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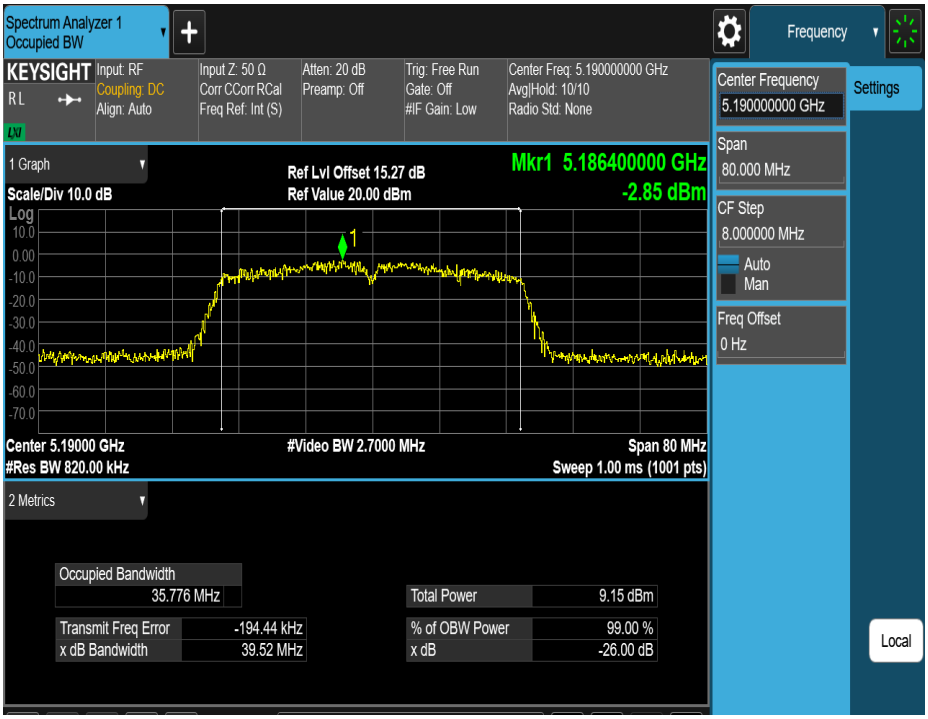
|---|
|  |



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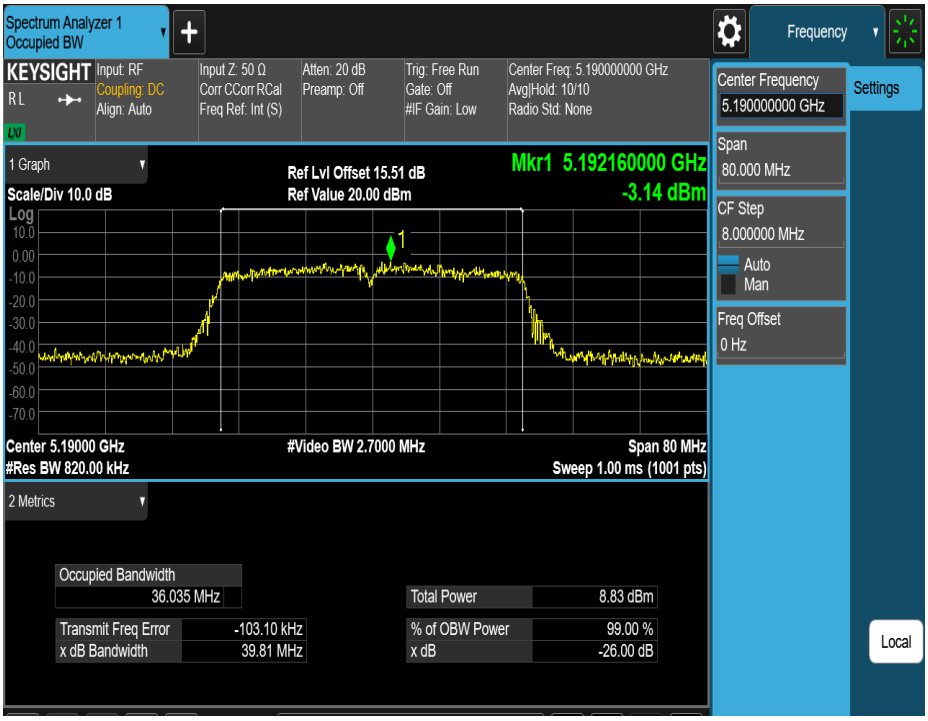
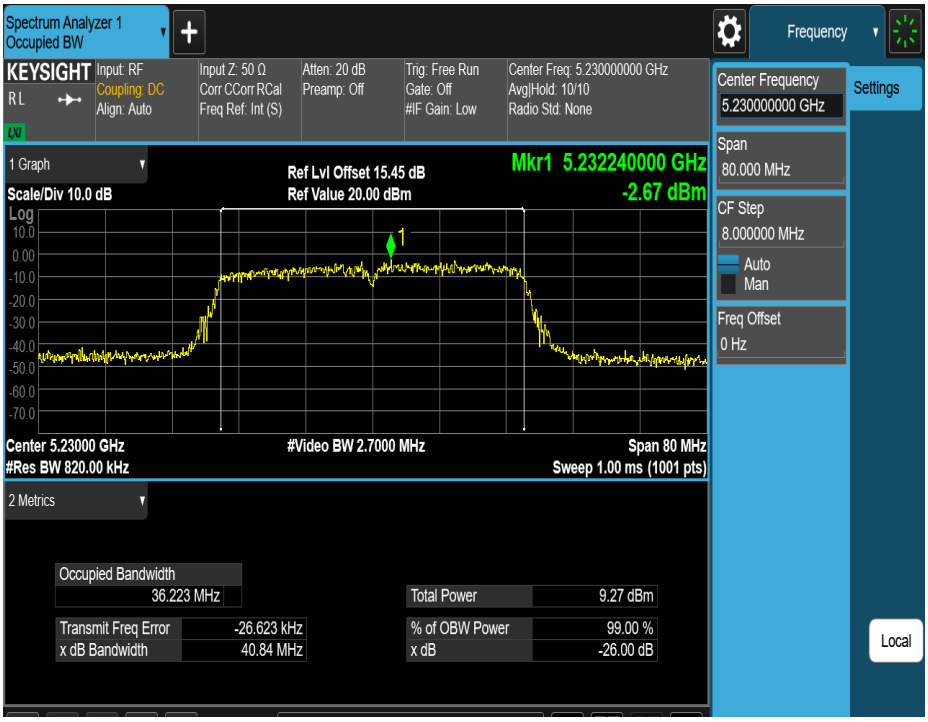
|---|
|  |

| 11N40MIMO_Ant1_5230 |
| --- |
|  |



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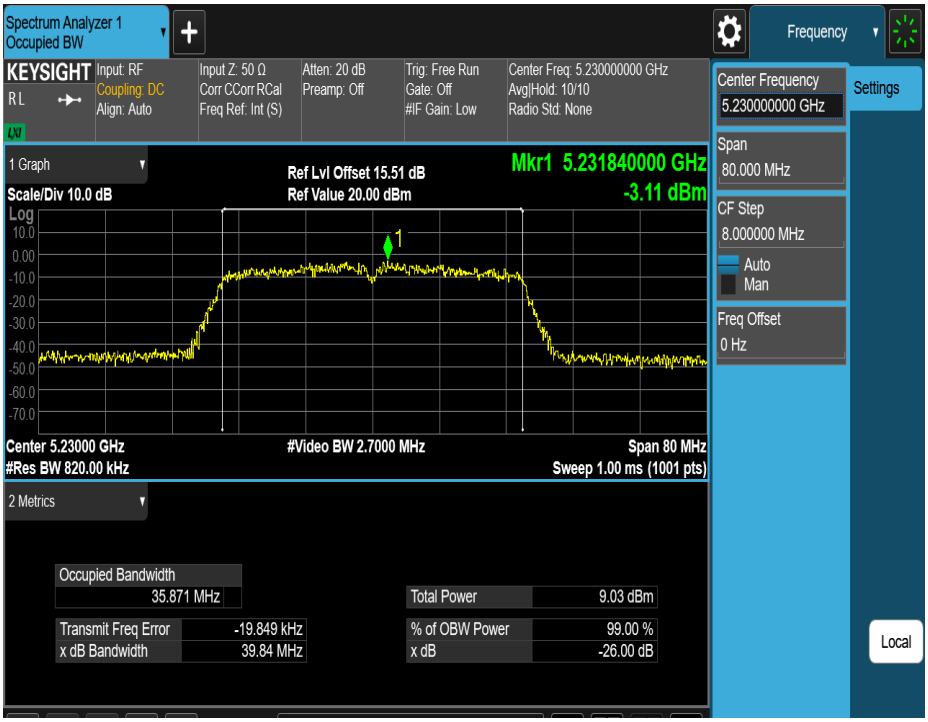
|  |

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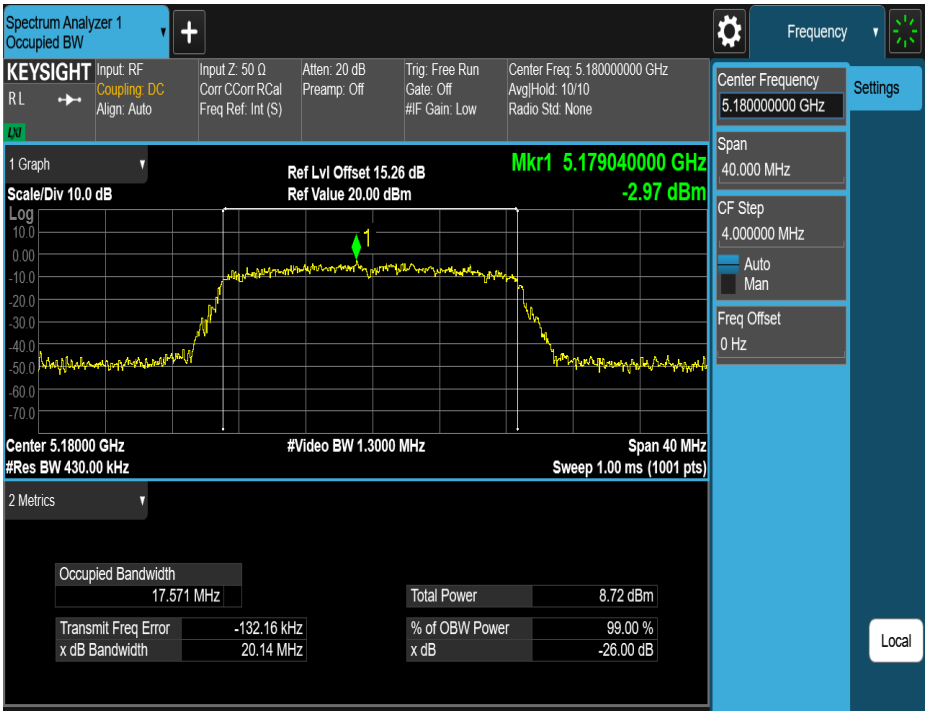
|  |



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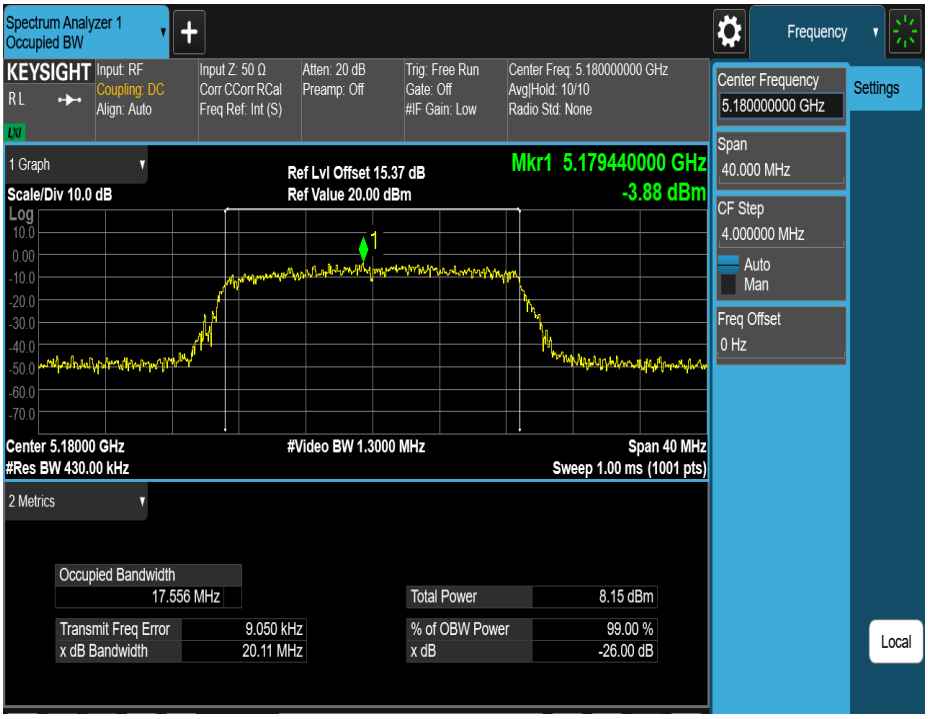
|  |

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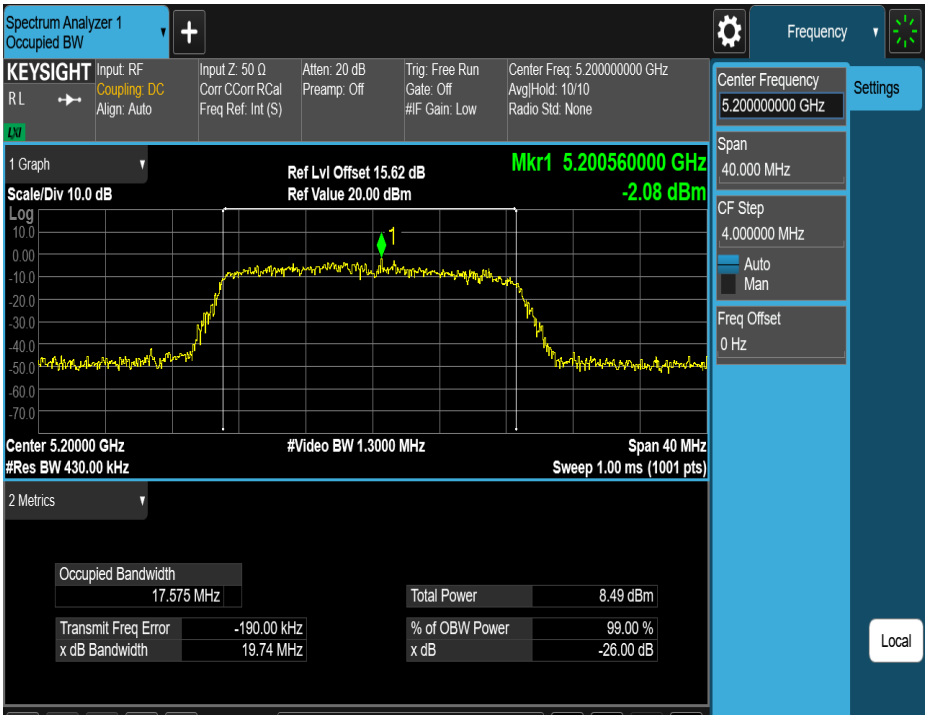
|  |



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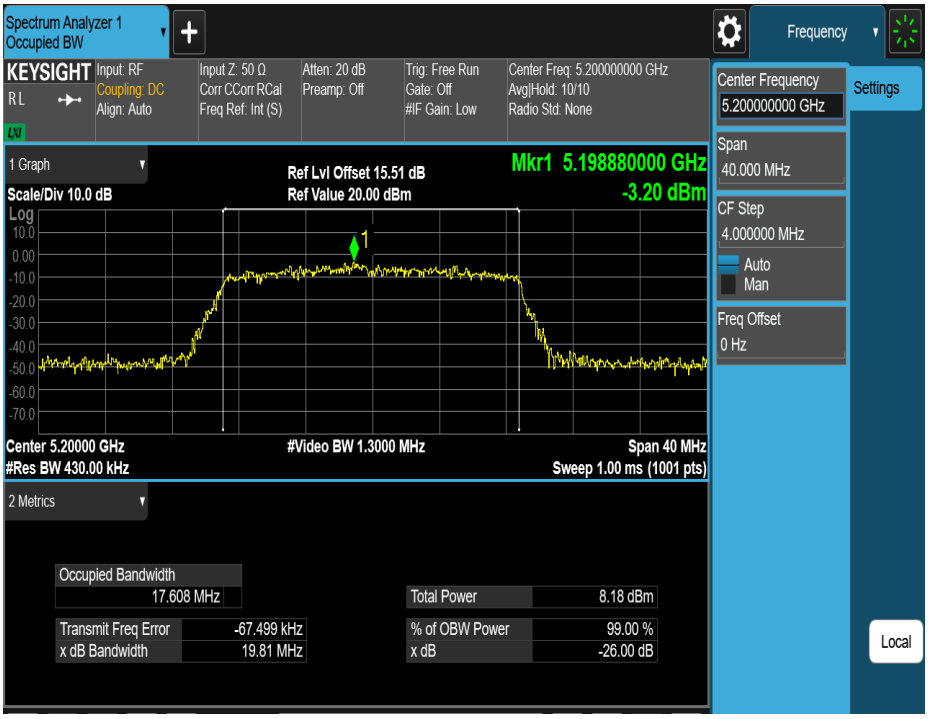
|  |

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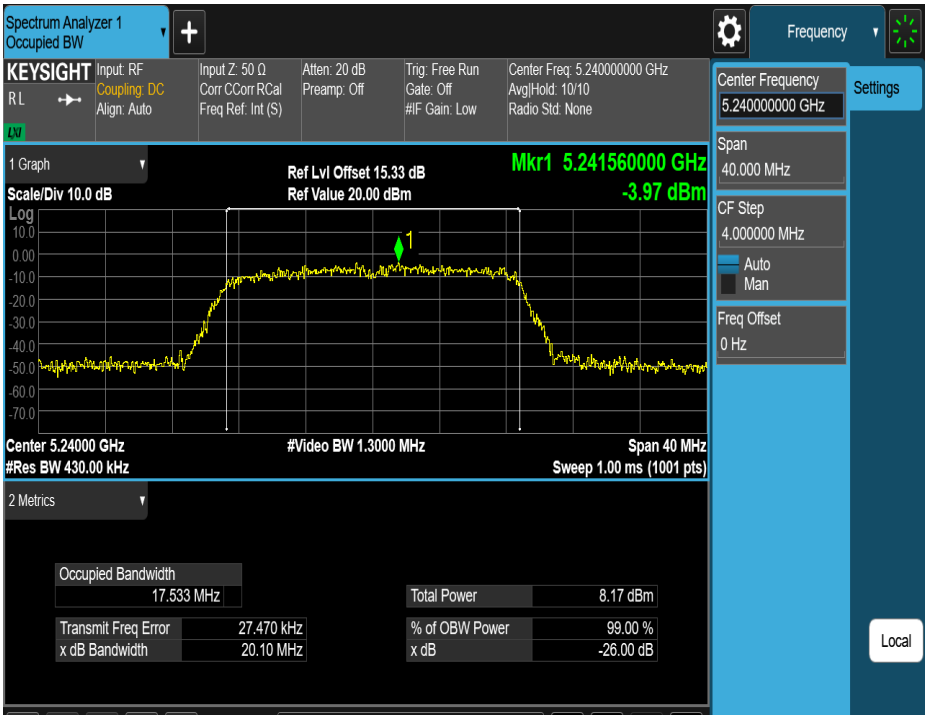
|  |



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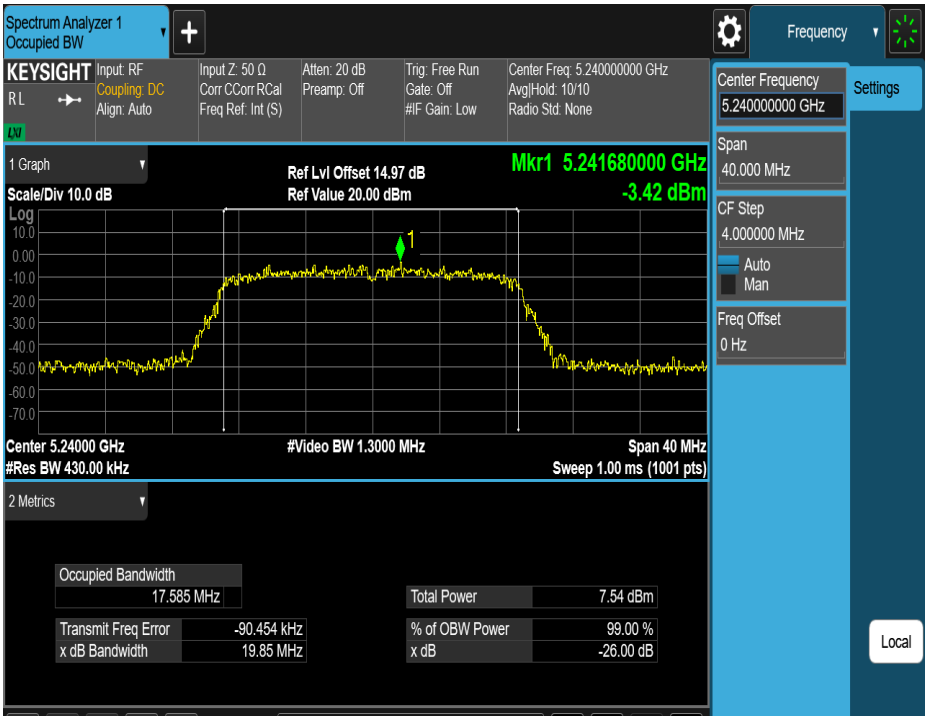
|  |

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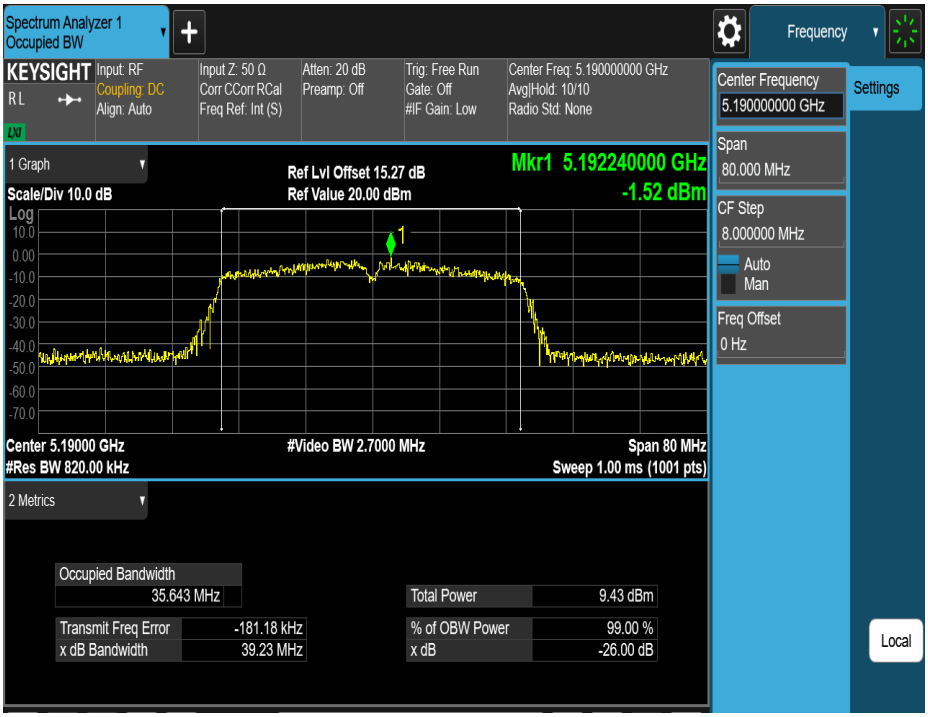
|  |



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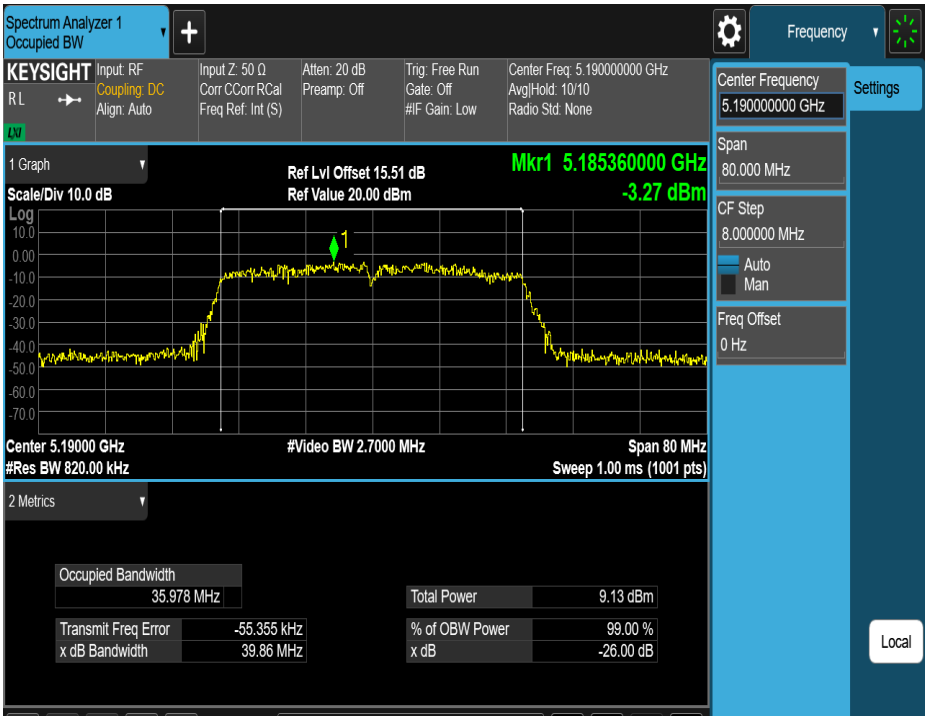
|  |

| 11AC40MIMO_Ant1_5230 |
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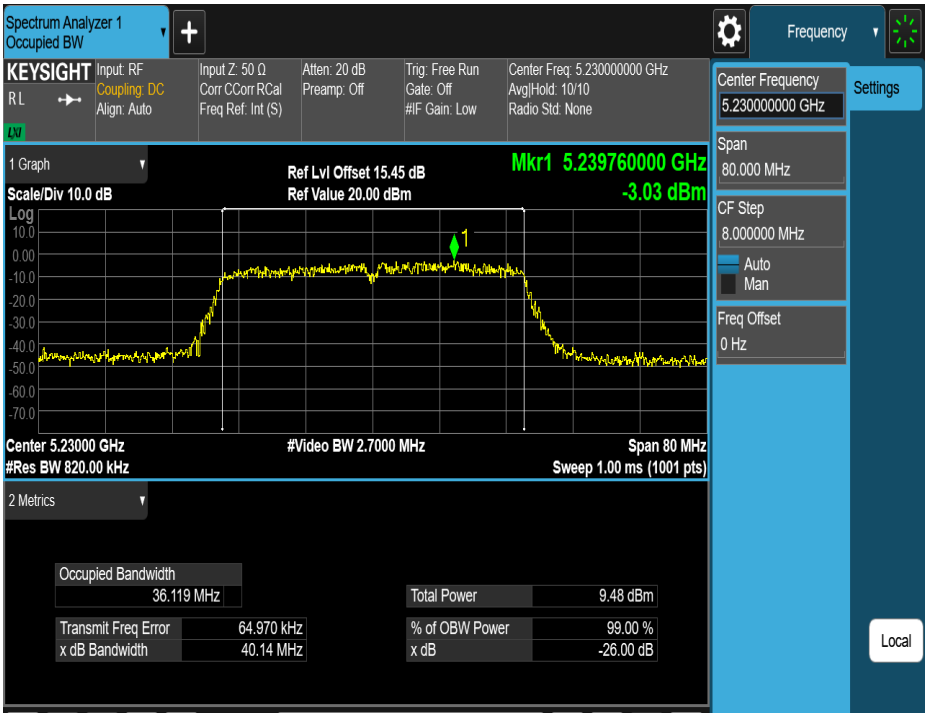
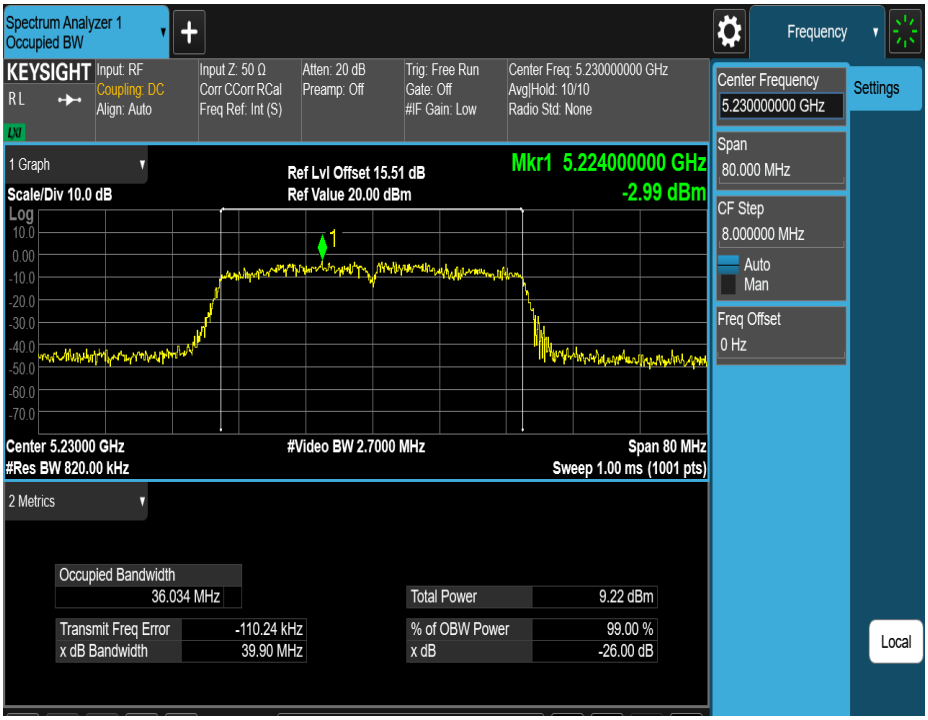
|  |



| 11AC40MIMO_Ant2_5230 |
|---|
|  |

| 11AC80MIMO_Ant1_5210 |
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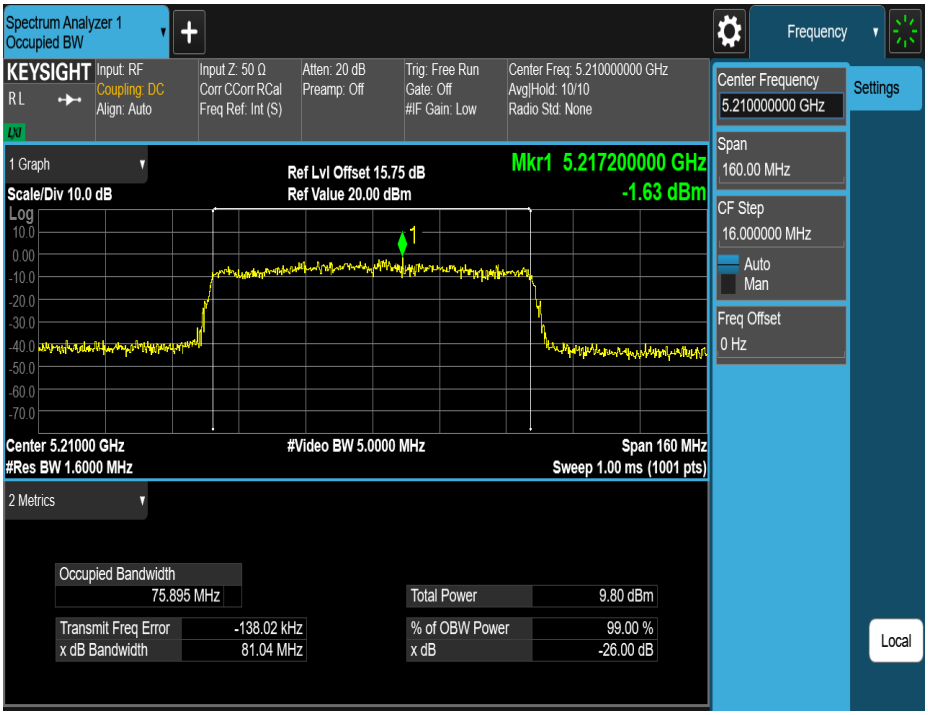
|  |



| 11AC80MIMO_Ant2_5210 |
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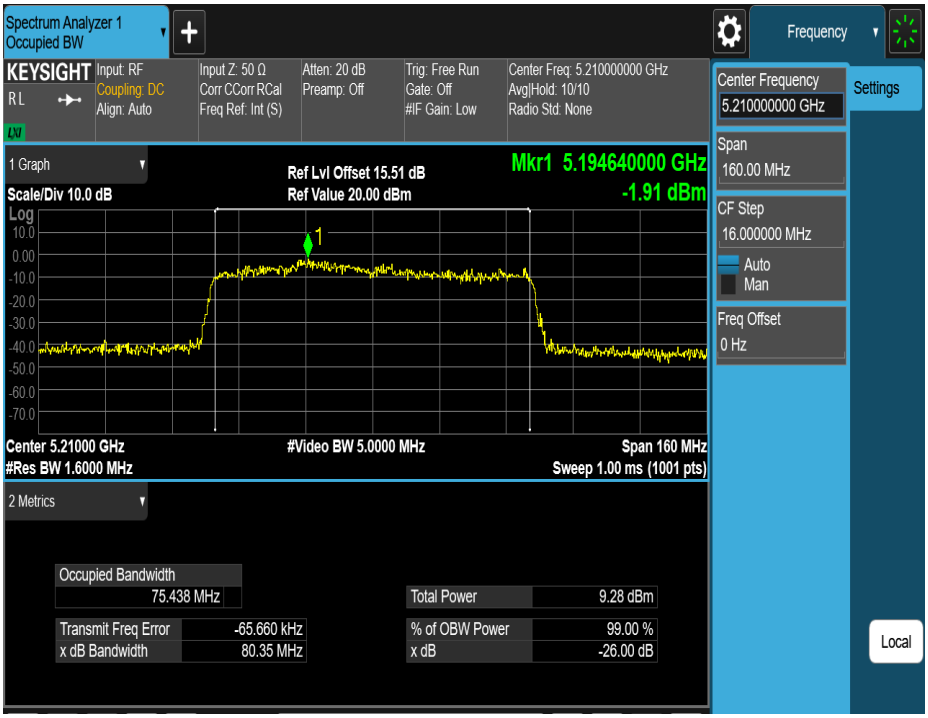
|  |

## 3.4 Conducted Output Power

### 3.4.1 Limit

| FCC Part15, Subpart E (15.407) | | | |
|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) |
| 15.407(a) | Conducted Output Power | Master device: 1 Watt (30 dBm)<br>Client device: 250 mW (23.98 dBm) | 5150-5250 |
| | | 250 mW (23.98 dBm) | 5250-5350 |
| | | 250 mW (23.98 dBm) | 5470-5725 |
| | | 1 Watt (30dBm) | 5725-5850 |

Note:

a. For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

b. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10log B, where B is the 26dB Bandwidth in megahertz.

### 3.4.2 Test Procedure

| Test Method | |
|---|---|
| ●Conducted Measurement | ○Radiated Measurement |
| Test Channels | |
| ●Lowest, Middle and Highest Channel | ○ Lowest and Highest Channel |
| Environmental conditions | |
| ●Normal | ○Normal and Extreme |
| Note:●:Test ○:No Test | |

a) The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.

b) Test was performed in accordance with method of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

### 3.4.3 Test Setup

### 3.4.4 Table of Parameters of Text Software Setting

| UNII-1 | | | |
|---|---|---|---|
| Test Software Version | Command | | |
| Frequency (MHz) | 5180 | 5200 | 5240 |
| IEEE 802.11a | default | default | default |
| IEEE 802.11n(HT20) | default | default | default |
| IEEE 802.11ac(VHT20) | default | default | default |
| Frequency (MHz) | 5190 | 5230 | |
| IEEE 802.11n(HT40) | default | default | |
| IEEE 802.11ac(VHT40) | default | default | |
| Frequency (MHz) | 5210 | | |
| IEEE 802.11ac(VHT80) | default | | |

### 3.4.5 The Result

| Test Mode | Antenna | Freq(MHz) | Result [dBm]note1 | Limit [dBm] | Verdict |
|---|---|---|---|---|---|
| 11A-CDD | Ant1 | 5180 | 5.13 | ≤22.48 | PASS |
| | Ant2 | 5180 | 4.60 | ≤22.48 | PASS |
| | total | 5180 | **7.88** | ≤22.48 | PASS |
| | Ant1 | 5200 | 4.97 | ≤22.48 | PASS |
| | Ant2 | 5200 | 4.50 | ≤22.48 | PASS |
| | total | 5200 | 7.75 | ≤22.48 | PASS |
| | Ant1 | 5240 | 4.82 | ≤22.48 | PASS |
| | Ant2 | 5240 | 4.01 | ≤22.48 | PASS |
| | total | 5240 | 7.44 | ≤22.48 | PASS |
| 11N20MIMO | Ant1 | 5180 | 3.88 | ≤22.48 | PASS |
| | Ant2 | 5180 | 3.64 | ≤22.48 | PASS |
| | total | 5180 | 6.77 | ≤22.48 | PASS |
| | Ant1 | 5200 | 3.99 | ≤22.48 | PASS |
| | Ant2 | 5200 | 3.25 | ≤22.48 | PASS |
| | total | 5200 | 6.65 | ≤22.48 | PASS |
| | Ant1 | 5240 | 3.53 | ≤22.48 | PASS |
| | Ant2 | 5240 | 2.95 | ≤22.48 | PASS |
| | total | 5240 | 6.26 | ≤22.48 | PASS |
| 11N40MIMO | Ant1 | 5190 | 4.19 | ≤22.48 | PASS |
| | Ant2 | 5190 | 3.97 | ≤22.48 | PASS |
| | total | 5190 | 7.09 | ≤22.48 | PASS |
| | Ant1 | 5230 | 4.29 | ≤22.48 | PASS |
| | Ant2 | 5230 | 3.83 | ≤22.48 | PASS |
| | total | 5230 | 7.08 | ≤22.48 | PASS |
| 11AC20MIMO | Ant1 | 5180 | 4.05 | ≤22.48 | PASS |
| | Ant2 | 5180 | 3.66 | ≤22.48 | PASS |
| | total | 5180 | 6.87 | ≤22.48 | PASS |
| | Ant1 | 5200 | 3.92 | ≤22.48 | PASS |
| | Ant2 | 5200 | 3.45 | ≤22.48 | PASS |
| | total | 5200 | 6.70 | ≤22.48 | PASS |
| | Ant1 | 5240 | 3.86 | ≤22.48 | PASS |
| | Ant2 | 5240 | 3.00 | ≤22.48 | PASS |
| | total | 5240 | 6.46 | ≤22.48 | PASS |
| 11AC40MIMO | Ant1 | 5190 | 4.31 | ≤22.48 | PASS |
| | Ant2 | 5190 | 4.16 | ≤22.48 | PASS |
| | total | 5190 | 7.25 | ≤22.48 | PASS |
| | Ant1 | 5230 | 3.94 | ≤22.48 | PASS |
| | Ant2 | 5230 | 3.62 | ≤22.48 | PASS |
| | total | 5230 | 6.79 | ≤22.48 | PASS |

| | | | | | |
|---|---|---|---|---|---|
| 11AC80MIMO | Ant1 | 5210 | 4.60 | ≤22.48 | PASS |
| | Ant2 | 5210 | 3.72 | ≤22.48 | PASS |
| | total | 5210 | 7.19 | ≤22.48 | PASS |

Note1: The measured value already includes the cable loss and DT factor.

For MIMO mode

| Frequency Band | ANT 1 Antenna Gain (dBi) | ANT 2 Antenna Gain (dBi) | Correlated chains directional gain (dBi) | Conducted Power Limit (dBm) |
|---|---|---|---|---|
| U-NII-1 | 4.72 | 4.26 | 7.50 | 22.48 |

Unequal antenna gains, with equal transmit powers. For antenna gains given by $G_1$, $G_2$, …, $G_N$ dBi

If transmit signals are correlated, then Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}$] dBi

[Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

Directional gain = 10log[$(10^{4.72/20} + 10^{4.26/20})^2 / N_{ANT}$] dBi=7.50

## 3.5 Power Spectral Density

### 3.5.1 Limit

| FCC Part15, Subpart E (15.407) | | | |
|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) |
| 15.407(a) | Power Spectral Density | Master device: 17 dBm/MHz<br>Client device: 11 dBm/MHz | 5150-5250 |
| | | 11 dBm/MHz | 5250-5350 |
| | | 11 dBm/MHz | 5470-5725 |
| | | 30 dBm/500 kHz | 5725-5850 |

Note:

1. For UNII-3, according to KDB publication 789033 D02 General UNII Test Procedures New Rules v02r01, section II.F.5., it is acceptable to set RBW at 300kHz and VBW at 1500kHz if the spectrum analyzer does not have 500 kHz RBW. Then, add 10 log (500 kHz/300 kHz) to the measured result, i.e. 2.22 dB.

2. During the test of U-NII 3 PSD, the measurement result with RBW=300kHz has been added 2.22 dB by compensating offset, offset=cable loss+duty factor+10log(500kHz/300kHz).

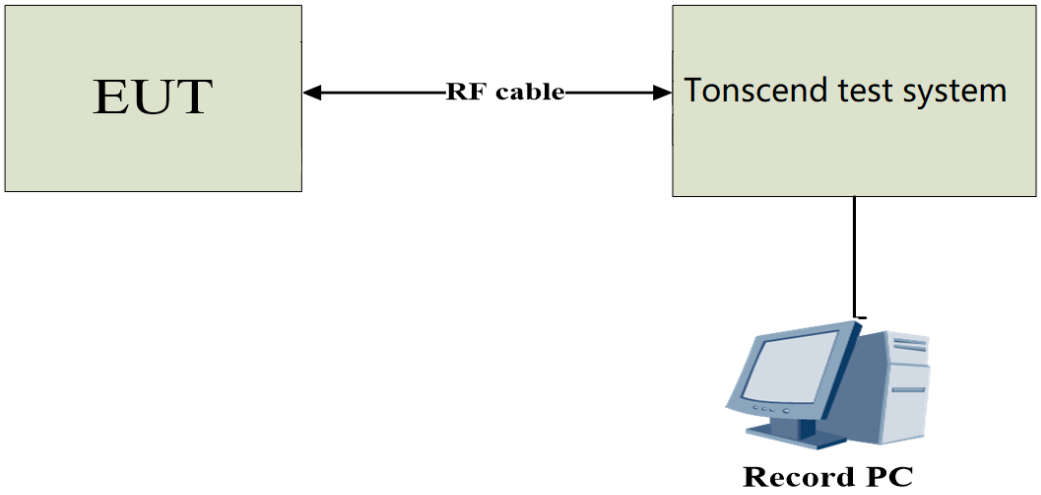
### 3.5.2 Test Procedure

| Test Method | |
|---|---|
| ●Conducted Measurement | ○Radiated Measurement |
| Test Channels | |
| ●Lowest, Middle and Highest Channel | ○ Lowest and Highest Channel |
| Environmental conditions | |
| ●Normal | ○Normal and Extreme |
| Note:●:Test ○:No Test | |

a) The EUT was directly connected to the tonscend test system and antenna output port as show in the block diagram below. Spectrum analyser settings as following:

| | |
|---|---|
| Centre Frequency | The centre frequency of the channel under test |
| RBW | = 1 MHz (Band1/2/3); = 500kHz (Band4) |
| VBW | ≥3 x RBW |
| Frequency span | 2 x Nominal Channel Bandwidth |
| Detector Mode | RMS |
| Trace Mode | Max Hold |
| Sweep Time | Auto Couple |

### 3.5.3 Test Setup



### 3.5.4 The Result

| Test Mode | Antenna | Freq(MHz) | Result [dBm/MHz][NOTE1] | Limit[dBm/MHz] | Verdict |
|---|---|---|---|---|---|
| 11A-CDD | Ant1 | 5180 | -4.72 | ≤9.50 | PASS |
| | Ant2 | 5180 | -5.31 | ≤9.50 | PASS |
| | total | 5180 | -1.99 | ≤9.50 | PASS |
| | Ant1 | 5200 | -4.38 | ≤9.50 | PASS |
| | Ant2 | 5200 | -5.14 | ≤9.50 | PASS |
| | total | 5200 | -1.73 | ≤9.50 | PASS |
| | Ant1 | 5240 | -5.02 | ≤9.50 | PASS |
| | Ant2 | 5240 | -5.96 | ≤9.50 | PASS |
| | total | 5240 | -2.45 | ≤9.50 | PASS |
| 11N20MIMO | Ant1 | 5180 | -5.7 | ≤9.50 | PASS |
| | Ant2 | 5180 | -6.26 | ≤9.50 | PASS |
| | total | 5180 | -2.96 | ≤9.50 | PASS |
| | Ant1 | 5200 | -5.41 | ≤9.50 | PASS |
| | Ant2 | 5200 | -6.29 | ≤9.50 | PASS |
| | total | 5200 | -2.82 | ≤9.50 | PASS |
| | Ant1 | 5240 | -6.41 | ≤9.50 | PASS |
| | Ant2 | 5240 | -6.91 | ≤9.50 | PASS |
| | total | 5240 | -3.64 | ≤9.50 | PASS |
| 11N40MIMO | Ant1 | 5190 | -8.19 | ≤9.50 | PASS |
| | Ant2 | 5190 | -8.7 | ≤9.50 | PASS |
| | total | 5190 | -5.43 | ≤9.50 | PASS |
| | Ant1 | 5230 | -8.69 | ≤9.50 | PASS |
| | Ant2 | 5230 | -8.99 | ≤9.50 | PASS |
| | total | 5230 | -5.83 | ≤9.50 | PASS |
| 11AC20MIMO | Ant1 | 5180 | -5.45 | ≤9.50 | PASS |
| | Ant2 | 5180 | -5.94 | ≤9.50 | PASS |
| | total | 5180 | -2.68 | ≤9.50 | PASS |
| | Ant1 | 5200 | -5.56 | ≤9.50 | PASS |
| | Ant2 | 5200 | -5.96 | ≤9.50 | PASS |
| | total | 5200 | -2.75 | ≤9.50 | PASS |
| | Ant1 | 5240 | -5.62 | ≤9.50 | PASS |
| | Ant2 | 5240 | -6.62 | ≤9.50 | PASS |
| | total | 5240 | -3.08 | ≤9.50 | PASS |
| 11AC40MIMO | Ant1 | 5190 | -7.41 | ≤9.50 | PASS |
| | Ant2 | 5190 | -8.18 | ≤9.50 | PASS |
| | total | 5190 | -4.77 | ≤9.50 | PASS |
| | Ant1 | 5230 | -9.05 | ≤9.50 | PASS |
| | Ant2 | 5230 | -9.16 | ≤9.50 | PASS |
| | total | 5230 | -6.09 | ≤9.50 | PASS |

| | | | | | |
|---|---|---|---|---|---|
| 11AC80MIMO | Ant1 | 5210 | -10.85 | ≤9.50 | PASS |
| | Ant2 | 5210 | -10.55 | ≤9.50 | PASS |
| | total | 5210 | -7.69 | ≤9.50 | PASS |

Note1: The measured value already includes the cable loss and DT factor.

For MIMO mode

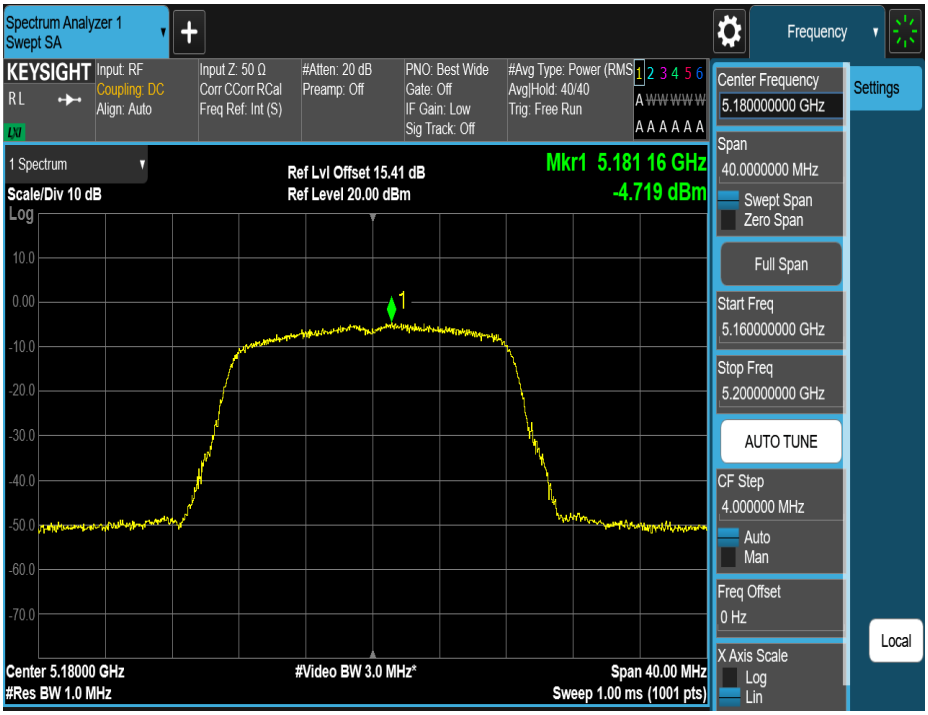
| Frequency Band | ANT 1 Antenna Gain (dBi) | ANT 2 Antenna Gain (dBi) | Correlated chains directional gain (dBi) | Max. PSD Limit (dBm) |
|---|---|---|---|---|
| U-NII-1 | 4.72 | 4.26 | 7.50 | 9.50 |

Unequal antenna gains, with equal transmit powers. For antenna gains given by $G_1$, $G_2$, …, $G_N$ dBi

If transmit signals are correlated, then Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}$] dBi

[Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

Directional gain = 10log[$(10^{4.72/20} + 10^{4.26/20})^2 / N_{ANT}$] dBi=7.50

| 11A-CDD_Ant1_5180 |
| --- |
|  |



| 11A-CDD_Ant2_5180 |
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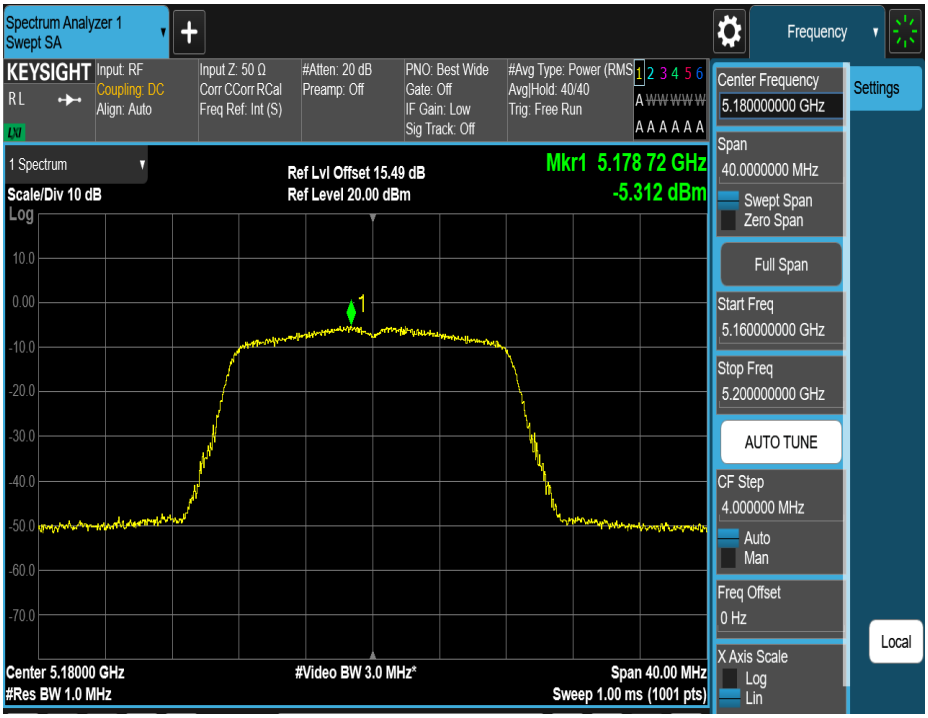
|  |

| 11A-CDD_Ant1_5200 |
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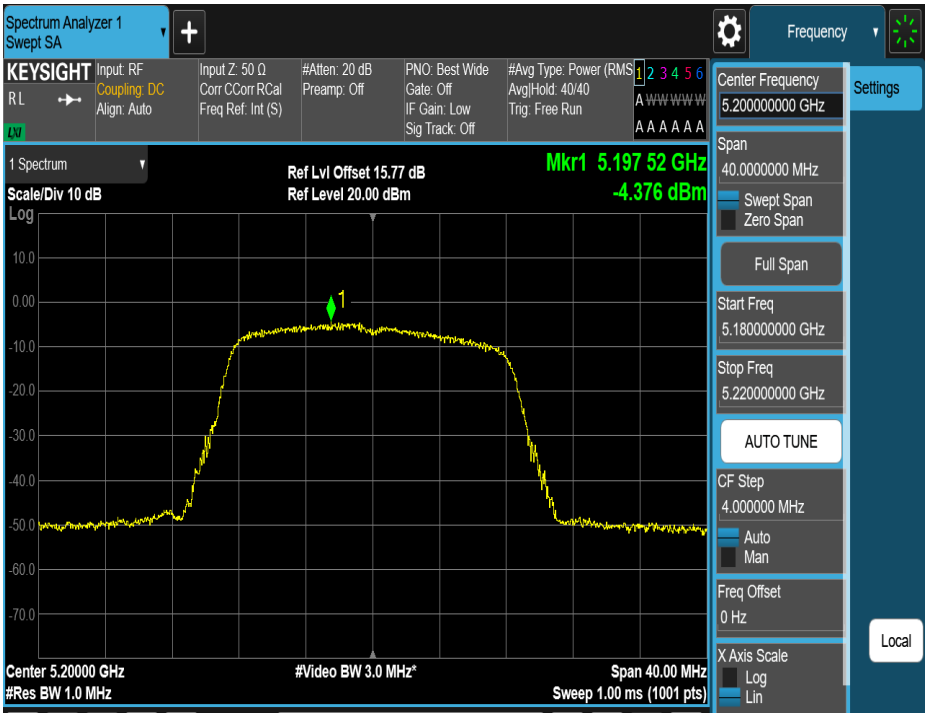
|  |



| 11A-CDD_Ant2_5200 |
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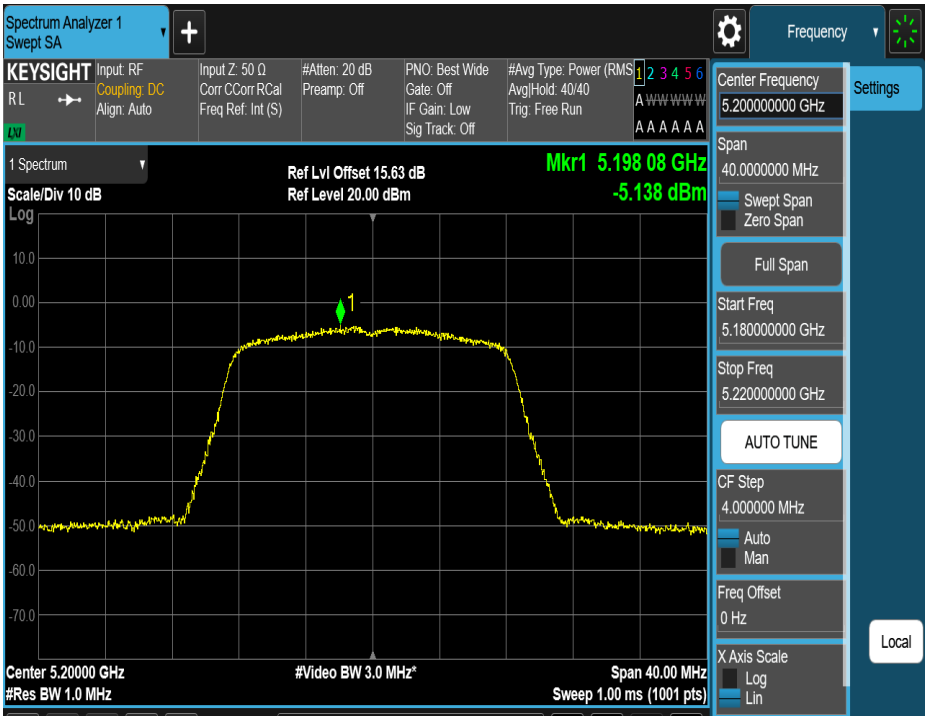
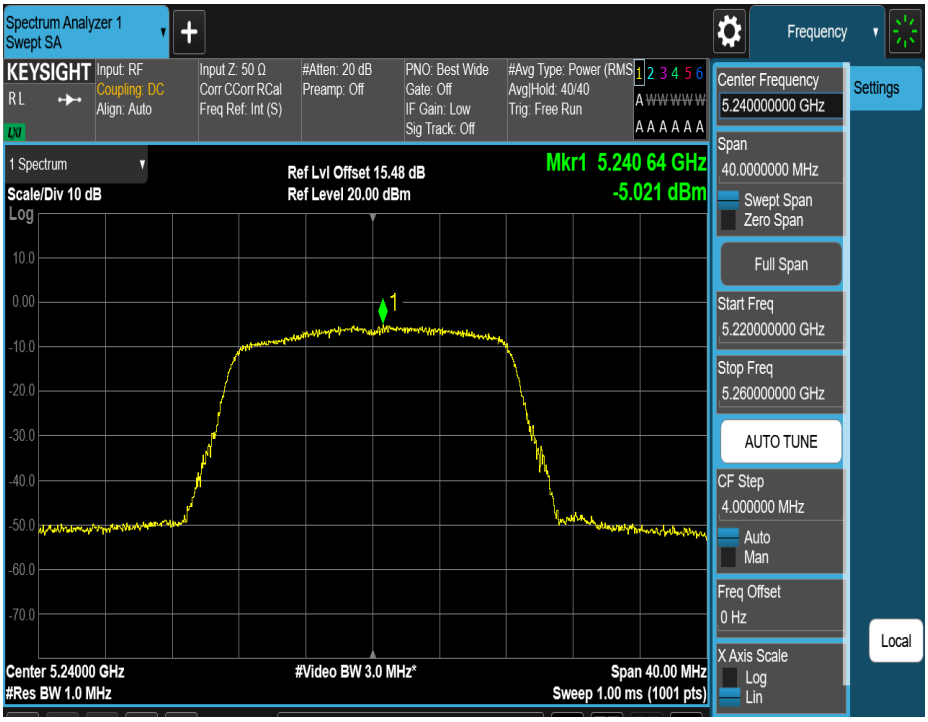
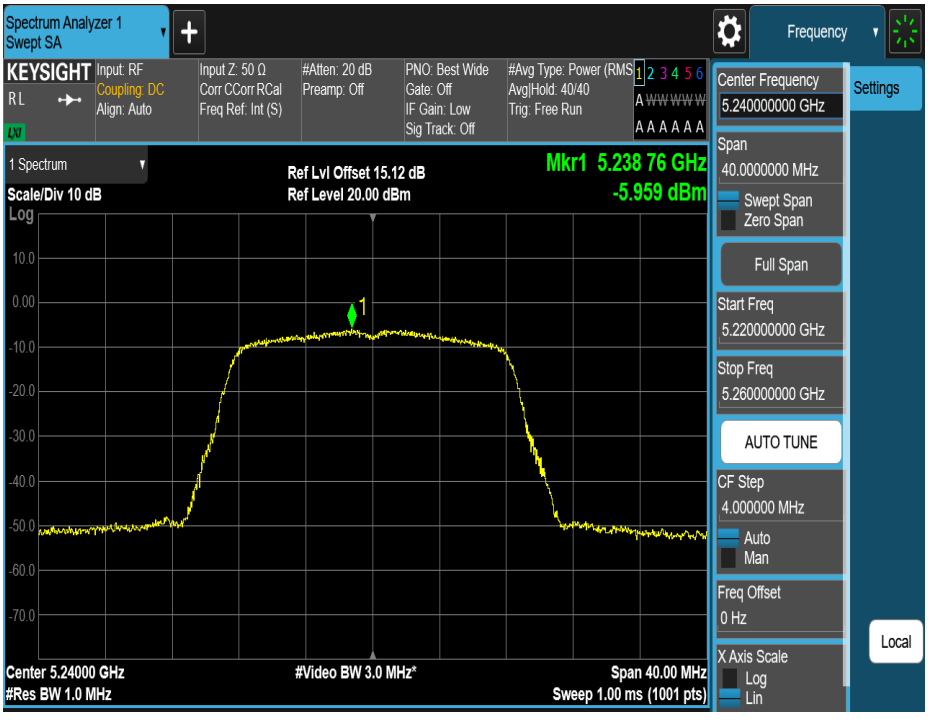
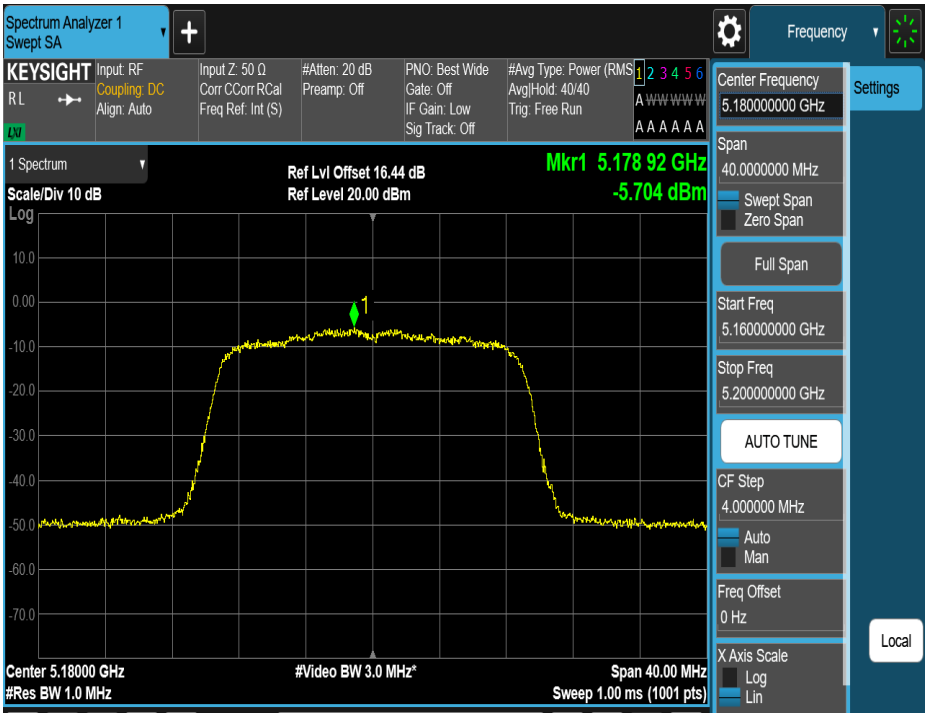
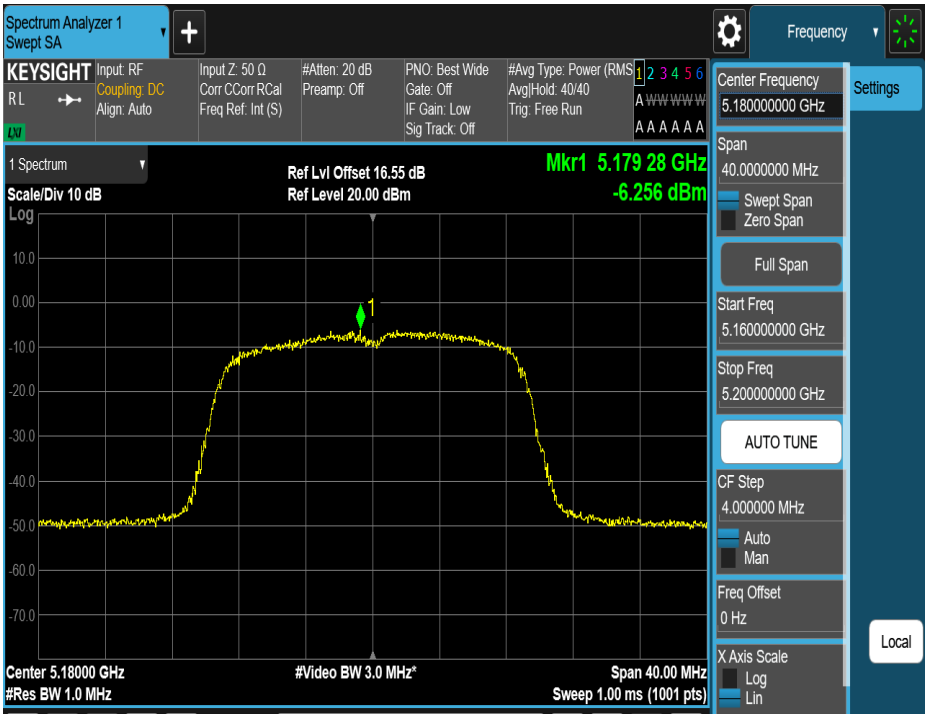
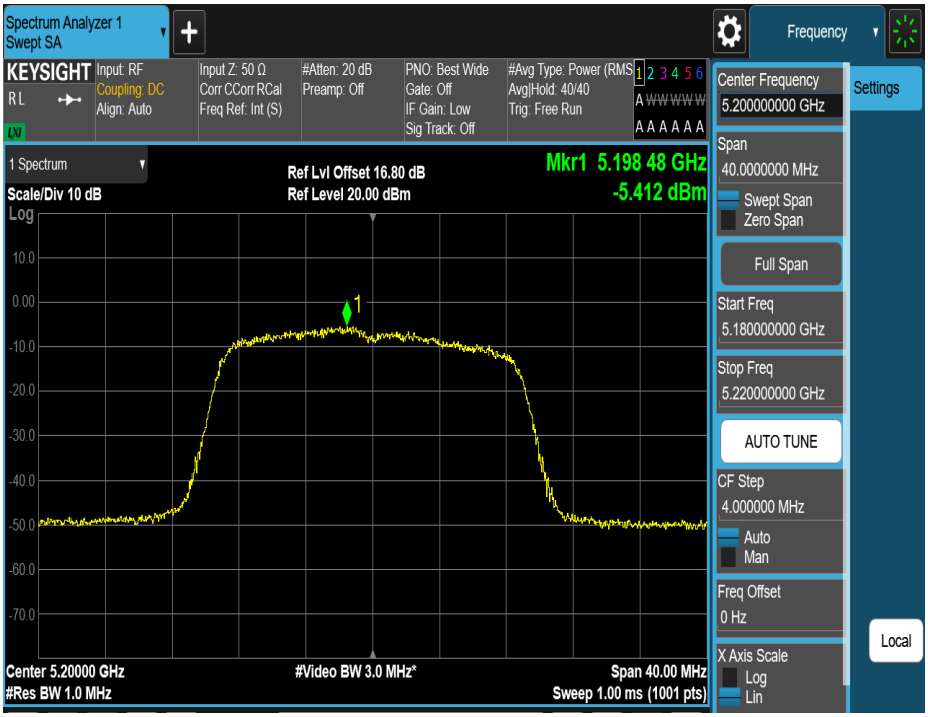
|  |

| 11A-CDD_Ant1_5240 |
| --- |
|  |
| 11A-CDD_Ant2_5240 |
|  |

| 11N20MIMO_Ant1_5180 |
| --- |
|  |
| 11N20MIMO_Ant2_5180 |
|  |

| 11N20MIMO_Ant1_5200 |
| --- |
|  |

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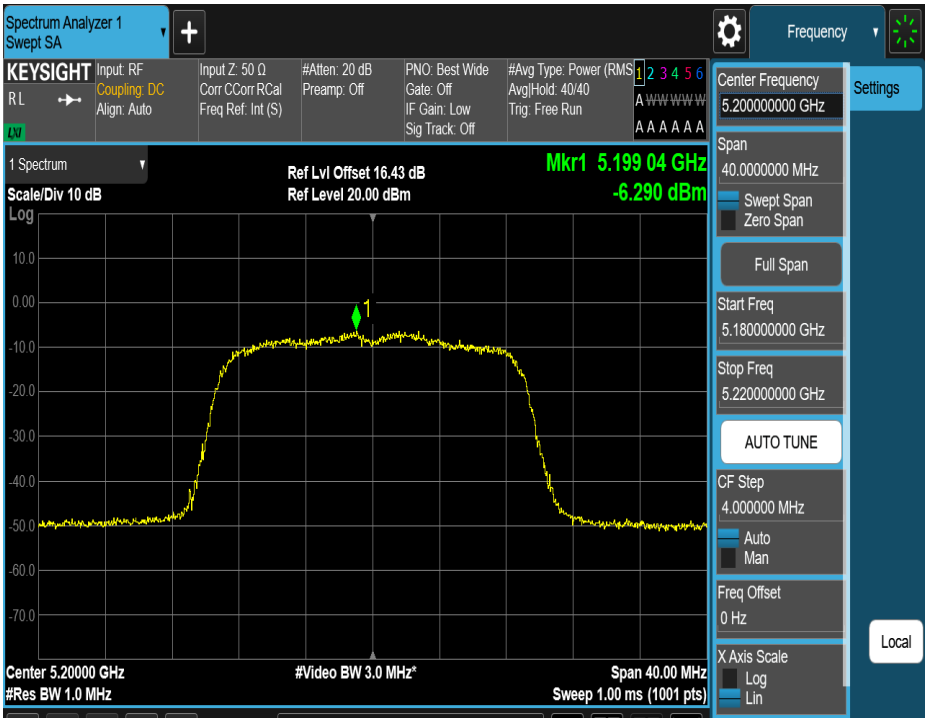
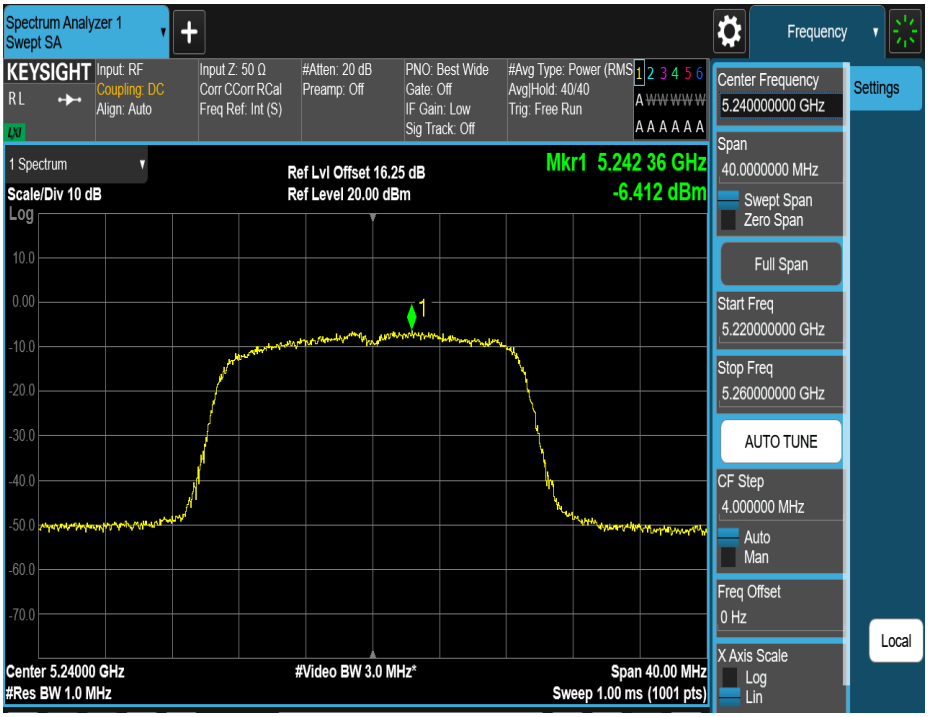
| --- |
|  |

| 11N20MIMO_Ant1_5240 |
| --- |
|  |
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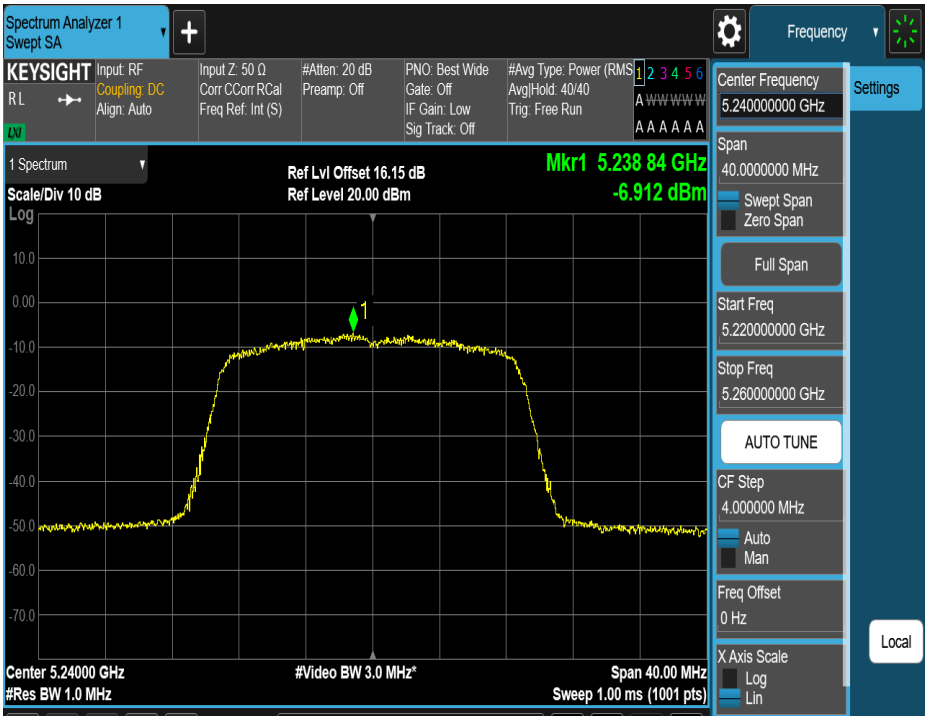
|  |

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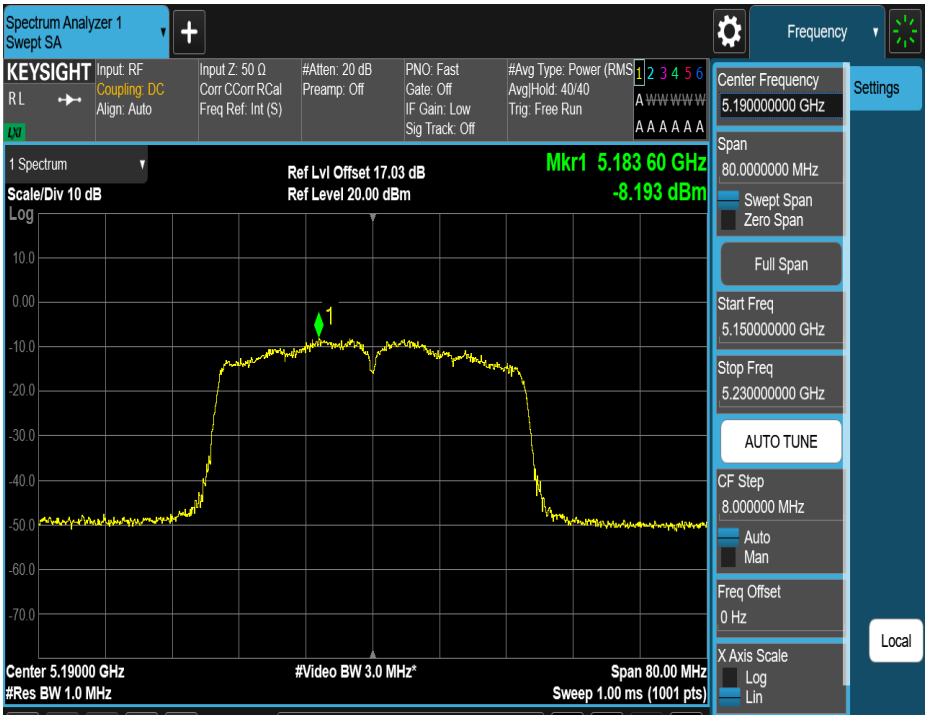
|  |

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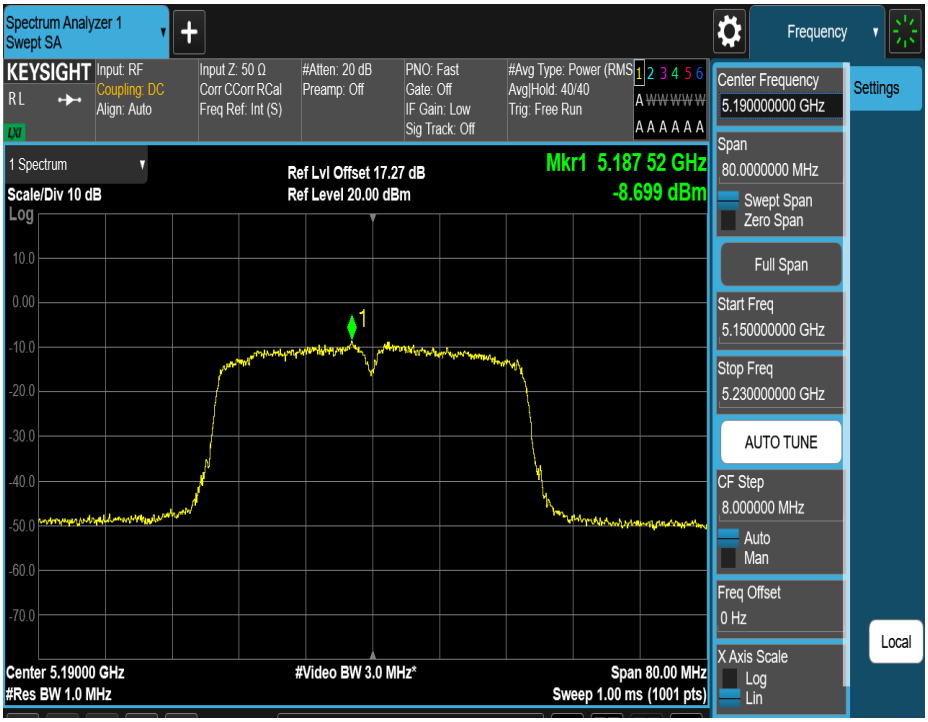
|  |

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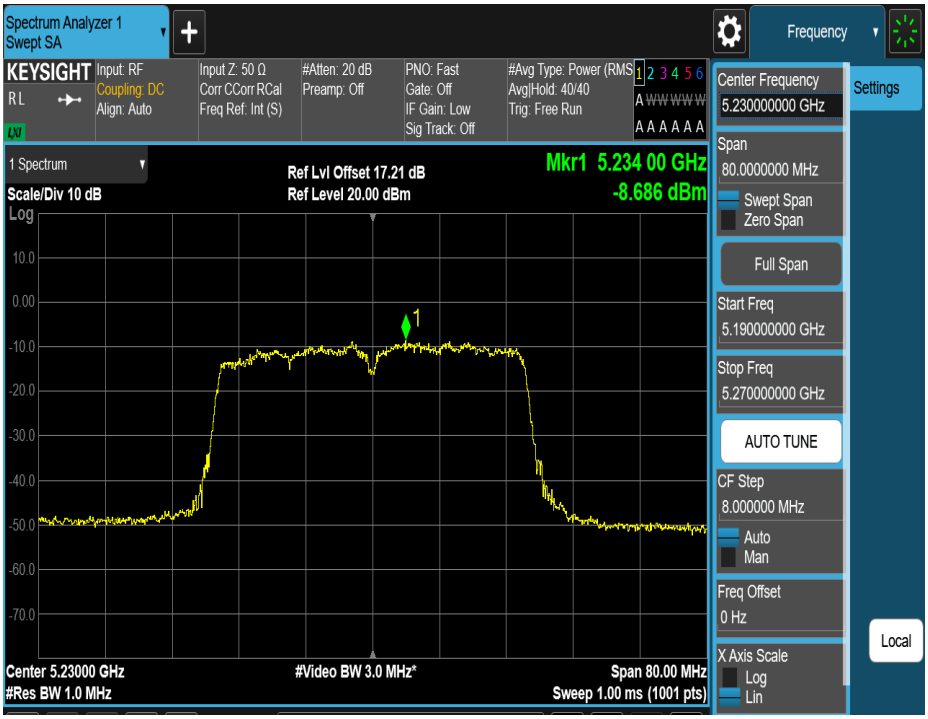
|  |

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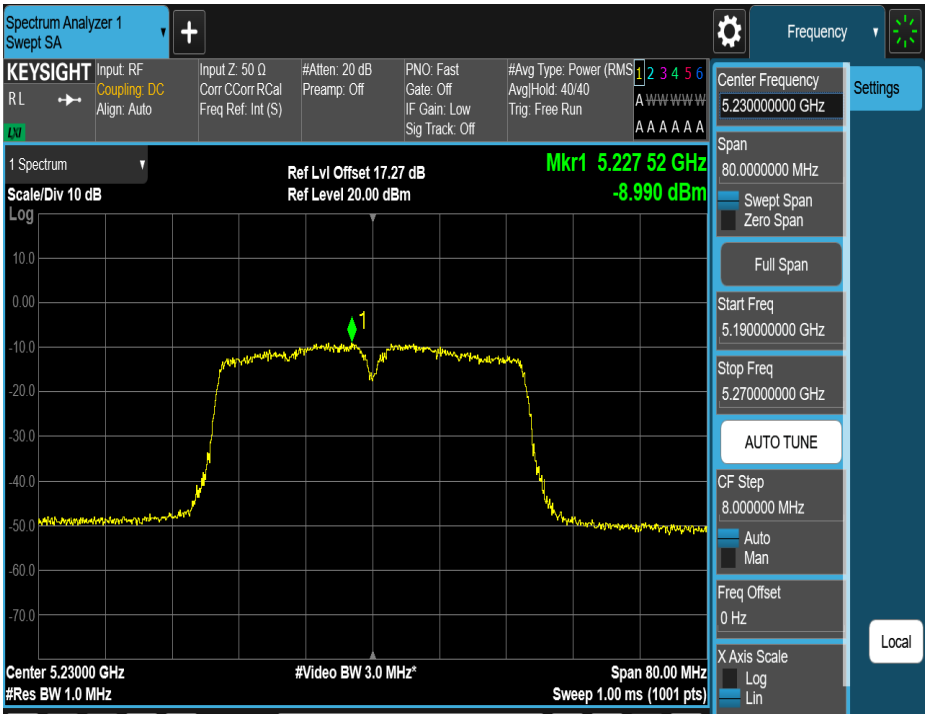
|  |

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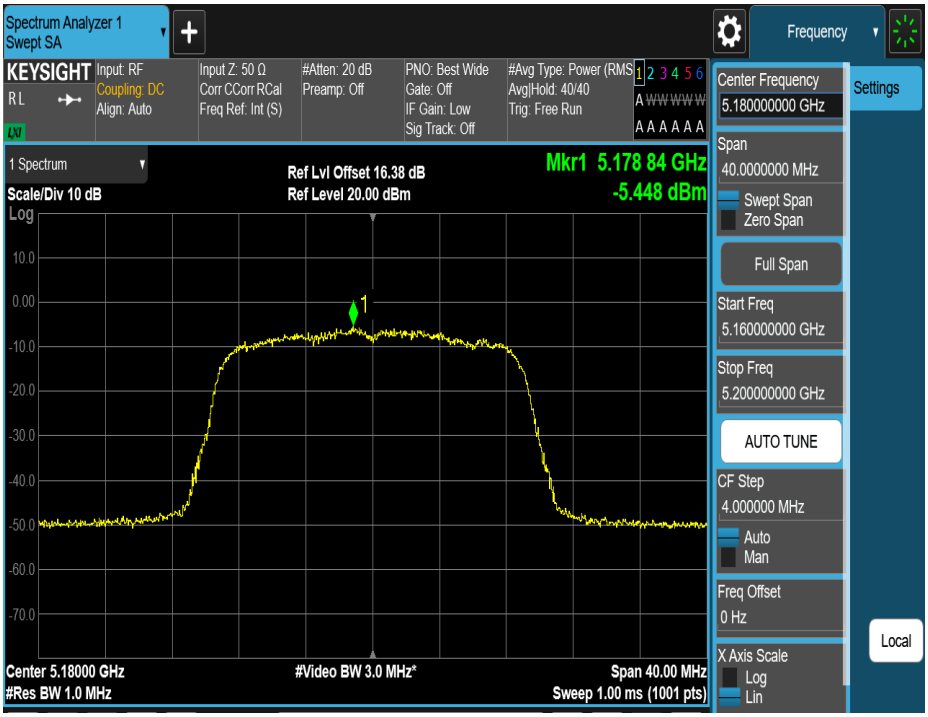
|  |
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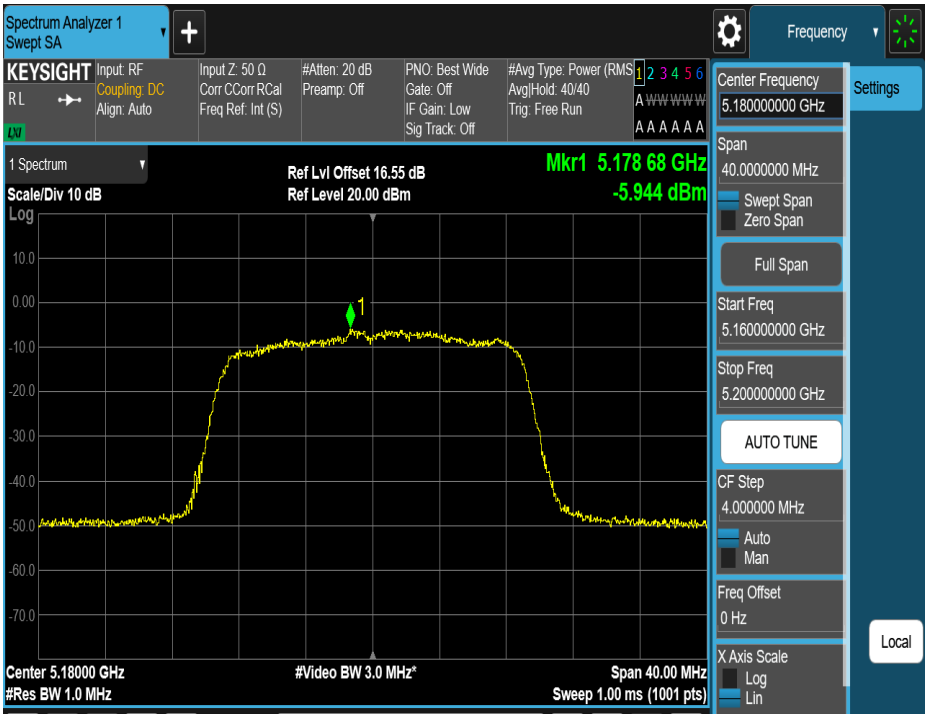
|  |

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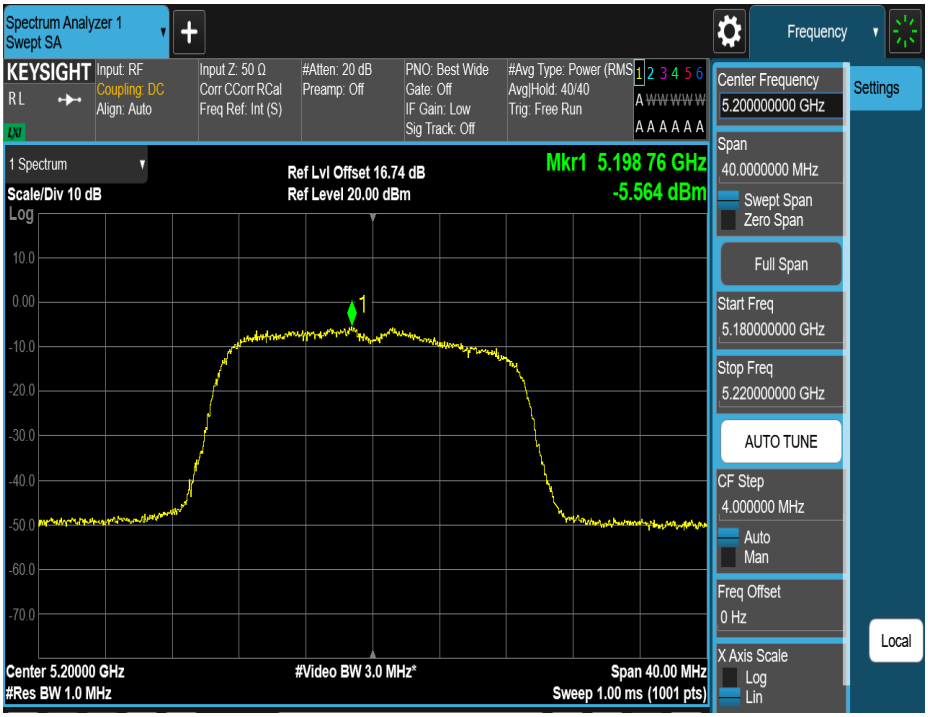
|  |



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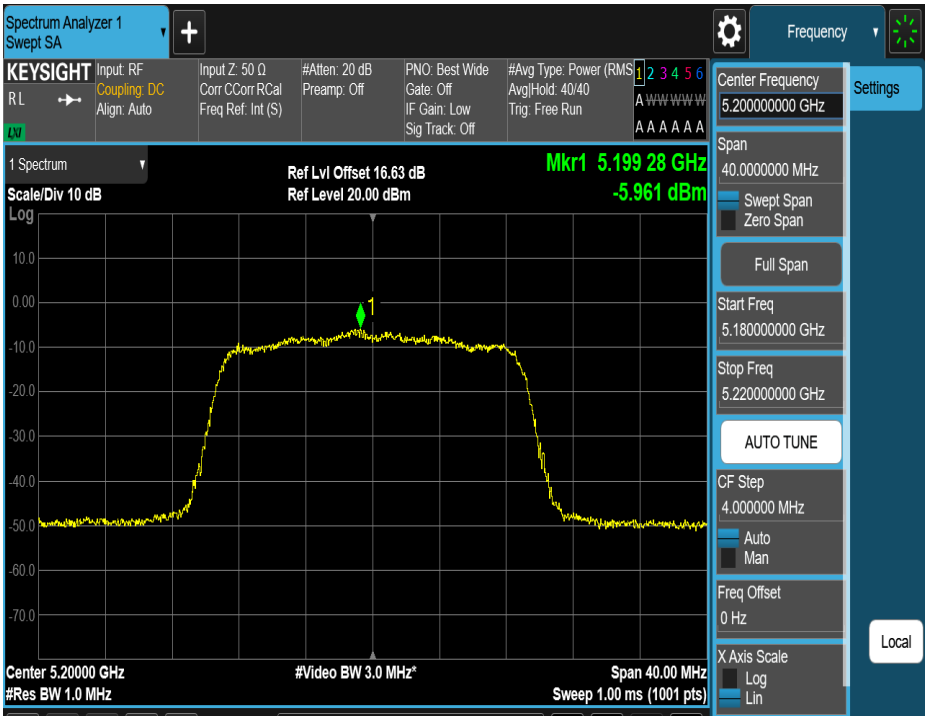
|  |

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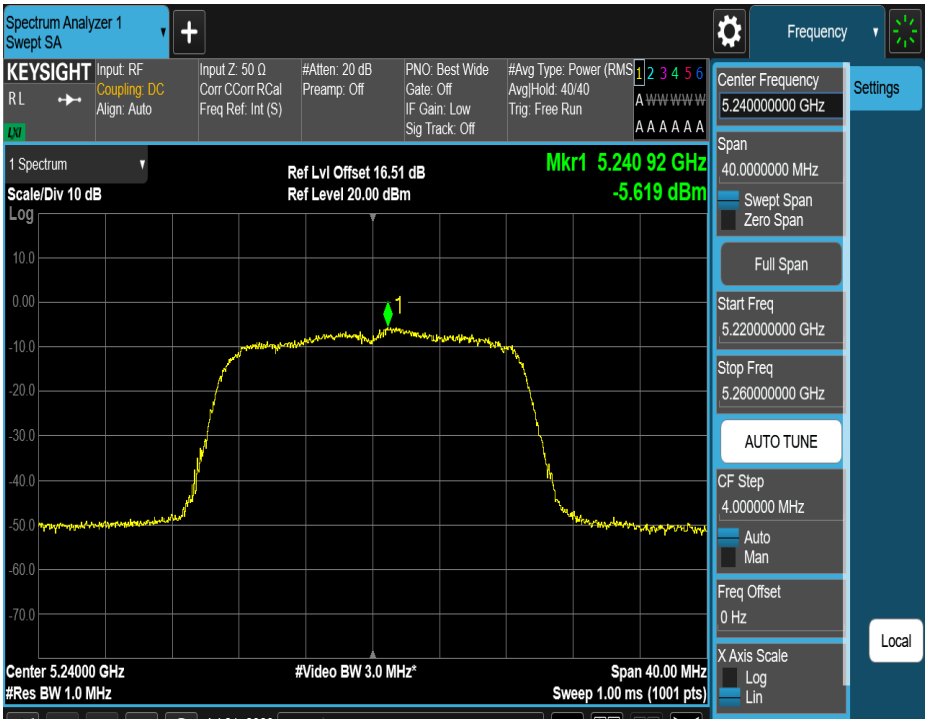
|  |
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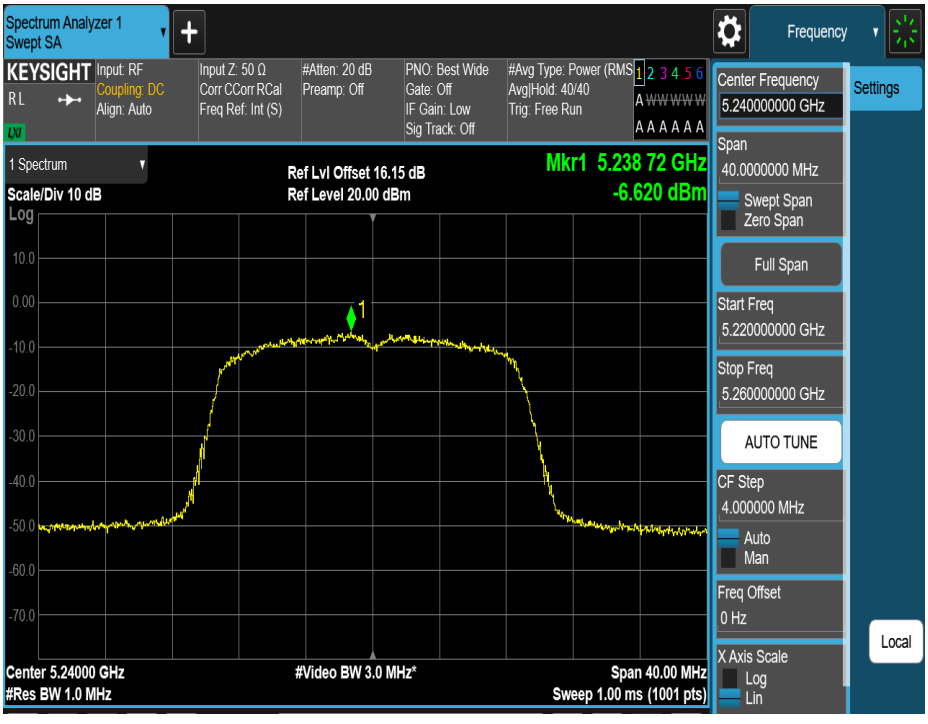
|  |

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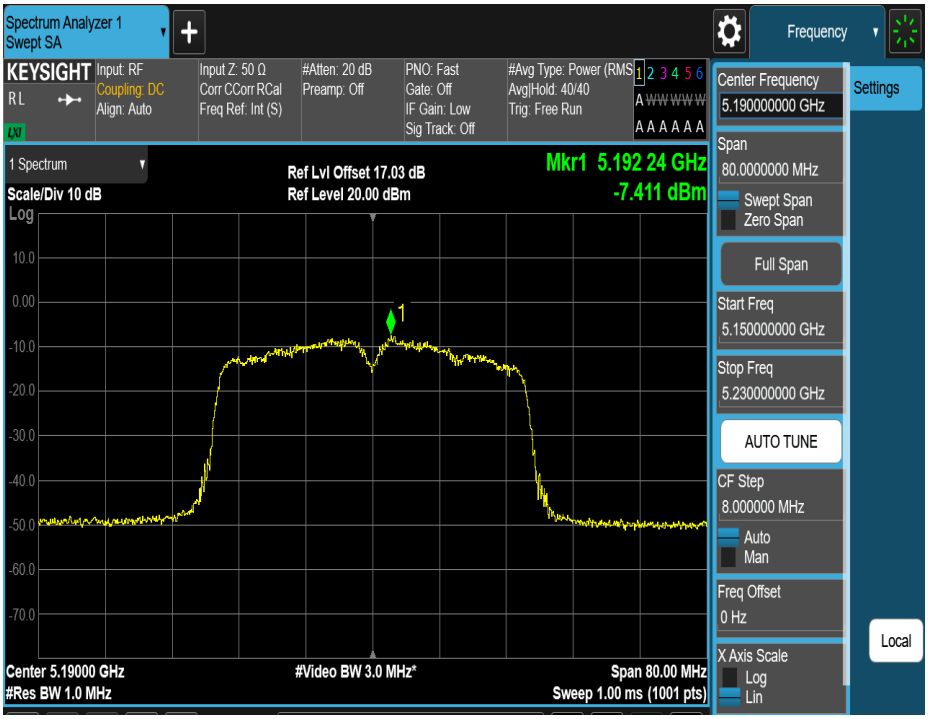
|  |
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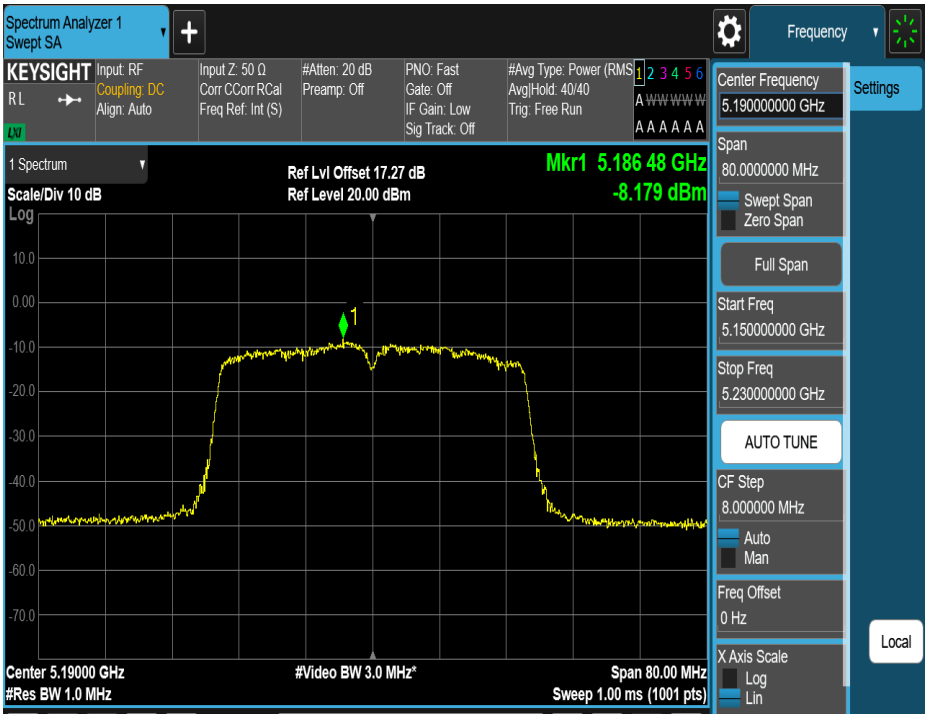
|  |

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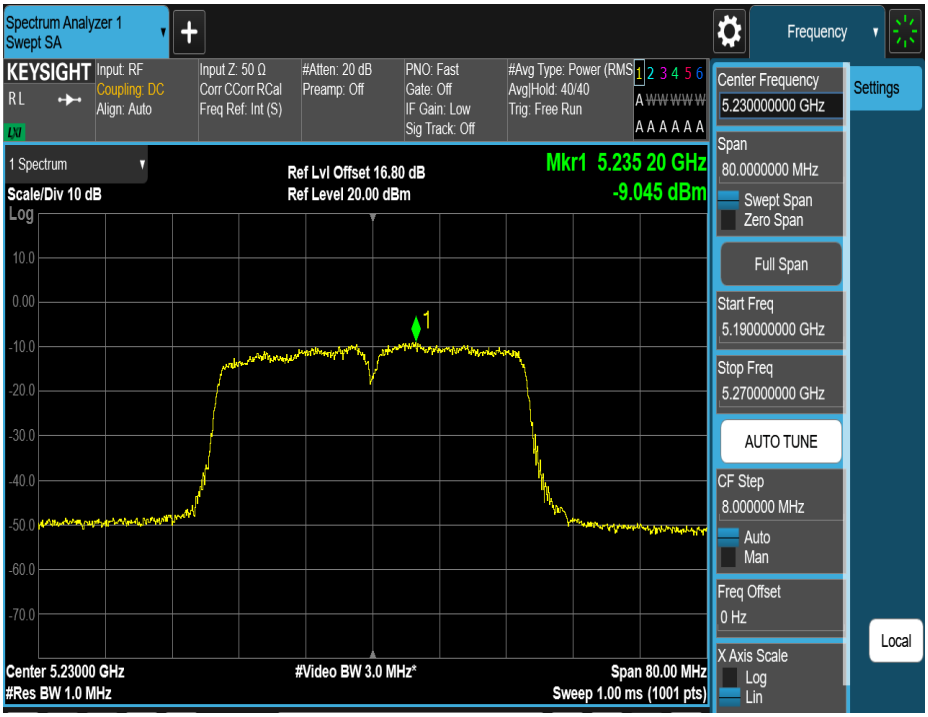
|  |
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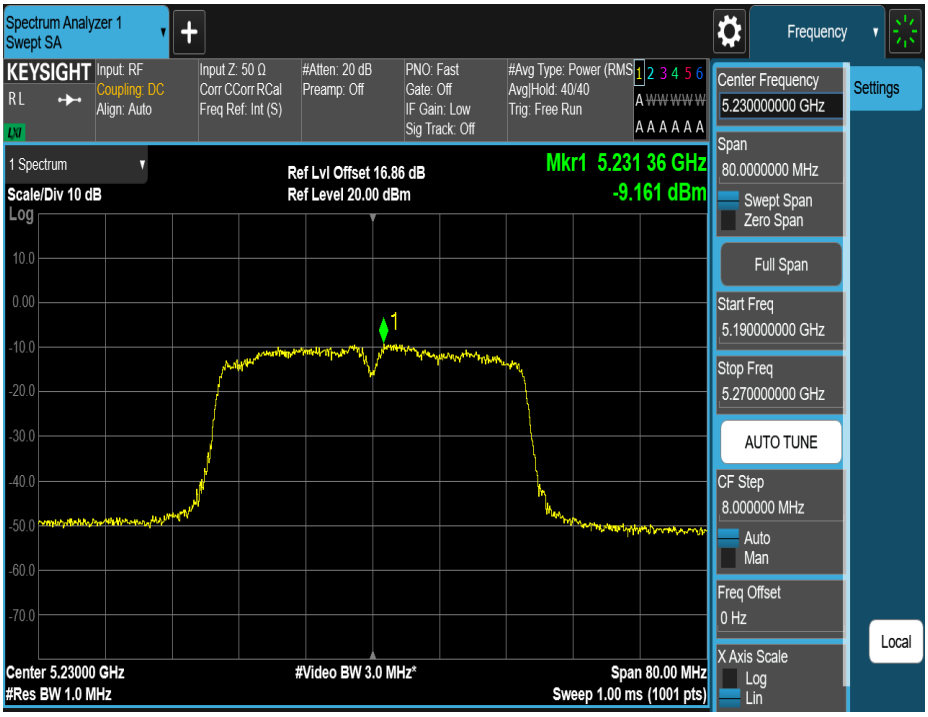
|  |

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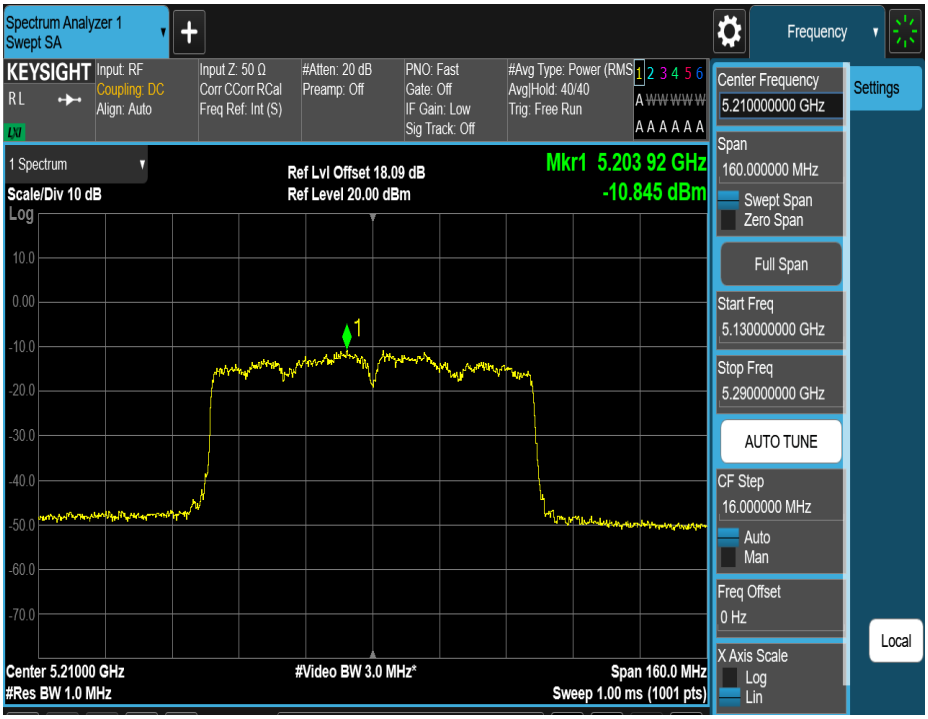
|  |

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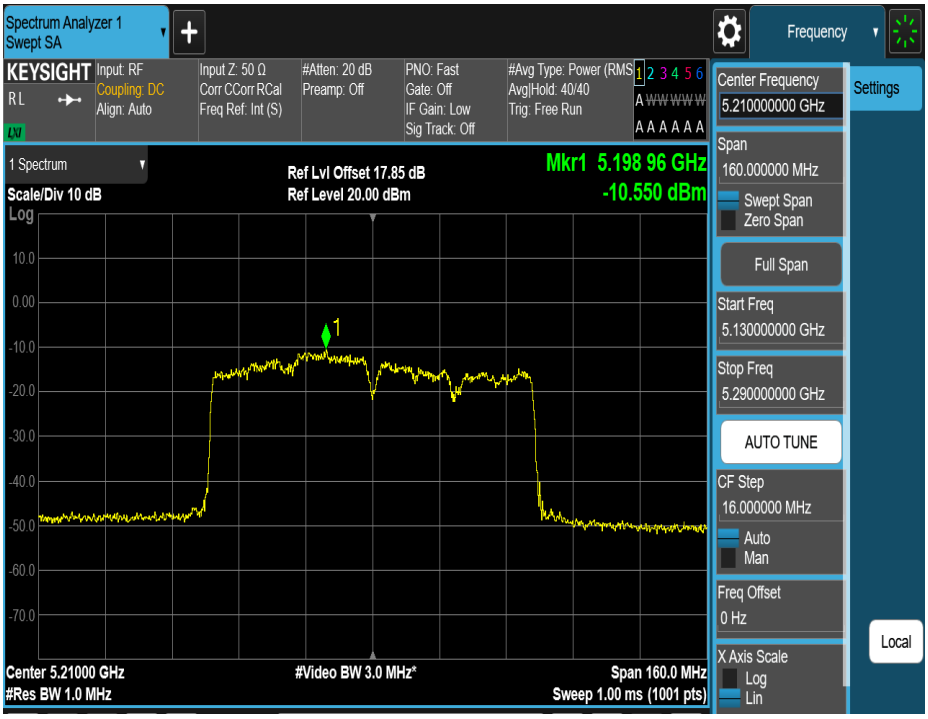
|  |

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