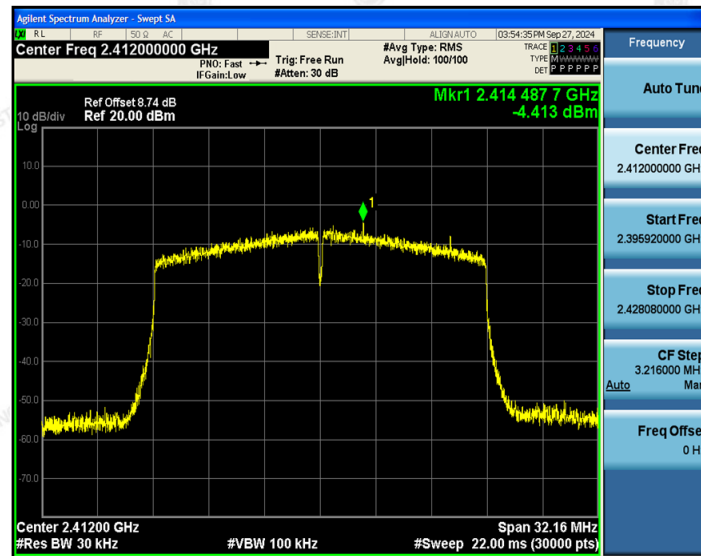


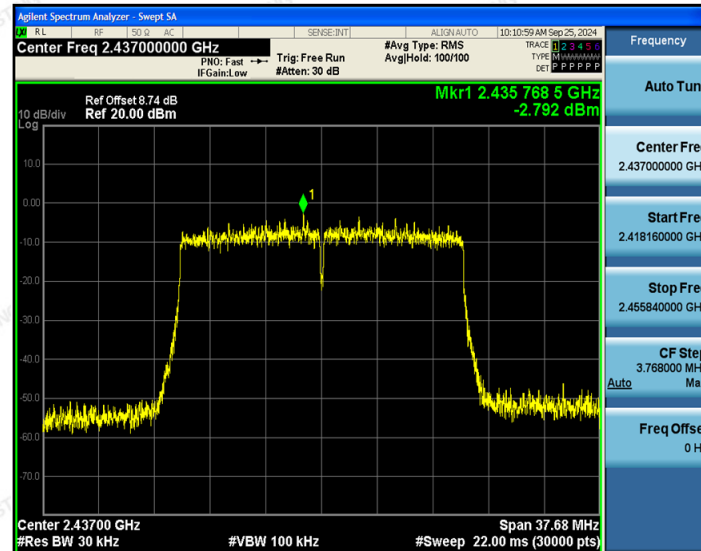


## 802.11ax (HT20) Modulation

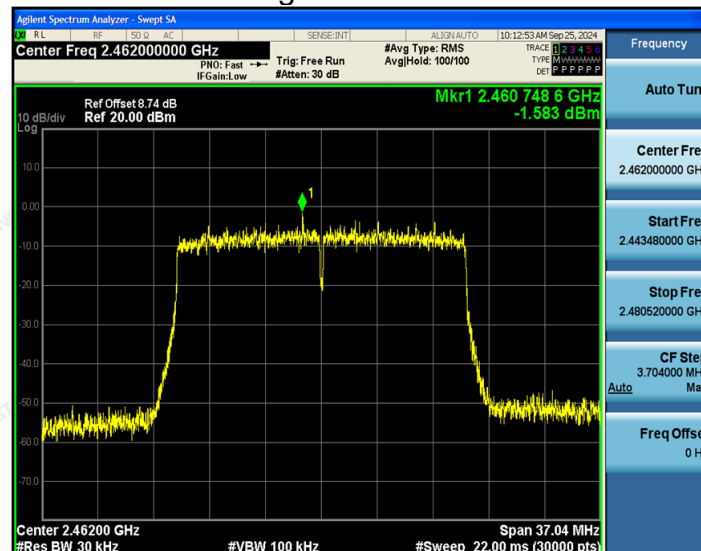
## Lowest channel



## Middle channel



## Highest channel



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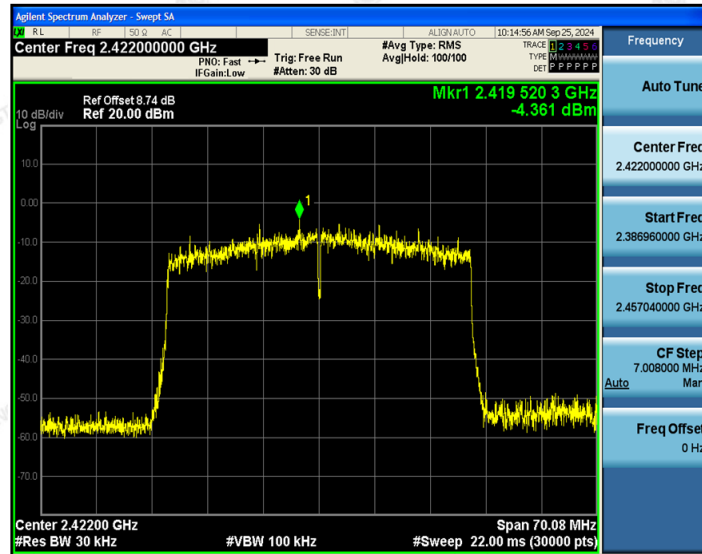
TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

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

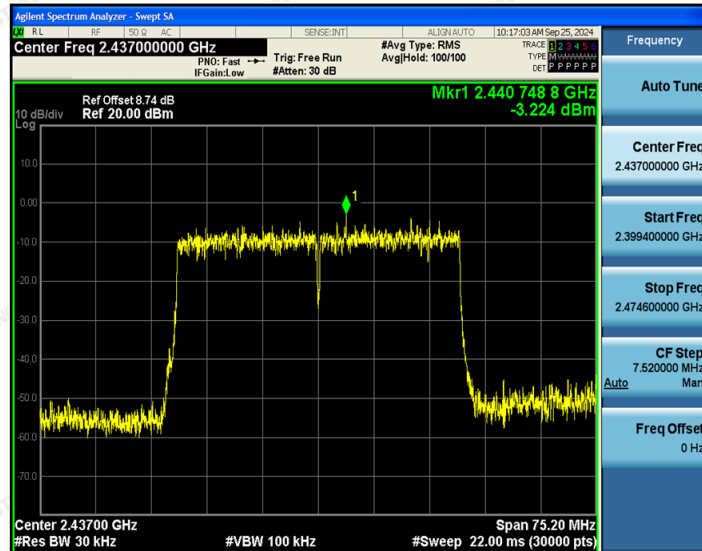


## 802.11ax (HT40) Modulation

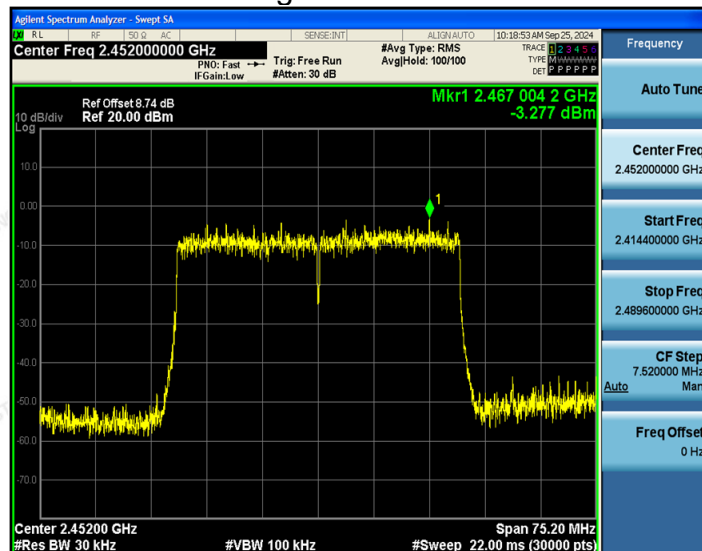
## Lowest channel



## Middle channel



## Highest channel



**For antenna port 2**

| EUT Set Mode                                               | Channel | Test Result (dBm/30kHz) | Result (dBm/3kHz) |
|------------------------------------------------------------|---------|-------------------------|-------------------|
| 802.11b                                                    | Lowest  | -0.26                   | -10.26            |
|                                                            | Middle  | 0.36                    | -9.64             |
|                                                            | Highest | 0.67                    | -9.33             |
| 802.11g                                                    | Lowest  | -2.17                   | -12.17            |
|                                                            | Middle  | -3.36                   | -13.36            |
|                                                            | Highest | -2.42                   | -12.42            |
| 802.11n(HT20)                                              | Lowest  | -2.26                   | -12.26            |
|                                                            | Middle  | -2.16                   | -12.16            |
|                                                            | Highest | -2.38                   | -12.38            |
| 802.11n(HT40)                                              | Lowest  | -3.76                   | -13.76            |
|                                                            | Middle  | -2.98                   | -12.98            |
|                                                            | Highest | -4.03                   | -14.03            |
| 802.11ax(HT20)                                             | Lowest  | -2.72                   | -12.72            |
|                                                            | Middle  | -2.54                   | -12.54            |
|                                                            | Highest | -4.40                   | -14.40            |
| 802.11ax(HT40)                                             | Lowest  | -3.57                   | -13.57            |
|                                                            | Middle  | -5.77                   | -15.77            |
|                                                            | Highest | -4.31                   | -14.31            |
| PSD test result (dBm/3kHz)= PSD test result (dBm/30kHz)-10 |         |                         |                   |
| Limit: 8dBm/3kHz                                           |         |                         |                   |
| Test Result:                                               |         | PASS                    |                   |

**Test plots as follows:**



## 802.11b Modulation

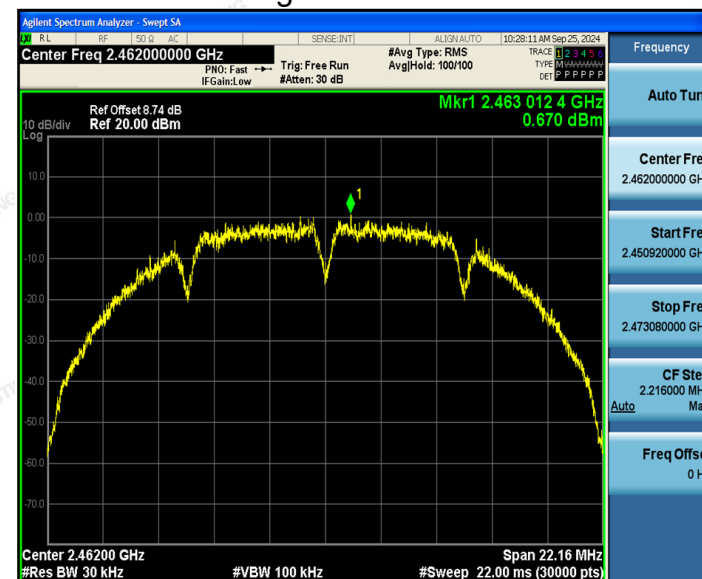
## Lowest channel



## Middle channel



## Highest channel



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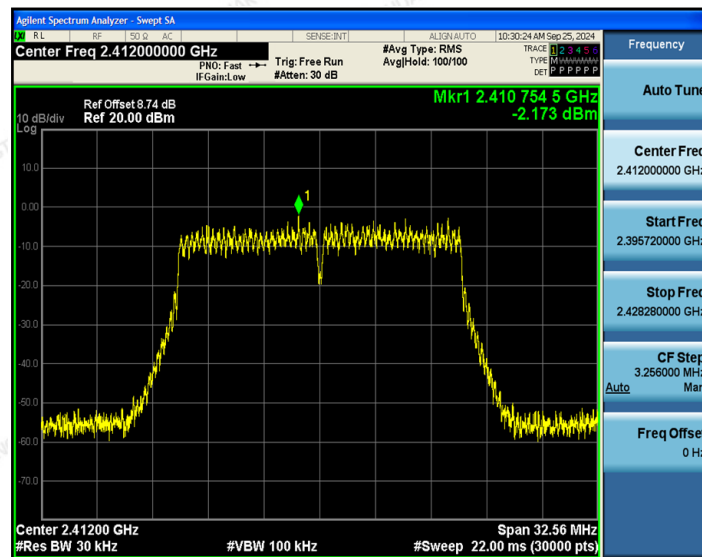
TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : [service@cer-mark.com](mailto:service@cer-mark.com)

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

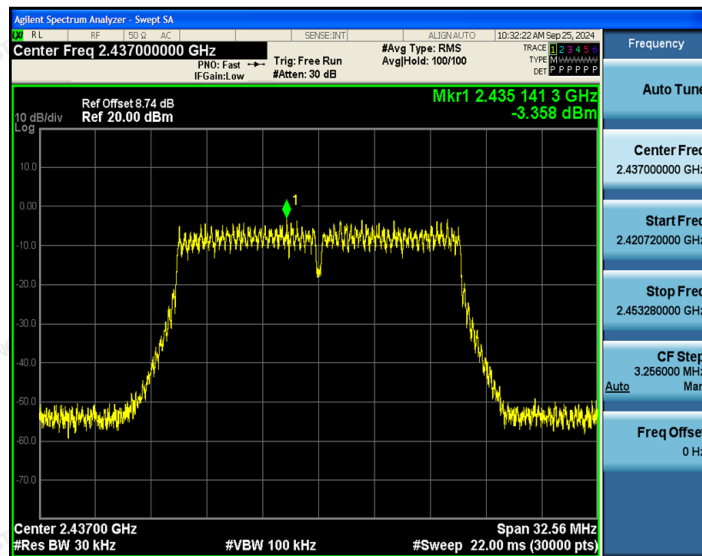


## 802.11g Modulation

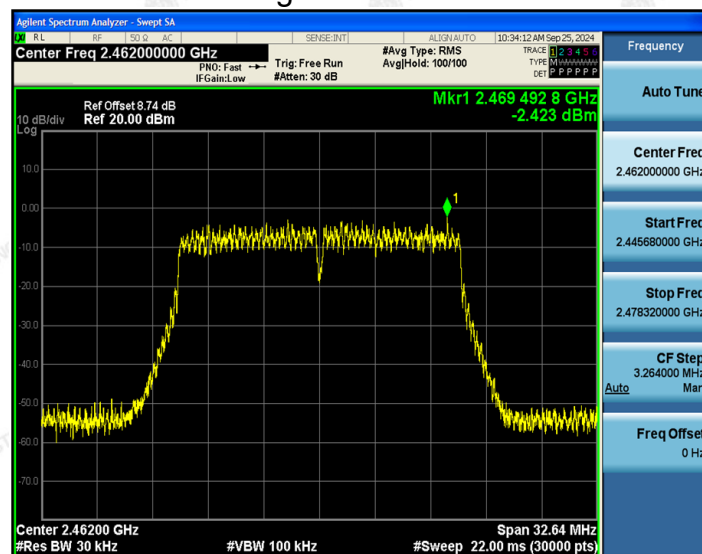
## Lowest channel



## Middle channel



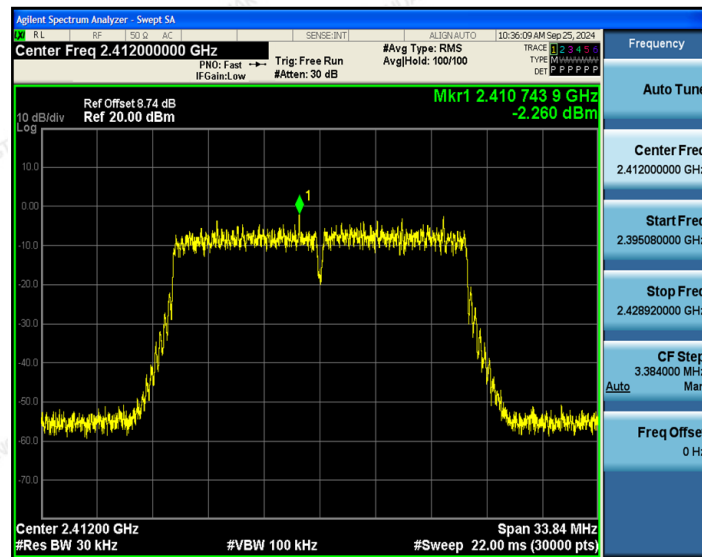
## Highest channel



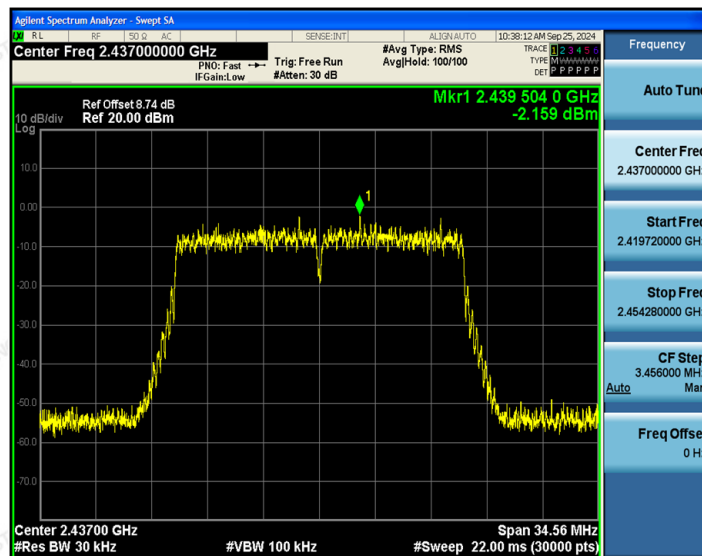


## 802.11n (HT20) Modulation

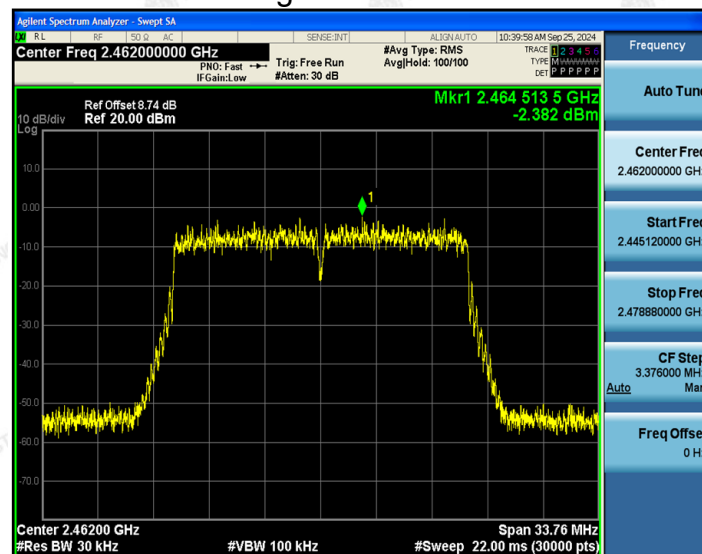
## Lowest channel



## Middle channel



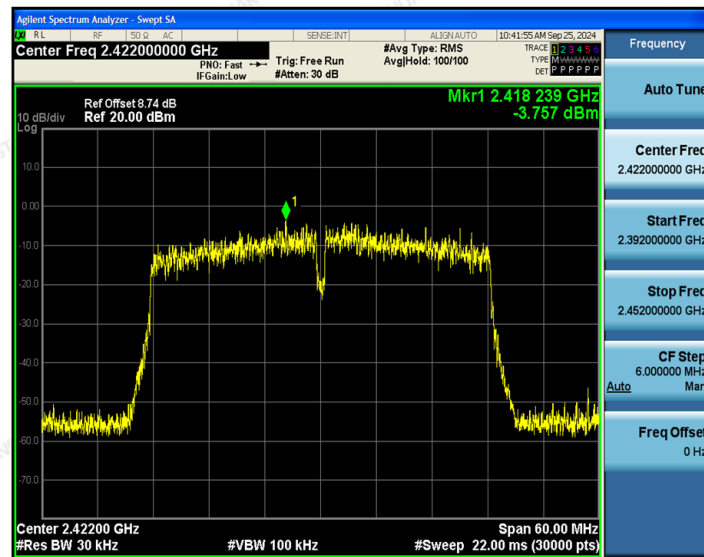
## Highest channel



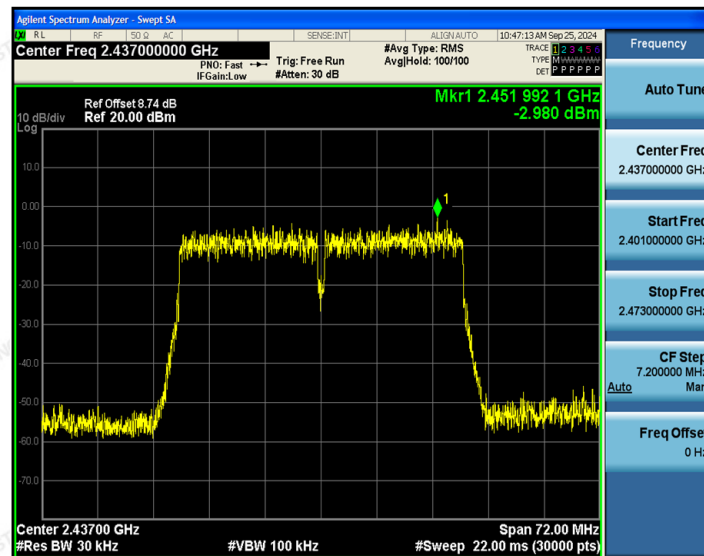


## 802.11n (HT40) Modulation

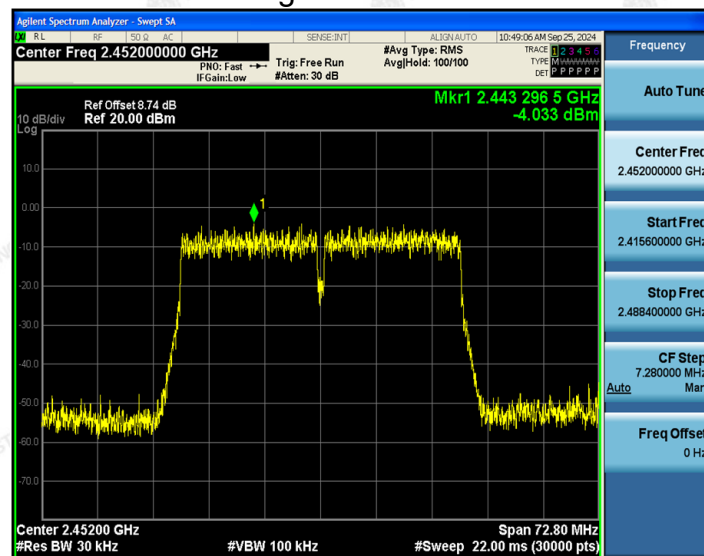
## Lowest channel



## Middle channel



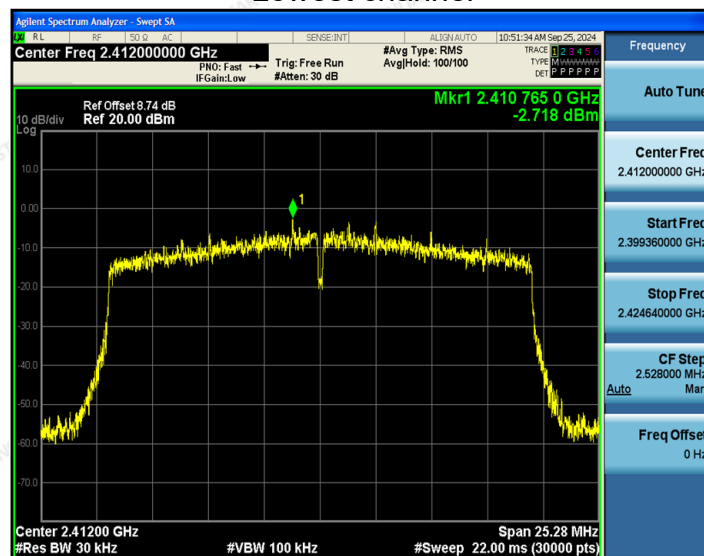
## Highest channel



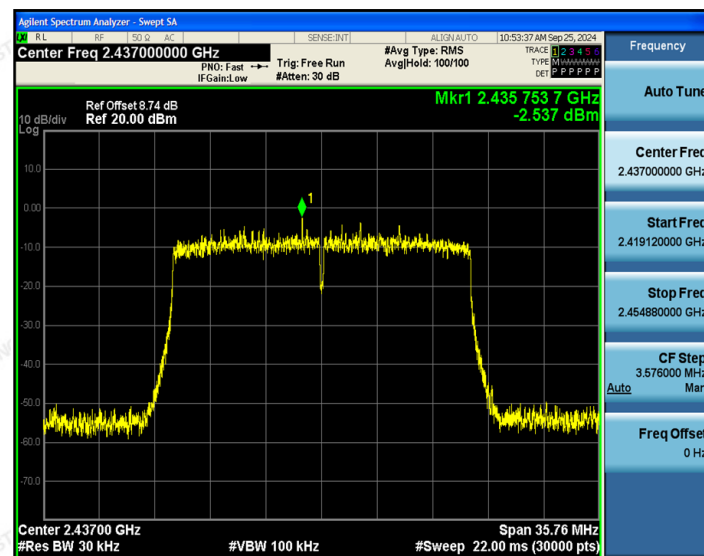


## 802.11ax (HT20) Modulation

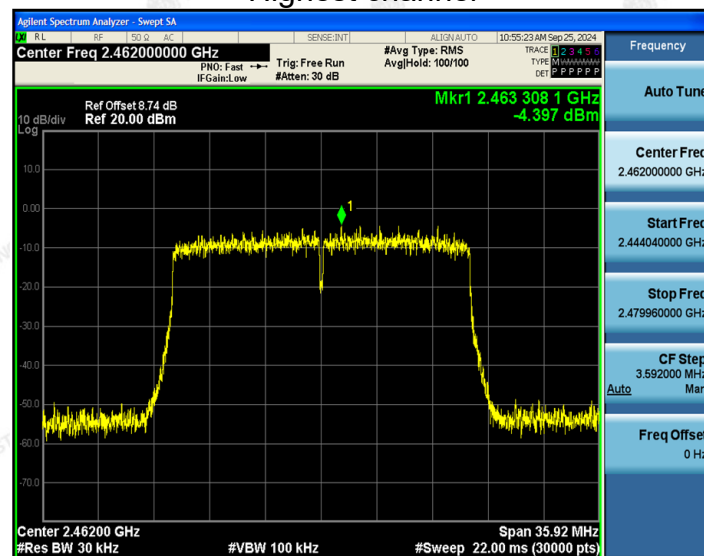
## Lowest channel



## Middle channel



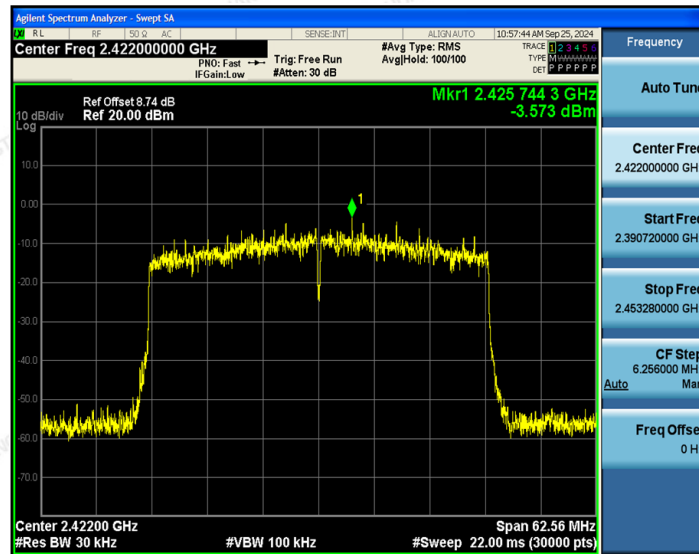
## Highest channel



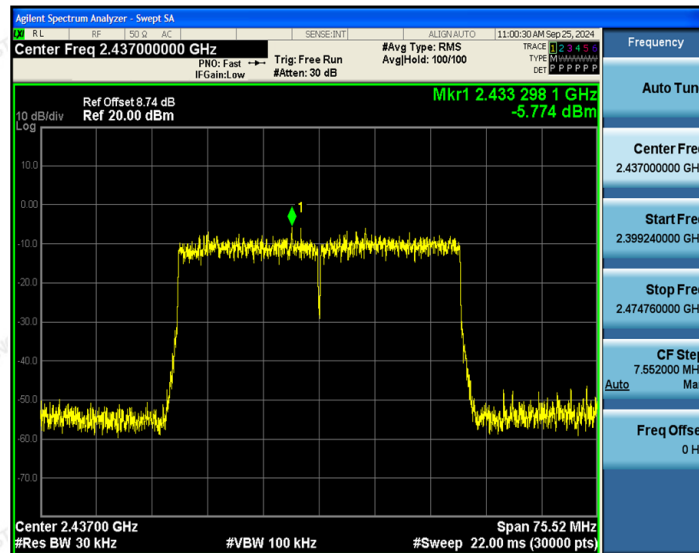


802.11ax (HT40) Modulation

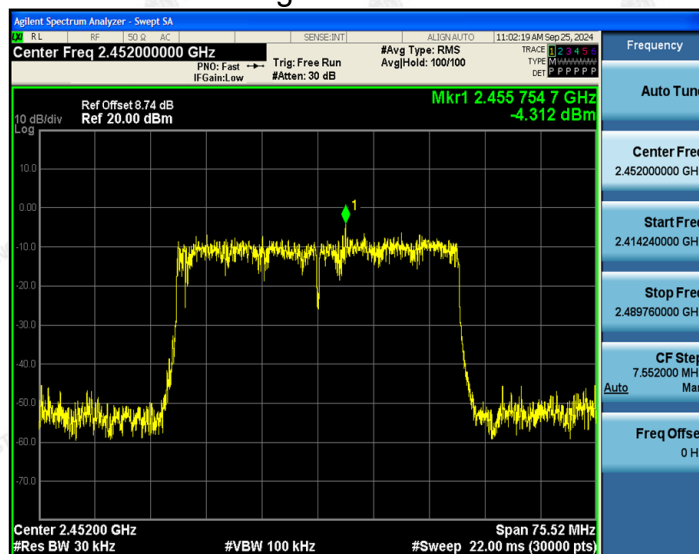
Lowest channel



Middle channel



Highest channel



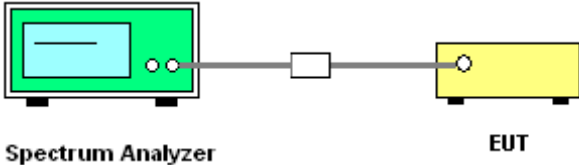


| For MIMO antenna port 1+antenna port 2                                                                                                                                                                                                                                                                                                                                                        |                     |             |        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------|--------|
| Frequency                                                                                                                                                                                                                                                                                                                                                                                     | Power Density (dBm) | Limit (dBm) | Result |
| TX 802.11n/HT20 Mode                                                                                                                                                                                                                                                                                                                                                                          |                     |             |        |
| 2412 MHz                                                                                                                                                                                                                                                                                                                                                                                      | -9.36               | 8           | PASS   |
| 2437 MHz                                                                                                                                                                                                                                                                                                                                                                                      | -9.25               | 8           | PASS   |
| 2462 MHz                                                                                                                                                                                                                                                                                                                                                                                      | -8.76               | 8           | PASS   |
| TX 802.11n/HT40 Mode                                                                                                                                                                                                                                                                                                                                                                          |                     |             |        |
| 2422 MHz                                                                                                                                                                                                                                                                                                                                                                                      | -10.87              | 8           | PASS   |
| 2437 MHz                                                                                                                                                                                                                                                                                                                                                                                      | -10.35              | 8           | PASS   |
| 2452 MHz                                                                                                                                                                                                                                                                                                                                                                                      | -10.85              | 8           | PASS   |
| TX 802.11ax/HT20 Mode                                                                                                                                                                                                                                                                                                                                                                         |                     |             |        |
| 2412 MHz                                                                                                                                                                                                                                                                                                                                                                                      | -10.47              | 8           | PASS   |
| 2437 MHz                                                                                                                                                                                                                                                                                                                                                                                      | -9.65               | 8           | PASS   |
| 2462 MHz                                                                                                                                                                                                                                                                                                                                                                                      | -9.75               | 8           | PASS   |
| TX 802.11ax/HT40 Mode                                                                                                                                                                                                                                                                                                                                                                         |                     |             |        |
| 2422 MHz                                                                                                                                                                                                                                                                                                                                                                                      | -10.94              | 8           | PASS   |
| 2437 MHz                                                                                                                                                                                                                                                                                                                                                                                      | -11.30              | 8           | PASS   |
| 2452 MHz                                                                                                                                                                                                                                                                                                                                                                                      | -10.75              | 8           | PASS   |
| Note: 1 According to KDB 662911, Result power = $10\log(10(\text{ant1}/10+10(\text{ant2}/10)))$ .<br>2 Result unit: W, The end result is converted to units of dBm.<br>limit=8dBm-(direction gain-6dBi)=8-(0.56+10log2-6)=8dBm<br>3 This product supports antenna 1, and antenna 2 launch, but only support 802.11 n/802.11ax for MIMO mode, not support 802.11 b and 802.11 g for MIMO mode. |                     |             |        |



## 4.5. Conducted Band Edge and Spurious Emission Measurement

### 4.5.1. Test Specification

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement:</b> | FCC Part15 C Section 15.247 (d)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Test Method:</b>      | KDB558074 D01 15.247 Meas Guidance v05r02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Limit:</b>            | 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).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Test Setup:</b>       |  <p>The diagram shows a Spectrum Analyzer (green box) connected to an EUT (yellow box) via an RF cable and an attenuator (white box). The Spectrum Analyzer is labeled 'Spectrum Analyzer' and the EUT is labeled 'EUT'.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Test Mode:</b>        | Transmitting mode with modulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"><li>1. The testing follows FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02.</li><li>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.</li><li>3. Set to the maximum power setting and enable the EUT transmit continuously.</li><li>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).</li><li>5. Measure and record the results in the test report.</li><li>6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.</li></ol> |
| <b>Test Result:</b>      | PASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |



#### 4.5.2. Test Instruments

| RF Test Room              |              |                            |               |                  |                 |
|---------------------------|--------------|----------------------------|---------------|------------------|-----------------|
| Equipment                 | Manufacturer | Model                      | Serial Number | Calibration Date | Calibration Due |
| Spectrum analyzer         | Agilent      | N9020A                     | HKE-025       | 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<br>Version 3.3.23 | HKE-083       | N/A              | N/A             |

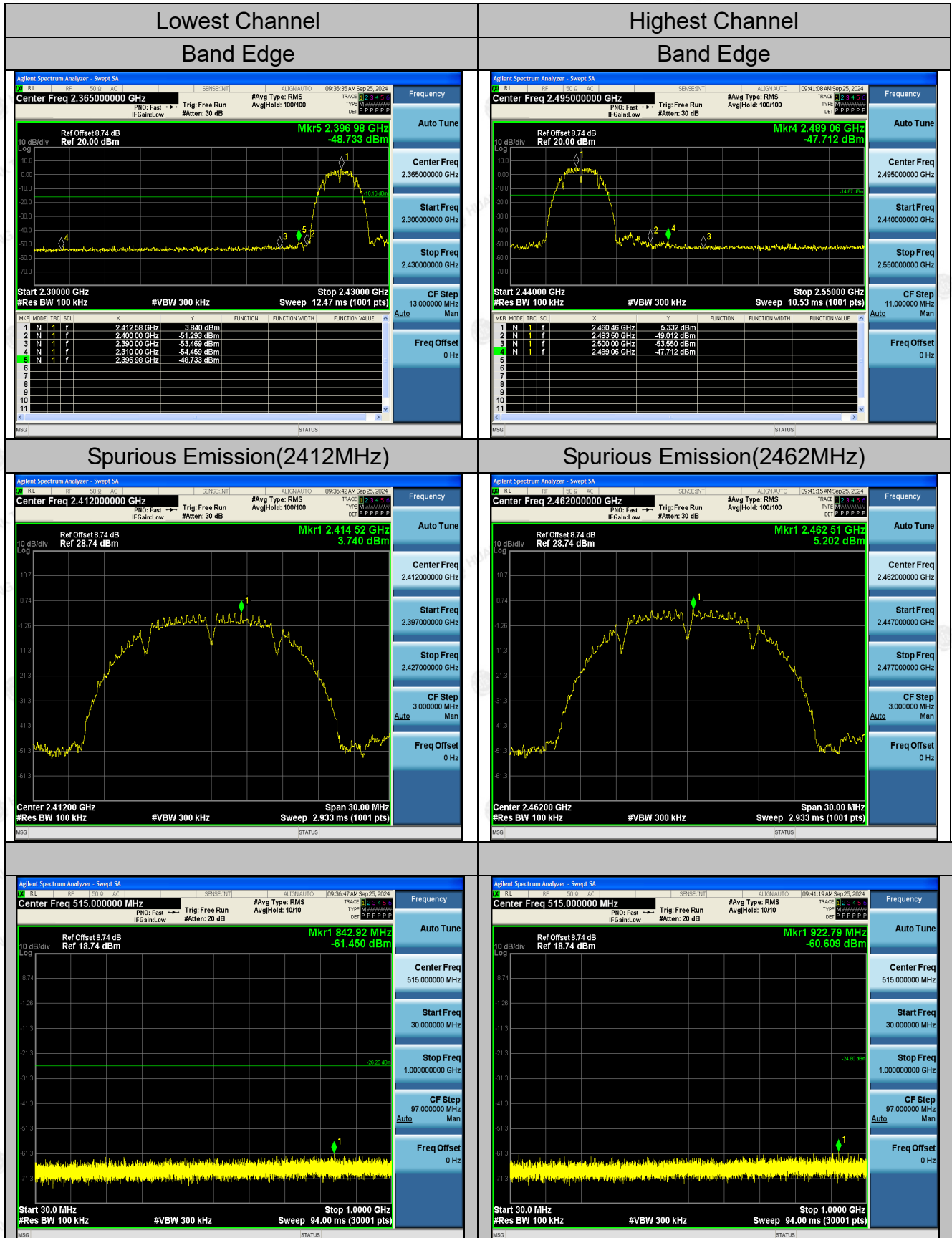
**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



### 4.5.3. Test Data

#### Chain 1

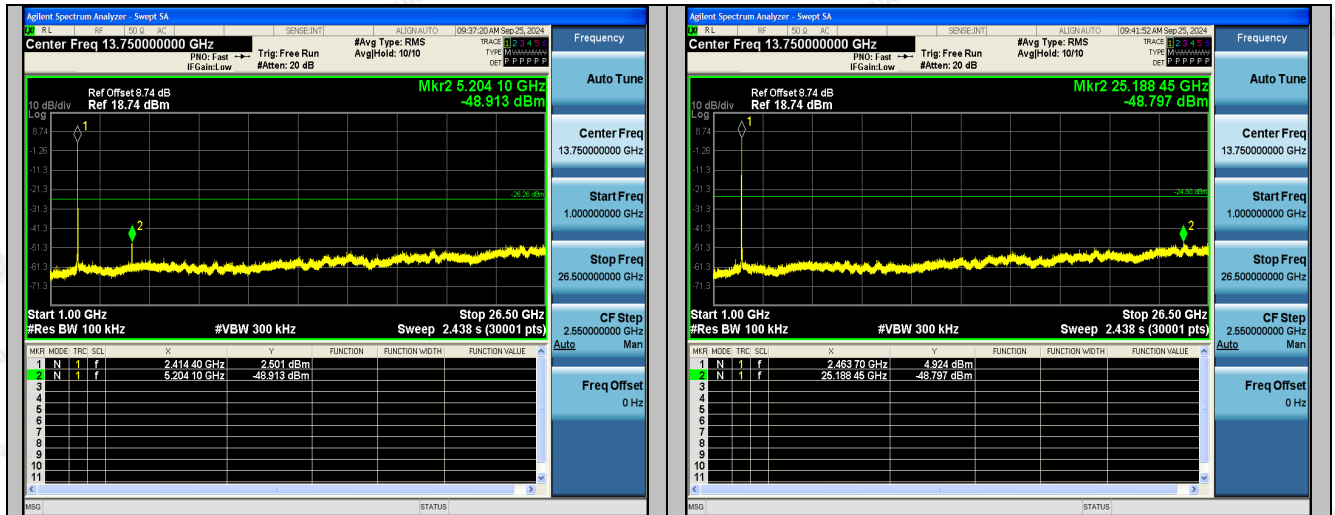
#### 802.11b Modulation



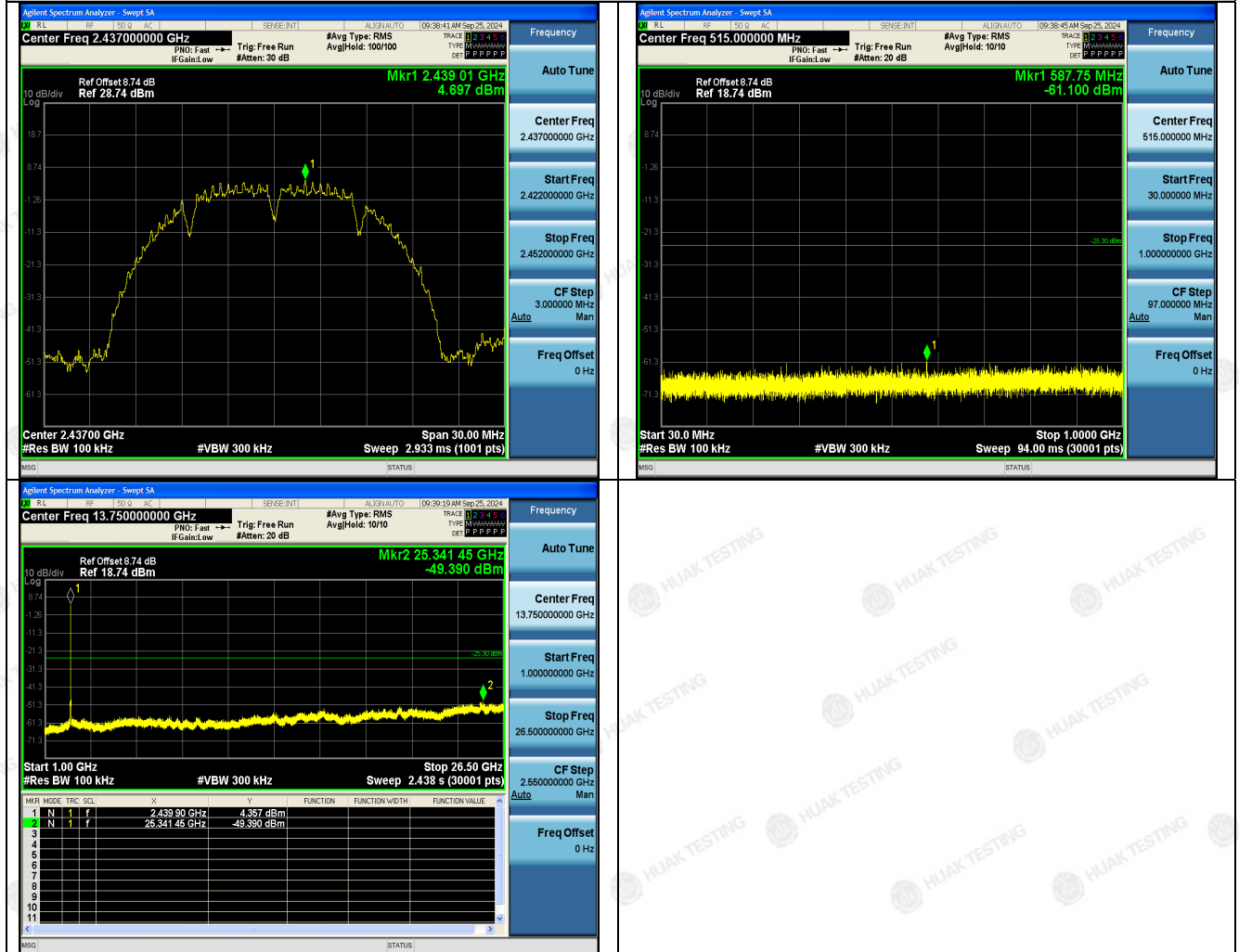
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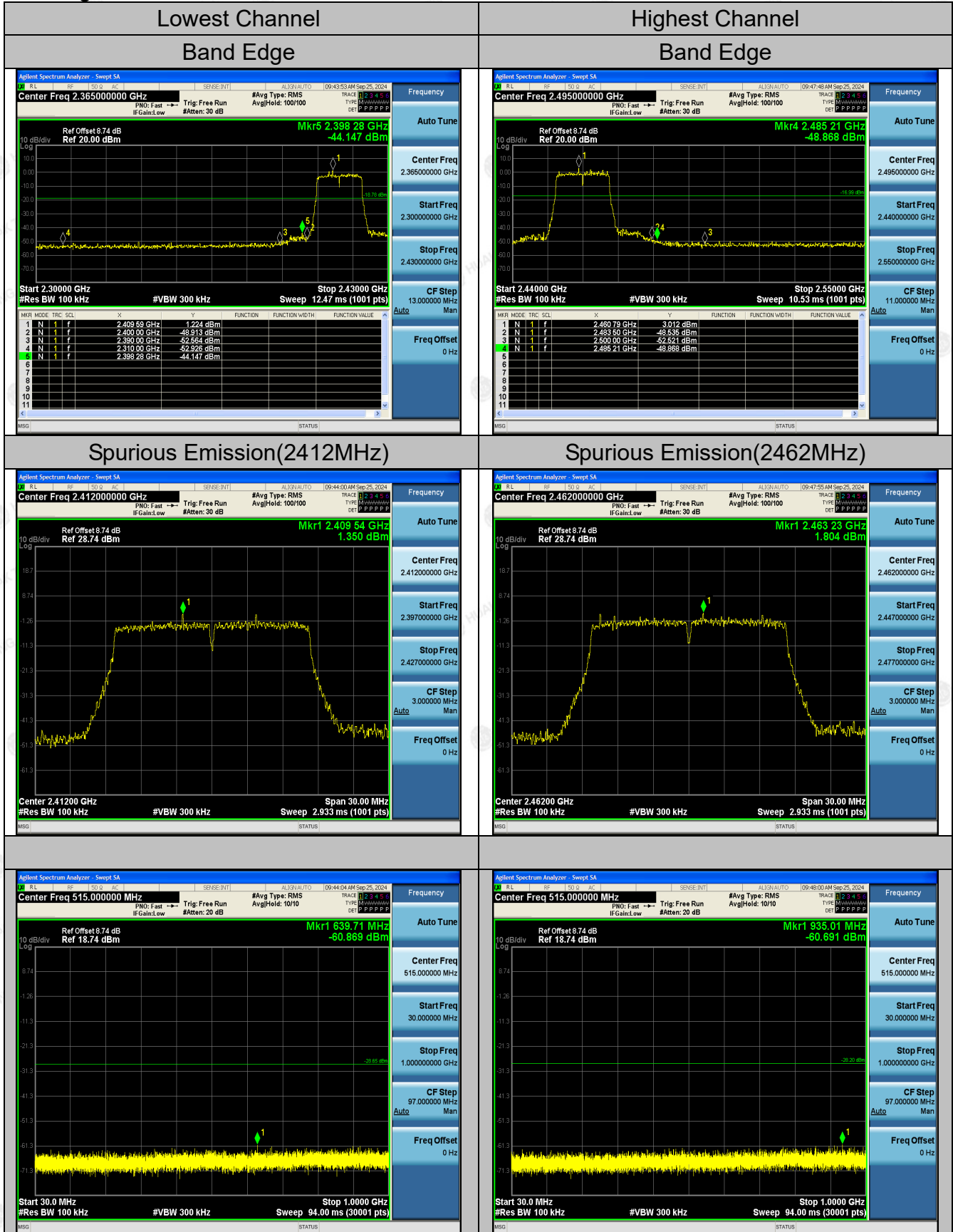


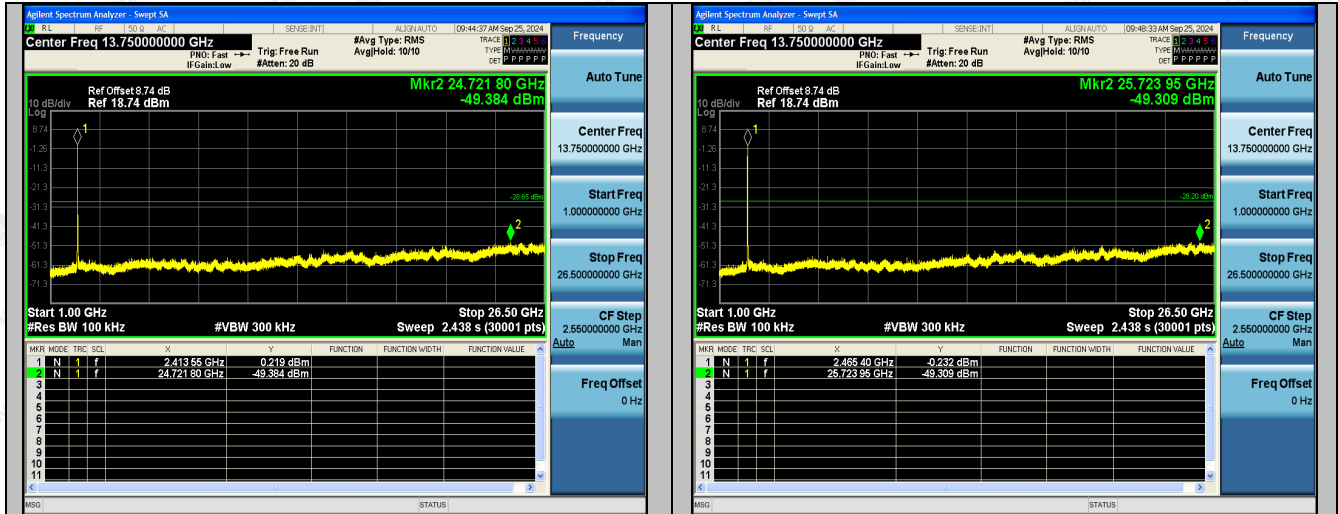
### Spurious Emission(2437MHz)



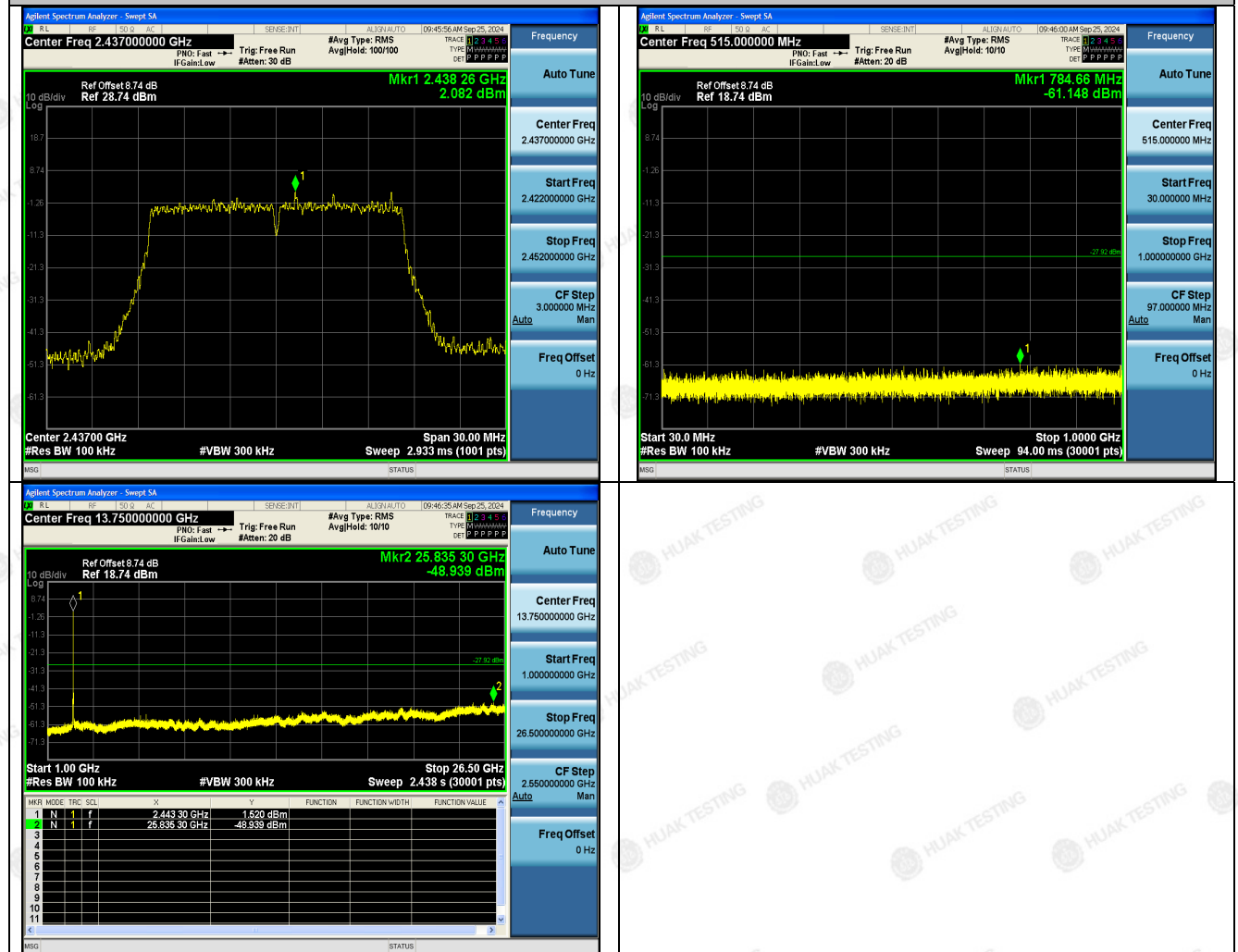


## 802.11g Modulation





## Spurious Emission(2437MHz)

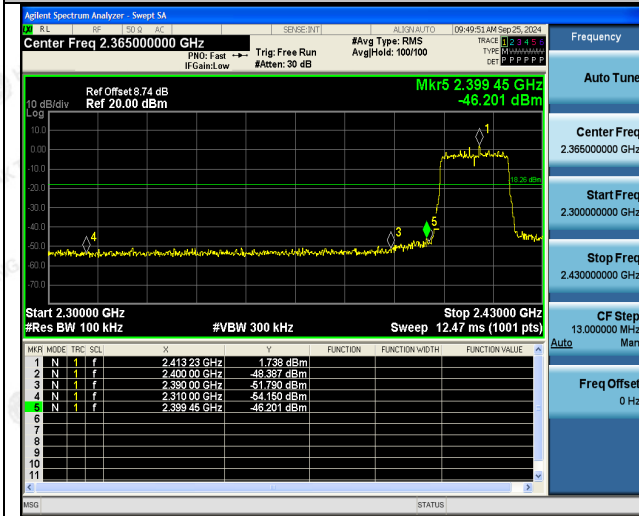




## 802.11n (HT20) Modulation

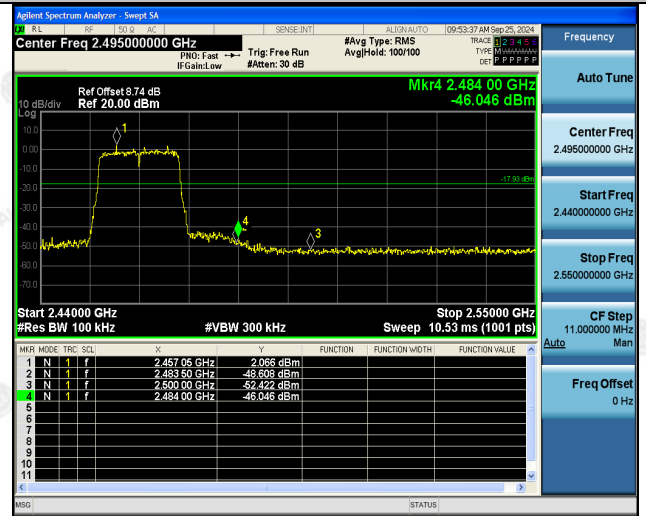
## Lowest Channel

## Band Edge



## Highest Channel

## Band Edge



## Spurious Emission(2412MHz)



## Spurious Emission(2462MHz)

