

## ANNEX D TEST DATA

For

|                |                   |
|----------------|-------------------|
| Project No.:   | 8235EU012915W     |
| Client:        | QUEST USA CORP.   |
| Product Name:  | Speaker           |
| Model No.:     | DS20587-FB        |
| FCC ID:        | 2AJQ7CUBES        |
| Technology:    | Bluetooth BDR&EDR |
| Test Engineer: | <i>Mikoy zhu</i>  |
| Test Date:     | 2024-12-05        |

## Test Summary

| Item                                                 | Result |
|------------------------------------------------------|--------|
| Duty Cycle                                           | Pass   |
| Bandwidth                                            | Pass   |
| Maximum Conducted Output Power                       | Pass   |
| Carrier Frequency Separation                         | Pass   |
| Number of Hopping Frequencies                        | Pass   |
| Time of Occupancy (Dwell Time)                       | Pass   |
| Unwanted Emissions In Non-restricted Frequency Bands | Pass   |

## 1. Duty Cycle

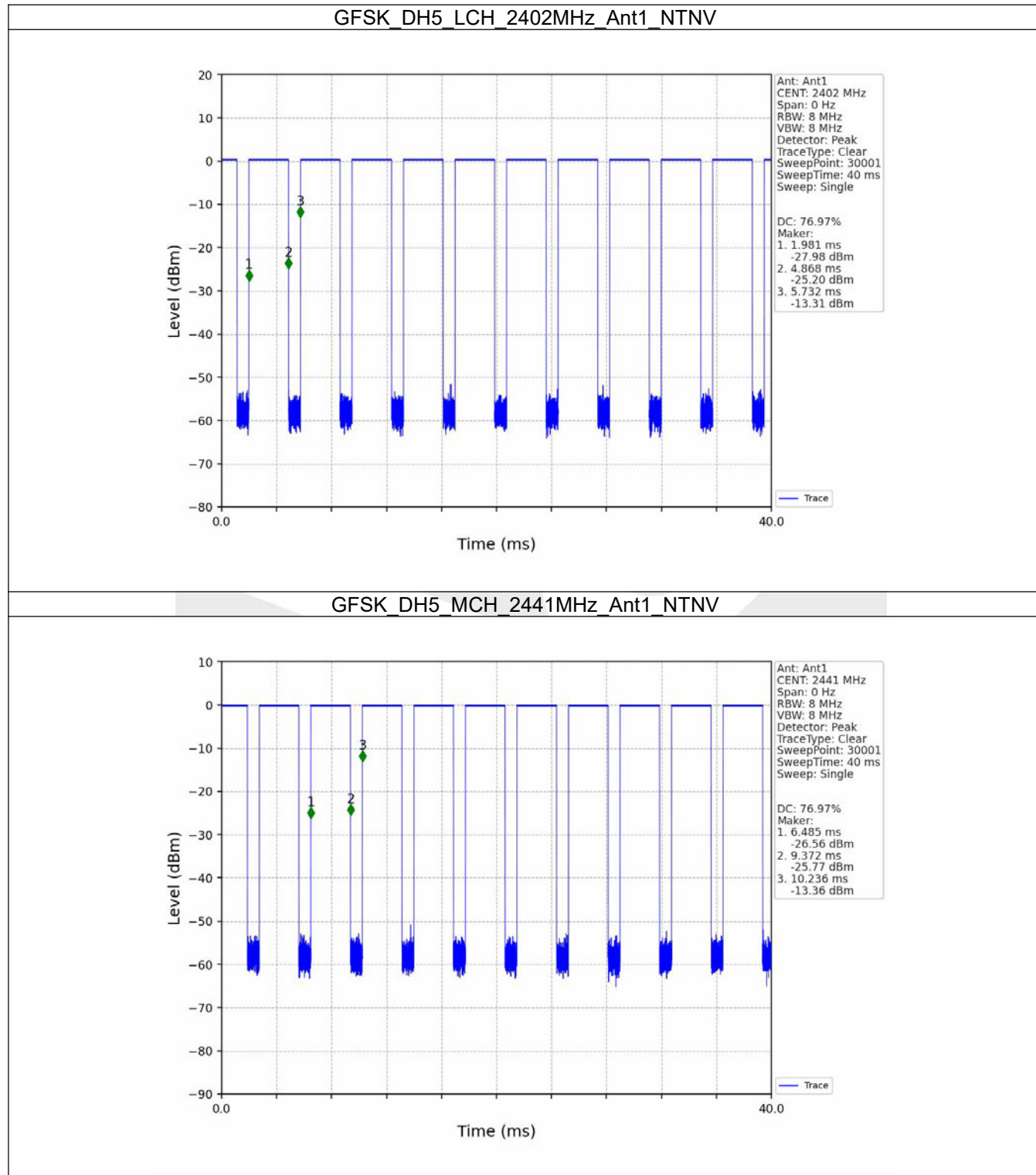
### 1.1 Test Result

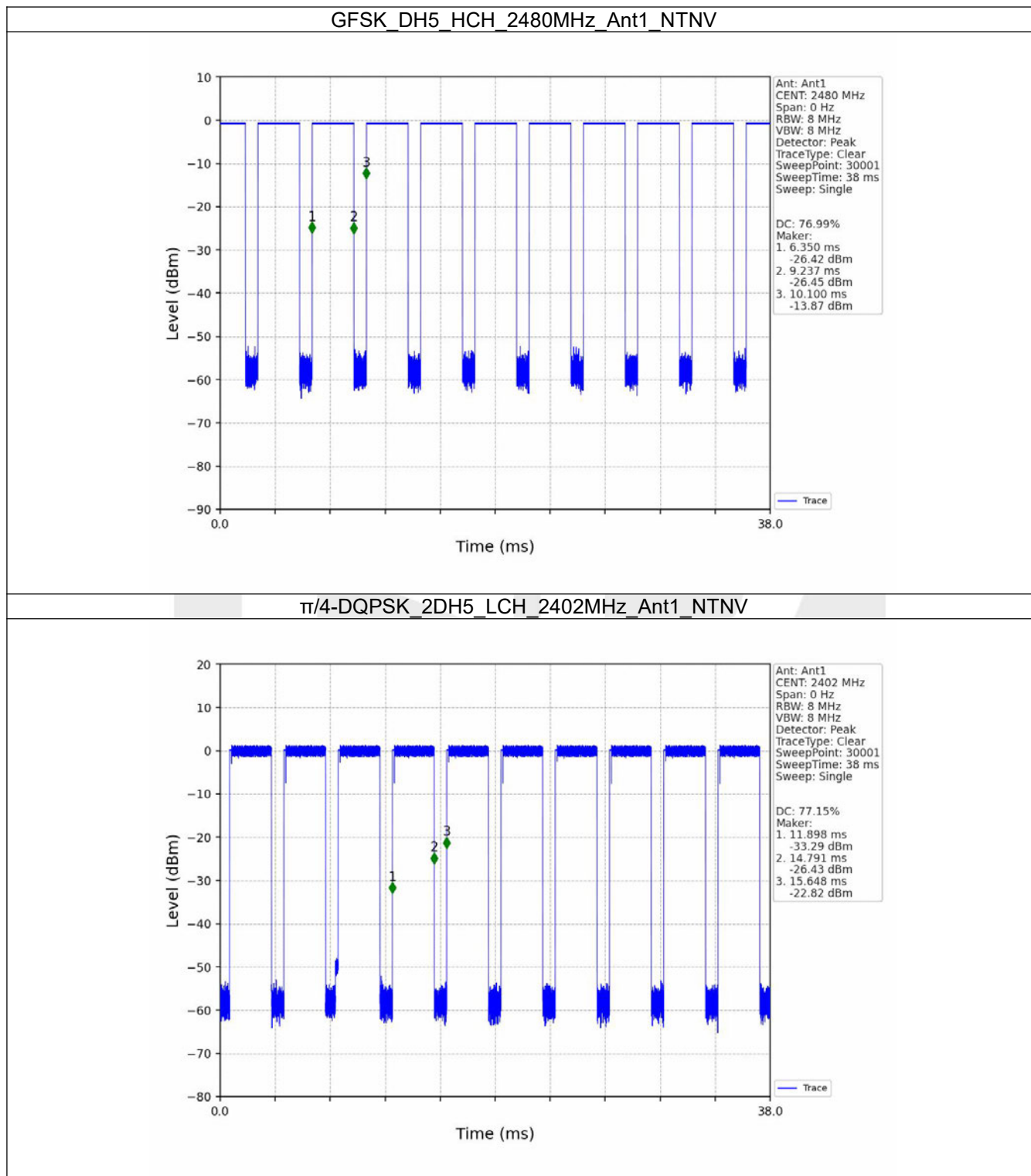
#### 1.1.1 Ant1

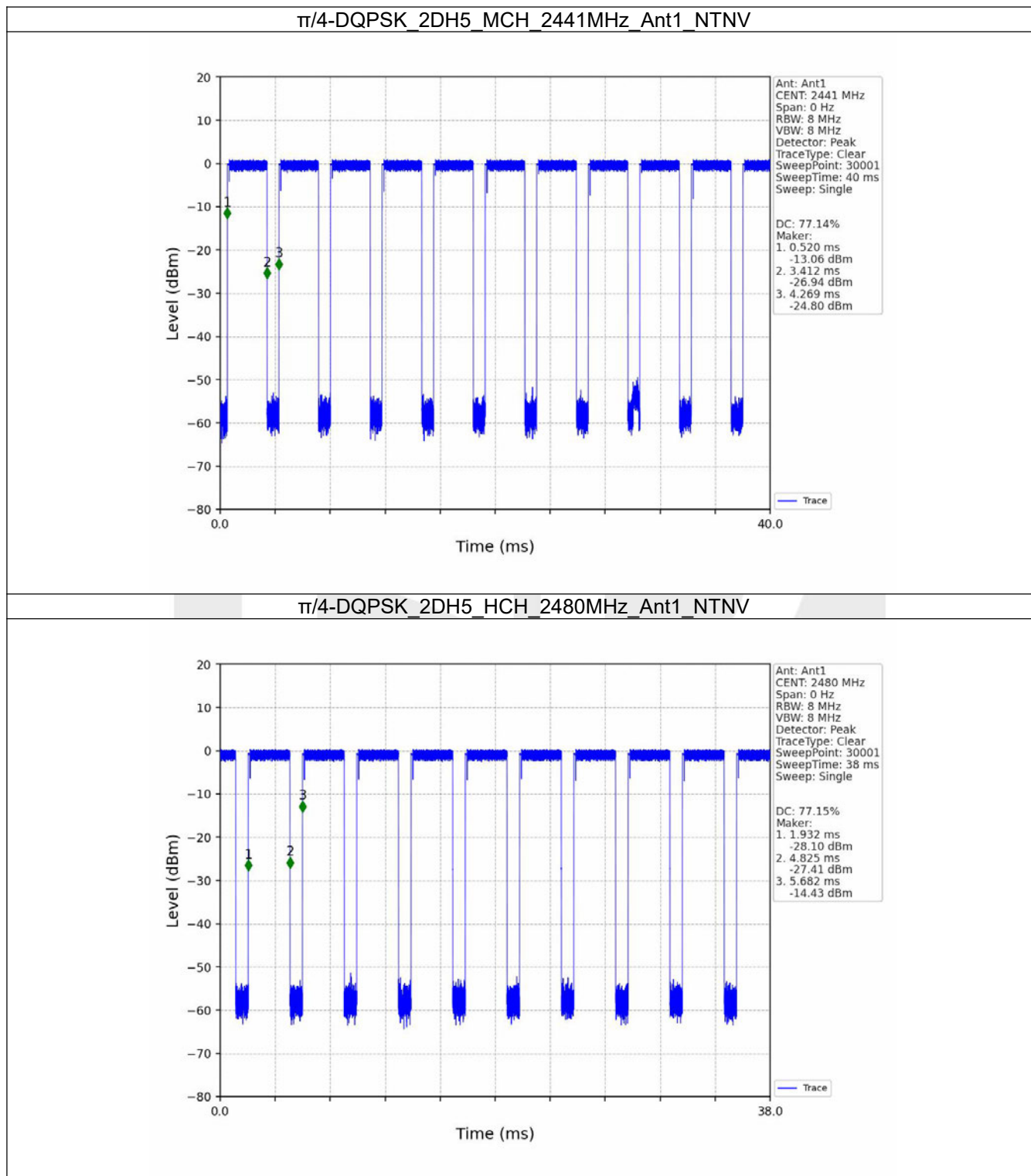
| Ant1           |         |                 |             |           |             |                |                                   |                       |
|----------------|---------|-----------------|-------------|-----------|-------------|----------------|-----------------------------------|-----------------------|
| Mode           | TX Type | Frequency (MHz) | Packet Type | T_on (ms) | Period (ms) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | Max. DC Variation (%) |
| GFSK           | SISO    | 2402            | DH5         | 2.887     | 3.751       | 76.97          | 1.14                              | 0.03                  |
|                |         | 2441            | DH5         | 2.887     | 3.751       | 76.97          | 1.14                              | 0.04                  |
|                |         | 2480            | DH5         | 2.887     | 3.750       | 76.99          | 1.14                              | 0.03                  |
| $\pi/4$ -DQPSK | SISO    | 2402            | 2DH5        | 2.893     | 3.750       | 77.15          | 1.13                              | 0.03                  |
|                |         | 2441            | 2DH5        | 2.892     | 3.749       | 77.14          | 1.13                              | 0.04                  |
|                |         | 2480            | 2DH5        | 2.893     | 3.750       | 77.15          | 1.13                              | 0.03                  |

## 1.2 Test Graph

### 1.2.1 Ant1







## 2. Bandwidth

### 2.1 Test Result

#### 2.1.1 OBW

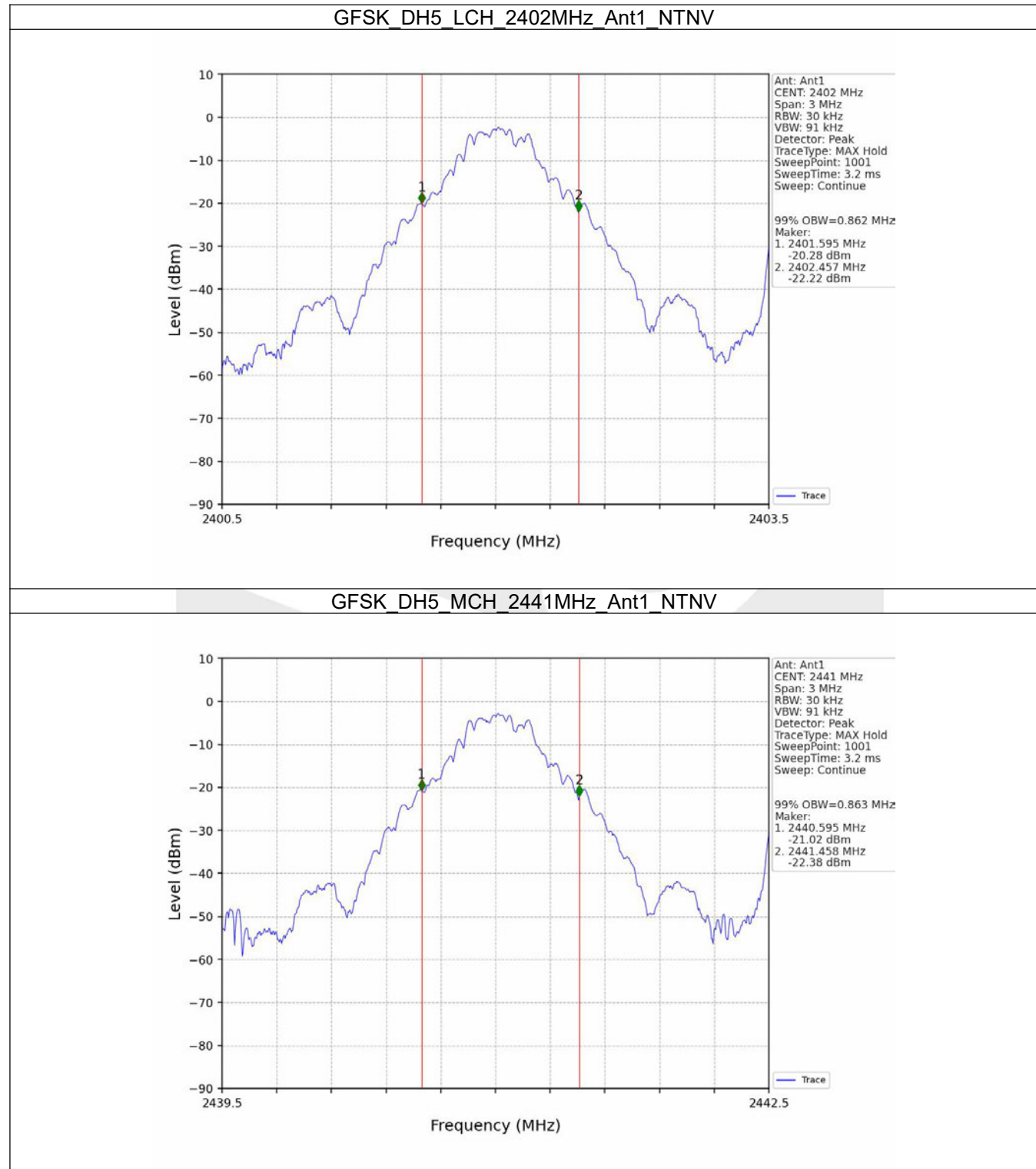
| Mode           | TX Type | Frequency (MHz) | Packet Type | ANT | 99% Occupied Bandwidth (MHz) |       | Verdict |
|----------------|---------|-----------------|-------------|-----|------------------------------|-------|---------|
|                |         |                 |             |     | Result                       | Limit |         |
| GFSK           | SISO    | 2402            | DH5         | 1   | 0.862                        | /     | Pass    |
|                |         | 2441            | DH5         | 1   | 0.863                        | /     | Pass    |
|                |         | 2480            | DH5         | 1   | 0.863                        | /     | Pass    |
| $\pi/4$ -DQPSK | SISO    | 2402            | 2DH5        | 1   | 1.182                        | /     | Pass    |
|                |         | 2441            | 2DH5        | 1   | 1.181                        | /     | Pass    |
|                |         | 2480            | 2DH5        | 1   | 1.183                        | /     | Pass    |

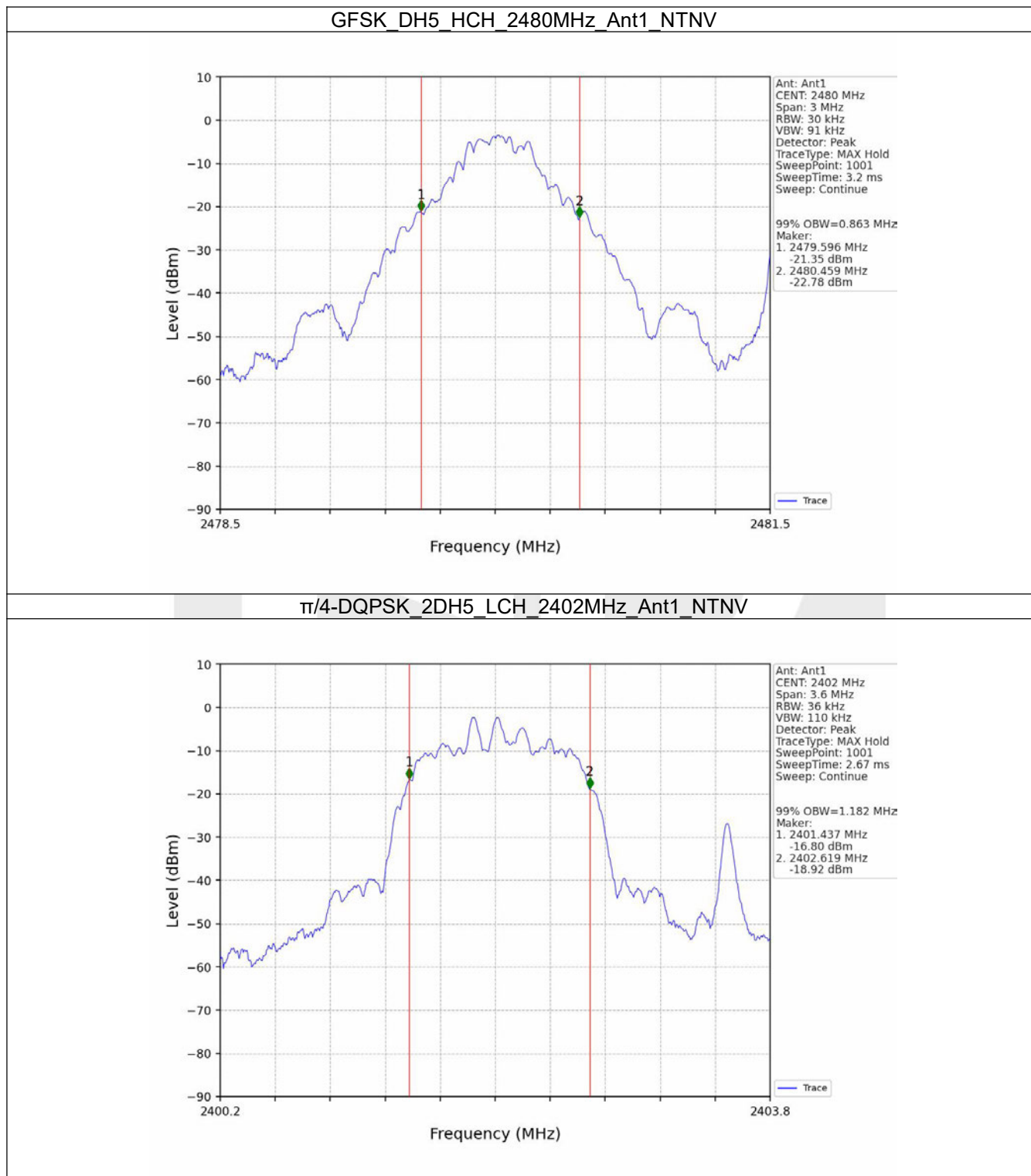
#### 2.1.2 20dB BW

| Mode           | TX Type | Frequency (MHz) | Packet Type | ANT | 20dB Bandwidth (MHz) |       | Verdict |
|----------------|---------|-----------------|-------------|-----|----------------------|-------|---------|
|                |         |                 |             |     | Result               | Limit |         |
| GFSK           | SISO    | 2402            | DH5         | 1   | 0.956                | /     | Pass    |
|                |         | 2441            | DH5         | 1   | 0.956                | /     | Pass    |
|                |         | 2480            | DH5         | 1   | 0.960                | /     | Pass    |
| $\pi/4$ -DQPSK | SISO    | 2402            | 2DH5        | 1   | 1.291                | /     | Pass    |
|                |         | 2441            | 2DH5        | 1   | 1.291                | /     | Pass    |
|                |         | 2480            | 2DH5        | 1   | 1.293                | /     | Pass    |

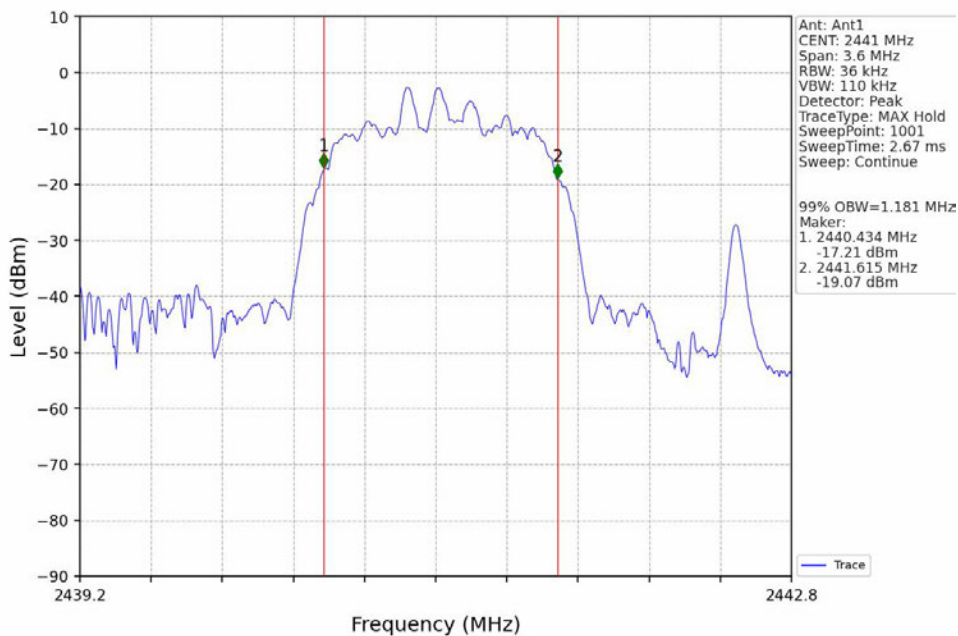
## 2.2 Test Graph

### 2.2.1 OBW

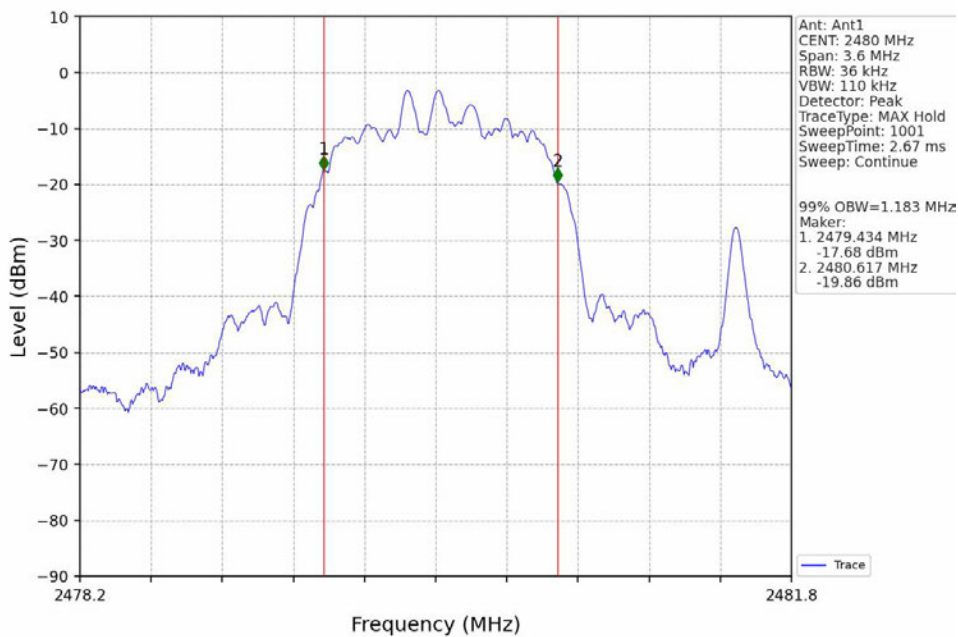




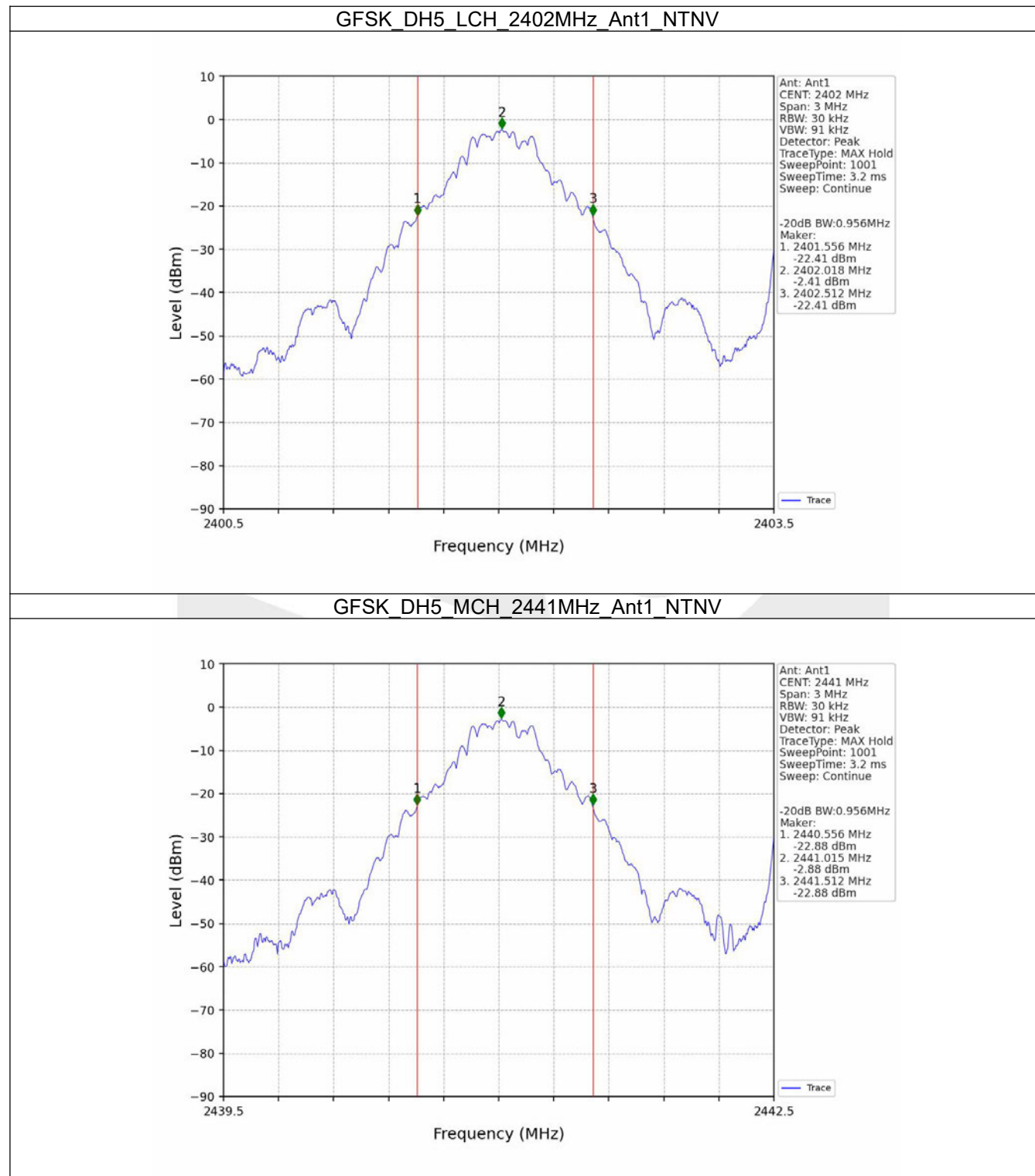
$\pi/4$ -DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV

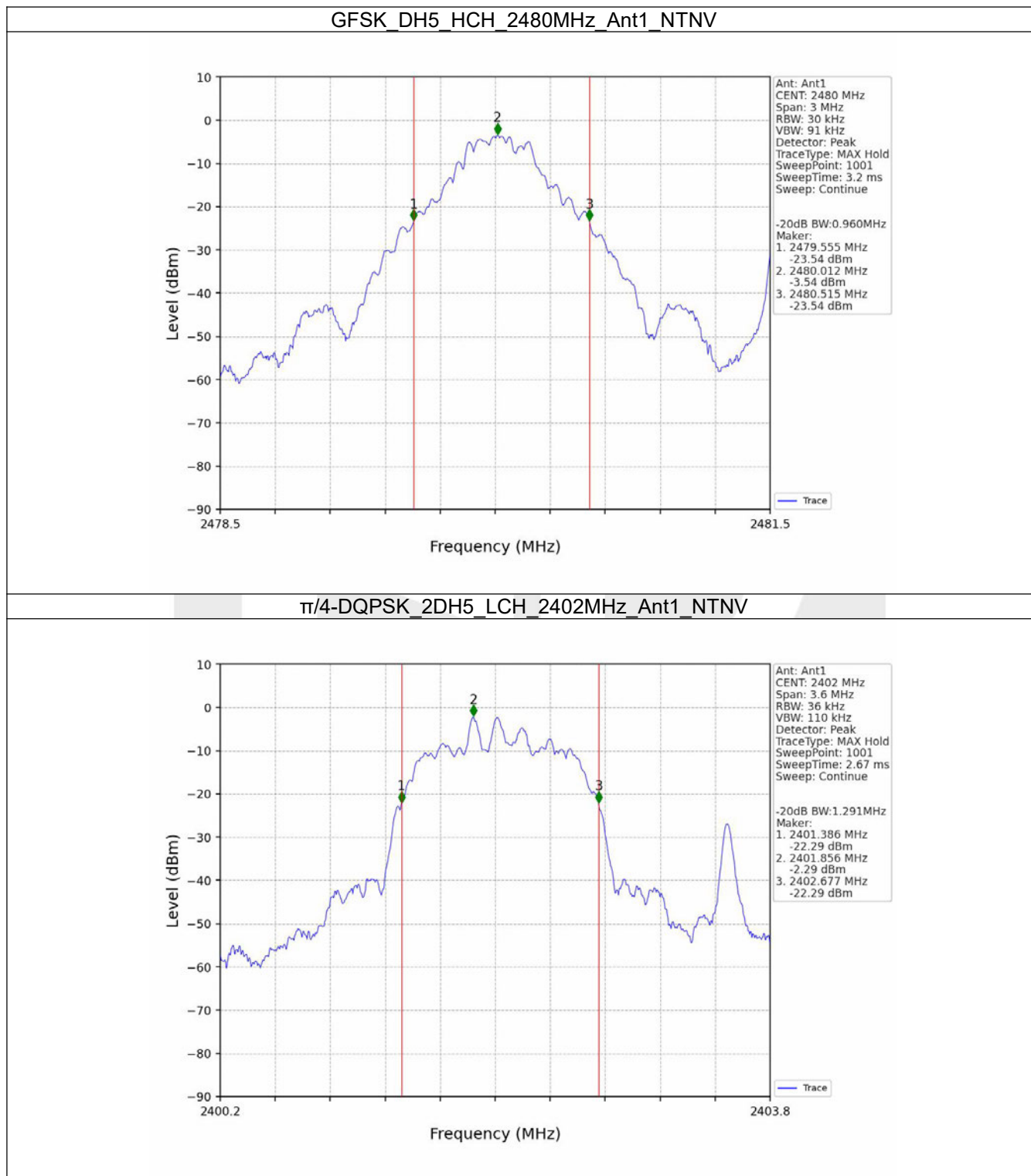


$\pi/4$ -DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV

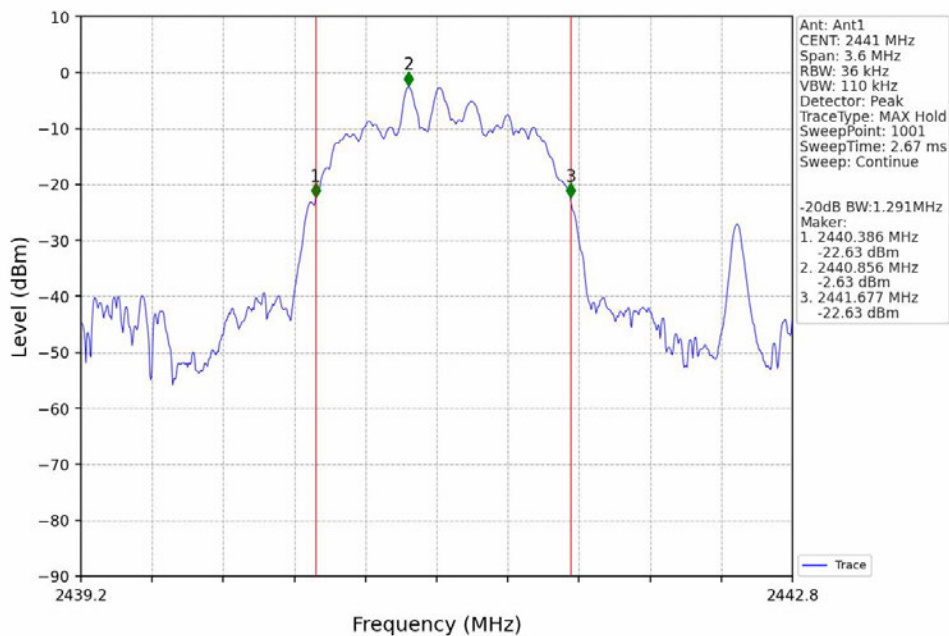


### 2.2.2 20dB BW

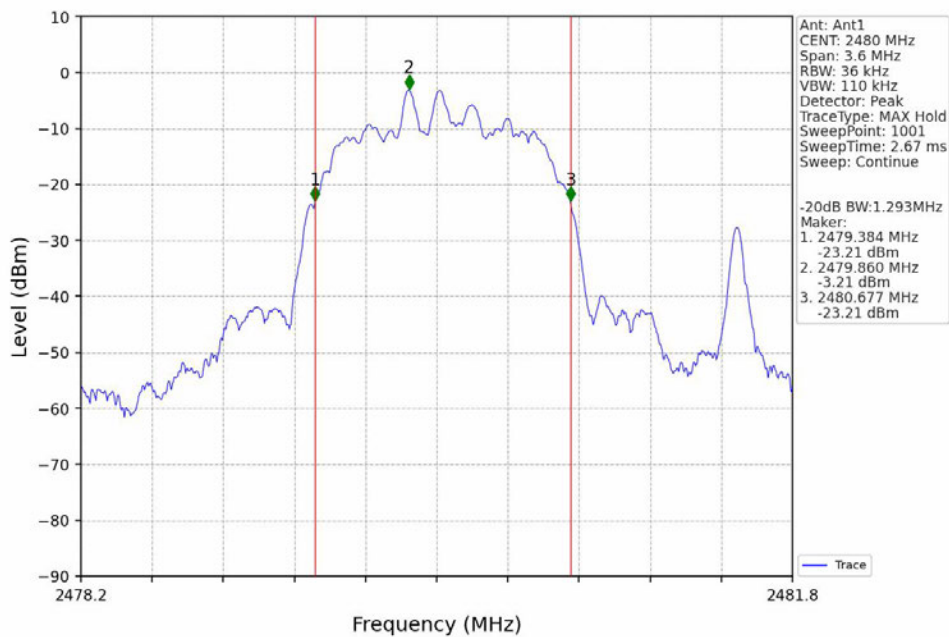




$\pi/4$ -DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



$\pi/4$ -DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



### 3. Maximum Conducted Output Power

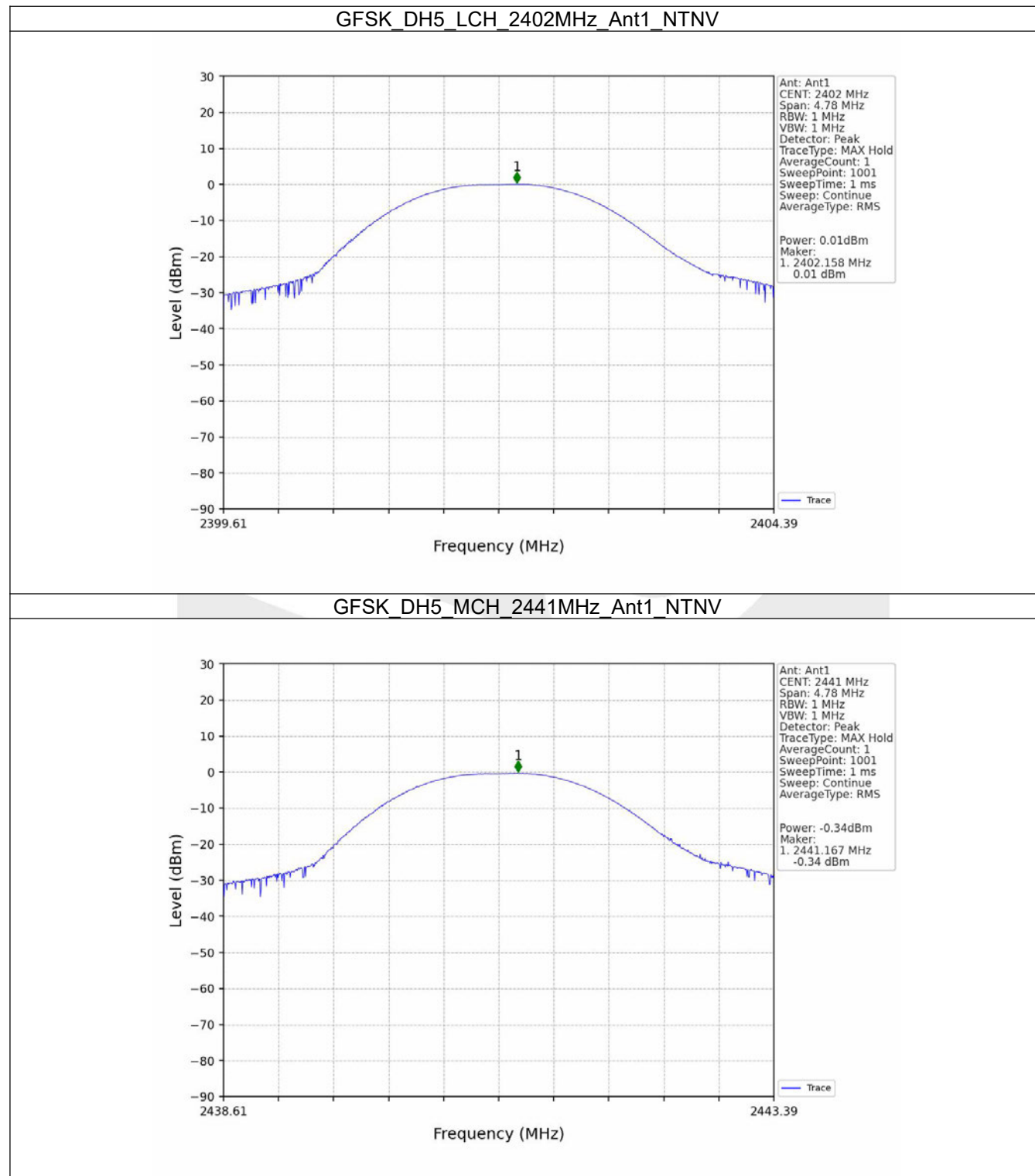
#### 3.1 Test Result

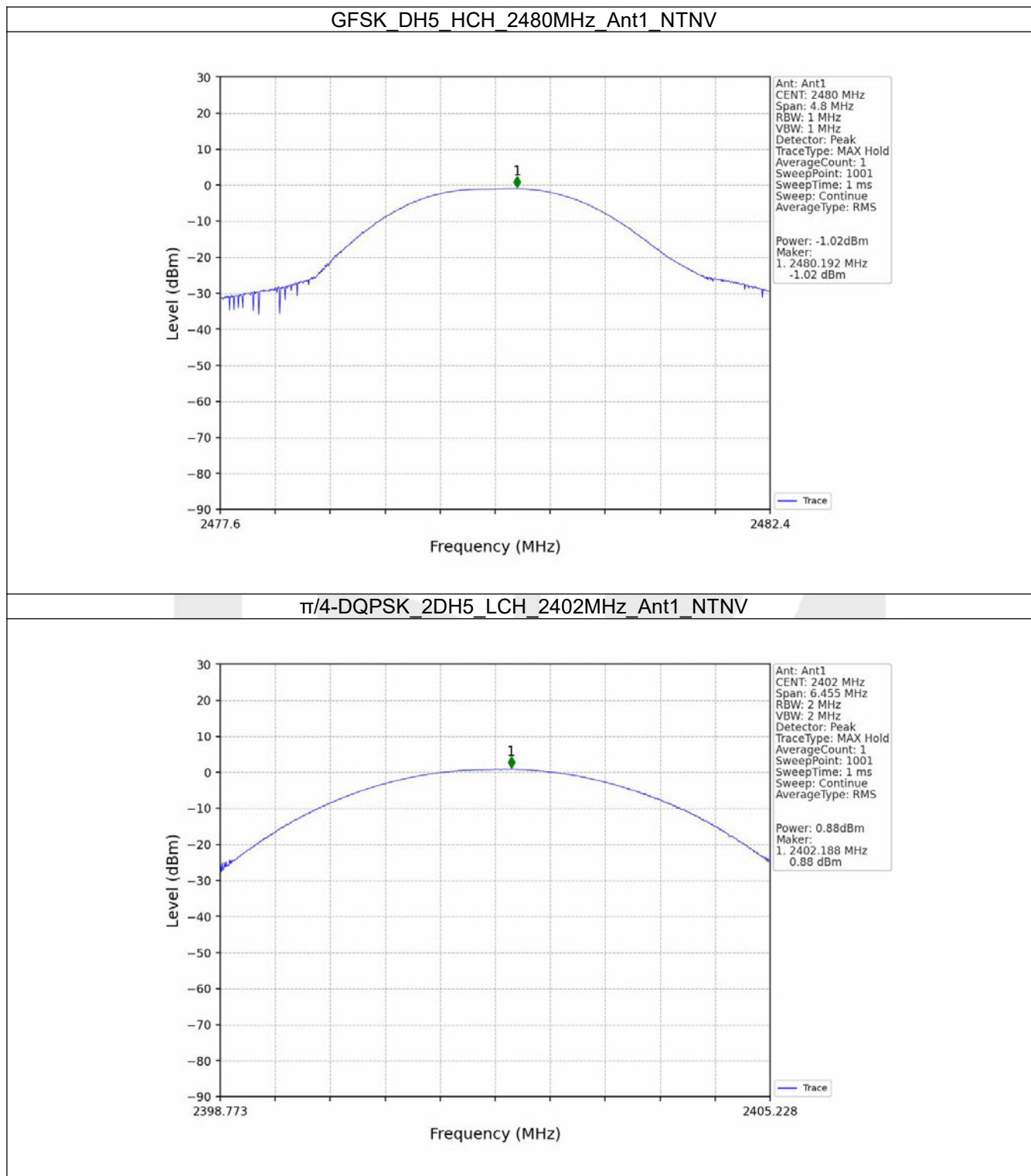
##### 3.1.1 Power

| Mode                                | TX Type | Frequency (MHz) | Packet Type | Maximum Peak Conducted Output Power (dBm) |         | Verdict |
|-------------------------------------|---------|-----------------|-------------|-------------------------------------------|---------|---------|
|                                     |         |                 |             | ANT1                                      | Limit   |         |
| GFSK                                | SISO    | 2402            | DH5         | 0.01                                      | <=30    | Pass    |
|                                     |         | 2441            | DH5         | -0.34                                     | <=30    | Pass    |
|                                     |         | 2480            | DH5         | -1.02                                     | <=30    | Pass    |
| π/4-DQPSK                           | SISO    | 2402            | 2DH5        | 0.88                                      | <=20.97 | Pass    |
|                                     |         | 2441            | 2DH5        | 0.54                                      | <=20.97 | Pass    |
|                                     |         | 2480            | 2DH5        | -0.01                                     | <=20.97 | Pass    |
| Note1: Antenna Gain: Ant1: 2.50dBi; |         |                 |             |                                           |         |         |

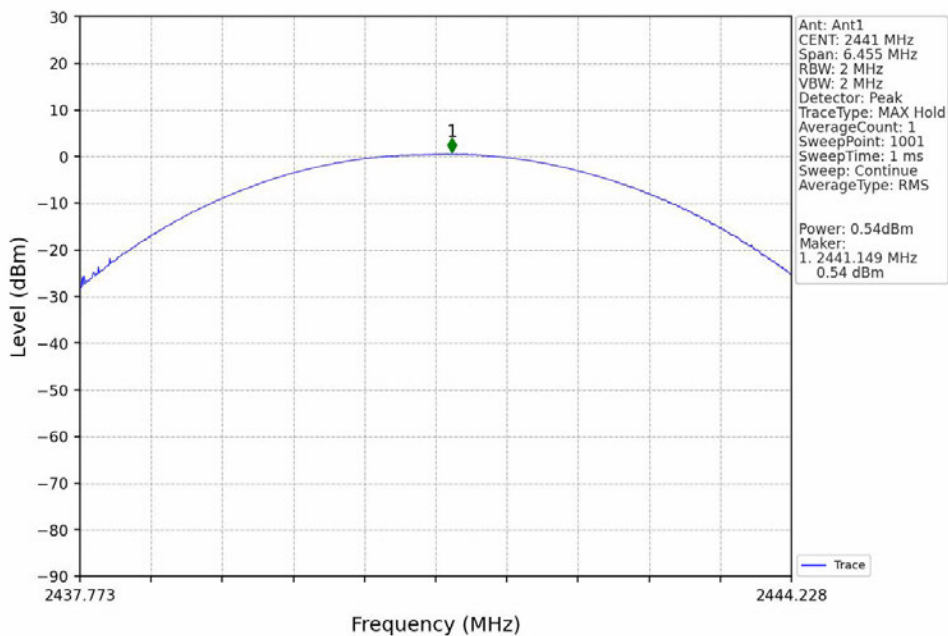
## 3.2 Test Graph

### 3.2.1 Power

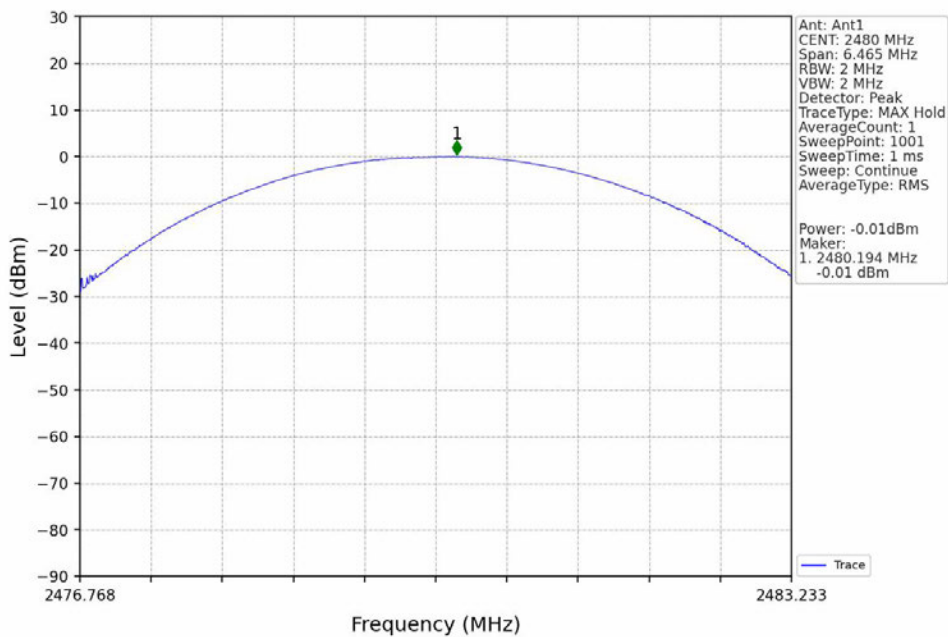




$\pi/4$ -DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



$\pi/4$ -DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



#### 4. Carrier Frequency Separation

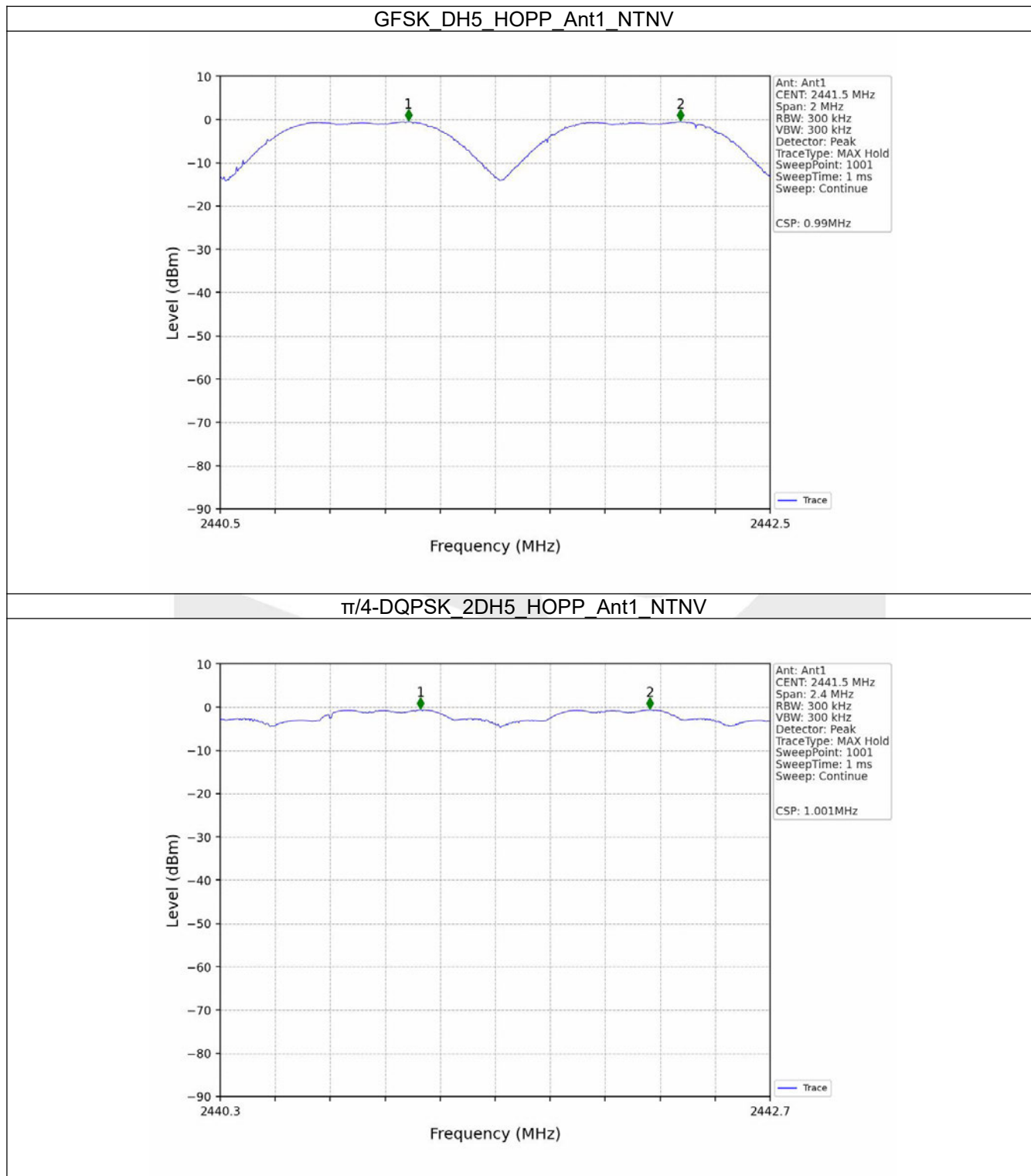
##### 4.1 Test Result

###### 4.1.1 Ant1

| Ant1           |         |                 |             |                          |                      |              |         |
|----------------|---------|-----------------|-------------|--------------------------|----------------------|--------------|---------|
| Mode           | TX Type | Frequency (MHz) | Packet Type | Channel Separation (MHz) | 20dB Bandwidth (MHz) | Limit (MHz)  | Verdict |
| GFSK           | SISO    | HOPP            | DH5         | 0.990                    | 0.960                | $\geq 0.96$  | Pass    |
| $\pi/4$ -DQPSK | SISO    | HOPP            | 2DH5        | 1.001                    | 1.293                | $\geq 0.862$ | Pass    |

## 4.2 Test Graph

### 4.2.1 Ant1



## 5. Number of Hopping Frequencies

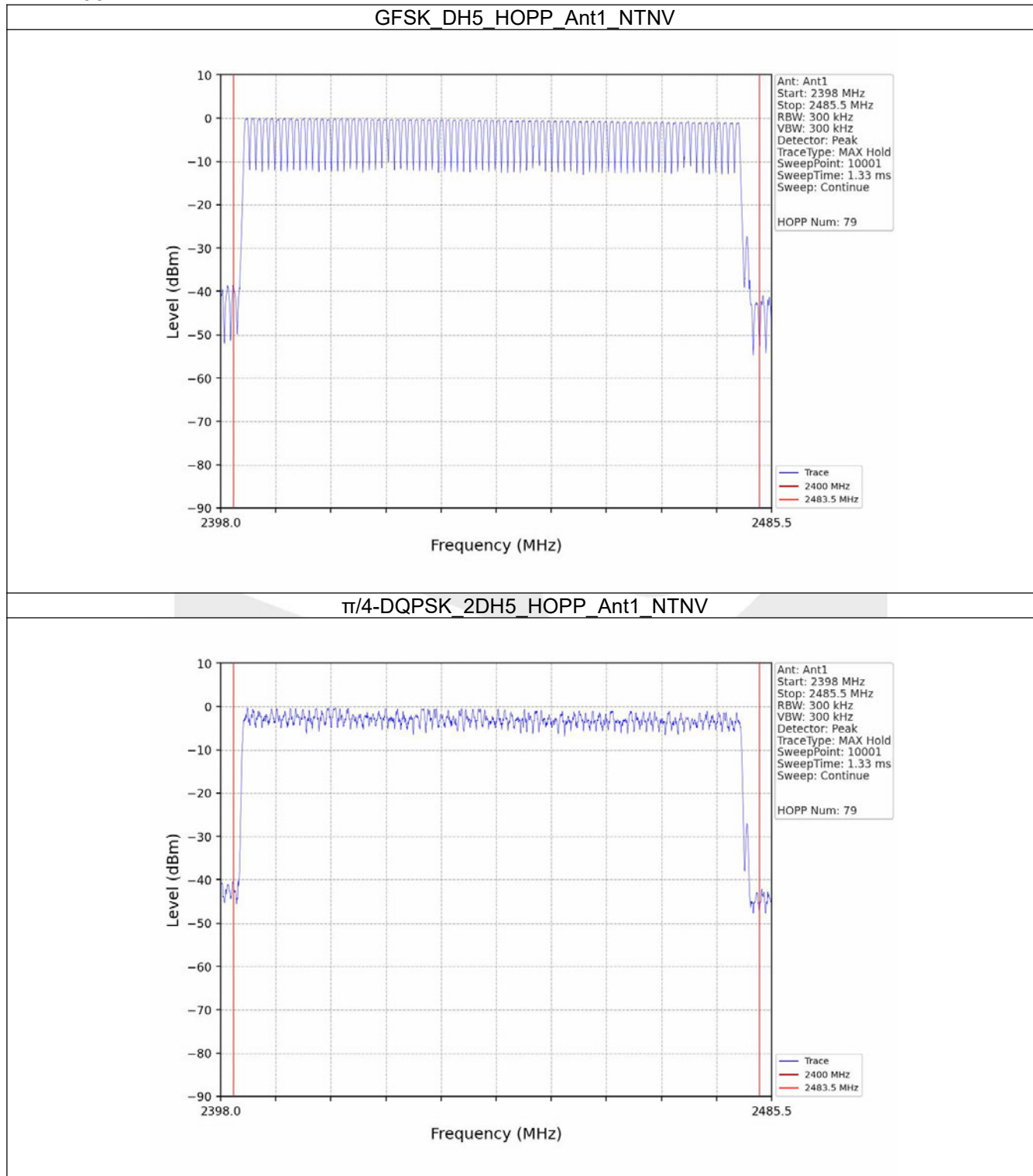
### 5.1 Test Result

#### 5.1.1 HoppNum

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

## 5.2 Test Graph

### 5.2.1 HoppNum



## 6. Time of Occupancy (Dwell Time)

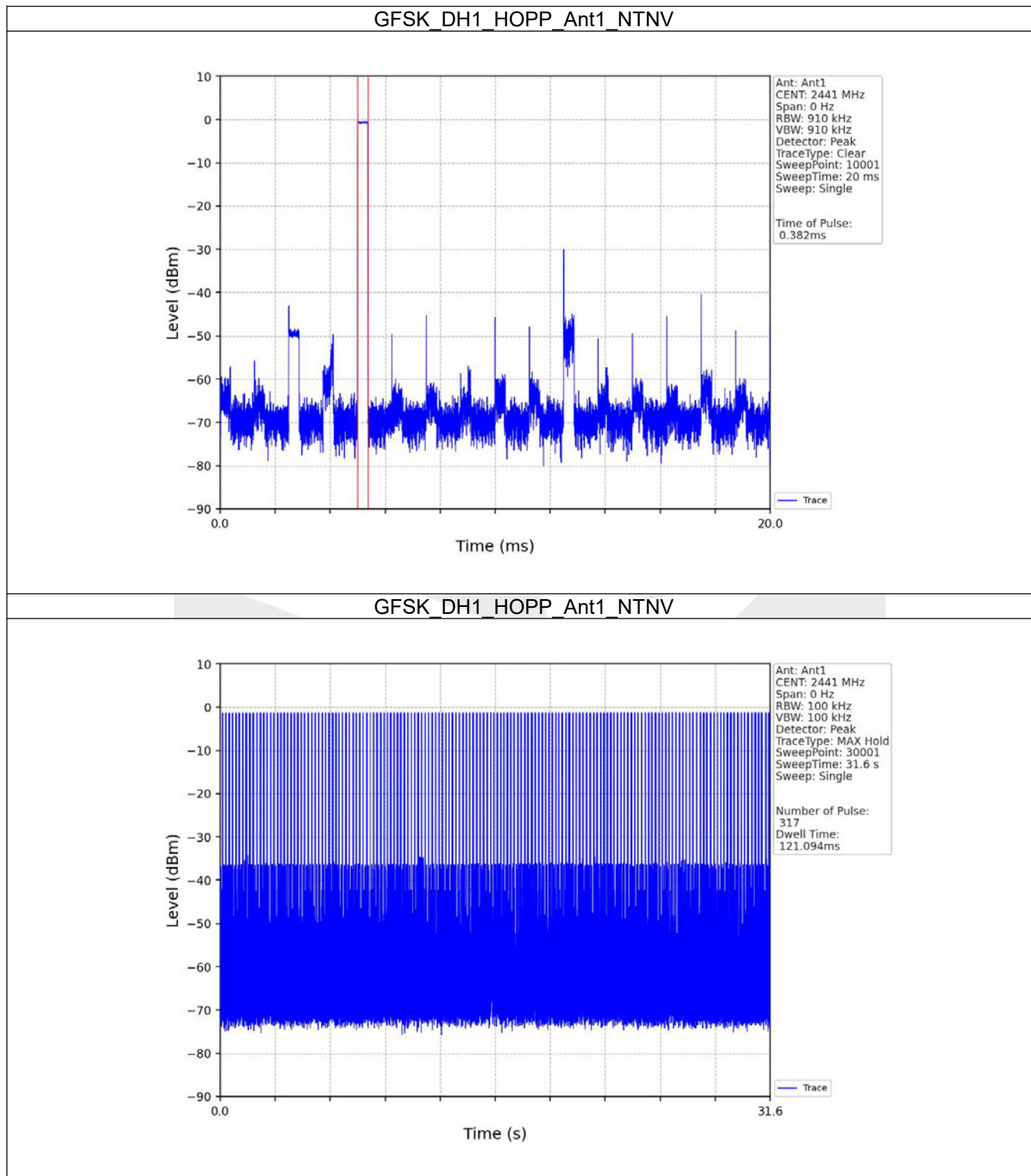
### 6.1 Test Result

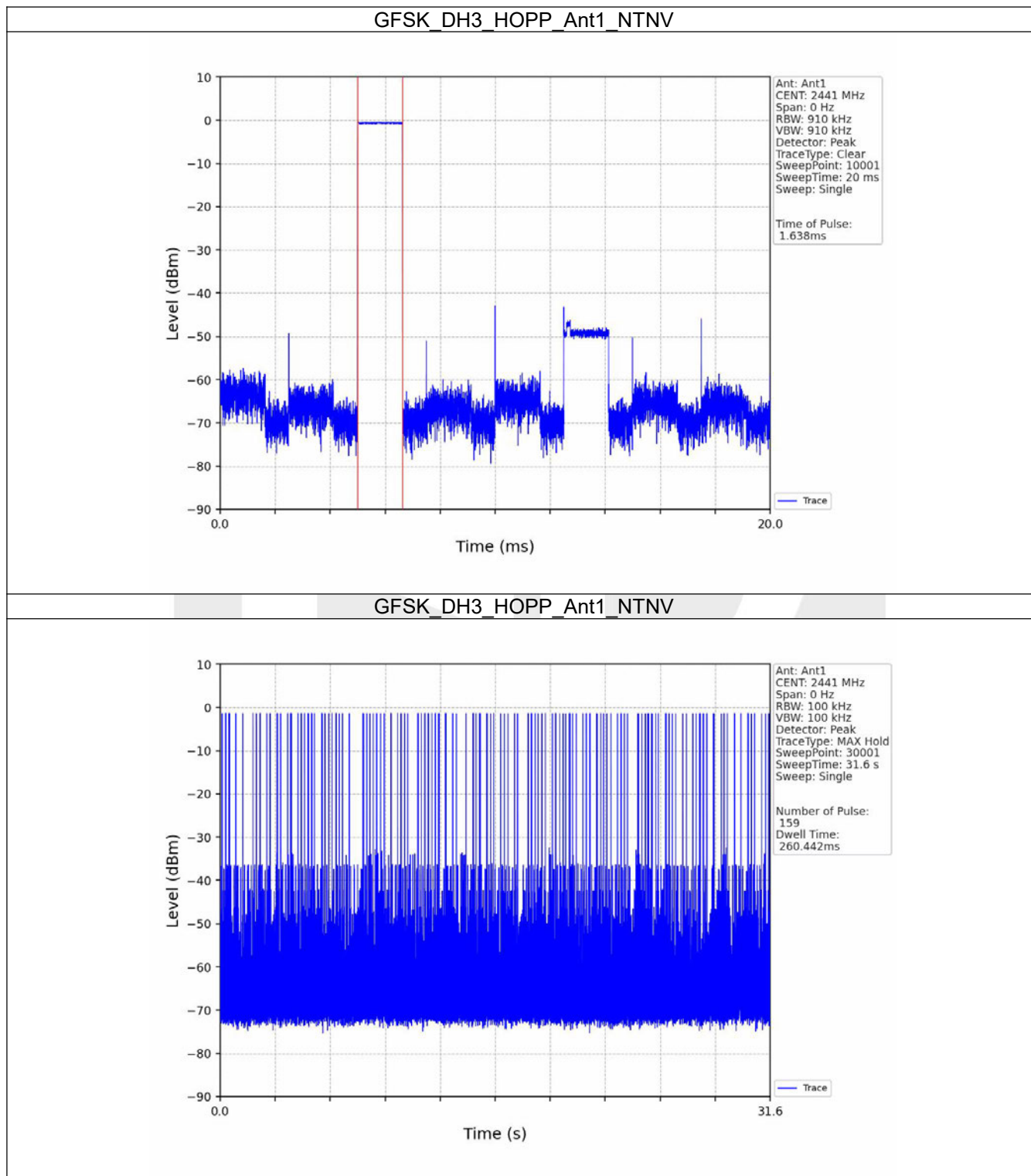
#### 6.1.1 Ant1

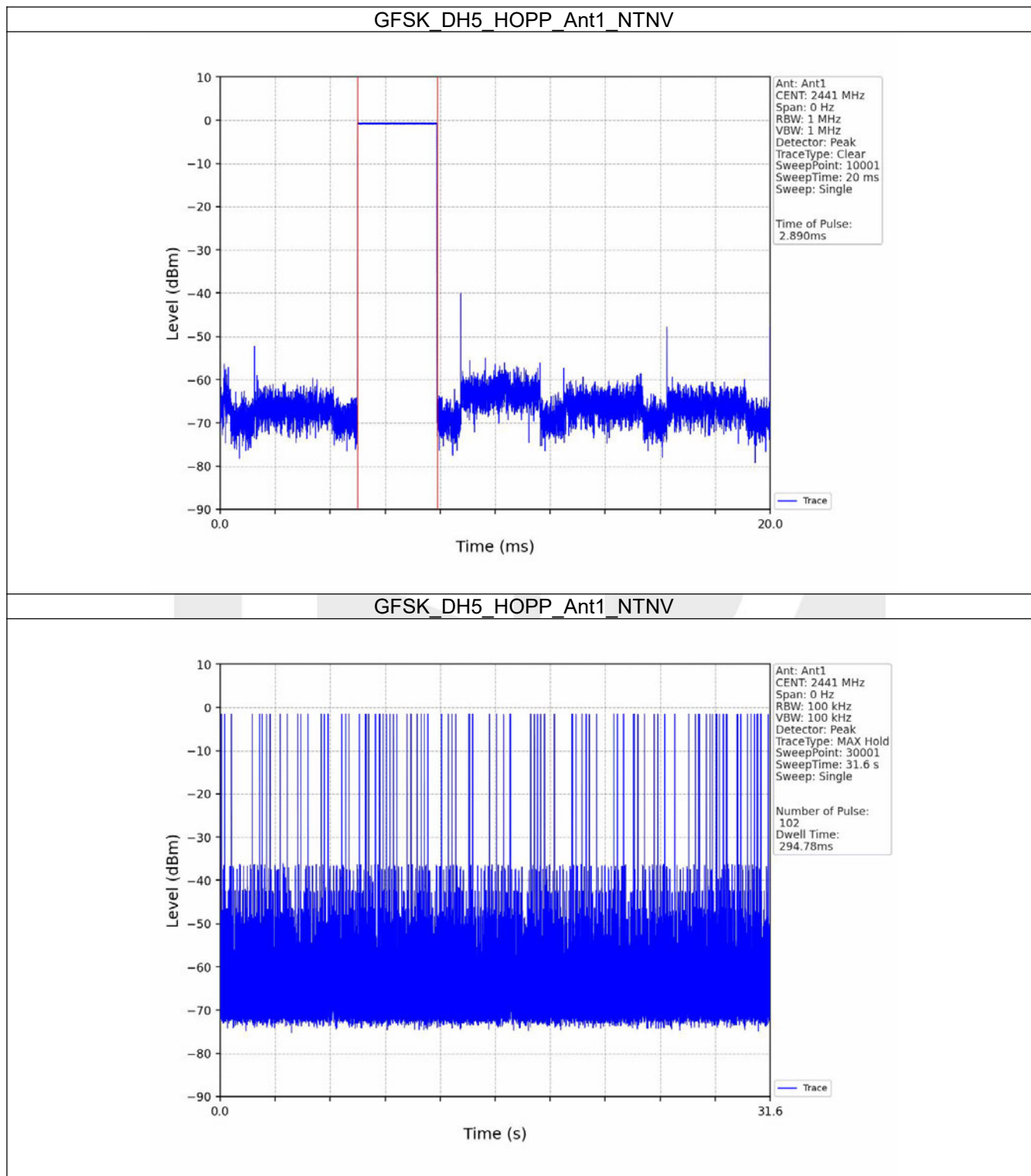
| Ant1           |         |                 |             |                               |                        |                                    |                 |            |         |
|----------------|---------|-----------------|-------------|-------------------------------|------------------------|------------------------------------|-----------------|------------|---------|
| 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         | 0.382                         | 31.600                 | 317                                | 121.094         | <=400      | Pass    |
|                |         |                 | DH3         | 1.638                         | 31.600                 | 159                                | 260.442         | <=400      | Pass    |
|                |         |                 | DH5         | 2.890                         | 31.600                 | 102                                | 294.780         | <=400      | Pass    |
| $\pi/4$ -DQPSK | SISO    | HOPP            | 2DH1        | 0.390                         | 31.600                 | 320                                | 124.800         | <=400      | Pass    |
|                |         |                 | 2DH3        | 1.642                         | 31.600                 | 157                                | 257.794         | <=400      | Pass    |
|                |         |                 | 2DH5        | 2.890                         | 31.600                 | 94                                 | 271.660         | <=400      | Pass    |

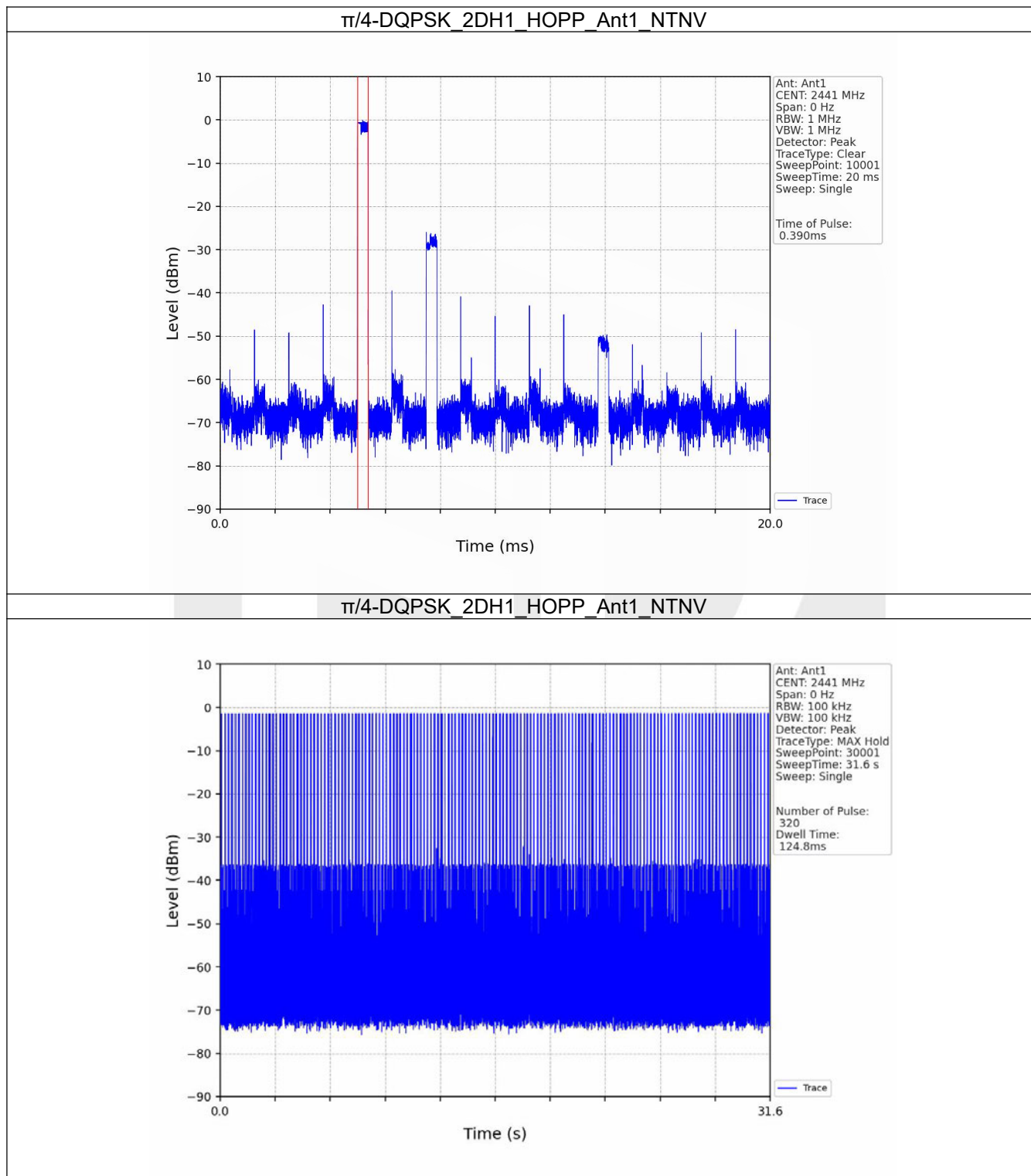
## 6.2 Test Graph

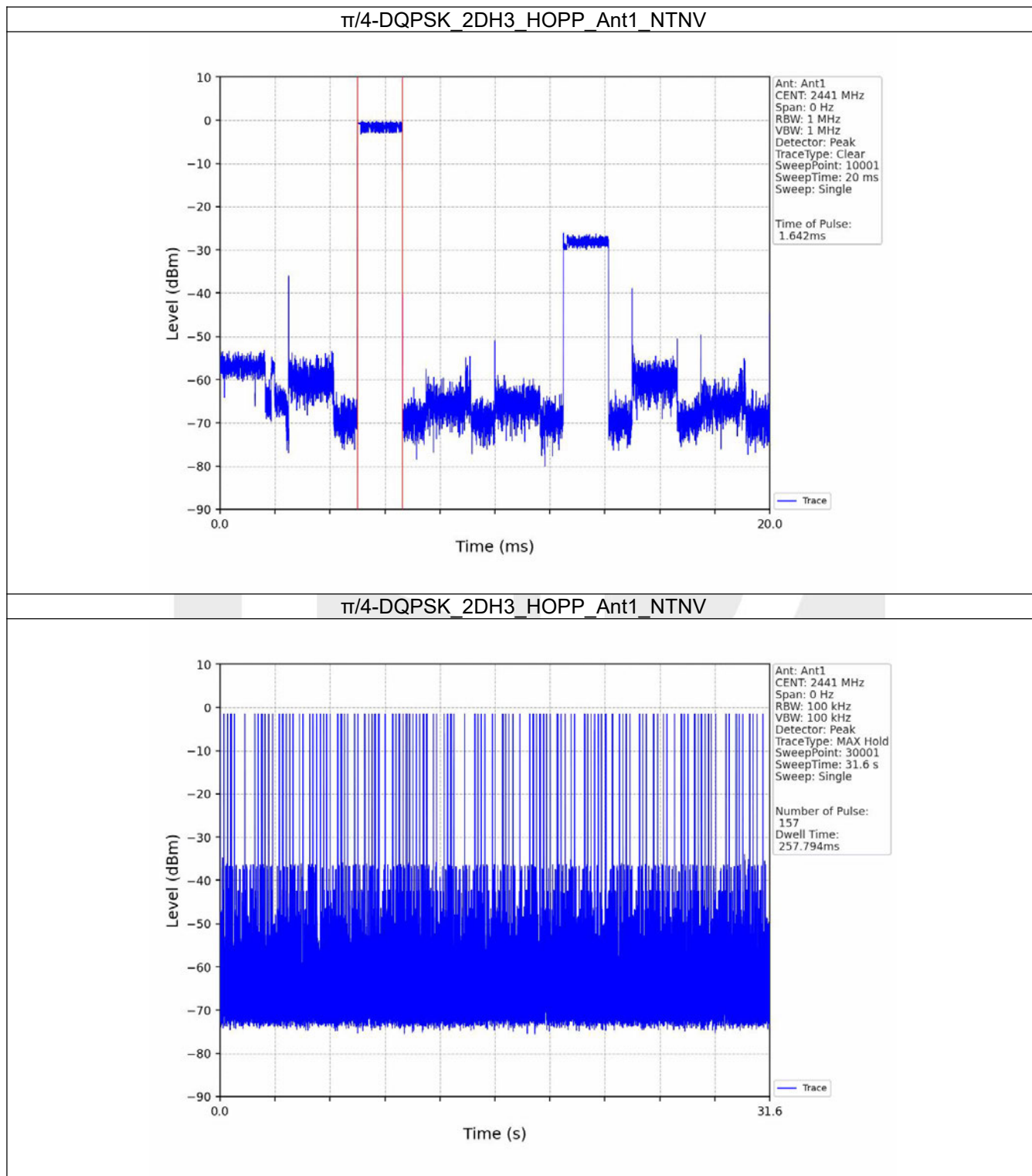
### 6.2.1 Ant1

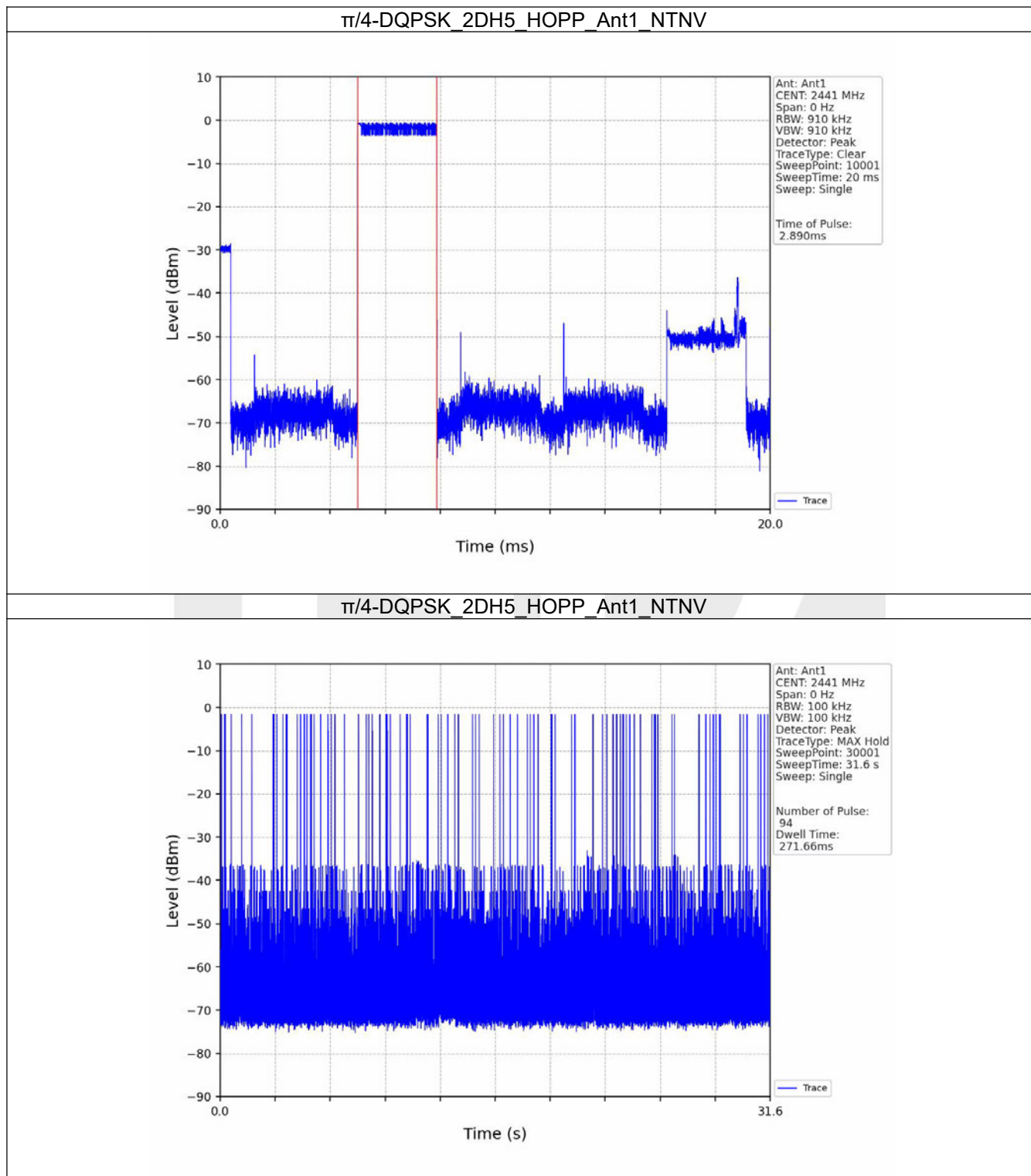












## 7. Unwanted Emissions In Non-restricted Frequency Bands

### 7.1 Test Result

#### 7.1.1 Ref

| Mode           | TX Type | Frequency (MHz) | Packet Type | ANT | Level of Reference (dBm) |
|----------------|---------|-----------------|-------------|-----|--------------------------|
| GFSK           | SISO    | 2402            | DH5         | 1   | -0.26                    |
|                |         | 2441            | DH5         | 1   | -0.67                    |
|                |         | 2480            | DH5         | 1   | -1.50                    |
|                |         | HOPP            | DH5         | 1   | -0.63                    |
|                |         |                 |             |     | -0.63                    |
| $\pi/4$ -DQPSK | SISO    | 2402            | 2DH5        | 1   | -0.50                    |
|                |         | 2441            | 2DH5        | 1   | -0.86                    |
|                |         | 2480            | 2DH5        | 1   | -1.41                    |
|                |         | HOPP            | 2DH5        | 1   | -0.59                    |
|                |         |                 |             |     | -0.59                    |

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.

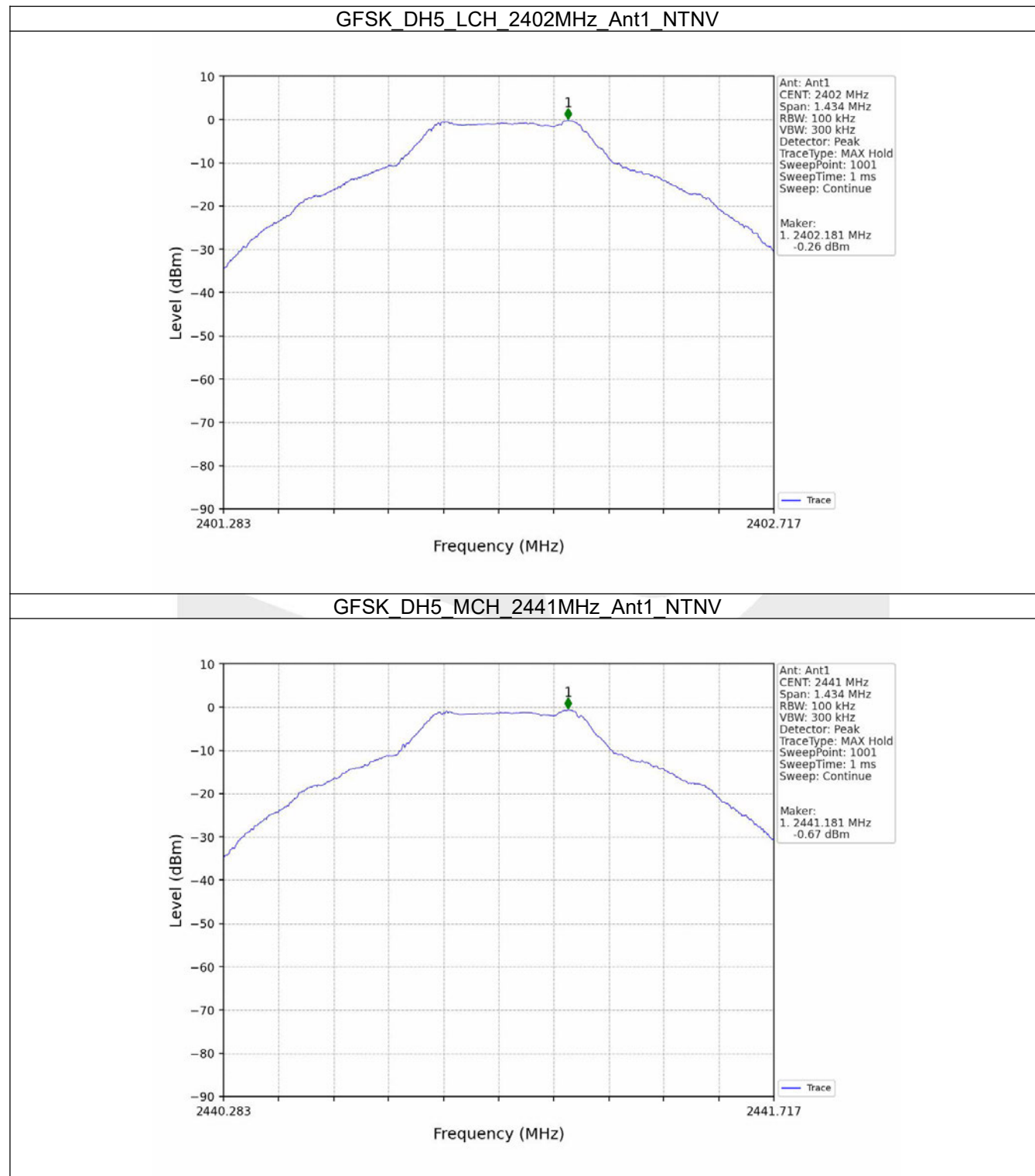
#### 7.1.2 CSE

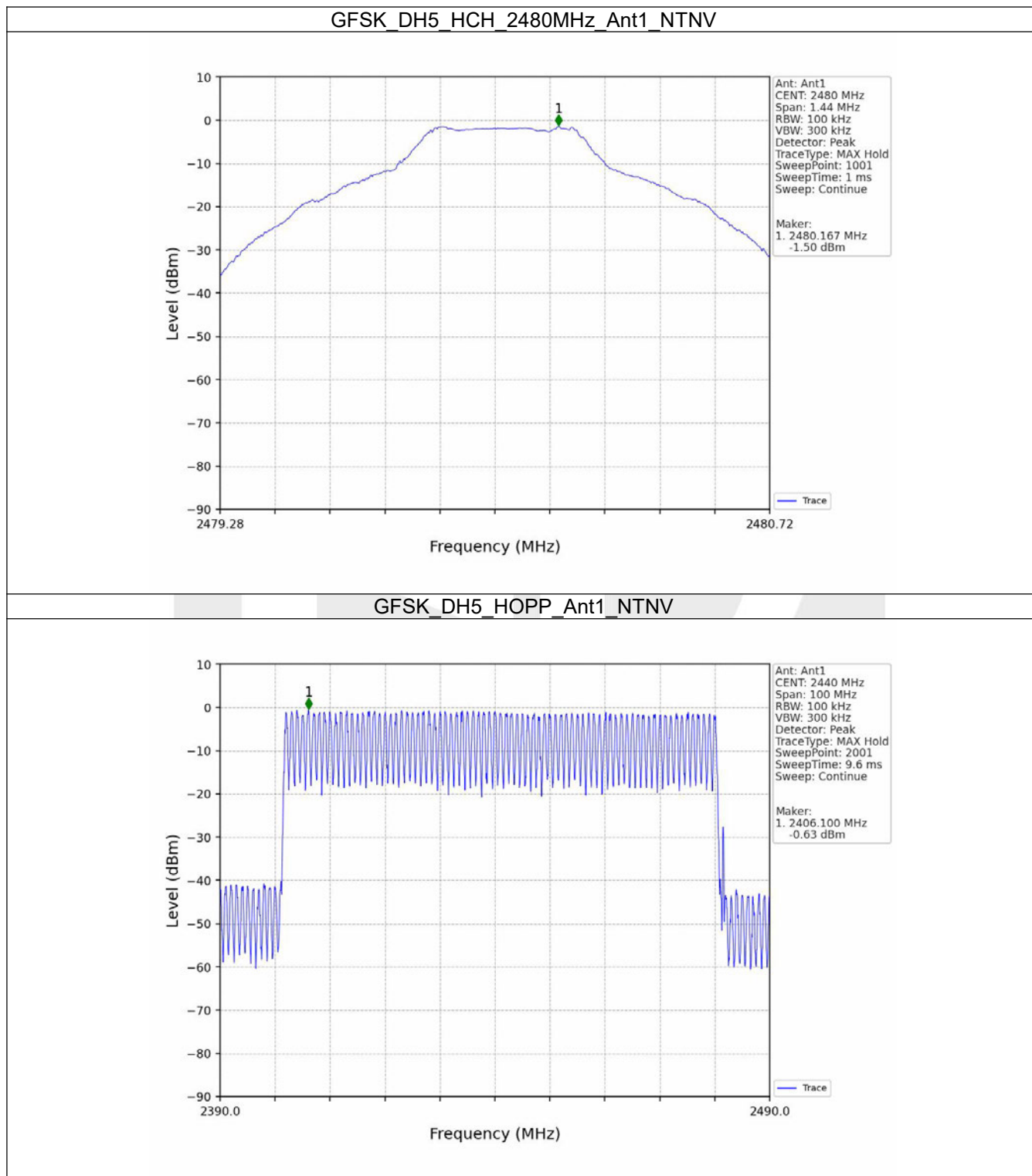
| Mode           | TX Type | Frequency (MHz) | Packet Type | ANT | Level of Reference (dBm) | Limit (dBm) | Verdict |
|----------------|---------|-----------------|-------------|-----|--------------------------|-------------|---------|
| GFSK           | SISO    | 2402            | DH5         | 1   | -0.26                    | -20.26      | Pass    |
|                |         | 2441            | DH5         | 1   | -0.67                    | -20.67      | Pass    |
|                |         | 2480            | DH5         | 1   | -1.50                    | -21.50      | Pass    |
|                |         | HOPP            | DH5         | 1   | -0.63                    | -20.63      | Pass    |
|                |         |                 |             |     | -0.63                    | -20.63      | Pass    |
| $\pi/4$ -DQPSK | SISO    | 2402            | 2DH5        | 1   | -0.50                    | -20.50      | Pass    |
|                |         | 2441            | 2DH5        | 1   | -0.86                    | -20.86      | Pass    |
|                |         | 2480            | 2DH5        | 1   | -1.41                    | -21.41      | Pass    |
|                |         | HOPP            | 2DH5        | 1   | -0.59                    | -20.59      | Pass    |
|                |         |                 |             |     | -0.59                    | -20.59      | Pass    |

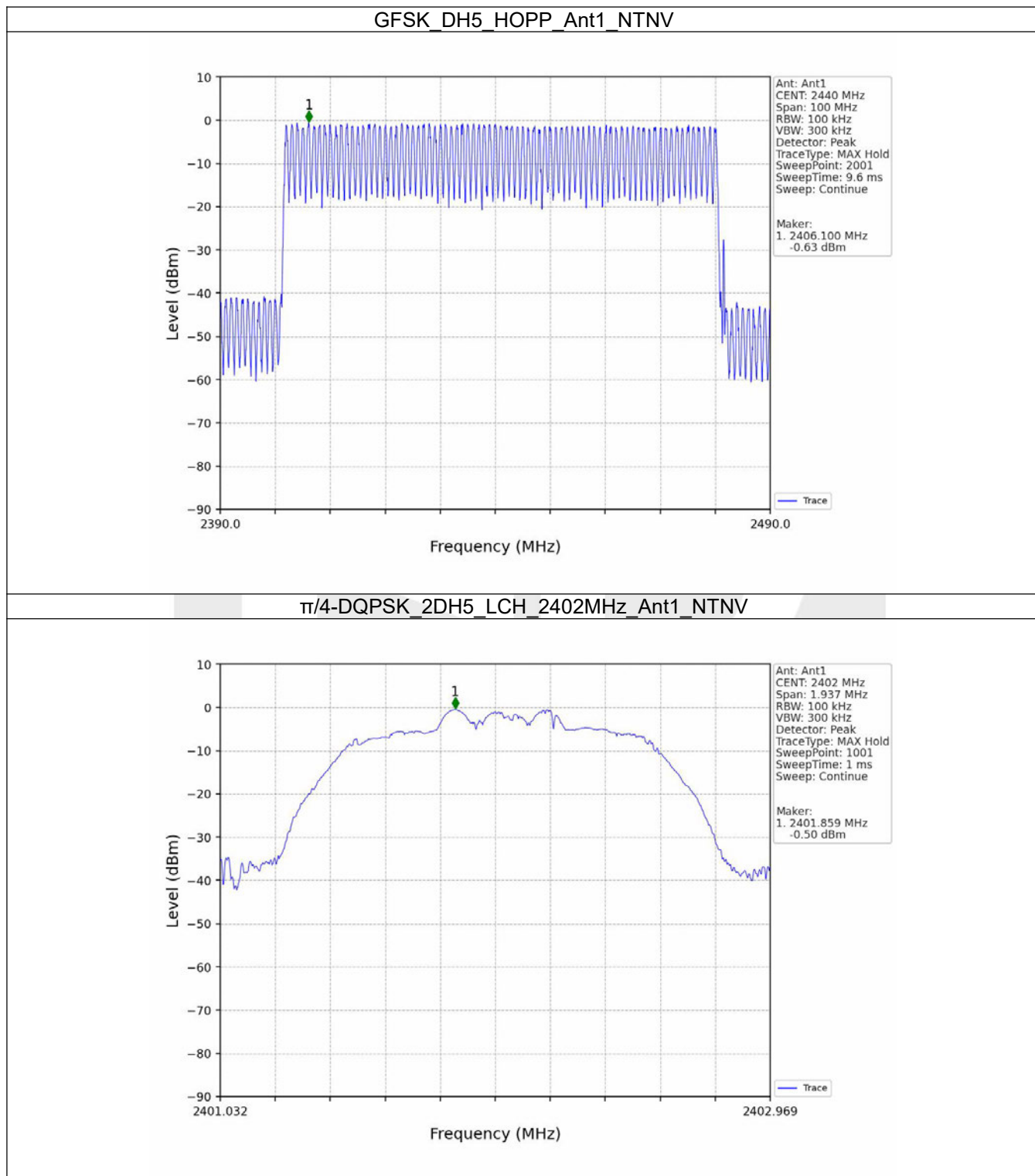
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.

## 7.2 Test Graph

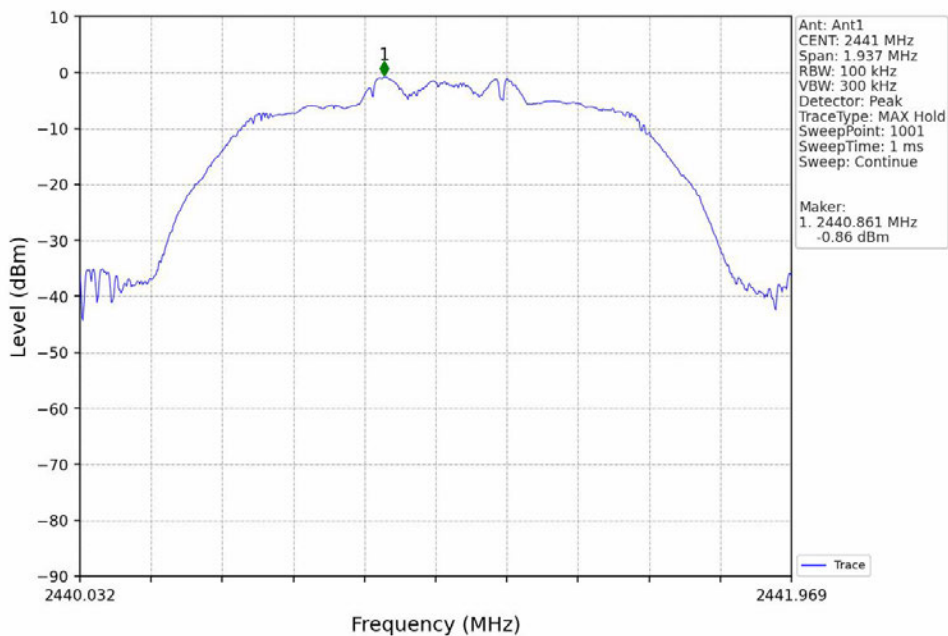
### 7.2.1 Ref



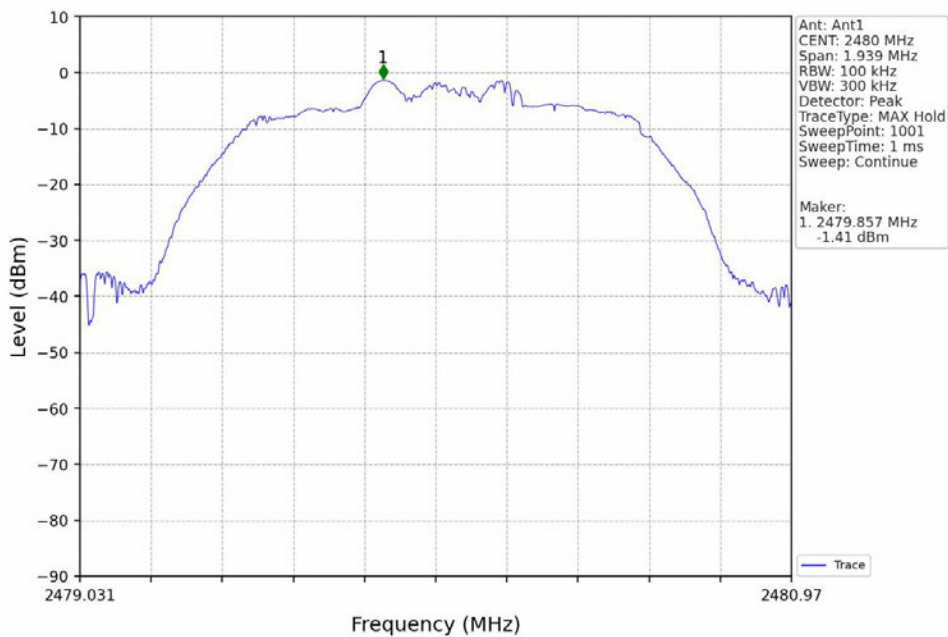


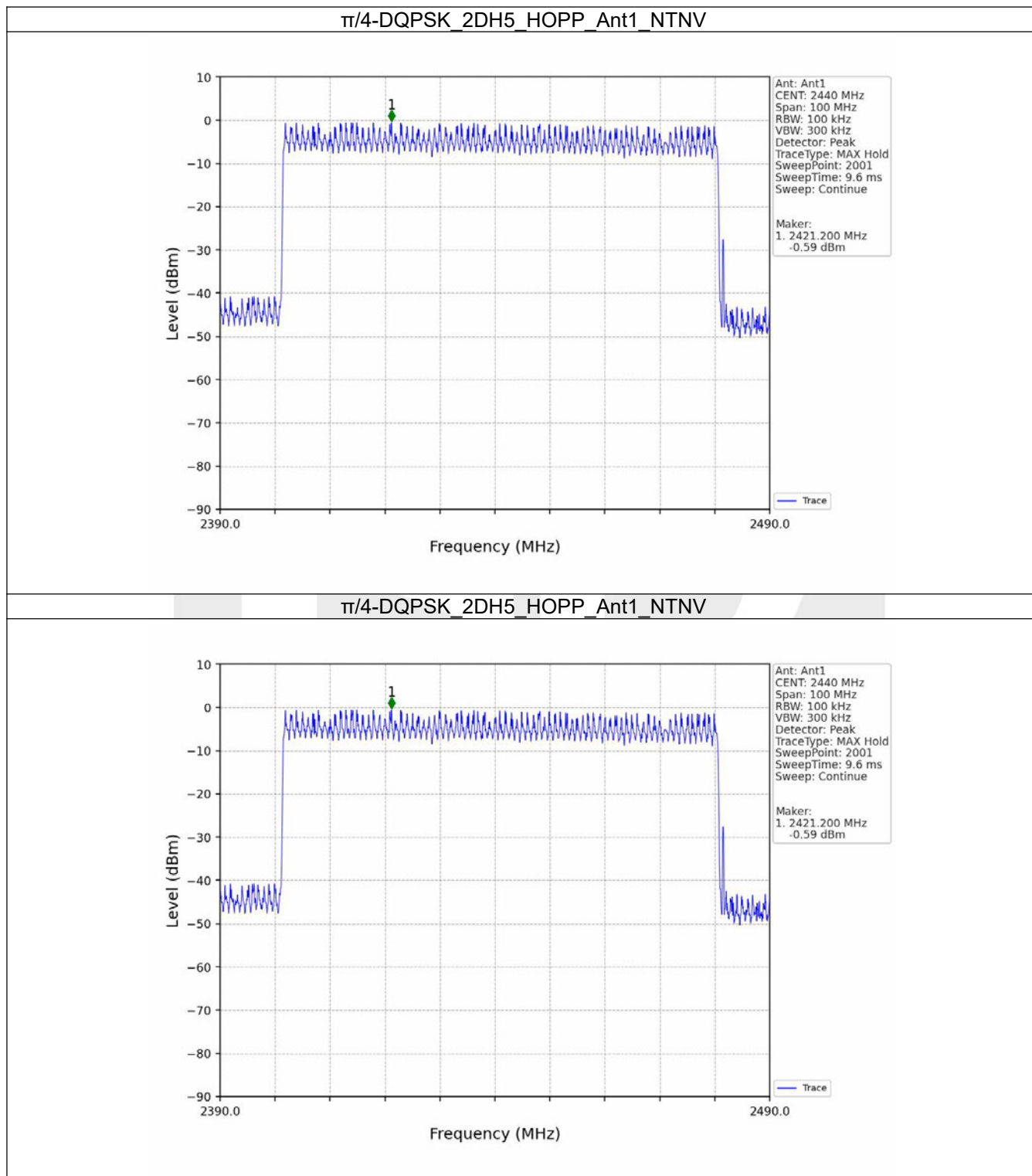


$\pi/4$ -DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV

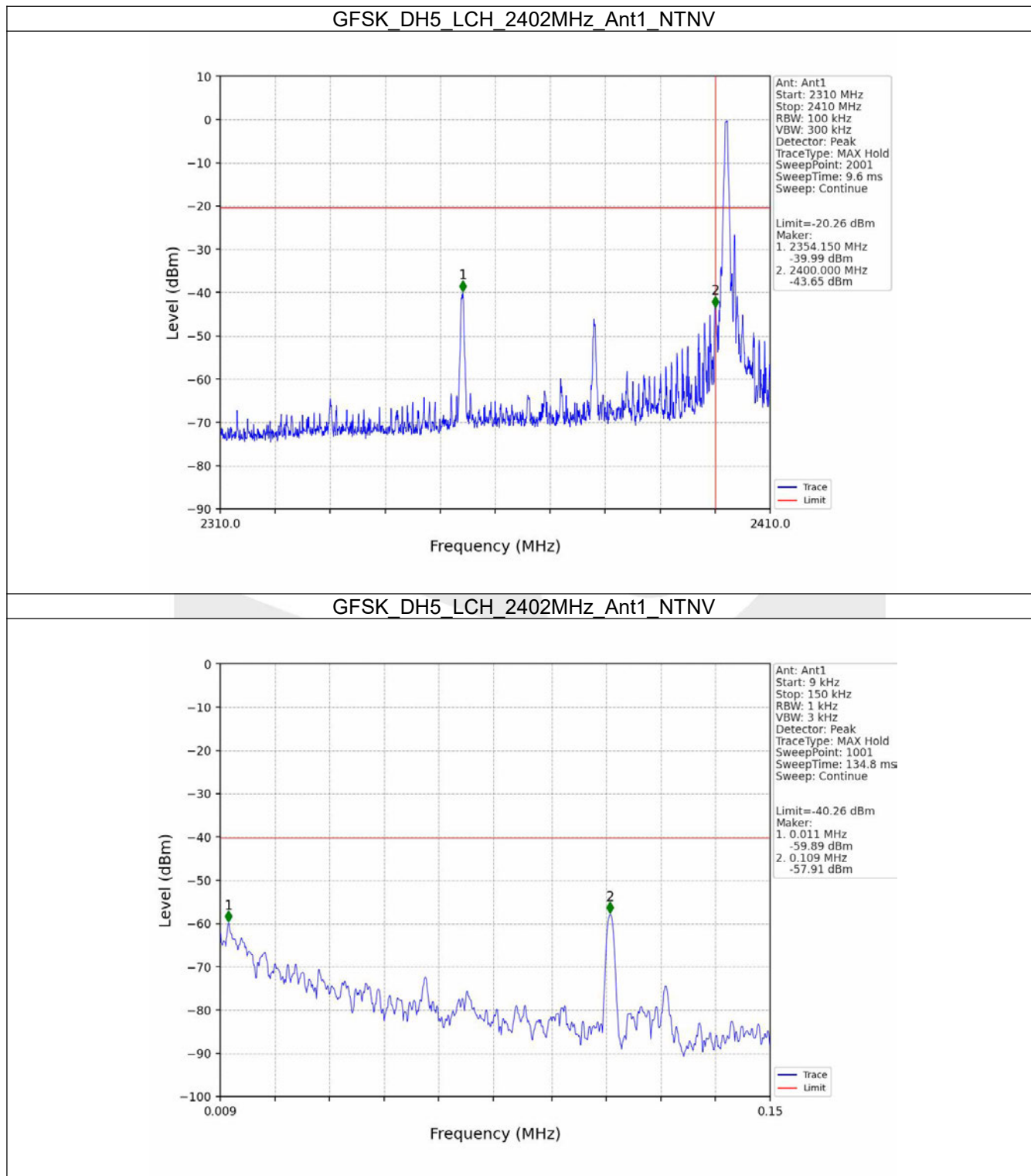


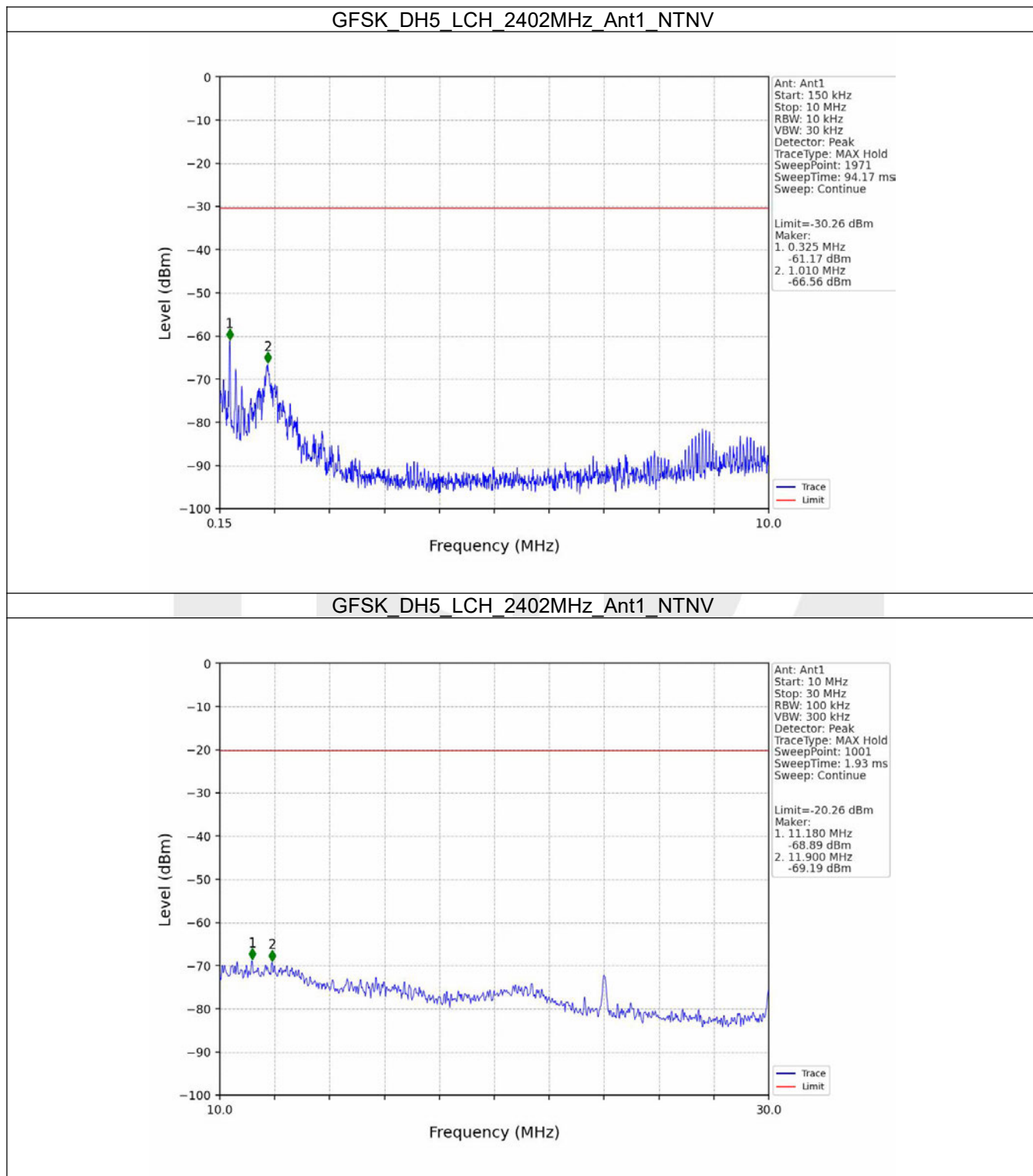
$\pi/4$ -DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV

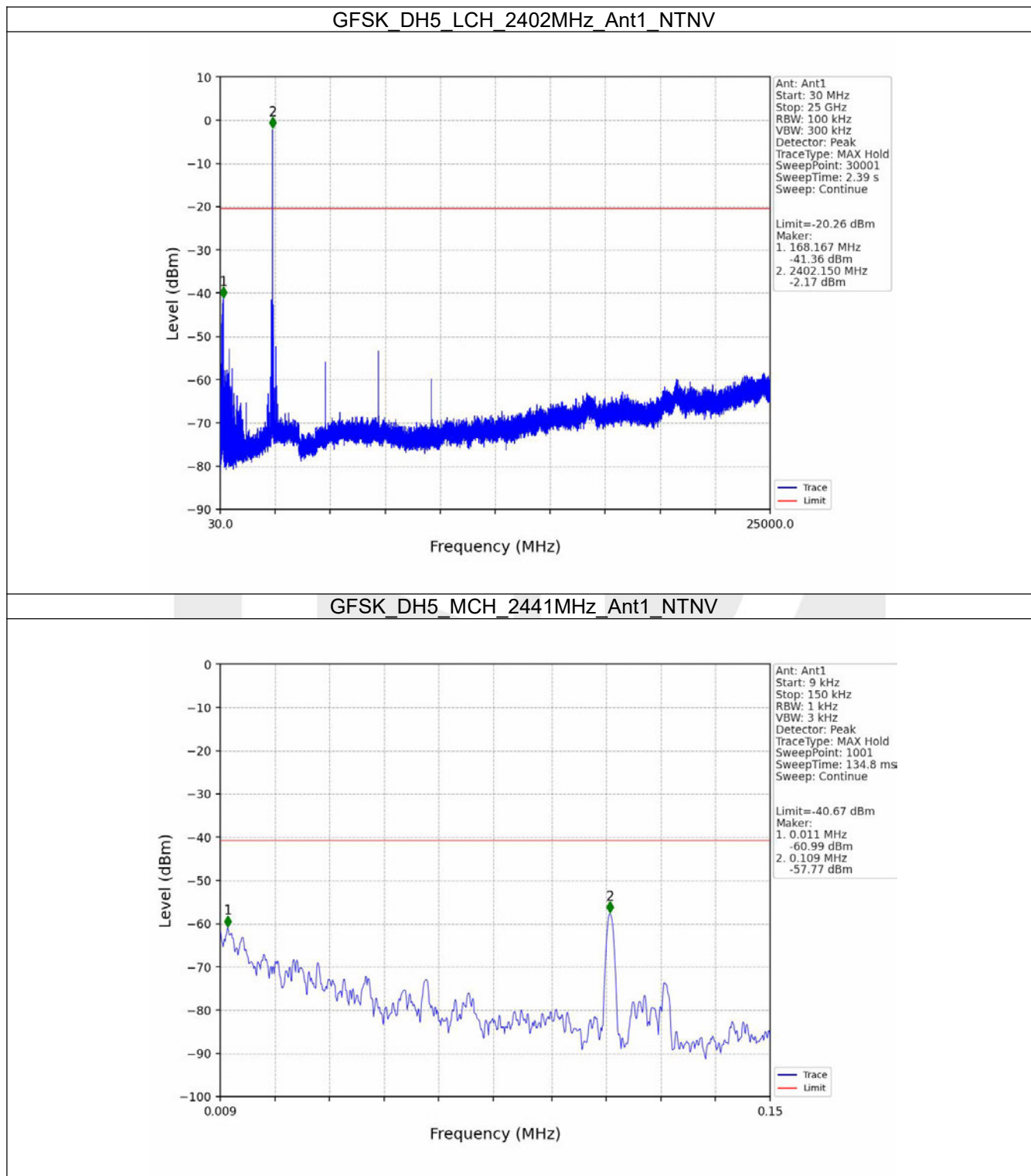




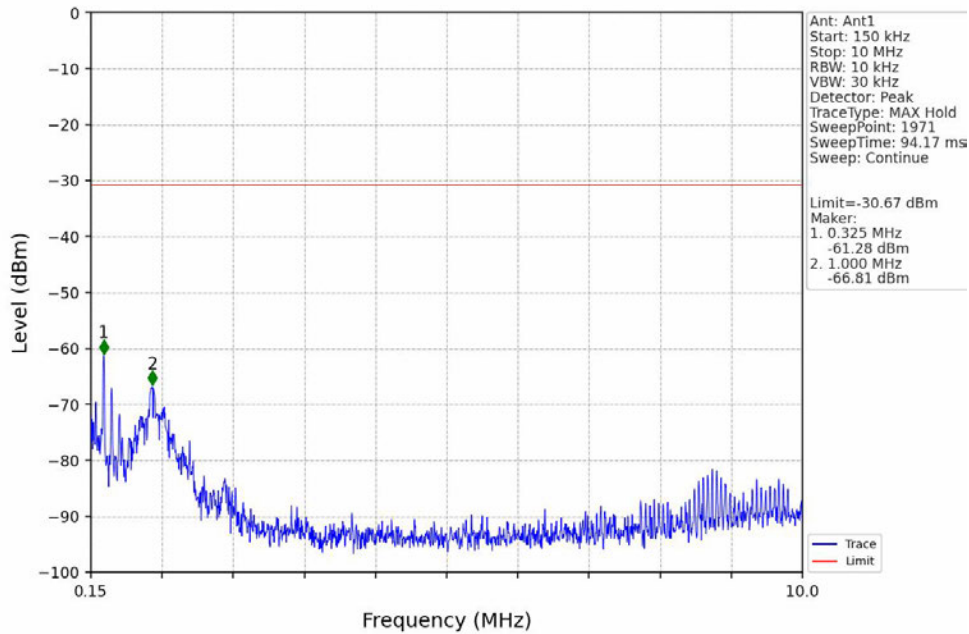
## 7.2.2 CSE



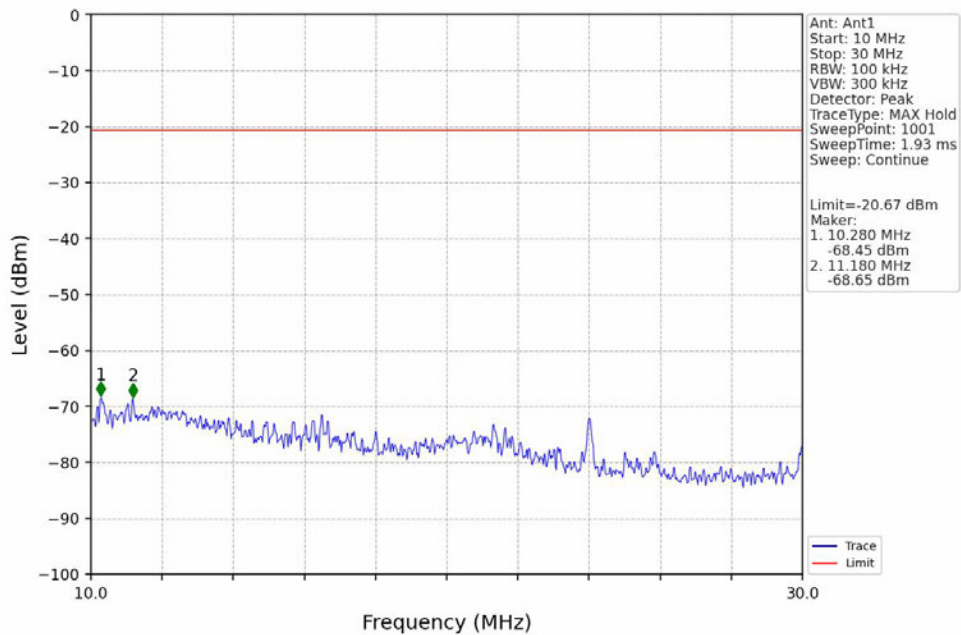




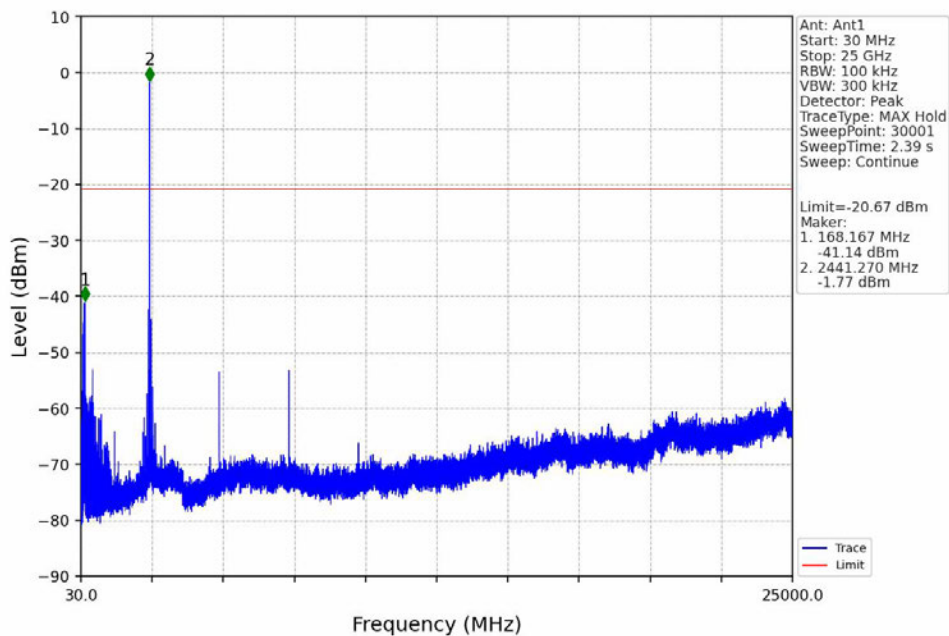
GFSK\_DH5\_MCH\_2441MHz\_Ant1\_NTNV



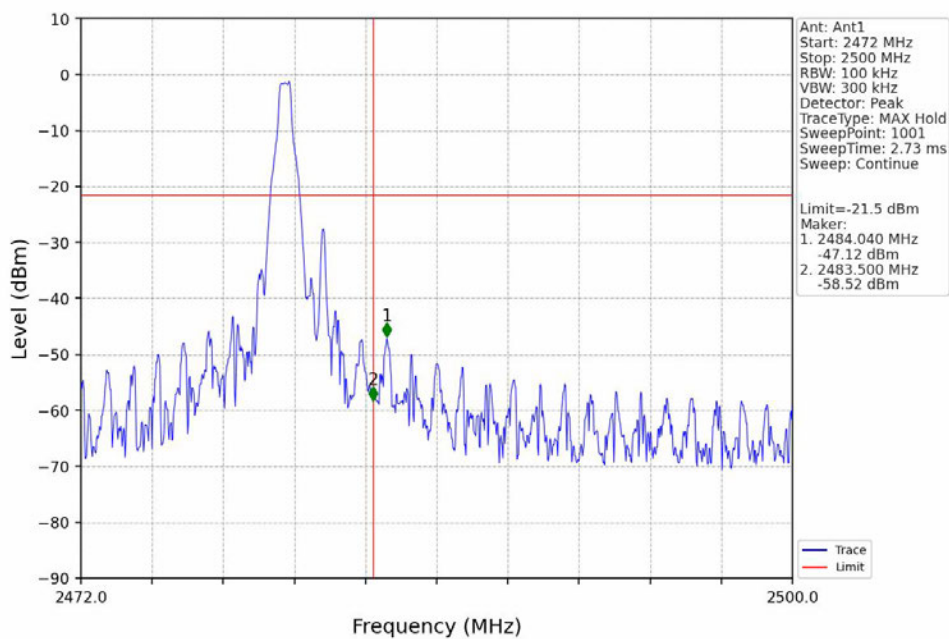
GFSK\_DH5\_MCH\_2441MHz\_Ant1\_NTNV



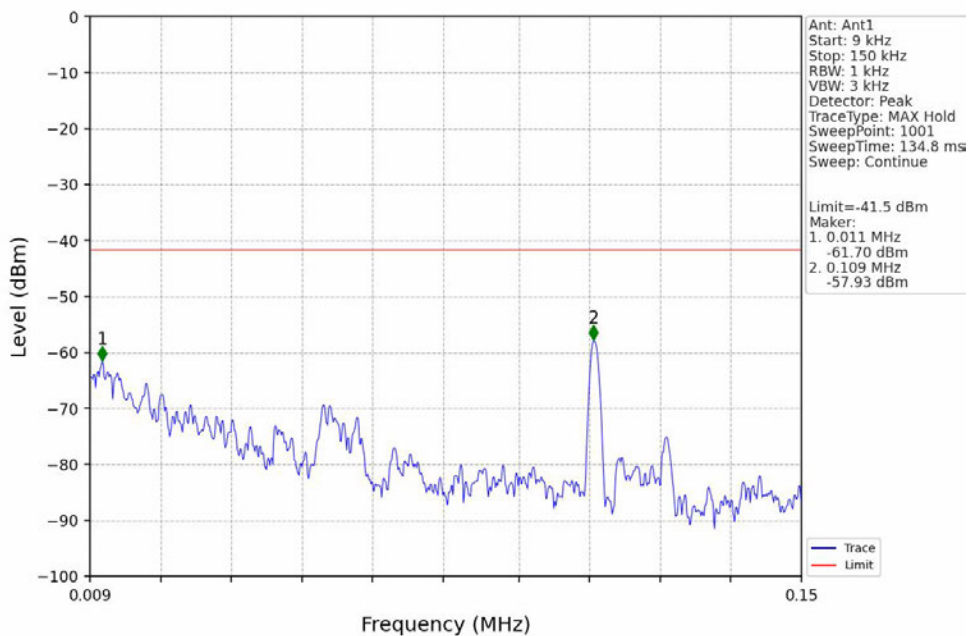
GFSK\_DH5\_MCH\_2441MHz\_Ant1\_NTNV



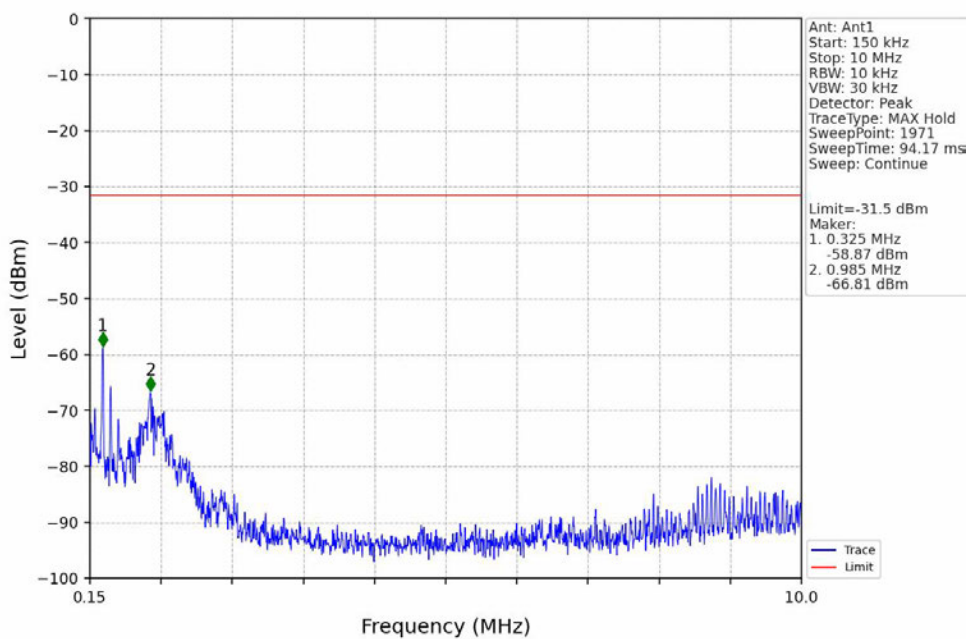
GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV

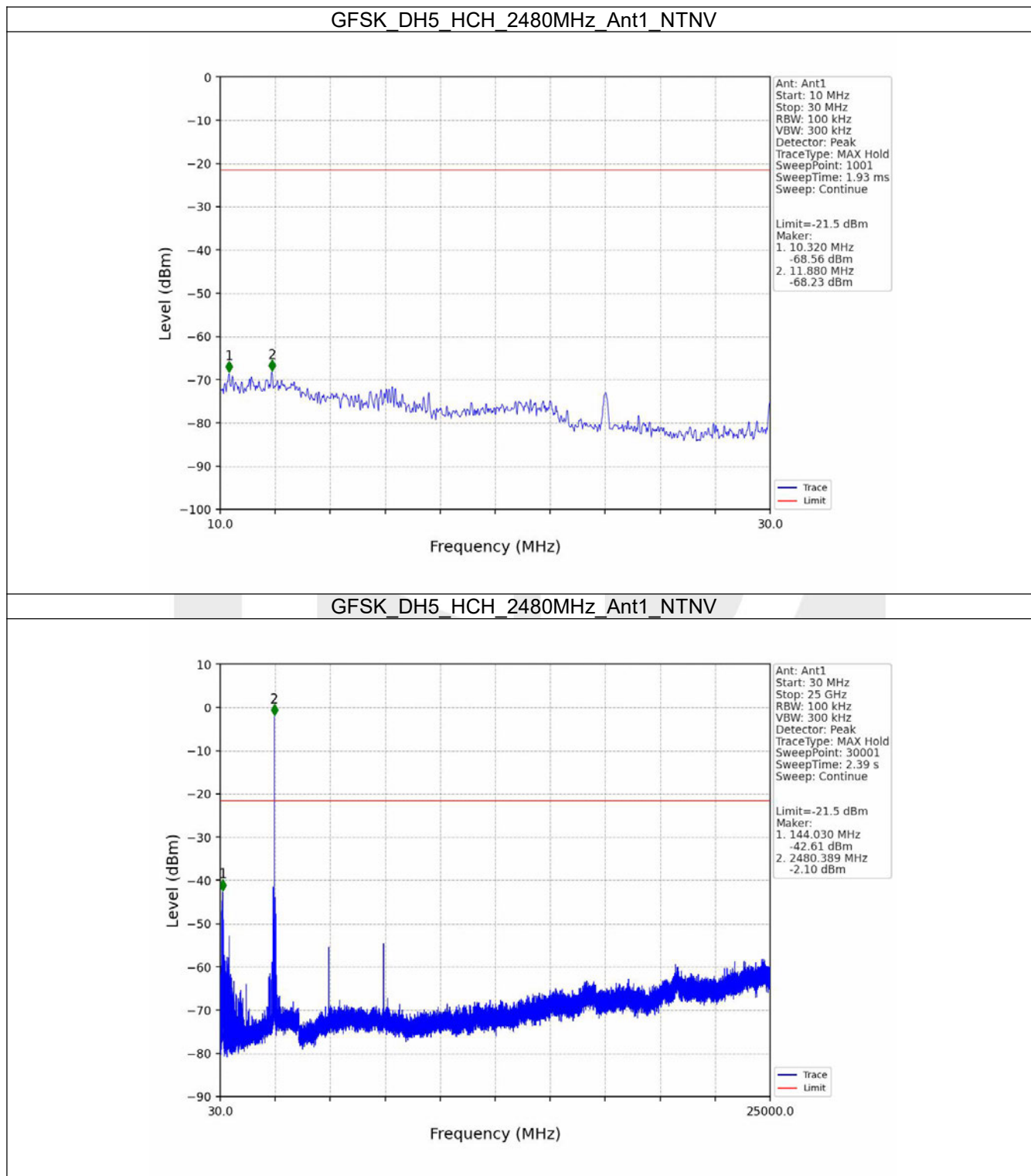


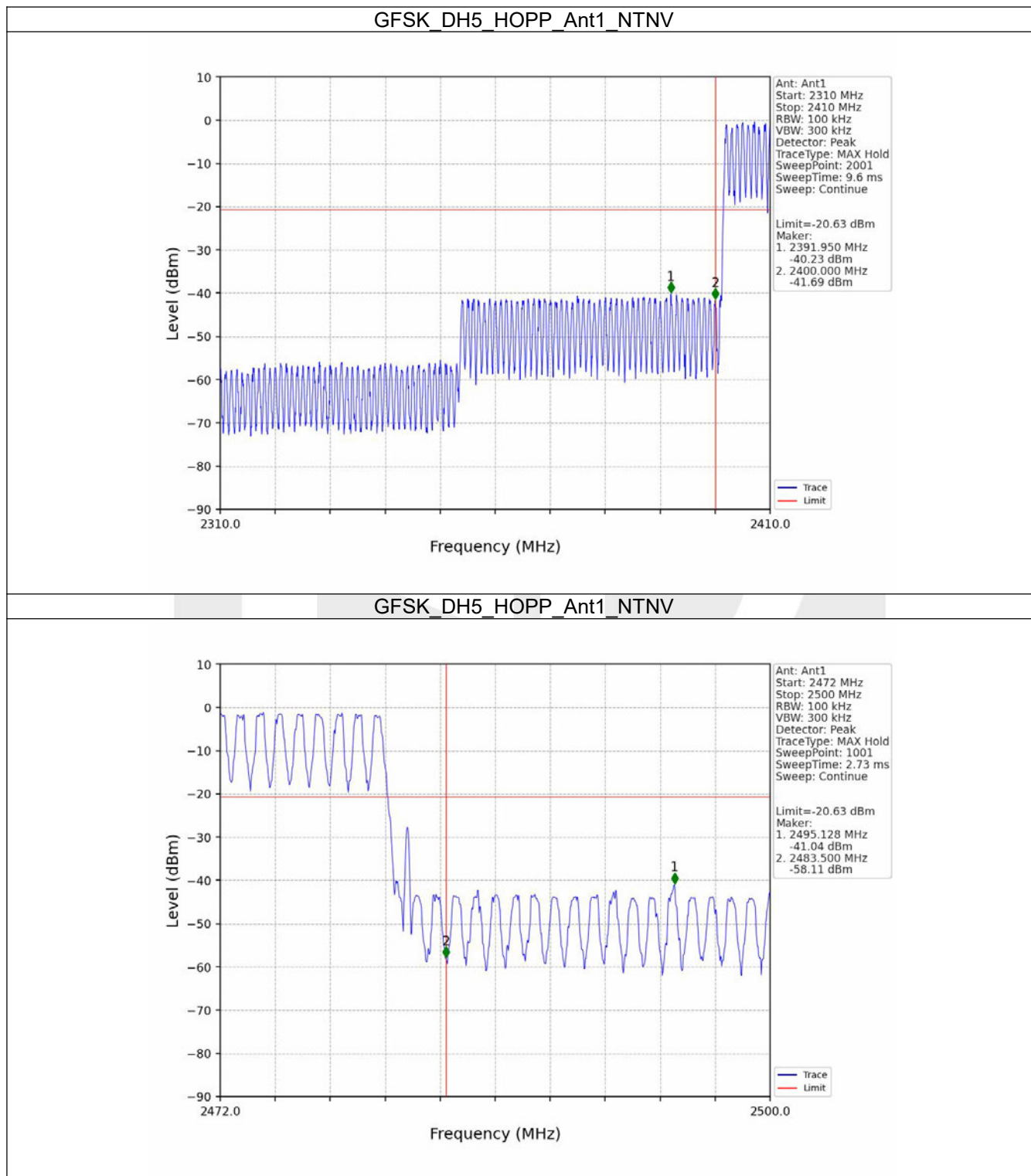
GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



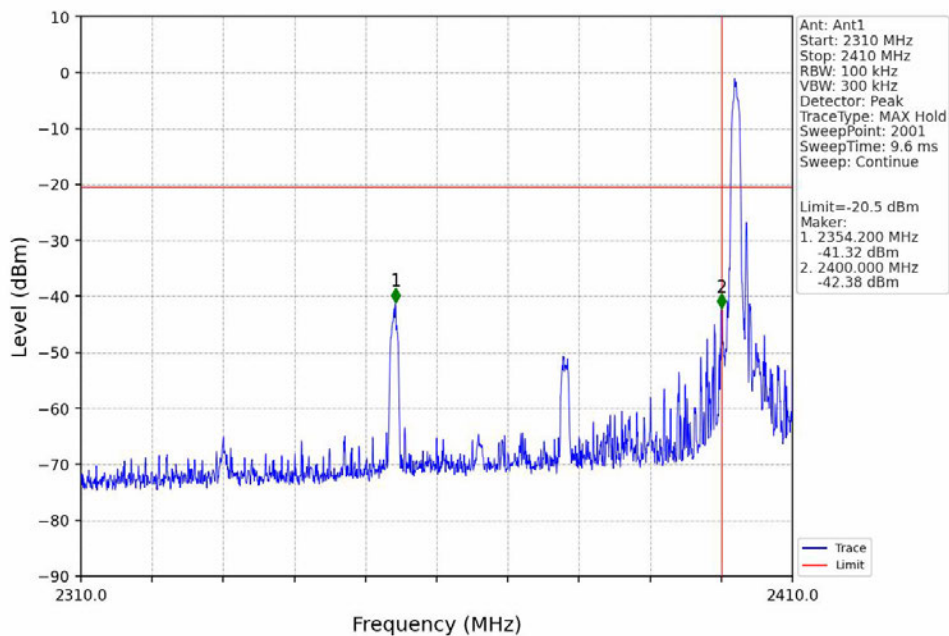
GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



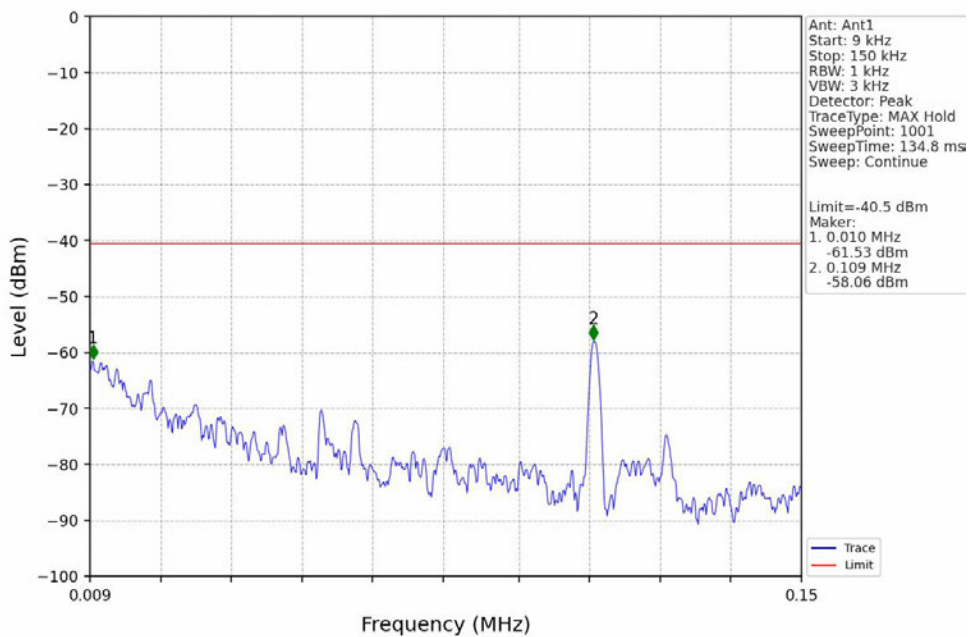




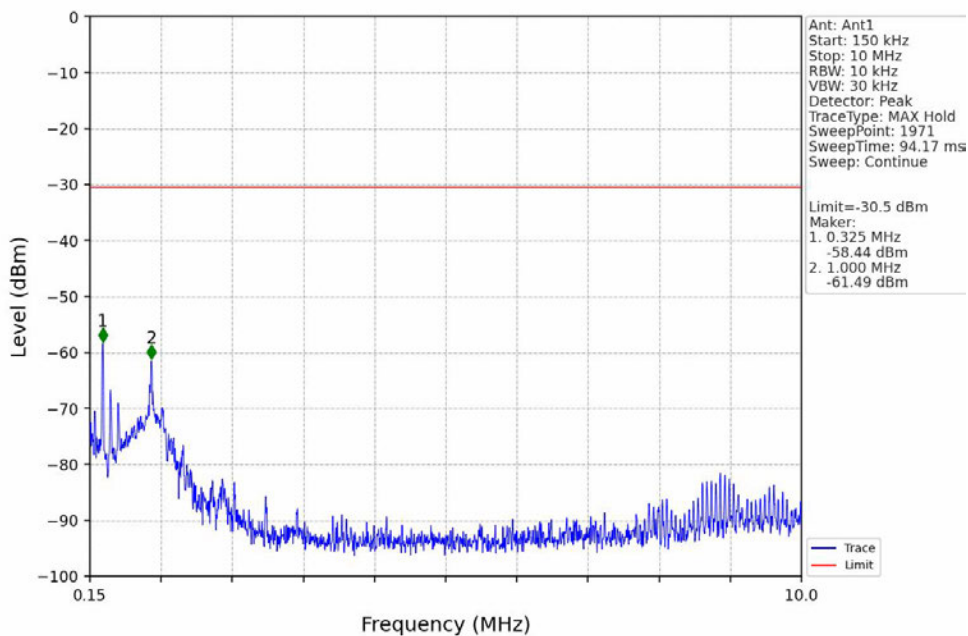
$\pi/4$ -DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



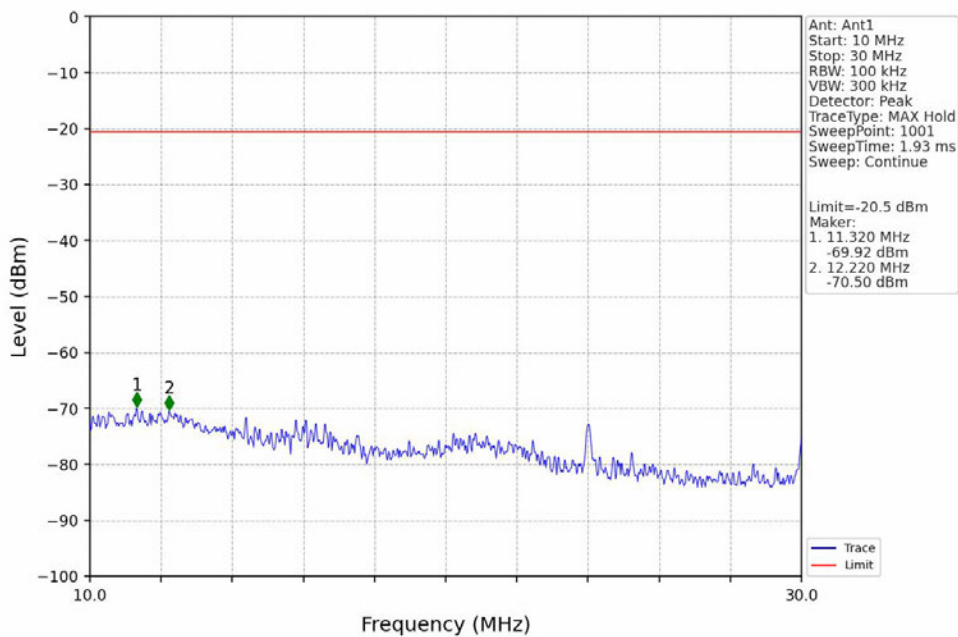
$\pi/4$ -DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



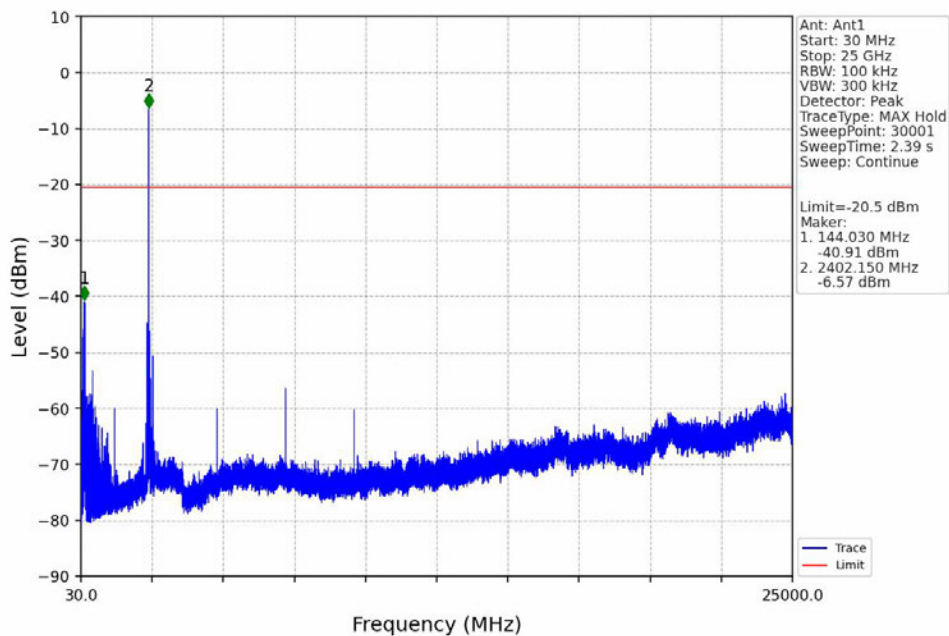
$\pi/4$ -DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



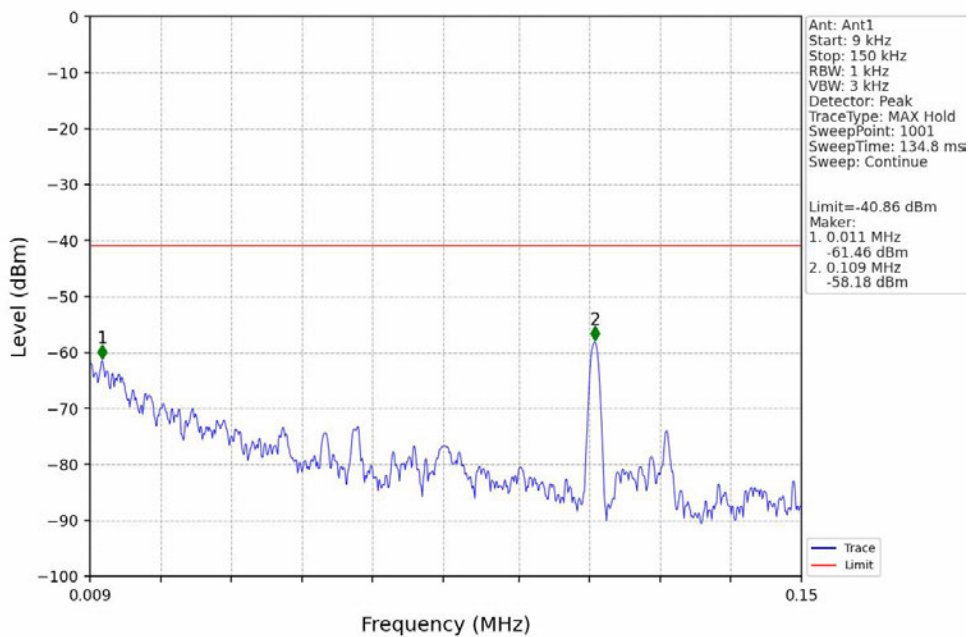
$\pi/4$ -DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



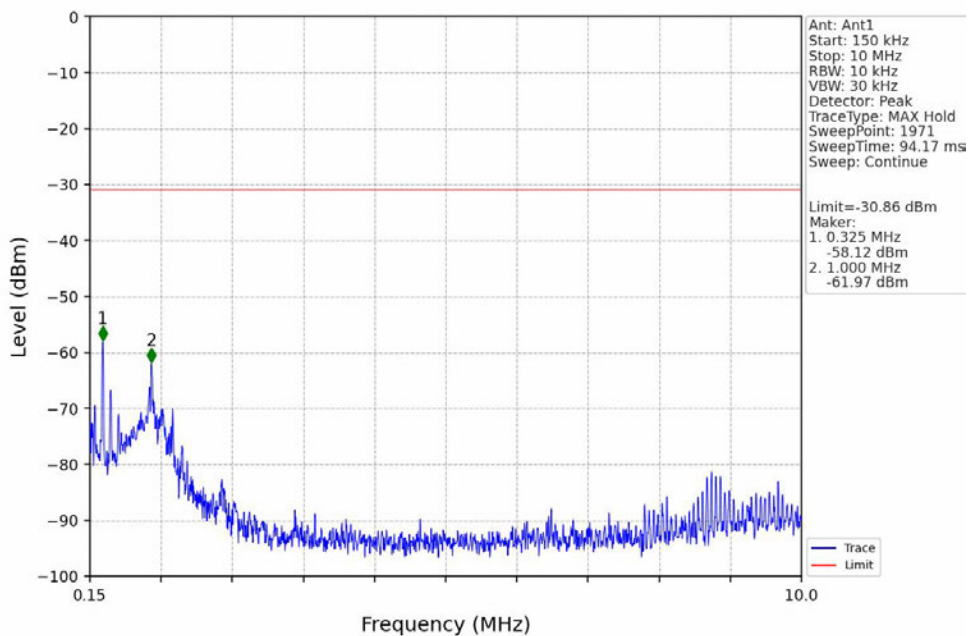
$\pi/4$ -DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



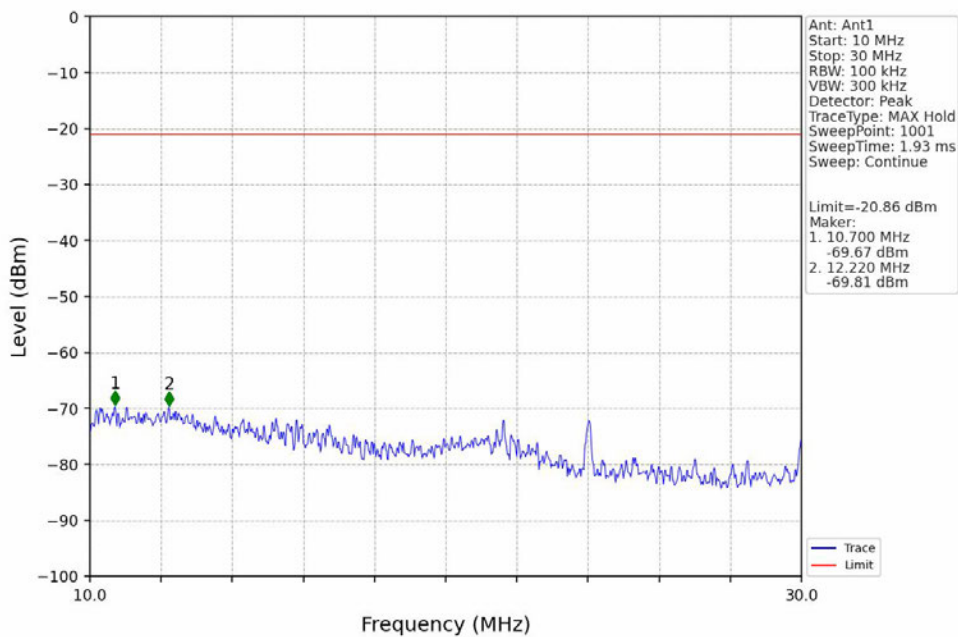
$\pi/4$ -DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



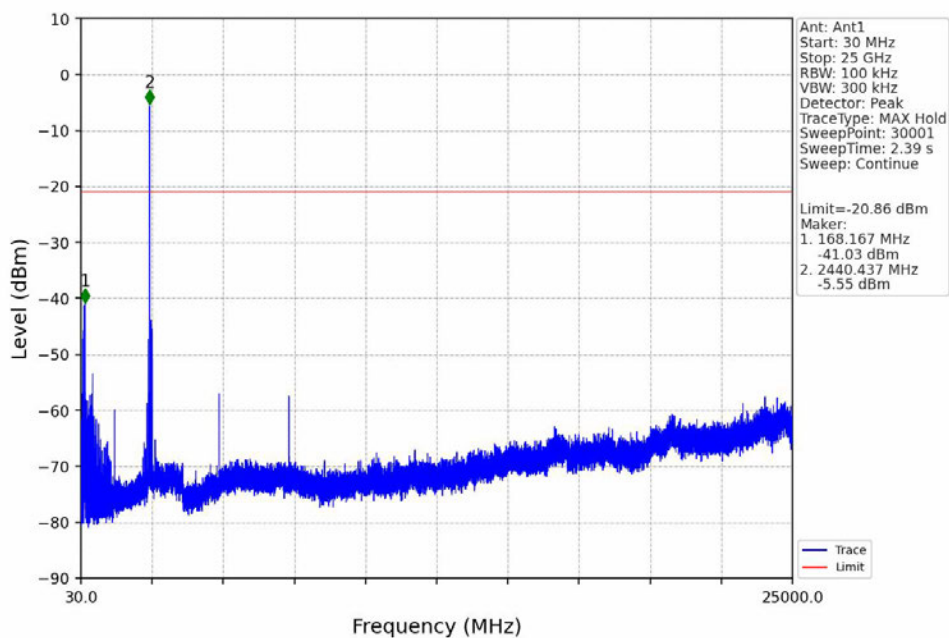
$\pi/4$ -DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



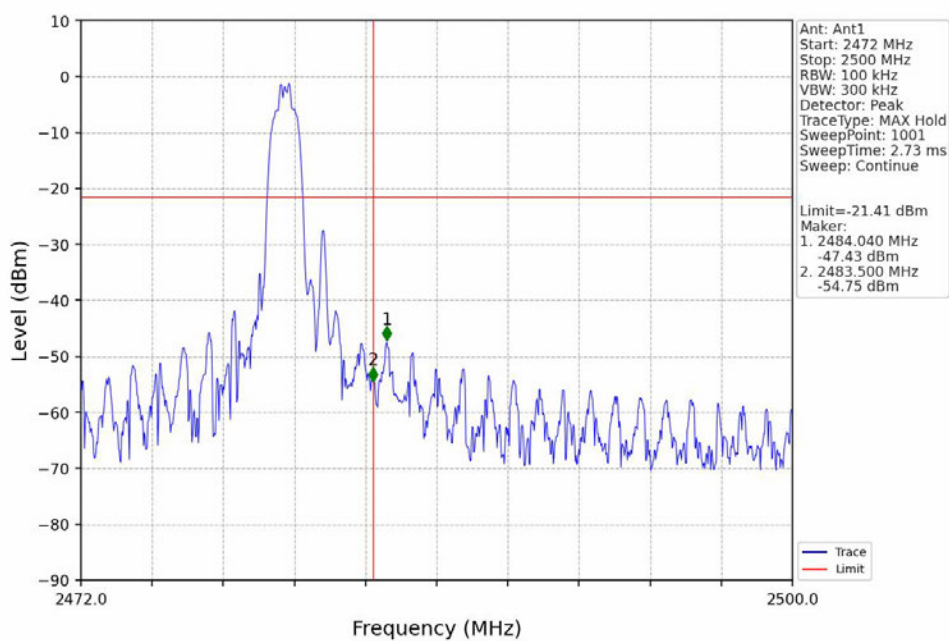
$\pi/4$ -DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



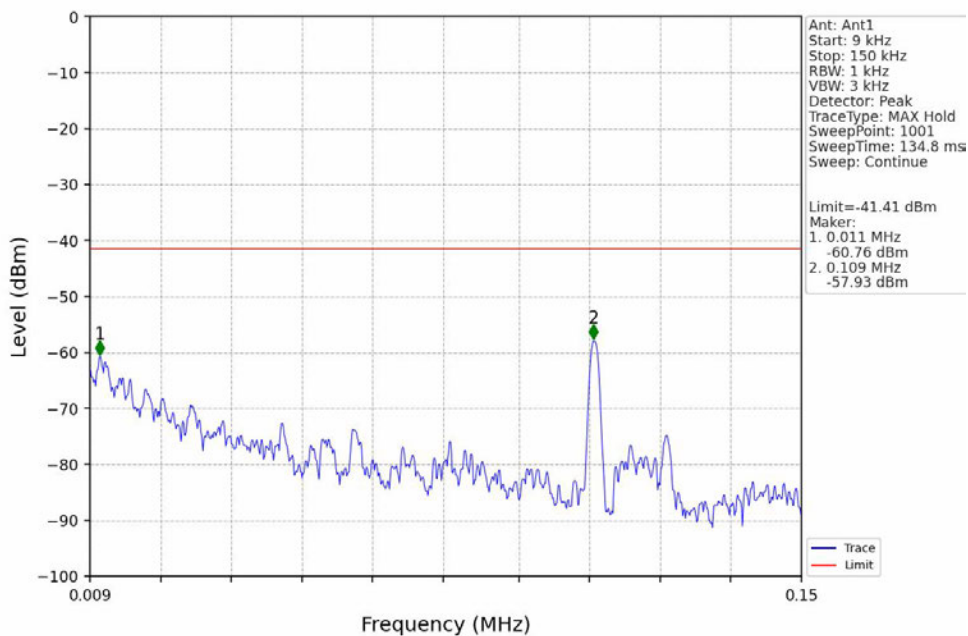
$\pi/4$ -DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



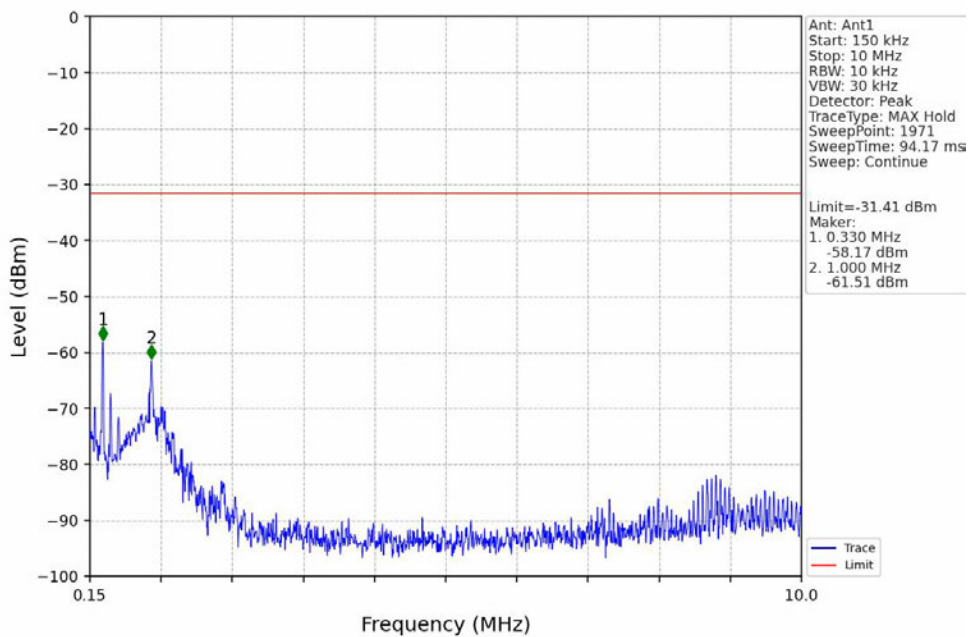
$\pi/4$ -DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



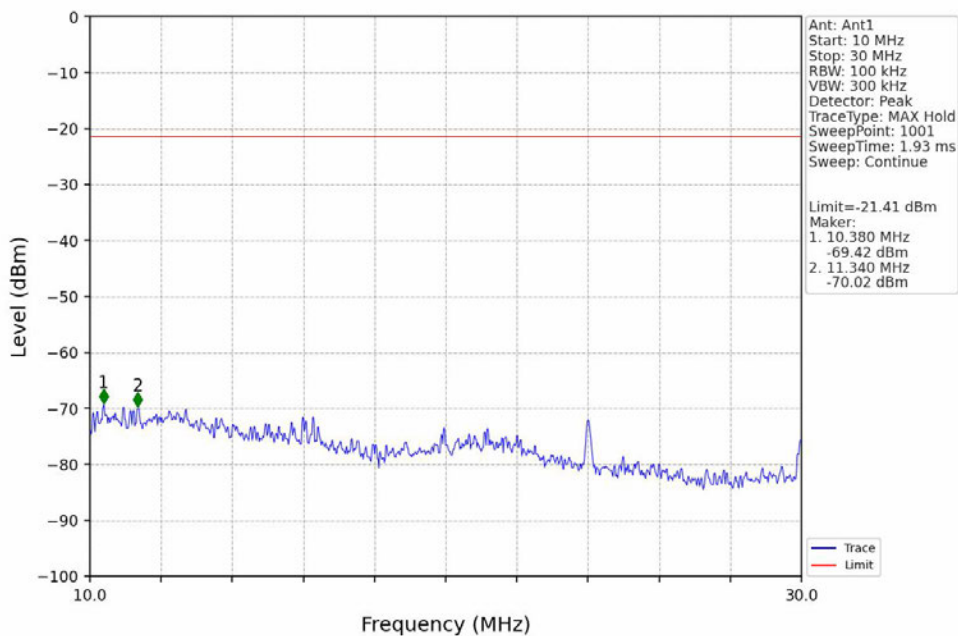
$\pi/4$ -DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



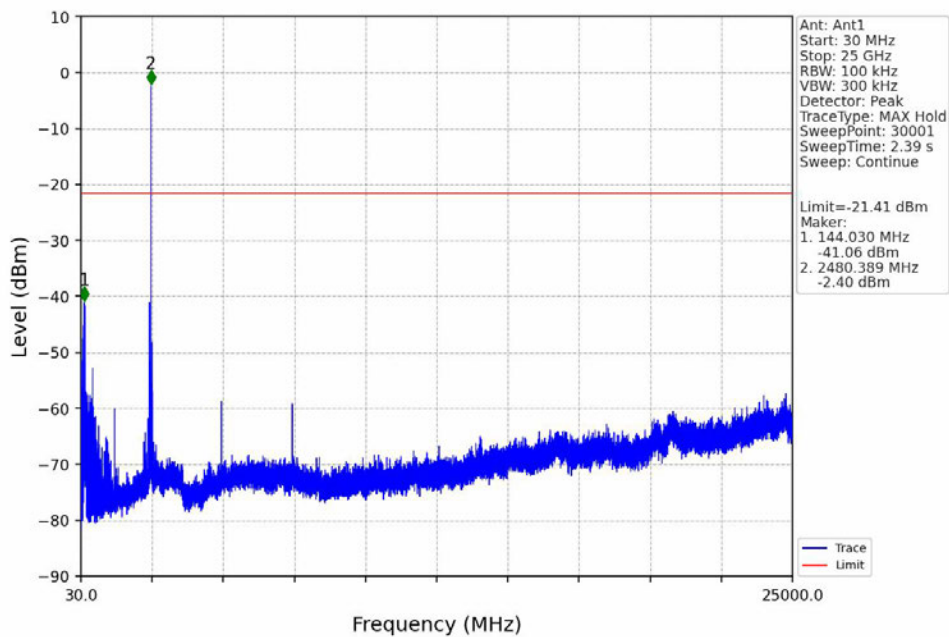
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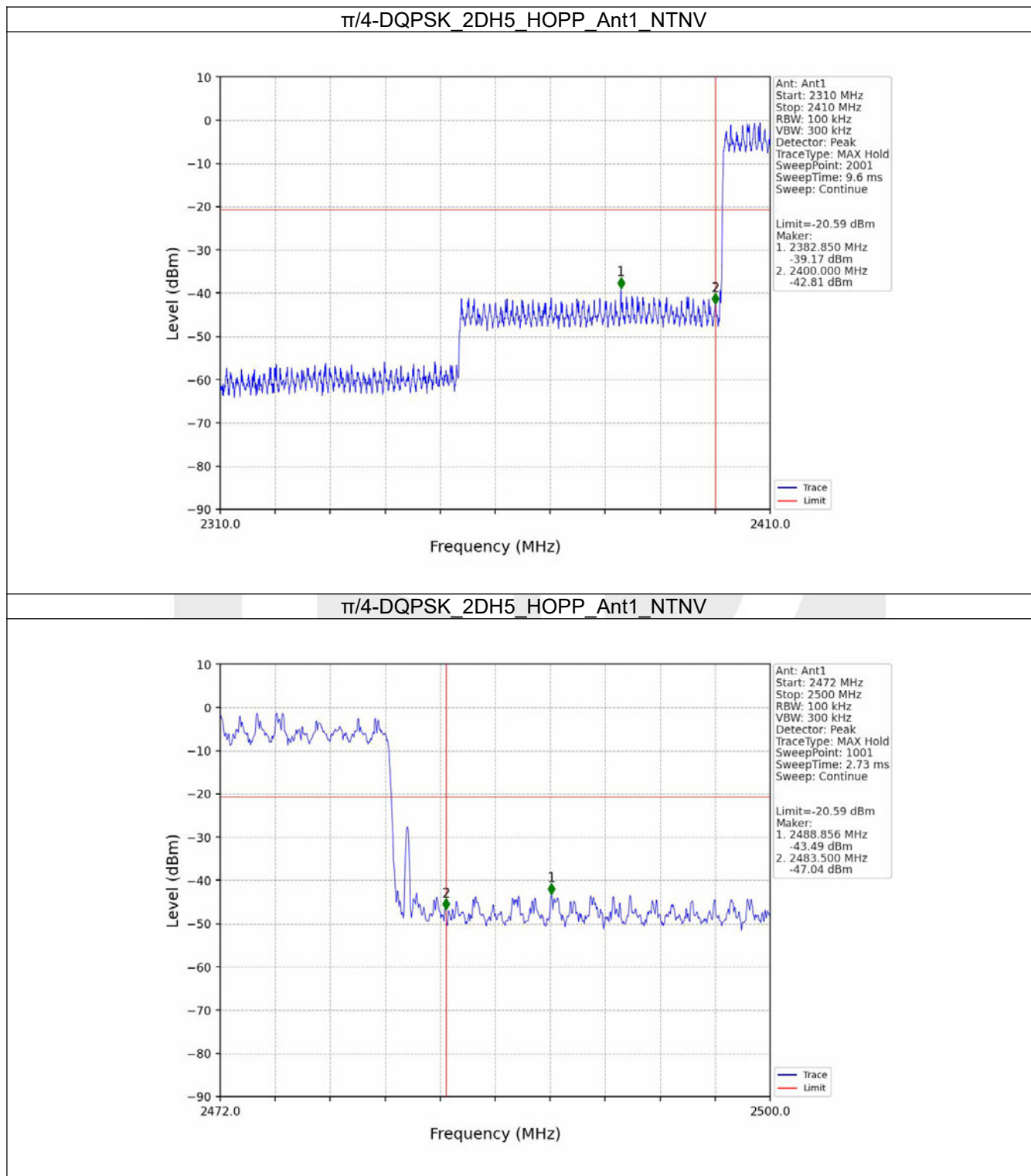


$\pi/4$ -DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



$\pi/4$ -DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV





----- End of Report -----