

## Appendix for 15.247

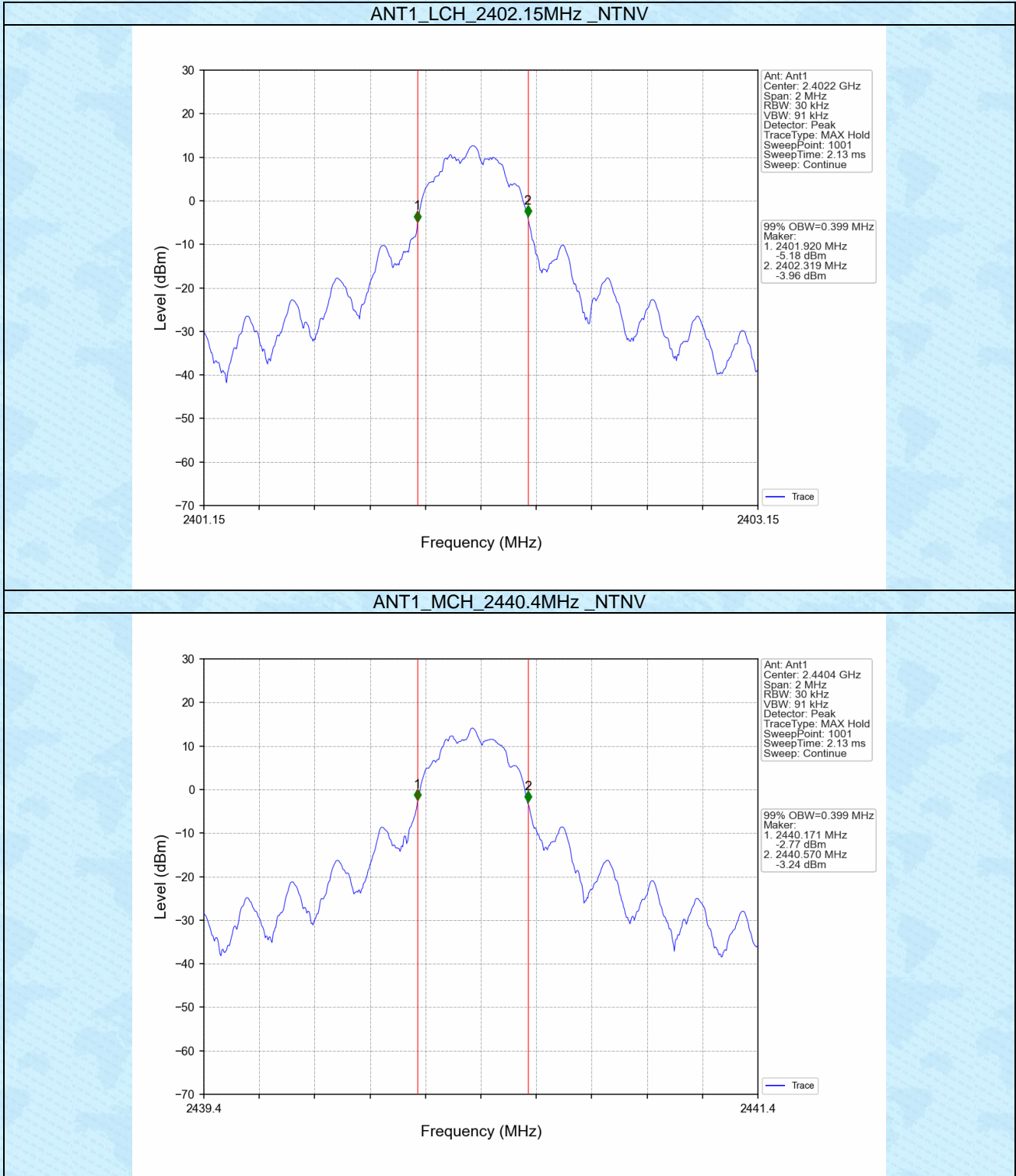
### 1. Bandwidth

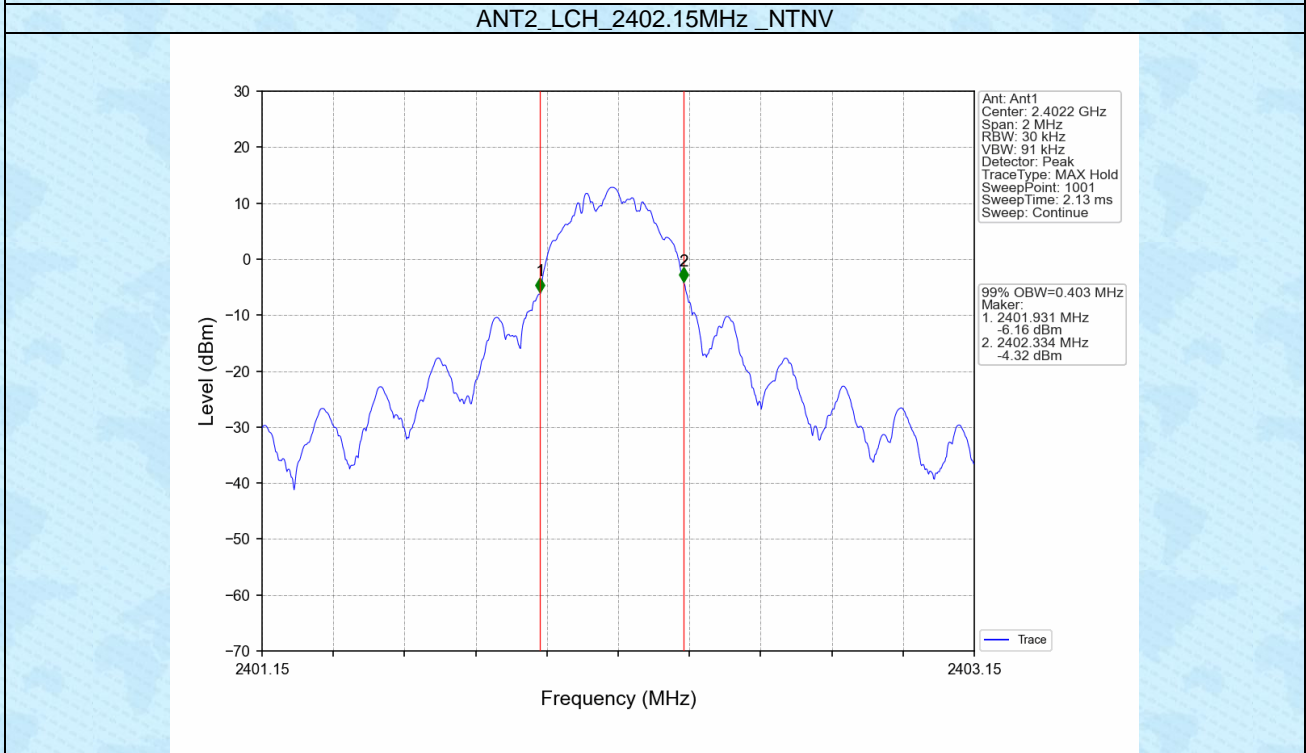
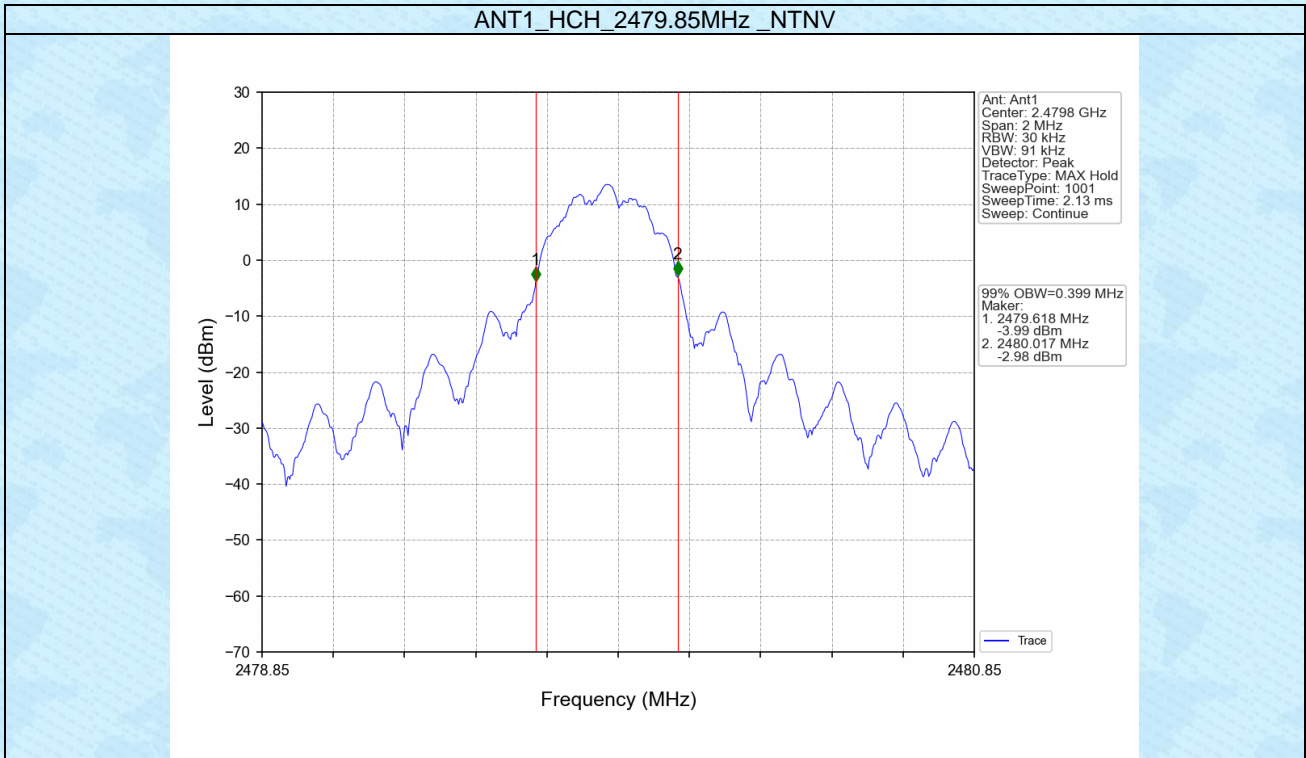
#### 1.1 OBW

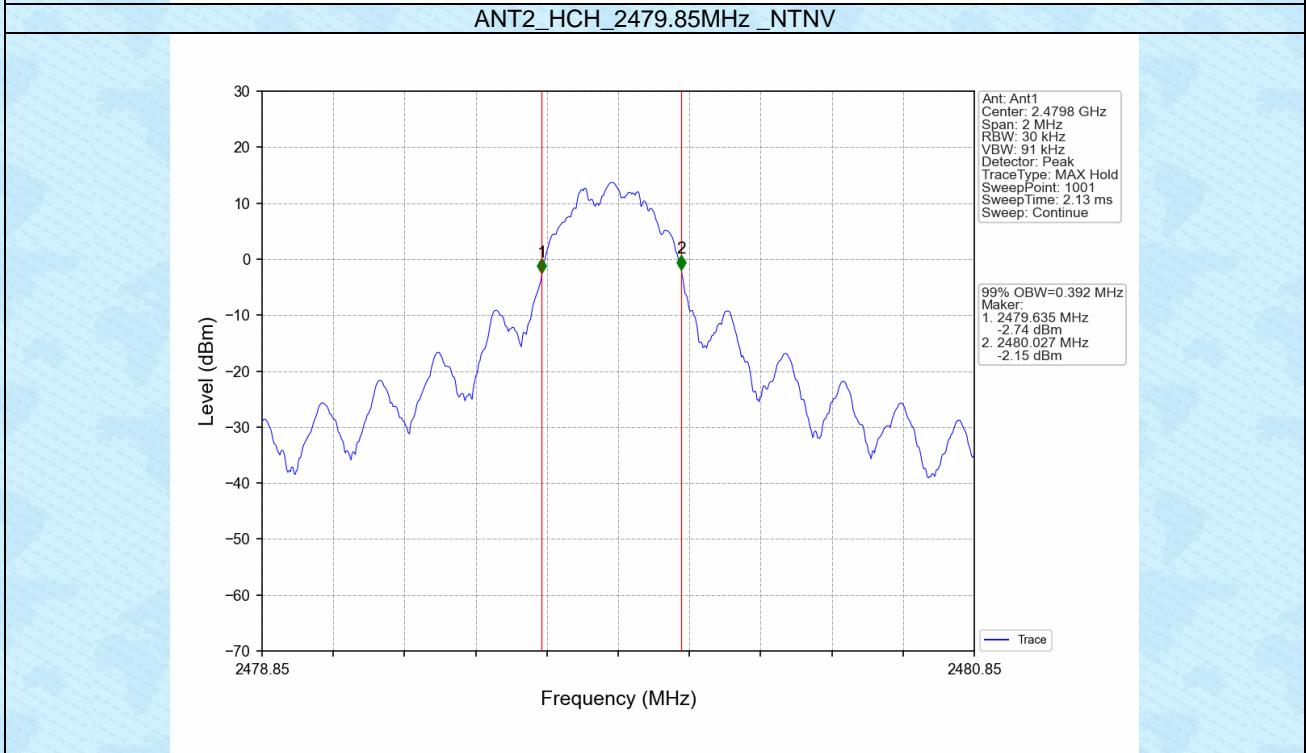
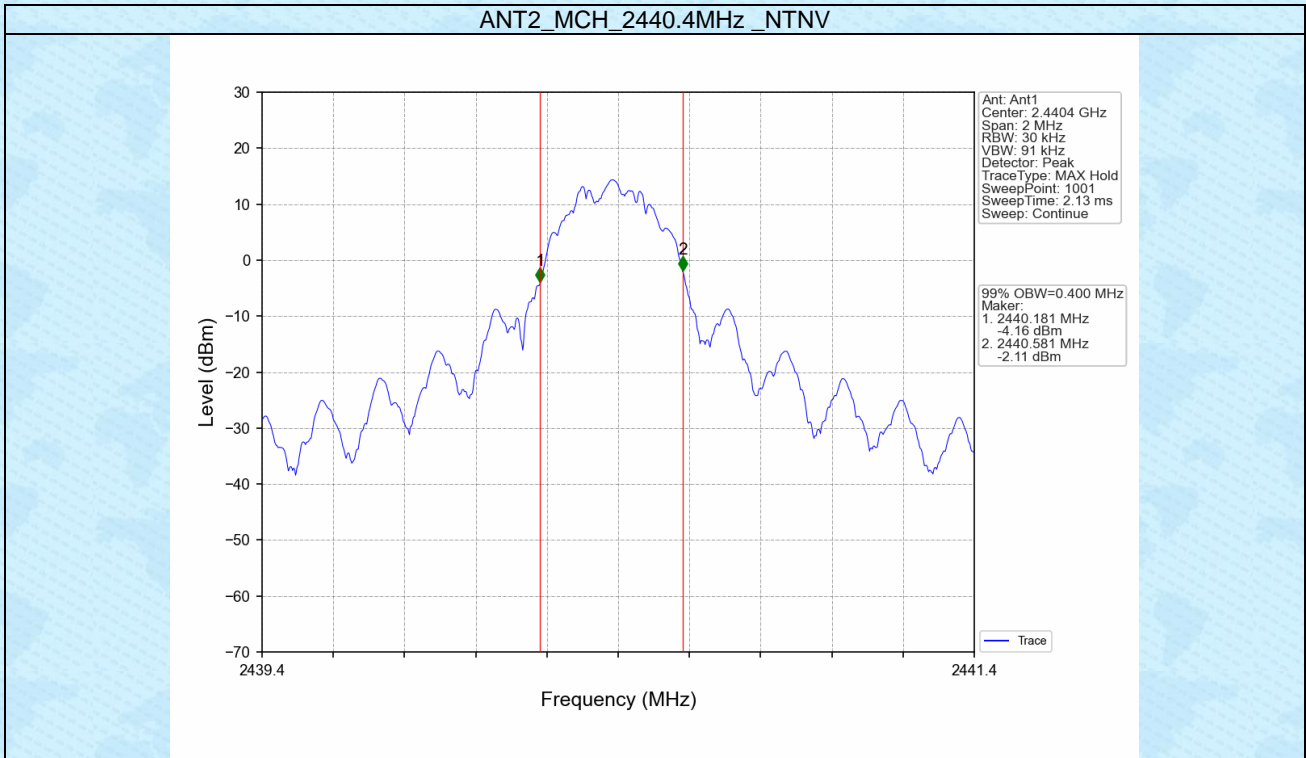
##### 1.1.1 Test Result

| Mode | TX Type | Frequency (MHz) | ANT  | 99% Occupied Bandwidth (MHz) | Verdict |
|------|---------|-----------------|------|------------------------------|---------|
|      |         |                 |      | Result                       |         |
| GMSK | SISO    | 2402.15         | ANT1 | 0.399                        | Pass    |
|      |         | 2440.4          | ANT1 | 0.399                        | Pass    |
|      |         | 2479.85         | ANT1 | 0.399                        | Pass    |
| GMSK | SISO    | 2402.15         | ANT2 | 0.403                        | Pass    |
|      |         | 2440.4          | ANT2 | 0.400                        | Pass    |
|      |         | 2479.85         | ANT2 | 0.392                        | Pass    |

## 1.1.2 Test Graph







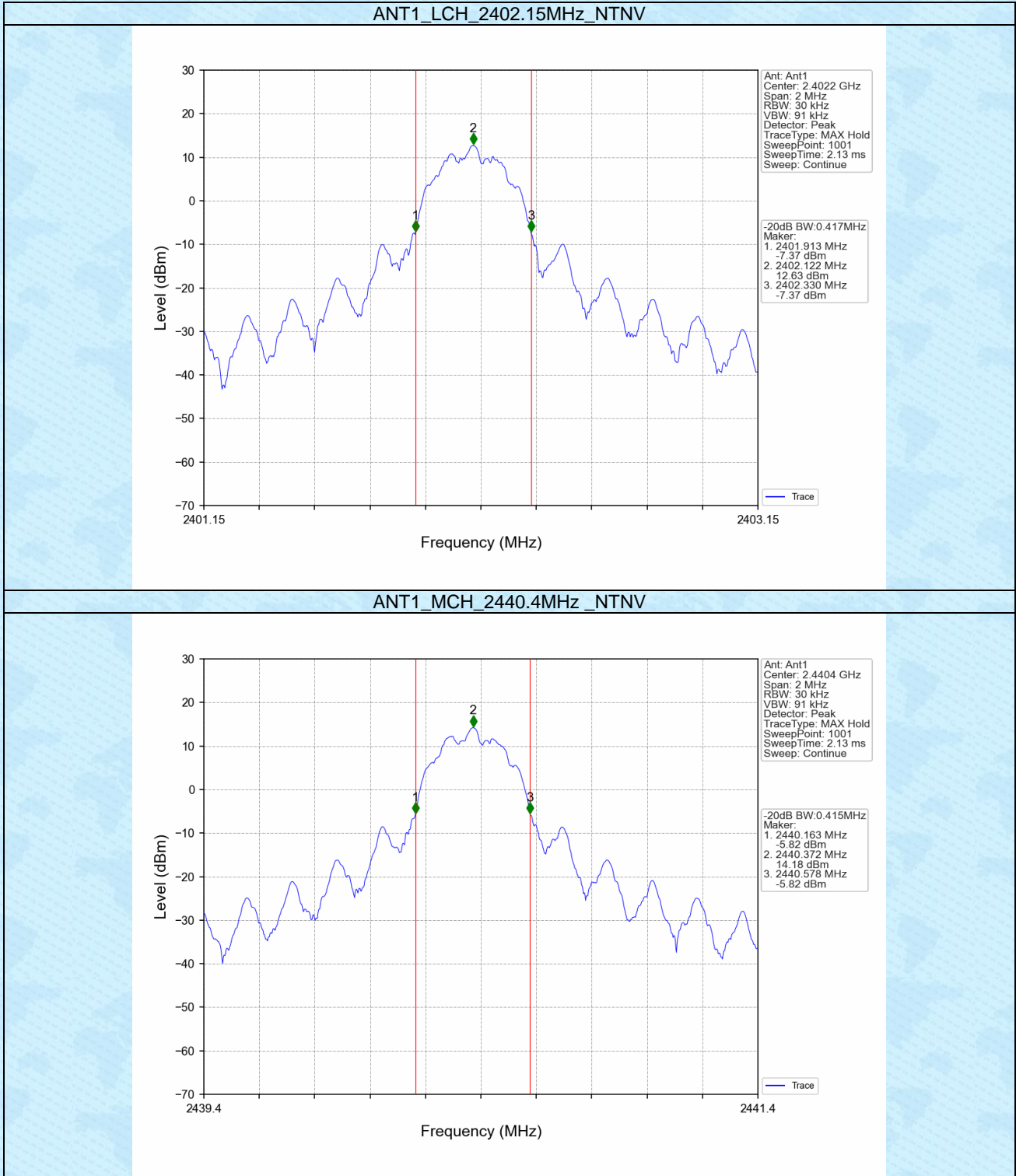


## 1.2 20dB BW

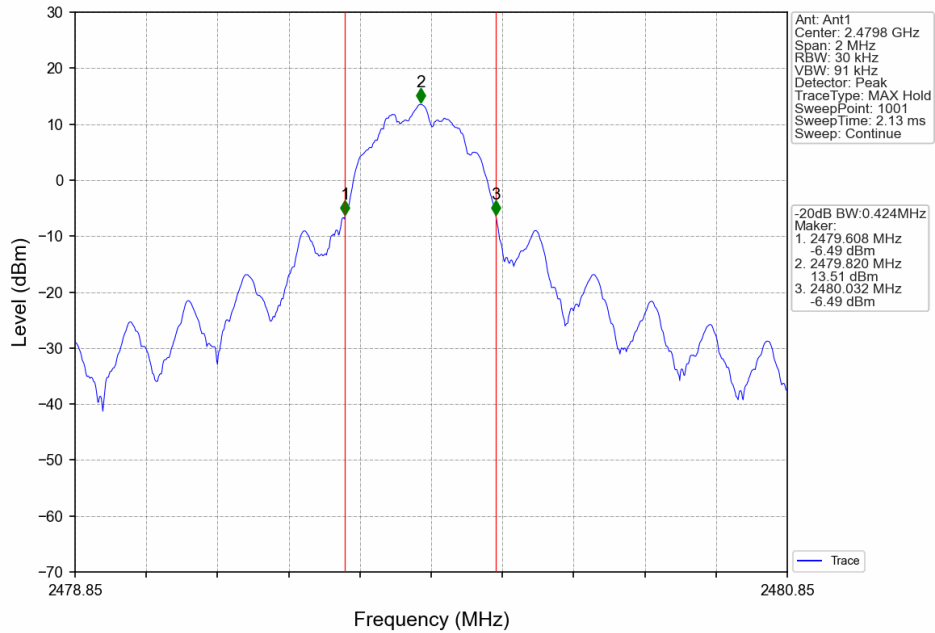
### 1.2.1 Test Result

| Mode | TX Type | Frequency (MHz) | ANT  | 20dB Bandwidth (MHz) | Verdict |
|------|---------|-----------------|------|----------------------|---------|
|      |         |                 |      | Result               |         |
| GMSK | SISO    | 2402.15         | ANT1 | 0.417                | Pass    |
|      |         | 2440.4          | ANT1 | 0.415                | Pass    |
|      |         | 2479.85         | ANT1 | 0.424                | Pass    |
| GMSK | SISO    | 2402.15         | ANT2 | 0.432                | Pass    |
|      |         | 2440.4          | ANT2 | 0.431                | Pass    |
|      |         | 2479.85         | ANT2 | 0.424                | Pass    |

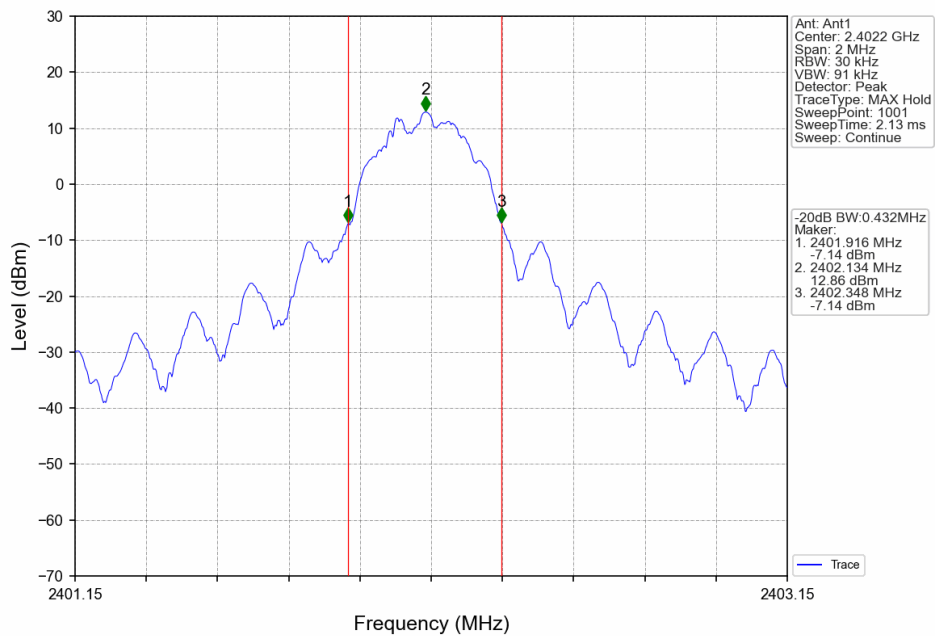
## 1.2.2 Test Graph

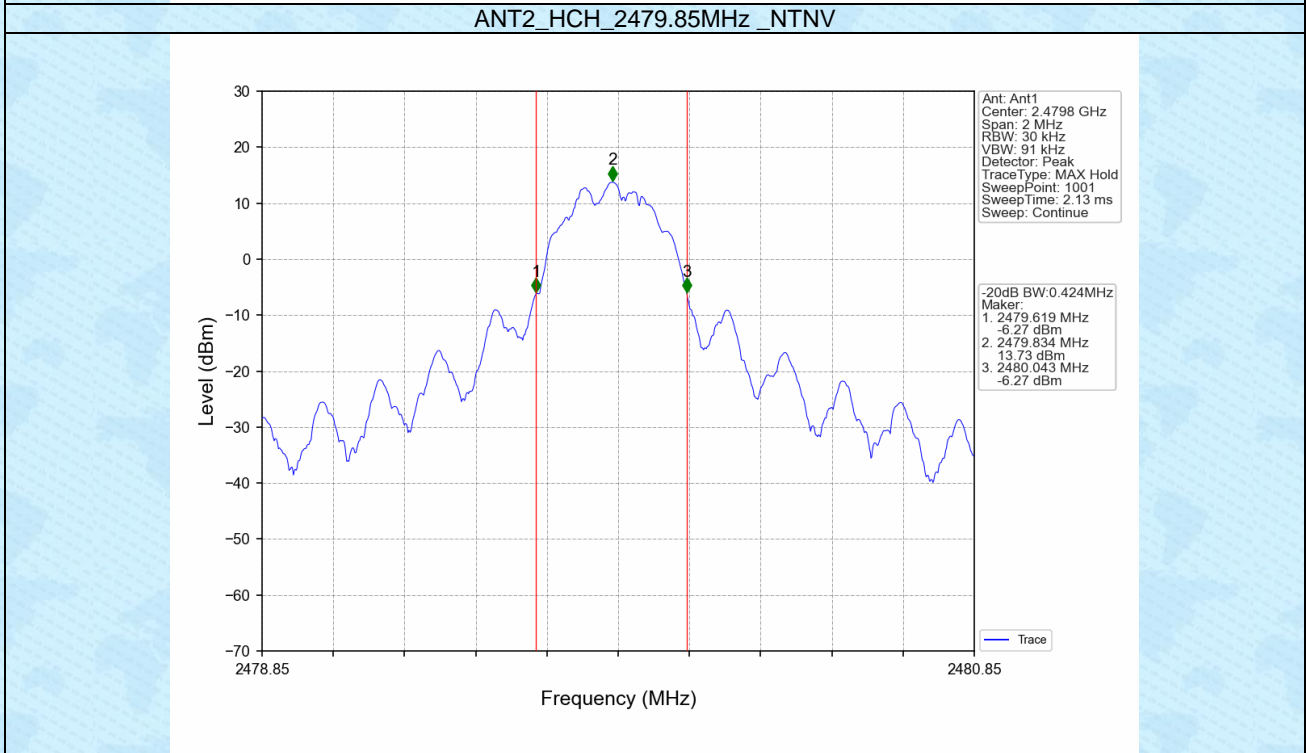
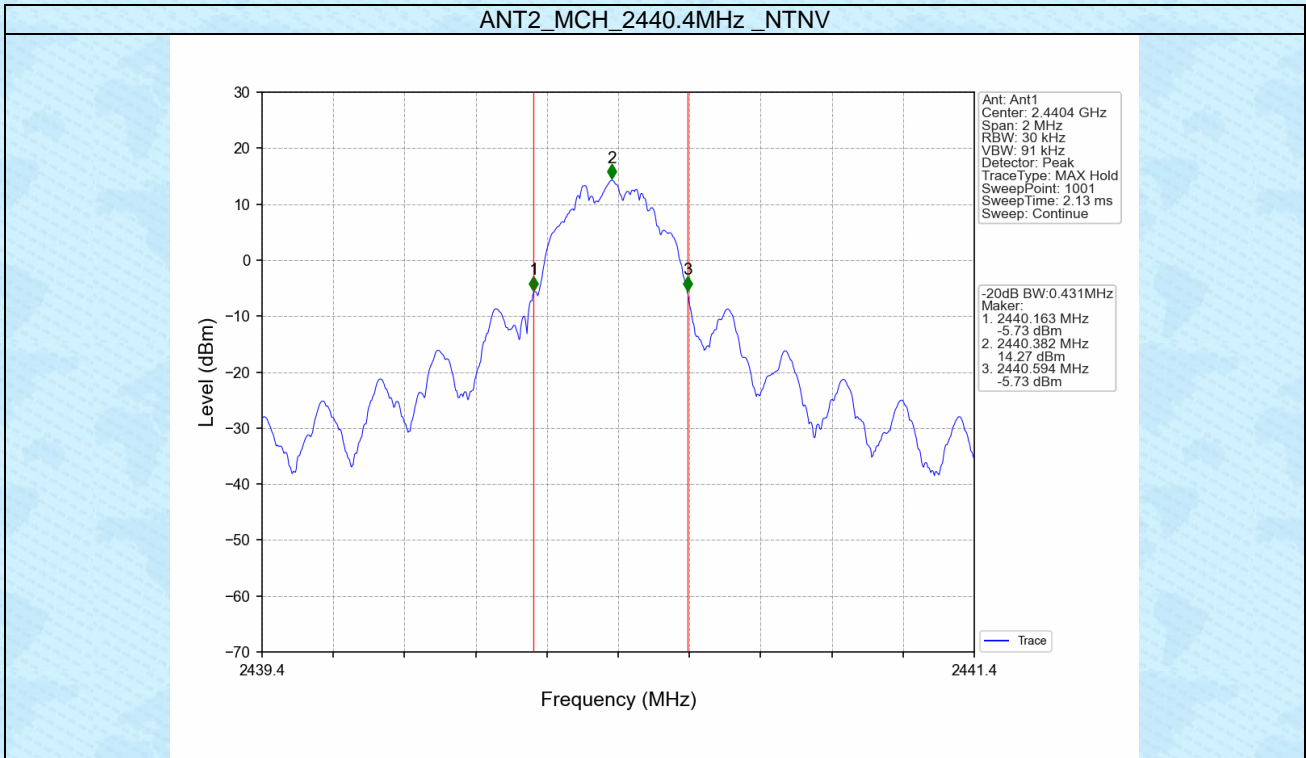


ANT1\_HCH\_2479.85MHz \_NTNV



ANT2\_LCH\_2402.15MHz \_NTNV







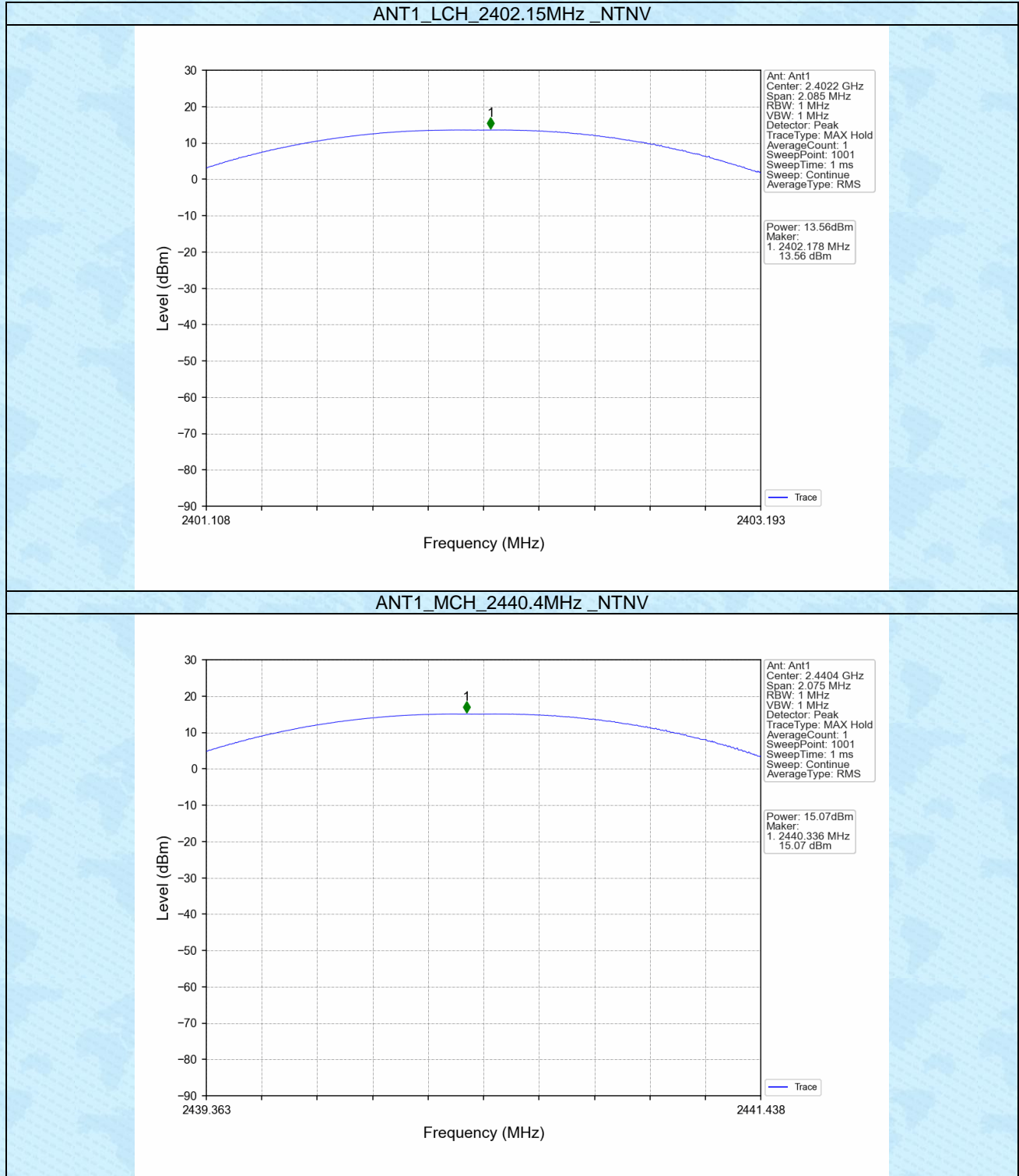
## 2. Maximum Conducted Output Power

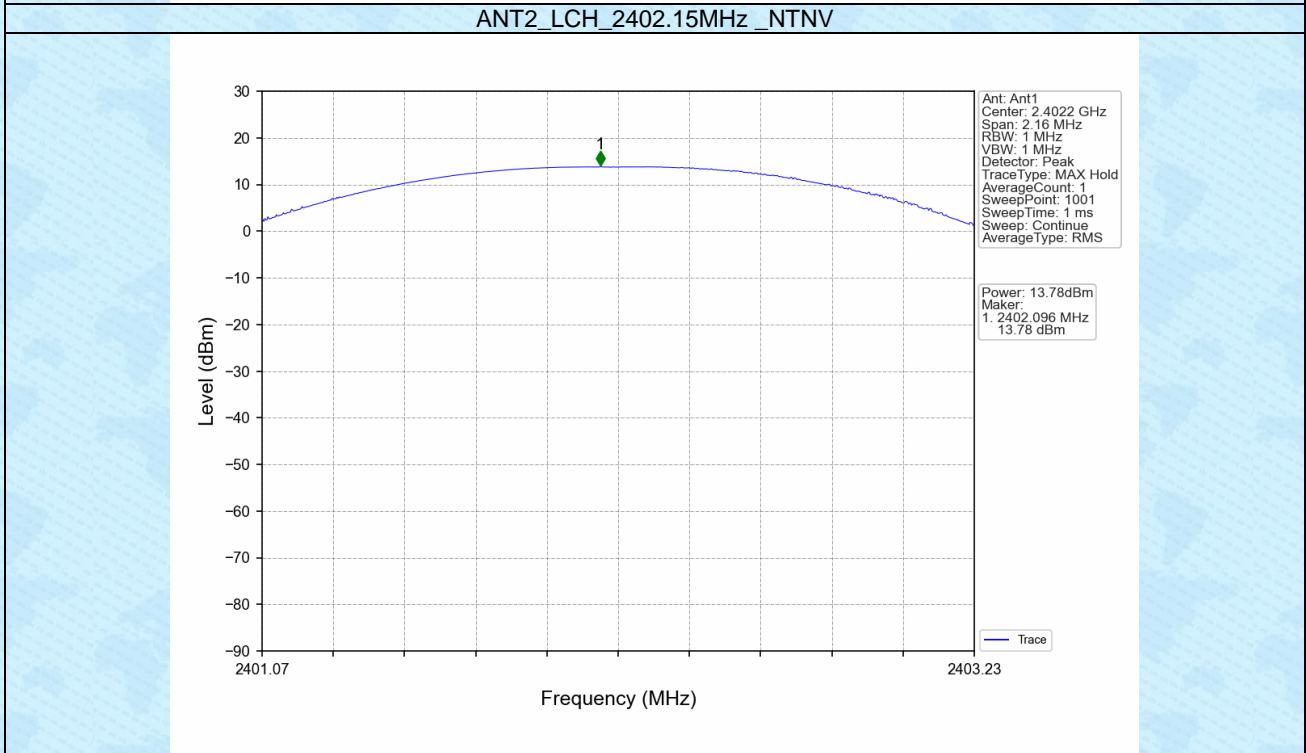
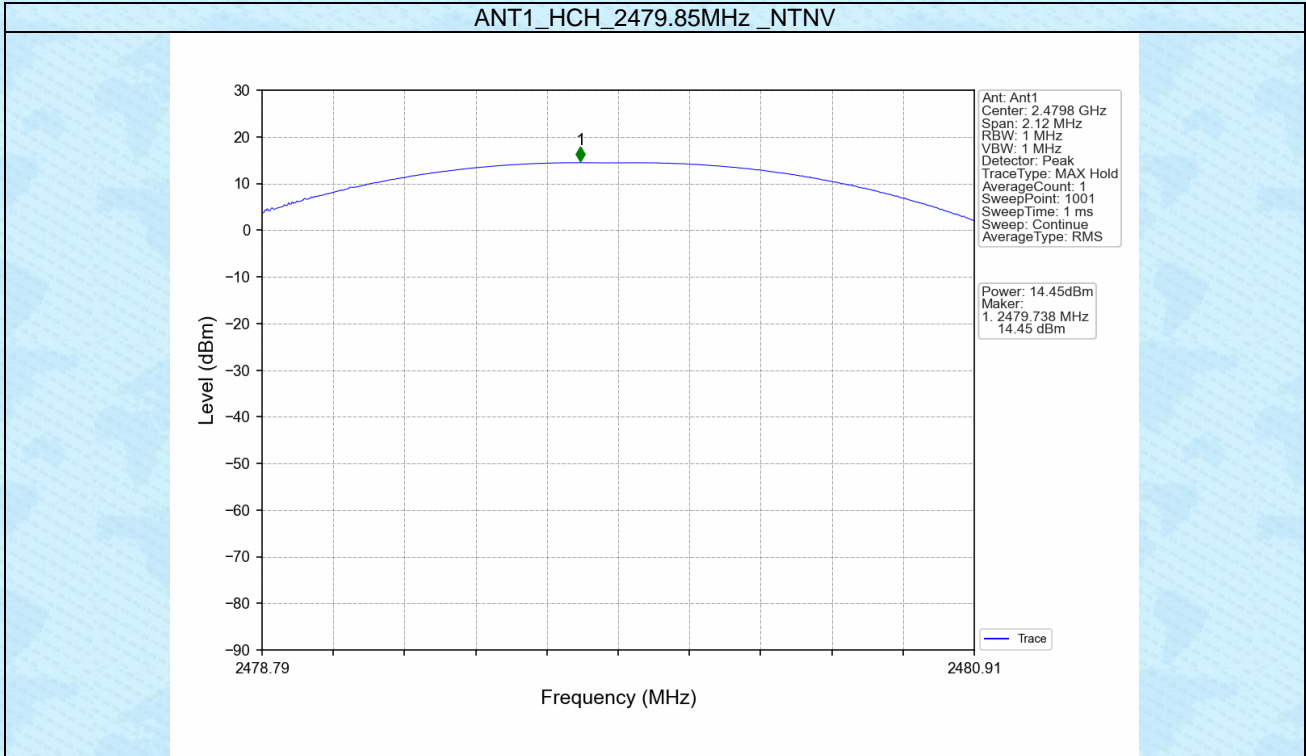
### 2.1 Power

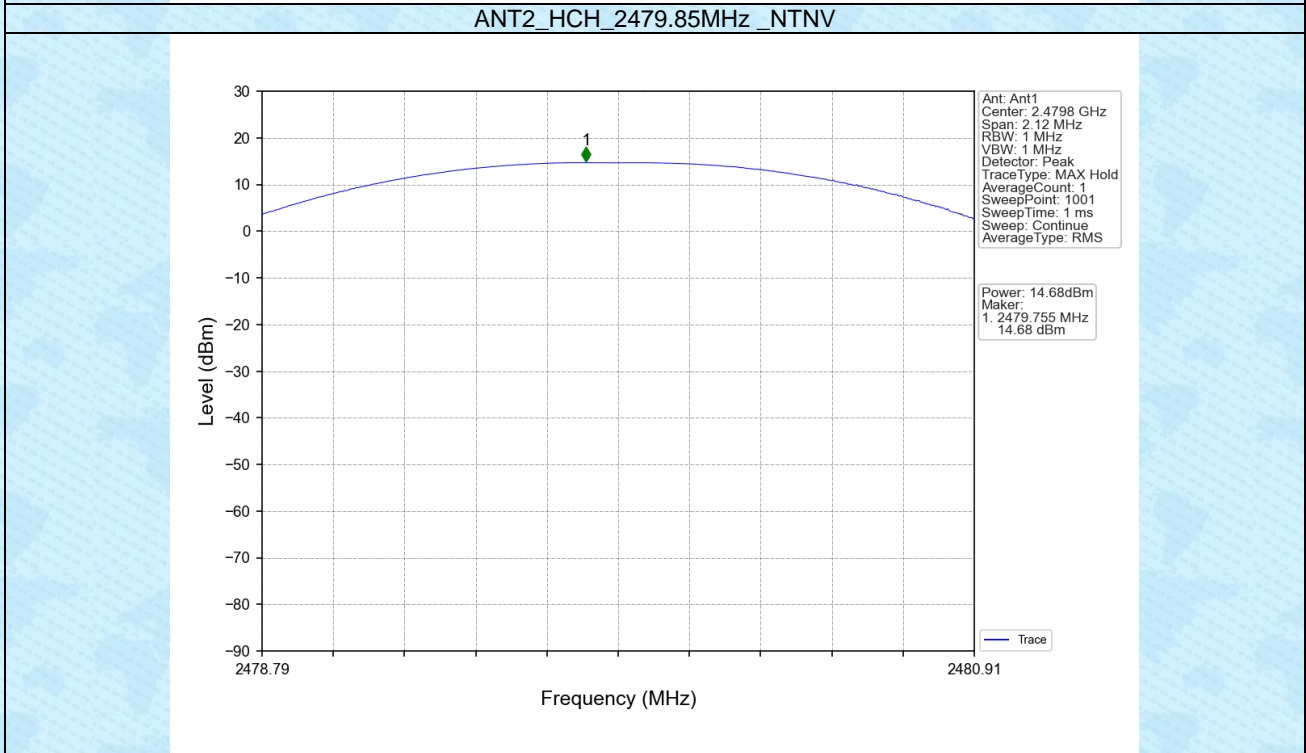
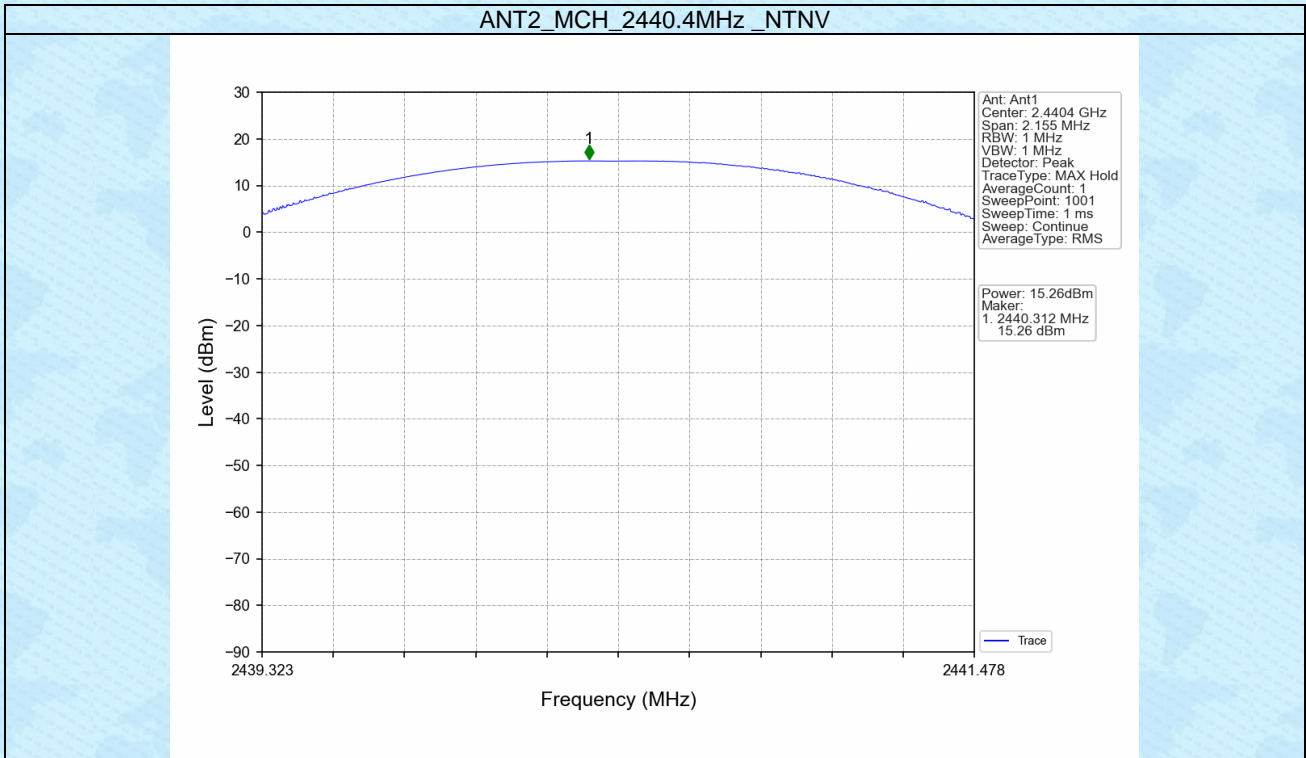
#### 2.1.1 Test Result

| Mode | TX Type | Frequency (MHz) | Maximum Peak Conducted Output Power (dBm) |       |         | Verdict |
|------|---------|-----------------|---|-------|---------|---------|
|      |         |                 | ANT 1                                     | ANT 2 | Limit   |         |
| GMSK | SISO    | 2402.15         | 13.56                                     | 13.78 | <=20.97 | Pass    |
|      |         | 2440.4          | 15.07                                     | 15.26 | <=20.97 | Pass    |
|      |         | 2479.85         | 14.45                                     | 14.68 | <=20.97 | Pass    |

## 2.1.2 Test Graph







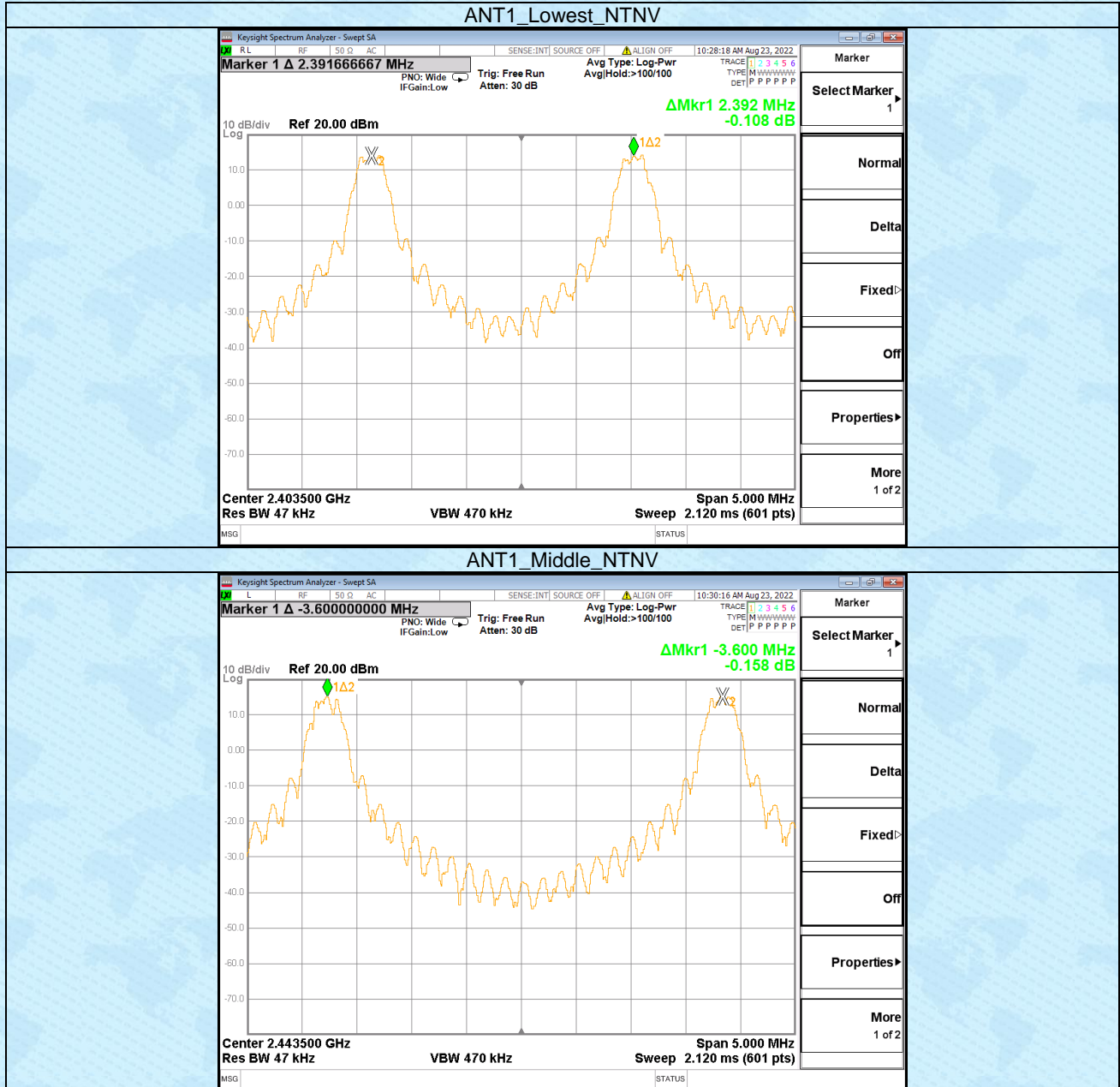


## 3. Carrier Frequency Separation

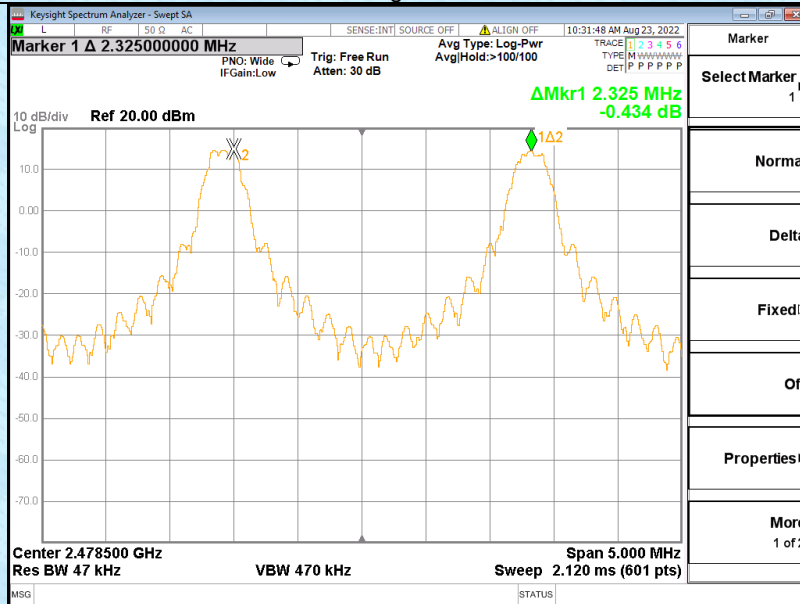
### 3.1 Test Result

| ANT  | TX Type | Frequency (MHz) | Channel Separation (MHz) | 20dB Bandwidth (MHz) | Limit (MHz) | Verdict |
|------|---------|-----------------|--------------------------|----------------------|-------------|---------|
| ANT1 | SISO    | Lowest          | 2.392                    | 0.417                | 0.278       | Pass    |
|      |         | Middle          | 3.600                    | 0.415                | 0.277       | Pass    |
|      |         | Highest         | 2.325                    | 0.424                | 0.283       | Pass    |
| ANT2 | SISO    | Lowest          | 2.408                    | 0.432                | 0.288       | Pass    |
|      |         | Middle          | 3.592                    | 0.431                | 0.287       | Pass    |
|      |         | Highest         | 2.400                    | 0.424                | 0.283       | Pass    |

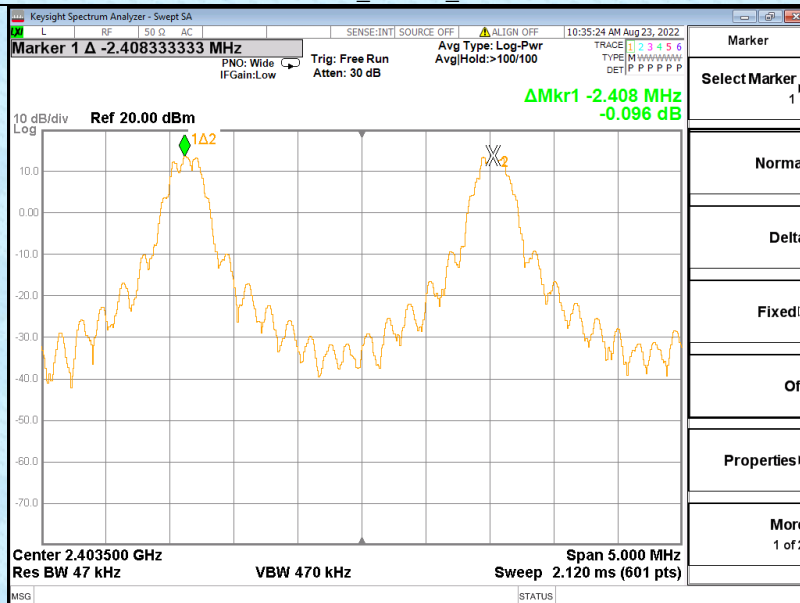
### 3. 2 Test Graph



### ANT1\_Highest\_NTNV



### ANT2\_Lowest\_NTNV







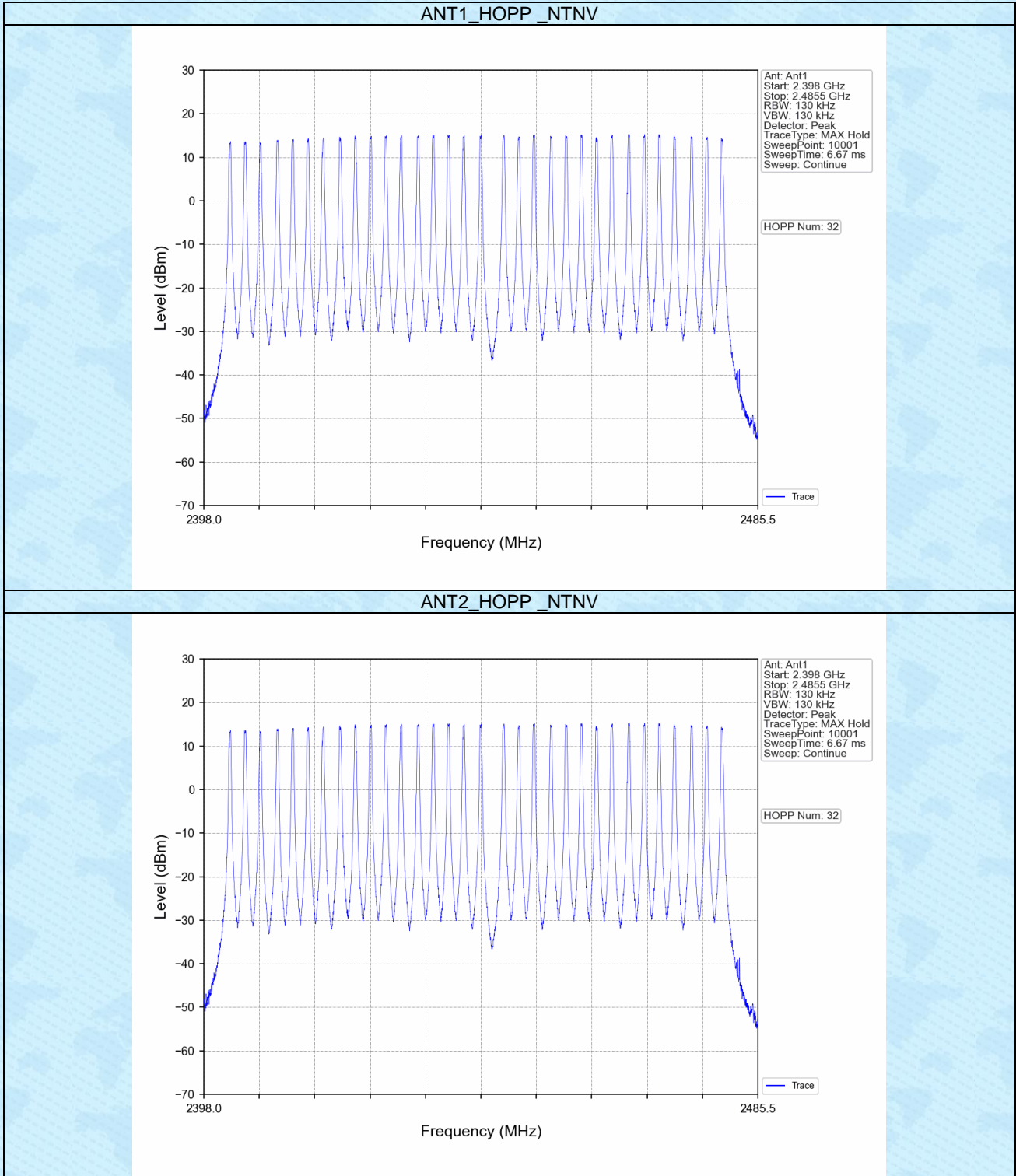
## 4. Number of Hopping Frequencies

### 4.1 Hopp Num

#### 4.1.1 Test Result

| Mode | TX Type | Frequency (MHz) | Num of Hopping Frequencies |       |           | Verdict |
|------|---------|-----------------|----------------------------|-------|-----------|---------|
|      |         |                 | ANT 1                      | ANT 2 | Limit     |         |
| FHSS | SISO    | HOPP            | 32                         | 32    | $\geq 15$ | Pass    |

## 4.1.2 Test Graph



## 5. Time of Occupancy (Dwell Time)

### 5.1 Test Result

| ANT  | TX Type | Test channel | Ton (ms) | Dwell time(ms) | Limit(ms) | Result |
|------|---------|--------------|----------|----------------|-----------|--------|
| ANT1 | SISO    | Lowest       | 2.467    | 221.04         | 400       | Pass   |
|      |         | Middle       | 2.500    | 224.00         | 400       | Pass   |
|      |         | Highest      | 2.500    | 224.00         | 400       | Pass   |
| ANT2 | SISO    | Lowest       | 2.500    | 224.00         | 400       | Pass   |
|      |         | Middle       | 2.500    | 224.00         | 400       | Pass   |
|      |         | Highest      | 2.500    | 224.00         | 400       | Pass   |

The formula as below:

ANT1:

Lowest: Dwell time = Ton \* Ton times in 1s \* 0.4s \* channel numbers=2.467ms\*7\*0.4\*32=221.04ms

Middle: Dwell time = Ton \* Ton times in 1s \* 0.4s \* channel numbers=2.500ms\*7\*0.4\*32=224.00ms

Highest: Dwell time = Ton \* Ton times in 1s \* 0.4s \* channel numbers=2.500ms\*7\*0.4\*32=224.00ms

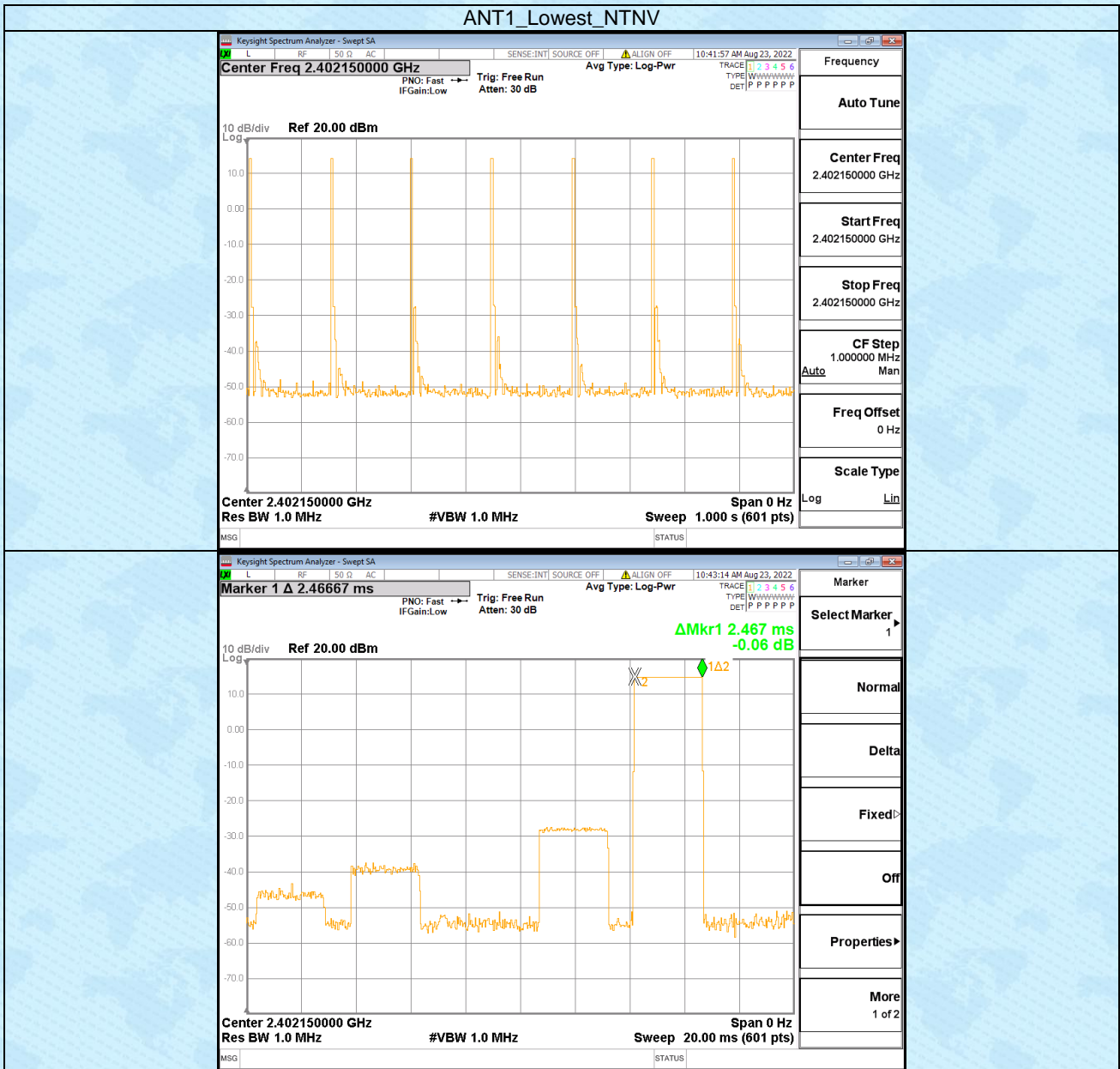
ANT2:

Lowest: Dwell time = Ton \* Ton times in 1s \* 0.4s \* channel numbers=2.500ms\*7\*0.4\*32=224.00ms

Middle: Dwell time = Ton \* Ton times in 1s \* 0.4s \* channel numbers=2.500ms\*7\*0.4\*32=224.00ms

Highest: Dwell time = Ton \* Ton times in 1s \* 0.4s \* channel numbers=2.500ms\*7\*0.4\*32=224.00ms

## 5.2 Test Graph





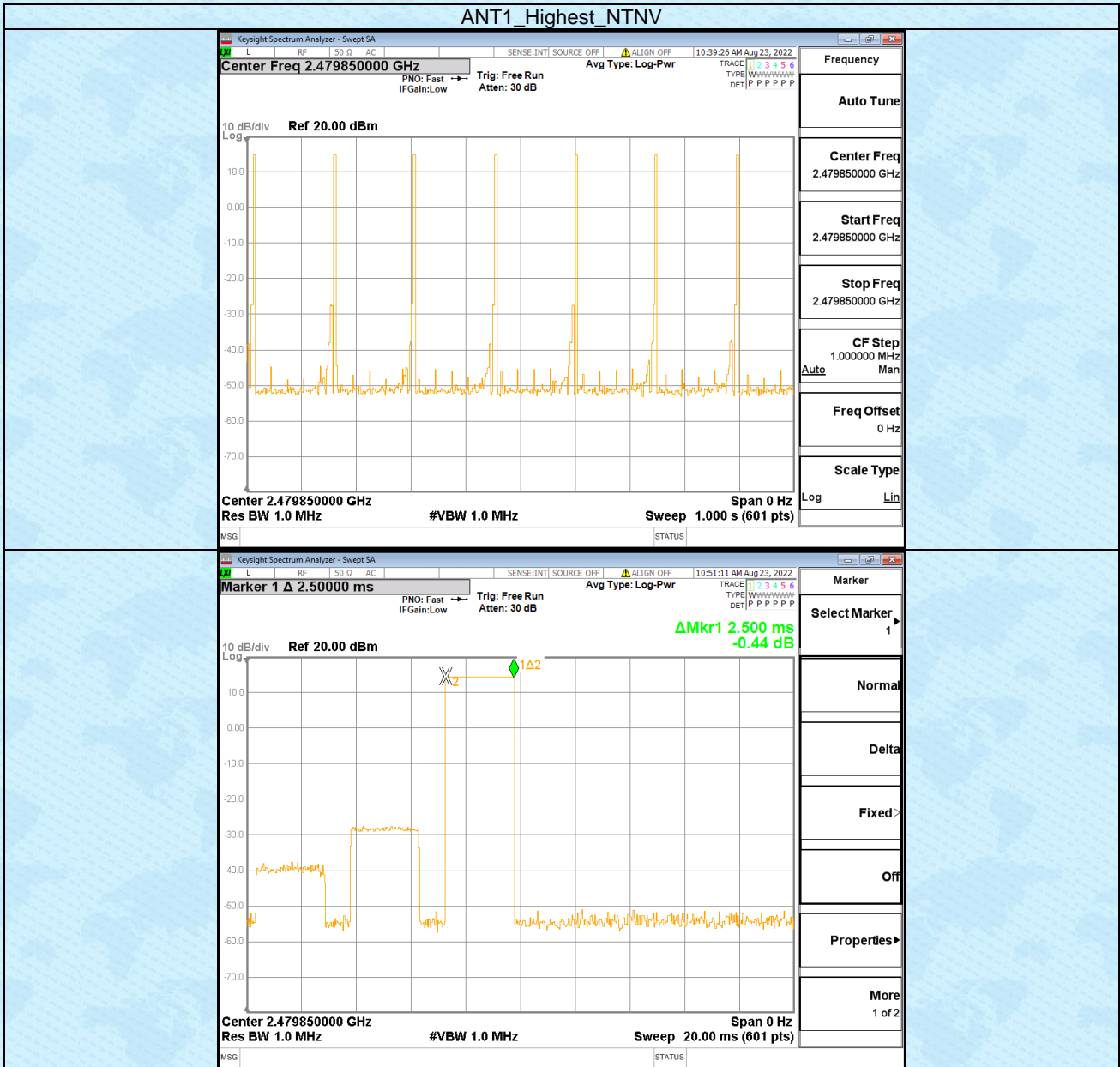












## 6. Unwanted Emissions In Non-restricted Frequency Bands

### 6.1 Ref

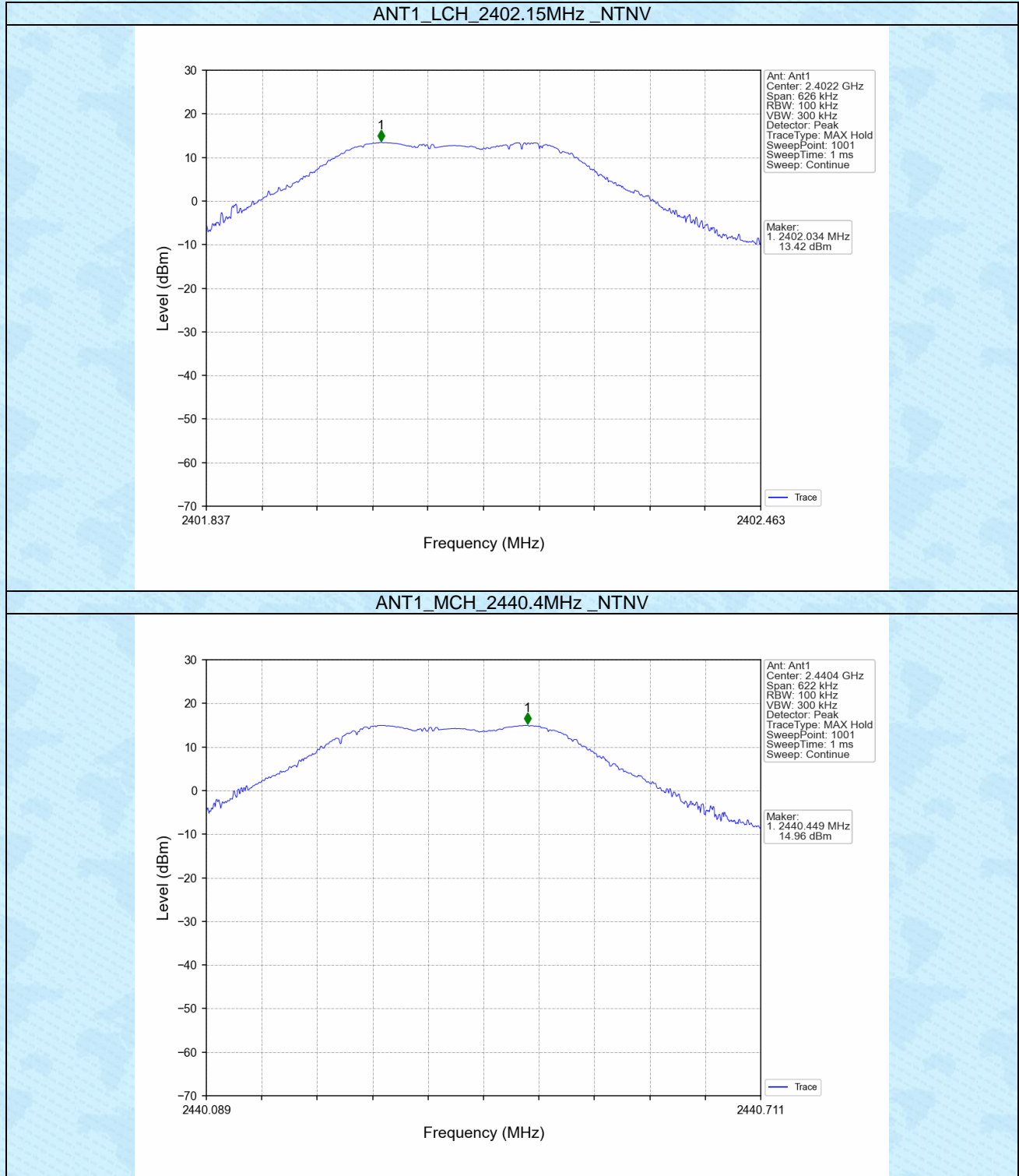
#### 6.1.1 Test Result

| Mode | TX Type | Frequency (MHz) | ANT  | Level of Reference (dBm) |
|------|---------|-----------------|------|--------------------------|
| FHSS | SISO    | 2402.15         | ANT1 | 13.42                    |
|      |         | 2440.4          | ANT1 | 14.96                    |
|      |         | 2479.85         | ANT1 | 14.36                    |
|      | SISO    | 2402.15         | ANT2 | 13.63                    |
|      |         | 2440.4          | ANT2 | 15.12                    |
|      |         | 2479.85         | ANT2 | 14.55                    |

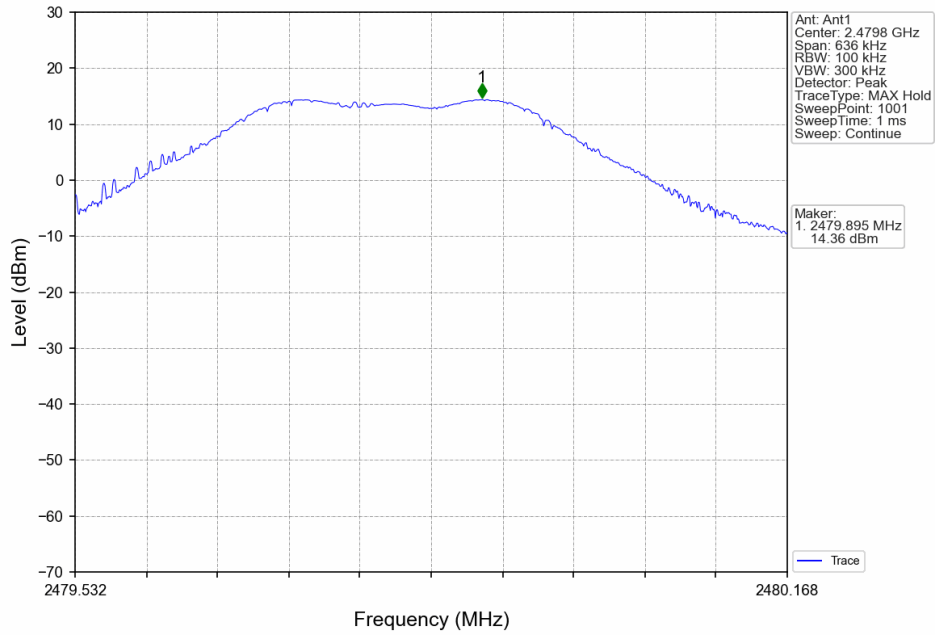
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

Note2: RBW = 1MHz was used during the pre-test. The final test will be performed at RBW=100kHz while the margin is less than 3dB.

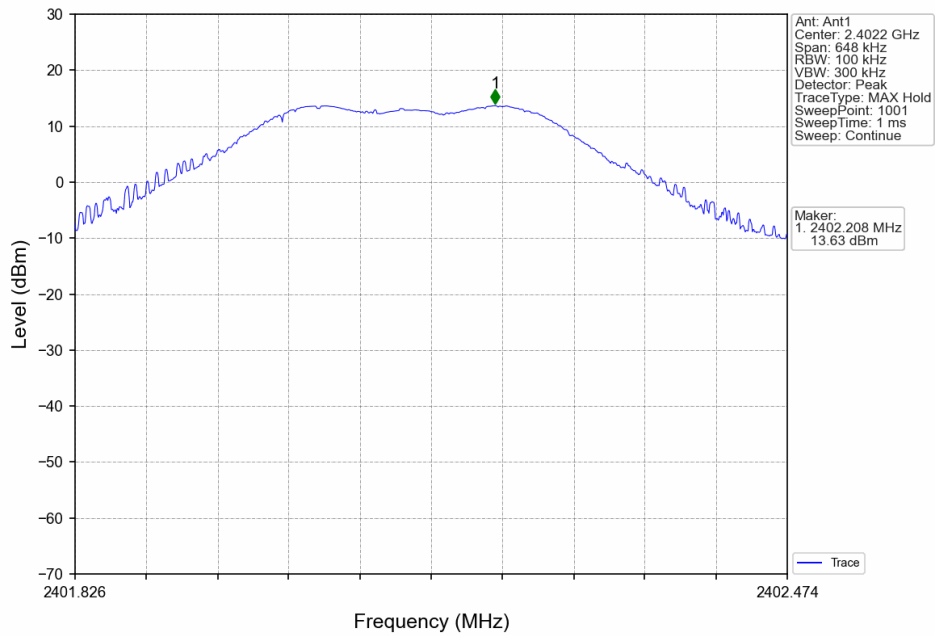
## 6.1.2 Test Graph



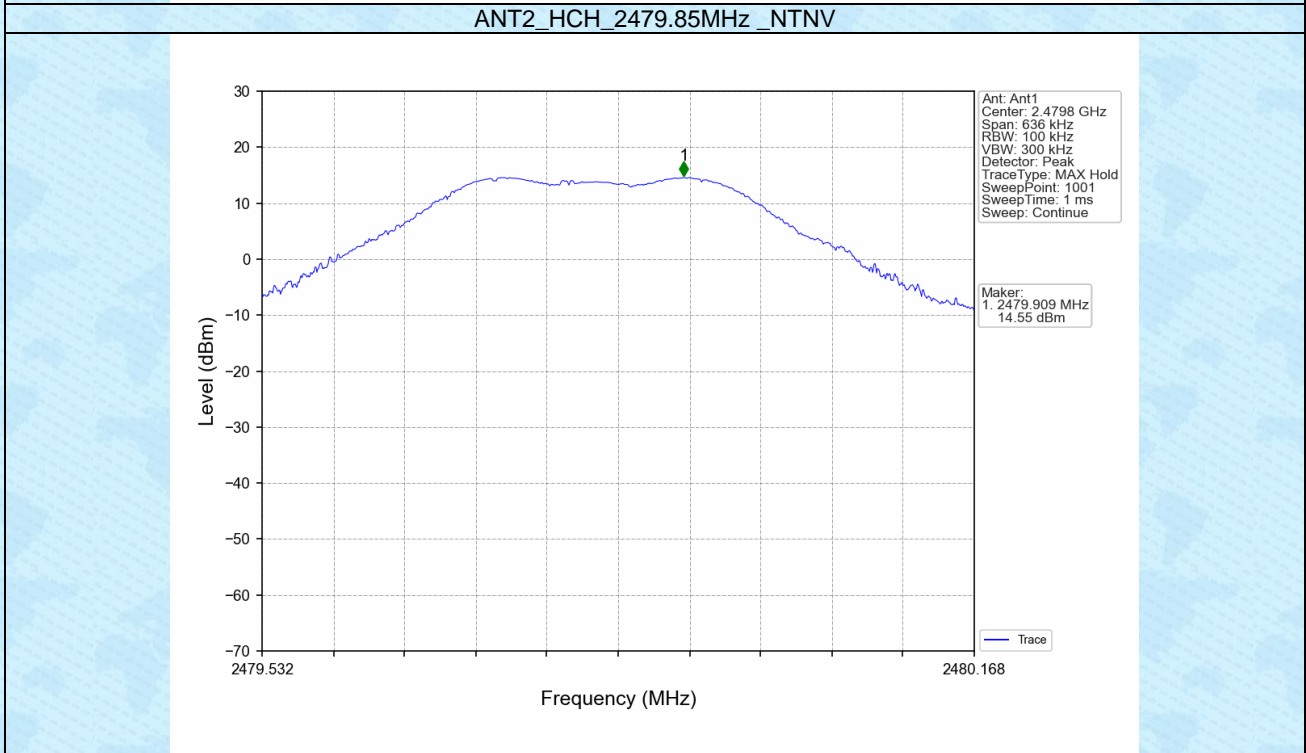
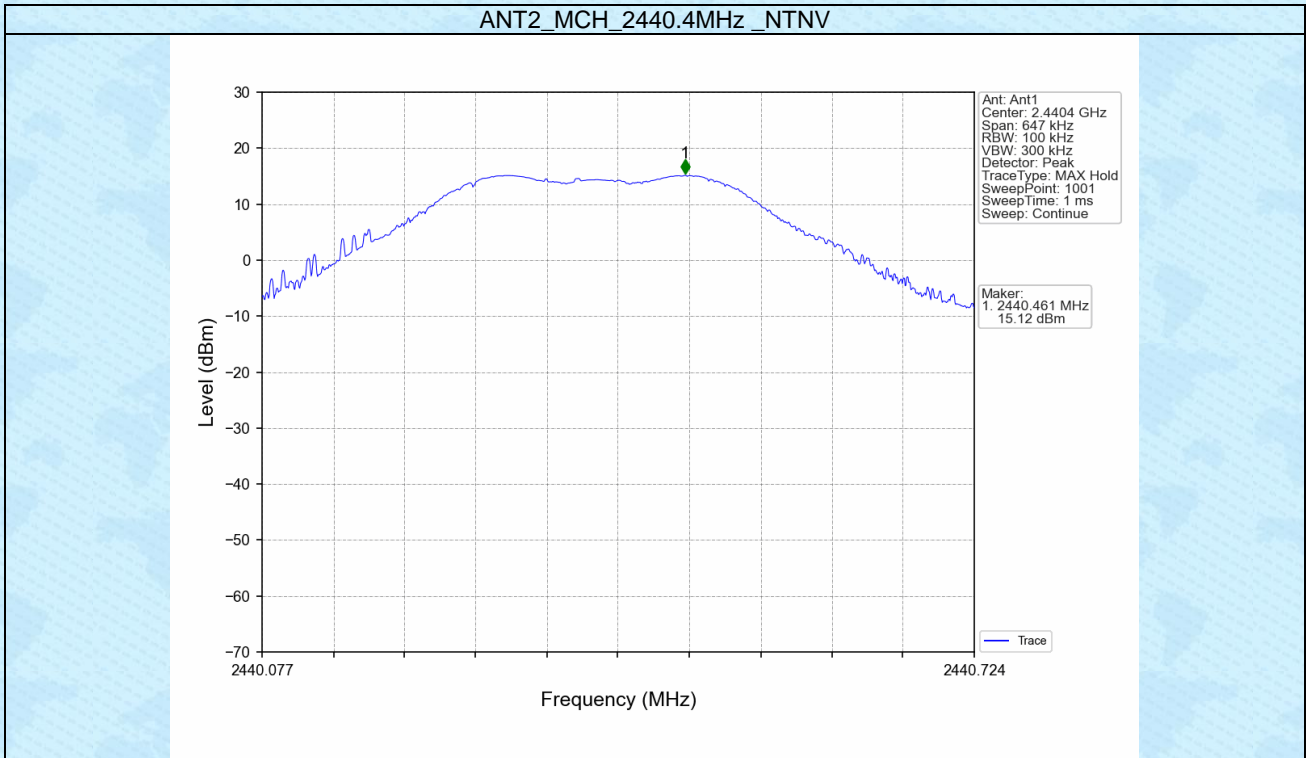
ANT1\_HCH\_2479.85MHz \_NTNV



ANT2\_LCH\_2402.15MHz \_NTNV







## 6.2 CSE

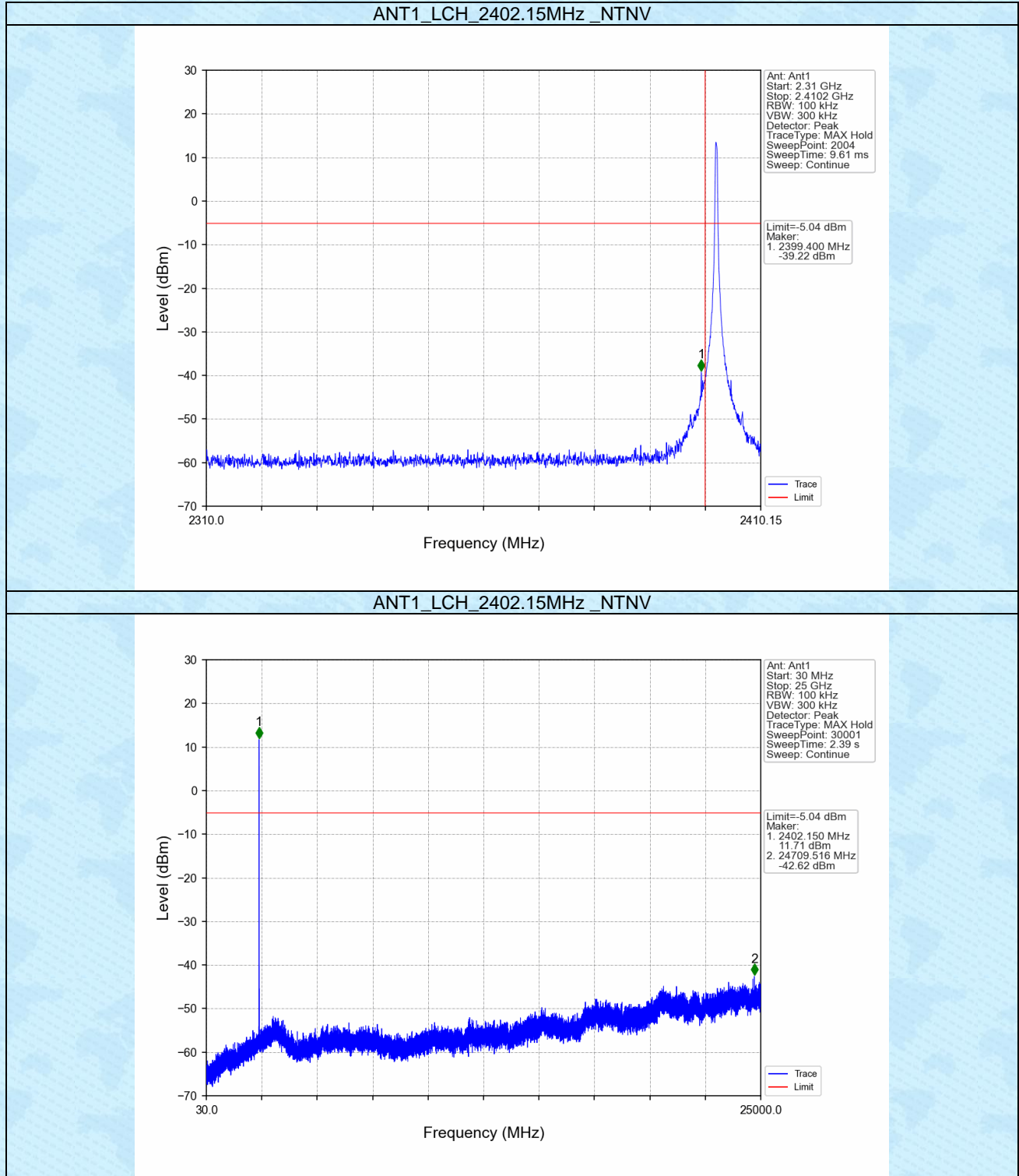
### 6.2.1 Test Result

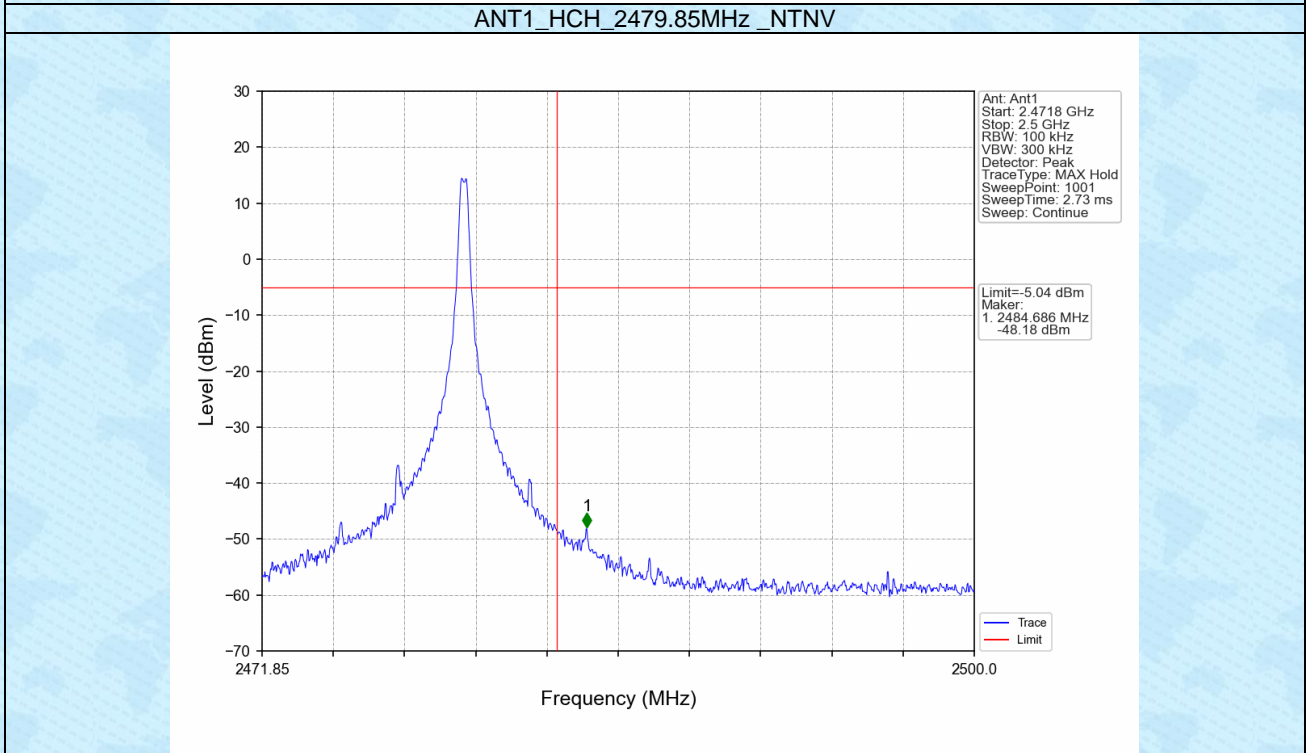
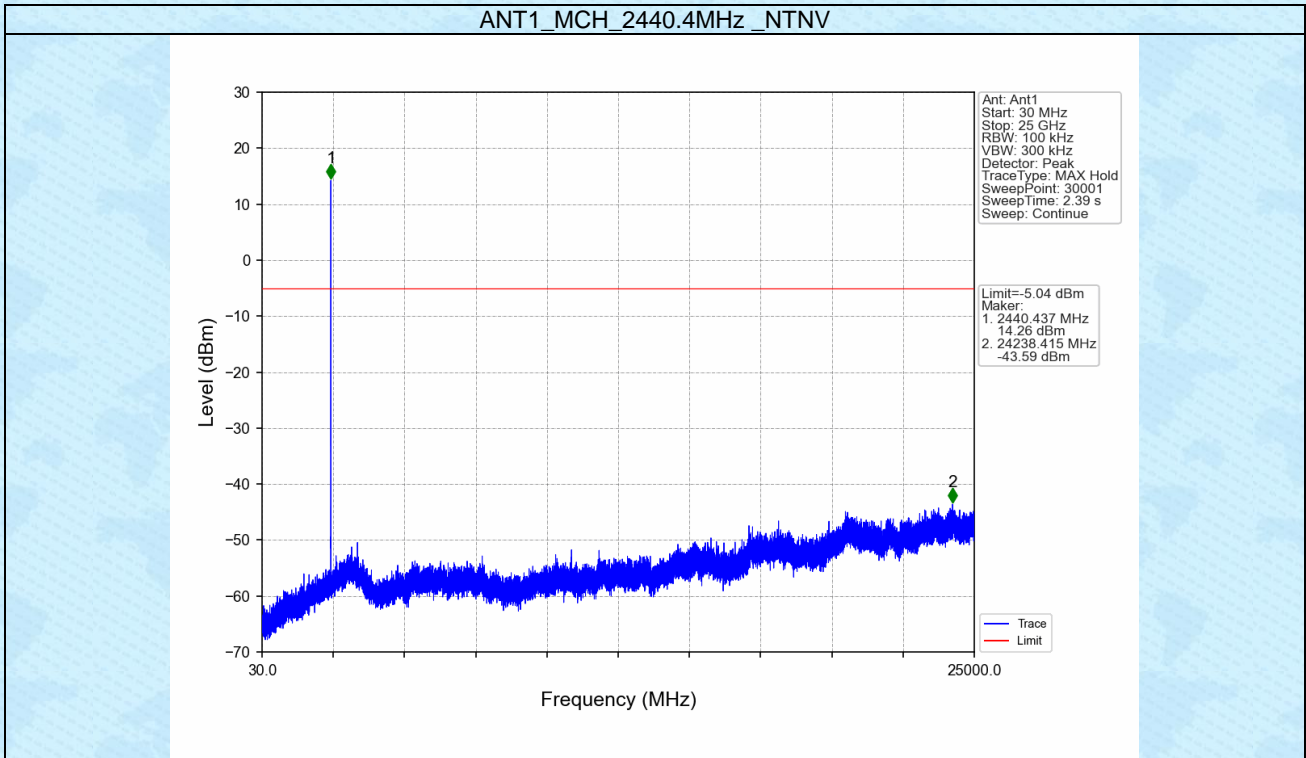
| Mode | TX Type | Frequency (MHz) | ANT  | Level of Reference (dBm) | Limit (dBm) | Verdict |
|------|---------|-----------------|------|--------------------------|-------------|---------|
| FHSS | SISO    | 2402.15         | ANT1 | 14.96                    | -5.04       | Pass    |
|      |         | 2440.4          | ANT1 | 14.96                    | -5.04       | Pass    |
|      |         | 2479.85         | ANT1 | 14.96                    | -5.04       | Pass    |
|      |         | HOPP            | ANT1 | 14.96                    | -5.04       | Pass    |
|      | SISO    | 2402.15         | ANT2 | 15.12                    | -4.88       | Pass    |
|      |         | 2440.4          | ANT2 | 15.12                    | -4.88       | Pass    |
|      |         | 2479.85         | ANT2 | 15.12                    | -4.88       | Pass    |
|      |         | HOPP            | ANT2 | 15.12                    | -4.88       | 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.

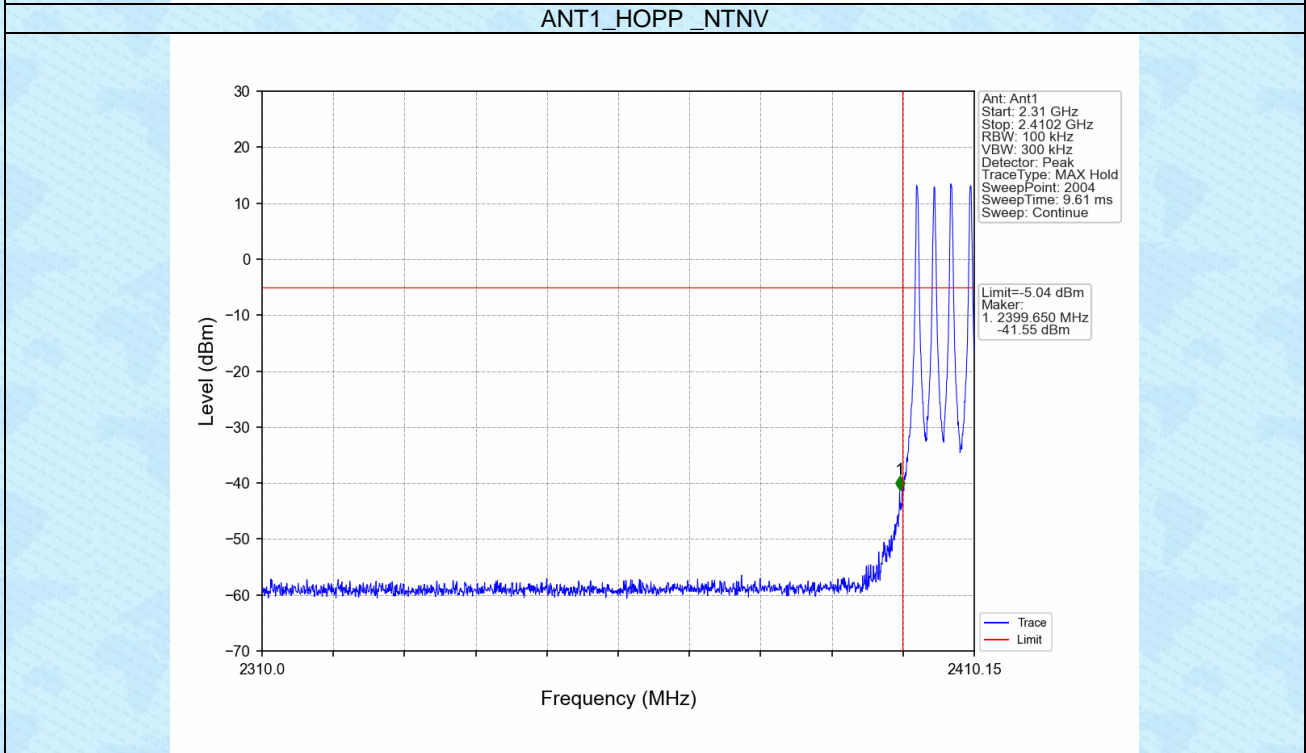
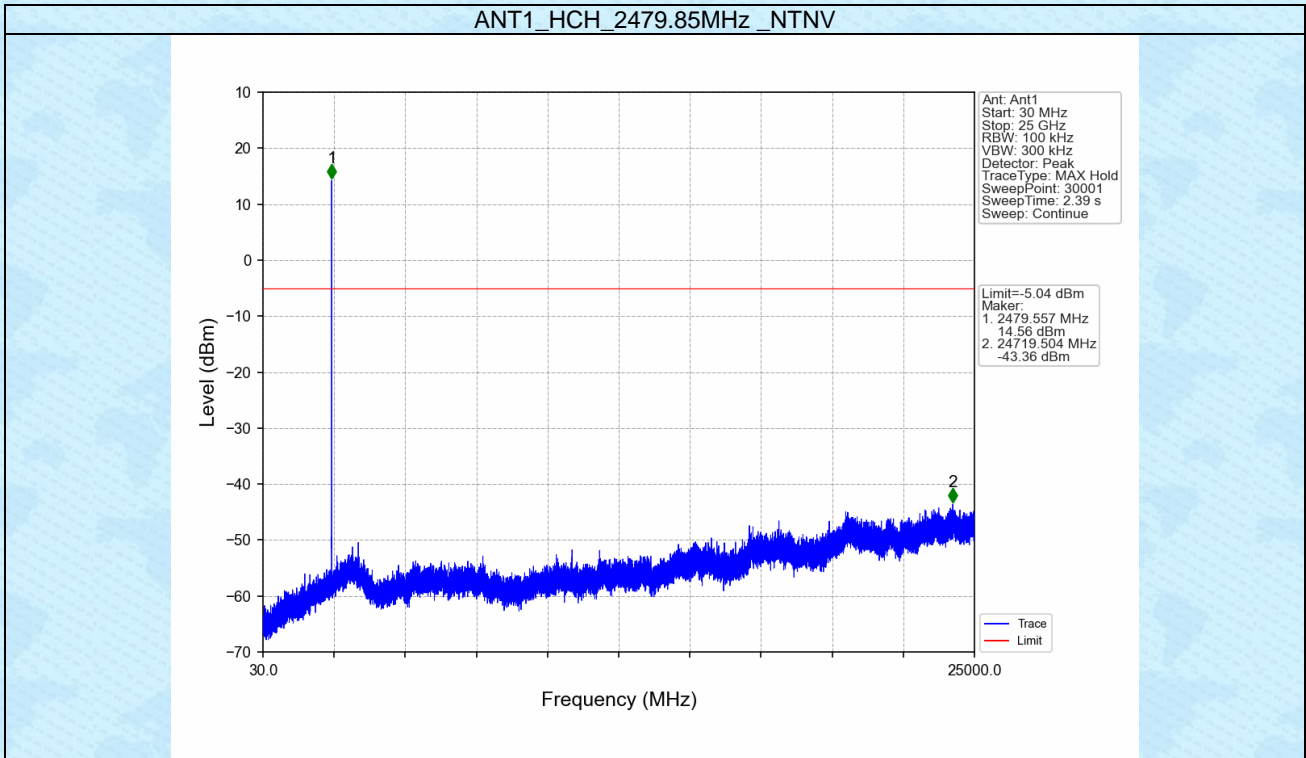
Note2: RBW = 1MHz was used during the pre-test. The final test will be performed at RBW=100kHz while the margin is less than 3dB.

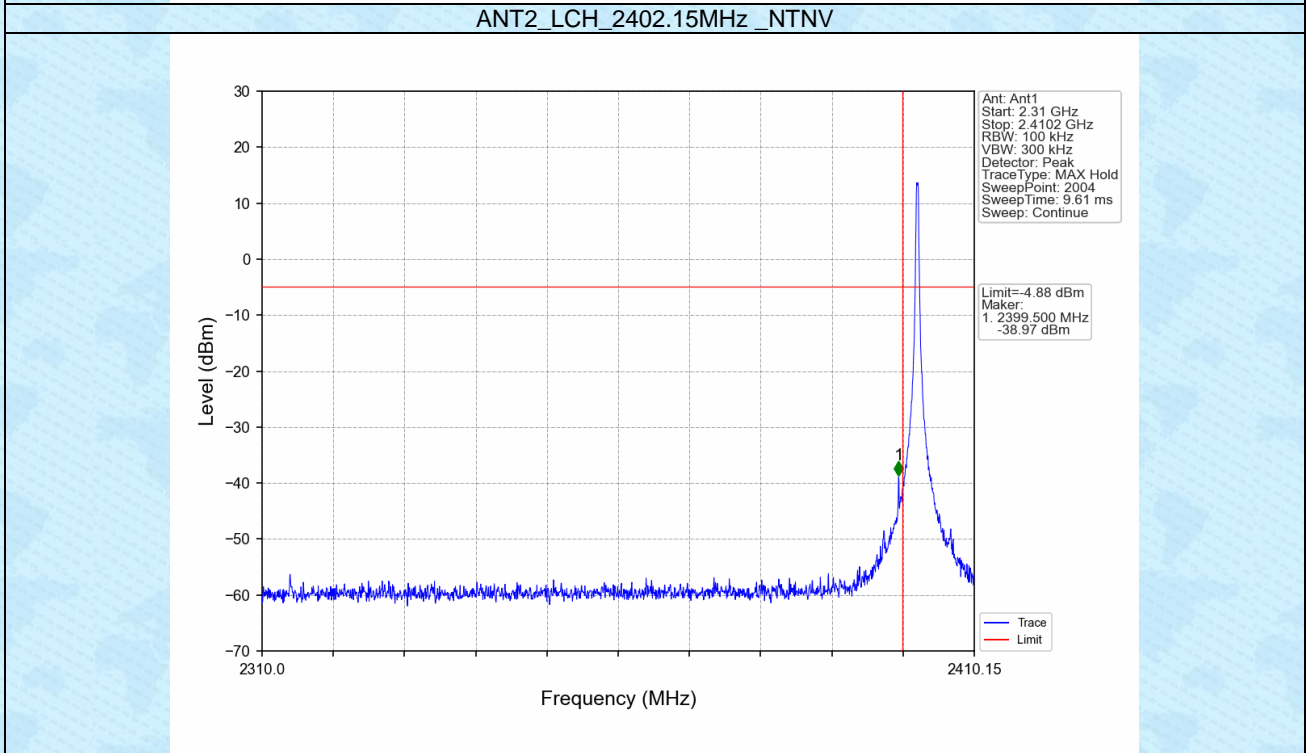
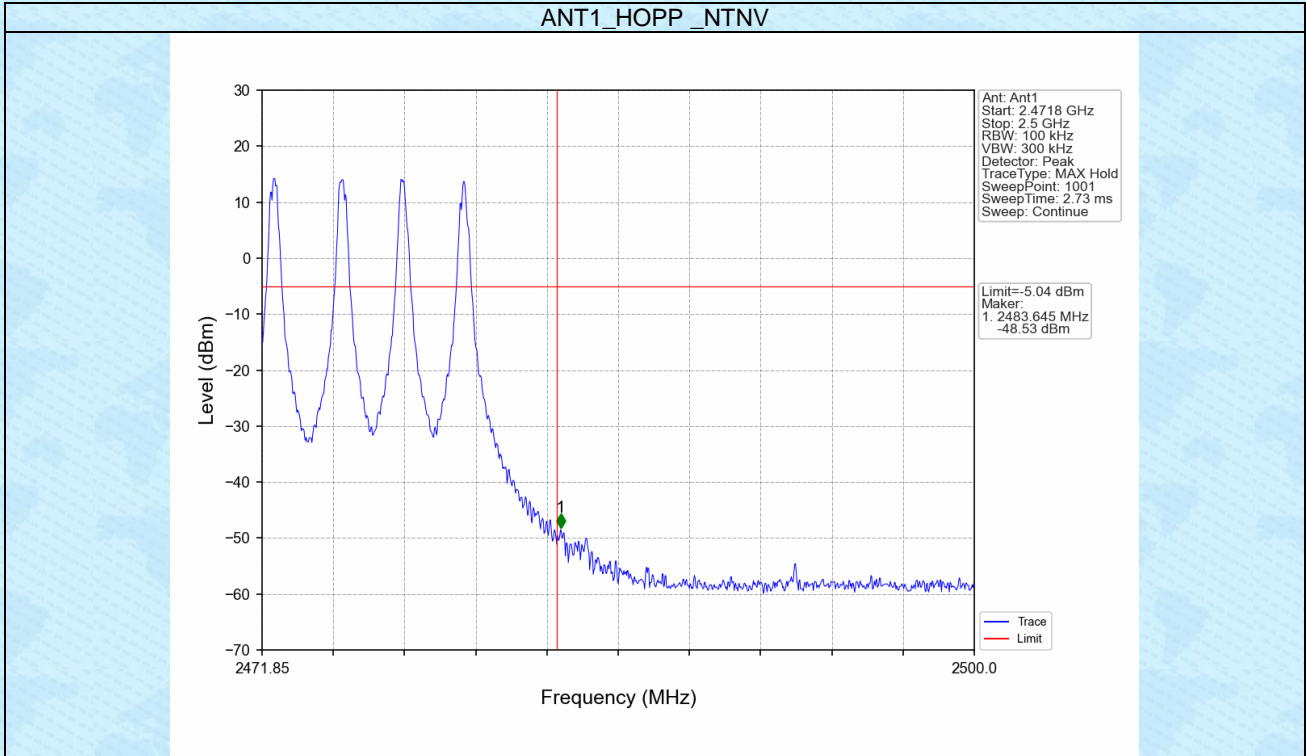
## 6.2.2 Test Graph



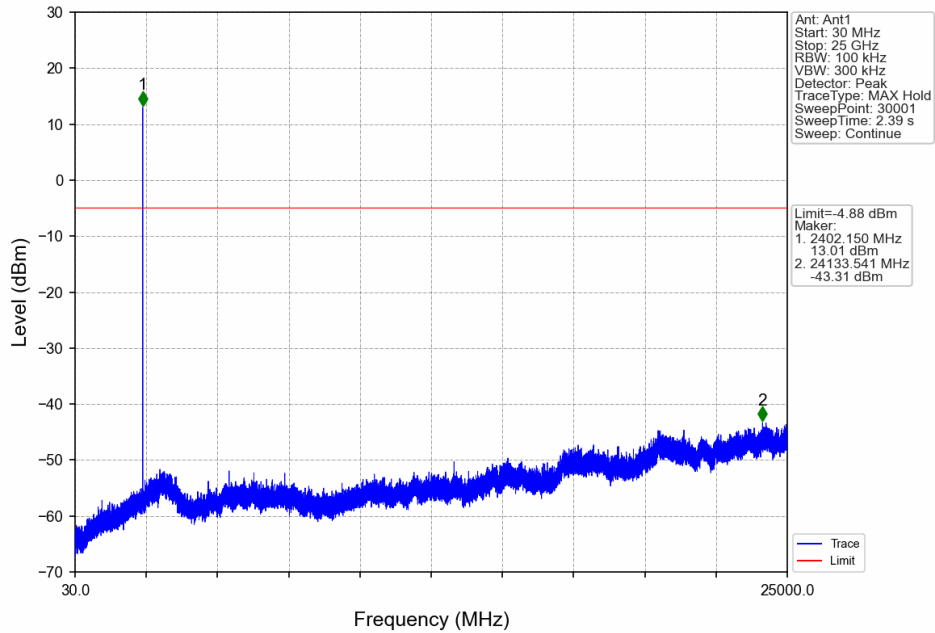




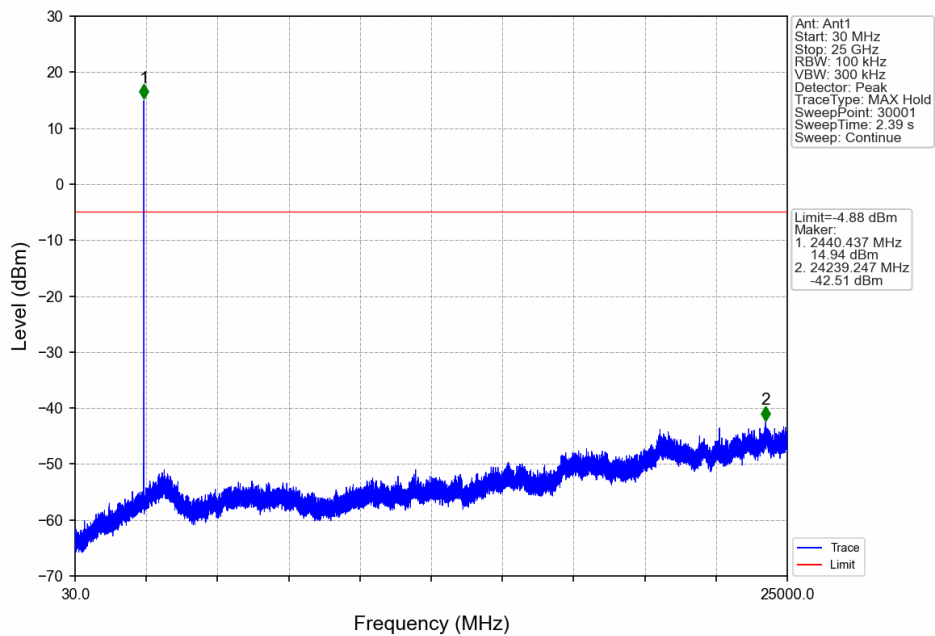


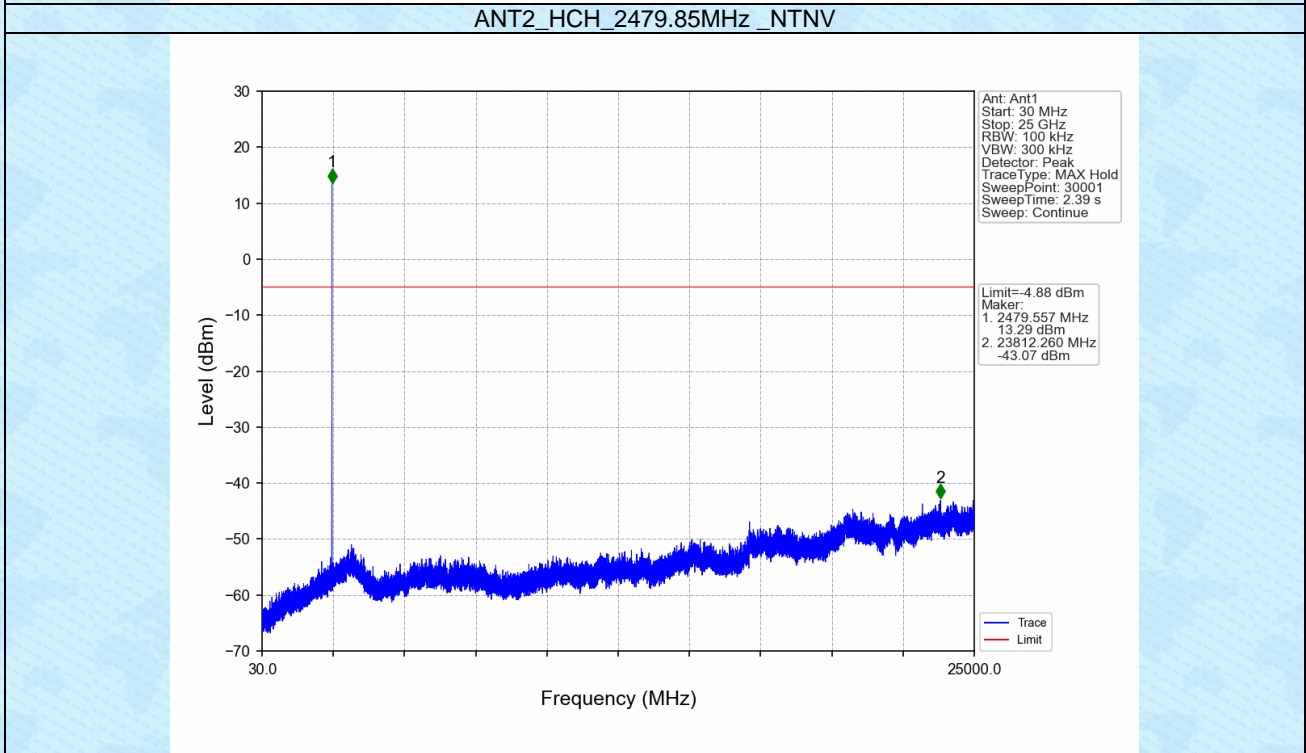
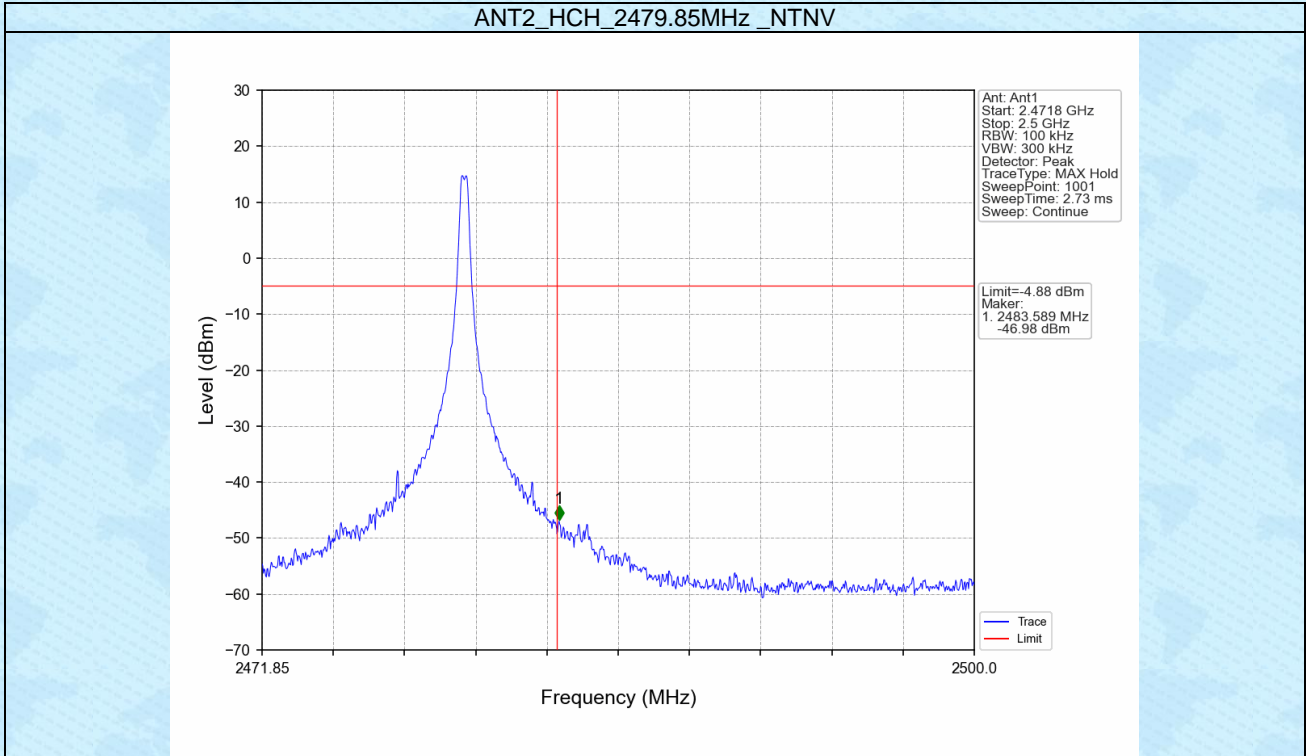


ANT2\_LCH\_2402.15MHz \_NTNV

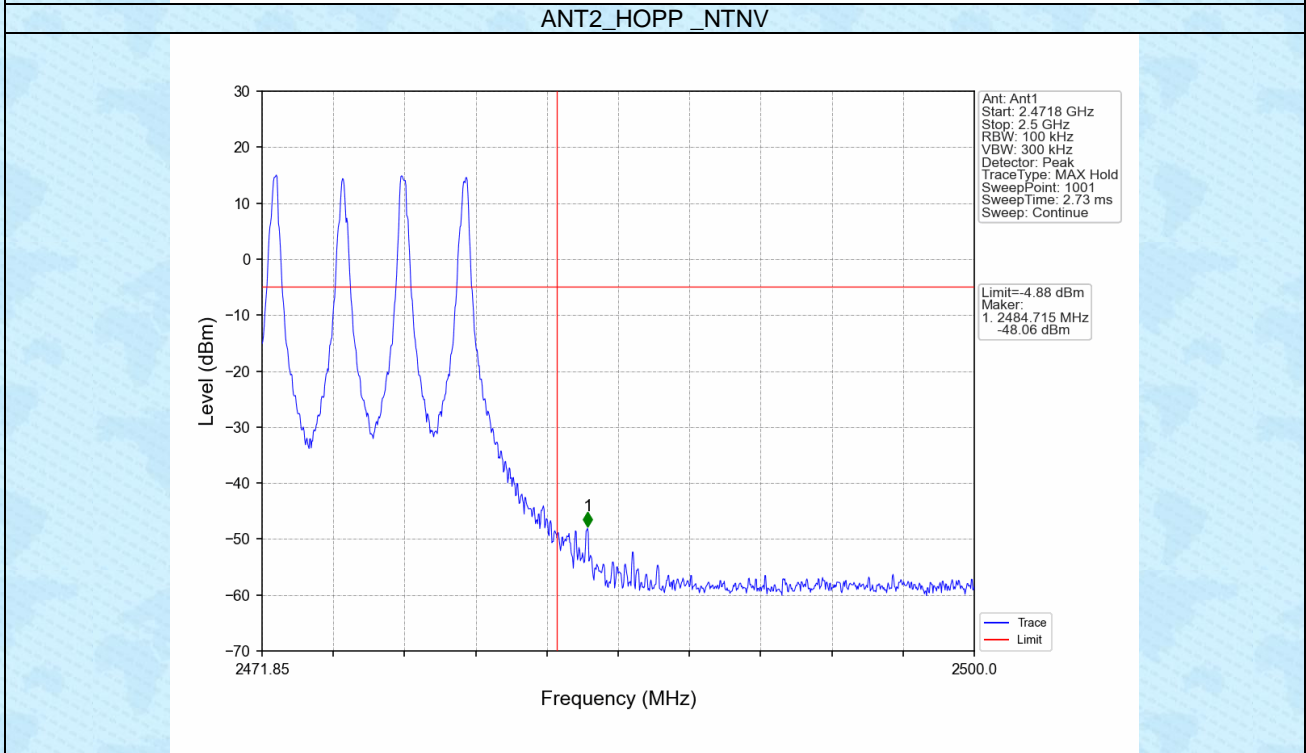
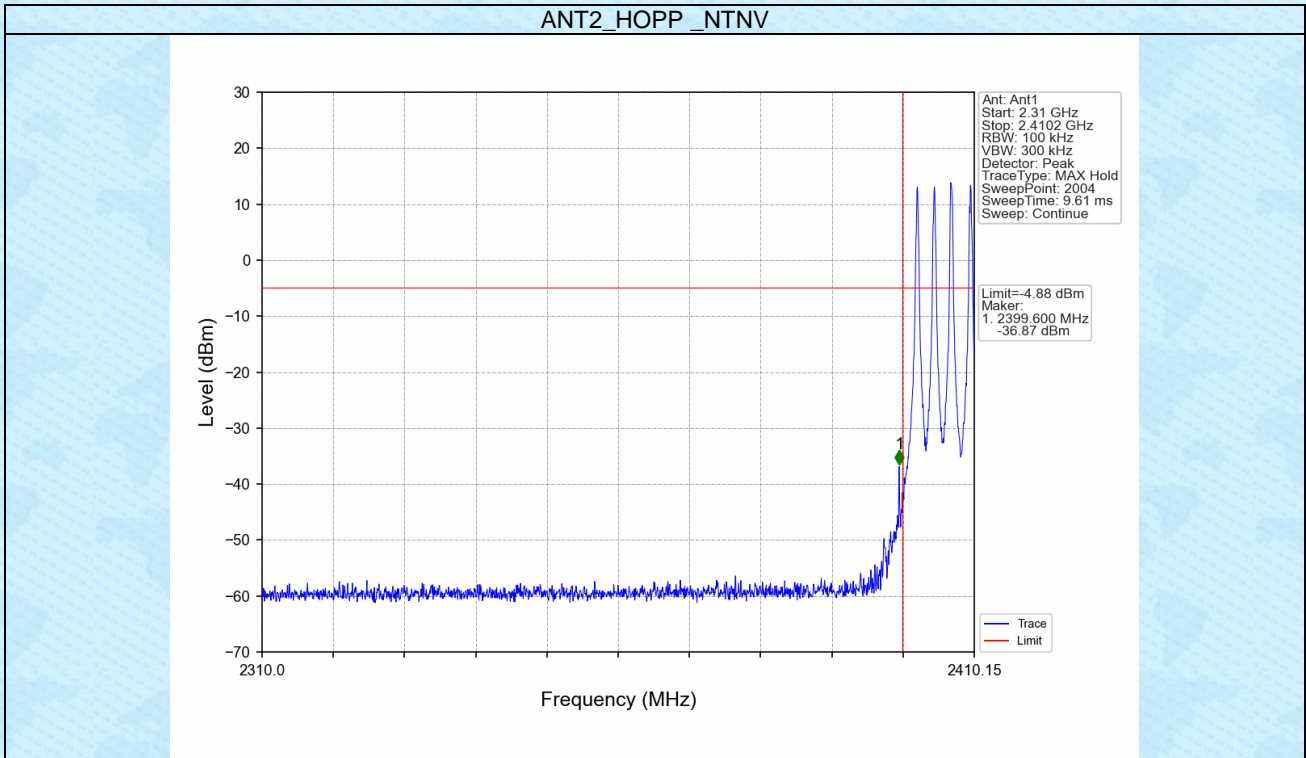


ANT2\_MCH\_2440.4MHz \_NTNV









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