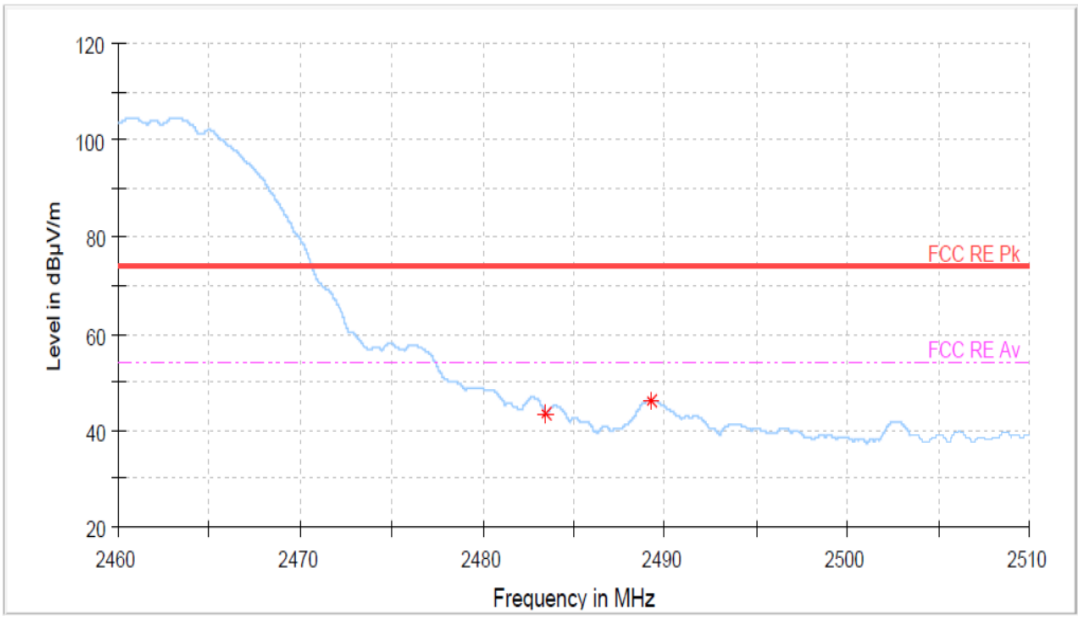
PLOTS OF EMISSIONS

802.11 b mode

Lowest Channel (2 412 MHz)_Peak

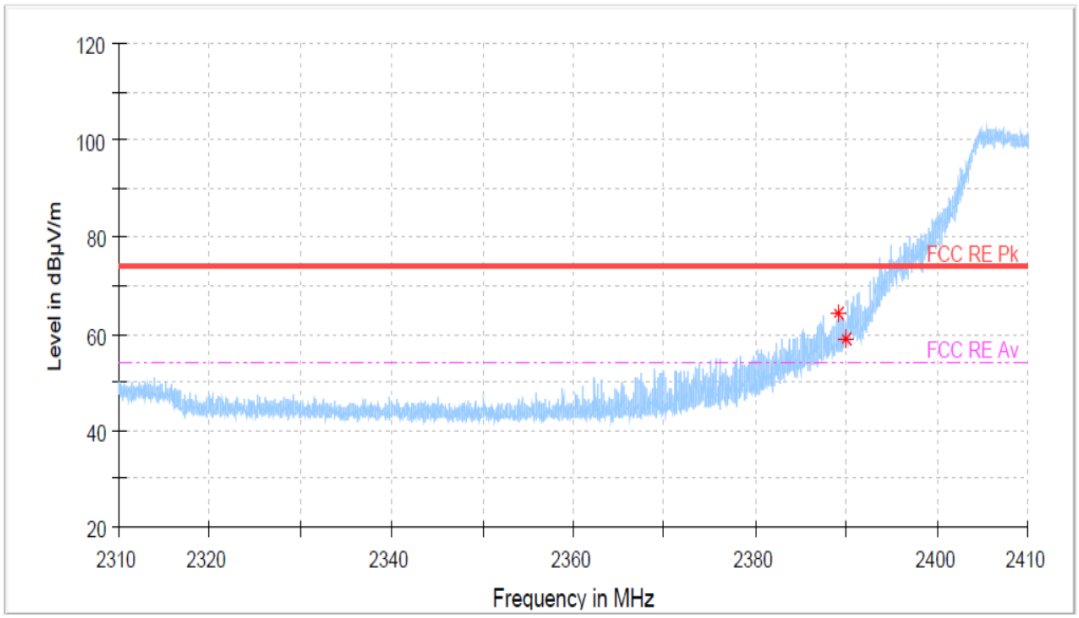


Highest Channel (2 462 MHz)_Peak

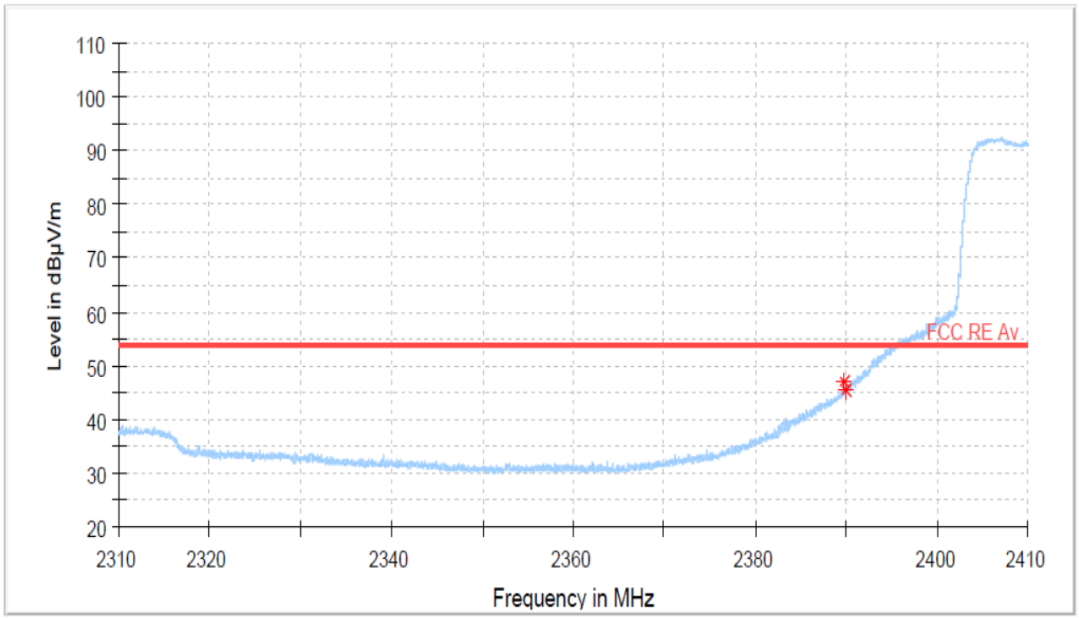


802.11 g mode

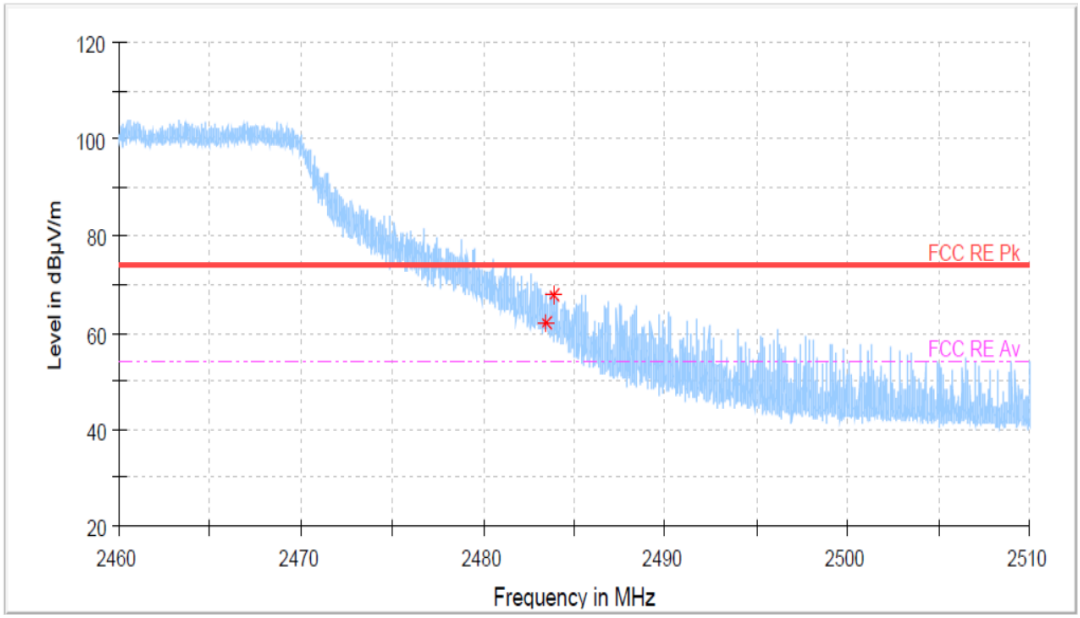
Lowest Channel (2 412 MHz)_Peak



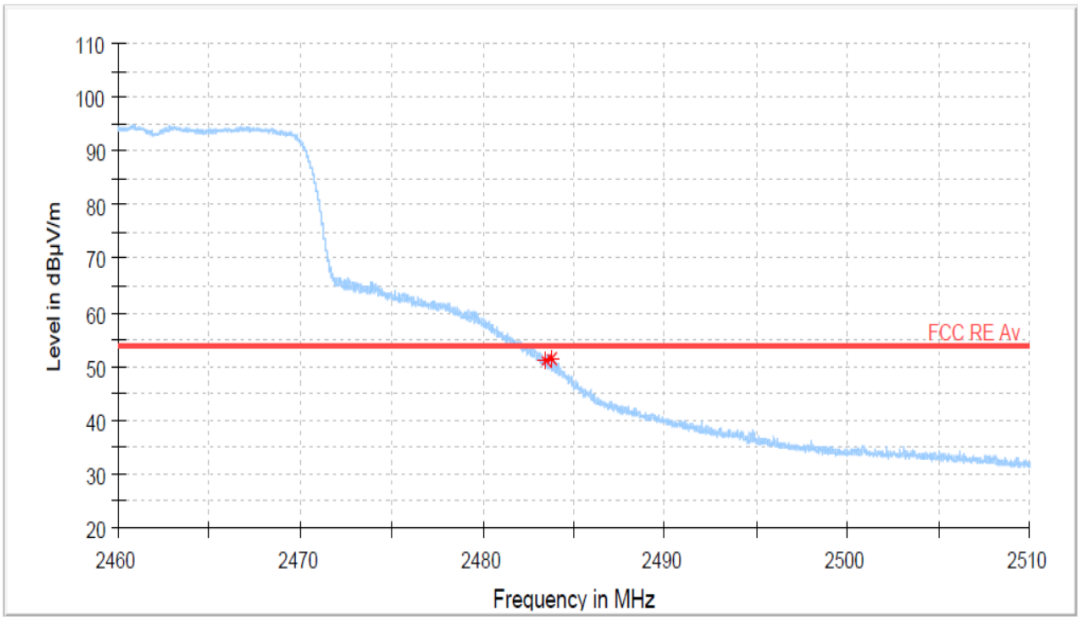
Lowest Channel (2 412 MHz)_Average



Highest Channel (2 462 MHz)_Peak

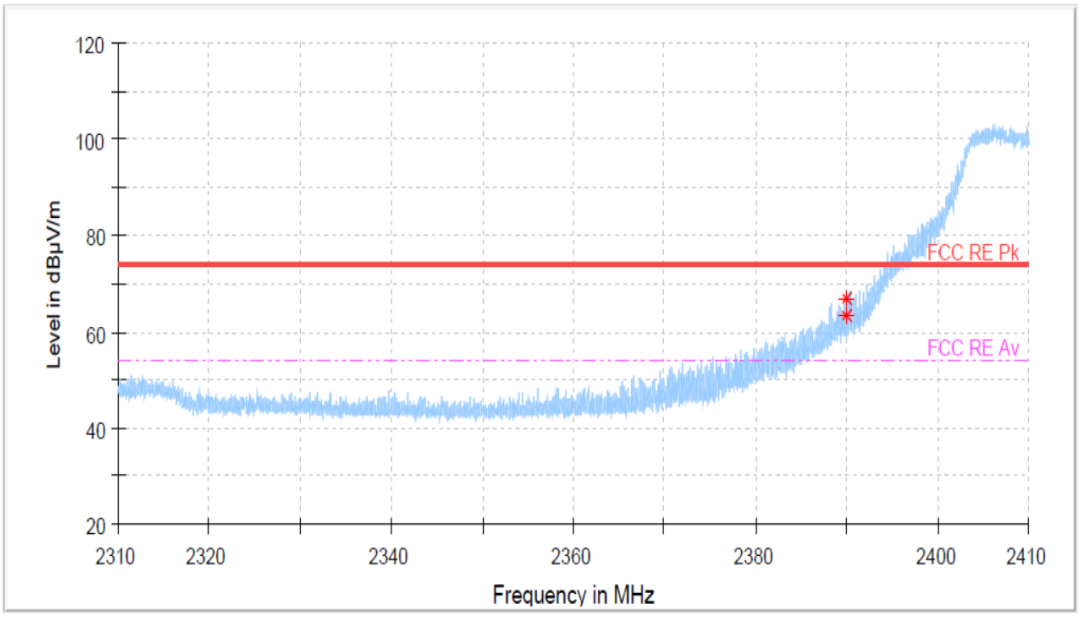


Highest Channel (2 462 MHz)_Average

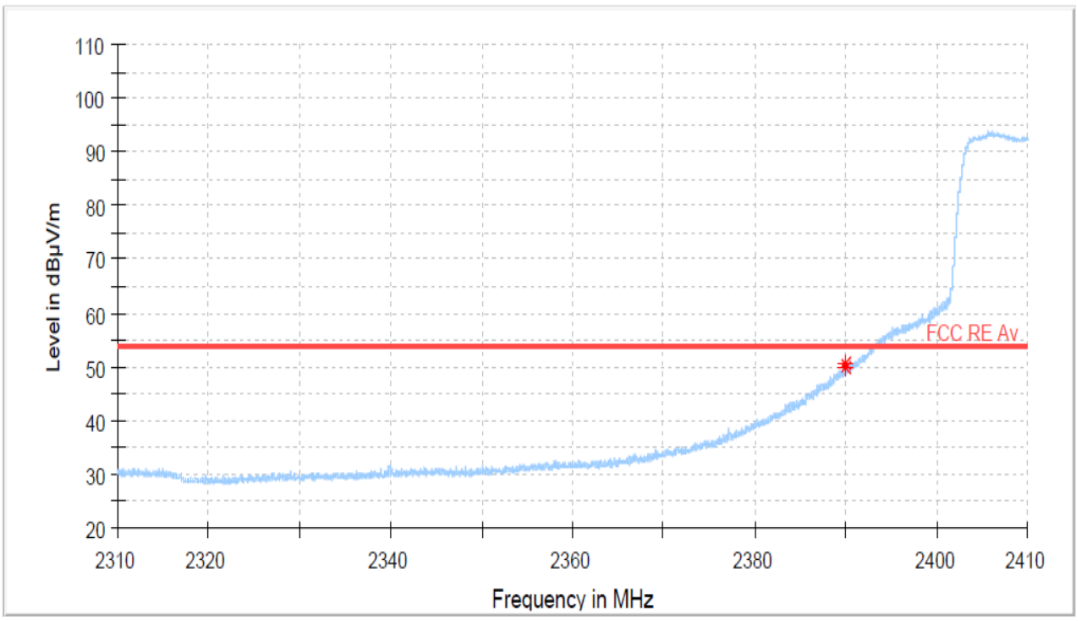


802.11 ac(20 MHz) mode

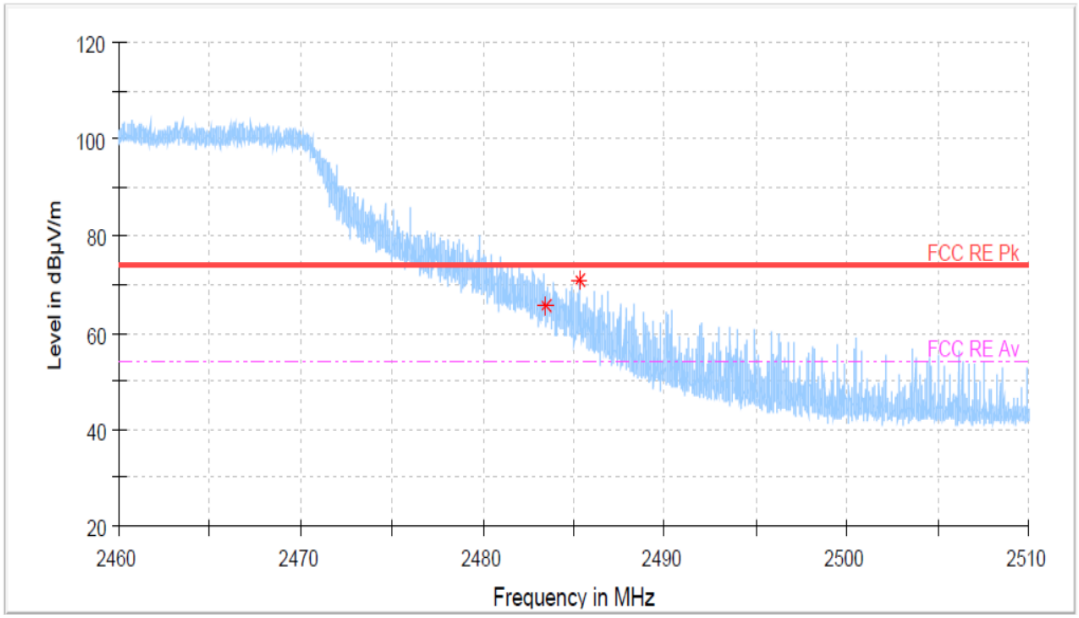
Lowest Channel (2 412 MHz)_Peak



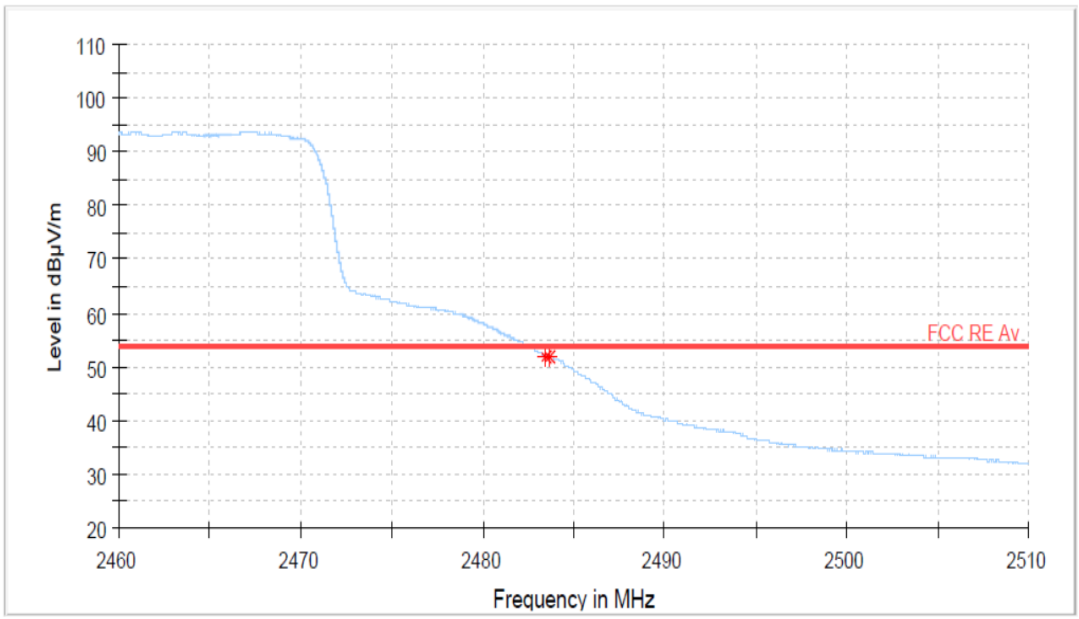
Lowest Channel (2 412 MHz)_Average



Highest Channel (2 462 MHz)_Peak

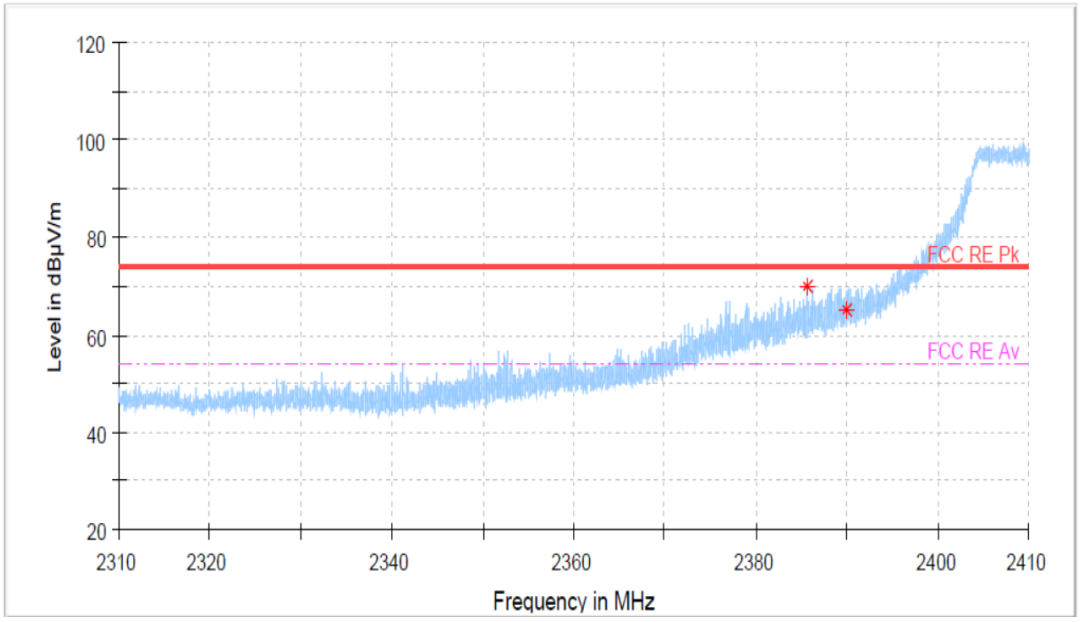


Highest Channel (2 462 MHz)_Average

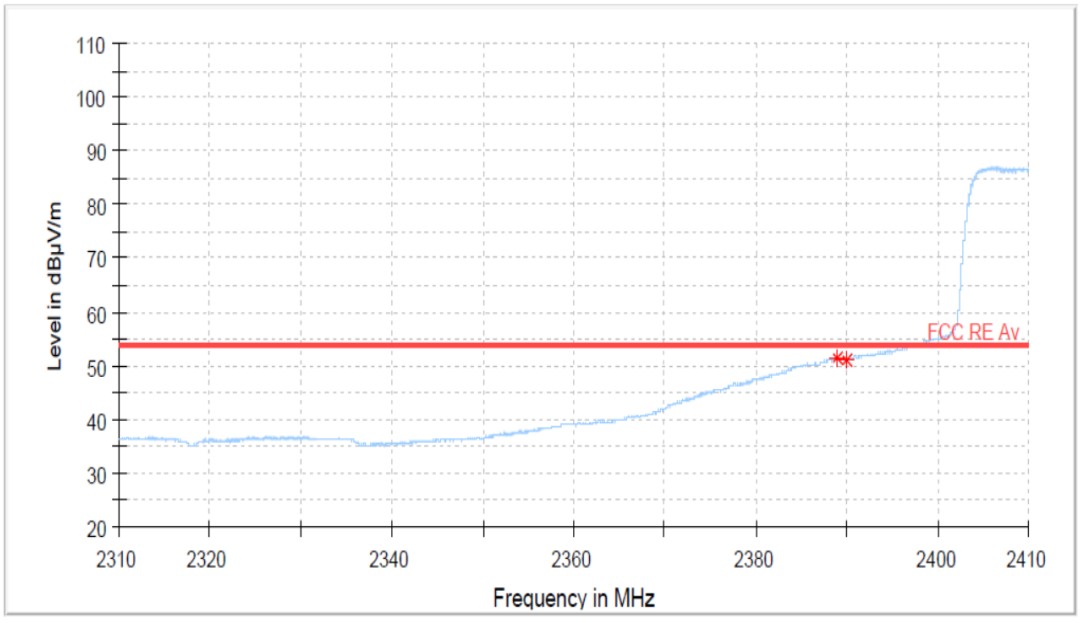


802.11 ac(40 MHz) mode

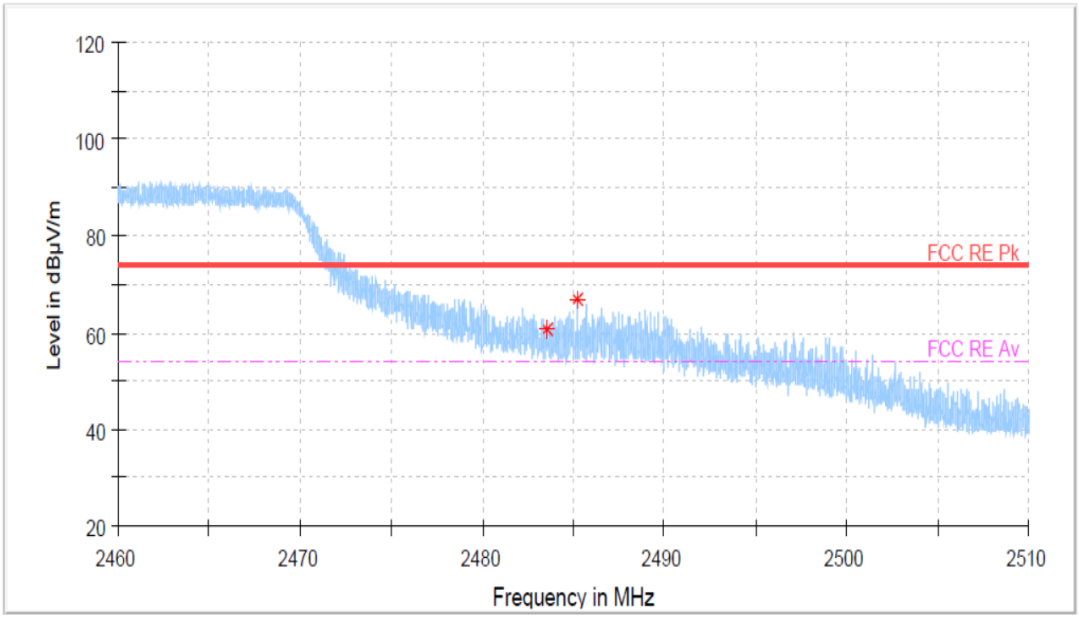
Lowest Channel (2 422 MHz)_Peak



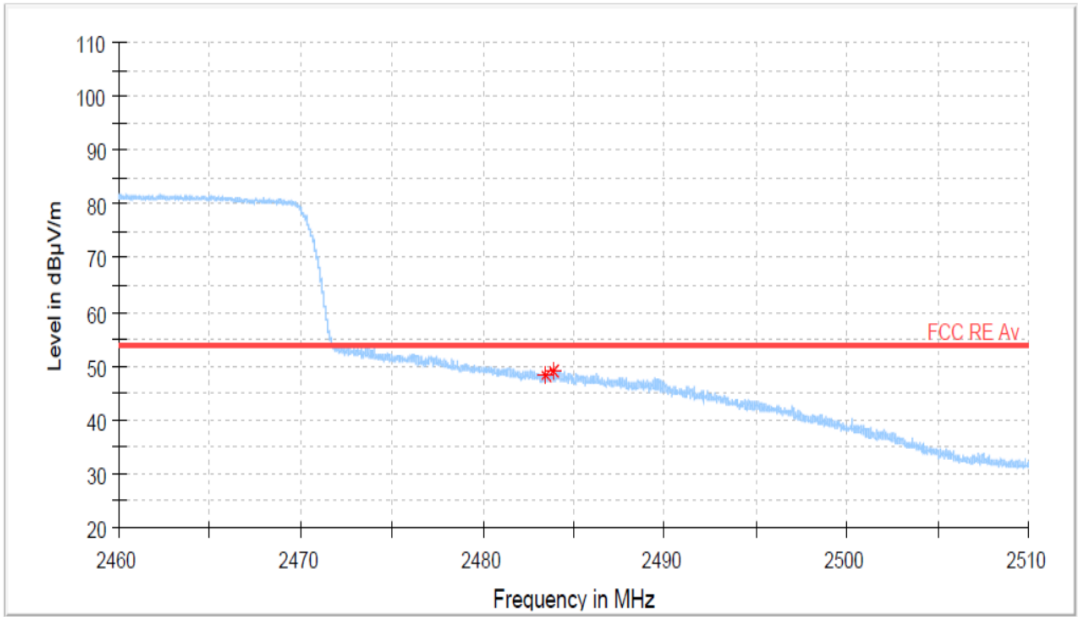
Lowest Channel (2 422 MHz)_Average



Highest Channel (2 452 MHz)_Peak



Highest Channel (2 452 MHz)_Average



7.7 Radiated Emissions_Below 1GHz

FCC §15.209
RSS-Gen (8.9)

Result

802.11* ac*(40 MHz) mode Highest Channel (2 452 MHz)

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	Mode	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
35.53	32.69	V	QP	-8.7	23.99	40.00	16.01
59.36	33.71	V	QP	-6.5	27.21	40.00	12.79
83.96	39.59	V	QP	-11.3	28.29	40.00	11.71
92.15	38.17	V	QP	-8.3	29.87	43.50	13.63
173.24	49.19	H	QP	-9.3	39.89	43.50	3.61
850.01	30.91	H	QP	5.1	36.01	46.00	9.99

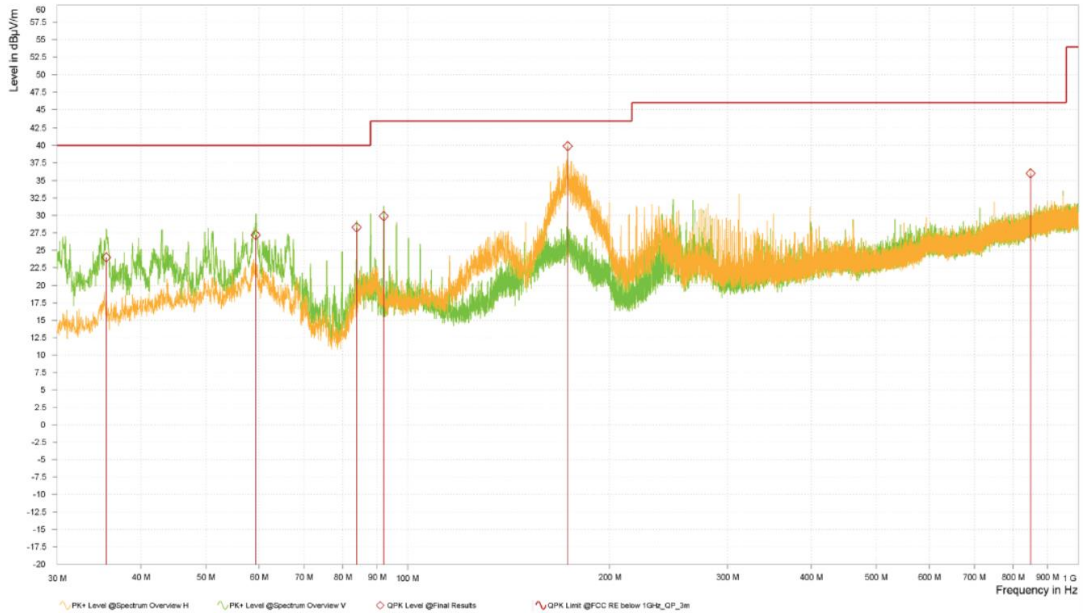
Radiated Measurements at 3meters

Notes:
1. The worst-case emission was reported.
2. *Pol. : H = Horizontal, V = Vertical
3. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
4. Measurements using CISPR quasi-peak mode below 1 GHz.
5. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, vertical polarization. The worst data was recorded.
6. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
   Per FCC part 15.31(o), test results were not reported.
   Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
   Therefore, sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.
7. The limit is on the FCC §15.209.

PLOTS OF EMISSIONS

Worst Case

Radiated emission below 1GHz, Highest Channel (2 452 MHz)



7.8 AC Line Conducted Emissions

FCC §15.207
RSS-Gen(8.8)

Result

802.11 ac(40 MHz) mode, Highest Channel (2 452 MHz)

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	49.73	---	65.46	15.73	9.000	N	9.9
0.150000	---	32.30	55.46	23.16	9.000	N	9.9
0.167910	---	27.46	54.57	27.11	9.000	N	10.2
0.167910	46.21	---	64.57	18.36	9.000	N	10.2
0.182835	45.84	---	63.90	18.06	9.000	N	10.2
0.182835	---	28.15	53.90	25.75	9.000	N	10.2
0.206715	42.68	---	62.94	20.26	9.000	N	10.0
0.206715	---	25.92	52.94	27.02	9.000	N	10.0
0.397755	34.16	---	57.80	23.64	9.000	N	9.9
0.397755	---	25.14	47.80	22.65	9.000	N	9.9
0.406710	---	34.72	47.62	12.90	9.000	L1	9.9
0.406710	41.05	---	57.62	16.57	9.000	L1	9.9

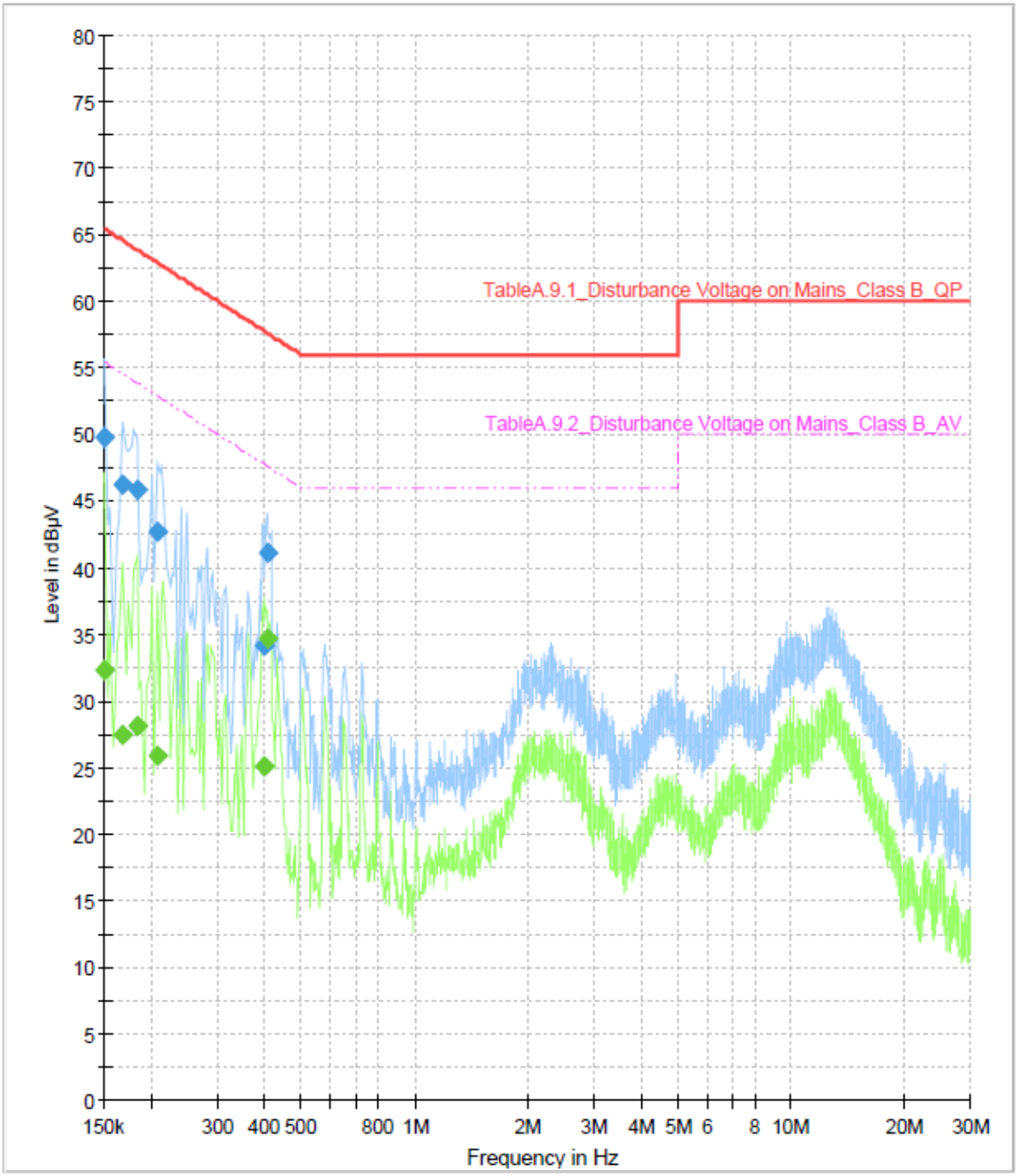
Line Conducted Emission Tabulated Data

Notes:
1. Measurement using CISPR quasi-peak mode & average mode.
2. The worst channel was investigated and the worst-case emission are reported. See attached Plots.
3. Highest channel (2 452 MHz) is the worst case.
4. *) Factor = LISN + Cable loss
5. **) LINE : L = Line, N = Neutral
6. The limit is on the FCC §15.207 and IC RSS-GEN 8.8.

PLOTS OF EMISSIONS

Worst Case

AC Line Conducted emission, 802.11 ac40 mode Highest Channel (2 452 MHz)



8. TEST EQUIPMENT

No.	Instrument	Manufacture	Model	Serial No.	Calibration Date	Next Calibration Date
1	DIGITAL MULTIMETER	EZ DIGITAL	DM-334	2111395	10/8/2024	10/8/2025
2	Humidity Temperature	Lutron	MHB-382SD	AK.26553	10/16/2024	10/16/2025
3	Spectrum Analyzer	Agilent	E4440A	MY44303257	10/7/2024	10/7/2025
4	Signal Generator	R&S	SMB100A	175861	3/29/2024	3/29/2025
5	10 dB Attenuator	API technologies	40A2W-10	1916	7/3/2024	7/3/2025
6	Signal & Spectrum Analyzer	R&S	FSW43	104084	3/27/2024	3/27/2025
7	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-508	7/9/2024	7/9/2025
8	Horn Antenna	Q-par Angus	QMS-00208	17636	8/28/2024	8/28/2025
9	Horn Antenna	Q-par Angus	QSH20S20	8179	7/9/2024	7/9/2025
10	Signal Conditioning Unit	R&S	SCU-18F	180025	3/27/2024	3/27/2025
11	Signal Conditioning Unit	R&S	SCU-26	10011	7/5/2024	7/5/2025
12	WiFi Filter Bank	R&S	U083	N/A	N/A	N/A
13	TRILOG Broadband Test Antenna	Schwarzbeck	VULB 9163	01431	11/11/2024	11/11/2026
14	EMI TEST RECEIVER	R&S	ESW44	103318	1/8/2025	1/8/2026
15	AMPLIFIER	HP	8447F	2805A03406	1/8/2025	1/8/2026
16	HYGROMETER	DRETEC	O-230	NK-B-E-0157	1/13/2025	1/13/2026
17	TWO-LINE V-NETWORK	R&S	ENV216	102829	7/3/2024	7/3/2025
18	EMI TEST RECEIVER	R&S	ESR3	102930	7/2/2024	7/2/2025
19	Active Loop Antenna	R&S	HFH2-Z2E	101190	1/13/2025	1/13/2026
20	BIAS UNIT	R&S	IN 600	101621	N/A	N/A
21	MICROWAVE PEAK POWER SENSOR	Anritsu	MA24408A	12199	1/15/2025	1/15/2026
22	6dB ATTENUATOR	QUALWAVE	QFA1802-26-6-S	225335	1/14/2025	1/14/2026
23	Software	R&S	EMC32	Version: 10.60.20	N/A	N/A
24	Software	R&S	ELEKTRA	Version: 5.03.1	N/A	N/A

9. ACCURACY OF MEASUREMENT & DECISION RULE

9.1 Uncertainty Calculation

The Measurement Uncertainties stated were calculated in accordance with the requirements of measurement uncertainty contained in CISPR 16-4-2 with the confidence level of 95%

PARAMETER	UNCERTAINTY
Radiated Disturbance, Below 30 MHz	4.36 dB
Radiated Disturbance, 30 MHz to 1 GHz	5.60 dB
Radiated Disturbance, 1 GHz ~ 18 GHz	3.70 dB
Radiated Disturbance, 18 GHz ~ 26.5 GHz	4.90 dB

9.2 Decision rule

The choice of whether or not to include the measurement uncertainty of the measuring system used in the test in the conformance determination.:

☐ Application of internal procedures used in type testing where traceability of measurement uncertainty is established.
☒ Applying the decision that the standard used for type testing does not require it.

END REPORT