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Hefei BOE Vision-electronic Technology Co.,Ltd.

TEST REPORT

SCOPE OF WORK
FCC TESTING–100146663, TBRED100146663, TBSIL100146663, TBGRY100146663, TBROS100146663

REPORT NUMBER
240530016SZN-003

ISSUE DATE	**[REVISED DATE]**
18 July 2024	[----------]

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TEST REPORT

Intertek Report No.: 240530016SZN-003

Hefei BOE Vision-electronic Technology Co.,Ltd.

Application
For
Certification

FCC ID: 2AYT5100146663

onn. 12.1 Tablet Pro

Model: 100146663, TBRED100146663, TBSIL100146663, TBGRY100146663, TBROS100146663

2.4GHz Wi-Fi Transceiver

Report No.: 240530016SZN-003

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [10-1-23]

Prepared and Checked by:

Bruce

Bruce Zheng
Project Engineer

Approved by:

Ryan

Ryan Chen
Project Engineer
Date: 18 July 2024

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MEASUREMENT/TECHNICAL REPORT

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 [10-01-23] Edition] provision.

Report prepared by:

Bruce Zheng
Intertek Testing Services Shenzhen Ltd. Longhua Branch
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1.0 Summary of Test results

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Applicant Address: NO.2177 Dongfang RD, Xinzhan General Pilot Zone, Hefei, Anhui, 230012, P.R.China
Manufacturer: Hefei BOE Vision-electronic Technology Co.,Ltd.
Manufacturer Address: NO.2177 Dongfang RD, Xinzhan General Pilot Zone, Hefei, Anhui, 230012, P.R.China

Model: 100146663
FCC ID: 2AYT5100146663

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), 15.209, FCC 15.205	Pass
AC Conducted Emission	15.207	Pass
Antenna Requirement	15.203	Pass (See Notes)

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

2.0 General Description

2.1 Product Description

The equipment under test (EUT) is a onn. 12.1 Tablet Pro with Bluetooth 5.3 (dual-mode) function operating in 2402-2480MHz, 2.4G WIFI function operating in 2412-2462MHz and 5G WIFI function operating in 5150MHz~5250 MHz, 5250MHz~5350MHz, 5470MHz-5725MHZ, 5725MHz~5850MHz. The EUT is powered by battery DC 3.85V, 8000mAh, 30.80Wh, or charging by AC 100-240V, 50/60Hz. For more detailed features description, please refer to the user's manual.

Type of Modulation: BPSK, QPSK, 16QAM, 64QAM for OFDM; CCK, DQPSK, DBPSK for DSSS.
Antenna Type: IFA FPC Antenna
Antenna Gain: -1.2dBi (This information is provided by applicant, and the applicant is responsible for the authenticity of the provided information.)

The Model: TBRED100146663, TBSIL100146663, TBGRY100146663, TBROS100146663 are the same as the Model: 100146663 in hardware and electrical aspect. The difference in model number serves as packaging and marketing purpose only.

For the model of EUT cable, the Model: 8B47-4CS0002R-FG, 8B47-4CS0003R-FG, 8B47-4CS0004R-FG is the same as the Model: 8B47-4CS0001R-FG in hardware aspect. The difference in model number serves as shell colour, corresponding to different colours of EUT series models. Only the 8B47-4CS0001R-FG has used in the test.

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

2.2 Related Submittal(s) Grants

This is an application for certification of a transceiver for the onn. 12.1 Tablet Pro which has 2.4GHz WIFI function.
For the classic Bluetooth function was tested and demonstrated in report 240530016SZN-001.
For the BT BLE function was tested and demonstrated in report240530016SZN-002.
For the 5GHz WIFI function was tested and demonstrated in report 240530016SZN-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 v05r02. 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.

2.4 Test Facility

The Semi-anechoic chamber and shielded 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, P.R. China. This test facility and site measurement data have been fully placed on file with File Number: CN1188.

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 battery DC 3.85V, 8000mAh, 30.80Wh, or charging by AC 100-240V, 50/60Hz during the test.

On 802.11b/g/n-HT20/ax-HT20 mode, 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.

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 EUT and transmitting antenna was centered on the turntable.

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.
Test Software: cmd

3.3 Special Accessories

N/A.

3.4 Measurement Uncertainty

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

3.5 Equipment Modification

Any modifications installed previous to testing by Hefei BOE Vision-electronic Technology Co.,Ltd. will be incorporated in each production model sold / leased in the United States.

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

3.6 Support Equipment List and Description

Description	Manufacturer	Model No.
AC Adapter (Provided by Applicant)	ASAP Technology(Jiangxi) Co., Ltd.	LACA271(Input:100-240V~,50/60Hz,0.5A;Output:5.0Vdc,3.0A or 9.0Vdc,2.22A)
C to C cable (Provided by Applicant)	Luxshare-ICT	8B47-4CS0001R-FG (0.915m length, shielded, without ferrite core)
SD card (provided by Intertek)	SanDisk	BE0934314559D (C10)

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663

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 6 dBi or less, maximum allowed Transmitter output is 1 watt (+30 dBm).

IEEE 802.11b (Antenna Gain = -1.2dBi) (CCK, 1Mbps)		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2412	19.9	97.72
Middle Channel: 2437	19.8	95.50
High Channel: 2462	19.8	95.50

IEEE 802.11g (Antenna Gain = -1.2dBi) (16QAM, 6Mbps)		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2412	24.7	295.12
Middle Channel: 2437	24.7	295.12
High Channel: 2462	24.8	302.00

IEEE 802.11n-HT20 (Antenna Gain = -1.2dBi) (64QAM, 6Mbps)		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2412	24.7	295.12
Middle Channel: 2437	24.8	302.00
High Channel: 2462	24.7	295.12

IEEE 802.11ax-HT20 (Antenna Gain = -1.2dBi) (64QAM, 6Mbps)		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2412	24.7	295.12
Middle Channel: 2437	24.8	302.00
High Channel: 2462	24.7	295.12

Cable loss: 0.5 dB External Attenuation: 0 dB

Cable loss, external attenuation has been included in OFFSET function

EUT max. output level = 24.8dBm
EUT max. E.I.R.P = 24.8dBm – 1.2dBi = 23.6dBm = 229.09mW

For RF Exposure, the information refer to report number:240530016SZN-005.

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663

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 v05r02. 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	8.130
2437	8.130
2462	8.130

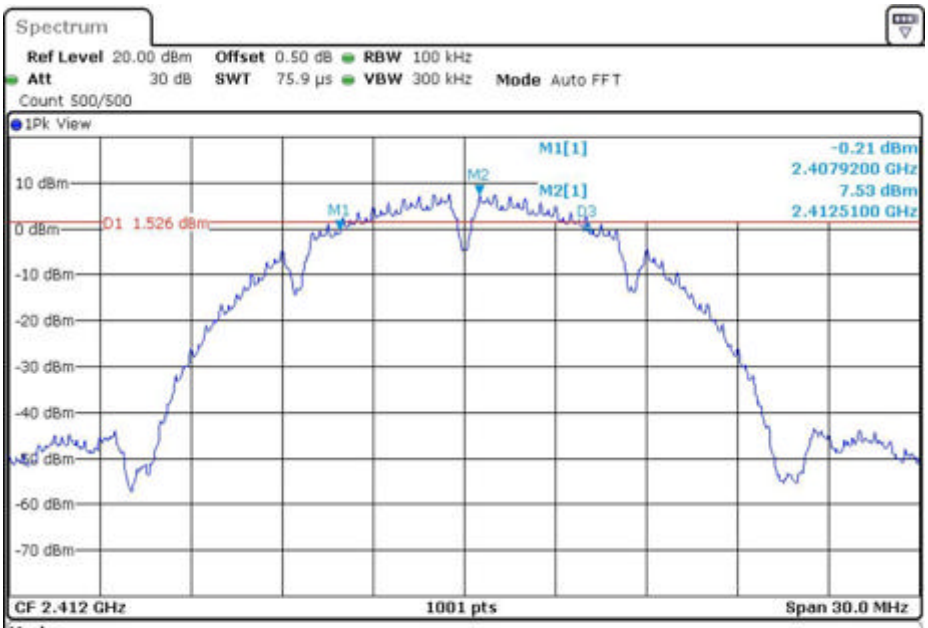
IEEE 802.11g (16QAM, 6Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	15.120
2437	14.070
2462	15.090

IEEE 802.11n-HT20 (64QAM, 6Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	15.120
2437	13.920
2462	13.920

IEEE 802.11ax-HT20 (64QAM, 6Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	17.250
2437	16.380
2462	15.150

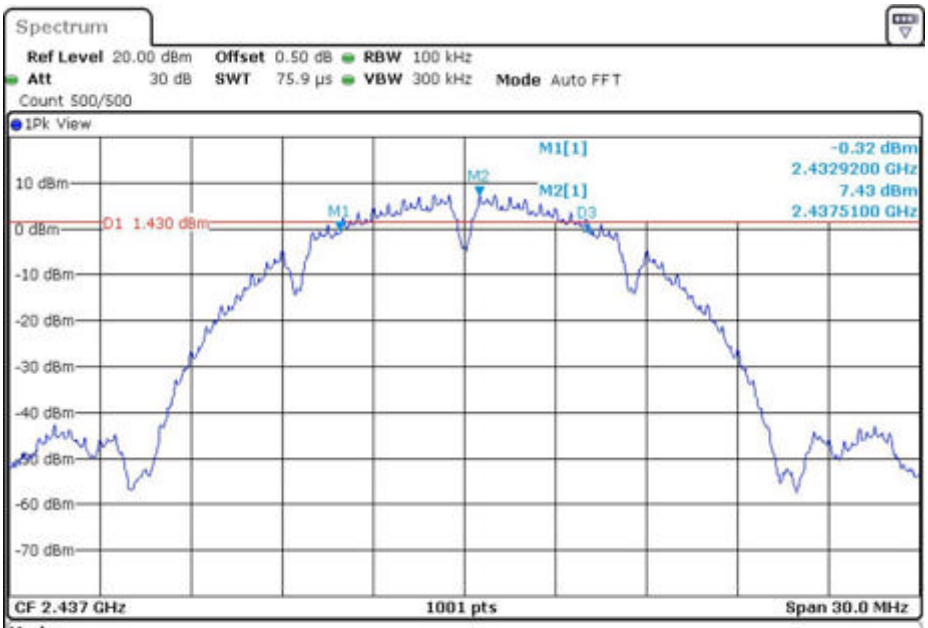
The test plots are attached as below.

802.11b



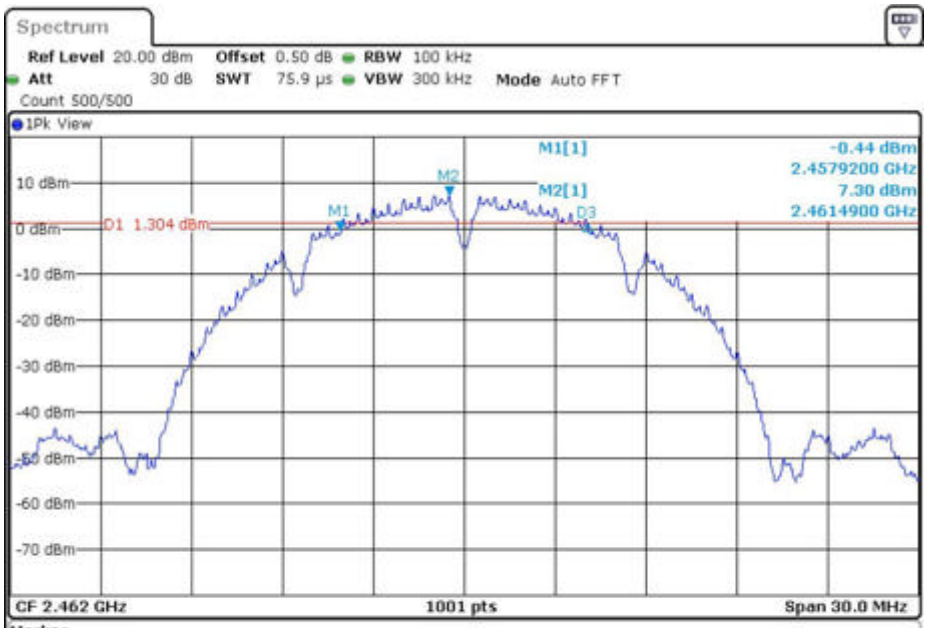
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40792 GHz	-0.21 dBm		
M2		1	2.41251 GHz	7.53 dBm		
D3	M1	1	8.13 MHz	1.69 dB		



Marker

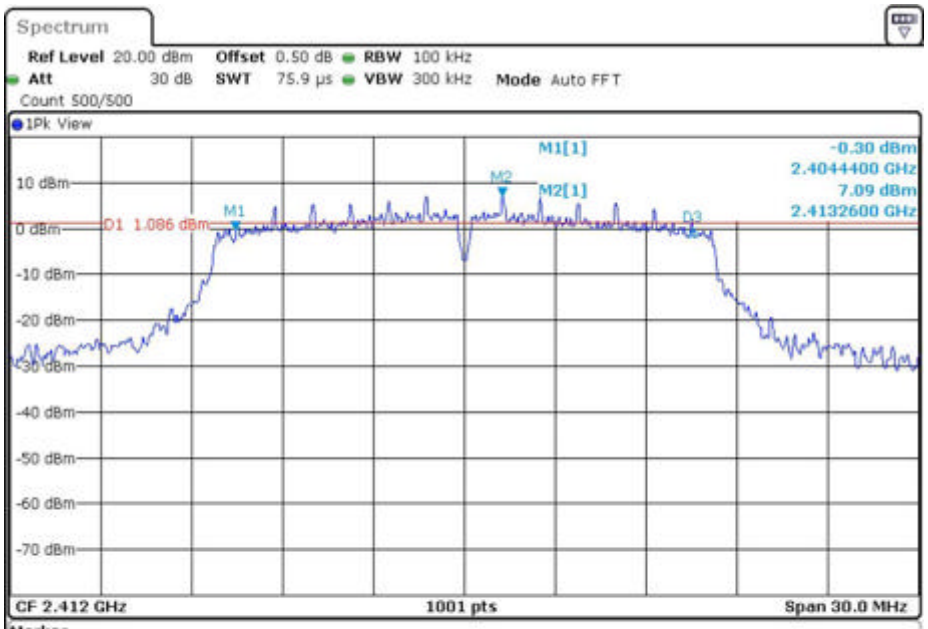
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.43292 GHz	-0.32 dBm		
M2		1	2.43751 GHz	7.43 dBm		
D3	M1	1	8.13 MHz	1.51 dB		



Marker

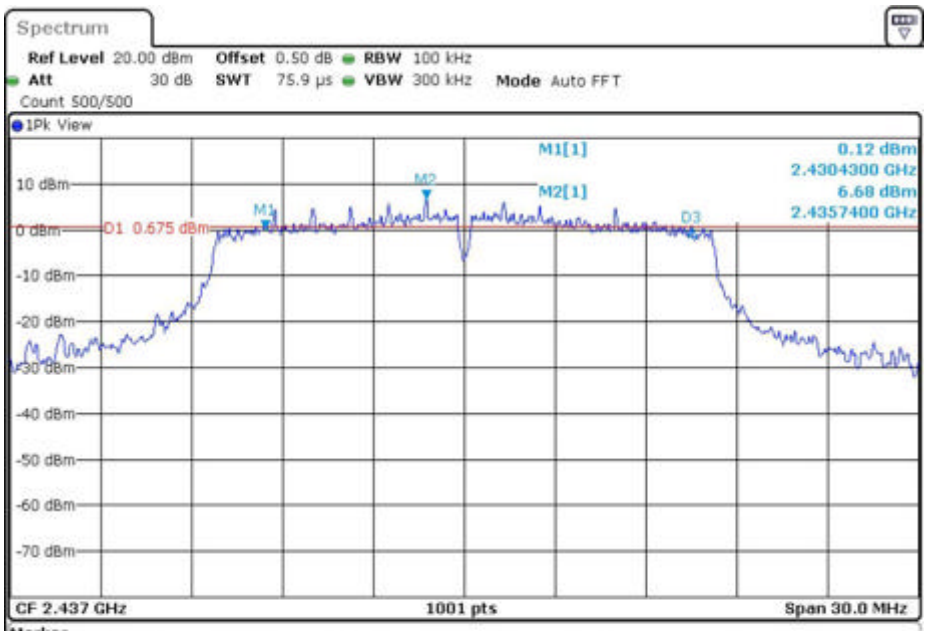
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45792 GHz	-0.44 dBm		
M2		1	2.46149 GHz	7.30 dBm		
D3	M1	1	8.13 MHz	1.66 dB		

802.11g



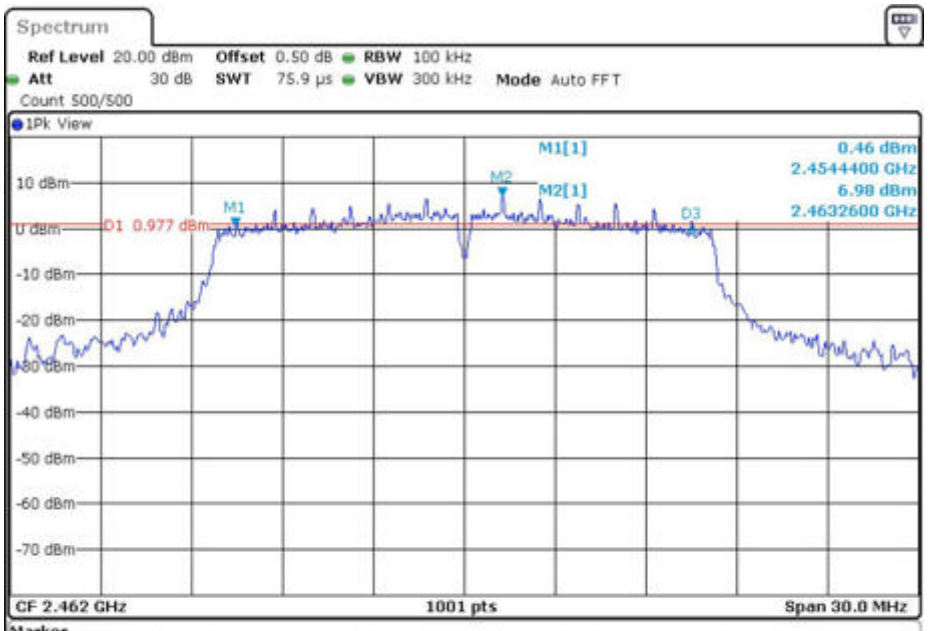
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40444 GHz	-0.30 dBm		
M2		1	2.41326 GHz	7.09 dBm		
D3	M1	1	15.12 MHz	0.48 dB		



Marker

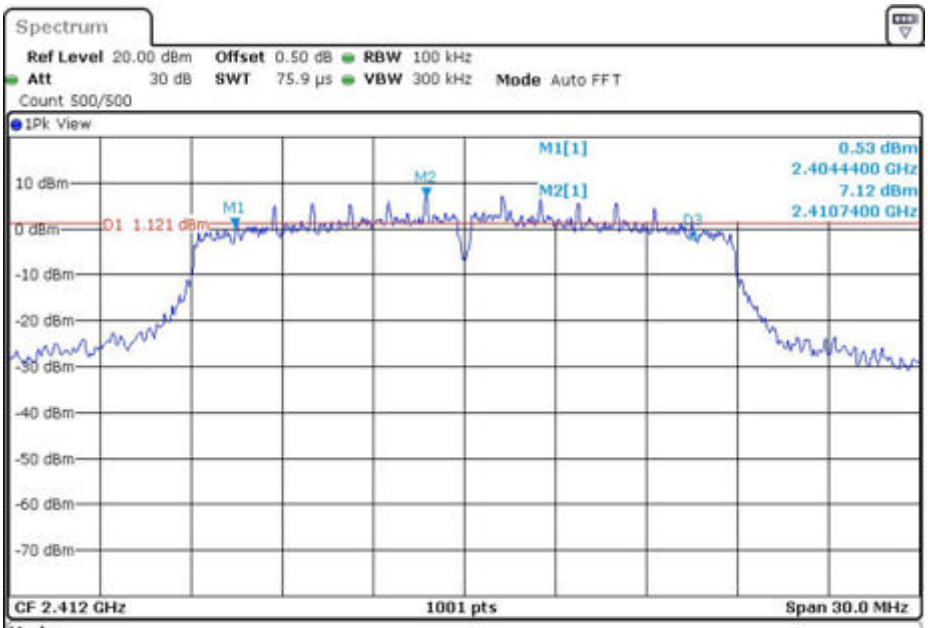
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.43043 GHz	0.12 dBm		
M2		1	2.43574 GHz	6.68 dBm		
D3	M1	1	14.07 MHz	0.20 dB		



Marker

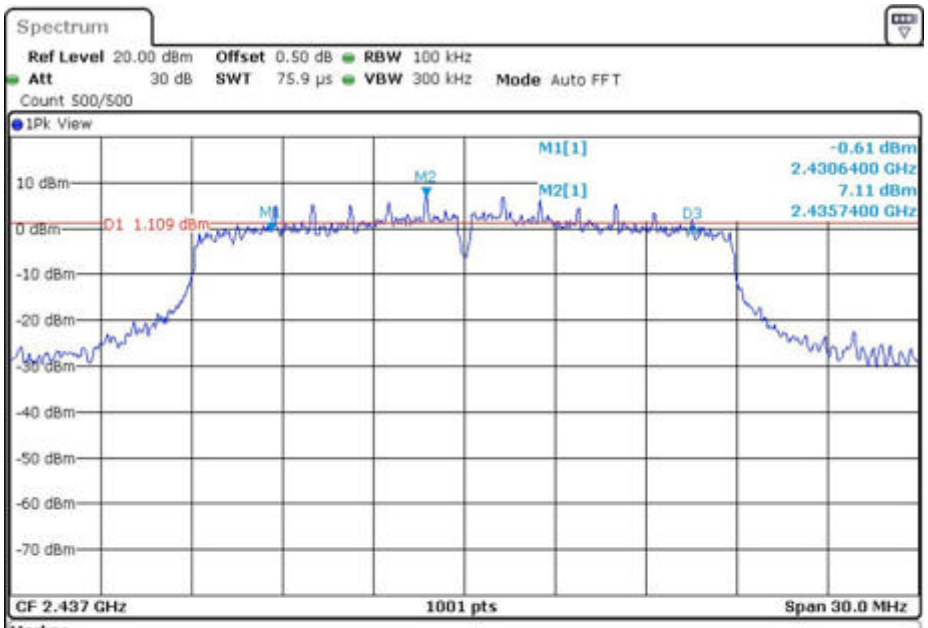
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45444 GHz	0.46 dBm		
M2		1	2.46326 GHz	6.98 dBm		
D3	M1	1	15.09 MHz	0.49 dB		

802.11n-HT20



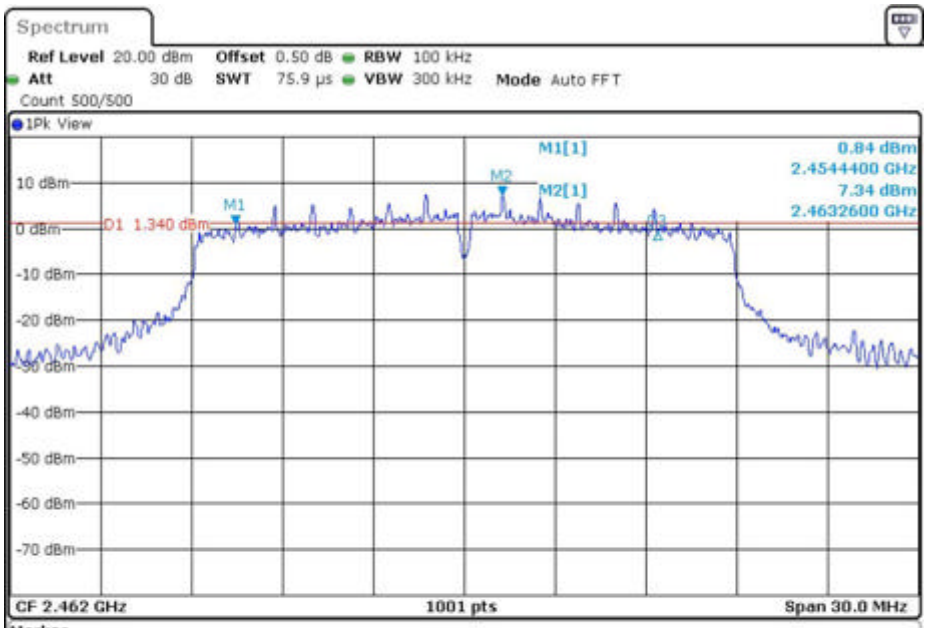
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40444 GHz	0.53 dBm		
M2		1	2.41074 GHz	7.12 dBm		
D3	M1	1	15.12 MHz	-0.89 dB		

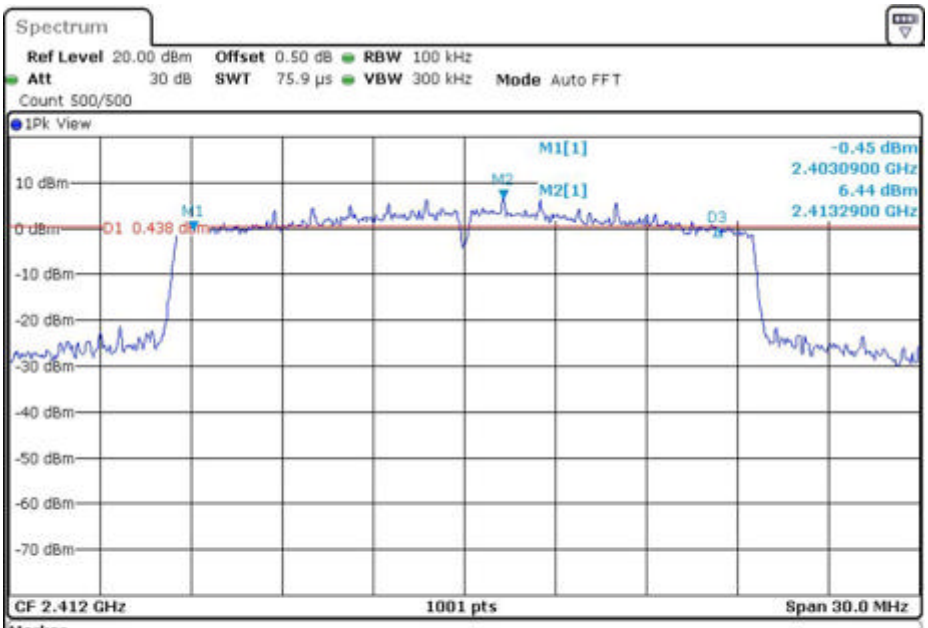


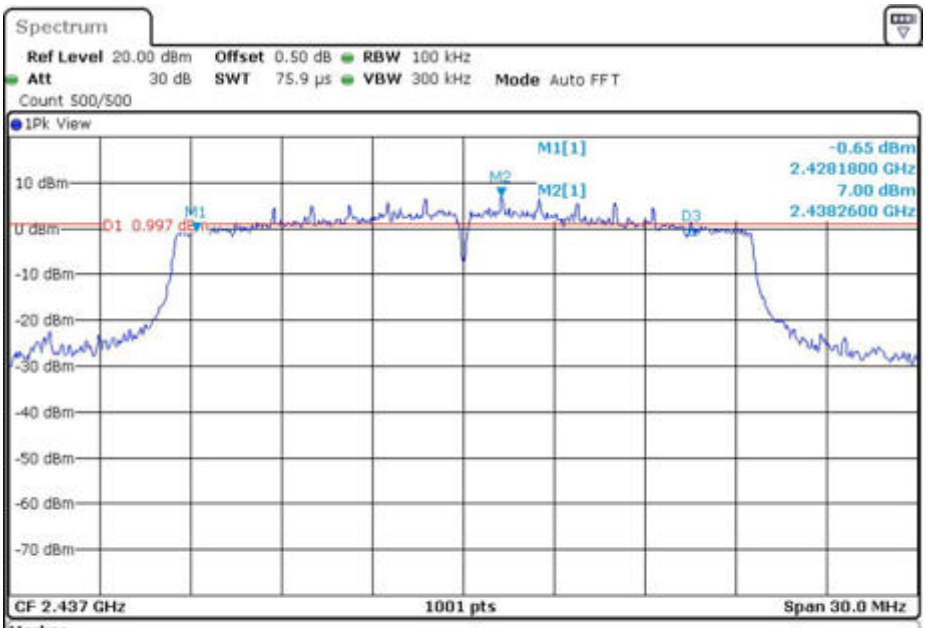
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.43064 GHz	-0.61 dBm		
M2		1	2.43574 GHz	7.11 dBm		
D3	M1	1	13.92 MHz	1.52 dB		



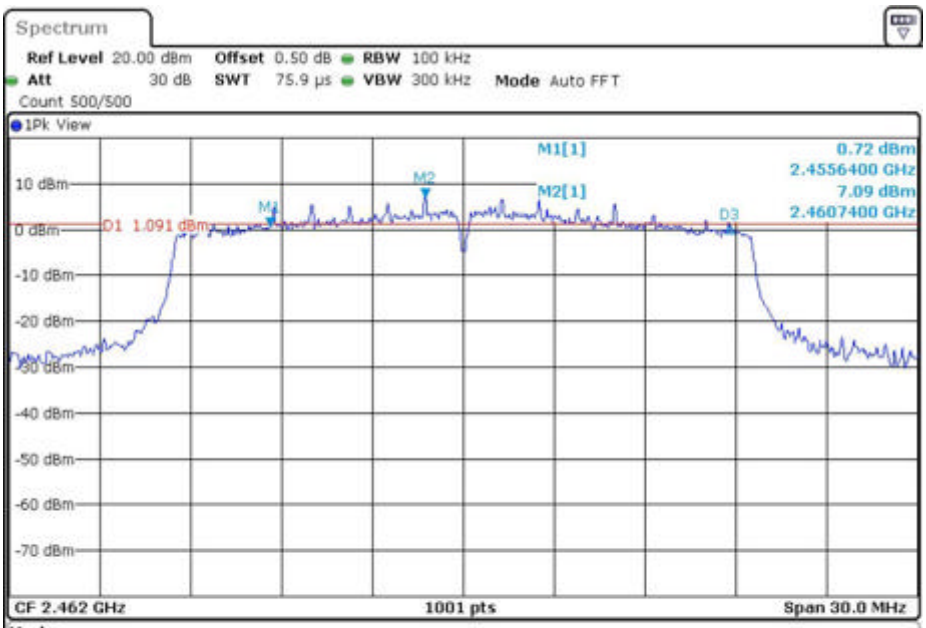
802.11ax-HT20





Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.42818 GHz	-0.65 dBm		
M2		1	2.43826 GHz	7.00 dBm		
D3	M1	1	16.38 MHz	1.18 dB		



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45564 GHz	0.72 dBm		
M2		1	2.46074 GHz	7.09 dBm		
D3	M1	1	15.15 MHz	0.16 dB		

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

The Measurement Procedure PKPSD was set according to the FCC KDB 558074 D01 v05r02.

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 with RBW 3kHz
2412	6.61
2437	6.49
2462	6.41

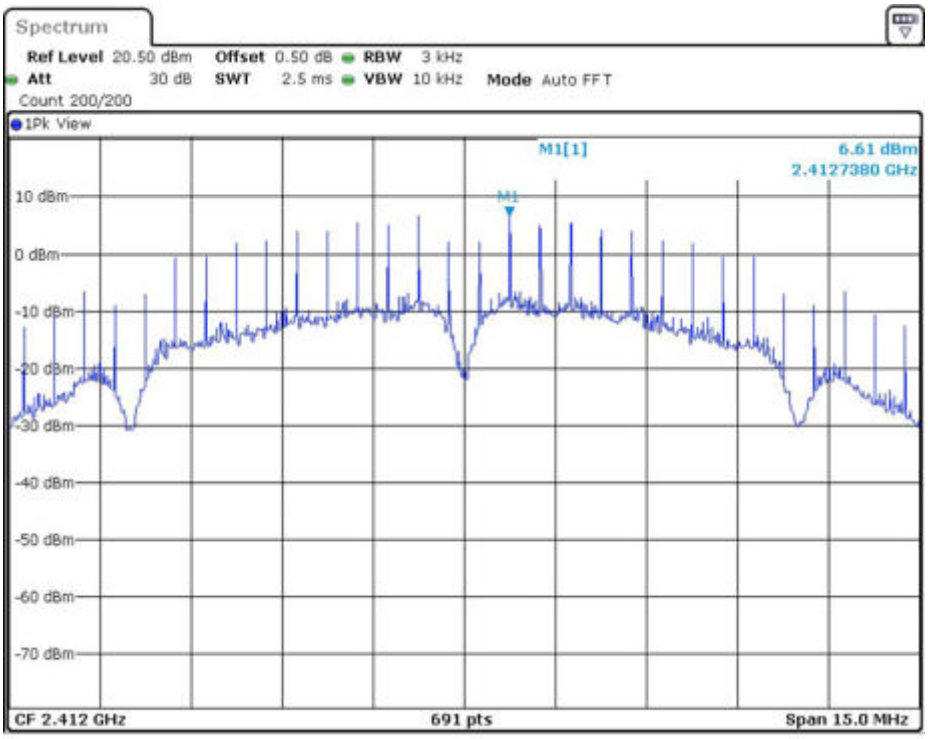
IEEE 802.11g (16QAM, 6Mbps)	
Frequency (MHz)	Power Density with RBW 3kHz
2412	-8.22
2437	-7.89
2462	-6.91

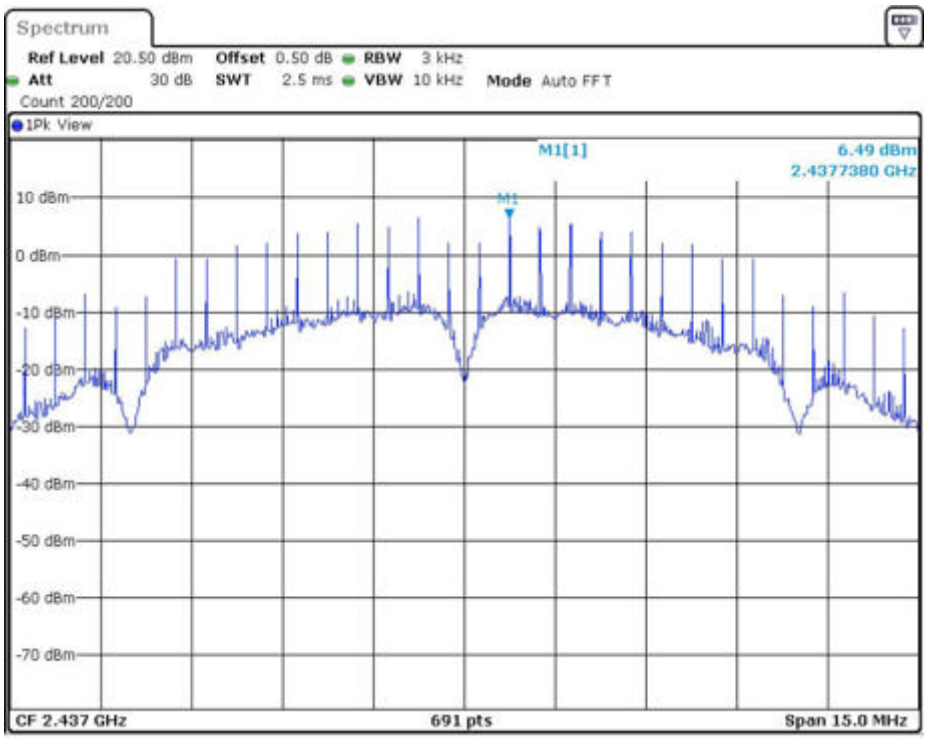
IEEE 802.11n-HT20 (64QAM, 6Mbps)	
Frequency (MHz)	Power Density with RBW 3kHz
2412	-5.86
2437	-6.62
2462	-6.55

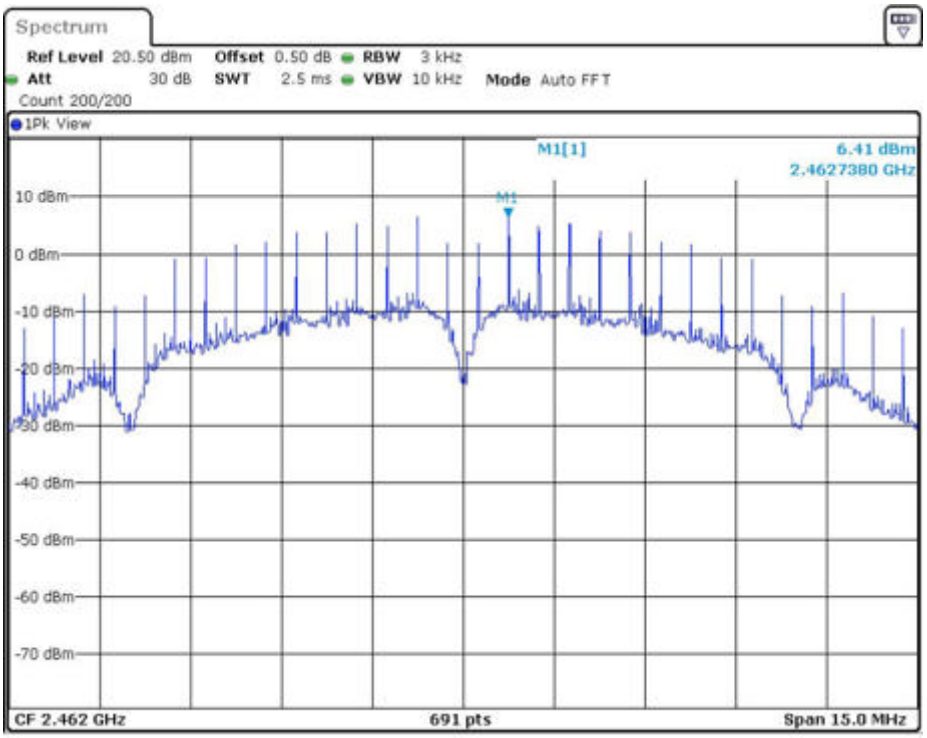
IEEE 802.11ax-HT20 (64QAM, 6Mbps)	
Frequency (MHz)	Power Density with RBW 3kHz
2412	-6.03
2437	-7.09
2462	-6.53

The test plots are attached as below.

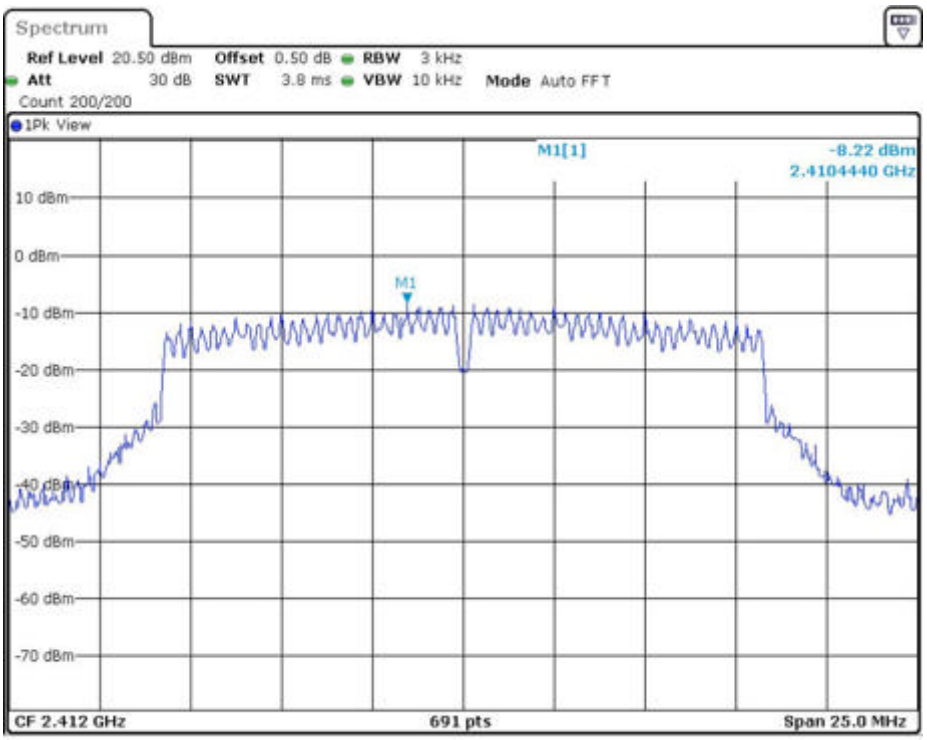
802.11b

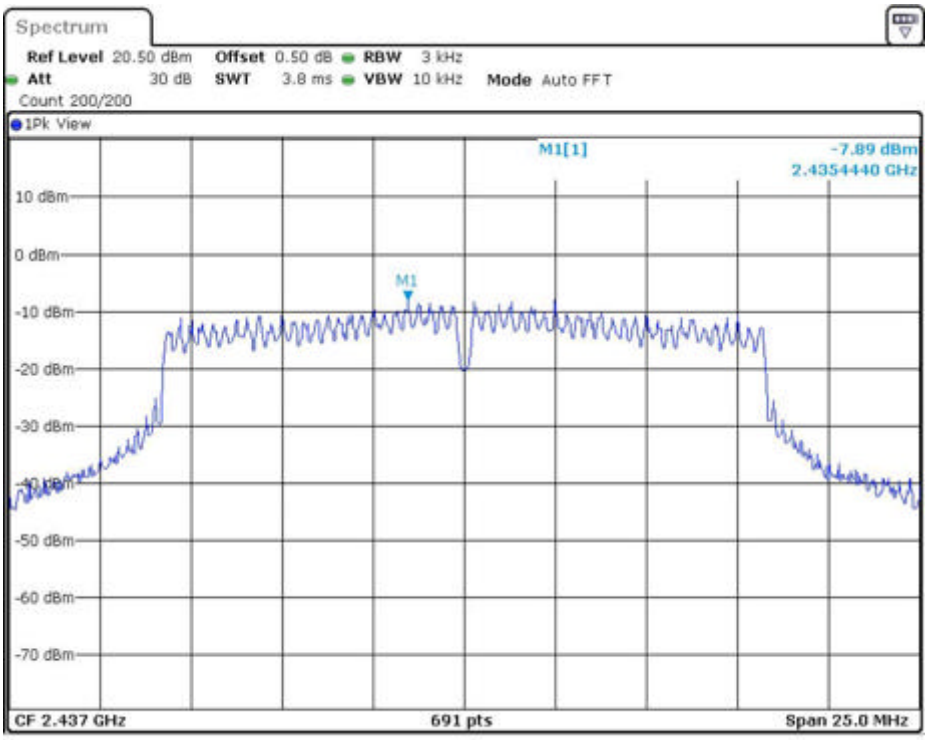

Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 2.5 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] 6.61 dBm
2.4127380 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.412 GHz
691 pts
Span 15.0 MHz

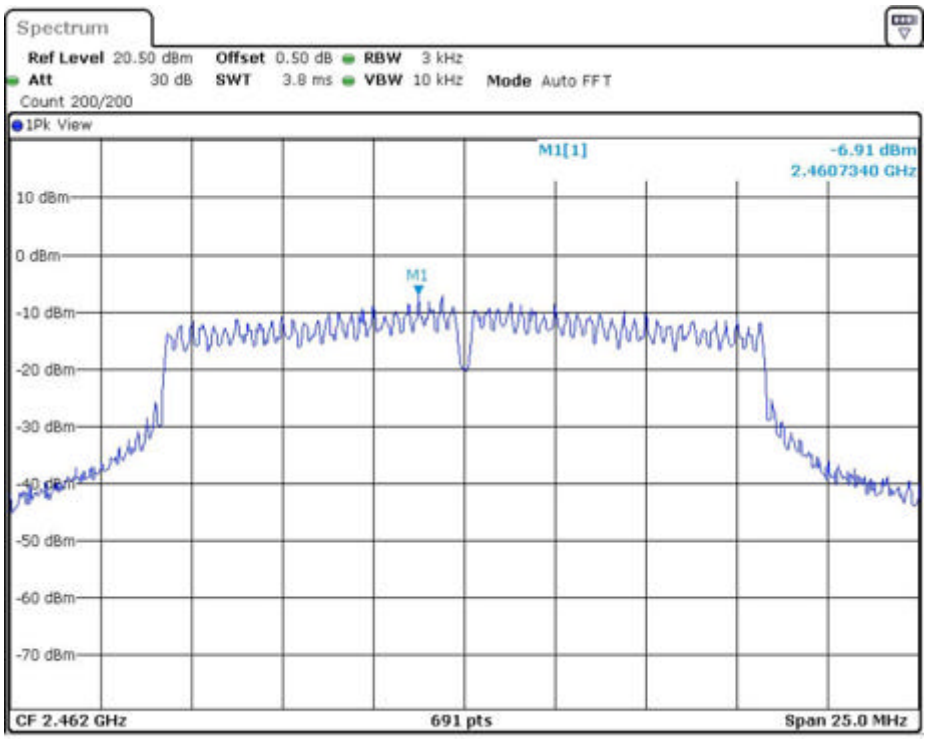

Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 2.5 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] 6.49 dBm
2.4377380 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.437 GHz
691 pts
Span 15.0 MHz


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 2.5 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] 6.41 dBm
2.4627380 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 15.0 MHz

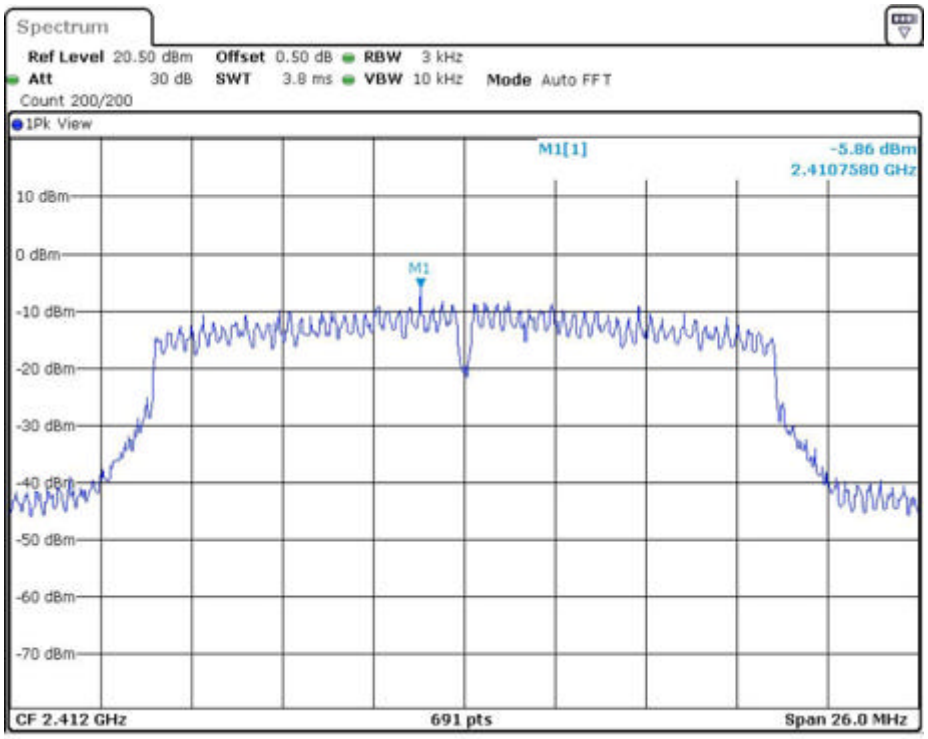
802.11g

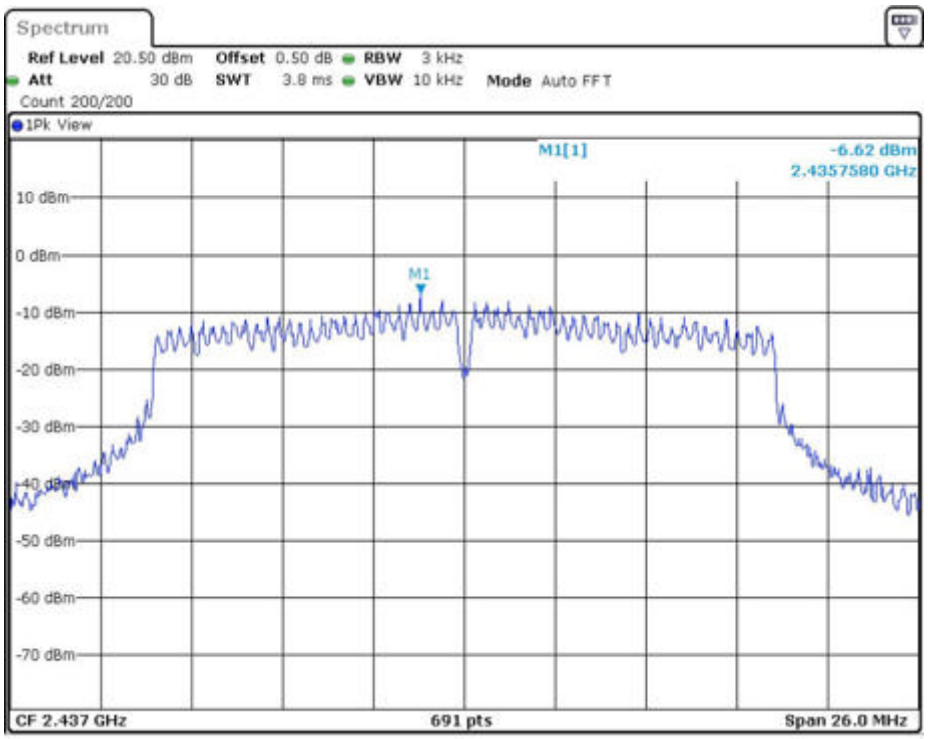

Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -8.22 dBm
2.4104440 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.412 GHz
691 pts
Span 25.0 MHz

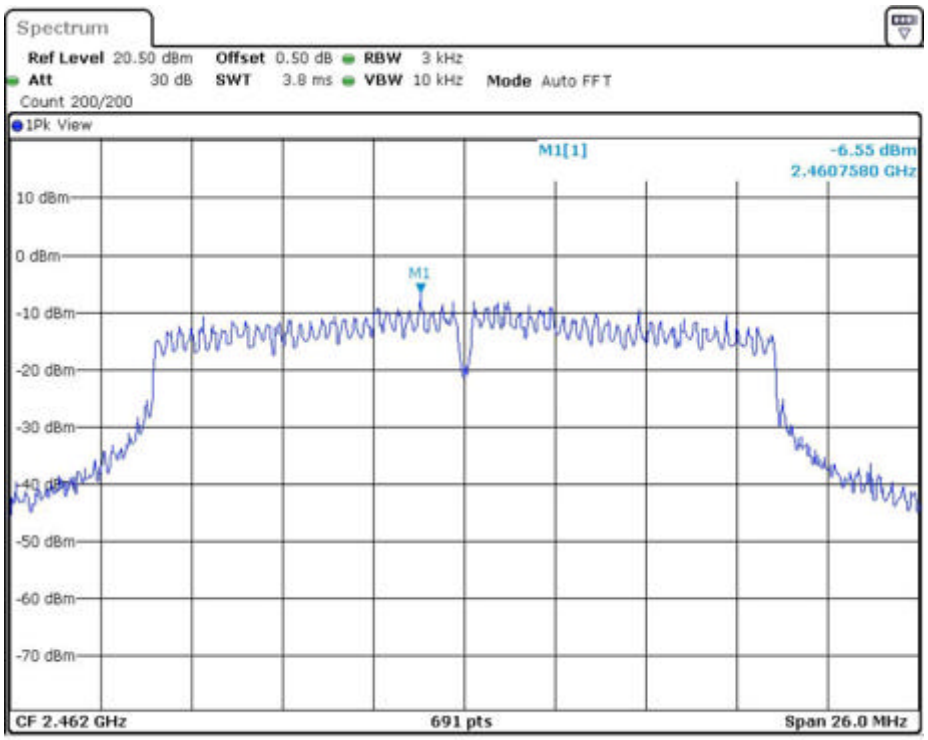

Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -7.89 dBm
2.4354440 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.437 GHz
691 pts
Span 25.0 MHz


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -6.91 dBm
2.4607340 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 25.0 MHz

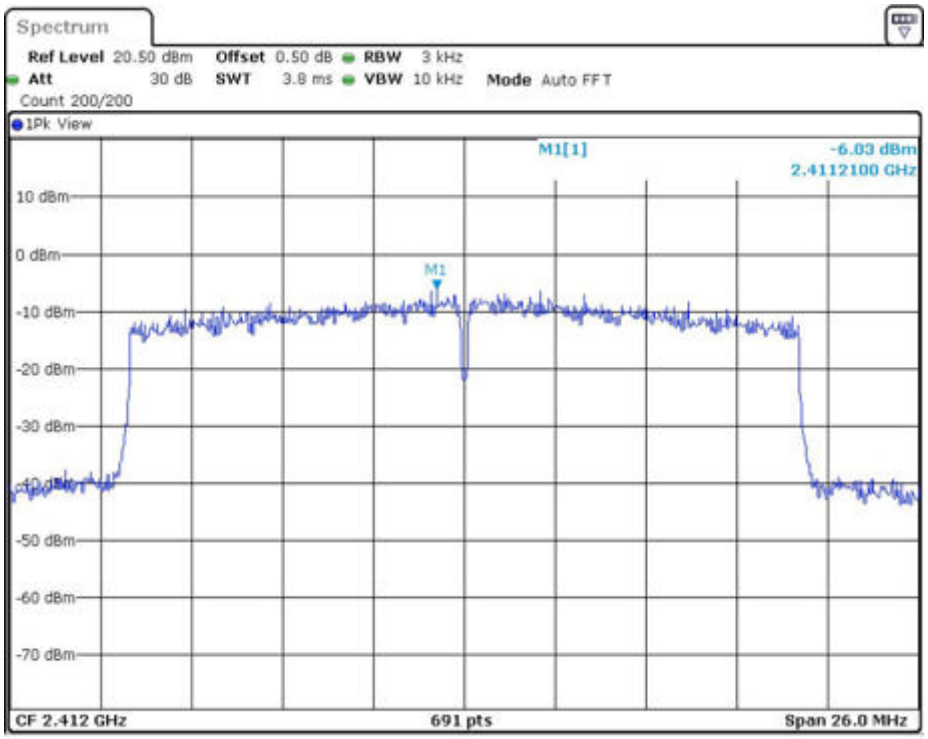
802.11n-HT20

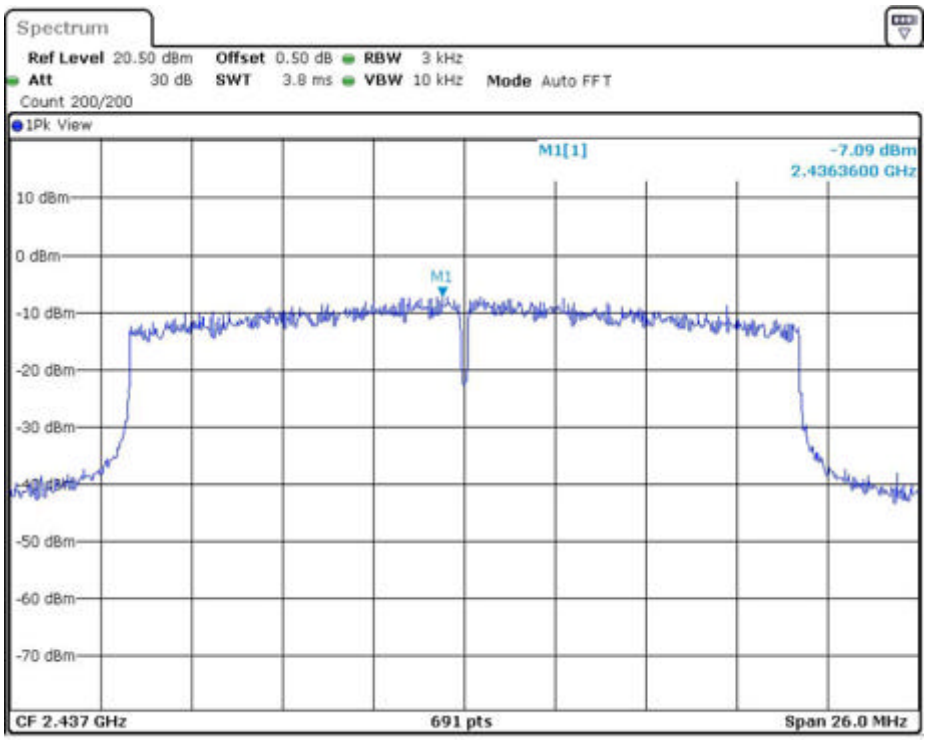

Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -5.86 dBm
2.4107580 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.412 GHz
691 pts
Span 26.0 MHz

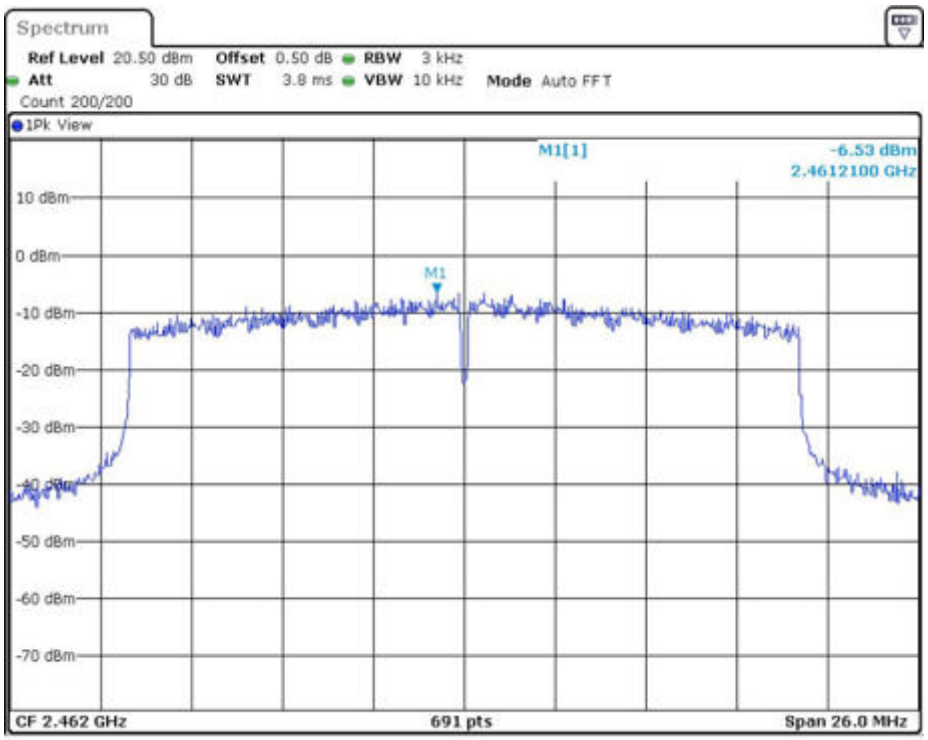

Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -6.62 dBm
2.4357580 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.437 GHz
691 pts
Span 26.0 MHz



802.11ax-HT20




Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -7.09 dBm
2.4363600 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.437 GHz
691 pts
Span 26.0 MHz


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -6.53 dBm
2.4612100 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.462 GHz
691 pts
Span 26.0 MHz

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663

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 v05r02.

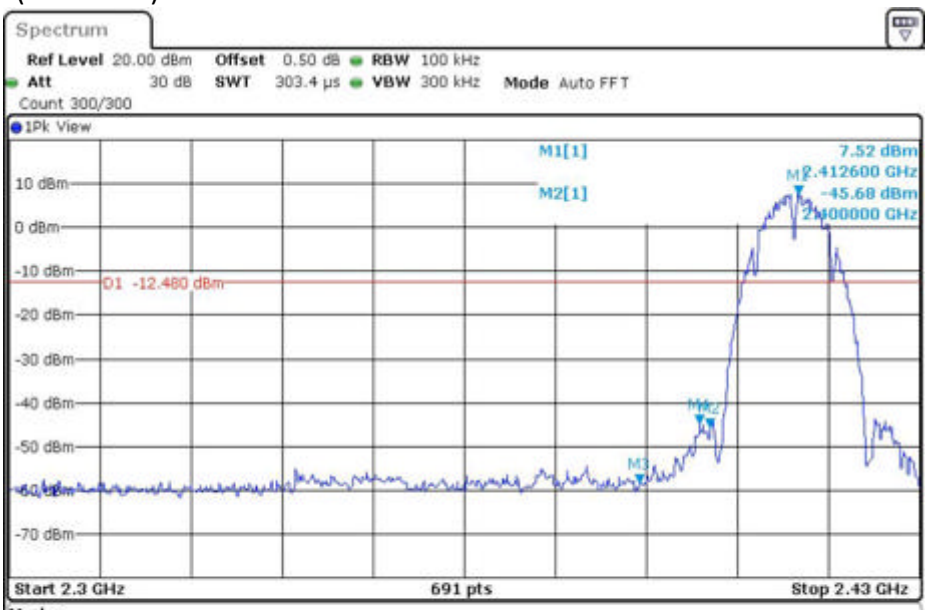
All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

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

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.

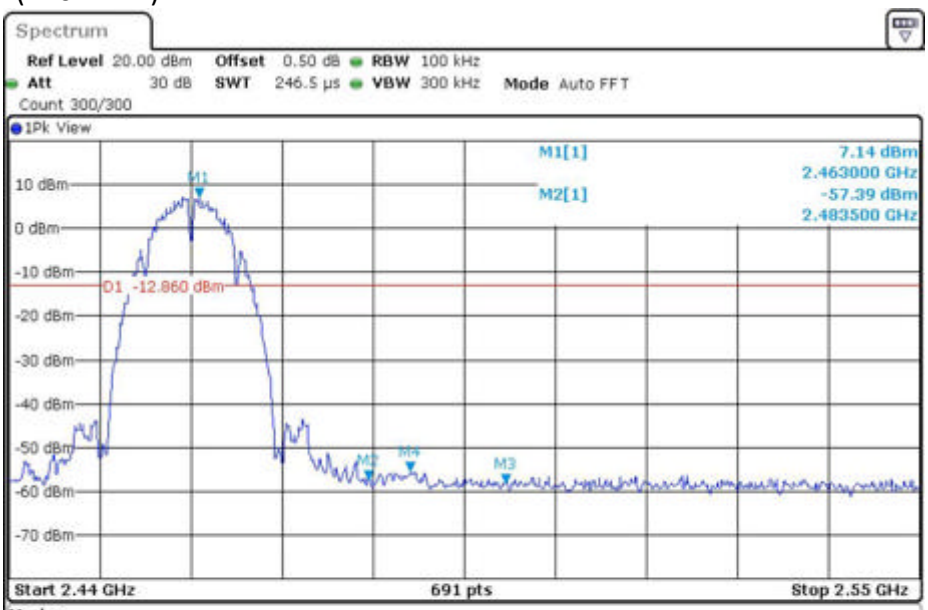
Band edge measurements:
802.11b
Channel 01 (2412MHz)



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4126 GHz	7.52 dBm		
M2		1	2.4 GHz	-45.68 dBm		
M3		1	2.39 GHz	-58.46 dBm		
M4		1	2.398536 GHz	-44.87 dBm		

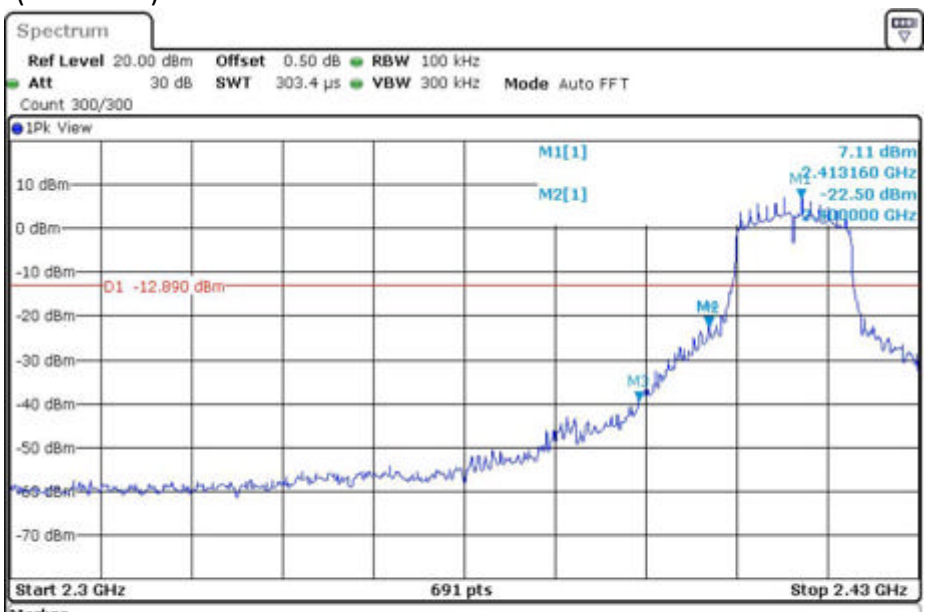
802.11b
Channel 11 (2462MHz)



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.463 GHz	7.14 dBm		
M2		1	2.4835 GHz	-57.39 dBm		
M3		1	2.5 GHz	-58.44 dBm		
M4		1	2.488464 GHz	-55.47 dBm		

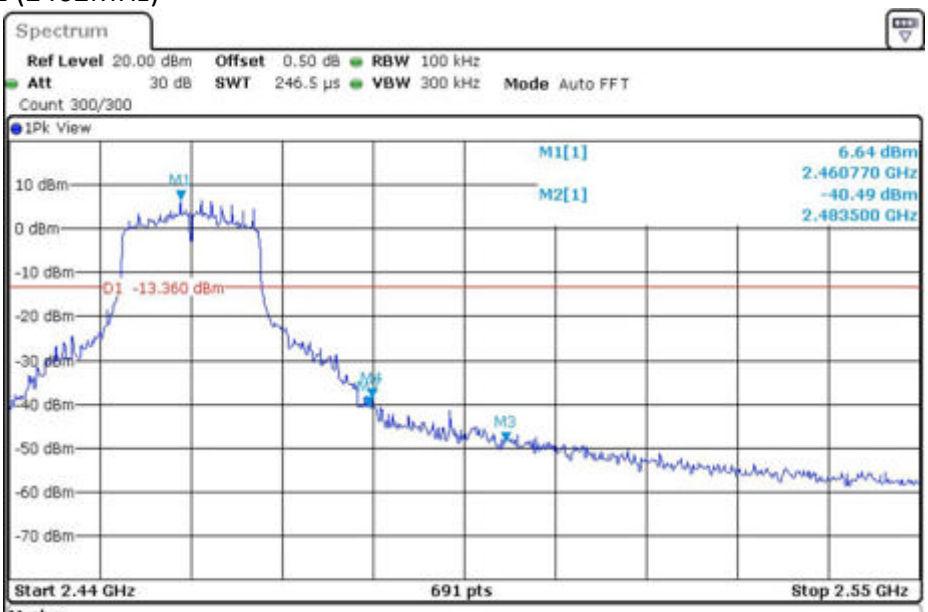
802.11g
Channel 01 (2412MHz)



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41316 GHz	7.11 dBm		
M2		1	2.4 GHz	-22.50 dBm		
M3		1	2.39 GHz	-39.27 dBm		
M4		1	2.399855 GHz	-21.98 dBm		

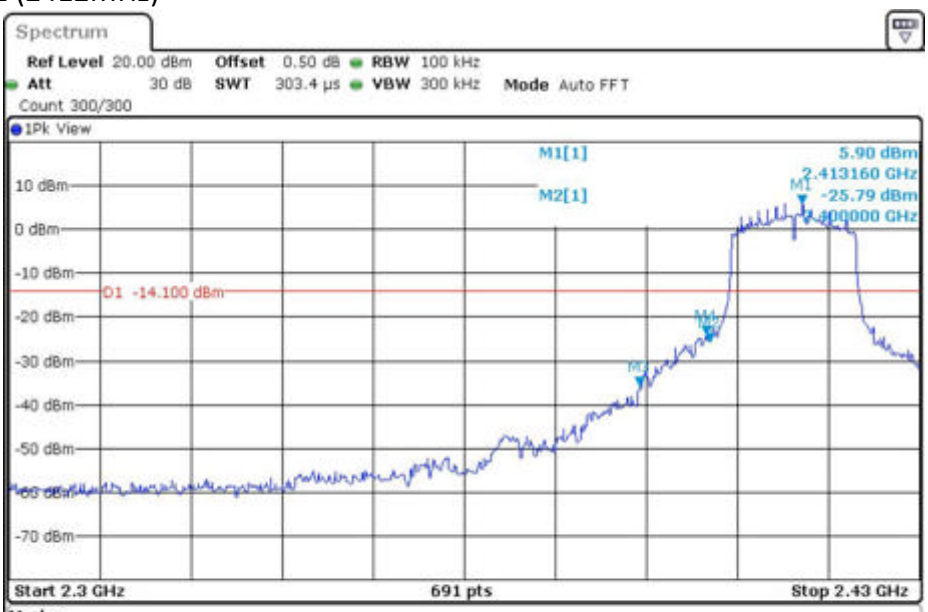
802.11g
Channel 11 (2462MHz)



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46077 GHz	6.64 dBm		
M2		1	2.4835 GHz	-40.49 dBm		
M3		1	2.5 GHz	-48.58 dBm		
M4		1	2.483841 GHz	-38.40 dBm		

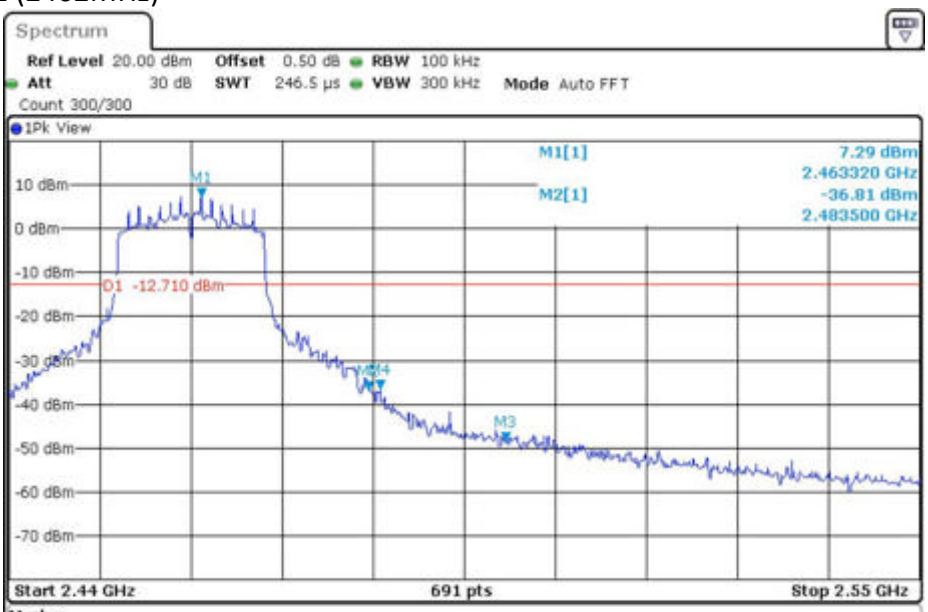
802.11n-HT20
Channel 01 (2412MHz)



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41316 GHz	5.90 dBm		
M2		1	2.4 GHz	-25.79 dBm		
M3		1	2.39 GHz	-35.81 dBm		
M4		1	2.399478 GHz	-23.95 dBm		

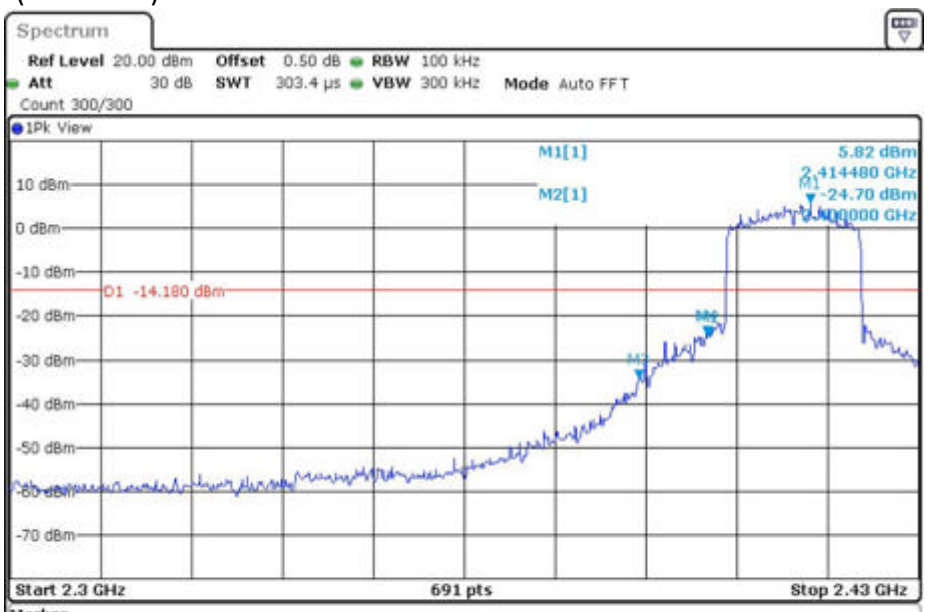
802.11n-HT20
Channel 11 (2462MHz)



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46332 GHz	7.29 dBm		
M2		1	2.4835 GHz	-36.81 dBm		
M3		1	2.5 GHz	-48.74 dBm		
M4		1	2.484797 GHz	-36.56 dBm		

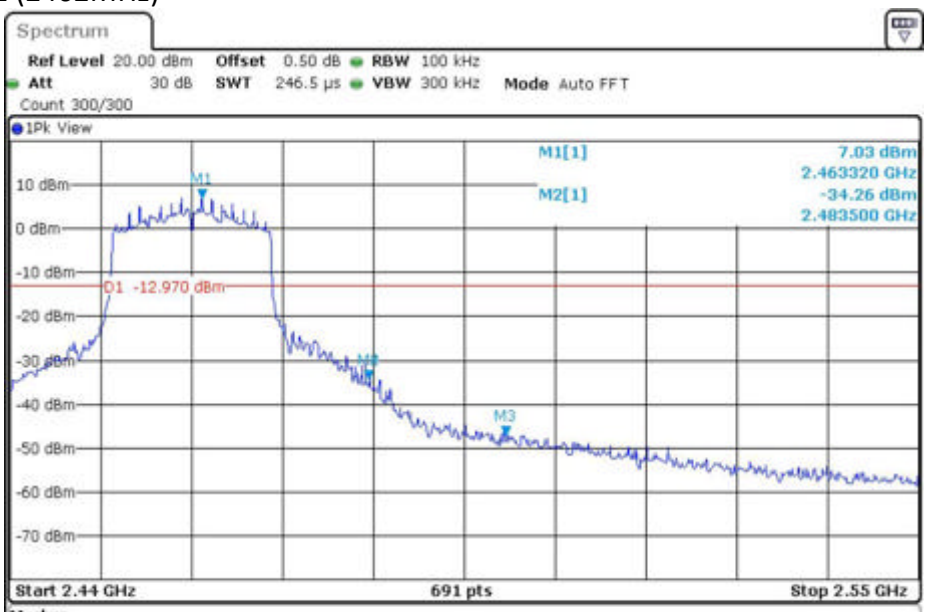
802.11ax-HT20
Channel 01 (2412MHz)



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41448 GHz	5.82 dBm		
M2		1	2.4 GHz	-24.70 dBm		
M3		1	2.39 GHz	-34.42 dBm		
M4		1	2.399667 GHz	-24.26 dBm		

802.11ax-HT20
Channel 11 (2462MHz)



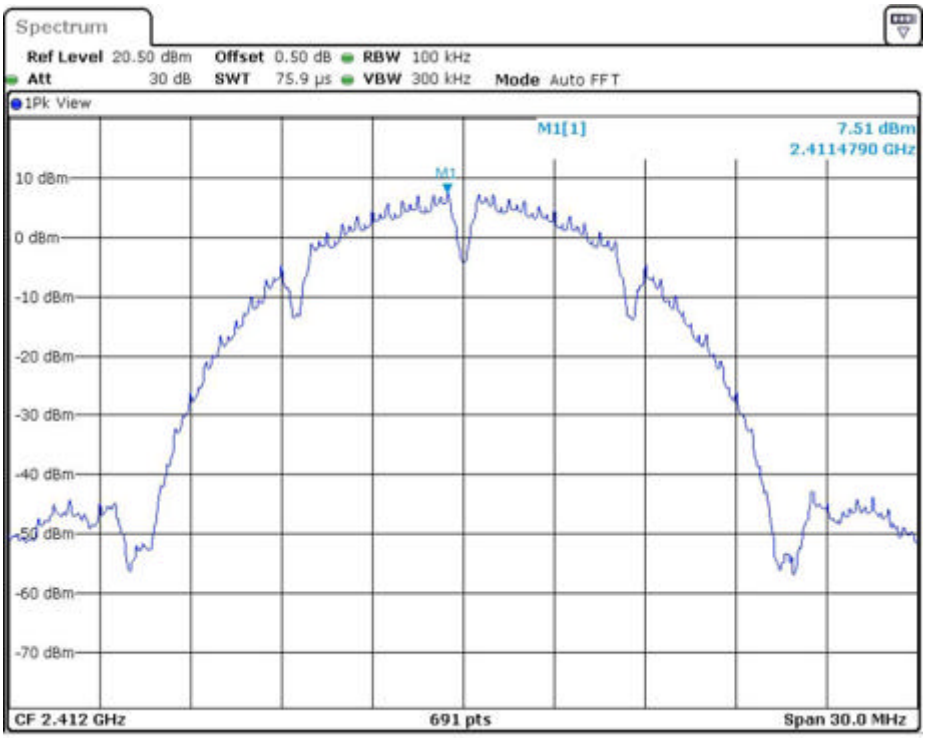
Marker

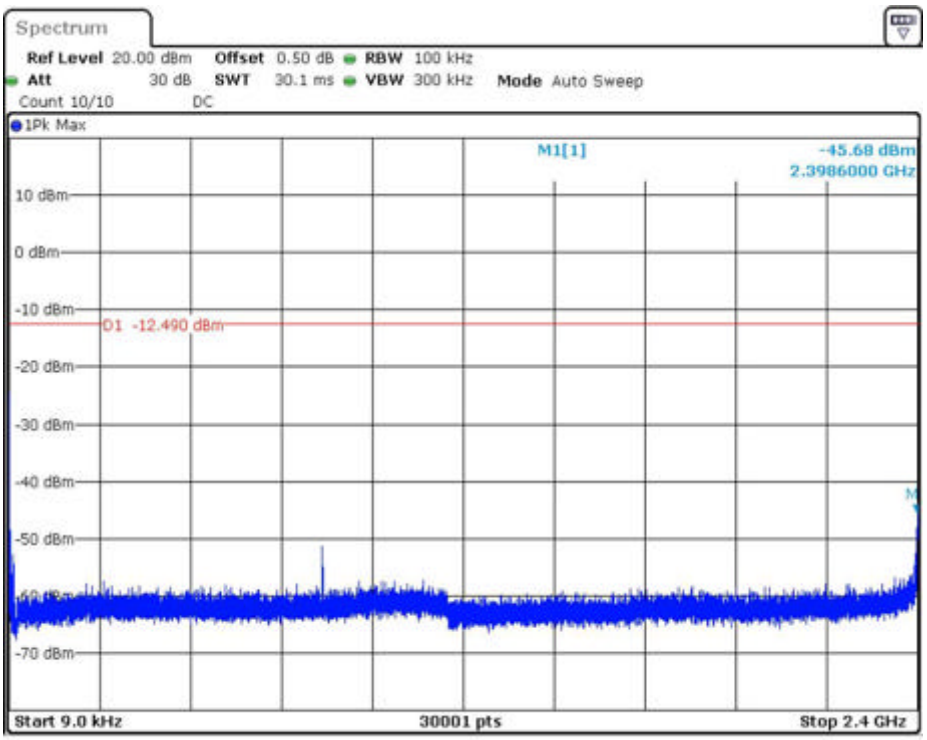
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46332 GHz	7.03 dBm		
M2		1	2.4835 GHz	-34.26 dBm		
M3		1	2.5 GHz	-45.92 dBm		
M4		1	2.483522 GHz	-34.26 dBm		

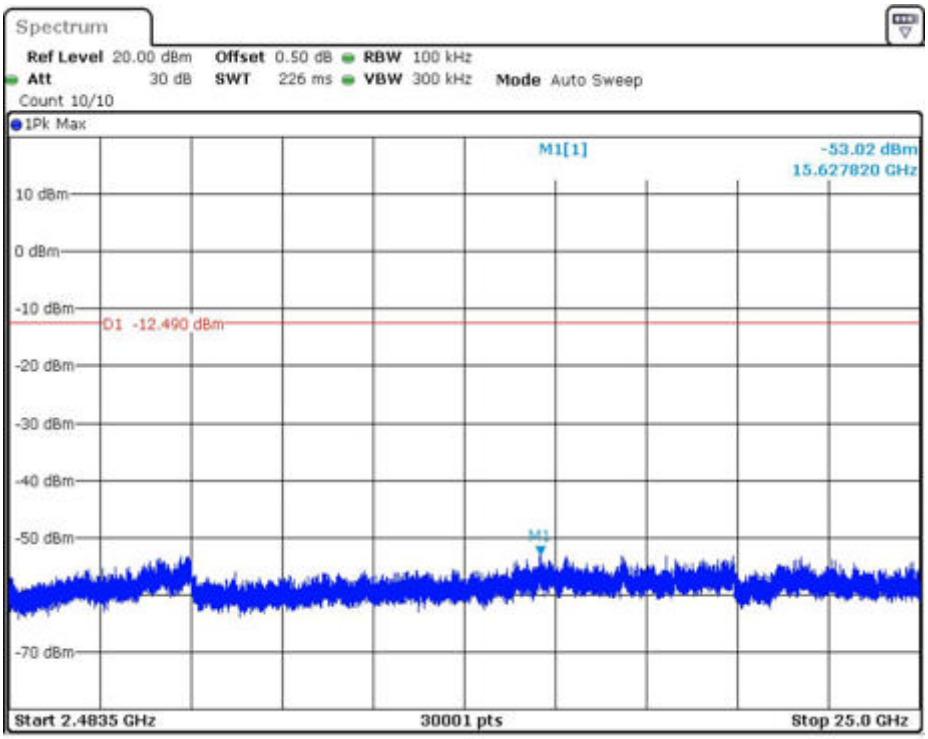
Conducted Spurious Emission:

802.11b

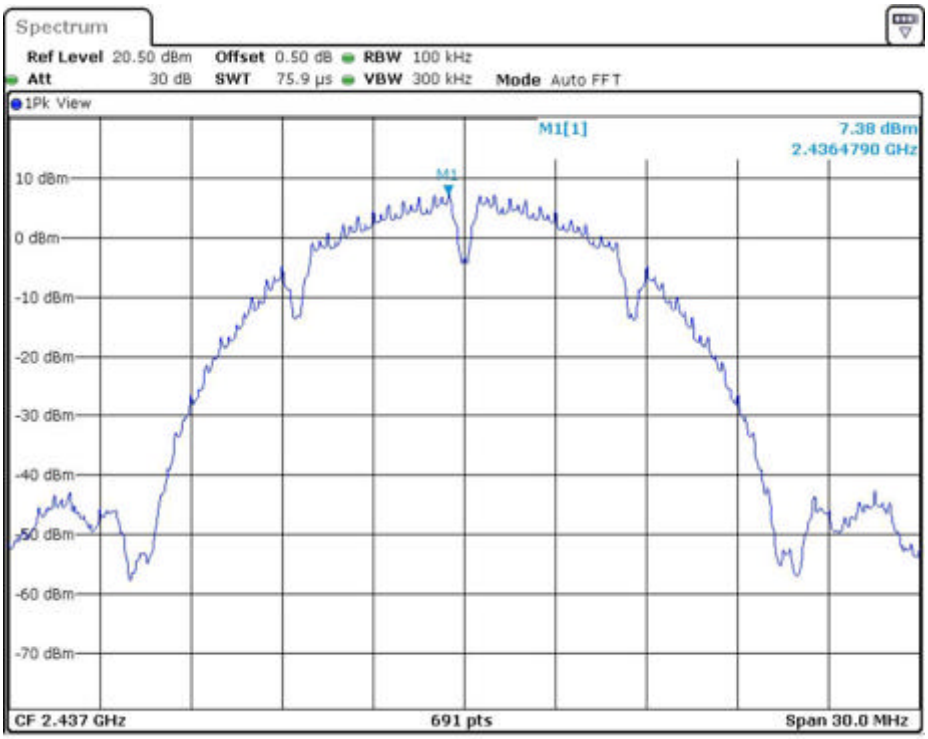
Channel 01 (2412MHz) Reference Level: 7.51dBm

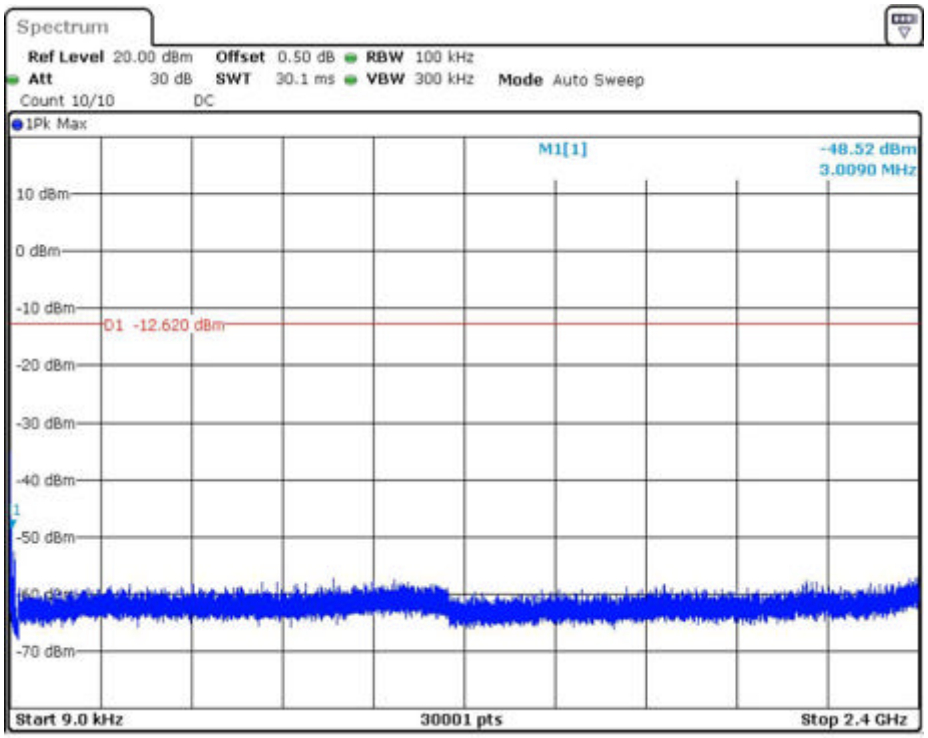


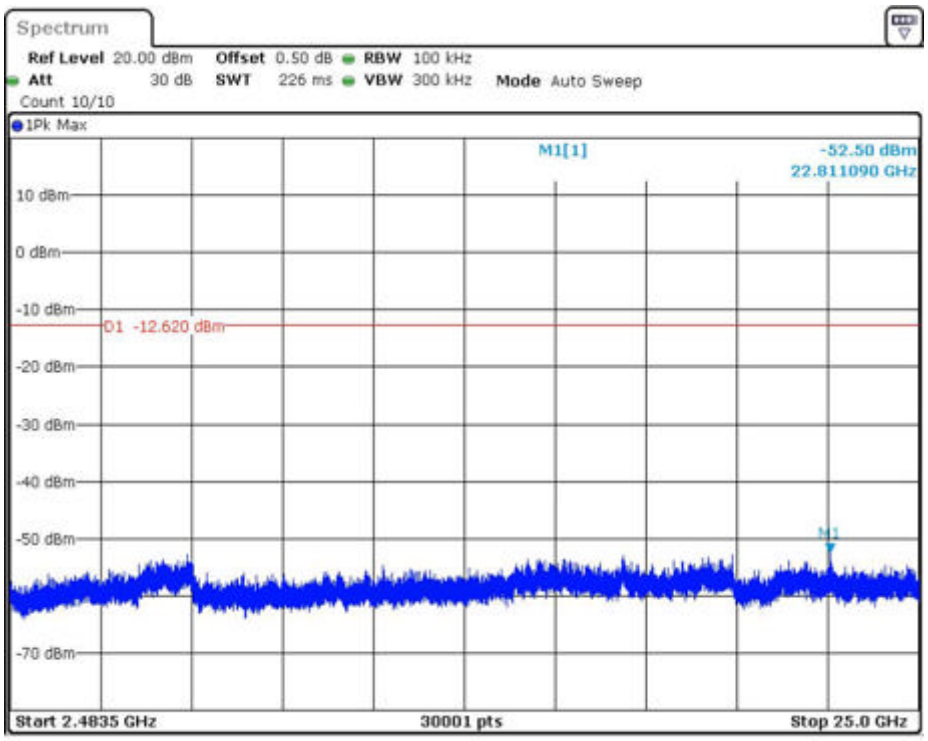



Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -53.02 dBm
15.627820 GHz
10 dBm
0 dBm
-10 dBm
D1 -12.490 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

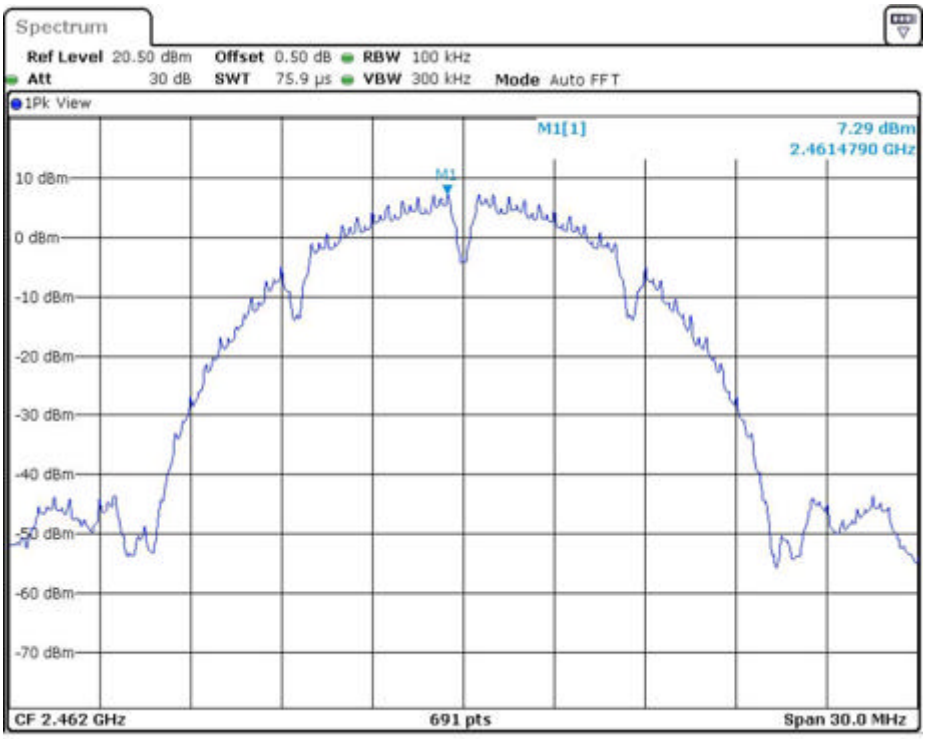
Channel 06 (2437MHz) Reference Level: 7.38dBm

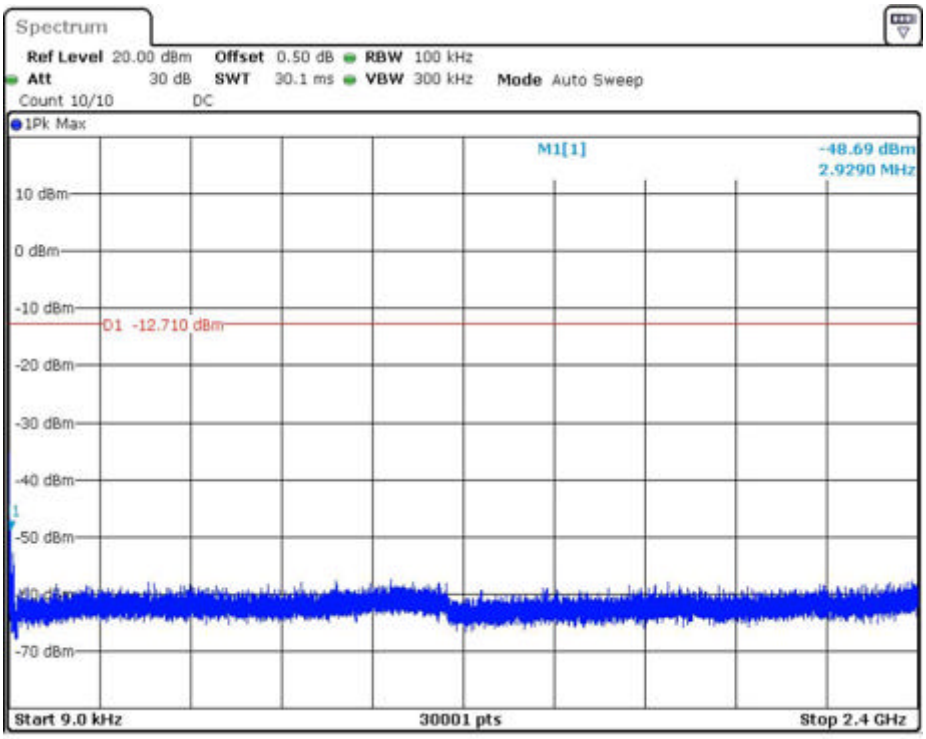


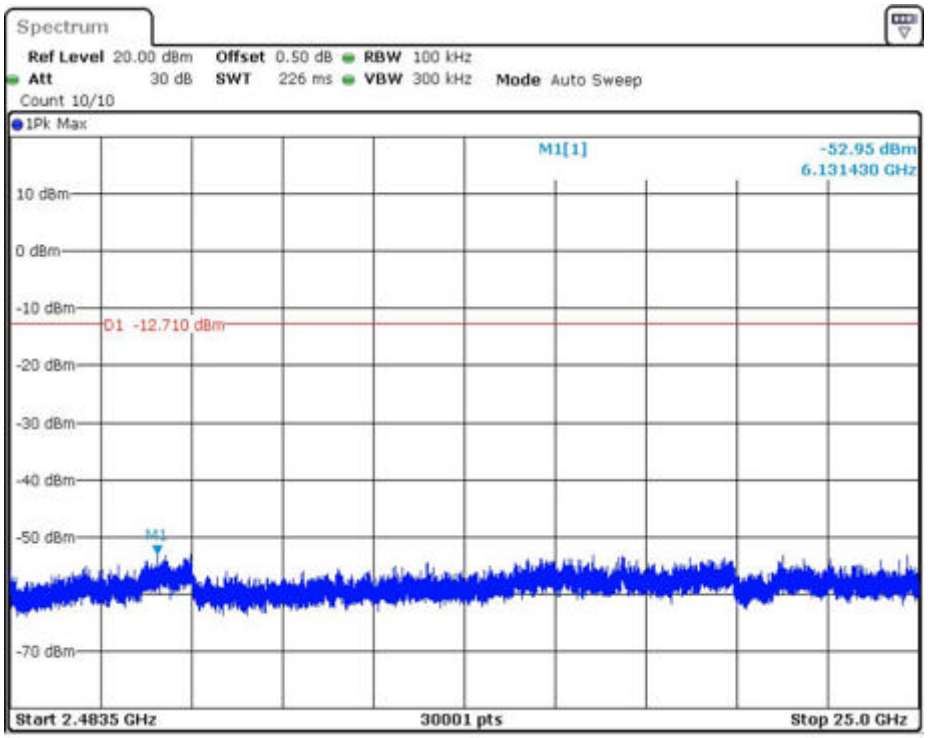



Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -52.50 dBm
22.811090 GHz
10 dBm
0 dBm
-10 dBm
D1 -12.620 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
M1
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

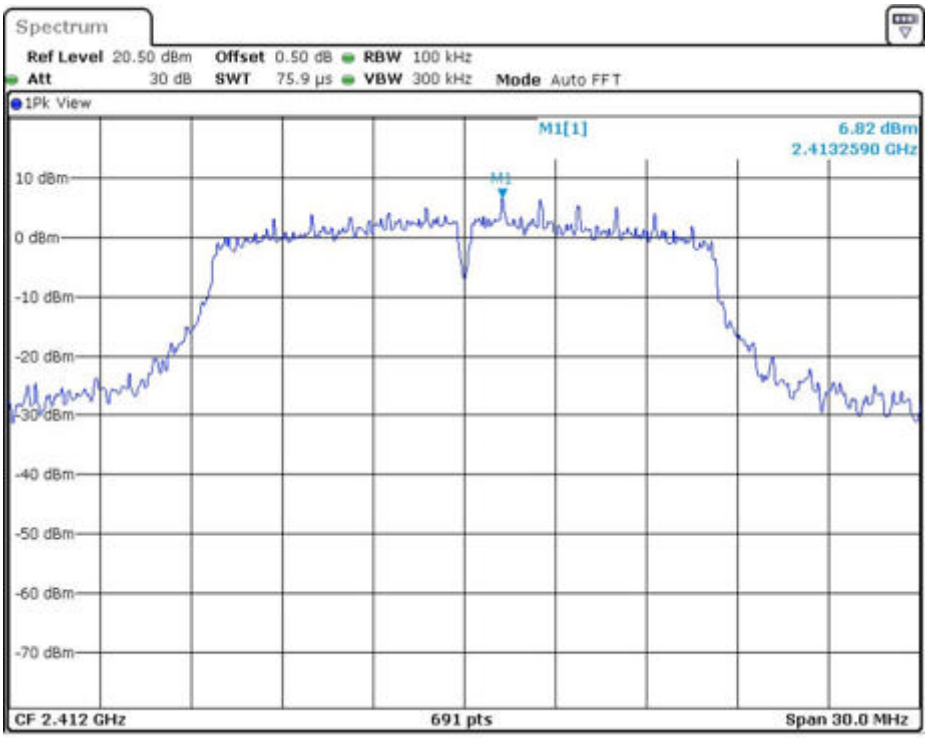
Channel 11 (2462MHz) Reference Level: 7.29dBm

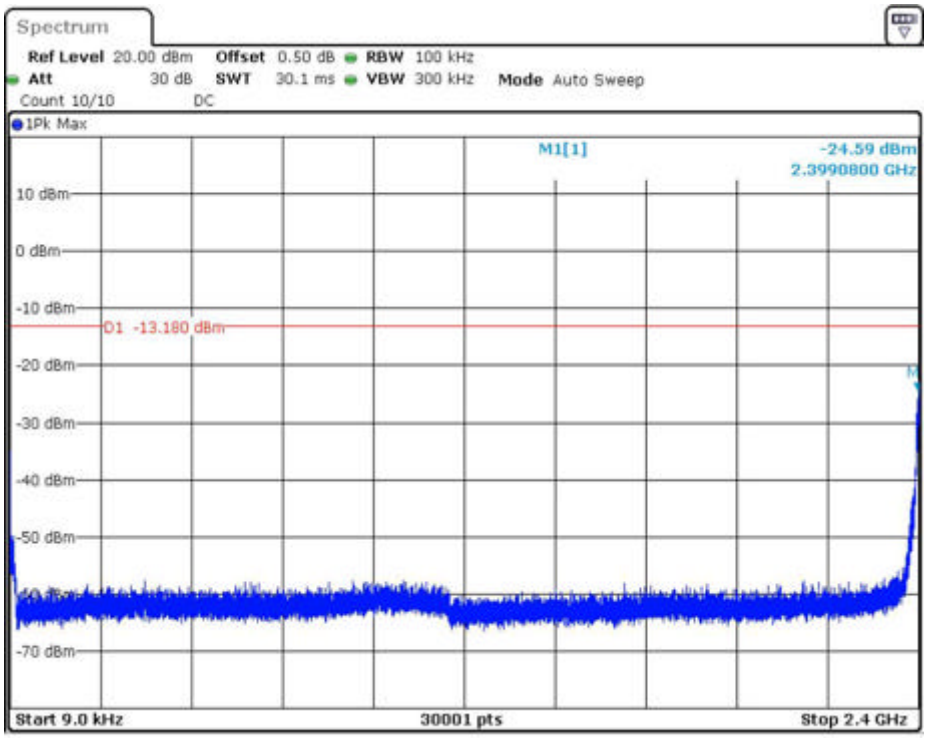


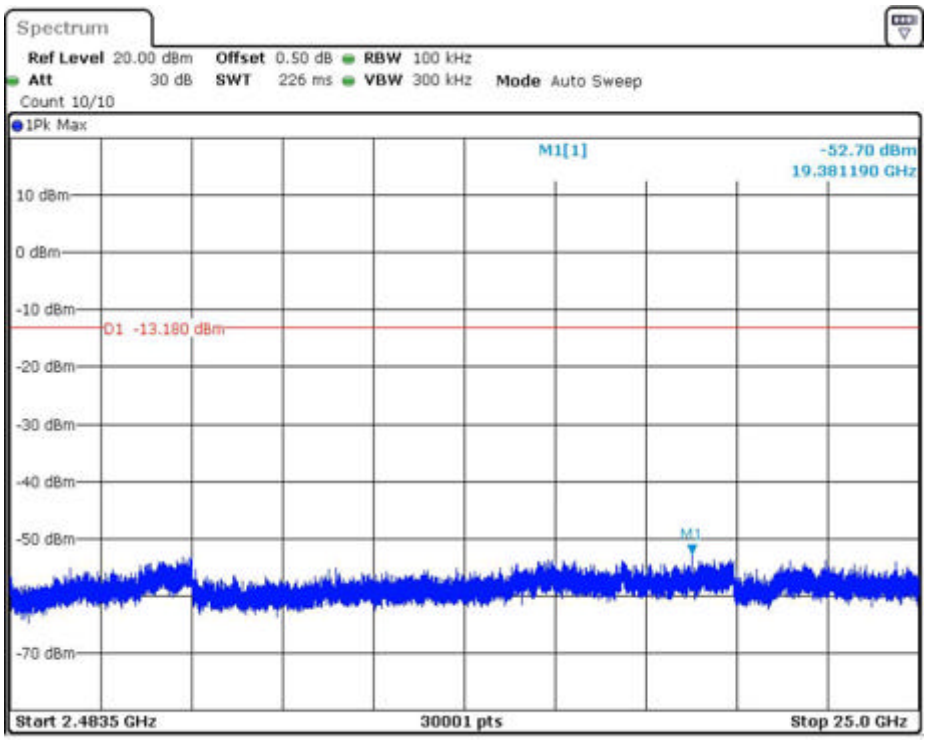



Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -52.95 dBm
6.131430 GHz
10 dBm
0 dBm
-10 dBm
D1 -12.710 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
M1
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

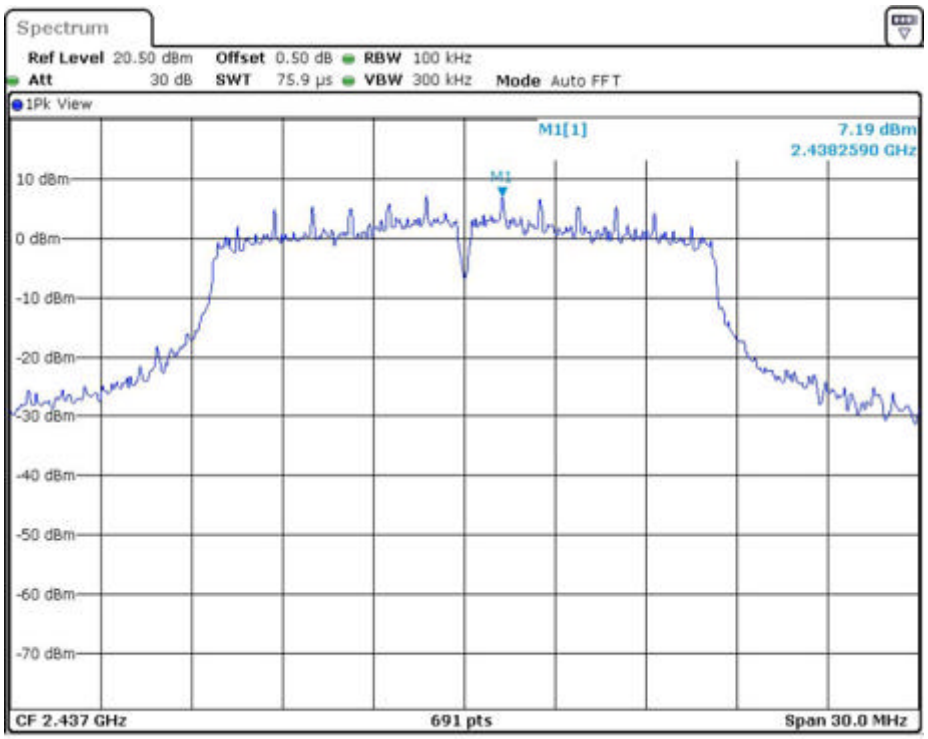
802.11g
Channel 01 (2412MHz) Reference Level: 6.82dBm

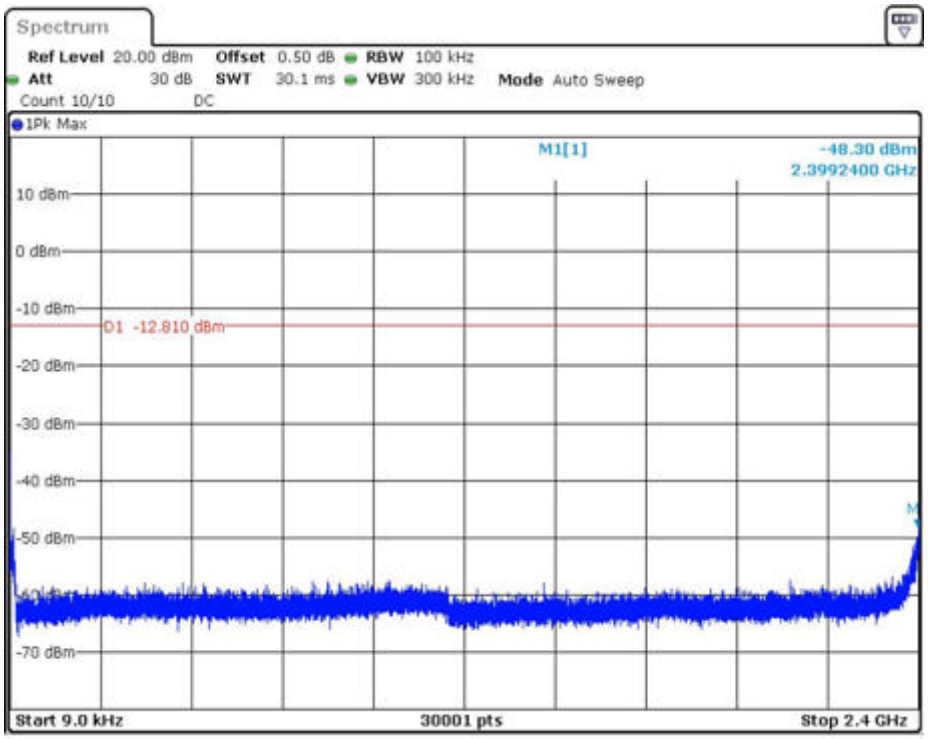


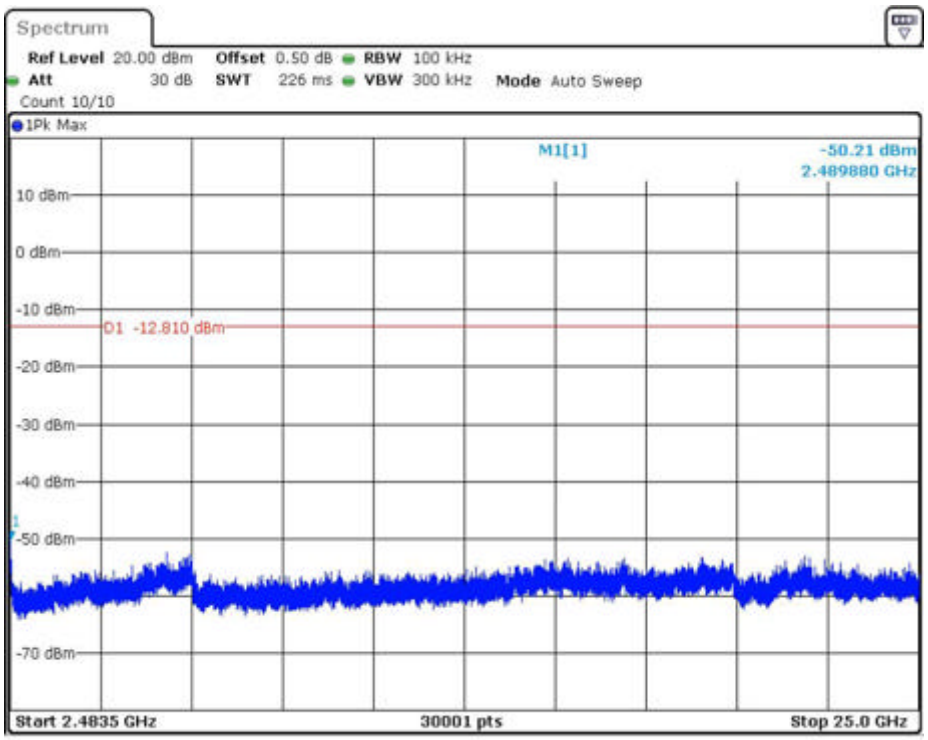



Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -52.70 dBm
19.381190 GHz
10 dBm
0 dBm
-10 dBm
D1 -13.180 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
M1
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

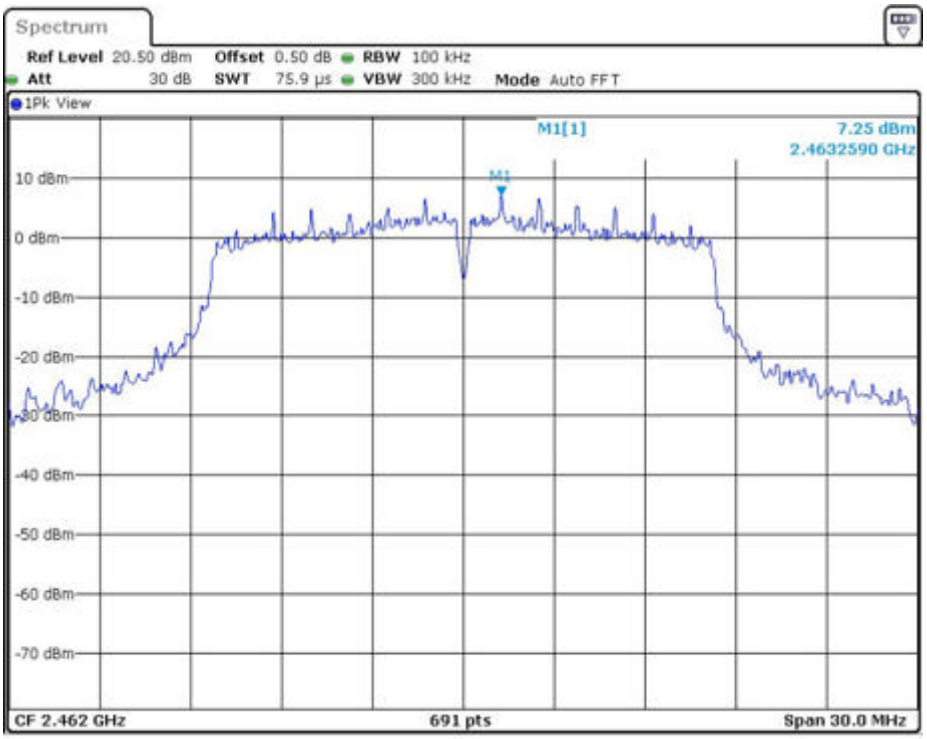
Channel 06 (2437MHz) Reference Level: 7.19dBm

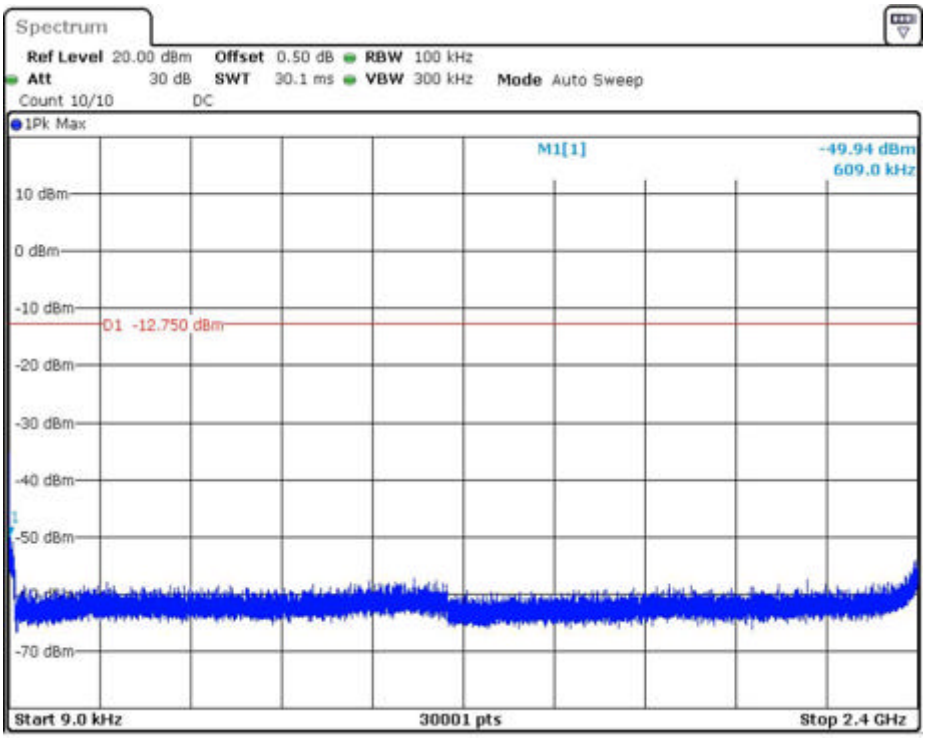


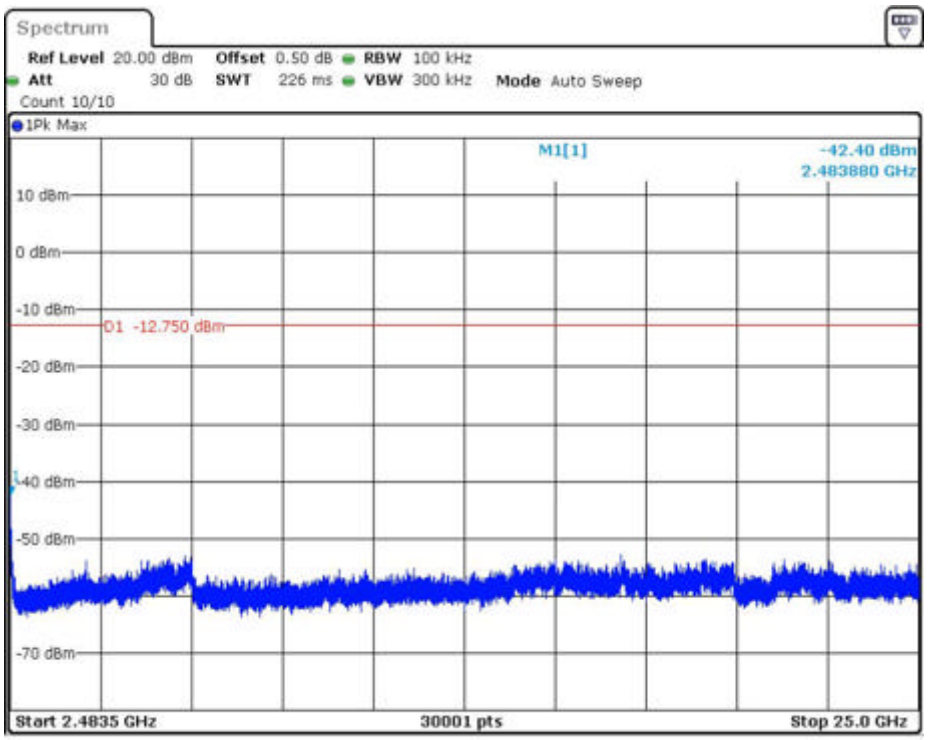



Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -50.21 dBm
2.489880 GHz
10 dBm
0 dBm
-10 dBm
D1 -12.810 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

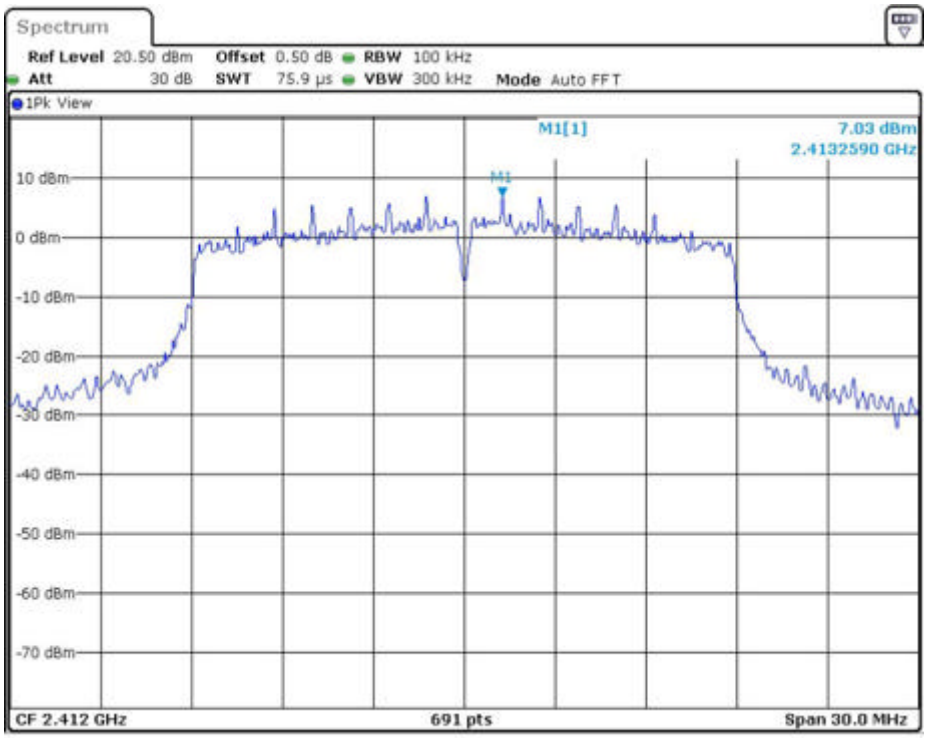
Channel 11 (2462MHz) Reference Level: 7.25dBm

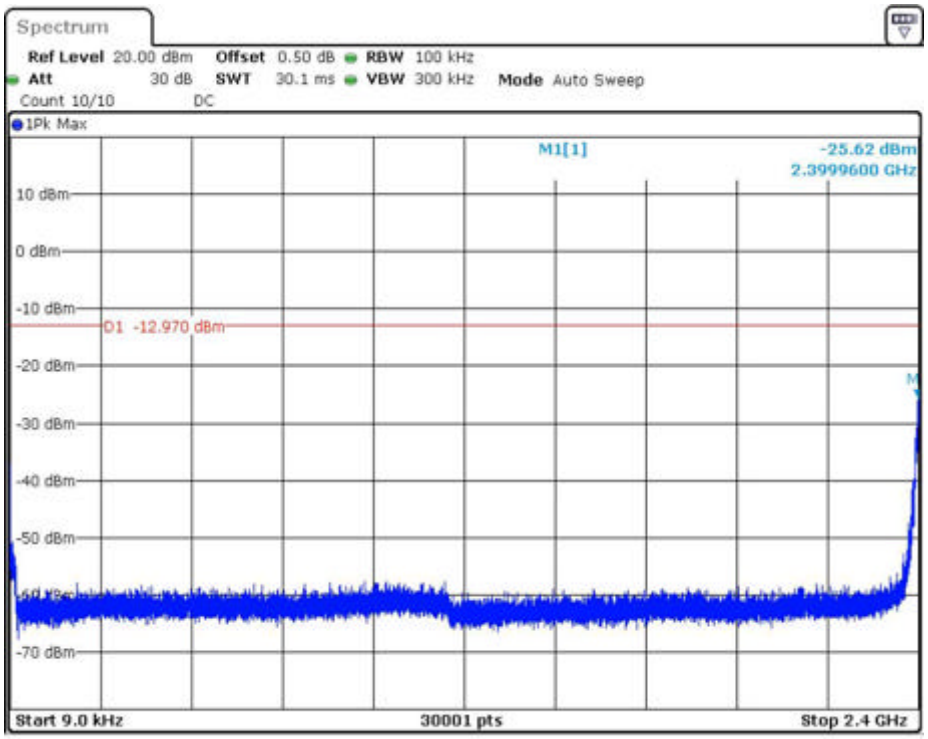


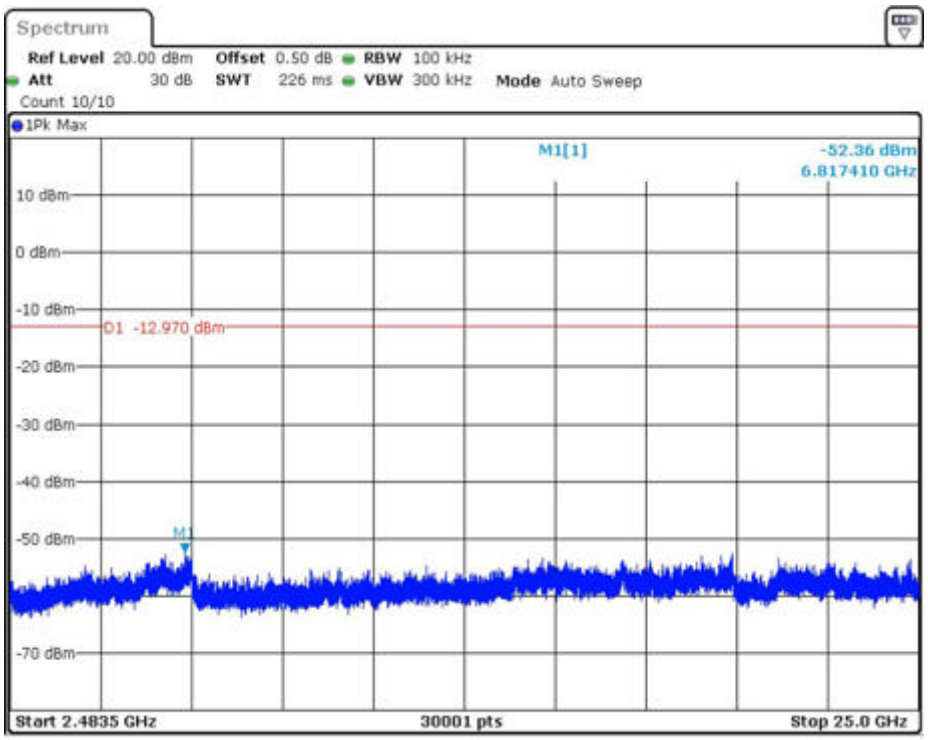



Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -42.40 dBm
2.483880 GHz
10 dBm
0 dBm
-10 dBm
D1 -12.750 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

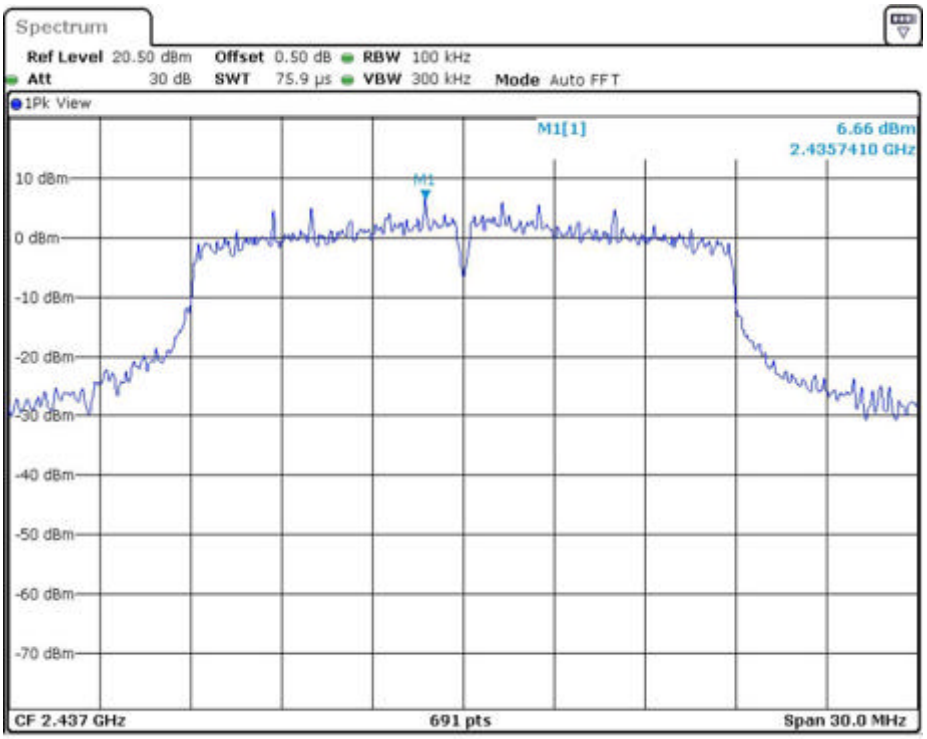
802.11n-HT20
Channel 01 (2412MHz) Reference Level: 7.03dBm

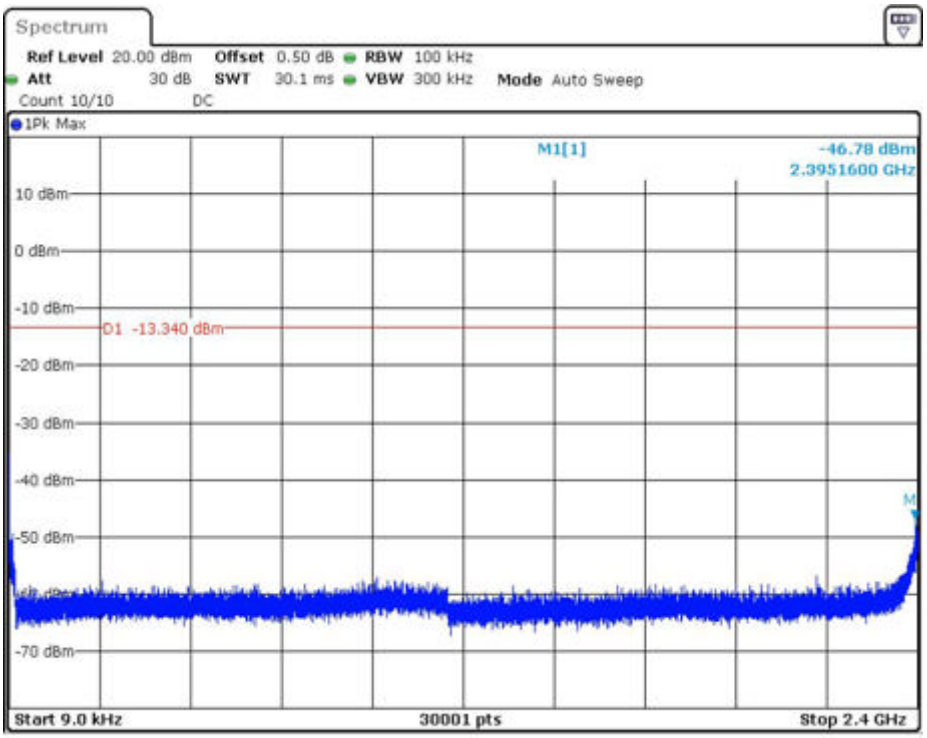


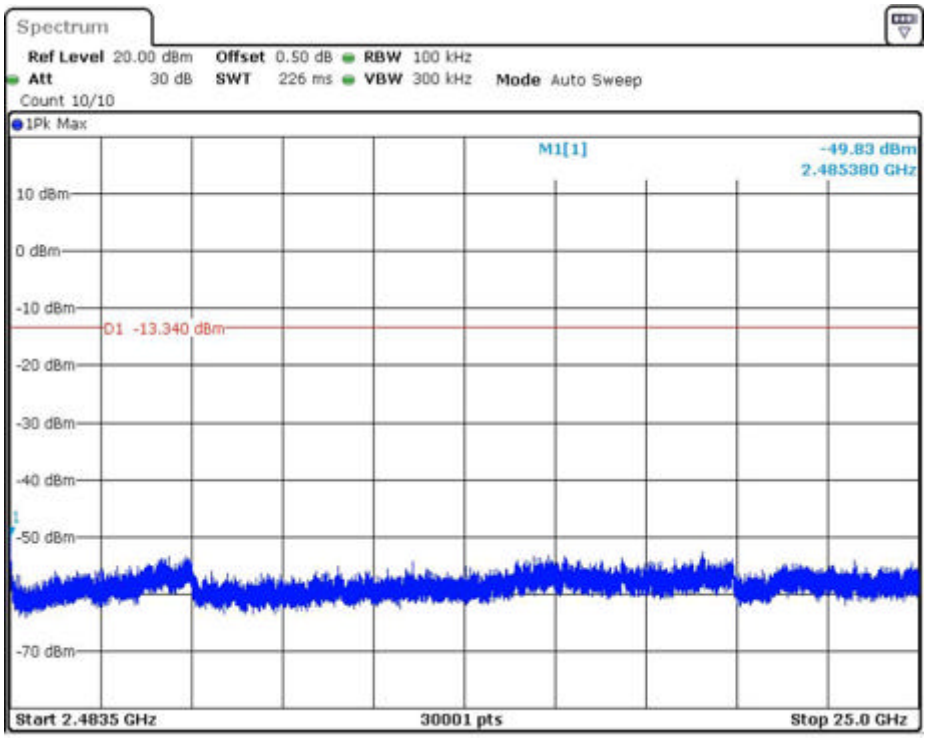



Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -52.36 dBm
6.817410 GHz
10 dBm
0 dBm
-10 dBm
D1 -12.970 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
M1
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

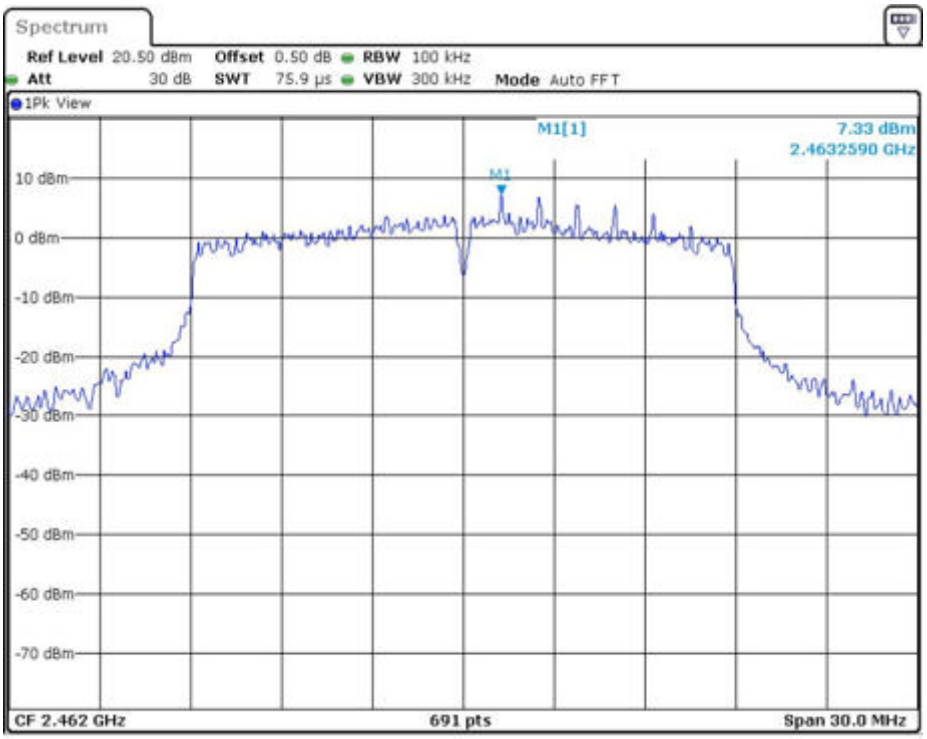
Channel 06 (2437MHz) Reference Level: 6.66dBm

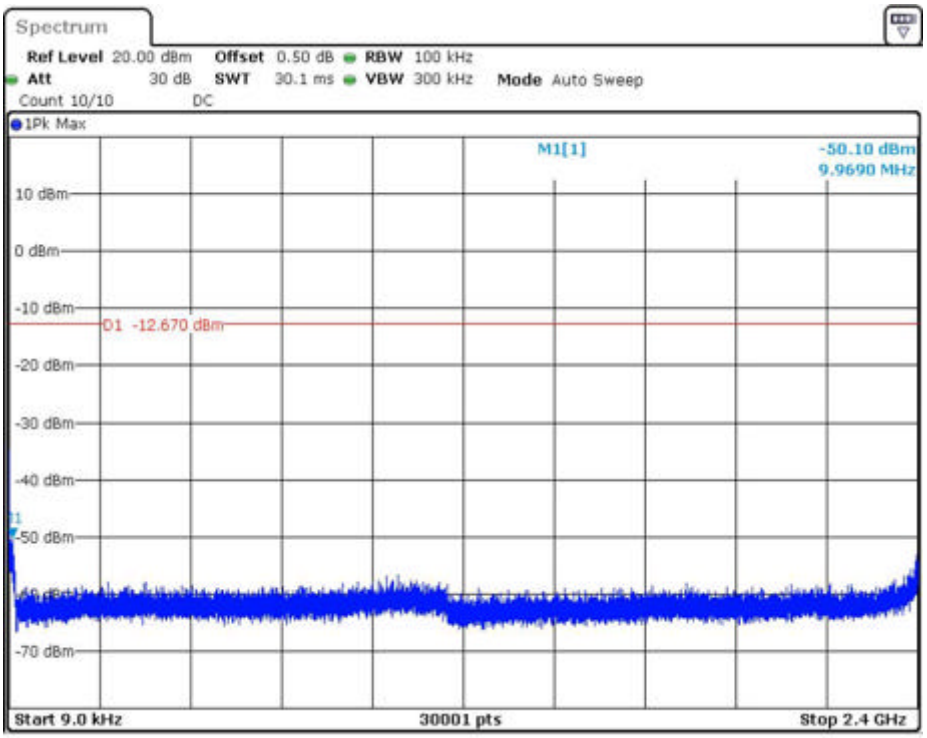


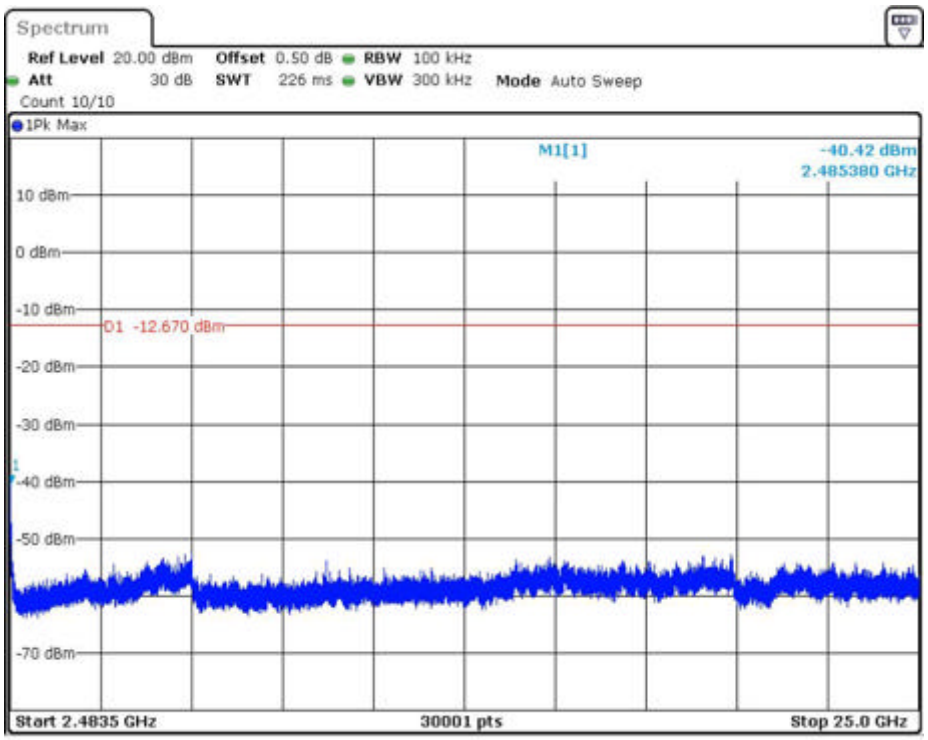



Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -49.83 dBm
2.485380 GHz
10 dBm
0 dBm
-10 dBm
D1 -13.340 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

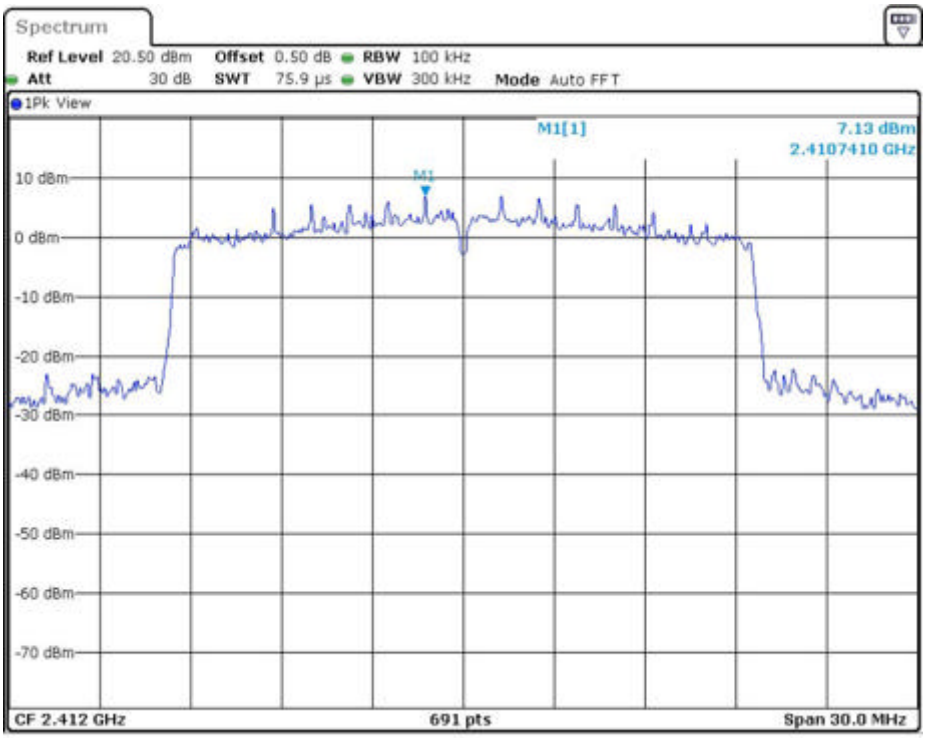
Channel 11 (2462MHz) Reference Level: 7.33dBm

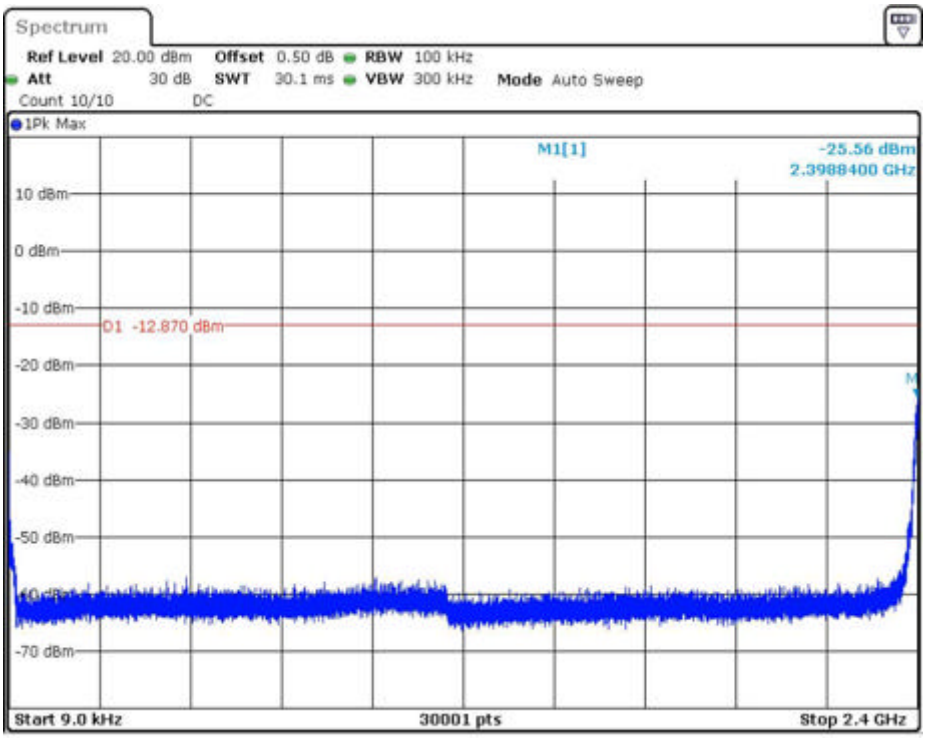


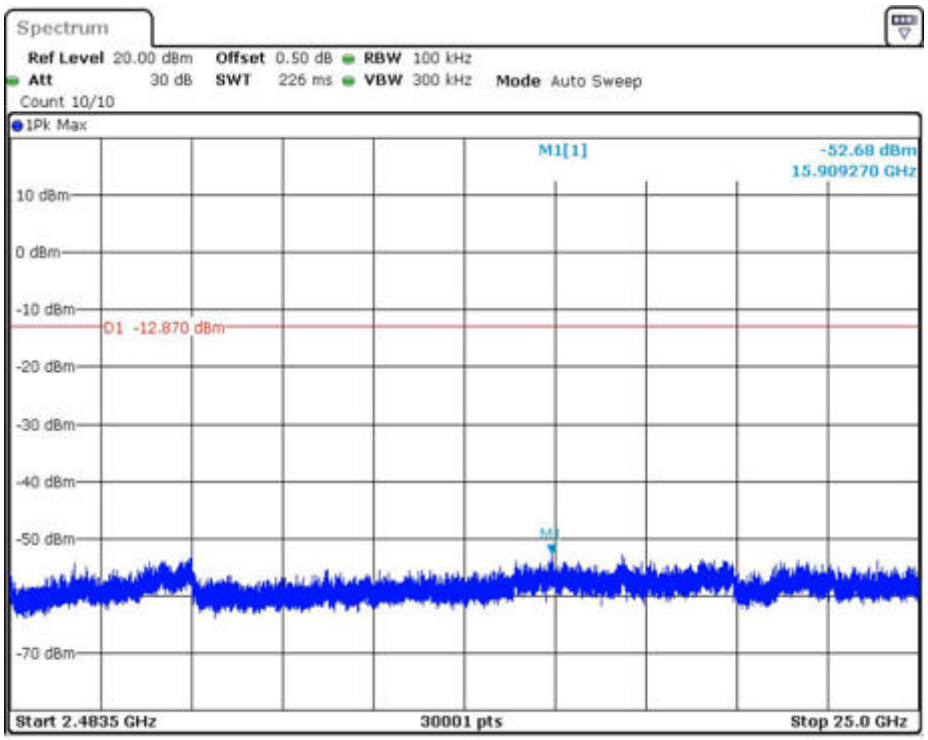



Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -40.42 dBm
2.485380 GHz
10 dBm
0 dBm
-10 dBm
D1 -12.670 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

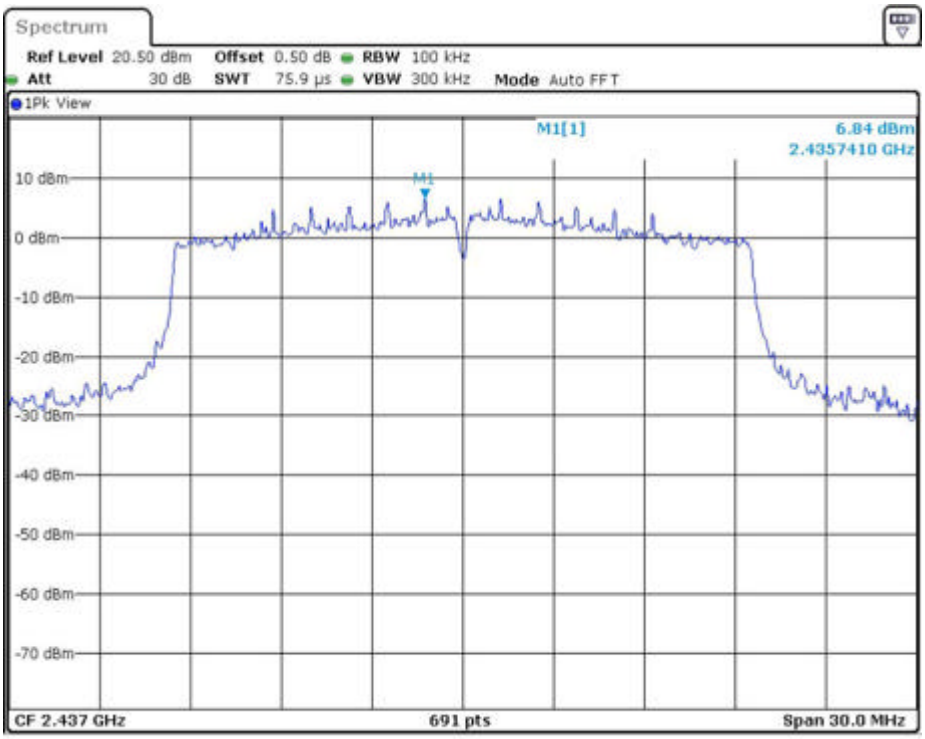
802.11ax-HT20
Channel 01 (2412MHz) Reference Level: 7.13dBm



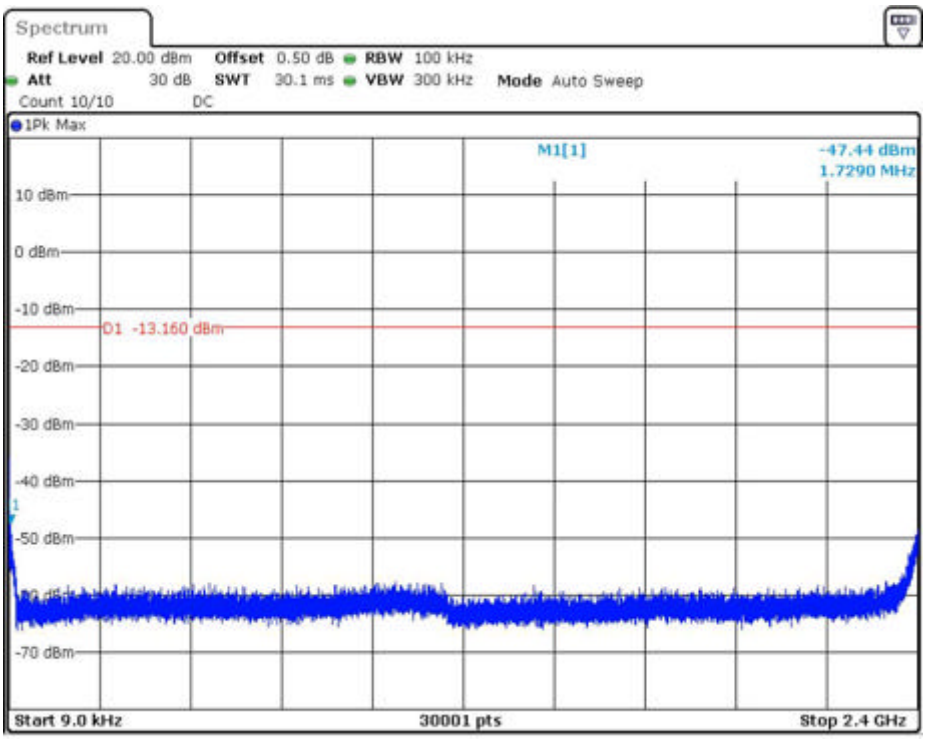


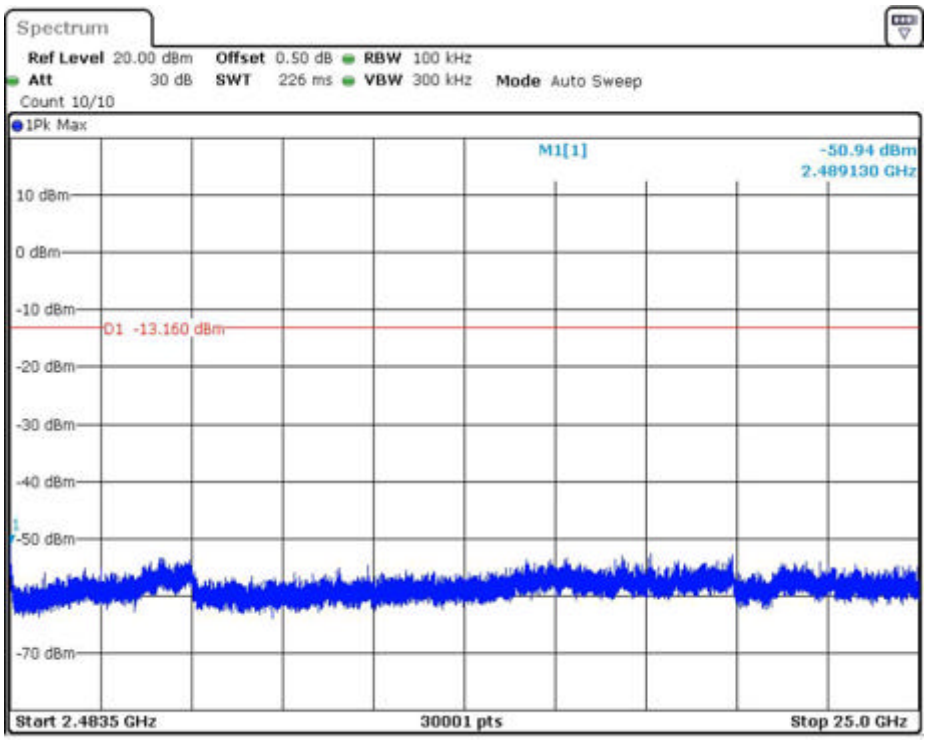

Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -52.68 dBm
15.909270 GHz
10 dBm
0 dBm
-10 dBm
D1 -12.870 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

Channel 06 (2437MHz) Reference Level: 6.84dBm

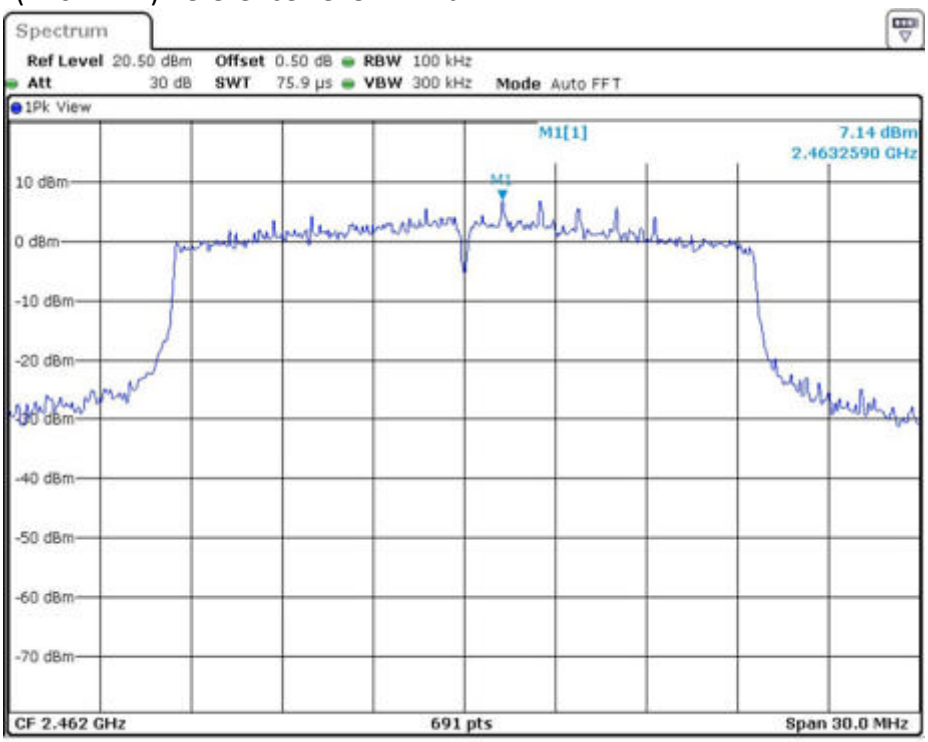


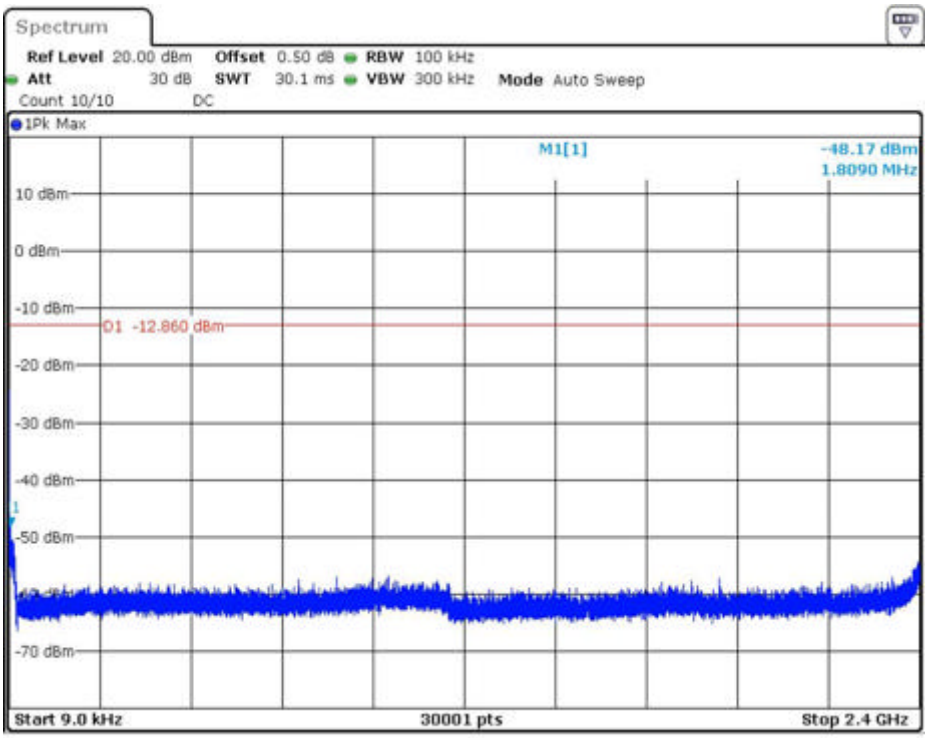
v

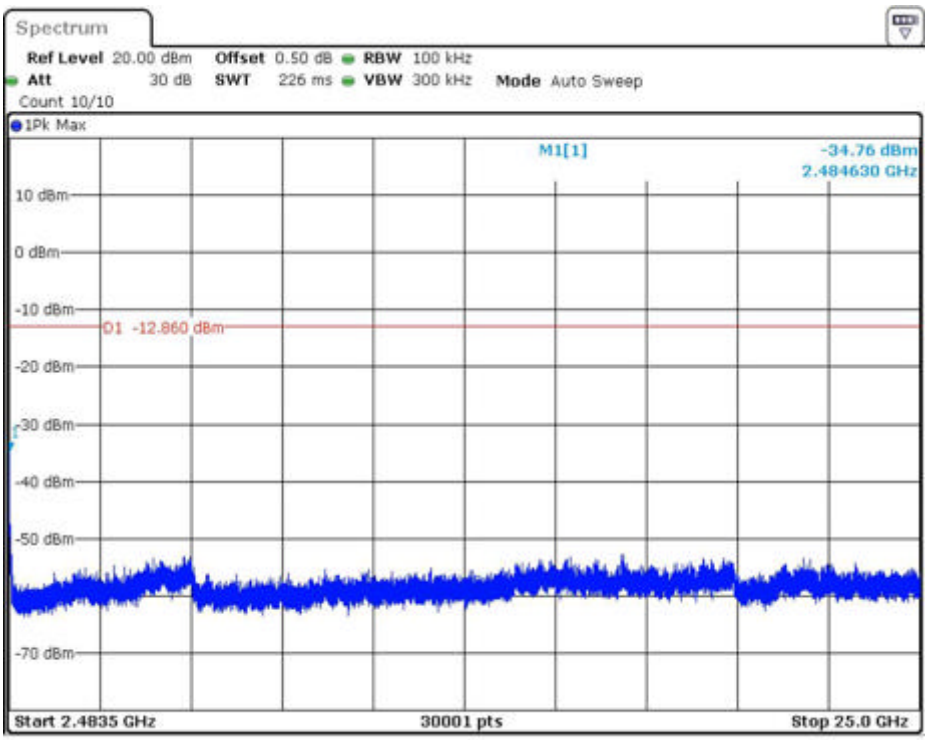



Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -50.94 dBm
2.489130 GHz
10 dBm
0 dBm
-10 dBm
D1 -13.160 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

Channel 11 (2462MHz) Reference Level: 7.14dBm






Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -34.76 dBm
2.484630 GHz
10 dBm
0 dBm
-10 dBm
D1 -12.860 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: N/A Model: 100146663

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.

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

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/m
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

<u>Example</u>
Assume a receiver reading of 62.0 dBμV is obtained. The antenna factor of 7.4 dB/m 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/m
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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663

4.8 Radiated Spurious Emission

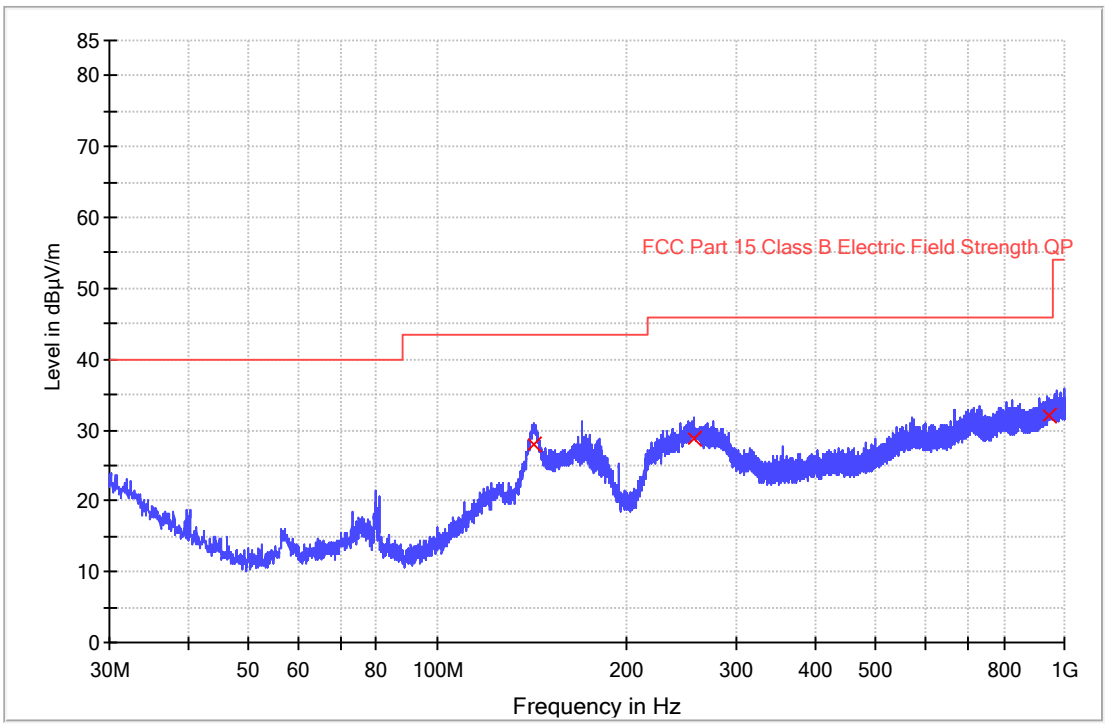
Worst Case Radiated Spurious Emission
at 39.991MHz
is passed by 4.5dB margin.

Synchronous transmission has been considered. Only the worst mode is represented in the report

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

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663
Worst Case Operating Mode: transmission (802.11b-Channel 01)

ANT Polarity: Horizontal

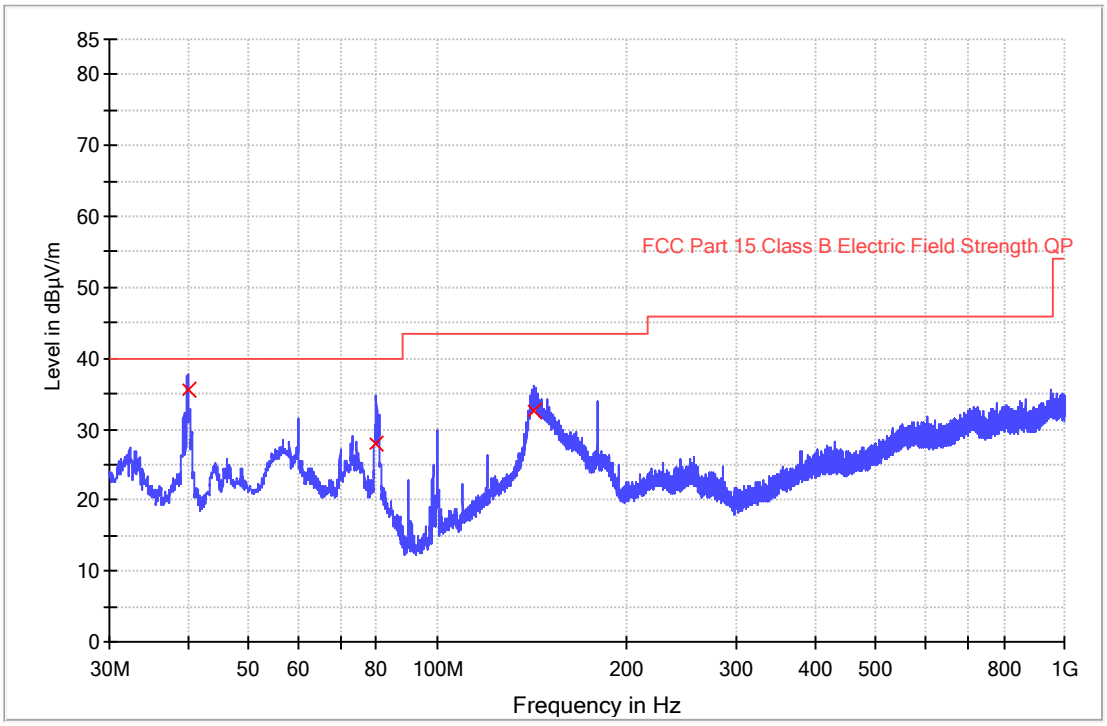


Frequency (MHz)	Quasi Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB/m)	Margin - QPK (dB)	Limit – QPK (dBµV/m)
142.778667	28.1	1000.0	120.000	H	15.6	15.4	43.5
256.236333	28.9	1000.0	120.000	H	19.5	17.1	46.0
943.416667	32.2	1000.0	120.000	H	33.4	13.8	46.0

Remark:
1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Quasi Peak (dBµV/m) = Corr. (dB/m) + Read Level (dBµV)
3. Margin (dB) = Limit Line (dBµV/m) – Level (dBµV/m)

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663
Worst Case Operating Mode: transmission (802.11b-Channel 01)

ANT Polarity: Vertical



Frequency (MHz)	Quasi Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB/m)	Margin - QPK (dB)	Limit – QPK (dBµV/m)
39.991000	35.5	1000.0	120.000	V	16.4	4.5	40.0
79.955000	27.9	1000.0	120.000	V	13.6	12.1	40.0
142.132000	32.7	1000.0	120.000	V	15.6	10.8	43.5

Remark:
1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Quasi Peak (dBµV/m) = Corr. (dB/m) + Read Level (dBµV)
3. Margin (dB) = Limit Line (dBµV/m) – Level (dBµV/m)

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663
Worst Case Operating Mode: transmission (802.11b-Channel 01)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	50.1	36.8	33.5	46.8	74.0	-27.2
Horizontal	*2390.000	66.6	36.4	29.1	59.3	74.0	-14.7

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	42.4	36.8	33.5	39.1	54.0	-14.9
Horizontal	*2390.000	54.9	36.4	29.1	47.6	54.0	-6.4

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663
Worst Case Operating Mode: transmission(802.11b-Channel 06)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	49.8	36.7	33.4	46.5	74.0	-27.5
Horizontal	*7311.000	54.0	36.6	35.8	53.2	74.0	-20.8

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	43.2	36.7	33.4	39.9	54.0	-14.1
Horizontal	*7311.000	48.5	36.6	35.8	47.7	54.0	-6.3

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663
Worst Case Operating Mode: transmission (802.11b-Channel 11)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	51.3	36.8	33.3	47.8	74.0	-26.2
Horizontal	*7386.000	60.8	36.5	29.3	53.6	74.0	-20.4
Horizontal	*2483.500	66.6	36.4	29.5	59.7	74.0	-14.3

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	43.6	36.8	33.3	40.1	54.0	-13.9
Horizontal	*7386.000	53.2	36.5	29.3	46.0	54.0	-8.0
Horizontal	*2483.500	54.1	36.4	29.5	47.2	54.0	-6.8

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663
Worst Case Operating Mode: Transmission (802.11g-Channel 01)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	51.3	36.8	33.5	48.0	74.0	-26.0
Horizontal	*2390.000	66.5	36.4	29.1	59.2	74.0	-14.8

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	42.1	36.8	33.5	38.8	54.0	-15.2
Horizontal	*2390.000	55.3	36.4	29.1	48.0	54.0	-6.0

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663
Worst Case Operating Mode: Transmission (802.11g-Channel 06)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	49.5	36.7	33.4	46.2	74.0	-27.8
Horizontal	*7311.000	53.1	36.6	35.8	52.3	74.0	-21.7

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	43.3	36.7	33.4	40.0	54.0	-14.0
Horizontal	*7311.000	47.3	36.6	35.8	46.5	54.0	-7.5

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663
Worst Case Operating Mode: Transmission (802.11g-Channel 11)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	50.7	36.8	33.3	47.2	74.0	-26.8
Horizontal	*7386.000	62.2	36.5	29.3	55.0	74.0	-19.0
Horizontal	*2483.500	64.8	36.4	29.5	57.9	74.0	-16.1

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	43.8	36.8	33.3	40.3	54.0	-13.7
Horizontal	*7386.000	55.3	36.5	29.3	48.1	54.0	-5.9
Horizontal	*2483.500	54.3	36.4	29.5	47.4	54.0	-6.6

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663
Worst Case Operating Mode: Transmission (802.11n20-Channel 01)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	50.2	36.8	33.5	46.9	74.0	-27.1
Horizontal	*2390.000	64.9	36.4	29.1	57.6	74.0	-16.4

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	43.9	36.8	33.5	40.6	54.0	-13.4
Horizontal	*2390.000	54.8	36.4	29.1	47.5	54.0	-6.5

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663
Worst Case Operating Mode: Transmission (802.11n20-Channel 06)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	50.1	36.7	33.4	46.8	74.0	-27.2
Horizontal	*7311.000	53.1	36.6	35.8	52.3	74.0	-21.7

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	43.1	36.7	33.4	39.8	54.0	-14.2
Horizontal	*7311.000	45.8	36.6	35.8	45.0	54.0	-9.0

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663
Worst Case Operating Mode: Transmission (802.11n20-Channel 11)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	51.1	36.8	33.3	47.6	74.0	-26.4
Horizontal	*7386.000	59.1	36.5	29.3	51.9	74.0	-22.1
Horizontal	*2483.500	66.2	36.4	29.5	59.3	74.0	-14.7

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	43.3	36.8	33.3	39.8	54.0	-14.2
Horizontal	*7386.000	52.1	36.5	29.3	44.9	54.0	-9.1
Horizontal	*2483.500	54.3	36.4	29.5	47.4	54.0	-6.6

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663
Worst Case Operating Mode: Transmission (802.11ax20-Channel 01)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	50.0	36.8	33.5	46.7	74.0	-27.3
Horizontal	*2390.000	66.0	36.4	29.1	58.7	74.0	-15.3

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	43.2	36.8	33.5	39.9	54.0	-14.1
Horizontal	*2390.000	55.2	36.4	29.1	47.9	54.0	-6.1

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663
Worst Case Operating Mode: Transmission (802.11ax20-Channel 06)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	50.6	36.7	33.4	47.3	74.0	-26.7
Horizontal	*7311.000	52.9	36.6	35.8	52.1	74.0	-21.9

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	43.6	36.7	33.4	40.3	54.0	-13.7
Horizontal	*7311.000	47.6	36.6	35.8	46.8	54.0	-7.2

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 01 July 2024 Model: 100146663
Worst Case Operating Mode: Transmission (802.11ax20-Channel 11)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	50.4	36.8	33.3	46.9	74.0	-27.1
Horizontal	*7386.000	61.3	36.5	29.3	54.1	74.0	-19.9
Horizontal	*2483.500	65.4	36.4	29.5	58.5	74.0	-15.5

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	43.3	36.8	33.3	39.8	54.0	-14.2
Horizontal	*7386.000	53.4	36.5	29.3	46.2	54.0	-7.8
Horizontal	*2483.500	54.2	36.4	29.5	47.3	54.0	-6.7

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 05 June 2024
Model: 100146663

4.9 Conducted Emission

Worst Case Conducted Emission
at 0.498MHz
is passed by 10.9dB margin.

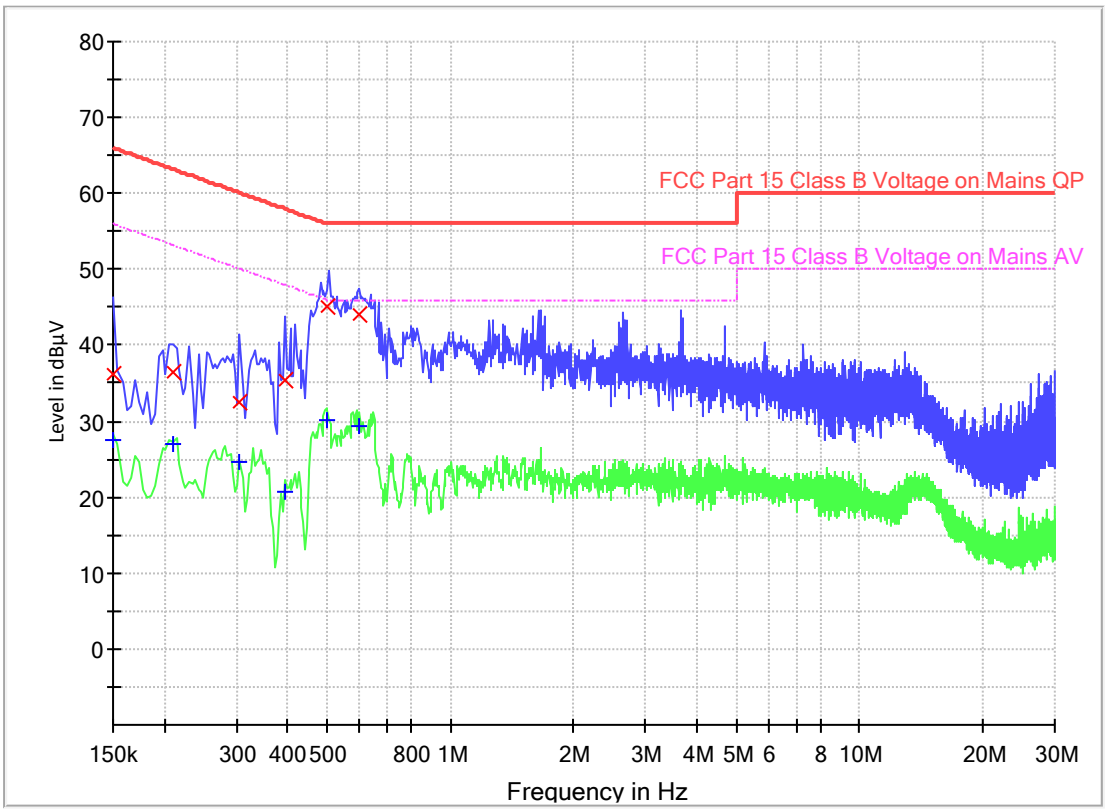
Synchronous transmission has been considered. Only the worst mode is represented in the report.

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

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 05 June 2024
Model: 100146663
Worst Case Operating Mode: transmission (802.11b-Channel 01)
Phase: Live

Graphic / Data Table

Conducted Emissions
Pursuant to FCC 15.207: Emissions Requirement



Limit and Margin QP

Frequency (MHz)	Quasi Peak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	36.3	9.000	L1	9.6	29.7	66.0
0.210000	36.4	9.000	L1	9.6	26.8	63.2
0.306000	32.5	9.000	L1	9.6	27.6	60.1
0.394000	35.5	9.000	L1	9.6	22.5	58.0
0.498000	45.1	9.000	L1	9.6	10.9	56.0
0.598000	43.9	9.000	L1	9.6	12.1	56.0

Limit and Margin AV

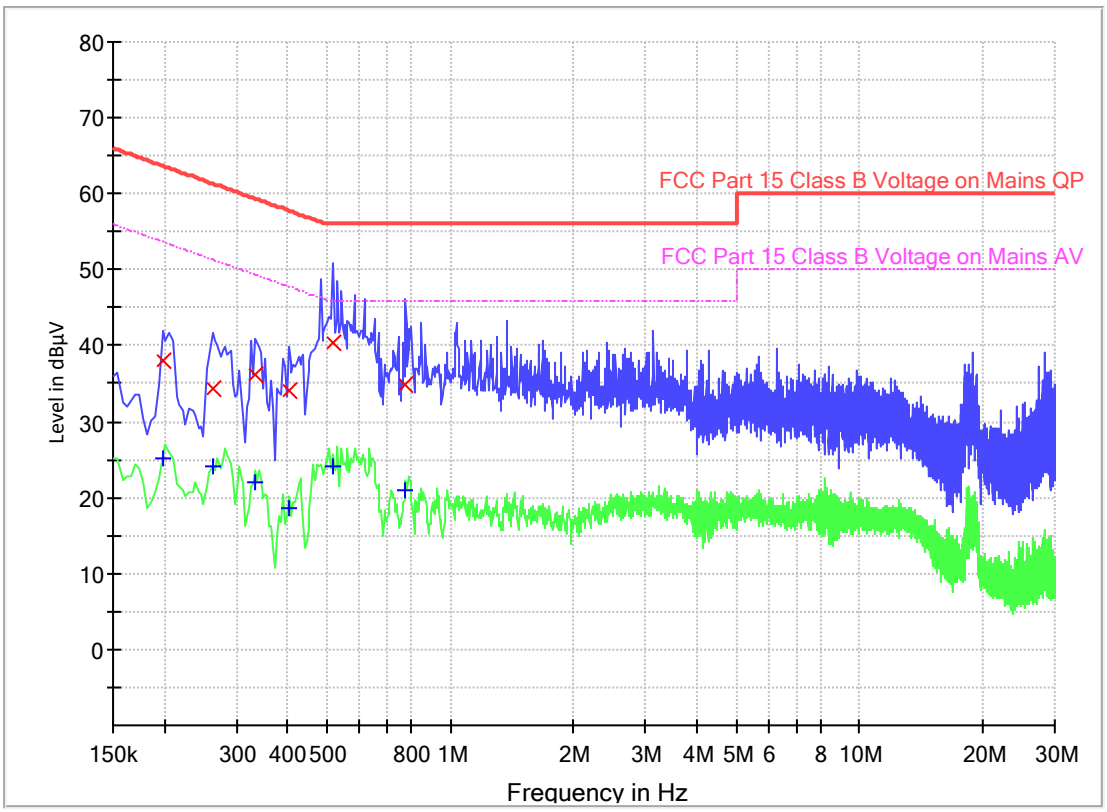
Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	27.6	9.000	L1	9.6	28.4	56.0
0.210000	27.0	9.000	L1	9.6	26.2	53.2
0.306000	24.7	9.000	L1	9.6	25.4	50.1
0.394000	20.8	9.000	L1	9.6	27.2	48.0
0.498000	30.3	9.000	L1	9.6	15.7	46.0
0.598000	29.3	9.000	L1	9.6	16.7	46.0

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 05 June 2024
Model: 100146663
Worst Case Operating Mode: transmission (802.11b-Channel 01)
Phase: Neutral

Graphic / Data Table

Conducted Emissions

Pursuant to FCC 15.207: Emissions Requirement



Limit and Margin QP

Frequency (MHz)	Quasi Peak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.198000	38.0	9.000	N	9.6	25.7	63.7
0.262000	34.5	9.000	N	9.6	26.9	61.4
0.334000	36.1	9.000	N	9.6	23.3	59.4
0.402000	34.1	9.000	N	9.6	23.7	57.8
0.518000	40.3	9.000	N	9.6	15.7	56.0
0.778000	34.8	9.000	N	9.6	21.2	56.0

Limit and Margin AV

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.198000	25.2	9.000	N	9.6	28.5	53.7
0.262000	24.1	9.000	N	9.6	27.3	51.4
0.334000	22.0	9.000	N	9.6	27.4	49.4
0.402000	18.6	9.000	N	9.6	29.2	47.8
0.518000	24.2	9.000	N	9.6	21.8	46.0
0.778000	20.8	9.000	N	9.6	25.2	46.0

Applicant: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: 05 June 2024
Model: 100146663

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: Hefei BOE Vision-electronic Technology Co.,Ltd.
Date of Test: N/A
Model: 100146663

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.

5.0 Equipment Photographs

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

6.0 Product Labeling

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

7.0 Technical Specifications

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

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.

9.0 Confidentiality Request

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

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.

11.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	2021-08-04	2024-08-04
SZ061-09	Double-Ridged Waveguide Horn Antenna	ETS	3115	00092347	22-10-14	2025-10-14
SZ185-02	EMI Receiver	R&S	ESCI	100692	2023-07-11	2024-07-11
SZ061-08	Horn Antenna	ETS	3115	00092346	2021-09-05	2024-09-05
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	2024-05-05	2027-05-05
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	2024-04-22	2025-04-22
SZ056-06	Signal Analyzer	R&S	FSV 40	101101	2023-12-13	2024-12-13
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	2024-04-22	2025-04-22
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	2021-12-12	2024-12-12
SZ062-02	RF Cable	RADIALL	RG 213U	--	2024-05-01	2024-11-01
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	2024-05-01	2024-11-01
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	2024-05-01	2024-11-01
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	--	2024-04-23	2025-04-23
SZ185-03	EMI Test Receiver	R&S	ESR7	101975	2024-04-23	2025-04-23
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	2023-10-18	2024-10-18
SZ188-03	Shielding Room	ETS	RFD-100	4100	2022-12-20	2025-12-20

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