



FCC TEST REPORT

**Test report
On Behalf of
Shenzhen Dazzle Laser Forming Technology Co., Ltd.
For
3D Printer
Model No.: L120 Basic**

FCC ID: 2AUV9-L120B

**Prepared for : Shenzhen Dazzle Laser Forming Technology Co., Ltd.
Rm K-2F, Junxiangda Building A, No.9 Zhongshanyuan Rd.,
Nanshan District, Shenzhen, China**

**Prepared By : Shenzhen HUAKE Testing Technology Co., Ltd.
1F, B2 Building, JunfengZhongchengZhizao Innovation Park,
Fuhai Street, Bao'an District, Shenzhen City, China**

Date of Test: Nov. 06, 2019 ~ Jun. 04, 2020

Date of Report: Jun. 04, 2020

Report Number: HK1911102832-1E



TEST RESULT CERTIFICATION

Applicant's name..... : Shenzhen Dazzle Laser Forming Technology Co., Ltd.

Address..... : Rm K-2F, Junxiangda Building A, No.9 Zhongshanyuan Rd.,
Nanshan District, Shenzhen, China

Manufacture's Name..... : Suzhou Dazzle 3D Printing Technology Co.,Ltd.

Address..... : Rm 311, Building B2, No.218 Xinghu Street, Suzhou, China

Product description

Trade Mark..... : fastprint.io

Product name..... : 3D Printer

Model and/or type reference : L120 Basic

Standards..... : FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.10: 2013

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Date of Test..... :

Date (s) of performance of tests..... : Nov. 06, 2019 ~ Jun. 04, 2020

Date of Issue..... : Jun. 04, 2020

Test Result..... : **Pass**

Testing Engineer :

(Gary Qian)

Technical Manager :

(Eden Hu)

Authorized Signatory :

(Jason Zhou)



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1. Test Result Summary

1.1. Test Procedures and Results

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203/§15.247 (c)	PASS
AC Power Line Conducted Emission	§15.207	PASS
Conducted Peak Output Power	§15.247 (b)(3)	PASS
6dB Emission Bandwidth	§15.247 (a)(2)	PASS
Power Spectral Density	§15.247 (e)	PASS
Band Edge	§15.247(d)	PASS
Spurious Emission	§15.205/§15.209	PASS

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

1.2. Test Facility

Test Firm : Shenzhen HUAK Testing Technology Co., Ltd.

Address 1F, B2 Building, JunfengZhongchengZhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China



1.3. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	$\pm 2.56\text{dB}$
2	RF power, conducted	$\pm 0.12\text{dB}$
3	Spurious emissions, conducted	$\pm 0.11\text{dB}$
4	All emissions, radiated(<1G)	$\pm 3.92\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.28\text{dB}$
6	Temperature	$\pm 0.1^{\circ}\text{C}$
7	Humidity	$\pm 1.0\%$



2. EUT Description

2.1. General Description OF EUT

Equipment	3D Printer
Model Name	L120 Basic
Serial No.	N/A
Trade Mark	fastprint.io
FCC ID	2AUV9-L120B
Hardware Version:	V1.2
Software Version:	V1.1_12.1
Test sample ID:	HK1911102832-S
Operation frequency	802.11b/g/n 20: 2412~2462 MHz 802.11n 40: 2422~2452MHz
Number of Channels	802.11b/g/n20: 11CH 802.11n 40: 7CH
Antenna Type	ChipAntenna
Antenna Gain	1.5dBi
Modulation Type	CCK/DSSS/OFDM
PowerSource	DC 24V from adapter

2.2. Carrier Frequency of Channels

Channel List for 802.11b/802.11g/802.11n (HT20)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

Channel List For 802.11n (HT40)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
--	--	04	2427	07	2442	--	--
--	--	05	2432	08	2447	--	--
03	2422	06	2437	09	2452		

Note: In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below.



2.3. Operation of EUT during testing

Test software: MP tool

Operating Mode

The mode is used: **Transmitting mode for 802.11b/802.11g/802.11n (HT20)**

Low Channel: 2412MHz

Middle Channel: 2437MHz

High Channel: 2462MHz

The mode is used: Transmitting mode for 802.11n (HT40)

Low Channel: 2422MHz

Middle Channel: 2437MHz

High Channel: 2452MHz

2.4. Description OF Test Setup

Operation of EUT during conducted testing:



Operation of EUT during Radiation and above 1GHz Radiation testing:





3. General Information

3.1. Test environment and mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting by select channel and modulations(The value of duty cycle is 96.47%)
The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.For the full battery state and The output power to the maximum state.	

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	Data rate
802.11b	1Mbps
802.11g	6Mbps
802.11n(H20)	MCS0
802.11n(H40)	MCS7

Final Test Mode:

Operation mode:	Keep the EUT in continuous transmitting with modulation
1. For WIFI function, the engineering test program was provided and enabled to make EUT continuous transmit/receive. 2.According to ANSI C63.10 standards, the test results are both the “worst case” and “worst setup” 1Mbps for 802.11b, 6Mbps for 802.11g, MCS0 for 802.11n(H20), MCS7 for 802.11(H40). Duty cycle setting during the transmission is 98.5% with maximum power setting for all modulations.	



3.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Description	Model No.	Manufacturer	Remark	Certificate
AC/DC Adapter	MODEL:GM95-240400-F INPUT:100-240~50/60Hz 2.5A OUTPUT:24V 4A	FOSHAN SHUNDE GUANYUDAPOWER SUPPLY CO.,LTD	/	SDOC
network cable	/	Suzhou Dazzle 3D Printing Technology Co.,Ltd.	/	SDOC
--	--	--	--	--

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.



4. Test Results and Measurement Data

4.1. Conducted Emission

Test Specification

Test Requirement:	FCC Part15 C Section 15.207														
Test Method:	ANSI C63.10:2013														
Frequency Range:	150 kHz to 30 MHz														
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto														
Limits:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table>	Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													
Test Setup:	Reference Plane 40cm 80cm E.U.T AC power LISN Filter AC power EMI Receiver Test table/Insulation plane Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m														
Test Mode:	Charging + transmitting with modulation														
Test Procedure:	1. The E.U.T is connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.														
Test Result:	PASS														

**Test Instruments**

Conducted Emission Shielding Room Test Site (843)				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Receiver	R&S	ESCI 7	HKE-010	Dec. 27, 2019
LISN	R&S	ENV216	HKE-002	Dec. 27, 2019
Conducted test software	Tonscend	TS+ Rev 2.5.0.0	HKE-081	N/A

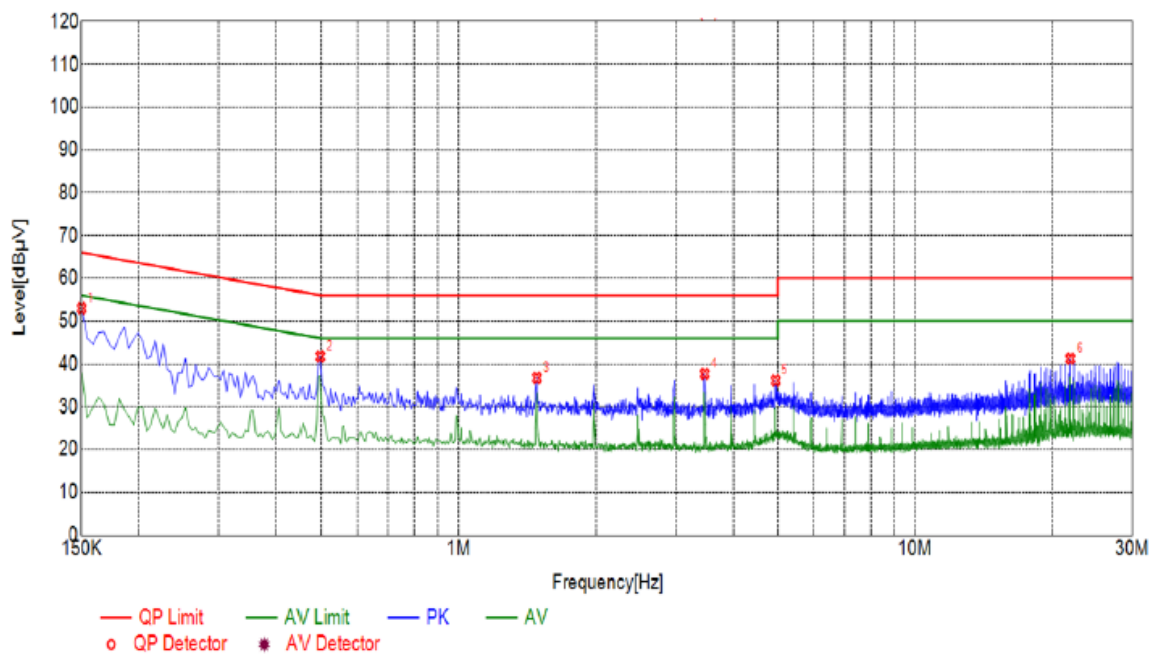
Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

**Test data**

Temperature	22.8°C	Humidity	56%
Test Engineer	Eden Hu	Configurations	WIFI

Note :

All the test modes completed for test. only the worst result of AC 120V/60Hz(802.11b at 2412MHz) was reported as below:

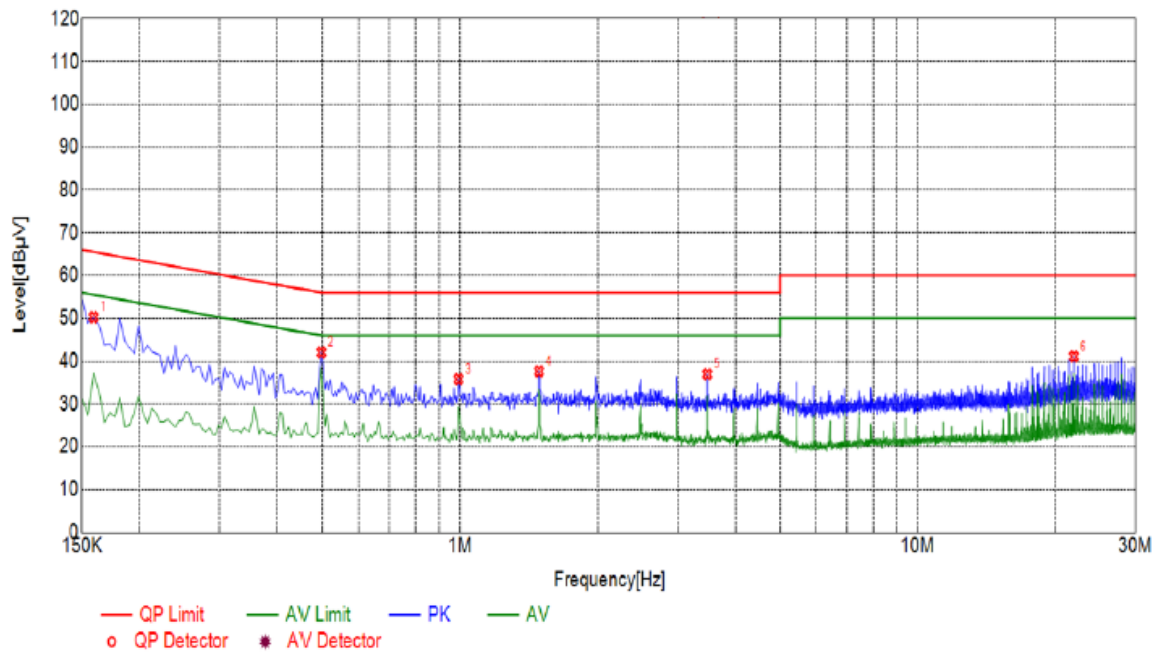
Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)

Suspected List						
NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Detector
1	0.1500	53.00	10.03	66.00	13.00	PK
2	0.4965	41.76	10.04	56.06	14.30	PK
3	1.4820	36.78	10.10	56.00	19.22	PK
4	3.4620	37.72	10.25	56.00	18.28	PK
5	4.9470	36.13	10.26	56.00	19.87	PK
6	21.9390	41.24	10.15	60.00	18.76	PK

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

**Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)**

Suspected List						
NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Detector
1	0.1590	50.26	10.01	65.52	15.26	PK
2	0.4965	42.08	10.04	56.06	13.98	PK
3	0.9915	35.80	10.06	56.00	20.20	PK
4	1.4865	37.66	10.10	56.00	18.34	PK
5	3.4710	36.97	10.25	56.00	19.03	PK
6	21.9930	41.13	10.16	60.00	18.87	PK

Remark: Margin = Limit – Level

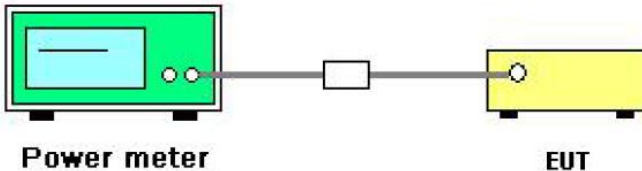
Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor



4.2. Maximum Conducted Output Power

Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	KDB 558074
Limit:	30dBm
Test Setup:	 The diagram illustrates the test setup. On the left is a green box labeled 'Power meter'. A cable connects it to a small white box labeled 'Attenuator'. Another cable connects the attenuator to a yellow box labeled 'EUT' (Equipment Under Test).
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v05. 2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Measure the Peak output power and record the results in the test report.
Test Result:	PASS

Test Instruments

RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power meter	Agilent	E4417B	HKE-107	Dec. 27, 2019
Power Sensor	Agilent	E9327A	HKE-113	Dec. 27, 2019
RF cable	Times	1-40G	HKE-034	Dec. 27, 2019
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 27, 2019

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

**Test Data**

Temperature	22.8°C	Humidity	56%
Test Engineer	Eden Hu	Configurations	WIFI

TX 802.11b Mode			
Test Channel	Frequency	MaximumPeak Conducted Output Power	LIMIT
	(MHz)	(dBm)	dBm
CH01	2412	18.56	30
CH06	2437	18.41	30
CH11	2462	18.81	30
TX 802.11g Mode			
CH01	2412	17.60	30
CH06	2437	17.10	30
CH11	2462	17.66	30
TX 802.11n20 Mode			
CH01	2412	16.48	30
CH06	2437	16.63	30
CH11	2462	16.51	30
TX 802.11n40 Mode			
CH03	2422	15.53	30
CH06	2437	15.78	30
CH09	2452	15.70	30



4.3. Emission Bandwidth

Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	KDB 558074
Limit:	>500kHz
Test Setup:	 Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v05. 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz. 4. Measure and record the results in the test report.
Test Result:	PASS

Test Instruments

RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2019
RF Cable (9KHz-26.5GHz)	Tonscend	170660	N/A	Dec. 27, 2019
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 27, 2019

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

**Test data**

Temperature	22.8°C	Humidity	56%
Test Engineer	Eden Hu	Configurations	WIFI

Test channel	6dB Emission Bandwidth (MHz)			
	802.11b	802.11g	802.11n(H20)	802.11n(H40)
Lowest	9.794	16.38	17.82	36.50
Middle	9.132	16.39	17.85	36.48
Highest	10.05	16.38	17.84	36.51
Limit:	>500kHz			
Test Result:	PASS			

Test plots as follows:**802.11b Modulation****Lowest channel**



Middle channel



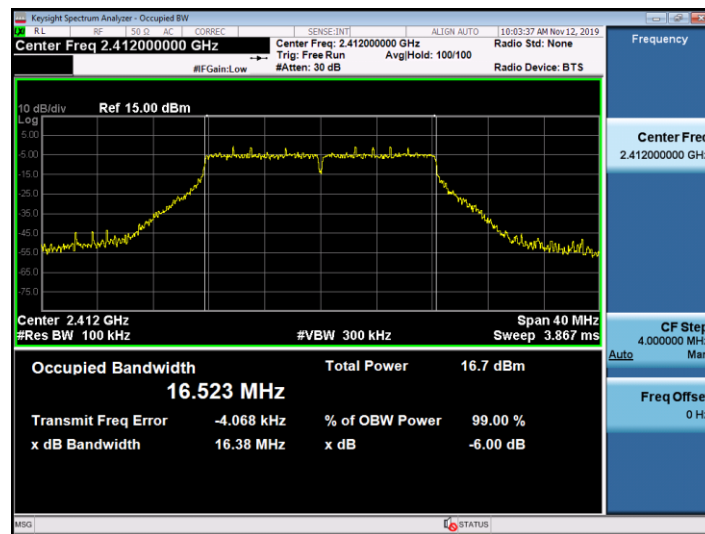
Highest channel





802.11g Modulation

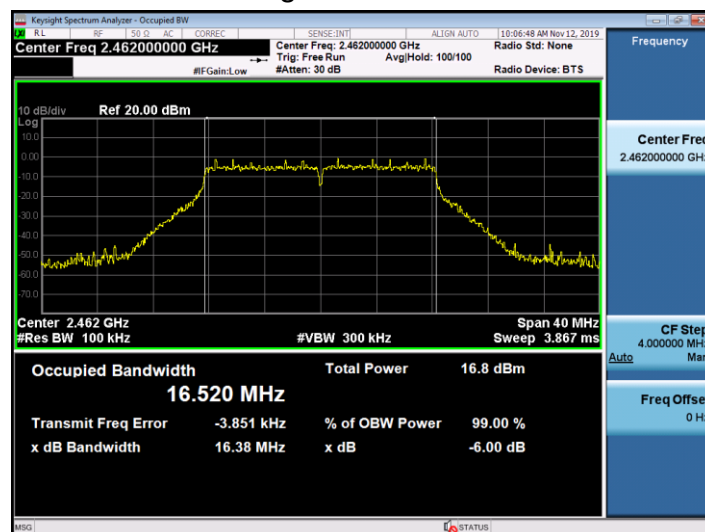
Lowest channel

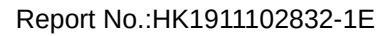


Middle channel

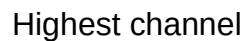
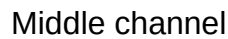


Highest channel





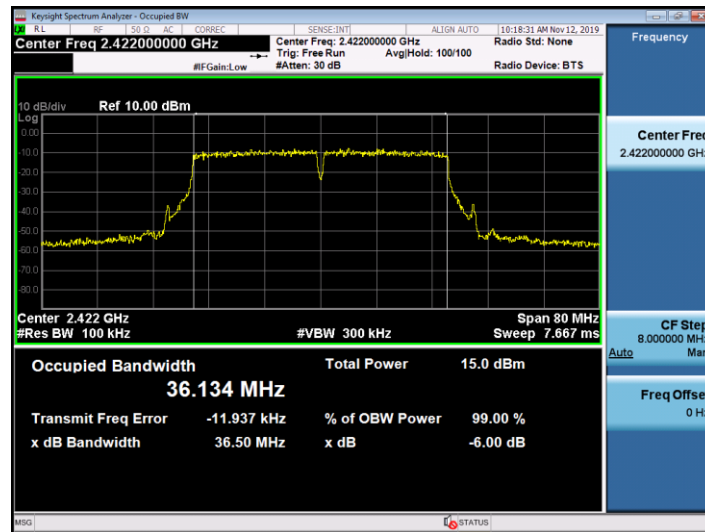
Lowest channel



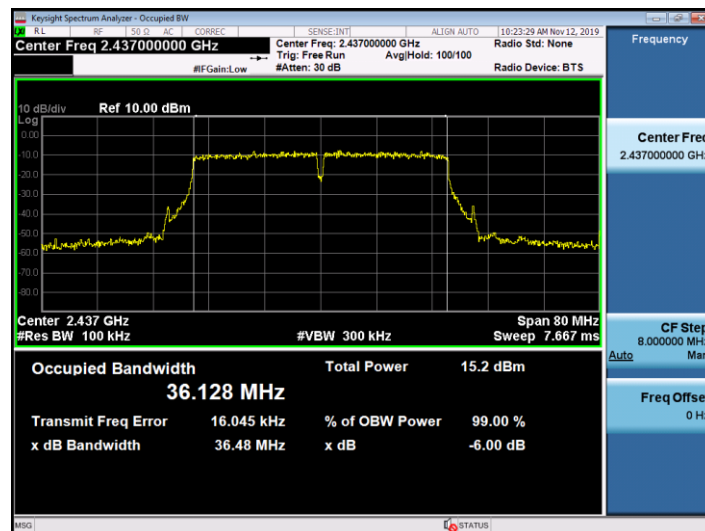


802.11n (HT40) Modulation

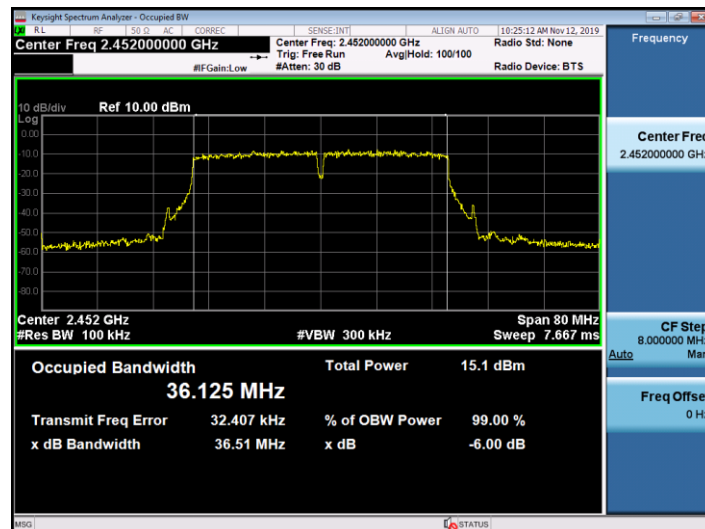
Lowest channel



Middle channel



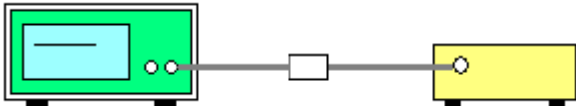
Highest channel





4.4. Power Spectral Density

Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB 558074
Limit:	The average power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.
Test Setup:	 Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows Measurement procedure 10.2 method PKPSD of FCC KDB Publication No.558074 D01 DTS Meas. Guidance v05 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW): $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$. Video bandwidth VBW $\geq 3 \times \text{RBW}$. Set the span to at least 1.5 times the OBW. 5. Detector = Peak, Sweep time = auto couple. 6. Employ trace averaging (Peak) mode over a minimum of 100 traces. Use the peak marker function to determine the maximum power level. 6. Measure and record the results in the test report.
Test Result:	PASS

Test Instruments

RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2019
RF Cable (9KHz-26.5GHz)	Tonscend	170660	N/A	Dec. 27, 2019
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 27, 2019

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

**Test data**

Temperature	22.8℃	Humidity	56%
Test Engineer	Eden Hu	Configurations	WIFI

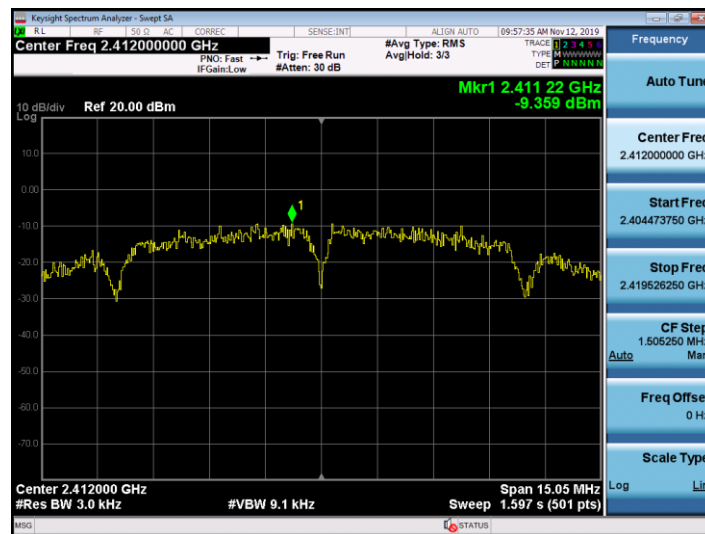
EUT Set Mode	Channel	Result (dBm/3kHz)
802.11b	Lowest	-9.359
	Middle	-8.335
	Highest	-8.590
802.11g	Lowest	-15.904
	Middle	-15.999
	Highest	-15.097
802.11n(H20)	Lowest	-18.586
	Middle	-19.024
	Highest	-18.442
802.11n(H40)	Lowest	-20.553
	Middle	-20.828
	Highest	-20.682
Limit	8dBm/3kHz	
Test Result:	PASS	

Test plots as follows:

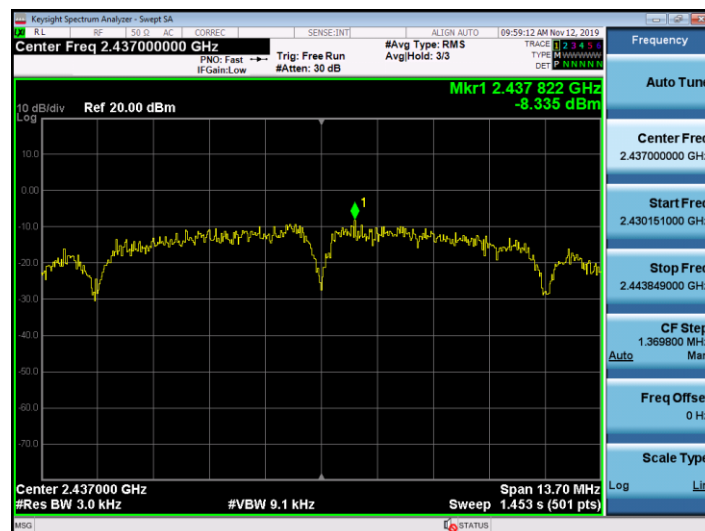


802.11b Modulation

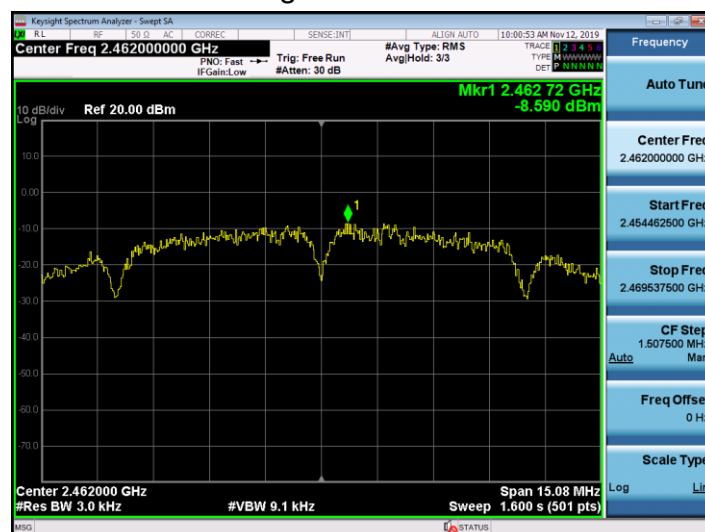
Lowest channel



Middle channel



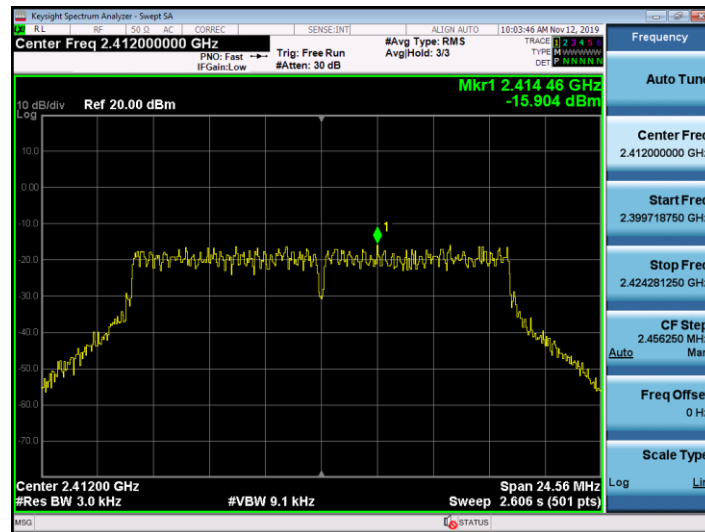
Highest channel



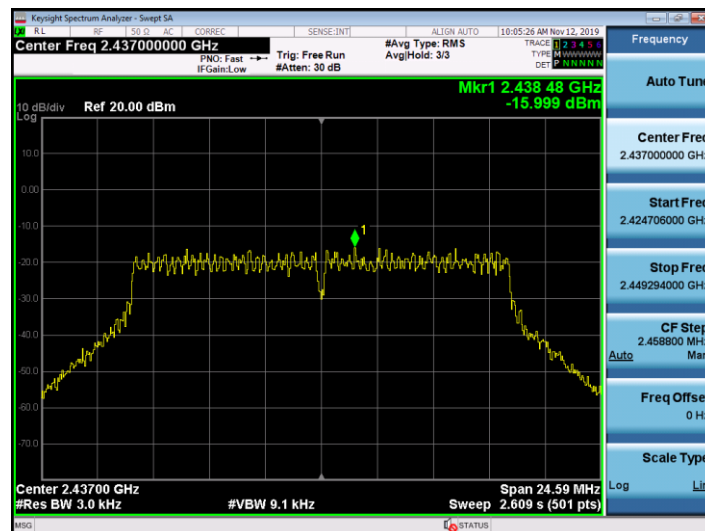


802.11g Modulation

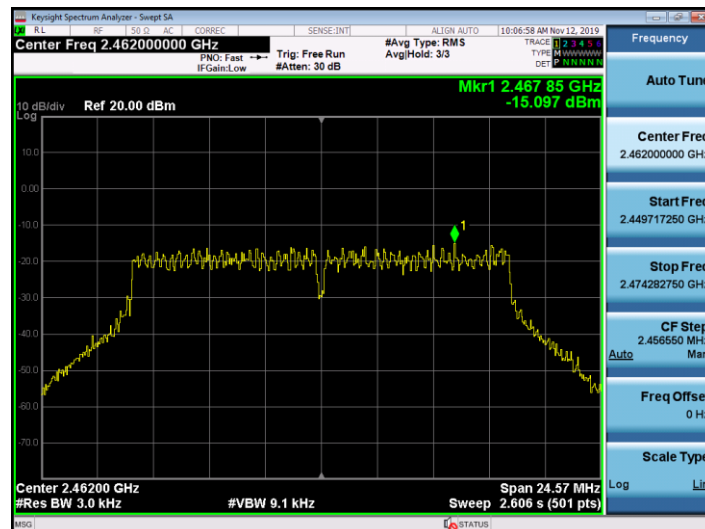
Lowest channel



Middle channel



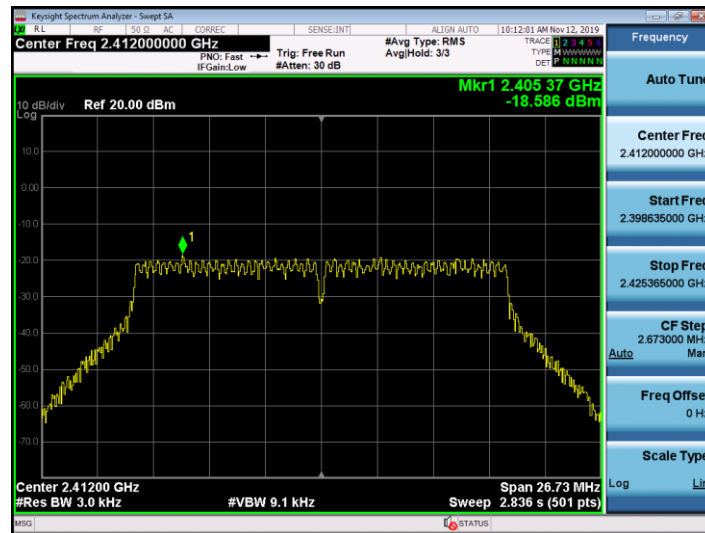
Highest channel



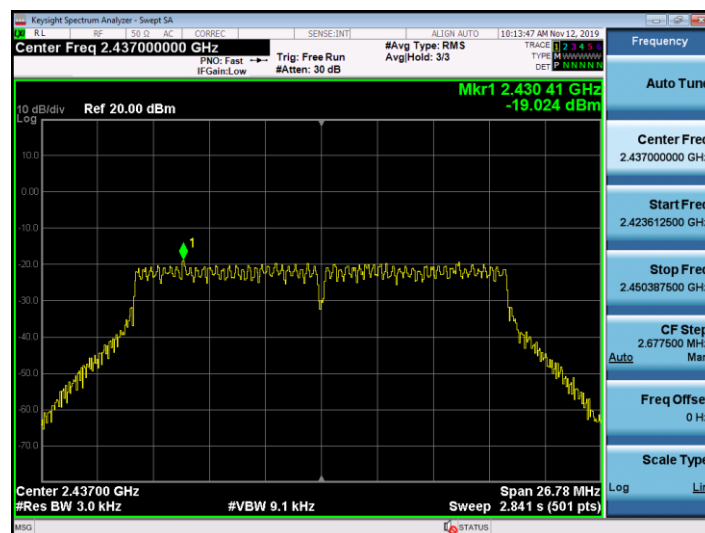


802.11n (HT20) Modulation

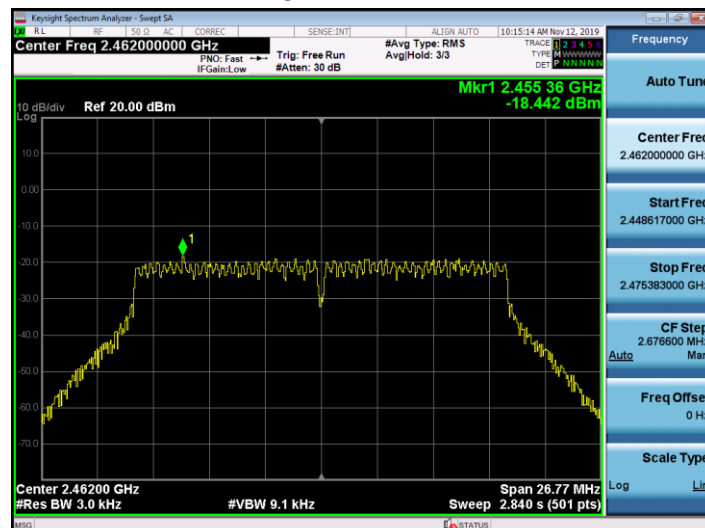
Lowest channel



Middle channel



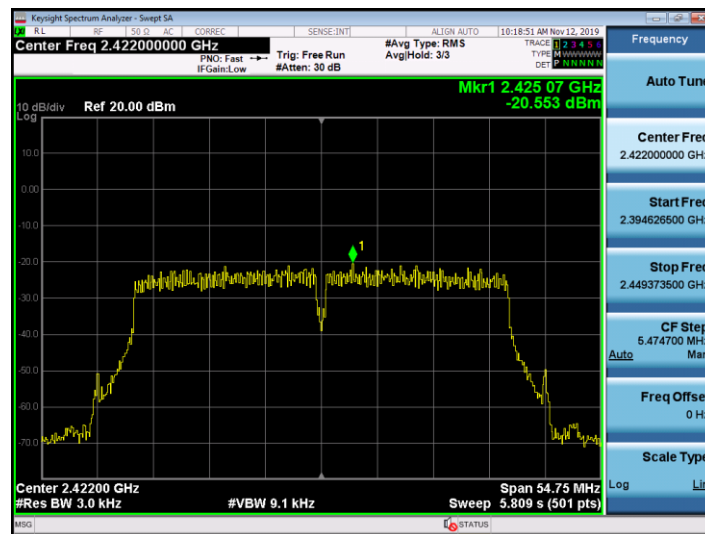
Highest channel



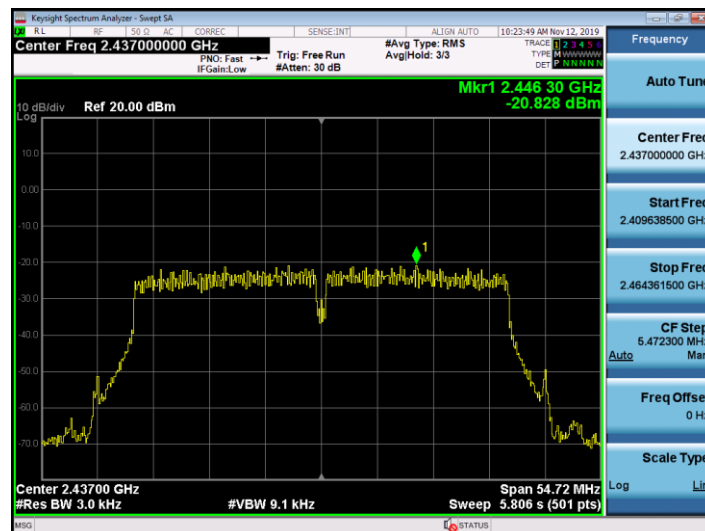


802.11n (HT40) Modulation

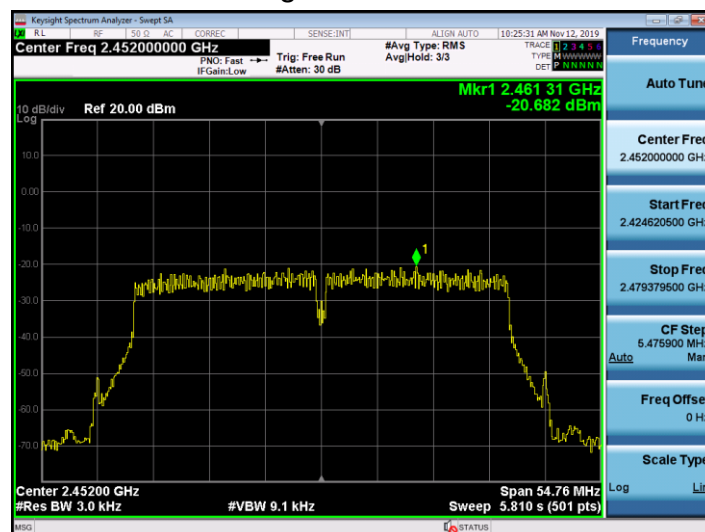
Lowest channel



Middle channel



Highest channel





4.5. Conducted Band Edge and Spurious Emission Measurement

Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074
Limit:	In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).
Test Setup:	 Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05. 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d). 5. Measure and record the results in the test report. 6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
Test Result:	PASS



Test Instruments

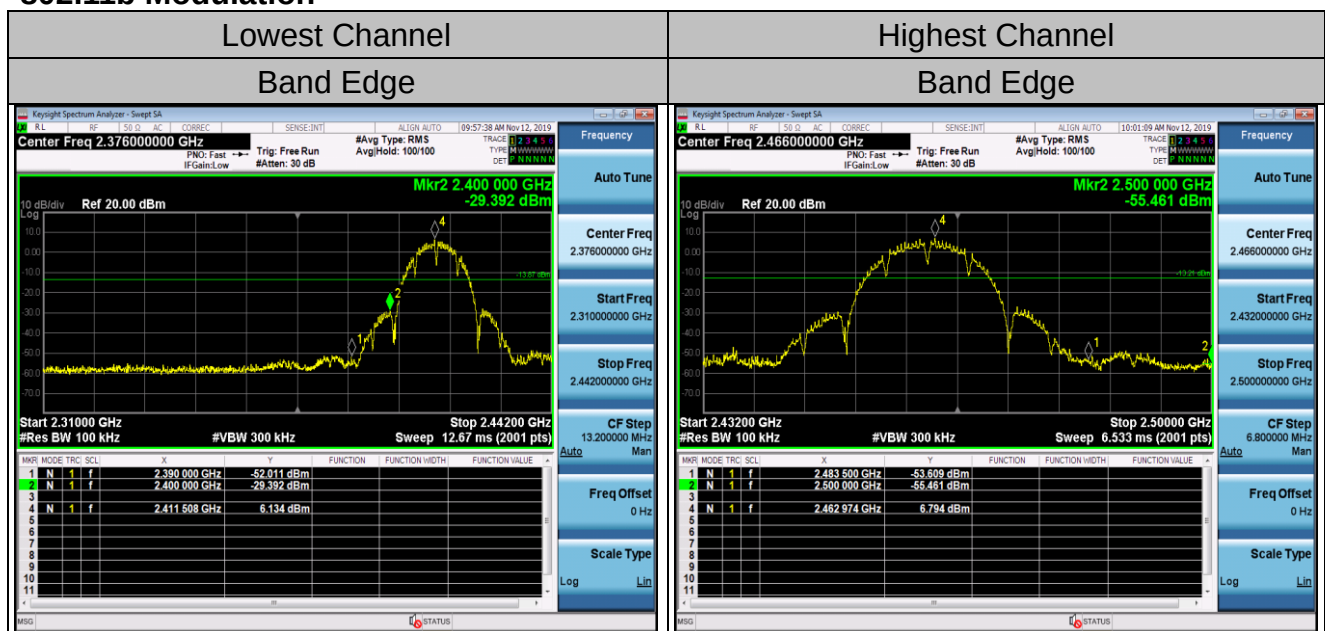
RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2019
Signal generator	Agilent	N5183A	HKE-071	Dec. 27, 2019
RF Cable (9KHz-26.5GHz)	Tonscend	170660	N/A	Dec. 27, 2019
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 27, 2019

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

Test Data

Temperature	22.8°C	Humidity	56%
Test Engineer	Eden Hu	Configurations	WIFI

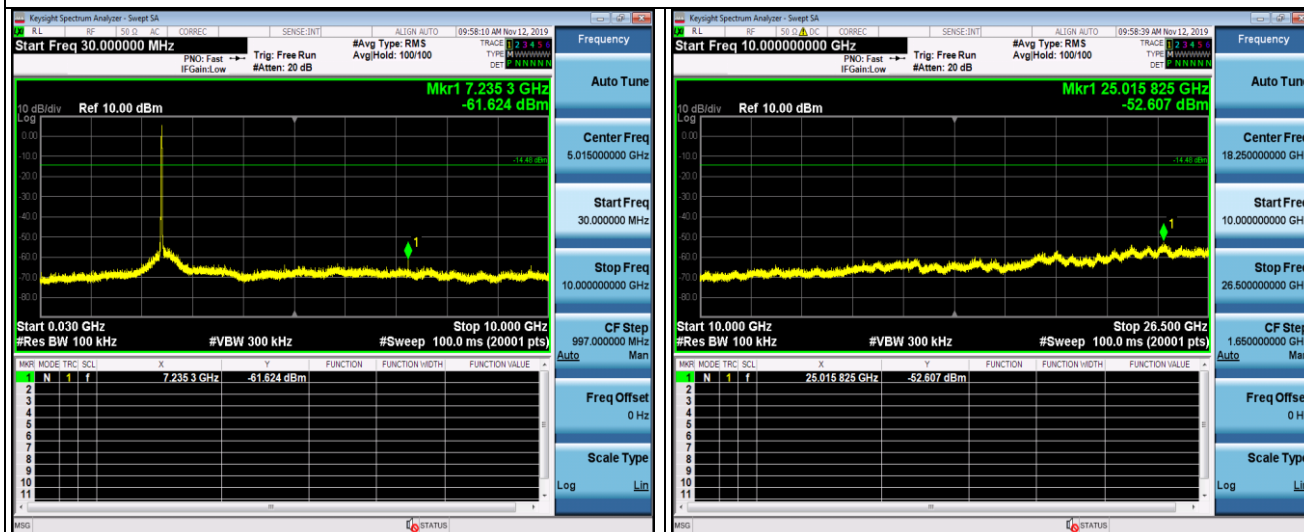
802.11b Modulation



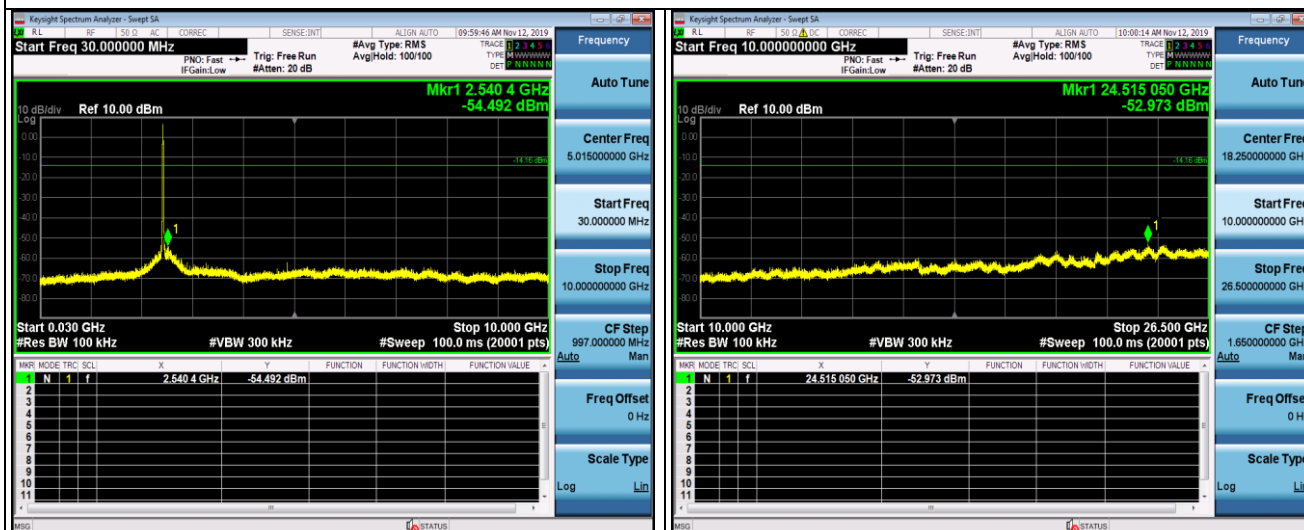


Spurious emission

Low Channel



Middle Channel



High Channel

