

## Appendix-2.4G WiFi

### Conducted Test Data

#### Conducted Output Power

##### Test Result

| Mode            | Channel | Peak Output Power (dBm) | Peak Power Limit (dBm) | EIRP (dBm) | EIRP Limit (dBm) | Result |
|-----------------|---------|-------------------------|------------------------|------------|------------------|--------|
| IEEE 802.11b    | 1       | 21.25                   | ≤30                    | 22.50      | ≤36              | PASS   |
|                 | 6       | 21.25                   | ≤30                    | 22.50      | ≤36              | PASS   |
|                 | 11      | <b>21.47</b>            | ≤30                    | 22.72      | ≤36              | PASS   |
| IEEE 802.11g    | 1       | 25.60                   | ≤30                    | 26.85      | ≤36              | PASS   |
|                 | 6       | 25.53                   | ≤30                    | 26.78      | ≤36              | PASS   |
|                 | 11      | <b>25.74</b>            | ≤30                    | 26.99      | ≤36              | PASS   |
| IEEE 802.11n_20 | 1       | 23.77                   | ≤30                    | 25.02      | ≤36              | PASS   |
|                 | 6       | <b>23.80</b>            | ≤30                    | 25.05      | ≤36              | PASS   |
|                 | 11      | 23.70                   | ≤30                    | 24.95      | ≤36              | PASS   |
| IEEE 802.11n_40 | 3       | 23.89                   | ≤30                    | 25.14      | ≤36              | PASS   |
|                 | 6       | <b>23.98</b>            | ≤30                    | 25.23      | ≤36              | PASS   |
|                 | 9       | 23.85                   | ≤30                    | 25.10      | ≤36              | PASS   |

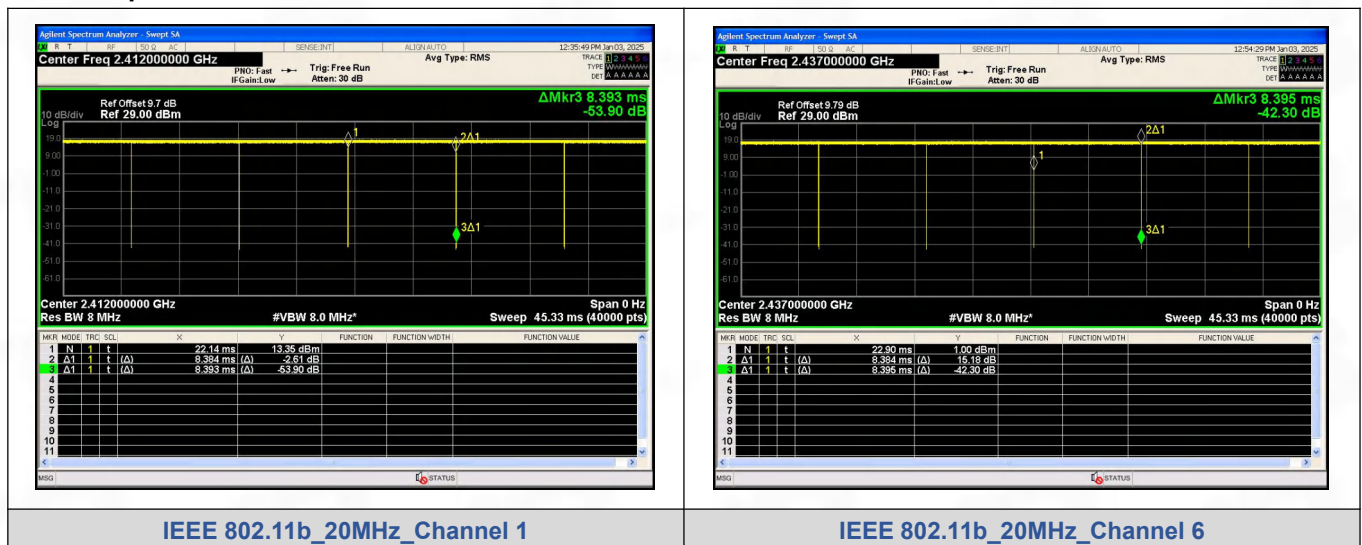
Note:  $EIRP = P_{out} + G_{ant}$ , where  $P_{out}$  is the conducted output power (i.e., the Peak Output Power in the table), and  $G_{ant}$  is the antenna gain equal to 1.25 dBi.

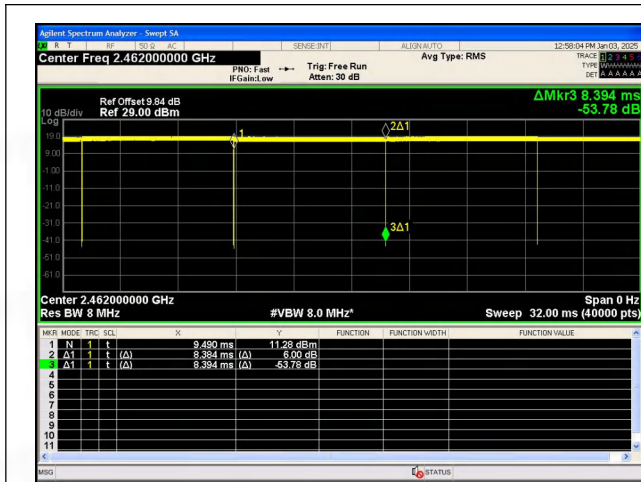
## Duty Cycle

### Test Result

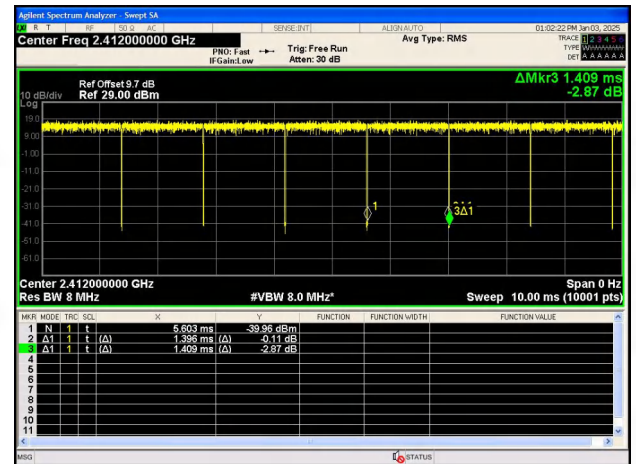
| Mode            | Data rates | Channel | Antenna | On Time (ms) | Period (ms) | Duty Cycle (%) | Duty Cycle (linear) | Duty Cycle Factor (dB) | 1/T    |
|-----------------|------------|---------|---------|--------------|-------------|----------------|---------------------|------------------------|--------|
| IEEE 802.11b    | 1          | 1       | 1       | 8.384        | 8.393       | 99.89          | 0.9989              | 0.0048                 | 0.1193 |
|                 |            | 6       |         | 8.384        | 8.395       | 99.88          | 0.9988              | 0.0052                 | 0.1193 |
|                 |            | 11      |         | 8.384        | 8.394       | 99.88          | 0.9988              | 0.0052                 | 0.1193 |
| IEEE 802.11g    | 6          | 1       |         | 1.396        | 1.409       | 99.08          | 0.9908              | 0.0401                 | 0.7163 |
|                 |            | 6       |         | 1.395        | 1.409       | 99.01          | 0.9901              | 0.0432                 | 0.7168 |
|                 |            | 11      |         | 1.395        | 1.409       | 99.01          | 0.9901              | 0.0432                 | 0.7168 |
| IEEE 802.11n_20 | MCS 0      | 1       |         | 1.302        | 1.316       | 98.94          | 0.9894              | 0.0463                 | 0.7680 |
|                 |            | 6       |         | 1.302        | 1.316       | 98.94          | 0.9894              | 0.0463                 | 0.7680 |
|                 |            | 11      |         | 1.303        | 1.317       | 98.94          | 0.9894              | 0.0463                 | 0.7675 |
| IEEE 802.11n_40 |            | 3       |         | 0.650        | 0.665       | 97.73          | 0.9773              | 0.0997                 | 1.5385 |
|                 |            | 6       |         | 0.650        | 0.665       | 97.73          | 0.9773              | 0.0997                 | 1.5385 |
|                 |            | 9       |         | 0.649        | 0.665       | 97.66          | 0.9766              | 0.1028                 | 1.5408 |

### Test Graphs

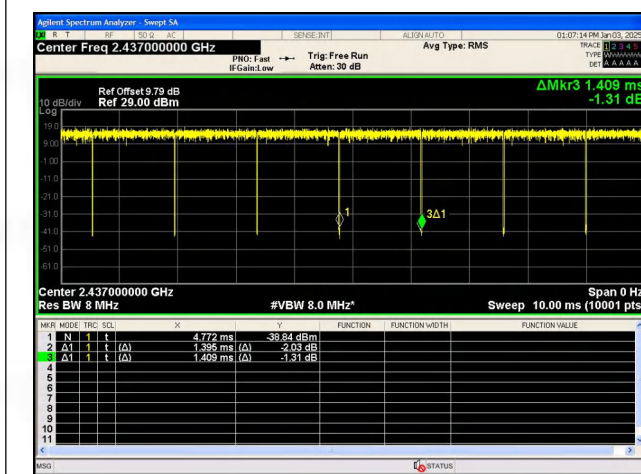




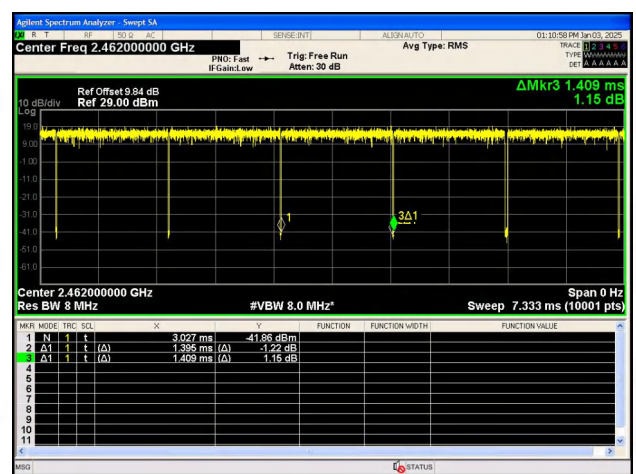
IEEE 802.11b\_20MHz\_Channel 11



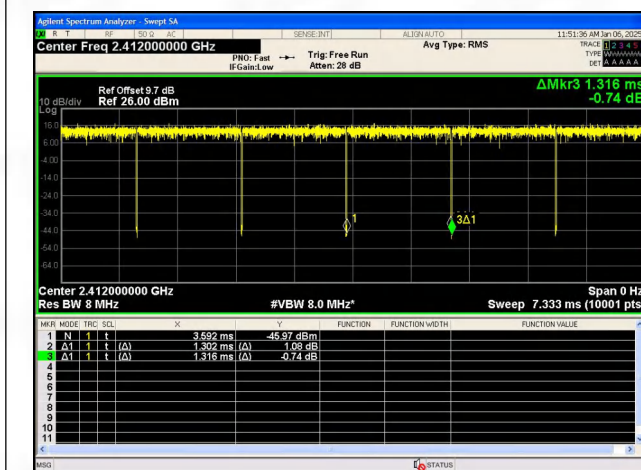
IEEE 802.11g\_20MHz\_Channel 1



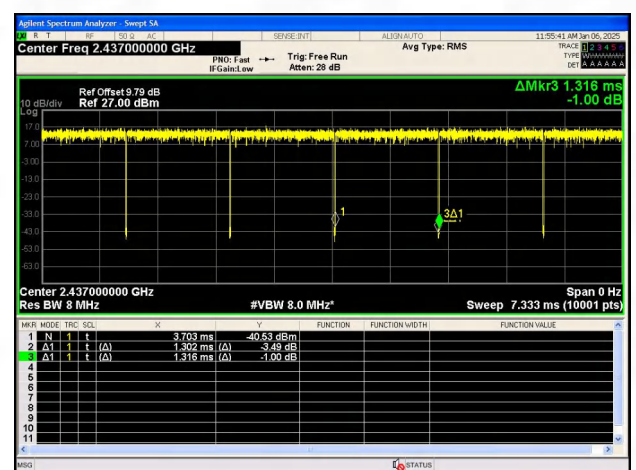
IEEE 802.11g\_20MHz\_Channel 6



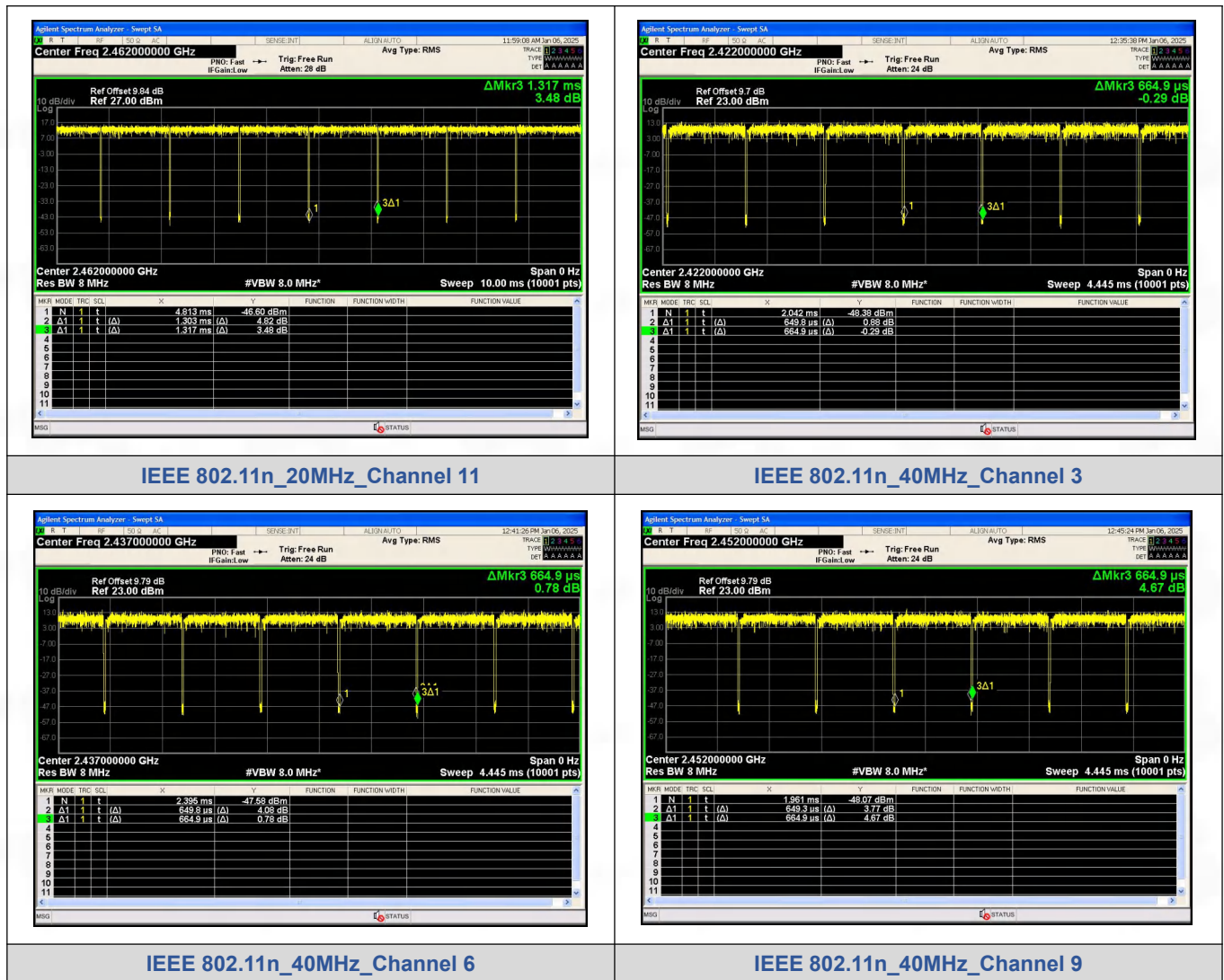
IEEE 802.11g\_20MHz\_Channel 11



IEEE 802.11n\_20MHz\_Channel 1



IEEE 802.11n\_20MHz\_Channel 6



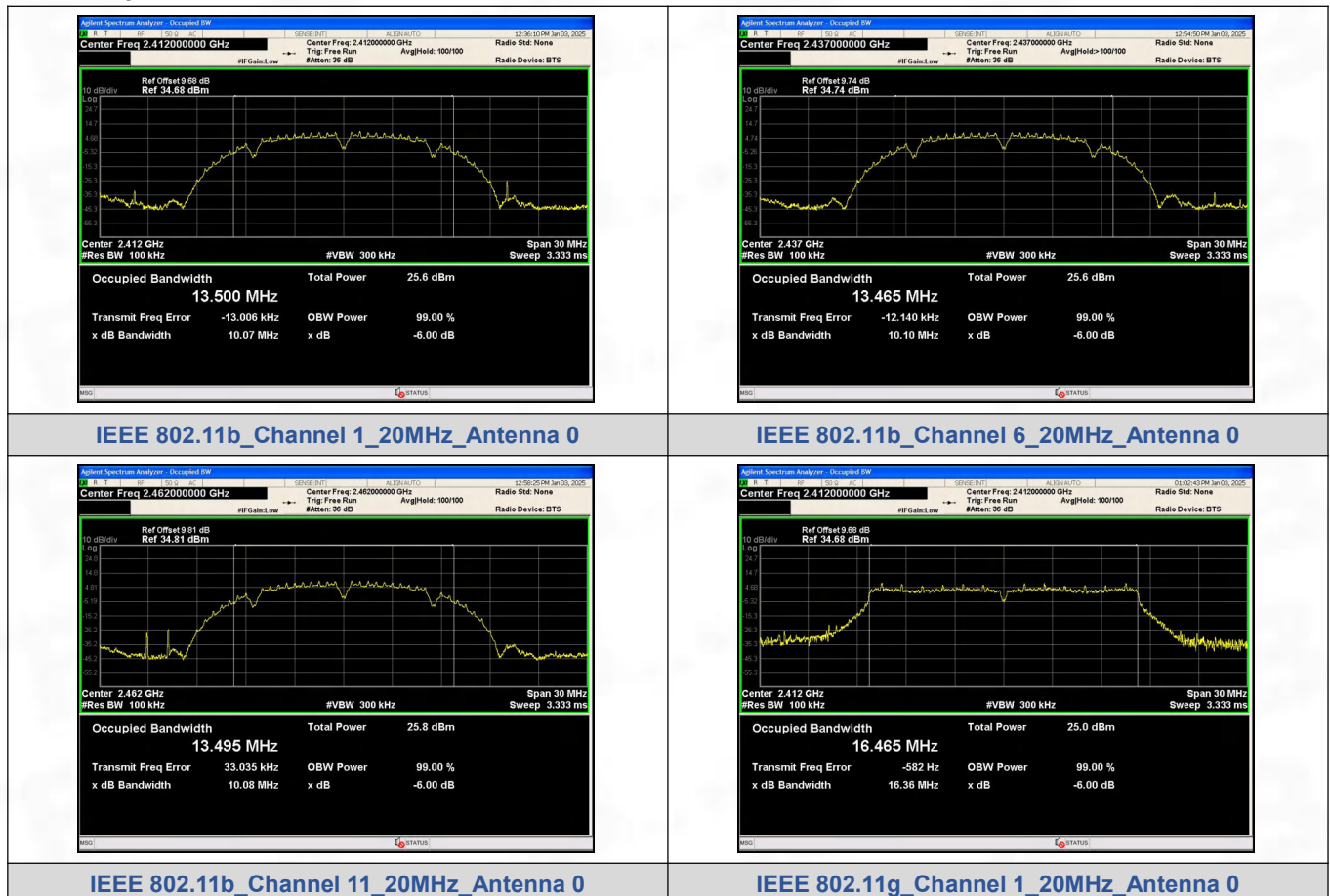
## 6dB Bandwidth and 99% Bandwidth

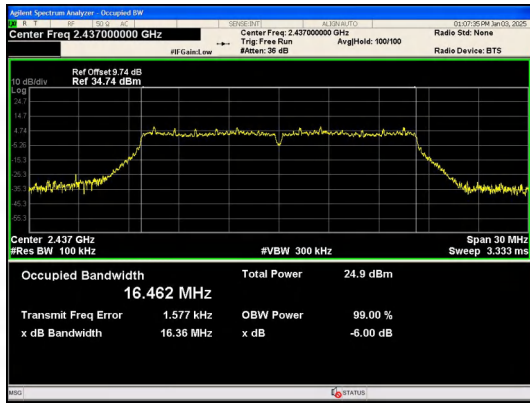
### 6dB Bandwidth

#### Test Result

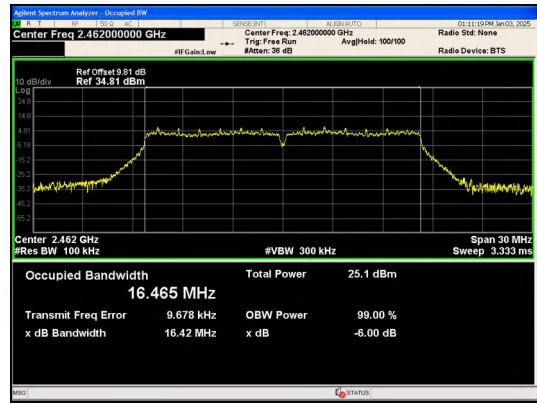
| Mode            | Channel | Ant. | Center Frequency (MHz) | 6 dB Bandwidth (MHz) | Limit (MHz) | Result |
|-----------------|---------|------|------------------------|----------------------|-------------|--------|
| IEEE 802.11b    | 1       | 0    | 2412                   | 10.07                | ≥0.5        | PASS   |
|                 | 6       |      | 2437                   | 10.10                |             | PASS   |
|                 | 11      |      | 2462                   | 10.08                |             | PASS   |
| IEEE 802.11g    | 1       |      | 2412                   | 16.36                |             | PASS   |
|                 | 6       |      | 2437                   | 16.36                |             | PASS   |
|                 | 11      |      | 2462                   | 16.42                |             | PASS   |
| IEEE 802.11n_20 | 1       |      | 2412                   | 17.57                |             | PASS   |
|                 | 6       |      | 2437                   | 17.58                |             | PASS   |
|                 | 11      |      | 2462                   | 17.56                |             | PASS   |
| IEEE 802.11n_40 | 3       |      | 2422                   | 35.82                |             | PASS   |
|                 | 6       |      | 2437                   | 35.49                |             | PASS   |
|                 | 9       |      | 2452                   | 35.70                |             | PASS   |

#### Test Graphs

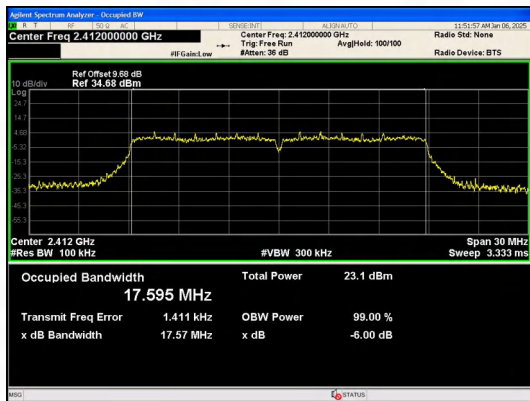




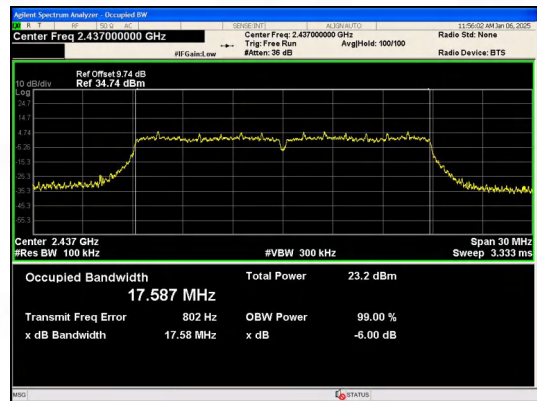
IEEE 802.11g\_Channel 6\_20MHz\_Antenna 0



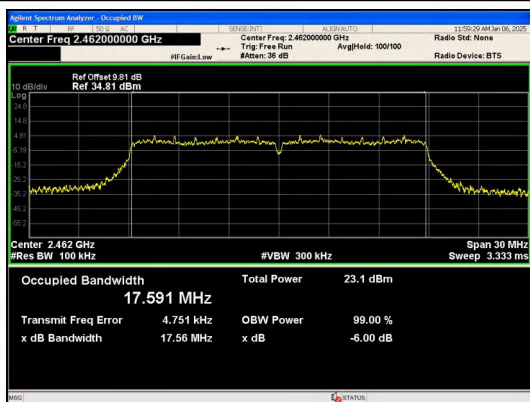
IEEE 802.11g\_Channel 11\_20MHz\_Antenna 0



IEEE 802.11n\_Channel 1\_20MHz\_Antenna 0



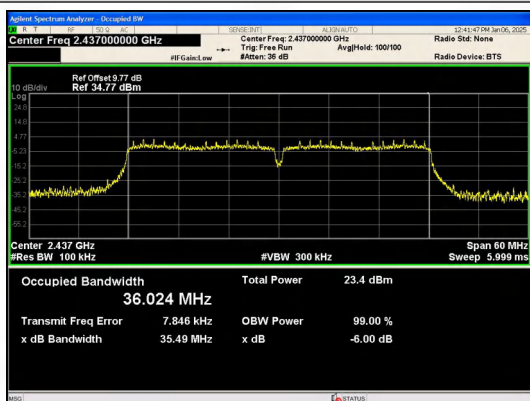
IEEE 802.11n\_Channel 6\_20MHz\_Antenna 0



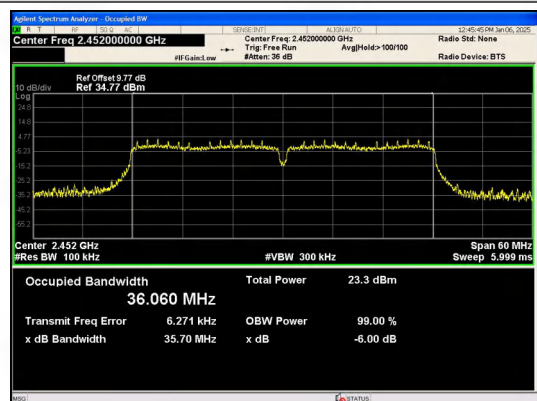
IEEE 802.11n\_Channel 11\_20MHz\_Antenna 0



IEEE 802.11n\_Channel 3\_40MHz\_Antenna 0



IEEE 802.11n\_Channel 6\_40MHz\_Antenna 0



IEEE 802.11n\_Channel 9\_40MHz\_Antenna 0

## 99% Bandwidth

### Test Result

| Mode            | Channel | Ant. | Center Frequency (MHz) | 99% BW (MHz) |
|-----------------|---------|------|------------------------|--------------|
| IEEE 802.11b    | 1       | 0    | 2412                   | 13.514       |
|                 | 6       |      | 2437                   | 13.456       |
|                 | 11      |      | 2462                   | 13.470       |
| IEEE 802.11g    | 1       |      | 2412                   | 16.727       |
|                 | 6       |      | 2437                   | 16.702       |
|                 | 11      |      | 2462                   | 16.745       |
| IEEE 802.11n_20 | 1       |      | 2412                   | 17.703       |
|                 | 6       |      | 2437                   | 17.715       |
|                 | 11      |      | 2462                   | 17.713       |
| IEEE 802.11n_40 | 3       |      | 2422                   | 36.229       |
|                 | 6       |      | 2437                   | 36.216       |
|                 | 9       |      | 2452                   | 36.250       |

### Test Graphs



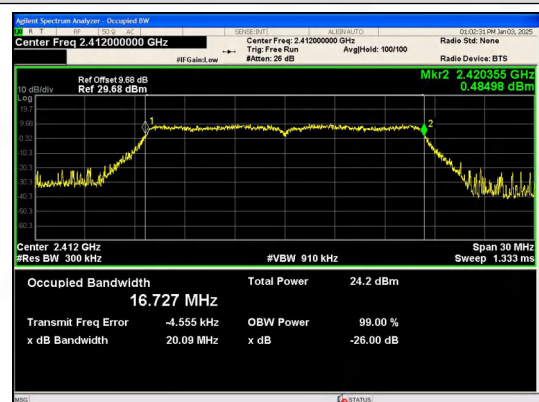
IEEE 802.11b\_Channel 1\_20MHz\_Antenna 0



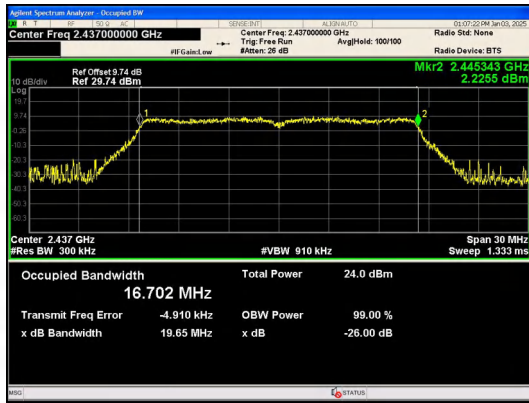
IEEE 802.11b\_Channel 6\_20MHz\_Antenna 0



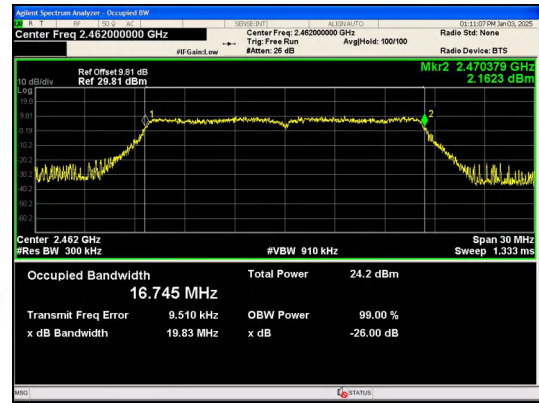
IEEE 802.11b\_Channel 11\_20MHz\_Antenna 0



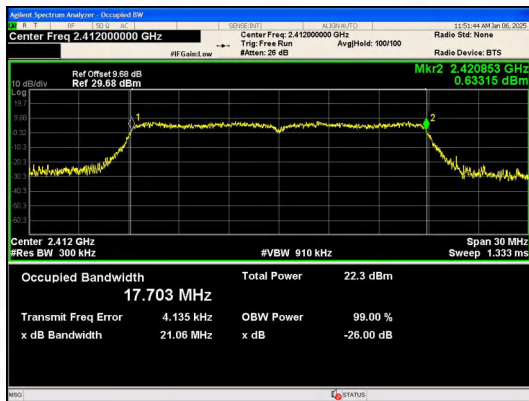
IEEE 802.11g\_Channel 1\_20MHz\_Antenna 0



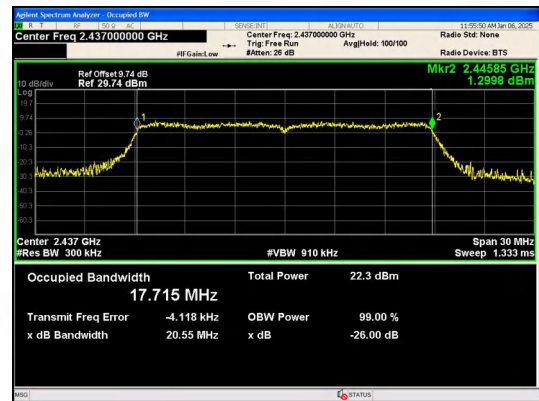
IEEE 802.11g\_Channel 6\_20MHz\_Antenna 0



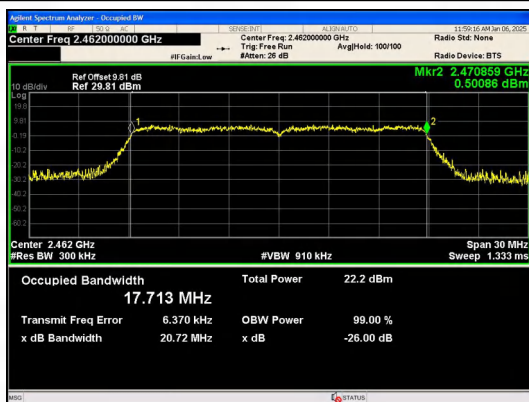
IEEE 802.11g\_Channel 11\_20MHz\_Antenna 0



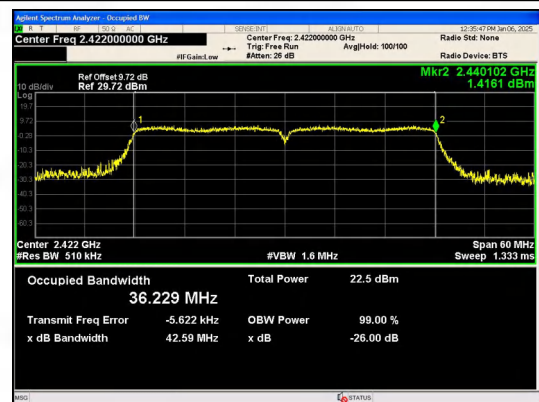
IEEE 802.11n\_Channel 1\_20MHz\_Antenna 0



IEEE 802.11n\_Channel 6\_20MHz\_Antenna 0



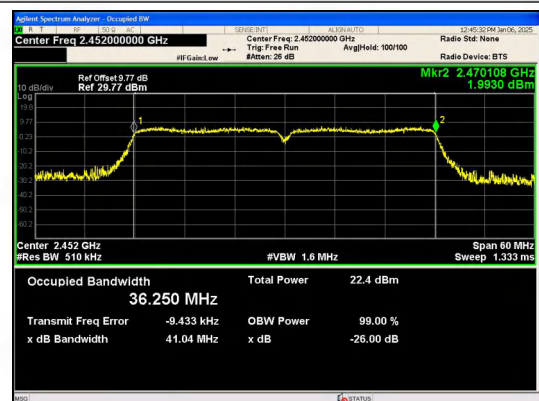
IEEE 802.11n\_Channel 11\_20MHz\_Antenna 0



IEEE 802.11n\_Channel 3\_40MHz\_Antenna 0



IEEE 802.11n\_Channel 6\_40MHz\_Antenna 0



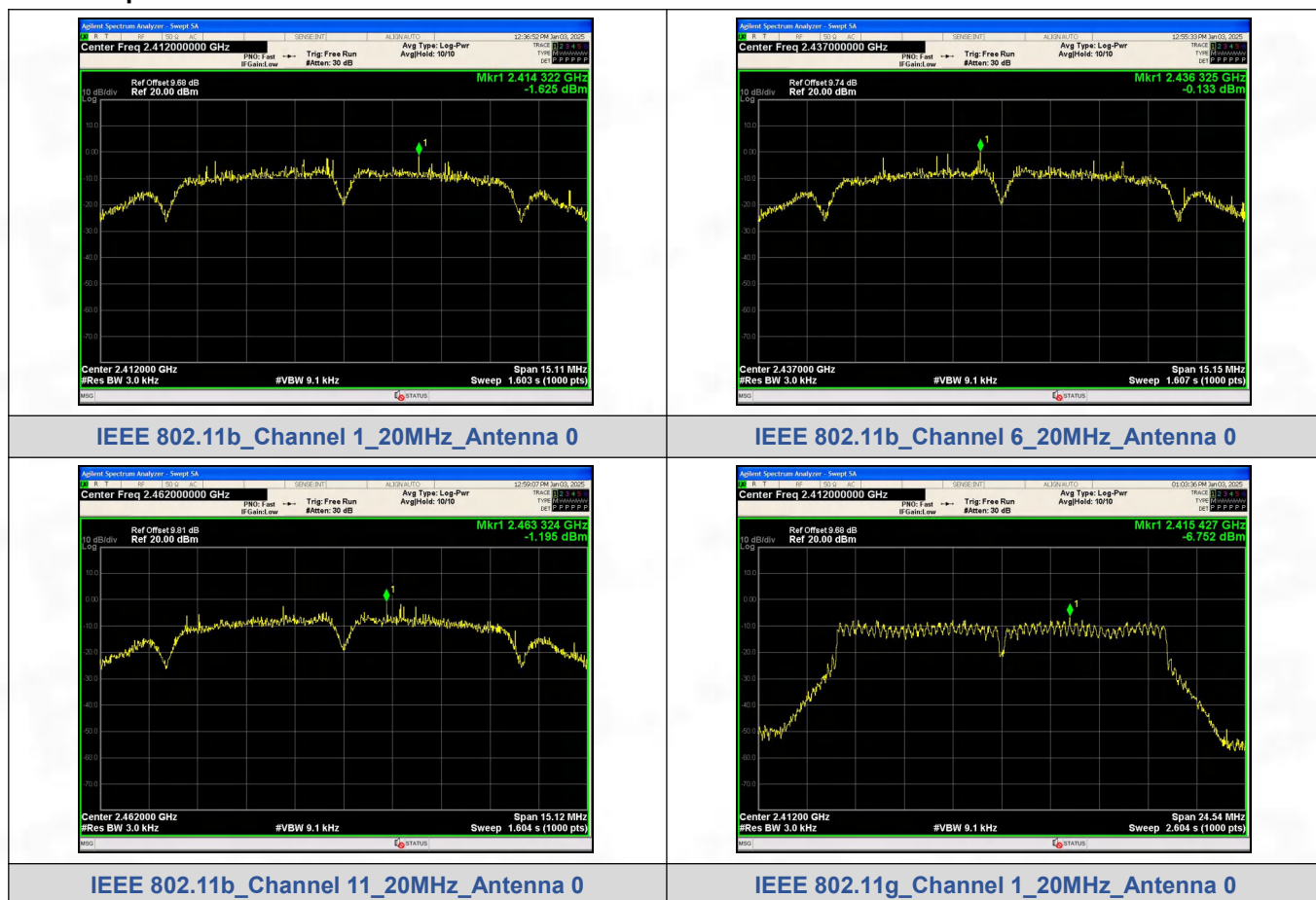
IEEE 802.11n\_Channel 9\_40MHz\_Antenna 0

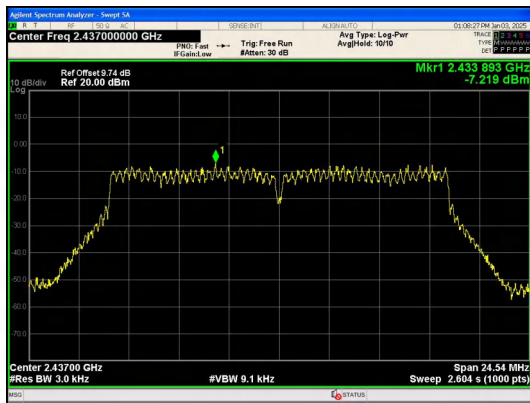
## Power Spectral Density

### Test Result

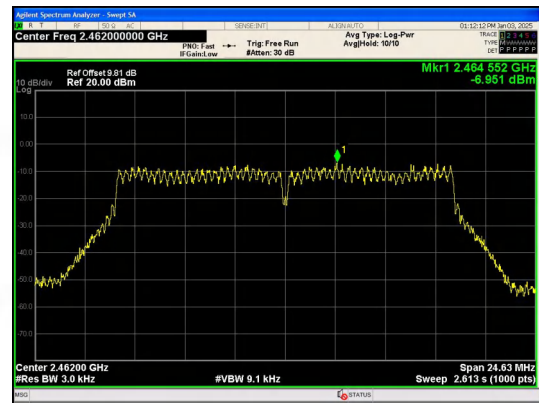
| Mode            | Channel | PSD<br>(dBm/3kHz)<br>Ant. 0 | Limit<br>(dBm/3kHz) | Result |
|-----------------|---------|-----------------------------|---------------------|--------|
| IEEE 802.11b    | 1       | -1.625                      | ≤8                  | PASS   |
|                 | 6       | -0.133                      |                     | PASS   |
|                 | 11      | -1.195                      |                     | PASS   |
| IEEE 802.11g    | 1       | -6.752                      |                     | PASS   |
|                 | 6       | -7.219                      |                     | PASS   |
|                 | 11      | -6.951                      |                     | PASS   |
| IEEE 802.11n_20 | 1       | -9.114                      |                     | PASS   |
|                 | 6       | -8.282                      |                     | PASS   |
|                 | 11      | -7.884                      |                     | PASS   |
| IEEE 802.11n_40 | 3       | -11.294                     |                     | PASS   |
|                 | 6       | -11.332                     |                     | PASS   |
|                 | 9       | -11.055                     |                     | PASS   |

### Test Graphs

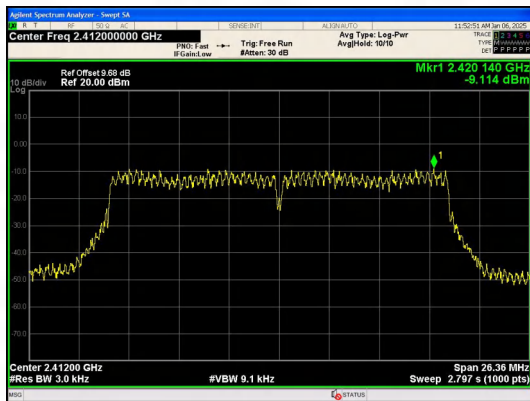




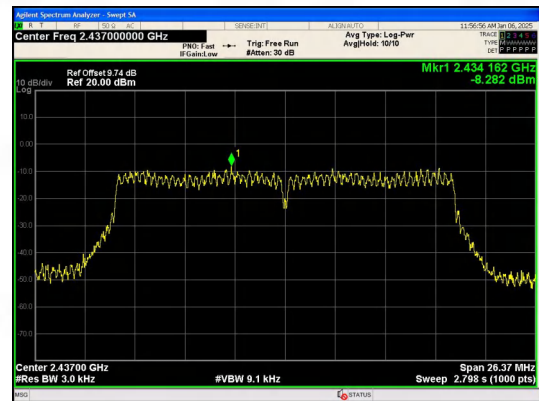
IEEE 802.11g\_Channel 6\_20MHz\_Antenna 0



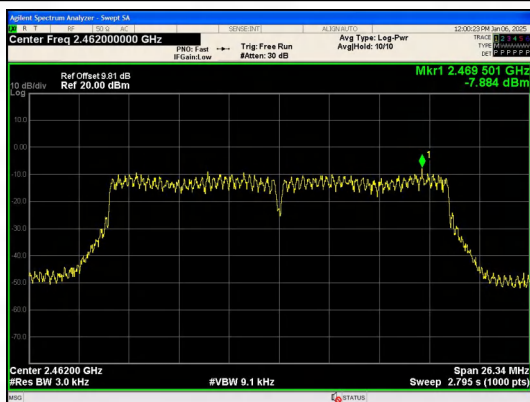
IEEE 802.11g\_Channel 11\_20MHz\_Antenna 0



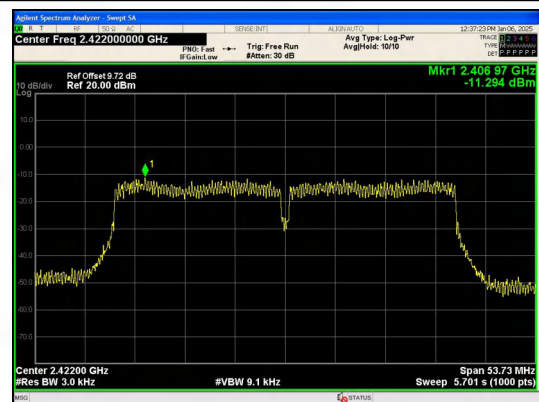
IEEE 802.11n\_Channel 1\_20MHz\_Antenna 0



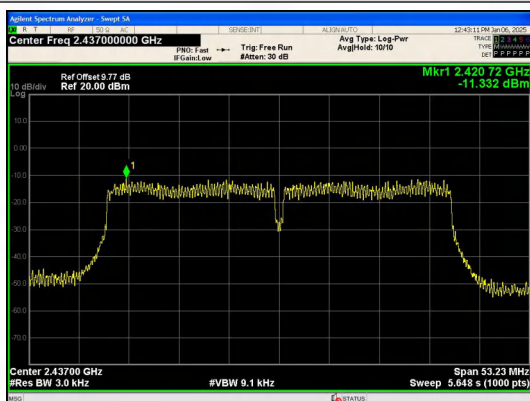
IEEE 802.11n\_Channel 6\_20MHz\_Antenna 0



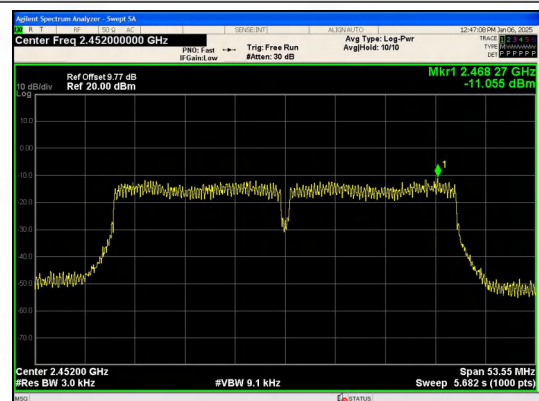
IEEE 802.11n\_Channel 11\_20MHz\_Antenna 0



IEEE 802.11n\_Channel 3\_40MHz\_Antenna 0



IEEE 802.11n\_Channel 6\_40MHz\_Antenna 0



IEEE 802.11n\_Channel 9\_40MHz\_Antenna 0



## Conducted Spurious Emission

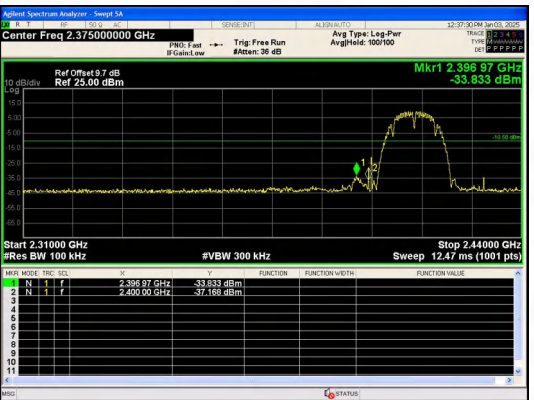
### Test Result

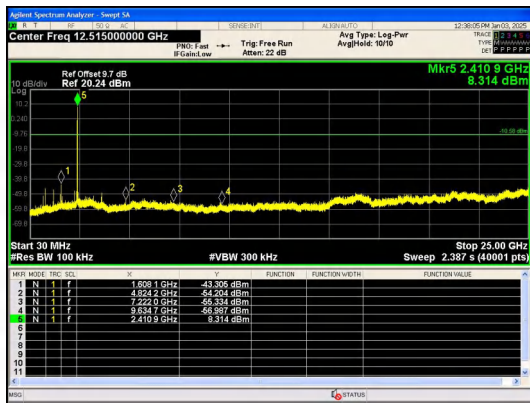
| Mode               | Channel | Ant. | OOB<br>Emission<br>Frequency<br>(MHz) | OOB<br>Emission<br>Level<br>(dBm) | Limit<br>(dBm) | Over Limit<br>(dB) | Result |
|--------------------|---------|------|---------------------------------------|-----------------------------------|----------------|--------------------|--------|
| IEEE 802.11b       | 1       | 0    | 1608.10                               | -43.305                           | -10.58         | -32.725            | PASS   |
|                    |         |      | 2396.97                               | -33.833                           | -10.58         | -23.253            | PASS   |
|                    |         |      | 2400.00                               | -37.168                           | -10.58         | -26.588            | PASS   |
|                    |         |      | 4824.20                               | -54.204                           | -10.58         | -43.624            | PASS   |
|                    |         |      | 7222.00                               | -55.334                           | -10.58         | -44.754            | PASS   |
|                    |         |      | 9634.70                               | -56.987                           | -10.58         | -46.407            | PASS   |
|                    | 6       |      | 811.56                                | -42.210                           | -10.62         | -31.590            | PASS   |
|                    |         |      | 4874.18                               | -51.740                           | -10.62         | -41.120            | PASS   |
|                    |         |      | 7295.65                               | -55.825                           | -10.62         | -45.205            | PASS   |
|                    |         |      | 9747.70                               | -56.122                           | -10.62         | -45.502            | PASS   |
|                    | 11      |      | 1641.19                               | -43.760                           | -10.32         | -33.440            | PASS   |
|                    |         |      | 2483.50                               | -39.723                           | -10.32         | -29.403            | PASS   |
|                    |         |      | 4924.12                               | -51.021                           | -10.32         | -40.701            | PASS   |
|                    |         |      | 7386.16                               | -56.267                           | -10.32         | -45.947            | PASS   |
|                    |         |      | 9855.69                               | -57.098                           | -10.32         | -46.778            | PASS   |
| IEEE 802.11g       | 1       |      | 2398.14                               | -28.511                           | -12.34         | -16.171            | PASS   |
|                    |         |      | 2400.00                               | -30.428                           | -12.34         | -18.088            | PASS   |
|                    |         |      | 4833.00                               | -56.664                           | -12.34         | -44.324            | PASS   |
|                    |         |      | 7240.10                               | -54.992                           | -12.34         | -42.652            | PASS   |
|                    |         |      | 9629.70                               | -55.910                           | -12.34         | -43.570            | PASS   |
|                    |         |      | 24667.3                               | -45.385                           | -12.34         | -33.045            | PASS   |
|                    | 6       |      | 809.69                                | -44.615                           | -12.39         | -32.225            | PASS   |
|                    |         |      | 4892.28                               | -56.137                           | -12.39         | -43.747            | PASS   |
|                    |         |      | 7315.62                               | -56.774                           | -12.39         | -44.384            | PASS   |
|                    |         |      | 9738.96                               | -56.811                           | -12.39         | -44.421            | PASS   |
|                    | 11      |      | 828.42                                | -41.686                           | -12.1          | -29.586            | PASS   |
|                    |         |      | 2483.50                               | -35.044                           | -12.1          | -22.944            | PASS   |
|                    |         |      | 4929.11                               | -56.663                           | -12.1          | -44.563            | PASS   |
|                    |         |      | 7396.77                               | -55.925                           | -12.1          | -43.825            | PASS   |
|                    |         |      | 9866.93                               | -57.751                           | -12.1          | -45.651            | PASS   |
| IEEE<br>802.11n_20 | 1       |      | 2398.92                               | -26.398                           | -14.11         | -12.288            | PASS   |
|                    |         |      | 2400.00                               | -28.789                           | -14.11         | -14.679            | PASS   |
|                    |         |      | 4824.90                               | -56.949                           | -14.11         | -42.839            | PASS   |
|                    |         |      | 7232.60                               | -57.067                           | -14.11         | -42.957            | PASS   |
|                    |         |      | 9660.90                               | -56.910                           | -14.11         | -42.800            | PASS   |
|                    |         |      | 24724.7                               | -45.831                           | -14.11         | -31.721            | PASS   |
|                    | 6       |      | 4854.20                               | -56.350                           | -14.15         | -42.200            | PASS   |

|                    |    |         |         |        |         |      |
|--------------------|----|---------|---------|--------|---------|------|
|                    | 11 | 7315.00 | -57.252 | -14.15 | -43.102 | PASS |
|                    |    | 9755.19 | -56.874 | -14.15 | -42.724 | PASS |
|                    |    | 24624.8 | -45.416 | -14.15 | -31.266 | PASS |
|                    |    | 2483.50 | -38.176 | -14.28 | -23.896 | PASS |
|                    |    | 4931.61 | -55.894 | -14.28 | -41.614 | PASS |
|                    |    | 7388.66 | -56.842 | -14.28 | -42.562 | PASS |
|                    |    | 9835.72 | -58.114 | -14.28 | -43.834 | PASS |
|                    |    | 24980.0 | -45.426 | -14.28 | -31.146 | PASS |
|                    |    | 2396.19 | -27.567 | -16.87 | -10.697 | PASS |
|                    |    | 2400.00 | -31.323 | -16.87 | -14.453 | PASS |
|                    |    | 4854.20 | -56.660 | -16.87 | -39.790 | PASS |
| IEEE<br>802.11n_40 | 3  | 7282.50 | -55.789 | -16.87 | -38.919 | PASS |
|                    |    | 9679.70 | -57.605 | -16.87 | -40.735 | PASS |
|                    |    | 24697.9 | -45.735 | -16.87 | -28.865 | PASS |
|                    |    | 4890.41 | -55.674 | -16.81 | -38.864 | PASS |
|                    |    | 7296.89 | -56.712 | -16.81 | -39.902 | PASS |
|                    | 6  | 9743.95 | -56.636 | -16.81 | -39.826 | PASS |
|                    |    | 24749.7 | -46.184 | -16.81 | -29.374 | PASS |
|                    |    | 2483.50 | -36.022 | -16.81 | -19.212 | PASS |
|                    |    | 4936.60 | -56.346 | -16.81 | -39.535 | PASS |
|                    | 9  | 7321.86 | -57.155 | -16.81 | -40.345 | PASS |
|                    |    | 9778.29 | -57.636 | -16.81 | -40.826 | PASS |
|                    |    | 24708.5 | -45.148 | -16.81 | -28.338 | PASS |

Note:The maximum loss of the test system for testing at 30MHz-26.5GHz is 17.2dB. The offset on the test chart is the offset of the main frequency, and the margin is sufficient to offset the difference between the maximum loss of the system and the offset of the main frequency

## Test Graphs

|                                                                                                                                                                      |                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p><b>In-Band Reference Level</b><br/>IEEE 802.11b_Channel 1_20MHz_Antenna 0</p> |  <p><b>Out Of Band Emission</b><br/>IEEE 802.11b_Channel 1_20MHz_Antenna 0</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|



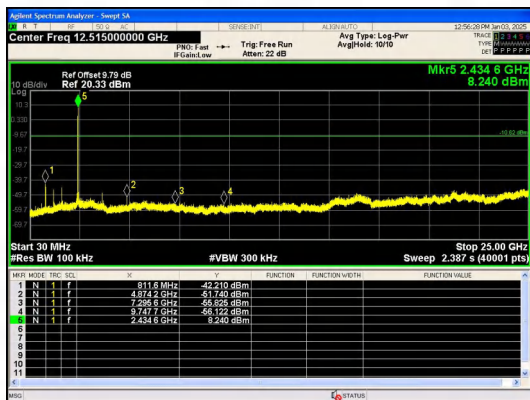
30.0 MHz - 25000.0 MHz

IEEE 802.11b\_Channel 1\_20MHz\_Antenna 0



In-Band Reference Level

IEEE 802.11b\_Channel 6\_20MHz\_Antenna 0



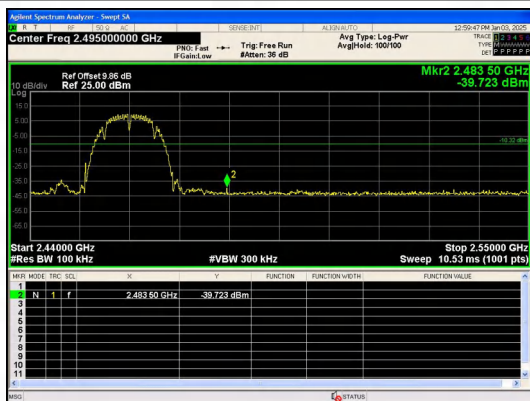
30.0 MHz - 25000.0 MHz

IEEE 802.11b\_Channel 6\_20MHz\_Antenna 0



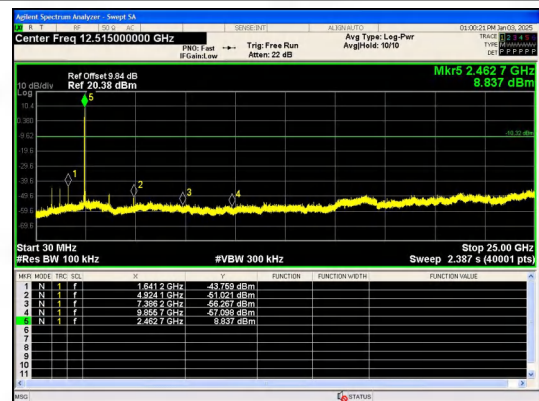
In-Band Reference Level

IEEE 802.11b\_Channel 11\_20MHz\_Antenna 0



Out Of Band Emission

IEEE 802.11b\_Channel 11\_20MHz\_Antenna 0

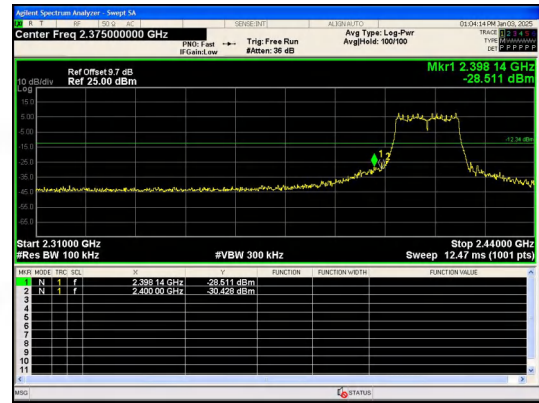


30.0 MHz - 25000.0 MHz

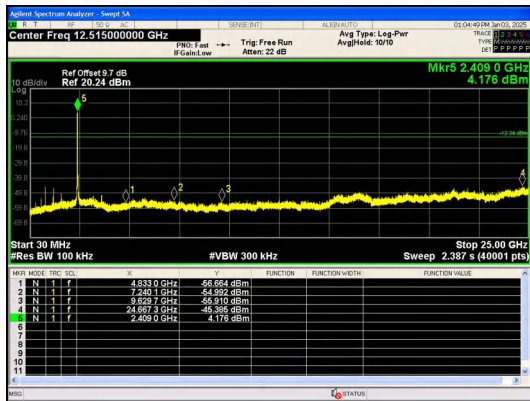
IEEE 802.11b\_Channel 11\_20MHz\_Antenna 0



In-Band Reference Level  
IEEE 802.11g\_Channel 1\_20MHz\_Antenna 0



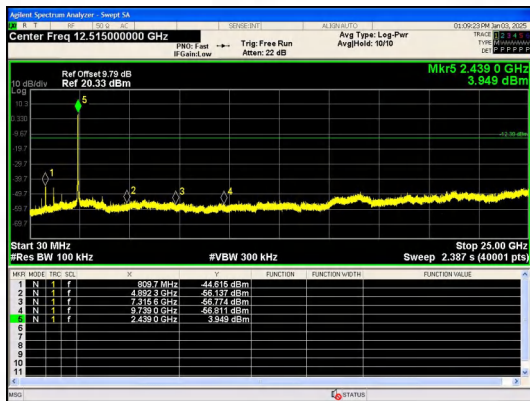
Out Of Band Emission  
IEEE 802.11g\_Channel 1\_20MHz\_Antenna 0



30.0 MHz - 25000.0 MHz  
IEEE 802.11g\_Channel 1\_20MHz\_Antenna 0



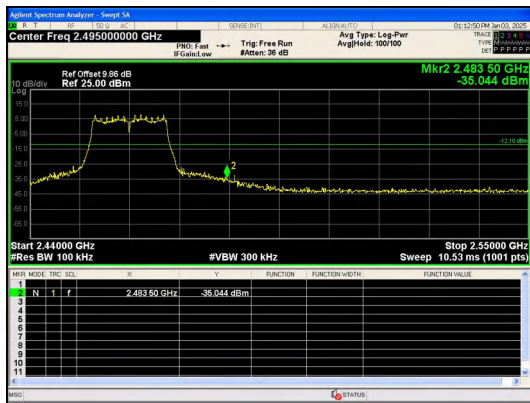
In-Band Reference Level  
IEEE 802.11g\_Channel 6\_20MHz\_Antenna 0



30.0 MHz - 25000.0 MHz  
IEEE 802.11g\_Channel 6\_20MHz\_Antenna 0

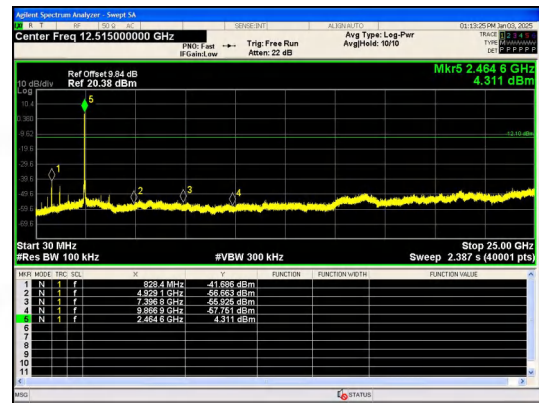


In-Band Reference Level  
IEEE 802.11g\_Channel 11\_20MHz\_Antenna 0



Out Of Band Emission

IEEE 802.11g\_Channel 11\_20MHz\_Antenna 0



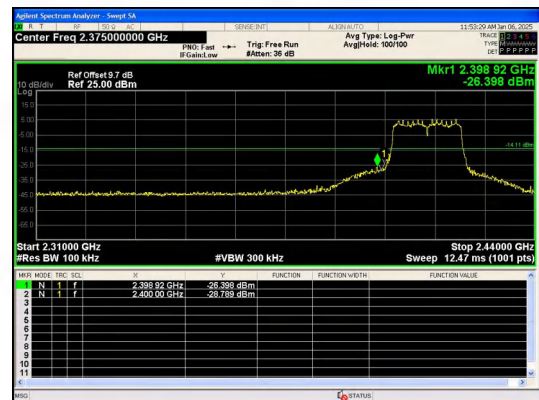
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IEEE 802.11g\_Channel 11\_20MHz\_Antenna 0



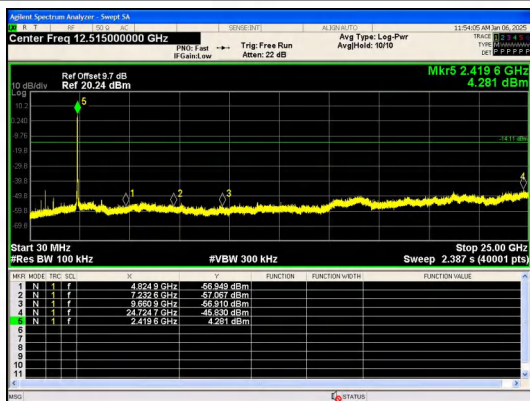
In-Band Reference Level

IEEE 802.11n\_Channel 1\_20MHz\_Antenna 0



Out Of Band Emission

IEEE 802.11n\_Channel 1\_20MHz\_Antenna 0



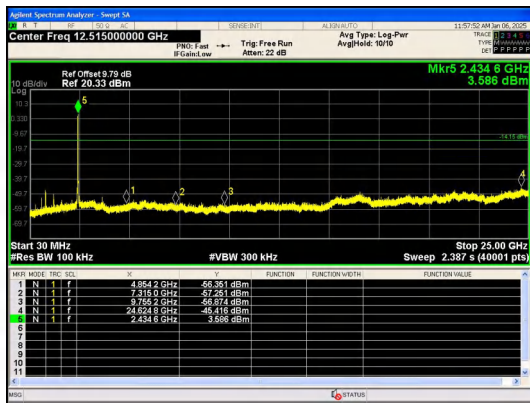
30.0 MHz - 25000.0 MHz

IEEE 802.11n\_Channel 1\_20MHz\_Antenna 0

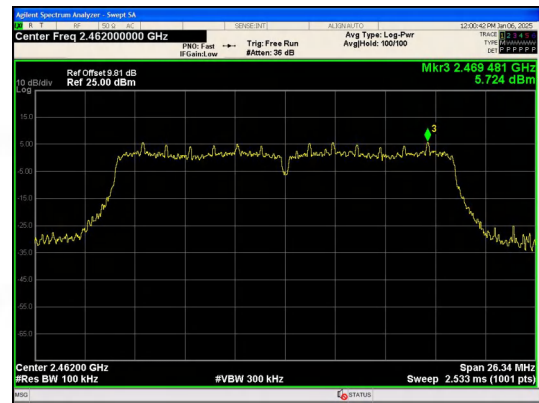


In-Band Reference Level

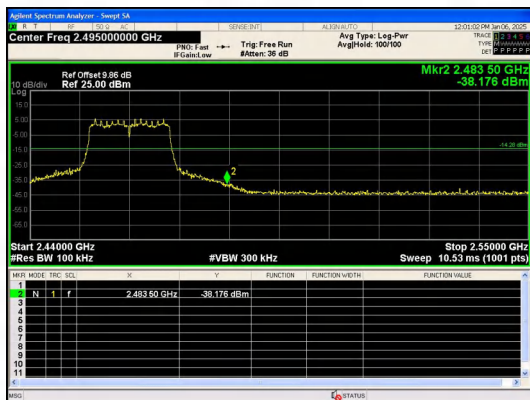
IEEE 802.11n\_Channel 6\_20MHz\_Antenna 0



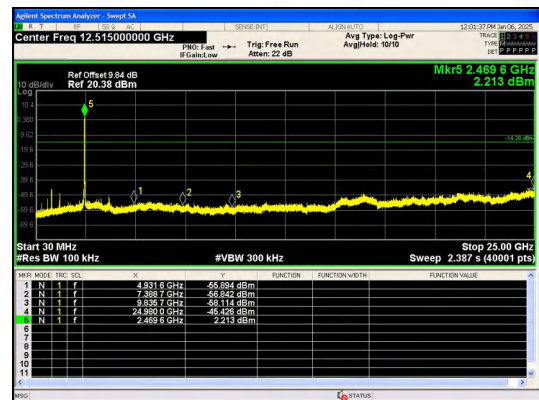
30.0 MHz - 25000.0 MHz  
IEEE 802.11n\_Channel 6\_20MHz\_Antenna 0



In-Band Reference Level  
IEEE 802.11n\_Channel 11\_20MHz\_Antenna 0



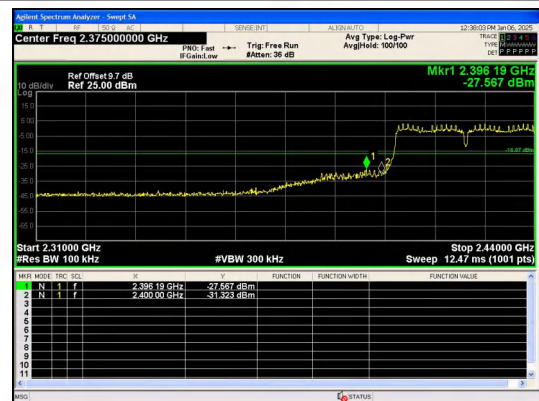
Out Of Band Emission  
IEEE 802.11n\_Channel 11\_20MHz\_Antenna 0



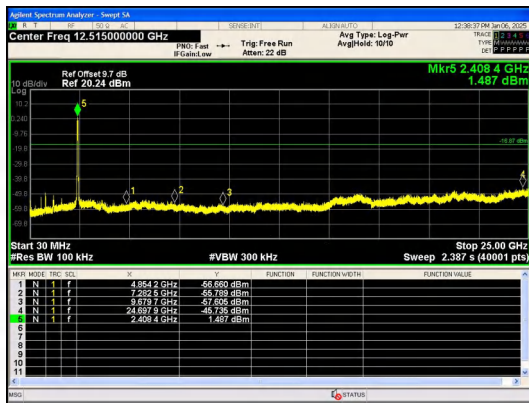
30.0 MHz - 25000.0 MHz  
IEEE 802.11n\_Channel 11\_20MHz\_Antenna 0



In-Band Reference Level  
IEEE 802.11n\_Channel 3\_40MHz\_Antenna 0



Out Of Band Emission  
IEEE 802.11n\_Channel 3\_40MHz\_Antenna 0



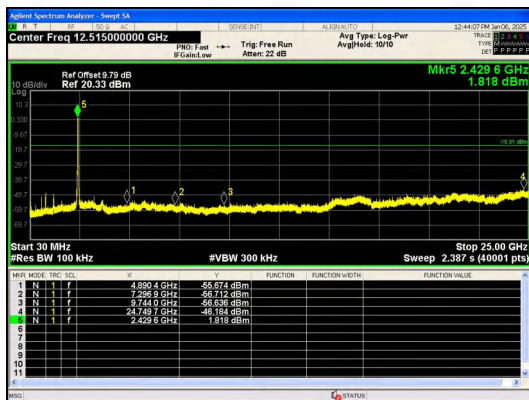
30.0 MHz - 25000.0 MHz

IEEE 802.11n\_Channel 3\_40MHz\_Antenna 0



In-Band Reference Level

IEEE 802.11n\_Channel 6\_40MHz\_Antenna 0



30.0 MHz - 25000.0 MHz

IEEE 802.11n\_Channel 6\_40MHz\_Antenna 0



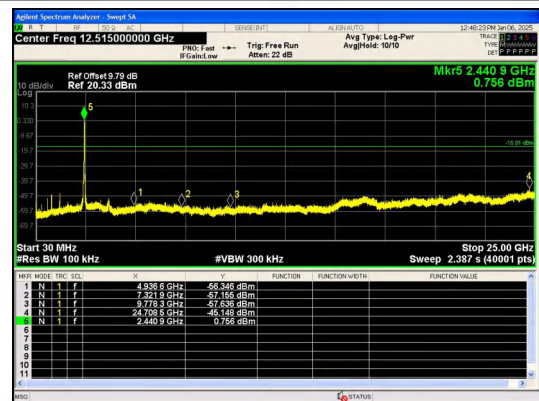
In-Band Reference Level

IEEE 802.11n\_Channel 9\_40MHz\_Antenna 0



Out Of Band Emission

IEEE 802.11n\_Channel 9\_40MHz\_Antenna 0



30.0 MHz - 25000.0 MHz

IEEE 802.11n\_Channel 9\_40MHz\_Antenna 0