# FCC Test Report

**Test report**
**On Behalf of**
**Tradewinds Networks Incorporated**
**For**
**Wireless Router**
**Model No.: BRouter6**

**FCC ID: 2BF7S-BROUTER6**

**Prepared For :** **Tradewinds Networks Incorporated**
**23 Corporate Plaza Suite 150 Newport Beach, California 92660 United States**

**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:** **Apr. 17, 2024 ~ Apr. 30, 2024**
**Date of Report:** **Apr. 30, 2024**
**Report Number:** **HK2404171876-1E**

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# Test Result Certification

**Applicant's name** .....: Tradewinds Networks Incorporated

Address .....: 23 Corporate Plaza Suite 150 Newport Beach, California 92660 United States

**Manufacturer's Name** .....: Tradewinds Networks Incorporated

Address .....: 23 Corporate Plaza Suite 150 Newport Beach, California 92660 United States

**Product description**

Trade Mark: tradewinds networks

Product name.....: Wireless Router

Model and/or type reference .: BRouter6

**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 .....: **Apr. 17, 2024 ~ Apr. 30, 2024**

Date of Issue.....: **Apr. 30, 2024**

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

Testing Engineer : Len Liao

(Len Liao)

Technical Manager : Sliver Wan

(Sliver Wan)

Authorized Signatory : Jason Zhou

(Jason Zhou)

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# ** Modified History **

| Revision | Description | Issued Data | Remark |
|---|---|---|---|
| Revision 1.0 | Initial Test Report Release | Apr. 30, 2024 | Jason Zhou |
| | | | |
| | | | |

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Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

# 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: | Wireless Router |
| Model Name: | BRouter6 |
| Serial Model: | N/A |
| Model Difference: | N/A |
| Trade Mark: | tradewinds networks |
| FCC ID: | 2BF7S-BROUTER6 |
| Antenna Type: | External Antenna |
| Antenna Gain: | Antenna 1:4.87dBi<br>Antenna 2:4.66dBi<br>MIMO: 7.78dBi |
| Operation frequency: | 802.11b/g/n/ax(HT20): 2412~2462MHz<br>802.11n/ax(HT40): 2422~2452MHz |
| Number of Channels: | 802.11b/g/n/ax(HT20): 11CH<br>802.11n/ax(HT40): 7CH |
| Modulation Type: | CCK/OFDM/DBPSK/DAPSK |
| Power Source: | DC IN:12V, 1.0A |
| Power Rating: | DC IN:12V, 1.0A |
| Hardware Version | V2.1 |
| Software Version: | V2.1 |
| Note: 1.The EUT incorporates a MIMO function. Physically, it provides two completed transmitters and receivers(2T2R), two transmit signals are completely correlated, then, Direction gain=GANT + Array Gain(Array Gain=10 log(2) dB for power spectral density; Array Gain=0 for power measurement)<br>2. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.<br>3. Antenna gain Refer to the antenna specifications.<br>4. The cable loss data is obtained from the supplier.<br>5. The test results in the report only apply to the tested sample. | |

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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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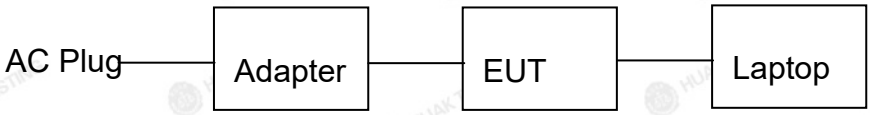
## 2.4. Description of Test Setup

Operation of EUT during testing:




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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## 2.5. 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.

| Item | Equipment | Trade Mark | Model/Type No. | Specification | Remark |
|---|---|---|---|---|---|
| 1 | Wireless Router | tradewinds networks | BRouter6 | N/A | EUT |
| 2 | Network cable | N/A | N/A | Length:0.94m | Accessory |
| 3 | Adapter | N/A | RD1201000-C55-35MGD | Input: 100-240V, 50/60Hz, 0.6A Output: 12V, 1.0A | Accessory |
| 4 | Laptop | N/A | TP00096A | Input: DC 20V, 2.25A/3.25A | Peripheral |
| | | | | | |
| | | | | | |

***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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# 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(HT20)/ax (HT20) | 6.5Mbps |
| 802.11n(HT40)/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(HT20)/ax (HT20), 13.5Mbps for 802.11n(HT40)/ax (HT40).

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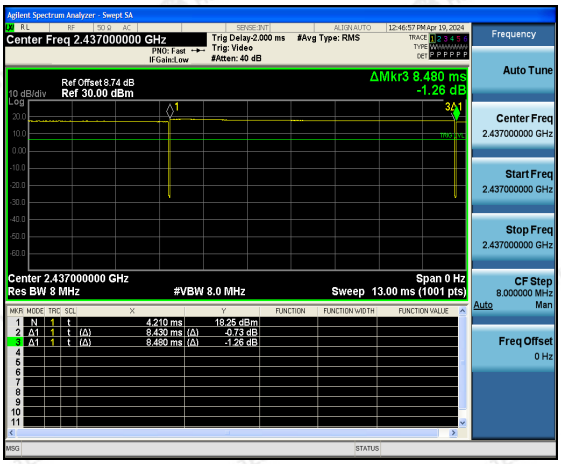
3. Mode Test Duty Cycle

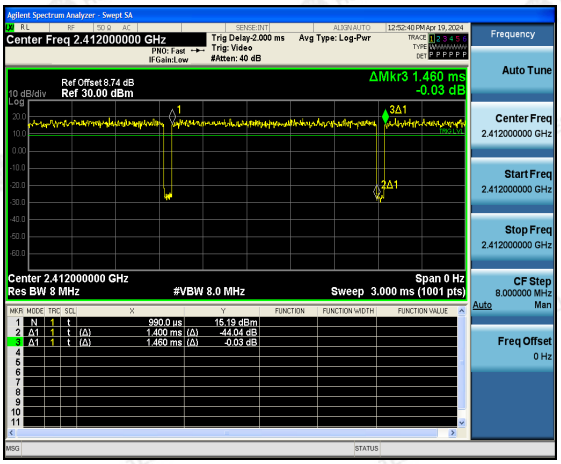
ANT.1:

| Mode | Duty Cycle | Duty Cycle Factor (dB) |
|---|---|---|
| 802.11b | 0.99 | -0.04 |
| 802.11g | 0.96 | -0.18 |
| 802.11n(HT20) | 0.96 | -0.18 |
| 802.11n(HT40) | 0.93 | -0.32 |
| 802.11ax(HT20) | 0.92 | -0.36 |
| 802.11ax(HT40) | 0.86 | -0.66 |

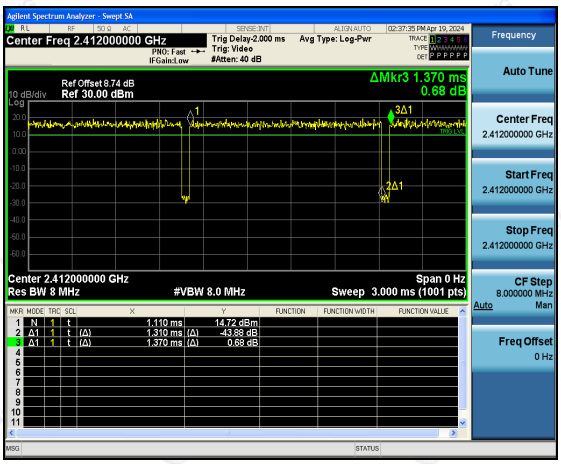
**802.11b**



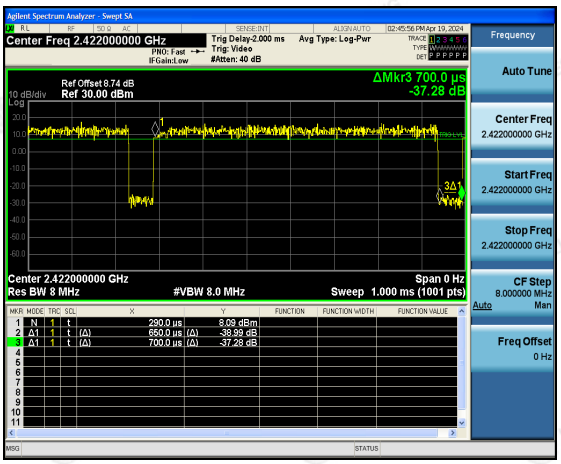

**802.11g**




**802.11n(HT20)**




**802.11n(HT40)**

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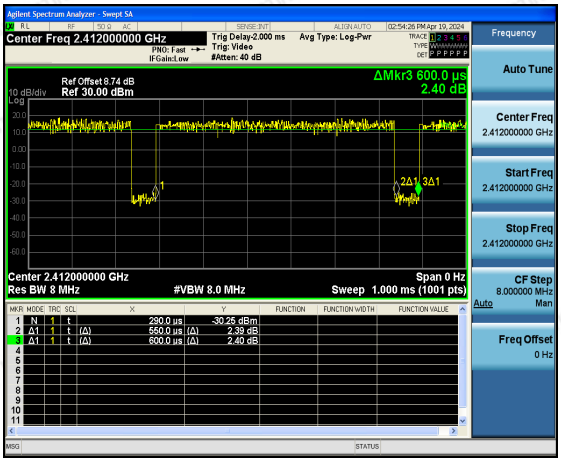
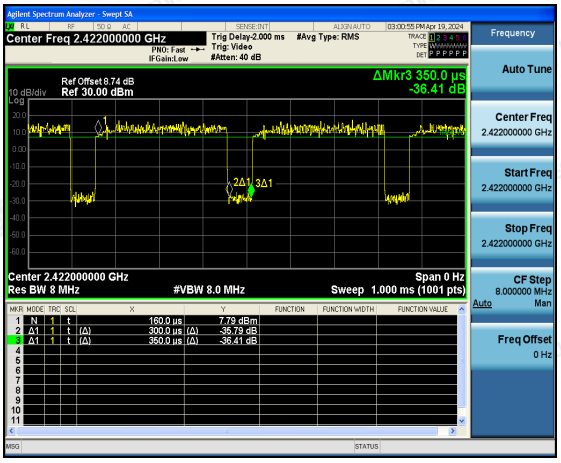
## 802.11ax(HT20)




## 802.11ax(HT40)

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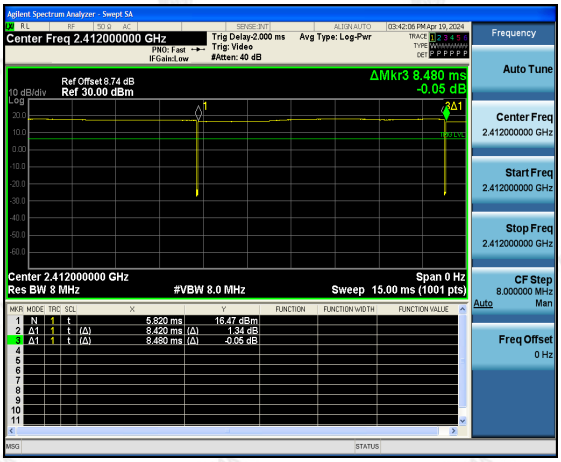
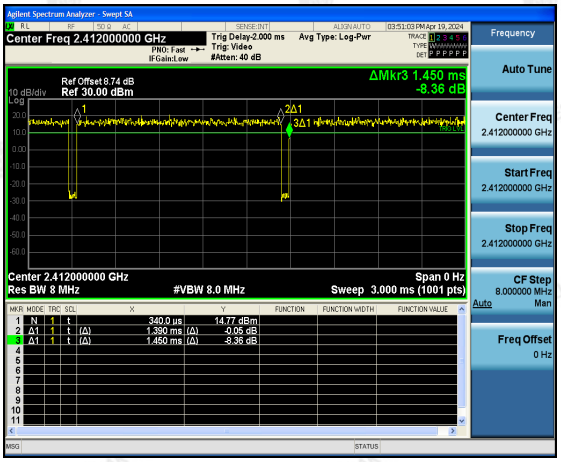
ANT.2:

| Mode | Duty Cycle | Duty Cycle Factor (dB) |
|---|---|---|
| 802.11b | 0.99 | -0.04 |
| 802.11g | 0.96 | -0.18 |
| 802.11n(HT20) | 0.96 | -0.18 |
| 802.11n(HT40) | 0.92 | -0.36 |
| 802.11ax(HT20) | 0.90 | -0.46 |
| 802.11ax(HT40) | 0.86 | -0.66 |

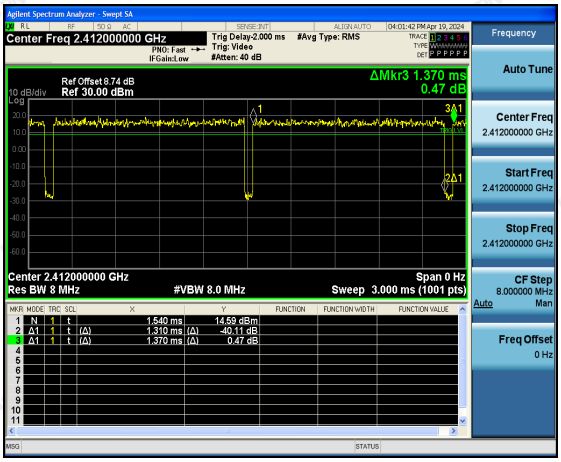
**802.11b**



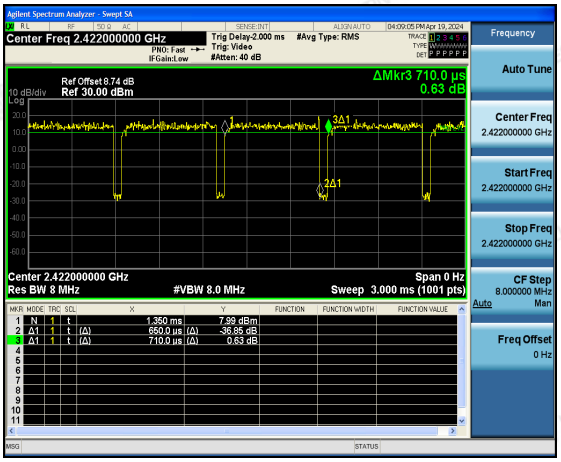

**802.11g**




**802.11n(HT20)**




**802.11n(HT40)**

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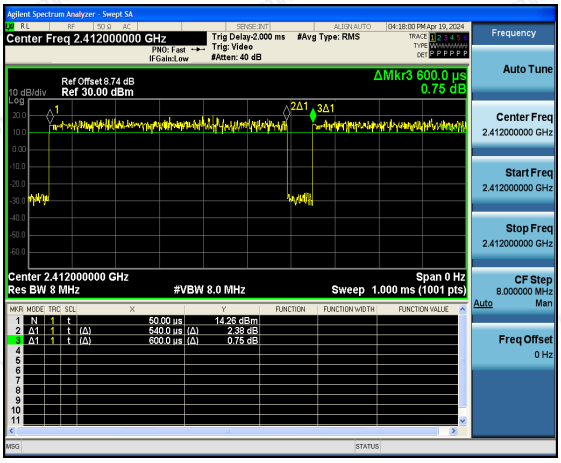
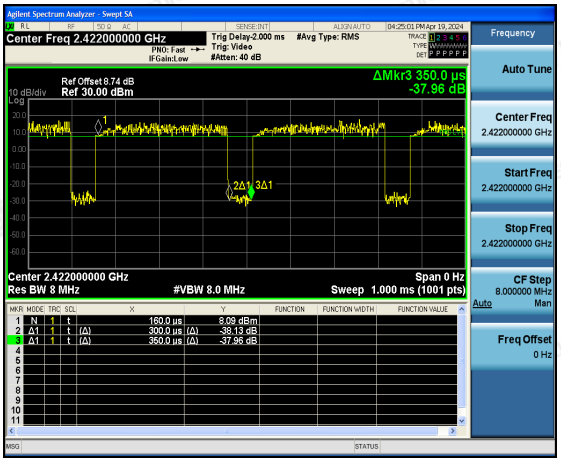
## 802.11ax(HT20)




## 802.11ax(HT40)

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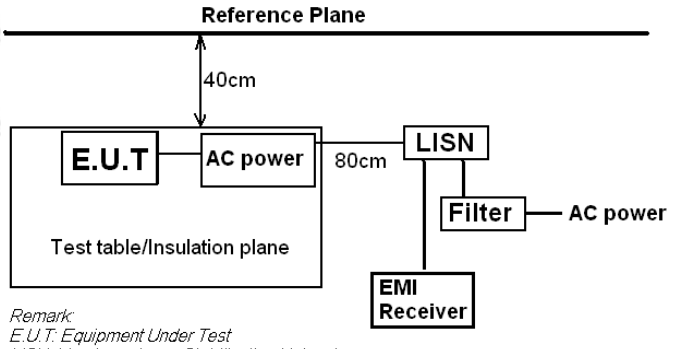
# 4. Test Results and Measurement Data

## 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:<br>E.U.T: Equipment Under Test<br>LISN: Line Impedence Stabilization Network<br>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.<br>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).<br>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 | ESR | HKE-005 | Feb. 20, 2024 | Feb. 19, 2025 |
| LISN | R&S | ENV216 | HKE-002 | Feb. 20, 2024 | Feb. 19, 2025 |
| LISN | R&S | ENV216 | HKE-059 | Feb. 20, 2024 | Feb. 19, 2025 |
| Coax cable (9KHz-30MHz) | Times | 381806-002 | N/A | Feb. 20, 2024 | Feb. 19, 2025 |
| EMI Test Software | Tonscend | JS32-CE 2.5.0.6 | HKE-081 | N/A | N/A |
| 10dB Attenuator | Schwarzbeck | VTSD9561F | HKE-153 | Feb. 20, 2024 | Feb. 19, 2025 |

***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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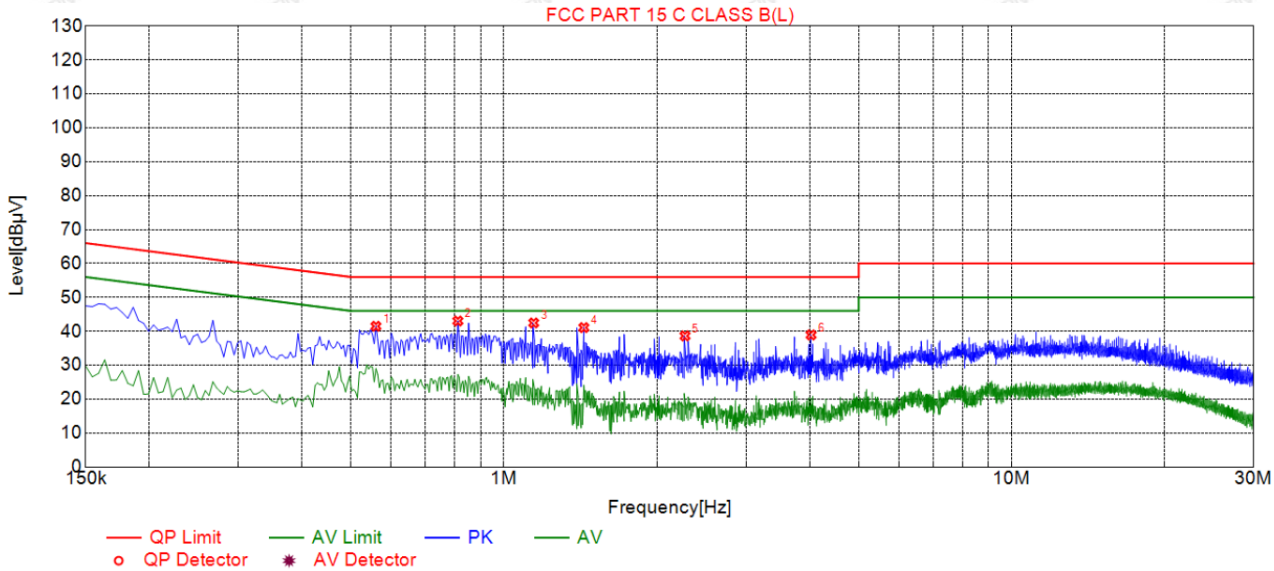
### 4.1.3 Test data

Test Specification: Line




| Suspected List | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | Freq. [MHz] | Level [dBμV] | Factor [dB] | Limit [dBμV] | Margin [dB] | Reading [dBμV] | Detector | Type |
| 1 | 0.5595 | 41.48 | 20.06 | 56.00 | 14.52 | 21.42 | PK | L |
| 2 | 0.8115 | 43.04 | 20.06 | 56.00 | 12.96 | 22.98 | PK | L |
| 3 | 1.1445 | 42.47 | 20.09 | 56.00 | 13.53 | 22.38 | PK | L |
| 4 | 1.4370 | 41.09 | 20.10 | 56.00 | 14.91 | 20.99 | PK | L |
| 5 | 2.2740 | 38.64 | 20.18 | 56.00 | 17.36 | 18.46 | PK | L |
| 6 | 4.0290 | 38.93 | 20.25 | 56.00 | 17.07 | 18.68 | PK | L |

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

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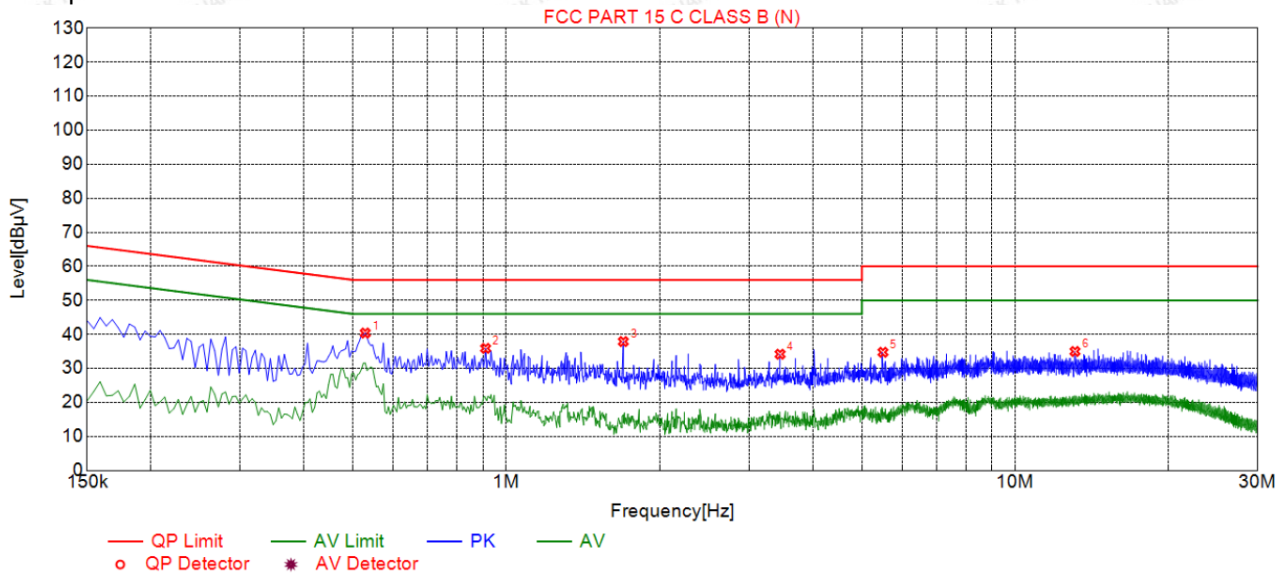
Test Specification: Neutral




| Suspected List | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | Freq. [MHz] | Level [dBμV] | Factor [dB] | Limit [dBμV] | Margin [dB] | Reading [dBμV] | Detector | Type |
| 1 | 0.5280 | 40.39 | 20.04 | 56.00 | 15.61 | 20.35 | PK | N |
| 2 | 0.9105 | 35.89 | 20.06 | 56.00 | 20.11 | 15.83 | PK | N |
| 3 | 1.6980 | 37.90 | 20.13 | 56.00 | 18.10 | 17.77 | PK | N |
| 4 | 3.4530 | 34.17 | 20.25 | 56.00 | 21.83 | 13.92 | PK | N |
| 5 | 5.5005 | 34.74 | 20.26 | 60.00 | 25.26 | 14.48 | PK | N |
| 6 | 13.1190 | 34.98 | 19.96 | 60.00 | 25.02 | 15.02 | PK | N |

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

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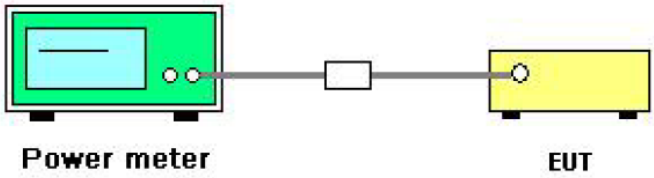
## 4.2. Maximum Conducted Output Power

### 4.2.1. Test Specification

| | |
|---|---|
| **Test Requirement:** | FCC Part15 C Section 15.247 (b)(3) |
| **Test Method:** | KDB 558074 D01 15.247 Meas Guidance v05r02 |
| **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.<br>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.<br>3. Set to the maximum power setting and enable the EUT transmit continuously.<br>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** |
| Spectrum analyzer | Agilent | N9020A | HKE-048 | Feb. 20, 2024 | Feb. 19, 2025 |
| Power meter | Agilent | E4419B | HKE-085 | Feb. 20, 2024 | Feb. 19, 2025 |
| Power Sensor | Agilent | E9300A | HKE-086 | Feb. 20, 2024 | Feb. 19, 2025 |
| RF cable | Times | 1-40G | HKE-034 | Feb. 20, 2024 | Feb. 19, 2025 |
| RF automatic control unit | Tonscend | JS0806-2 | HKE-060 | Feb. 20, 2024 | Feb. 19, 2025 |
| RF Test Software | Tonscend | JS1120-3 Version 3.3.23 | HKE-083 | 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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### 4.2.3. Test Data

| Mode | Test channel | Frequency (MHz) | Reading Conducted Output Power (dBm) | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|---|
| | | | Antenna port 1 | Antenna port 2 | MIMO | | |
| 802.11b | CH01 | 2412 | 13.24 | 13.22 | | 30 | PASS |
| 802.11b | CH06 | 2437 | 13.75 | 14.29 | | 30 | PASS |
| 802.11b | CH11 | 2462 | 14.61 | 14.58 | | 30 | PASS |
| 802.11g | CH01 | 2412 | 12.56 | 12.46 | | 30 | PASS |
| 802.11g | CH06 | 2437 | 12.89 | 13.61 | | 30 | PASS |
| 802.11g | CH11 | 2462 | 13.67 | 13.98 | | 30 | PASS |
| 802.11n(HT20) | CH01 | 2412 | 12.42 | 12.32 | 15.38 | 30 | PASS |
| 802.11n(HT20) | CH06 | 2437 | 12.84 | 13.46 | 16.17 | 30 | PASS |
| 802.11n(HT20) | CH11 | 2462 | 13.50 | 13.81 | 16.67 | 30 | PASS |
| 802.11n(HT40) | CH03 | 2422 | 12.61 | 12.70 | 15.67 | 30 | PASS |
| 802.11n(HT40) | CH06 | 2437 | 12.44 | 13.05 | 15.77 | 30 | PASS |
| 802.11n(HT40) | CH09 | 2452 | 12.07 | 12.69 | 15.40 | 30 | PASS |
| 802.11ax(HT20) | CH01 | 2412 | 12.21 | 12.33 | 15.28 | 30 | PASS |
| 802.11ax(HT20) | CH06 | 2437 | 12.77 | 13.43 | 16.12 | 30 | PASS |
| 802.11ax(HT20) | CH11 | 2462 | 13.50 | 13.93 | 16.73 | 30 | PASS |
| 802.11ax(HT40) | CH03 | 2422 | 12.37 | 12.44 | 15.42 | 30 | PASS |
| 802.11ax(HT40) | CH06 | 2437 | 12.23 | 12.86 | 15.57 | 30 | PASS |
| 802.11ax(HT40) | CH09 | 2452 | 11.88 | 12.48 | 15.20 | 30 | PASS |

Note: 1.The test results including the cable lose.
2. This product supports antenna 1 and antenna 2 launch, but only support 802.11 n/ax for MIMO mode, not support 802.11 b and 802.11 g for MIMO mode.

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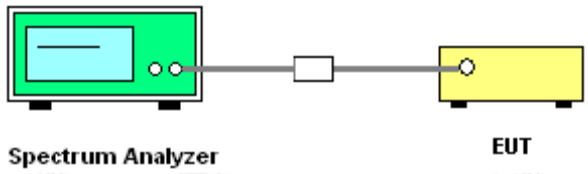
## 4.3. Emission Bandwidth

### 4.3.1. Test Specification

| | |
|---|---|
| **Test Requirement:** | FCC Part15 C Section 15.247 (a)(2) |
| **Test Method:** | KDB 558074 D01 15.247 Meas Guidance v05r02 |
| **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.<br>2. Set to the maximum power setting and enable the EUT transmit continuously.<br>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.<br>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 | Feb. 20, 2024 | Feb. 19, 2025 |
| RF cable | Times | 1-40G | HKE-034 | Feb. 20, 2024 | Feb. 19, 2025 |
| RF automatic control unit | Tonscend | JS0806-2 | HKE-060 | Feb. 20, 2024 | Feb. 19, 2025 |
| RF Test Software | Tonscend | JS1120-3 Version 3.3.23 | HKE-083 | 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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### 4.3.3. Test data

**For antenna port 1**

| Test channel | 6dB Emission Bandwidth (MHz) | | | | | |
|---|---|---|---|---|---|---|
| | 802.11b | 802.11g | 802.11n (HT20) | 802.11n (HT40) | 802.11ax (HT20) | 802.11ax (HT40) |
| Lowest | 7.60 | 15.48 | 15.04 | 35.04 | 16.92 | 35.92 |
| Middle | 7.56 | 15.44 | 12.76 | 35.04 | 16.64 | 35.92 |
| Highest | 8.04 | 14.04 | 13.76 | 35.12 | 16.84 | 37.60 |
| Limit: | >500KHz | | | | | |
| Test Result: | PASS | | | | | |

**Test plots as follows:**

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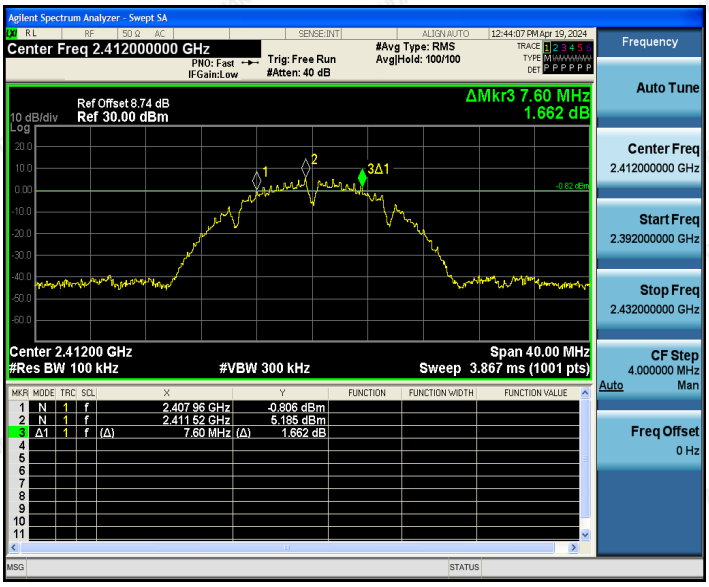
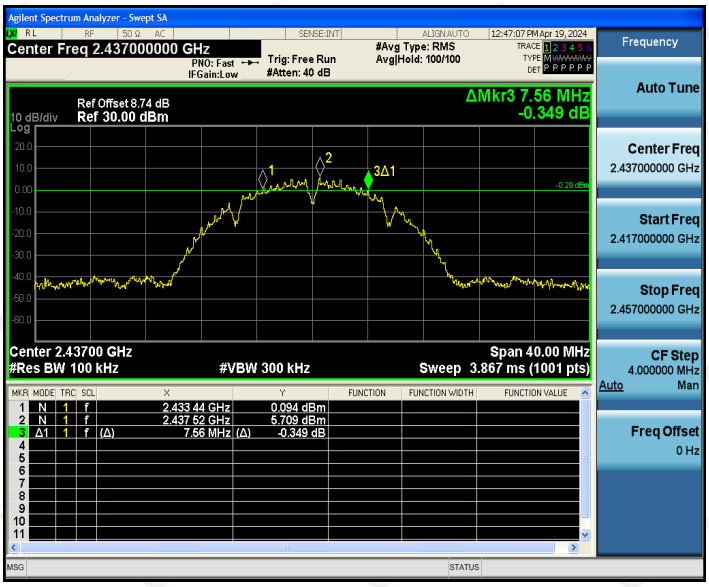
**802.11b Modulation**

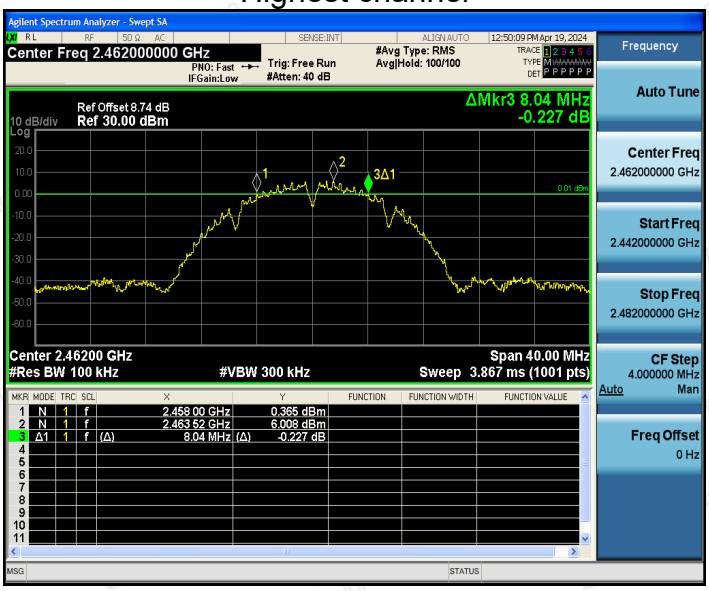
Lowest channel




Middle channel




Highest channel

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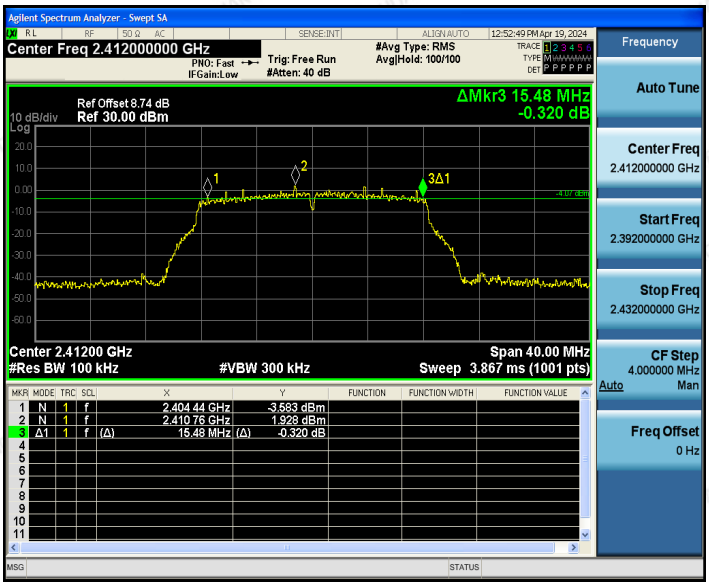
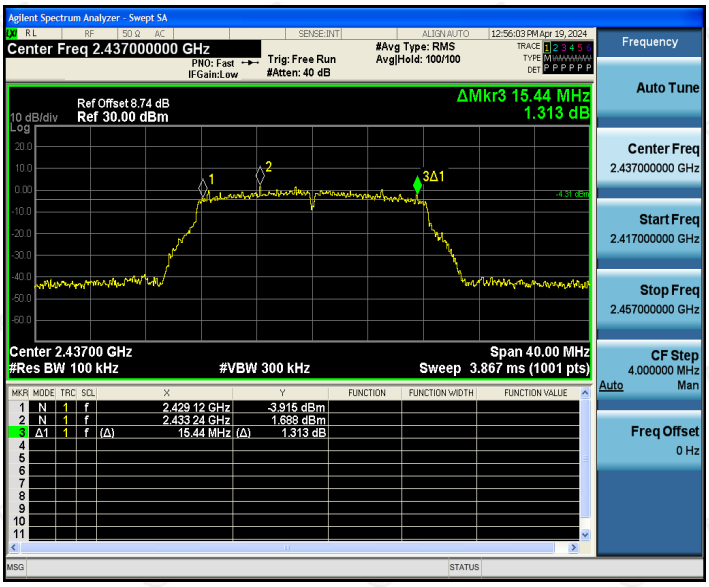
**802.11g Modulation**

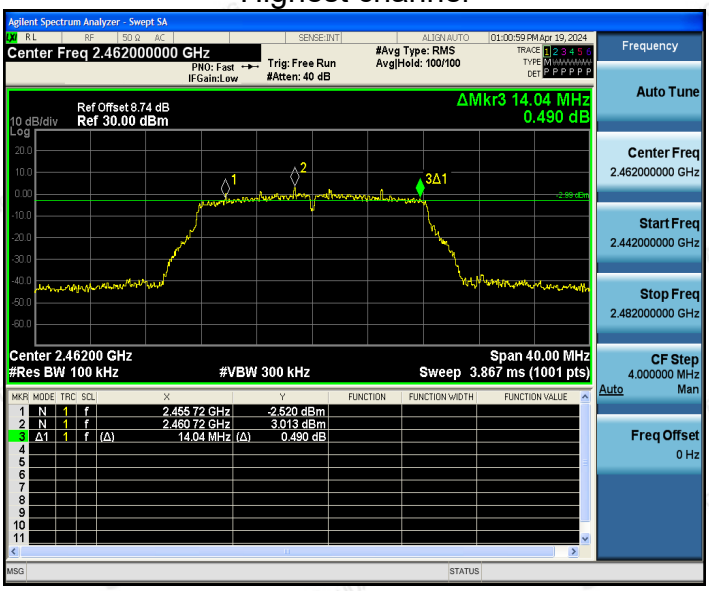
Lowest channel




Middle channel




Highest channel

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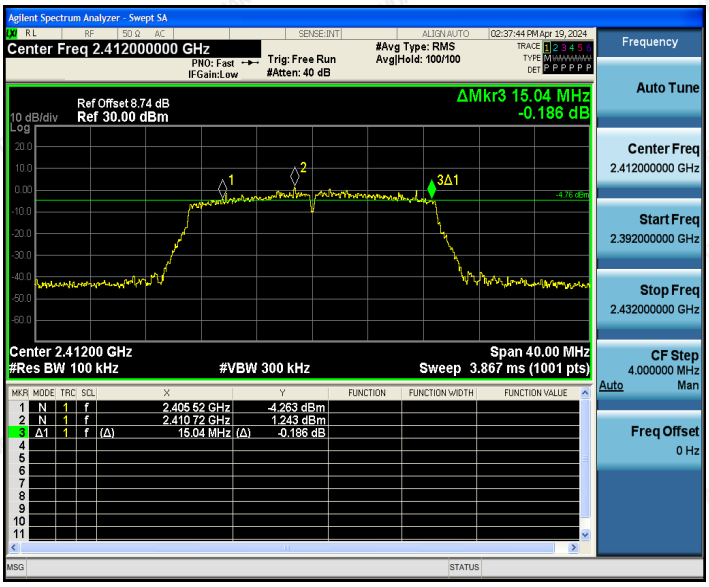
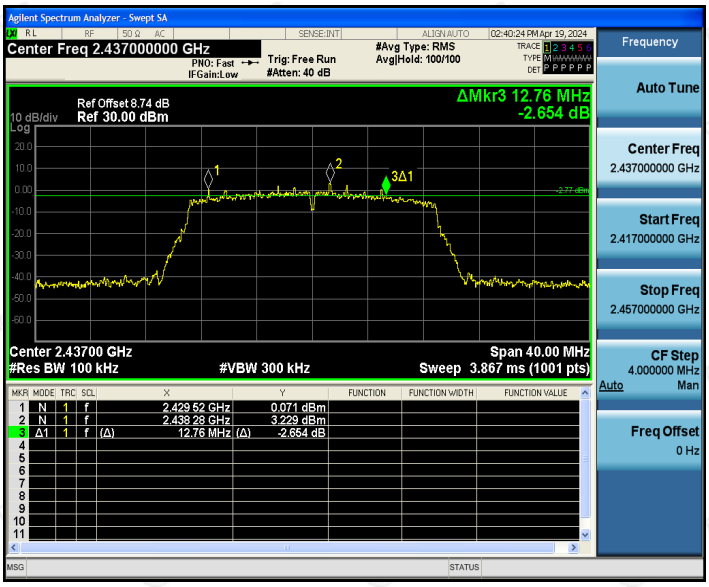
**802.11n (HT20) Modulation**

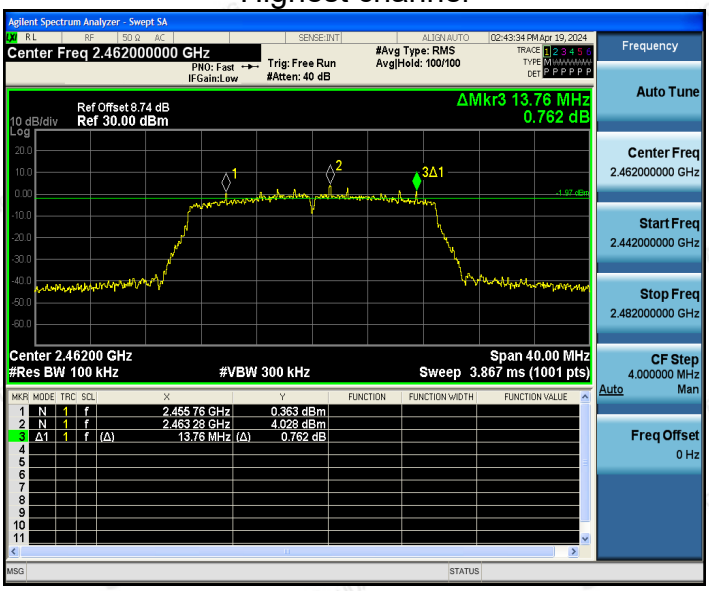
Lowest channel




Middle channel




Highest channel

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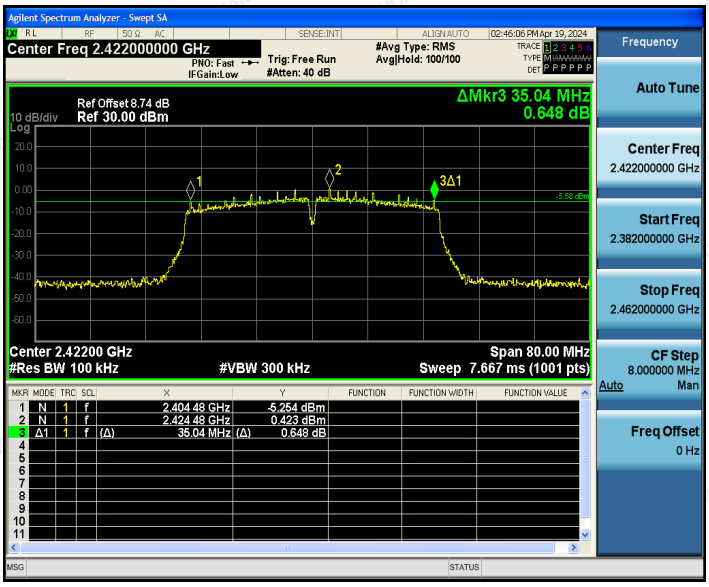
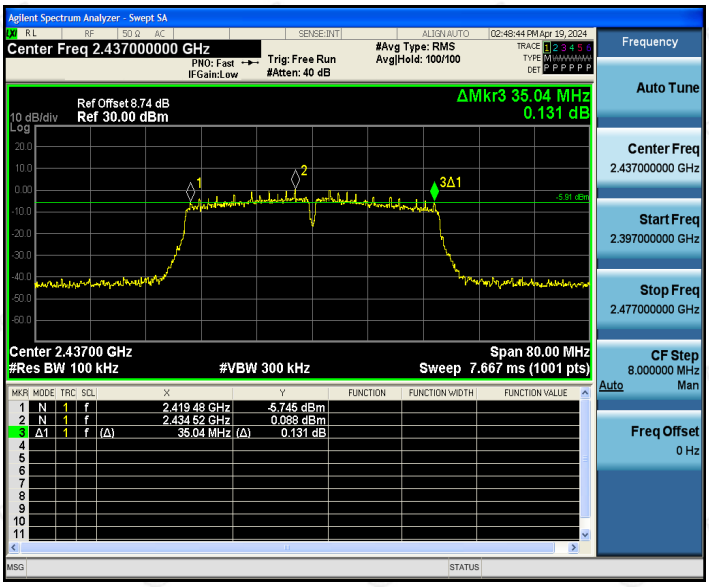
**802.11n (HT40) Modulation**

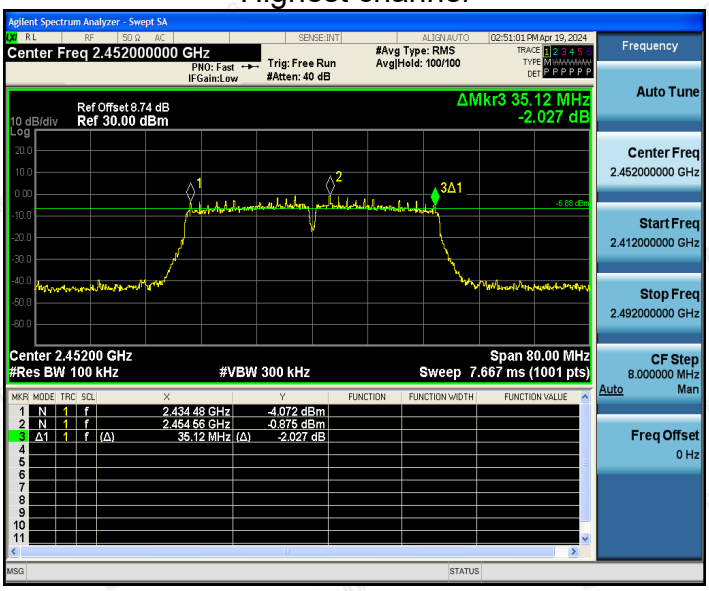
Lowest channel




Middle channel




Highest channel

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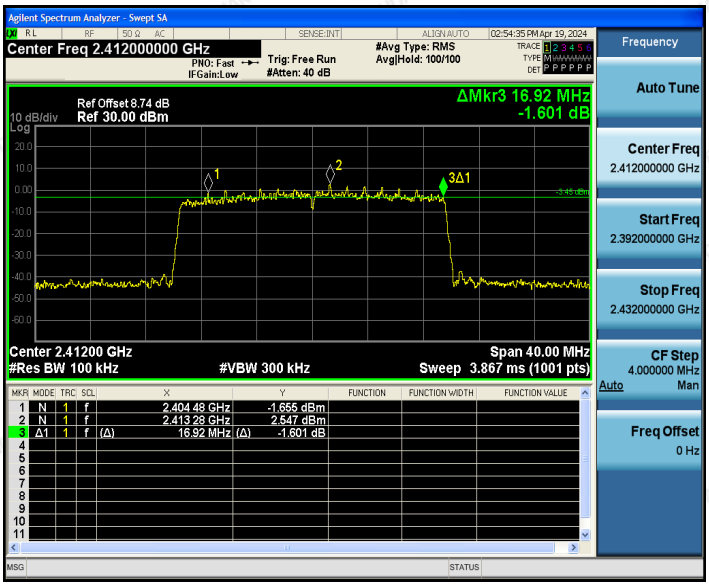
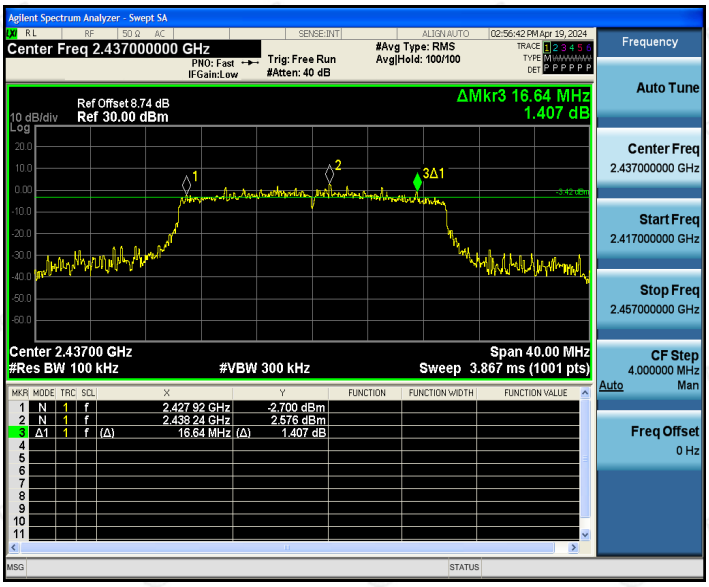
**802.11ax (HT20) Modulation**

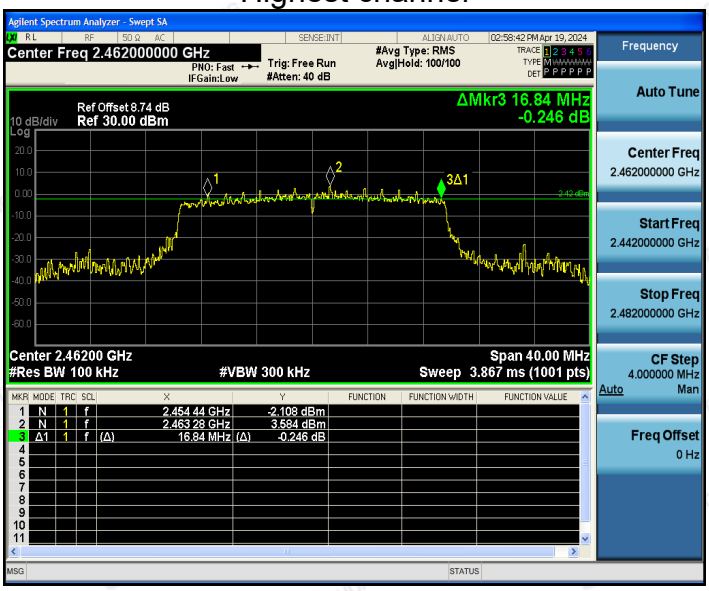
Lowest channel




Middle channel




Highest channel

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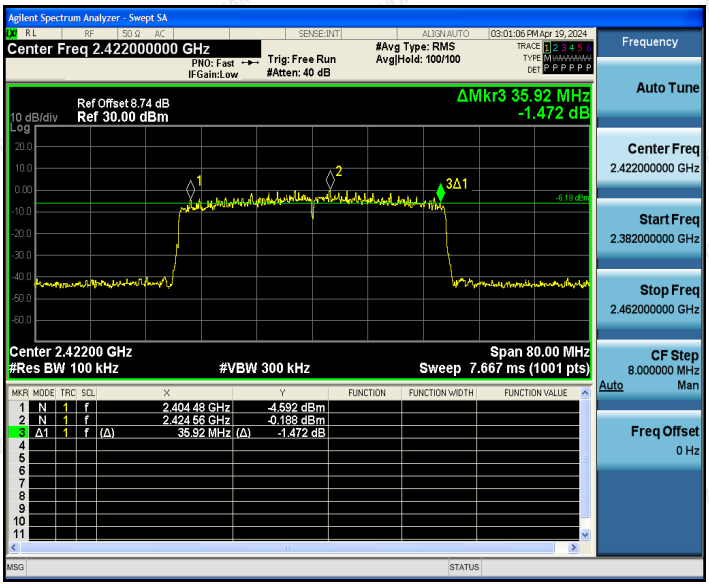
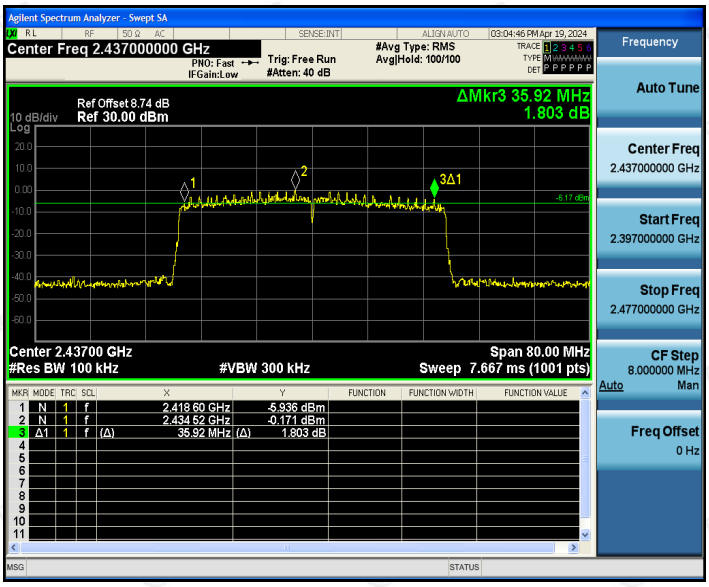
**802.11ax (HT40) Modulation**

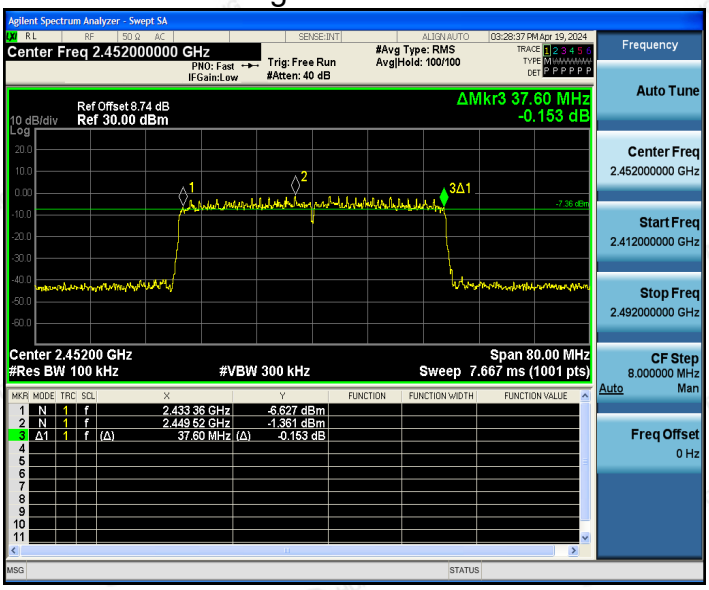
Lowest channel




Middle channel




Highest channel

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**For antenna port 2**

| Test channel | 6dB Emission Bandwidth (MHz) | | | | | |
|---|---|---|---|---|---|---|
| | 802.11b | 802.11g | 802.11n (HT20) | 802.11n (HT40) | 802.11ax (HT20) | 802.11ax (HT40) |
| Lowest | 8.04 | 14.32 | 16.28 | 35.12 | 18.16 | 35.04 |
| Middle | 8.56 | 15.12 | 16.08 | 32.56 | 16.28 | 35.04 |
| Highest | 8.04 | 13.00 | 15.80 | 35.04 | 16.40 | 37.36 |
| Limit: | >500KHz | | | | | |
| Test Result: | PASS | | | | | |

**Test plots as follows:**

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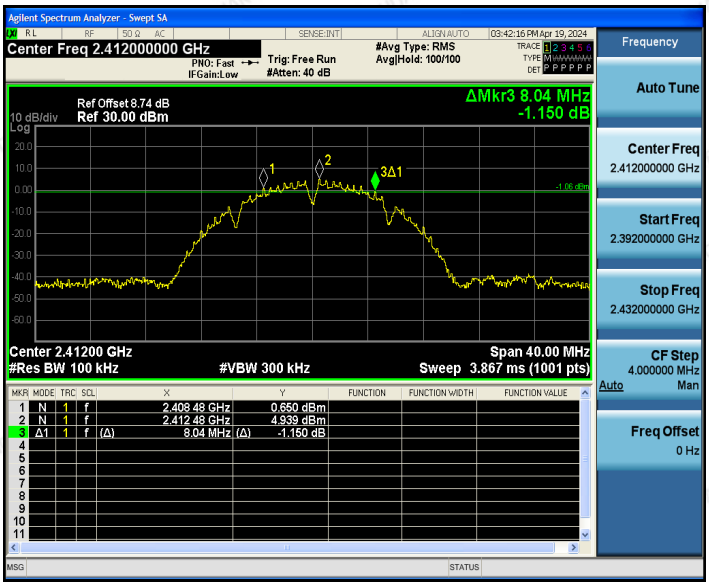
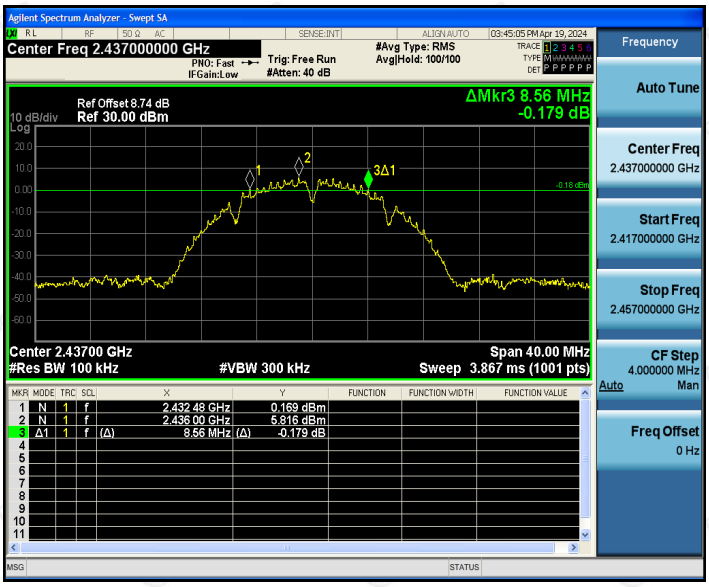
**802.11b Modulation**

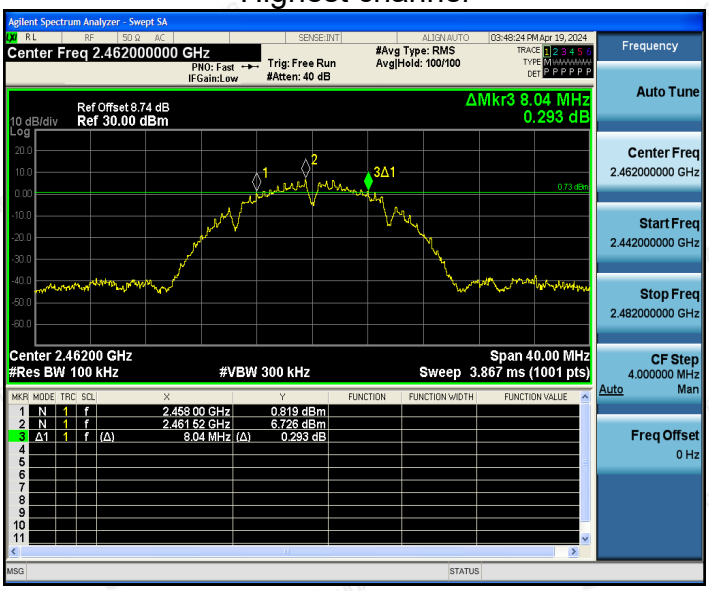
Lowest channel




Middle channel




Highest channel

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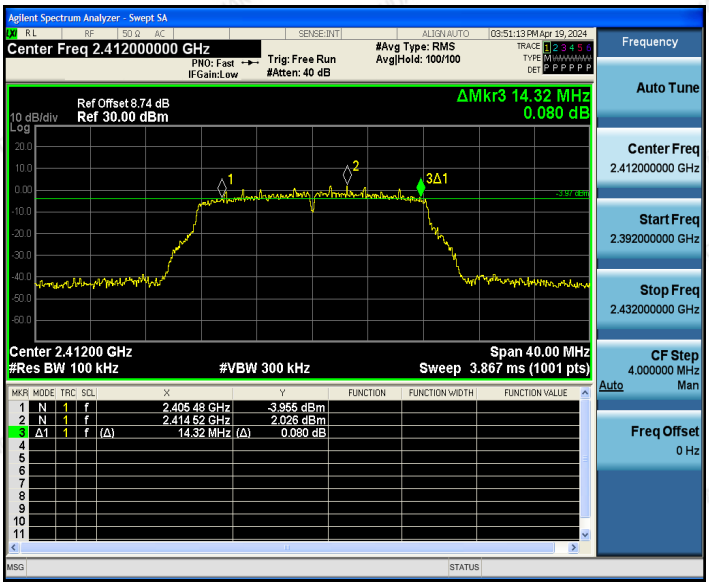
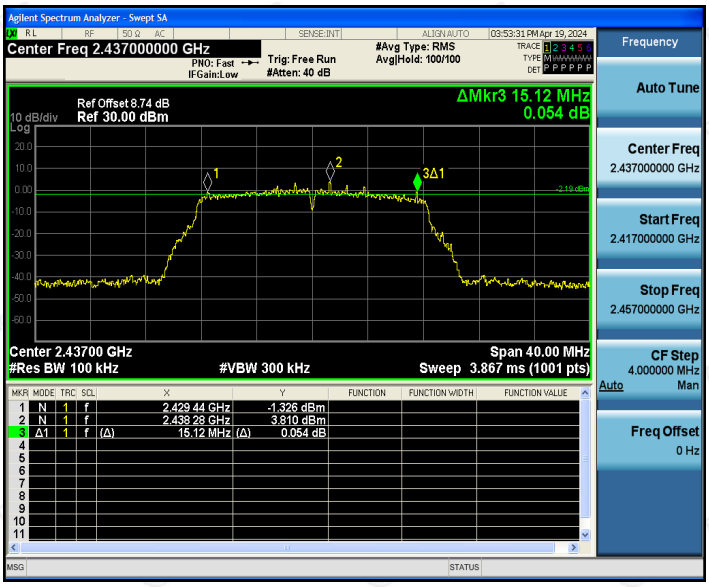
**802.11g Modulation**

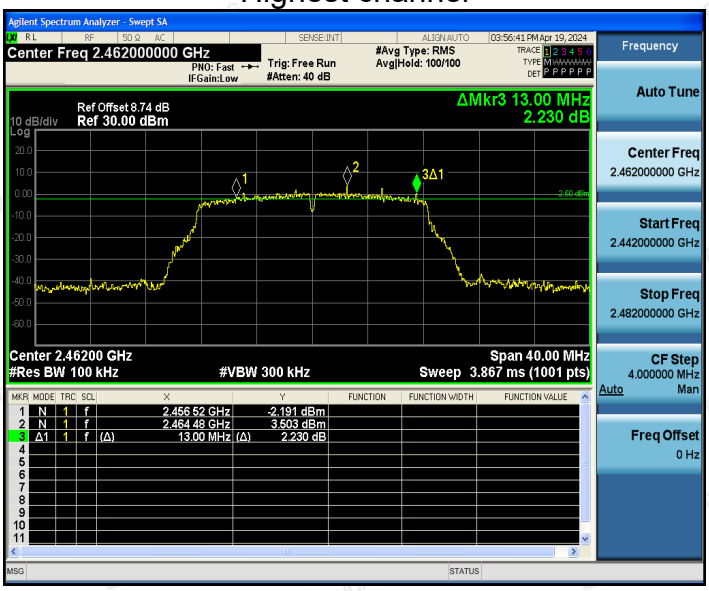
Lowest channel




Middle channel




Highest channel

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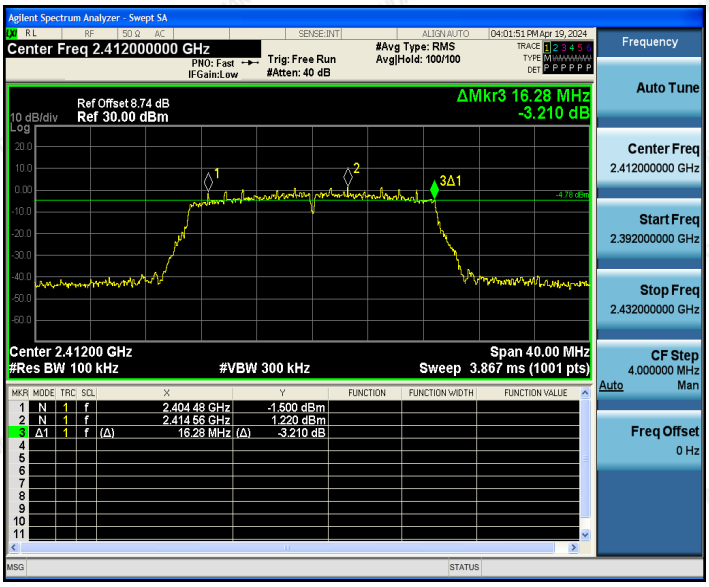
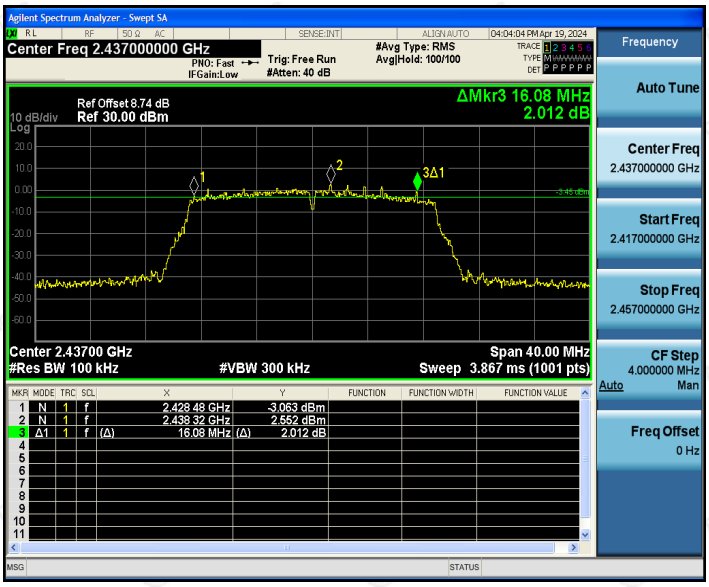
**802.11n (HT20) Modulation**

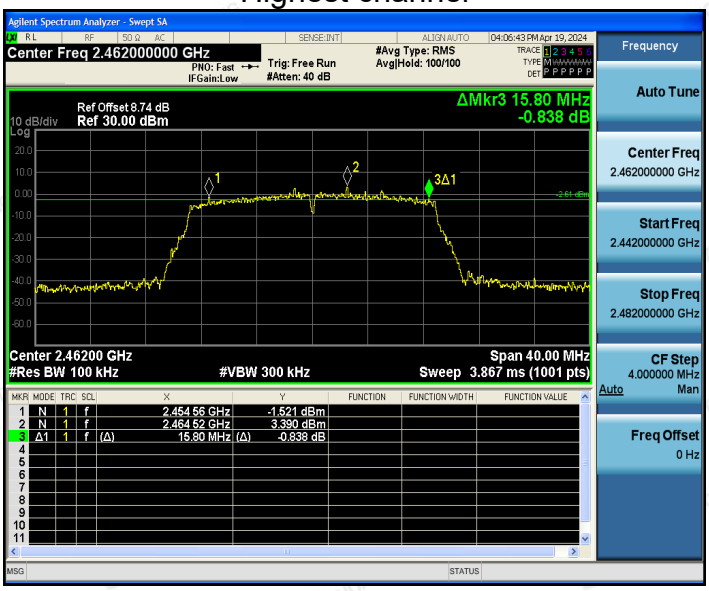
Lowest channel




Middle channel




Highest channel

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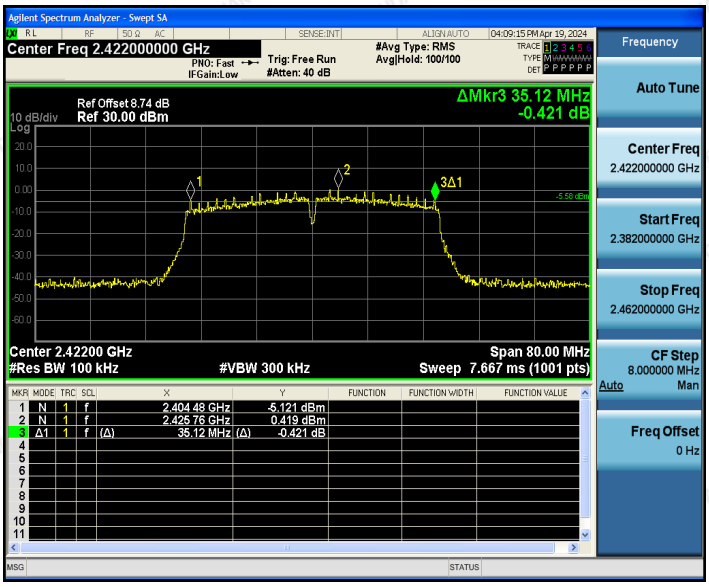
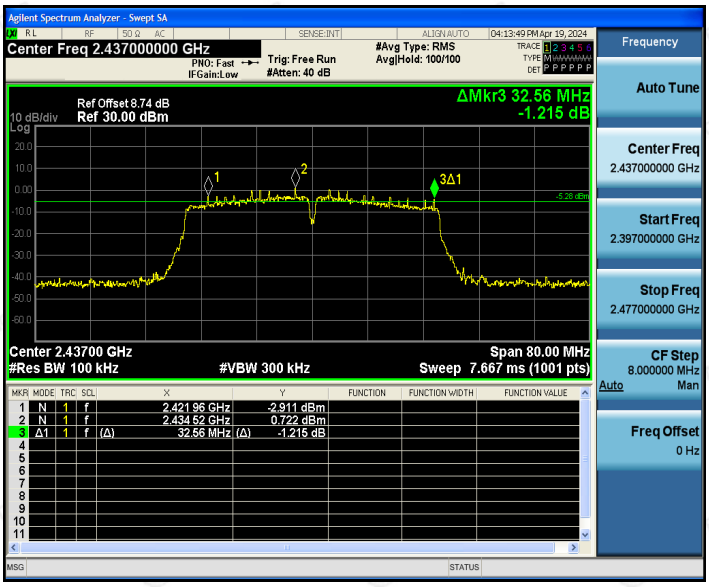
**802.11n (HT40) Modulation**

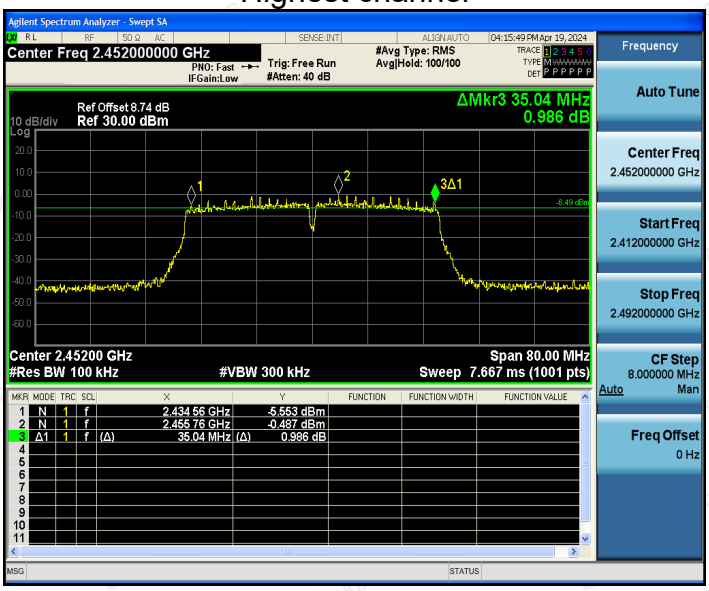
Lowest channel




Middle channel




Highest channel

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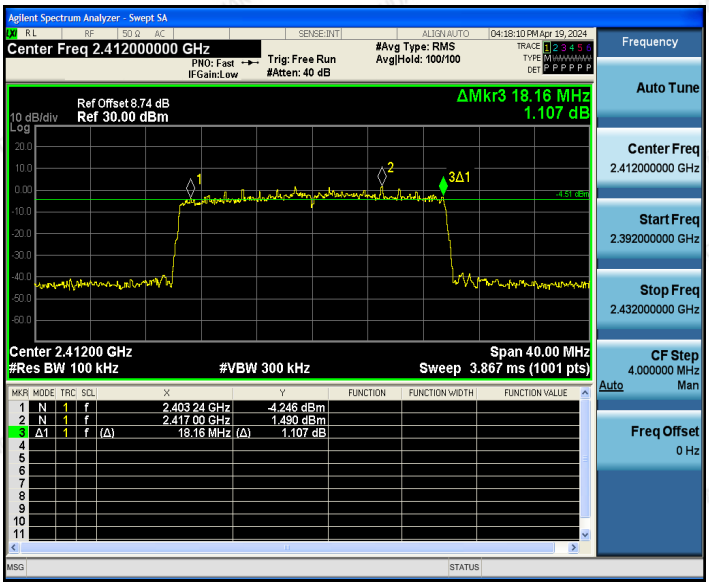
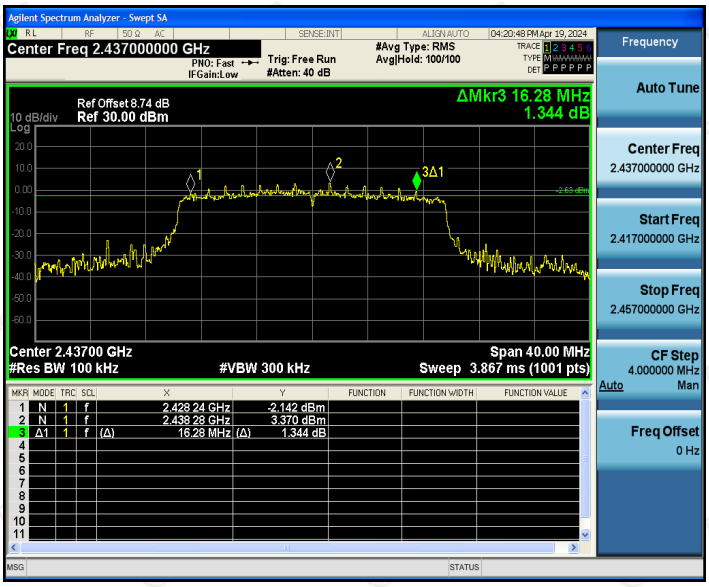
**802.11ax (HT20) Modulation**

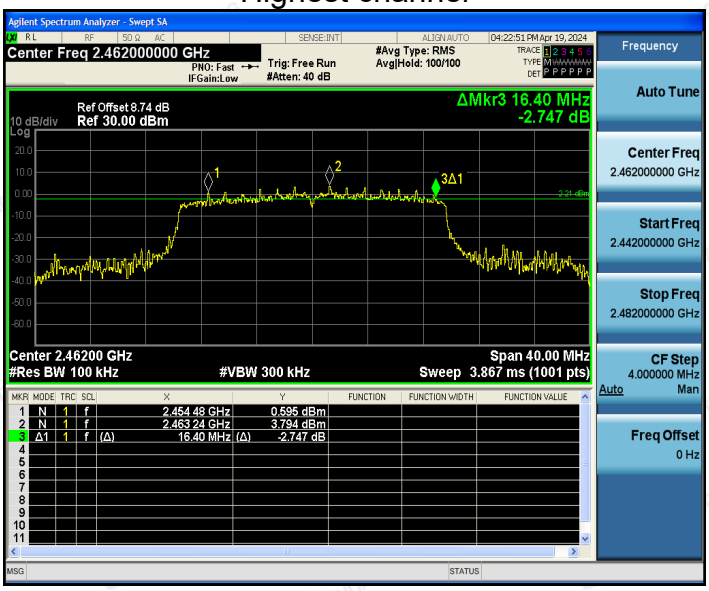
Lowest channel




Middle channel




Highest channel

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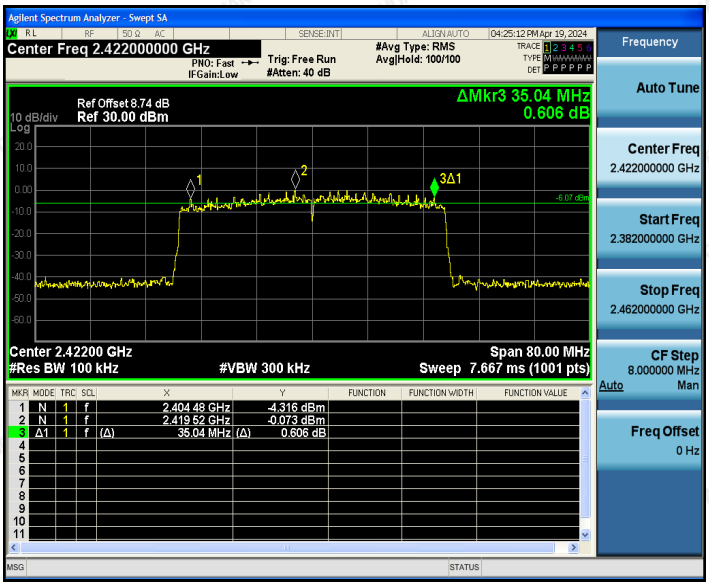
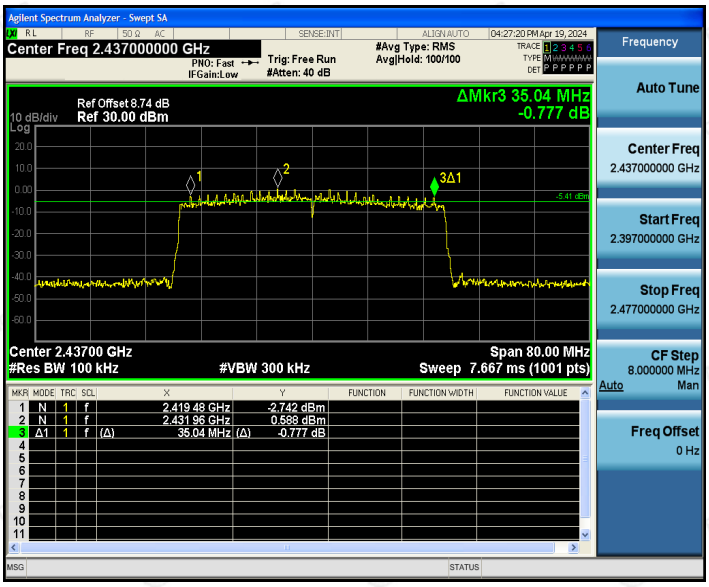
**802.11ax (HT40) Modulation**

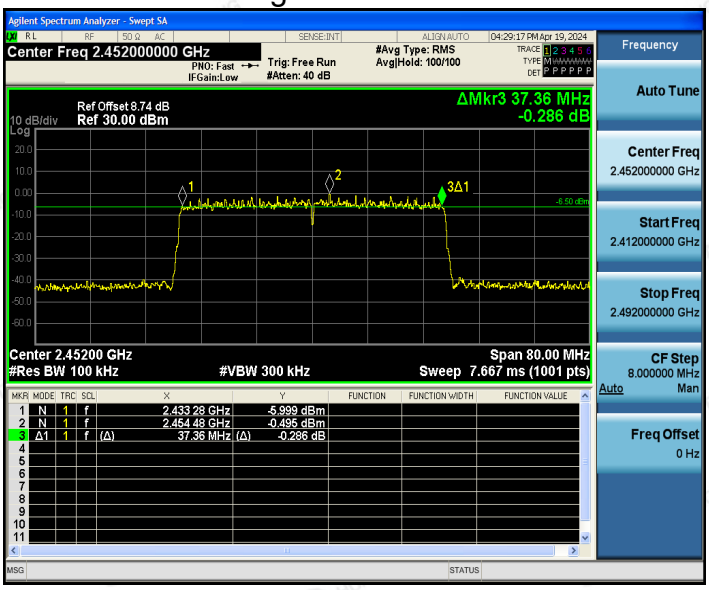
Lowest channel




Middle channel




Highest channel

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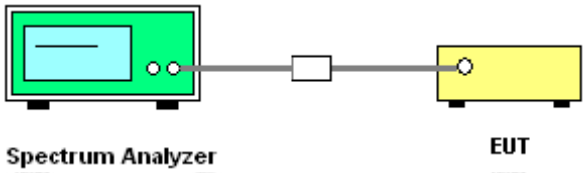
## 4.4. Power Spectral Density

### 4.4.1. Test Specification

| | |
|---|---|
| **Test Requirement:** | FCC Part15 C Section 15.247 (e) |
| **Test Method:** | KDB 558074 D01 15.247 Meas Guidance v05r02 |
| **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.<br>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.<br>3. Set to the maximum power setting and enable the EUT transmit continuously.<br>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.<br>5. Detector = Peak, Sweep time = auto couple.<br>6. Employ trace averaging (Peak) mode over a minimum of 100 traces. Use the peak marker function to determine the maximum power level.<br>7. Measure and record the results in the test report. |
| **Test Result:** | PASS |

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### 4.4.2. Test Instruments

| RF Test Room | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Date** | **Calibration Due** |
| Spectrum analyzer | Agilent | N9020A | HKE-048 | Feb. 20, 2024 | Feb. 19, 2025 |
| RF cable | Times | 1-40G | HKE-034 | Feb. 20, 2024 | Feb. 19, 2025 |
| RF automatic control unit | Tonscend | JS0806-2 | HKE-060 | Feb. 20, 2024 | Feb. 19, 2025 |
| RF Test Software | Tonscend | JS1120-3 Version 3.3.23 | HKE-083 | 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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### 4.4.3. Test data

**For antenna port 1**

| EUT Set Mode | Channel | Test Result (dBm/30kHz) | Result (dBm/3kHz) |
|---|---|---|---|
| 802.11b | Lowest | 1.34 | -8.66 |
| | Middle | 1.65 | -8.35 |
| | Highest | 2.28 | -7.72 |
| 802.11g | Lowest | -1.91 | -11.91 |
| | Middle | -1.21 | -11.21 |
| | Highest | -0.89 | -10.89 |
| 802.11n(HT20) | Lowest | -1.63 | -11.63 |
| | Middle | -1.74 | -11.74 |
| | Highest | -0.48 | -10.48 |
| 802.11n(HT40) | Lowest | -3.78 | -13.78 |
| | Middle | -2.91 | -12.91 |
| | Highest | -4.64 | -14.64 |
| 802.11ax(HT20) | Lowest | -2.00 | -12.00 |
| | Middle | -1.47 | -11.47 |
| | Highest | -0.84 | -10.84 |
| 802.11ax(HT40) | Lowest | -3.43 | -13.43 |
| | Middle | -3.34 | -13.34 |
| | Highest | -4.54 | -14.54 |
| PSD test result (dBm/3kHz)= PSD test result (dBm/30kHz)-10 | | | |
| Limit: 8dBm/3kHz | | | |
| Test Result: | PASS | | |

**Test plots as follows:**

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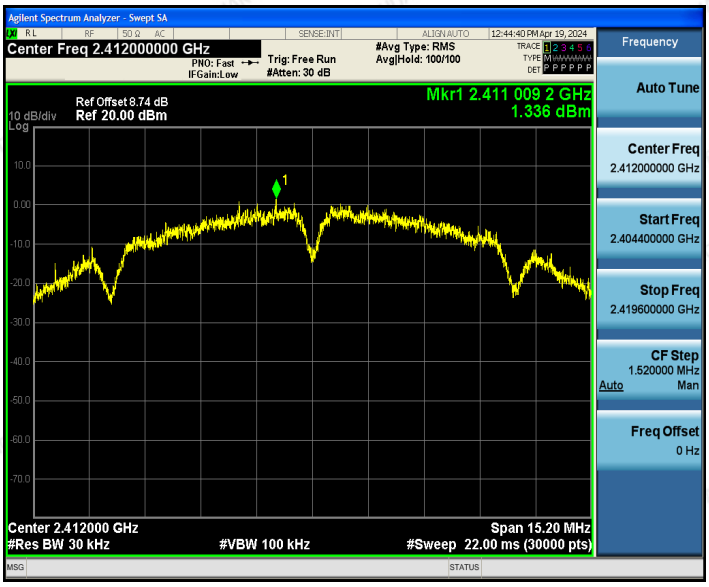
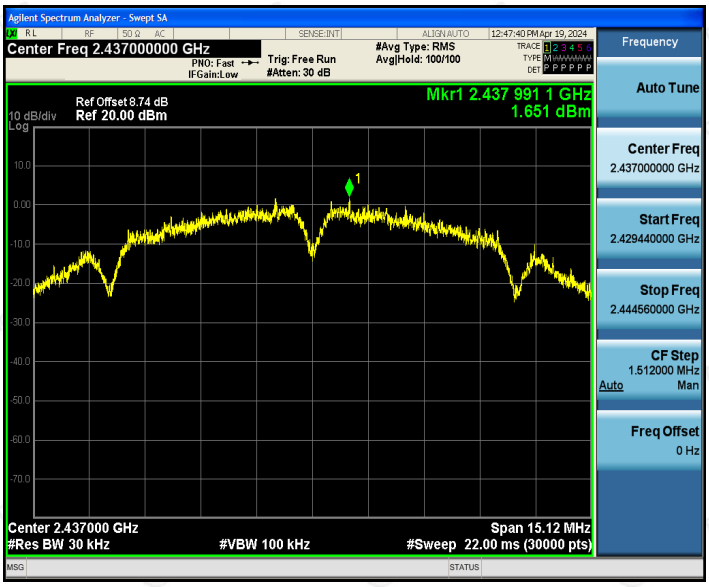
**802.11b Modulation**

Lowest channel




Middle channel




Highest channel

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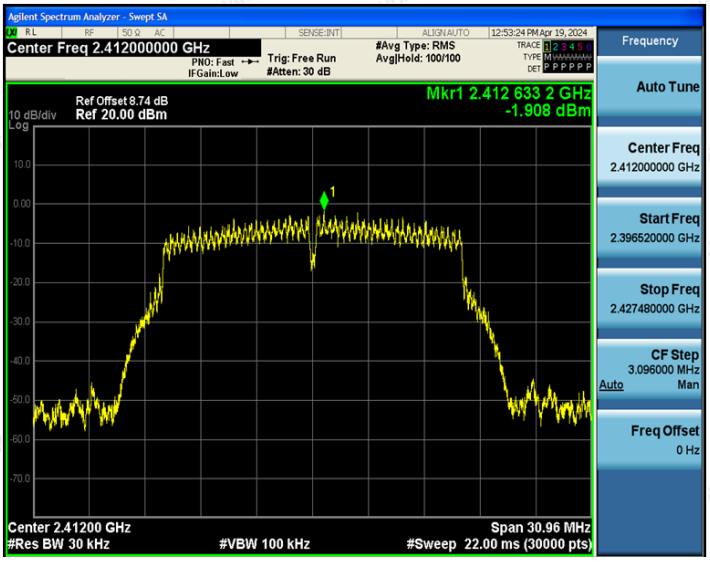
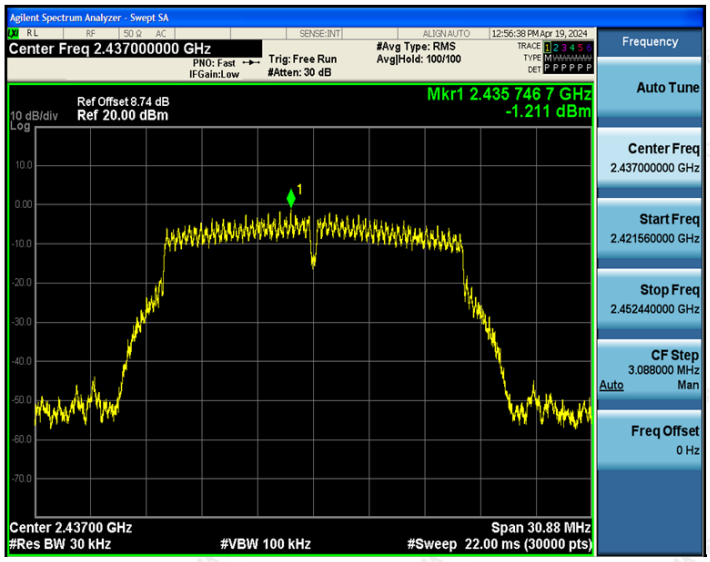
**802.11g Modulation**

Lowest channel




Middle channel




Highest channel

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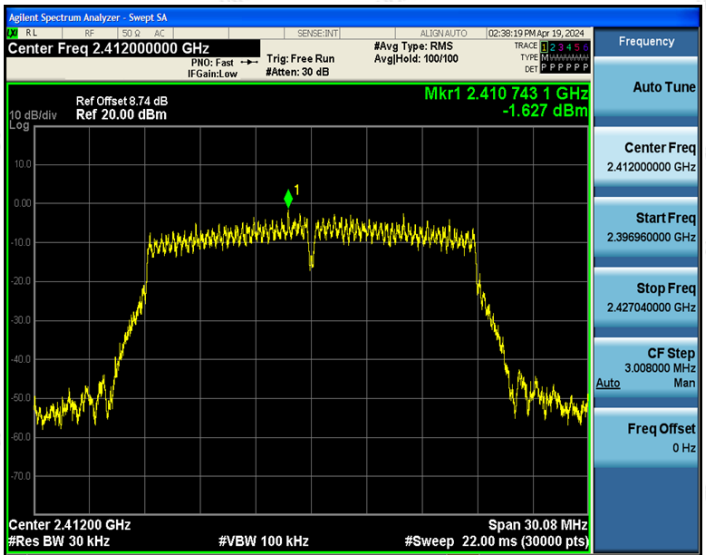
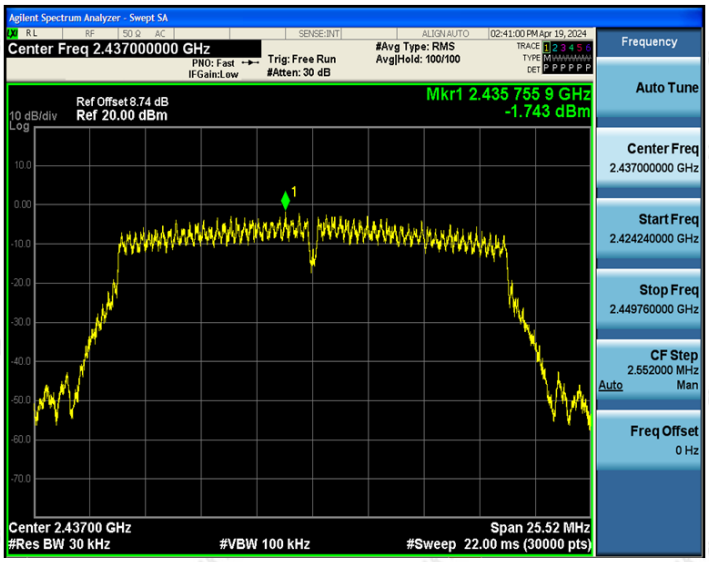
**802.11n (HT20) Modulation**

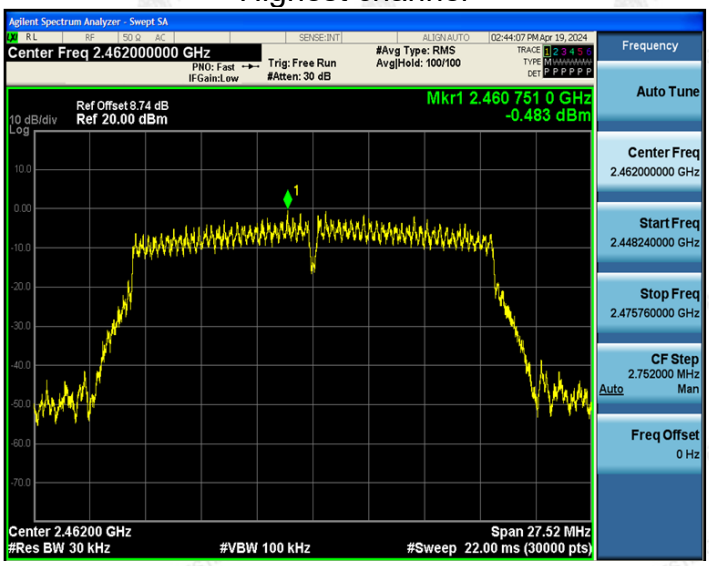
Lowest channel




Middle channel




Highest channel

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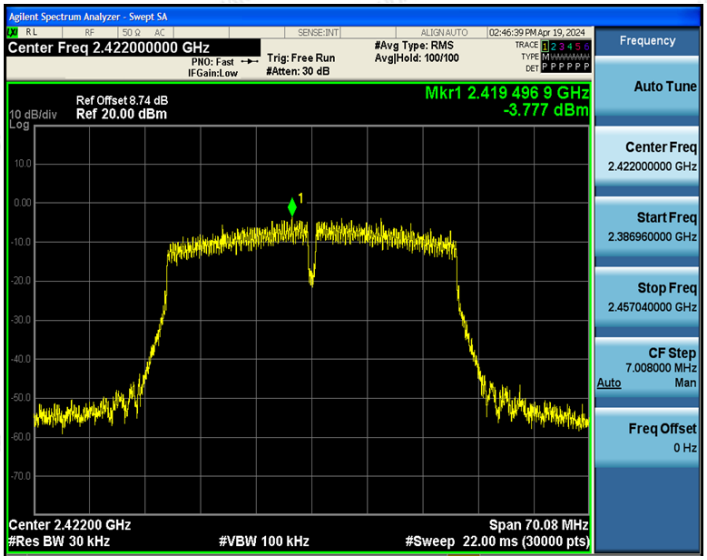
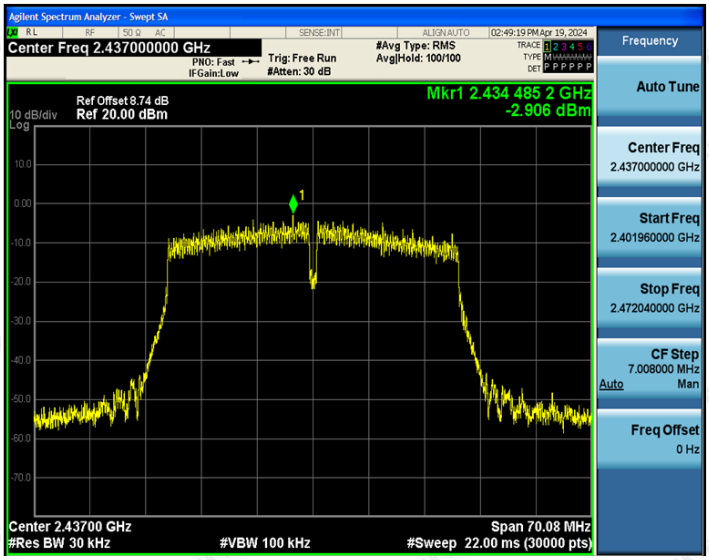
**802.11n (HT40) Modulation**

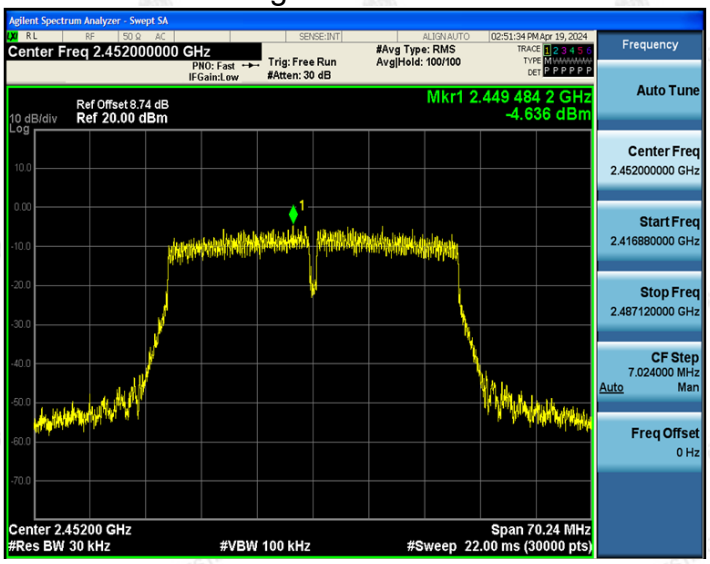
Lowest channel




Middle channel




Highest channel

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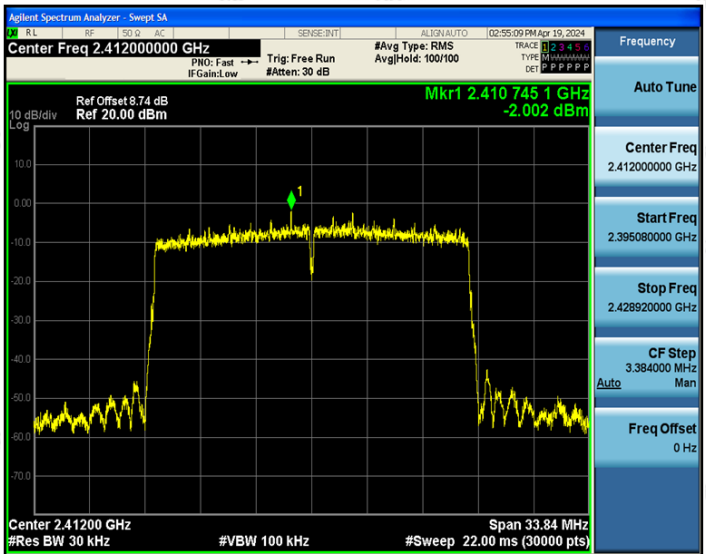
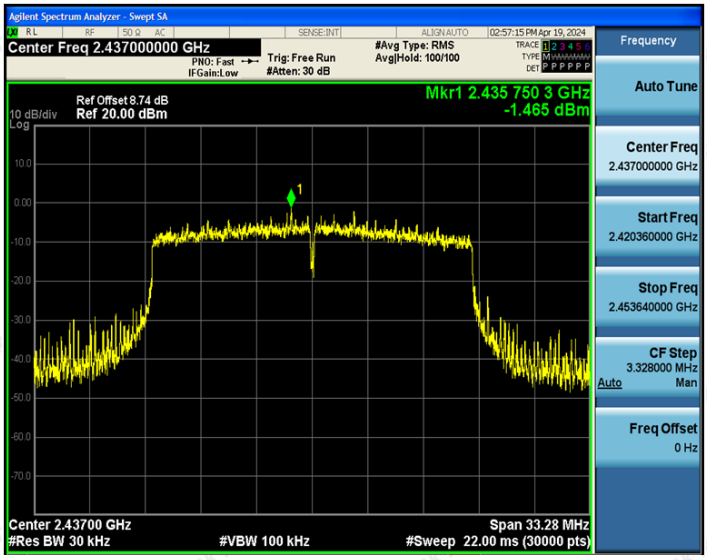
**802.11ax (HT20) Modulation**

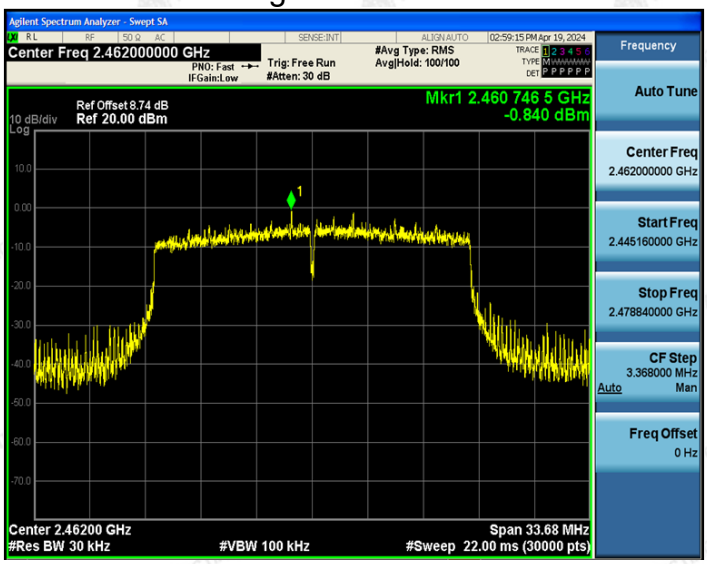
Lowest channel




Middle channel




Highest channel

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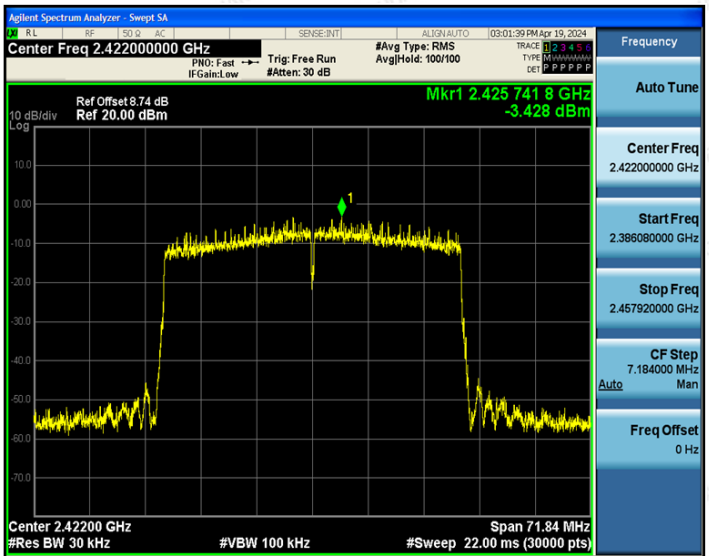
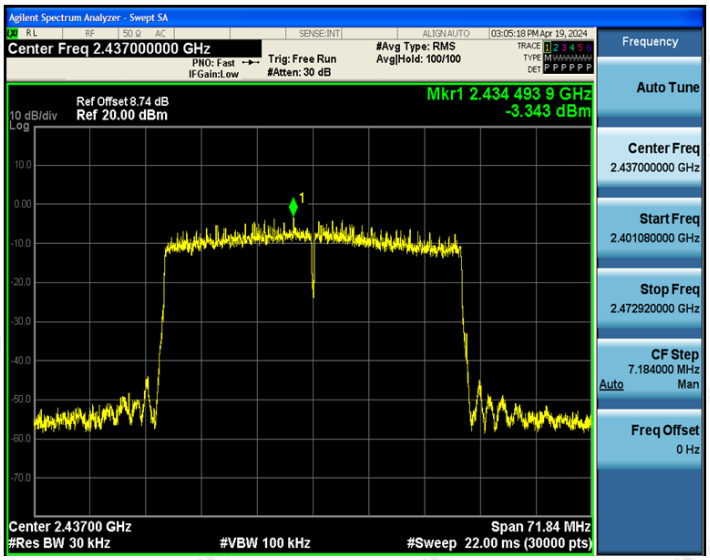
**802.11ax (HT40) Modulation**

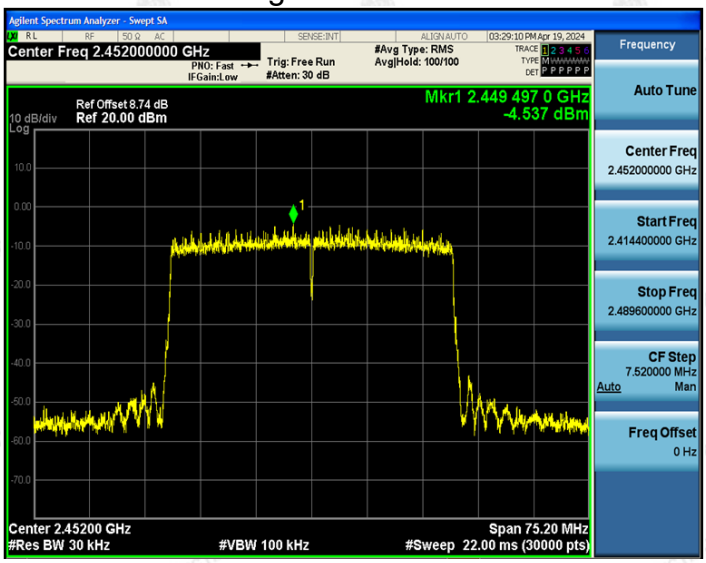
Lowest channel




Middle channel




Highest channel

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**For antenna port 2**

| EUT Set Mode | Channel | Test Result (dBm/30kHz) | Result (dBm/3kHz) |
|---|---|---|---|
| 802.11b | Lowest | 0.76 | -9.24 |
| | Middle | 2.12 | -7.88 |
| | Highest | 3.01 | -6.99 |
| 802.11g | Lowest | -1.68 | -11.68 |
| | Middle | -1.45 | -11.45 |
| | Highest | -0.62 | -10.62 |
| 802.11n(HT20) | Lowest | -1.90 | -11.90 |
| | Middle | -0.41 | -10.41 |
| | Highest | -1.03 | -11.03 |
| 802.11n(HT40) | Lowest | -3.67 | -13.67 |
| | Middle | -2.93 | -12.93 |
| | Highest | -4.44 | -14.44 |
| 802.11ax(HT20) | Lowest | -1.92 | -11.92 |
| | Middle | -0.36 | -10.36 |
| | Highest | -0.58 | -10.58 |
| 802.11ax(HT40) | Lowest | -3.33 | -13.33 |
| | Middle | -2.49 | -12.49 |
| | Highest | -3.80 | -13.80 |
| PSD test result (dBm/3kHz)= PSD test result (dBm/30kHz)-10 | | | |
| Limit: 8dBm/3kHz | | | |
| Test Result: | PASS | | |

**Test plots as follows:**

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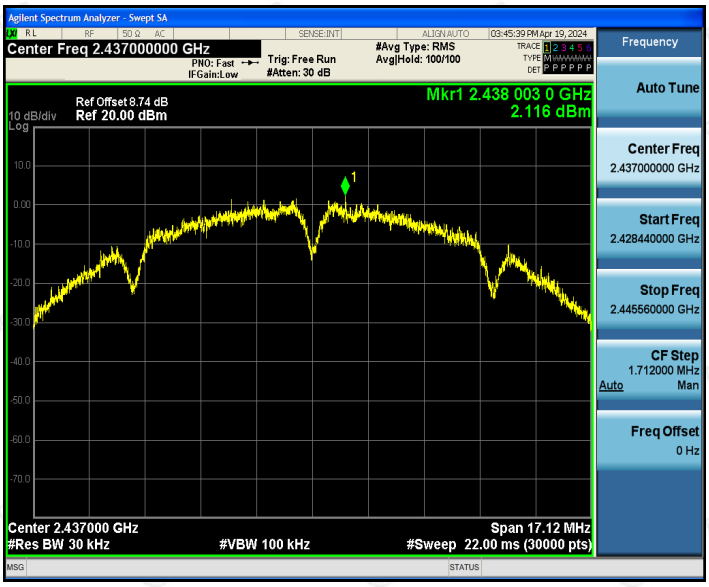
**802.11b Modulation**

Lowest channel

Middle channel




Highest channel

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