



Shenzhen CTL Testing Technology Co., Ltd.

Unit 01A&B&C&D-1, Building A3, Guangming Sci-Tech Park, Guan Guang Road,  
Fenghuang Subdistrict, Guangming District, Shenzhen, Guangdong, China  
Tel: +86-755-89486194 E-mail: ctl@ctl-lab.com

## Annex for Bluetooth

**Test Report No.: CTL2604152051-WF01**

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## 1. Bandwidth

### 1.1 Test Result

#### 1.1.1 OBW

| Mode      | TX Type | Frequency (MHz) | Packet Type | ANT | 99% Occupied Bandwidth (MHz) |       | Verdict |
|-----------|---------|-----------------|-------------|-----|------------------------------|-------|---------|
|           |         |                 |             |     | Result                       | Limit |         |
| GFSK      | SISO    | 2402            | DH5         | 1   | 0.869                        | /     | Pass    |
|           |         | 2441            | DH5         | 1   | 0.867                        | /     | Pass    |
|           |         | 2480            | DH5         | 1   | 0.870                        | /     | Pass    |
| Pi/4DQPSK | SISO    | 2402            | 2DH5        | 1   | 1.170                        | /     | Pass    |
|           |         | 2441            | 2DH5        | 1   | 1.167                        | /     | Pass    |
|           |         | 2480            | 2DH5        | 1   | 1.170                        | /     | Pass    |
| 8DPSK     | SISO    | 2402            | 3DH5        | 1   | 1.172                        | /     | Pass    |
|           |         | 2441            | 3DH5        | 1   | 1.173                        | /     | Pass    |
|           |         | 2480            | 3DH5        | 1   | 1.175                        | /     | Pass    |

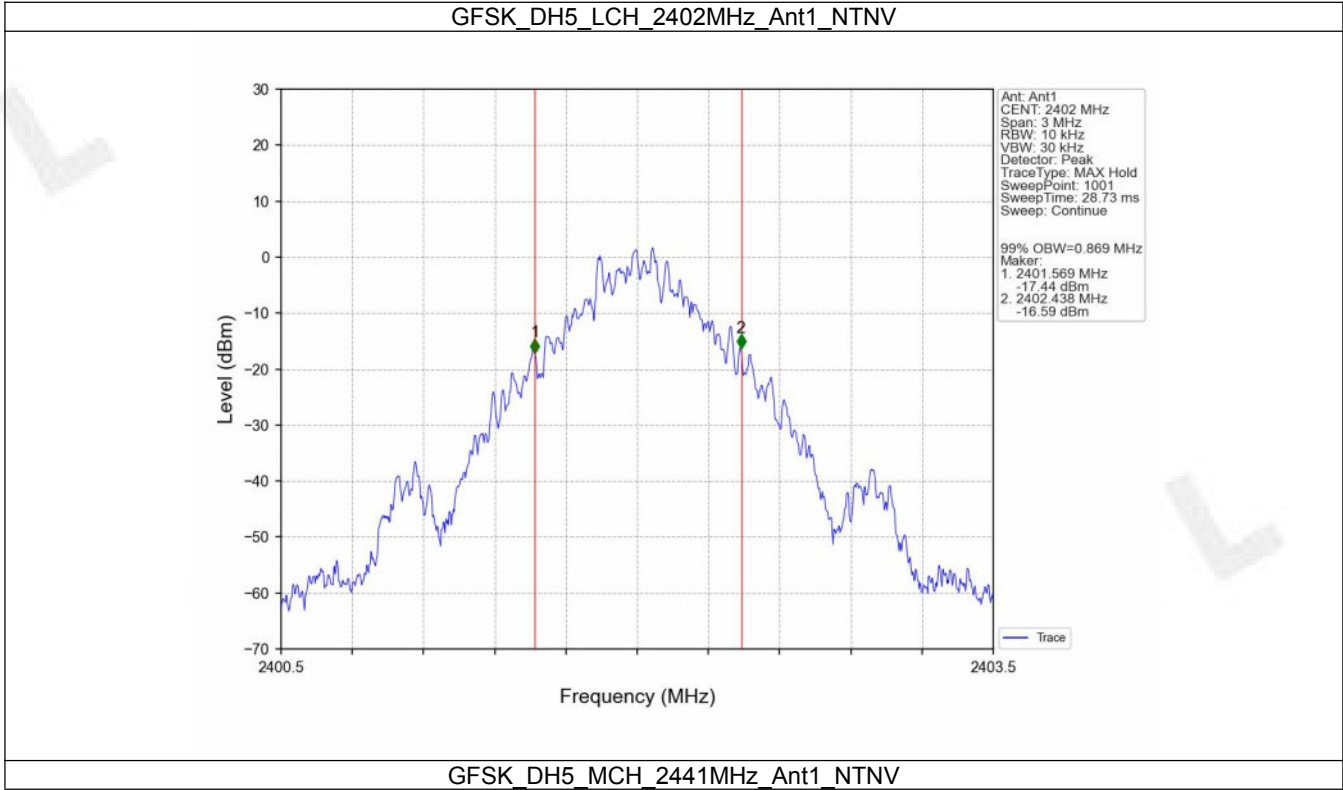
#### 1.1.2 20dB BW

| Mode      | TX Type | Frequency (MHz) | Packet Type | ANT | 20dB Bandwidth (MHz) |       | Verdict |
|-----------|---------|-----------------|-------------|-----|----------------------|-------|---------|
|           |         |                 |             |     | Result               | Limit |         |
| GFSK      | SISO    | 2402            | DH5         | 1   | 1.104                | /     | Pass    |
|           |         | 2441            | DH5         | 1   | 1.109                | /     | Pass    |
|           |         | 2480            | DH5         | 1   | 1.108                | /     | Pass    |
| Pi/4DQPSK | SISO    | 2402            | 2DH5        | 1   | 1.364                | /     | Pass    |
|           |         | 2441            | 2DH5        | 1   | 1.365                | /     | Pass    |
|           |         | 2480            | 2DH5        | 1   | 1.367                | /     | Pass    |
| 8DPSK     | SISO    | 2402            | 3DH5        | 1   | 1.370                | /     | Pass    |
|           |         | 2441            | 3DH5        | 1   | 1.366                | /     | Pass    |
|           |         | 2480            | 3DH5        | 1   | 1.372                | /     | Pass    |

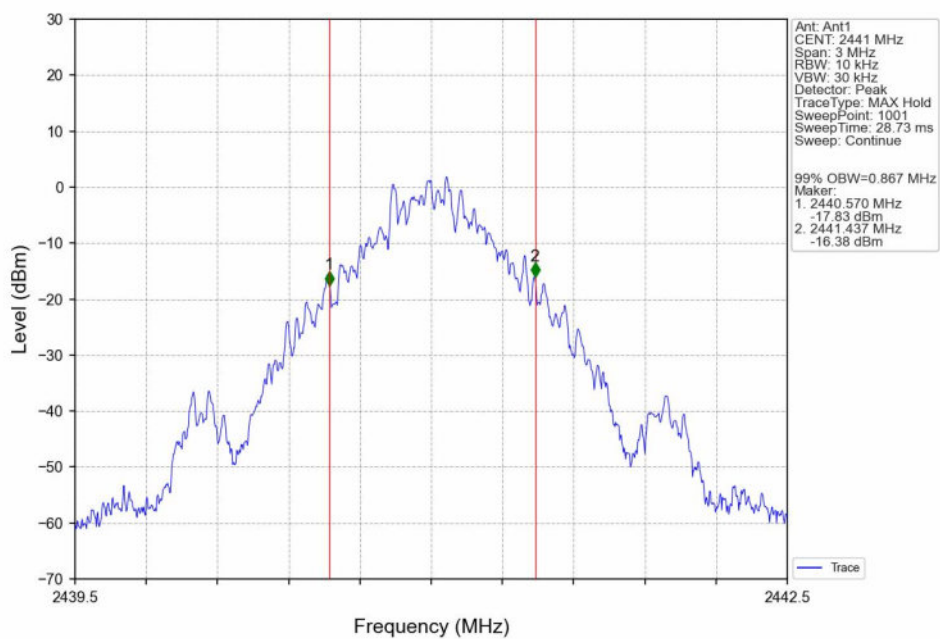
FCC ID: 2A94J-CP025

1.2 Test Graph

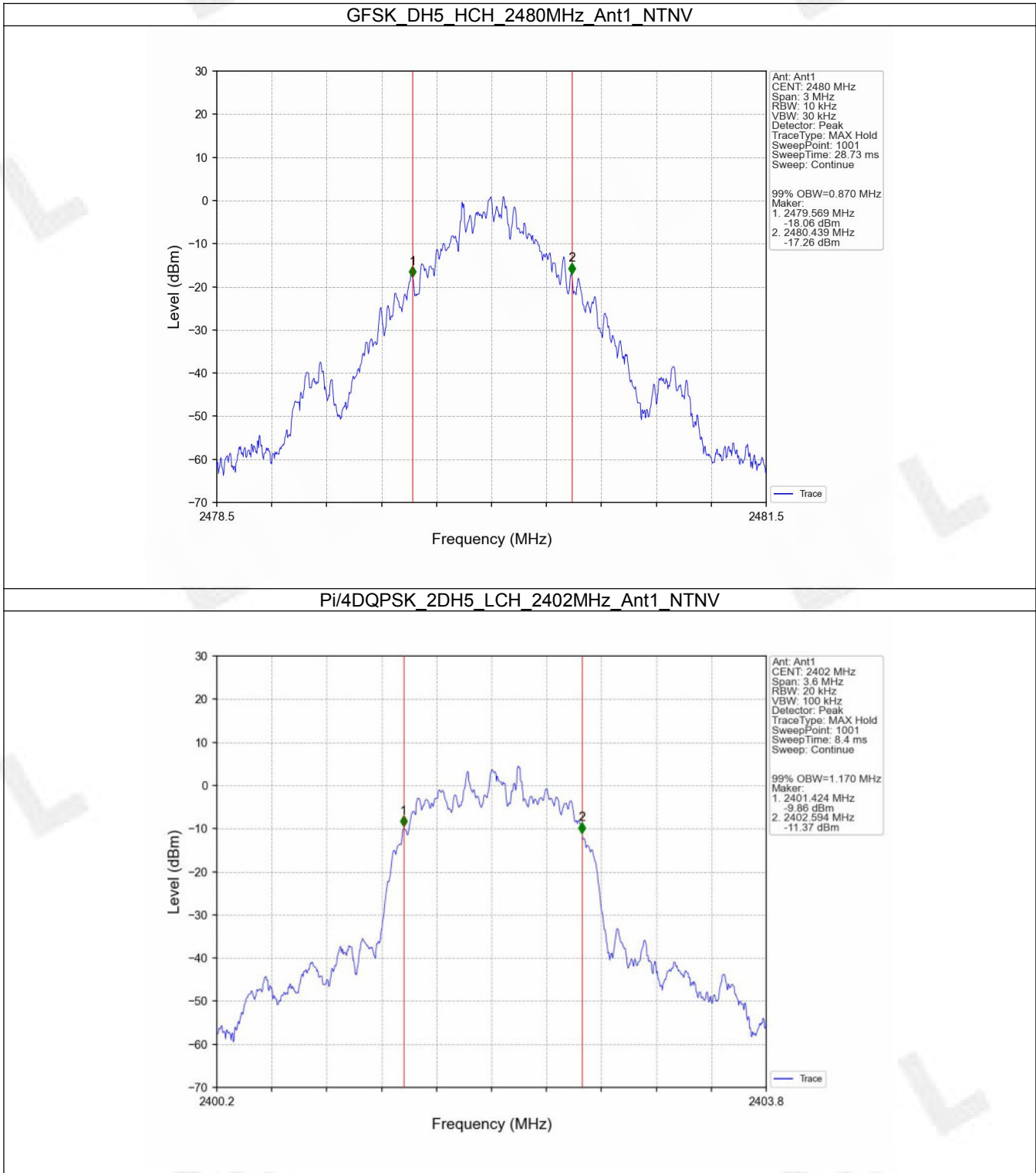
1.2.1 OBW



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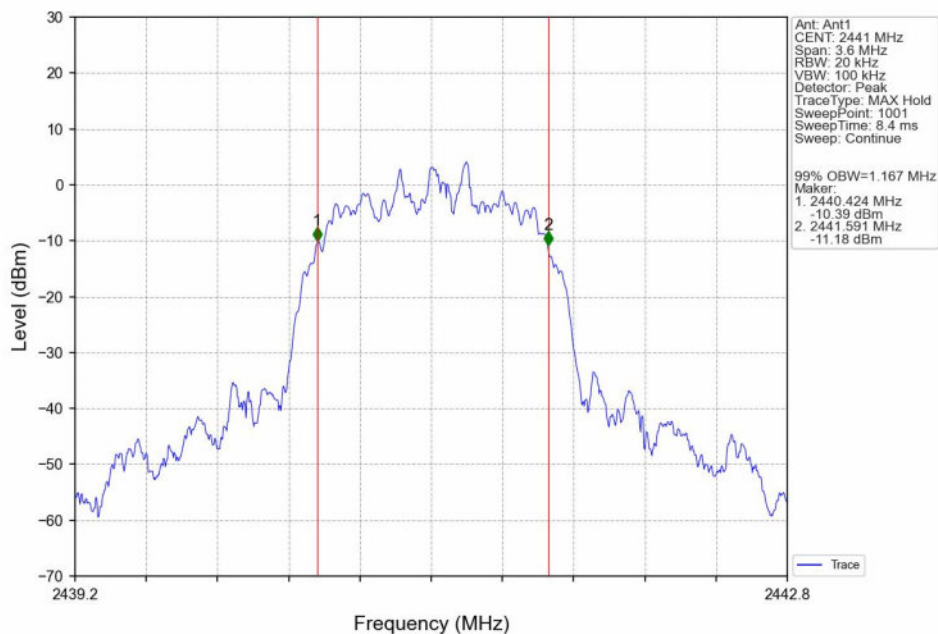


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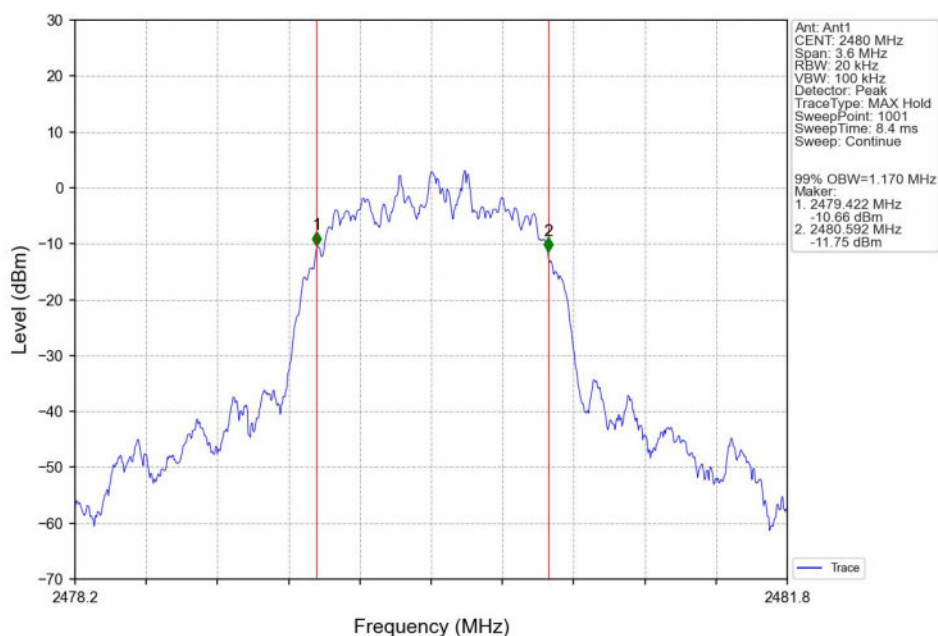


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Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV

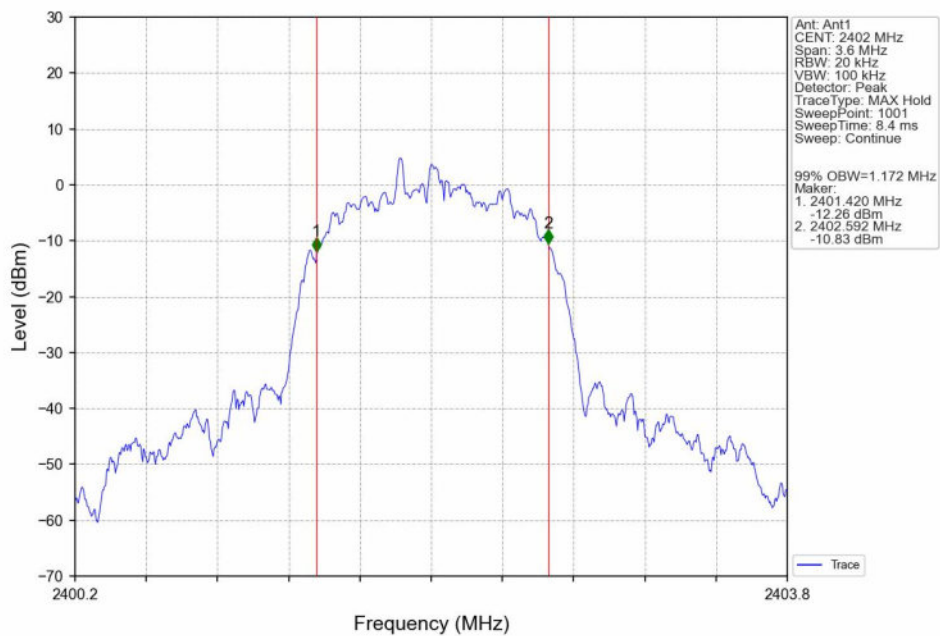


Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV

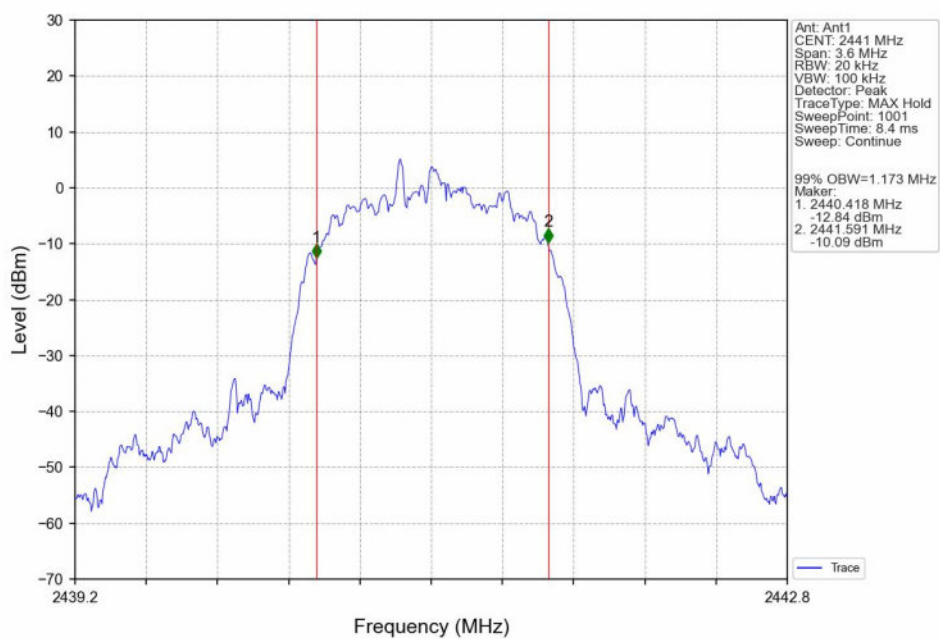


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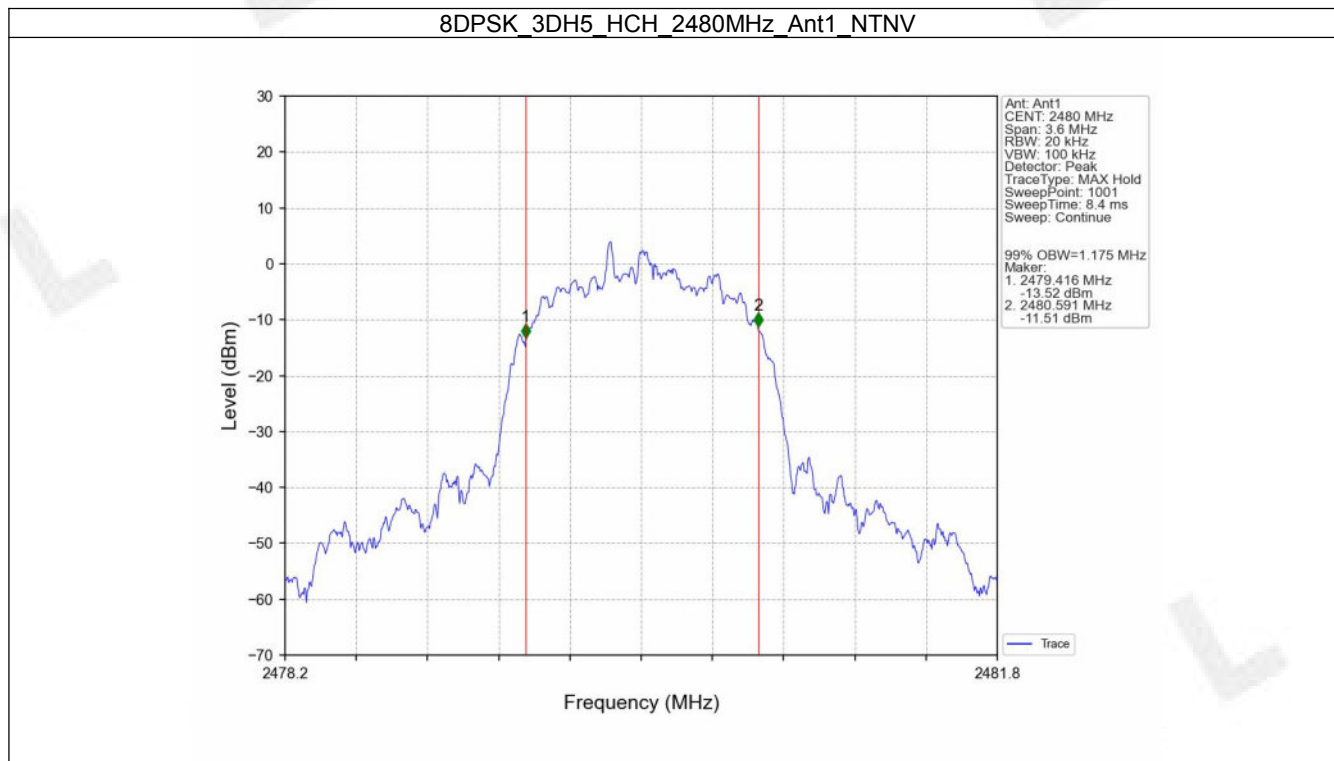
8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV

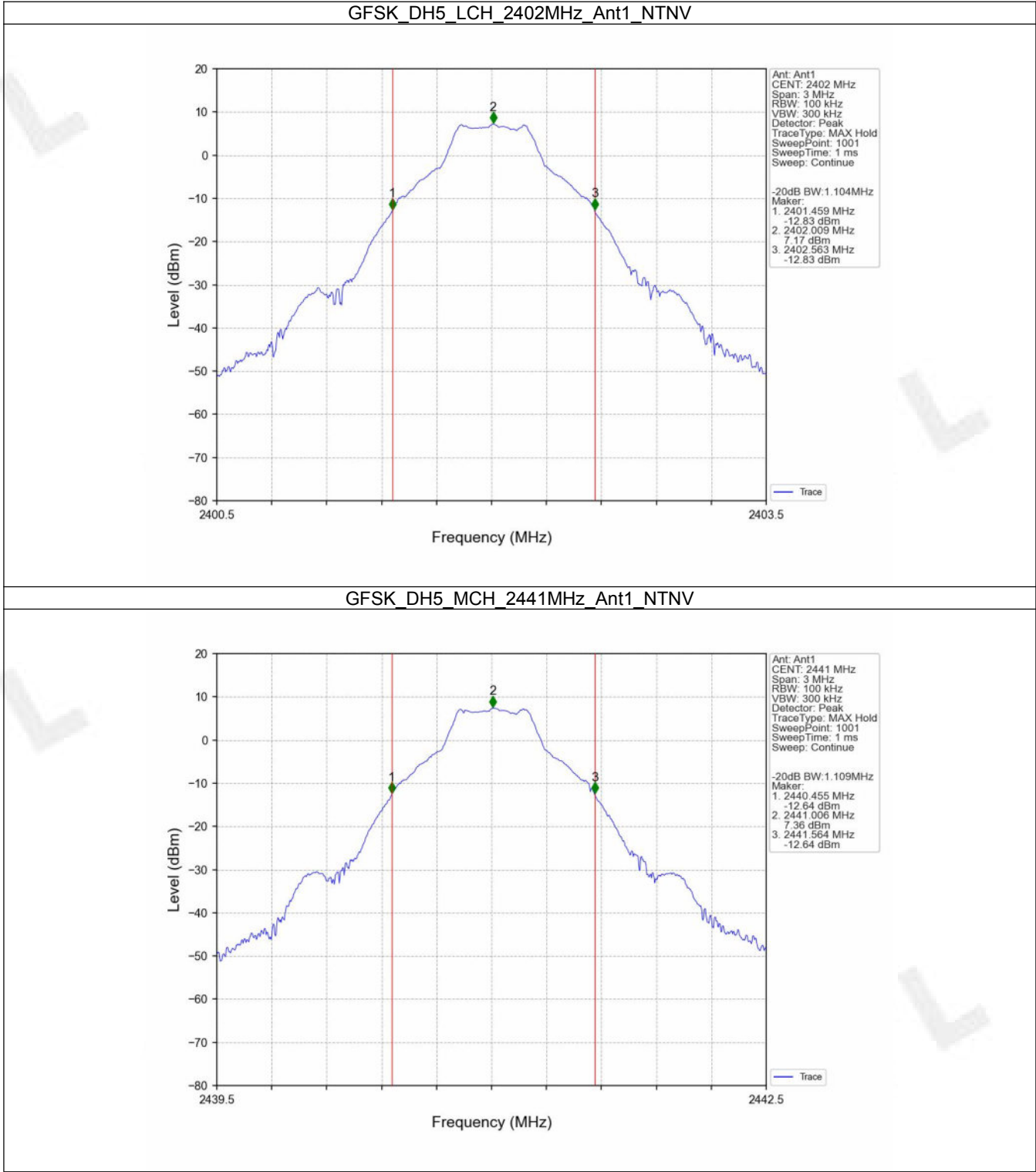


FCC ID: 2A94J-CP025



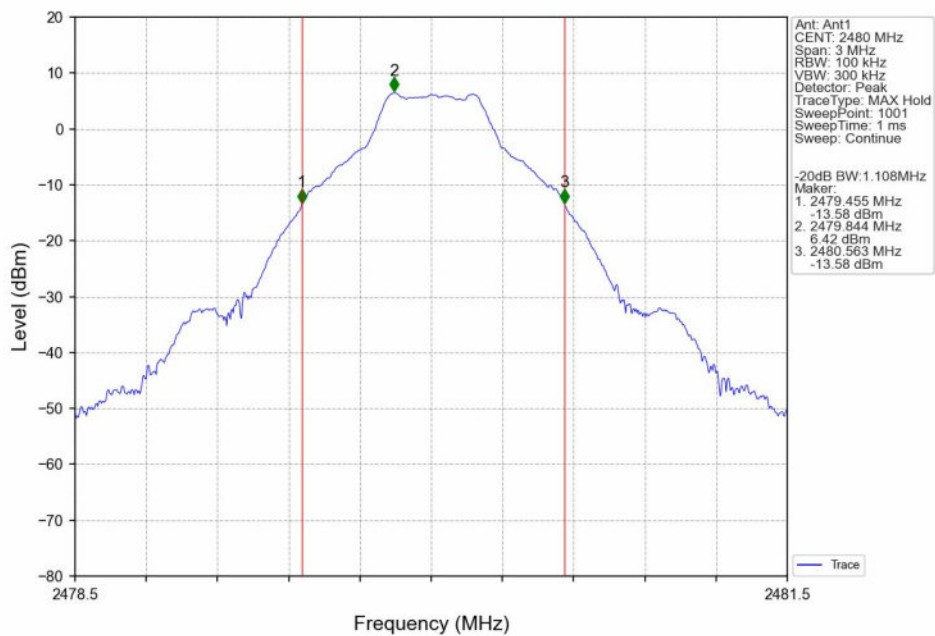
FCC ID: 2A94J-CP025

1.2.2 20dB BW

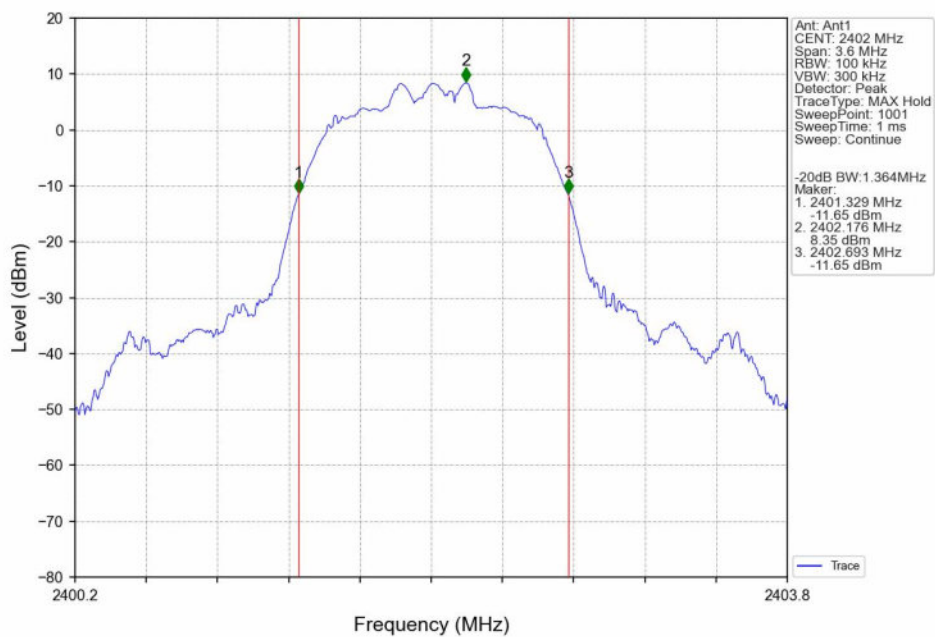


FCC ID: 2A94J-CP025

GFSK DH5\_HCH\_2480MHz\_Ant1\_NTNV

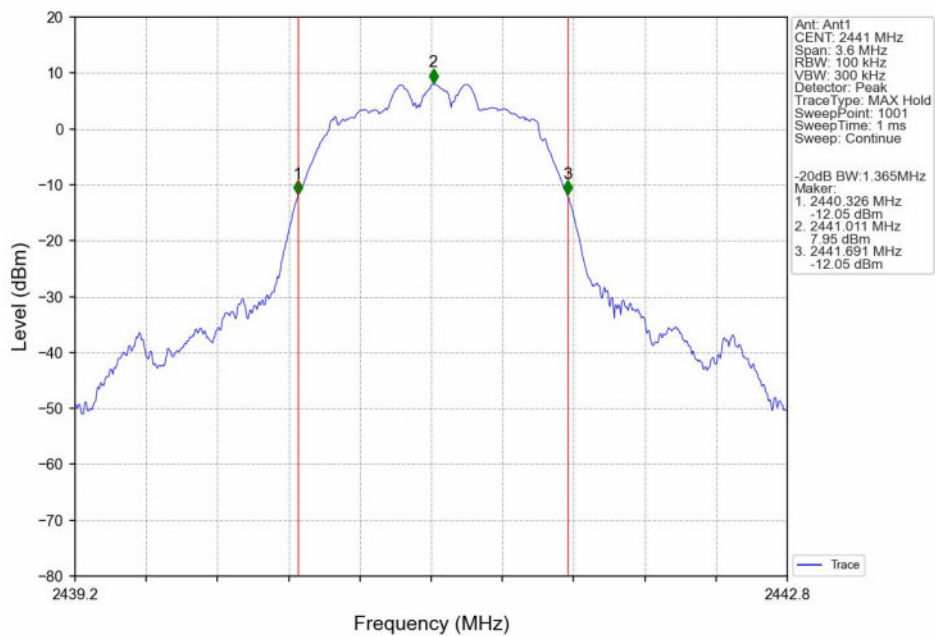


Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV

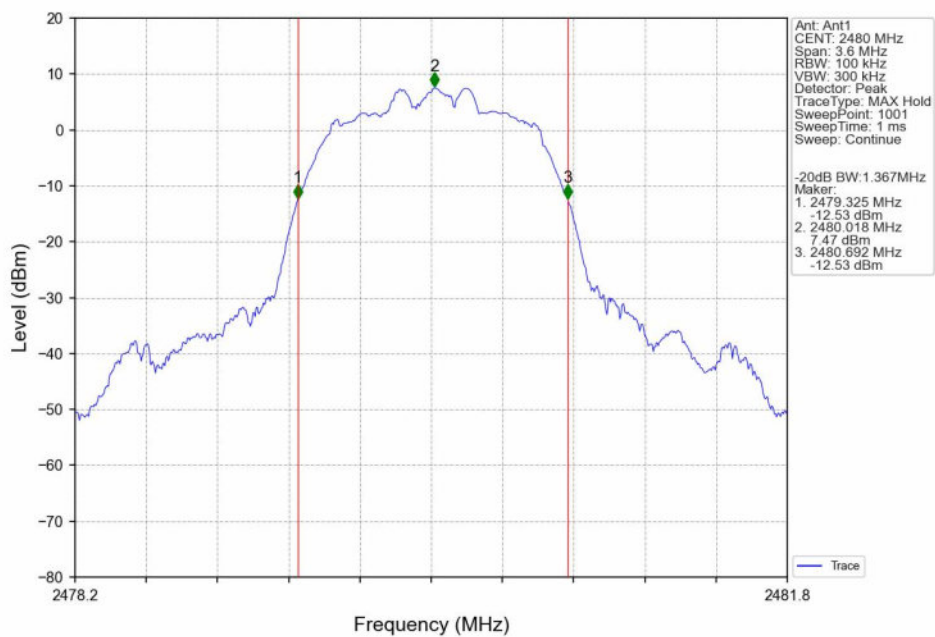


FCC ID: 2A94J-CP025

Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV

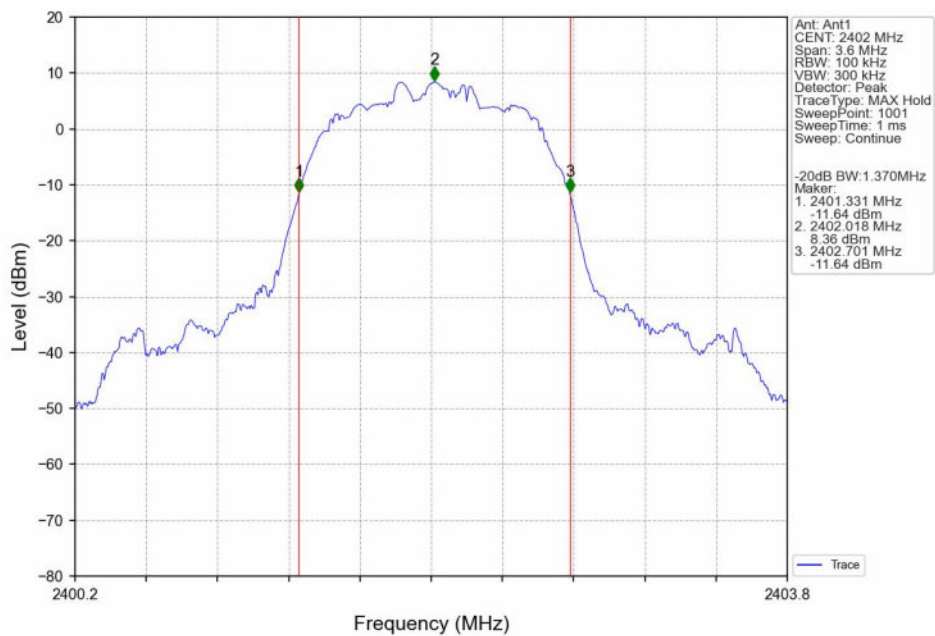


Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV

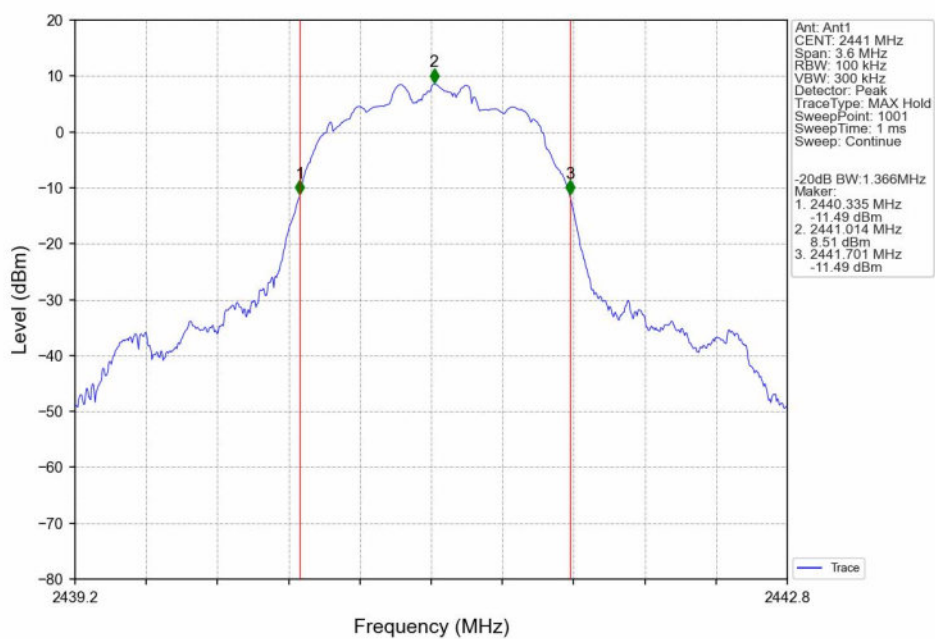


FCC ID: 2A94J-CP025

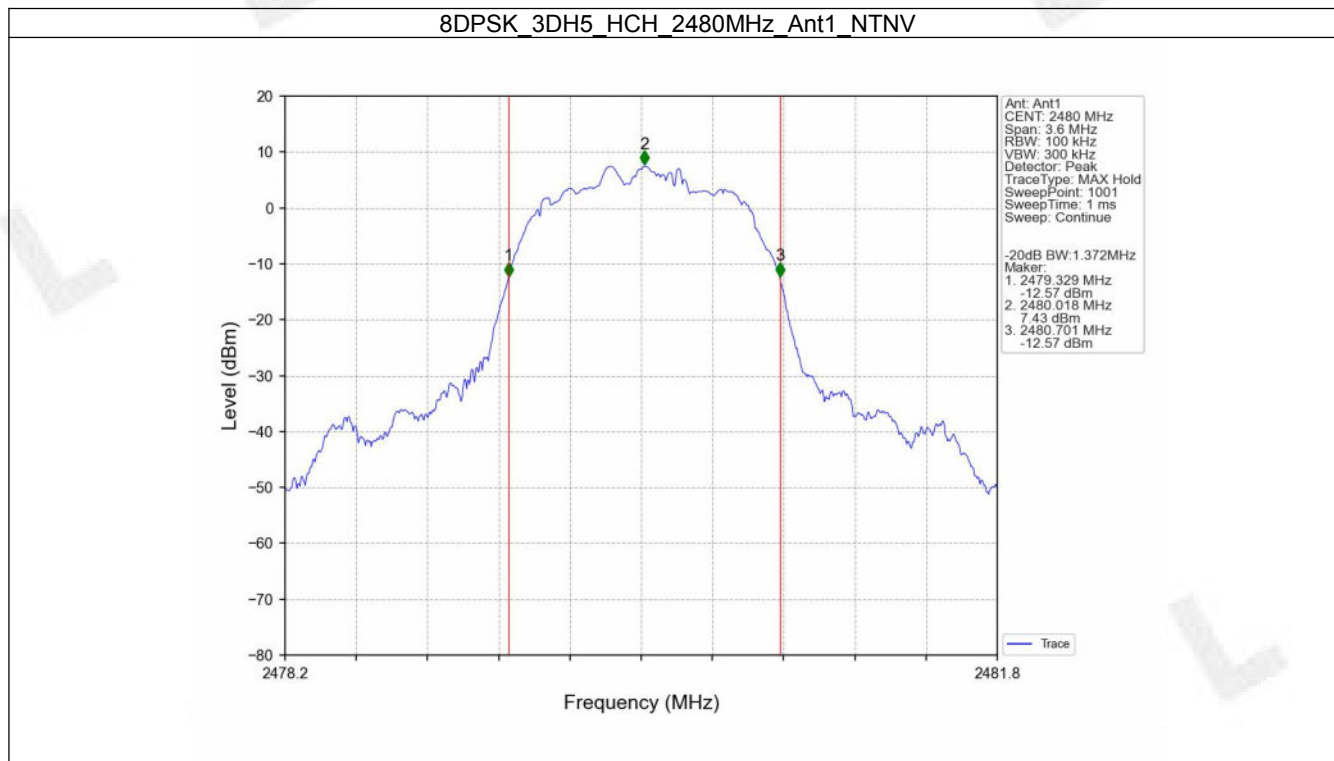
8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV



FCC ID: 2A94J-CP025



## 2. Maximum Conducted Output Power

### 2.1 Test Result

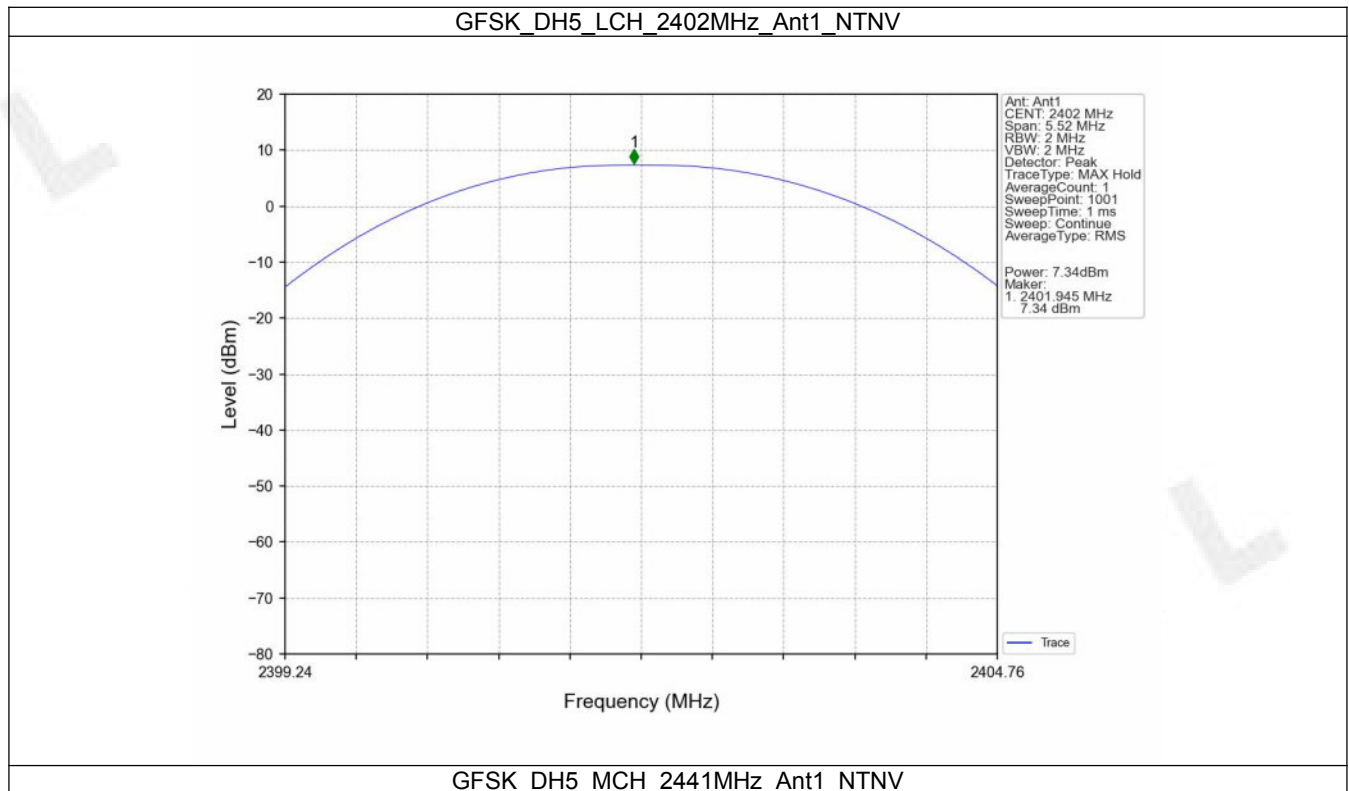
#### 2.1.1 Power

| Mode                                                                                                                 | TX Type | Frequency (MHz) | Packet Type | Maximum Peak Conducted Output Power (dBm) |         | Verdict |
|----------------------------------------------------------------------------------------------------------------------|---------|-----------------|-------------|-------------------------------------------|---------|---------|
|                                                                                                                      |         |                 |             | ANT1                                      | Limit   |         |
| GFSK                                                                                                                 | SISO    | 2402            | DH5         | 7.34                                      | <=20.97 | Pass    |
|                                                                                                                      |         | 2441            | DH5         | 7.59                                      | <=20.97 | Pass    |
|                                                                                                                      |         | 2480            | DH5         | 6.61                                      | <=20.97 | Pass    |
| Pi/4DQPSK                                                                                                            | SISO    | 2402            | 2DH5        | 9.83                                      | <=20.97 | Pass    |
|                                                                                                                      |         | 2441            | 2DH5        | 9.40                                      | <=20.97 | Pass    |
|                                                                                                                      |         | 2480            | 2DH5        | 8.96                                      | <=20.97 | Pass    |
| 8DPSK                                                                                                                | SISO    | 2402            | 3DH5        | 10.30                                     | <=20.97 | Pass    |
|                                                                                                                      |         | 2441            | 3DH5        | 10.43                                     | <=20.97 | Pass    |
|                                                                                                                      |         | 2480            | 3DH5        | 9.40                                      | <=20.97 | Pass    |
| Note1: Antenna Gain: Ant1: -3.68dBi;<br>Note2: RF Cable loss=0.5dB<br>Note3: The test results include RF Cable loss. |         |                 |             |                                           |         |         |

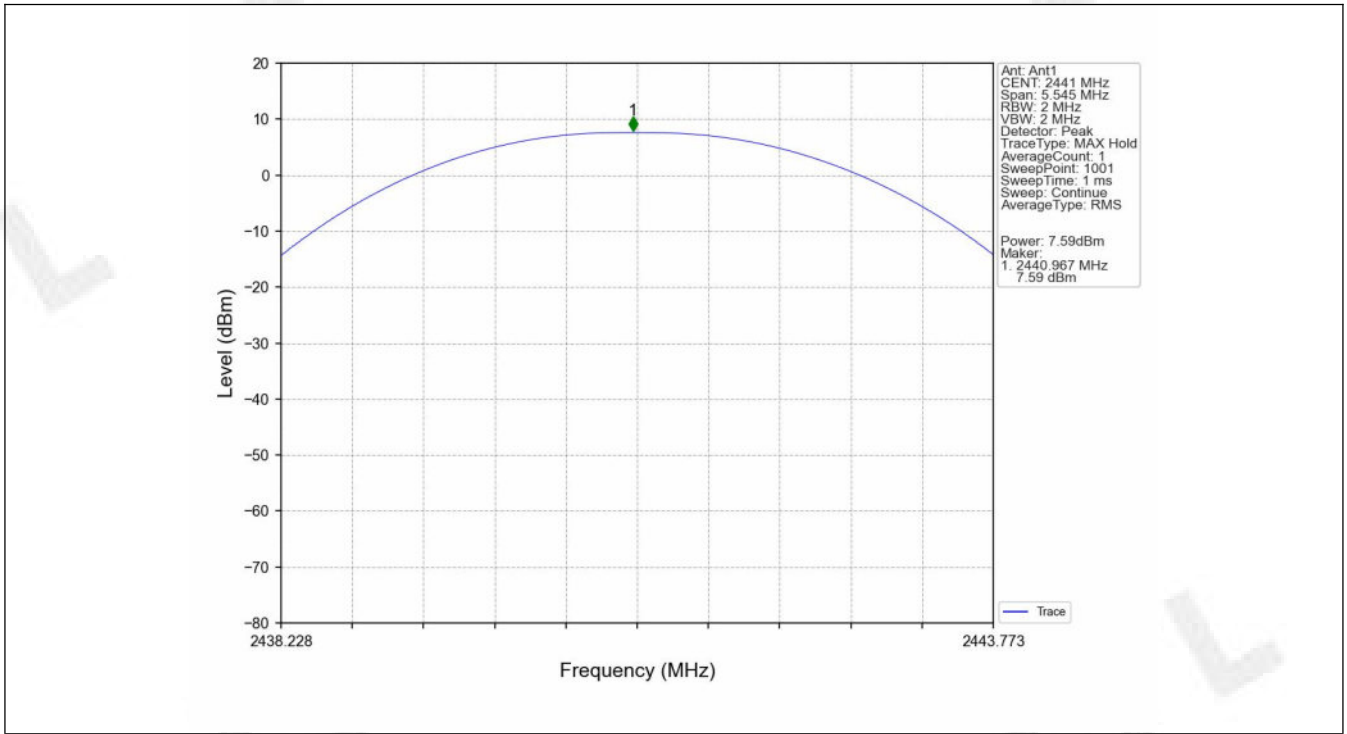
FCC ID: 2A94J-CP025

## 2.2 Test Graph

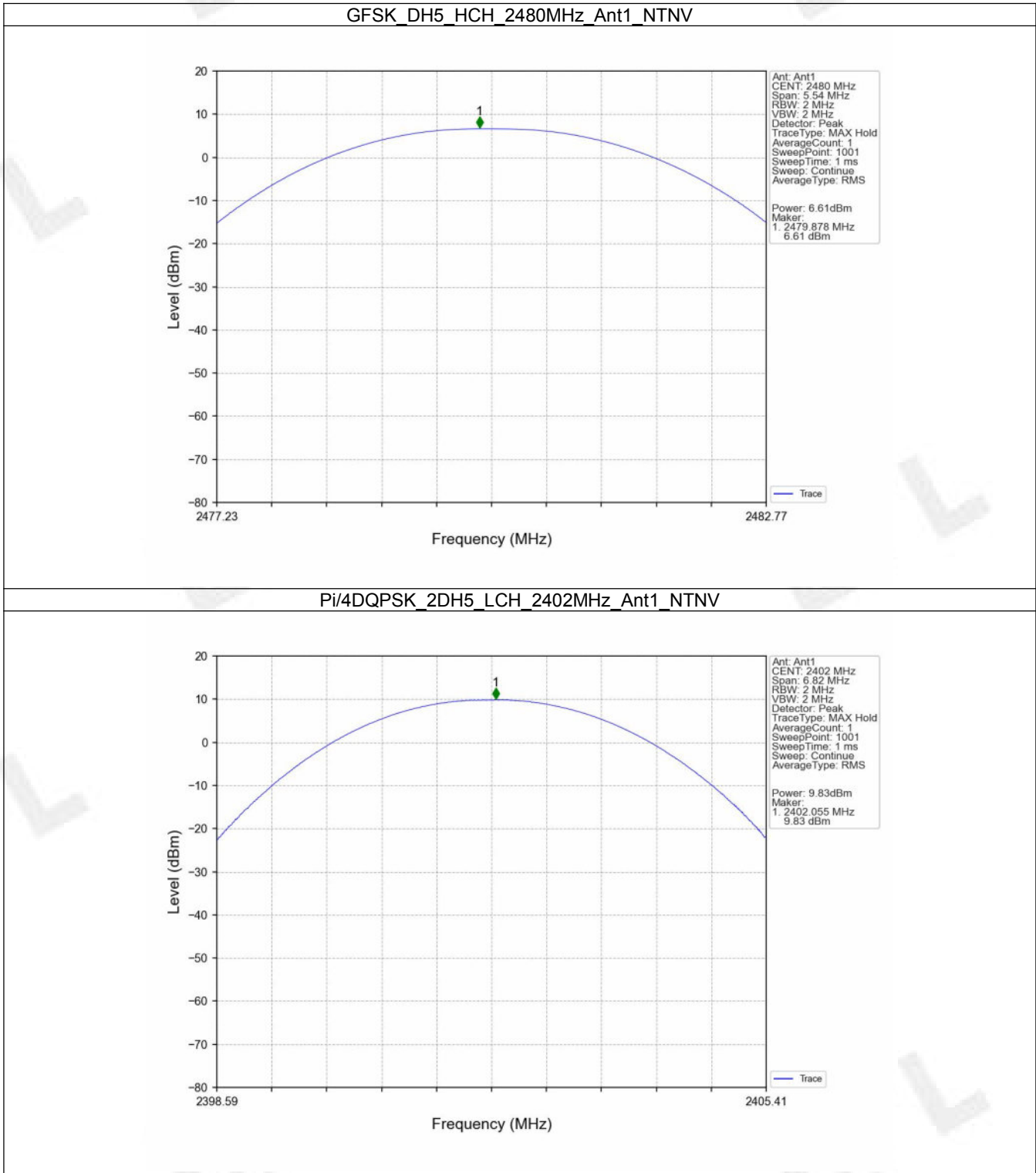
### 2.2.1 Power



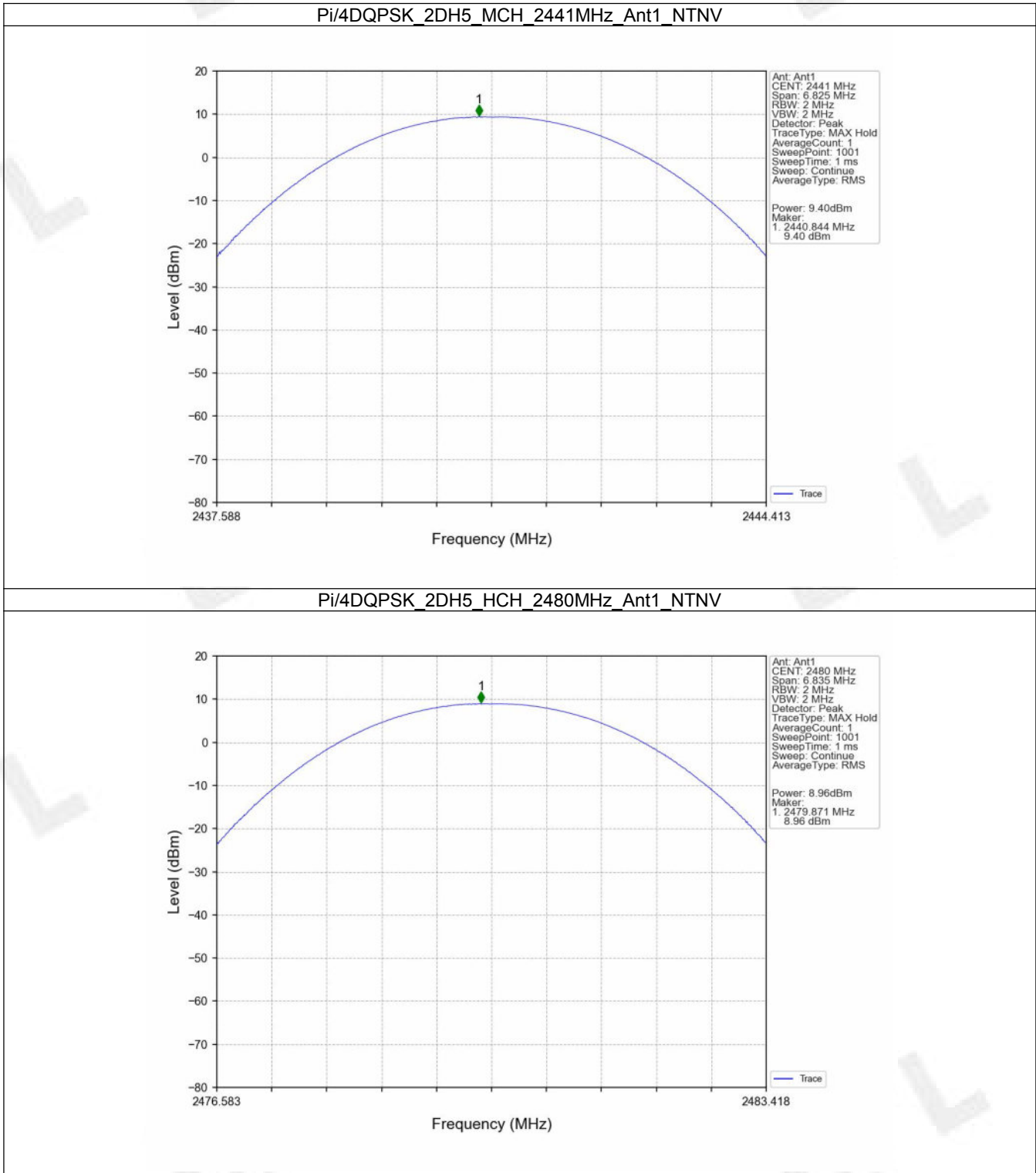
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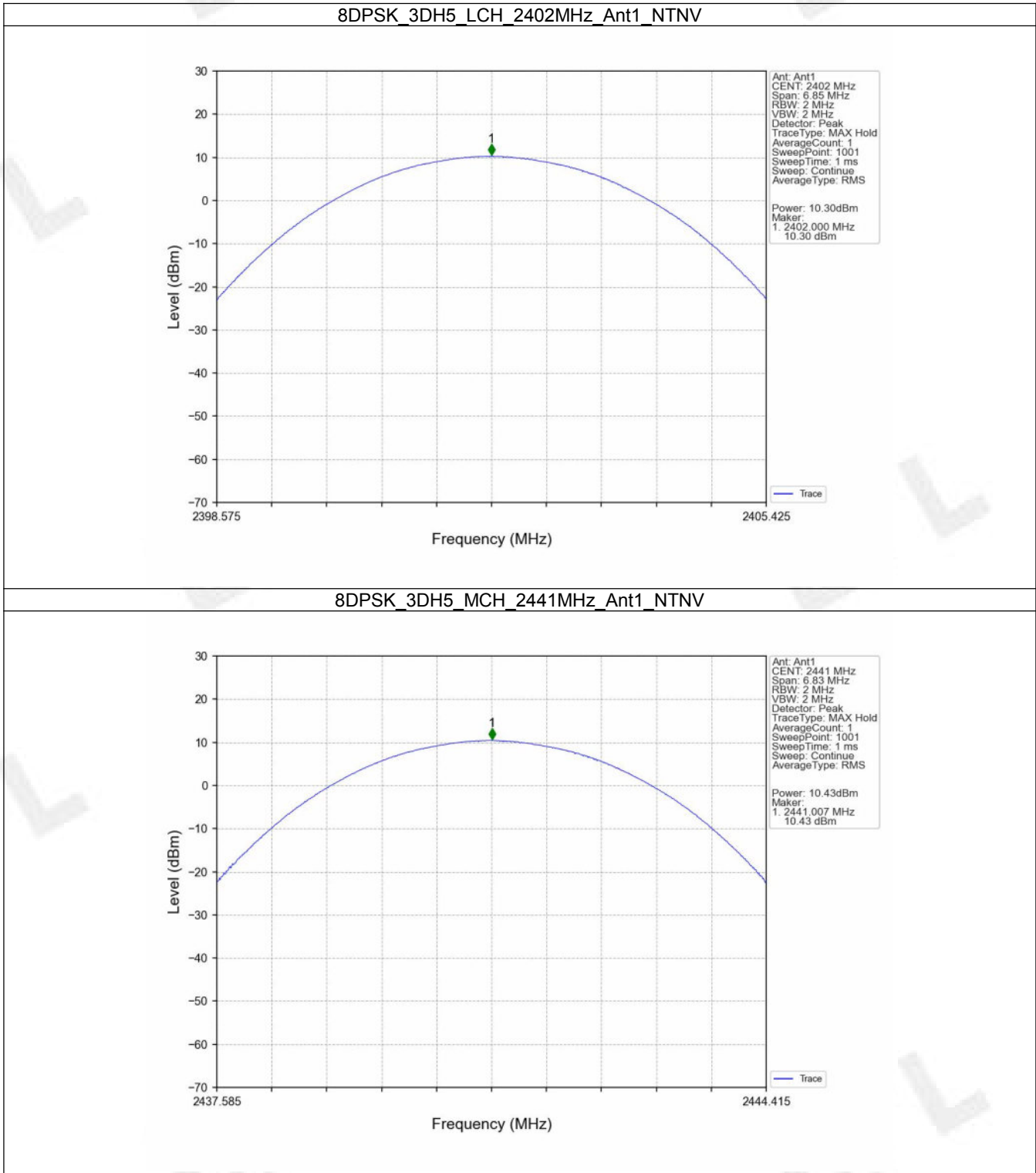
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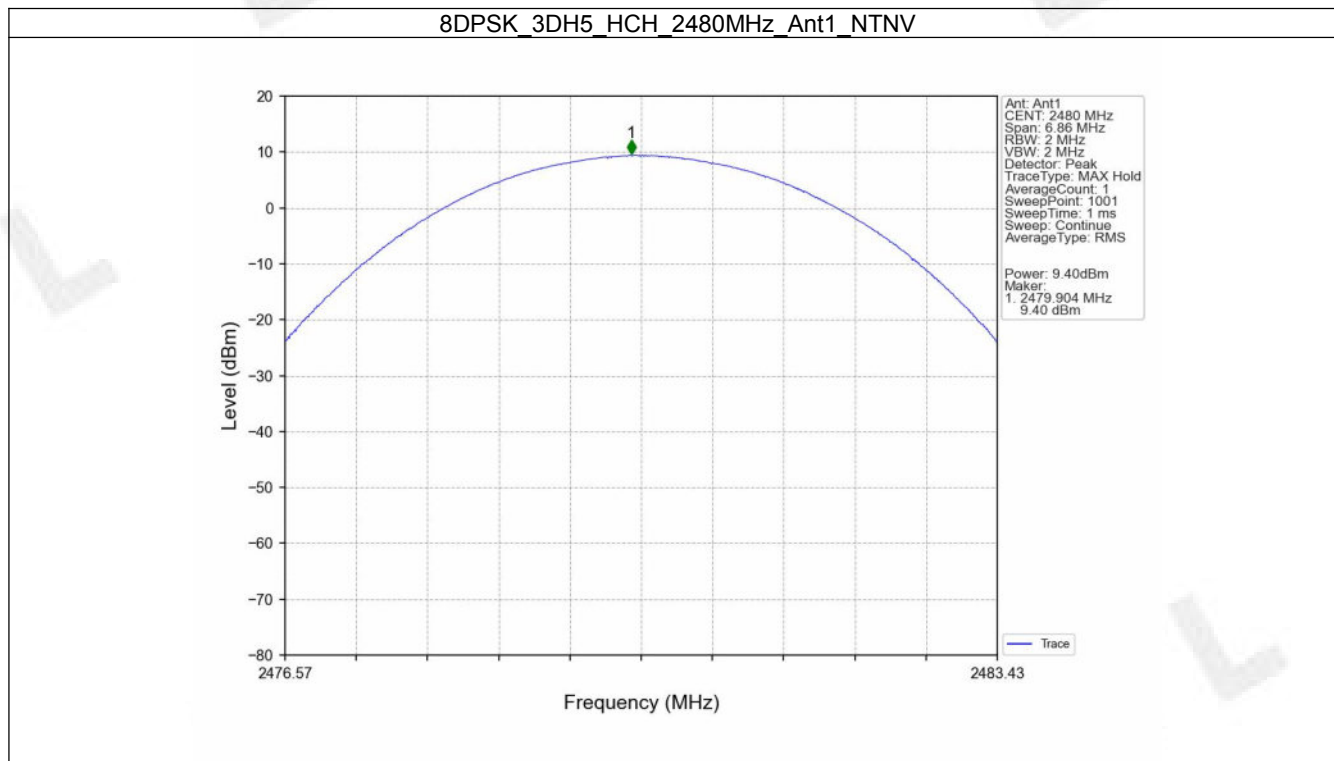
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FCC ID: 2A94J-CP025



FCC ID: 2A94J-CP025



### 3. Carrier Frequency Separation

#### 3.1 Test Result

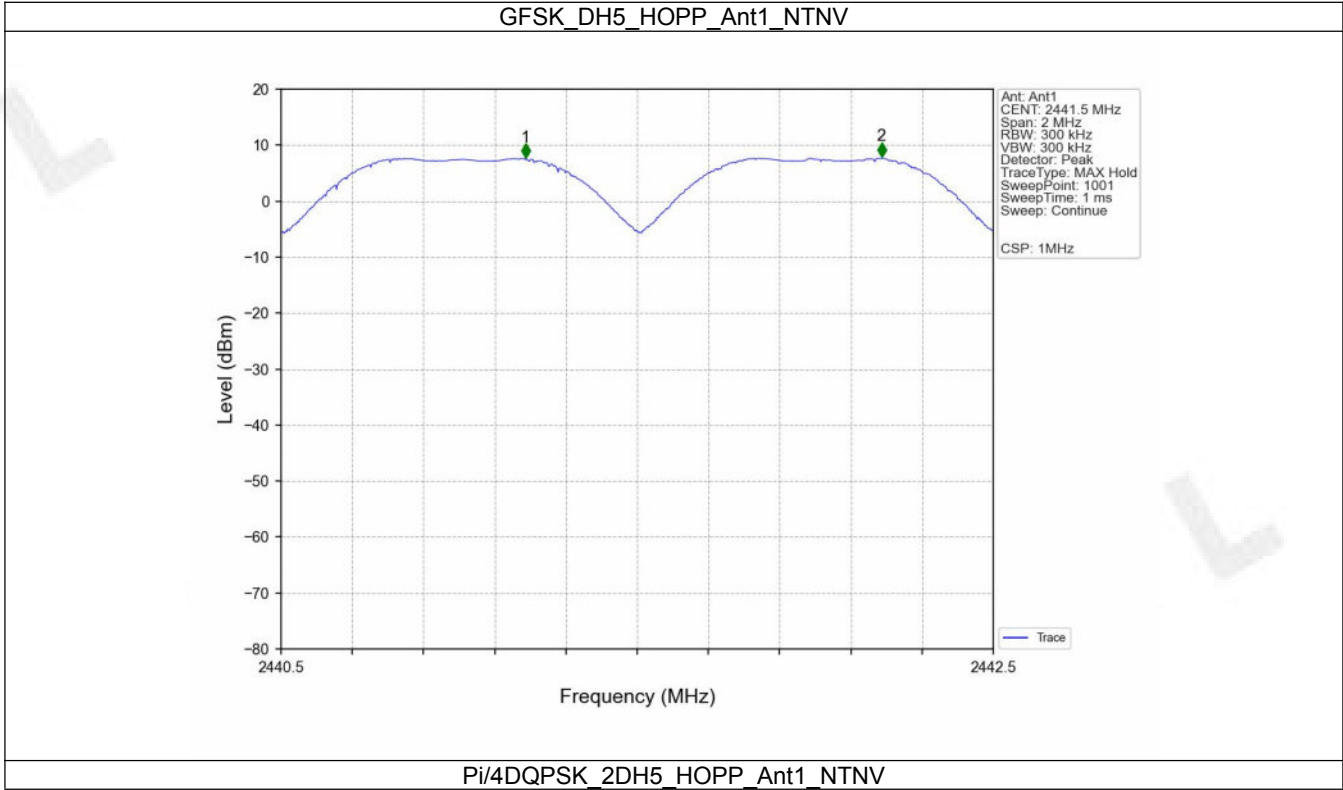
##### 3.1.1 Ant1

| Ant1      |         |                 |             |                          |                      |              |         |
|-----------|---------|-----------------|-------------|--------------------------|----------------------|--------------|---------|
| Mode      | TX Type | Frequency (MHz) | Packet Type | Channel Separation (MHz) | 20dB Bandwidth (MHz) | Limit (MHz)  | Verdict |
| GFSK      | SISO    | HOPP            | DH5         | 1.000                    | 1.109                | $\geq 0.739$ | Pass    |
| PI/4DQPSK | SISO    | HOPP            | 2DH5        | 1.001                    | 1.367                | $\geq 0.911$ | Pass    |
| 8DPSK     | SISO    | HOPP            | 3DH5        | 1.010                    | 1.372                | $\geq 0.915$ | Pass    |

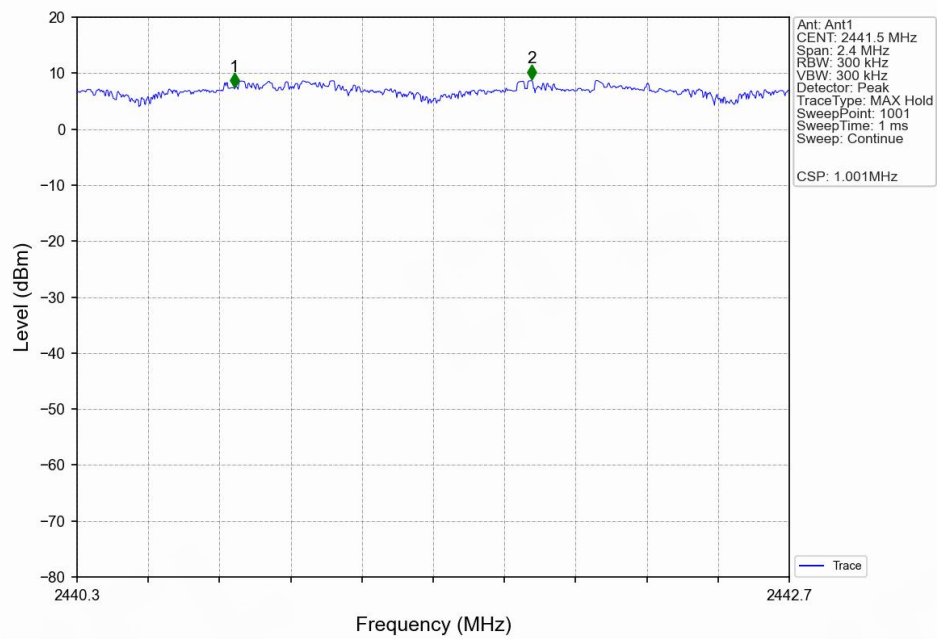
FCC ID: 2A94J-CP025

3.2 Test Graph

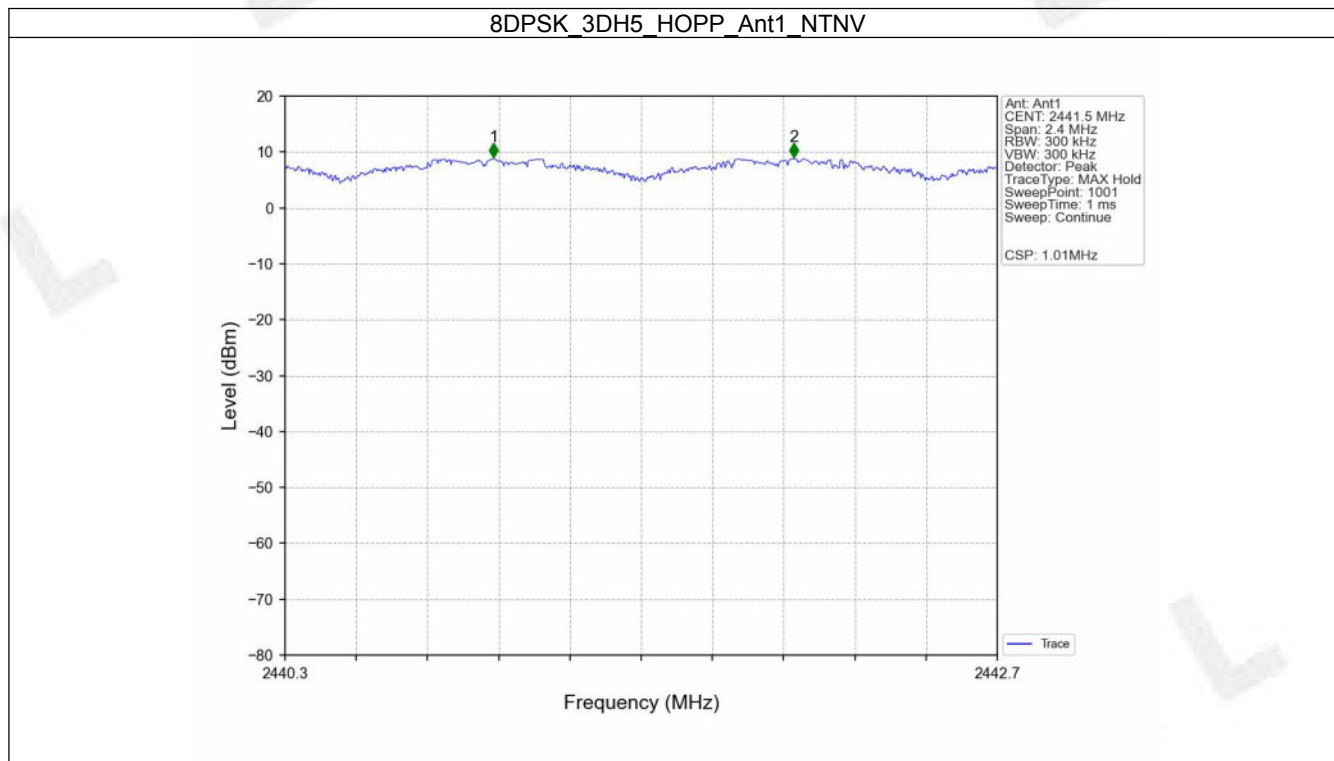
3.2.1 Ant1



FCC ID: 2A94J-CP025



FCC ID: 2A94J-CP025



## 4. Number of Hopping Frequencies

### 4.1 Test Result

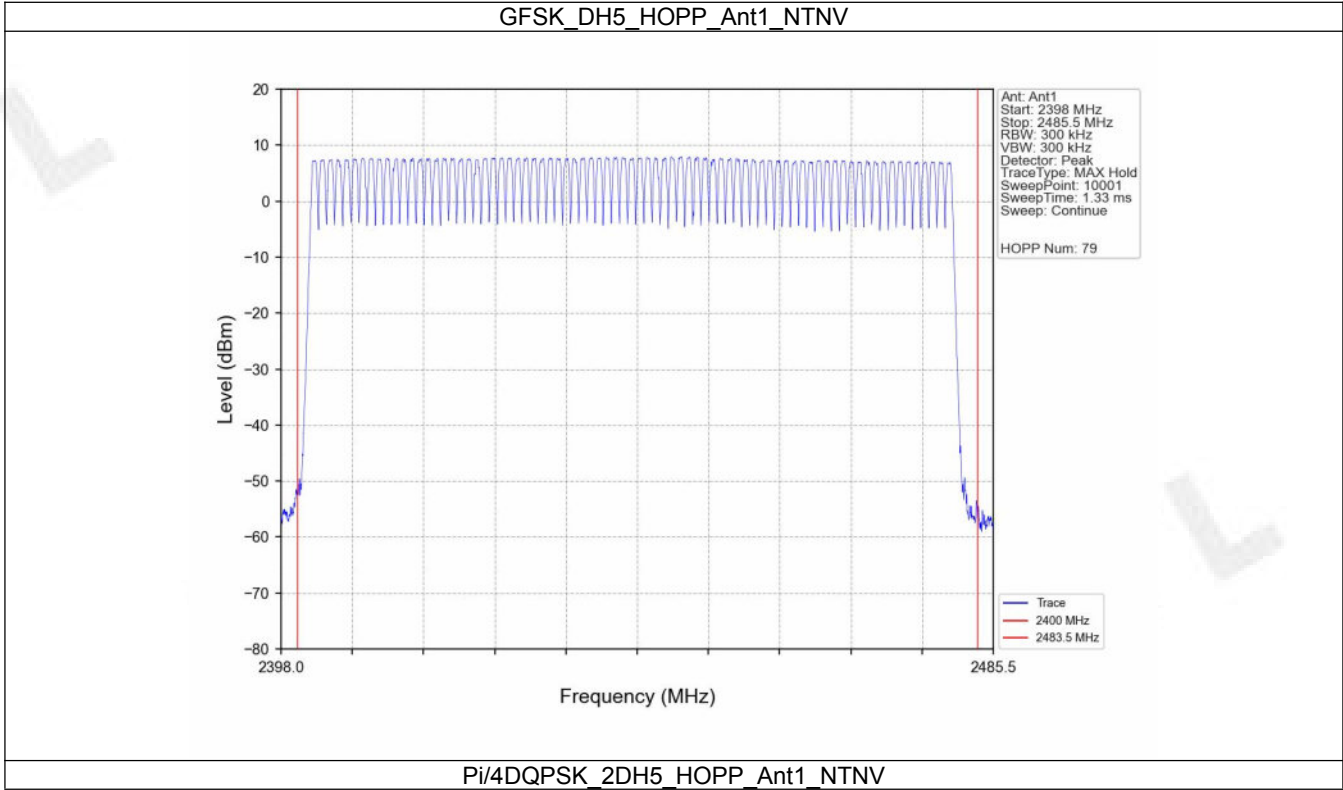
#### 4.1.1 HoppNum

| Mode      | TX Type | Frequency (MHz) | Packet Type | Num of Hopping Frequencies |           | Verdict |
|-----------|---------|-----------------|-------------|----------------------------|-----------|---------|
|           |         |                 |             | ANT1                       | Limit     |         |
| GFSK      | SISO    | HOPP            | DH5         | 79                         | $\geq 15$ | Pass    |
| Pi/4DQPSK | SISO    | HOPP            | 2DH5        | 79                         | $\geq 15$ | Pass    |
| 8DPSK     | SISO    | HOPP            | 3DH5        | 79                         | $\geq 15$ | Pass    |

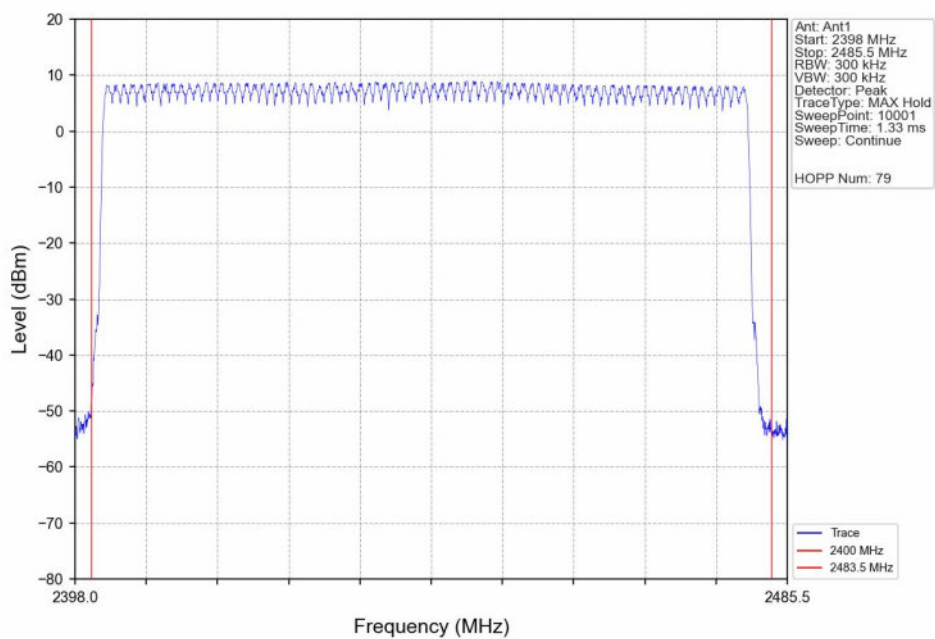
FCC ID: 2A94J-CP025

4.2 Test Graph

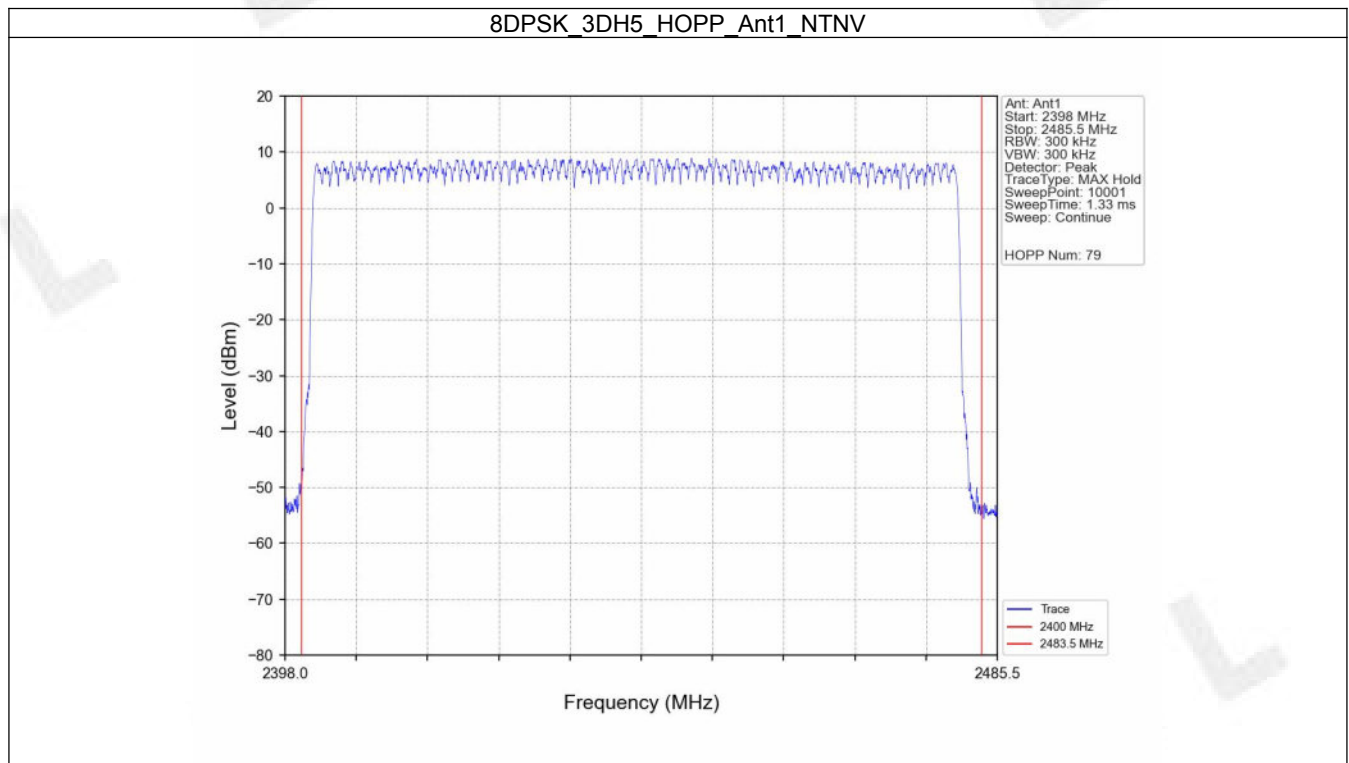
4.2.1 HoppNum



FCC ID: 2A94J-CP025



FCC ID: 2A94J-CP025



## 5. Time of Occupancy (Dwell Time)

### 5.1 Test Result

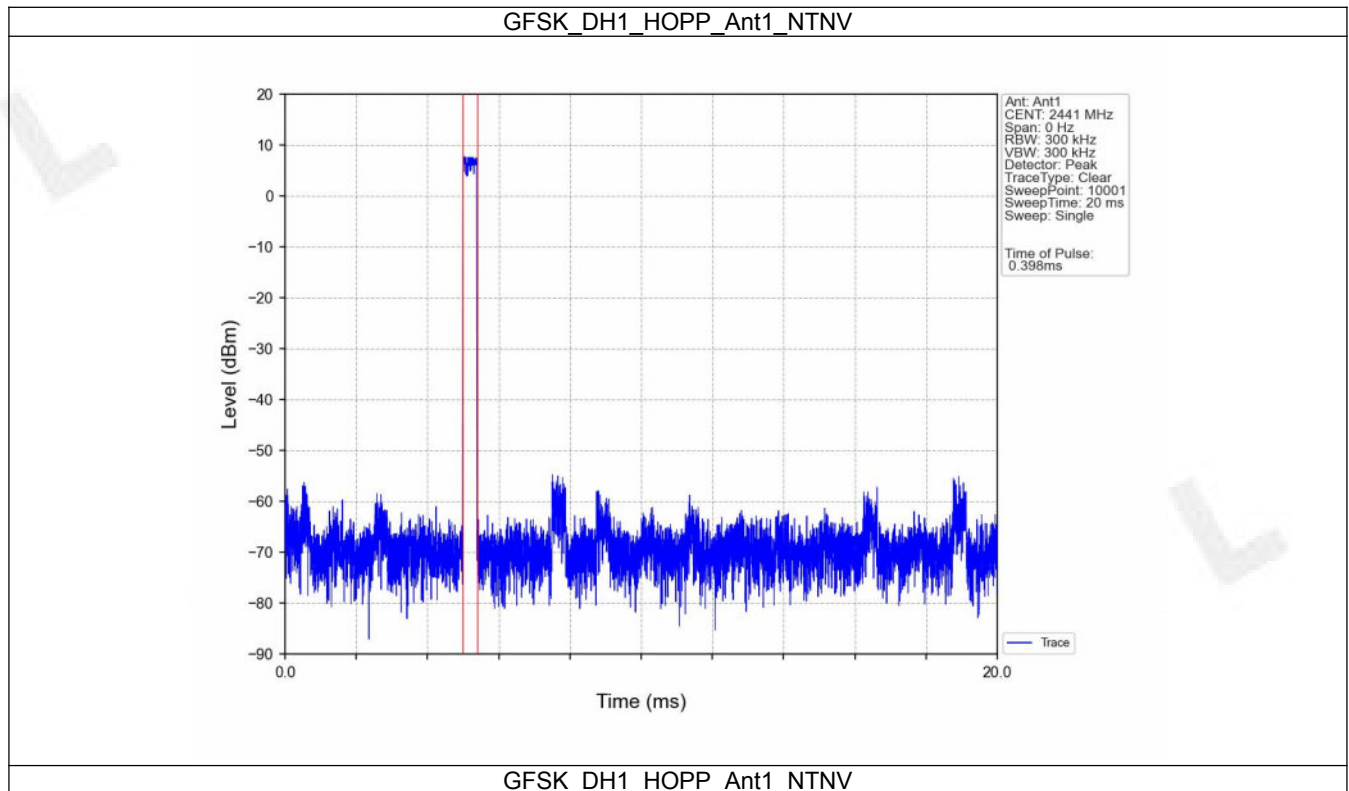
#### 5.1.1 Ant1

| Ant1      |         |                 |             |                               |                        |                                    |                 |            |         |
|-----------|---------|-----------------|-------------|-------------------------------|------------------------|------------------------------------|-----------------|------------|---------|
| Mode      | Tx Type | Frequency (MHz) | Packet Type | Duration of Single Pulse (ms) | Observation Period (s) | Num of Pulse in Observation Period | Dwell Time (ms) | Limit (ms) | Verdict |
| GFSK      | SISO    | HOPP            | DH1         | 0.398                         | 31.600                 | 320                                | 127.360         | <=400      | Pass    |
|           |         |                 | DH3         | 1.654                         | 31.600                 | 152                                | 251.408         | <=400      | Pass    |
|           |         |                 | DH5         | 2.900                         | 31.600                 | 104                                | 301.600         | <=400      | Pass    |
| Pi/4DQPSK | SISO    | HOPP            | 2DH1        | 0.404                         | 31.600                 | 320                                | 129.280         | <=400      | Pass    |
|           |         |                 | 2DH3        | 1.648                         | 31.600                 | 157                                | 258.736         | <=400      | Pass    |
|           |         |                 | 2DH5        | 2.894                         | 31.600                 | 111                                | 321.234         | <=400      | Pass    |
| 8DPSK     | SISO    | HOPP            | 3DH1        | 0.394                         | 31.600                 | 320                                | 126.080         | <=400      | Pass    |
|           |         |                 | 3DH3        | 1.656                         | 31.600                 | 164                                | 271.584         | <=400      | Pass    |
|           |         |                 | 3DH5        | 2.906                         | 31.600                 | 106                                | 308.036         | <=400      | Pass    |

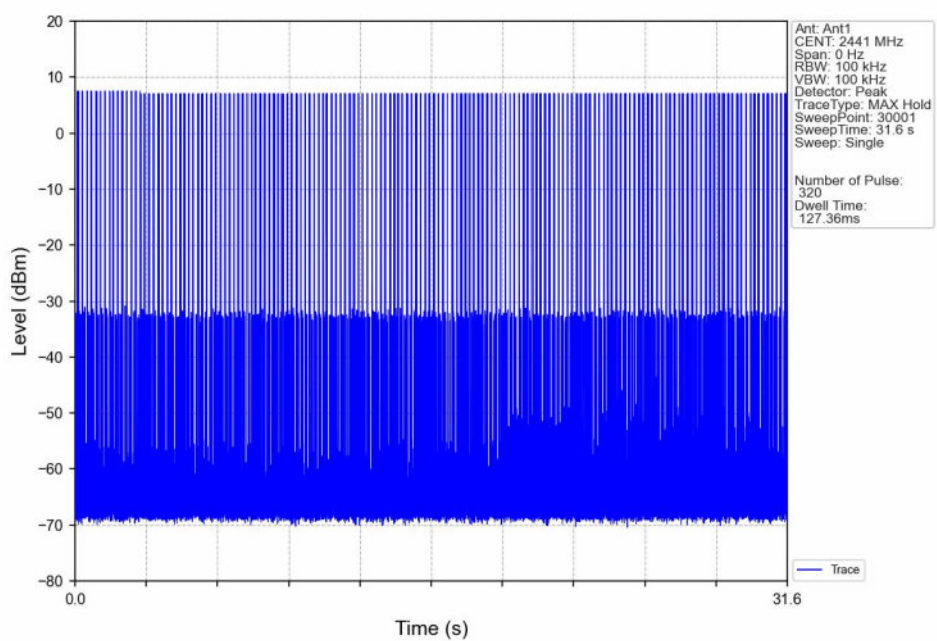
FCC ID: 2A94J-CP025

## 5.2 Test Graph

### 5.2.1 Ant1

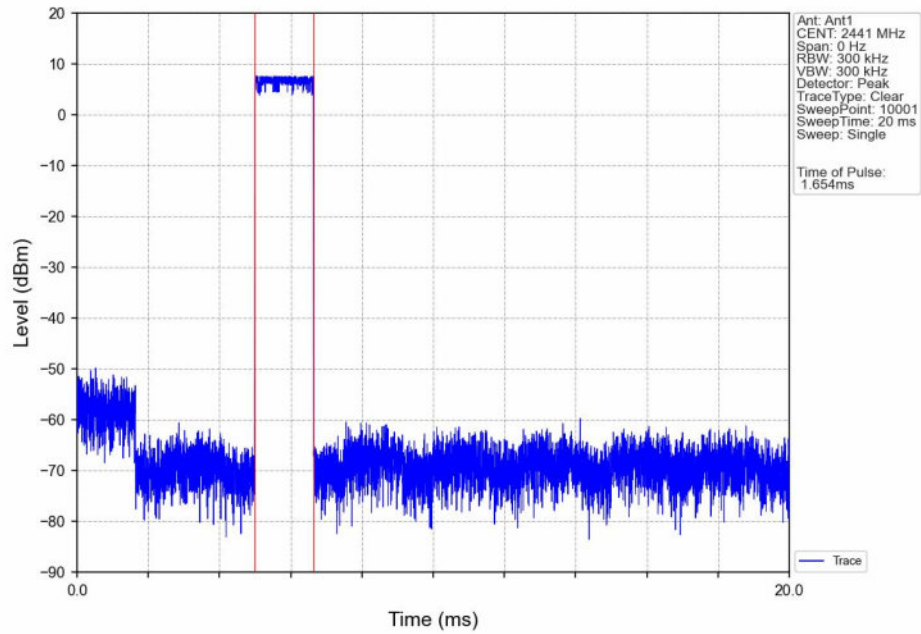


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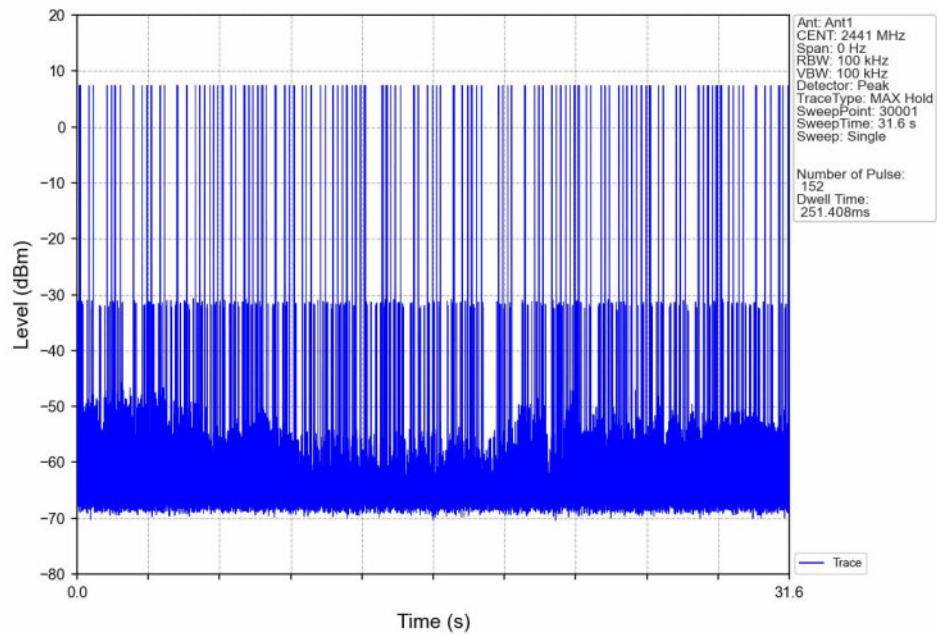


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GFSK\_DH3\_HOPP\_Ant1\_NTNV

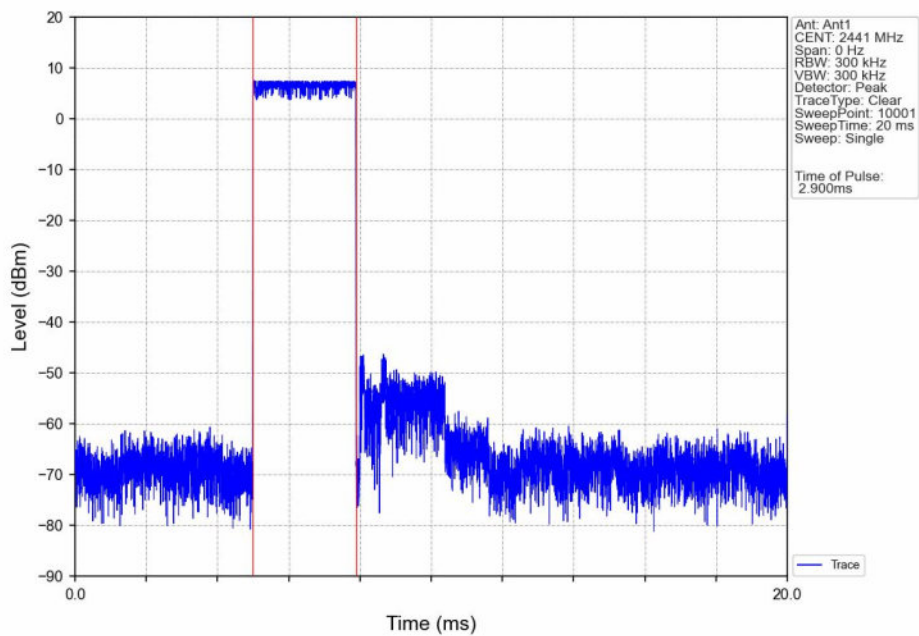


GFSK\_DH3\_HOPP\_Ant1\_NTNV

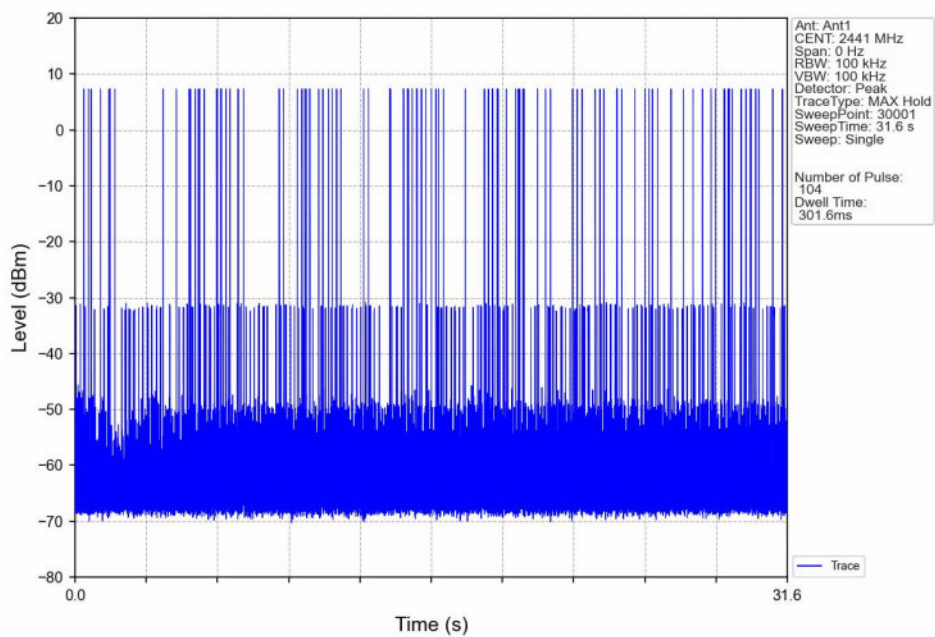


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GFSK\_DH5\_HOPP\_Ant1\_NTNV

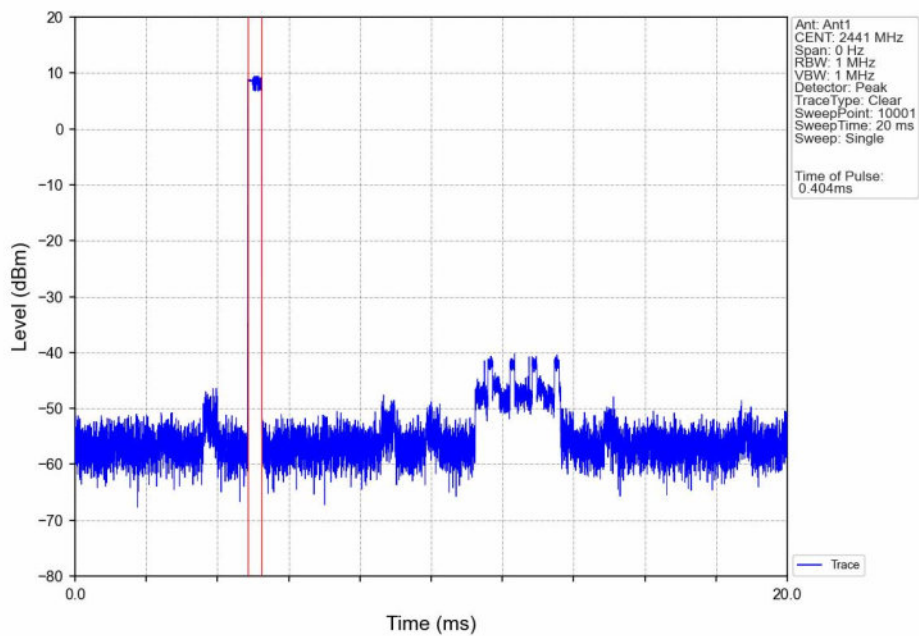


GFSK\_DH5\_HOPP\_Ant1\_NTNV

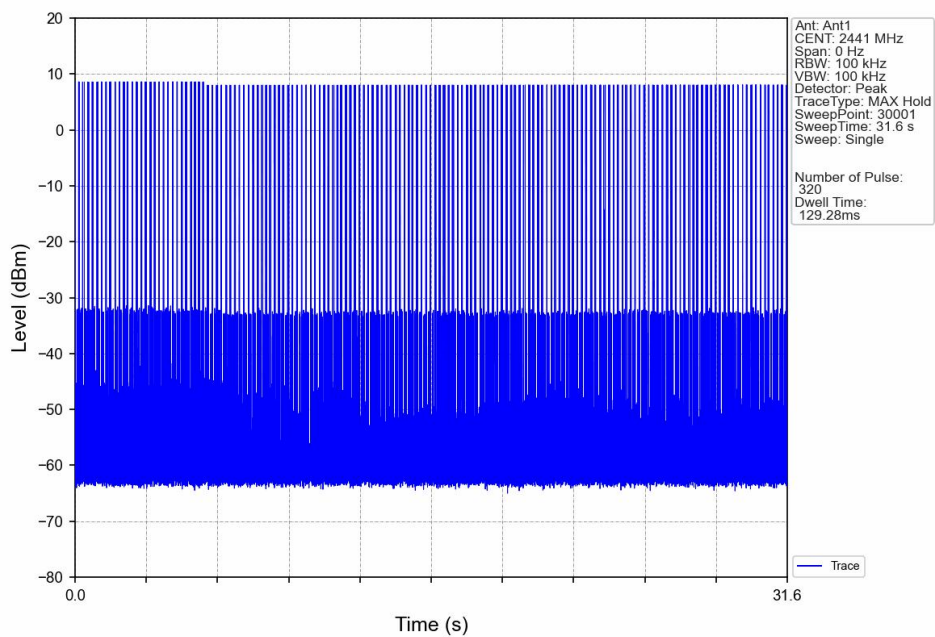


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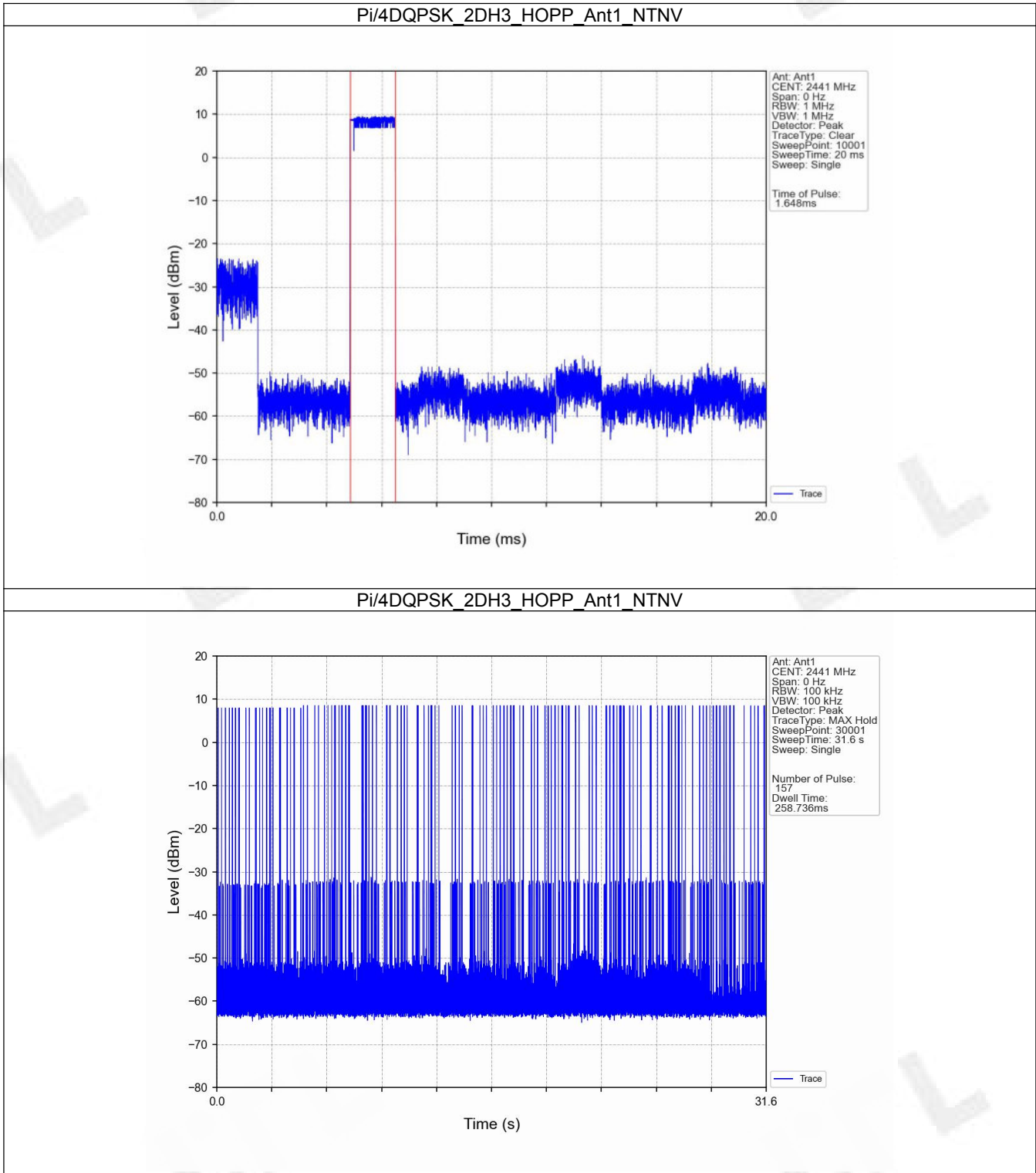
Pi/4DQPSK\_2DH1\_HOPP\_Ant1\_NTNV



Pi/4DQPSK\_2DH1\_HOPP\_Ant1\_NTNV

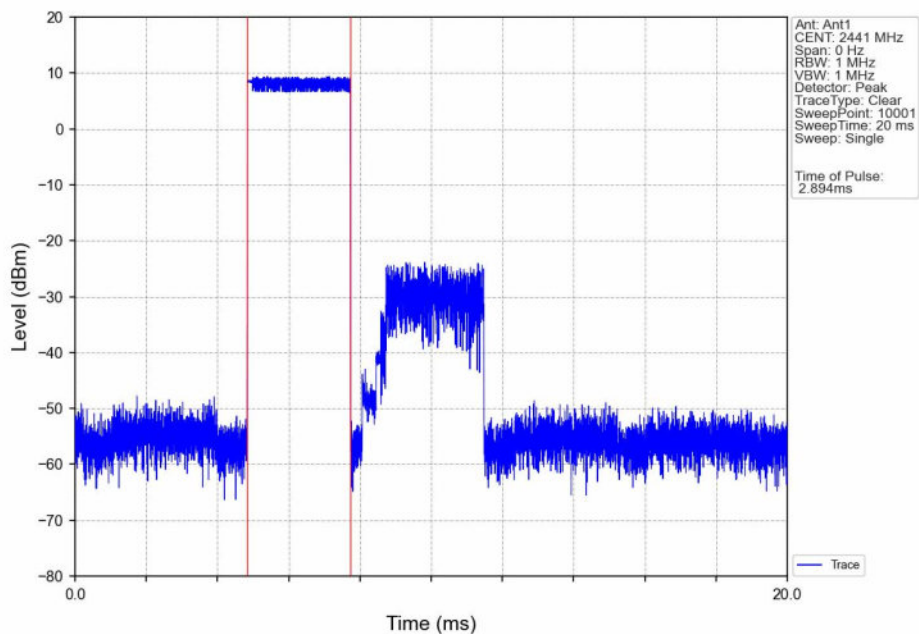


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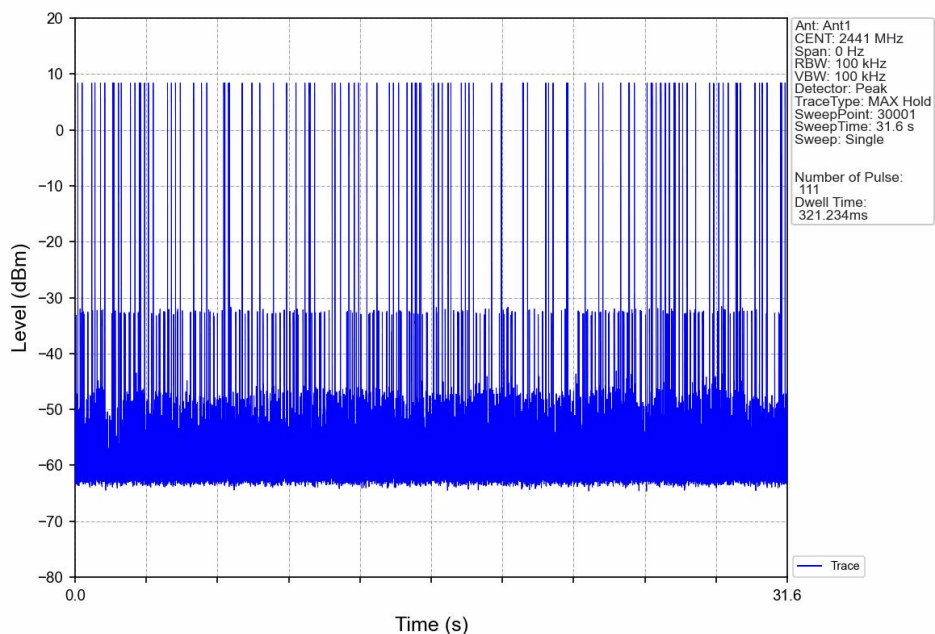


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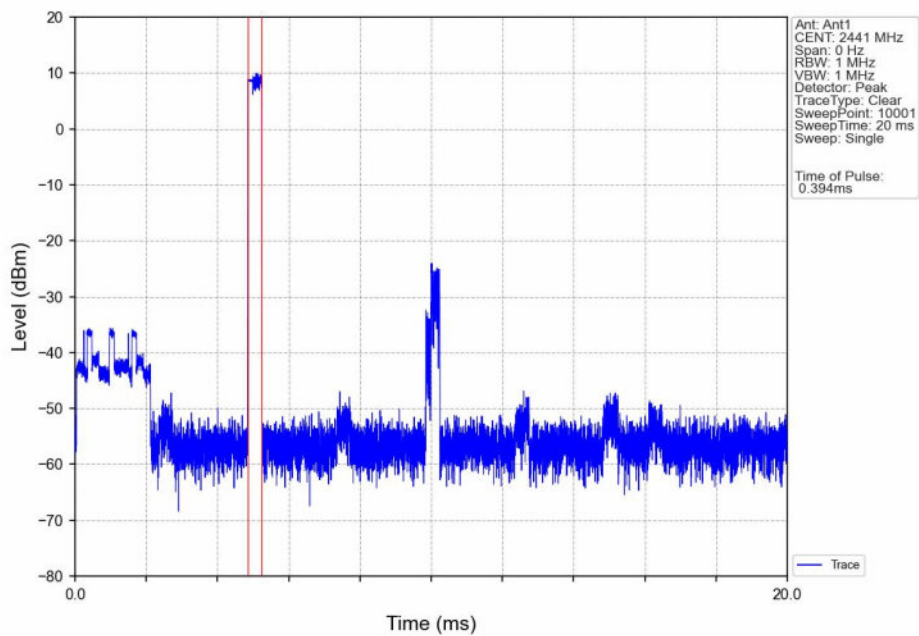
Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV



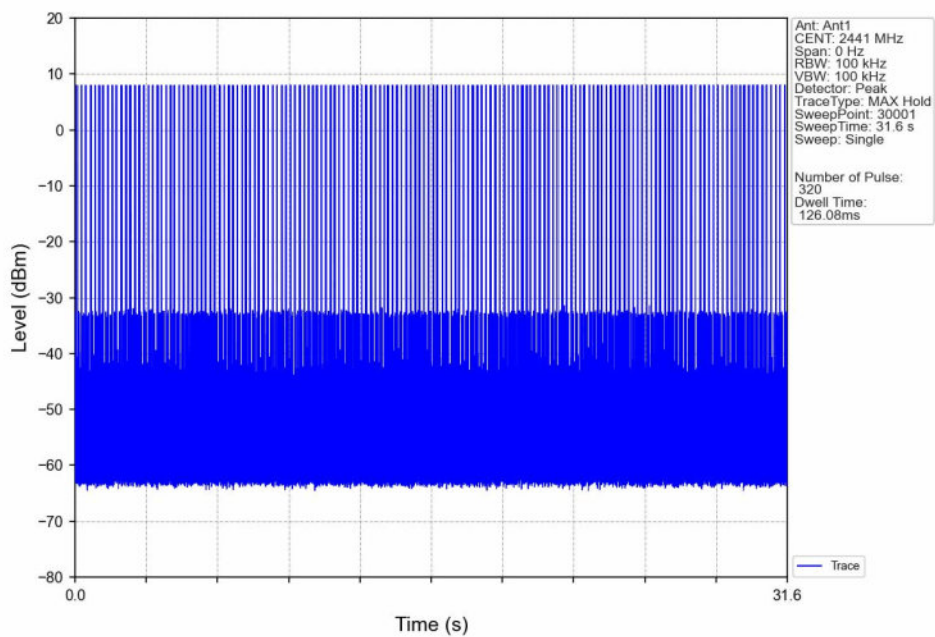
Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV



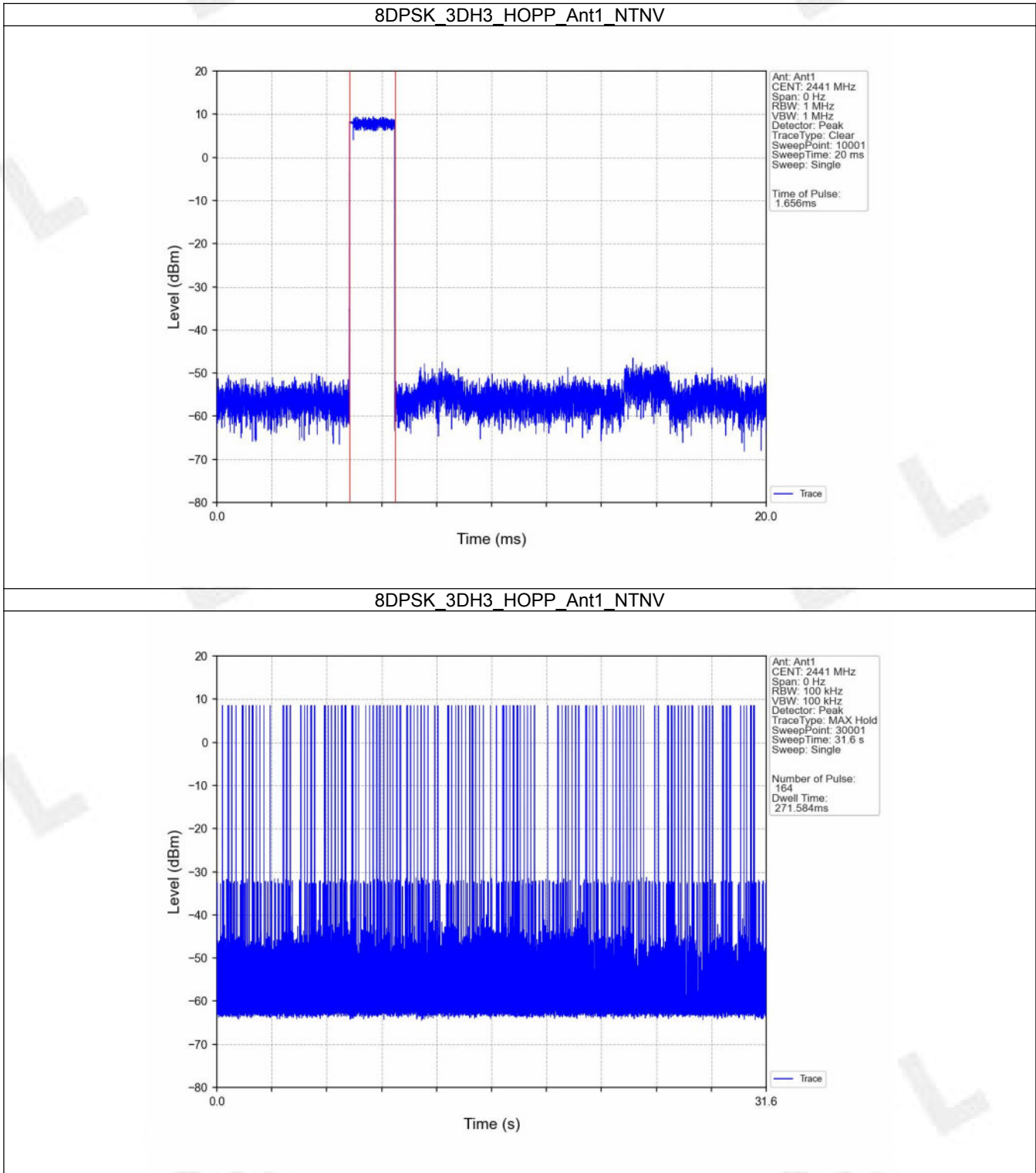
8DPSK\_3DH1\_HOPP\_Ant1\_NTNV



8DPSK\_3DH1\_HOPP\_Ant1\_NTNV

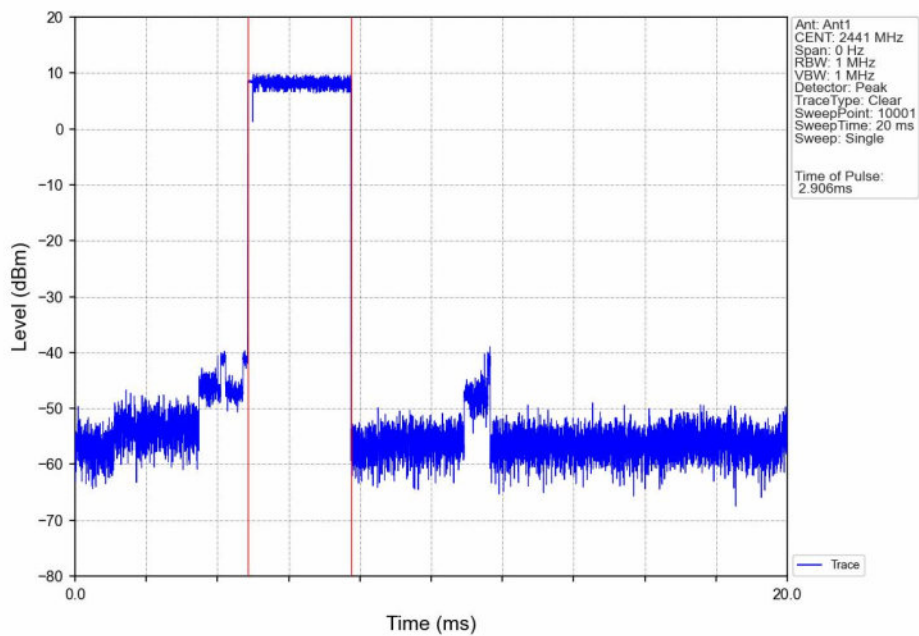


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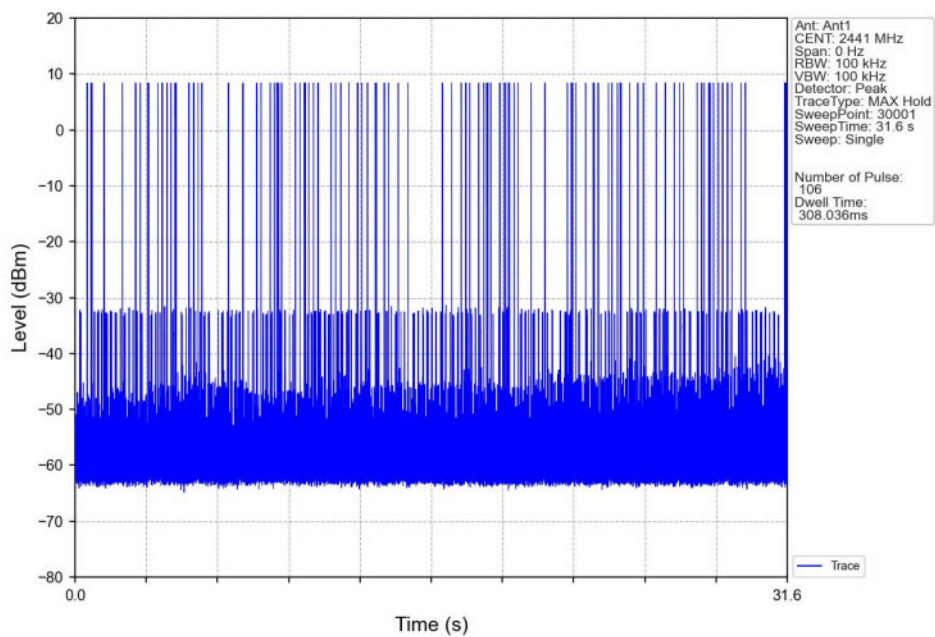


FCC ID: 2A94J-CP025

8DPSK\_3DH5\_HOPP\_Ant1\_NTNV



8DPSK\_3DH5\_HOPP\_Ant1\_NTNV



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

### 6.1 Test Result

#### 6.1.1 Ref

| Mode      | Tx Type | Frequency (MHz) | Packet Type | ANT | Level of Reference (dBm) |
|-----------|---------|-----------------|-------------|-----|--------------------------|
| GFSK      | SISO    | 2402            | DH5         | 1   | 7.19                     |
|           |         | 2441            | DH5         | 1   | 7.40                     |
|           |         | 2480            | DH5         | 1   | 6.40                     |
|           |         | HOPP            | DH5         | 1   | 7.24                     |
|           |         |                 |             |     | 7.24                     |
| Pi/4DQPSK | SISO    | 2402            | 2DH5        | 1   | 8.33                     |
|           |         | 2441            | 2DH5        | 1   | 7.90                     |
|           |         | 2480            | 2DH5        | 1   | 7.47                     |
|           |         | HOPP            | 2DH5        | 1   | 8.42                     |
|           |         |                 |             |     | 8.42                     |
| 8DPSK     | SISO    | 2402            | 3DH5        | 1   | 8.32                     |
|           |         | 2441            | 3DH5        | 1   | 8.45                     |
|           |         | 2480            | 3DH5        | 1   | 7.41                     |
|           |         | HOPP            | 3DH5        | 1   | 8.43                     |
|           |         |                 |             |     | 8.43                     |

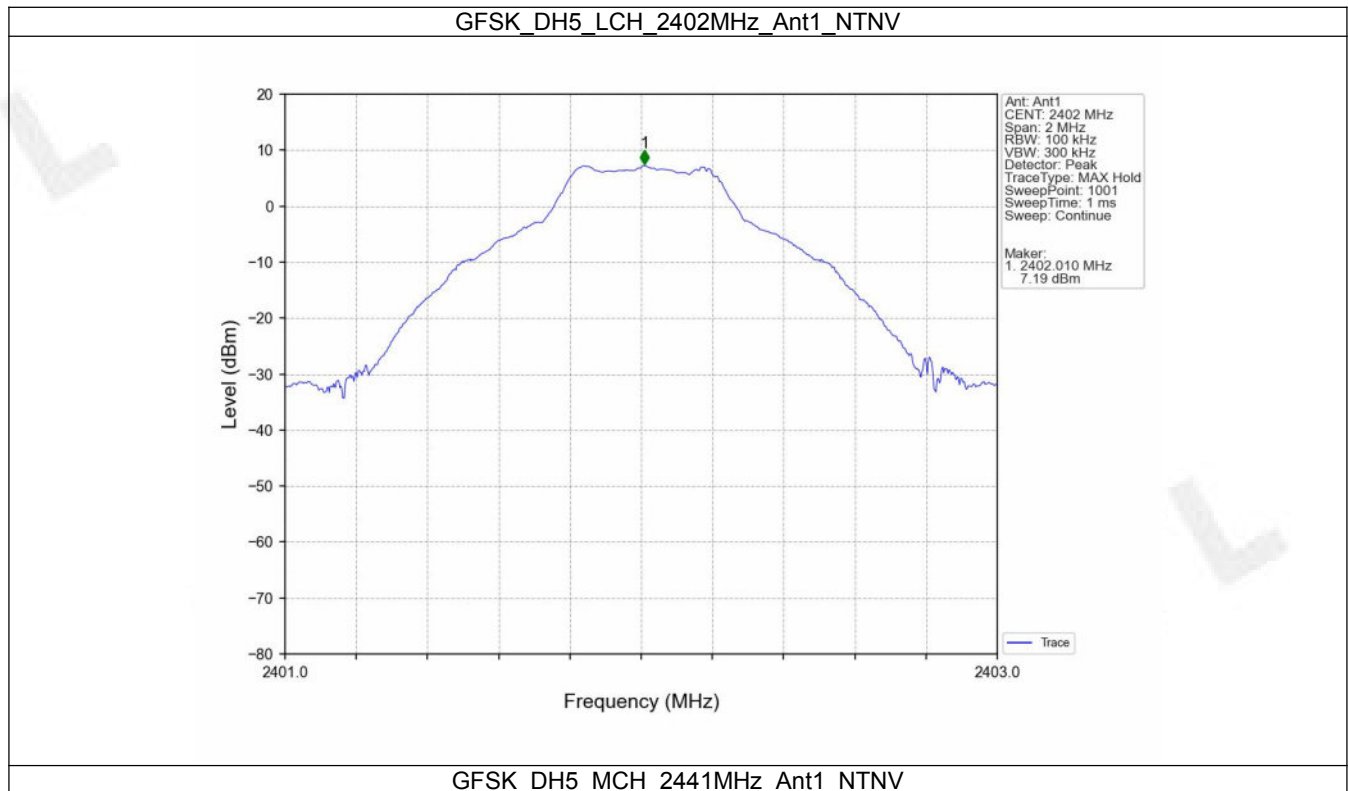
#### 6.1.2 CSE

| Mode      | Tx Type | Frequency (MHz) | Packet Type | ANT | Level of Reference (dBm) | Limit (dBm) | Verdict |
|-----------|---------|-----------------|-------------|-----|--------------------------|-------------|---------|
| GFSK      | SISO    | 2402            | DH5         | 1   | 7.19                     | -12.81      | Pass    |
|           |         | 2441            | DH5         | 1   | 7.40                     | -12.60      | Pass    |
|           |         | 2480            | DH5         | 1   | 6.40                     | -13.60      | Pass    |
|           |         | HOPP            | DH5         | 1   | 7.24                     | -12.76      | Pass    |
|           |         |                 |             |     | 7.24                     | -12.76      | Pass    |
| Pi/4DQPSK | SISO    | 2402            | 2DH5        | 1   | 8.33                     | -11.67      | Pass    |
|           |         | 2441            | 2DH5        | 1   | 7.90                     | -12.10      | Pass    |
|           |         | 2480            | 2DH5        | 1   | 7.47                     | -12.53      | Pass    |
|           |         | HOPP            | 2DH5        | 1   | 8.42                     | -11.58      | Pass    |
|           |         |                 |             |     | 8.42                     | -11.58      | Pass    |
| 8DPSK     | SISO    | 2402            | 3DH5        | 1   | 8.32                     | -11.68      | Pass    |
|           |         | 2441            | 3DH5        | 1   | 8.45                     | -11.55      | Pass    |
|           |         | 2480            | 3DH5        | 1   | 7.41                     | -12.59      | Pass    |
|           |         | HOPP            | 3DH5        | 1   | 8.43                     | -11.57      | Pass    |
|           |         |                 |             |     | 8.43                     | -11.57      | Pass    |

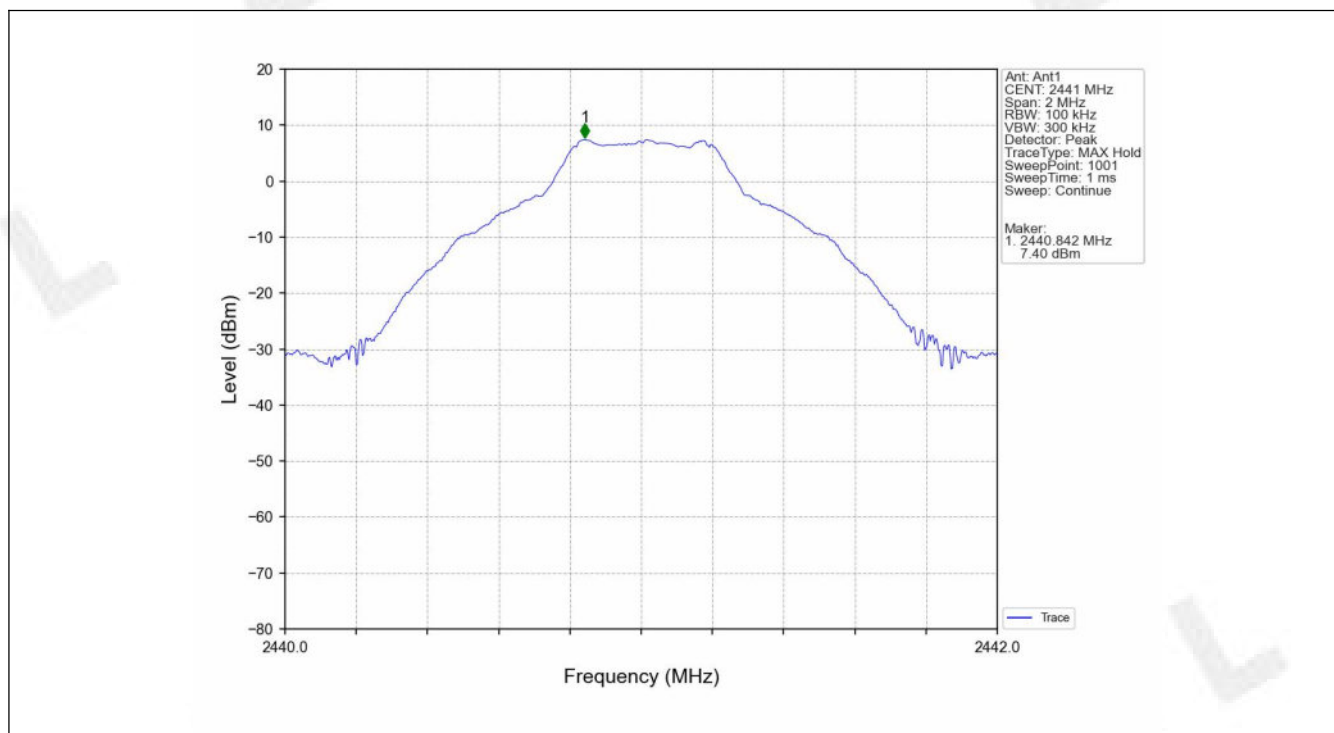
FCC ID: 2A94J-CP025

## 6.2 Test Graph

### 6.2.1 Ref

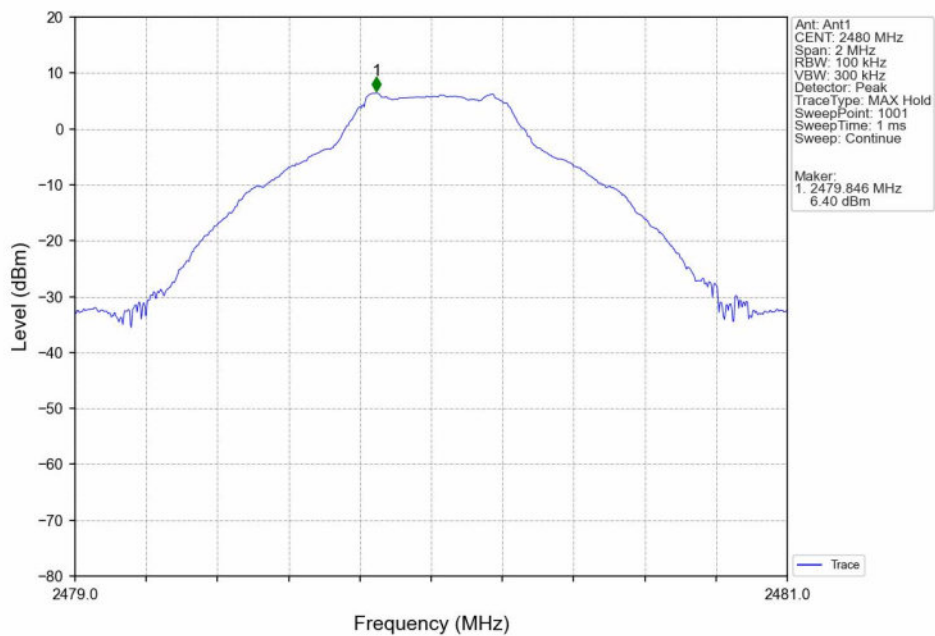


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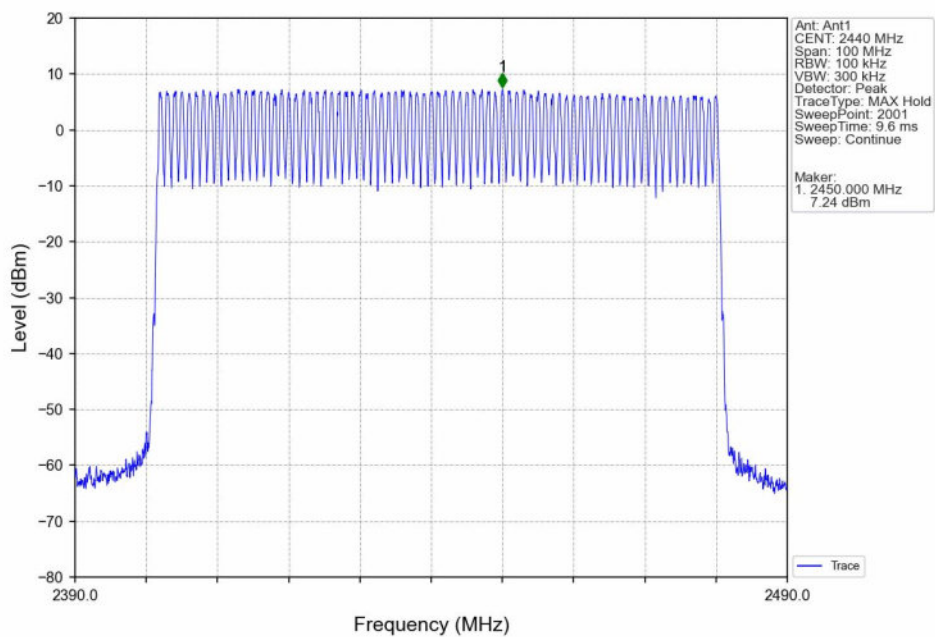


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GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV

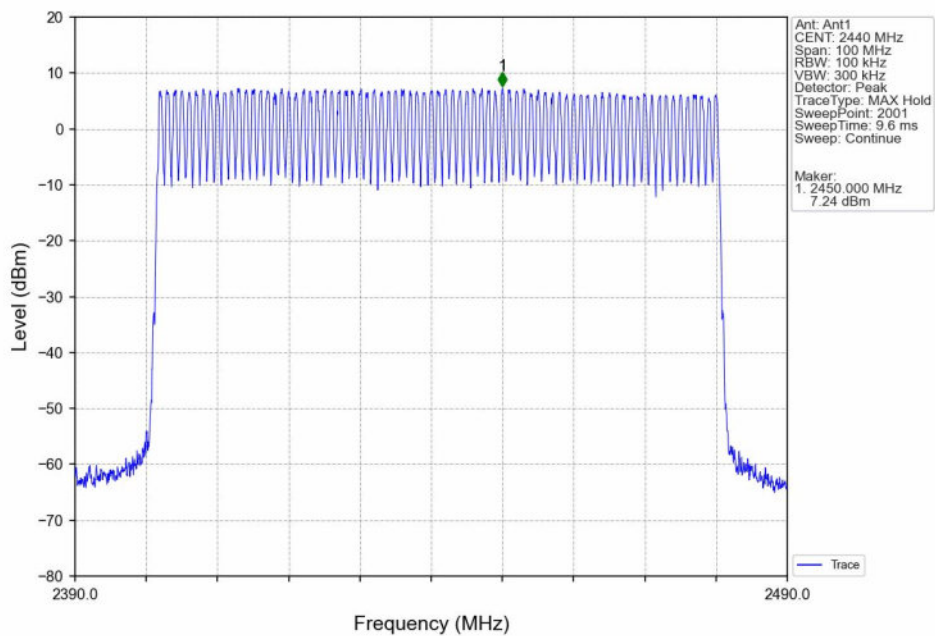


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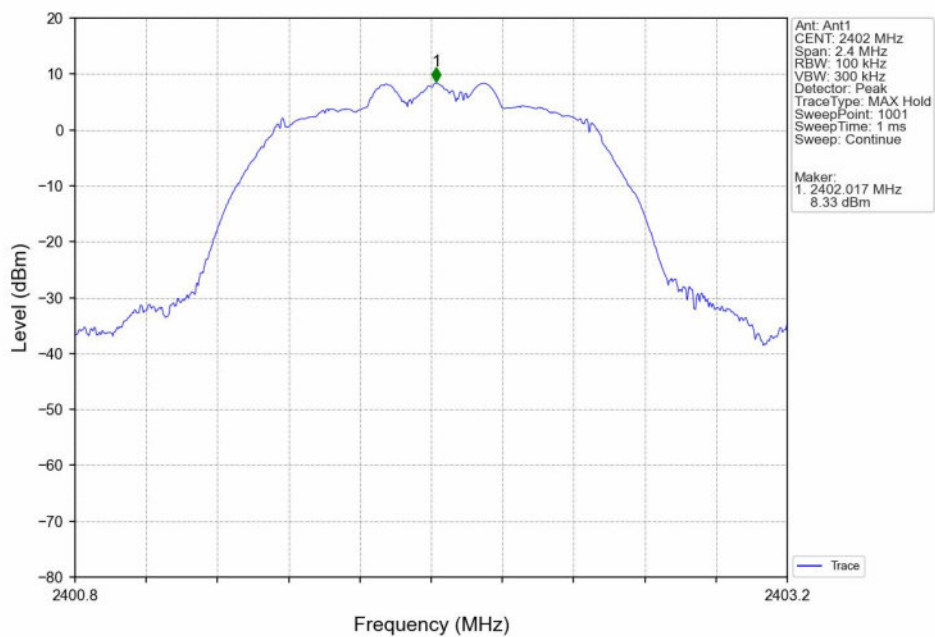


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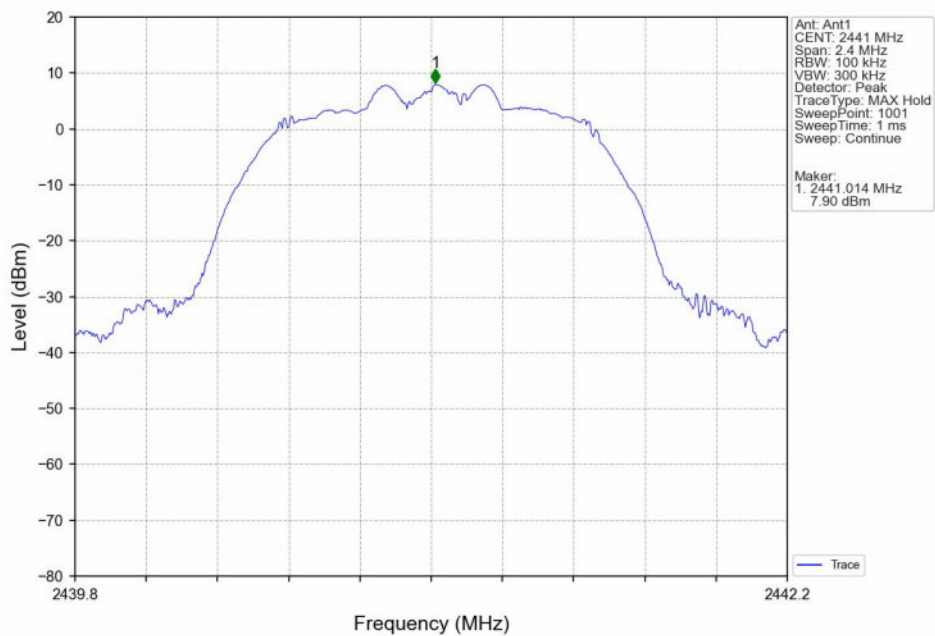


Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV

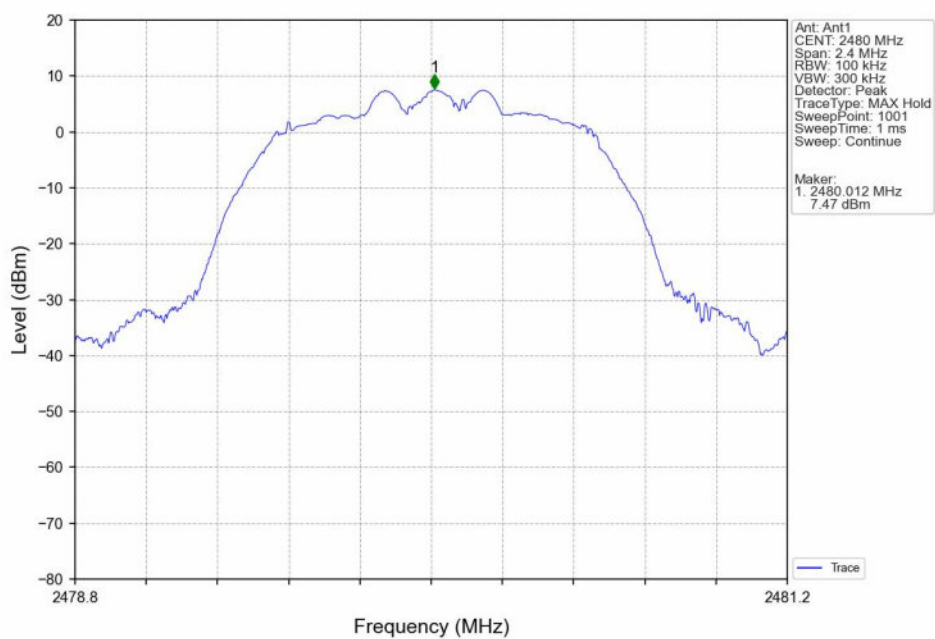


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Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV

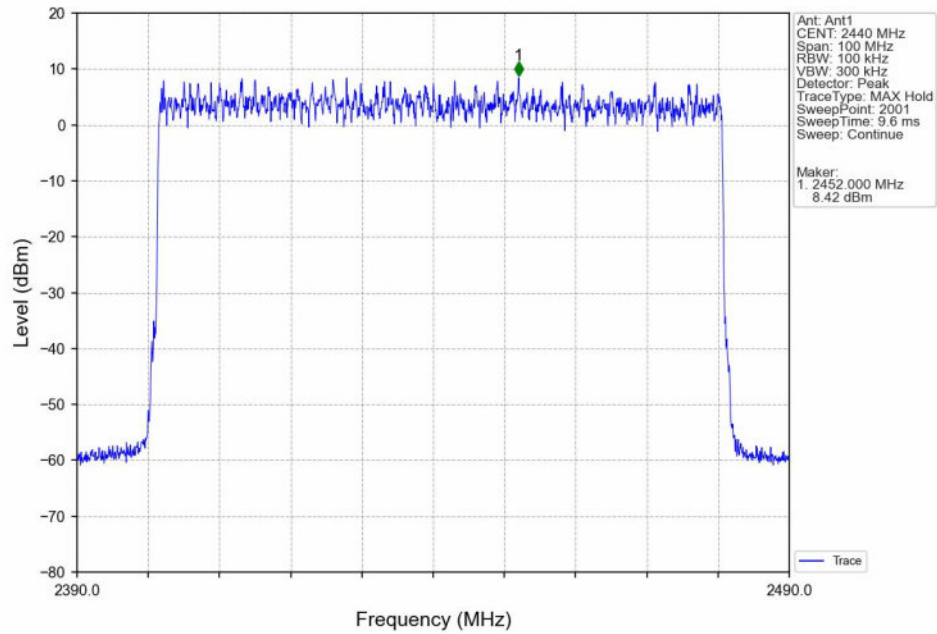


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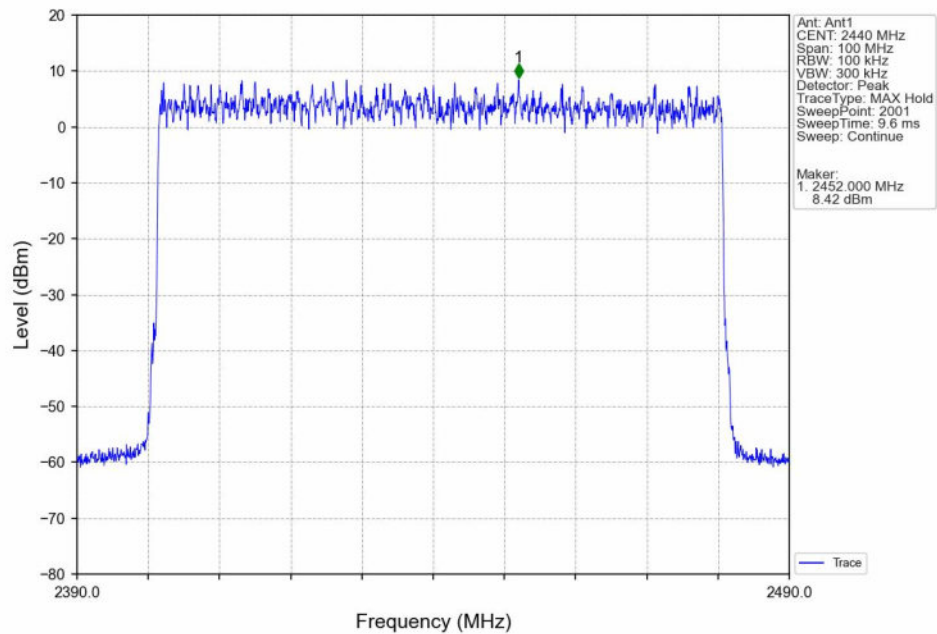


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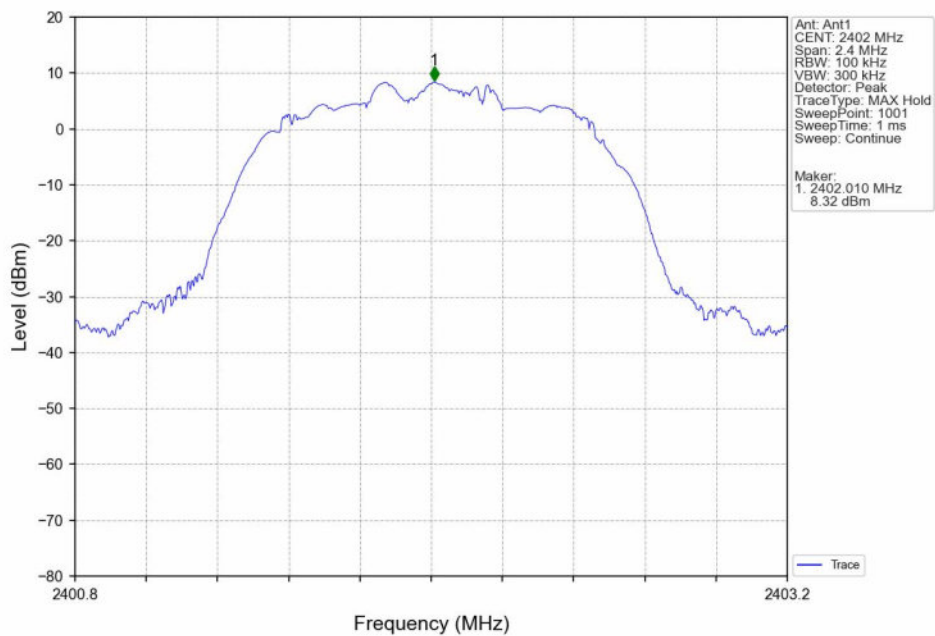


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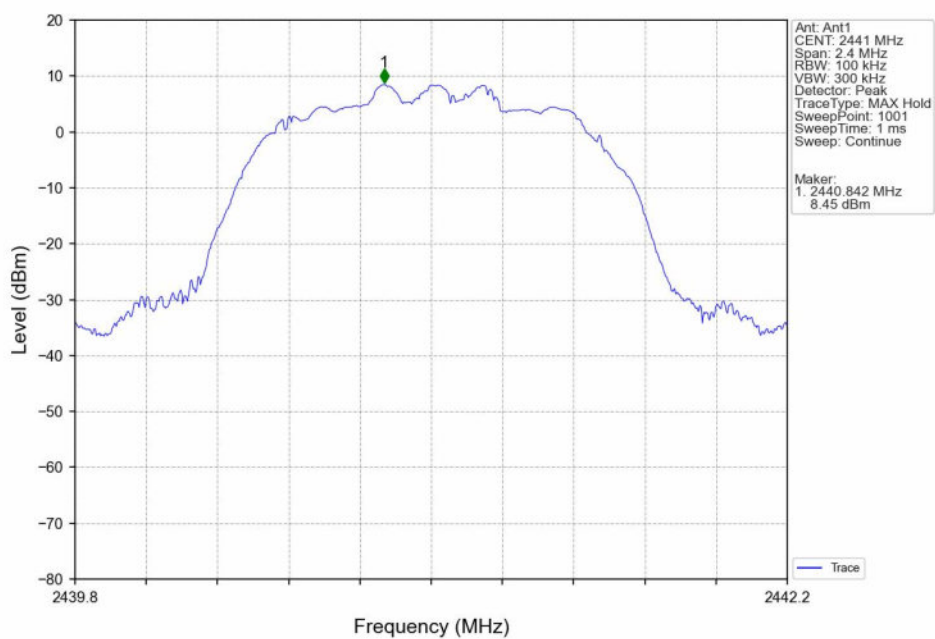


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8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV

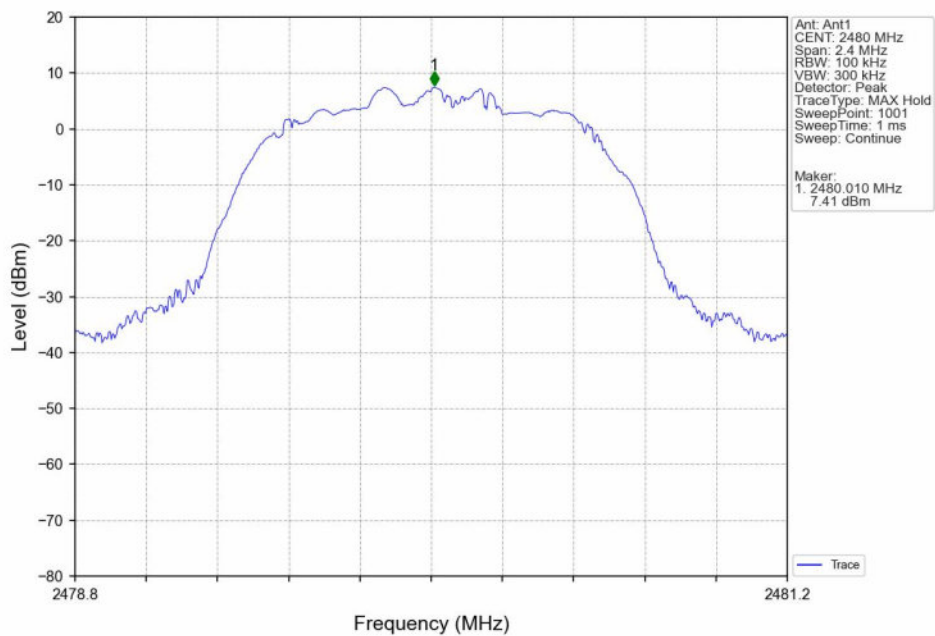


8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV

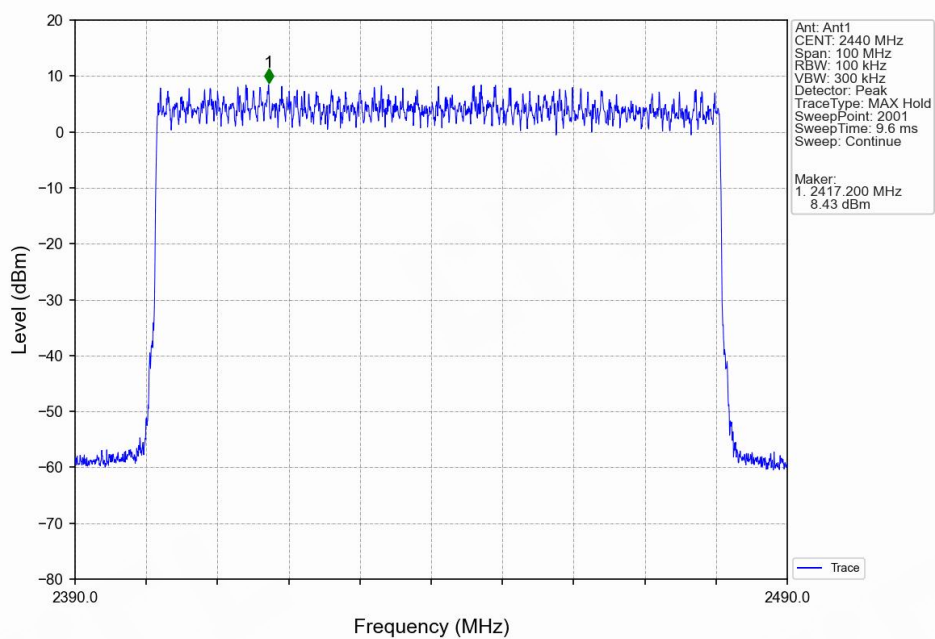


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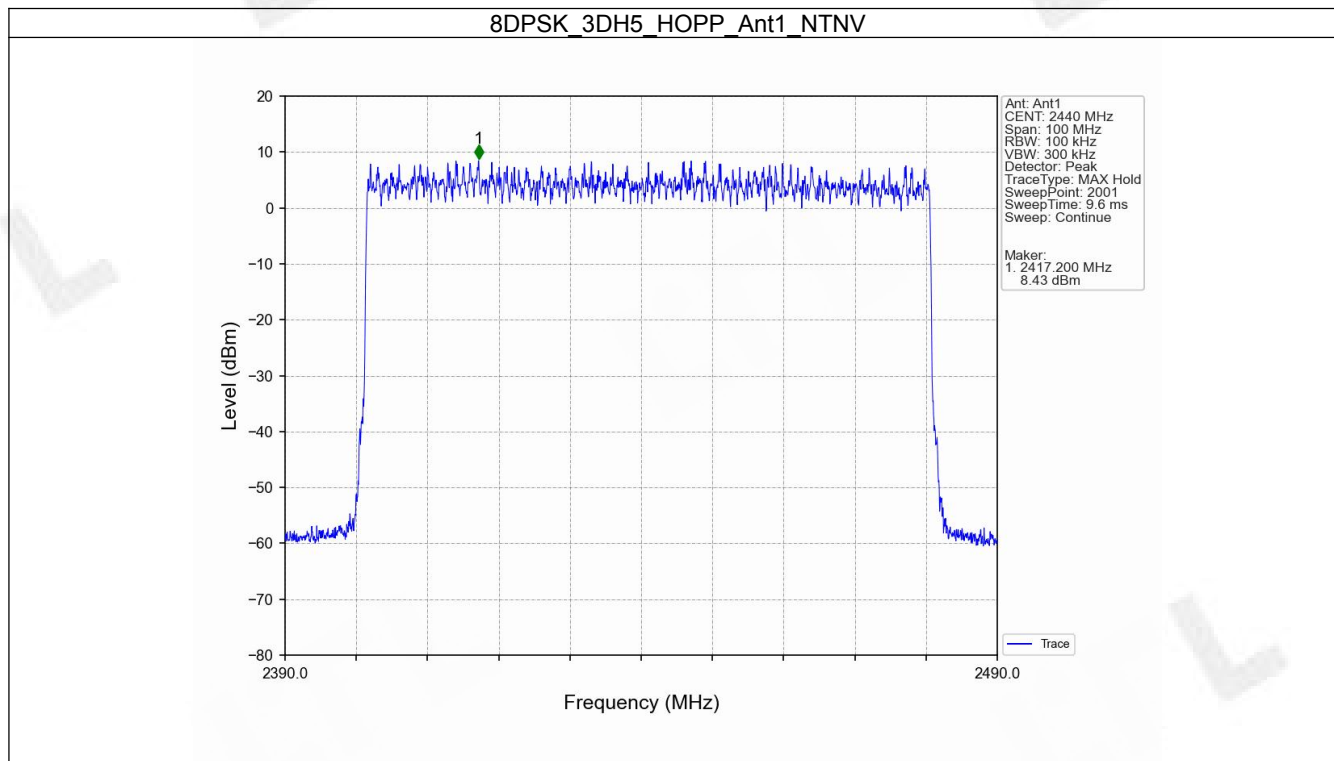
8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV



8DPSK\_3DH5\_HOPP\_Ant1\_NTNV

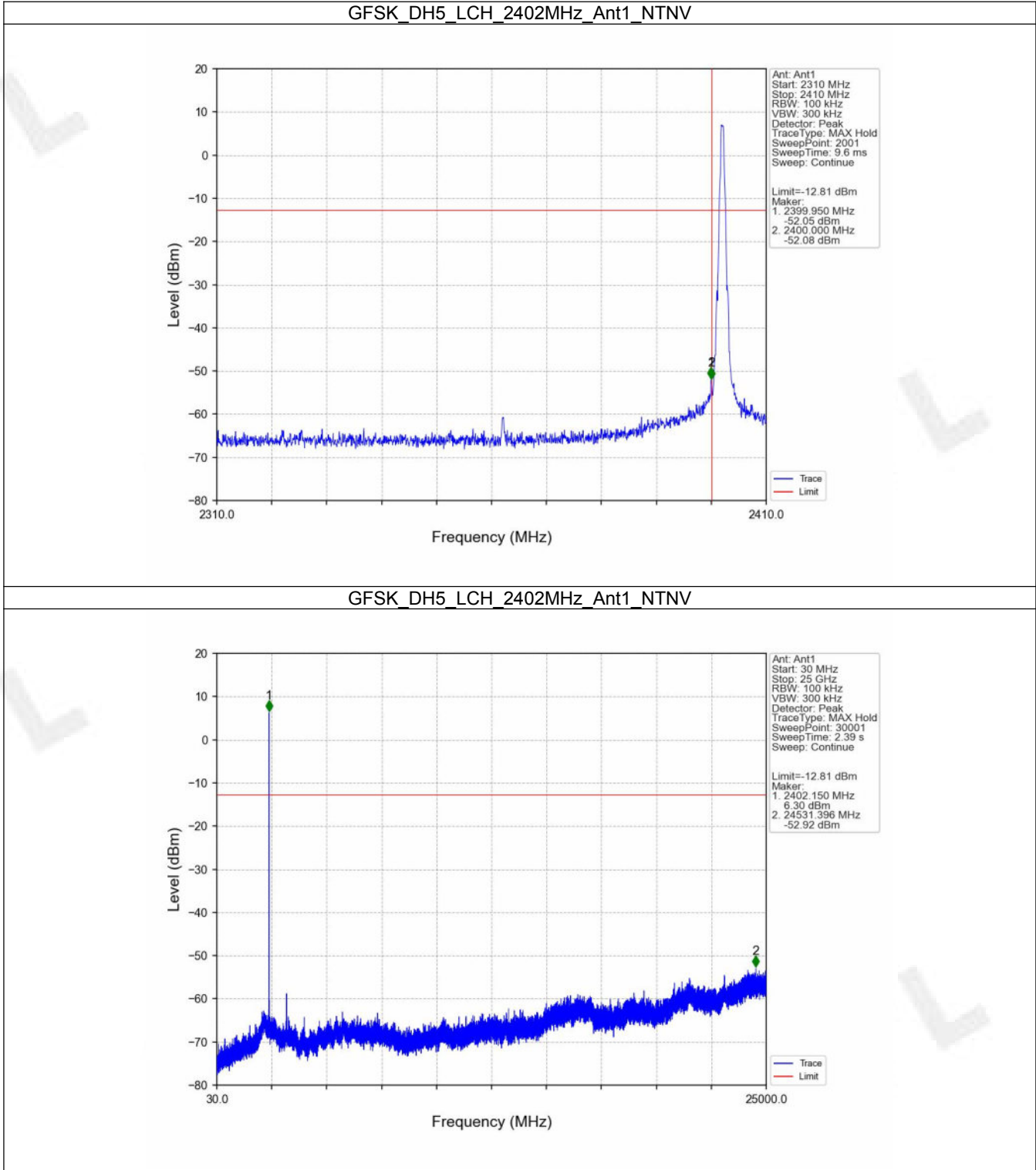


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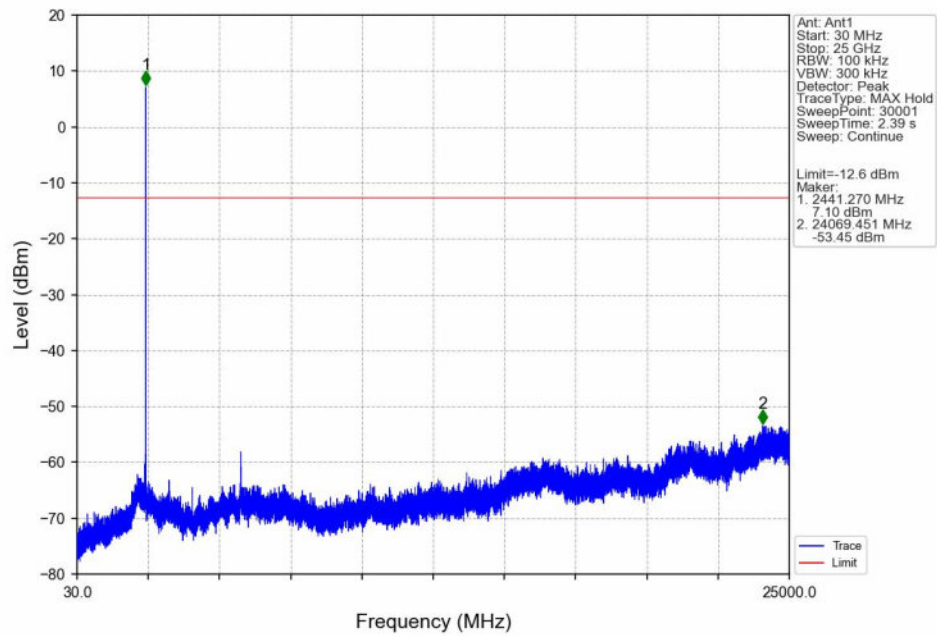
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6.2.2 CSE

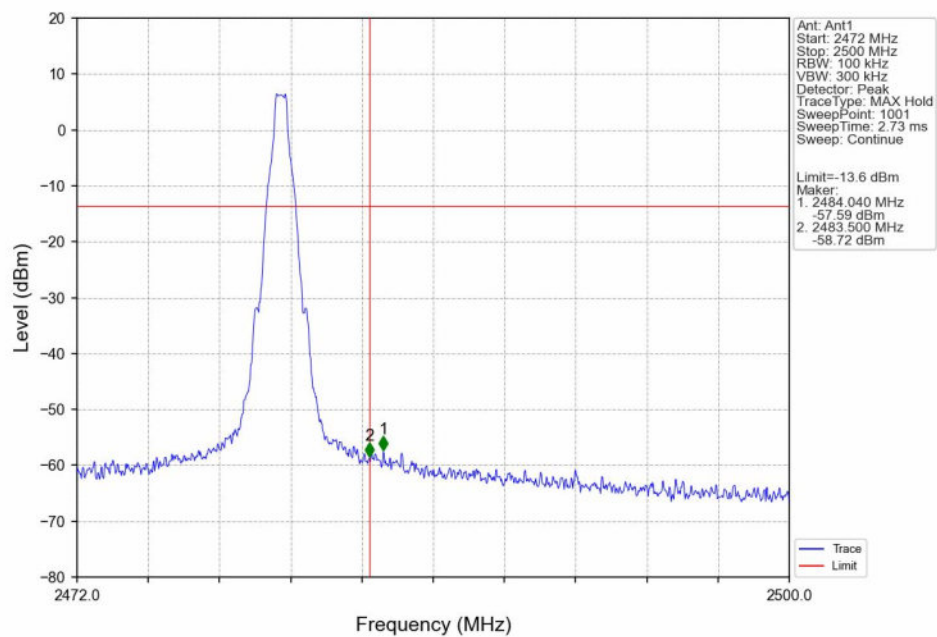


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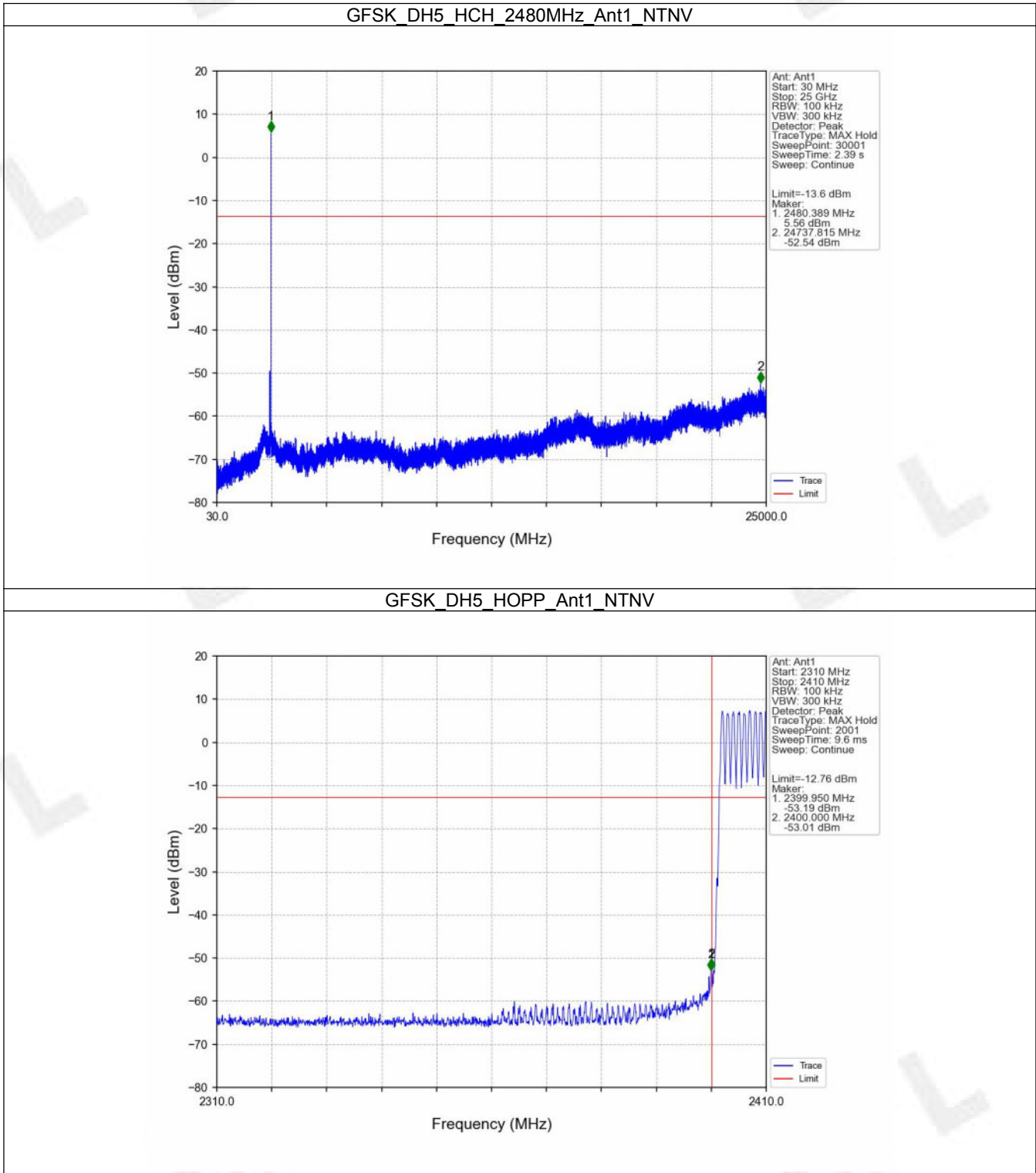
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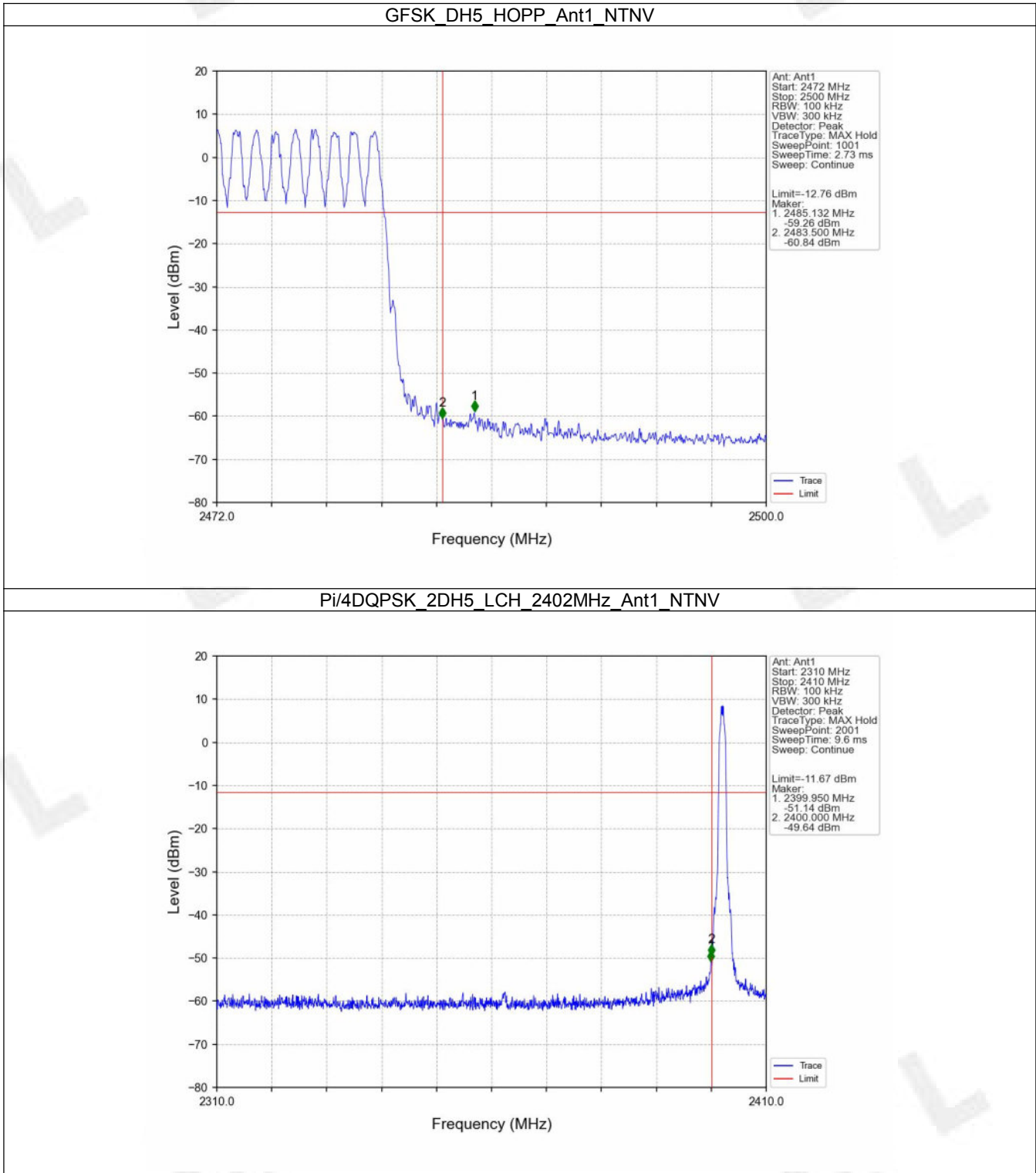
GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



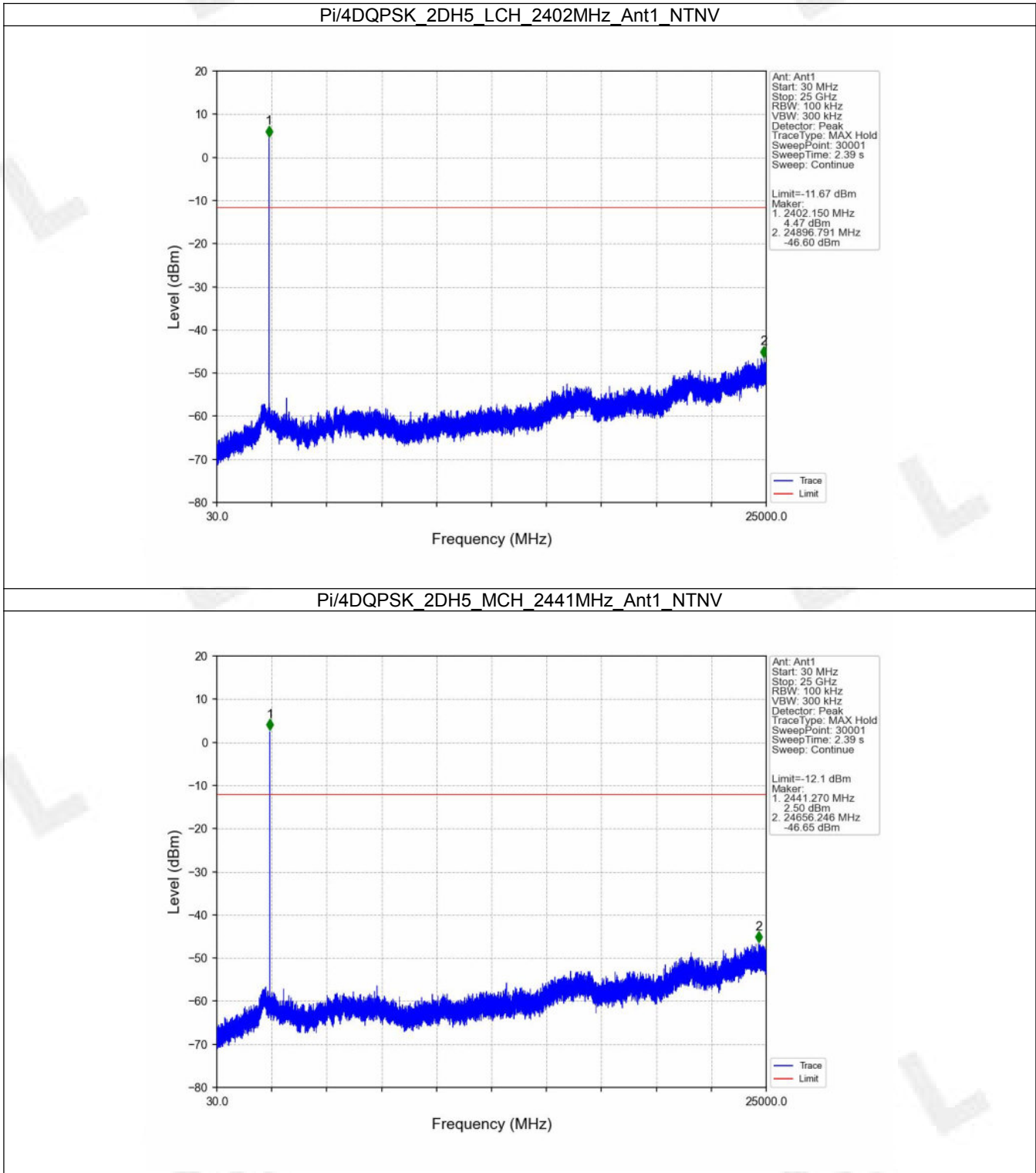
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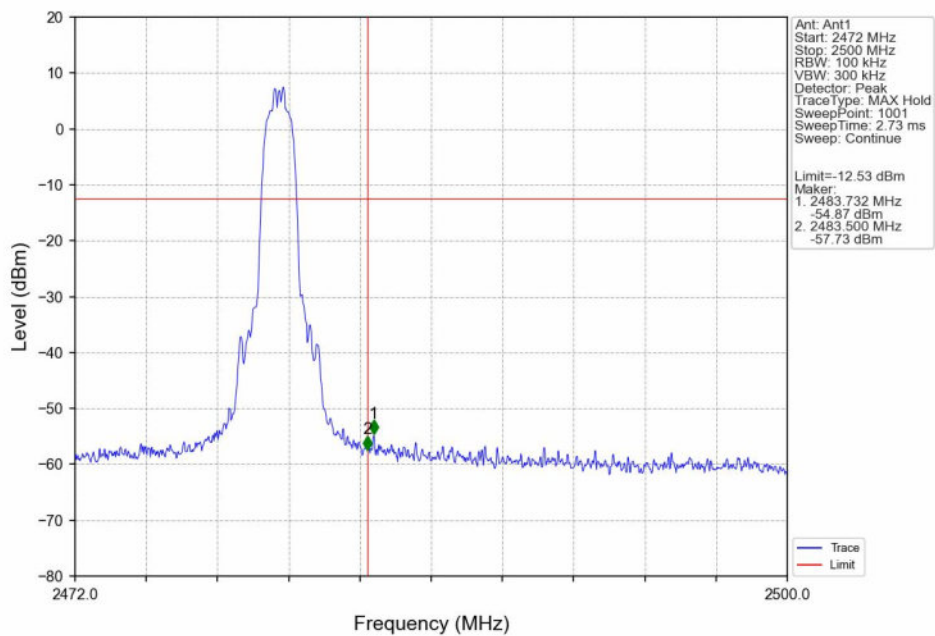


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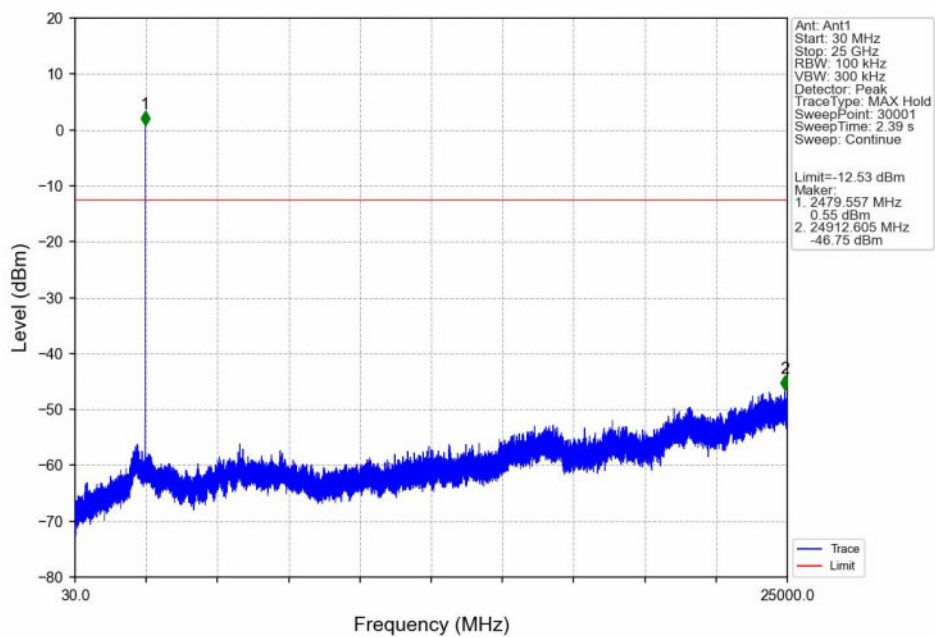


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Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV

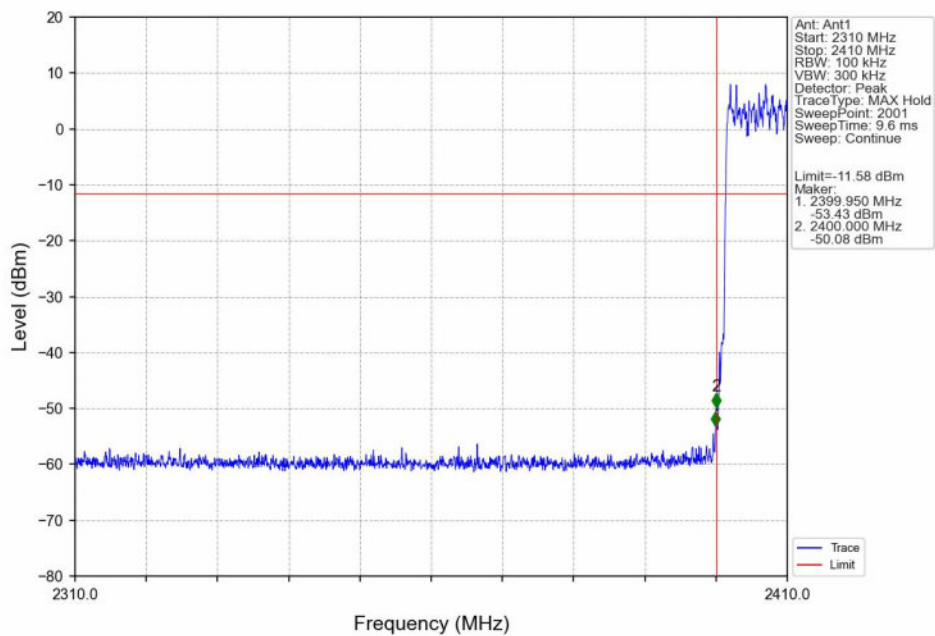


Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV

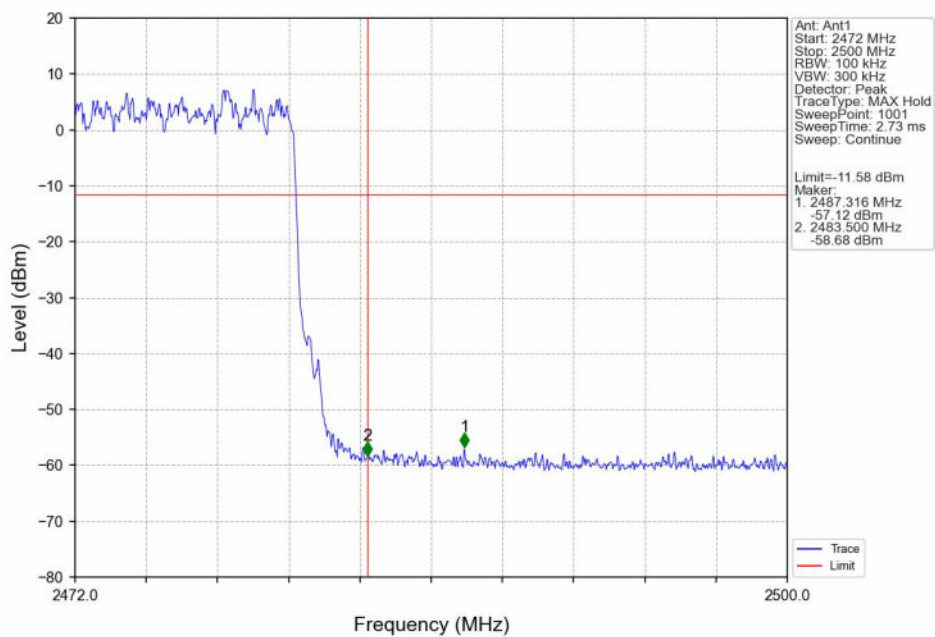


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Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV

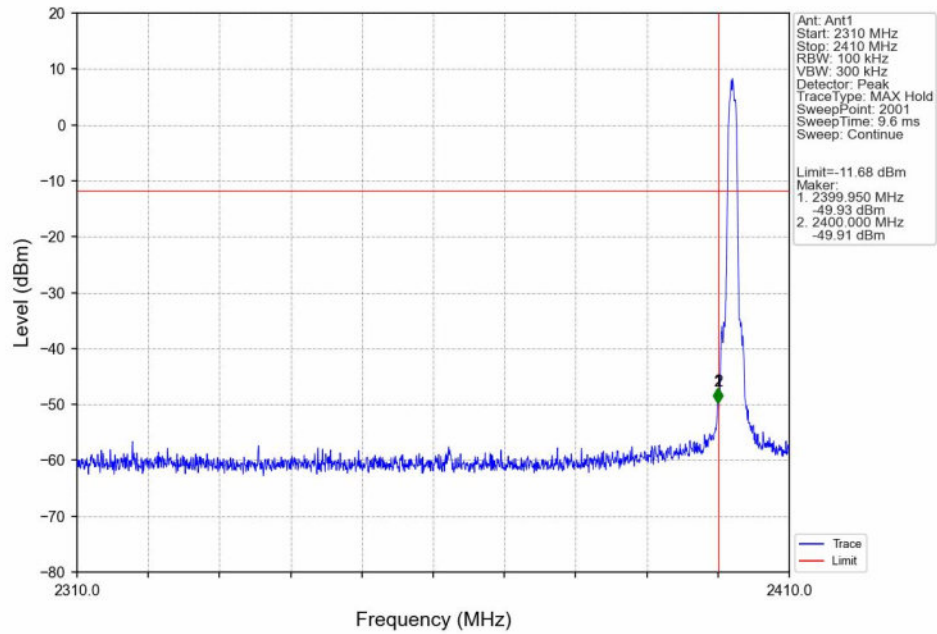


Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV

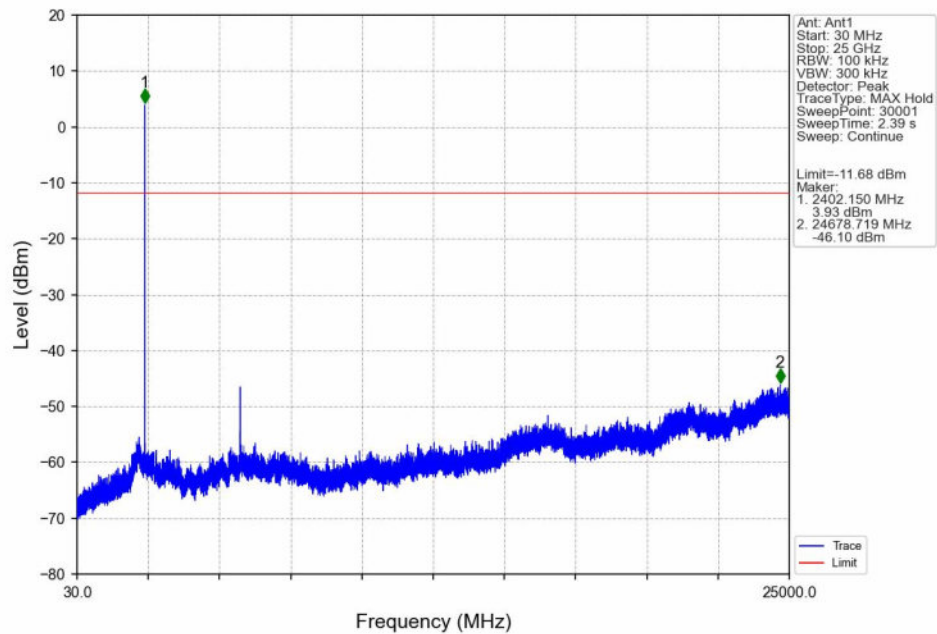


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8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV

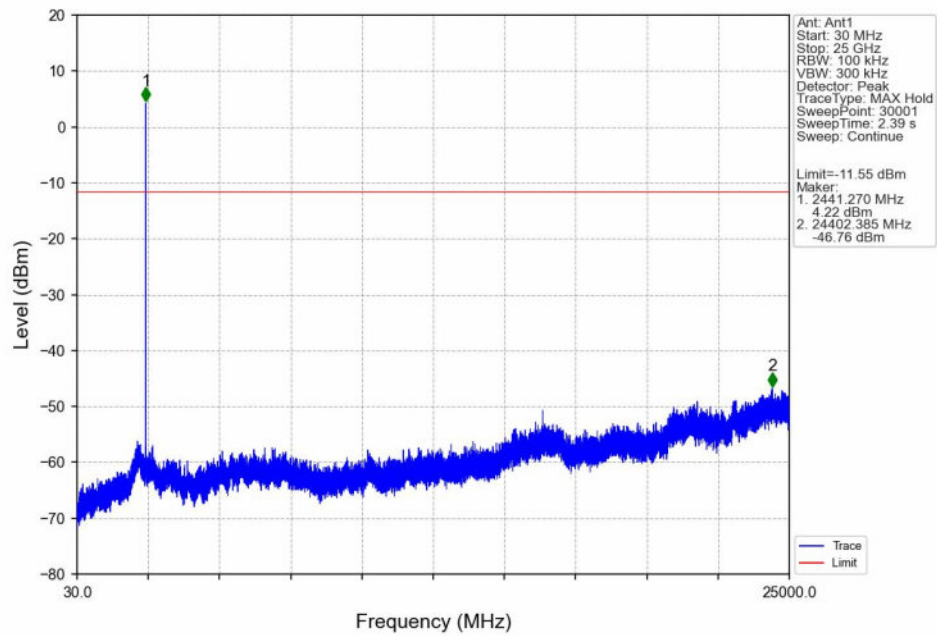


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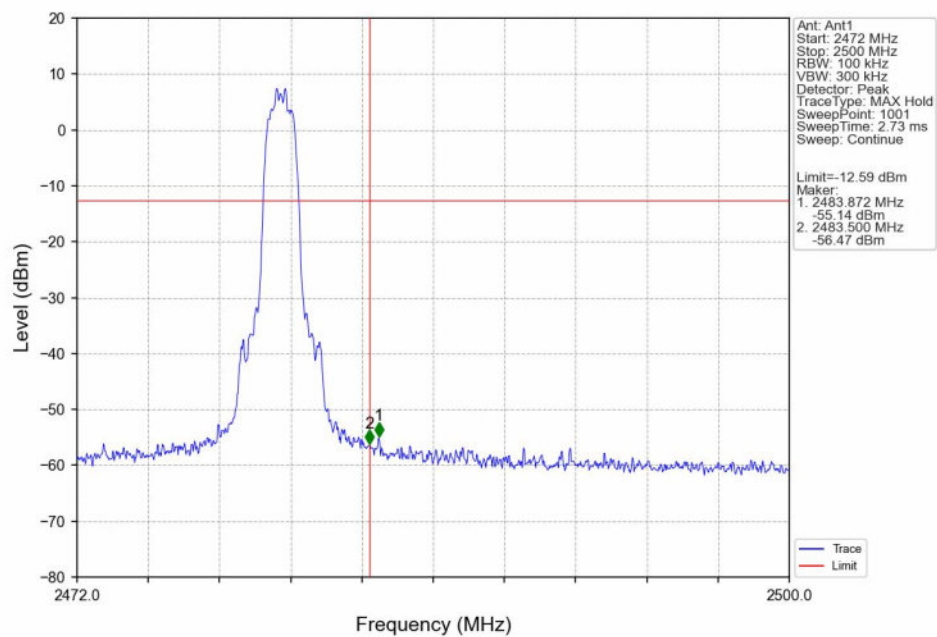


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8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV

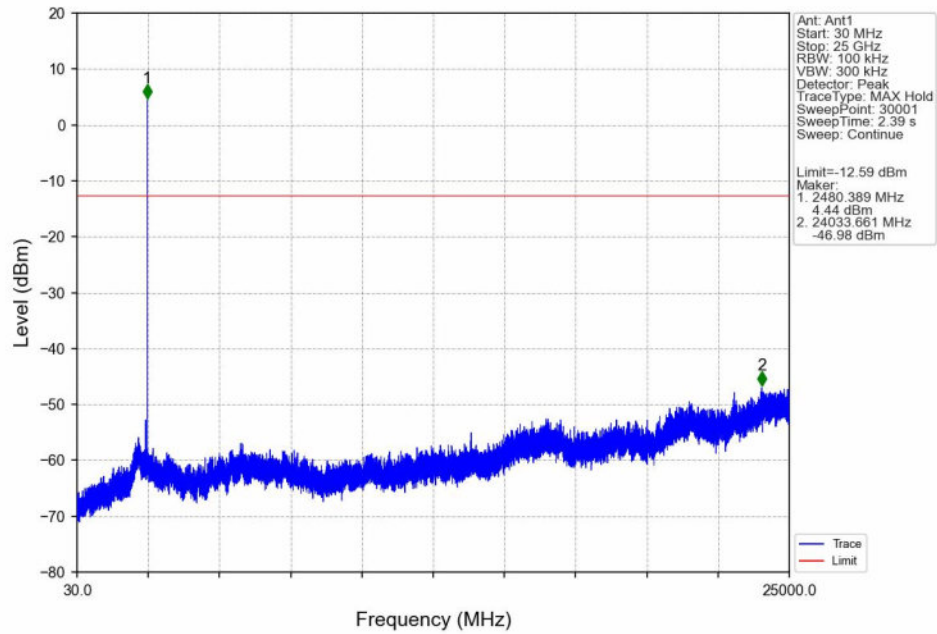


8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV



FCC ID: 2A94J-CP025

8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV



8DPSK\_3DH5\_HOPP\_Ant1\_NTNV

