

Test Report



INTENTIONAL RADIATOR TESTS ACCORDING TO FCC PART 15 C AND ISED CANADA REQUIREMENTS

Equipment Under Test: Wi-Fi 802.11bgn SiP transceiver radio module

Model: WFM200SA
WFM200SN

Manufacturer: SILICON LABORATORIES FINLAND OY
Alberga Business Park, Bertel Jungin aukio 3,
02600 Espoo, Finland

Customer: SILICON LABORATORIES FINLAND OY
Alberga Business Park, Bertel Jungin aukio 3,
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FCC Rule Part: 15.247: 2018
IC Rule Part: RSS-247, Issue 2, 2017
RSS-GEN Issue 5 Amendment 1, 2019

KDB: 558074 D01 15.247 Meas Guidance v05r02
Guidance for Compliance Measurements on Digital
Transmission Systems, Frequency Hopping Spread
Spectrum System, and Hybrid System Devices
Operating Under §15.247 of the FCC rules
(April 2, 2019)

Date: 23 September 2019

Issued by:


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Date: 23 September 2019

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GENERAL REMARKS**Disclaimer**

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. This document cannot be reproduced except in full, without prior approval of the Company.

RELEASE HISTORY

Version	Changes	Issued
1.0	Initial release	2 September 2019
1.0	Another model added. Page 23: measurement distance added (3m) Page 85: Typo corrected 2..371 --> 2.371	23 September 2019

PRODUCT DESCRIPTION

Equipment Under Test

Trade mark:	Silicon Labs
Model:	WFM200SA, WMF200SN
Type:	-
Serial no:	-
FCC ID:	QOQWFM200
IC:	5123A-WFM200

General Description

Low-power Wi-Fi 802.11bgn SiP transceiver radio module, targeted to, but not limited to, operate with a Linux-based host system as a network co-processor for connectivity to WLANs.

Module has two RF pins. End-product manufacturer can decide to connect external antenna to RF1 and/or RF2. The unused RF port should be 50Ω terminated. Reason for connecting both external antennas would be to implement the supported switched diversity. There is no MIMO functionality, and there is never simultaneous transmission out of the antennas, since an internal switch redirects the RF signal to either RF1 or RF2, where RF2 has ~1dB less TX power compared to RF1.

Only the A-variant, WFM200SA, has the integral antenna assembled, so a customer might want to use it, instead of an external antenna, by shorting the RF1 pin with the adjacent ANT_IN pin using a 0Ω resistor.

Classification

Fixed device	<input type="checkbox"/>
Mobile Device (Human body distance > 20cm)	<input checked="" type="checkbox"/>
Portable Device (Human body distance < 20cm)	<input checked="" type="checkbox"/>

Modifications Incorporated in the EUT

No modifications were applied to the EUTs during testing.

Samples

Two samples were used in the testing. During the tests the EUT was set to transmit continuously and was set to the channel under test. Normal test modulation and maximum transmit power was used in all tests. No modifications were done during the tests. Each antenna and RF I/O port were tested individually.

EUT	Description
EUT 1, C7	WMF200SA sample was used for radiated spurious emission tests for integral antenna. During the tests the RF I/O port 2 was terminated by 50 Ω SMA-terminating resistor.
EUT 2, B3	<p>WMF200SN sample was used for radiated spurious emission tests for external antennas and for all conducted tests. Following configurations were used.</p> <ol style="list-style-type: none"> 1. Antenna connected to RF I/O port 1 with 50Ω coaxial cable and SMA-connector, RF I/O port 2 terminated by 50 Ω SMA-terminating resistor. 2. Antenna connected to RF I/O port 2 with 50Ω coaxial cable and SMA-connector, RF I/O port 1 terminated by 50 Ω SMA-terminating resistor. 3. RF I/O port 1 connected to Rohde & Schwarz TS8997 measurements system with 50Ω coaxial cable and SMA-connector, RF I/O port 2 terminated by 50 Ω SMA-terminating resistor. 4. RF I/O port 2 connected to Rohde & Schwarz TS8997 measurements system with 50Ω coaxial cable and SMA-connector, RF I/O port 1 terminated by 50 Ω SMA-terminating resistor.

Ratings and declarations

Operating Frequency Range (OFR):	2412 - 2462 MHz
Channels:	11
Channel separation:	5 MHz
Transmission technique:	DSSS
Modulation:	CCK, QPSK, OFDM
Antenna type:	1x Integral, 2x External
Integral Antenna gain:	4.7 dBi
External Antenna gain:	4.7 dBi

Power Supply

Operating voltage range: 3.0-3.6 VDC (tested with 3.3V regulated by the Raspberry Pi)

AC/DC power supply was used powering the Raspberry pi.

Manufacturer:	STONTRONICS LTD.
Model:	DSA-12CA-05
Rated voltage:	100-240 VAC
Rated current:	0.3 A max
Rated frequency:	50-60 Hz
Output voltage:	+5 VDC
Output current:	2.0 A

Mechanical Size of the EUT

Height: 1.30 mm

Width: 6.50 mm

Length: 6.50 mm

PeripheralsLaptop
Wireless routerDELL Latitude E7240
Asus

SUMMARY OF TESTING

Test Specification	Description of Test	Result
§15.207(a) / RSS-GEN 8.8	Conducted Emissions on Power Supply Lines	PASS
§15.247(b)(3) / RSS-247 5.4(d)	Maximum Peak Conducted Output Power	PASS
§15.247(a)(1) / RSS-247 5.1	Hopping Channel Carrier Frequency Separation	N/T ⁽¹⁾
§15.247(a)(1) / RSS-247 5.1	Number of Hopping Frequencies	N/T ⁽¹⁾
§15.247(a)(1) / RSS-247 5.1	Average Time of Occupancy of Hopping Frequency	N/T ⁽¹⁾
§15.247(a)(1) / RSS-247 5.1	20 dB Bandwidth	N/T ⁽¹⁾
§15.247(a)(2) / RSS-247 5.2(a)	6 dB Bandwidth	PASS
§15.247(e) / RSS-247 5.2(b)	Power Spectral Density	PASS
RSS-GEN 6.7	99% Occupied Bandwidth	PASS
§15.247(d) / RSS-247 5.5	100 kHz Bandwidth of Frequency Band Edges and Conducted Spurious Emissions	PASS
§15.209(a), §15.247(d) / RSS-247 5.5	Radiated Emissions Within the Restricted Bands	PASS

1) Applicable only for FHSS

The decision rule applied for the tests results stated in this test report is according to the requirements of section 1.3 of ANSI C63.10-2013.

EUT Test Conditions during Testing

The EUT was in continuous transmit mode during all the tests. The hopping was stopped and the EUT was configured into the wanted channel using software provided by the manufacturer.

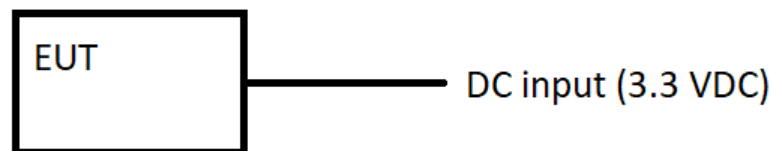


Figure 1: Test setup blocking diagram

Following channels were used during the tests when the hopping was stopped:

Channel Low (Ch 1) = 2412 MHz

Channel Mid (Ch 6) = 2437 MHz

Channel High (Ch 11) = 2462 MHz

Test Facility

<p>Testing Laboratory / address: FCC registration number: 904175</p>	<p>SGS Fimko Ltd Särkiniementie 3 FI-00210, HELSINKI FINLAND</p>
<p>Test Site:</p>	<p><input type="checkbox"/> K10LAB, ISED Canada registration number: 8708A-1 <input checked="" type="checkbox"/> K5LAB, ISED Canada registration number: 8708A-2 <input type="checkbox"/> L3LAB <input type="checkbox"/> T10LAB</p>

TEST RESULTS

Conducted Emissions In The Frequency Range 150 kHz - 30 MHz

Standard: ANSI C63.10 (2013)
Tested by: JAT
Date: 16 August 2019
Temperature: 23 ± 3°C
Humidity: 20 - 60 % RH
Barometric pressure: 1001 hPa
Measurement uncertainty: ± 2.9 dB Level of confidence 95 % (k = 2)

FCC Rule: 15.207 (a)
RSS-GEN 8.8

Conducted disturbance voltage was measured with an artificial main network from 150 kHz to 30 MHz with 4 kHz steps and a resolution bandwidth of 9 kHz. Measurements were carried out with peak and average detectors.

Frequency of emission (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

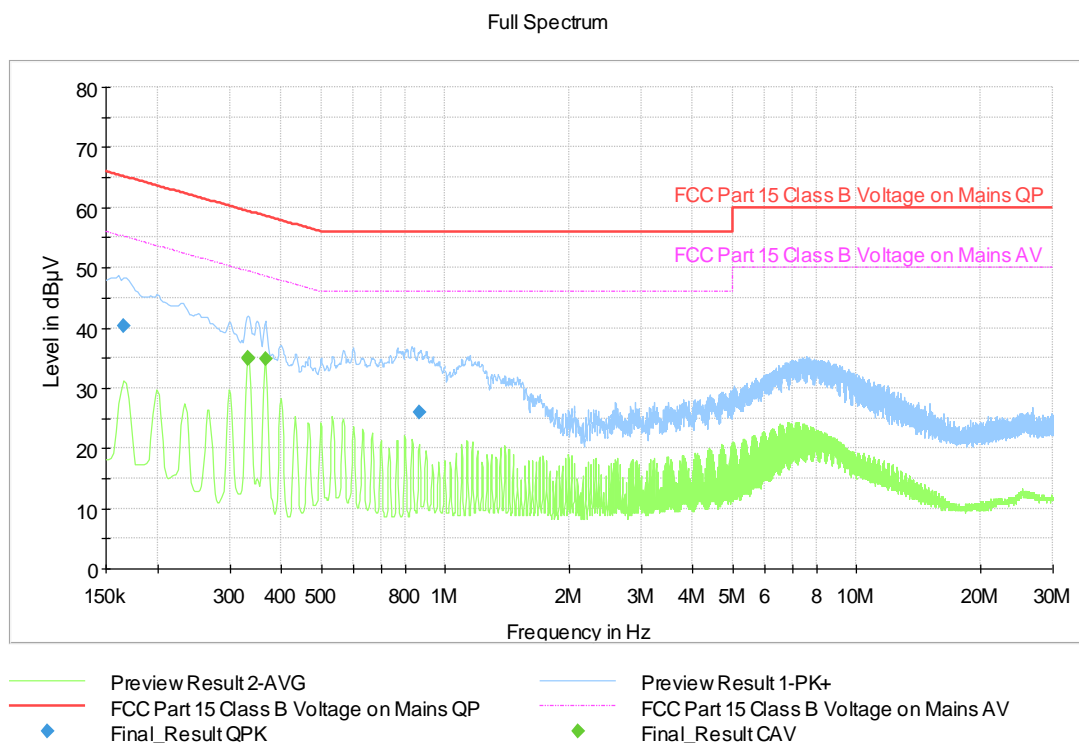


Figure 2. The measured curves with peak- and average detector

Final measurements from the worst frequencies

Table 1: Final QuasiPeak and Average measurements from the worst frequencies

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.166000	40.30	---	65.16	24.86	1000.0	9.000	N	ON	9.6
0.331250	---	34.87	49.42	14.55	1000.0	9.000	L1	ON	9.6
0.333000	---	35.08	49.38	14.30	1000.0	9.000	L1	ON	9.6
0.366750	---	34.87	48.57	13.70	1000.0	9.000	L1	ON	9.7
0.866250	25.86	---	56.00	30.14	1000.0	9.000	N	ON	9.7

The correction factor in the final result table contains the sum of the transducers.
The result value is the measured value corrected with the correction factor.

Maximum Peak Conducted Output Power

Maximum Peak Conducted Output Power

Standard: ANSI C63.10 (2013)
Tested by: JAT
Date: 8 - 12 August 2019
Temperature: 23 ± 3 °C
Humidity: 20 - 60 % RH
Measurement uncertainty: ± 2.87dB Level of confidence 95 % (k = 2)

**FCC Rule: 15.247(b)(3)
RSS-247 5.4(d)**

For systems using digital modulation in the 2400-2483.5 MHz bands the limit is 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. Gated RMS power was measured with Rohde & Schwarz TS8997 test system. Following measurement method was used, AVGPM-G (C11.9.2.3.2), ANSI 63.10
Pre-measurements were performed to RF I/O port 1 and RF I/O port 2, the worst-case test results have been reported.

Results:

Table 2: Maximum conducted output power

802.11b (RF I/O port 1, U.FL connector at the back side of the board)

Data rate [Mbps]	Conducted power, Gated RMS [dBm]			Limit [dBm]	Result
	Low channel 1	Mid channel 6	High channel 11		
1	14.4	16.4	14.7	30	PASS
2	13.3	13.7	13.5	30	PASS
5.5	13.1	13.5	13.3	30	PASS
11	13.1	13.5	13.2	30	PASS

802.11g (RF I/O port 1, U.FL connector at the back side of the board)

Data rate [Mbps]	Conducted power, Gated RMS [dBm]			Limit [dBm]	Result
	Low channel 1	Mid channel 6	High channel 11		
6	9.6	13.4	9.5	30	PASS
9	9.8	13.5	9.7	30	PASS
12	9.4	13.3	9.4	30	PASS
18	8.0	11.6	7.9	30	PASS
24	8.0	11.6	7.9	30	PASS
36	8.5	10.9	8.6	30	PASS
48	6.8	9.3	6.9	30	PASS
54	7.5	7.9	7.4	30	PASS

802.11n (RF I/O port 1, U.FL connector at the back side of the board)

Data rate [Mbps]	Conducted power, Gated RMS [dBm]			Limit [dBm]	Result
	Low channel 1	Mid channel 6	High channel 11		
7.2(MCS0)	9.1	12.9	9.0	30	PASS
14.4(MCS1)	9.1	13.0	9.0	30	PASS
21.7(MCS2)	7.6	11.2	7.5	30	PASS
28.9(MCS3)	7.7	11.3	7.6	30	PASS
43.3(MCS4)	8.2	10.6	8.3	30	PASS
57.8(MCS5)	7.1	9.5	7.2	30	PASS
65(MCS6)	6.9	7.1	6.6	30	PASS
72.2(MCS7)	5.2	5.5	5.4	30	PASS

Maximum Peak Conducted Output Power

802.11b (RF I/O port 2, U.FL connector next to chip)

Data rate [Mbps]	Conducted power, Gated RMS [dBm]			Limit [dBm]	Result
	Low channel 1	Mid channel 6	High channel 11		
1	13.7	15.8	13.8	30	PASS

802.11g (RF I/O port 2, U.FL connector next to chip)

Data rate [Mbps]	Conducted power, Gated RMS [dBm]			Limit [dBm]	Result
	Low channel 1	Mid channel 6	High channel 11		
9	8.9	12.5	8.5	30	PASS

802.11n (RF I/O port 2, U.FL connector next to chip)

Data rate [Mbps]	Conducted power, Gated RMS [dBm]			Limit [dBm]	Result
	Low channel 1	Mid channel 6	High channel 11		
14.4(MCS1)	8.0	11.9	7.9	30	PASS

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2412.000000	14.4	30.0	14.4	94.147	PASS

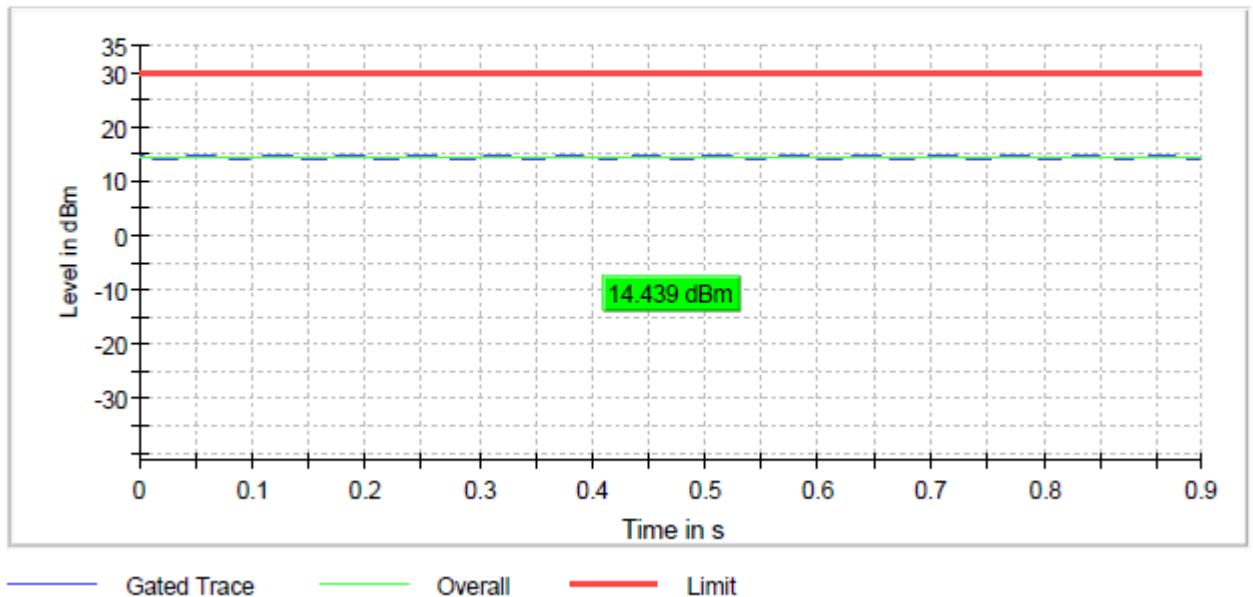


Figure 3: Conducted power, RF I/O port 1_802.11b_1Mbps_Channel 1

Maximum Peak Conducted Output Power

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2437.000000	16.4	30.0	16.4	94.146	PASS

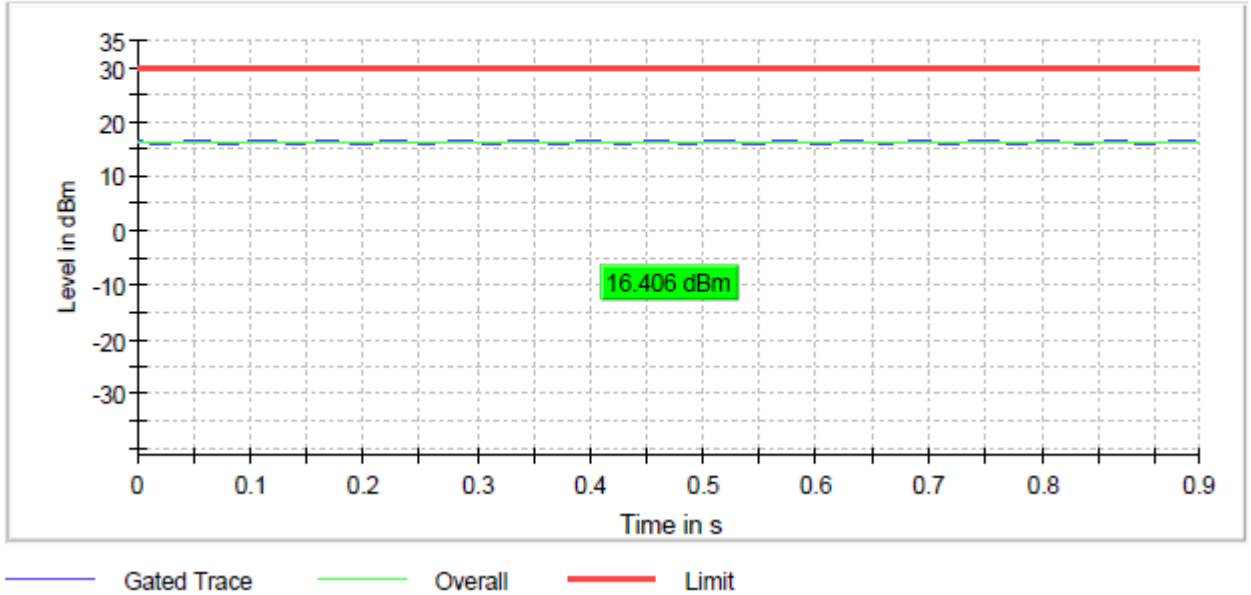


Figure 4: Conducted power, RF I/O port 1_802.11b_1Mbps_Channel 6

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2462.000000	14.7	30.0	14.7	94.145	PASS

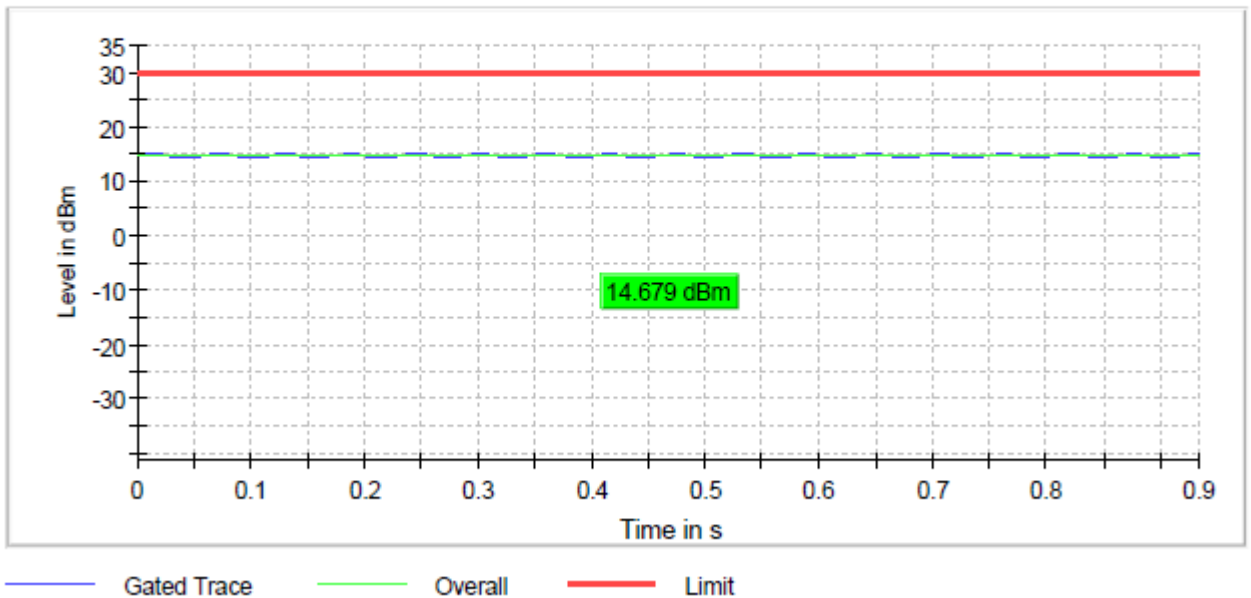


Figure 5: Conducted power, RF I/O port 1_802.11b_1Mbps_Channel 11

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2412.000000	9.8	30.0	9.8	63.783	PASS

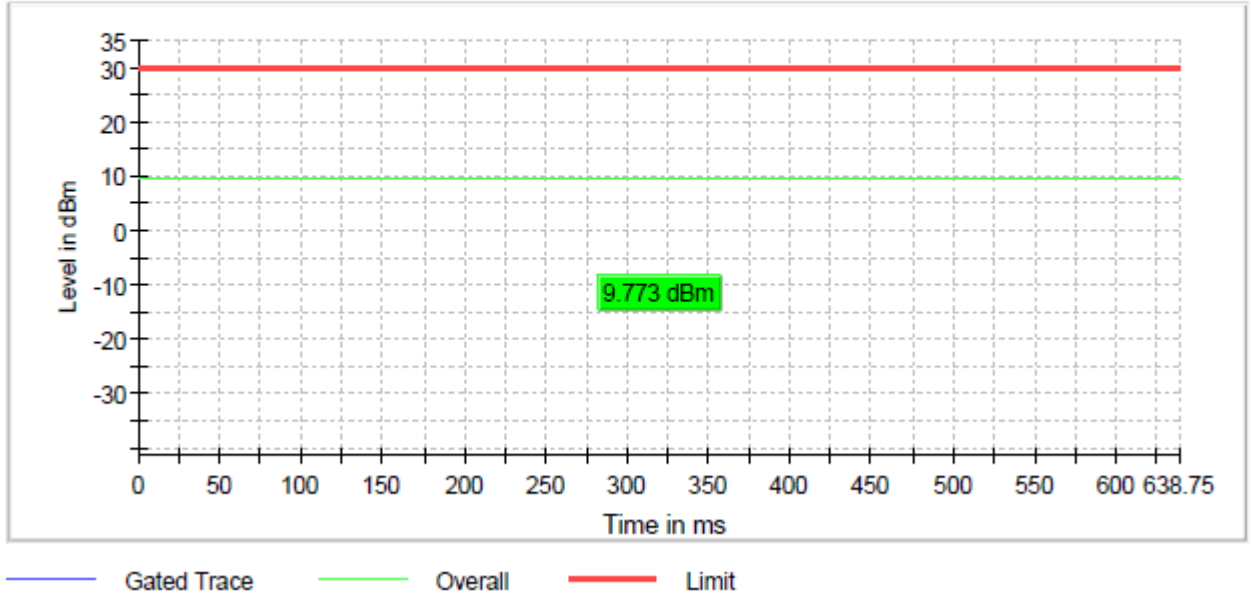


Figure 6: Conducted power, RF I/O port 1_802.11g_9Mbps_Channel 1

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2437.000000	13.5	30.0	13.5	63.771	PASS

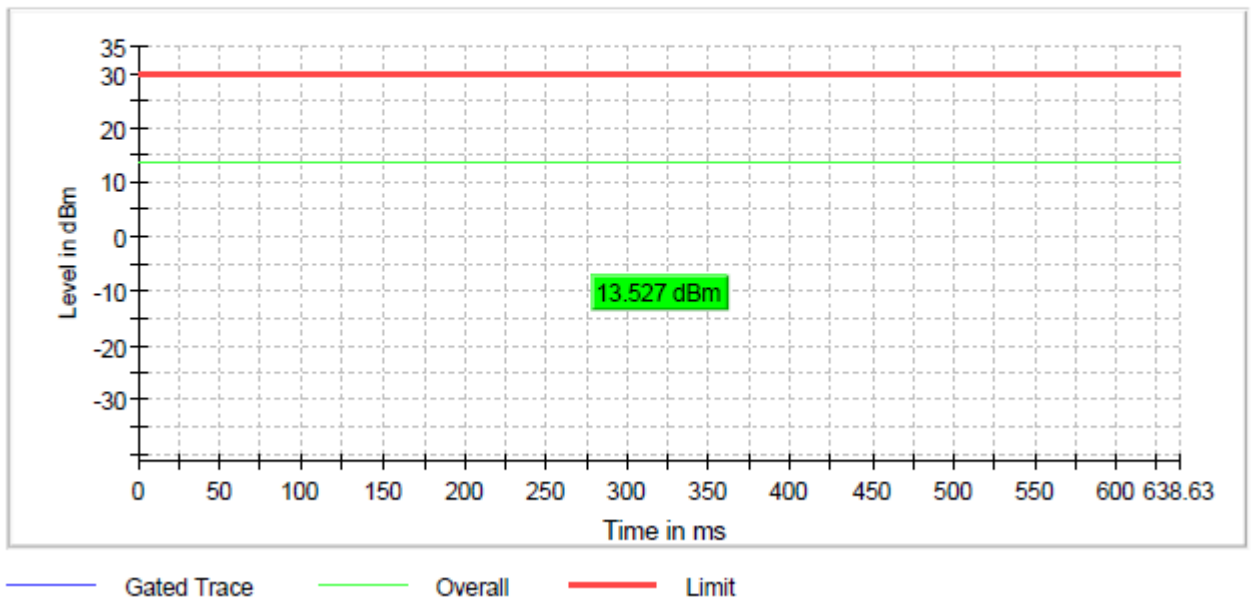


Figure 7: Conducted power, RF I/O port 1_802.11g_9Mbps_Channel 6

Maximum Peak Conducted Output Power

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2462.000000	9.6	30.0	9.6	63.777	PASS

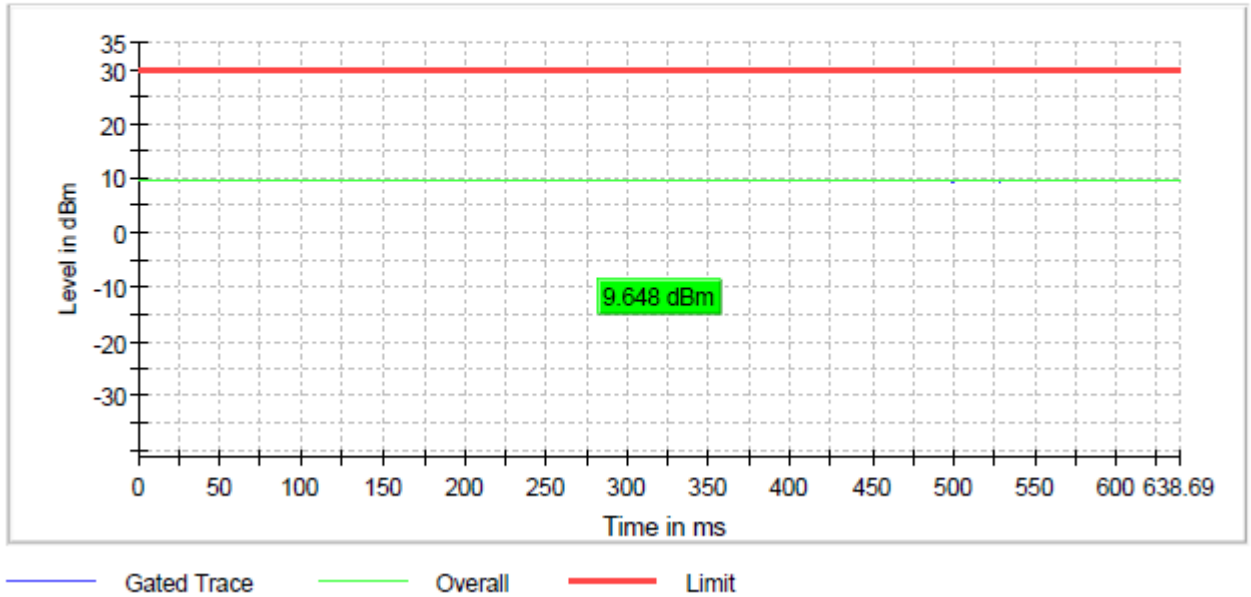


Figure 8: Conducted power, RF I/O port 1_802.11g_9Mbps_Channel 11

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2412.000000	9.1	30.0	9.1	77.913	PASS

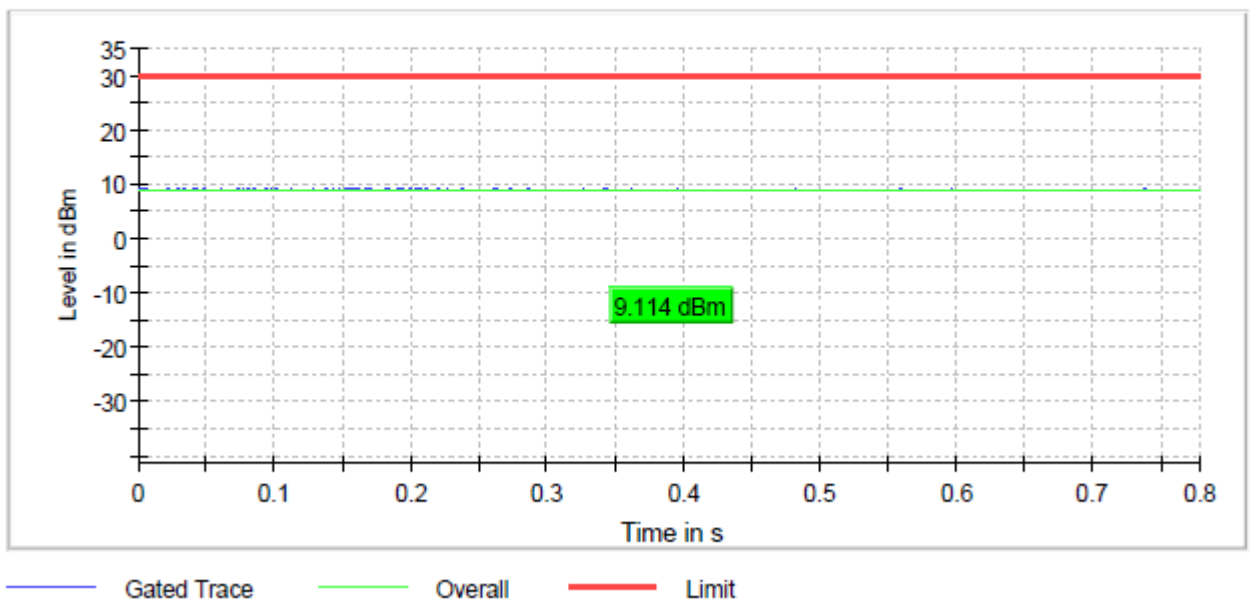


Figure 9: Conducted power, RF I/O port 1_802.11n_14.4Mbps (MCS1)_Channel 1

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2437.000000	13.0	30.0	13.0	77.929	PASS

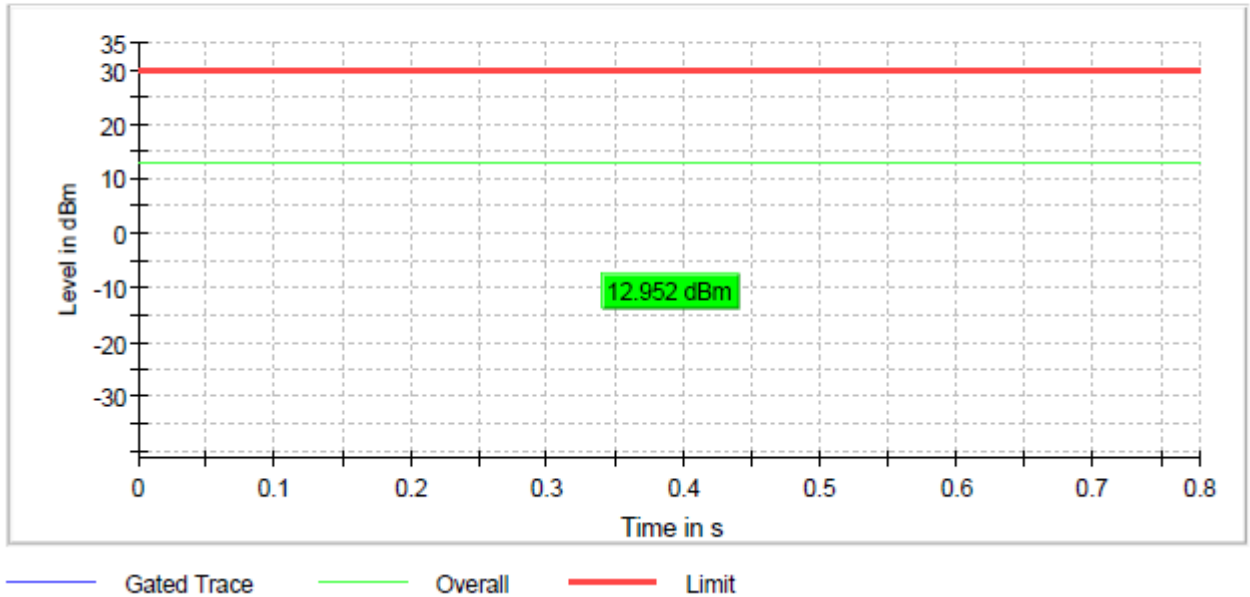


Figure 10: Conducted power, RF I/O port 1_802.11n_14.4Mbps (MCS1)_Channel 6

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2462.000000	9.0	30.0	9.0	77.933	PASS

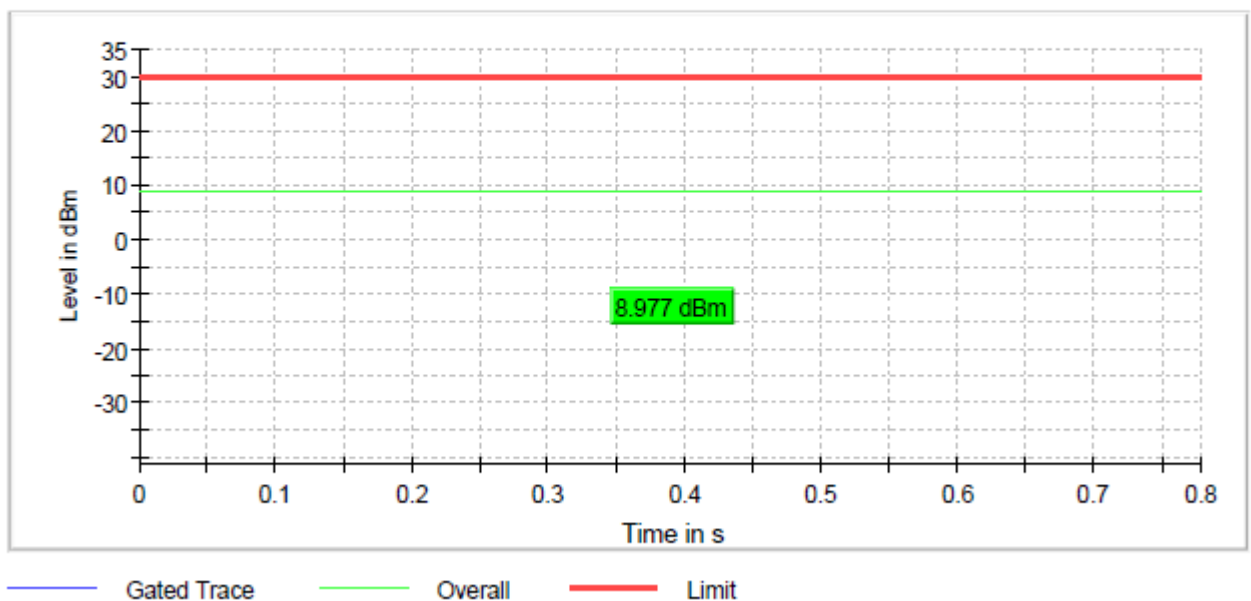


Figure 11: Conducted power, RF I/O port 1_802.11n_14.4Mbps (MCS1)_Channel 11

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2412.000000	13.7	30.0	13.7	94.147	PASS

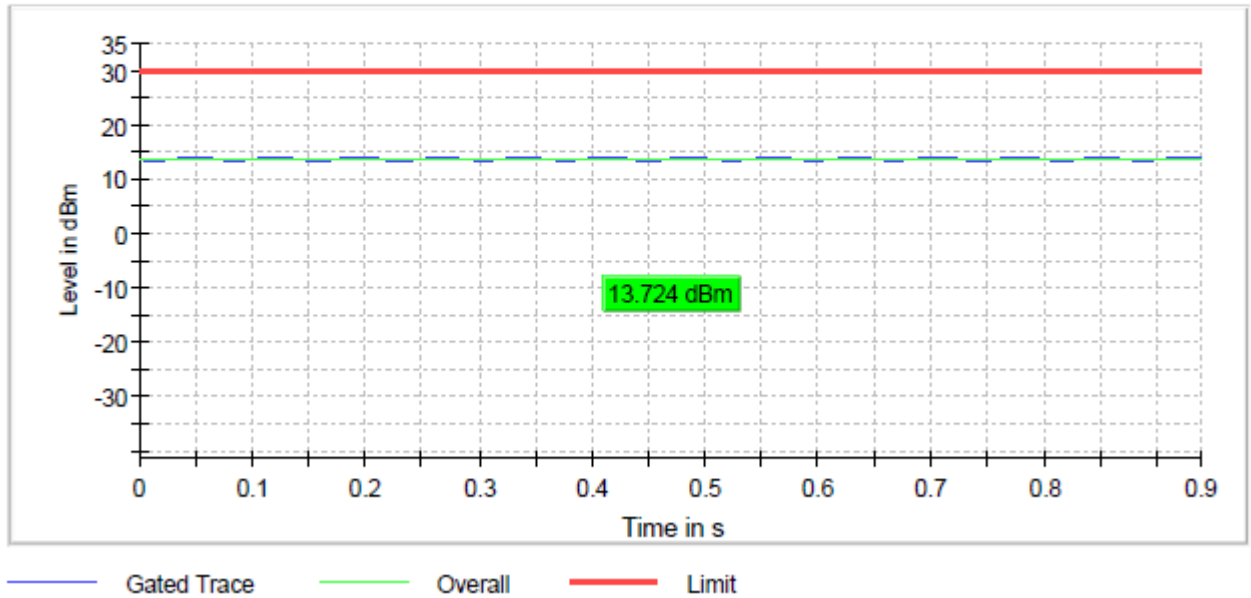


Figure 12: Conducted power, RF I/O port 2_802.11b_1Mbps_Channel 1

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2437.000000	15.8	30.0	15.8	94.146	PASS

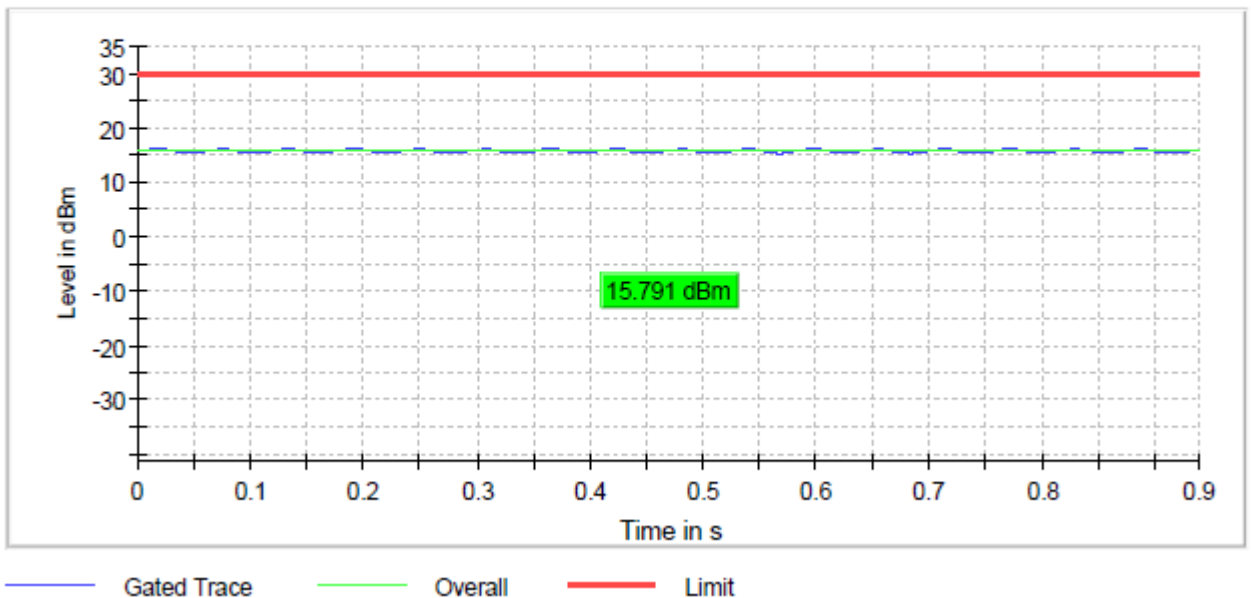


Figure 4: Conducted power, RF I/O port 2_802.11b_1Mbps_Channel 6

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2462.000000	13.8	30.0	13.8	94.148	PASS

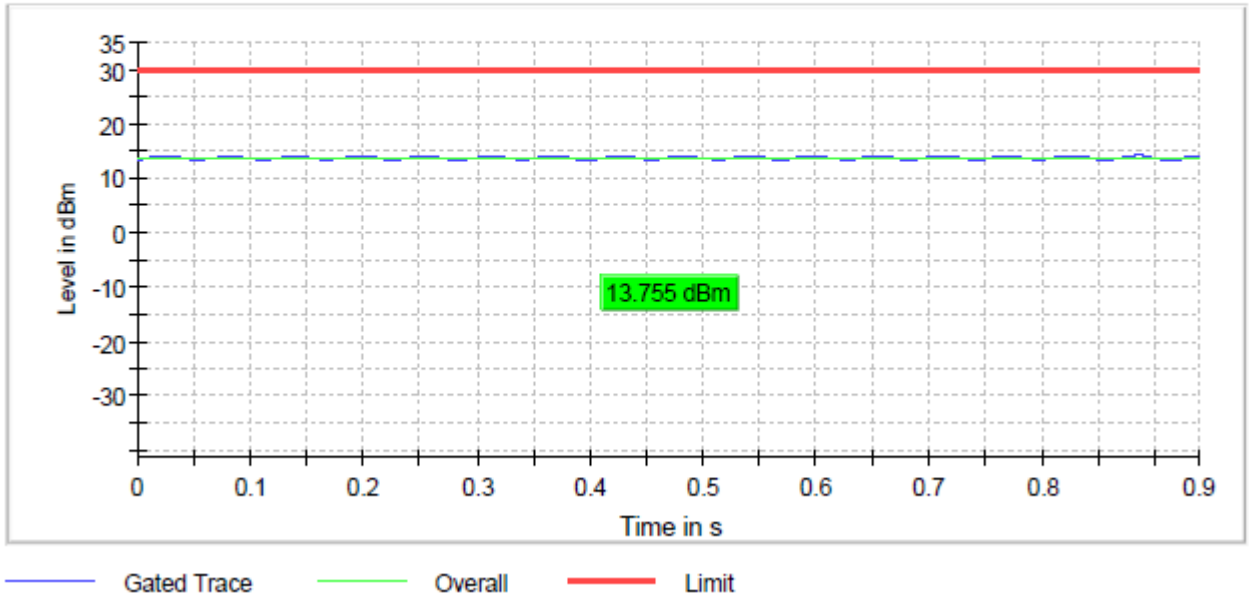


Figure 13: Conducted power, RF I/O port 2_802.11b_1Mbps_Channel 11

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2412.000000	8.9	30.0	8.9	63.788	PASS

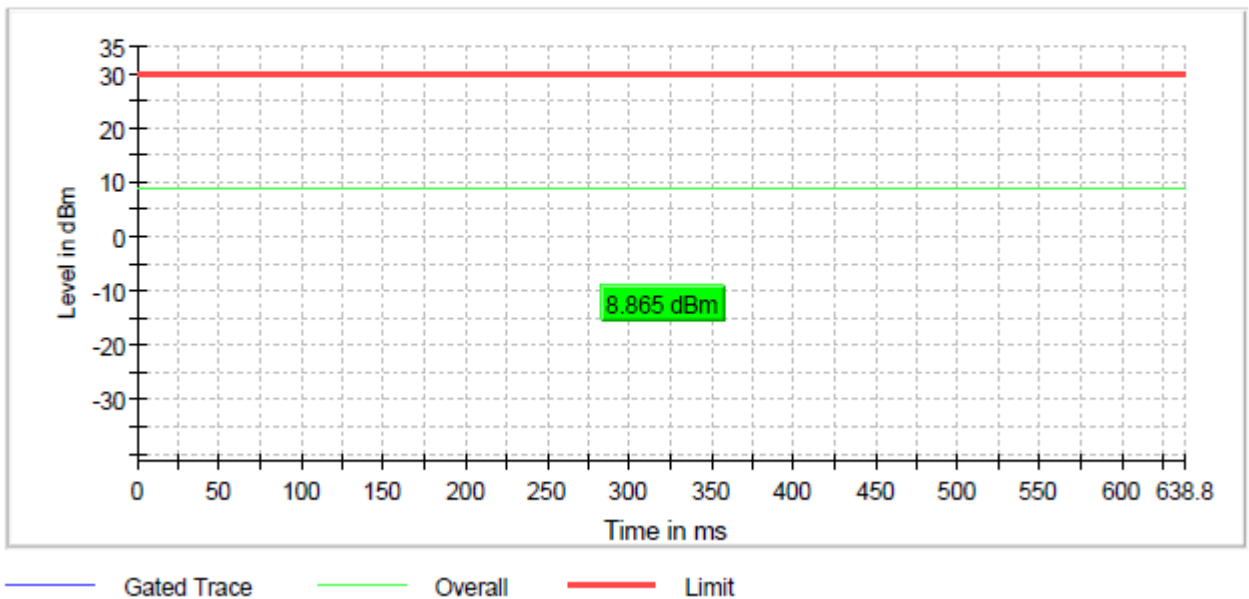


Figure 14: Conducted power, RF I/O port 2_802.11g_9Mbps_Channel 1

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2437.000000	12.5	30.0	12.5	63.774	PASS

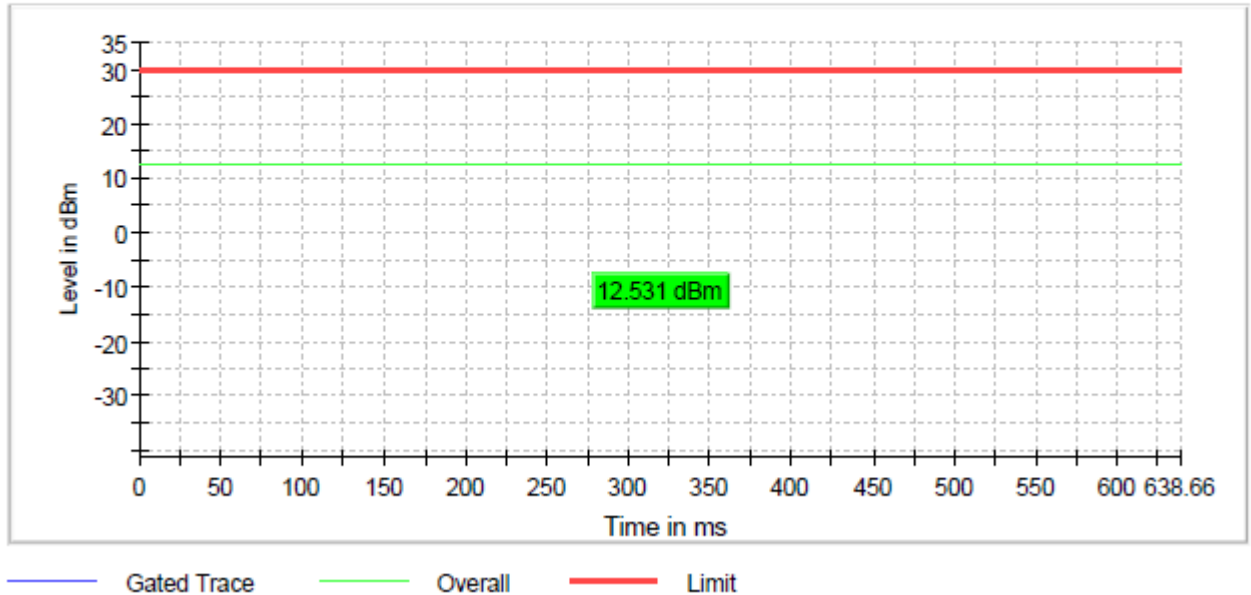


Figure 15: Conducted power, RF I/O port 2_802.11g_9Mbps_Channel 6

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2462.000000	8.5	30.0	8.5	63.790	PASS

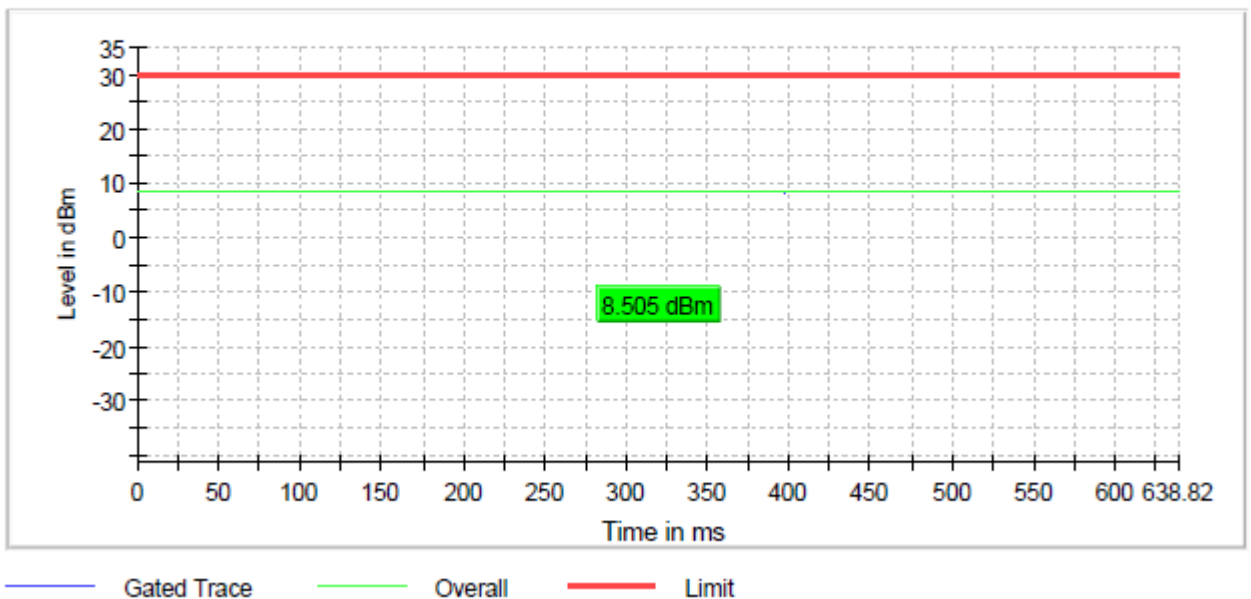


Figure 16: Conducted power, RF I/O port 2_802.11g_9Mbps_Channel 11

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2412.000000	8.0	30.0	8.0	77.920	PASS

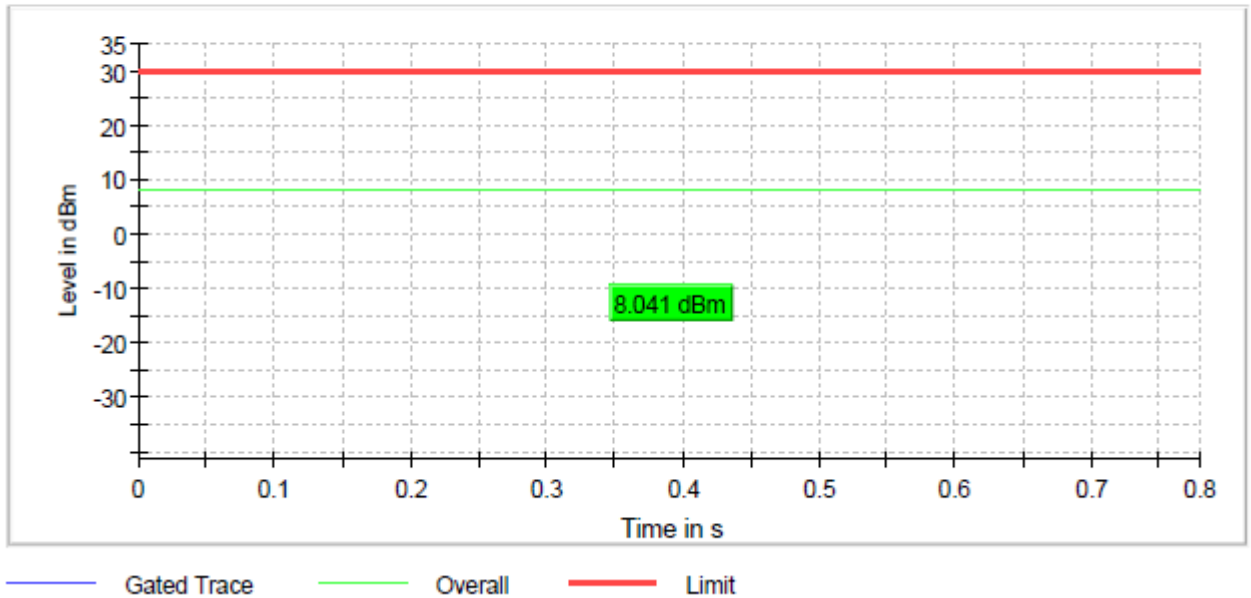


Figure 17: Conducted power, RF I/O port 2_802.11n_14.4Mbps (MCS1)_Channel 1

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2437.000000	11.9	30.0	11.9	77.920	PASS

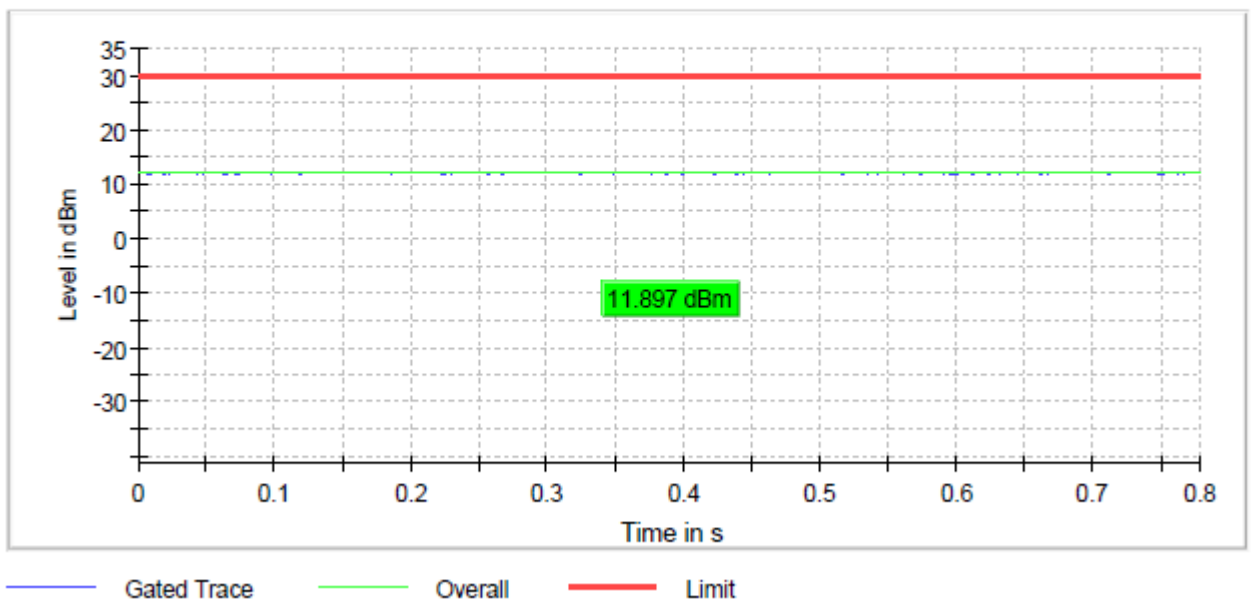
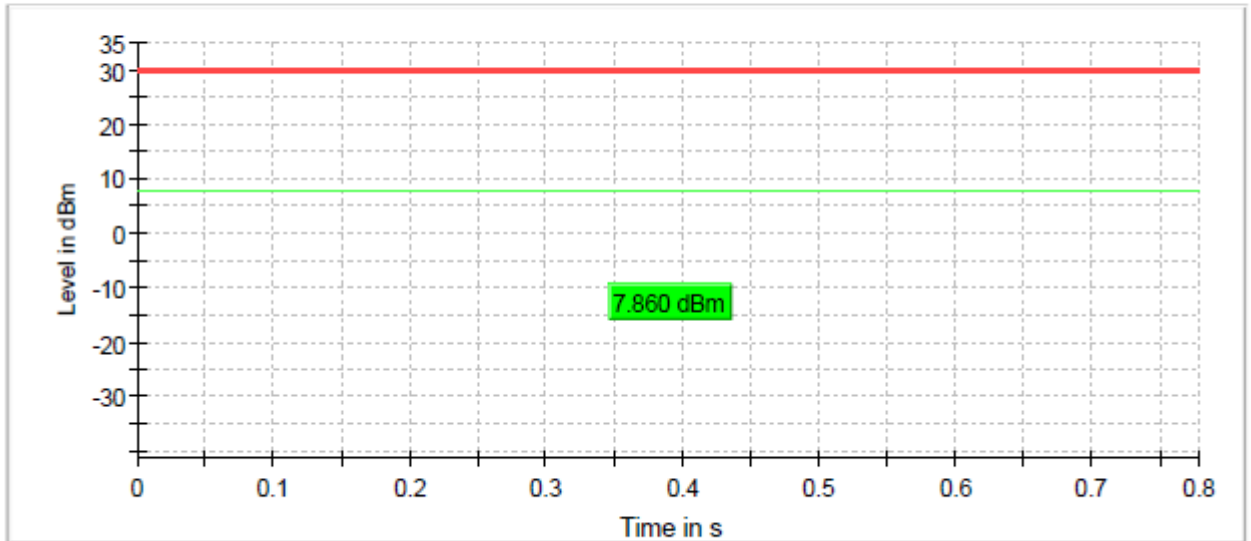


Figure 18: Conducted power, RF I/O port 2_802.11n_14.4Mbps (MCS1)_Channel 6

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2462.000000	7.9	30.0	7.9	77.930	PASS



— Gated Trace — Overall — Limit

Figure 19: Conducted power, RF I/O port 2_802.11n_14.4Mbps (MCS1)_Channel 11

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Standard: ANSI C63.10 (2013)
Tested by: JAT
Date: 2 - 16 August 2019
Temperature: 23 ± 3 °C
Humidity: 20 - 60 % RH
Measurement uncertainty: ± 4.51 dB Level of confidence 95 % (k = 2)

FCC Rule: 15.247(d), 15.209(a)
RSS-247 5.5

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. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

Measurement distance was 3 meters during the tests.

The correction factor in the final result table contains the sum of the transducers (antenna + amplifier + cables).

Peak values of emissions below 1000 MHz measured for reference as well as transmitter fundamental.

The pre measurements were performed with the EUT being in three orthogonal positions (X, Y, Z). Final measurements were done in worst position.

Radiated spurious emissions measurements were tested with 1Mbps data rate.

Frequency range [MHz]	Limit [μ V/m]	Limit [dB μ V/m]	Detector
30 - 80	100	40.0	Quasi-peak
88 - 216	150	43.5	Quasi-peak
216 - 960	200	46.0	Quasi-peak
960 - 1000	500	53.9	Quasi-peak
Above 1000	500	53.9	Average
Above 1000	5000	73.9	Peak

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Results: RF I/O port 1 External antenna_802.11b_1Mbps_Channel 1

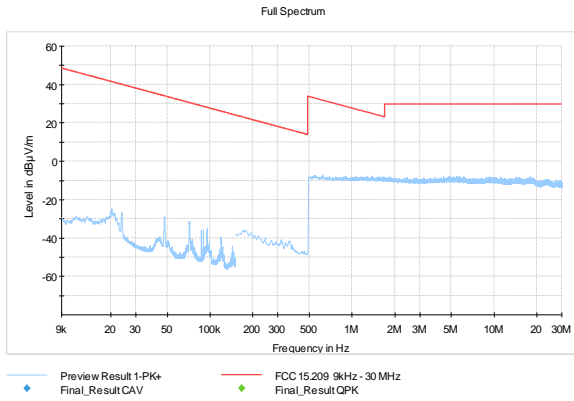


Figure 20: LOW channel (9 kHz – 30 MHz)

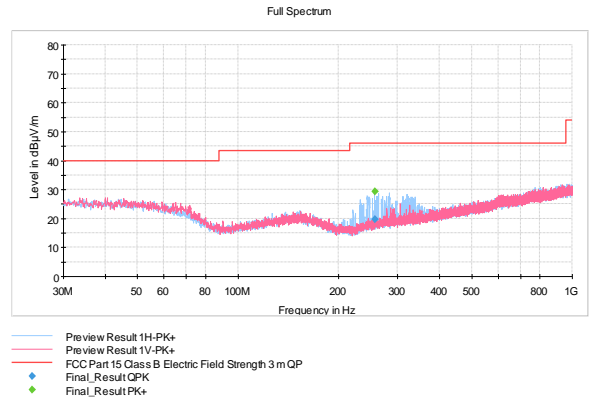


Figure 21: LOW channel (30 MHz – 1000 MHz)

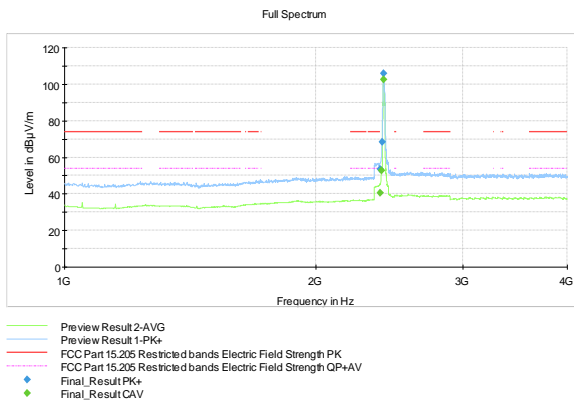


Figure 22: LOW channel (1 GHz – 4 GHz)

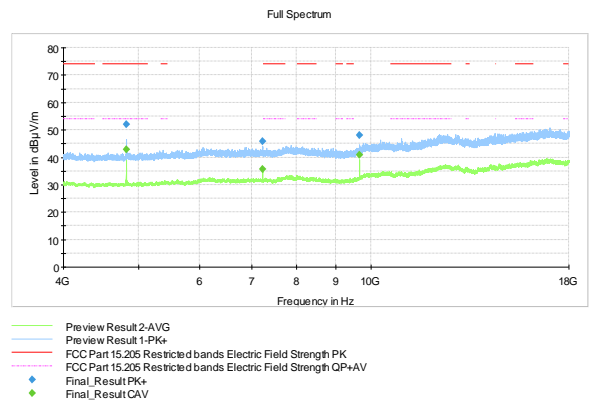


Figure 23: LOW channel (4 GHz – 18 GHz)

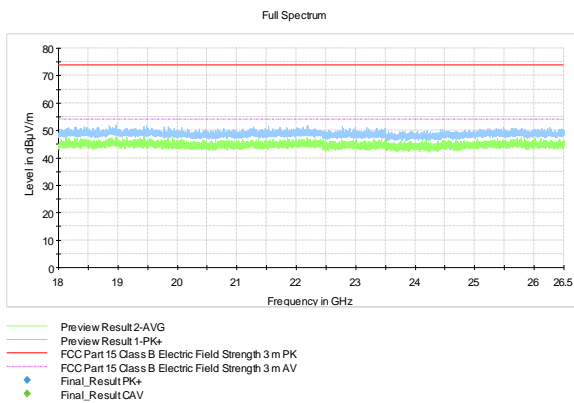


Figure 24: LOW channel (18 GHz – 26.5 GHz)

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Table 3: Peak results LOW channel

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2387.200000	53.52	74.00	20.48	1000.0	1000.000	192.0	V	286.0	13.7	-
2400.000000	68.25	85.81	17.56	1000.0	1000.000	130.0	V	177.0	13.8	limit -20 dBc
2412.850000	105.81	---	---	1000.0	1000.000	154.0	V	117.0	13.8	Fundamental
4823.900000	51.90	74.00	22.10	1000.0	1000.000	181.0	V	162.0	7.1	-
7236.800000	45.72	85.81	40.09	1000.0	1000.000	151.0	V	12.0	10.2	limit -20 dBc
9648.100000	48.08	85.81	37.73	1000.0	1000.000	137.0	H	38.0	13.7	limit -20 dBc

Table 4: Average results LOW channel

Frequency (MHz)	CAverage (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2389.000000	40.34	54.00	13.66	1000.0	1000.000	153.0	V	116.0	13.7	-
2399.200000	52.73	82.48	29.75	1000.0	1000.000	173.0	V	117.0	13.8	limit -20 dBc
2411.250000	102.48	---	---	1000.0	1000.000	154.0	V	117.0	13.8	Fundamental
4823.900000	42.77	54.00	11.23	1000.0	1000.000	107.0	V	131.0	7.1	-
7236.800000	35.57	82.48	46.91	1000.0	1000.000	129.0	V	193.0	10.2	limit -20 dBc
9648.000000	40.91	82.48	41.57	1000.0	1000.000	100.0	H	52.0	13.7	limit -20 dBc

Table 5: Quasi-peak results LOW channel

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
256.470000	19.74	46.00	26.26	1000.0	120.000	136.0	H	7.0	15.9	-

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Results: RF I/O port 1 External antenna_802.11b_1Mbps_Channel 6

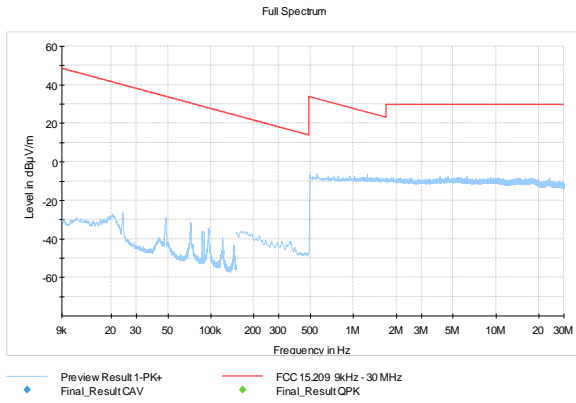


Figure 25: MID channel (9 kHz – 30 MHz)

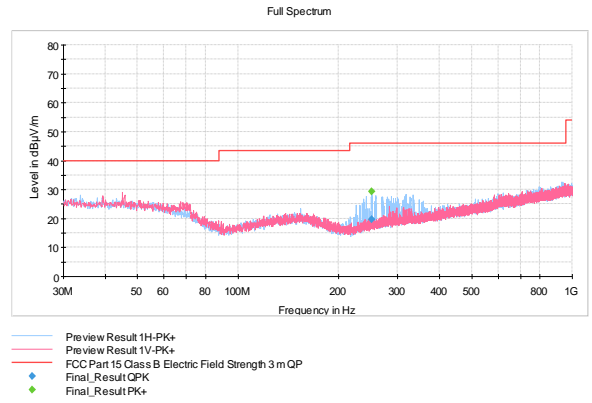


Figure 26: MID channel (30 MHz – 1000 MHz)

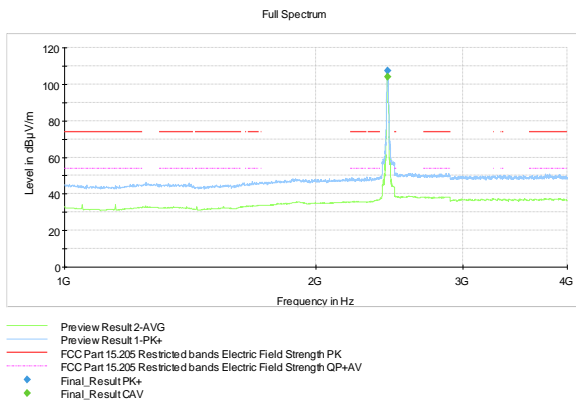


Figure 27: MID channel (1 GHz – 4 GHz)

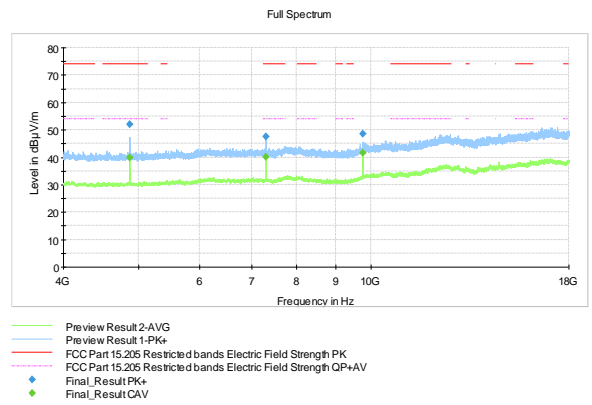


Figure 28: MID channel (4 GHz – 18 GHz)

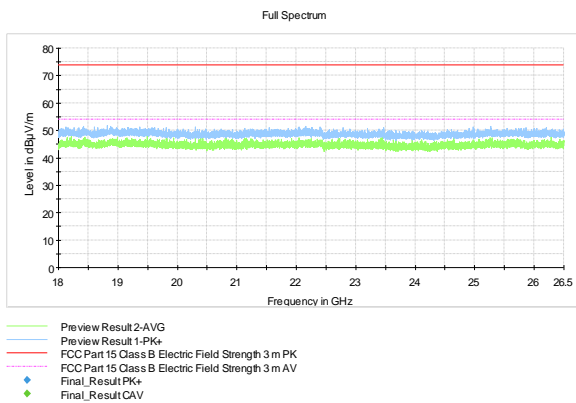


Figure 29: MID channel (18 GHz – 26.5 GHz)

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Table 6: Peak results MID channel

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2437.850000	107.41	---	---	1000.0	1000.000	149.0	V	219.0	13.6	Fundamental
4874.000000	51.96	74.00	22.04	1000.0	1000.000	100.0	V	345.0	7.2	---
7312.500000	47.47	74.00	26.53	1000.0	1000.000	148.0	V	13.0	10.2	---
9748.100000	48.52	87.41	38.89	1000.0	1000.000	144.0	H	52.0	13.9	limit -20 dBc

Table 7: Average results MID channel

Frequency (MHz)	CAverage (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2437.850000	104.12	---	---	1000.0	1000.000	148.0	V	219.0	13.6	Fundamental
4874.000000	39.79	54.00	14.21	1000.0	1000.000	217.0	V	341.0	7.2	---
7311.700000	40.19	54.00	13.81	1000.0	1000.000	151.0	V	0.0	10.2	---
9747.900000	41.66	84.12	42.46	1000.0	1000.000	114.0	H	52.0	13.9	limit -20 dBc

Table 8: Quasi-peak results MID channel

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
251.231000	19.68	46.00	26.32	1000.0	120.000	127.0	H	11.0	15.7	---

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Results: RF I/O port 1 External antenna_802.11b_1Mbps_Channel 11

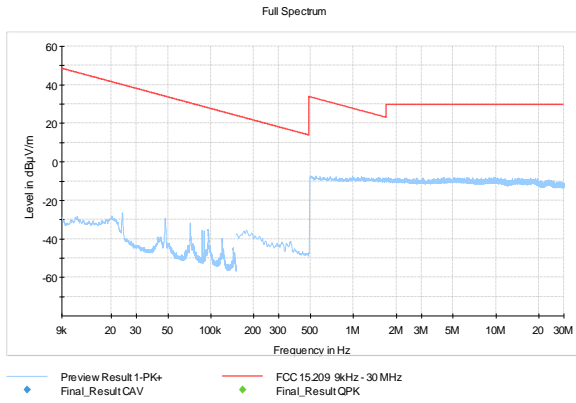


Figure 30: HIGH channel (9 kHz – 30 MHz)

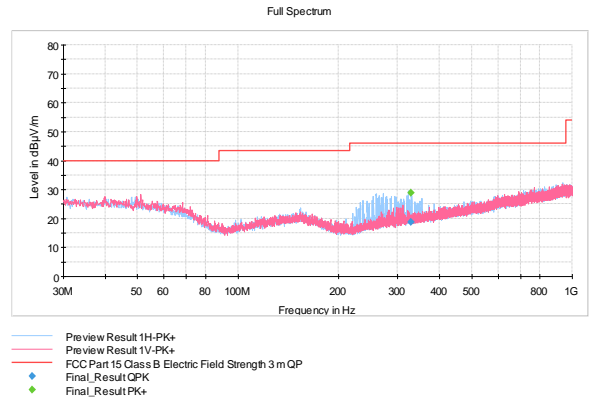


Figure 31: HIGH channel (30 MHz – 1000 MHz)

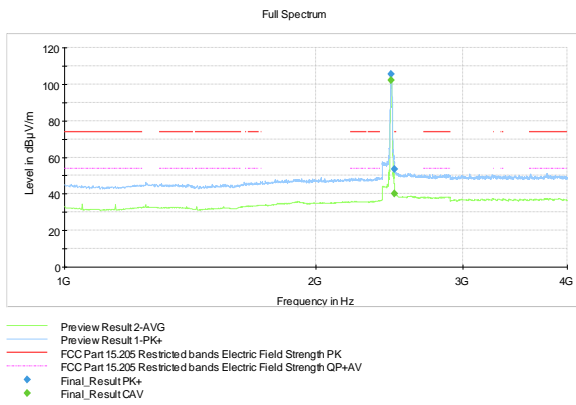


Figure 32: HIGH channel (1 GHz – 4 GHz)

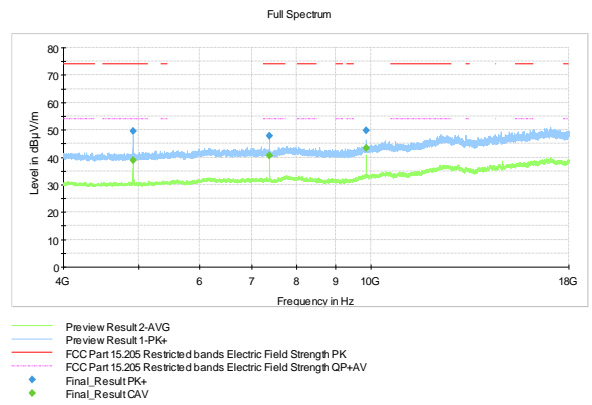


Figure 33: HIGH channel (4 GHz – 18 GHz)

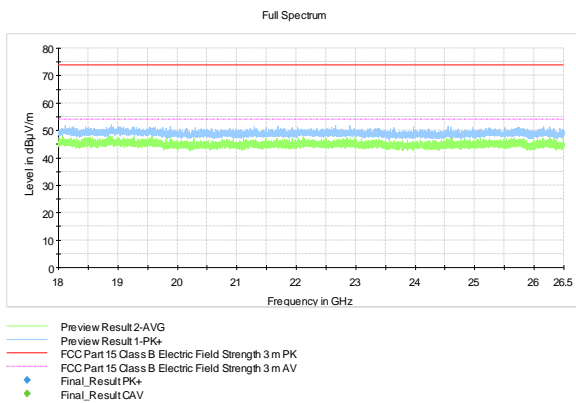


Figure 34: HIGH channel (18 GHz – 26.5 GHz)

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Table 9: Peak results HIGH channel

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2462.850000	105.50	---	---	1000.0	1000.000	154.0	V	321.0	13.7	Fundamental
2484.900000	53.68	74.00	20.32	1000.0	1000.000	135.0	V	155.0	13.9	---
4924.000000	49.64	74.00	24.36	1000.0	1000.000	207.0	V	304.0	7.1	---
7386.900000	47.88	74.00	26.12	1000.0	1000.000	166.0	V	262.0	10.2	---
9848.000000	49.72	85.50	35.78	1000.0	1000.000	115.0	H	54.0	14.0	limit -20 dBc

Table 10: Average results HIGH channel

Frequency (MHz)	CAverage (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2462.700000	102.32	---	---	1000.0	1000.000	154.0	V	323.0	13.7	Fundamental
2484.900000	40.07	54.00	13.93	1000.0	1000.000	116.0	V	136.0	13.9	---
4924.000000	38.98	54.00	15.02	1000.0	1000.000	207.0	V	305.0	7.1	---
7386.600000	40.70	54.00	13.30	1000.0	1000.000	136.0	V	196.0	10.2	---
9848.000000	43.33	82.32	38.99	1000.0	1000.000	100.0	H	53.0	14.0	limit -20 dBc

Table 11: Quasi-peak results HIGH channel

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
329.410000	18.78	46.00	27.22	1000.0	120.000	109.0	H	207.0	18.0	---

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Radiated lower and upper band edge results RF I/O port 1 External antenna_802.11b_1Mbps

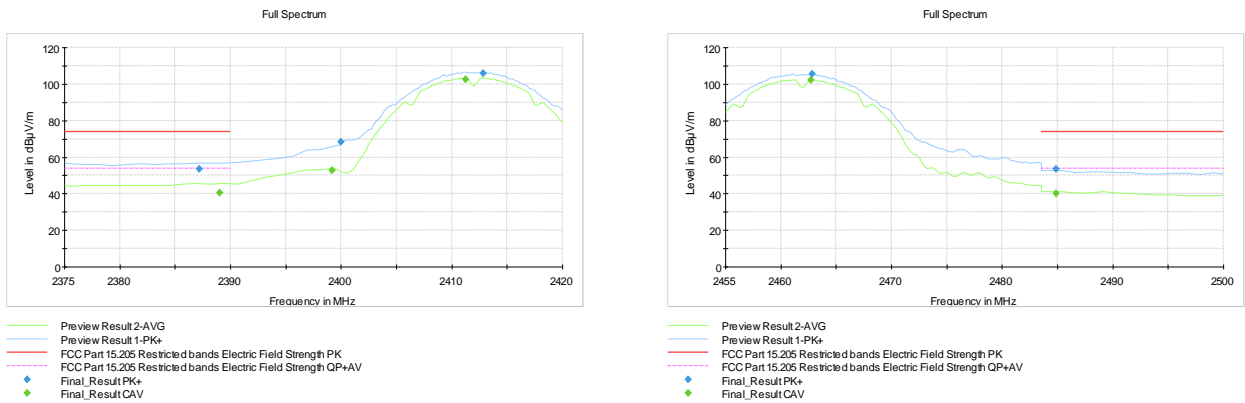


Figure 35: Radiated lower and upper band edge results RF I/O port 1 External antenna_802.11b_1Mbps

Table 12: Peak results Radiated lower and upper band edge results RF I/O port 1 External antenna_802.11b_1Mbps

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2387.200000	53.52	74.00	20.48	1000.0	1000.000	192.0	V	286.0	13.7	---
2400.000000	68.25	85.81	17.56	1000.0	1000.000	130.0	V	177.0	13.8	limit -20 dBc
2412.850000	105.81	---	---	1000.0	1000.000	154.0	V	117.0	13.8	Fundamental
2462.850000	105.50	---	---	1000.0	1000.000	154.0	V	321.0	13.7	Fundamental
2484.900000	53.68	74.00	20.32	1000.0	1000.000	135.0	V	155.0	13.9	---

Table 13: Average results Radiated lower and upper band edge results RF I/O port 1 External antenna_802.11b_1Mbps

Frequency (MHz)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2389.000000	40.34	54.00	13.66	1000.0	1000.000	153.0	V	116.0	13.7	---
2399.200000	52.73	82.48	29.75	1000.0	1000.000	173.0	V	117.0	13.8	limit -20 dBc
2411.250000	102.48	---	---	1000.0	1000.000	154.0	V	117.0	13.8	Fundamental
2462.700000	102.32	---	---	1000.0	1000.000	154.0	V	323.0	13.7	Fundamental
2484.900000	40.07	54.00	13.93	1000.0	1000.000	116.0	V	136.0	13.9	---

Results: RF I/O port 2 External antenna_802.11b_1Mbps_Channel 1

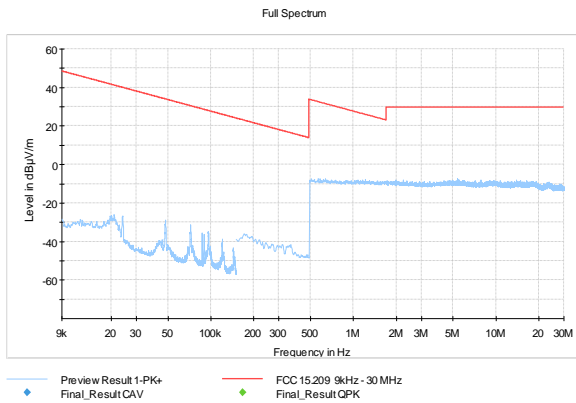


Figure 36: LOW channel (9 kHz – 30 MHz)

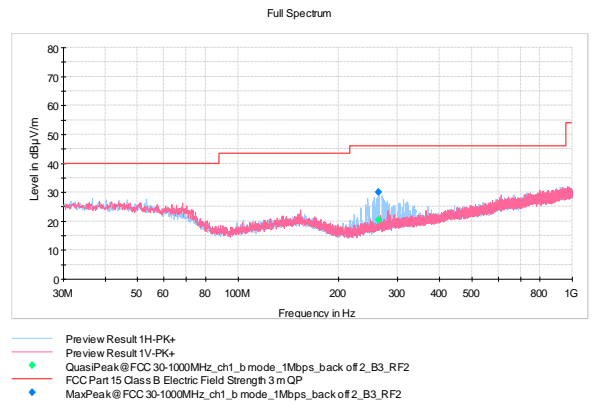


Figure 37: LOW channel (30 MHz – 1000 MHz)

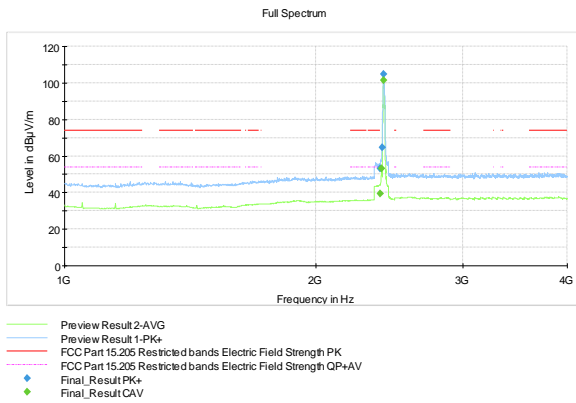


Figure 38: LOW channel (1 GHz – 4 GHz)

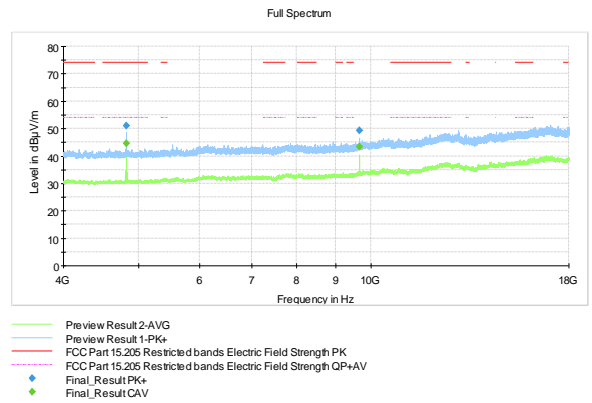


Figure 39: LOW channel (4 GHz – 18 GHz)

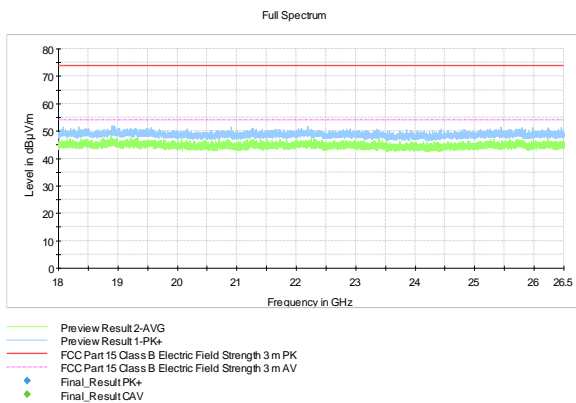


Figure 40: LOW channel (18 GHz – 26.5 GHz)

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Table 14: Peak results LOW channel

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2388.800000	52.96	74.00	21.04	1000.0	1000.000	195.0	V	309.0	13.7	---
2400.000000	64.57	84.79	20.22	1000.0	1000.000	154.0	V	188.0	13.8	limit -20 dBc
2412.800000	104.79	---	---	1000.0	1000.000	149.0	V	15.0	13.8	Fundamental
4824.000000	51.09	74.00	22.91	1000.0	1000.000	181.0	V	153.0	7.1	---
9647.800000	49.23	84.79	35.56	1000.0	1000.000	107.0	H	55.0	13.7	limit -20 dBc

Table 15: Average results LOW channel

Frequency (MHz)	CAverage (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2387.400000	39.22	54.00	14.78	1000.0	1000.000	248.0	V	13.0	13.7	---
2399.200000	53.22	81.36	28.14	1000.0	1000.000	131.0	V	22.0	13.8	limit -20 dBc
2412.850000	101.36	---	---	1000.0	1000.000	148.0	V	15.0	13.8	Fundamental
4823.900000	44.50	54.00	9.50	1000.0	1000.000	166.0	V	134.0	7.1	---
9648.000000	43.38	81.36	37.98	1000.0	1000.000	100.0	H	57.0	13.7	limit -20 dBc

Table 16: Quasi-peak results LOW channel

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
263.434000	20.51	46.00	25.49	1000.0	120.000	109.0	H	184.0	16.1	---

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Results: RF I/O port 2 External antenna_802.11b_1Mbps_Channel 6

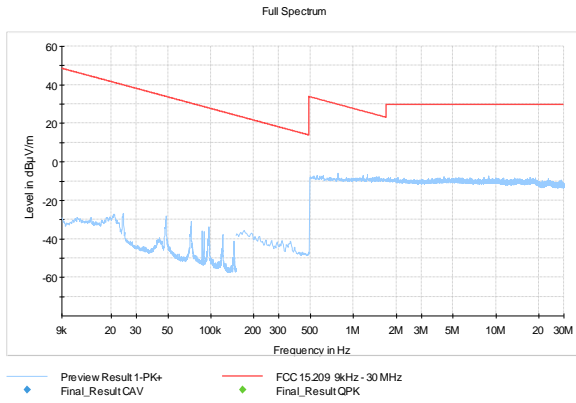


Figure 41: MID channel (9 kHz – 30 MHz)

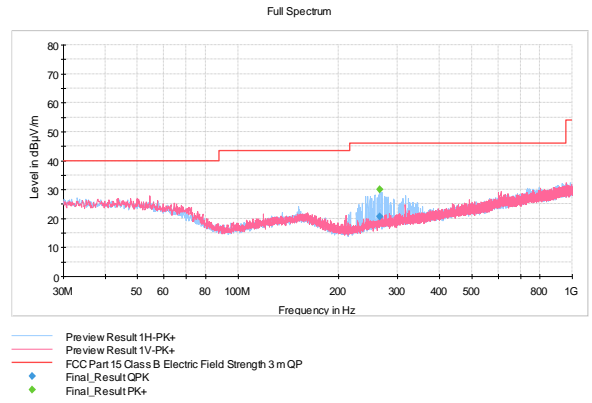


Figure 42: MID channel (30 MHz – 1000 MHz)

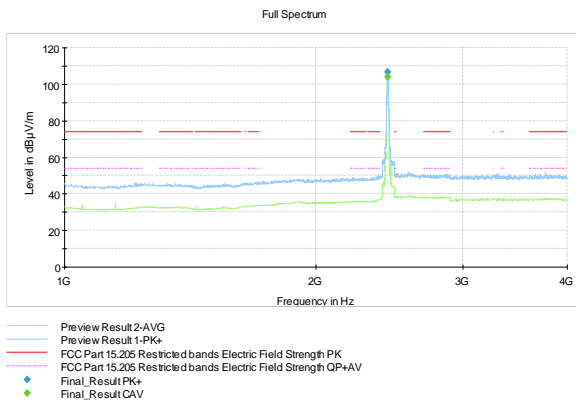


Figure 43: MID channel (1 GHz – 4 GHz)

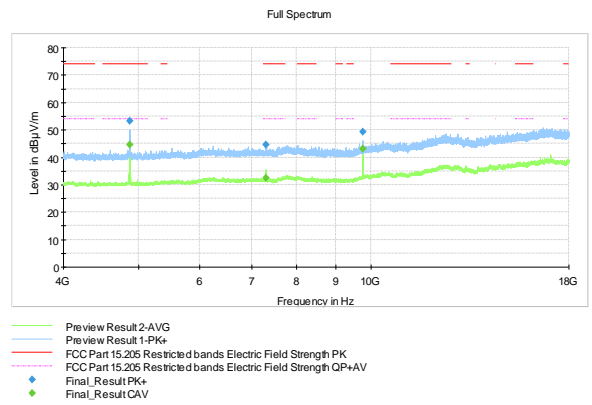


Figure 44: MID channel (4 GHz – 18 GHz)

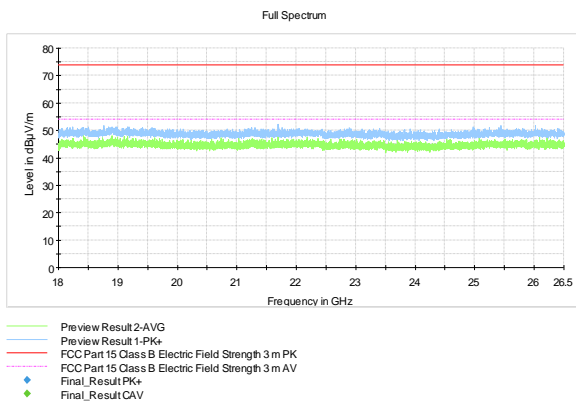


Figure 45: MID channel (18 GHz – 26.5 GHz)

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz
Table 17: Peak results MID channel

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2437.800000	106.65	---	---	1000.0	1000.000	152.0	V	223.0	13.6	Fundamental
4873.800000	53.24	74.00	20.76	1000.0	1000.000	166.0	V	167.0	7.2	---
7310.600000	44.61	74.00	29.39	1000.0	1000.000	225.0	H	33.0	10.2	---
9747.900000	49.34	86.65	37.31	1000.0	1000.000	115.0	H	34.0	13.9	limit -20 dBc

Table 18: Average results MID channel

Frequency (MHz)	CAverage (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2437.750000	103.97	---	---	1000.0	1000.000	159.0	V	154.0	13.6	Fundamental
4871.000000	44.54	54.00	9.46	1000.0	1000.000	195.0	V	165.0	7.2	---
7311.700000	32.37	54.00	21.63	1000.0	1000.000	159.0	V	313.0	10.2	---
9747.900000	43.10	83.97	40.87	1000.0	1000.000	129.0	H	36.0	13.9	limit -20 dBc

Table 19: Quasi-peak results MID channel

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
265.631000	20.54	46.00	25.46	1000.0	120.000	118.0	H	184.0	16.3	---

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Results: RF I/O port 2 External antenna_802.11b_1Mbps_Channel 11

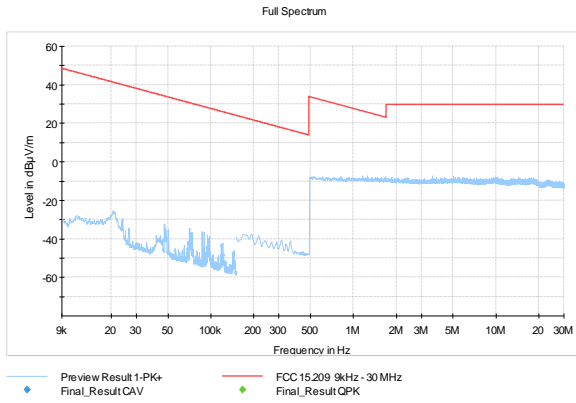


Figure 46: HIGH channel (9 kHz – 30 MHz)

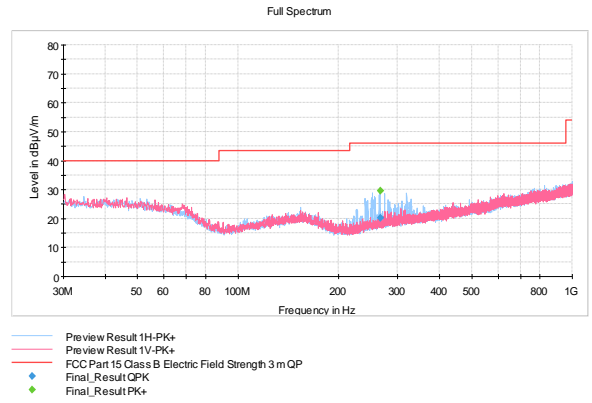


Figure 47: HIGH channel (30 MHz – 1000 MHz)

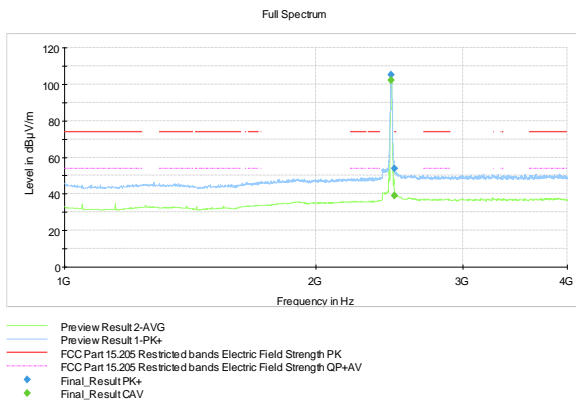


Figure 48: HIGH channel (1 GHz – 4 GHz)

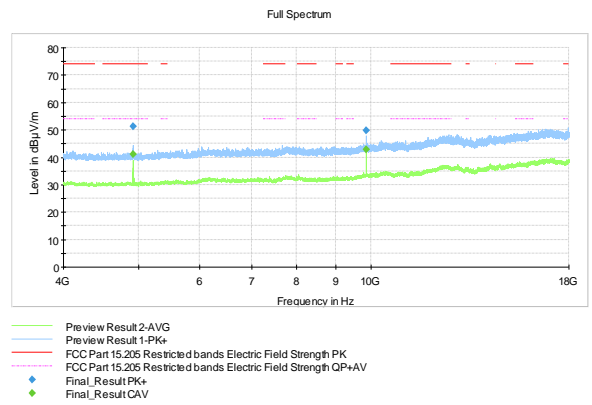


Figure 49: HIGH channel (4 GHz – 18 GHz)

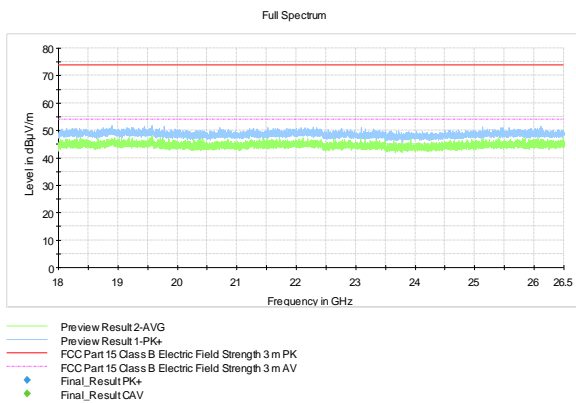


Figure 50: HIGH channel (18 GHz – 26.5 GHz)

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz
Table 20: Peak results HIGH channel

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2462.750000	105.20	---	---	1000.0	1000.000	144.0	V	192.0	13.7	Fundamental
2484.900000	53.87	74.00	20.13	1000.0	1000.000	164.0	V	174.0	13.9	---
4923.900000	51.35	74.00	22.65	1000.0	1000.000	195.0	V	65.0	7.1	---
9848.000000	49.79	85.20	35.41	1000.0	1000.000	115.0	H	35.0	14.0	limit -20 dBc

Table 21: Average results HIGH channel

Frequency (MHz)	CAverage (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2462.750000	102.17	---	---	1000.0	1000.000	140.0	V	192.0	13.7	Fundamental
2483.500000	39.08	54.00	14.92	1000.0	1000.000	144.0	V	0.0	13.9	---
4924.000000	41.07	54.00	12.93	1000.0	1000.000	100.0	V	167.0	7.1	---
9848.000000	42.77	82.17	39.40	1000.0	1000.000	137.0	H	35.0	14.0	limit -20 dBc

Table 22: Quasi-peak results HIGH channel

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
266.247000	20.15	46.00	25.85	1000.0	120.000	127.0	H	196.0	16.3	---

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Radiated lower and upper band edge results RF I/O port 2 External antenna_802.11b_1Mbps

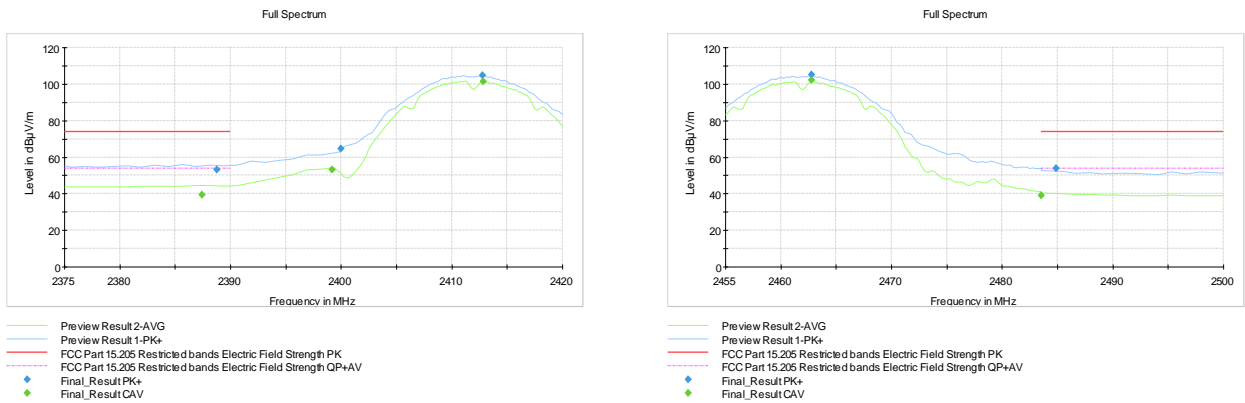


Figure 51: Radiated lower and upper band edge results RF I/O port 2 External antenna_802.11b_1Mbps

Table 23: Peak results Radiated lower and upper band edge results RF I/O port 2 External antenna_802.11b_1Mbps

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2388.800000	52.96	74.00	21.04	1000.0	1000.000	195.0	V	309.0	13.7	---
2400.000000	64.57	84.79	20.22	1000.0	1000.000	154.0	V	188.0	13.8	limit -20 dBc
2412.800000	104.79	---	---	1000.0	1000.000	149.0	V	15.0	13.8	Fundamental
2462.750000	105.20	---	---	1000.0	1000.000	144.0	V	192.0	13.7	Fundamental
2484.900000	53.87	74.00	20.13	1000.0	1000.000	164.0	V	174.0	13.9	---

Table 24: Average results Radiated lower and upper band edge results RF I/O port 2 External antenna_802.11b_1Mbps

Frequency (MHz)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2387.400000	39.22	54.00	14.78	1000.0	1000.000	248.0	V	13.0	13.7	---
2399.200000	53.22	81.36	28.14	1000.0	1000.000	131.0	V	22.0	13.8	limit -20 dBc
2412.850000	101.36	---	---	1000.0	1000.000	148.0	V	15.0	13.8	Fundamental
2462.750000	102.17	---	---	1000.0	1000.000	140.0	V	192.0	13.7	Fundamental
2483.500000	39.08	54.00	14.92	1000.0	1000.000	144.0	V	0.0	13.9	---

Results: RF I/O port 1 Integral antenna_802.11b_1Mbps_Channel 1

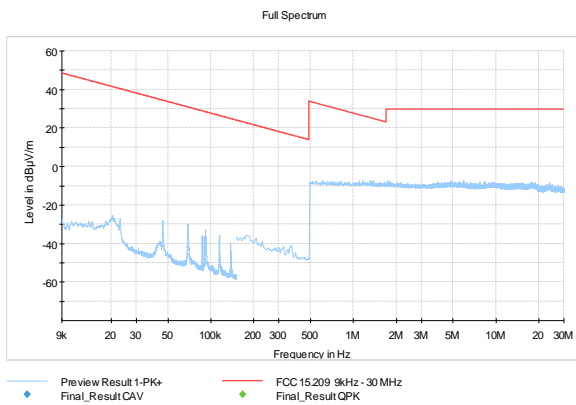


Figure 52: LOW channel (9 kHz – 30 MHz)

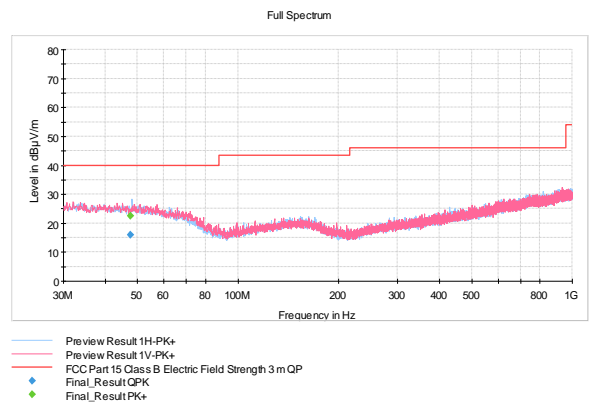


Figure 53: LOW channel (30 MHz – 1000 MHz)

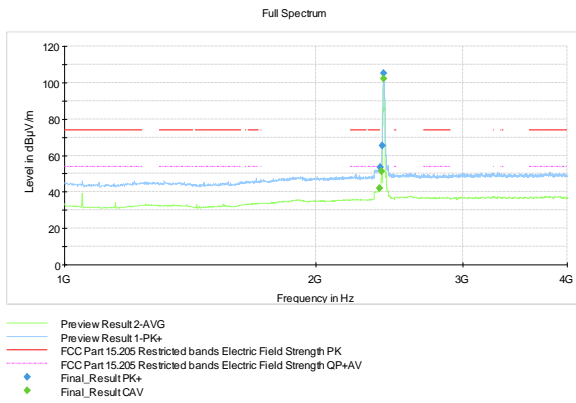


Figure 54: LOW channel (1 GHz – 4 GHz)

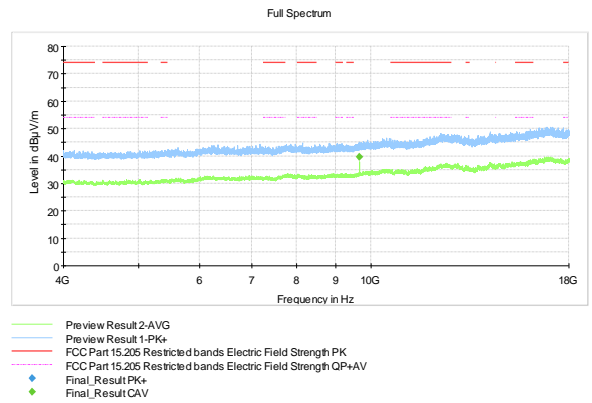


Figure 55: LOW channel (4 GHz – 18 GHz)

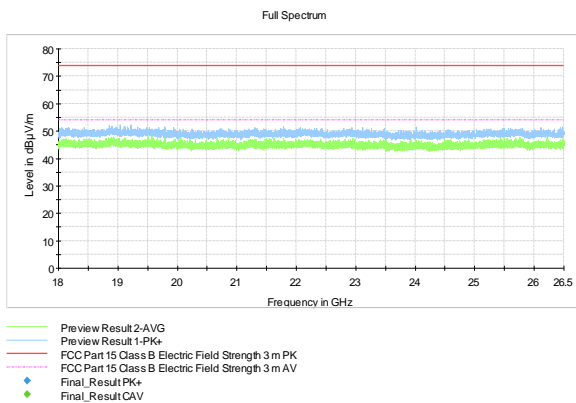


Figure 56: LOW channel (18 GHz – 26.5 GHz)

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Table 25: Peak results LOW channel

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2387.000000	53.36	74.00	20.64	1000.0	1000.000	390.0	H	77.0	13.7	---
2400.000000	65.48	85.31	19.83	1000.0	1000.000	168.0	H	45.0	13.8	limit -20 dBc
2412.800000	105.31	---	---	1000.0	1000.000	121.0	H	80.0	13.8	Fundamental

Table 26: Average results LOW channel

Frequency (MHz)	CAverage (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2386.200000	41.95	54.00	12.05	1000.0	1000.000	319.0	H	51.0	13.7	---
2399.200000	51.22	82.26	31.04	1000.0	1000.000	121.0	H	67.0	13.8	limit -20 dBc
2412.750000	102.26	---	---	1000.0	1000.000	229.0	H	78.0	13.8	Fundamental
9648.000000	39.62	82.26	42.64	1000.0	1000.000	107.0	H	54.0	13.7	limit -20 dBc

Table 27: Quasi-peak results LOW channel

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
47.559000	15.86	40.00	24.14	1000.0	120.000	248.0	H	113.0	17.8	---

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Results: RF I/O port 1 Integral antenna_802.11b_1Mbps_Channel 6

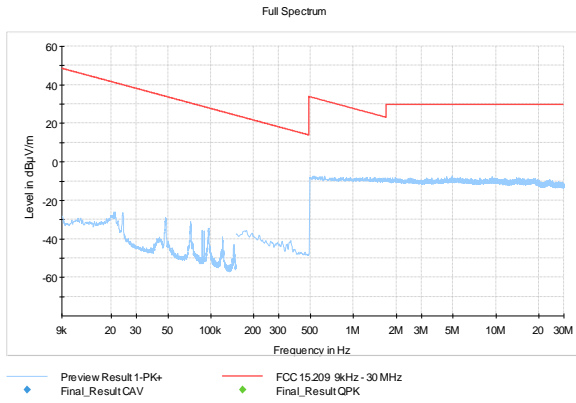


Figure 57: MID channel (9 kHz – 30 MHz)

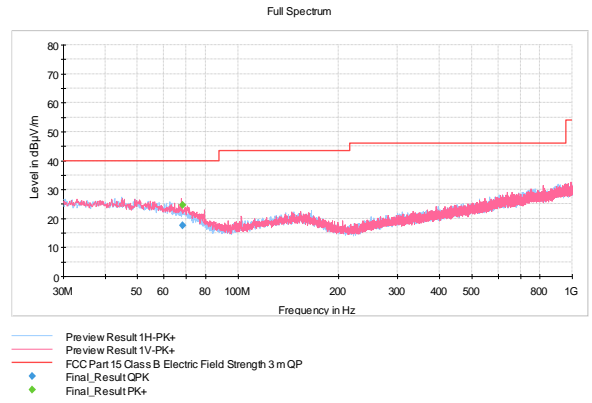


Figure 58: MID channel (30 MHz – 1000 MHz)

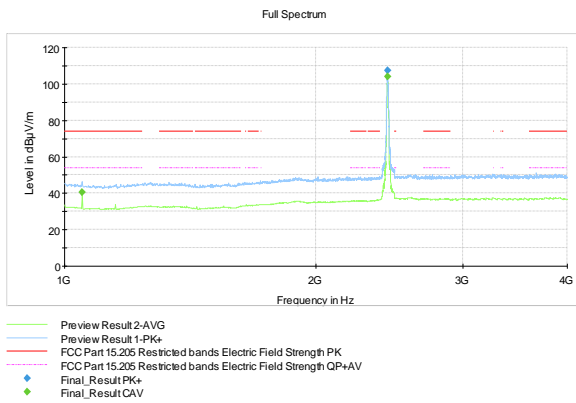


Figure 59: MID channel (1 GHz – 4 GHz)

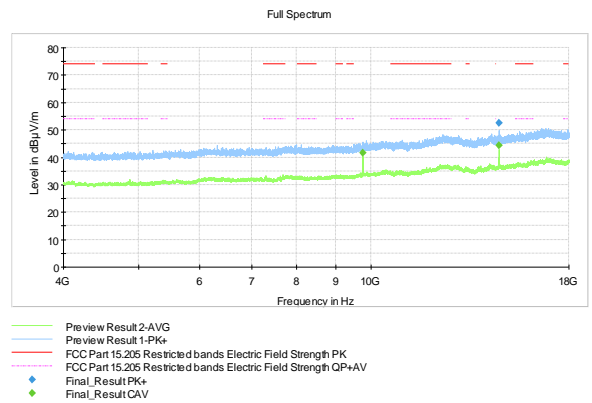


Figure 60: MID channel (4 GHz – 18 GHz)

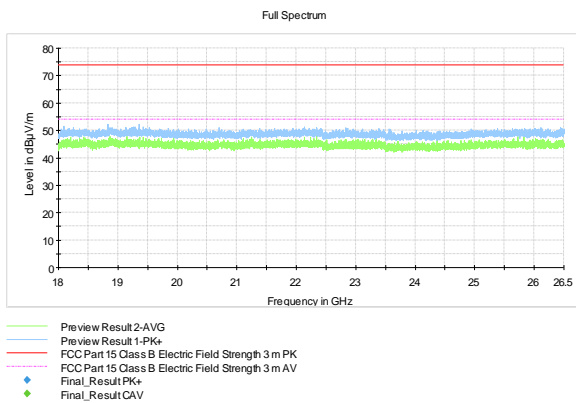


Figure 61: MID channel (18 GHz – 26.5 GHz)

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz
Table 28: Peak results MID channel

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2437.750000	107.42	---	---	1000.0	1000.000	181.0	H	79.0	13.6	Fundamental
14621.800000	52.51	87.42	34.91	1000.0	1000.000	122.0	H	17.0	18.4	limit -20 dBc

Table 29: Average results MID channel

Frequency (MHz)	CAverage (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
1050.025000	40.53	54.00	13.47	1000.0	1000.000	267.0	H	133.0	8.9	---
2437.700000	104.08	---	---	1000.0	1000.000	183.0	H	78.0	13.6	Fundamental
9747.900000	41.54	84.08	42.54	1000.0	1000.000	151.0	H	38.0	13.9	limit -20 dBc
14621.800000	44.39	84.08	39.69	1000.0	1000.000	107.0	H	18.0	18.4	limit -20 dBc

Table 30: Quasi-peak results MID channel

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
68.116000	17.62	40.00	22.38	1000.0	120.000	109.0	V	212.0	15.9	---

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Results: RF I/O port 1 Integral antenna_802.11b_1Mbps_Channel 11

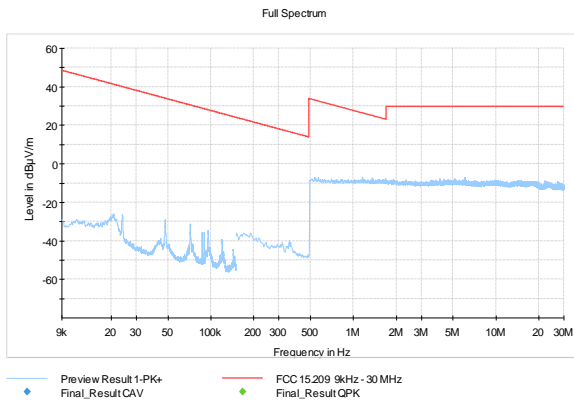


Figure 62: HIGH channel (9 kHz – 30 MHz)

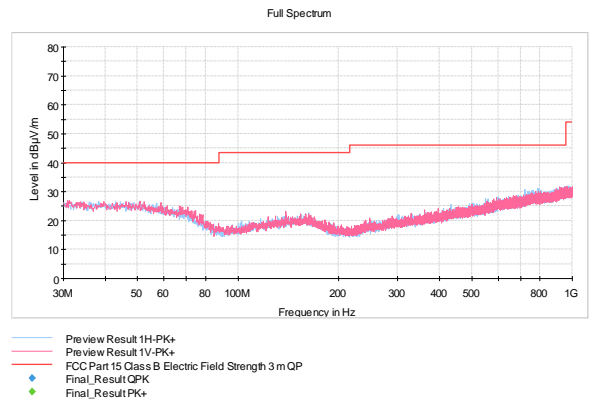


Figure 63: HIGH channel (30 MHz – 1000 MHz)

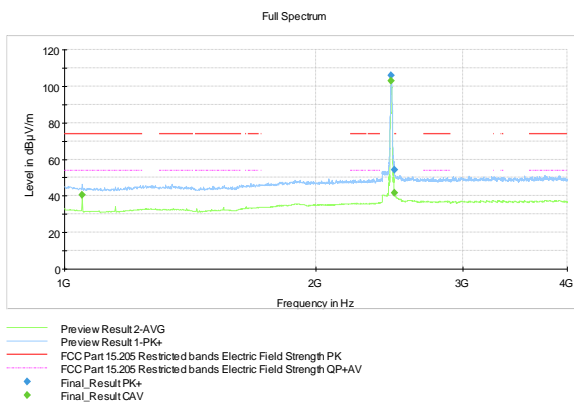


Figure 64: HIGH channel (1 GHz – 4 GHz)

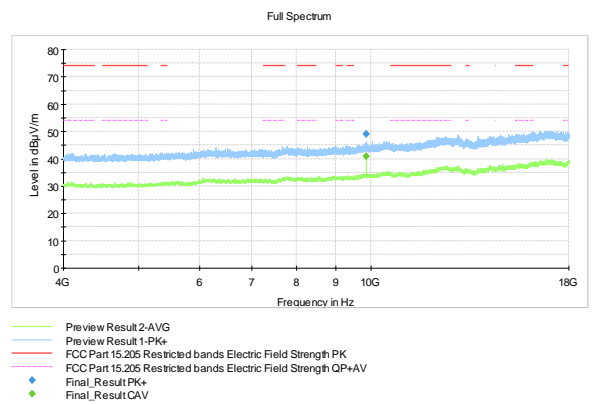


Figure 65: HIGH channel (4 GHz – 18 GHz)

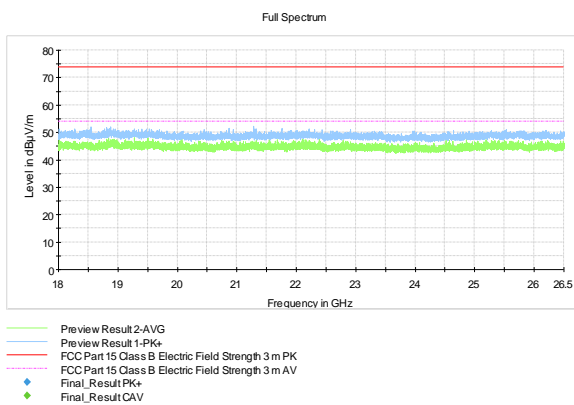


Figure 66: HIGH channel (18 GHz – 26.5 GHz)

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz
Table 31: Peak results HIGH channel

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2462.850000	106.03	---	---	1000.0	1000.000	273.0	H	59.0	13.7	Fundamental
2484.500000	54.14	74.00	19.86	1000.0	1000.000	116.0	H	65.0	13.9	---
9848.000000	49.06	86.03	36.97	1000.0	1000.000	115.0	H	32.0	14.0	limit -20 dBc

Table 32: Average results HIGH channel

Frequency (MHz)	CAverage (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
1050.025000	40.35	54.00	13.65	1000.0	1000.000	263.0	H	132.0	8.9	---
2462.750000	102.79	---	---	1000.0	1000.000	273.0	H	58.0	13.7	Fundamental
2484.700000	41.45	54.00	12.55	1000.0	1000.000	268.0	H	63.0	13.9	---
9848.000000	40.97	82.79	41.82	1000.0	1000.000	137.0	H	32.0	14.0	limit -20 dBc

Transmitter Radiated Spurious Emissions 9 kHz – 26.5 GHz

Radiated lower and upper band edge results RF I/O port 1 Integral antenna_802.11b_1Mbps

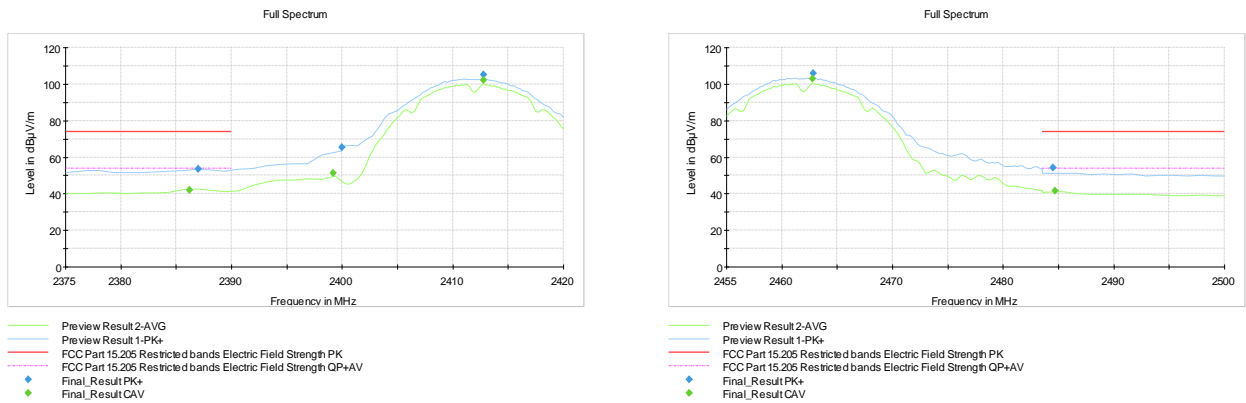


Figure 67: Radiated lower and upper band edge results RF I/O port 1 Integral antenna_802.11b_1Mbps

Table 33: Peak results Radiated lower and upper band edge results RF I/O port 1 Integral antenna_802.11b_1Mbps

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2387.000000	53.36	74.00	20.64	1000.0	1000.000	390.0	H	77.0	13.7	---
2400.000000	65.48	85.31	19.83	1000.0	1000.000	168.0	H	45.0	13.8	limit -20 dBc
2412.800000	105.31	---	---	1000.0	1000.000	121.0	H	80.0	13.8	Fundamental
2462.850000	106.03	---	---	1000.0	1000.000	273.0	H	59.0	13.7	Fundamental
2484.500000	54.14	74.00	19.86	1000.0	1000.000	116.0	H	65.0	13.9	---

Table 34: Average results Radiated lower and upper band edge results RF I/O port 1 Integral antenna_802.11b_1Mbps

Frequency (MHz)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2386.200000	41.95	54.00	12.05	1000.0	1000.000	319.0	H	51.0	13.7	---
2399.200000	51.22	82.26	31.04	1000.0	1000.000	121.0	H	67.0	13.8	limit -20 dBc
2412.750000	102.26	---	---	1000.0	1000.000	229.0	H	78.0	13.8	Fundamental
2462.750000	102.79	---	---	1000.0	1000.000	273.0	H	58.0	13.7	Fundamental
2484.700000	41.45	54.00	12.55	1000.0	1000.000	268.0	H	63.0	13.9	---

Transmitter Band Edge Measurement and Conducted Spurious Emissions

Standard: ANSI C63.10 (2013)
Tested by: JAT
Date: 8 - 12 August 2019
Temperature: 23 ± 3 °C
Humidity: 20 - 60 % RH
Measurement uncertainty: ± 2.87 dB Level of confidence 95 % (k = 2)

FCC Rule: 15.247(d), 15.209(a)

RSS-247 5.5

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 Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Table 35: Band edge attenuation

Band Edge Attenuation		
Test mode	Lower Band Edge	Upper Band Edge
RF I/O port 1_802.11b_1Mbps	-49.4 dBc	-49.5 dBc
RF I/O port 2_802.11b_1Mbps	-47.9 dBc	-48.7 dBc
RF I/O port 1_802.11g_9Mbps	-30.0 dBc	-47.6 dBc
RF I/O port 2_802.11g_9Mbps	-30.4 dBc	-47.6 dBc
RF I/O port 1_802.11n_14.4Mbps (MCS1)	-30.4 dBc	-45.8 dBc
RF I/O port 2_802.11n_14.4Mbps (MCS1)	-32.5 dBc	-46.8 dBc
Limit: -20 dBc		

Transmitter Band Edge Measurement and Conducted Spurious Emissions

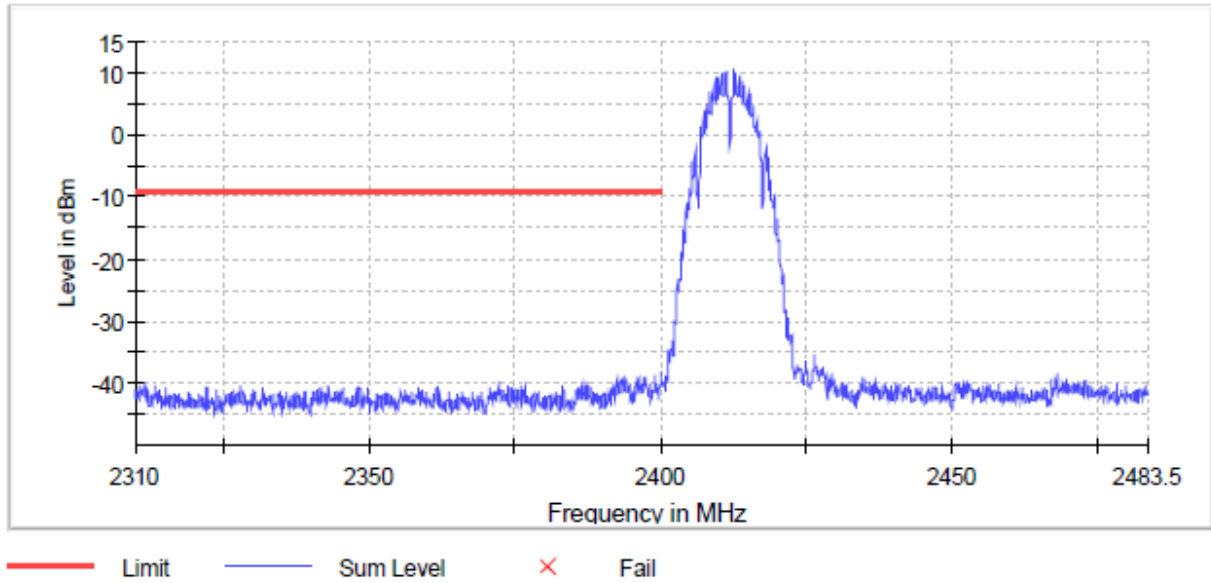


Figure 68: Lower Band Edge, RF I/O port 1_802.11b_1Mbps

Table 36: Lower band edge results, RF I/O port 1_802.11b_1Mbps

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.075000	-38.6	29.4	-9.2	PASS
2399.125000	-38.7	29.5	-9.2	PASS
2397.475000	-39.0	29.8	-9.2	PASS
2395.975000	-39.1	29.9	-9.2	PASS
2398.875000	-39.2	29.9	-9.2	PASS
2397.225000	-39.2	30.0	-9.2	PASS
2392.525000	-39.3	30.0	-9.2	PASS
2398.925000	-39.3	30.1	-9.2	PASS
2392.475000	-39.3	30.1	-9.2	PASS
2393.225000	-39.4	30.1	-9.2	PASS
2393.575000	-39.4	30.2	-9.2	PASS
2397.425000	-39.5	30.2	-9.2	PASS
2387.425000	-39.6	30.3	-9.2	PASS
2396.025000	-39.6	30.4	-9.2	PASS
2395.925000	-39.6	30.4	-9.2	PASS

Transmitter Band Edge Measurement and Conducted Spurious Emissions

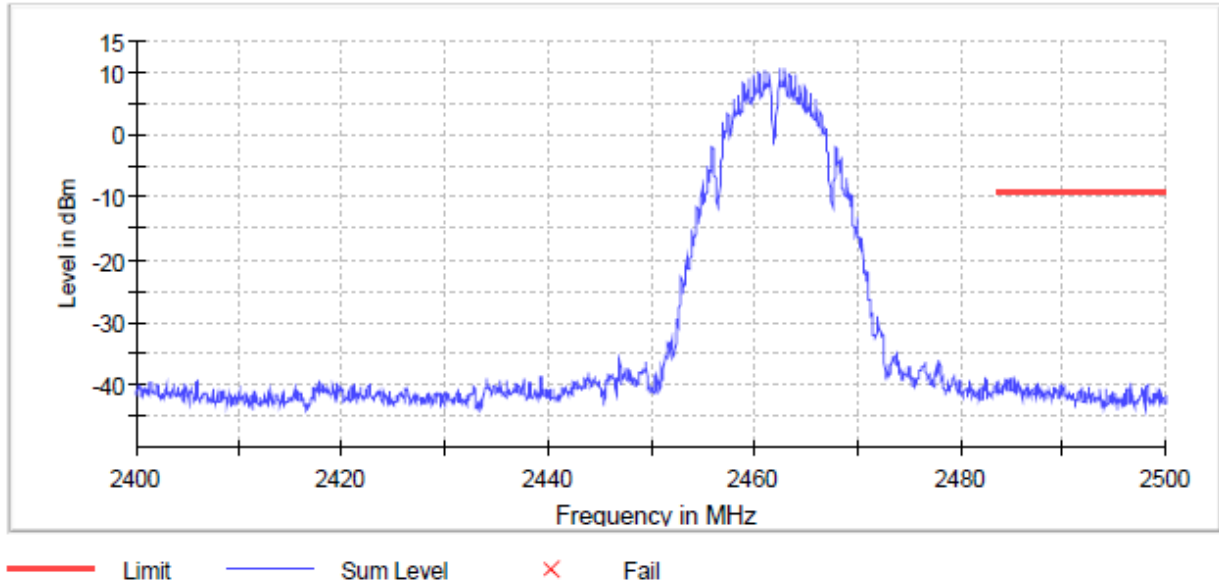


Figure 69: Upper Band Edge, RF I/O port 1_802.11b_1Mbps

Table 37: Upper band edge results, RF I/O port 1_802.11b_1Mbps

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2485.275000	-38.8	29.5	-9.2	PASS
2485.325000	-38.9	29.7	-9.2	PASS
2484.875000	-39.0	29.8	-9.2	PASS
2485.225000	-39.1	29.8	-9.2	PASS
2484.925000	-39.1	29.8	-9.2	PASS
2484.425000	-39.1	29.9	-9.2	PASS
2484.375000	-39.2	30.0	-9.2	PASS
2483.725000	-39.3	30.0	-9.2	PASS
2483.675000	-39.3	30.1	-9.2	PASS
2485.175000	-39.4	30.2	-9.2	PASS
2484.675000	-39.5	30.2	-9.2	PASS
2484.725000	-39.6	30.3	-9.2	PASS
2483.625000	-39.7	30.4	-9.2	PASS
2483.575000	-39.7	30.4	-9.2	PASS
2485.675000	-39.7	30.4	-9.2	PASS

Conducted spurious emissions results LOW channel, RF I/O port 1_802.11b_1Mbps

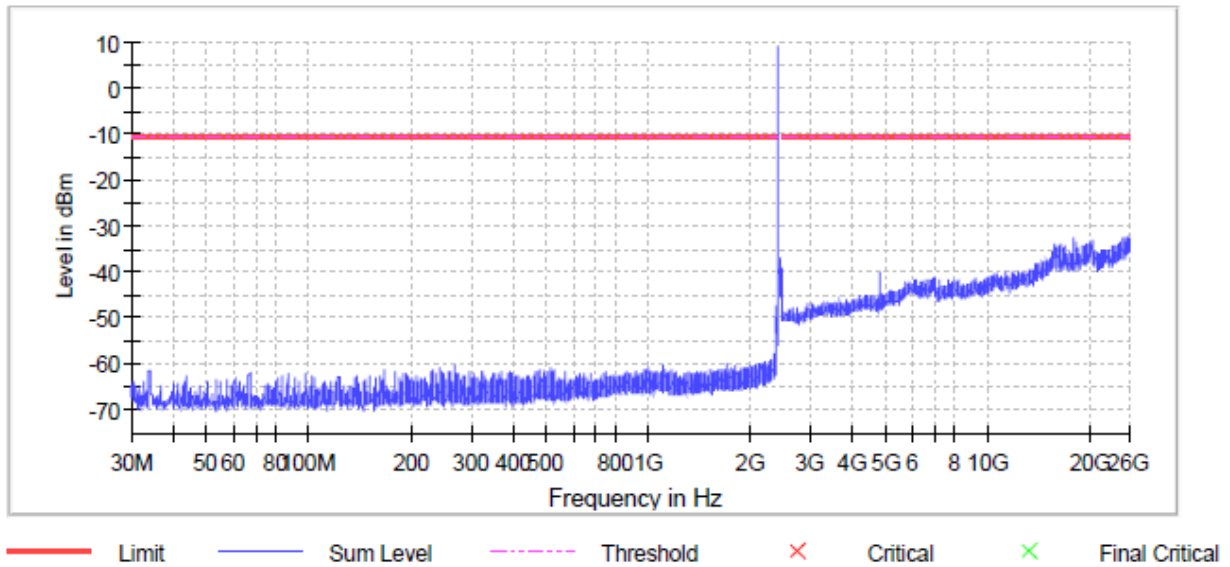


Figure 70: Conducted spurious emissions 30 - 26500 MHz LOW channel

Table 38: Pre measurements, conducted spurious emissions LOW channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
25901.160300	-32.1	21.3	-10.8
25863.682049	-32.2	21.4	-10.8
25826.203798	-32.3	21.6	-10.8
25912.183315	-32.4	21.6	-10.8
25241.984008	-32.5	21.7	-10.8
25931.289874	-32.5	21.8	-10.8
25900.425432	-32.6	21.8	-10.8
24834.867324	-32.6	21.8	-10.8
17845.541007	-32.6	21.8	-10.8
25520.498852	-32.7	21.9	-10.8
25875.439932	-32.8	22.0	-10.8
25911.448447	-32.8	22.0	-10.8
25882.788608	-32.8	22.0	-10.8
25907.774109	-32.9	22.1	-10.8
25860.742578	-32.9	22.1	-10.8

Table 39: Final measurements, conducted spurious emissions LOW channel

No final measurements were made; no emissions near the limit.

Conducted spurious emissions results MID channel, RF I/O port 1_802.11b_1Mbps

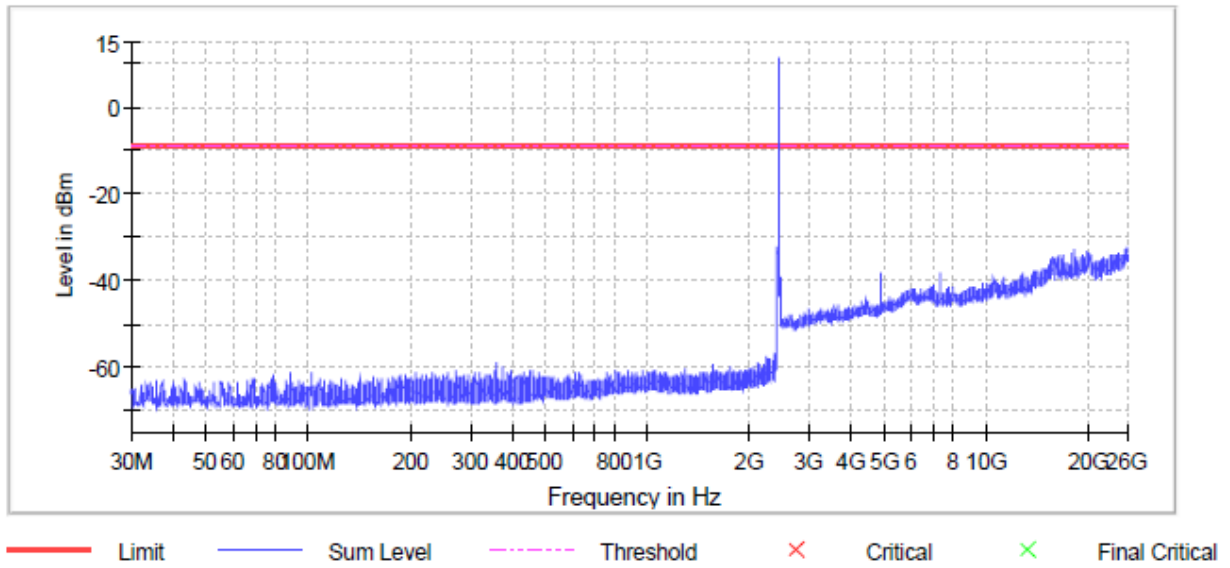


Figure 71: Conducted spurious emissions 30 - 26500 MHz MID channel

Table 40: Pre measurements, conducted spurious emissions MID channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
25972.442463	-32.2	23.4	-8.8
25922.471462	-32.5	23.7	-8.8
25840.901152	-32.6	23.8	-8.8
25893.076755	-32.7	23.8	-8.8
18190.928807	-32.7	23.9	-8.8
25540.340278	-32.8	24.0	-8.8
25885.728079	-32.9	24.1	-8.8
25824.734063	-32.9	24.1	-8.8
25880.584005	-33.0	24.2	-8.8
19809.842263	-33.0	24.2	-8.8
25886.462946	-33.0	24.2	-8.8
25459.504836	-33.1	24.3	-8.8
25568.265250	-33.1	24.3	-8.8
25905.569506	-33.2	24.3	-8.8
25898.220829	-33.2	24.4	-8.8

Table 41: Final measurements, conducted spurious emissions MID channel

No final measurements were made; no emissions near the limit.

Conducted spurious emissions results HIGH channel, RF I/O port 1_802.11b_1Mbps

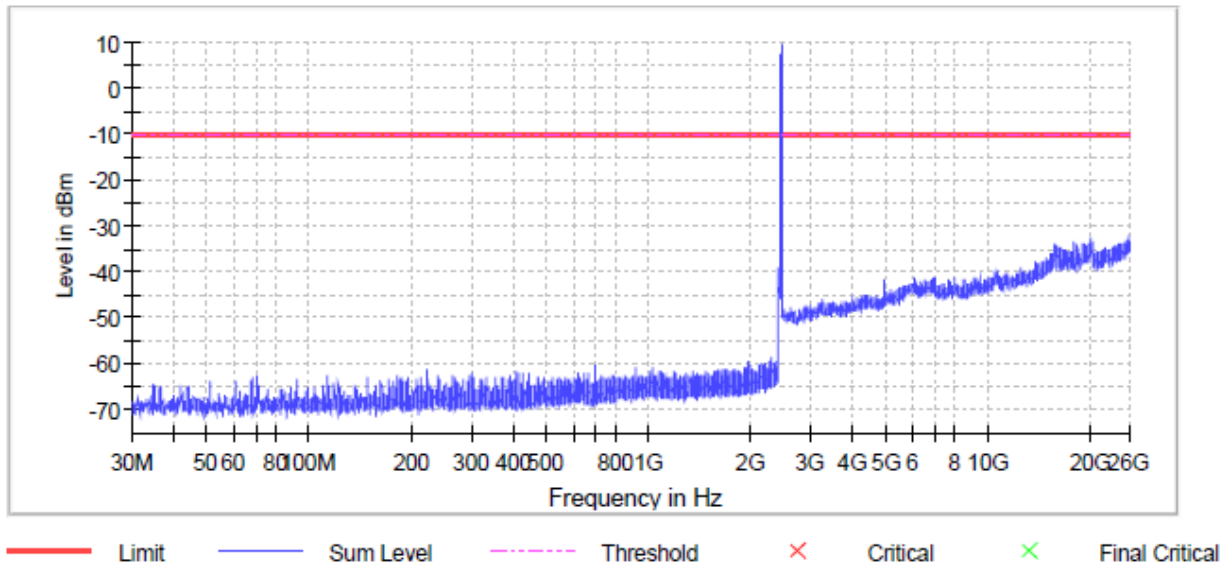


Figure 72: Conducted spurious emissions 30 - 26500 MHz HIGH channel

Table 42: Pre measurements, conducted spurious emissions HIGH channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
25923.941197	-31.9	21.5	-10.4
25904.099770	-31.9	21.5	-10.4
25899.690564	-32.5	22.1	-10.4
20172.132019	-32.6	22.2	-10.4
25892.341888	-32.8	22.3	-10.4
25832.817607	-32.8	22.3	-10.4
25943.782624	-32.8	22.4	-10.4
25850.454431	-32.8	22.4	-10.4
25879.849138	-33.0	22.5	-10.4
25912.183315	-33.0	22.6	-10.4
25909.243844	-33.0	22.6	-10.4
25898.955697	-33.1	22.6	-10.4
25487.429807	-33.1	22.6	-10.4
20202.996461	-33.2	22.7	-10.4
25934.964212	-33.2	22.8	-10.4

Table 43: Final measurements, conducted spurious emissions HIGH channel

No final measurements were made; no emissions near the limit.

Transmitter Band Edge Measurement and Conducted Spurious Emissions

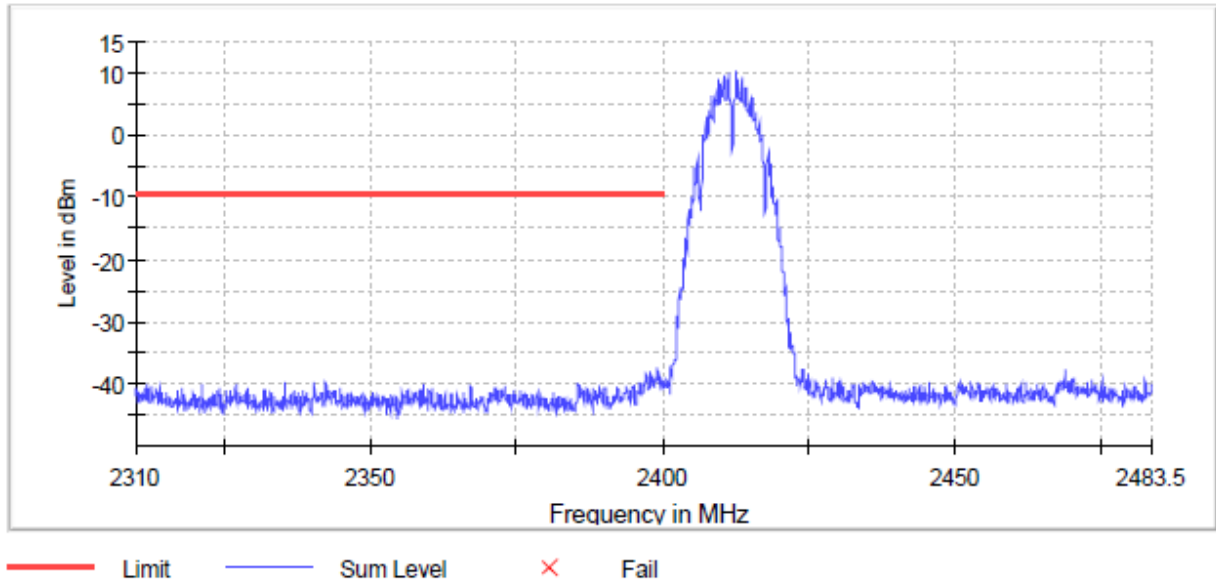


Figure 73: Lower Band Edge, RF I/O port 2_802.11b_1Mbps

Table 44: Lower band edge results, RF I/O port 2_802.11b_1Mbps

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.125000	-37.6	27.9	-9.6	PASS
2399.075000	-37.7	28.1	-9.6	PASS
2398.975000	-37.7	28.1	-9.6	PASS
2399.175000	-37.8	28.2	-9.6	PASS
2399.025000	-37.9	28.3	-9.6	PASS
2399.275000	-38.0	28.4	-9.6	PASS
2398.025000	-38.0	28.4	-9.6	PASS
2397.975000	-38.1	28.5	-9.6	PASS
2399.325000	-38.1	28.5	-9.6	PASS
2399.225000	-38.2	28.6	-9.6	PASS
2397.275000	-38.5	28.9	-9.6	PASS
2397.125000	-38.6	29.0	-9.6	PASS
2397.175000	-38.7	29.1	-9.6	PASS
2398.375000	-38.7	29.1	-9.6	PASS
2397.325000	-38.9	29.3	-9.6	PASS

Transmitter Band Edge Measurement and Conducted Spurious Emissions

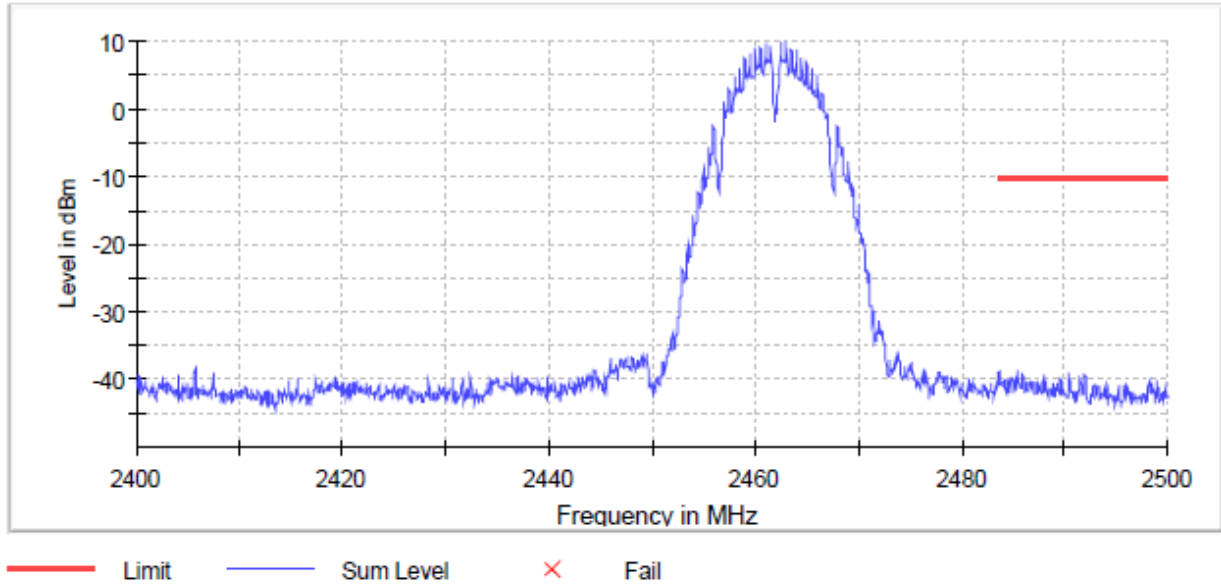


Figure 74: Upper Band Edge, RF I/O port 2_802.11b_1Mbps

Table 45: Upper band edge results, RF I/O port 2_802.11b_1Mbps

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.675000	-38.8	28.7	-10.1	PASS
2485.475000	-38.8	28.7	-10.1	PASS
2483.575000	-38.9	28.8	-10.1	PASS
2485.425000	-39.0	29.0	-10.1	PASS
2483.625000	-39.1	29.1	-10.1	PASS
2490.375000	-39.1	29.1	-10.1	PASS
2491.925000	-39.2	29.1	-10.1	PASS
2487.975000	-39.3	29.3	-10.1	PASS
2483.725000	-39.4	29.3	-10.1	PASS
2485.925000	-39.4	29.4	-10.1	PASS
2484.775000	-39.5	29.4	-10.1	PASS
2483.525000	-39.5	29.4	-10.1	PASS
2491.975000	-39.5	29.4	-10.1	PASS
2490.425000	-39.6	29.5	-10.1	PASS
2485.525000	-39.6	29.6	-10.1	PASS

Conducted spurious emissions results LOW channel, RF I/O port 2_802.11b_1Mbps

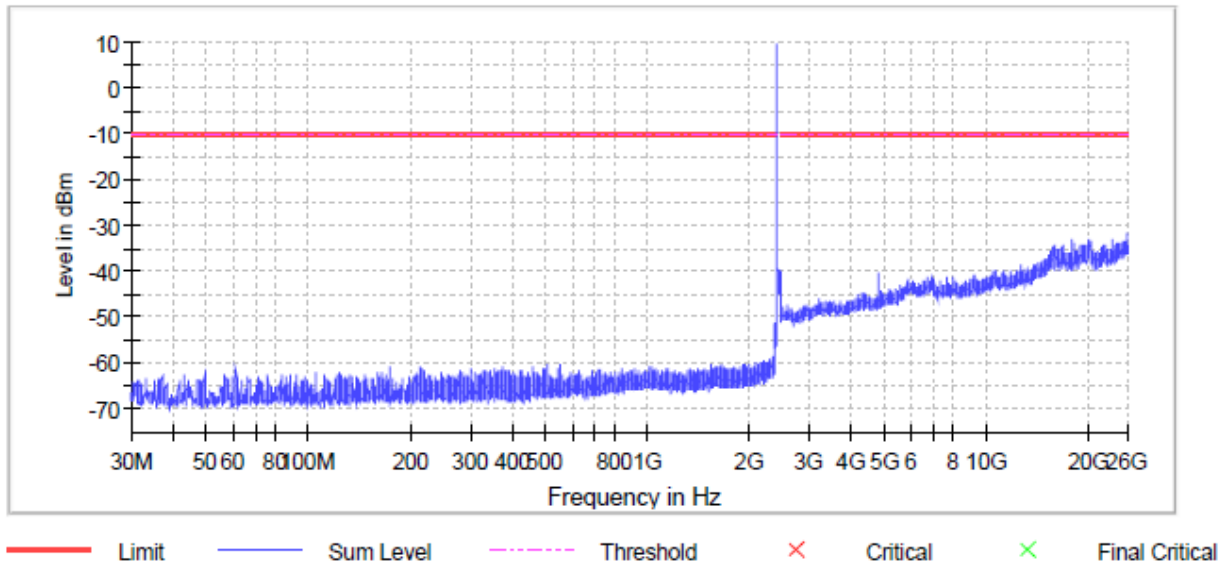


Figure 75: Conducted spurious emissions 30 - 26500 MHz LOW channel

Table 46: Pre measurements, conducted spurious emissions LOW channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
25885.728079	-31.6	21.1	-10.5
25840.901152	-32.4	21.9	-10.5
25872.500461	-32.7	22.3	-10.5
25834.287343	-32.8	22.3	-10.5
25927.615535	-32.8	22.3	-10.5
25908.508976	-32.9	22.4	-10.5
23606.168596	-32.9	22.4	-10.5
25904.834638	-32.9	22.4	-10.5
25815.180783	-32.9	22.4	-10.5
25869.560990	-32.9	22.4	-10.5
17855.829154	-33.0	22.5	-10.5
17862.442963	-33.0	22.5	-10.5
20133.918901	-33.1	22.6	-10.5
25882.053741	-33.1	22.6	-10.5
25876.909667	-33.1	22.6	-10.5

Table 47: Final measurements, conducted spurious emissions LOW channel

No final measurements were made; no emissions near the limit.

Conducted spurious emissions results MID channel, RF I/O port 2_802.11b_1Mbps

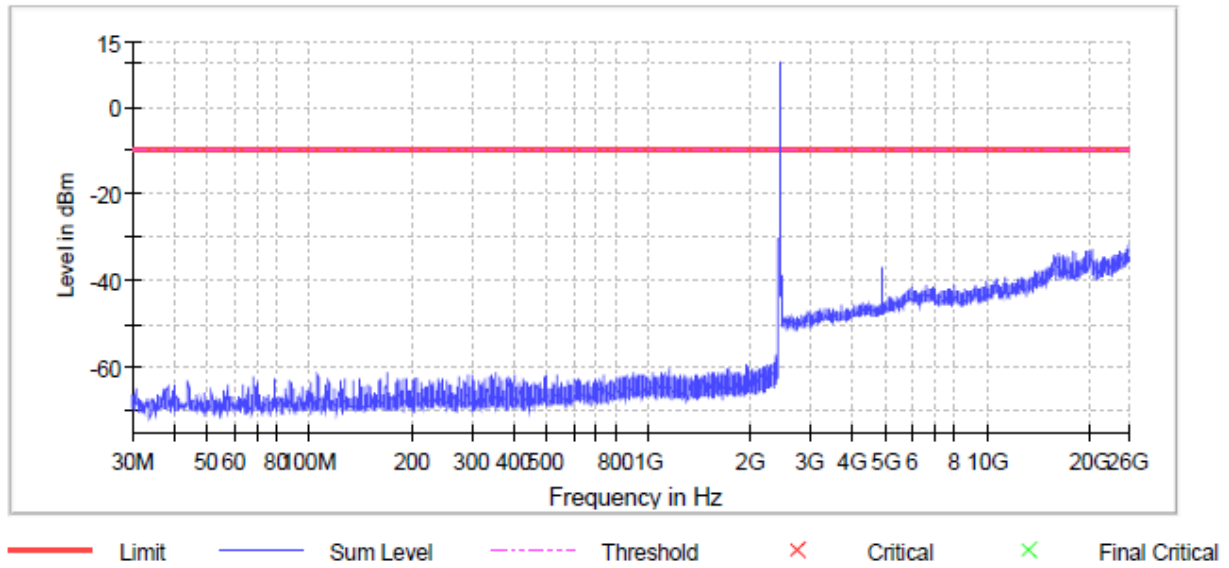


Figure 76: Conducted spurious emissions 30 - 26500 MHz MID channel

Table 48: Pre measurements, conducted spurious emissions MID channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
25922.471462	-31.6	21.9	-9.7
25862.947181	-32.2	22.5	-9.7
25848.249828	-32.3	22.6	-9.7
25906.304373	-32.4	22.7	-9.7
25860.007711	-32.6	22.9	-9.7
25459.504836	-32.7	22.9	-9.7
25867.356387	-32.7	23.0	-9.7
20215.489211	-32.7	23.0	-9.7
25909.243844	-32.8	23.1	-9.7
25896.016226	-32.9	23.2	-9.7
25894.546491	-33.0	23.3	-9.7
25846.045225	-33.0	23.3	-9.7
17858.768624	-33.1	23.3	-9.7
25845.310357	-33.1	23.3	-9.7
25878.379402	-33.1	23.4	-9.7

Table 49: Final measurements, conducted spurious emissions MID channel

No final measurements were made; no emissions near the limit.

Conducted spurious emissions results HIGH channel, RF I/O port 2_802.11b_1Mbps

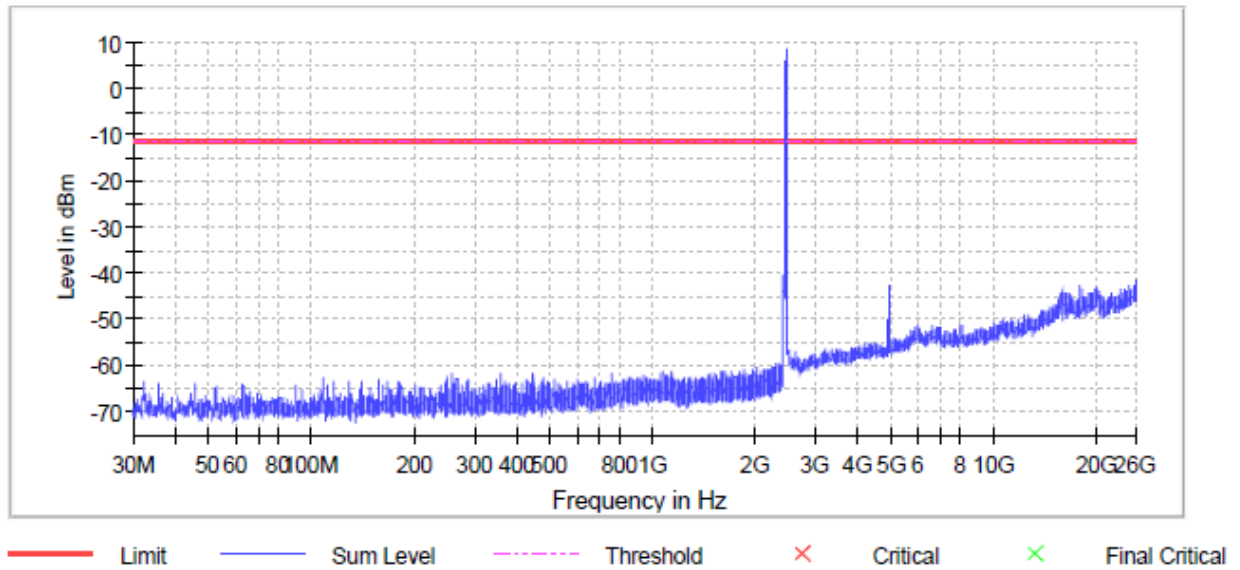


Figure 77: Conducted spurious emissions 30 - 26500 MHz HIGH channel

Table 50: Pre measurements, conducted spurious emissions HIGH channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
25895.281358	-41.7	30.3	-11.5
25876.909667	-42.1	30.6	-11.5
25840.901152	-42.1	30.7	-11.5
25863.682049	-42.1	30.7	-11.5
4923.628066	-42.3	30.9	-11.5
25901.895167	-42.3	30.9	-11.5
25929.820138	-42.4	31.0	-11.5
25727.731532	-42.5	31.0	-11.5
25904.834638	-42.5	31.1	-11.5
4924.362934	-42.5	31.1	-11.5
25875.439932	-42.5	31.1	-11.5
17840.396933	-42.6	31.1	-11.5
24809.881824	-42.6	31.1	-11.5
25902.630035	-42.7	31.2	-11.5
25831.347872	-42.7	31.2	-11.5

Table 51: Final measurements, conducted spurious emissions HIGH channel

No final measurements were made; no emissions near the limit.

Transmitter Band Edge Measurement and Conducted Spurious Emissions

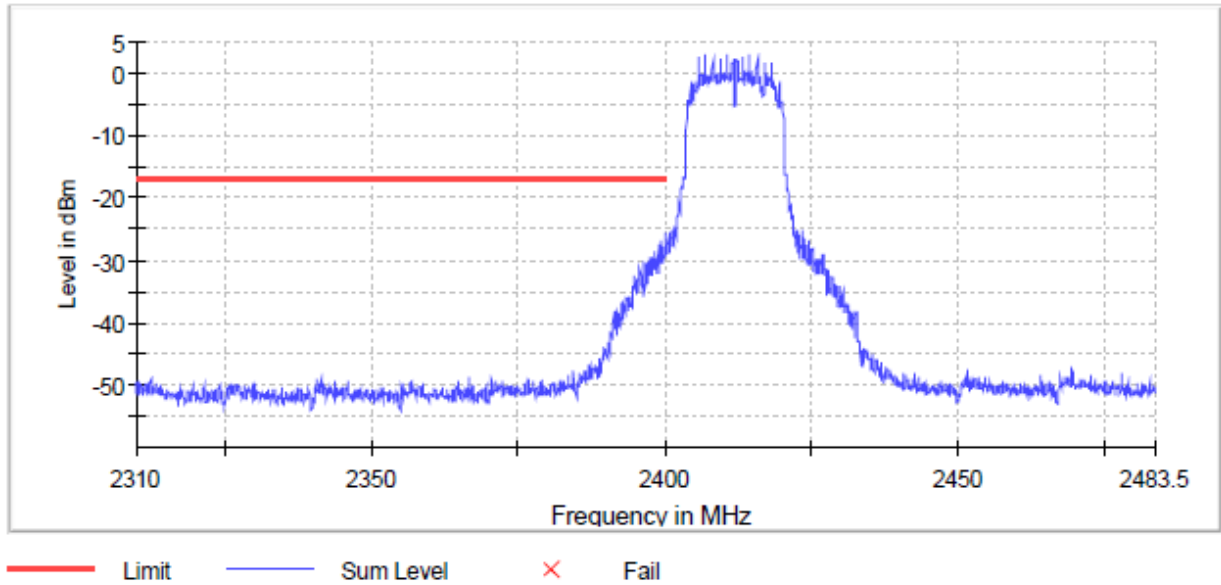


Figure 78: Lower Band Edge, RF I/O port 1_802.11g_9Mbps

Table 52: Lower band edge results, RF I/O port 1_802.11g_9Mbps

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.475000	-27.0	10.0	-17.0	PASS
2399.525000	-27.3	10.3	-17.0	PASS
2399.225000	-27.5	10.5	-17.0	PASS
2399.175000	-27.5	10.5	-17.0	PASS
2399.425000	-27.8	10.8	-17.0	PASS
2399.825000	-28.0	11.0	-17.0	PASS
2398.875000	-28.0	11.0	-17.0	PASS
2399.875000	-28.0	11.0	-17.0	PASS
2398.825000	-28.2	11.2	-17.0	PASS
2399.725000	-28.3	11.3	-17.0	PASS
2399.775000	-28.4	11.4	-17.0	PASS
2399.275000	-28.5	11.5	-17.0	PASS
2398.225000	-28.6	11.6	-17.0	PASS
2399.125000	-28.6	11.6	-17.0	PASS
2398.275000	-28.7	11.7	-17.0	PASS

Transmitter Band Edge Measurement and Conducted Spurious Emissions

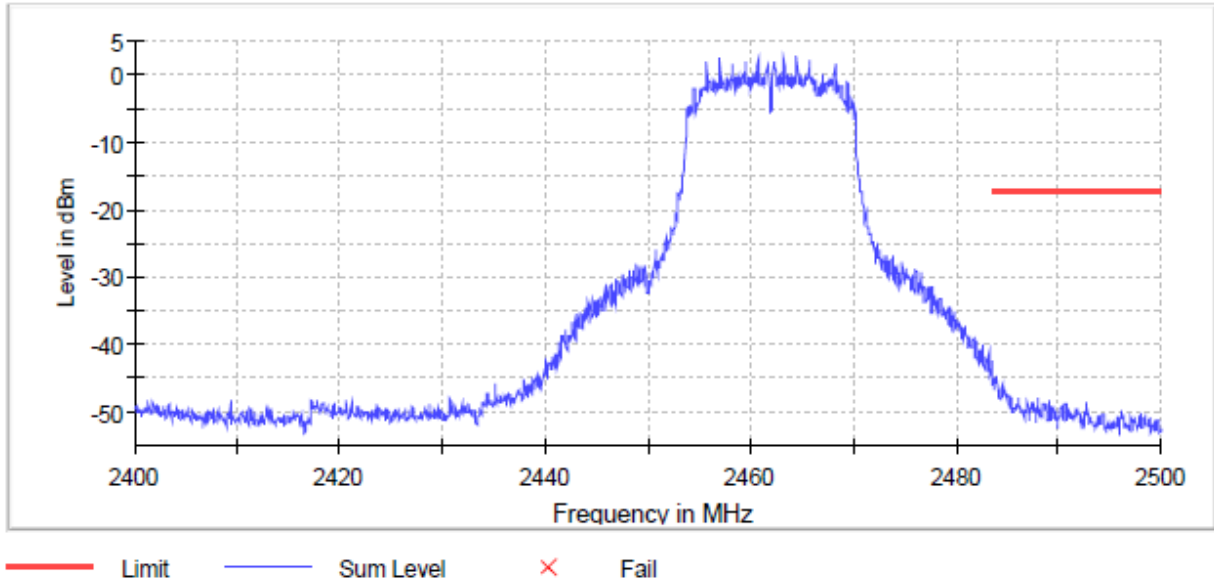
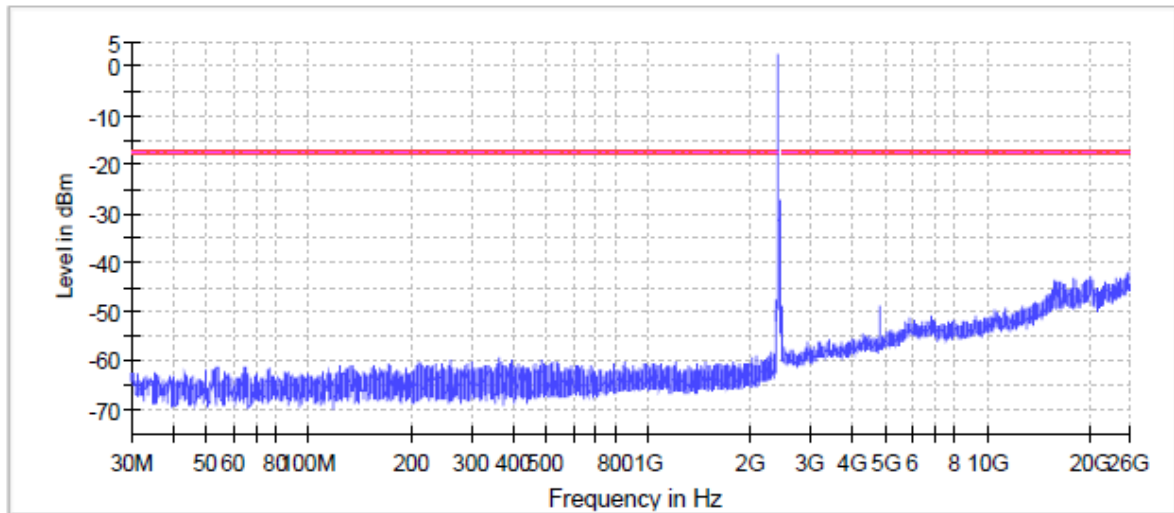


Figure 79: Upper Band Edge, RF I/O port 1_802.11g_9Mbps

Table 53: Upper band edge results, RF I/O port 1_802.11b_1Mbps

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2484.025000	-44.8	27.6	-17.2	PASS
2483.975000	-44.8	27.6	-17.2	PASS
2483.875000	-44.9	27.7	-17.2	PASS
2483.825000	-45.2	28.0	-17.2	PASS
2483.575000	-45.6	28.4	-17.2	PASS
2483.925000	-45.9	28.7	-17.2	PASS
2483.625000	-45.9	28.7	-17.2	PASS
2484.525000	-45.9	28.7	-17.2	PASS
2483.525000	-46.1	28.9	-17.2	PASS
2483.725000	-46.1	28.9	-17.2	PASS
2483.775000	-46.3	29.1	-17.2	PASS
2483.675000	-46.7	29.5	-17.2	PASS
2484.475000	-46.7	29.5	-17.2	PASS
2484.675000	-46.7	29.5	-17.2	PASS
2484.175000	-46.8	29.6	-17.2	PASS

Conducted spurious emissions results LOW channel, RF I/O port 1_802.11g_9Mbps



— Limit — Sum Level - - - Threshold × Critical × Final Critical

Figure 80: Conducted spurious emissions 30 - 26500 MHz LOW channel

Table 54: Pre measurements, conducted spurious emissions LOW channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2399.814850	-27.7	10.3	-17.4
2399.740789	-28.4	11.0	-17.4
2399.222368	-29.3	11.9	-17.4
2398.259586	-29.3	11.9	-17.4
2398.333646	-29.6	12.2	-17.4
2398.852067	-29.7	12.3	-17.4
2398.555826	-29.9	12.5	-17.4
2398.481766	-30.0	12.6	-17.4
2398.926127	-30.1	12.6	-17.4
2399.296428	-30.2	12.8	-17.4
2398.629887	-30.4	13.0	-17.4
2399.518609	-30.5	13.1	-17.4
2399.148308	-30.7	13.2	-17.4
2398.778007	-30.8	13.3	-17.4
2399.592669	-30.8	13.4	-17.4

Table 55: Final measurements, conducted spurious emissions LOW channel

No final measurements were made; no emissions near the limit.

Conducted spurious emissions results MID channel, RF I/O port 1_802.11g_9Mbps

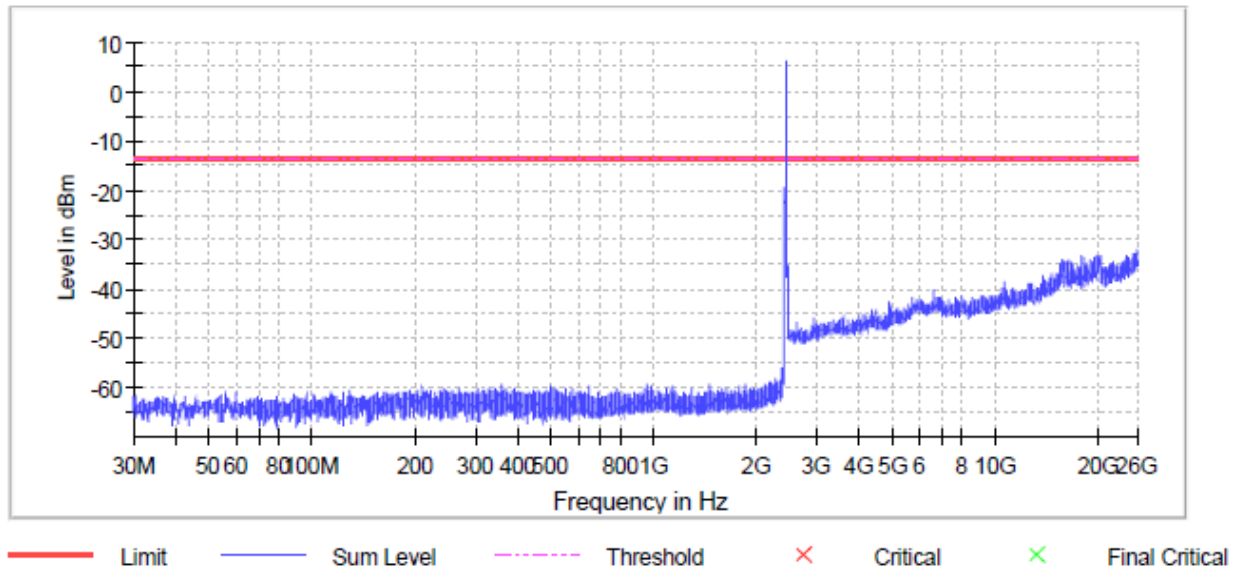


Figure 81: Conducted spurious emissions 30 - 26500 MHz MID channel

Table 56: Pre measurements, conducted spurious emissions MID channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
25907.039241	-32.1	18.5	-13.6
25915.857653	-32.5	18.8	-13.6
25924.676065	-32.6	19.0	-13.6
25901.160300	-32.7	19.0	-13.6
25867.356387	-32.7	19.1	-13.6
25835.022210	-32.8	19.2	-13.6
25876.909667	-32.9	19.2	-13.6
25827.673534	-32.9	19.2	-13.6
25893.811623	-32.9	19.3	-13.6
25406.594364	-32.9	19.3	-13.6
25914.387918	-32.9	19.3	-13.6
25883.523476	-32.9	19.3	-13.6
25895.281358	-32.9	19.3	-13.6
25934.229344	-32.9	19.3	-13.6
25884.258343	-33.0	19.3	-13.6

Table 57: Final measurements, conducted spurious emissions MID channel

No final measurements were made; no emissions near the limit.

Conducted spurious emissions results HIGH channel, RF I/O port 1_802.11b_1Mbps

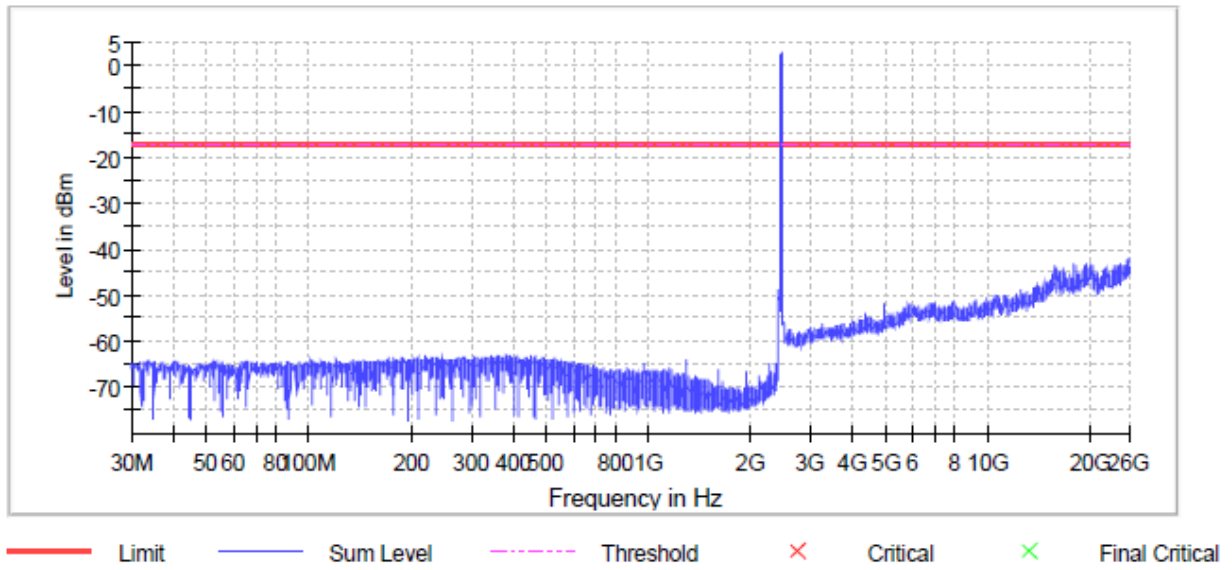


Figure 82: Conducted spurious emissions 30 - 26500 MHz HIGH channel

Table 58: Pre measurements, conducted spurious emissions HIGH channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
25907.774109	-41.8	24.5	-17.3
25871.765593	-42.1	24.8	-17.3
25854.128769	-42.2	24.9	-17.3
25862.212314	-42.5	25.2	-17.3
25503.596895	-42.5	25.2	-17.3
25832.082740	-42.5	25.2	-17.3
25889.402417	-42.6	25.3	-17.3
25848.984696	-42.7	25.4	-17.3
25788.725548	-42.7	25.4	-17.3
25710.829576	-42.7	25.4	-17.3
25907.039241	-42.8	25.5	-17.3
25902.630035	-42.8	25.5	-17.3
25852.659034	-42.8	25.5	-17.3
25502.127160	-42.8	25.5	-17.3
25892.341888	-42.9	25.6	-17.3

Table 59: Final measurements, conducted spurious emissions HIGH channel

No final measurements were made; no emissions near the limit.

Transmitter Band Edge Measurement and Conducted Spurious Emissions

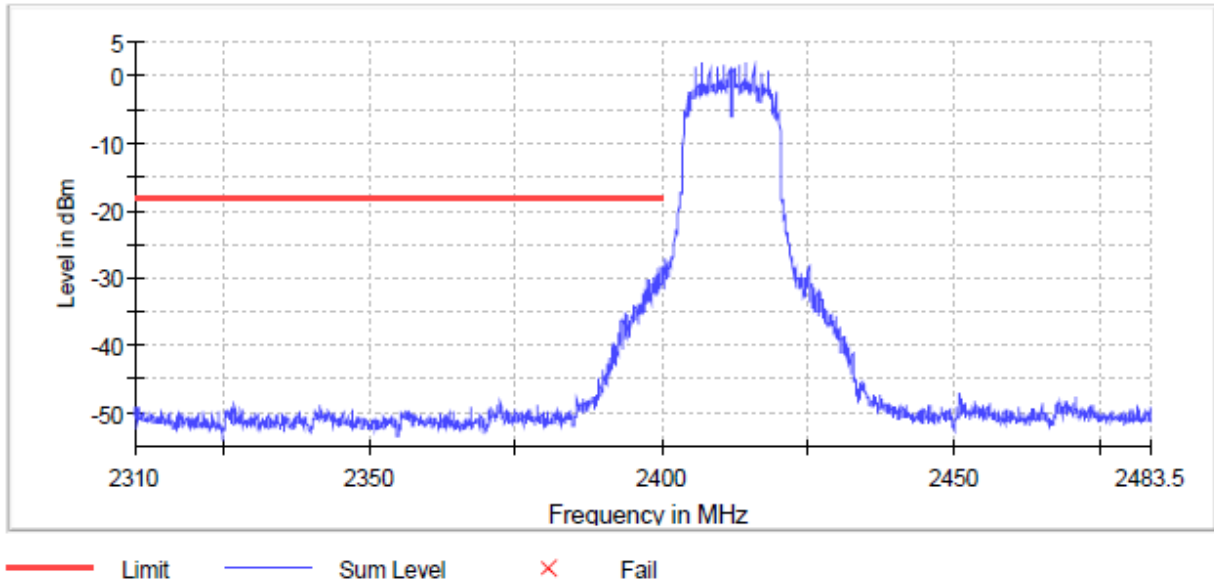


Figure 83: Lower Band Edge, RF I/O port 2_802.11g_9Mbps

Table 60: Lower band edge results, RF I/O port 2_802.11g_9Mbps

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.775000	-28.4	10.3	-18.1	PASS
2399.725000	-28.5	10.4	-18.1	PASS
2399.475000	-29.5	11.3	-18.1	PASS
2399.175000	-29.6	11.5	-18.1	PASS
2399.525000	-29.6	11.5	-18.1	PASS
2399.225000	-29.7	11.5	-18.1	PASS
2398.575000	-29.8	11.7	-18.1	PASS
2398.525000	-29.8	11.7	-18.1	PASS
2399.875000	-29.9	11.7	-18.1	PASS
2398.875000	-29.9	11.7	-18.1	PASS
2399.825000	-29.9	11.7	-18.1	PASS
2399.125000	-30.0	11.8	-18.1	PASS
2397.875000	-30.2	12.0	-18.1	PASS
2398.825000	-30.2	12.1	-18.1	PASS
2397.575000	-30.2	12.1	-18.1	PASS

Transmitter Band Edge Measurement and Conducted Spurious Emissions

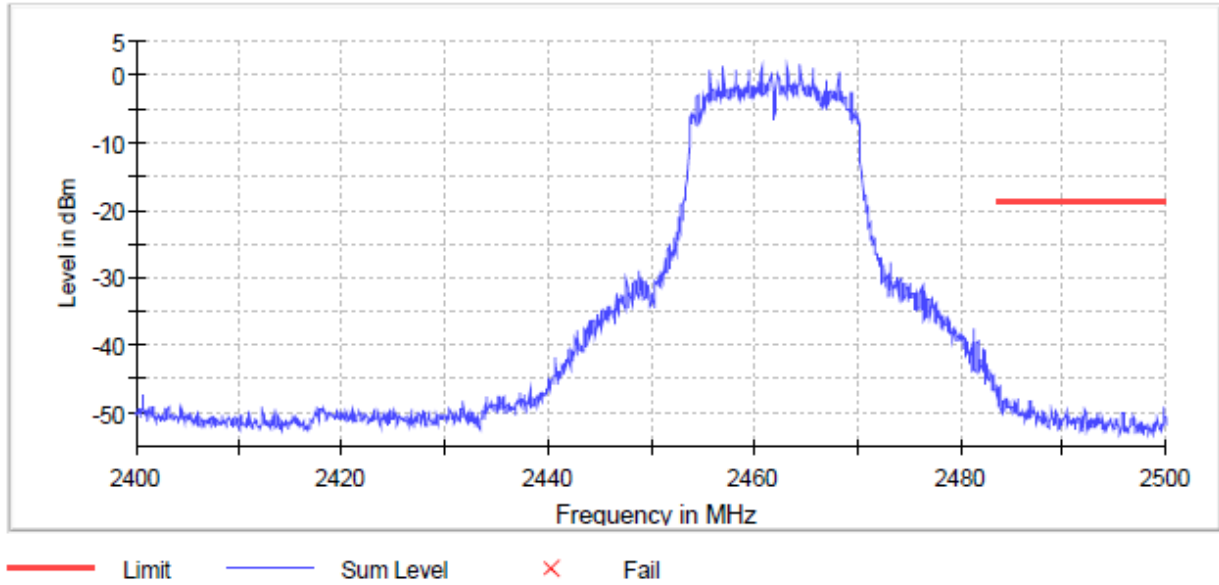


Figure 84: Upper Band Edge, RF I/O port 2_802.11g_9Mbps

Table 61: Upper band edge results, RF I/O port 2_802.11g_9Mbps

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.875000	-46.1	27.6	-18.5	PASS
2483.825000	-46.3	27.9	-18.5	PASS
2483.925000	-46.5	28.0	-18.5	PASS
2483.575000	-47.0	28.5	-18.5	PASS
2483.525000	-47.1	28.6	-18.5	PASS
2483.775000	-47.1	28.7	-18.5	PASS
2484.625000	-47.8	29.4	-18.5	PASS
2485.625000	-47.9	29.4	-18.5	PASS
2484.475000	-47.9	29.5	-18.5	PASS
2484.525000	-47.9	29.5	-18.5	PASS
2485.575000	-48.0	29.5	-18.5	PASS
2483.975000	-48.1	29.6	-18.5	PASS
2484.225000	-48.2	29.7	-18.5	PASS
2484.575000	-48.2	29.8	-18.5	PASS
2484.825000	-48.2	29.8	-18.5	PASS

Conducted spurious emissions results LOW channel, RF I/O port 2_802.11g_9Mbps

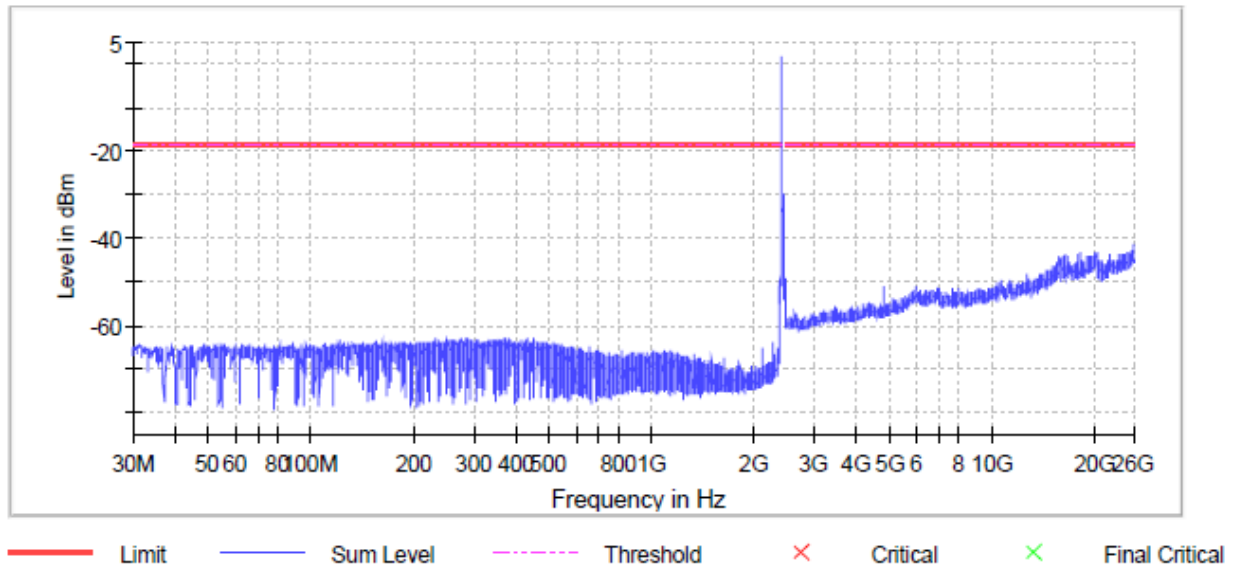


Figure 85: Conducted spurious emissions 30 - 26500 MHz LOW channel

Table 62: Pre measurements, conducted spurious emissions LOW channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2398.926127	-30.2	12.0	-18.2
2398.852067	-30.3	12.0	-18.2
2399.814850	-30.5	12.3	-18.2
2399.740789	-30.5	12.3	-18.2
2399.518609	-30.7	12.5	-18.2
2399.888910	-31.1	12.9	-18.2
2399.444549	-31.3	13.1	-18.2
2397.667104	-31.8	13.6	-18.2
2399.370488	-31.9	13.7	-18.2
2399.962970	-32.0	13.8	-18.2
2399.000187	-32.3	14.1	-18.2
2398.778007	-32.3	14.1	-18.2
2399.592669	-32.4	14.2	-18.2
2399.296428	-32.5	14.3	-18.2
2398.481766	-32.6	14.4	-18.2

Table 63: Final measurements, conducted spurious emissions LOW channel

No final measurements were made; no emissions near the limit.

Conducted spurious emissions results MID channel, RF I/O port 2_802.11g_9Mbps

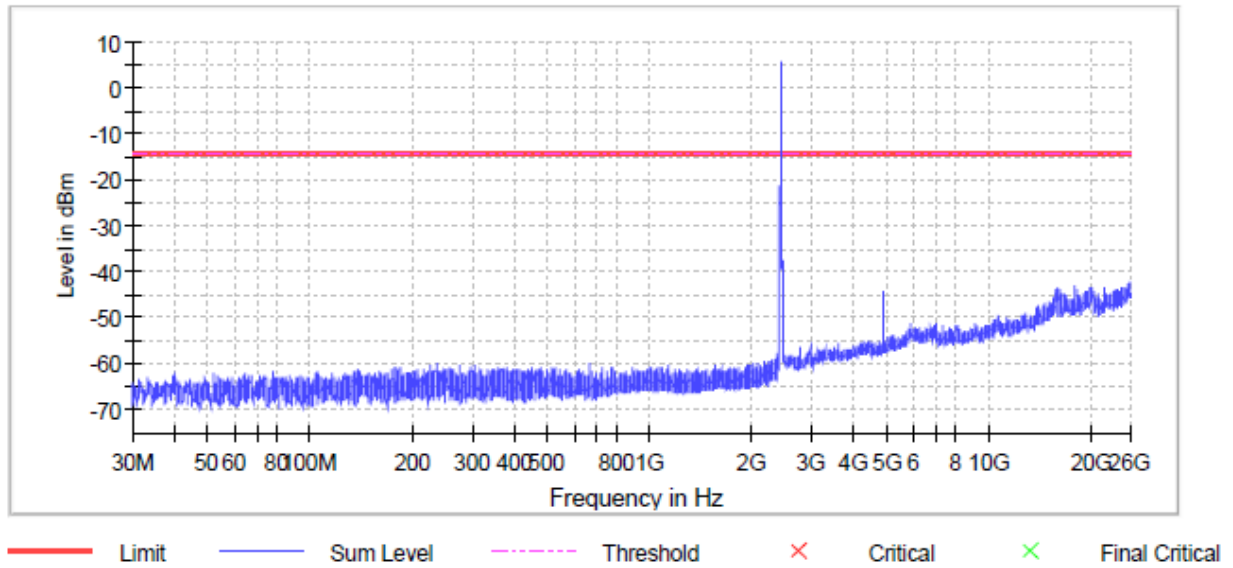


Figure 86: Conducted spurious emissions 30 - 26500 MHz MID channel

Table 64: Pre measurements, conducted spurious emissions MID channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
25872.500461	-42.2	27.9	-14.3
25879.114270	-42.3	28.0	-14.3
25895.281358	-42.5	28.2	-14.3
25789.460415	-42.5	28.2	-14.3
25914.387918	-42.6	28.3	-14.3
25871.030726	-42.7	28.3	-14.3
25871.765593	-42.7	28.4	-14.3
25892.341888	-42.8	28.5	-14.3
25922.471462	-42.9	28.6	-14.3
25899.690564	-42.9	28.6	-14.3
25909.243844	-42.9	28.6	-14.3
25896.016226	-42.9	28.6	-14.3
25807.097239	-42.9	28.6	-14.3
17841.131801	-42.9	28.6	-14.3
25854.128769	-43.0	28.7	-14.3

Table 65: Final measurements, conducted spurious emissions MID channel

No final measurements were made; no emissions near the limit.

Conducted spurious emissions results HIGH channel, RF I/O port 2_802.11g_9Mbps

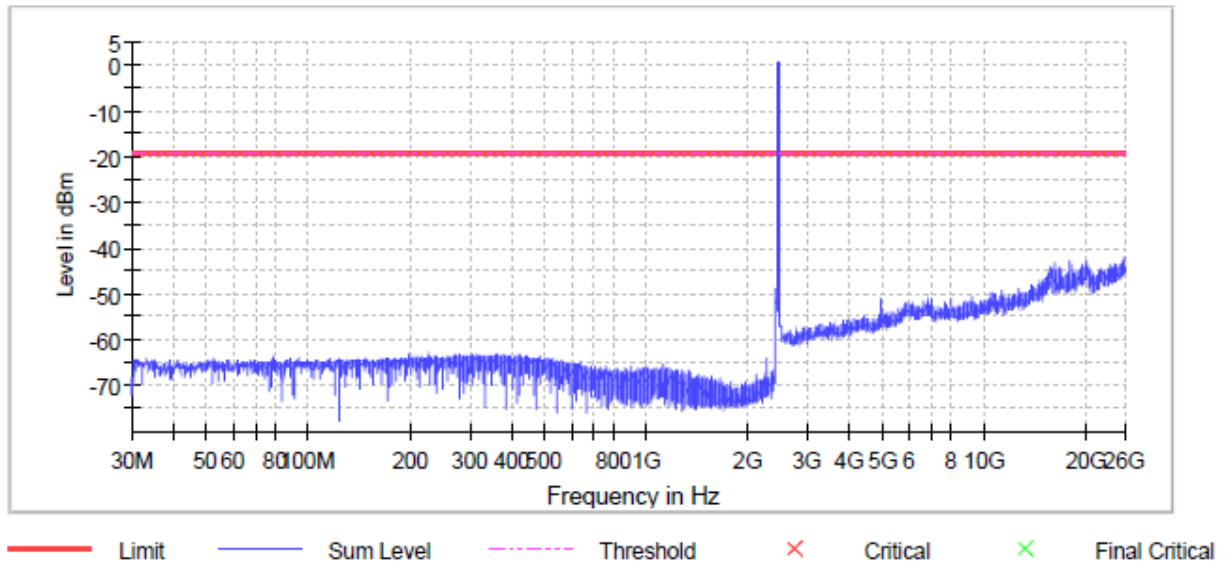


Figure 87: Conducted spurious emissions 30 - 26500 MHz HIGH channel

Table 66: Pre measurements, conducted spurious emissions HIGH channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
25837.961681	-41.7	22.5	-19.2
25876.909667	-42.4	23.2	-19.2
25882.788608	-42.5	23.3	-19.2
25878.379402	-42.5	23.3	-19.2
25901.895167	-42.5	23.4	-19.2
25922.471462	-42.6	23.4	-19.2
25850.454431	-42.6	23.4	-19.2
25867.356387	-42.7	23.5	-19.2
25854.863637	-42.7	23.6	-19.2
20158.169534	-42.8	23.6	-19.2
25868.826123	-42.8	23.6	-19.2
25851.189299	-42.8	23.6	-19.2
17843.336404	-42.8	23.6	-19.2
25937.168815	-42.8	23.7	-19.2
25823.264328	-42.9	23.7	-19.2

Table 67: Final measurements, conducted spurious emissions HIGH channel

No final measurements were made; no emissions near the limit.

Transmitter Band Edge Measurement and Conducted Spurious Emissions

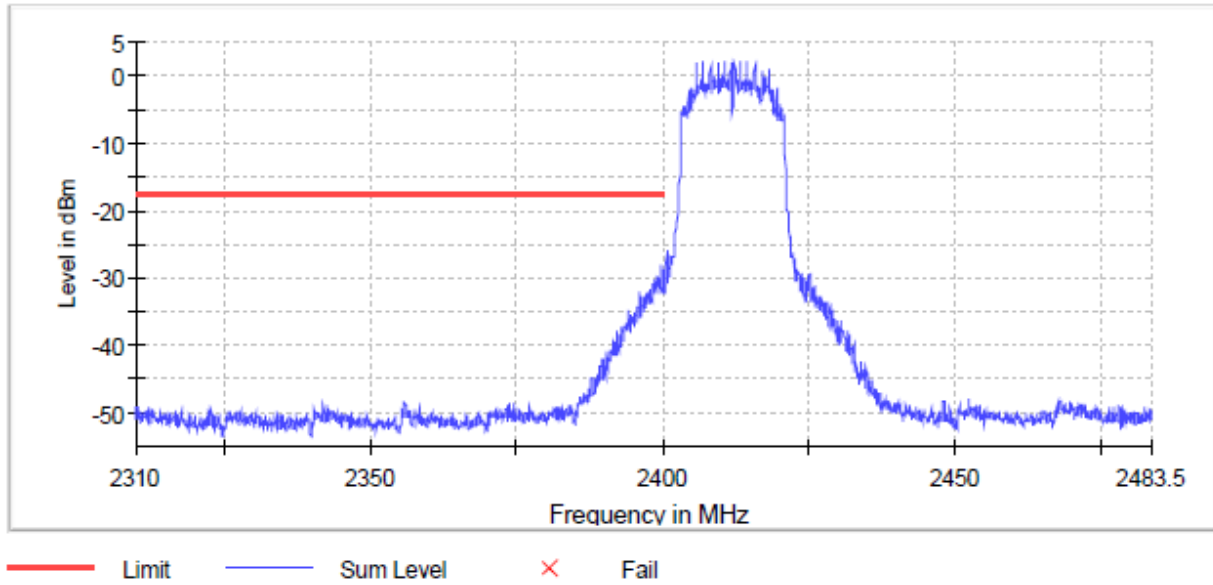


Figure 88: Lower Band Edge, RF I/O port 1_802.11n_14.4Mbps (MCS1)

Table 68: Lower band edge results, RF I/O port 1_802.11n_14.4Mbps (MCS1)

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.825000	-28.0	10.4	-17.7	PASS
2399.775000	-28.3	10.6	-17.7	PASS
2399.725000	-29.3	11.7	-17.7	PASS
2399.875000	-29.4	11.8	-17.7	PASS
2399.525000	-30.1	12.4	-17.7	PASS
2398.575000	-30.1	12.4	-17.7	PASS
2399.475000	-30.1	12.5	-17.7	PASS
2399.175000	-30.2	12.6	-17.7	PASS
2399.425000	-30.2	12.6	-17.7	PASS
2398.525000	-30.2	12.6	-17.7	PASS
2399.675000	-30.4	12.7	-17.7	PASS
2399.325000	-30.4	12.8	-17.7	PASS
2399.125000	-30.5	12.8	-17.7	PASS
2398.875000	-30.5	12.9	-17.7	PASS
2398.825000	-30.6	13.0	-17.7	PASS

Transmitter Band Edge Measurement and Conducted Spurious Emissions

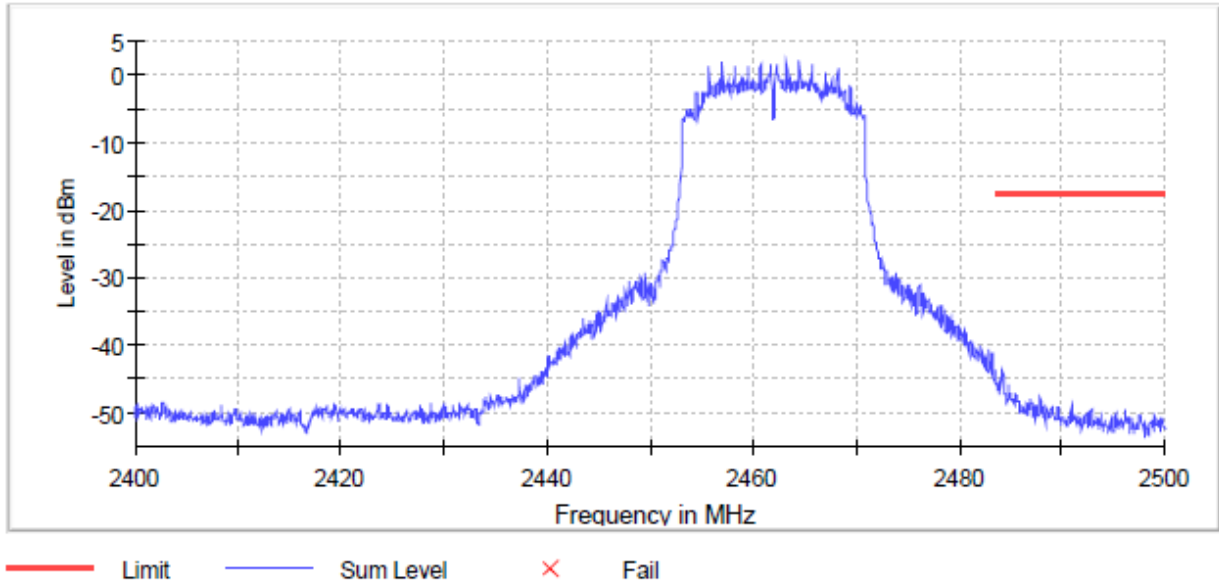


Figure 89: Upper Band Edge, RF I/O port 1_802.11n_14.4Mbps (MCS1)

Table 69: Upper band edge results, RF I/O port 1_802.11n_14.4Mbps (MCS1)

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2484.175000	-43.6	25.8	-17.8	PASS
2484.125000	-43.8	26.0	-17.8	PASS
2484.225000	-43.8	26.0	-17.8	PASS
2484.275000	-44.6	26.8	-17.8	PASS
2484.325000	-45.0	27.2	-17.8	PASS
2483.875000	-45.3	27.5	-17.8	PASS
2484.075000	-45.3	27.5	-17.8	PASS
2483.575000	-45.5	27.7	-17.8	PASS
2484.375000	-45.5	27.7	-17.8	PASS
2483.925000	-45.7	27.9	-17.8	PASS
2483.525000	-45.7	27.9	-17.8	PASS
2484.825000	-45.8	28.0	-17.8	PASS
2484.775000	-46.0	28.2	-17.8	PASS
2483.625000	-46.0	28.2	-17.8	PASS
2483.675000	-46.0	28.2	-17.8	PASS

Conducted spurious emissions results LOW channel, RF I/O port 1_802.11n_14.4Mbps (MCS1)

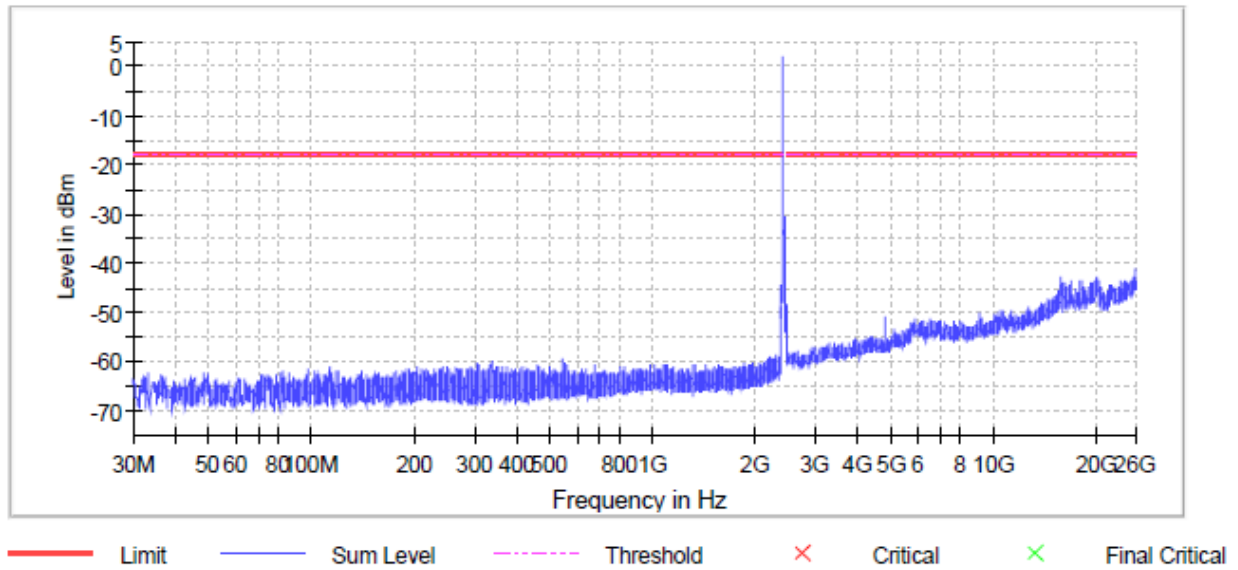


Figure 90: Conducted spurious emissions 30 - 26500 MHz LOW channel

Table 70: Pre measurements, conducted spurious emissions LOW channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2399.814850	-30.5	12.4	-18.0
2399.000187	-30.6	12.6	-18.0
2398.926127	-30.6	12.6	-18.0
2399.740789	-30.8	12.8	-18.0
2399.888910	-30.9	12.9	-18.0
2399.370488	-31.2	13.2	-18.0
2398.629887	-31.3	13.3	-18.0
2399.518609	-31.3	13.3	-18.0
2399.296428	-31.5	13.4	-18.0
2398.555826	-31.5	13.5	-18.0
2399.222368	-31.9	13.9	-18.0
2398.703947	-31.9	13.9	-18.0
2398.852067	-31.9	13.9	-18.0
2399.962970	-32.0	13.9	-18.0
2399.592669	-32.1	14.1	-18.0

Table 71: Final measurements, conducted spurious emissions LOW channel

No final measurements were made; no emissions near the limit.

Conducted spurious emissions results MID channel, RF I/O port 1_802.11n_14.4Mbps (MCS1)

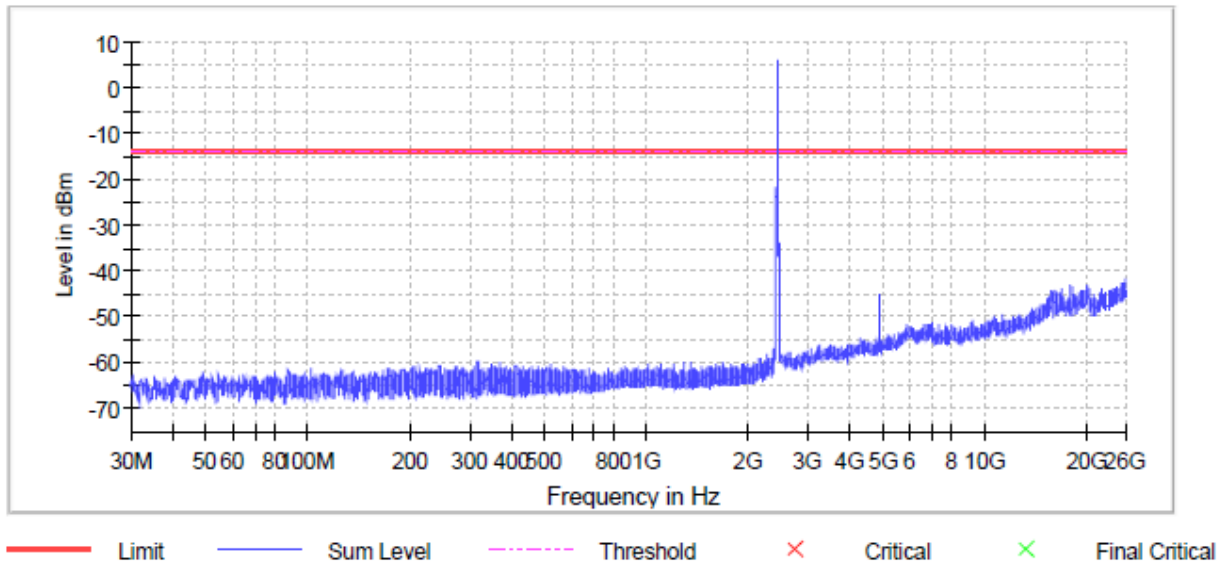


Figure 91: Conducted spurious emissions 30 - 26500 MHz MID channel

Table 72: Pre measurements, conducted spurious emissions MID channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
25877.644535	-41.4	27.4	-14.0
25818.120254	-42.0	28.0	-14.0
25750.512429	-42.3	28.3	-14.0
25885.728079	-42.4	28.3	-14.0
25847.514960	-42.4	28.4	-14.0
25883.523476	-42.4	28.4	-14.0
25442.602880	-42.5	28.5	-14.0
25898.955697	-42.5	28.5	-14.0
25854.128769	-42.5	28.5	-14.0
25741.694017	-42.6	28.6	-14.0
20161.843872	-42.7	28.7	-14.0
25876.909667	-42.8	28.8	-14.0
25926.145800	-42.8	28.8	-14.0
25959.949713	-42.9	28.9	-14.0
25931.289874	-42.9	28.9	-14.0

Table 73: Final measurements, conducted spurious emissions MID channel

No final measurements were made; no emissions near the limit.

Conducted spurious emissions results HIGH channel, RF I/O port 1_802.11n_14.4Mbps (MCS1)

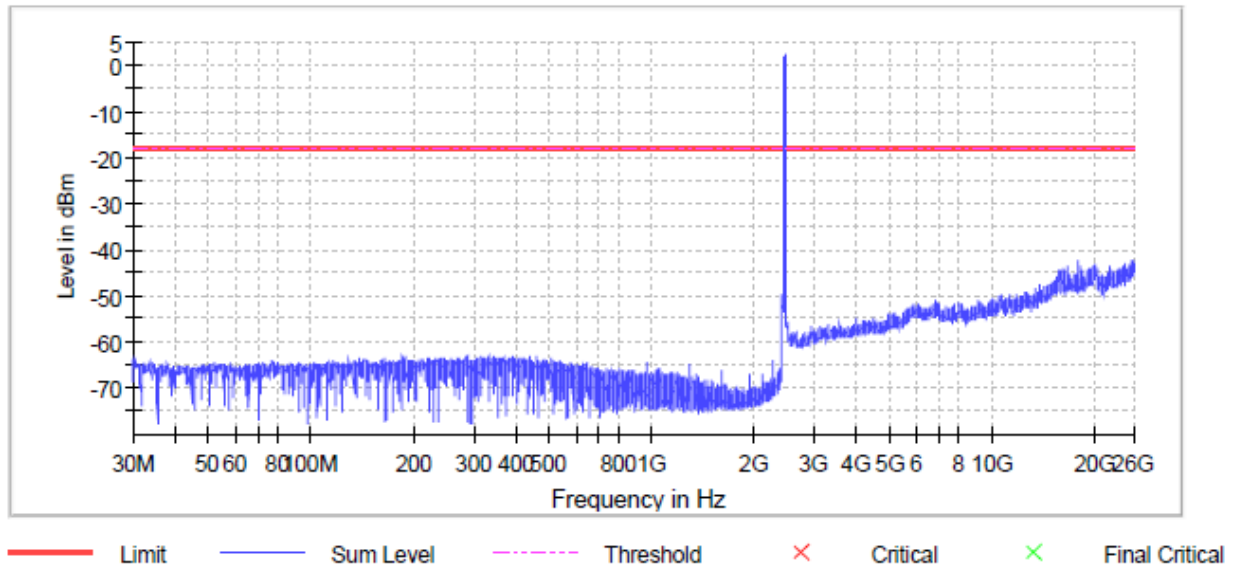


Figure 92: Conducted spurious emissions 30 - 26500 MHz HIGH channel

Table 74: Pre measurements, conducted spurious emissions HIGH channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
25716.708517	-42.1	24.3	-17.8
25955.540507	-42.2	24.4	-17.8
25854.128769	-42.3	24.5	-17.8
25904.099770	-42.3	24.5	-17.8
25893.076755	-42.4	24.6	-17.8
25935.699080	-42.4	24.6	-17.8
25860.742578	-42.4	24.6	-17.8
17835.987727	-42.5	24.7	-17.8
25873.970196	-42.5	24.7	-17.8
25875.439932	-42.5	24.7	-17.8
25915.122785	-42.8	25.0	-17.8
25937.168815	-42.8	25.0	-17.8
25831.347872	-42.8	25.0	-17.8
25888.667549	-42.9	25.0	-17.8
25729.936135	-42.9	25.1	-17.8

Table 75: Final measurements, conducted spurious emissions HIGH channel

No final measurements were made; no emissions near the limit.

Transmitter Band Edge Measurement and Conducted Spurious Emissions

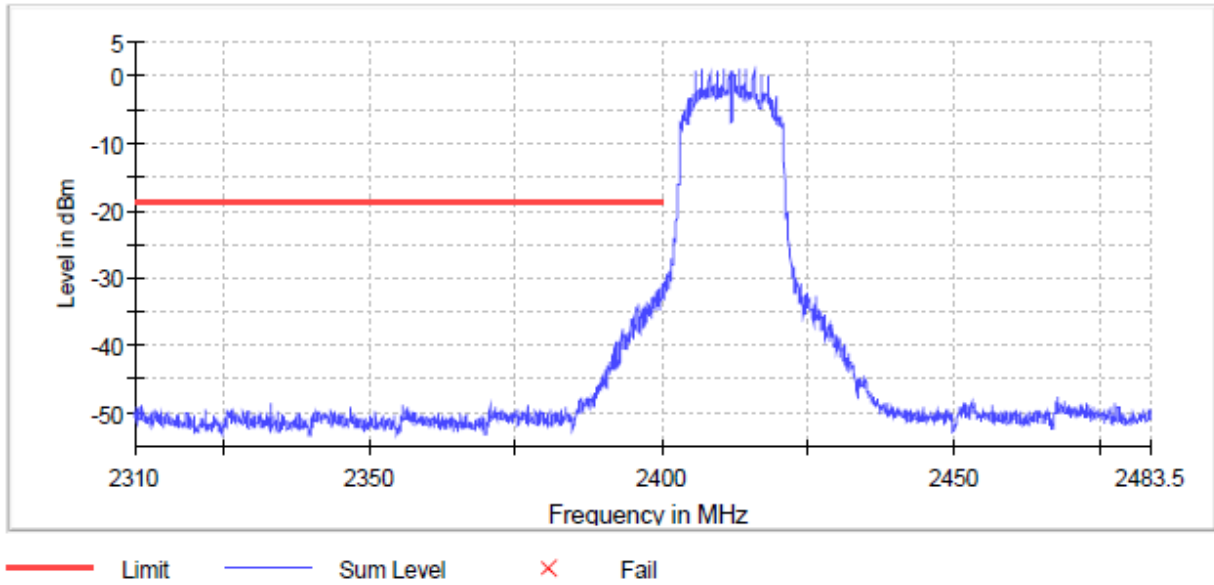


Figure 93: Lower Band Edge, RF I/O port 2_802.11n_14.4Mbps (MCS1)

Table 76: Lower band edge results, RF I/O port 2_802.11n_14.4Mbps (MCS1)

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.825000	-31.3	12.5	-18.8	PASS
2399.475000	-31.7	12.9	-18.8	PASS
2399.875000	-31.8	12.9	-18.8	PASS
2399.775000	-31.8	13.0	-18.8	PASS
2399.425000	-32.0	13.1	-18.8	PASS
2399.525000	-32.0	13.2	-18.8	PASS
2399.125000	-32.1	13.2	-18.8	PASS
2399.175000	-32.3	13.4	-18.8	PASS
2398.525000	-32.6	13.7	-18.8	PASS
2398.875000	-32.7	13.8	-18.8	PASS
2399.975000	-32.8	14.0	-18.8	PASS
2398.275000	-32.9	14.0	-18.8	PASS
2399.575000	-32.9	14.1	-18.8	PASS
2398.825000	-32.9	14.1	-18.8	PASS
2398.575000	-33.0	14.1	-18.8	PASS

Transmitter Band Edge Measurement and Conducted Spurious Emissions

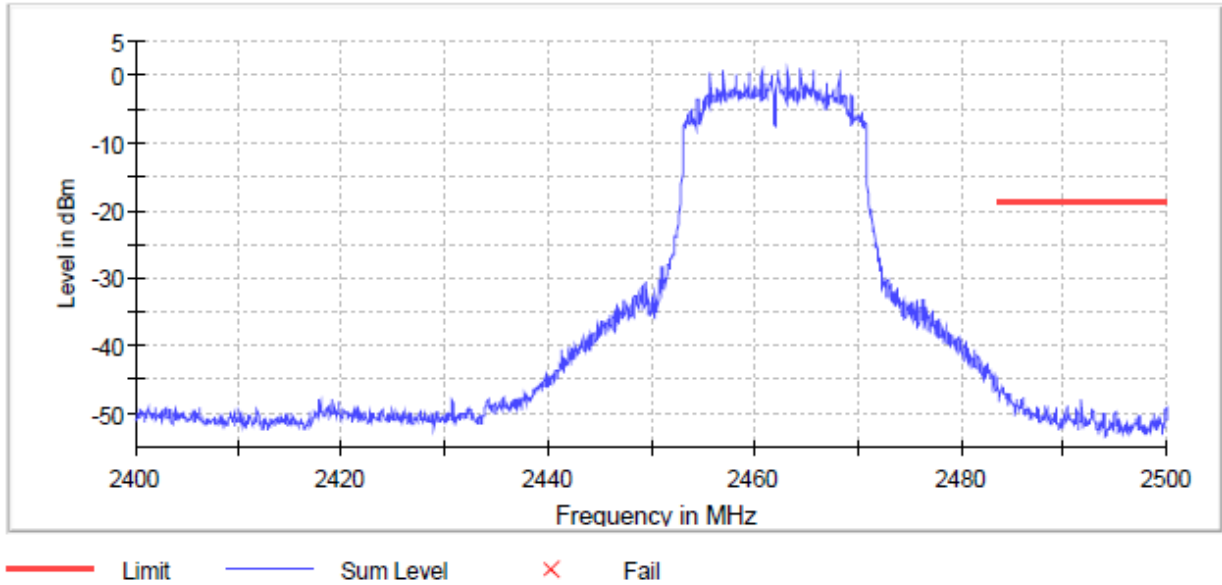


Figure 94: Upper Band Edge, RF I/O port 2_802.11n_14.4Mbps (MCS1)

Table 77: Upper band edge results, RF I/O port 2_802.11n_14.4Mbps (MCS1)

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.525000	-45.8	26.8	-19.0	PASS
2483.575000	-46.0	27.0	-19.0	PASS
2484.125000	-46.1	27.1	-19.0	PASS
2483.975000	-46.3	27.3	-19.0	PASS
2483.875000	-46.4	27.4	-19.0	PASS
2484.175000	-46.4	27.4	-19.0	PASS
2483.925000	-46.5	27.5	-19.0	PASS
2484.025000	-46.8	27.8	-19.0	PASS
2484.075000	-46.8	27.8	-19.0	PASS
2483.625000	-46.9	27.9	-19.0	PASS
2484.775000	-46.9	27.9	-19.0	PASS
2483.675000	-46.9	27.9	-19.0	PASS
2484.325000	-47.0	28.0	-19.0	PASS
2484.275000	-47.0	28.0	-19.0	PASS
2484.225000	-47.1	28.1	-19.0	PASS

Conducted spurious emissions results LOW channel, RF I/O port 2_802.11n_14.4Mbps (MCS1)

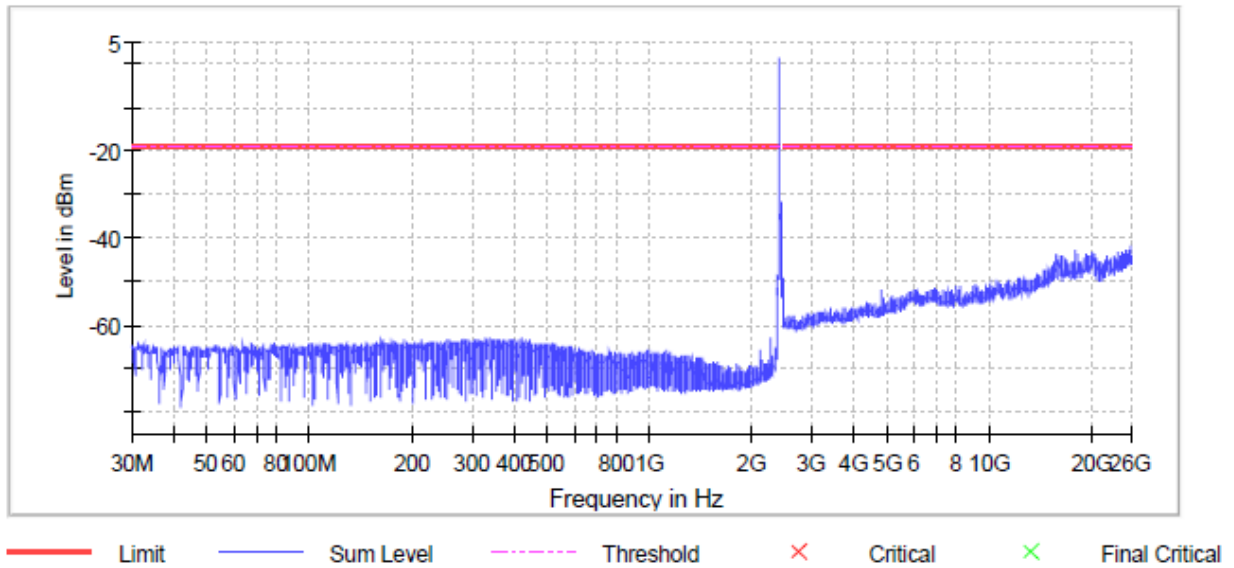


Figure 95: Conducted spurious emissions 30 - 26500 MHz LOW channel

Table 78: Pre measurements, conducted spurious emissions LOW channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2399.444549	-31.5	12.7	-18.9
2399.148308	-31.9	13.0	-18.9
2399.518609	-32.0	13.1	-18.9
2399.222368	-32.3	13.4	-18.9
2399.814850	-32.9	14.0	-18.9
2399.888910	-33.0	14.1	-18.9
2399.740789	-33.4	14.5	-18.9
2398.852067	-33.5	14.6	-18.9
2397.667104	-33.5	14.6	-18.9
2397.889285	-33.6	14.7	-18.9
2398.111465	-33.8	14.9	-18.9
2398.037405	-33.8	15.0	-18.9
2398.629887	-34.1	15.2	-18.9
2399.296428	-34.1	15.3	-18.9
2398.926127	-34.2	15.3	-18.9

Table 79: Final measurements, conducted spurious emissions LOW channel

No final measurements were made; no emissions near the limit.

Conducted spurious emissions results MID channel, RF I/O port 2_802.11n_14.4Mbps (MCS1)

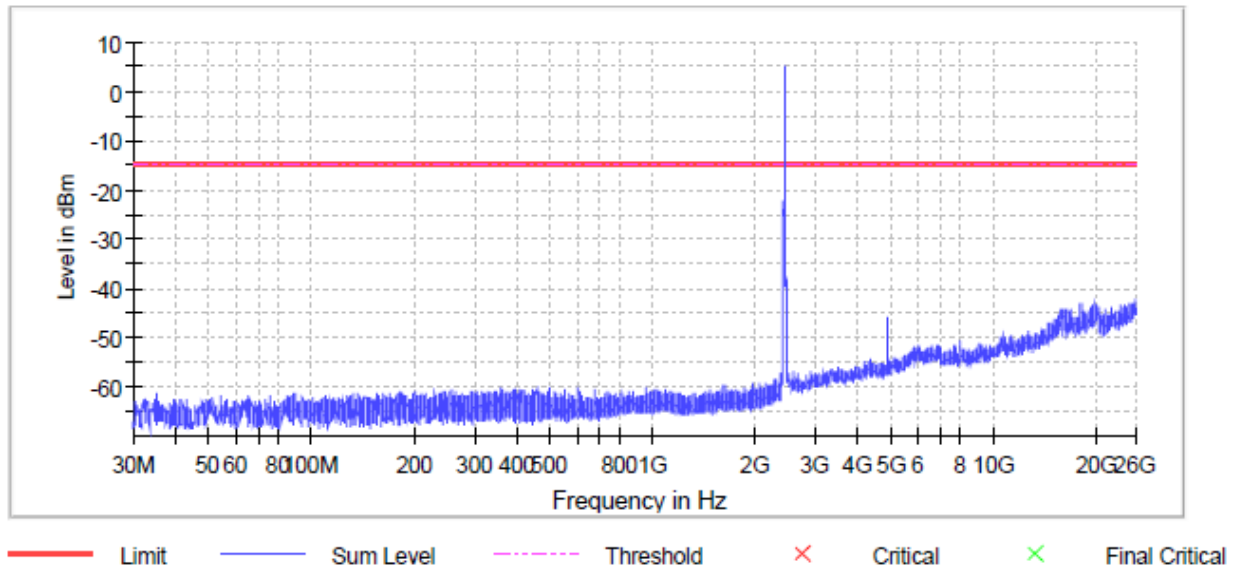


Figure 96: Conducted spurious emissions 30 - 26500 MHz MID channel

Table 80: Pre measurements, conducted spurious emissions MID channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
25878.379402	-42.3	27.4	-14.9
25891.607020	-42.4	27.5	-14.9
25977.586536	-42.5	27.6	-14.9
25874.705064	-42.6	27.7	-14.9
25861.477446	-42.6	27.7	-14.9
25898.220829	-42.7	27.7	-14.9
25896.751094	-42.7	27.8	-14.9
25892.341888	-42.7	27.8	-14.9
25890.137285	-42.7	27.8	-14.9
25918.797124	-42.7	27.8	-14.9
25970.237860	-42.8	27.9	-14.9
25936.433947	-42.8	27.9	-14.9
25859.272843	-42.8	27.9	-14.9
25466.118645	-42.9	28.0	-14.9
25901.160300	-42.9	28.0	-14.9

Table 81: Final measurements, conducted spurious emissions MID channel

No final measurements were made; no emissions near the limit.

Conducted spurious emissions results HIGH channel, RF I/O port 2_802.11n_14.4Mbps (MCS1)

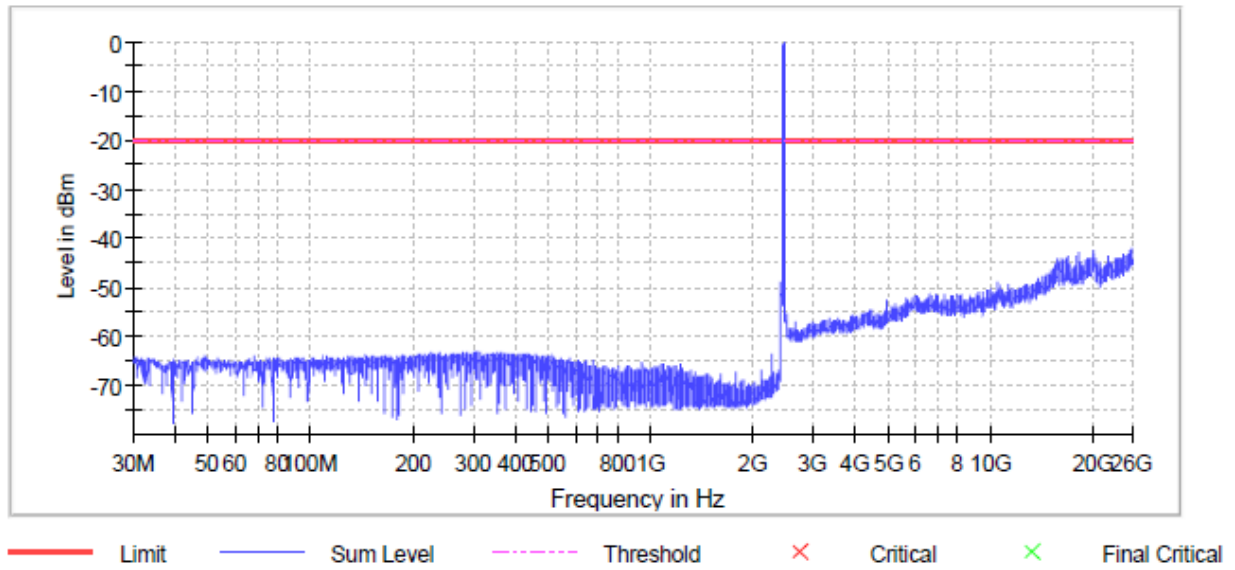


Figure 97: Conducted spurious emissions 30 - 26500 MHz HIGH channel

Table 82: Pre measurements, conducted spurious emissions HIGH channel

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
25830.613004	-42.0	22.0	-20.0
25856.333372	-42.3	22.3	-20.0
25867.356387	-42.4	22.4	-20.0
25899.690564	-42.5	22.4	-20.0
25706.420370	-42.5	22.4	-20.0
20133.184033	-42.5	22.5	-20.0
25928.350403	-42.6	22.6	-20.0
25874.705064	-42.6	22.6	-20.0
25837.226813	-42.6	22.6	-20.0
25793.134754	-42.6	22.6	-20.0
25796.809092	-42.7	22.6	-20.0
25927.615535	-42.7	22.7	-20.0
25882.053741	-42.7	22.7	-20.0
18162.268968	-42.8	22.8	-20.0
25904.834638	-42.8	22.8	-20.0

Table 83: Final measurements, conducted spurious emissions HIGH channel

No final measurements were made; no emissions near the limit.

Transmitter Band Edge Measurement and Conducted Spurious Emissions
Table 84: Measurement settings, band edge Low

Setting	Instrument Value	Target Value
Span	90.000 MHz	90.000 MHz
Start Frequency	2.31000 GHz	2.31000 GHz
Stop Frequency	2.40000 GHz	2.40000 GHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1800	~ 1800
Sweeptime	113.672 µs	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	36 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.23 dB	0.50 dB

Table 85: Measurement settings, band edge High

Setting	Instrument Value	Target Value
Span	83.500 MHz	83.500 MHz
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.48350 GHz	2.48350 GHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	94.727 µs	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	32 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.42 dB	0.50 dB

Table 86: Measurement settings, spurious emissions

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	32100	~ 47400
Sweeptime	32.100 ms	AUTO
Reference Level	-10.000 dBm	-30.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	1.00 dB	1.00 dB
Run	13 / max. 40	max. 40
Stable	1 / 1	1
Max Stable Difference	0.76 dB	1.00 dB

6 dB Bandwidth of the Channel

Standard: ANSI C63.10 (2013)
Tested by: JAT
Date: 8 - 12 August 2019
Temperature: 23 ± 3 °C
Humidity: 20 - 60 % RH

FCC Rule: 15.247(a)(2)
RSS-247 5.2(a)

Results:

Table 87: 6 dB bandwidth test results

Test mode	Channel	6 dB BW [MHz]	Minimum limit [kHz]	Result
RF I/O port 1_802.11b_1Mbps	Low 1	8.150	500	PASS
	Mid 6	8.100		PASS
	High 11	8.150		PASS
RF I/O port 2_802.11b_1Mbps	Low 1	8.150		PASS
	Mid 6	7.650		PASS
	High 11	7.150		PASS
RF I/O port 1_802.11g_9Mbps	Low 1	15.150		PASS
	Mid 6	15.150		PASS
	High 11	15.150		PASS
RF I/O port 2_802.11g_9Mbps	Low 1	15.150		PASS
	Mid 6	15.150		PASS
	High 11	15.150		PASS
RF I/O port 1_802.11n_14.4Mbps (MCS1)	Low 1	15.150		PASS
	Mid 6	15.150		PASS
	High 11	15.150		PASS
RF I/O port 2_802.11n_14.4Mbps (MCS1)	Low 1	15.150	PASS	
	Mid 6	15.150	PASS	
	High 11	15.150	PASS	

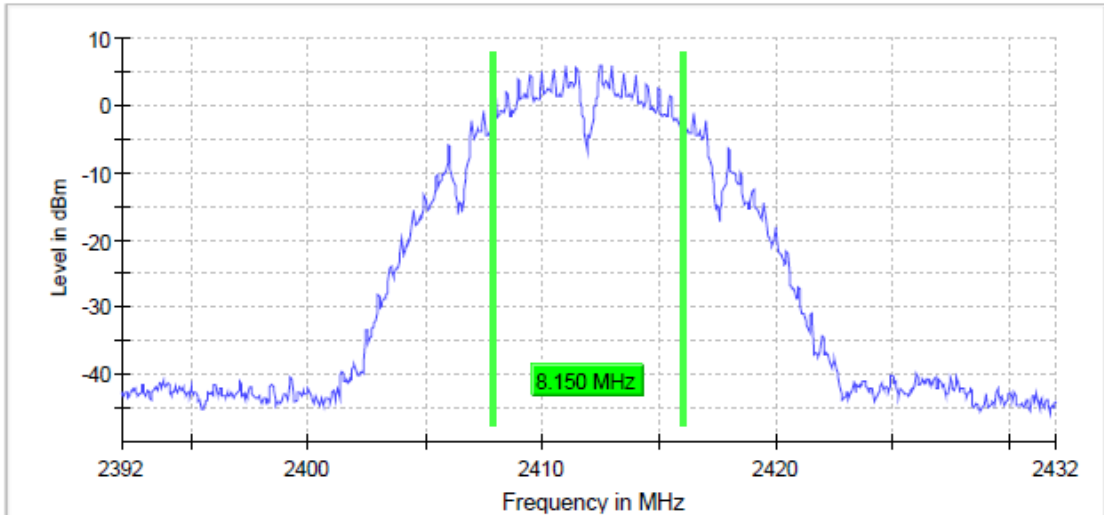


Figure 98: 6 dB bandwidth, RF I/O port 1_802.11b_1Mbps_Channel 1

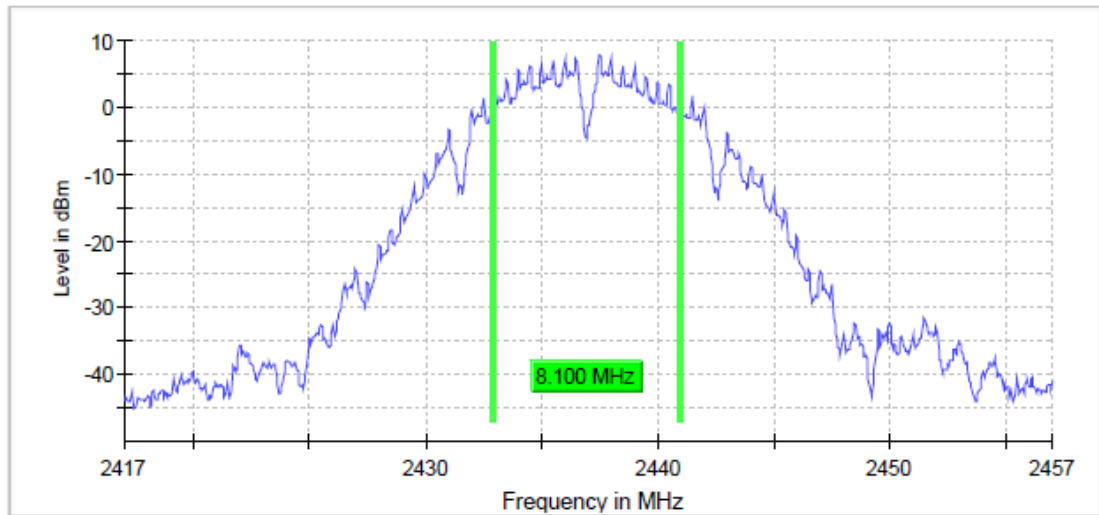


Figure 99: 6 dB bandwidth, RF I/O port 1_802.11b_1Mbps_Channel 6

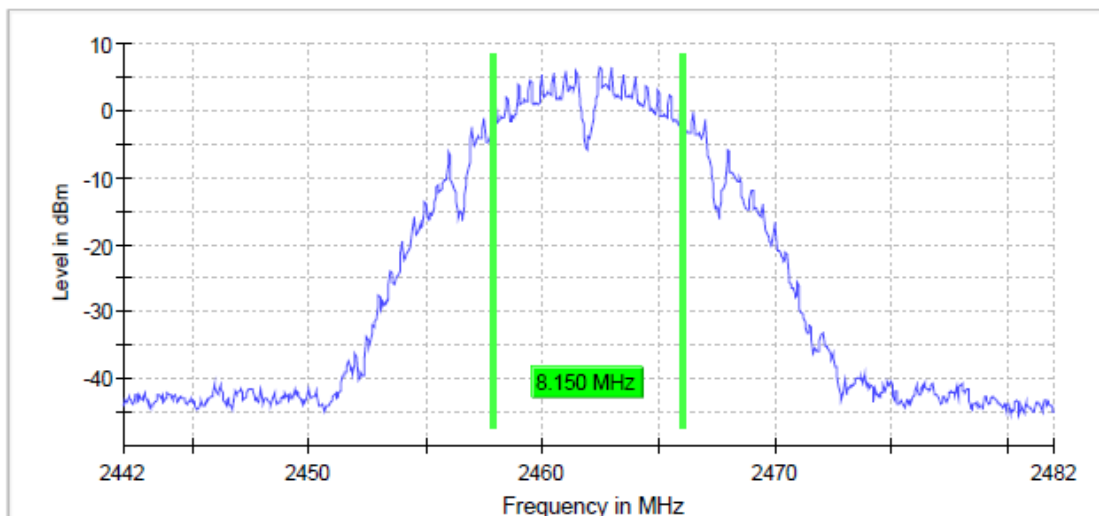


Figure 100: 6 dB bandwidth, RF I/O port 1_802.11b_1Mbps_Channel 11

6 dB Bandwidth of the Channel

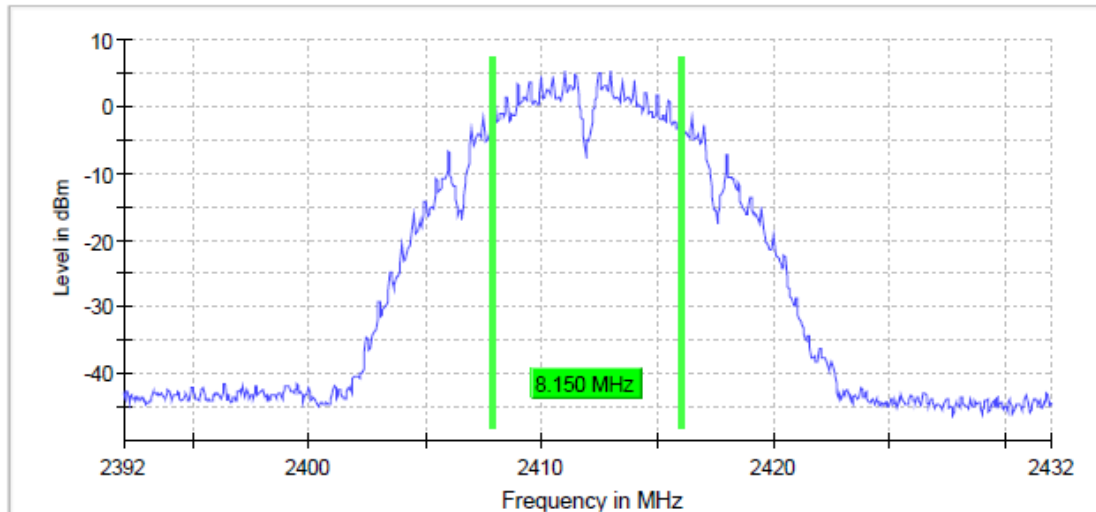


Figure 101: 6 dB bandwidth, RF I/O port 2_802.11b_1Mbps_Channel 1

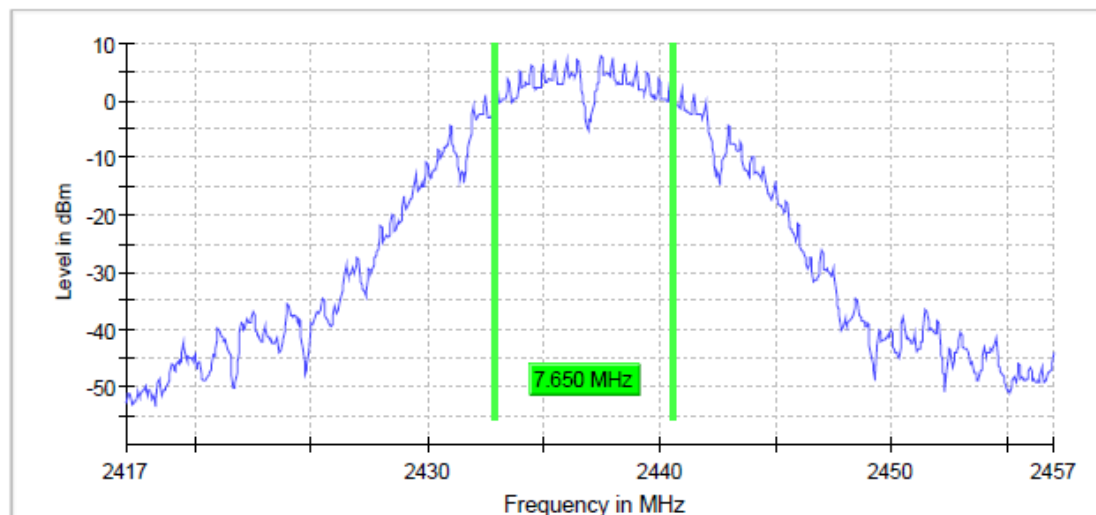


Figure 102: 6 dB bandwidth, RF I/O port 2_802.11b_1Mbps_Channel 6

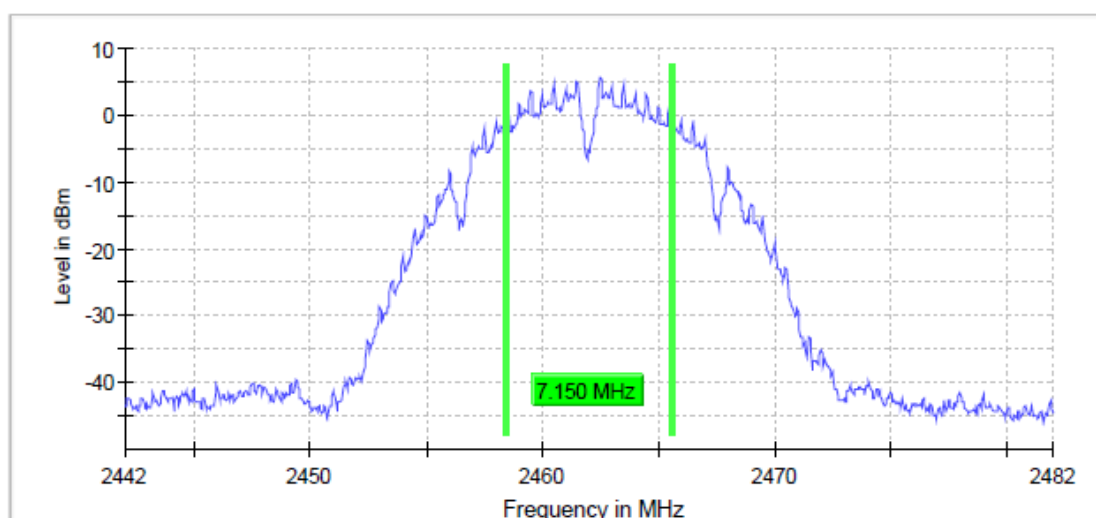


Figure 103: 6 dB bandwidth, RF I/O port _802.11b_1Mbps_Channel 11

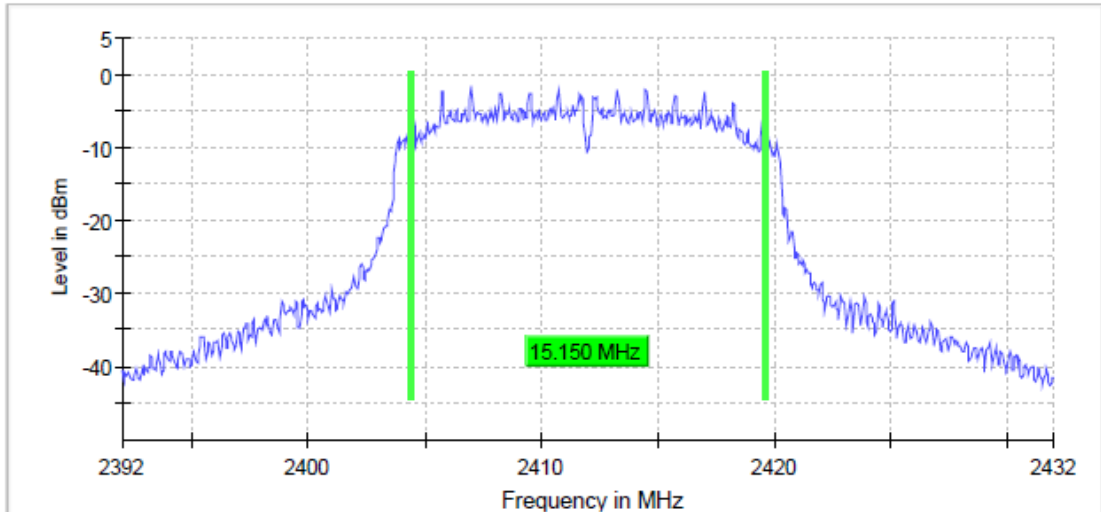


Figure 104: 6 dB bandwidth, RF I/O port 1_802.11g_9Mbps_Channel 1

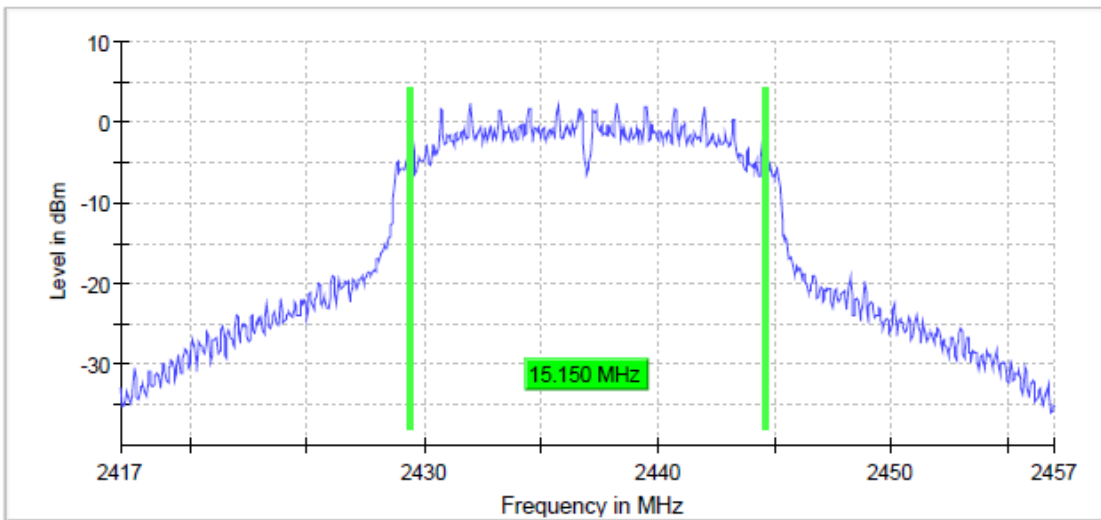


Figure 105: 6 dB bandwidth, RF I/O port 1_802.11g_9Mbps_Channel 6

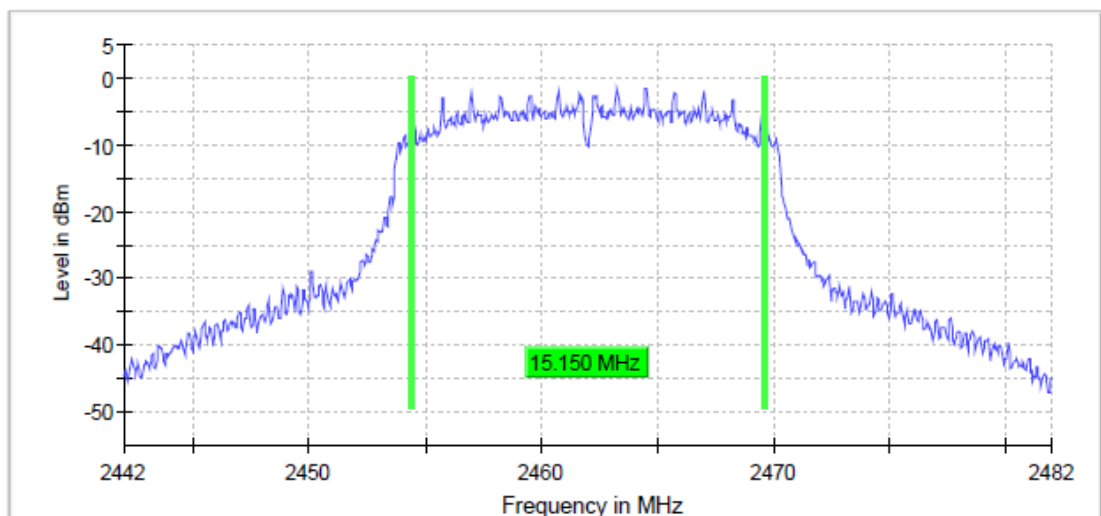


Figure 106: 6 dB bandwidth, RF I/O port 1_802.11g_9Mbps_Channel 11

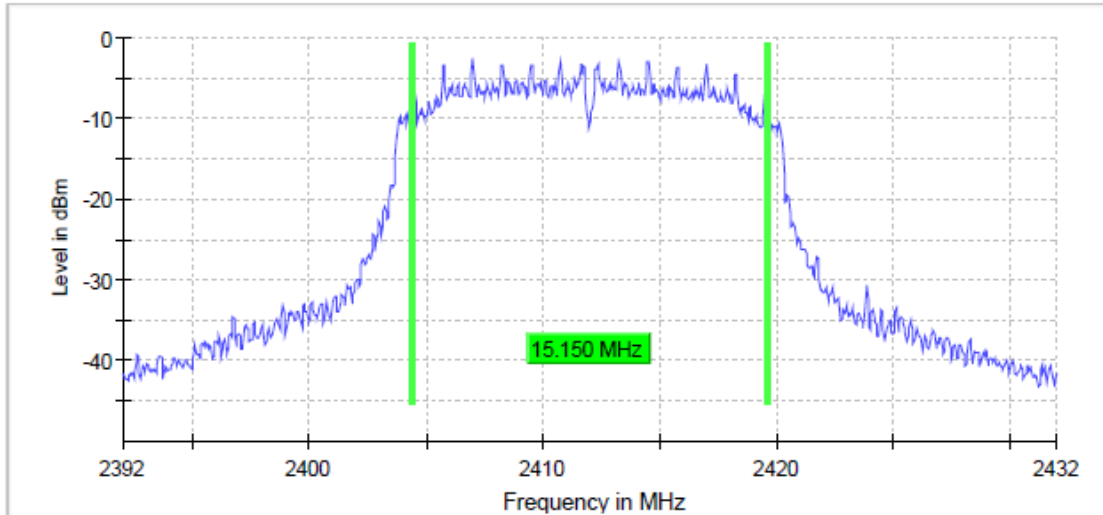


Figure 107: 6 dB bandwidth, RF I/O port 2_802.11g_9Mbps_Channel 1

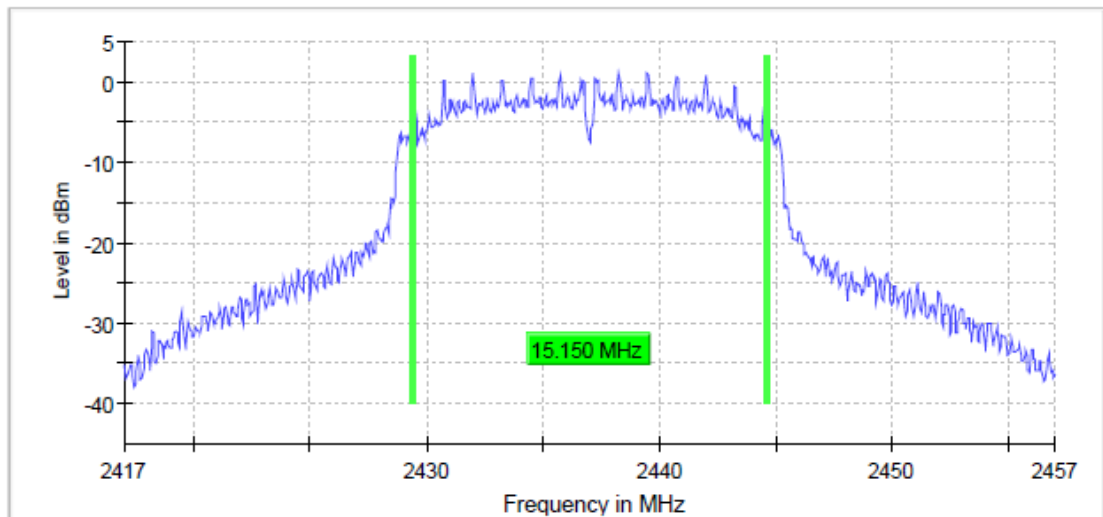


Figure 108: 6 dB bandwidth, RF I/O port 2_802.11g_9Mbps_Channel 6

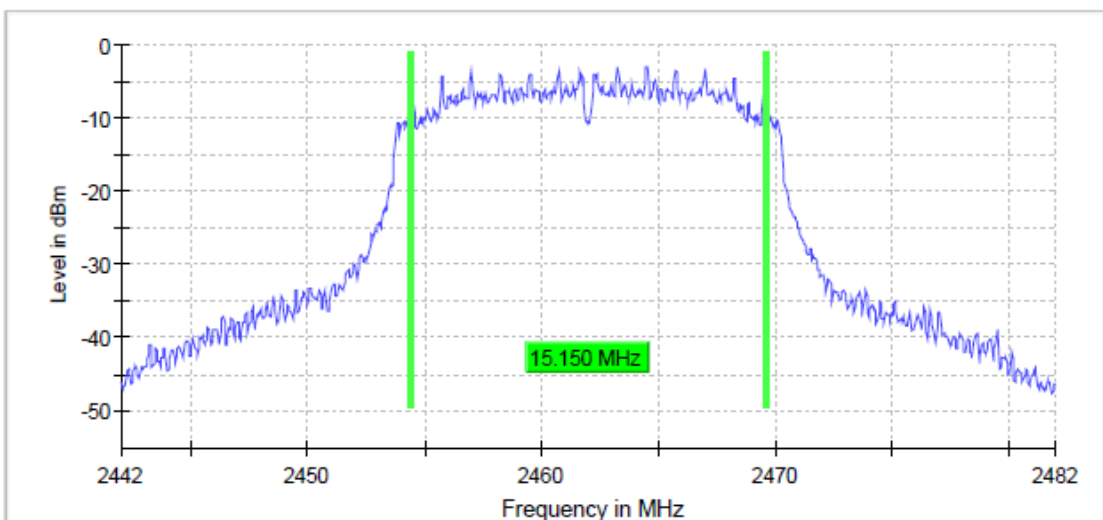


Figure 109: 6 dB bandwidth, RF I/O port 2_802.11g_9Mbps_Channel 11

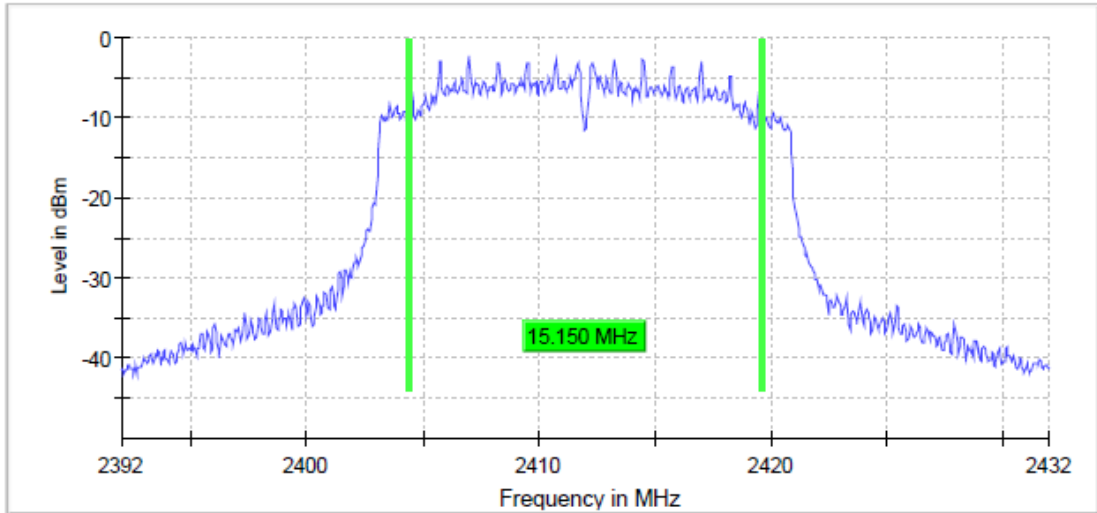


Figure 110: 6 dB bandwidth, RF I/O port 1_802.11n_14.4Mbps (MCS1)_Channel 1

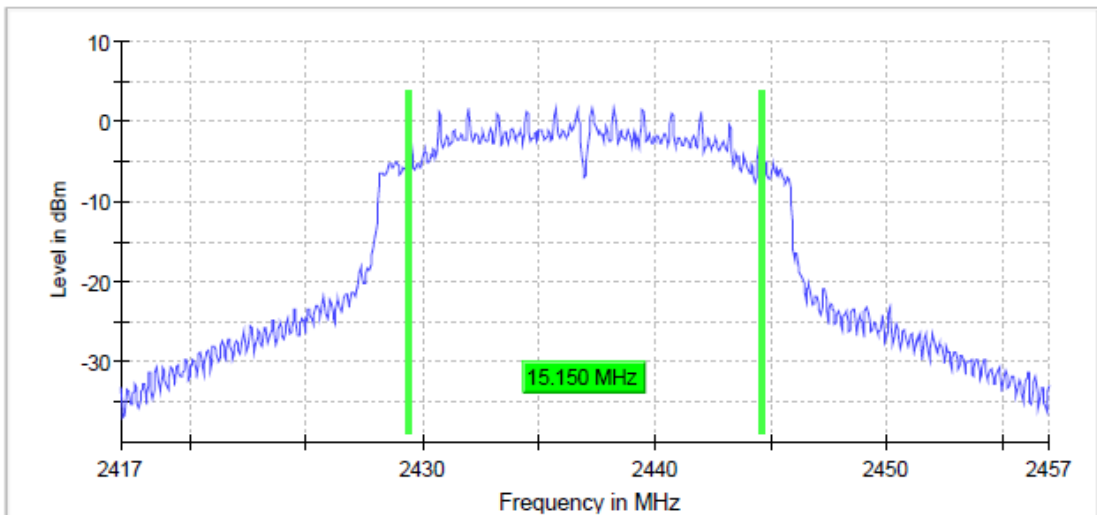


Figure 111: 6 dB bandwidth, RF I/O port 1_802.11n_14.4Mbps (MCS1)_Channel 6

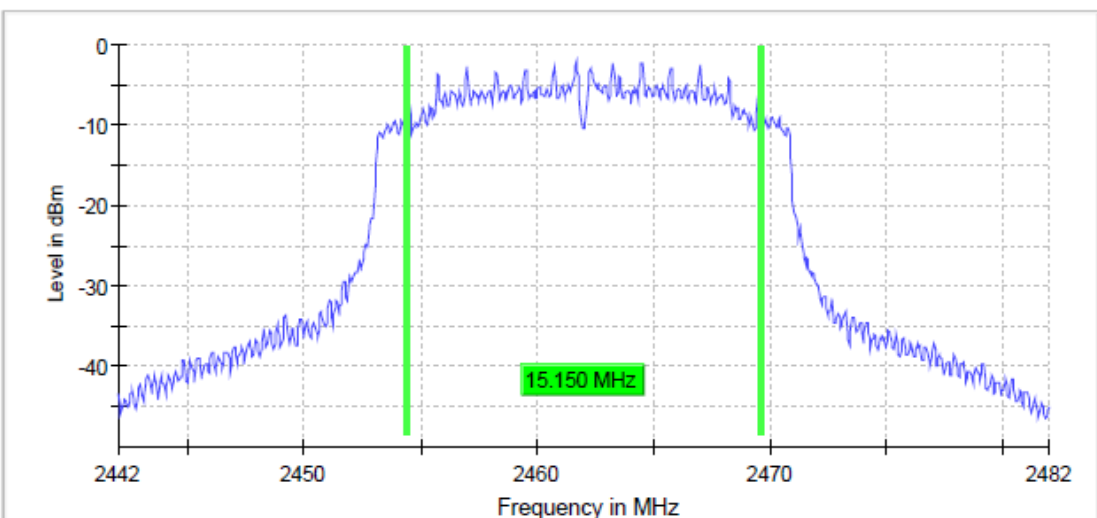


Figure 112: 6 dB bandwidth, RF I/O port 1_802.11n_14.4Mbps (MCS1)_Channel 11

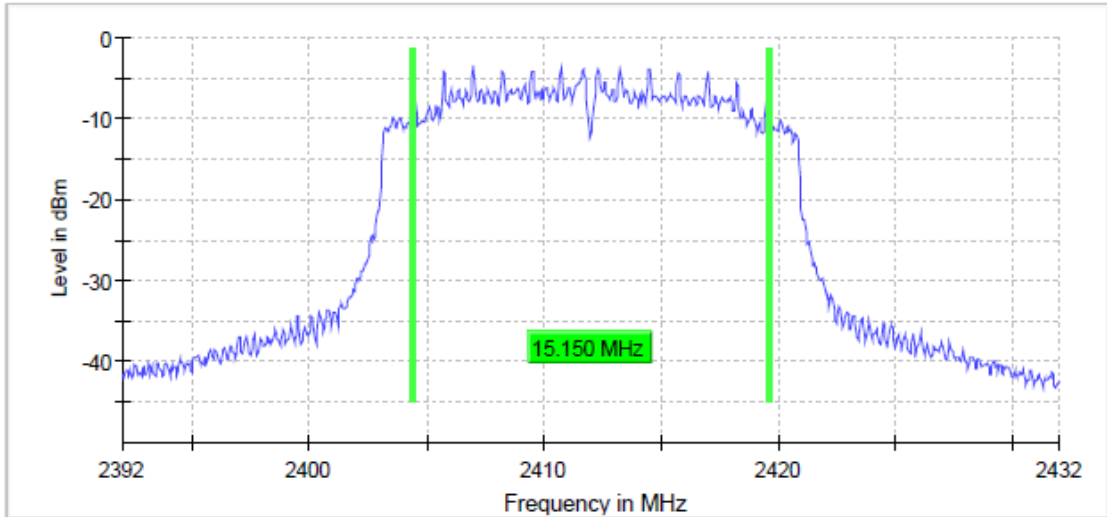


Figure 113: 6 dB bandwidth, RF I/O port 2_802.11n_14.4Mbps (MCS1)_Channel 1

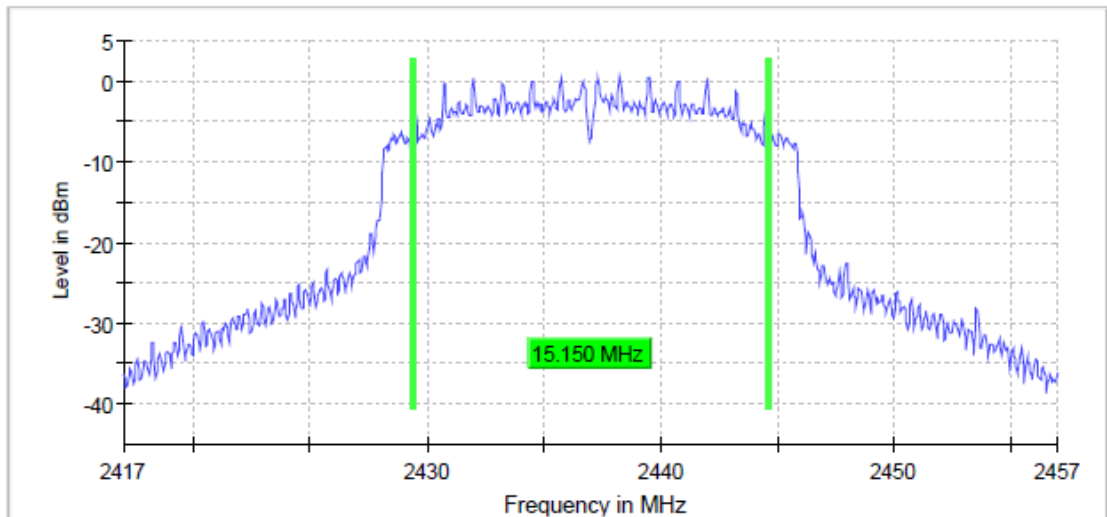


Figure 114: 6 dB bandwidth, RF I/O port 2_802.11n_14.4Mbps (MCS1)_Channel 6

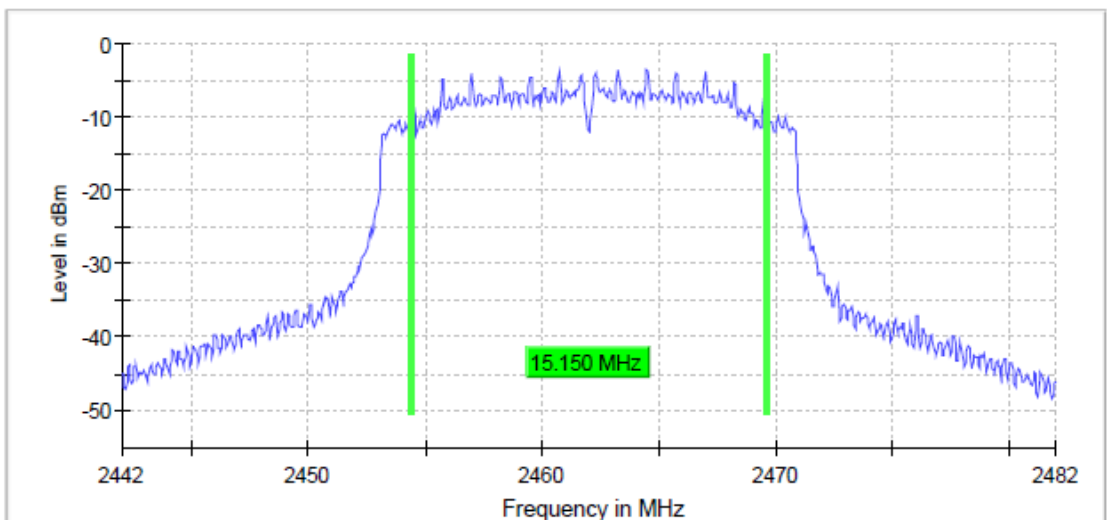


Figure 115: 6 dB bandwidth, RF I/O port 2_802.11n_14.4Mbps (MCS1)_Channel 11

Table 88: Measurement settings, 6 dB bandwidth

Setting	Instrument Value	Target Value
Span	40.000 MHz	40.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	800	~ 800
SweepTime	56.836 μ s	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	75 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.46 dB	0.50 dB

Power Spectral Density

Standard: ANSI C63.10 (2013)
Tested by: JAT
Date: 8 - 12 August 2019
Temperature: 23 ± 3 °C
Humidity: 20 - 60 % RH

FCC Rule: 15.247(e)
RSS-247 5.2(b)

Results:

Table 89: Power spectral density test results

Test mode	Channel	PSD dBm/3 kHz	Maximum limit [dBm/3kHz]	Result
RF I/O port 1_802.11b_1Mbps	Low 1	5.658	8	PASS
	Mid 6	7.538		PASS
	High 11	6.784		PASS
RF I/O port 2_802.11b_1Mbps	Low 1	5.282		PASS
	Mid 6	7.695		PASS
	High 11	5.765		PASS
RF I/O port 1_802.11g_9Mbps	Low 1	-1.582		PASS
	Mid 6	2.371		PASS
	High 11	-1.633		PASS
RF I/O port 2_802.11g_9Mbps	Low 1	-2.485		PASS
	Mid 6	1.127		PASS
	High 11	-2.966		PASS
RF I/O port 1_802.11n_14.4Mbps (MCS1)	Low 1	-2.241		PASS
	Mid 6	1.834		PASS
	High 11	-2.268		PASS
RF I/O port 2_802.11n_14.4Mbps (MCS1)	Low 1	-3.392	PASS	
	Mid 6	0.583	PASS	
	High 11	-3.435	PASS	

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2412.975000	5.658	8.0	PASS

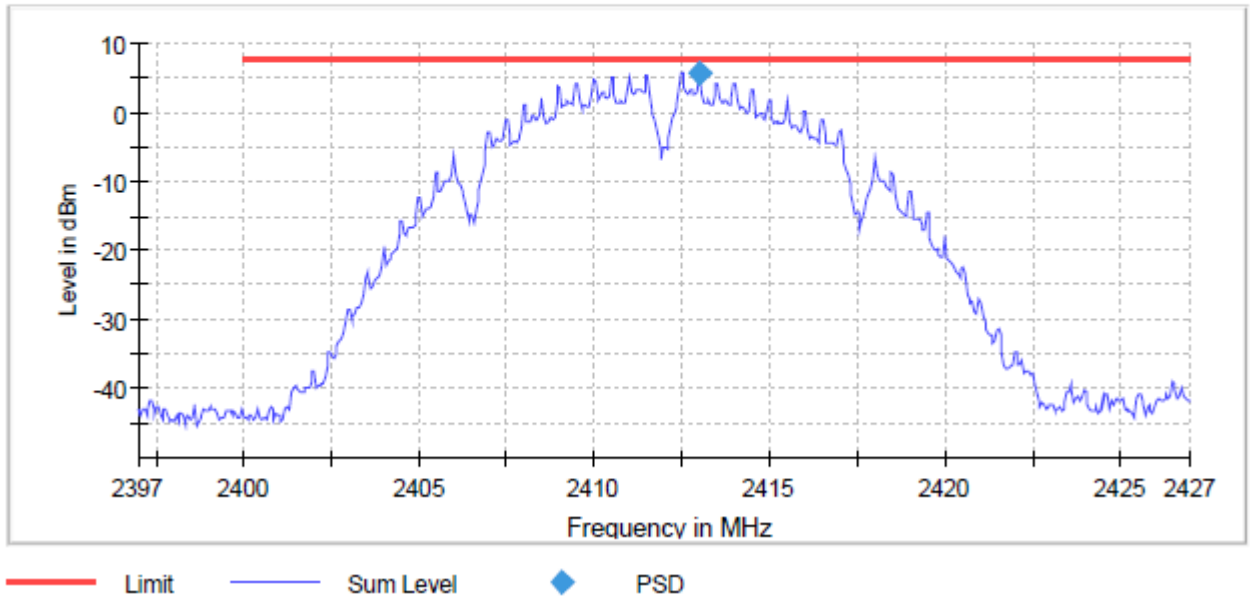


Figure 116: Power spectral density, RF I/O port 1_802.11b_1Mbps_Channel 1

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2435.975000	7.538	8.0	PASS

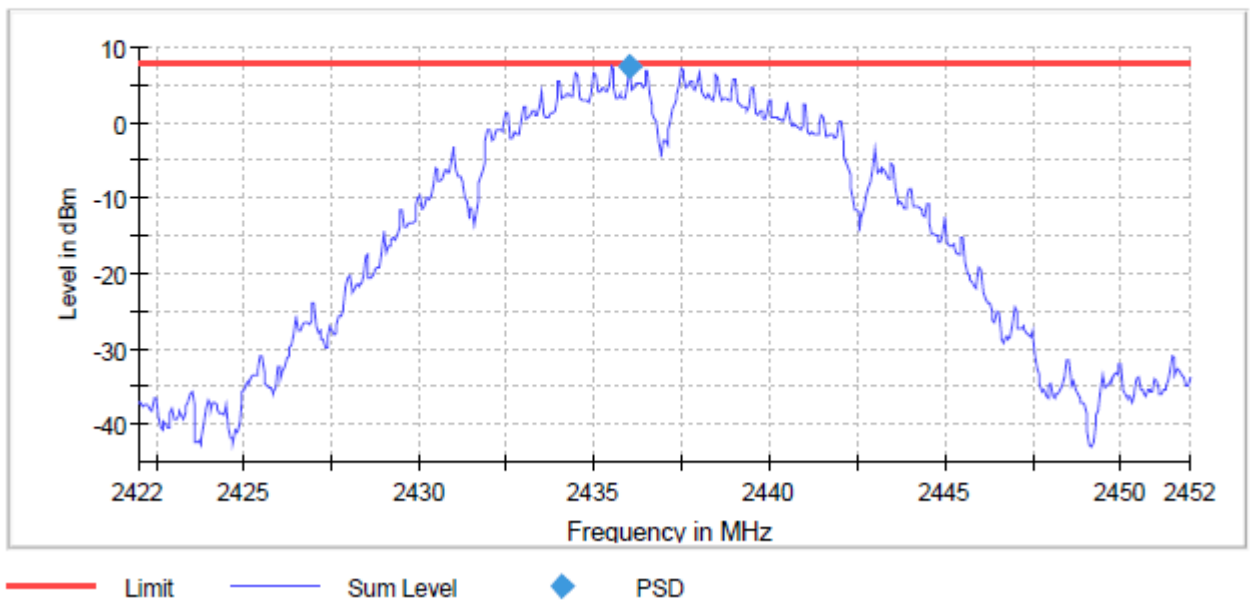


Figure 117: Power spectral density, RF I/O port 1_802.11b_1Mbps_Channel 6

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2462.000000	2462.525000	6.784	8.0	PASS

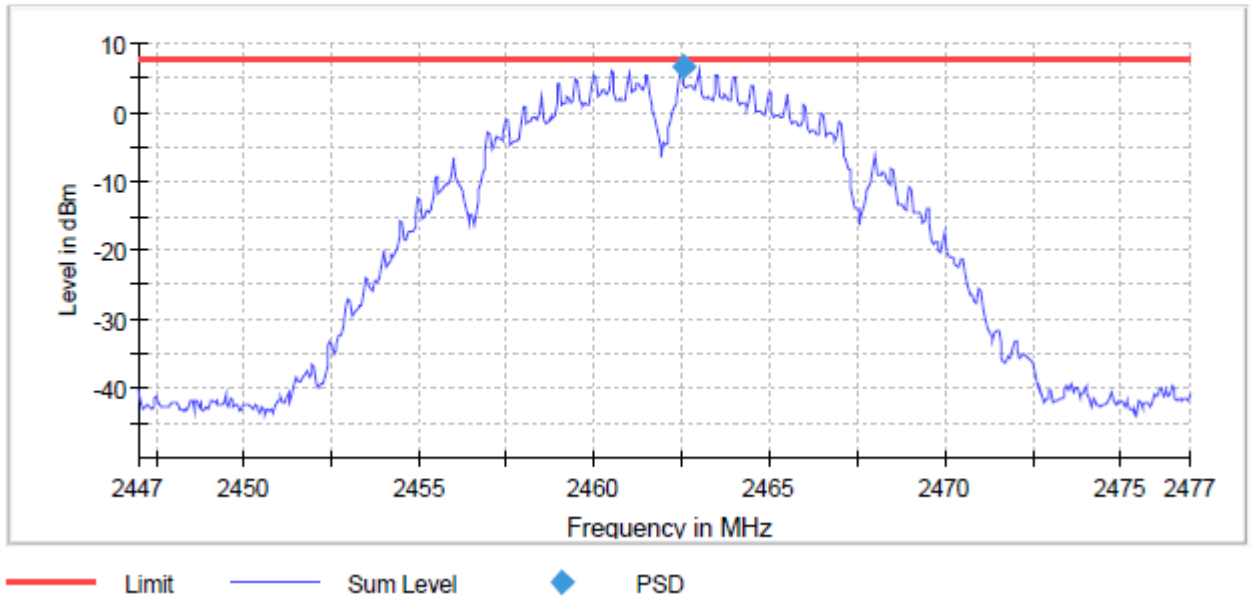


Figure 118: Power spectral density, RF I/O port 1_802.11b_1Mbps_Channel 11

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2411.475000	5.282	8.0	PASS

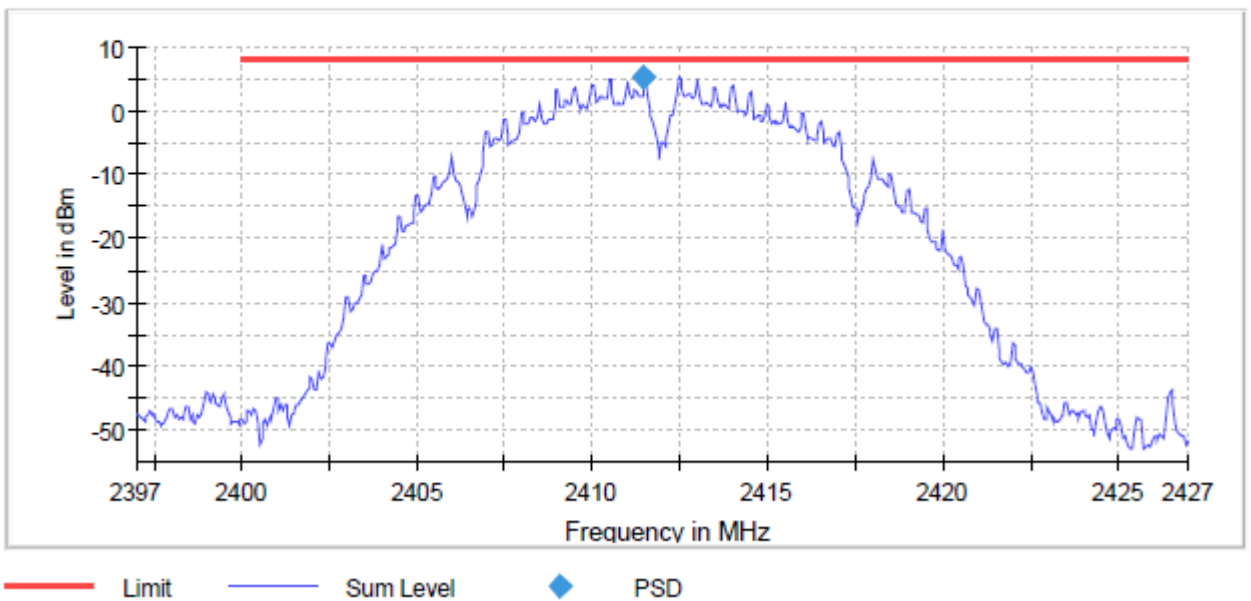


Figure 119: Power spectral density, RF I/O port 2_802.11b_1Mbps_Channel 1

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2437.525000	7.695	8.0	PASS

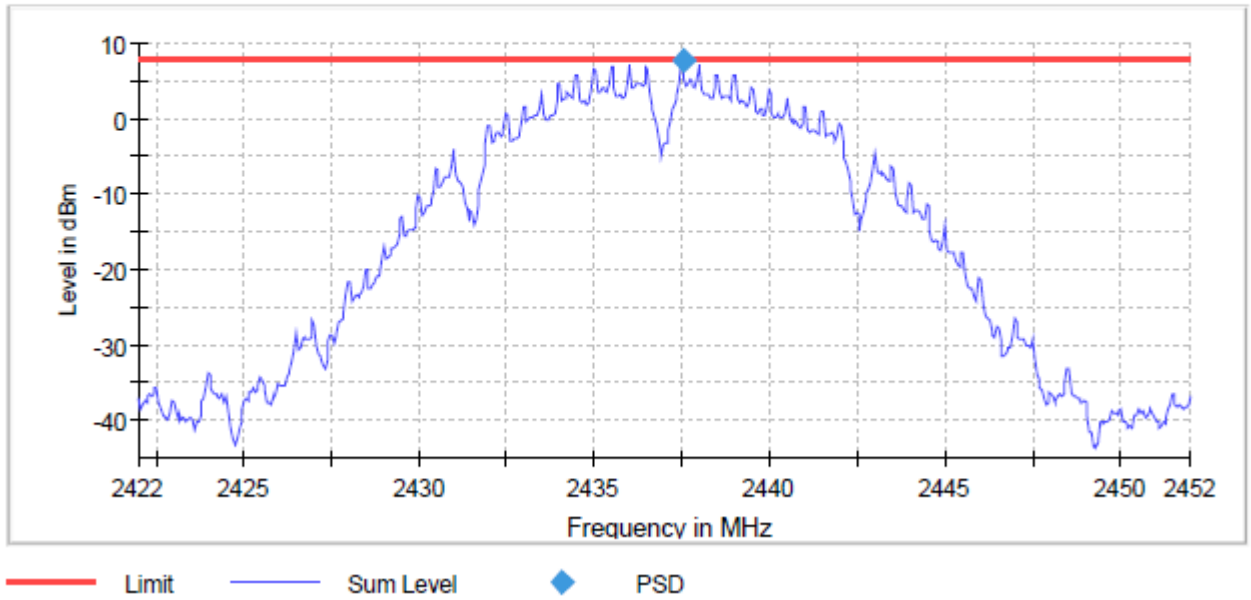


Figure 120: Power spectral density, RF I/O port 2_802.11b_1Mbps_Channel 6

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2462.000000	2462.525000	5.765	8.0	PASS

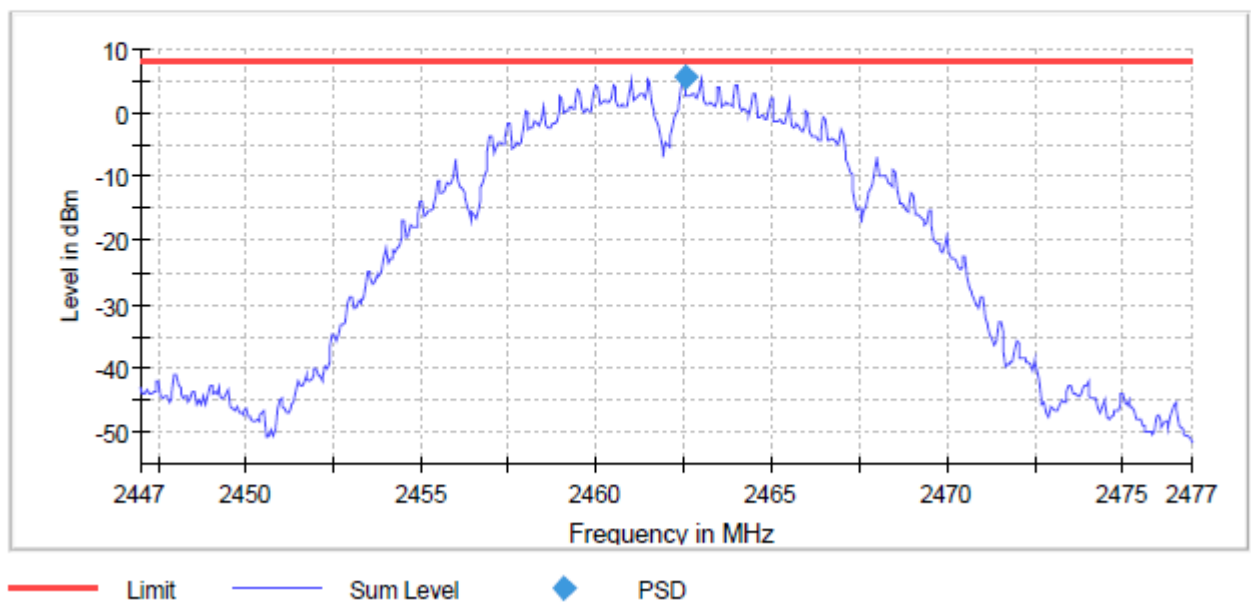


Figure 121: Power spectral density, RF I/O port 2_802.11b_1Mbps_Channel 11

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2407.025000	-1.582	8.0	PASS

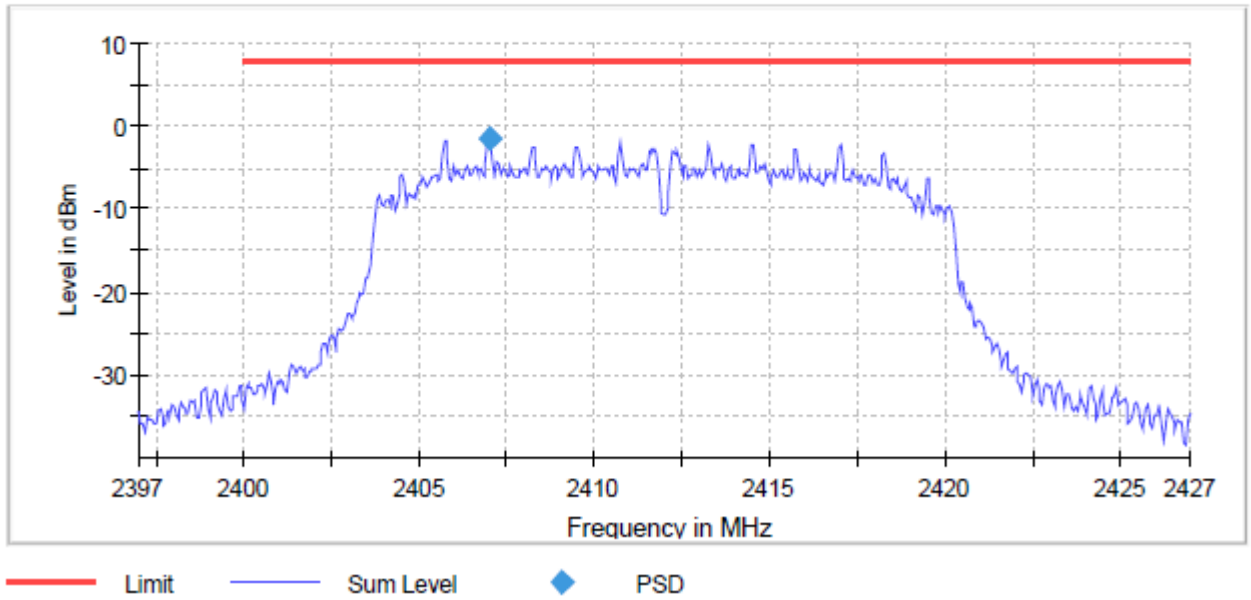


Figure 122: Power spectral density, RF I/O port 1_802.11g_9Mbps_Channel 1

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2432.025000	2.371	8.0	PASS

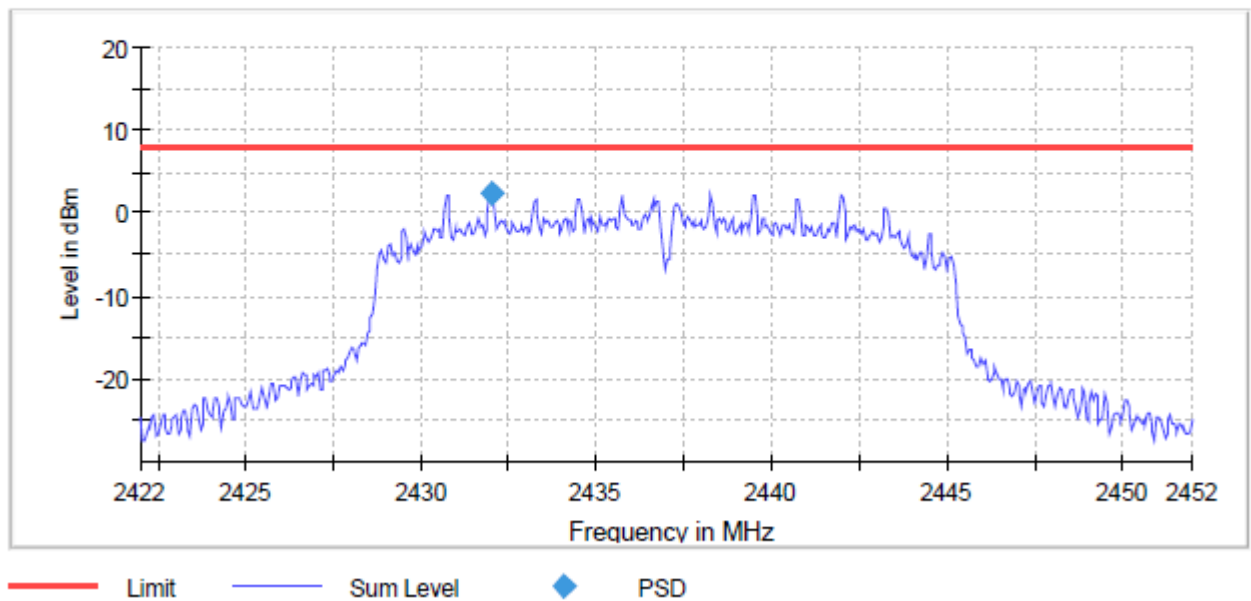


Figure 123: Power spectral density, RF I/O port 1_802.11g_9Mbps_Channel 6

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2462.000000	2464.525000	-1.633	8.0	PASS

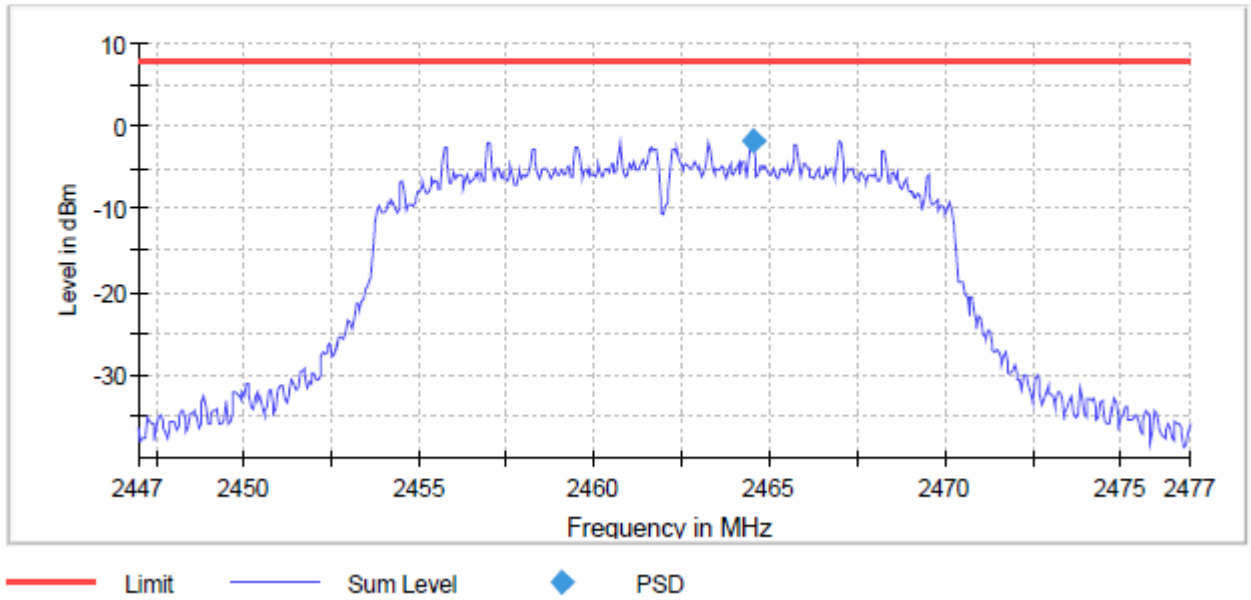


Figure 124: Power spectral density, RF I/O port 1_802.11g_9Mbps_Channel 11

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2407.025000	-2.485	8.0	PASS

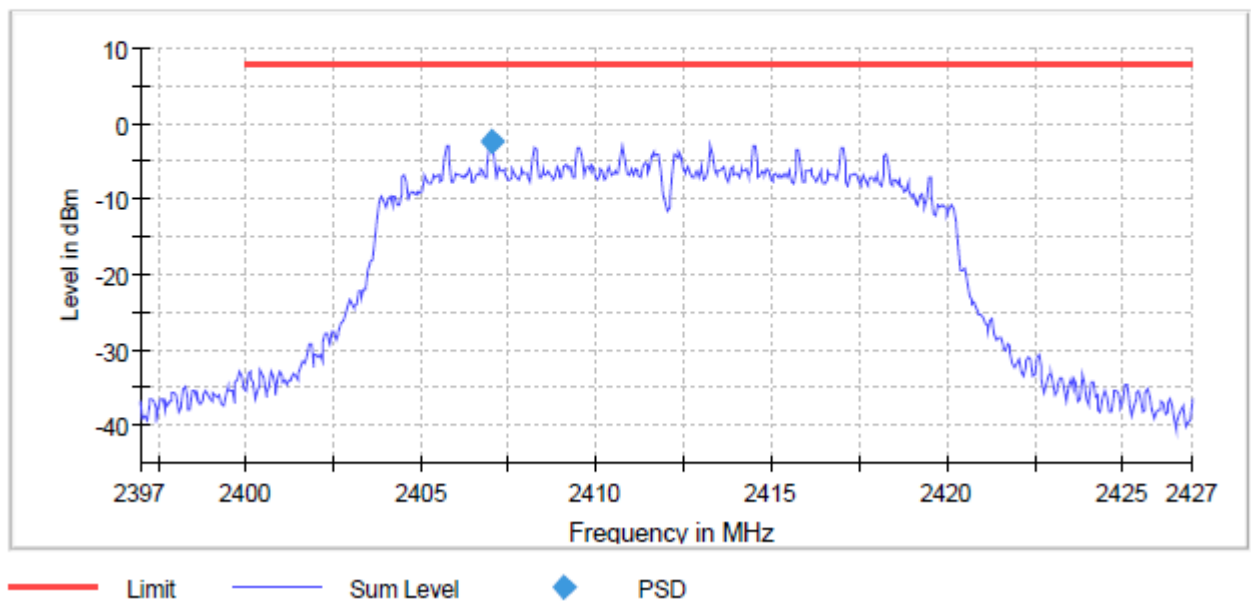


Figure 125: Power spectral density, RF I/O port 2_802.11g_9Mbps_Channel 1

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2438.275000	1.127	8.0	PASS

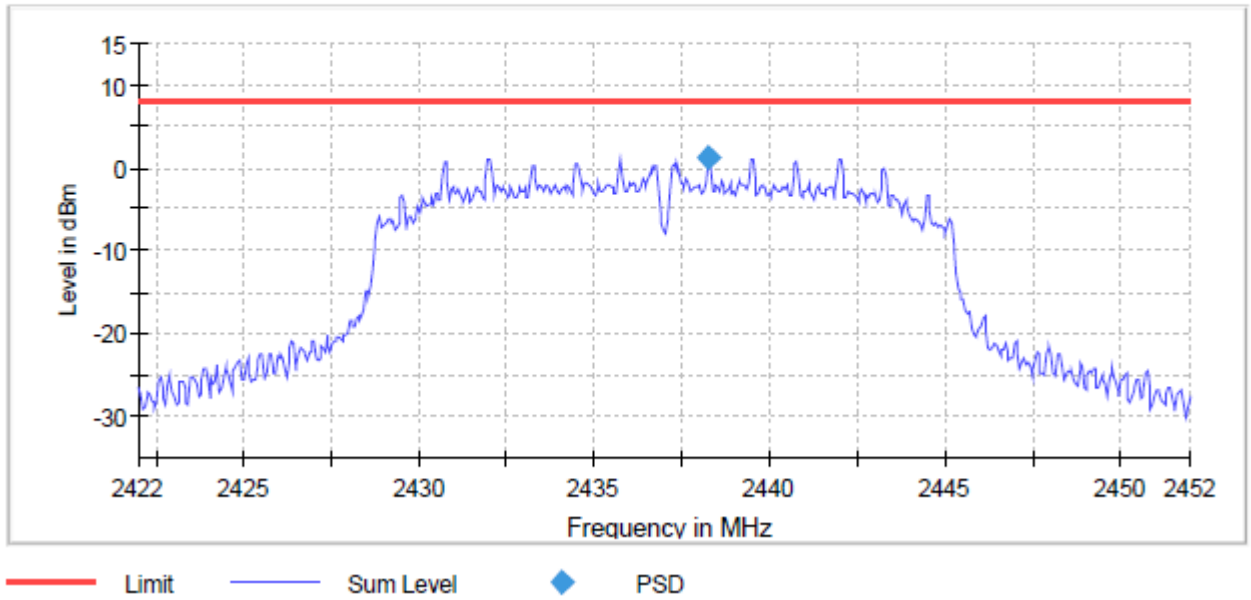


Figure 126: Power spectral density, RF I/O port 2_802.11g_9Mbps_Channel 6

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2462.000000	2464.525000	-2.966	8.0	PASS

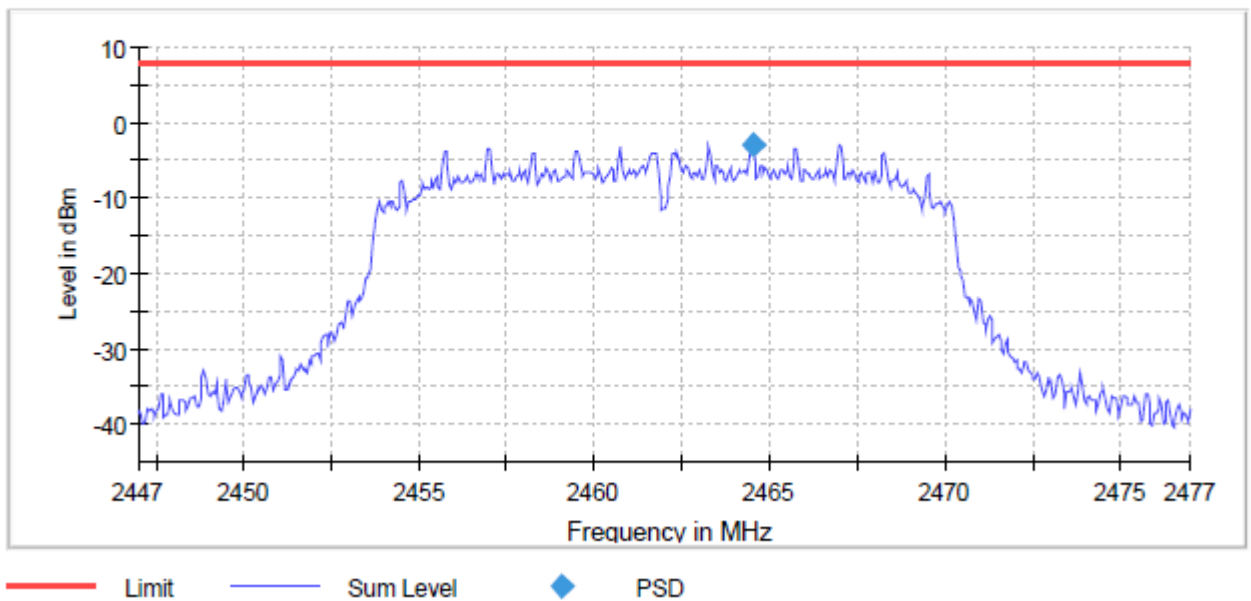


Figure 127: Power spectral density, RF I/O port 2_802.11g_9Mbps_Channel 11

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2407.025000	-2.241	8.0	PASS

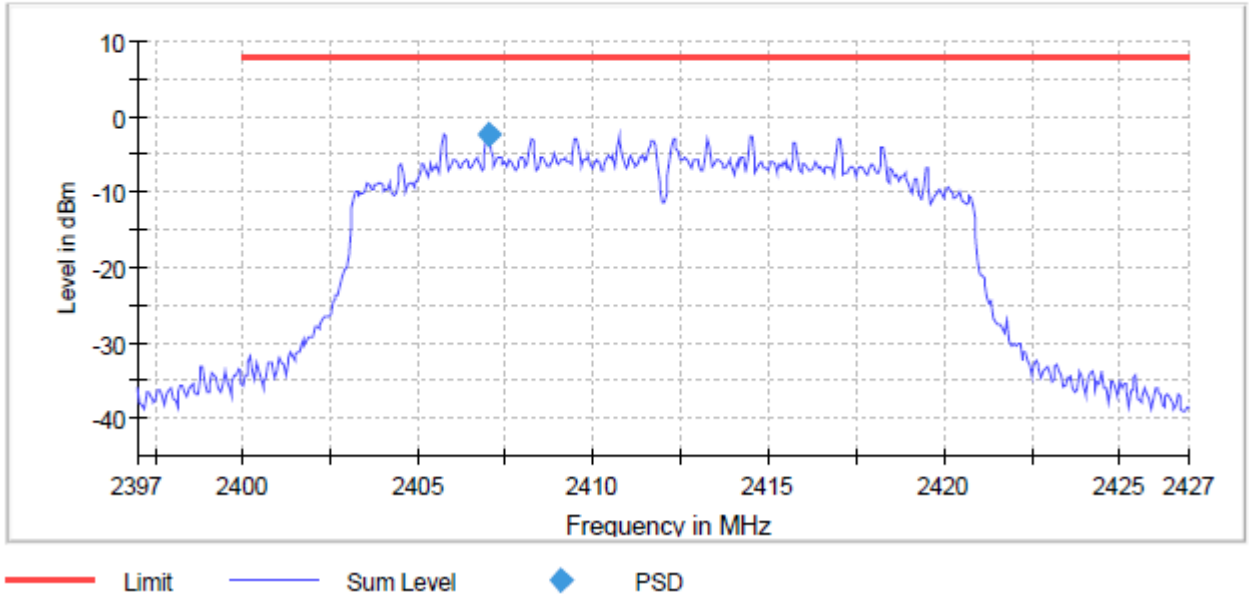


Figure 128: Power spectral density, RF I/O port 1_802.11n_14.4Mbps (MCS1)_Channel 1

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2431.975000	1.834	8.0	PASS

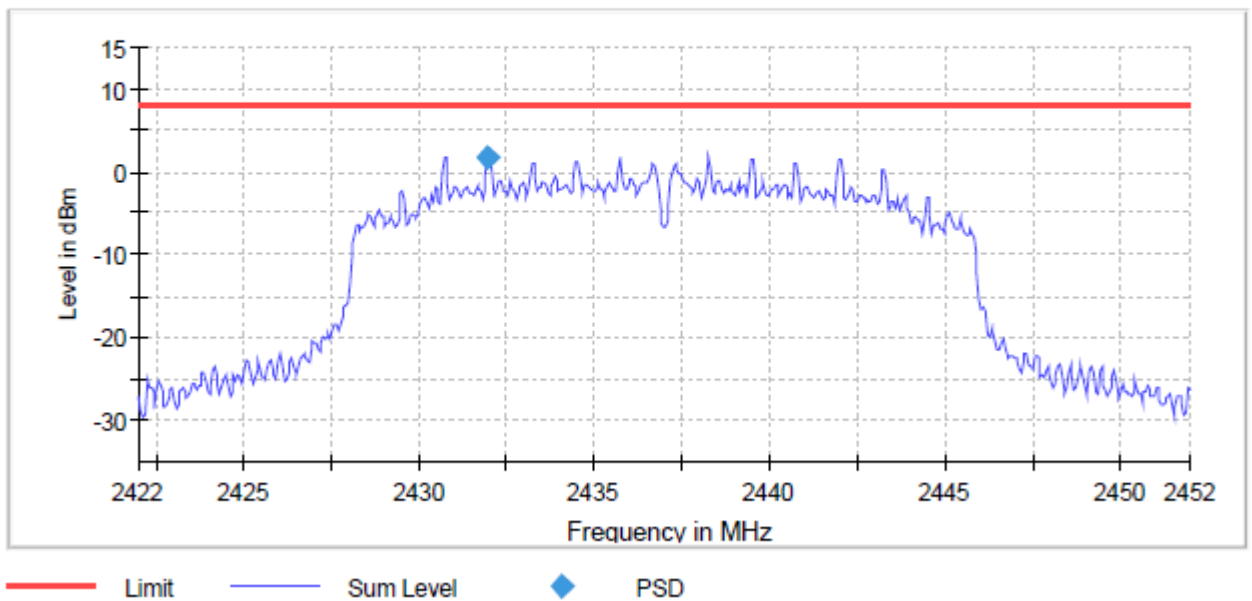


Figure 129: Power spectral density, RF I/O port 1_802.11n_14.4Mbps (MCS1)_Channel 6

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2462.000000	2464.525000	-2.268	8.0	PASS

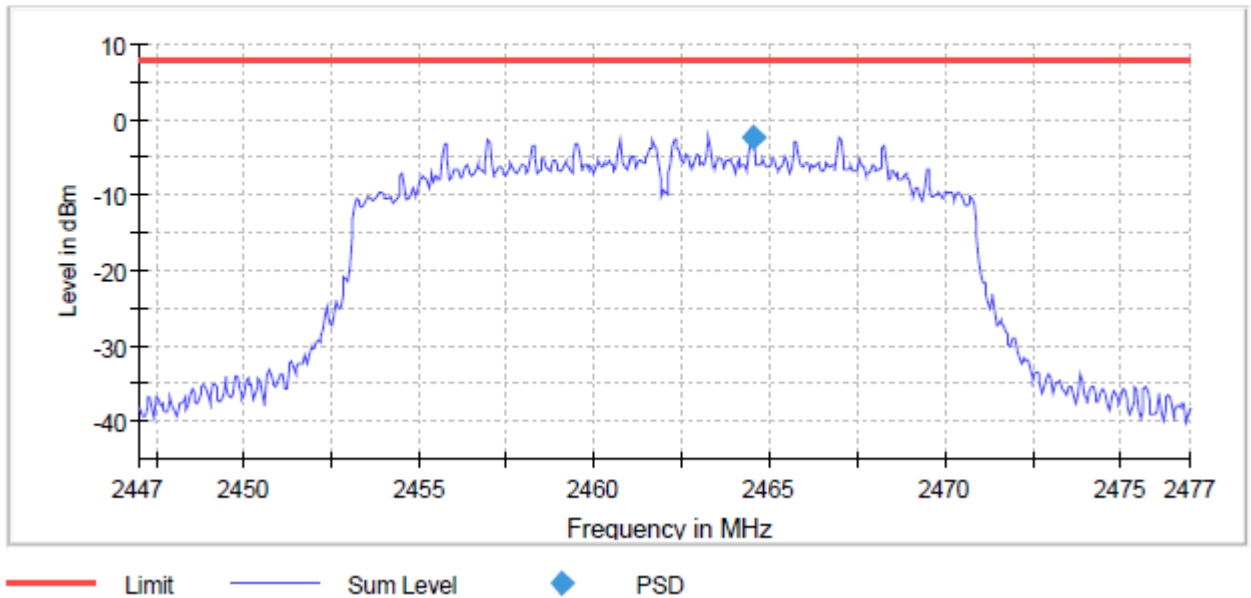


Figure 130: Power spectral density, RF I/O port 1_802.11n_14.4Mbps (MCS1)_Channel 11

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2407.025000	-3.392	8.0	PASS

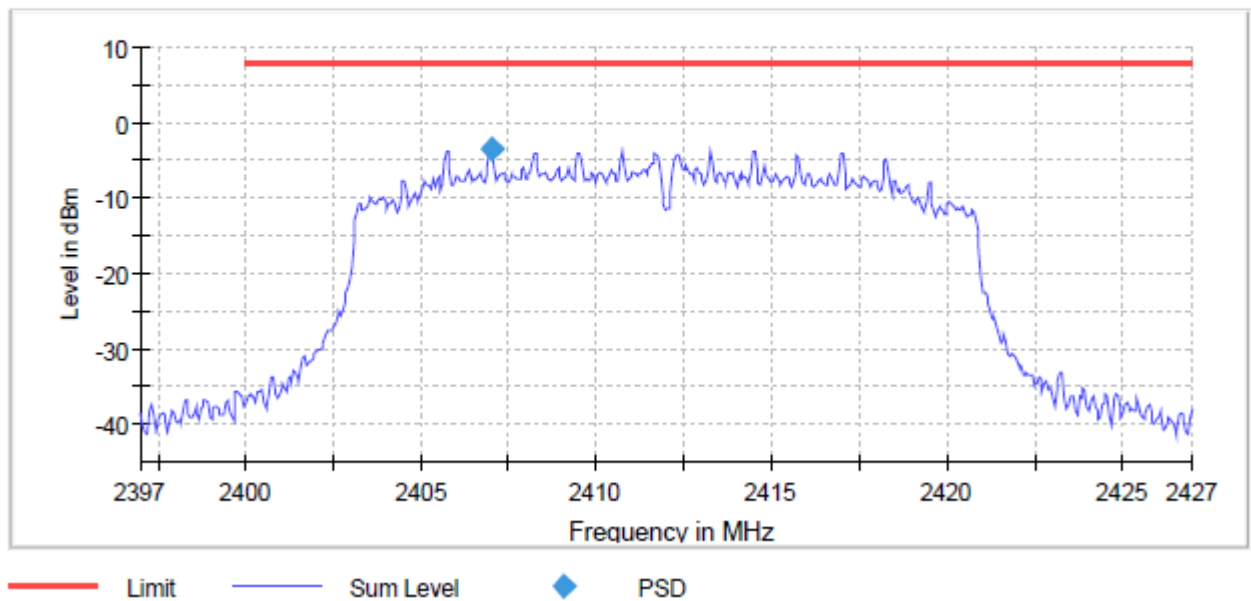


Figure 131: Power spectral density, RF I/O port 2_802.11n_14.4Mbps (MCS1)_Channel 1

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2438.275000	0.583	8.0	PASS

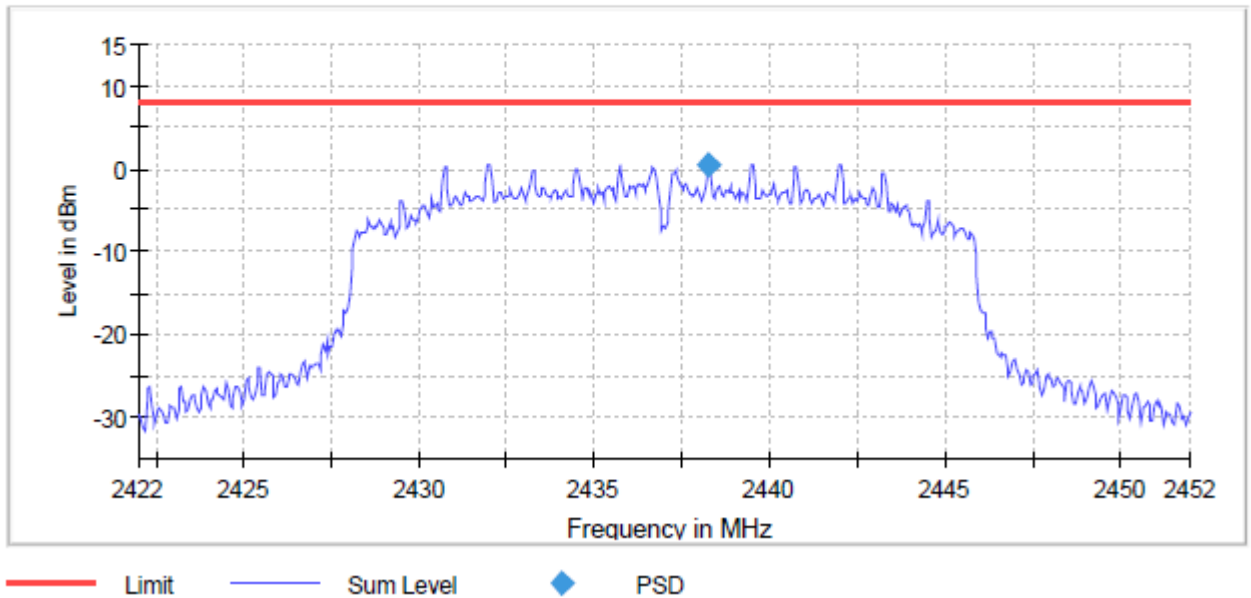


Figure 132: Power spectral density, RF I/O port 2_802.11n_14.4Mbps (MCS1)_Channel 6

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2462.000000	2464.475000	-3.435	8.0	PASS

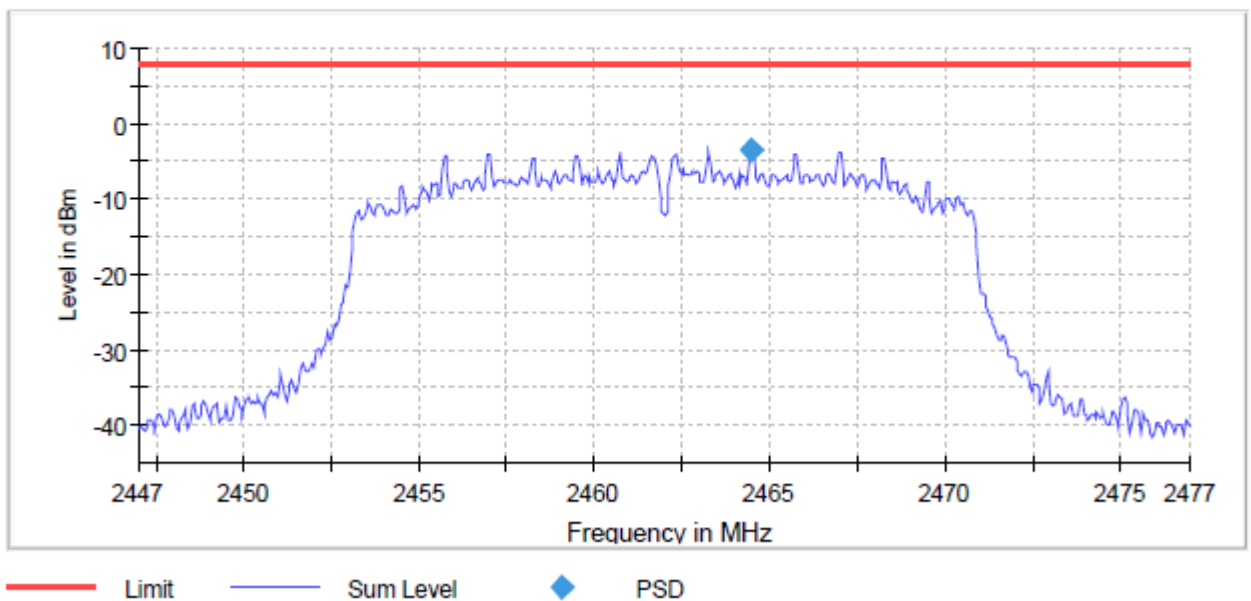


Figure 133: Power spectral density, RF I/O port 2_802.11n_14.4Mbps (MCS1)_Channel 11

Table 90: Measurement settings, Power spectral density

Setting	Instrument Value	Target Value
Span	30.000 MHz	30.000 MHz
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	600	~ 600
SweepTime	1.040 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	Sweep
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	38 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.40 dB	0.50 dB

99% Occupied Bandwidth

Standard: RSS-GEN (2019)
 Tested by: JAT
 Date: 8 - 12 August 2019
 Temperature: 23 ± 3 °C
 Humidity: 20 - 60 % RH

RSS-GEN 6.6

Results

Table 91: 99% occupied bandwidth test results

Test mode	Channel	Limit	99 % BW [MHz]	Result
RF I/O port 1_802.11b_1Mbps	Low 1	---	12.7	PASS
	Mid 6	---	13.4	PASS
	High 11	---	12.6	PASS
RF I/O port 2_802.11b_1Mbps	Low 1	---	12.6	PASS
	Mid 6	---	13.0	PASS
	High 11	---	12.5	PASS
RF I/O port 1_802.11g_9Mbps	Low 1	---	16.5	PASS
	Mid 6	---	17.1	PASS
	High 11	---	16.4	PASS
RF I/O port 2_802.11g_9Mbps	Low 1	---	16.4	PASS
	Mid 6	---	16.8	PASS
	High 11	---	16.4	PASS
RF I/O port 1_802.11n_14.4Mbps (MCS1)	Low 1	---	17.6	PASS
	Mid 6	---	17.8	PASS
	High 11	---	17.5	PASS
RF I/O port 2_802.11n_14.4Mbps (MCS1)	Low 1	---	17.5	PASS
	Mid 6	---	17.6	PASS
	High 11	---	17.5	PASS

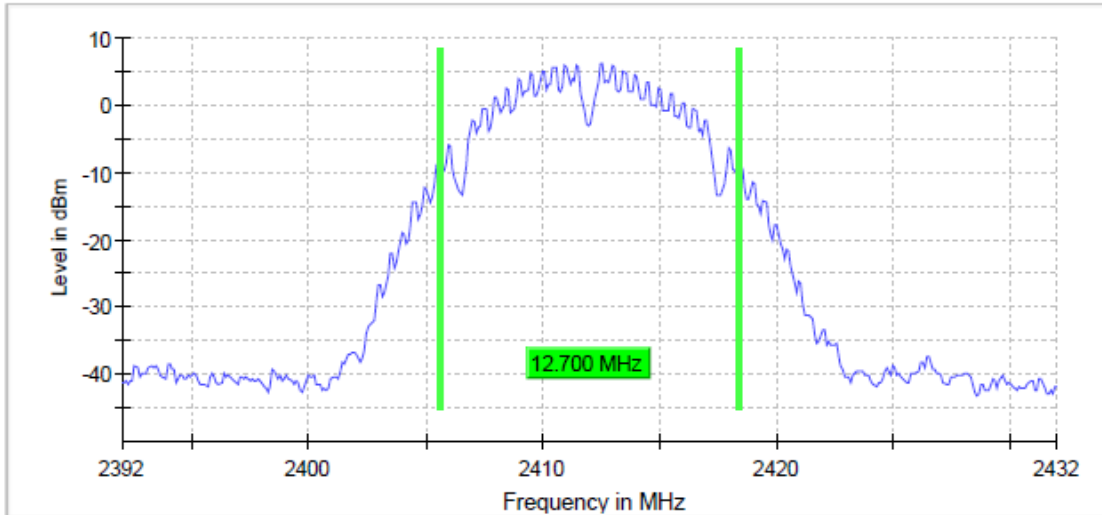


Figure 134: 99% OBW, RF I/O port 1_802.11b_1Mbps_Channel 1

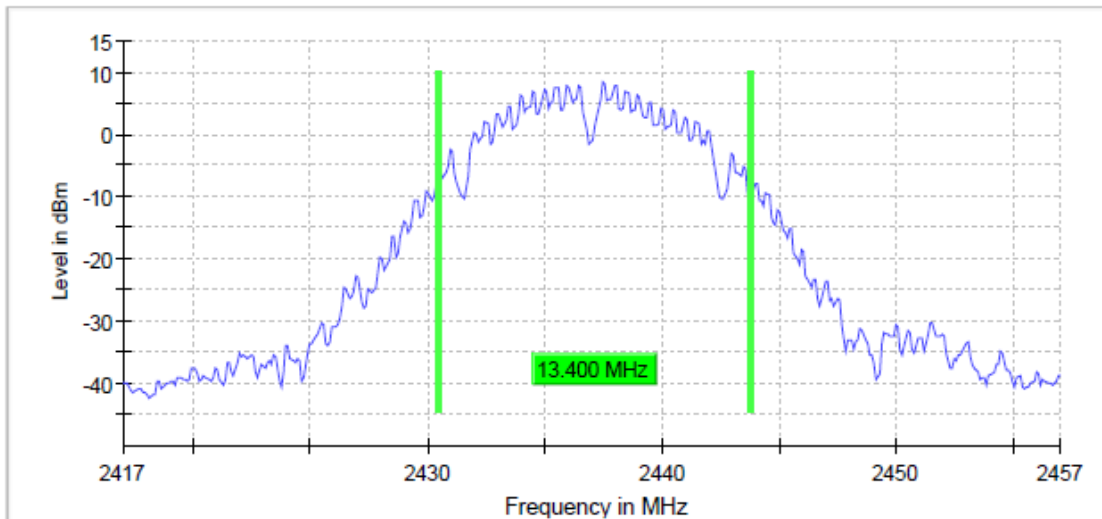


Figure 135: 99% OBW, RF I/O port 1_802.11b_1Mbps_Channel 6

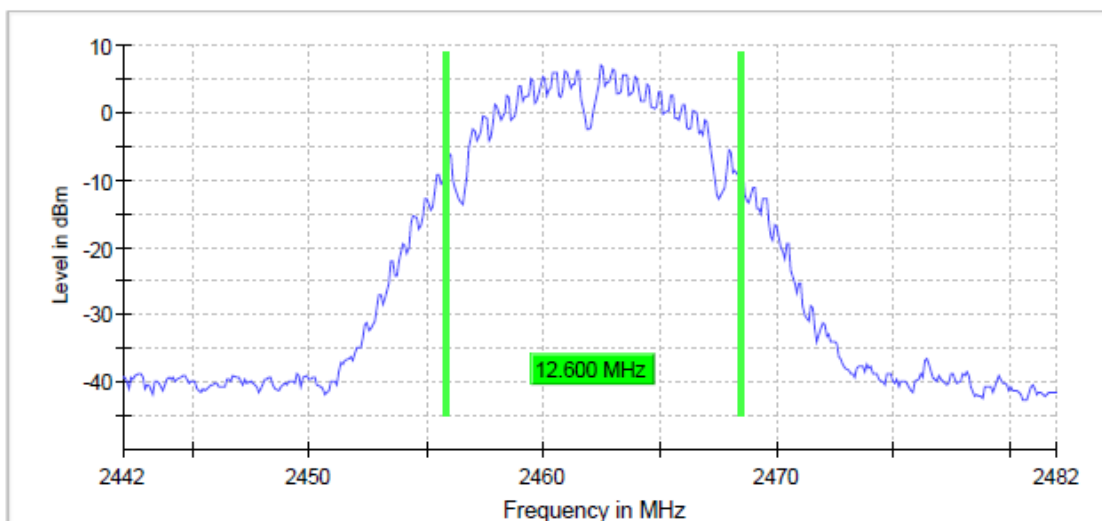


Figure 136: 99% OBW, RF I/O port 1_802.11b_1Mbps_Channel 11

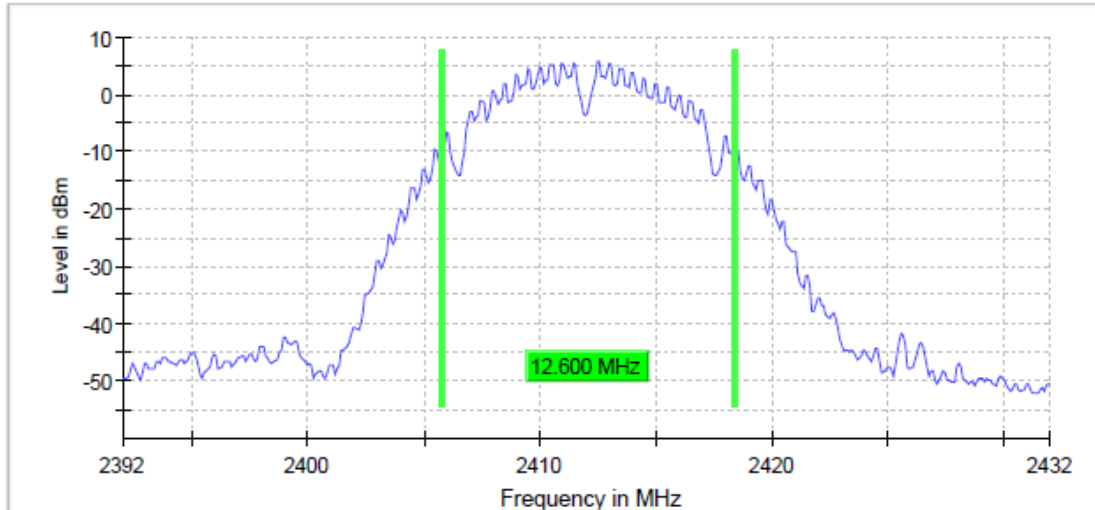


Figure 137: 99% OBW, RF I/O port 2_802.11b_1Mbps_Channel 1

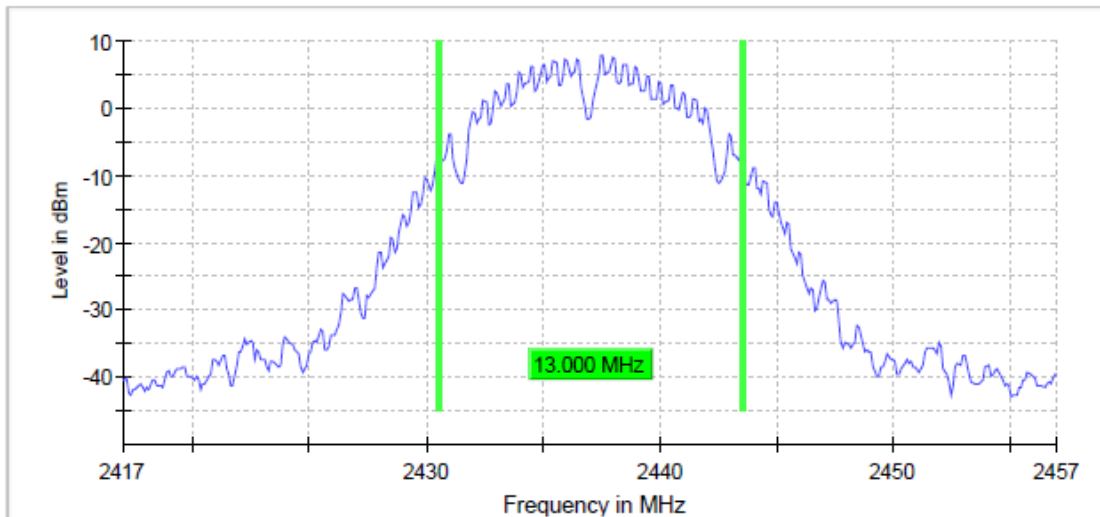


Figure 138: 99% OBW, RF I/O port 2_802.11b_1Mbps_Channel 6

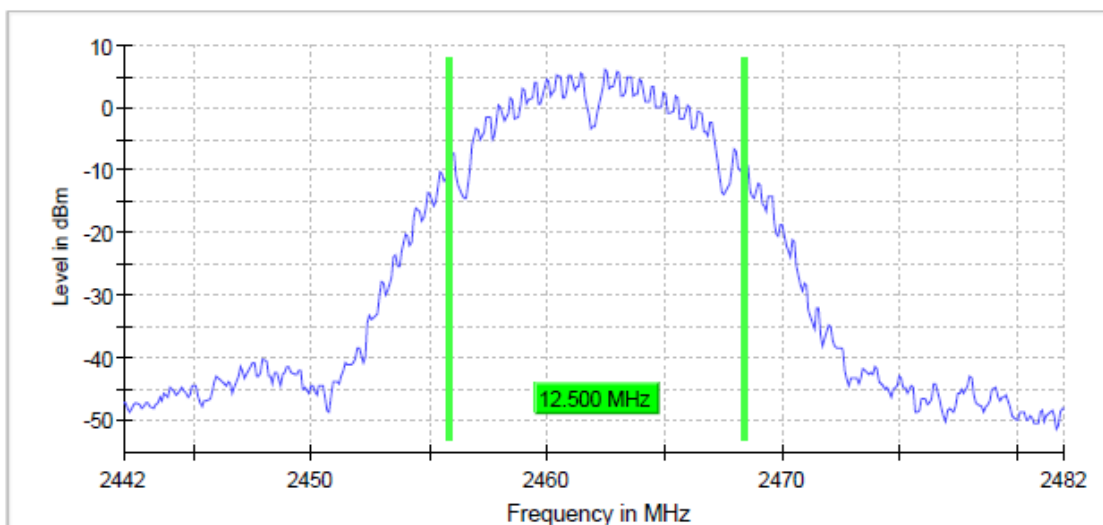


Figure 139: 99% OBW, RF I/O port 2_802.11b_1Mbps_Channel 11

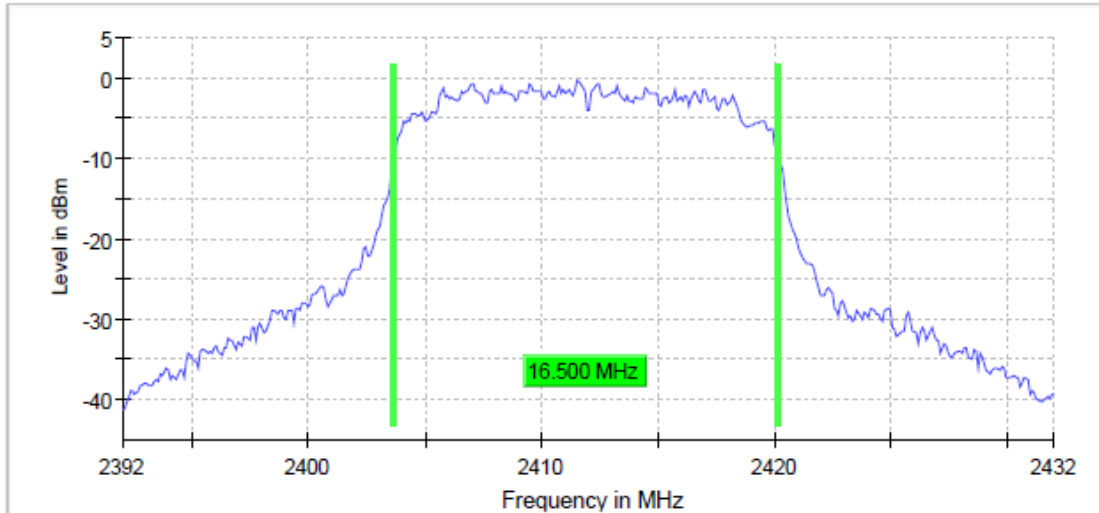


Figure 140: 99% OBW, RF I/O port 1_802.11g_9Mbps_Channel 1

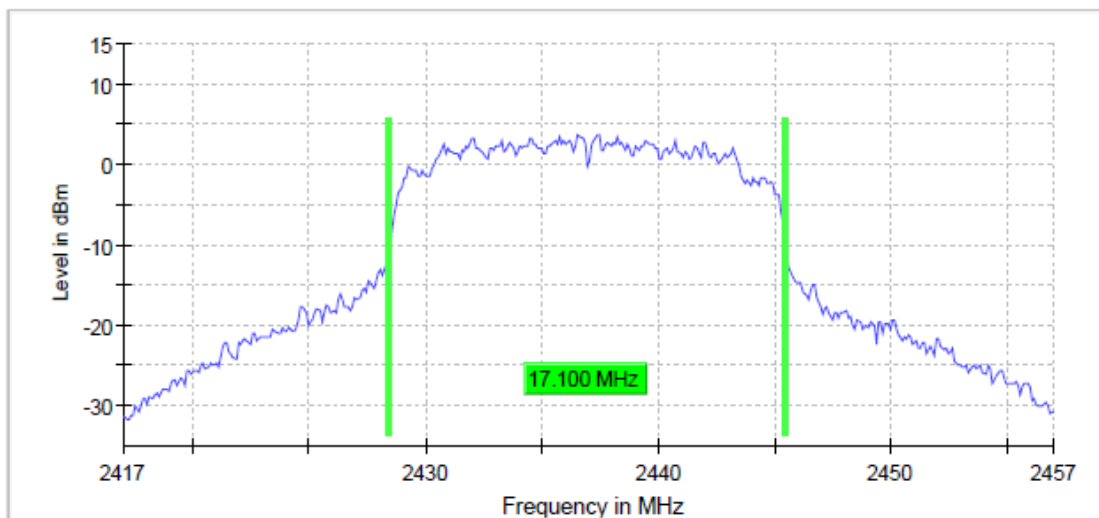


Figure 141: 99% OBW, RF I/O port 1_802.11g_9Mbps_Channel 6

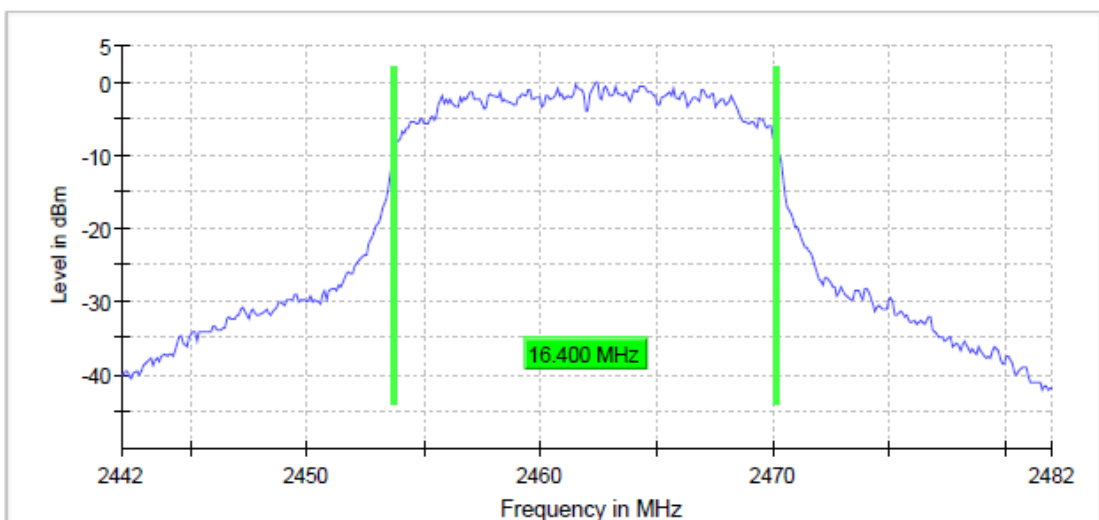


Figure 142: 99% OBW, RF I/O port 1_802.11g_9Mbps_Channel 11

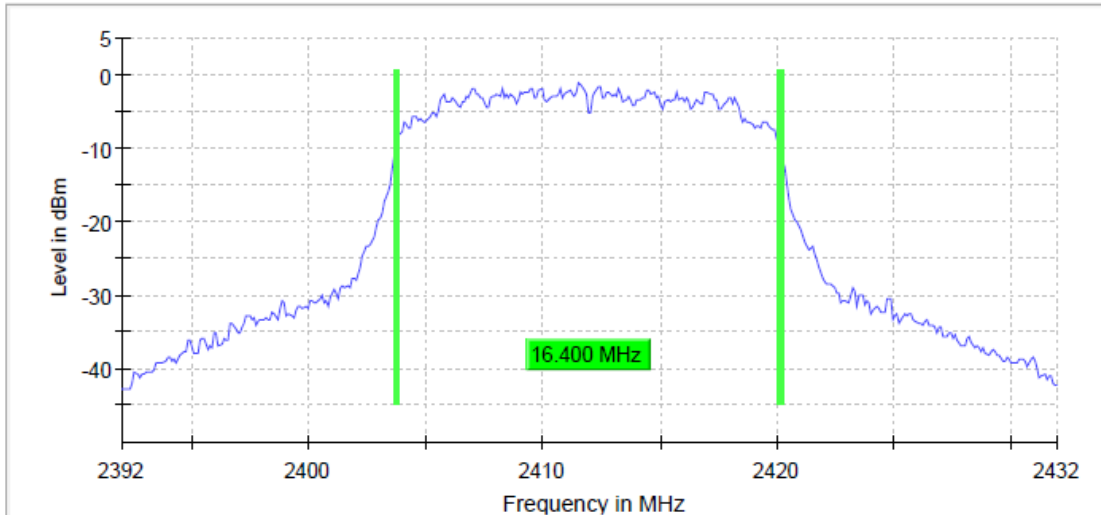


Figure 143: 99% OBW, RF I/O port2_802.11g_9Mbps_Channel 1

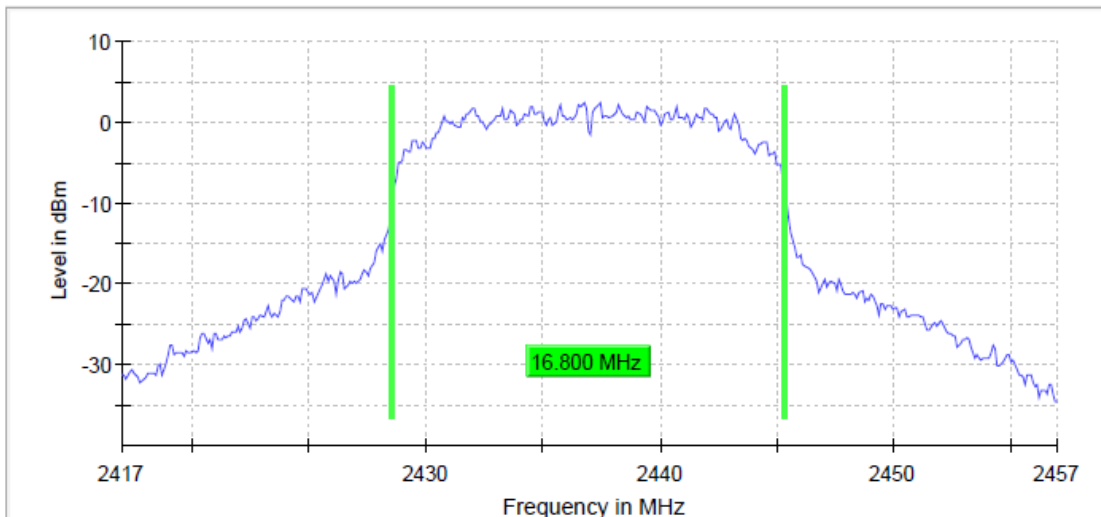


Figure 144: 99% OBW, RF I/O port 2_802.11g_9Mbps_Channel 6



Figure 145: 99% OBW, RF I/O port 2_802.11g_9Mbps_Channel 11

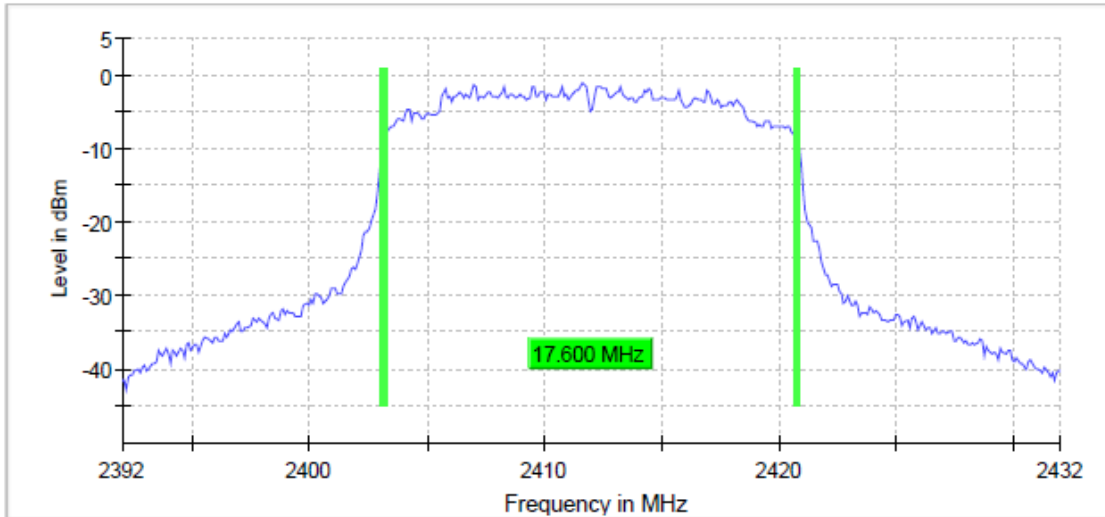


Figure 146: 99% OBW, RF I/O port 1_802.11n_14.4Mbps (MCS1)_Channel 1

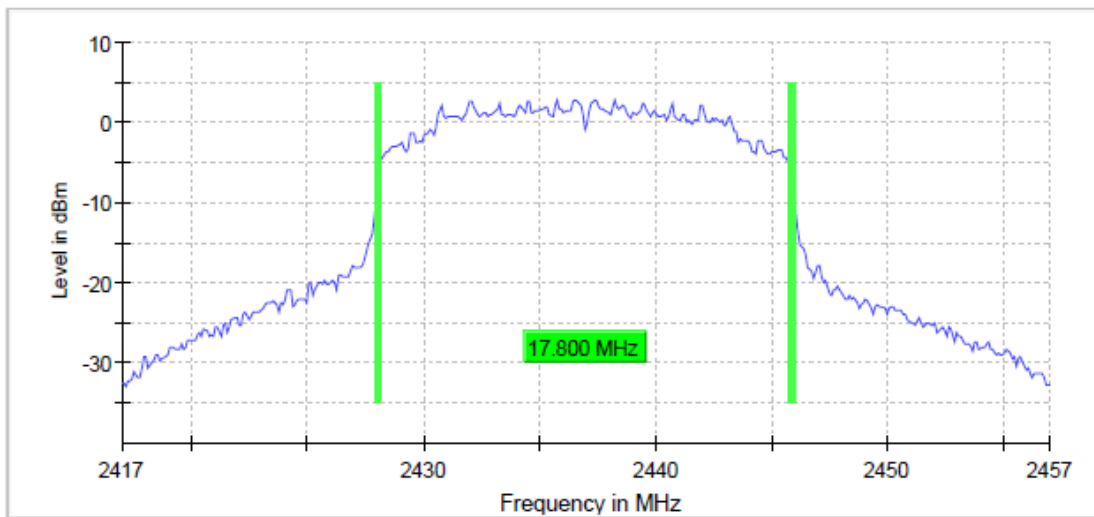


Figure 147: 99% OBW, RF I/O port 1_802.11n_14.4Mbps (MCS1)_Channel 6

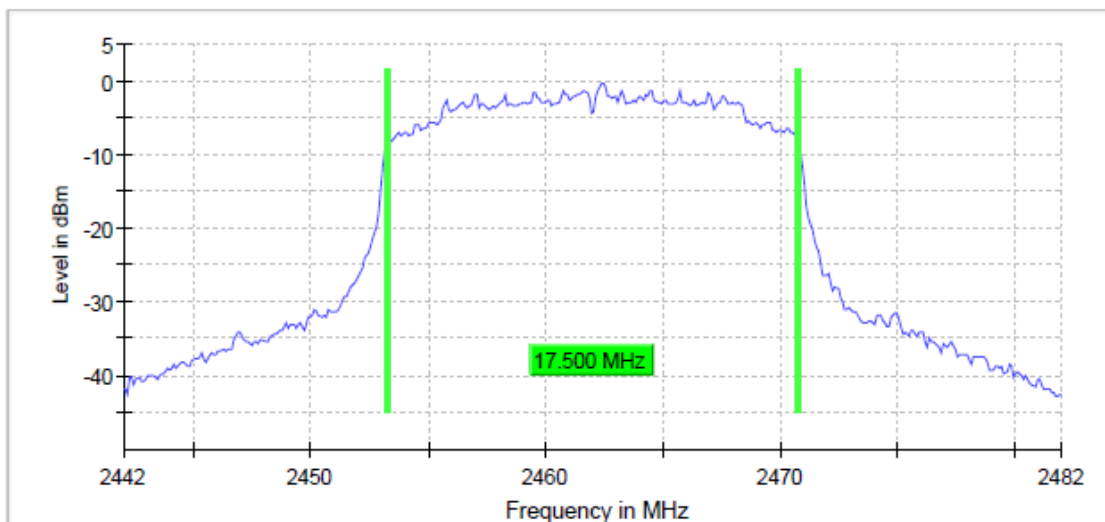


Figure 148: 99% OBW, RF I/O port 1_802.11n_14.4Mbps (MCS1)_Channel 11

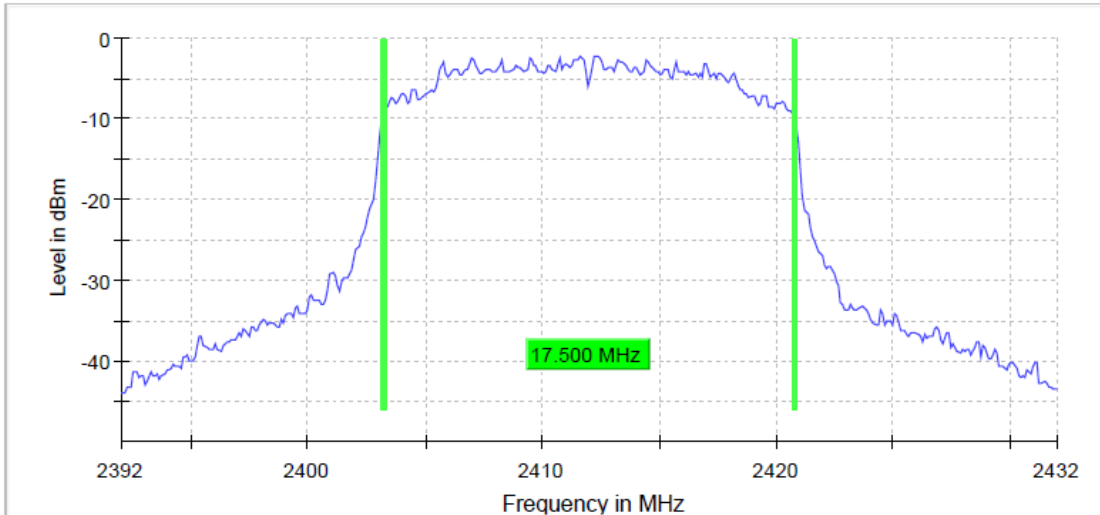


Figure 149: 99% OBW, RF I/O port 2_802.11n_14.4Mbps (MCS1)_Channel 1

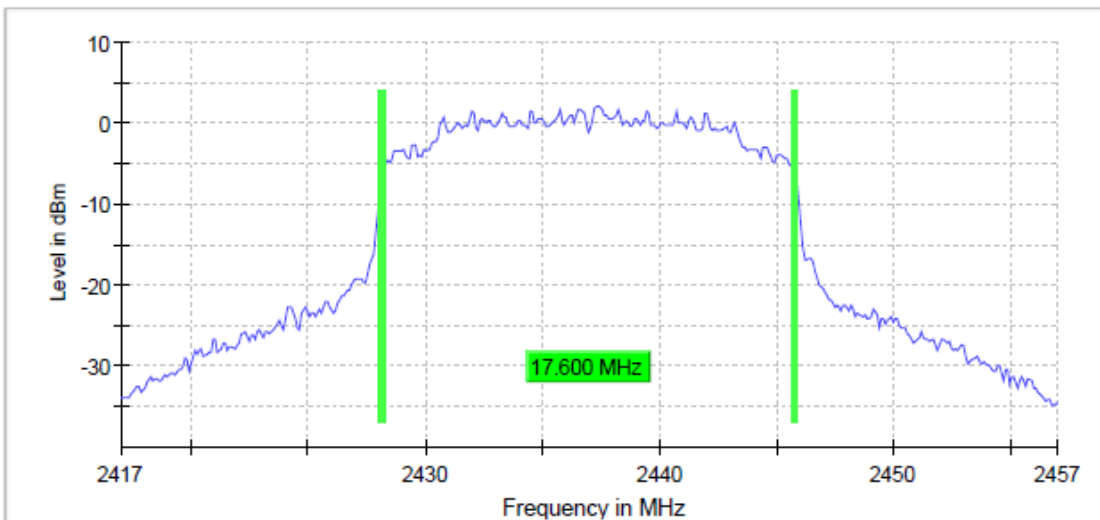


Figure 150: 99% OBW, RF I/O port 2_802.11n_14.4Mbps (MCS1)_Channel 6

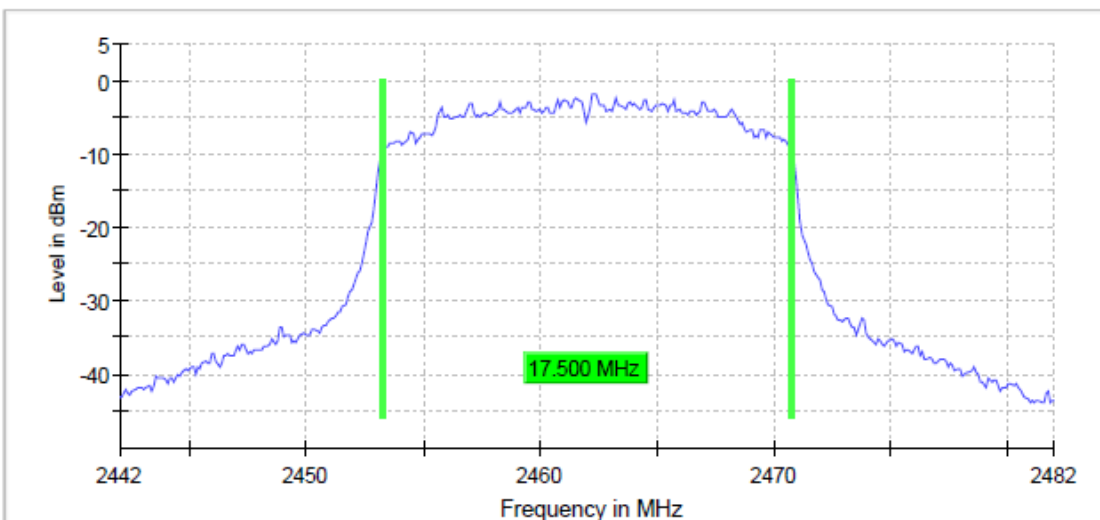


Figure 151: 99% OBW, RF I/O port 2_802.11n_14.4Mbps (MCS1)_Channel 11

Table 92: Measurements settings, 99% occupied bandwidth

Setting	Instrument Value	Target Value
Span	40.000 MHz	40.000 MHz
RBW	200.000 kHz	>= 200.000 kHz
VBW	1000.000 kHz	>= 600.000 kHz
SweepPoints	400	~ 400
Sweeptime	28.477 μ s	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	70 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.28 dB	0.30 dB

TEST EQUIPMENT
Conducted Emissions

Equipment	Manufacturer	Type	Inv or serial	Prev Calib	Next Calib
POWER SUPPLY	CALIFORNIA INSTR.	5001i-400	inv:9487	-	-
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	-	-
LISN	ROHDE & SCHWARZ	ENV216	inv:9611	2019-03-01	2020-03-01
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW26	inv:10679	2019-06-28	2020-06-27

RF-Test Equipment

Equipment	Manufacturer	Type	Inv or serial	Prev Calib	Next Calib
ANTENNA	A.H. SYSTEMS	SAS-200/518	inv:7873	-	-
SPECTRUM ANALYZER	AGILENT	E7405A	inv:9746	2018-01-08	2020-01-08
RF PREAMPLIFIER	CIAO	CA118-3123	inv:10278	2018-11-26	2019-11-26
RF PREAMPLIFIER	CIAO	CA1840-5019	inv:10593	2018-09-12	2019-09-12
TEMPERATURE CHAMBER	CTS	T-65/50	inv:10521	-	-
TEMPERATURE/ HUMIDITY SENSOR	EDS	OW-ENV-TH	inv:10517	2018-11-13	2019-11-13
TEMPERATURE/ HUMIDITY SENSOR	EDS	OW-ENV-TH	inv:10516	2018-11-13	2019-11-13
ANTENNA	EMCO	3117, 1-18GHz	inv:7293	2018-03-14	2020-03-14
ANTENNA	EMCO	3160-09	inv:7294	2019-03-11	2020-03-11
ATTENUATOR	INMET	10 dB, DC-40 GHz	inv:10347	2019-04-01	2021-04-01
ATTENUATOR	PASTERNAK	PE 7004-4	inv:10126	2019-04-01	2021-04-01
TURNTABLE	MATURO	DS430 UPGRADED	inv:10182	-	-
MAST & TURNTABLE CONTROLLER	MATURO	NCD	inv:10183	-	-
ANTENNA MAST	MATURO	TAM 4.0E	inv:10181	-	-
ATTENUATOR	PASTERNAK	10 dB, DC-40 GHz	sn: A1	2019-04-01	2021-04-01
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	-	-
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW26	inv:10679	2019-06-28	2020-06-27
SPECTRUM ANALYZER	ROHDE & SCHWARZ	FSV40	inv:10881	2019-02-07	2021-02-07
ANTENNA	ROHDE & SCHWARZ	HFH2-Z2 , 335.4711.52	inv:8013	2018-10-30	2020-10-30
OSP BASE UNIT	ROHDE & SCHWARZ	OSP120	inv:10882	2019-02-28	2021-02-28
OSP-B157W 8 PORT	ROHDE & SCHWARZ	OSP-B157W8	inv:10883	2019-02-06	2021-02-06
OSP-B157WX	ROHDE & SCHWARZ	OSP-B157WX	inv:10884	2019-02-13	2021-02-13
RF SIGNAL GENERATOR	ROHDE & SCHWARZ	SMB100A	inv:9288	2017-02-10	2020-02-10
VECTOR SIGNAL GENERATOR	ROHDE & SCHWARZ	SMBV100A	inv:9290	2019-06-27	2022-06-27
ANTENNA	SCHWARZBECK	VULB 9168, 30-2000MHz	inv:8911	2018-10-25	2020-10-25
TEMPERATURE/ HUMIDITY METER	VAISALA	HMT 333	inv:8638	2019-04-10	2020-04-10
FILTER	WAINWRIGHT	HP, WHKX4.0/18G-10SS	inv:10403	2019-04-01	2021-04-01
ATTENUATOR	ZYSEN	ZSJ70/1-06-2A2	inv:10332	-	-