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## Annex for 5G Wi-Fi BAND1

Test Report No.: CTL2506052011-WF04

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## 1. Duty Cycle

### 1.1 Test Result

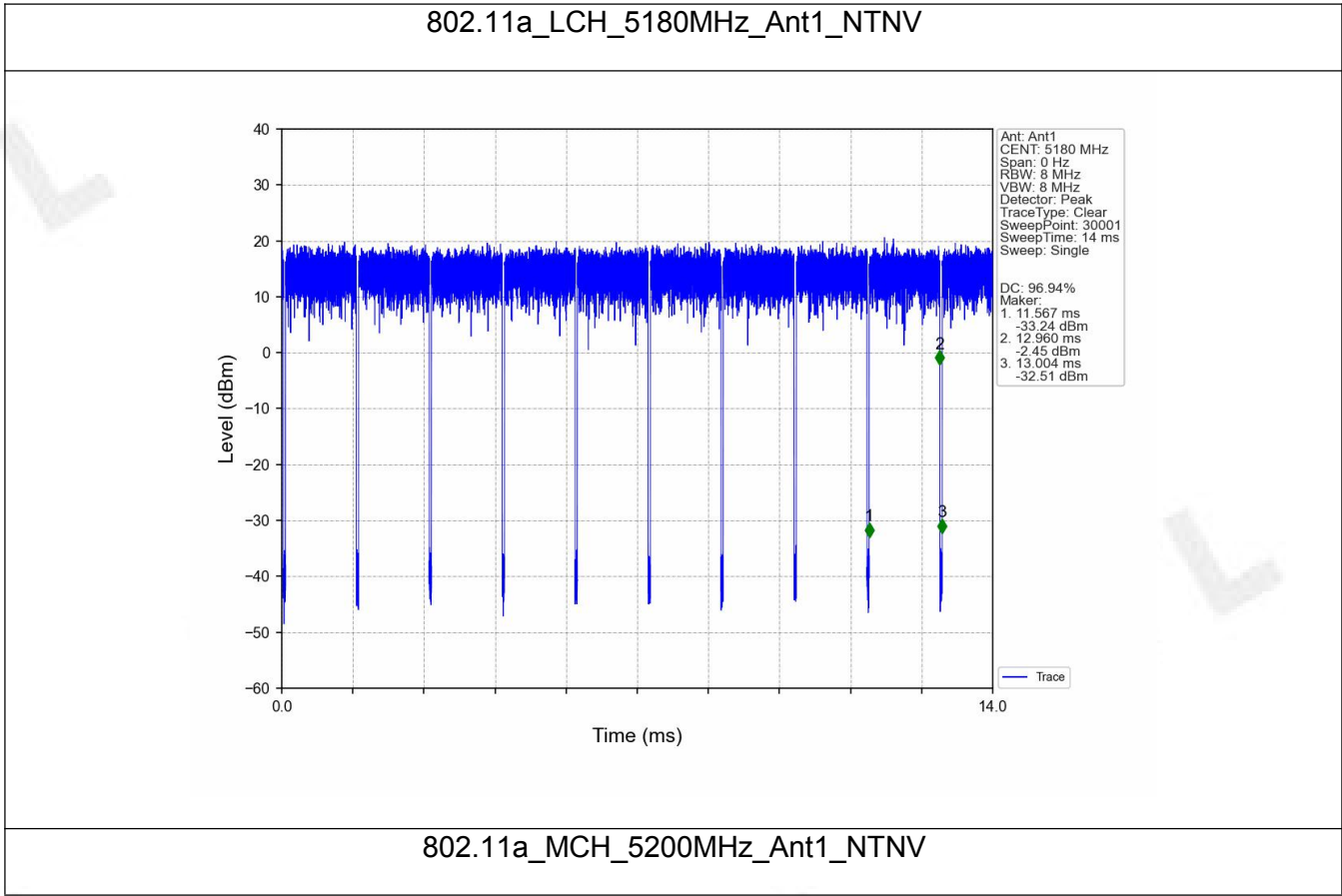
#### 1.1.1 Ant1

| Ant1             |         |                 |           |             |                |                                   |                       |
|------------------|---------|-----------------|-----------|-------------|----------------|-----------------------------------|-----------------------|
| Mode             | TX Type | Frequency (MHz) | T_on (ms) | Period (ms) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | Max. DC Variation (%) |
| 802.11a          | SISO    | 5180            | 1.393     | 1.437       | 96.94          | 0.14                              | 0.06                  |
|                  |         | 5200            | 1.392     | 1.436       | 96.94          | 0.14                              | 0.07                  |
|                  |         | 5240            | 1.393     | 1.436       | 97.01          | 0.13                              | 0.04                  |
| 802.11n (HT20)   | SISO    | 5180            | 1.300     | 1.344       | 96.73          | 0.14                              | 0.07                  |
|                  |         | 5200            | 1.301     | 1.345       | 96.73          | 0.14                              | 0.07                  |
|                  |         | 5240            | 1.301     | 1.344       | 96.80          | 0.14                              | 0.07                  |
| 802.11n (HT40)   | SISO    | 5190            | 0.648     | 0.692       | 93.64          | 0.29                              | 0.07                  |
|                  |         | 5230            | 0.650     | 0.692       | 93.93          | 0.27                              | 0.04                  |
| 802.11ac (VHT20) | SISO    | 5180            | 1.313     | 1.356       | 96.83          | 0.14                              | 0.07                  |
|                  |         | 5200            | 1.313     | 1.356       | 96.83          | 0.14                              | 0.00                  |
|                  |         | 5240            | 1.313     | 1.357       | 96.76          | 0.14                              | 0.07                  |
| 802.11ac (VHT40) | SISO    | 5190            | 0.653     | 0.696       | 93.82          | 0.28                              | 0.06                  |
|                  |         | 5230            | 0.652     | 0.696       | 93.68          | 0.28                              | 0.03                  |
| 802.11ac (VHT80) | SISO    | 5210            | 0.325     | 0.369       | 88.08          | 0.55                              | 0.07                  |

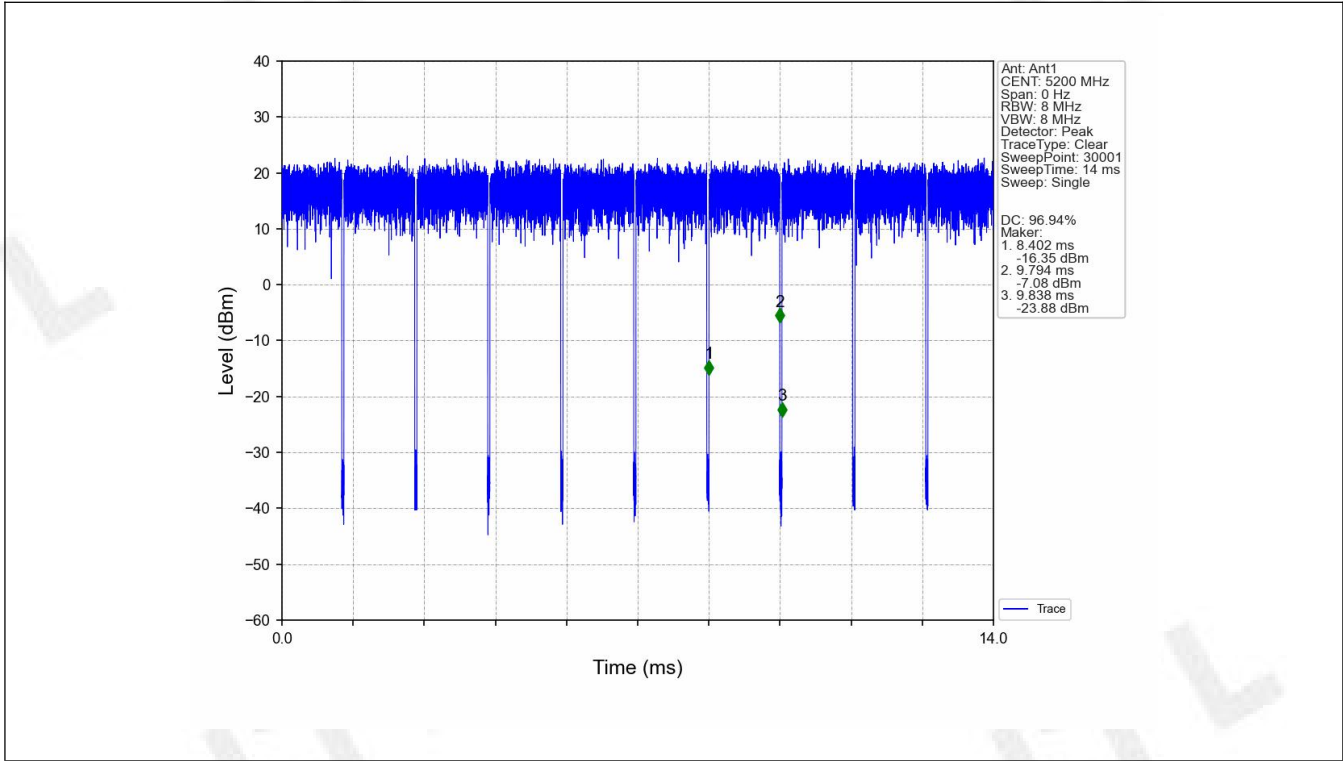
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1.2 Test Graph

1.2.1 Ant1

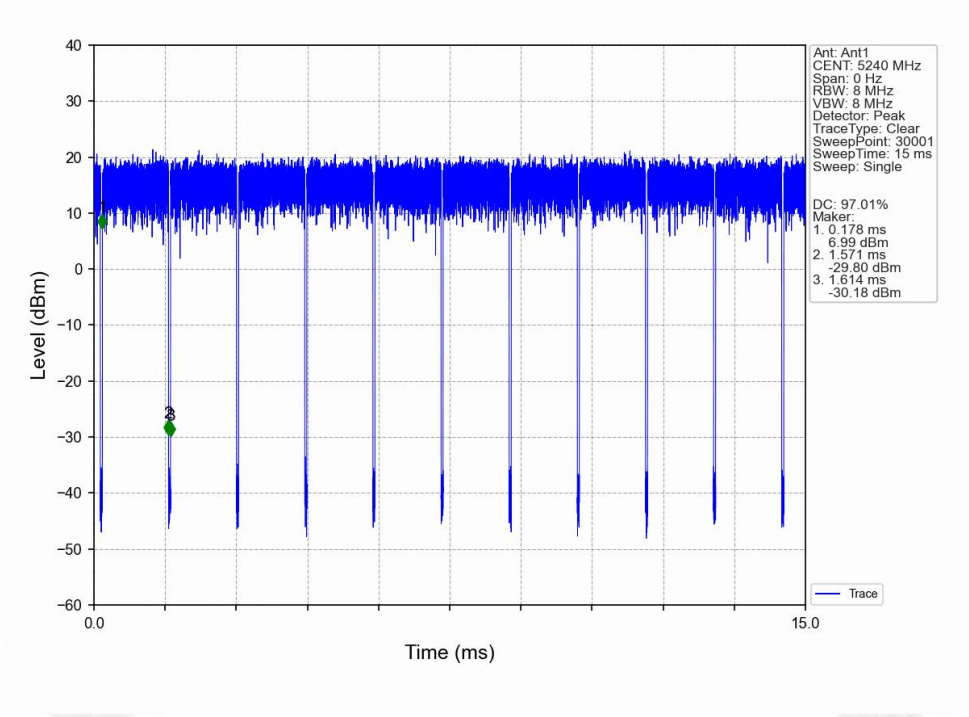


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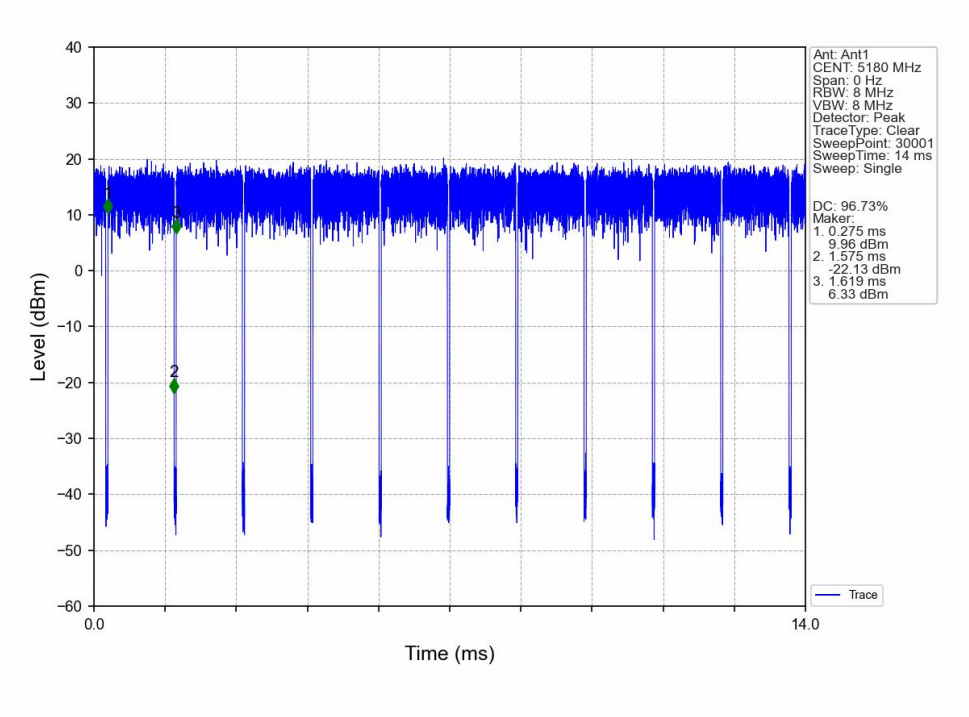


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802.11a\_HCH\_5240MHz\_Ant1\_NTNV

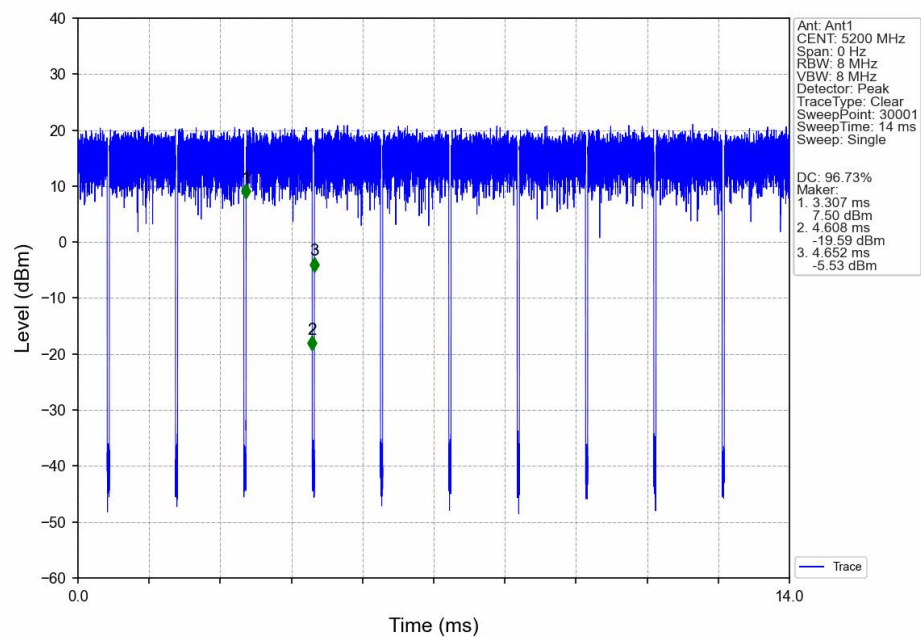


802.11n(HT20)\_LCH\_5180MHz\_Ant1\_NTNV

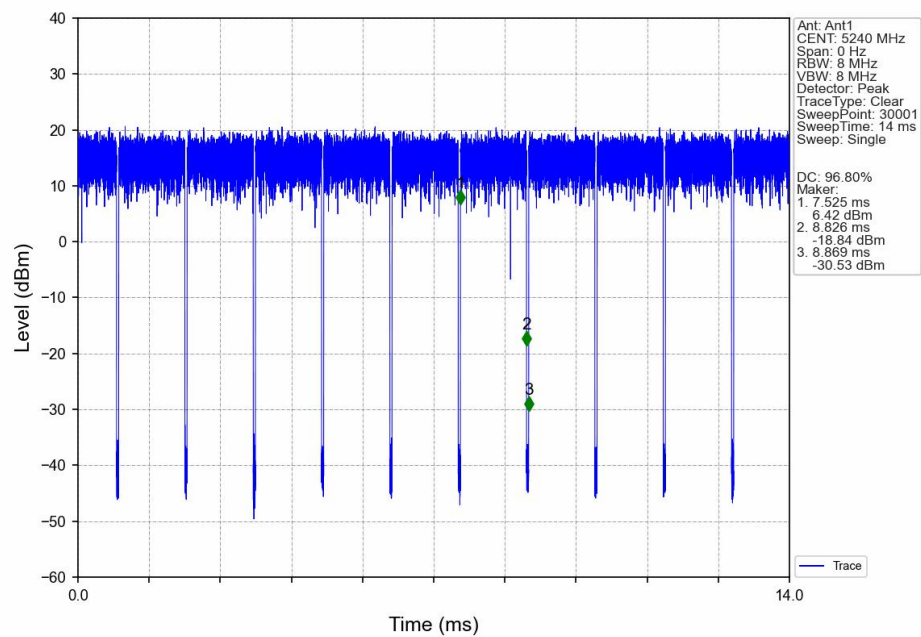


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802.11n(HT20)\_MCH\_5200MHz\_Ant1\_NTNV

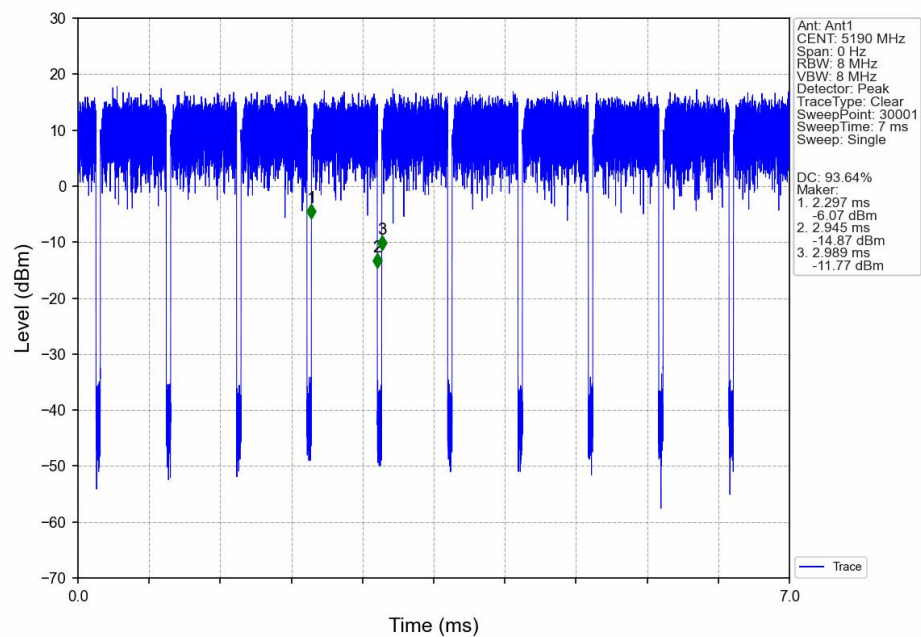


802.11n(HT20)\_HCH\_5240MHz\_Ant1\_NTNV

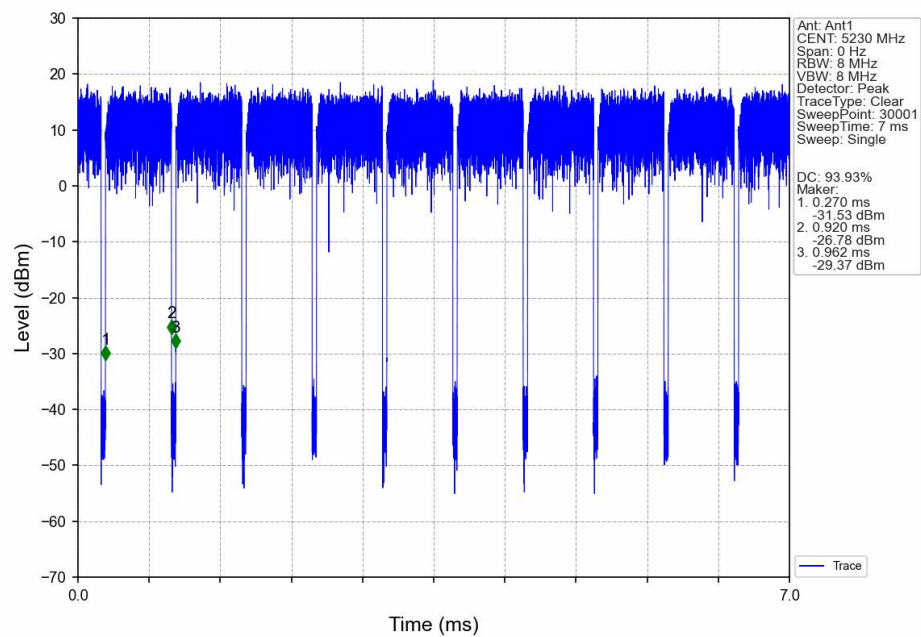


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802.11n(HT40)\_LCH\_5190MHz\_Ant1\_NTNV

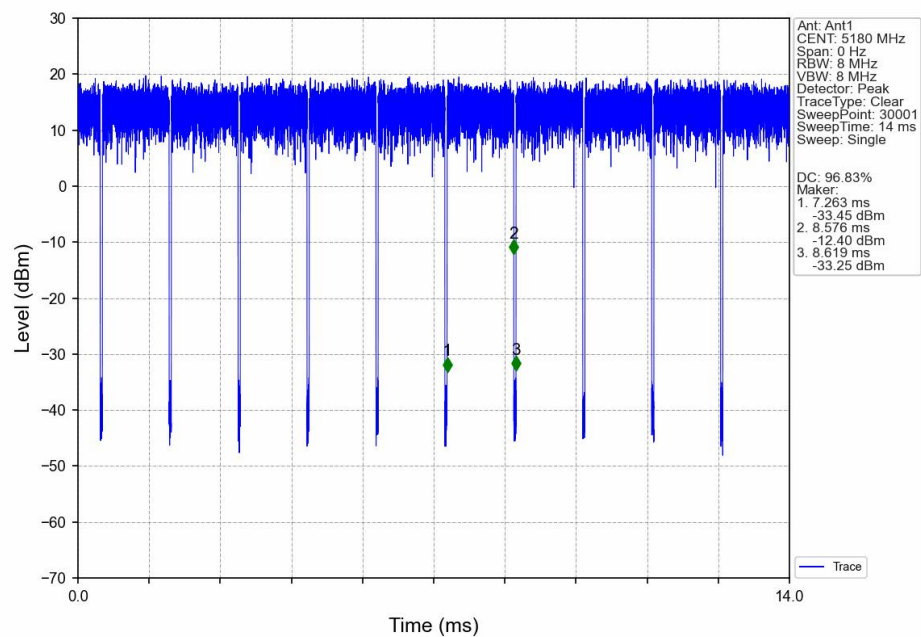


802.11n(HT40)\_HCH\_5230MHz\_Ant1\_NTNV

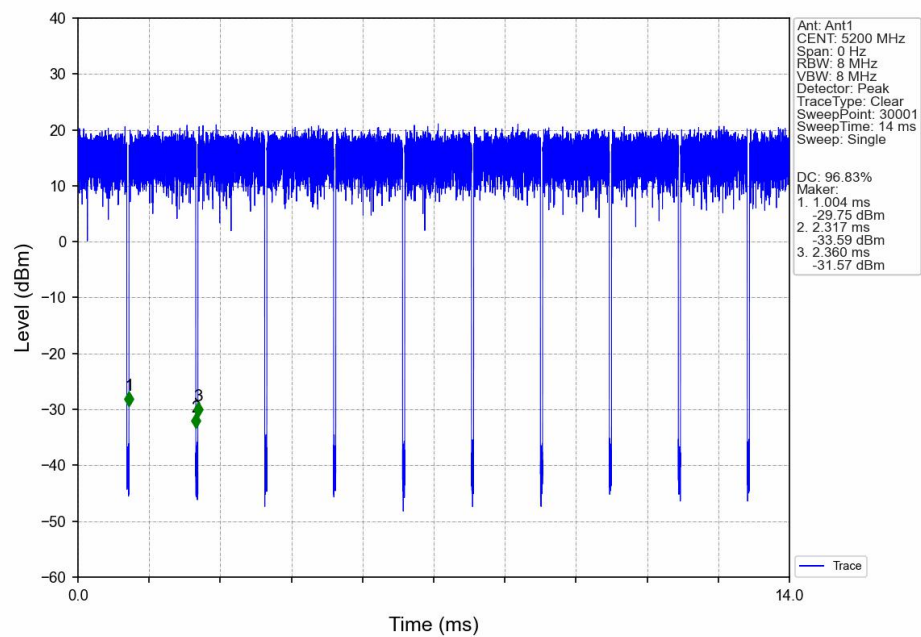


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802.11ac(VHT20)\_LCH\_5180MHz\_Ant1\_NTNV

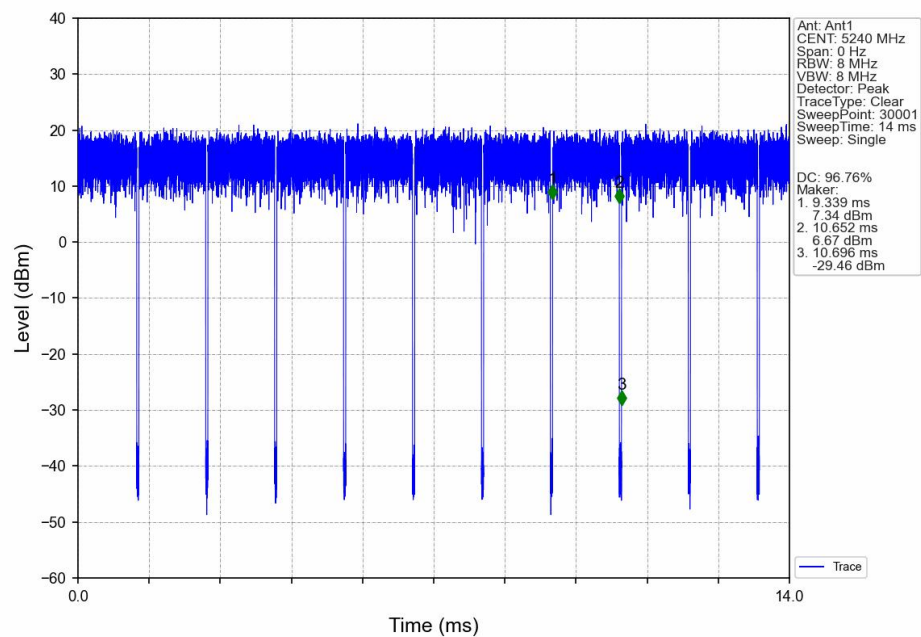


802.11ac(VHT20)\_MCH\_5200MHz\_Ant1\_NTNV

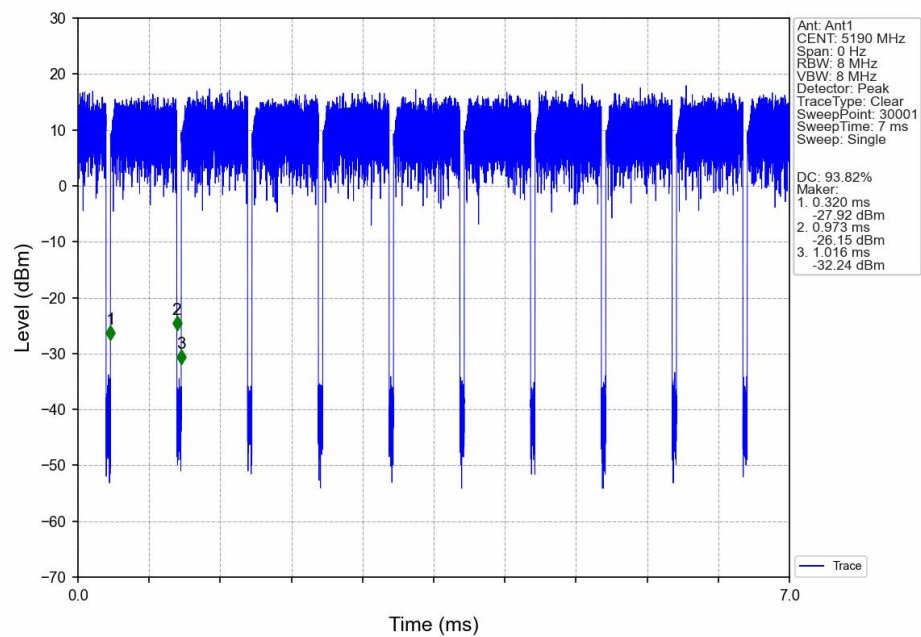


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802.11ac(VHT20)\_HCH\_5240MHz\_Ant1\_NTNV

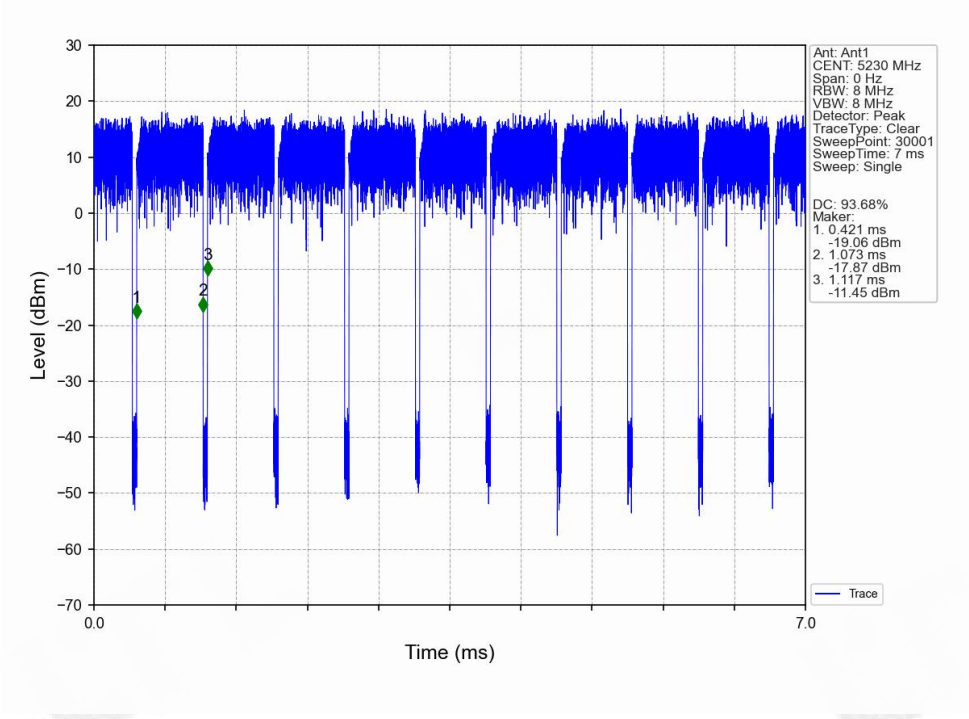


802.11ac(VHT40)\_LCH\_5190MHz\_Ant1\_NTNV

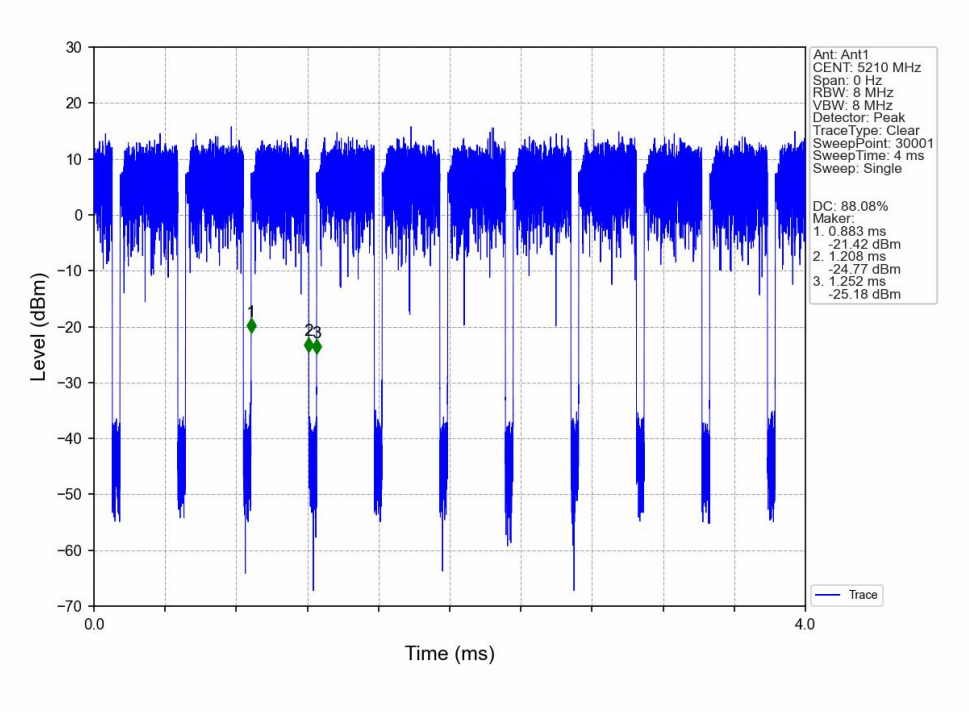


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802.11ac(VHT40)\_HCH\_5230MHz\_Ant1\_NTNV



802.11ac(VHT80)\_MCH\_5210MHz\_Ant1\_NTNV



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## 2. Bandwidth

### 2.1 Test Result

#### 2.1.1 OBW

| Mode             | TX Type | Frequency (MHz) | ANT | 99% Occupied Bandwidth (MHz) |       | Verdict |
|------------------|---------|-----------------|-----|------------------------------|-------|---------|
|                  |         |                 |     | Result                       | Limit |         |
| 802.11a          | SISO    | 5180            | 1   | 17.678                       | /     | Pass    |
|                  |         | 5200            | 1   | 17.536                       | /     | Pass    |
|                  |         | 5240            | 1   | 17.595                       | /     | Pass    |
| 802.11n (HT20)   | SISO    | 5180            | 1   | 18.579                       | /     | Pass    |
|                  |         | 5200            | 1   | 18.384                       | /     | Pass    |
|                  |         | 5240            | 1   | 18.449                       | /     | Pass    |
| 802.11n (HT40)   | SISO    | 5190            | 1   | 36.925                       | /     | Pass    |
|                  |         | 5230            | 1   | 36.728                       | /     | Pass    |
| 802.11ac (VHT20) | SISO    | 5180            | 1   | 18.490                       | /     | Pass    |
|                  |         | 5200            | 1   | 18.372                       | /     | Pass    |
|                  |         | 5240            | 1   | 18.377                       | /     | Pass    |
| 802.11ac (VHT40) | SISO    | 5190            | 1   | 36.759                       | /     | Pass    |
|                  |         | 5230            | 1   | 36.697                       | /     | Pass    |
| 802.11ac (VHT80) | SISO    | 5210            | 1   | 76.352                       | /     | Pass    |

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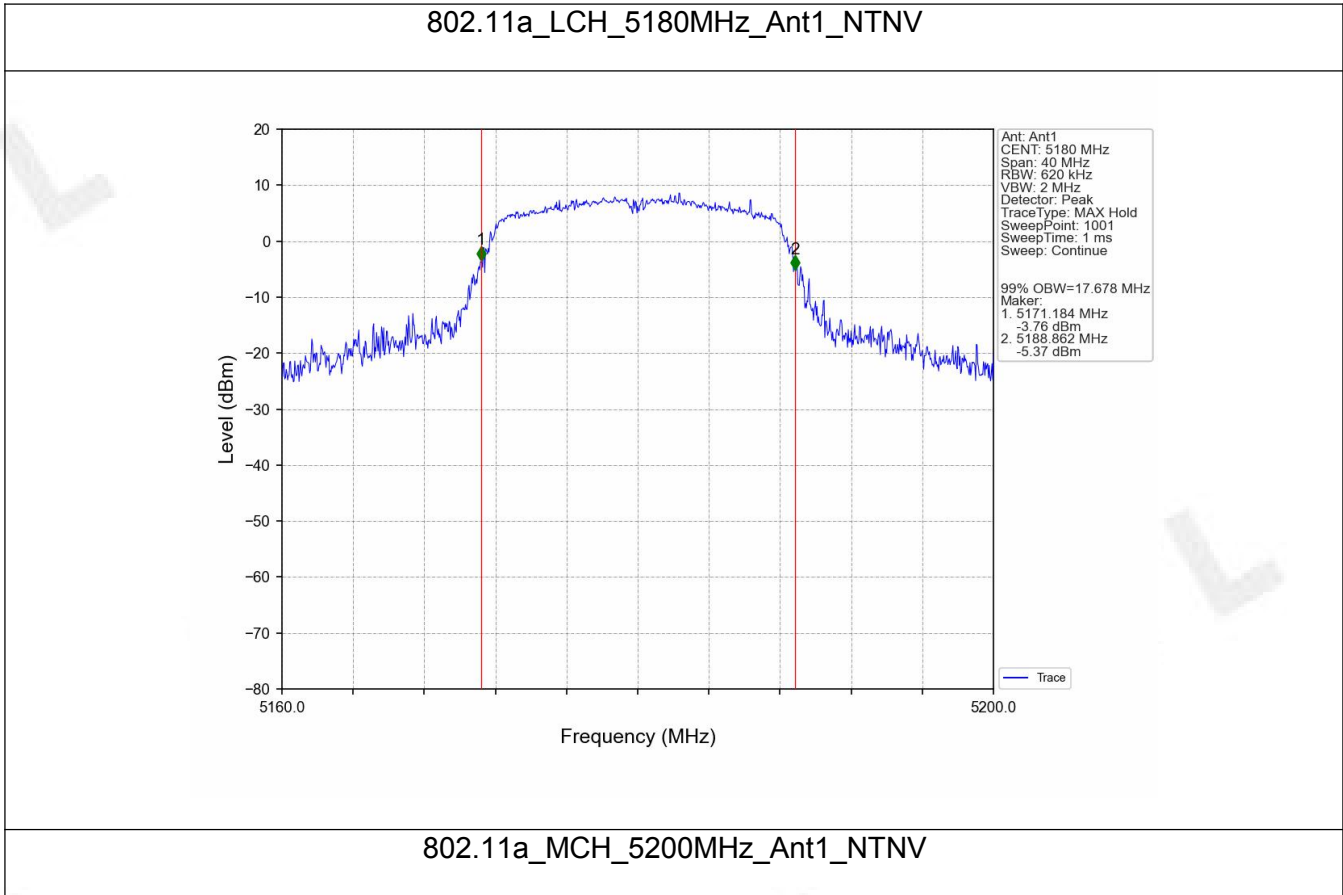
**2.1.2 26dB BW**

| Mode             | TX Type | Frequency (MHz) | ANT | 26dB Bandwidth (MHz) |       | Verdict |
|------------------|---------|-----------------|-----|----------------------|-------|---------|
|                  |         |                 |     | Result               | Limit |         |
| 802.11a          | SISO    | 5180            | 1   | 26.763               | /     | Pass    |
|                  |         | 5200            | 1   | 23.323               | /     | Pass    |
|                  |         | 5240            | 1   | 25.017               | /     | Pass    |
| 802.11n (HT20)   | SISO    | 5180            | 1   | 27.798               | /     | Pass    |
|                  |         | 5200            | 1   | 24.325               | /     | Pass    |
|                  |         | 5240            | 1   | 27.096               | /     | Pass    |
| 802.11n (HT40)   | SISO    | 5190            | 1   | 64.606               | /     | Pass    |
|                  |         | 5230            | 1   | 57.247               | /     | Pass    |
| 802.11ac (VHT20) | SISO    | 5180            | 1   | 27.421               | /     | Pass    |
|                  |         | 5200            | 1   | 23.737               | /     | Pass    |
|                  |         | 5240            | 1   | 21.896               | /     | Pass    |
| 802.11ac (VHT40) | SISO    | 5190            | 1   | 56.168               | /     | Pass    |
|                  |         | 5230            | 1   | 49.063               | /     | Pass    |
| 802.11ac (VHT80) | SISO    | 5210            | 1   | 113.525              | /     | Pass    |

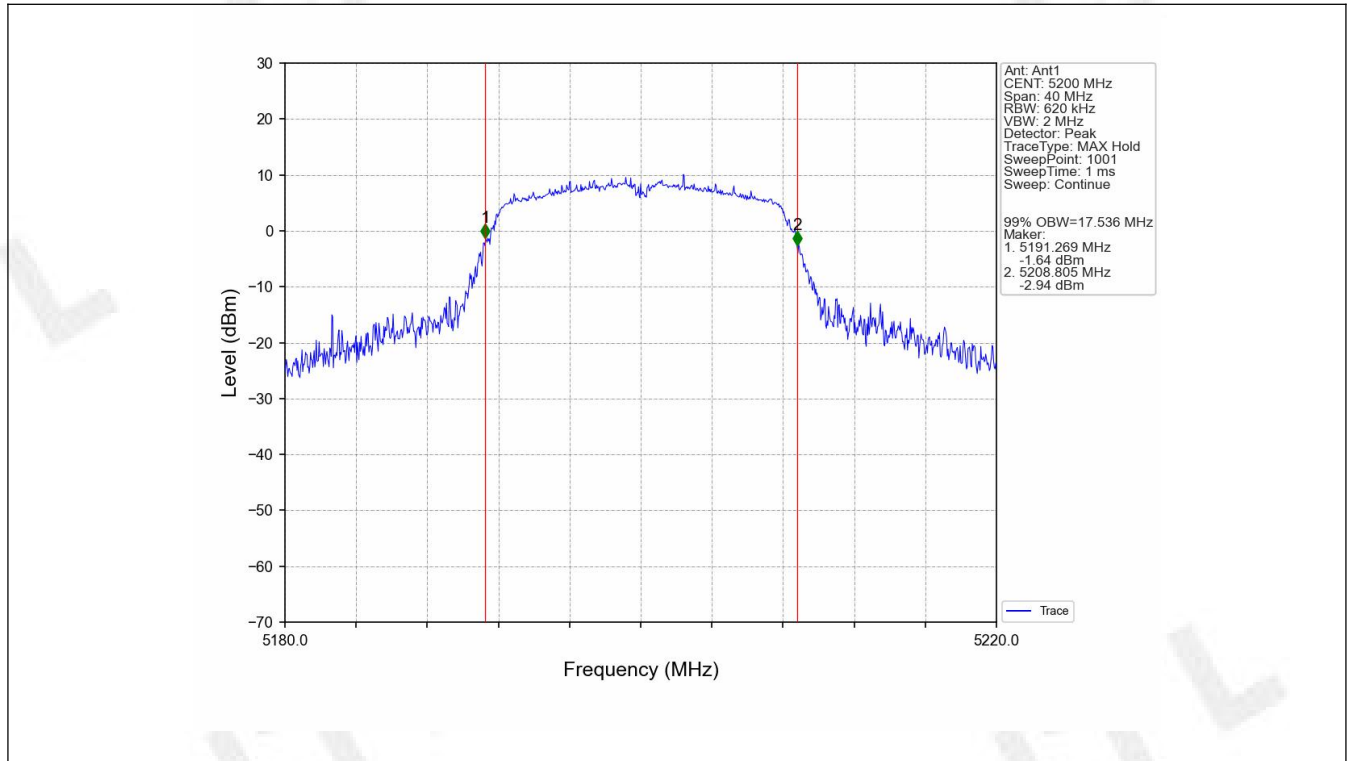
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2.2 Test Graph

2.2.1 OBW

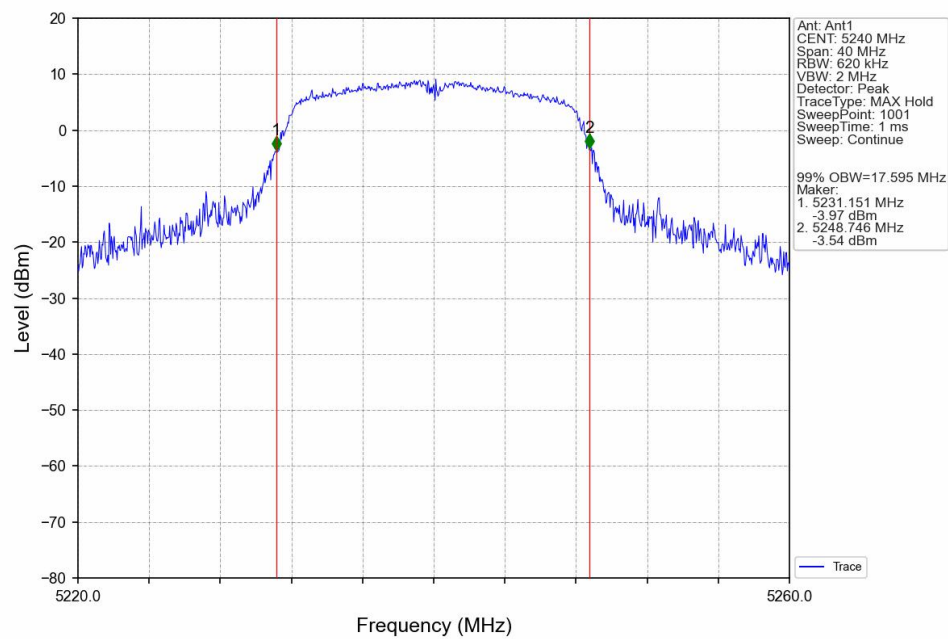


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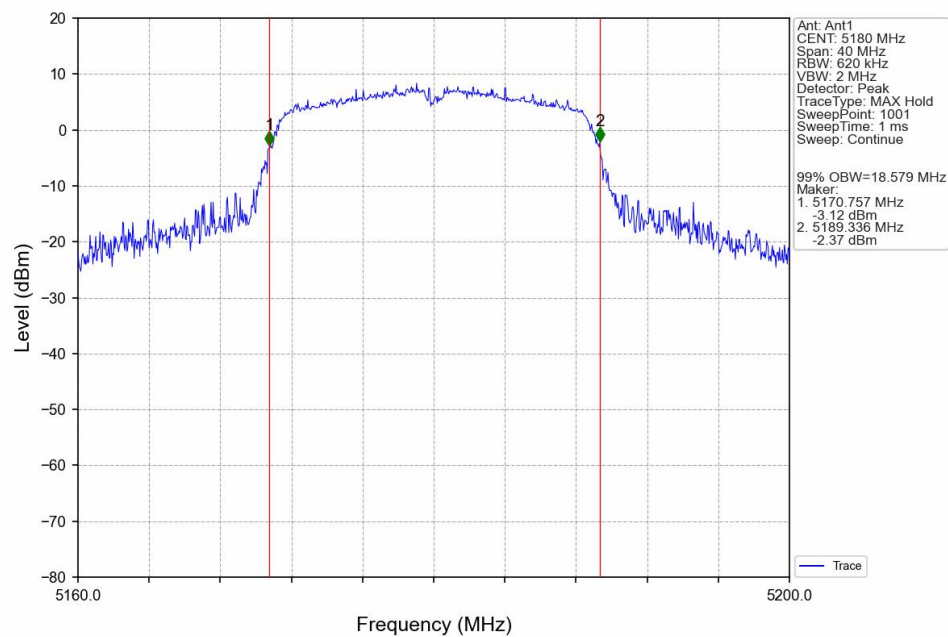


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802.11a\_HCH\_5240MHz\_Ant1\_NTNV

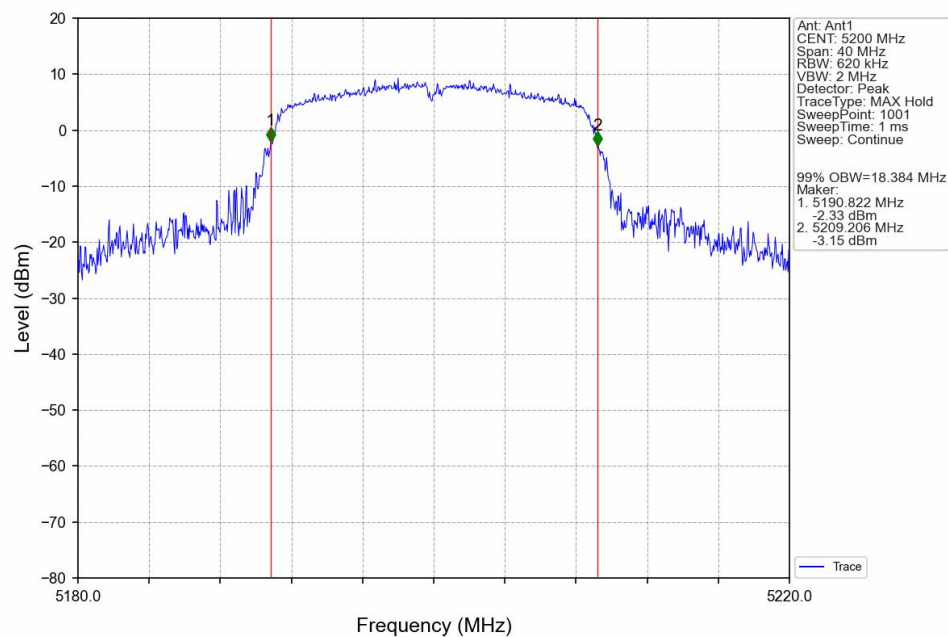


802.11n(HT20)\_LCH\_5180MHz\_Ant1\_NTNV

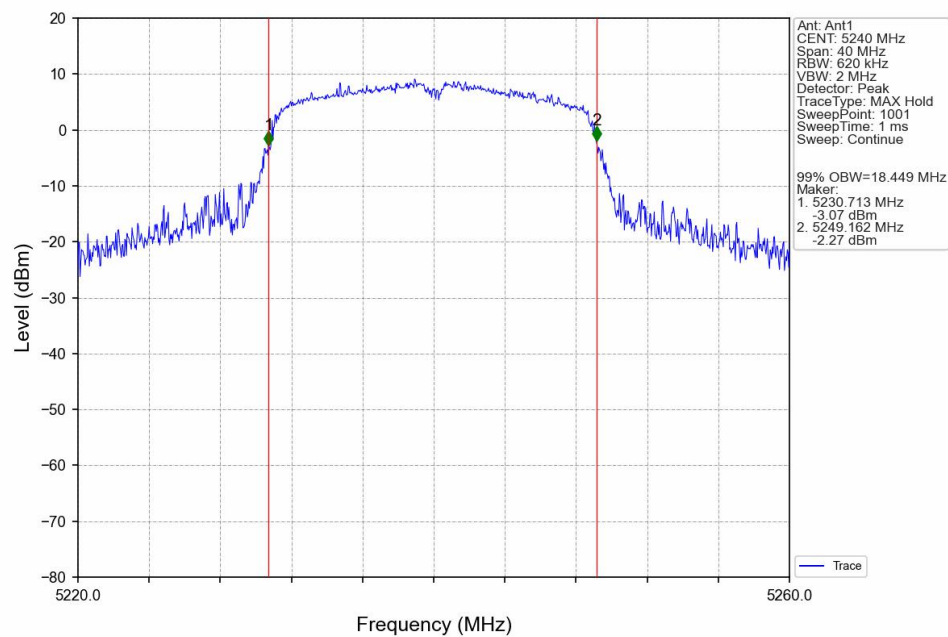


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802.11n(HT20)\_MCH\_5200MHz\_Ant1\_NTNV

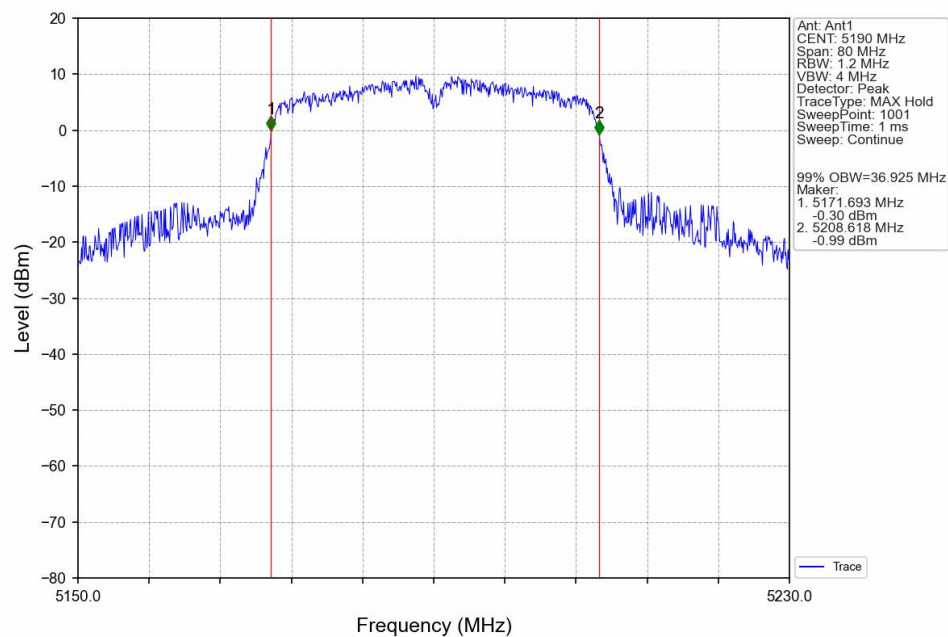


802.11n(HT20)\_HCH\_5240MHz\_Ant1\_NTNV

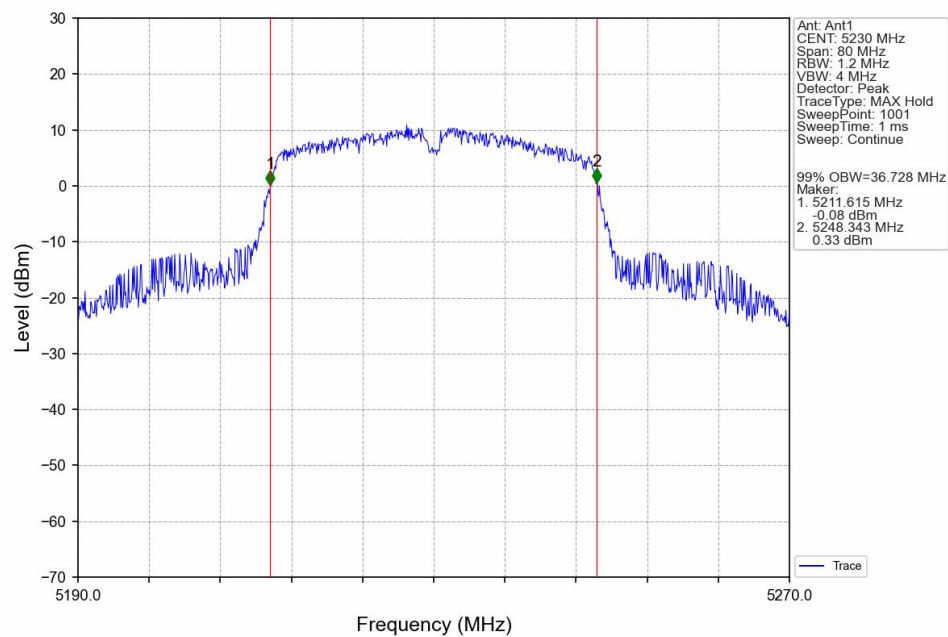


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802.11n(HT40)\_LCH\_5190MHz\_Ant1\_NTNV

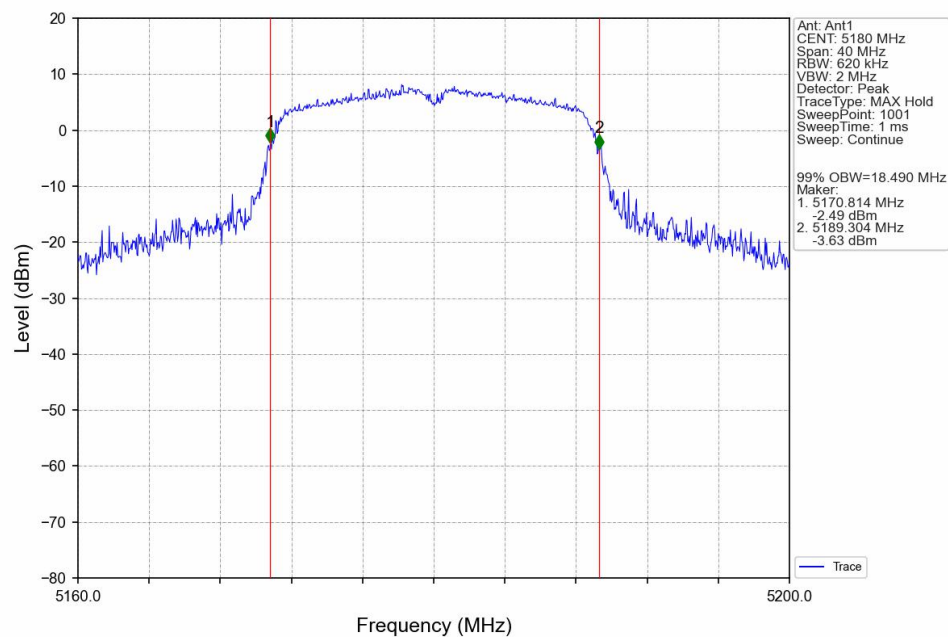


802.11n(HT40)\_HCH\_5230MHz\_Ant1\_NTNV

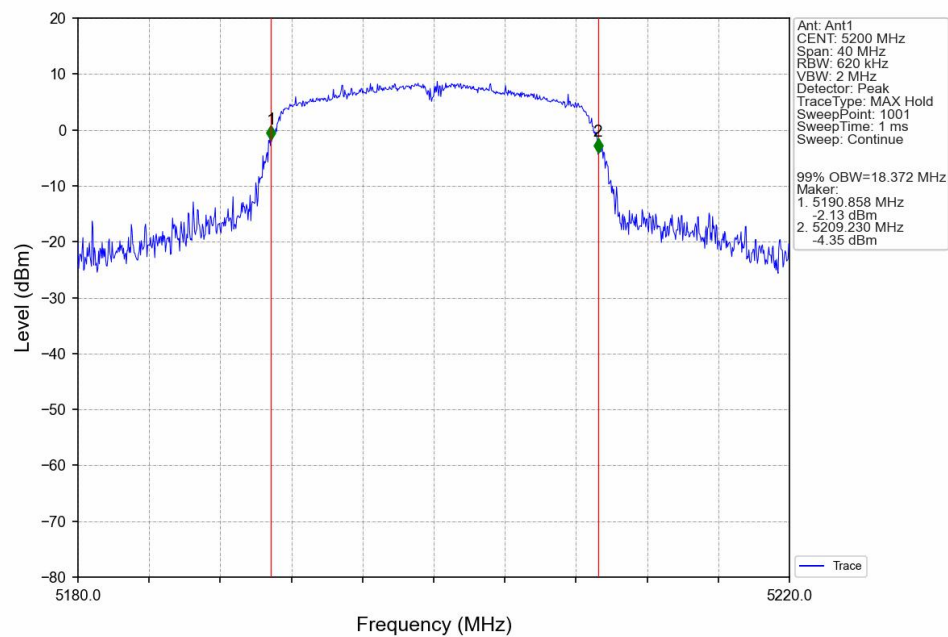


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802.11ac(VHT20)\_LCH\_5180MHz\_Ant1\_NTNV

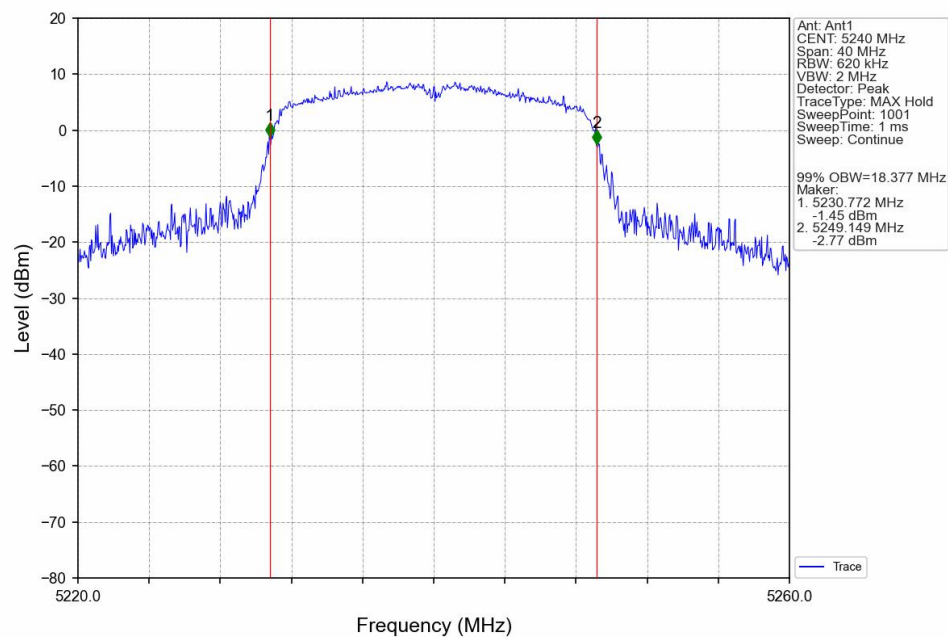


802.11ac(VHT20)\_MCH\_5200MHz\_Ant1\_NTNV

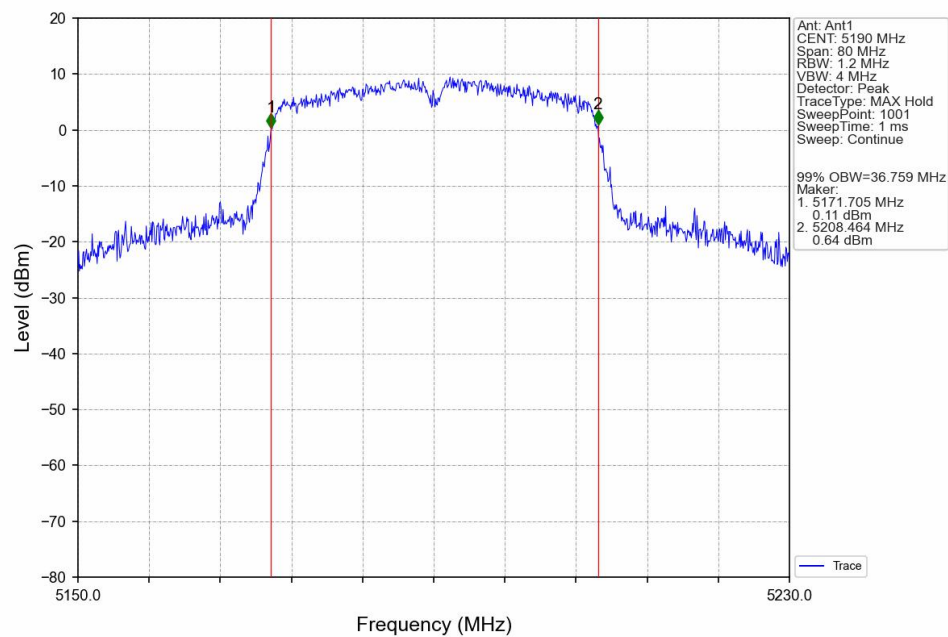


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802.11ac(VHT20)\_HCH\_5240MHz\_Ant1\_NTNV

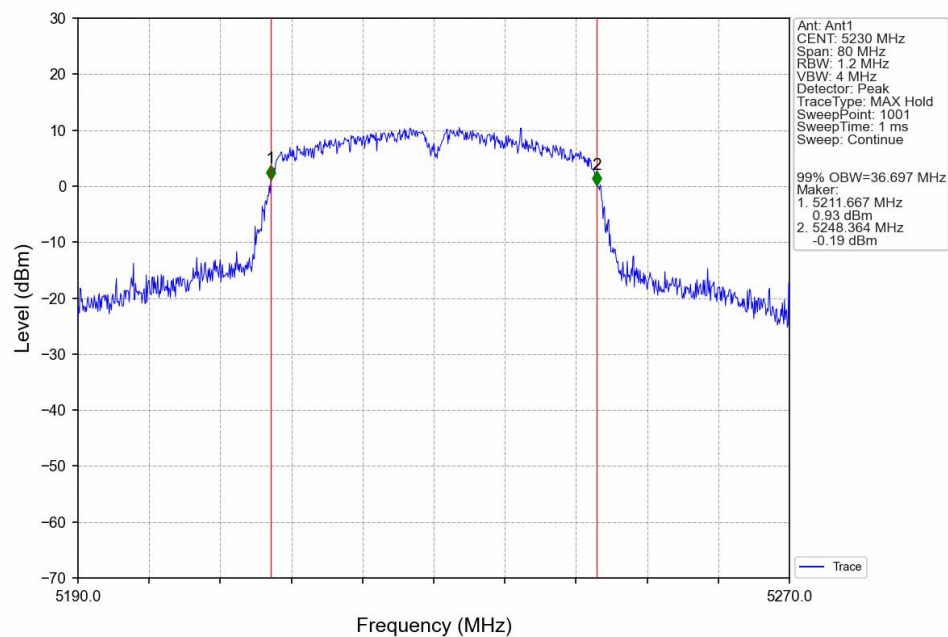


802.11ac(VHT40)\_LCH\_5190MHz\_Ant1\_NTNV

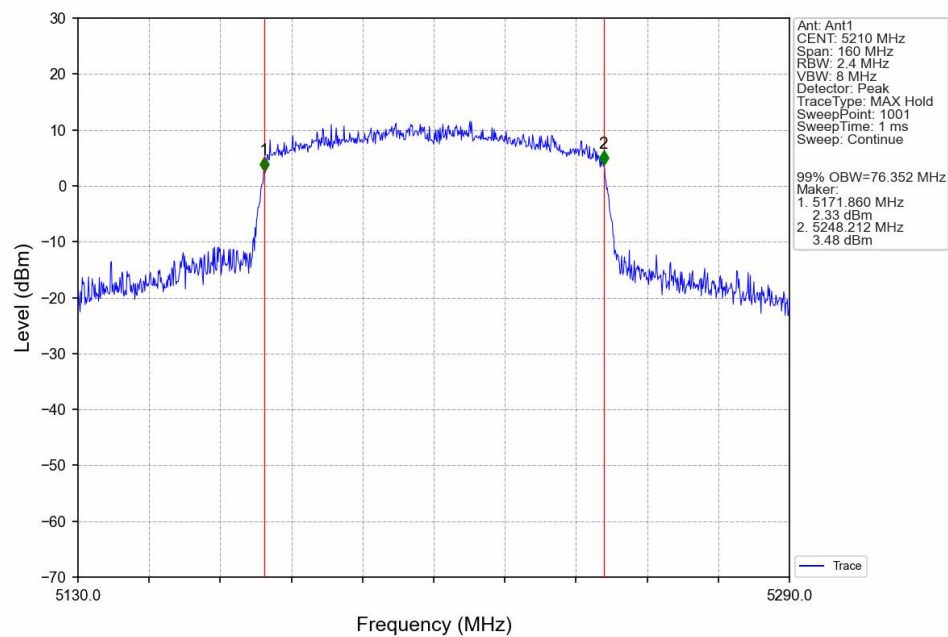


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802.11ac(VHT40)\_HCH\_5230MHz\_Ant1\_NTNV

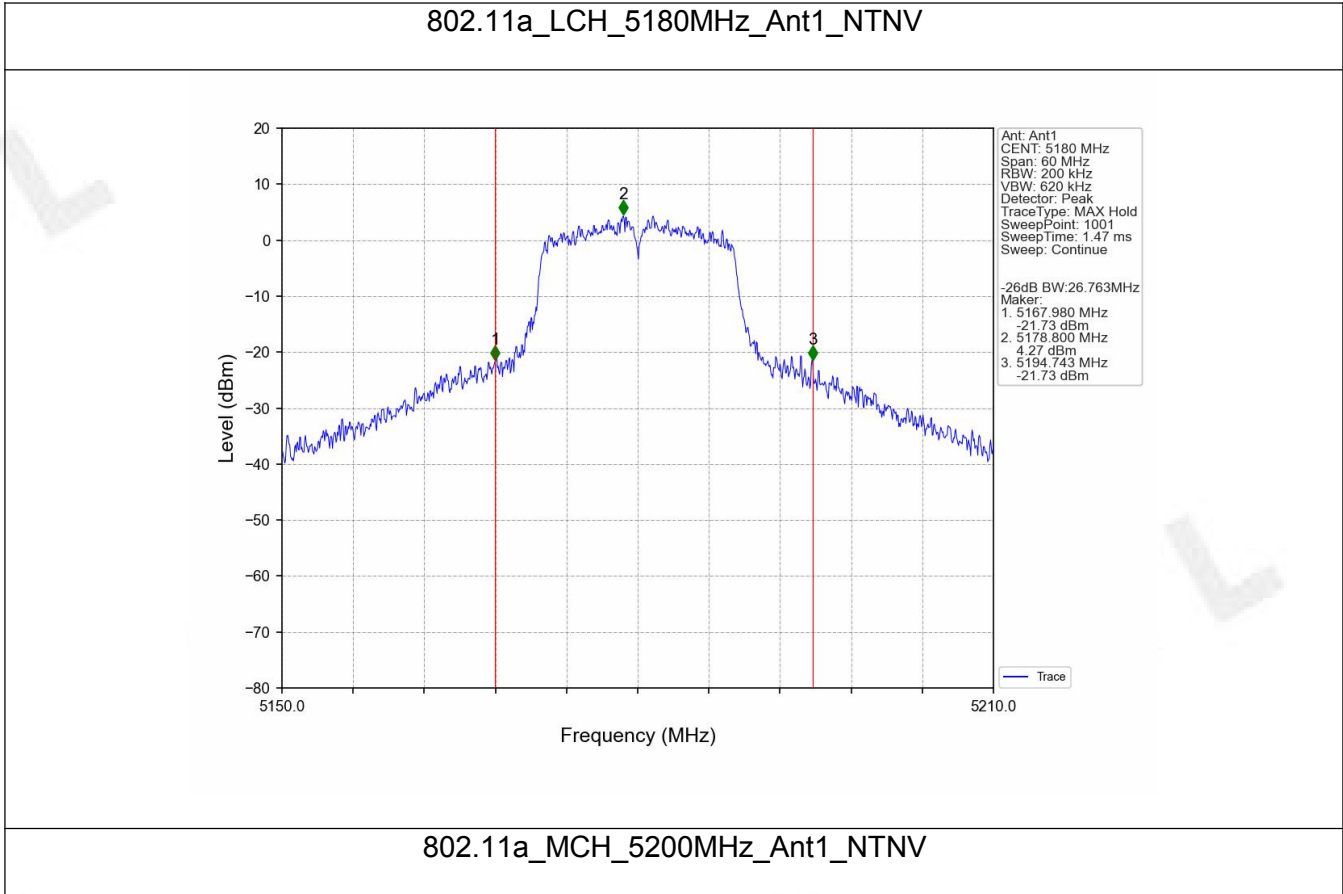


802.11ac(VHT80)\_MCH\_5210MHz\_Ant1\_NTNV

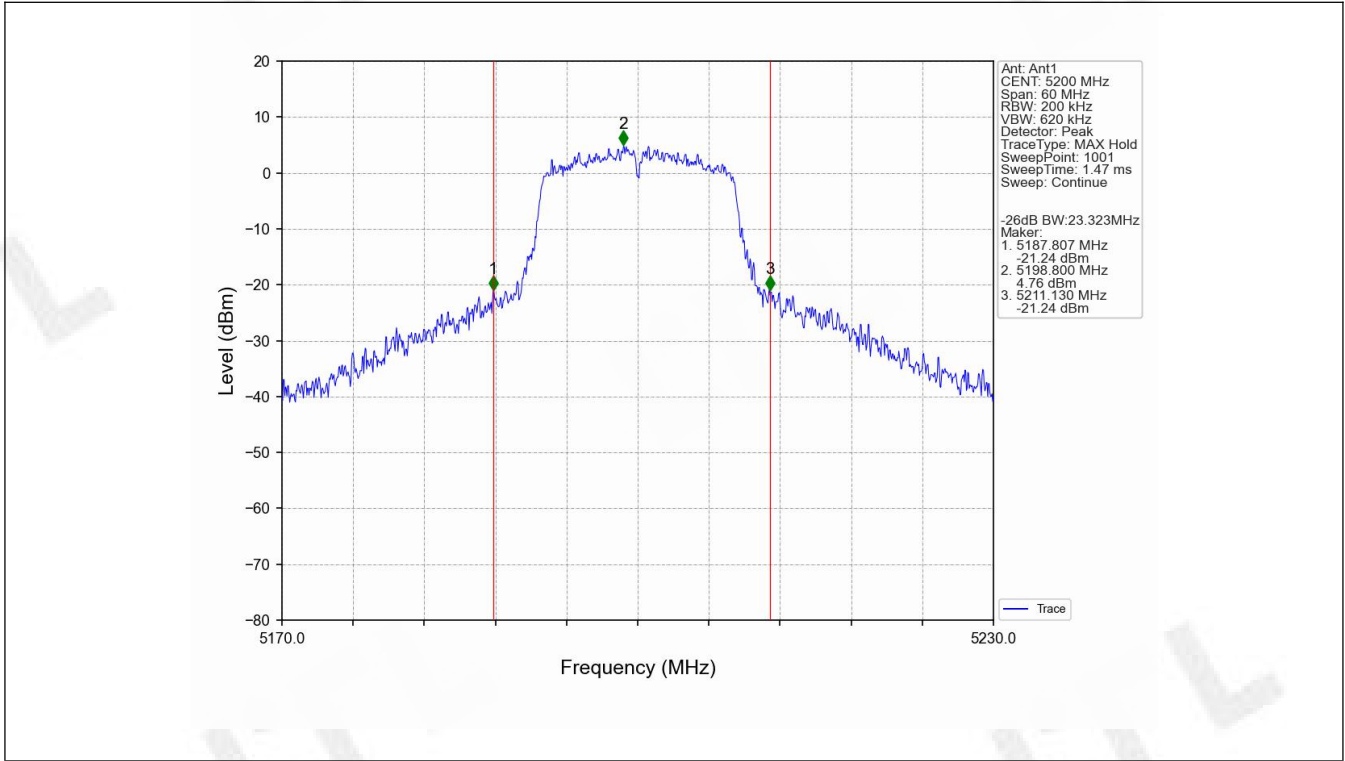


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2.2.2 26dB BW

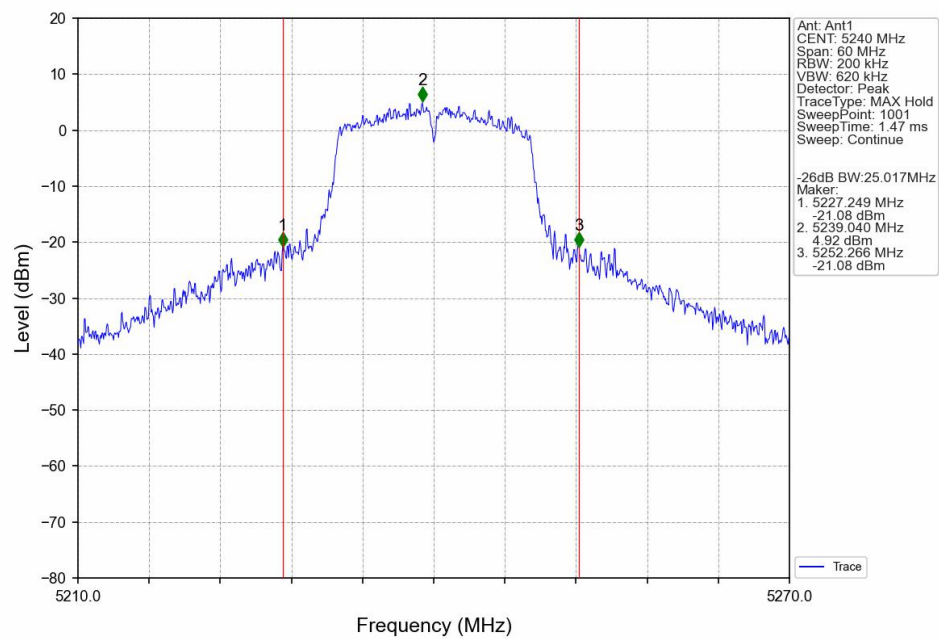


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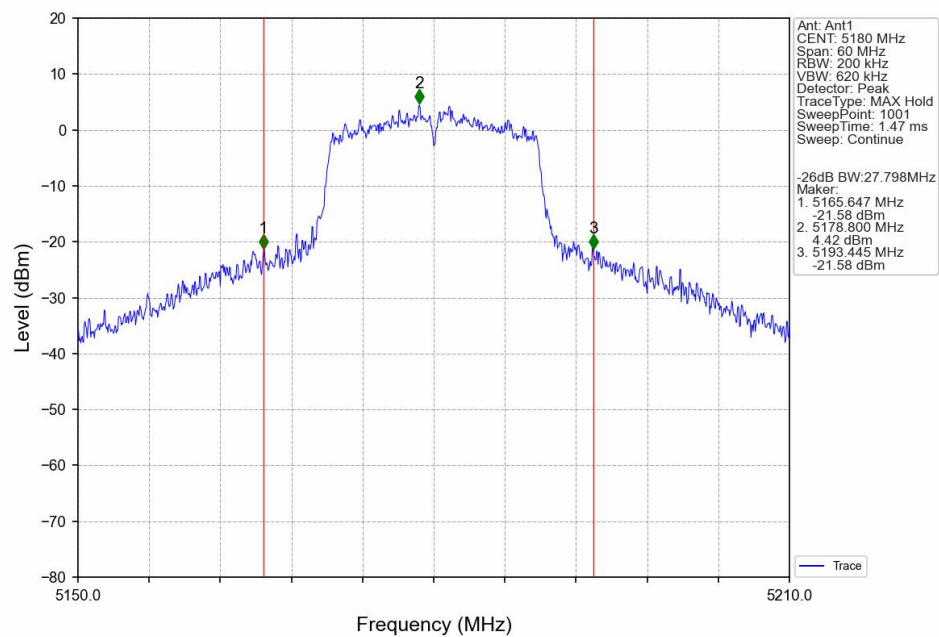


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802.11a\_HCH\_5240MHz\_Ant1\_NTNV

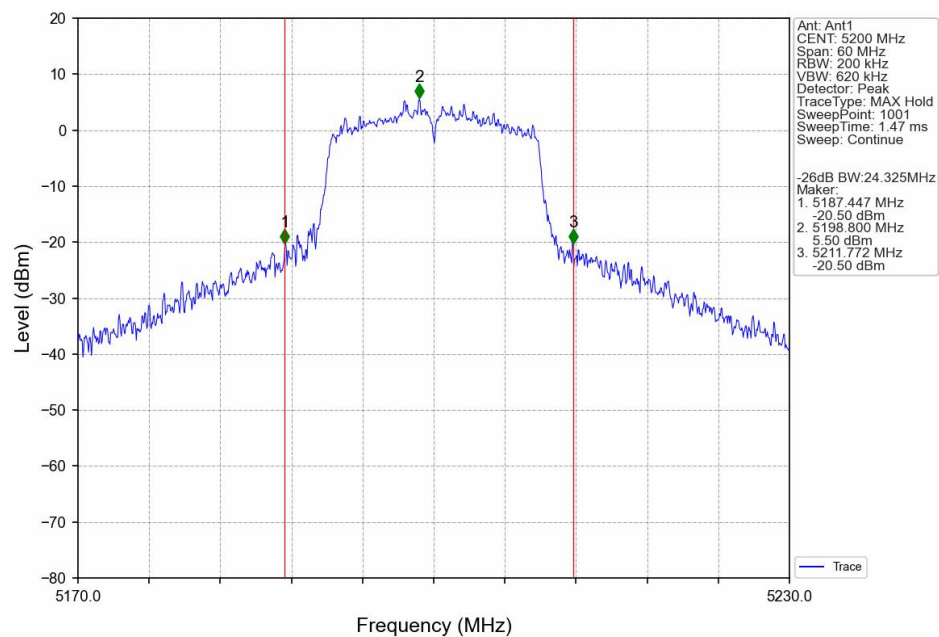


802.11n(HT20)\_LCH\_5180MHz\_Ant1\_NTNV

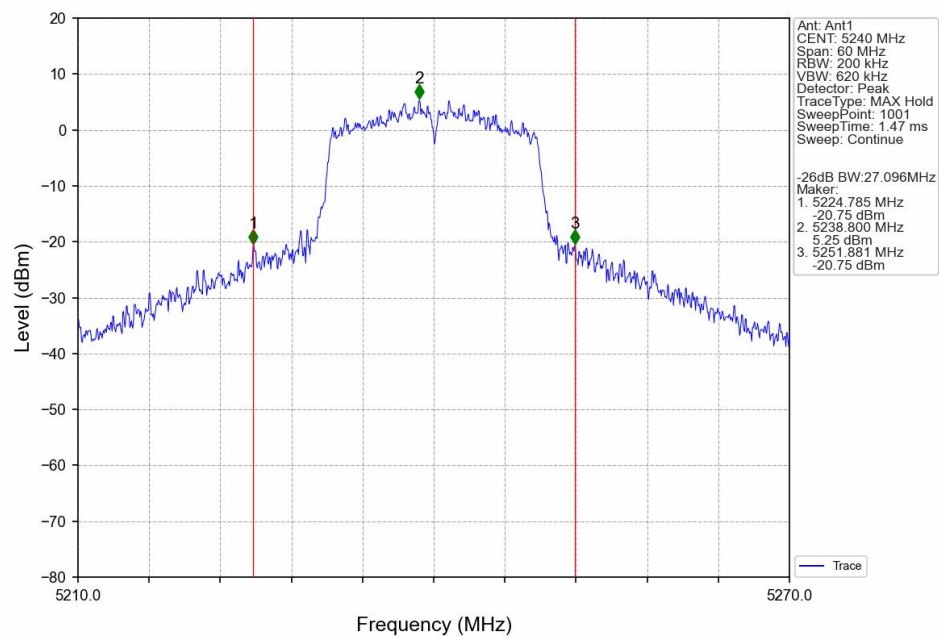


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802.11n(HT20)\_MCH\_5200MHz\_Ant1\_NTNV

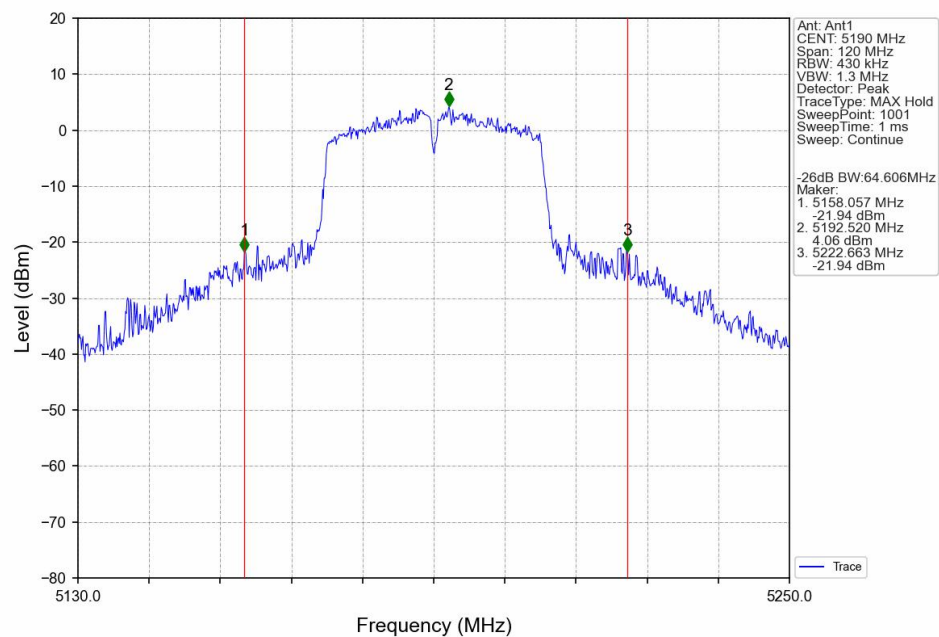


802.11n(HT20)\_HCH\_5240MHz\_Ant1\_NTNV

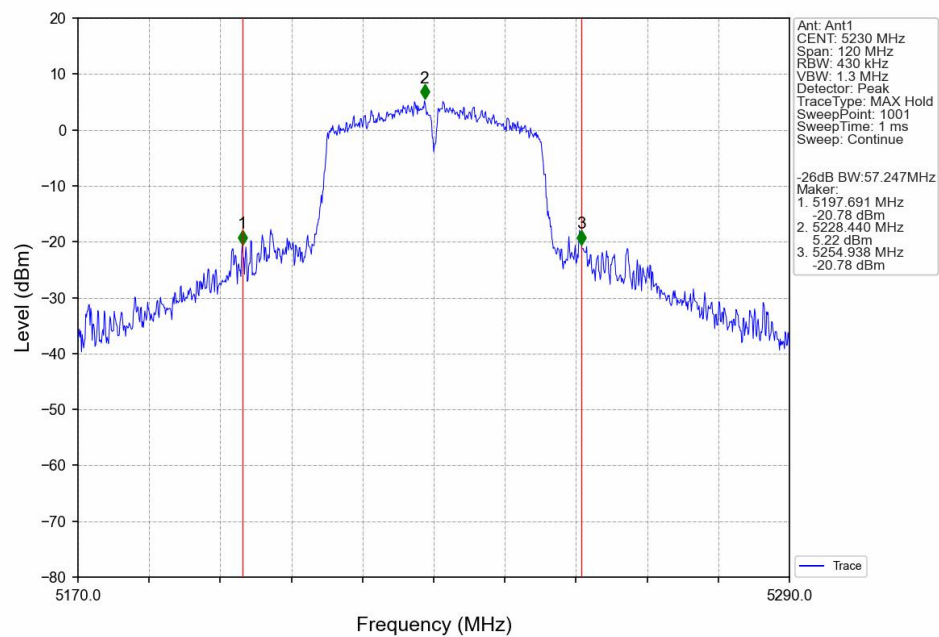


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802.11n(HT40)\_LCH\_5190MHz\_Ant1\_NTNV

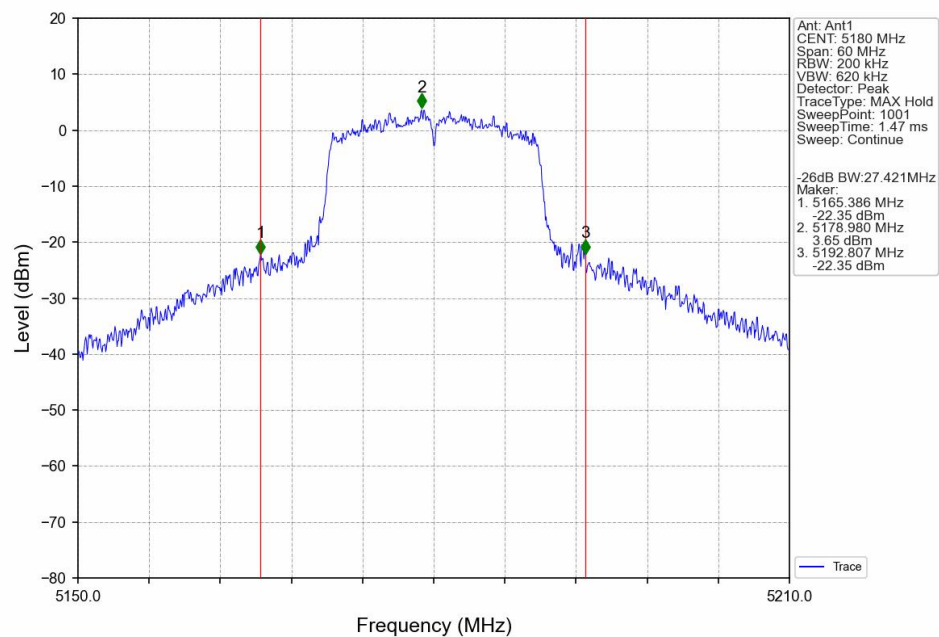


802.11n(HT40)\_HCH\_5230MHz\_Ant1\_NTNV

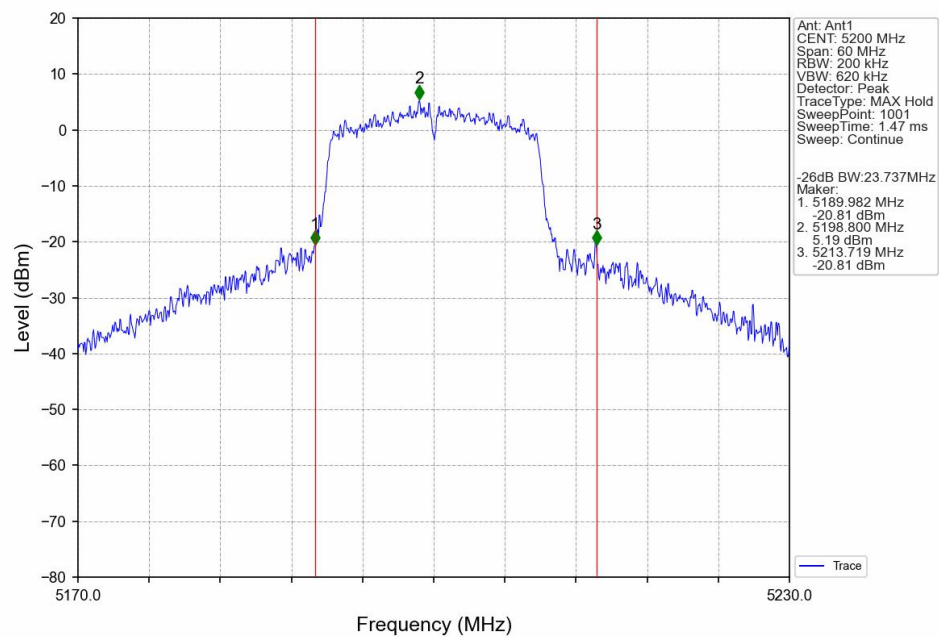


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802.11ac(VHT20)\_LCH\_5180MHz\_Ant1\_NTNV

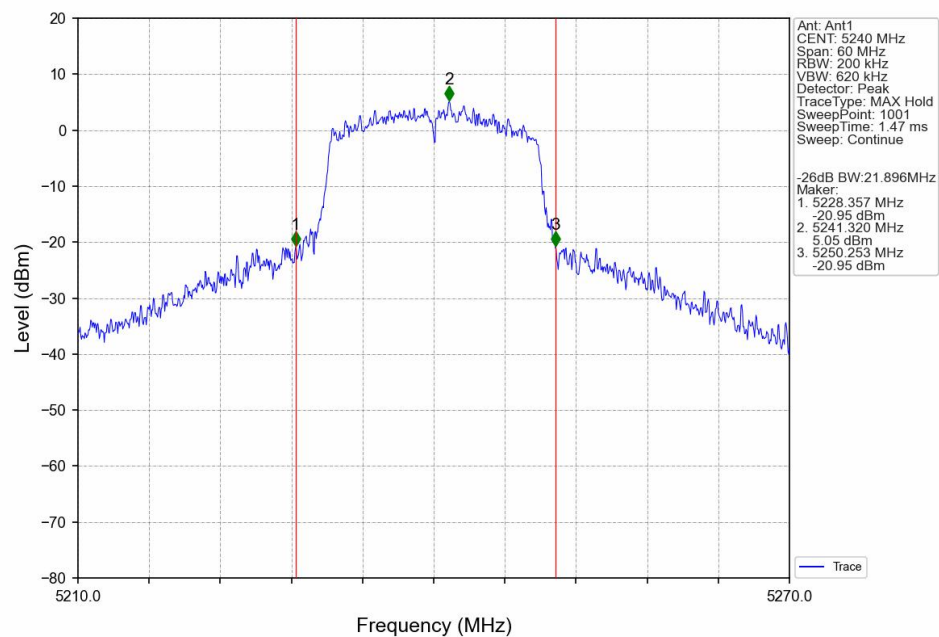


802.11ac(VHT20)\_MCH\_5200MHz\_Ant1\_NTNV

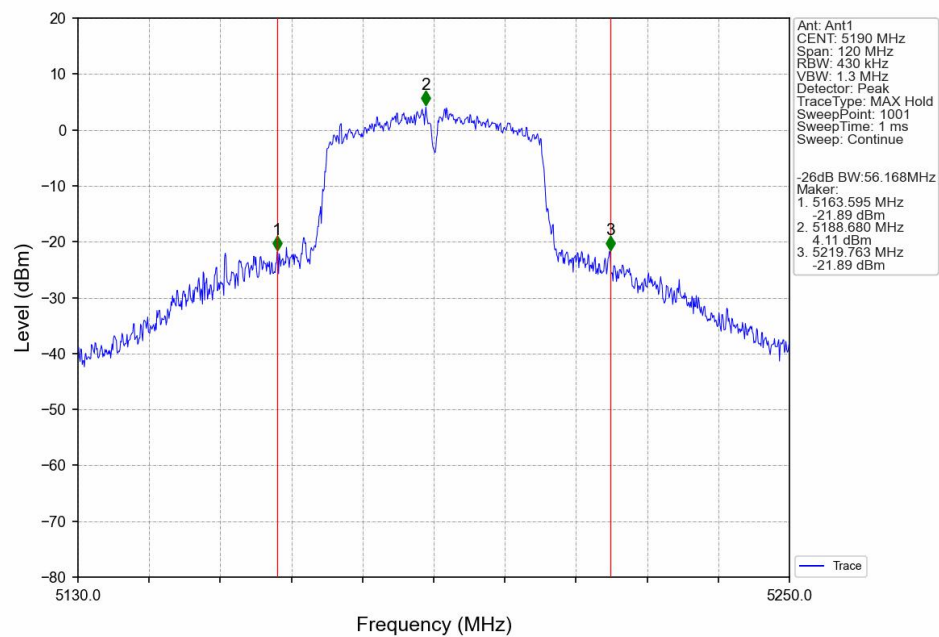


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802.11ac(VHT20)\_HCH\_5240MHz\_Ant1\_NTNV

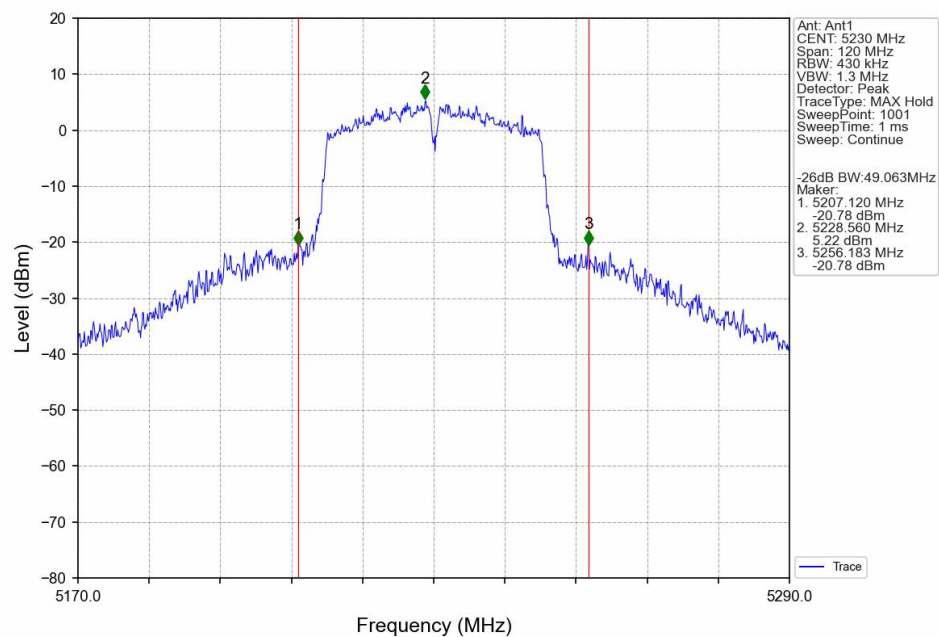


802.11ac(VHT40)\_LCH\_5190MHz\_Ant1\_NTNV

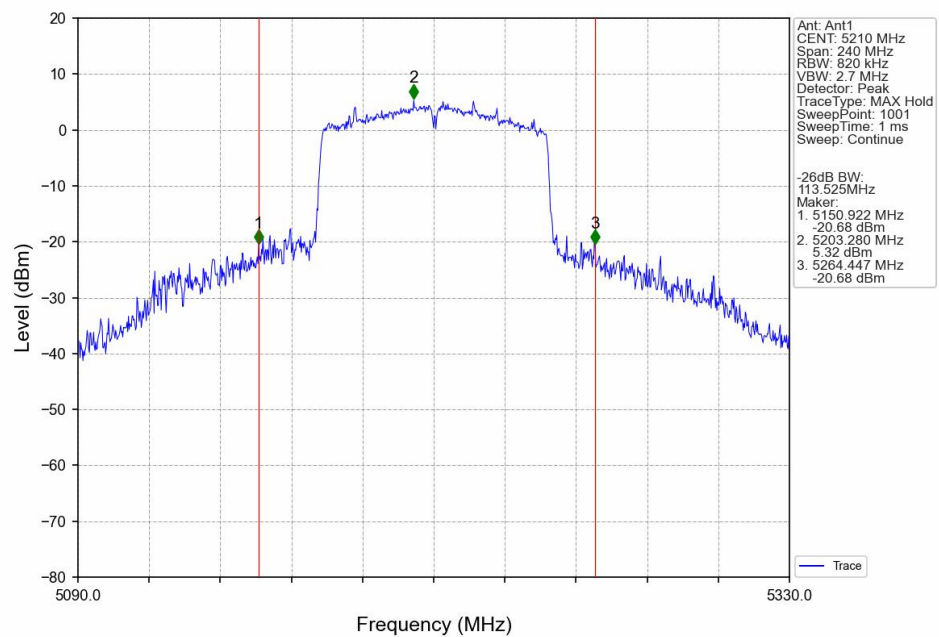


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802.11ac(VHT40)\_HCH\_5230MHz\_Ant1\_NTNV



802.11ac(VHT80)\_MCH\_5210MHz\_Ant1\_NTNV



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### 3. Maximum Conducted Output Power

#### 3.1 Test Result

##### 3.1.1 Power

| Mode                                | TX Type | Frequency (MHz) | Maximum Average Conducted Output Power (dBm) |              | Verdict |
|-------------------------------------|---------|-----------------|----------------------------------------------|--------------|---------|
|                                     |         |                 | ANT1                                         | Limit        |         |
| 802.11a                             | SISO    | 5180            | 13.61                                        | $\leq 23.98$ | Pass    |
|                                     |         | 5200            | 14.57                                        | $\leq 23.98$ | Pass    |
|                                     |         | 5240            | 14.50                                        | $\leq 23.98$ | Pass    |
| 802.11n (HT20)                      | SISO    | 5180            | 13.50                                        | $\leq 23.98$ | Pass    |
|                                     |         | 5200            | 14.64                                        | $\leq 23.98$ | Pass    |
|                                     |         | 5240            | 14.43                                        | $\leq 23.98$ | Pass    |
| 802.11n (HT40)                      | SISO    | 5190            | 13.48                                        | $\leq 23.98$ | Pass    |
|                                     |         | 5230            | 14.55                                        | $\leq 23.98$ | Pass    |
| 802.11ac (VHT20)                    | SISO    | 5180            | 13.46                                        | $\leq 23.98$ | Pass    |
|                                     |         | 5200            | 14.61                                        | $\leq 23.98$ | Pass    |
|                                     |         | 5240            | 14.30                                        | $\leq 23.98$ | Pass    |
| 802.11ac (VHT40)                    | SISO    | 5190            | 13.62                                        | $\leq 23.98$ | Pass    |
|                                     |         | 5230            | 14.47                                        | $\leq 23.98$ | Pass    |
| 802.11ac (VHT80)                    | SISO    | 5210            | 14.59                                        | $\leq 23.98$ | Pass    |
| Note1: Antenna Gain: Ant1: 3.24dBi; |         |                 |                                              |              |         |

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## 4. Maximum Power Spectral Density

### 4.1 Test Result

#### 4.1.1 PSD

| Mode             | TX Type | Frequency (MHz) | Maximum PSD (dBm/MHz) |       | Verdict |
|------------------|---------|-----------------|-----------------------|-------|---------|
|                  |         |                 | ANT1                  | Limit |         |
| 802.11a          | SISO    | 5180            | 3.19                  | <=11  | Pass    |
|                  |         | 5200            | 3.41                  | <=11  | Pass    |
|                  |         | 5240            | 3.56                  | <=11  | Pass    |
| 802.11n (HT20)   | SISO    | 5180            | 3.06                  | <=11  | Pass    |
|                  |         | 5200            | 3.12                  | <=11  | Pass    |
|                  |         | 5240            | 3.33                  | <=11  | Pass    |
| 802.11n (HT40)   | SISO    | 5190            | 0.05                  | <=11  | Pass    |
|                  |         | 5230            | 0.36                  | <=11  | Pass    |
| 802.11ac (VHT20) | SISO    | 5180            | 2.94                  | <=11  | Pass    |
|                  |         | 5200            | 3.12                  | <=11  | Pass    |
|                  |         | 5240            | 3.03                  | <=11  | Pass    |
| 802.11ac (VHT40) | SISO    | 5190            | 0.20                  | <=11  | Pass    |
|                  |         | 5230            | 0.42                  | <=11  | Pass    |
| 802.11ac (VHT80) | SISO    | 5210            | -3.13                 | <=11  | Pass    |

Note1: Antenna Gain: Ant1: 3.24dBi;

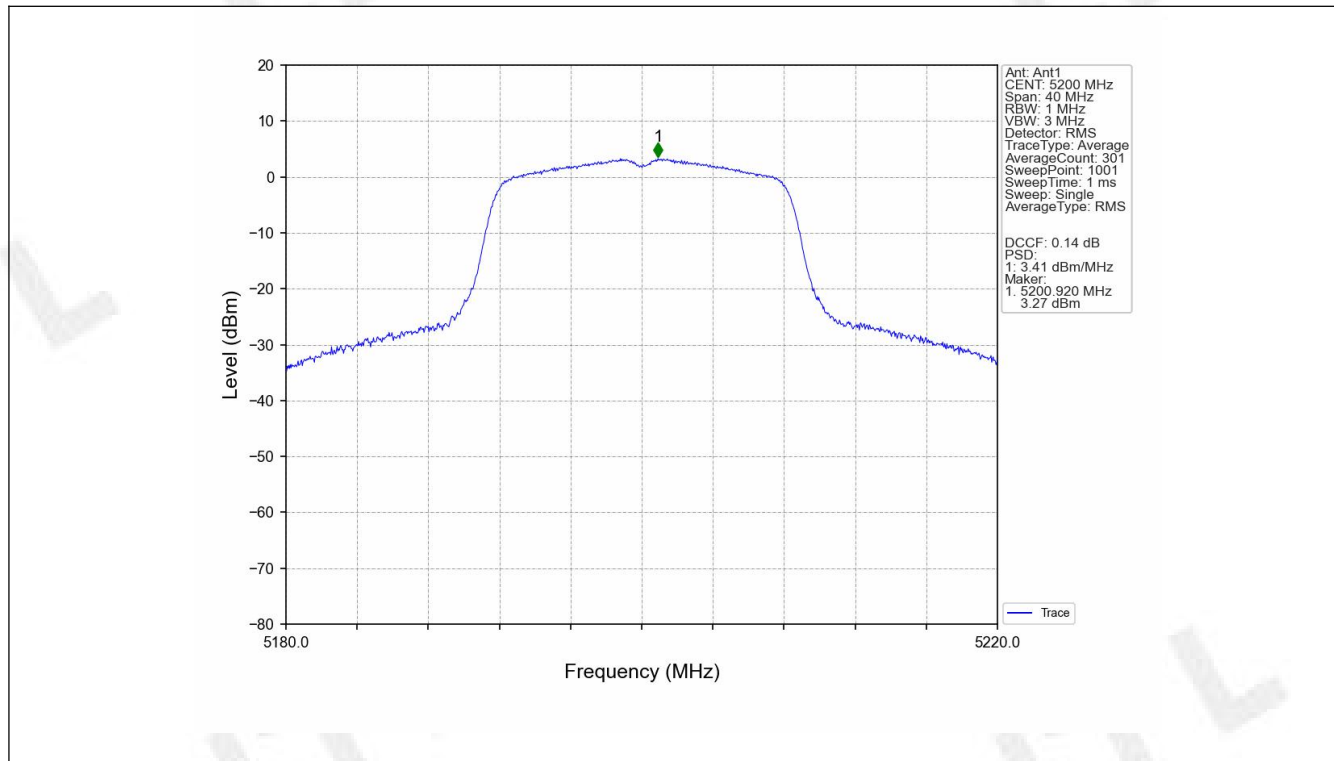
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4.2 Test Graph

4.2.1 PSD

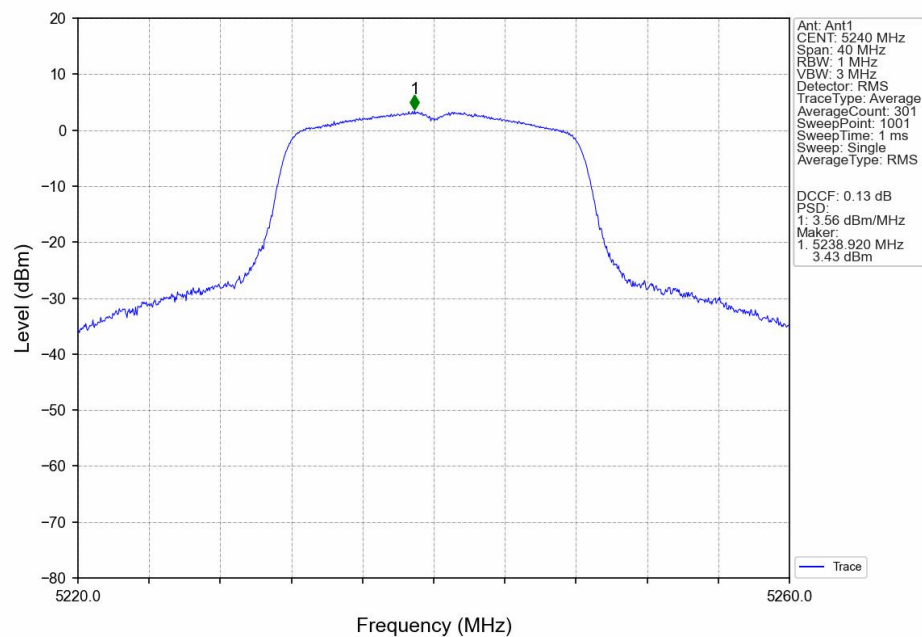


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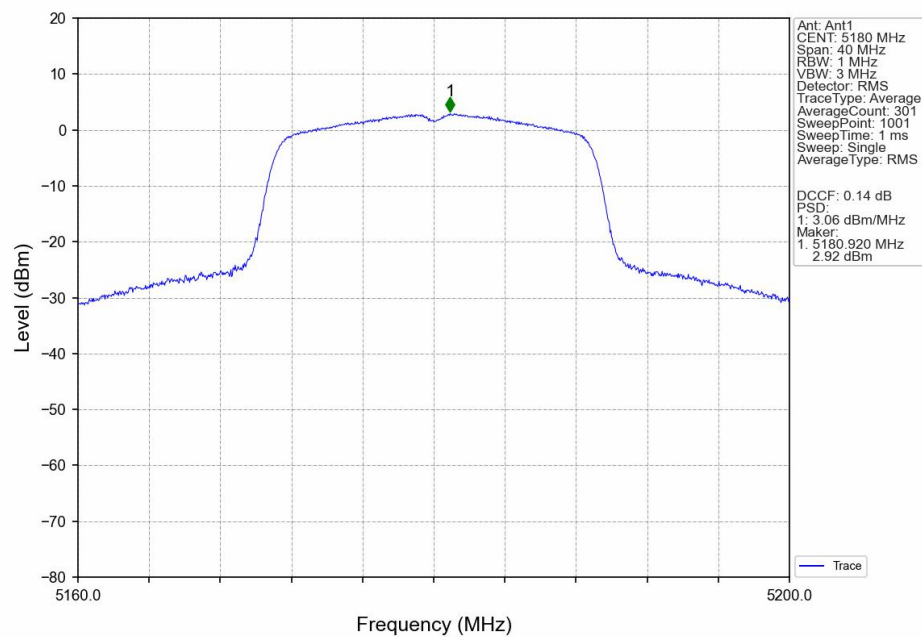


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802.11a\_HCH\_5240MHz\_Ant1\_NTNV

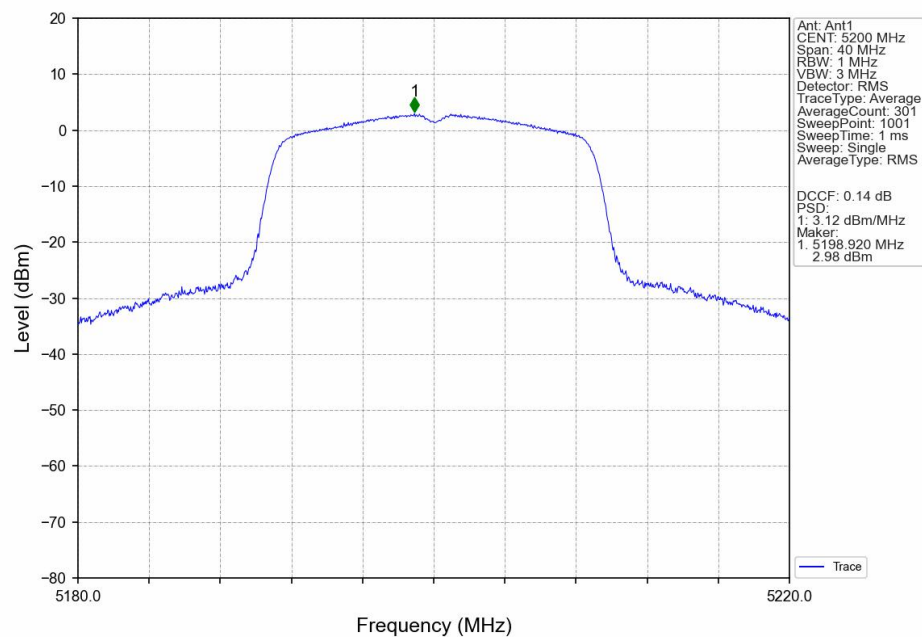


802.11n(HT20)\_LCH\_5180MHz\_Ant1\_NTNV

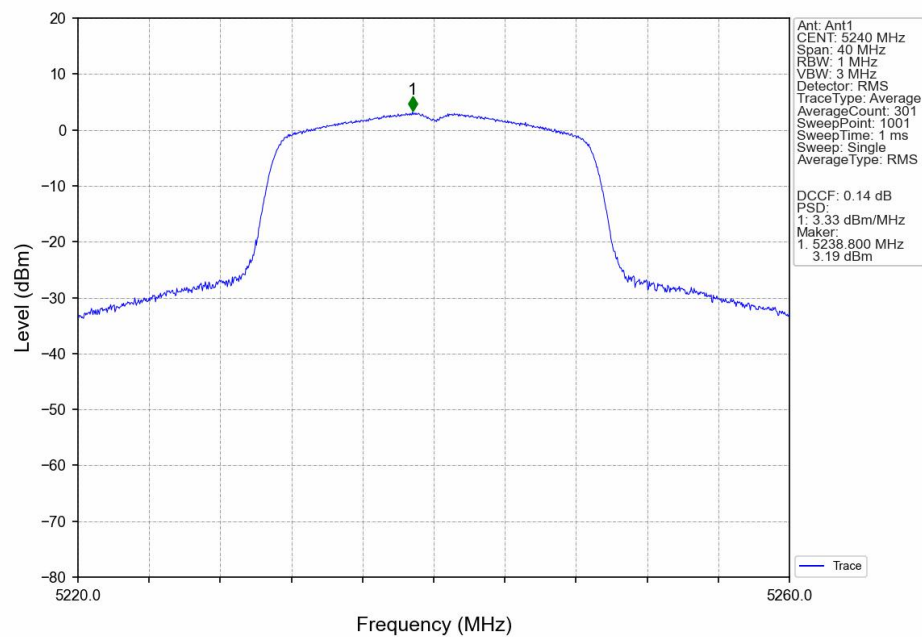


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802.11n(HT20)\_MCH\_5200MHz\_Ant1\_NTNV

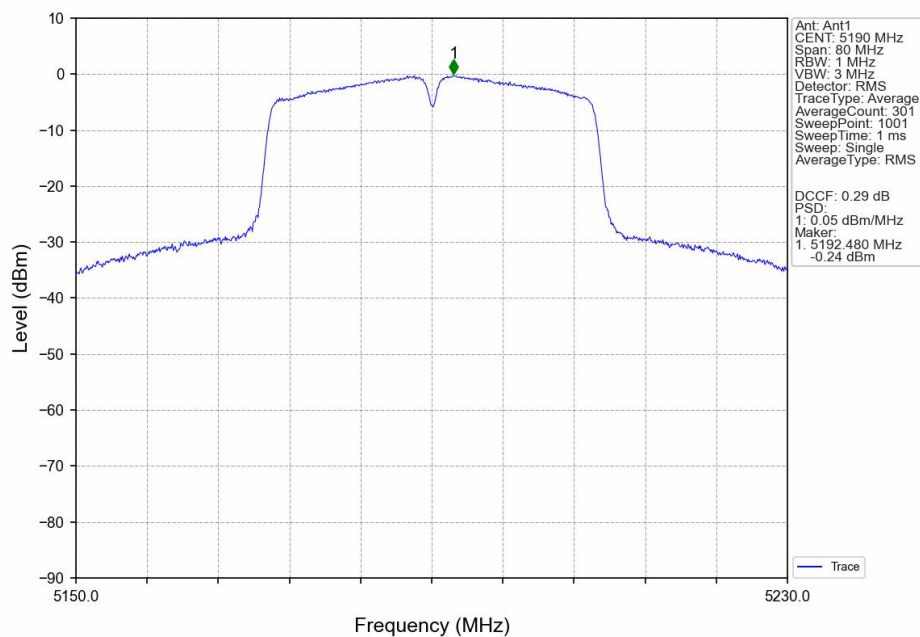


802.11n(HT20)\_HCH\_5240MHz\_Ant1\_NTNV

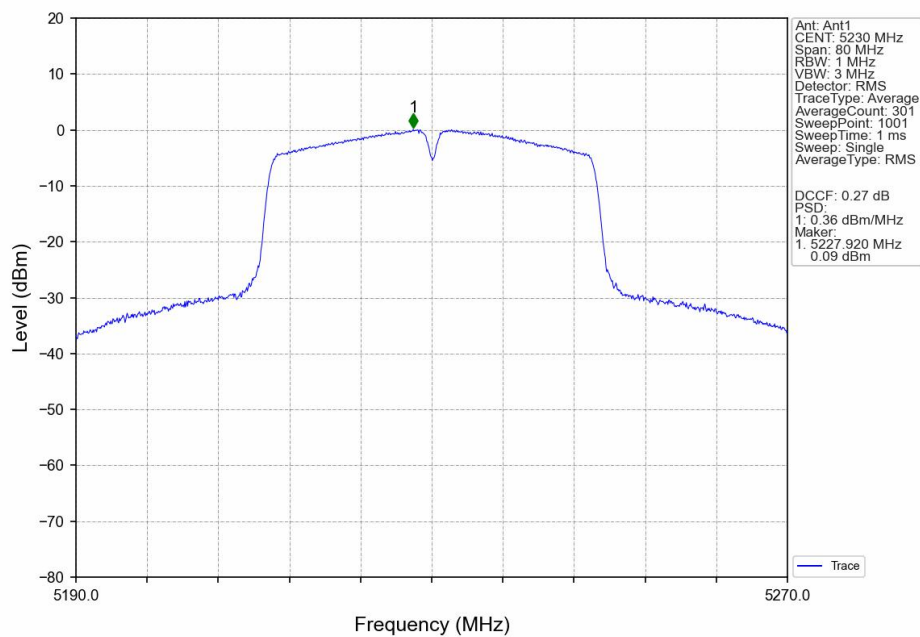


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802.11n(HT40)\_LCH\_5190MHz\_Ant1\_NTNV

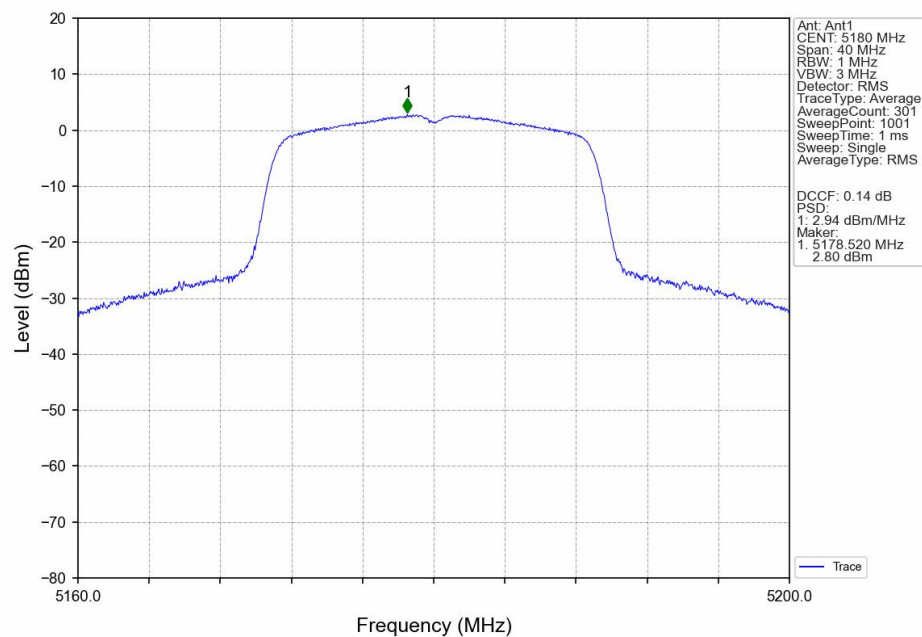


802.11n(HT40)\_HCH\_5230MHz\_Ant1\_NTNV

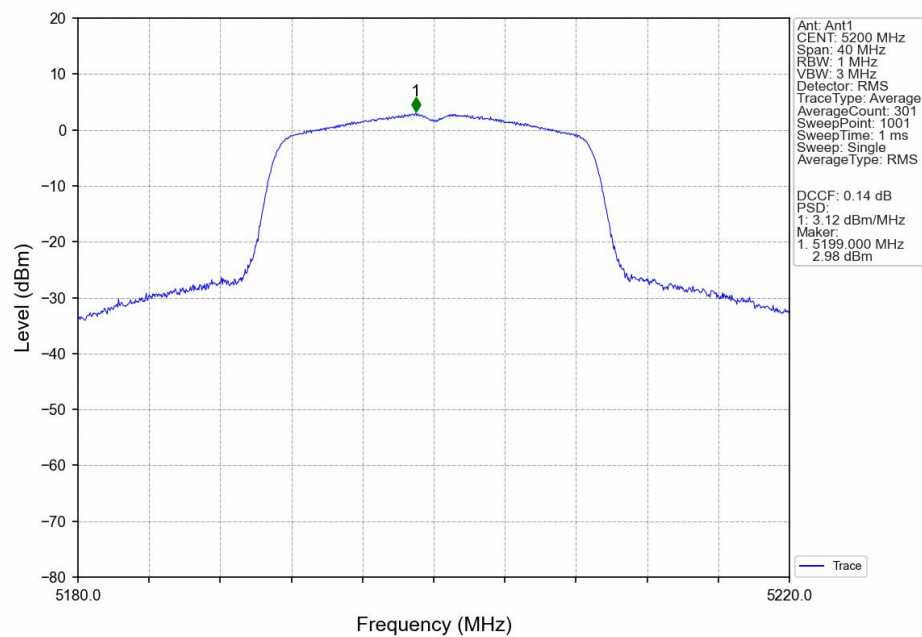


FCCID: 2AUARVENU701

802.11ac(VHT20)\_LCH\_5180MHz\_Ant1\_NTNV

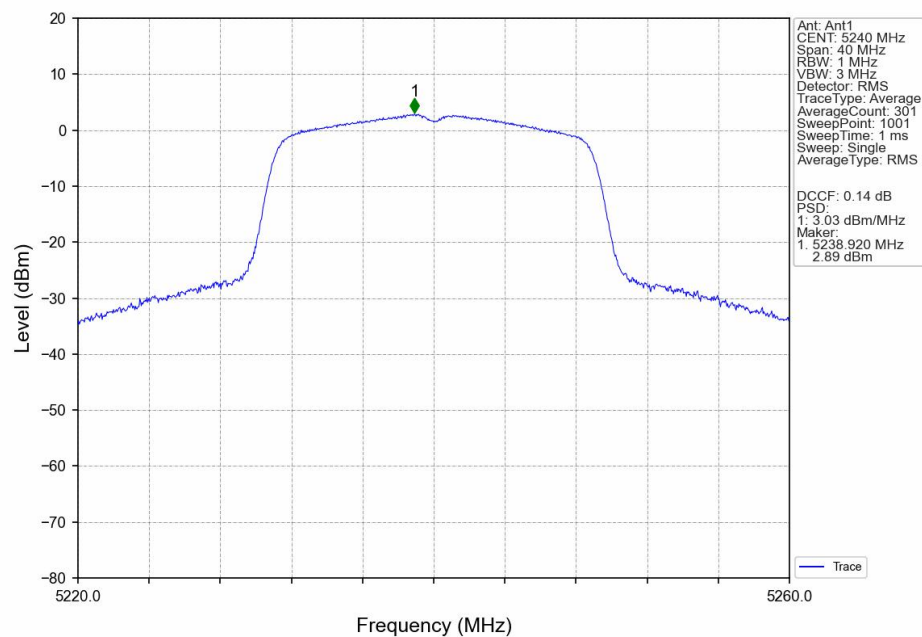


802.11ac(VHT20)\_MCH\_5200MHz\_Ant1\_NTNV

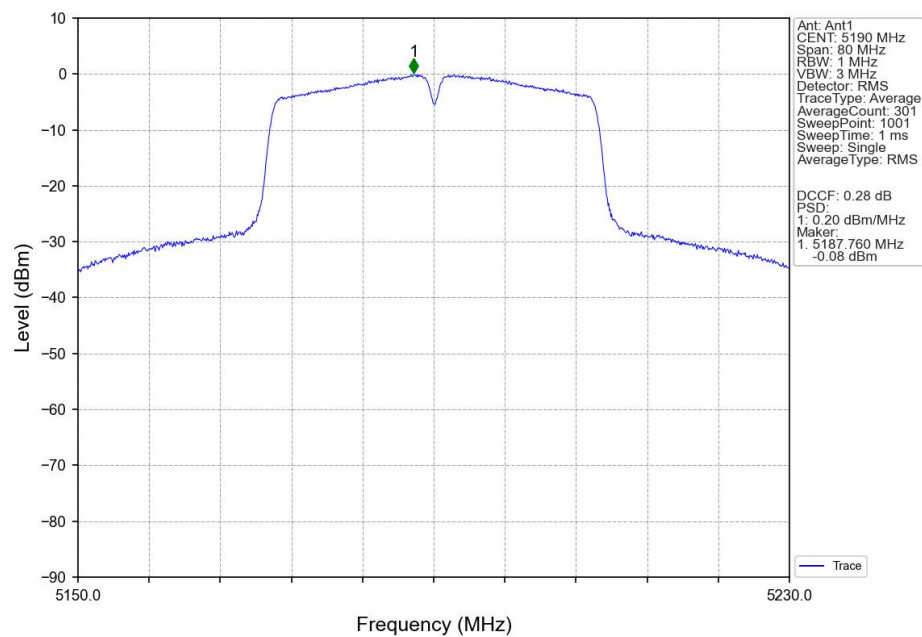


FCCID: 2AUARVENU701

802.11ac(VHT20)\_HCH\_5240MHz\_Ant1\_NTNV

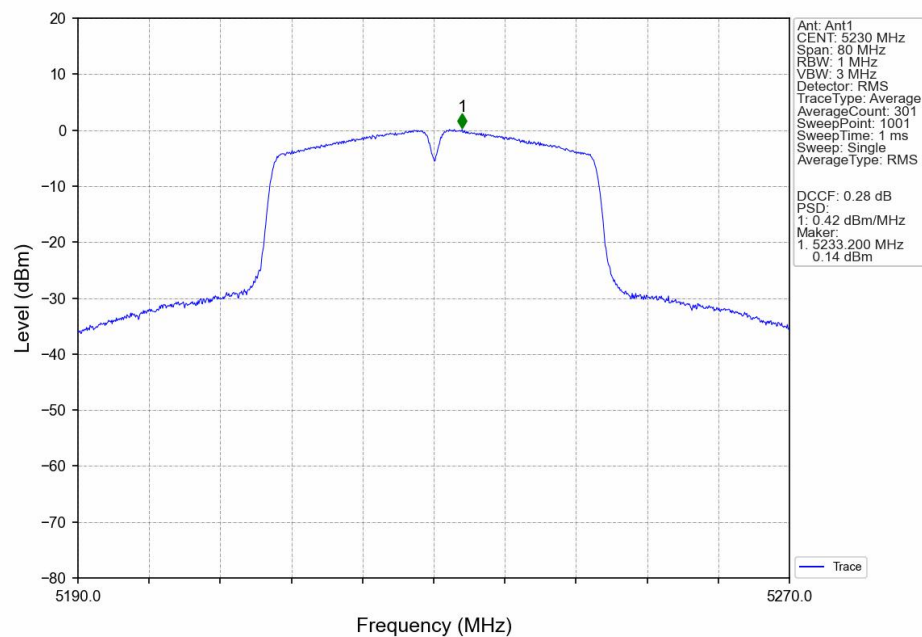


802.11ac(VHT40)\_LCH\_5190MHz\_Ant1\_NTNV

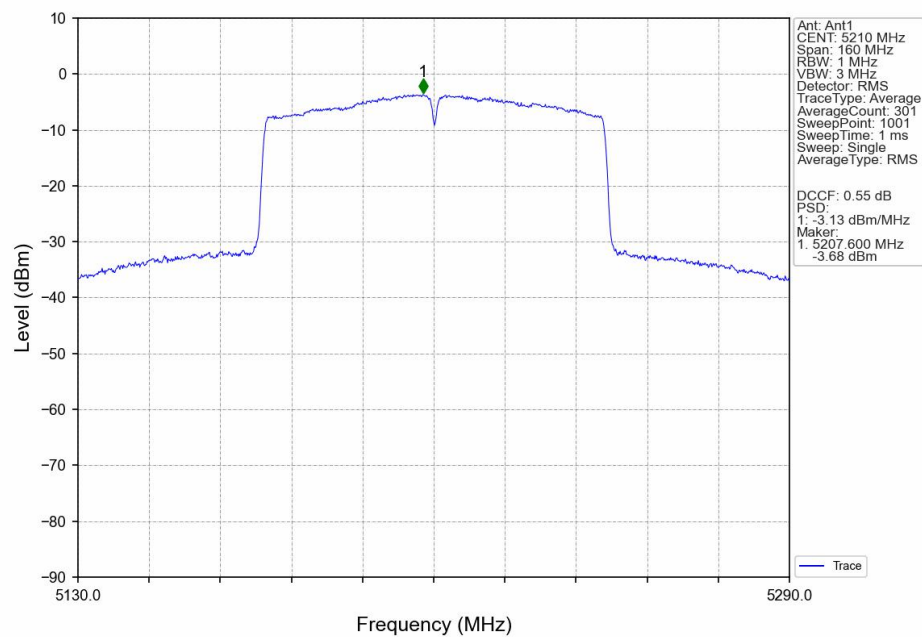


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802.11ac(VHT40)\_HCH\_5230MHz\_Ant1\_NTNV



802.11ac(VHT80)\_MCH\_5210MHz\_Ant1\_NTNV



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## 5. Frequency Stability

### 5.1 Test Result

#### 5.1.1 Ant1

| Ant1         |         |                 |                  |               |                          |              |         |
|--------------|---------|-----------------|------------------|---------------|--------------------------|--------------|---------|
| Mode         | TX Type | Frequency (MHz) | Temperature (°C) | Voltage (VAC) | Measured Frequency (MHz) | Limit (MHz)  | Verdict |
| Carrier Wave | SISO    | 5180            | 20               | 102           | 5179.999                 | 5150 to 5250 | Pass    |
|              |         |                 |                  | 120           | 5179.999                 | 5150 to 5250 | Pass    |
|              |         |                 |                  | 138           | 5179.999                 | 5150 to 5250 | Pass    |
|              |         |                 | -30              | 120           | 5179.999                 | 5150 to 5250 | Pass    |
|              |         |                 | -20              | 120           | 5179.999                 | 5150 to 5250 | Pass    |
|              |         |                 | -10              | 120           | 5179.999                 | 5150 to 5250 | Pass    |
|              |         |                 | 0                | 120           | 5179.999                 | 5150 to 5250 | Pass    |
|              |         |                 | 10               | 120           | 5179.999                 | 5150 to 5250 | Pass    |
|              |         |                 | 30               | 120           | 5179.999                 | 5150 to 5250 | Pass    |
|              |         |                 | 40               | 120           | 5179.998                 | 5150 to 5250 | Pass    |
|              |         |                 | 50               | 120           | 5179.999                 | 5150 to 5250 | Pass    |
|              |         | 5200            | 20               | 102           | 5199.999                 | 5150 to 5250 | Pass    |
|              |         |                 |                  | 120           | 5199.999                 | 5150 to 5250 | Pass    |
|              |         |                 |                  | 138           | 5199.999                 | 5150 to 5250 | Pass    |
|              |         |                 | -30              | 120           | 5199.999                 | 5150 to 5250 | Pass    |
|              |         |                 | -20              | 120           | 5199.999                 | 5150 to 5250 | Pass    |
|              |         |                 | -10              | 120           | 5199.999                 | 5150 to 5250 | Pass    |

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|  |  |      |     |     |          |              |      |
|--|--|------|-----|-----|----------|--------------|------|
|  |  |      | 0   | 120 | 5199.999 | 5150 to 5250 | Pass |
|  |  |      | 10  | 120 | 5199.999 | 5150 to 5250 | Pass |
|  |  |      | 30  | 120 | 5199.999 | 5150 to 5250 | Pass |
|  |  |      | 40  | 120 | 5199.999 | 5150 to 5250 | Pass |
|  |  |      | 50  | 120 | 5199.999 | 5150 to 5250 | Pass |
|  |  | 5240 | 20  | 102 | 5239.999 | 5150 to 5250 | Pass |
|  |  |      |     | 120 | 5239.999 | 5150 to 5250 | Pass |
|  |  |      |     | 138 | 5239.999 | 5150 to 5250 | Pass |
|  |  |      | -30 | 120 | 5239.999 | 5150 to 5250 | Pass |
|  |  |      | -20 | 120 | 5239.999 | 5150 to 5250 | Pass |
|  |  |      | -10 | 120 | 5239.999 | 5150 to 5250 | Pass |
|  |  |      | 0   | 120 | 5239.999 | 5150 to 5250 | Pass |
|  |  |      | 10  | 120 | 5239.999 | 5150 to 5250 | Pass |
|  |  |      | 30  | 120 | 5239.999 | 5150 to 5250 | Pass |
|  |  |      | 40  | 120 | 5239.999 | 5150 to 5250 | Pass |
|  |  |      | 50  | 120 | 5239.999 | 5150 to 5250 | Pass |
|  |  | 5190 | 20  | 102 | 5189.999 | 5150 to 5250 | Pass |
|  |  |      |     | 120 | 5189.999 | 5150 to 5250 | Pass |
|  |  |      |     | 138 | 5189.999 | 5150 to 5250 | Pass |
|  |  |      | -30 | 120 | 5189.999 | 5150 to 5250 | Pass |
|  |  |      | -20 | 120 | 5189.999 | 5150 to 5250 | Pass |
|  |  |      | -10 | 120 | 5189.999 | 5150 to 5250 | Pass |
|  |  |      | 0   | 120 | 5189.999 | 5150 to 5250 | Pass |
|  |  |      | 10  | 120 | 5189.999 | 5150 to 5250 | Pass |
|  |  |      | 30  | 120 | 5189.999 | 5150 to 5250 | Pass |

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|  |  |      |     |     |          |              |      |
|--|--|------|-----|-----|----------|--------------|------|
|  |  |      | 40  | 120 | 5189.999 | 5150 to 5250 | Pass |
|  |  |      | 50  | 120 | 5189.999 | 5150 to 5250 | Pass |
|  |  | 5230 | 20  | 102 | 5229.999 | 5150 to 5250 | Pass |
|  |  |      |     | 120 | 5229.999 | 5150 to 5250 | Pass |
|  |  |      |     | 138 | 5229.999 | 5150 to 5250 | Pass |
|  |  |      | -30 | 120 | 5229.999 | 5150 to 5250 | Pass |
|  |  |      | -20 | 120 | 5229.999 | 5150 to 5250 | Pass |
|  |  |      | -10 | 120 | 5229.999 | 5150 to 5250 | Pass |
|  |  |      | 0   | 120 | 5229.999 | 5150 to 5250 | Pass |
|  |  |      | 10  | 120 | 5229.999 | 5150 to 5250 | Pass |
|  |  |      | 30  | 120 | 5229.999 | 5150 to 5250 | Pass |
|  |  |      | 40  | 120 | 5229.999 | 5150 to 5250 | Pass |
|  |  |      | 50  | 120 | 5229.999 | 5150 to 5250 | Pass |
|  |  | 5210 | 20  | 102 | 5209.999 | 5150 to 5250 | Pass |
|  |  |      |     | 120 | 5209.999 | 5150 to 5250 | Pass |
|  |  |      |     | 138 | 5209.999 | 5150 to 5250 | Pass |
|  |  |      | -30 | 120 | 5209.999 | 5150 to 5250 | Pass |
|  |  |      | -20 | 120 | 5209.999 | 5150 to 5250 | Pass |
|  |  |      | -10 | 120 | 5209.999 | 5150 to 5250 | Pass |
|  |  |      | 0   | 120 | 5209.999 | 5150 to 5250 | Pass |
|  |  |      | 10  | 120 | 5209.999 | 5150 to 5250 | Pass |
|  |  |      | 30  | 120 | 5209.999 | 5150 to 5250 | Pass |
|  |  |      | 40  | 120 | 5209.999 | 5150 to 5250 | Pass |
|  |  |      | 50  | 120 | 5209.999 | 5150 to 5250 | Pass |