



2.3 Restricted Band Edges

2.3.1 Specification Reference

FCC 47 CFR Part 15C, ISED Canada RSS-247 and ISED Canada RSS-GEN, Clause 15.205 N/A and 8.10

2.3.2 Equipment Under Test and Modification State

Porsche Home Energy Manager, S/N: M186 HCM-C1.1 - Modification State 0

2.3.3 Date of Test

2019-01-23 to 2019-02-15

2.3.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 6.10.5.

Plots for average measurements were taken in accordance with ANSI C63.10 clause 4.1.4.2.3. These are shown for information purposes and were used to determine the worst case measurement point. Final average measurements were then taken in accordance with ANSI C63.10 clause 4.1.4.2.2. to obtain the measurement result recorded in the test results tables.

The following conversion can be applied to convert from dB μ V/m to μ V/m:
 $10^{(\text{Field Strength in dB}\mu\text{V/m}/20)}$.

2.3.5 Environmental Conditions

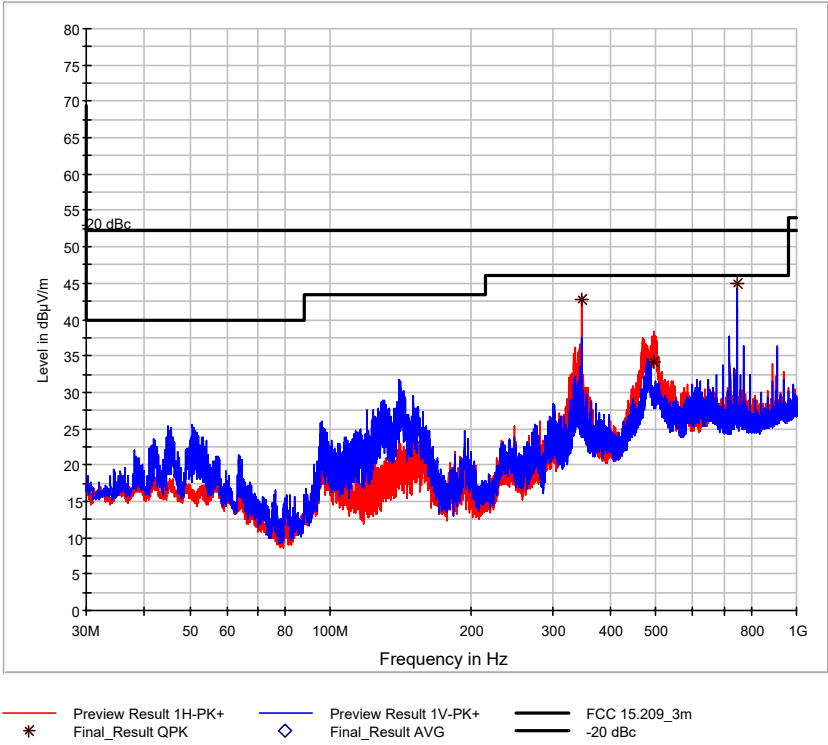
Ambient Temperature	22,0 °C
Relative Humidity	24,0 %



Product Service

2.3.6 Test Results

Test has been performed as radiated test for worst case mode (802.11g/20MHz/MCS0). No emissions above limit clause 15.209 have been detected at any frequency:

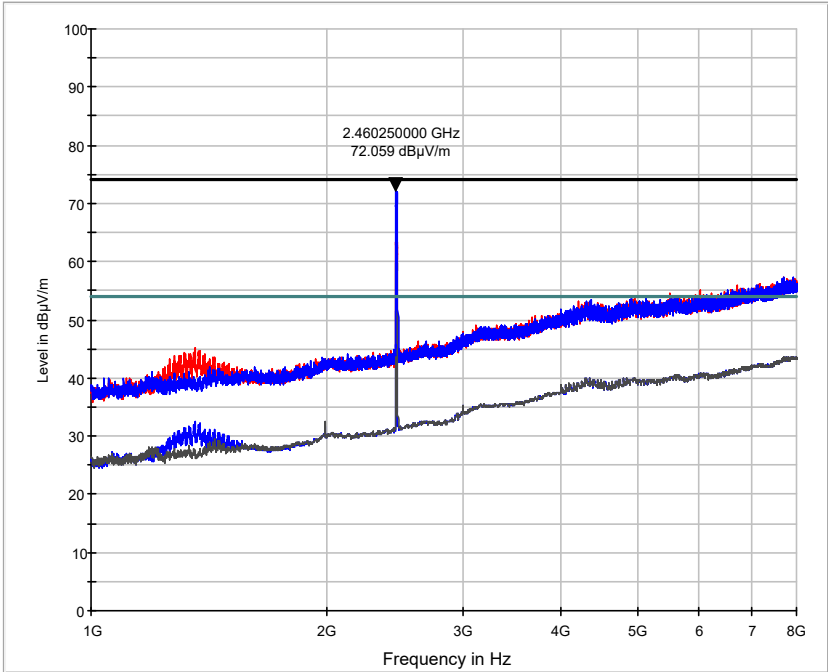


Final Results:

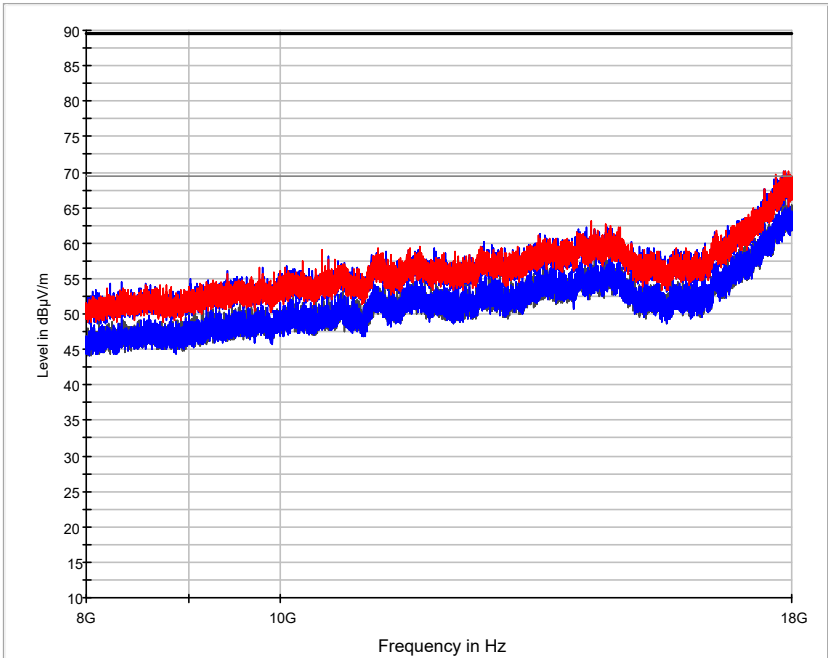
Frequency	QuasiPeak	Average	Limit	Margin	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr.
MHz	dBµV/m	dBµV/m	dBµV/m	dB	ms	kHz	cm		deg	dB
346.470000	42.86	---	46.00	3.14	1000.0	120.000	145.0	H	-137.0	17.0
492.795000	34.19	---	46.00	11.81	1000.0	120.000	103.0	H	152.0	19.4
743.940000	44.89	---	46.00	1.11	1000.0	120.000	159.0	V	-17.0	23.5



Product Service



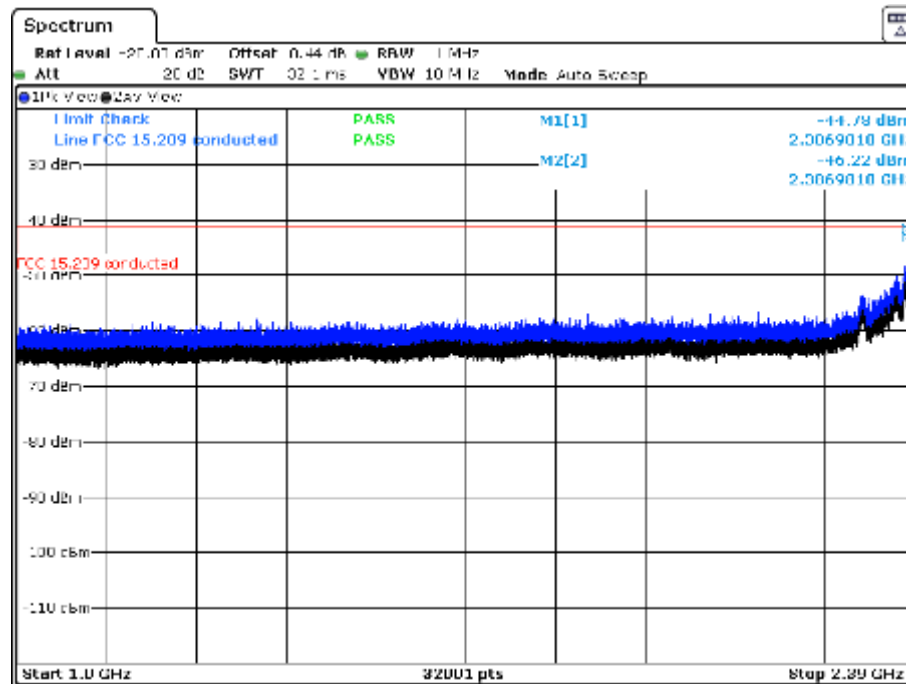
Preview Result 2H-AVG Preview Result 1H-PK+ Preview Result 2V-AVG
Preview Result 1V-PK+ FCC 15.209 3 m PK FCC 15.209 3 m AV



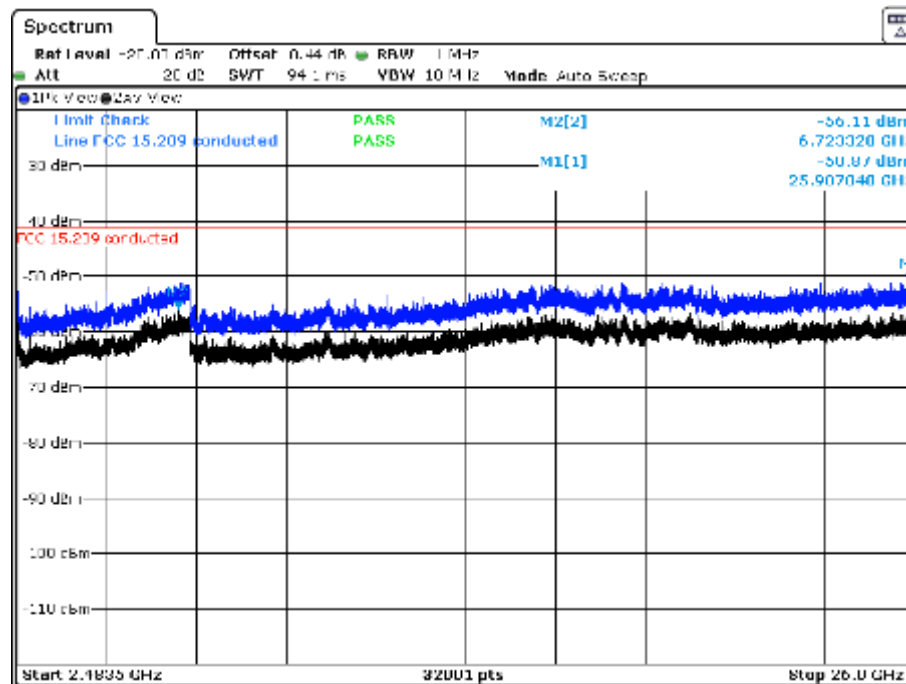
Preview Result 2V-AVG Preview Result 1V-PK+ Preview Result 2H-AVG
Preview Result 1H-PK+ FCC 15.209 (0.5m) PK FCC 15.209 (0.5m) AV
* Final_Result PK+ ♦ Final_Result AVG

Test has been performed as conducted test for any operational mode. No emissions above limit clause 15.209 have been detected at any frequency:

Mode 802.11b, 20MHz, 1Mbps – 2412 MHz



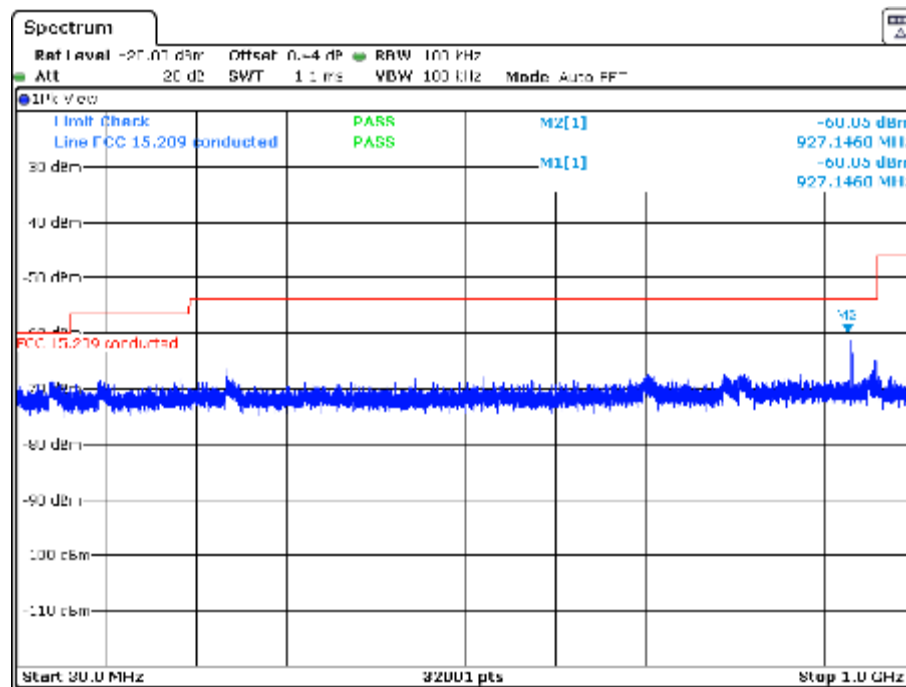
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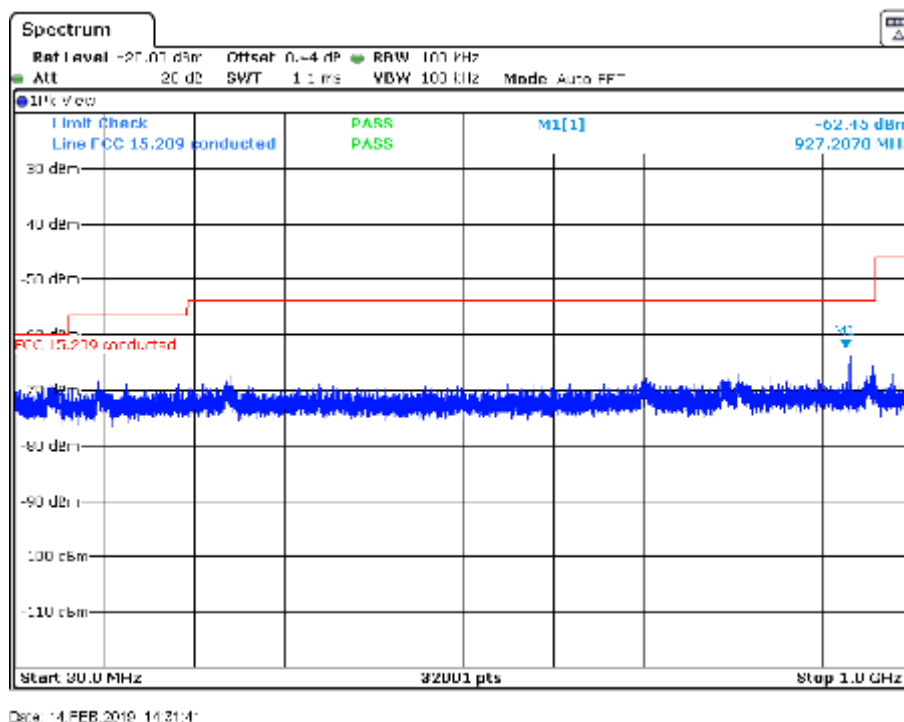
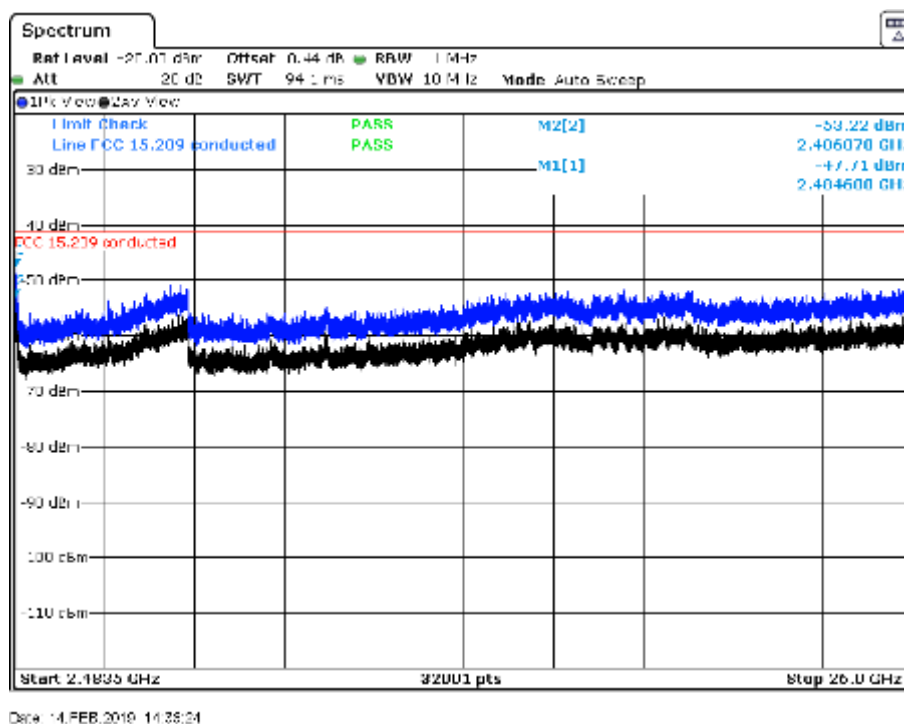
Product Service



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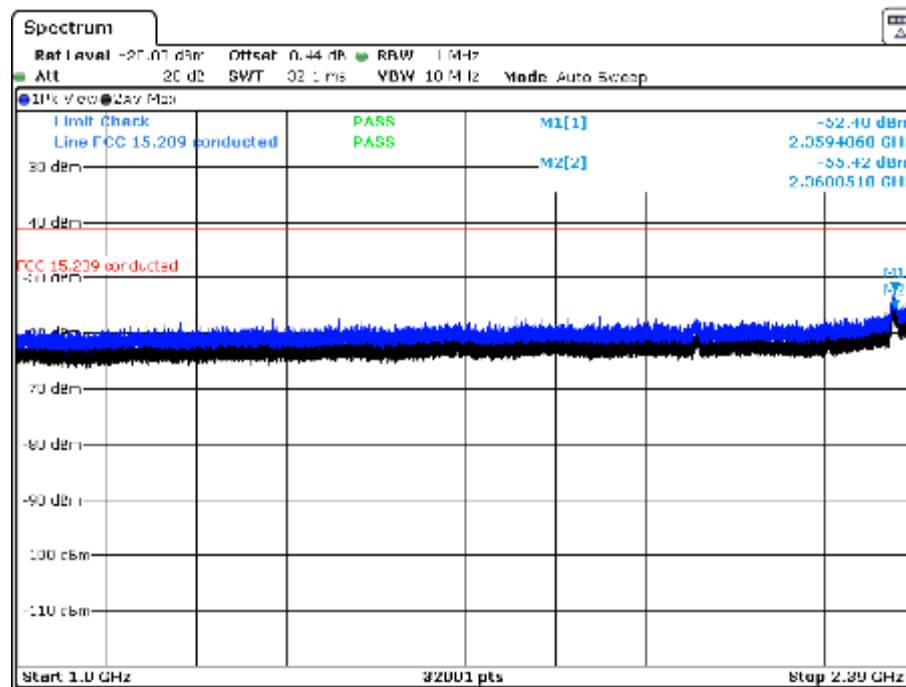


Mode 802.11b, 20MHz, 1Mbps – 2437 MHz





Product Service

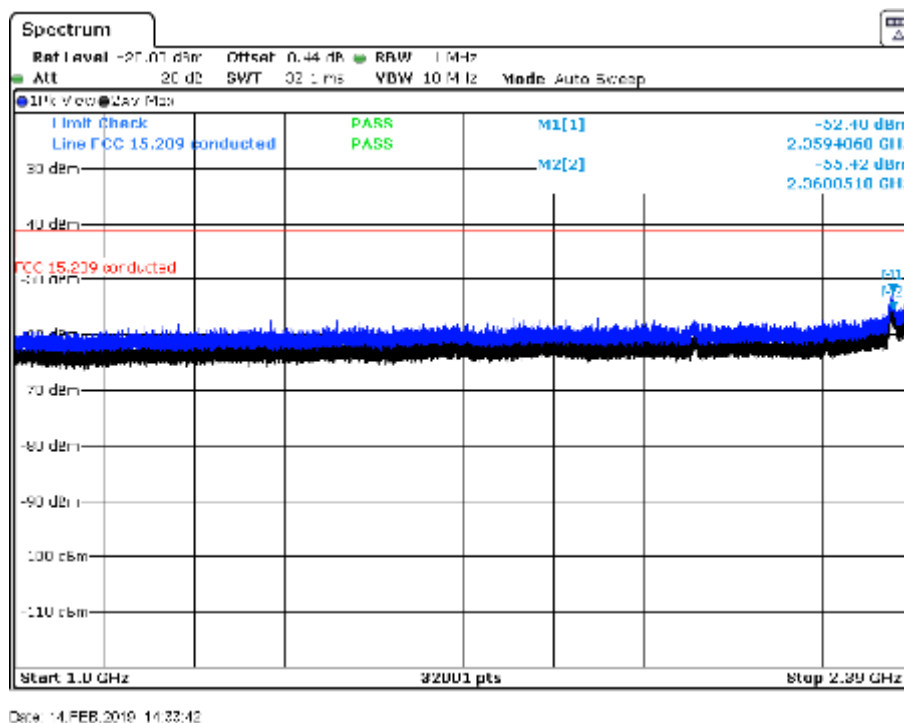
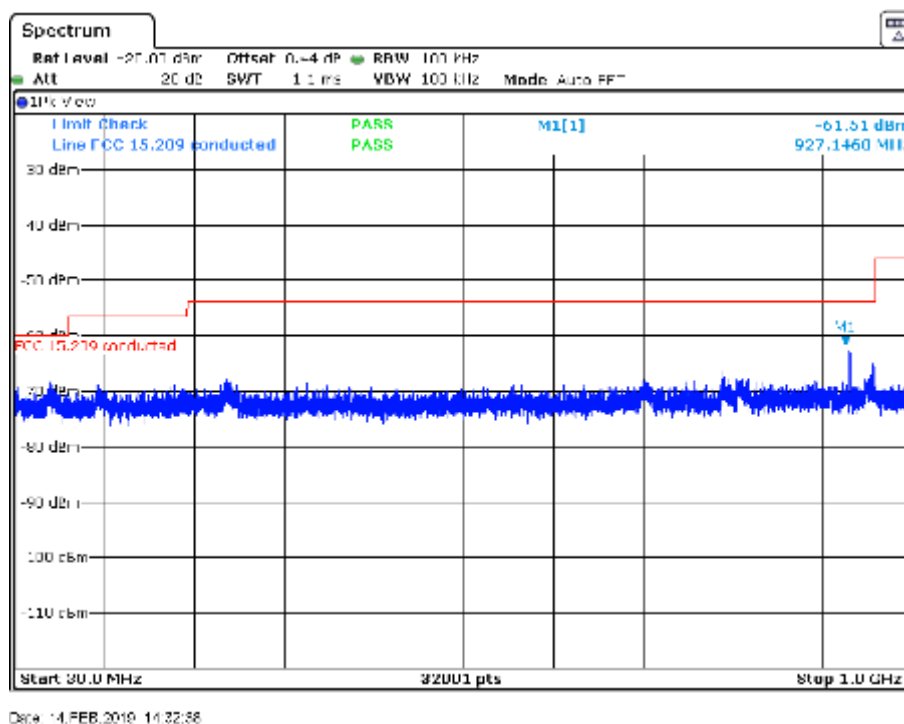


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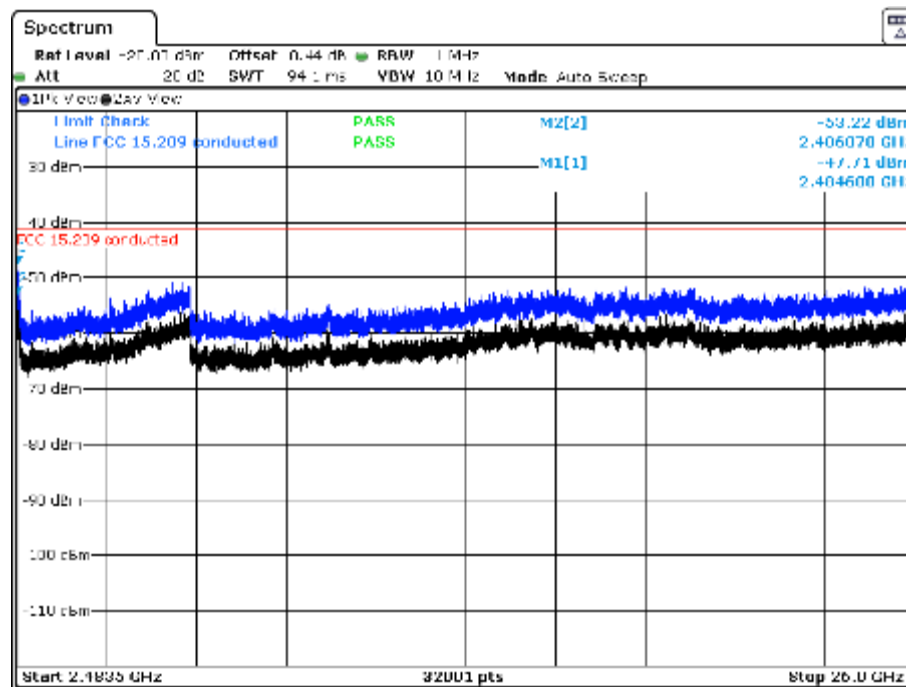
Product Service

Mode 802.11b, 20MHz, 1Mbps – 2462 MHz





Product Service

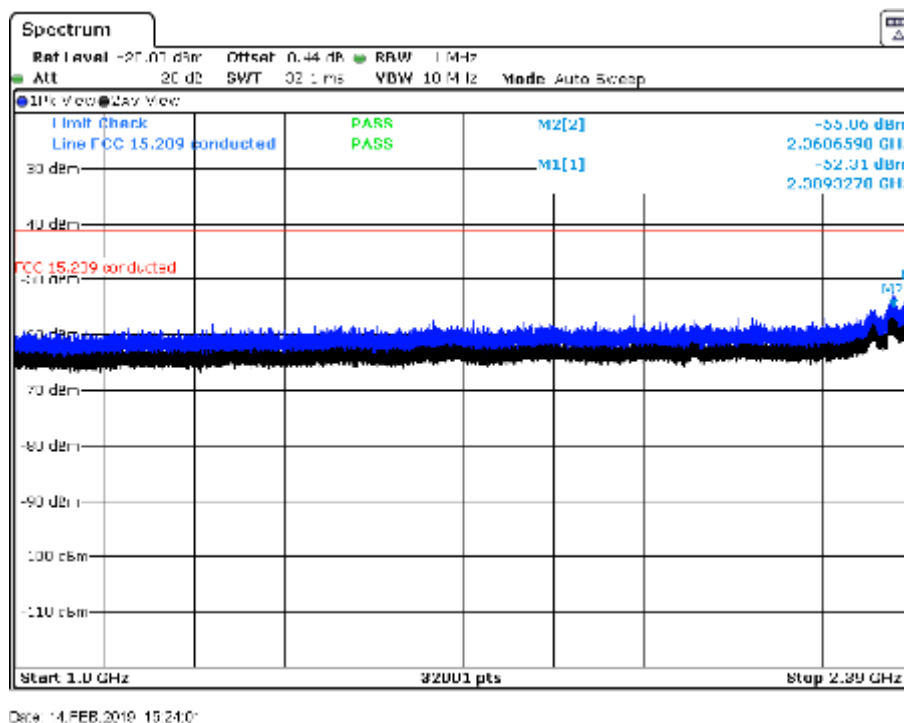
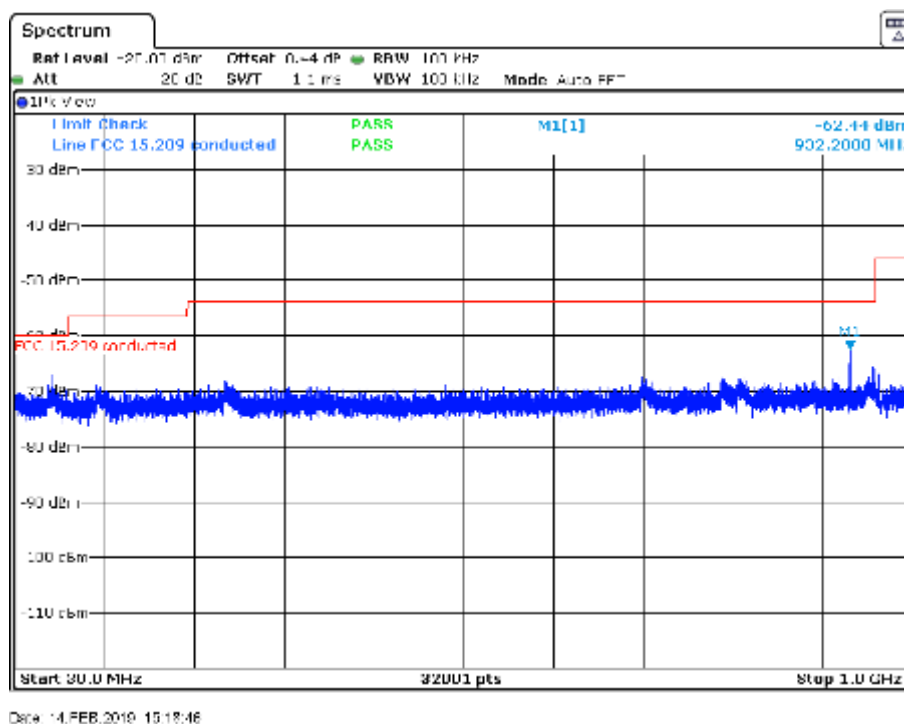


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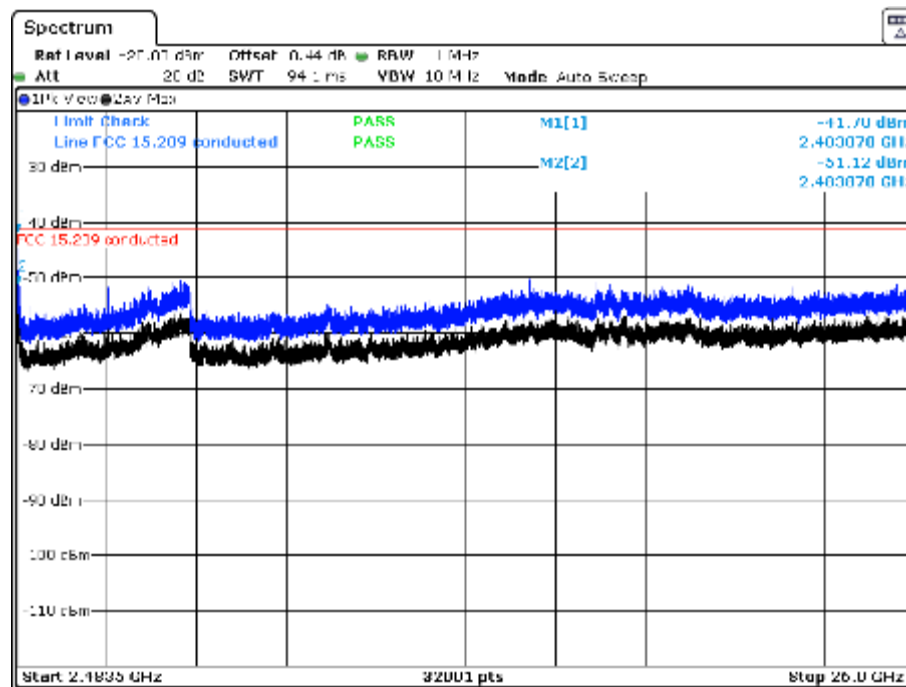
Product Service

Mode 802.11g, 20MHz, 6Mbps – 2412 MHz





Product Service

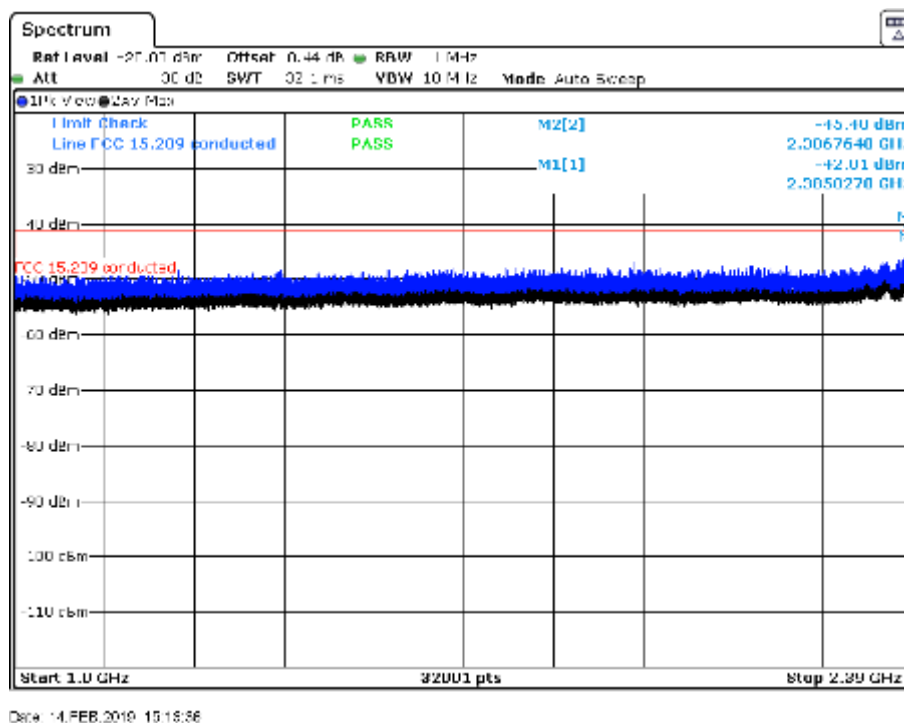
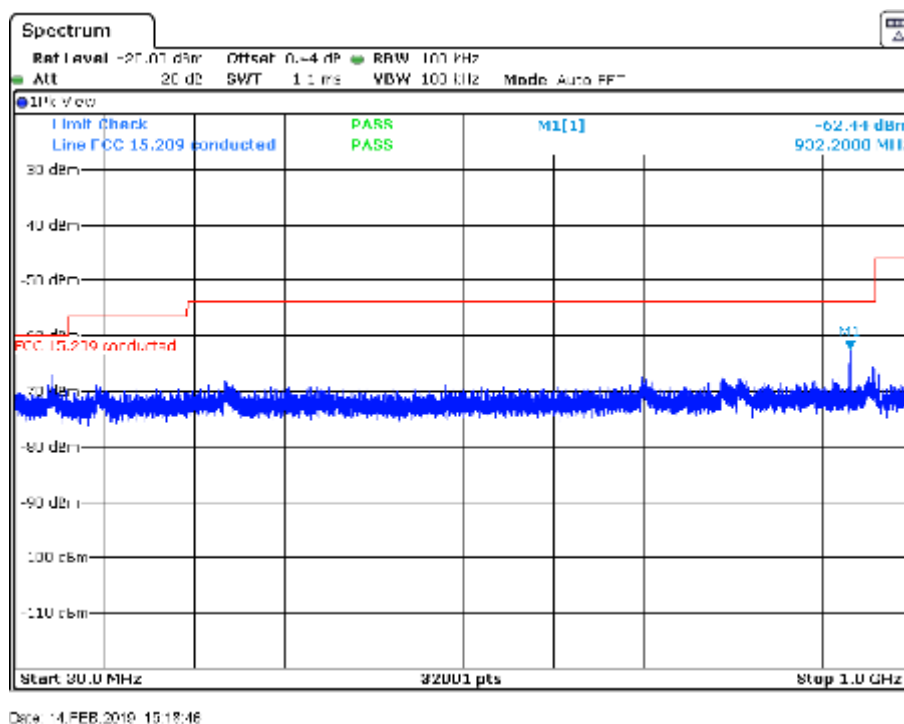


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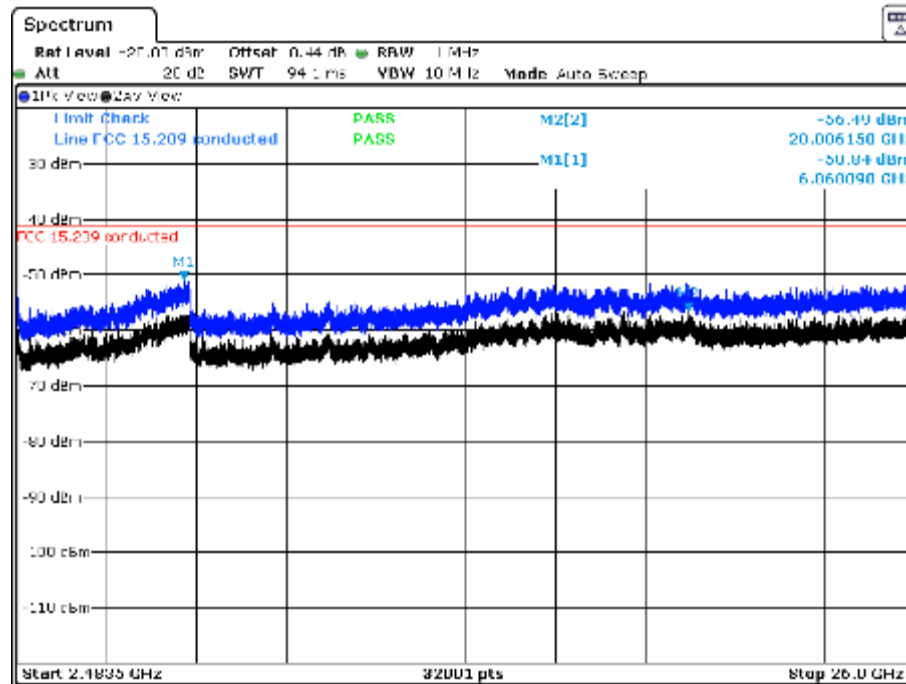
Product Service

Mode 802.11g, 20MHz, 6Mbps – 2437 MHz





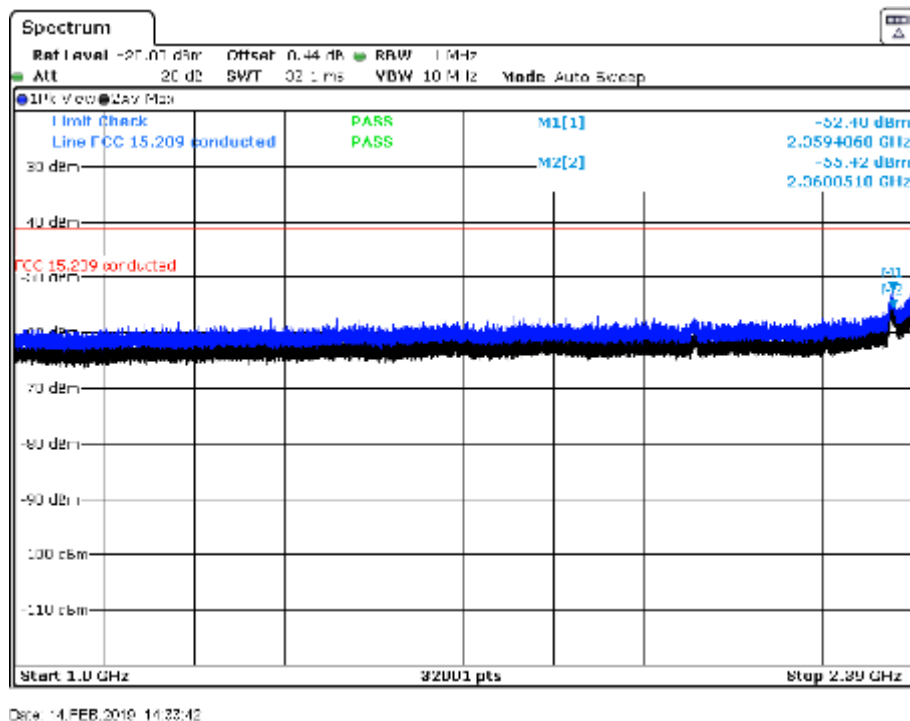
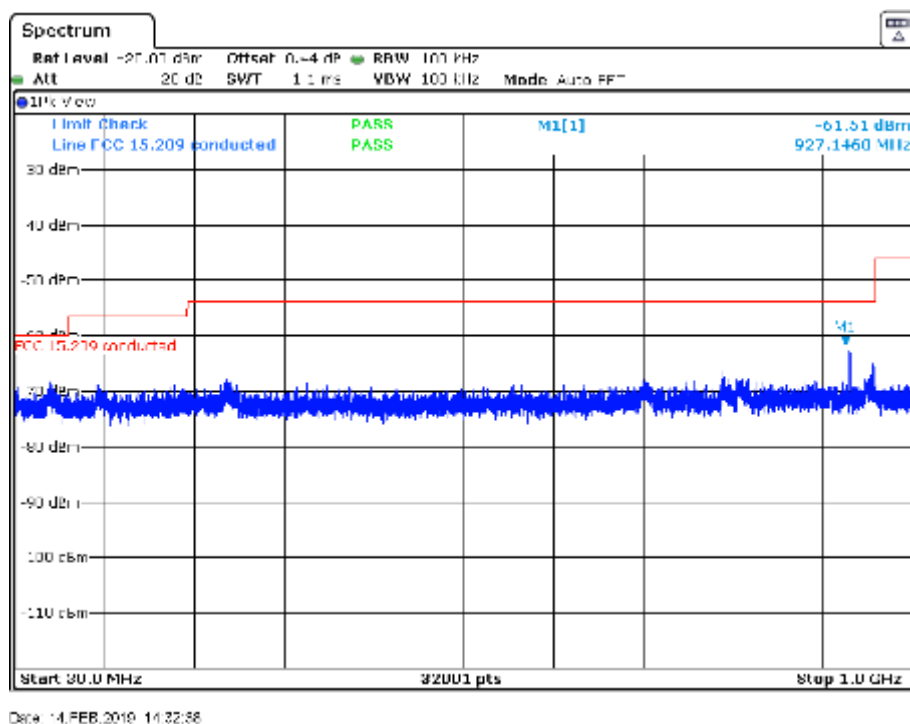
Product Service



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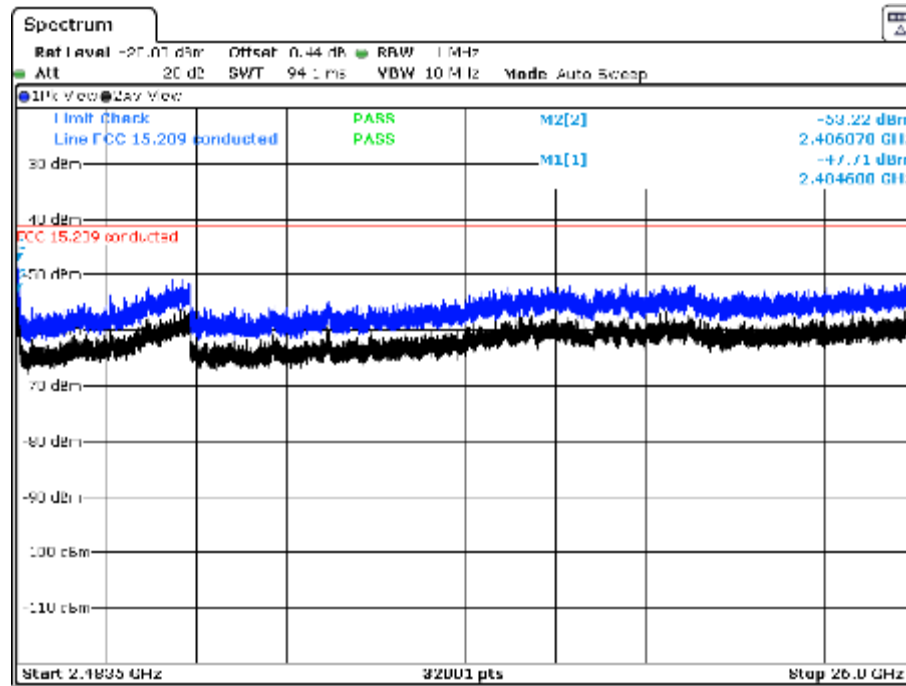


Mode 802.11g, 20MHz, 6Mbps – 2462 MHz





Product Service

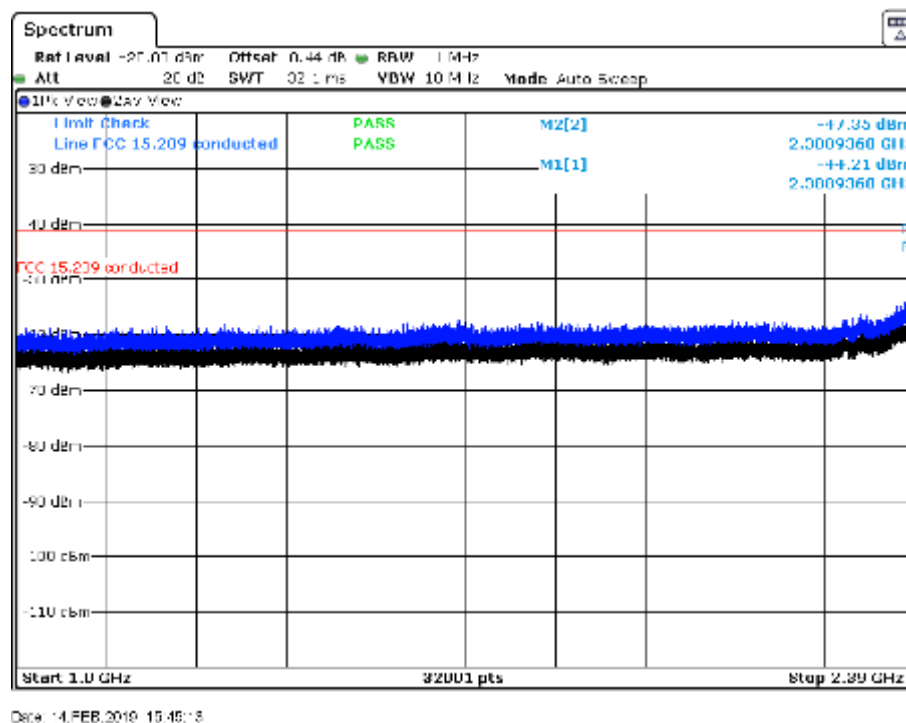
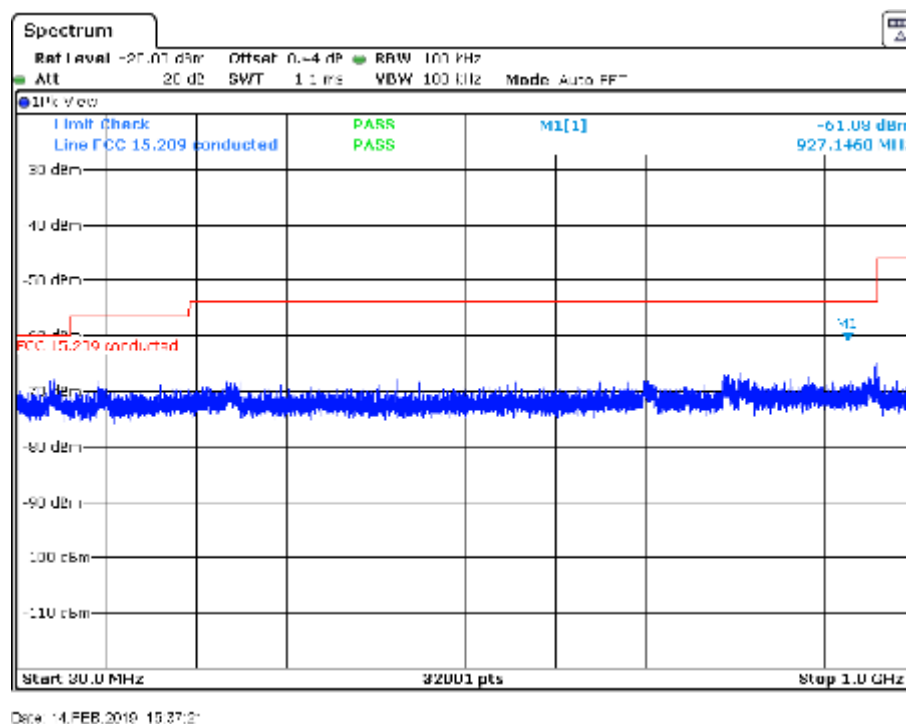


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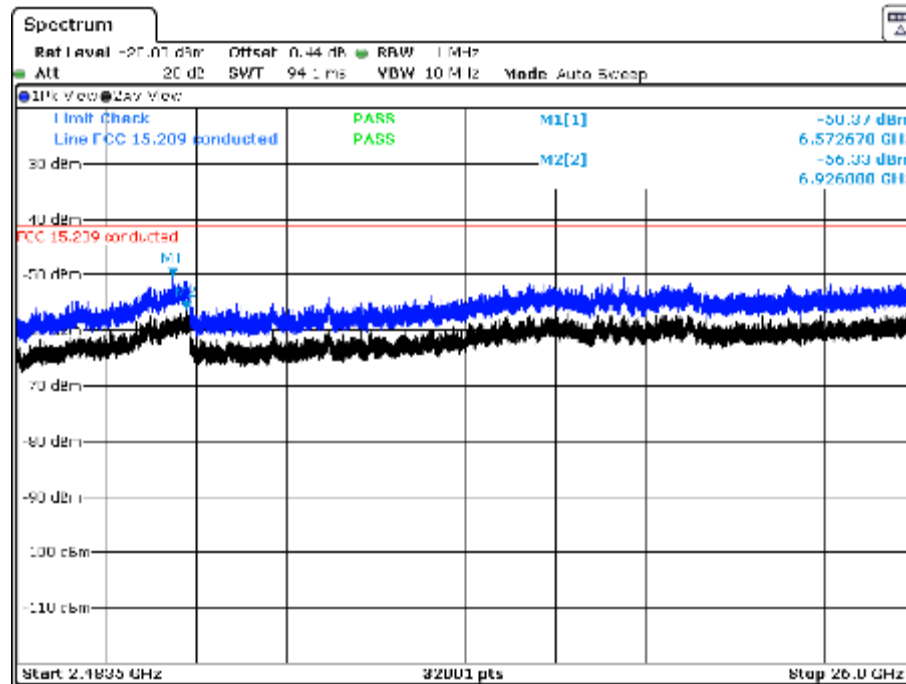
Product Service

Mode 802.11n, 20MHz, MCS0 – 2412 MHz





Product Service

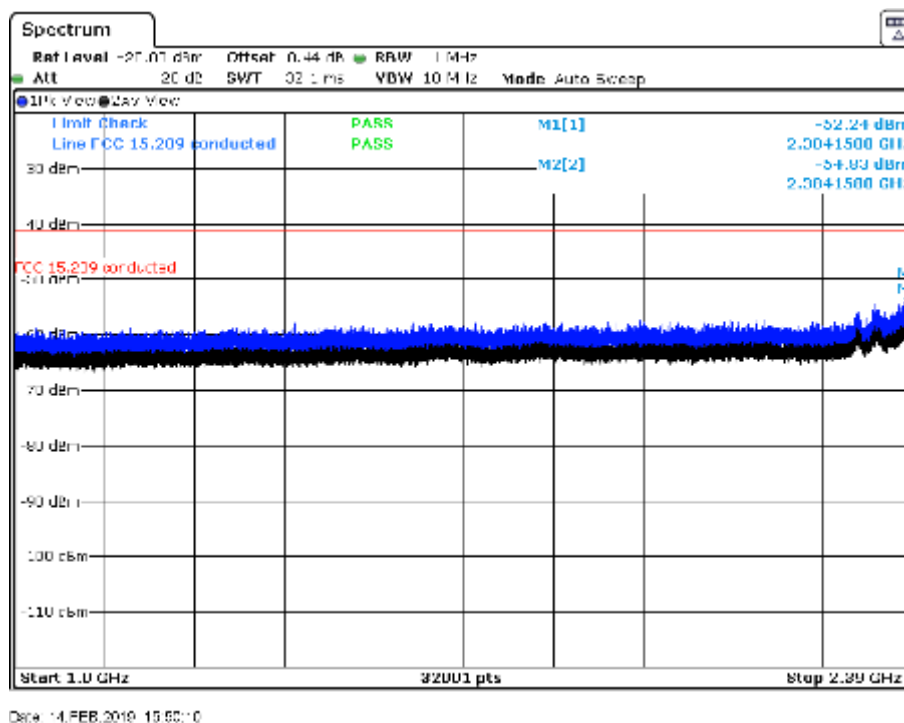
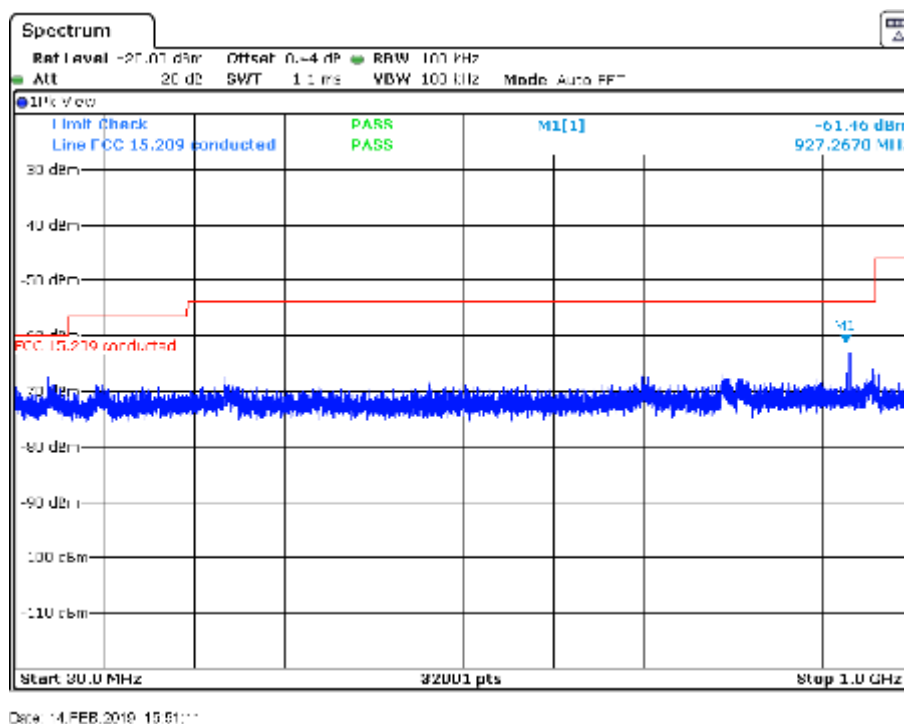


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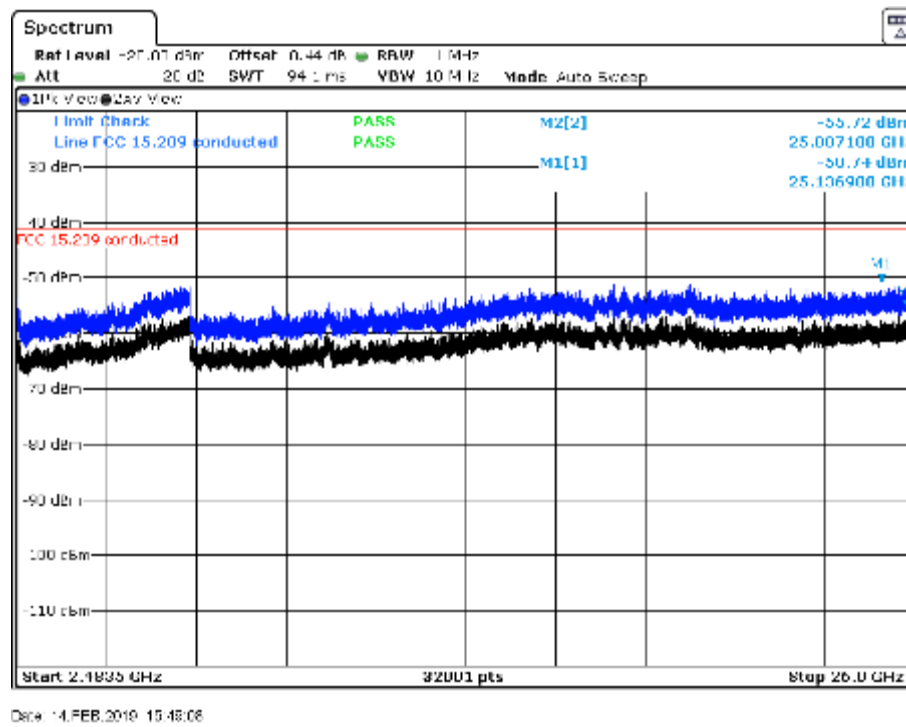
Product Service

Mode 802.11n, 20MHz, MCS0 – 2437 MHz





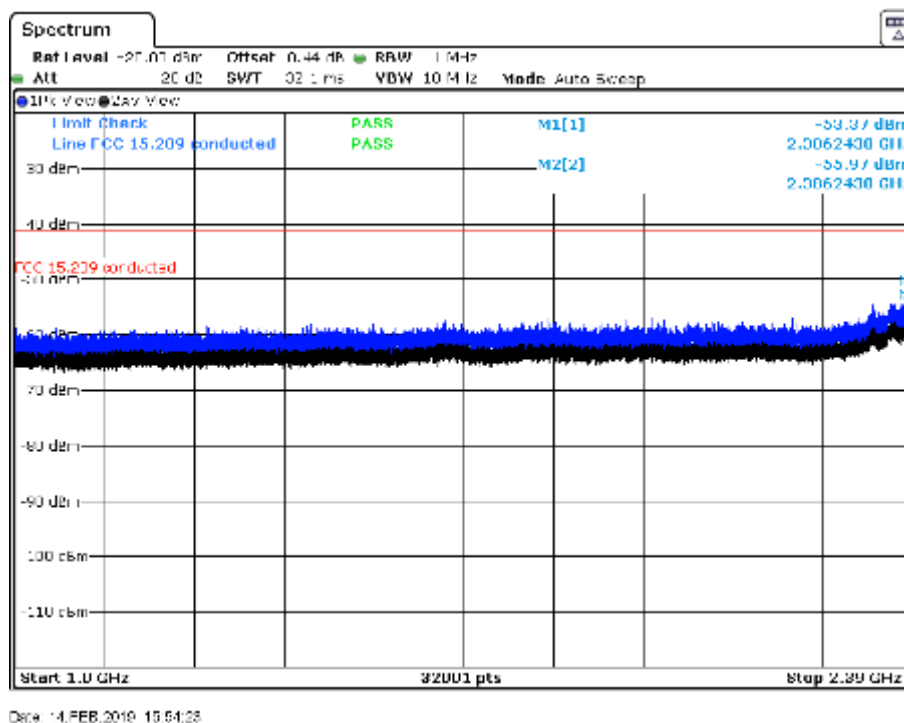
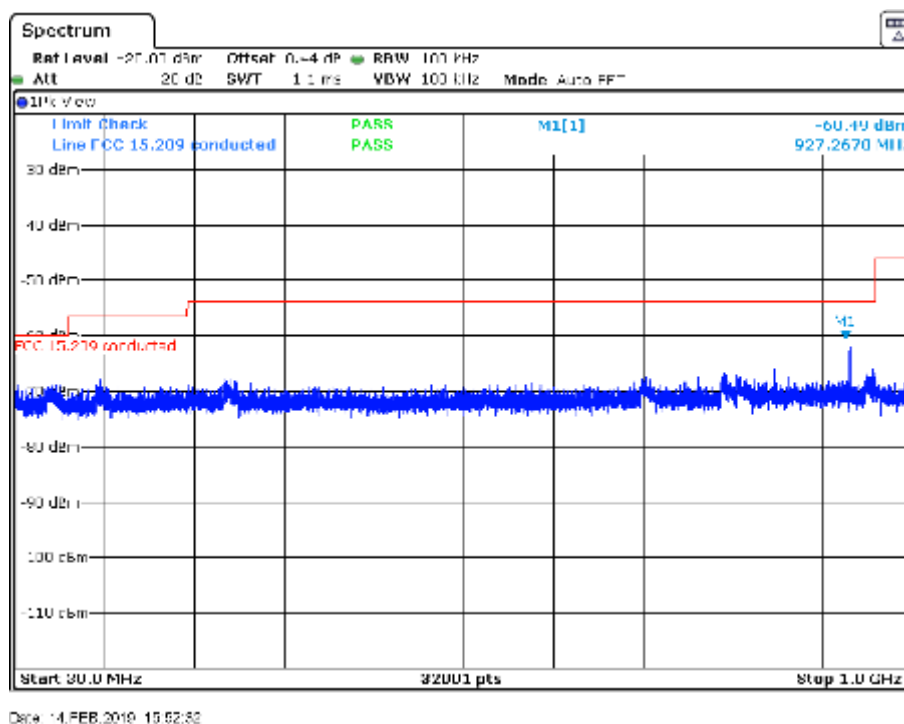
Product Service





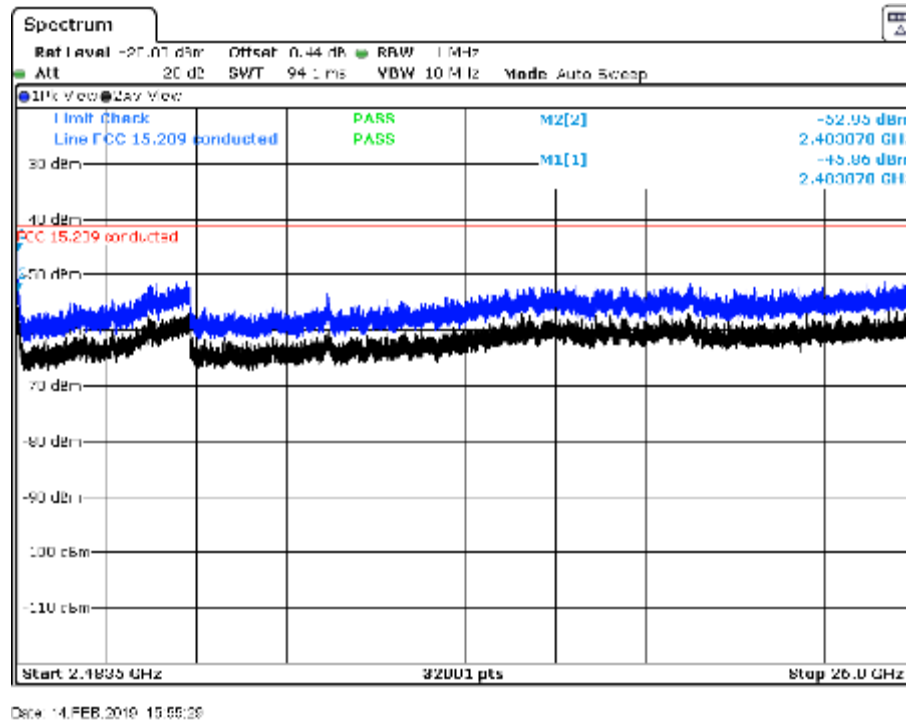
Product Service

Mode 802.11n, 20MHz, MCS0 – 2462 MHz





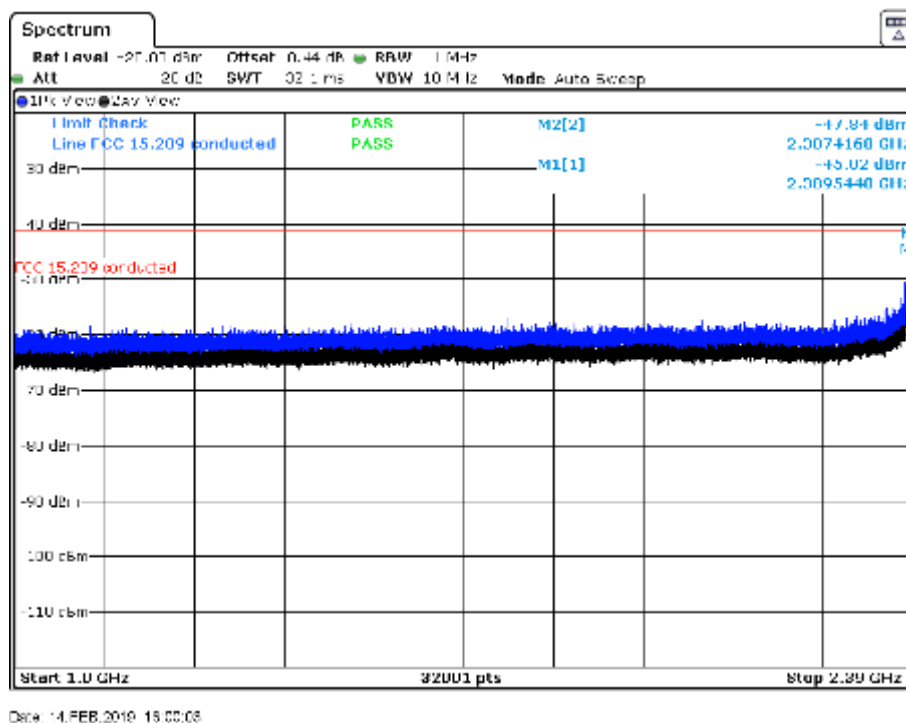
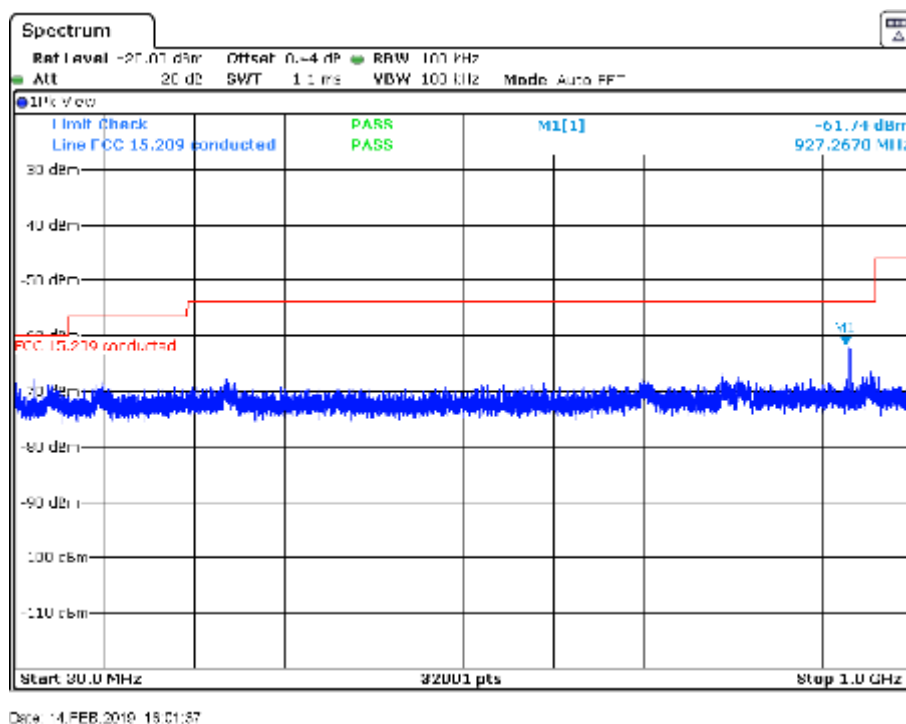
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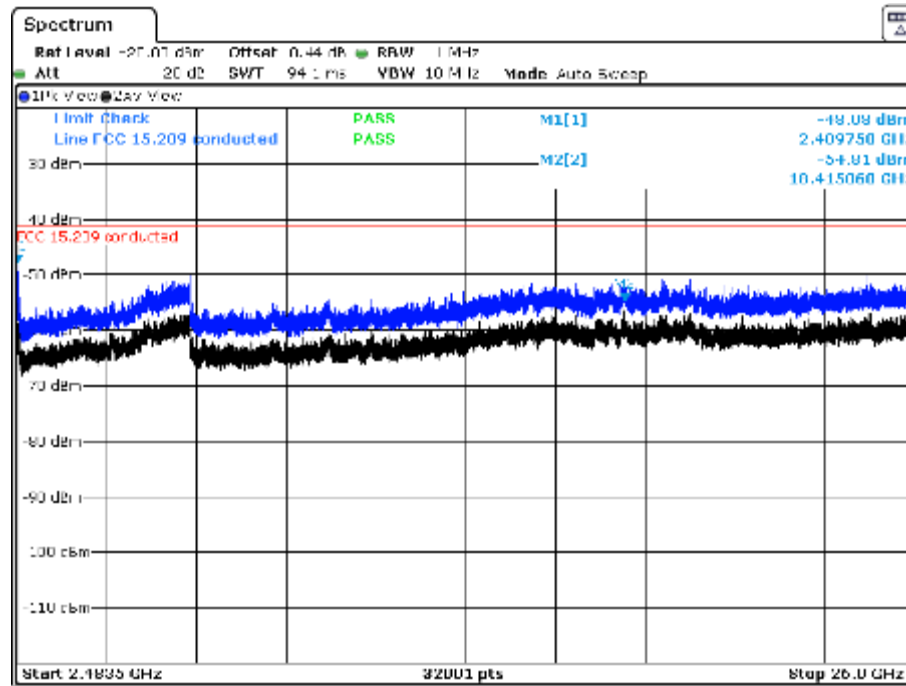
Product Service

Mode 802.11n, 40MHz, MCS8 – 2422 MHz





Product Service

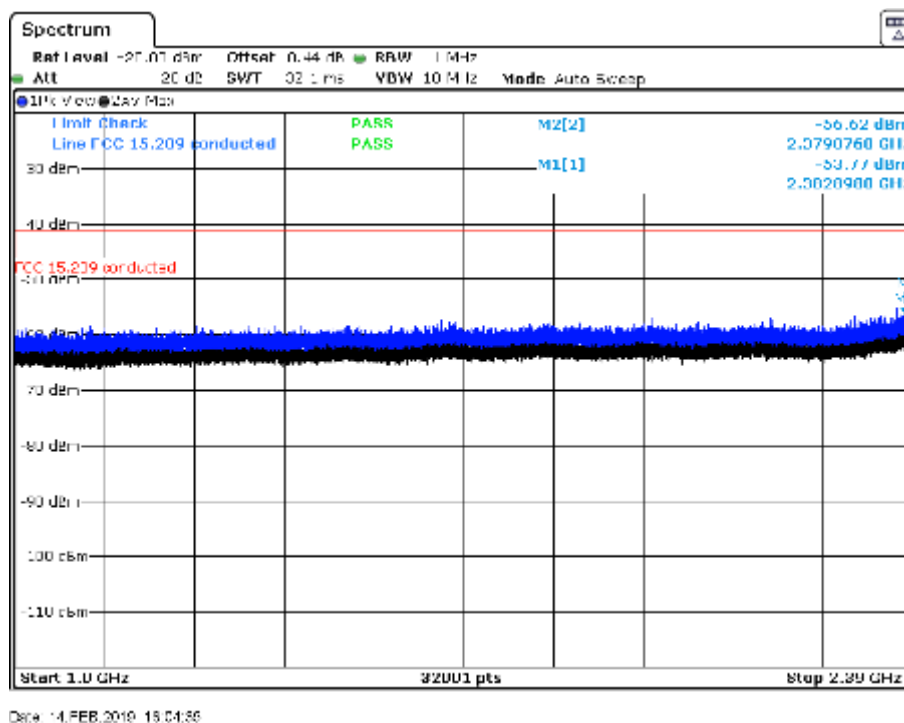
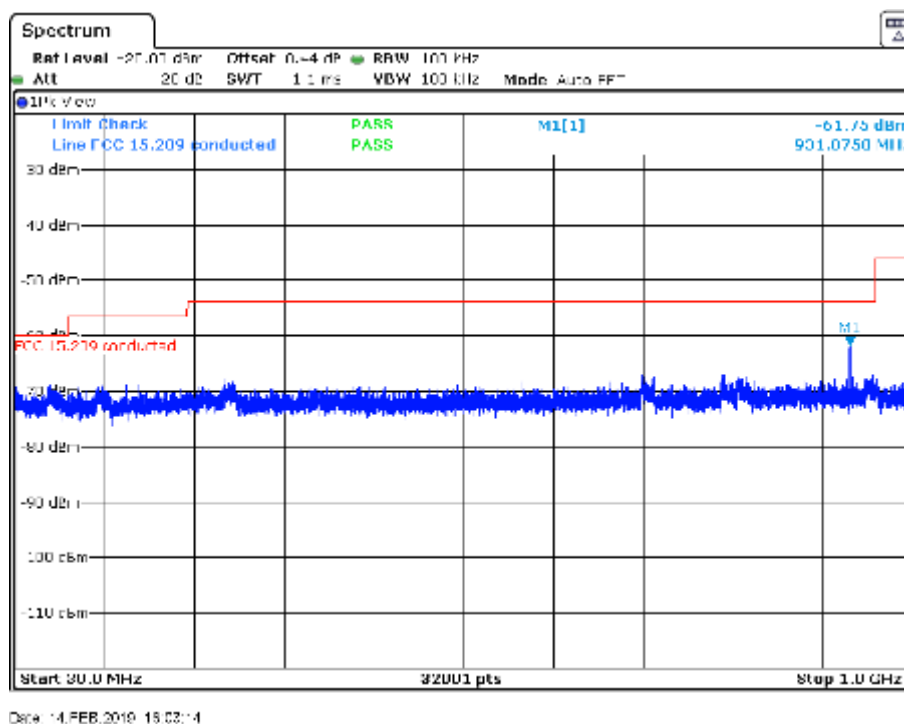


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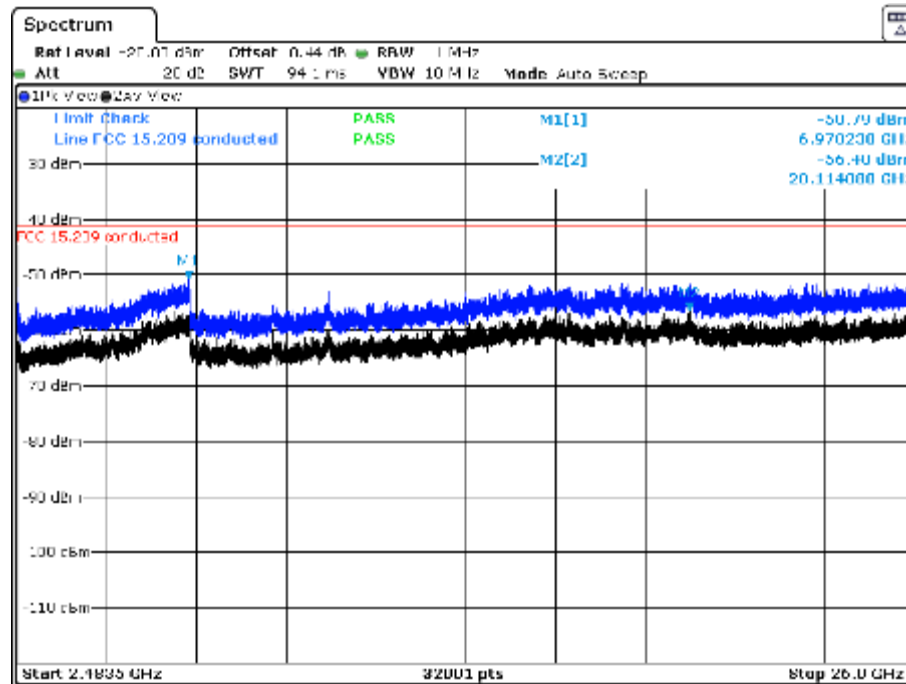
Product Service

Mode 802.11n, 40MHz, MCS8 – 2442 MHz





Product Service

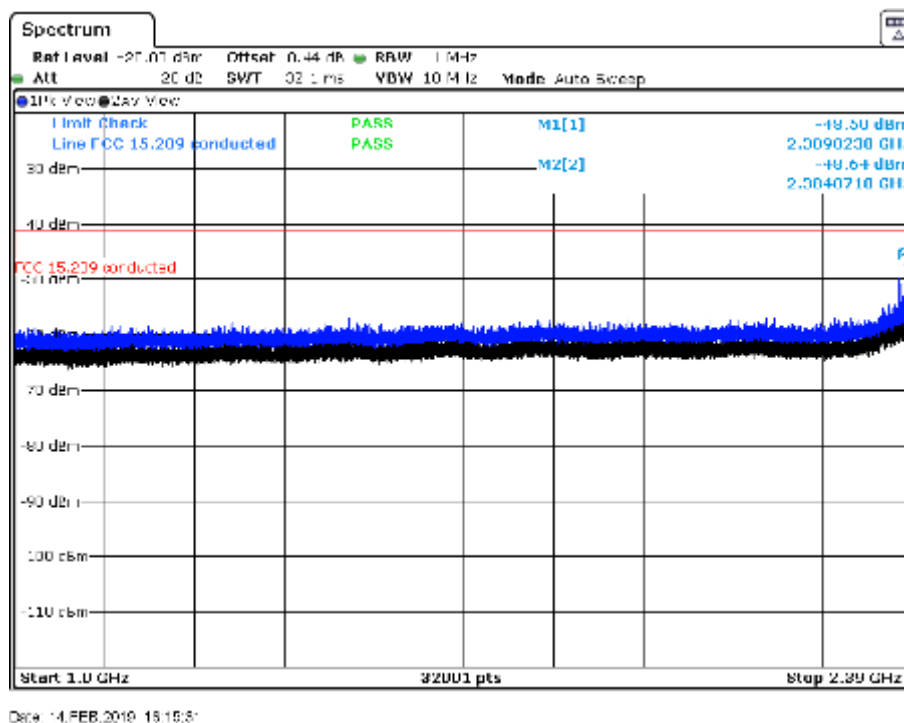
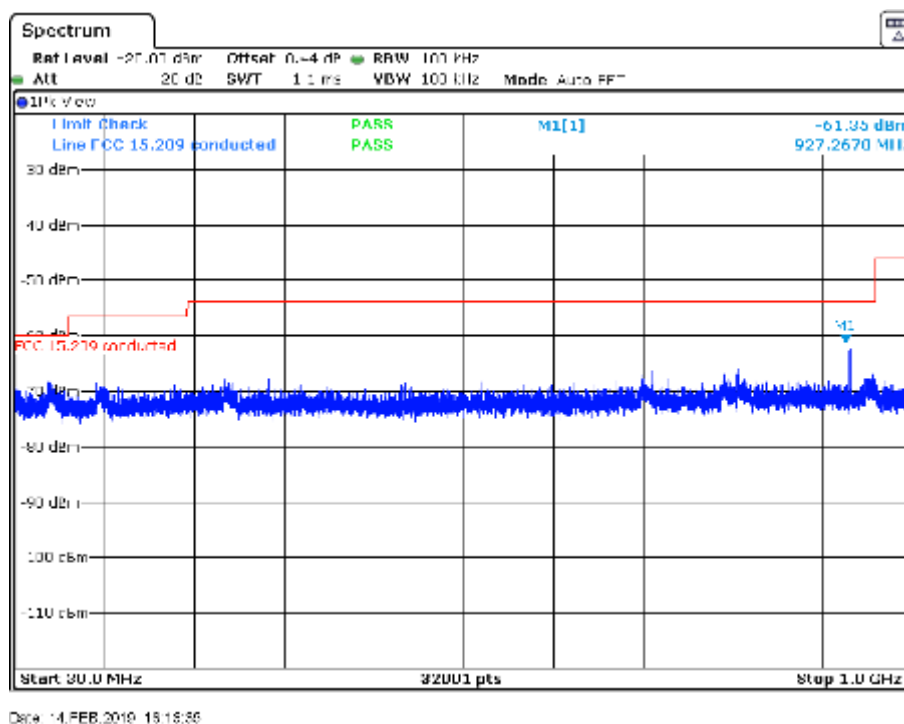


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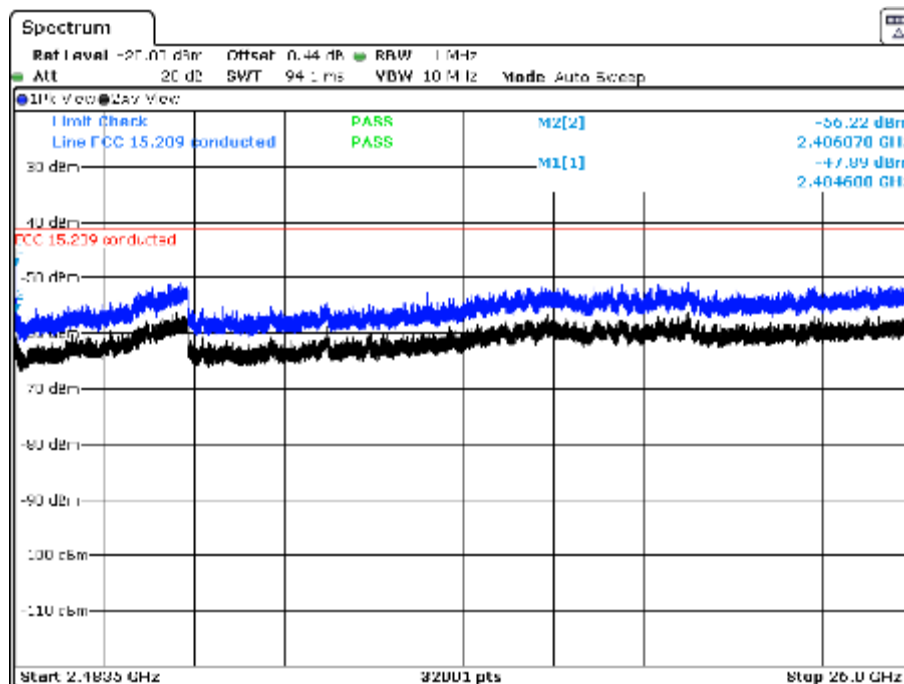
Product Service

Mode 802.11n, 40MHz, MCS8 – 2462 MHz





Product Service



Date: 14.FEB.2019 15:12:43



FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength ($\mu\text{V}/\text{m}$ at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 8

ISED Canada RSS-GEN, Limit Clause 8.9

Frequency (MHz)	Field Strength ($\mu\text{V}/\text{m}$ at 3 metres)
30-88	100
88-216	150
216-960	200
Above 960*	500

Table 9

*Unless otherwise specified, for all frequencies greater than 1 GHz, the radiated emission limits for licence-exempt radio apparatus stated in applicable RSSs (including RSS-Gen) are based on measurements using a linear average detector function having a minimum resolution bandwidth of 1 MHz. If an average limit is specified for the EUT, then the peak emission shall also be measured with instrumentation properly adjusted for such factors as pulse desensitization to ensure the peak emission is less than 20 dB above the average limit.

2.3.7 Test Location and Test Equipment Used

Conducted test was carried out in Non-shielded room with Test system TS8997.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde&Schwarz	FSV40	20219	12	2020-01-31
Vector Signal Generator	Rohde&Schwarz	SMBV100A	20238	24	2019-10-31
Signal Generator	Rohde&Schwarz	SMB100A	20215	36	2021-03-31
Switching Device	Rohde&Schwarz	OSP120 I	20248	24	2020-01-31
Switching Device	Rohde&Schwarz	OSP120 II	38807	24	2020-09-30
Radio Communication Tester	Rohde&Schwarz	CMW500	38845	12	2019-09-30
EMC Measurement Software	Rohde&Schwarz	EMC32	19719	---	---

Table 10

Radiated Test was carried out in FAR No.8

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESW26	28268	12	2019-05-31
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	19918	36	2019-07-31
Horn Antenna	Rohde&Schwarz	HF907	19933	24	2029-06-30
Semi Anechoic Room	Albatross	Cabin No. 8	19917	36	2020-09-30
EMC Measurement Software	Rohde&Schwarz	EMC32	23229	---	---

Table 11

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment
N/A - Not Applicable



Product Service

2.4 Authorised Band Edges

2.4.1 Specification Reference

FCC 47 CFR Part 15C, ISED Canada RSS-247 and ISED Canada RSS-GEN, Clause 15.247 (d), 5.5 and N/A

2.4.2 Equipment Under Test and Modification State

Porsche Home Energy Manager, S/N: M186 HCM-C1.1 - Modification State 0

2.4.3 Date of Test

2019-02-08 to 2019-03-08

2.4.4 Test Method

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v05 8.7 and ANSI C63.10-2013

2.4.5 Environmental Conditions

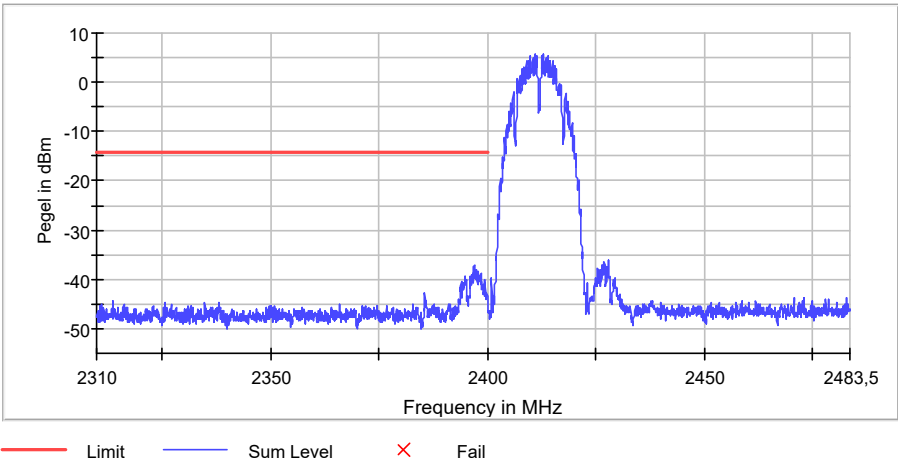
Ambient Temperature	24,0 °C
Relative Humidity	26,0 %



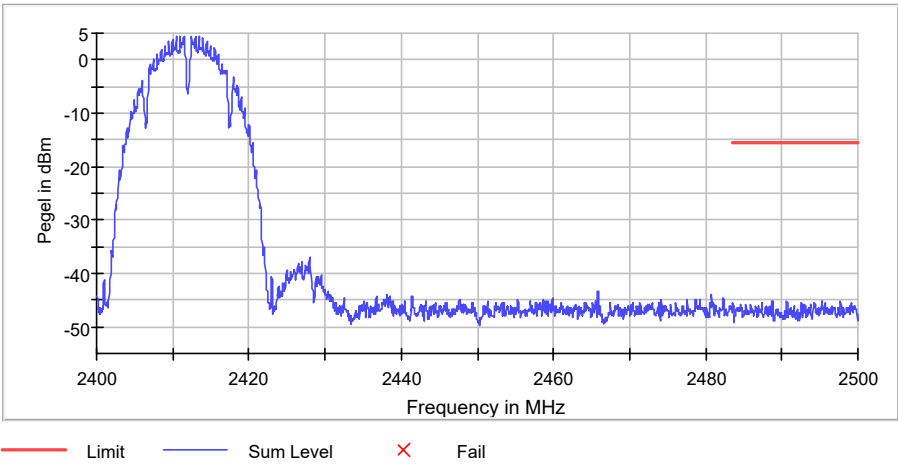
2.4.6 Test Results

Mode 802.11b, 20MHz, 1Mbps – 2412 MHz

Band Edge Low



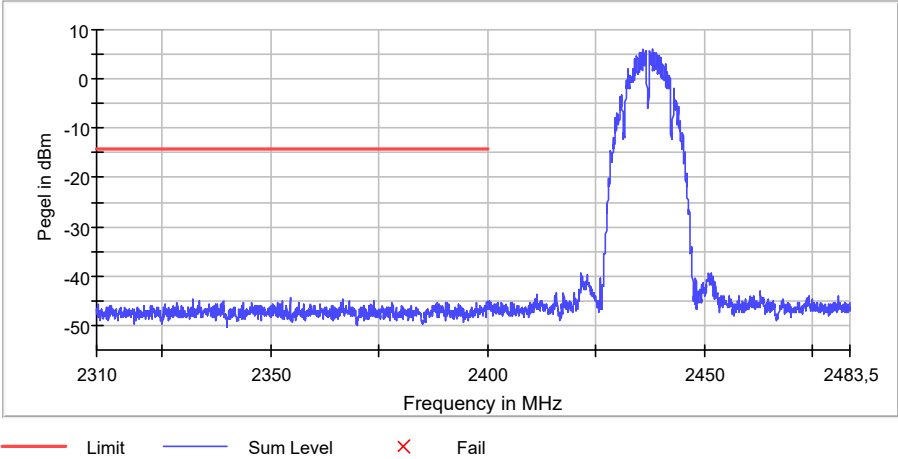
Band Edge High



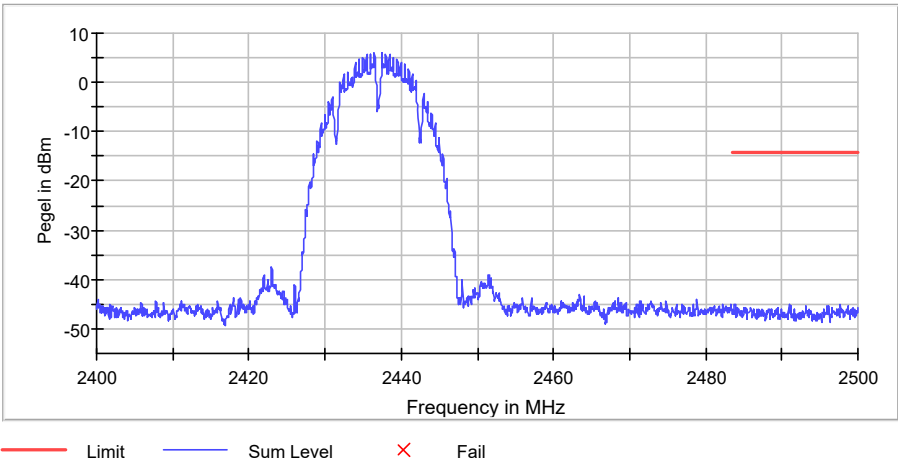


Mode 802.11b, 20MHz, 1Mbps – 2437 MHz

Band Edge Low



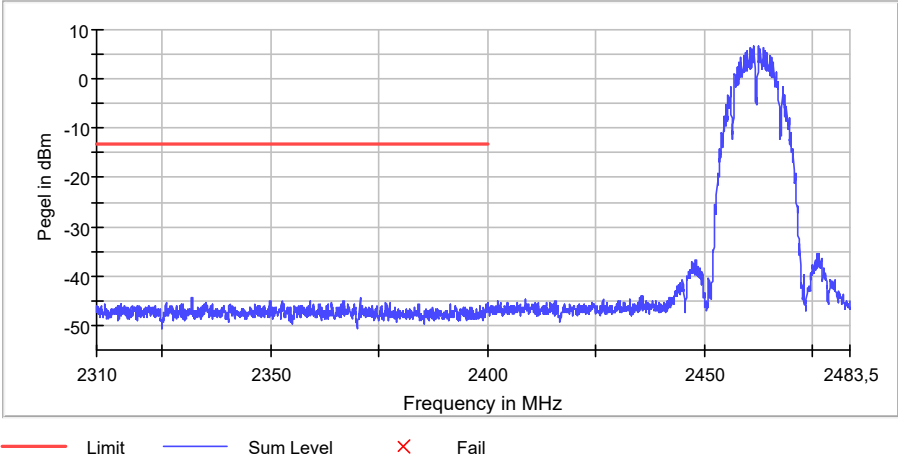
Band Edge High



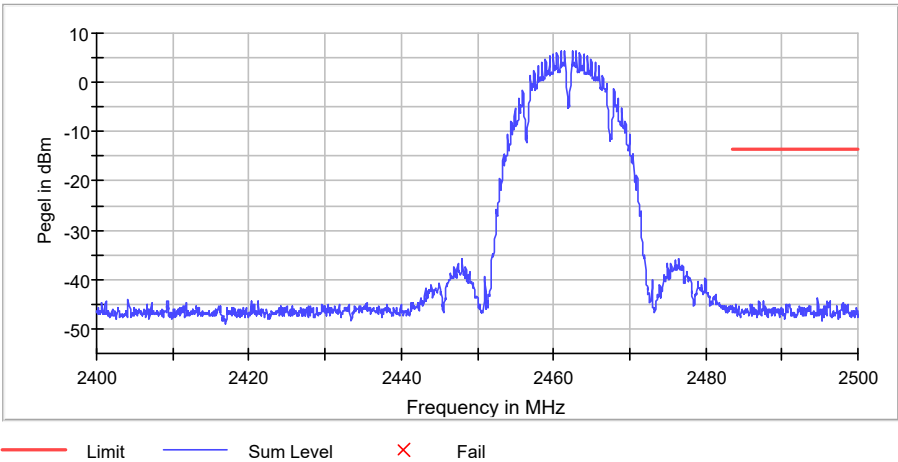


Mode 802.11b, 20MHz, 1Mbps – 2462 MHz

Band Edge Low



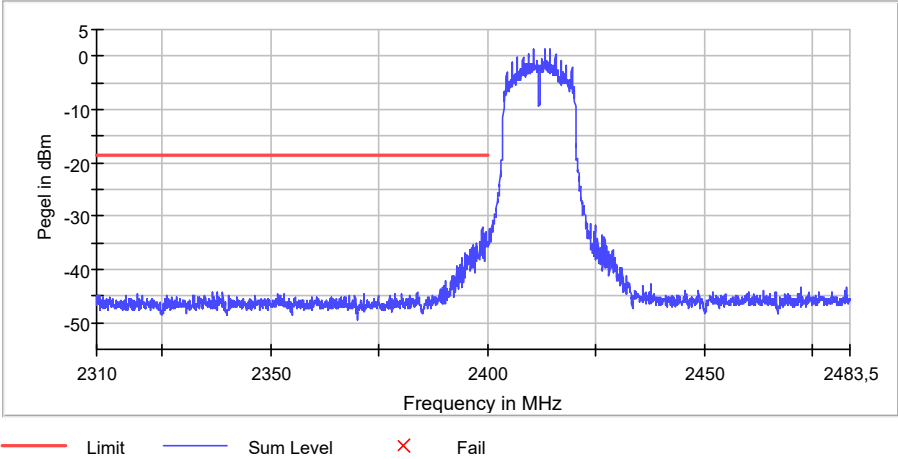
Band Edge High



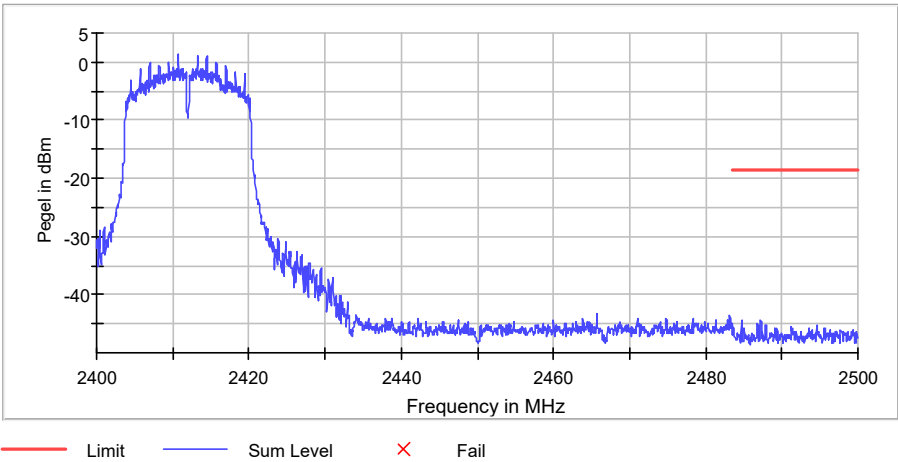


Mode 802.11g, 20MHz, 6Mbps – 2412 MHz

Band Edge Low



Band Edge High

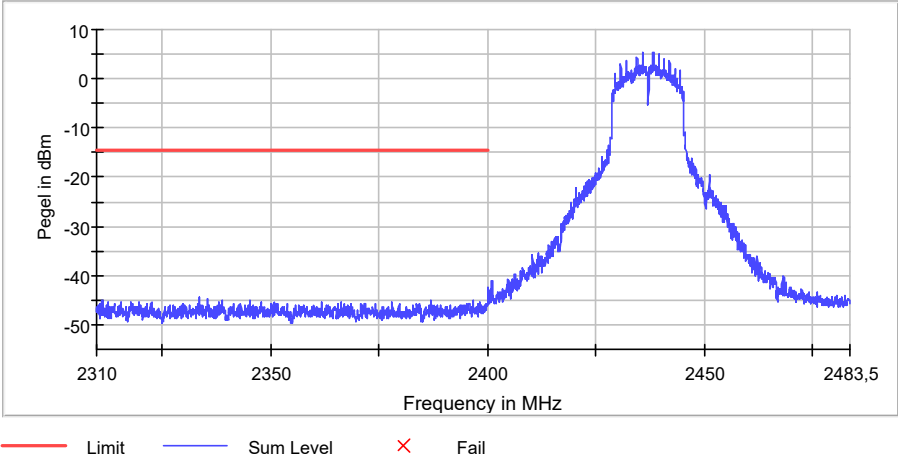




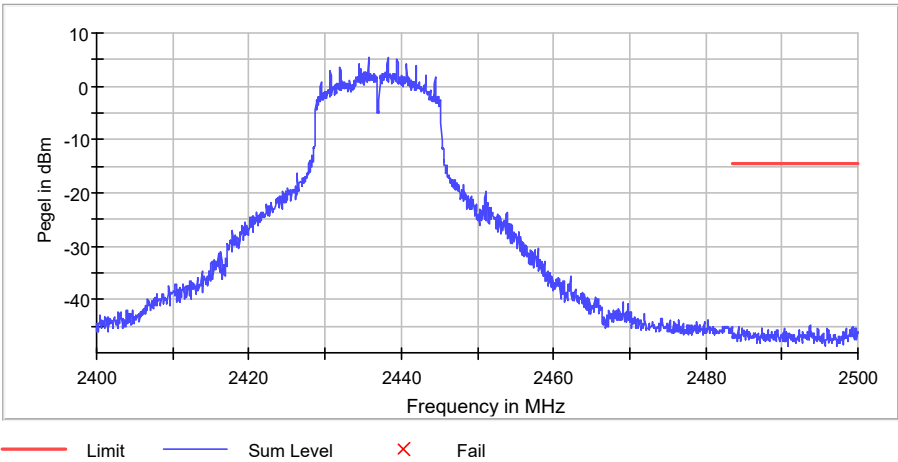
Product Service

Mode 802.11g, 20MHz, 6Mbps – 2437 MHz

Band Edge Low



Band Edge High

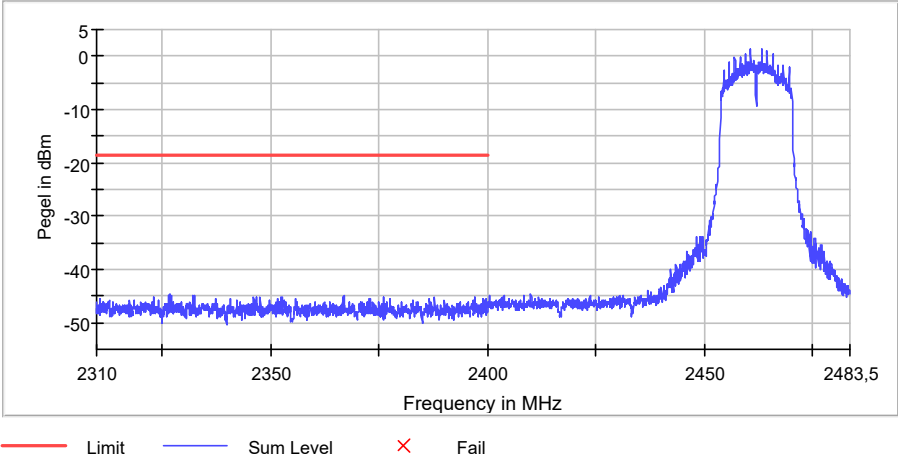




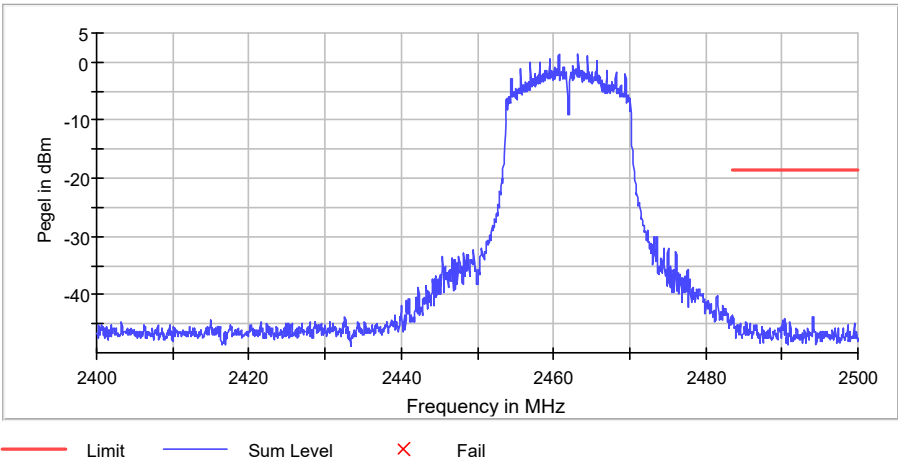
Product Service

Mode 802.11g, 20MHz, 6Mbps – 2462 MHz

Band Edge Low



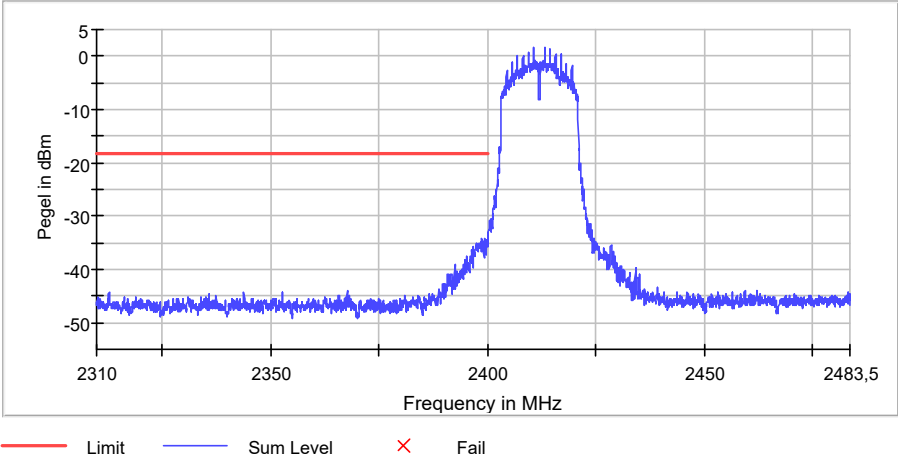
Band Edge High



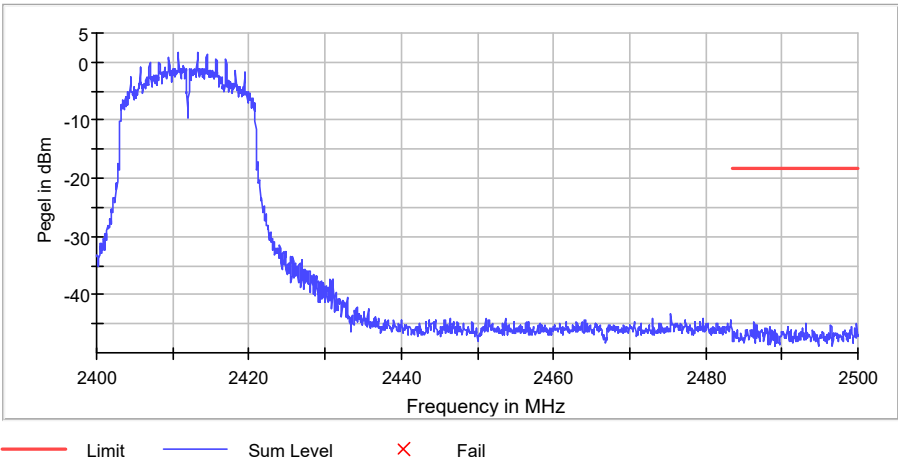


Mode 802.11n, 20MHz, MCS0 – 2412 MHz

Band Edge Low



Band Edge High

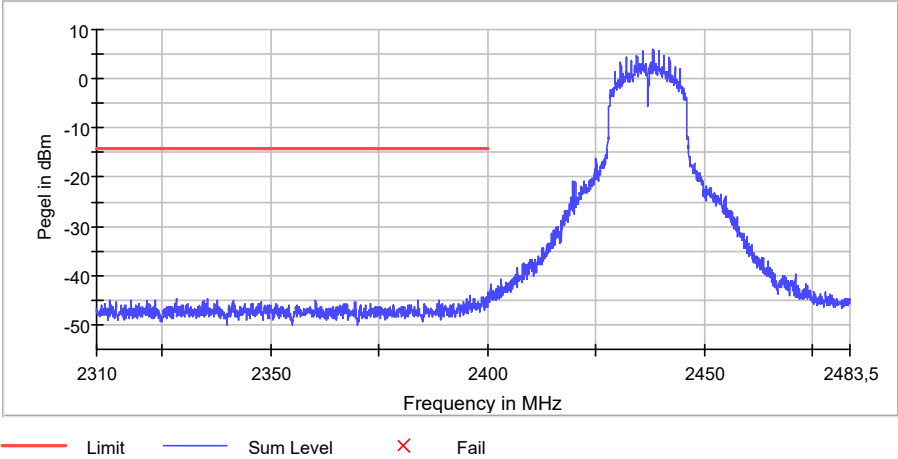




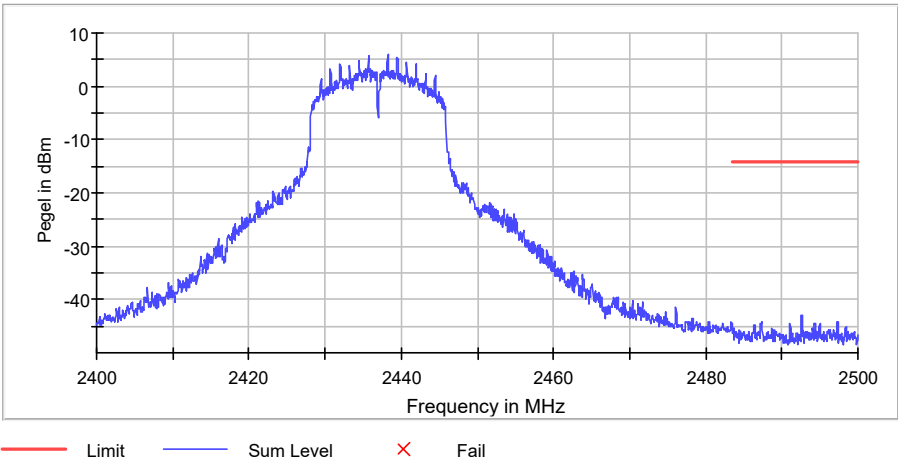
Product Service

Mode 802.11n, 20MHz, MCS0 – 2462 MHz

Band Edge Low



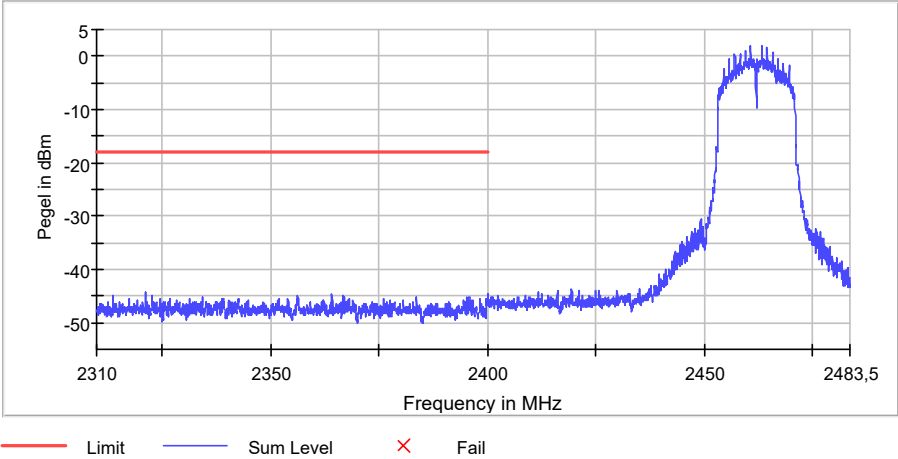
Band Edge High



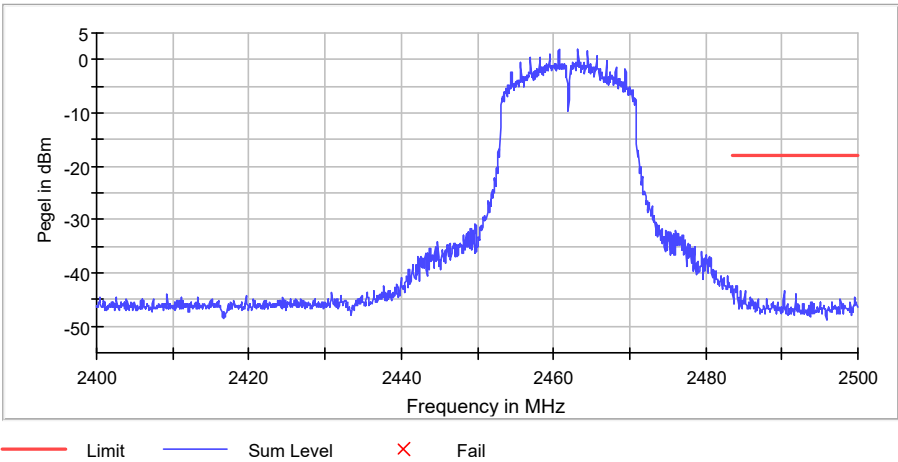


Mode 802.11n, 20MHz, MCS0 – 2462 MHz

Band Edge Low



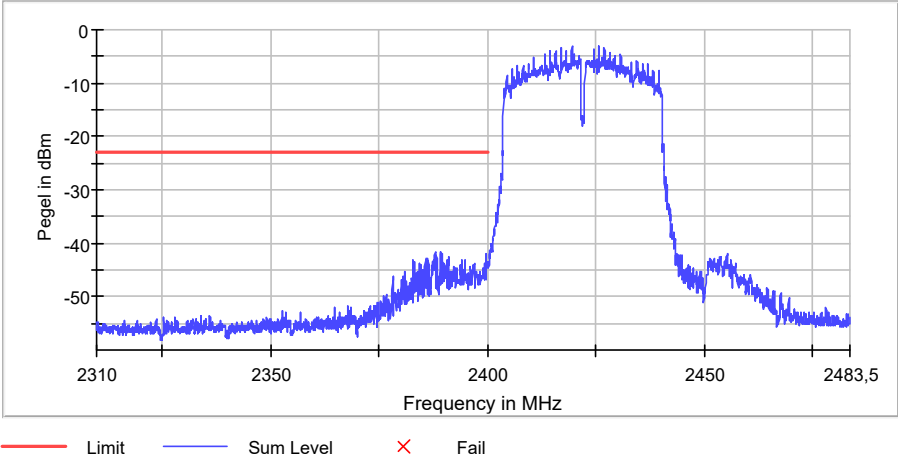
Band Edge High



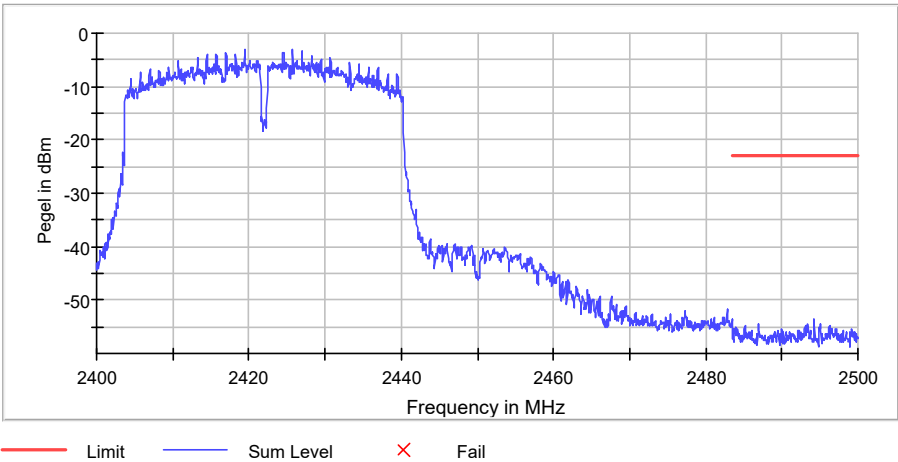


Mode 802.11n, 40MHz, MCS8 – 2422 MHz

Band Edge Low



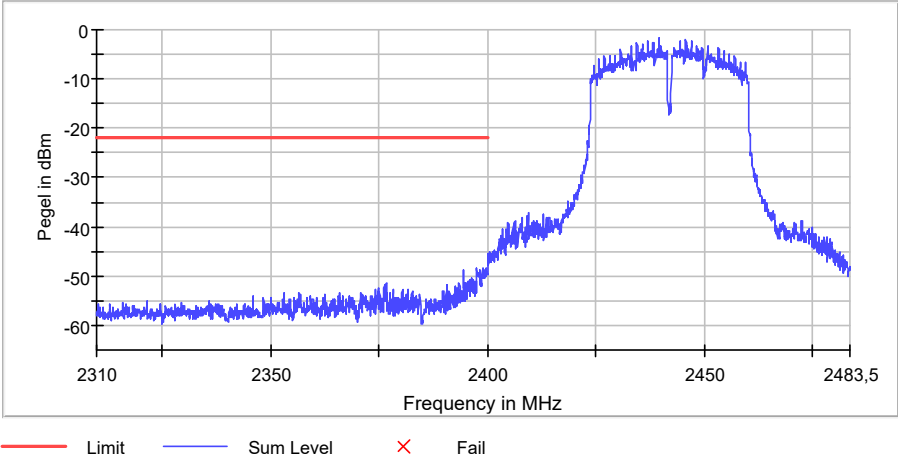
Band Edge High



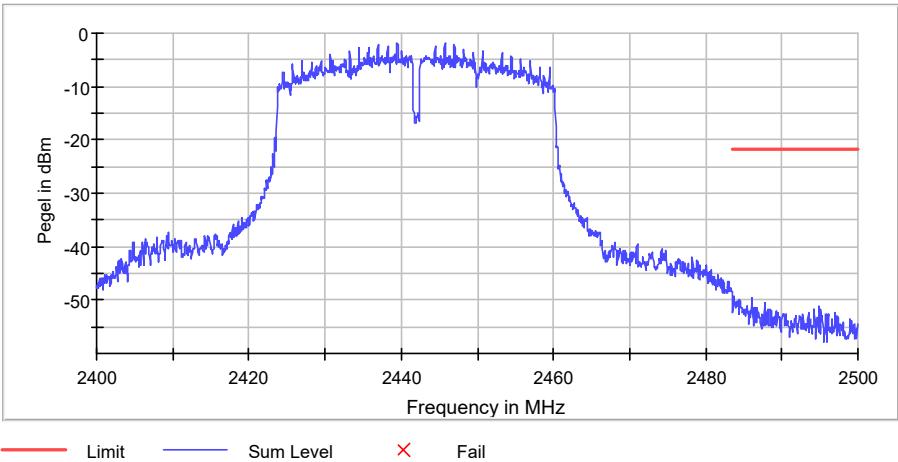


Mode 802.11n, 40MHz, MCS8 – 2442 MHz

Band Edge Low



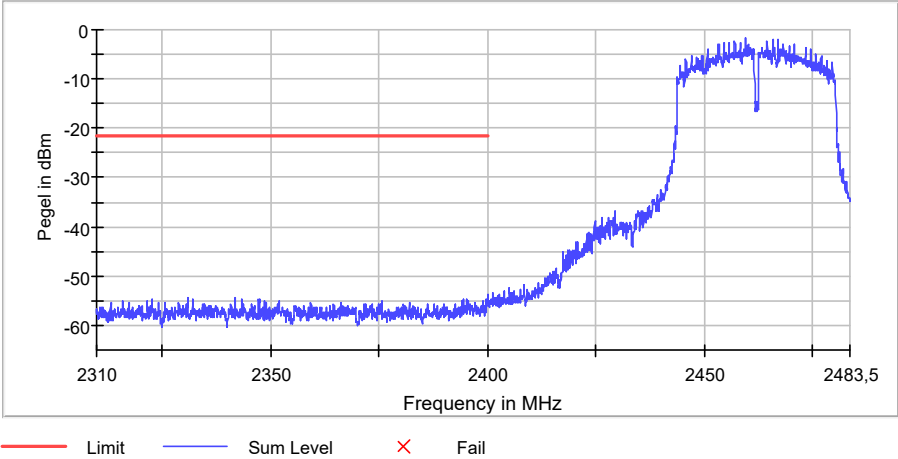
Band Edge High



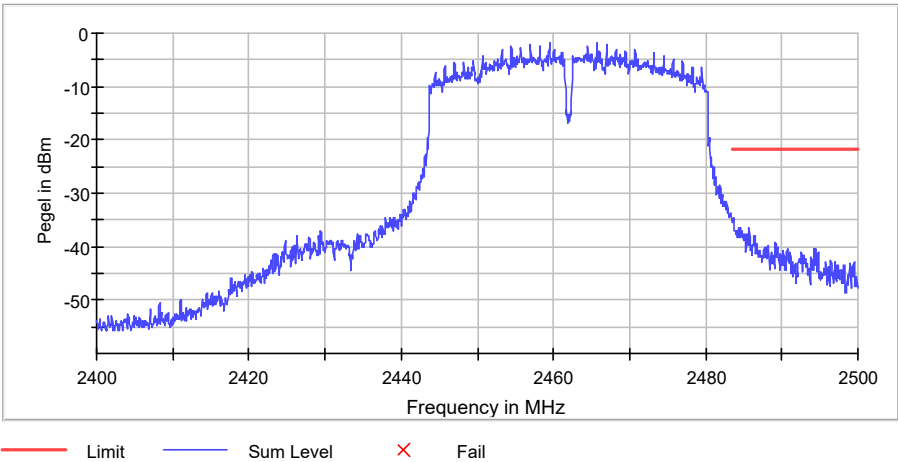


Mode 802.11n, 40MHz, MCS8 – 2462 MHz

Band Edge Low



Band Edge High



FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

ISED Canada RSS-247, Limit Clause 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

2.4.7 Test Location and Test Equipment Used

Conducted test was carried out in Non-shielded room with Test system TS8997.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde&Schwarz	FSV40	20219	12	2020-01-31
Vector Signal Generator	Rohde&Schwarz	SMBV100A	20238	24	2019-10-31
Signal Generator	Rohde&Schwarz	SMB100A	20215	36	2021-03-31
Switching Device	Rohde&Schwarz	OSP120 I	20248	24	2020-01-31
Switching Device	Rohde&Schwarz	OSP120 II	38807	24	2020-09-30
Radio Communication Tester	Rohde&Schwarz	CMW500	38845	12	2019-09-30
EMC Measurement Software	Rohde&Schwarz	EMC32	19719	---	---

Table 12

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



Product Service

2.5 Emission Bandwidth

2.5.1 Specification Reference

FCC 47 CFR Part 15C, ISED Canada RSS-247 and ISED Canada RSS-GEN, Clause 15.247 (a)(2), 5.2 and 6.6

2.5.2 Equipment Under Test and Modification State

Porsche Home Energy Manager, S/N: M186 HCM-C1.1 - Modification State 0

2.5.3 Date of Test

2019-02-08

2.5.4 Test Method

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.8.1

2.5.5 Environmental Conditions

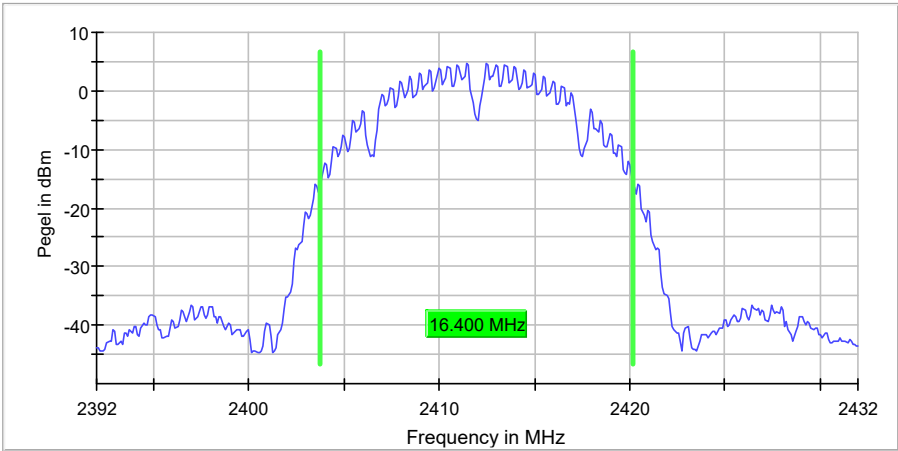
Ambient Temperature	24,0 °C
Relative Humidity	26,0 %



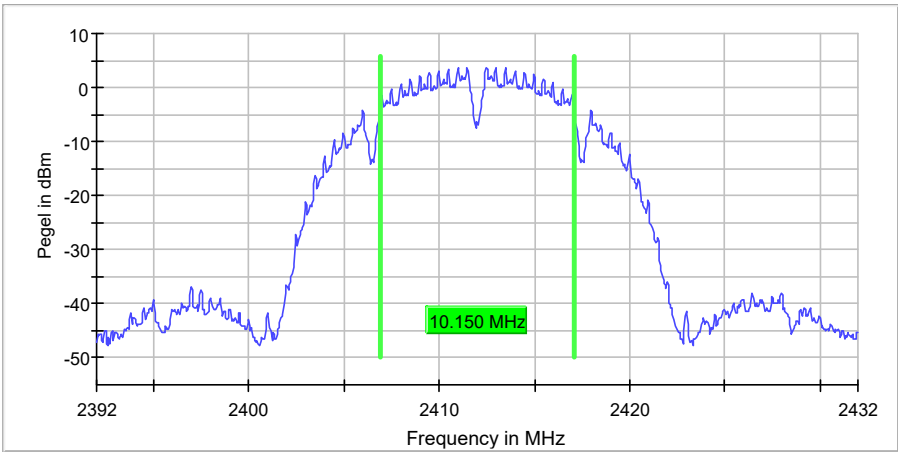
Product Service

2.5.6 Test Results

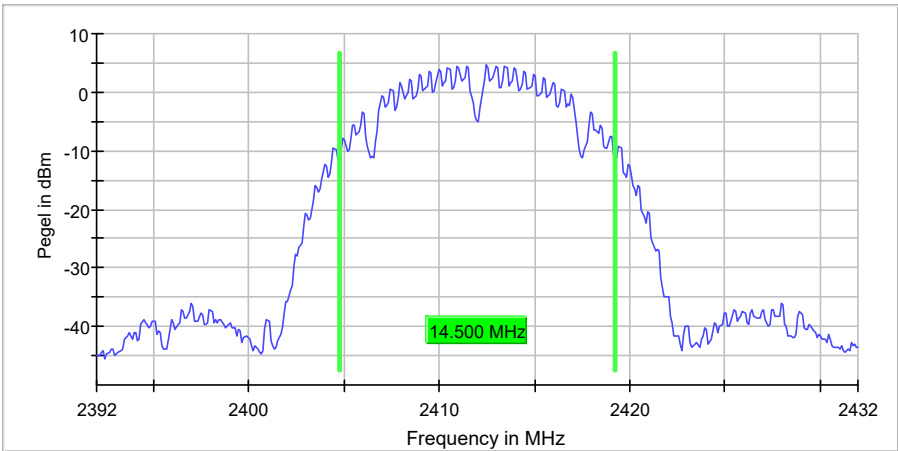
Operating Mode	Frequency (MHz)	20 dB Bandwidth (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11b, 20MHz, 1Mbps	2412	16.4	10.15	14.5
802.11b, 20MHz, 1Mbps	2437	16.4	10.15	14.5
802.11b, 20MHz, 1Mbps	2462	16.4	10.15	14.4
802.11g, 20MHz, 6Mbps	2412	17.7	15.2	16.3
802.11g, 20MHz, 6Mbps	2437	19.3	15.2	17.1
802.11g, 20MHz, 6Mbps	2462	17.8	15.2	16.3
802.11n, 20MHz, MCS0	2412	18.9	15.2	17.5
802.11n, 20MHz, MCS0	2437	19.7	15.2	18.2
802.11n, 20MHz, MCS0	2462	19.0	15.2	17.4
802.11n, 40MHz, MCS8	2422	39.0	35.2	35.8
802.11n, 40MHz, MCS8	2442	39.3	35.2	36.0
802.11n, 40MHz, MCS8	2462	38.8	35.2	36.0



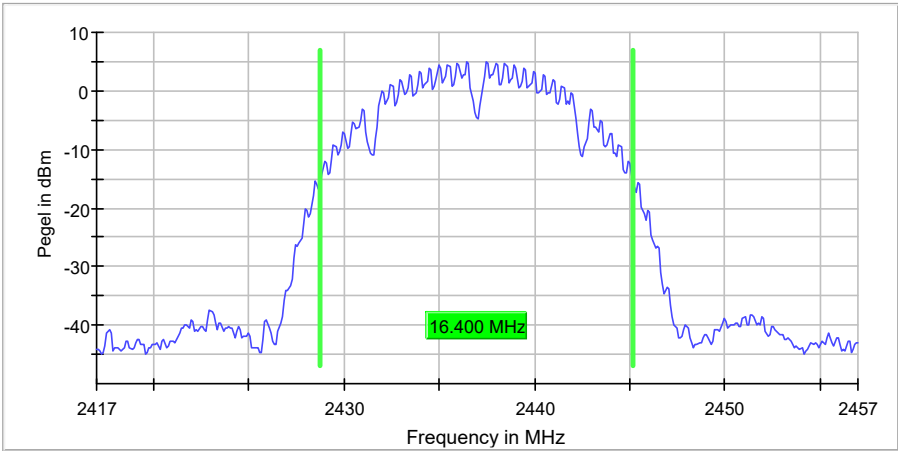
20dB-BW, 2412 MHz, 802.11b, 20MHz, 1Mbps



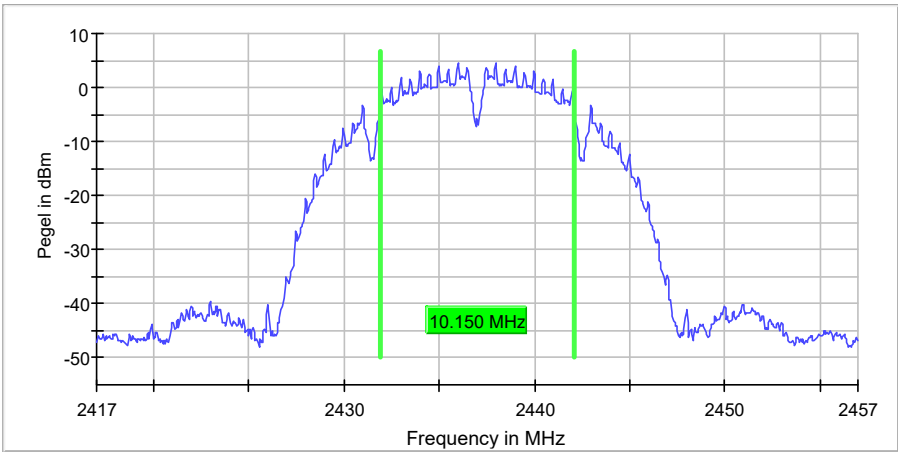
6dB-BW, 2412 MHz, 802.11b, 20MHz, 1Mbps



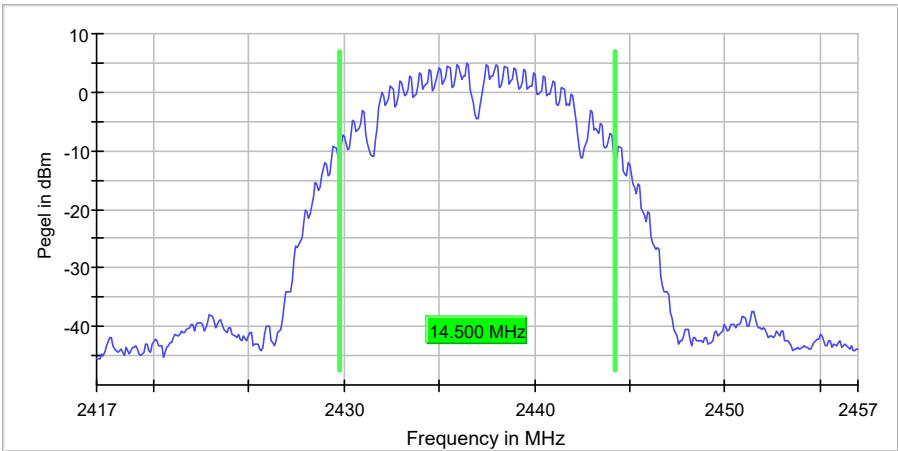
99%-BW, 2412 MHz, 802.11b, 20MHz, 1Mbps



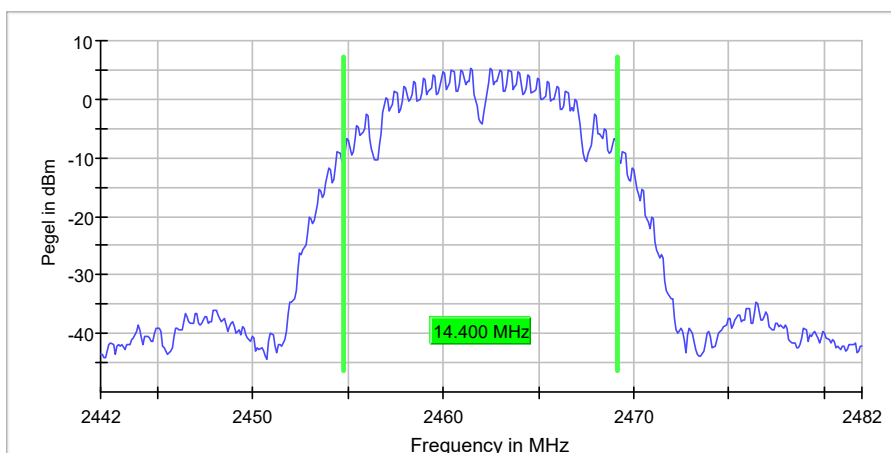
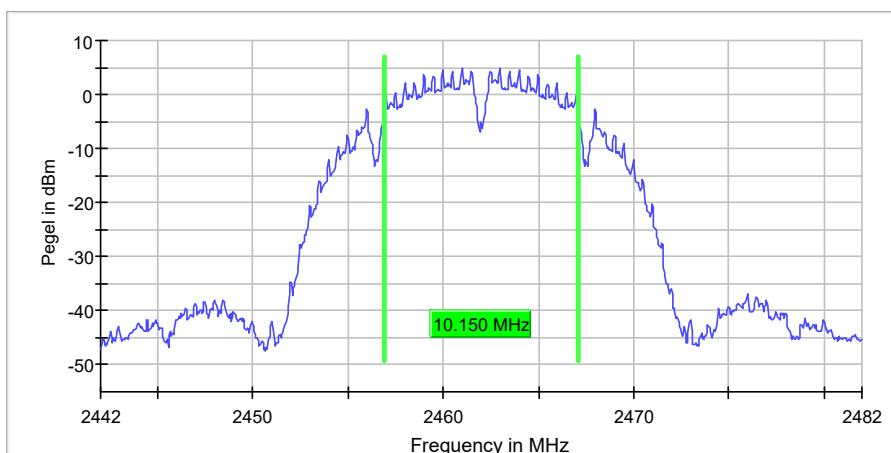
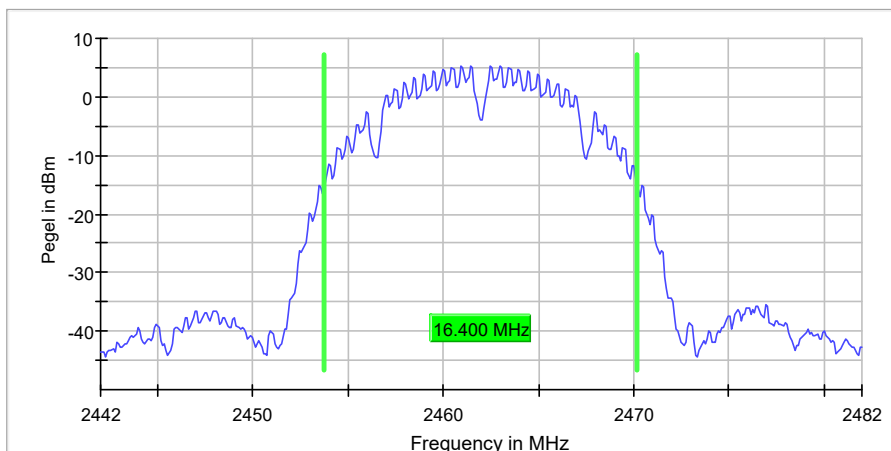
20dB-BW, 2437 MHz, 802.11b, 20MHz, 1Mbps

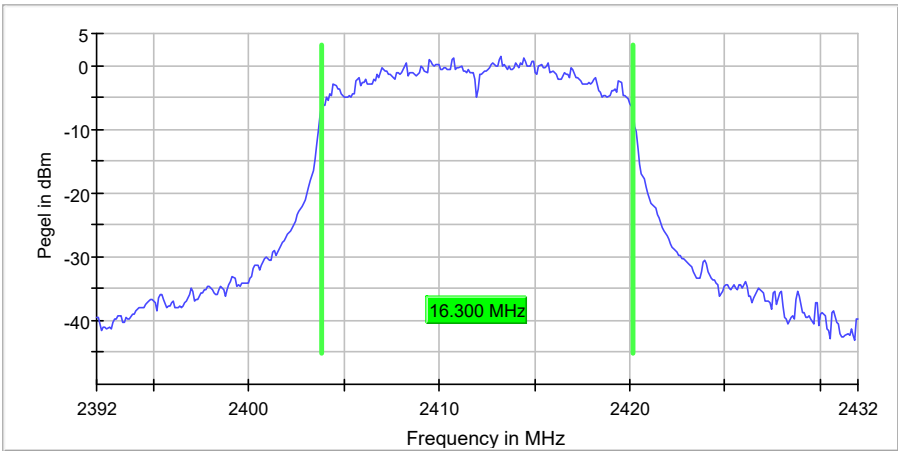
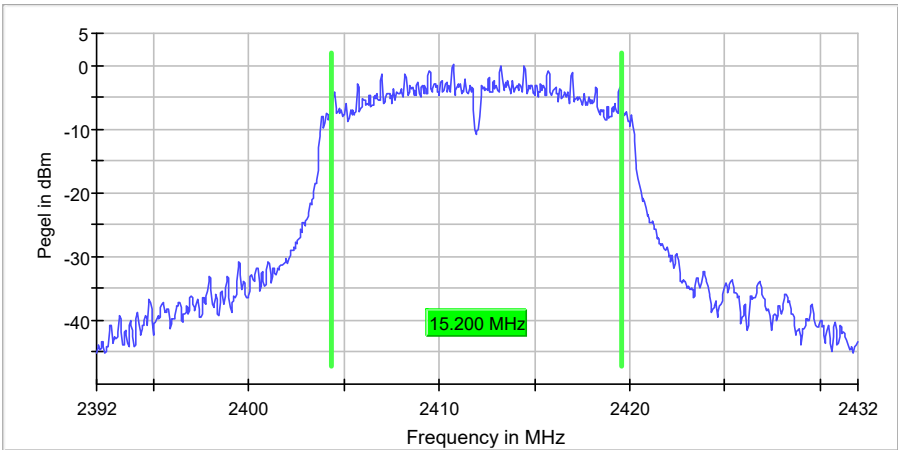
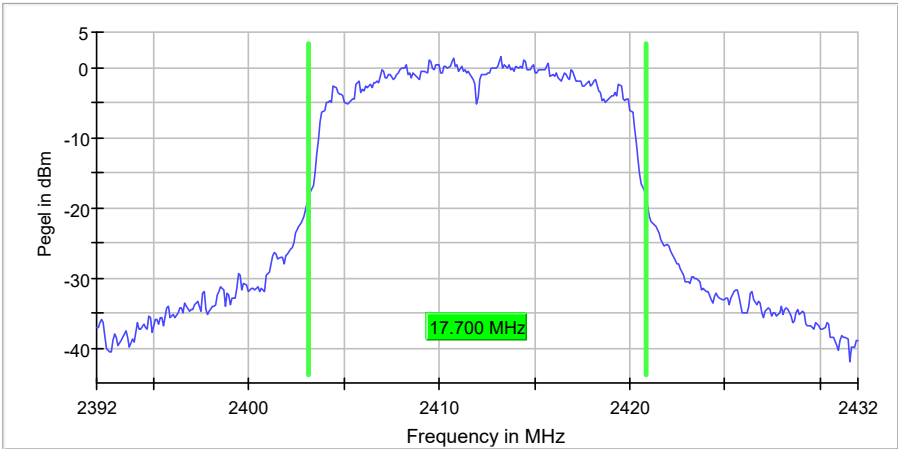


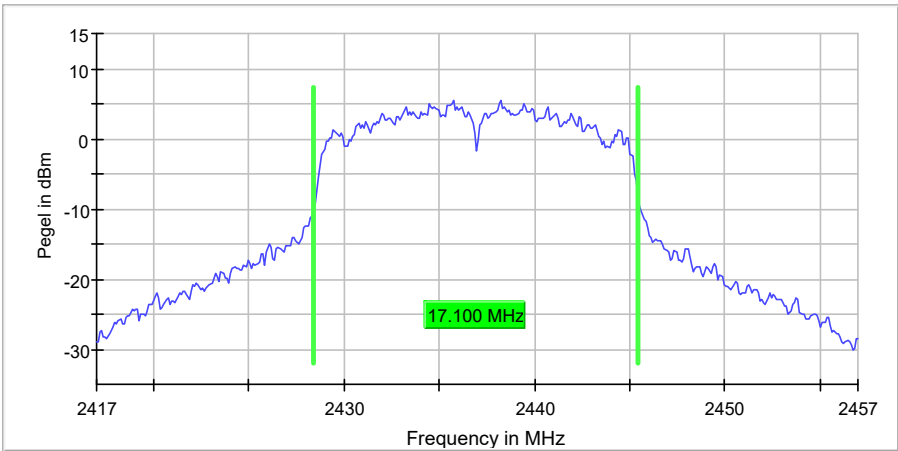
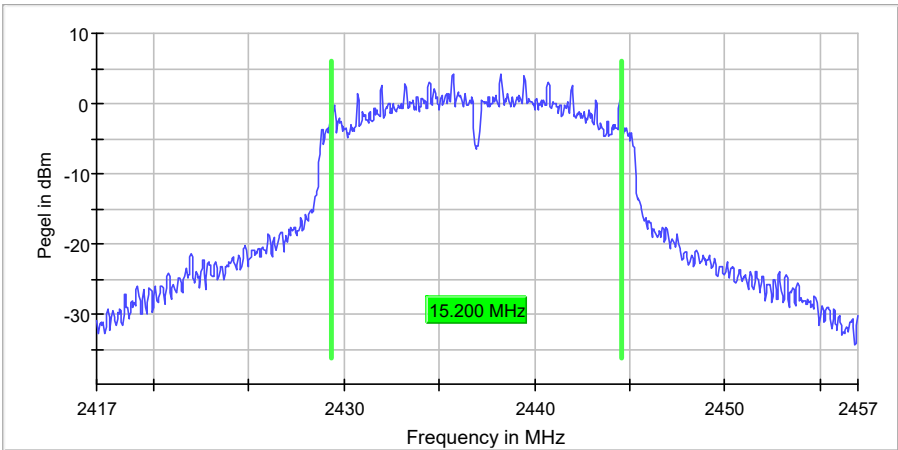
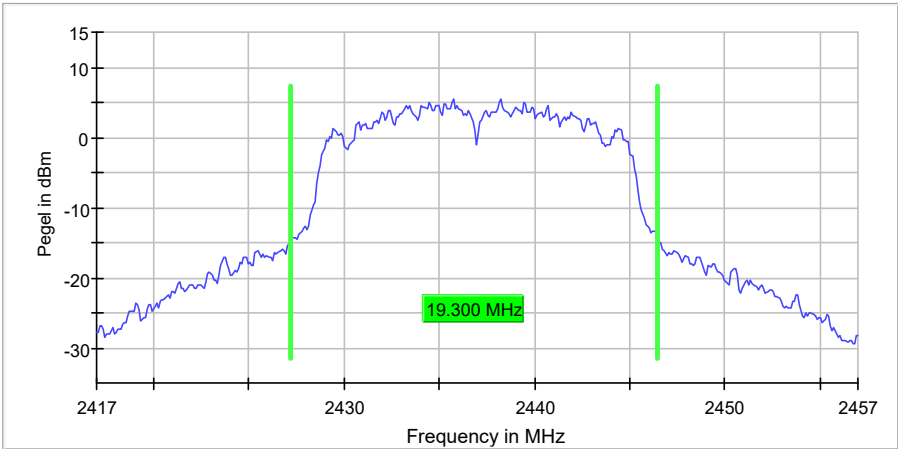
6dB-BW, 2437 MHz, 802.11b, 20MHz, 1Mbps

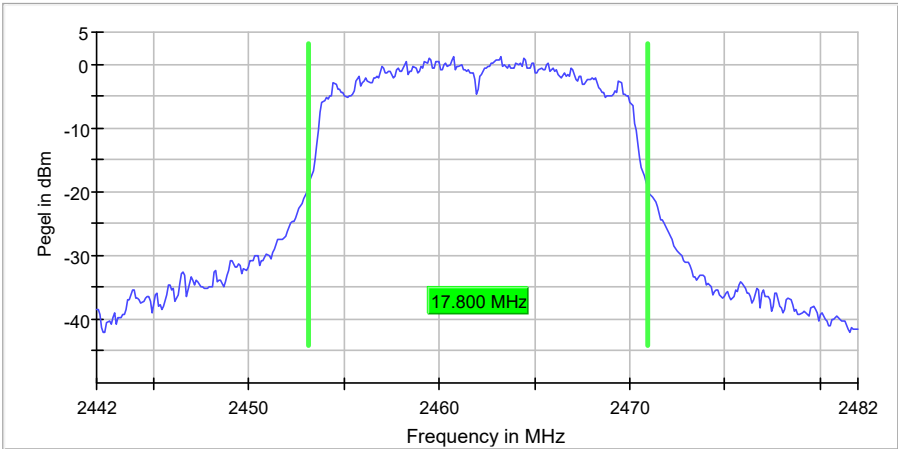


99%-BW, 2437 MHz, 802.11b, 20MHz, 1Mbps

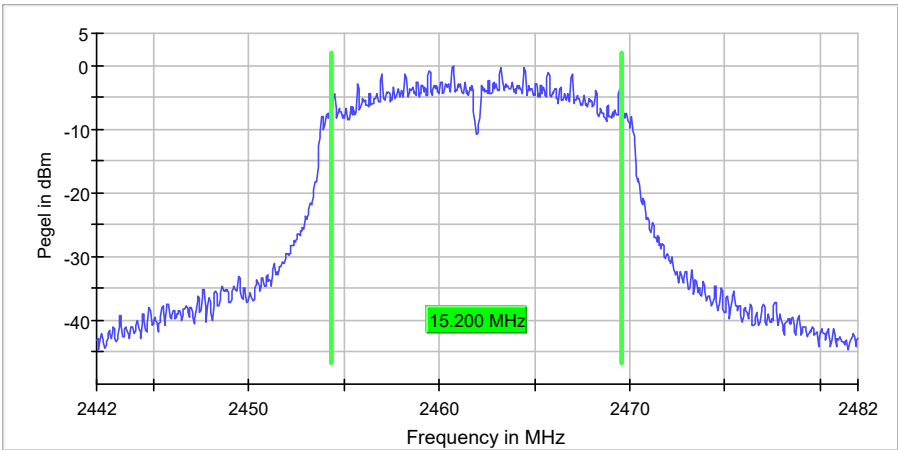




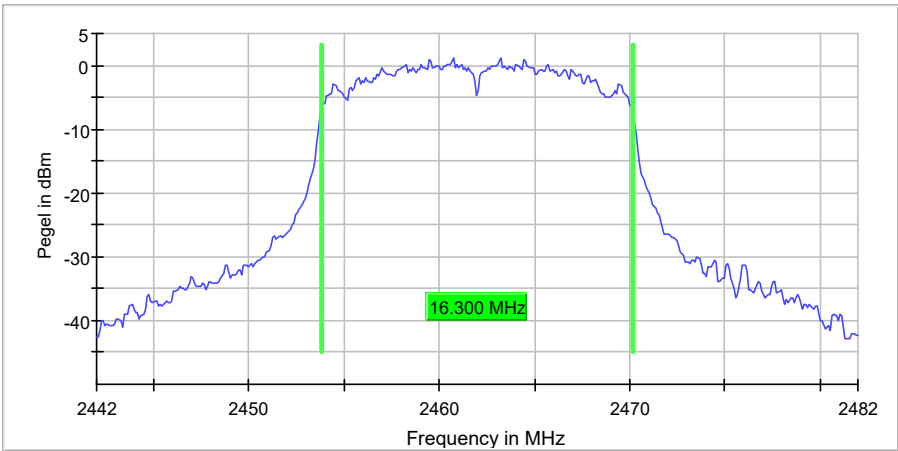




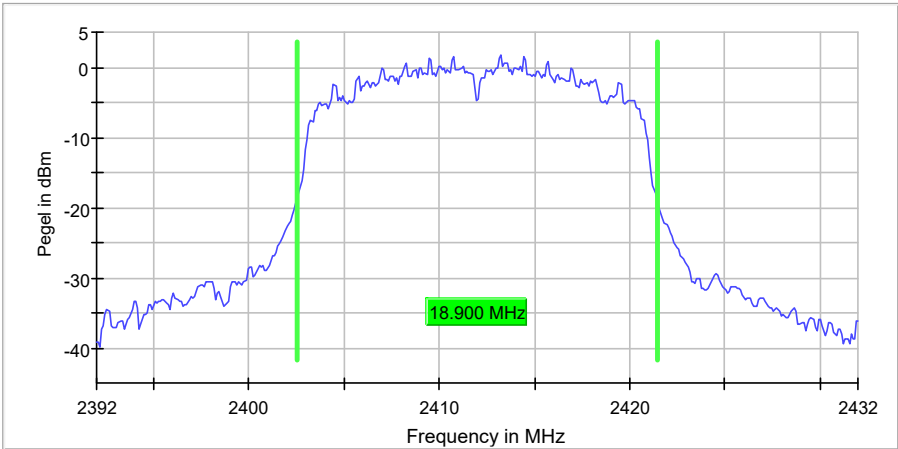
20dB-BW, 2437 MHz, 802.11g, 20MHz, 6Mbps



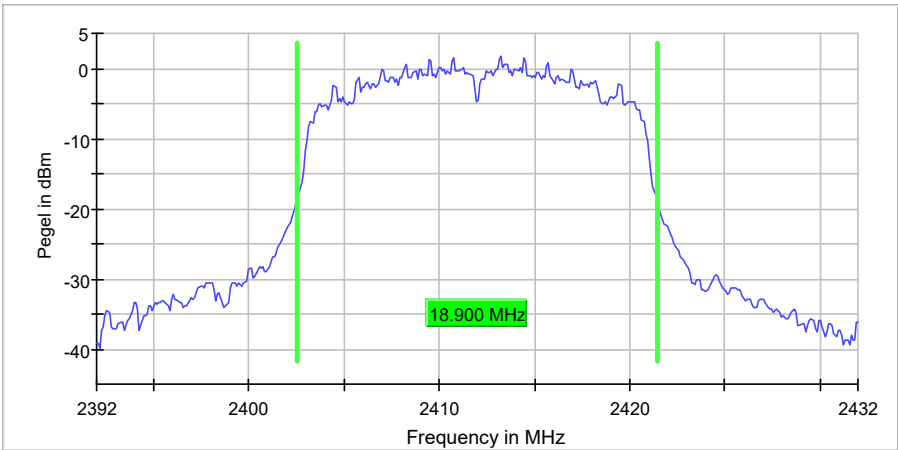
6dB-BW, 2437 MHz, 802.11g, 20MHz, 6Mbps



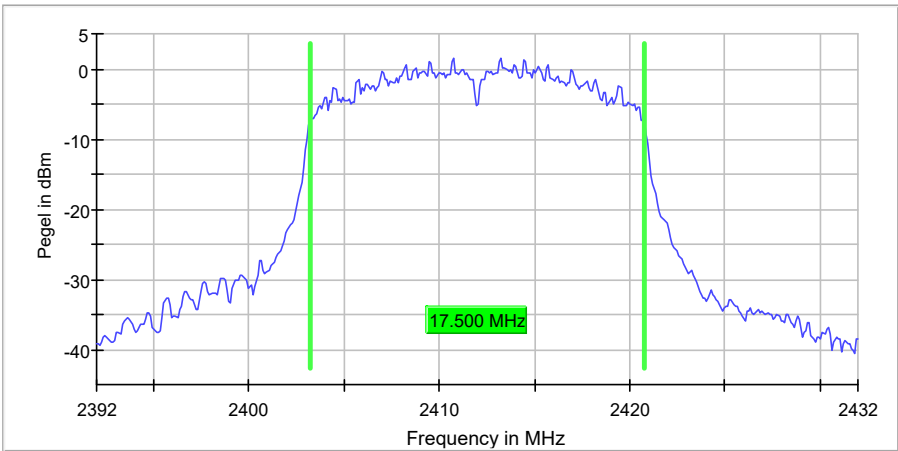
99%-BW, 2437 MHz, 802.11g, 20MHz, 6Mbps



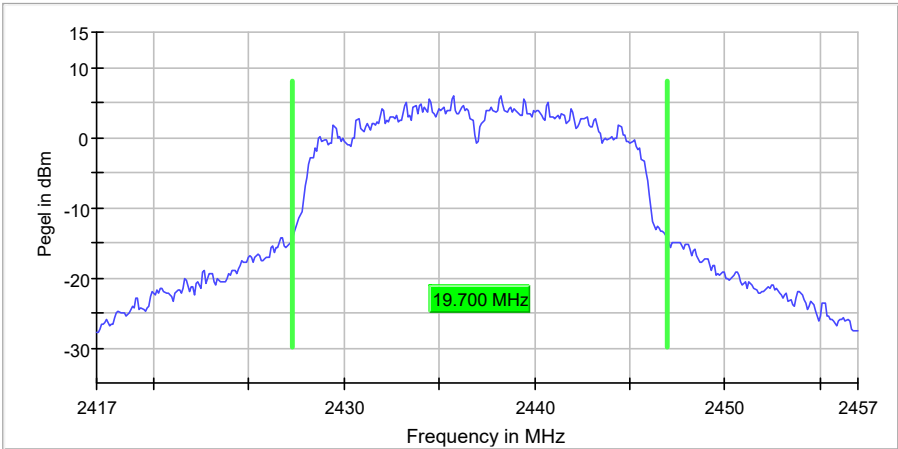
20dB BW, 2412 MHz, 802.11n, 20MHz, MCS0



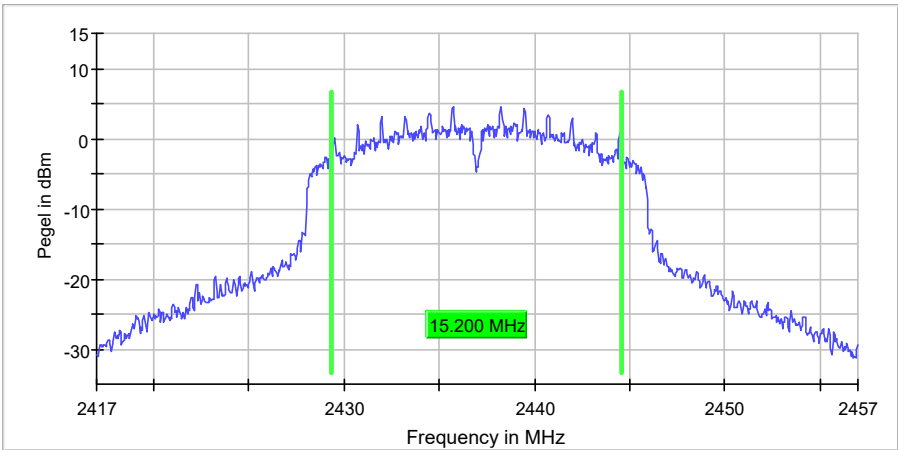
6 dB BW, 2412 MHz, 802.11n, 20MHz, MCS0



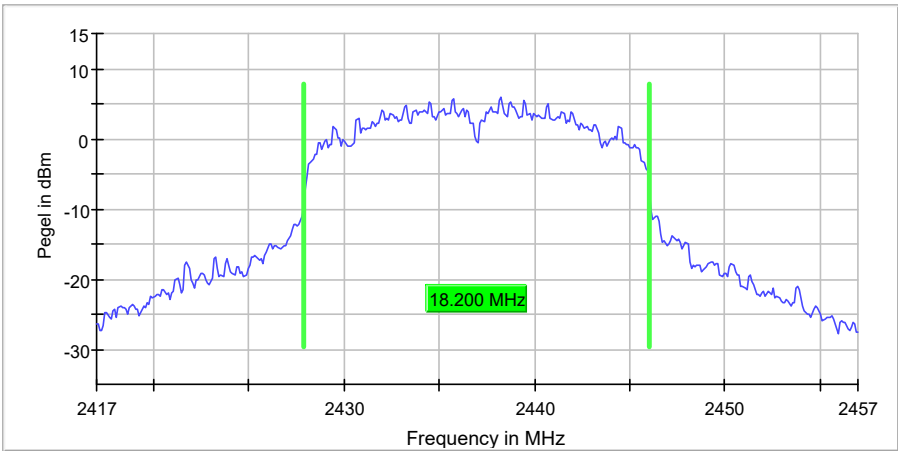
99%-BW, 2412 MHz, 802.11n, 20MHz, MCS0



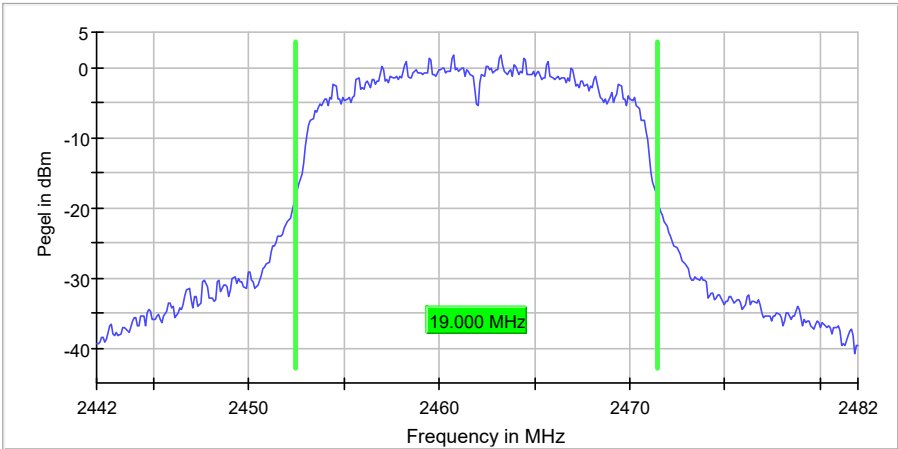
20dB BW, 2437 MHz, 802.11n, 20MHz, MCS0



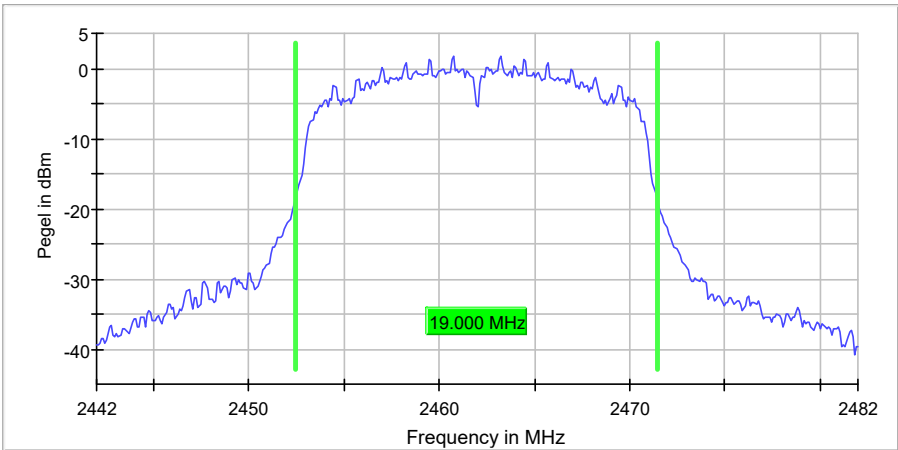
6 dB BW, 2437 MHz, 802.11n, 20MHz, MCS0



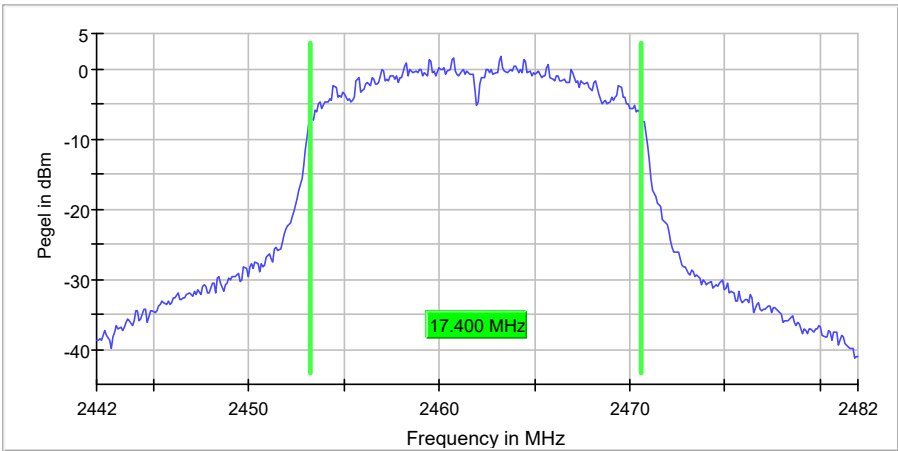
99%-BW, 2437 MHz, 802.11n, 20MHz, MCS0



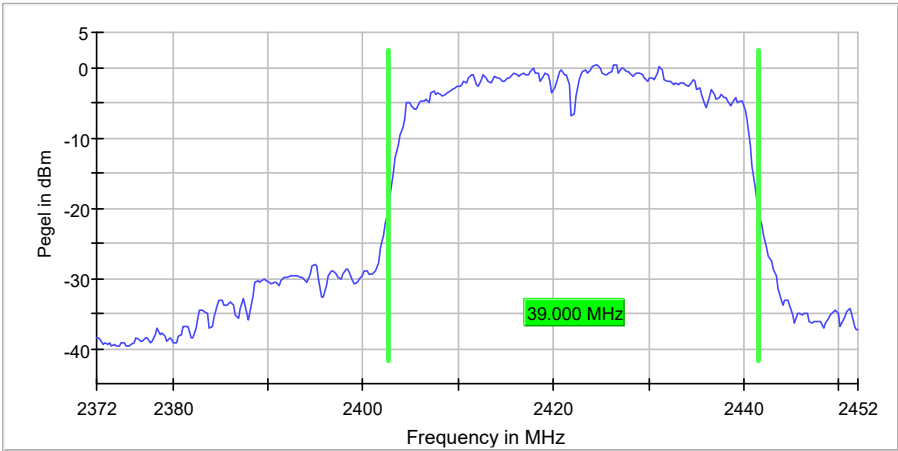
20dB BW, 2462 MHz, 802.11n, 20MHz, MCS0



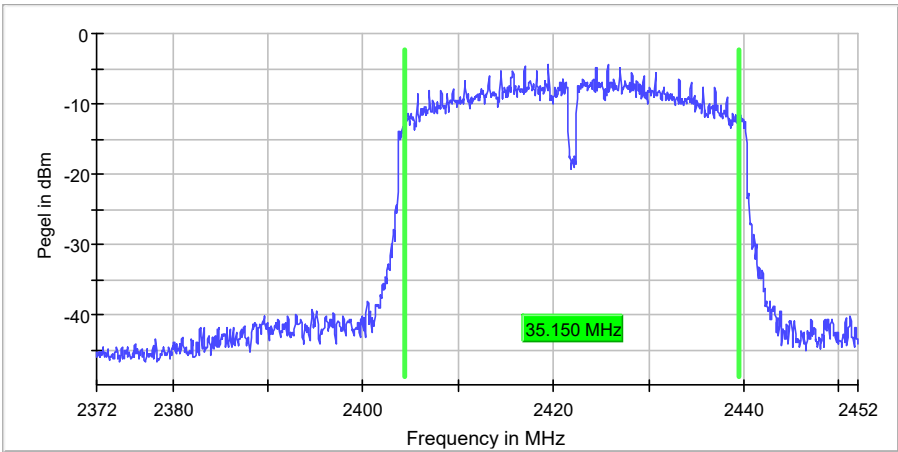
6 dB BW, 2462 MHz, 802.11n, 20MHz, MCS0



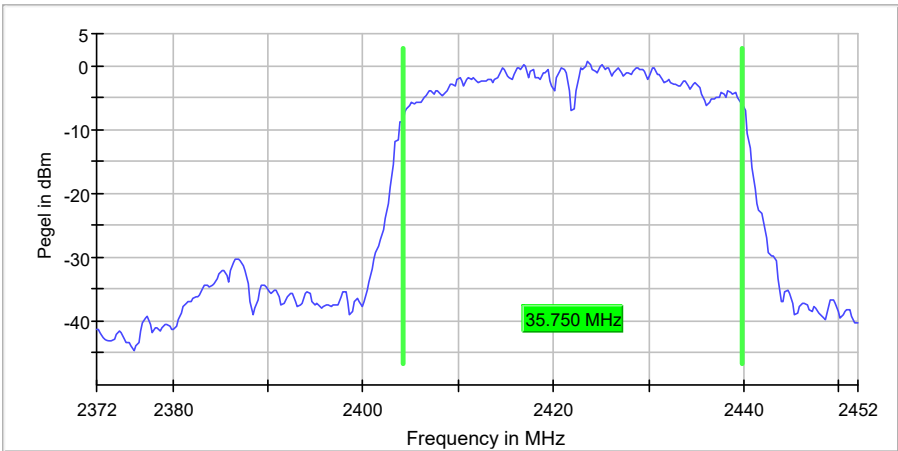
99%-BW, 2462 MHz, 802.11n, 20MHz, MCS0



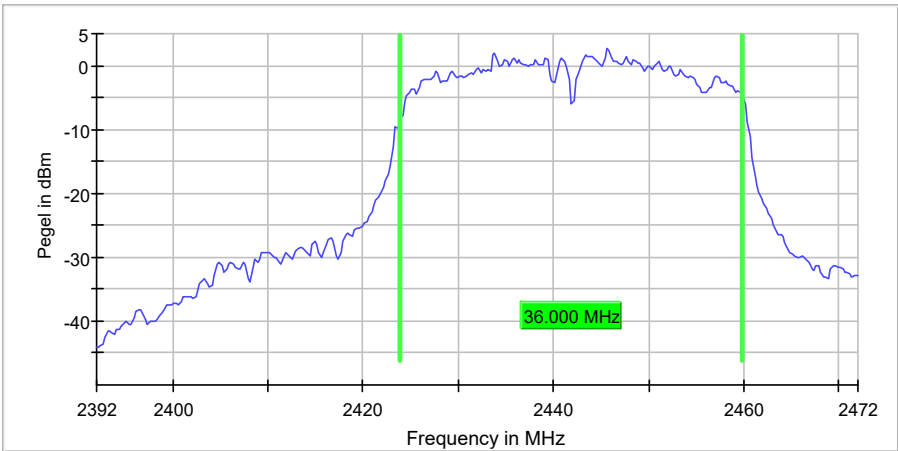
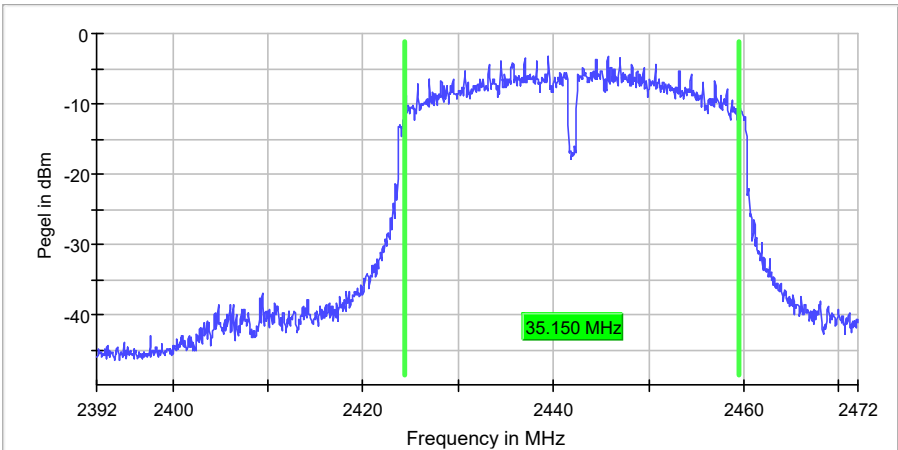
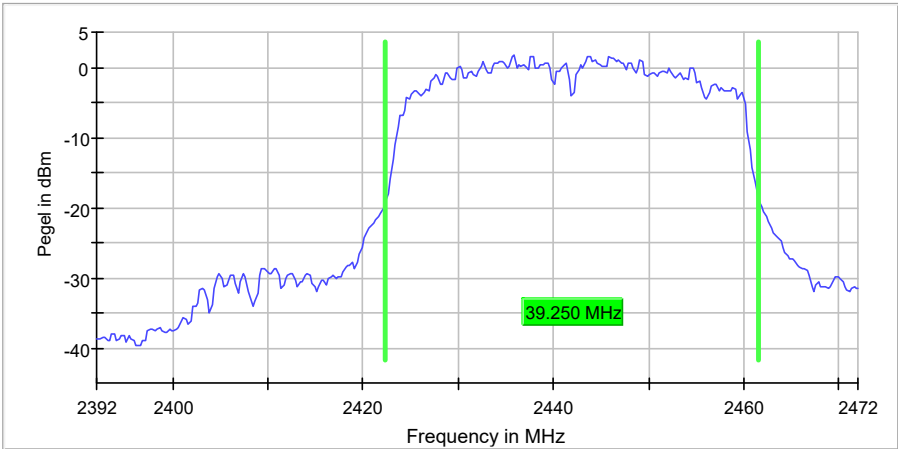
20dB BW, 2422 MHz, 802.11n, 40MHz, MCS8



6 dB BW, 2422 MHz, 802.11n, 40MHz, MCS8



99%-BW, 2422 MHz, 802.11n, 40MHz, MCS8



FCC 47 CFR Part 15, Limit Clause 15.247(a)(2) and ISED Canada RSS-247, Clause 5.2(a)

The minimum 6 dB Bandwidth shall be at least 500 kHz.

2.5.7 Test Location and Test Equipment Used

Conducted test was carried out in Non-shielded room with Test system TS8997.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde&Schwarz	FSV40	20219	12	2020-01-31
Vector Signal Generator	Rohde&Schwarz	SMBV100A	20238	24	2019-10-31
Signal Generator	Rohde&Schwarz	SMB100A	20215	36	2021-03-31
Switching Device	Rohde&Schwarz	OSP120 I	20248	24	2020-01-31
Switching Device	Rohde&Schwarz	OSP120 II	38807	24	2020-09-30
Radio Communication Tester	Rohde&Schwarz	CMW500	38845	12	2019-09-30
EMC Measurement Software	Rohde&Schwarz	EMC32	19719	---	---

Table 13

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



Product Service

2.6 Power Spectral Density

2.6.1 Specification Reference

Test according to FCC title 47 part 15 §15.247(a),(e), KDB 558074 D01 DTS Meas Guidance v05 F and ANSI C63.10-2013

2.6.2 Equipment Under Test and Modification State

Porsche Home Energy Manager, S/N: M186 HCM-C1.1 - Modification State 0

2.6.3 Date of Test

2019-02-08

2.6.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.10.2.

2.6.5 Environmental Conditions

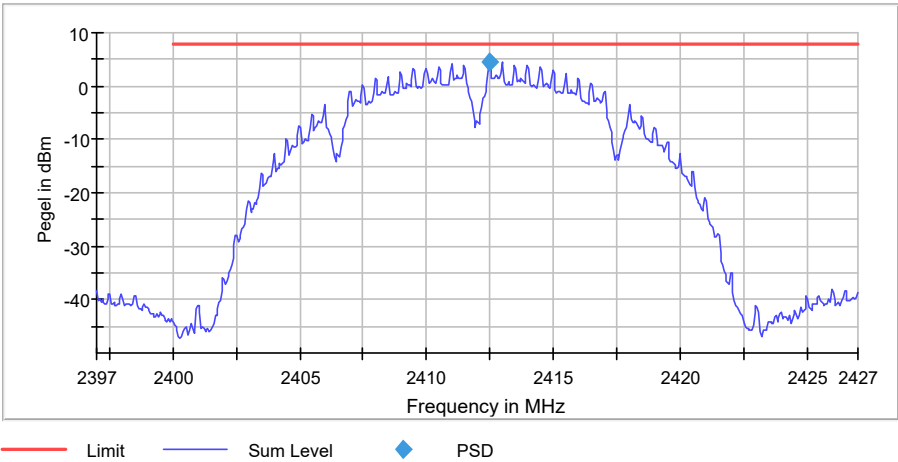
Ambient Temperature	24,0 °C
Relative Humidity	26,0 %



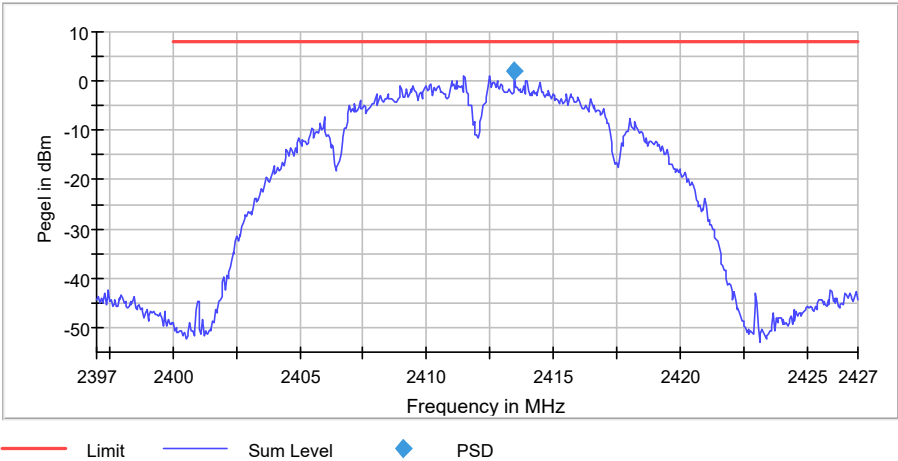
Product Service

2.6.6 Test Results

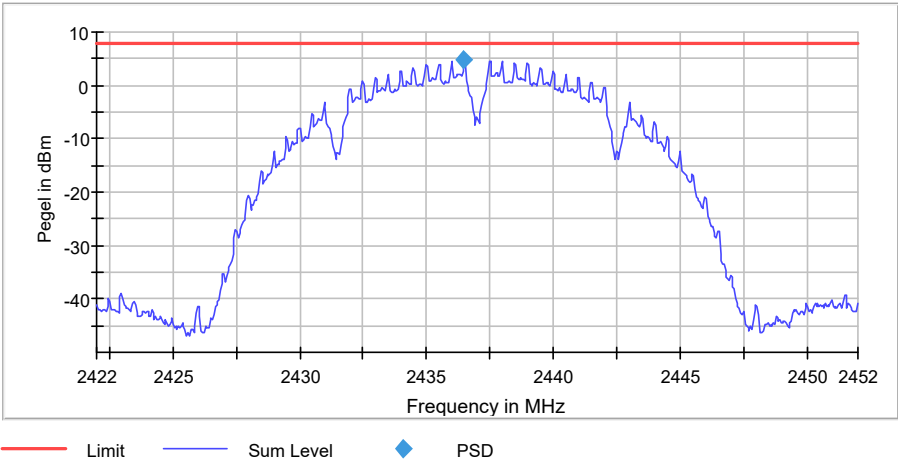
Operating Mode	Frequency (MHz)	Peak PSD (dBm)	PSD (dBm)	Limit (dBm)
802.11b, 20MHz, 1Mbps	2412.475	4.470	1.926	8.0
802.11b, 20MHz, 1Mbps	2436.475	4.84	1.624	8.0
802.11b, 20MHz, 1Mbps	2462.475	4.915	1.645	8.0
802.11g, 20MHz, 6Mbps	2410.725	0.002	-3.173	8.0
802.11g, 20MHz, 6Mbps	2435.725	4.126	0.733	8.0
802.11g, 20MHz, 6Mbps	2460.725	-0.106	-3.318	8.0
802.11n, 20MHz, MCS0	2410.725	0.244	-2.860	8.0
802.11n, 20MHz, MCS0	2435.725	4.558	1.333	8.0
802.11n, 20MHz, MCS0	2460.725	0.379	-2.574	8.0
802.11n, 40MHz, MCS8	2419.475	-4.311	-7.773	8.0
802.11n, 40MHz, MCS8	2439.475	-3.075	-6.625	8.0
802.11n, 40MHz, MCS8	2459.525	-3.200	-6.694	8.0



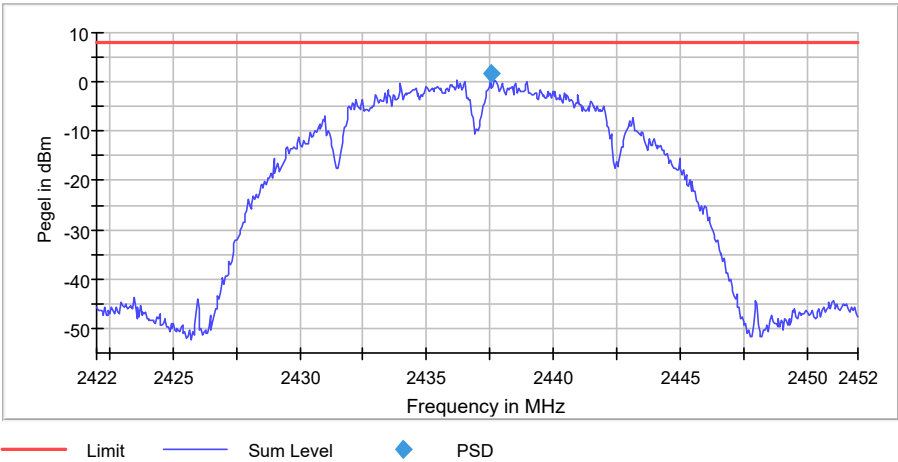
Pk PSD, 2412 MHz, 802.11b, 20MHz, 1Mbps



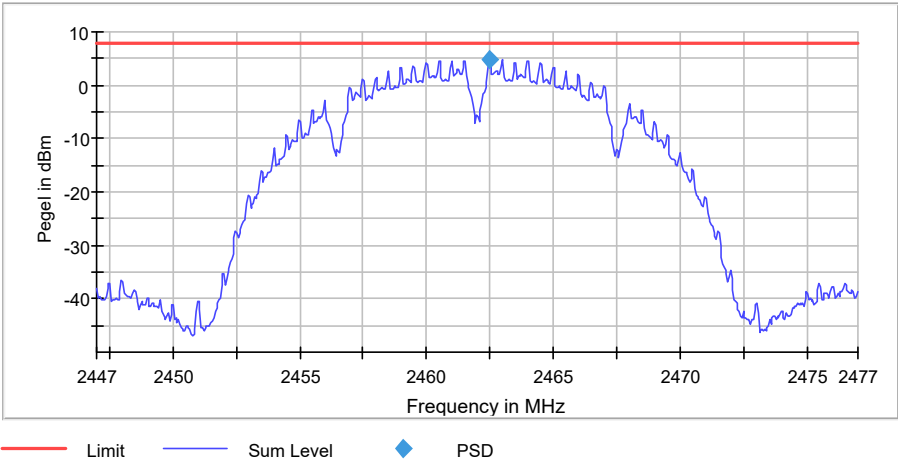
PSD, 2412 MHz, 802.11b, 20MHz, 1Mbps



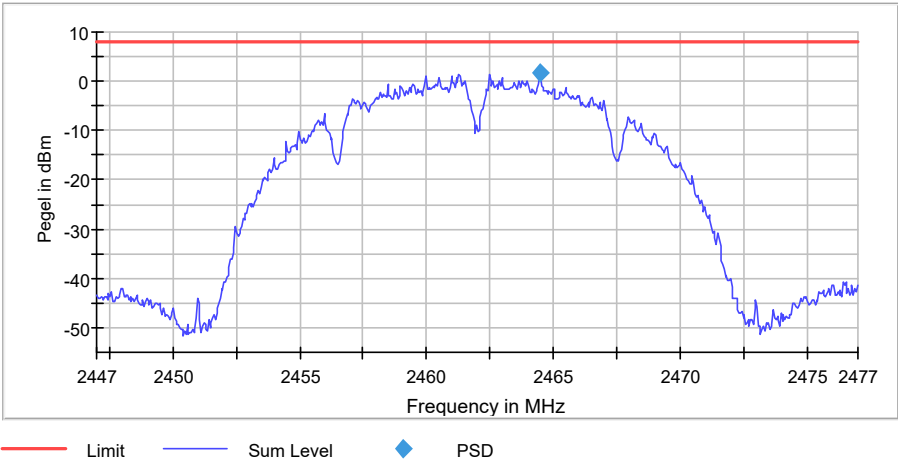
Pk PSD, 2437 MHz, 802.11b, 20MHz, 1Mbps



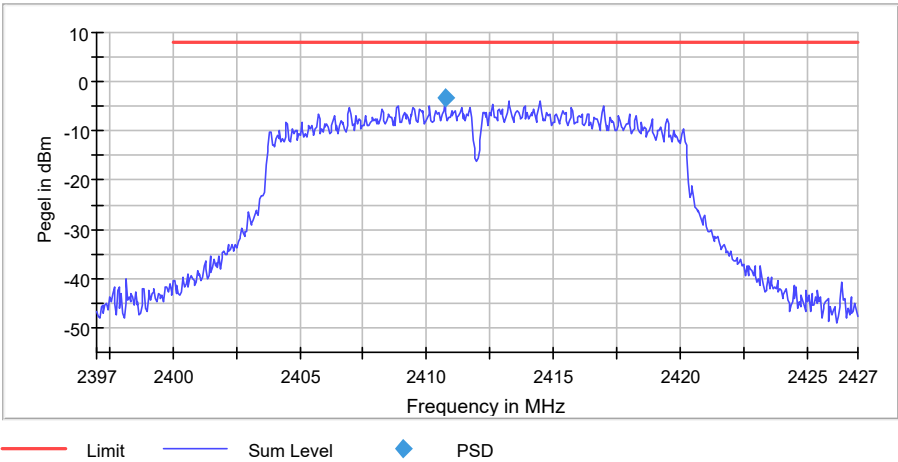
PSD, 2437 MHz, 802.11b, 20MHz, 1Mbps



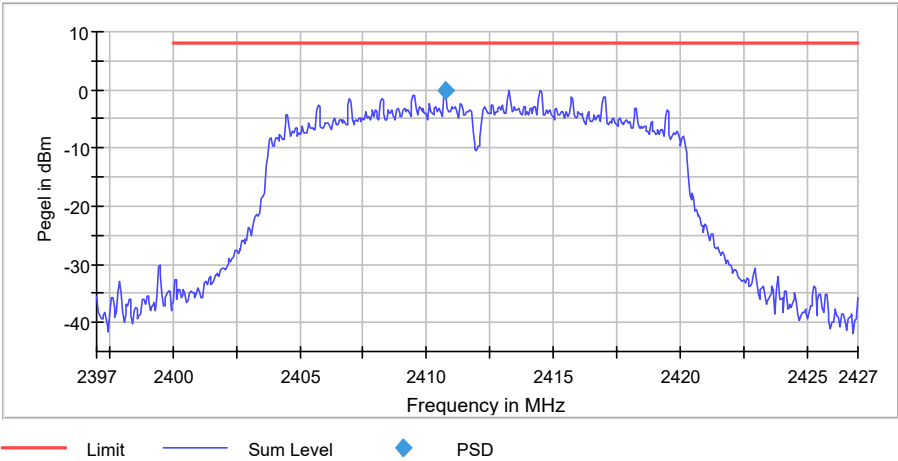
Pk PSD, 2462 MHz, 802.11b, 20MHz, 1Mbps



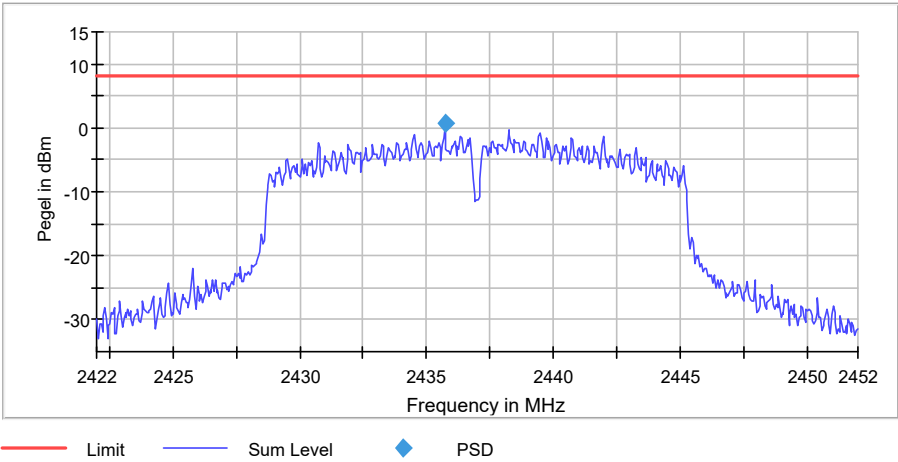
PSD, 2462 MHz, 802.11b, 20MHz, 1Mbps



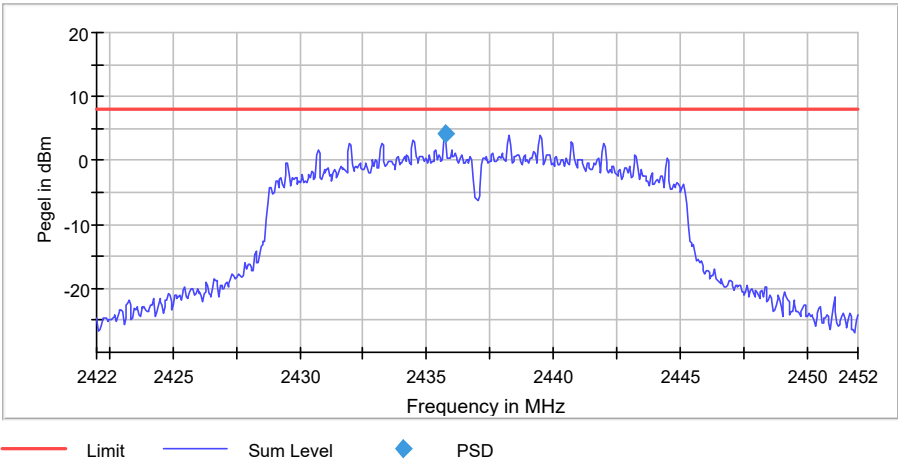
PSD, 2412 MHz, 802.11g, 20MHz, 6Mbps



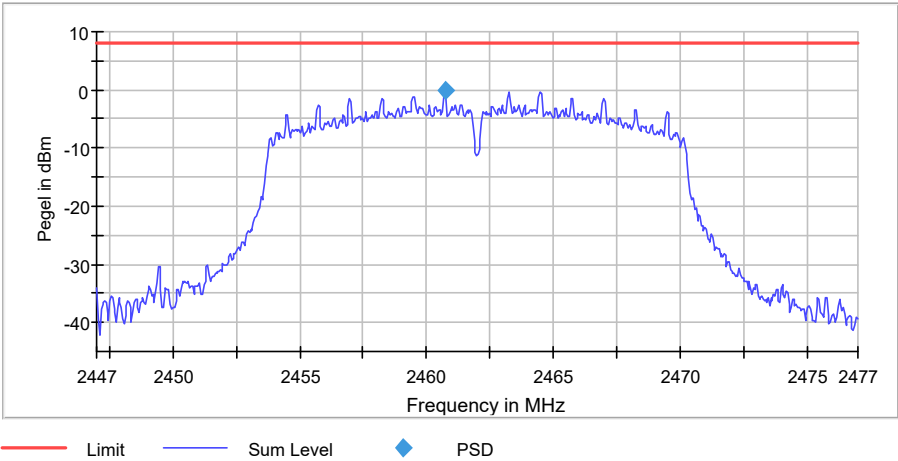
Pk PSD, 2412 MHz, 802.11g, 20MHz, 6Mbps



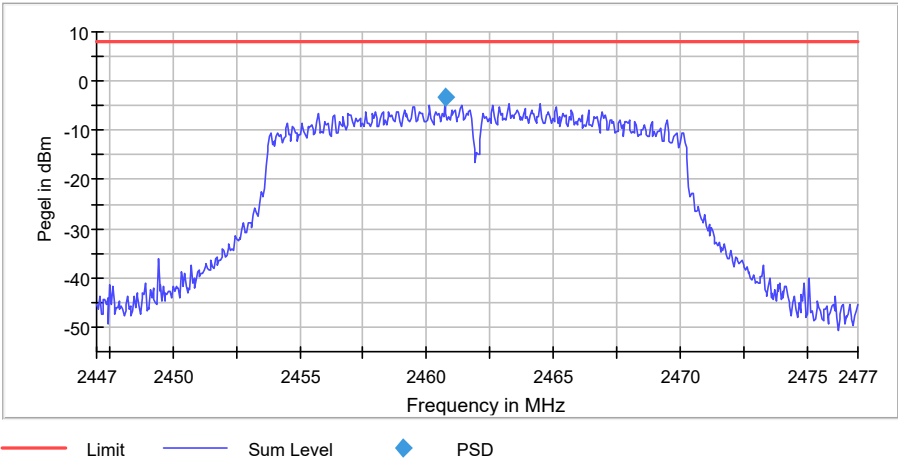
PSD, 2437 MHz, 802.11g, 20MHz, 6Mbps



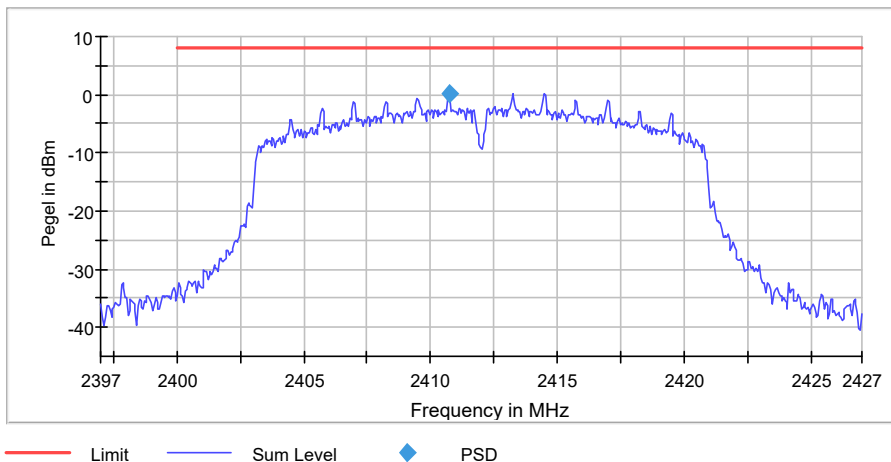
Pk PSD, 2437 MHz, 802.11g, 20MHz, 6Mbps



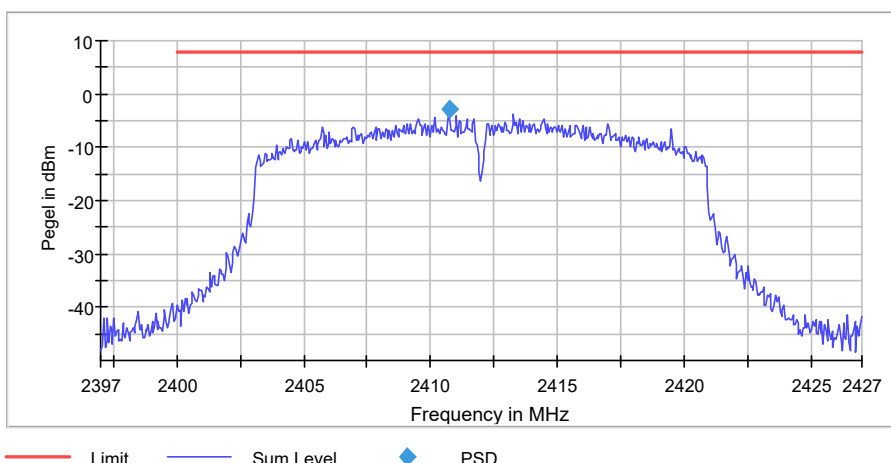
Pk PSD, 2462 MHz, 802.11g, 20MHz, 6Mbps



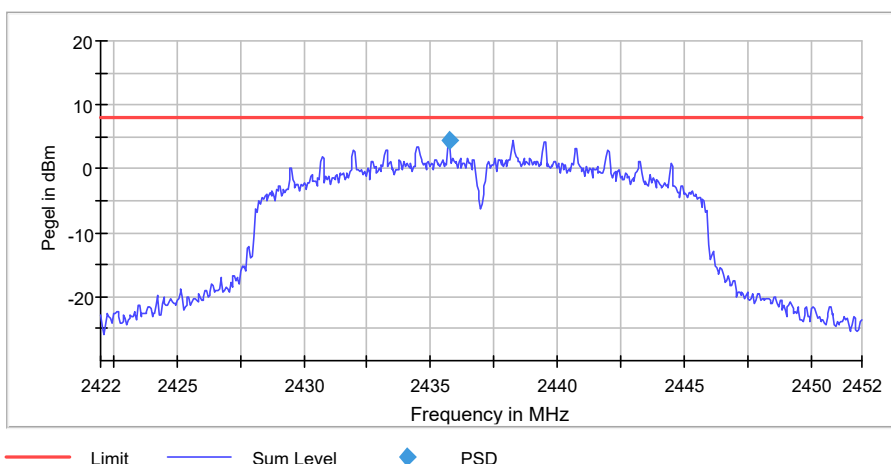
PSD, 2462 MHz, 802.11g, 20MHz, 6Mbps



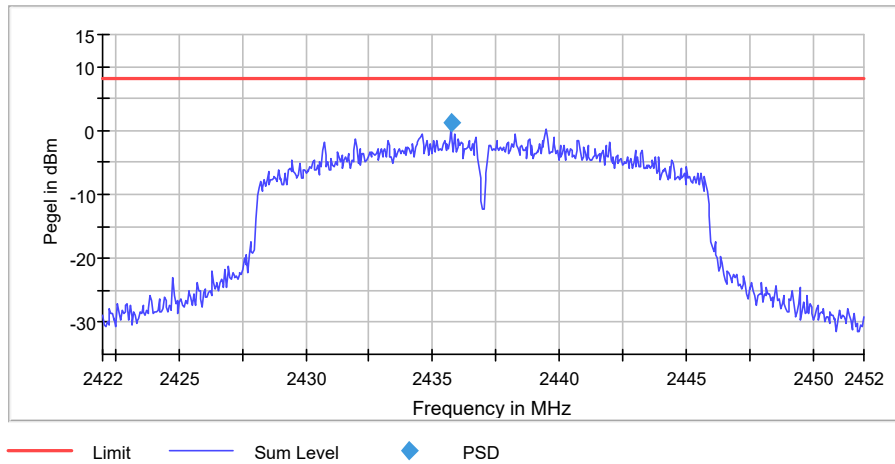
Pk PSD, 2412 MHz, 802.11n, 20MHz, MCS0



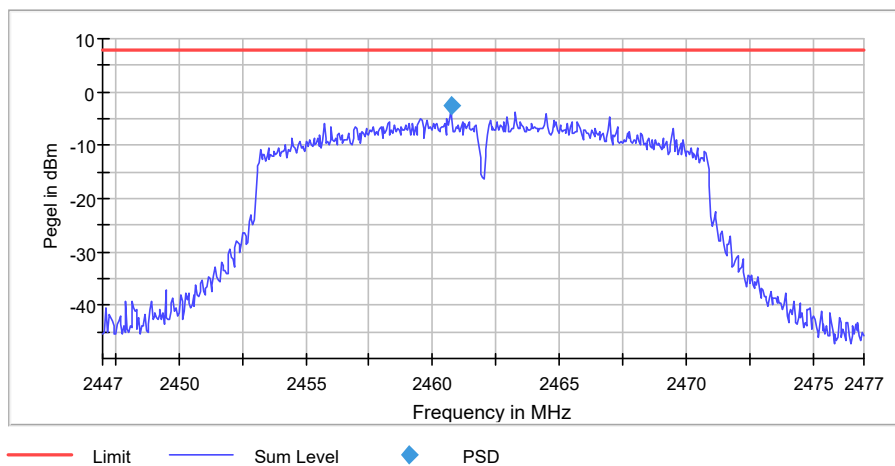
PSD, 2412 MHz, 802.11n, 20MHz, MCS0



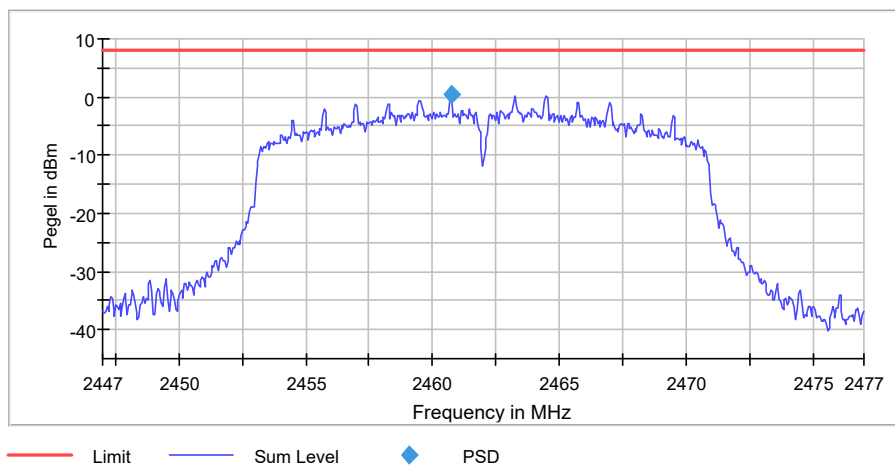
Pk PSD, 2437 MHz, 802.11n, 20MHz, MCS0



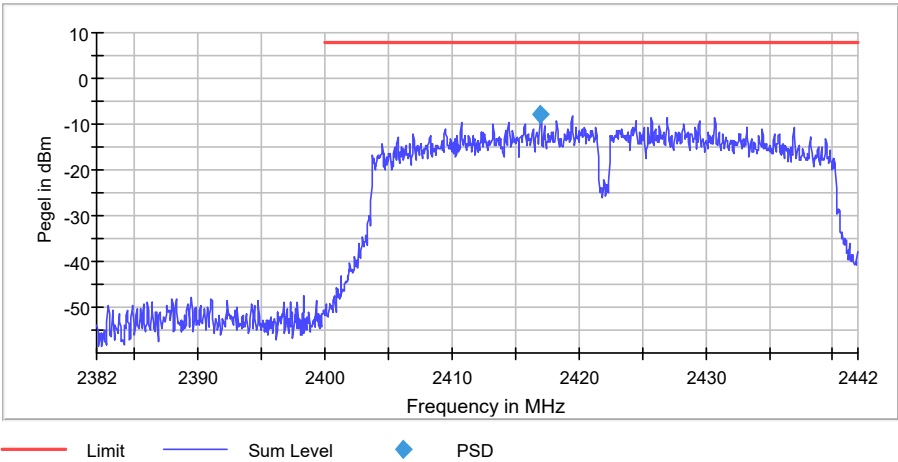
PSD, 2437 MHz, 802.11n, 20MHz, MCS0



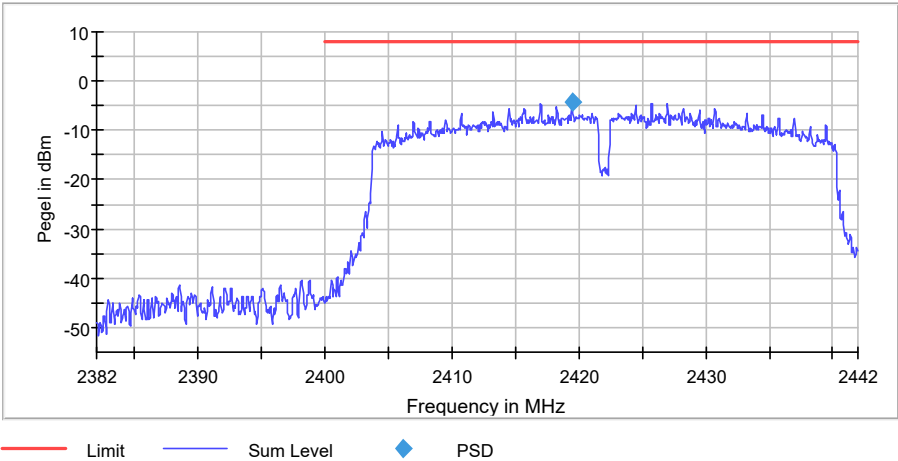
PSD, 2462 MHz, 802.11n, 20MHz, MCS0



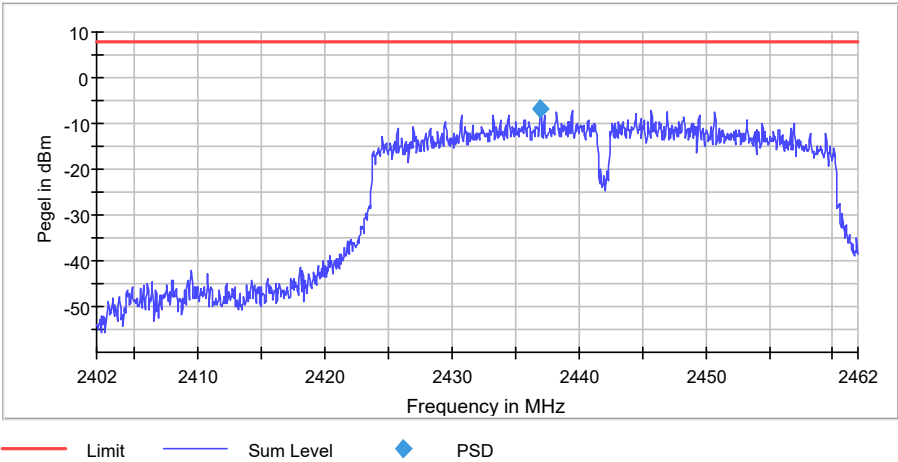
Pk PSD, 2462 MHz, 802.11n, 20MHz, MCS0



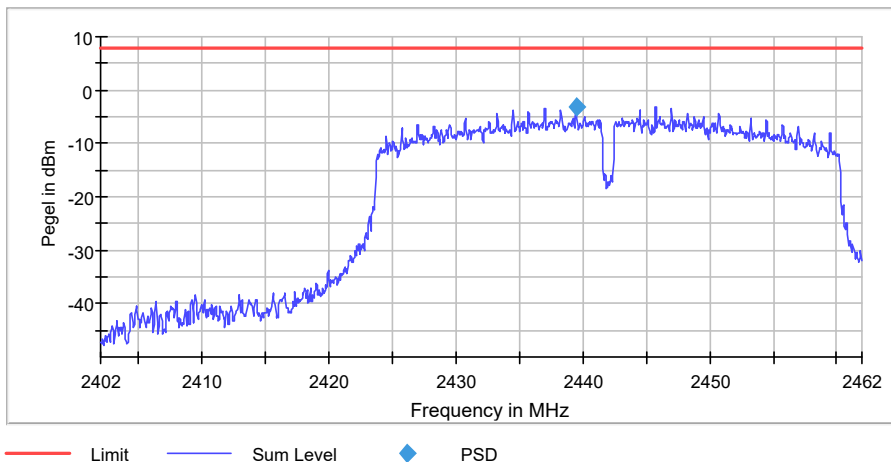
PSD, 2422 MHz, 802.11n, 40MHz, MCS8



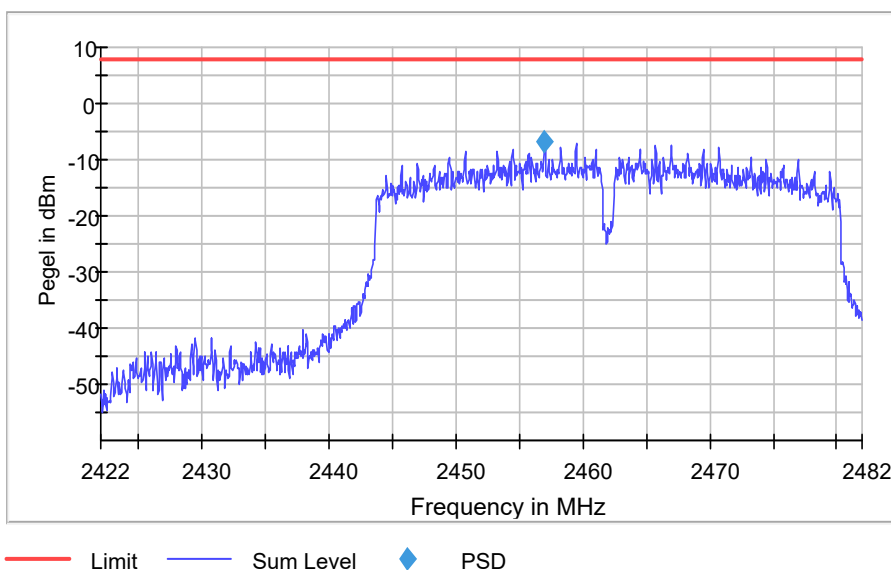
Pk PSD, 2422 MHz, 802.11n, 40MHz, MCS8



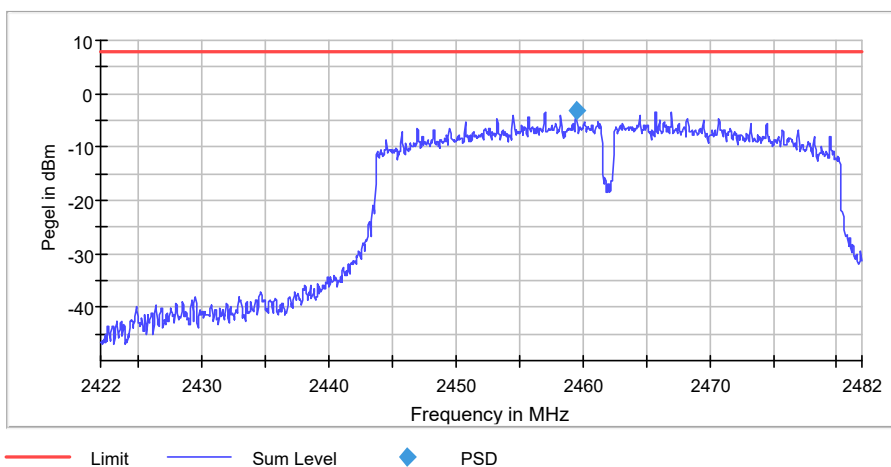
PSD, 2442 MHz, 802.11n, 40MHz, MCS8



Pk PSD, 2442 MHz, 802.11n, 40MHz, MCS8



PSD, 2462 MHz, 802.11n, 40MHz, MCS8



Pk PSD, 2462 MHz, 802.11n, 40MHz, MCS8

FCC 47 CFR Part 15, Limit Clause 15.247 (e)

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

ISED Canada RSS-247, Limit Clause 5.2(b)

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

2.6.7 Test Location and Test Equipment Used

Conducted test was carried out in Non-shielded room with Test system TS8997.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde&Schwarz	FSV40	20219	12	2020-01-31
Vector Signal Generator	Rohde&Schwarz	SMBV100A	20238	24	2019-10-31
Signal Generator	Rohde&Schwarz	SMB100A	20215	36	2021-03-31
Switching Device	Rohde&Schwarz	OSP120 I	20248	24	2020-01-31
Switching Device	Rohde&Schwarz	OSP120 II	38807	24	2020-09-30
Radio Communication Tester	Rohde&Schwarz	CMW500	38845	12	2019-09-30
EMC Measurement Software	Rohde&Schwarz	EMC32	19719	---	---

Table 14

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



Product Service

2.7 Maximum Conducted Output Power

2.7.1 Specification Reference

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v05 and ANSI C63.10-2013 11.9.2.3.2

2.7.2 Equipment Under Test and Modification State

Porsche Home Energy Manager, S/N: M186 HCM-C1.1 - Modification State 0

2.7.3 Date of Test

2019-02-08

2.7.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.9.1.1.

2.7.5 Environmental Conditions

Ambient Temperature	24,0 °C
Relative Humidity	26,0 %



Product Service

2.7.6 Test Results

Operating Mode	Frequency (MHz)	Gated EIRP (dBm)	DutyCycle (%)	Limit Max (dBm)
802.11b, 20MHz, 1Mbps	2412	15.8	95.748	30.0
802.11b, 20MHz, 1Mbps	2437	16.1	95.747	30.0
802.11b, 20MHz, 1Mbps	2462	16.4	95.746	30.0
802.11g, 20MHz, 6Mbps	2412	13.3	77.769	30.0
802.11g, 20MHz, 6Mbps	2437	17.1	77.675	30.0
802.11g, 20MHz, 6Mbps	2462	13.3	77.770	30.0
802.11n, 20MHz, MCS0s	2412	13.2	74.974	30.0
802.11n, 20MHz, MCS0	2437	17.3	74.863	30.0
802.11n, 20MHz, MCS0	2462	13.5	74.972	30.0
802.11n, 40MHz, MCS8	2422	11.1	24.669	30.0
802.11n, 40MHz, MCS8	2442	12.5	24.640	30.0
802.11n, 40MHz, MCS8	2462	12.4	24.645	30

FCC 47 CFR Part 15, Limit Clause 15.247 (b)(3)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

ISED Canada RSS-247, Limit Clause 5.4 (b)

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

2.7.7 Test Location and Test Equipment Used

Conducted test was carried out in Non-shielded room with Test system TS8997.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde&Schwarz	FSV40	20219	12	2020-01-31
Vector Signal Generator	Rohde&Schwarz	SMBV100A	20238	24	2019-10-31
Signal Generator	Rohde&Schwarz	SMB100A	20215	36	2021-03-31
Switching Device	Rohde&Schwarz	OSP120 I	20248	24	2020-01-31
Switching Device	Rohde&Schwarz	OSP120 II	38807	24	2020-09-30
Radio Communication Tester	Rohde&Schwarz	CMW500	38845	12	2019-09-30
EMC Measurement Software	Rohde&Schwarz	EMC32	19719	---	---

Table 15

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



Product Service

2.8 AC Power Line Conducted Emissions

2.8.1 Specification Reference

FCC 47 CFR Part 15C, ISED Canada RSS-247 and ISED Canada RSS-GEN, Clause 15.207, N/A and 8.8

2.8.2 Equipment Under Test and Modification State

Porsche Home Energy Manager, S/N: M186 HCM-C1.1 - Modification State 0

2.8.3 Date of Test

2019-02-13

2.8.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.2.

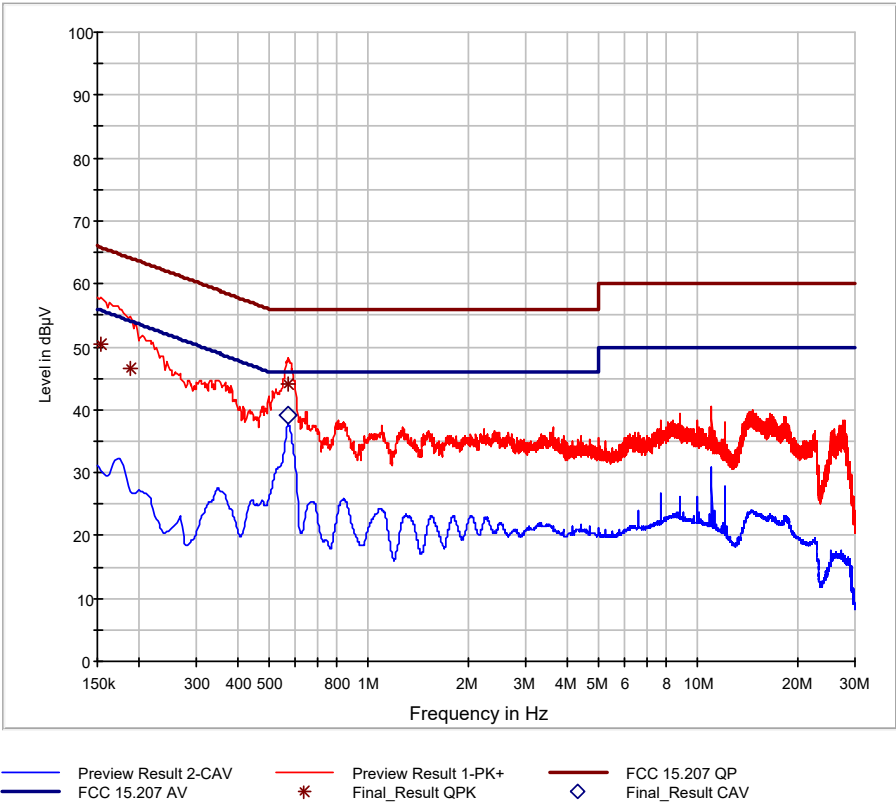
2.8.5 Environmental Conditions

Ambient Temperature	22,0 °C
Relative Humidity	32,0 %



Product Service

2.8.6 Test Results

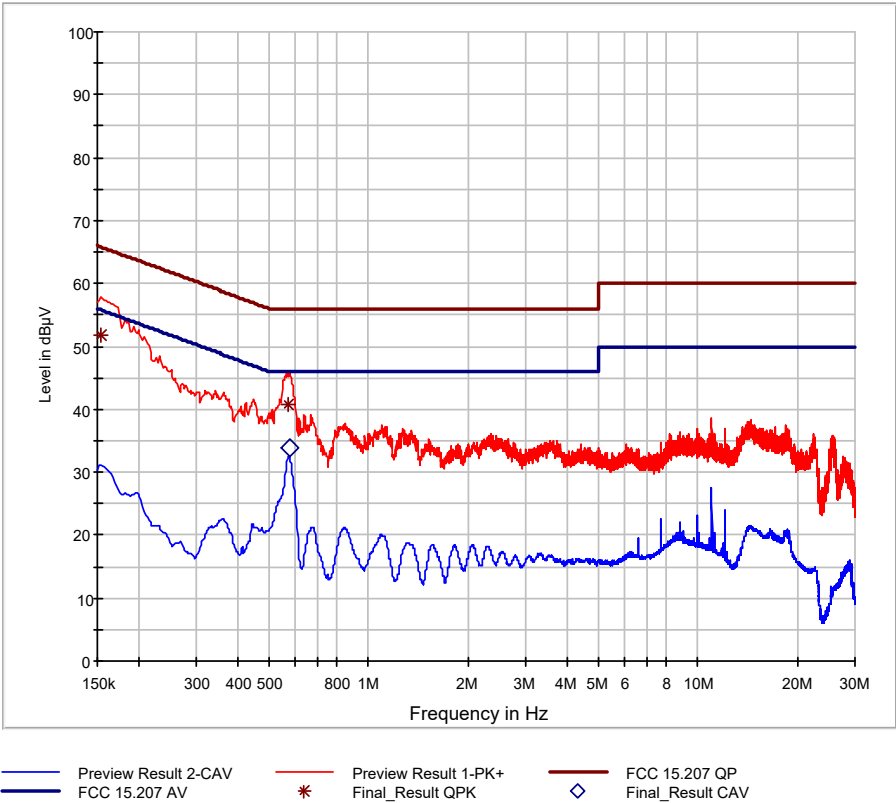


Final Results:

Frequency MHz	QuasiPeak dBµV	CAverage dBµV	Limit dBµV	Margin dB	Meas. Time ms	Bandwidth kHz	Line	PE	Corr. dB
0.154500	50.41	---	65.75	15.35	1000.0	9.000	Plus	GND	0.0
0.188250	46.59	---	64.11	17.53	1000.0	9.000	Plus	GND	0.0
0.566250	44.13	---	56.00	11.87	1000.0	9.000	Plus	GND	0.0
0.568500	---	39.01	46.00	6.99	1000.0	9.000	Plus	GND	0.0



Product Service



Final Results:

Frequency MHz	QuasiPeak dBµV	CAverage dBµV	Limit dBµV	Margin dB	Meas. Time ms	Bandwidth kHz	Line	PE	Corr. dB
0.154500	51.83	---	65.75	13.92	1000.0	9.000	Minus	GND	0.0
0.568500	40.67	---	56.00	15.33	1000.0	9.000	Minus	GND	0.0
0.573000	---	33.93	46.00	12.07	1000.0	9.000	Minus	GND	0.0



FCC 47 CFR Part 15, Limit Clause 15.207 and ISED Canada RSS-GEN, Limit Clause 8.8

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

Table 16

*Decreases with the logarithm of the frequency.

2.8.7 Test Location and Test Equipment Used

This test was carried out in Shielded room - cabin no. 4.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI test receiver	Rohde & Schwarz	ESPI7	19578	18	2019-03-31
V-network	Rohde & Schwarz	ESH 3-Z5	18919	36	2019-10-31
EMC Measurement Software	Rohde&Schwarz	EMC32 V9.26.01	20090	---	---

Table 17

TU - Traceability Unscheduled
 O/P Mon – Output Monitored using calibrated equipment
 N/A - Not Applicable



Product Service

2.9 Transmitter frequency stability

2.9.1 Specification Reference

RSS-Gen, Issue 5, April 2018 (General Requirements for Compliance of Radio Apparatus)

2.9.2 Equipment Under Test and Modification State

Porsche Home Energy Manager, S/N: M186 HCM-C1.1 - Modification State 0

2.9.3 Date of Test

2019-01-23

2.9.4 Test Method

RSS-Gen, Issue 5, April 2018, chapter 6.11

2.9.5 Environmental Conditions

Ambient Temperature	24,0 °C
Relative Humidity	24,0 %



2.9.6 Test Results

Operating Frequency	Temperature (°C)	Voltage (V)	Tested Centre Frequency (MHz)	Frequency Error (kHz)
Lower, 2412 MHz	20.0	24.0	2412.007311	7,311465
Lower, 2412 MHz	20.0	20.4	2412.003418	3,418320
Lower, 2412 MHz	20.0	27.6	2411.992711	-7,289040
Lower, 2412 MHz	-30.0	24.0	2411.996751	-3,248745
Lower, 2412 MHz	50.0	24.0	2411.994295	-5,704755
Upper, 2462 MHz	20.0	24.0	2462.002100	2.099685
Upper, 2462 MHz	20.0	20.4	2461.993858	-6.142425
Upper, 2462 MHz	20.0	27.6	2461.994754	-5.246430
Upper, 2462 MHz	-30.0	24.0	2462.005529	5.528700
Upper, 2462 MHz	50.0	24.0	2461.995091	-4.908945

Note: - Measured Frequency Error does not affect any band edge requirements.
- Measurement was performed with modulated transmitter signal

2.9.7 Test Location and Test Equipment Used

Conducted test was carried out in Non-shielded room with Test system TS8997.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde&Schwarz	FSV40	20219	12	2020-01-31
Vector Signal Generator	Rohde&Schwarz	SMBV100A	20238	24	2019-10-31
Signal Generator	Rohde&Schwarz	SMB100A	20215	36	2021-03-31
Switching Device	Rohde&Schwarz	OSP120 I	20248	24	2020-01-31
Switching Device	Rohde&Schwarz	OSP120 II	38807	24	2020-09-30
Radio Communication Tester	Rohde&Schwarz	CMW500	38845	12	2019-09-30
EMC Measurement Software	Rohde&Schwarz	EMC32	19719	---	---

Table 18

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment
N/A - Not Applicable



Product Service

2.10 Exposure of Humans to RF Fields

2.10.1 Specification Reference

IC RSS-GEN Issue 4, section 3.2 and
IC RSS-102, Issue 5, section 2.5
KDB 447498 D01 General RF Exposure Guidance v06, chapter 4.3.1

2.10.2 Equipment Under Test and Modification State

Porsche Home Energy Manager, S/N: M186 HCM-C1.1 - Modification State 0

2.10.3 Date of Test

2019-01-23 to 2019-03-08



Product Service

2.10.4 Test Results

acc. to KDB 447498 D01:

Maximum Radiated Power (EIRP) Pmax:	17.3 dBm = 53.7 mW	(Max. CP Test Result is 17.3 dBm including 2.0 dBi antenna gain. See chapter 2.7, Mode: 802.11n, 20MHz)
Compliance Boundary d:	40 mm	
Frequency f:	2437 MHz = 2.437 GHz	
Numeric Threshold (Pmax / d) (f) ^{0.5}	2.1	
Numeric Threshold Limit (1 g SAR):	3.0	



IC RSS-GEN Issue 4, section 3.2 and IC RSS-102, Issue 5, section 2.5:

Exposure of Humans to RF Fields	Applicable	Declared by applicant	Measured	Exemption
The antenna is				
☒ detachable				
The conducted output power (CP in watts) is measured at the antenna connector: $CP = 33.9 \text{ mW } 17.3 \text{ dBm}$ (Max. CP Test Result is 17.3 dBm including 2.0 dBi antenna gain. See chapter 2.7, Mode: 802.11n, 20MHz) The effective isotropic radiated power (EIRP in watts) is calculated using ☒ the numerical antenna gain: $G = 2.0 \text{ dBi}$ $EIRP = G \cdot CP \Rightarrow EIRP = 53.7 \text{ mW}$ ☐ the field strength¹ in V/m: $FS = \dots\dots\dots \text{ V/m}$ $EIRP = \frac{(FS \cdot D)^2}{30} \Rightarrow EIRP = \dots\dots\dots \text{ mW}$ with: Distance between the antennas in m: $D = 40 \text{ mm}$			☒	
☐ not detachable				
A field strength measurement is used to determine the effective isotropic radiated power (EIRP in watts) given by: $EIRP = \frac{(FS \cdot D)^2}{30} \Rightarrow EIRP = \dots\dots\dots \text{ W}$ with: Field strength in V/m: $FS = \dots\dots\dots \text{ dB}\mu\text{V/m}$ $= \dots\dots\dots \text{ mV/m}$ Distance between the two antennas in m: $D = \dots\dots\dots \text{ m}$			☒	☒
Selection of output power				
The output power TP is the higher of the conducted or effective isotropic radiated power (e.i.r.p.): $TP = 53.7 \text{ mW}$				

¹ The conversion formula is valid only for properly matched antennas. In other cases the transmitter output power may have to be measured by a terminated measurement when applying the exemption clauses. If an open area test site is used for field strength measurement, the effect due to the metal ground reflecting plane should be subtracted from the maximum field strength value in order to reference it to free space, before calculating TP.



Exposure of Humans to RF Fields (continued)	Applicable	Declared by applicant	Measured	Exemption
Separation distance between the user and the transmitting device is				
☒ less than or equal to 20 cm	☐ greater than 20 cm	☒		
Transmitting device is				
☐ in the vicinity of the human head	☐ body-worn	☐		



SAR evaluation										
SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in the table. For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in the table are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in the table are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in the table, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required. For medical implants devices, the exemption limit for routine evaluation is set at 1 mW. The output power of a medical implants device is defined as the higher of the conducted or e.i.r.p to determine whether the device is exempt from the SAR evaluation.										
Frequency (MHz)	Exemption limits (mW) ² at separation distance of									
	≤5 mm	10 mm	15 mm	20 mm	25 mm	30 mm	35 mm	40 mm	45 mm	≥50 mm
450	52	70	88	106	123	141	159	177	195	213
835	17	30	42	55	67	80	92	105	117	130
1900	7	10	18	34	60	99	153	225	316	431
2450	4	7	15	30	52	83	123	173	235	309
3500	2	6	16	32	55	86	124	170	225	290
5800	1	6	15	27	41	56	71	85	97	106
Carrier frequency:	$f = 2437 \text{ MHz}$									
Distance:	$d = 40 \text{ mm}$									
Transmitter output power:	$TP = 53.7 \text{ mW}$									
Limit:	$TP_{limit} = 173 \text{ mW}$									

² The exemption limit in the table are based on measurements and simulations on half-wave dipole antennas at separation distances of 5 mm to 25 mm from a flat phantom, providing a SAR value of approximately 0.4 W/kg for 1 g of tissue. For low frequencies (300 MHz to 835 MHz), the exemption limits are derived from a linear fit. For high frequencies (1900 MHz and above), the exemption limits are derived from a third order polynomial fit.

3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Radio Testing			
Test Name	kp	Expanded Uncertainty	Note
Occupied Bandwidth	2.0	$\pm 1.14 \%$	2
RF-Frequency error	1.96	$\pm 1 \cdot 10^{-7}$	7
RF-Power, conducted carrier	2	$\pm 0.079 \text{ dB}$	2
RF-Power uncertainty for given BER	1.96	$+0.94 \text{ dB} / -1.05$	7
RF power, conducted, spurious emissions	1.96	$+1.4 \text{ dB} / -1.6 \text{ dB}$	7
RF power, radiated			
25 MHz – 4 GHz	1.96	$+3.6 \text{ dB} / -5.2 \text{ dB}$	8
1 GHz – 18 GHz	1.96	$+3.8 \text{ dB} / -5.6 \text{ dB}$	8
18 GHz – 26.5 GHz	1.96	$+3.4 \text{ dB} / -4.5 \text{ dB}$	8
40 GHz – 170 GHz	1.96	$+4.2 \text{ dB} / -7.1 \text{ dB}$	8
Spectral Power Density, conducted	2.0	$\pm 0.53 \text{ dB}$	2
Maximum frequency deviation			
300 Hz – 6 kHz	2	$\pm 2.89 \%$	2
6 kHz – 25 kHz	2	$\pm 0.2 \text{ dB}$	2
Maximum frequency deviation for FM	2	$\pm 2.89 \%$	2
Adjacent channel power 25 MHz – 1 GHz	2	$\pm 2.31 \%$	2
Temperature	2	$\pm 0.39 \text{ K}$	4
(Relative) Humidity	2	$\pm 2.28 \%$	2
DC- and low frequency AC voltage			
DC voltage	2	$\pm 0.01 \%$	2
AC voltage up to 1 kHz	2	$\pm 1.2 \%$	2
Time	2	$\pm 0.6 \%$	2

Table 19



Radio Interference Emission Testing			
Test Name	kp	Expanded Uncertainty	Note
Conducted Voltage Emission			
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB	1
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB	1
100 kHz to 200 MHz (50Ω/5μH AMN)	2	± 3.6 dB	1
Discontinuous Conducted Emission			
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB	1
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB	1
Conducted Current Emission			
9 kHz to 200 MHz	2	± 3.5 dB	1
Magnetic Fieldstrength			
9 kHz to 30 MHz (with loop antenna)	2	± 3.9 dB	1
9 kHz to 30 MHz (large-loop antenna 2 m)	2	± 3.5 dB	1
Radiated Emission			
Test distance 1 m (ALSE)			
9 kHz to 150 kHz	2	± 4.6 dB	1
150 kHz to 30 MHz	2	± 4.1 dB	1
30 MHz to 200 MHz	2	± 5.2 dB	1
200 MHz to 2 GHz	2	± 4.4 dB	1
2 GHz to 3 GHz	2	± 4.6 dB	1
Test distance 3 m			
30 MHz to 300 MHz	2	± 4.9 dB	1
300 MHz to 1 GHz	2	± 5.0 dB	1
1 GHz to 6 GHz	2	± 4.6 dB	1
Test distance 10 m			
30 MHz to 300 MHz	2	± 4.9 dB	1
300 MHz to 1 GHz	2	± 4.9 dB	1
Radio Interference Power			
30 MHz to 300 MHz	2	± 3.5 dB	1
Harmonic Current Emissions			4
Voltage Changes, Voltage Fluctuations and Flicker			4

Table 20

Immunity Testing			
Test Name	kp	Expanded Uncertainty	Note
Electrostatic Discharges			4
Radiated RF-Field			
Pre-calibrated field level	2	+32.2 / - 24.3 %	5
Dynamic feedback field level	2.05	+21.2 / - 17.5 %	3
Electrical Fast Transients (EFT) / Bursts			4
Surges			4
Conducted Disturbances, induced by RF-Fields			
via CDN	2	+15.1 / - 13.1 %	6
via EM clamp	2	+42.6 / - 29.9 %	6
via current clamp	2	+43.9 / - 30.5 %	6
Power Frequency Magnetic Field	2	+20.7 / - 17.1 %	2
Pulse Magnetic Field			4
Voltage Dips, Short Interruptions and Voltage Variations			4
Oscillatory Waves		a	4
Conducted Low Frequency Disturbances			
Voltage setting	2	± 0.9 %	2
Frequency setting	2	± 0.1 %	2
Electrical Transient Transmission in Road Vehicles			4

Table 21

Note 1:

The expanded uncertainty reported according to CISPR 16-4-2:2003-11 is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$, providing a level of confidence of $p = 95.45\%$

Note 2:

The expanded uncertainty reported according to UKAS Lab 34 (Edition 1, 2002-08) is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$, providing a level of confidence of $p = 95.45\%$

Note 3:

The expanded uncertainty reported according to UKAS Lab 34 (Edition 1, 2002-08) is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2.05$, providing a level of confidence of $p = 95.45\%$

Note 4:

It has been demonstrated that the used test equipment meets the specified requirements in the standard with at least a 95% confidence.

Note 5:

The expanded uncertainty reported according to IEC 61000-4-3 is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$, providing a level of confidence of $p = 95.45\%$

Note 6:

The expanded uncertainty reported according to IEC 61000-4-6 is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$, providing a level of confidence of $p = 95.45\%$

Note 7:



Product Service

The expanded uncertainty reported according ETSI TR 100 028 V1.4.1 (all parts) to is based on a standard uncertainty multiplied by a coverage factor of $k_p = 1.96$, providing a level of confidence of $p = 95.45\%$

Note 8:

The expanded uncertainty reported according to ETSI TR 102 273 V1.2.1 (all parts) is based on a standard uncertainty multiplied by a coverage factor of $k_p = 1.96$, providing a level of confidence of $p = 95.45\%$