FCC- TEST REPORT

Report Number	:	**68.960.17.091.01**	Date of Issue:	27 November 2017
Model	:	**WOOBO 1.0**		
Product Type	:	Woobo Smart Robot		
Applicant	:	Woobo Inc.		
Address	:	198 River St. Cambridge, Massachusetts 02139, United States		
Production Facility	:	Dongguan Yuan Kang Plush Toys Co., Ltd		
Address	:	No.10, Yuanying Road, Zhuyuan, Liaobu Town, Dongguan City,		
	:	Guangdong province, China		
Test Result	:	■ **Positive** ☐ **Negative**		
Total pages including Appendices	:	57		

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1 Table of Contents

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2 Details about the Test Laboratory

Details about the Test Laboratory
Test Site 1

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District, Shenzhen City, 518052, P. R. China
FCC Registration Number:	514049
Telephone:	86 755 8828 6998
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3 Description of the Equipment under Test

Description of the Equipment Under Test

Product:	Woobo Smart Robot
Model no.:	WOOBO 1.0
FCC ID:	2ANIX-0001
Options and accessories:	Power Adapter (USB Cable: 1.0m, Unshielded, Detachable)
Rating:	5.0VDC, 1.8A Max or DC 3.7V, 6000mAh (Built-in rechargeable Li-ion battery) (For Woobo Smart Robot) Power Adapter (M/N: NB-A520A USBA-Z, manufactured by Ruide) with following ratings: Input: 100-240VAC, 50/60Hz, 300mA Output: 5.0VDC, 2000mA
RF Transmission Frequency:	2412-2462MHz (for 802.11b, 802.11g, 802.11n-HT20) 2422-2452MHz (for 802.11n-HT40)
No. of Operated Channel:	11
Modulation:	CCK, DQPSK, DBPSK for 802.11b QPSK, BPSK, 64QAM, 16QAM for 802.11g/n
Duty Cycle:	100%
Antenna Type:	Integral Antenna
Antenna Gain:	3.3dBi
Description of the EUT:	The Equipment Under Test (EUT) is a Woobo Smart Robot with WIFI function operating at 2.4GHz

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4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2016 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to KDB558074 D01 v04 DTS Measurement Guidance and ANSI C63.10 (2013).

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5 Summary of Test Results

Technical Requirements				
FCC Part 15 Subpart C/RSS-247 Issue 2/RSS-Gen Issue 4				
Test Condition		Pages	Test Result	Test Site
§15.207	Conducted emission AC power port	10	Pass	Site 1
§15.247(b)(1)	Conducted peak output power	13	Pass	Site 1
§15.247(e)	Power spectral density	21	Pass	Site 1
§15.247(a)(2)	6dB bandwidth	14	Pass	Site 1
§15.247(a)(1)	20dB bandwidth	--	N/A	--
§15.247(a)(1)	Carrier frequency separation	--	N/A	--
§15.247(a)(1)(iii)	Number of hopping frequencies	--	N/A	--
§15.247(a)(1)(iii)	Dwell Time	--	N/A	--
§15.247(d)	Spurious RF conducted emissions	29	Pass	Site 1
§15.247(d)	Band edge	42	Pass	Site 1
§15.247(d) & §15.209	Spurious radiated emissions for transmitter and receiver	47	Pass	Site 1
§15.203	Antenna requirement	See note 1	Pass	--

Remark: N/A – Not Applicable.

Note 1: The EUT uses an Integrated Antenna, which gain is 3.3dBi. According to §15.203, it is considered sufficiently to comply with the provisions of this section.

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6 General Remarks

Remarks

Model WOOBO 1.0 have three color of appearance: Pink, Purple, Green.

This submittal(s) (test report) is intended for FCC ID: 2ANIX-0001 complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

☐ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date:	October 19, 2017
Testing Start Date:	October 19, 2017
Testing End Date:	November 17, 2017

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch -

Reviewed by:

Trevor You

Trevor You
EMC Senior Project Engineer

Reviewed by:

Nick Huang

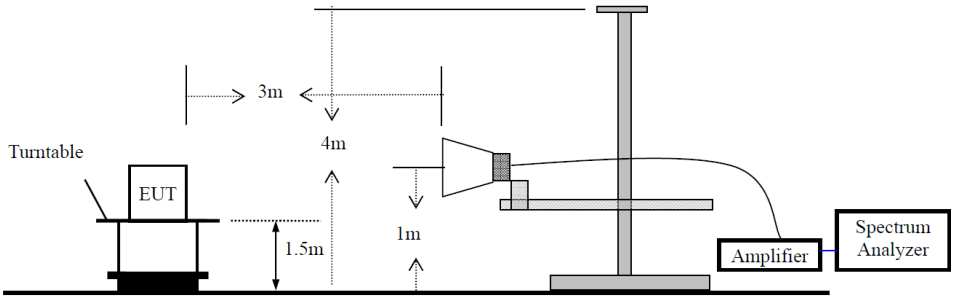
Nick Huang
EMC Project Engineer

7 Test Setups

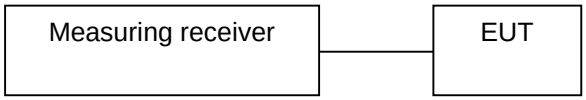
7.1 Radiated test setups

Below 1GHz

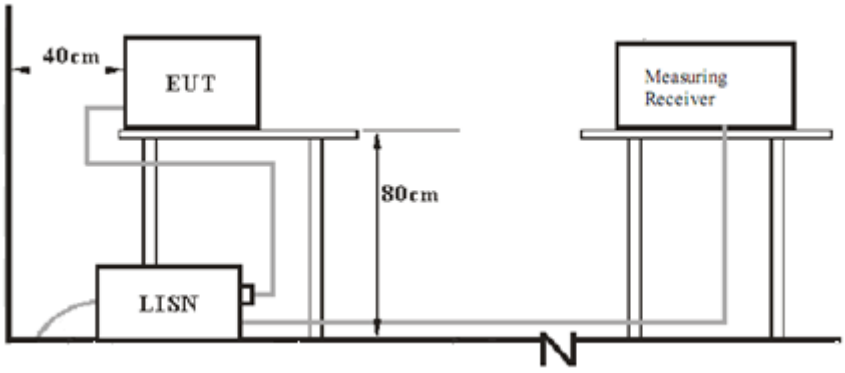
Above 1GHz



7.2 Conducted RF test setups



7.3 AC Power Line Conducted Emission test setups



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8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
---	---	---	---

Test software: RF test tool

The system was configured to channel 1, 6 and 11 for 802.11b/g/nHT20 test and configured to channel 3, 6 and 9 for 802.11nHT40 test.

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9 Technical Requirement

9.1 Conducted Emission

Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

Limit

Frequency MHz	QP Limit dBµV	AV Limit dBµV
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

*Decreasing linear

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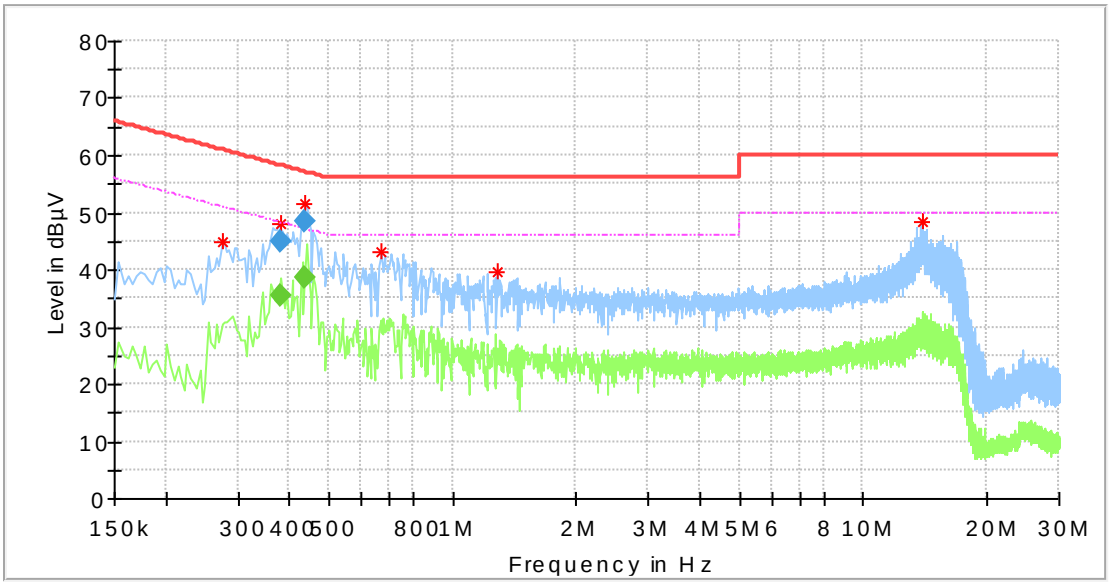
Conducted Emission Test 150kHz – 30MHz

M/N: WOOBO 1.0
Op Cond.: Charging + Media Playing + WiFi Connect
Test Spec.: Power Line, Live
Comment: AC 120V/60Hz

Temperature (°C): 23.1 Relative Humidity (%): 58.0 Atmospheric Pressure(mbar) : 1012



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr.* (dB)
0.274000	45.09	---	61.00	15.91	L1	10.2
0.381500	48.10	---	58.32	10.23	L1	11.0
0.437500	51.46	---	57.02	5.56	L1	11.1
0.670000	43.26	---	56.00	12.74	L1	10.2
1.286000	39.58	---	56.00	16.42	L1	10.2
14.022000	48.46	---	60.00	11.54	L1	10.7

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr.* (dB)
0.381500	---	35.52	48.25	12.73	L1	11.1
0.381500	44.95	---	58.25	13.30	L1	11.1
0.437500	---	38.48	47.11	8.63	L1	11.1
0.437500	48.29	---	57.11	8.82	L1	11.1

Remark: “*” Correct factor=cable loss + LISN factor

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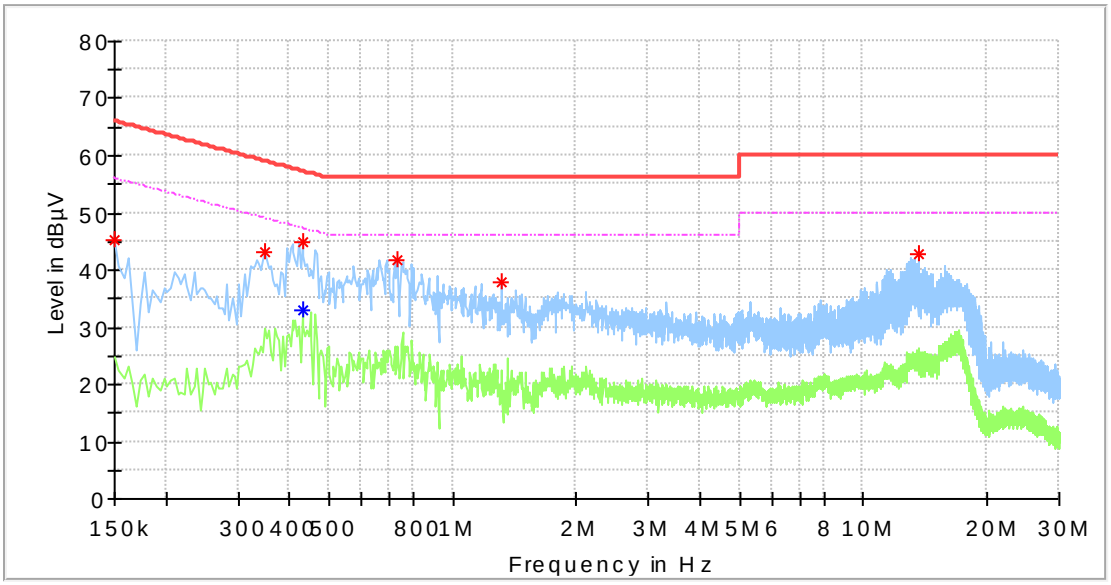
Conducted Emission Test 150kHz – 30MHz

M/N: WOOBO 1.0
Op Cond.: Charging + Media Playing + WiFi Connect
Test Spec.: Power Line, Neutral
Comment: AC 120V/60Hz

Temperature (°C): 23.1 Relative Humidity (%): 58.0 Atmospheric Pressure(mbar) : 1012



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr.* (dB)
0.150000	45.12	---	66.00	20.88	N	10.3
0.350000	43.30	---	58.96	15.67	N	10.3
0.430000	---	33.09	47.25	14.17	N	10.3
0.430000	44.76	---	57.25	12.49	N	10.3
0.734000	41.81	---	56.00	14.19	N	10.4
1.314000	37.79	---	56.00	18.21	N	10.4
13.646000	42.85	---	60.00	17.15	N	11.0

Final_Result

Frequency (MHz)	QuasiPeak	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr.* (dB)
---	---	---	---	---		---

Remark: “*” Correct factor=cable loss + LISN factor

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9.2 Conducted peak output power

Test Method

1. Use the following spectrum analyzer settings:
   RBW > the 6 dB bandwidth of the emission being measured, VBW≥3RBW, Span≥3RBW
   Sweep = auto, Detector function = peak, Trace = max hold.
2. Add a correction factor to the display.
3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.

Limits

According to §15.247 (b) (1), conducted peak output power limit as below:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤1	≤30

Test result as below table

802.11b

Frequency MHz	Conducted Peak Output Power dBm	Result
Top channel 2412MHz	13.9	Pass
Middle channel 2437MHz	14.1	Pass
Bottom channel 2462MHz	14.3	Pass

802.11g

Frequency MHz	Conducted Peak Output Power dBm	Result
Top channel 2412MHz	11.7	Pass
Middle channel 2437MHz	12.0	Pass
Bottom channel 2462MHz	11.7	Pass

802.11nHT20

Frequency MHz	Conducted Peak Output Power dBm	Result
Top channel 2412MHz	10.1	Pass
Middle channel 2437MHz	10.0	Pass
Bottom channel 2462MHz	10.6	Pass

802.11nHT40

Frequency MHz	Conducted Peak Output Power dBm	Result
Top channel 2422MHz	8.8	Pass
Middle channel 2437MHz	8.9	Pass
Bottom channel 2452MHz	9.4	Pass

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9.3 6dB bandwidth

Test Method

1. Use the following spectrum analyzer settings:
   RBW=100K, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
3. Allow the trace to stabilize, record the X dB Bandwidth value.

Limit

Limit [kHz]
≥500

Test result

802.11b

Frequency MHz	6dB bandwidth KHz	Result
Bottom channel 2412MHz	10120	Pass
Middle channel 2437MHz	10120	Pass
Top channel 2462MHz	10120	Pass

802.11g

Frequency MHz	6dB bandwidth KHz	Result
Bottom channel 2412MHz	16540	Pass
Middle channel 2437MHz	16540	Pass
Top channel 2462MHz	16580	Pass

802.11nHT20

Frequency MHz	6dB bandwidth KHz	Result
Bottom channel 2412MHz	17840	Pass
Middle channel 2437MHz	17800	Pass
Top channel 2462MHz	17840	Pass

802.11nHT40

Frequency MHz	6dB bandwidth KHz	Result
Bottom channel 2422MHz	36560	Pass
Middle channel 2437MHz	36470	Pass
Top channel 2452MHz	36470	Pass

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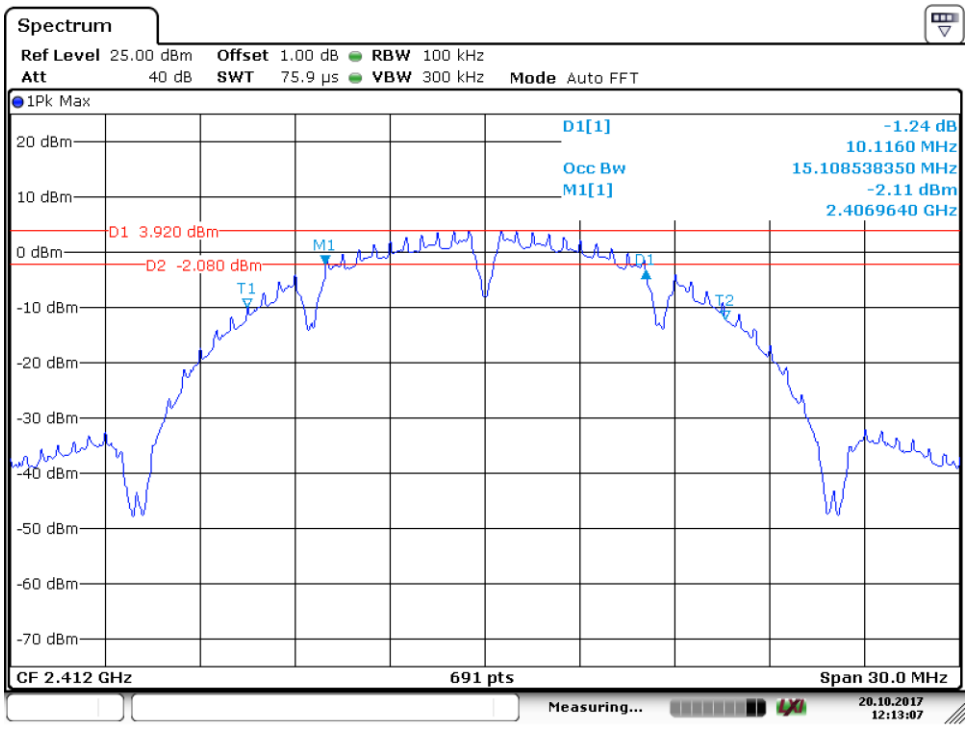
6dB bandwidth

802.11b



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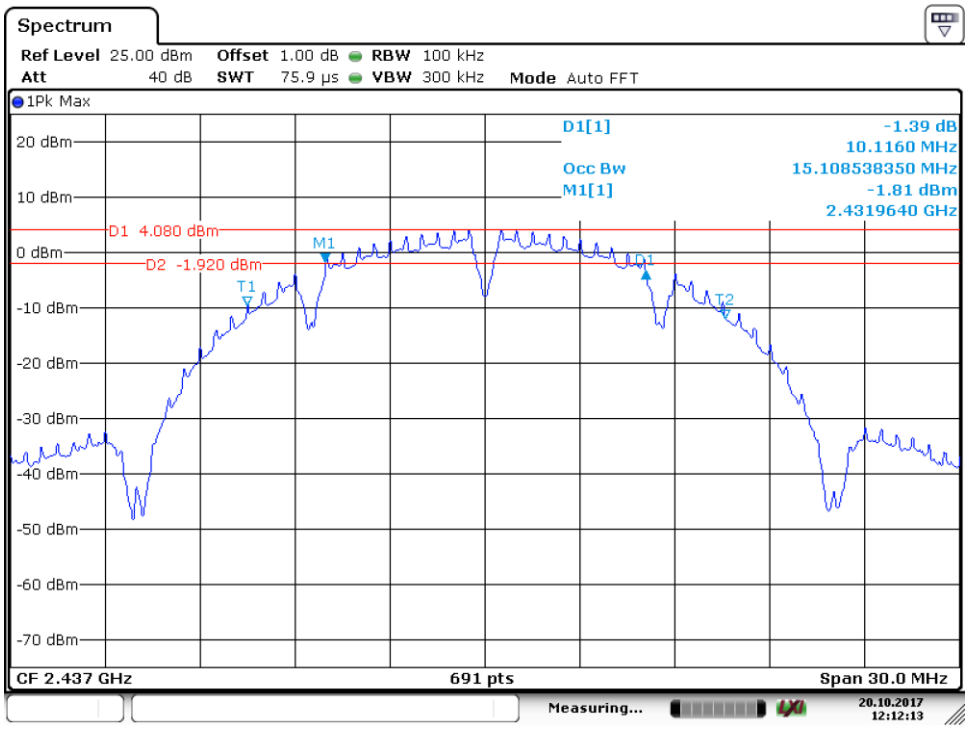
2412MHz



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2437MHz

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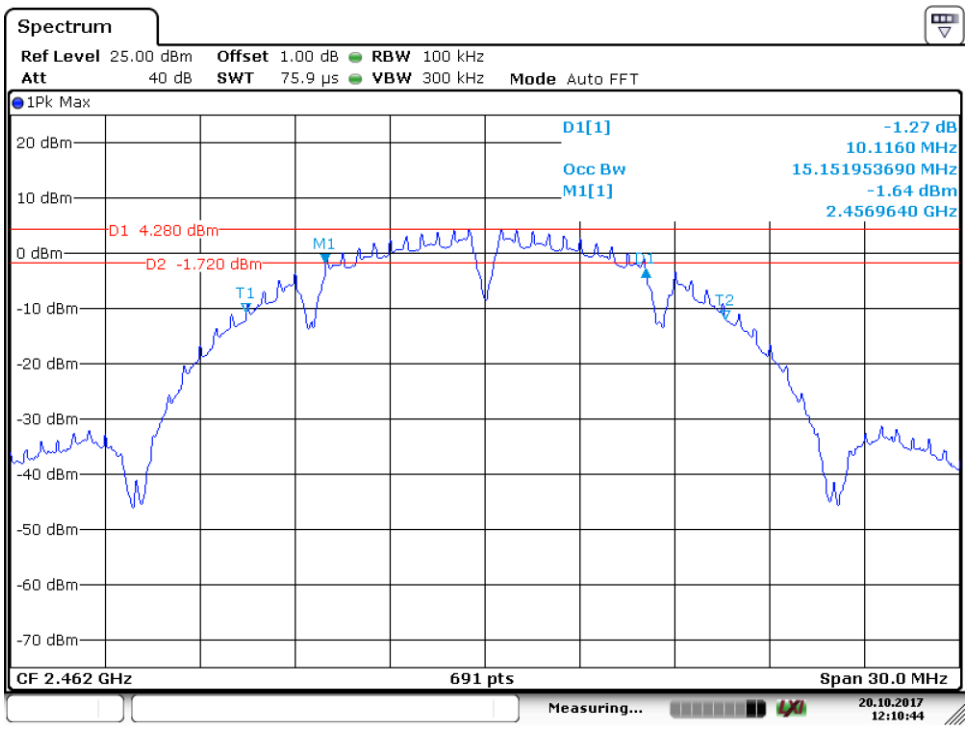
6dB bandwidth



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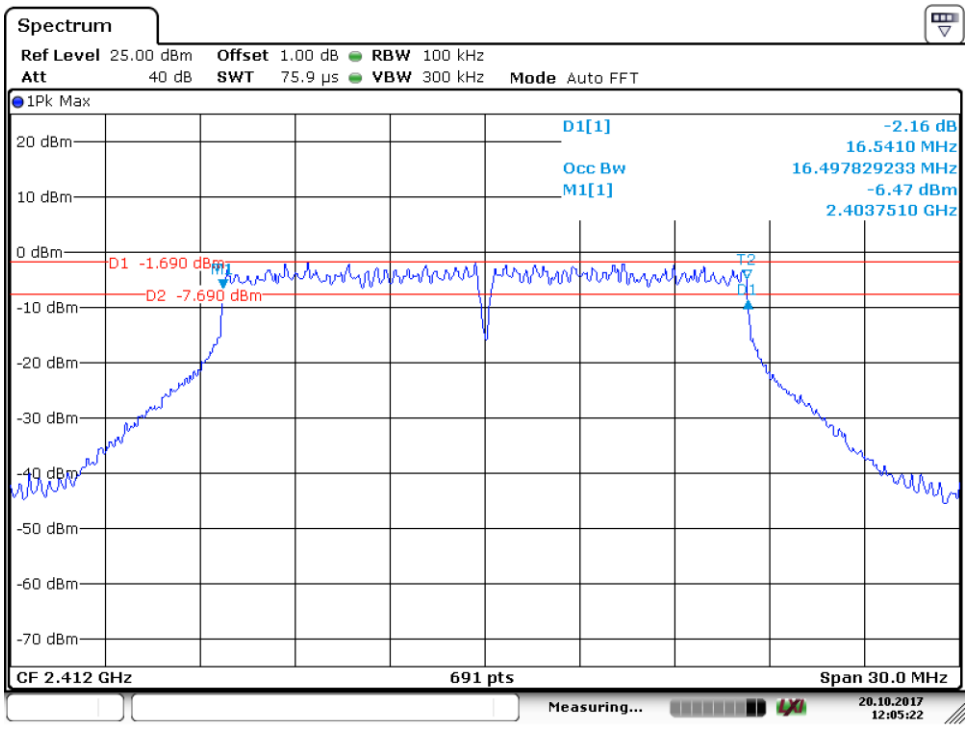
2462MHz

802.11g



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2412MHz

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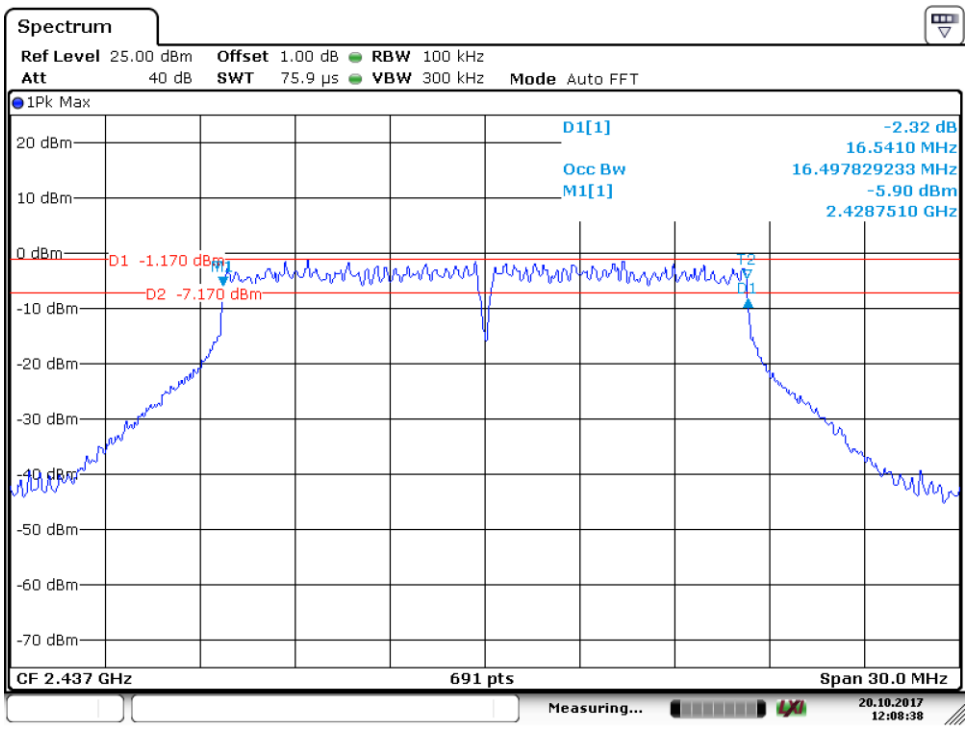
6dB bandwidth



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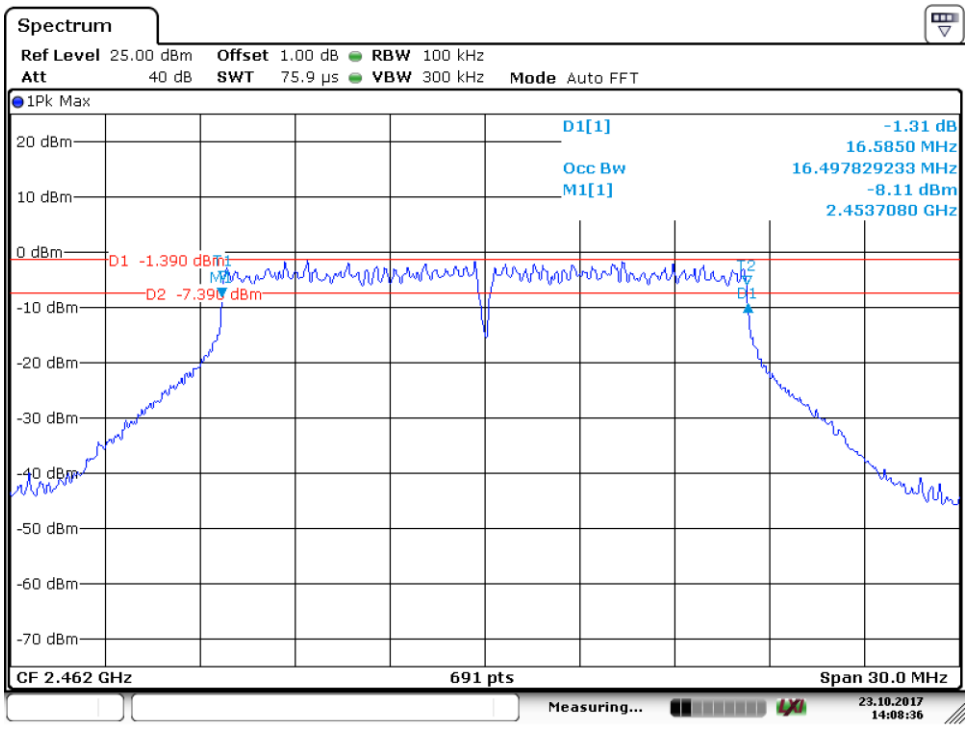
2437MHz



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2462MHz

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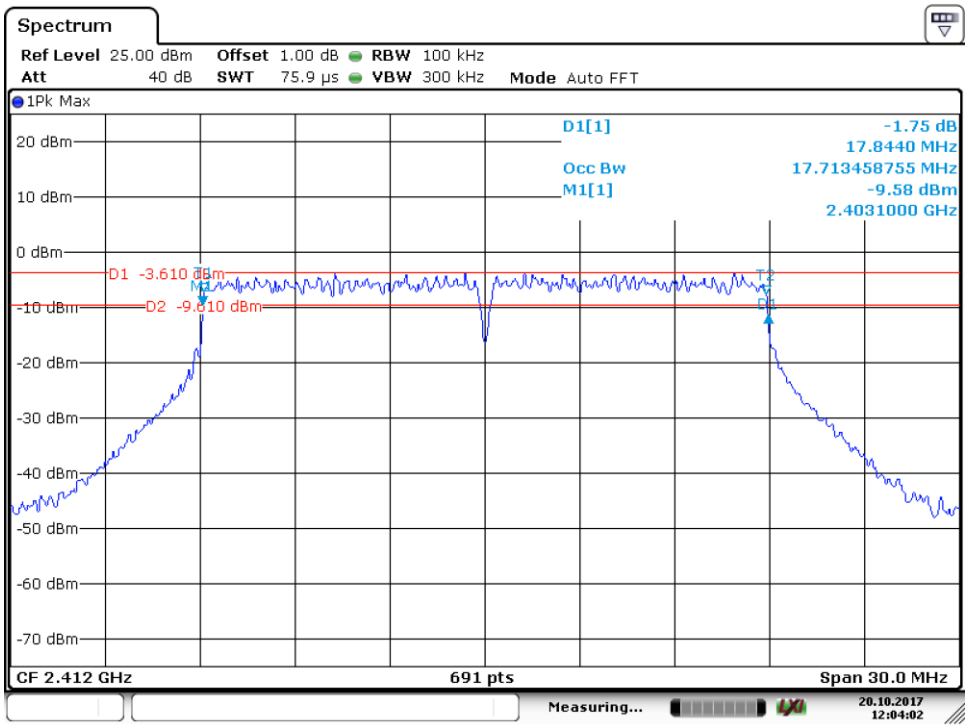
6dB bandwidth

802.11nHT20



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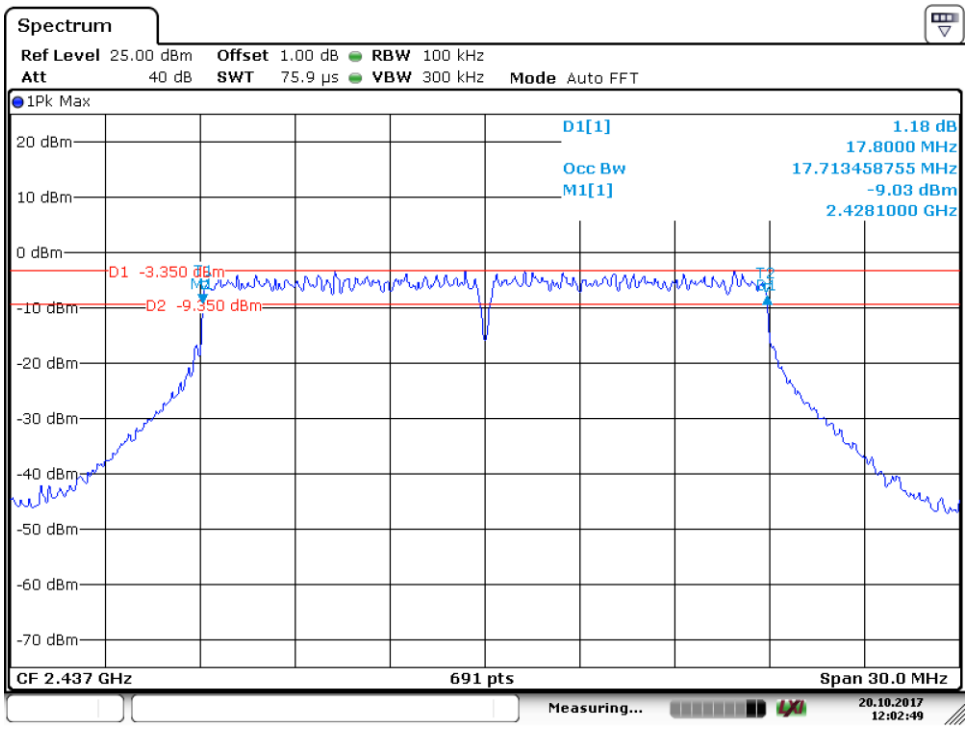
2412MHz



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2437MHz

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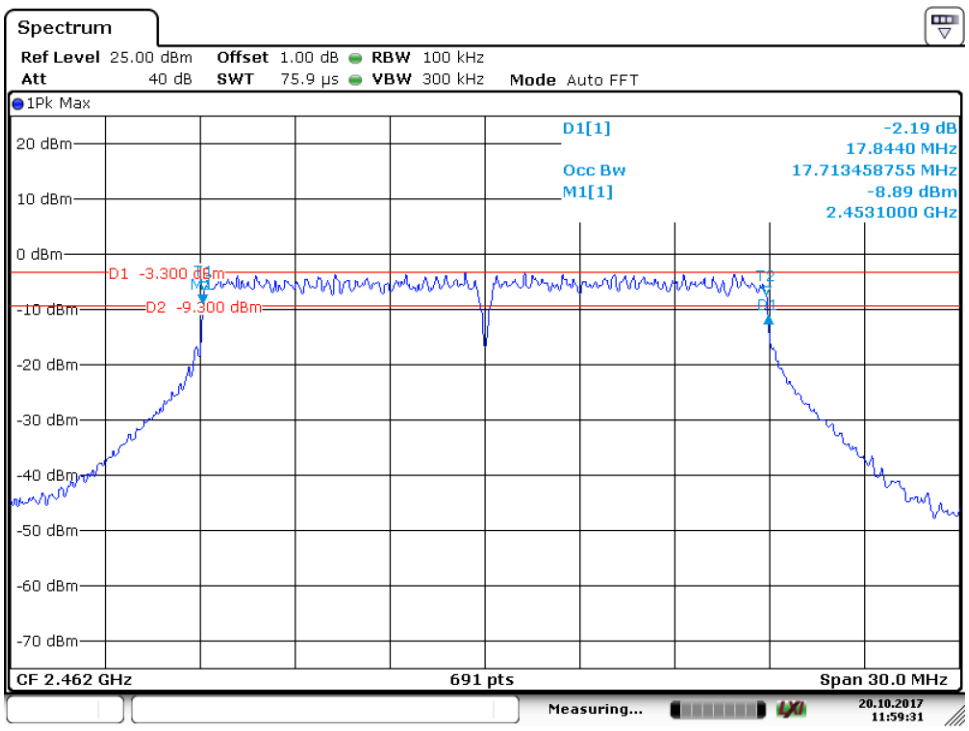
6dB bandwidth



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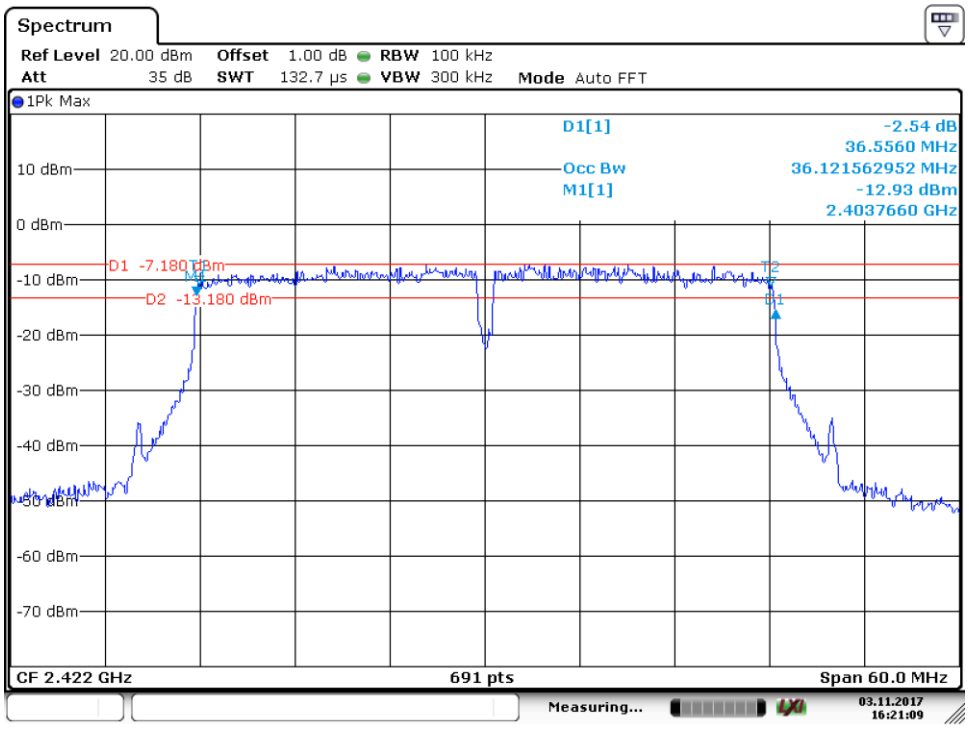
2462MHz

802.11 HT40



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2422MHz

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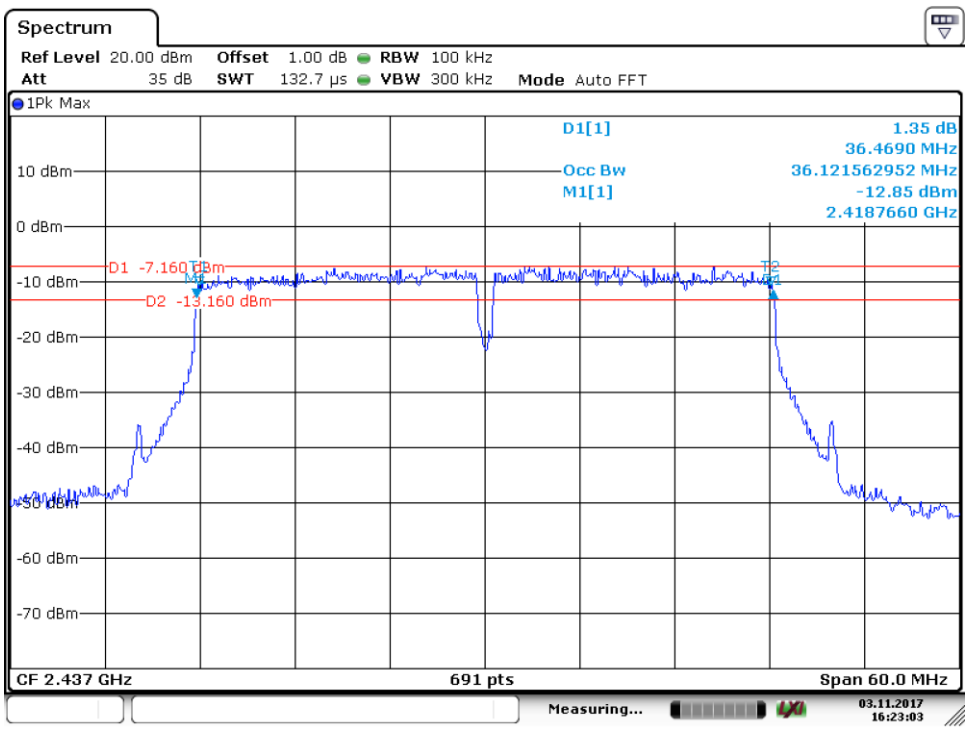
6dB bandwidth



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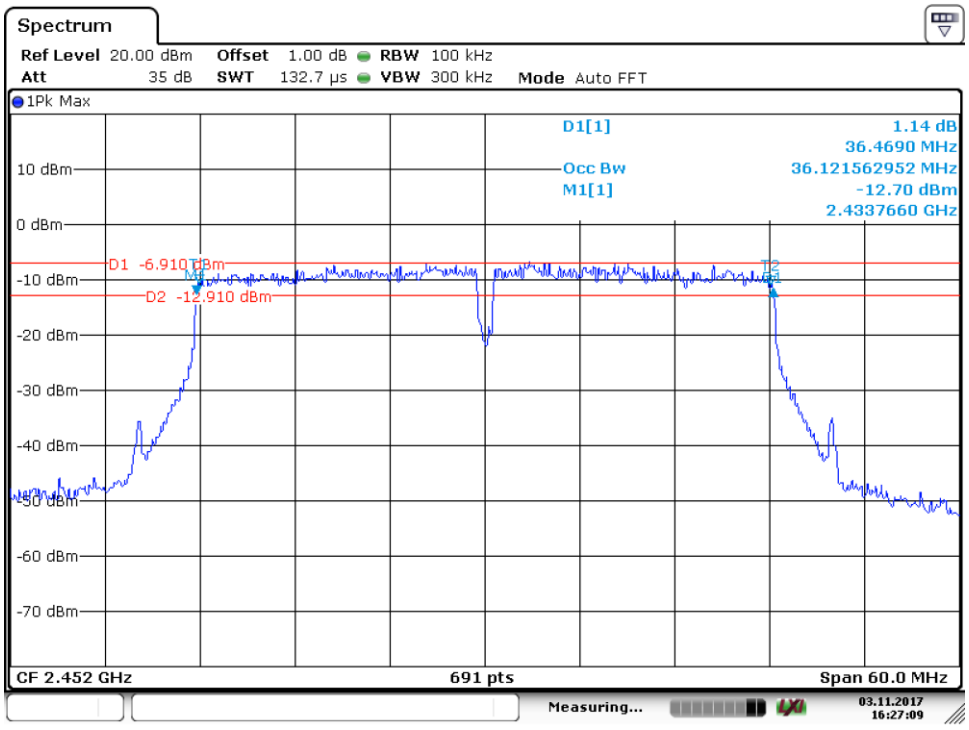
2437MHz



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2452MHz

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9.4 Power spectral density

Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz, VBW≥3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
3. Repeat above procedures until other frequencies measured were completed.

Limit

Limit [dBm]
≤8

Test result

802.11b

Frequency	Power spectral density	Result
MHz	**dBm**	
Top channel 2412MHz	-16.80	Pass
Middle channel 2437MHz	-16.69	Pass
Bottom channel 2462MHz	-16.47	Pass

802.11g

Frequency	Power spectral density	Result
MHz	**dBm**	
Top channel 2412MHz	-15.83	Pass
Middle channel 2437MHz	-15.54	Pass
Bottom channel 2462MHz	-15.39	Pass

802.11nHT20

Frequency	Power spectral density	Result
MHz	**dBm**	
Top channel 2412MHz	-17.71	Pass
Middle channel 2437MHz	-17.37	Pass
Bottom channel 2462MHz	-17.27	Pass

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802.11nHT40

Frequency	Power spectral density	Result
MHz	**dBm**	
Top channel 2412MHz	-19.97	Pass
Middle channel 2437MHz	-19.87	Pass
Bottom channel 2462MHz	-19.71	Pass

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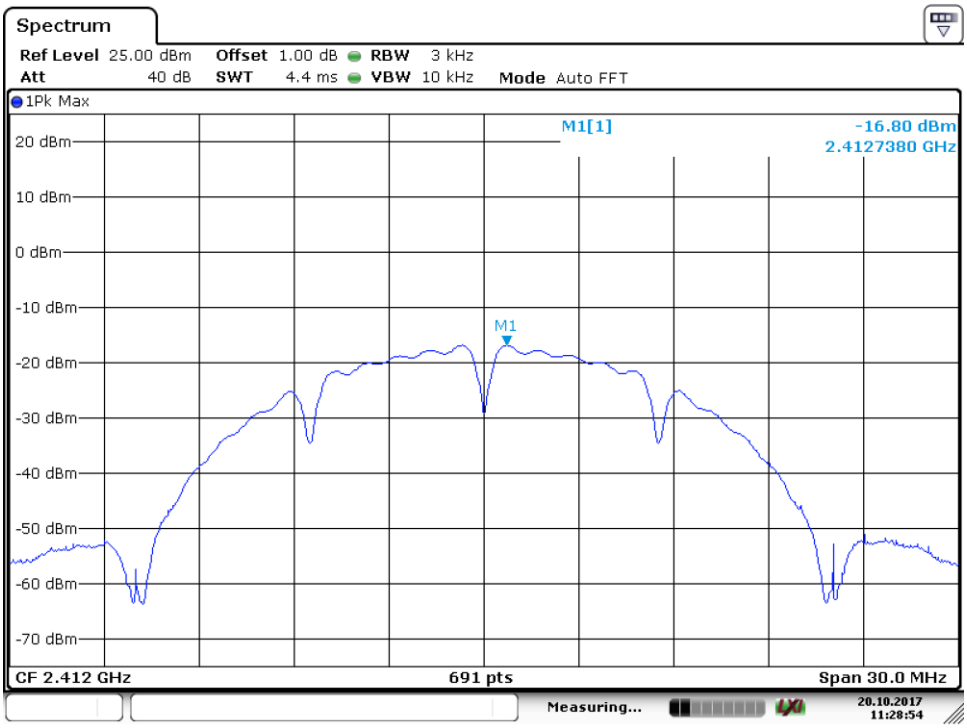
Power spectral density

802.11b



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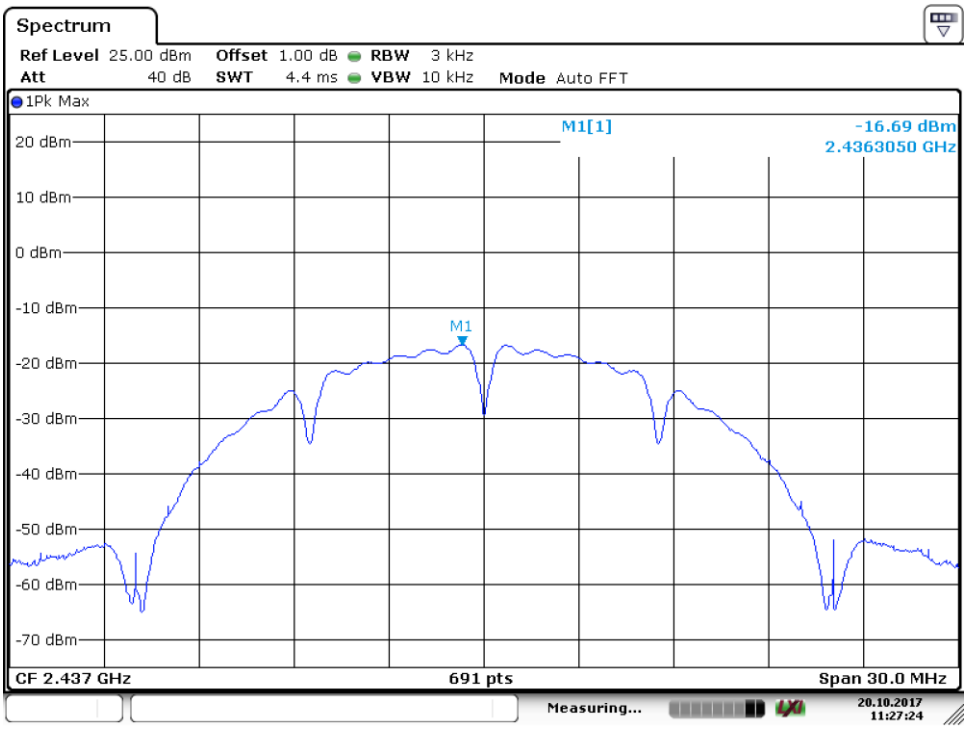
2412MHz



Date: 20.OCT.2017 11:27:24

2437MHz

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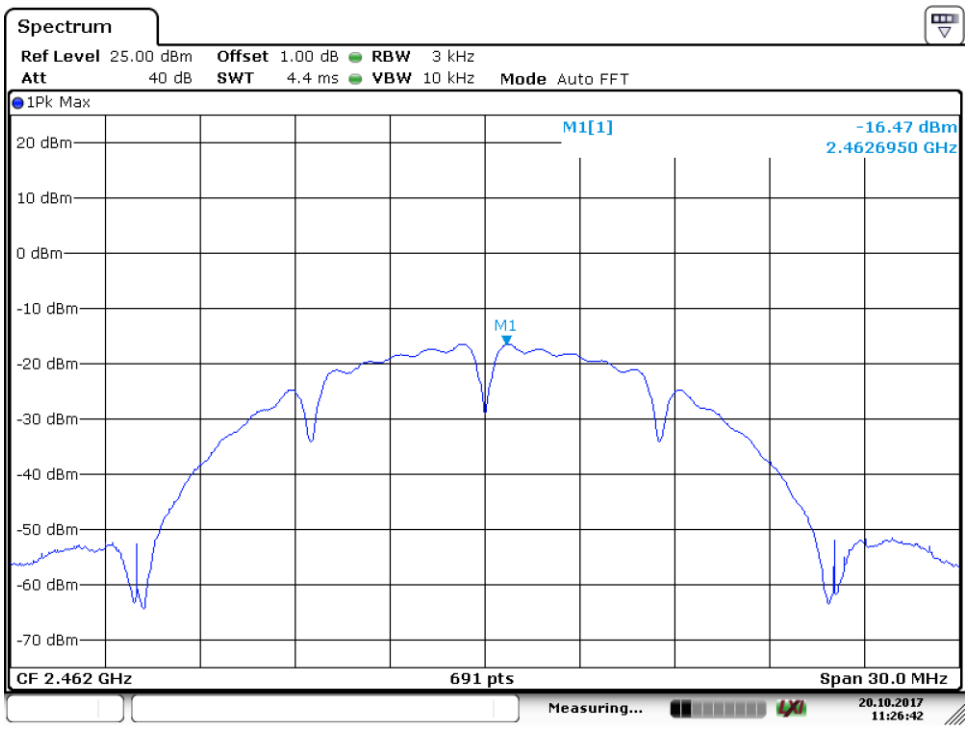
Power spectral density



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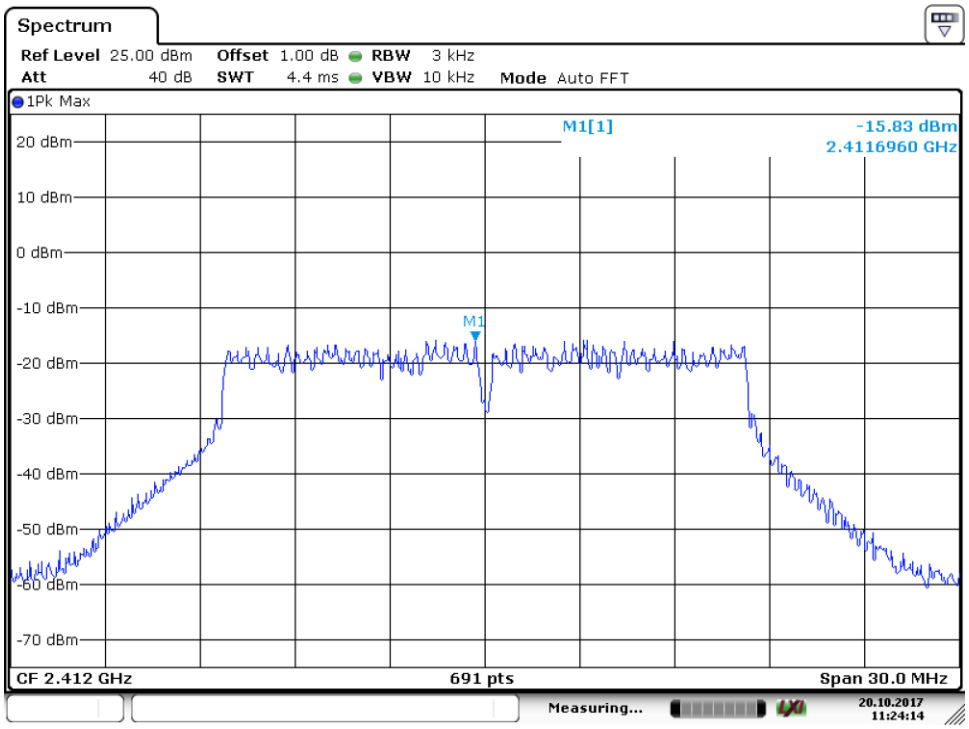
2462MHz

802.11g



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2412MHz

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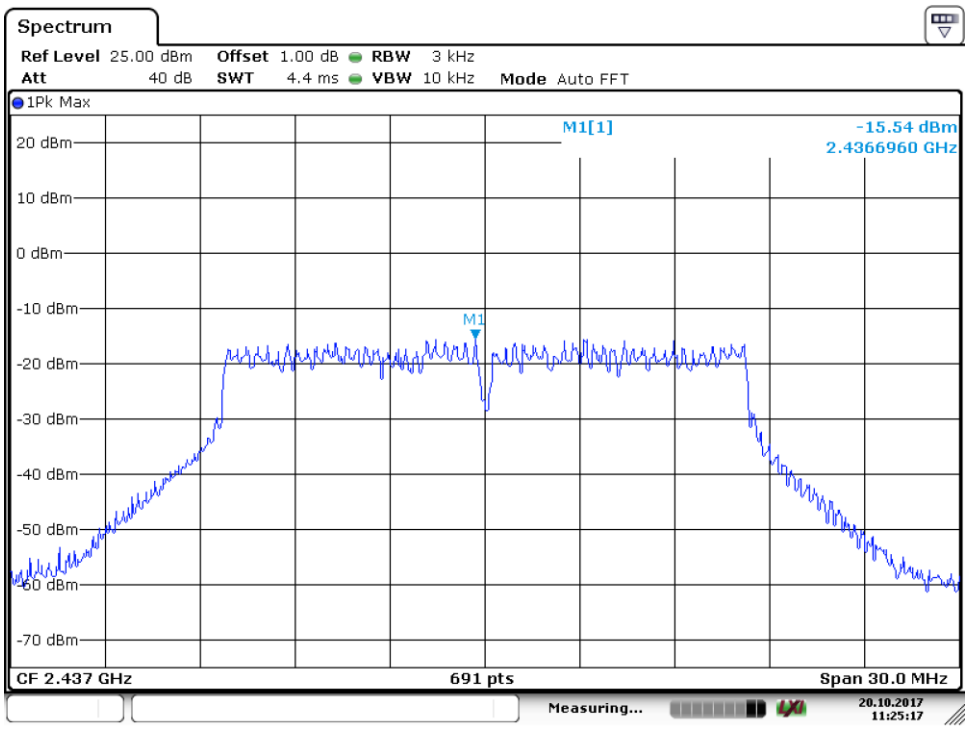
Power spectral density



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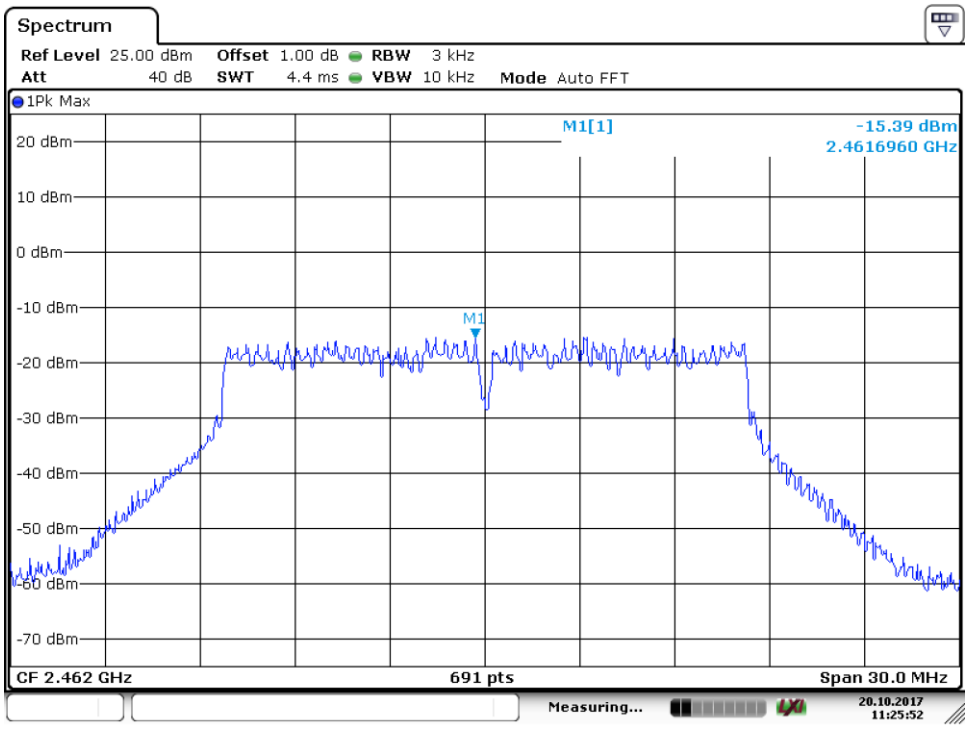
2437MHz



Date: 20.OCT.2017 11:25:52

2462MHz

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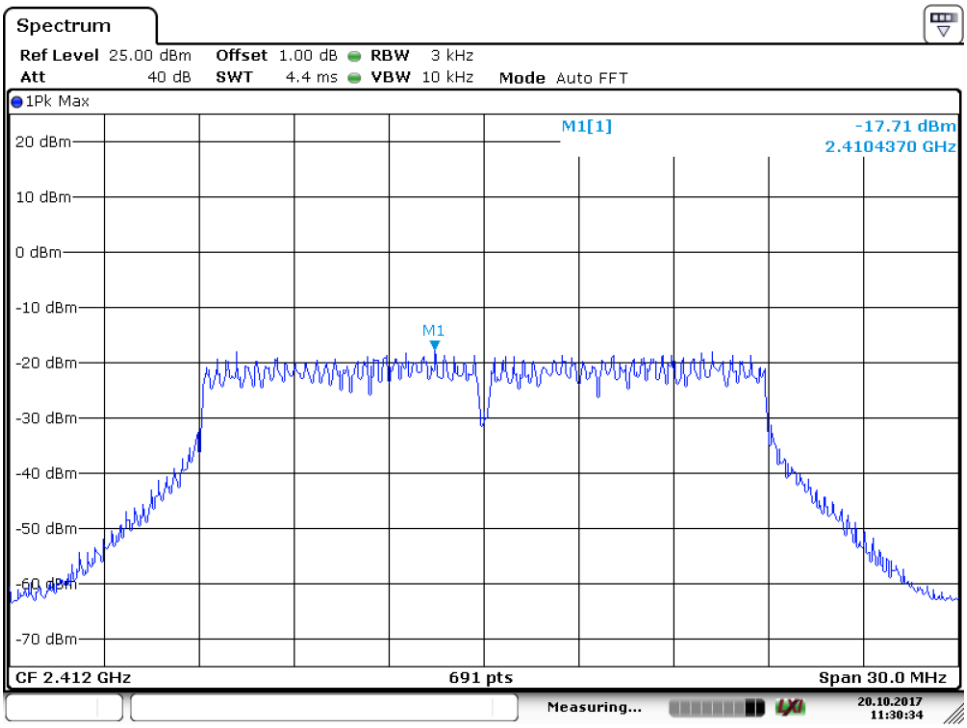
Power spectral density

802.11nHT20



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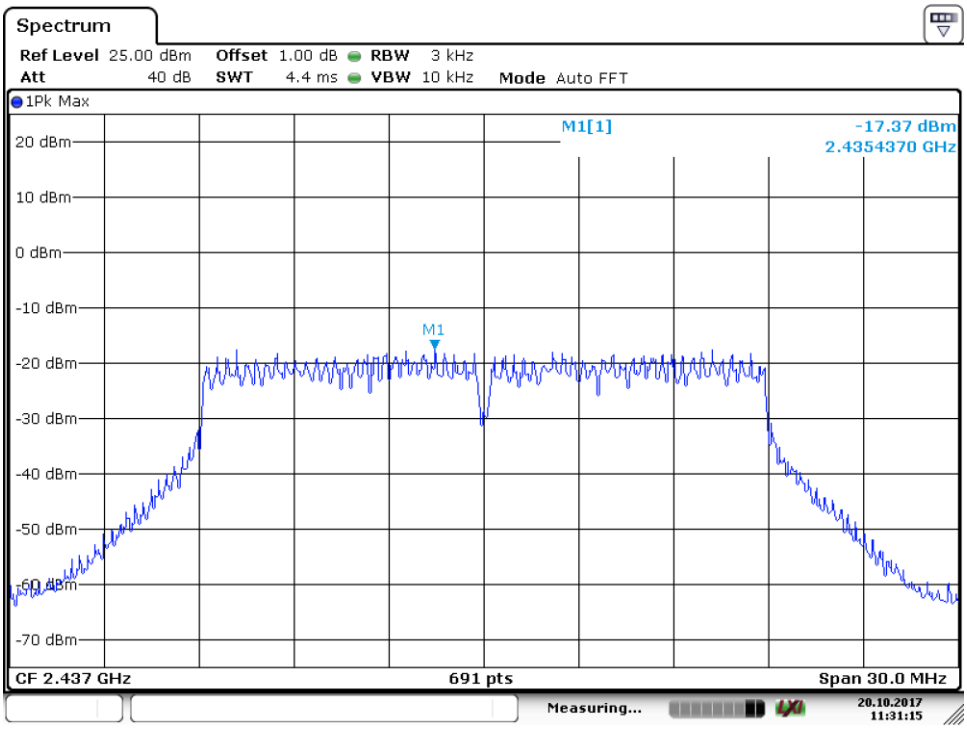
2412MHz



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2437MHz

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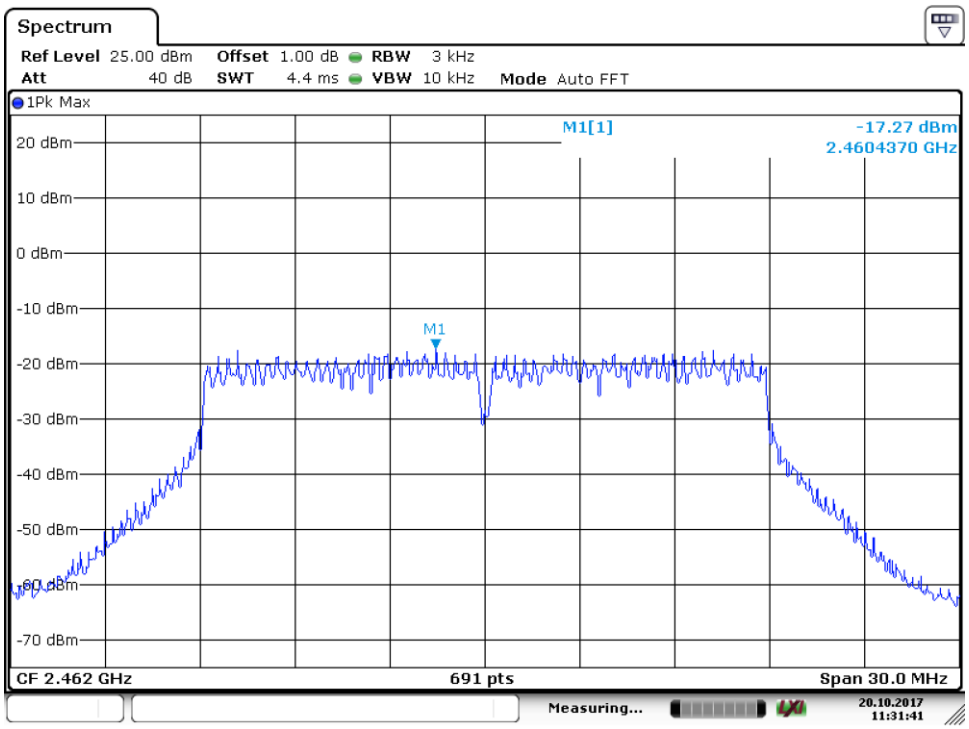
Power spectral density



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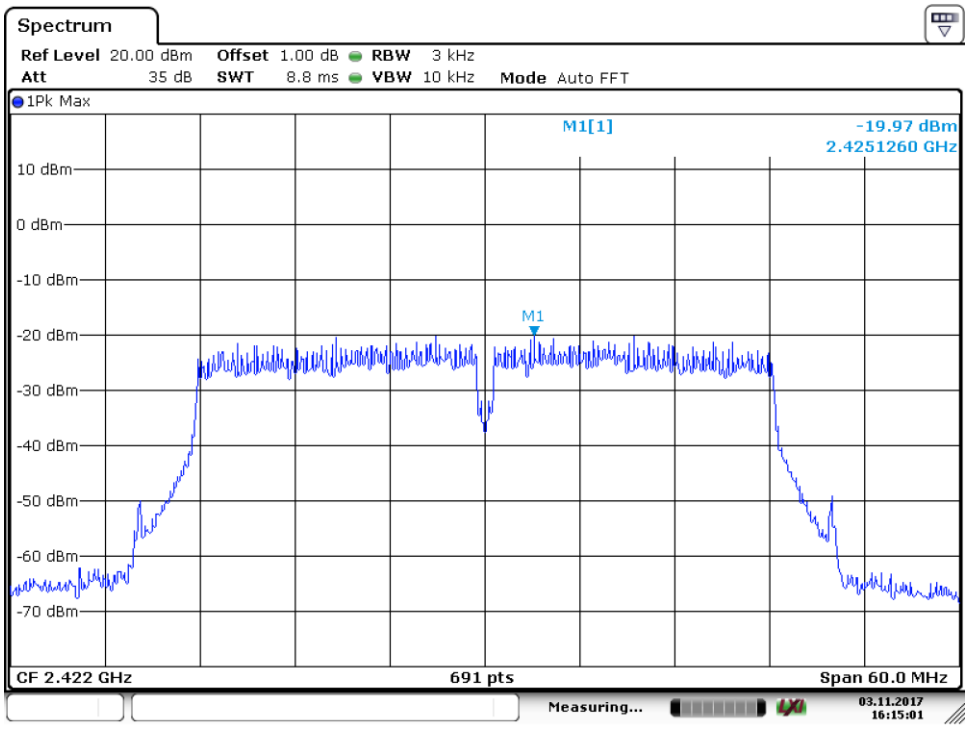
2462MHz

802.11nHT40



Date: 3.NOV.2017 16:15:01

2422MHz

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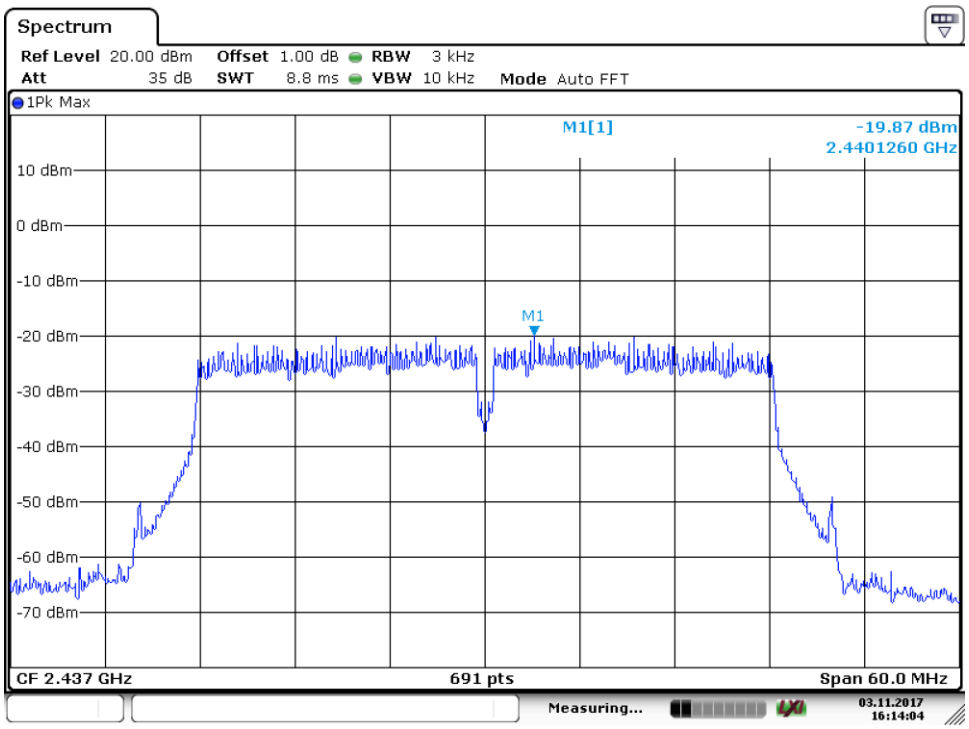
Power spectral density



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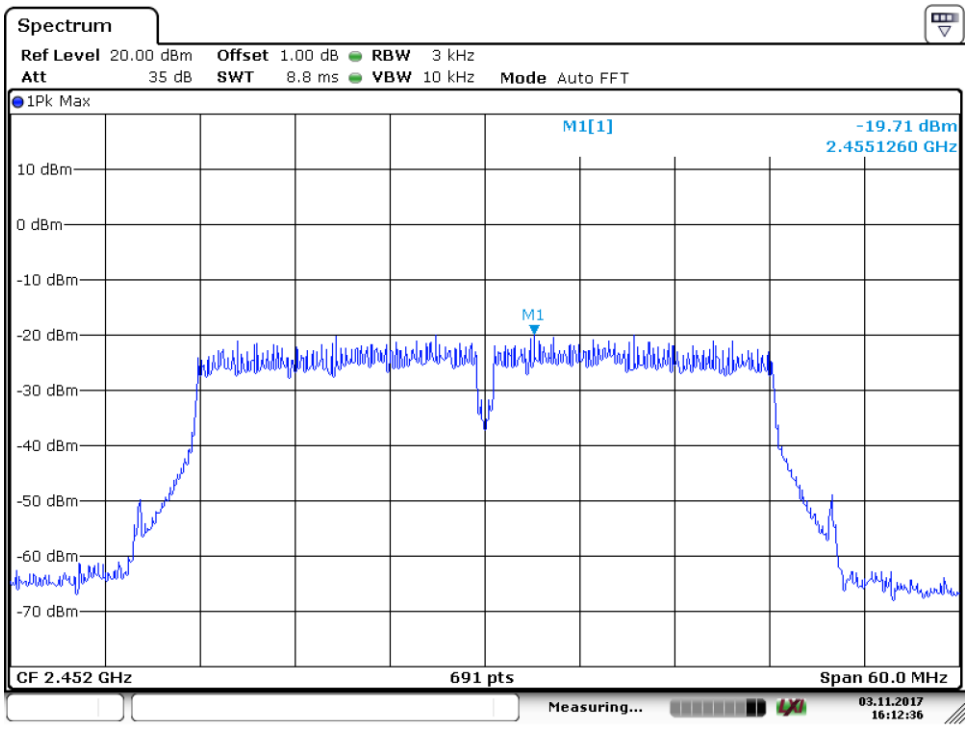
2437MHz



Date: 3.NOV.2017 16:12:37

2452MHz

9.5 Spurious RF conducted emissions

Test Method

1. Establish a reference level by using the following procedure:
   a. Set RBW=100 kHz. VBW≥3RBW. Detector =peak, Sweep time = auto couple, Trace mode = max hold.
   b. Allow trace to fully stabilize, use the peak marker function to determine the maximum PSD level.
2. Use the maximum PSD level to establish the reference level.
   a. Set the center frequency and span to encompass frequency range to be measured.
   b. Use the peak marker function to determine the maximum amplitude level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements, report the three highest emissions relative to the limit.
3. Repeat above procedures until other frequencies measured were completed.

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

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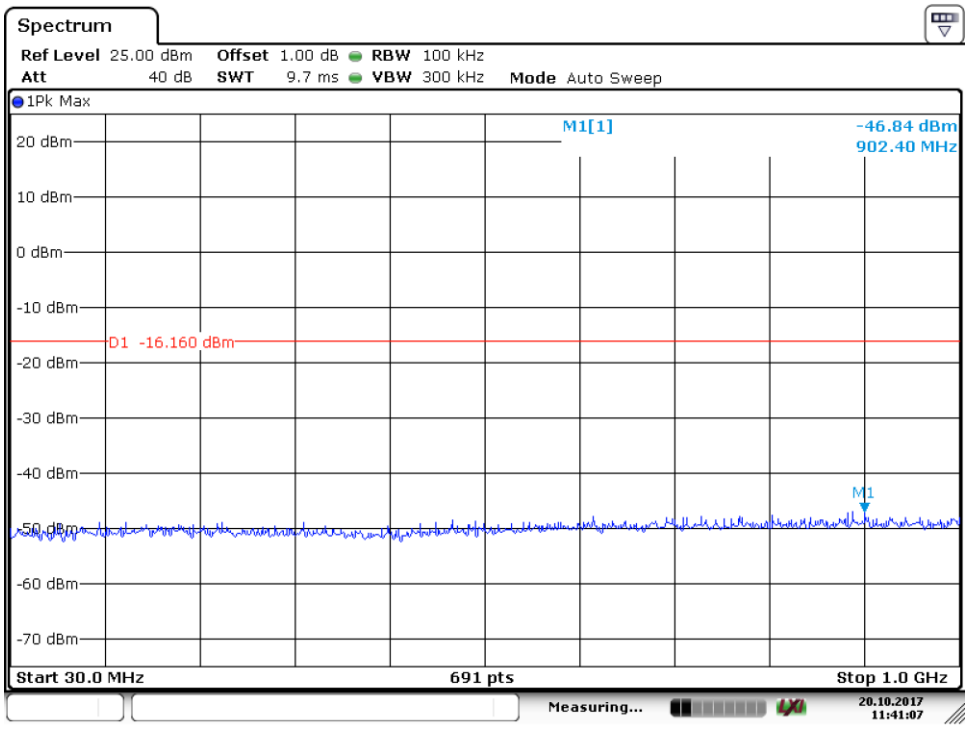
Spurious RF conducted emissions

802.11b



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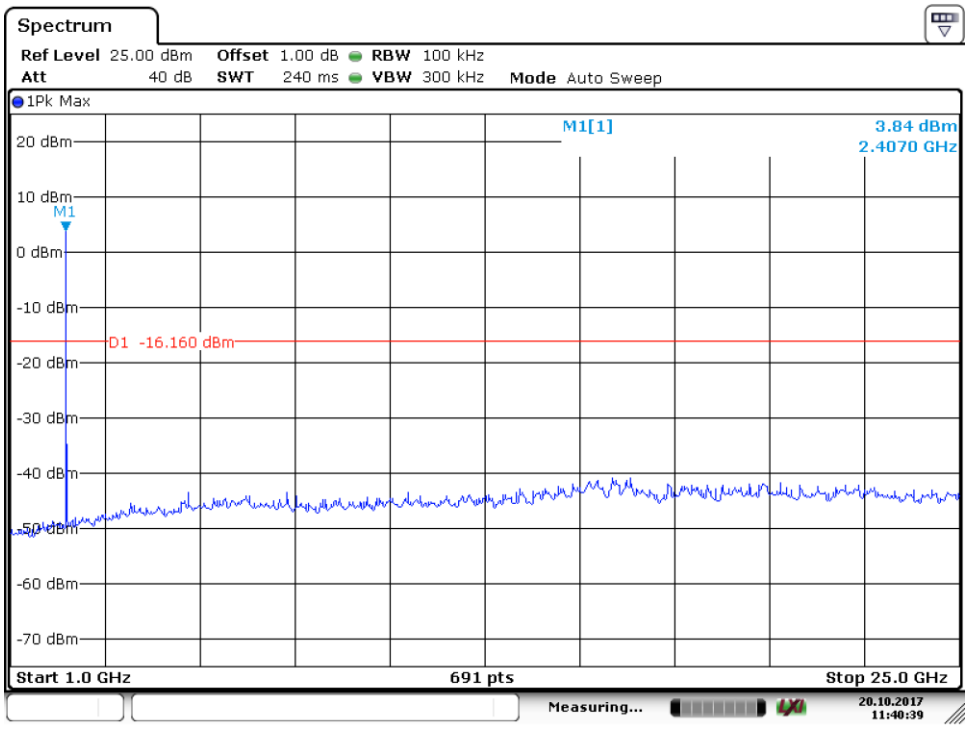

Date: 20.OCT.2017 11:40:39

2412MHz

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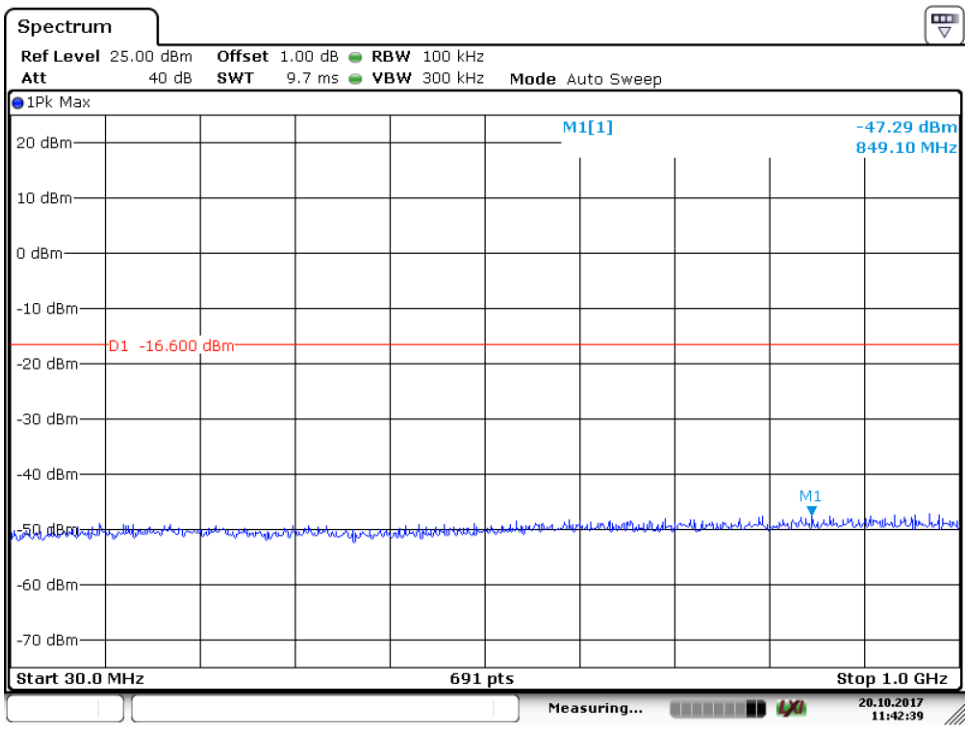
Spurious RF conducted emissions



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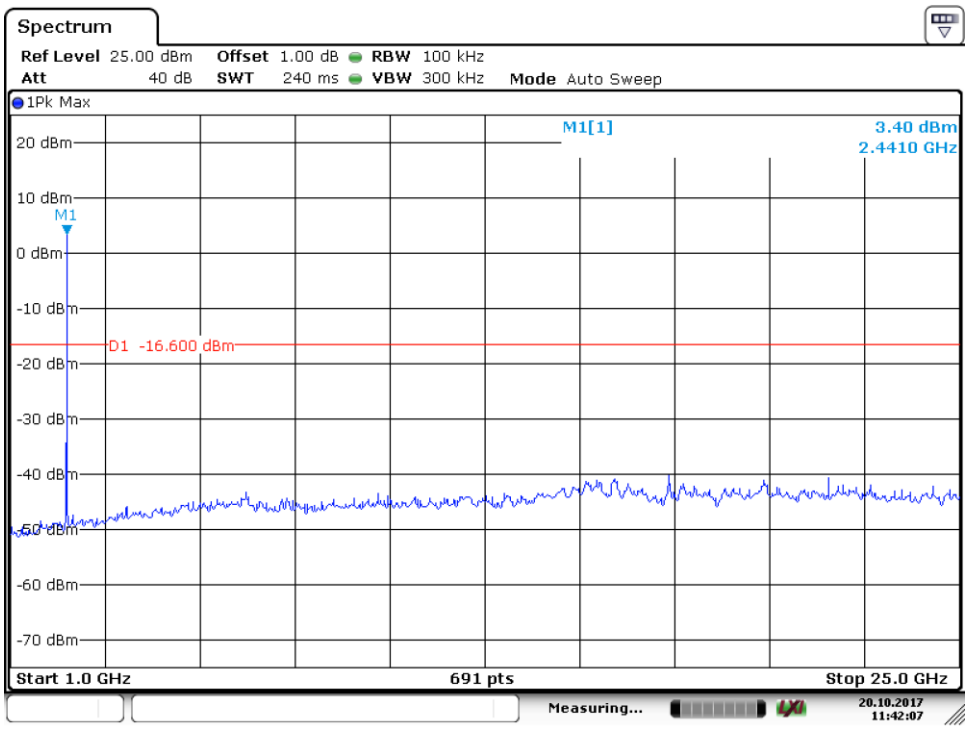

Date: 20.OCT.2017 11:42:07

2437MHz

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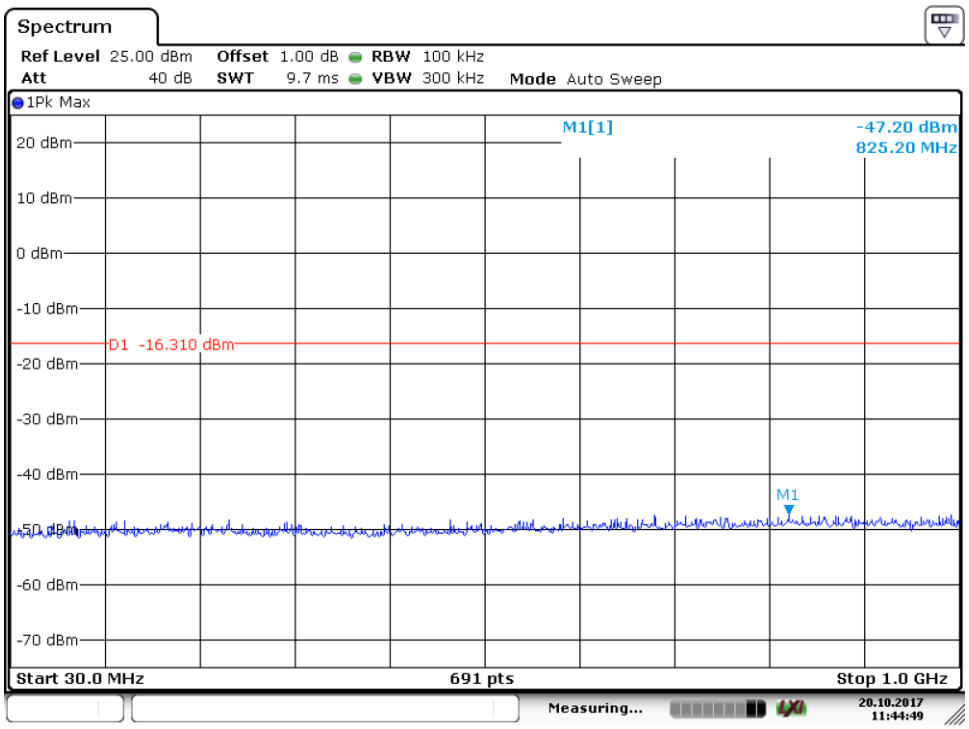
Spurious RF conducted emissions



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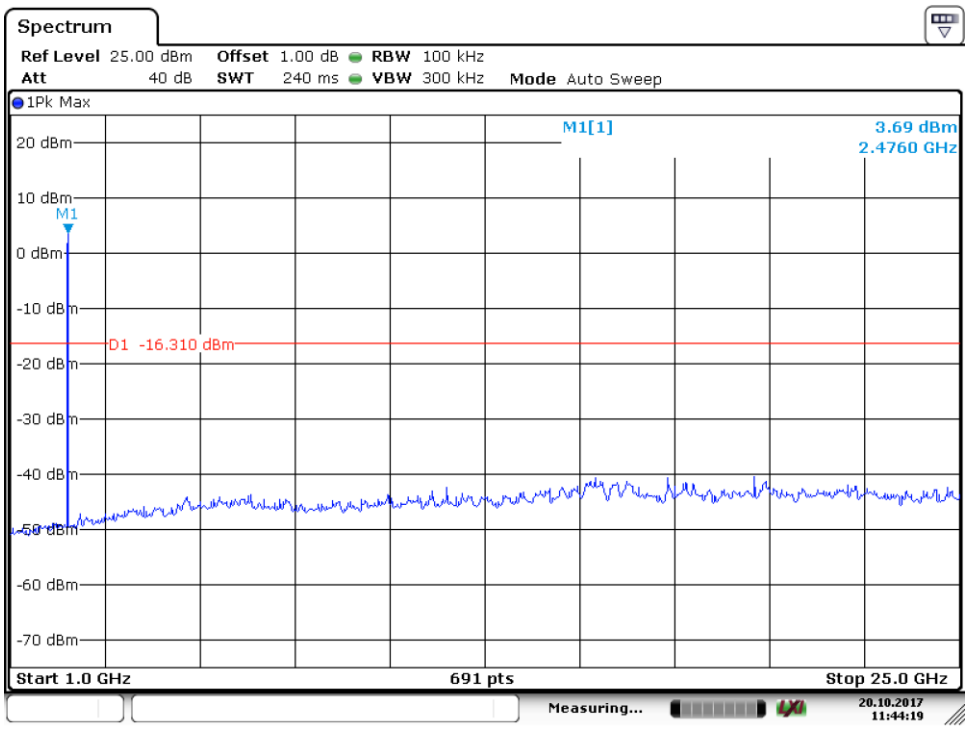

Date: 20.OCT.2017 11:44:18

2462MHz

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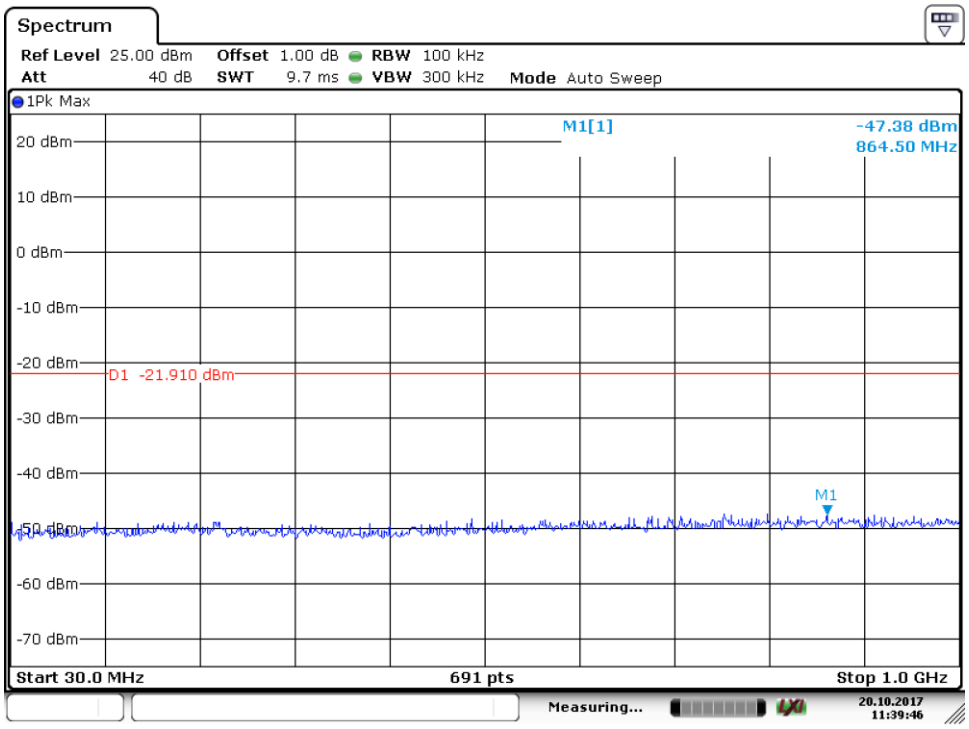
Spurious RF conducted emissions

802.11g



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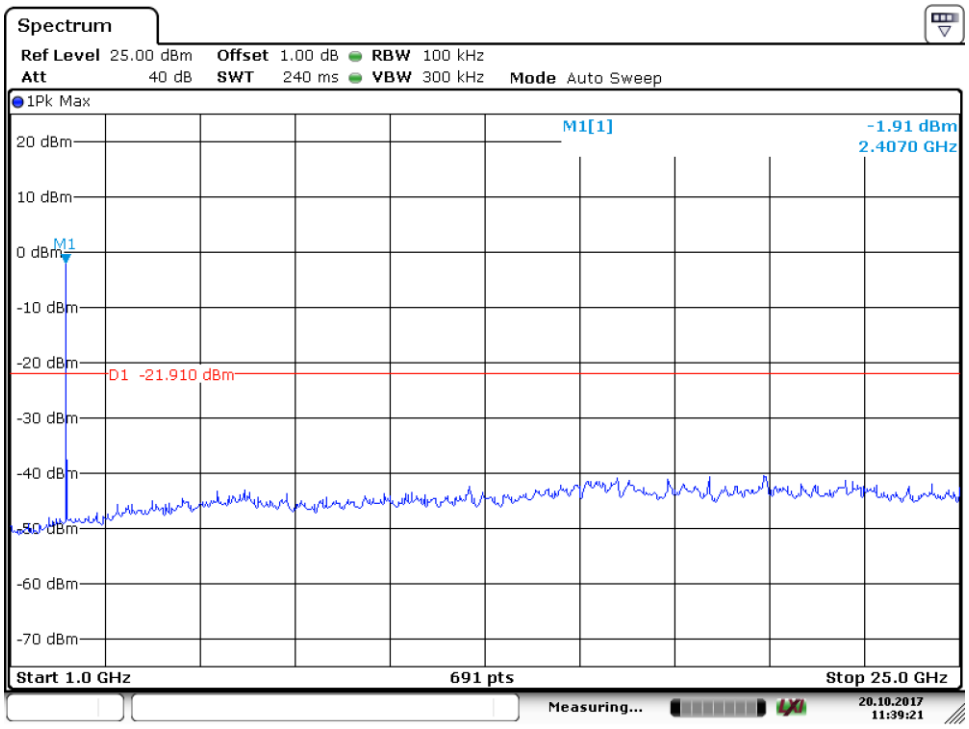

Date: 20.OCT.2017 11:39:22

2412MHz

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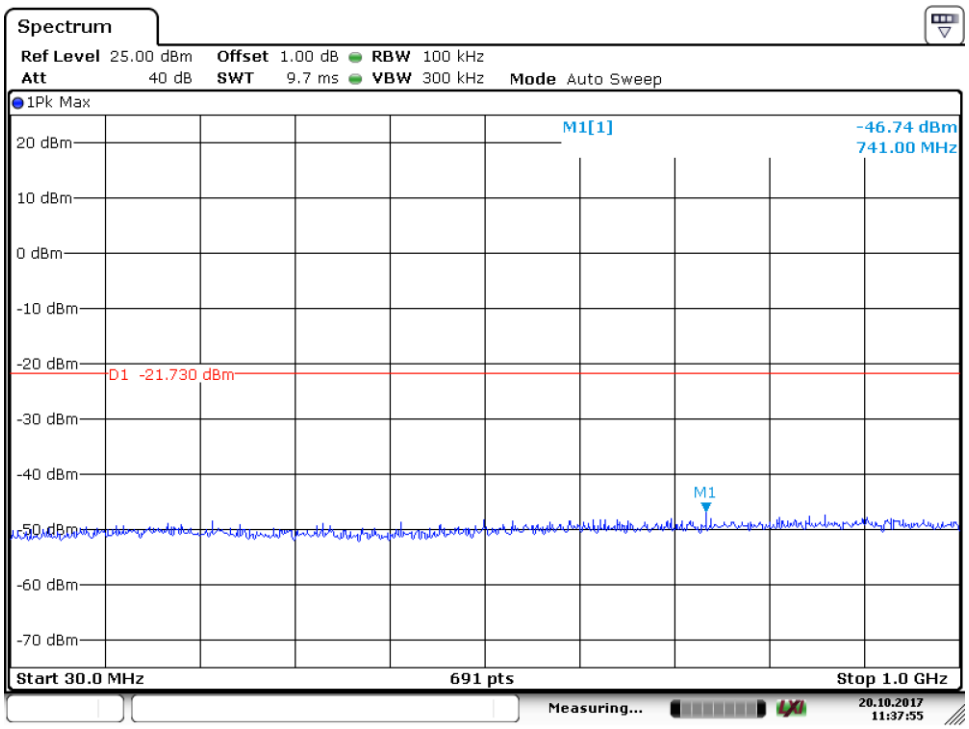
Spurious RF conducted emissions



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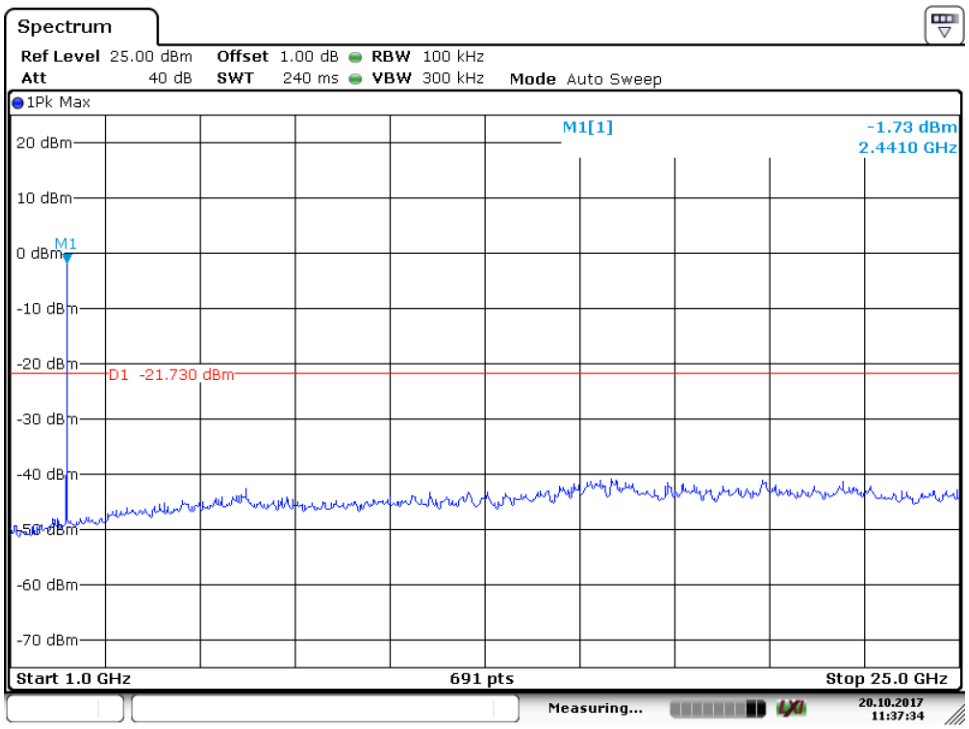

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2437MHz

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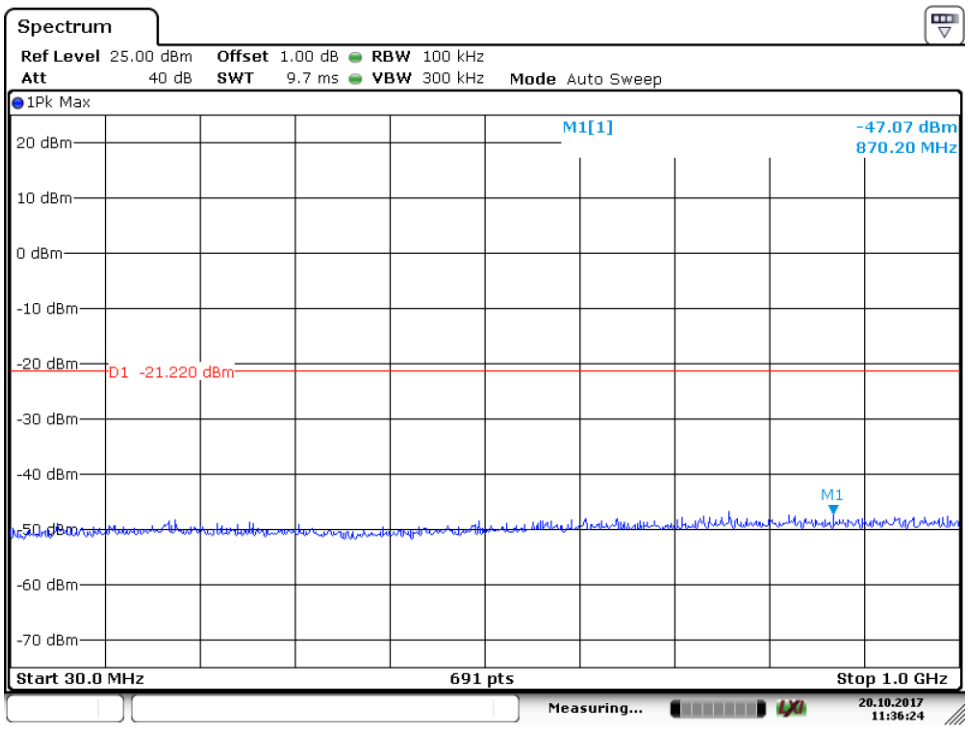
Spurious RF conducted emissions



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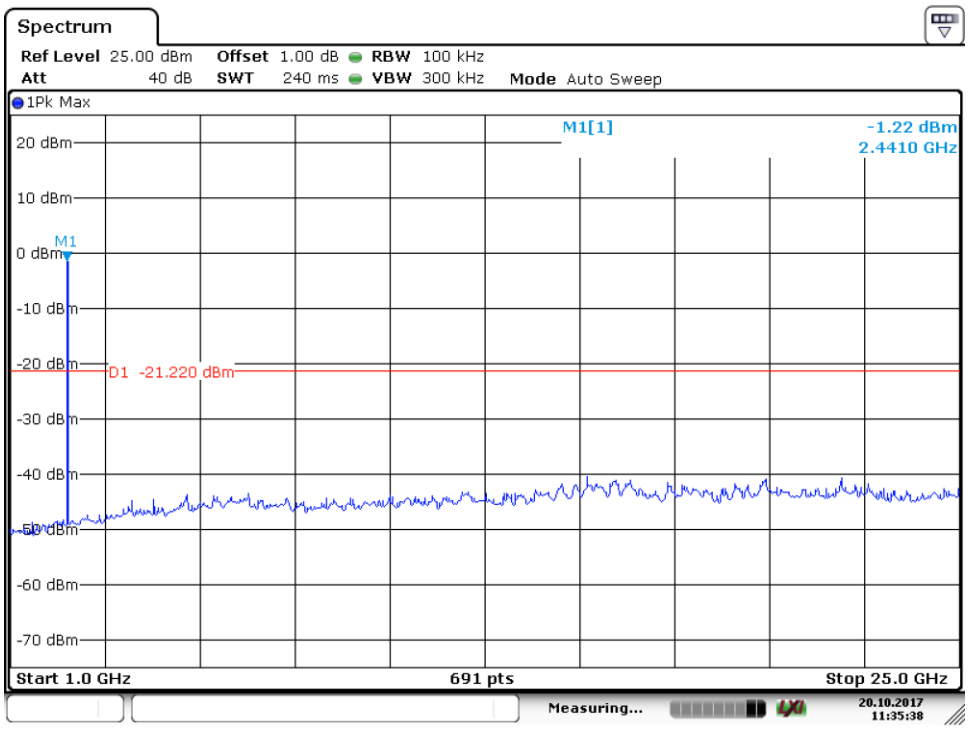

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2462MHz

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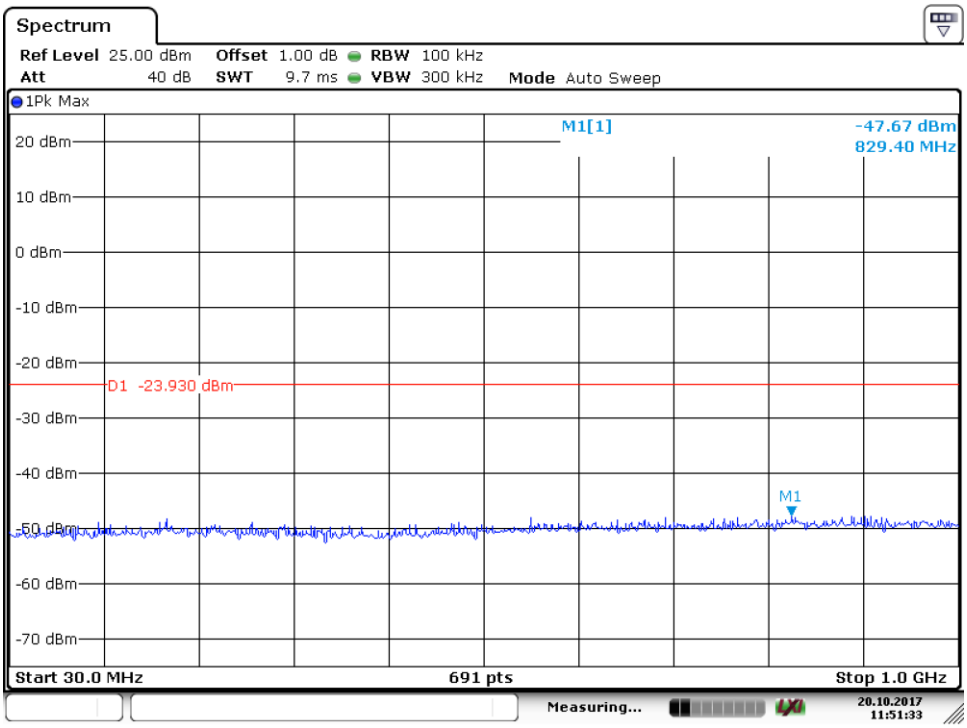
Spurious RF conducted emissions

802.11nHT20



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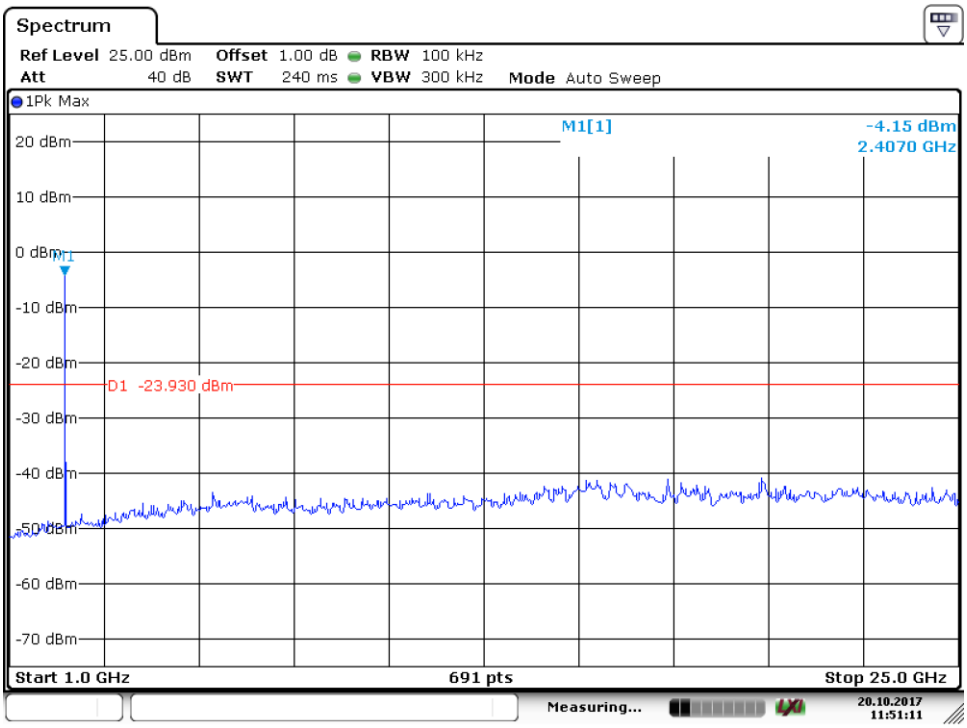

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2412MHz

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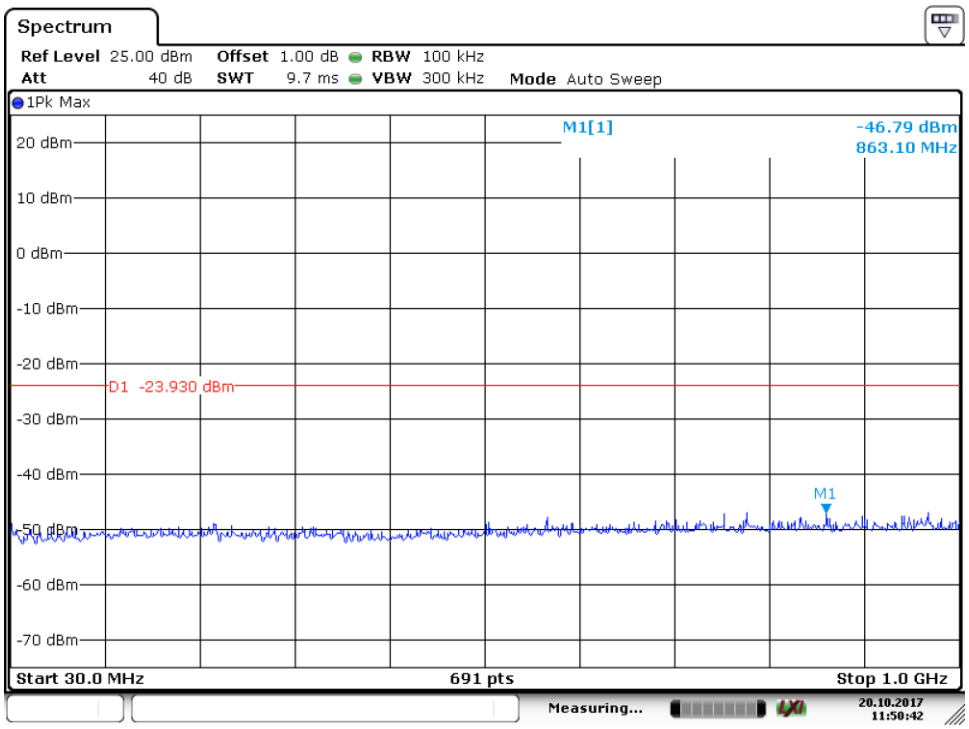
Spurious RF conducted emissions



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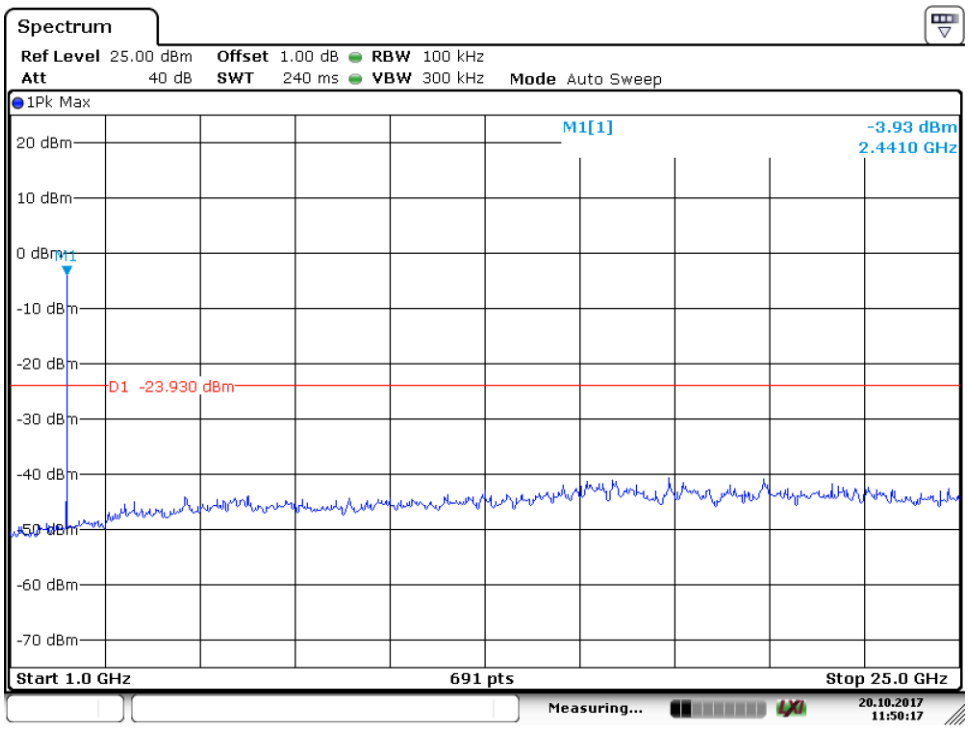

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2437MHz

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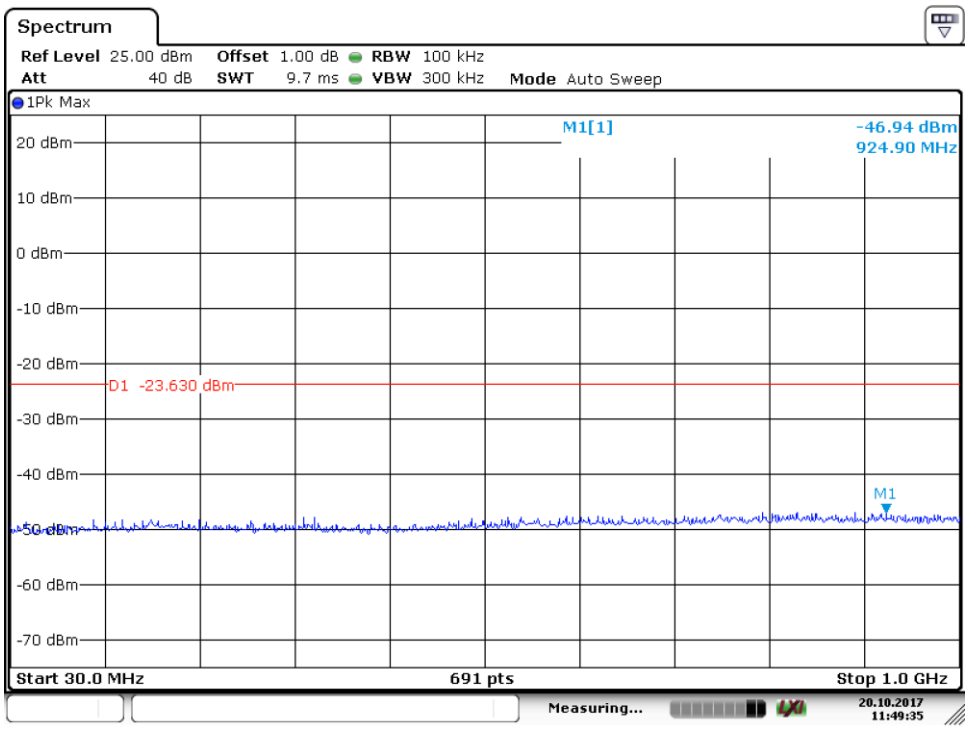
Spurious RF conducted emissions



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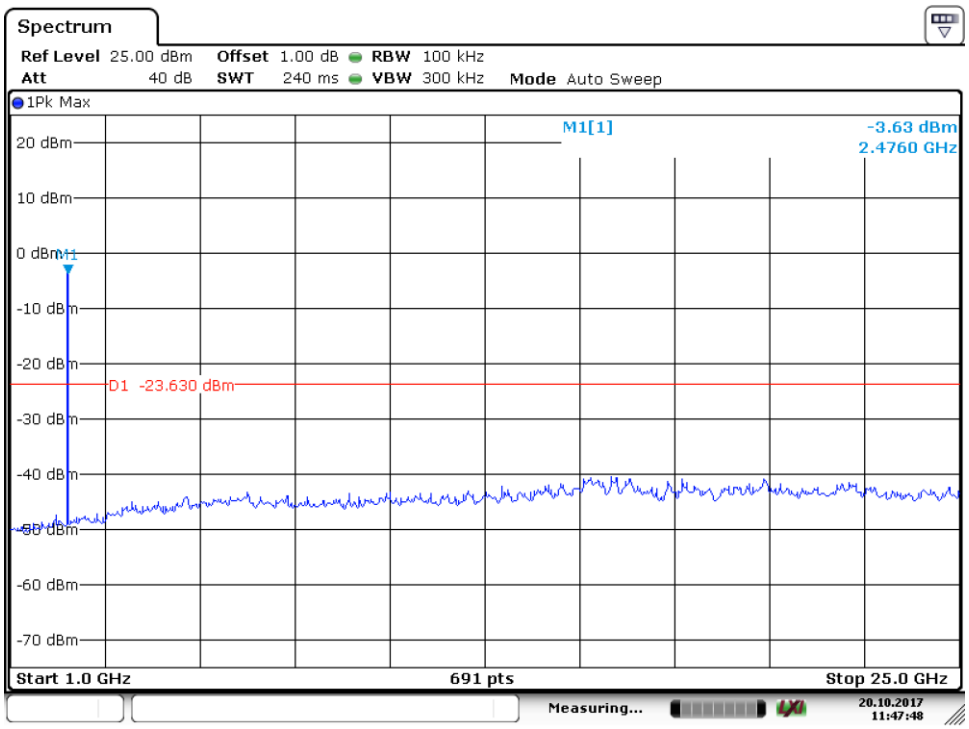

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2462MHz

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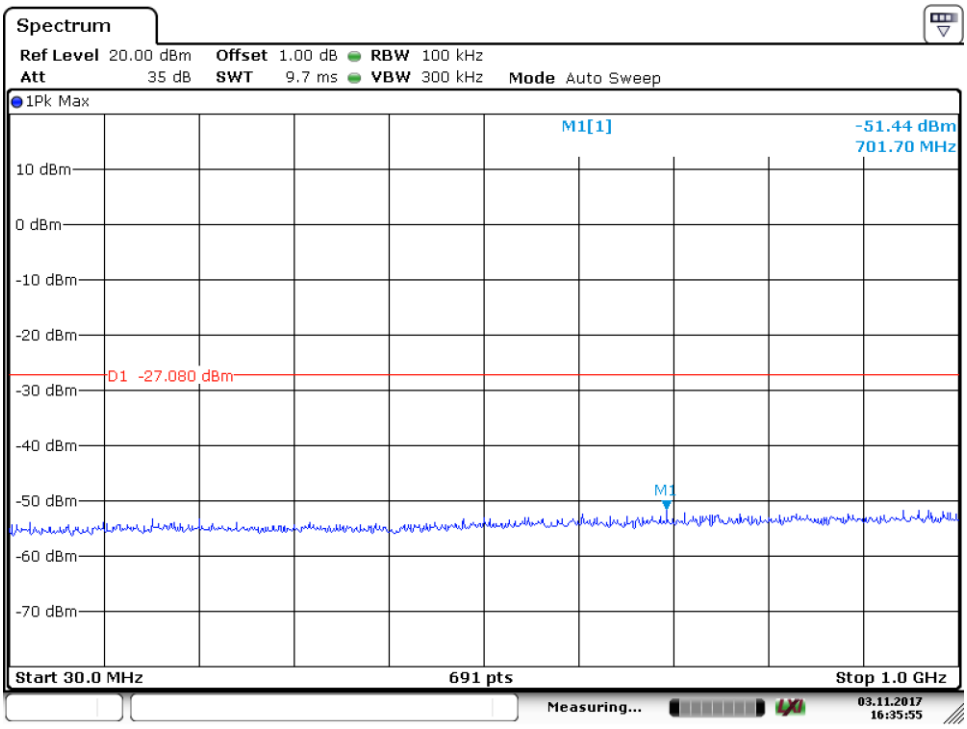
Spurious RF conducted emissions

802.11nHT40



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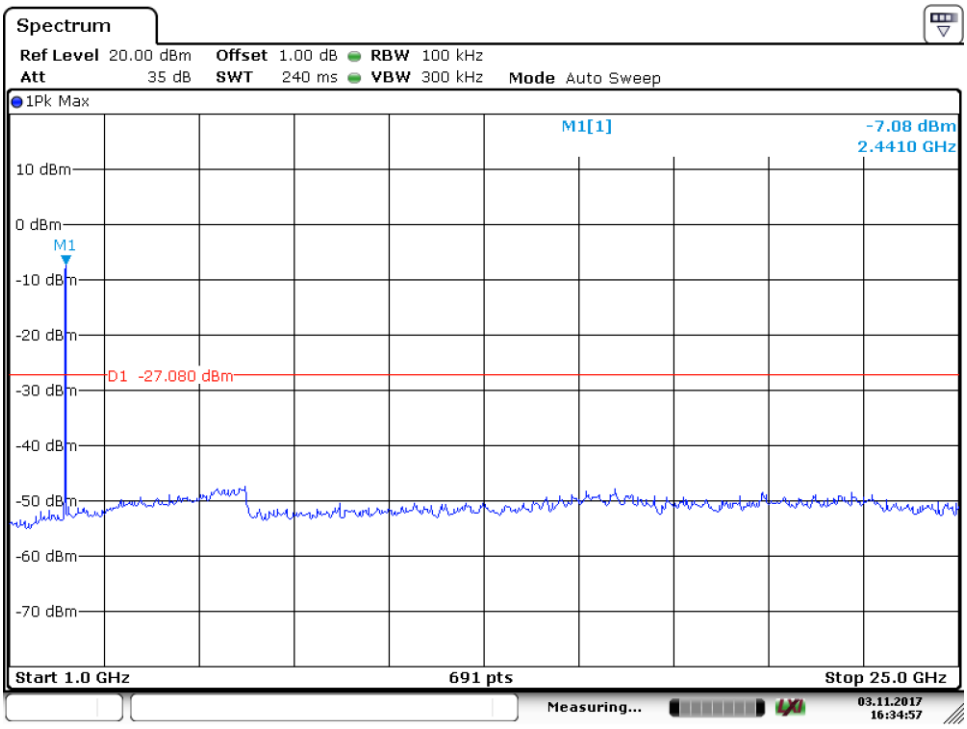

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2422MHz

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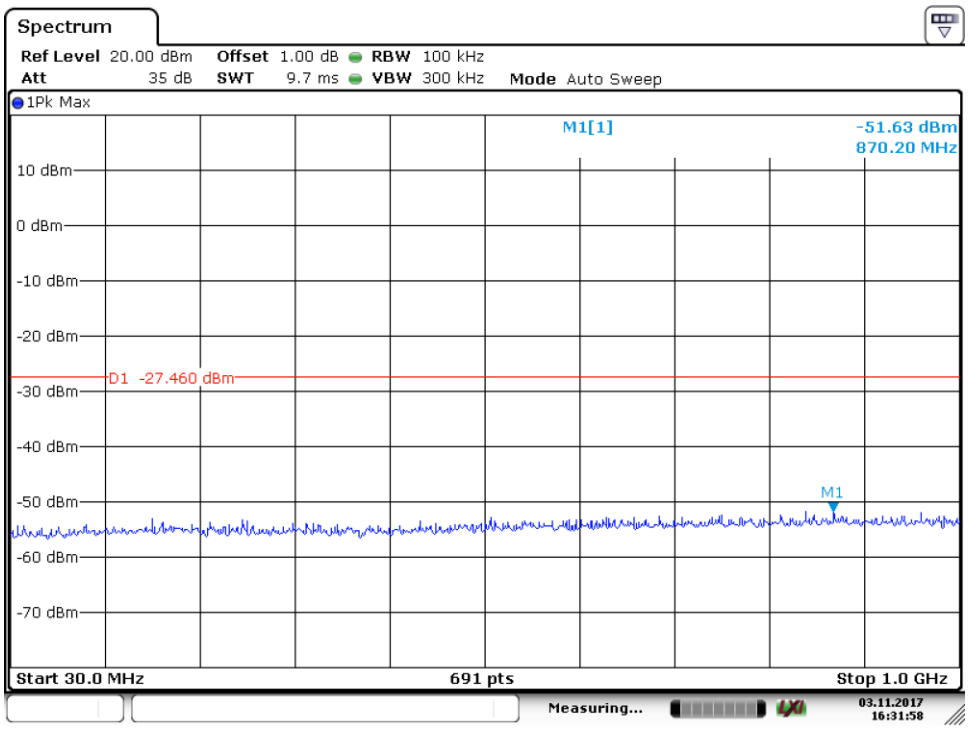
Spurious RF conducted emissions



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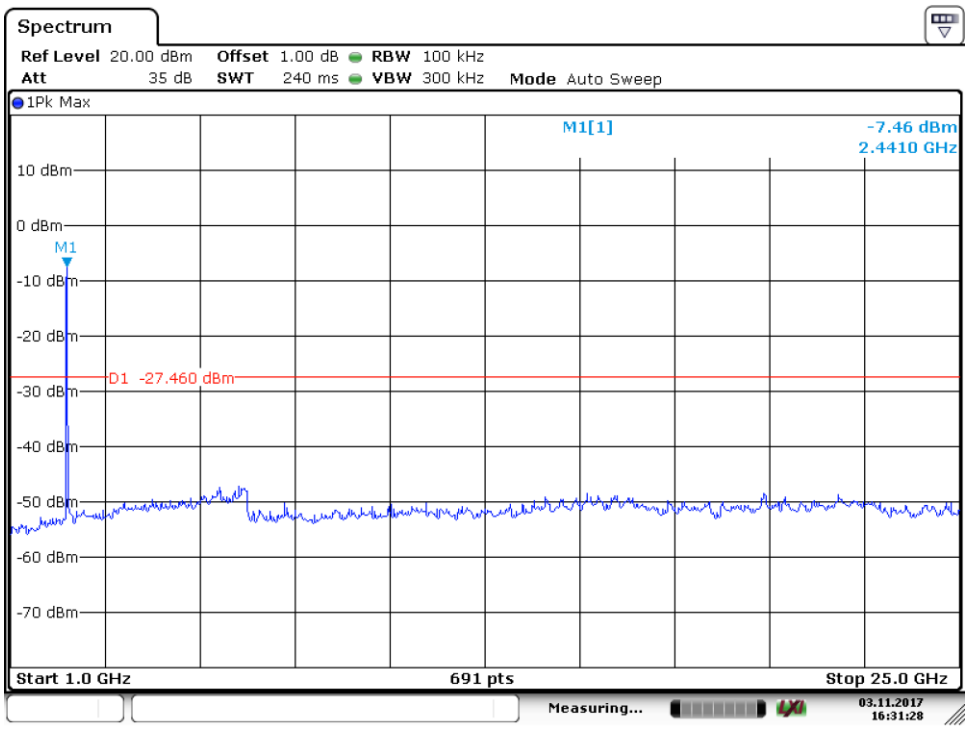

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2437MHz

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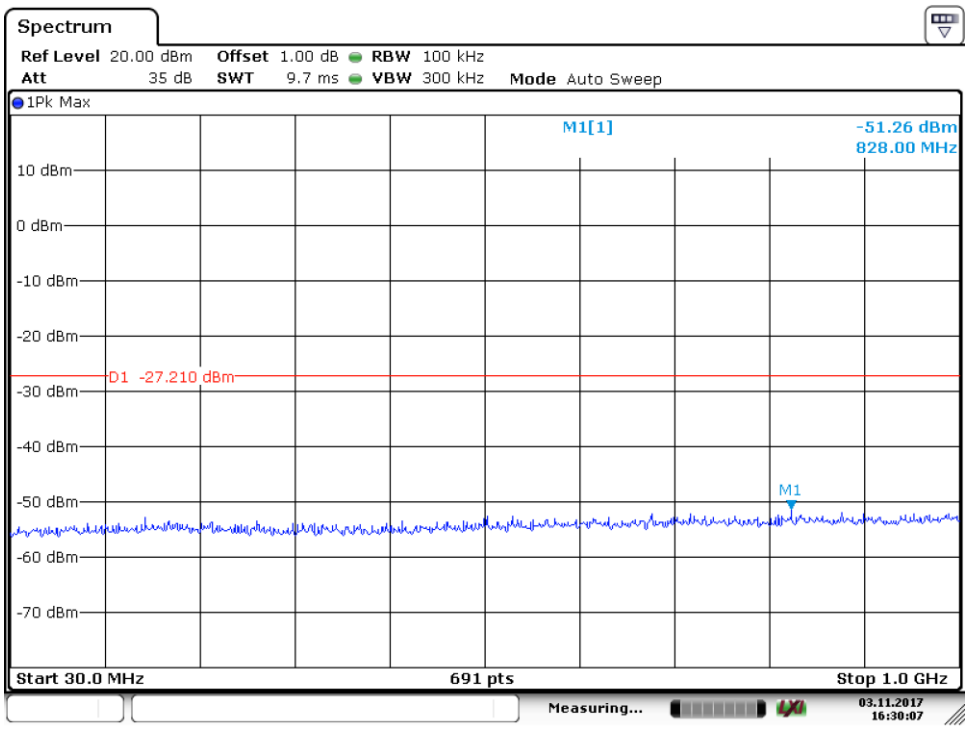
Spurious RF conducted emissions



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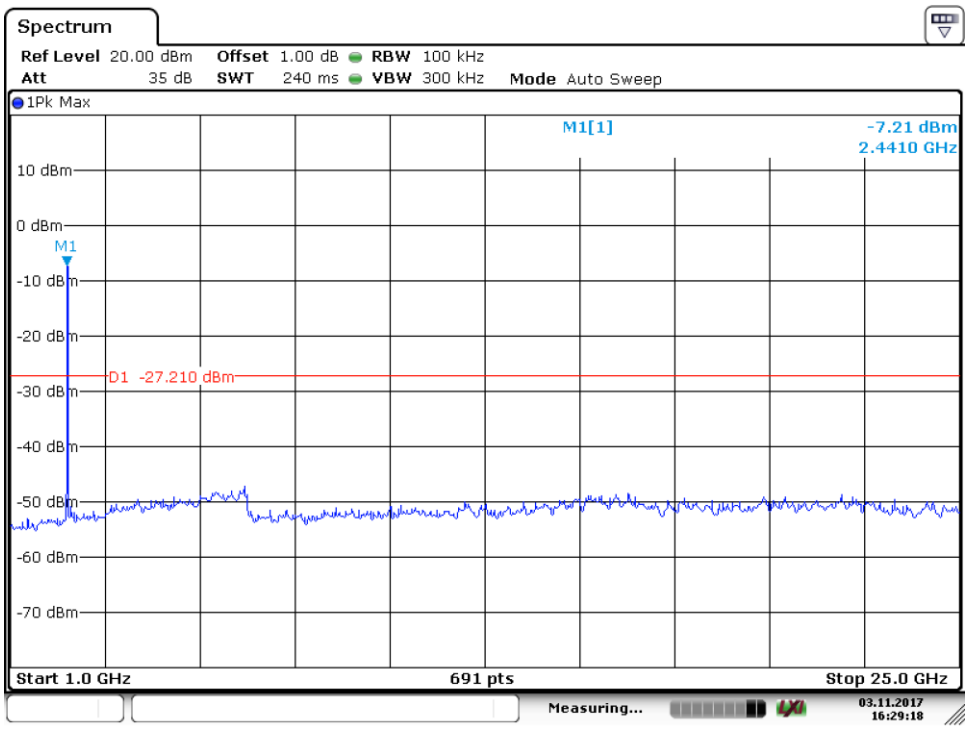

Date: 3.NOV.2017 16:29:18

2452MHz

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9.6 Band edge

Test Method

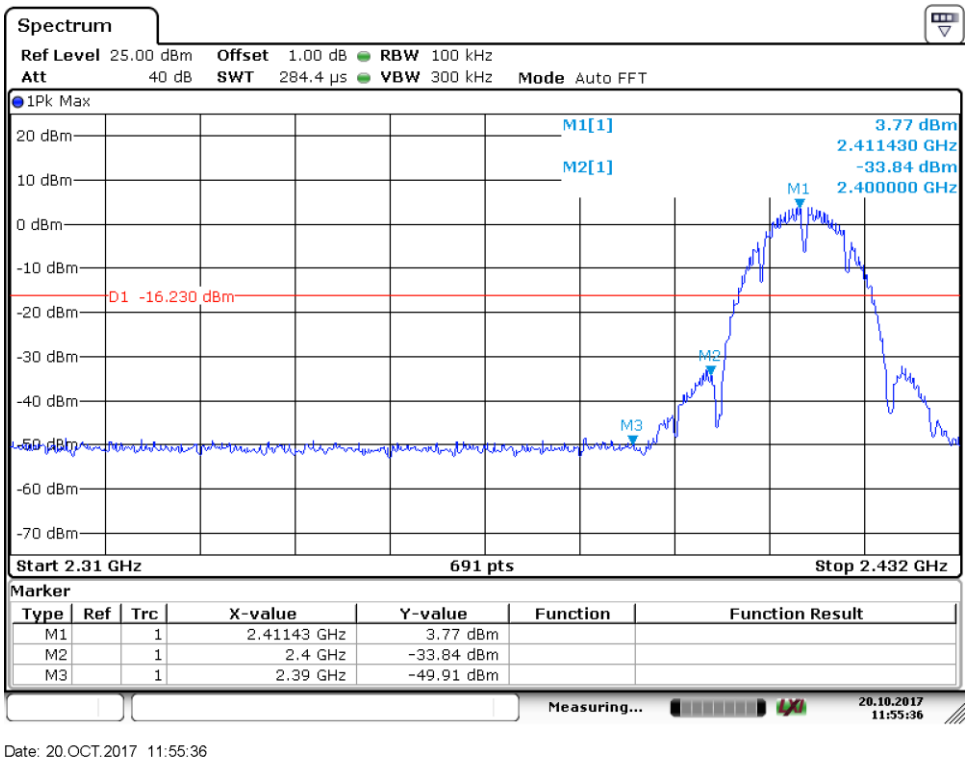
1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold.
2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
3 The level displayed must comply with the limit specified in this Section.

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

Test result

802.11b



Date: 20.OCT.2017 11:55:36

2412MHz

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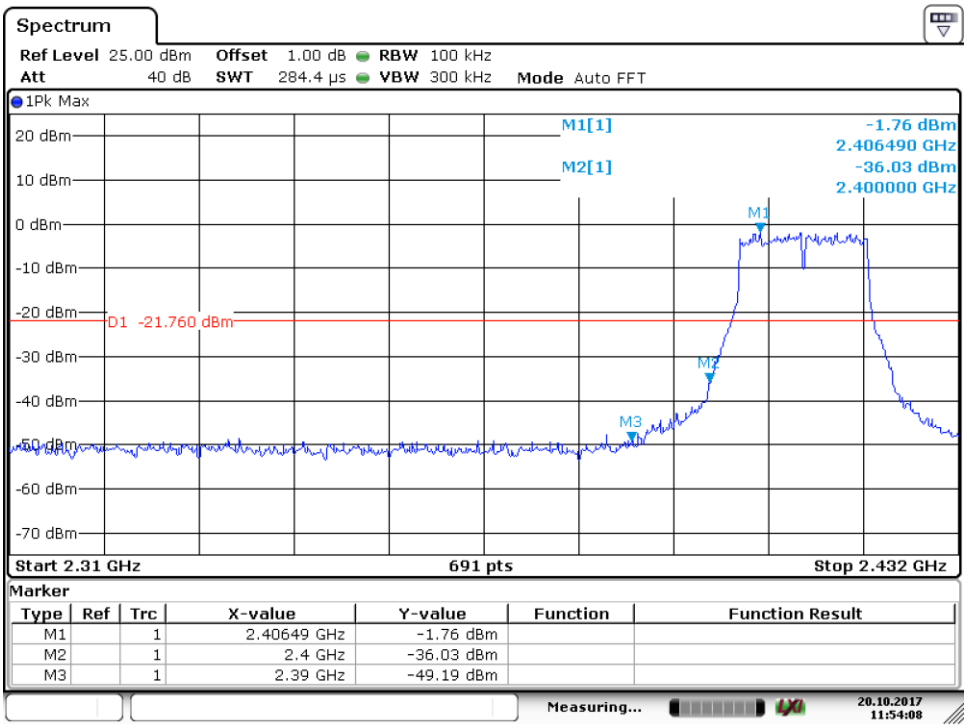
Band edge

Date: 20.OCT.2017 11:56:35

2462MHz

802.11g



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2412MHz

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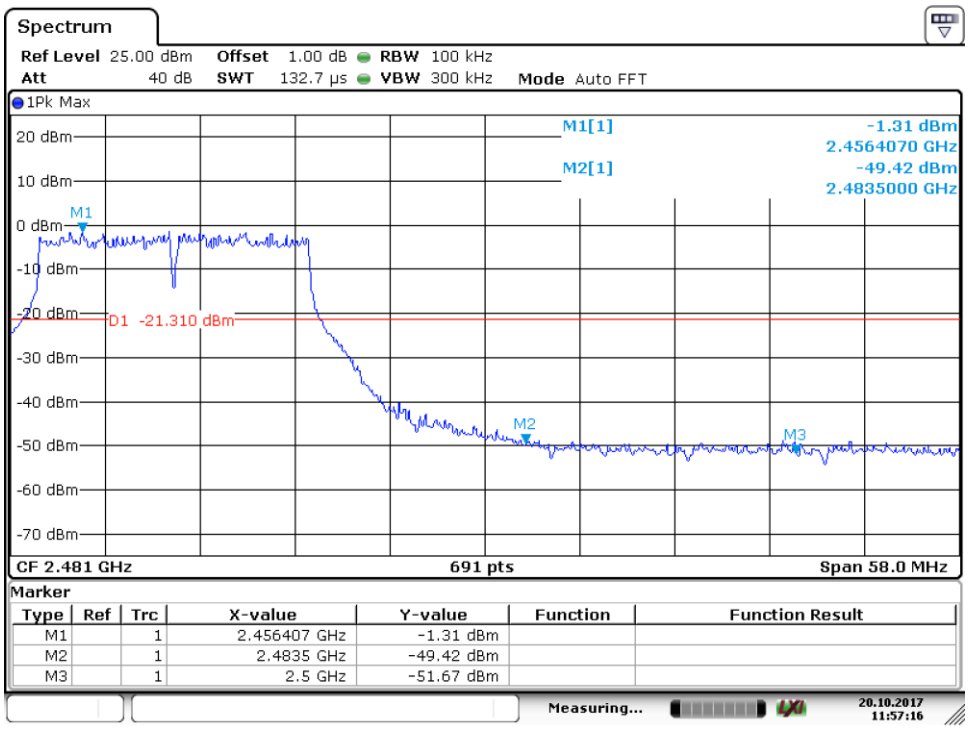
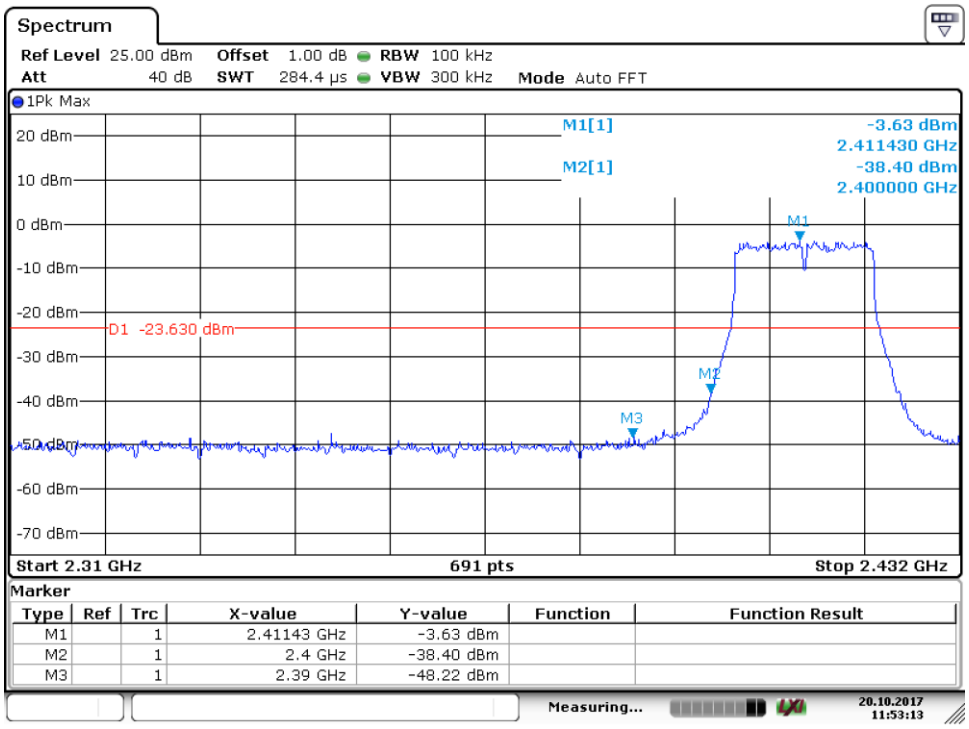
Band edge



Date: 20.OCT.2017 11:57:17

2462MHz

802.11nHT20



Date: 20.OCT.2017 11:53:13

2412MHz

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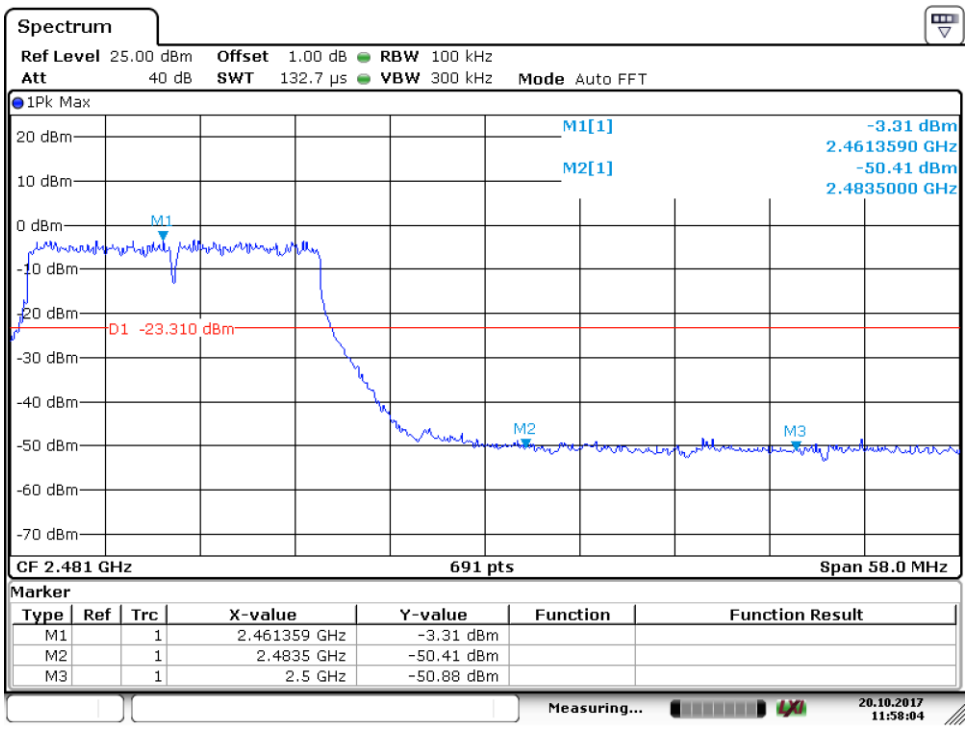
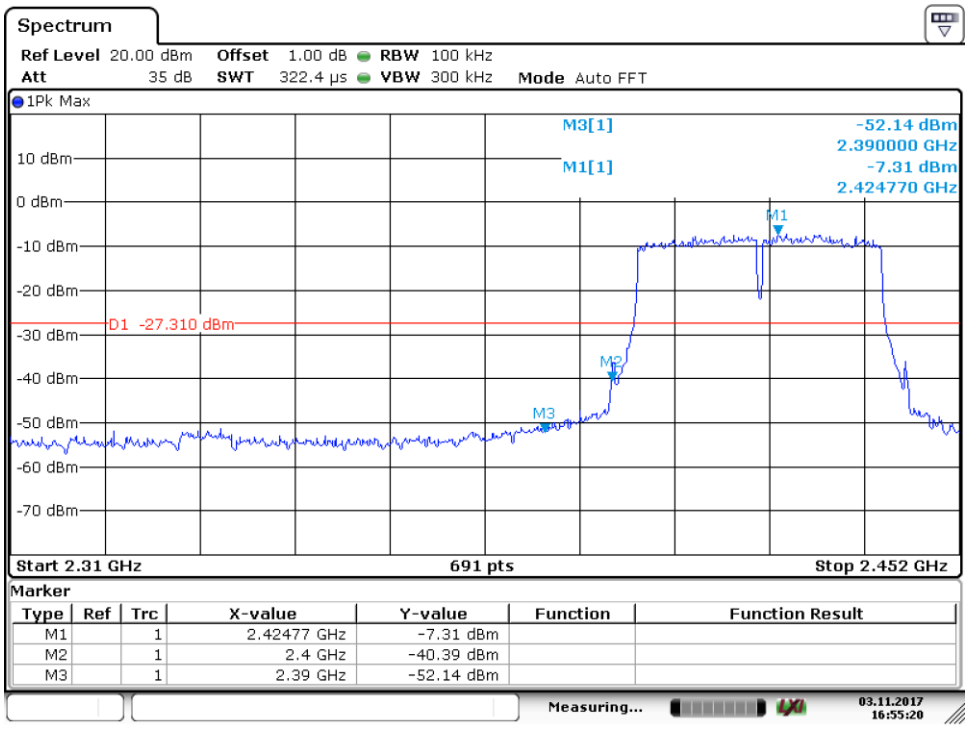
Band edge



Date: 20.OCT.2017 11:58:04

2462MHz

802.11nHT40



Date: 3.NOV.2017 16:55:20

2422MHz

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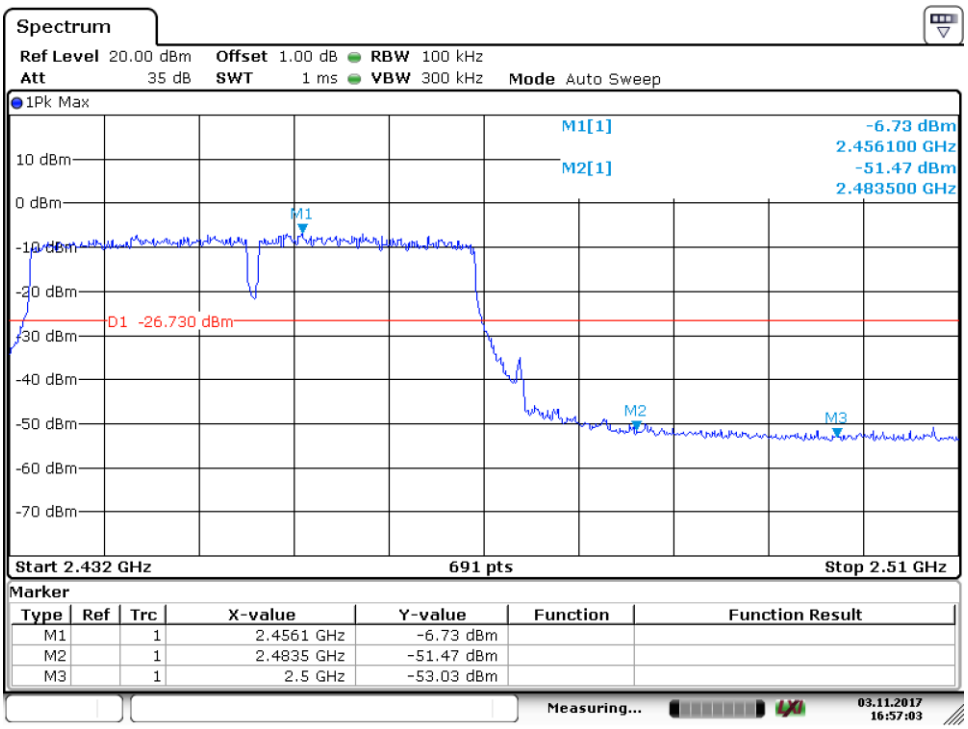
Band edge



Date: 3.NOV.2017 16:57:03

2452MHz

9.7 Spurious radiated emissions for transmitter

Test Method

1: The EUT was place on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.

3: The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

4: For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

5: Use the following spectrum analyzer settings According to C63.10:

For Above 1GHz

Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 1MHz, VBW≥RBW for peak measurement and VBW = 10Hz for average measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Below 1GHz

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 100 KHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

Note:

1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.

2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.

3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (20log(1/duty cycle)).

4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.

Spurious radiated emissions for transmitter

Limit

The radio emission outside the operating frequency band 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. Radiated emissions which fall in the restricted bands, as defined in section15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

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Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Transmitting spurious emission test result as below:

802.11b
2412MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
396.013333	36.99	Horizontal	46.00	QP	9.01	-23.7	Pass
396.013333	36.68	Vertical	46.00	QP	9.32	-23.2	Pass

2412MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
2772.188 *	46.21	Horizontal	74.00	PK	27.79	-4.7	Pass
2772.188 *	46.27	Vertical	74.00	PK	27.73	-4.6	Pass

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

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Spurious radiated emissions for transmitter

2437MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
--	--	Horizontal	--	QP	--	--	Pass
--	--	Vertical	--	QP	--	--	Pass

2437MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
2772.188 *	45.45	Horizontal	74.00	PK	28.55	-4.7	Pass
4874.063 *	44.71	Vertical	74.00	PK	29.29	2.6	Pass

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

2462MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
--	--	Horizontal	--	QP	--	--	Pass
--	--	Vertical	--	QP	--	--	Pass

2462MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
2772.188 *	46.13	Horizontal	74.00	PK	27.87	-4.7	Pass
1188.00 *	44.00	Vertical	74.00	PK	30.00	-12.6	Pass

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

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Spurious radiated emissions for transmitter

802.11g

2412MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
--	--	Horizontal	--	QP	--	--	Pass
--	--	Vertical	--	QP	--	--	Pass

2412MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
2772.125 *	46.45	Horizontal	74.00	PK	27.55	-4.7	Pass
2772.250 *	44.34	Vertical	74.00	PK	29.66	-4.6	Pass

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.

(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

2437MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
--	--	Horizontal	--	QP	--	--	Pass
--	--	Vertical	--	QP	--	--	Pass

2437MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
2772.00 *	45.28	Horizontal	74.00	PK	28.72	-4.7	Pass
12796.41 *	44.60	Vertical	74.00	PK	29.40	13.0	Pass

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.

(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

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Spurious radiated emissions for transmitter

2462MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
--	--	Horizontal	--	QP	--	--	Pass
--	--	Vertical	--	QP	--	--	Pass

2462MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
2772.00 *	45.50	Horizontal	74.00	PK	28.50	-4.7	Pass
1188.063 *	42.41	Vertical	74.00	PK	31.59	-12.6	Pass

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

802.11nHT20

2412MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
--	--	Horizontal	--	QP	--	--	Pass
--	--	Vertical	--	QP	--	--	Pass

2412MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
15068.91 *	46.53	Horizontal	74.00	PK	27.47	18.5	Pass
4356.094 *	49.47	Vertical	74.00	PK	24.53	1.0	Pass

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

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Spurious radiated emissions for transmitter

802.11nHT40

2422MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
--	--	Horizontal	--	QP	--	--	Pass
--	--	Vertical	--	QP	--	--	Pass

2422MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
15735.47 *	47.03	Horizontal	74.00	PK	26.97	19.2	Pass
12500.63 *	44.61	Vertical	74.00	PK	29.39	12.7	Pass

Remark:

(4) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(5) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(6) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

2437MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
--	--	Horizontal	--	QP	--	--	Pass
--	--	Vertical	--	QP	--	--	Pass

2437MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
2772.13 *	45.76	Horizontal	74.00	PK	28.24	-4.7	Pass
17787.66 *	50.32	Vertical	74.00	PK	23.68	22.9	Pass

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

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Spurious radiated emissions for transmitter

2452MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
--	--	Horizontal	--	QP	--	--	Pass
--	--	Vertical	--	QP	--	--	Pass

2452MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
15051.56 *	47.32	Horizontal	74.00	PK	26.68	18.6	Pass
9808.13 *	42.95	Vertical	74.00	PK	31.05	9.1	Pass

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.

(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

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Spurious radiated emissions for transmitter

2437MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
--	--	Horizontal	--	QP	--	--	Pass
--	--	Vertical	--	QP	--	--	Pass

2437MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
2772.00 *	47.42	Horizontal	74.00	PK	26.58	-4.7	Pass
1187.938 *	45.27	Vertical	74.00	PK	28.73	-12.6	Pass

Remark:

(1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(2) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

2462MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
--	--	Horizontal	--	QP	--	--	Pass
--	--	Vertical	--	QP	--	--	Pass

2462MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Margin dBuV/m	Correct factor (dB/m)	Result
2772.00 *	45.50	Horizontal	74.00	PK	28.50	-4.7	Pass
14782.50 *	47.57	Vertical	74.00	PK	26.43	17.7	Pass

Remark:

(4) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
(5) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
(6) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

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10 Test Equipment List

List of Test Instruments

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2018-7-7
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2018-7-7
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2018-7-7
Horn Antenna	Rohde & Schwarz	HF907	102294	2018-7-7
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2018-7-7
3m Semi-anechoic chamber	TDK	9X6X6	----	2019-5-29
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2018-7-7
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2018-7-7
Horn Antenna	Rohde & Schwarz	HF907	102294	2018-7-14
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2018-7-14
LISN	Rohde & Schwarz	ENV4200	100249	2018-7-14
LISN	Rohde & Schwarz	ENV216	100326	2018-7-14
ISN	Rohde & Schwarz	ENY81	100177	2018-7-14
ISN	Rohde & Schwarz	ENY81-CA6	101664	2018-7-14
High Voltage Probe	Rohde & Schwarz	TK9420(VT9420)	9420-58	2018-7-14
RF Current Probe	Rohde & Schwarz	EZ-17	100816	2018-7-14

C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth
- Power spectral density*
- Spurious RF conducted emissions
- Band edge

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11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.98dB; Vertical: 5.06dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.95dB; Vertical: 4.94dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 5.14dB; Vertical: 5.12dB;
Uncertainty for Conducted RF test with TS 8997	Power level test involved: 2.06dB Frequency test involved: 1.16×10^{-7}

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