KenXen Electronic (SZ) Limited

Application
For
Certification

FCC ID: 2AEBDW4R

Scanner

Model: W4R
Additional Model: IRIScan™ Book 5 WIFI

Brand name: DIRECTSCAN, IRIScan™

2.4GHz WiFi Transceiver

Report No.: 161018003SZN-001

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 [10-1-15]

Prepared and Checked by:	Approved by:
Sign on file	Digitally signed by Kidd Yang Location: Intertek Testing Services
Powell Bao Engineer	Kidd Yang Senior Project Engineer Date: November 05, 2016

TRF no.: FCC 15C_Tx_c

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MEASUREMENT/TECHNICAL REPORT

Scanner

Model: W4R

FCC ID: 2AEBDW4R

This report concerns (check one) Original Grant ___X___ Class II Change ____

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

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes _____ No ___X___

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 ___X___

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-01-15] Edition] provision.

Report prepared by:

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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

Scanner

Model: W4R
Additional Model: IRIScan™ Book 5 WIFI

FCC ID: 2AEBDW4R

TEST	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 Scanner 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 was powered by DC 3.7V internal rechargerable battery and can be chargered via USB port. For more detailed features description, please refer to the user's manual.

The Model: IRIScan™ Book 5 WIFI is the same as the Model: W4R in hardware aspect (circuitry and electrical, mechanical and physical construction), the only differences are the appearance and model no. for trading purpose.

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

Antenna Type: Integral Antenna.

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

2.2 Related Submittal(s) Grants

This is an application for certification of:
DTS- Part 15 Digital Transmission Systems (2.4GHz WiFi transmitter portion). The data transfer function which subjected to FCC DOC was tested and demonstrated in report 161018004SZN-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 v03r05. 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. Kejiyuan Branch** and located at 6F, Block D, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: 242492).

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 3.7V internal rechargerable battery and can be chargered via USB port. Only the worst case data was reported.

On 802.11b, g, n (20MHz, 40MHz) mode, only one antenna is used, and all data rate were tested and only the worst case data is shown in the 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.

The rear of unit was flushed with the rear of the table up to 1GHz and placed in the centre of turntable above 1GHz.

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.

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

Shielded USB cable with two ferrite cores.

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 KenXen Electronic (SZ) Limited will be incorporated in each production model sold / leased in the United States.

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

3.6 Support Equipment List and Description

This product was tested in the following configuration:

Refer List:

Description	Manufacturer	Detail
Laptop	Lenovo	X1
Hard Disk	Smart.drive	HD-003
USB Cable	Smart.drive	Unshielded, Length 155cm
USB Cable with two ferrite cores	Kenxen Electronic (SZ) Limited.	Shielded, Length 100cm
Mini SD Card	SanDisk	1GB

EXHIBIT 4

MEASUREMENT RESULTS

Applicant: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R

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).

IEEE 802.11b (Antenna Gain = 2.2dBi) (CCK, 1Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	17.6	57.5
Middle Channel: 2437	17.2	52.5
High Channel: 2462	17.8	60.3

IEEE 802.11g (Antenna Gain = 2.2dBi) (16QAM, 6Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	18.0	63.1
Middle Channel: 2437	17.5	56.2
High Channel: 2462	17.6	57.5

IEEE 802.11n-HT20 (Antenna Gain = 2.2dBi) (16QAM, 6.5Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	17.9	61.7
Middle Channel: 2437	17.4	55.0
High Channel: 2462	18.0	63.1

IEEE 802.11n-HT40 (Antenna Gain = 2.2dBi) (64QAM, 13.5Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2422	18.2	66.1
Middle Channel: 2437	17.8	60.3
High Channel: 2452	18.1	64.6

Cable loss: 0.5 dB External Attenuation: 0 dB
Cable loss, external attenuation has been included in OFFSET function
EUT max. output level = 18.2dBm

Applicant: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R

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 v03r05. 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.

IEEE 802.11b (CCK, 1Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	10.072
2437	10.116
2462	10.116

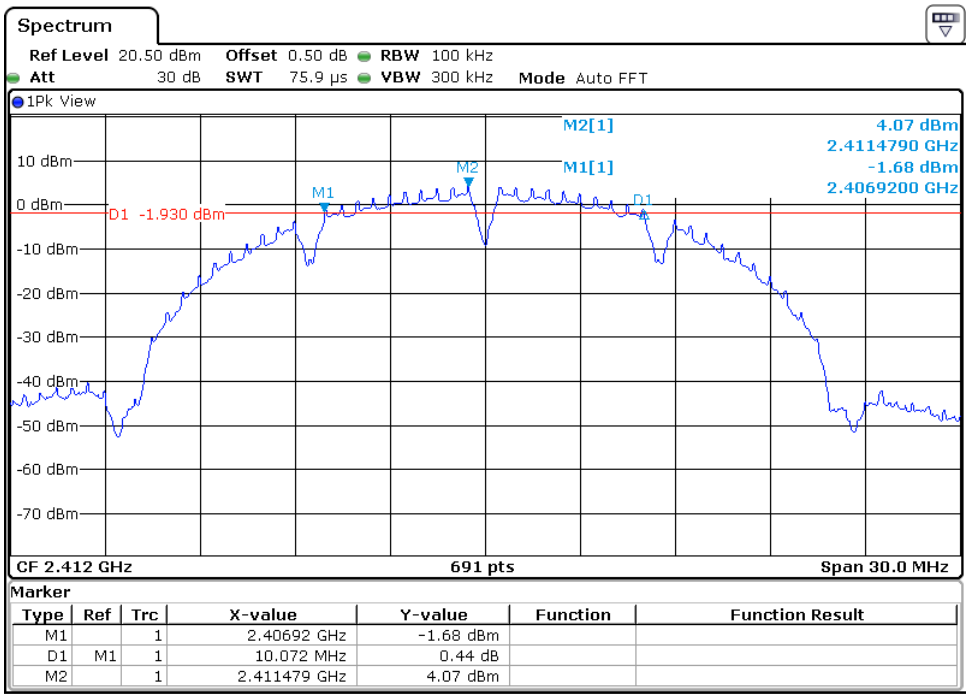
IEEE 802.11g (16QAM, 6Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	16.585
2437	16.585
2462	16.585

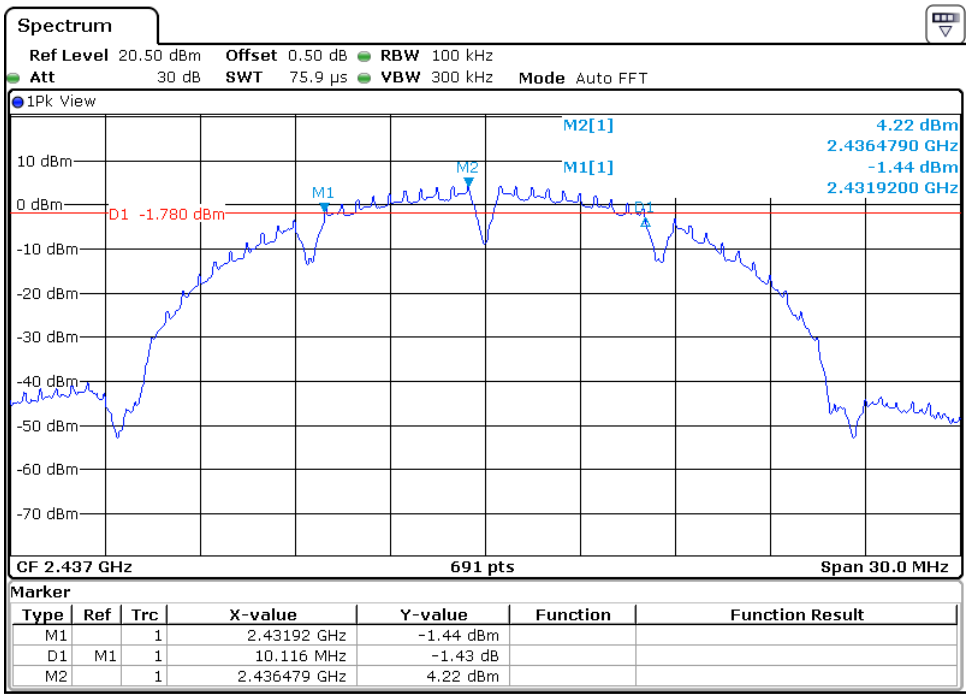
IEEE 802.11n-HT20 (16QAM, 6.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	17.800
2437	17.800
2462	17.800

IEEE 802.11n-HT40 (64QAM, 13.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2422	36.397
2437	36.397
2452	36.397

The test plots are attached as below.

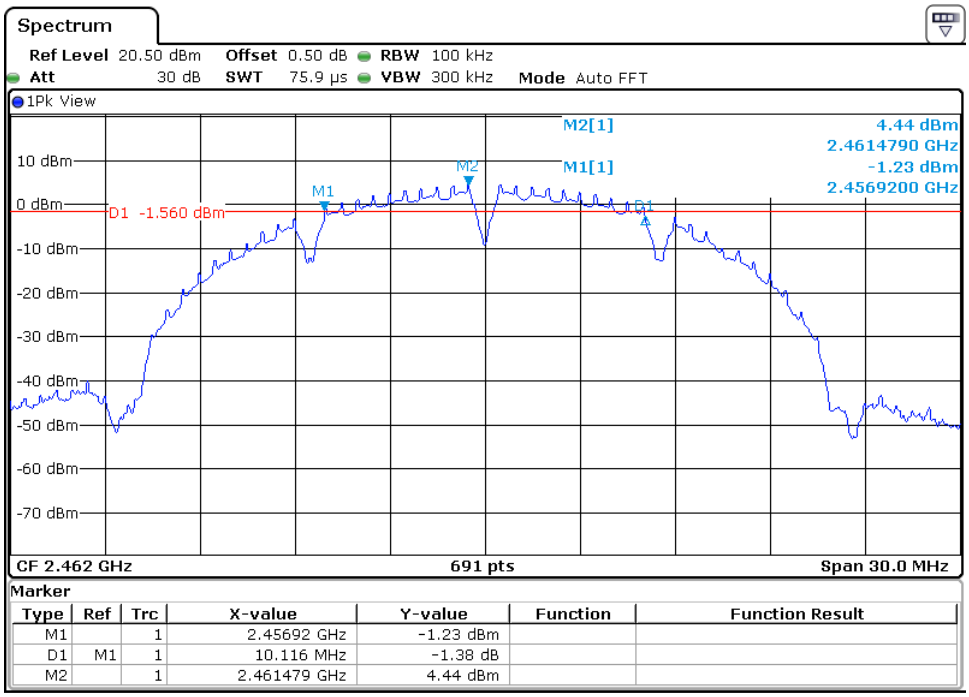
802.11b





Marker

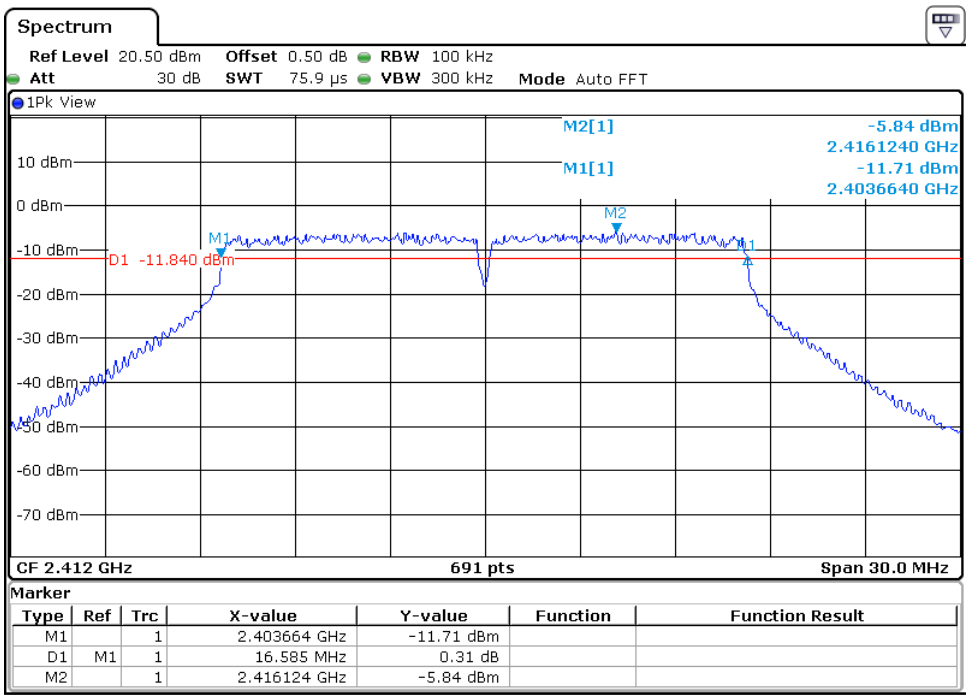
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.43192 GHz	-1.44 dBm		
D1	M1	1	10.116 MHz	-1.43 dB		
M2		1	2.436479 GHz	4.22 dBm		

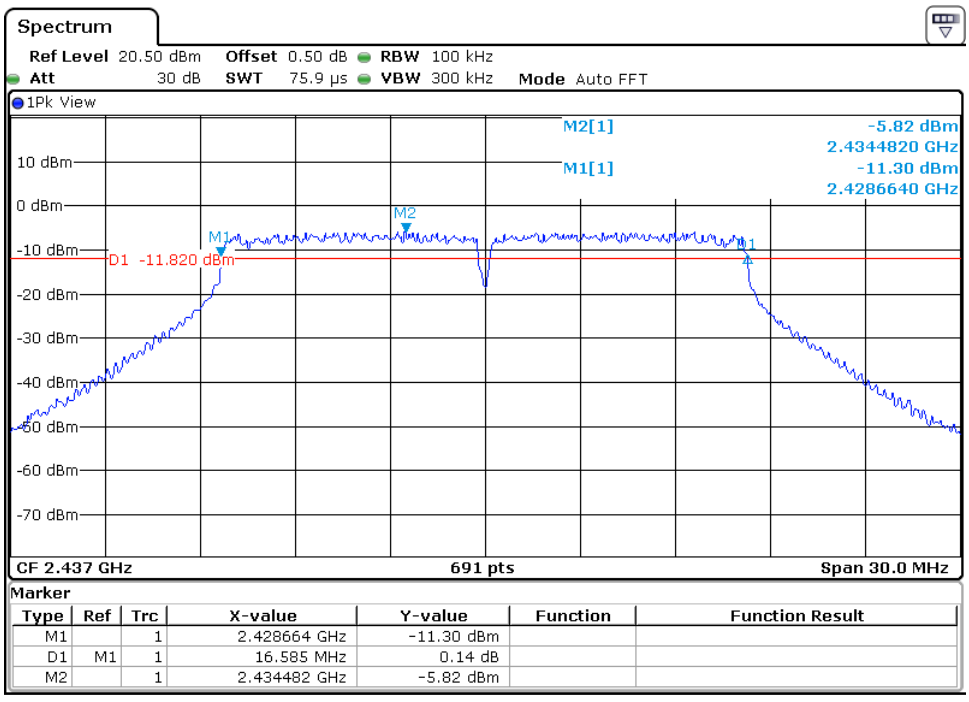


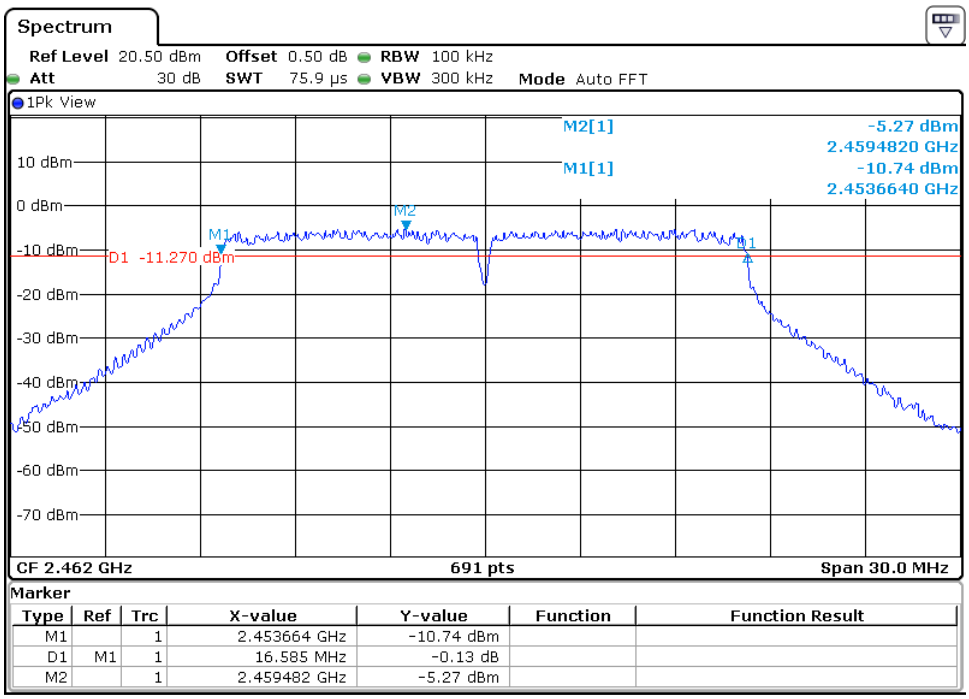
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45692 GHz	-1.23 dBm		
D1	M1	1	10.116 MHz	-1.38 dB		
M2		1	2.461479 GHz	4.44 dBm		

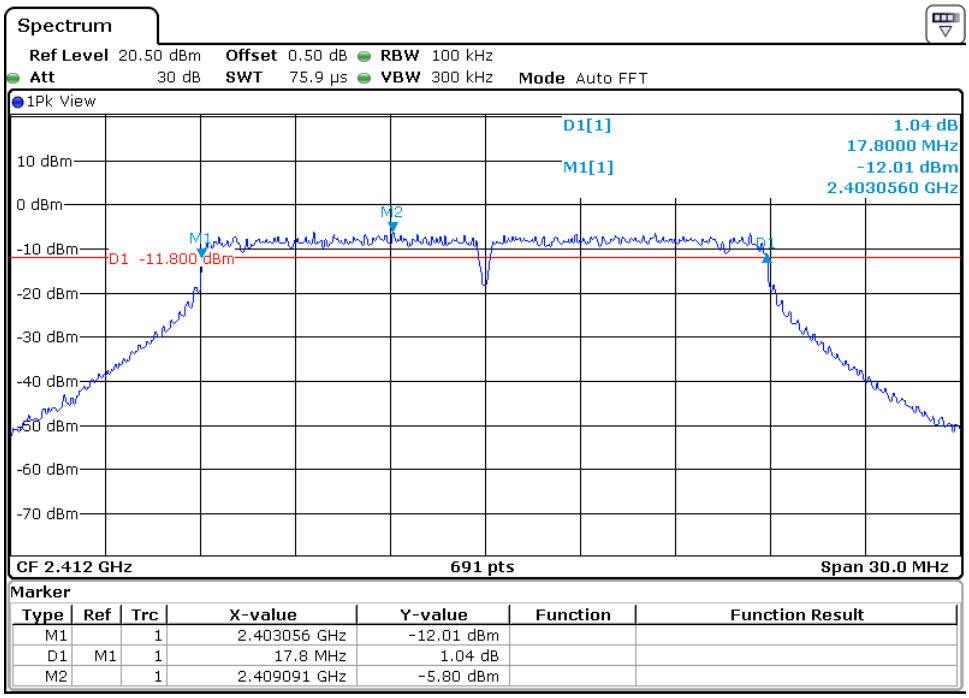
802.11g

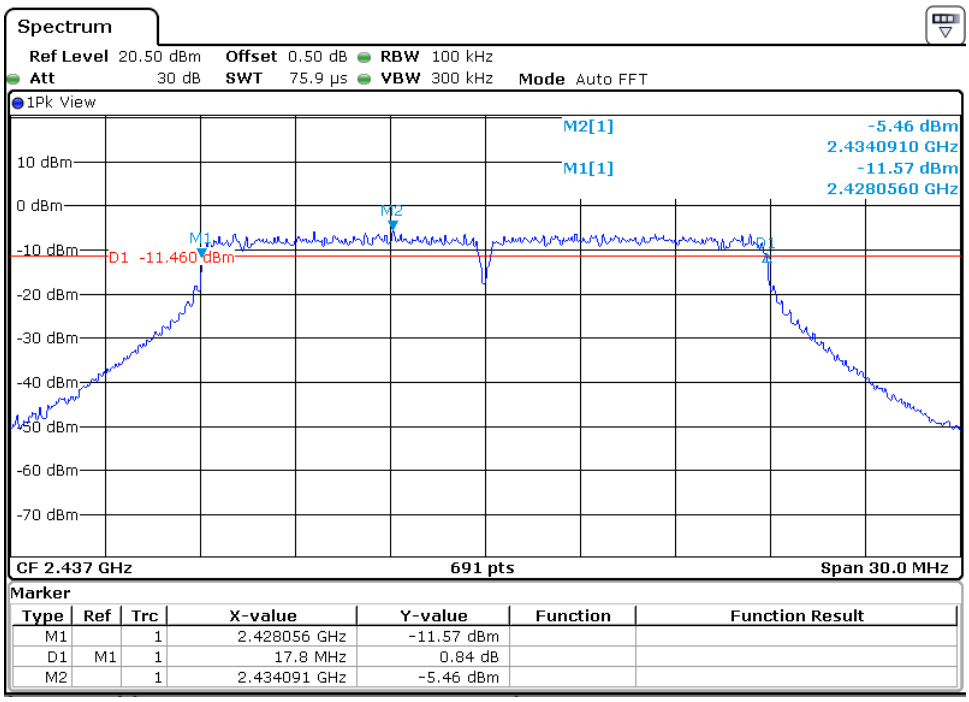

Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT
1Pk View
M2[1] -5.84 dBm
2.4161240 GHz
M1[1] -11.71 dBm
2.4036640 GHz
D1 -11.840 dBm
CF 2.412 GHz
691 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.403664 GHz -11.71 dBm
D1 M1 1 16.585 MHz 0.31 dB
M2 1 2.416124 GHz -5.84 dBm


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT
1Pk View
M2[1] -5.82 dBm
2.4344820 GHz
M1[1] -11.30 dBm
2.4286640 GHz
D1 -11.820 dBm
CF 2.437 GHz
691 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.428664 GHz -11.30 dBm
D1 M1 1 16.585 MHz 0.14 dB
M2 1 2.434482 GHz -5.82 dBm


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT
1Pk View
M2[1] -5.27 dBm
2.4594820 GHz
M1[1] -10.74 dBm
2.4536640 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
D1 -11.270 dBm
CF 2.462 GHz
691 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.453664 GHz -10.74 dBm
D1 M1 1 16.585 MHz -0.13 dB
M2 1 2.459482 GHz -5.27 dBm

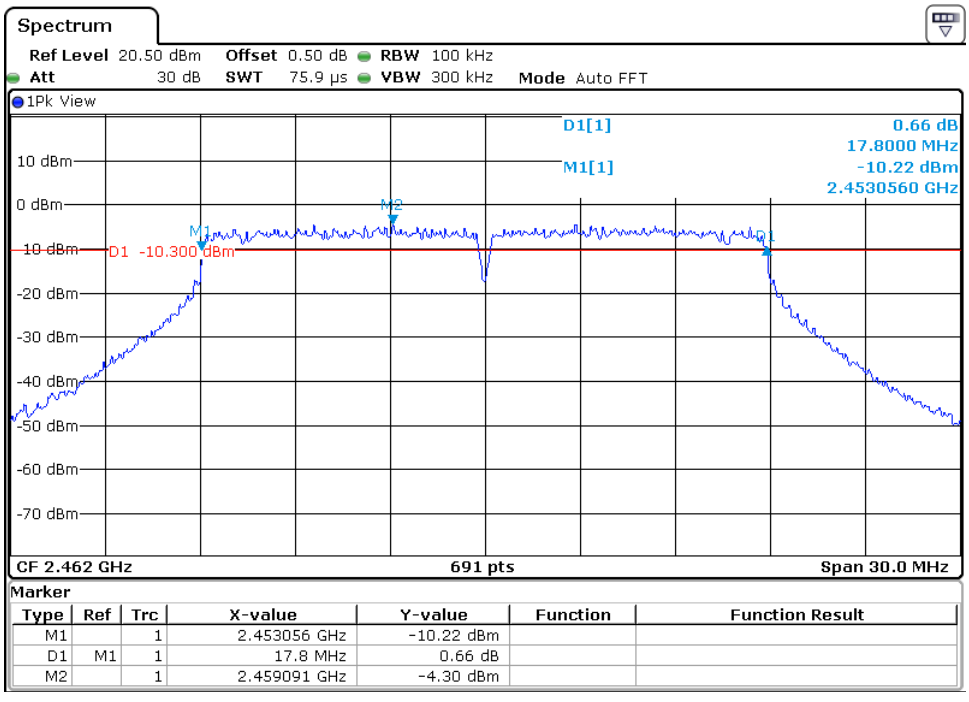
802.11n-HT20


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT
1Pk View
D1[1] 1.04 dB
17.8000 MHz
M1[1] -12.01 dBm
2.4030560 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
D1 -11.800 dBm
CF 2.412 GHz
691 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.403056 GHz -12.01 dBm
D1 M1 1 17.8 MHz 1.04 dB
M2 1 2.409091 GHz -5.80 dBm



Marker

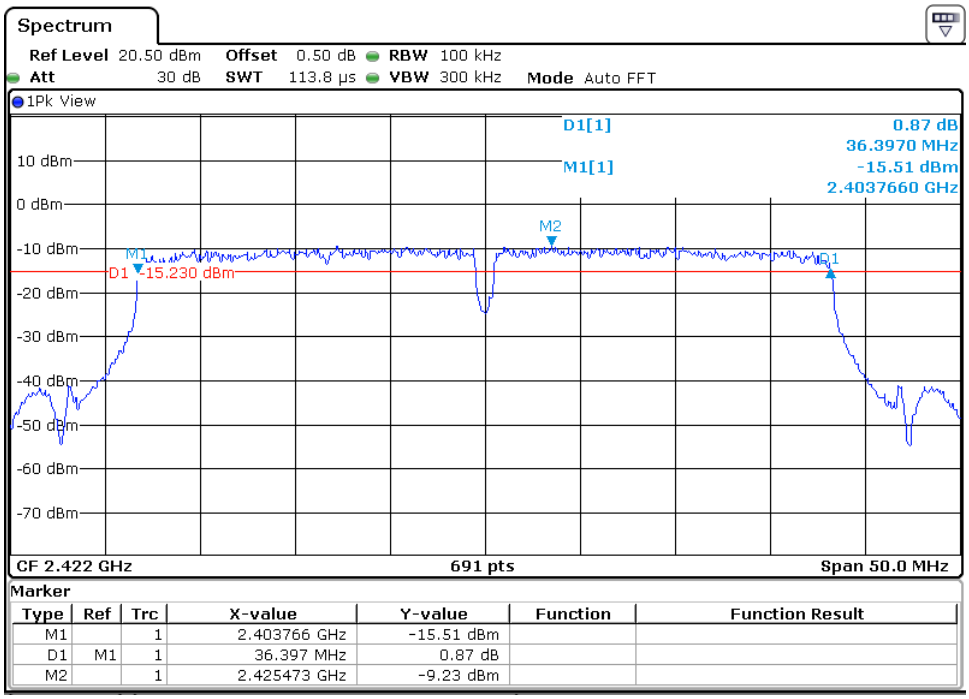
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.428056 GHz	-11.57 dBm		
D1	M1	1	17.8 MHz	0.84 dB		
M2		1	2.434091 GHz	-5.46 dBm		

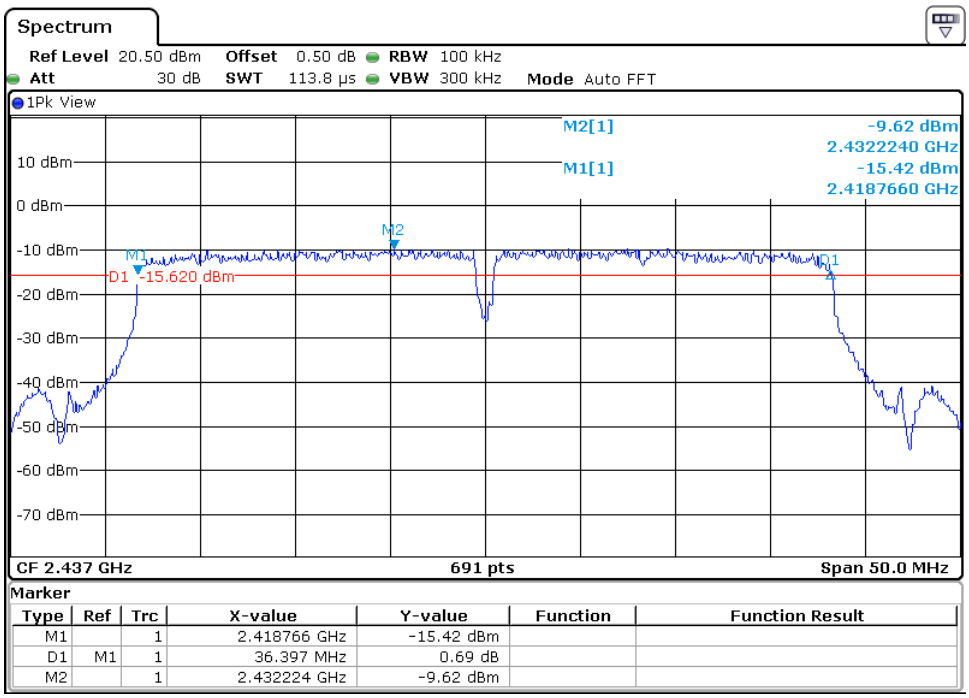


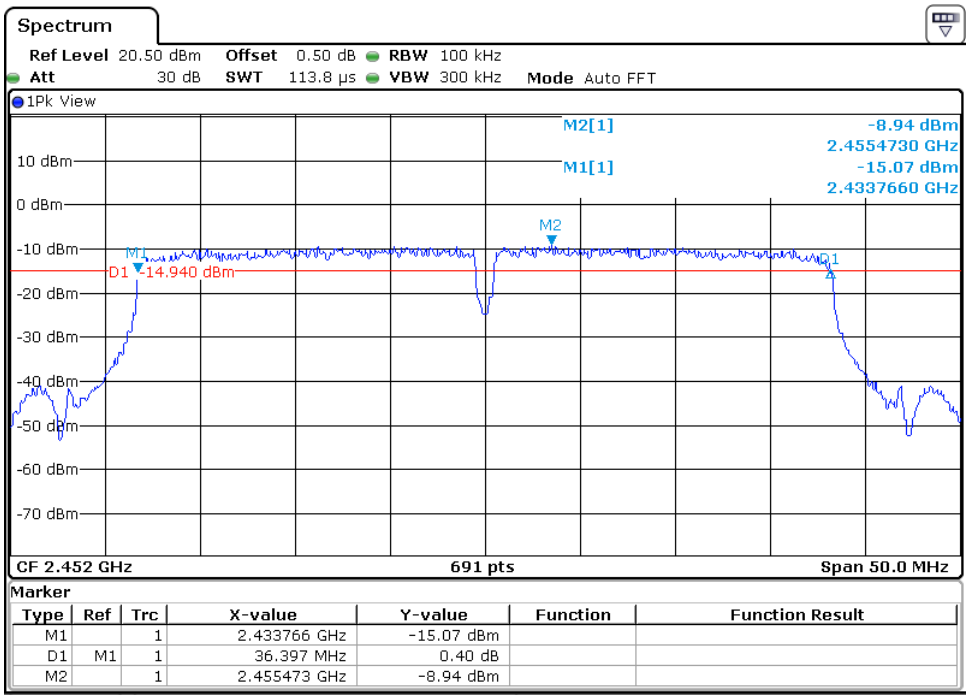
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.453056 GHz	-10.22 dBm		
D1	M1	1	17.8 MHz	0.66 dB		
M2		1	2.459091 GHz	-4.30 dBm		

802.11n-HT40


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 113.8 µs VBW 300 kHz Mode Auto FFT
1Pk View
D1[1] 0.87 dB
36.3970 MHz
M1[1] -15.51 dBm
2.4037660 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
D1 -15.230 dBm
M2
CF 2.422 GHz
691 pts
Span 50.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.403766 GHz -15.51 dBm
D1 M1 1 36.397 MHz 0.87 dB
M2 1 2.425473 GHz -9.23 dBm


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 113.8 µs VBW 300 kHz Mode Auto FFT
1Pk View
M2[1] -9.62 dBm
2.4322240 GHz
M1[1] -15.42 dBm
2.4187660 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
D1 -15.620 dBm
M2
CF 2.437 GHz
691 pts
Span 50.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.418766 GHz -15.42 dBm
D1 M1 1 36.397 MHz 0.69 dB
M2 1 2.432224 GHz -9.62 dBm


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 113.8 µs VBW 300 kHz Mode Auto FFT
1Pk View
M2[1] -8.94 dBm
2.4554730 GHz
M1[1] -15.07 dBm
2.4337660 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
D1 -14.940 dBm
M2
CF 2.452 GHz
691 pts
Span 50.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.433766 GHz -15.07 dBm
D1 M1 1 36.397 MHz 0.40 dB
M2 1 2.455473 GHz -8.94 dBm

Applicant: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R

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

The Measurement Procedure PKPSD was set according to the FCC KDB 558074 D01 v03r05.

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.

IEEE 802.11b (CCK, 1Mbps)	
Frequency (MHz)	Power Density (dBm)
2412	3.90
2437	4.22
2462	4.22

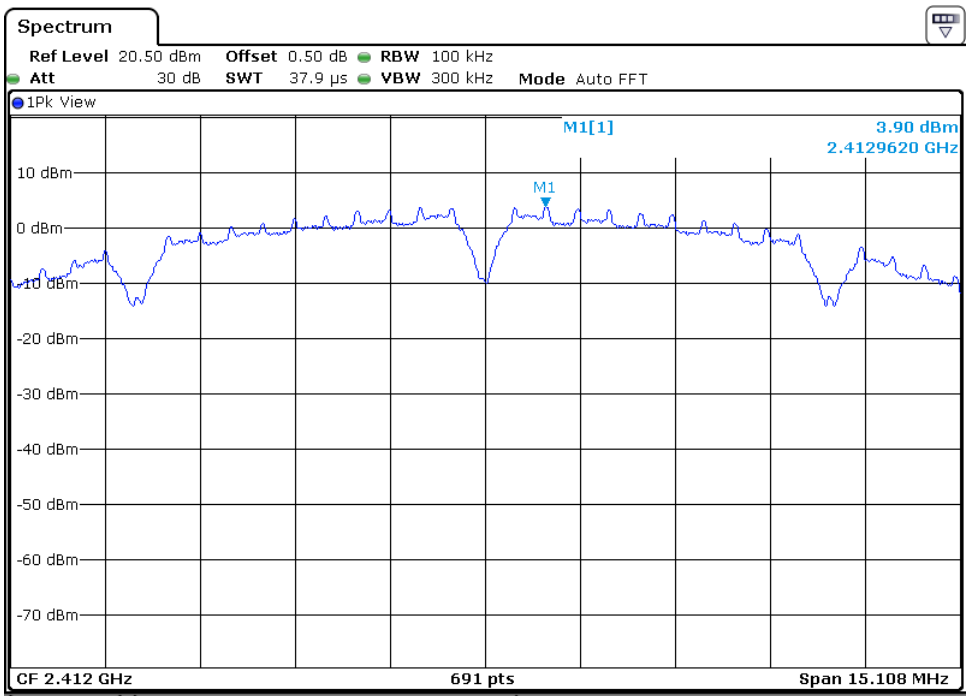
IEEE 802.11g (16QAM, 6Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz (dBm)
2412	-6.21
2437	-5.80
2462	-5.57

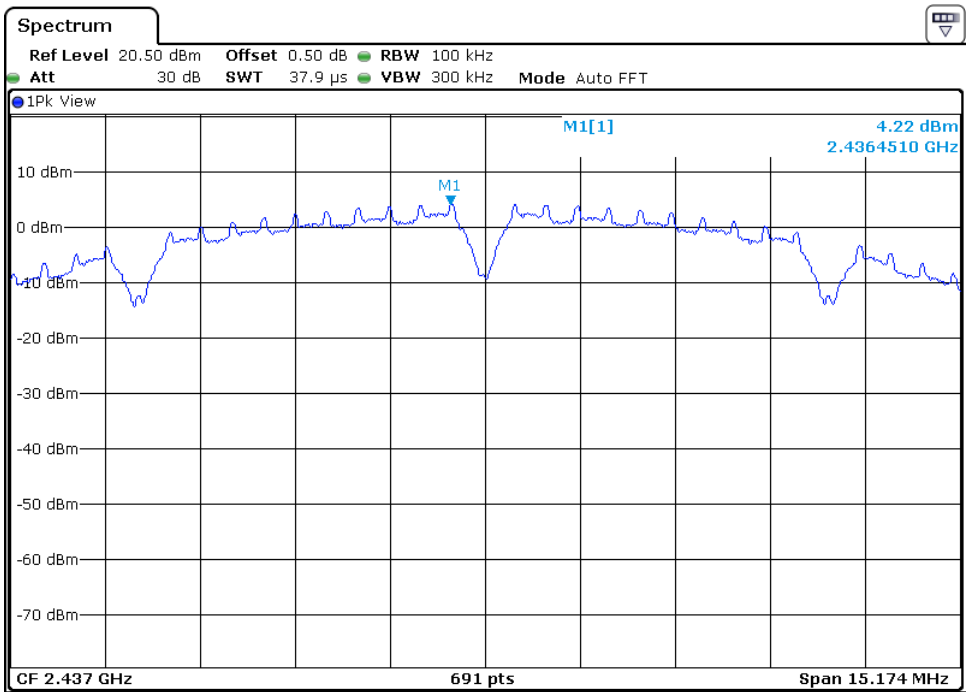
IEEE 802.11n-HT20 (16QAM, 6.5Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz (dBm)
2412	-5.85
2437	-6.12
2462	-4.76

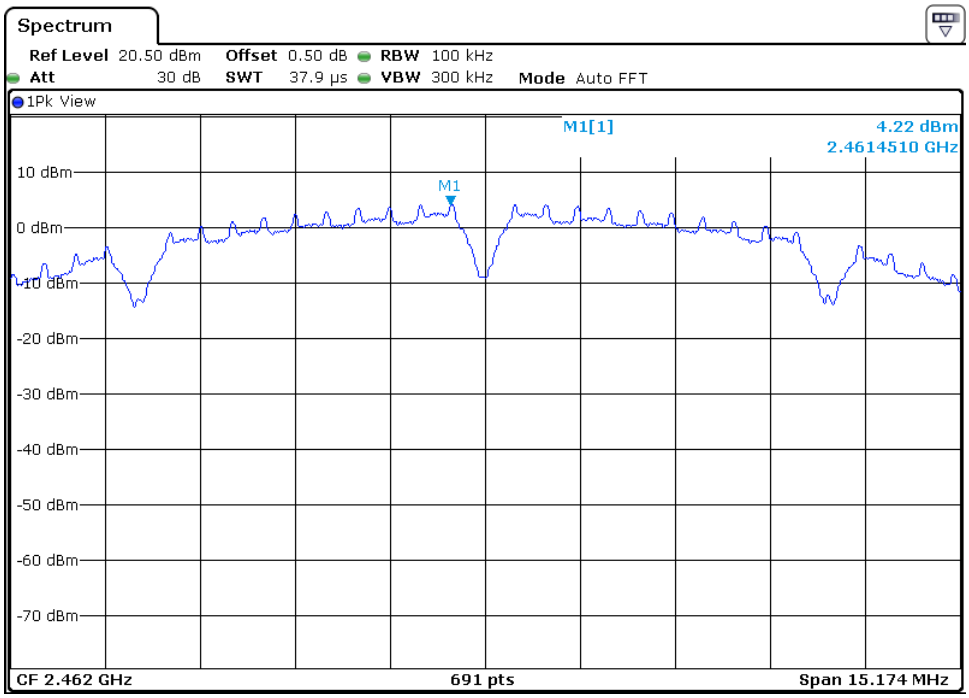
IEEE 802.11n-HT20 (64QAM, 13.5Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz (dBm)
2422	-9.65
2437	-9.70
2452	-9.44

The test plots are attached as below.

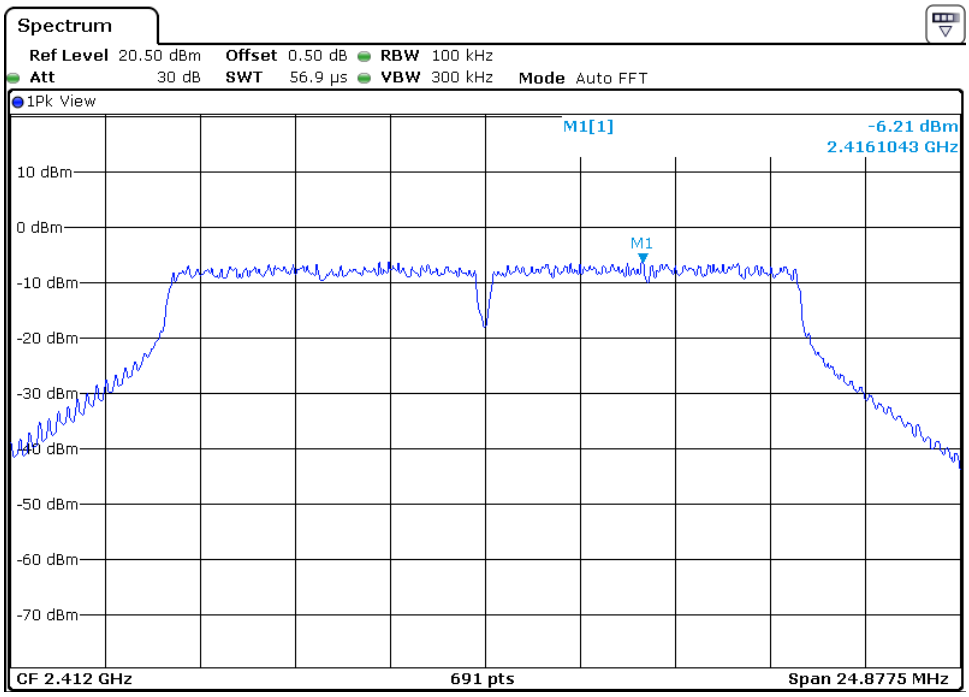
802.11b

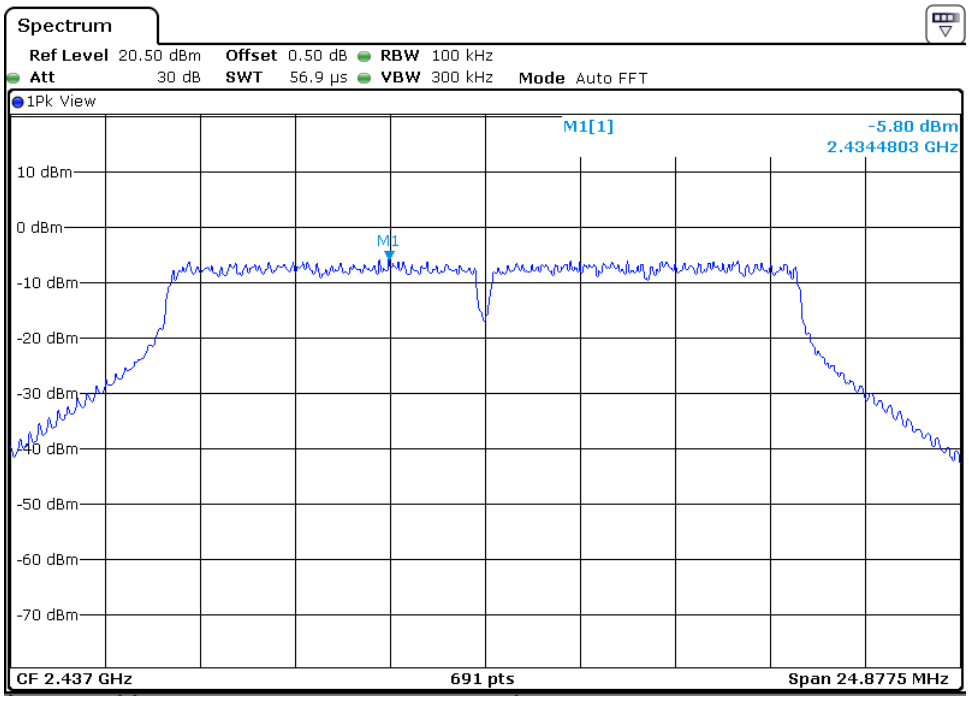

Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 37.9 µs VBW 300 kHz Mode Auto FFT
1Pk View
M1[1] 3.90 dBm
2.4129620 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.412 GHz
691 pts
Span 15.108 MHz

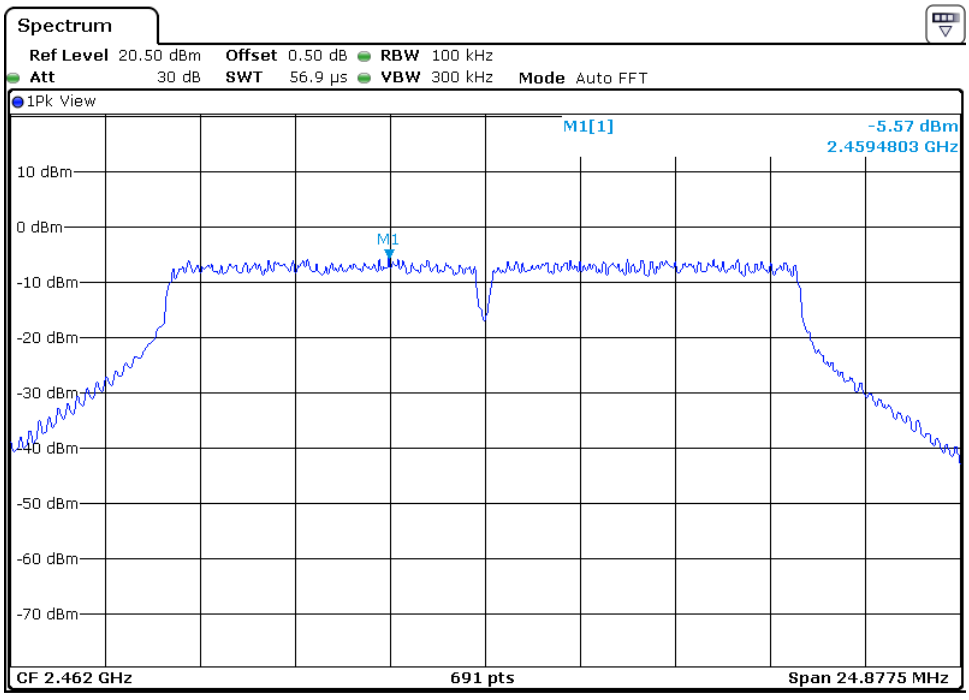

Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 37.9 µs VBW 300 kHz Mode Auto FFT
1Pk View
M1[1] 4.22 dBm
2.4364510 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.437 GHz
691 pts
Span 15.174 MHz


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 37.9 µs VBW 300 kHz Mode Auto FFT
1Pk View
M1[1] 4.22 dBm
2.4614510 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.462 GHz
691 pts
Span 15.174 MHz

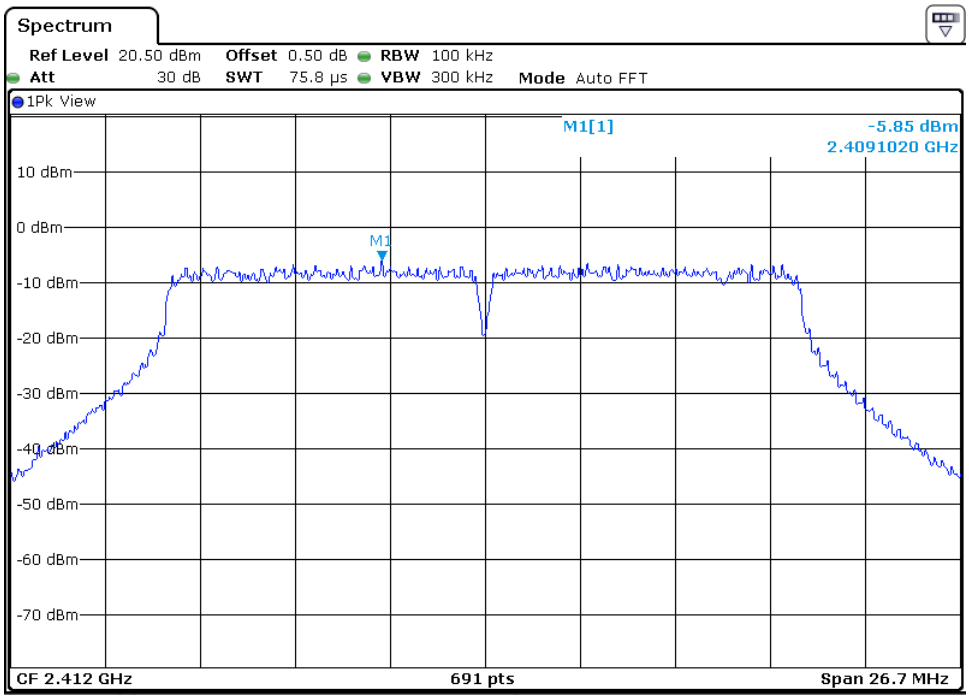
802.11g

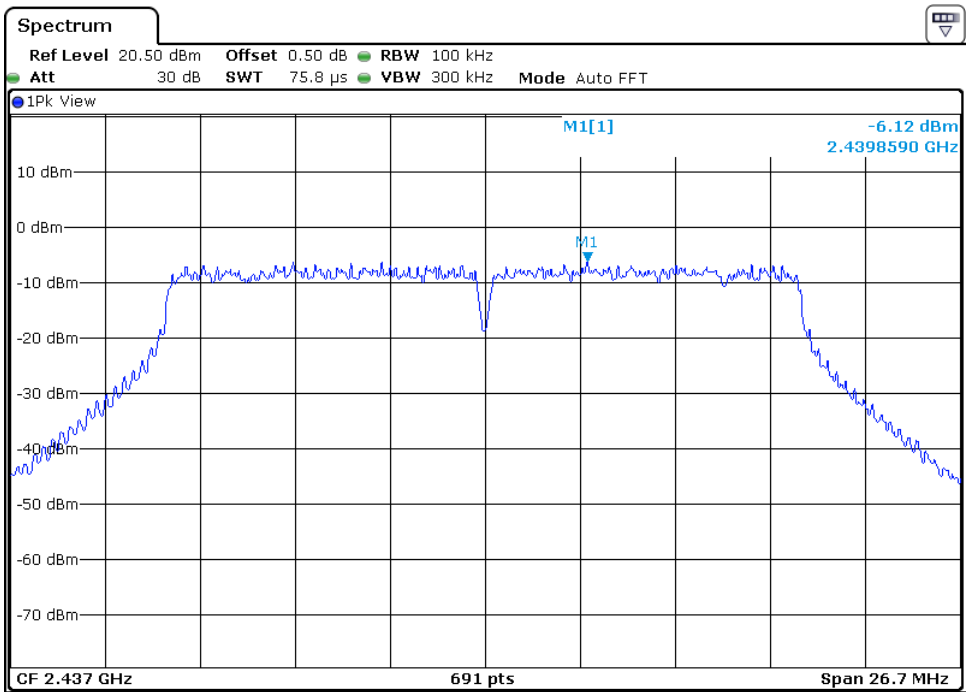

Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 56.9 µs VBW 300 kHz Mode Auto FFT
1Pk View
M1[1] -6.21 dBm
2.4161043 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.412 GHz
691 pts
Span 24.8775 MHz

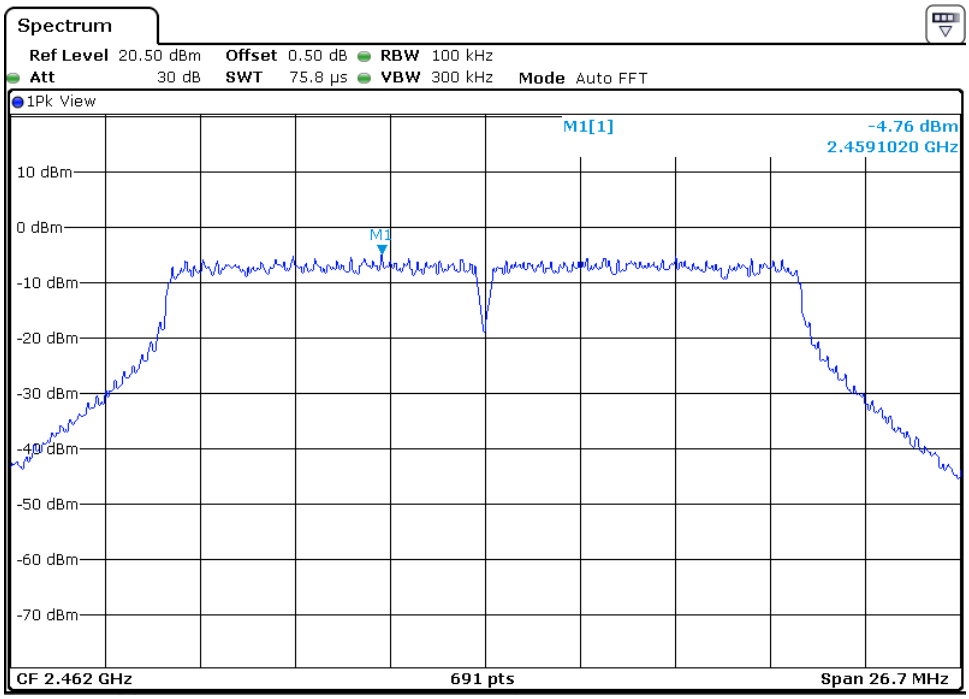

Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 56.9 µs VBW 300 kHz Mode Auto FFT
1Pk View
M1[1] -5.80 dBm
2.4344803 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.437 GHz
691 pts
Span 24.8775 MHz


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 56.9 µs VBW 300 kHz Mode Auto FFT
1Pk View
M1[1] -5.57 dBm
2.4594803 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.462 GHz
691 pts
Span 24.8775 MHz

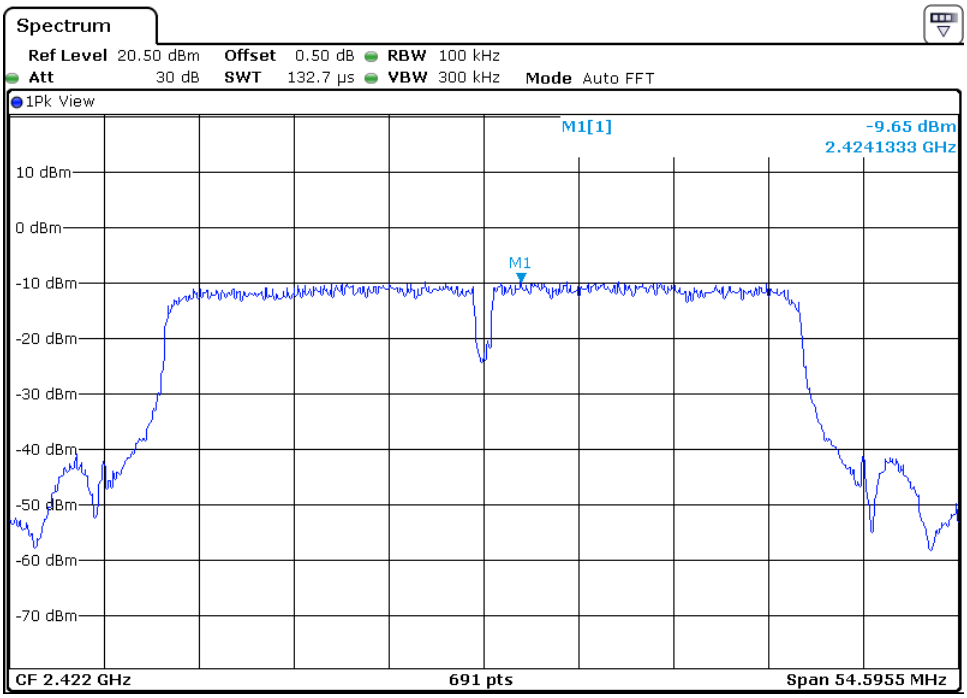
802.11n-HT20

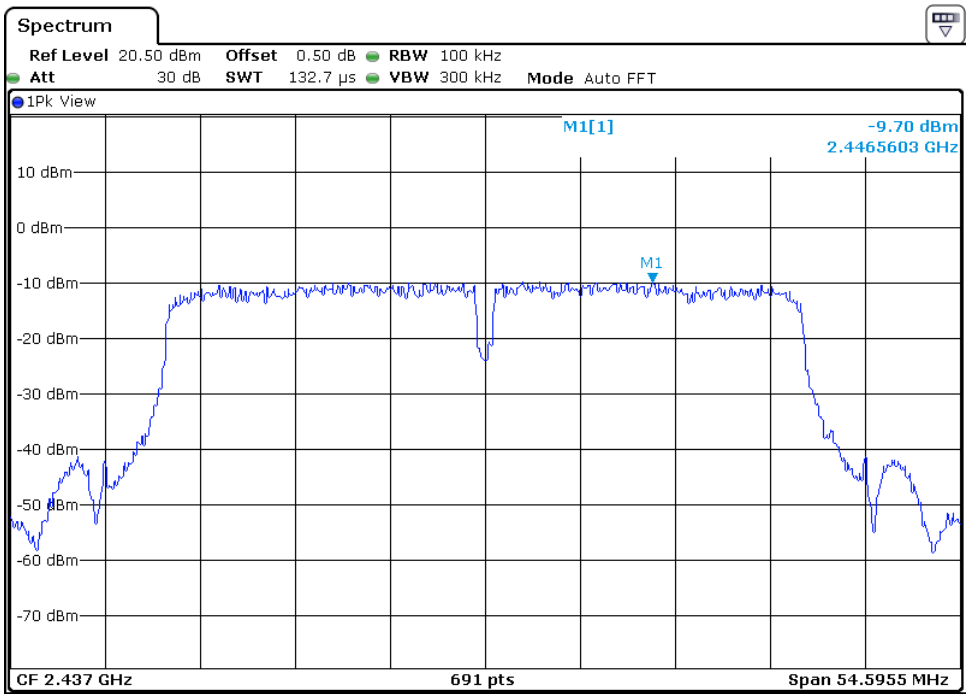

Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 75.8 µs VBW 300 kHz Mode Auto FFT
1Pk View
M1[1] -5.85 dBm
2.4091020 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.412 GHz
691 pts
Span 26.7 MHz

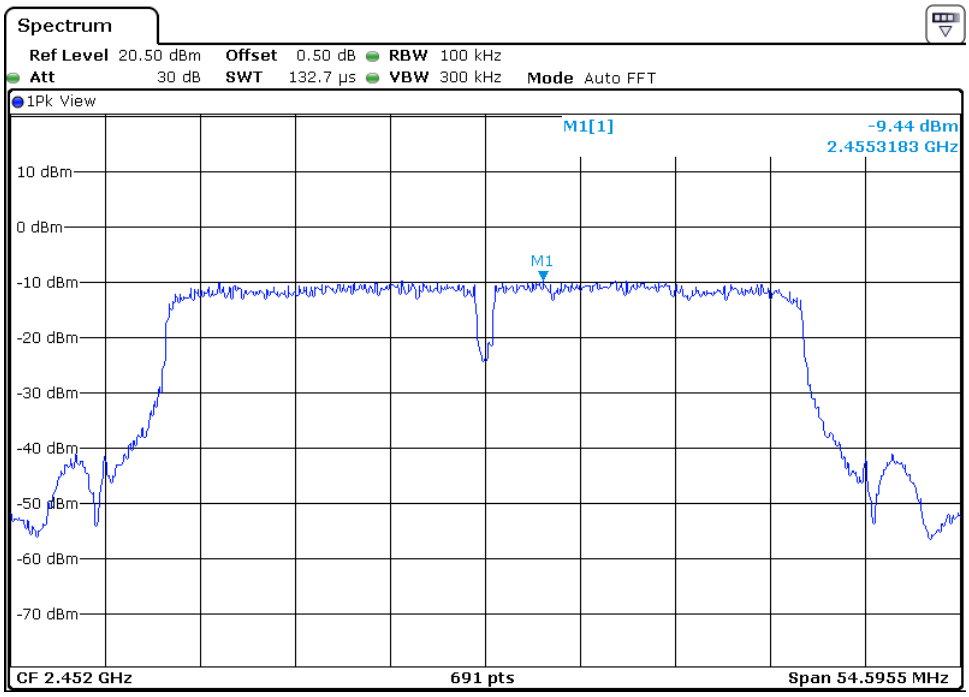

Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 75.8 µs VBW 300 kHz Mode Auto FFT
1Pk View
M1[1] -6.12 dBm
2.4398590 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.437 GHz
691 pts
Span 26.7 MHz


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 75.8 µs VBW 300 kHz Mode Auto FFT
1Pk View
M1[1] -4.76 dBm
2.4591020 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.462 GHz
691 pts
Span 26.7 MHz

802.11n-HT40


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 132.7 µs VBW 300 kHz Mode Auto FFT
1Pk View
M1[1] -9.65 dBm
2.4241333 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.422 GHz
691 pts
Span 54.5955 MHz


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 132.7 µs VBW 300 kHz Mode Auto FFT
1Pk View
M1[1] -9.70 dBm
2.4465603 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.437 GHz
691 pts
Span 54.5955 MHz


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 132.7 µs VBW 300 kHz Mode Auto FFT
1Pk View
M1[1] -9.44 dBm
2.4553183 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.452 GHz
691 pts
Span 54.5955 MHz

Applicant: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R

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 v03r05.

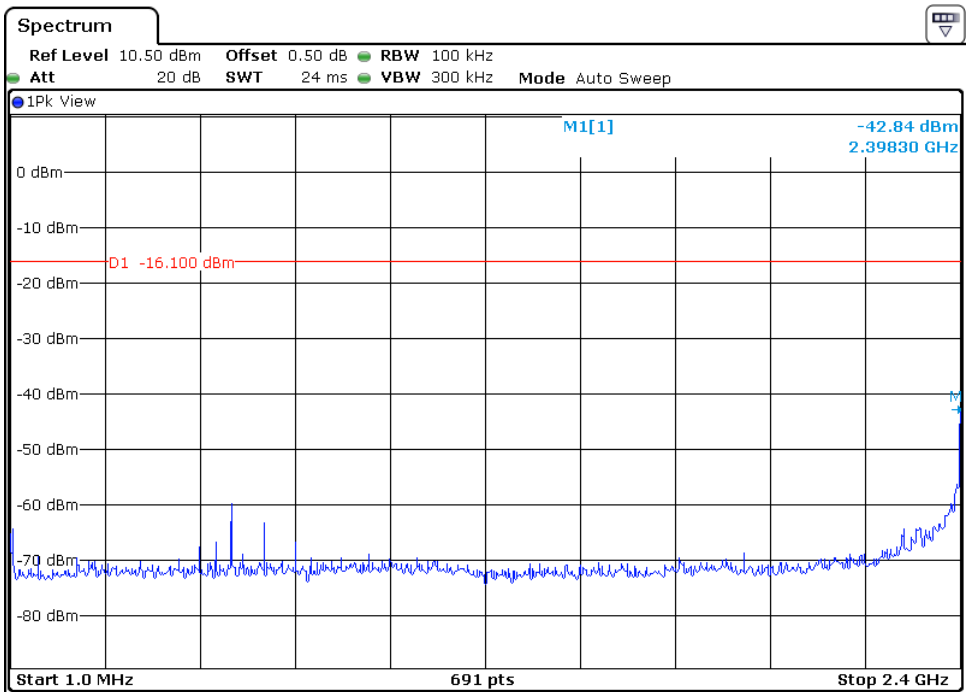
All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

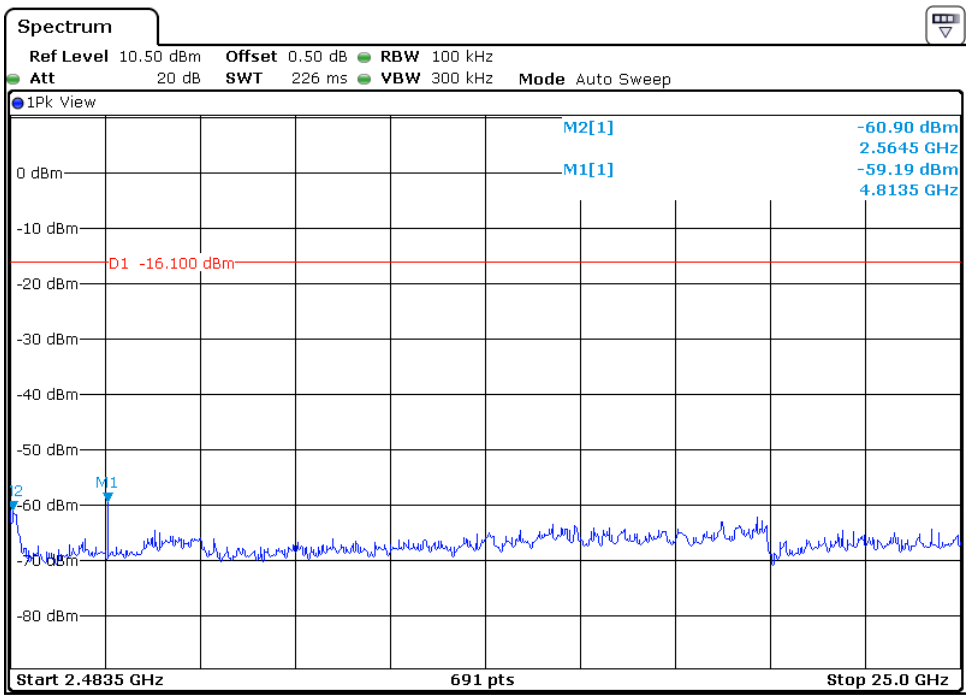
Refer to the attached test plots for out of band conducted emissions data with rate of 1Mbps for 802.11b, 6Mbps for 802.11g and 6.5Mbps for 802.11n-HT20 and 13.5Mbps for 802.11n-HT40.

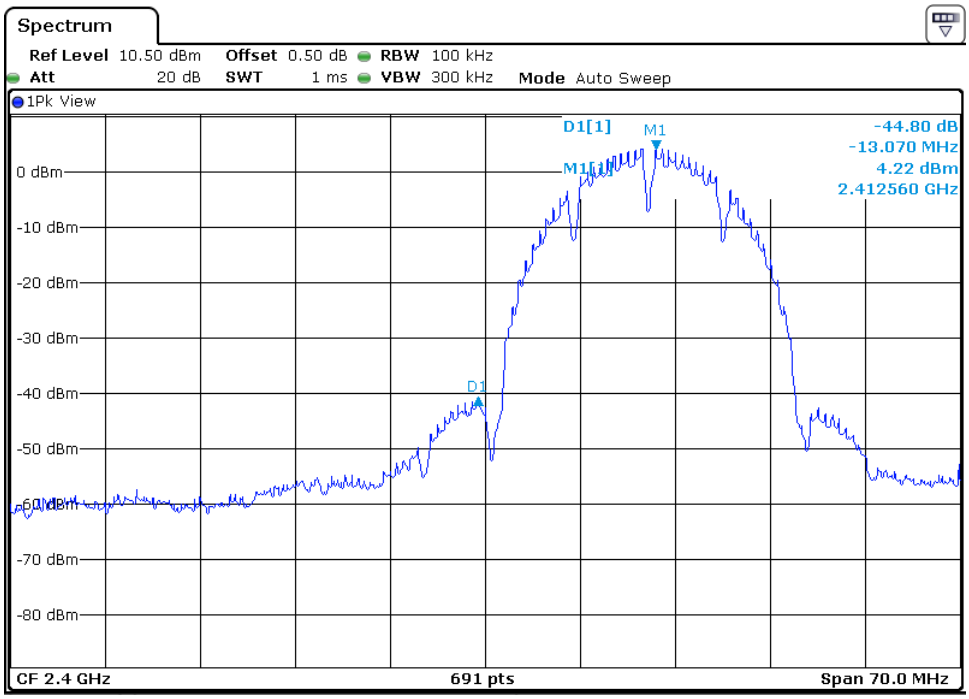
The test plots showed all spurious emission up to the tenth harmonic were measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.

The test plots are attached as below.

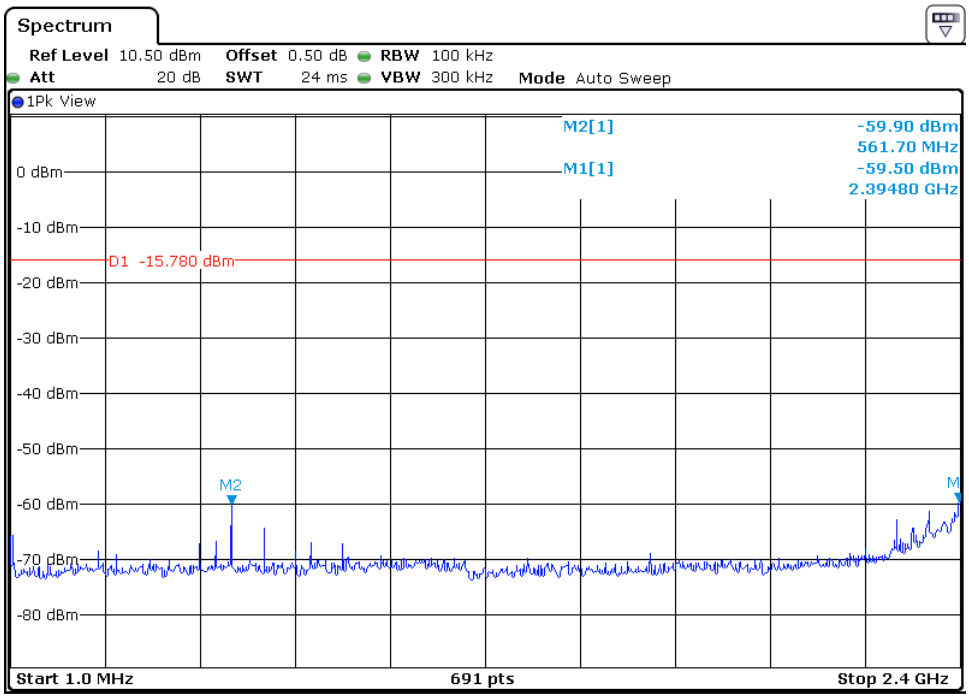
802.11b
Channel 01 (2412MHz) Reference Level: 3.90dBm

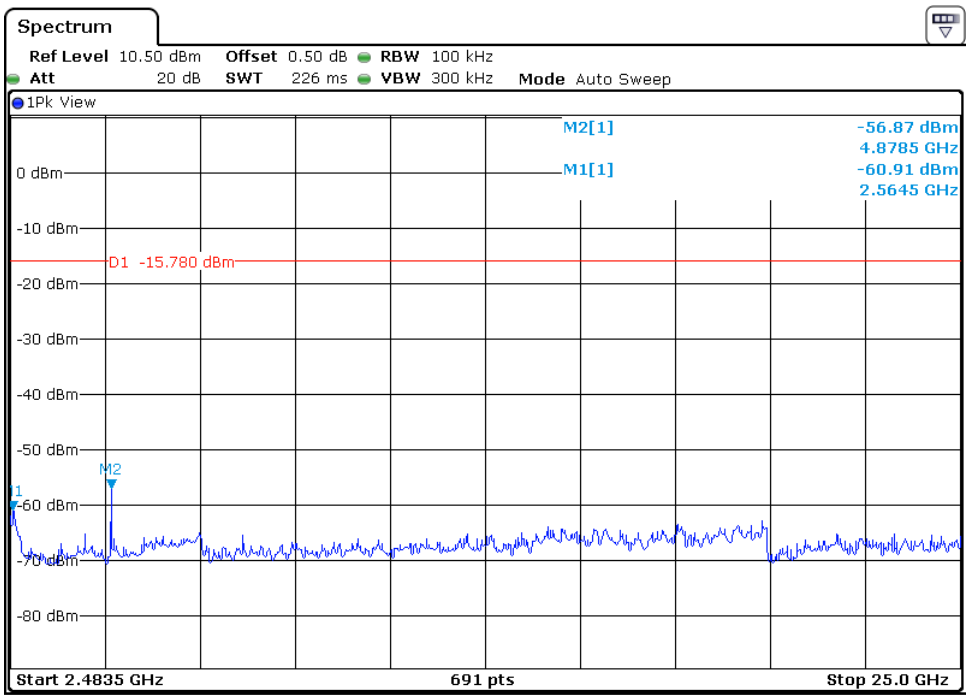




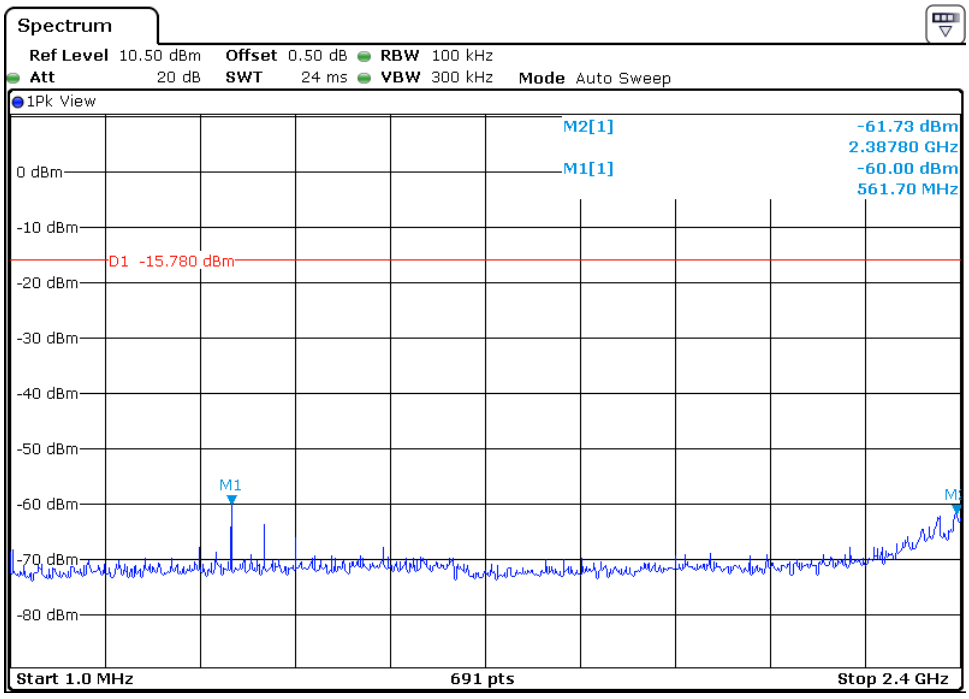


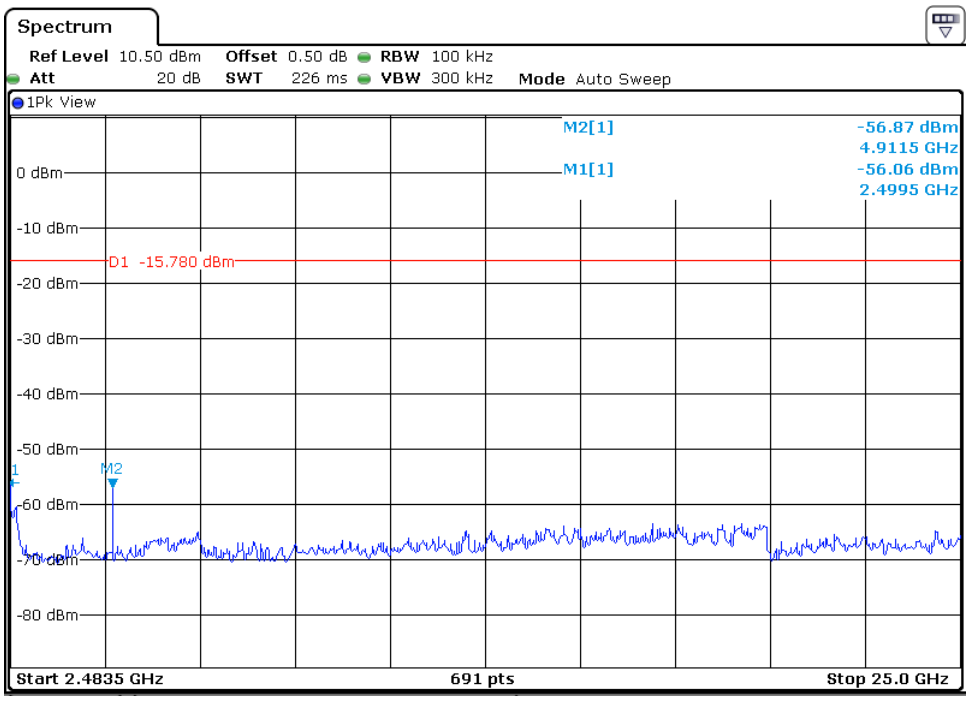
Channel 06 (2437MHz) Reference Level: 4.22dBm





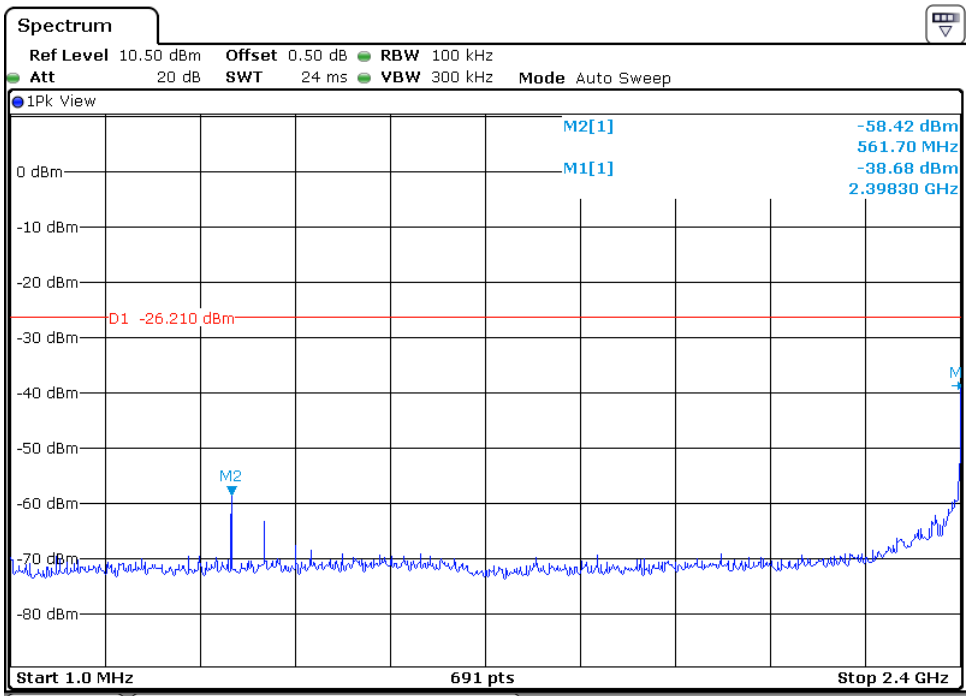
Channel 11 (2462MHz) Reference Level: 4.22dBm

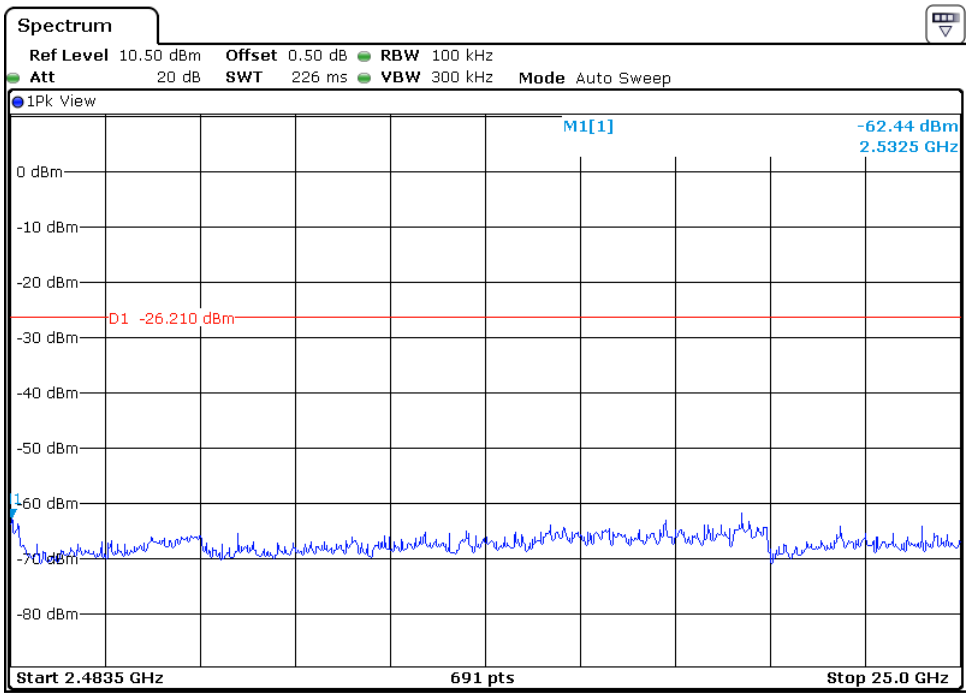


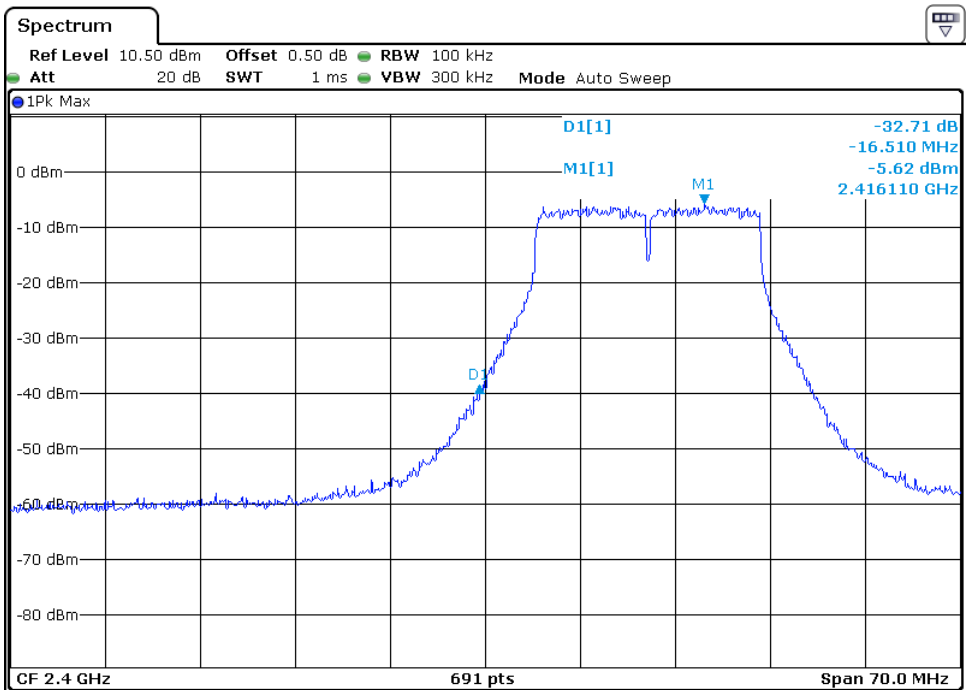

Spectrum
Ref Level 10.50 dBm Offset 0.50 dB RBW 100 kHz
Att 20 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
1Pk View
M2[1] -56.87 dBm
4.9115 GHz
M1[1] -56.06 dBm
2.4995 GHz
D1 -15.780 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
Start 2.4835 GHz
691 pts
Stop 25.0 GHz


Spectrum
Ref Level 10.50 dBm Offset 0.50 dB RBW 100 kHz
Att 20 dB SWT 1 ms VBW 300 kHz Mode Auto Sweep
1Pk View
D1[1] -58.58 dB
24.620 MHz
M1[1] 4.42 dBm
2.462530 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.4835 GHz
691 pts
Span 70.0 MHz

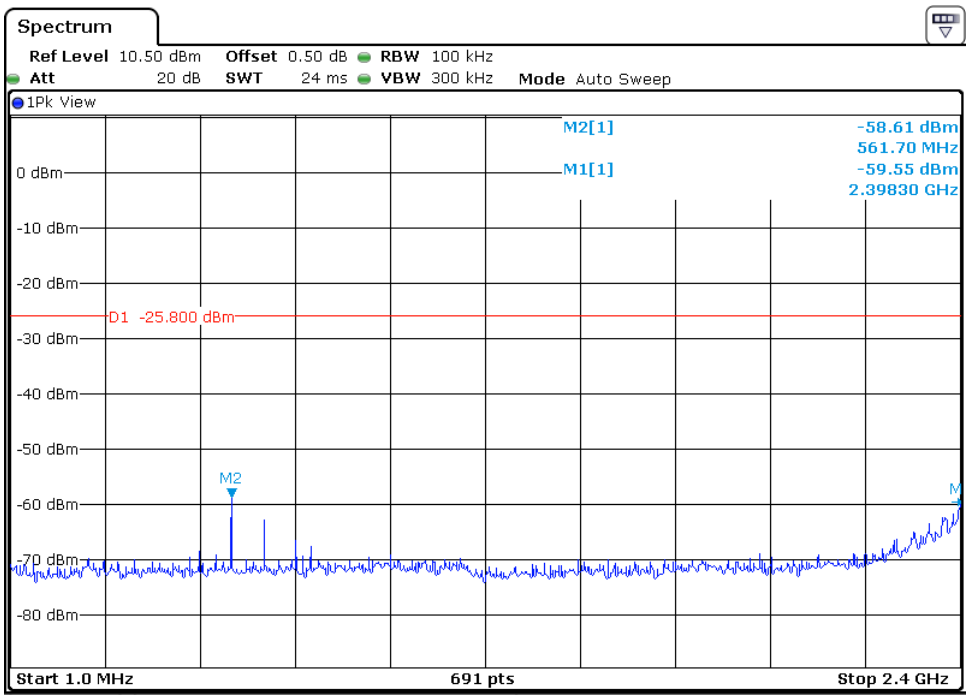
802.11g
Channel 01 (2412MHz) Reference Level: -6.21dBm

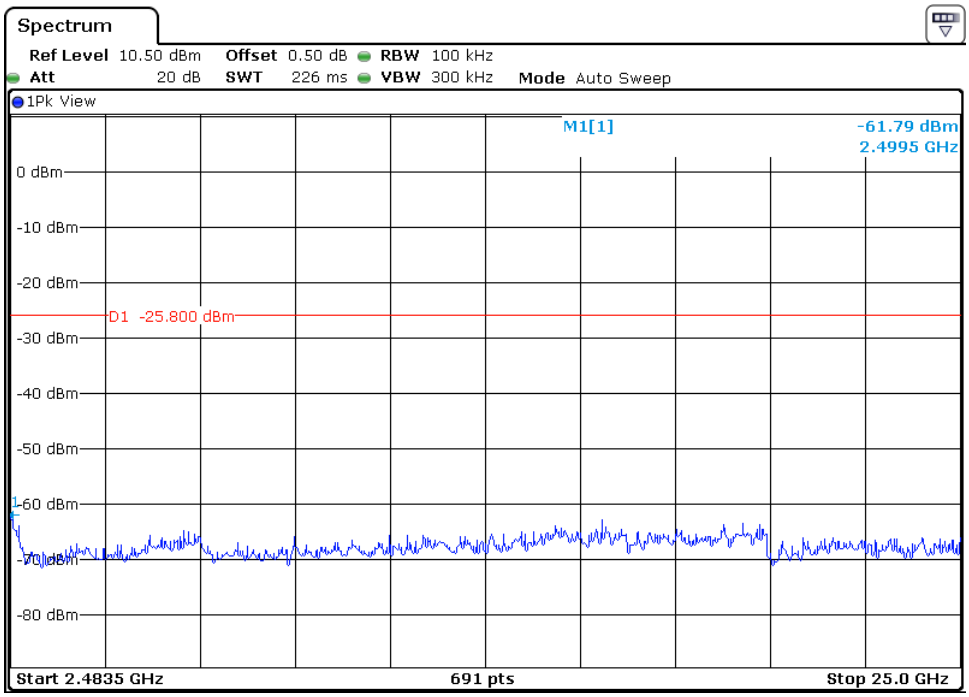




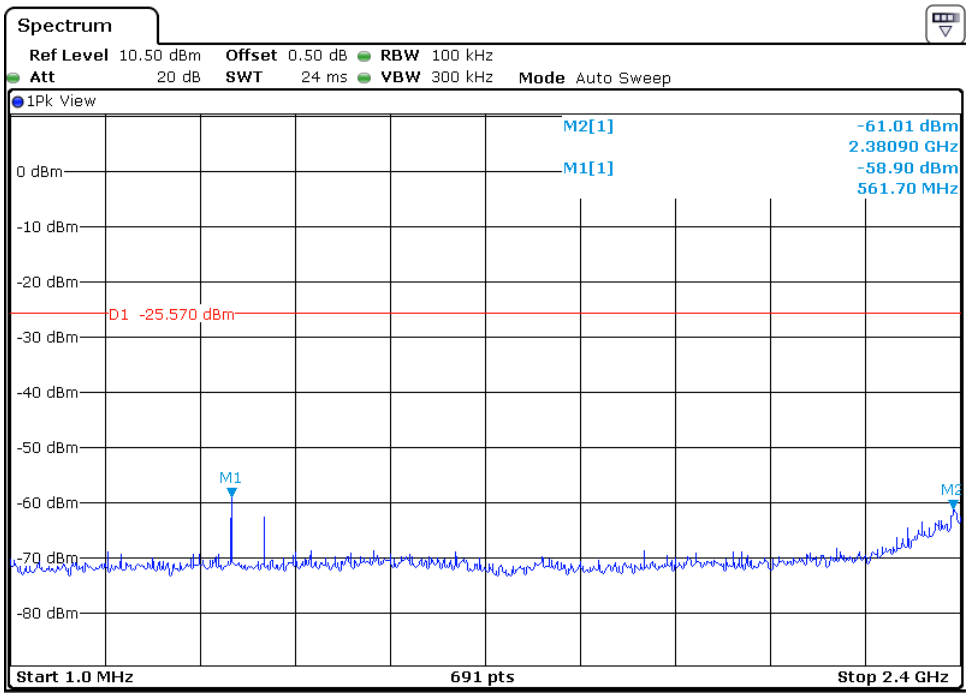


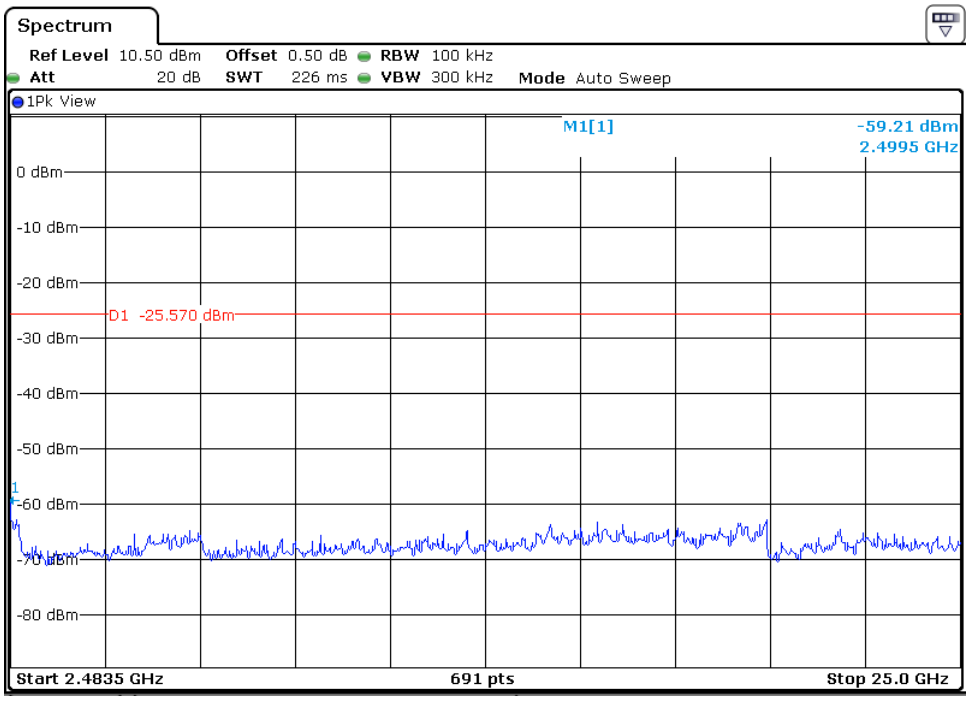
Channel 06 (2437MHz) Reference Level: -5.80dBm

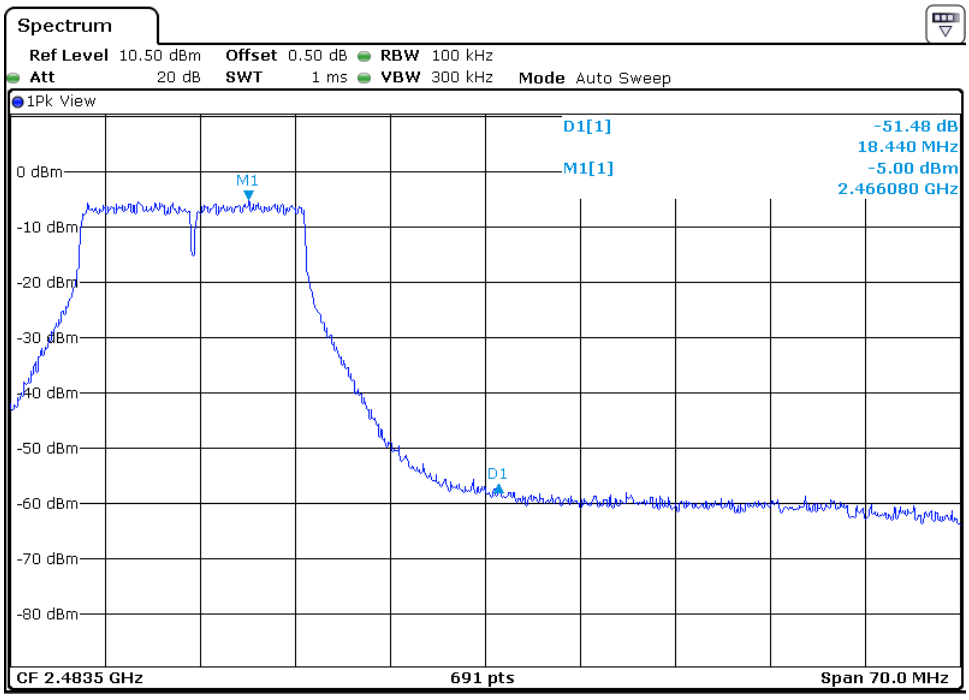




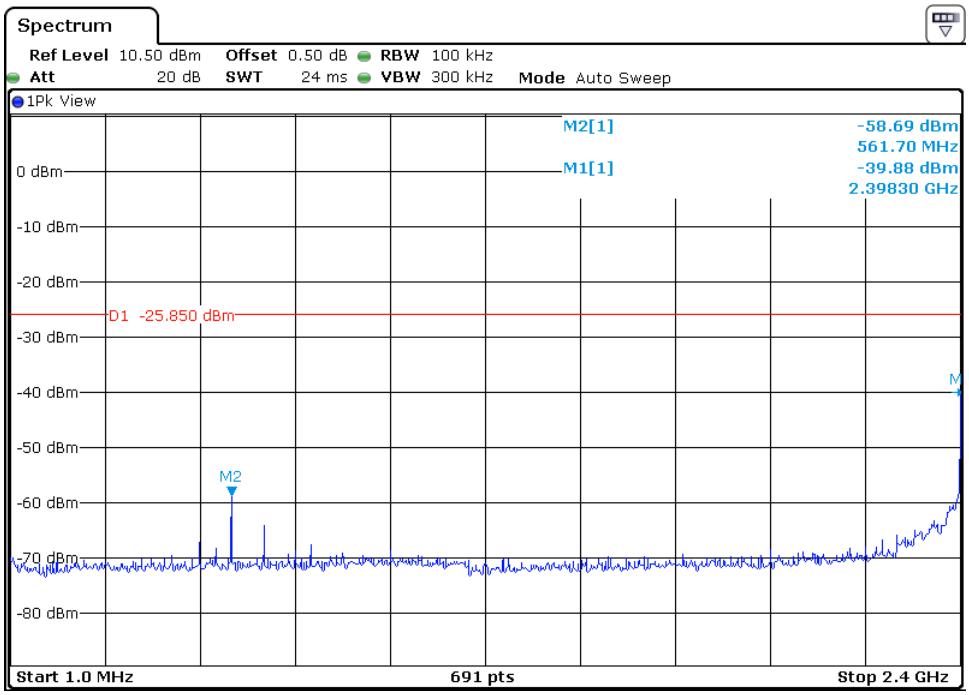
Channel 11 (2462MHz) Reference Level: -5.57dBm

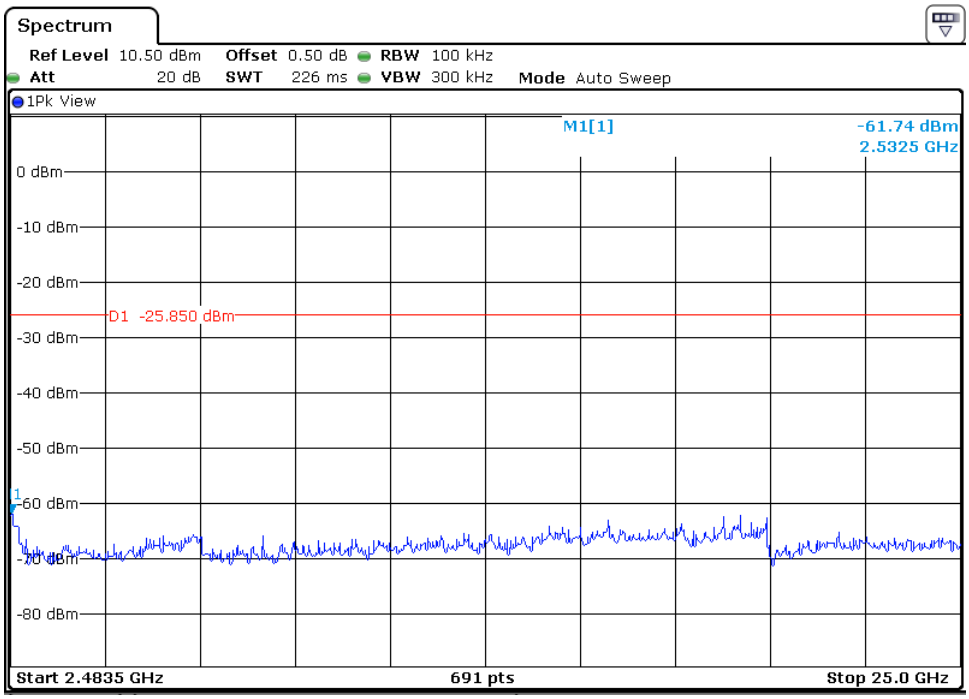


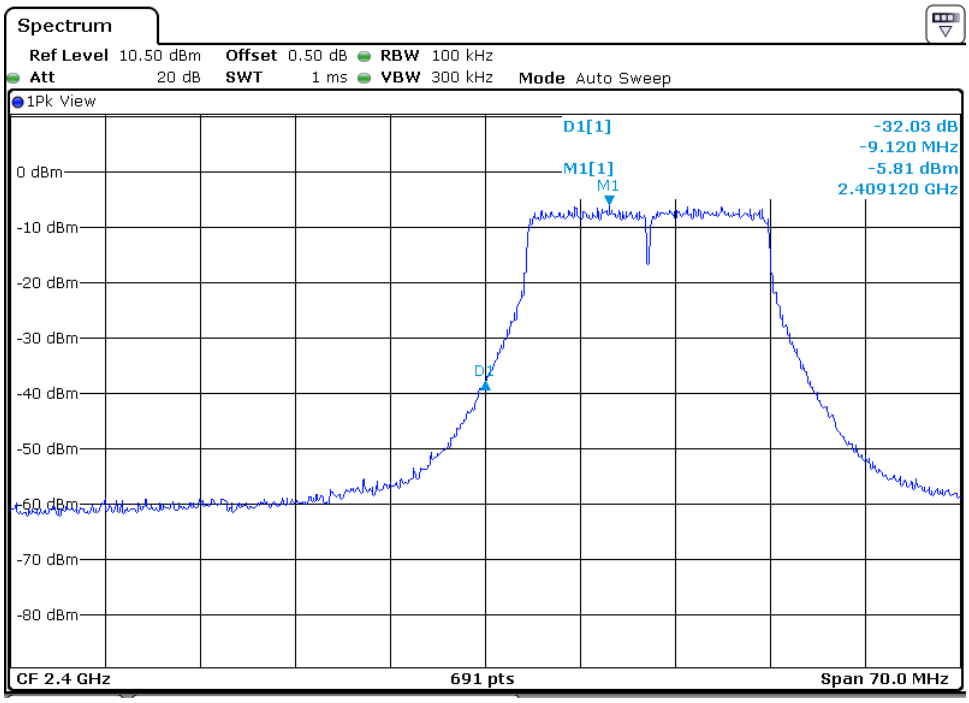

Spectrum
Ref Level 10.50 dBm Offset 0.50 dB RBW 100 kHz
Att 20 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
1Pk View
M1[1] -59.21 dBm
2.4995 GHz
D1 -25.570 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
Start 2.4835 GHz
691 pts
Stop 25.0 GHz


Spectrum
Ref Level 10.50 dBm Offset 0.50 dB RBW 100 kHz
Att 20 dB SWT 1 ms VBW 300 kHz Mode Auto Sweep
1Pk View
D1[1] -51.48 dB
18.440 MHz
M1[1] -5.00 dBm
2.466080 GHz
M1
D1
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.4835 GHz
691 pts
Span 70.0 MHz

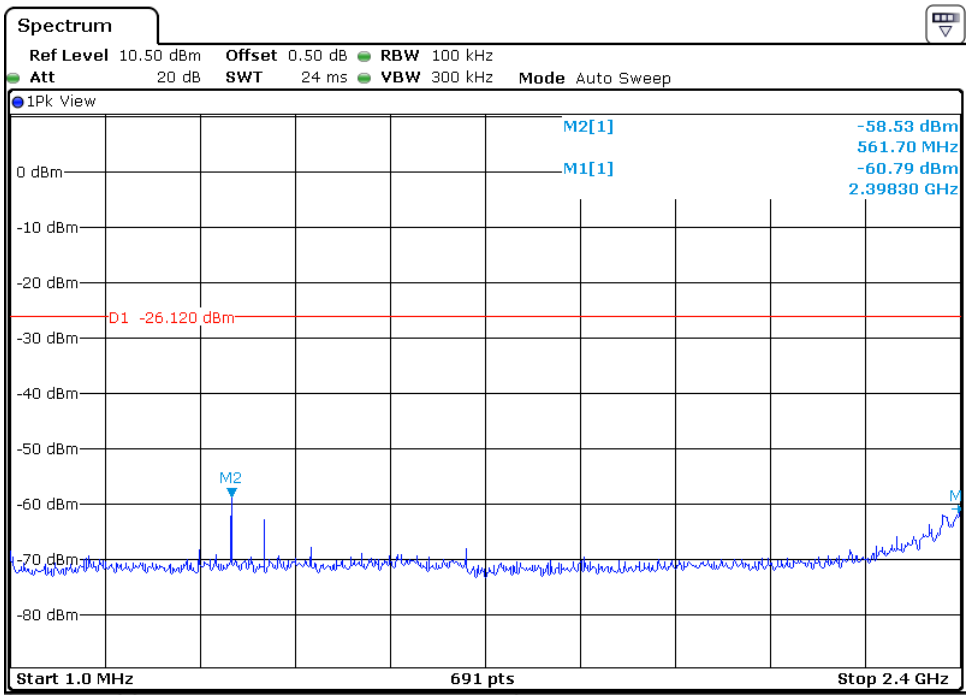
802.11n-HT20
Channel 01 (2412MHz) Reference Level: -5.85dBm

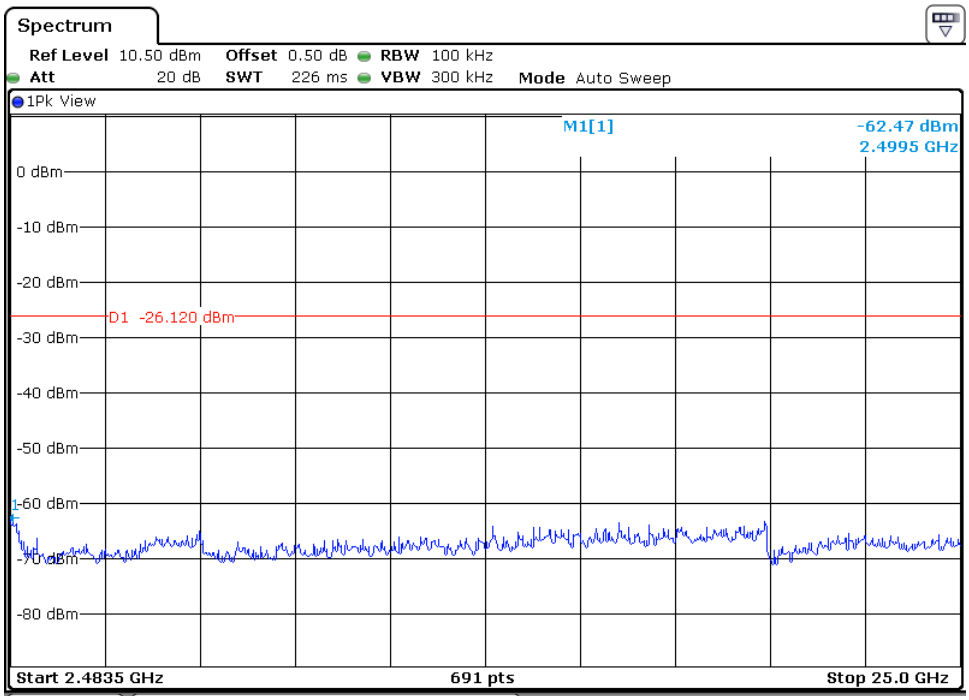




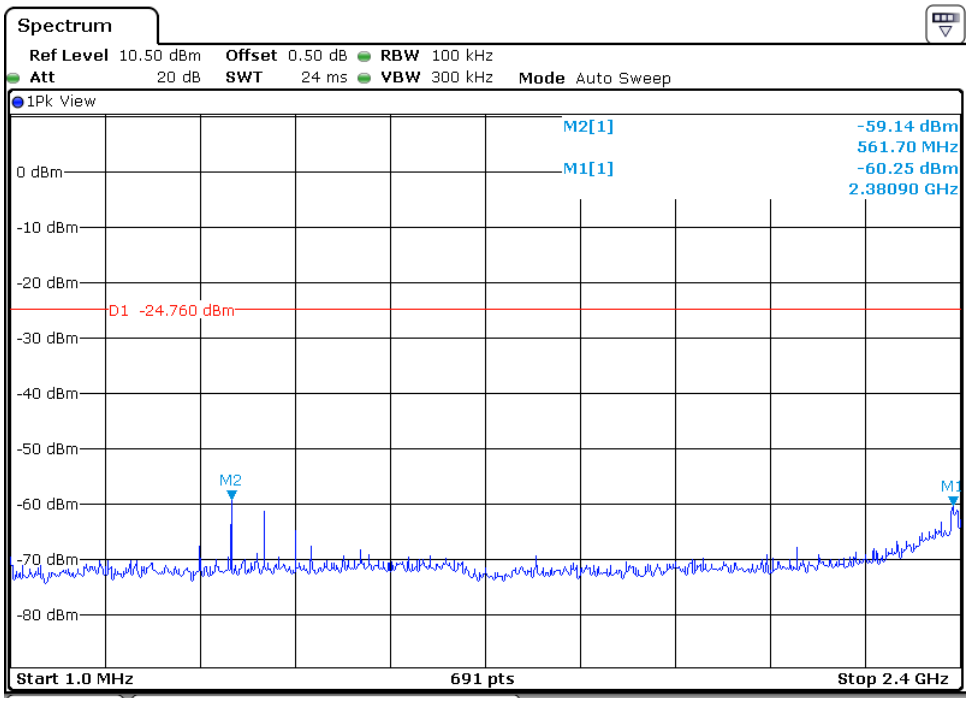

Spectrum
Ref Level 10.50 dBm Offset 0.50 dB RBW 100 kHz
Att 20 dB SWT 1 ms VBW 300 kHz Mode Auto Sweep
1Pk View
D1[1] -32.03 dB
-9.120 MHz
M1[1] -5.81 dBm
2.409120 GHz
M1
D1
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.4 GHz
691 pts
Span 70.0 MHz

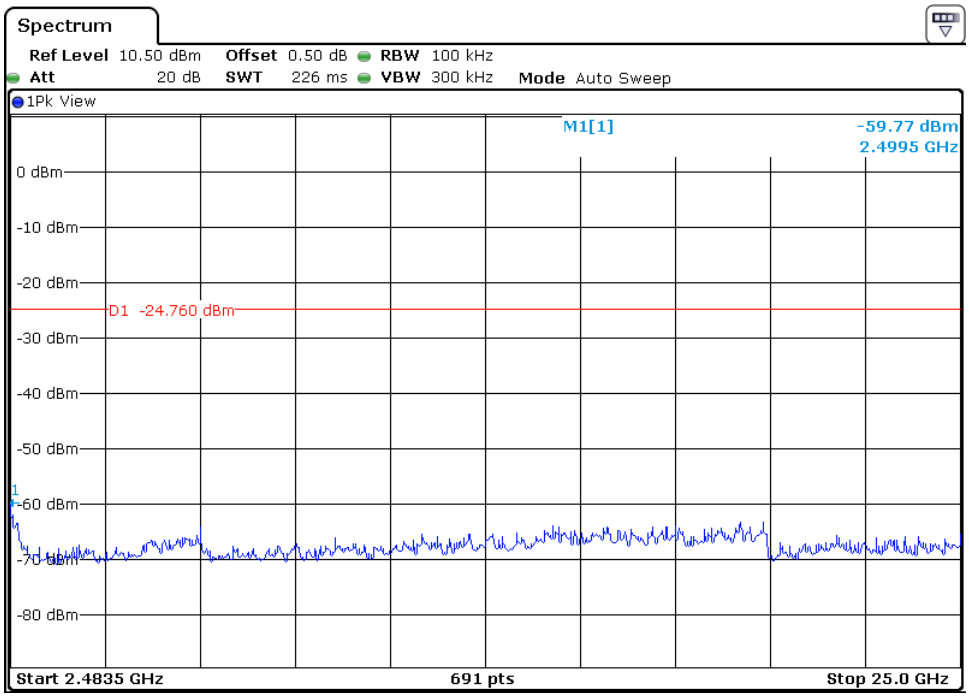
Channel 06 (2437MHz) Reference Level: -6.12dBm

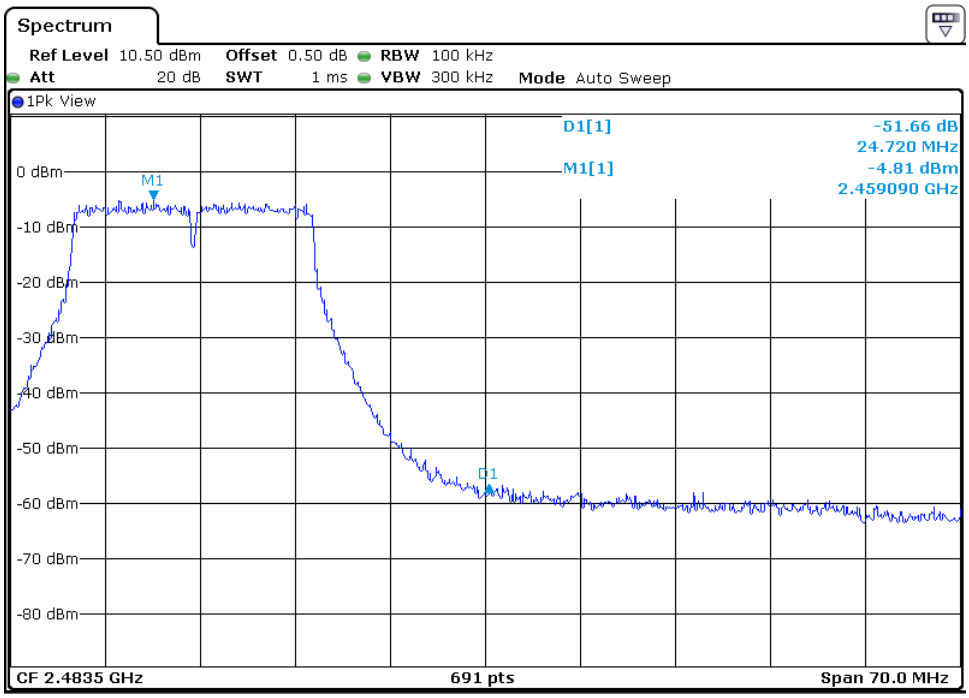




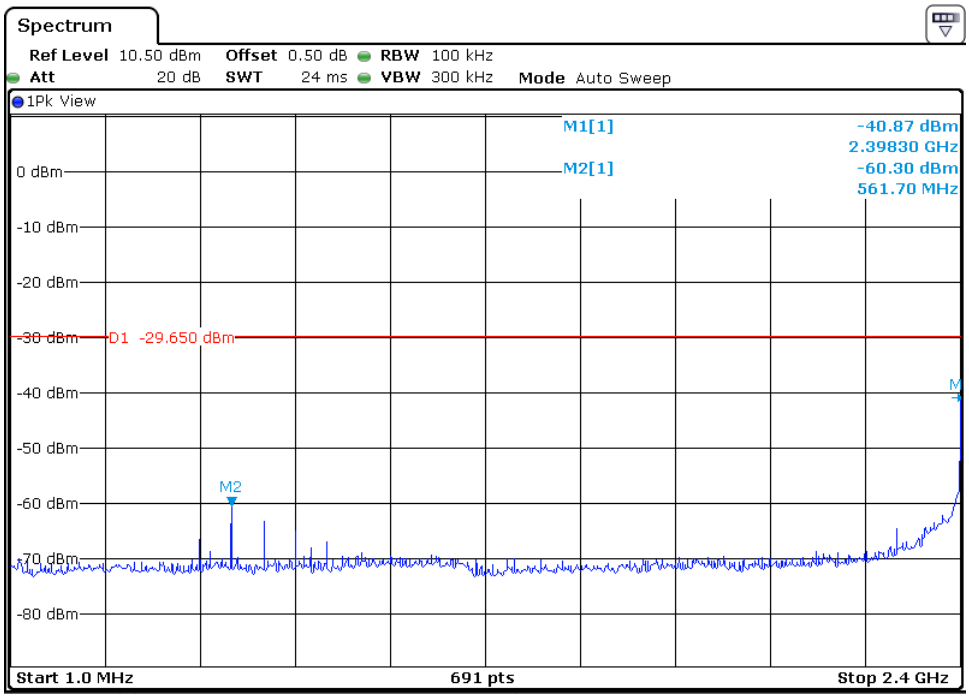
Channel 11 (2462MHz) Reference Level: -4.76dBm

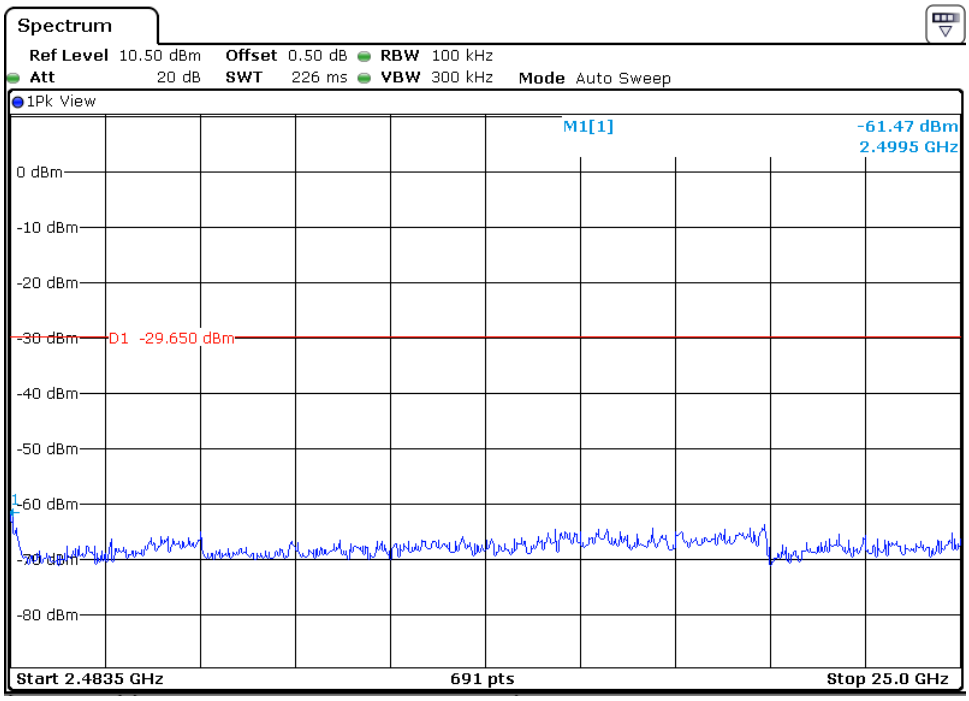


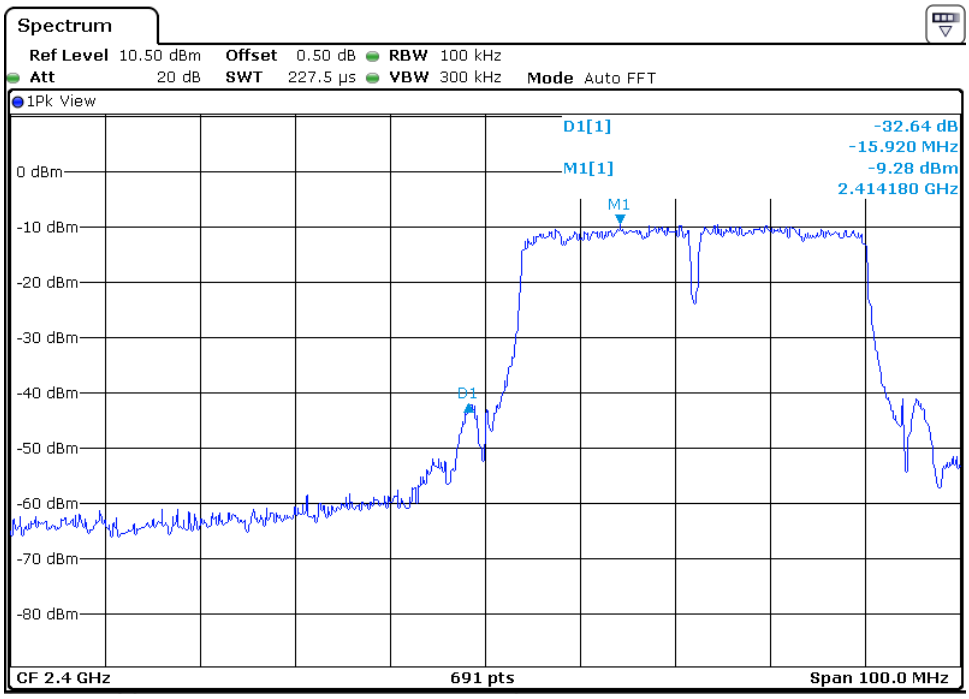




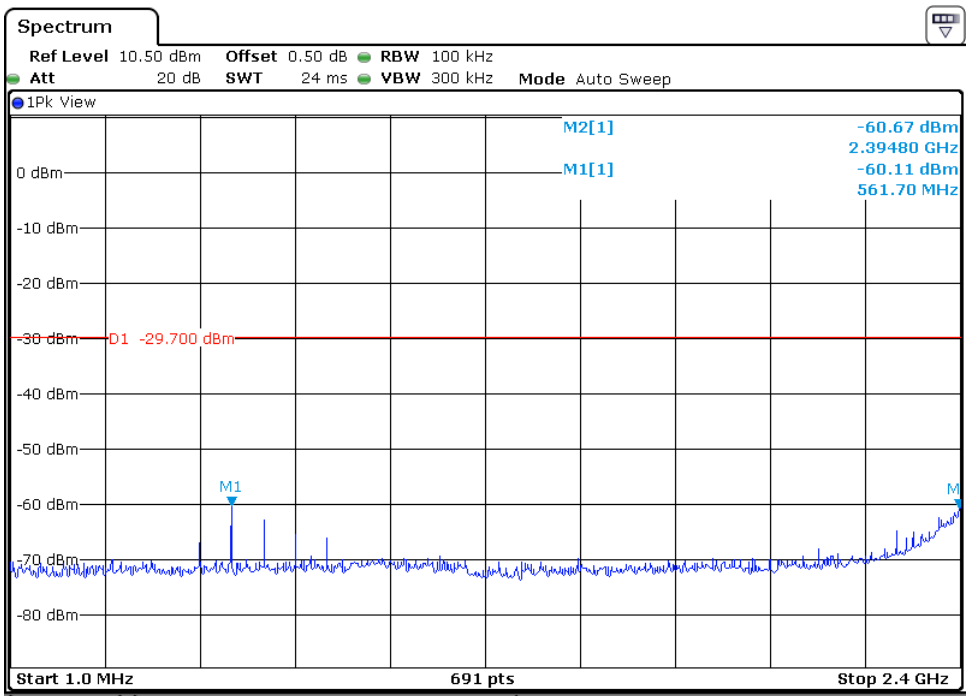
802.11n-HT40
Channel 01 (2422MHz) Reference Level: -9.65dBm

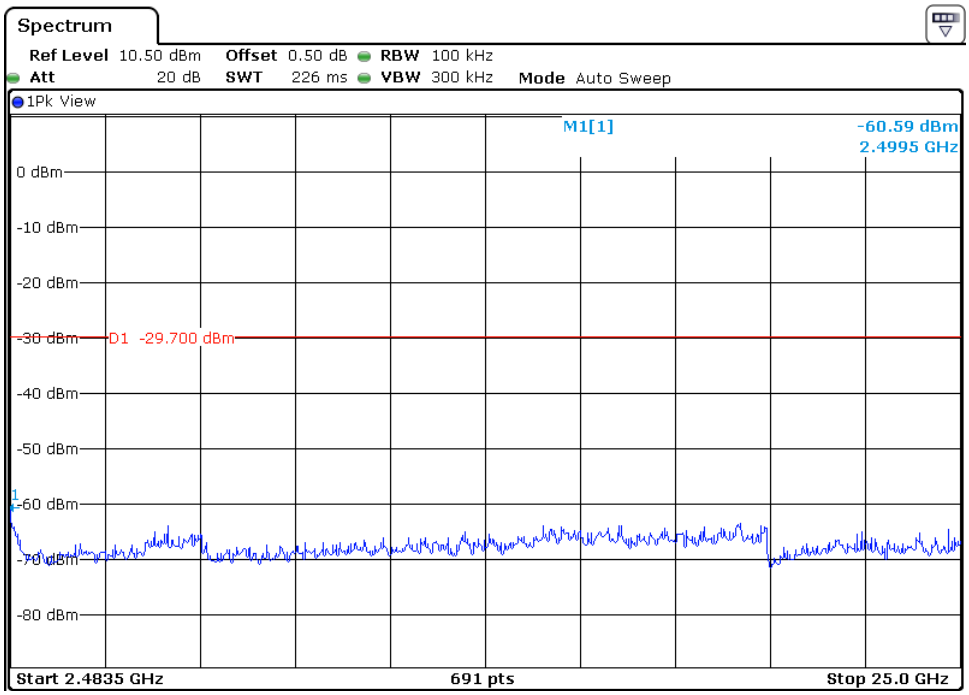



Spectrum
Ref Level 10.50 dBm Offset 0.50 dB RBW 100 kHz
Att 20 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
1Pk View
M1[1] -61.47 dBm
2.4995 GHz
D1 -29.650 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
Start 2.4835 GHz
691 pts
Stop 25.0 GHz

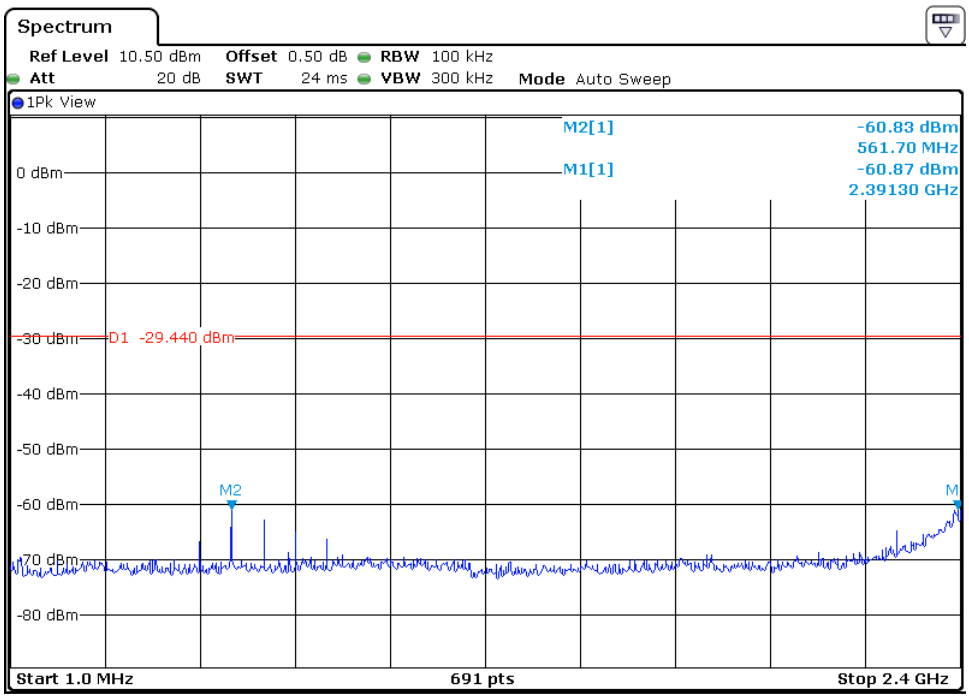

Spectrum
Ref Level 10.50 dBm Offset 0.50 dB RBW 100 kHz
Att 20 dB SWT 227.5 µs VBW 300 kHz Mode Auto FFT
1Pk View
D1[1] -32.64 dB
-15.920 MHz
M1[1] -9.28 dBm
2.414180 GHz
M1
D1
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.4 GHz
691 pts
Span 100.0 MHz

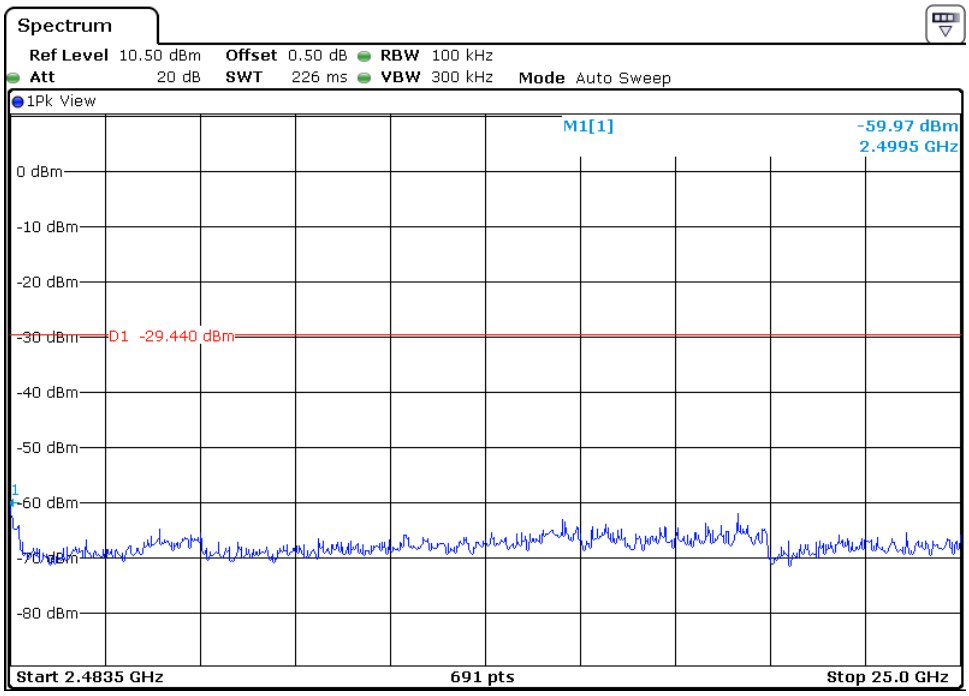
Channel 06 (2437MHz) Reference Level: -9.70dBm

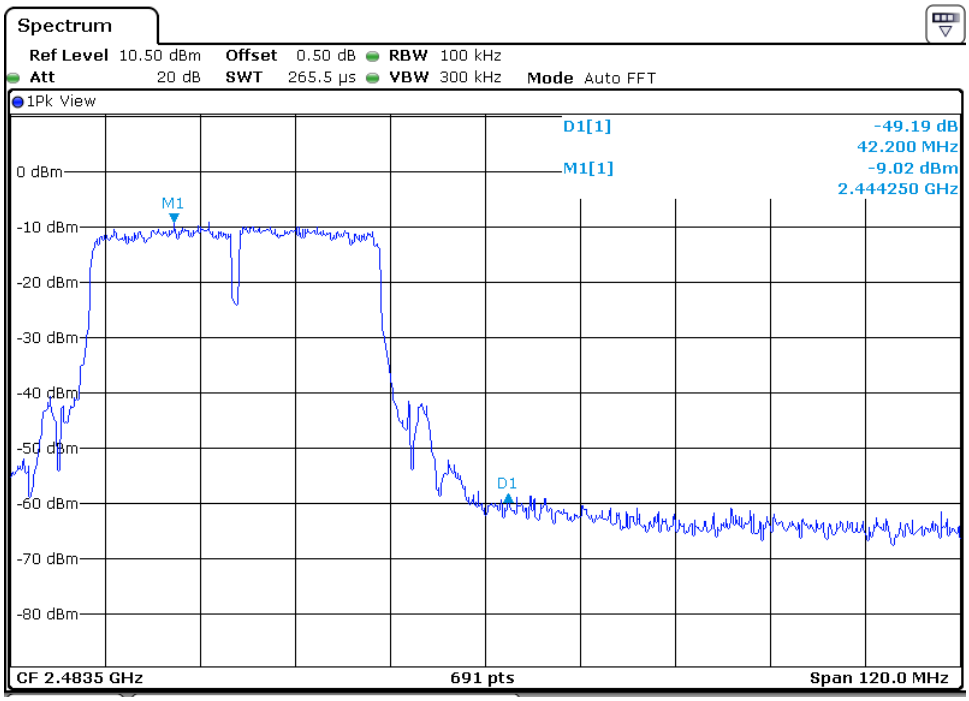




Channel 9 (2452MHz) Reference Level: -9.44dBm






Spectrum
Ref Level 10.50 dBm Offset 0.50 dB RBW 100 kHz
Att 20 dB SWT 265.5 µs VBW 300 kHz Mode Auto FFT
1Pk View
D1[1] -49.19 dB
42.200 MHz
M1[1] -9.02 dBm
2.444250 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
M1
D1
CF 2.4835 GHz
691 pts
Span 120.0 MHz

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: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R

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 transmitting was considered during the testing.

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

Applicant: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R

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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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 dBμV 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 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0 dB
FS = 62 + 7.4 + 1.6 - 29 + 0 = 42 dBμV/m

Level in mV/m = Common Antilogarithm [(42 dBμV/m)/20] = 125.9 μV/m

Applicant: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R

4.8 Radiated Spurious Emission

Worst Case Radiated Spurious Emission (802.11n-HT20) at 800.023MHz is passed by 5.2dB margin.

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

Applicant: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R
Worst Case Operating Mode: 802.11n-HT20 (TX-Channel 01)

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	180.015	39.4	20.0	12.0	31.4	43.5	-12.1
Horizontal	202.660	32.4	20.0	17.4	29.8	43.5	-13.7
Horizontal	800.033	30.5	20.0	27.8	38.3	46.0	-7.7
Vertical	39.215	39.8	20.0	8.3	28.1	40.0	-11.9
Vertical	149.795	28.6	20.0	21.9	30.5	43.5	-13.0
Vertical	800.023	33.0	20.0	27.8	40.8	46.0	-5.2

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.

Applicant: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R
Worst Case Operating Mode: 802.11b (TX-Channel 01)

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	54.4	36.1	34.2	52.5	74.0	-21.5
Horizontal	*2386.380	58.5	36.7	28.4	50.2	74.0	-23.8

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	41.1	36.1	34.2	39.2	54.0	-14.8
Horizontal	*2386.380	46.8	36.7	28.4	38.5	54.0	-15.5

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: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R
Worst Case Operating Mode: 802.11b (TX-Channel 06)

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	54.3	36.1	34.6	52.8	74.0	-21.2
Horizontal	*7311.000	50.4	35.6	37.1	51.9	74.0	-22.1

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	40.2	36.1	34.6	38.7	54.0	-15.3
Horizontal	*7311.000	33.7	35.6	37.1	35.2	54.0	-18.8

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: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R
Worst Case Operating Mode: 802.11b (TX-Channel 11)

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	54.1	36.1	34.6	52.6	74.0	-21.4
Horizontal	*7386.000	57.5	35.6	37.2	59.1	74.0	-14.9
Horizontal	*2487.540	60.4	36.7	28.1	51.8	74.0	-22.2

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	41.6	36.1	34.6	40.1	54.0	-13.9
Horizontal	*7386.000	44.0	35.6	37.2	45.6	54.0	-8.4
Horizontal	*2487.540	51.1	36.7	28.1	42.5	54.0	-11.5

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: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R
Worst Case Operating Mode: 802.11g (TX-Channel 01)

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	54.1	36.1	34.2	52.2	74.0	-21.8
Horizontal	*2390.000	45.9	36.7	28.8	38.0	74.0	-36.0

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	39.9	36.1	34.2	38.0	54.0	-16.0
Horizontal	*2390.000	49.5	36.7	28.8	41.6	54.0	-12.4

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: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R
Worst Case Operating Mode: 802.11g (TX-Channel 06)

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	53.7	36.1	34.6	52.2	74.0	-21.8
Horizontal	*7311.000	56.7	35.6	37.1	58.2	74.0	-15.8

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	39.9	36.1	34.6	38.4	54.0	-15.6
Horizontal	*7311.000	42.8	35.6	37.1	44.3	54.0	-9.7

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: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R
Worst Case Operating Mode: 802.11g (TX-Channel 11)

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	53.6	36.1	34.6	52.1	74.0	-21.9
Horizontal	*7386.000	56.6	35.6	37.2	58.2	74.0	-15.8
Horizontal	*2483.760	61.6	36.7	28.0	52.9	74.0	-21.1

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	39.6	36.1	34.6	38.1	54.0	-15.9
Horizontal	*7386.000	40.8	35.6	37.2	42.4	54.0	-11.6
Horizontal	*2483.760	55.7	36.7	28.0	47.0	54.0	-7.0

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: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R
Worst Case Operating Mode: 802.11n-HT20 (TX-Channel 01)

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	54.5	36.1	34.2	52.6	74.0	-21.4
Horizontal	*2389.920	58.7	36.7	28.7	50.7	74.0	-23.3

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	40.2	36.1	34.2	38.3	54.0	-15.7
Horizontal	*2389.920	47.9	36.7	28.7	39.9	54.0	-14.1

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: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R
Worst Case Operating Mode: 802.11n-HT20 (TX-Channel 06)

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	54.9	36.1	34.2	53.0	74.0	-21.0
Horizontal	*7311.000	57.6	35.6	37.1	59.1	74.0	-14.9

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	41.2	36.1	34.2	39.3	54.0	-14.7
Horizontal	*7311.000	43.3	35.6	37.1	44.8	54.0	-9.2

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: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R
Worst Case Operating Mode: 802.11n-HT20 (TX-Channel 11)

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	54.1	36.1	34.6	52.6	74.0	-21.4
Horizontal	*7386.000	57.9	35.6	37.2	59.5	74.0	-14.5
Horizontal	*2484.080	61.4	36.7	28.0	52.7	74.0	-21.3

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	36.1	34.6	38.4	54.0	-15.6
Horizontal	*7386.000	43.3	35.6	37.2	44.9	54.0	-9.1
Horizontal	*2484.080	48.7	36.7	28.0	40.0	54.0	-14.0

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: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R
Worst Case Operating Mode: 802.11n-HT40 (TX-Channel 03)

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	*4844.000	54.0	36.1	34.2	52.1	74.0	-21.9
Horizontal	*2389.640	50.3	20.0	28.2	58.5	74.0	-15.5

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	*4844.000	40.5	36.1	34.2	38.6	54.0	-15.4
Horizontal	*2389.640	30.0	20.0	28.2	38.2	54.0	-15.8

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: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R
Worst Case Operating Mode: 802.11n-HT40 (TX-Channel 06)

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	61.2	36.1	34.2	59.3	74.0	-14.7
Horizontal	*7311.000	56.7	35.6	37.1	58.2	74.0	-15.8

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	43.0	36.1	34.2	41.1	54.0	-12.9
Horizontal	*7311.000	40.1	35.6	37.1	41.6	54.0	-12.4

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: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R
Worst Case Operating Mode: 802.11n-HT40 (TX-Channel 09)

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)
Vertical	*4904.000	54.4	36.1	34.6	52.9	74.0	-21.1
Vertical	*2483.500	47.5	20.0	28.0	55.5	74.0	-18.5

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)
Vertical	*4904.000	40.2	36.1	34.6	38.7	54.0	-15.3
Vertical	*2483.500	26.8	20.0	28.0	34.8	54.0	-19.2

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.

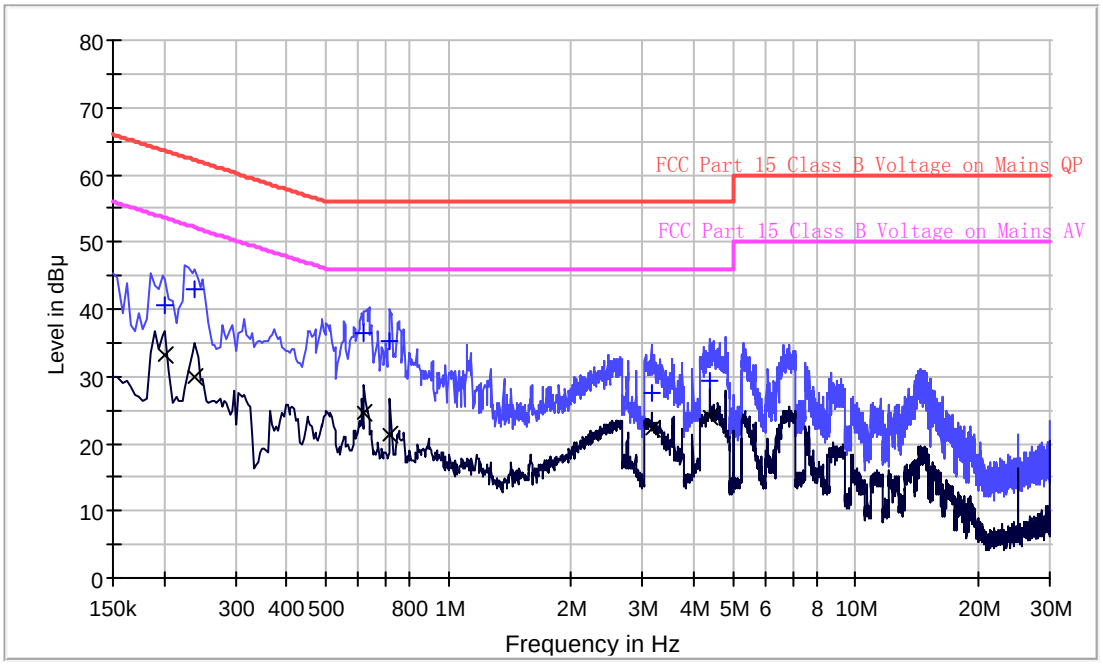
* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted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

4.9 Conducted Emission

Worst Case Conducted emission at 0.226MHz is Passed by 17.8dB margin

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

Applicant: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R
Worst Case Operating Mode: 802.11n-HT20 (TX-Channel 01)
Line: Live
Conducted Emission Test - FCC



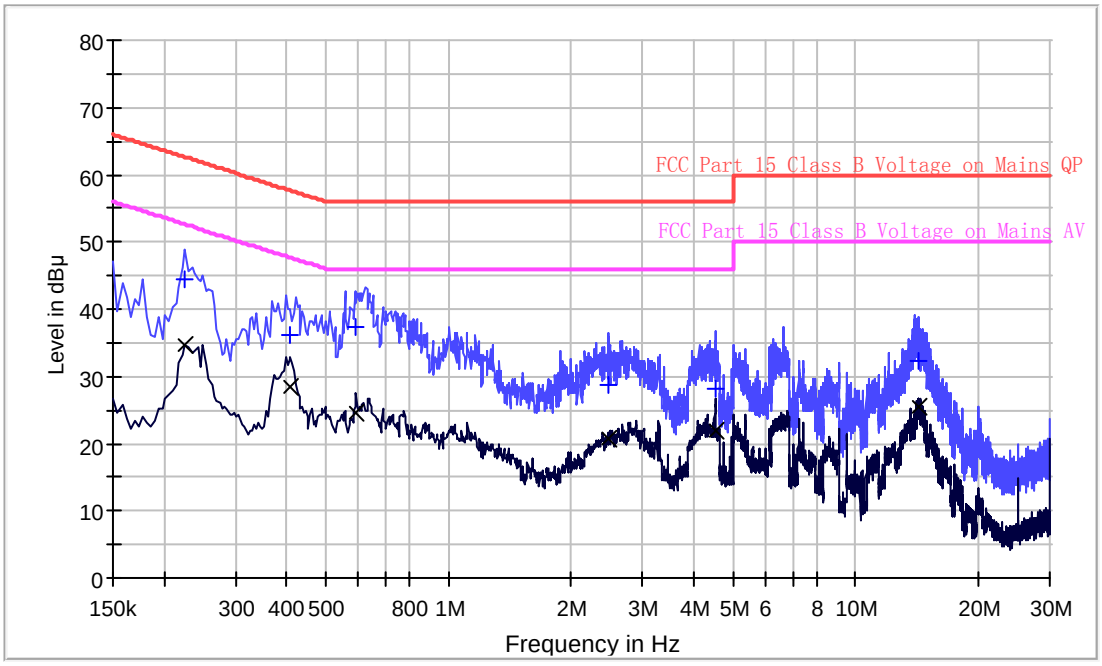
Limit and Margin QP

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.202	40.7	L1	9.7	22.8	63.5
0.238	42.8	L1	9.7	19.4	62.2
0.622	36.4	L1	9.7	19.6	56.0
0.718	35.3	L1	9.7	20.7	56.0
3.146	27.4	L1	9.8	28.6	56.0
4.390	29.4	L1	9.8	26.6	56.0

Limit and Margin AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.202	33.2	L1	9.7	20.3	53.5
0.238	29.9	L1	9.7	22.3	52.2
0.622	24.5	L1	9.7	21.5	46.0
0.718	21.2	L1	9.7	24.8	46.0
3.146	22.1	L1	9.8	23.9	46.0
4.390	24.1	L1	9.8	21.9	46.0

Applicant: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R
Worst Case Operating Mode: 802.11n-HT20 (TX-Channel 01)
Line: Neutral
Conducted Emission Test - FCC



Limit and Margin QP

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.226	44.3	N	9.7	18.3	62.6
0.410	36.3	N	9.7	21.3	57.6
0.594	37.3	N	9.7	18.7	56.0
2.470	28.7	N	9.7	27.3	56.0
4.530	28.2	N	9.8	27.8	56.0
14.230	32.2	N	10.0	27.8	60.0

Limit and Margin AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.226	34.8	N	9.7	17.8	52.6
0.410	28.5	N	9.7	19.1	47.6
0.594	24.7	N	9.7	21.3	46.0
2.470	20.8	N	9.7	25.2	46.0
4.530	22.0	N	9.8	24.0	46.0
14.230	25.5	N	10.0	24.5	50.0

Applicant: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R

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

[ ] Not required - No digital part

[ ] Test results are attached

[x] Included in the separated report.

Applicant: KenXen Electronic (SZ) Limited
Date of Test: October 21, 2016
Model: W4R

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	23-May-2016	23-May-2017
SZ182-02-01	Power Sensor	Anritsu	MA2411B	1207429	23-May-2016	23-May-2017
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	09-Sep-2016	09-Sep-2017
SZ185-01	EMI Receiver	R&S	ESCI	100547	23-Jan-2016	23-Jan-2017
SZ061-09	Horn Antenna	ETS	3115	00092346	31-Oct-2015	31-Oct-2016
SZ061-07	Pyramidal Horn Antenna	ETS	3160-09	00083067	29-Mar-2016	29-Mar-2017
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	11-May-2016	11-May-2017
SZ056-06	Spectrum Analyzer	R&S	FSV40	101101	2-Jul-2016	2-Jul-2017
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	23-Jan-2016	23-Jan-2017
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	16-Apr-2016	16-Apr-2018
SZ062-02	RF Cable	RADIALL	RG 213U	--	8-Jul-2016	8-Jan-2017
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	26-Sep-2016	26-Mar-2017
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	26-Sep-2016	26-Mar-2017
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	--	23-May-2016	23-May-2017
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	3-Nov-2015	3-Nov-2016
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	3-Nov-2015	3-Nov-2016
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	01-Jul-2016	01-Jul-2017
SZ188-03	Shielding Room	ETS	RFD-100	4100	17-Aug-2016	17-Aug-2018