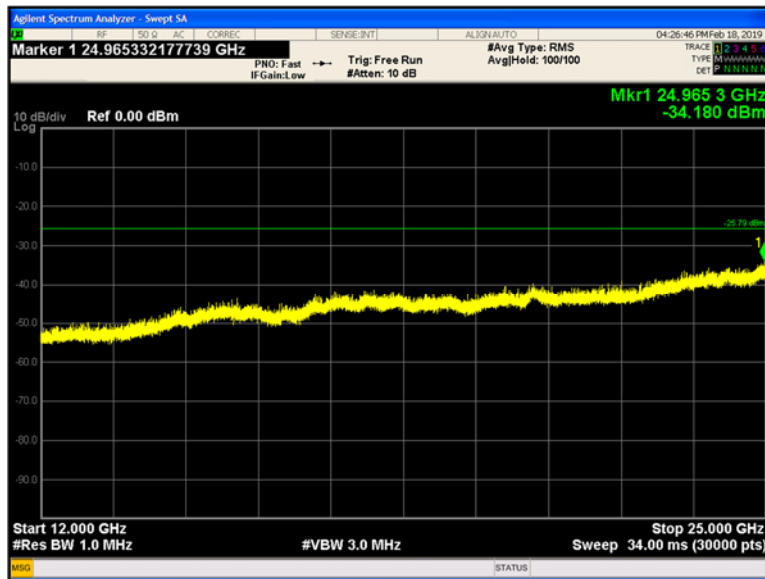
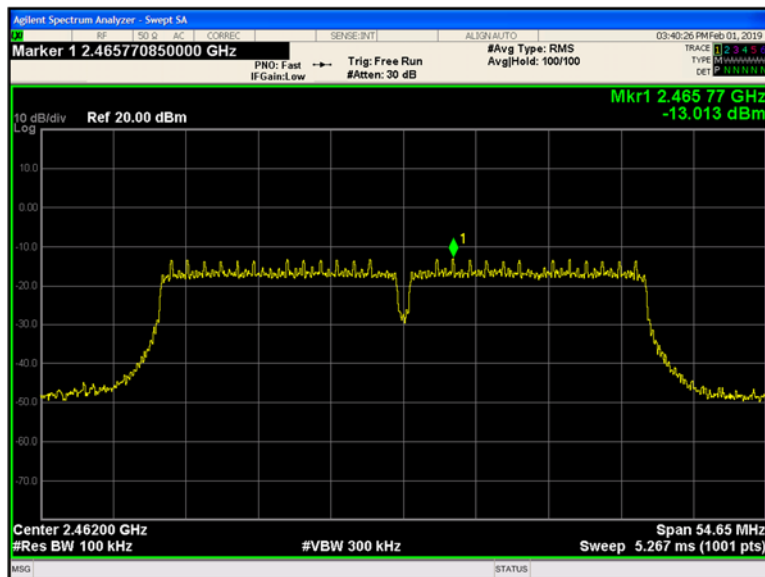
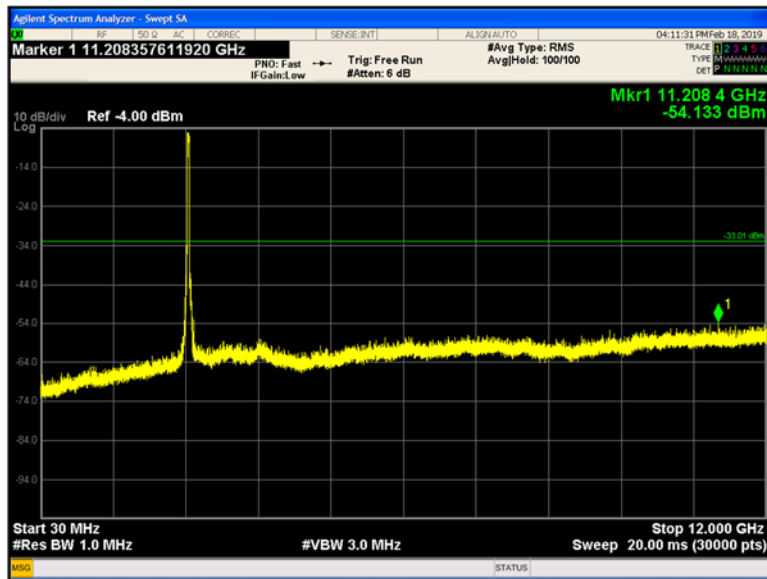




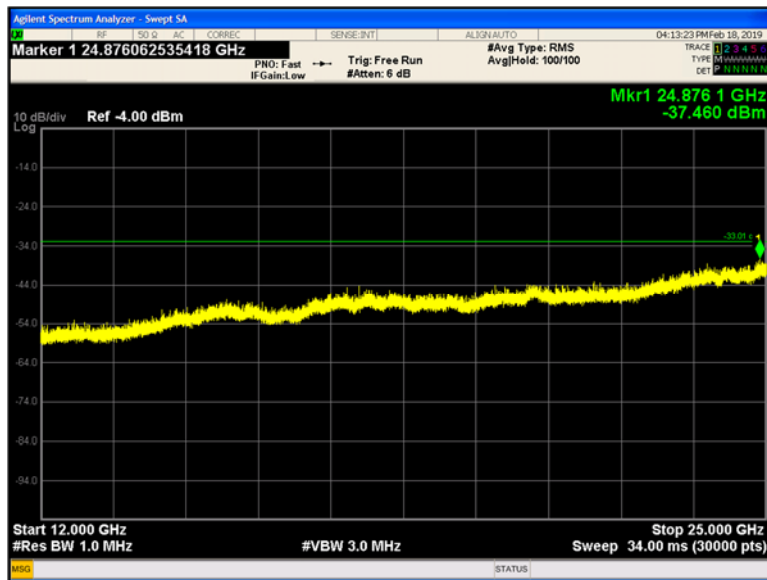
Plot 9-245 Chain B Conducted Spurious Emissions 12 - 25 GHz 802.11n40 - Ch.10 (2457 MHz)



Plot 9-246 Chain B Reference Level 802.11n40 - Ch.11 (2462 MHz)



Plot 9-247 Chain B Conducted Spurious Emissions 30 MHz - 12 GHz 802.11n40 - Ch.11 (2462 MHz)



Plot 9-248 Chain B Conducted Spurious Emissions 12 - 25 GHz 802.11n40 - Ch.11 (2462 MHz)

9.7 Conducted Band Edge Emissions

9.7.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (d)

ISED RSS-247 [5.5]

9.7.2 Test Method:

Measurements were performed according to the procedure defined in KDB 558074 - Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 V05 and ANSI C63.10 2013.

Spectrum analyzer settings:

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation

RBW = 100 kHz

VBW = 300 kHz

Sweep = auto couple

Detector function = Peak

Trace = Max Hold

The trace was allowed to stabilize. The marker was set on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. The delta marker function was set, and the marker-to-peak function moved to the peak of the in-band emission.

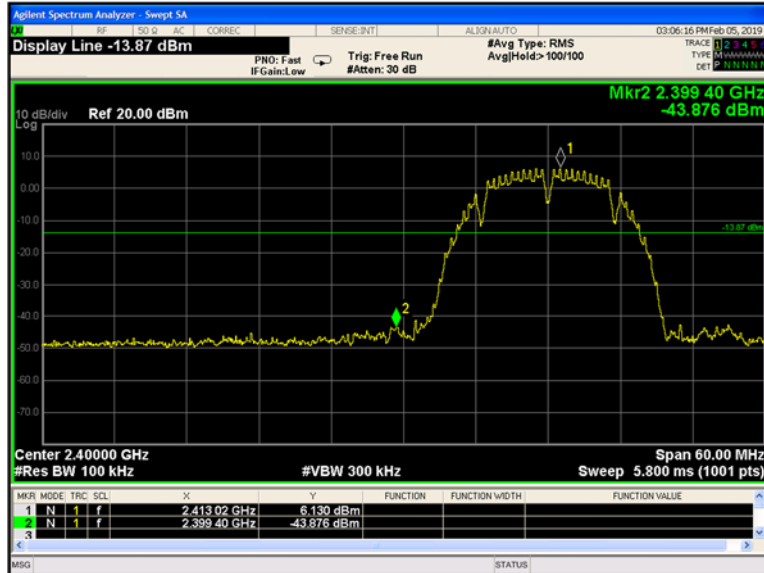
9.7.3 Limits:

All spurious emissions at least 20 dBc.

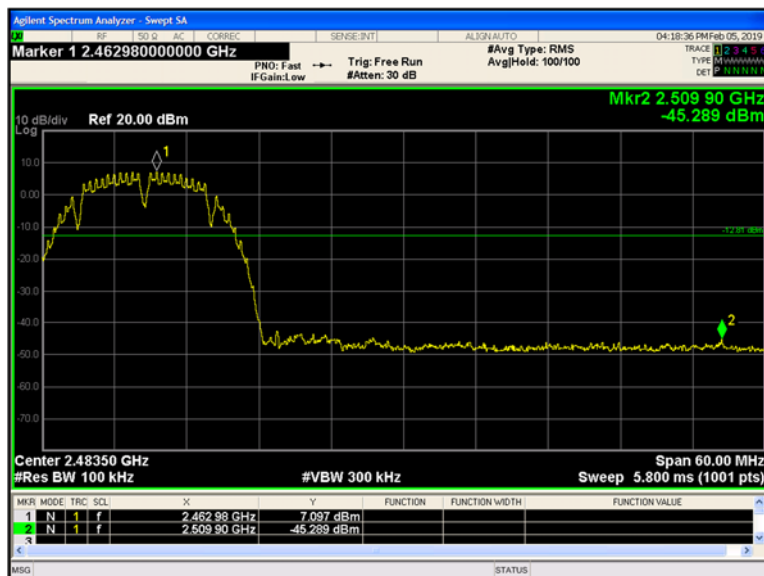
9.7.4 Test Result:

Pass.

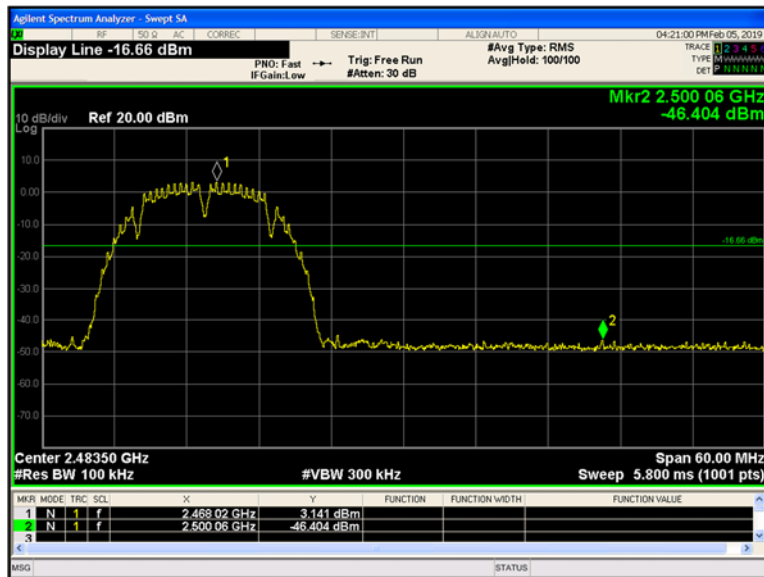
9.7.5 Test Data:



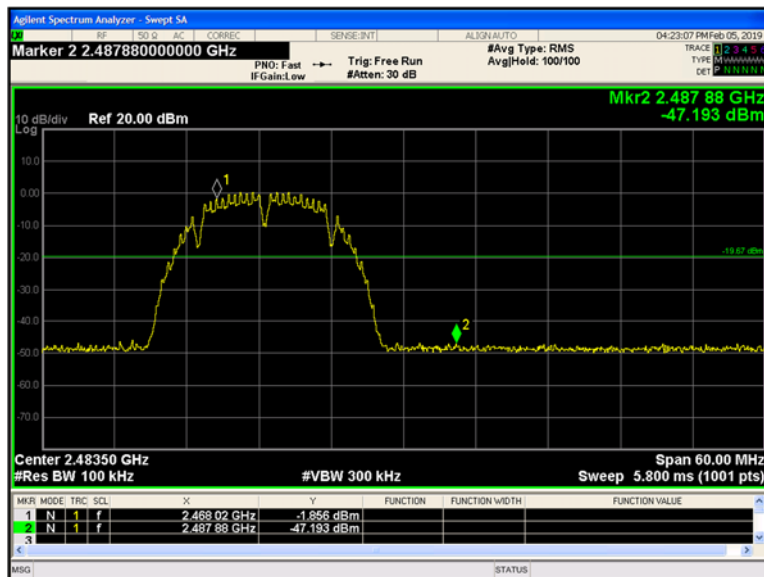
Plot 9-249 Chain A Conducted Band Edge 802.11b - Ch. 1 (2412 MHz)



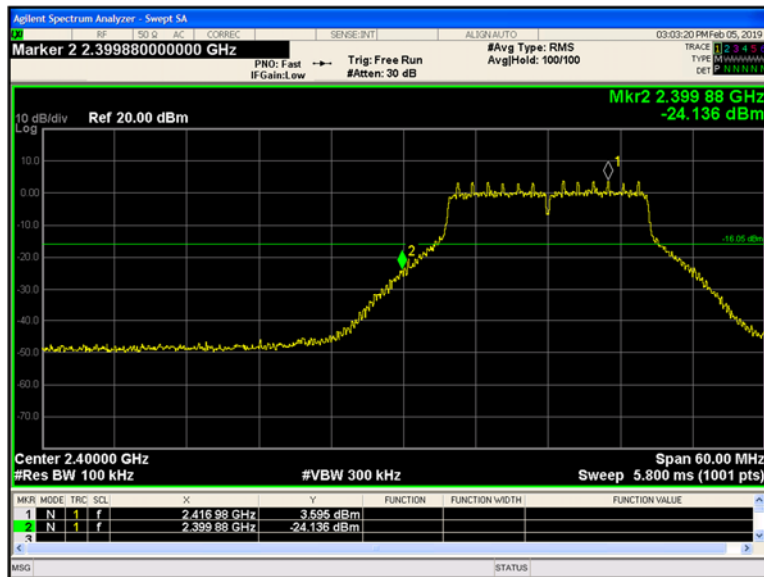
Plot 9-250 Chain A Conducted Band Edge 802.11b - Ch. 11 (2462 MHz)



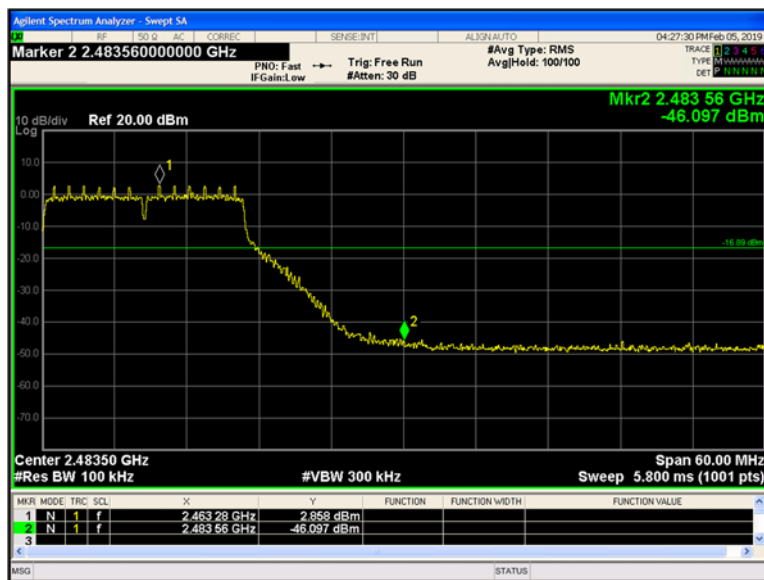
Plot 9-251 Chain A Conducted Band Edge 802.11b - Ch. 12 (2467 MHz)



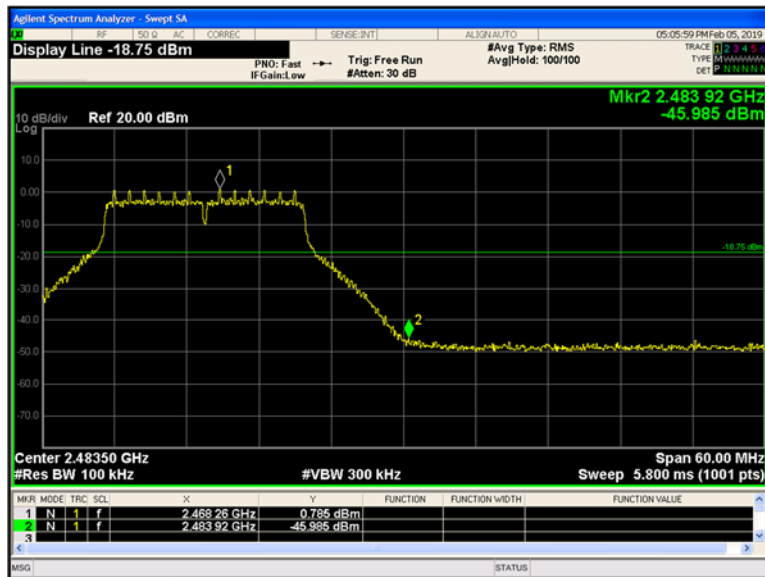
Plot 9-252 Chain A Conducted Band Edge 802.11b - Ch. 13 (2472 MHz)



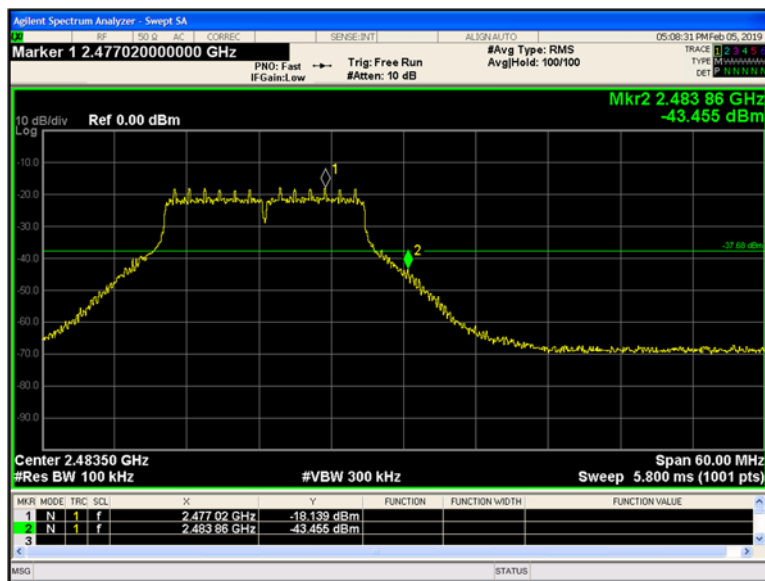
Plot 9-253 Chain A Conducted Band Edge 802.11g - Ch. 1 (2412 MHz)



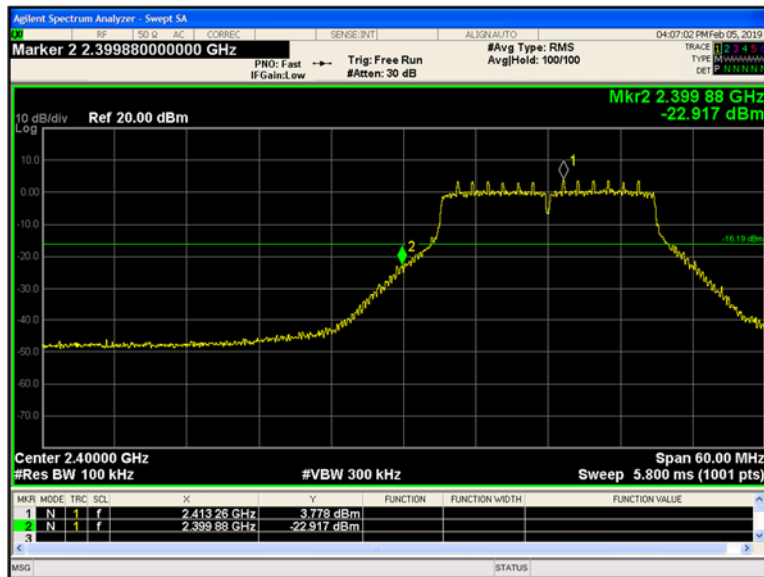
Plot 9-254 Chain A Conducted Band Edge 802.11g - Ch. 11 (2462 MHz)



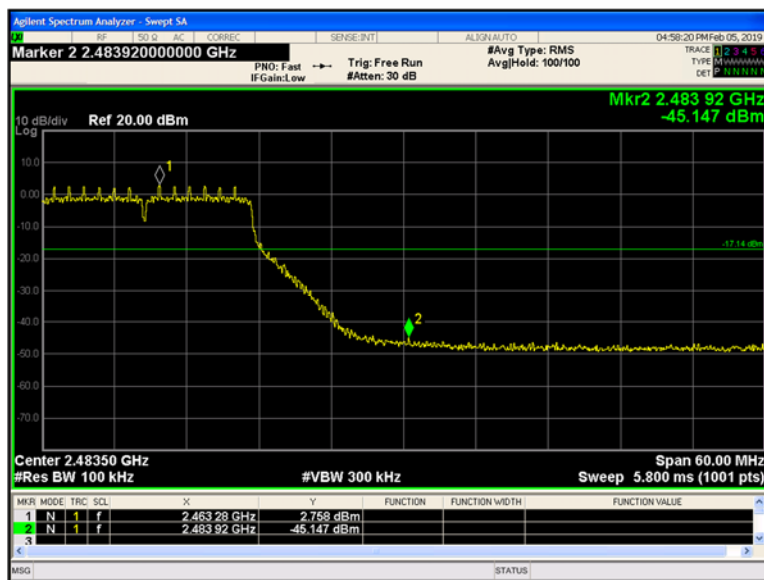
Plot 9-255 Chain A Conducted Band Edge 802.11g - Ch. 12 (2467 MHz)



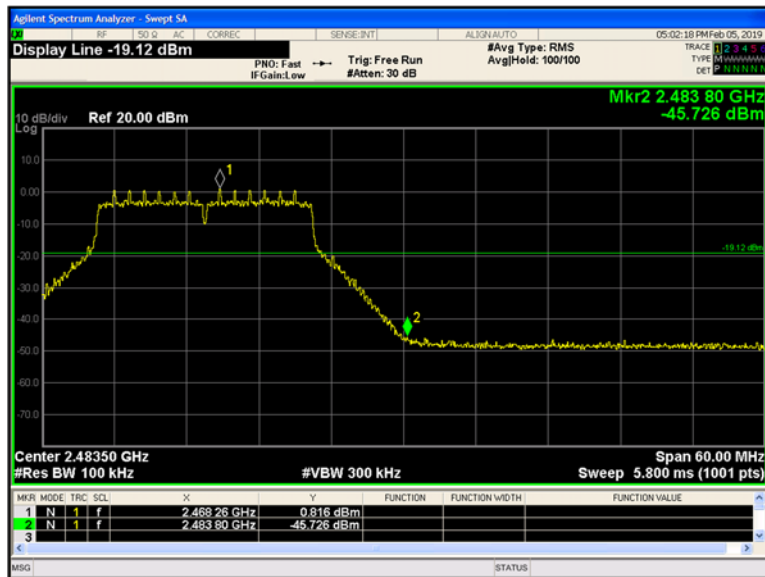
Plot 9-256 Chain A Conducted Band Edge 802.11g - Ch. 13 (2472 MHz)



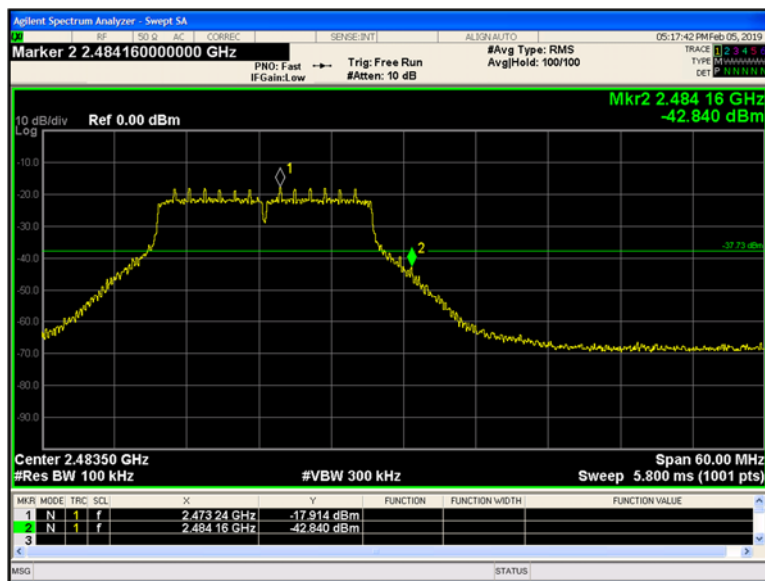
Plot 9-257 Chain A Conducted Band Edge 802.11n20 - Ch. 1 (2412 MHz)



Plot 9-258 Chain A Conducted Band Edge 802.11n20 - Ch. 11 (2462 MHz)



Plot 9-259 Chain A Conducted Band Edge 802.11n20 - Ch. 12 (2467 MHz)



Plot 9-260 Chain A Conducted Band Edge 802.11n20 - Ch. 13 (2472 MHz)



Plot 9-261 Chain A Conducted Band Edge 802.11n40 - Ch. 3 (2422 MHz)



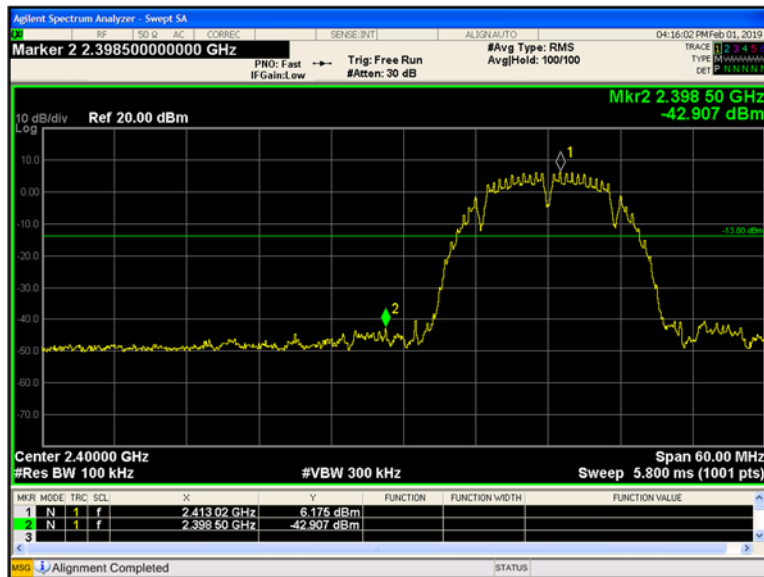
Plot 9-262 Chain A Conducted Band Edge 802.11n40 - Ch. 9 (2452 MHz)



Plot 9-263 Chain A Conducted Band Edge 802.11n40 - Ch. 10 (2457 MHz)



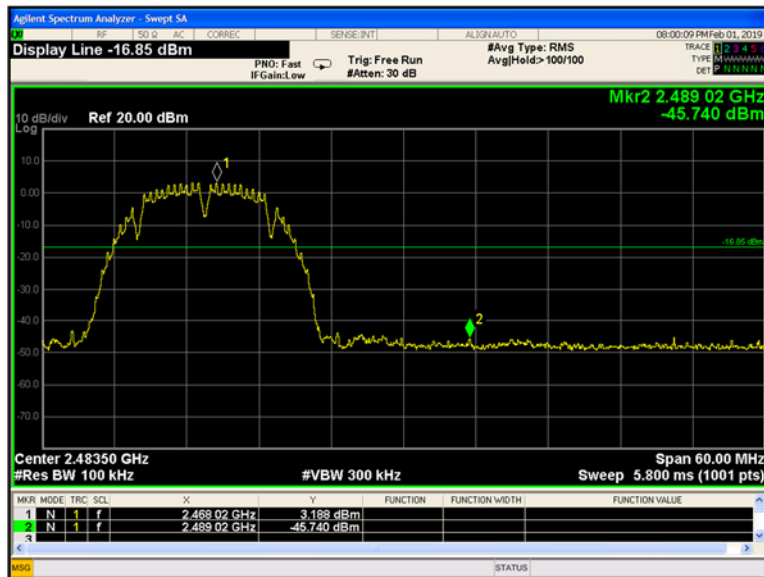
Plot 9-264 Chain A Conducted Band Edge 802.11n40 - Ch. 11 (2462 MHz)



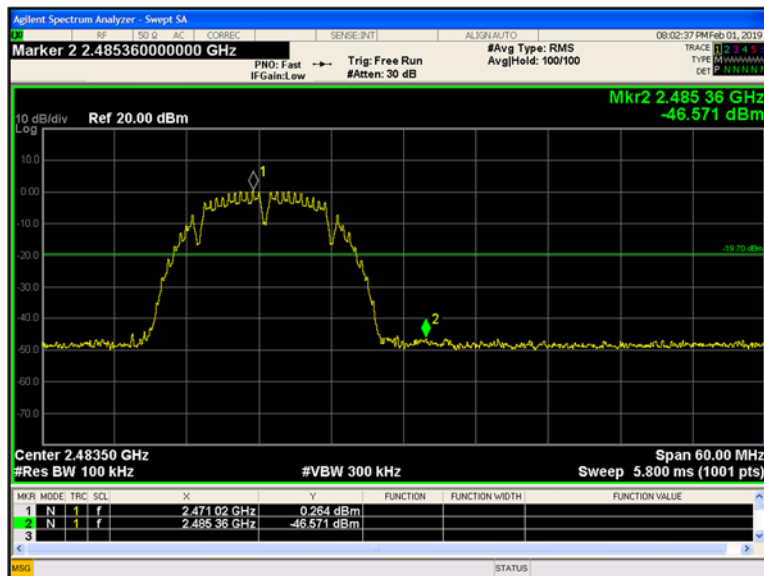
Plot 9-265 Chain B Conducted Band Edge 802.11b - Ch. 1 (2412 MHz)



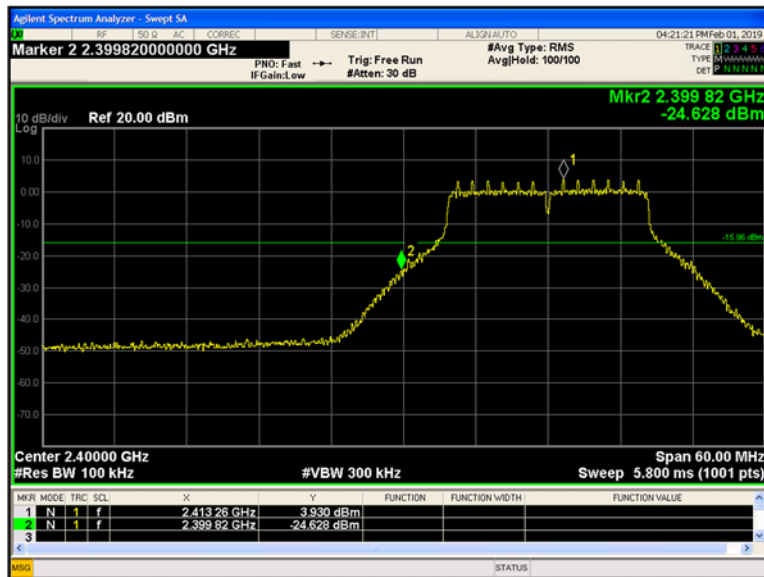
Plot 9-266 Chain B Conducted Band Edge 802.11b - Ch. 11 (2462 MHz)



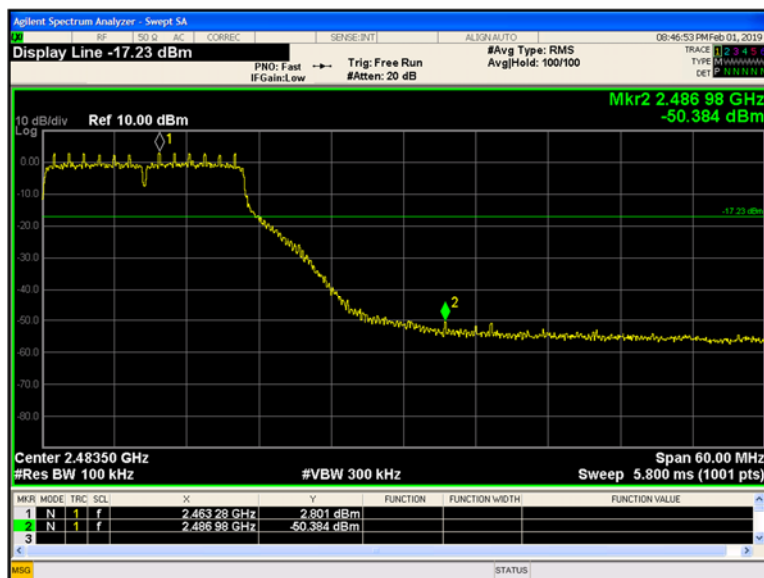
Plot 9-267 Chain B Conducted Band Edge 802.11b - Ch. 12 (2467 MHz)



Plot 9-268 Chain B Conducted Band Edge 802.11b - Ch. 13 (2472 MHz)



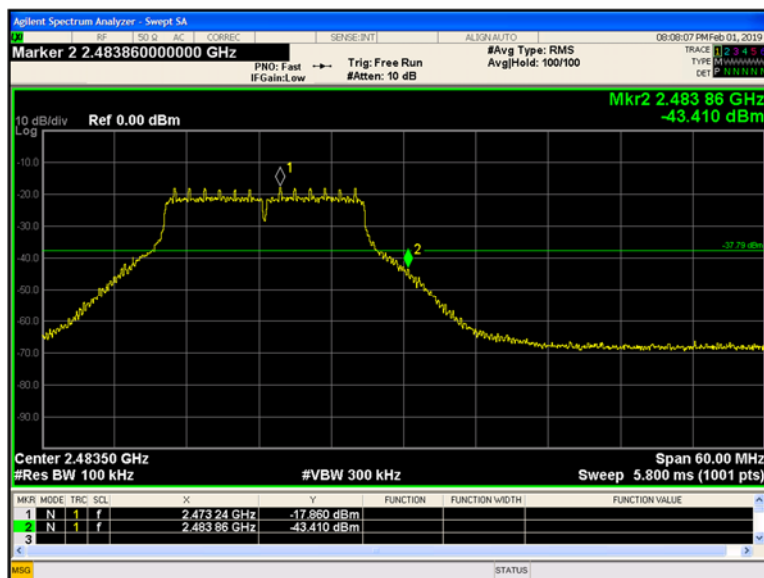
Plot 9-269 Chain B Conducted Band Edge 802.11g - Ch. 1 (2412 MHz)



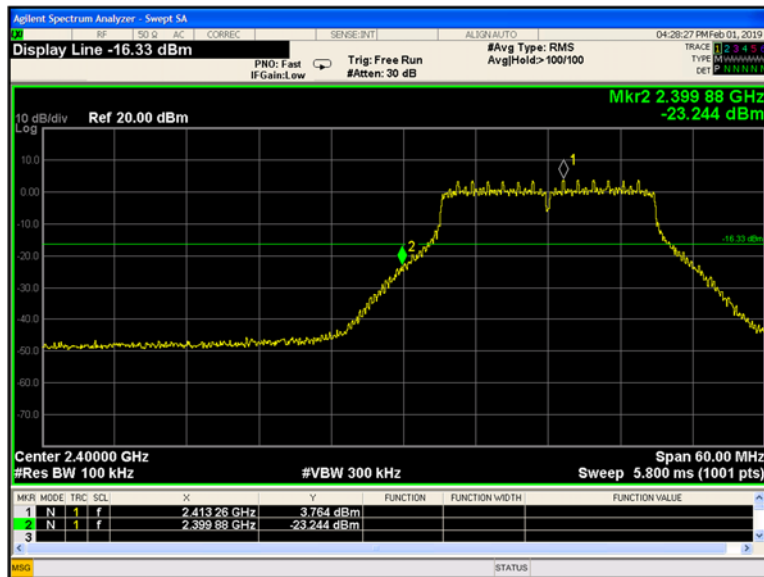
Plot 9-270 Chain B Conducted Band Edge 802.11g - Ch. 11 (2462 MHz)



Plot 9-271 Chain B Conducted Band Edge 802.11g - Ch. 12 (2467 MHz)



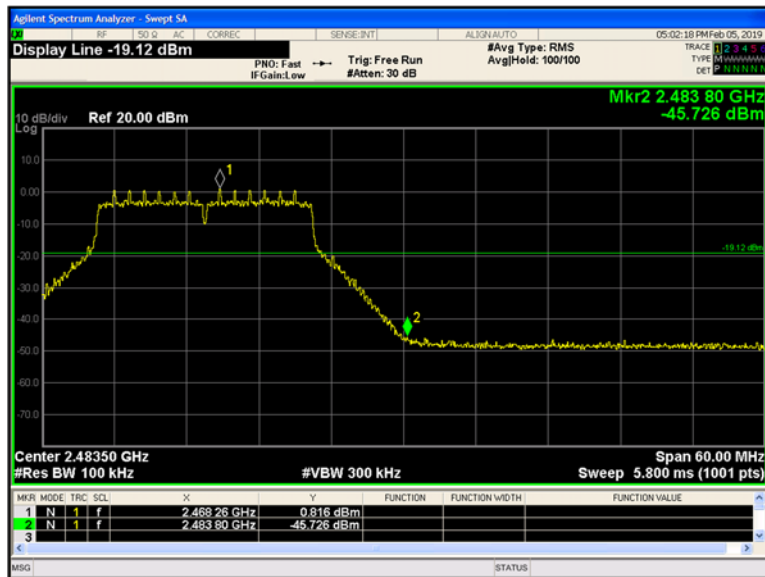
Plot 9-272 Chain B Conducted Band Edge 802.11g - Ch. 13 (2472 MHz)



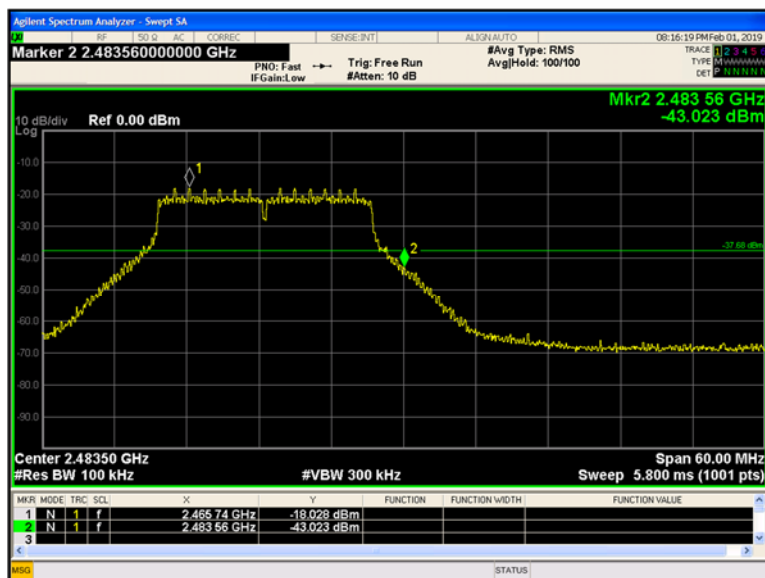
Plot 9-273 Chain B Conducted Band Edge 802.11n20 - Ch. 1 (2412 MHz)



Plot 9-274 Chain B Conducted Band Edge 802.11n20 - Ch. 11 (2462 MHz)



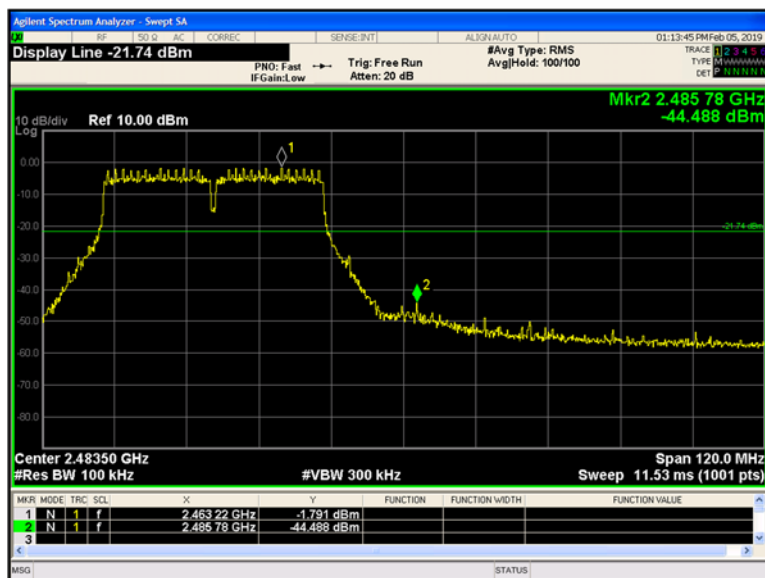
Plot 9-275 Chain B Conducted Band Edge 802.11n20 - Ch. 12 (2467 MHz)



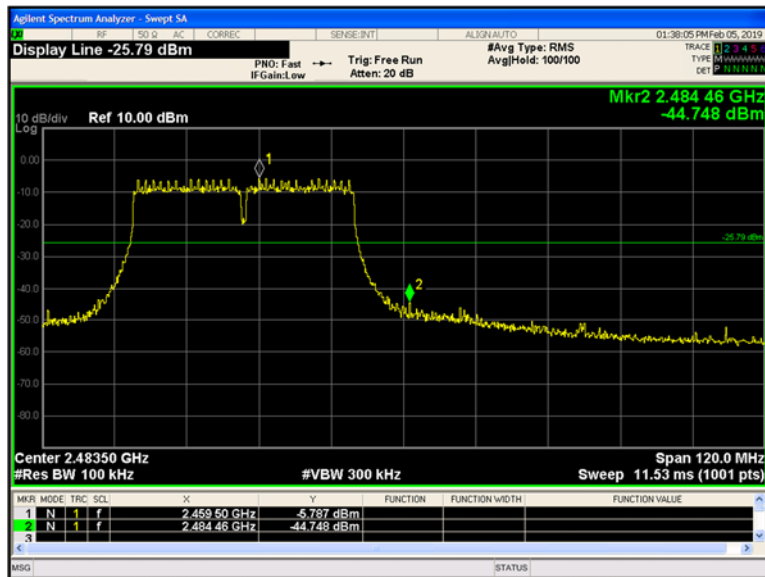
Plot 9-276 Chain B Conducted Band Edge 802.11n20 - Ch. 13 (2472 MHz)



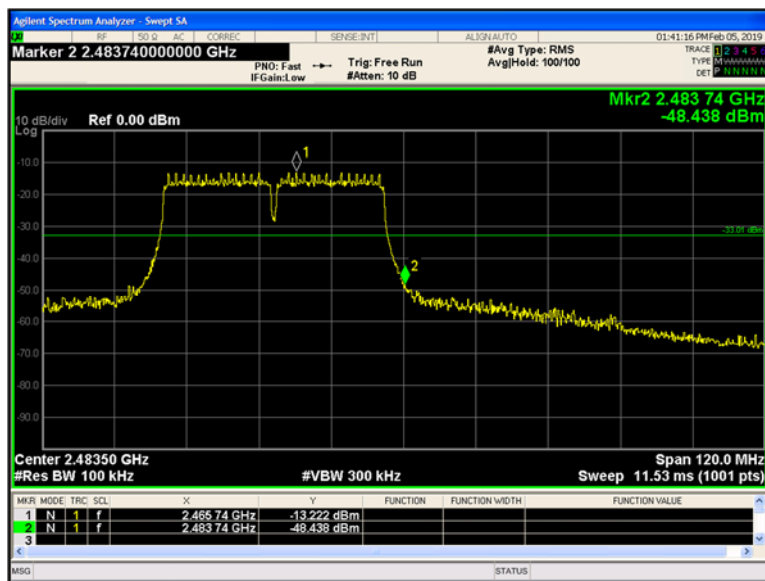
Plot 9-277 Chain B Conducted Band Edge 802.11n40 - Ch. 3 (2422 MHz)



Plot 9-278 Chain B Conducted Band Edge 802.11n40 - Ch. 9 (2452 MHz)



Plot 9-279 Chain B Conducted Band Edge 802.11n40 - Ch. 10 (2457 MHz)



Plot 9-280 Chain B Conducted Band Edge 802.11n40 - Ch. 11 (2462 MHz)

9.8 Radiated Spurious and Band Edge Emissions

9.8.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (d)
ISED RSS-247 [5.5] and RSS GEN [8.9]

9.8.2 Test Method:

Measurements were performed according to the procedure defined in KDB 558074 - Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 V05 and ANSI C63.10: 2013.

Radiated spurious measurements are made from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The limit for radiated spurious emissions is per 15.209 and RSS-247 [5.5]. Additionally, emissions found in the restricted bands as listed in 15.205 were tested for compliance per limits in 15.209 and RSS-Gen.

The EUT was tested near the low, middle and high channels of operation in each sub band. Guidelines in ANSI C63.10:2013 were followed with respect to maximizing the emissions.

A pre-amp and a high pass filter were required for this test to provide the measuring system with sufficient sensitivity. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength.

Both horizontal and vertical antenna polarizations were investigated. Worst-case maximized data for both polarizations is shown in this test report.

Radiated Spurious Emissions**Spectrum Analyzer Settings:****30 MHz- 1 GHz:**

RBW= 120 kHz

VBW $\geq 3 \times$ RBW

Trace Mode: Peak Detector (Max Hold). Final measurements performed using QP Detector.

Span= 30 MHz- 1 GHz

Sweep time= Auto

Sweep points $\geq 2 \times$ Span/RBW**Above 1 GHz:**

RBW= 1 MHz

VBW= 3 MHz

Trace Mode: Peak Detector (Max Hold) and RMS Average Detector (Max Hold)

Span= 1- 18 GHz and 18- 26.5 GHz.

Sweep time= Auto

Sweep points $\geq 2 \times$ Span/RBW**Final Measurements above 1 GHz****Peak Measurements****Spectrum Analyzer Settings:**

RBW= 1 MHz

VBW= 3 MHz

Trace Mode: Peak Detector (Max Hold)

Span= wide enough to encompass the emission

Sweep Points $\geq 2 \times$ Span/RBW

Sweep Time = Auto

RMS Average Measurements**Spectrum Analyzer Settings:**

RBW= 1 MHz

VBW $\geq 3 \times$ RBW

Detector= RMS

Span= wide enough to encompass the emission

Sweep points $\geq 2 \times$ Span/RBW

Sweep time = auto

Trace= Average at least 100 traces

Trace Averaging Type= power (RMS)

The duty cycle correction factor is added to the emission level.

Restricted Band-Edge Emissions**Peak Measurements****Spectrum Analyzer Settings:**

RBW= 1 MHz

VBW= 3 MHz

Trace Mode: Peak Detector (Max Hold)

Span= 2310 – 2500 MHz

Sweep Points = 401

Sweep Time = Auto

Average Measurements (Reduced Video Bandwidth Method)**Spectrum Analyzer Settings:**

RBW= 1 MHz

VBW= 3 MHz

VBW Mode = Linear

Trace Mode: RMS (Average)

Span= 2310 – 2500 MHz

Sweep Points = 401

Sweep Time = Auto

Sweep Count = at least 100

Sample Calculation:

Field Strength Level: Amplitude (Analyzer level) + AFCL (Antenna Factor and Cable losses) –
Amplifier Gain = 50 dBuV + 33 dB – 25 dB = 58dBuV/m

9.8.3 Limits:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (meters)	Corrected Field Strength for 3m measurement distance (dB $\mu\text{V/m}$)
0.009-0.490	2400/F (kHz)	300	48.5- 13.8
0.490-1.705	24000/F (kHz)	30	33.8- 23.0
1.705-30	30	30	29.5
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
960-1000	500	3	54
Above 1000 (Restricted Frequency Bands)	500	3	54 (Average) 74 (Peak)

9.8.4 Test Result:

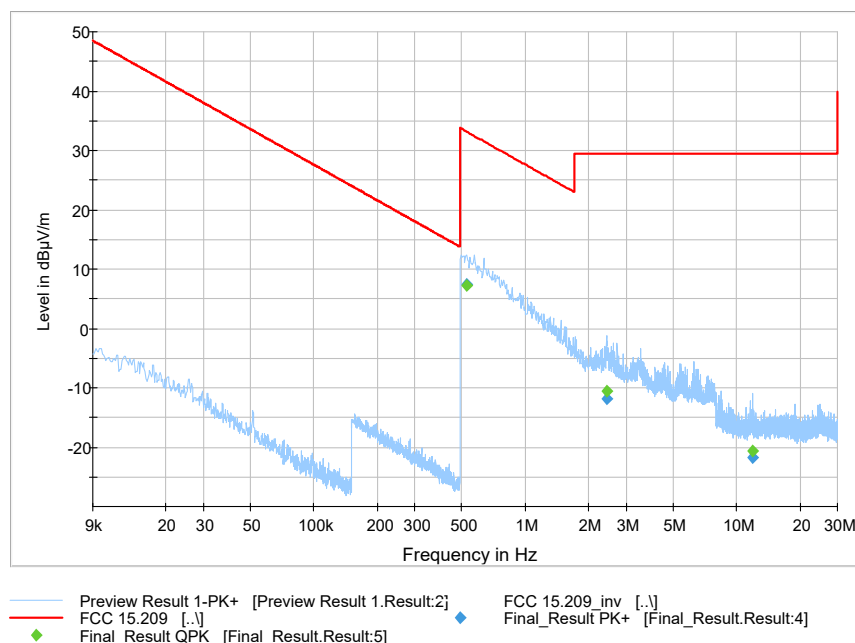
Pass.

9.8.5 Test Data:

9.8.5.1 Emissions in 9 KHz- 30 MHz range

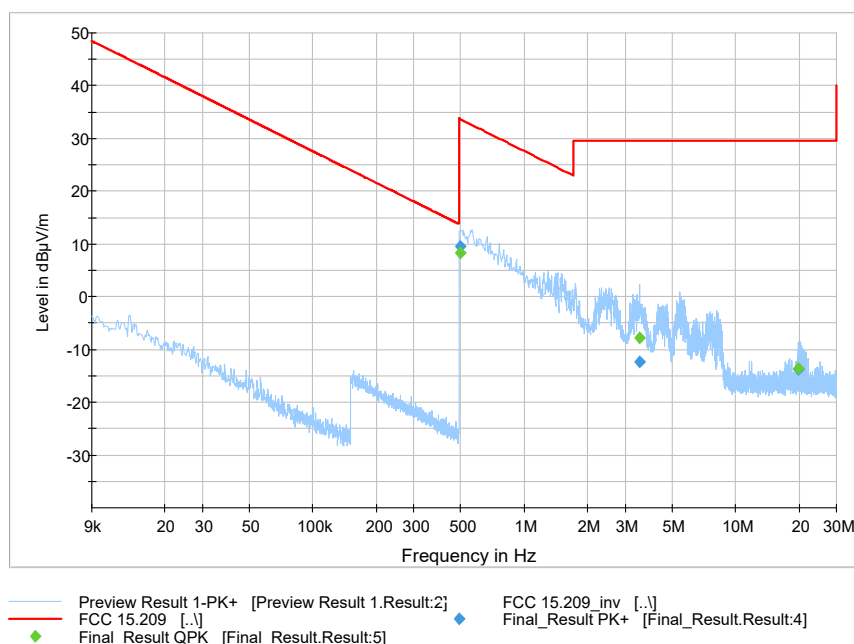
All channels and modes were tested, and worst-case results shown here.

RSE 9KHz – 30MHz Parallel loop orientation							
Carrier Frequency (MHz)	Mode	Emission Frequency (MHz)	Raw Quasi-Peak Amplitude (dB μ V/m)	Correction Factor (dB)	Corrected Quasi-Peak Field Strength (dB μ V/m)	Quasi-Peak Limit (dB μ V/m)	Quasi-Peak Margin (dB)
2437	802.11n20	0.530	-4.51	11.8	7.29	33.12	-25.83
2437	802.11n20	2.426	-10.69	0.1	-10.59	29.50	-40.09
2437	802.11n20	11.950	-15.68	-5.0	-20.68	29.50	-50.18



Plot 9-281 Radiated Spurious Emissions 9KHz – 30 MHz 802.11n20 - Ch. 6 (2437 MHz) parallel loop orientation

RSE 9KHz – 30MHz Perpendicular loop orientation							
Carrier Frequency (MHz)	Mode	Emission Frequency (MHz)	Raw Quasi-Peak Amplitude (dB μ V/m)	Correction Factor (dB)	Corrected Quasi-Peak Field Strength (dB μ V/m)	Quasi-Peak Limit (dB μ V/m)	Quasi-Peak Margin (dB)
2442	802.11n40	0.498	-4.02	12.3	8.28	33.66	-25.38
2442	802.11n40	3.501	-5.40	-2.5	-7.90	29.50	-37.40
2442	802.11n40	19.871	-7.95	-5.7	-13.65	29.50	-43.15

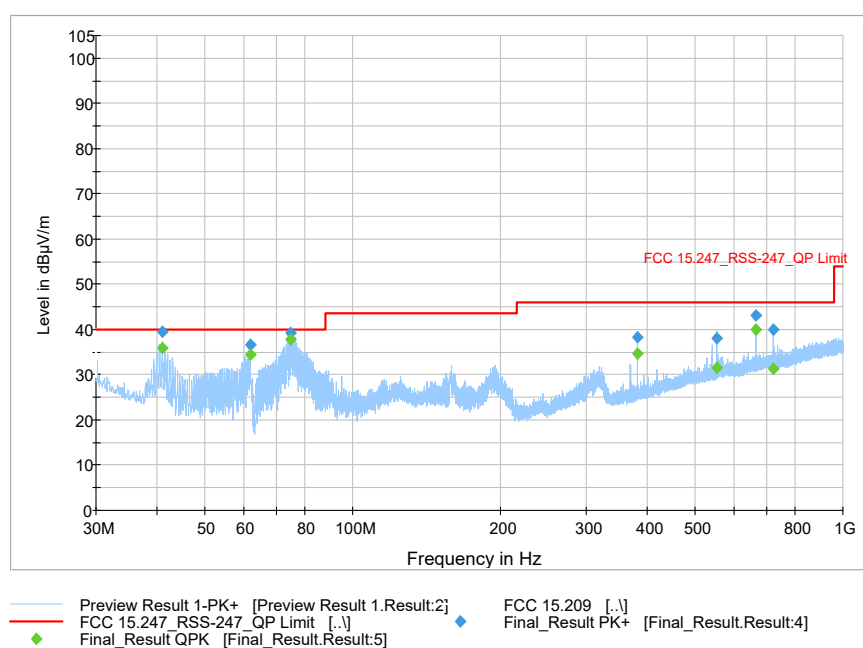


Plot 9-282 Radiated Spurious Emissions 9KHz – 30 MHz 802.11n40 - Ch. 7 (2442 MHz)
perpendicular loop orientation

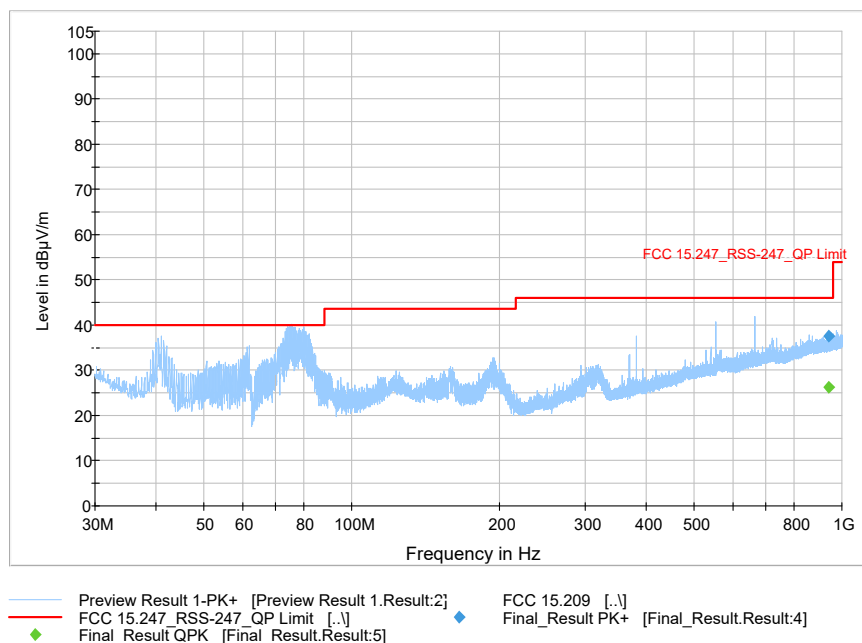
9.8.5.2 Emissions in 30 MHz- 1 GHz range

All channels and modes were tested, and worst-case results shown here.

RSE 30-1000 MHz							
Mode	Tx Freq (MHz)	Spurious Frequency (MHz)	Raw Quasi-Peak Amplitude (dBμV/m)	System Correction Factor (dB)	Corrected Quasi-Peak Field Strength (dBμV/m)	Quasi-Peak Limit (dBμV/m)	Quasi-Peak Margin (dB)
802.11b	2412	941.694		33.2	26.27	46.02	-19.75

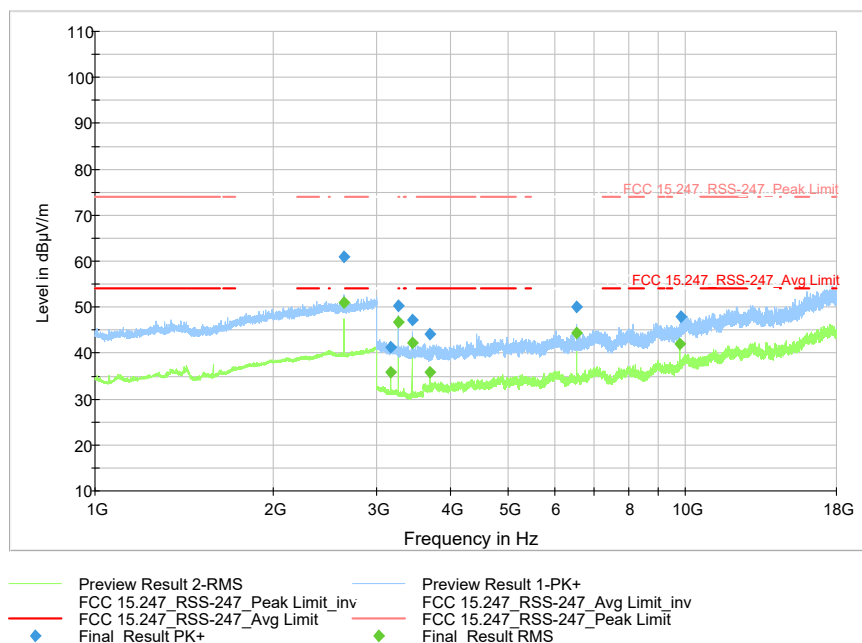


Plot 9-283 Radiated Spurious Emissions 30 – 1000 MHz – Ambient - Radio Off – Digital Transmissions



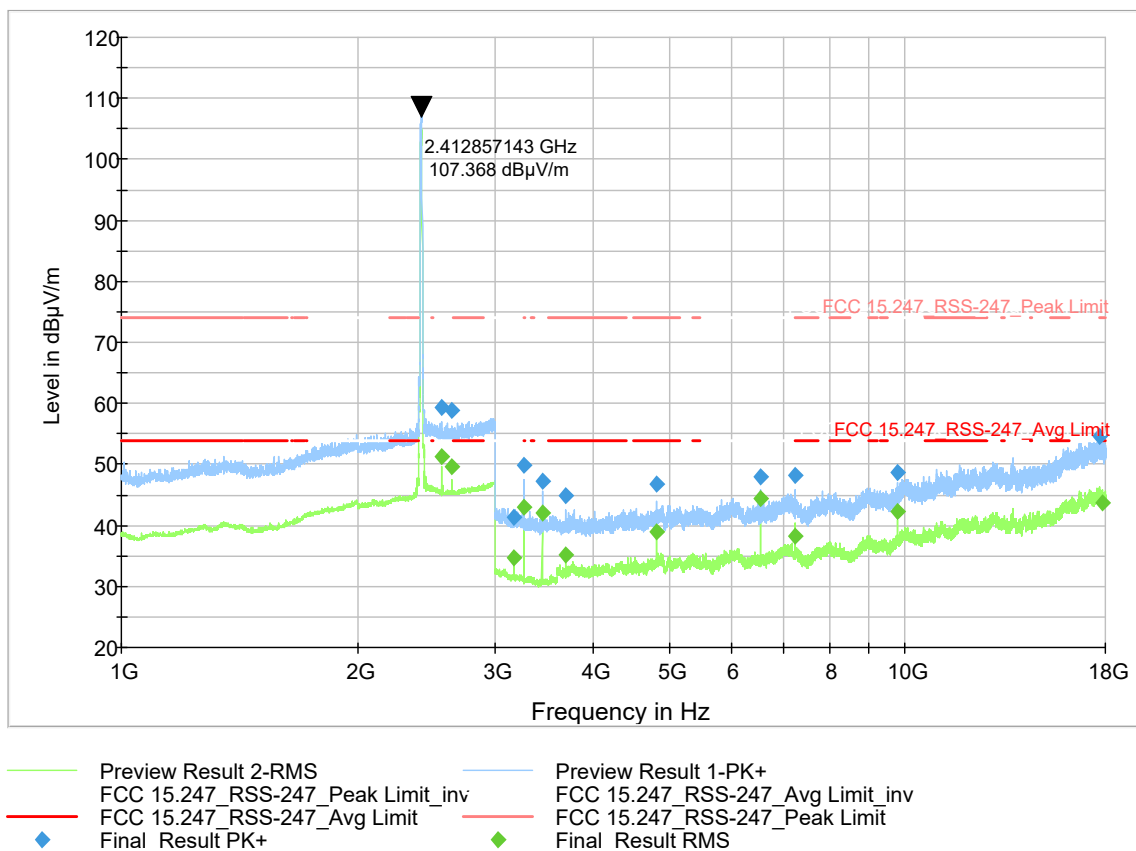
Plot 9-284 Radiated Spurious Emissions 30 – 1000 MHz 802.11b - Ch. 1 (2412 MHz)

9.8.5.3 Emissions in 1-18 GHz range

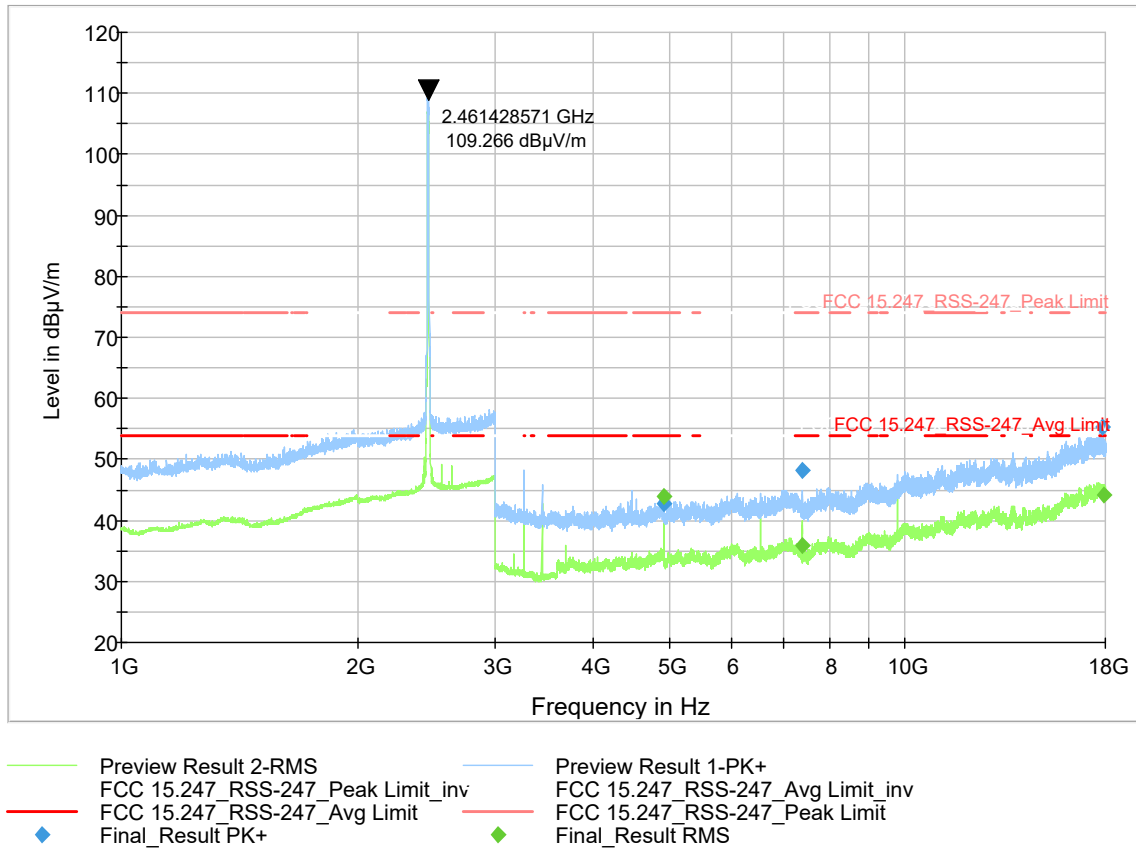


Plot 9-285 Radiated Spurious Emissions 1-18GHz – Ambient - Radio Off – Digital Transmissions

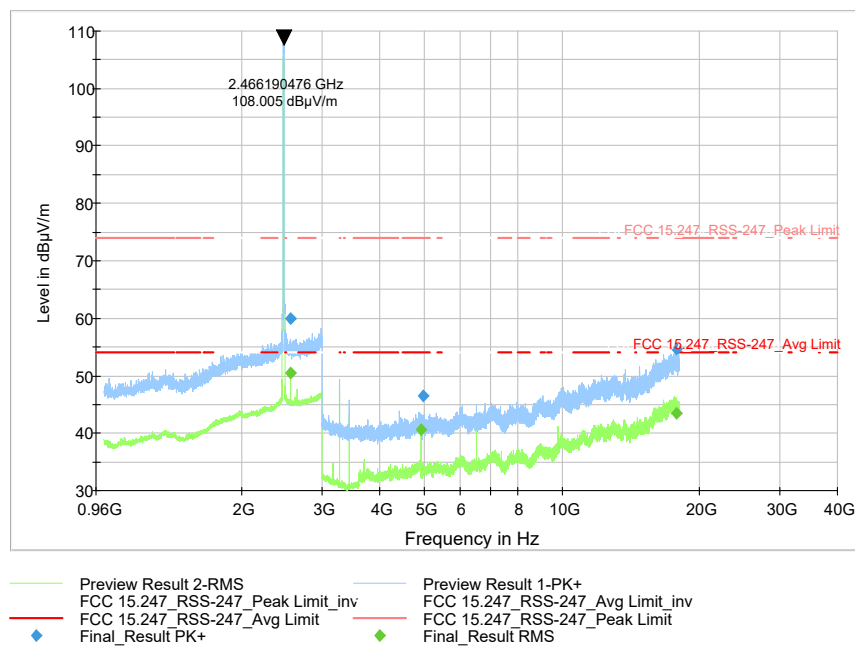
802.11b RSE 1 - 18GHz Average Data						
Carrier Frequency (MHz)	Frequency (MHz)	Raw Avg. Amplitude (dBμV)	Correction Factor (incl DCF=0dB) (dB)	Corrected Avg. Field Strength (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)
2412	17842.2	19.70	23.9	43.60	54	-10.40
2462	4924.0	35.76	8.2	43.96	54	-10.04
2462	7385.1	24.14	11.7	35.84	54	-18.16
2462	17891.1	19.63	24.5	44.13	54	-9.87
2467	2560.0	37.56	13.0	50.56	54	-3.44
2467	4933.9	32.40	8.2	40.60	54	-13.40
2467	17800.6	19.94	23.5	43.44	54	-10.56
2472	2560.0	38.45	13.0	51.45	54	-2.55
2472	4944.0	30.59	8.2	38.79	54	-15.21
2472	17984.0	19.45	24.5	43.95	54	-10.05
802.11b RSE 1 - 18GHz Peak Data						
Carrier Frequency (MHz)	Frequency (MHz)	Raw Peak Amplitude (dBμV)	Correction Factor (dB)	Corrected Peak Field Strength (dBμV/m)	Peak Limit (dBμV/m)	Margin (dB)
2412	17728.0	31.03	23.6	54.63	74	-19.37
2462	4926.0	34.56	8.2	42.76	74	-31.24
2462	7385.8	36.42	11.7	48.12	74	-25.88
2462	17864.8	31.14	24.2	55.34	74	-18.66
2467	2559.7	46.93	13.0	59.93	74	-14.07
2467	4976.0	37.96	8.6	46.56	74	-27.44
2467	17809.1	31.08	23.5	54.58	74	-19.42
2472	2560.0	46.79	13.0	59.79	74	-14.21
2472	4944.0	38.71	8.2	46.91	74	-27.09
2472	17985.3	30.99	24.5	55.49	74	-18.51



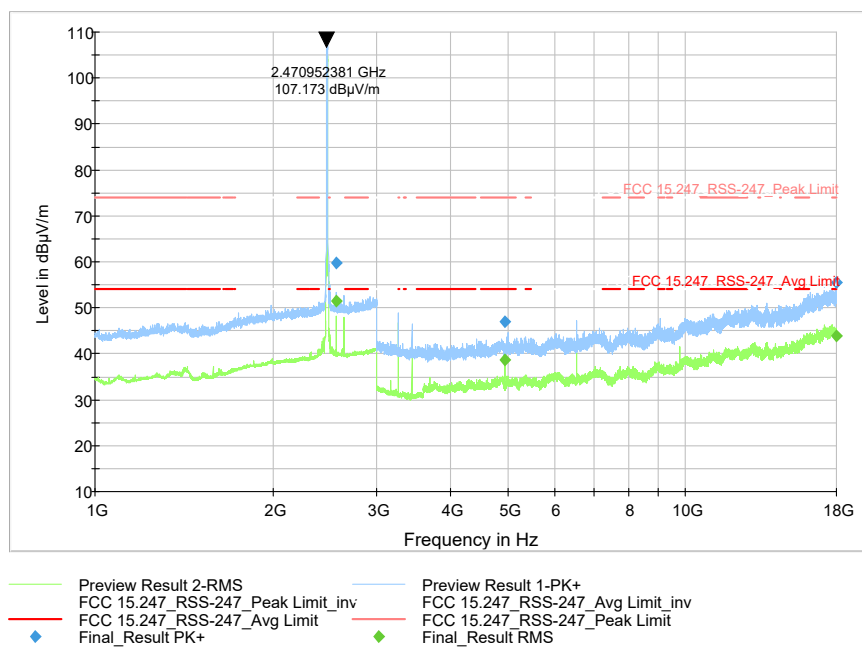
Plot 9-286 Radiated Spurious Emission 1-18GHz 802.11b - Ch.1 (2412 MHz)



Plot 9-287 Radiated Spurious Emission 1-18GHz 802.11b - Ch.11 (2462 MHz)

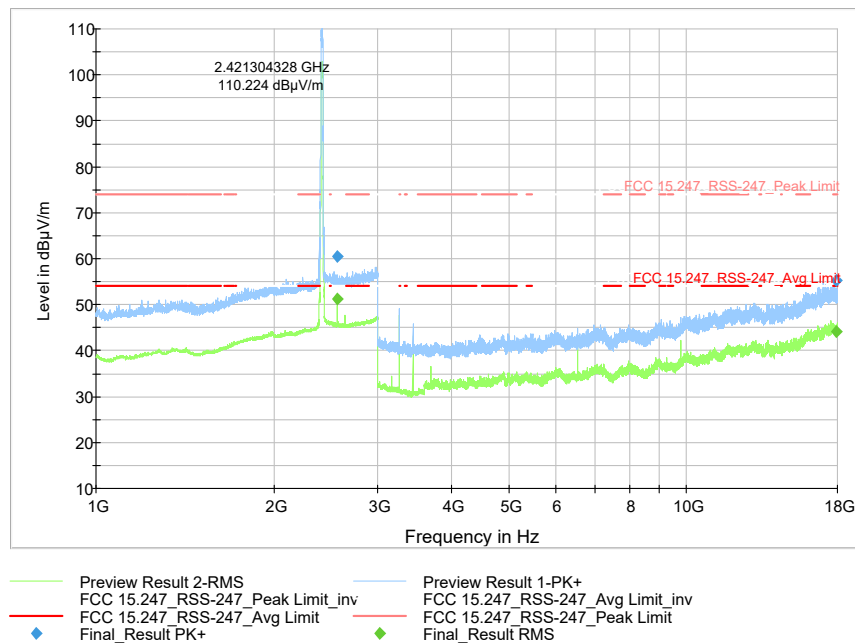


Plot 9-288 Radiated Spurious Emission 1-18GHz 802.11b - Ch.12 (2467 MHz)

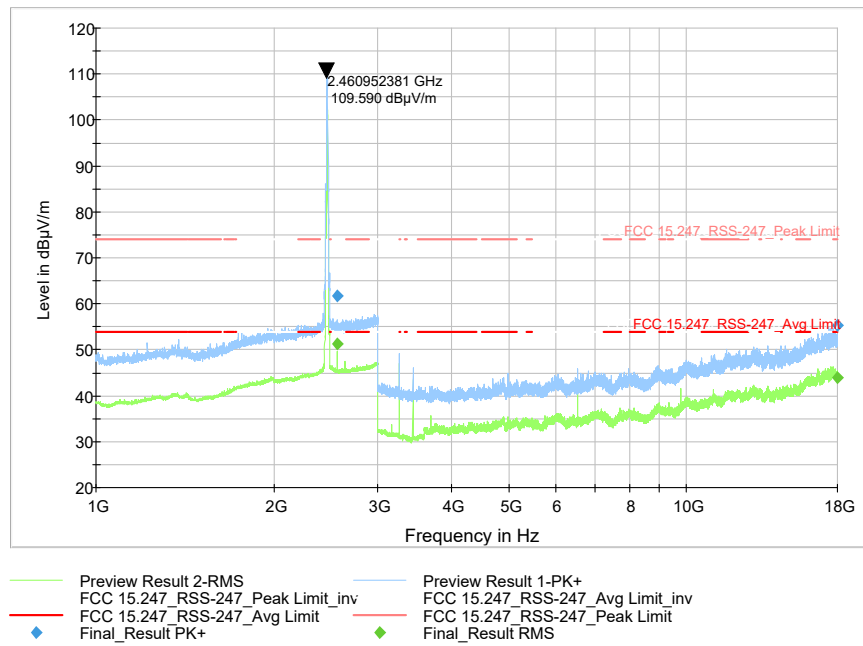


Plot 9-289 Radiated Spurious Emission 1-18GHz 802.11b - Ch.13 (2472 MHz)

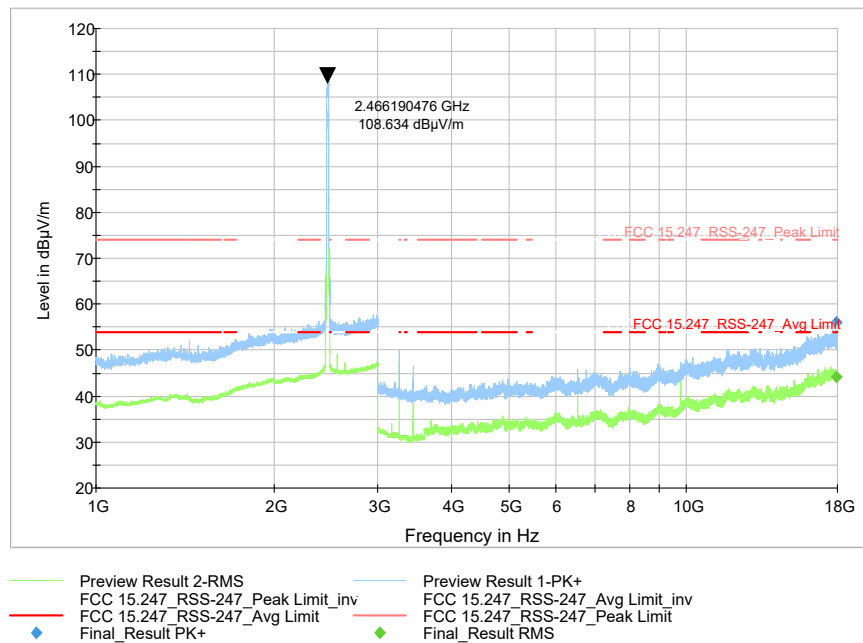
802.11g RSE 1 - 18GHz Average Data						
Carrier Frequency (MHz)	Frequency (MHz)	Raw Avg. Amplitude (dBμV)	Correction Factor (incl DCF=0dB) (dB)	Corrected Avg. Field Strength (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)
2412	2560.0	38.19	13.0	51.19	54	-2.81
2412	17893.9	19.53	24.5	44.03	54	-9.97
2462	2560.0	38.32	13.0	51.32	54	-2.68
2462	17967.0	19.55	24.3	43.85	54	-10.15
2467	17890.1	19.61	24.5	44.11	54	-9.89
2472	17889.0	19.64	24.4	44.04	54	-9.96
802.11g RSE 1 - 18GHz Peak Data						
Carrier Frequency (MHz)	Frequency (MHz)	Raw Peak Amplitude (dBμV)	Correction Factor (dB)	Corrected Peak Field Strength (dBμV/m)	Peak Limit (dBμV/m)	Margin (dB)
2412	2560.0	47.54	13.0	60.54	74	-13.46
2412	17891.4	30.87	24.5	55.37	74	-18.63
2462	2560.0	48.76	13.0	61.76	74	-12.24
2462	17967.3	30.94	24.3	55.24	74	-18.76
2467	17896.7	31.61	24.4	56.01	74	-17.99
2472	17894.9	30.77	24.5	55.27	74	-18.73



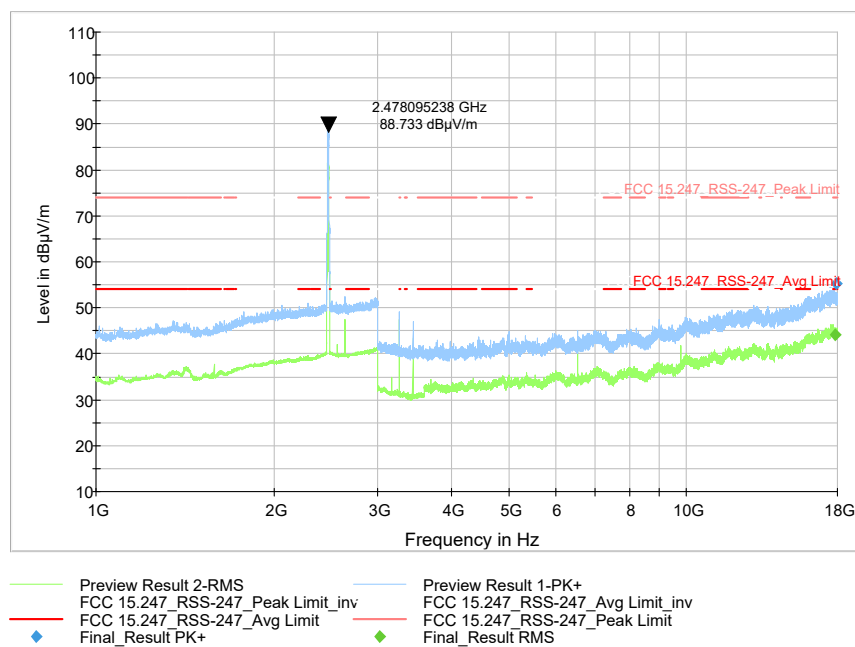
Plot 9-290 Radiated Spurious Emission 1-18GHz 802.11g - Ch.1 (2412 MHz)



Plot 9-291 Radiated Spurious Emission 1-18GHz 802.11g - Ch.11 (2462 MHz)

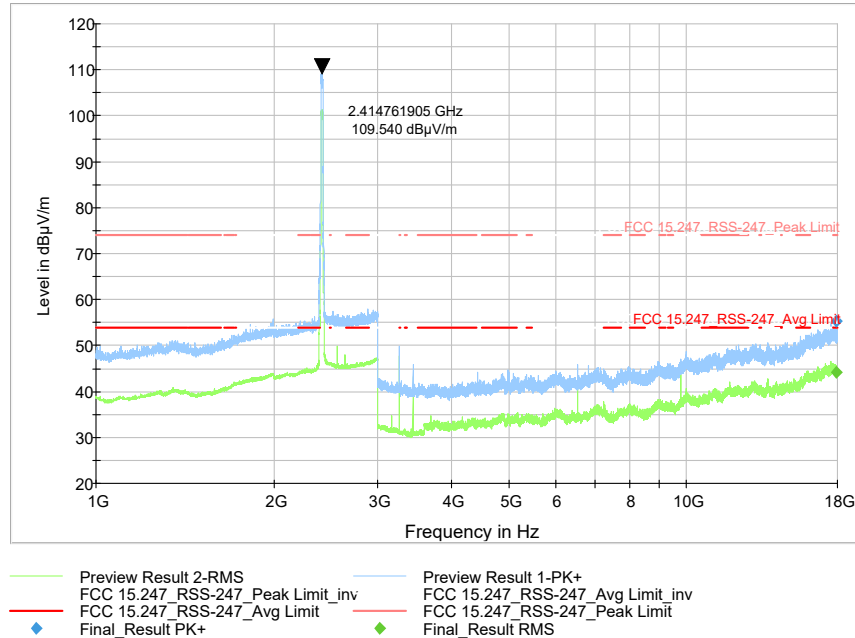


Plot 9-292 Radiated Spurious Emission 1-18GHz 802.11g - Ch.12 (2467 MHz)

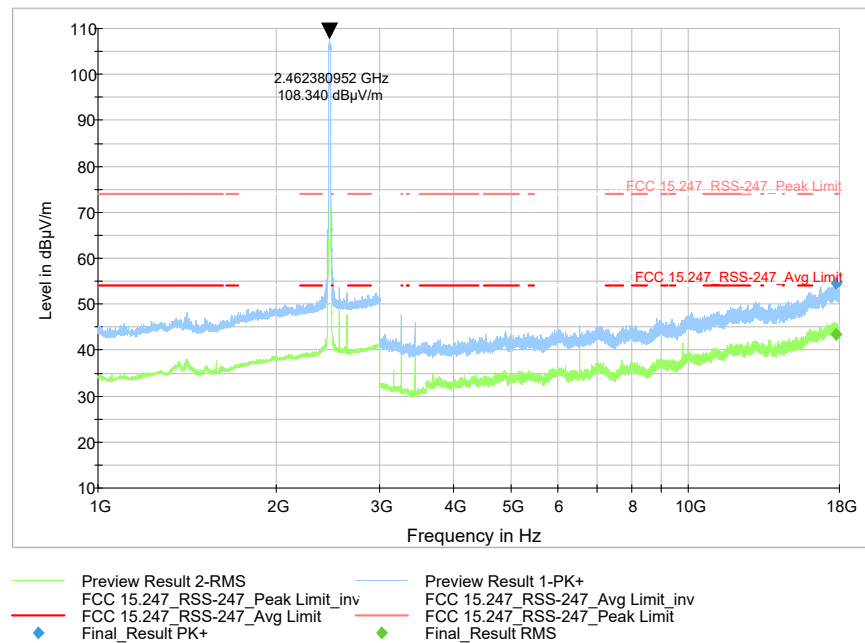
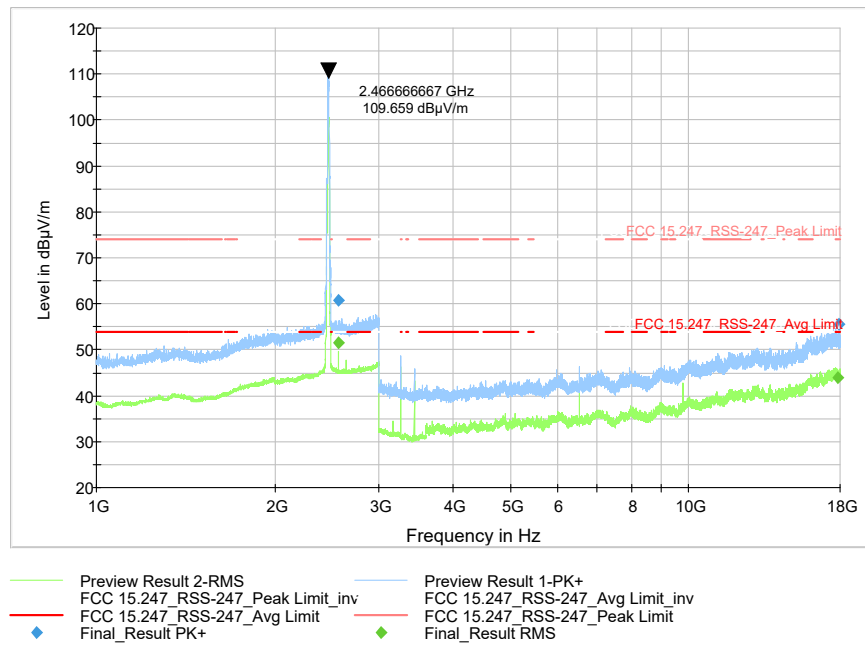


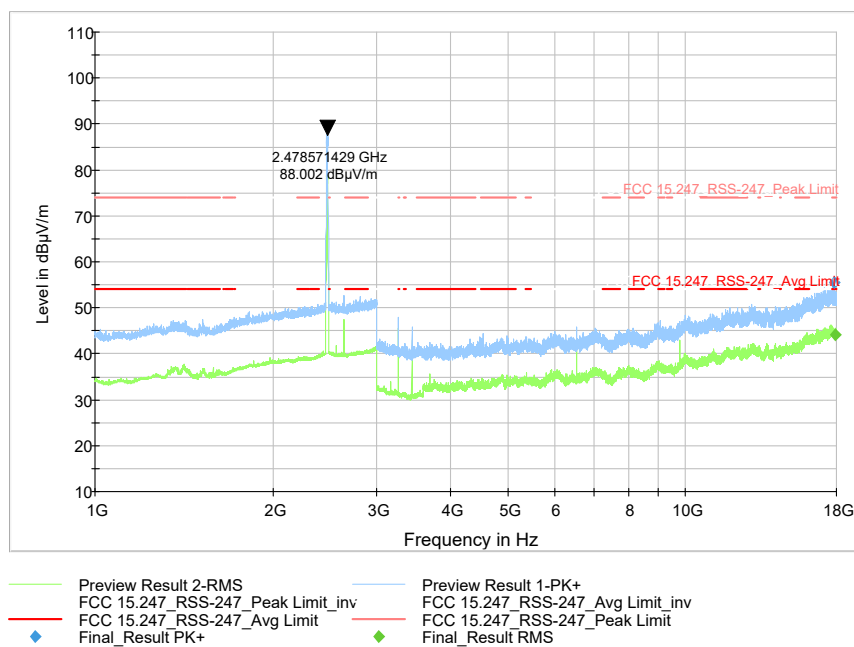
Plot 9-293 Radiated Spurious Emission 1-18GHz 802.11g - Ch.13 (2472 MHz)

802.11n20 RSE 1 - 18GHz Average Data						
Carrier Frequency (MHz)	Frequency (MHz)	Raw Avg. Amplitude (dBμV)	Correction Factor (incl DCF=0dB) (dB)	Corrected Avg. Field Strength (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)
2412	17889.8	19.57	24.5	44.07	54	-9.93
2462	2560.0	38.41	13.0	51.41	54	-2.59
2462	17876.2	19.50	24.4	43.90	54	-10.10
2467	17785.0	19.91	23.5	43.41	54	-10.59
2472	17889.7	19.58	24.5	44.08	54	-9.92
802.11n20 RSE 1 - 18GHz Peak Data						
Carrier Frequency (MHz)	Frequency (MHz)	Raw Peak Amplitude (dBμV)	Correction Factor (dB)	Corrected Peak Field Strength (dBμV/m)	Peak Limit (dBμV/m)	Margin (dB)
2412	17892.6	30.76	24.5	55.26	74	-18.74
2462	2560.0	47.83	13.0	60.83	74	-13.17
2462	17898.0	31.04	24.4	55.44	74	-18.56
2467	17779.6	31.13	23.5	54.63	74	-19.37
2472	17869.3	31.37	24.2	55.57	74	-18.43



Plot 9-294 Radiated Spurious Emission 1-18GHz 802.11n20 - Ch.1 (2412 MHz)

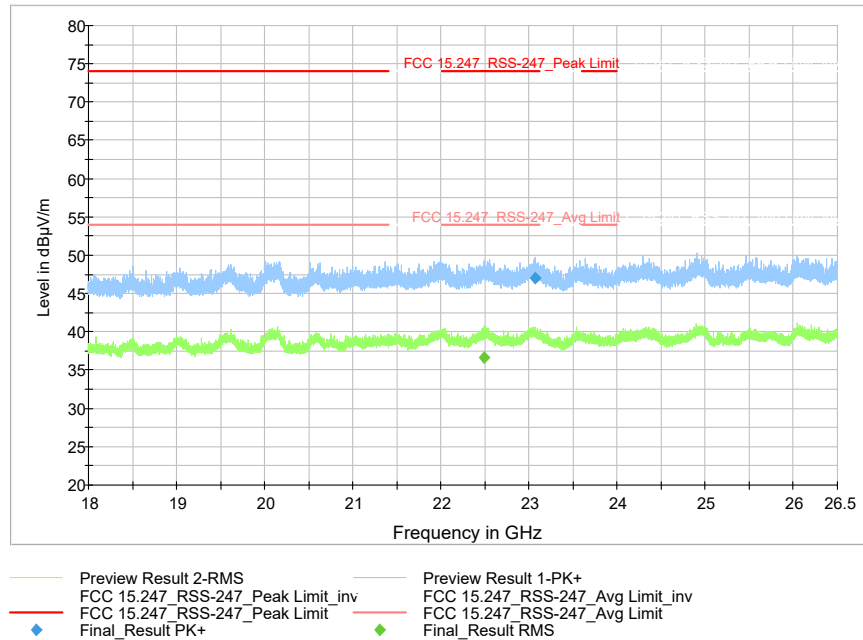




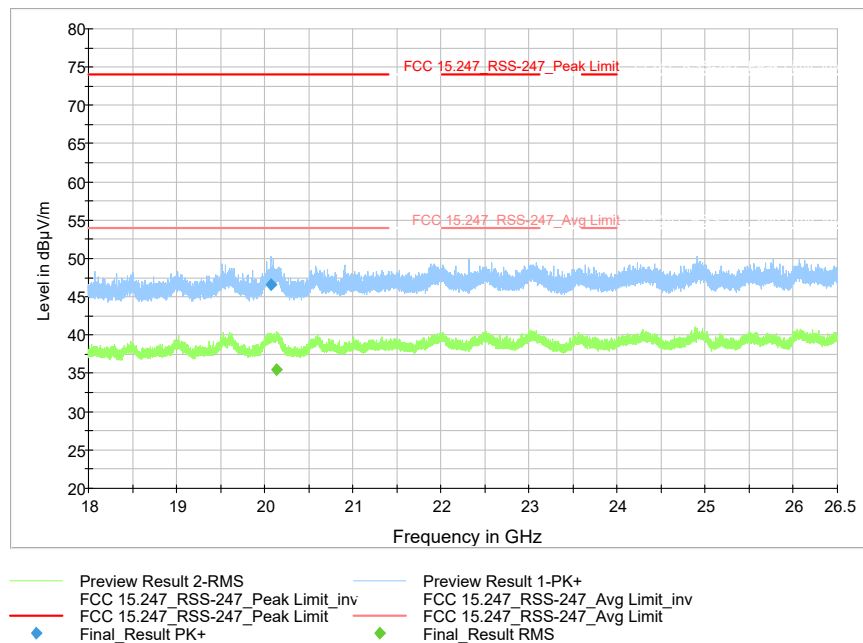
Plot 9-297 Radiated Spurious Emission 1-18GHz 802.11n - Ch.13 (2472 MHz)

9.8.5.4 Emissions in 18-26.5 GHz range

All modes and channels were tested, and worst-case data is shown here. No significant emissions to report above noise floor.

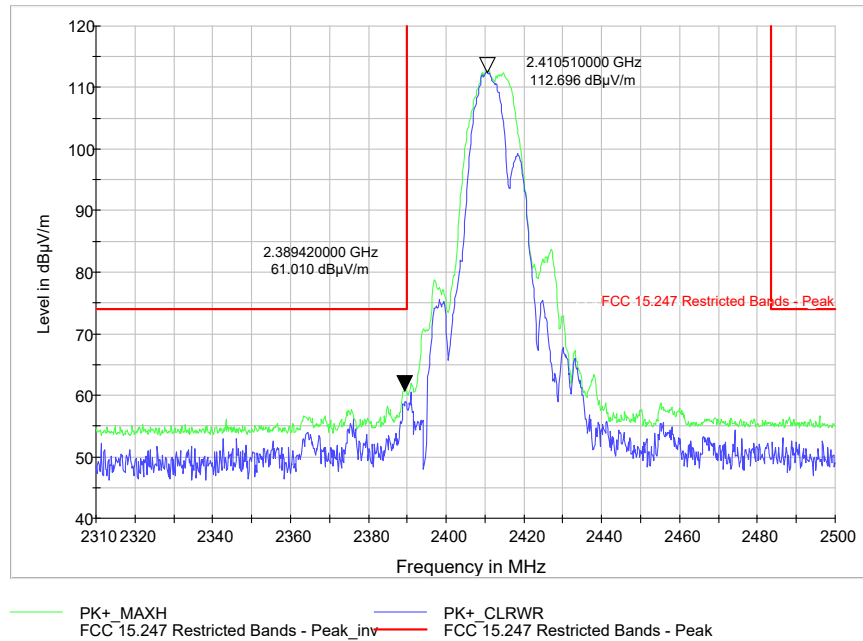


Plot 9-298 Radiated Spurious Emissions 18-26.5GHz 802.11b - Ch.6 (2437 MHz)

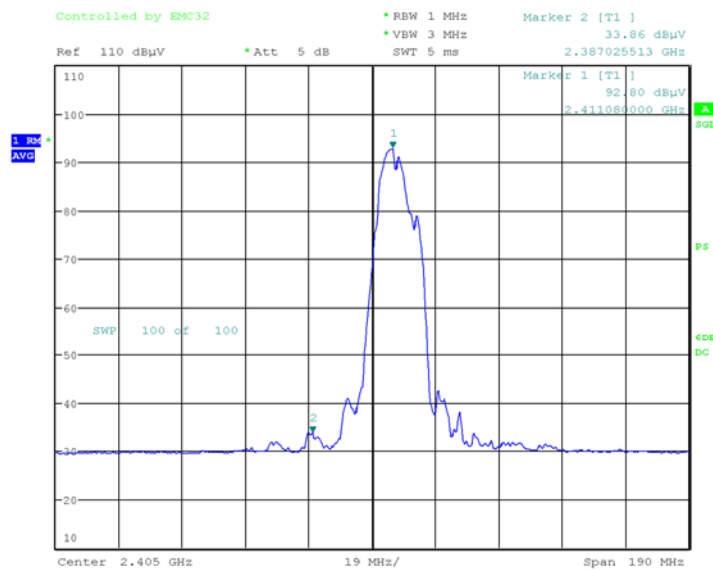


Plot 9-299 Radiated Spurious Emissions 18-26.5GHz 802.11n40 - Ch.7 (2442 MHz)

9.8.5.5 Radiated restricted Band-edge emissions (MIMO)

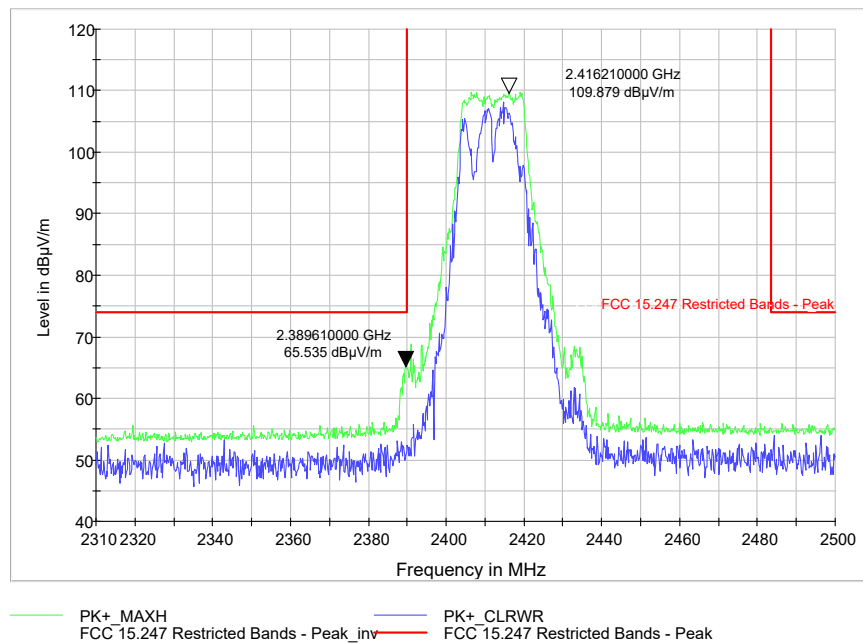


Plot 9-300 Radiated Band Edge Peak 802.11b - Ch.1 (2412 MHz)

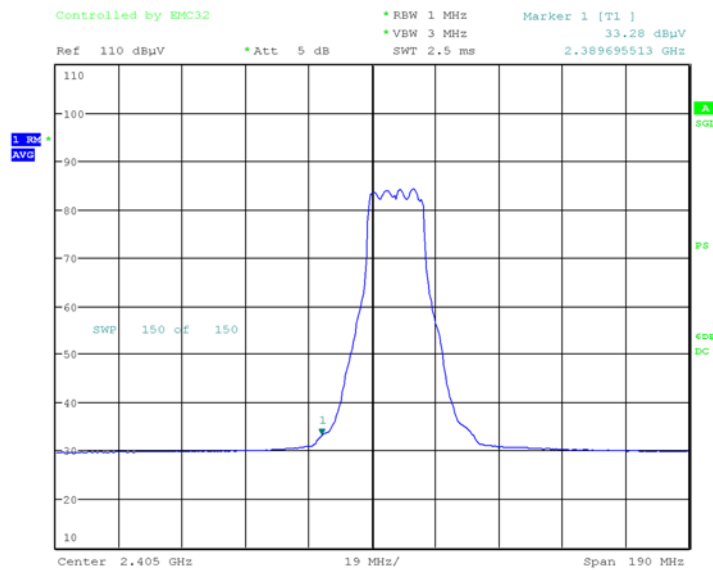


Date: 14.FEB.2019 22:54:14

Plot 9-301 Radiated Band Edge Average 802.11b - Ch.1 (2412 MHz)

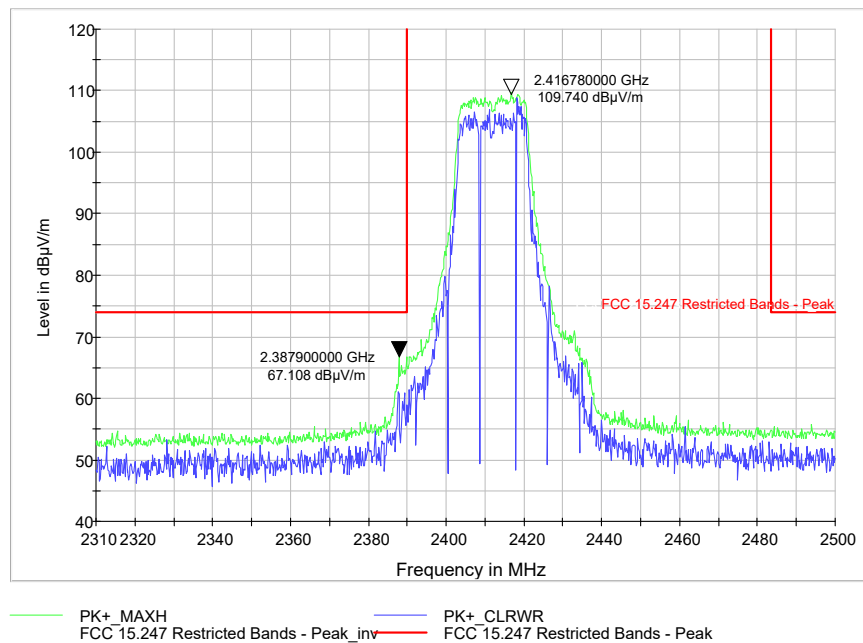


Plot 9-302 Radiated Band Edge Peak 802.11g - Ch.1 (2412 MHz)

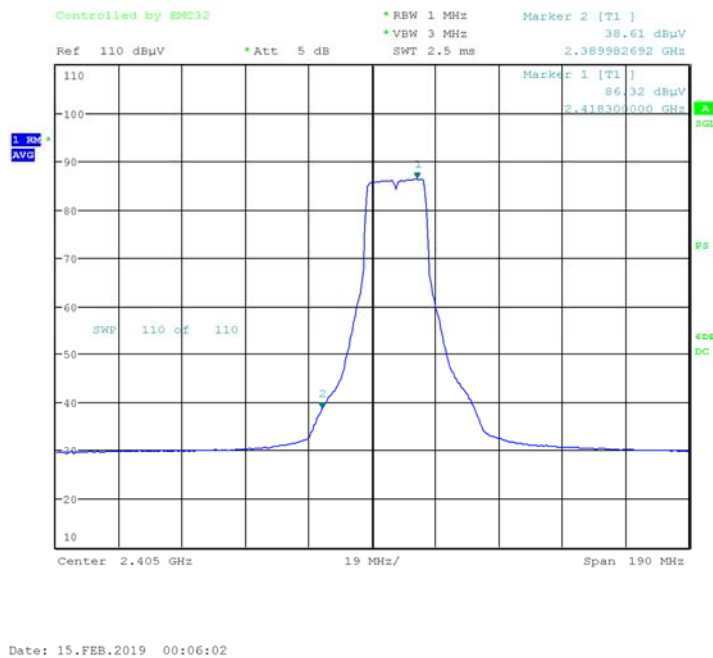


Date: 15.FEB.2019 23:28:13

Plot 9-303 Radiated Band Edge Average 802.11g - Ch.1 (2412 MHz)



Plot 9-304 Radiated Band Edge Peak 802.11n20 - Ch.1 (2412 MHz)



Plot 9-305 Radiated Band Edge Average 802.11n20 - Ch.1 (2412 MHz)

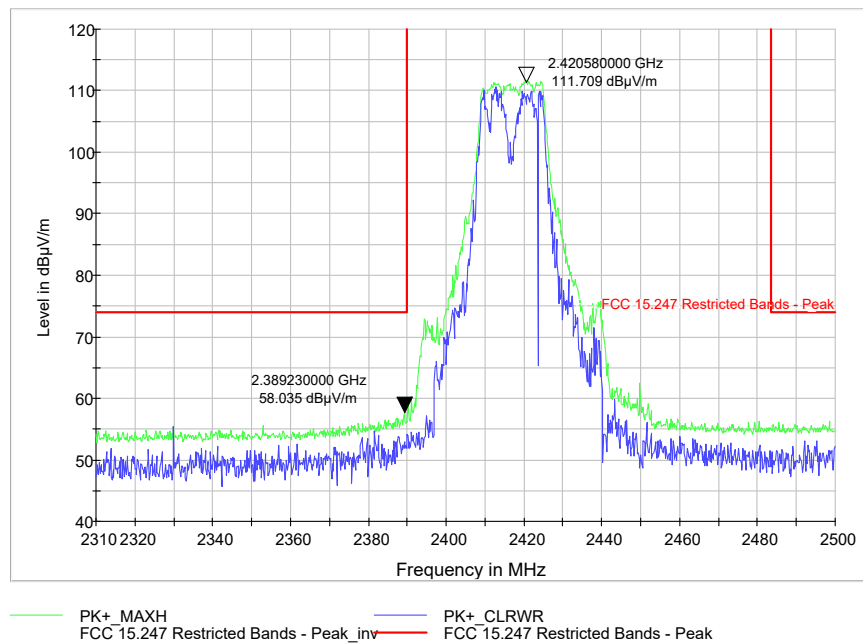
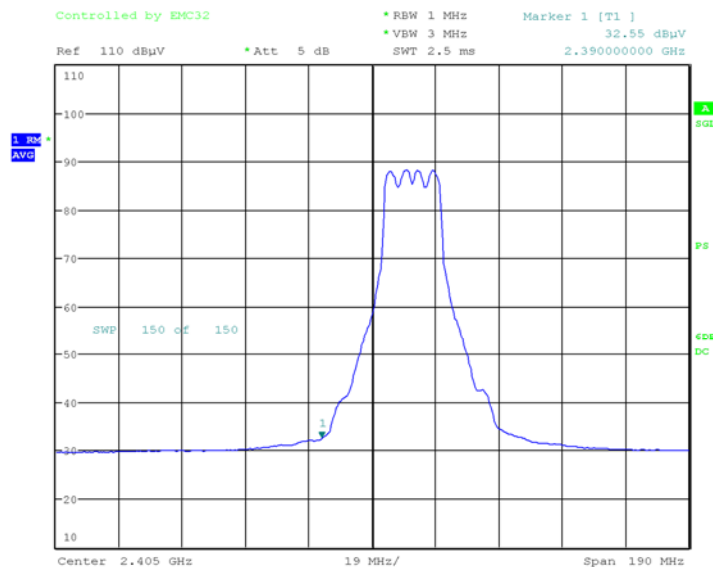


Figure 9-306 Radiated Band Edge Peak 802.11g - Ch.2 (2417 MHz)



Date: 15.FEB.2019 23:05:42

Figure 9-307 Radiated Band Edge Average 802.11g - Ch.2 (2417 MHz)

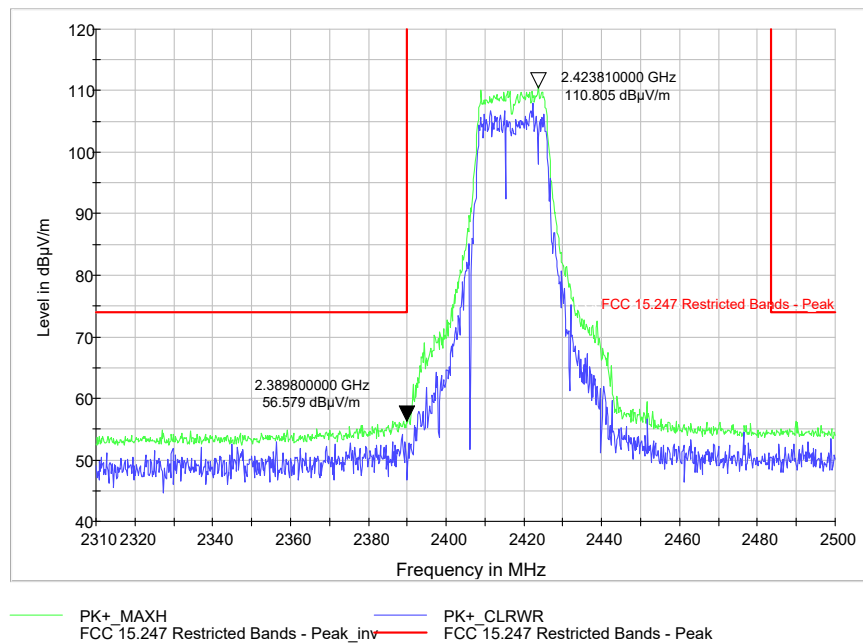


Figure 9-308 Radiated Band Edge Peak 802.11n20 - Ch.2 (2417 MHz)

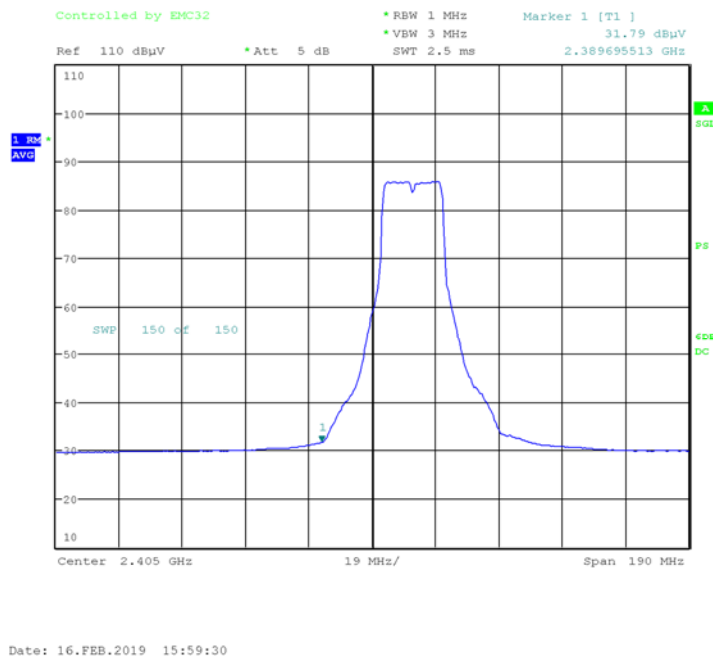


Figure 9-309 Radiated Band Edge Average 802.11n20 - Ch.2 (2417 MHz)

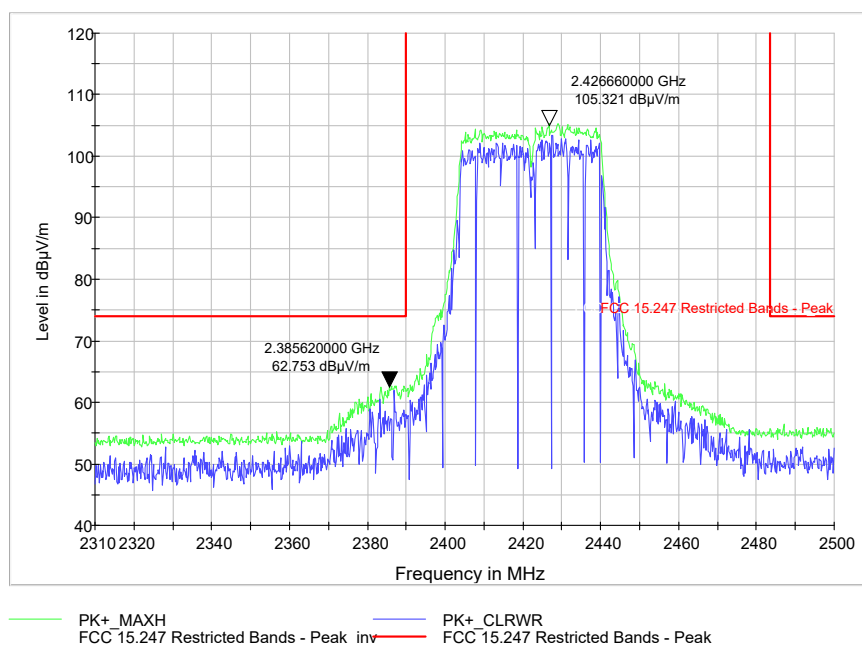
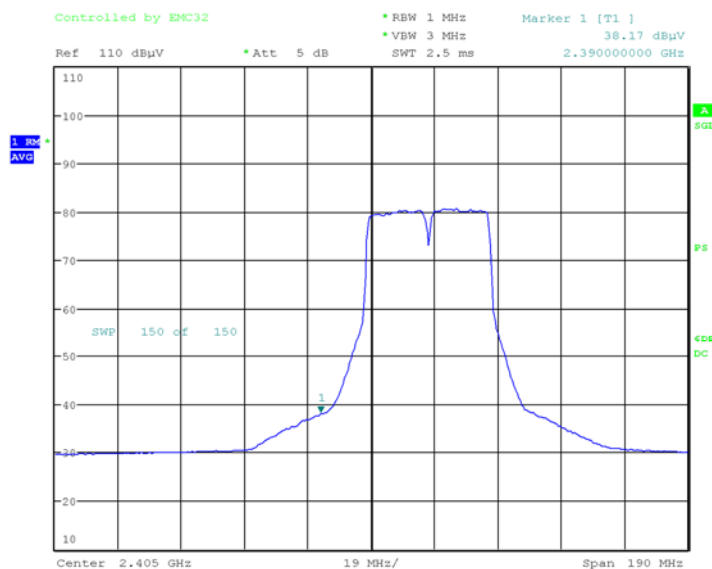


Figure 9-310 Radiated Band Edge Peak 802.11n40 - Ch.3 (2422 MHz)



Date: 16.FEB.2019 19:01:06

Figure 9-311 Radiated Band Edge Average 802.11n40 - Ch.3 (2422 MHz)

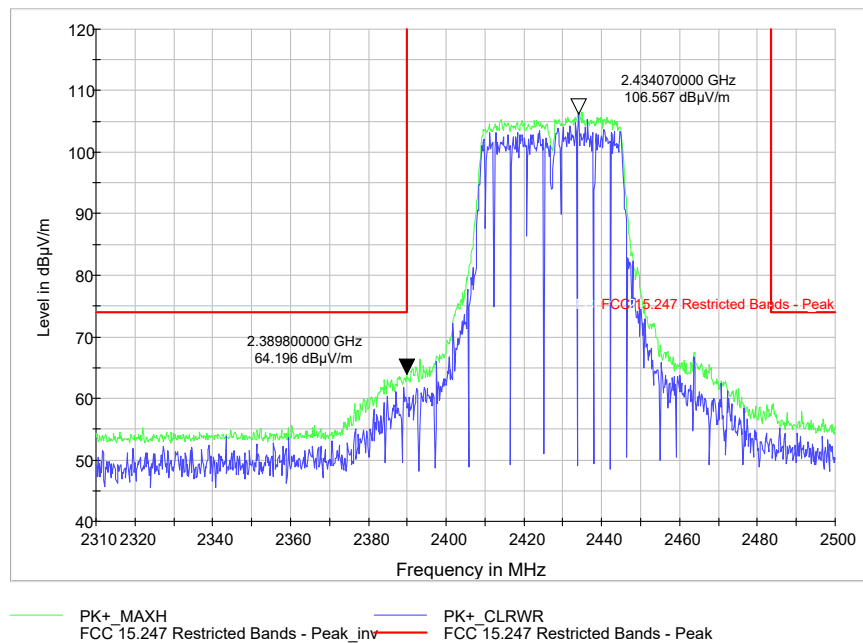


Figure 9-312 Radiated Band Edge Peak 802.11n40 - Ch.4 (2427 MHz)

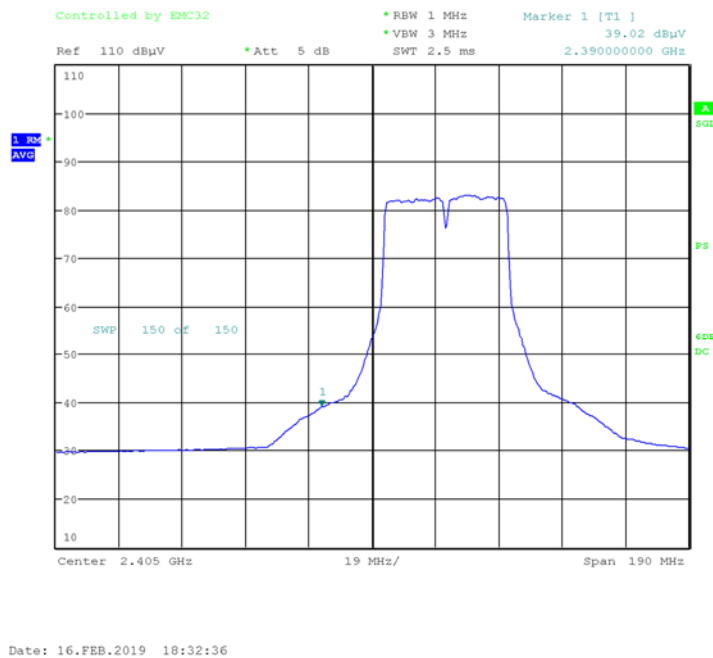


Figure 9-313 Radiated Band Edge Average 802.11n40 - Ch.4 (2427 MHz)

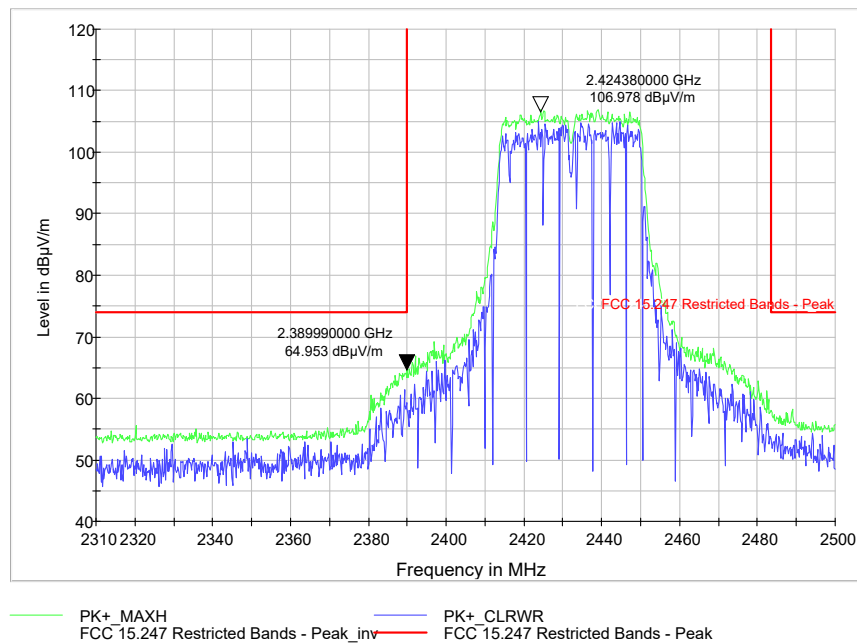


Figure 9-314 Radiated Band Edge Peak 802.11n40 - Ch.5 (2432 MHz)

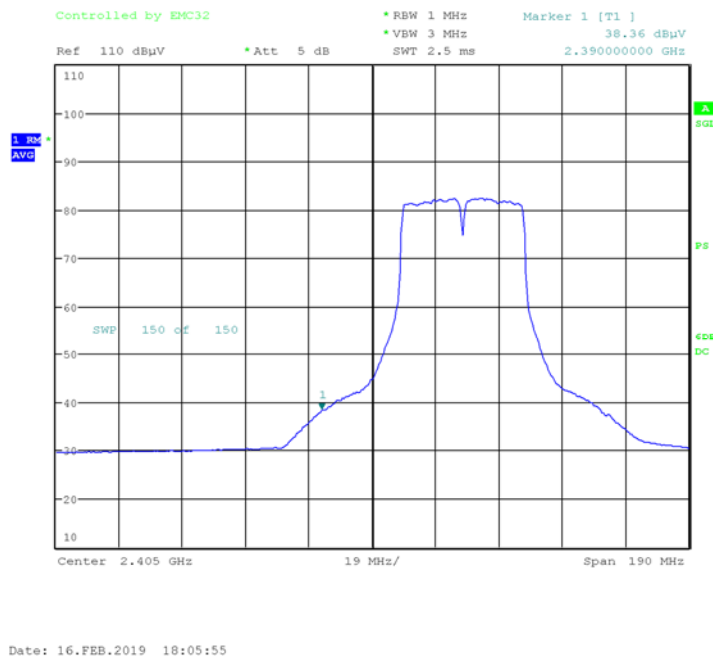


Figure 9-315 Radiated Band Edge Average 802.11n40 - Ch.5 (2432 MHz)

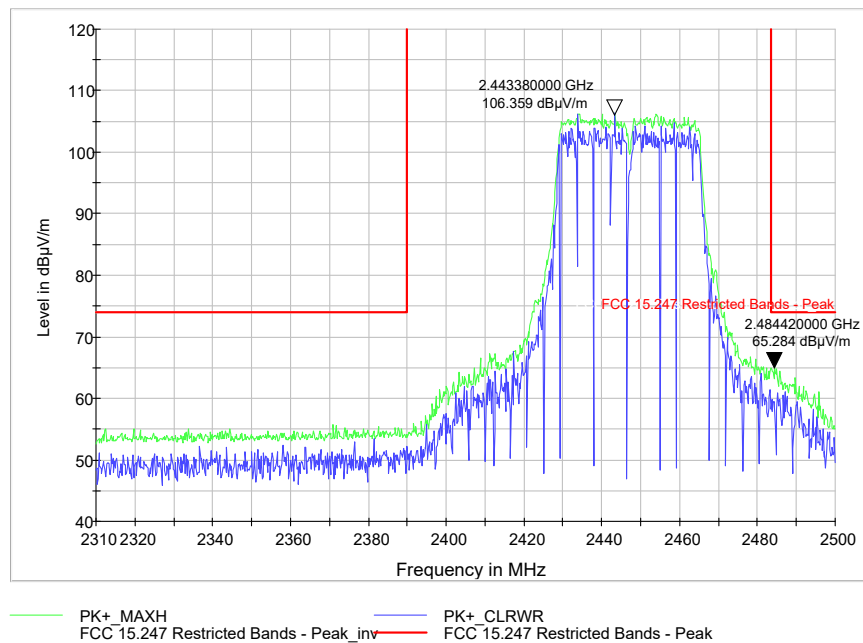


Figure 9-316 Radiated Band Edge Peak 802.11n40 - Ch.8 (2447 MHz)

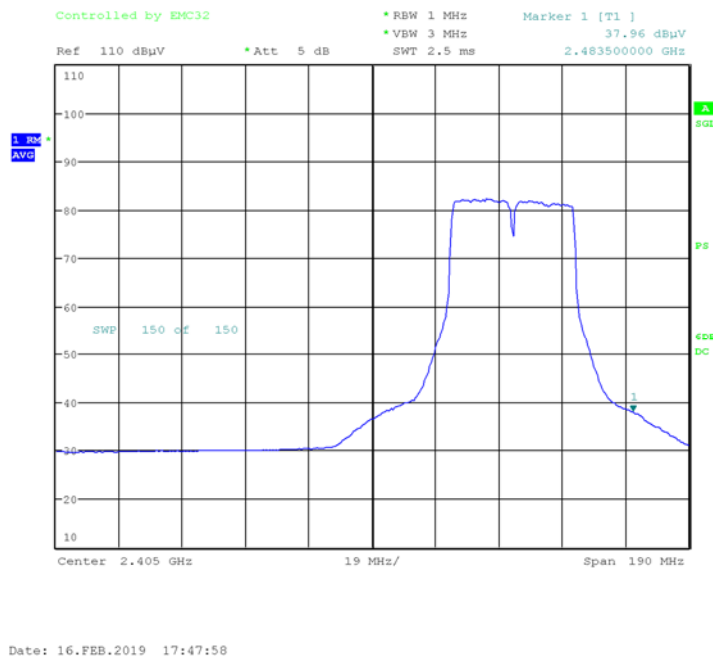


Figure 9-317 Radiated Band Edge Average 802.11n40 - Ch.8 (2447 MHz)

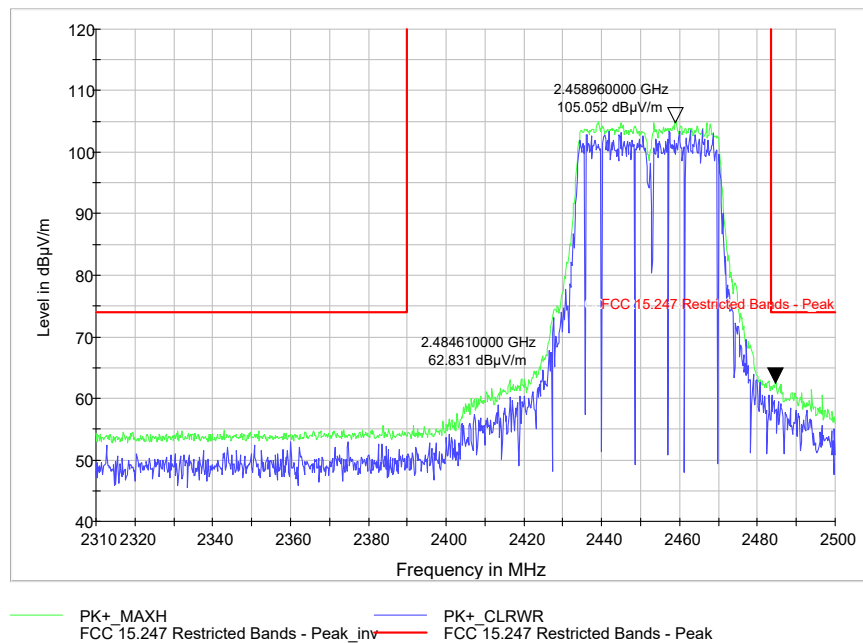


Figure 9-318 Radiated Band Edge Peak 802.11n40 - Ch.9 (2452 MHz)

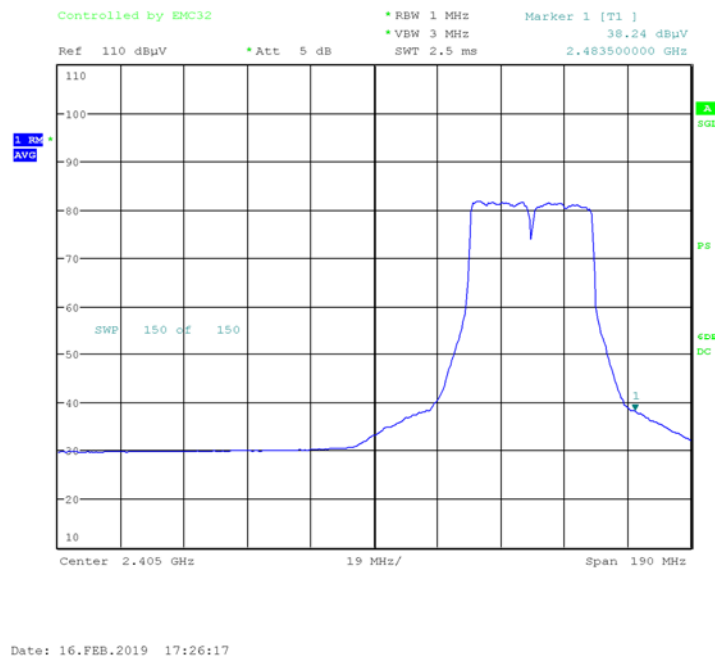


Figure 9-319 Radiated Band Edge Average 802.11n40 - Ch.9 (2452 MHz)

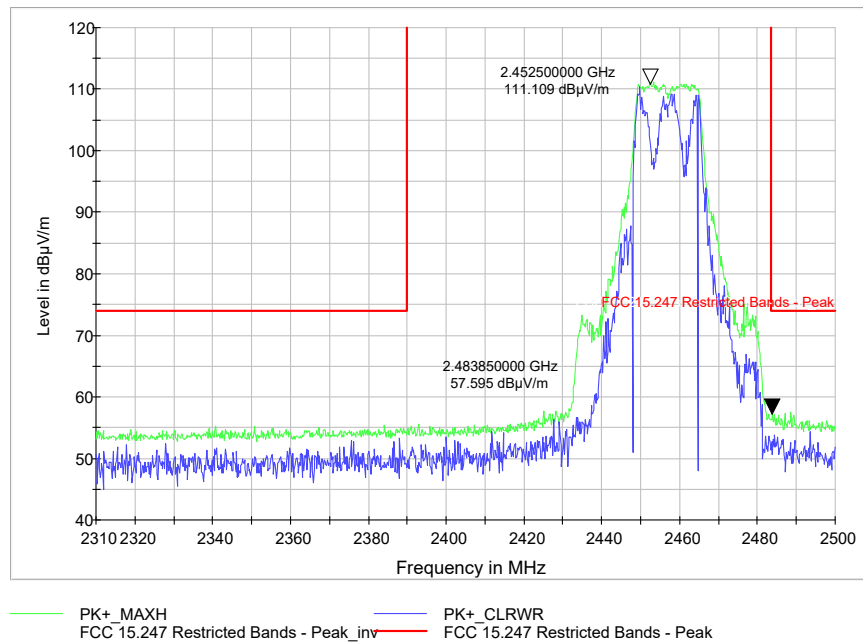
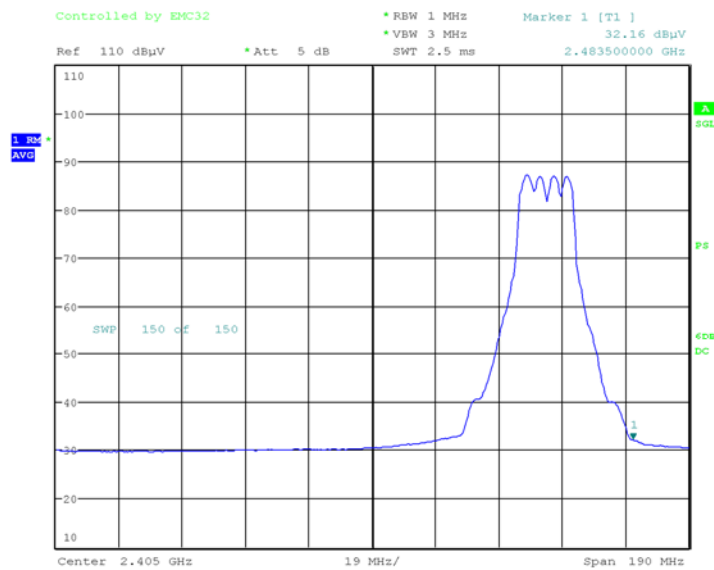


Figure 9-320 Radiated Band Edge Peak 802.11g - Ch.10 (2457 MHz)



Date: 15.FEB.2019 22:42:46

Figure 9-321 Radiated Band Edge Average 802.11g - Ch.10 (2457 MHz)