FCC TEST REPORT

Test report
On Behalf of
Aoife Solutions S.L. (Galgus)
For
Access Point
Model No.: IX450, OX450, IX850, OX850, IC600

FCC ID: 2AYVA-IX450

Prepared for :	**Aoife Solutions S.L. (Galgus)** **Italica nr.1, First Floor, 41900 CAMAS, Sevilla, Spain**
Prepared By :	**Shenzhen HUAK Testing Technology Co., Ltd.** **1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China**

Date of Test:	**Jun.24, 2021 ~ Jul. 06, 2021**
Date of Report:	**Jul. 06, 2021**
Report Number:	**HK2106181951-1E**

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TEST RESULT CERTIFICATION

Applicant's name.....: Aoife Solutions S.L. (Galgus)

Address .....: Italica nr.1, First Floor, 41900 CAMAS, Sevilla, Spain

Manufacture's Name.....: Aoife Solutions S.L. (Galgus)

Address .....: Italica nr.1, First Floor, 41900 CAMAS, Sevilla, Spain

Product description

Trade Mark: GALGUS

Product name.....: Access Point

Model and/or type reference .: IX450, OX450, IX850, OX850, IC600

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 .....: Jun.24, 2021 ~ Jul. 06, 2021

Date of Issue.....: Jul. 06, 2021

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

Testing Engineer : Gary Qian
(Gary Qian)

Technical Manager : Eden Hu
(Eden Hu)

Authorized Signatory : Jason Zhou
(Jason Zhou)

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** Modified History **

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	Jul. 06, 2021	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(b)(4)	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	1§5.247(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. Information of the Test Laboratory

Shenzhen HUAK Testing Technology Co., Ltd.
Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization：

A2LA Accreditation Code is 4781.01.
FCC Designation Number is CN1229.
Canada IC CAB identifier is CN0045.
CNAS Registration Number is L9589.

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1.3. Measurement Uncertainty

The reported uncertainty of measurement y ± U, where expended 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	±0.37dB
2	RF power, conducted	±3.35dB
3	Spurious emissions, conducted	±2.20dB
4	All emissions, radiated(<1G)	±3.90dB
5	All emissions, radiated(>1G)	±4.28dB
6	Temperature	±0.1°C
7	Humidity	±1.0%

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2. EUT Description

2.1. GENERAL DESCRIPTION OF EUT

Equipment	Access Point
Model Name	IX450
Serial Model	OX450, IX850, OX850, IC600
Model Difference	All model's the function, software and electric circuit are th e same, only with a product color, appearance and model named different. Test sample model: IX450
Trade Mark	GALGUS
FCC ID	**2AYVA-IX450**
Antenna Type	Internal Antenna
Antenna Gain	Antenna 1:3dBi Antenna 2:3dBi MIMO: 6.010dBi
Operation frequency	802.11b/g/n 20:2412~2462MHz 802.11n 40: 2422~2452MHz 802.11ax HT20: 2412~2462MHz 802.11ax HT40: 2422~2452MHz
Number of Channels	802.11b/g/n 20: 11CH 802.11n 40: 7CH 802.11ax HT20: 11CH 802.11ax HT40: 7CH
Modulation Type	CCK/OFDM/DBPSK/DAPSK
Power Source	POE IN: 48V, 0.5A DC IN: 12V, 1.5A
Power Rating	POE IN: 48V, 0.5A DC IN: 12V, 1.5A
Note: The EUT incorporates a MIMO function. Physically, it provides two completed tran smitters and receivers(2T2R), two transmit signals are completely correlated, then, Dire ction gain=GANT + Array Gain(Array Gain=10 log(2) dB for power spectral density; Arra y Gain=0 for power measurement)	

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2.2. Carrier Frequency of Channels

Channel List for 802.11b/802.11g/802.11n (HT20)/ 802.11ax 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)/802.11ax 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

Operating Mode

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

Low Channel: 2412MHz
Middle Channel: 2437MHz
High Channel: 2462MHz

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

Low Channel: 2422MHz
Middle Channel: 2437MHz
High Channel: 2452MHz

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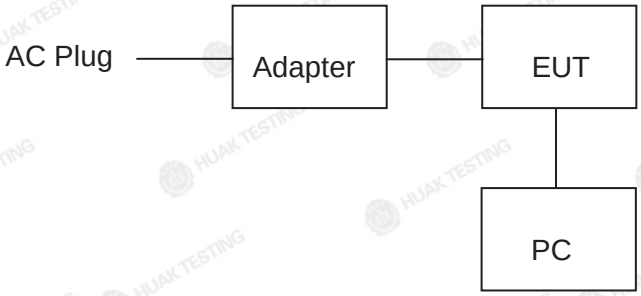
2.4. DESCRIPTION OF TEST SETUP

Operation of EUT during conducted testing and below 1GHz Radiation testing:



Operation of EUT during Above1GHz Radiation testing:

- PC information
  Model: TP00067A
  Input: DC 20V, 2.25~3.25A
  Output: 5VDC, 0.5A

  Adapter information
  Model: GRT-POE15-480050
  Input: AC100-240V 0.8A Max 50/60Hz
  Output: DC48V 500mA

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. The worst case is X position.

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3. Genera 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 98.46%)

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)/ax HT20	6.5Mbps
802.11n(H40)/ax HT40	13.5Mbps
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, 6.5Mbps for 802.11n(H20)/ac HT20/ax HT20, 13.5Mbps for 802.11(H40)/ac HT40/ax HT40. Duty cycle setting during the transmission is 98.5% with maximum power setting for all modulations.

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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.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
/	/	/	/	/

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.

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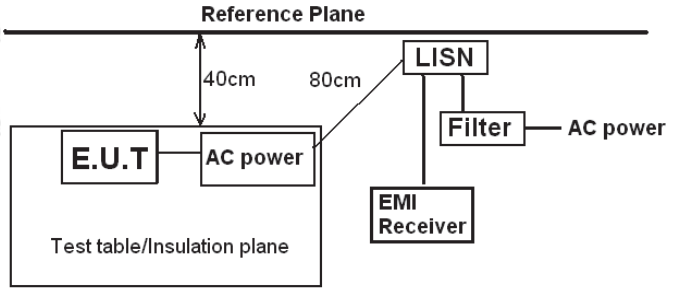
4. Test Results and Measurement Data

4.1. Conducted Emission

4.1.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Frequency Range:</td><td>150 kHz to 30 MHz</td></tr>
<tr><td>Receiver setup:</td><td>RBW=9 kHz, VBW=30 kHz, Sweep time=auto</td></tr>
<tr><td>Limits:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></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>
</td></tr>
<tr><td>Test Setup:</td><td>


Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m
</td></tr>
<tr><td>Test Mode:</td><td>Charging + transmitting with modulation</td></tr>
<tr><td>Test Procedure:</td><td>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.</td></tr>
<tr><td>Test Result:</td><td>Pass</td></tr>
</table>

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4.1.2. Test Instruments

Conducted Emission Shielding Room Test Site (843)					
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Receiver	R&S	ESCI 7	HKE-010	Dec. 10, 2020	Dec. 09, 2021
LISN	R&S	ENV216	HKE-002	Dec. 10, 2020	Dec. 09, 2021
Conducted test software	Tonscend	TS+ Rev 2.5.0.0	HKE-081	N/A	N/A

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

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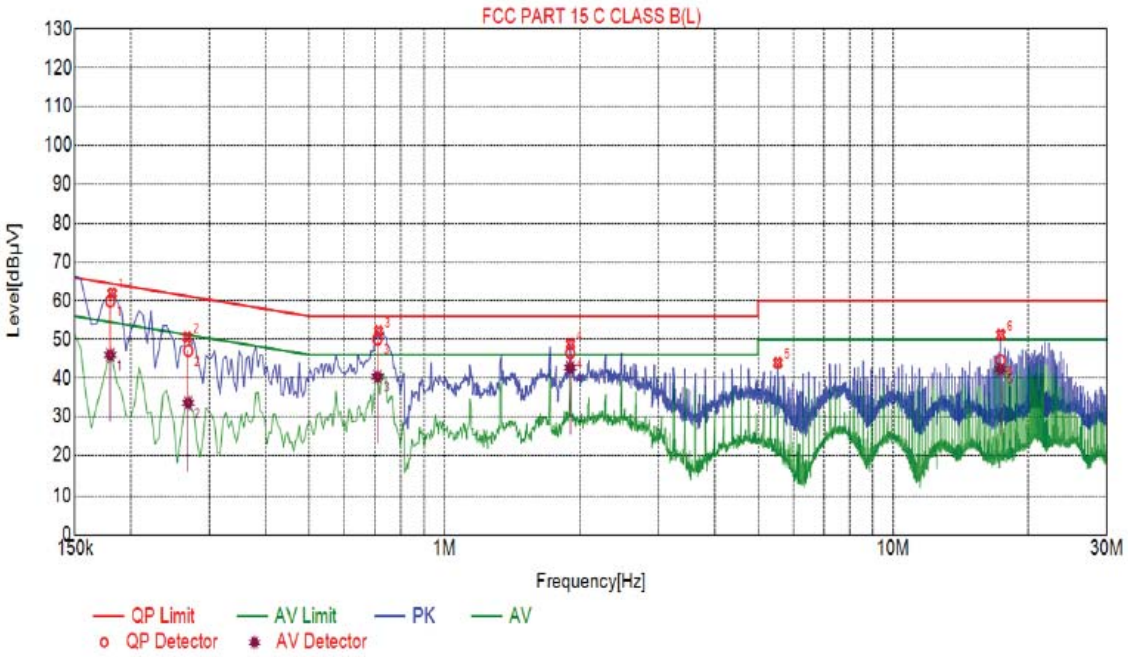
4.1.3 Test data

Test Specification: Line



Suspected List								
NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1815	61.93	20.06	64.42	2.49	41.87	PK	L
2	0.2670	50.56	20.03	61.21	10.65	30.53	PK	L
3	0.7125	52.09	20.05	56.00	3.91	32.04	PK	L
4	1.9095	48.84	20.14	56.00	7.16	28.70	PK	L
5	5.5365	43.96	20.25	60.00	16.04	23.71	PK	L
6	17.3670	51.22	20.01	60.00	8.78	31.21	PK	L

Final Data List											
NO.	Freq. [MHz]	Correction factor[dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	QP Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	AV Reading [dBμV]	Type
1	0.1797	20.06	59.88	64.50	4.62	39.82	45.98	54.50	8.52	25.92	L
2	0.2683	20.03	47.07	61.17	14.10	27.04	33.55	51.17	17.62	13.52	L
3	0.7084	20.05	50.07	56.00	5.93	30.02	40.35	46.00	5.65	20.30	L
4	1.9057	20.14	46.54	56.00	9.46	26.40	42.70	46.00	3.30	22.56	L
5	17.3424	20.01	44.55	60.00	15.45	24.54	42.32	50.00	7.68	22.31	L

Remark: Margin = Limit – Level
Correction factor = Cable lose + LISN insertion loss
Level=Test receiver reading + correction factor

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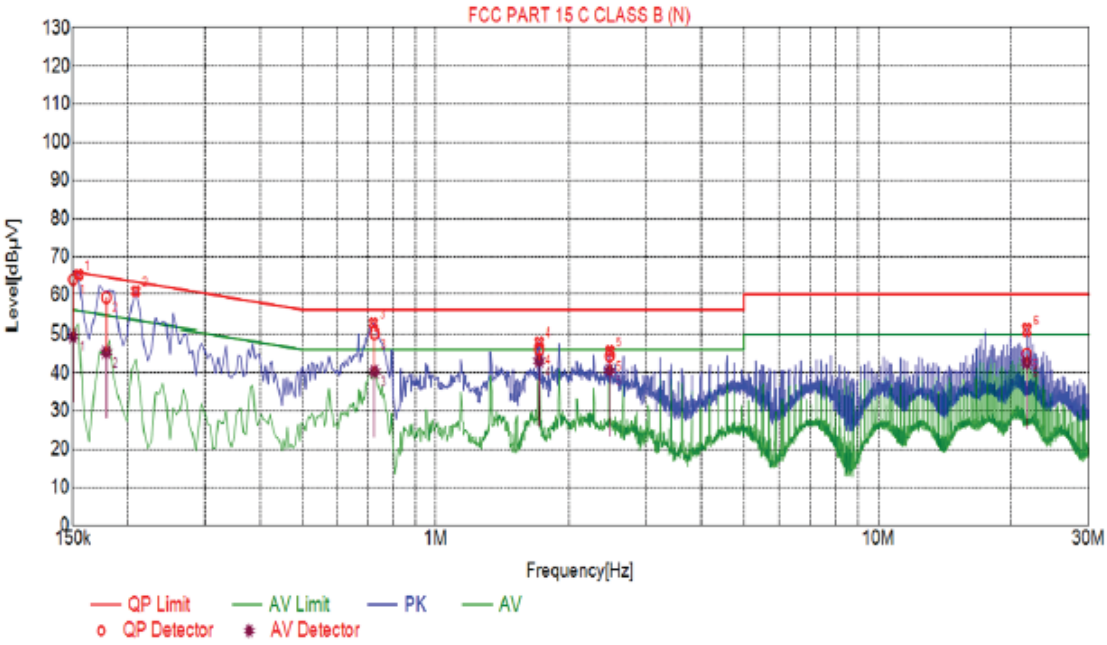
Test Specification: Neutral



Suspected List

NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Type
1	0.1545	65.21	20.03	65.75	0.54	45.18	PK	N
2	0.2085	60.81	20.04	63.26	2.45	40.77	PK	N
3	0.7215	52.47	20.06	56.00	3.53	32.41	PK	N
4	1.7160	47.98	20.13	56.00	8.02	27.85	PK	N
5	2.4810	45.67	20.19	56.00	10.33	25.48	PK	N
6	21.7320	51.00	20.15	60.00	9.00	30.85	PK	N

Final Data List

NO.	Freq. [MHz]	Correction factor[dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	QP Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	AV Reading [dBµV]	Type
1	0.1501	20.03	63.90	66.00	2.10	43.87	49.46	56.00	6.54	29.43	N
2	0.1788	20.06	59.21	64.54	5.33	39.15	45.35	54.54	9.19	25.29	N
3	0.7256	20.06	50.16	56.00	5.84	30.10	40.33	46.00	5.67	20.27	N
4	1.7148	20.13	46.14	56.00	9.86	26.01	43.11	46.00	2.89	22.98	N
5	2.4767	20.19	44.37	56.00	11.63	24.18	40.64	46.00	5.36	20.45	N
6	21.7191	20.15	44.87	60.00	15.13	24.72	42.69	50.00	7.31	22.54	N

Remark: Margin = Limit – Level
Correction factor = Cable lose + LISN insertion loss
Level=Test receiver reading + correction factor

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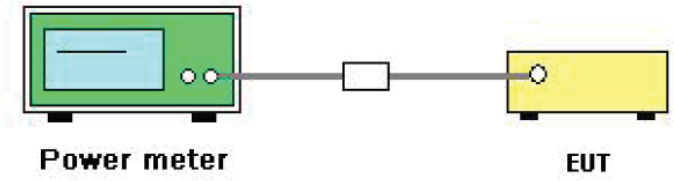
4.2. Maximum Conducted Output Power

4.2.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	KDB 558074
Limit:	30dBm
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 15.247 Meas Guidance v05r02. 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

4.2.2. Test Instruments

RF Test Room					
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Power meter	Agilent	E4419B	HKE-085	Dec. 10, 2020	Dec. 09, 2021
Power Sensor	Agilent	E9300A	HKE-086	Dec. 10, 2020	Dec. 09, 2021
RF cable	Times	1-40G	HKE-034	Dec. 10, 2020	Dec. 09, 2021
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 10, 2020	Dec. 09, 2021

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

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4.2.3. Test Data

Test Channel	Frequency	Maximum Peak Conducted Output Power (dBm)			LIMIT
	(MHz)	Antenna port 1	Antenna port 2	MIMO	dBm
TX 802.11b Mode					
CH01	2412	15.25	12.61	/	30
CH06	2437	14.03	12.83	/	30
CH11	2462	14.77	13.31	/	30
TX 802.11g Mode					
CH01	2412	14.02	13.43	/	30
CH06	2437	13.89	13.41	/	30
CH11	2462	14.18	13.81	/	30
TX 802.11n20 Mode					
CH01	2412	13.77	13.34	16.57	30
CH06	2437	13.64	13.33	16.50	30
CH11	2462	13.95	13.67	16.82	30
TX 802.11n40 Mode					
CH03	2422	14.54	14.29	17.43	30
CH06	2437	14.67	14.40	17.55	30
CH09	2452	14.58	14.50	17.55	30
802.11ax HT20 Mode					
CH01	2412	13.58	13.70	16.65	30
CH06	2437	13.75	14.11	16.94	30
CH11	2462	13.90	14.13	17.03	30
802.11ax HT40 Mode					
CH03	2422	14.61	14.39	17.51	30
CH06	2437	14.61	14.43	17.53	30
CH09	2452	14.75	14.57	17.67	30
Note: This product supports antenna 1 and antenna 2 launches, but only support 802.11 n/802.11ax for MIMO mode, not support 802.11 b and 802.11 g for MIMO mode.					

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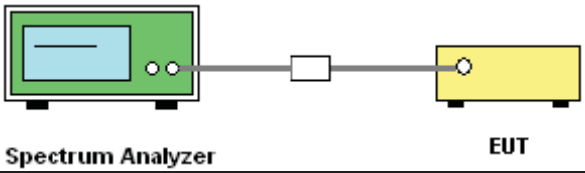
4.3. Emission Bandwidth

4.3.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	KDB 558074
Limit:	>500kHz
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02. 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

4.3.2. Test Instruments

RF Test Room					
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 10, 2020	Dec. 09, 2021
RF Cable (9KHz-26.5GHz)	Tonscend	170660	N/A	Dec. 10, 2020	Dec. 09, 2021
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 10, 2020	Dec. 09, 2021

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

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4.3.3. Test data

For antenna port 1

Test channel	6dB Emission Bandwidth (MHz)					
	802.11b	802.11g	802.11n (H20)	802.11n (H40)	802.11ax (H20)	802.11ax (H40)
Lowest	7.160	16.400	16.800	36.400	16.680	37.920
Middle	7.160	16.360	16.960	35.840	19.000	37.440
Highest	8.120	16.360	17.240	36.400	16.720	37.600
Limit:	>500khz					
Test Result:	PASS					

Test plots as follows:

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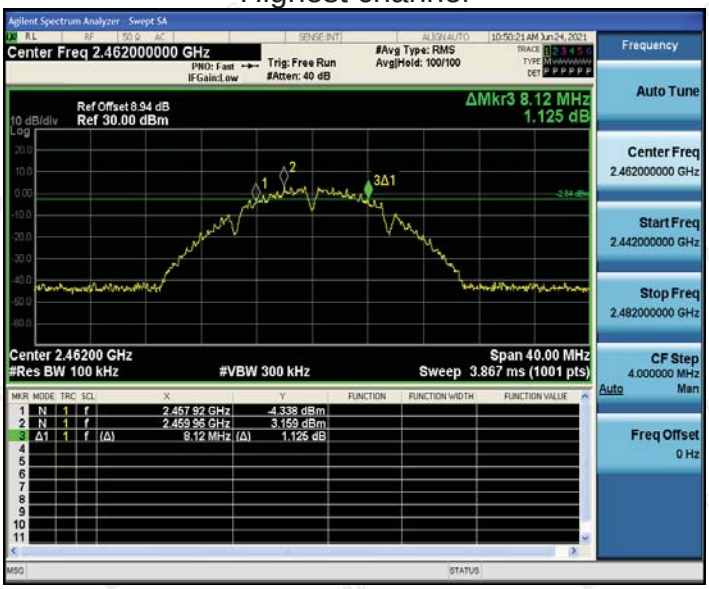
802.11b Modulation

Lowest channel

Middle channel

Highest channel



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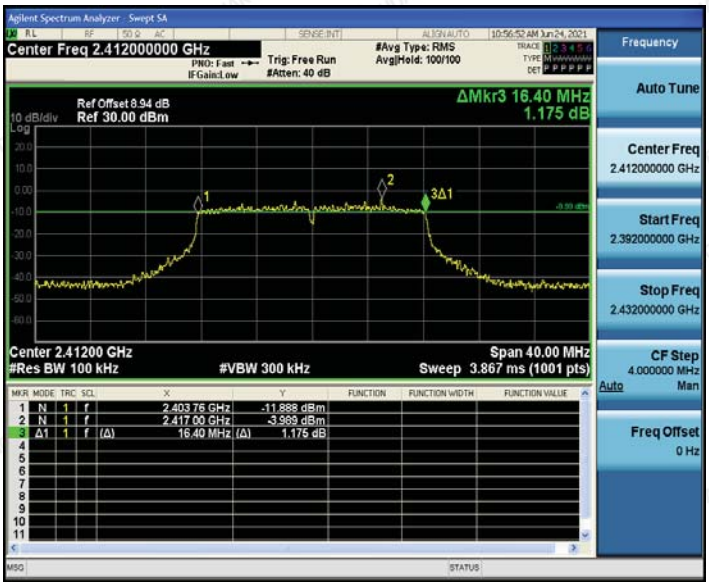
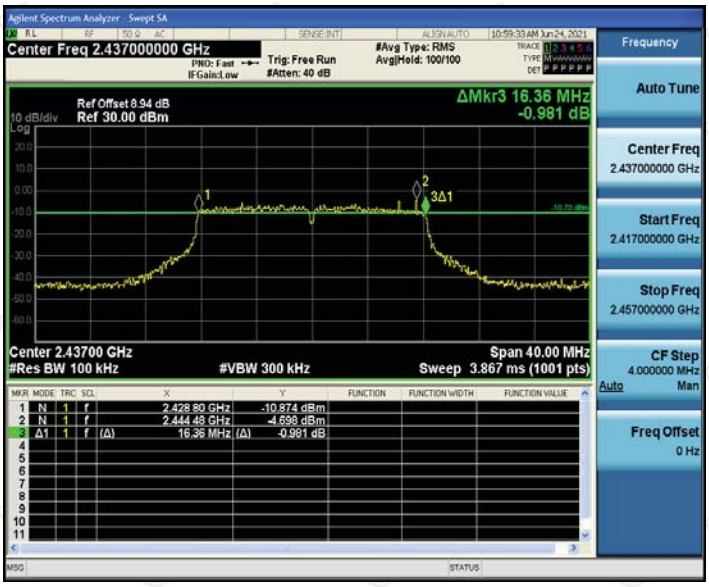
802.11g Modulation

Lowest channel



Middle channel



Highest channel

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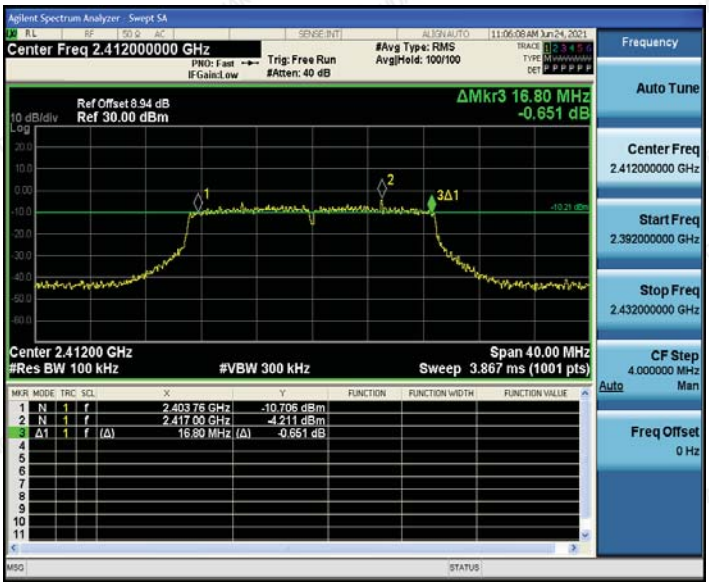
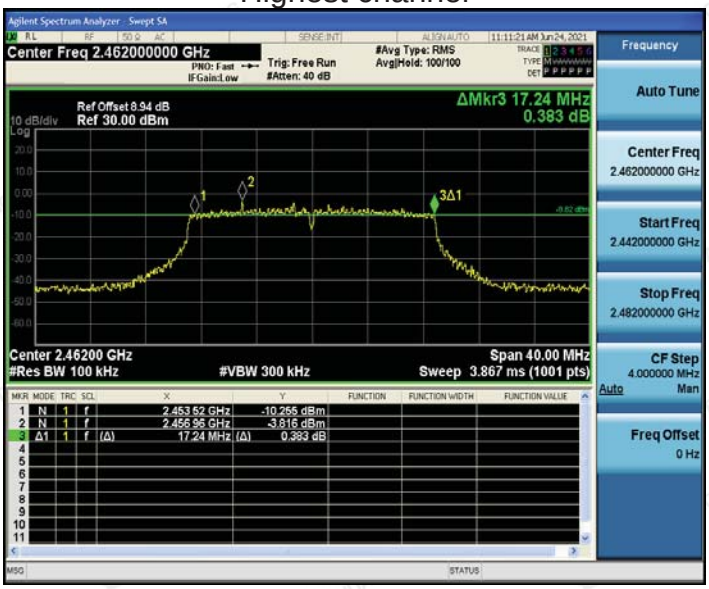
802.11n (HT20) Modulation

Lowest channel



Middle channel

Highest channel



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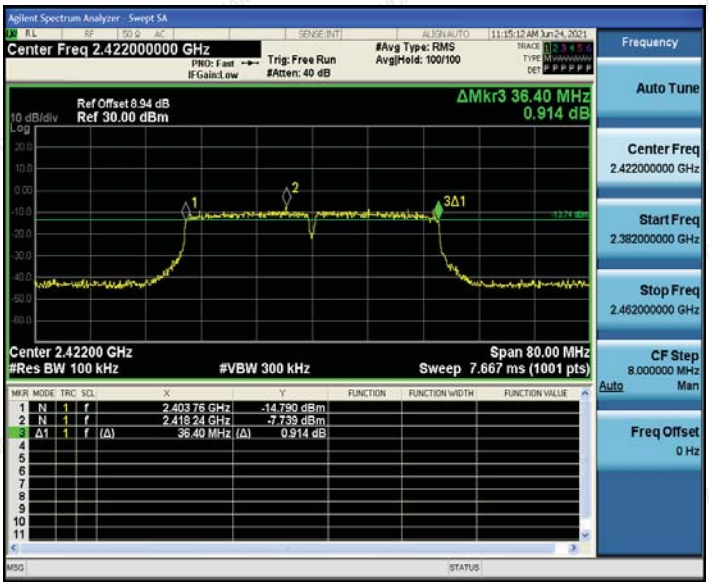
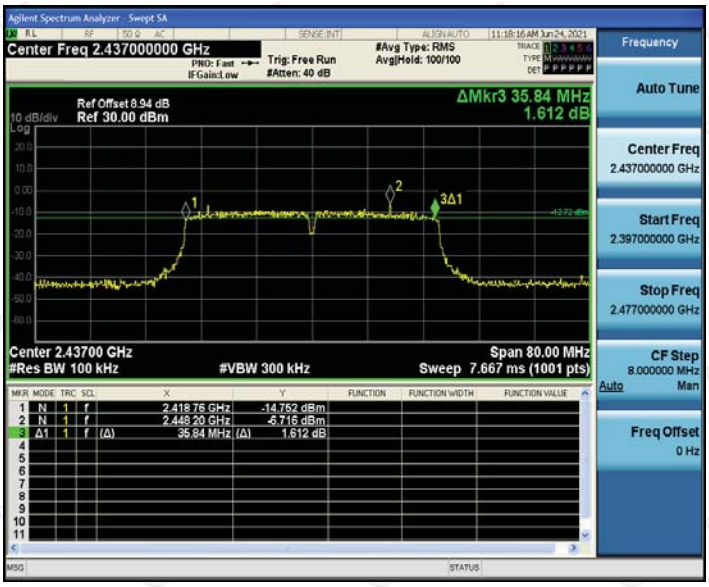
802.11n (HT40) Modulation

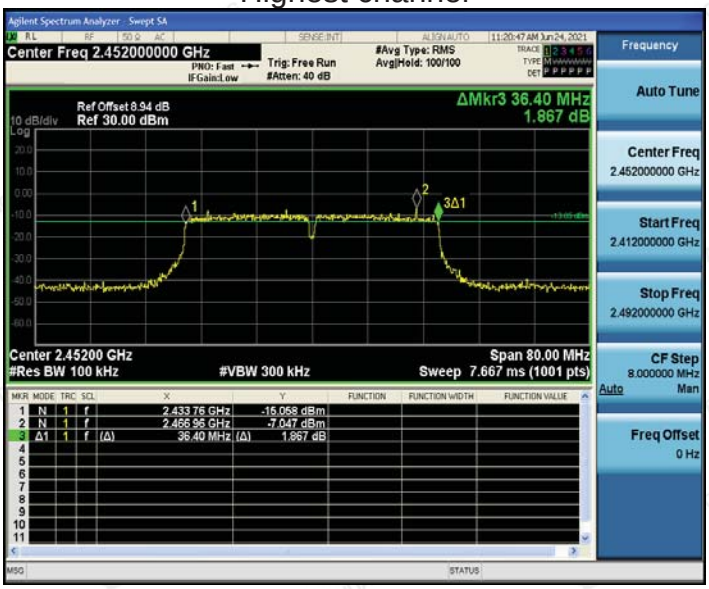
Lowest channel



Middle channel



Highest channel



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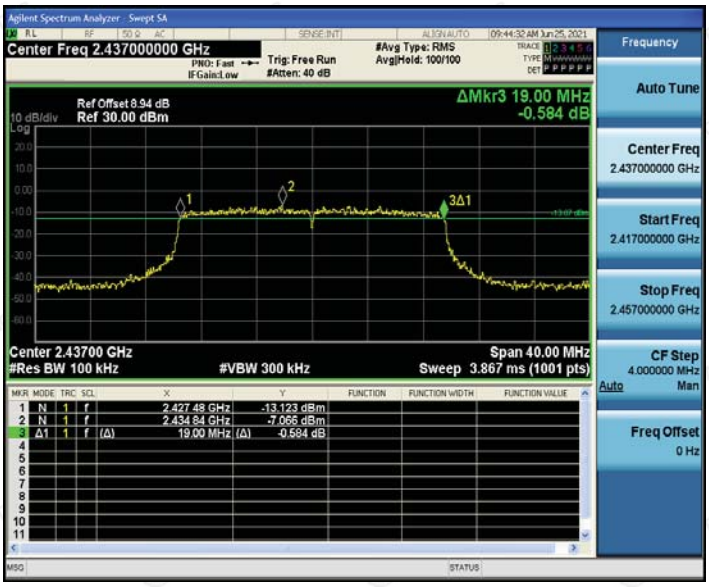
802.11ax (HT20) Modulation

Lowest channel

Middle channel



Highest channel

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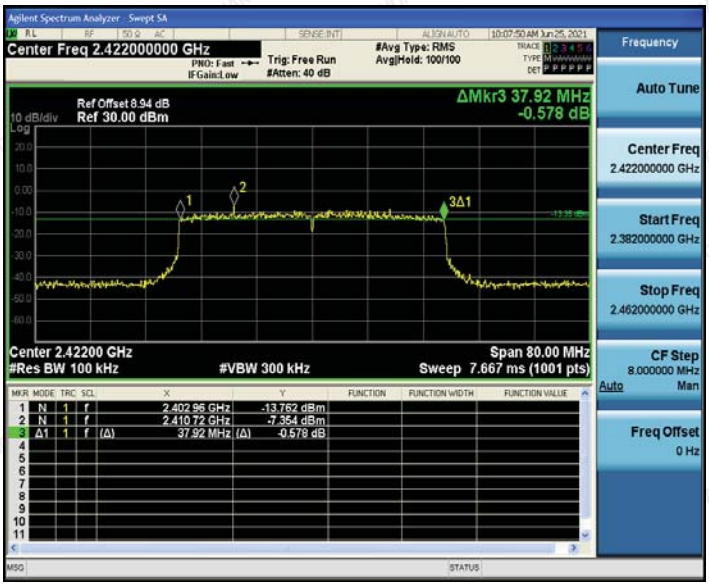
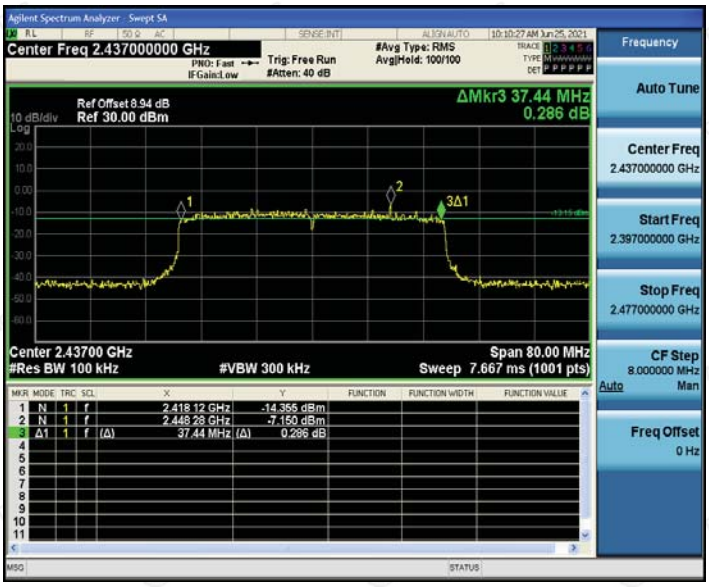
802.11ax (HT40) Modulation

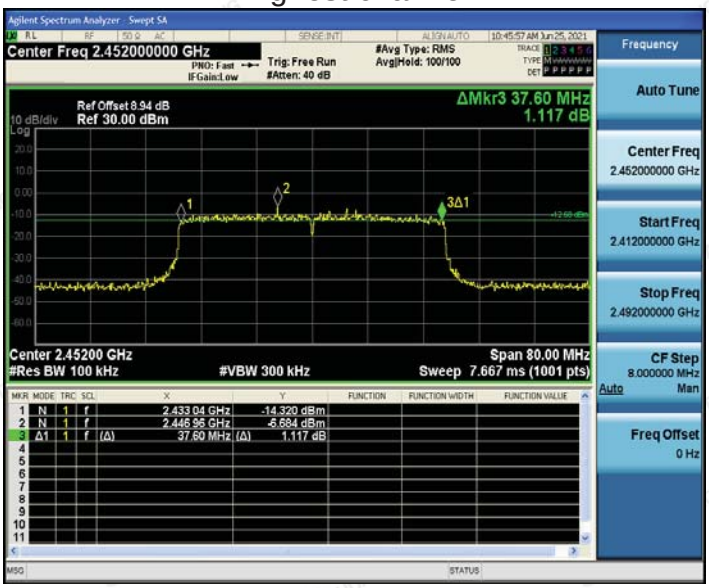
Lowest channel



Middle channel



Highest channel



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For antenna port 2

Test channel	6dB Emission Bandwidth (MHz)					
	802.11b	802.11g	802.11n (H20)	802.11n (H40)	802.11ax (HT20)	802.11ax (HT40)
Lowest	7.120	16.360	17.720	35.760	18.600	38.000
Middle	8.120	14.120	16.360	36.400	18.840	36.560
Highest	8.120	16.120	17.360	36.560	18.480	37.760
Limit:	>500khz					
Test Result:	PASS					

Test plots as follows:

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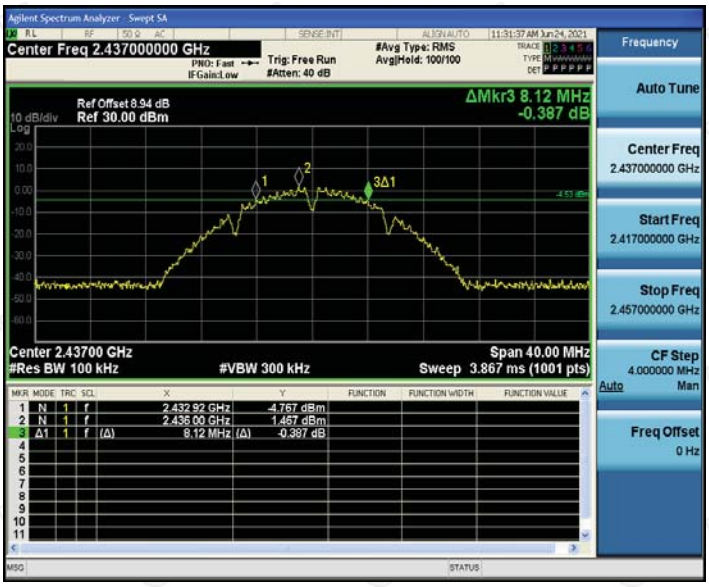
802.11b Modulation

Lowest channel

Middle channel



Highest channel

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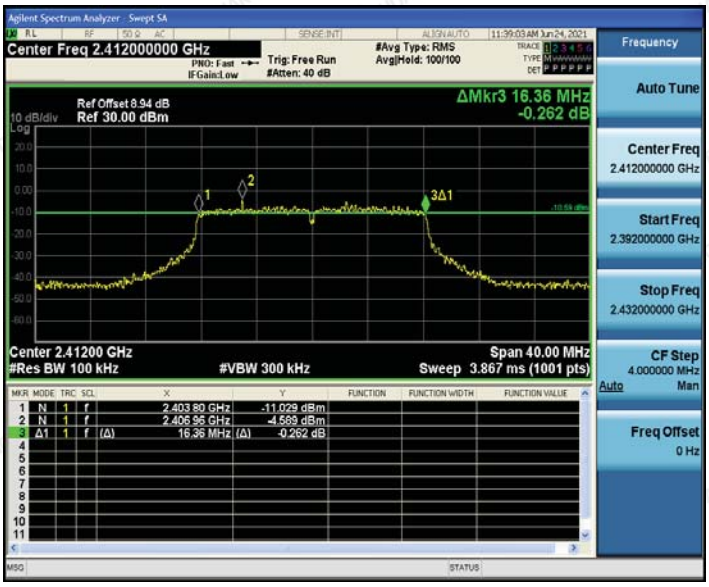
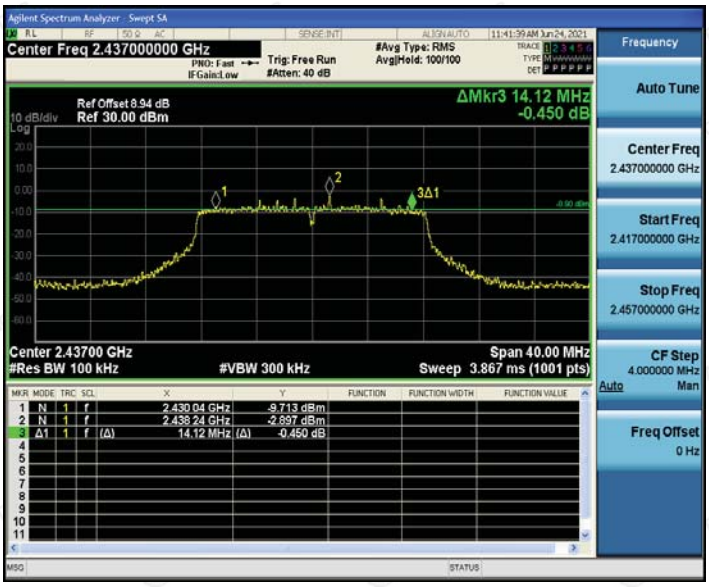
802.11g Modulation

Lowest channel



Middle channel



Highest channel

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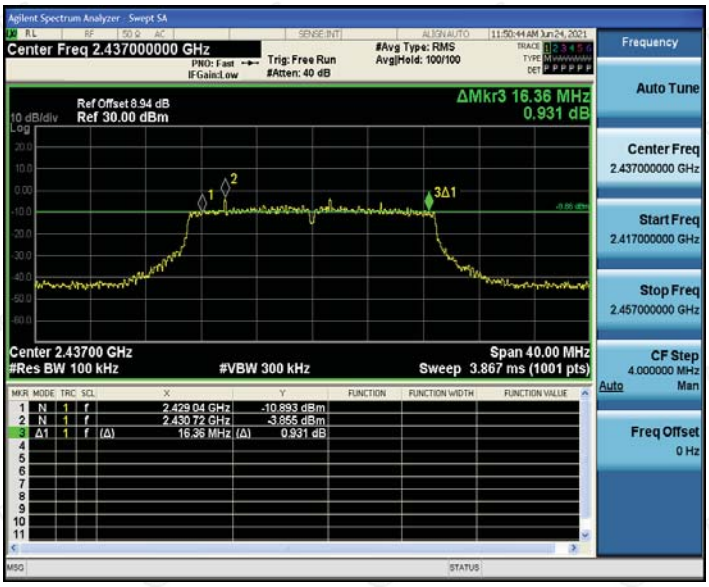
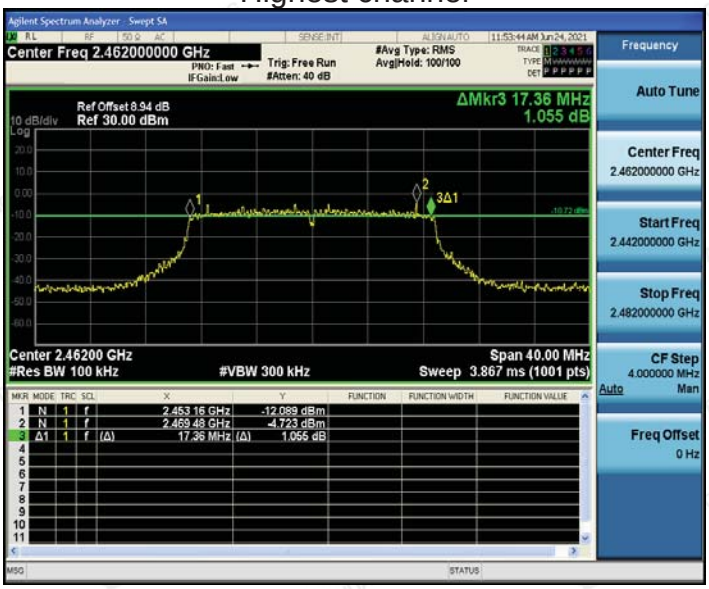
802.11n (HT20) Modulation

Lowest channel

Middle channel



Highest channel



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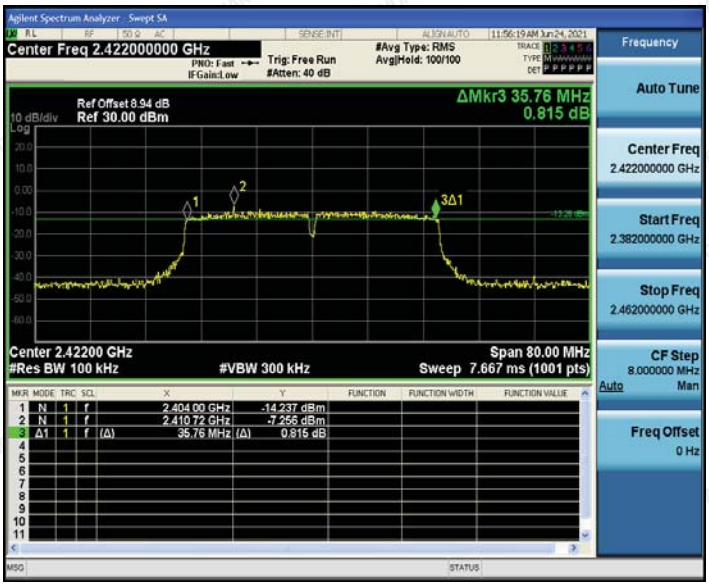
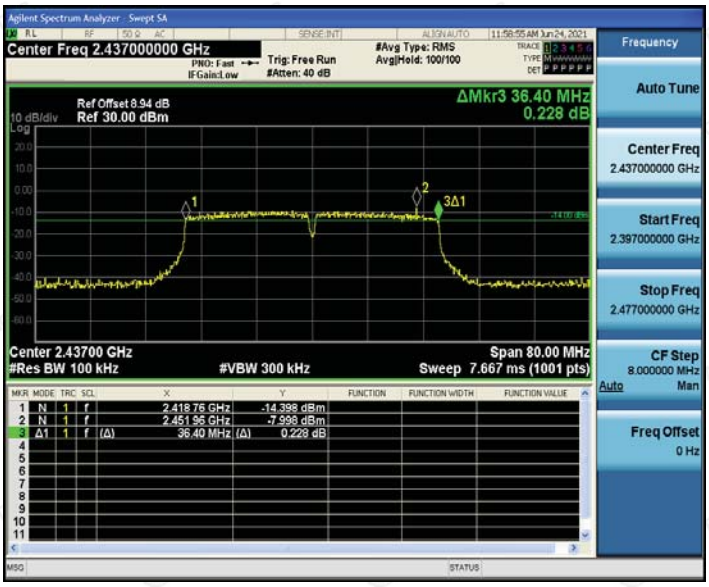
802.11n (HT40) Modulation

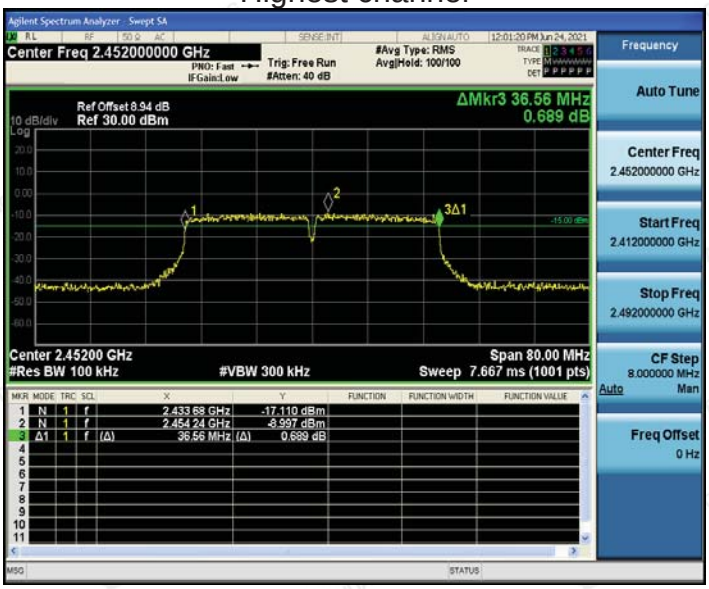
Lowest channel



Middle channel



Highest channel



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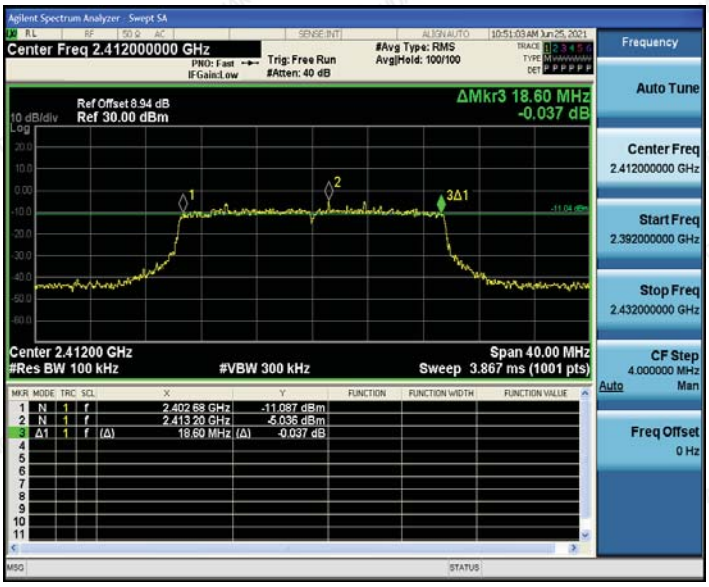
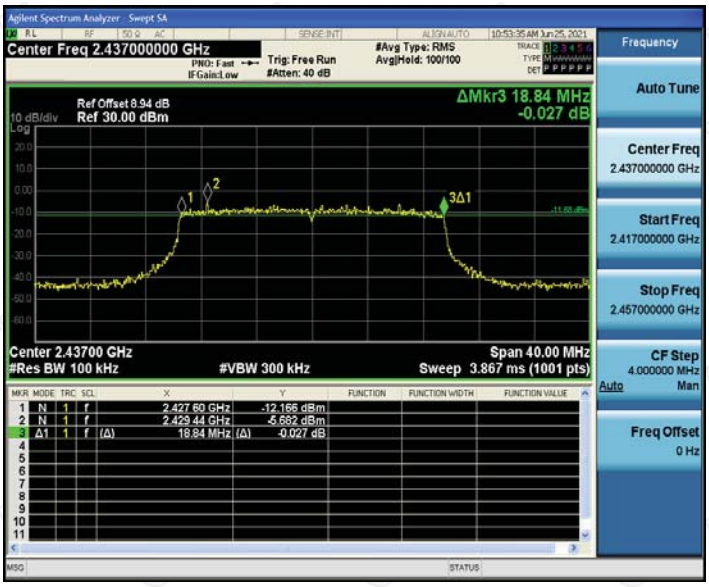
802.11ax (HT20) Modulation

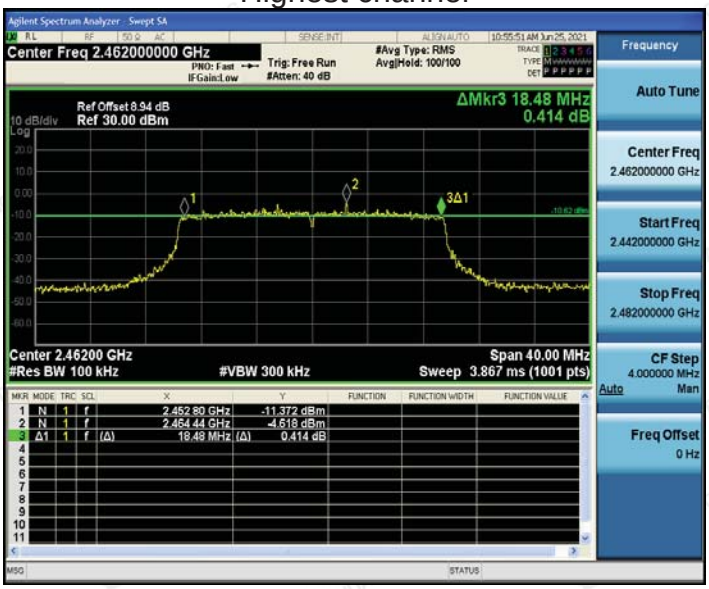
Lowest channel



Middle channel



Highest channel



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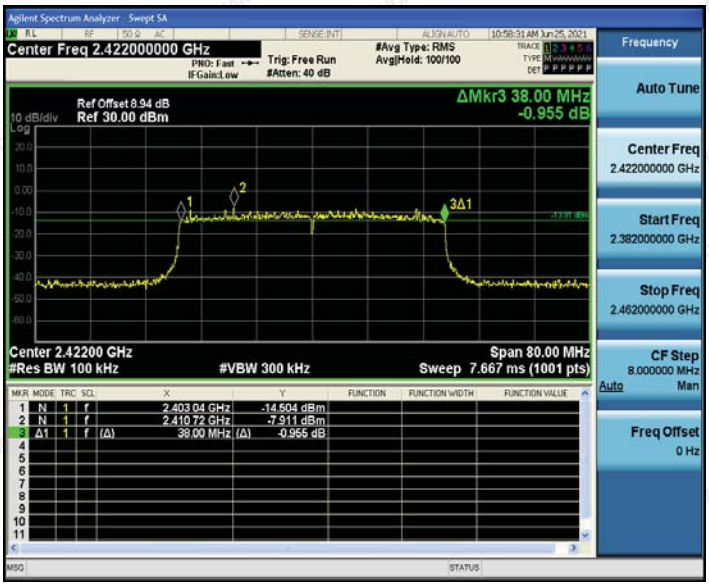
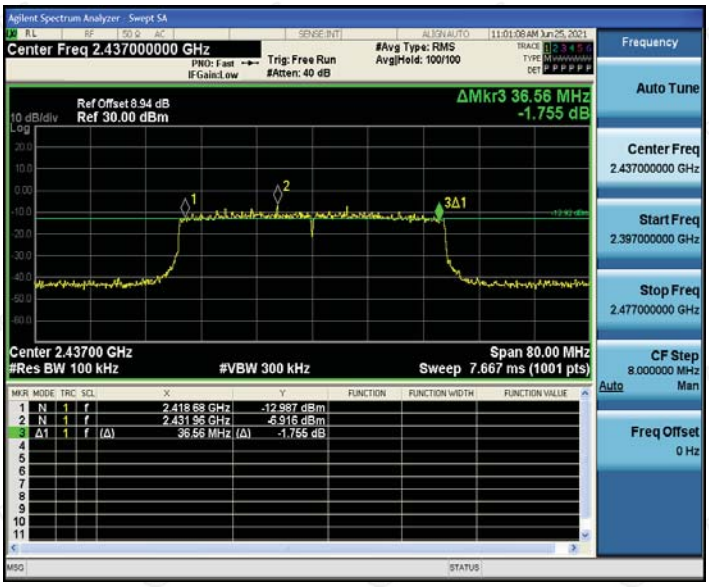
802.11ax (HT40) Modulation

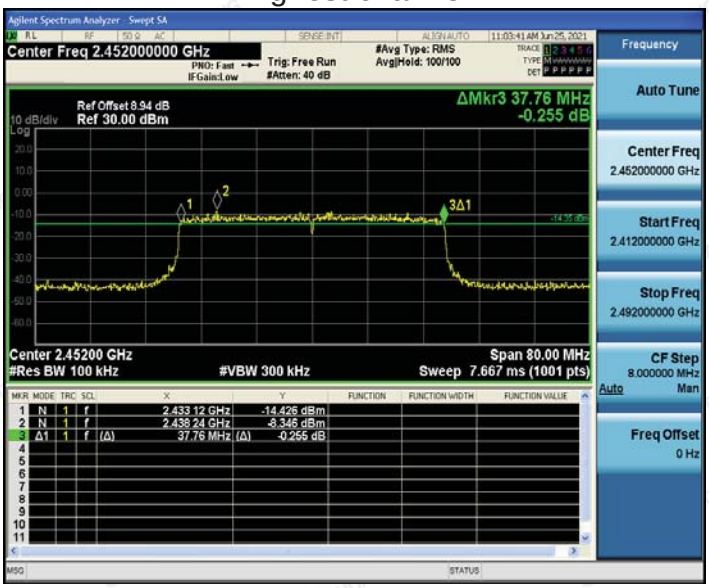
Lowest channel



Middle channel



Highest channel



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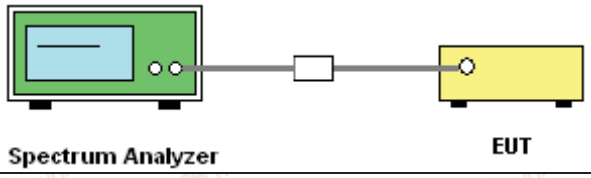
4.4. Power Spectral Density

4.4.1. 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:	
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 15.247 Meas Guidance v05r02. 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 kHz ≤ RBW ≤ 100 kHz. Video bandwidth VBW ≥ 3 x 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

4.4.2. Test Instruments

RF Test Room					
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 10, 2020	Dec. 09, 2021
RF Cable (9KHz-26.5GHz)	Tonscend	170660	N/A	Dec. 10, 2020	Dec. 09, 2021
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 10, 2020	Dec. 09, 2021

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

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4.4.3. Test data

For antenna port 1

EUT Set Mode	Channel	Result (dBm/30kHz)	Result (dBm/3kHz)
802.11b	Lowest	-0.88	-10.88
	Middle	-1.03	-11.03
	Highest	0.65	-9.35
802.11g	Lowest	-9.02	-19.02
	Middle	-8.67	-18.67
	Highest	-7.53	-17.53
802.11n(H20)	Lowest	-9.74	-19.74
	Middle	-8.95	-18.95
	Highest	-9.32	-19.32
802.11n(H40)	Lowest	-11.51	-21.51
	Middle	-11.3	-21.3
	Highest	-12.21	-22.21
802.11ax(H20)	Lowest	-10.65	-20.65
	Middle	-10.95	-20.95
	Highest	-10.38	-20.38
802.11ax(H40)	Lowest	-13.56	-23.56
	Middle	-12.58	-22.58
	Highest	-13.16	-23.16
PSD test result (dBm/3kHz)= PSD test result (dBm/30kHz)-10			
limit=8dBm-(direction gain-6dBi)=8-(3+10log2-6)=8dBm Limit: 8dBm/3kHz			
Test Result:	PASS		

Test plots as follows:

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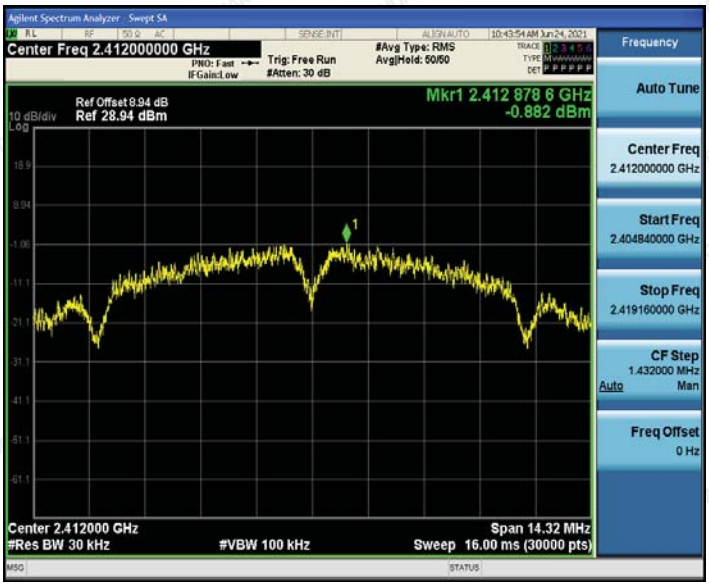
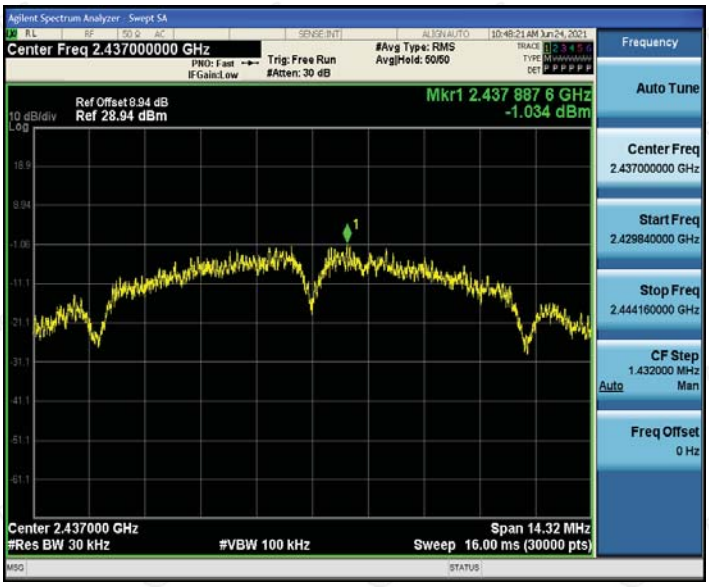
802.11b Modulation

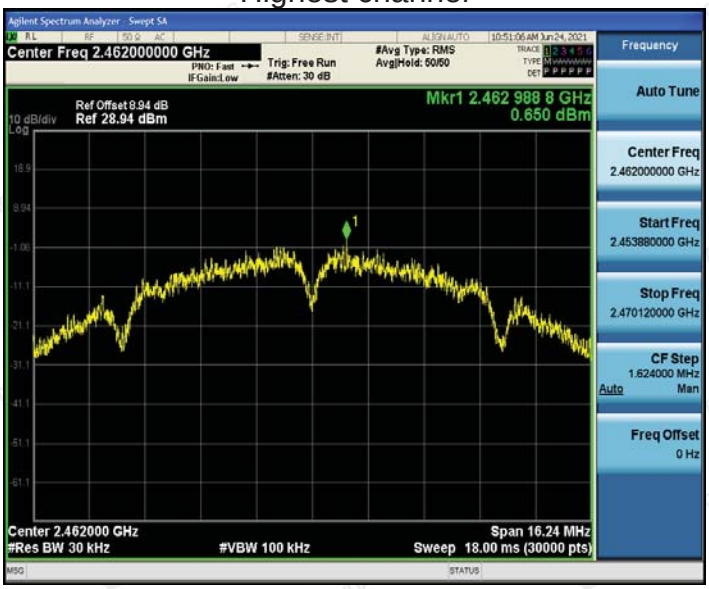
Lowest channel



Middle channel



Highest channel



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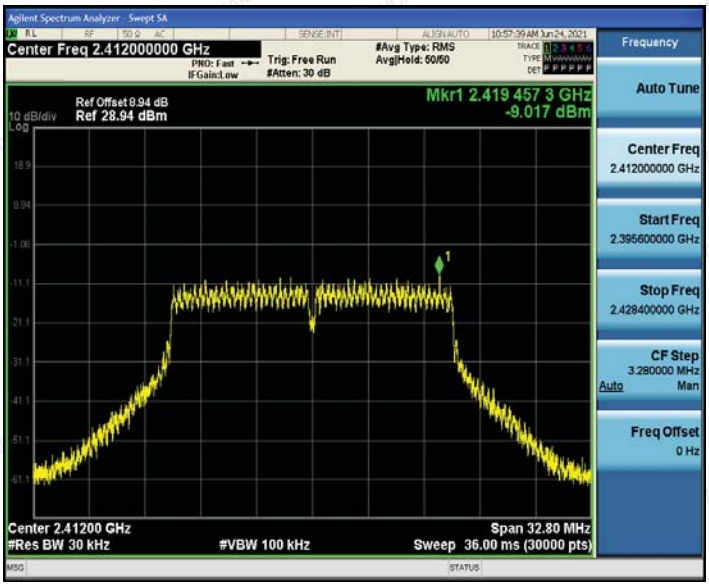
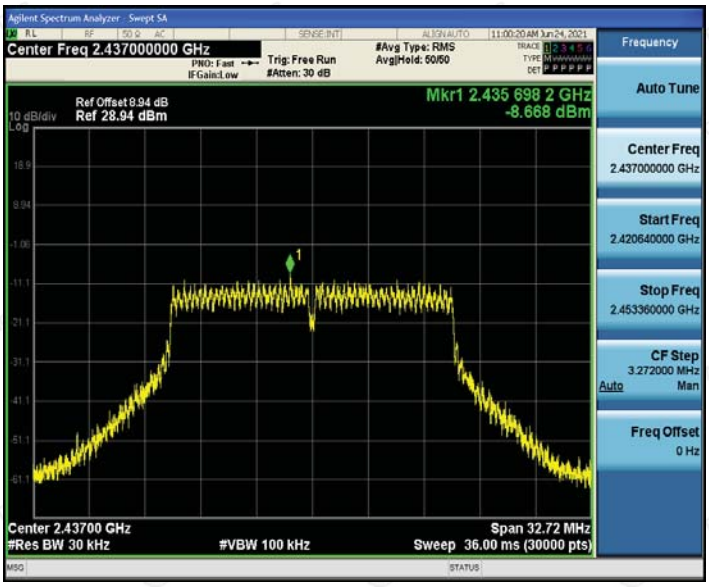
802.11g Modulation

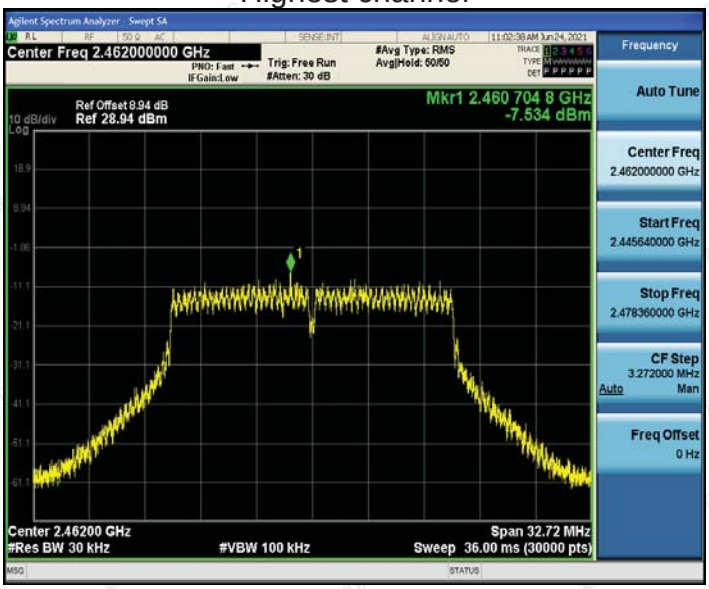
Lowest channel



Middle channel



Highest channel



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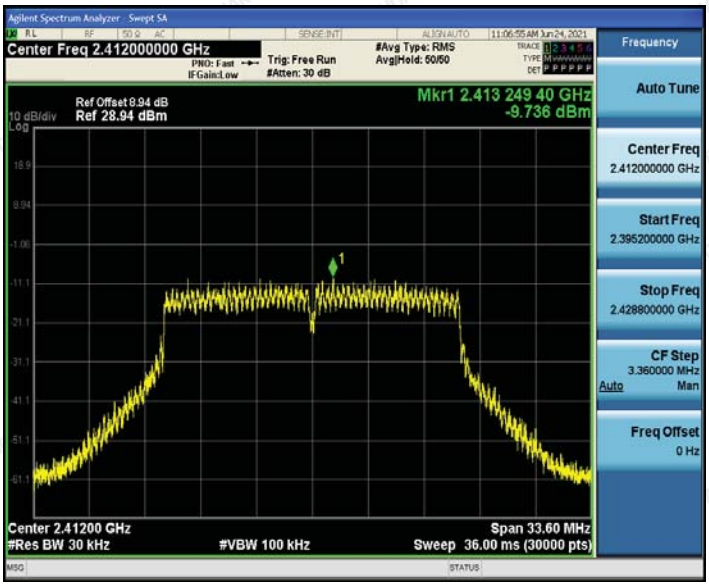
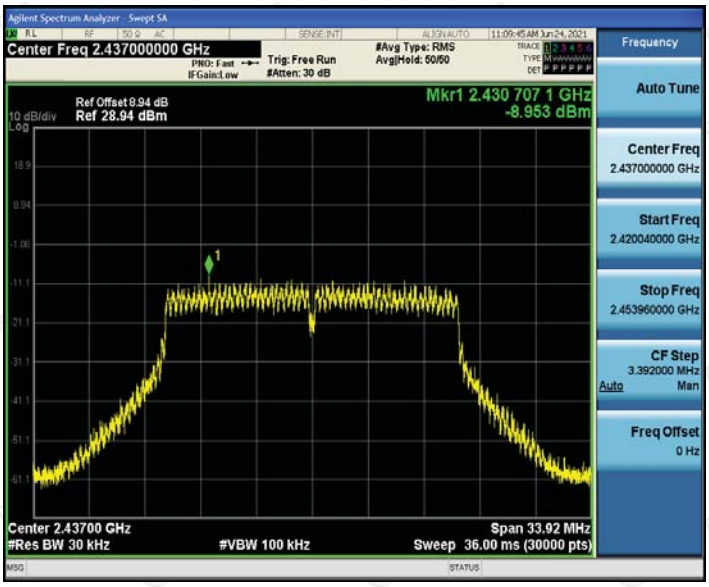
802.11n (HT20) Modulation

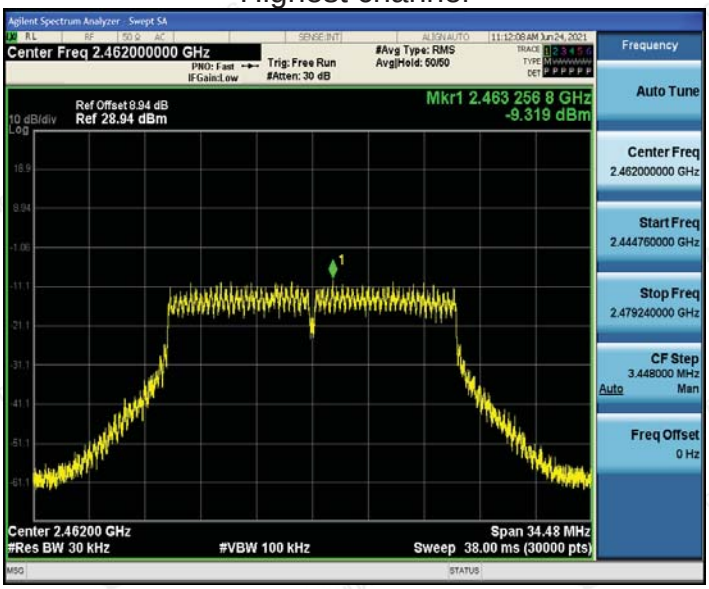
Lowest channel



Middle channel



Highest channel



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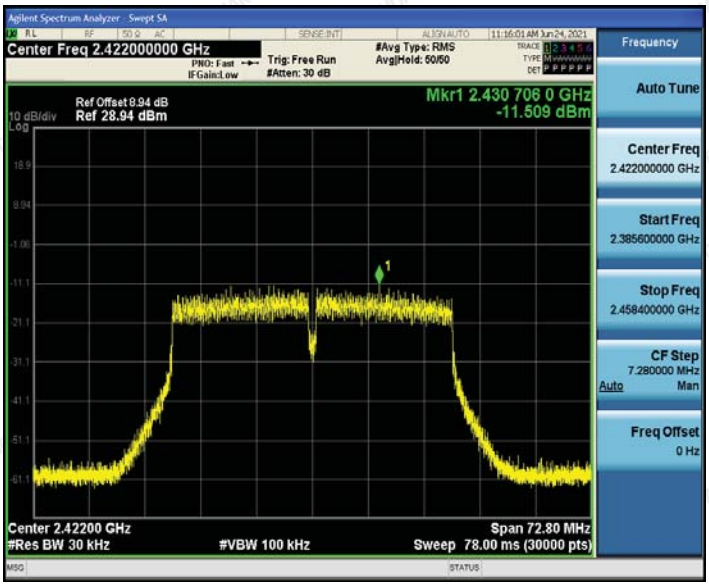
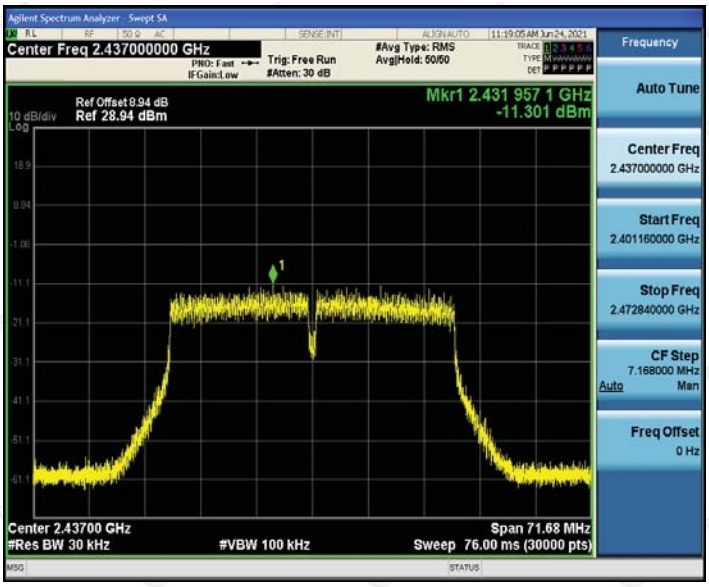
802.11n (HT40) Modulation

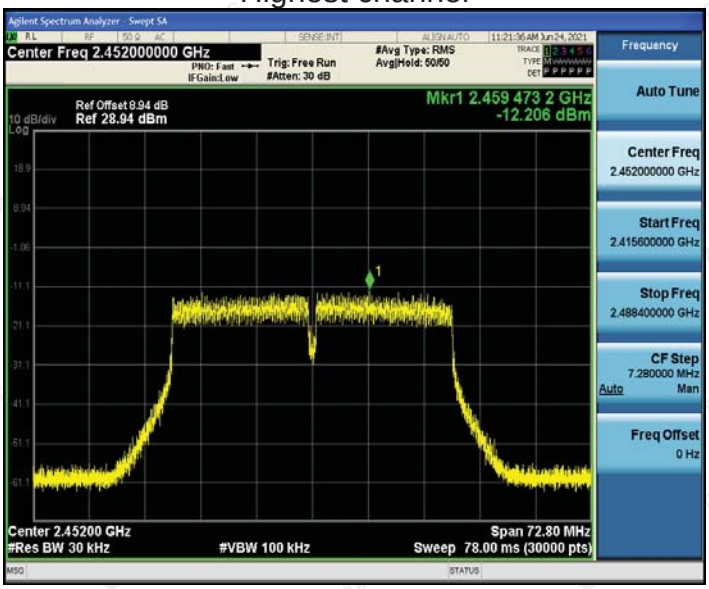
Lowest channel



Middle channel



Highest channel



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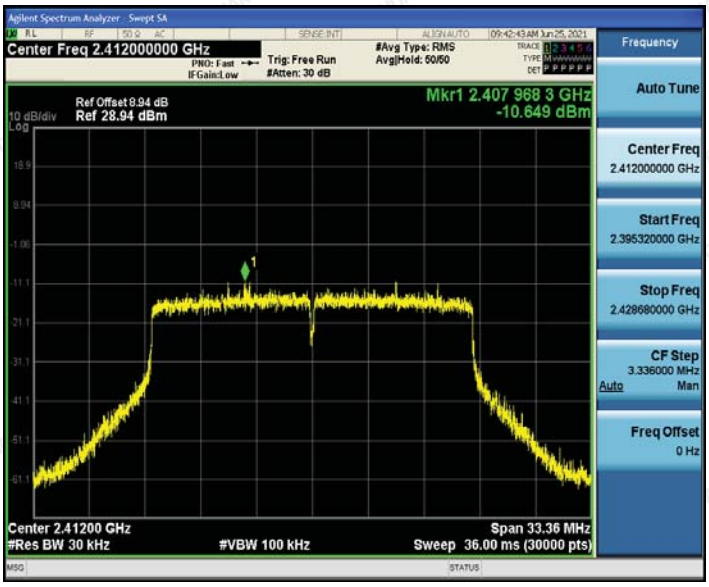
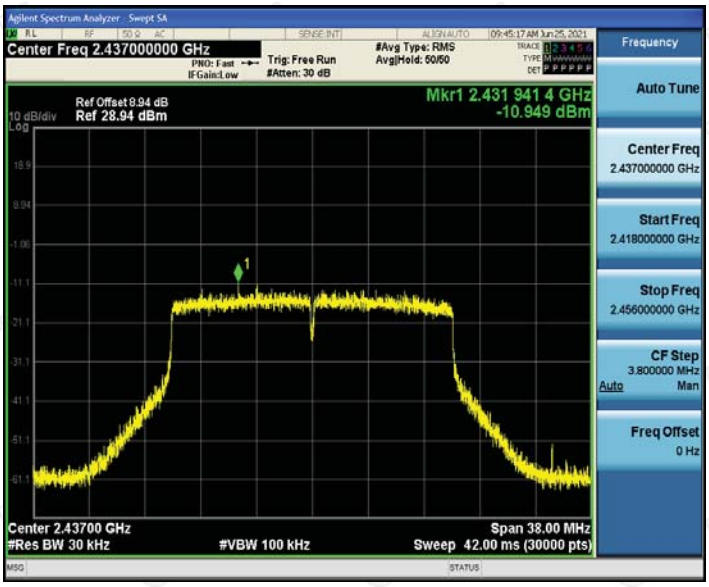
802.11ax(HT20) Modulation

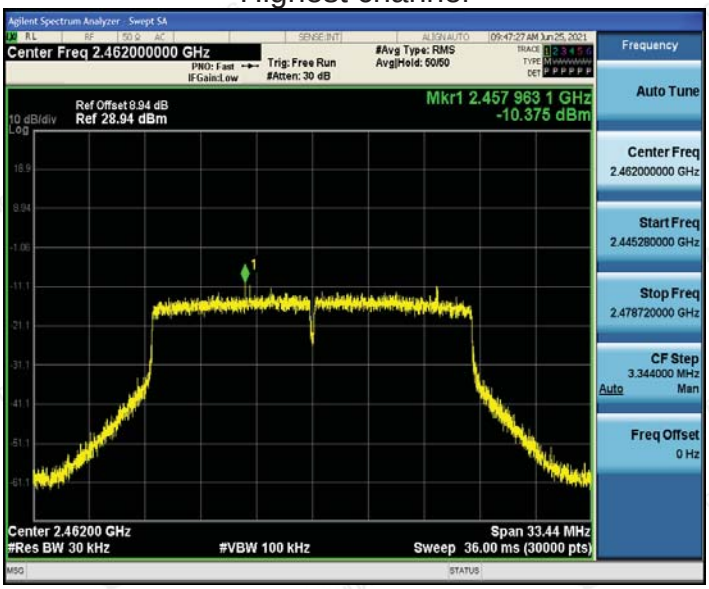
Lowest channel



Middle channel



Highest channel



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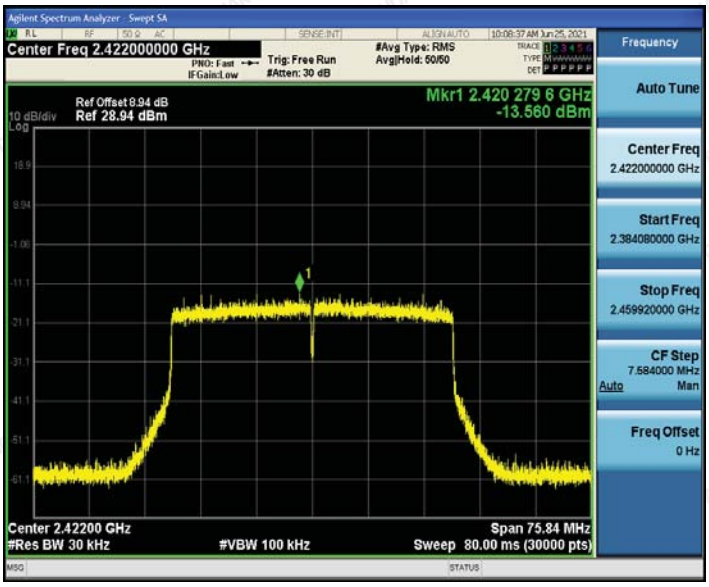
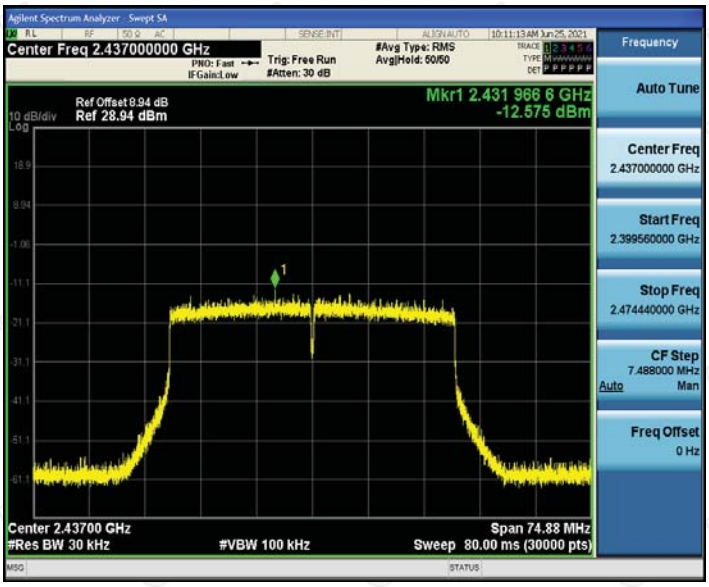
802.11ax (HT40) Modulation

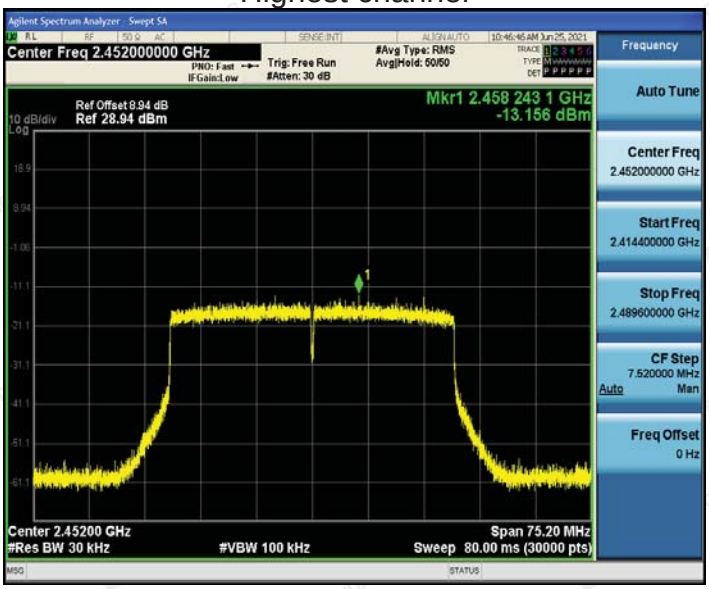
Lowest channel



Middle channel



Highest channel



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For antenna port 2

EUT Set Mode	Channel	Result (dBm/30kHz)	Result (dBm/3kHz)
802.11b	Lowest	-2.47	-12.47
	Middle	-2.9	-12.9
	Highest	2.15	-7.85
802.11g	Lowest	-9.82	-19.82
	Middle	-7.99	-17.99
	Highest	-9.07	-19.07
802.11n(H20)	Lowest	-9.8	-19.8
	Middle	-8.81	-18.81
	Highest	-8.69	-18.69
802.11n(H40)	Lowest	-12.25	-22.25
	Middle	-12.1	-22.1
	Highest	-11.8	-21.8
802.11ax(H20)	Lowest	-10.38	-20.38
	Middle	-9.31	-19.31
	Highest	-9.94	-19.94
802.11ax(H40)	Lowest	-13.88	-23.88
	Middle	-12.95	-22.95
	Highest	-13.69	-23.69
PSD test result (dBm/3kHz)= PSD test result (dBm/30kHz)-10			
limit=8dBm-(direction gain-6dBi)=8-(3+10log2-6)= 8dBm Limit: 8dBm/3kHz			
Test Result:	PASS		

Test plots as follows:

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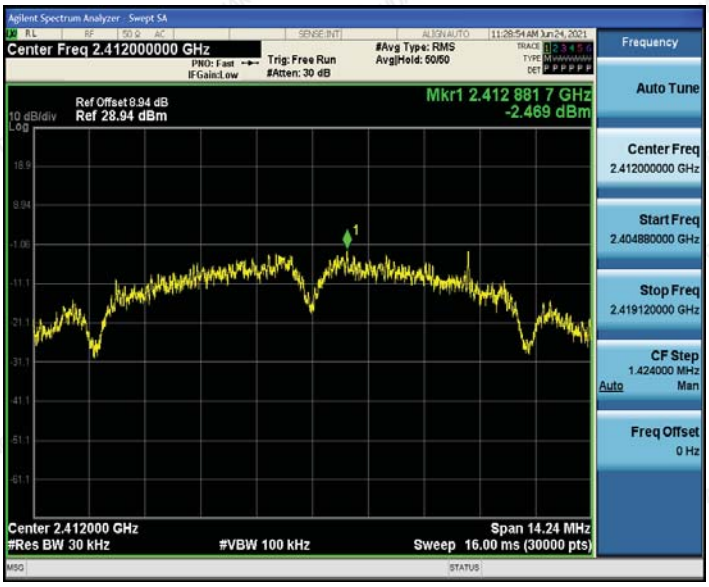
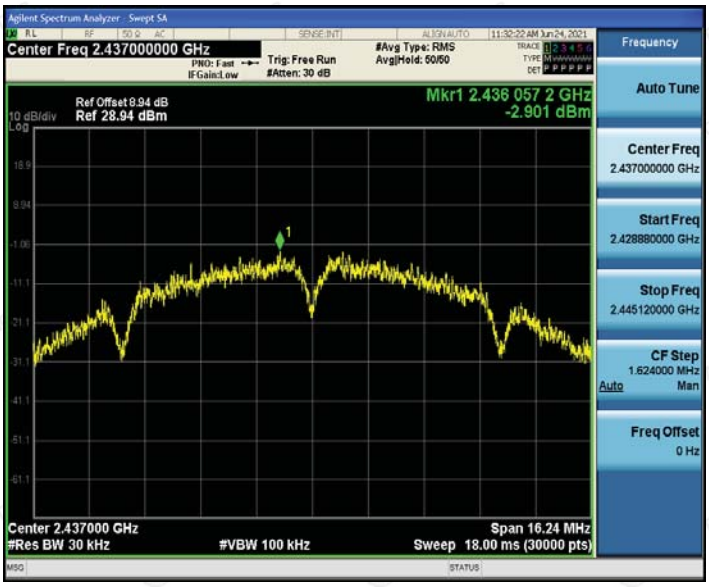
802.11b Modulation

Lowest channel



Middle channel



Highest channel

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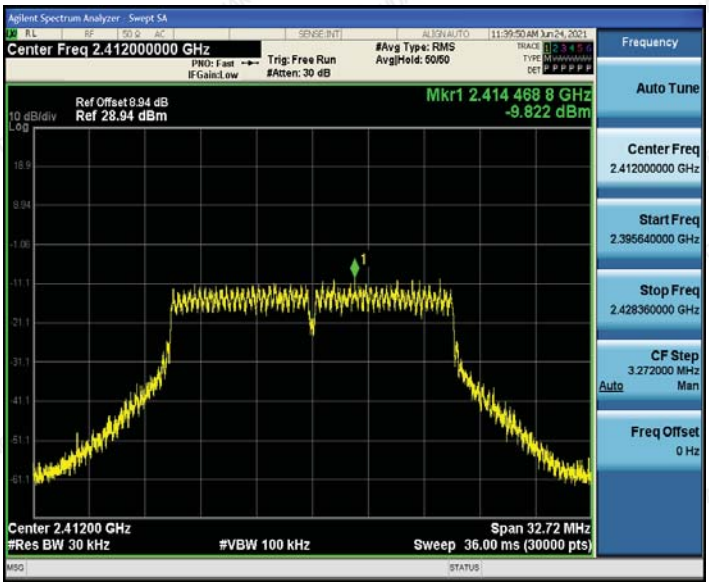
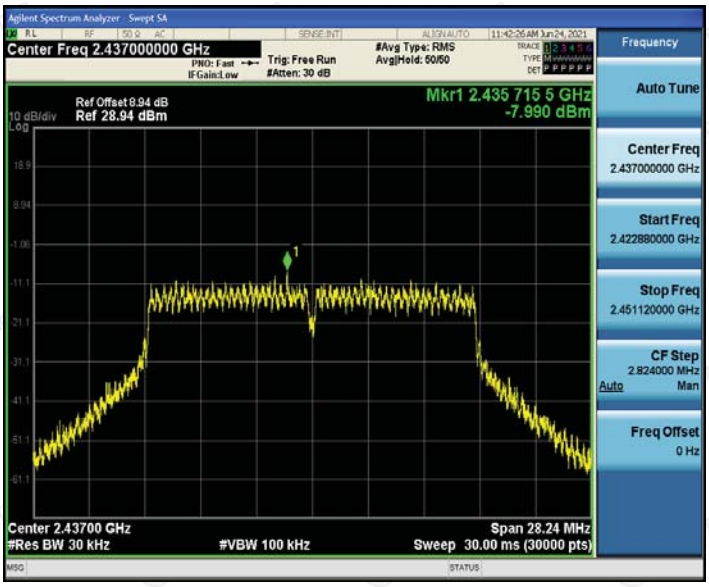
802.11g Modulation

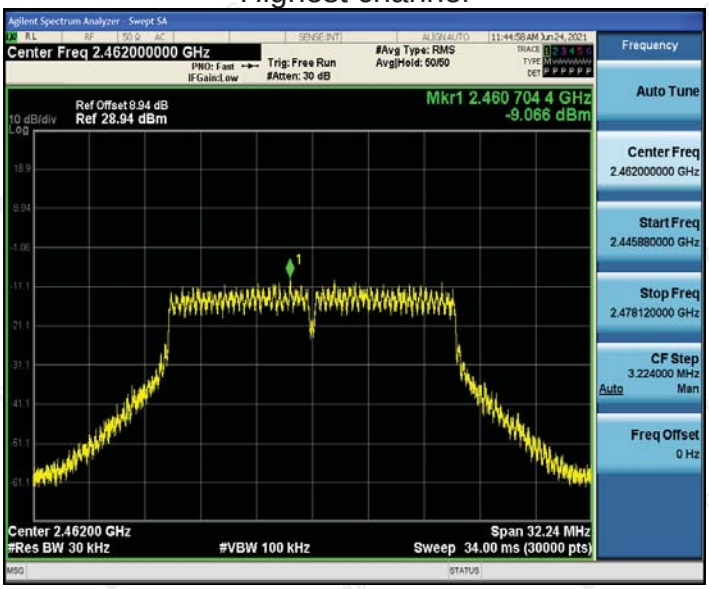
Lowest channel



Middle channel



Highest channel



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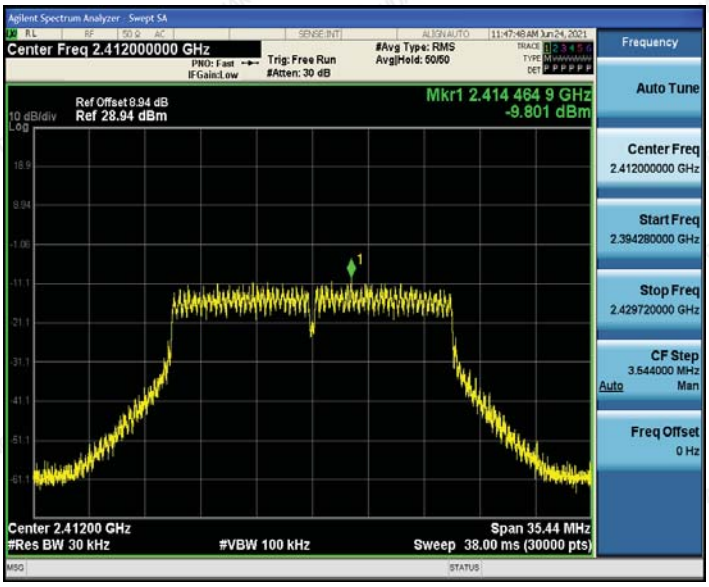
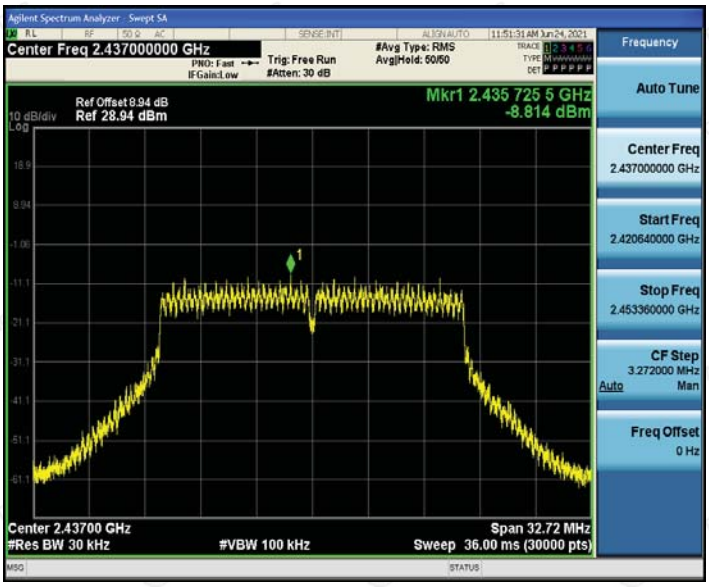
802.11n (HT20) Modulation

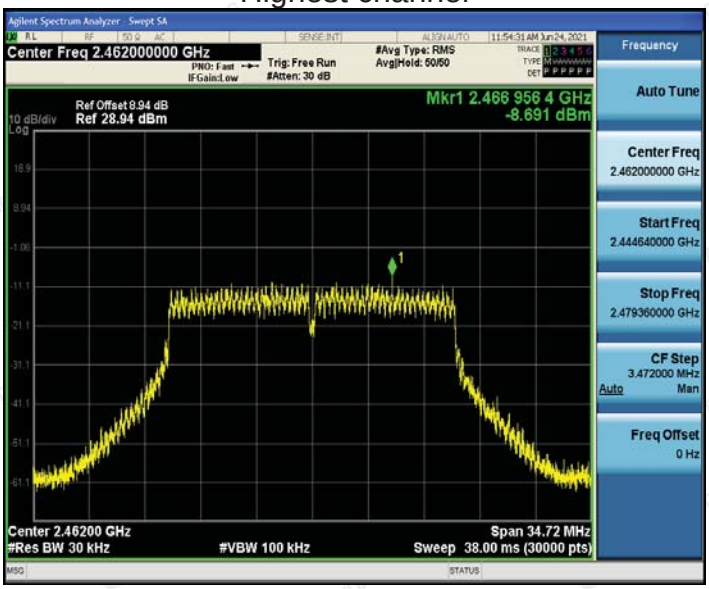
Lowest channel



Middle channel



Highest channel



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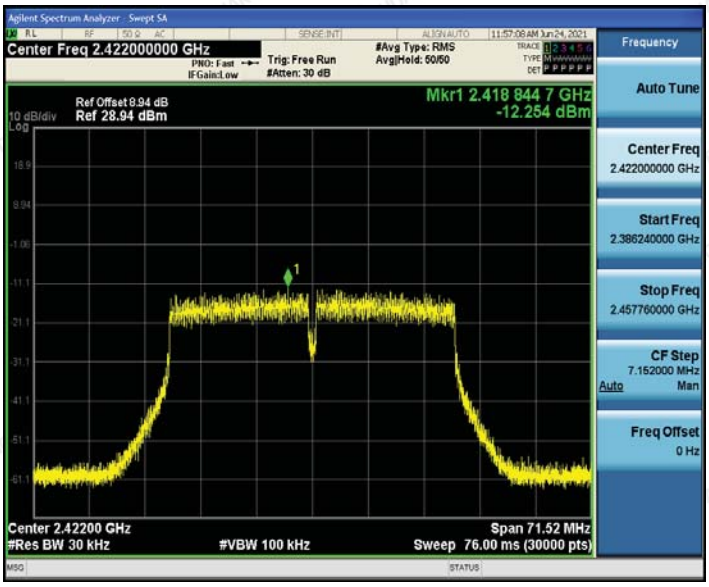
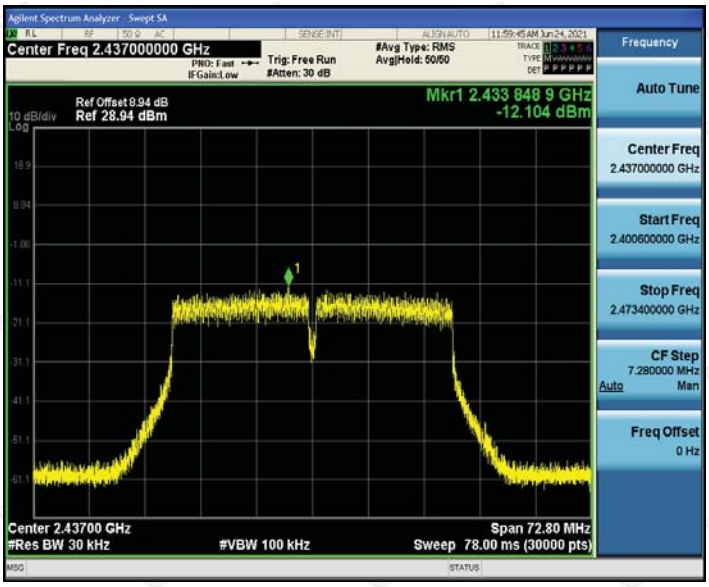
802.11n (HT40) Modulation

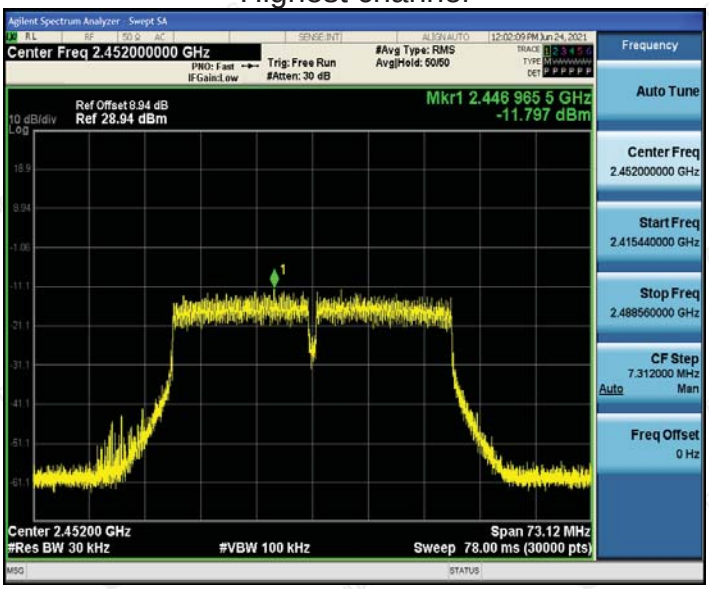
Lowest channel



Middle channel



Highest channel



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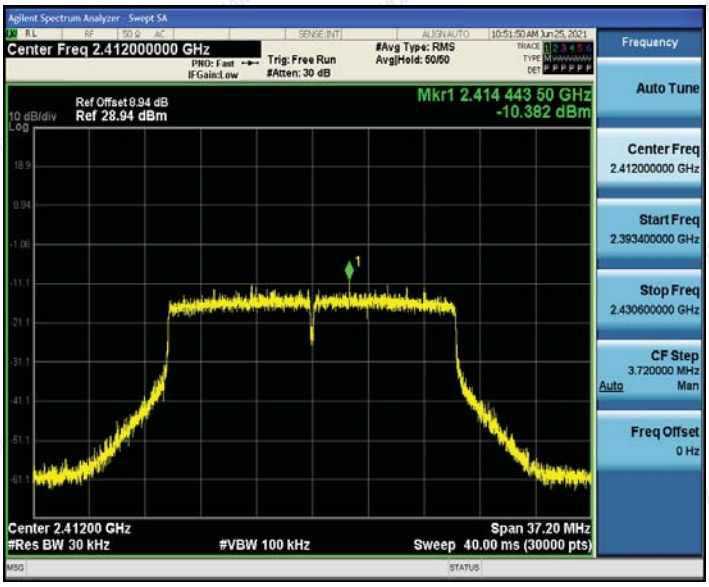
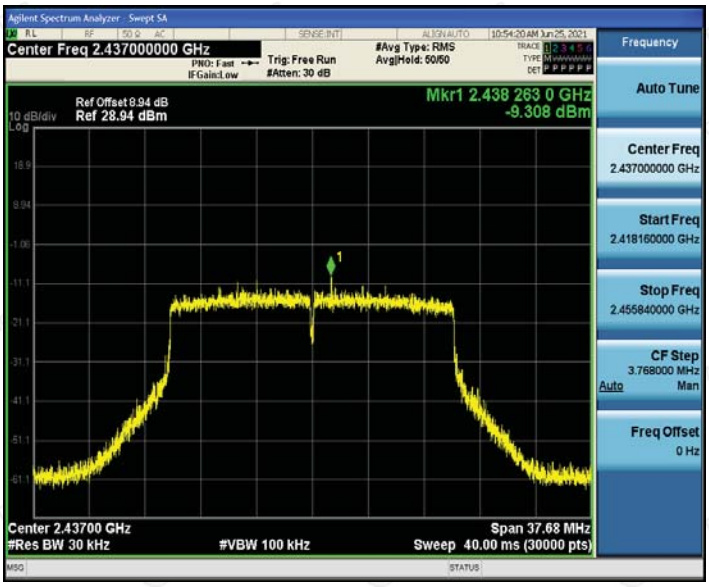
802.11ax(HT20) Modulation

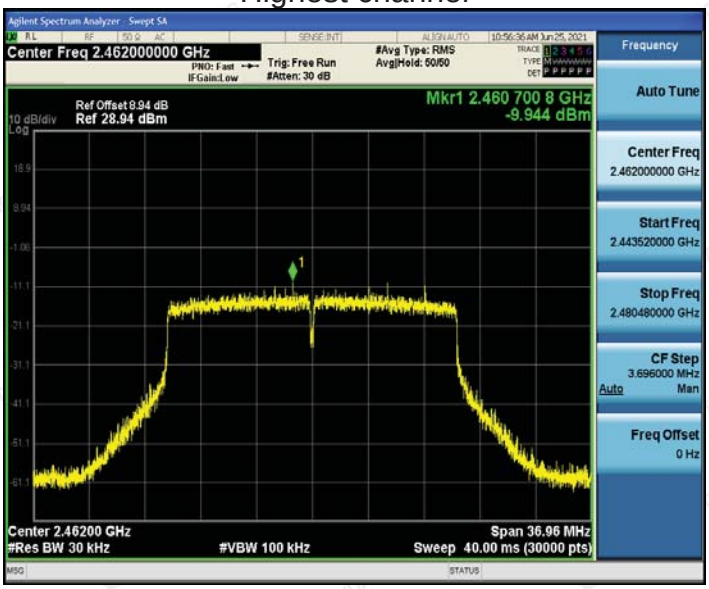
Lowest channel



Middle channel



Highest channel



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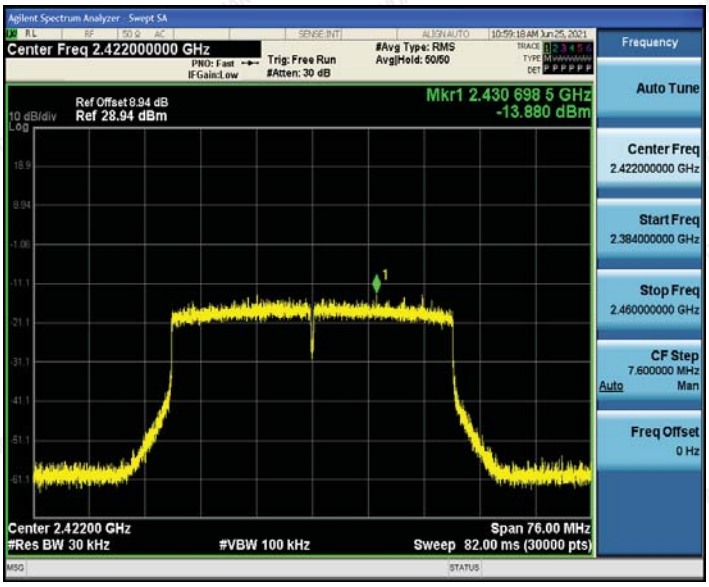
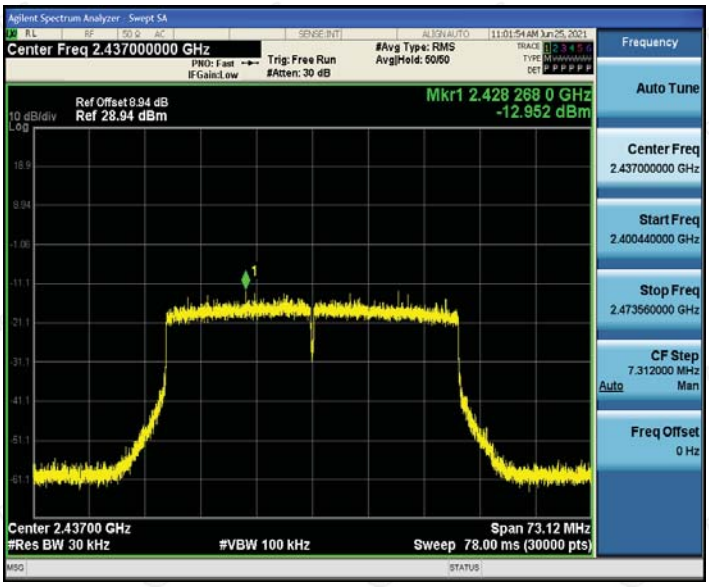
802.11ax (HT40) Modulation

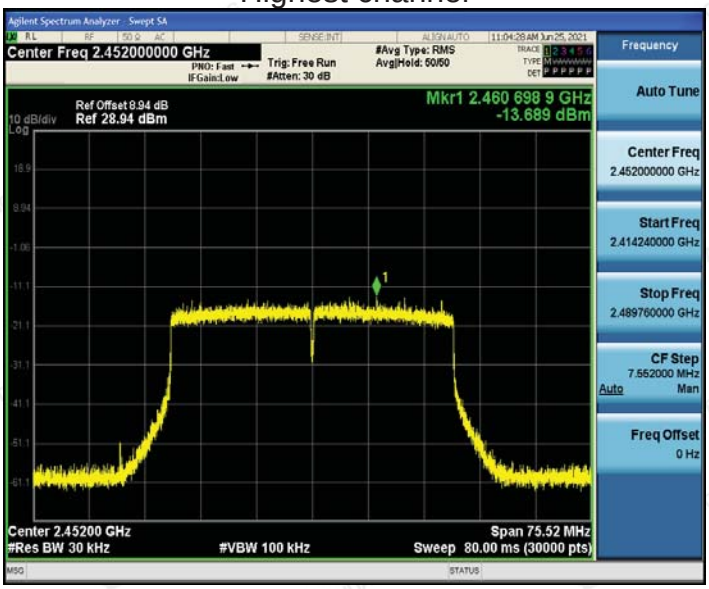
Lowest channel



Middle channel



Highest channel



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For MIMO antenna port 1+antenna port 2

TX 802.11b Mode			
Frequency	**Power Density (dBm)**	**Limit (dBm)**	**Result**
2412 MHz	/	8	/
2437 MHz	/	8	/
2462 MHz	/	8	/
TX 802.11g Mode			
2412 MHz	/	8	/
2437 MHz	/	8	/
2462 MHz	/	8	/
TX 802.11n/HT20 Mode			
2412 MHz	-6.76	8	**PASS**
2437 MHz	-5.87	8	**PASS**
2462 MHz	-5.98	8	**PASS**
TX 802.11n/HT40 Mode			
2422 MHz	-8.85	8	**PASS**
2437 MHz	-8.67	8	**PASS**
2452 MHz	-8.99	8	**PASS**
TX 802.11ax/HT20 Mode			
2412 MHz	-7.50	8	**PASS**
2437 MHz	-7.04	8	**PASS**
2462 MHz	-7.14	8	**PASS**
TX 802.11ax/HT40 Mode			
2422 MHz	-10.71	8	**PASS**
2437 MHz	-9.75	8	**PASS**
2452 MHz	-10.41	8	**PASS**

Note: 1 According to KDB 662911, Result power = $10\log(10^{(ant1/10}+10^{(ant2/10)})$.
2 Result unit: W, The end result is converted to units of dBm.
limit=8dBm-(direction gain-6dBi)=8-(3+10log2-6)= 8dBm

Note: This product supports antenna 1 and antenna 2 launch, but only support 802.11 n/ac/ax for MIMO mode, not support 802.11 b and 802.11 g for MIMO mode.

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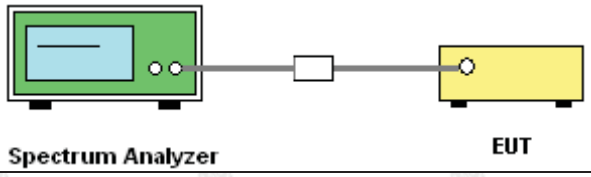
4.5. Conducted Band Edge and Spurious Emission Measurement

4.5.1. 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:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02. 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

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4.5.2. Test Instruments

RF Test Room					
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 10, 2020	Dec. 09, 2021
Signal generator	Agilent	N5183A	HKE-071	Dec. 10, 2020	Dec. 09, 2021
RF Cable (9KHz-26.5GHz)	Tonscend	170660	N/A	Dec. 10, 2020	Dec. 09, 2021
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 10, 2020	Dec. 09, 2021

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

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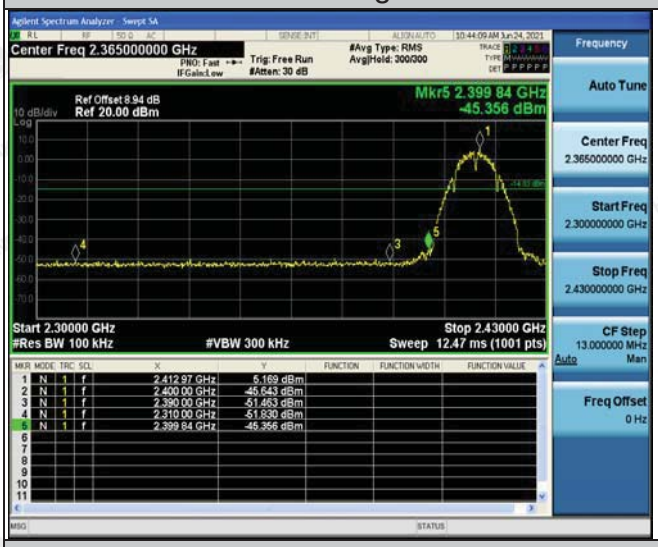
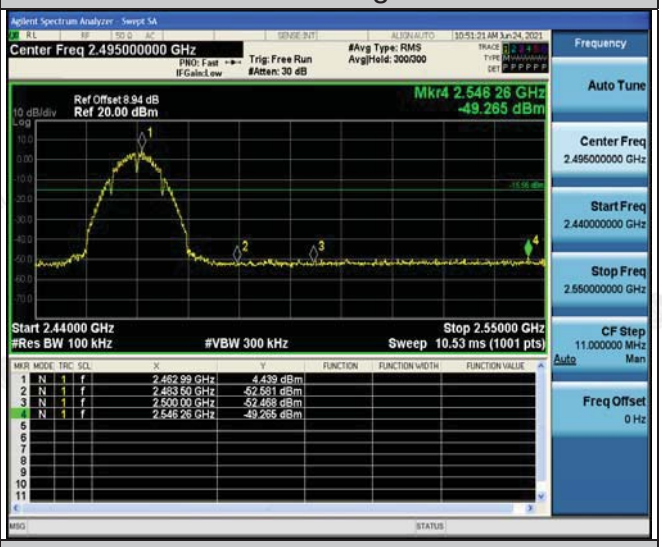
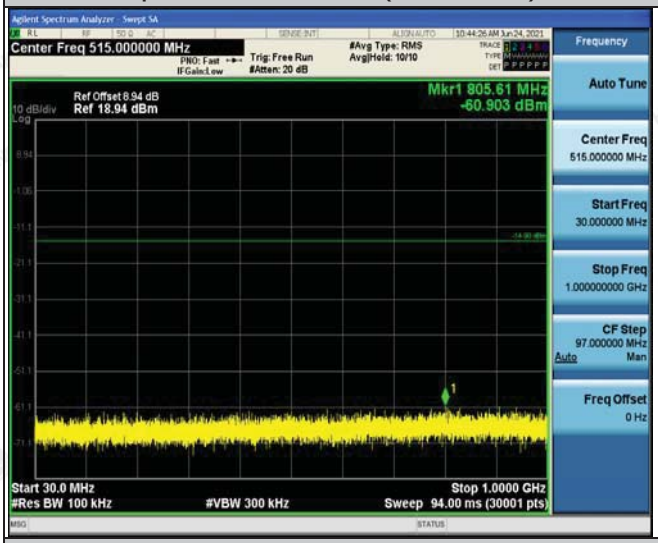
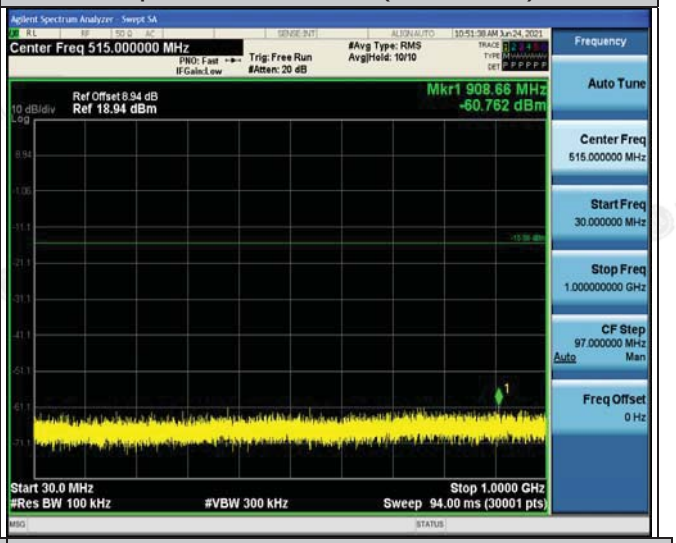
4.5.3. Test Data

Chain 1

802.11b Modulation

Lowest Channel	Highest Channel
Band Edge	Band Edge
	
Spurious emission(2412MHz)	Spurious emission(2462MHz)
	

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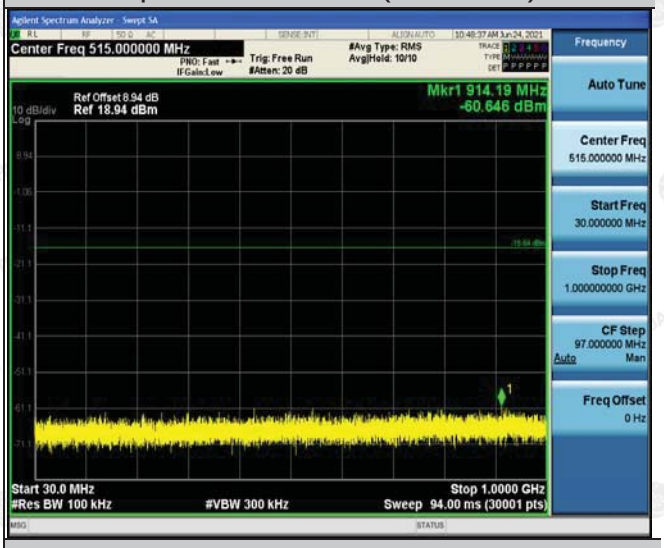
Spurious emission(2437MHz)



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