

Huawei Technologies Co., Ltd.

TEST REPORT

SCOPE OF WORK

FCC TESTING–X22C

REPORT NUMBER

190124006SZN-003

ISSUE DATE

13 March 2019

[REVISED DATE]

[-----]

PAGES

154

DOCUMENT CONTROL NUMBER

FCC ID 247_b

© 2017 INTERTEK



Huawei Technologies Co., Ltd.Application
For
Certification**FCC ID: QIS-X22C****Huawei STB/Huawei BOX****Model: X22C****Brand Name: HUAWEI****2.4GHz Transceiver**

Report No.: 190124006SZN-003

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [10-1-17]

Prepared and Checked by:**Approved by:**

Rui Zhou
Project Engineer

Kidd Yang
Technical Supervisor
Date: 13 March 2019

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

Intertek Testing Service Shenzhen Ltd. Longhua Branch

101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, Shenzhen.

Tel: (86 755) 8601 6288 Fax: (86 755) 8601 6751

LIST OF EXHIBITS

INTRODUCTION

<i>EXHIBIT 1:</i>	Summary of Tests
<i>EXHIBIT 2:</i>	General Description
<i>EXHIBIT 3:</i>	System Test Configuration
<i>EXHIBIT 4:</i>	Measurement Results
<i>EXHIBIT 5:</i>	Equipment Photographs
<i>EXHIBIT 6:</i>	Product Labeling
<i>EXHIBIT 7:</i>	Technical Specifications
<i>EXHIBIT 8:</i>	Instruction Manual
<i>EXHIBIT 9:</i>	Confidentiality Request
<i>EXHIBIT 10:</i>	Miscellaneous Information
<i>EXHIBIT 11:</i>	Test Equipment List

MEASUREMENT/TECHNICAL REPORT

Huawei Technologies Co., Ltd.

Model: X22C

FCC ID: QIS-X22C

This report concerns (check one) Original Grant ☒ Class II Change ☐

Equipment Type: DTS - Part 15 Digital Transmission Systems (Wi-Fi transmitter portion)

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes ☐ No ☒

If yes, defer until :
date

Company Name agrees to notify the Commission by:
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? Yes ☐ No ☒

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-1-17] Edition] provision.

Report prepared by:

Rui Zhou
Intertek Testing Services Shenzhen Ltd. Longhua Branch
101, 201, Building B, No. 308 Wuhe Avenue,
Zhangkengjing Community, GuanHu Subdistrict,
LongHua District, Shenzhen, P.R. China.
Tel: (86 755) 8601 6288 Fax: (86 755) 8601 6751

Table of Contents

1.0	Summary of Test results	7
2.0	General Description	9
2.1	Product Description	9
2.2	Related Submittal(s) Grants	9
2.3	Test Methodology	10
2.4	Test Facility	10
3.0	System Test Configuration	12
3.1	Justification	12
3.2	EUT Exercising Software	12
3.3	Special Accessories	13
3.4	Measurement Uncertainty	13
3.5	Equipment Modification	13
3.6	Support Equipment List and Description	13
4.0	Measurement Results	15
4.1	Maximum Conducted Output Power at Antenna Terminals	15
4.2	Minimum 6 dB RF Bandwidth	18
4.3	Maximum Power Density Reading	39
4.4	Out of Band Conducted Emissions	60
4.5	Out of Band Radiated Emissions	127
4.6	Transmitter Radiated Emissions in Restricted Bands	128
4.7	Field Strength Calculation	129
4.8	Radiated Spurious Emission	130
4.9	Conducted Emission at Mains Terminals	136
4.10	Radiated Emissions from Digital Section of Transceiver	139
4.11	Transmitter Duty Cycle Calculation and Measurements	140
5.0	Equipment Photographs	142
6.0	Product Labelling	144
7.0	Technical Specifications	146
8.0	Instruction Manual	148
9.0	Confidentiality Request	150
10.0	Discussion of Pulse Desensitization	152
11.0	Test Equipment List	154

List of attached file

Exhibit type	File Description	Filename
Test Report	Test Report	report.pdf
Test Setup Photo	Radiated Emission	radiated photos.pdf
Test Setup Photo	Conducted Emission	conducted photos.pdf
External Photo	External Photo	external photos.pdf
Internal Photo	Internal Photo	internal photos.pdf
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
Operation Description	Technical Description	descri.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Cover Letter	Confidentiality Letter	request.pdf
Cover Letter	Letter of Agency	agency.pdf

EXHIBIT 1

SUMMARY OF TEST RESULTS

1.0 Summary of Test results

Huawei STB/Huawei BOX

Model: X22C

FCC ID: QIS-X22C

TEST ITEM	REFERENCE	RESULTS
Max. Output power	15.247(b)(3)	Pass
6 dB Bandwidth	15.247(a)(2)	Pass
Max. Power Density	15.247(e)	Pass
Out of Band Antenna Conducted Emission	15.247(d)	Pass
Radiated Emission in Restricted Bands	15.247(d)	Pass
AC Conducted Emission	15.207	Pass
Antenna Requirement	15.203	Pass (See Notes)

Notes: The EUT uses an Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.

EXHIBIT 2

GENERAL DESCRIPTION

2.0 General Description

2.1 Product Description

The Equipment Under Test (EUT) is a Huawei STB/Huawei BOX with WIFI function operating at 2412-2462MHz for 802.11b/g/n-HT20, 11 channels with 5MHz channel spacing and 2422-2452MHz for 802.11n-HT40, 7 channels with 5MHz channel spacing. The EUT can be powered by DC 12V/1A through adapter. For more detailed features description, please refer to the user's manual.

Antenna Type: Integral antenna

Type of Modulation: BPSK, QPSK, 16QAM, 64QAM, CCK, DQPSK, DBPSK.

Antenna Gain: Antenna 1: 0 dBi Max for 2.4G WIFI

Antenna 2: 0 dBi Max for 2.4G WIFI

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

The Huawei STB/Huawei BOX, Model: X22C has six designing schemes. It would be placed on the market with two different adapters, Partly tests are required to both designing schemes, and show the worst case in report.

Adapter	Model	Manufacture	Electrical parameters
Adapter 1	HW-120100U0W	Shenzhen TOPOW Electronics Co.,Ltd.	Input: AC 100-240V, 50/60Hz, 0.5A Output: DC 12V 1A
Adapter 2	HW-120100U0W	Shenzhen Huntkey Electronic Co.,Ltd.	Input: AC 100-240V, 50/60Hz, 0.5A Output: DC 12V 1A
Adapter 3	HW-120100U0W	Dongguan Phitek Electronics Co.,Ltd.	Input: AC 100-240V, 50/60Hz, 0.5A Output: DC 12V 1A
Adapter 4	HW-120100U2W	Shenzhen TOPOW Electronics Co.,Ltd.	Input: AC 100-150V, 60Hz, 500mA Output: DC 12V 1A
Adapter 5	HW-120100U2W	Dongguan Shilong Fuhua Electronic Co.,Ltd.	Input: AC 100-150V, 60Hz, 500mA Output: DC 12V 1A
Adapter 6	HW-120100U2W	Dongguan Phitek Electronics Co.,Ltd.	Input: AC 100-150V, 60Hz, 500mA Output: DC 12V 1A

2.2 Related Submittal(s) Grants

This is an application for certification of DTS- Part 15 Digital Transmission Systems (2.4GHz Wi-Fi transmitter portion).

For the BT classic function was tested and demonstrated in report 190124006SZN-001.

For the BT BLE function was tested and demonstrated in report 190124006SZN-002.

For the 5GHz WiFi function was tested and demonstrated in report 190124006SZN-004.

For other functions were reported in the SDOC report: 190124005SZN-001.

2.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10: 2013 and KDB 558074 D01 v05r01. Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the “**Justification Section**” of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

The Semi-Anechoic chamber and shield room used to collect the radiated data and conducted data are **Intertek Testing Services Shenzhen Ltd. Longhua Branch** and located at 1F/2F, Building B, QiaoAn Scientific Technology Park, Shangkeng Community, Guanhu Subdistrict, Longhua District, Shenzhen, P.R. China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: CN1188).

EXHIBIT 3

SYSTEM TEST CONFIGURATION

3.0 System Test Configuration

3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. The EUT was powered by DC 12V/1A through adapter and the adapter was powered by AC 120V, 60Hz during the test, only the worst data was reported in this report.

For maximizing emissions, the EUT was rotated through 360°, the EUT was placed on the styrene turntable with 0.8m up to 1GHz and 1.5 m above 1GHz. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

The rear of unit was flushed with the rear of the table.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

3.2 EUT Exercising Software

The EUT exercise program (provided by client) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The worst case configuration is used in all specified testing.

The parameters of test software setting:

During the test, Channel and power controlling software provided by the applicant was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the application and is going to be fixed on the firmware of the end product.

3.3 Special Accessories

N/A.

3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

3.5 Equipment Modification

Any modifications installed previous to testing by Huawei Technologies Co., Ltd. will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Longhua Branch.

3.6 Support Equipment List and Description

Refer List:

Description	Manufacturer	Model No.
Laptop (Provided by Intertek)	Lenovo	T420
Test TV (Provided by Intertek)	SONY	KDL-24EX520
Wireless Route (Provided by Intertek)	NETGEAR	R7800
USB Memory (Provided by Intertek)	SanDisk	SDCZ36-002G-P36
Optical cable (Provided by Intertek)	/	unshielded, 130cm
Dummy Load (Provided by Intertek)	/	/
HDMI Cable (Provided by Applicant)	/	unshielded, 150cm
AV out Cable (Provided by Applicant)	/	unshielded, 150cm
RJ45 Cable (Provided by Applicant)	/	unshielded, 150cm
Remote control	/	/

EXHIBIT 4

MEASUREMENT RESULTS

Applicant: Huawei Technologies Co., Ltd.

Date of Test: March 05, 2019

Model: X22C

4.0 Measurement Results

4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b)(3):

The antenna power of the EUT was connected to the input of a broadband peak RF power meter. The power meter have a video bandwidth that is greater than DTS bandwidth and utilize a fast-responding diode detector. Power was read directly at the EUT antenna terminals with cable loss added.

For antennas with gains of 6 dBi or less, maximum allowed Transmitter output is 1 watt (+30 dBm). 2.4G band Ant gain: 0 dBi. In MIMO (2Tx), Ant1+Ant2 Directional gain = $G_{ANT} + 10 \log(N)$ dBi = $0 + 10 \log(2) = 3.0$ dBi < 6 dBi, so the Power limit is 30.0dBm(1W) for conducted TX power.

SISO Mode, Ant1:

IEEE 802.11b (Antenna Gain = 0dBi) (1Mbps)		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2412	16.15	41.21
Middle Channel: 2437	16.46	44.26
High Channel: 2462	16.20	41.69

IEEE 802.11g (Antenna Gain = 0dBi) (6Mbps)		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2412	22.15	168.06
Middle Channel: 2437	22.56	180.30
High Channel: 2462	20.75	118.85

IEEE 802.11n-HT20 (Antenna Gain = 0dBi) (6.5Mbps)		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2412	20.83	121.06
Middle Channel: 2437	22.74	187.93
High Channel: 2462	20.57	114.02

IEEE 802.11n-HT40 (Antenna Gain = 0dBi) (13.5Mbps)		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2422	18.92	77.98
Middle Channel: 2437	21.47	140.28
High Channel: 2452	20.83	121.06

SISO Mode, Ant2:

IEEE 802.11b (Antenna Gain = 0dBi) (1Mbps)		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2412	17.17	52.12
Middle Channel: 2437	16.75	47.32
High Channel: 2462	16.52	44.87

IEEE 802.11g (Antenna Gain = 0dBi) (6Mbps)		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2412	22.05	160.32
Middle Channel: 2437	23.72	235.50
High Channel: 2462	21.42	138.67

IEEE 802.11n-HT20 (Antenna Gain = 0dBi) (6.5Mbps)		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2412	20.55	113.50
Middle Channel: 2437	24.26	266.68
High Channel: 2462	21.83	152.41

IEEE 802.11n-HT40 (Antenna Gain = 0dBi) (13.5Mbps)		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2422	18.71	74.30
Middle Channel: 2437	22.09	161.81
High Channel: 2452	21.29	134.59

MIMO Mode:

IEEE 802.11n-HT20 (MIMO, Antenna Gain = 3dBi) (6.5Mbps)				
Frequency (MHz)	Output in dBm(Peak Reading)			Total Output in mWatt
	Ant 1	Ant 2	Total	
Low Channel: 2412	18.34	18.75	21.56	143.22
Middle Channel: 2437	21.21	22.21	24.75	298.54
High Channel: 2462	18.89	19.65	22.30	169.82

IEEE 802.11n-HT40 (MIMO, Antenna Gain = 3dBi) (13.5Mbps)				
Frequency (MHz)	Output in dBm(Peak Reading)			Total Output in mWatt
	Ant 1	Ant 2	Total	
Low Channel: 2422	17.33	18.53	20.98	125.36
Middle Channel: 2437	20.06	21.40	23.79	239.43
High Channel: 2452	19.43	20.14	22.81	190.98

Cable loss: 1.4 dB External Attenuation: 0 dB
Cable loss, external attenuation has been included in OFFSET function

EUT max. output level = 24.75 dBm
For RF Exposure, the information is saved with filename: RF exposure.pdf.

Applicant: Huawei Technologies Co., Ltd.

Date of Test: March 05, 2019

Model: X22C

4.2 Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a) (2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 KHz according to FCC KDB 558074 D01 v05r01. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

Limit: The 6 dB Bandwidth is at least 500 kHz.

SISO Mode, Ant1:

IEEE 802.11b (1Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	10.029
2437	10.029
2462	10.029

IEEE 802.11g (6Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	16.324
2437	16.324
2462	16.324

IEEE 802.11n-HT20 (6.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	17.149
2437	17.149
2462	17.149

IEEE 802.11n-HT40 (13.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2422	36.295
2437	36.295
2452	36.295

SISO Mode, Ant2:

IEEE 802.11b (1Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	10.029
2437	10.029
2462	10.029

IEEE 802.11g (6Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	16.324
2437	16.324
2462	16.324

IEEE 802.11n-HT20 (6.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	17.149
2437	17.149
2462	17.149

IEEE 802.11n-HT40 (13.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2422	36.295
2437	36.295
2452	36.295

MIMO Mode, Ant1:

IEEE 802.11n-HT20 (6.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	17.149
2437	17.149
2462	17.149

IEEE 802.11n-HT40 (13.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2422	36.295
2437	35.295
2452	36.382

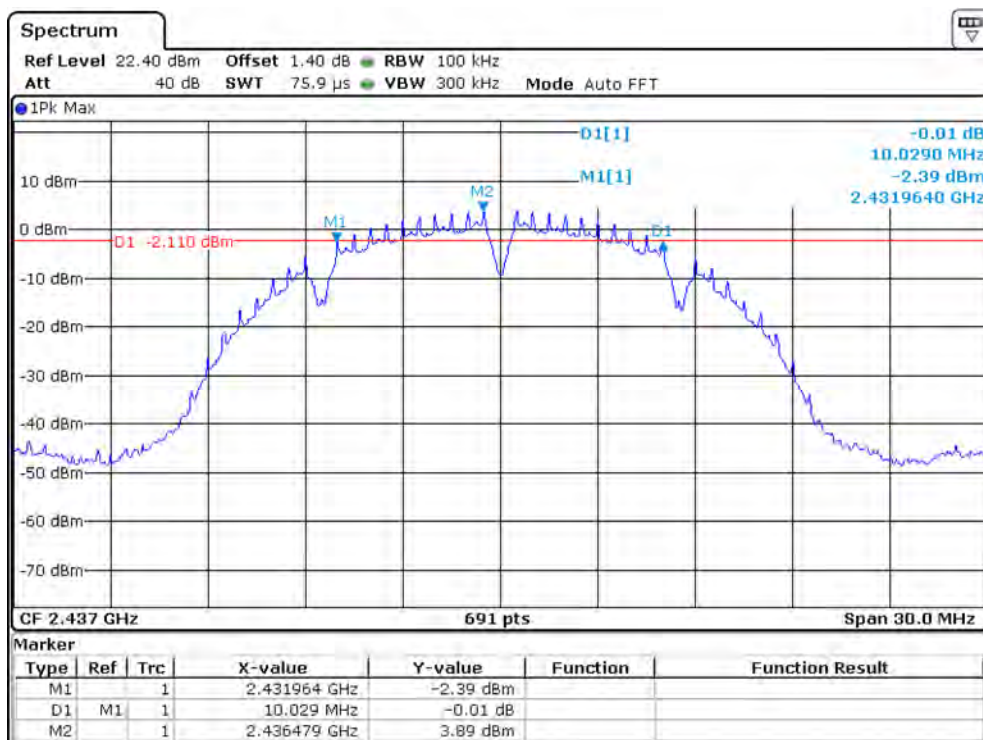
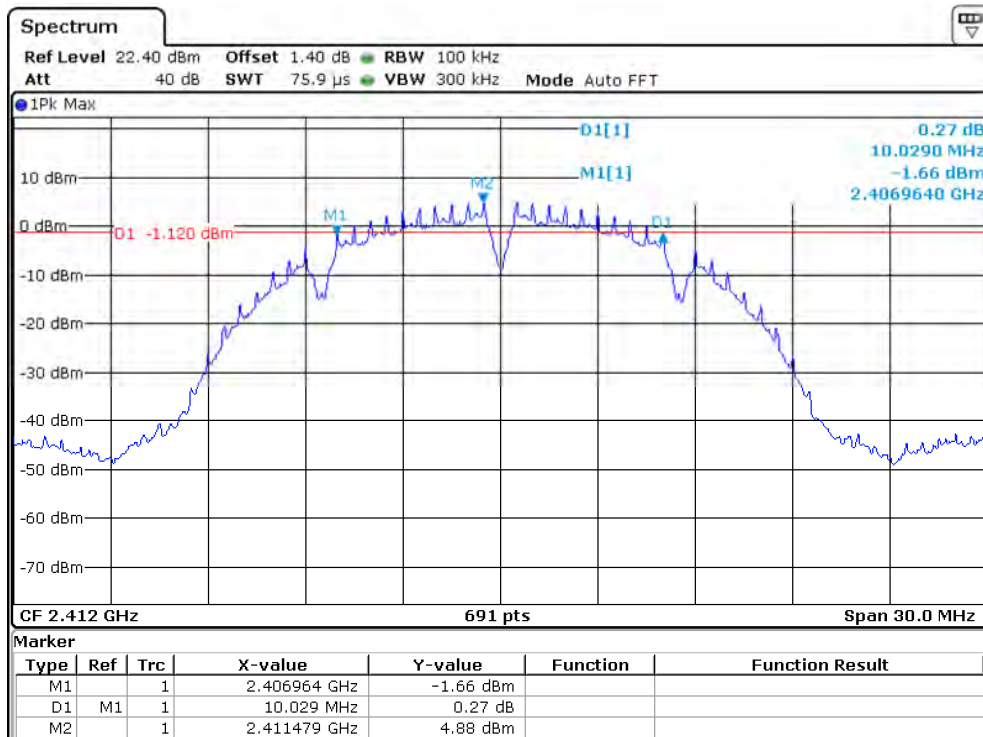
MIMO Mode, Ant2:

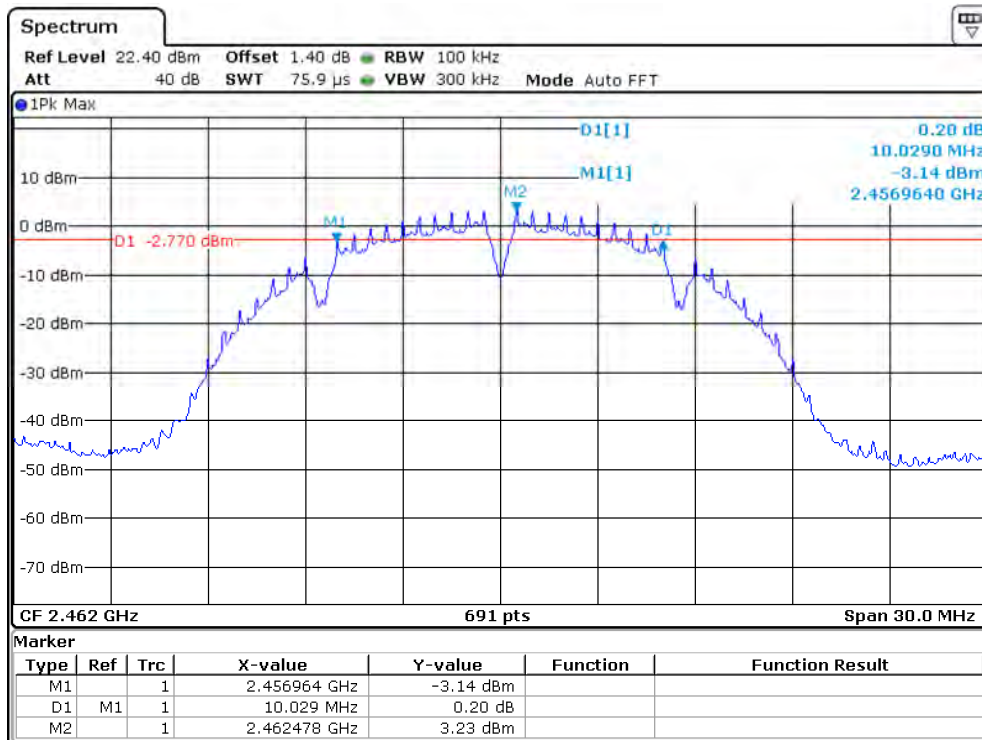
IEEE 802.11n-HT20 (6.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	17.149
2437	17.149
2462	17.149

IEEE 802.11n-HT40 (13.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2422	36.295
2437	36.295
2452	36.295

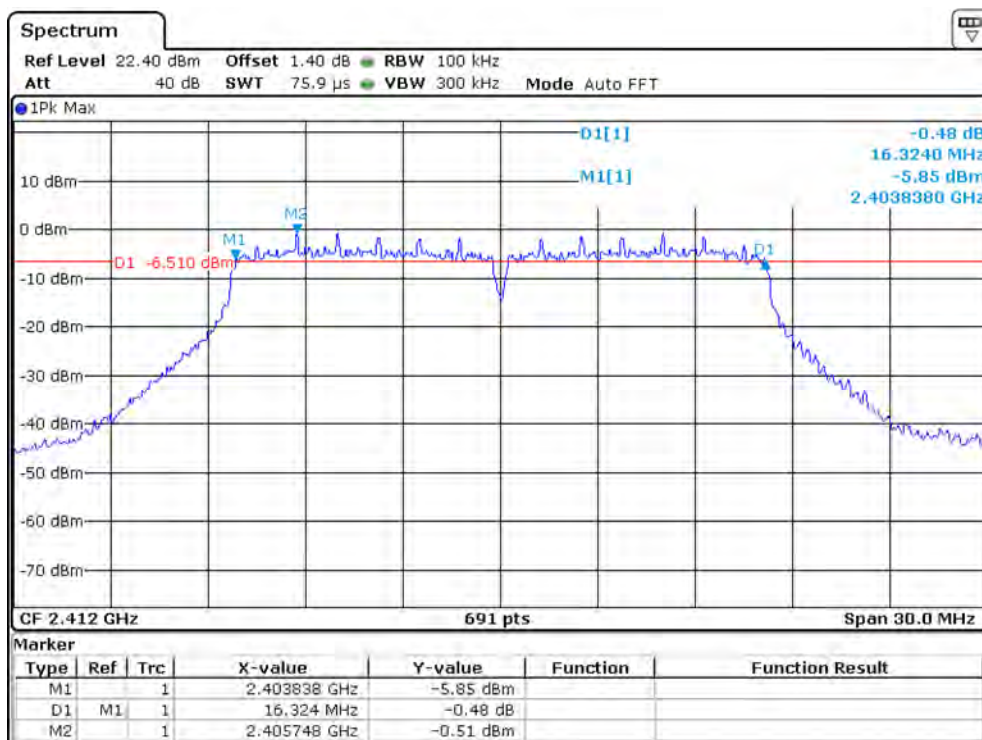
The test plots are attached as below.

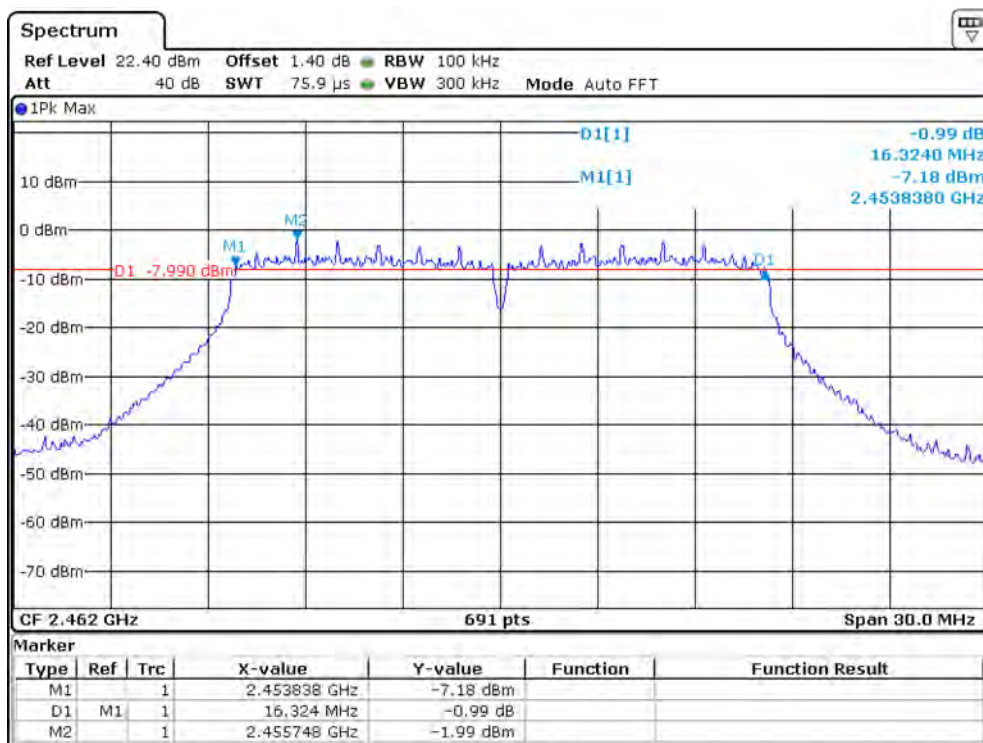
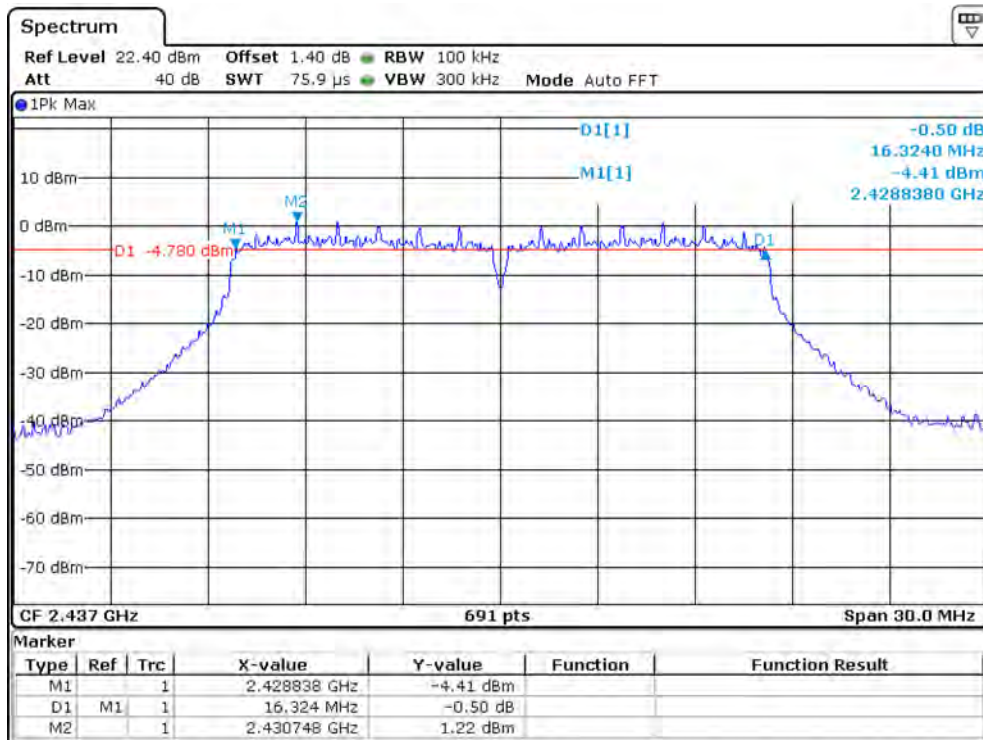
SISO Mode, Ant1:
802.11b



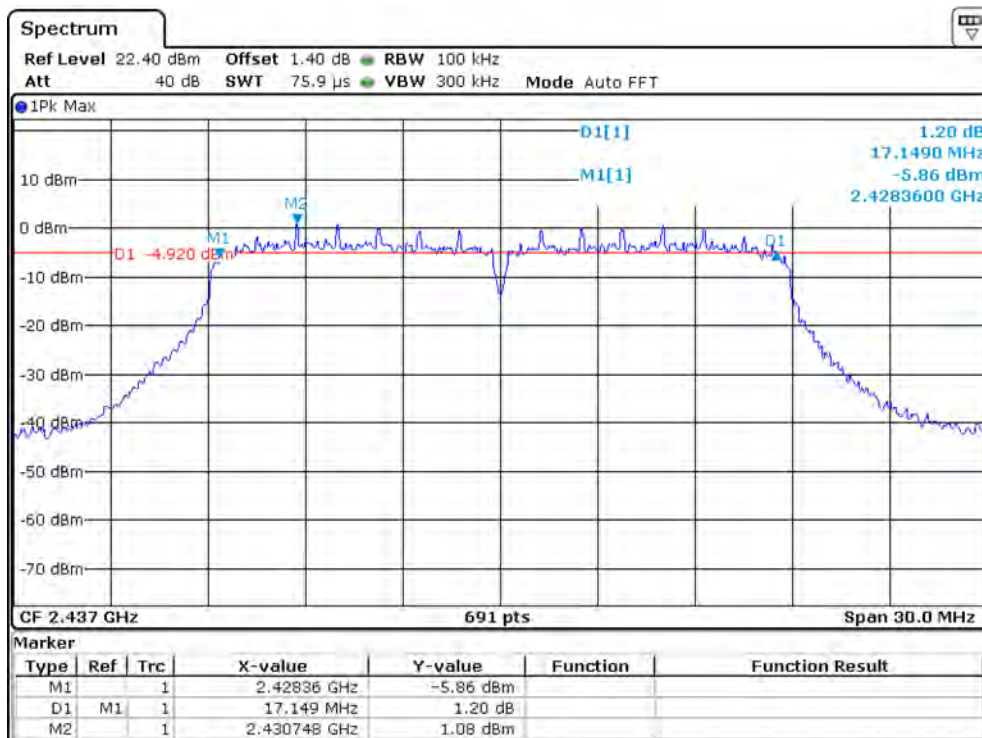
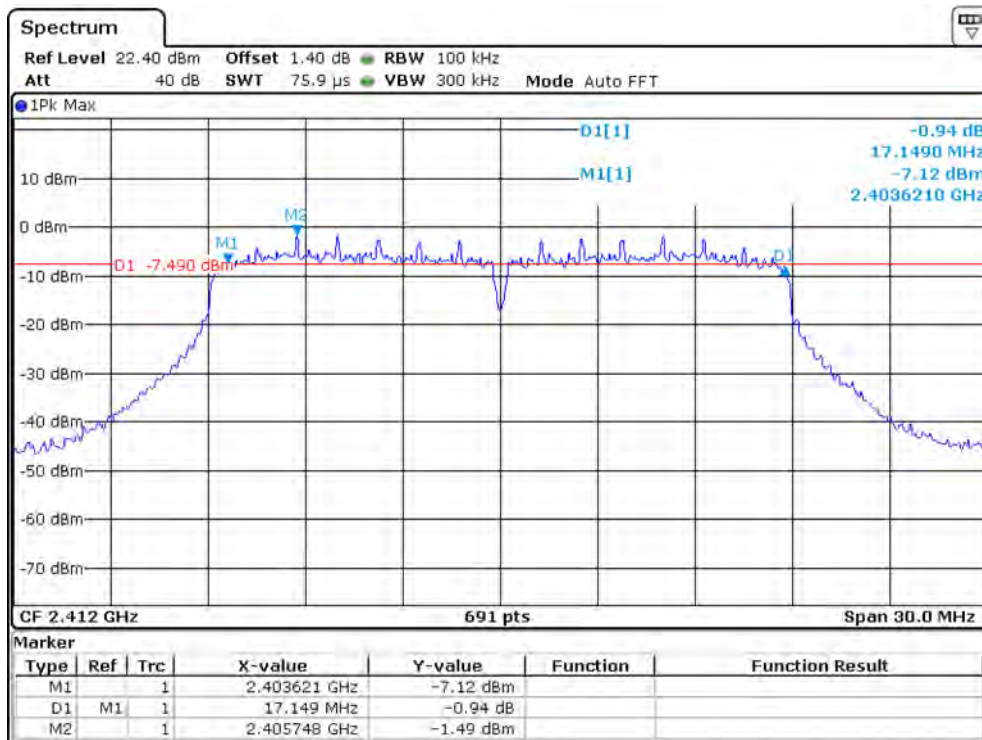


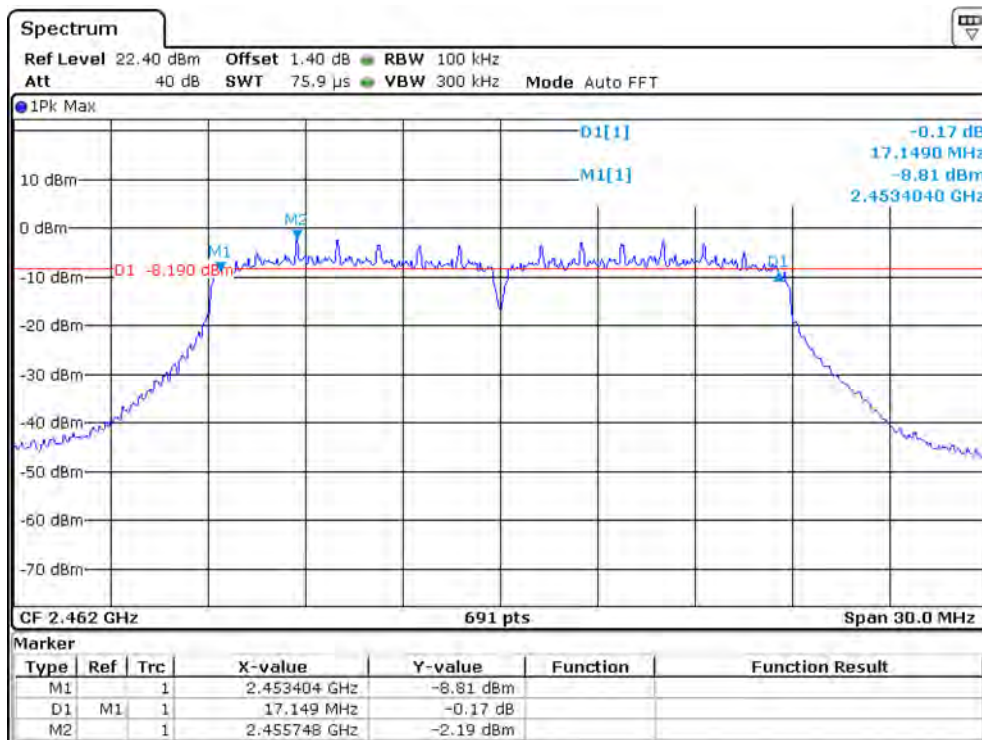
802.11g



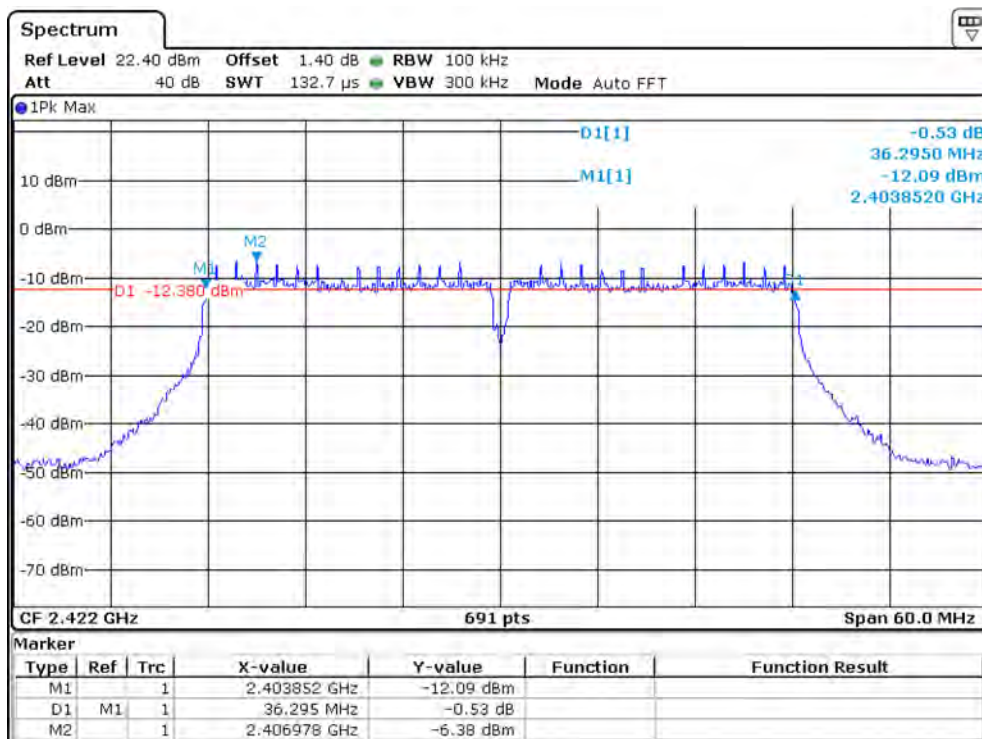


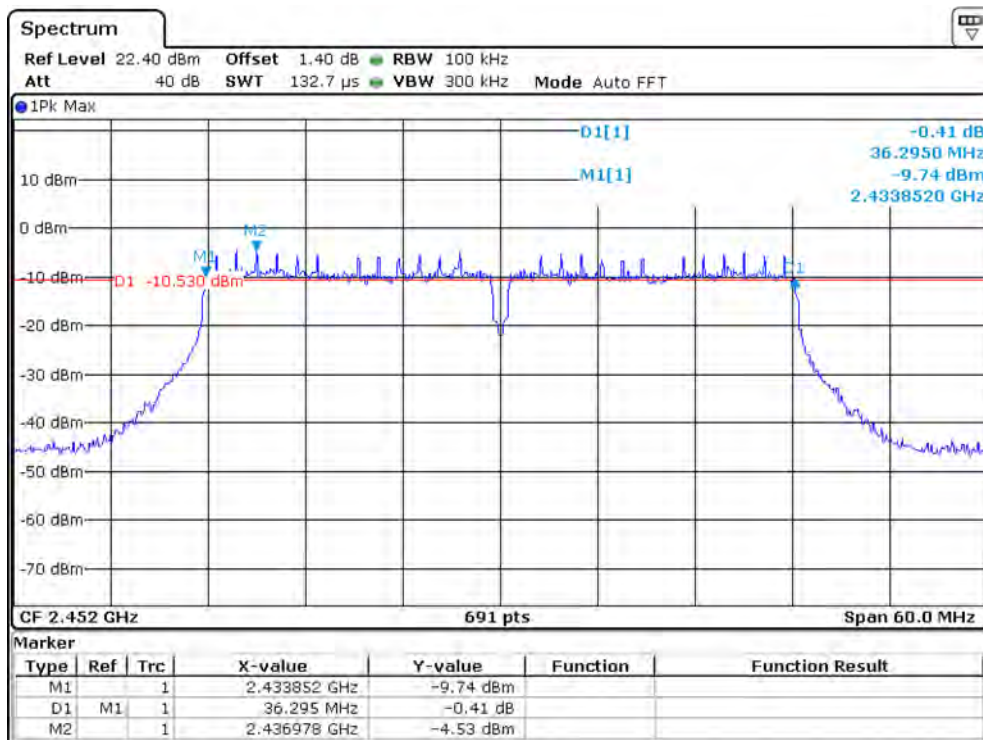
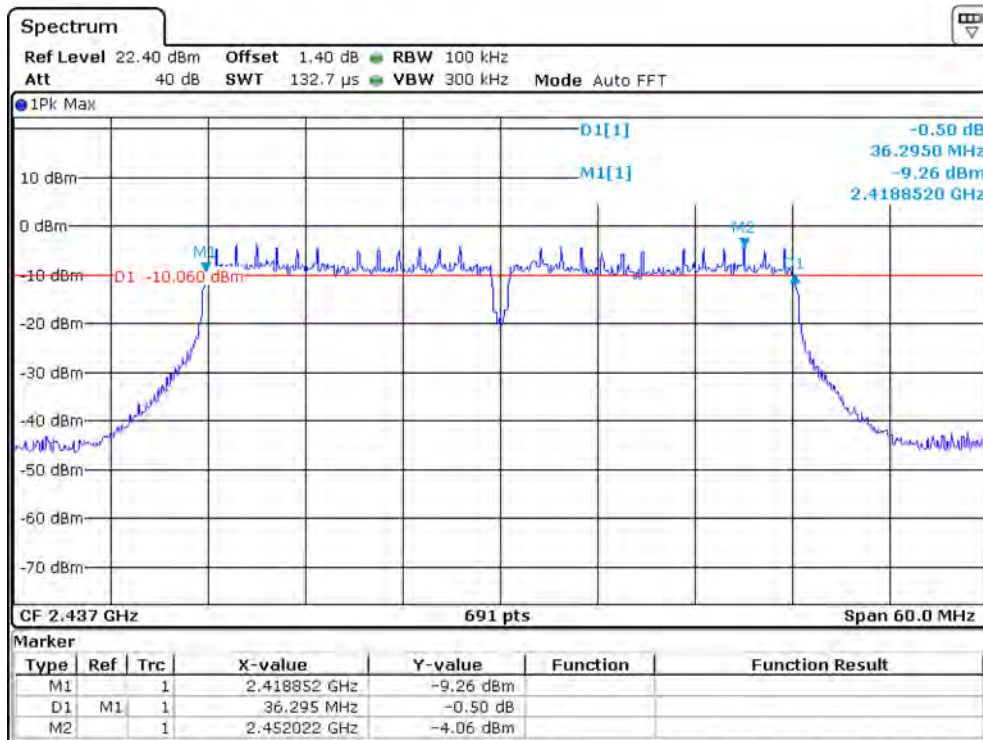
802.11n-HT20



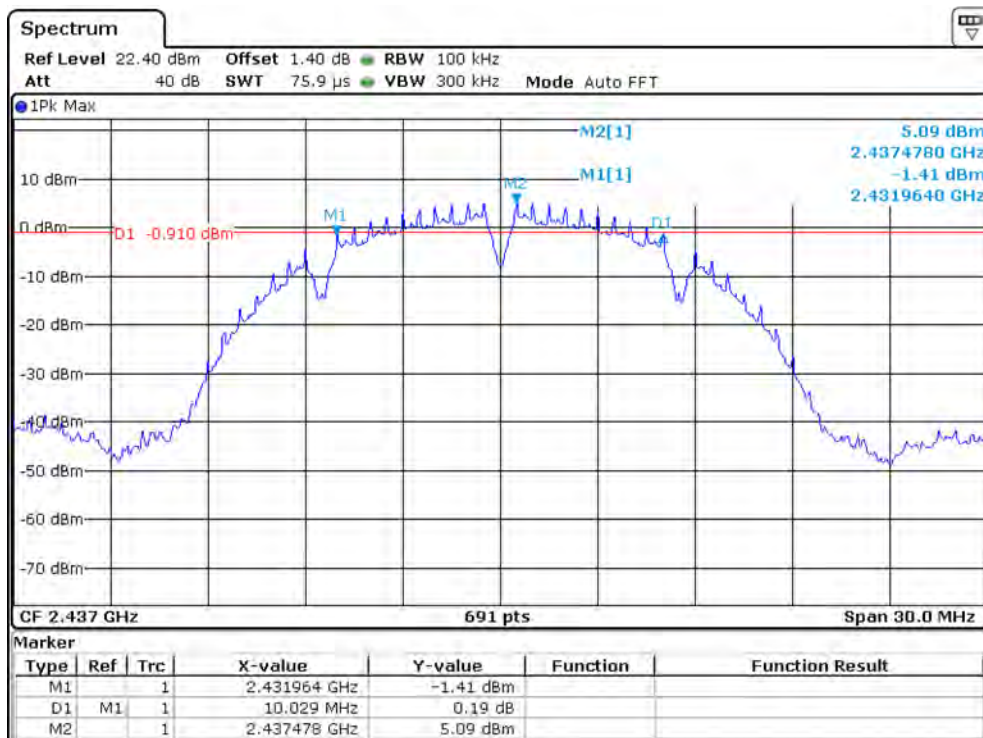
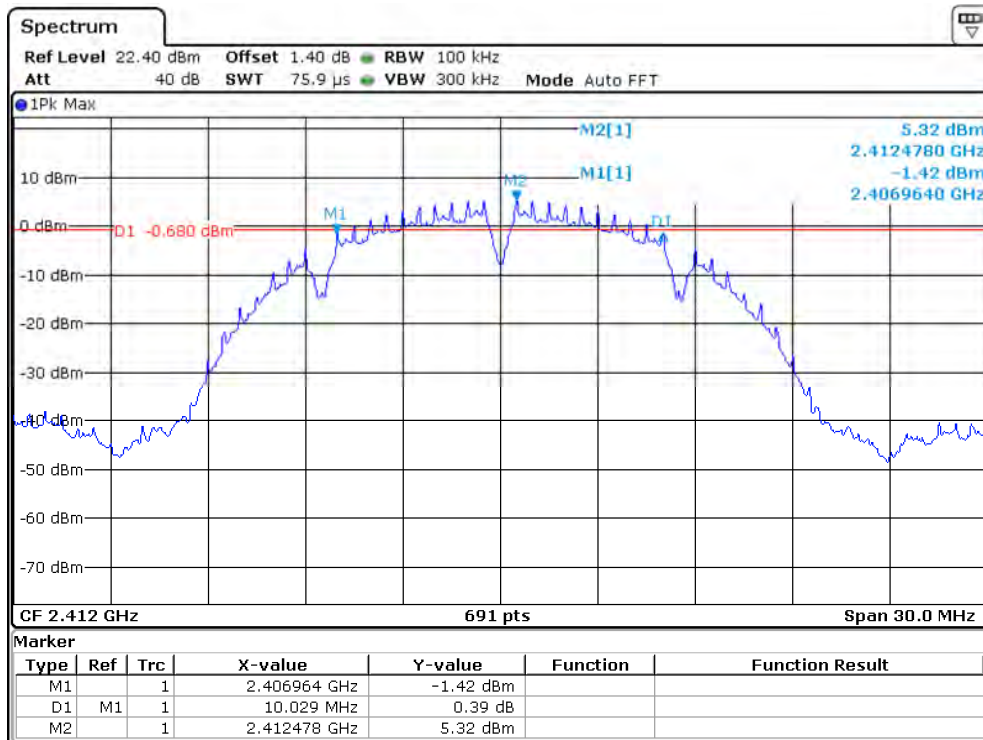


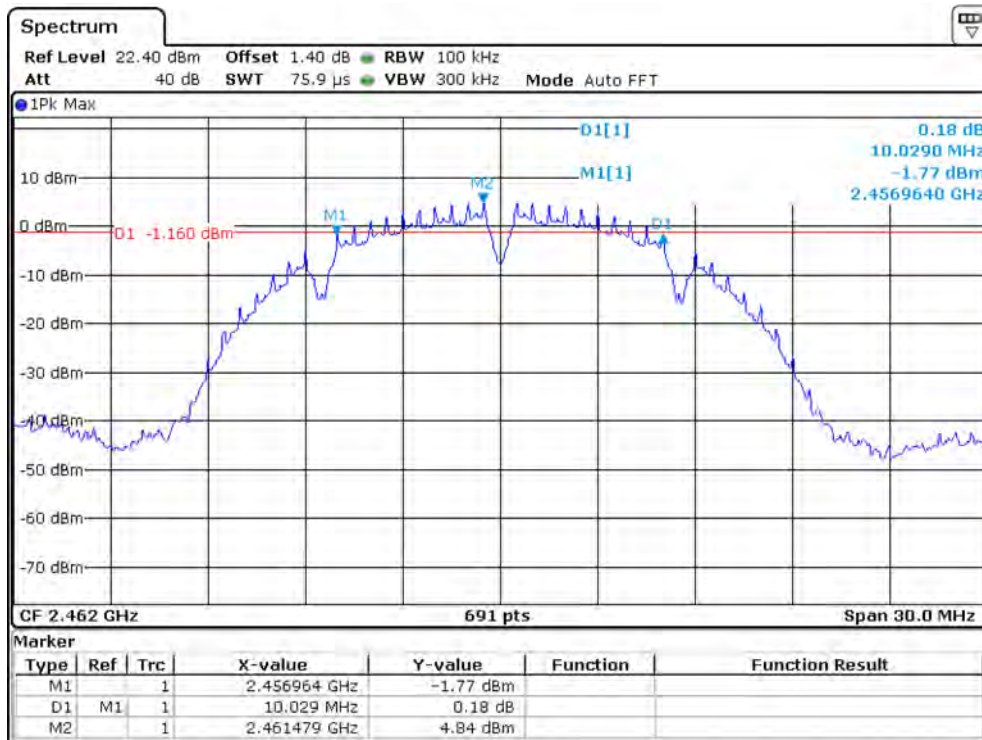
802.11n-HT40



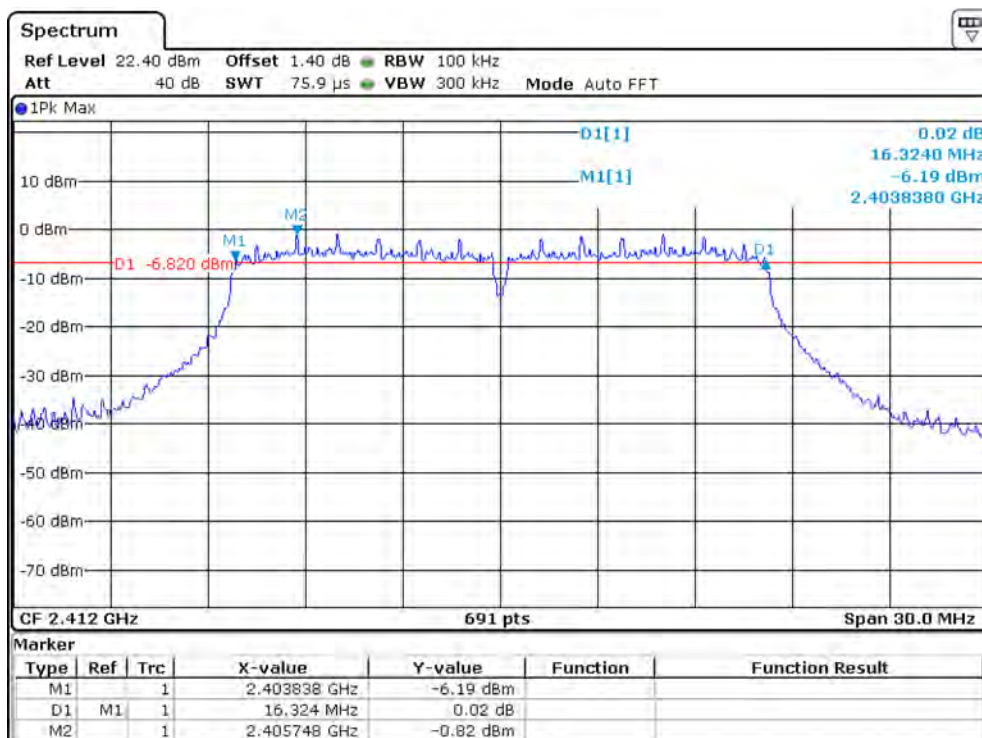


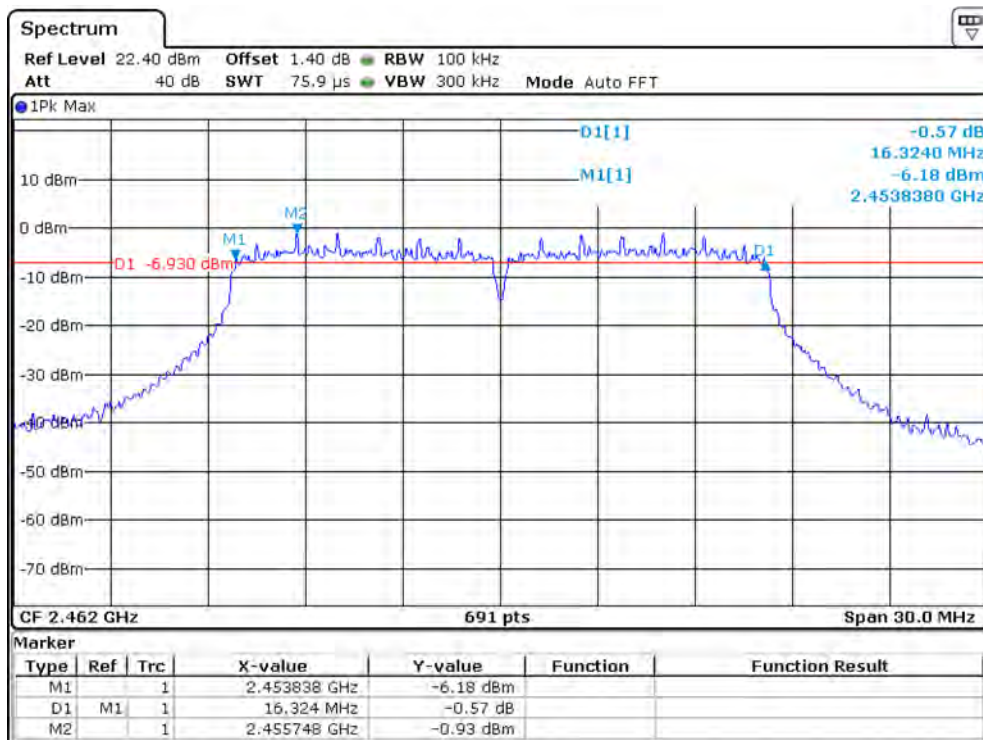
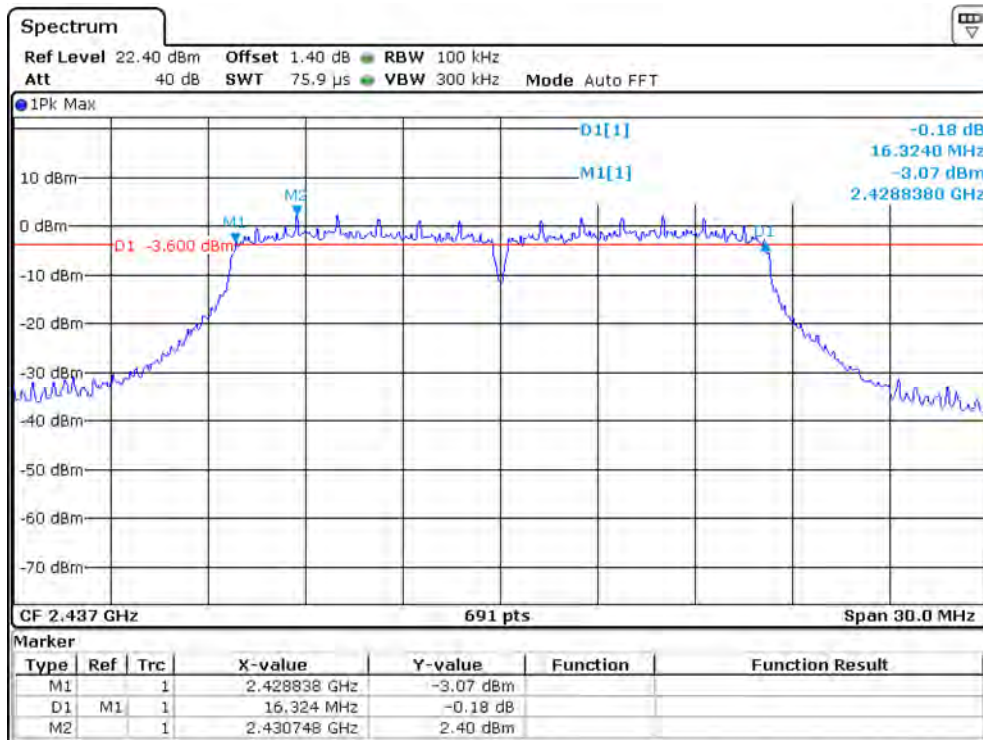
SISO Mode, Ant2:
802.11b



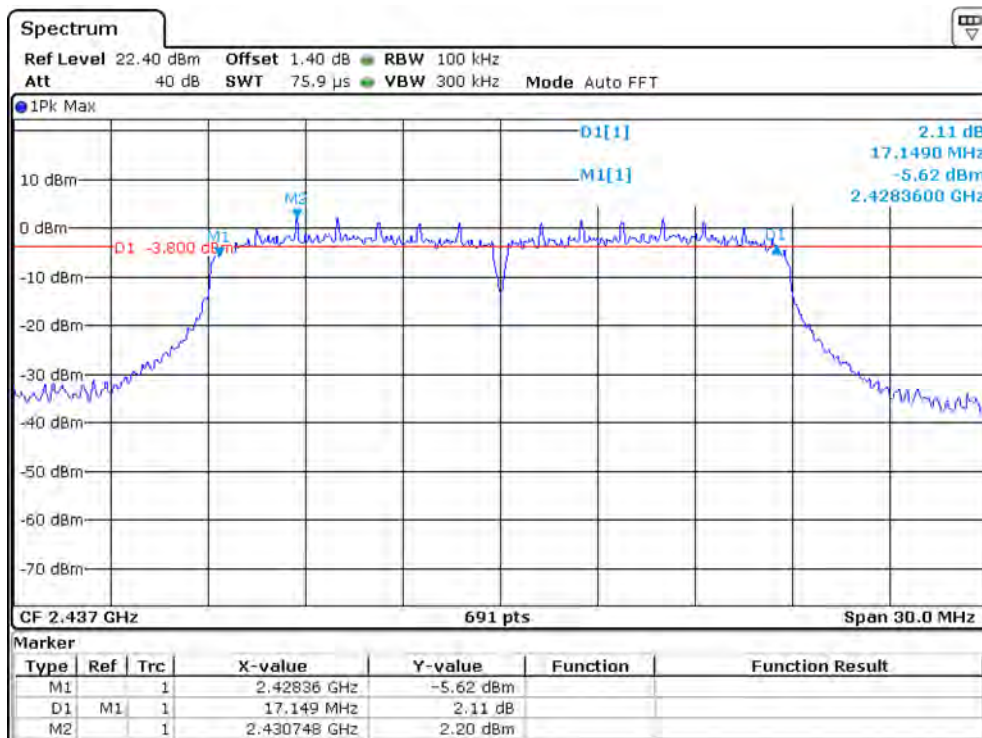
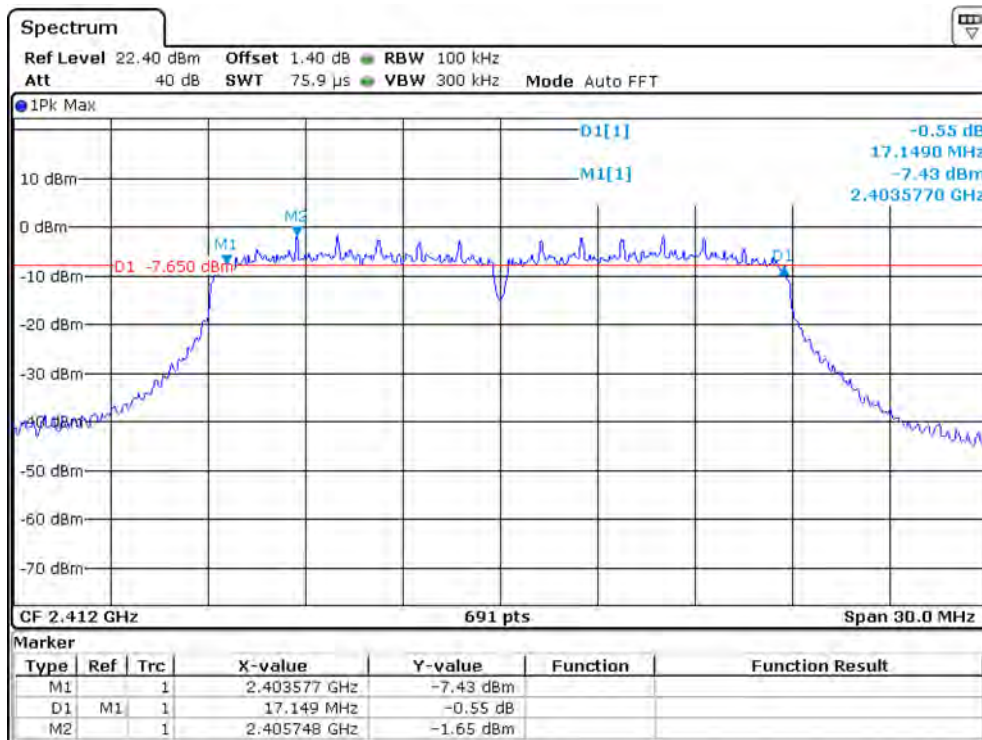


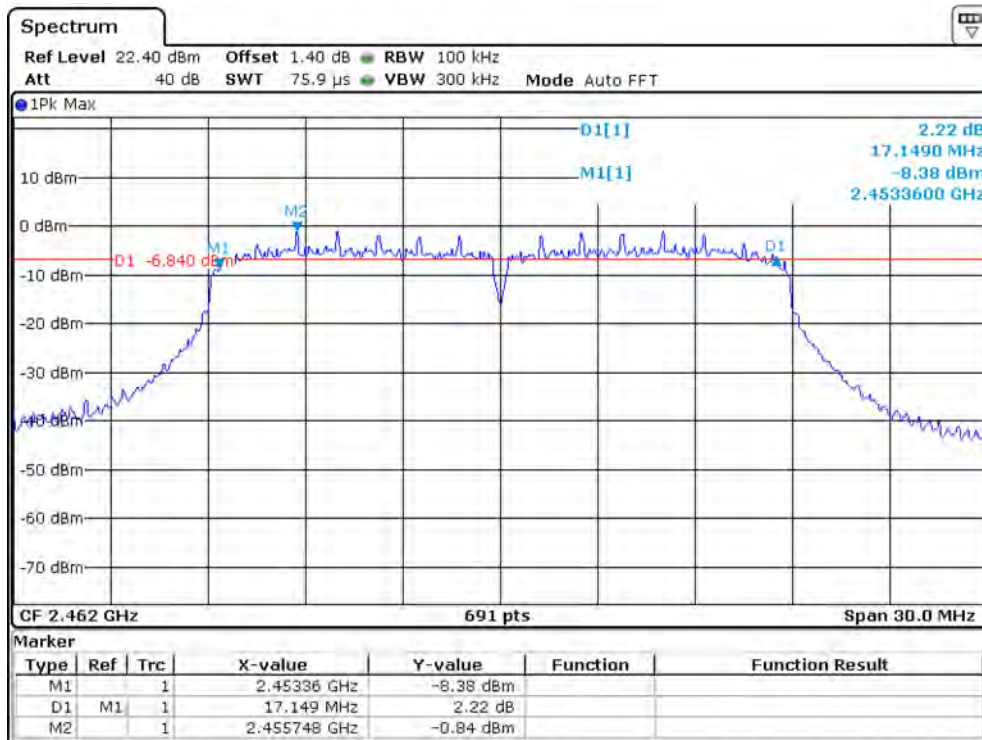
802.11g



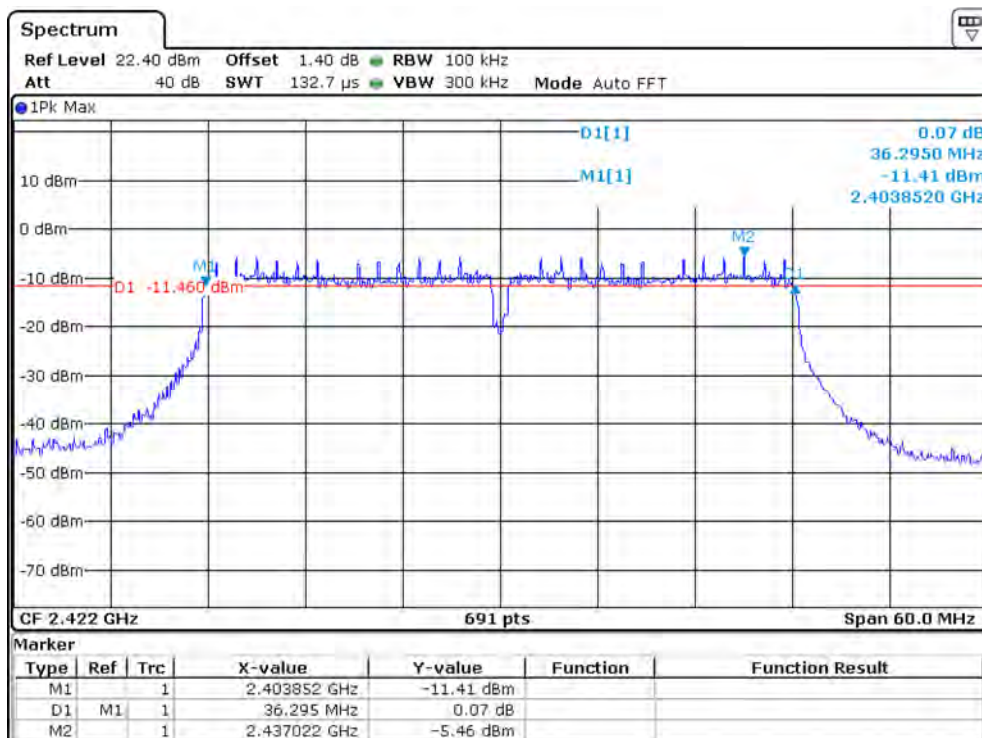


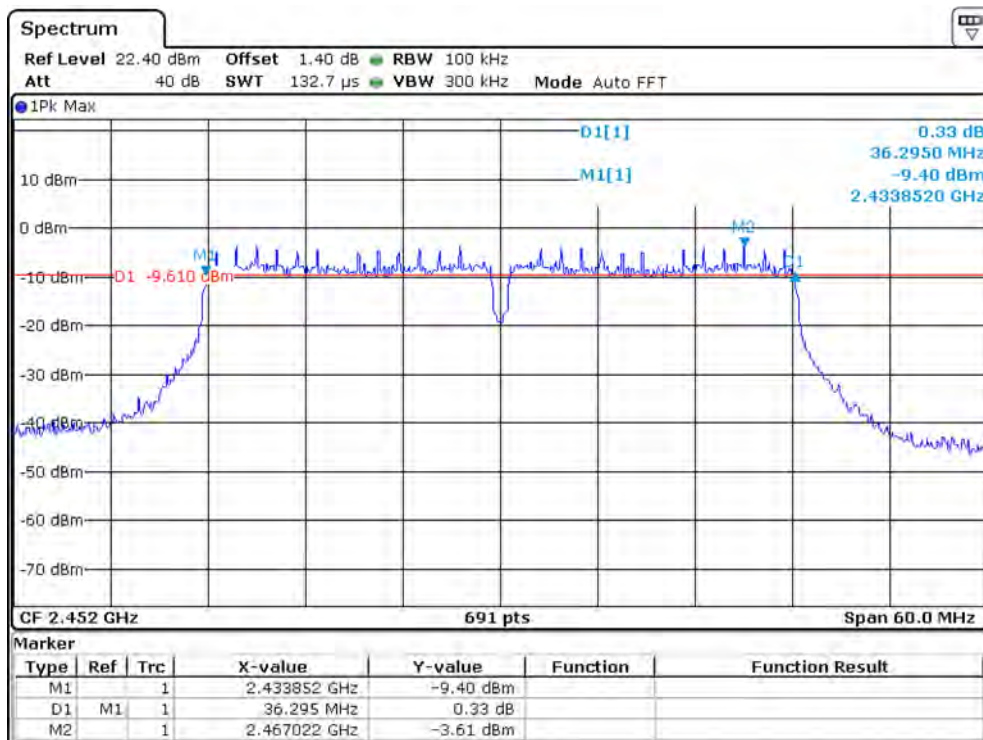
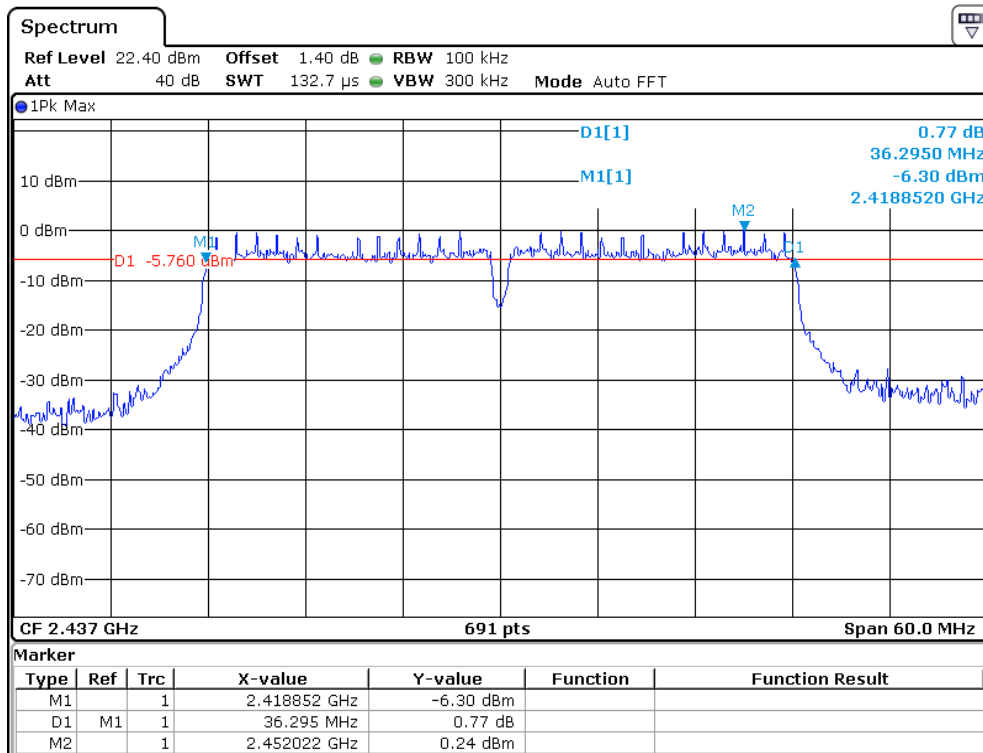
802.11n-HT20



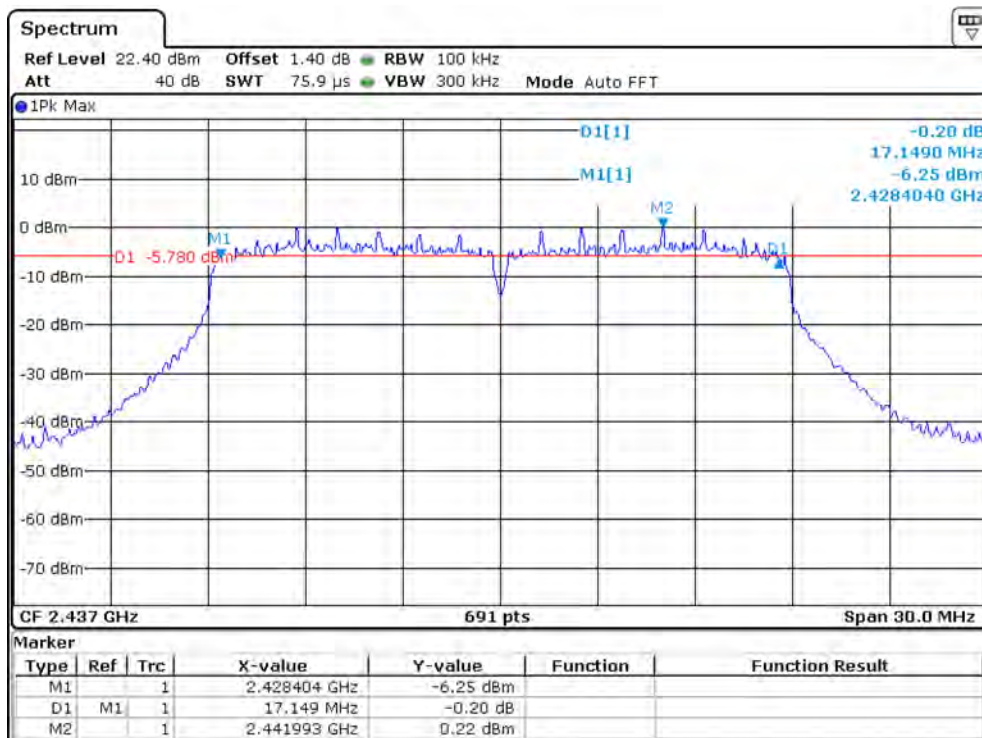
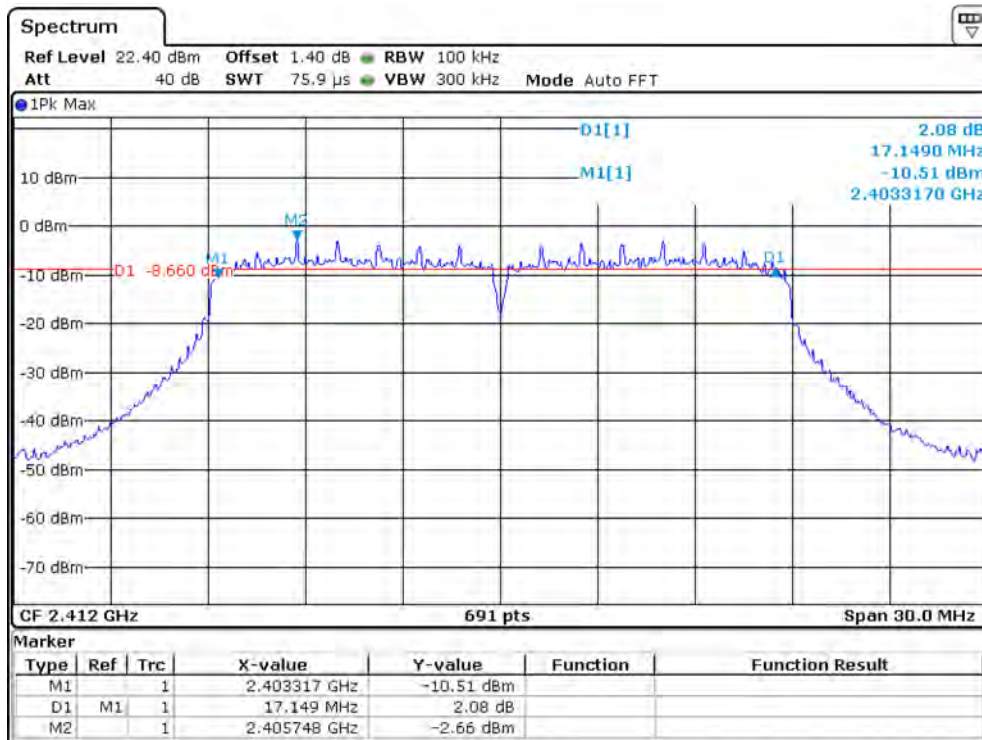


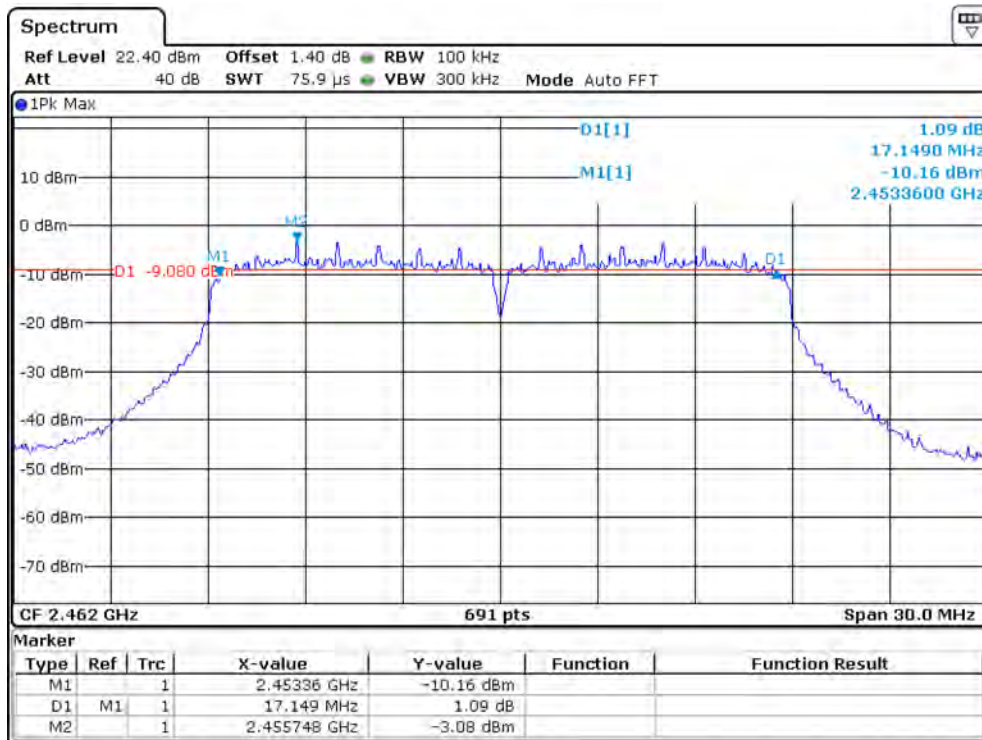
802.11n-HT40



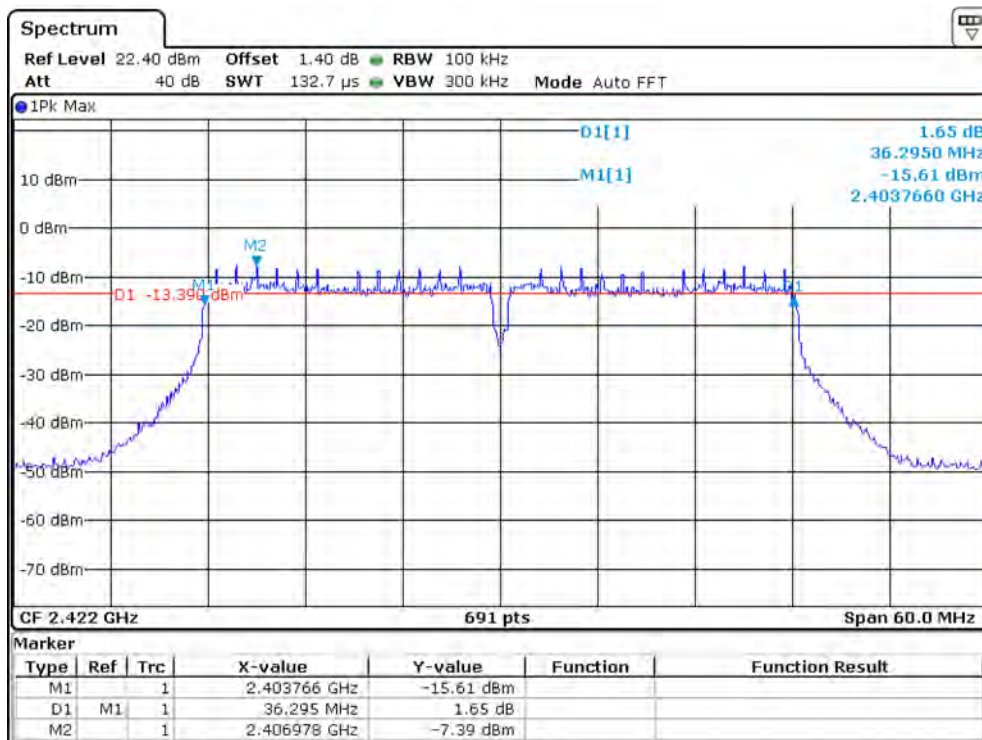


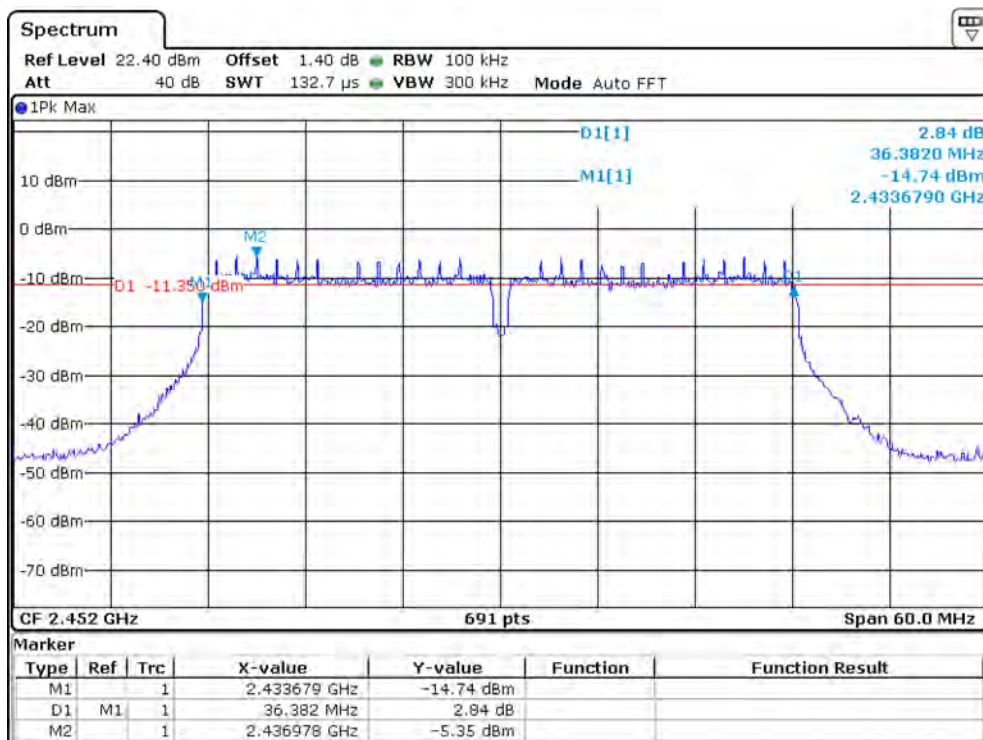
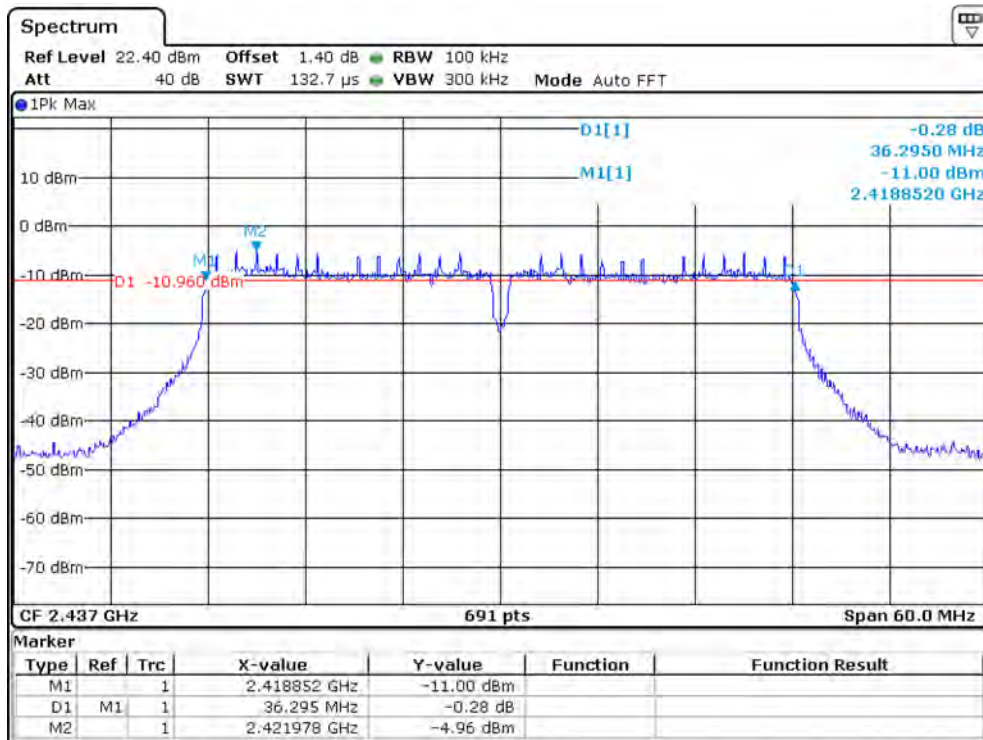
MIMO Mode, Ant1:
802.11n-HT20



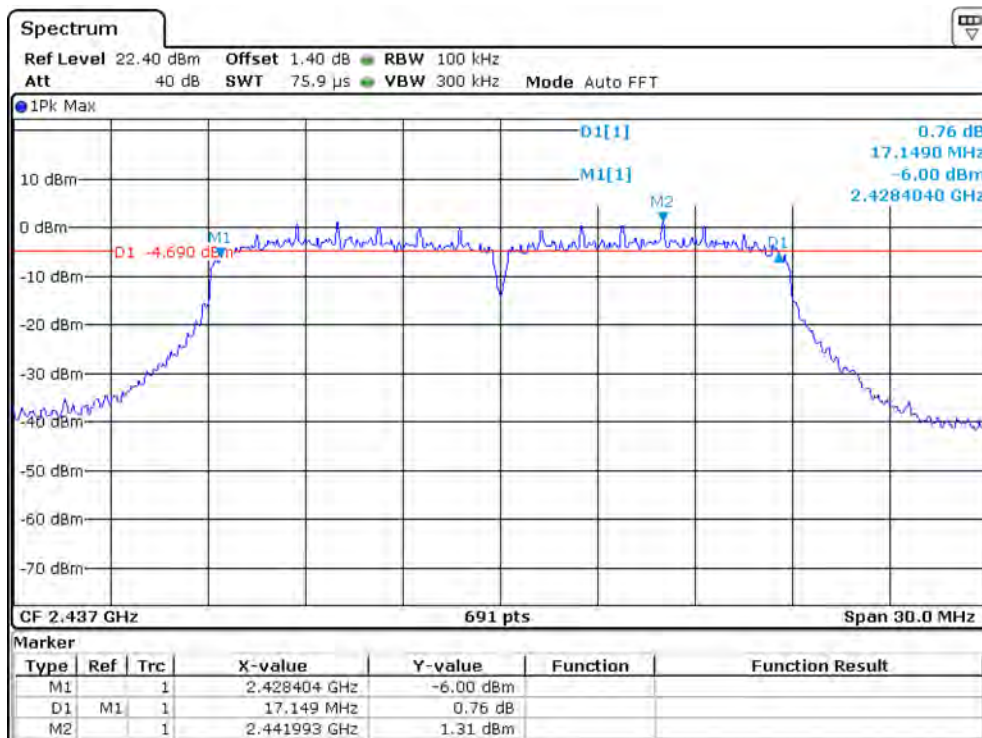
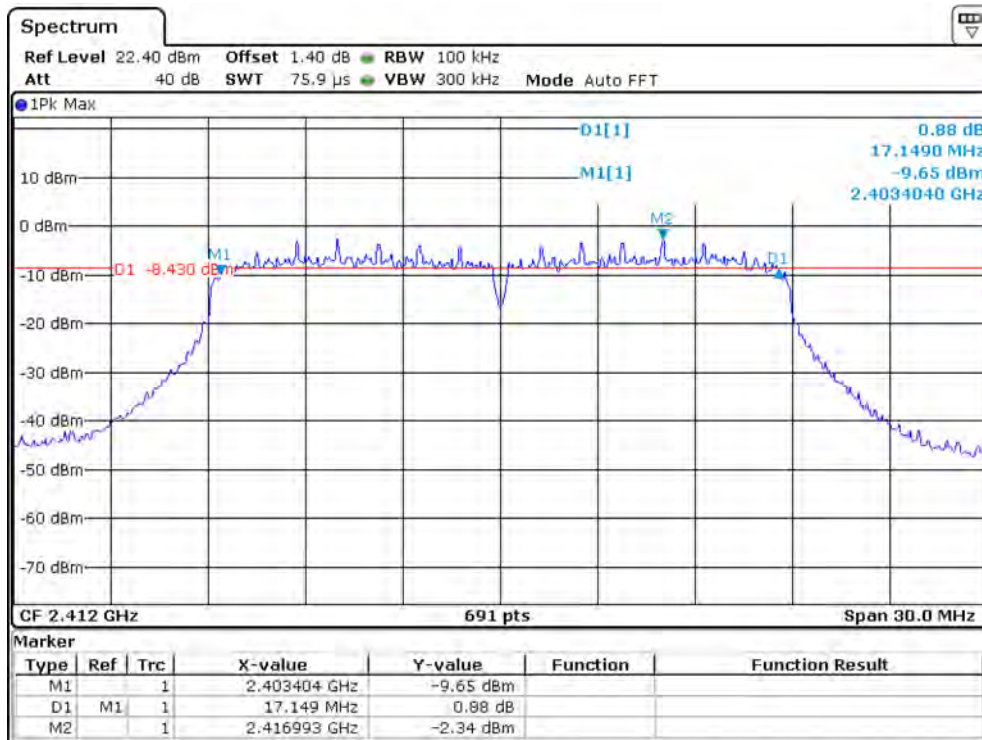


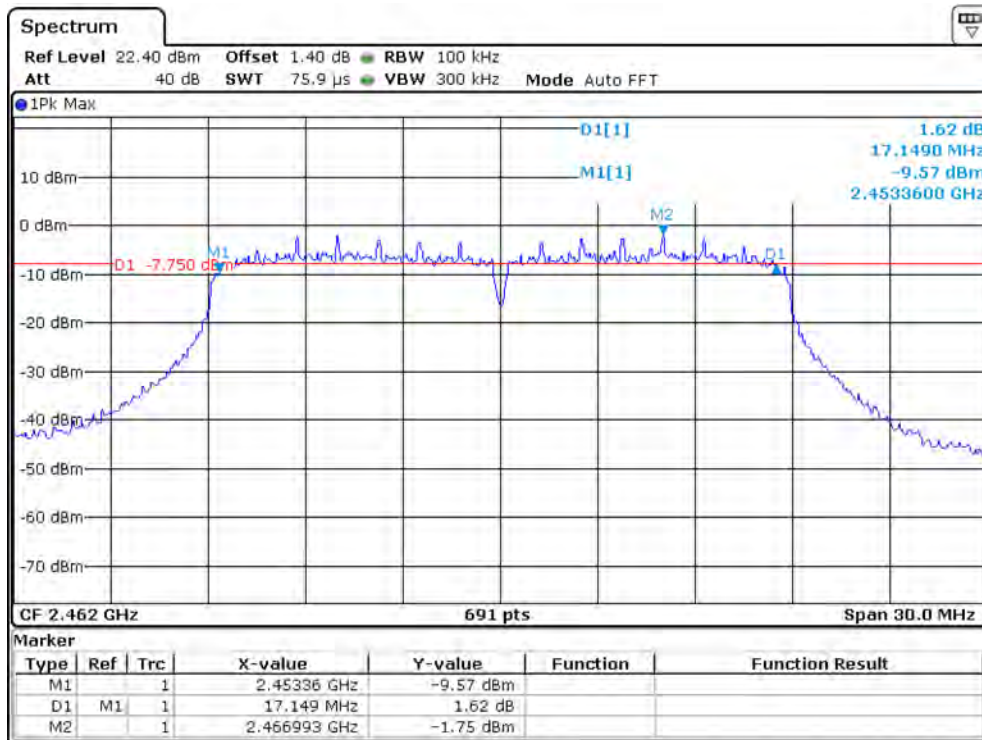
802.11n-HT40



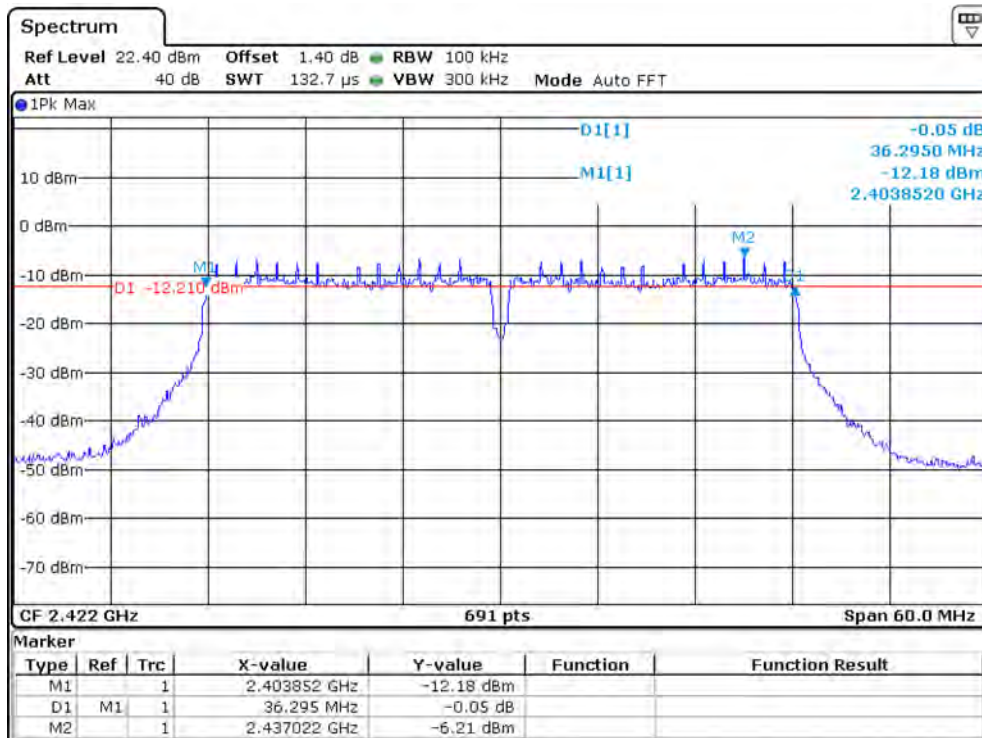


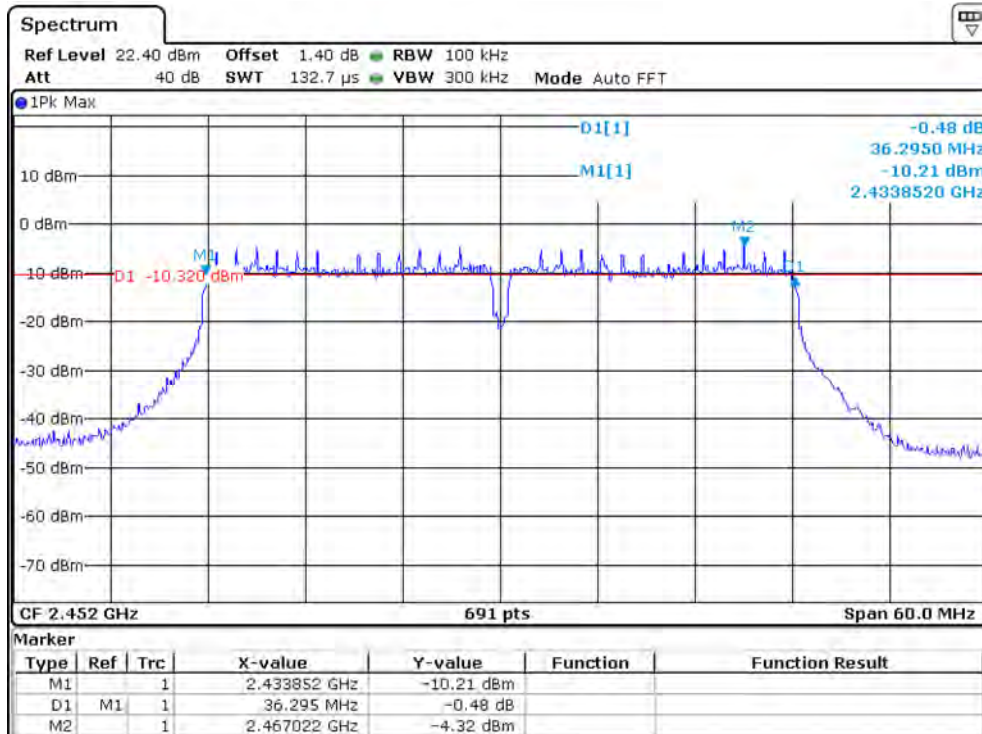
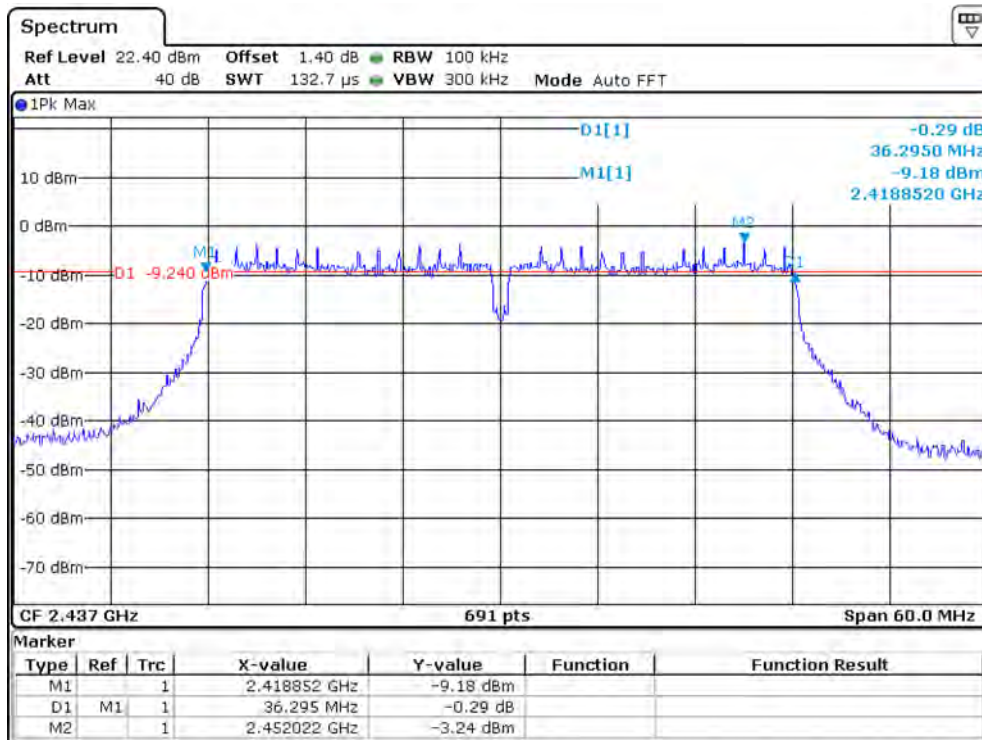
MIMO Mode, Ant2:
802.11n-HT20





802.11n-HT40





Applicant: Huawei Technologies Co., Ltd.

Date of Test: March 5, 2019

Model: X22C

4.3 Maximum Power Density Reading, FCC Rule 15.247(e):

The Measurement Procedure PKPSD was set according to the FCC KDB 558074 D01 v05r01.

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

Limit: The Power Density does not exceed 8dBm/3 kHz.

SISO Mode, Ant1:

IEEE 802.11b (1Mbps)	
Frequency (MHz)	Power Density with RBW 3KHz
2412	-8.21
2437	-9.67
2462	-9.79

IEEE 802.11g (6Mbps)	
Frequency (MHz)	Power Density with RBW 3KHz
2412	-15.28
2437	-12.35
2462	-16.90

IEEE 802.11n-HT20 (6.5Mbps)	
Frequency (MHz)	Power Density with RBW 3KHz
2412	-16.53
2437	-14.25
2462	-15.91

IEEE 802.11n-HT40 (13.5Mbps)	
Frequency (MHz)	Power Density with RBW 3KHz
2422	-20.94
2437	-18.32
2452	-19.28

SISO Mode, Ant2:

IEEE 802.11b (1Mbps)	
Frequency (MHz)	Power Density with RBW 3KHz
2412	-7.88
2437	-7.86
2462	-8.42

IEEE 802.11g (6Mbps)	
Frequency (MHz)	Power Density with RBW 3KHz
2412	-14.20
2437	-10.83
2462	-15.07

IEEE 802.11n-HT20 (6.5Mbps)	
Frequency (MHz)	Power Density with RBW 3KHz
2412	-16.23
2437	-11.10
2462	-15.36

IEEE 802.11n-HT40 (13.5Mbps)	
Frequency (MHz)	Power Density with RBW 3KHz
2422	-20.15
2437	-16.29
2452	-15.66

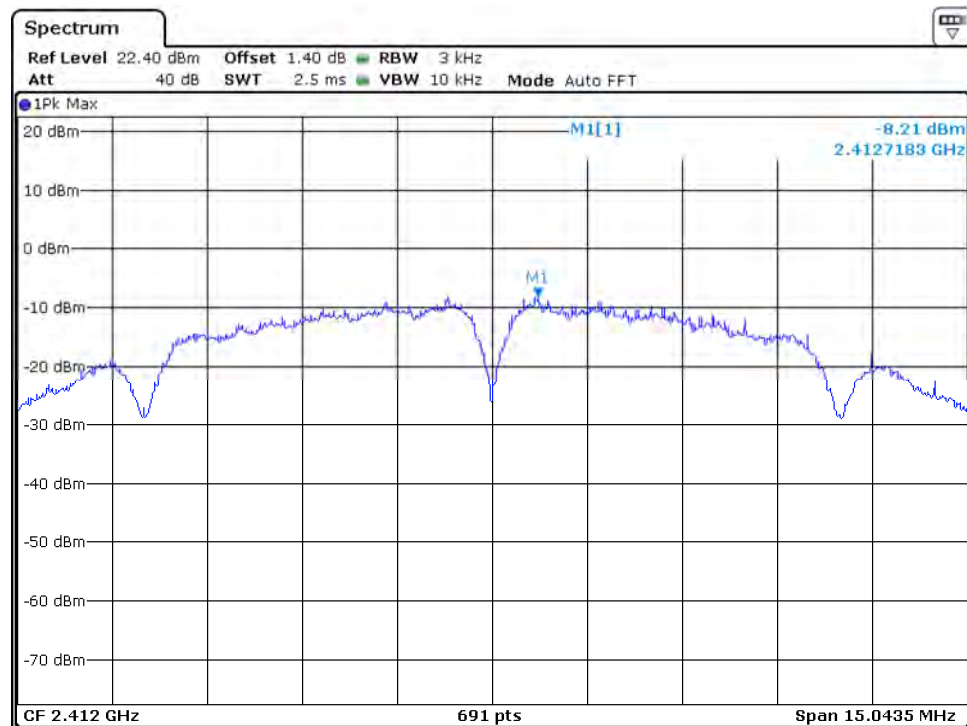
MIMO Mode:

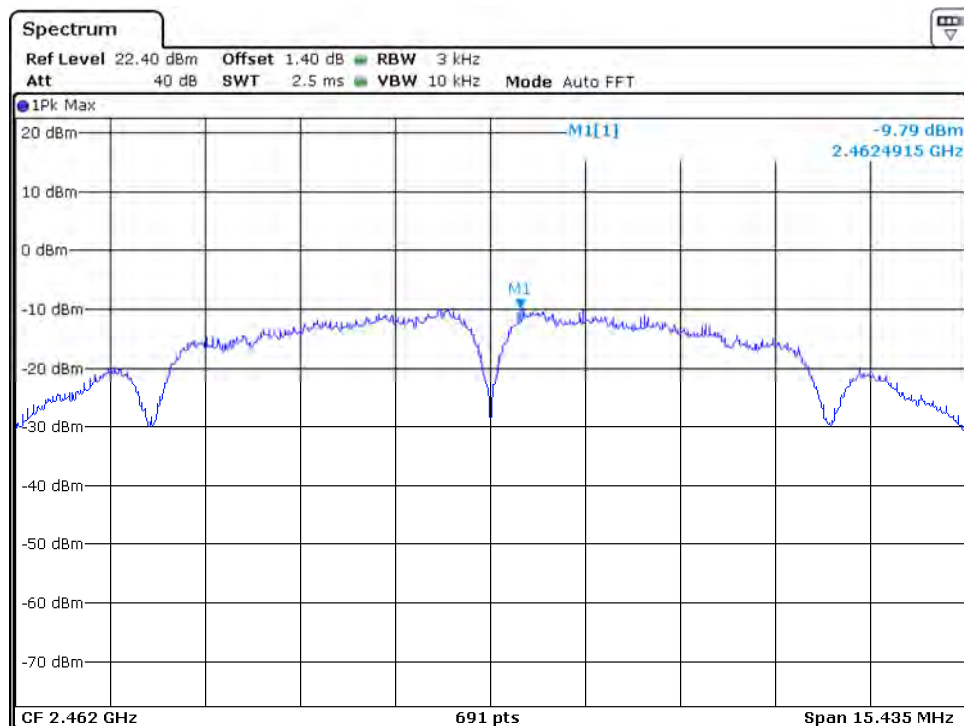
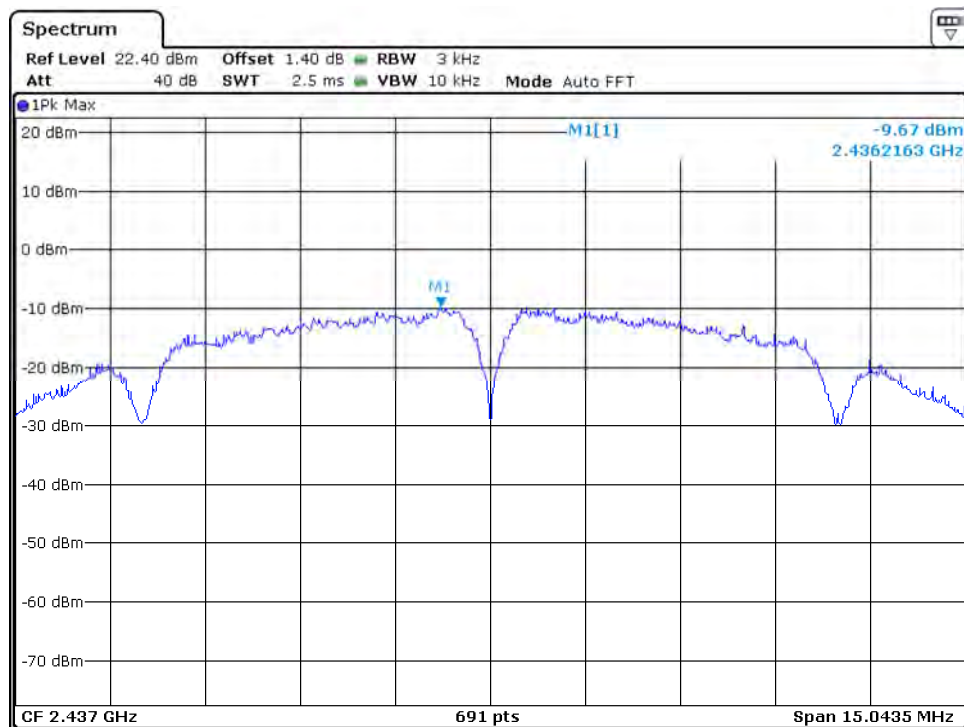
IEEE 802.11n-HT20 (6.5Mbps)			
Frequency (MHz)	Power Density with RBW 3KHz		Power Density with RBW 3KHz
	Ant1	Ant2	Total
2412	-17.15	-16.99	-14.06
2437	-14.27	-13.09	-10.63
2462	-17.50	-15.5	-13.38

IEEE 802.11n-HT40 (13.5Mbps)			
Frequency (MHz)	Power Density with RBW 3KHz		Power Density with RBW 3KHz
	Ant1	Ant2	Total
2422	-22.17	-20.94	-18.50
2437	-18.82	-18.11	-15.44
2452	-20.53	-20.42	-17.46

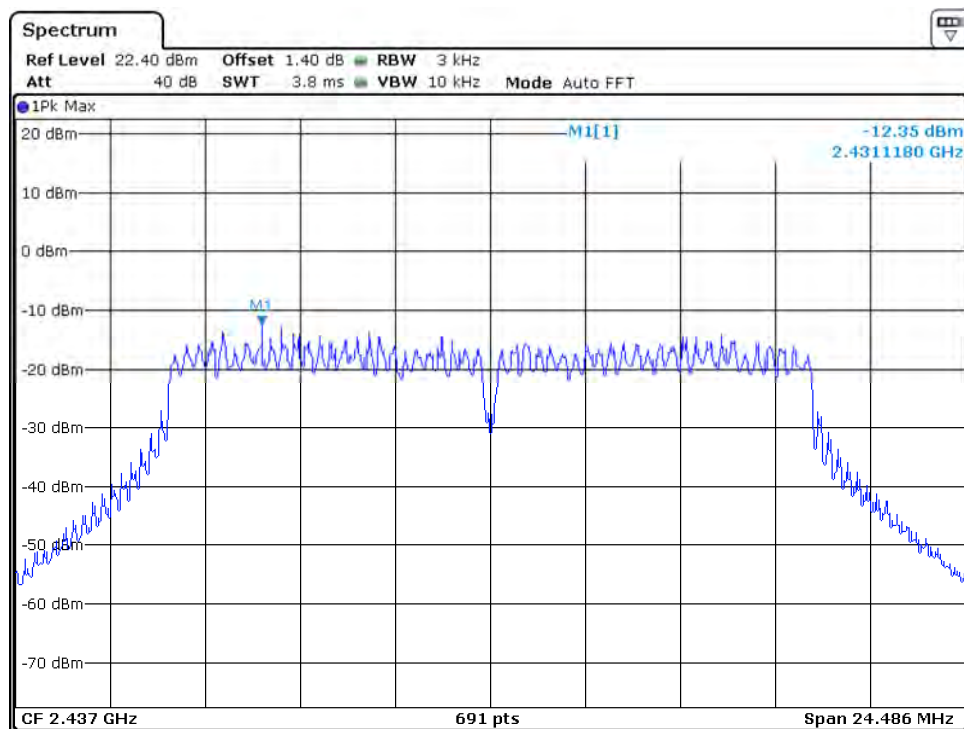
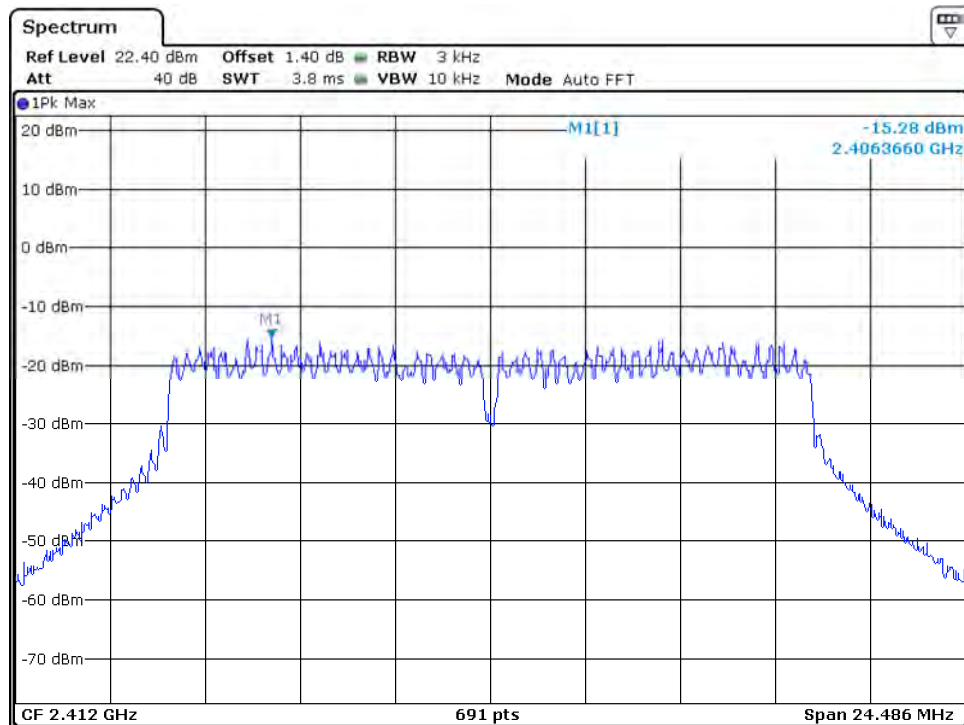
The test plots are attached as below.

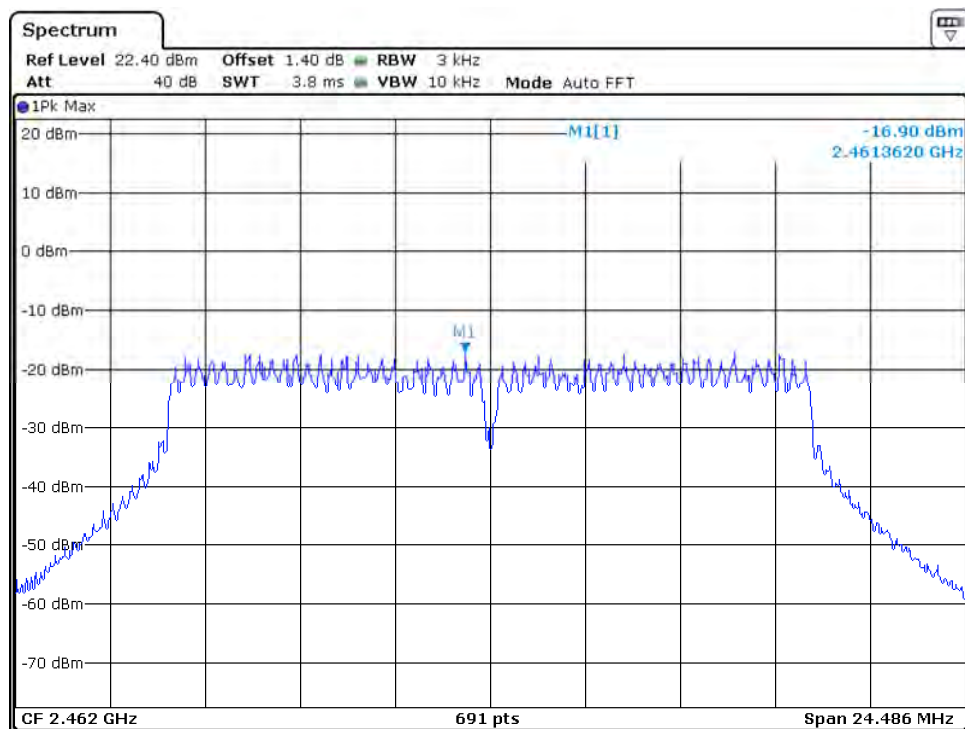
SISO Mode, Ant1:
802.11b



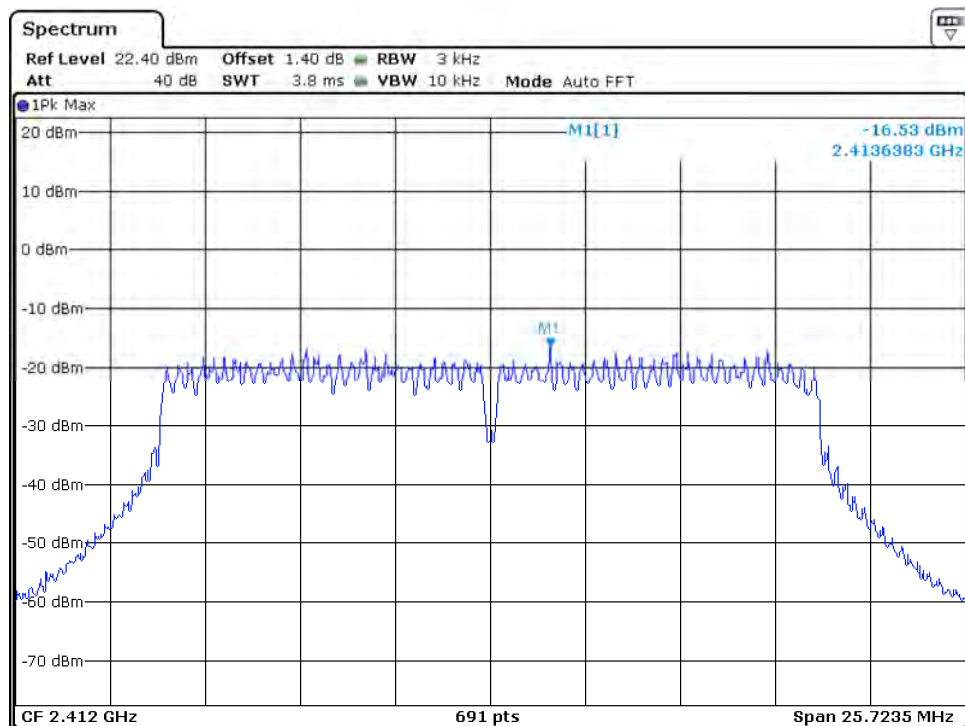


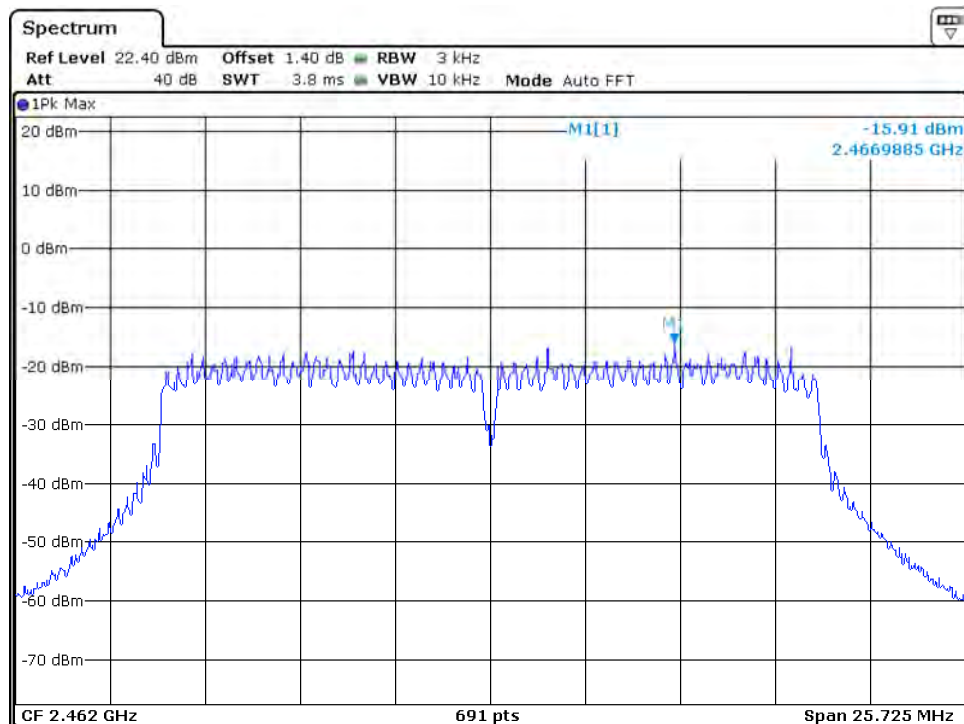
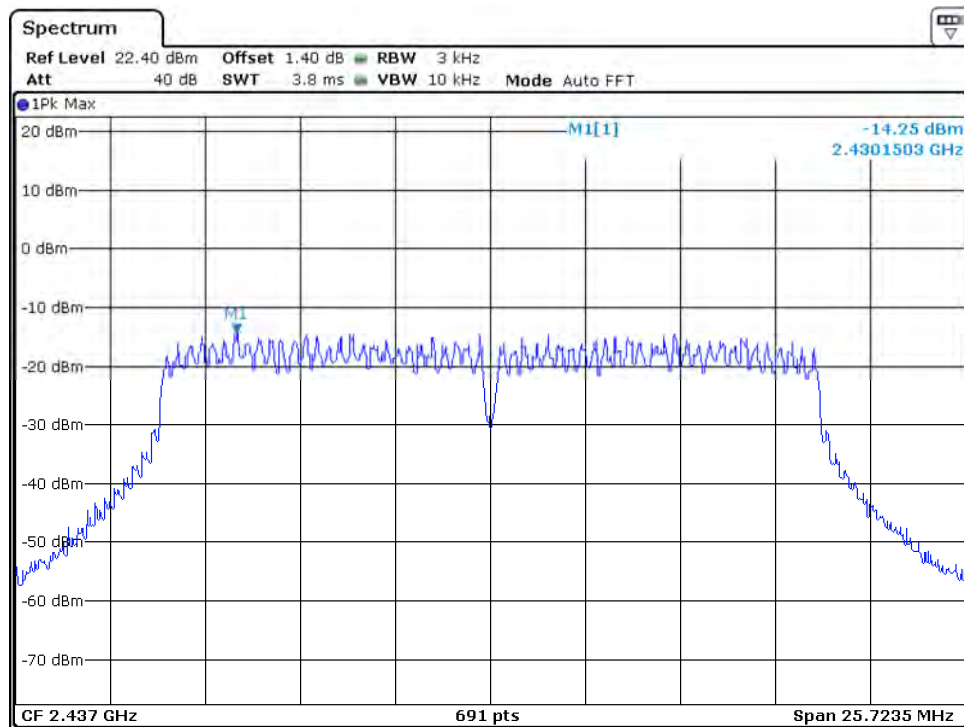
802.11g



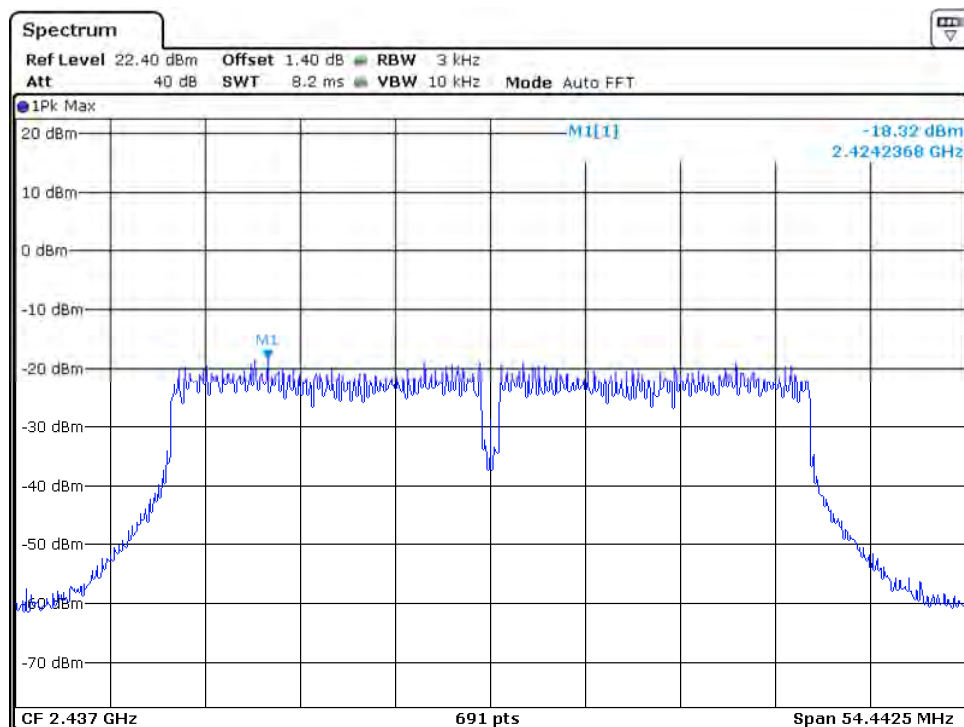
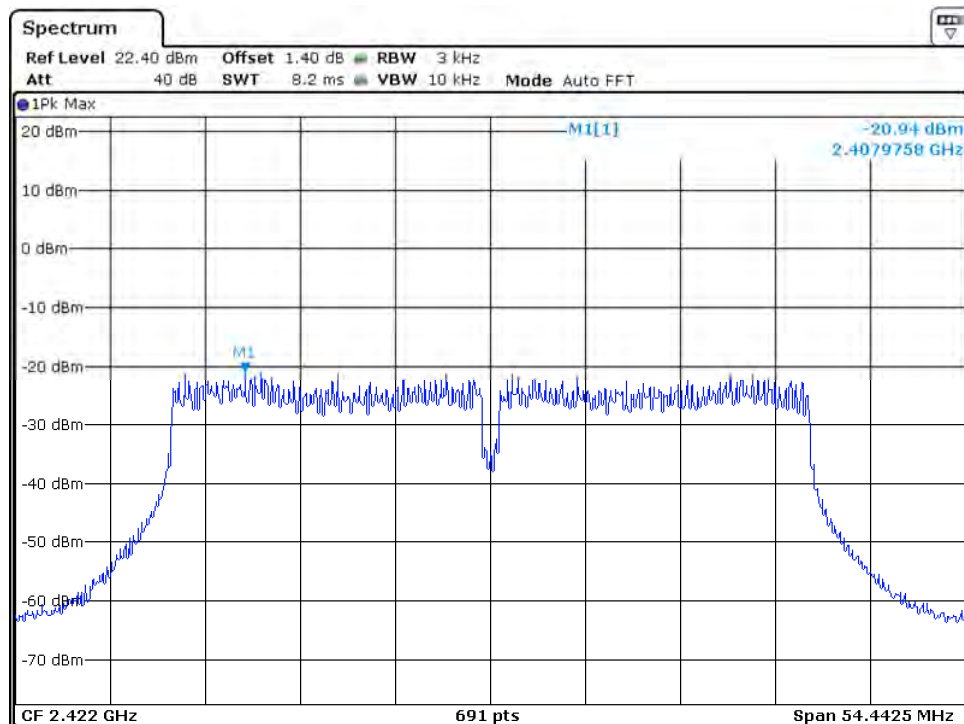


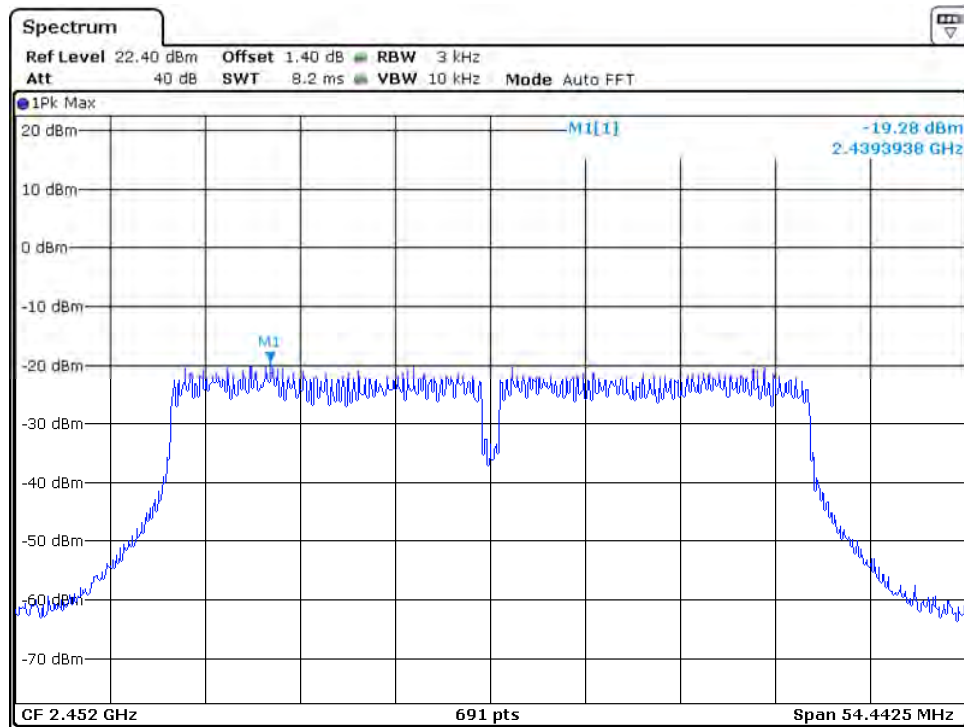
802.11n-HT20



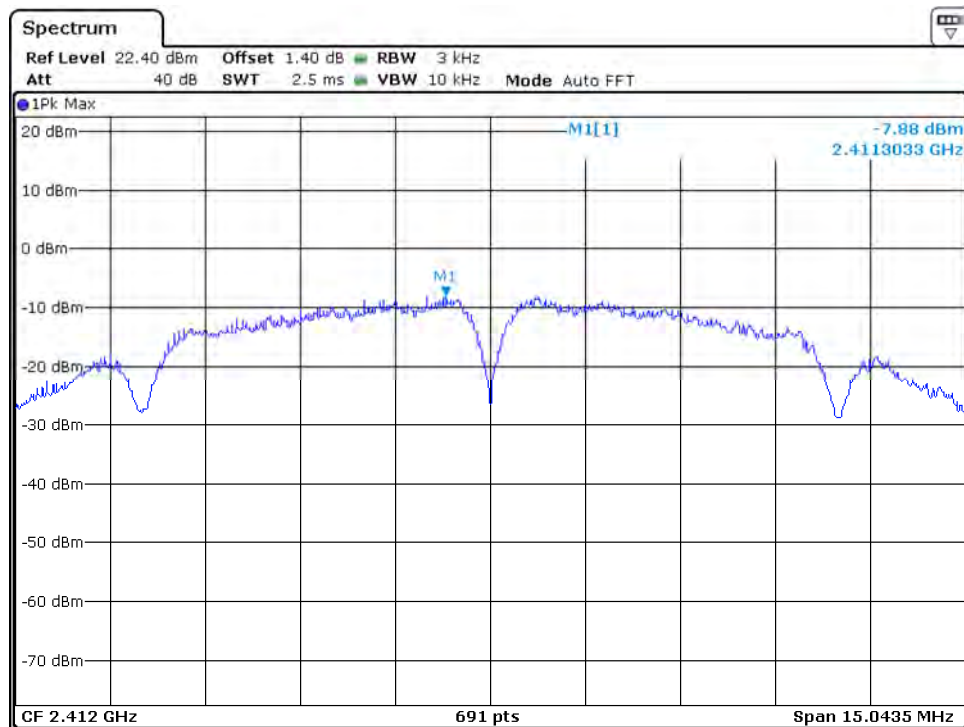


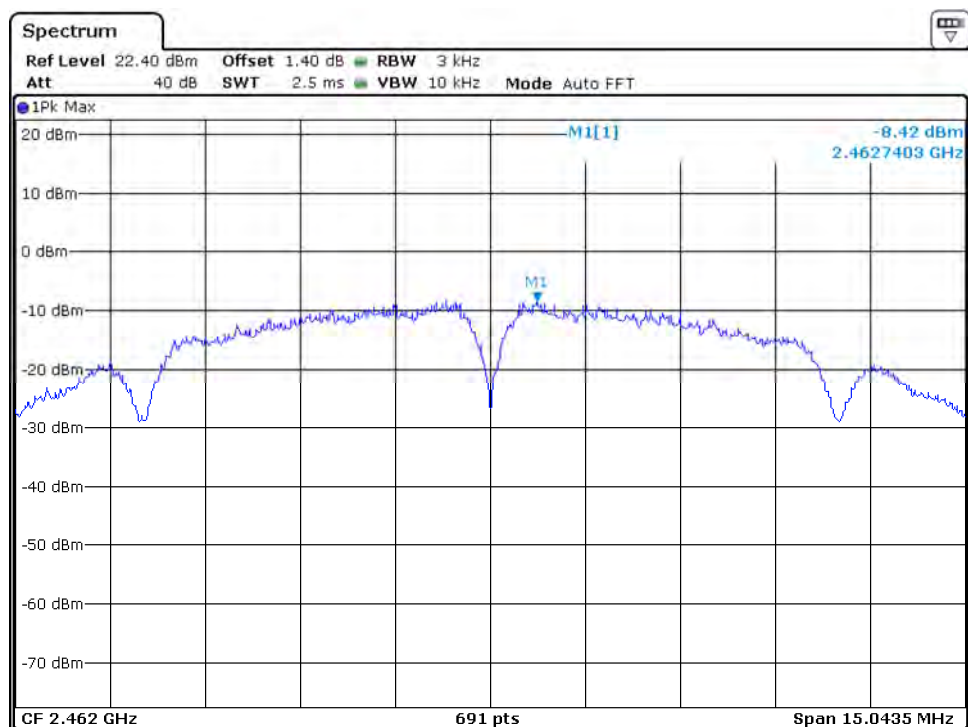
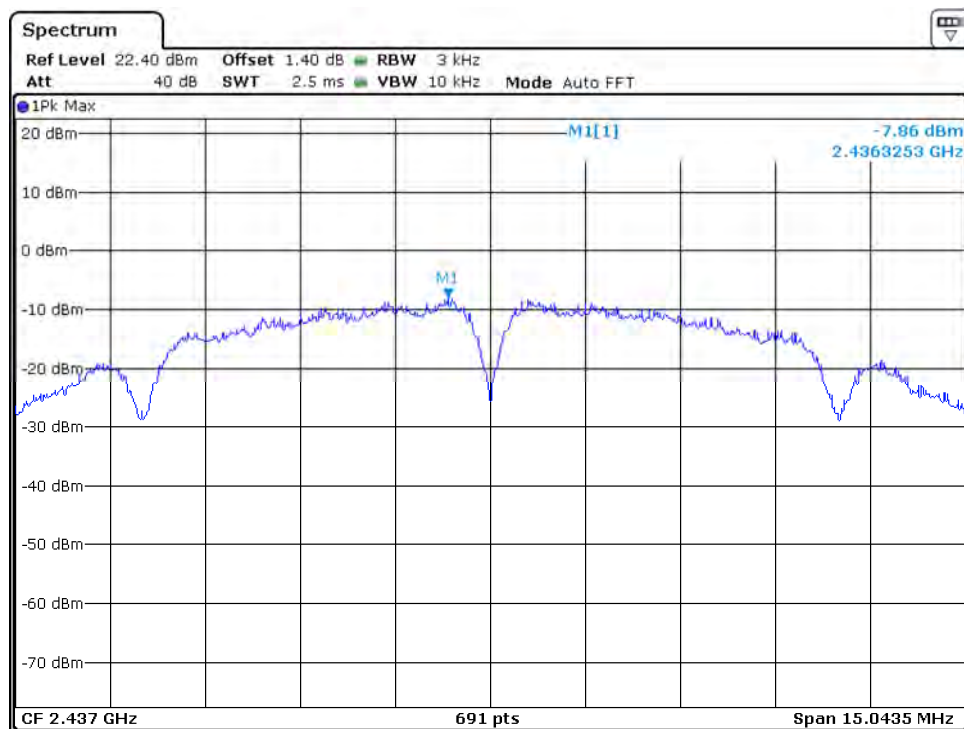
802.11n-HT40



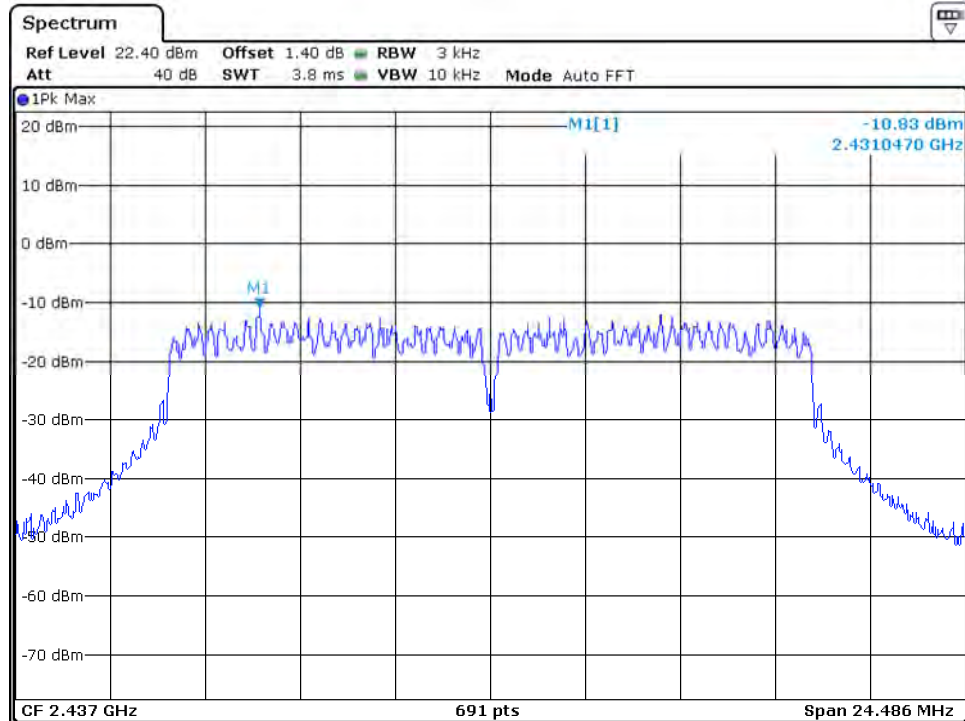
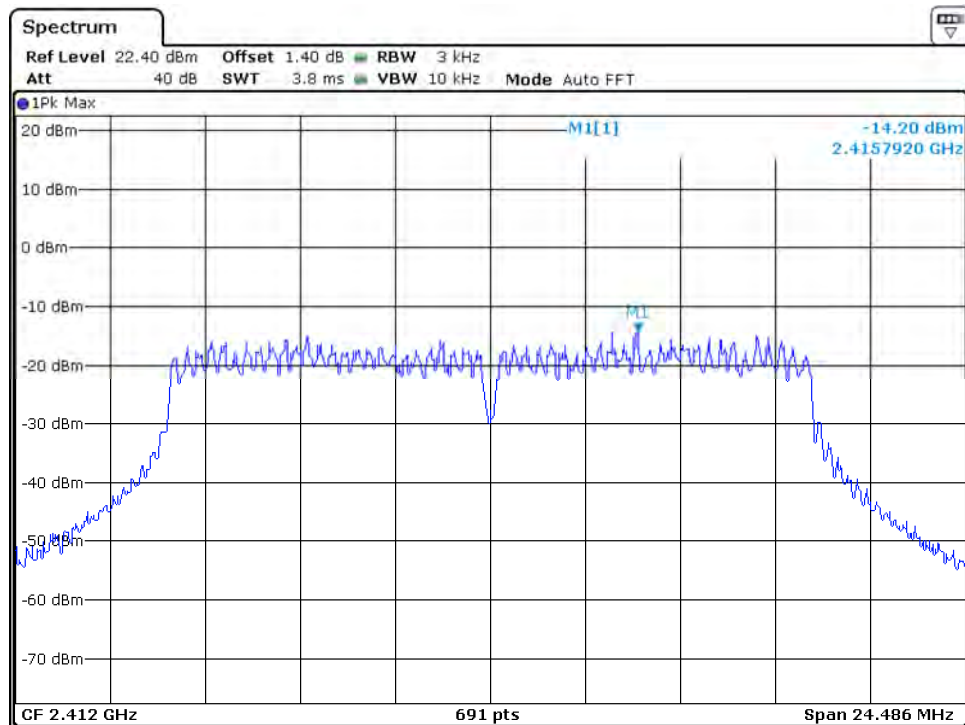


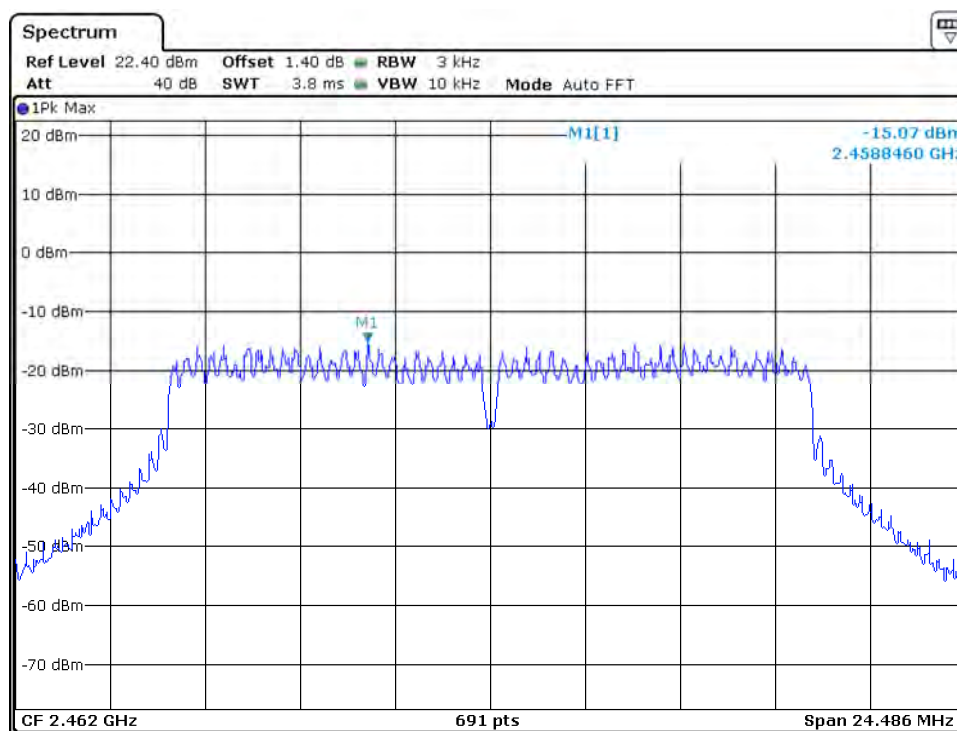
SISO Mode, Ant2:
802.11b



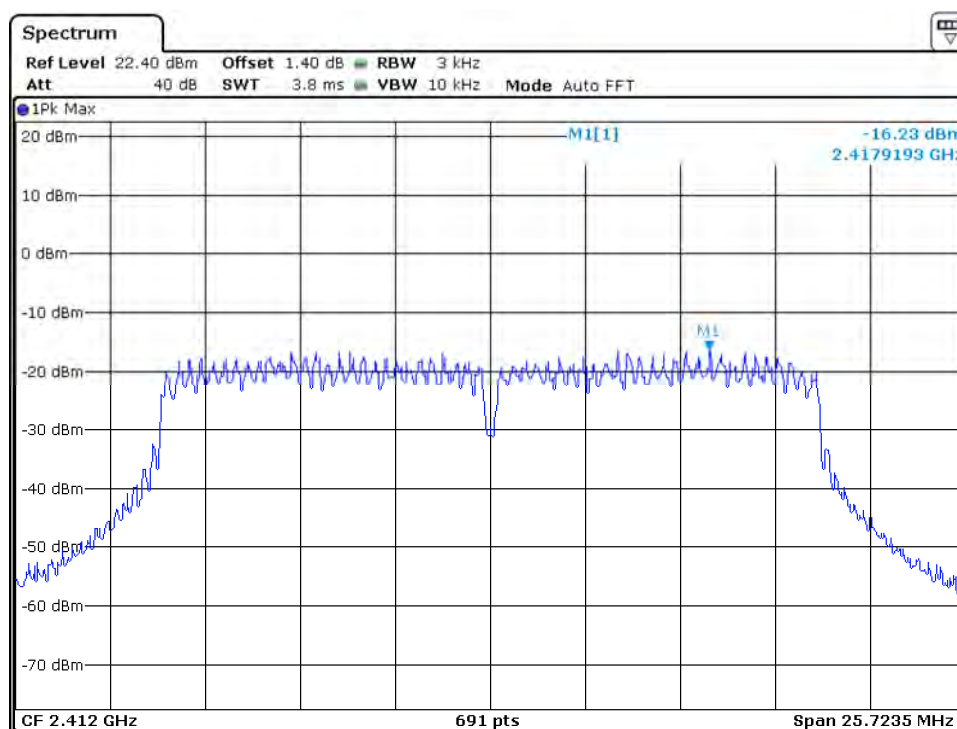


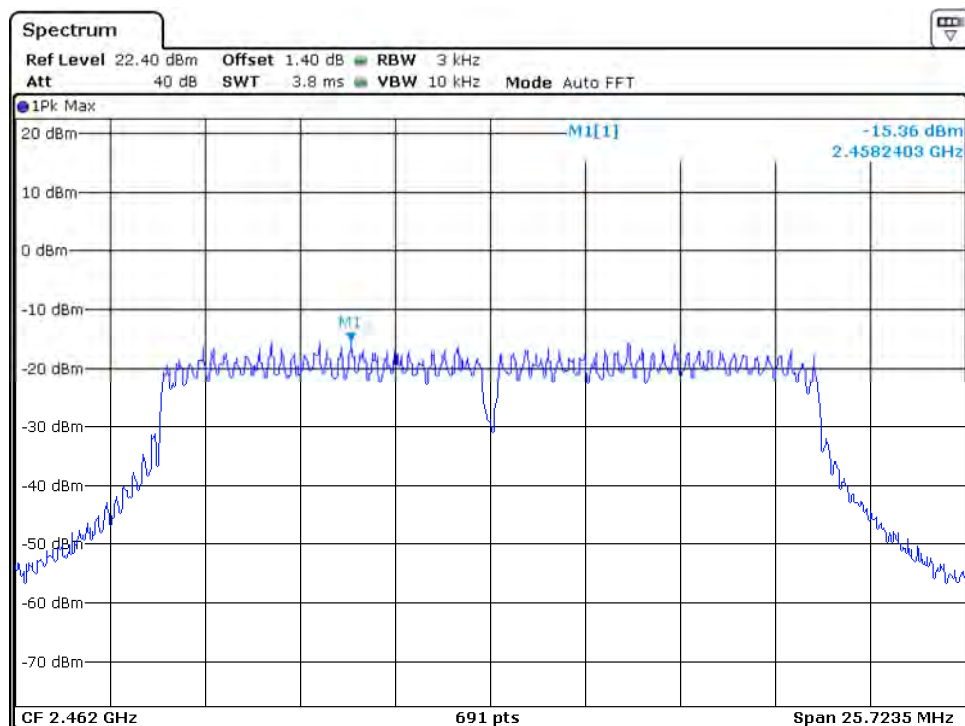
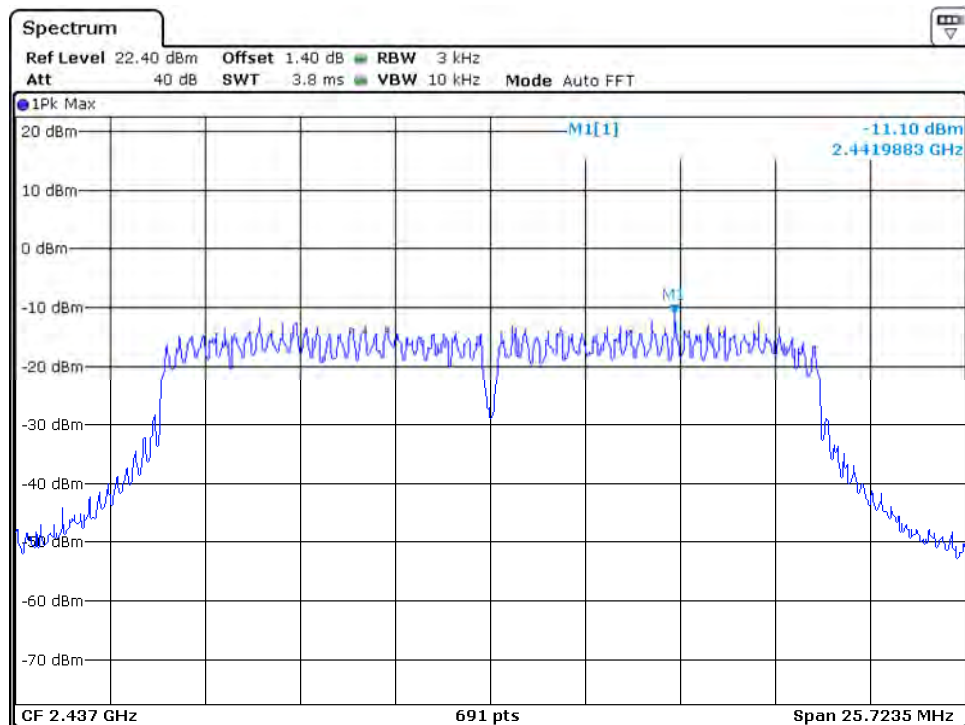
802.11g



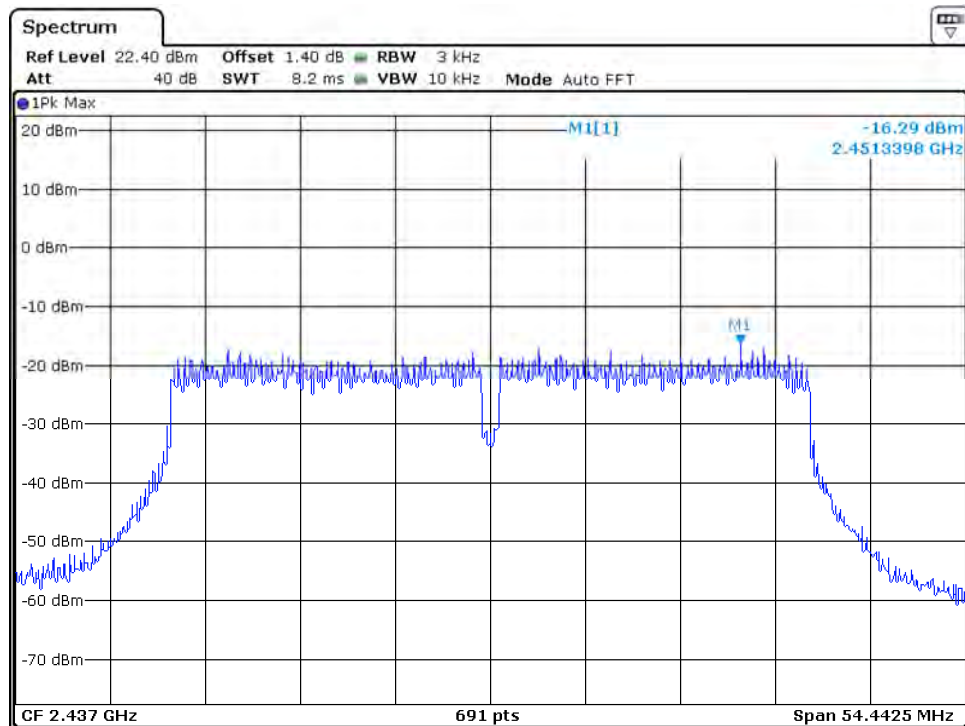
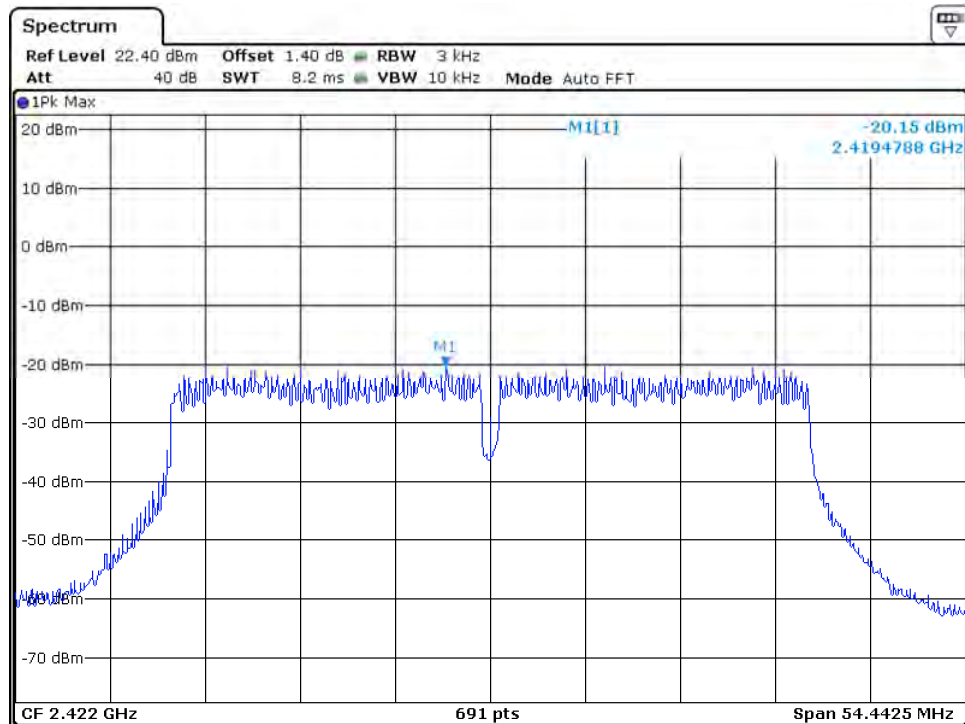


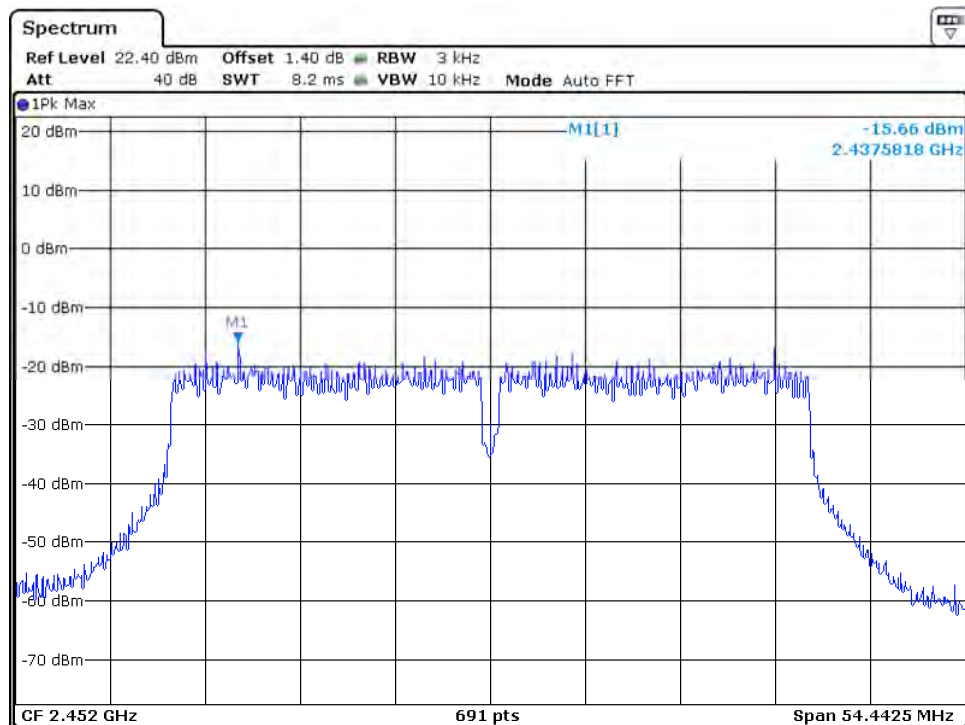
802.11n-HT20



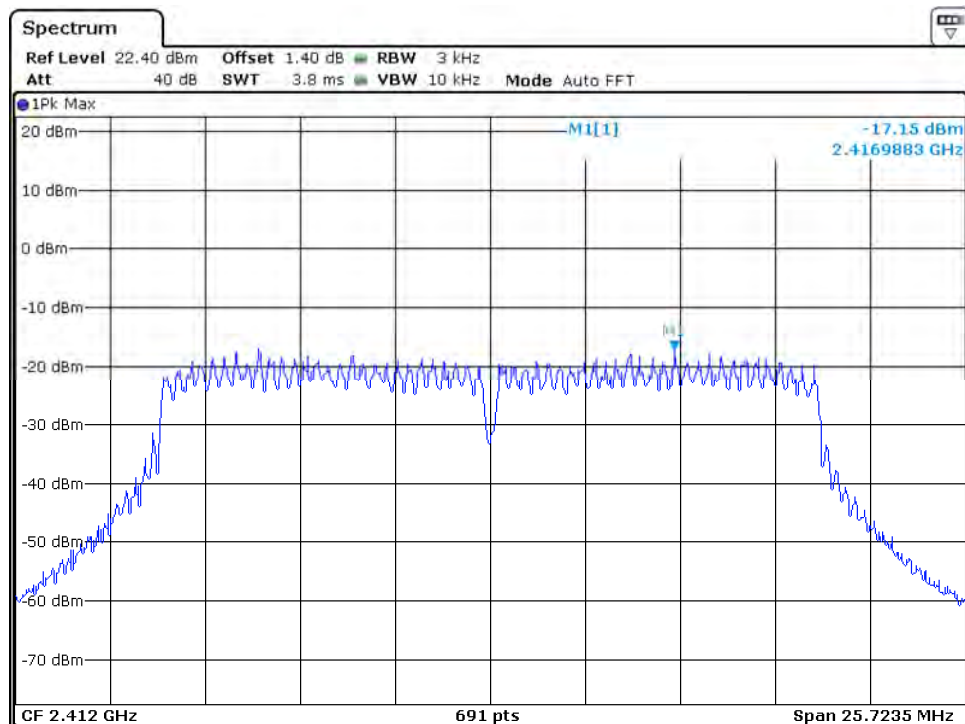


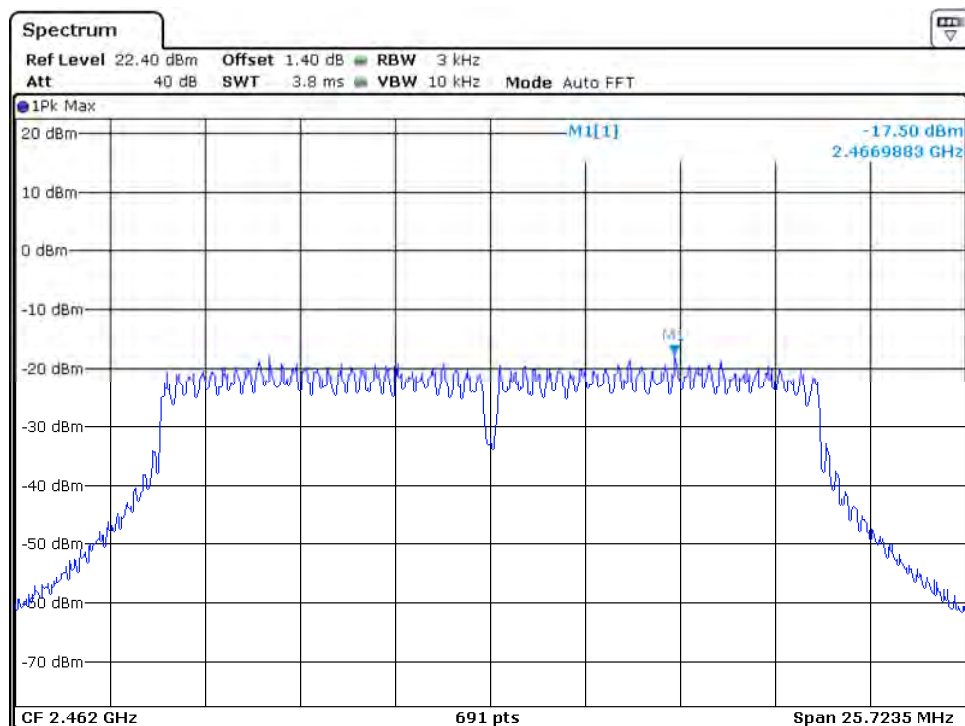
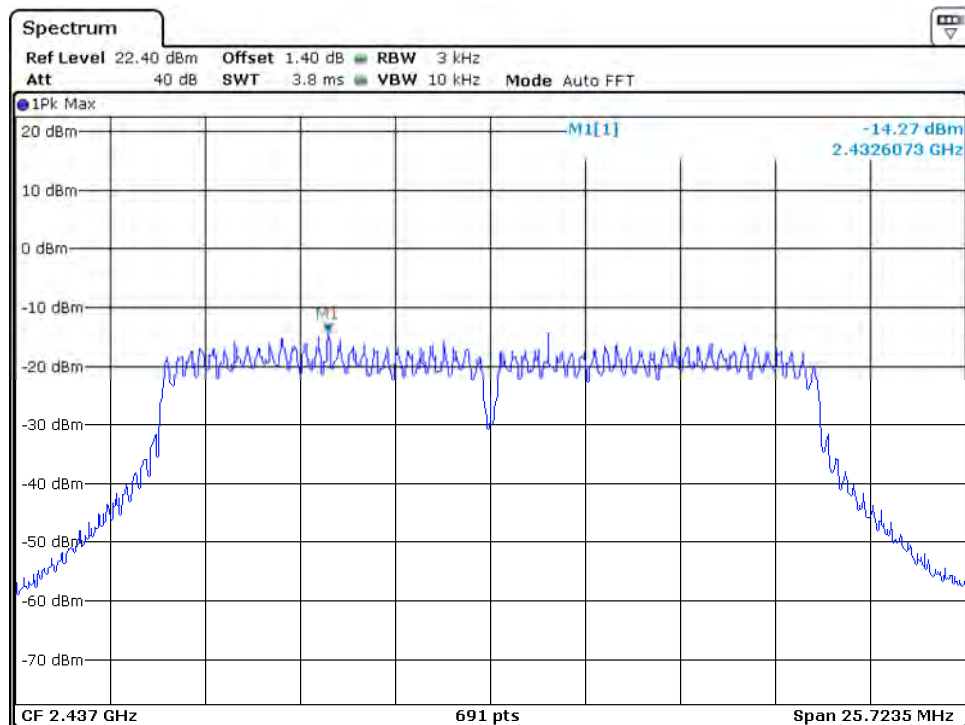
802.11n-HT40



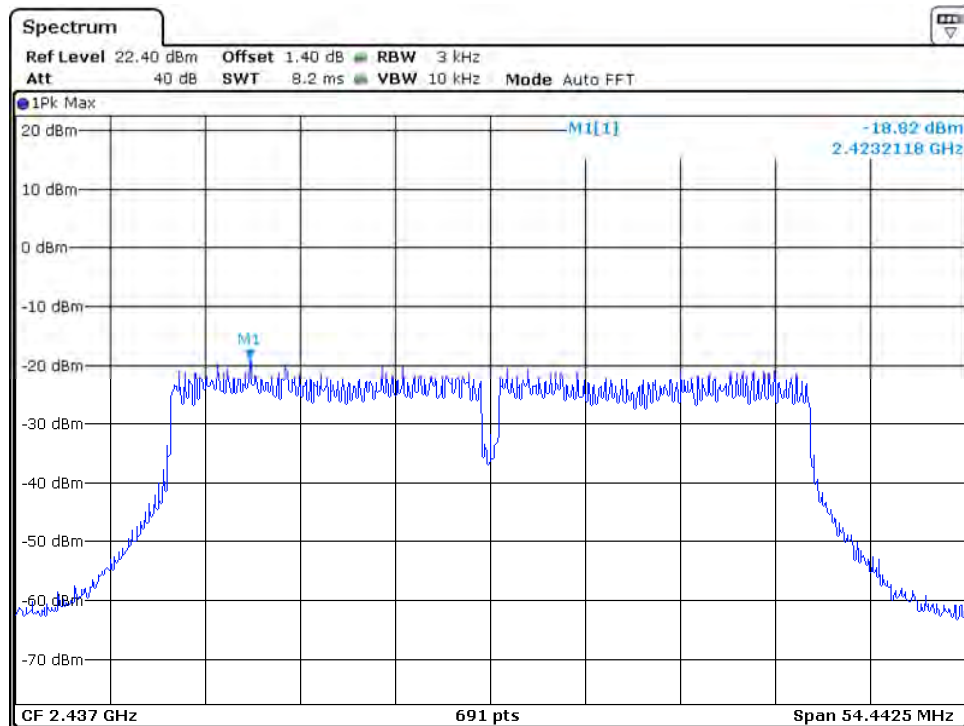
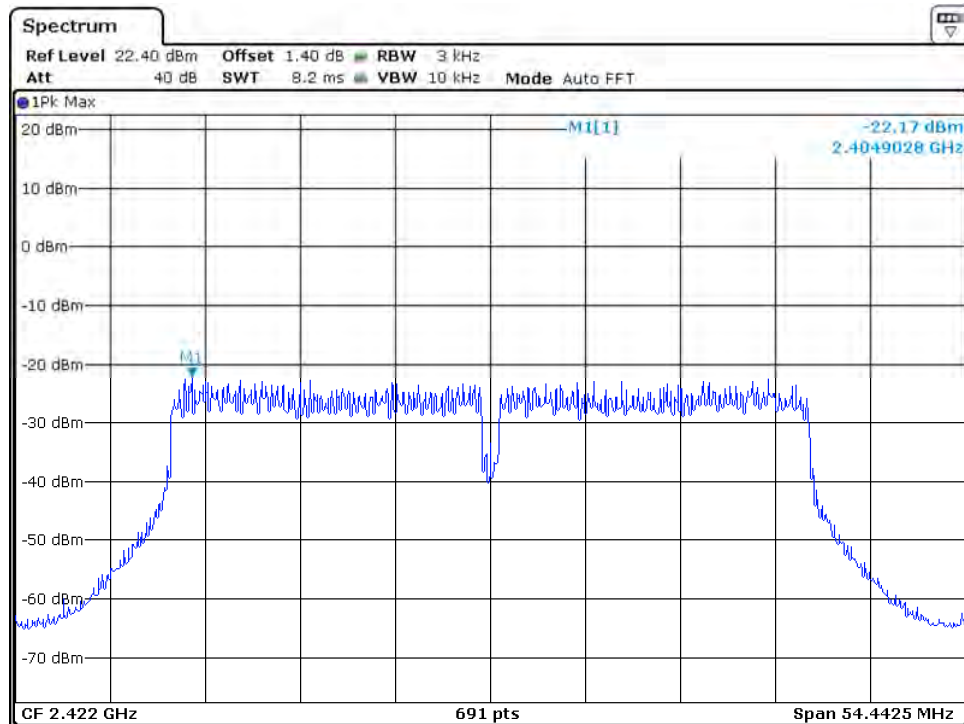


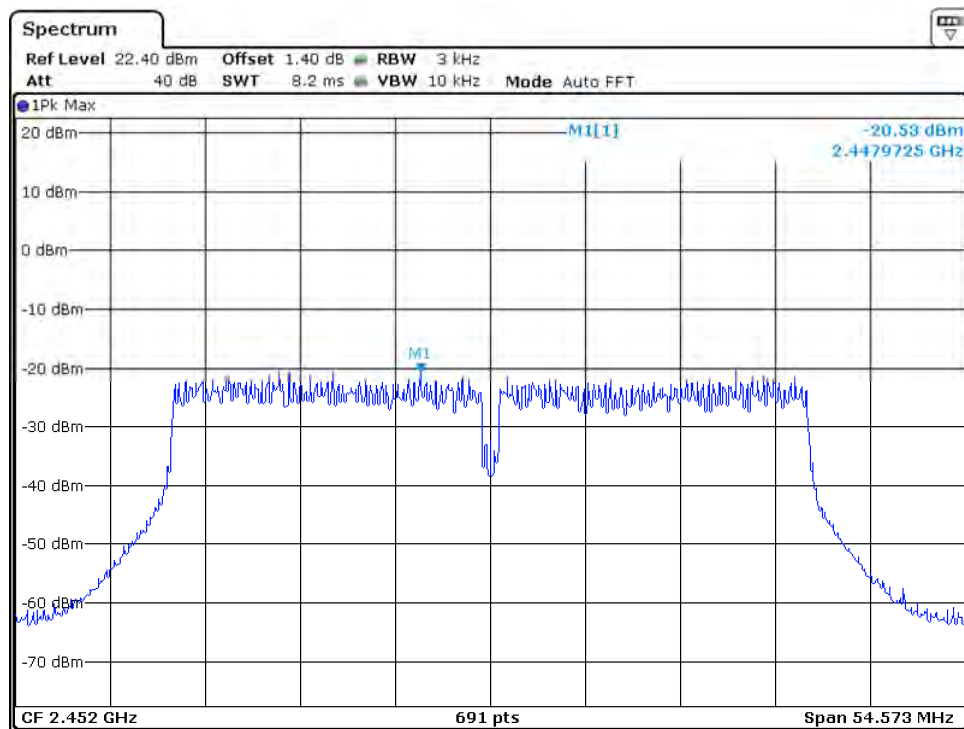
MIMO Mode, Ant1:
802.11n-HT20



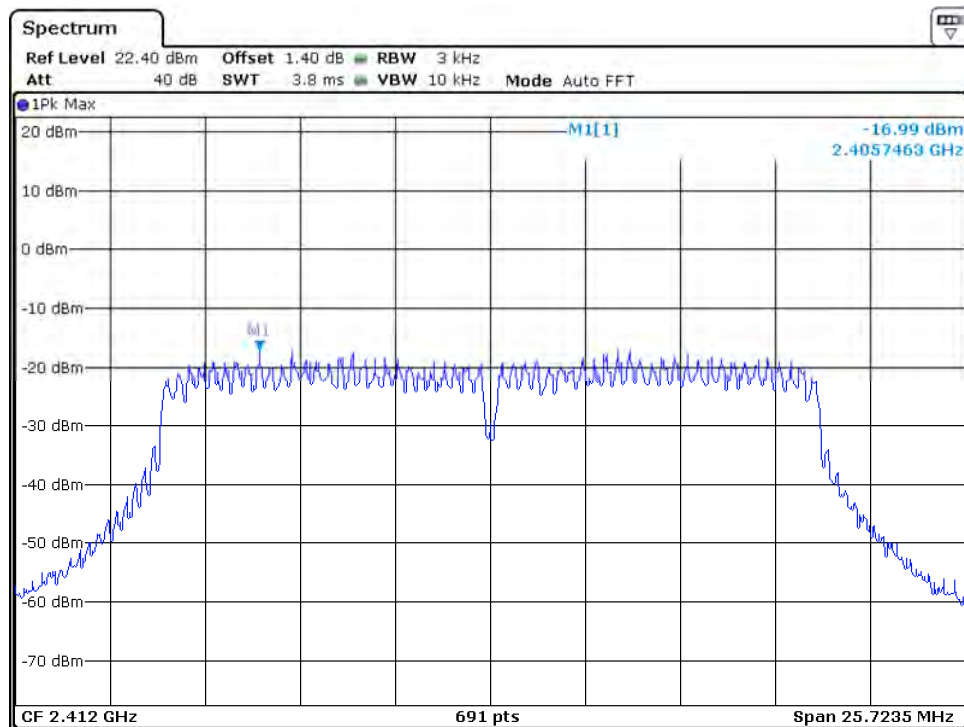


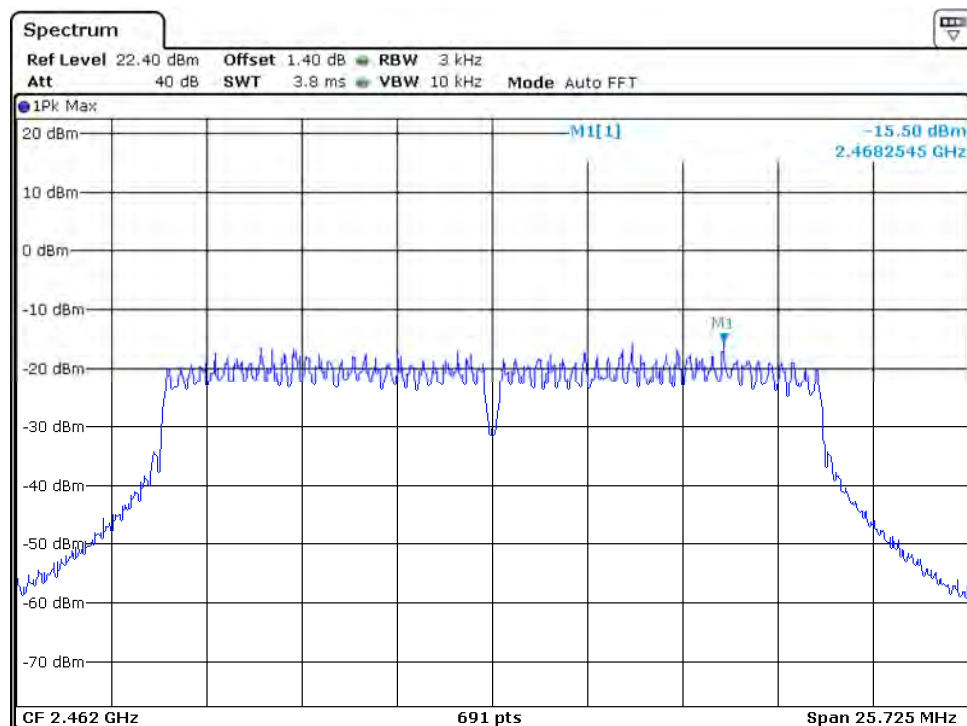
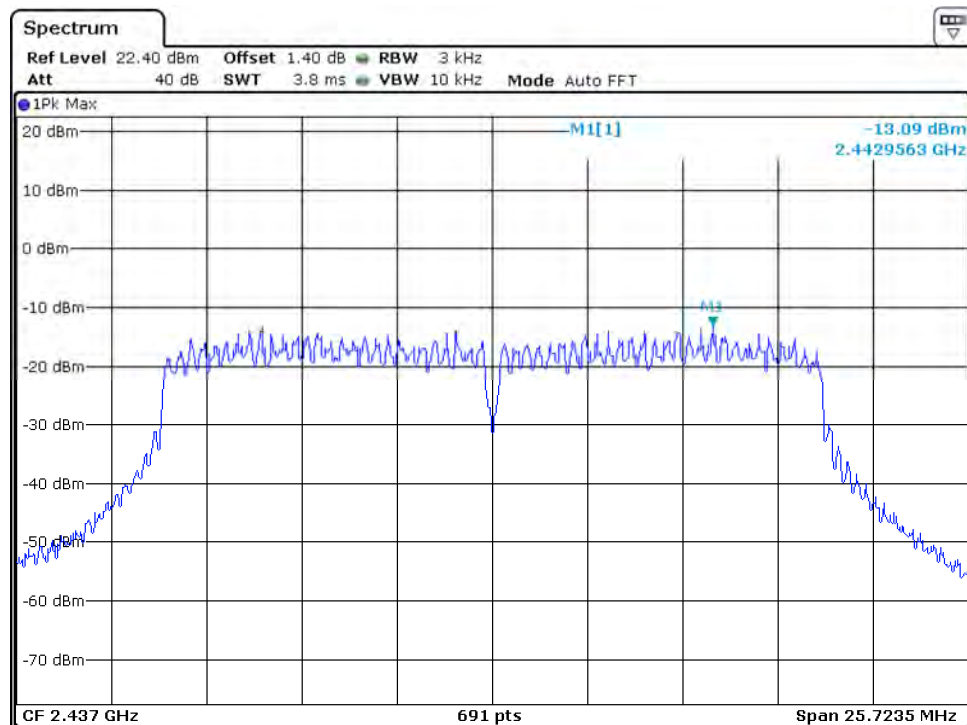
802.11n-HT40



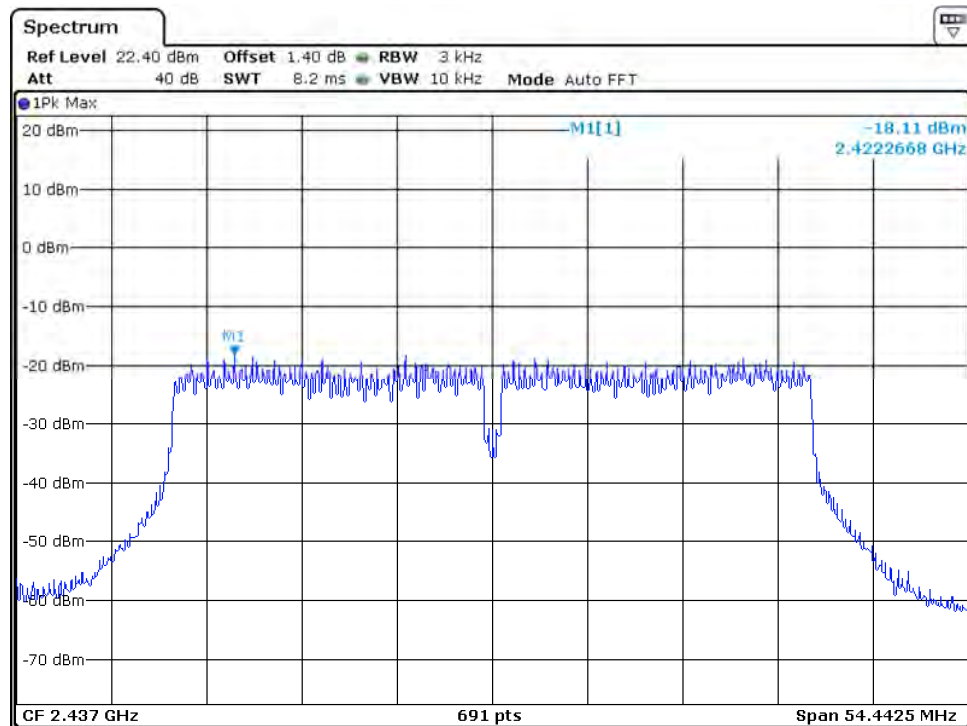
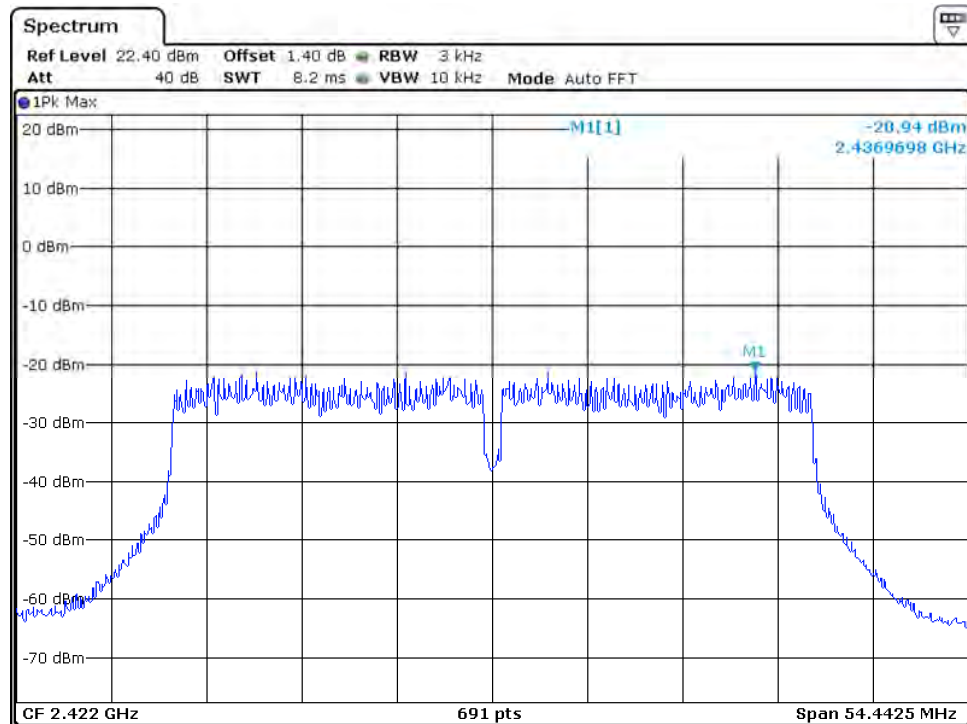


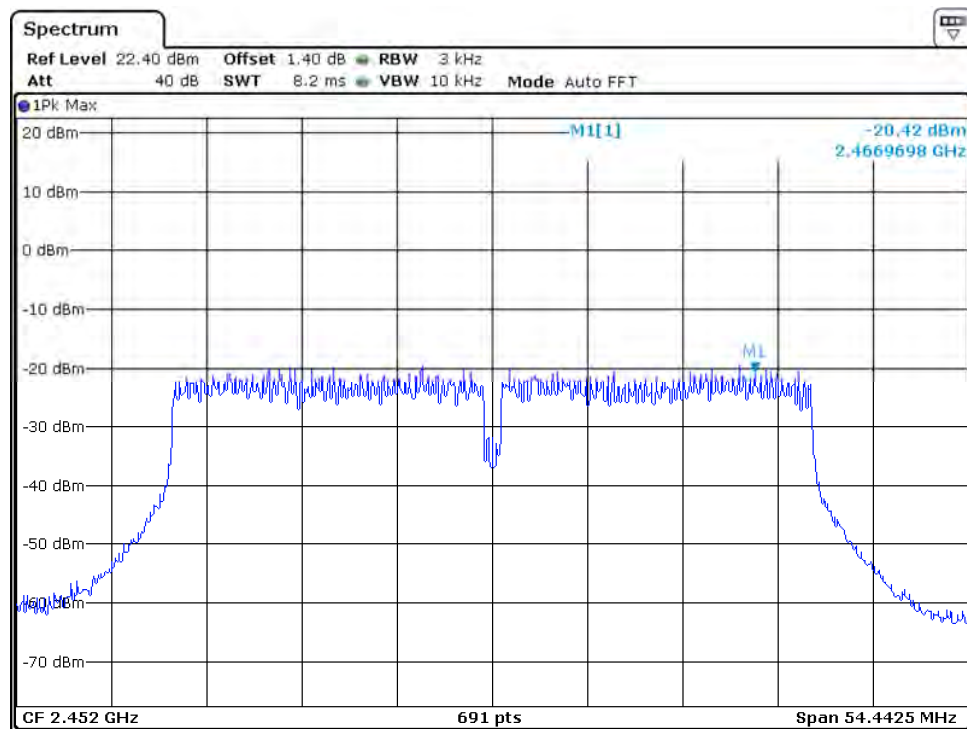
MIMO Mode, Ant2:
802.11n-HT20





802.11n-HT40





Applicant: Huawei Technologies Co., Ltd.

Date of Test: March 5, 2019

Model: X22C

4.4 Out of Band Conducted Emissions, FCC Rule 15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. The Measurement Procedure was set according to the FCC KDB 558074 D01 v05r01.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

Refer to the attached test plots for out of band conducted emissions data.

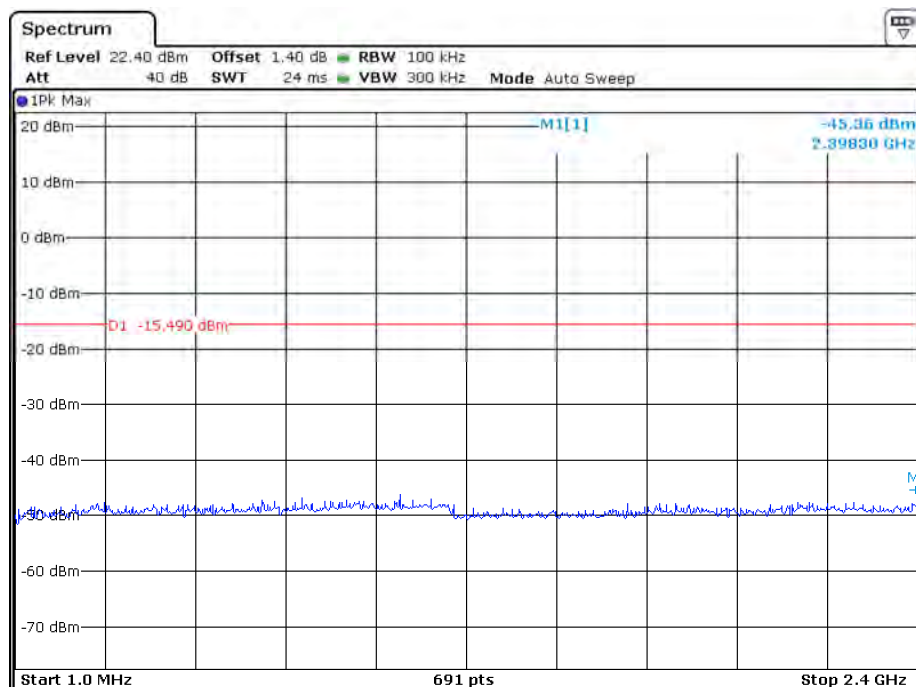
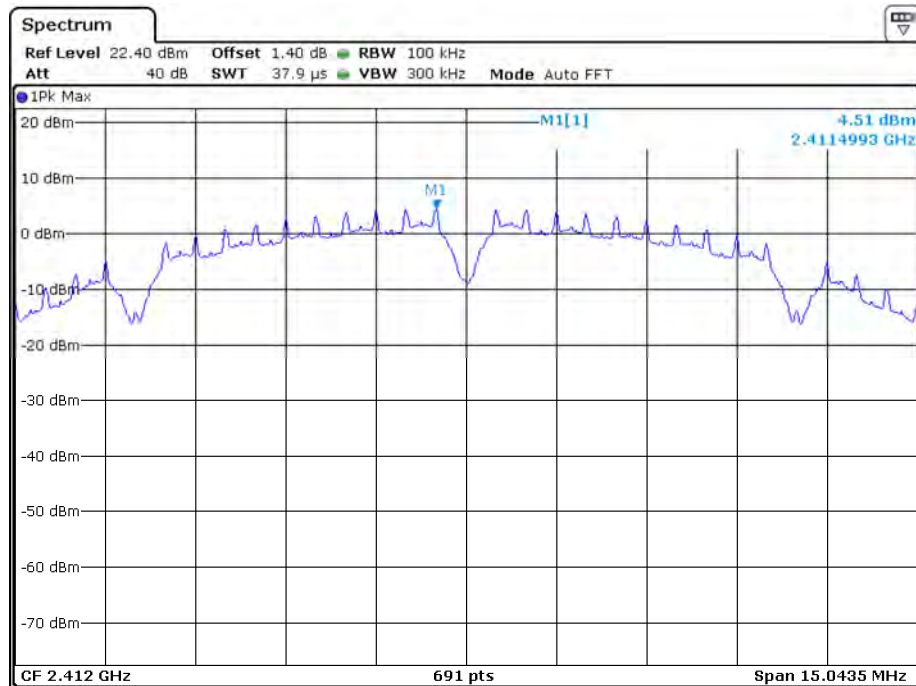
The test plots showed all spurious emission up to the tenth harmonic were measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.

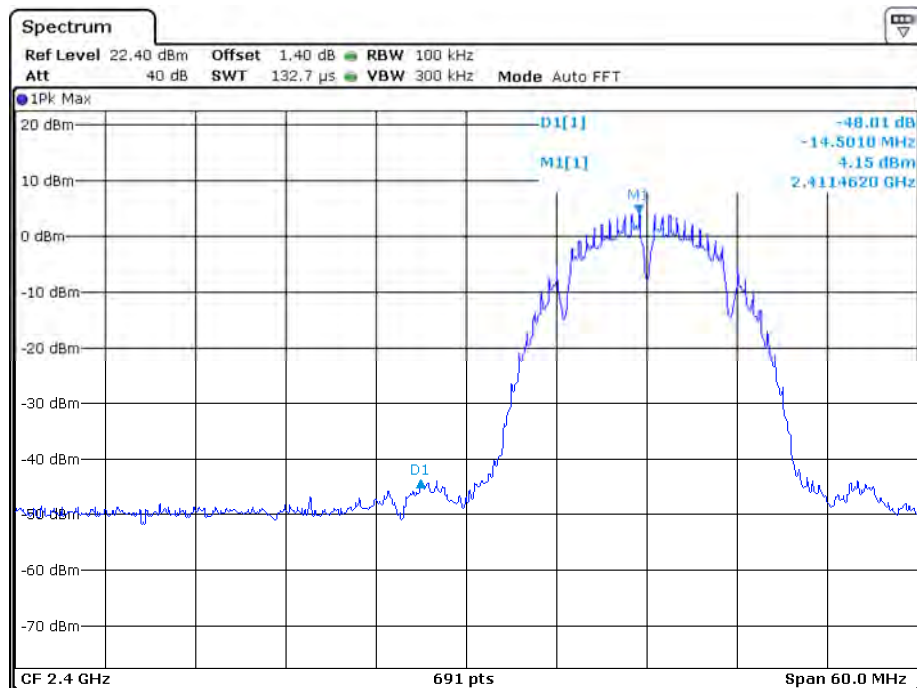
The test plots are attached as below.

SISO Mode, Ant1:

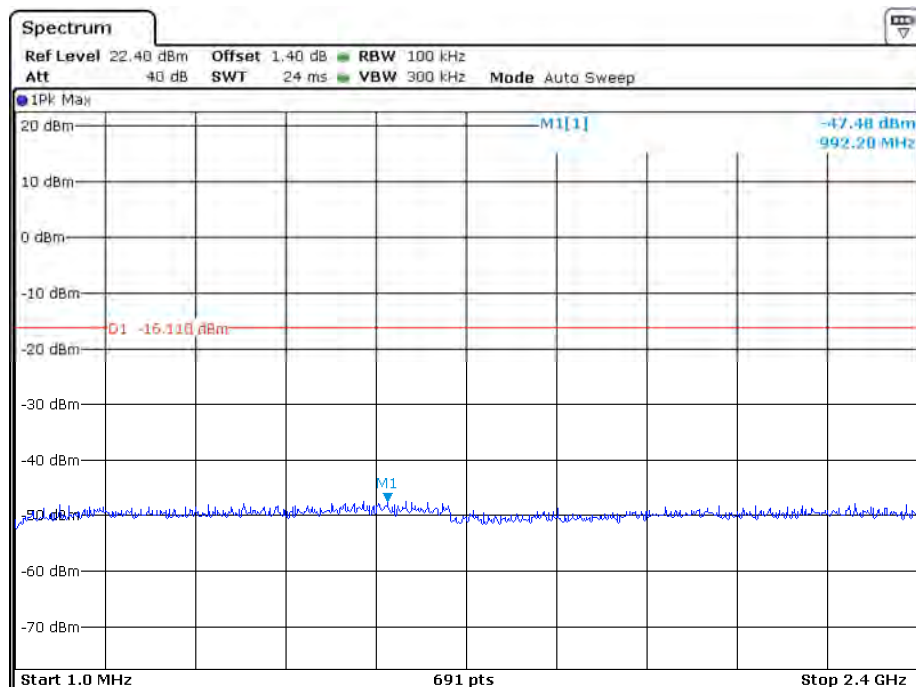
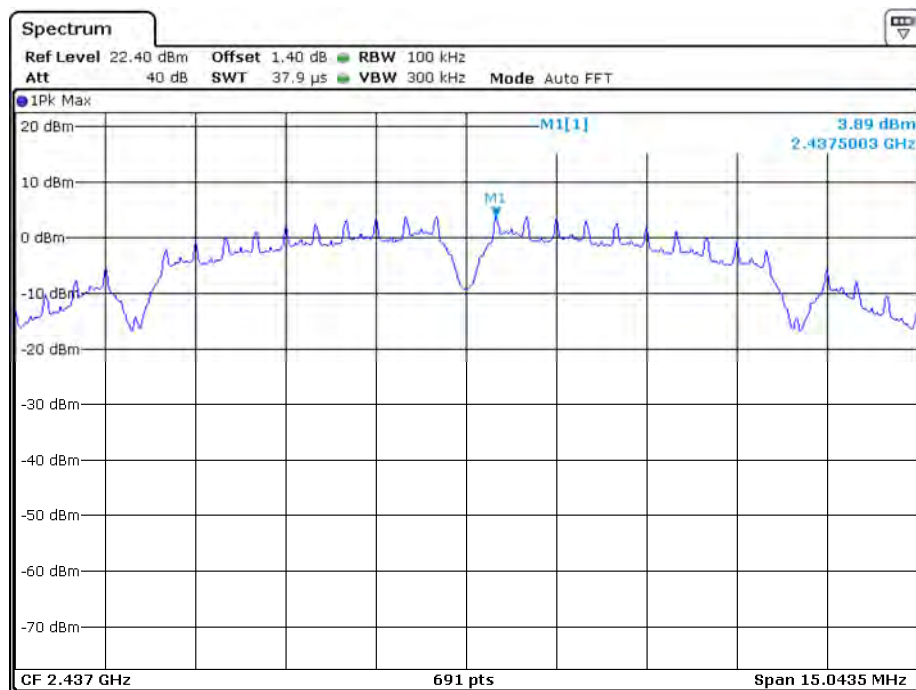
802.11b:

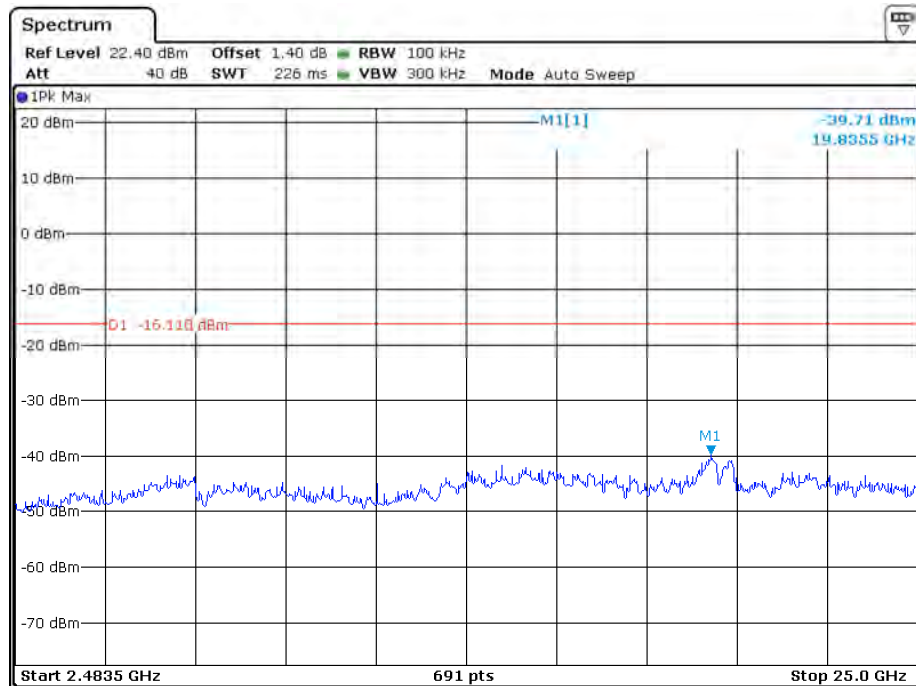
Channel 01 (2412MHz) Reference Level: 4.51dBm



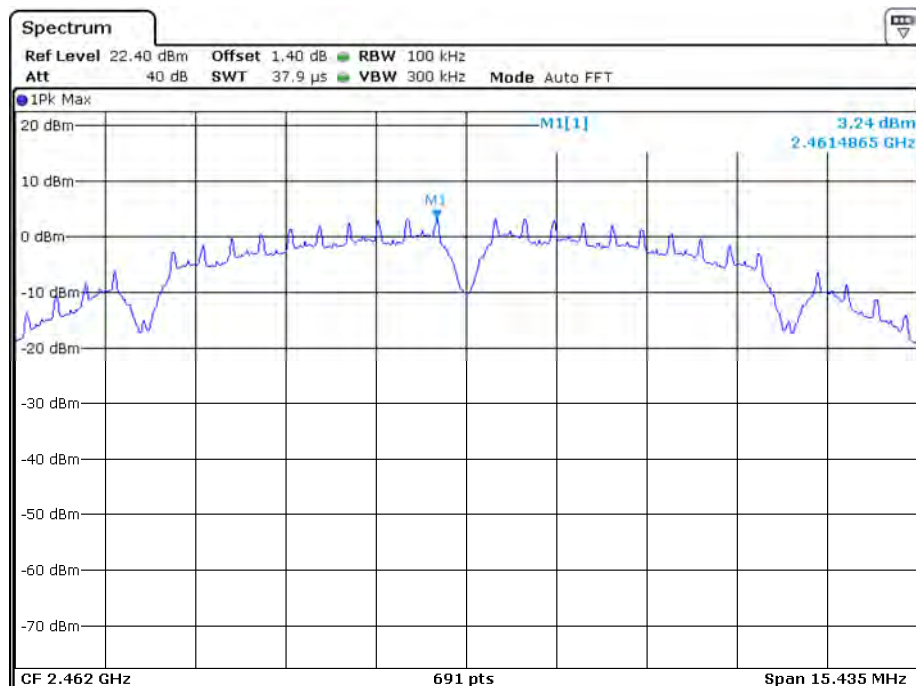


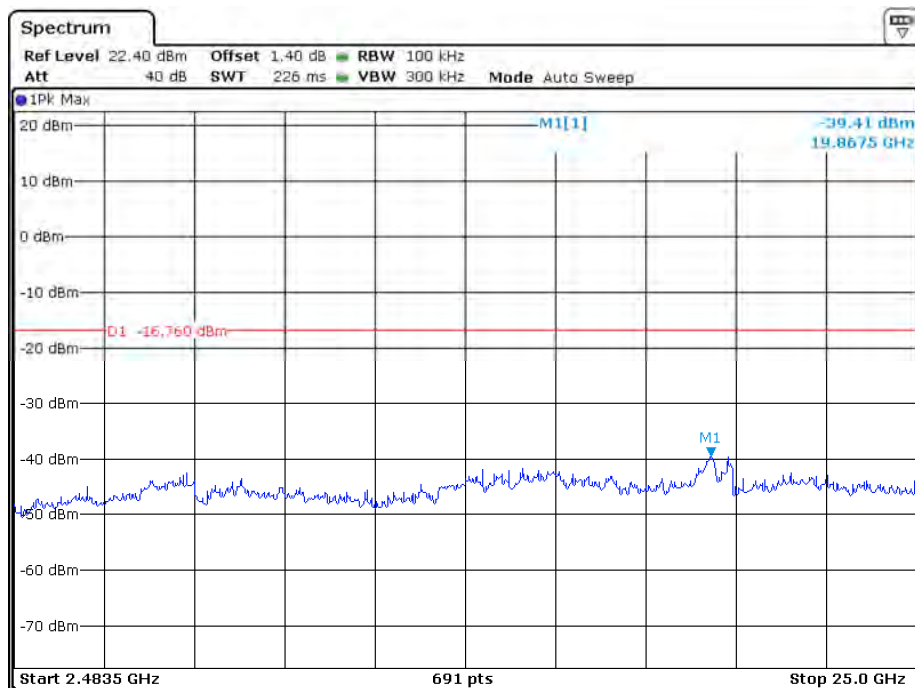
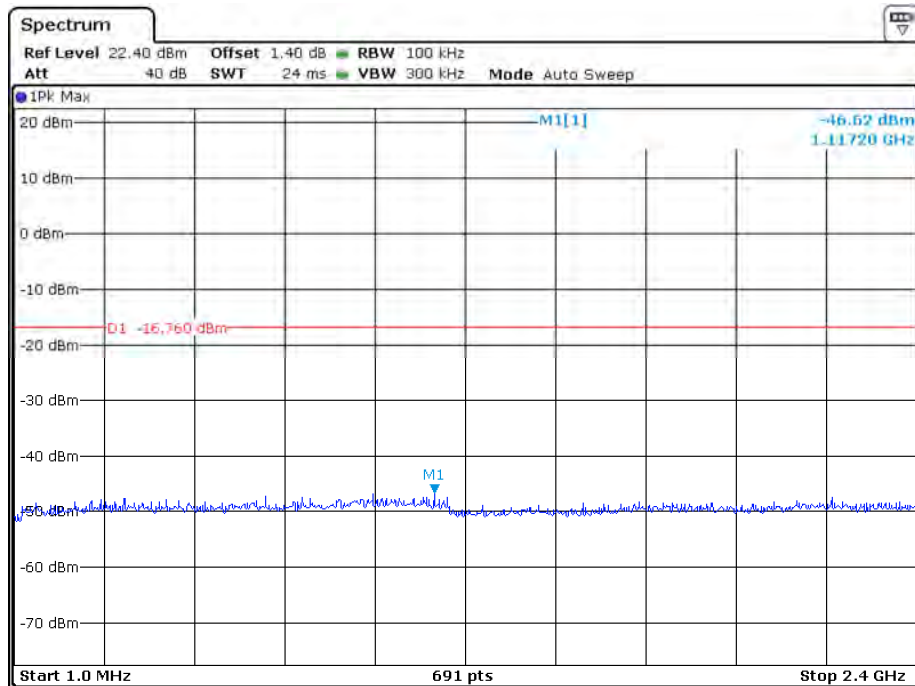
Channel 06 (2437MHz) Reference Level: 3.89dBm

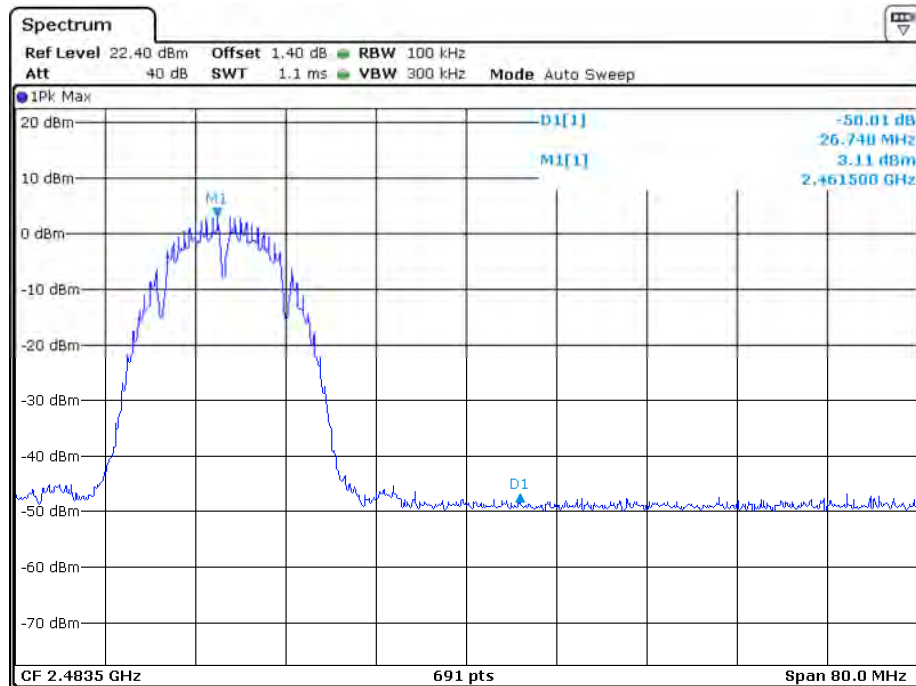




Channel 11 (2462MHz) Reference Level: 3.24dBm

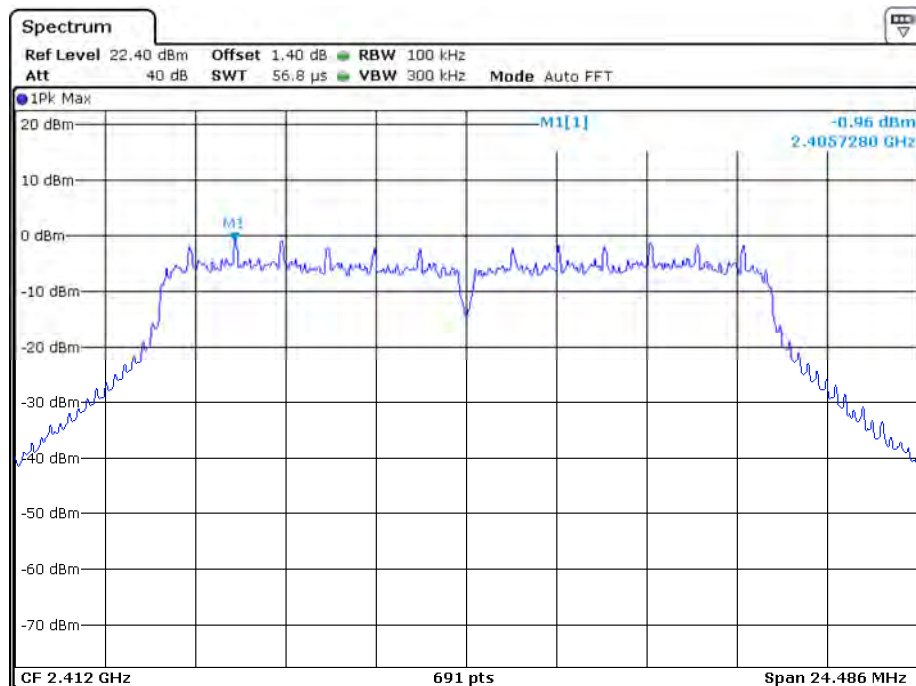


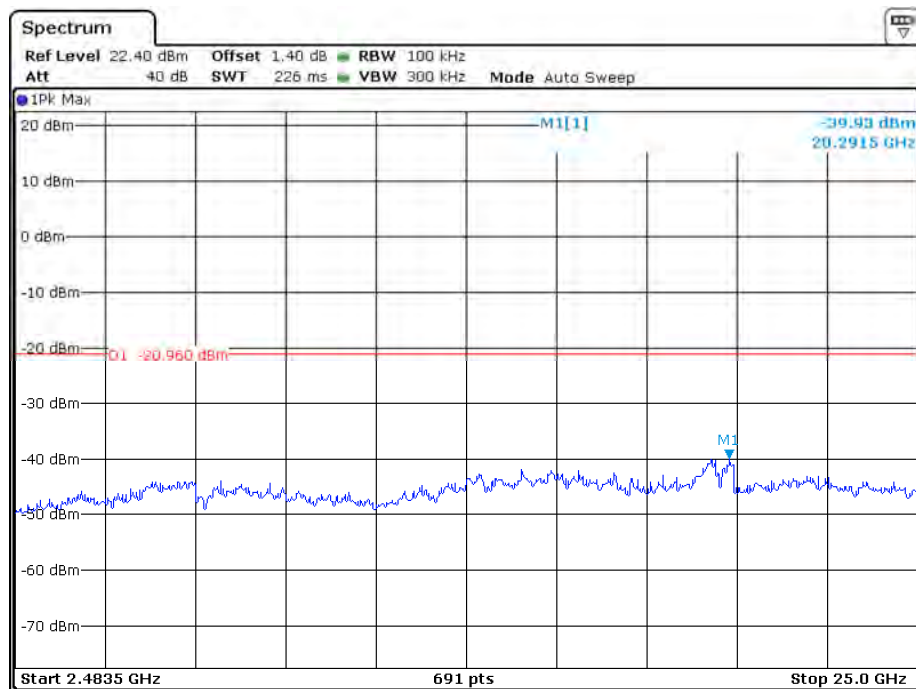
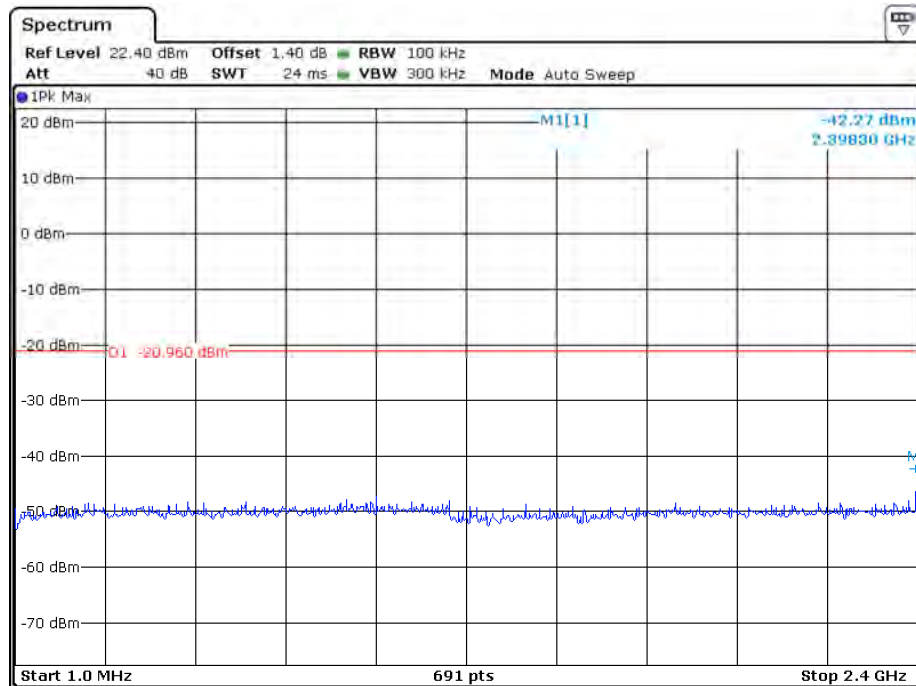


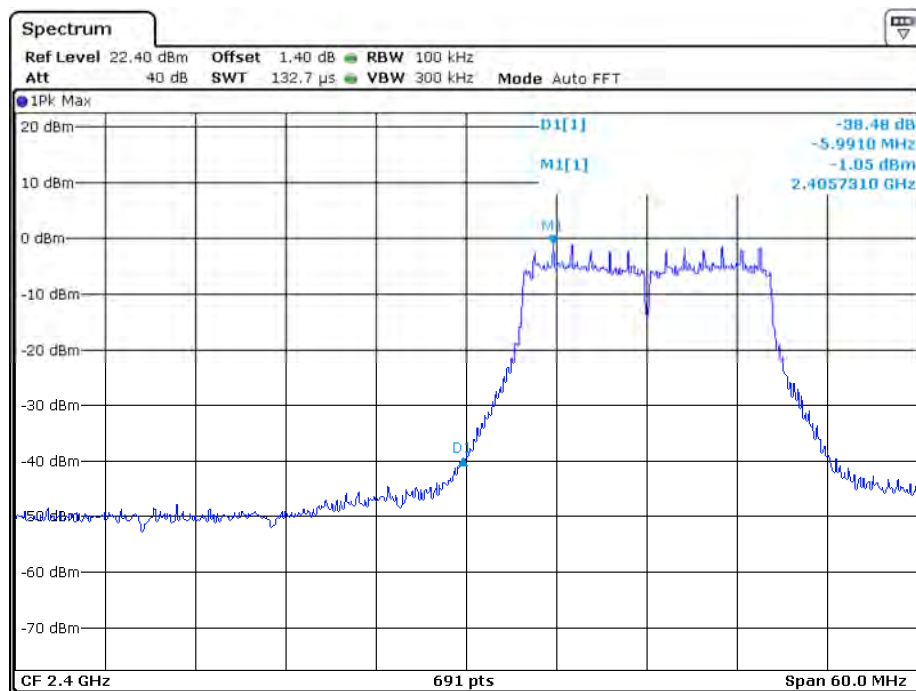


802.11g

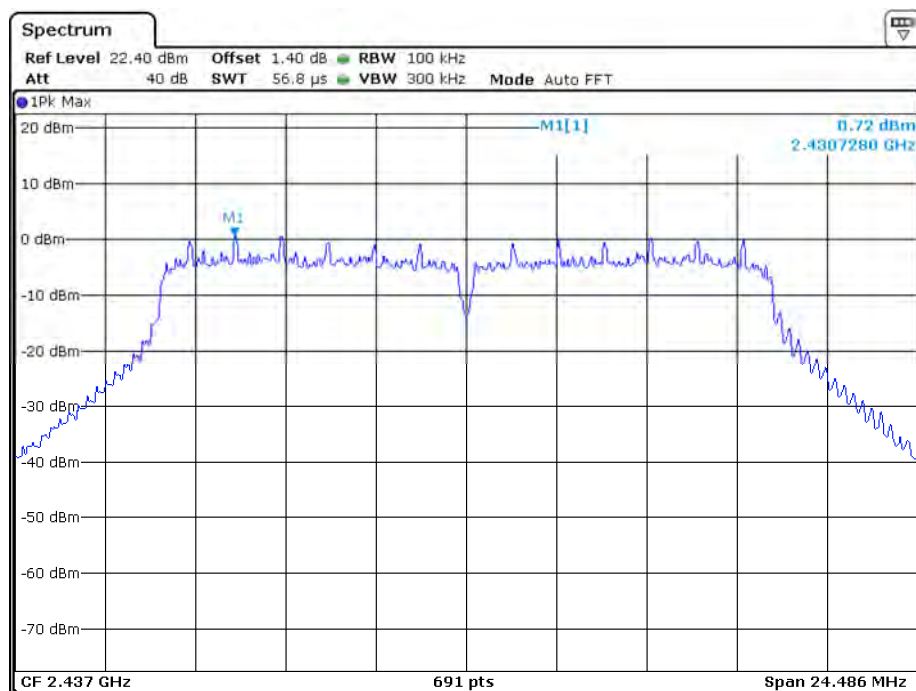
Channel 01 (2412MHz) Reference Level: -0.96dBm

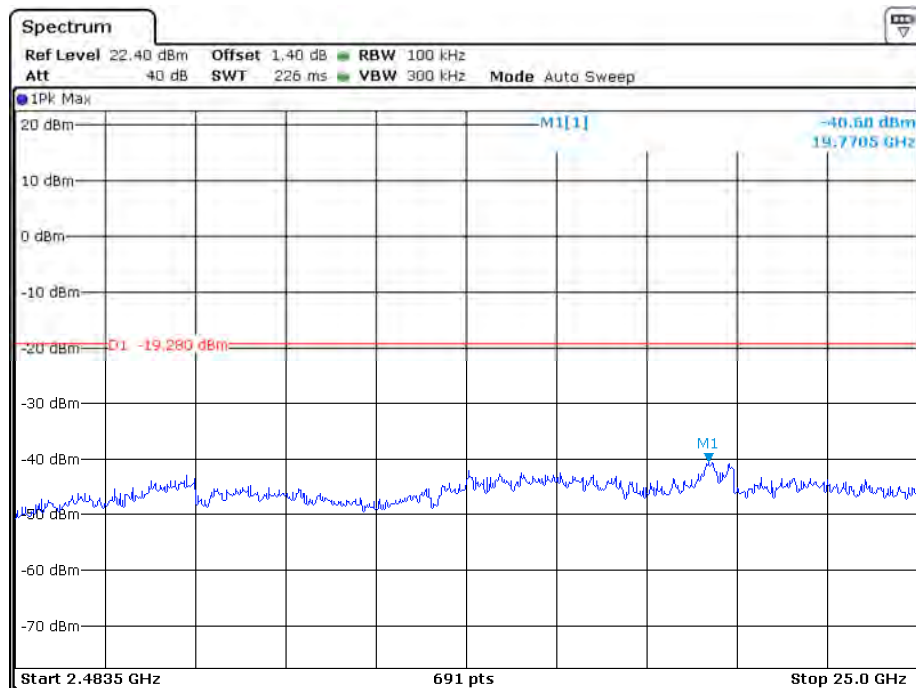
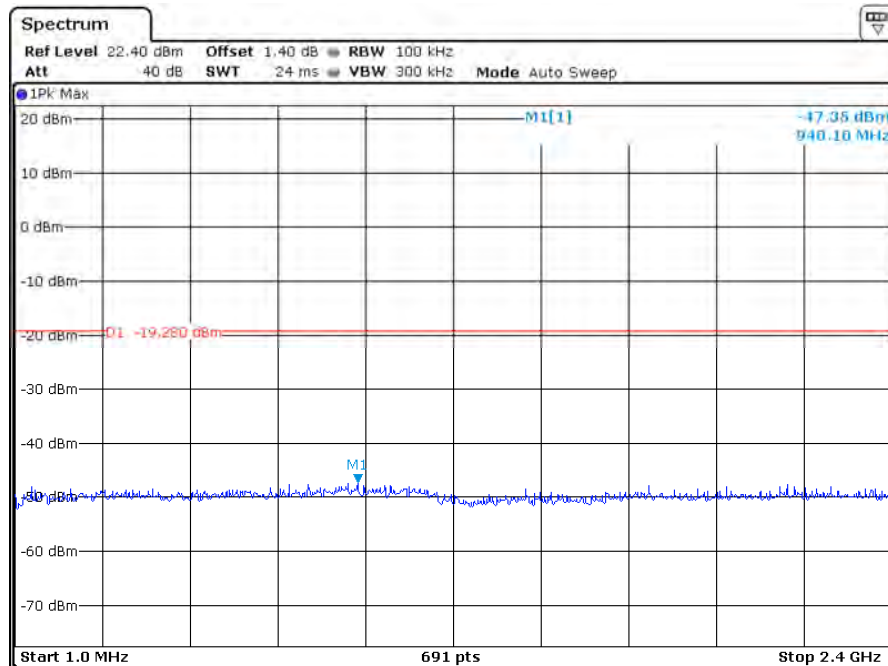




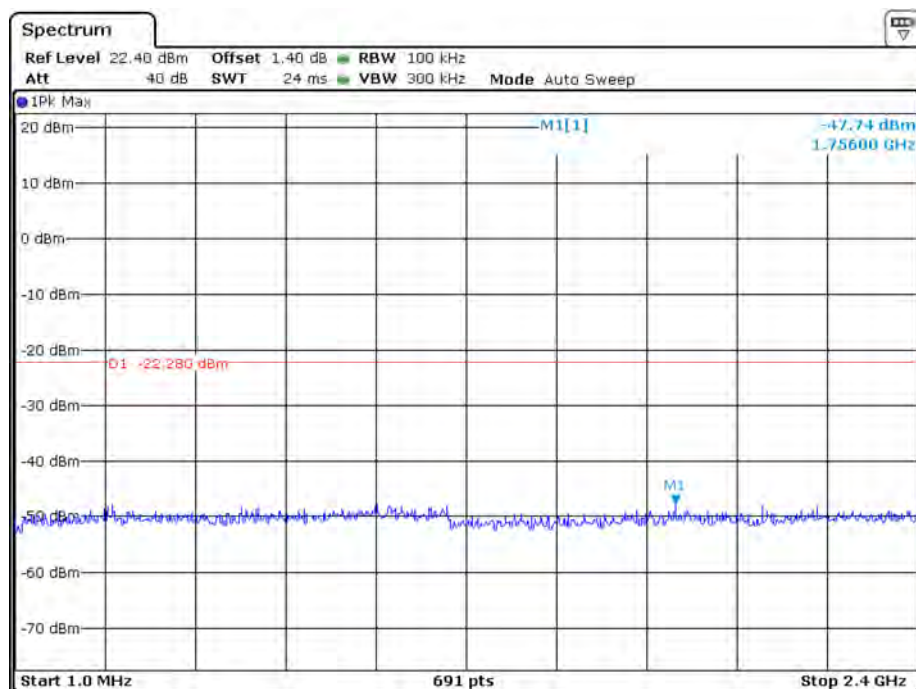
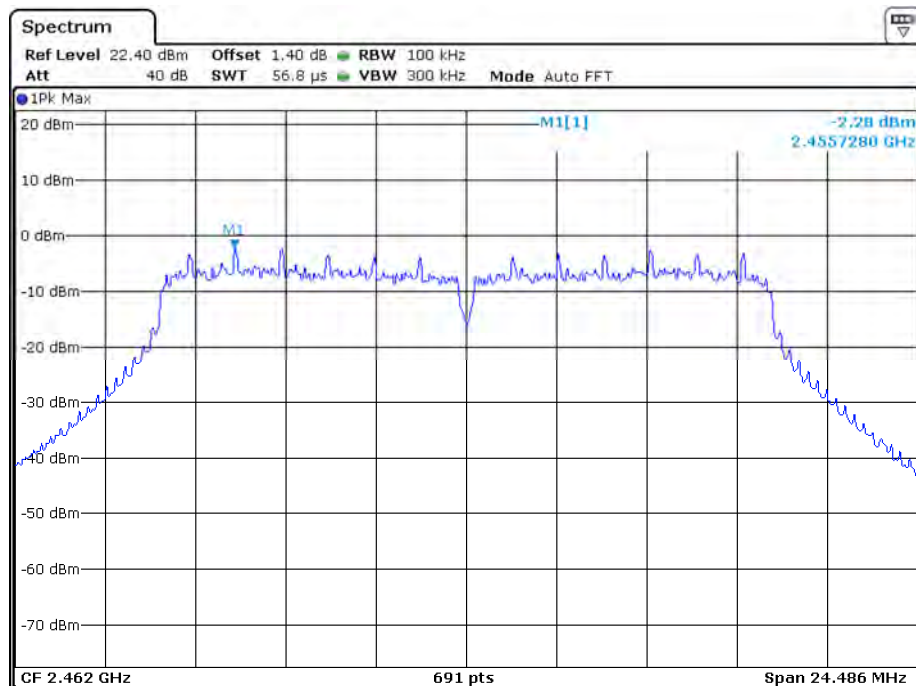


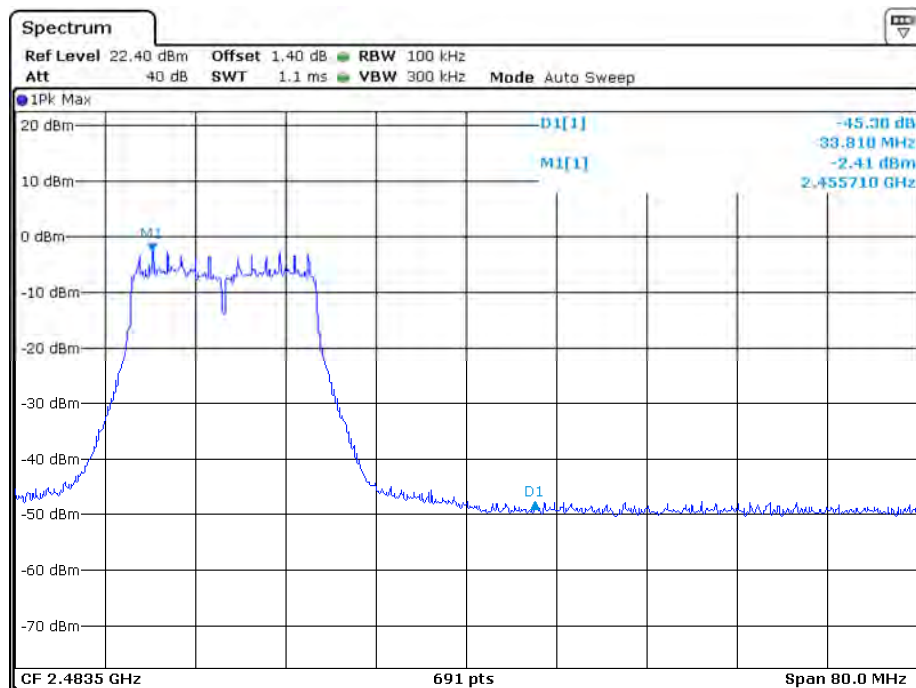
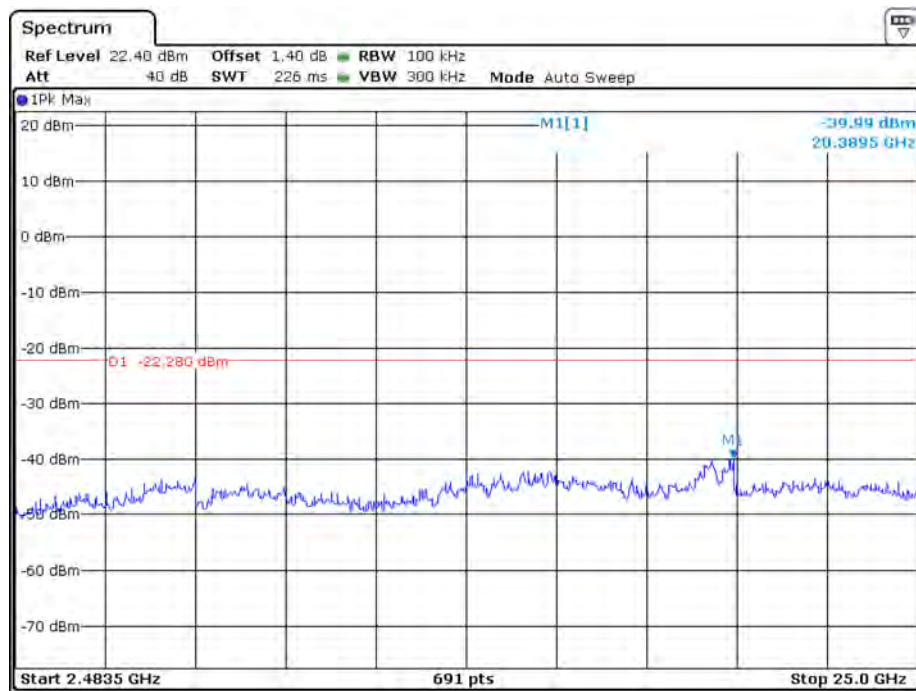
Channel 06 (2437MHz) Reference Level: 0.72dBm





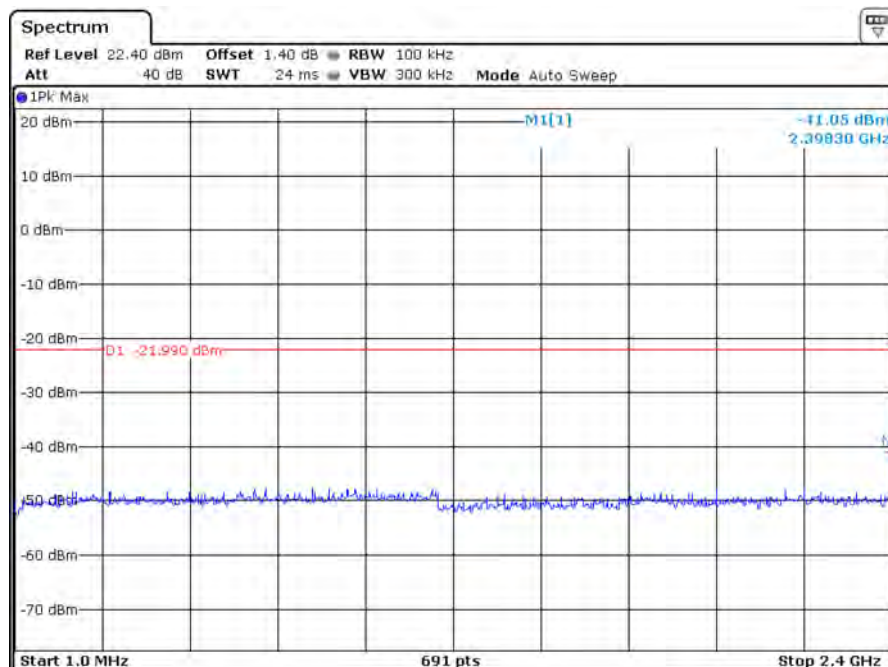
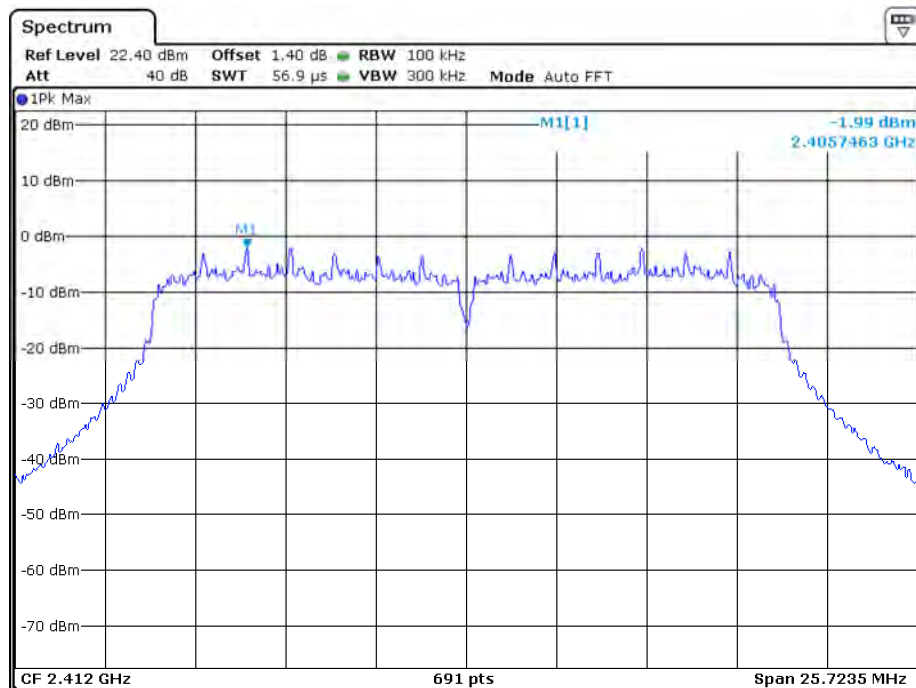
Channel 11 (2462MHz) Reference Level: -2.28dBm

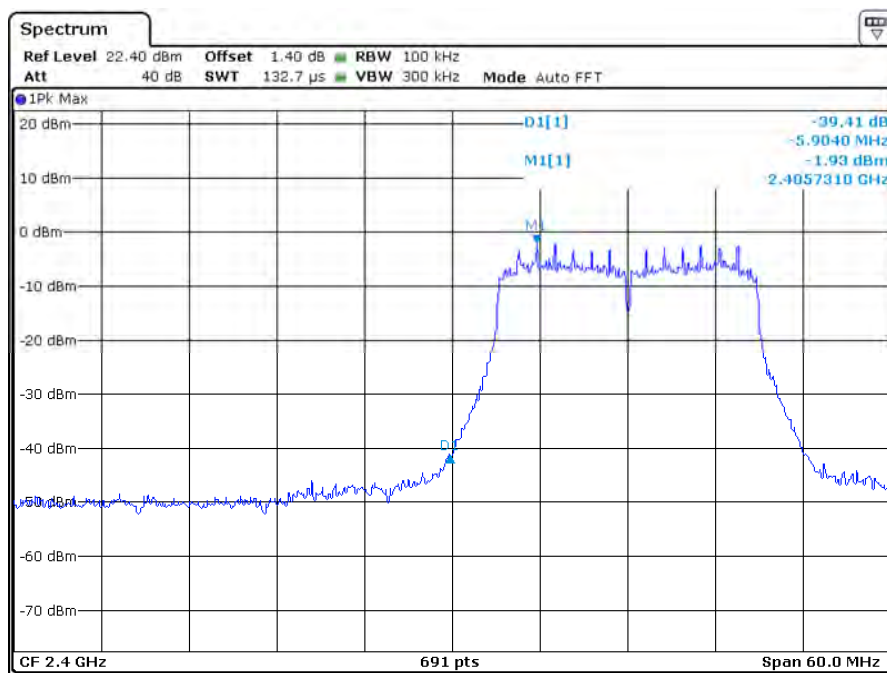
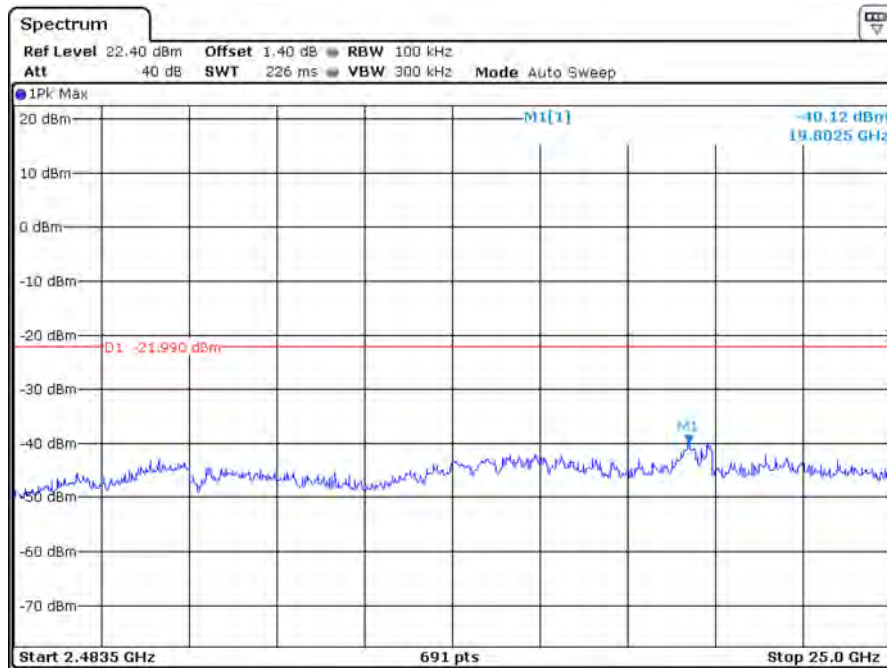




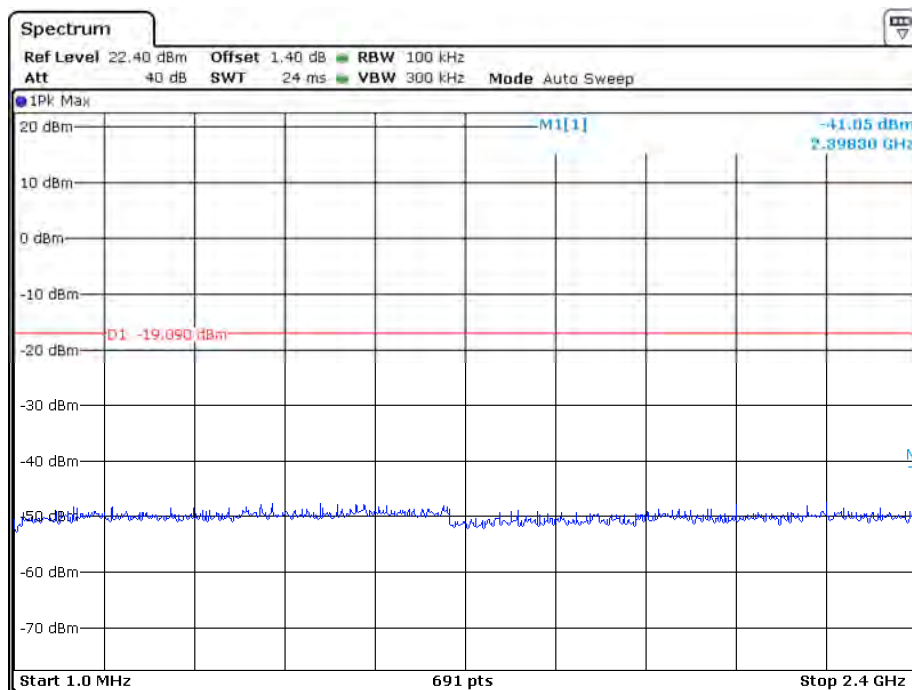
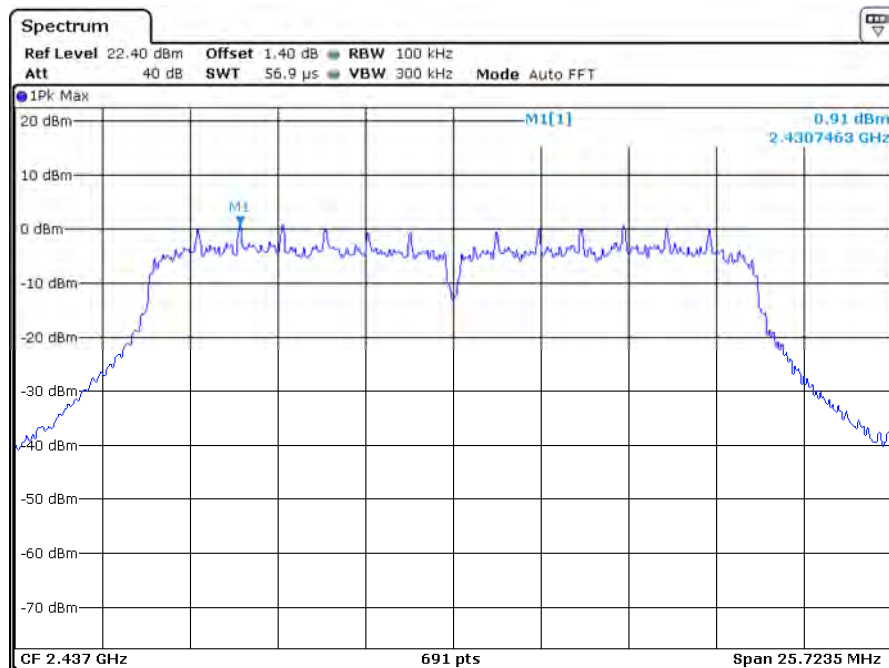
802.11n-HT20

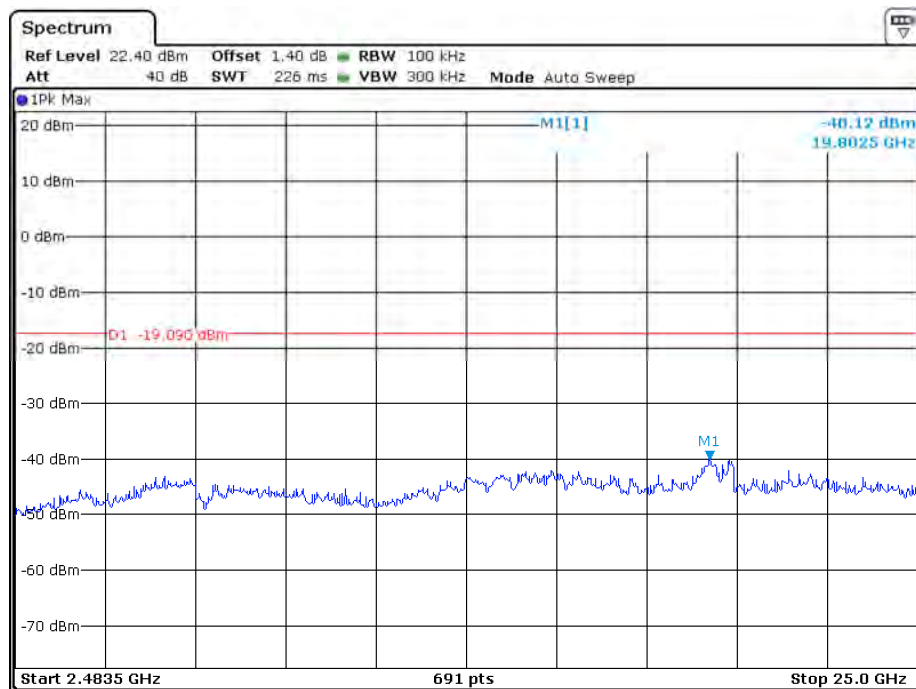
Channel 01 (2412MHz) Reference Level: -1.99dBm



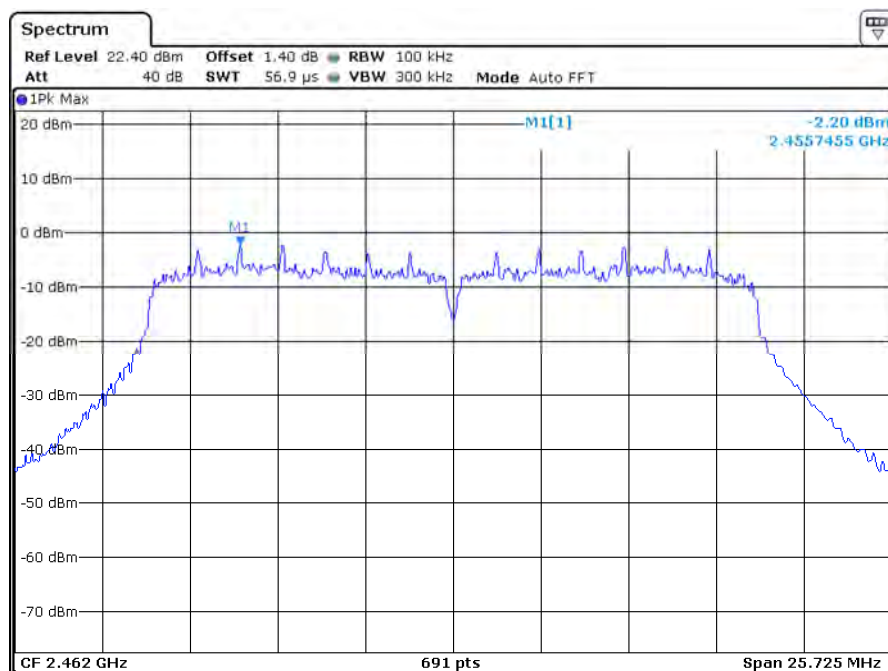


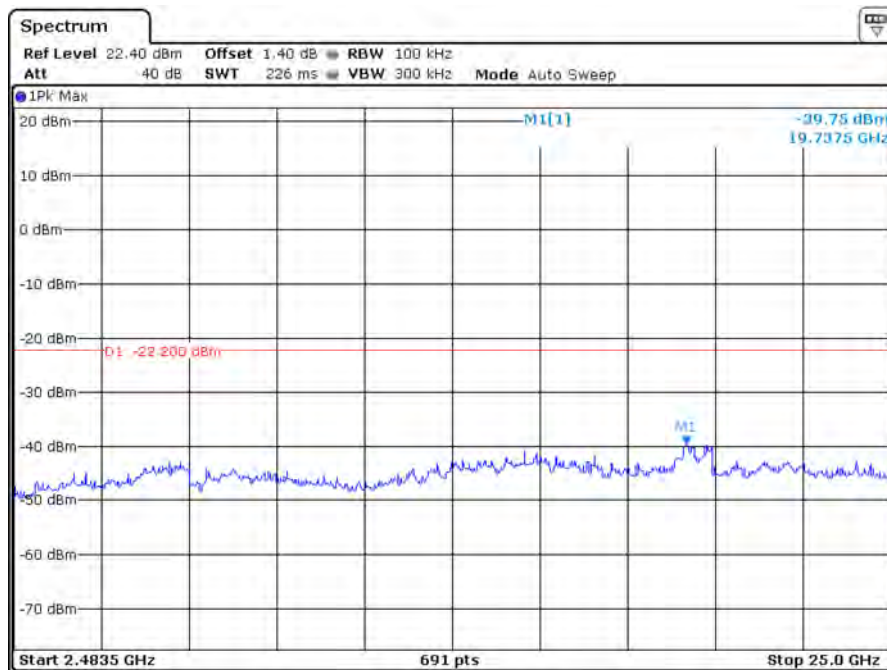
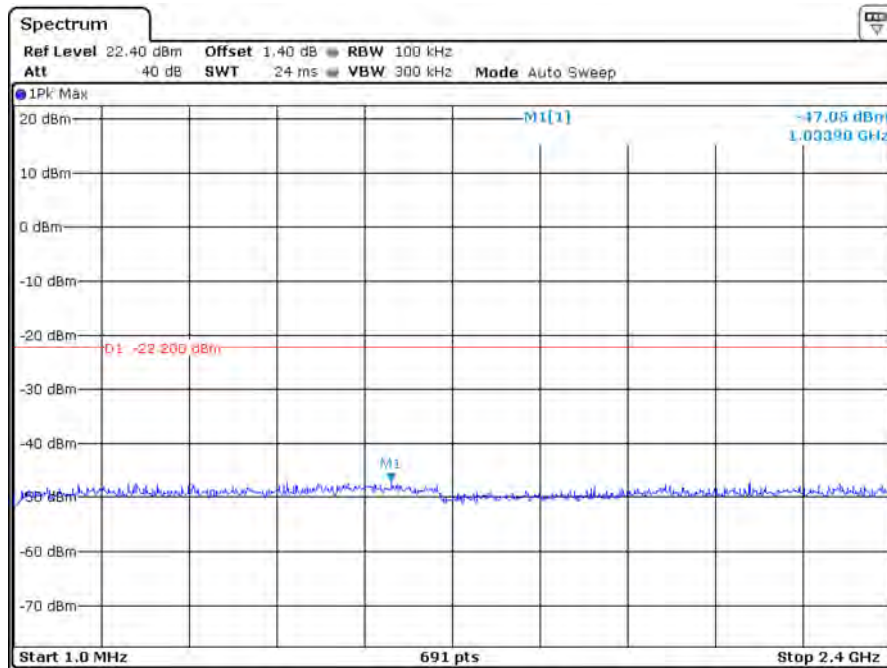
Channel 06 (2437MHz) Reference Level: 0.91dBm

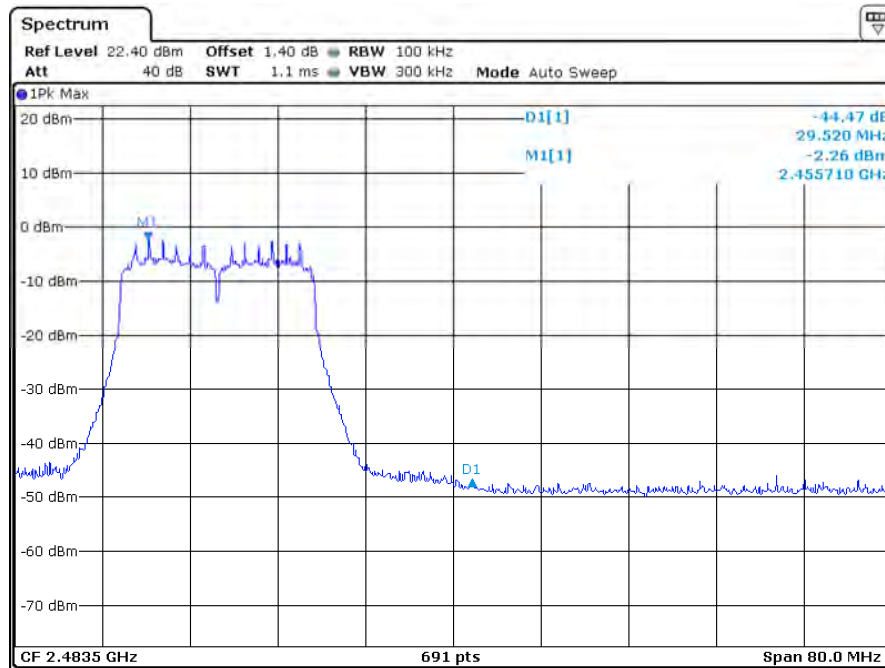




Channel 11 (2462MHz) Reference Level: -2.20dBm

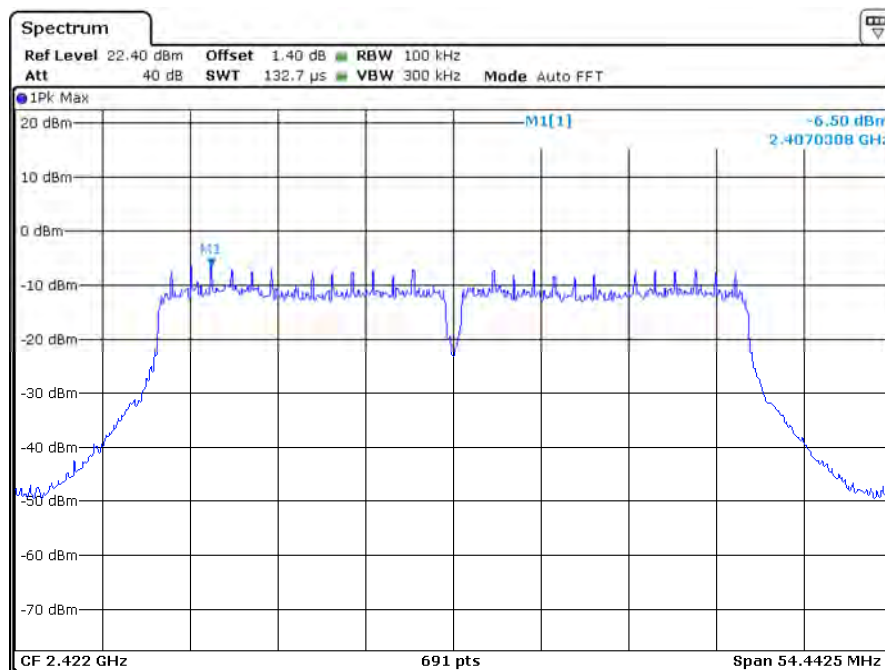


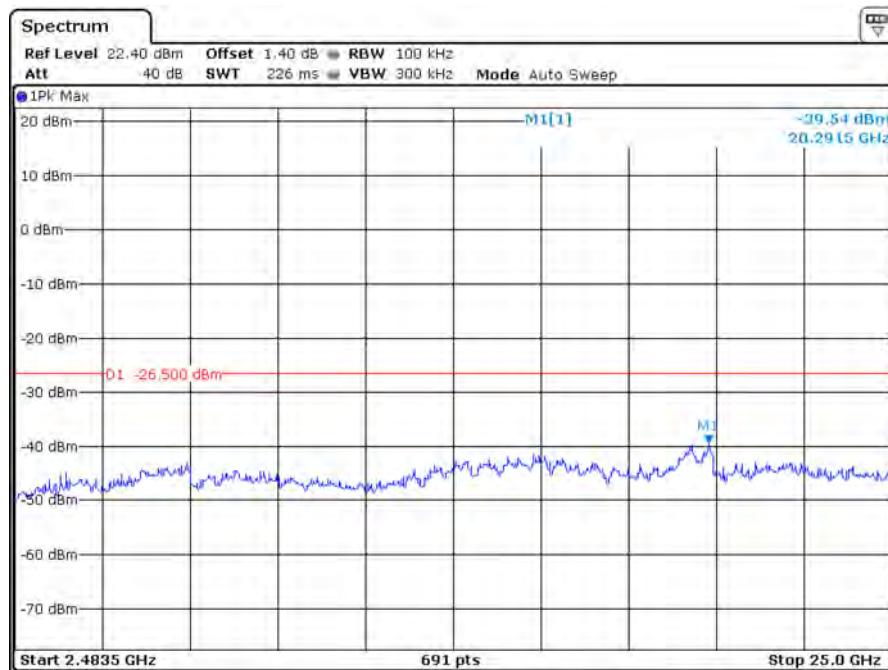
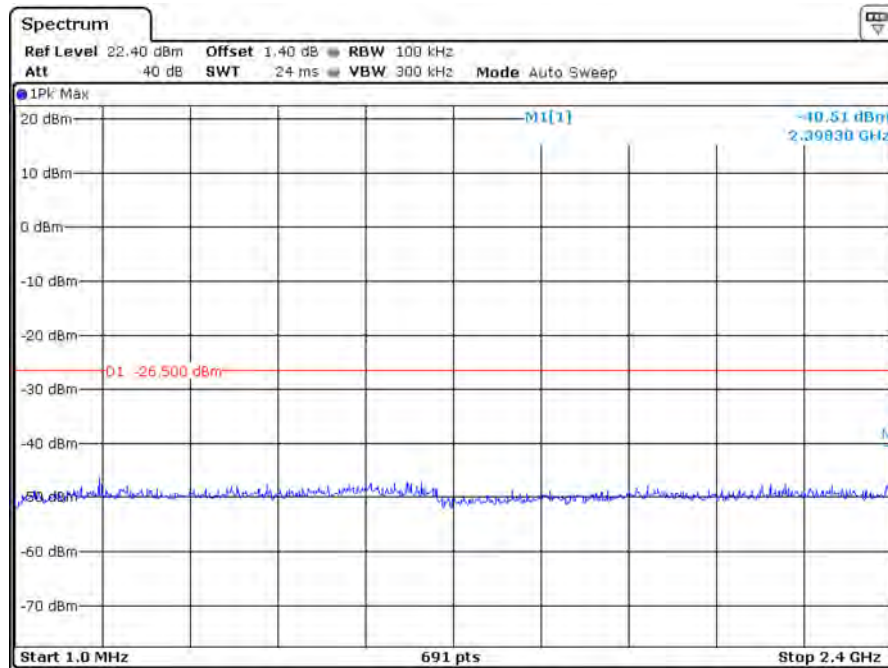


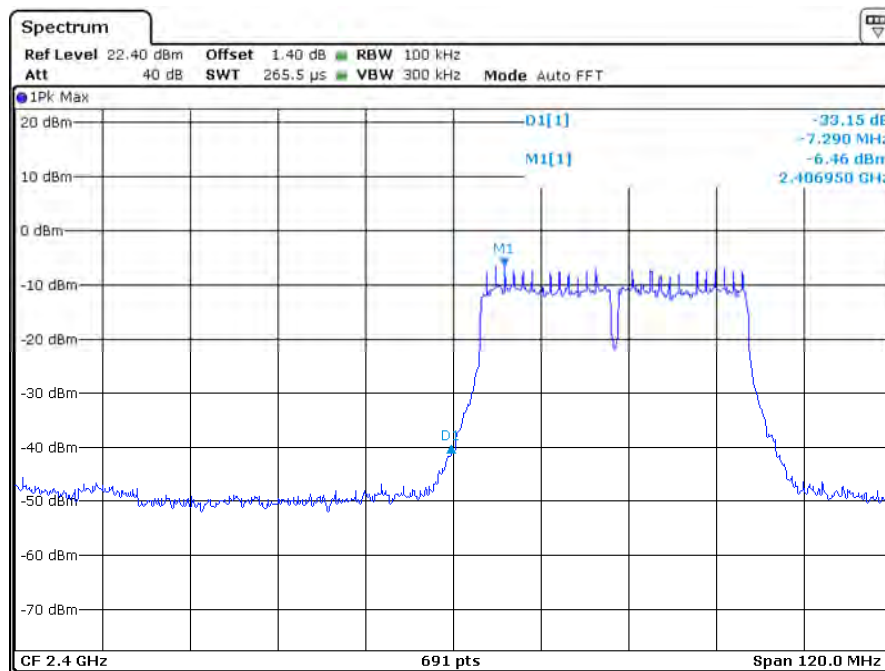


802.11n-HT40

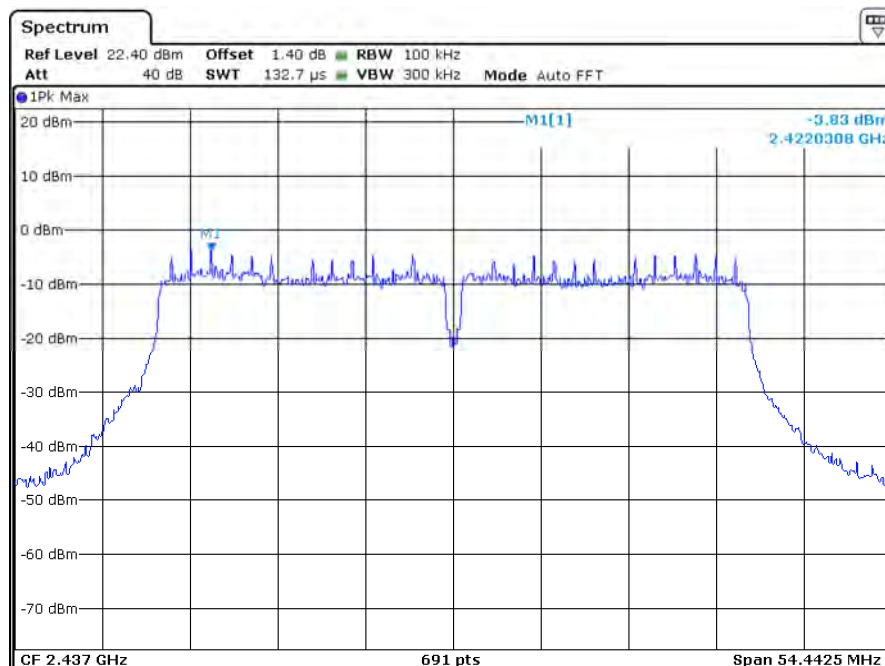
Channel 03 (2422MHz) Reference Level: -6.50dBm

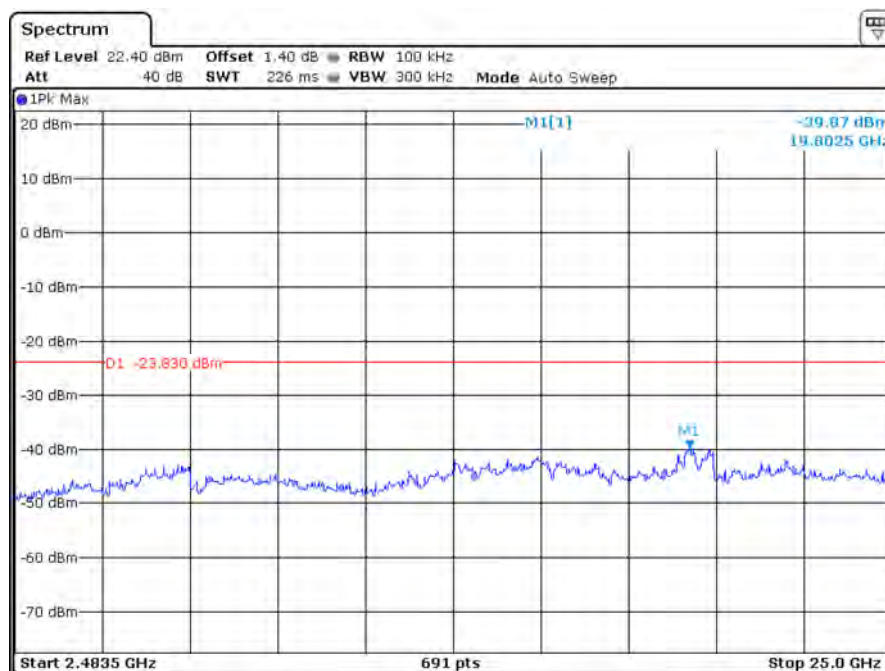
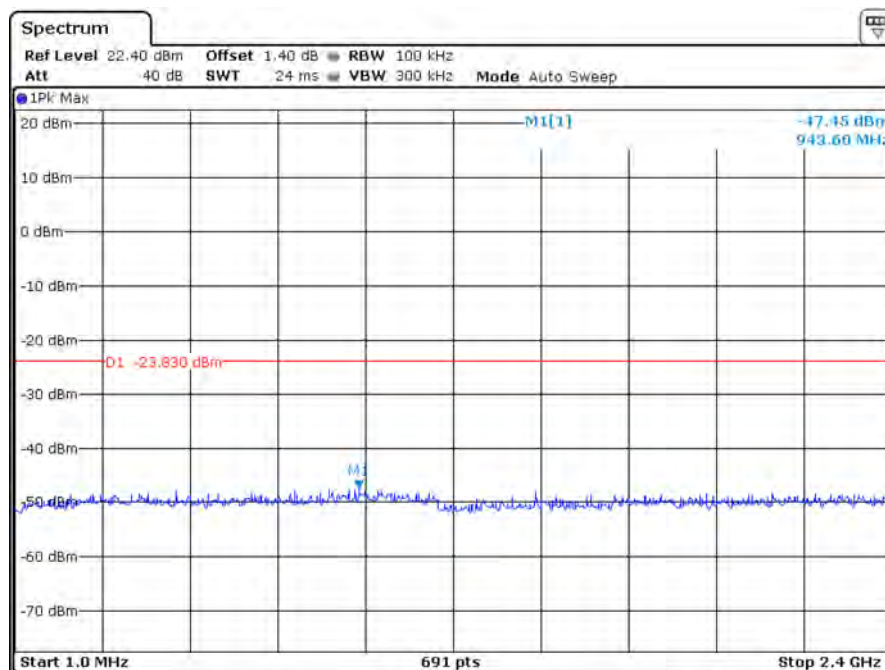




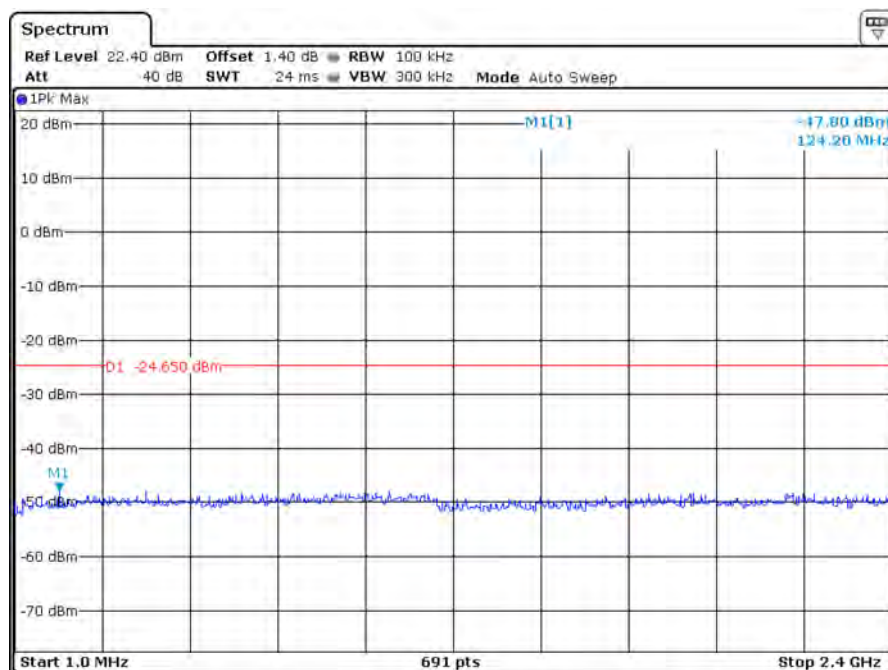
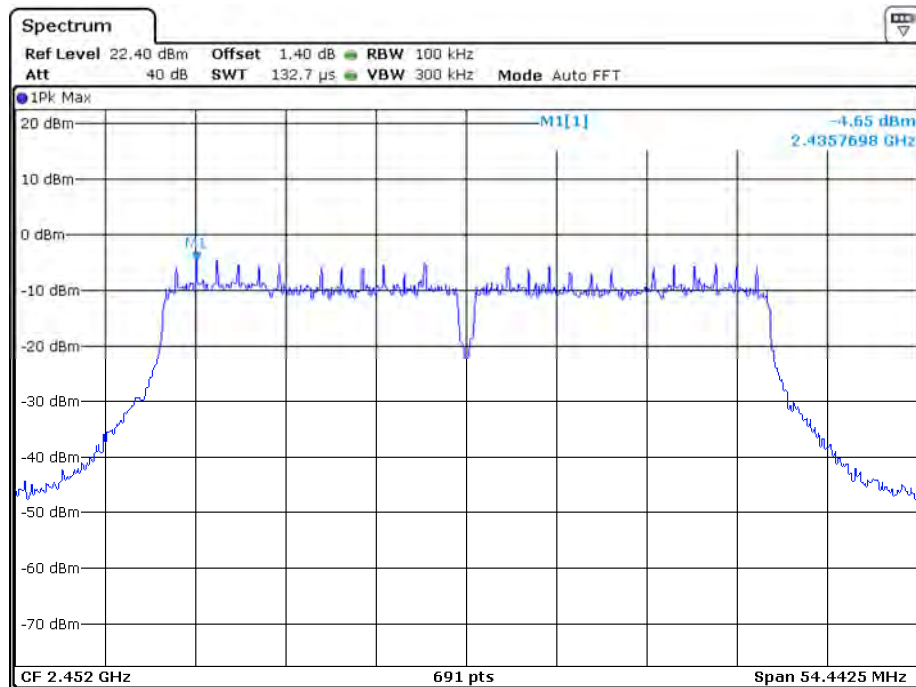


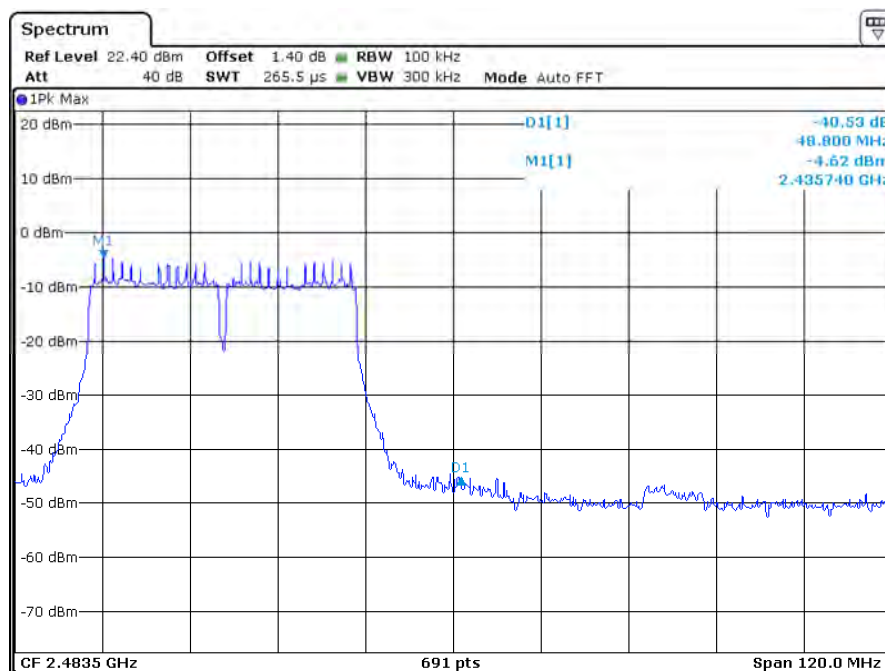
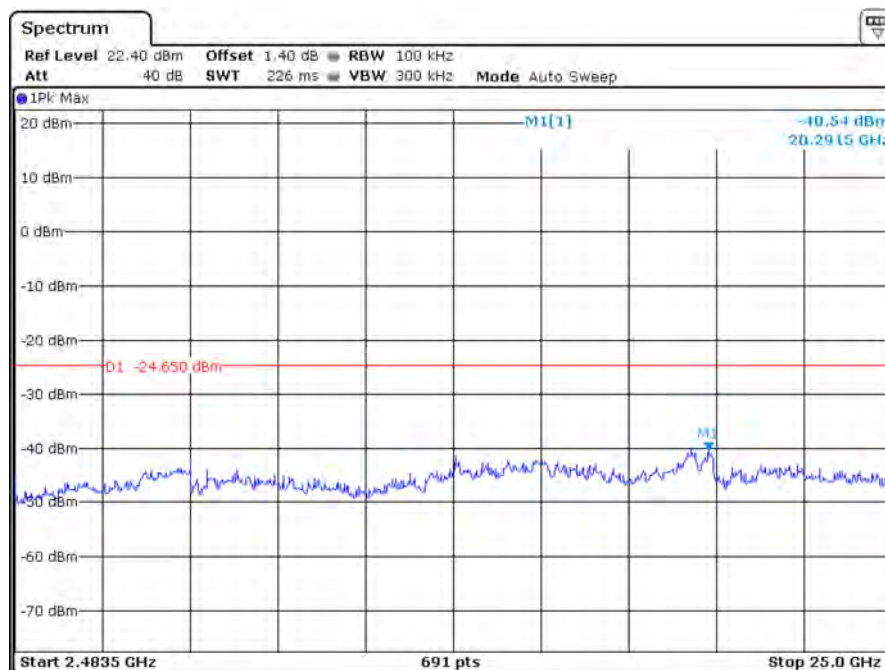
Channel 06 (2437MHz) Reference Level: -3.83dBm





Channel 09 (2452MHz) Reference Level: -4.65dBm

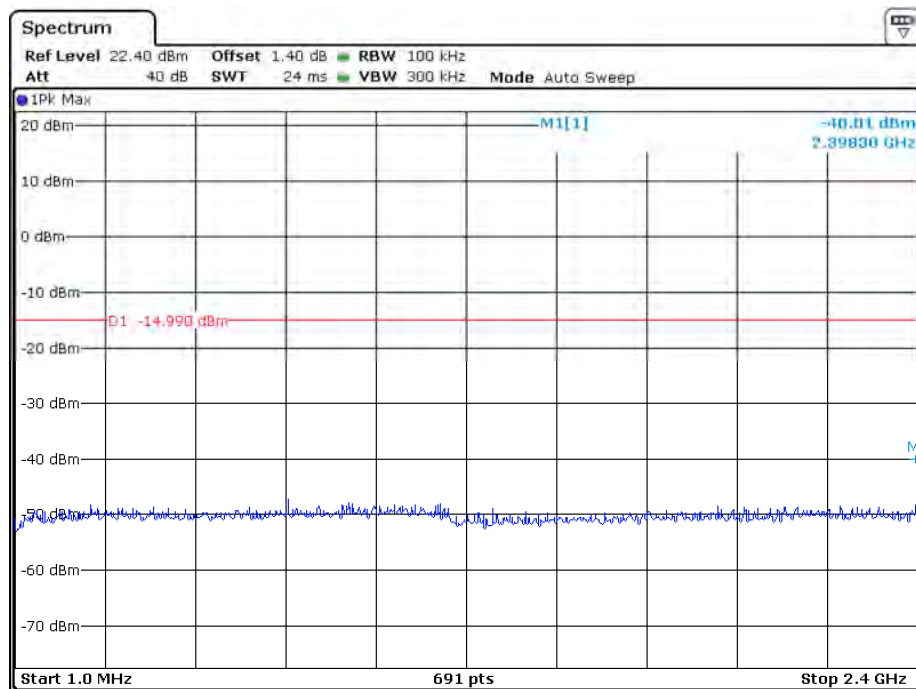
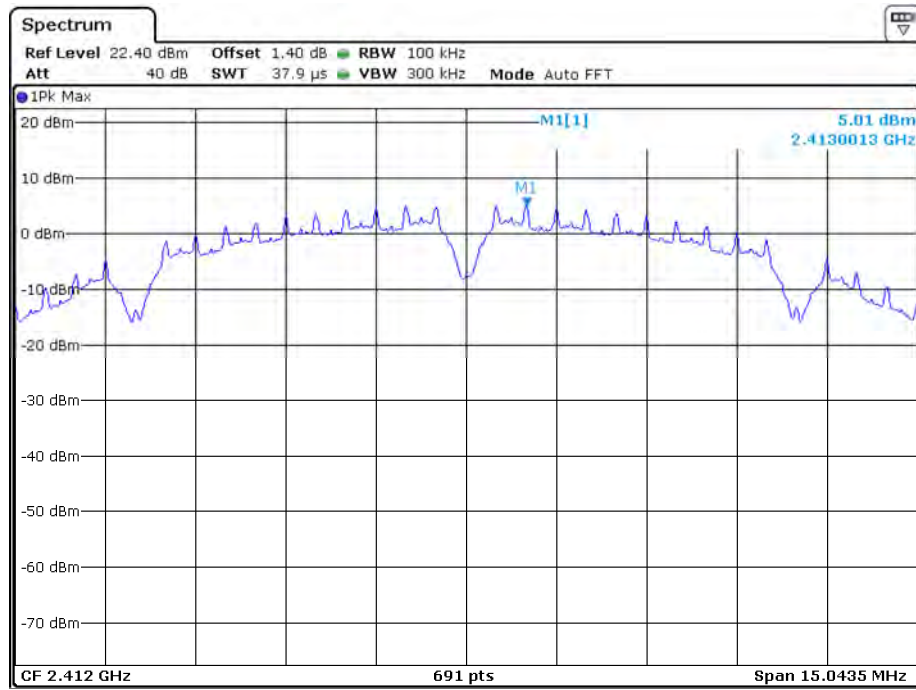


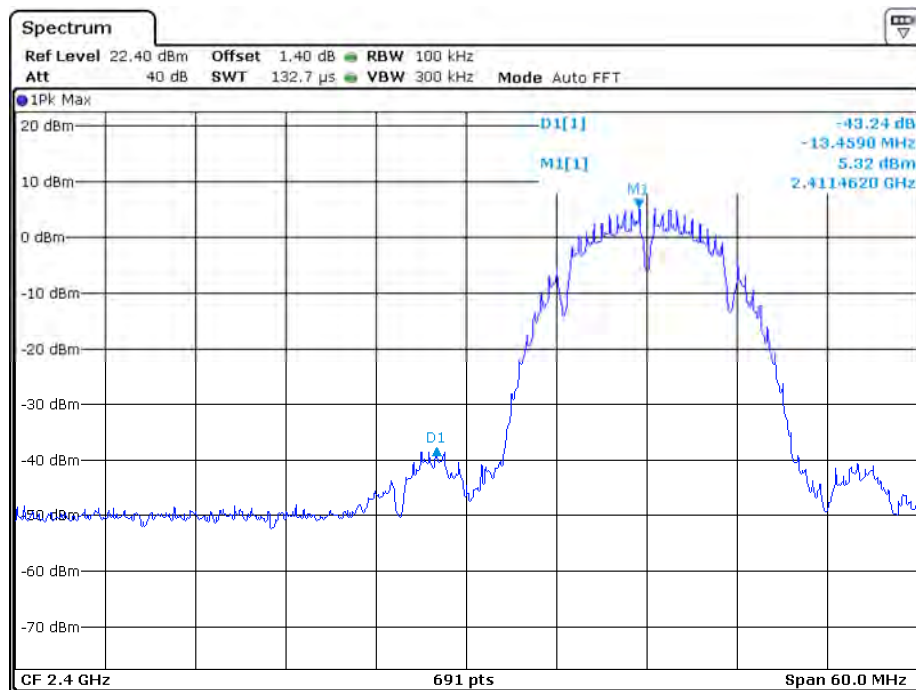
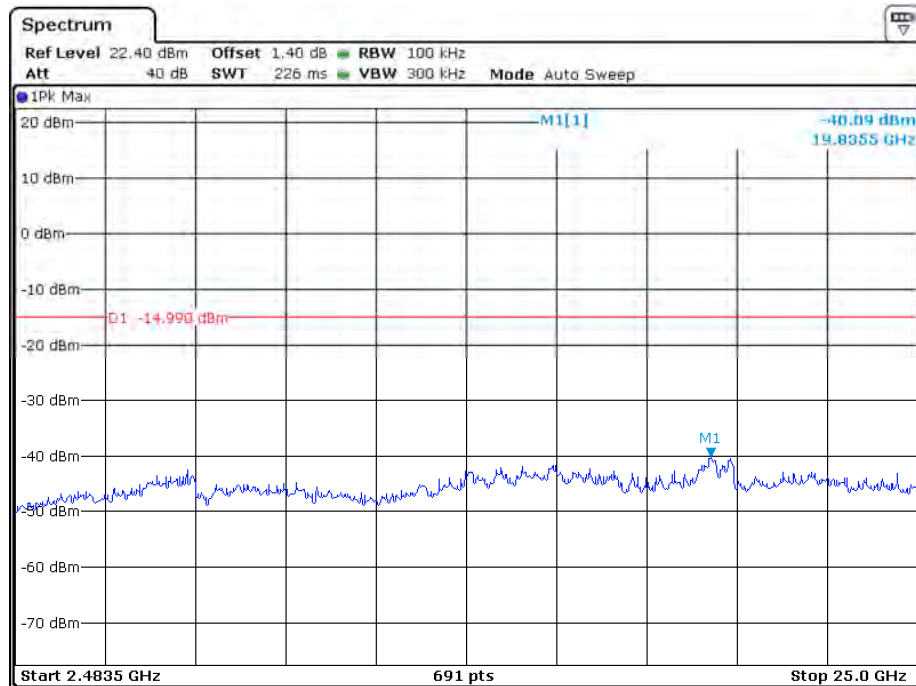


SISO Mode, Ant2:

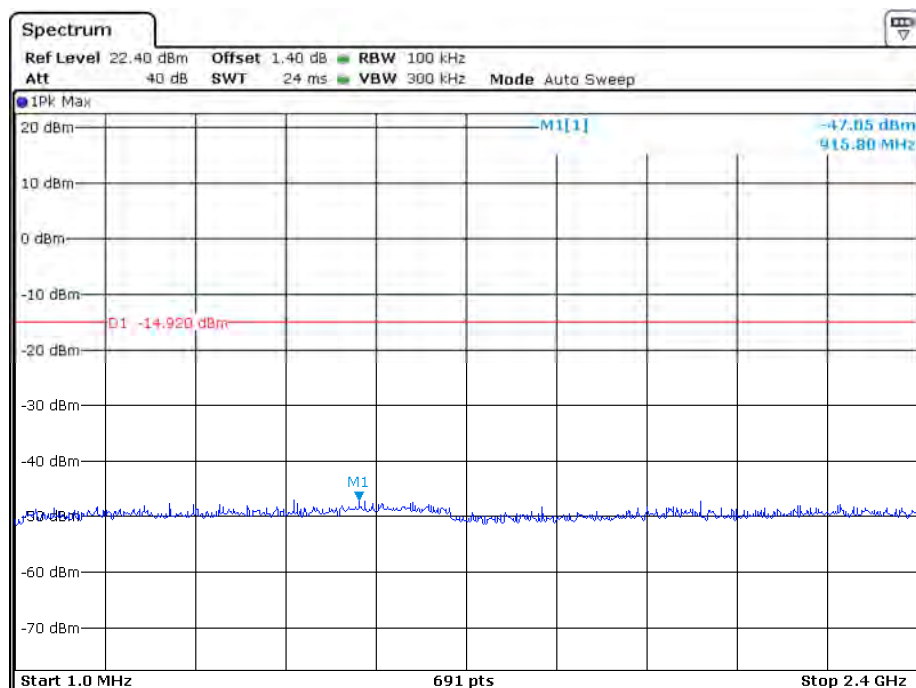
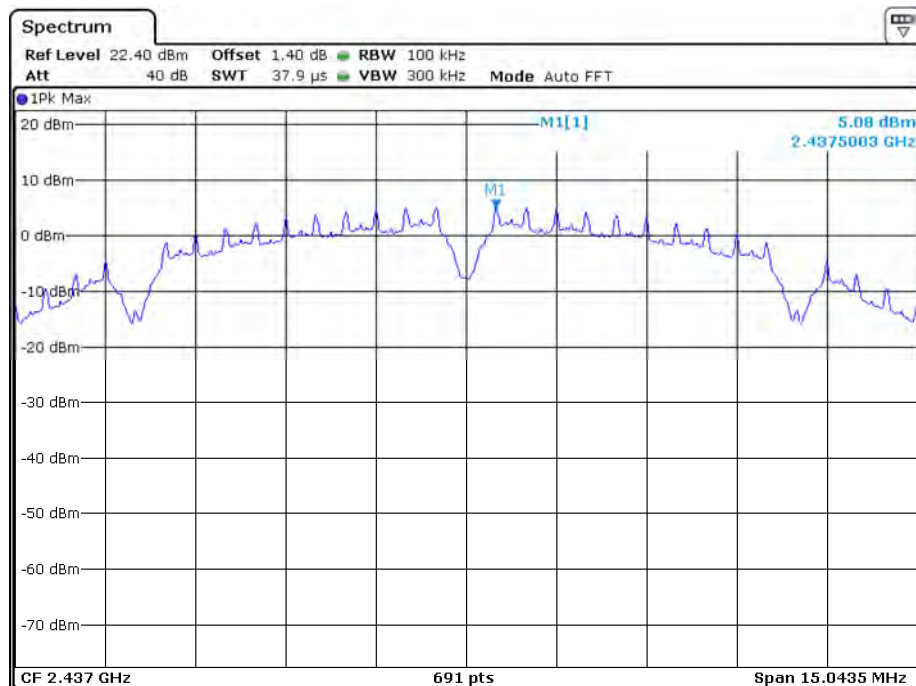
802.11b

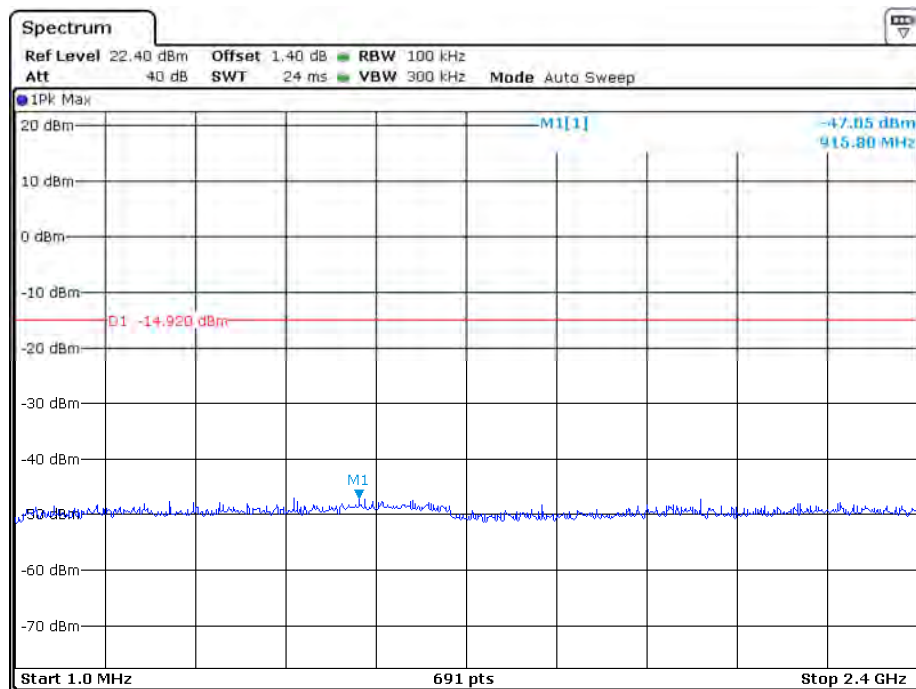
Channel 01 (2412MHz) Reference Level: 5.01dBm



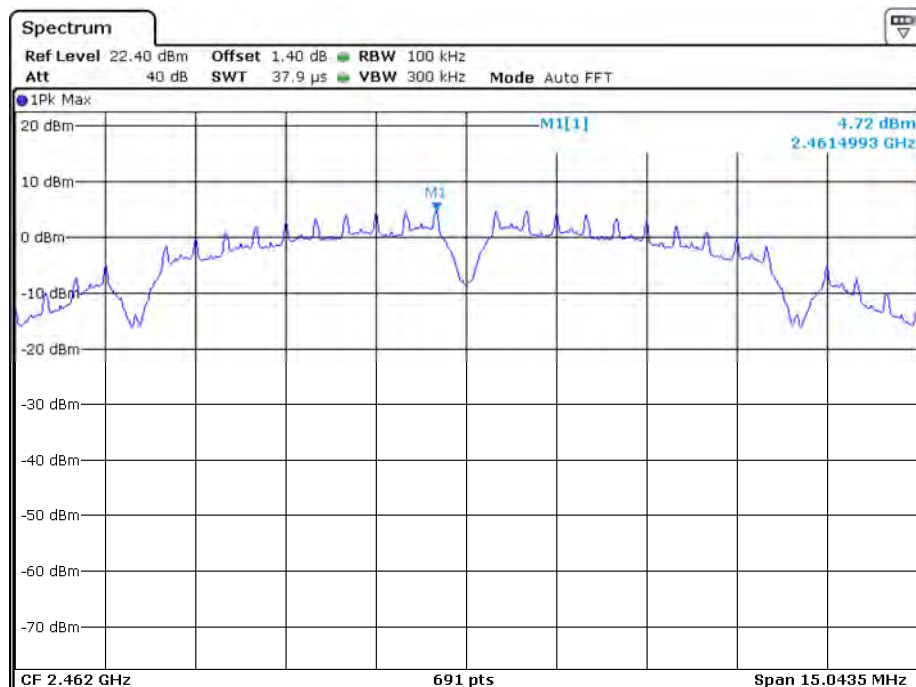


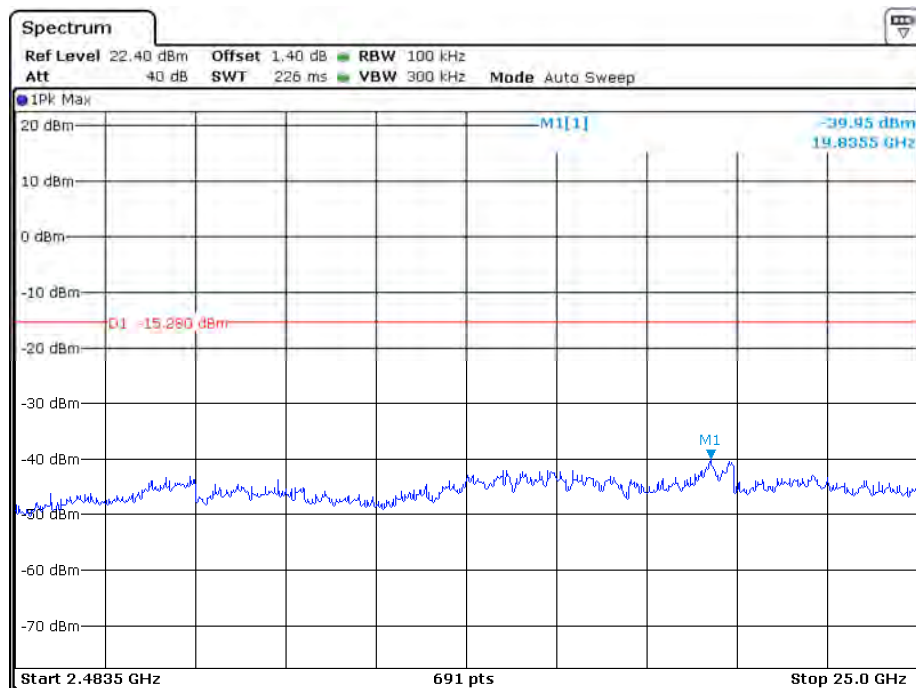
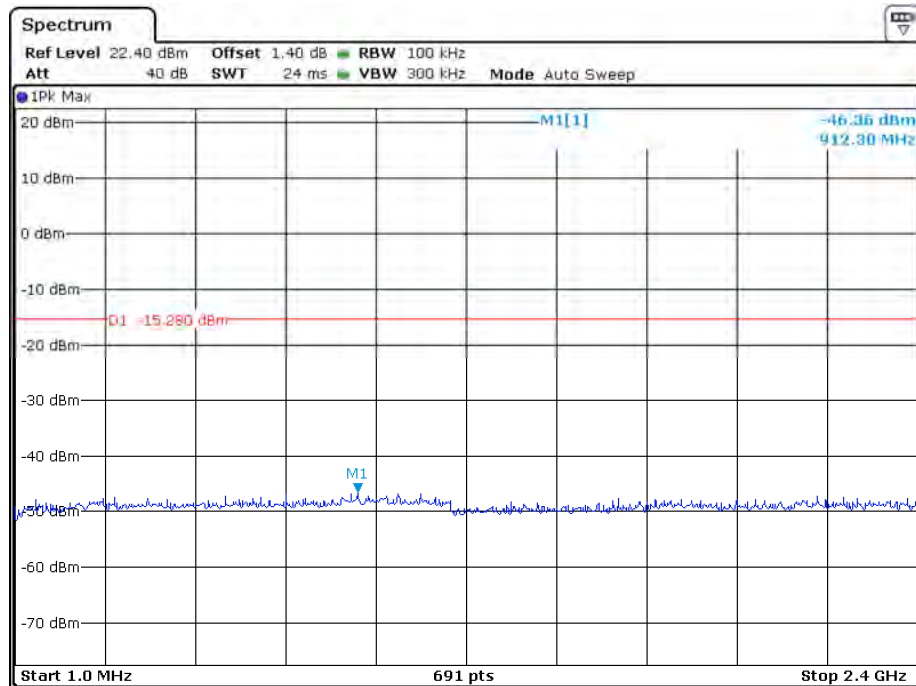
Channel 06 (2437MHz) Reference Level: 5.08dBm

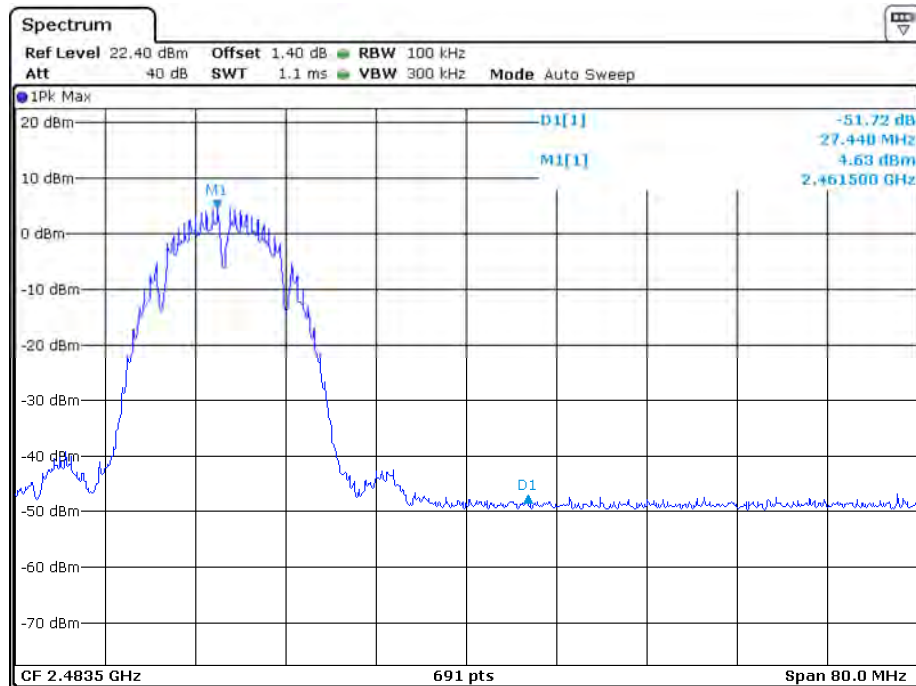




Channel 11 (2462MHz) Reference Level: 4.72dBm

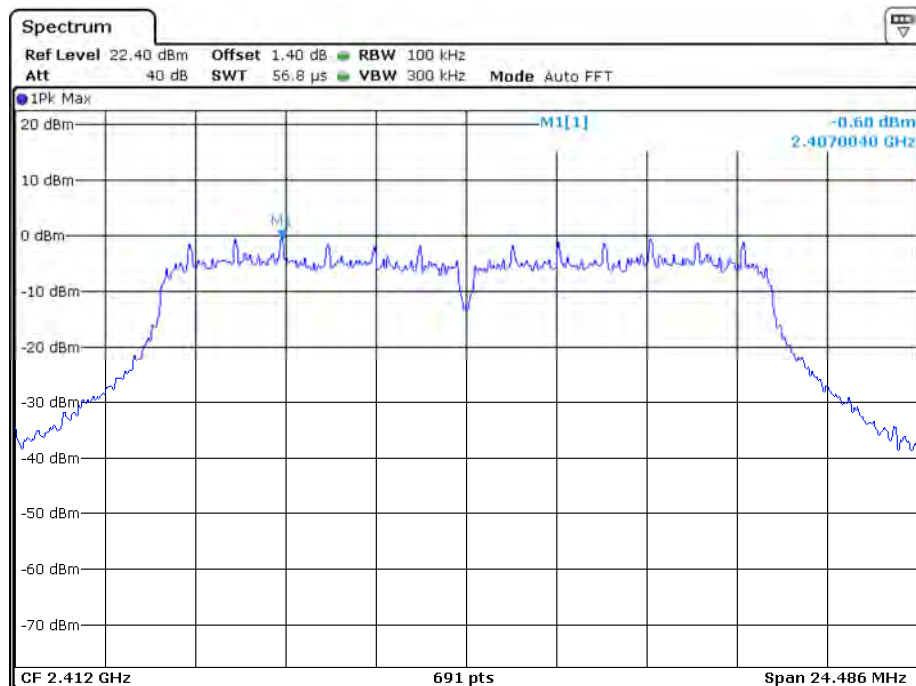


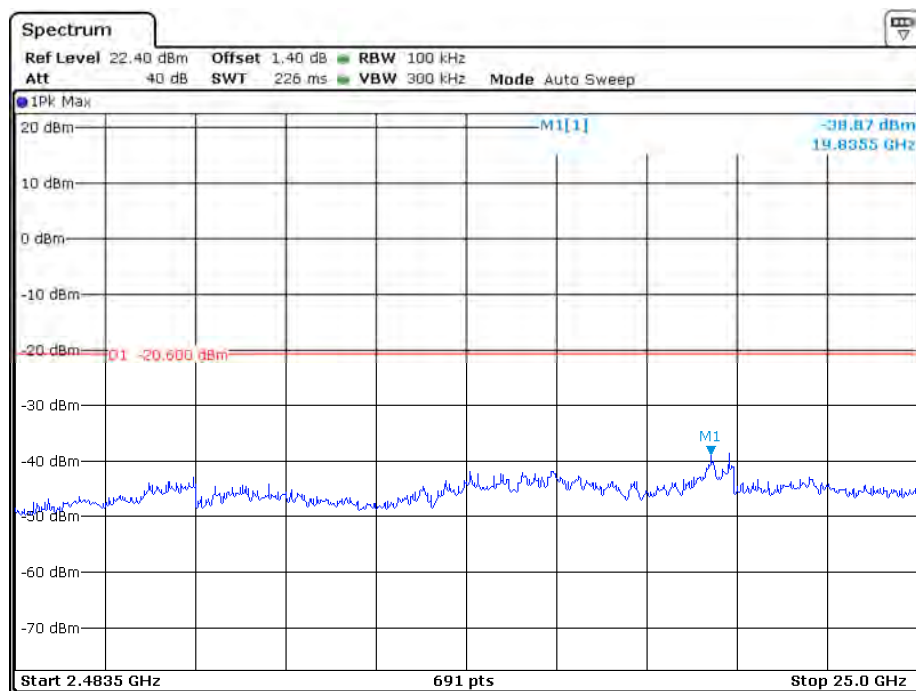
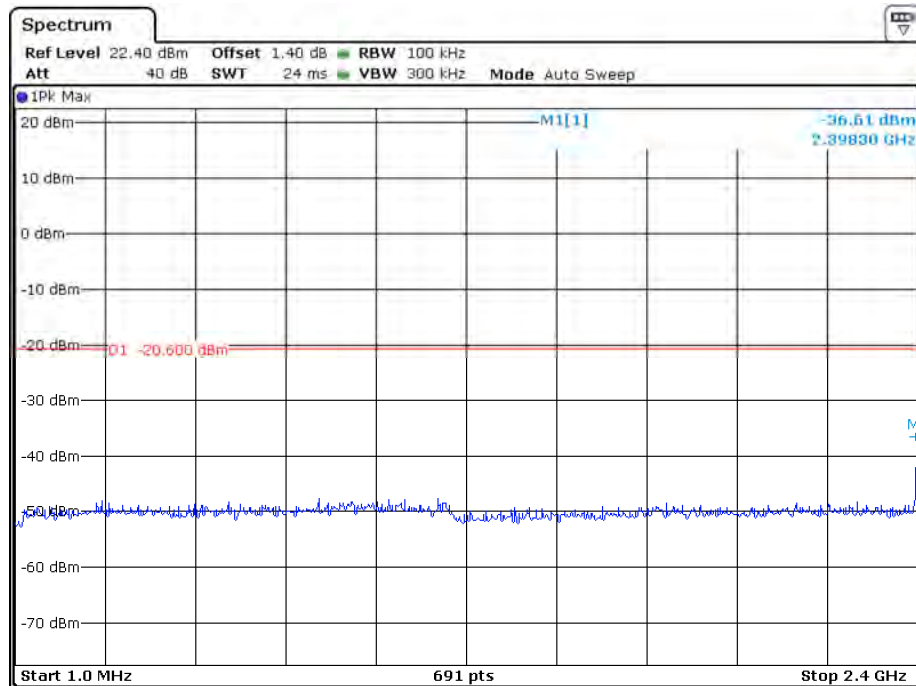


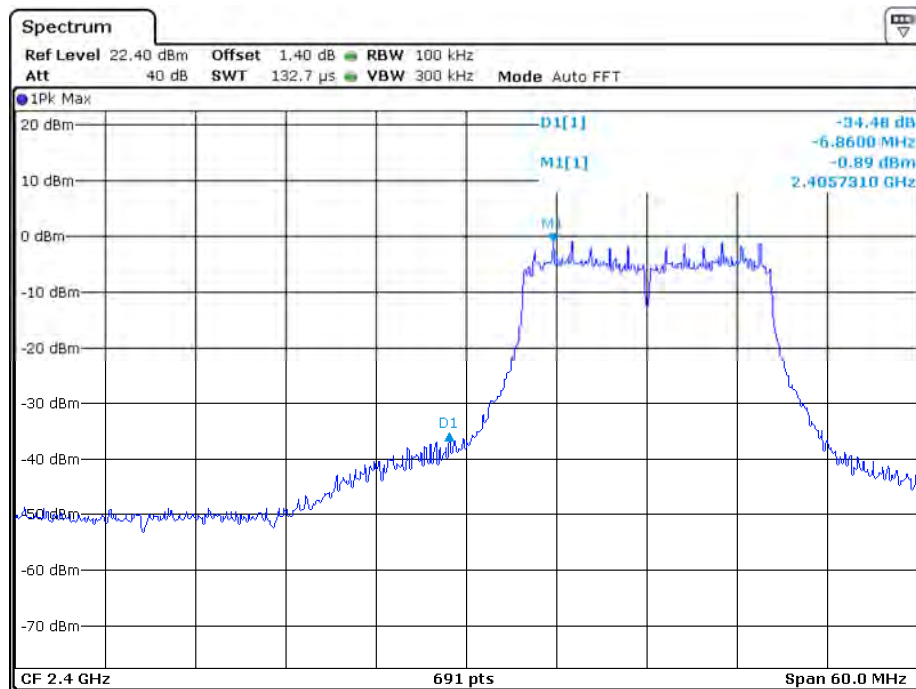


802.11g

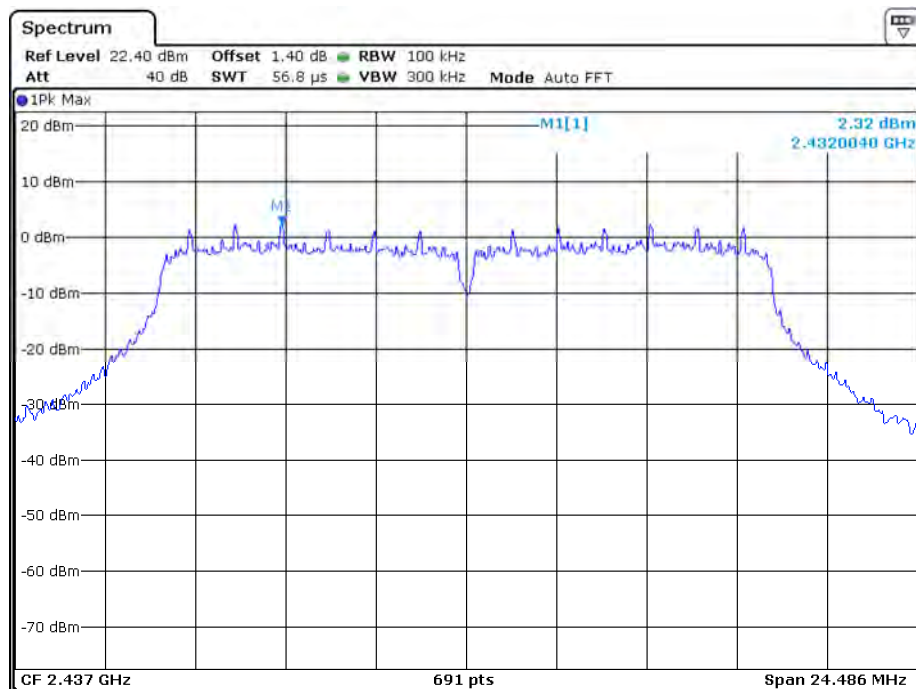
Channel 01 (2412MHz) Reference Level: -0.60dBm

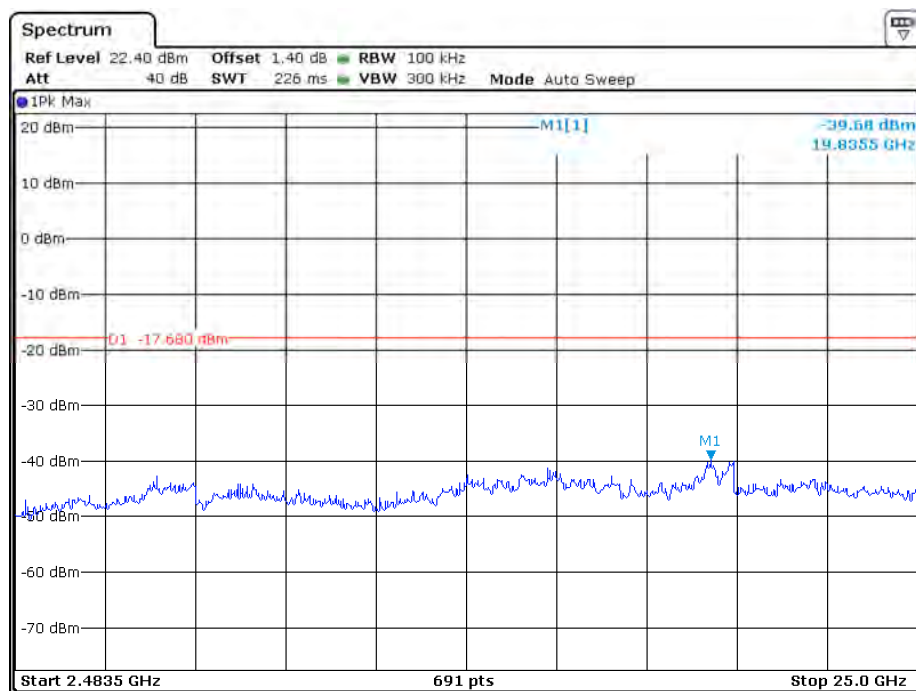
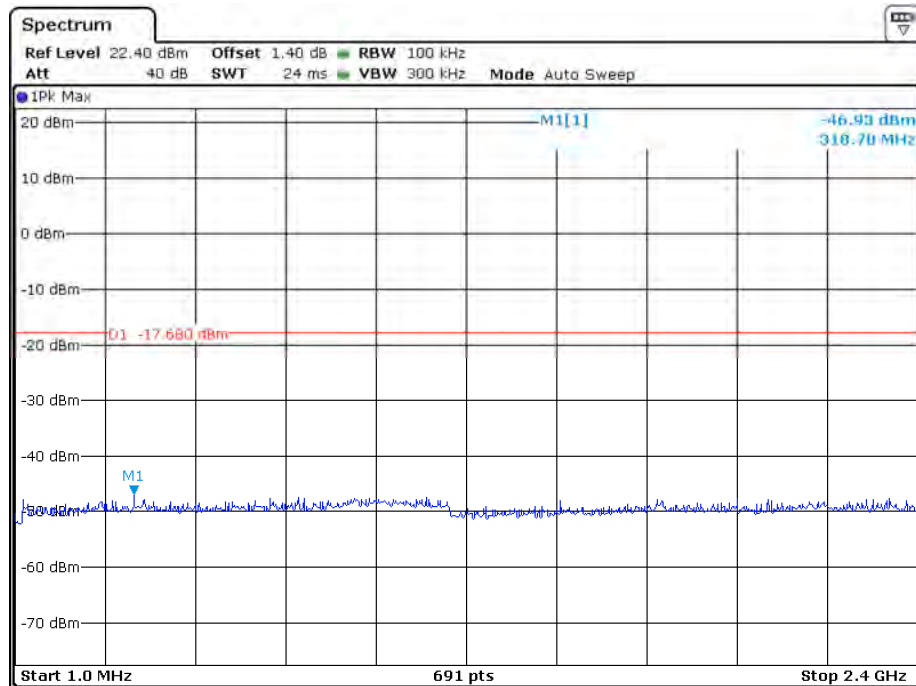




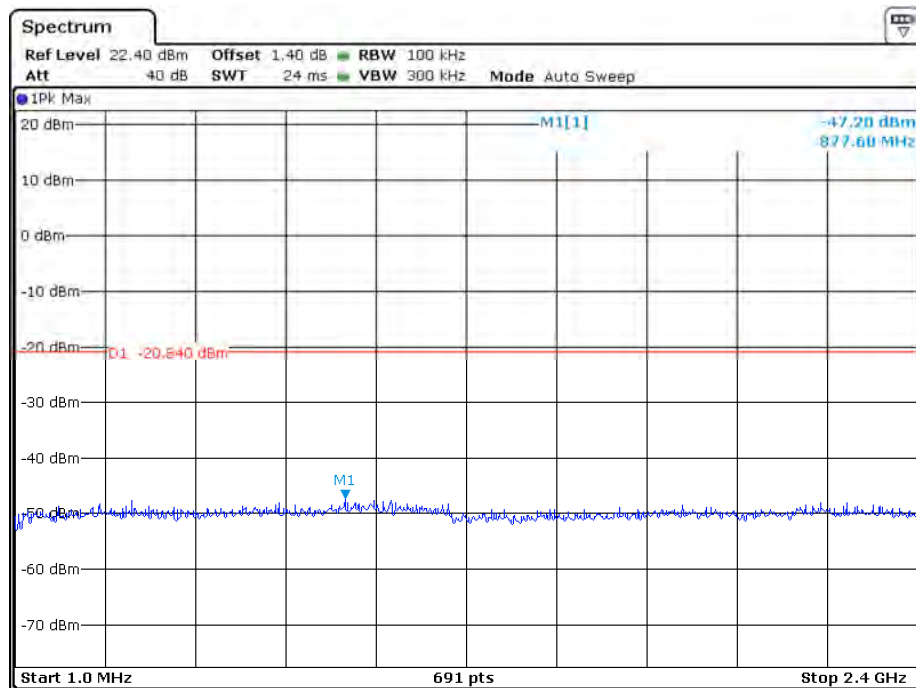
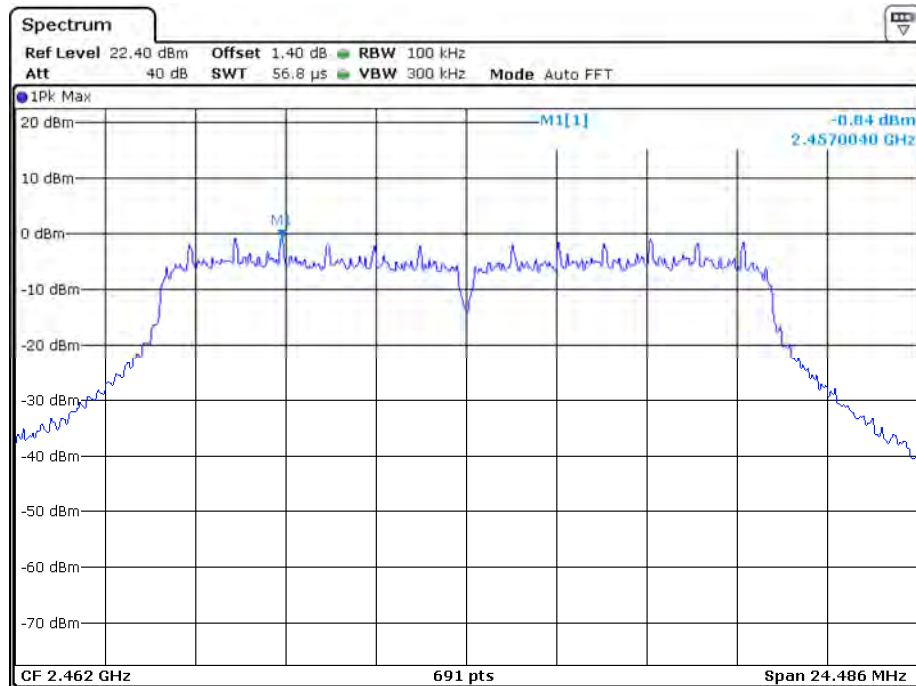


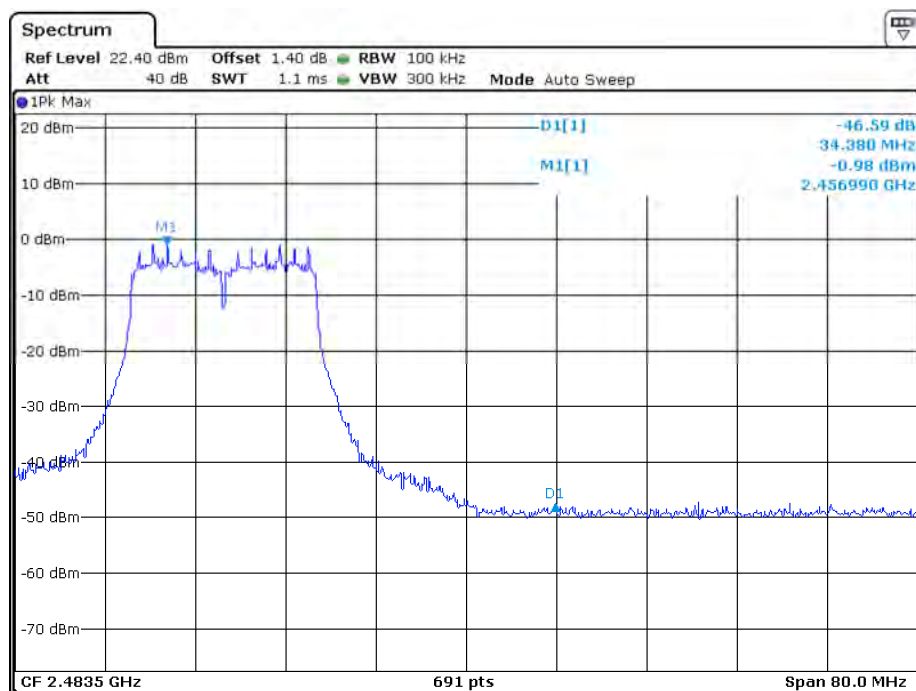
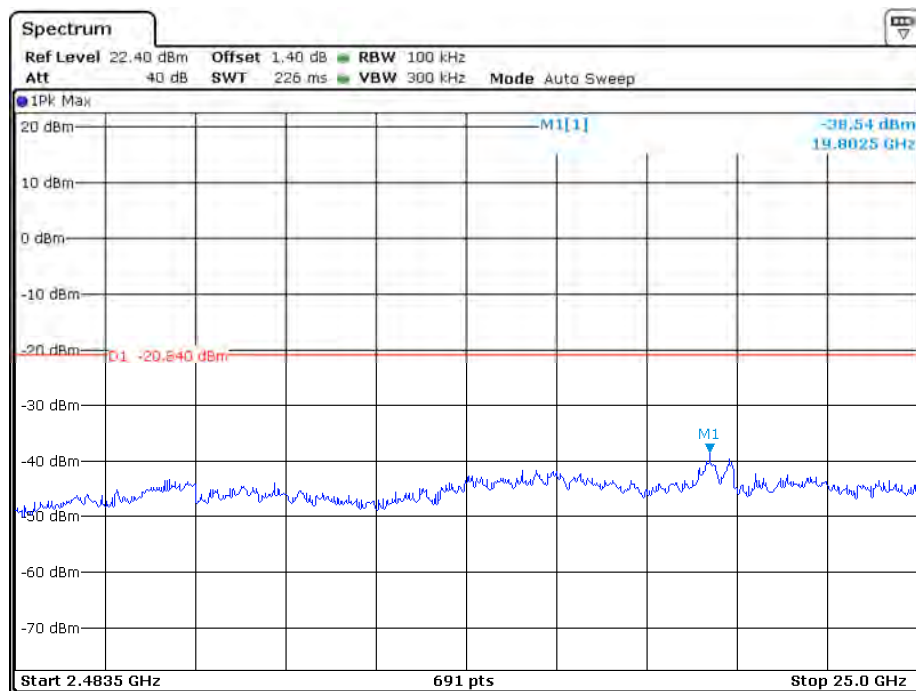
Channel 06 (2437MHz) Reference Level: 2.32dBm





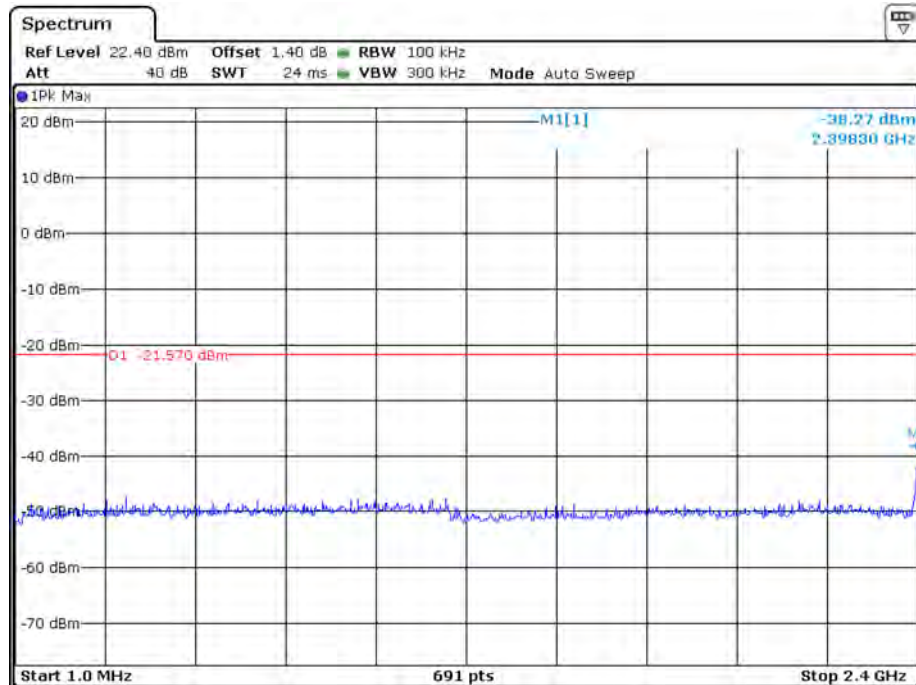
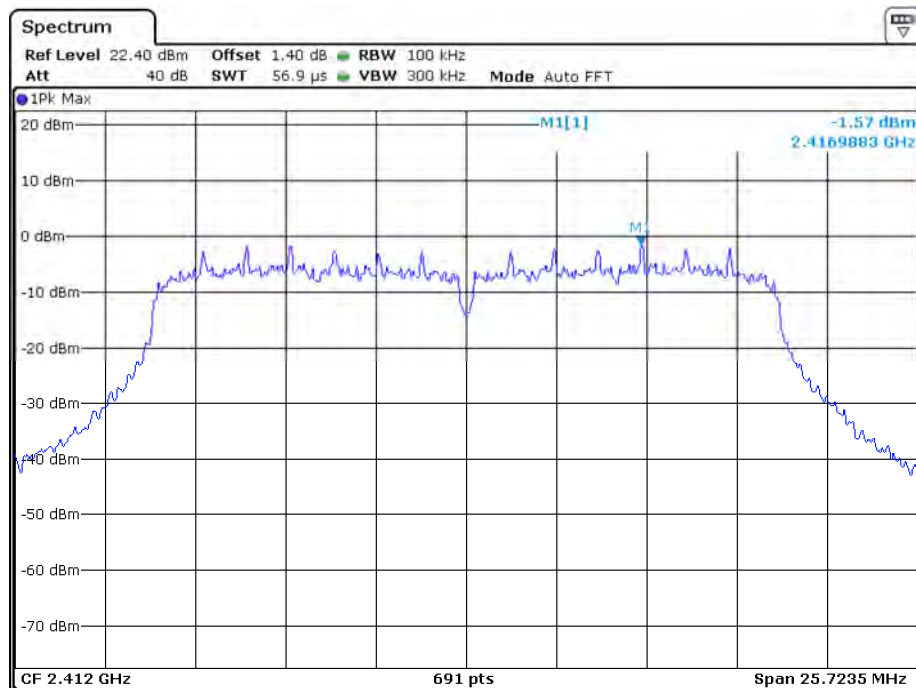
Channel 11 (2462MHz) Reference Level: -0.84dBm

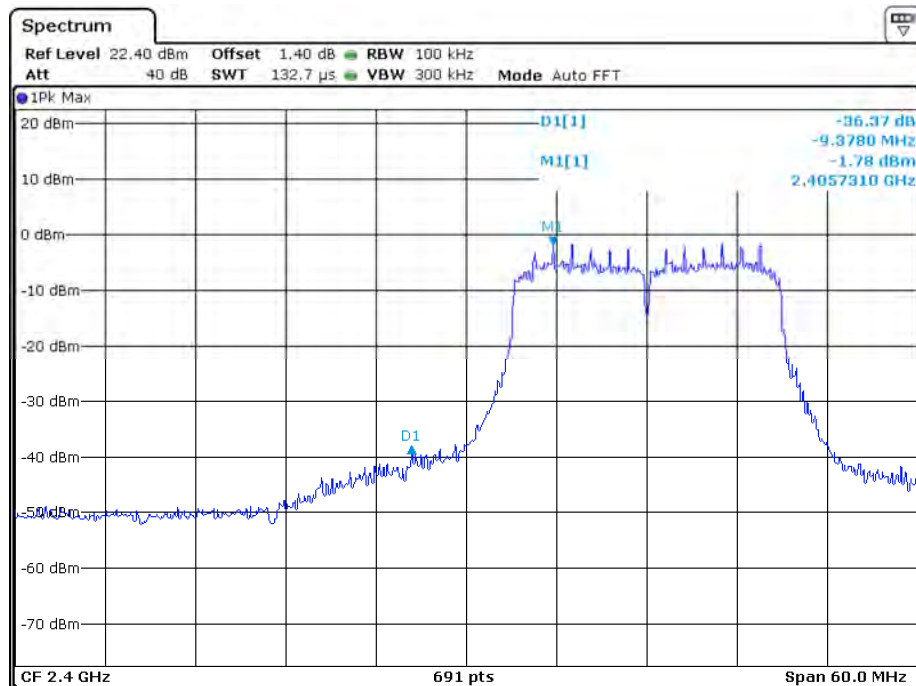
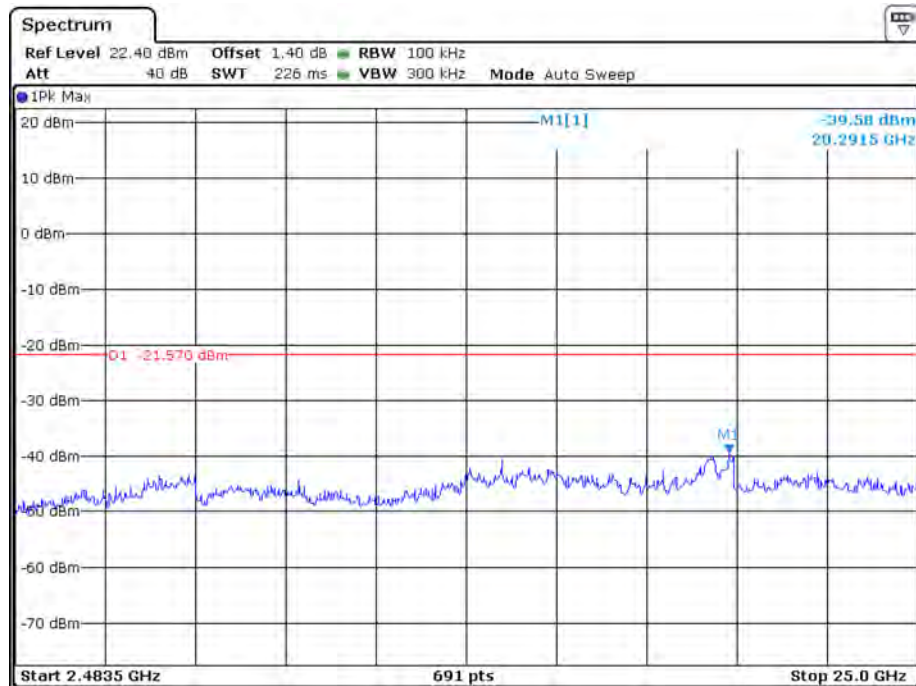




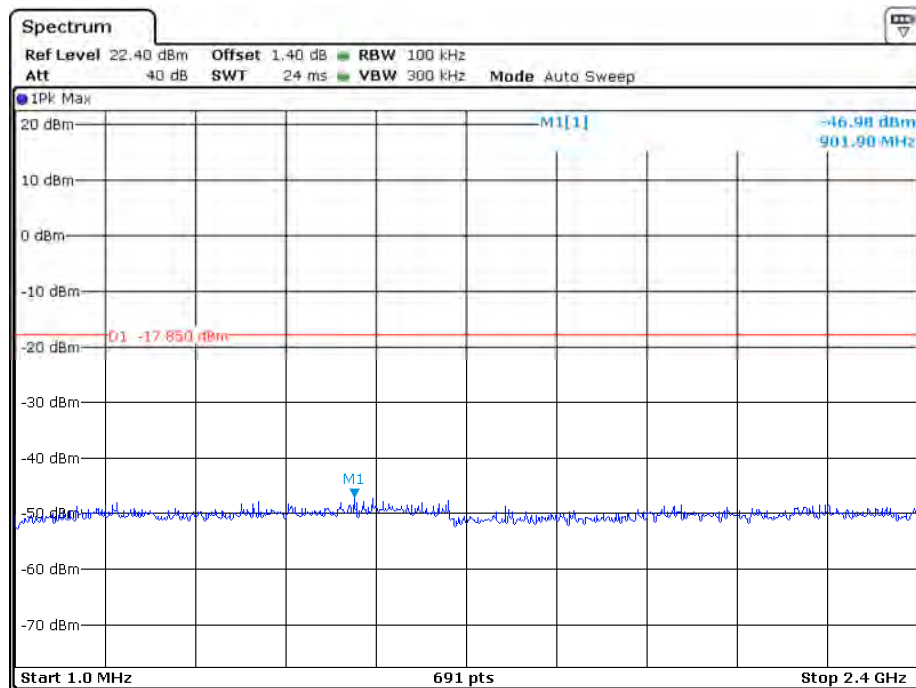
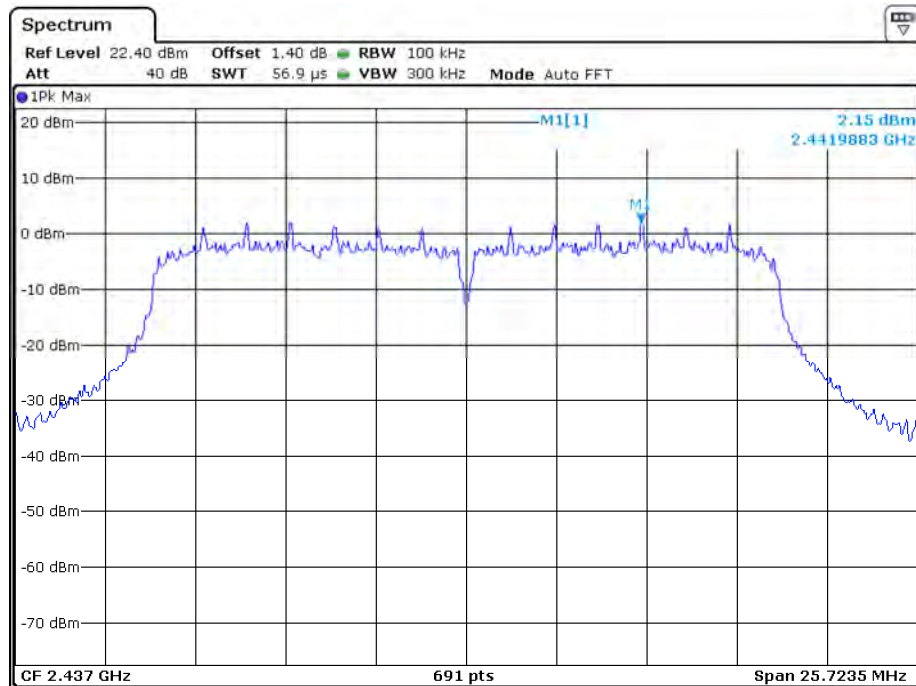
802.11n-HT20

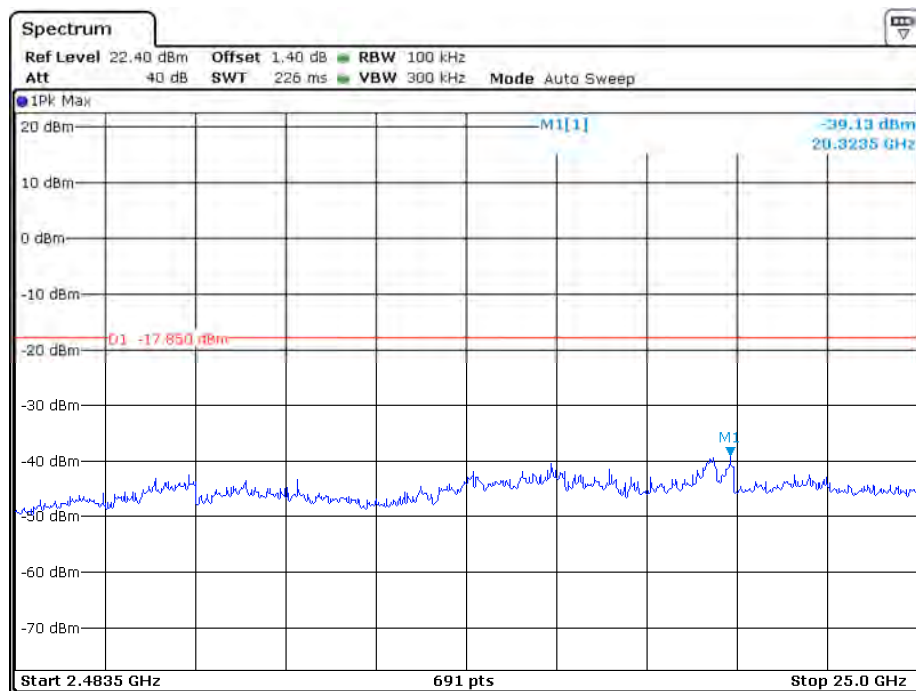
Channel 01 (2412MHz) Reference Level: -1.57dBm



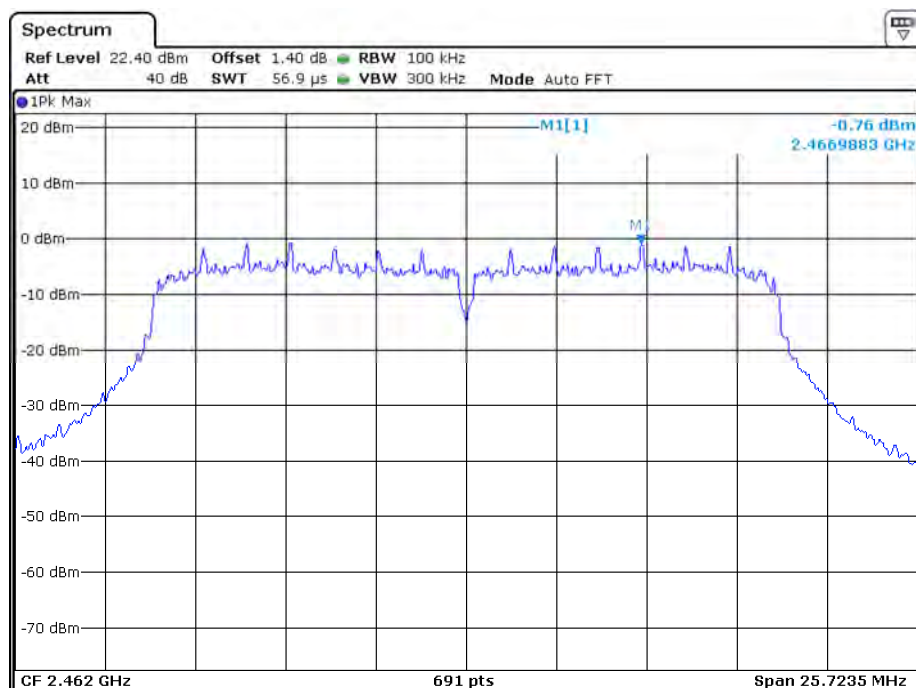


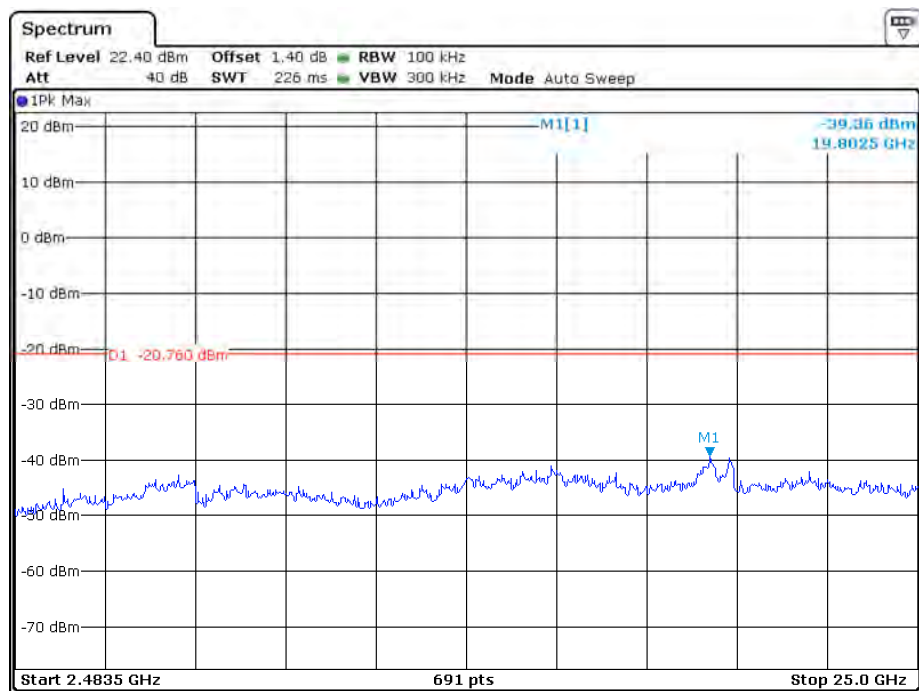
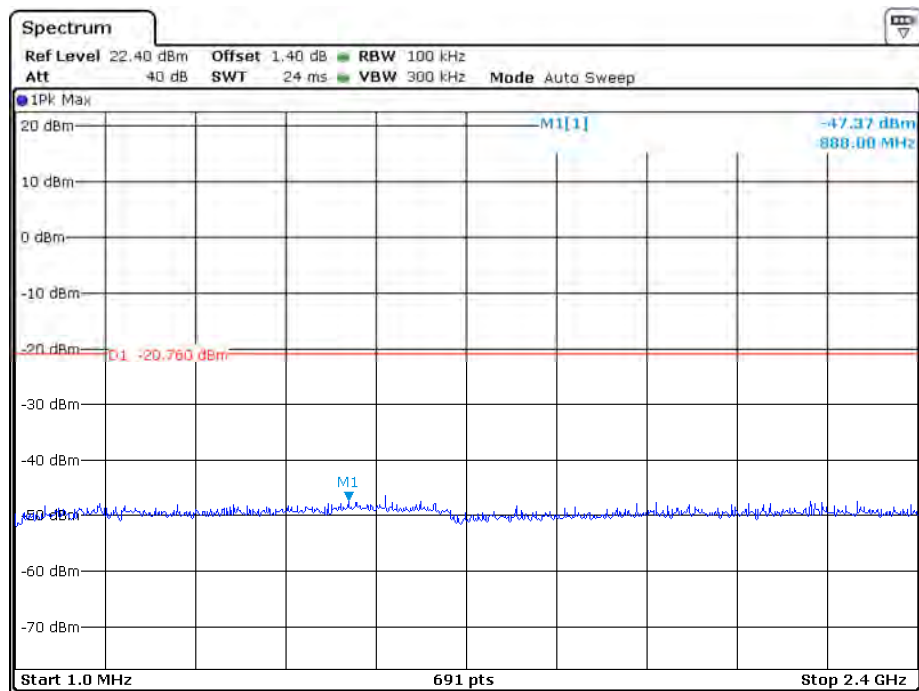
Channel 06 (2437MHz) Reference Level: 2.15dBm

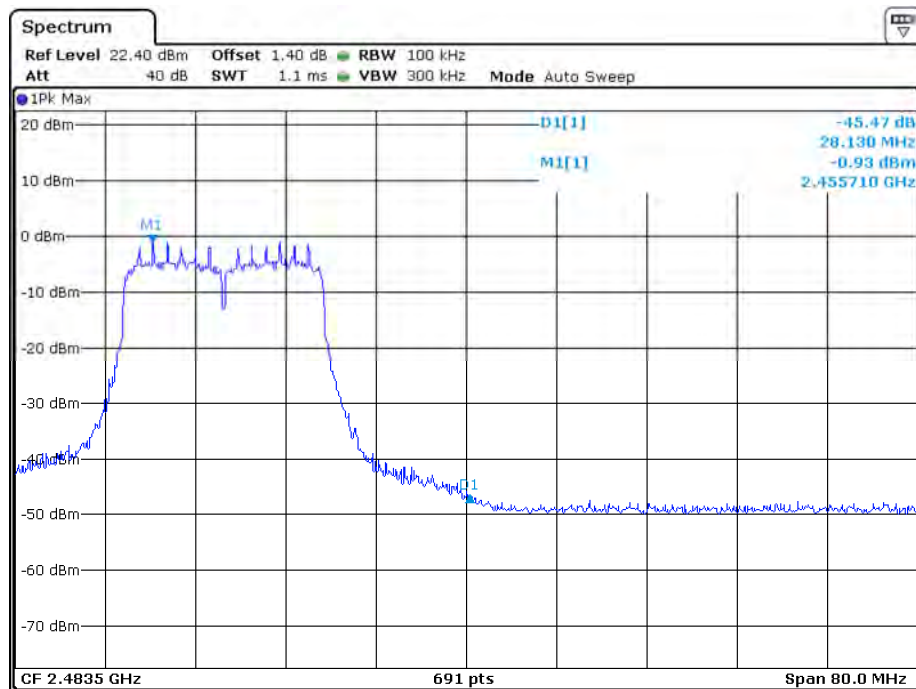




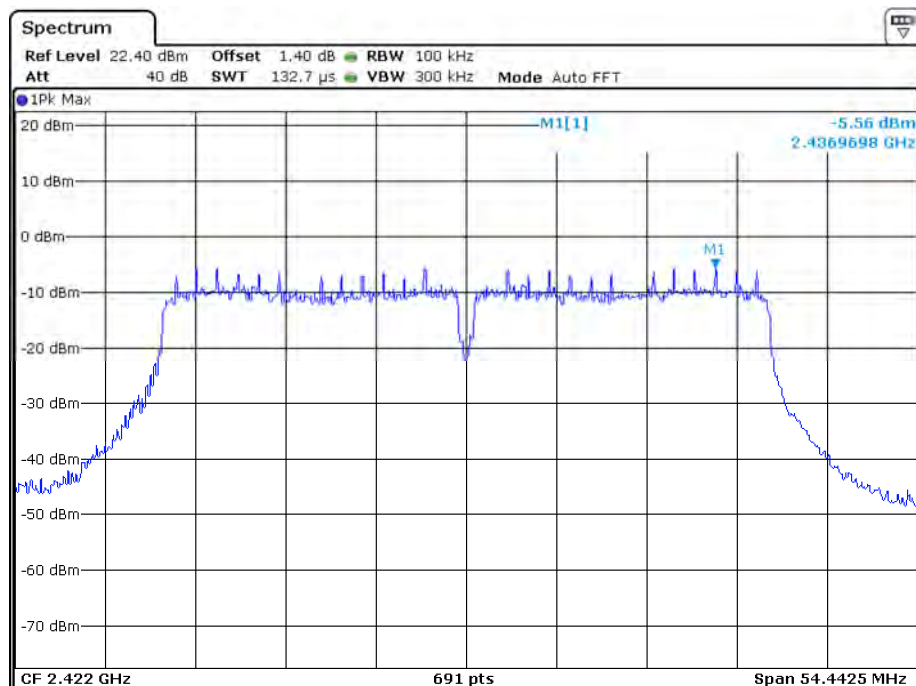
Channel 11 (2462MHz) Reference Level: -0.76dBm

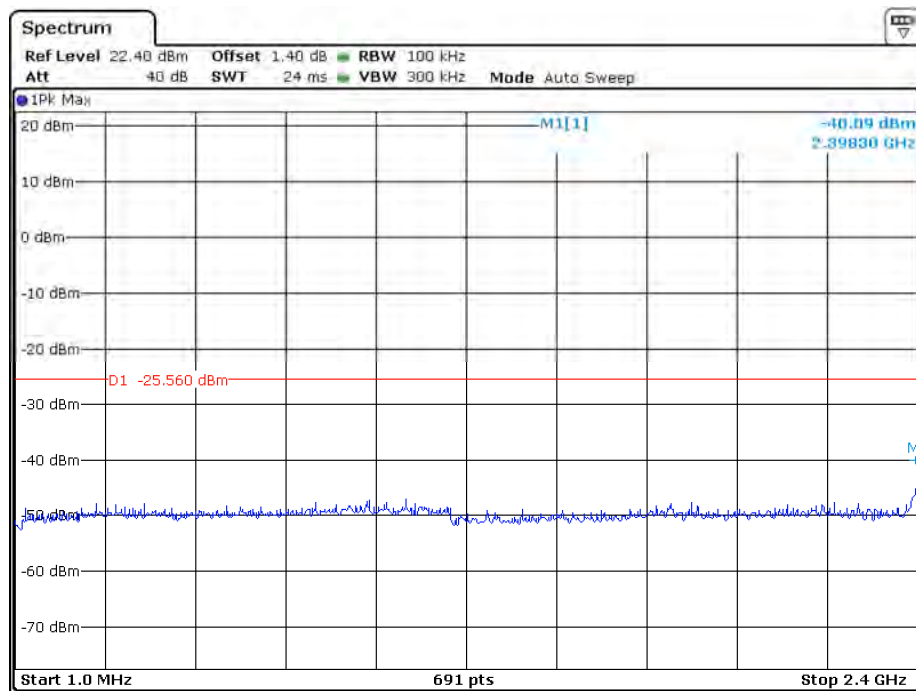


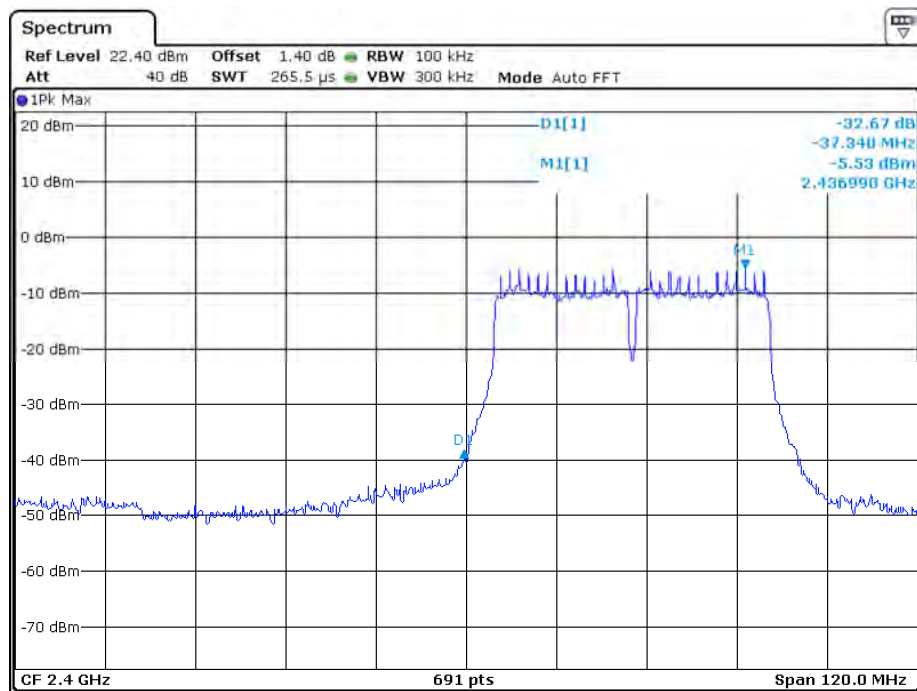




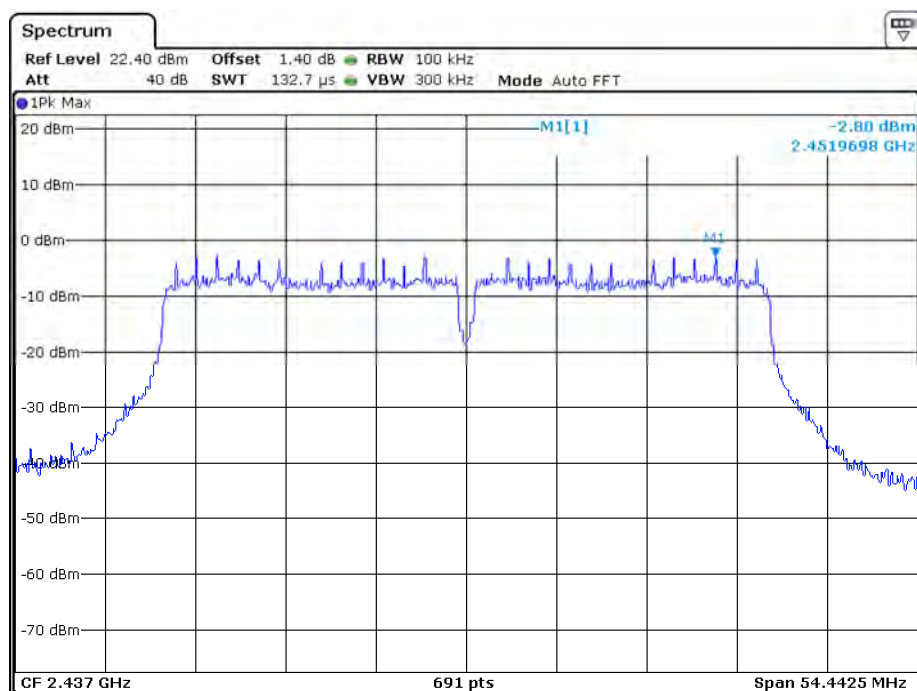
802.11n-HT40
Channel 03 (2422MHz) Reference Level: -5.56dBm

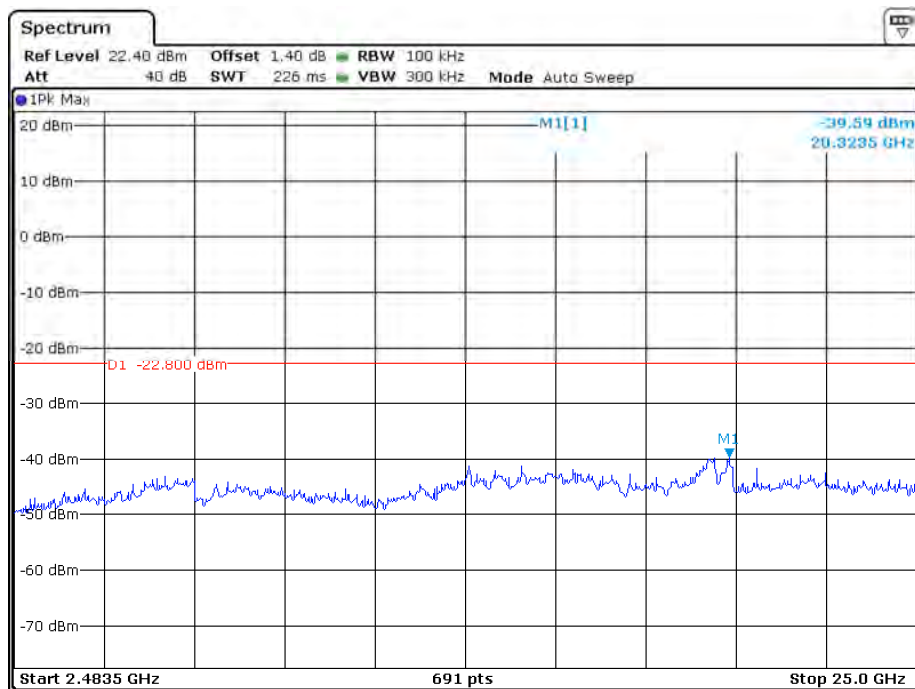
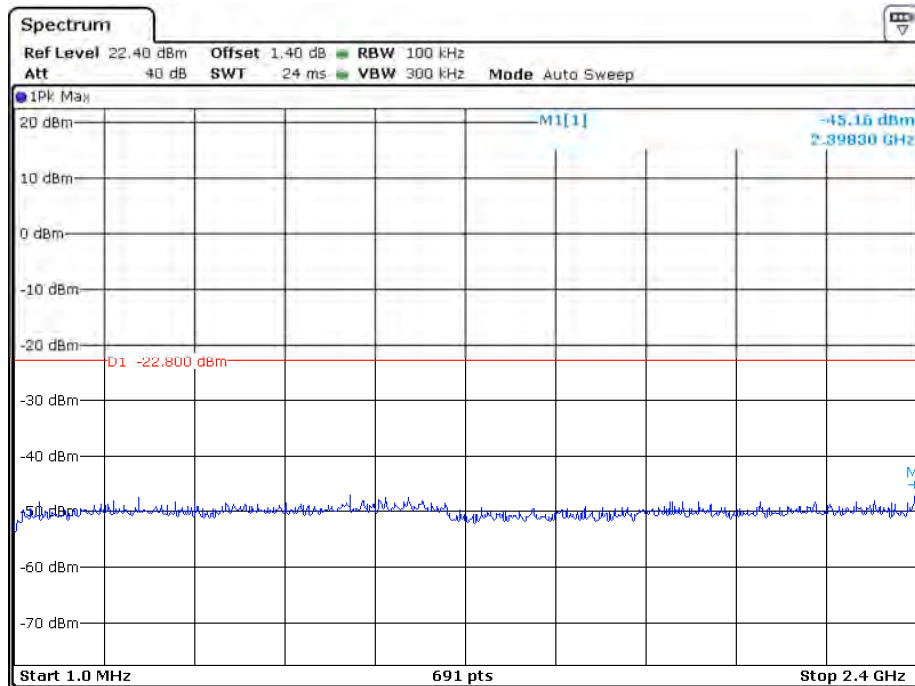




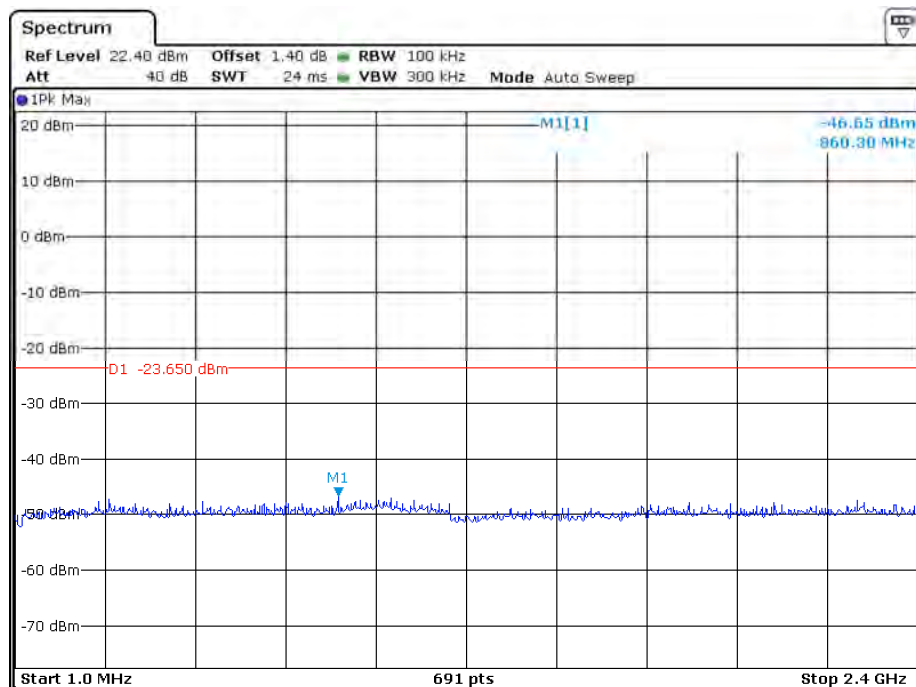
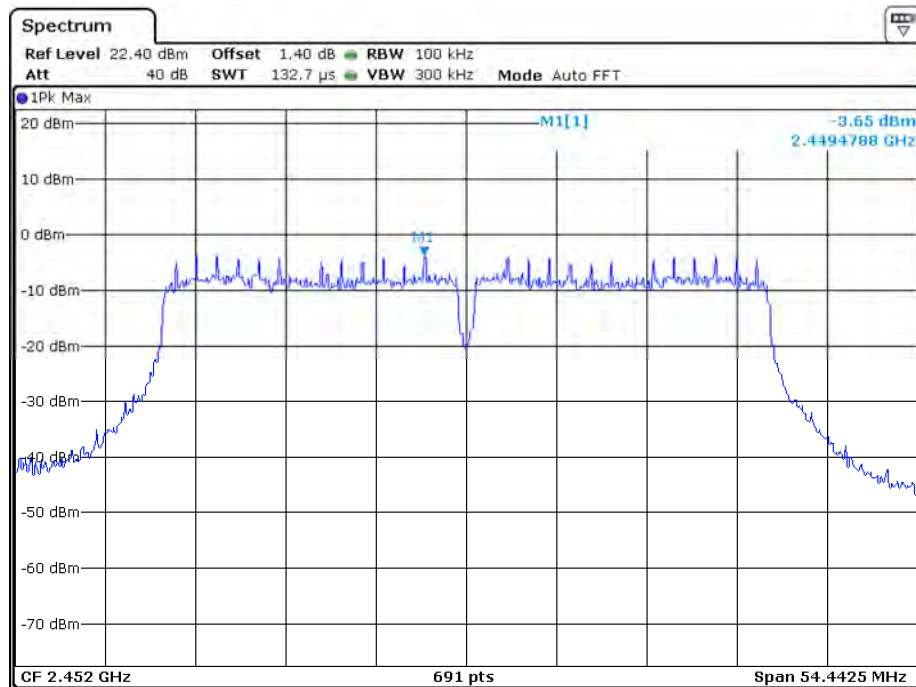


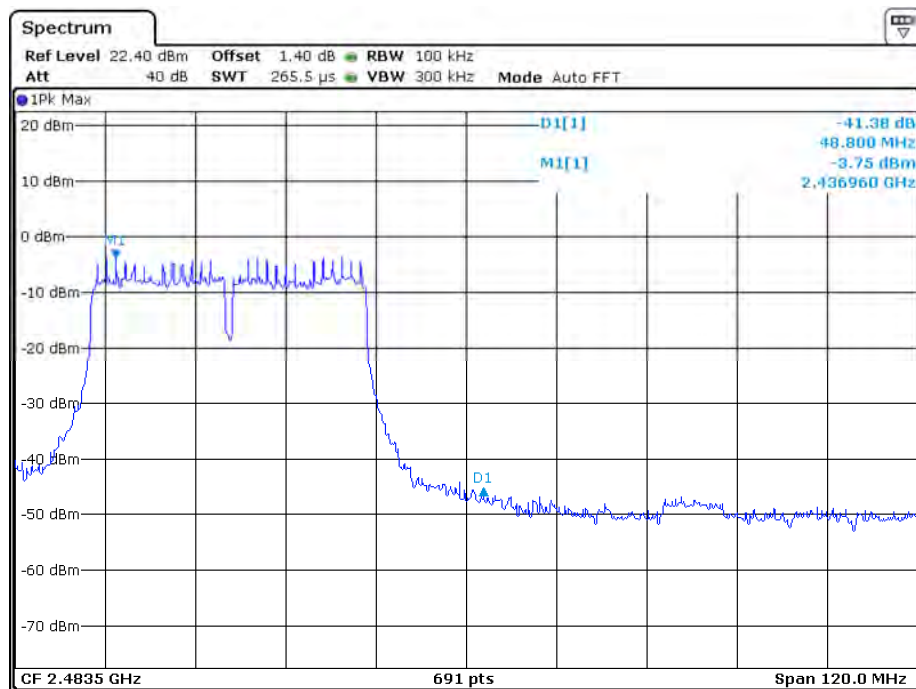
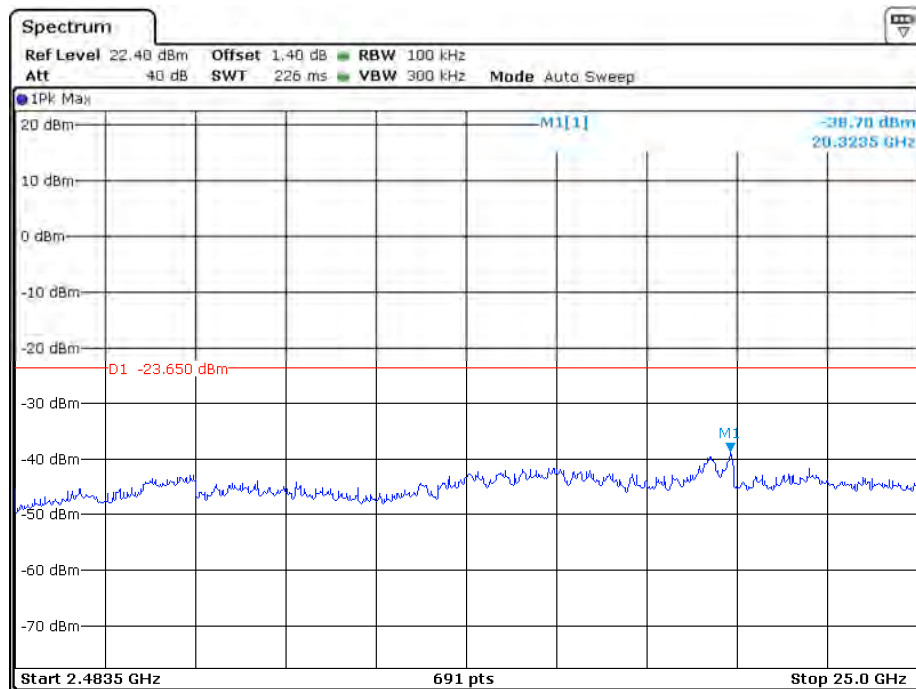
Channel 06 (2437MHz) Reference Level: -2.80dBm





Channel 09 (2452MHz) Reference Level: -3.65dBm

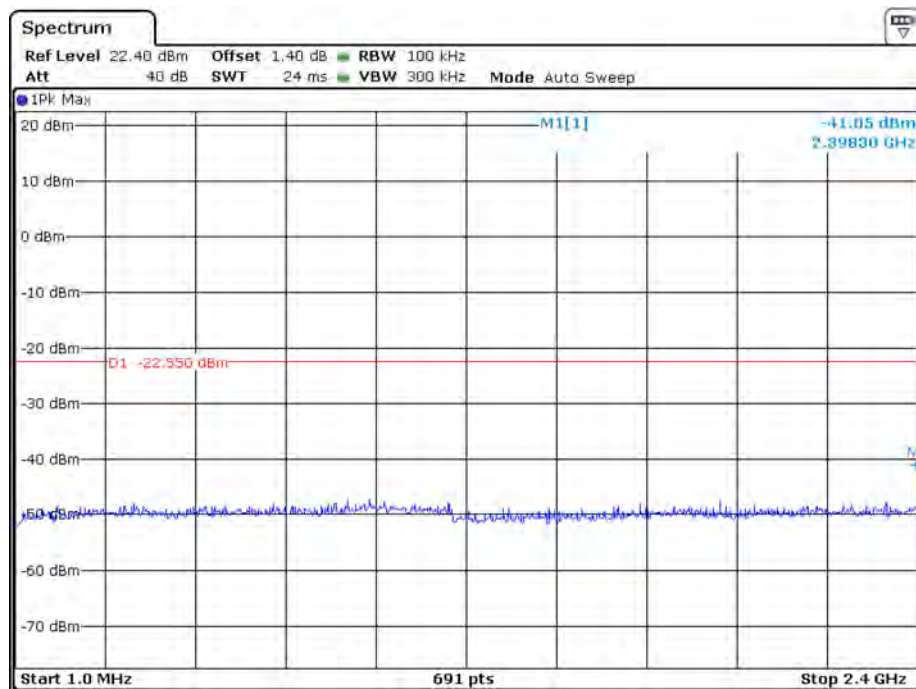
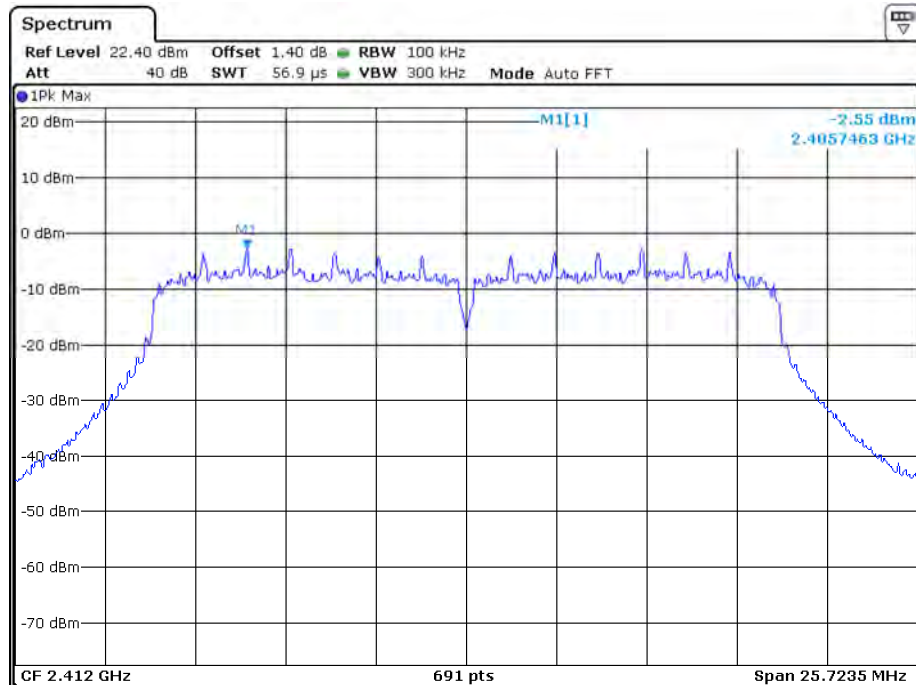


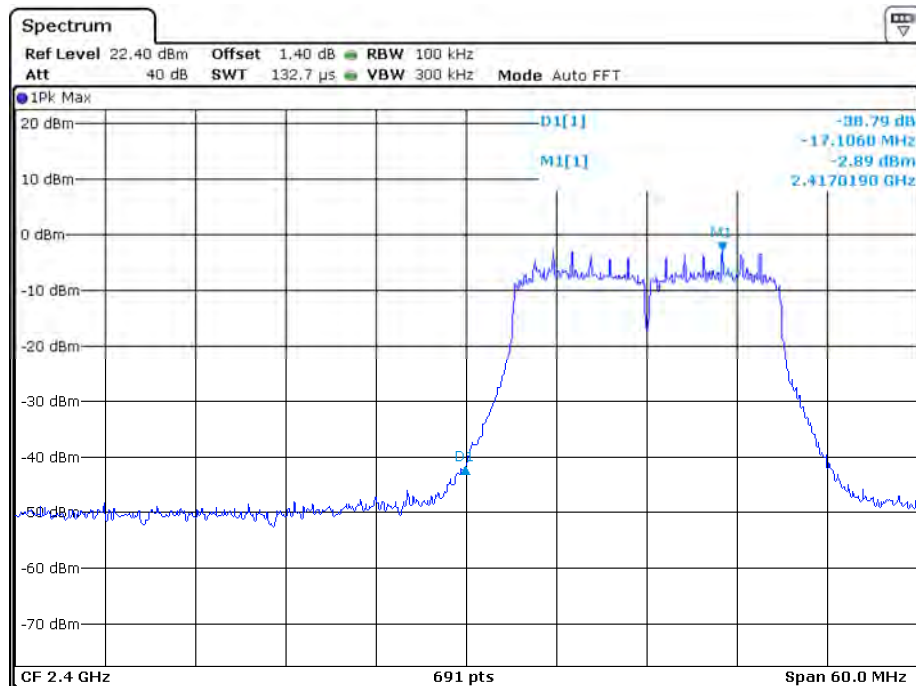
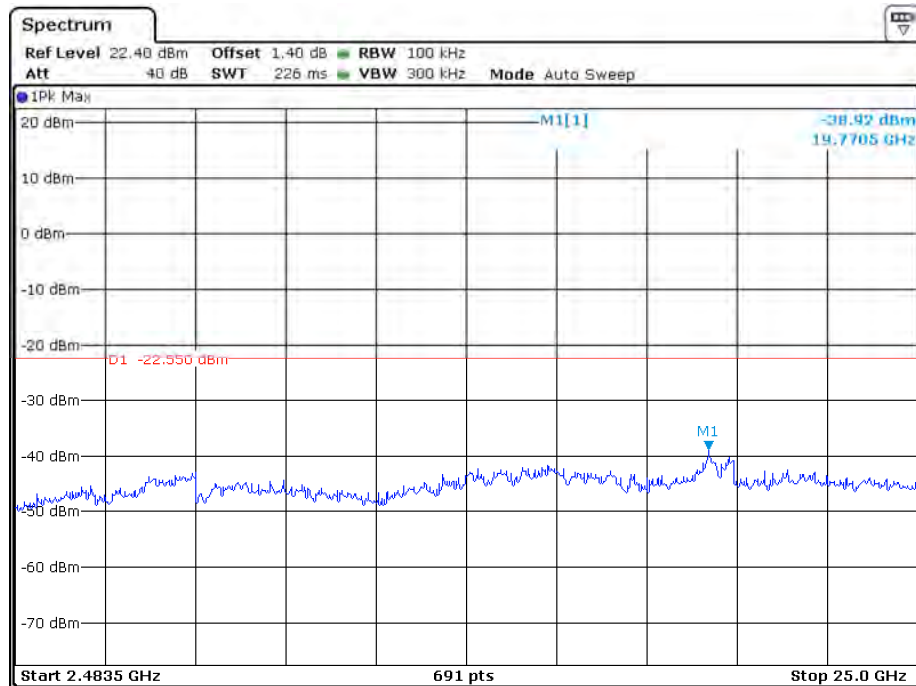


MIMO Mode, Ant1:

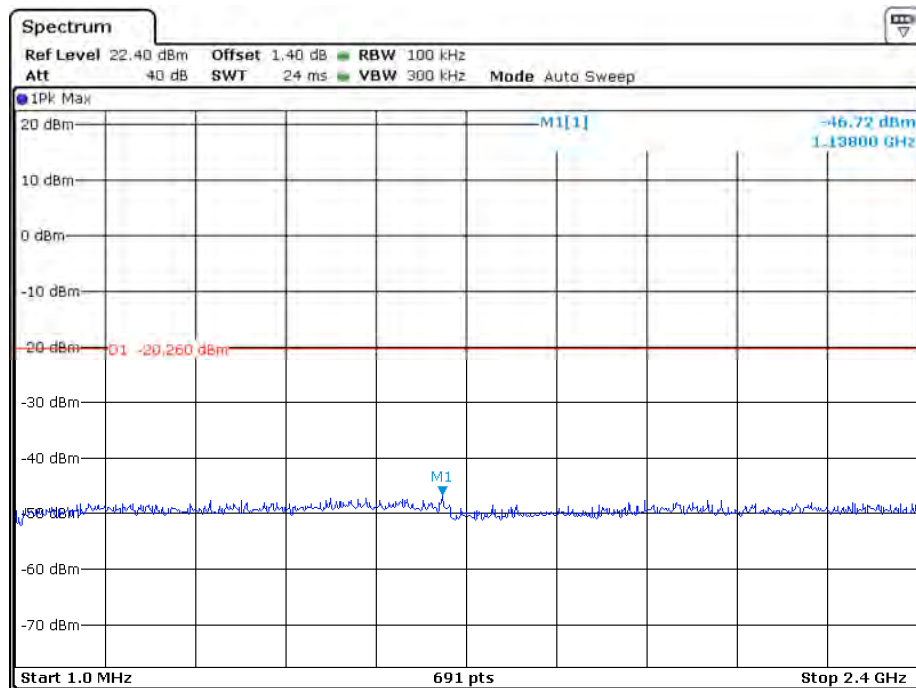
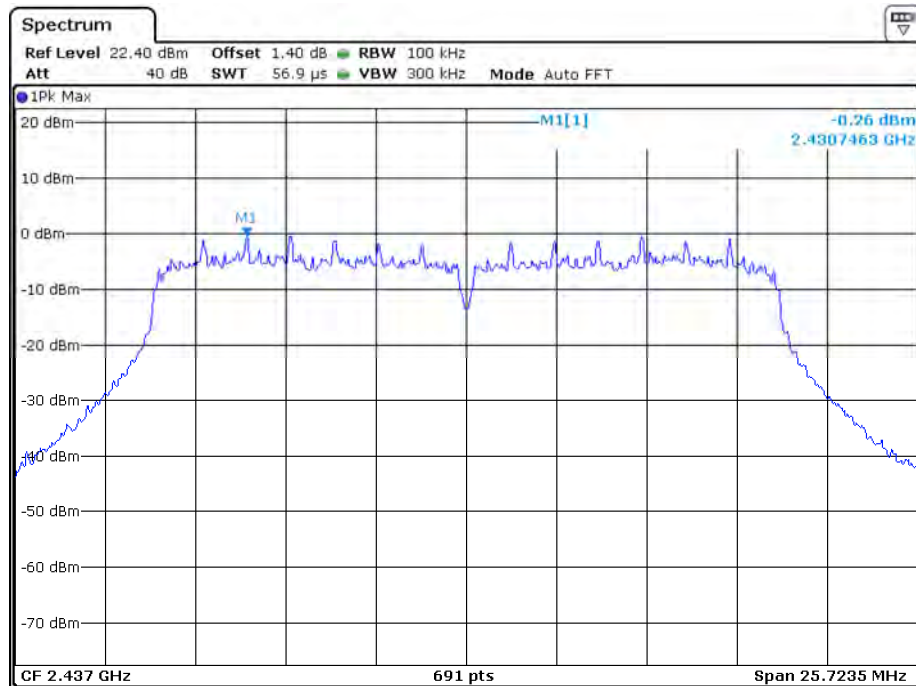
802.11n-HT20

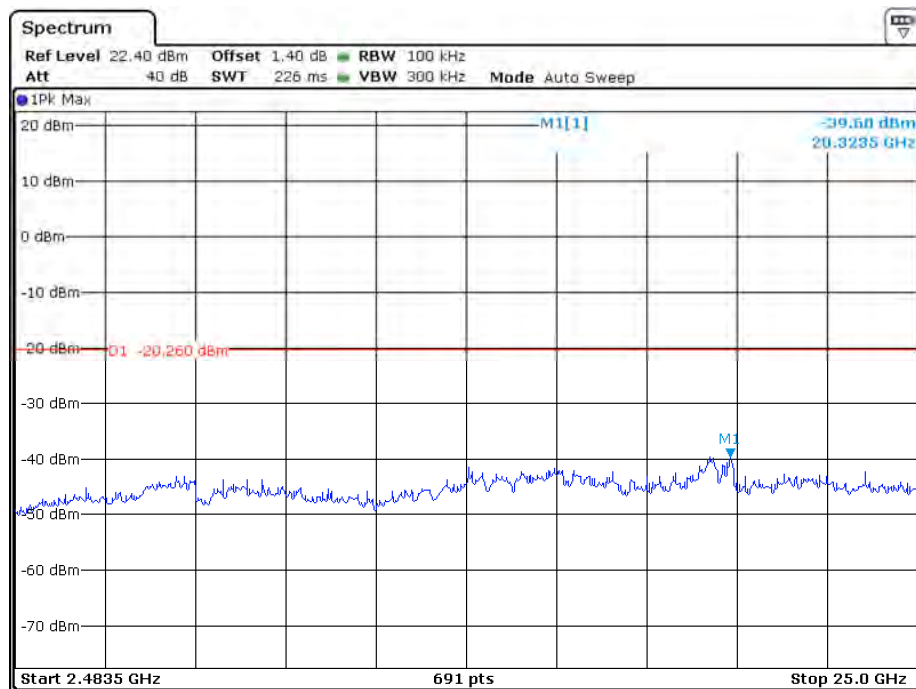
Channel 01 (2412MHz) Reference Level: -2.55dBm



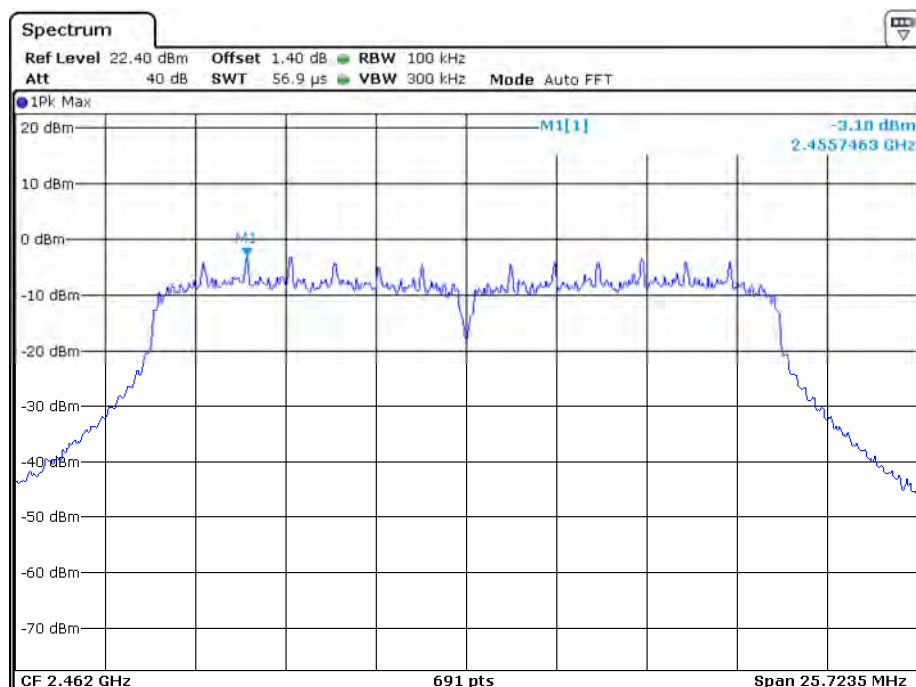


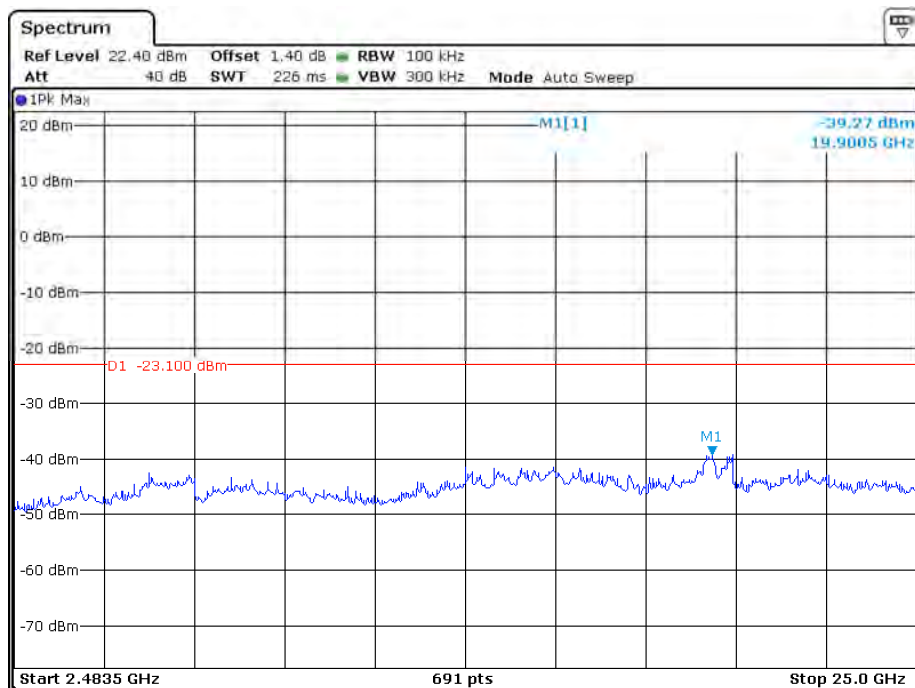
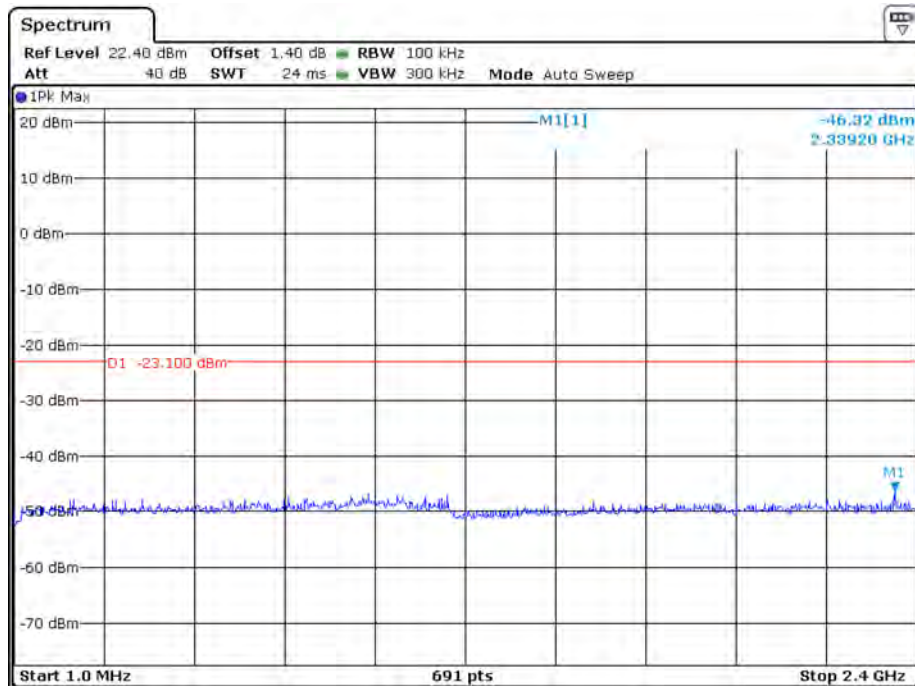
Channel 06 (2437MHz) Reference Level: -0.26dBm

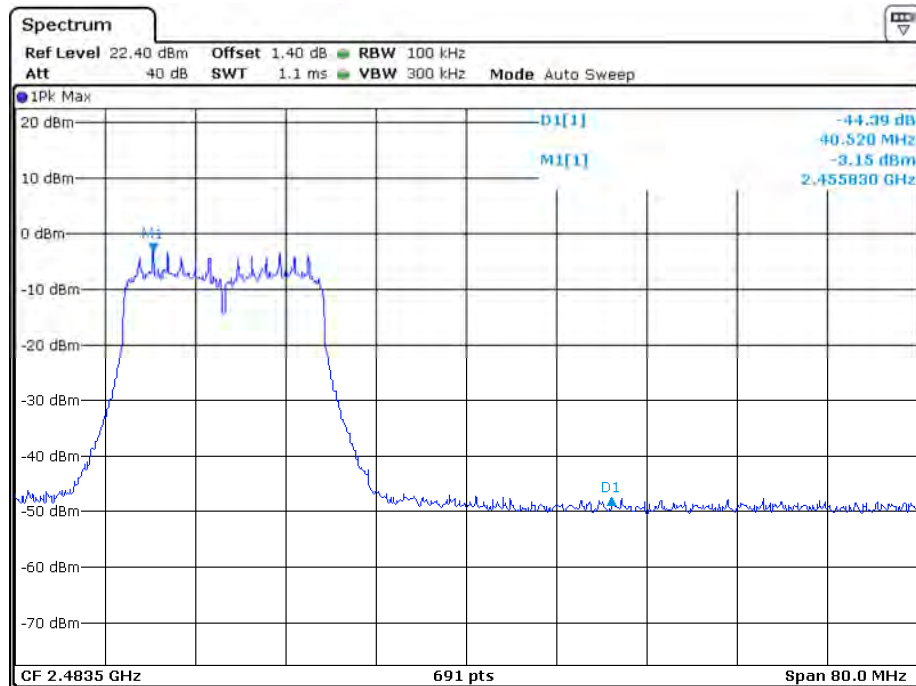




Channel 11 (2462MHz) Reference Level: -3.10dBm

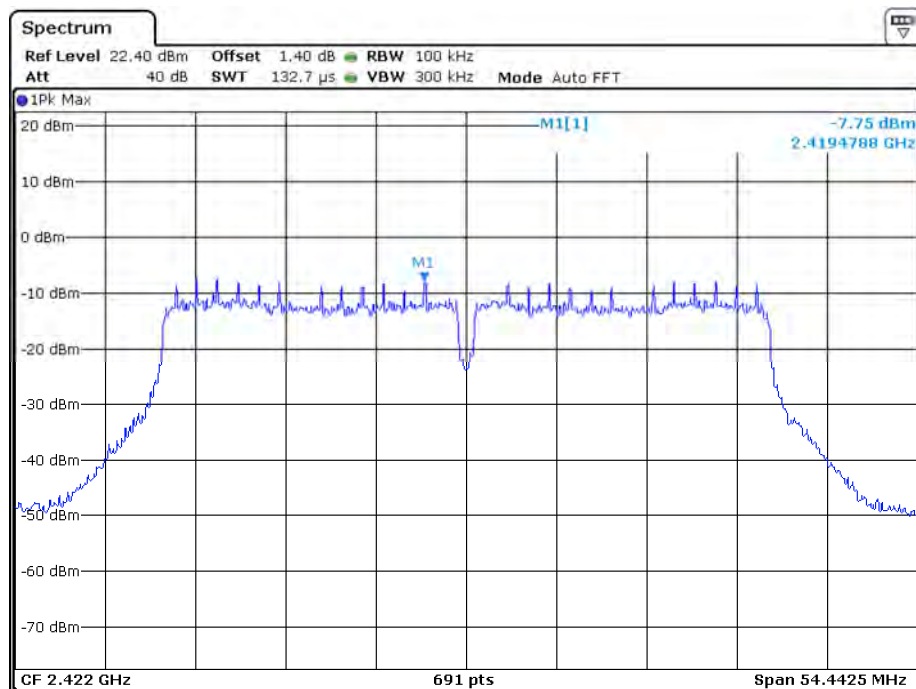


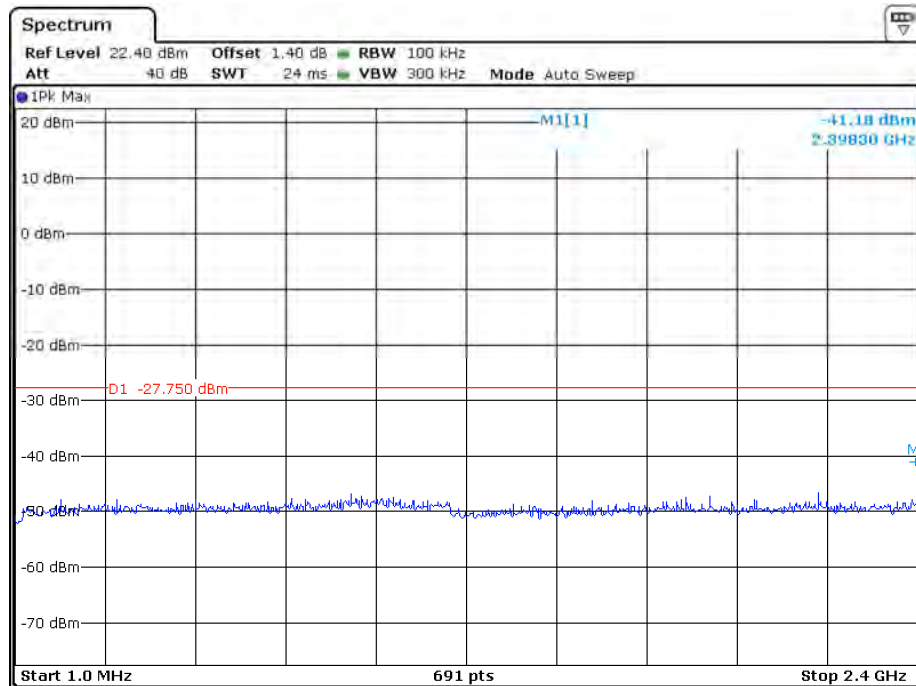


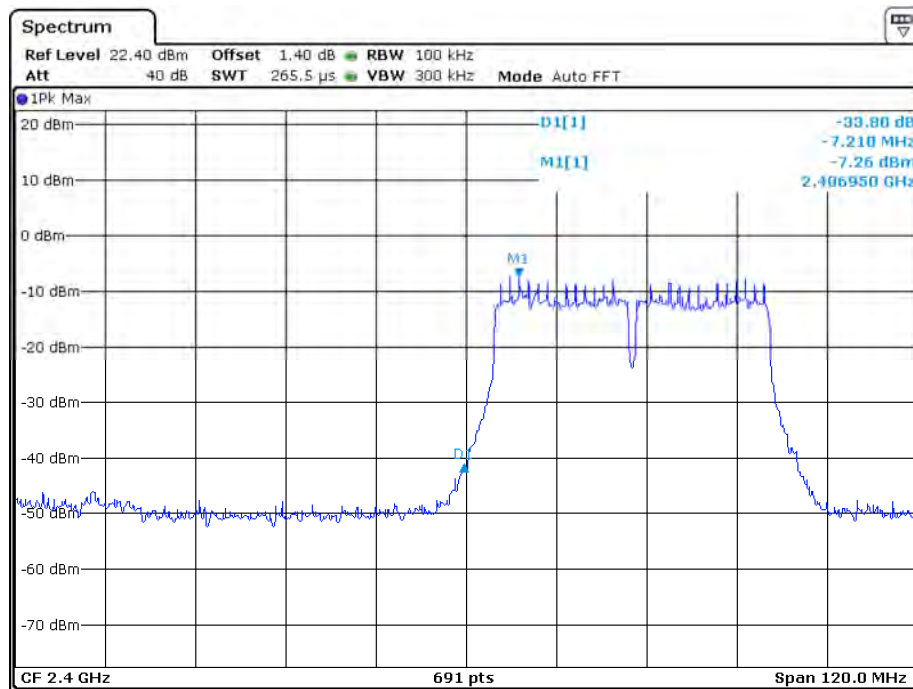


802.11n-HT40

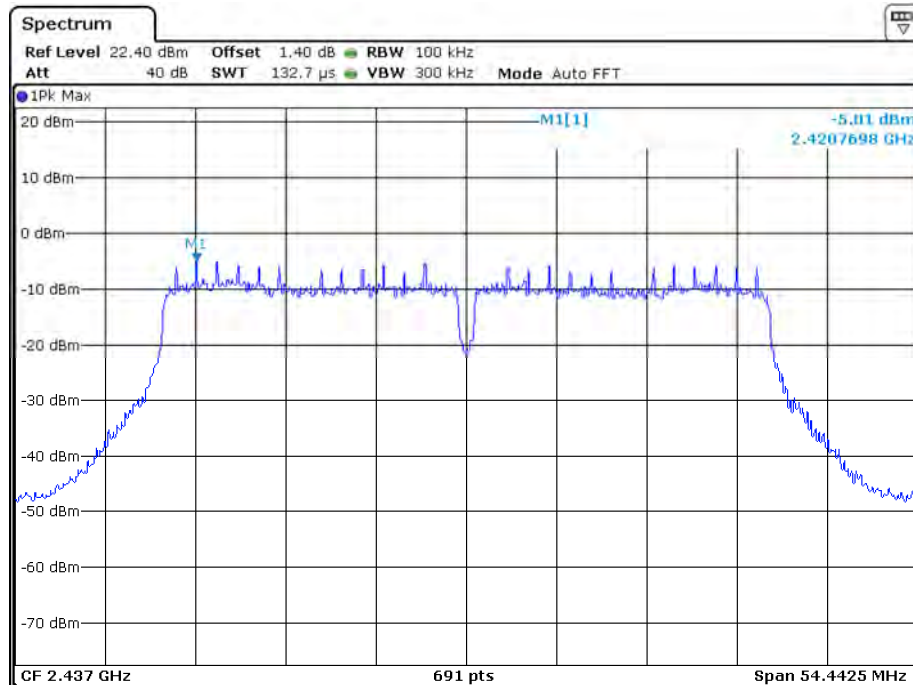
Channel 03 (2422MHz) Reference Level: -7.75dBm

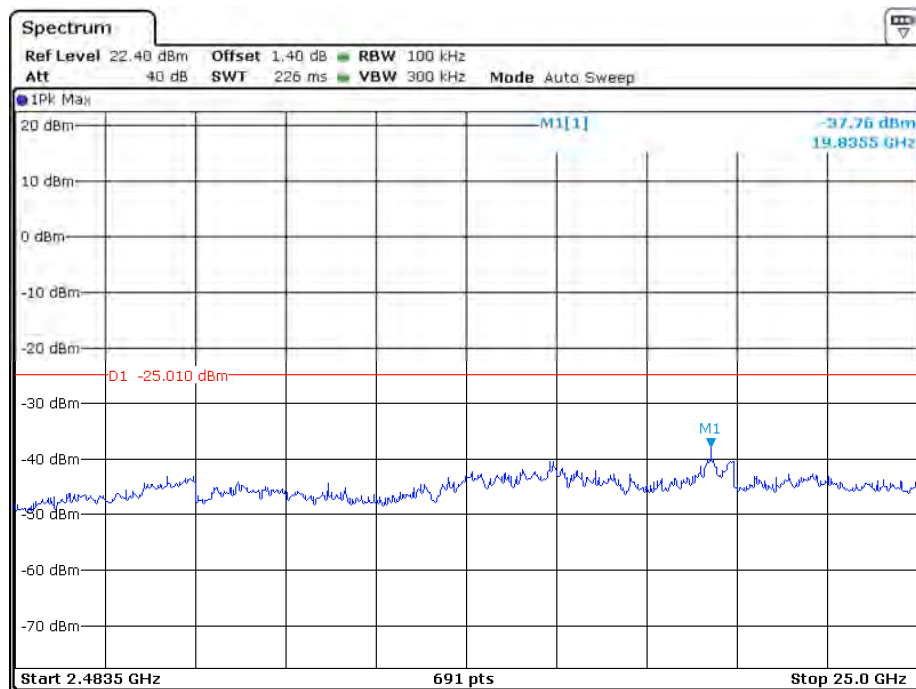
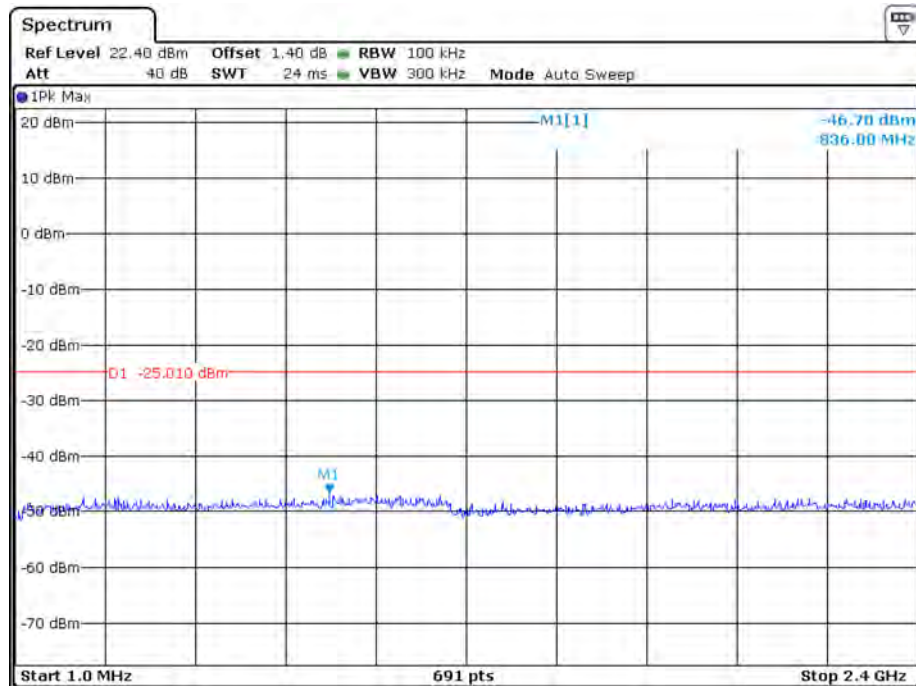




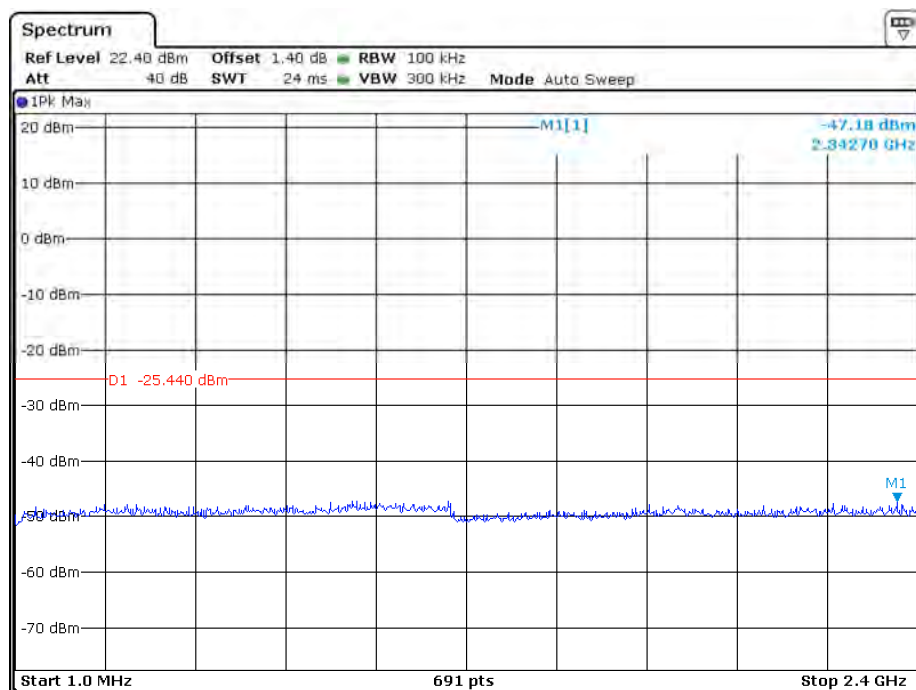
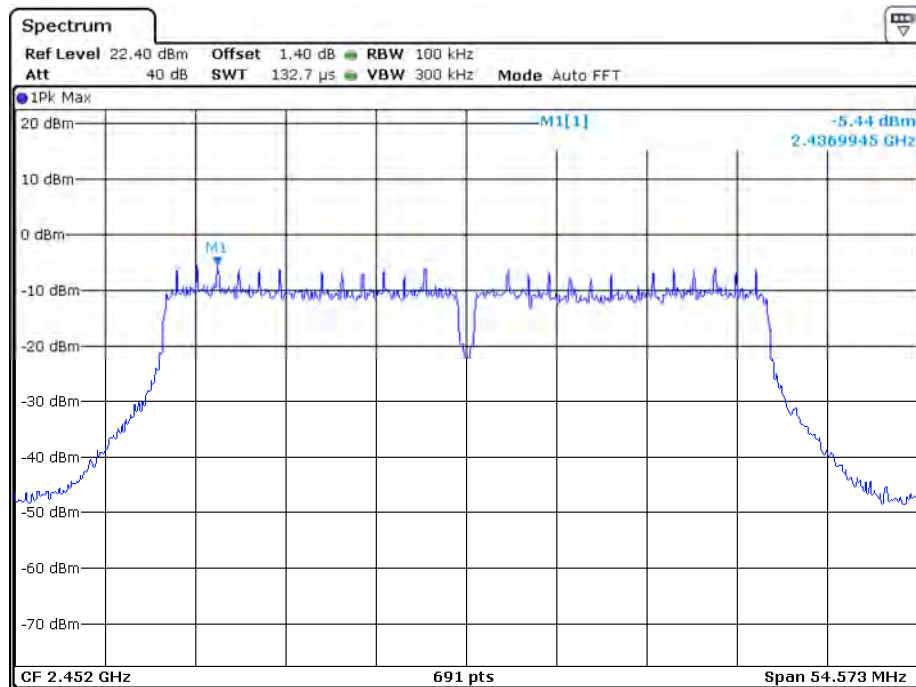


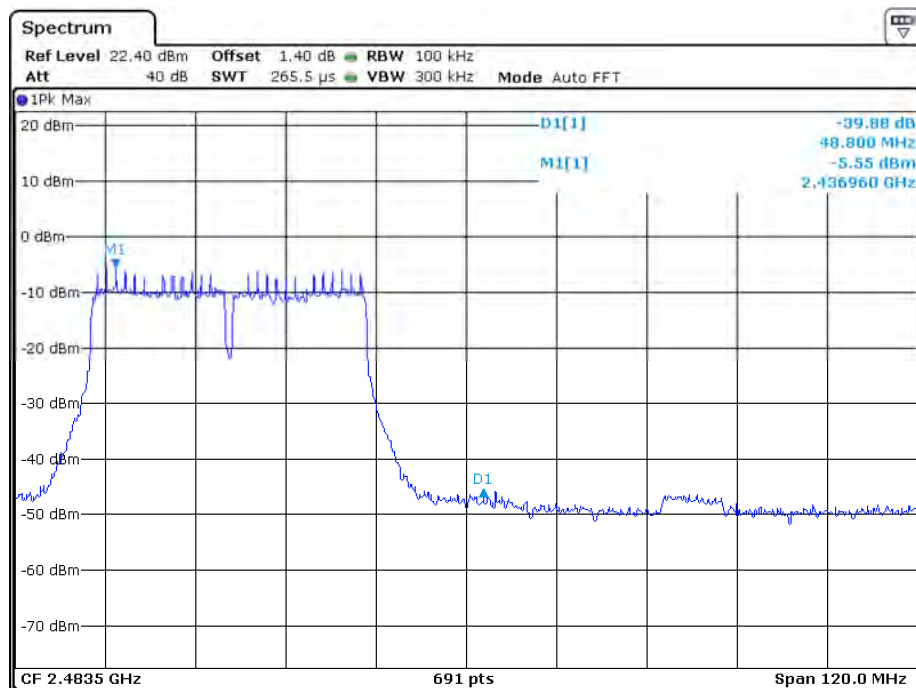
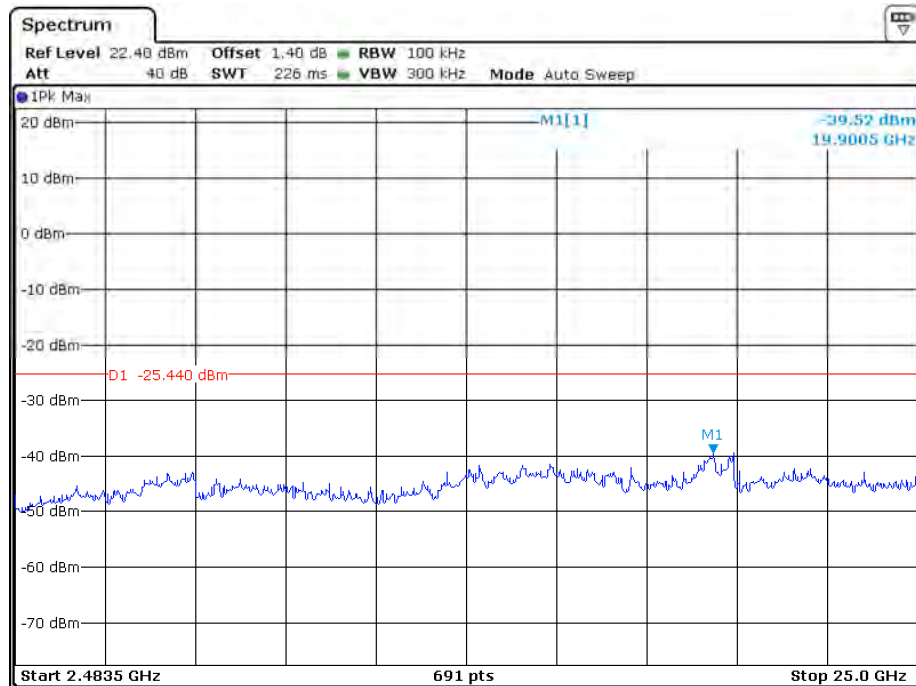
Channel 06 (2437MHz) Reference Level: -5.01dBm





Channel 09 (2452MHz) Reference Level: -5.44dBm

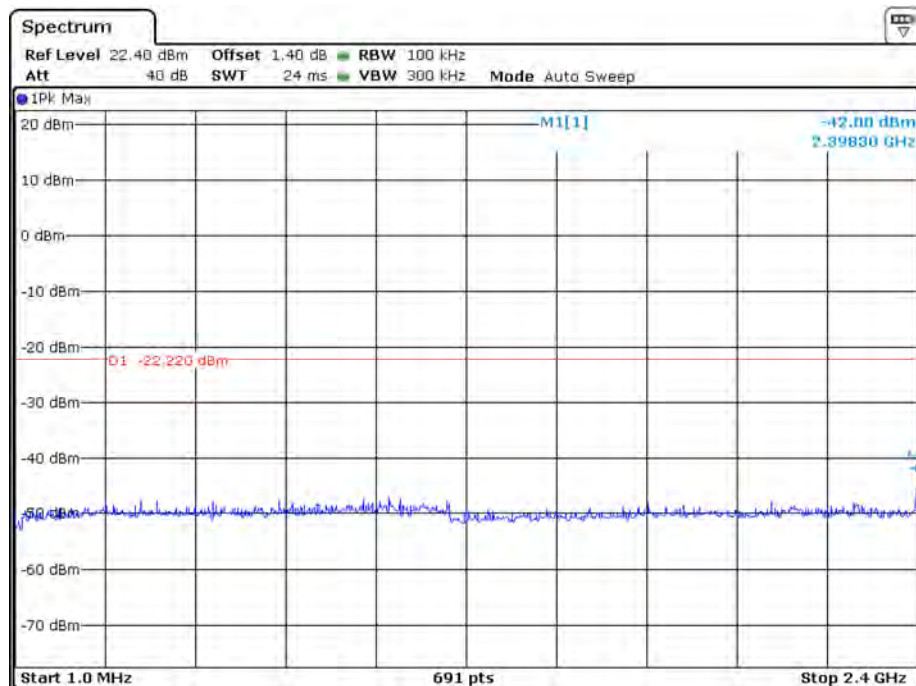
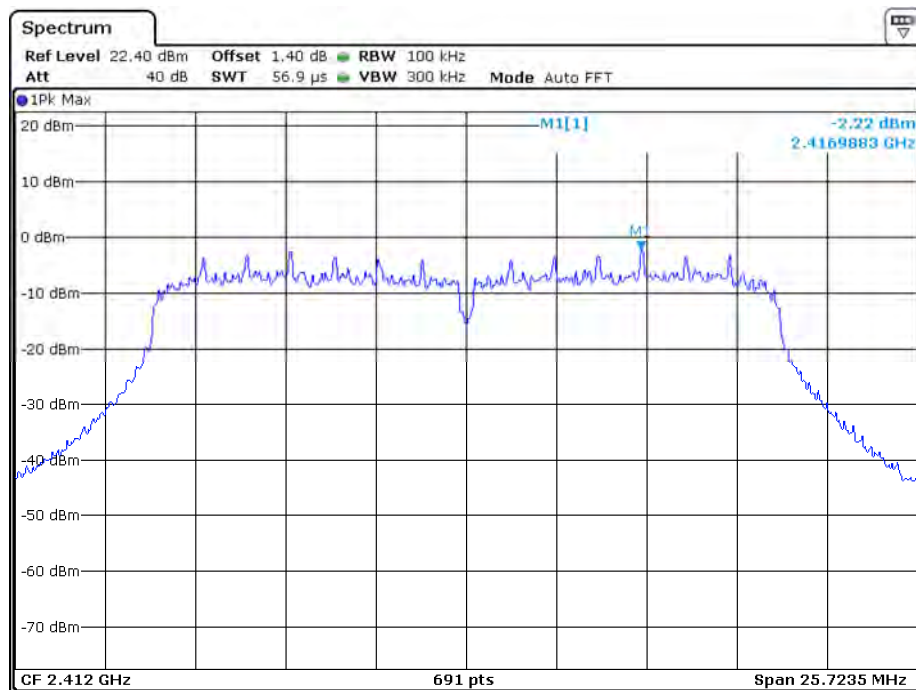


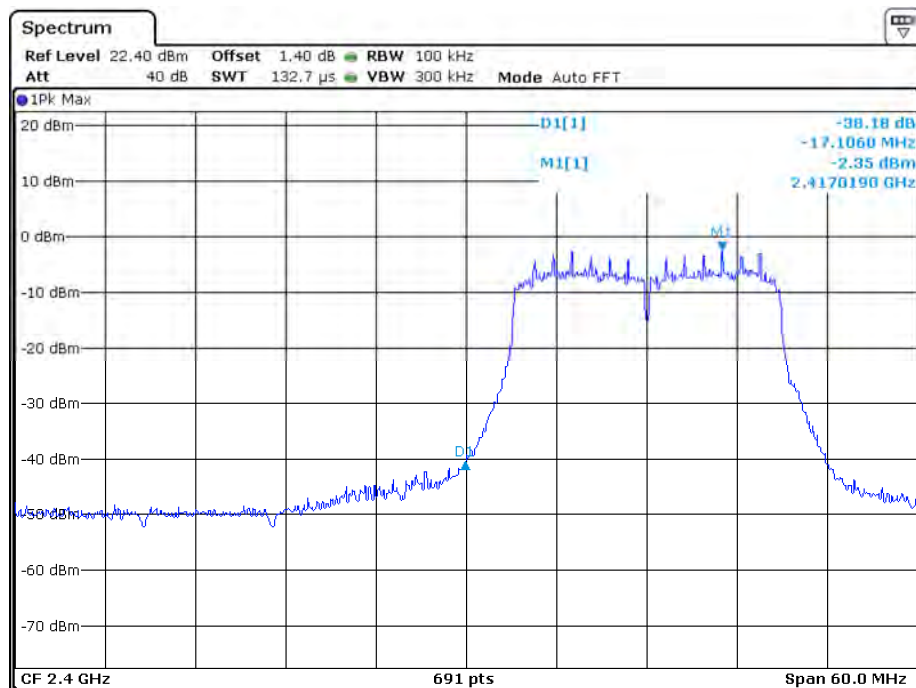
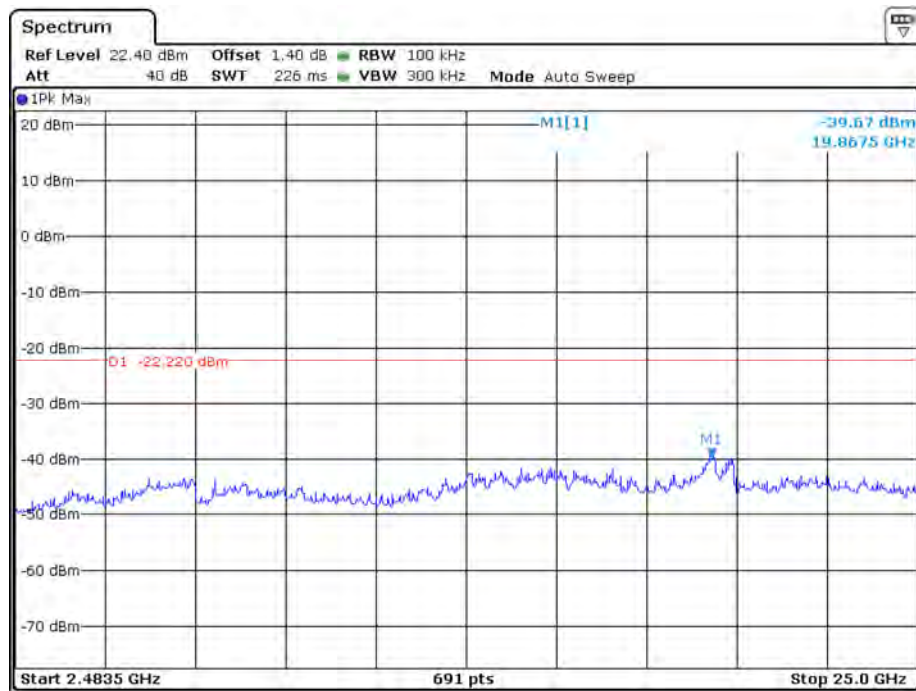


MIMO Mode, Ant2:

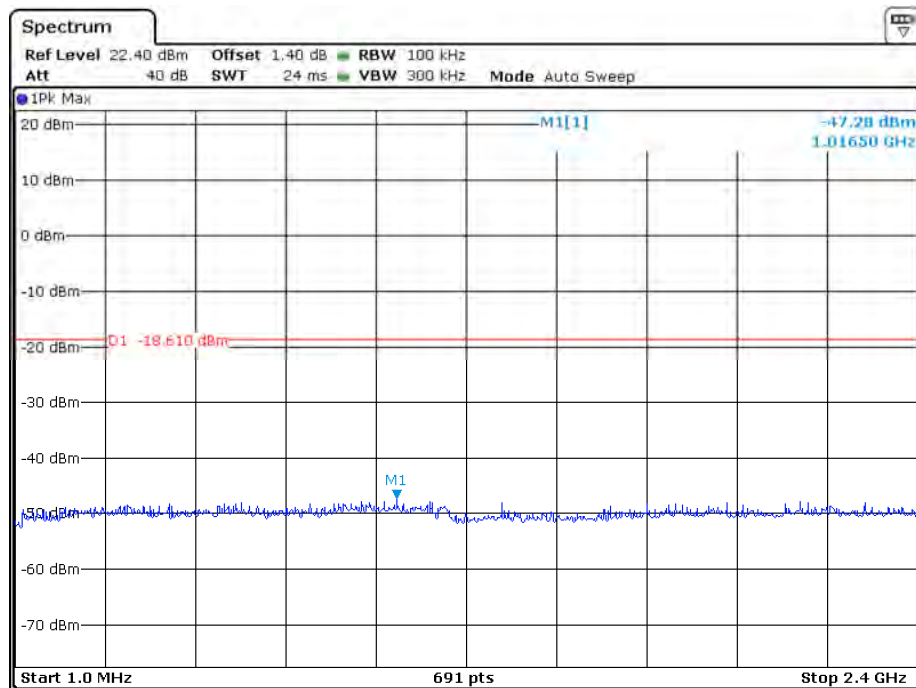
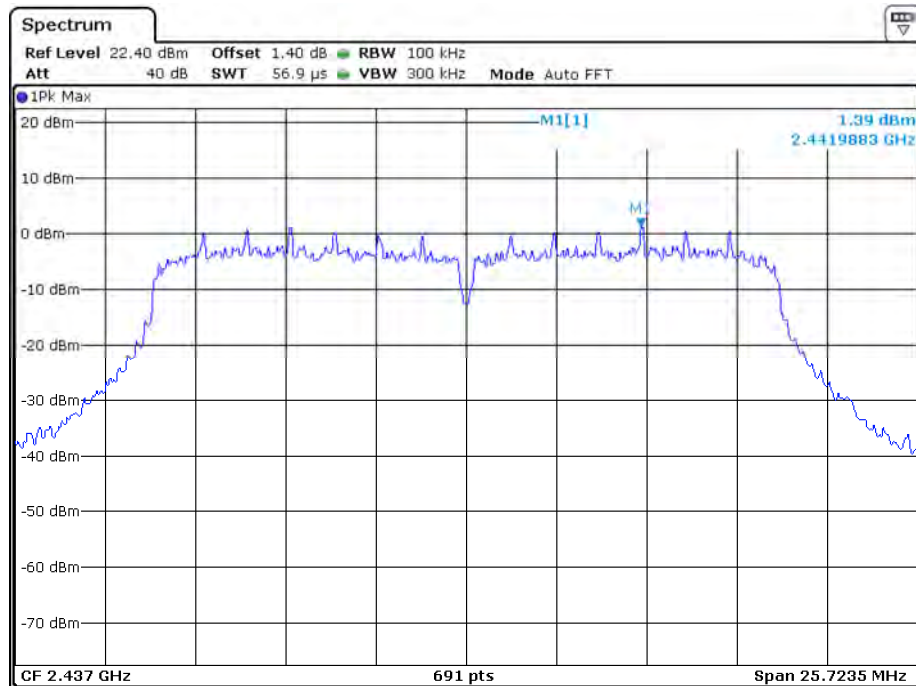
802.11n-HT20

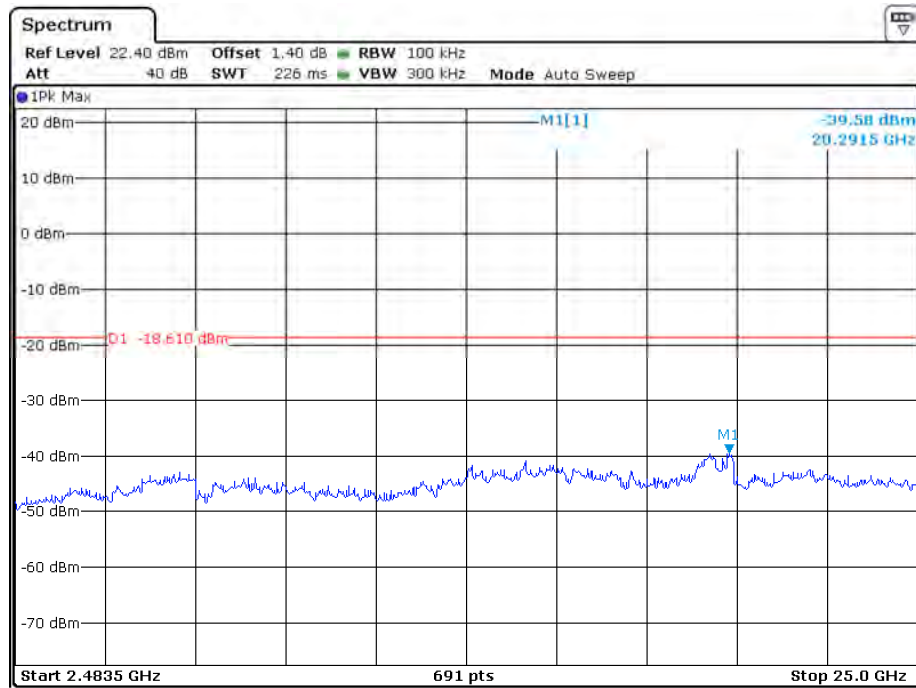
Channel 01 (2412MHz) Reference Level: -2.22dBm



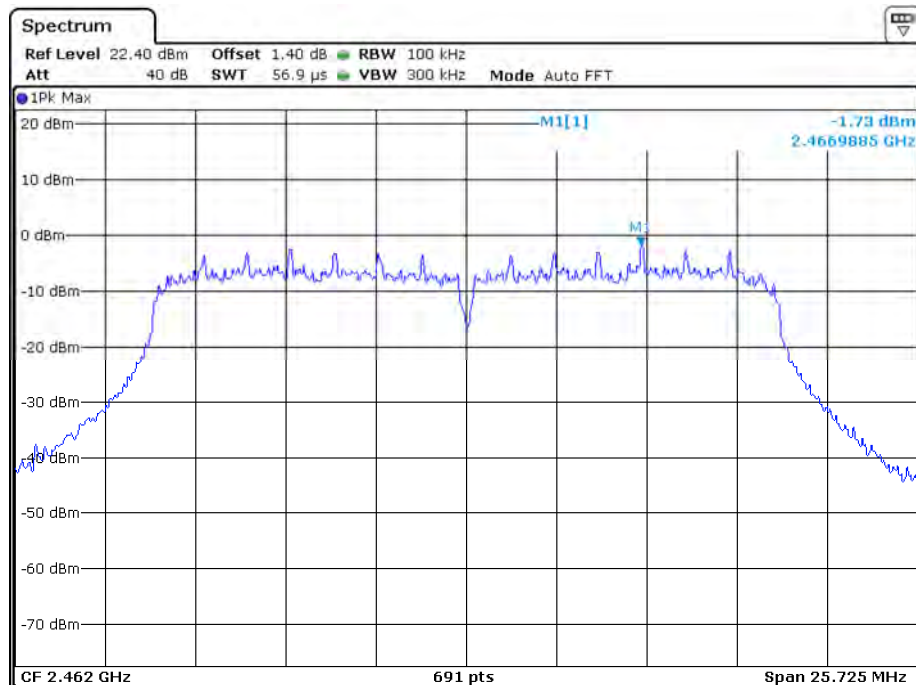


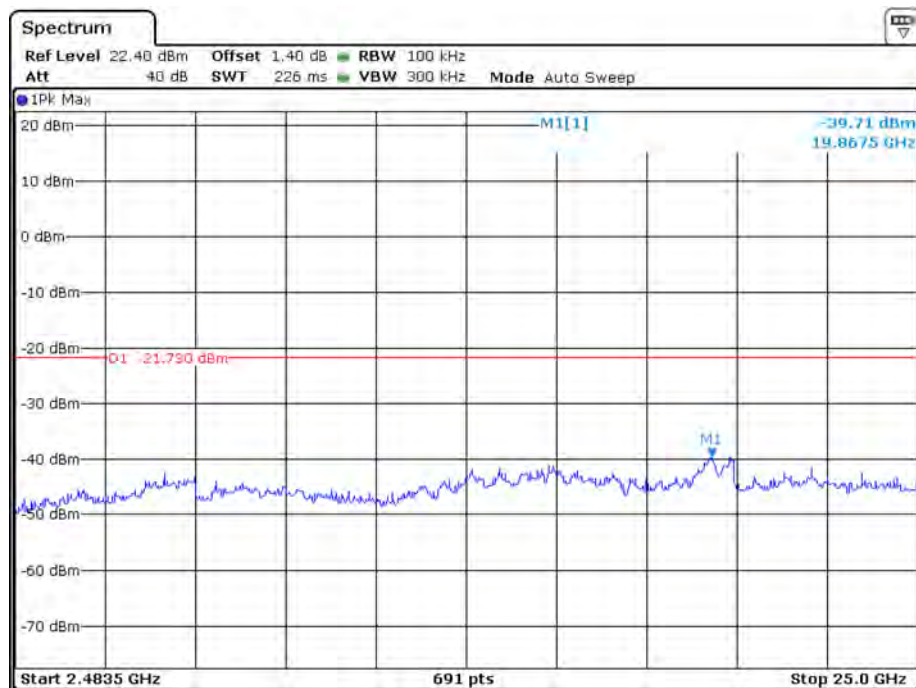
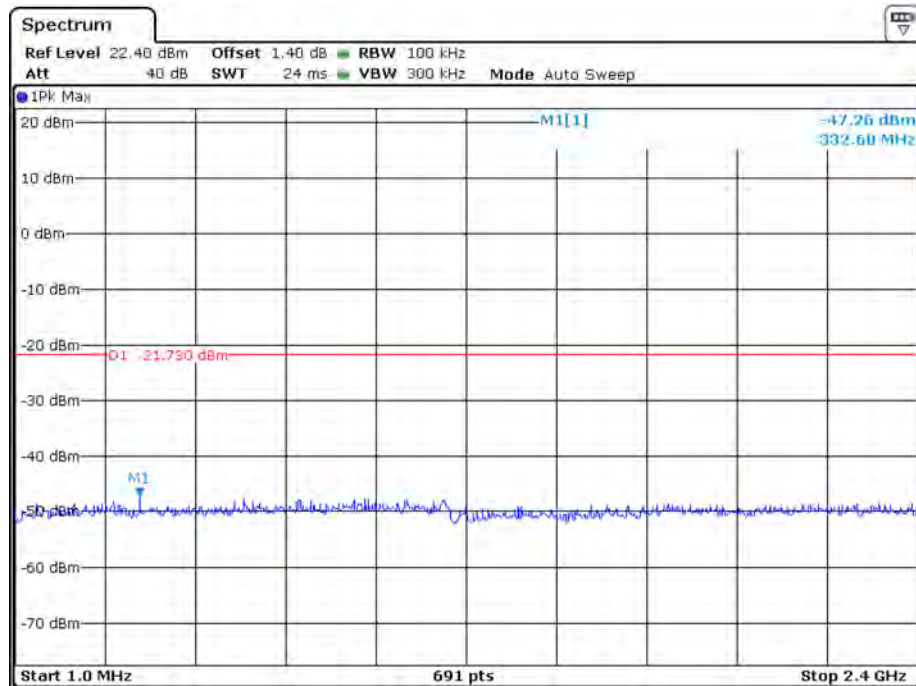
Channel 06 (2437MHz) Reference Level: 1.39dBm

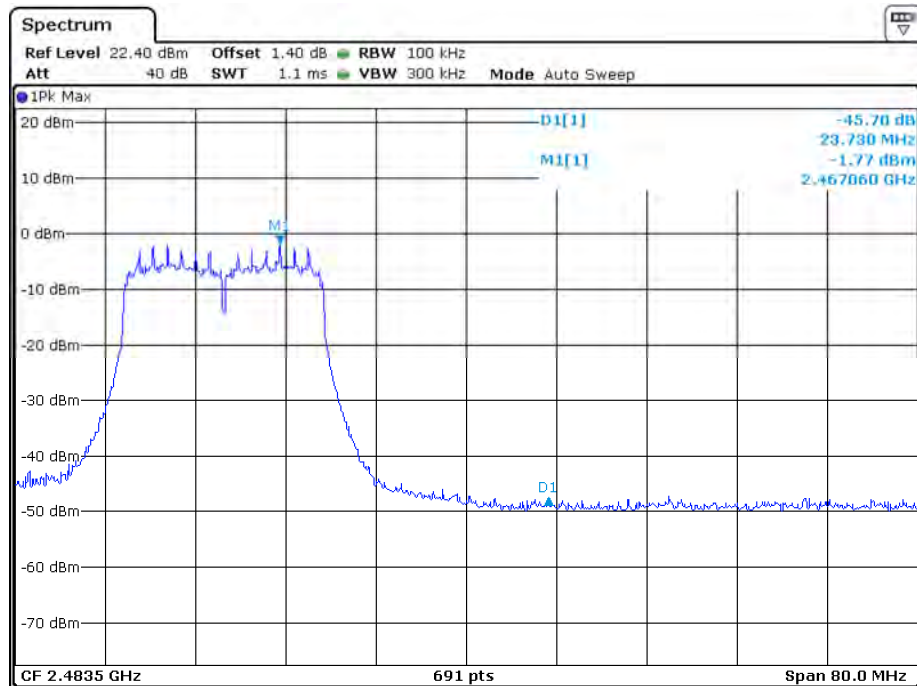




Channel 11 (2462MHz) Reference Level: -1.73dBm

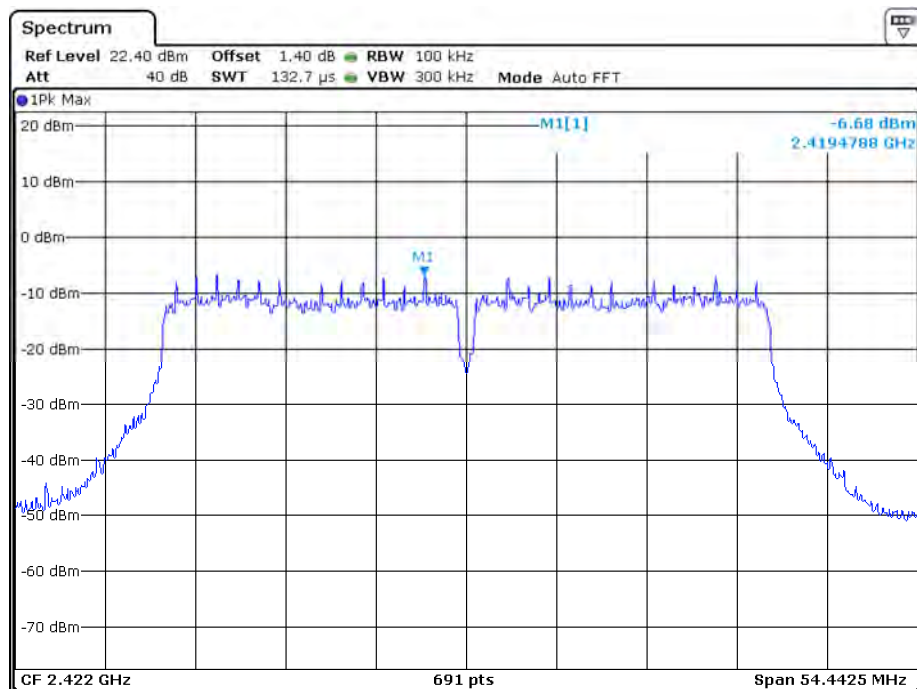


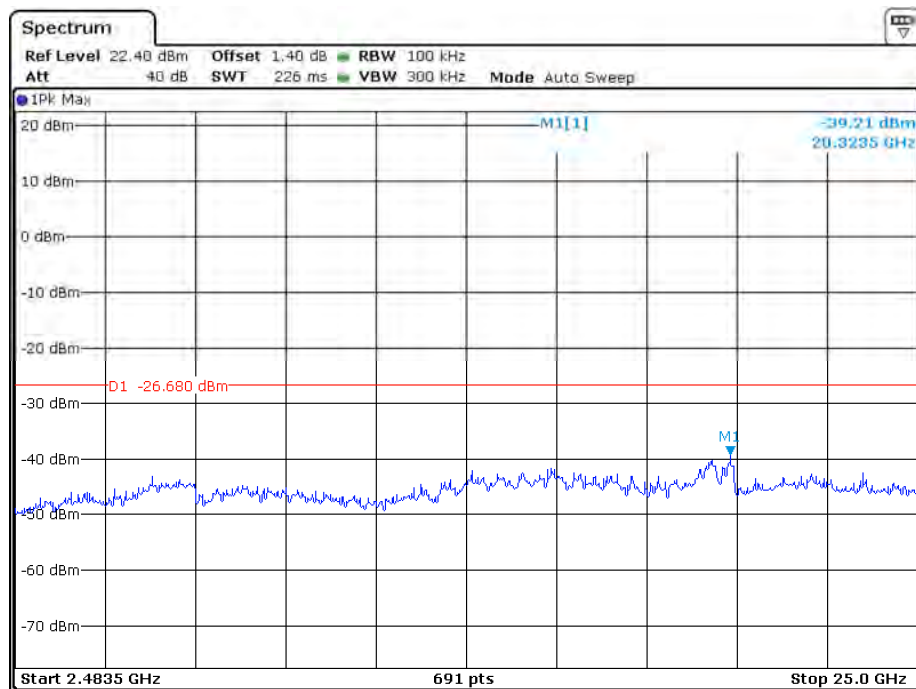
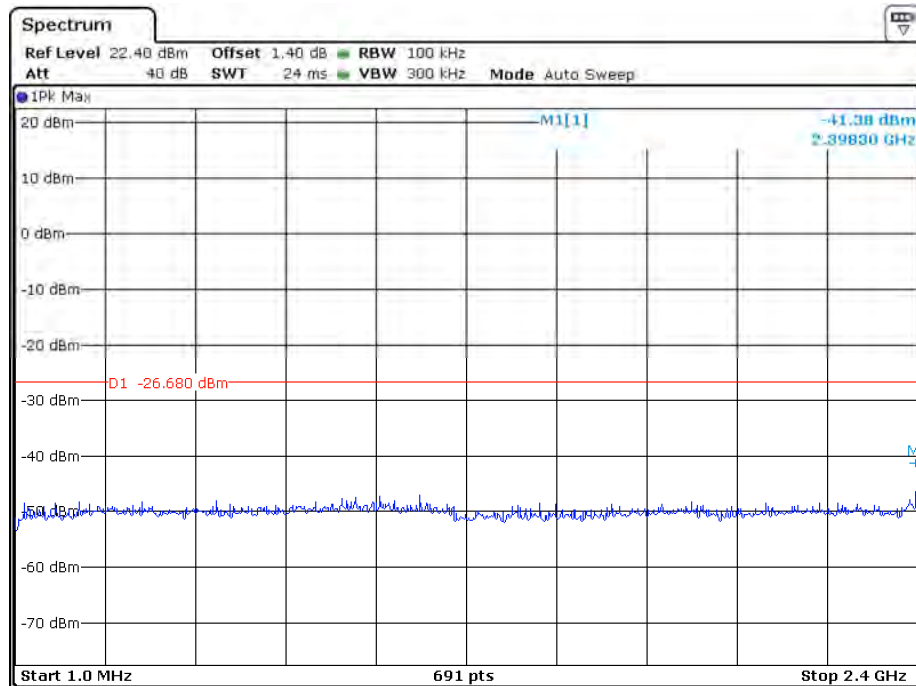


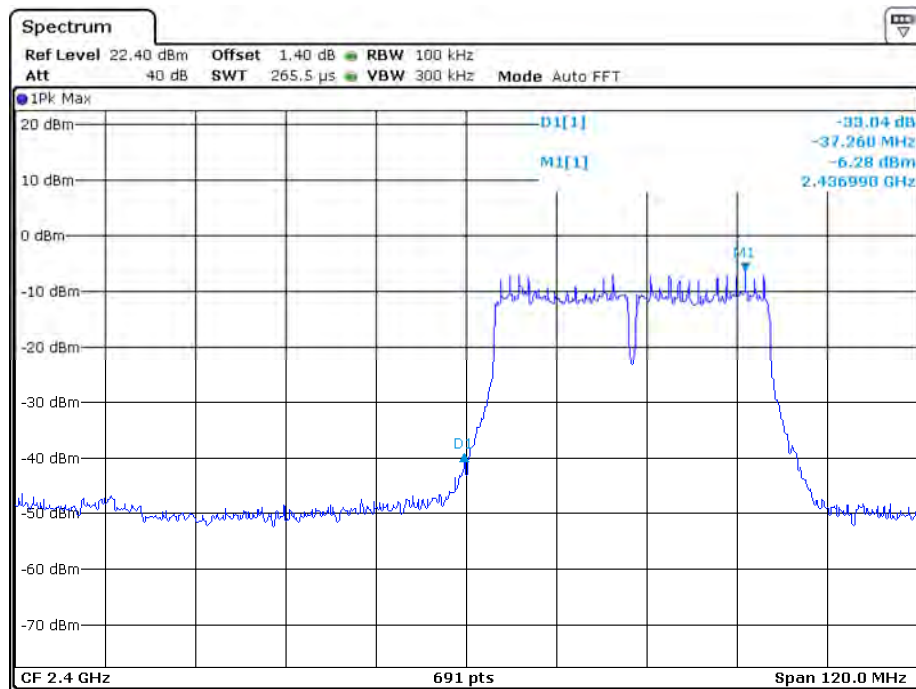


802.11n-HT40

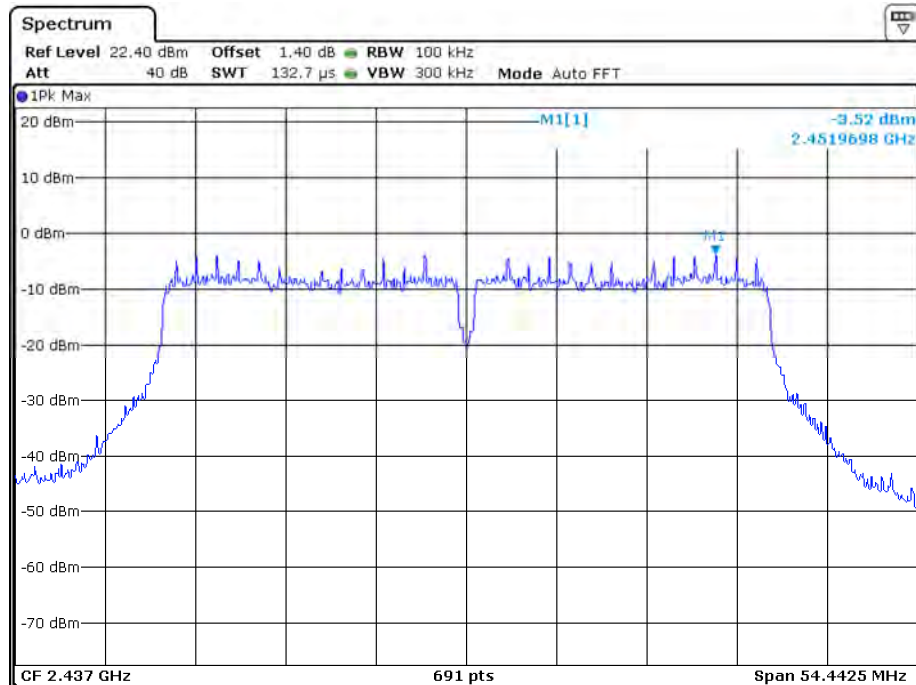
Channel 03 (2422MHz) Reference Level: -6.68dBm

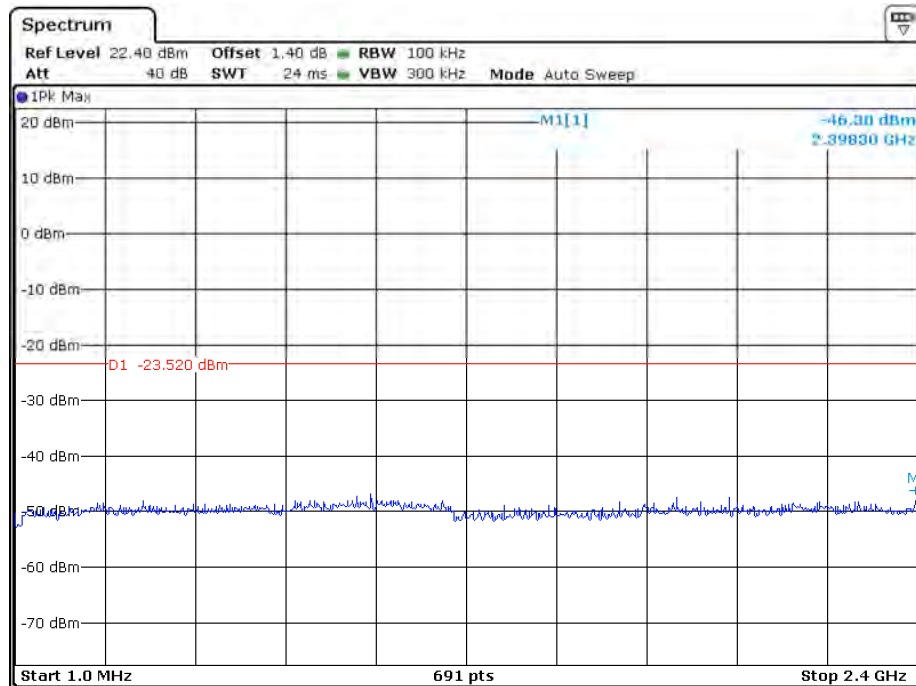




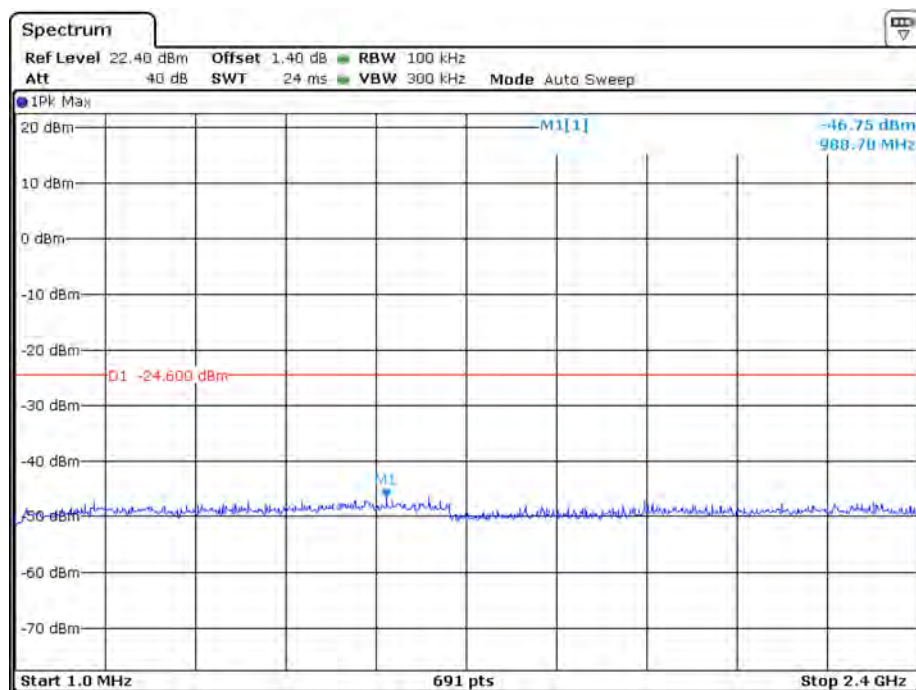


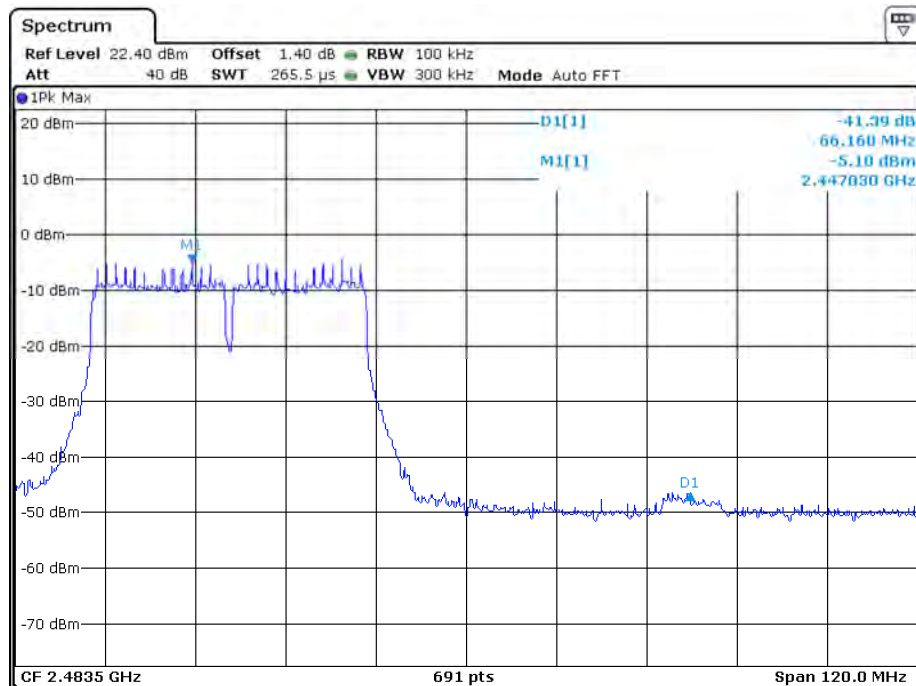
Channel 06 (2437MHz) Reference Level: -3.52dBm





Channel 09 (2452MHz) Reference Level: -4.60dBm





Applicant: Huawei Technologies Co., Ltd.

Date of Test: March 5, 2019

Model: X22C

4.5 Out of Band Radiated Emissions (for emissions in 4.4 above that are less than 20dB below carrier), FCC Rule 15.247(d):

For out of band emissions that are close to or that exceed the 20dB attenuation requirement described in the specification, radiated measurements were performed at a 3m separation distance to determine whether these emissions complied with the general radiated emission requirement.

[×] Not required, since all emissions are more than 20dB below fundamental

[] See attached data sheet

Applicant: Huawei Technologies Co., Ltd.

Date of Test: January 31, 2019

Model: X22C

4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.35(b) (c):

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified. Simultaneous transmission was considered during the test.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Applicant: Huawei Technologies Co., Ltd.

Date of Test: January 31, 2019

Model: X22C

4.7 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + AF + CF - AG + PD$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB
- PD = Pulse Desensitization in dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG + PD$$

Example

Assume a receiver reading of 62.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB. The net field strength for comparison to the appropriate emission limit is 42 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$\begin{aligned} RA &= 62.0 \text{ dB}\mu\text{V} \\ AF &= 7.4 \text{ dB} \\ CF &= 1.6 \text{ dB} \\ AG &= 29.0 \text{ dB} \\ PD &= 0 \text{ dB} \\ FS &= 62 + 7.4 + 1.6 - 29 + 0 = 42 \text{ dB}\mu\text{V/m} \end{aligned}$$

$$\text{Level in mV/m} = \text{Common Antilogarithm} [(42 \text{ dB}\mu\text{V/m})/20] = 125.9 \mu\text{V/m}$$

Applicant: Huawei Technologies Co., Ltd.

Date of Test: January 31, 2019

Model: X22C

4.8 Radiated Spurious Emission

Worst Case Radiated Spurious Emission
at 7386MHz
is passed by 9.99dB margin.

For the electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

Applicant: Huawei Technologies Co., Ltd.

Date of Test: January 31, 2019

Worst Case Operating Mode:

Worst Case Adapter:

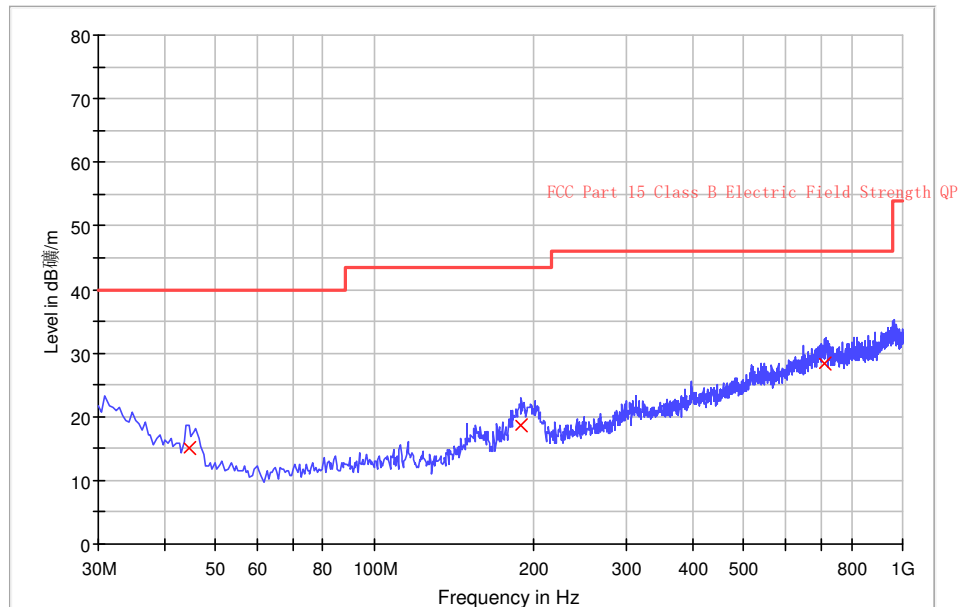
Model: X22C

Transmitting (11b-2412MHz)

Adapter1

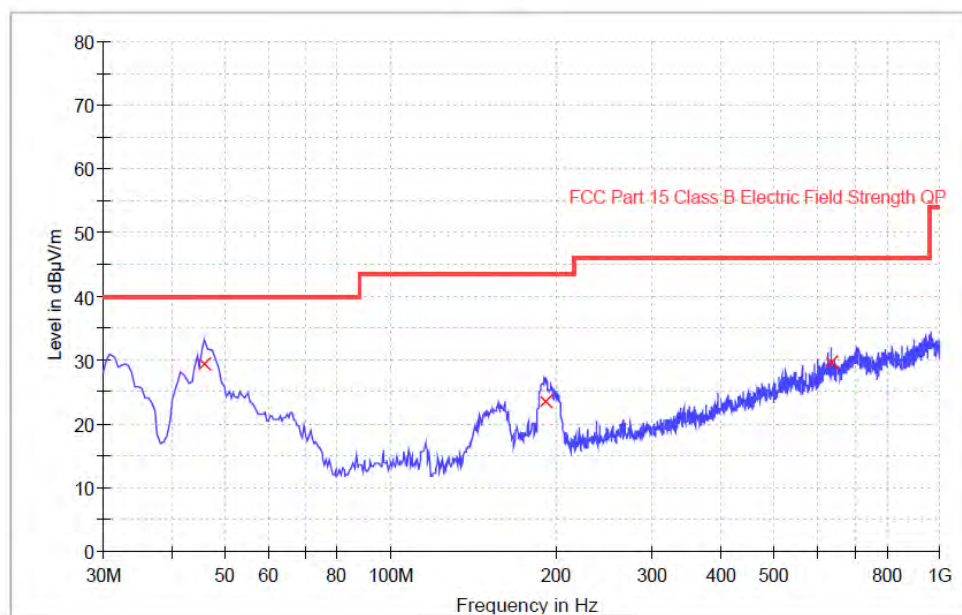
ANT Polarity: Horizontal

FCC Part 15



ANT Polarity: Vertical

FCC Part 15



Applicant: Huawei Technologies Co., Ltd.

Date of Test: January 31, 2019

Worst Case Operating Mode:

Worst Case Adapter:

Model: X22C

Transmitting (11b-2412MHz)

Adapter 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	44.550000	24.3	20.0	10.9	15.2	40.0	-24.8
Horizontal	189.565000	27.3	20.0	11.3	18.6	43.5	-24.9
Horizontal	712.880000	23.3	20.0	25.1	28.4	46.0	-17.6
Vertical	45.003000	38.8	20.0	10.3	29.1	40.0	-10.9
Vertical	189.250000	31.9	20.0	11.3	23.2	43.5	-20.3
Vertical	703.100000	26.8	20.0	23.9	30.7	46.0	-15.3

NOTES: 1. Quasi-Peak detector is used for frequency below 1GHz.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. All emissions are below the QP limit.

Applicant: Huawei Technologies Co., Ltd.

Date of Test: January 31, 2019

Worst Case Operating Mode:

Model: X22C

Transmitting (11b-2412MHz)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4824.000	50.1	36.3	33.5	47.30	74.0	-26.70
Horizontal	*2383.590	48.9	36.4	27.3	39.77	74.0	-34.23

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4824.000	40.1	36.3	33.5	37.29	54.0	-16.71
Horizontal	*2383.590	41.6	36.4	27.3	32.51	54.0	-21.49

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz/VBW=10Hz for average value.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Huawei Technologies Co., Ltd.

Date of Test: January 31, 2019

Worst Case Operating Mode:

Model: X22C

Transmitting (11b-2437MHz)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4874.000	50.4	36.3	33.6	47.69	74.0	-26.31
Horizontal	*7311.000	51.2	36.3	37.8	52.74	74.0	-21.26

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4874.000	40.1	36.3	33.6	37.38	54.0	-16.62
Horizontal	*7311.000	41.6	36.3	37.8	43.13	54.0	-10.87

NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: Huawei Technologies Co., Ltd.

Date of Test: January 31, 2019

Worst Case Operating Mode:

Model: X22C

Transmitting (11b-2462MHz)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4924.000	50.2	36.3	33.6	47.53	74.0	-26.47
Horizontal	*7386.000	52.8	36.3	37.8	54.34	74.0	-19.66

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4924.000	39.9	36.3	33.6	37.18	54.0	-16.82
Horizontal	*7386.000	42.5	36.3	37.8	44.01	54.0	-9.99

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

4.9 Conducted Emission at Mains Terminal

4.9.1 Conducted Emissions Configuration Photograph

For electronic filing, the worst case conducted emission configuration photograph is saved with filename: conducted photos.pdf.

4.9.2 Conducted Emissions

Worst Case Live-Conducted Configuration

At

0.334 MHz

Judgement: Passed by 9.4 dB margin

Applicant: Huawei Technologies Co., Ltd.

Date of Test: 18 February 2019

Worst Case Operating Mode:

Worst Case Adapter:

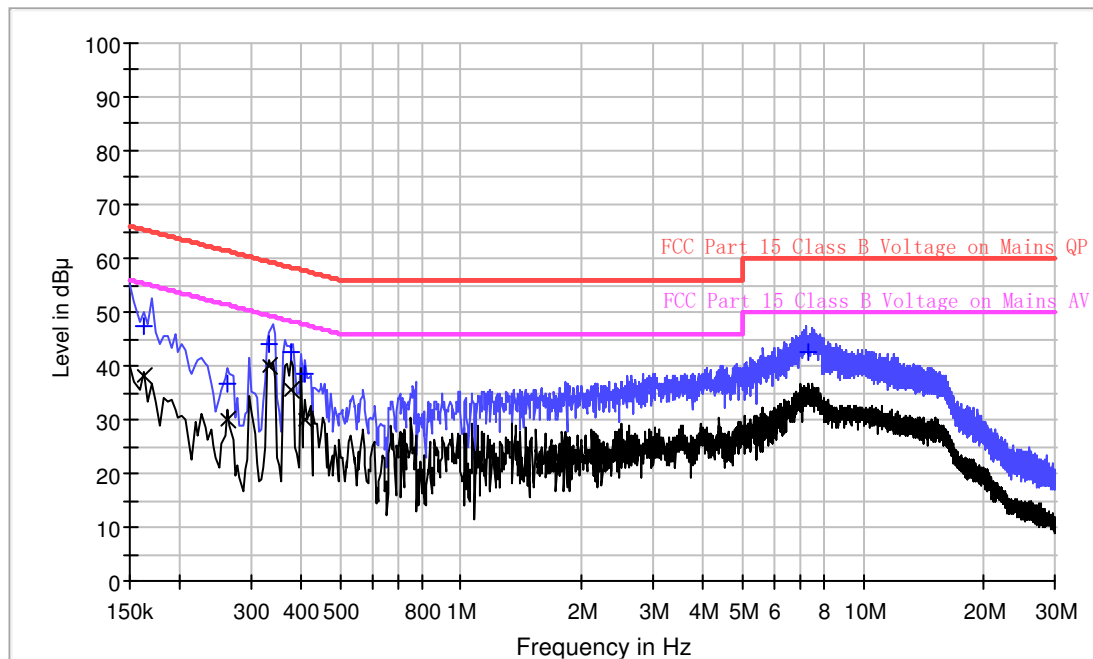
Phase: Live

Model: X22C

WIFI Link

Adapter 5

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.162000	47.5	L	9.6	17.9	65.4
0.262000	36.8	L	9.6	24.6	61.4
0.334000	44.2	L	9.6	15.2	59.4
0.378000	42.5	L	9.6	15.8	58.3
0.410000	38.5	L	9.6	19.1	57.6
7.330000	42.5	L	9.8	17.5	60.0

Result Table AV

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.162000	38.0	L	9.6	17.4	55.4
0.262000	29.9	L	9.6	21.5	51.4
0.334000	40.0	L	9.6	9.4	49.4
0.378000	35.7	L	9.6	12.6	48.3
0.410000	30.0	L	9.6	17.6	47.6
7.330000	34.4	L	9.8	15.6	50.0

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)

2. Margin (dB) = Limit (dBuV) – Level (dBuV)

Applicant: Huawei Technologies Co., Ltd.

Date of Test: 18 February 2019

Worst Case Operating Mode:

Worst Case Adapter:

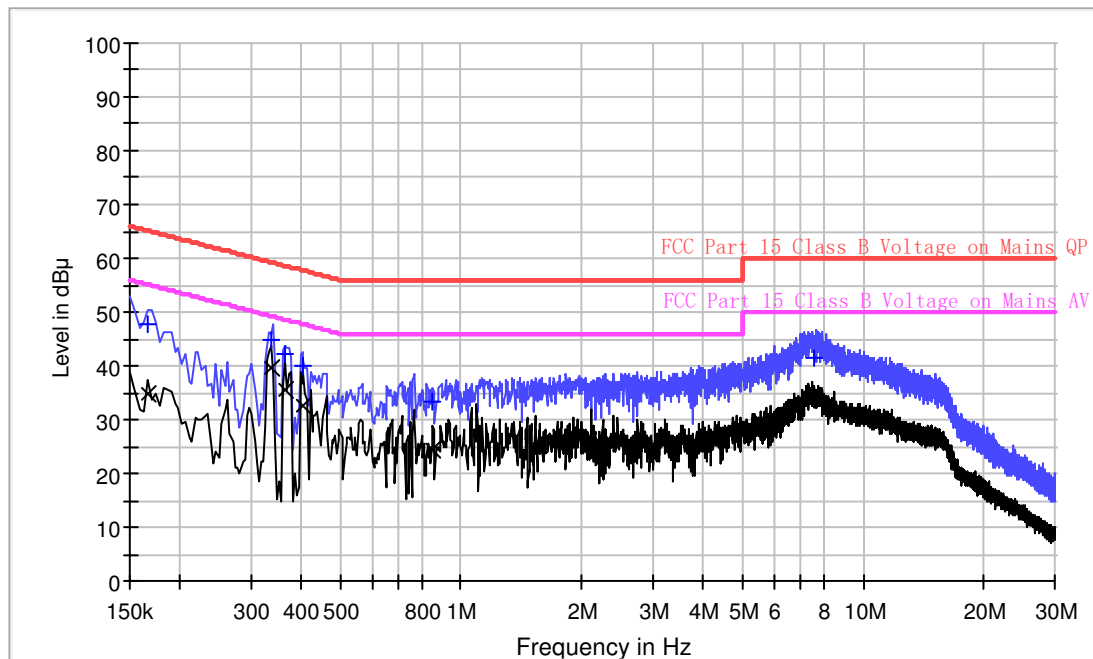
Phase: Neutral

Model: X22C

WIFI Link

Adapter 5

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.166000	47.7	N	9.6	17.5	65.2
0.338000	45.0	N	9.6	14.3	59.3
0.366000	42.1	N	9.6	16.5	58.6
0.406000	39.9	N	9.6	17.8	57.7
0.850000	33.2	N	9.7	22.8	56.0
7.558000	41.6	N	9.8	18.4	60.0

Result Table AV

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.166000	34.9	N	9.6	20.3	55.2
0.338000	39.7	N	9.6	9.6	49.3
0.366000	35.7	N	9.6	12.9	48.6
0.406000	32.4	N	9.6	15.3	47.7
0.850000	24.6	N	9.7	21.4	46.0
7.558000	34.5	N	9.8	15.5	50.0

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)

2. Margin (dB) = Limit (dBuV) – Level (dBuV)

Applicant: Huawei Technologies Co., Ltd.
Model: X22C

4.10 Radiated Emissions from Digital Section of Transceiver, FCC Ref: 15.109

- ☐ Not required - No digital part
- ☐ Test results are attached
- ☒ Included in the separated report.

Applicant: Huawei Technologies Co., Ltd.
Model: X22C

4.11 Transmitter Duty Cycle Calculation and Measurements, FCC Rule 15.35(b), (c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEP function on the analyzer was set to ZERO SPAN. The Transmitter ON time was determined from the resultant time-amplitude display:

	See attached spectrum analyzer chart (s) for Transmitter timing
	See Transmitter timing diagram provided by manufacturer
x	Not applicable, duty cycle was not used.

EXHIBIT 5

EQUIPMENT PHOTOGRAPHS

5.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.pdf & internal photos.pdf.

EXHIBIT 6

PRODUCT LABELLING

6.0 Product Labeling

For electronic filing, the FCC ID label artwork and location is saved with filename: label.pdf.

EXHIBIT 7

TECHNICAL SPECIFICATIONS

7.0 Technical Specifications

For electronic filing, the block diagram and circuit diagram are saved with filename: block.pdf and circuit.pdf respectively.

EXHIBIT 8

INSTRUCTION MANUAL

8.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

EXHIBIT 9

CONFIDENTIALITY REQUEST

9.0 Confidentiality Request

For electronic filing, the confidentiality request of the tested EUT is saved with filename: request.pdf.

EXHIBIT 10

MISCELLANEOUS INFORMATION

10.0 Discussion of Pulse Desensitization

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF*.

Pulse desensitivity is not applicable for this device since the transmitter transmits the RF signal continuously.

EXHIBIT 11

TEST EQUIPMENT LIST

11.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ182-02	RF Power Meter	Anritsu	ML2496A	1302005	5-Jun-2018	5-Jun-2019
SZ182-02-01	Power Sensor	Anritsu	MA2411B	1207429	5-Jun-2018	5-Jun-2019
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	11-May-2018	11-May-2019
SZ067-04	Notch Filter	Micro-Tronics	BRM5070 2-02	--	5-Jun-2018	5-Jun-2019
SZ061-03	Biconilog Antenna	ETS	3142C	00078828	16-Oct-2018	16-Oct-2019
SZ061-08	Horn Antenna	ETS	3115	00092346	14-Sep-2018	14-Sep-2019
SZ061-07	Pyramidal Horn Antenna	ETS	3160-09	00083067	17-Mar-2018	17-Mar-2019
SZ056-03	Spectrum Analyzer	R&S	FSP30	101148	05-Jun-2018	05-Jun-2019
SZ185-01	EMI Receiver	R & S	ESCI	100547	4-Jan-2019	4-Jan-2020
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	15-Jan-2019	15-Jan-2020
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	15-Dec-2018	15-Dec-2020
SZ062-02	RF Cable	RADIAL	RG 213U	--	02-Jul-2018	02-Jul-2019
SZ062-05	RF Cable	RADIAL	0.04-26.5GHz	--	09-Mar-2018	09-Sep-2018
SZ062-12	RF Cable	RADIAL	0.04-26.5GHz	--	09-Mar-2018	09-Sep-2018
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	30-Oct-2017	30-Oct-2018
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	30-Oct-2017	30-Oct-2018
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	04-Jul-2018	04-Jul-2019
SZ188-03	Shielding Room	ETS	RFD-100	4100	16-Jan-2017	16-Jan-2020
SZ062-16	RF Cable	HUBER+SUHNER	CBL2-BN-1m	110127-2231000	29-Oct-2018	29-Oct-2019

***** End of Report *****