Kenxen Digitech Limited

TEST REPORT

SCOPE OF WORK
FCC TESTING–TW03

REPORT NUMBER
190104020SZN-002

ISSUE DATE	**[REVISED DATE]**
16 January 2019	[----------]

PAGES
74

DOCUMENT CONTROL NUMBER
FCC ID 247_b

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
www.intertek.com

Total Quality. Assured.

TEST REPORT

Intertek Report No.: 190104020SZN-002

Kenxen Digitech Limited

Application
For
Certification

FCC ID: 2AL8TTW03

Dash Camera

Model: TW03

Brand Name: Kenxen, WAYLENS

2.4GHz Transceiver

Report No.: 190104020SZN-002

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:

Leo Li
Engineer

Approved by:

Kidd Yang
Technical Supervisor
Date: 16 January 2019

LIST OF EXHIBITS

MEASUREMENT/TECHNICAL REPORT

Kenxen Digitech Limited

Model: TW03

FCC ID: 2AL8TTW03

This report concerns (check one) Original Grant ___X___ 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 ___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 [10-1-17] Edition] provision.

Report prepared by:

Leo Li
Intertek Testing Services Shenzhen Ltd. Longhua Branch
101, 201, Building B, No. 308 Wuhe Avenue,
Zhangkengjing Community, GuanHu Subdistrict,
LongHua District, ShenZhen.
Tel: (86 755) 8614 0743 Fax: (86 755) 8601 6751

Table of Contents

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

Dash Camera

Model: TW03

FCC ID: 2AL8TTW03

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 Dash Camera 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; 5745 MHz - 5825 MHz for 802.11a/n/ac-HT20 with 5 channels, 5755 MHz ~ 5795 MHz for 802.11n/ac-HT40 with 2 channels and 5775 MHz for 802.11ac-HT80 with 1 channel. The EUT can be powered by DC 5.0V, 1.5A through Micro USB port. 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, DSSS.
Antenna Gain: -0.1dBi Max for 2.4G WIFI

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 Wi-Fi transmitter portion).
For the Bluetooth 4.2 BLE function was tested and demonstrated in report 190104020SZN-001.
For the 5GHz WiFi function was tested and demonstrated in report 190104020SZN-003.
For other functions were reported in the SDOC report: 190104020SZN-004.

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 101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, ShenZhen. 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 5.0V, 1.5A through Micro USB port with adapter 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 Kenxen Digitech Limited 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

This product was tested in the following configuration:

Refer List:

Description	Manufacturer	Model No.
Adapter	provided by Intertek	XIAOMI, MDY-08-EI
USB cable	provided by Intertek	Unshielded, 0.5m

EXHIBIT 4

MEASUREMENT RESULTS

Applicant: Kenxen Digitech Limited
Date of Test: January 10, 2019 Model: TW03

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 has 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 -0.1dBi <6dBi, So maximum allowed Transmitter output is 30dBm (1000mW).

IEEE 802.11b (Antenna Gain = -0.1dBi) (CCK, 1Mbps)		
Frequency (MHz)	Output in dBm (Peak reading)	Output in mWatt
Low Channel: 2412	17.69	58.7
Middle Channel: 2437	18.03	63.5
High Channel: 2462	17.52	56.5

IEEE 802.11g (Antenna Gain = -0.1dBi) (16QAM, 6Mbps)		
Frequency (MHz)	Output in dBm (Peak reading)	Output in mWatt
Low Channel: 2412	22.60	182.0
Middle Channel: 2437	22.36	172.2
High Channel: 2462	22.30	169.8

IEEE 802.11n-HT20 (Antenna Gain = -0.1dBi) (16QAM, 6.5Mbps)		
Frequency (MHz)	Output in dBm (Peak reading)	Output in mWatt
Low Channel: 2412	21.26	133.7
Middle Channel: 2437	22.43	175.0
High Channel: 2462	21.79	151.0

IEEE 802.11n-HT40 (Antenna Gain = -0.1dBi) (64QAM, 13.5Mbps)		
Frequency (MHz)	Output in dBm (Peak reading)	Output in mWatt
Low Channel: 2422	22.52	178.6
Middle Channel: 2437	23.37	217.3
High Channel: 2452	22.39	173.4

Cable loss: 2.5 dB External Attenuation: 0 dB
Cable loss, external attenuation has been included in OFFSET function

EUT max. output level = 23.37dBm
EUT max. radiated output level = 23.37dBm -0.1dBi = 23.27dBm
For RF Exposure, the information is saved with filename: RF exposure.pdf.

Applicant: Kenxen Digitech Limited
Date of Test: January 10, 2019 Model: TW03

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.

IEEE 802.11b (CCK, 1Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	10.12
2437	10.12
2462	10.12

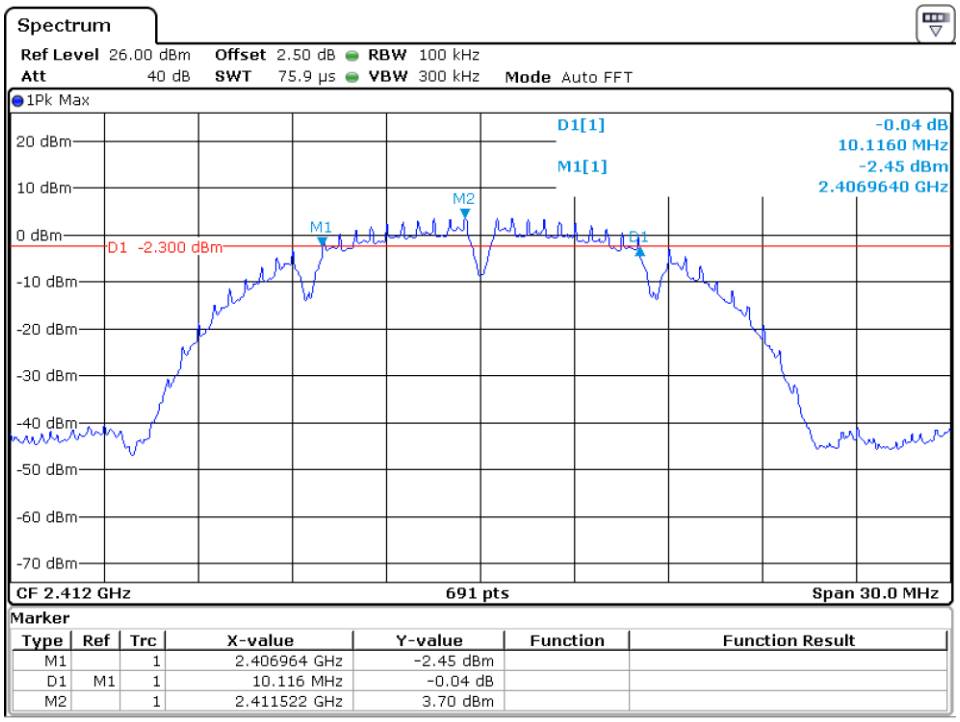
IEEE 802.11g (16QAM, 6Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	16.32
2437	16.32
2462	16.32

IEEE 802.11n-HT20 (16QAM, 6.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	17.06
2437	17.06
2462	17.06

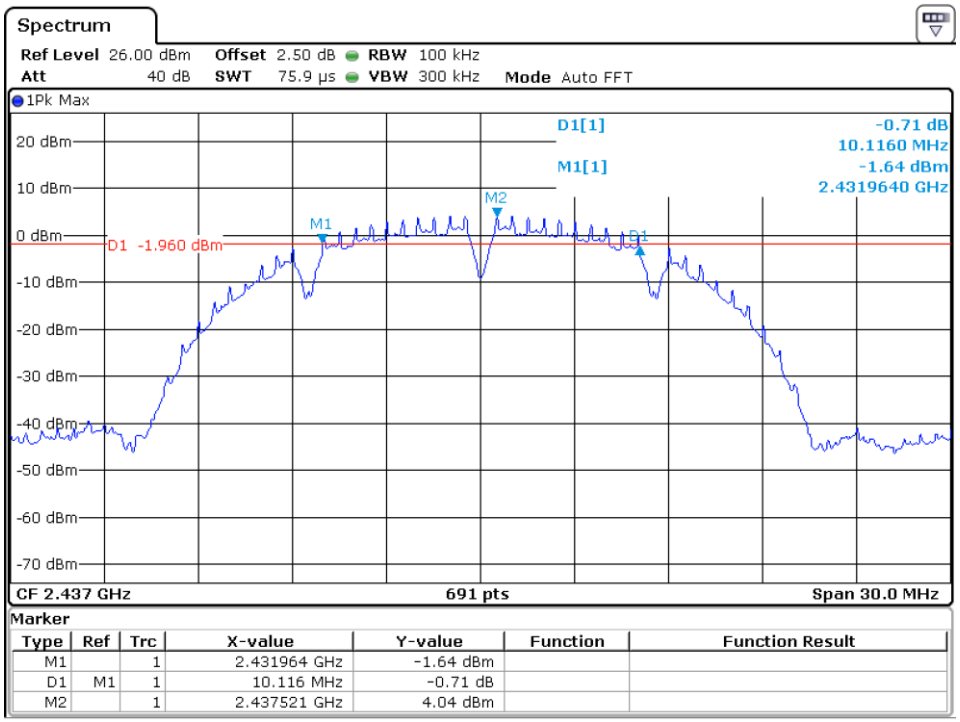
IEEE 802.11n-HT40 (64QAM, 13.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2422	35.62
2437	35.51
2452	35.51

The test plots are attached as below.

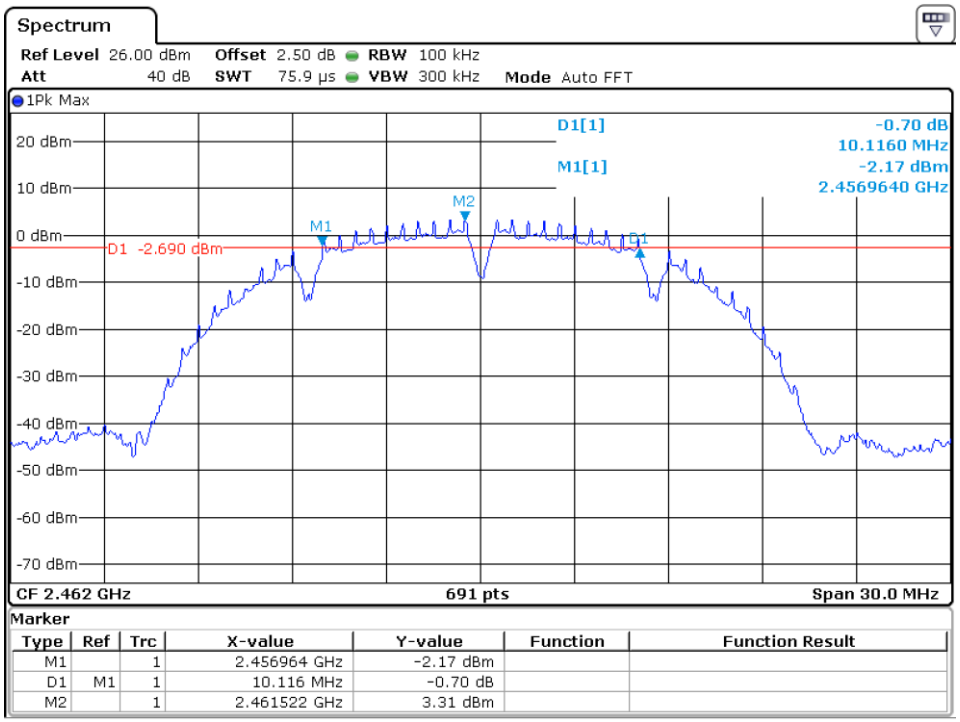
802.11b



Date: 10.JAN.2019 19:05:16

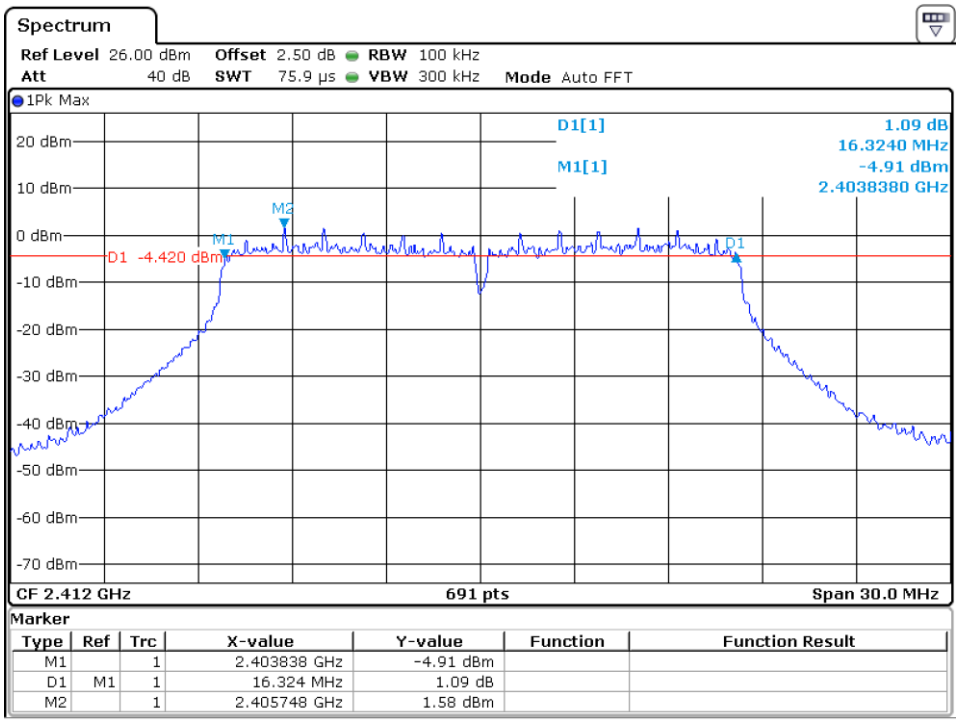


Date: 10.JAN.2019 19:13:57

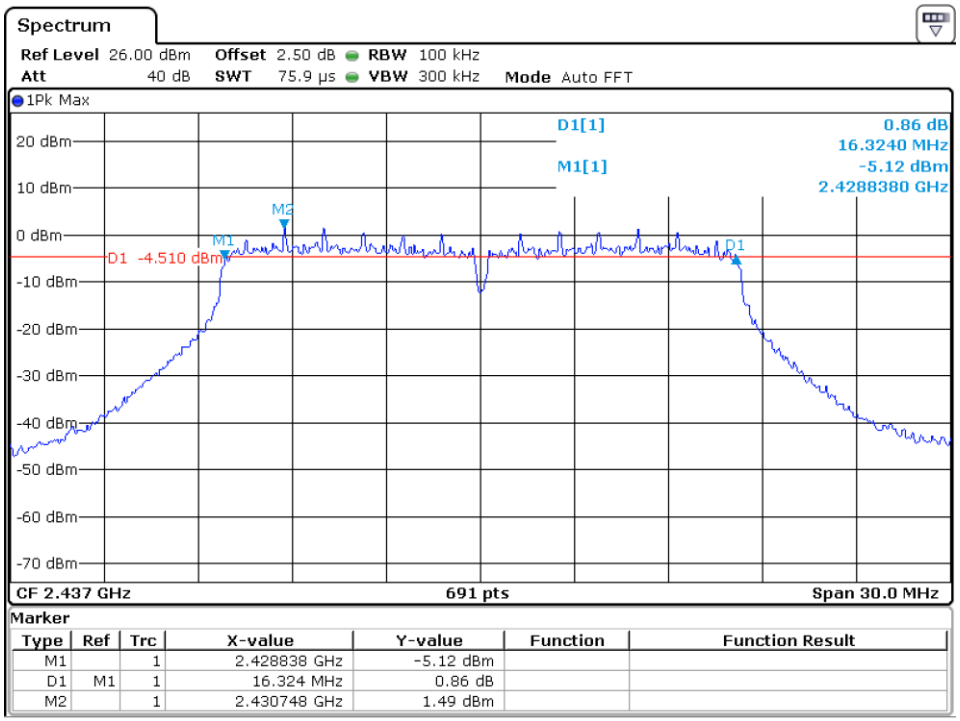


Date: 10.JAN.2019 19:16:52

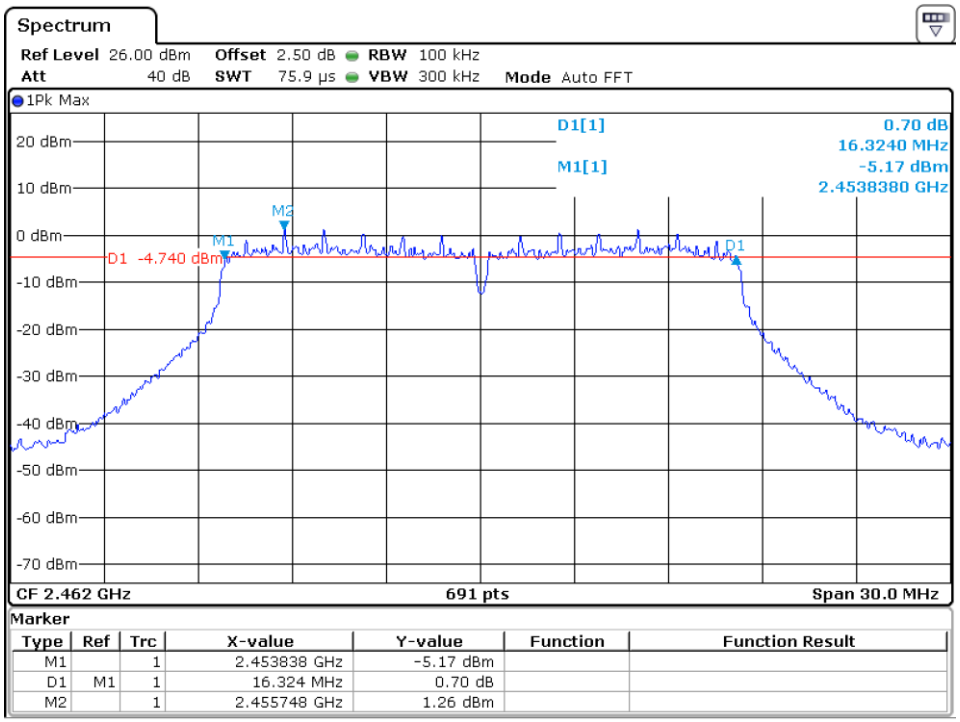
802.11g



Date: 10.JAN.2019 19:21:56

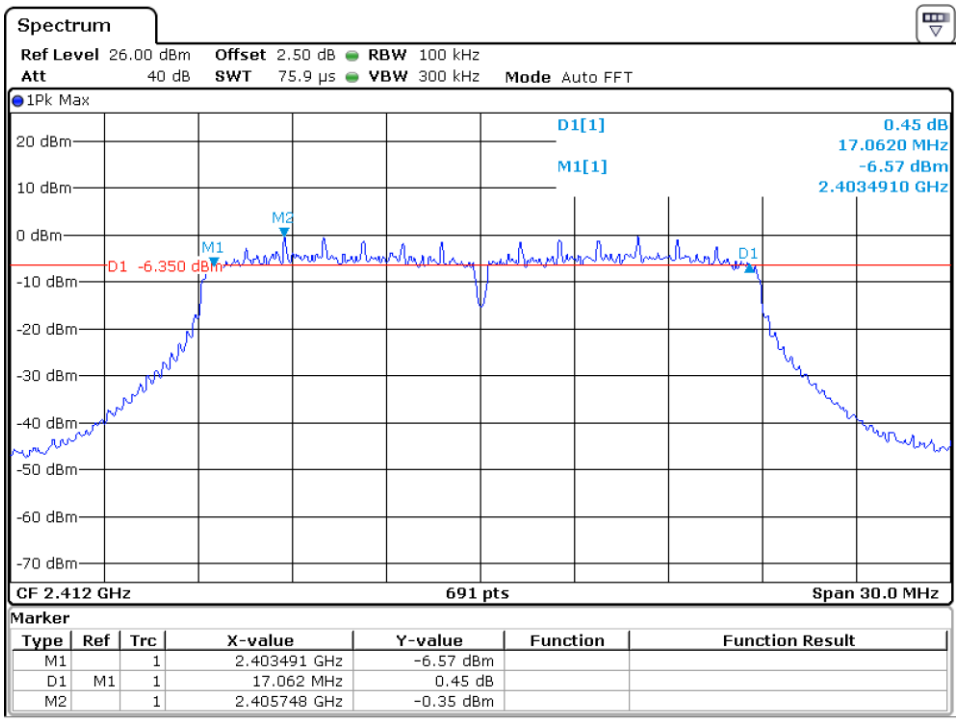


Date: 10.JAN.2019 19:25:54

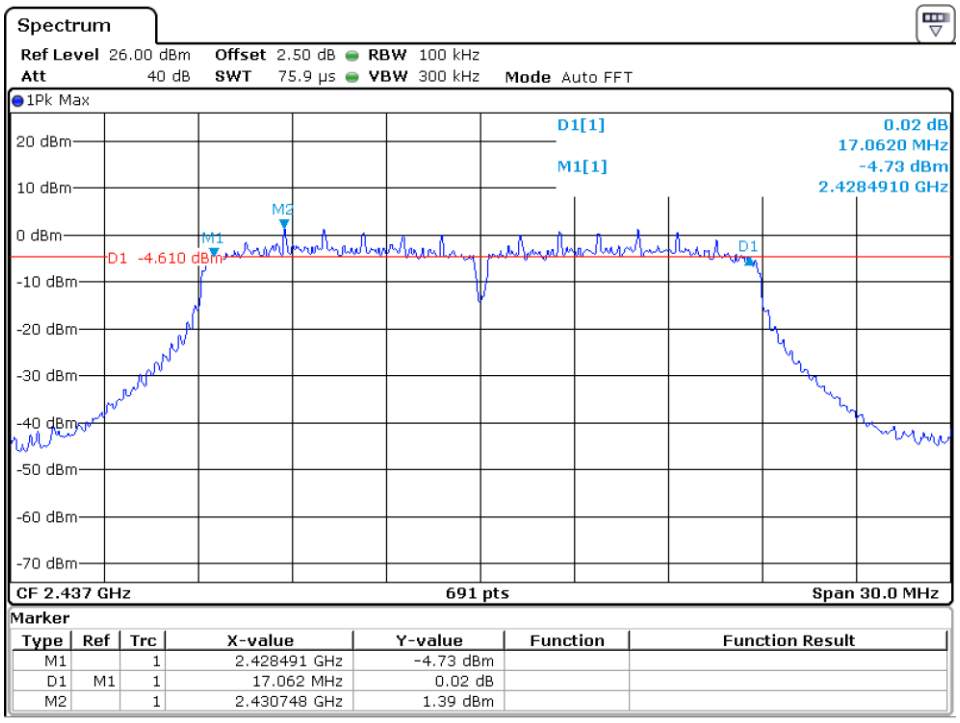


Date: 10.JAN.2019 19:29:21

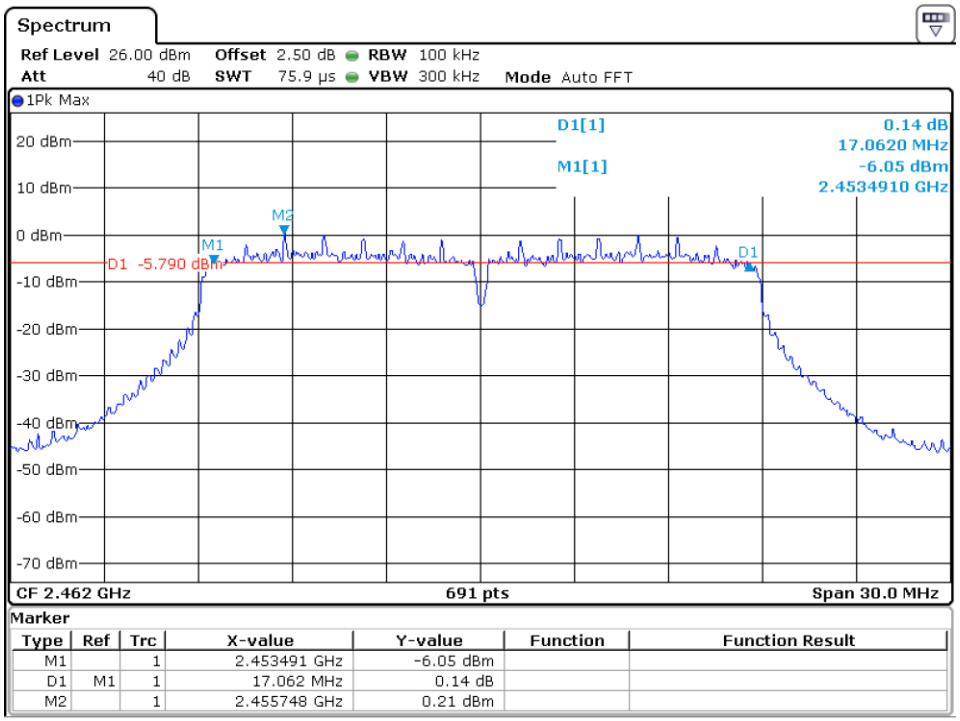
802.11n-HT20



Date: 10.JAN.2019 19:35:25

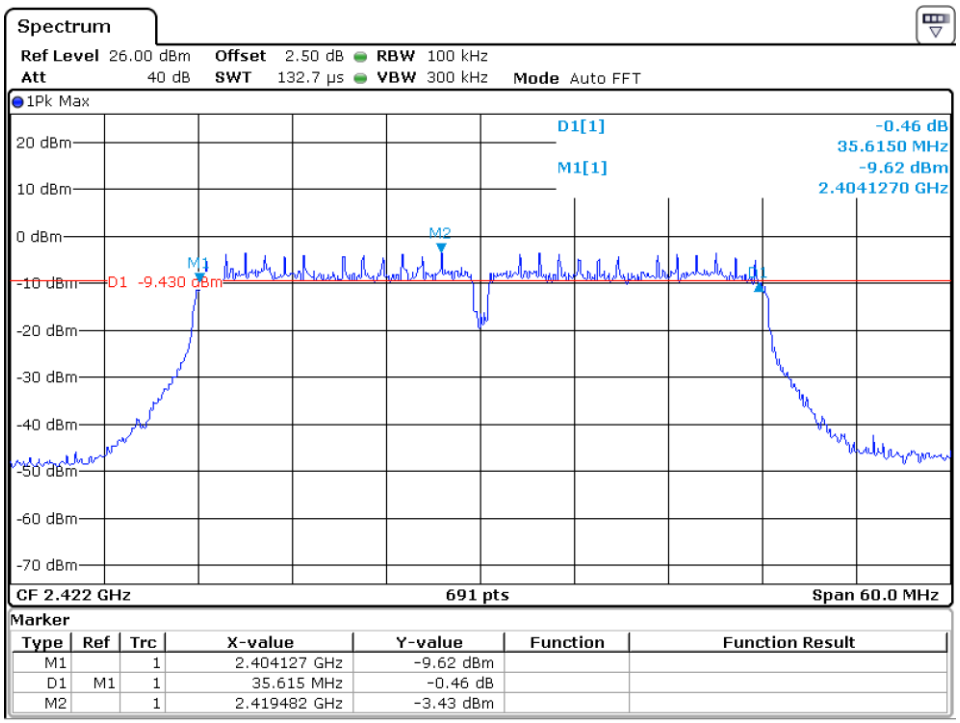


Date: 10.JAN.2019 19:39:31

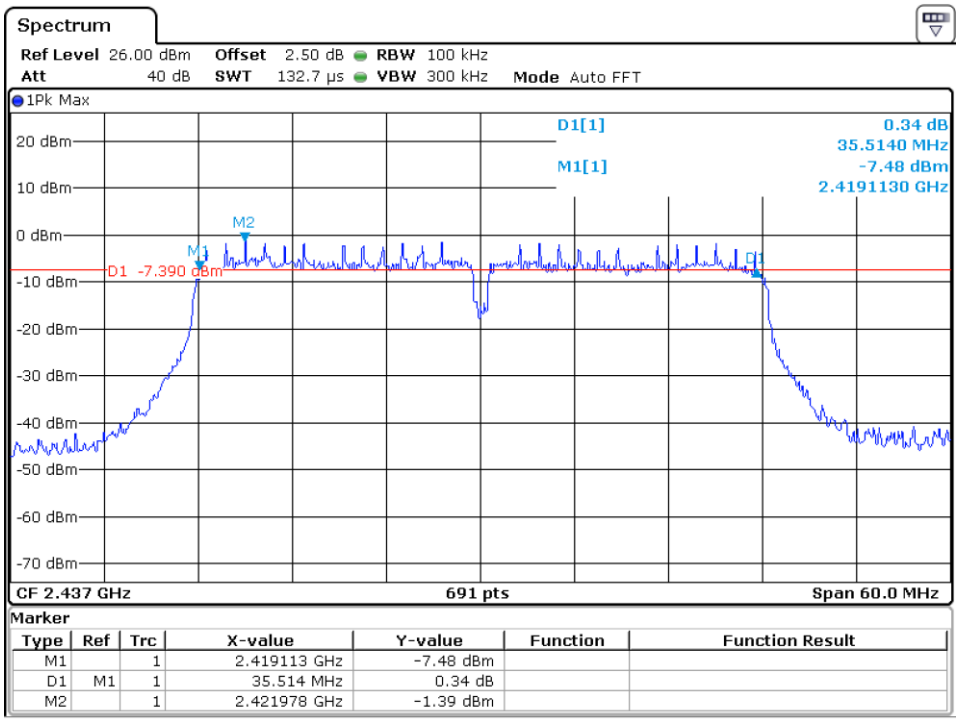


Date: 10.JAN.2019 19:43:38

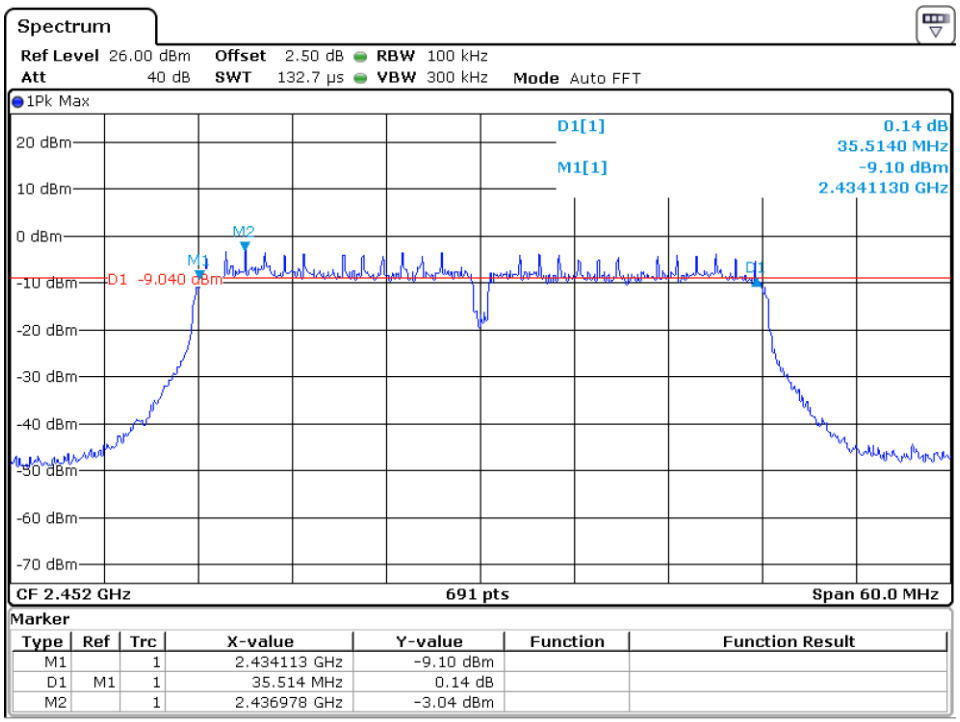
802.11n-HT40



Date: 10.JAN.2019 19:50:15



Date: 10.JAN.2019 19:54:38



Date: 10.JAN.2019 19:57:44

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

The Measurement Procedure PK PSD 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.

For antennas with gains of -0.1dBi <6dBi, So the limit of Power Density is 8dBm/3 kHz.

IEEE 802.11b (CCK, 1Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz
2412	3.68
2437	3.87
2462	3.26

IEEE 802.11g (16QAM, 6Mbps)	
Frequency (MHz)	Power Density with RBW 3KHz
2412	1.39
2437	1.25
2462	1.12

IEEE 802.11n-HT20 (16QAM, 6.5Mbps)	
Frequency (MHz)	Power Density with RBW 3KHz
2412	-0.50
2437	1.39
2462	-0.03

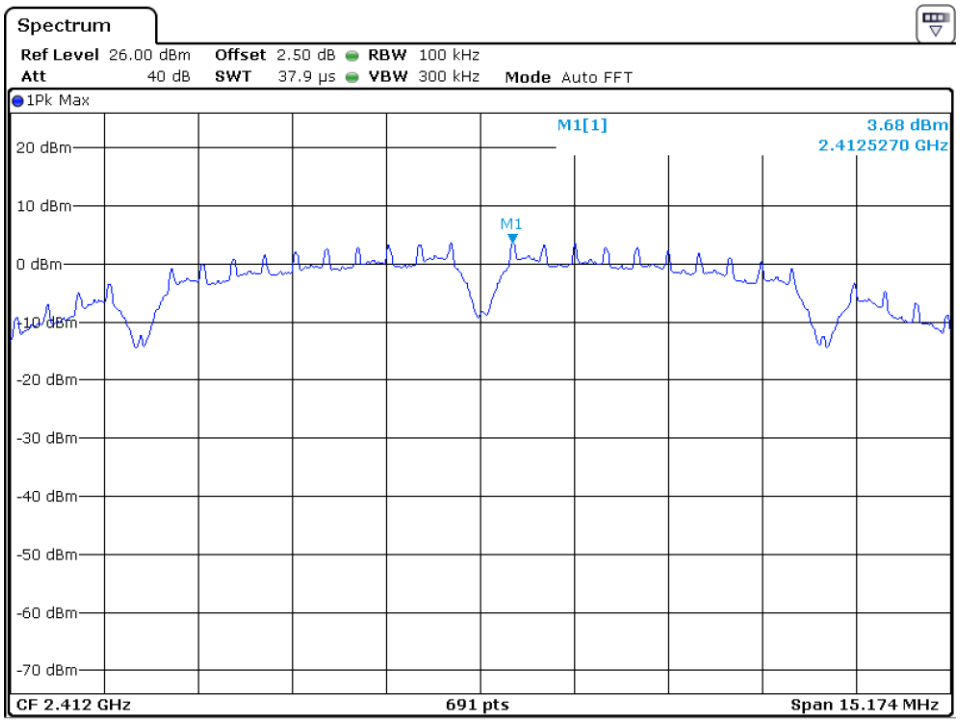
IEEE 802.11n-HT40 (64QAM, 13.5Mbps)	
Frequency (MHz)	Power Density with RBW 3KHz
2422	-3.45
2437	-1.46
2452	-3.14

Cable loss: 2.5 dB External Attenuation: 0 dB

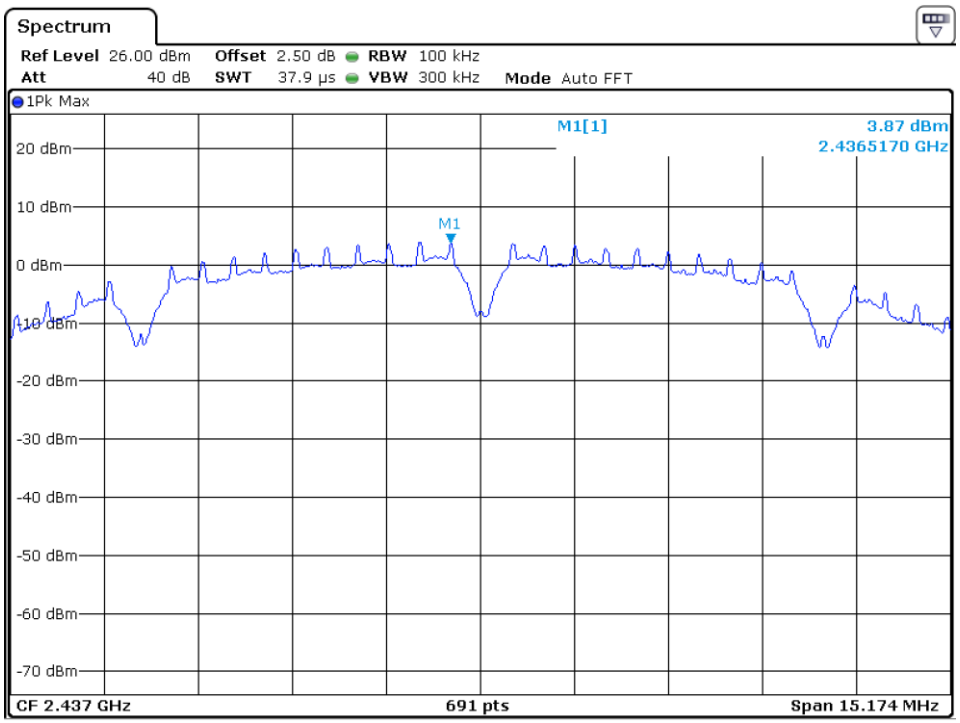
Cable loss, external attenuation has been included in OFFSET function

The test plots are attached as below.

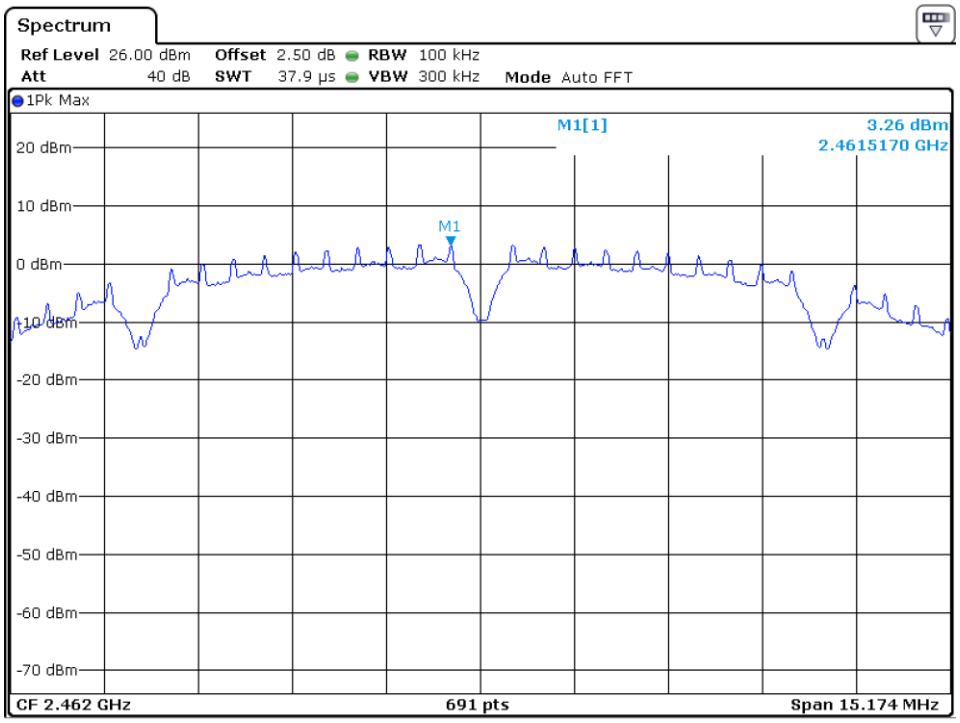
802.11b



Date: 10.JAN.2019 19:05:55

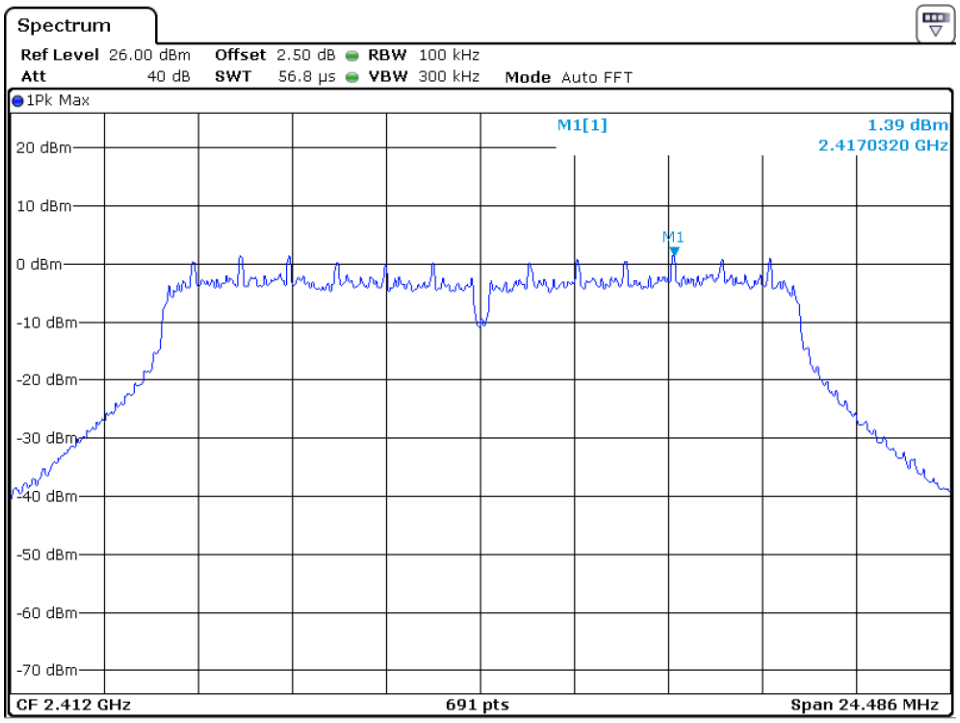


Date: 10.JAN.2019 19:14:27

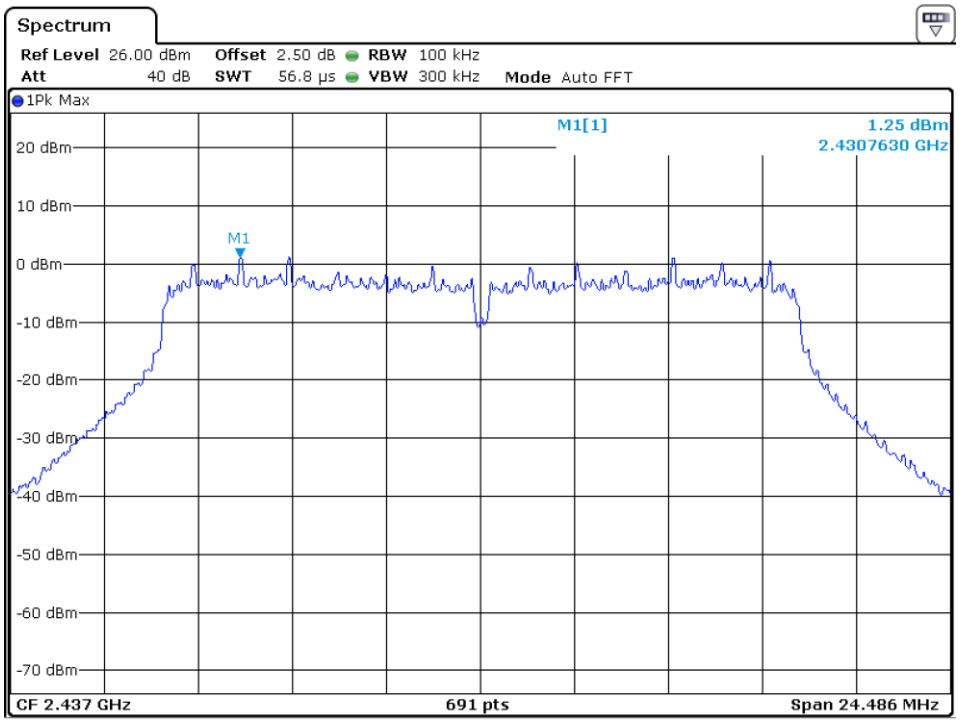


Date: 10.JAN.2019 19:17:21

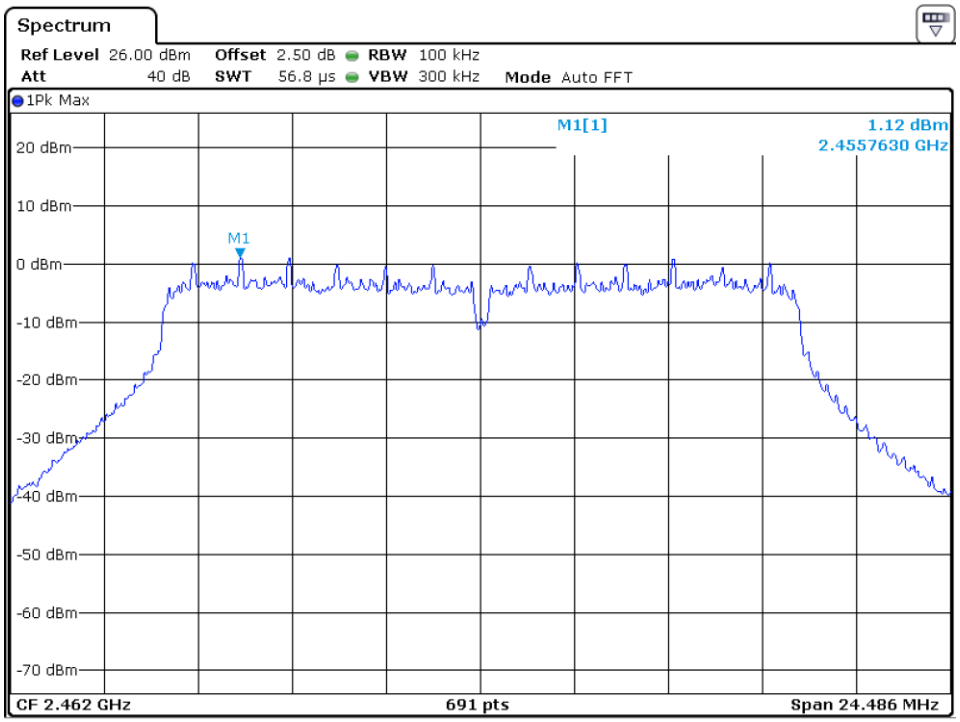
802.11g



Date: 10.JAN.2019 19:22:21

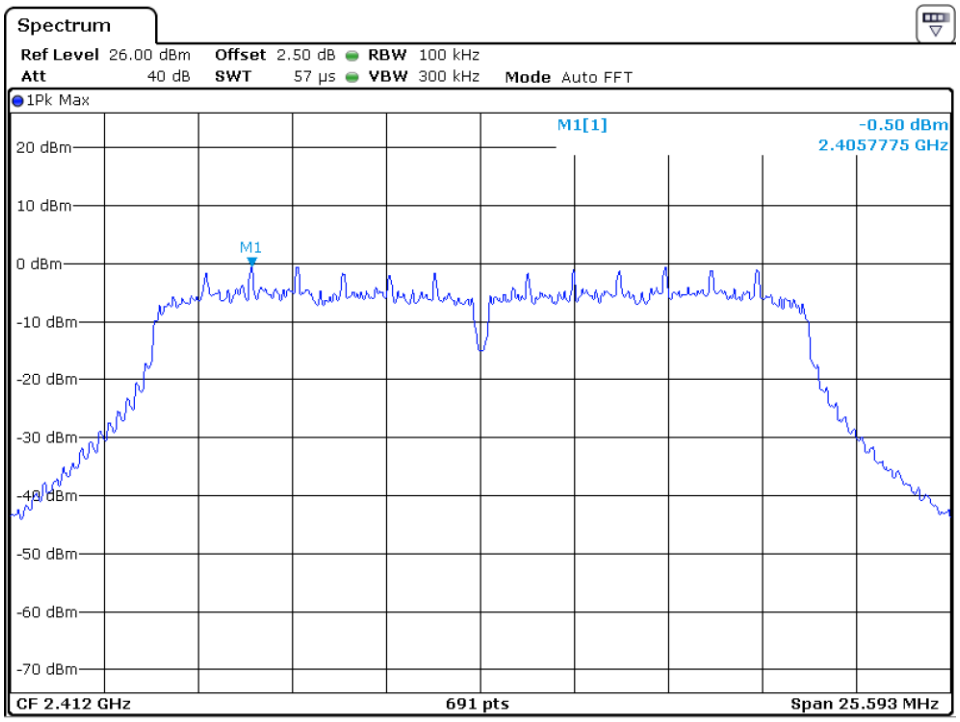


Date: 10.JAN.2019 19:26:25

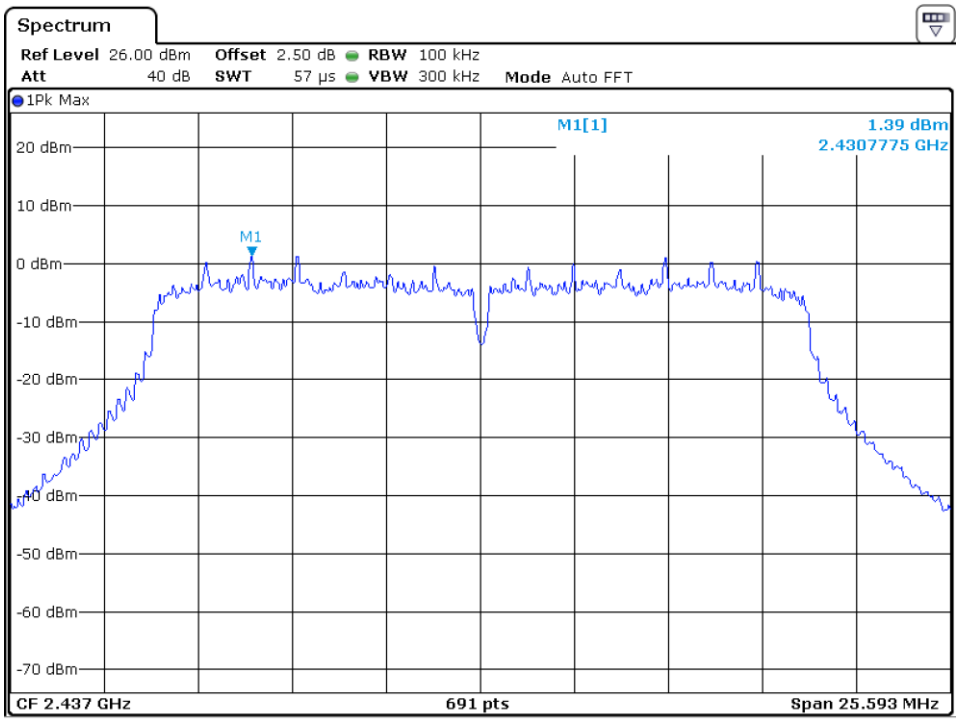


Date: 10.JAN.2019 19:29:49

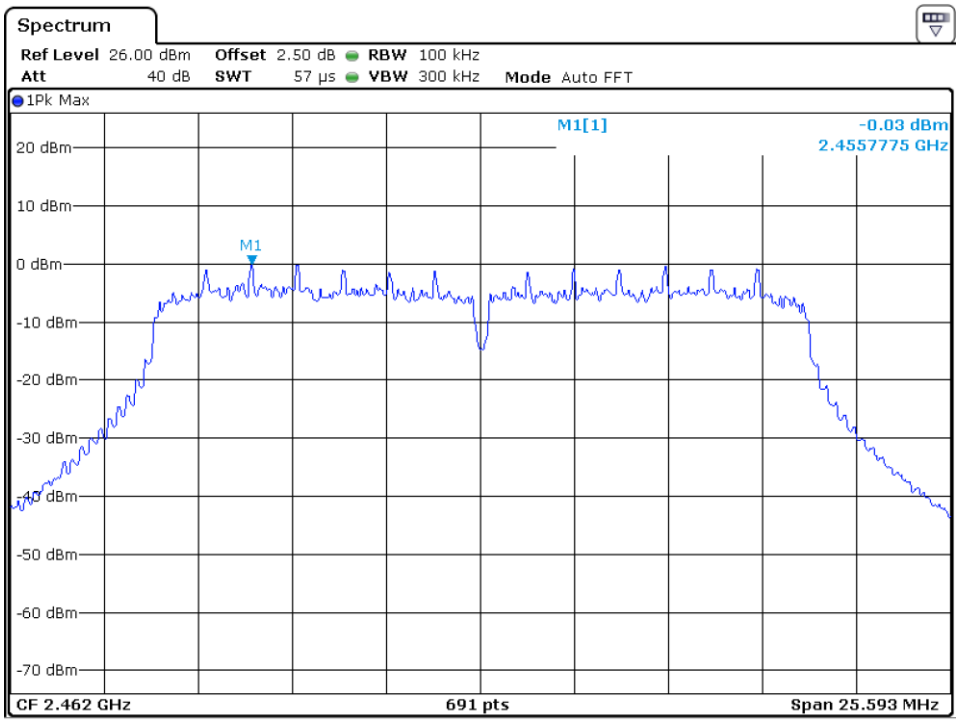
802.11n-HT20



Date: 10.JAN.2019 19:35:59

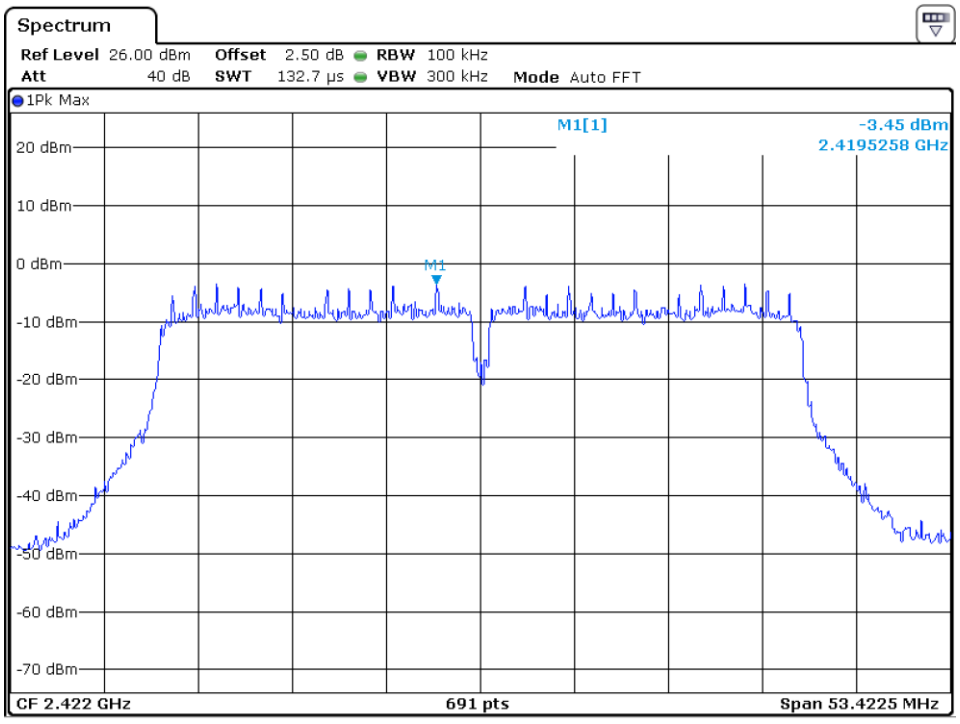


Date: 10.JAN.2019 19:39:59

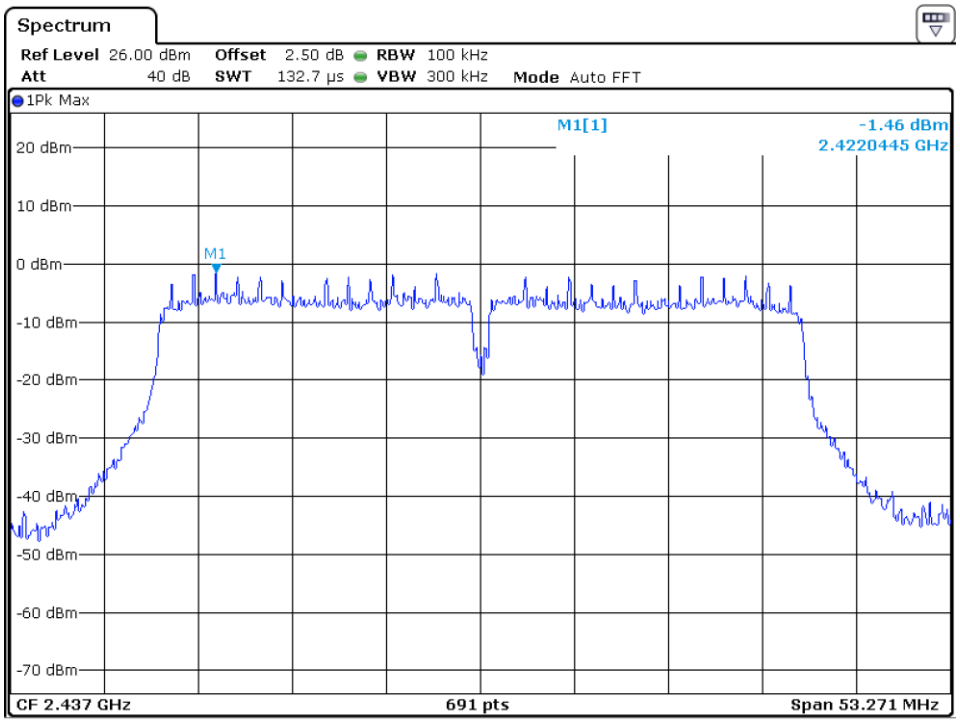


Date: 10.JAN.2019 19:44:39

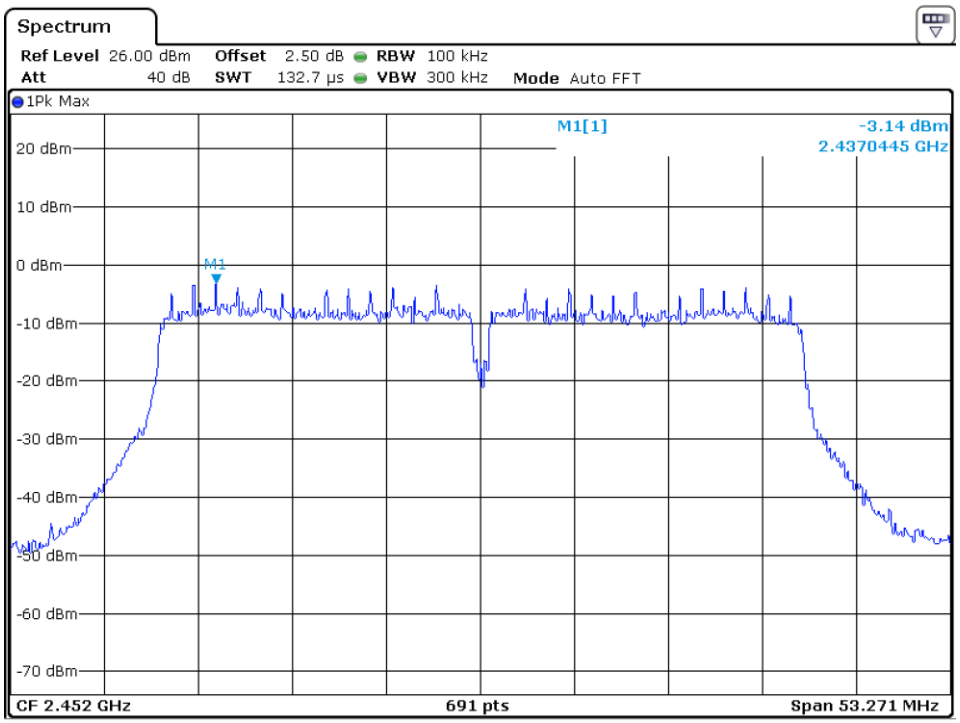
802.11n-HT40



Date: 10.JAN.2019 19:50:37



Date: 10.JAN.2019 19:55:17



Date: 10.JAN.2019 19:58:25

Applicant: Kenxen Digitech Limited
Date of Test: January 10, 2019 Model: TW03

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.

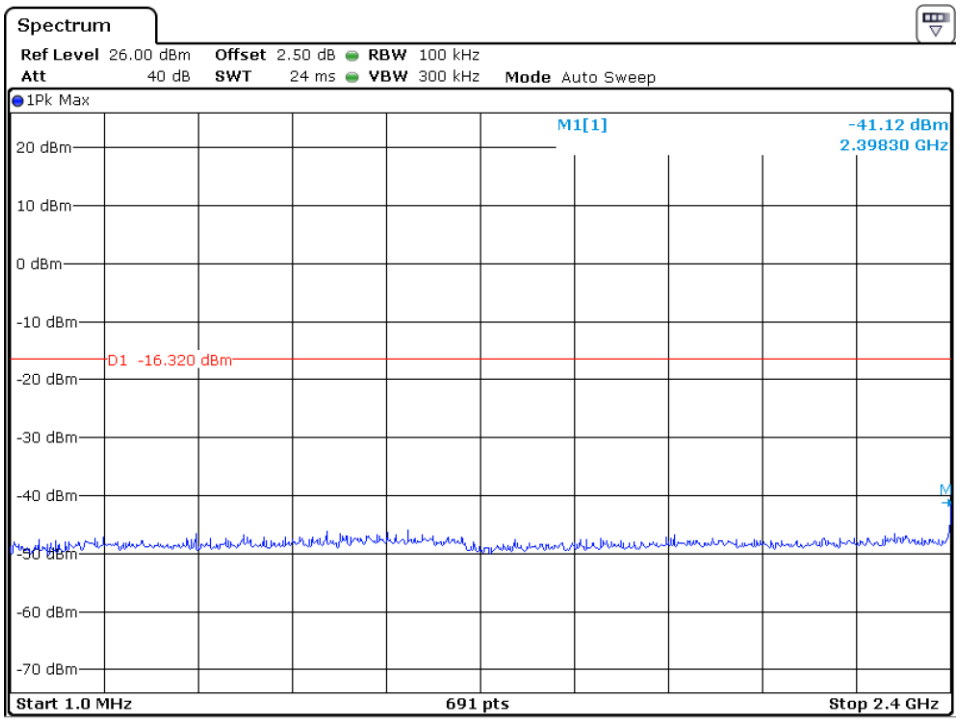
All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

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

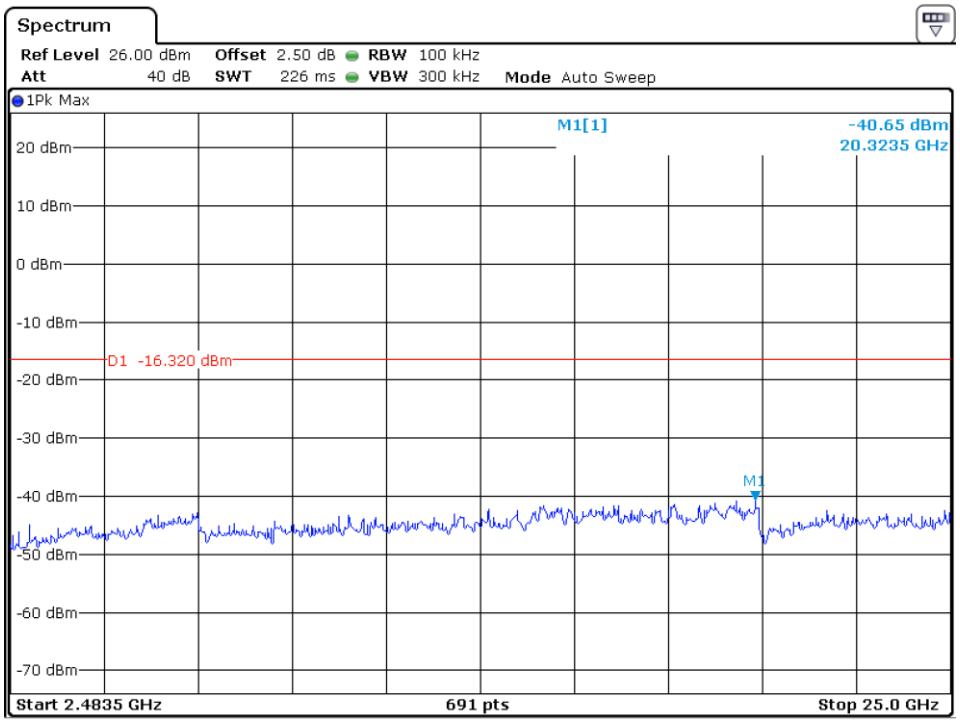
The test plots showed all spurious emission up to the tenth harmonic were measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.

The test plots are attached as below.

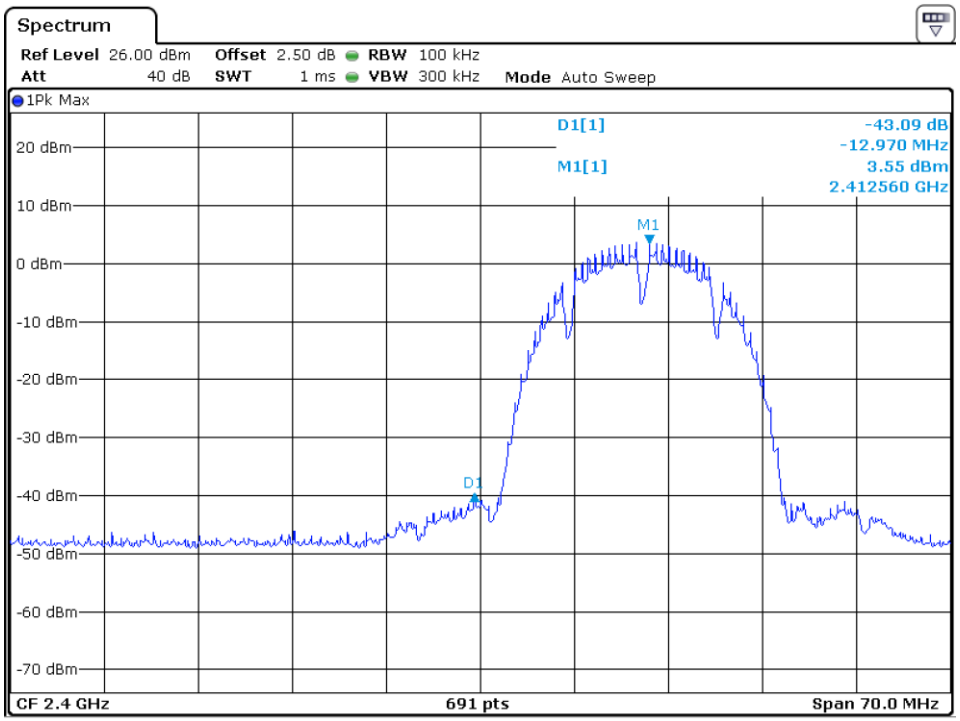
802.11b
Channel 01 (2412MHz) Reference Level: 3.68dBm



Date: 10.JAN.2019 19:07:20

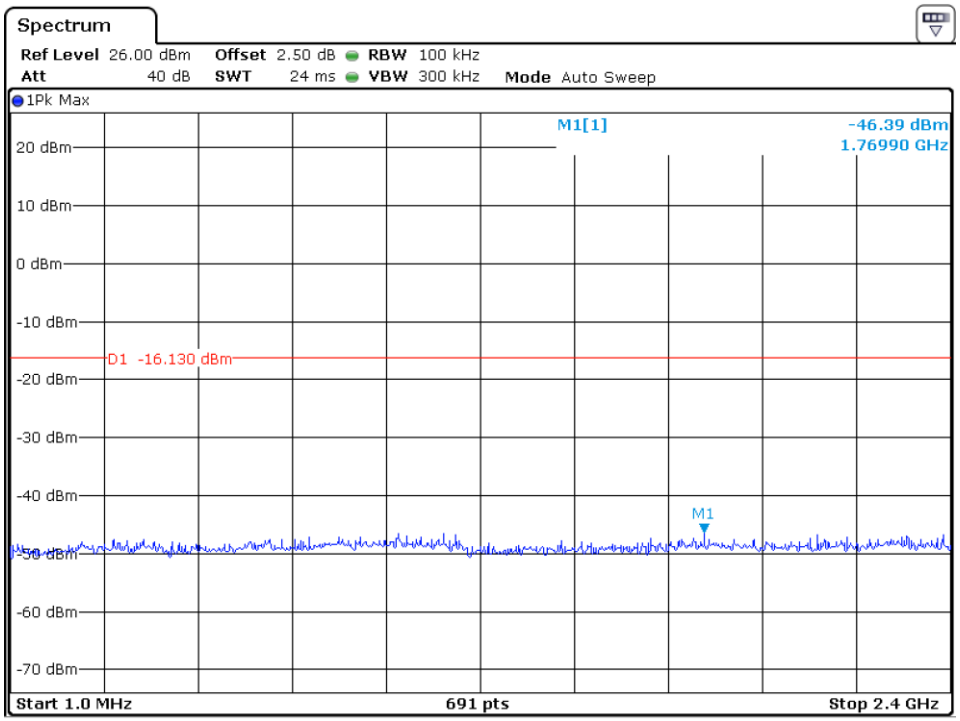


Date: 10.JAN.2019 19:07:39

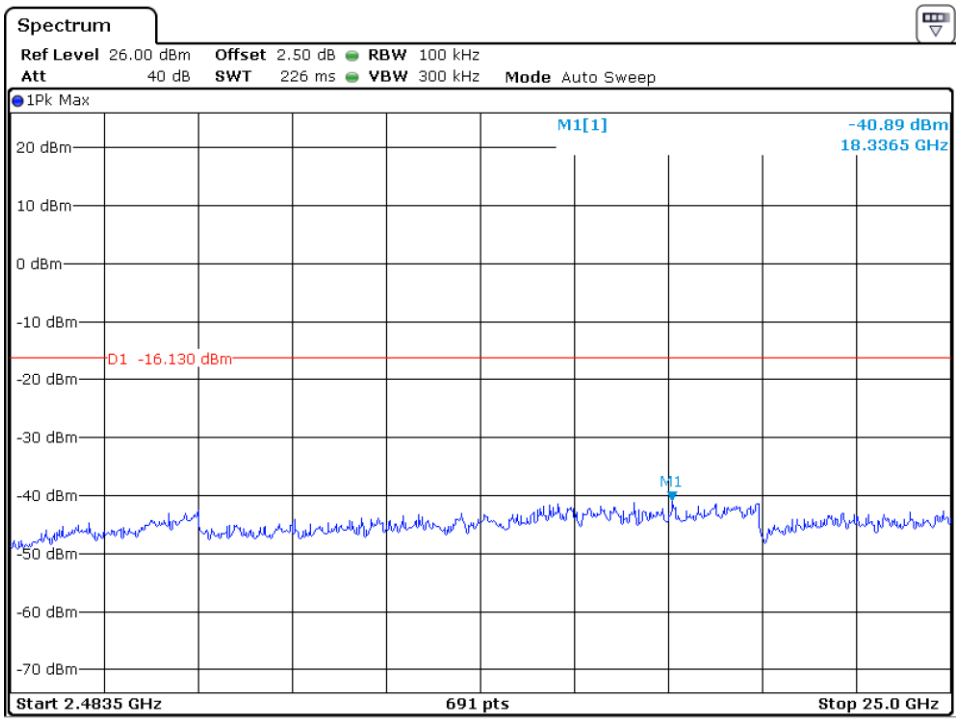


Date: 10.JAN.2019 19:08:16

Channel 06 (2437MHz) Reference Level: 3.87dBm

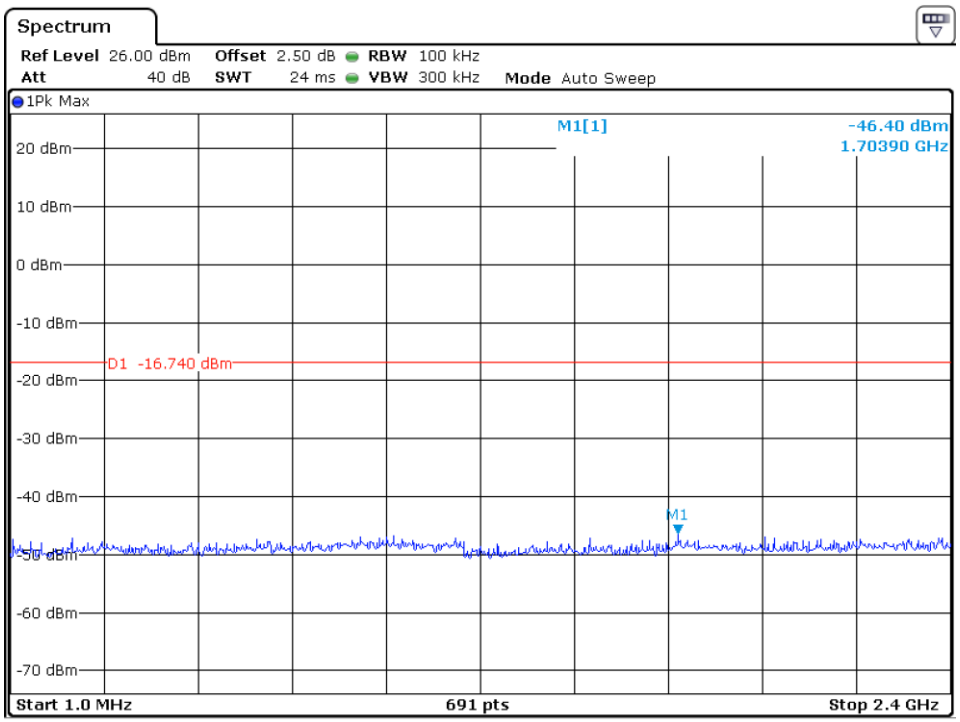


Date: 10.JAN.2019 19:15:25

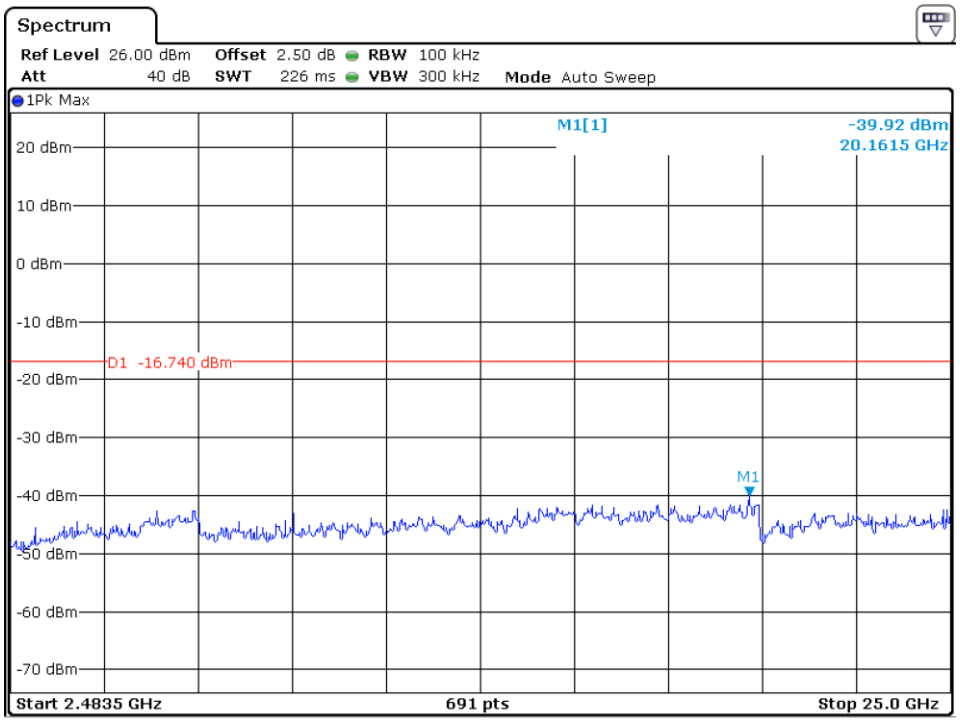


Date: 10.JAN.2019 19:15:42

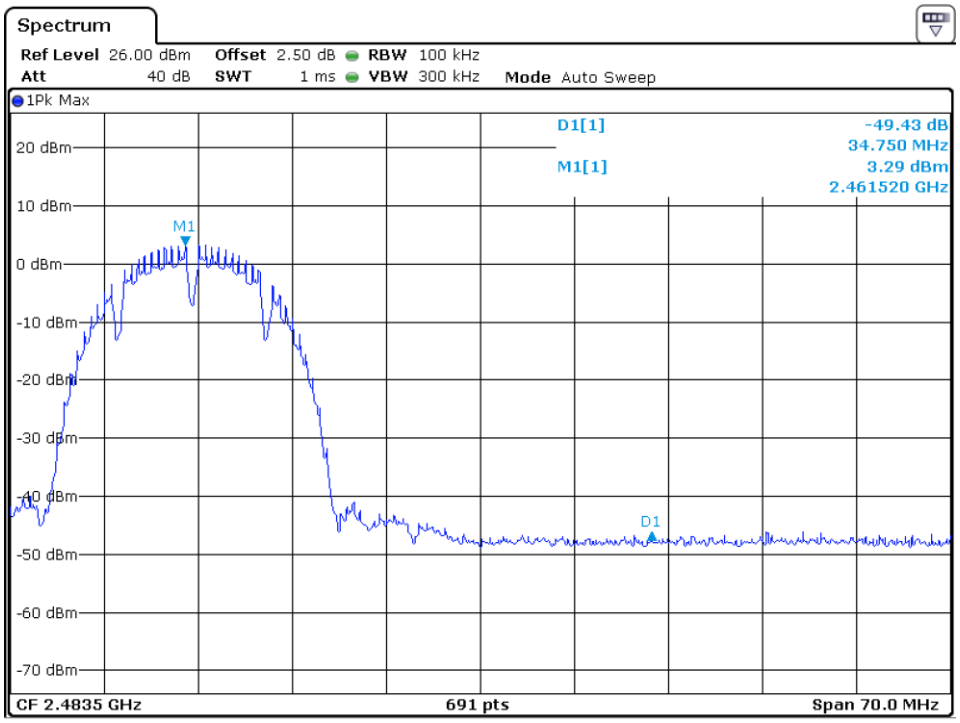
Channel 11 (2462MHz) Reference Level: 3.26dBm



Date: 10.JAN.2019 19:18:19

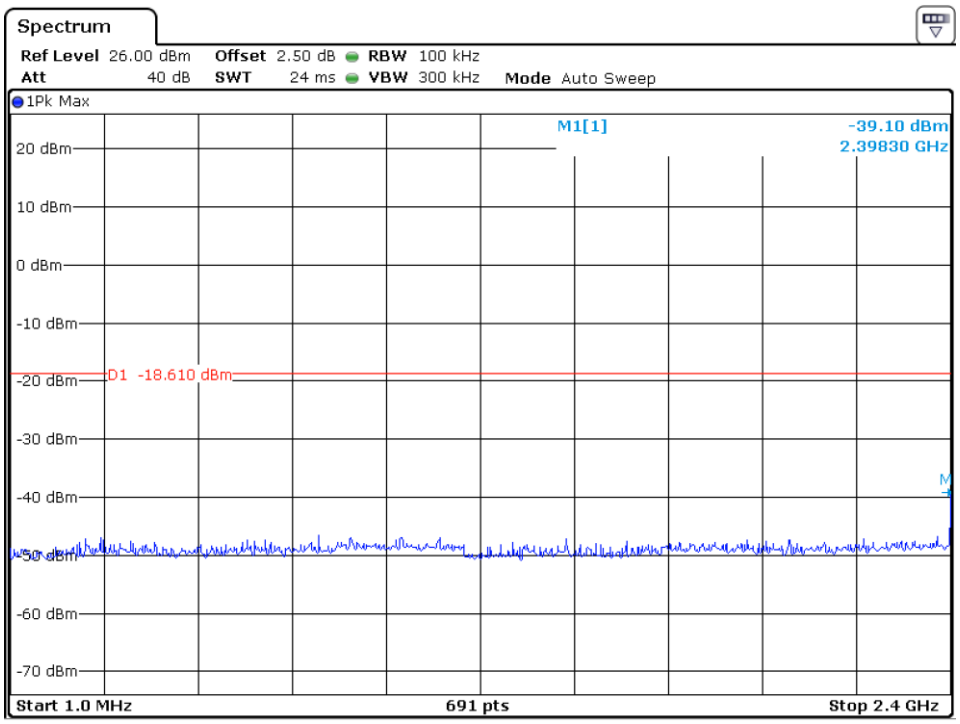


Date: 10.JAN.2019 19:18:34

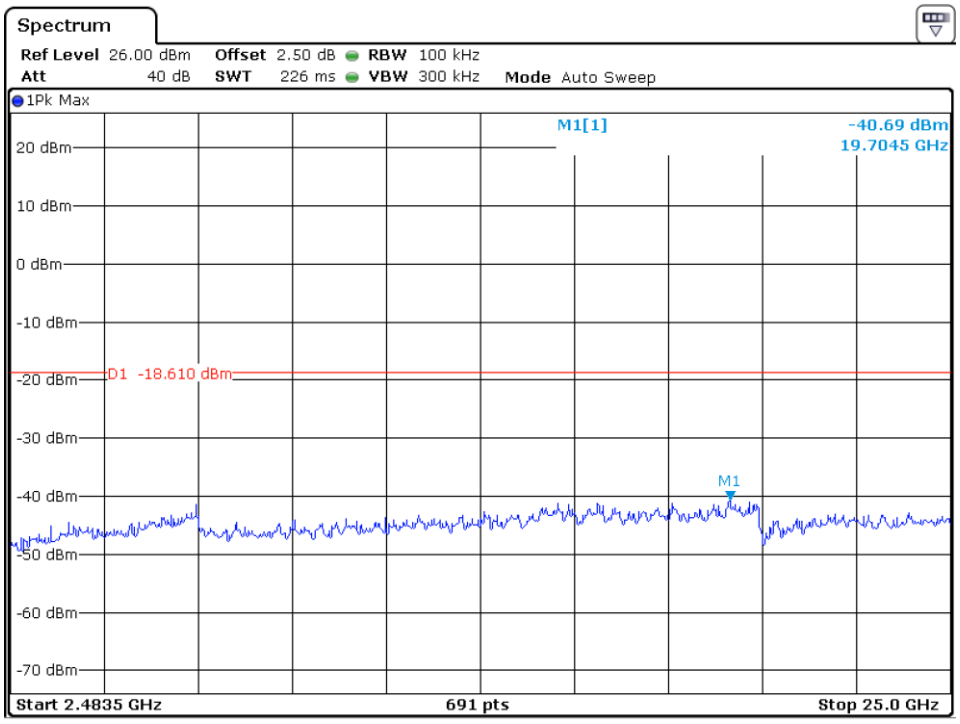


Date: 10.JAN.2019 19:19:31

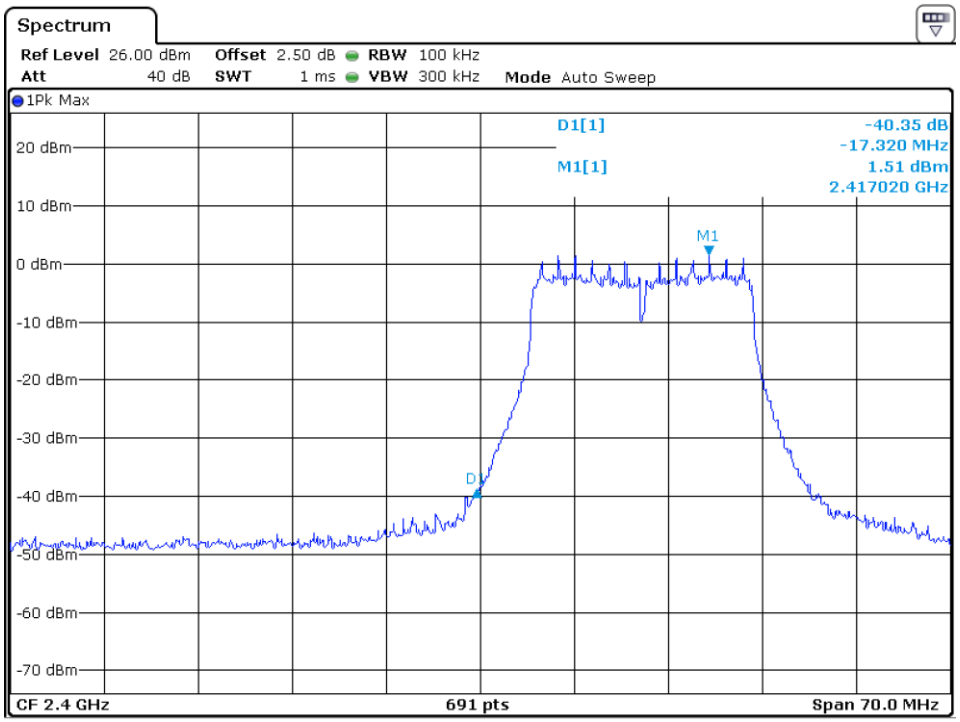
802.11g
Channel 01 (2412MHz) Reference Level: 1.39dBm



Date: 10.JAN.2019 19:23:11

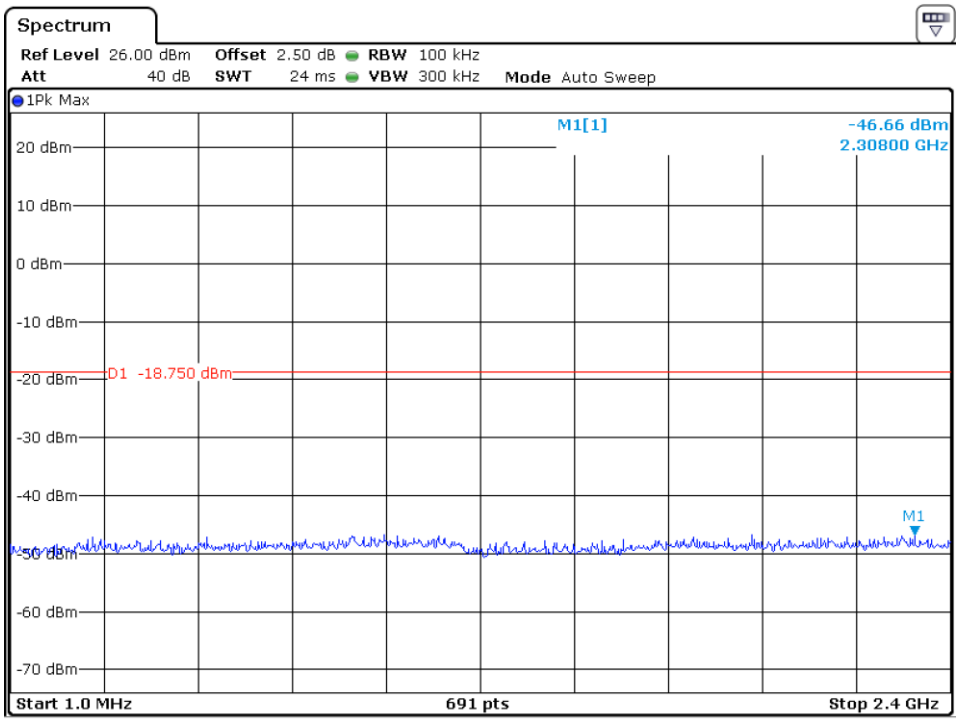


Date: 10.JAN.2019 19:23:28

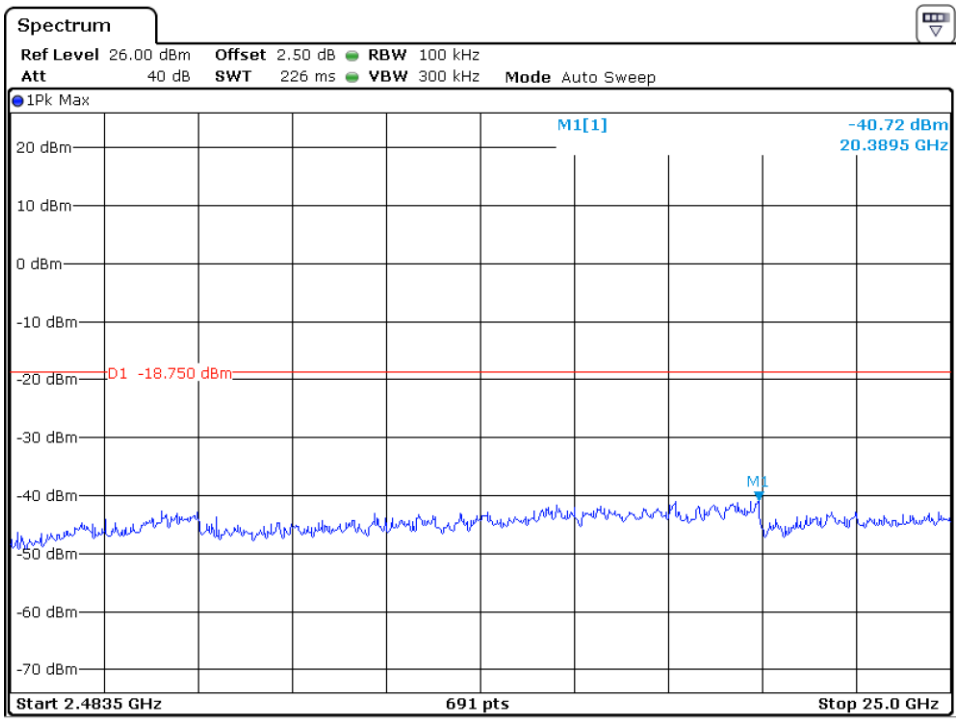


Date: 10.JAN.2019 19:23:54

Channel 06 (2437MHz) Reference Level: 1.25dBm

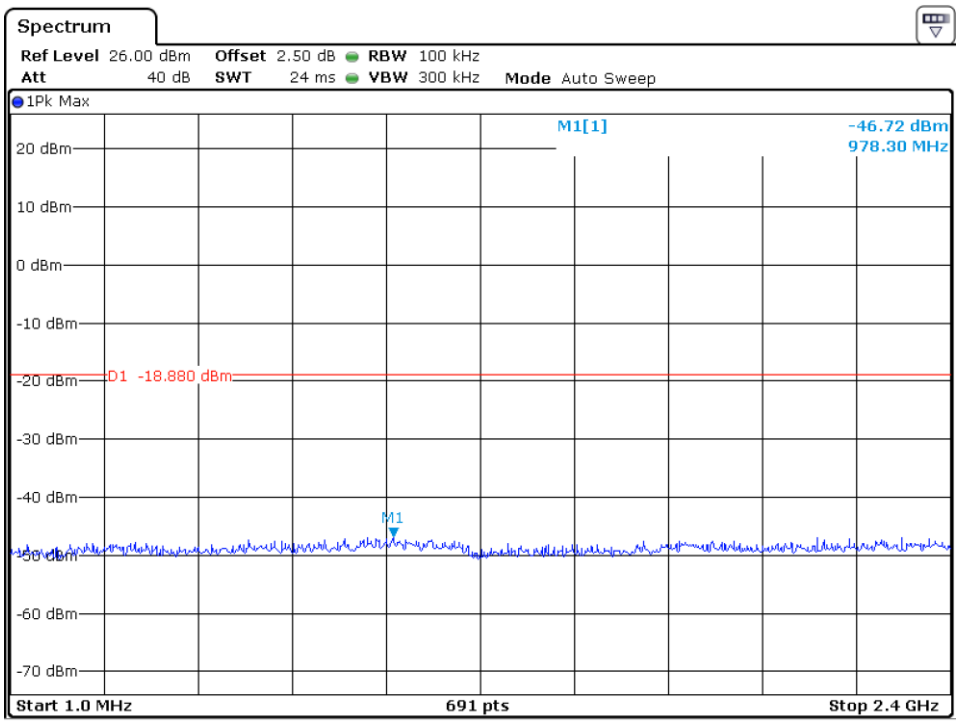


Date: 10.JAN.2019 19:27:33

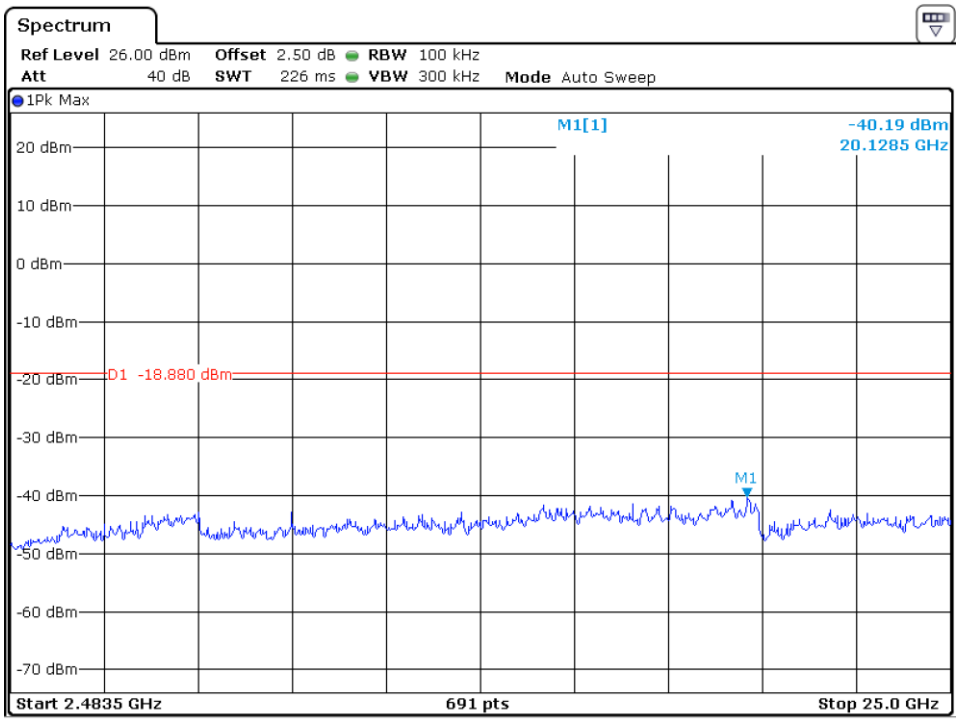


Date: 10.JAN.2019 19:27:57

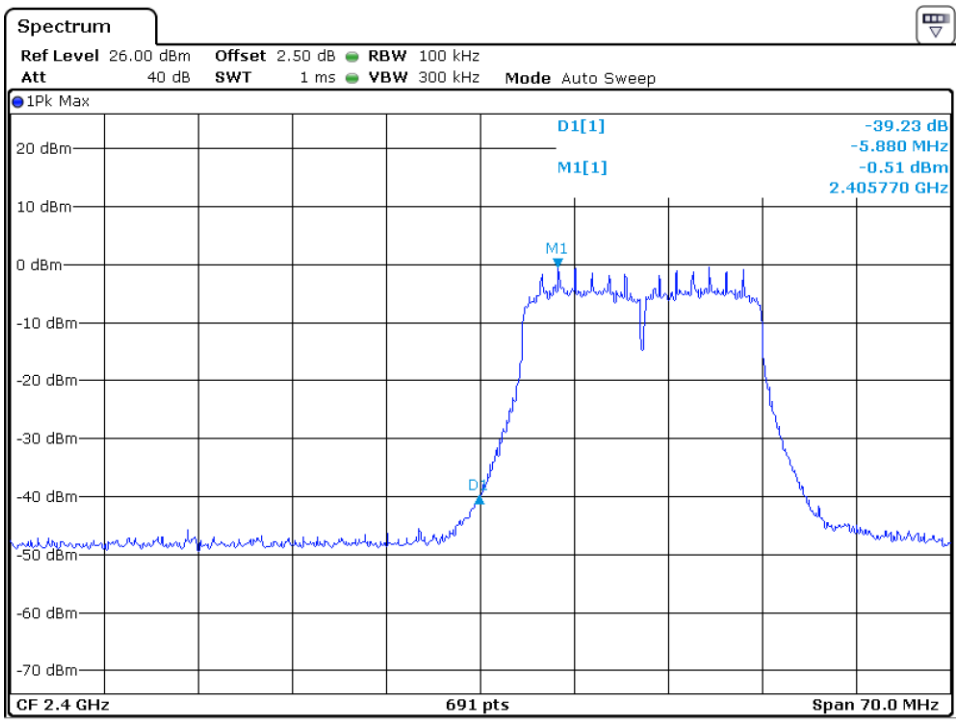
Channel 11 (2462MHz) Reference Level: 1.12dBm



Date: 10.JAN.2019 19:31:01

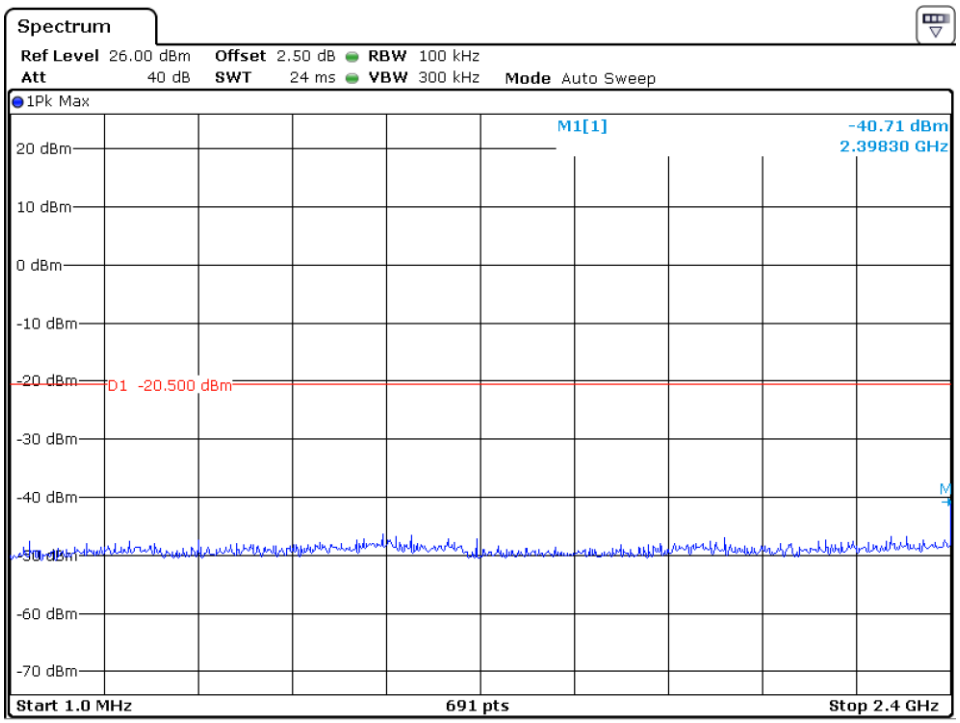


Date: 10.JAN.2019 19:31:21

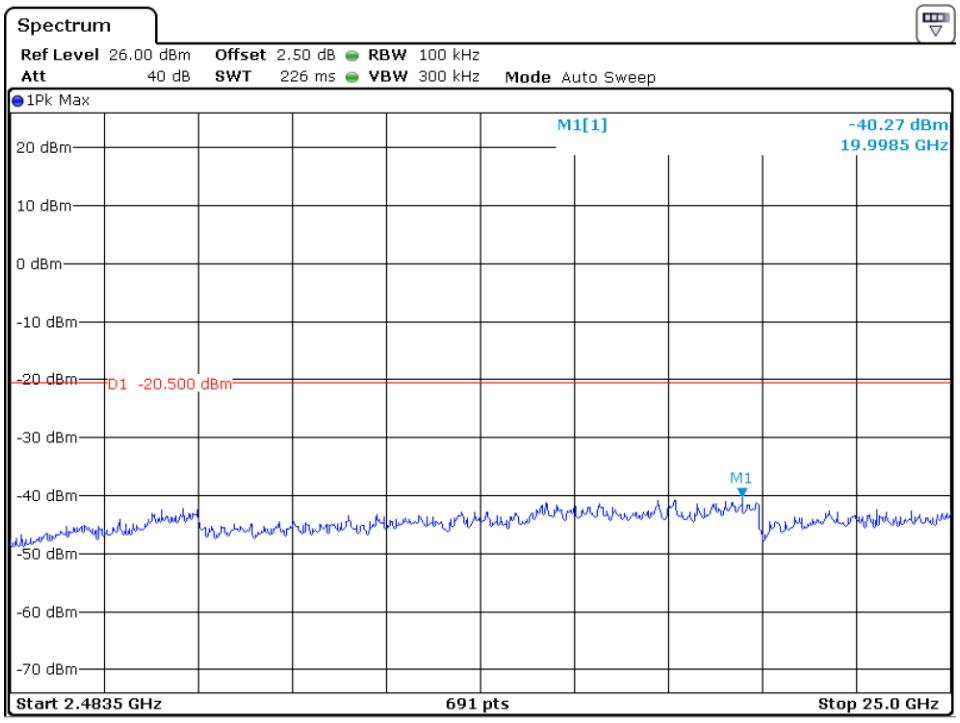


Date: 10.JAN.2019 19:37:53

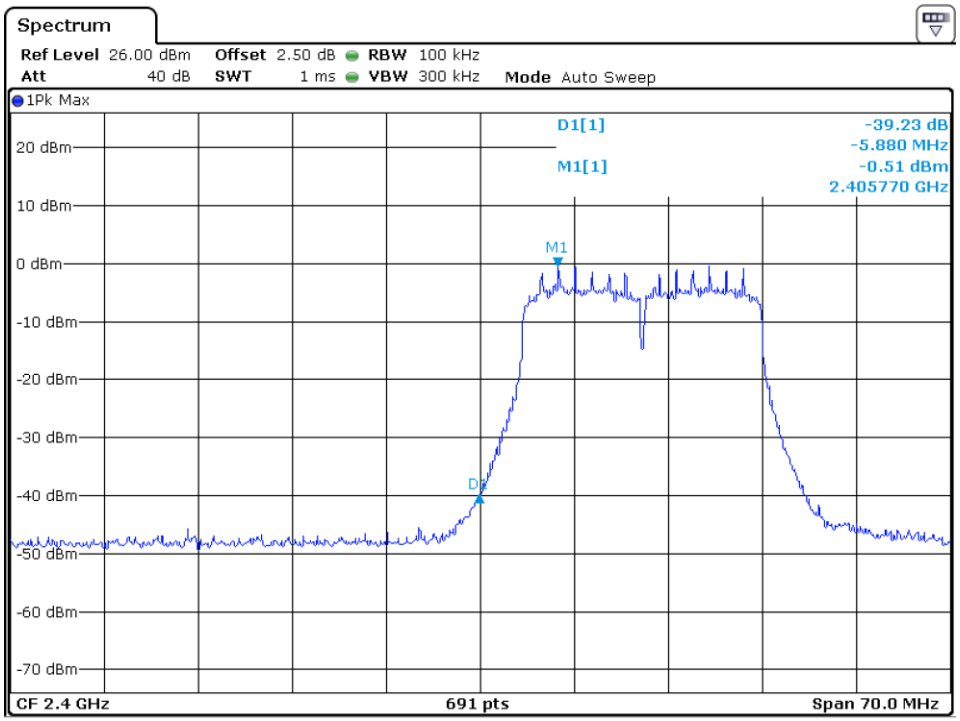
802.11n-HT20
Channel 01 (2412MHz) Reference Level: -0.50dBm



Date: 10.JAN.2019 19:36:54

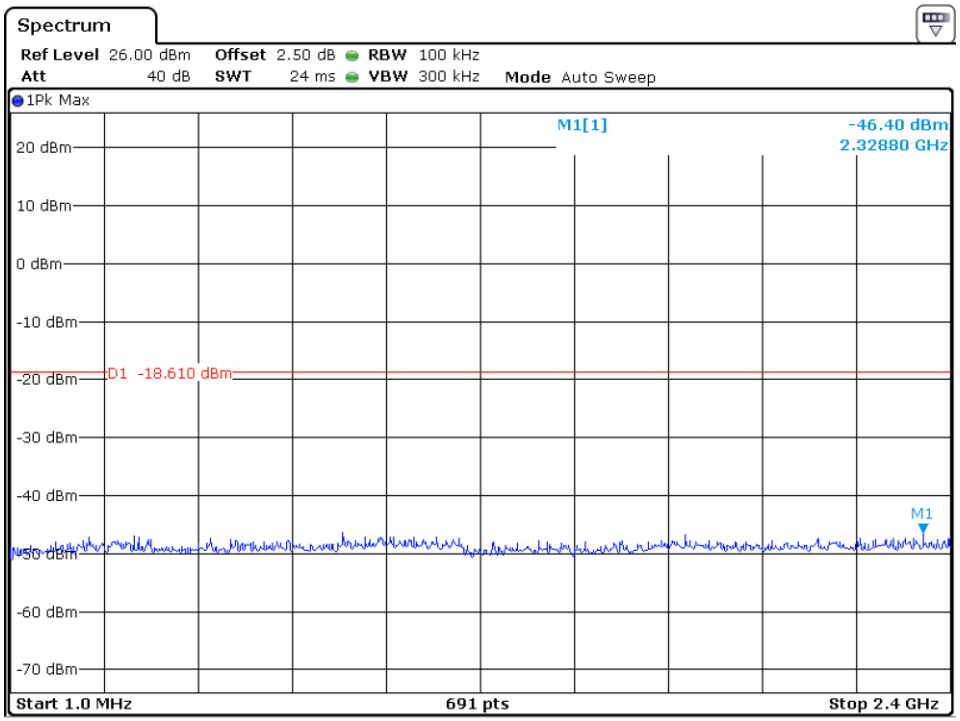


Date: 10.JAN.2019 19:37:17

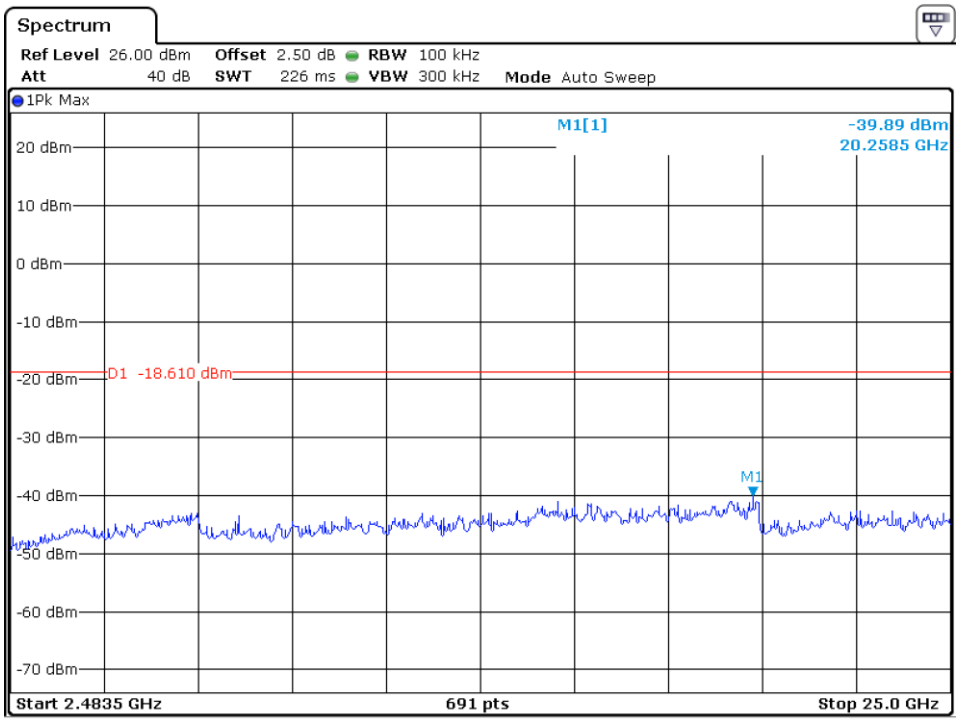


Date: 10.JAN.2019 19:37:53

Channel 06 (2437MHz) Reference Level: 1.39dBm

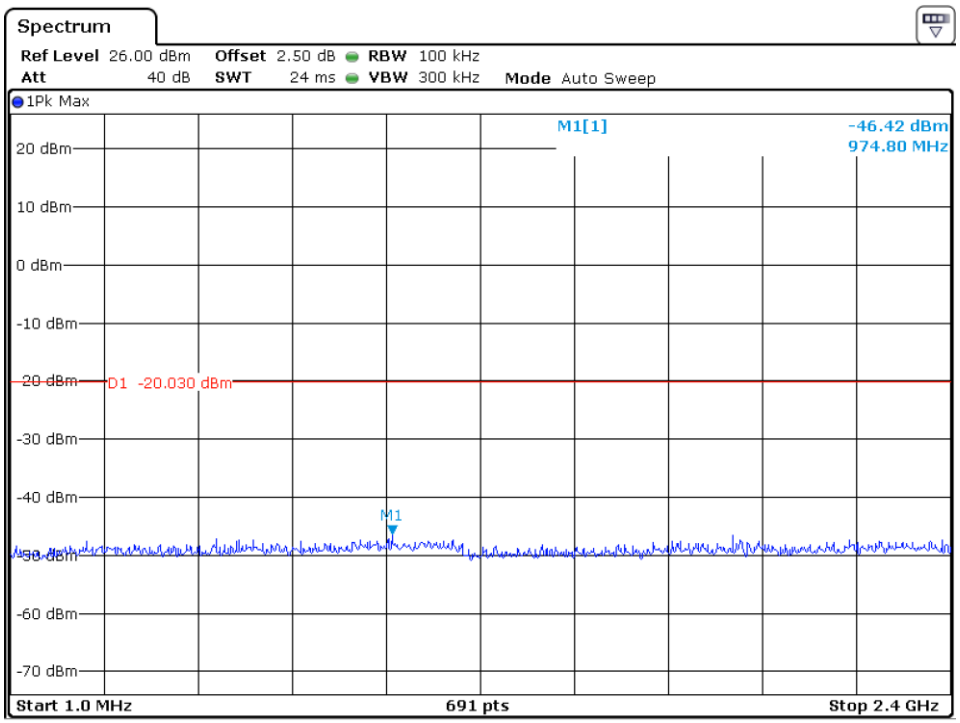


Date: 10.JAN.2019 19:40:55

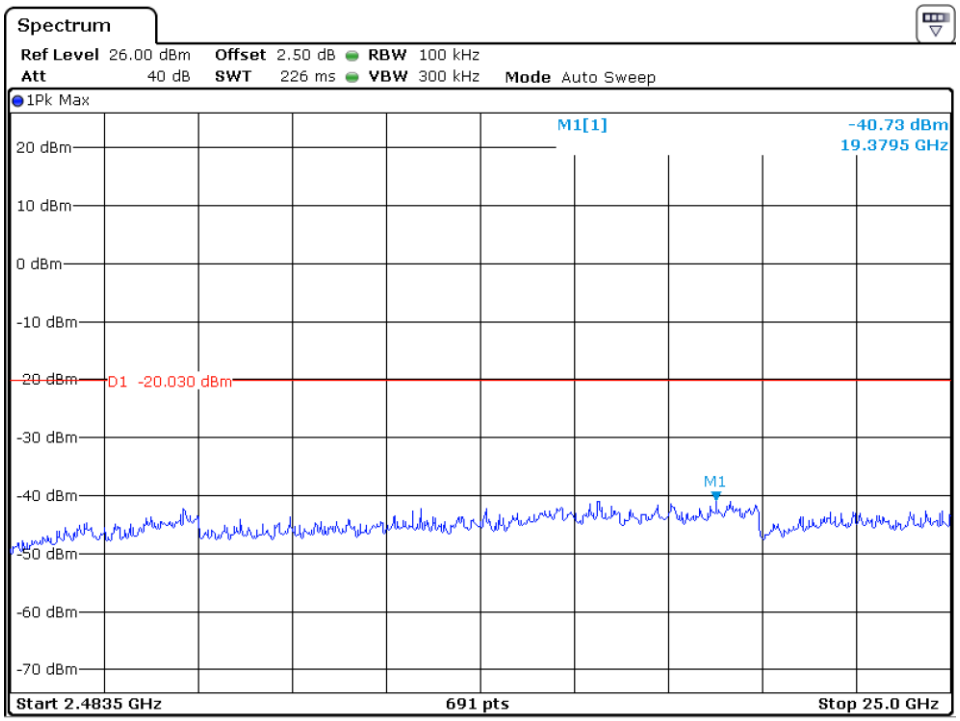


Date: 10.JAN.2019 19:41:17

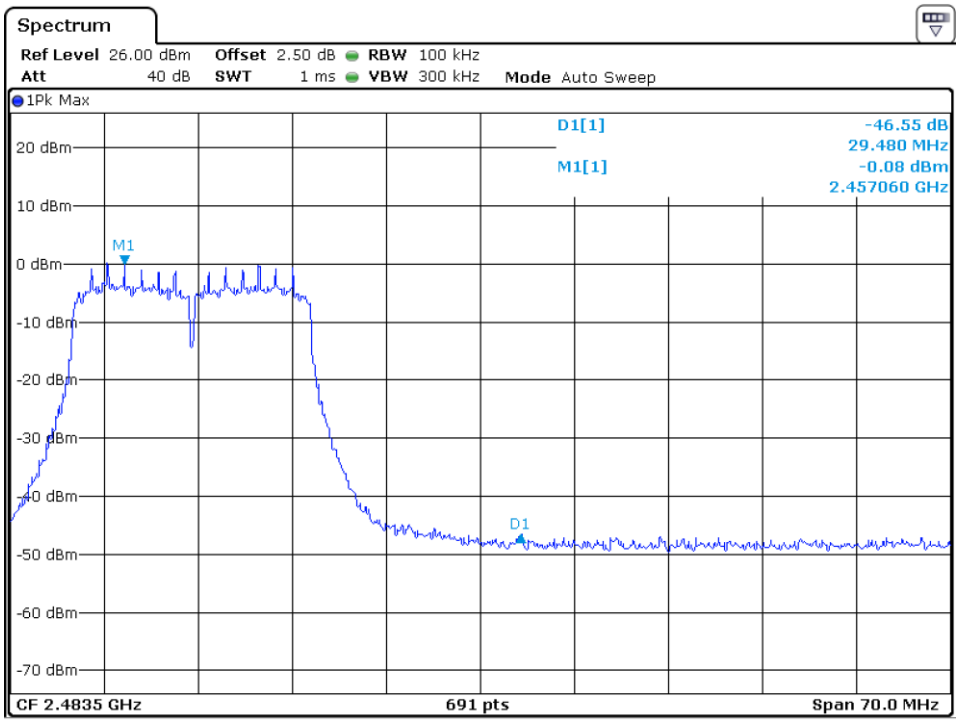
Channel 11 (2462MHz) Reference Level: -0.03dBm



Date: 10.JAN.2019 19:45:31

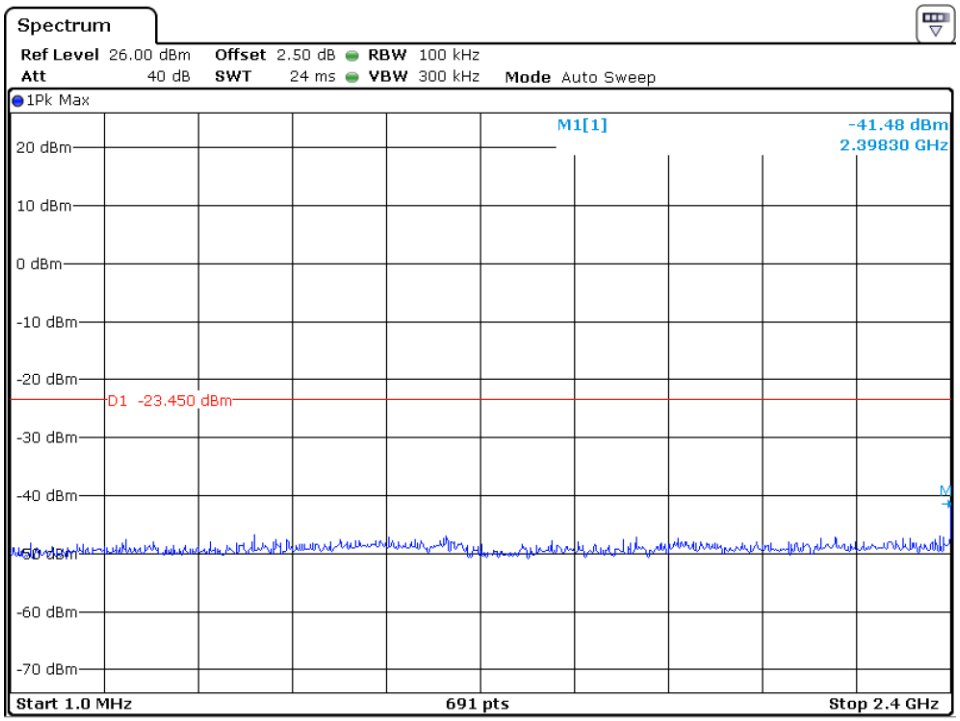


Date: 10.JAN.2019 19:45:53

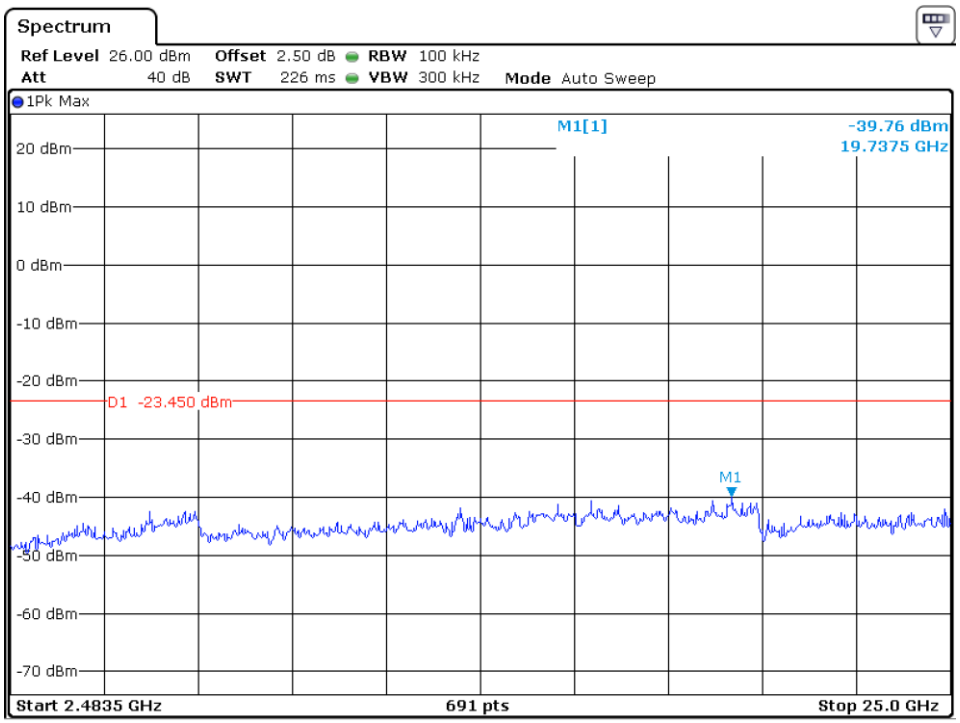


Date: 10.JAN.2019 19:46:17

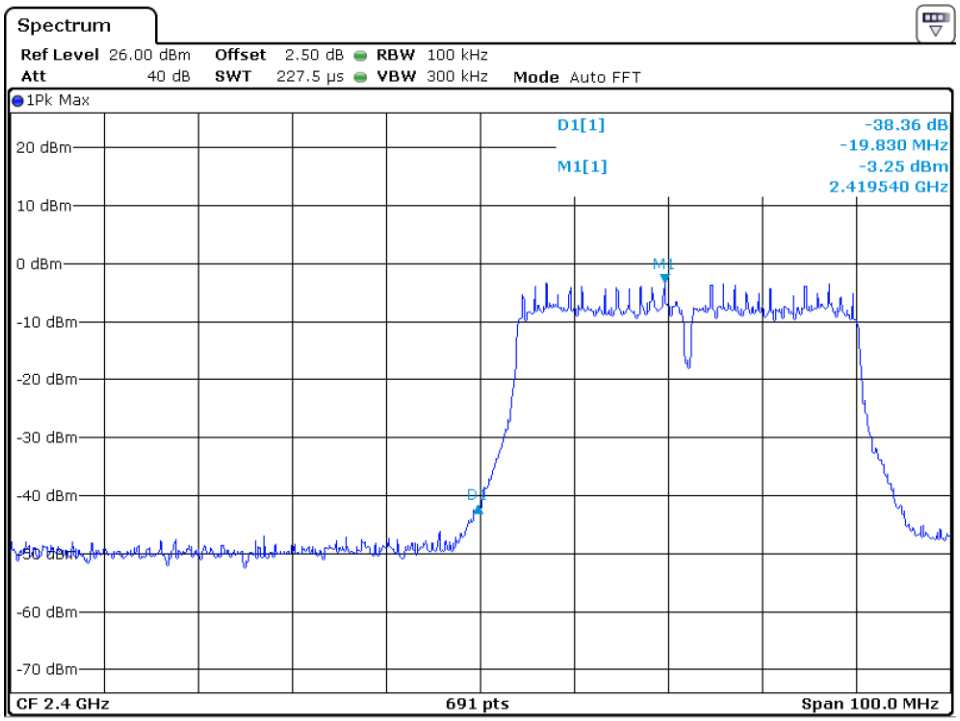
802.11n-HT40
Channel 03 (2422MHz) Reference Level: -3.45dBm



Date: 10.JAN.2019 19:51:26

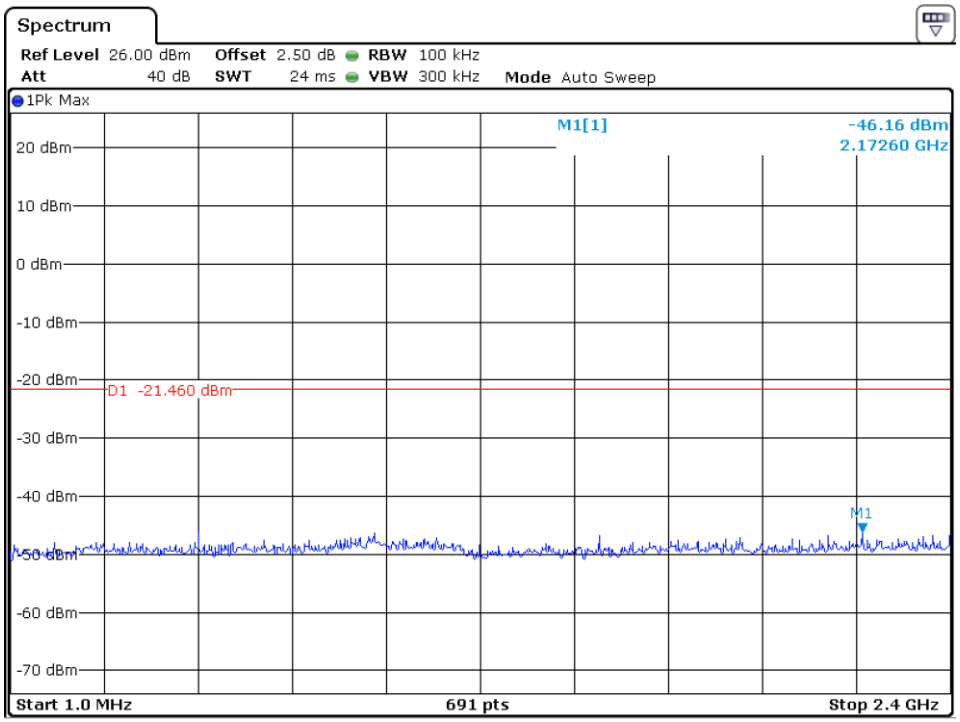


Date: 10.JAN.2019 19:51:47

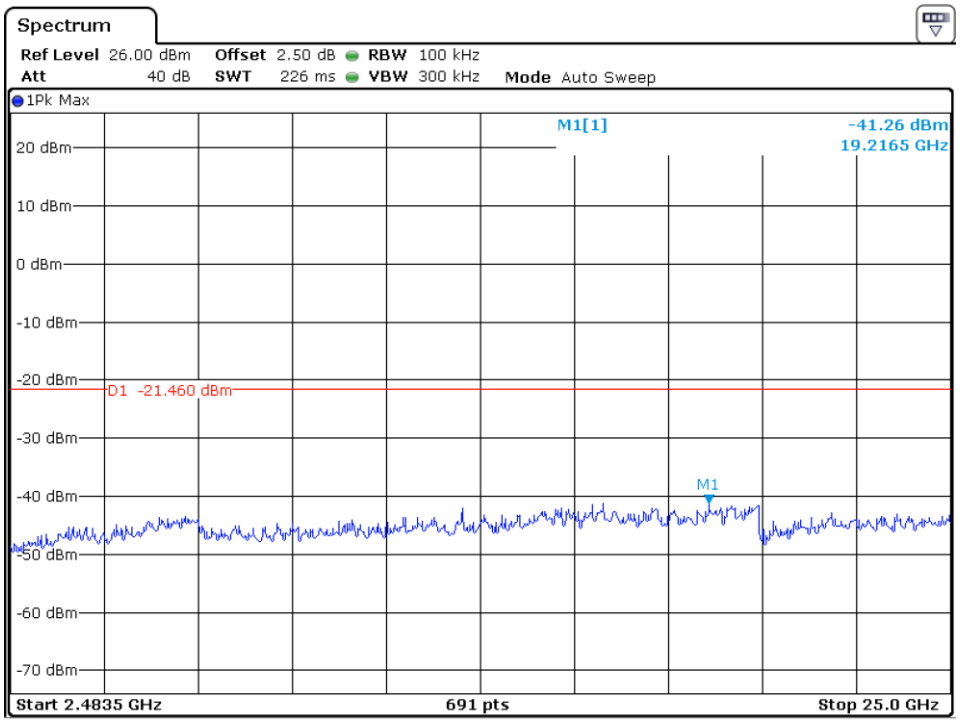


Date: 10.JAN.2019 19:52:54

Channel 06 (2437MHz) Reference Level: -1.46dBm

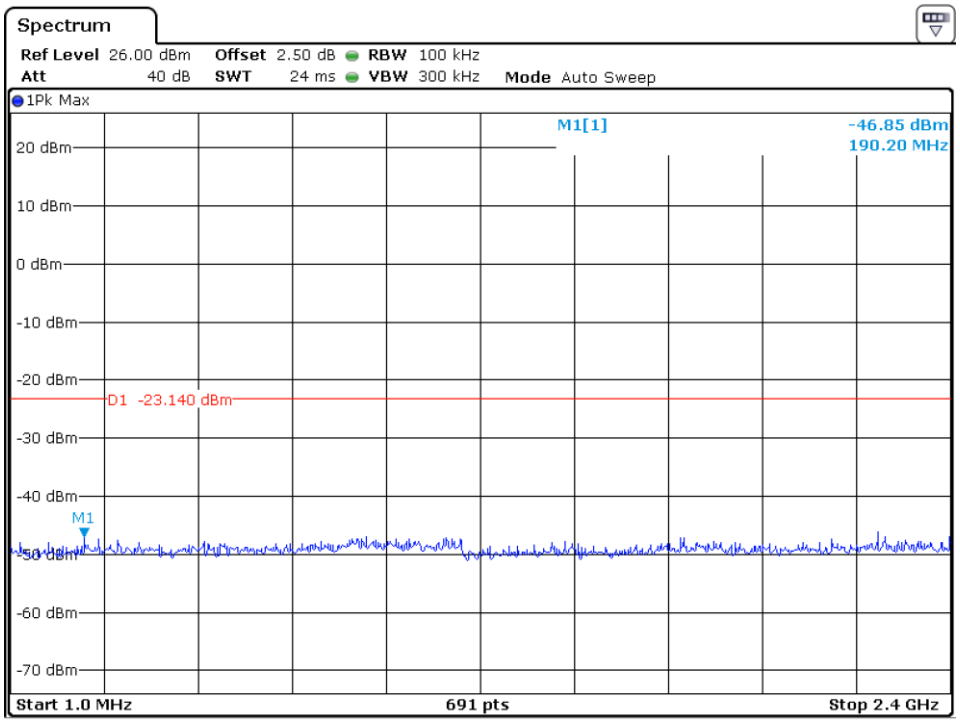


Date: 10.JAN.2019 19:56:21

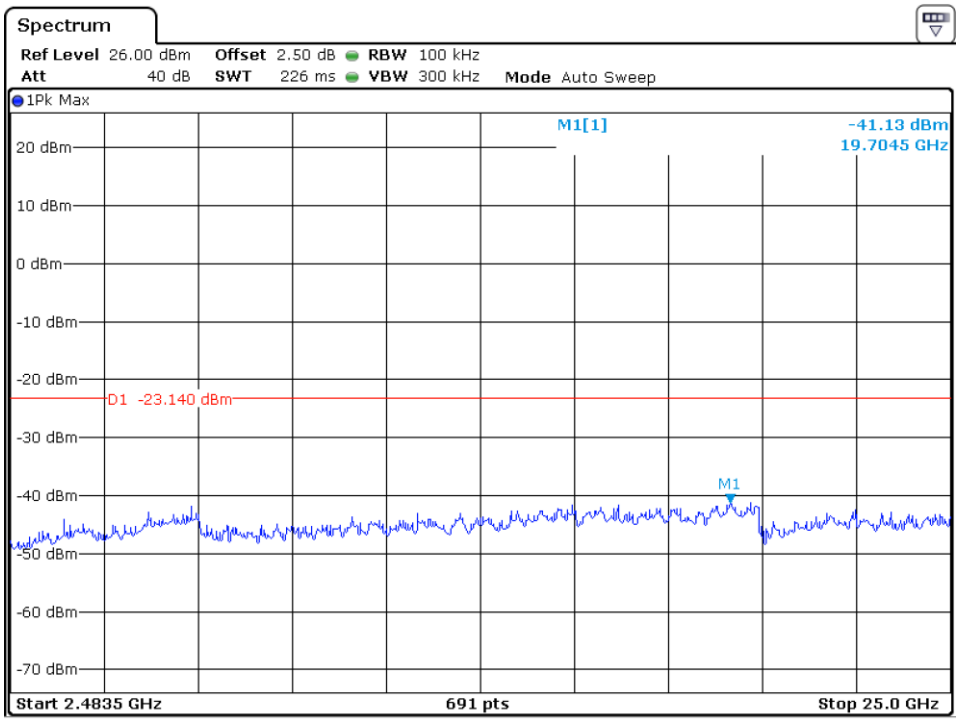


Date: 10.JAN.2019 19:56:40

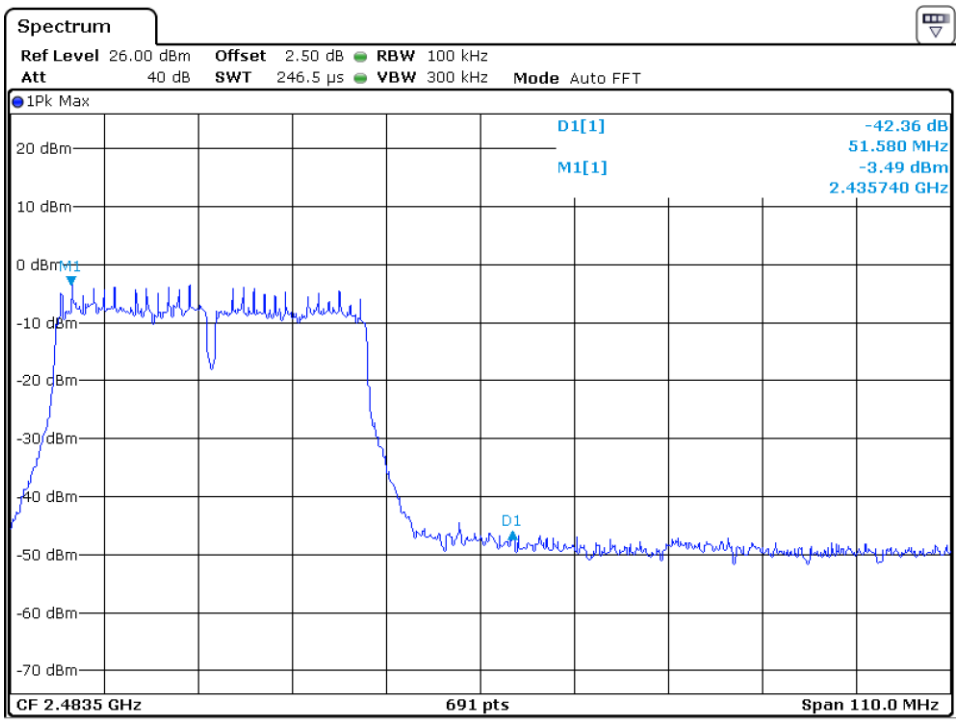
Channel 9 (2452MHz) Reference Level: -3.14dBm



Date: 10.JAN.2019 19:59:12



Date: 10.JAN.2019 19:59:30



Date: 10.JAN.2019 20:00:02

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

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: Kenxen Digitech Limited
Date of Test: January 10, 2019 Model: TW03

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 Digitech Limited
Date of Test: January 10, 2019 Model: TW03

4.8 Radiated Spurious Emission

Worst Case Radiated Spurious Emission (802.11b-Channel 11)
at 296.750MHz
is passed by 6.8dB margin.

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

Applicant: Kenxen Digitech Limited
Date of Test: January 10, 2019 Model: TW03
Worst Case Operating Mode: WIFI Link

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	95.960	36.0	20.0	8.6	24.6	43.5	-18.9
Horizontal	270.075	39.8	20.0	13.7	33.5	46.0	-12.5
Horizontal	296.750	45.3	20.0	13.9	39.2	46.0	-6.8
Vertical	44.159	36.2	20.0	10.5	26.7	40.0	-13.3
Vertical	402.339	33.5	20.0	17.3	30.8	46.0	-15.2
Vertical	550.238	31.4	20.0	20.0	31.4	46.0	-14.6

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: Kenxen Digitech Limited
Date of Test: January 10, 2019 Model: TW03
Worst Case Operating Mode: 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	54.8	36.3	33.5	52.0	74.0	-22.0
Horizontal	*2385.180	64.8	36.4	27.3	55.7	74.0	-18.3

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	44.3	36.3	33.5	41.5	54.0	-12.5
Horizontal	*2385.180	53.3	36.4	27.3	44.2	54.0	-9.8

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 Digitech Limited
Date of Test: January 10, 2019 Model: TW03
Worst Case Operating Mode: 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	52.5	36.3	33.6	49.8	74.0	-24.2
Horizontal	*7311.000	52.1	36.3	37.8	53.6	74.0	-20.4

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	42.8	36.3	33.6	40.1	54.0	-13.9
Horizontal	*7311.000	42.0	36.3	37.8	43.5	54.0	-10.5

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 Digitech Limited
Date of Test: January 10, 2019 Model: TW03
Worst Case Operating Mode: 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	51.8	36.3	33.6	49.1	74.0	-24.9
Horizontal	*7386.000	51.1	36.3	37.8	52.6	74.0	-21.4
Horizontal	*2484.390	65.0	36.4	27.5	56.1	74.0	-17.9

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	*4924.000	42.5	36.3	33.6	39.8	54.0	-14.2
Horizontal	*7386.000	43.6	36.3	37.8	45.1	54.0	-8.9
Horizontal	*2484.390	53.2	36.4	27.5	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.

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

0.830 MHz

Judgement: Passed by 20.0 dB margin

TEST PERSONNEL:

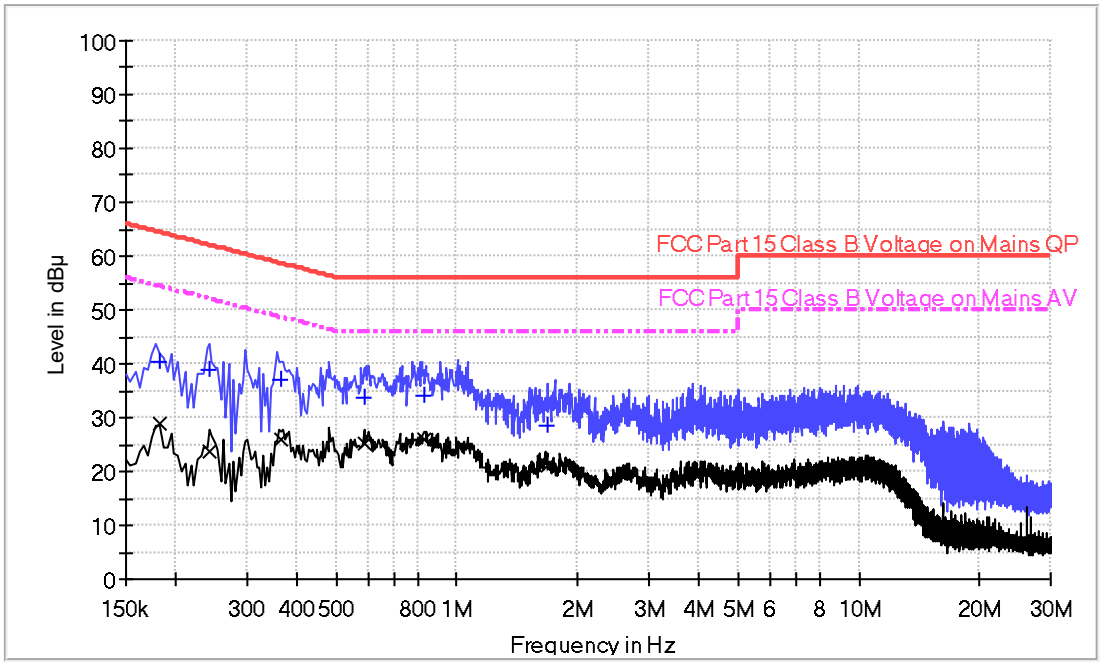
Sign on file

Leo Li, Engineer
Typed/Printed Name

January 10, 2019
Date

Applicant: Kenxen Digitech Limited
Date of Test: January 10, 2019 Model: TW03
Worst Case Operating Mode: WIFI Link

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.182000	40.3	L1	9.6	24.1	64.4
0.242000	38.7	L1	9.6	23.3	62.0
0.366000	36.9	L1	9.6	21.7	58.6
0.586000	33.6	L1	9.7	22.4	56.0
0.830000	34.1	L1	9.7	21.9	56.0
1.674000	28.3	L1	9.7	27.7	56.0

Result Table AV

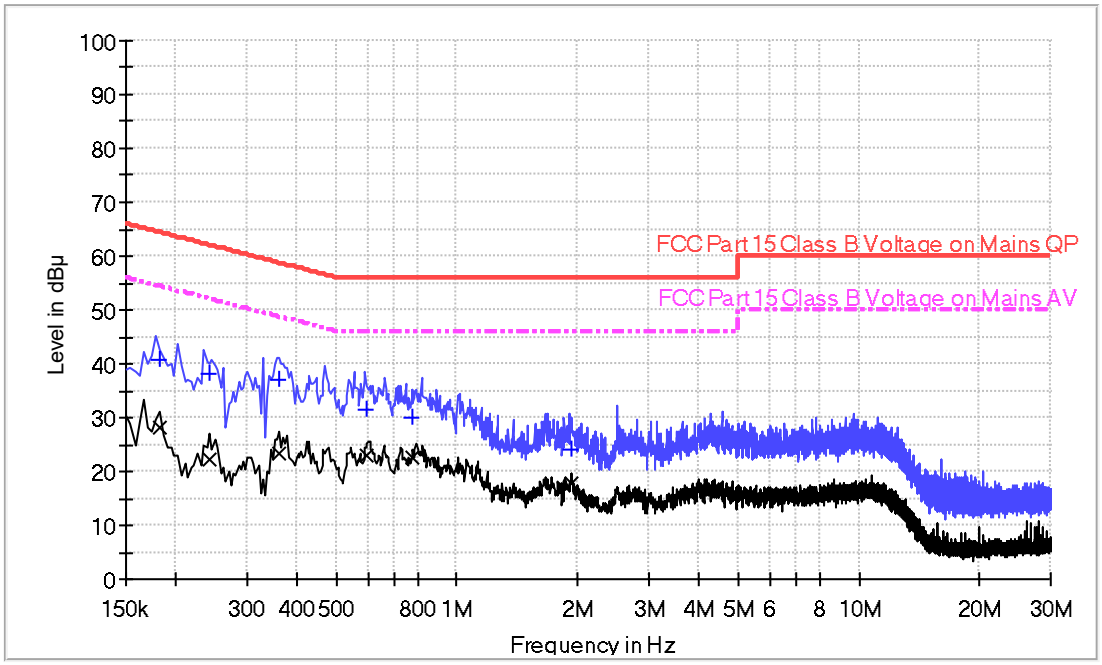
Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.182000	29.0	L1	9.6	25.4	54.4
0.242000	23.6	L1	9.6	28.4	52.0
0.366000	25.8	L1	9.6	22.8	48.6
0.586000	25.1	L1	9.7	20.9	46.0
0.830000	26.0	L1	9.7	20.0	46.0
1.674000	21.2	L1	9.7	24.8	46.0

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Limit (dBuV) – Level (dBuV)

Applicant: Kenxen Digitech Limited
Date of Test: January 10, 2019
Worst Case Operating Mode:

Model: TW03
WIFI Link

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.182000	40.7	N	9.6	23.7	64.4
0.242000	38.1	N	9.6	23.9	62.0
0.362000	36.9	N	9.6	21.8	58.7
0.598000	31.3	N	9.7	24.7	56.0
0.778000	30.0	N	9.7	26.0	56.0
1.922000	24.1	N	9.7	31.9	56.0

Result Table AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.182000	28.0	N	9.6	26.4	54.4
0.242000	22.2	N	9.6	29.8	52.0
0.362000	23.3	N	9.6	25.4	48.7
0.598000	23.1	N	9.7	22.9	46.0
0.778000	22.6	N	9.7	23.4	46.0
1.922000	17.8	N	9.7	28.2	46.0

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Limit (dBuV) – Level (dBuV)

Applicant: Kenxen Digitech Limited
Date of Test: January 10, 2019
Model: TW03

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 Digitech Limited
Date of Test: January 10, 2019
Model: TW03

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	BRM50702-02	--	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	24-Jan-2018	24-Jan-2019
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	24-Jan-2018	24-Jan-2019
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	16-Jan-2017	16-Jan-2019
SZ062-02	RF Cable	RADIALL	RG 213U	--	24-Jul-2018	24-Jan-2019
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	31-Aug-2018	28-Feb-2019
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	31-Aug-2018	28-Feb-2019
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	26-Oct-2018	26-Oct-2019
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	26-Oct-2018	26-Oct-2019
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-2019
SZ062-16	RF Cable	HUBER+SUHNER	CBL2-BN-1m	110127-2231000	29-Oct-2018	29-Oct-2019

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