

## Appendix A for SHEM210800989701

## 1. Duty Cycle

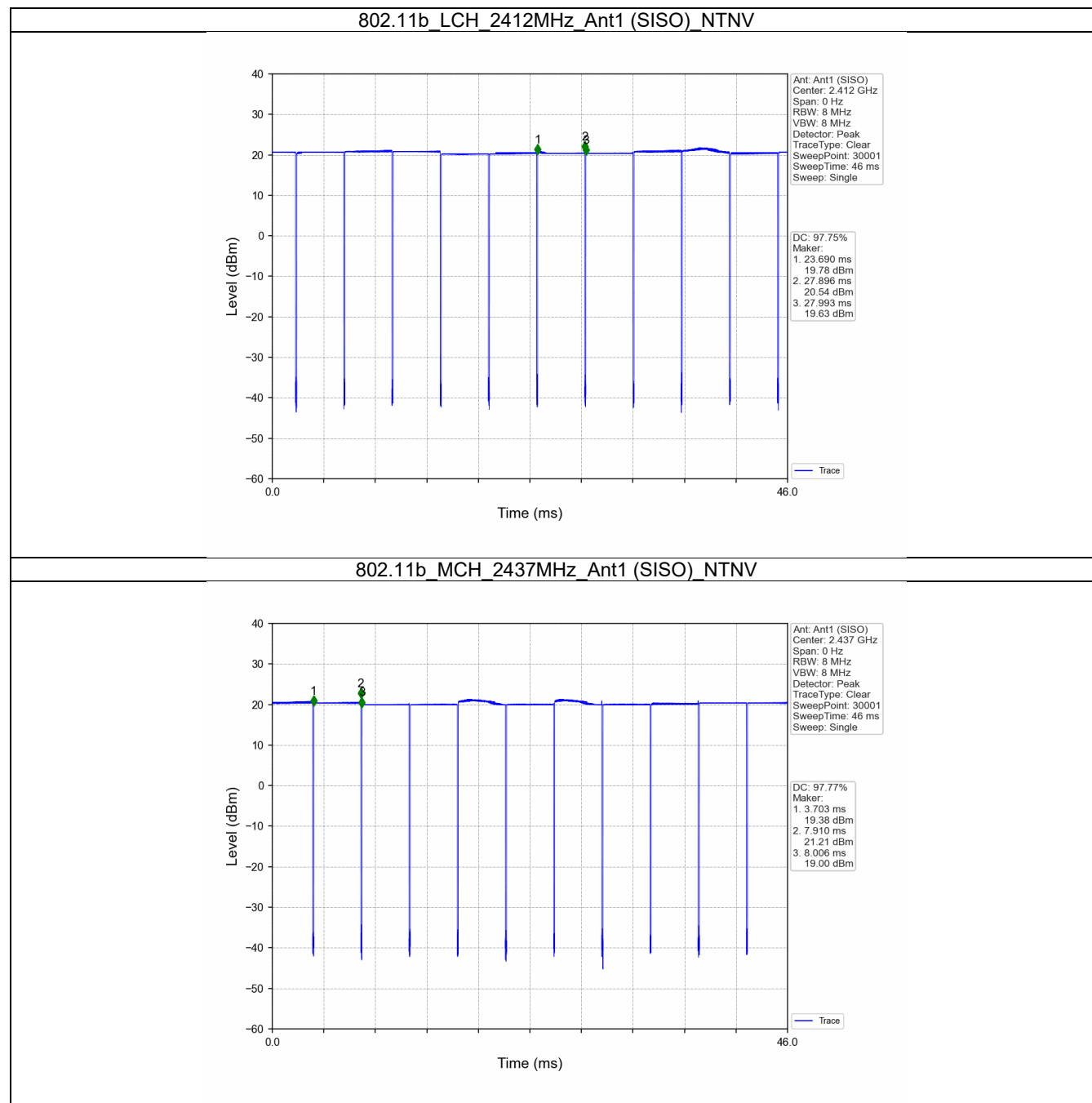
## 1.1 Ant1

## 1.1.1 Test Result

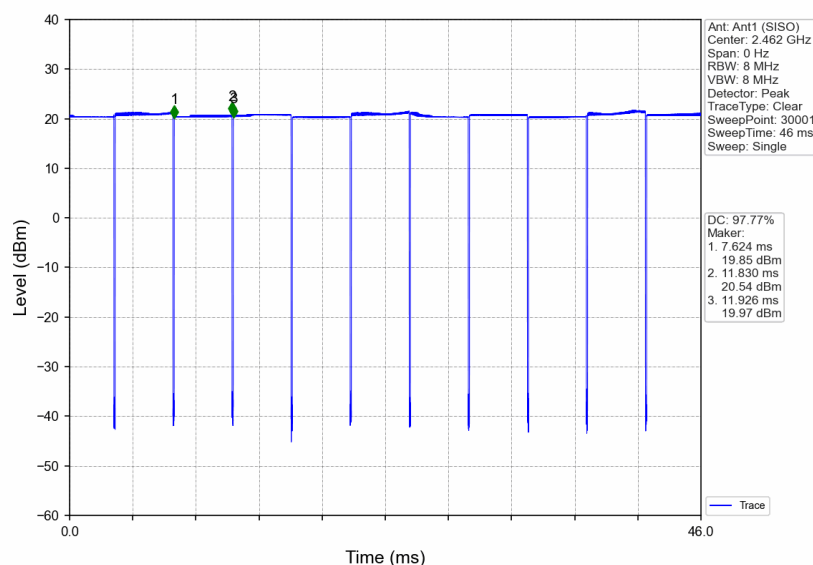
| Ant1           |         |                 |                      |             |                |                                   |                       |
|----------------|---------|-----------------|----------------------|-------------|----------------|-----------------------------------|-----------------------|
| Mode           | TX Type | Frequency (MHz) | T <sub>on</sub> (ms) | Period (ms) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | Max. DC Variation (%) |
| 802.11b        | SISO    | 2412            | 4.206                | 4.303       | 97.75          | 0.10                              | 0.07                  |
|                |         | 2437            | 4.207                | 4.303       | 97.77          | 0.10                              | 0.00                  |
|                |         | 2462            | 4.206                | 4.302       | 97.77          | 0.10                              | 0.04                  |
| 802.11g        | SISO    | 2412            | 0.707                | 0.807       | 87.61          | 0.57                              | 0.03                  |
|                |         | 2437            | 0.707                | 0.807       | 87.61          | 0.57                              | 0.03                  |
|                |         | 2462            | 0.708                | 0.808       | 87.62          | 0.57                              | 0.03                  |
| 802.11n (HT20) | MIMO    | 2412            | 1.307                | 1.408       | 92.83          | 0.32                              | 0.03                  |
|                |         | 2437            | 1.307                | 1.407       | 92.89          | 0.32                              | 0.03                  |
|                |         | 2462            | 1.308                | 1.408       | 92.90          | 0.32                              | 0.03                  |



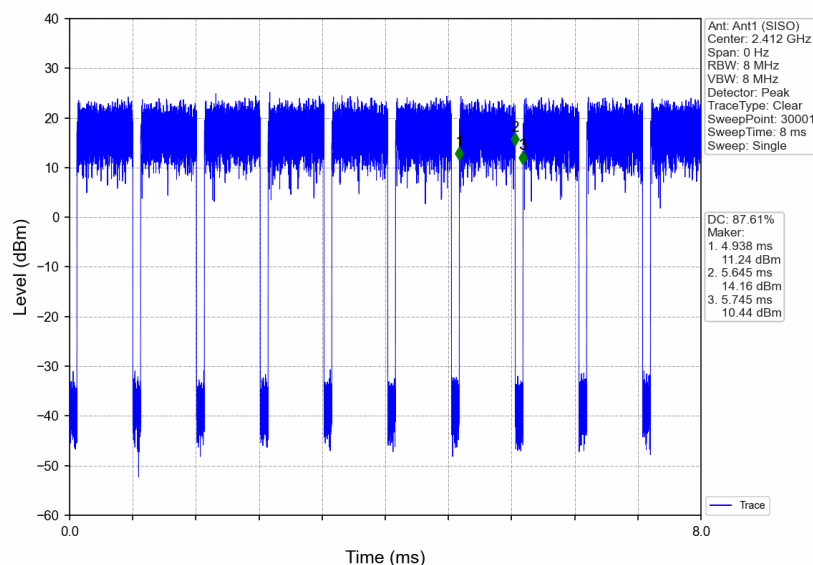
## 1.1.2 Test Graph



802.11b\_HCH\_2462MHz\_Ant1 (SISO)\_NTNV



802.11g\_LCH\_2412MHz\_Ant1 (SISO)\_NTNV



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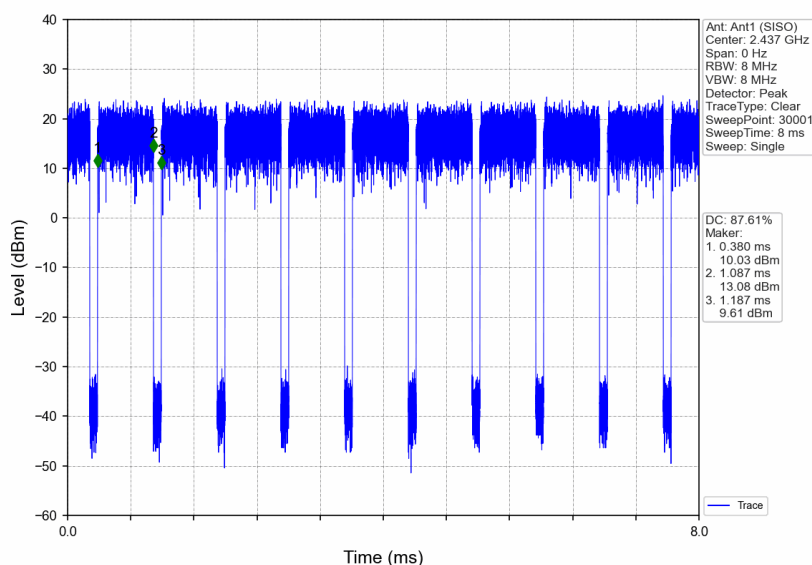
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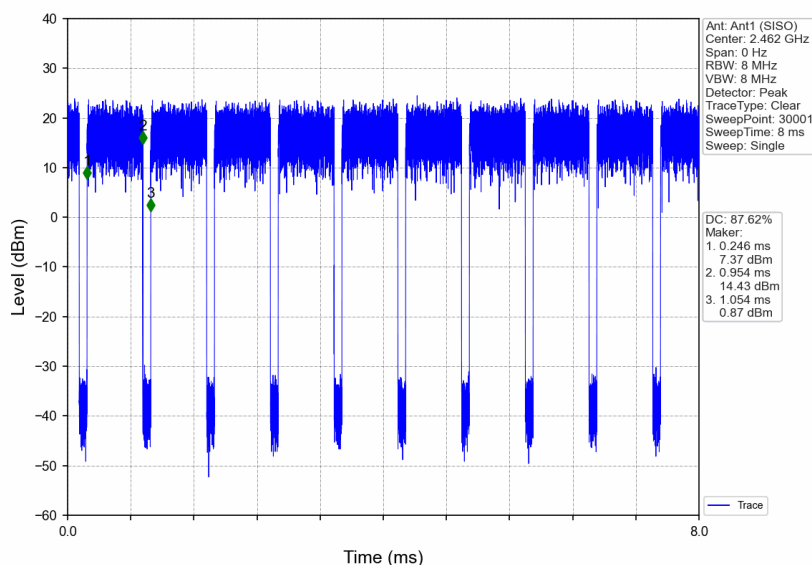
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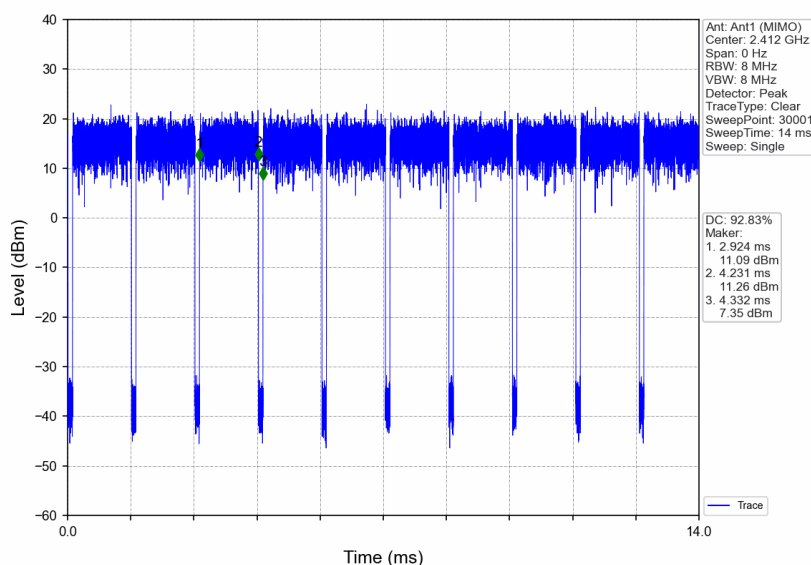
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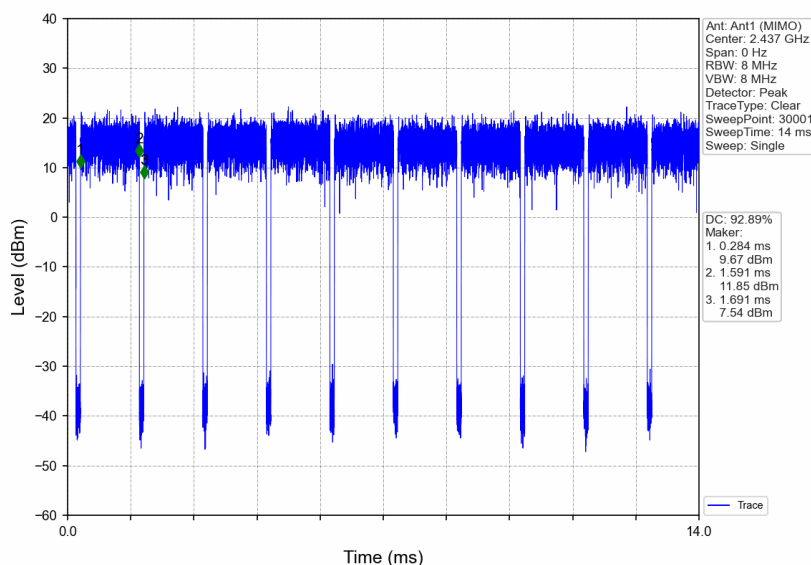
802.11g\_HCH\_2462MHz\_Ant1 (SISO)\_NTNV

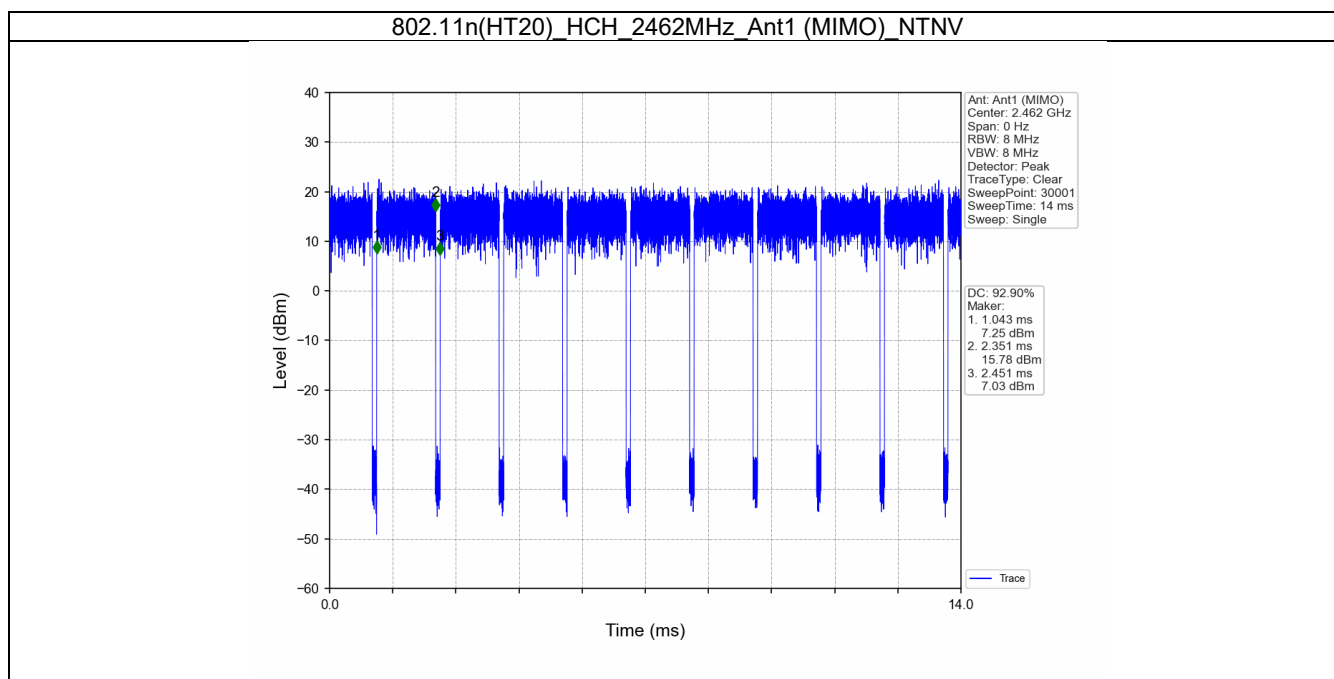


802.11n(HT20)\_LCH\_2412MHz\_Ant1 (MIMO)\_NTNV



802.11n(HT20)\_MCH\_2437MHz\_Ant1 (MIMO)\_NTNV





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## 2. Bandwidth

### 2.1 OBW

#### 2.1.1 Test Result

| Mode           | TX Type | Frequency (MHz) | Ant | 99% Occupied Bandwidth (MHz) | Verdict |
|----------------|---------|-----------------|-----|------------------------------|---------|
|                |         |                 |     | Result                       |         |
| 802.11b        | SISO    | 2412            | 1   | 12.350                       | Pass    |
|                |         |                 | 2   | 11.283                       | Pass    |
|                |         | 2437            | 1   | 12.308                       | Pass    |
|                |         |                 | 2   | 11.274                       | Pass    |
|                |         | 2462            | 1   | 12.315                       | Pass    |
|                |         |                 | 2   | 11.308                       | Pass    |
| 802.11g        | SISO    | 2412            | 1   | 17.790                       | Pass    |
|                |         |                 | 2   | 17.812                       | Pass    |
|                |         | 2437            | 1   | 17.845                       | Pass    |
|                |         |                 | 2   | 17.780                       | Pass    |
|                |         | 2462            | 1   | 17.819                       | Pass    |
|                |         |                 | 2   | 17.791                       | Pass    |
| 802.11n (HT20) | MIMO    | 2412            | 1   | 18.917                       | Pass    |
|                |         |                 | 2   | 18.884                       | Pass    |
|                |         | 2437            | 1   | 18.930                       | Pass    |
|                |         |                 | 2   | 18.927                       | Pass    |
|                |         | 2462            | 1   | 18.962                       | Pass    |
|                |         |                 | 2   | 18.920                       | Pass    |



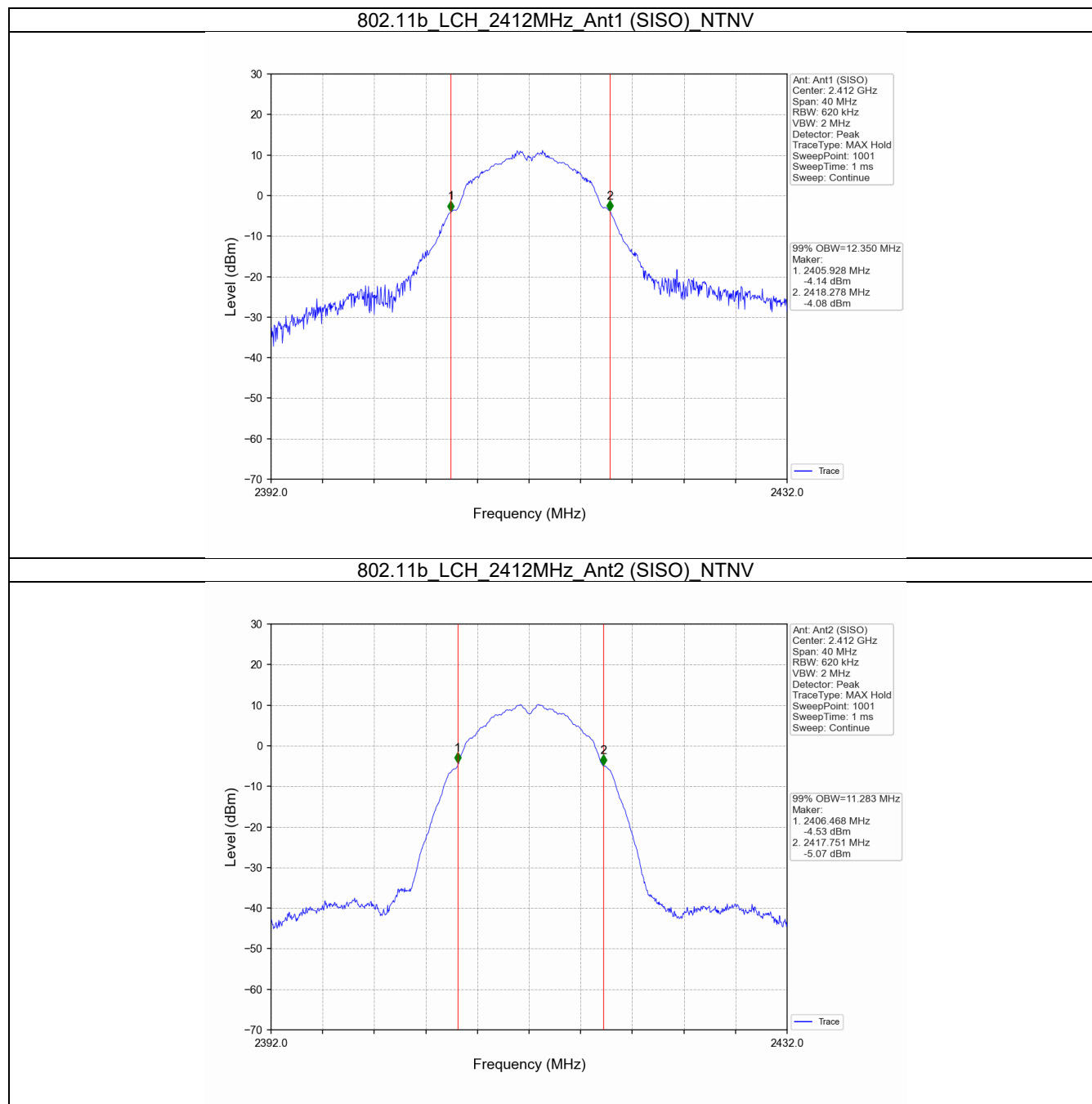
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## 2.1.2 Test Graph



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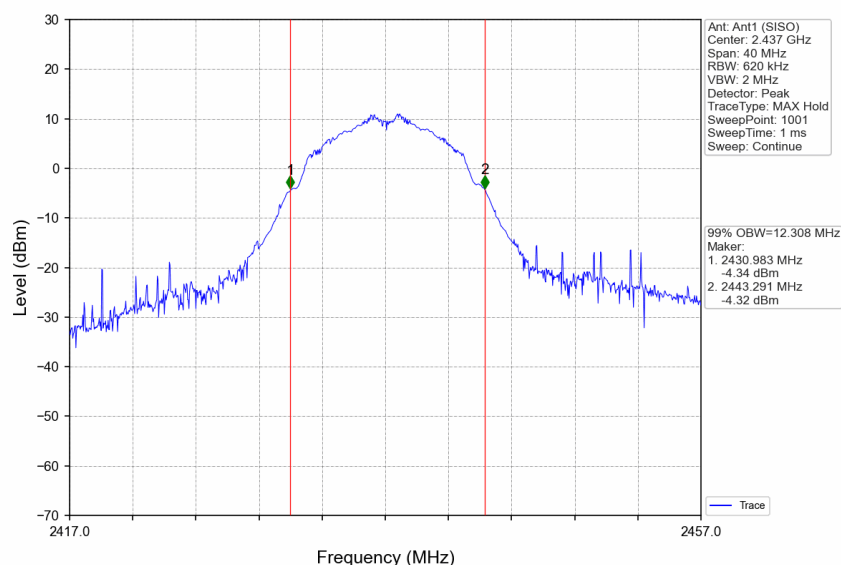
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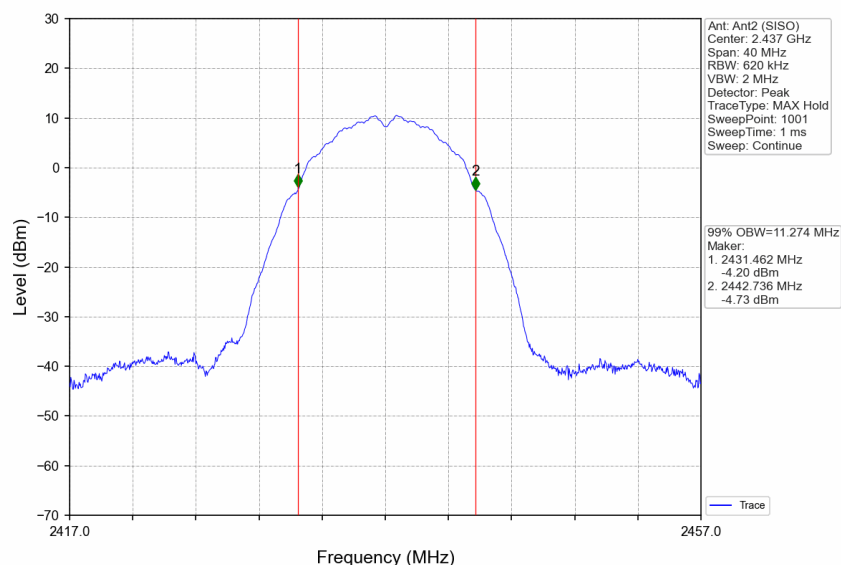


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802.11b\_MCH\_2437MHz\_Ant1 (SISO)\_NTNV



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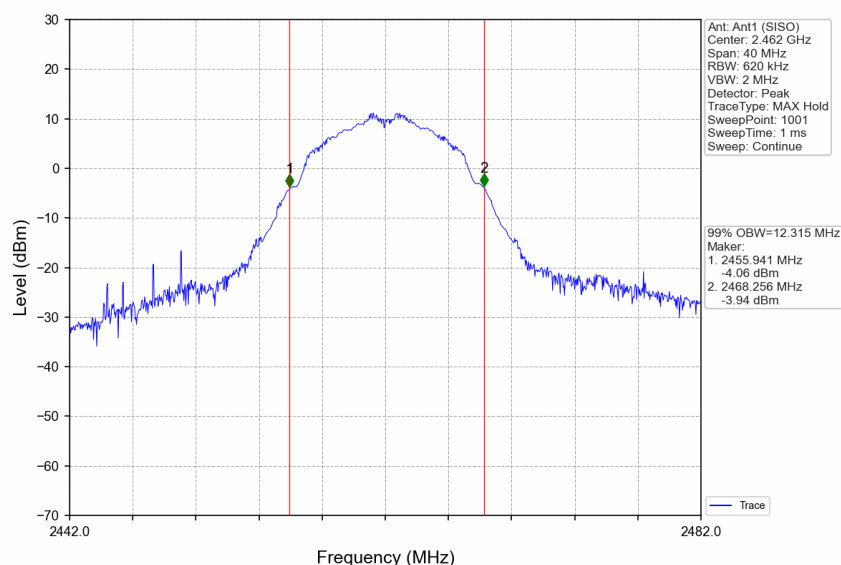
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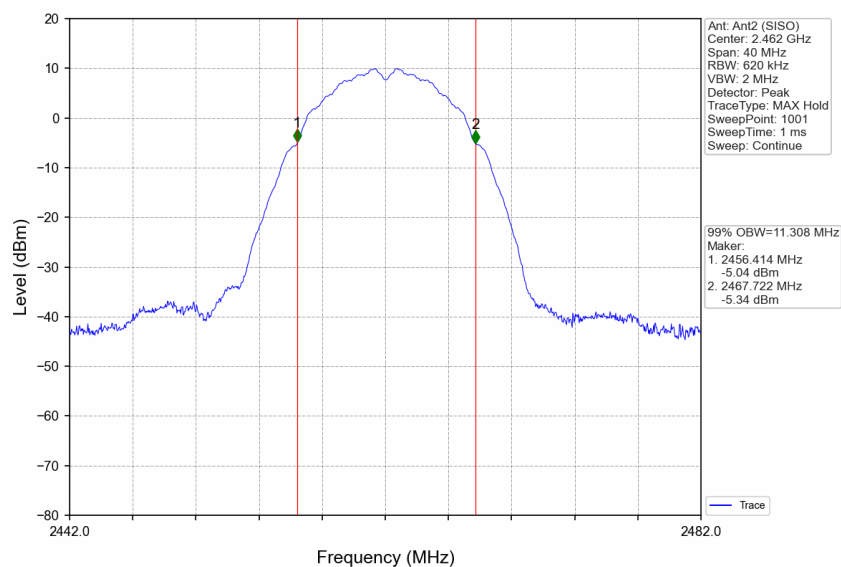
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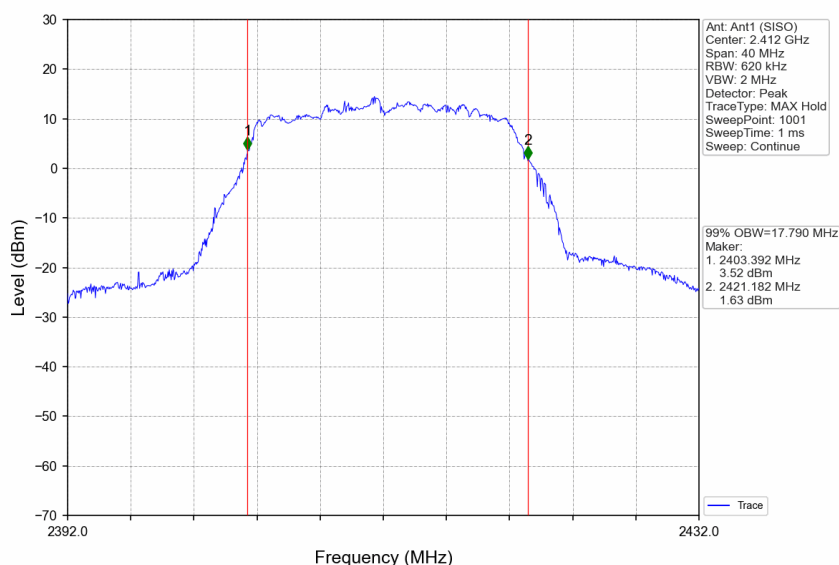
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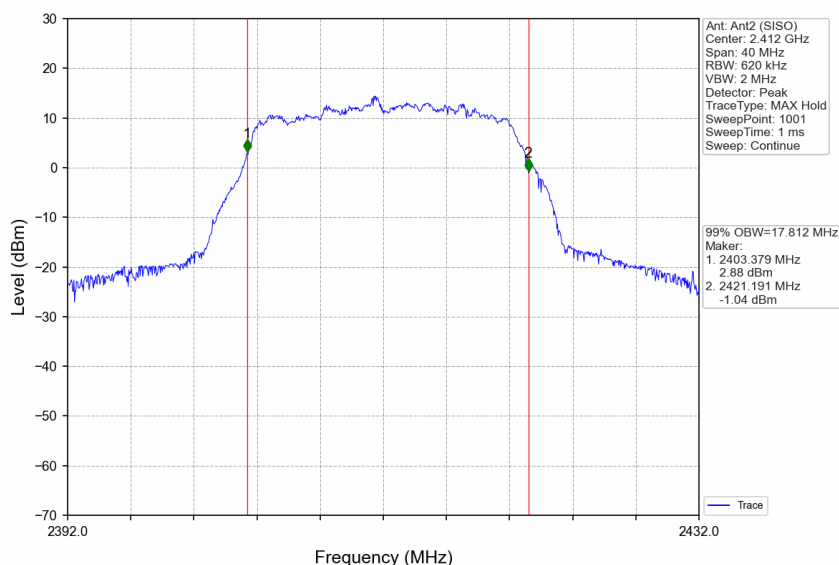
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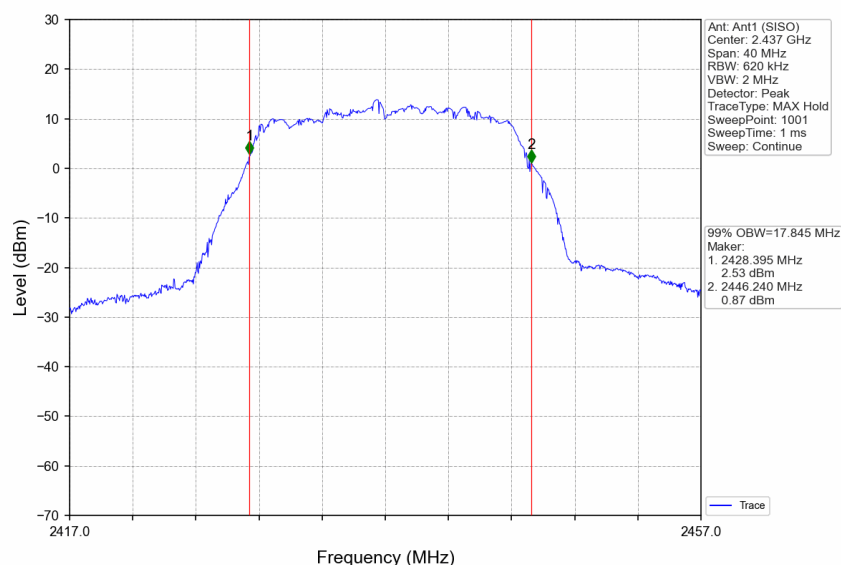
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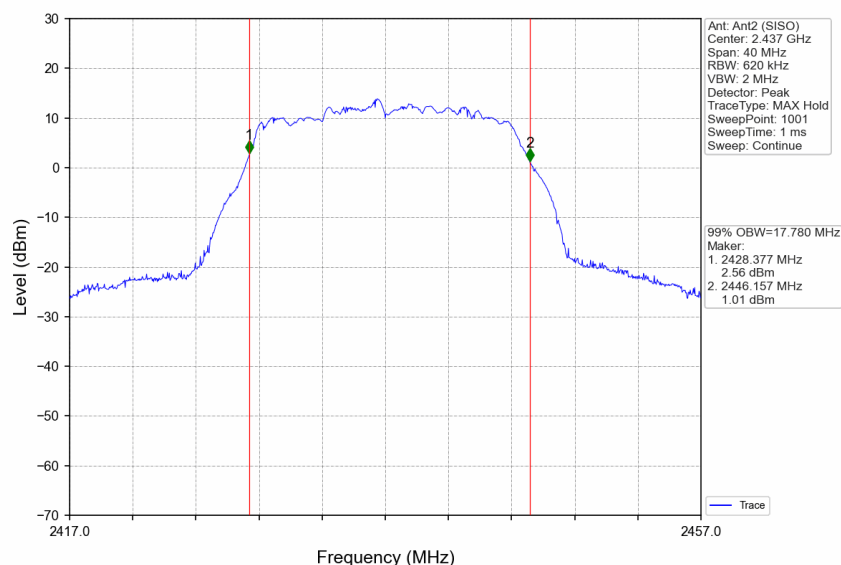
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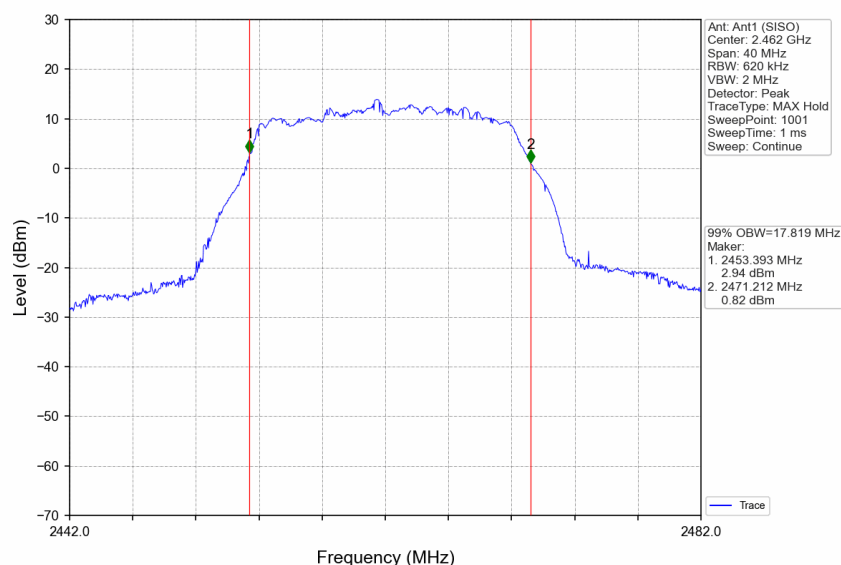
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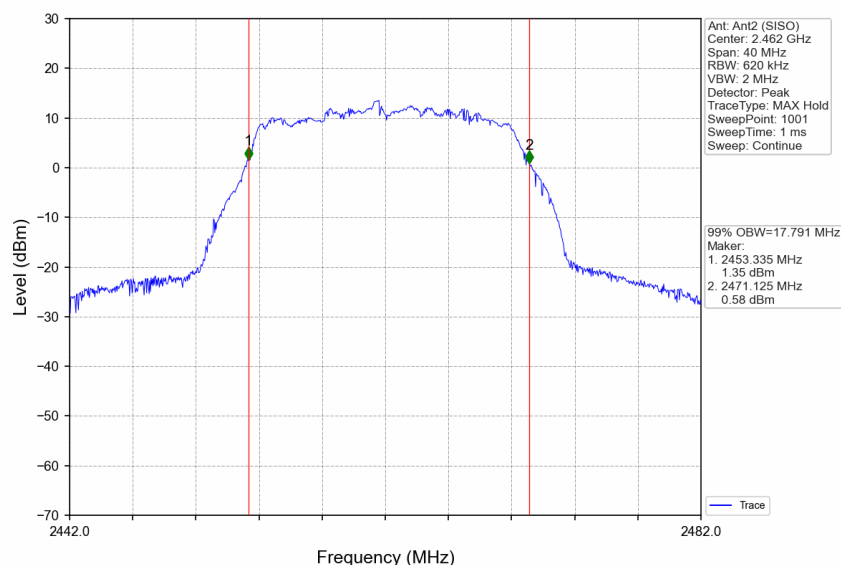
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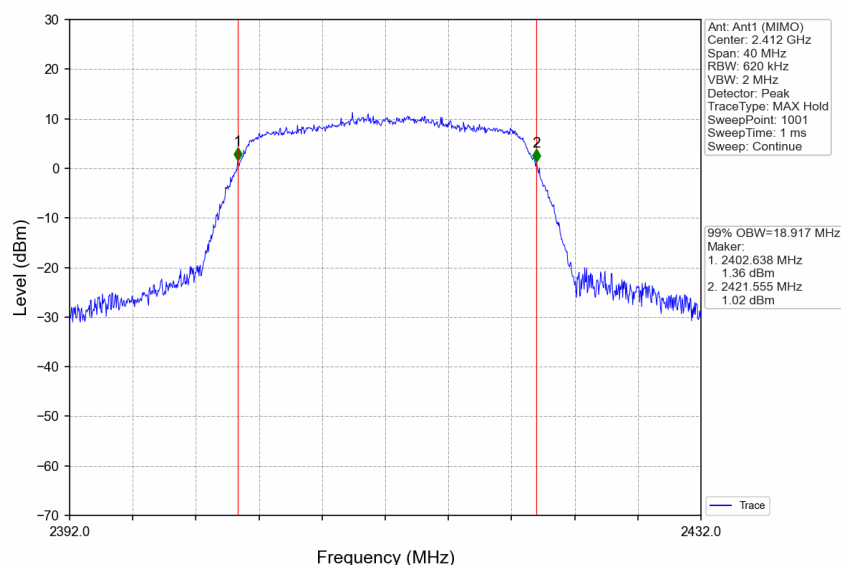
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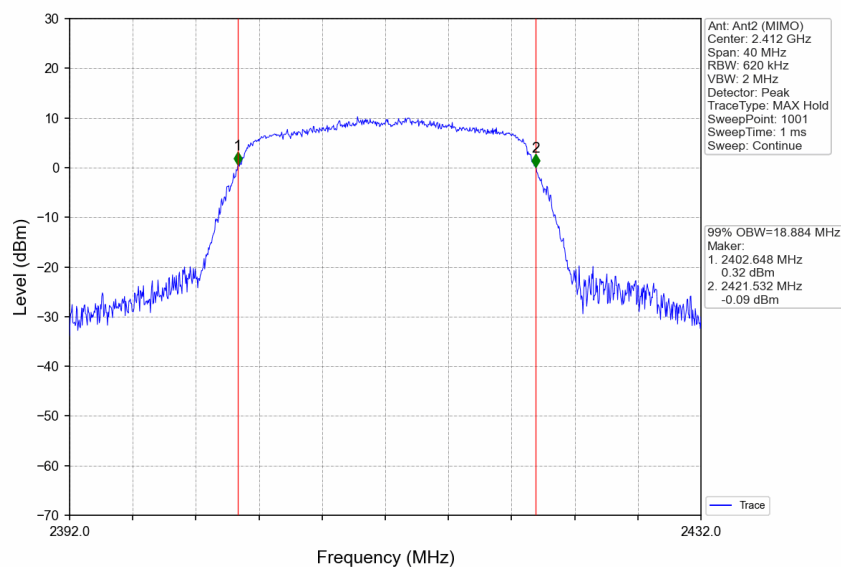
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802.11n(HT20)\_LCH\_2412MHz\_Ant2 (MIMO)\_NTNV



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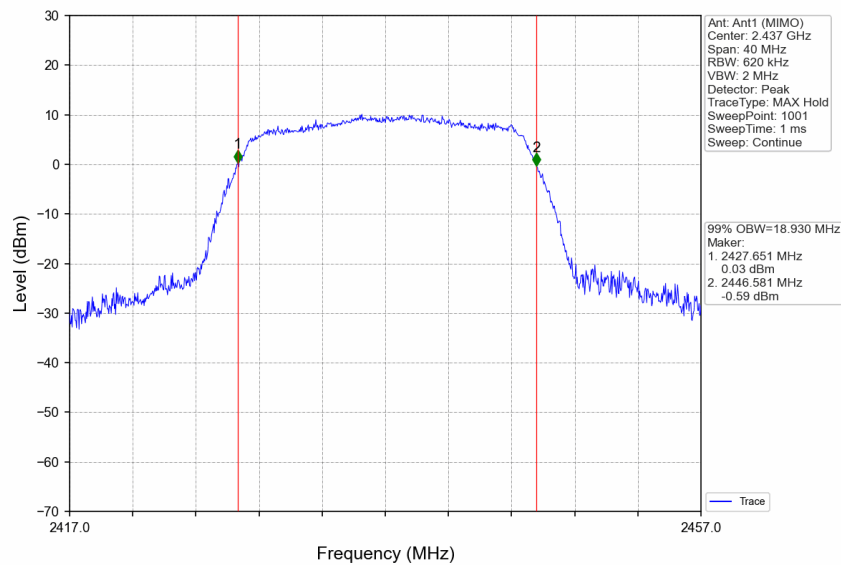
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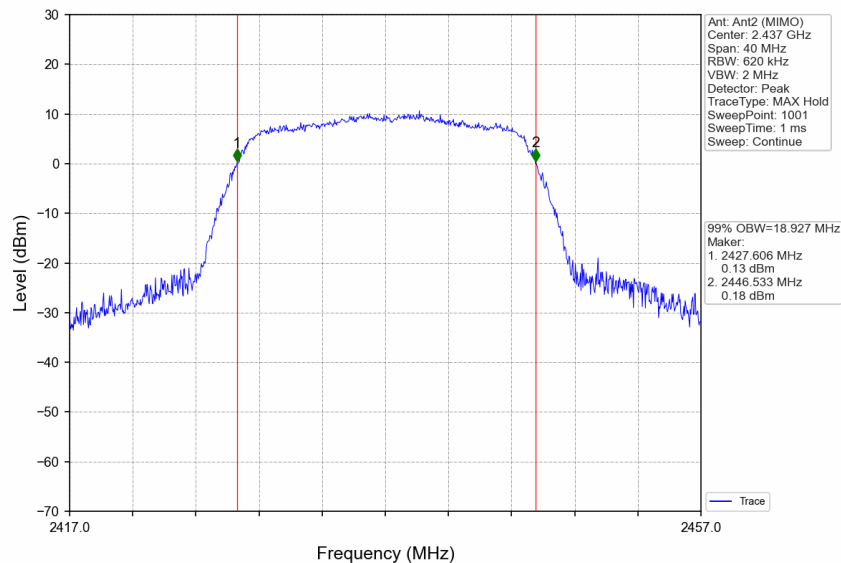
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802.11n(HT20)\_MCH\_2437MHz\_Ant1 (MIMO)\_NTNV



802.11n(HT20)\_MCH\_2437MHz\_Ant2 (MIMO)\_NTNV



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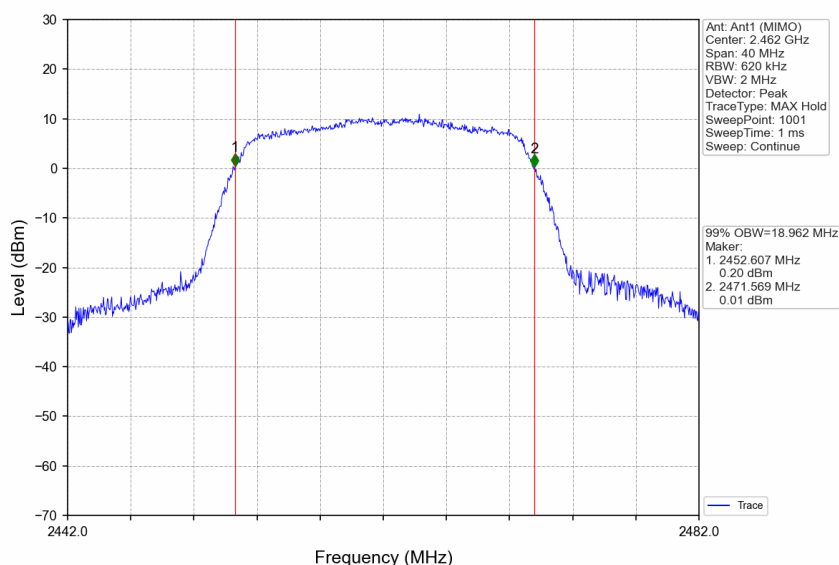
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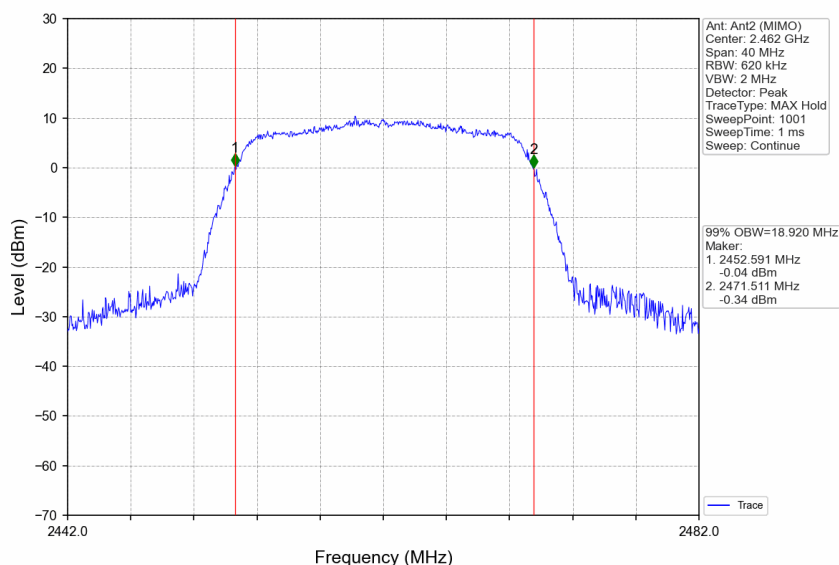
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802.11n(HT20)\_HCH\_2462MHz\_Ant1 (MIMO)\_NTNV



802.11n(HT20)\_HCH\_2462MHz\_Ant2 (MIMO)\_NTNV



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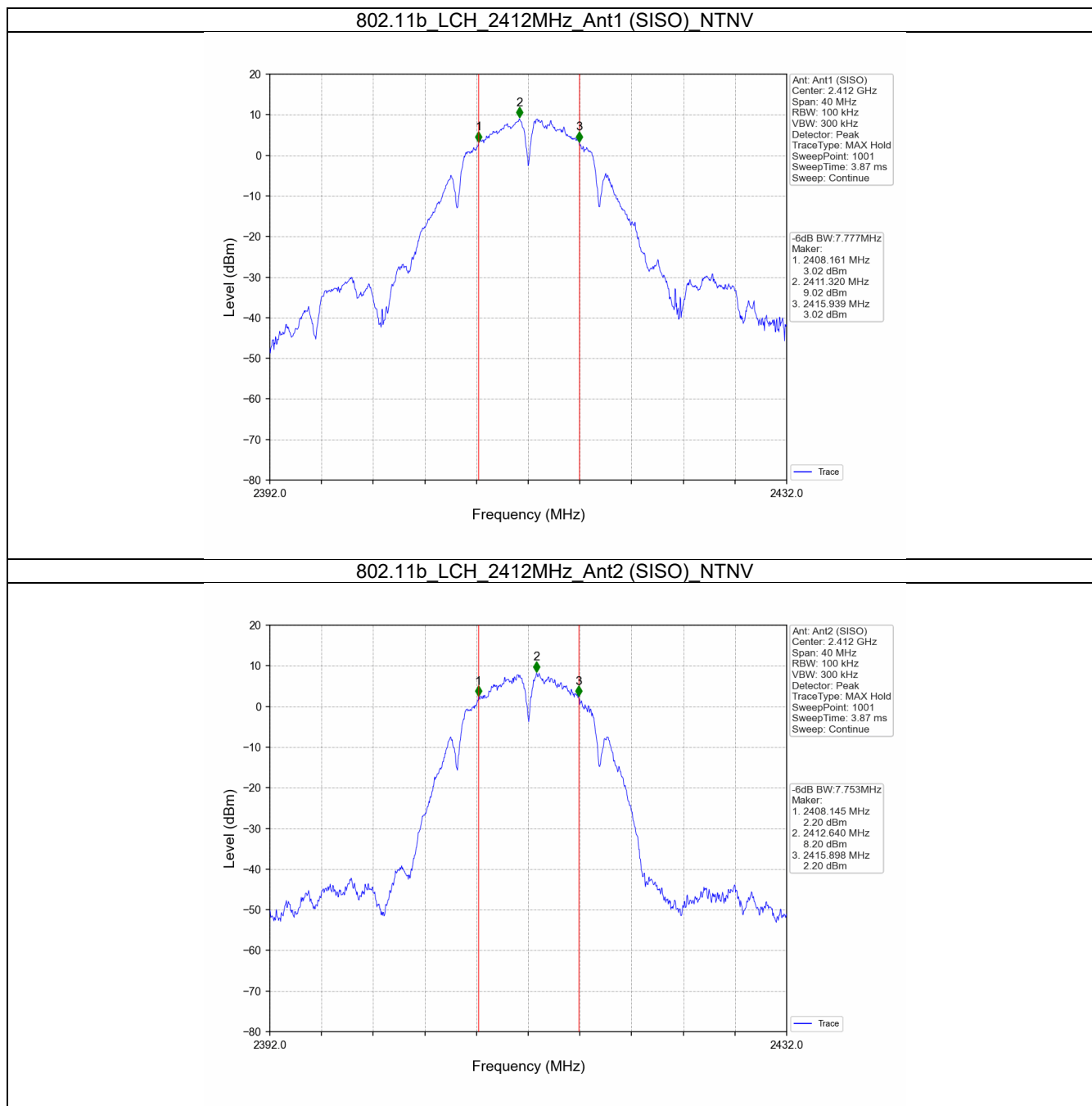
## 2.2 6dB BW

### 2.2.1 Test Result

| Mode           | TX Type | Frequency (MHz) | Ant | 6dB Bandwidth (MHz) |            | Verdict |
|----------------|---------|-----------------|-----|---------------------|------------|---------|
|                |         |                 |     | Result              | Limit      |         |
| 802.11b        | SISO    | 2412            | 1   | 7.777               | $\geq 0.5$ | Pass    |
|                |         |                 | 2   | 7.753               | $\geq 0.5$ | Pass    |
|                |         | 2437            | 1   | 8.000               | $\geq 0.5$ | Pass    |
|                |         |                 | 2   | 7.776               | $\geq 0.5$ | Pass    |
|                |         | 2462            | 1   | 7.907               | $\geq 0.5$ | Pass    |
|                |         |                 | 2   | 7.458               | $\geq 0.5$ | Pass    |
| 802.11g        | SISO    | 2412            | 1   | 16.443              | $\geq 0.5$ | Pass    |
|                |         |                 | 2   | 16.423              | $\geq 0.5$ | Pass    |
|                |         | 2437            | 1   | 16.442              | $\geq 0.5$ | Pass    |
|                |         |                 | 2   | 16.449              | $\geq 0.5$ | Pass    |
|                |         | 2462            | 1   | 16.455              | $\geq 0.5$ | Pass    |
|                |         |                 | 2   | 16.451              | $\geq 0.5$ | Pass    |
| 802.11n (HT20) | MIMO    | 2412            | 1   | 17.610              | $\geq 0.5$ | Pass    |
|                |         |                 | 2   | 17.623              | $\geq 0.5$ | Pass    |
|                |         | 2437            | 1   | 17.607              | $\geq 0.5$ | Pass    |
|                |         |                 | 2   | 17.614              | $\geq 0.5$ | Pass    |
|                |         | 2462            | 1   | 17.609              | $\geq 0.5$ | Pass    |
|                |         |                 | 2   | 17.616              | $\geq 0.5$ | Pass    |



## 2.2.2 Test Graph



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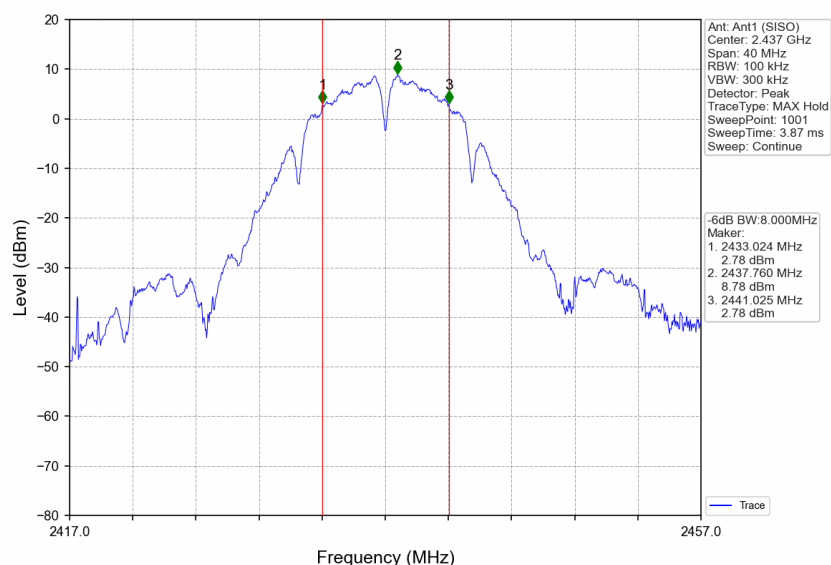
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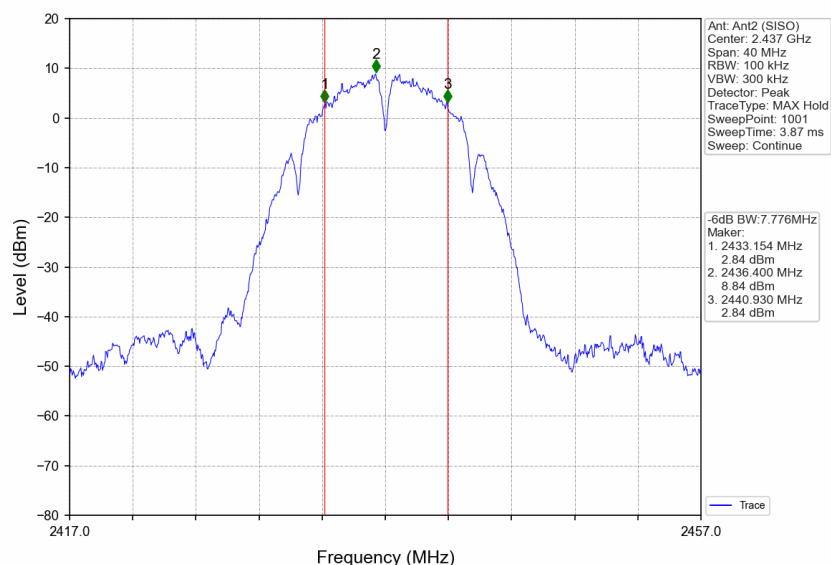
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802.11b\_MCH\_2437MHz\_Ant1 (SISO)\_NTNV



802.11b\_MCH\_2437MHz\_Ant2 (SISO)\_NTNV



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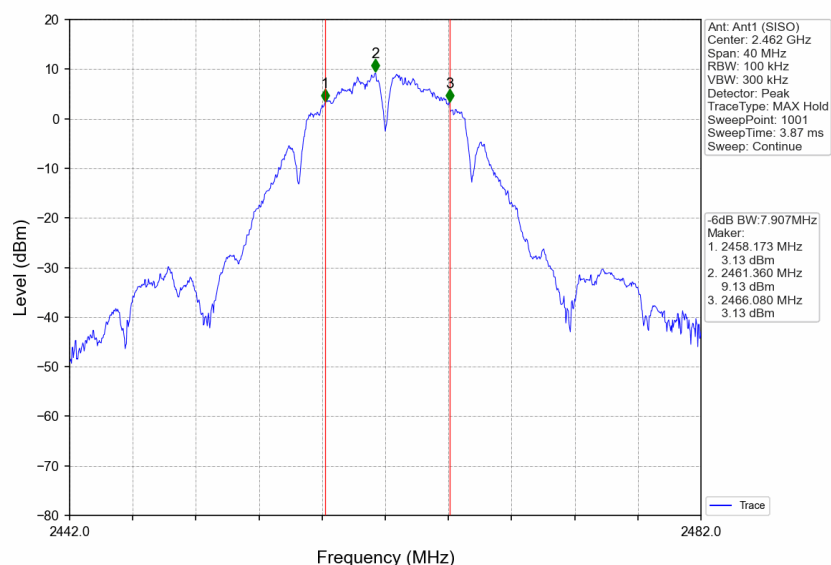
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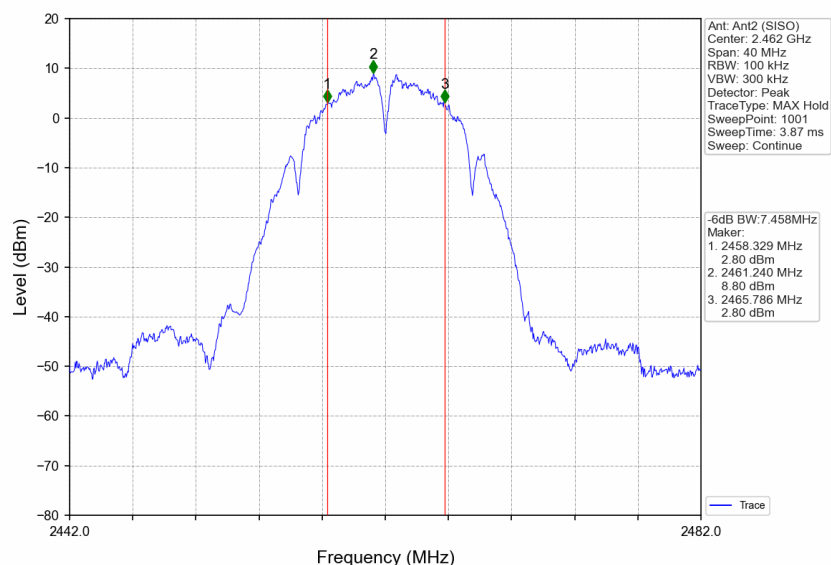
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802.11b\_HCH\_2462MHz\_Ant1 (SISO)\_NTNV



802.11b\_HCH\_2462MHz\_Ant2 (SISO)\_NTNV



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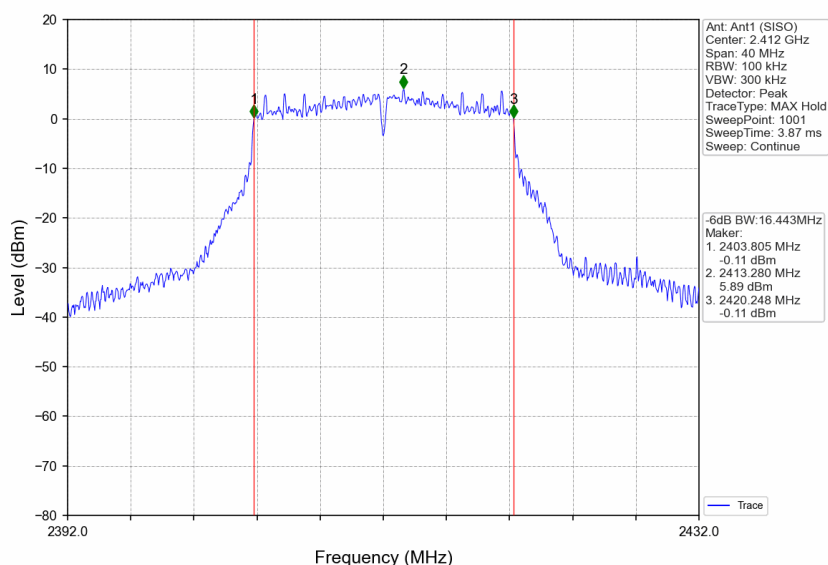
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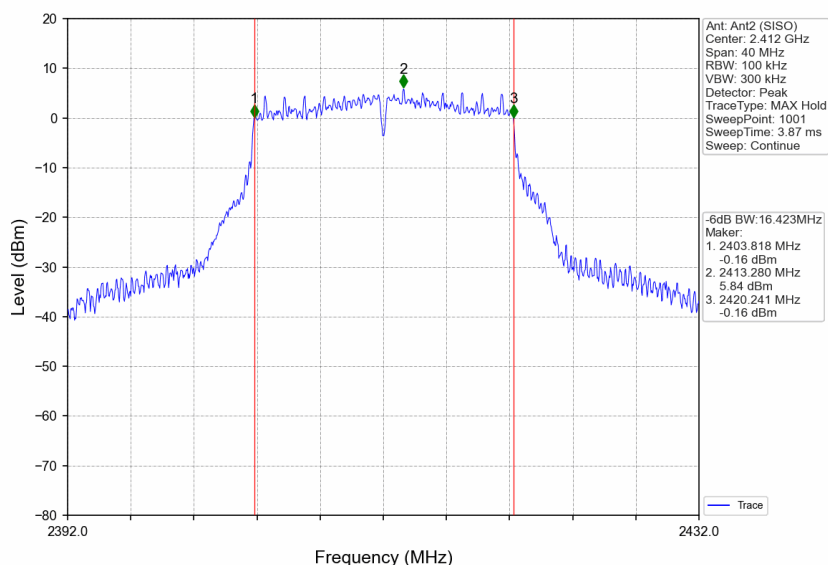
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802.11g\_LCH\_2412MHz\_Ant1 (SISO)\_NTNV



802.11g\_LCH\_2412MHz\_Ant2 (SISO)\_NTNV



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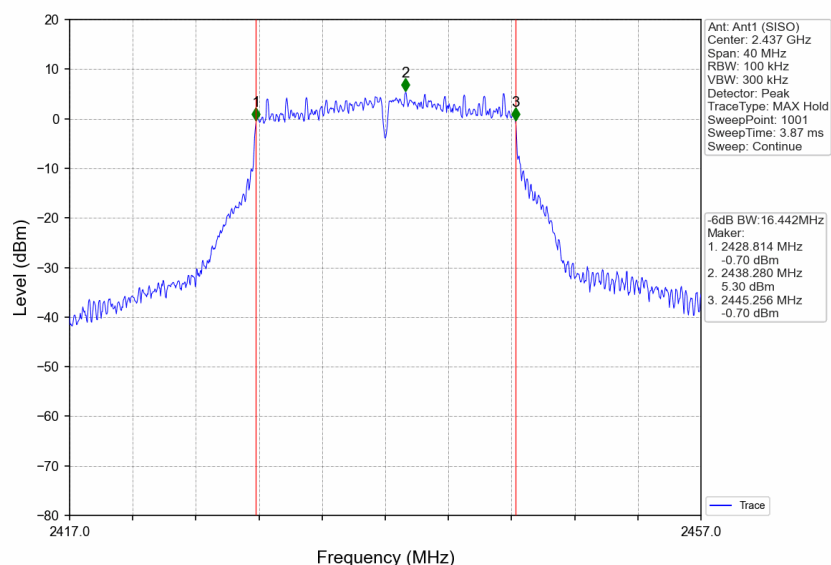
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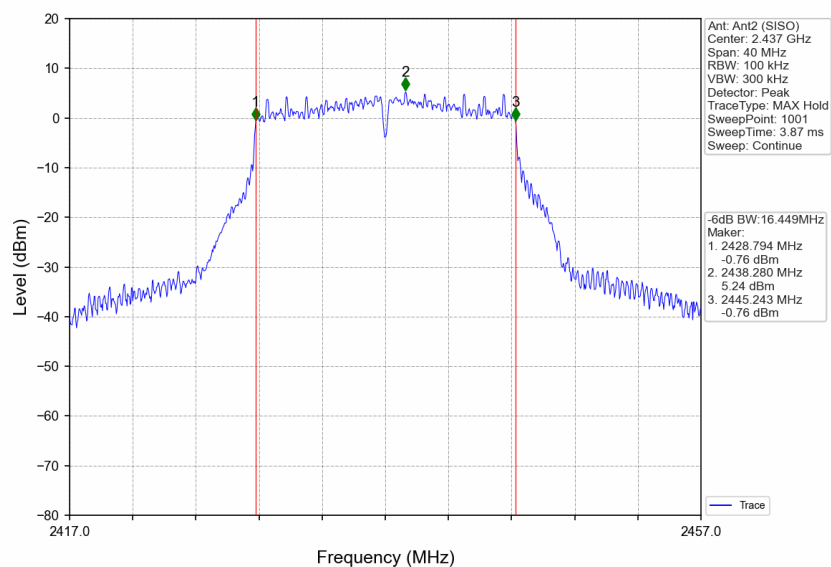
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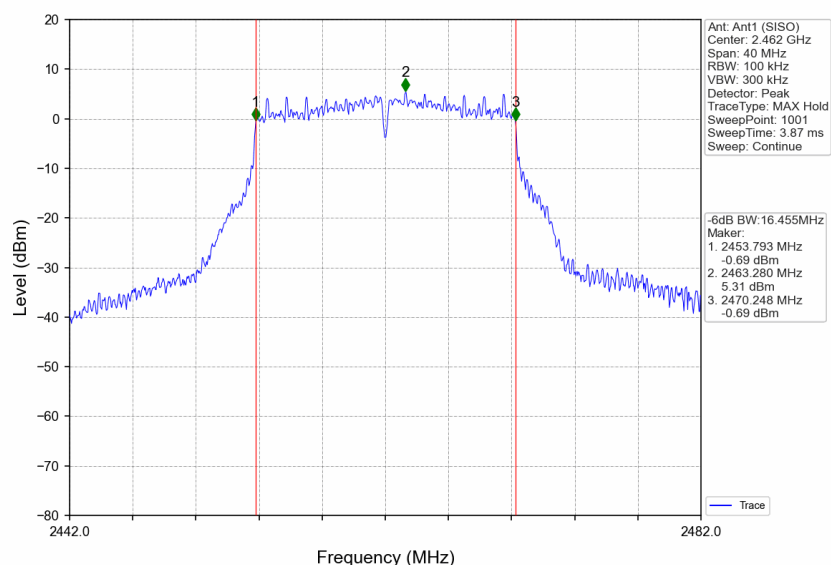
802.11g\_MCH\_2437MHz\_Ant1 (SISO)\_NTNV



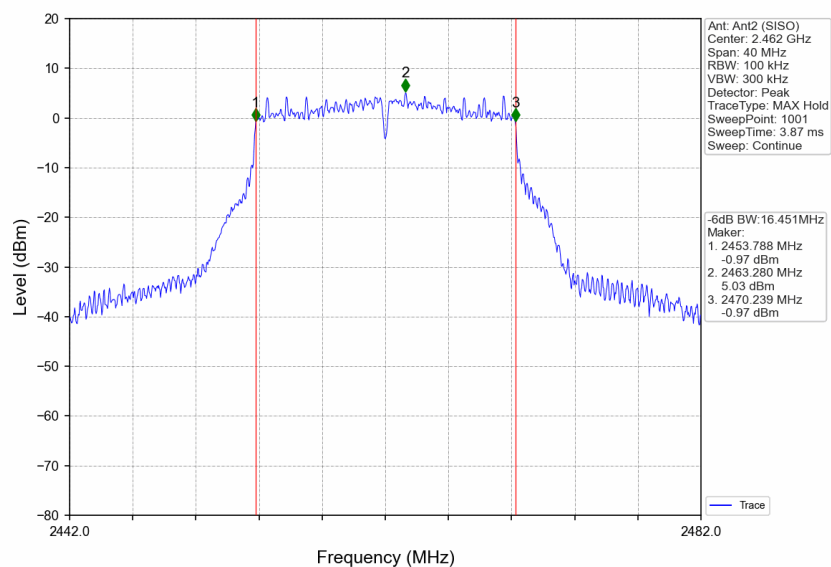
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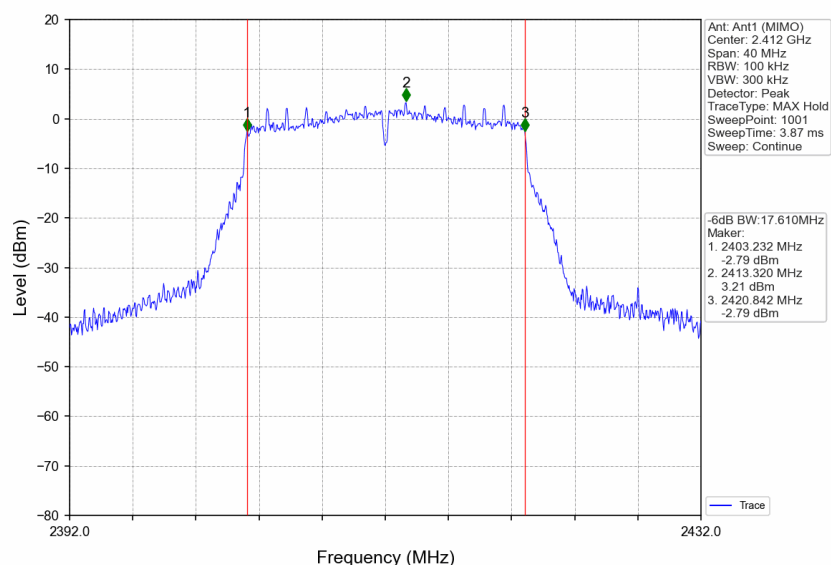
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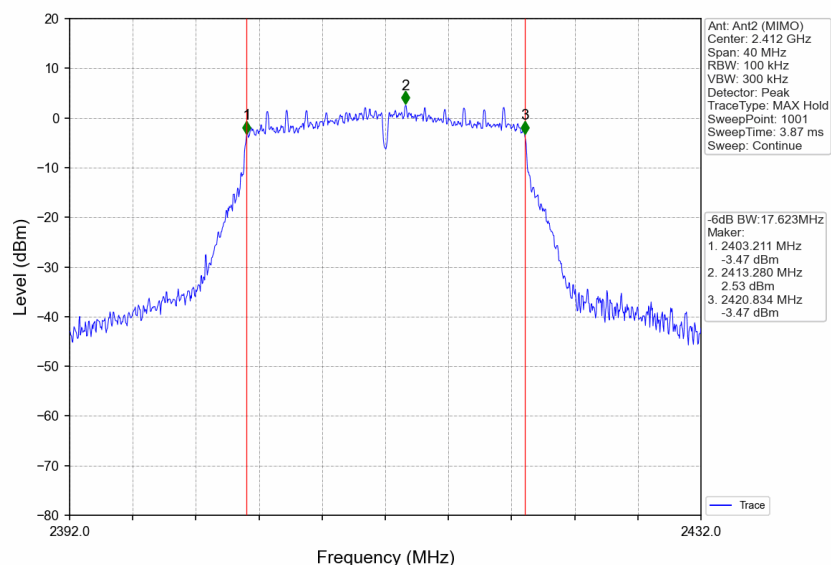
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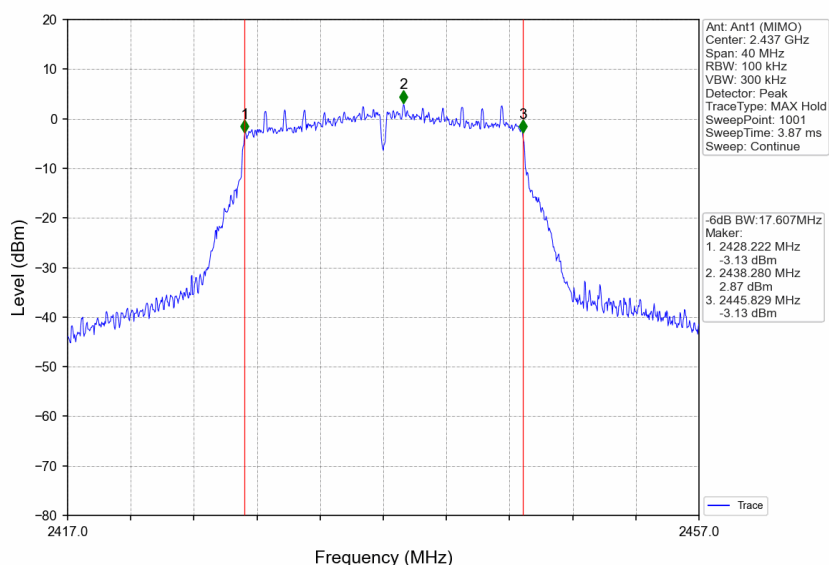
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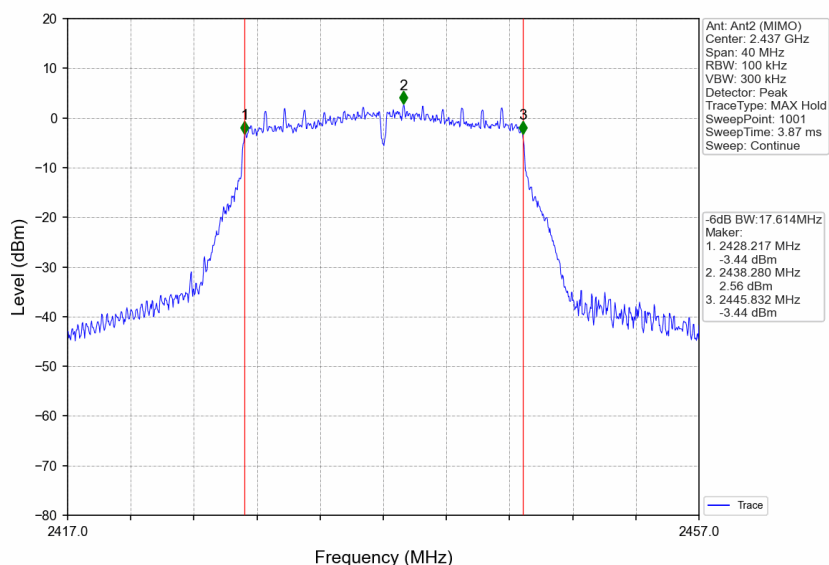
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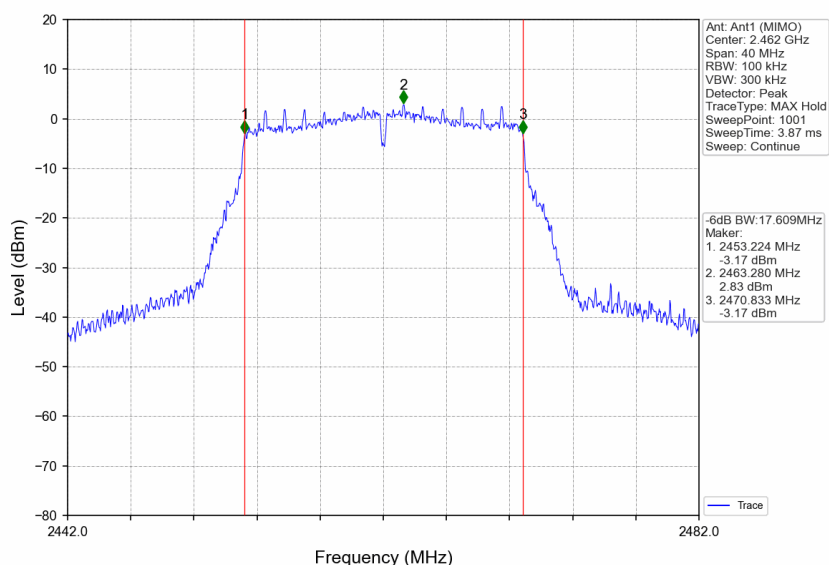
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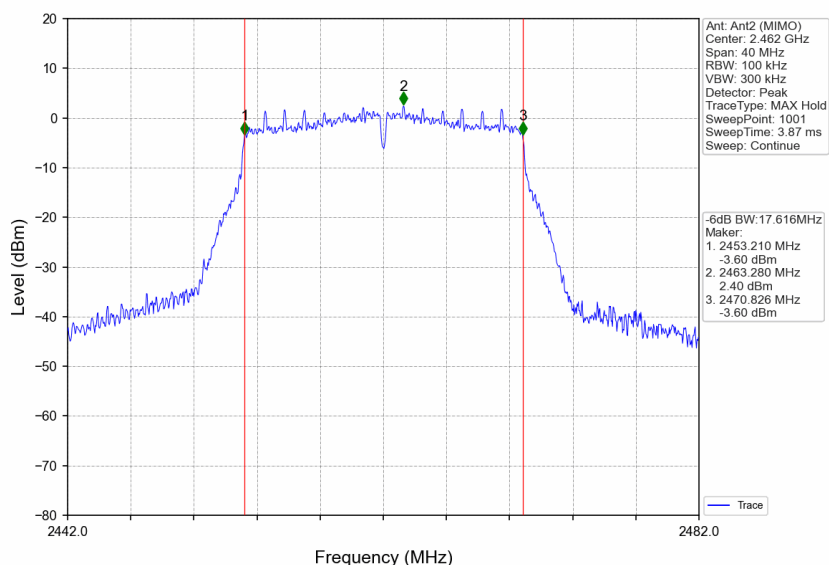
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### 3. Maximum Conducted Output Power

#### 3.1 Power

##### 3.1.1 Test Result

| Mode           | TX Type | Frequency (MHz) | Maximum Average Conducted Output Power (dBm) |       |       |       | Verdict |
|----------------|---------|-----------------|----------------------------------------------|-------|-------|-------|---------|
|                |         |                 | Ant1                                         | Ant2  | MIMO  | Limit |         |
| 802.11b        | SISO    | 2412            | 16.73                                        | 16.27 | /     | <=30  | Pass    |
|                |         | 2437            | 16.46                                        | 16.62 | /     | <=30  | Pass    |
|                |         | 2462            | 16.83                                        | 16.43 | /     | <=30  | Pass    |
| 802.11g        | SISO    | 2412            | 17.75                                        | 17.23 | /     | <=30  | Pass    |
|                |         | 2437            | 17.20                                        | 17.15 | /     | <=30  | Pass    |
|                |         | 2462            | 17.24                                        | 16.82 | /     | <=30  | Pass    |
| 802.11n (HT20) | MIMO    | 2412            | 14.92                                        | 14.34 | 17.65 | <=30  | Pass    |
|                |         | 2437            | 14.47                                        | 14.42 | 17.46 | <=30  | Pass    |
|                |         | 2462            | 14.63                                        | 14.17 | 17.42 | <=30  | Pass    |

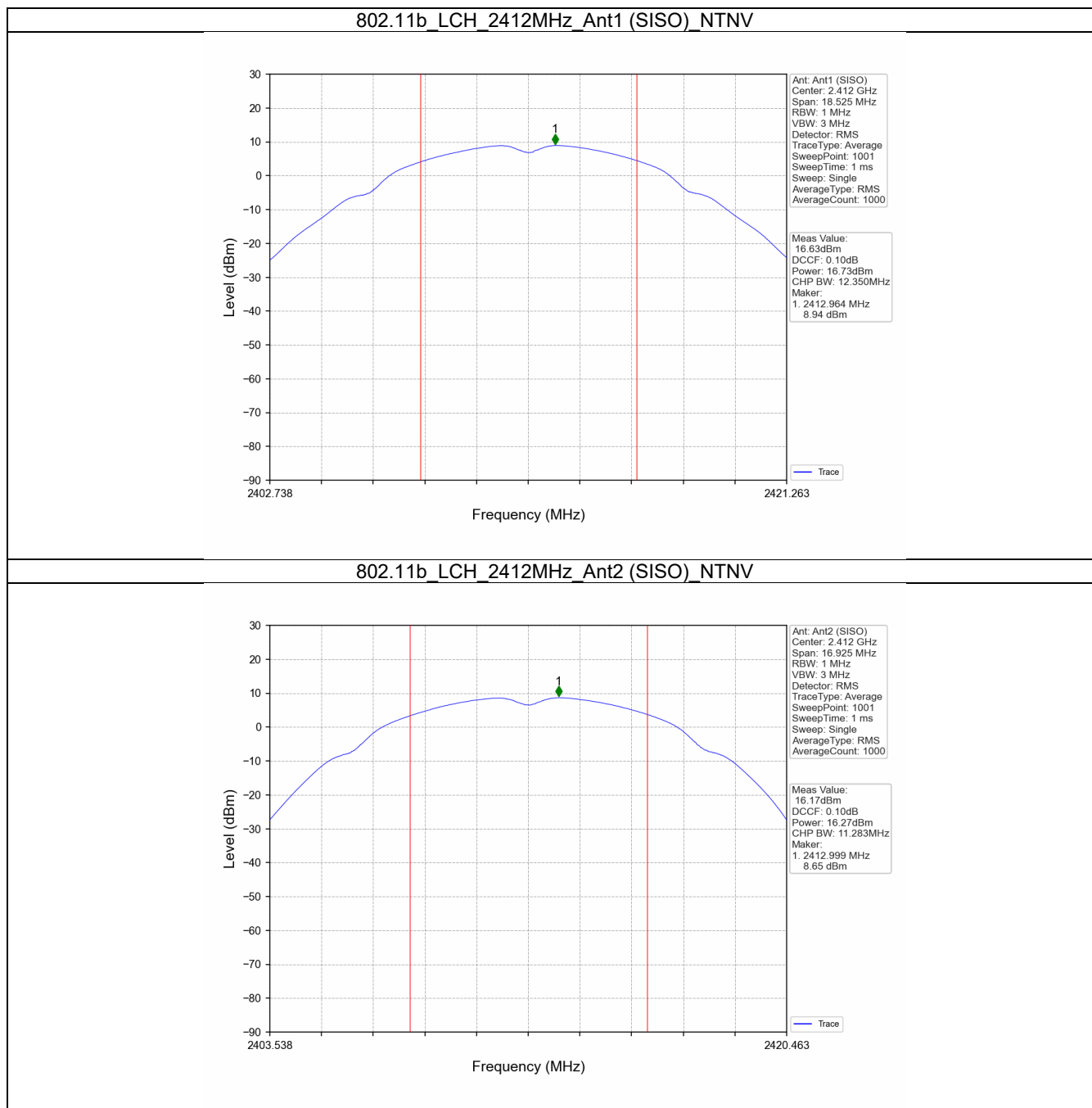
Note1: Antenna Gain: Ant1: 2.70dBi; Ant2: 2.70dBi;  
Note2: Directional Gain: 5.71dBi



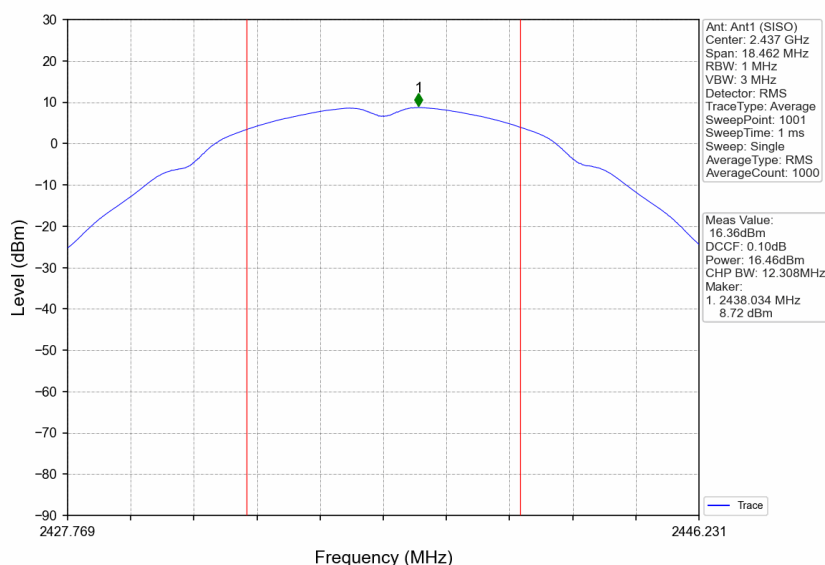
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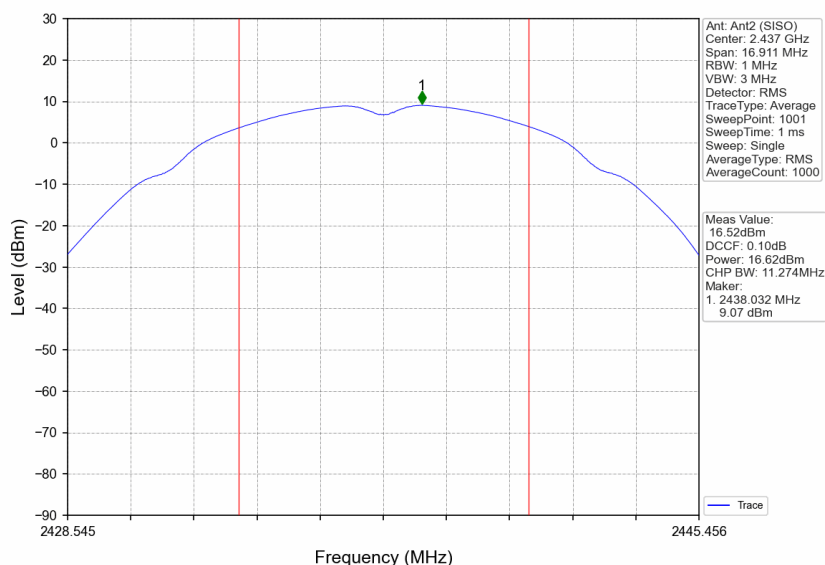
### 3.1.2 Test Graph



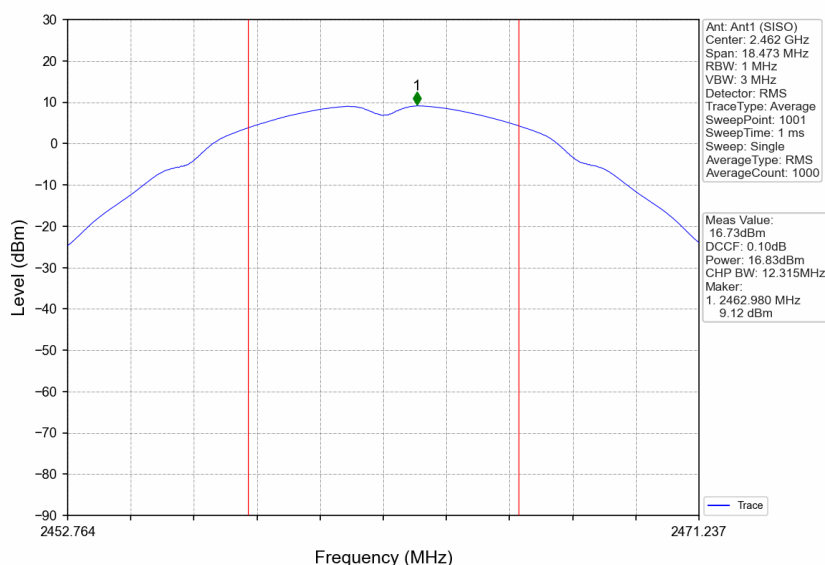
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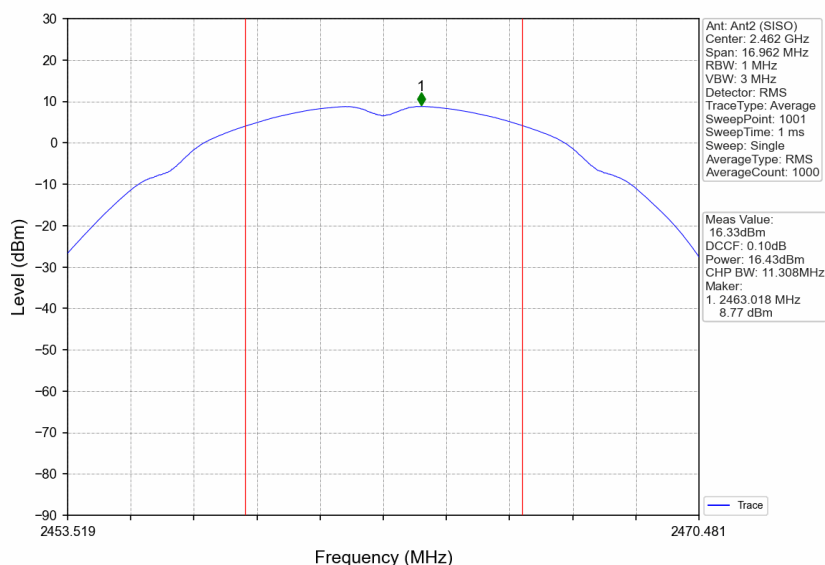
802.11b\_MCH\_2437MHz\_Ant2 (SISO)\_NTNV



802.11b\_HCH\_2462MHz\_Ant1 (SISO)\_NTNV



802.11b\_HCH\_2462MHz\_Ant2 (SISO)\_NTNV



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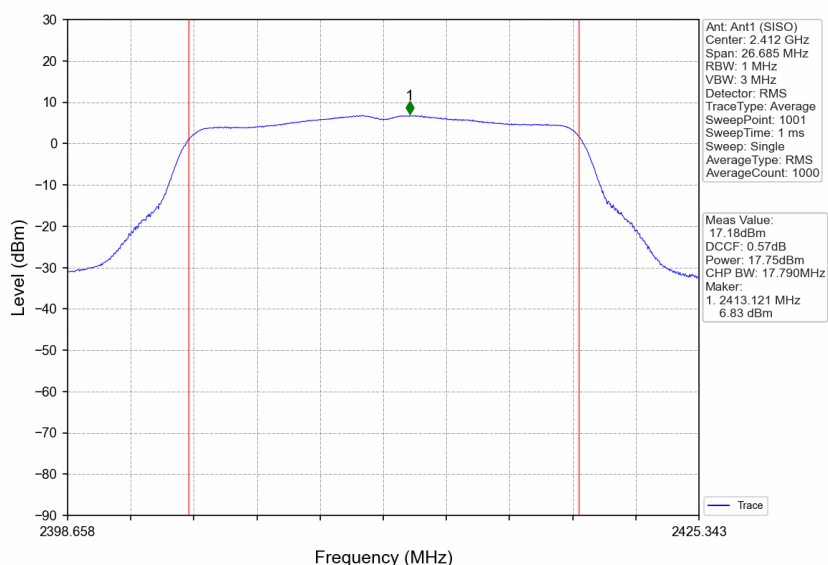
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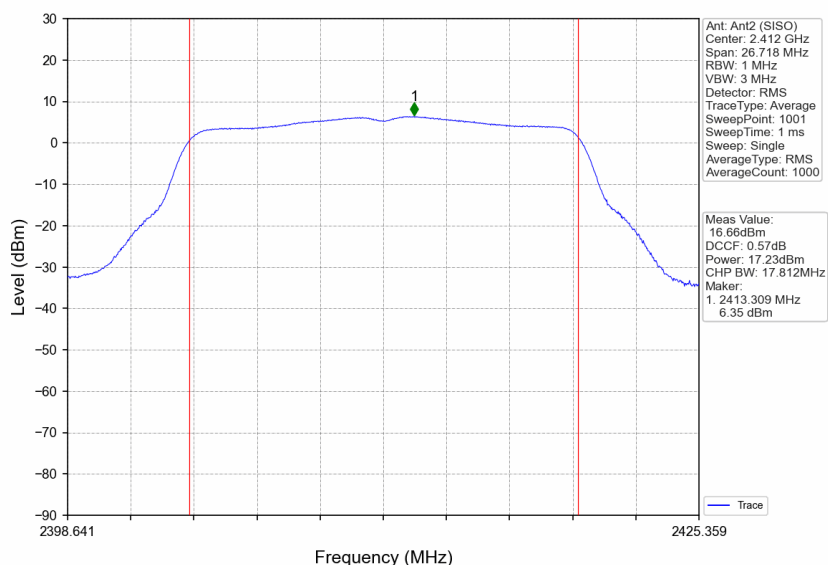
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802.11g\_LCH\_2412MHz\_Ant1 (SISO)\_NTNV



802.11g\_LCH\_2412MHz\_Ant2 (SISO)\_NTNV



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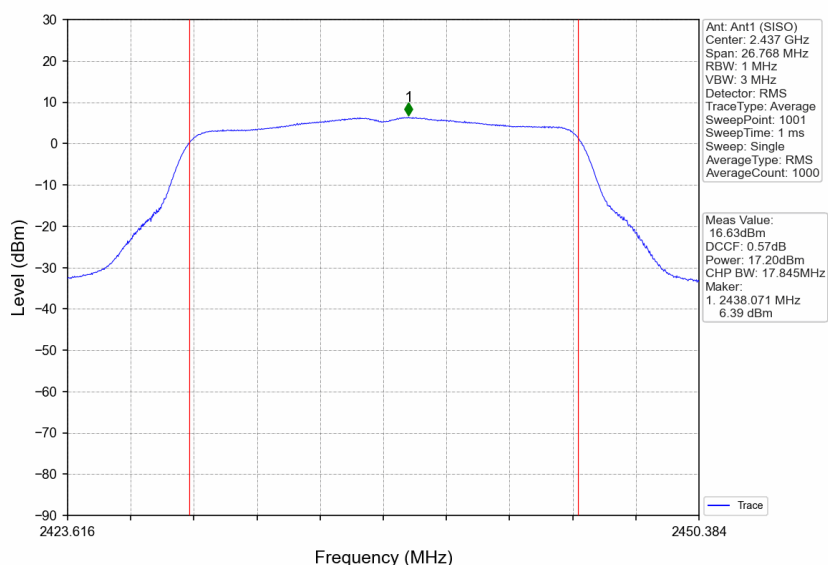
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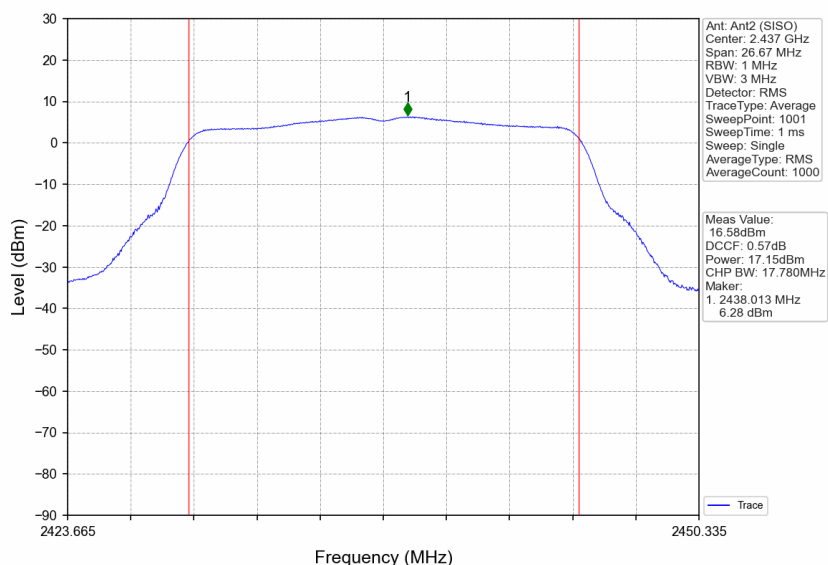
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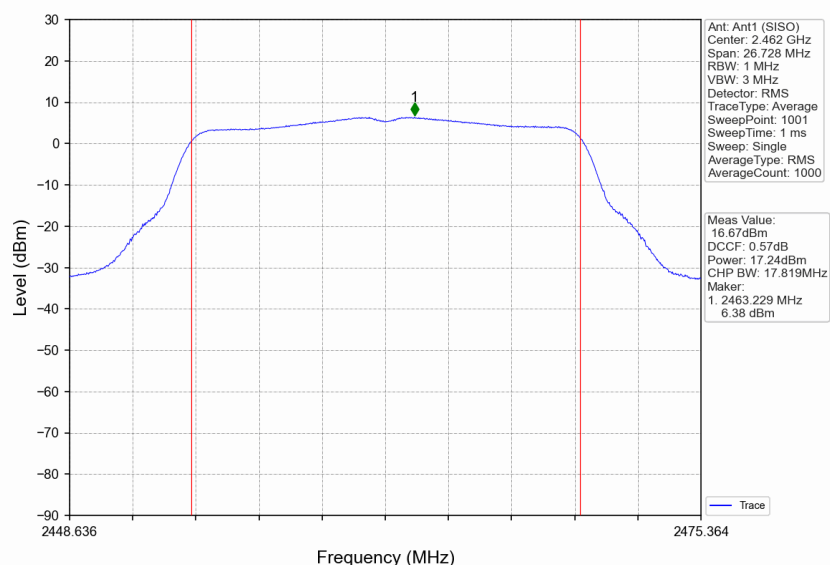
802.11g\_MCH\_2437MHz\_Ant1 (SISO)\_NTNV



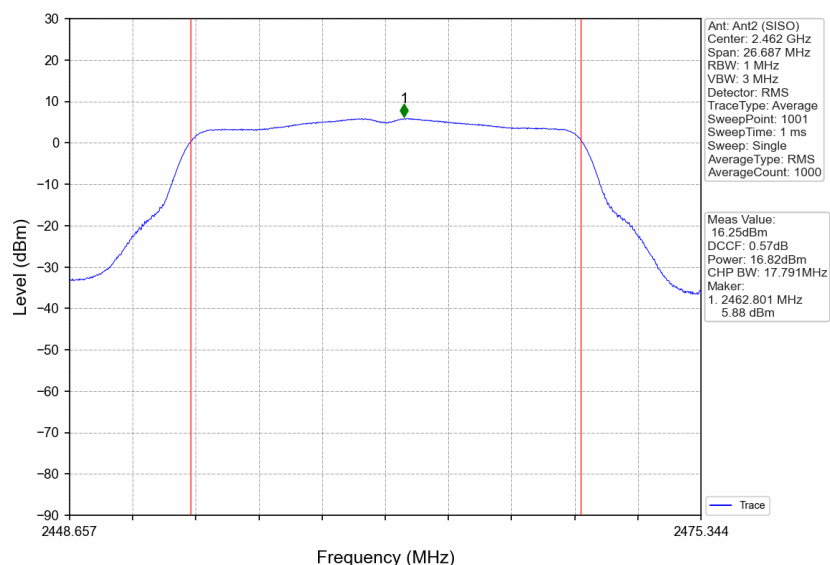
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802.11g\_HCH\_2462MHz\_Ant1 (SISO)\_NTNV



802.11g\_HCH\_2462MHz\_Ant2 (SISO)\_NTNV



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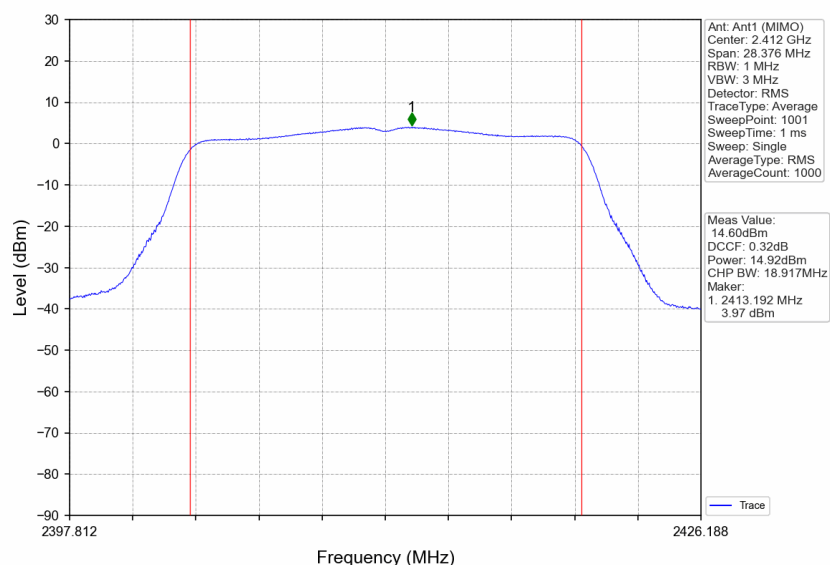
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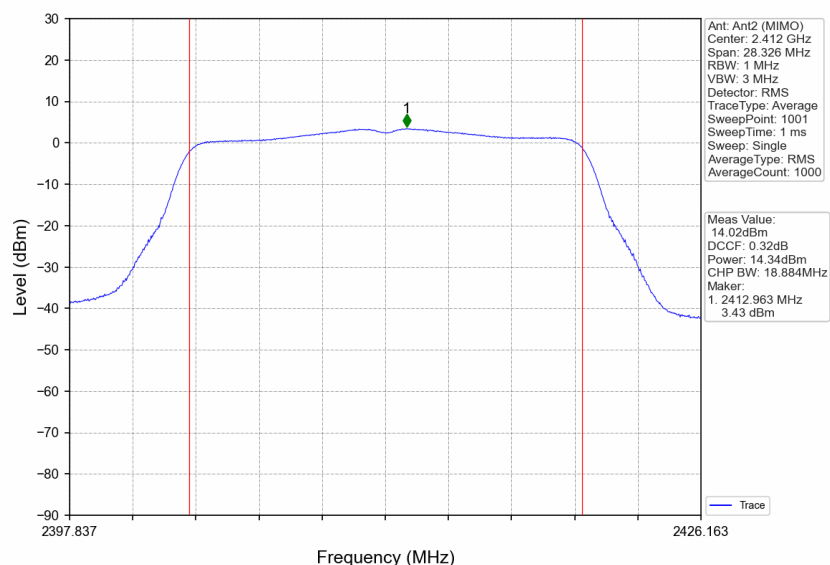
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802.11n(HT20)\_LCH\_2412MHz\_Ant1 (MIMO)\_NTNV



802.11n(HT20)\_LCH\_2412MHz\_Ant2 (MIMO)\_NTNV



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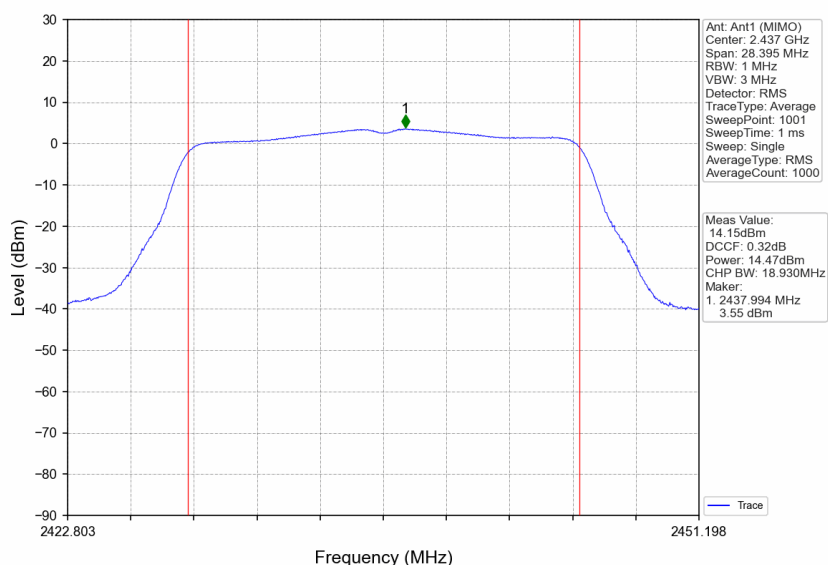
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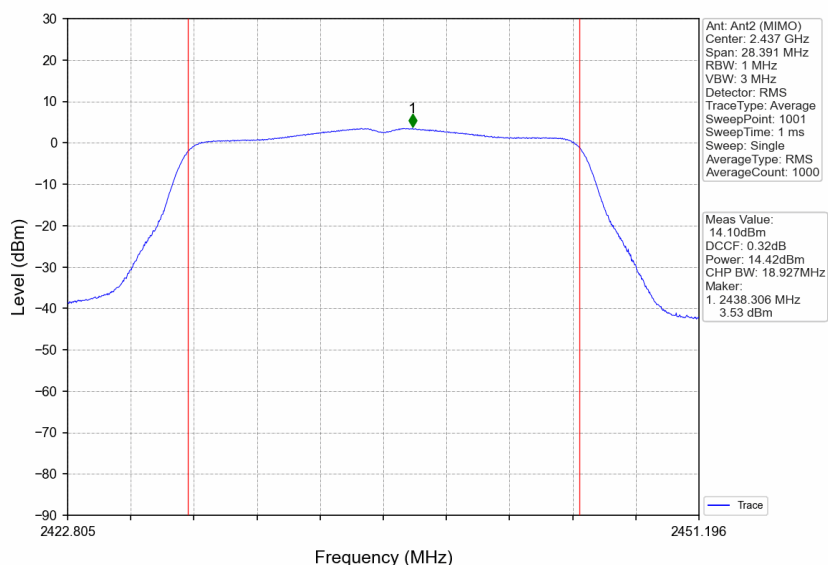
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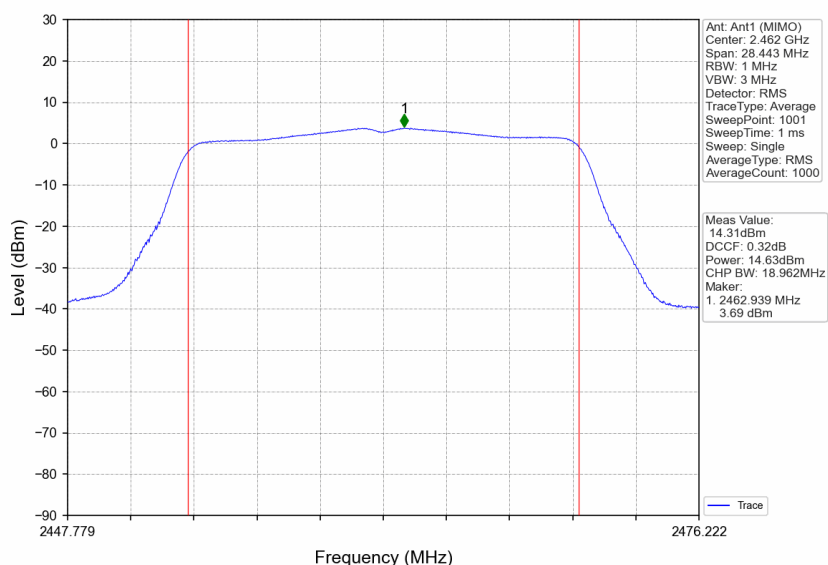
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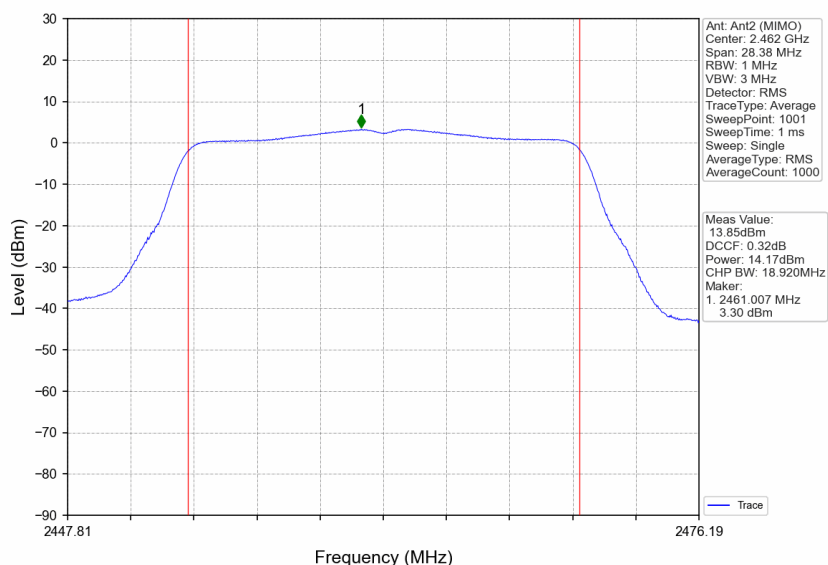
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## 4. Maximum Power Spectral Density

### 4.1 PSD

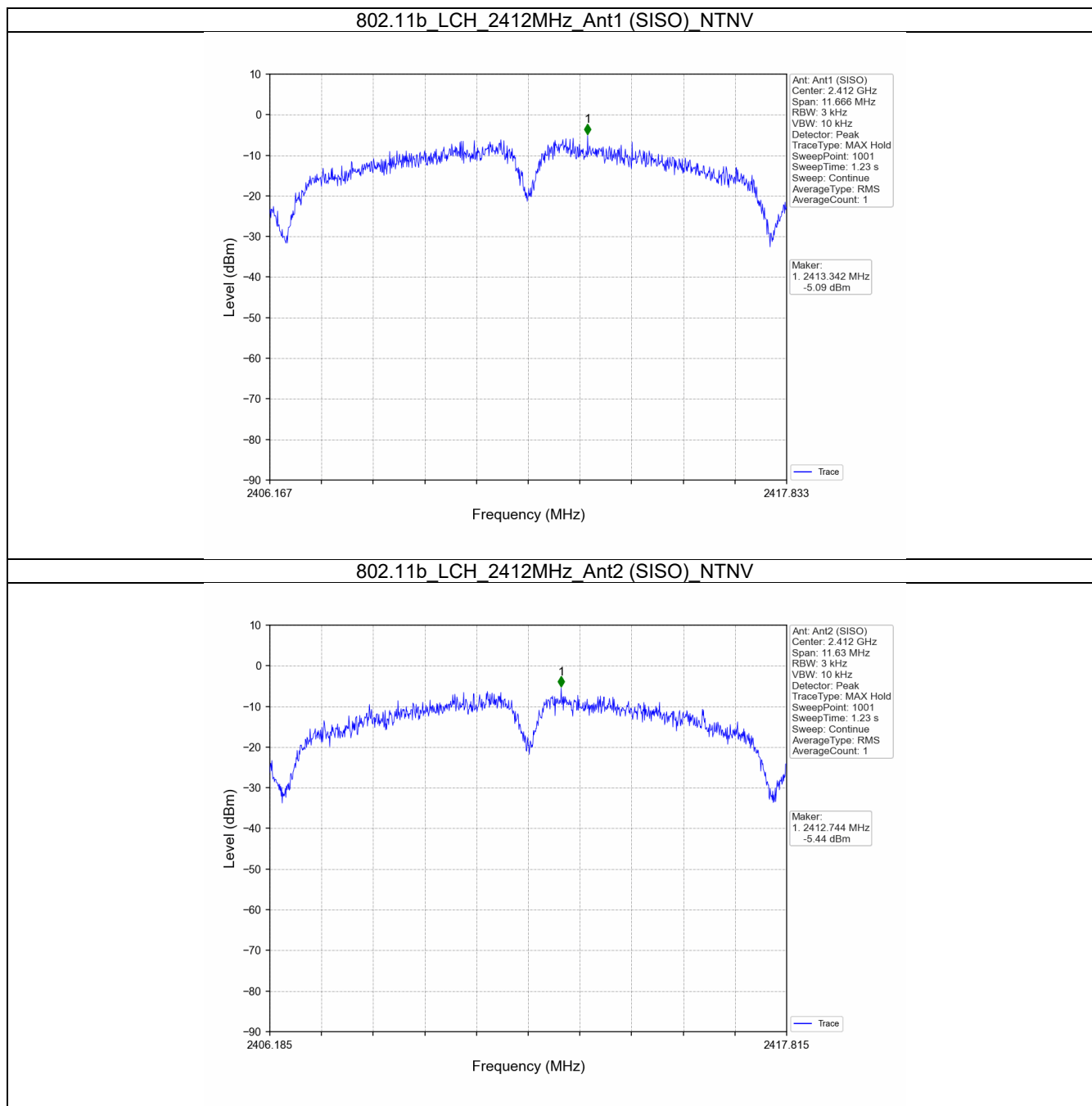
#### 4.1.1 Test Result

| Mode           | TX Type | Frequency (MHz) | Maximum PSD (dBm/3kHz) |        |       |       | Verdict |
|----------------|---------|-----------------|------------------------|--------|-------|-------|---------|
|                |         |                 | Ant1                   | Ant2   | MIMO  | Limit |         |
| 802.11b        | SISO    | 2412            | -5.09                  | -5.44  | /     | <=8   | Pass    |
|                |         | 2437            | -5.42                  | -5.55  | /     | <=8   | Pass    |
|                |         | 2462            | -5.65                  | -5.66  | /     | <=8   | Pass    |
| 802.11g        | SISO    | 2412            | -6.45                  | -6.17  | /     | <=8   | Pass    |
|                |         | 2437            | -7.07                  | -6.43  | /     | <=8   | Pass    |
|                |         | 2462            | -7.22                  | -7.01  | /     | <=8   | Pass    |
| 802.11n (HT20) | MIMO    | 2412            | -9.92                  | -10.16 | -7.74 | <=8   | Pass    |
|                |         | 2437            | -9.56                  | -9.81  | -7.35 | <=8   | Pass    |
|                |         | 2462            | -9.97                  | -10.01 | -7.84 | <=8   | Pass    |

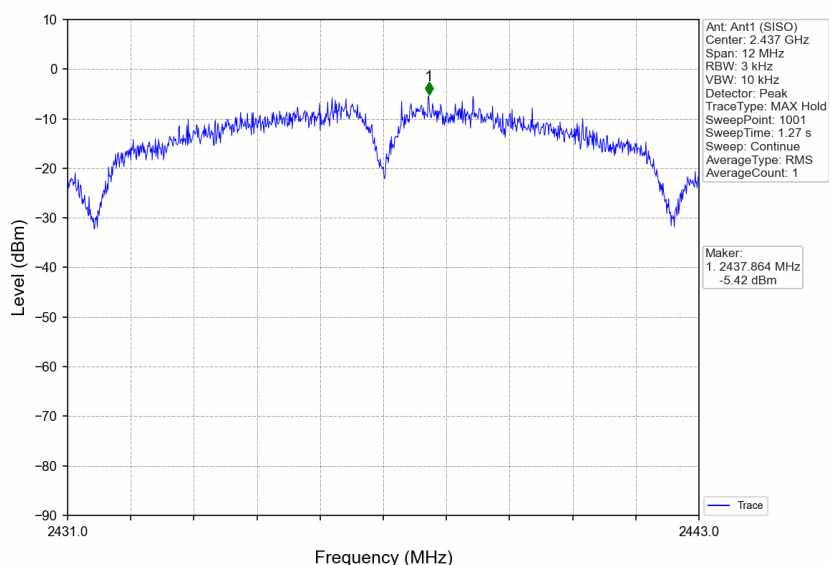
Note1: Antenna Gain: Ant1: 2.70dBi; Ant2: 2.70dBi;



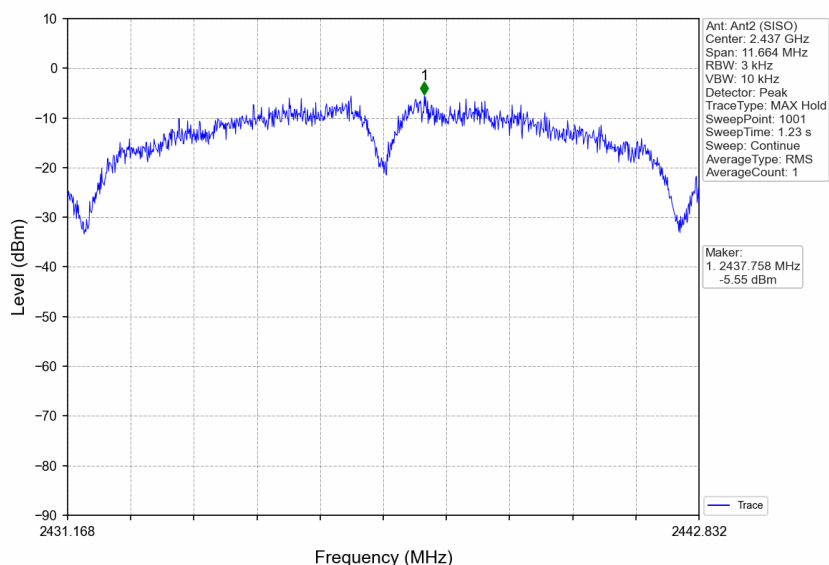
## 4.1.2 Test Graph



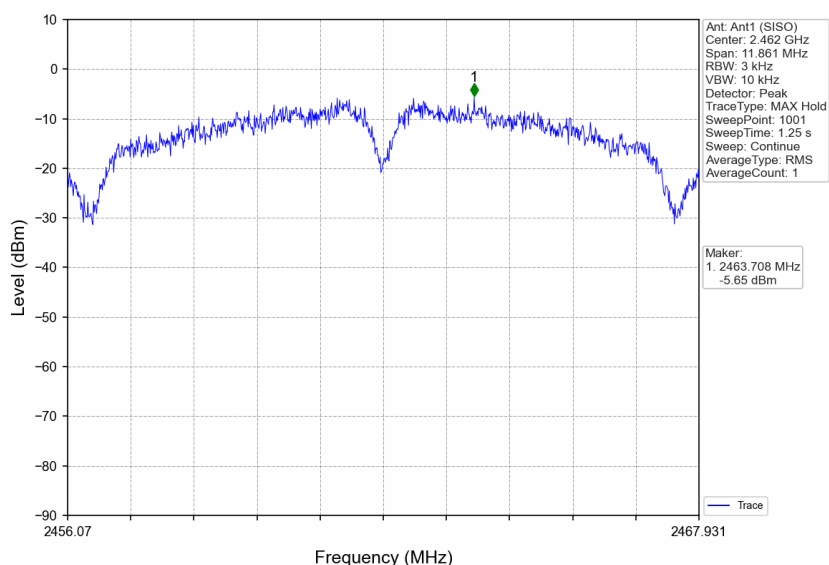
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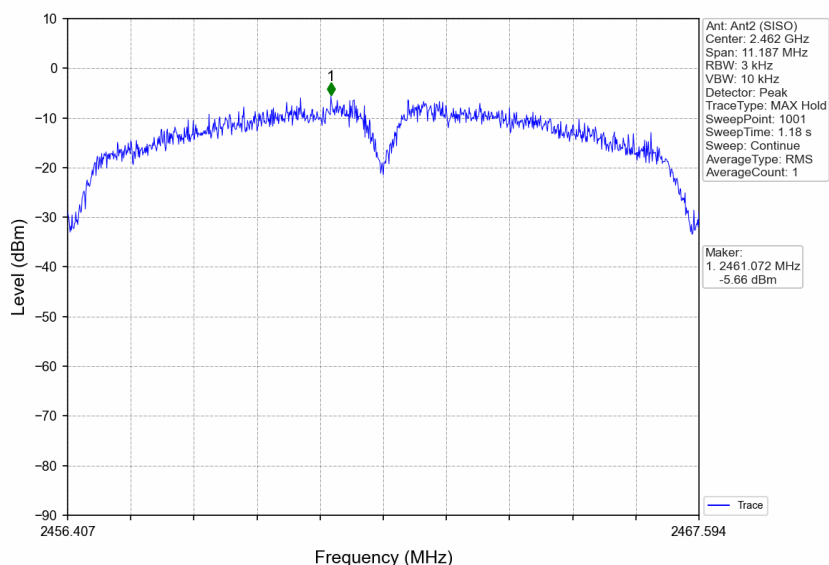
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802.11b\_HCH\_2462MHz\_Ant1 (SISO)\_NTNV



802.11b\_HCH\_2462MHz\_Ant2 (SISO)\_NTNV



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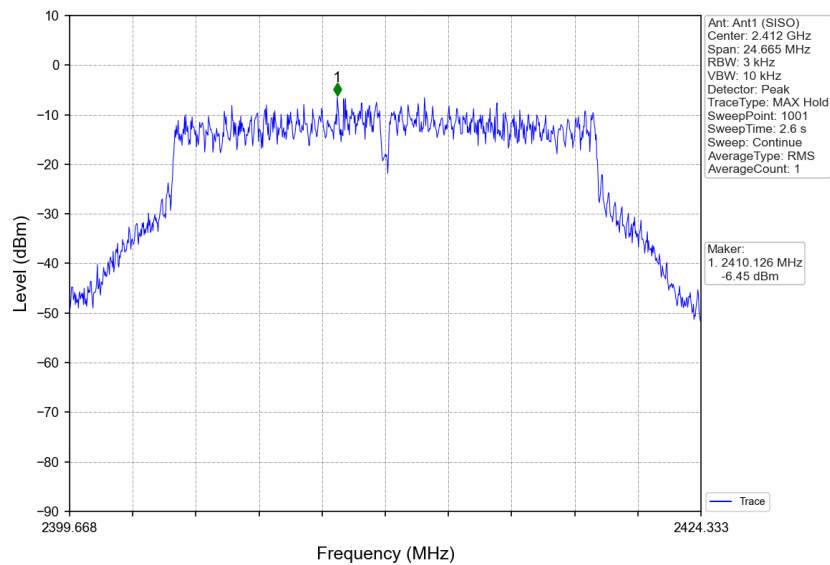
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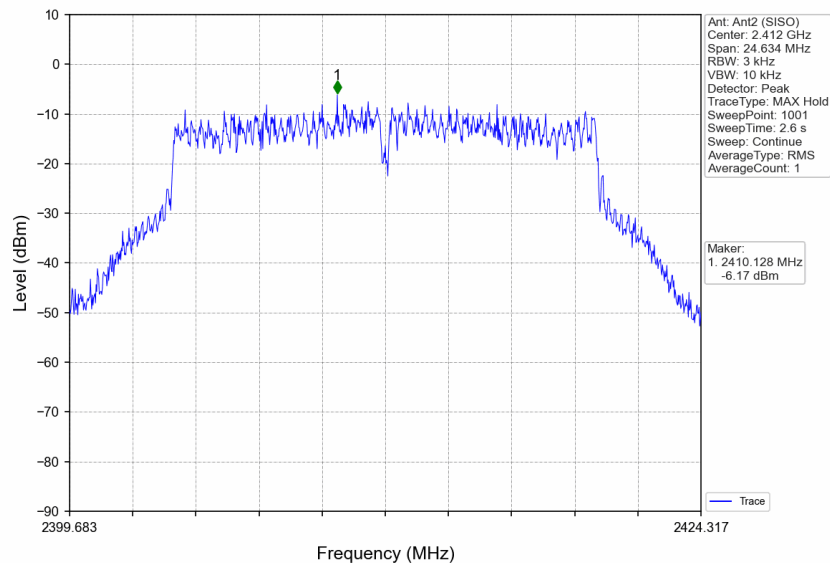
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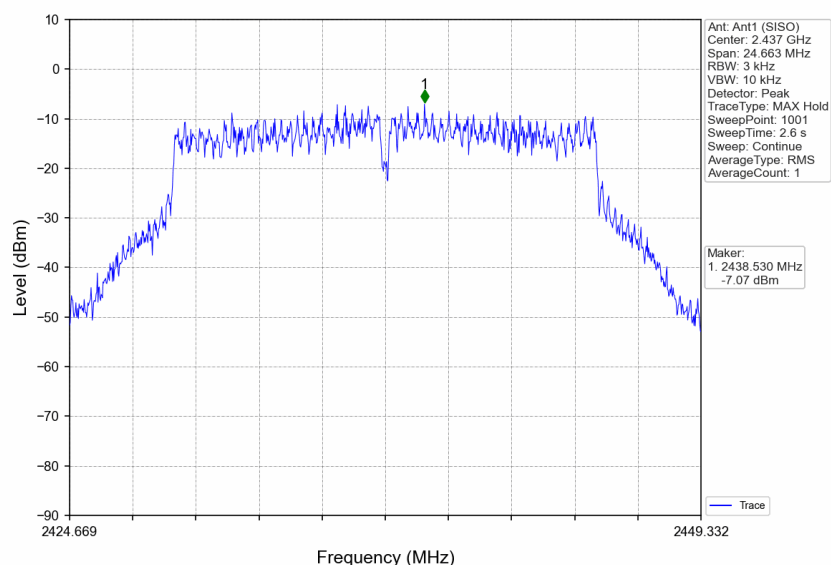
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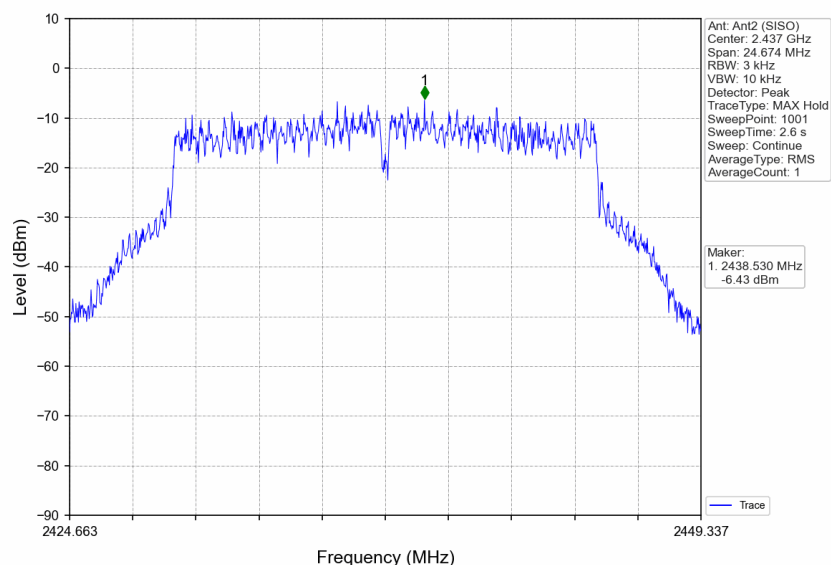
802.11g\_LCH\_2412MHz\_Ant2 (SISO)\_NTNV



802.11g\_MCH\_2437MHz\_Ant1 (SISO)\_NTNV



802.11g\_MCH\_2437MHz\_Ant2 (SISO)\_NTNV



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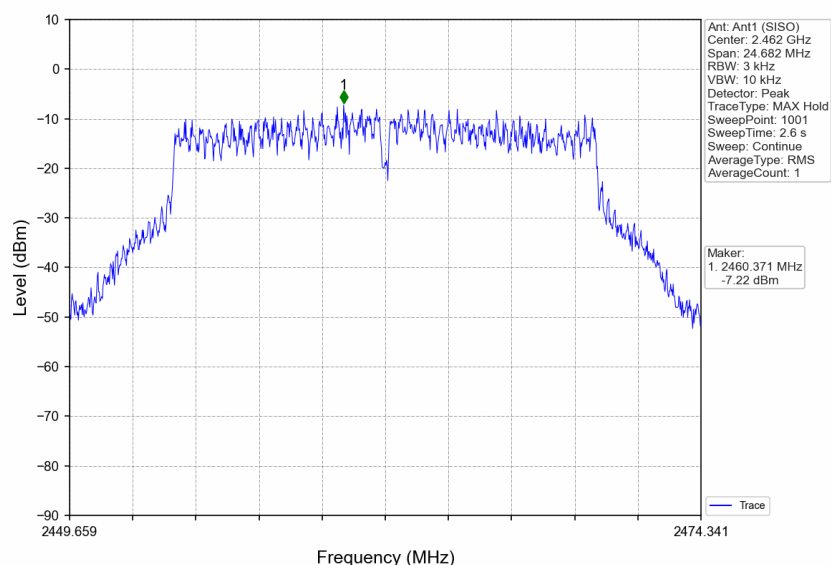
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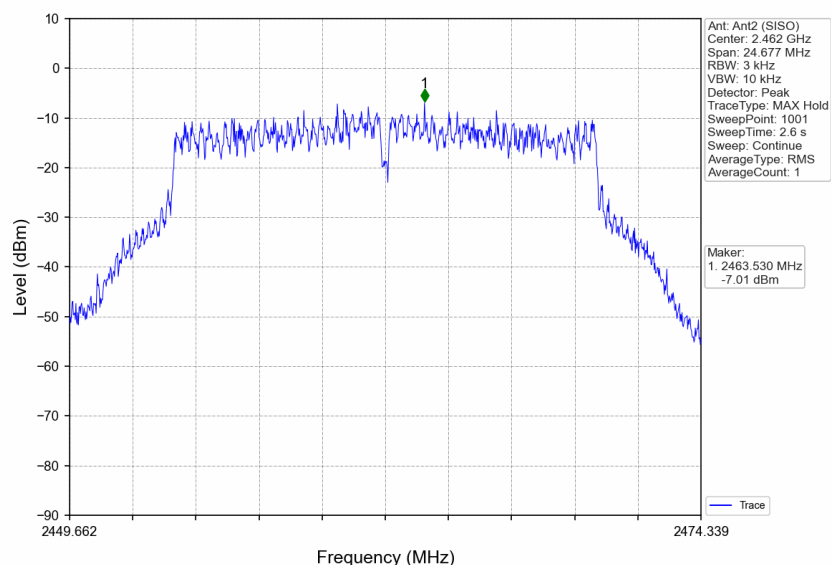
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802.11g\_HCH\_2462MHz\_Ant1 (SISO)\_NTNV



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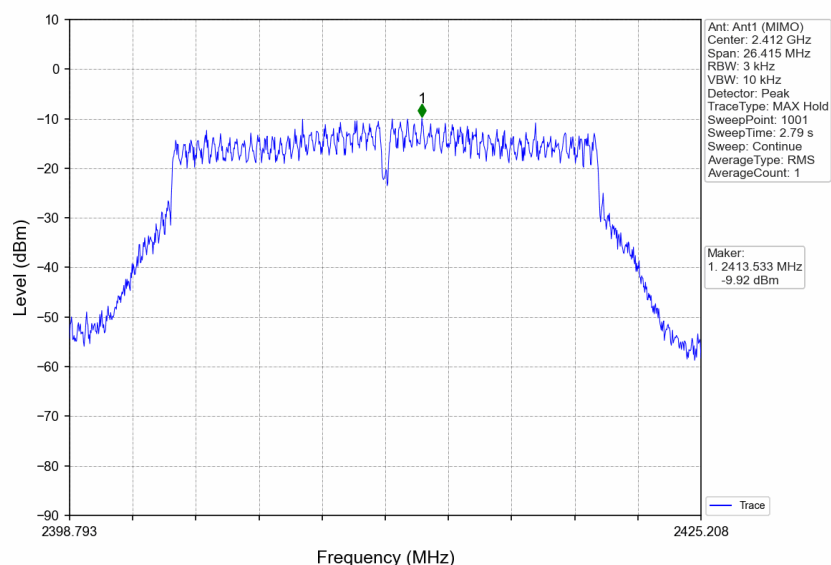
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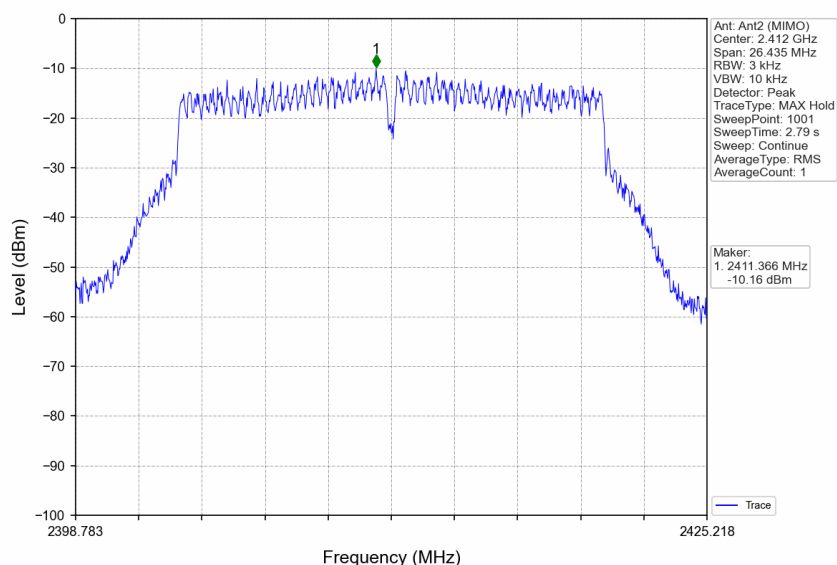
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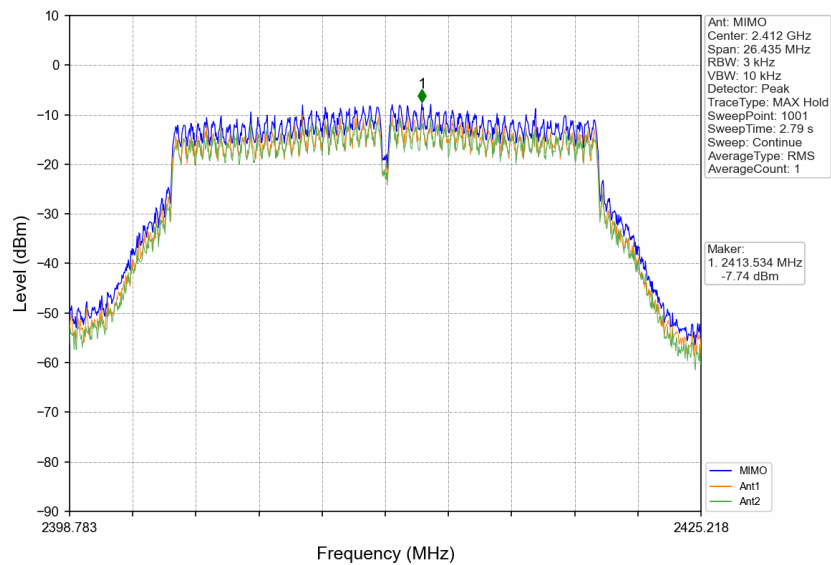
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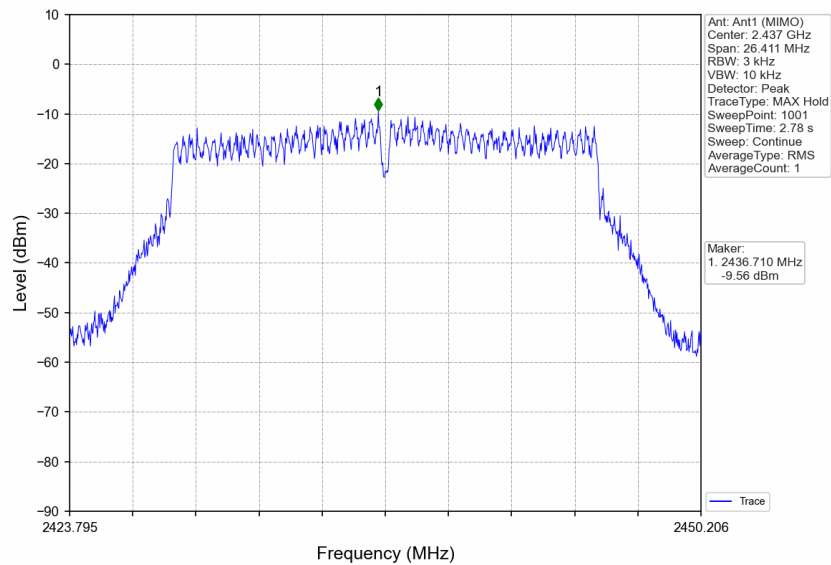
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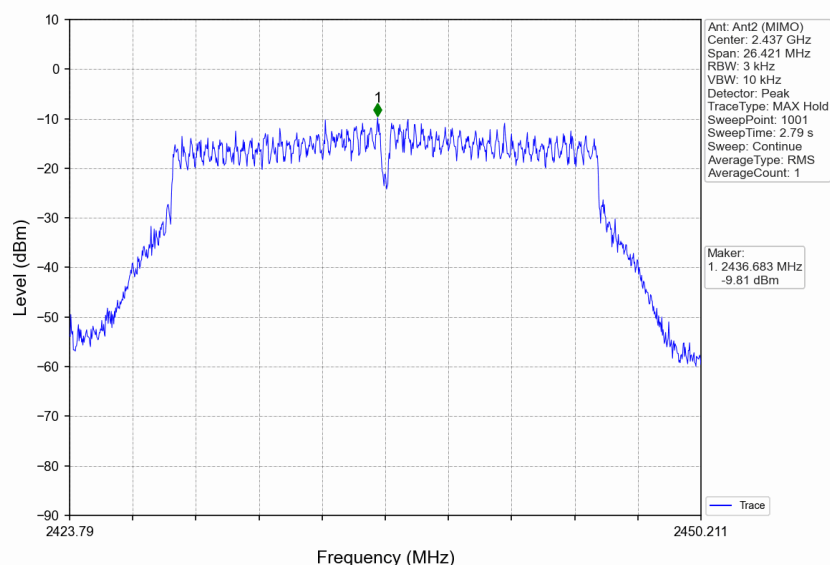
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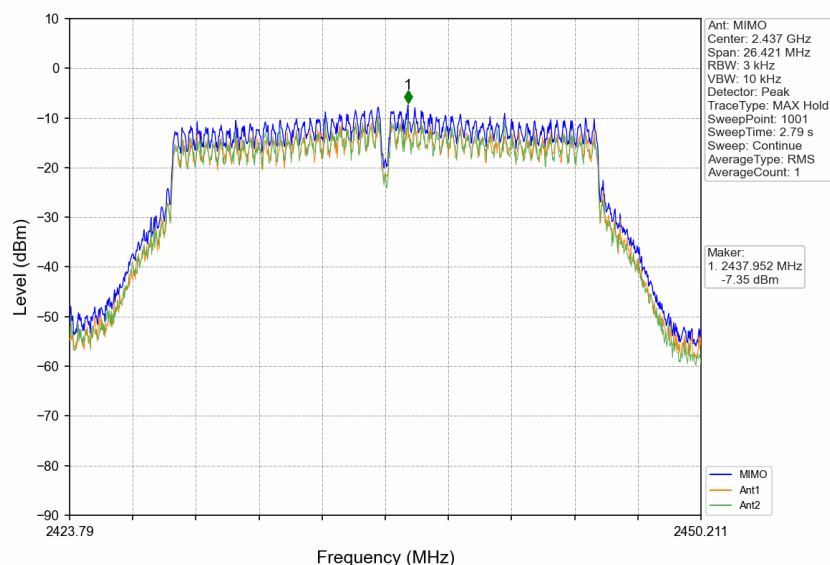
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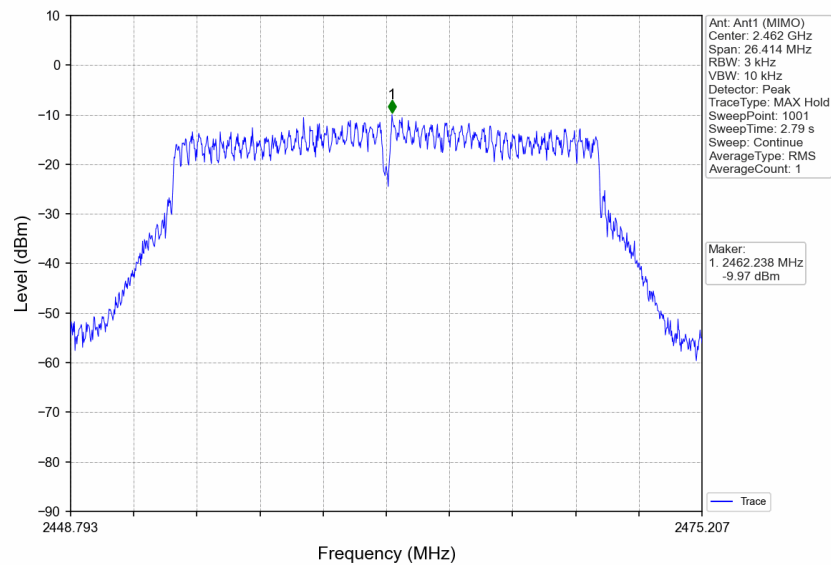
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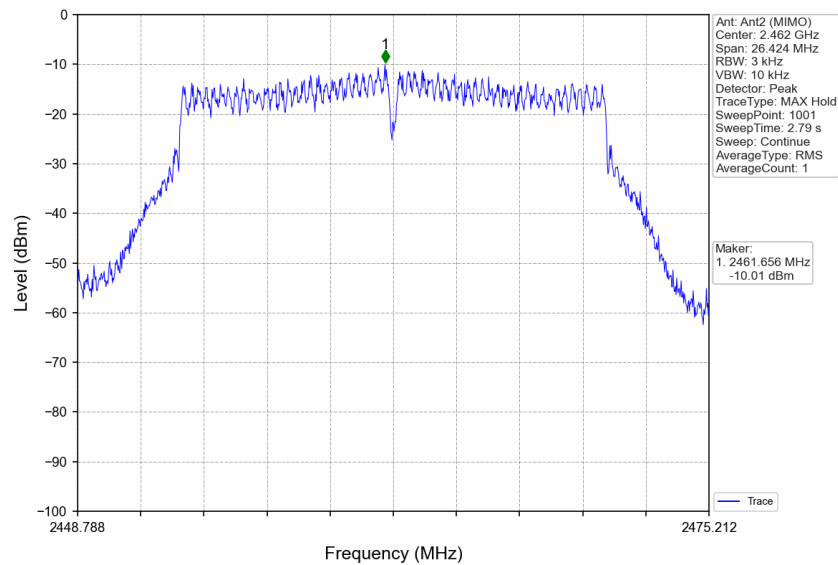
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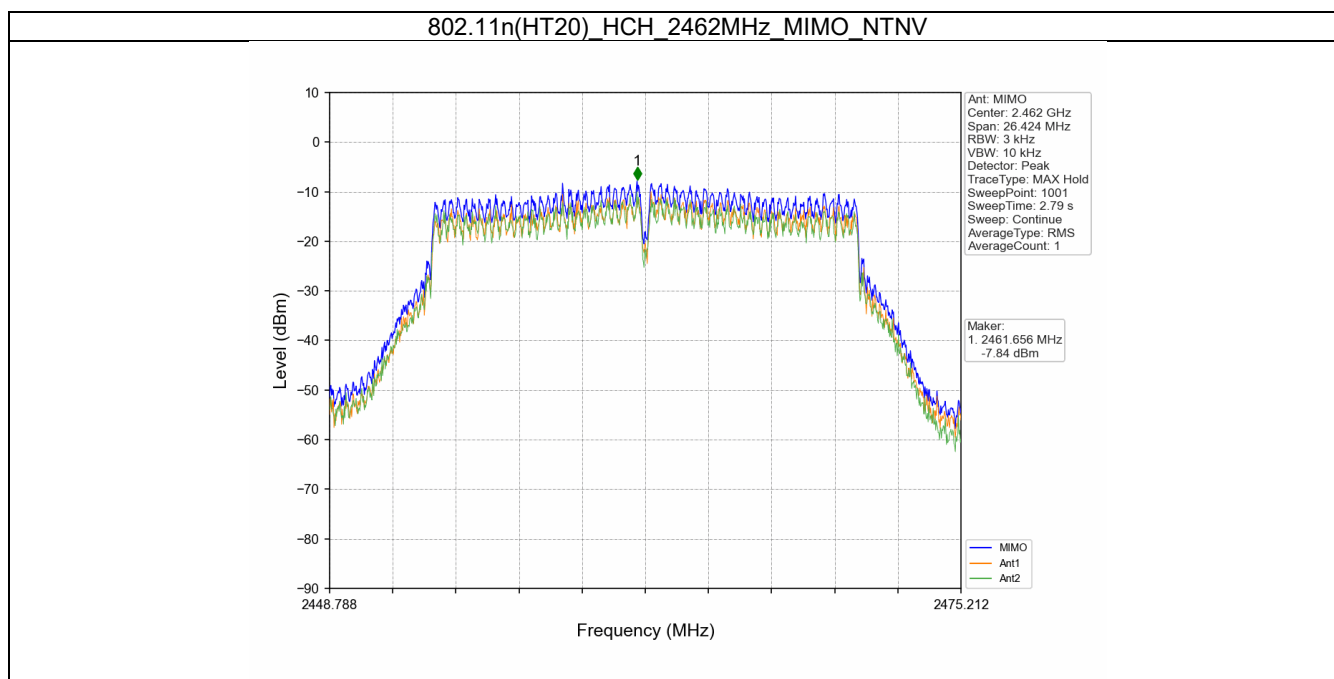
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802.11n(HT20)\_HCH\_2462MHz\_Ant1 (MIMO)\_NTNV



802.11n(HT20)\_HCH\_2462MHz\_Ant2 (MIMO)\_NTNV





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## 5. Unwanted Emissions In Non-restricted Frequency Bands

### 5.1 Ref

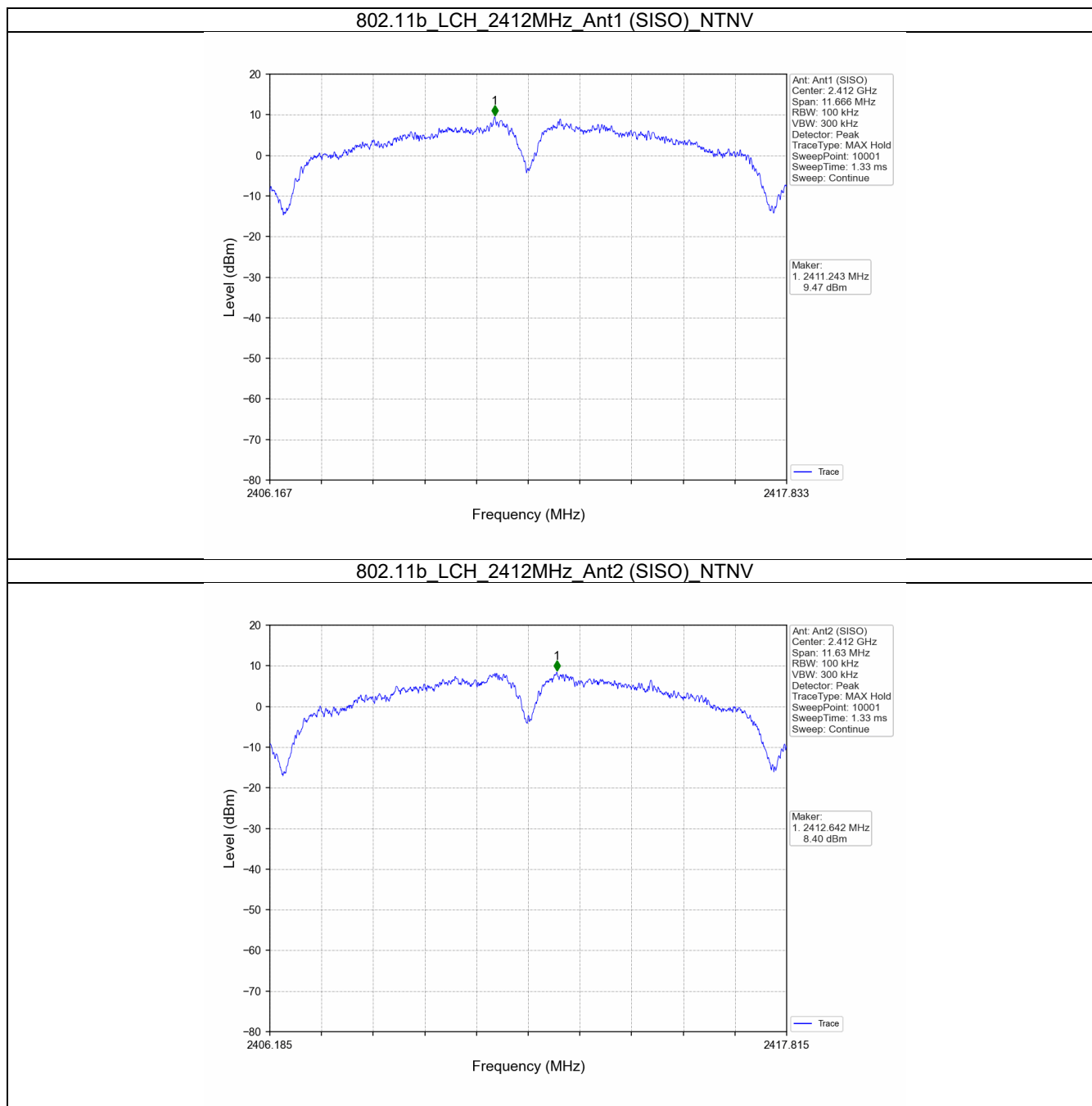
#### 5.1.1 Test Result

| Mode           | TX Type | Frequency (MHz) | Ant | Level of Reference (dBm) |
|----------------|---------|-----------------|-----|--------------------------|
| 802.11b        | SISO    | 2412            | 1   | 9.47                     |
|                |         |                 | 2   | 8.40                     |
|                |         | 2437            | 1   | 8.55                     |
|                |         |                 | 2   | 8.49                     |
|                |         | 2462            | 1   | 8.98                     |
|                |         |                 | 2   | 8.77                     |
| 802.11g        | SISO    | 2412            | 1   | 5.82                     |
|                |         |                 | 2   | 5.49                     |
|                |         | 2437            | 1   | 5.16                     |
|                |         |                 | 2   | 5.40                     |
|                |         | 2462            | 1   | 5.13                     |
|                |         |                 | 2   | 4.71                     |
| 802.11n (HT20) | MIMO    | 2412            | 1   | 2.90                     |
|                |         |                 | 2   | 2.43                     |
|                |         | 2437            | 1   | 2.69                     |
|                |         |                 | 2   | 2.61                     |
|                |         | 2462            | 1   | 2.66                     |
|                |         |                 | 2   | 2.23                     |

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.



## 5.1.2 Test Graph



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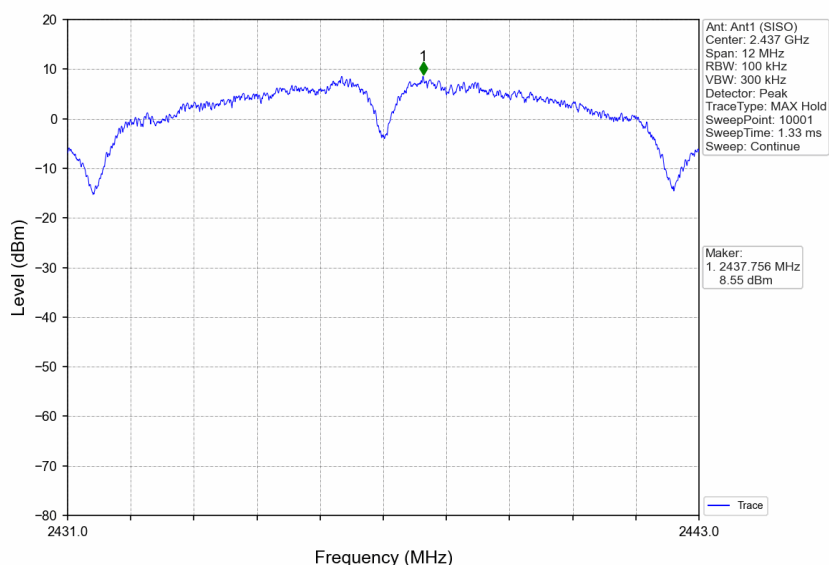
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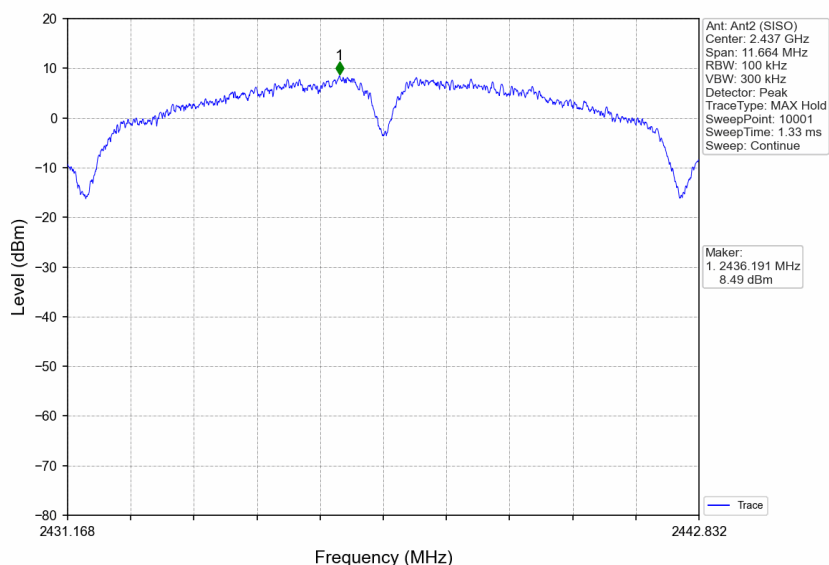
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802.11b\_MCH\_2437MHz\_Ant1 (SISO)\_NTNV



802.11b\_MCH\_2437MHz\_Ant2 (SISO)\_NTNV



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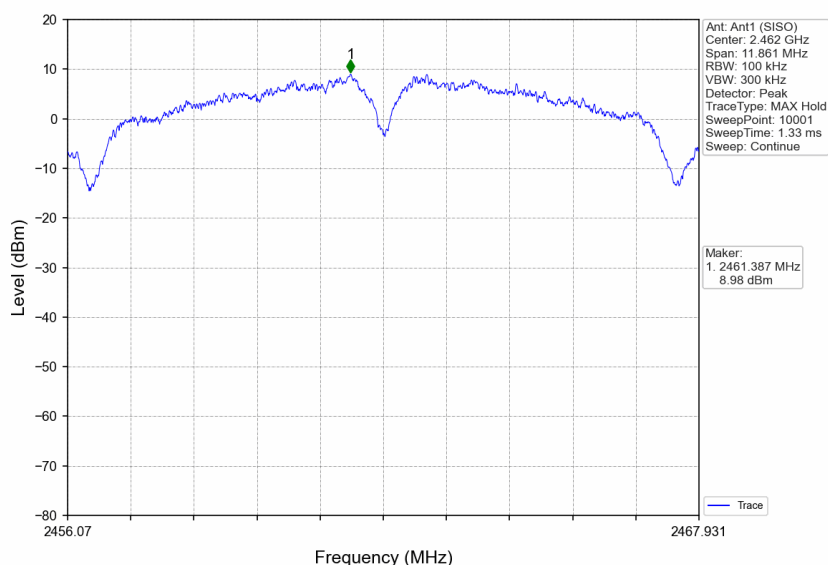
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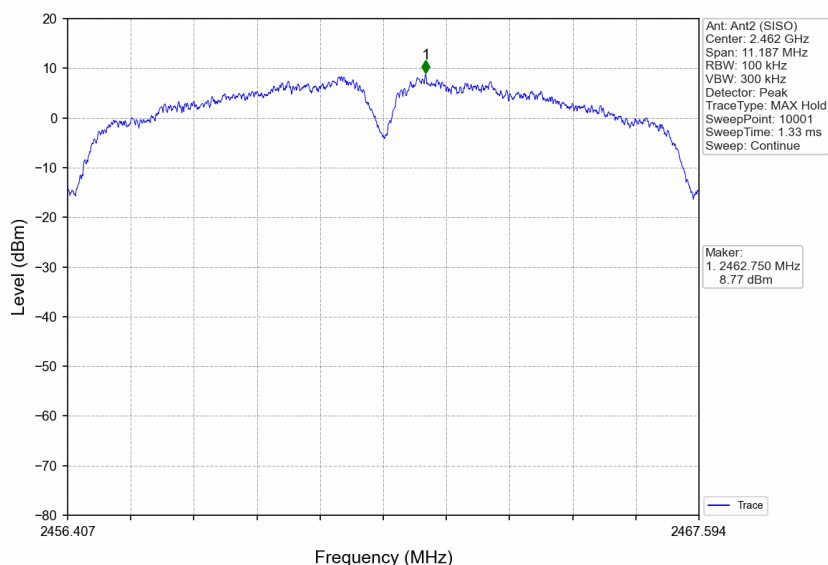
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802.11b\_HCH\_2462MHz\_Ant1 (SISO)\_NTNV



802.11b\_HCH\_2462MHz\_Ant2 (SISO)\_NTNV



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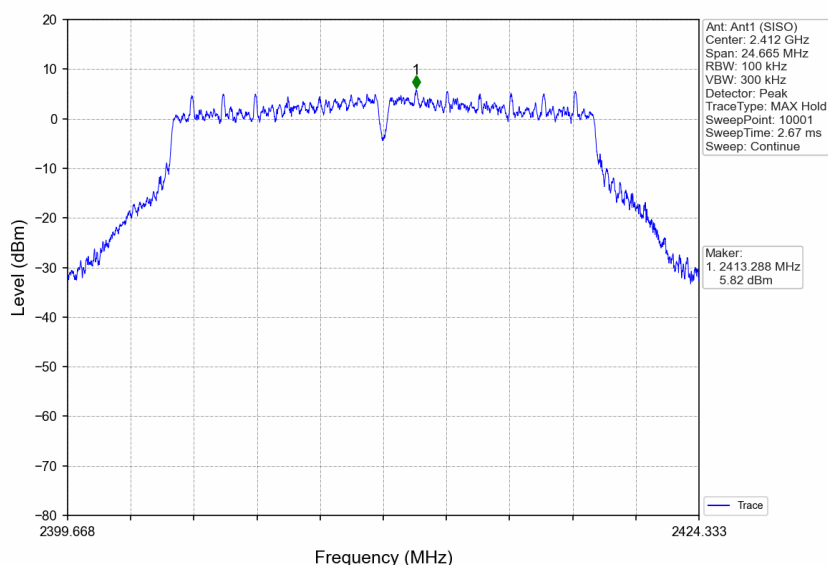
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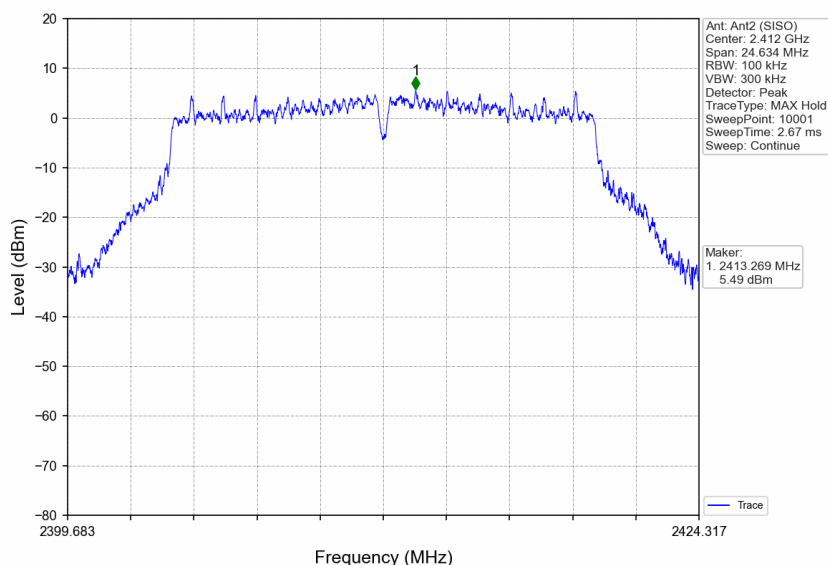
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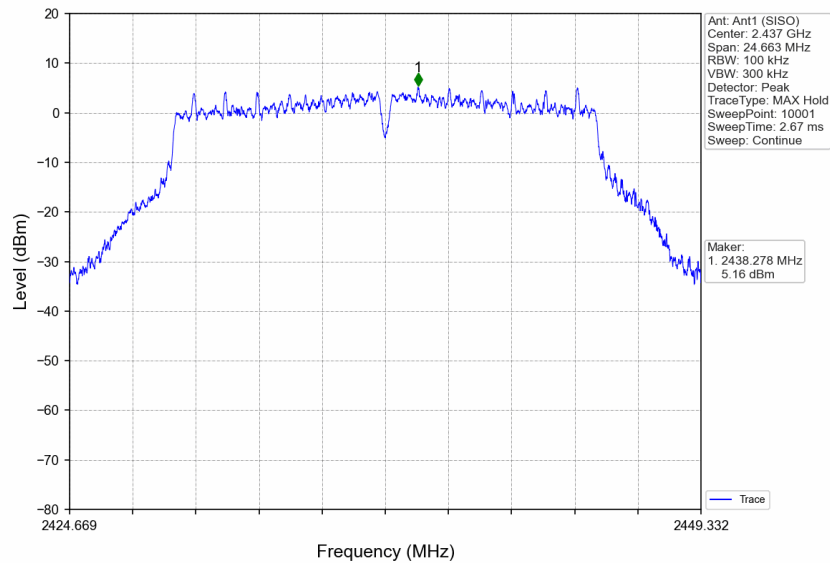
802.11g\_LCH\_2412MHz\_Ant1 (SISO)\_NTNV



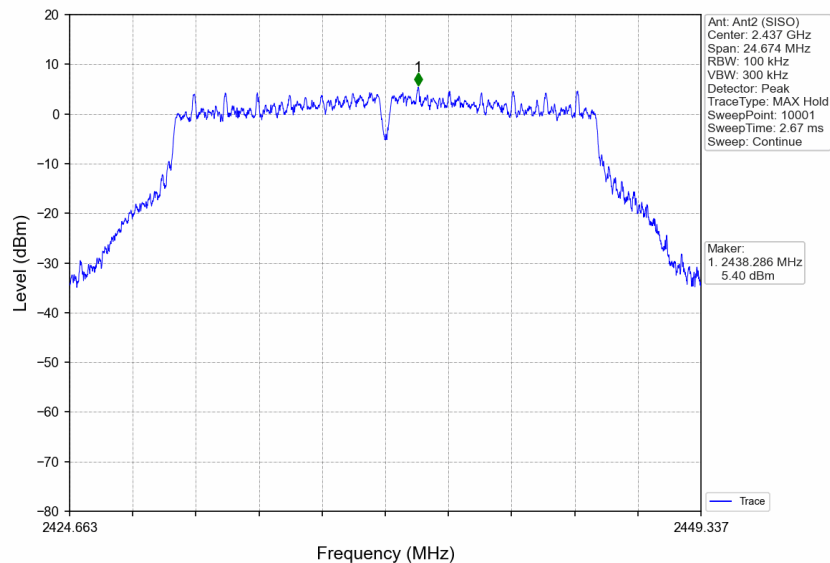
802.11g\_LCH\_2412MHz\_Ant2 (SISO)\_NTNV



802.11g\_MCH\_2437MHz\_Ant1 (SISO)\_NTNV



802.11g\_MCH\_2437MHz\_Ant2 (SISO)\_NTNV



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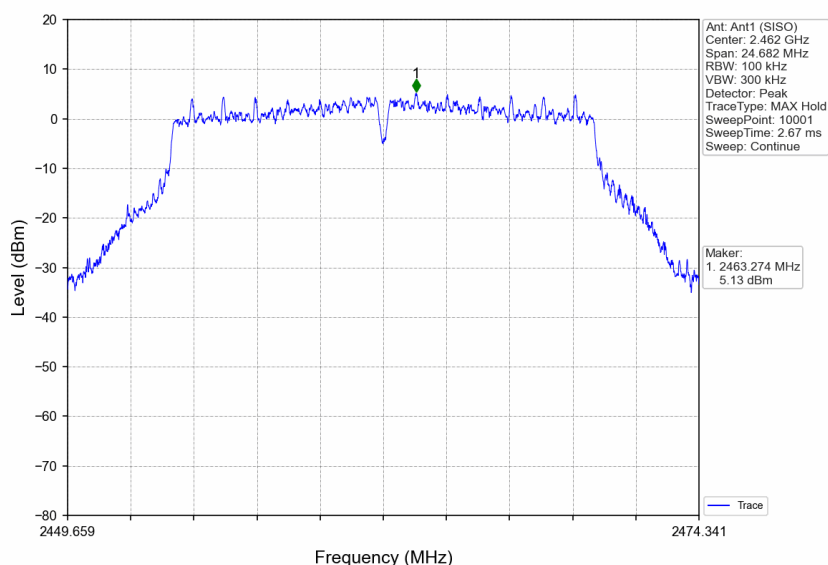
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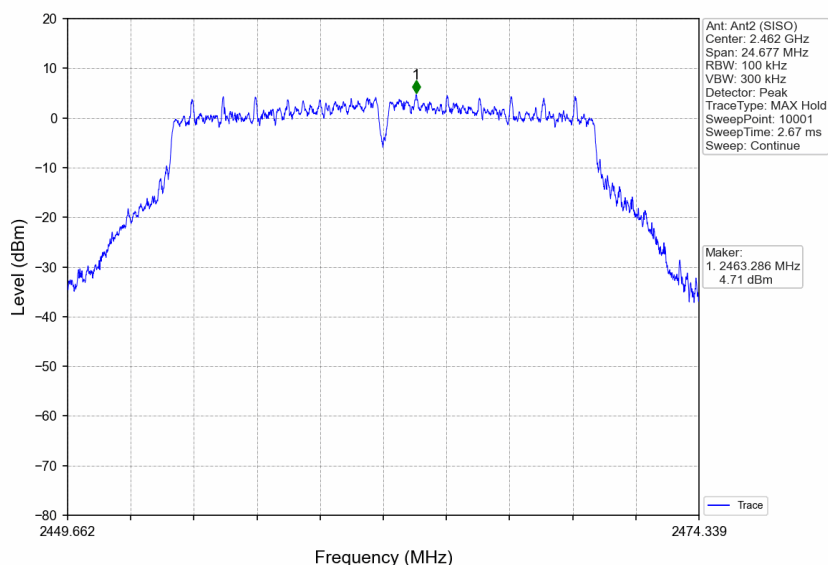
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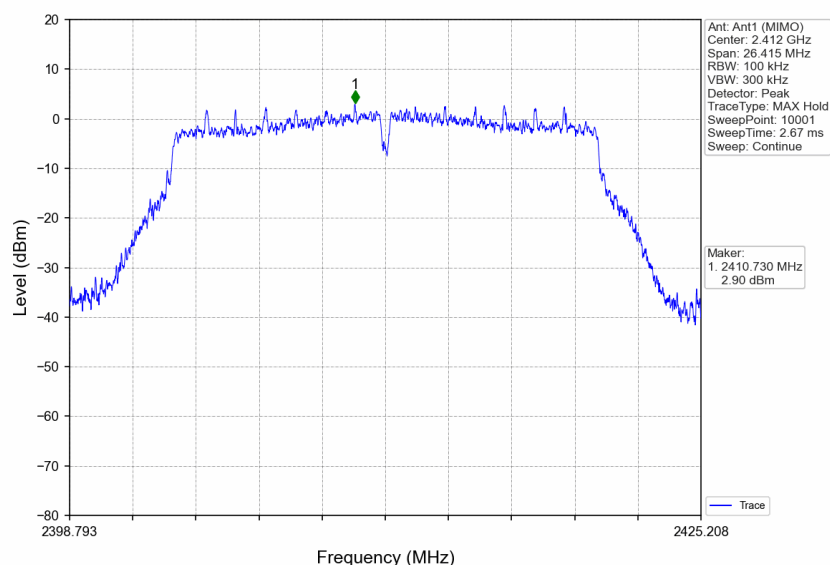
802.11g\_HCH\_2462MHz\_Ant1 (SISO)\_NTNV



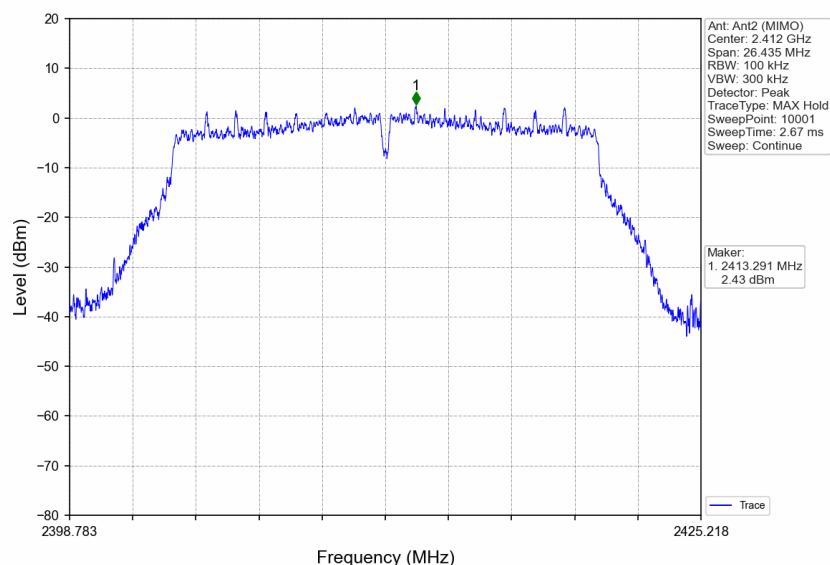
802.11g\_HCH\_2462MHz\_Ant2 (SISO)\_NTNV



802.11n(HT20)\_LCH\_2412MHz\_Ant1 (MIMO)\_NTNV



802.11n(HT20)\_LCH\_2412MHz\_Ant2 (MIMO)\_NTNV



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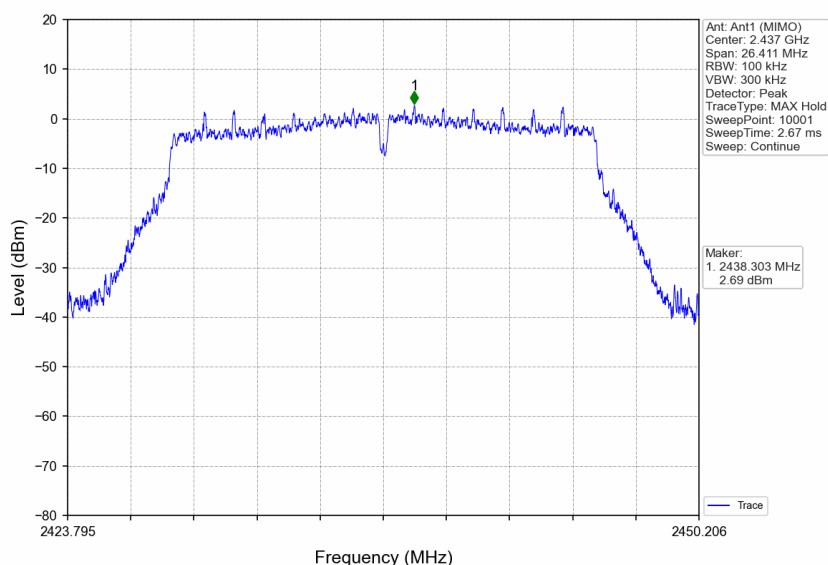
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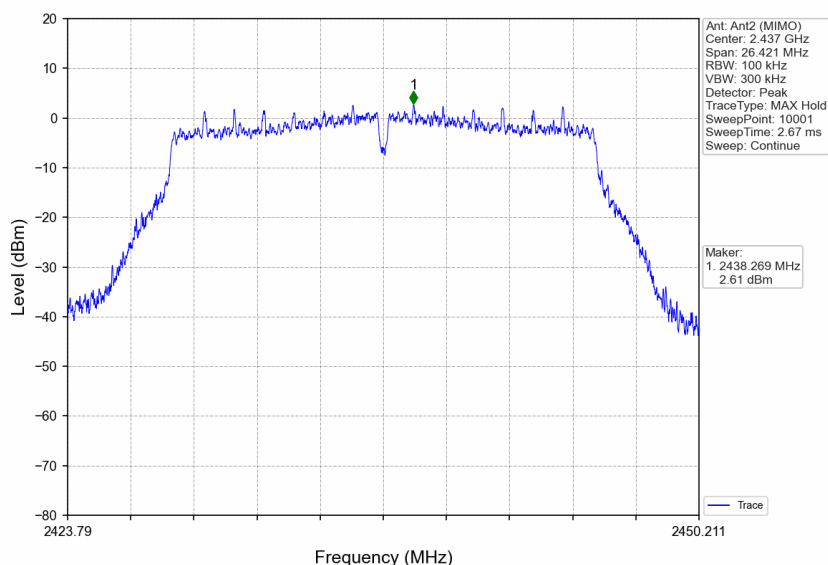
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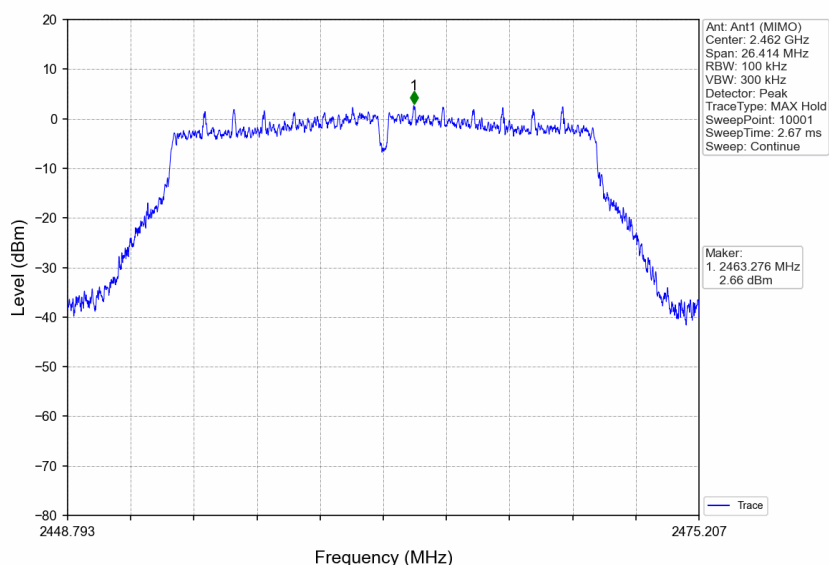
802.11n(HT20)\_MCH\_2437MHz\_Ant1 (MIMO)\_NTNV



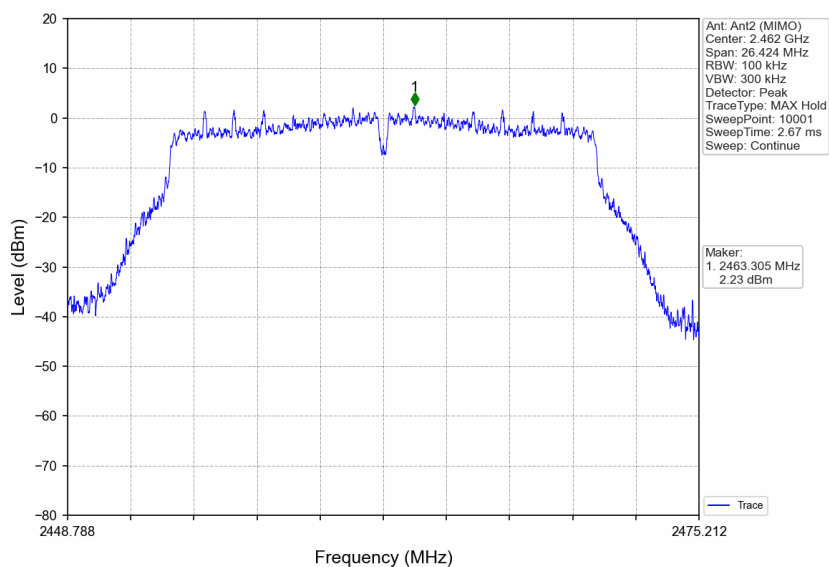
802.11n(HT20)\_MCH\_2437MHz\_Ant2 (MIMO)\_NTNV



802.11n(HT20)\_HCH\_2462MHz\_Ant1 (MIMO)\_NTNV



802.11n(HT20)\_HCH\_2462MHz\_Ant2 (MIMO)\_NTNV



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## 5.2 CSE

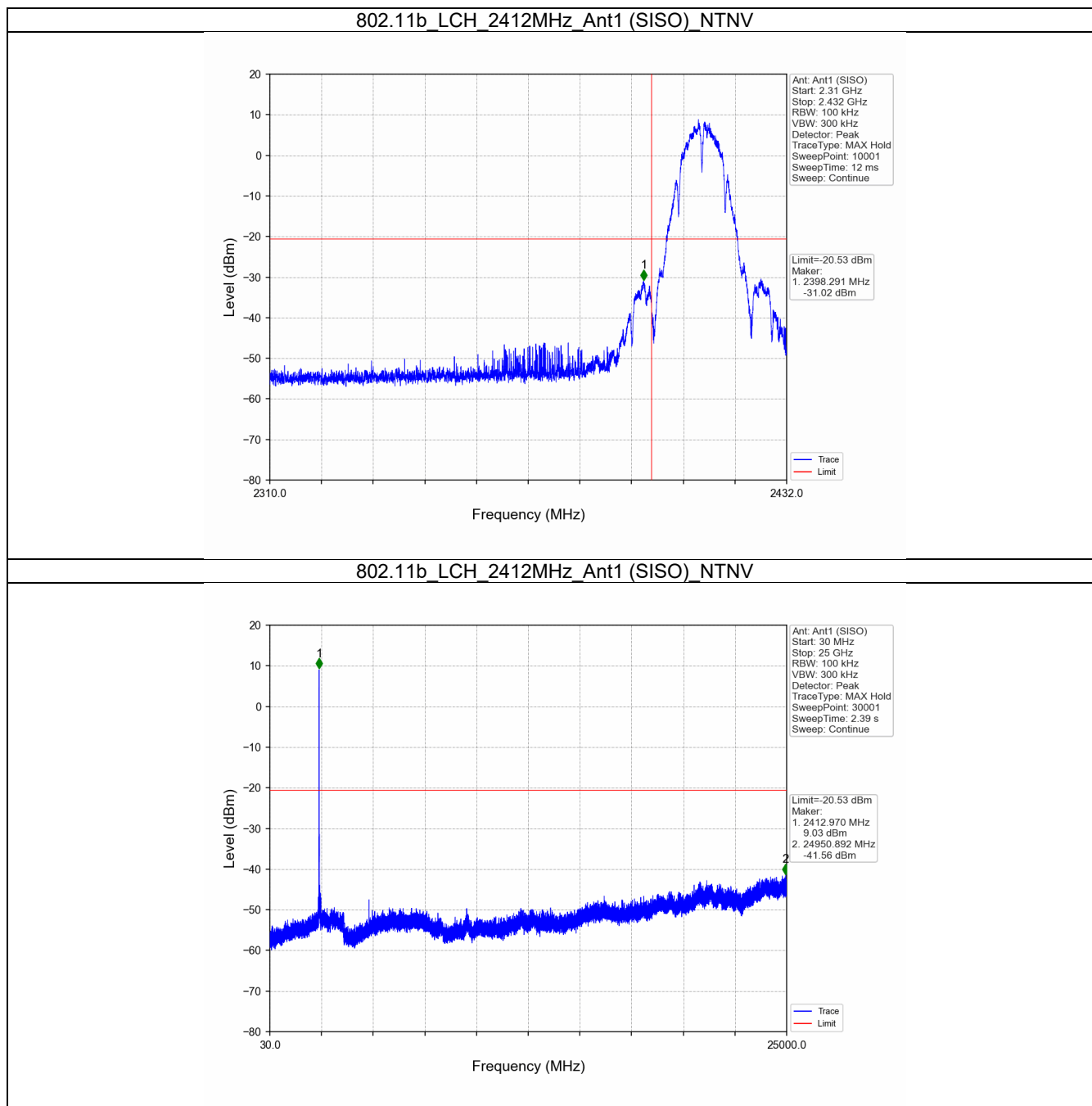
### 5.2.1 Test Result

| Mode           | TX Type | Frequency (MHz) | Ant | Level of Reference (dBm) | Limit (dBm) | Verdict |
|----------------|---------|-----------------|-----|--------------------------|-------------|---------|
| 802.11b        | SISO    | 2412            | 1   | 9.47                     | -20.53      | Pass    |
|                |         |                 | 2   | 8.77                     | -21.23      | Pass    |
|                |         | 2437            | 1   | 9.47                     | -20.53      | Pass    |
|                |         |                 | 2   | 8.77                     | -21.23      | Pass    |
|                |         | 2462            | 1   | 9.47                     | -20.53      | Pass    |
|                |         |                 | 2   | 8.77                     | -21.23      | Pass    |
| 802.11g        | SISO    | 2412            | 1   | 5.82                     | -24.18      | Pass    |
|                |         |                 | 2   | 5.49                     | -24.51      | Pass    |
|                |         | 2437            | 1   | 5.82                     | -24.18      | Pass    |
|                |         |                 | 2   | 5.49                     | -24.51      | Pass    |
|                |         | 2462            | 1   | 5.82                     | -24.18      | Pass    |
|                |         |                 | 2   | 5.49                     | -24.51      | Pass    |
| 802.11n (HT20) | MIMO    | 2412            | 1   | 2.90                     | -27.10      | Pass    |
|                |         |                 | 2   | 2.61                     | -27.39      | Pass    |
|                |         | 2437            | 1   | 2.90                     | -27.10      | Pass    |
|                |         |                 | 2   | 2.61                     | -27.39      | Pass    |
|                |         | 2462            | 1   | 2.90                     | -27.10      | Pass    |
|                |         |                 | 2   | 2.61                     | -27.39      | Pass    |

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.



## 5.2.2 Test Graph



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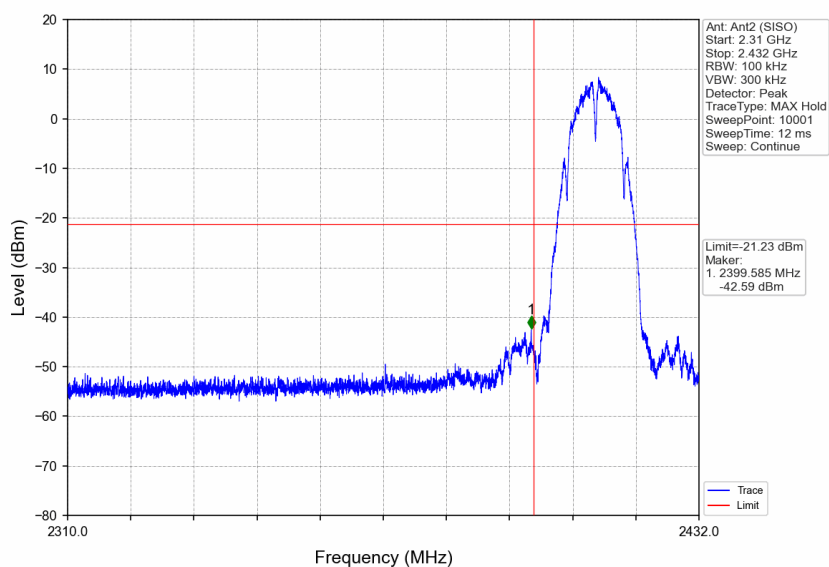
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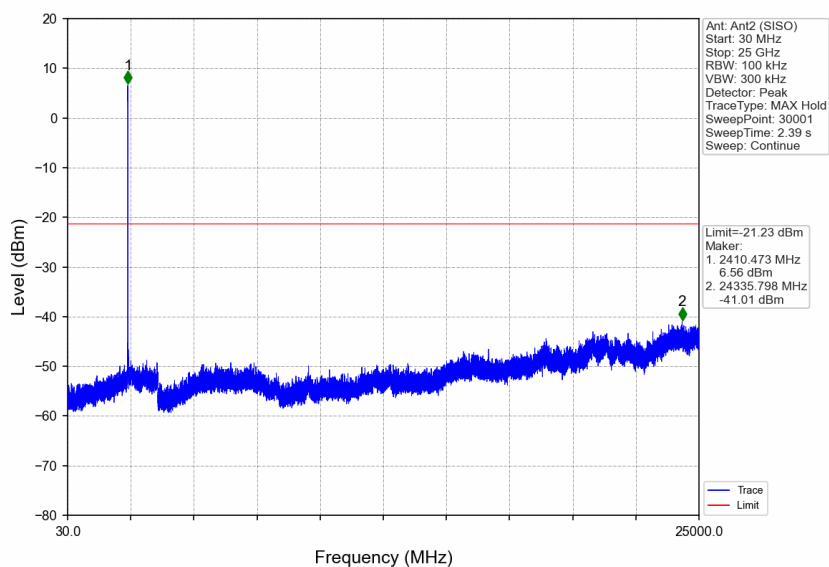
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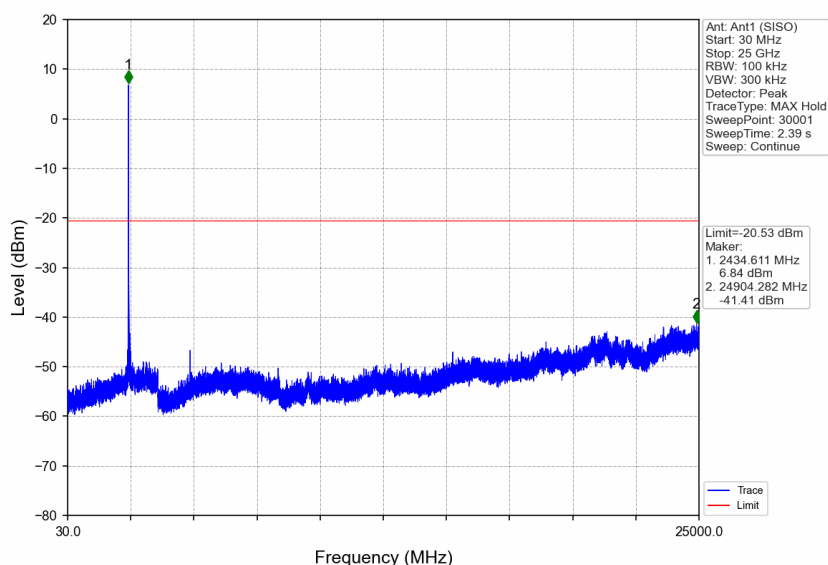
802.11b\_LCH\_2412MHz\_Ant2 (SISO)\_NTNV



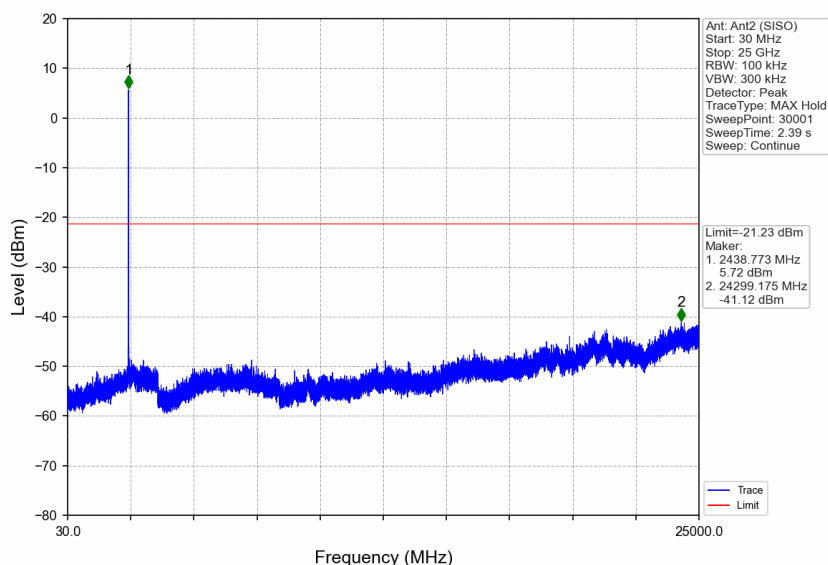
802.11b\_LCH\_2412MHz\_Ant2 (SISO)\_NTNV



802.11b\_MCH\_2437MHz\_Ant1 (SISO)\_NTNV



802.11b\_MCH\_2437MHz\_Ant2 (SISO)\_NTNV



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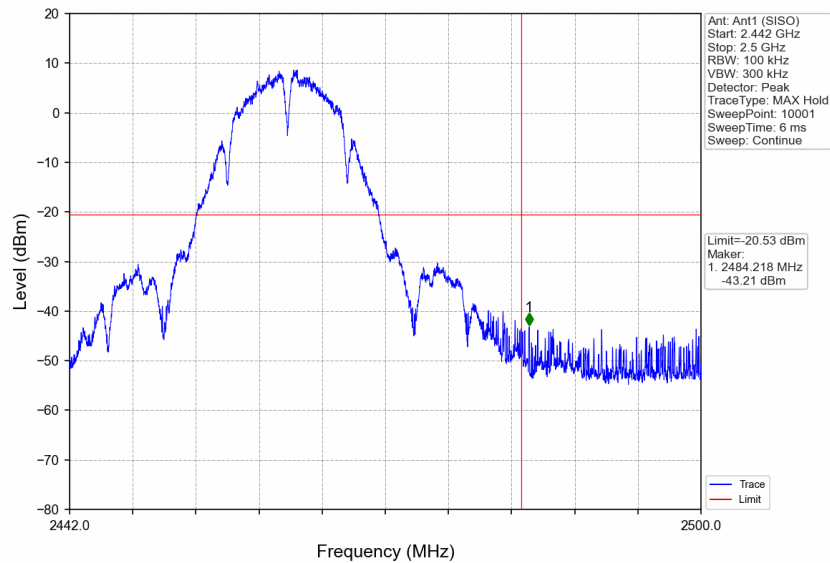
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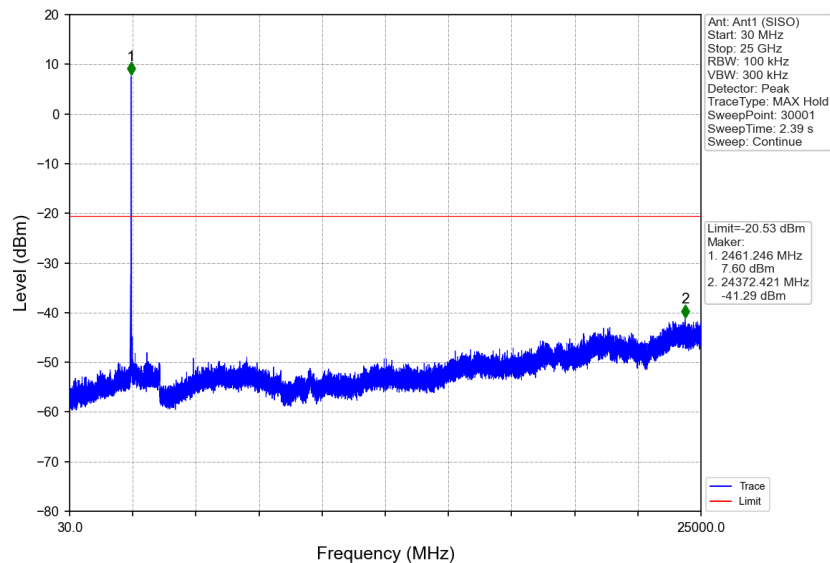
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802.11b\_HCH\_2462MHz\_Ant1 (SISO)\_NTNV



802.11b\_HCH\_2462MHz\_Ant1 (SISO)\_NTNV



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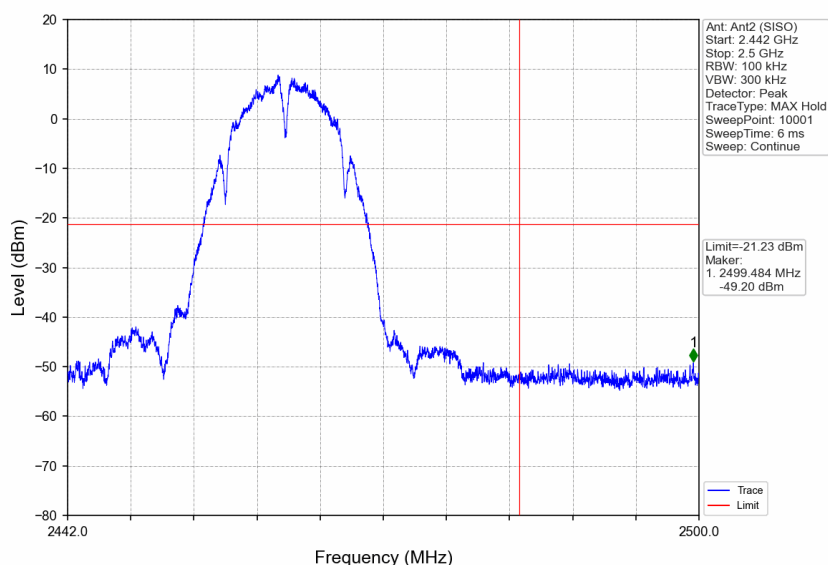
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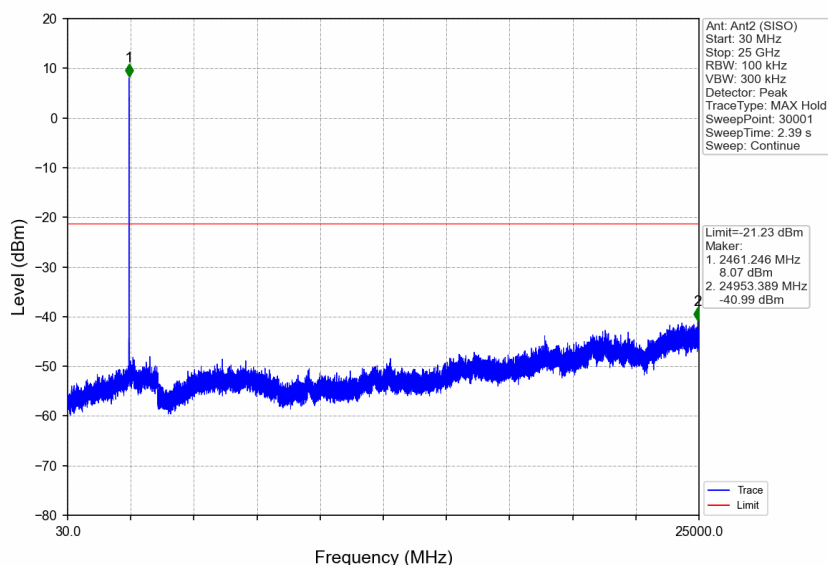
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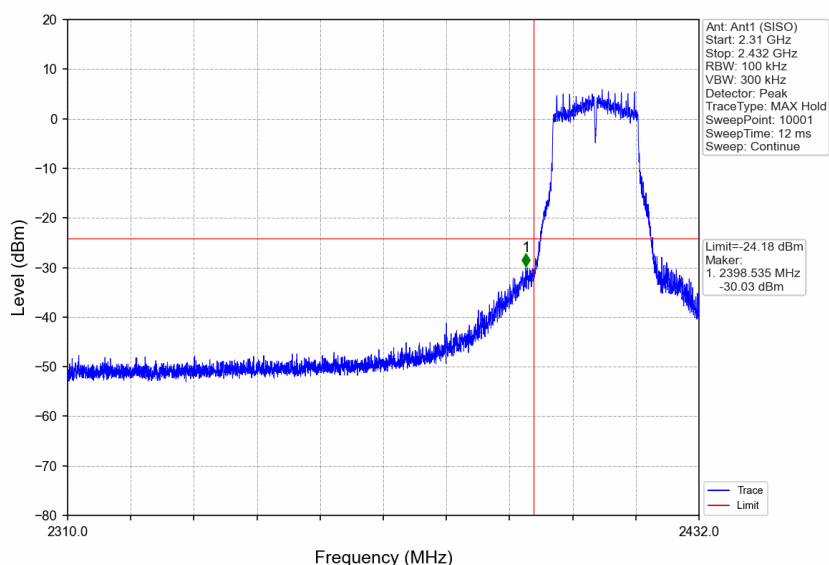
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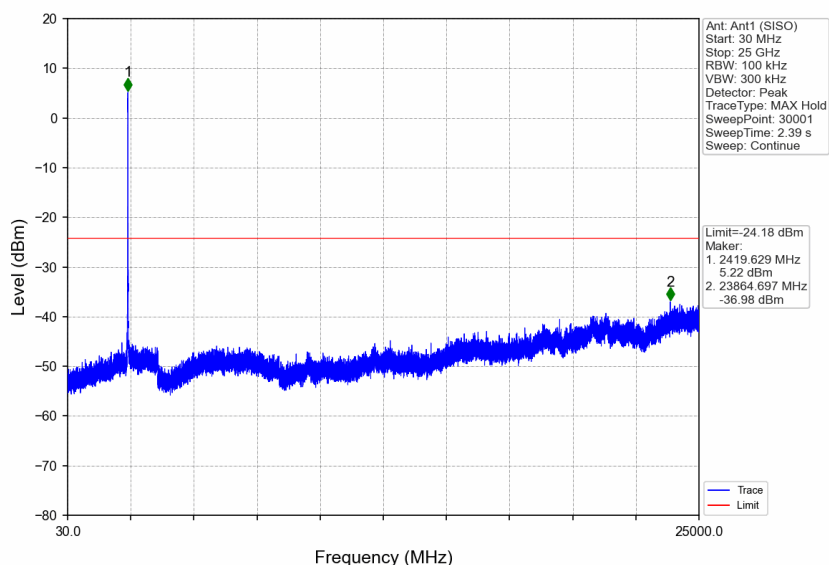
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802.11g\_LCH\_2412MHz\_Ant1 (SISO)\_NTNV



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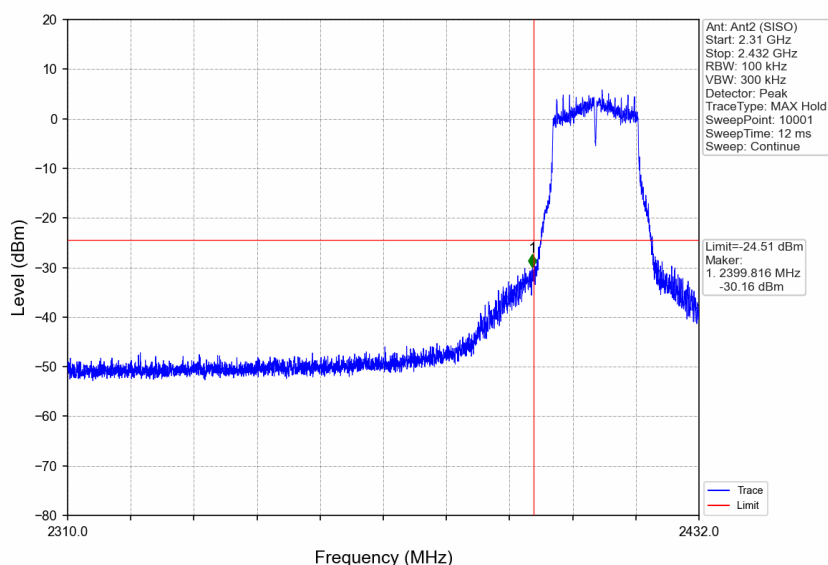
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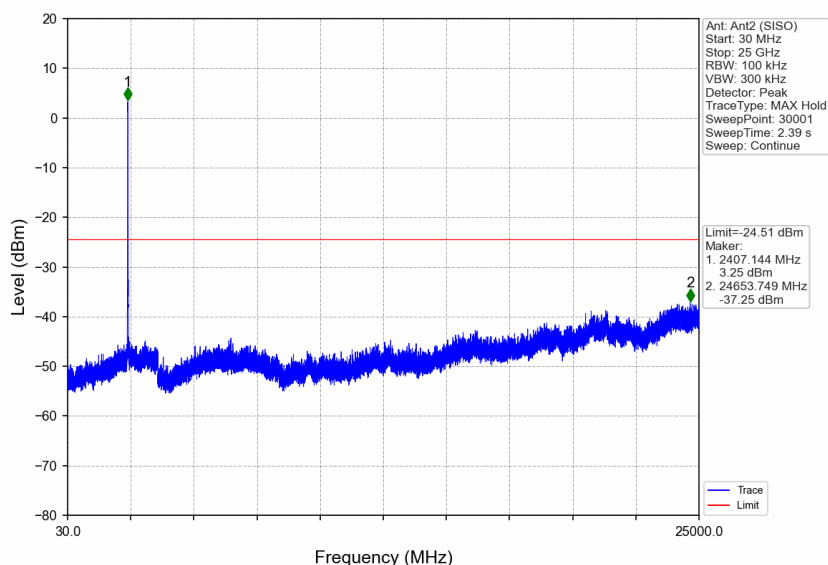
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802.11g\_LCH\_2412MHz\_Ant2 (SISO)\_NTNV



802.11g\_LCH\_2412MHz\_Ant2 (SISO)\_NTNV



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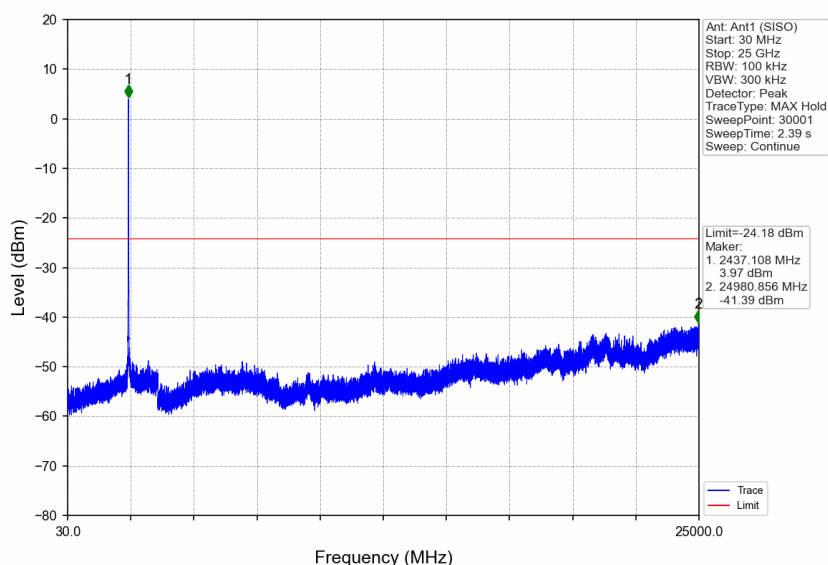
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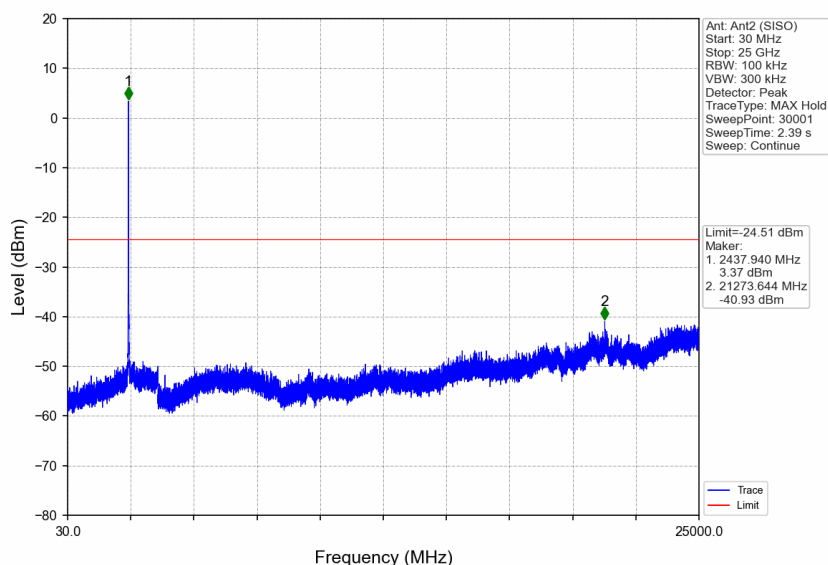
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802.11g\_MCH\_2437MHz\_Ant1 (SISO)\_NTNV



802.11g\_MCH\_2437MHz\_Ant2 (SISO)\_NTNV



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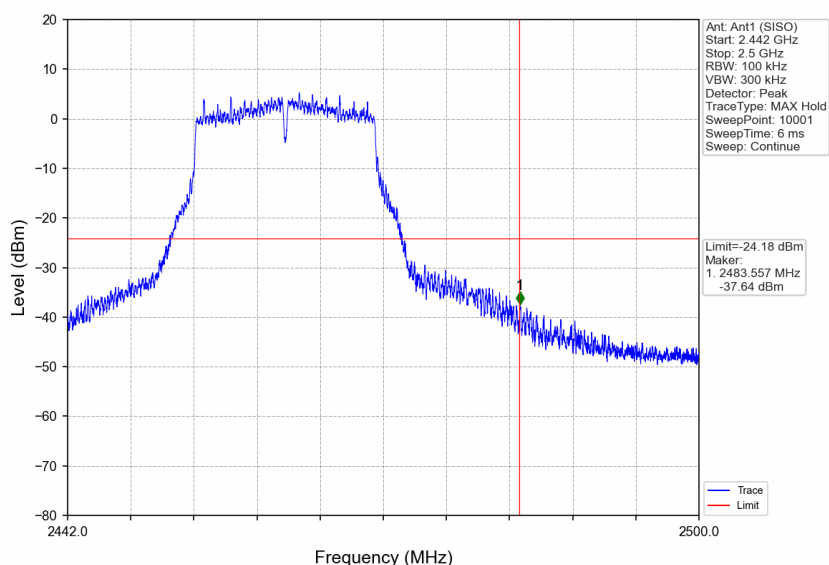
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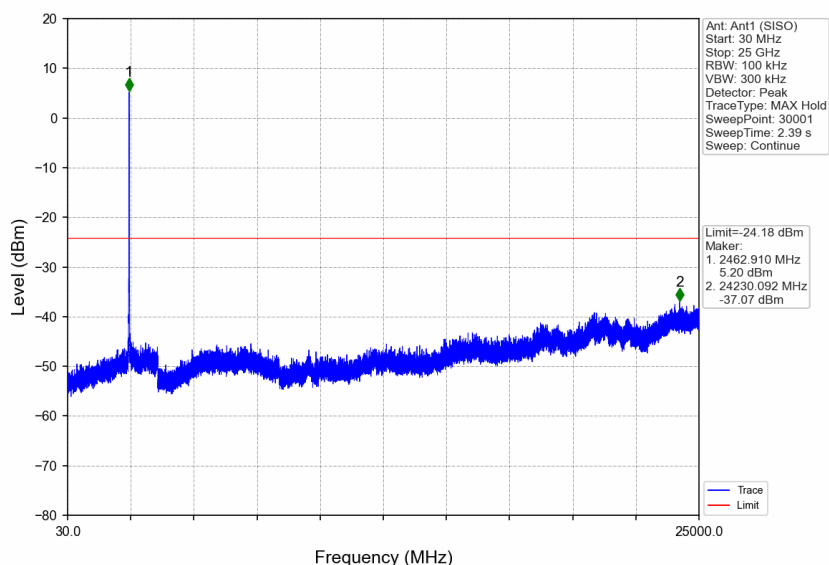
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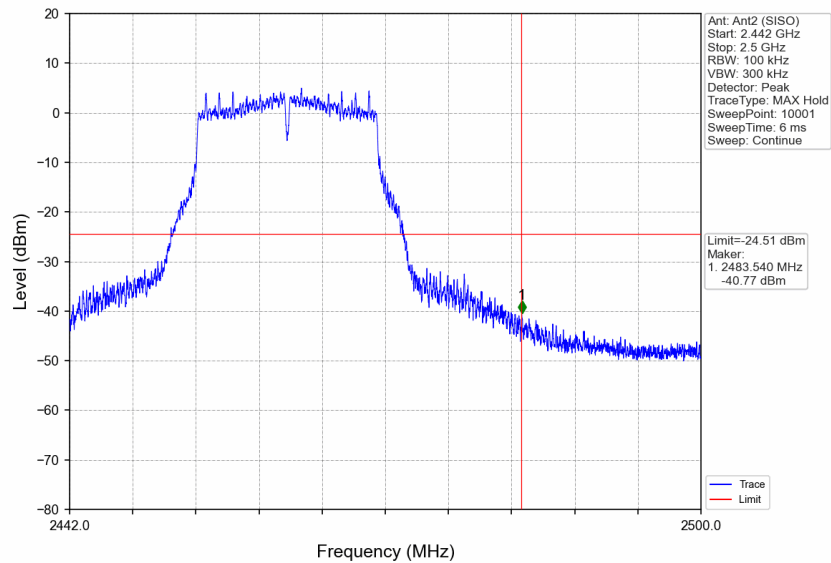
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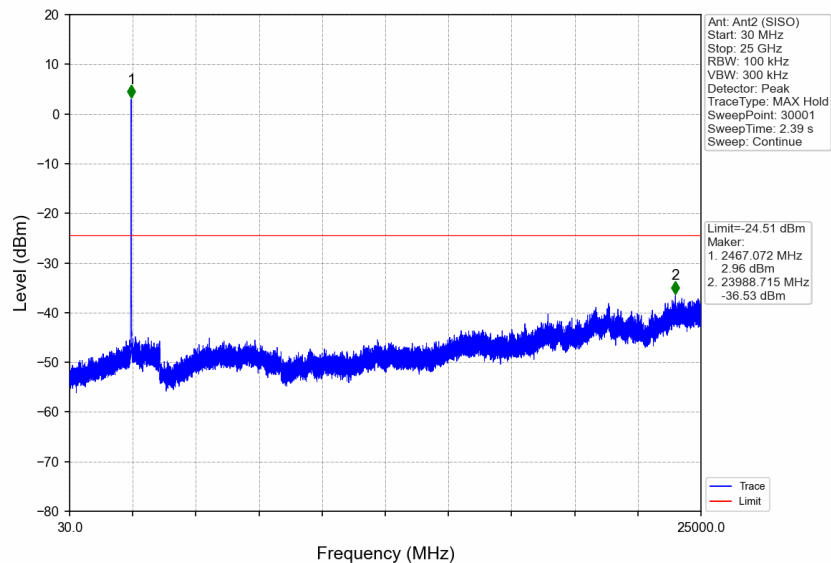
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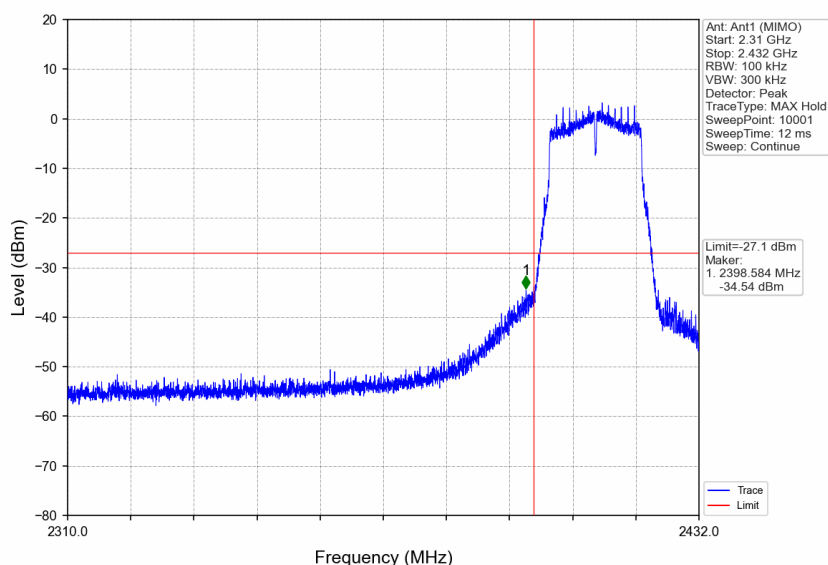
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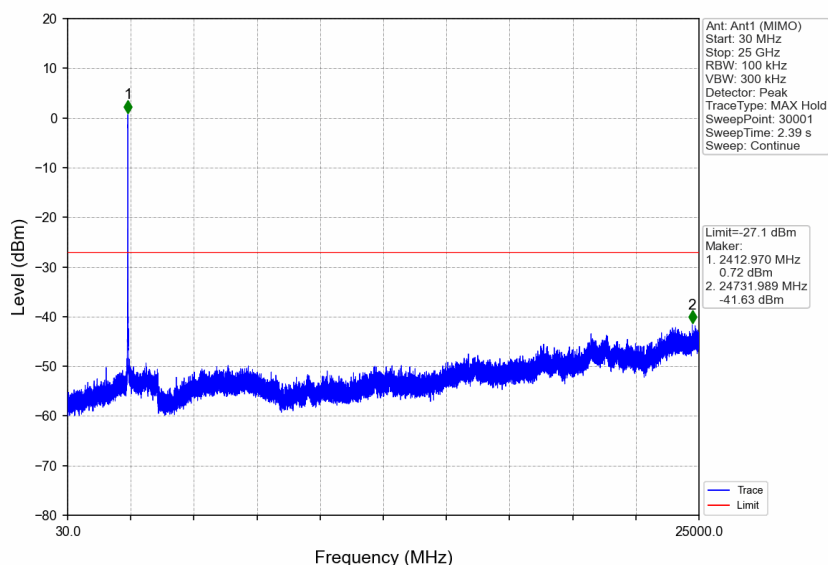
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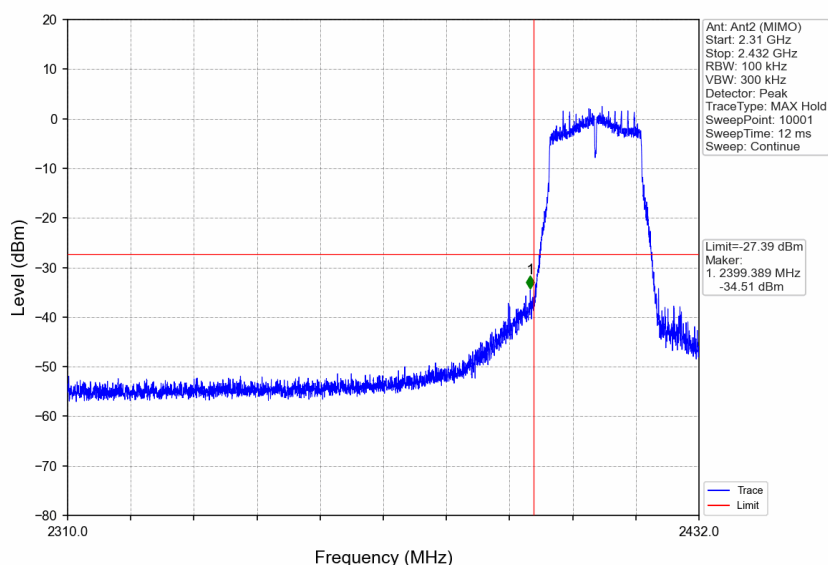
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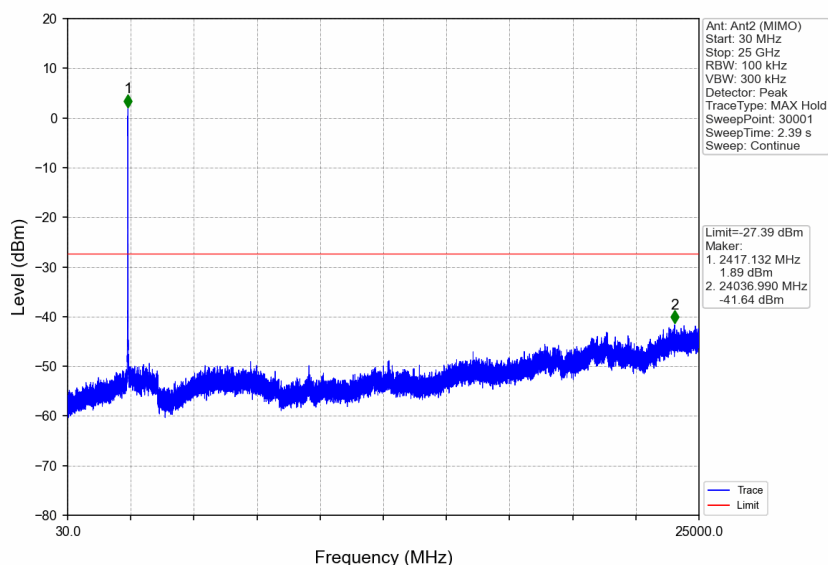
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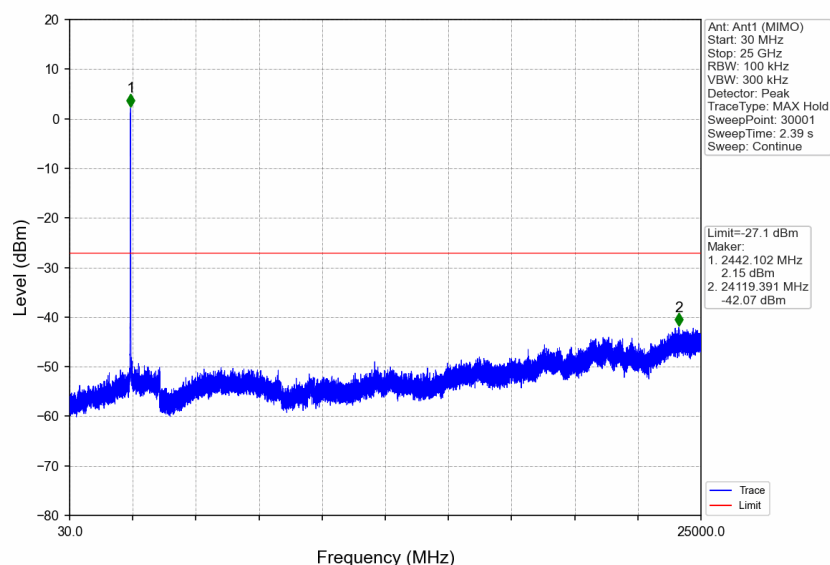
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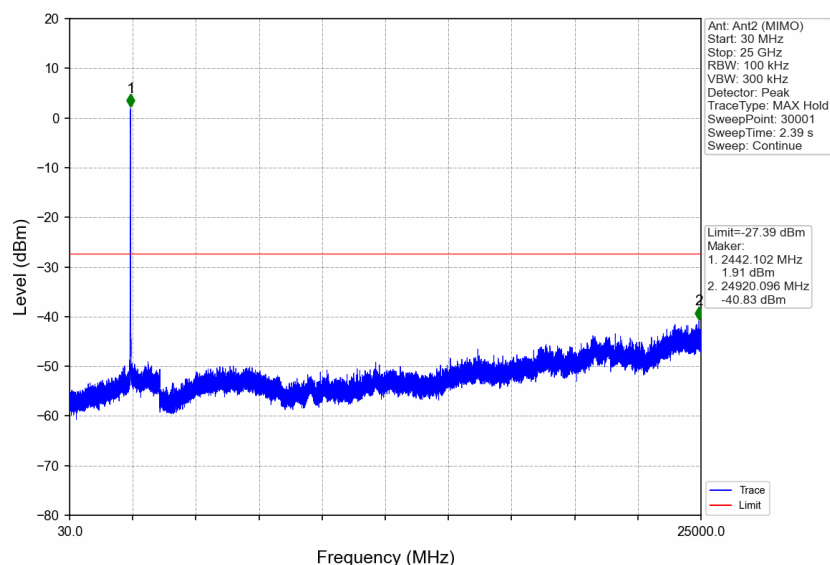
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802.11n(HT20)\_MCH\_2437MHz\_Ant1 (MIMO)\_NTNV



802.11n(HT20)\_MCH\_2437MHz\_Ant2 (MIMO)\_NTNV



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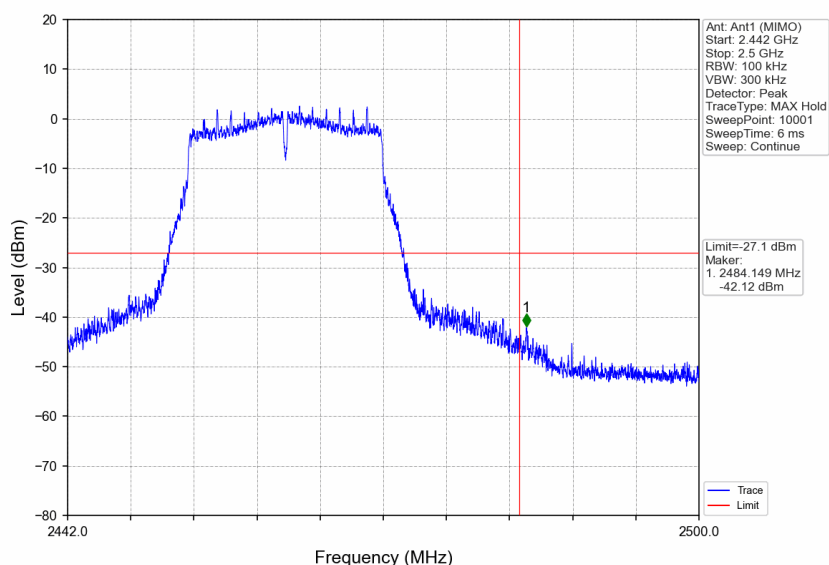
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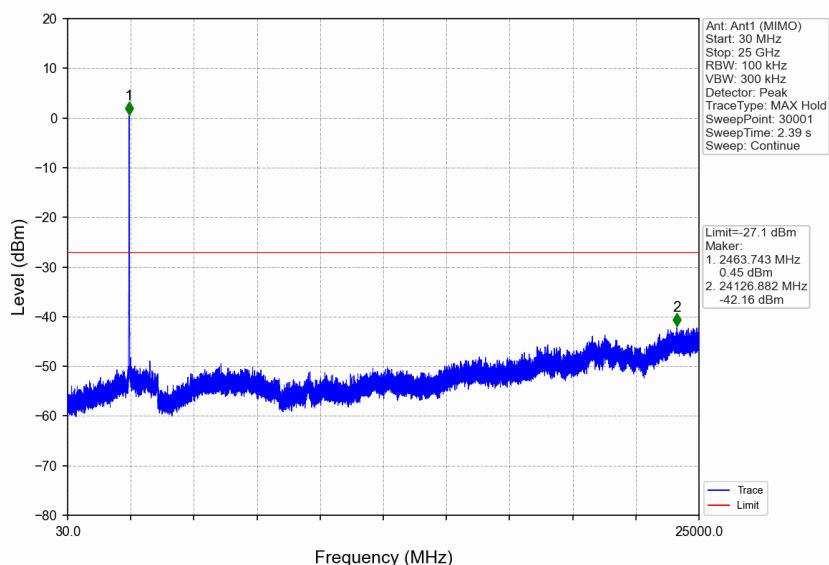
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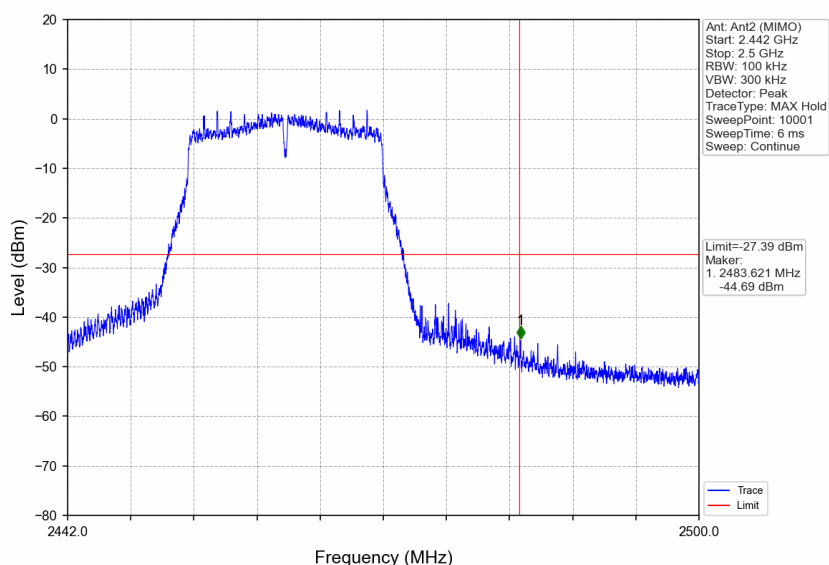
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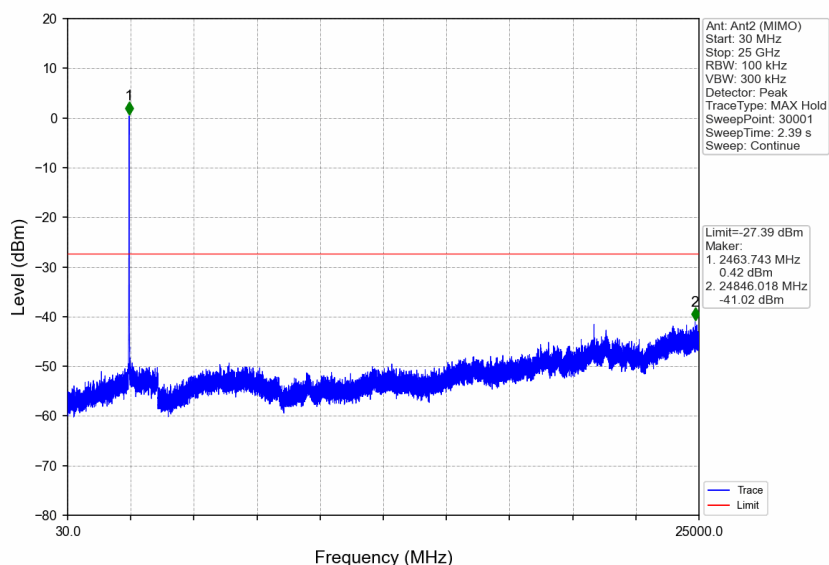
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