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SlimeVR B.V. TEST REPORT

SCOPE OF WORK

EMC TESTING – SLIMEVR FBT TRACKER

REPORT NUMBER

105609229LEX-002.1

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EMC TEST REPORT (FULL COMPLIANCE)

Report Number: 105609229LEX-002.1

Project Number: G105609229

Report Issue Date: 11/29/2023

Report Revised Date: 12/7/2023

Model(s) Tested: SlimeVR FBT Tracker

Standards: Title 47 CFR Part 15.247

RSS-247 Issue 3

RSS-Gen Issue 5

Tested by:
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Client:
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1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test full name	Result
6	Transmitter Spurious Emissions (FCC Part 15.247(d), RSS-247 Issue 3 § 5.5)	Pass
7	Output Power (FCC Part 15.247(b)(3), RSS-247 Issue 3 § 5.4(d))	Pass
8	Occupied Bandwidth (FCC Part 15.247, RSS-247 Issue 3 § 5.2(a))	Pass
9	Power Spectral Density (FCC Part 15.247(e), RSS-247 Issue 3 § 5.2(b))	Pass
10	Antenna Requirement (FCC Part 15.203, RSS-Gen Issue 5 § 6.8)	Pass



3 Client Information

This product was tested at the request of the following:

Client Information	
Client Name:	SlimeVR B.V.
Address:	Kabelweg 57 Amsterdam, Noord-Holland, 1014 BA The Netherlands
Contact:	Rena Dorogova
Email:	e@slimevr.dev
Manufacturer Information	
Manufacturer Name:	SlimeVR B.V.
Manufacturer Address:	Kabelweg 57 Amsterdam, Noord-Holland, 1014 BA The Netherlands



4 Description of Equipment under Test and Variant Models

Equipment Under Test	
Product Name	SlimeVR FBT Tracker
Model Numbers	SlimeVR FBT Tracker
Serial Number	SLIMEVR-MAIN-TRACKER
FCCID	2BC4F-SVR-TR1
ICID	31474-SVRTR1
Receive Date	10/12/2023
Test Start Date	10/13/2023
Test End Date	12/7/2023
Device Received Condition	Good
Test Sample Type	Production
Rated Voltage	Internal battery, 5V USB-C charging capability
Software Used By EUT	0.3.2
Frequency Band(s)	2412 – 2462 MHz
Modulation Type(s)	DSSS (802.11b), OFDM (802.11g/n)
Test Channel(s)	2412 MHz, 2437 MHz, 2462 MHz
Antenna Gain ¹	1.97dBi
Description of Equipment Under Test (provided by client)	
Full-body tracker for virtual reality.	

4.1 Variant Models:

There were no variant models covered by this evaluation.

¹ This information was provided by the client and may affect compliance. Intertek does not make any claims of compliance for values other than those shown.



5 System Setup and Method

5.1 Method:

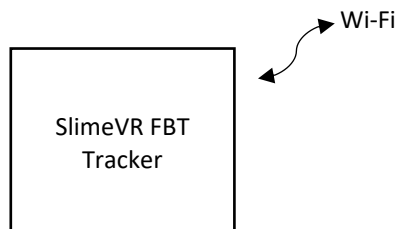
Configuration as required by ANSI C63.10:2020

No.	Descriptions of EUT Exercising
1	Transmitting an 802.11b/g/n Wi-Fi signal on low, middle, or high channel

Cables					
Qty	Description	Length (m)	Shielding	Ferrites	Termination
	None				

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
None			

5.2 EUT Block Diagram:





6 Transmitter Spurious Emissions

6.1 Test Limits

FCC Part 15.247(d):

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 20 dB below that in the 100 kHz 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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

RSS-247 Issue 3 § 5.5:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

6.2 Test Method

Tests are performed in accordance with ANSI C63.10:2013 § 11.12.1 Radiated emission measurements.



6.3 Test Equipment Used

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	8258	Rohde & Schwarz	ESW44	9/19/2023	9/19/2024
Magnetic Loop Antenna	2366	ETS	6502	8/28/2023	8/28/2024
Bilog Antenna (30MHz-1GHz)	7085	SunAR	JB6	3/7/2023	3/7/2024
Horn Antenna (1-18GHz)	3780	ETS	3117	8/8/2023	8/8/2024
Horn Antenna (18-40GHz)	3779	ETS	3116c	8/23/2023	8/23/2024
System Controller	4096	ETS Lindgren	2090	Verify at Time of Use	Verify at Time of Use
System Controller	3957	Sunol Sciences	SC99V	Verify at Time of Use	Verify at Time of Use
30M-1G 3m Signal Path without Preamplifier	3339, 2592, 8188, 8185			10/5/2023	10/5/2024
1-18GHz Signal Path with Preamplifier	3074, 3918, 2588, 2593, 8188, 8185			10/5/2023	10/5/2024
18-40GHz Signal Path with Preamplifier	7020, 3921, 7021			1/12/2023	1/12/2024

6.4 Software Utilized

Name	Manufacturer	Version
EMC32	Rohde & Schwarz	Version 10.60.20

6.5 Test Results

The sample tested was found to be **compliant**. The data presented represents the worst case emissions with the device positioned in three orthogonal positions. All observed emissions outside of the band of operation were attenuated by at least 20dB.

6.6 Test Conditions

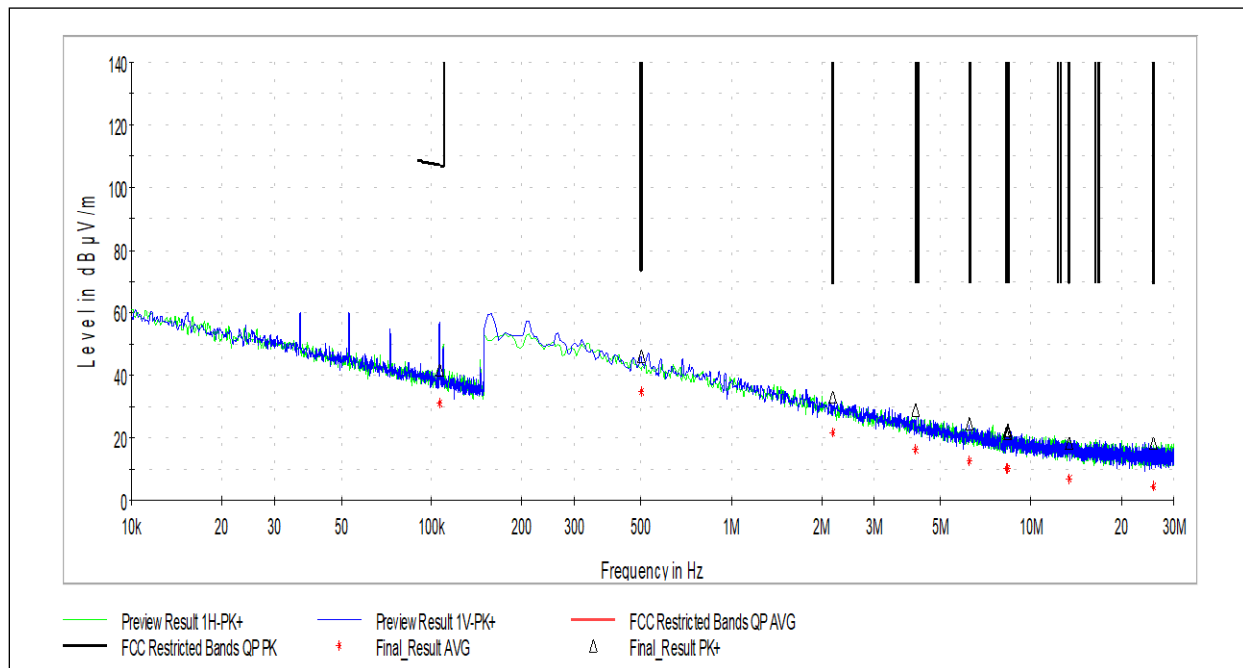
Test Personnel: Brian Lackey
Supervising/Reviewing Engineer: NA
(Where Applicable)
Product Standard: FCC Part 15.247
Input Voltage: RSS-247 Issue 3
Pretest Verification w / Ambient Signals or BB Source: Battery
Yes

Test Date: 10/23/2023-12/7/2023
Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205
Ambient Temperature: 23.0°C
Relative Humidity: 47.2%
Atmospheric Pressure: 988.8mbar

Deviations, Additions, or Exclusions: None.



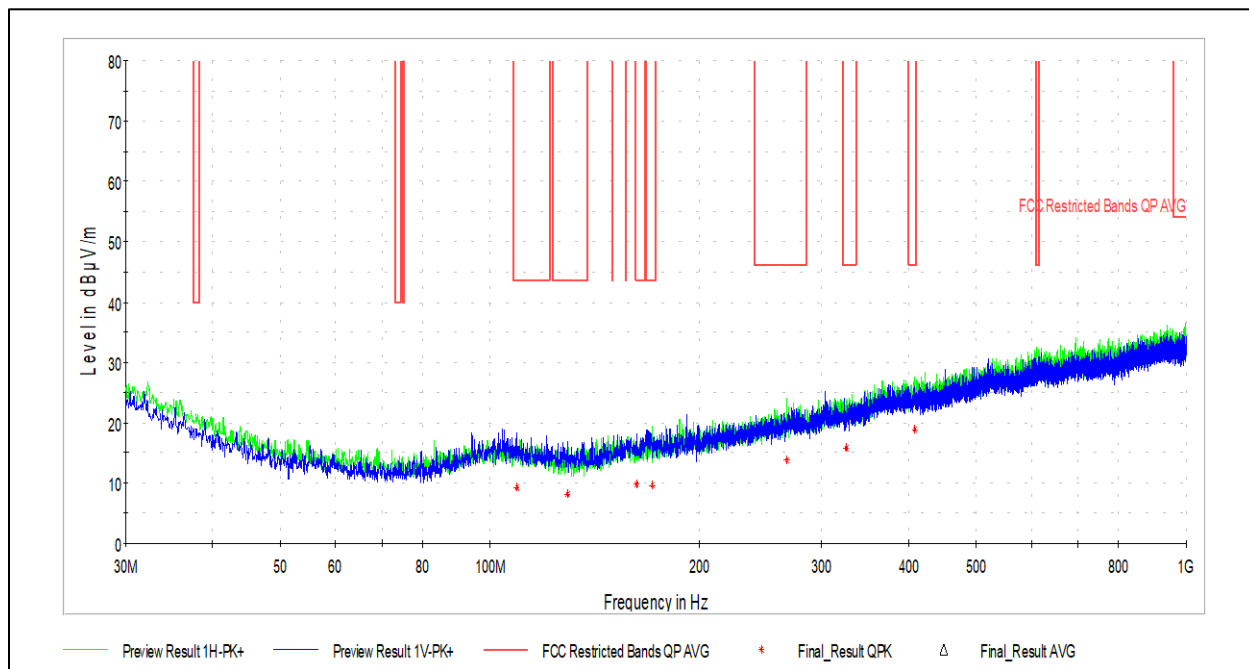
6.7 Radiated Spurious Emissions, 9kHz – 30 MHz



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
0.106	41.73	107.10	65.37	100.0	V	256.0	12.6
0.501	46.14	73.61	27.47	100.0	V	83.0	12.3
2.187	33.07	69.54	36.47	100.0	V	168.0	12.1
4.127	28.96	69.54	40.58	100.0	H	204.0	11.9
6.217	24.58	69.54	44.97	100.0	V	292.0	11.6
8.293	21.67	69.54	47.87	100.0	H	329.0	11.4
8.363	22.56	69.54	46.98	100.0	H	234.0	11.4
8.376	21.85	69.54	47.69	100.0	V	328.0	11.4
13.407	18.48	69.54	51.06	100.0	H	214.0	11.3
25.566	18.29	69.54	51.25	100.0	H	164.0	9.8

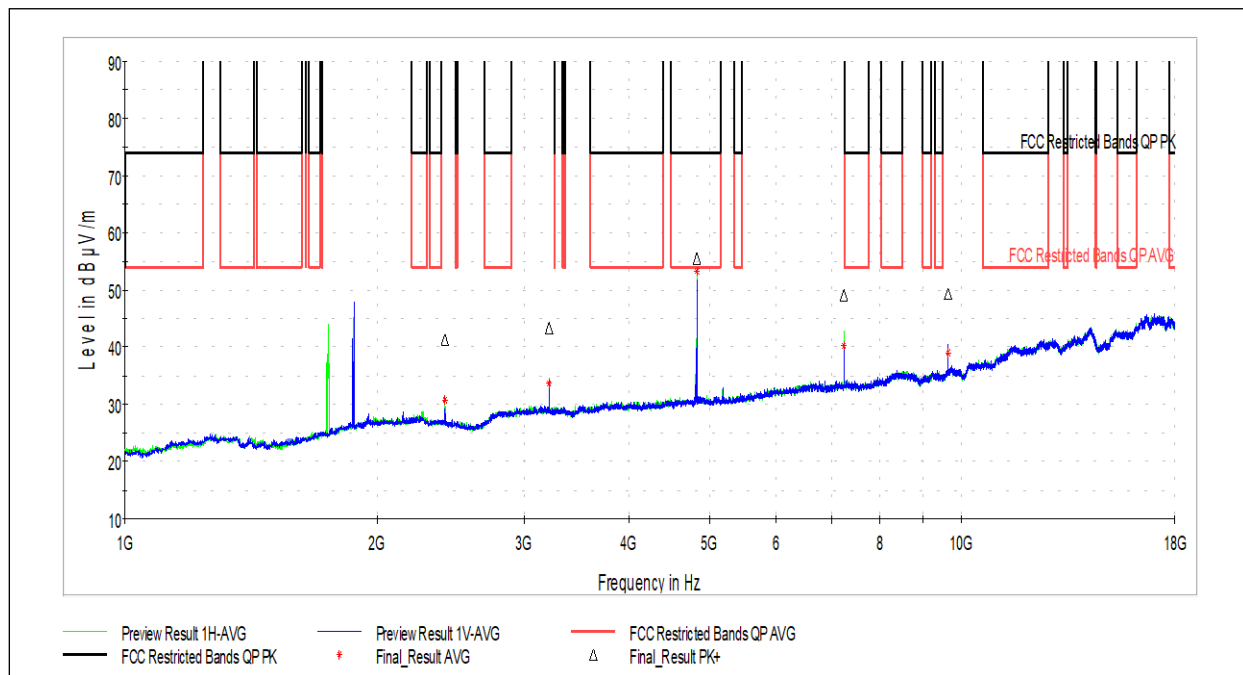
Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
0.106	31.19	107.10	75.91	100.0	V	256.0	12.6
0.501	34.62	73.61	38.98	100.0	V	83.0	12.3
2.187	21.66	69.54	47.88	100.0	V	168.0	12.1
4.127	16.24	69.54	53.30	100.0	H	204.0	11.9
6.217	12.56	69.54	56.99	100.0	V	292.0	11.6
8.293	10.04	69.54	59.50	100.0	H	329.0	11.4
8.363	10.12	69.54	59.43	100.0	H	234.0	11.4
8.376	10.16	69.54	59.39	100.0	V	328.0	11.4
13.407	6.89	69.54	62.66	100.0	H	214.0	11.3
25.566	4.49	69.54	65.05	100.0	H	164.0	9.8

Notes: testing represents the worst case of low, middle, and high channels in 802.11b, 802.11g, and 802.11n modes.

**6.8 Wi-Fi 802.11b Radiated Spurious Emissions****6.8.1 Radiated Spurious Emissions, 30 MHz – 1 GHz**

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
109.271	9.17	43.52	34.35	312.0	V	100.0	15.9
129.371	8.17	43.52	35.35	284.0	V	302.0	15.1
162.351	9.78	43.52	33.74	284.0	V	78.0	17.0
171.027	9.53	43.52	33.99	314.0	H	0.0	16.4
266.949	13.72	46.02	32.30	282.0	H	108.0	20.6
325.149	15.74	46.02	30.28	400.0	H	251.0	22.4
407.222	18.87	46.02	27.15	350.0	H	149.0	24.7

Notes: testing represents the worst case of low, middle, and high channels.

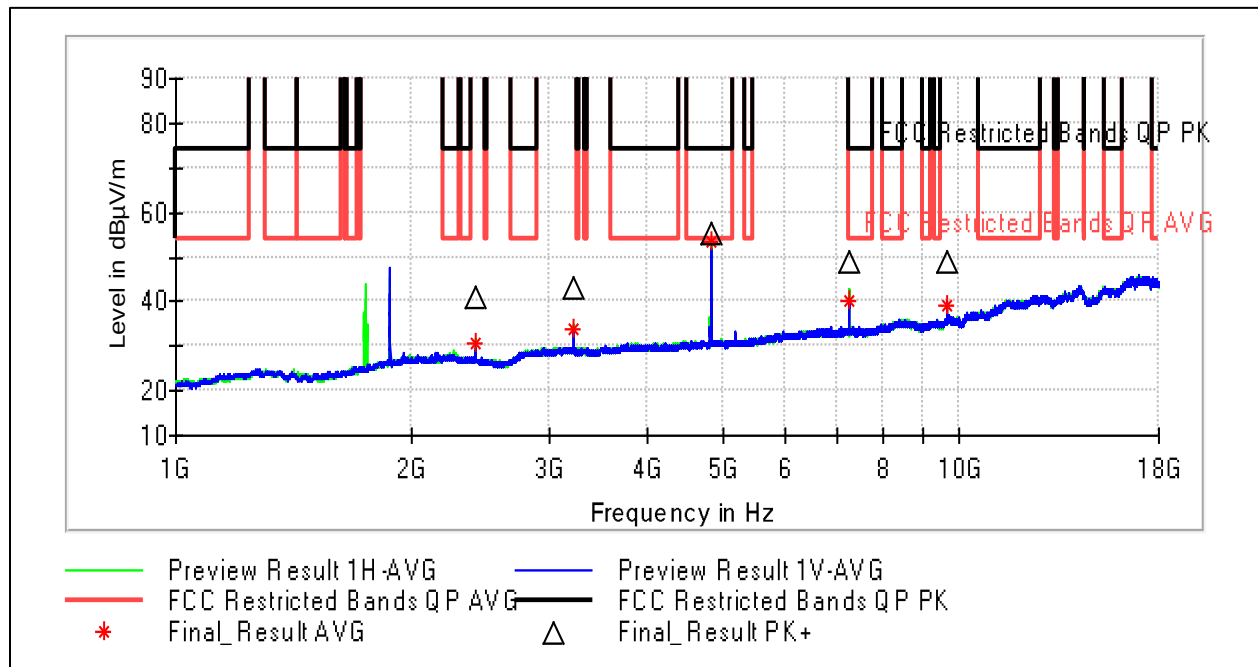
**6.8.2 Radiated Spurious Emissions, 1 GHz – 18 GHz****6.8.2.1 Channel 1 (2412 MHz)**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2410.500	41.31	1000.00	958.69	269.0	H	298.0	4.6
3216.000	43.46	1000.00	956.54	323.0	H	162.0	6.5
4824.000	55.62	73.98	18.36	334.0	H	349.0	9.4
7235.000	49.19	1000.00	950.81	398.0	H	33.0	13.3
9648.000	49.36	1000.00	950.64	410.0	V	296.0	15.7

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2410.500	30.75	1000.00	969.25	269.0	H	298.0	4.6
3216.000	33.72	1000.00	966.28	323.0	H	162.0	6.5
4824.000	53.24	53.98	0.74	334.0	H	349.0	9.4
7235.000	40.35	1000.00	959.65	398.0	H	33.0	13.3
9648.000	39.09	1000.00	960.91	410.0	V	296.0	15.7



6.8.2.2 Channel 6 (2437 MHz)

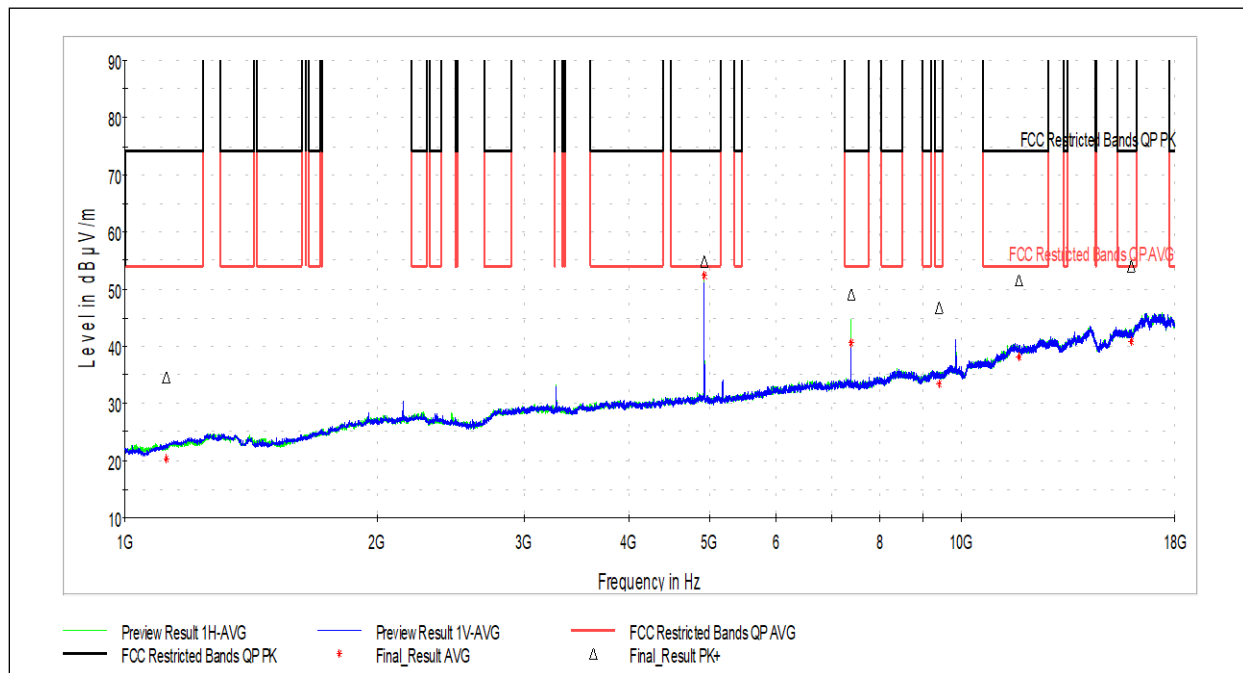


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2410.500	41.31	1000.00	958.69	269.0	H	298.0	4.6
3216.000	43.46	1000.00	956.54	323.0	H	162.0	6.5
4824.000	55.62	73.98	18.36	334.0	H	349.0	9.4
7235.000	49.19	1000.00	950.81	398.0	H	33.0	13.3
9648.000	49.36	1000.00	950.64	410.0	V	296.0	15.7

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2410.500	30.75	1000.00	969.25	269.0	H	298.0	4.6
3216.000	33.72	1000.00	966.28	323.0	H	162.0	6.5
4824.000	53.24	53.98	0.74	334.0	H	349.0	9.4
7235.000	40.35	1000.00	959.65	398.0	H	33.0	13.3
9648.000	39.09	1000.00	960.91	410.0	V	296.0	15.7



6.8.2.3 Channel 11 (2462 MHz)

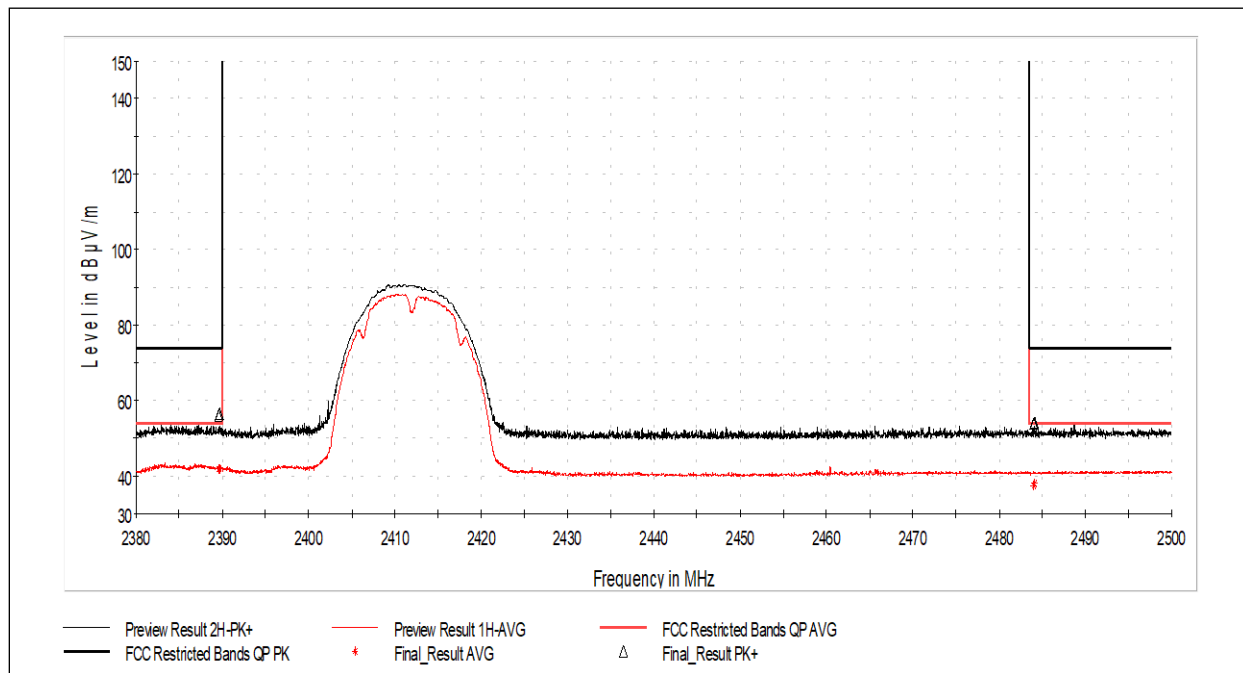


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1121.000	34.64	73.98	39.34	360.0	V	329.0	-1.6
4924.000	54.94	73.98	19.04	323.0	H	338.0	9.3
7387.000	49.01	73.98	24.97	306.0	H	22.0	13.4
9413.500	46.83	73.98	27.15	145.0	V	274.0	15.6
11708.000	51.46	73.98	22.52	410.0	V	150.0	19.4
15965.500	53.96	73.98	20.02	316.0	H	149.0	23.7

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1121.000	20.36	53.98	33.62	360.0	V	329.0	-1.6
4924.000	52.37	53.98	1.61	323.0	H	338.0	9.3
7387.000	40.52	53.98	13.46	306.0	H	22.0	13.4
9413.500	33.40	53.98	20.58	145.0	V	274.0	15.6
11708.000	38.03	53.98	15.95	410.0	V	150.0	19.4
15965.500	40.74	53.98	13.24	316.0	H	149.0	23.7



6.8.2.4 Emissions at the Low Band Edge

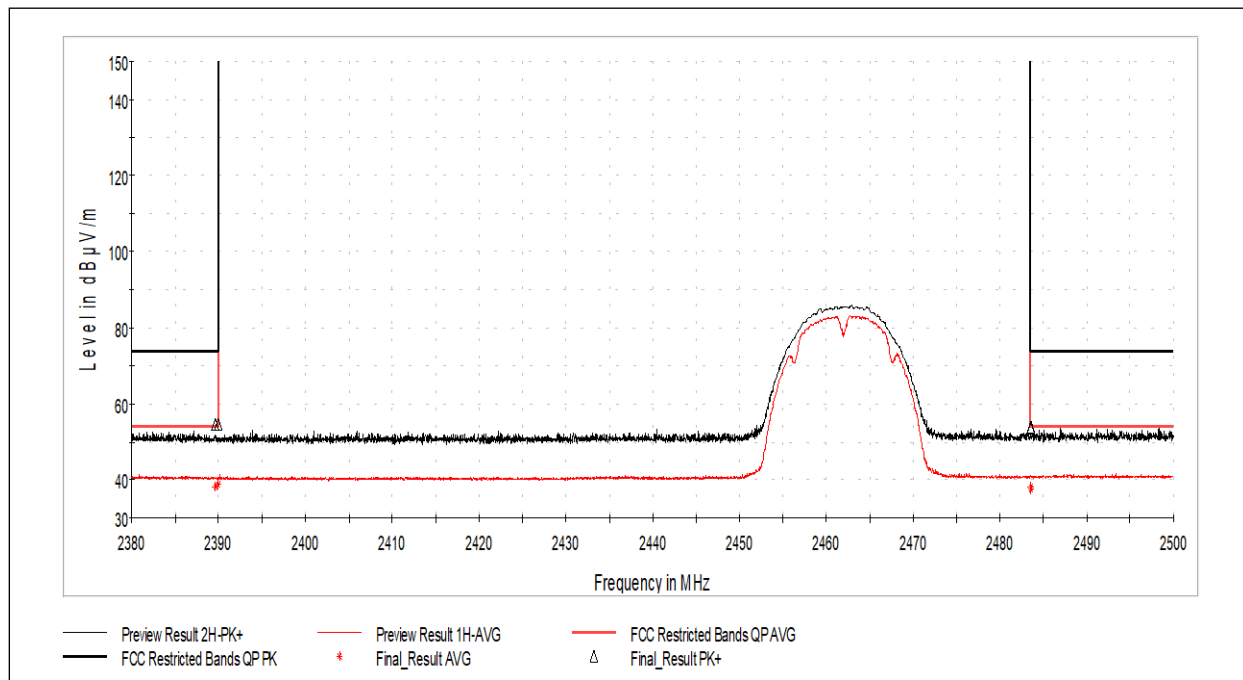


Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.600	56.00	73.98	17.98	362.0	H	205.0	38.1
2389.646	56.32	73.98	17.66	328.0	H	208.0	38.1
2484.008	53.84	73.98	20.14	286.0	H	230.0	38.8
2484.077	54.14	73.98	19.84	342.0	H	204.0	38.8

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.600	41.68	53.98	12.30	362.0	H	205.0	38.1
2389.646	41.70	53.98	12.28	328.0	H	208.0	38.1
2484.008	37.46	53.98	16.52	286.0	H	230.0	38.8
2484.077	37.91	53.98	16.07	342.0	H	204.0	38.8



6.8.2.5 Emissions at the High Band Edge

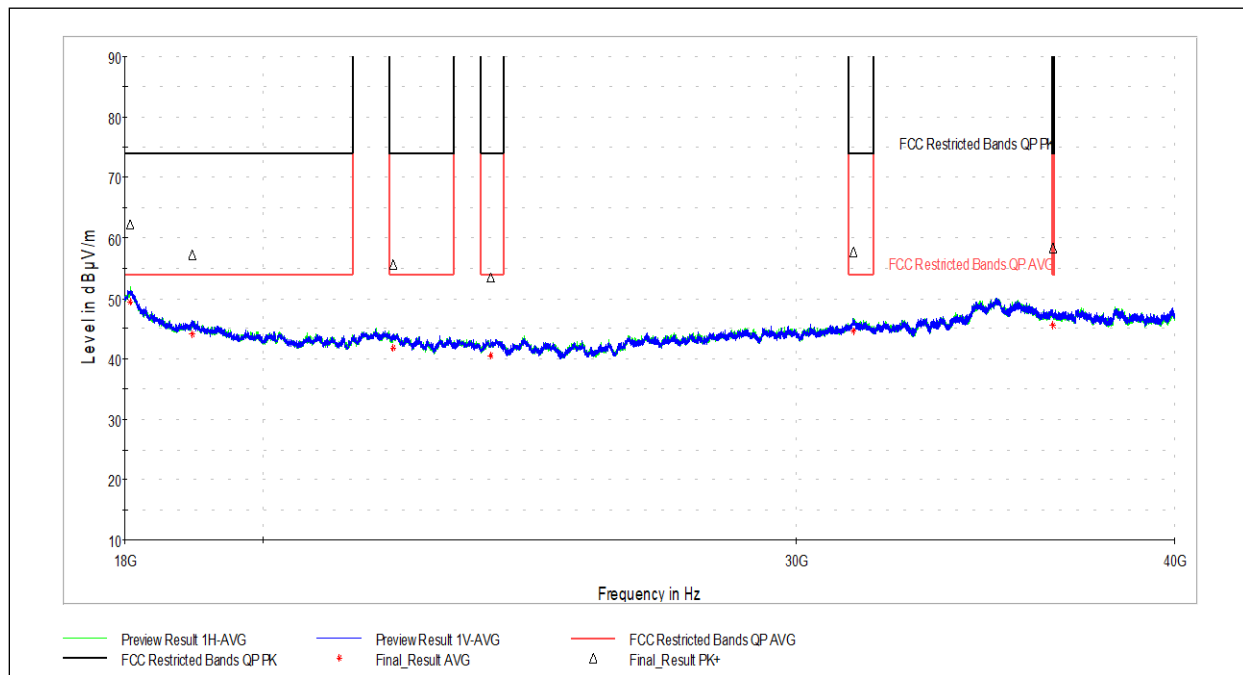


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.623	54.61	73.98	19.37	284.0	H	33.0	38.1
2389.923	54.62	73.98	19.36	317.0	H	44.0	38.1
2483.546	53.96	73.98	20.02	298.0	H	22.0	38.7
2483.569	53.60	73.98	20.38	325.0	H	56.0	38.7

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.623	38.31	53.98	15.67	284.0	H	33.0	38.1
2389.923	38.92	53.98	15.06	317.0	H	44.0	38.1
2483.546	38.12	53.98	15.86	298.0	H	22.0	38.7
2483.569	37.64	53.98	16.34	325.0	H	56.0	38.7



6.8.3 Radiated Spurious Emissions, 18 GHz – 40 GHz



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
18074.000	62.30	73.98	11.68	100.0	H	0.0	31.1
18949.000	57.22	73.98	16.76	100.0	V	0.0	25.3
22079.000	55.58	73.98	18.40	100.0	V	323.0	15.2
23766.000	53.53	73.98	20.45	100.0	H	0.0	13.1
31323.000	57.68	73.98	16.30	100.0	H	0.0	20.0
36461.000	58.43	73.98	15.55	410.0	V	46.0	21.3

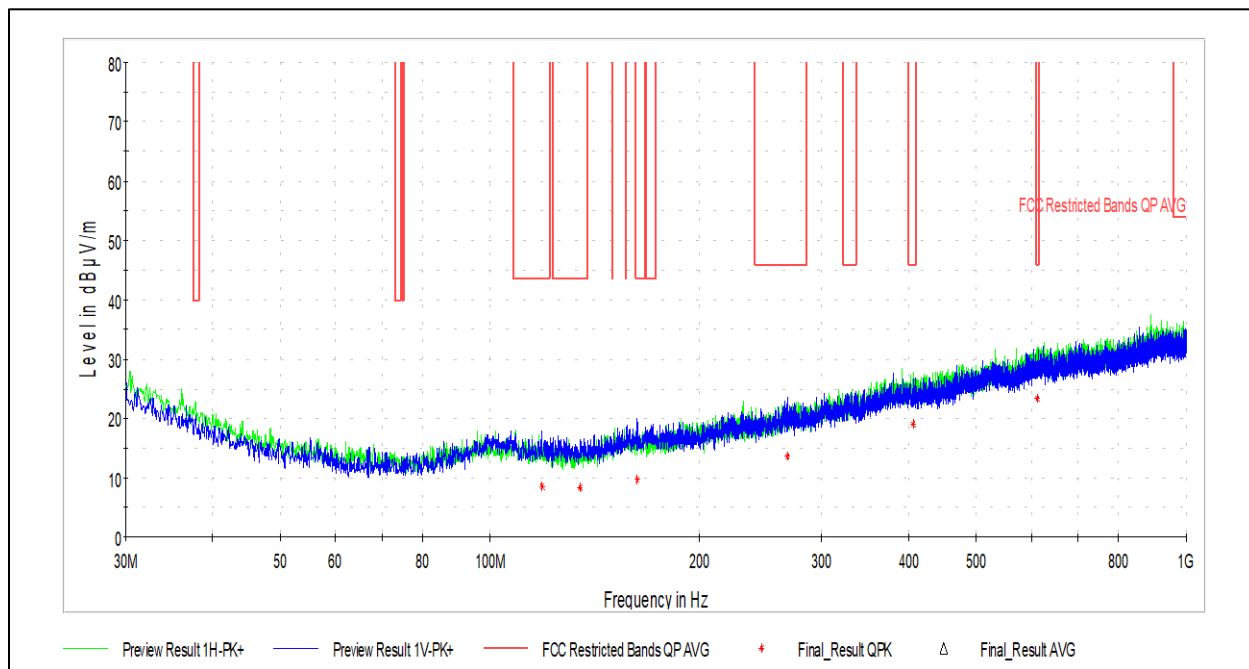
Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
18074.000	49.36	53.98	4.62	100.0	H	0.0	31.1
18949.000	44.04	53.98	9.94	100.0	V	0.0	25.3
22079.000	41.87	53.98	12.11	100.0	V	323.0	15.2
23766.000	40.47	53.98	13.51	100.0	H	0.0	13.1
31323.000	44.54	53.98	9.44	100.0	H	0.0	20.0
36461.000	45.49	53.98	8.49	410.0	V	46.0	21.3

Notes: testing represents the worst case of low, middle, and high channels.



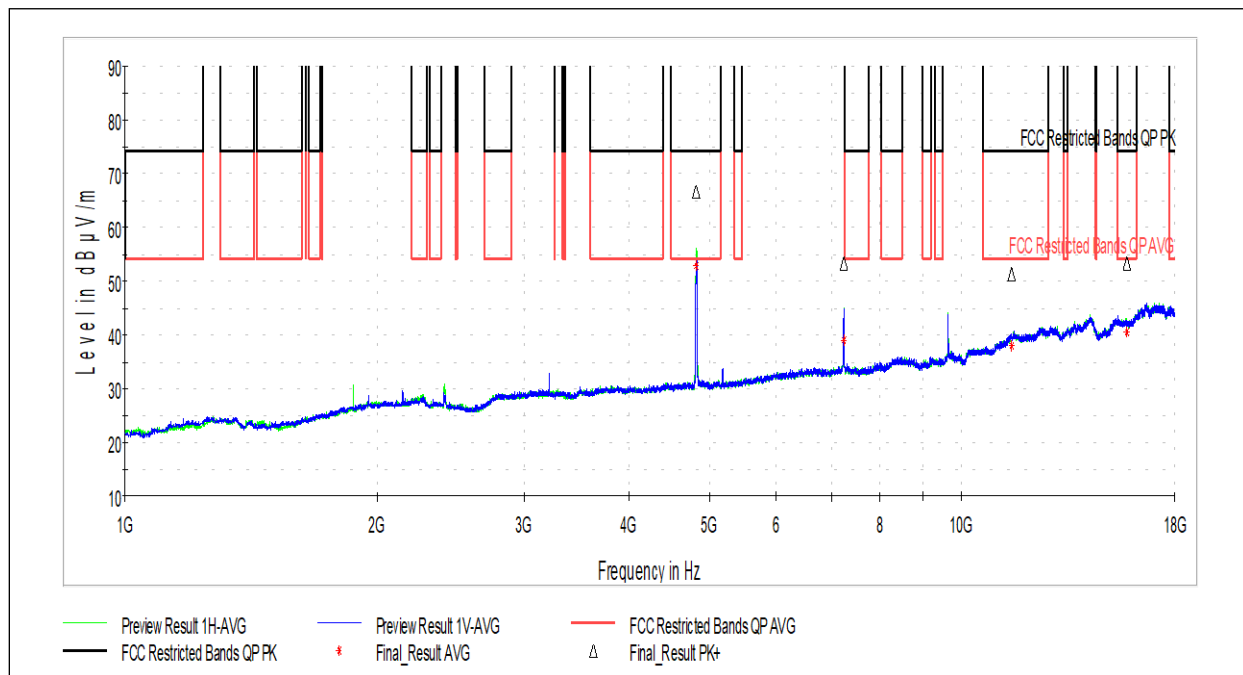
6.9 Wi-Fi 802.11g Radiated Spurious Emissions

6.9.1 Radiated Spurious Emissions, 30 MHz – 1 GHz



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
118.755	8.62	43.52	34.90	382.0	V	169.0	15.3
134.868	8.41	43.52	35.12	249.0	V	118.0	15.3
162.998	9.73	43.52	33.79	220.0	V	7.0	17.0
267.866	13.65	46.02	32.37	356.0	V	59.0	20.5
405.659	19.01	46.02	27.01	341.0	H	151.0	24.7
611.677	23.38	46.02	22.64	400.0	H	59.0	29.5

Notes: testing represents the worst case of low, middle, and high channels.

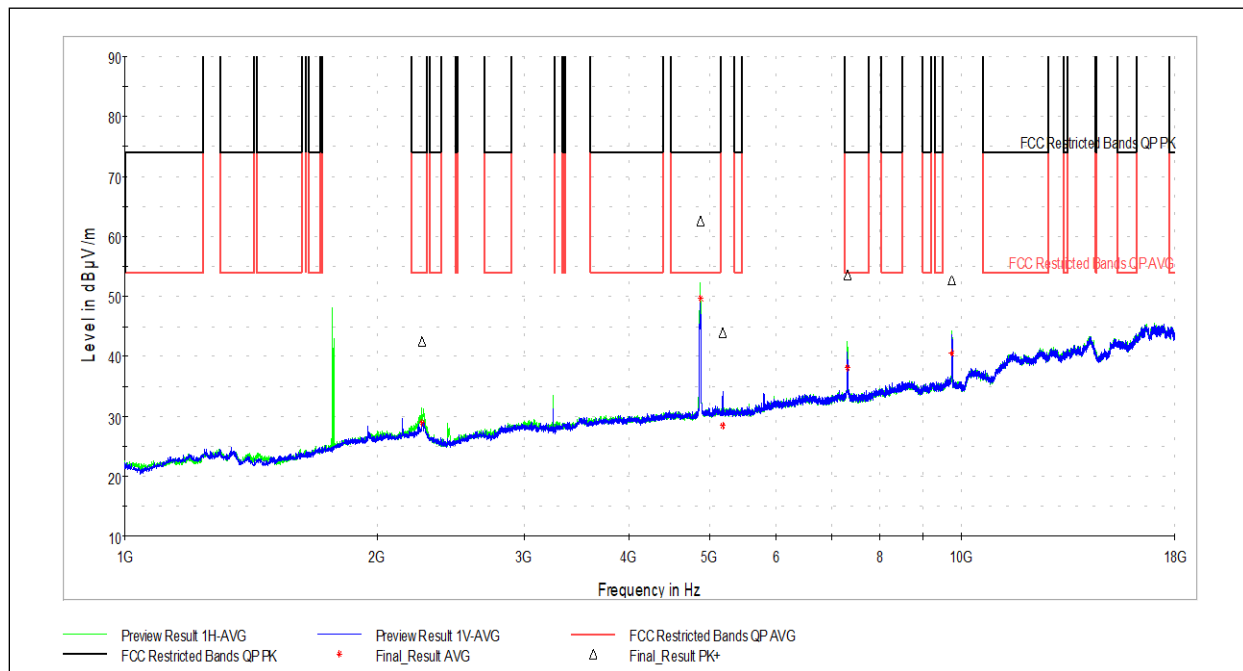
**6.9.2 Radiated Spurious Emissions, 1 GHz – 18 GHz****6.9.2.1 Channel 1 (2412 MHz)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4821.500	66.60	73.98	7.38	272.0	H	81.0	9.3
7240.500	53.36	1000.00	946.64	314.0	H	294.0	13.4
11481.000	51.37	73.98	22.61	109.0	H	0.0	19.1
15761.000	53.42	73.98	20.56	410.0	H	139.0	23.3

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4821.500	52.86	53.98	1.12	272.0	H	81.0	9.3
7240.500	38.86	1000.00	961.14	314.0	H	294.0	13.4
11481.000	37.97	53.98	16.01	109.0	H	0.0	19.1
15761.000	40.44	53.98	13.54	410.0	H	139.0	23.3



6.9.2.2 Channel 6 (2437 MHz)

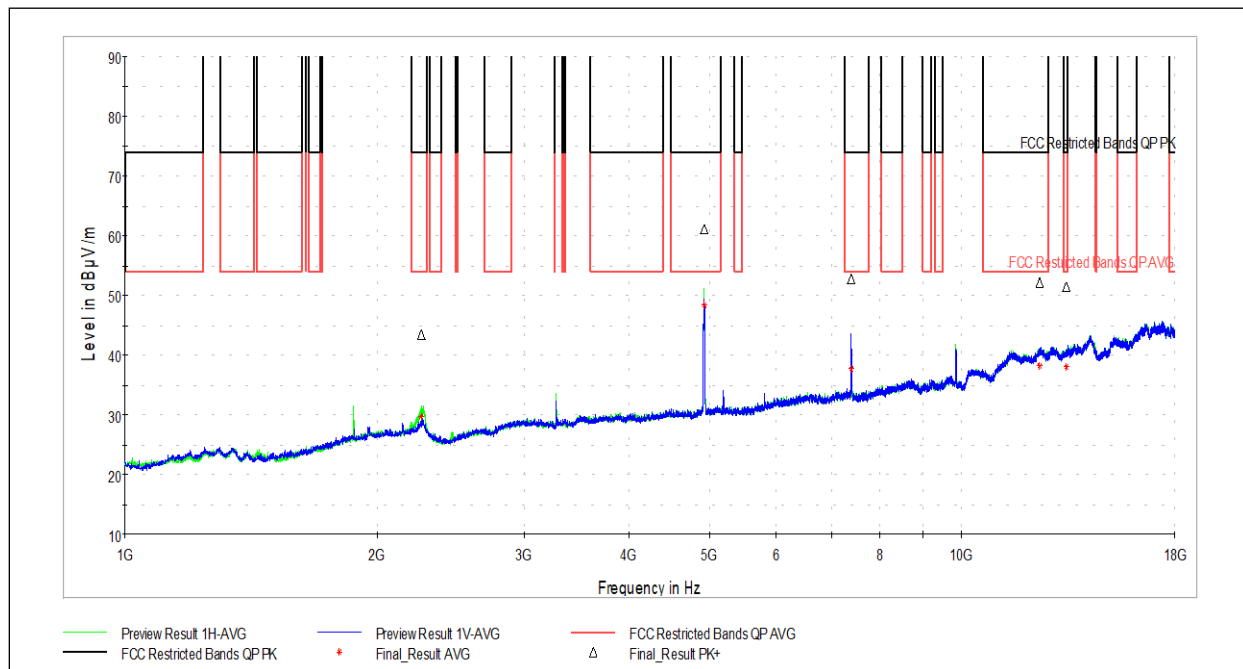


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2263.000	42.54	73.98	31.44	327.0	H	34.0	4.1
4873.000	62.63	73.98	11.35	281.0	H	45.0	9.4
5181.500	44.03	1000.00	955.97	199.0	V	35.0	9.9
7305.500	53.57	73.98	20.41	398.0	H	35.0	13.4
9748.000	52.77	1000.00	947.23	379.0	H	105.0	16.1

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2263.000	28.90	53.98	25.08	327.0	H	34.0	4.1
4873.000	49.75	53.98	4.23	281.0	H	45.0	9.4
5181.500	28.52	1000.00	971.48	199.0	V	35.0	9.9
7305.500	38.10	53.98	15.88	398.0	H	35.0	13.4
9748.000	40.50	1000.00	959.50	379.0	H	105.0	16.1



6.9.2.3 Channel 11 (2462 MHz)

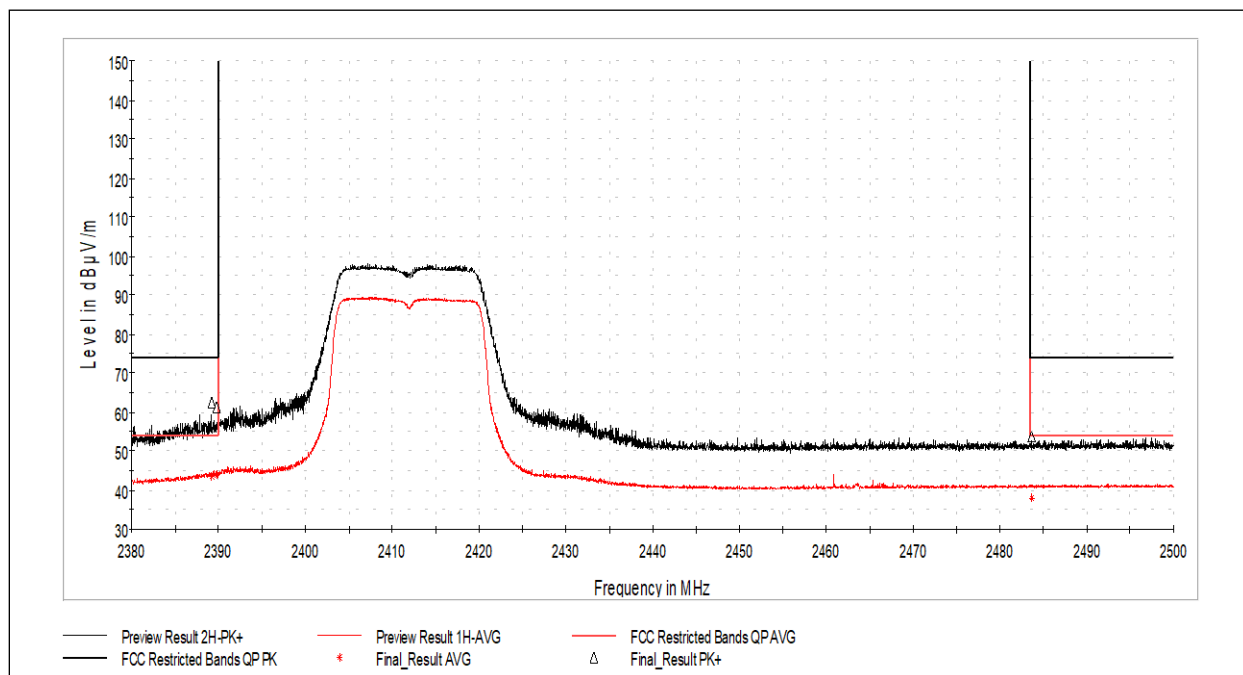


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2262.000	43.51	73.98	30.47	330.0	H	210.0	4.1
4922.500	61.07	73.98	12.91	375.0	H	0.0	9.4
7389.000	52.73	73.98	21.25	317.0	V	236.0	13.4
12416.000	52.14	73.98	21.84	410.0	V	104.0	20.2
13339.000	51.51	73.98	22.47	347.0	H	259.0	20.7

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2262.000	29.69	53.98	24.29	330.0	H	210.0	4.1
4922.500	48.28	53.98	5.70	375.0	H	0.0	9.4
7389.000	37.76	53.98	16.22	317.0	V	236.0	13.4
12416.000	38.26	53.98	15.72	410.0	V	104.0	20.2
13339.000	38.10	53.98	15.88	347.0	H	259.0	20.7



6.9.2.4 Emissions at the Low Band Edge

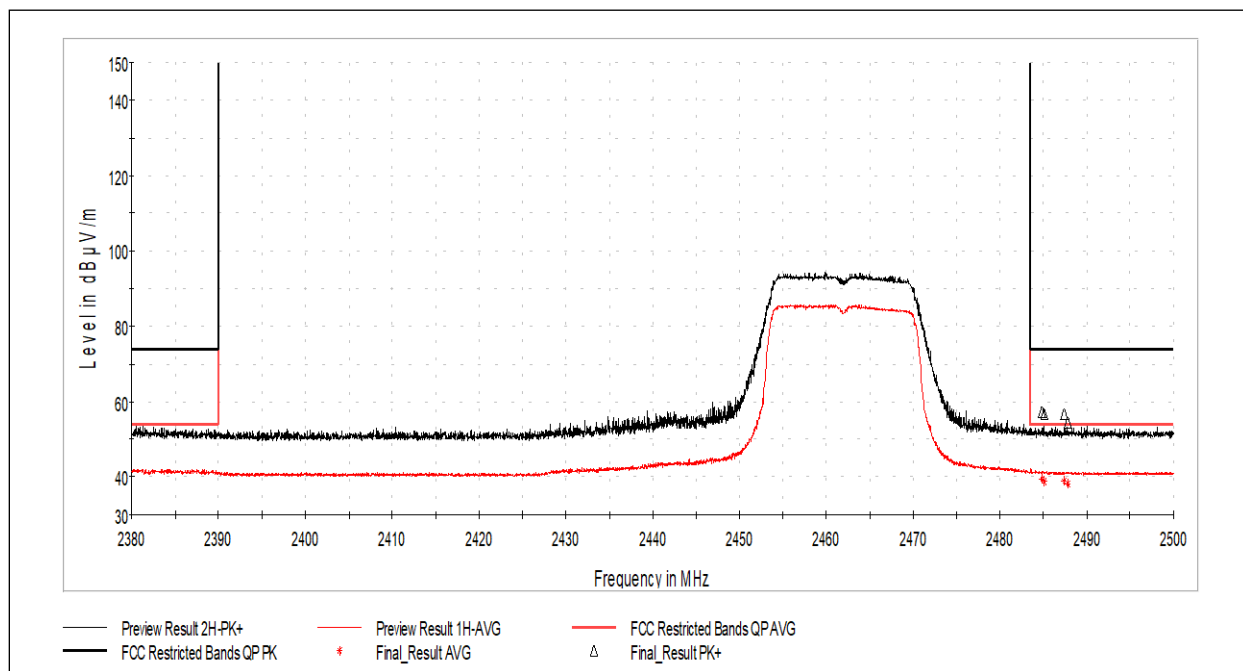


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.162	62.29	73.98	11.69	372.0	H	224.0	38.1
2389.762	61.14	73.98	12.84	371.0	H	228.0	38.1
2483.615	53.68	73.98	20.30	359.0	H	23.0	38.7

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.162	43.43	53.98	10.55	372.0	H	224.0	38.1
2389.762	43.70	53.98	10.28	371.0	H	228.0	38.1
2483.615	37.79	53.98	16.19	359.0	H	23.0	38.7



6.9.2.5 Emissions at the High Band Edge

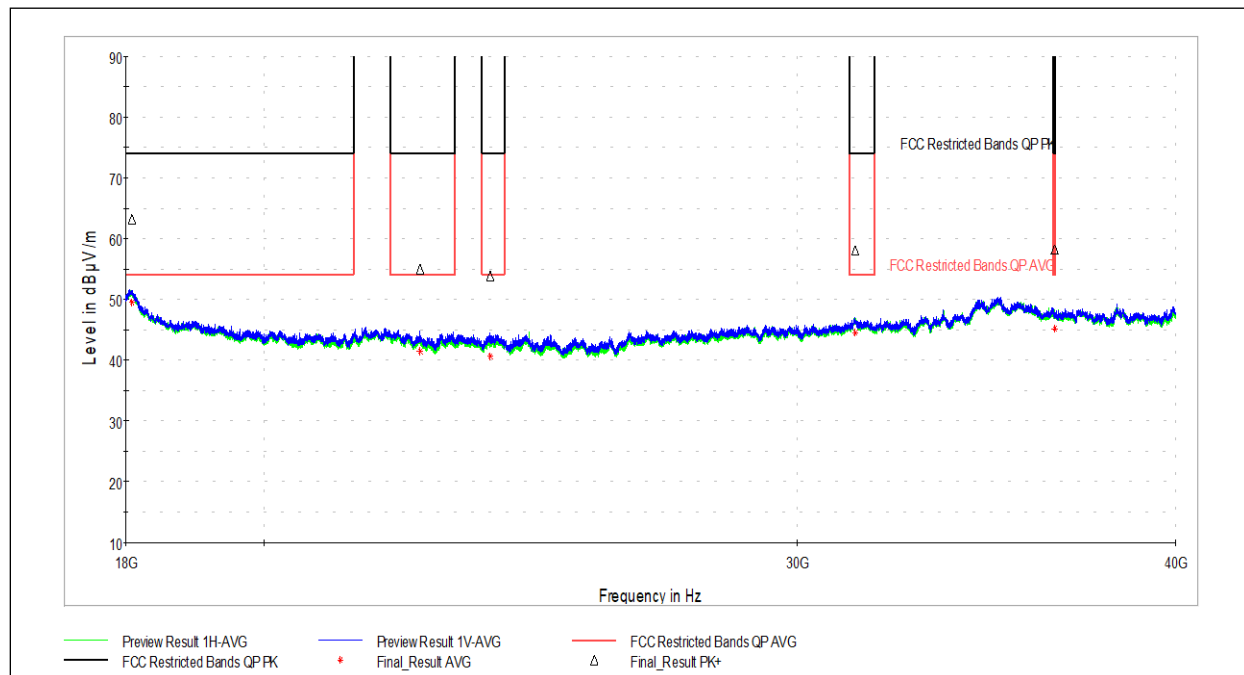


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2484.815	57.33	73.98	16.65	346.0	H	194.0	38.8
2485.069	56.67	73.98	17.31	326.0	H	58.0	38.8
2487.377	56.67	73.98	17.31	343.0	H	194.0	38.8
2487.862	54.52	73.98	19.46	359.0	H	57.0	38.8

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2484.815	39.48	53.98	14.50	346.0	H	194.0	38.8
2485.069	38.67	53.98	15.31	326.0	H	58.0	38.8
2487.377	38.78	53.98	15.20	343.0	H	194.0	38.8
2487.862	38.12	53.98	15.86	359.0	H	57.0	38.8



6.9.3 Radiated Spurious Emissions, 18 GHz – 40 GHz



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
18083.000	63.29	73.98	10.69	100.0	V	0.0	31.0
22514.000	55.06	73.98	18.92	100.0	V	0.0	14.5
23740.000	53.85	73.98	20.13	100.0	V	0.0	13.2
31345.000	58.12	73.98	15.86	100.0	V	0.0	20.1
36478.000	58.24	73.98	15.74	100.0	H	324.0	21.2

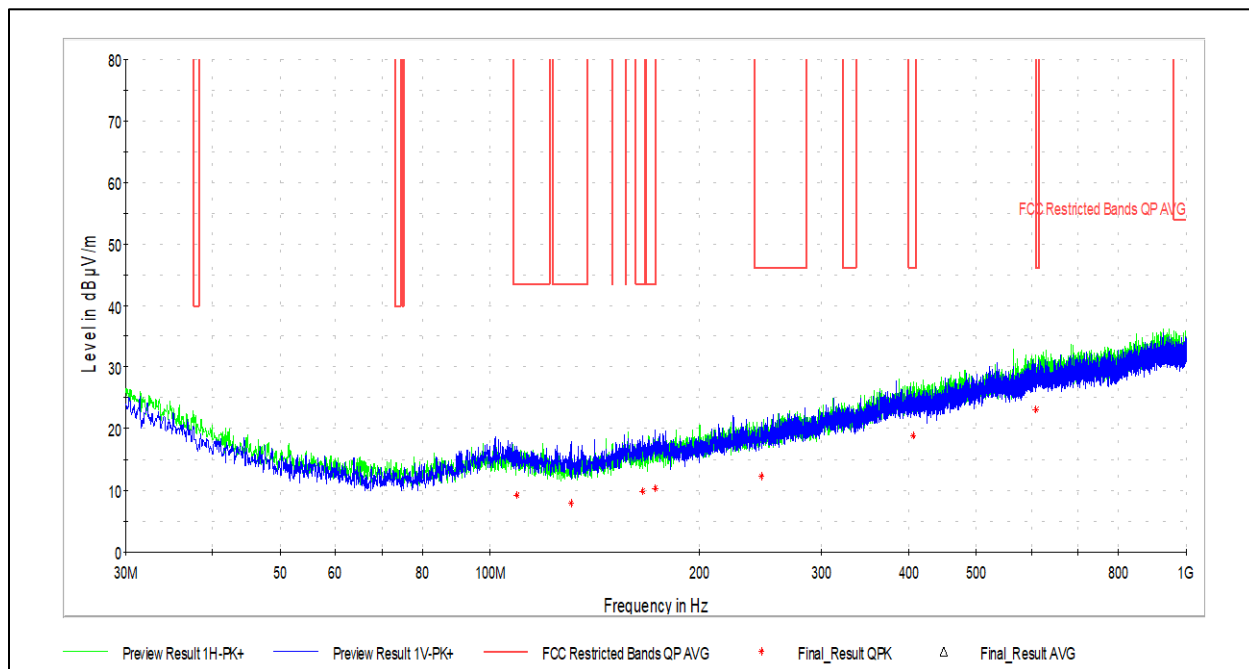
Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
18083.000	49.47	53.98	4.51	100.0	V	0.0	31.0
22514.000	41.40	53.98	12.58	100.0	V	0.0	14.5
23740.000	40.67	53.98	13.31	100.0	V	0.0	13.2
31345.000	44.55	53.98	9.43	100.0	V	0.0	20.1
36478.000	45.15	53.98	8.83	100.0	H	324.0	21.2

Notes: testing represents the worst case of low, middle, and high channels.



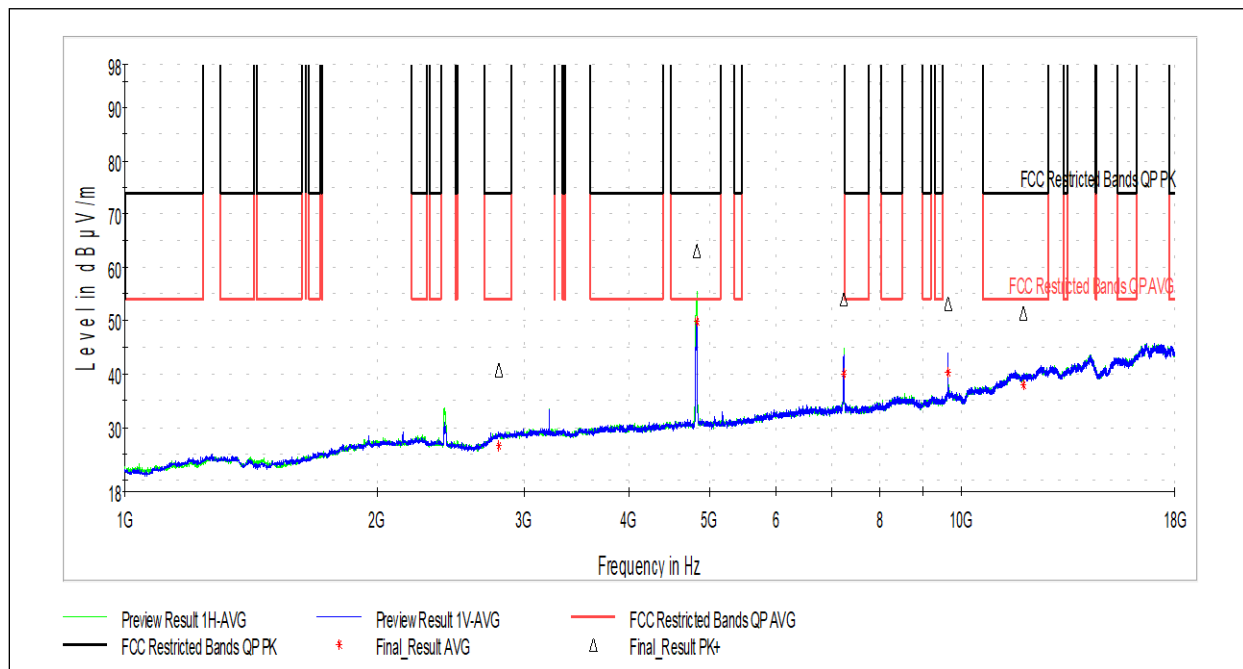
6.10 Wi-Fi 802.11n Radiated Spurious Emissions

6.10.1 Radiated Spurious Emissions, 30 MHz – 1 GHz



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
109.486	9.13	43.52	34.39	357.0	V	142.0	15.9
130.718	7.93	43.52	35.59	105.0	V	-1.0	14.9
165.854	9.86	43.52	33.66	400.0	V	286.0	17.1
172.590	10.27	43.52	33.25	184.0	V	180.0	17.3
245.394	12.29	46.02	33.73	342.0	V	243.0	19.7
405.174	18.91	46.02	27.11	241.0	H	342.0	24.7
608.605	23.15	46.02	22.87	226.0	H	120.0	29.3

Notes: testing represents the worst case of low, middle, and high channels.

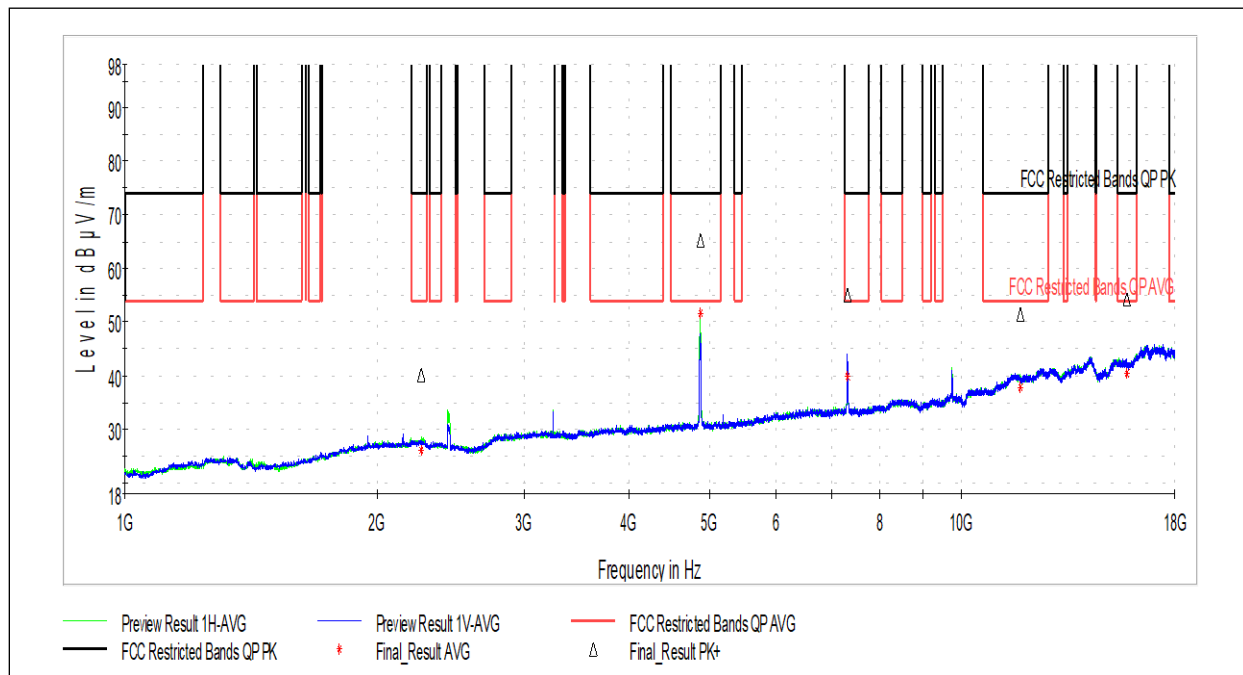
**6.10.2 Radiated Spurious Emissions, 1 GHz – 18 GHz****6.10.2.1 Channel 1 (2412 MHz)**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2801.000	40.78	73.98	33.20	392.0	V	112.0	5.6
4824.500	63.15	73.98	10.83	295.0	H	264.0	9.4
7236.500	54.07	1000.00	945.93	292.0	H	317.0	13.3
9648.000	53.21	1000.00	946.79	410.0	V	228.0	15.7
11869.500	51.51	73.98	22.47	330.0	H	194.0	19.5

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2801.000	26.49	53.98	27.49	392.0	V	112.0	5.6
4824.500	49.85	53.98	4.13	295.0	H	264.0	9.4
7236.500	39.97	1000.00	960.03	292.0	H	317.0	13.3
9648.000	40.28	1000.00	959.72	410.0	V	228.0	15.7
11869.500	37.89	53.98	16.09	330.0	H	194.0	19.5



6.10.2.2 Channel 6 (2437 MHz)

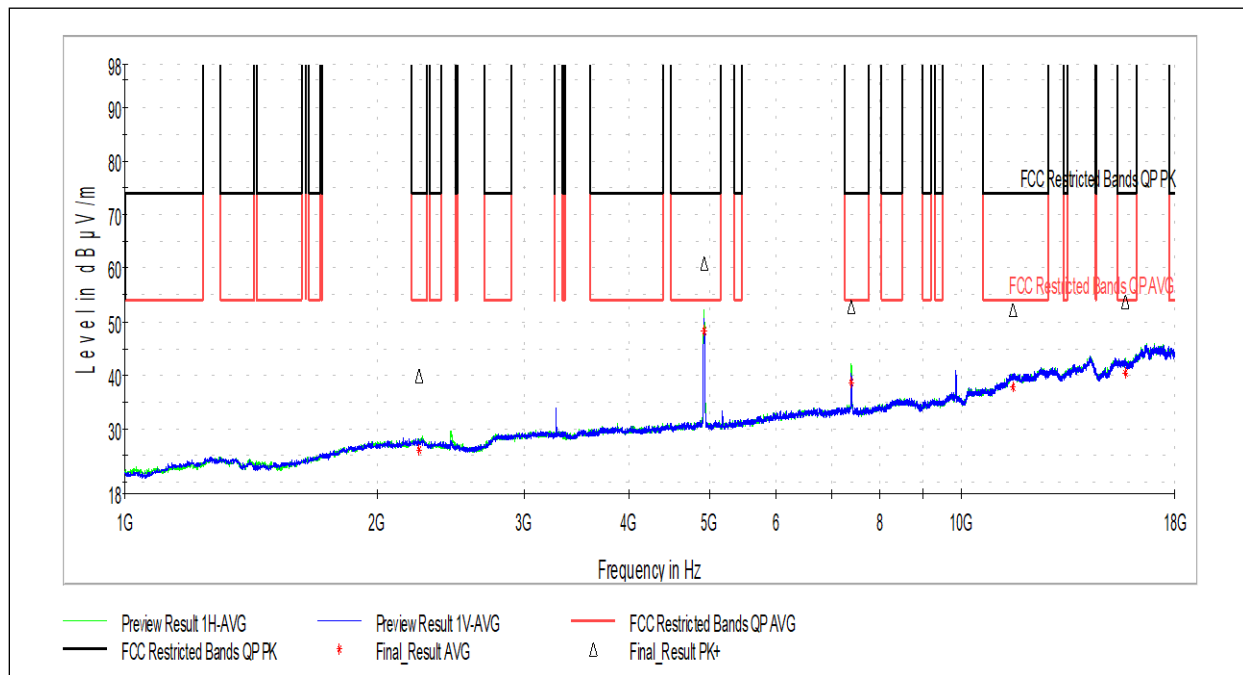


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2262.000	40.11	73.98	33.87	374.0	H	58.0	4.1
4872.000	65.24	73.98	8.74	327.0	H	0.0	9.4
7308.500	54.90	73.98	19.08	320.0	H	241.0	13.4
11758.500	51.45	73.98	22.53	100.0	H	221.0	19.3
15757.500	54.16	73.98	19.82	317.0	V	172.0	23.2

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2262.000	26.20	53.98	27.78	374.0	H	58.0	4.1
4872.000	51.57	53.98	2.41	327.0	H	0.0	9.4
7308.500	39.78	53.98	14.20	320.0	H	241.0	13.4
11758.500	37.76	53.98	16.22	100.0	H	221.0	19.3
15757.500	40.48	53.98	13.50	317.0	V	172.0	23.2



6.10.2.3 Channel 11 (2462 MHz)

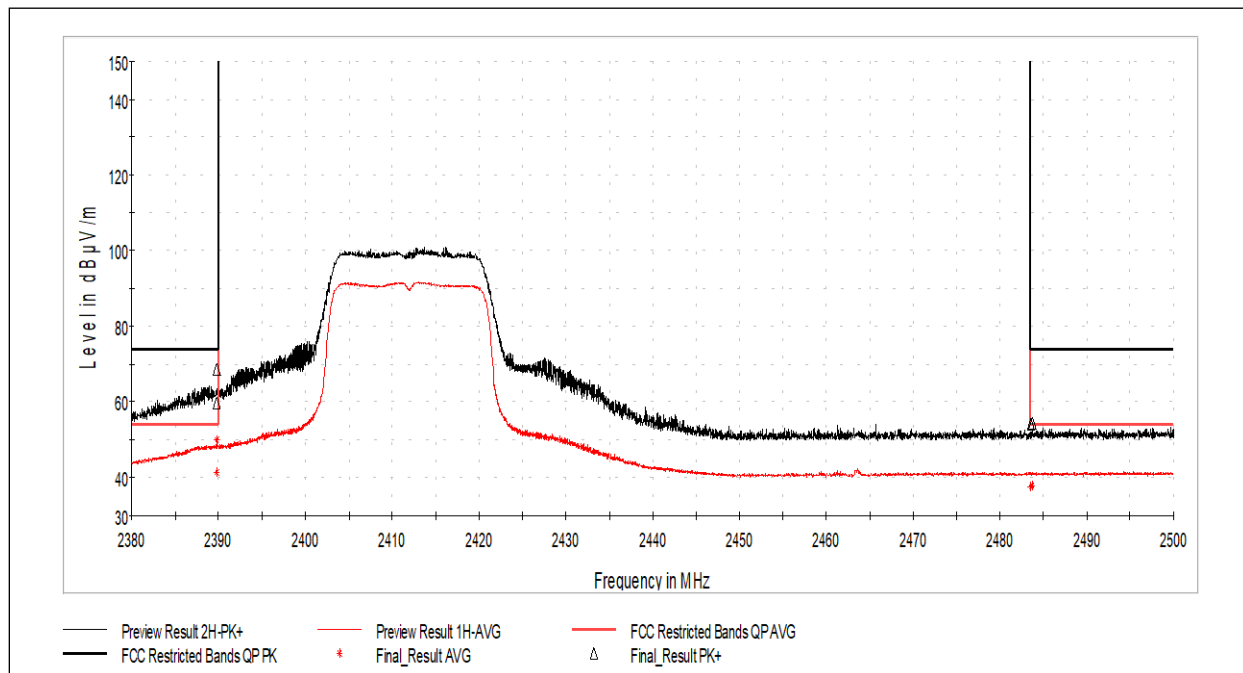


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2249.000	39.94	73.98	34.04	304.0	H	209.0	4.0
4925.000	60.95	73.98	13.03	372.0	H	332.0	9.3
7392.500	52.70	73.98	21.28	312.0	H	241.0	13.4
11525.000	52.26	73.98	21.72	117.0	H	195.0	19.0
15696.000	53.85	73.98	20.13	214.0	H	0.0	23.3

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2249.000	25.99	53.98	27.99	304.0	H	209.0	4.0
4925.000	48.42	53.98	5.56	372.0	H	332.0	9.3
7392.500	38.72	53.98	15.26	312.0	H	241.0	13.4
11525.000	37.93	53.98	16.05	117.0	H	195.0	19.0
15696.000	40.40	53.98	13.58	214.0	H	0.0	23.3



6.10.2.4 Emissions at the Low Band Edge

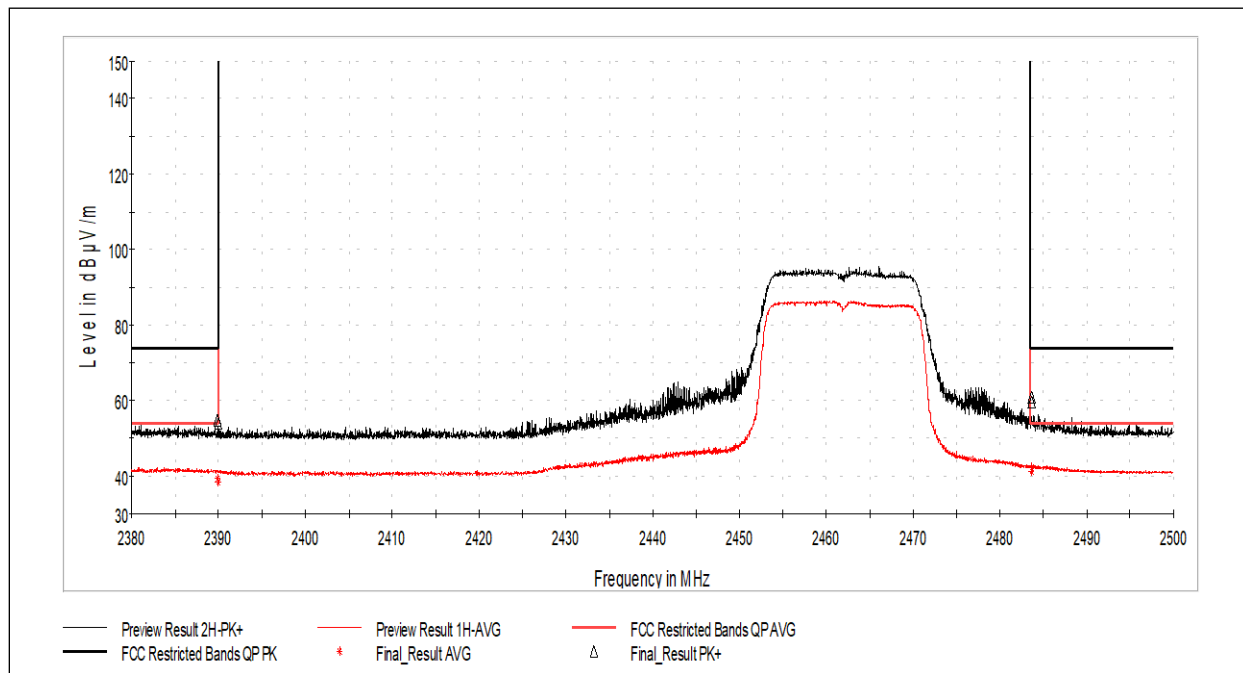


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.762	68.49	73.98	5.49	308.0	H	0.0	38.1
2389.808	59.84	73.98	14.14	263.0	V	0.0	38.2
2483.523	54.09	73.98	19.89	353.0	H	0.0	38.7
2483.731	54.50	73.98	19.48	358.0	H	0.0	38.7

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.762	49.87	53.98	4.11	308.0	H	0.0	38.1
2389.808	41.30	53.98	12.68	263.0	V	0.0	38.2
2483.523	37.75	53.98	16.23	353.0	H	0.0	38.7
2483.731	37.98	53.98	16.00	358.0	H	0.0	38.7

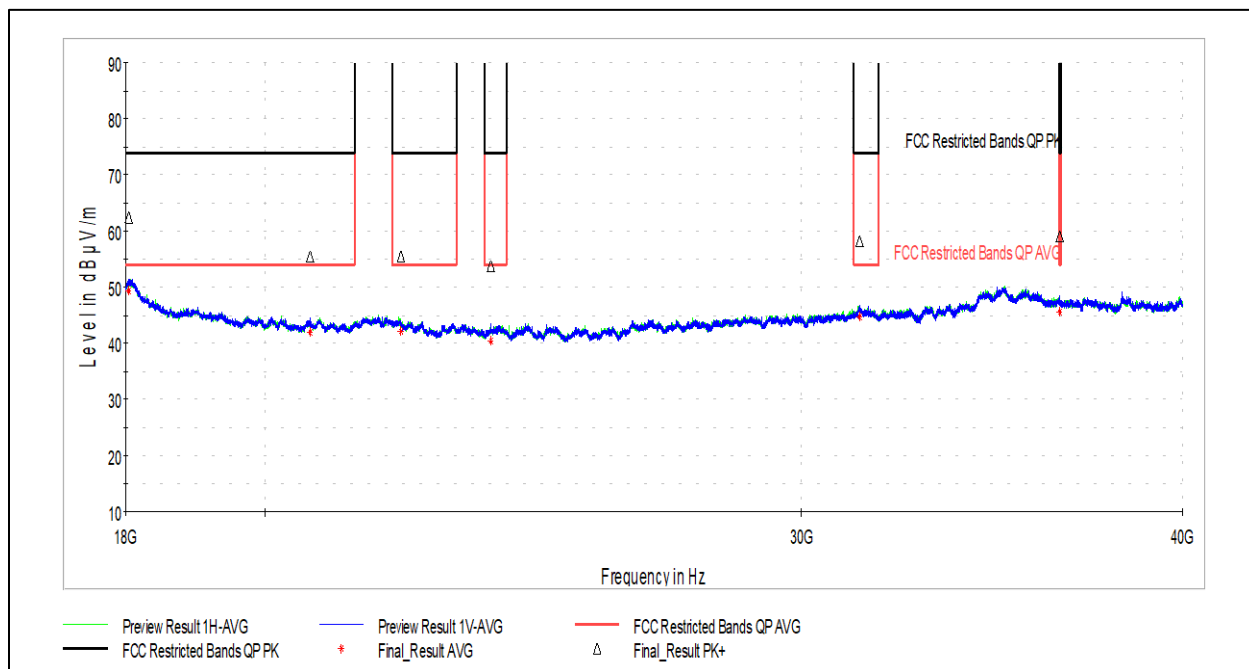


6.10.2.5 Emissions at the High Band Edge



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.854	54.95	73.98	19.03	372.0	H	195.0	38.1
2389.992	53.92	73.98	20.06	328.0	H	197.0	38.1
2483.662	59.67	73.98	14.31	326.0	H	58.0	38.7
2483.685	60.82	73.98	13.16	343.0	H	197.0	38.7

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.854	39.34	53.98	14.64	372.0	H	195.0	38.1
2389.992	38.25	53.98	15.73	328.0	H	197.0	38.1
2483.662	41.00	53.98	12.98	326.0	H	58.0	38.7
2483.685	42.09	53.98	11.89	343.0	H	197.0	38.7

**6.10.3 Radiated Spurious Emissions, 18 GHz – 40 GHz**

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
18044.000	62.48	73.98	11.50	100.0	V	244.0	31.0
20689.000	55.40	73.98	18.58	100.0	V	0.0	19.1
22155.000	55.56	73.98	18.42	100.0	V	348.0	15.0
23720.000	53.86	73.98	20.12	100.0	V	0.0	13.5
31343.000	58.27	73.98	15.71	100.0	H	344.0	20.2
36448.000	59.08	73.98	14.90	100.0	V	151.0	21.3

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
18044.000	49.33	53.98	4.65	100.0	V	244.0	31.0
20689.000	42.05	53.98	11.93	100.0	V	0.0	19.1
22155.000	42.22	53.98	11.76	100.0	V	348.0	15.0
23720.000	40.39	53.98	13.59	100.0	V	0.0	13.5
31343.000	44.69	53.98	9.29	100.0	H	344.0	20.2
36448.000	45.56	53.98	8.42	100.0	V	151.0	21.3

Notes: testing represents the worst case of low, middle, and high channels.



7 Output Power

7.1 Test Limits

FCC Part 15.247(b)(3):

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

RSS-247 Issue 3 § 5.4(d):

For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.



7.2 Test Method

Tests are performed in accordance with ANSI C63.10:2013 § 11.9.1.1

7.3 Test Equipment Used

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	8258	Rohde & Schwarz	ESW44	9/19/2023	9/19/2024
Horn Antenna (1-18GHz)	3780	ETS	3117	8/8/2023	8/8/2024
System Controller	4096	ETS Lindgren	2090	Verify at Time of Use	Verify at Time of Use
1-18GHz Signal Path without Preamplifier	3074, 2588, 2593, 8188, 8185			10/5/2023	10/5/2024

7.4 Test Results

The device was found to be **compliant**. The peak output power was less than 1W. The peak EIRP was less than 4W.

7.5 Test Conditions

Test Personnel:	Brian Lackey	Test Date:	11/13/2023
Supervising/Reviewing Engineer:		Limit Applied:	See Above
(Where Applicable)	NA	Ambient Temperature:	25.6°C
Product Standard:	FCC Part 15.247	Relative Humidity:	52.2%
Input Voltage:	RSS-247 Issue 3	Atmospheric Pressure:	985.4mbar
Pretest Verification w / Ambient	Battery		
Signals or BB Source:	Yes		

Deviations, Additions, or Exclusions: None.

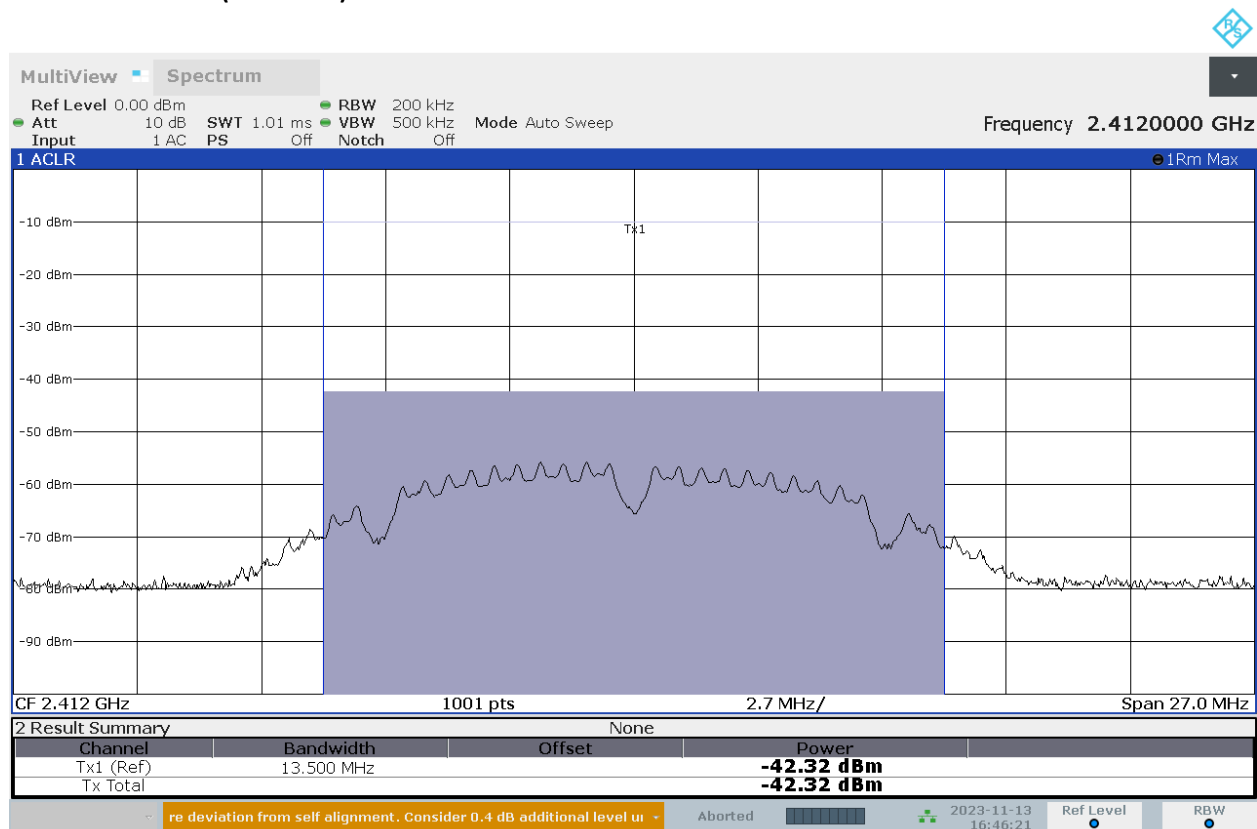
**7.6 Test Data**

Mode	Channel	Attenuation Setting	Receiver Measured Power (dBm)	Receiver Measured Power (dBuV)	Path Loss (dB)	Antenna Factor (dB/m)	E Field (dBuV/m)	EIRP (dBm)	Antenna Gain (dBi)	Conducted Output Power (dBm)
802.11b	1	40	-42.32	64.68	6.22	32.1	103	7.77	1.97	5.80
	6	40	-44.9	62.1	6.24	32.3	100.64	5.41	1.97	3.44
	11	40	-49.21	57.79	6.27	32.5	96.56	1.33	1.97	-0.64
802.11g	1	14	-35.34	71.66	6.22	32.1	109.98	14.75	1.97	12.78
	6	14	-38.5	68.5	6.24	32.3	107.04	11.81	1.97	9.84
	11	14	-42.8	64.2	6.27	32.5	102.97	7.74	1.97	5.77
802.11n	1	10	-34.94	72.06	6.22	32.1	110.38	15.15	1.97	13.18
	6	10	-38.25	68.75	6.24	32.3	107.29	12.06	1.97	10.09
	11	10	-41.99	65.01	6.27	32.5	103.78	8.55	1.97	6.58



7.7 Wi-Fi 802.11b

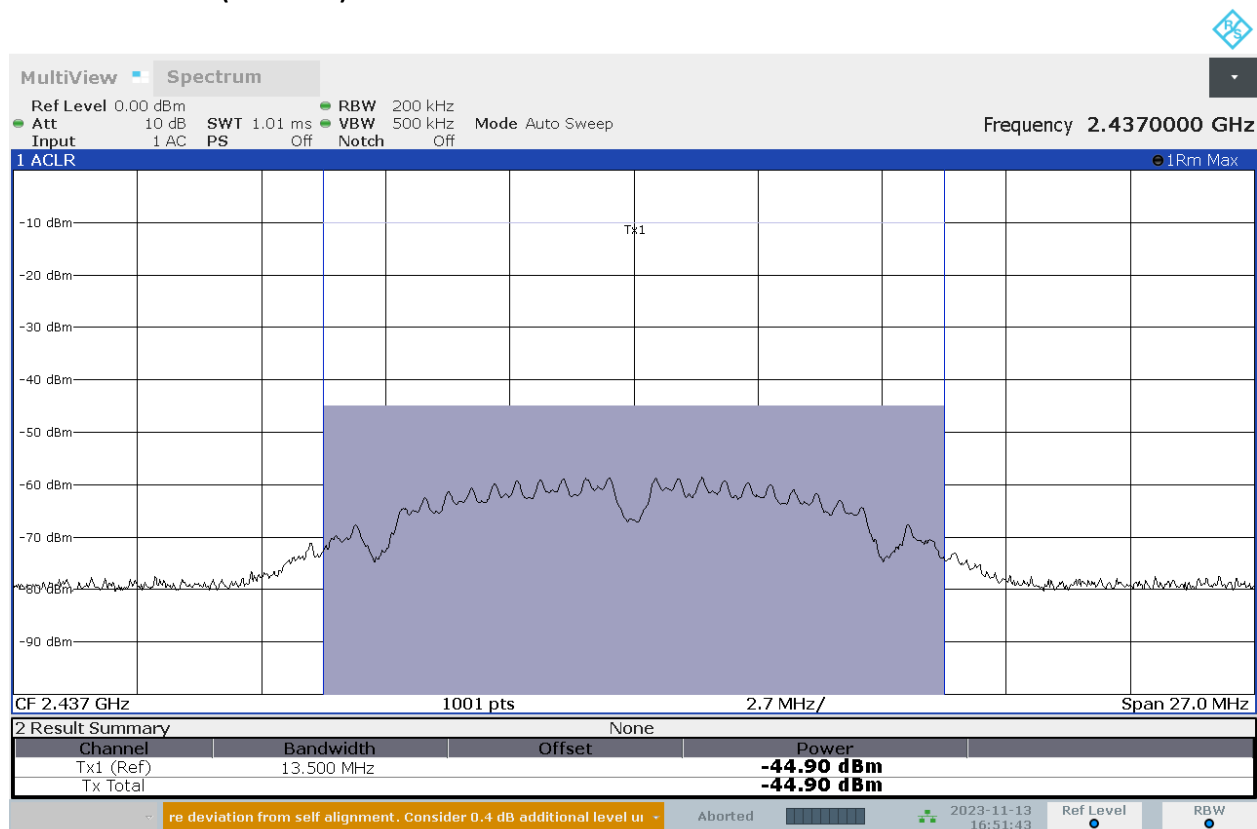
7.7.1 Channel 1 (2412 MHz)



04:46:22 PM 11/13/2023



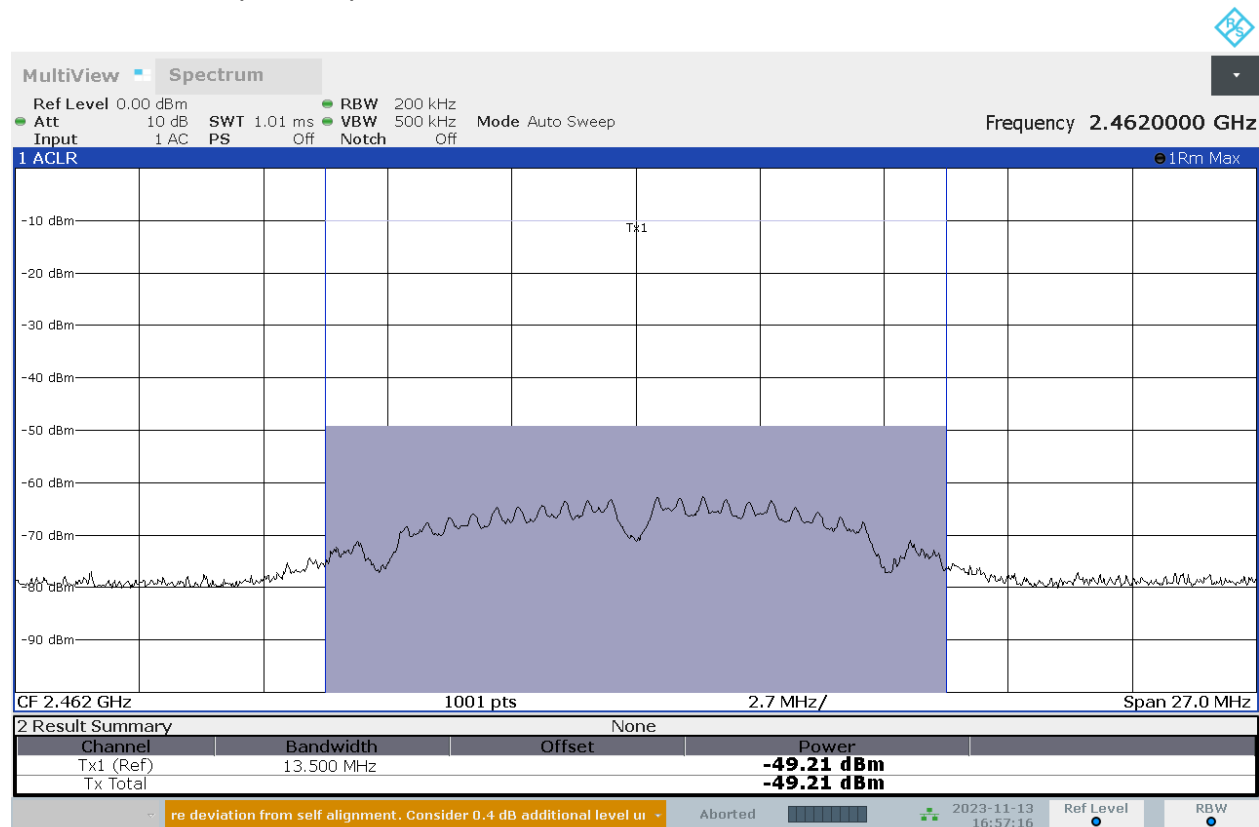
7.7.2 Channel 6 (2437 MHz)



04:51:44 PM 11/13/2023



7.7.3 Channel 11 (2462MHz)

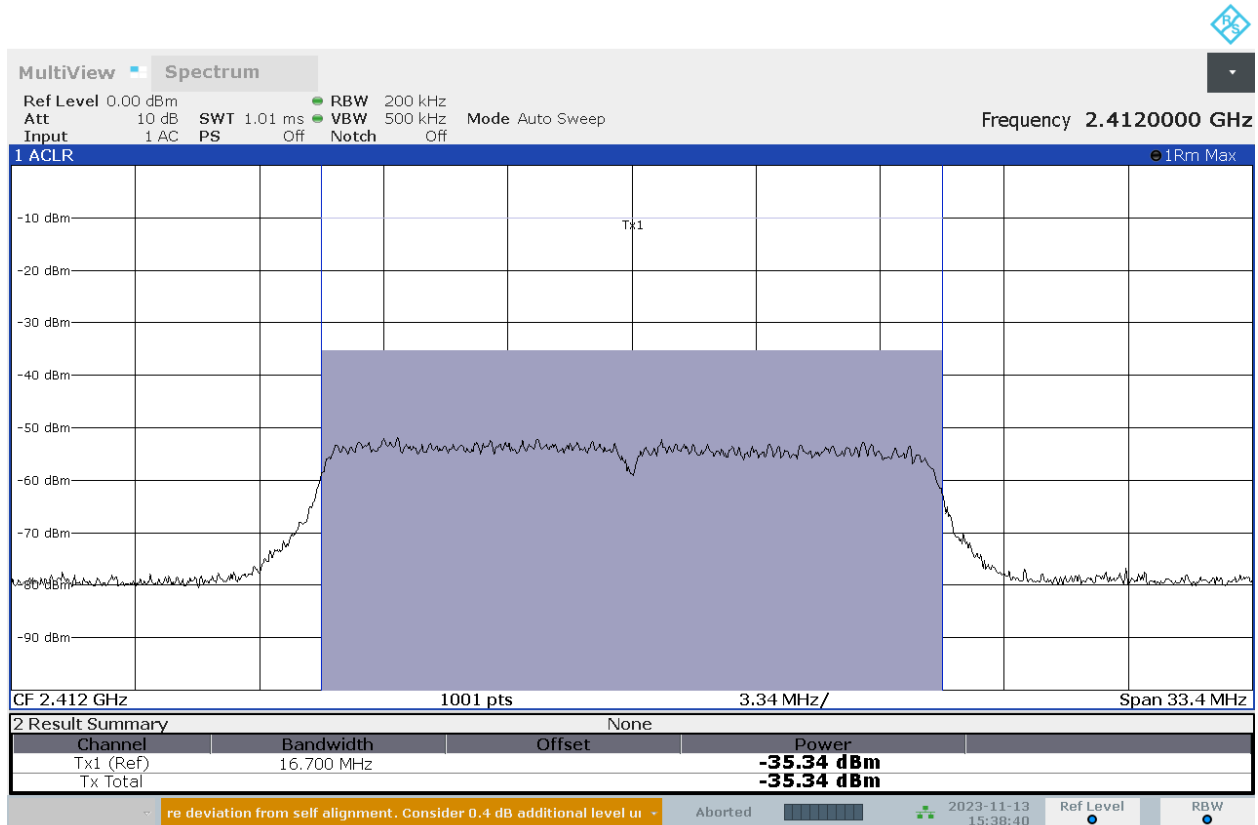


04:57:17 PM 11/13/2023



7.8 Wi-Fi 802.11g

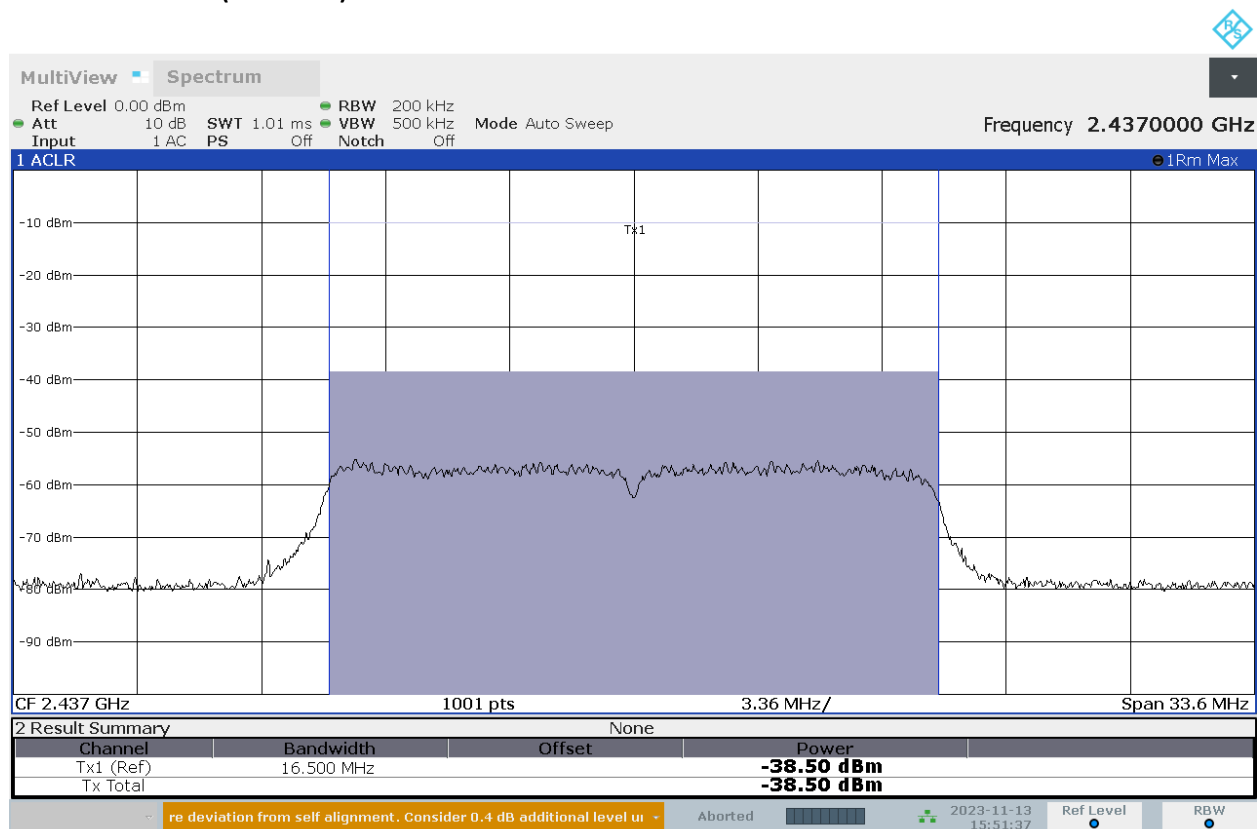
7.8.1 Channel 1 (2412 MHz)



03:38:40 PM 11/13/2023



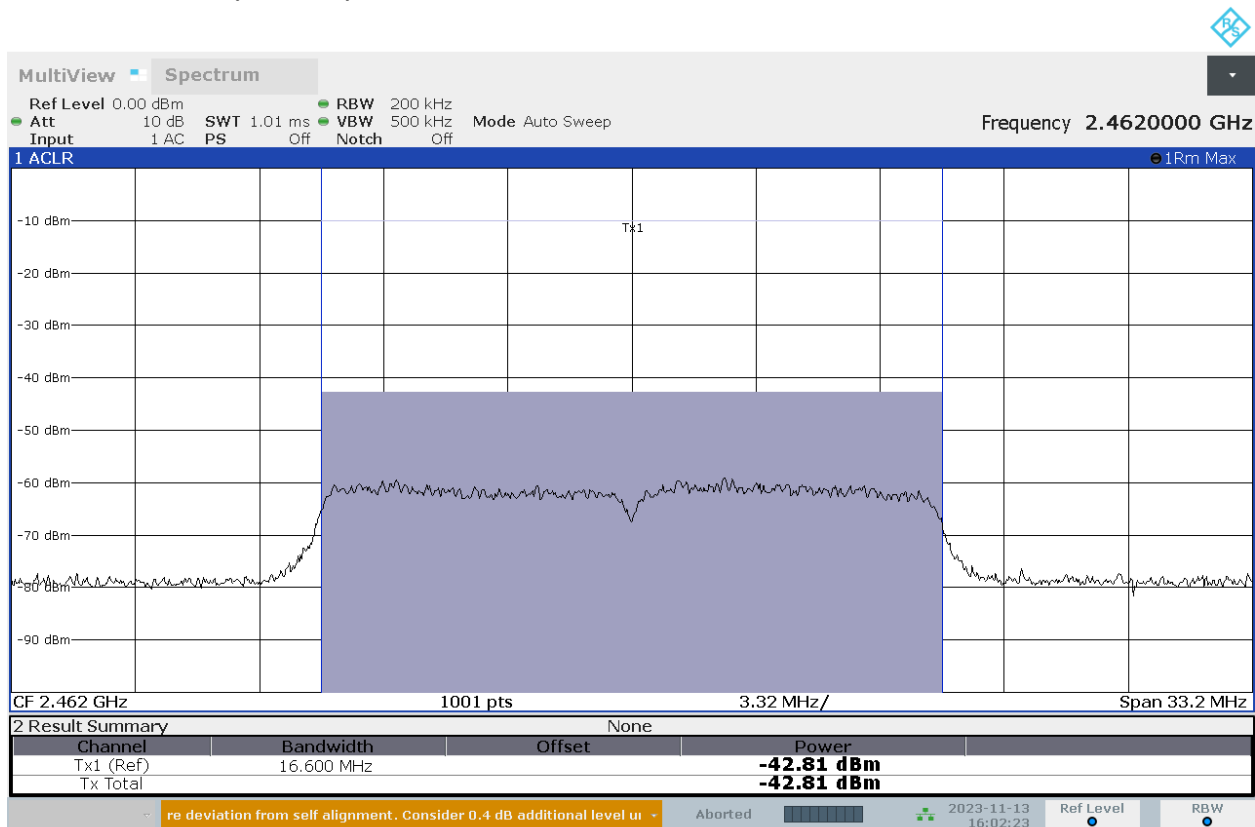
7.8.2 Channel 6 (2437 MHz)



03:51:37 PM 11/13/2023



7.8.3 Channel 11 (2462MHz)

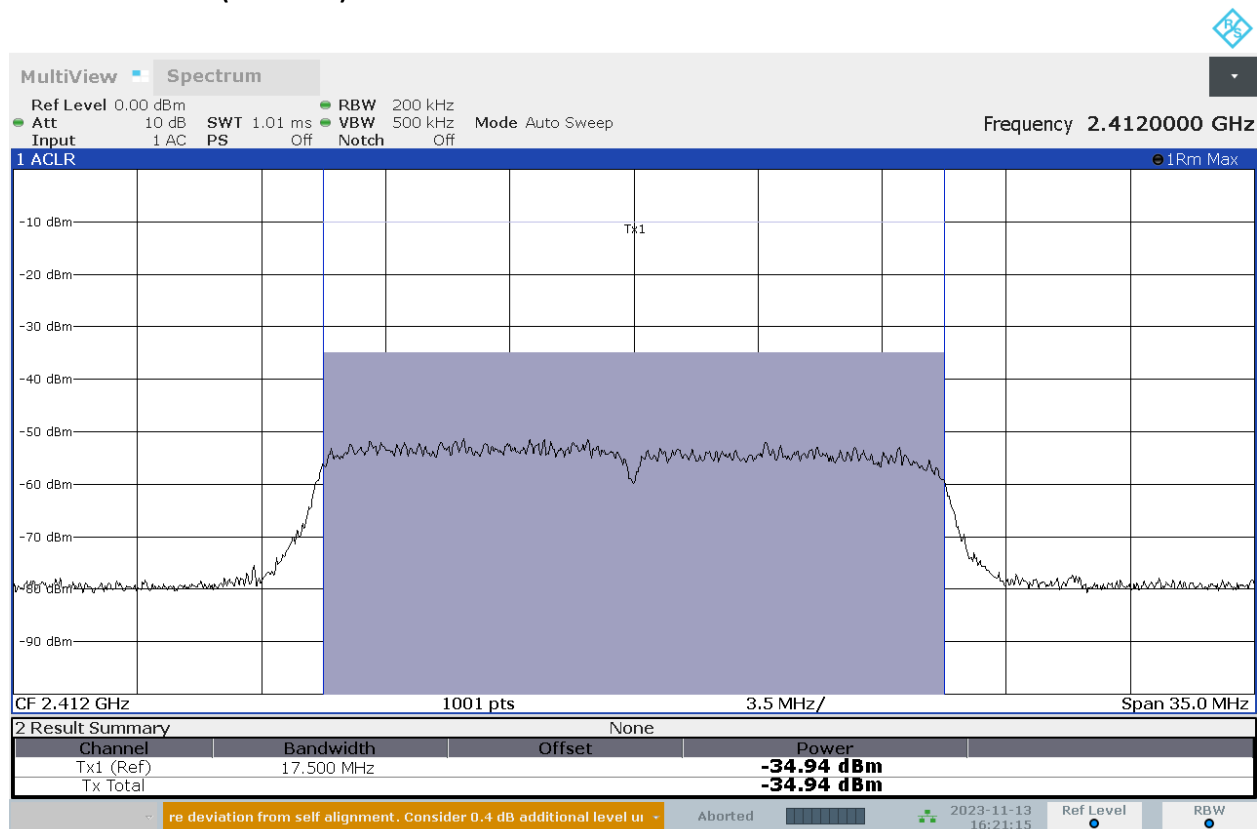


04:02:23 PM 11/13/2023



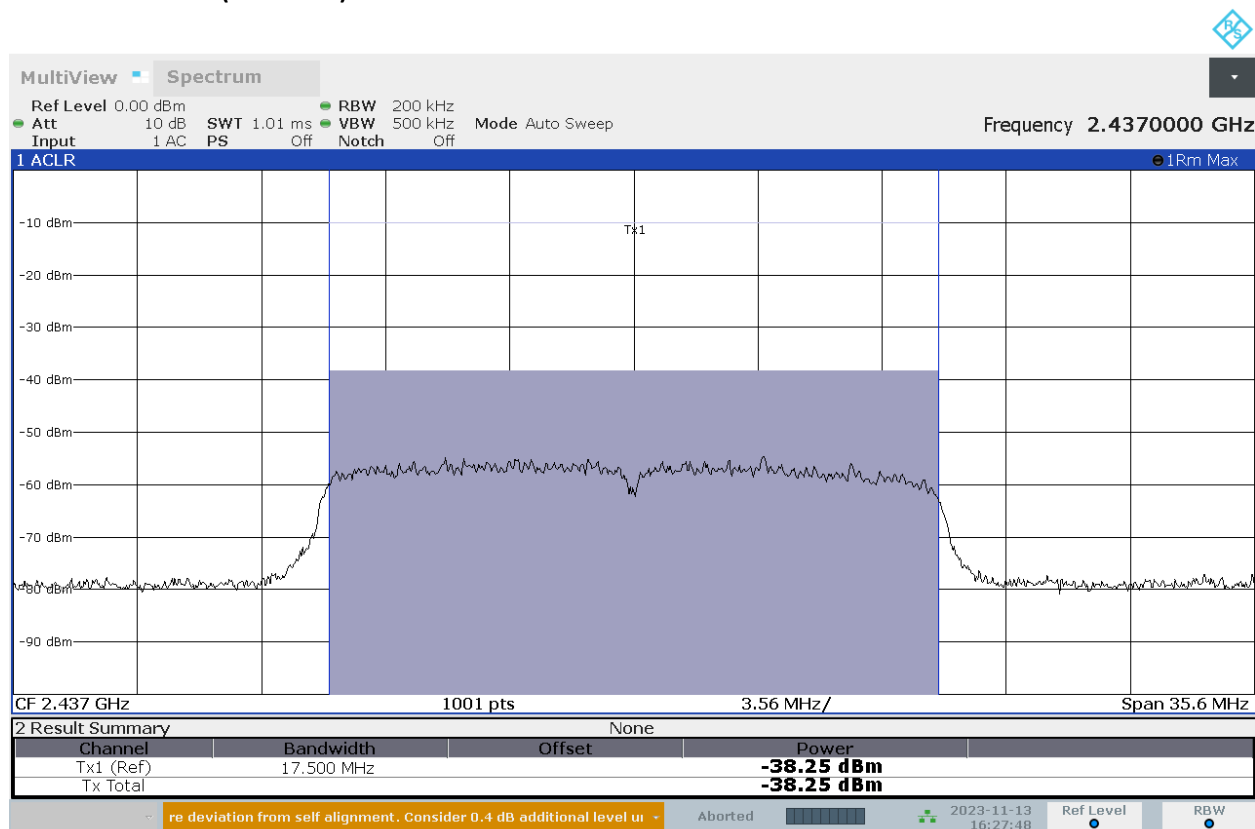
7.9 Wi-Fi 802.11n

7.9.1 Channel 1 (2412 MHz)





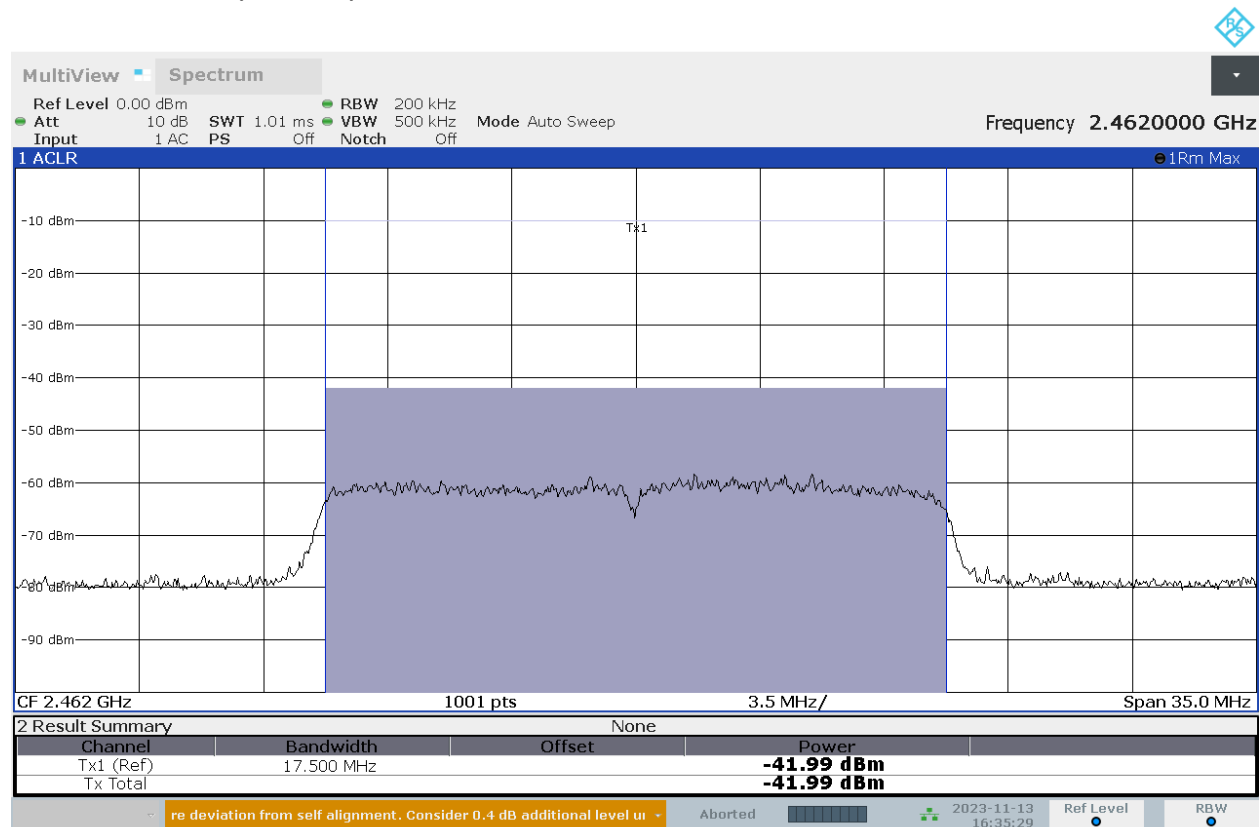
7.9.2 Channel 6 (2437 MHz)



04:27:48 PM 11/13/2023



7.9.3 Channel 11 (2462MHz)



04:35:29 PM 11/13/2023



8 Occupied Bandwidth

8.1 Test Limits

FCC Part 15.247(a)(2):

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

RSS-247 Issue 3 § 5.2(a):

The minimum 6 dB bandwidth shall be 500 kHz.

8.2 Test Method

Tests are performed in accordance with ANSI C63.10:2013 § 11.8.1.

8.3 Test Equipment Used

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	8258	Rohde & Schwarz	ESW44	9/19/2023	9/19/2024
Horn Antenna (1-18GHz)	3780	ETS	3117	8/8/2023	8/8/2024
System Controller	4096	ETS Lindgren	2090	Verify at Time of Use	Verify at Time of Use
1-18GHz Signal Path without Preamplifier	3074, 2588, 2593, 8188, 8185			10/5/2023	10/5/2024

8.4 Test Results

The device was found to be **compliant**. The 6dB bandwidth was at least 500kHz.

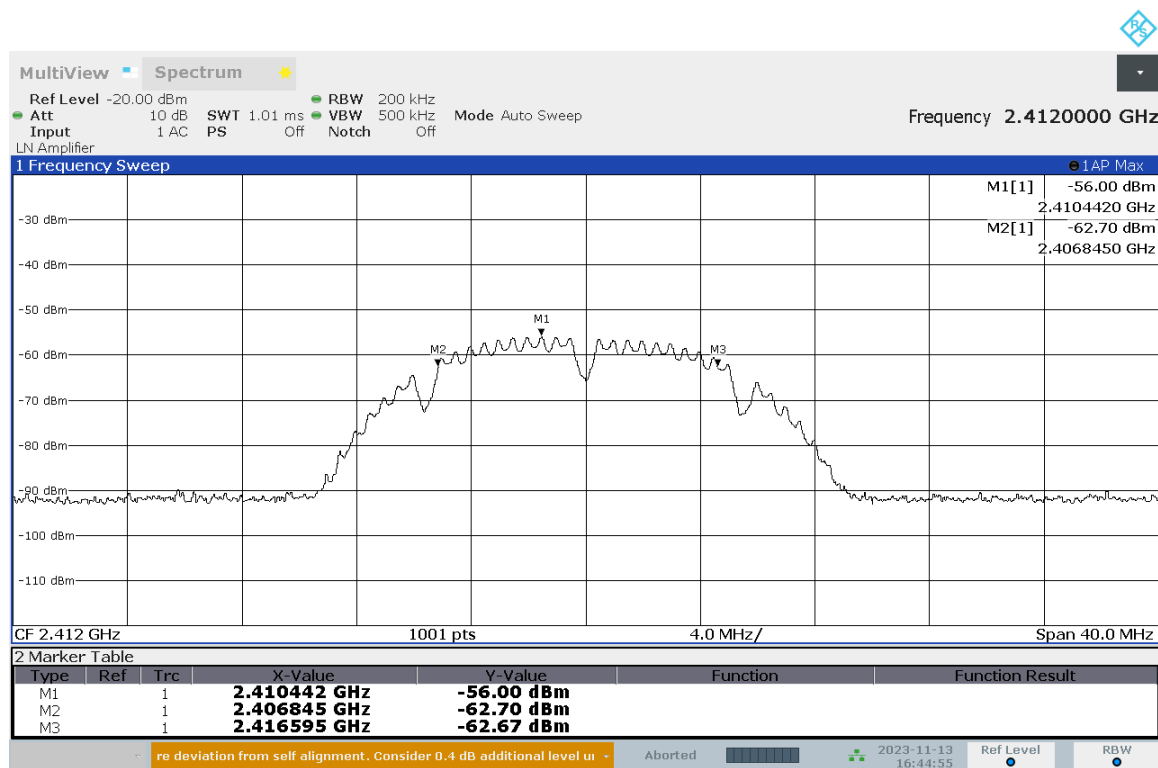
8.5 Test Conditions

Test Personnel:	<u>Brian Lackey</u>	Test Date:	<u>11/13/2023</u>
Supervising/Reviewing Engineer:		Limit Applied:	<u>See Above</u>
(Where Applicable)	<u>NA</u>	Ambient Temperature:	<u>25.6°C</u>
Product Standard:	<u>FCC Part 15.247</u>	Relative Humidity:	<u>52.2%</u>
Input Voltage:	<u>Battery</u>	Atmospheric Pressure:	<u>985.4mbar</u>
Pretest Verification w / Ambient Signals or BB Source:	<u>Yes</u>		

Deviations, Additions, or Exclusions: None.

**8.6 Test Data**

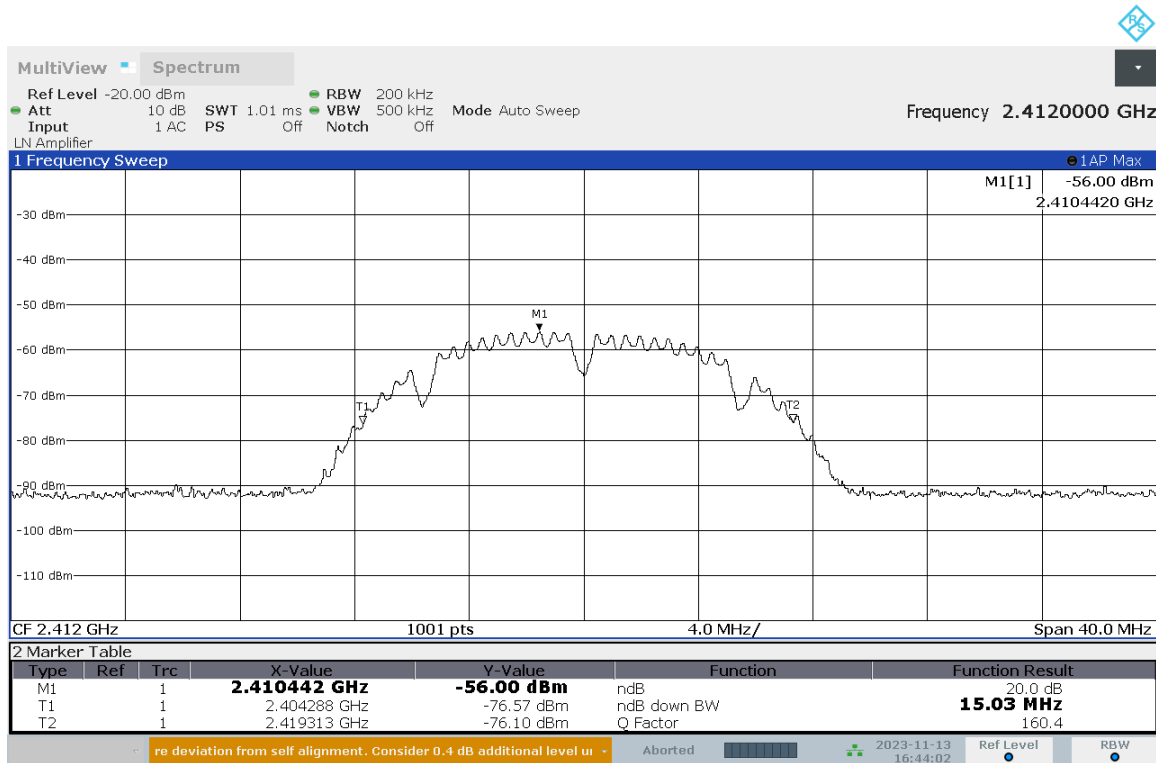
Mode	Channel / Frequency (MHz)	6dB BW (MHz)	20dB BW (MHz)	99% BW (MHz)
802.11b	1 / 2412 MHz	9.750	15.03	13.44
	6 / 2437 MHz	10.15	14.90	13.35
	11 / 2462 MHz	10.15	15.27	14.42
802.11g	1 / 2412 MHz	16.38	18.14	16.69
	6 / 2437 MHz	16.58	18.18	16.53
	11 / 2462 MHz	16.54	18.22	16.58
802.11n	1 / 2412 MHz	17.50	18.90	17.54
	6 / 2437 MHz	17.46	18.86	17.49
	11 / 2462 MHz	17.42	18.78	17.58

**8.7 Wi-Fi 802.11b****8.7.1 Channel 1 (2412 MHz)****8.7.1.1 6dB Bandwidth**

04:44:56 PM 11/13/2023

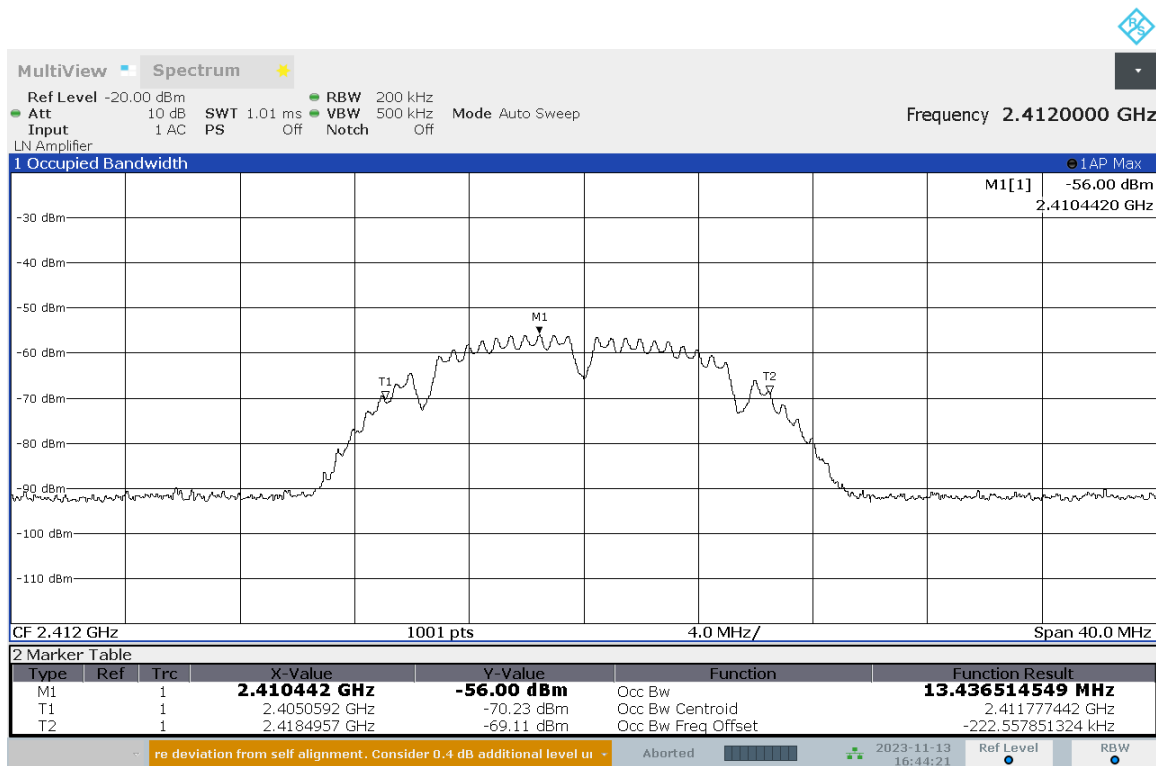


8.7.1.2 20dB Bandwidth



04:44:03 PM 11/13/2023

8.7.1.3 99% Bandwidth

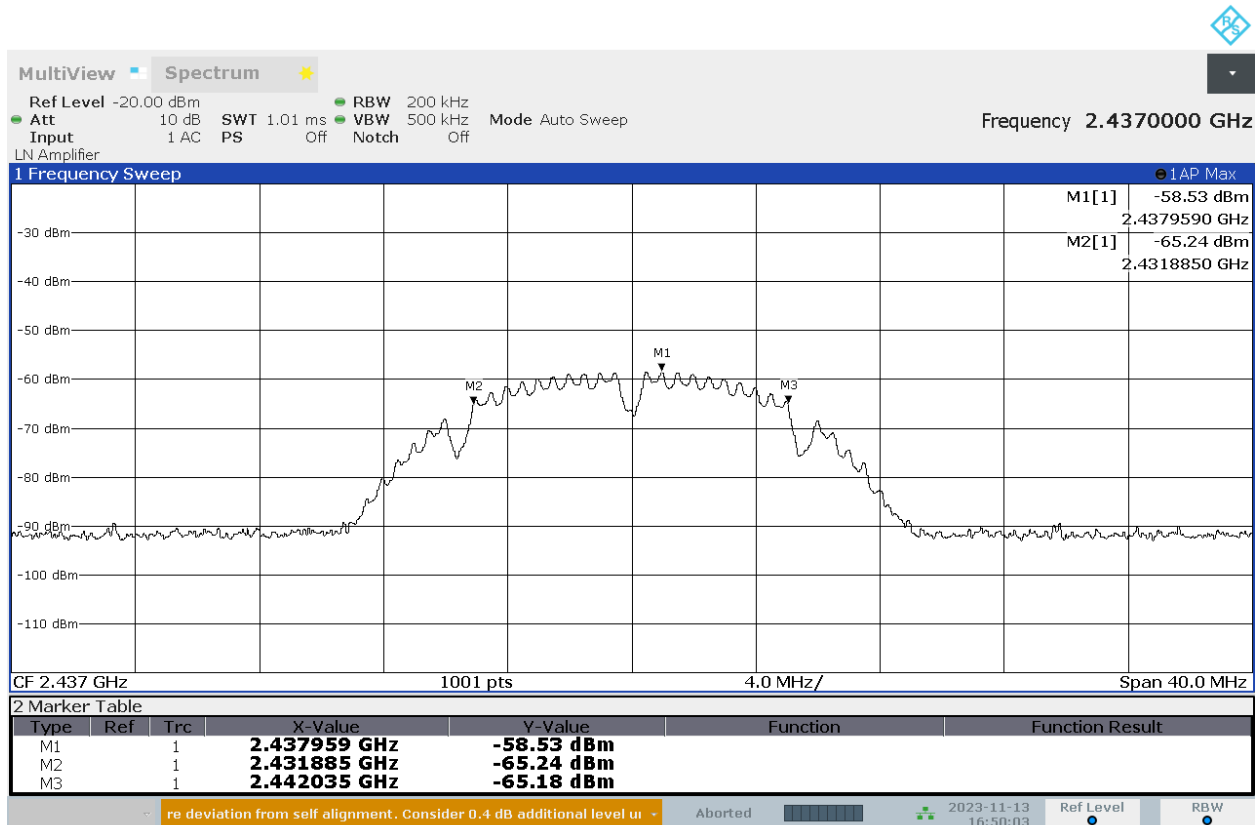


04:44:22 PM 11/13/2023



8.7.2 Channel 6 (2437 MHz)

8.7.2.1 6dB Bandwidth

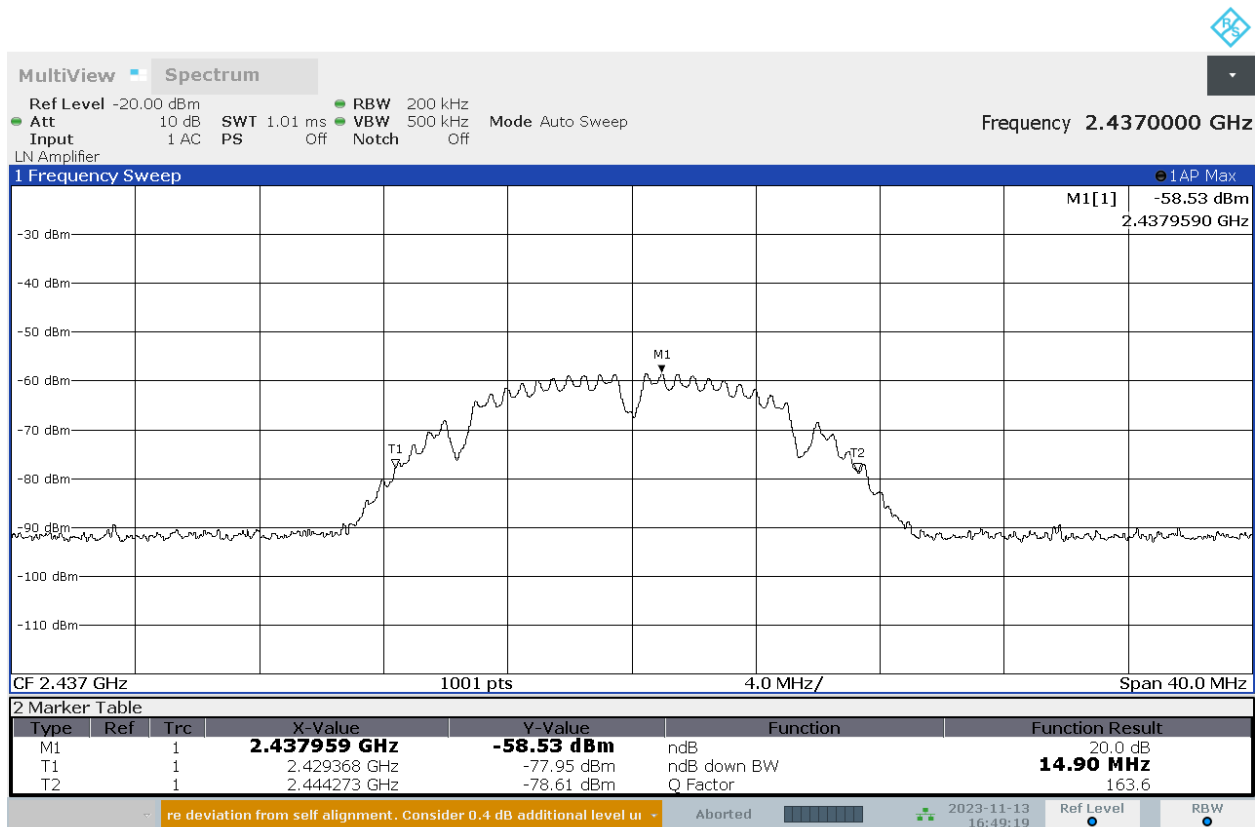


04:50:04 PM 11/13/2023



EMC Test Report

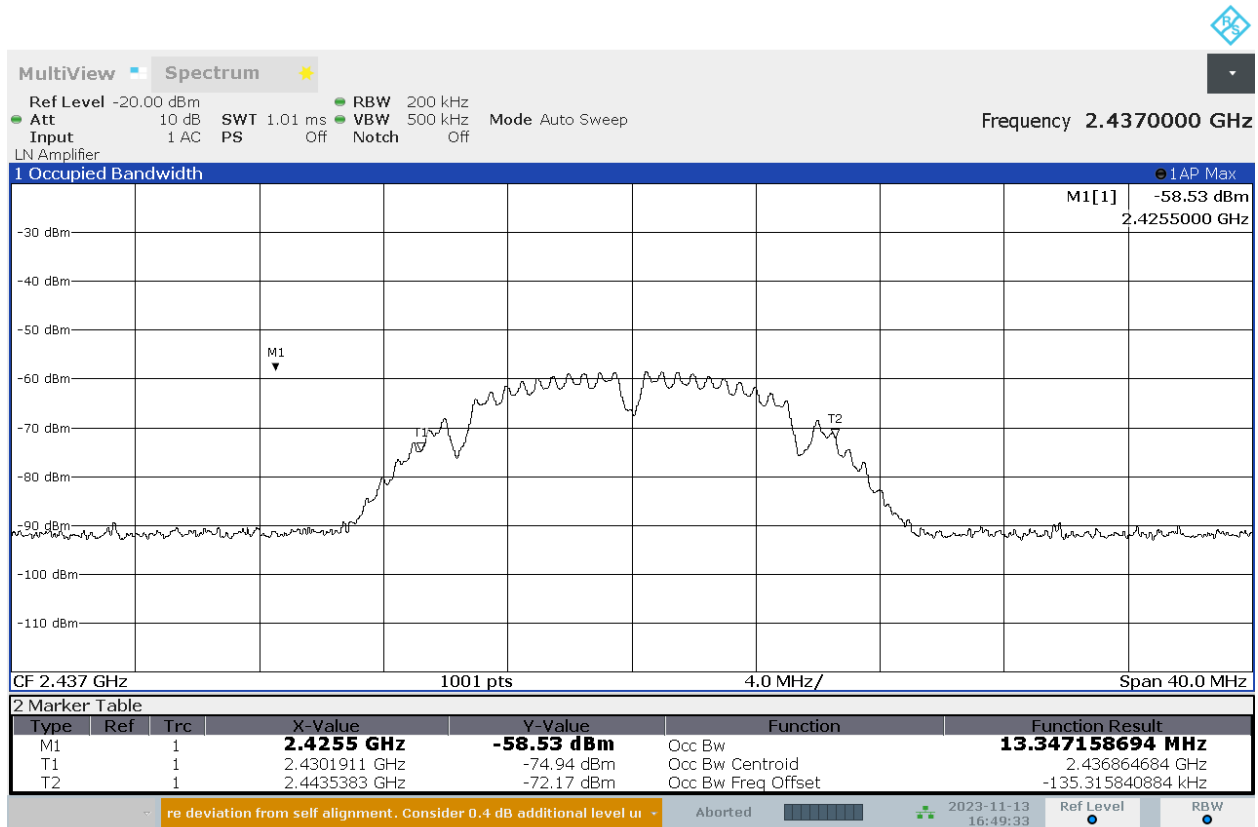
8.7.2.2 20dB Bandwidth



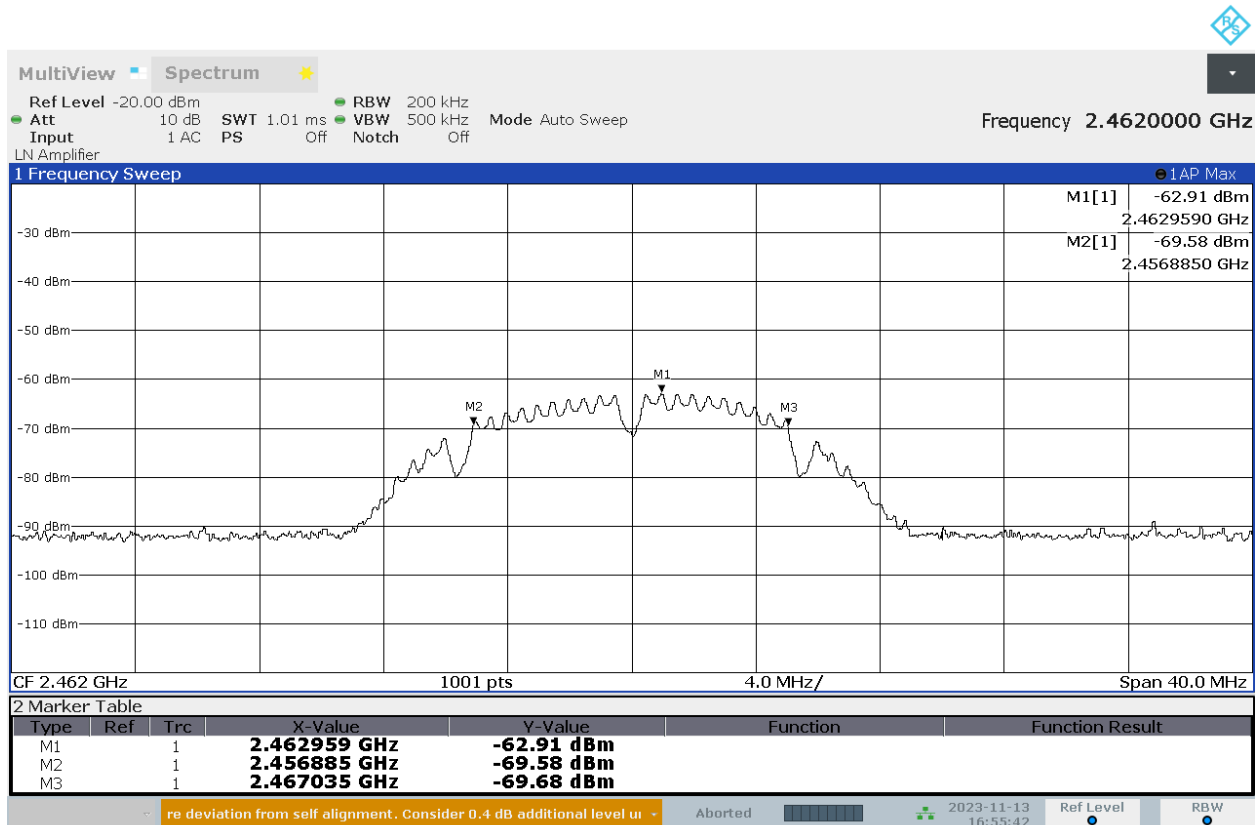
04:49:20 PM 11/13/2023



8.7.2.3 99% Bandwidth



04:49:34 PM 11/13/2023

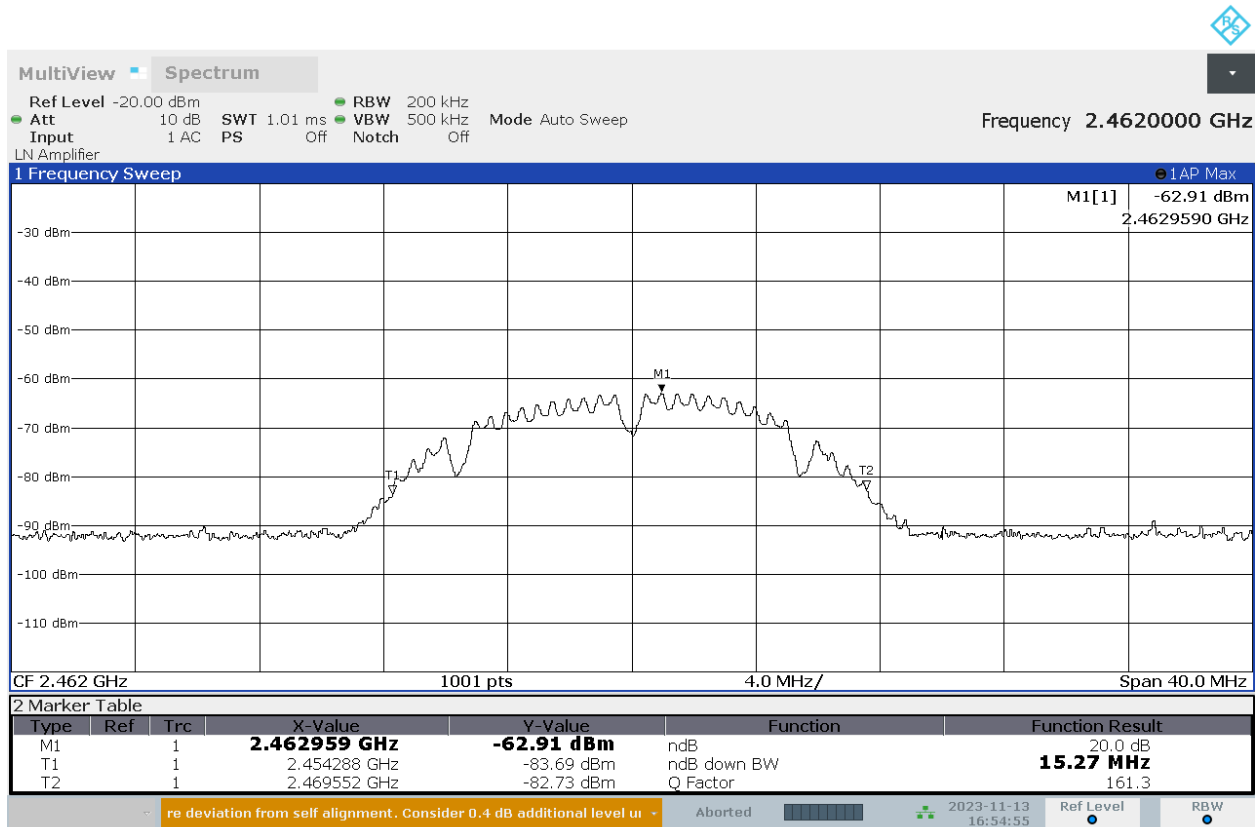
**8.7.3 Channel 11 (2462 MHz)****8.7.3.1 6dB Bandwidth**

04:55:43 PM 11/13/2023



EMC Test Report

8.7.3.2 20dB Bandwidth

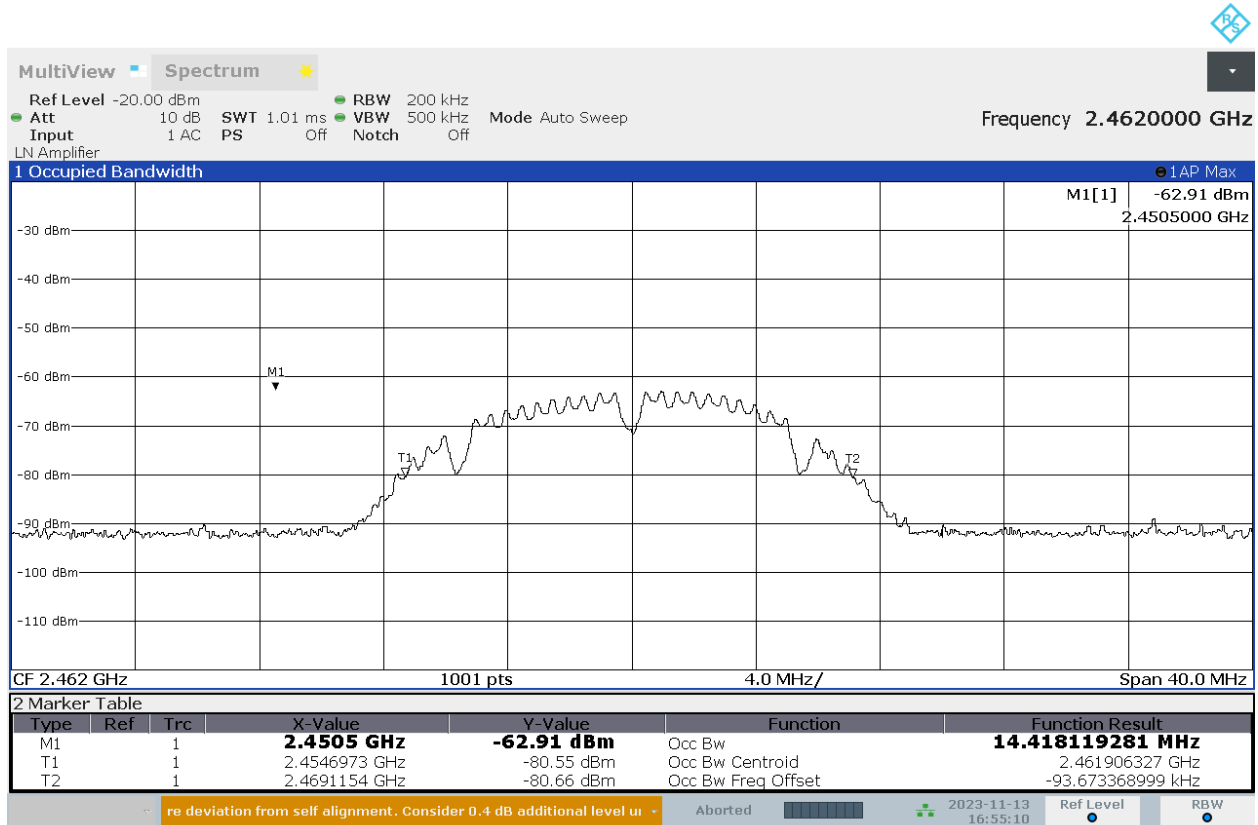


04:54:55 PM 11/13/2023



EMC Test Report

8.7.3.3 99% Bandwidth



04:55:11 PM 11/13/2023

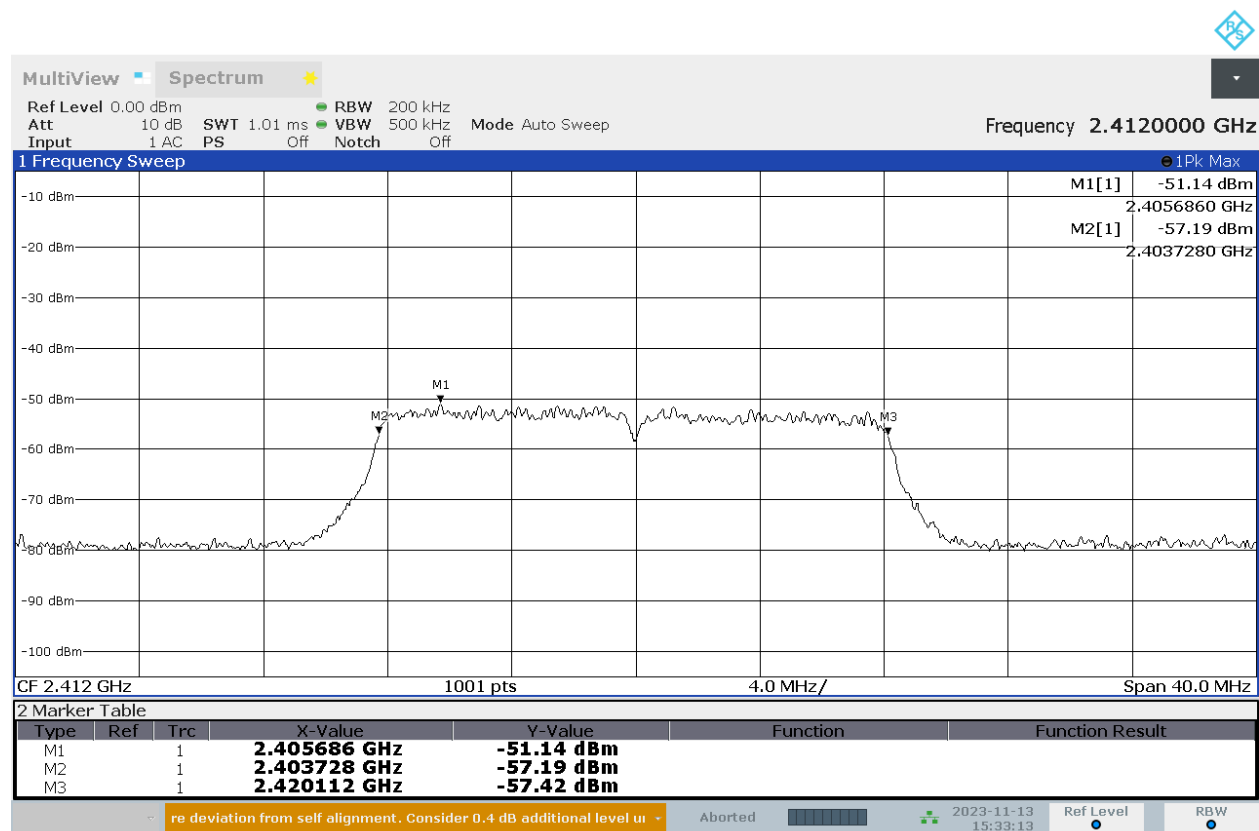


EMC Test Report

8.8 Wi-Fi 802.11g

8.8.1 Channel 1 (2412 MHz)

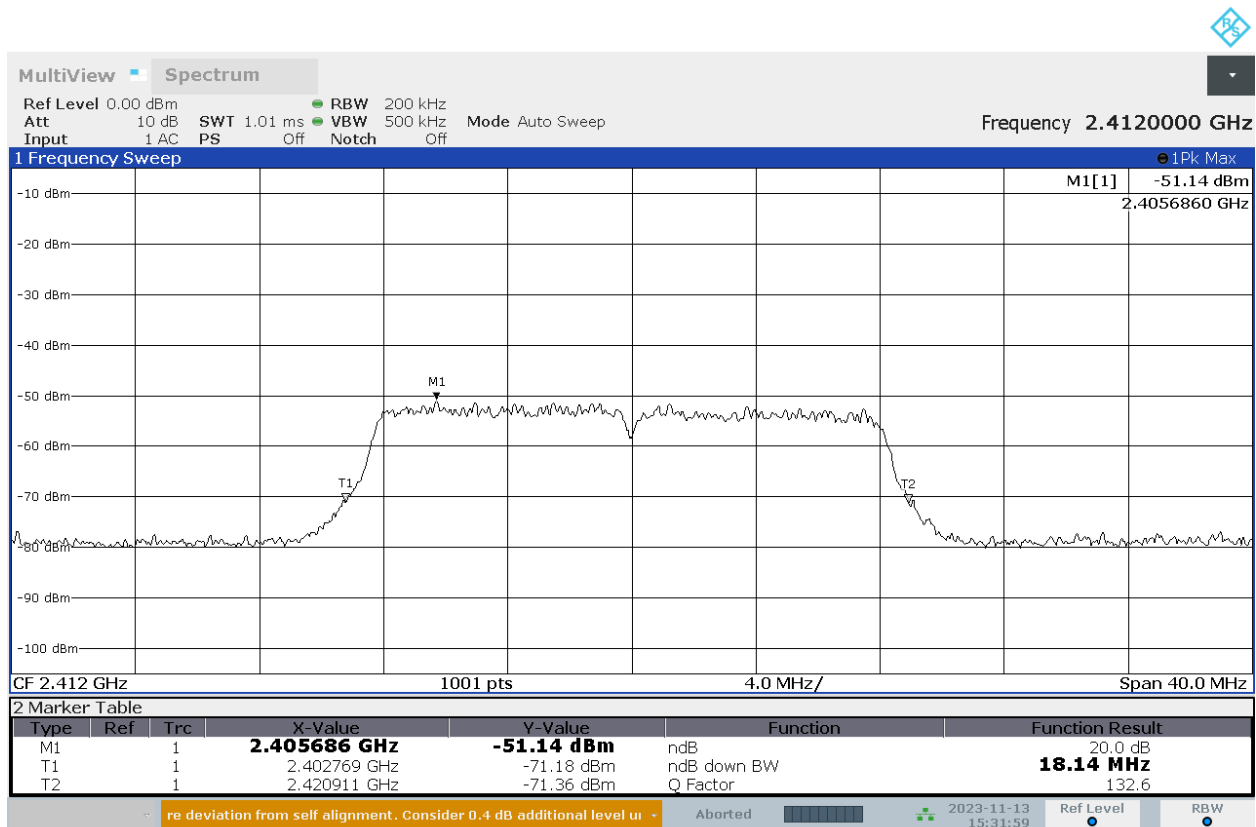
8.8.1.1 6dB Bandwidth



03:33:13 PM 11/13/2023



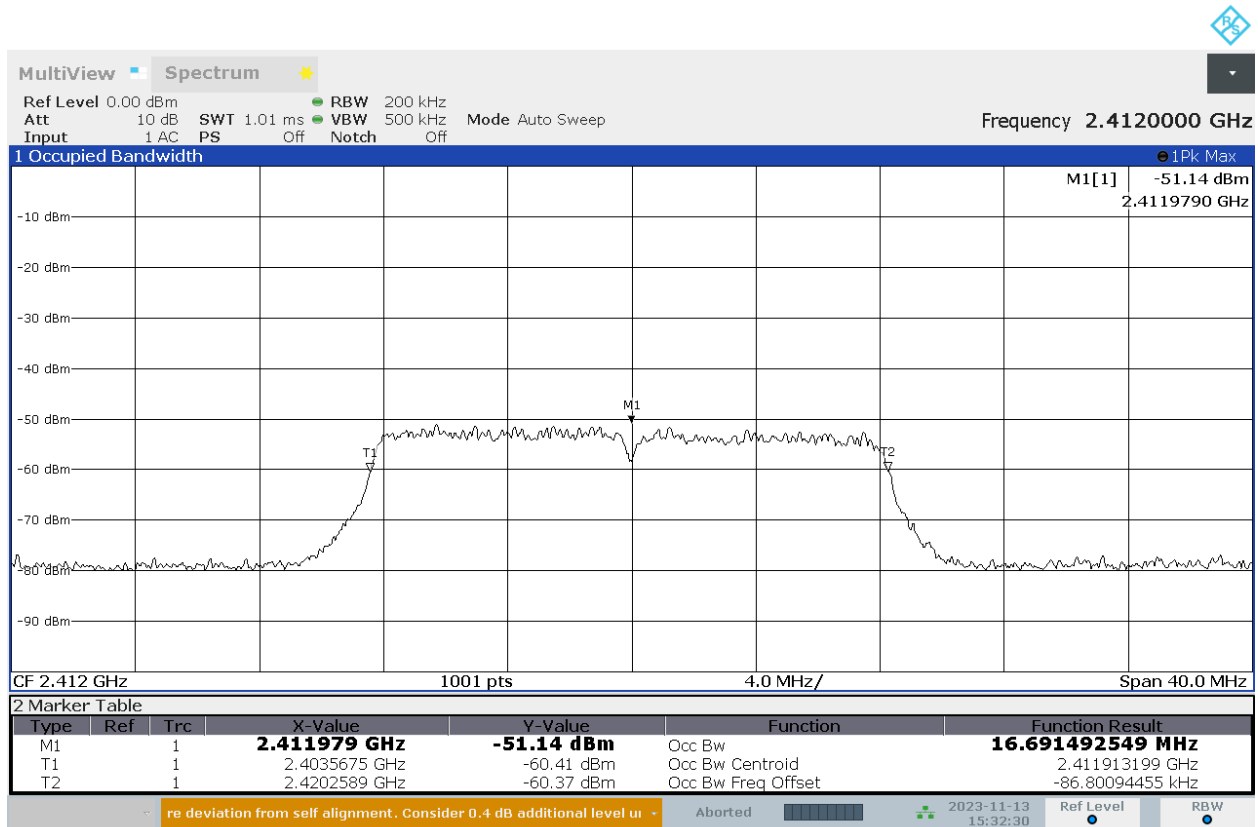
8.8.1.2 20dB Bandwidth



03:31:59 PM 11/13/2023



8.8.1.3 99% Bandwidth

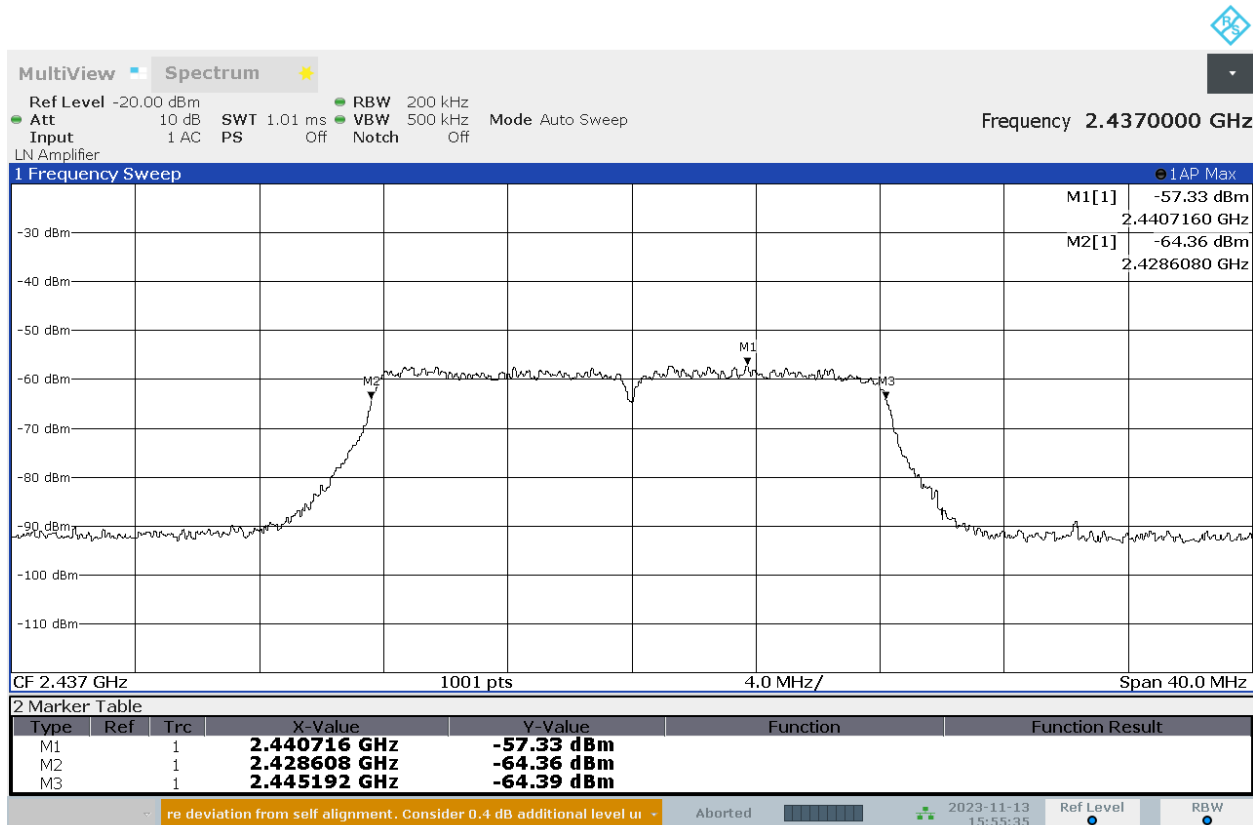


03:32:30 PM 11/13/2023



8.8.2 Channel 6 (2437 MHz)

8.8.2.1 6dB Bandwidth

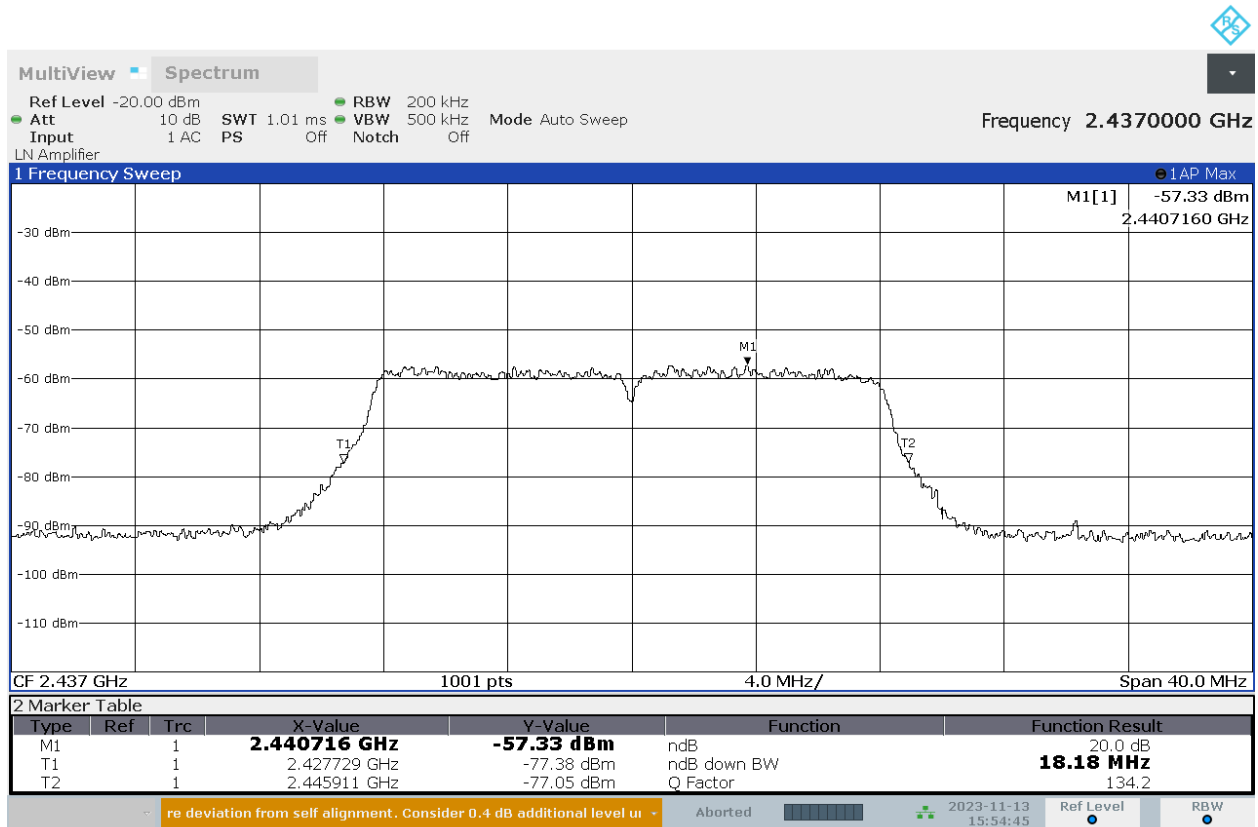


03:55:35 PM 11/13/2023



EMC Test Report

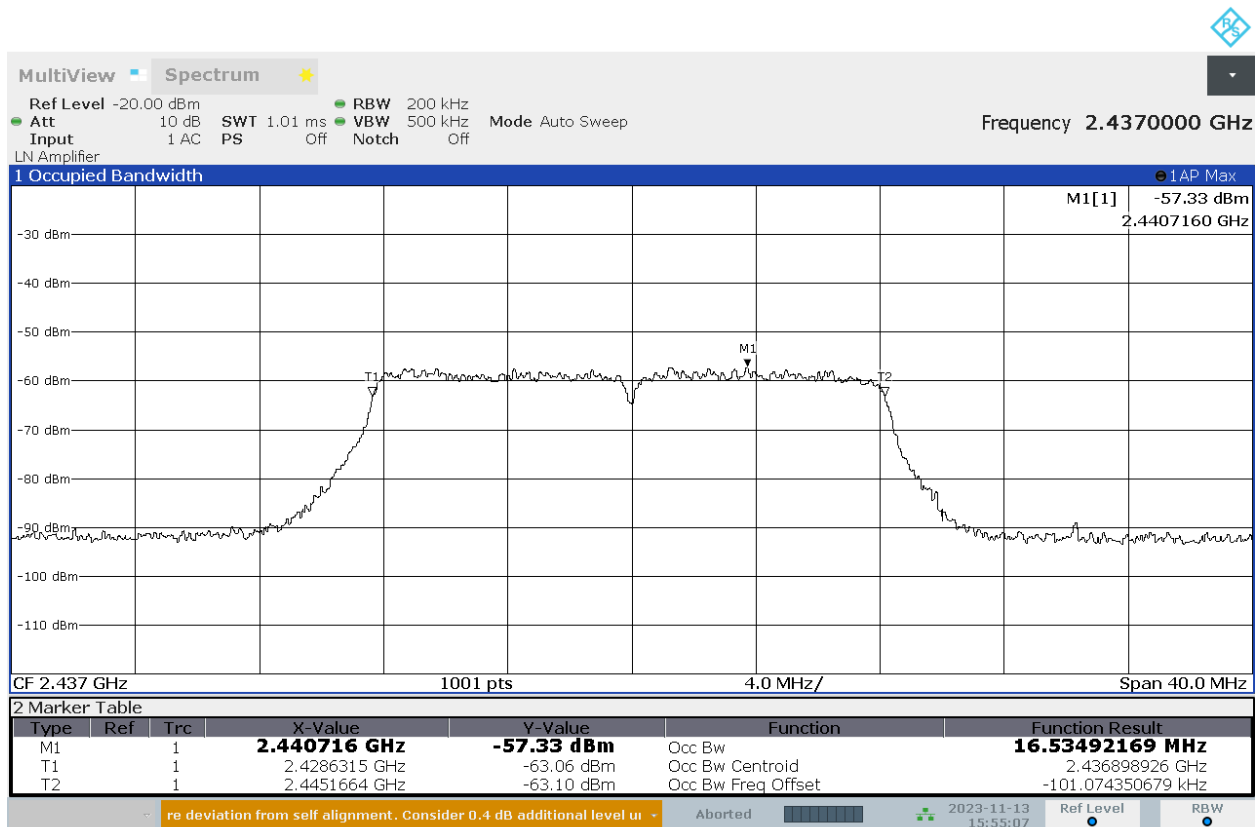
8.8.2.2 20dB Bandwidth



03:54:46 PM 11/13/2023



8.8.2.3 99% Bandwidth

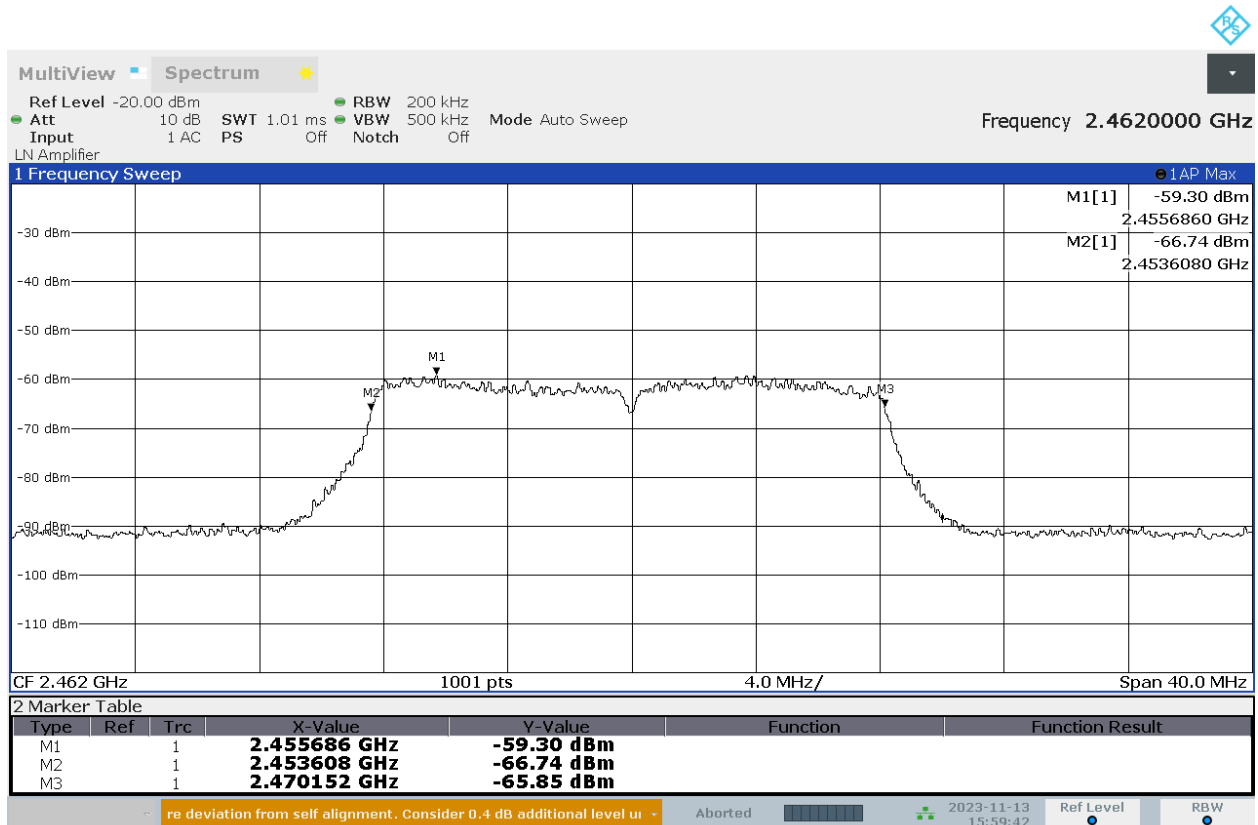


03:55:07 PM 11/13/2023



8.8.3 Channel 11 (2462 MHz)

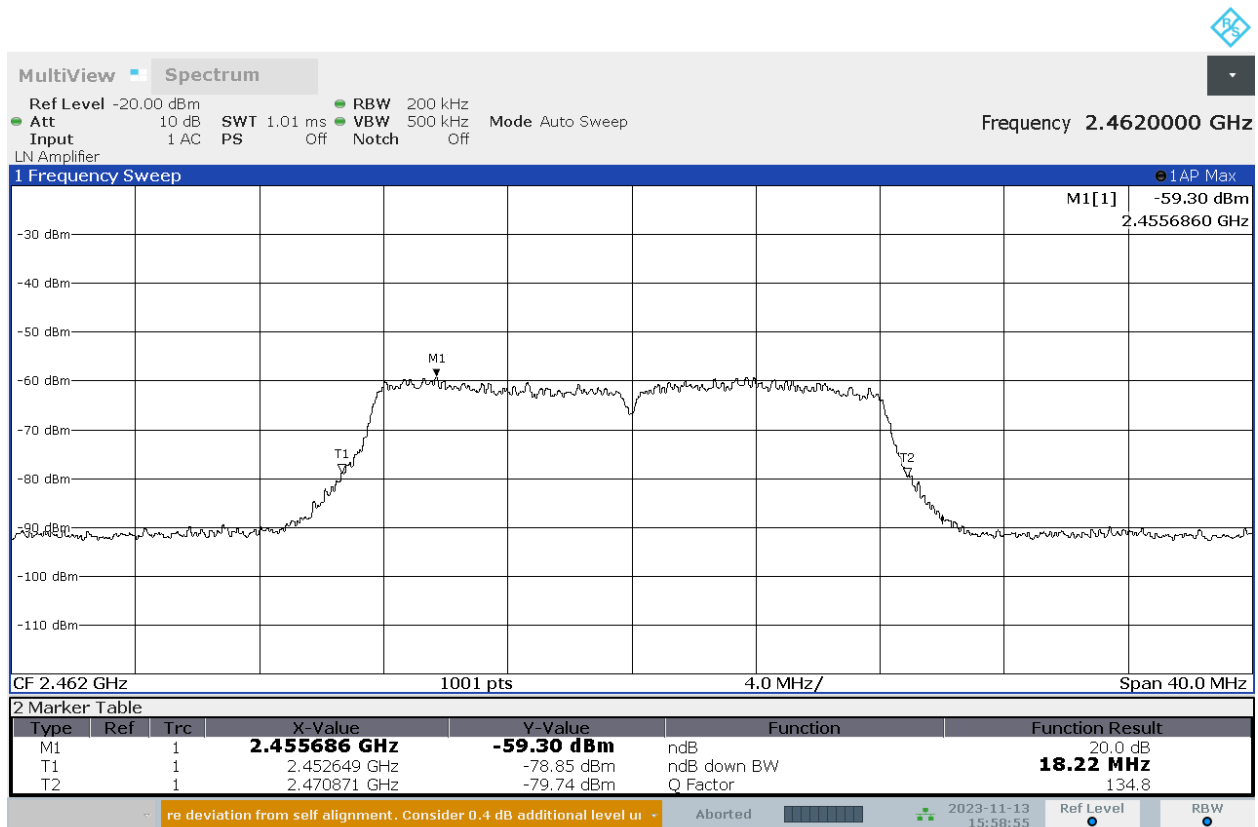
8.8.3.1 6dB Bandwidth



03:59:42 PM 11/13/2023



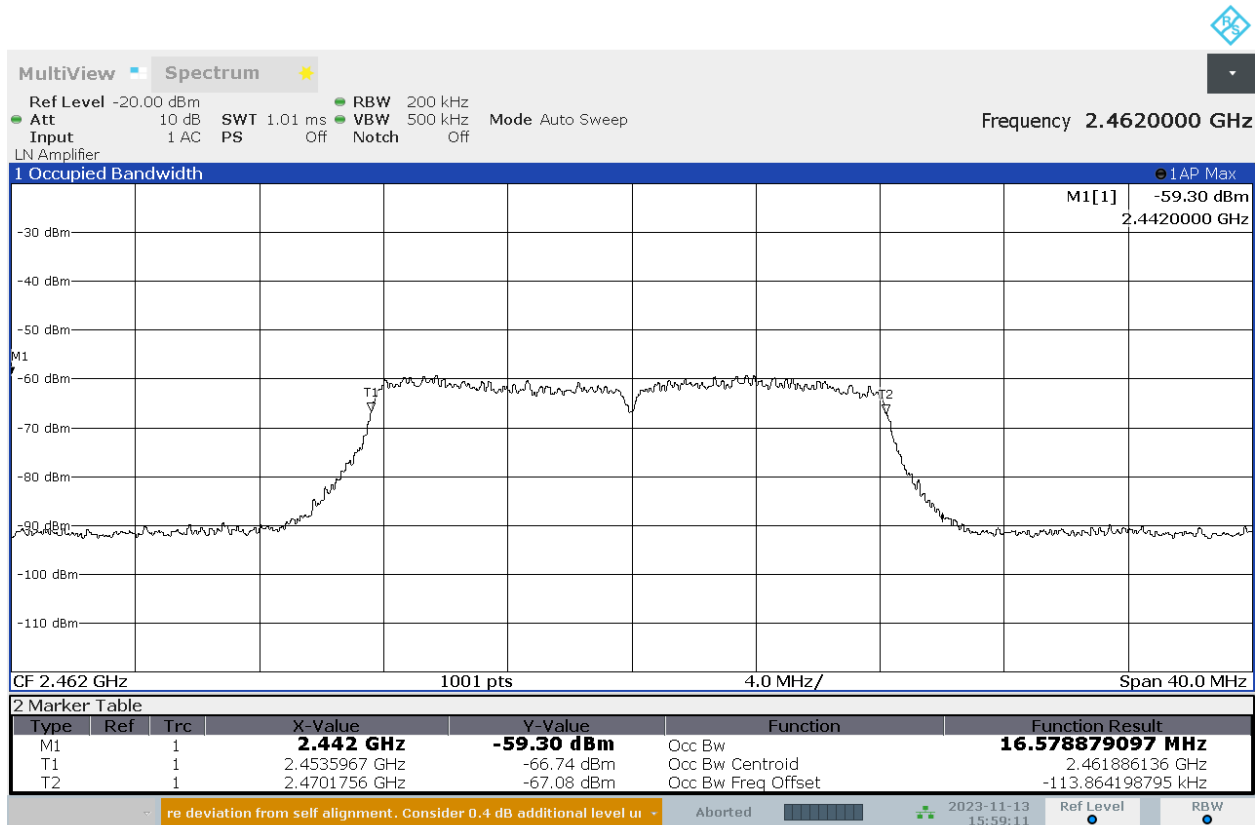
8.8.3.2 20dB Bandwidth



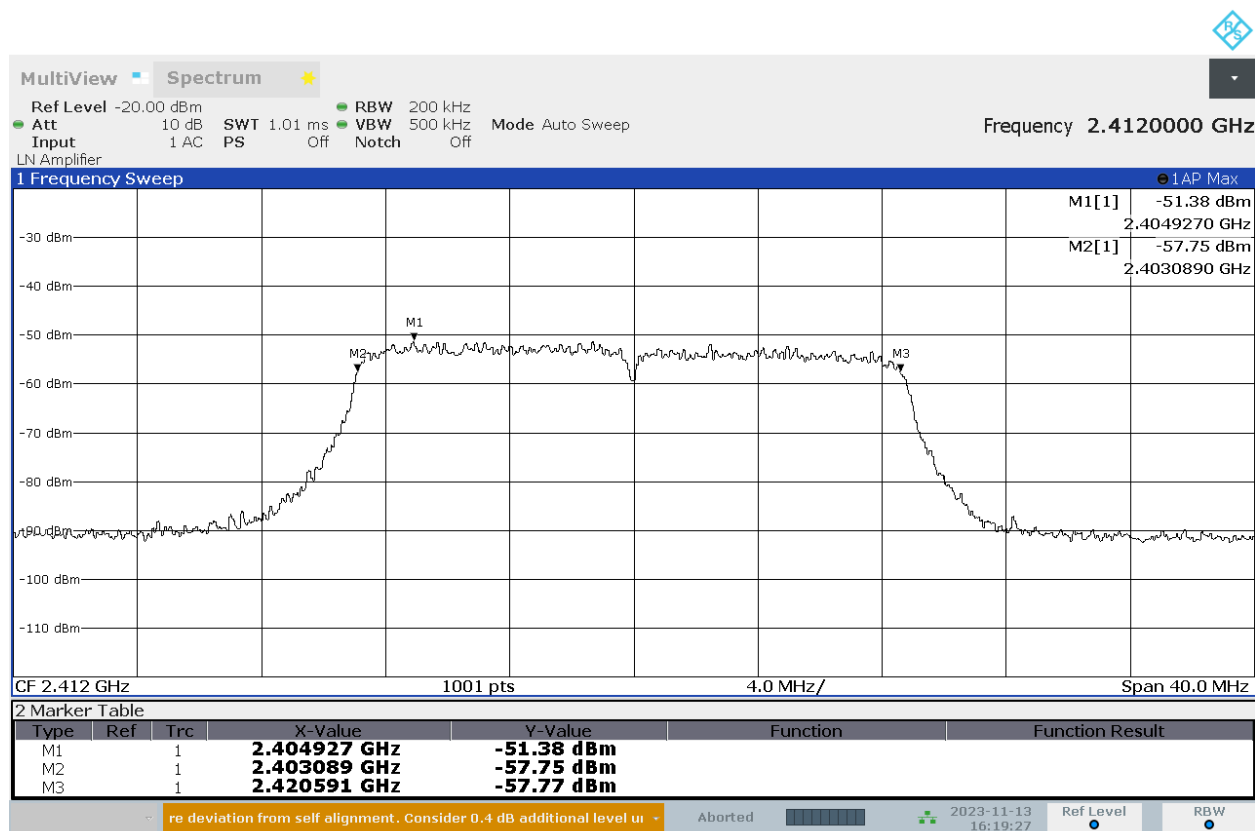
03:58:55 PM 11/13/2023



8.8.3.3 99% Bandwidth



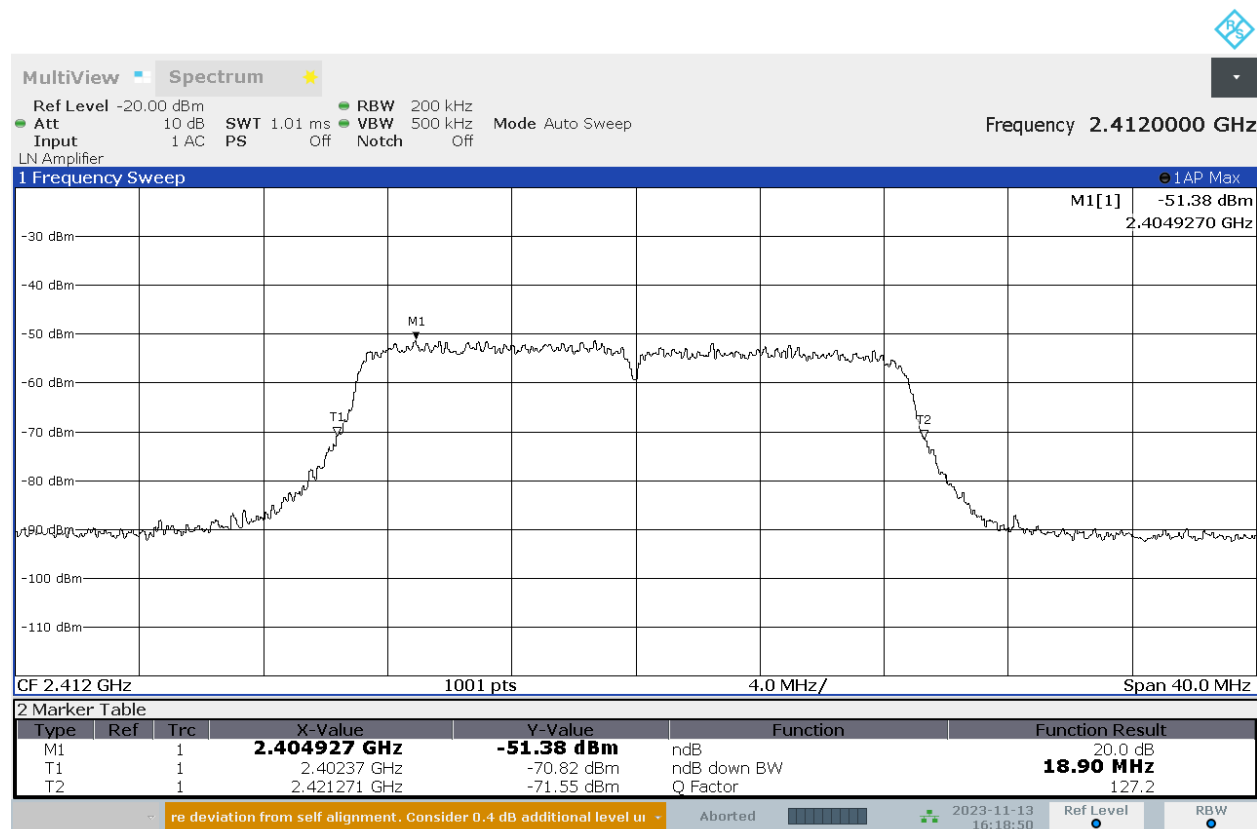
03:59:11 PM 11/13/2023

**8.9 Wi-Fi 802.11n****8.9.1 Channel 1 (2412 MHz)****8.9.1.1 6dB Bandwidth**

04:19:28 PM 11/13/2023



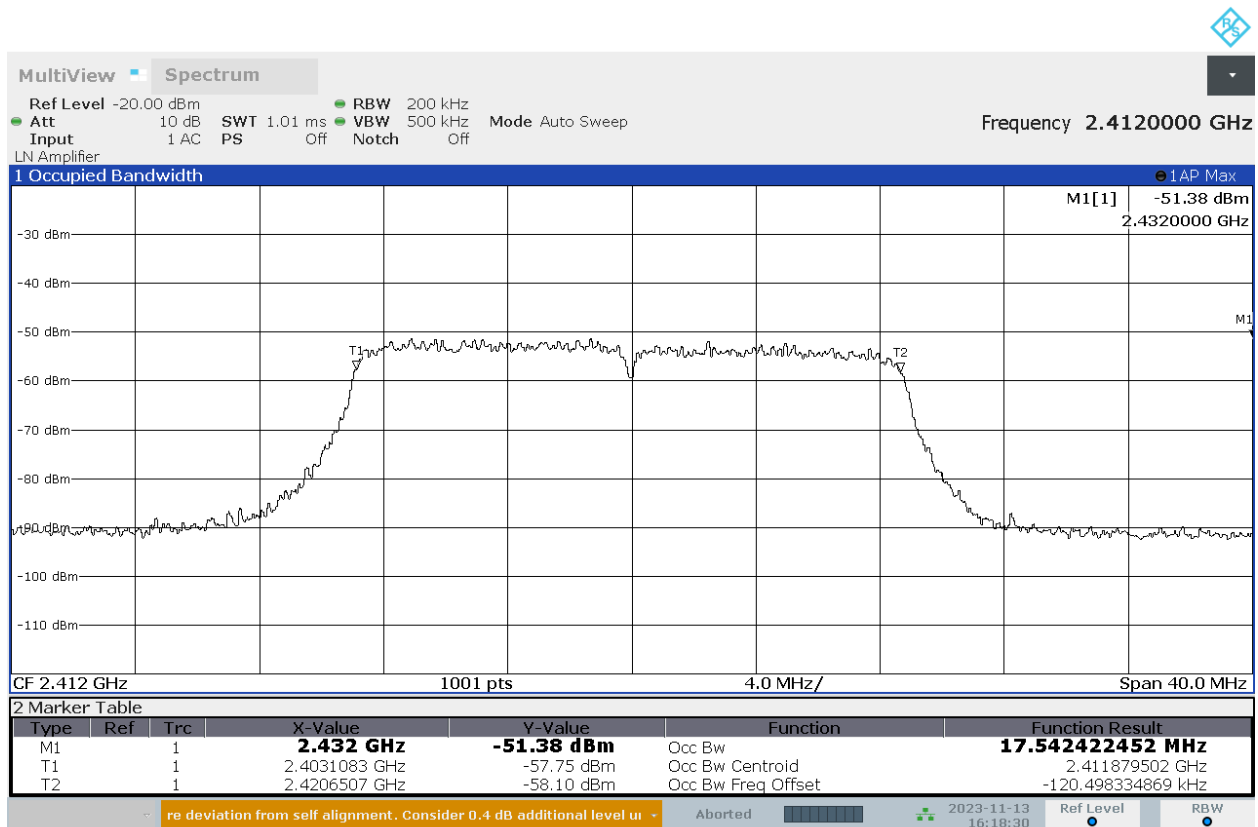
8.9.1.2 20dB Bandwidth



04:18:50 PM 11/13/2023



8.9.1.3 99% Bandwidth

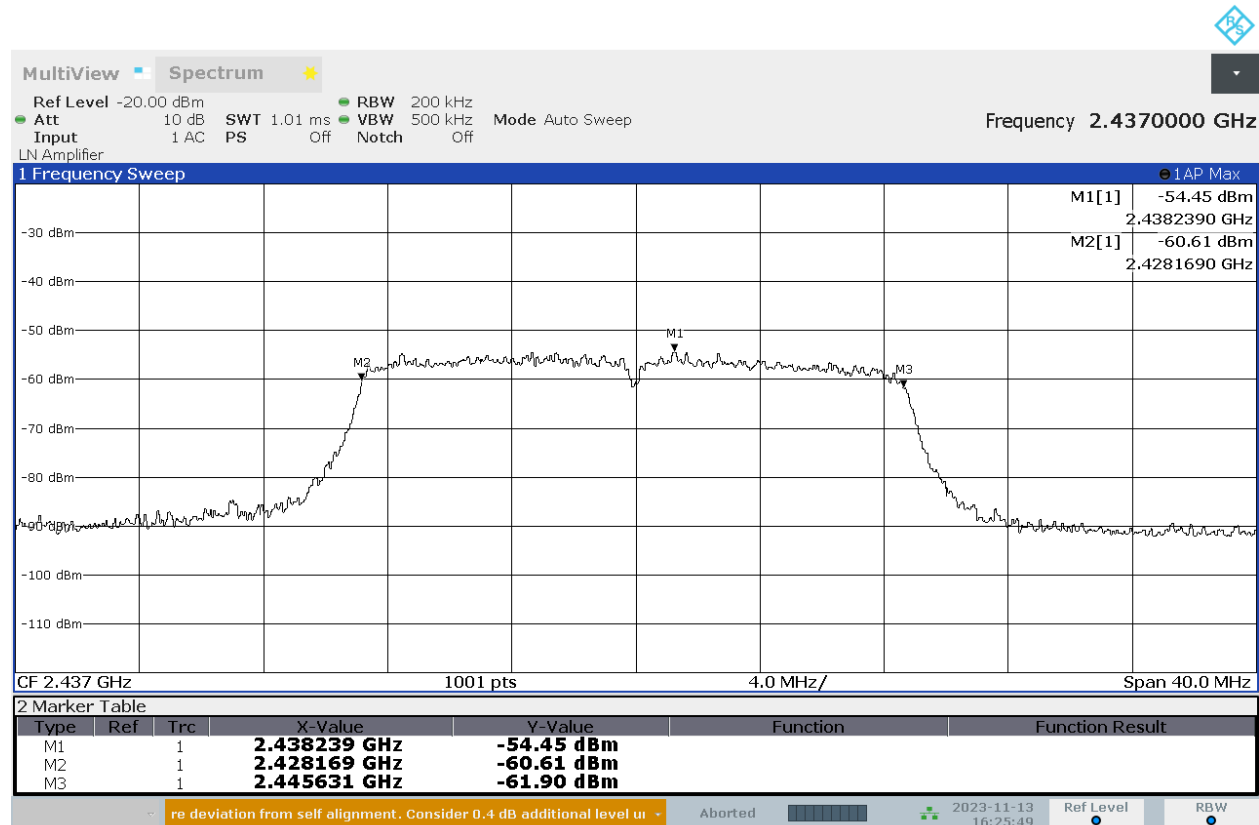


04:18:30 PM 11/13/2023



8.9.2 Channel 6 (2437 MHz)

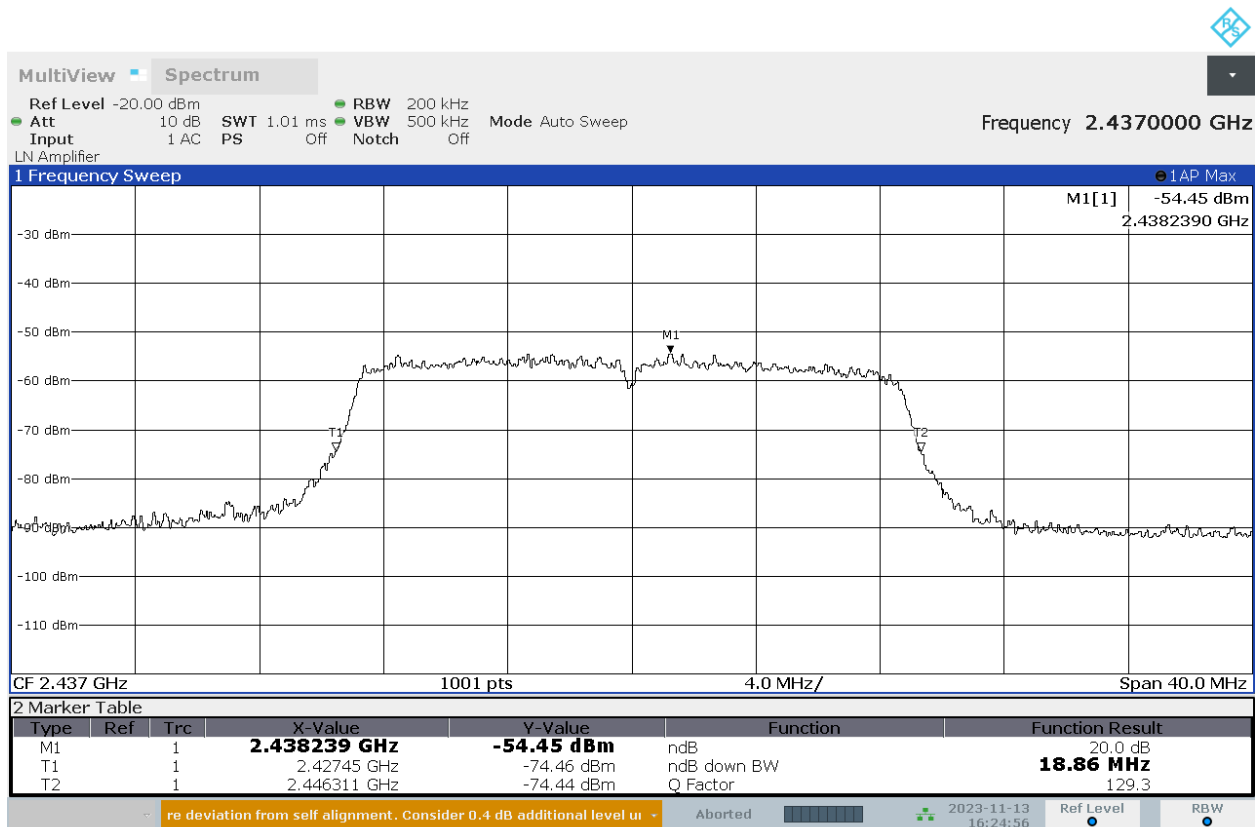
8.9.2.1 6dB Bandwidth



04:25:49 PM 11/13/2023



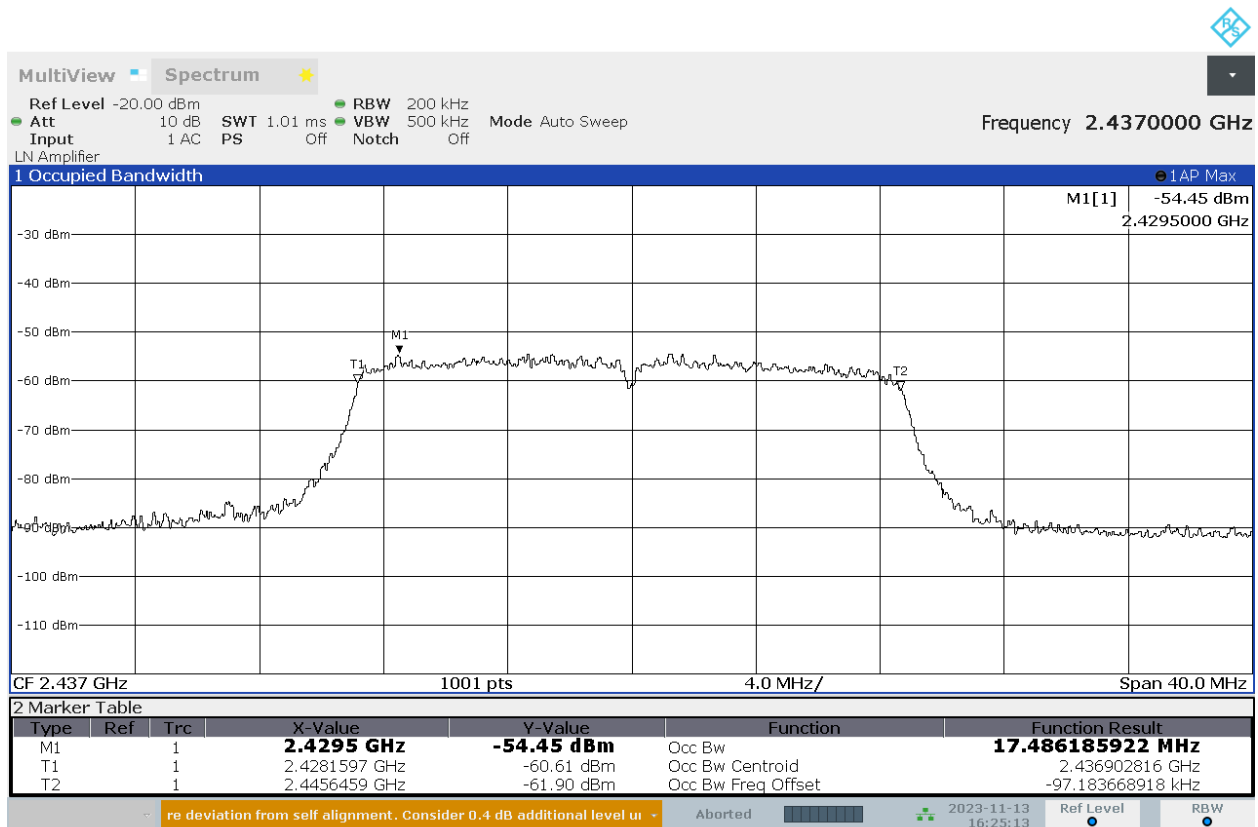
8.9.2.2 20dB Bandwidth



04:24:57 PM 11/13/2023



8.9.2.3 99% Bandwidth

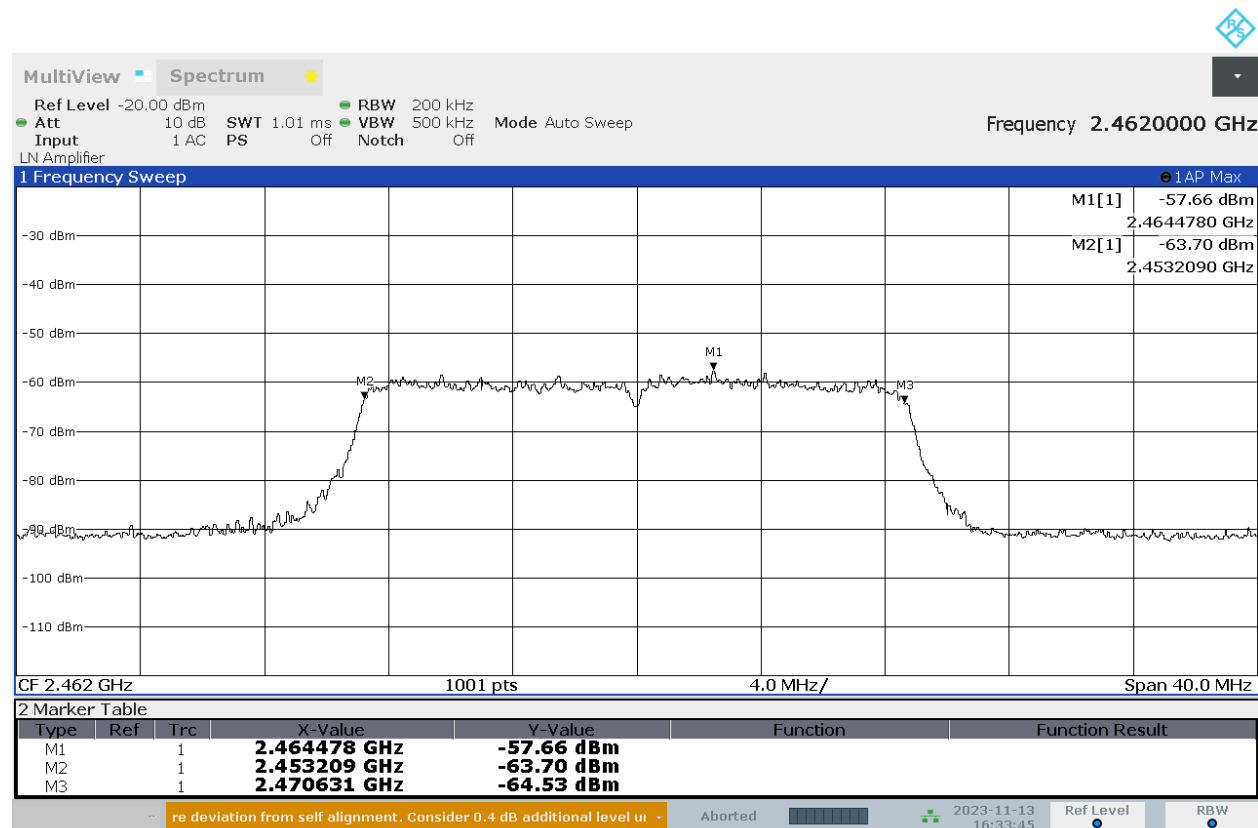


04:25:14 PM 11/13/2023



8.9.3 Channel 11 (2462 MHz)

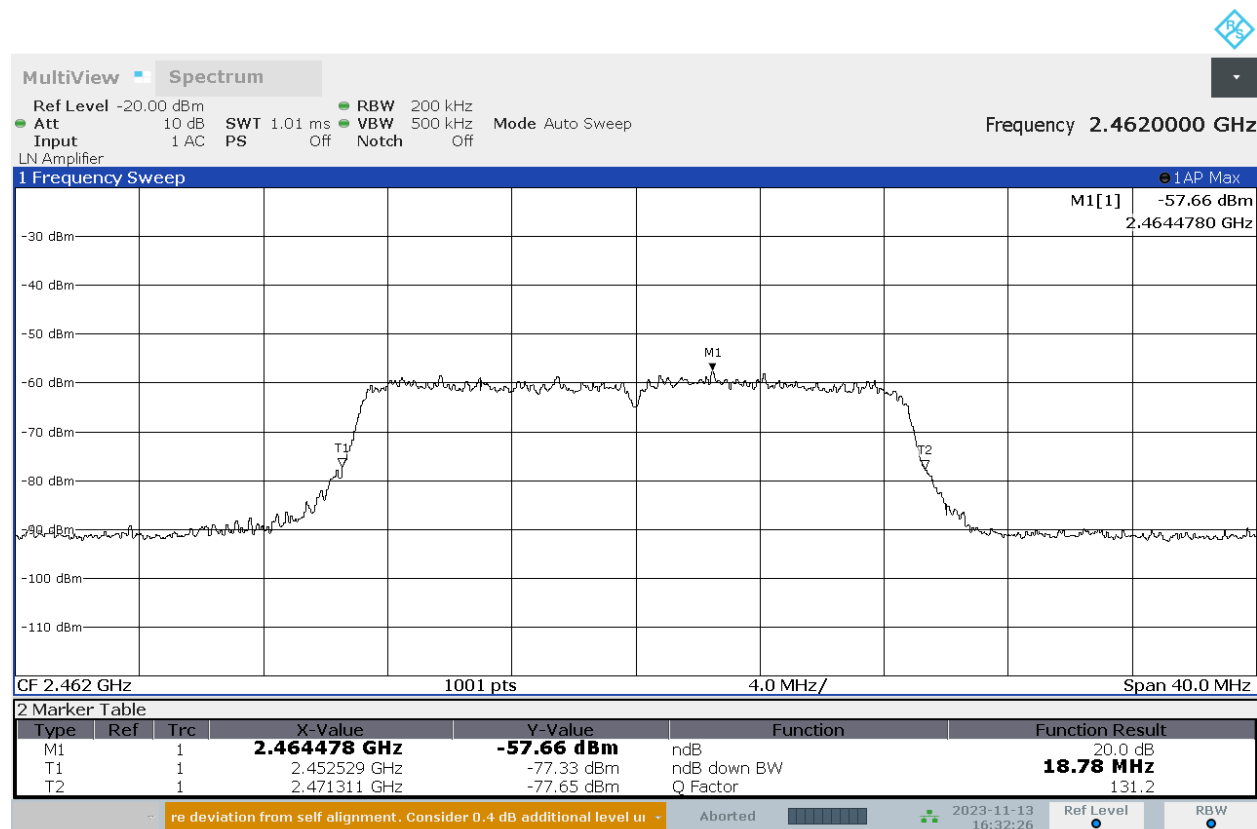
8.9.3.1 6dB Bandwidth



04:33:46 PM 11/13/2023



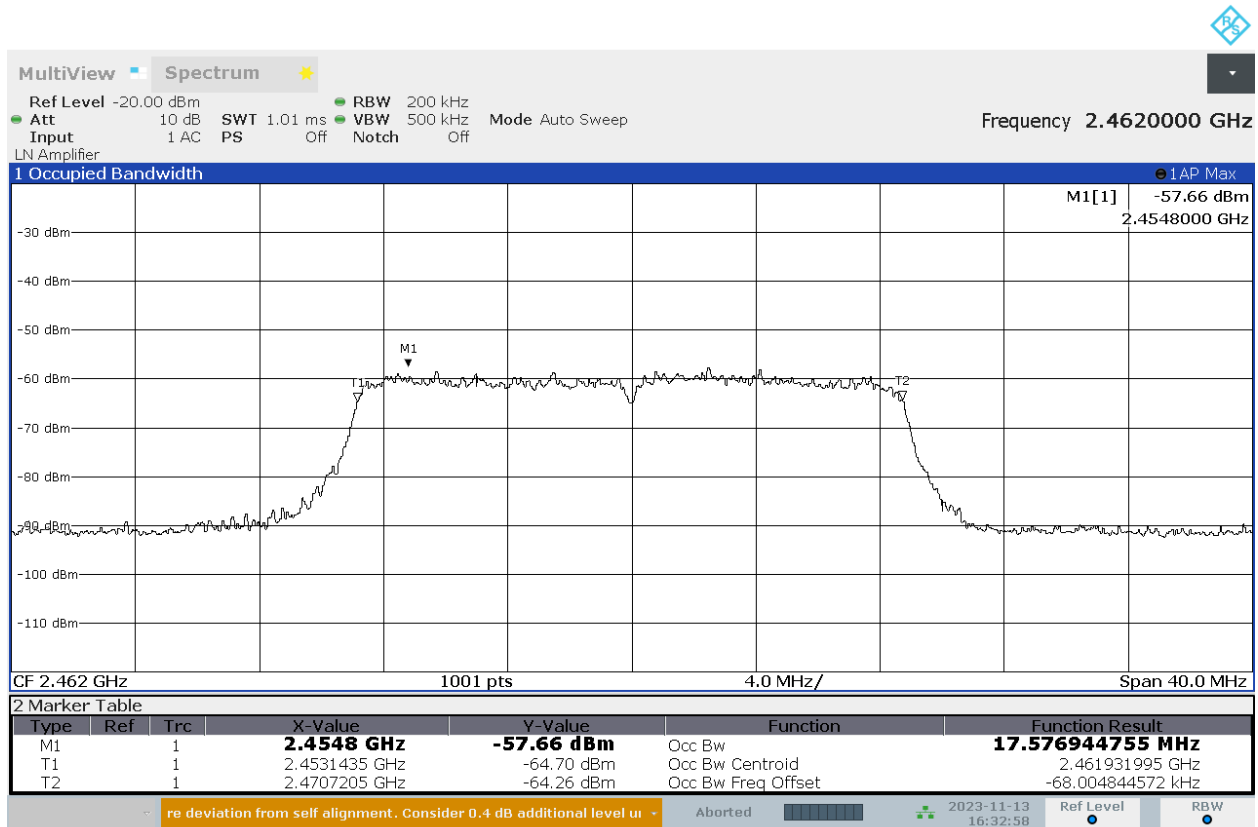
8.9.3.2 20dB Bandwidth



04:32:26 PM 11/13/2023



8.9.3.3 99% Bandwidth



04:32:58 PM 11/13/2023



9 Power Spectral Density

9.1 Test Limits

FCC Part 15.247(e):

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

RSS-247 Issue 3 § 5.2(b):

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of section 5.4(d), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

9.2 Test Method

Tests are performed in accordance with ANSI C63.10:2013 § 11.10.2 Method PKPSD (peak PSD).

9.3 Test Equipment Used

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	8258	Rohde & Schwarz	ESW44	9/19/2023	9/19/2024
Horn Antenna (1-18GHz)	3780	ETS	3117	8/8/2023	8/8/2024
System Controller	4096	ETS Lindgren	2090	Verify at Time of Use	Verify at Time of Use
1-18GHz Signal Path without Preamplifier	3074, 2588, 2593, 8188, 8185			10/5/2023	10/5/2024

9.4 Test Results

The device was found to be **compliant**. The peak power spectral density in 100kHz was less than 8dBm, and the device is thereby deemed to comply with the 8dBm/3kHz limit.

9.5 Test Conditions

Test Personnel:	Brian Lackey	Test Date:	11/14/2023
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Above
Product Standard:	FCC Part 15.247	Ambient Temperature:	25.6°C
Input Voltage:	Battery	Relative Humidity:	52.2%
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	985.4mbar

Deviations, Additions, or Exclusions: None.



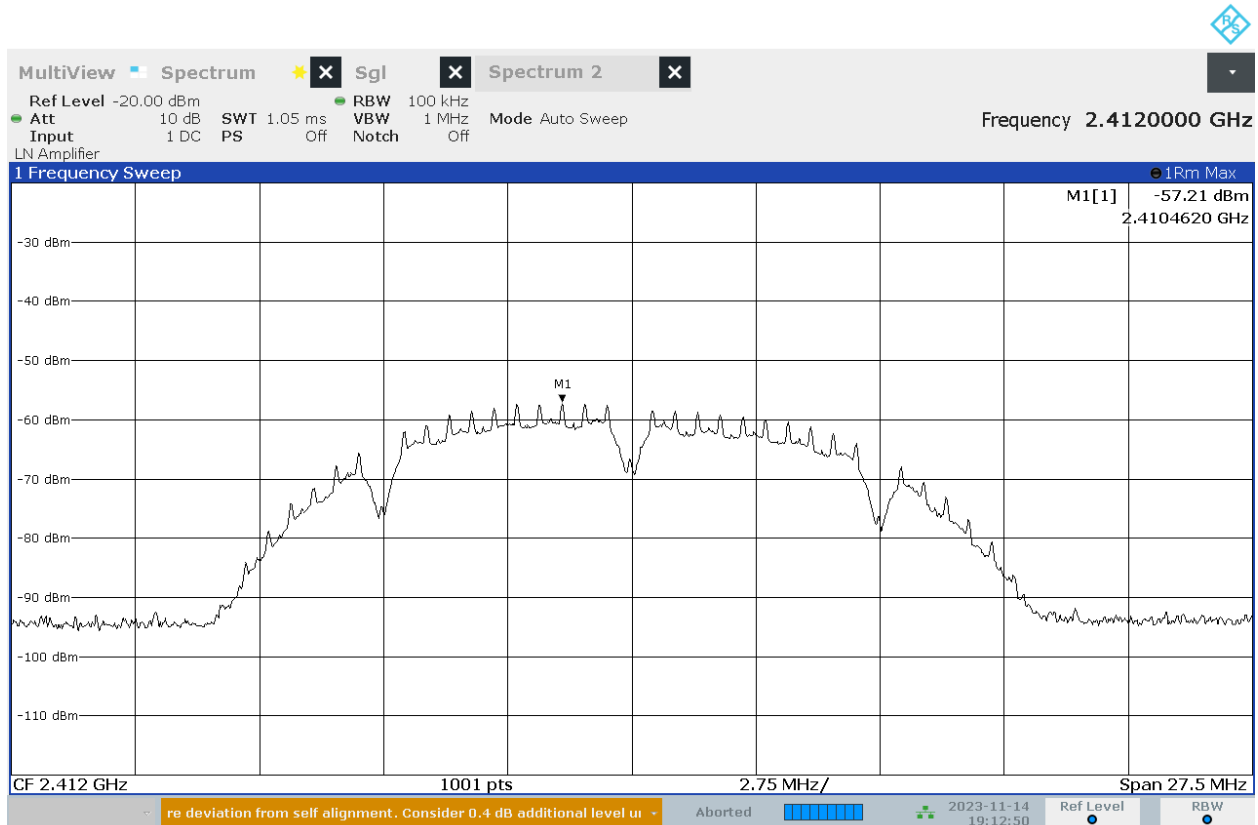
9.6 Test Data

Mode	Channel	Attenuation Setting	Receiver Measured Power (dBm/100kHz)	Receiver Measured Power (dBuV)	Path Loss (dB)	Antenna Factor (dB/m)	E Field (dBuV/m)	EIRP (dBm/100kHz)	Antenna Gain (dBi)	PPSD (dBm/100kHz)
802.11b	1	40	-57.21	49.79	6.22	32.1	88.11	-7.12	1.97	-9.09
	6	40	-61.06	45.94	6.24	32.3	84.48	-10.75	1.97	-12.72
	11	40	-63.48	43.52	6.27	32.5	82.29	-12.94	1.97	-14.91
802.11g	1	14	-52.45	54.55	6.22	32.1	92.87	-2.36	1.97	-4.33
	6	14	-58.22	48.78	6.24	32.3	87.32	-7.91	1.97	-9.88
	11	14	-60.78	46.22	6.27	32.5	84.99	-10.24	1.97	-12.21
802.11n	1	10	-51.91	55.09	6.22	32.1	93.41	-1.82	1.97	-3.79
	6	10	-56.77	50.23	6.24	32.3	88.77	-6.46	1.97	-8.43
	11	10	-59.49	47.51	6.27	32.5	86.28	-8.95	1.97	-10.92



9.7 Wi-Fi 802.11b

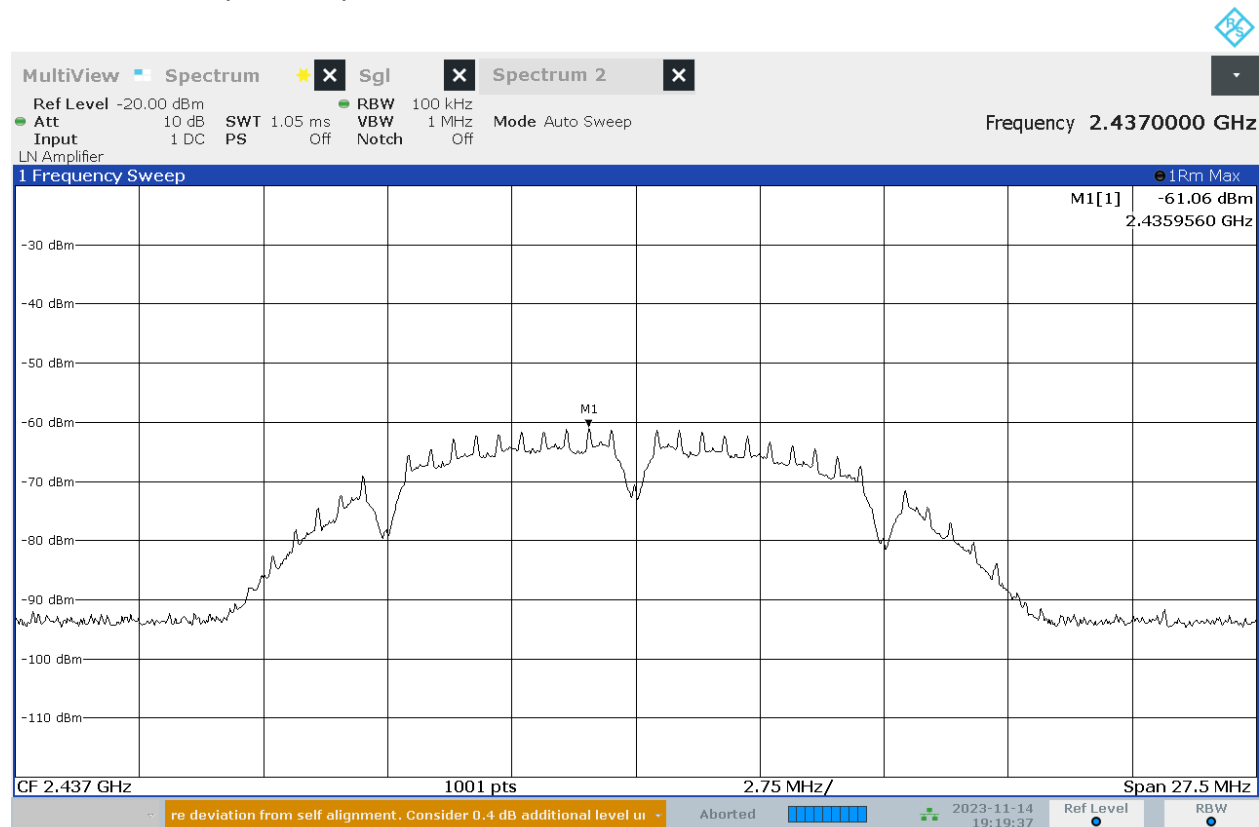
9.7.1 Channel 1 (2412 MHz)



07:12:50 PM 11/14/2023



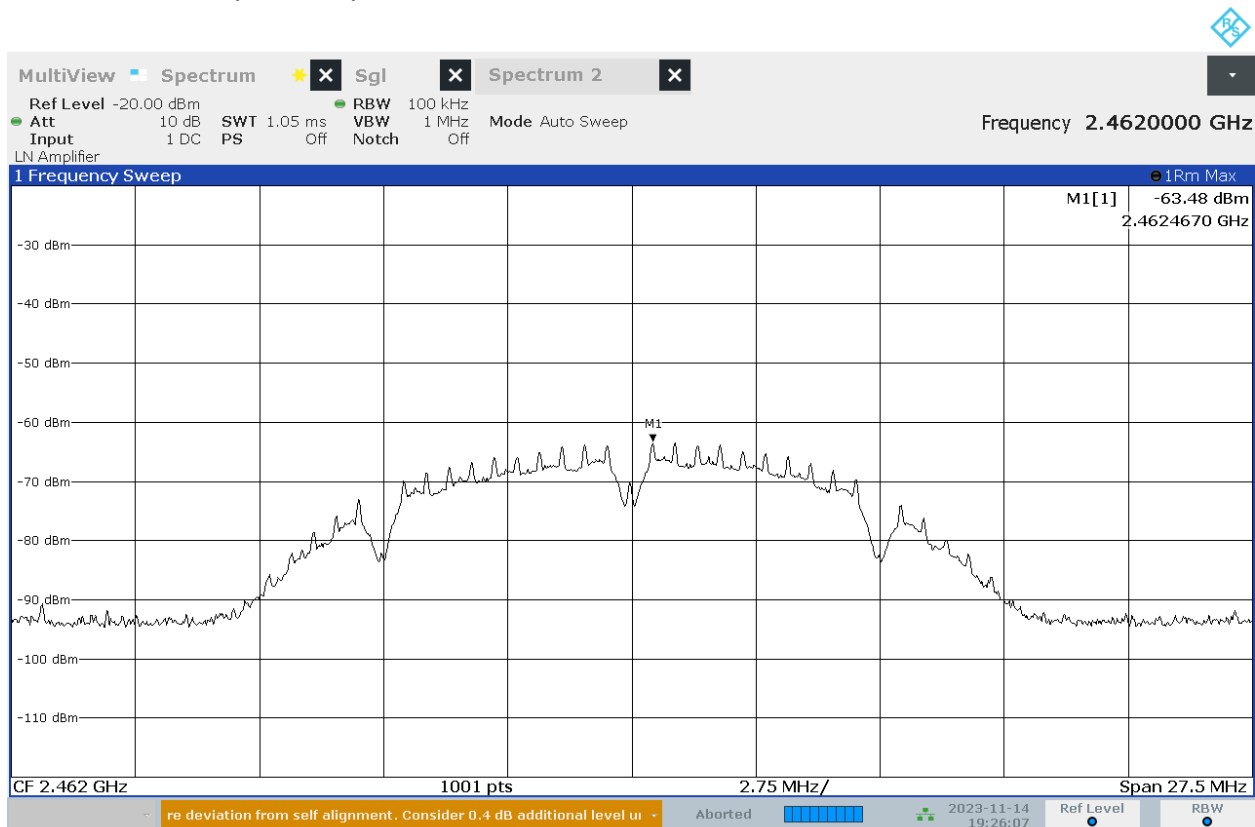
9.7.2 Channel 6 (2437 MHz)



07:19:37 PM 11/14/2023



9.7.3 Channel 11 (2462 MHz)

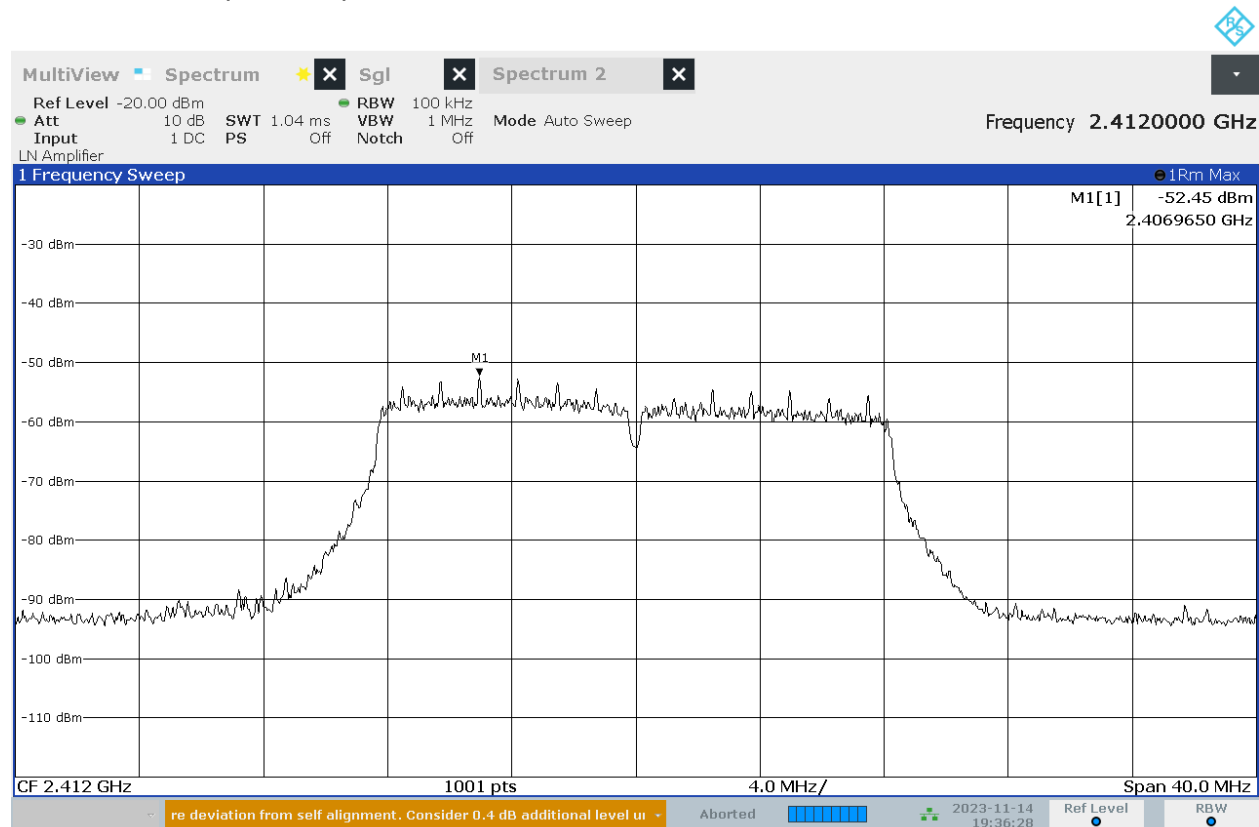


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9.8 Wi-Fi 802.11g

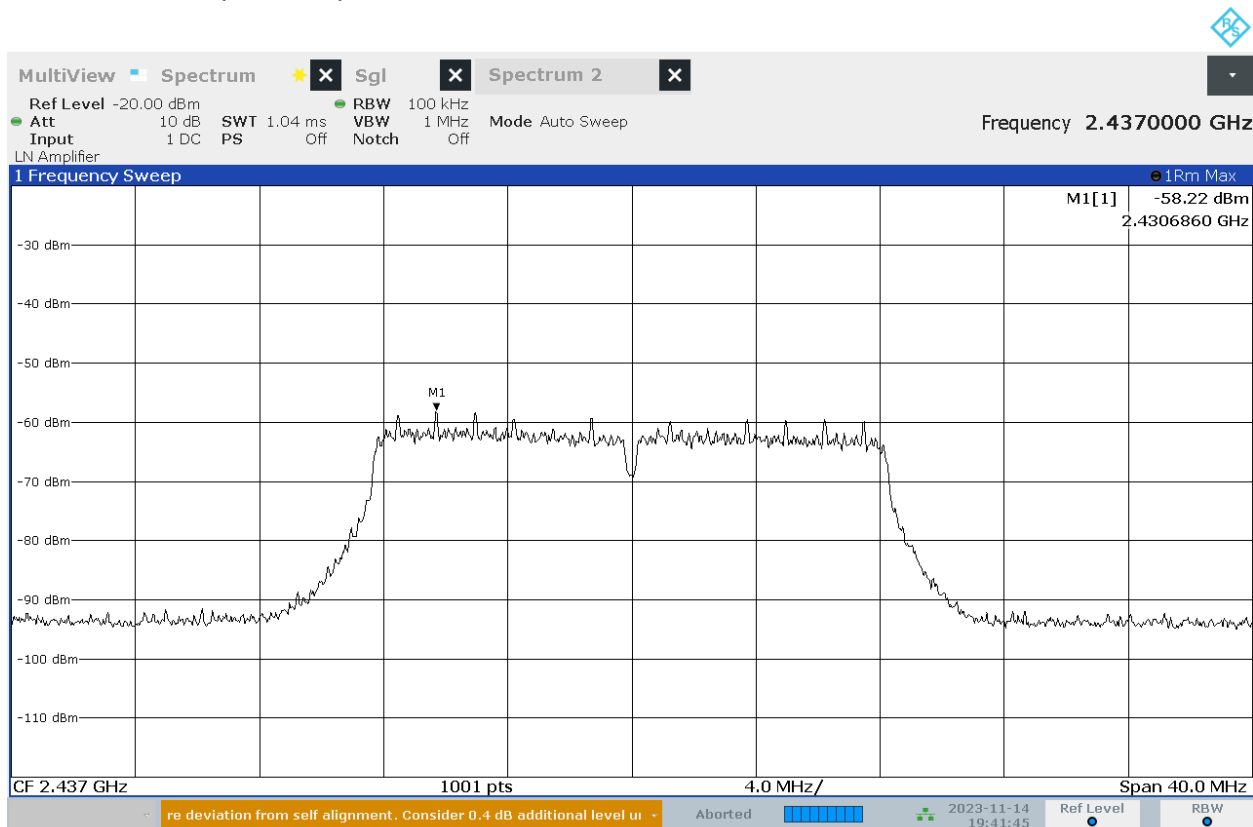
9.8.1 Channel 1 (2412 MHz)



07:36:28 PM 11/14/2023



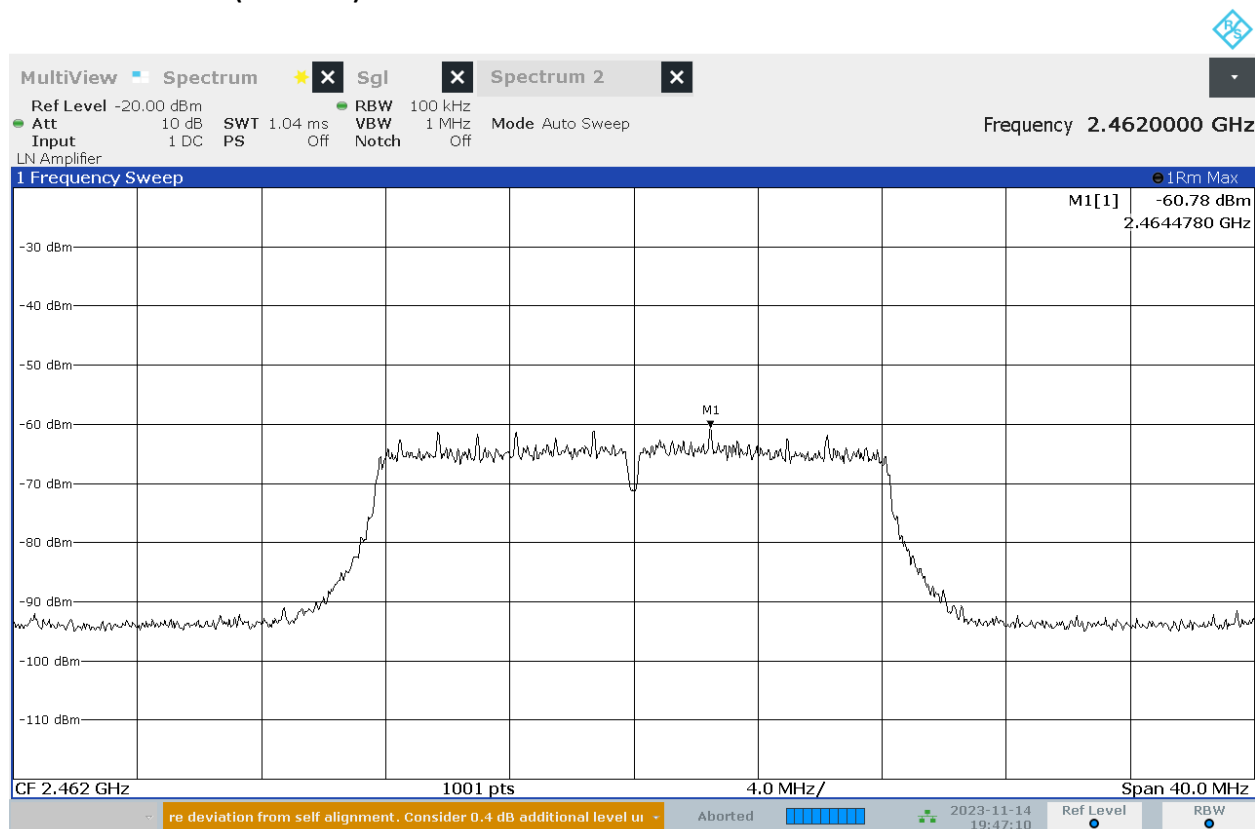
9.8.2 Channel 6 (2437 MHz)



07:41:45 PM 11/14/2023



9.8.3 Channel 11 (2462 MHz)

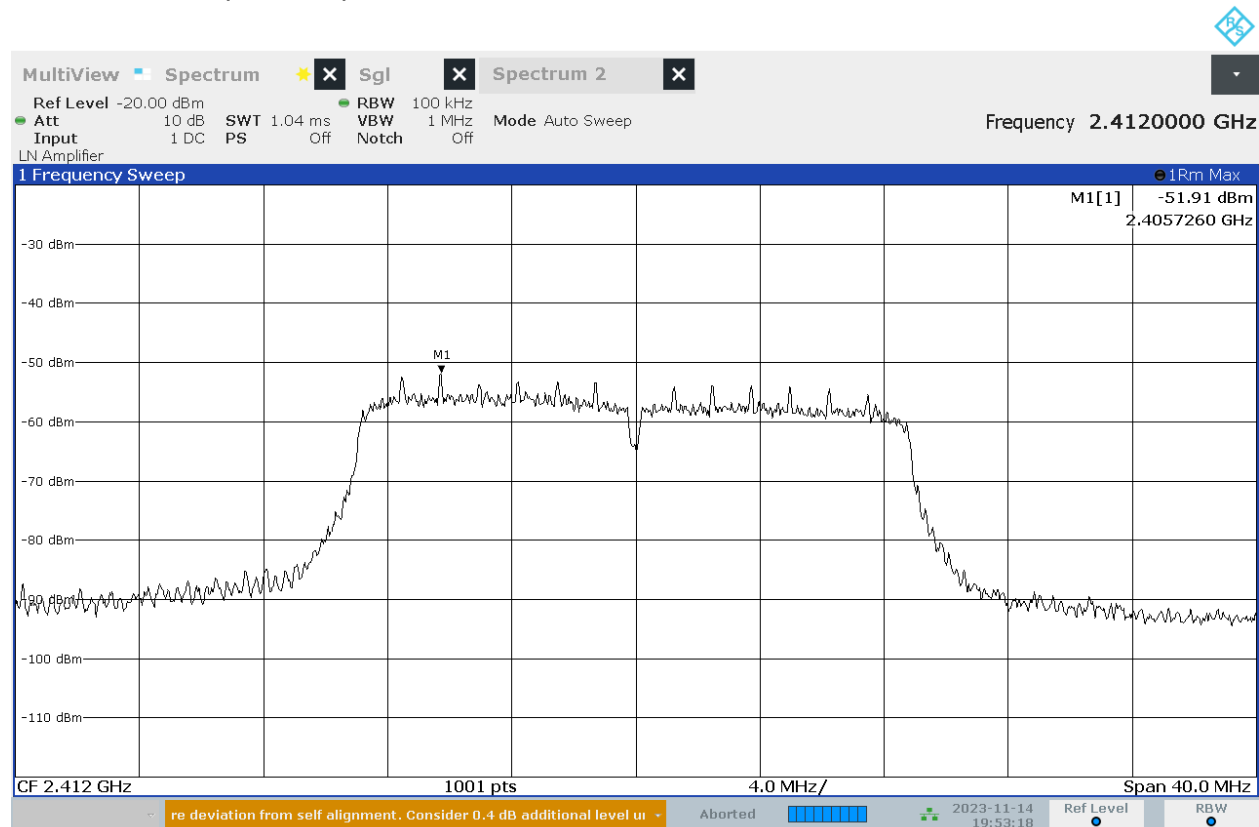


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9.9 Wi-Fi 802.11n

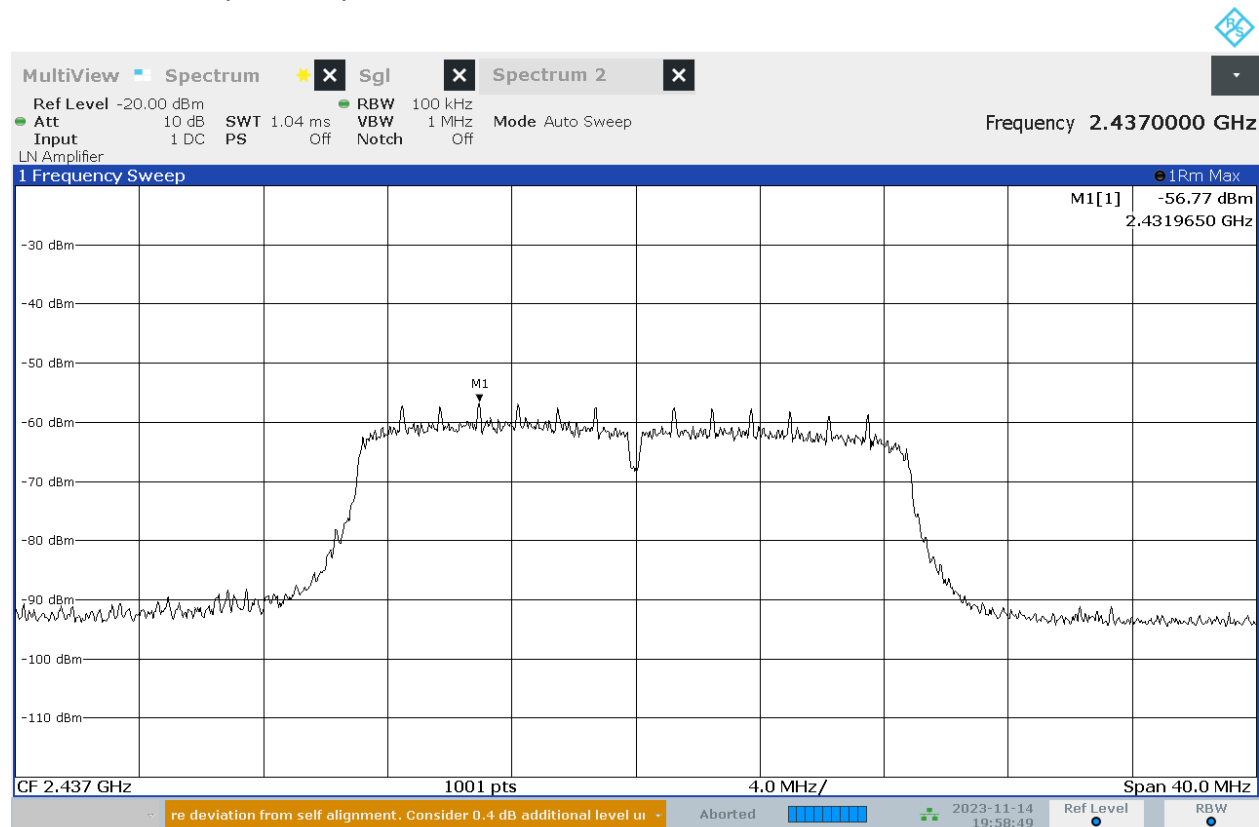
9.9.1 Channel 1 (2412 MHz)



07:53:18 PM 11/14/2023



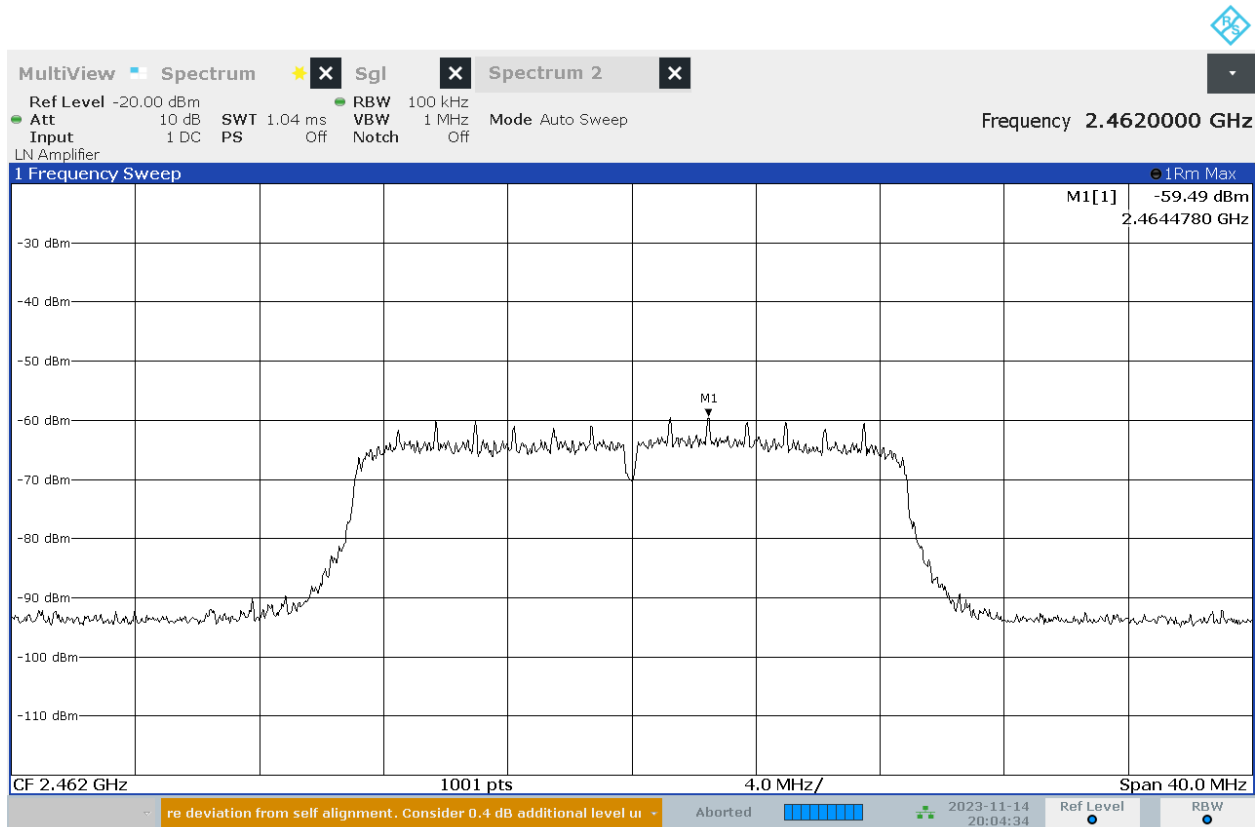
9.9.2 Channel 6 (2437 MHz)



07:58:49 PM 11/14/2023



9.9.3 Channel 11 (2462 MHz)



08:04:35 PM 11/14/2023



10 Antenna Requirement

10.1 Test Limits

FCC Part 15.203:

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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

RSS-Gen Issue 5 § 6.8:

The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level. When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

User manuals for transmitters equipped with detachable antennas shall also contain the following notice in a conspicuous location:

This radio transmitter (identify the device by certification number) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types approved for use with the transmitter, indicating the maximum permissible antenna gain (in dBi).

10.2 Test Results

The device was found to be **compliant**. The device has an internal, permanently affixed antenna.

**11 Revision History**

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	11/29/2023	105609229LEX-002	BZ	MC	Original Issue
1	12/7/2023	105609229LEX-002.1	BZ	MC	Updated antenna information