

## **Appendix RF Test Data for BT**

**Company:** : Shanghai WeihonghangCulture Communication Co., Ltd.

**EUT** : True Wireless Earphones

**FCC ID:** : 2BK8J-FREEBUDS7

**Model Number** : FreeBuds 7

**Report No.** : HTT2025061246F01

**Reviewed By** : Heber He

## 1. Duty Cycle

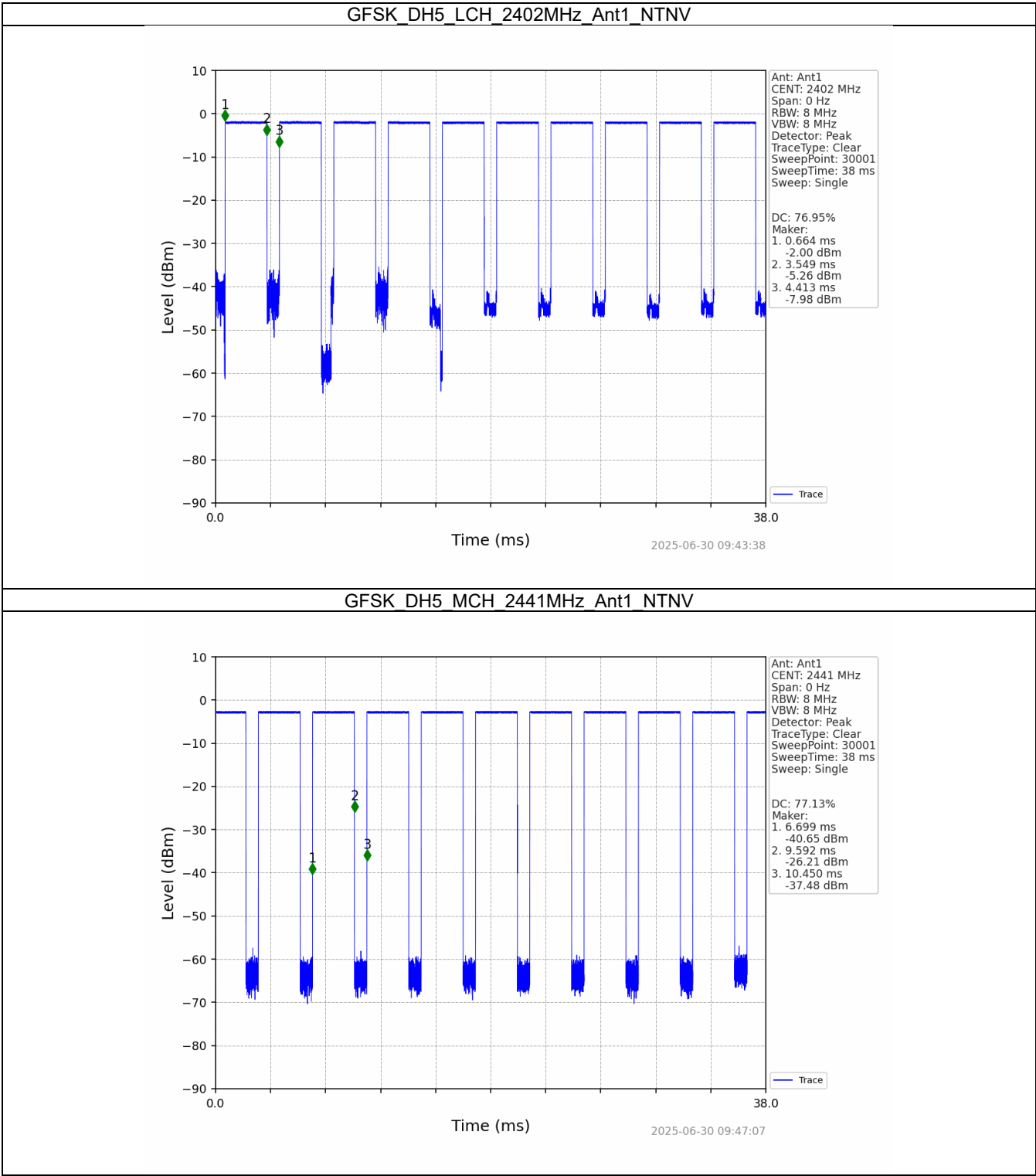
### 1.1 Test Result

#### 1.1.1 Ant1

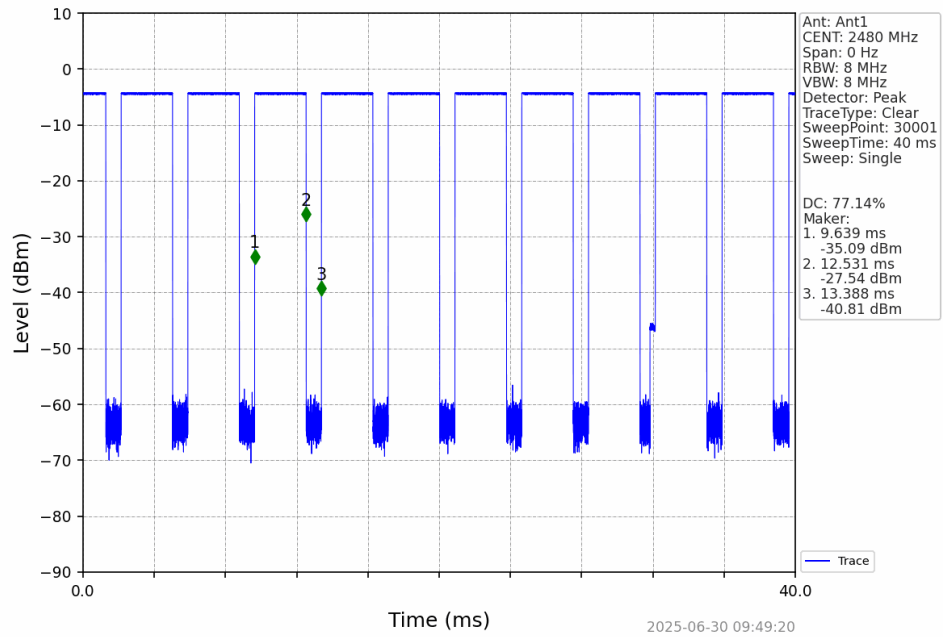
| Ant1      |         |                 |             |           |             |                |                                   |                       |
|-----------|---------|-----------------|-------------|-----------|-------------|----------------|-----------------------------------|-----------------------|
| 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         | 2.885     | 3.749       | 76.95          | 1.14                              | 0.04                  |
|           |         | 2441            | DH5         | 2.893     | 3.751       | 77.13          | 1.13                              | 0.03                  |
|           |         | 2480            | DH5         | 2.892     | 3.749       | 77.14          | 1.13                              | 6.69                  |
| Pi/4DQPSK | SISO    | 2402            | 2DH5        | 2.898     | 3.751       | 77.26          | 1.12                              | 0.03                  |
|           |         | 2441            | 2DH5        | 2.898     | 3.751       | 77.26          | 1.12                              | 0.03                  |
|           |         | 2480            | 2DH5        | 2.898     | 3.750       | 77.28          | 1.12                              | 0.04                  |

# 1.2 Test Graph

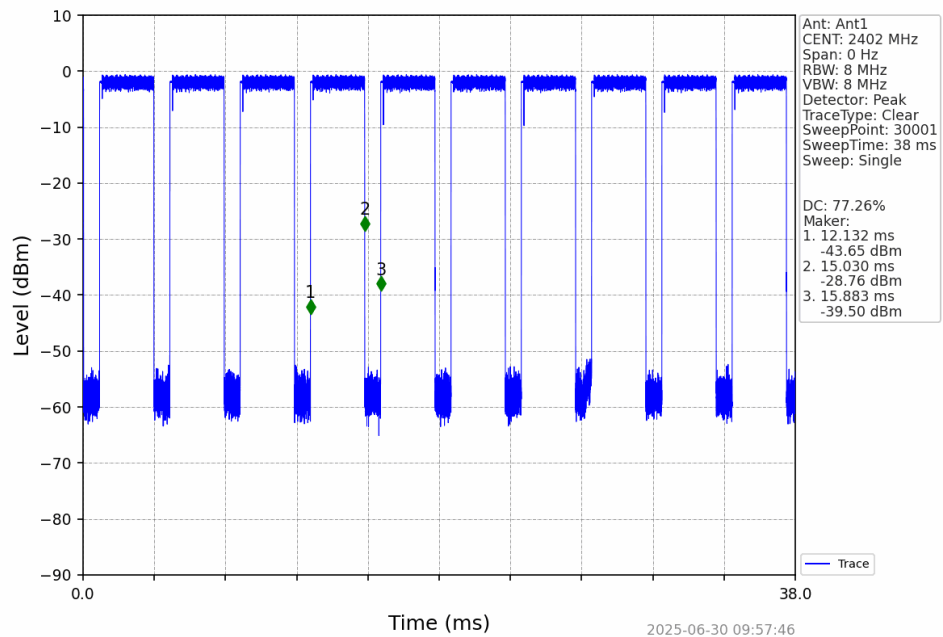
## 1.2.1 Ant1



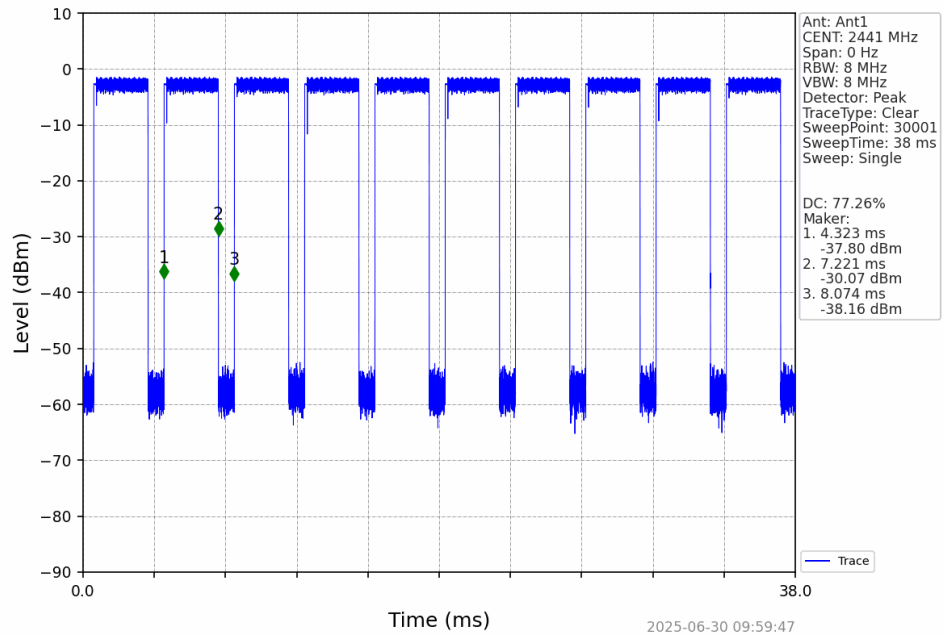
# GFSK DH5\_HCH\_2480MHz\_Ant1\_NTNV



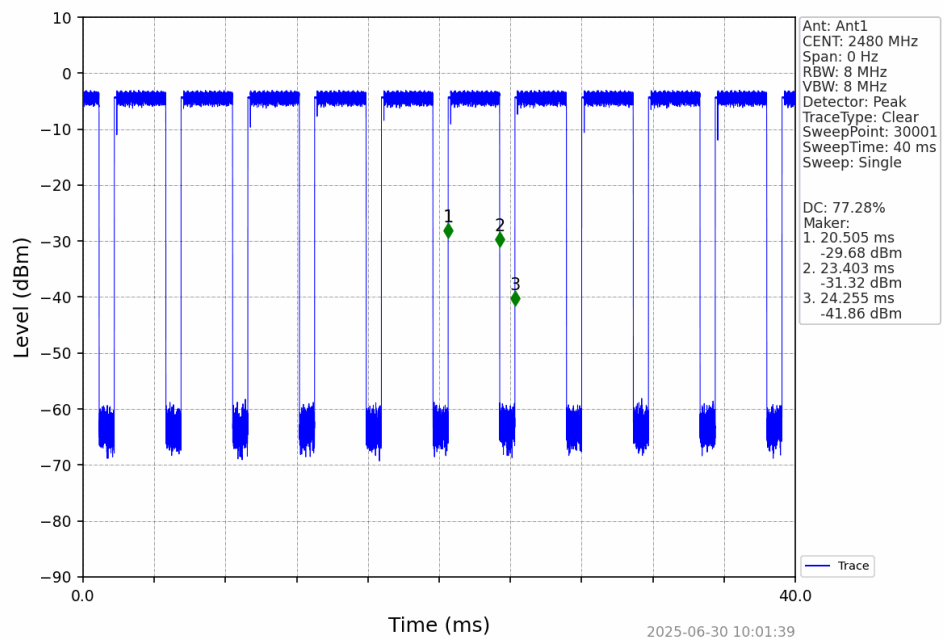
# Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



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



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



## 2. Bandwidth

### 2.1 Test Result

#### 2.1.1 OBW

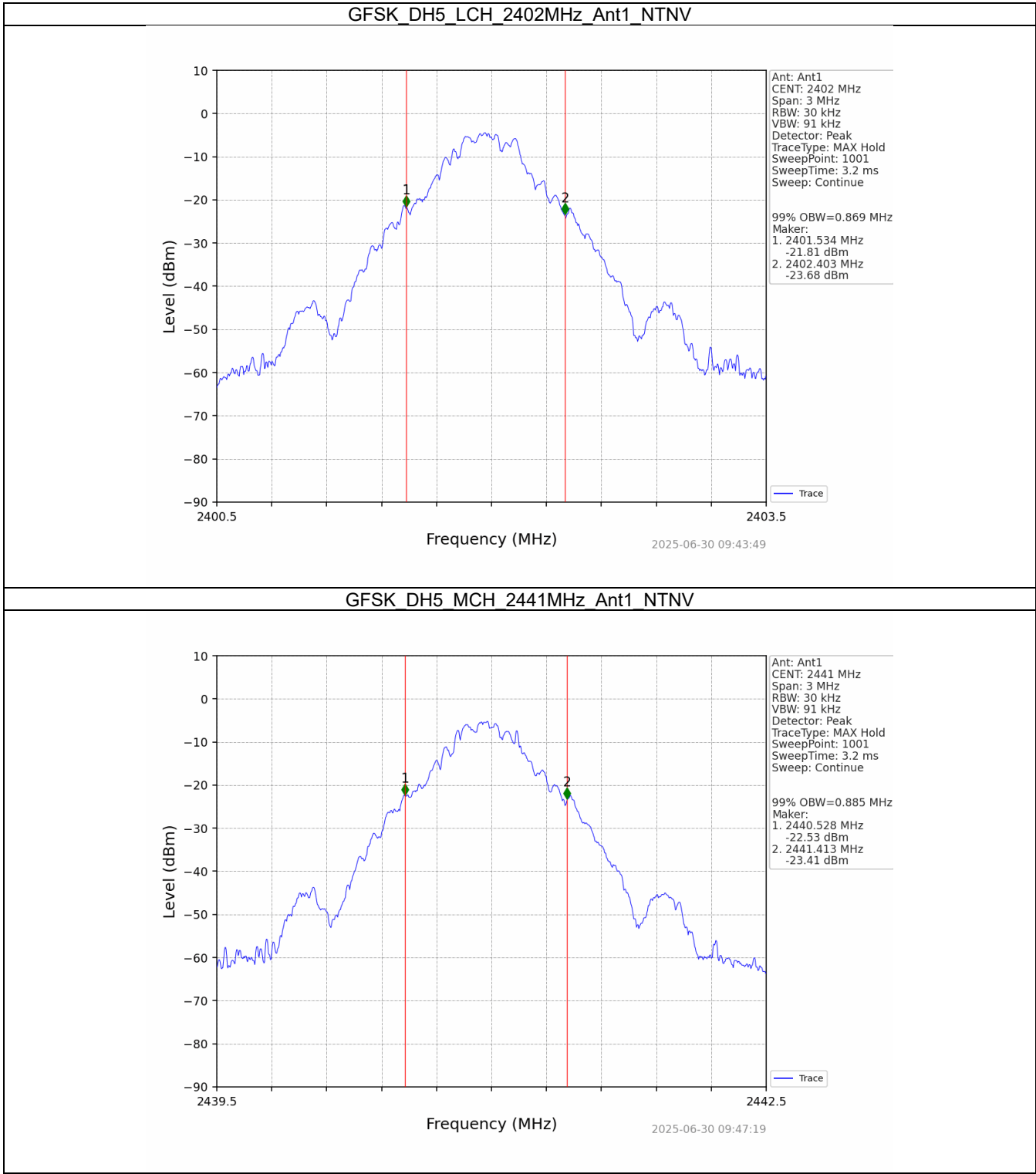
| Mode      | TX Type | Frequency (MHz) | Packet Type | ANT | 99% Occupied Bandwidth (MHz) |       | Verdict |
|-----------|---------|-----------------|-------------|-----|------------------------------|-------|---------|
|           |         |                 |             |     | Result                       | Limit |         |
| GFSK      | SISO    | 2402            | DH5         | 1   | 0.869                        | /     | Pass    |
|           |         | 2441            | DH5         | 1   | 0.885                        | /     | Pass    |
|           |         | 2480            | DH5         | 1   | 0.870                        | /     | Pass    |
| Pi/4DQPSK | SISO    | 2402            | 2DH5        | 1   | 1.168                        | /     | Pass    |
|           |         | 2441            | 2DH5        | 1   | 1.182                        | /     | Pass    |
|           |         | 2480            | 2DH5        | 1   | 1.172                        | /     | Pass    |

#### 2.1.2 20dB BW

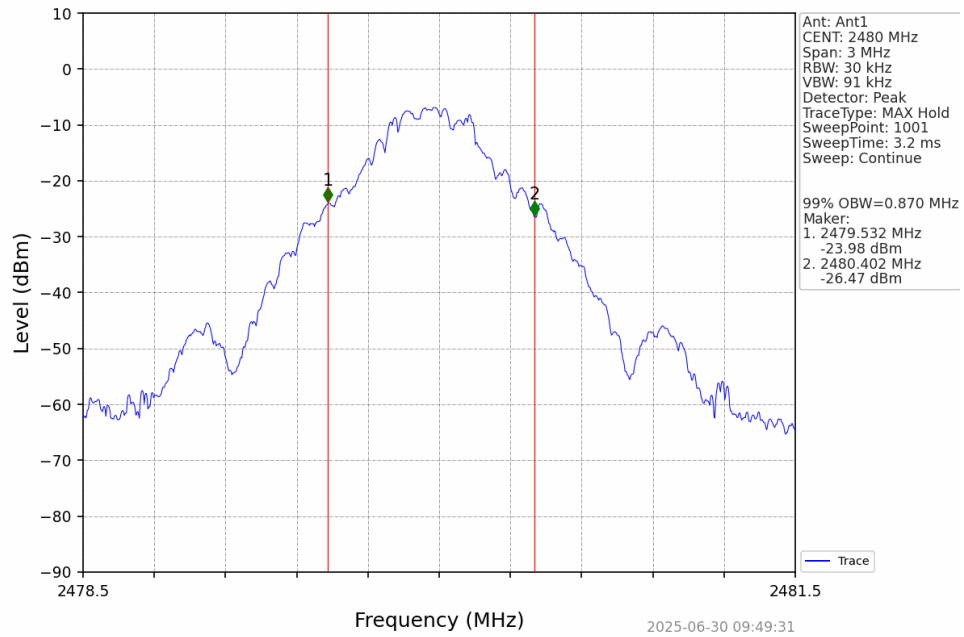
| Mode      | TX Type | Frequency (MHz) | Packet Type | ANT | 20dB Bandwidth (MHz) |       | Verdict |
|-----------|---------|-----------------|-------------|-----|----------------------|-------|---------|
|           |         |                 |             |     | Result               | Limit |         |
| GFSK      | SISO    | 2402            | DH5         | 1   | 0.948                | /     | Pass    |
|           |         | 2441            | DH5         | 1   | 0.965                | /     | Pass    |
|           |         | 2480            | DH5         | 1   | 0.957                | /     | Pass    |
| Pi/4DQPSK | SISO    | 2402            | 2DH5        | 1   | 1.318                | /     | Pass    |
|           |         | 2441            | 2DH5        | 1   | 1.291                | /     | Pass    |
|           |         | 2480            | 2DH5        | 1   | 1.288                | /     | Pass    |

2.2 Test Graph

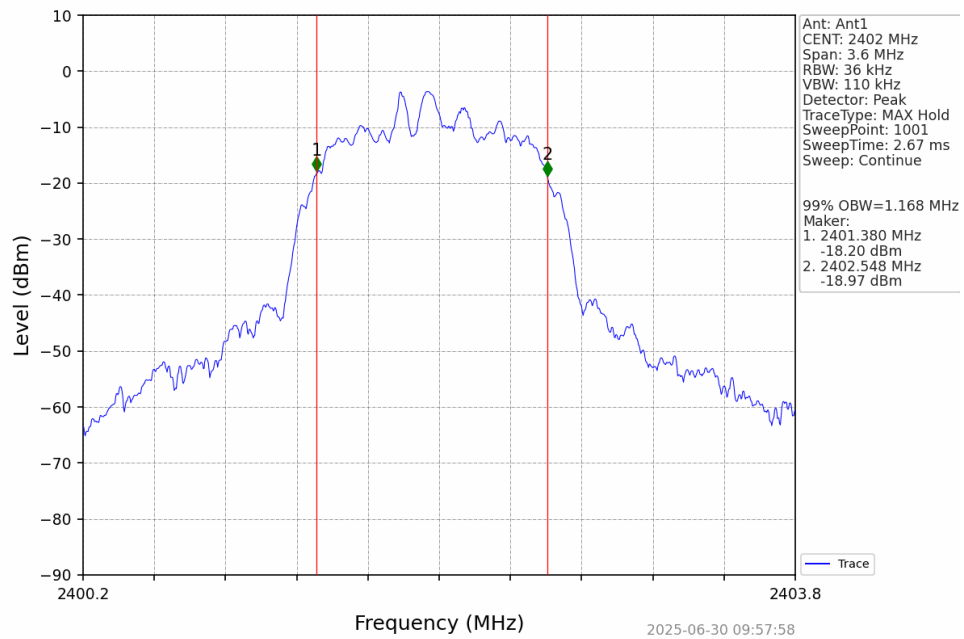
2.2.1 OBW



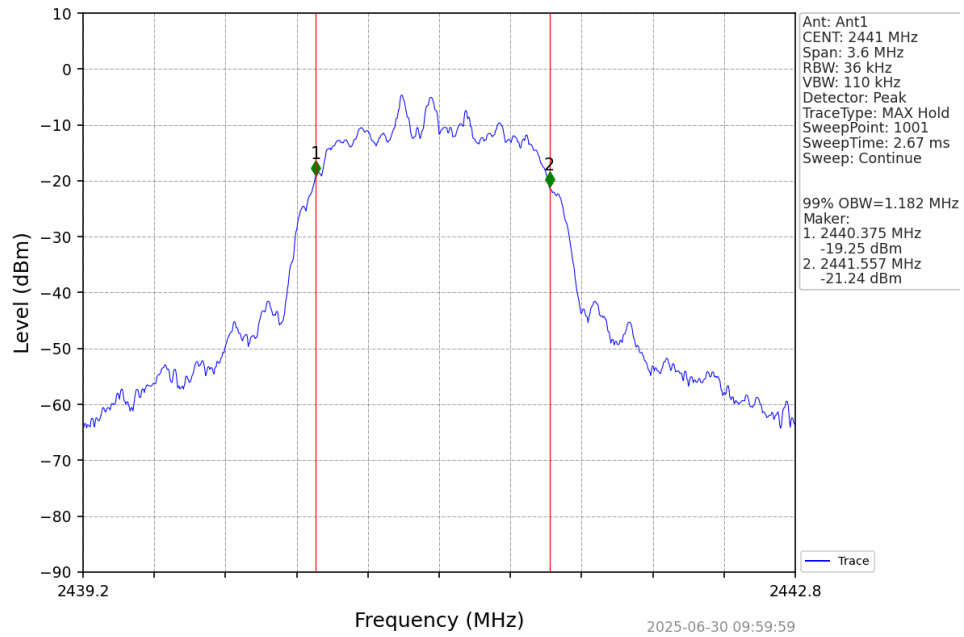
# GFSK DH5\_HCH\_2480MHz\_Ant1\_NTNV



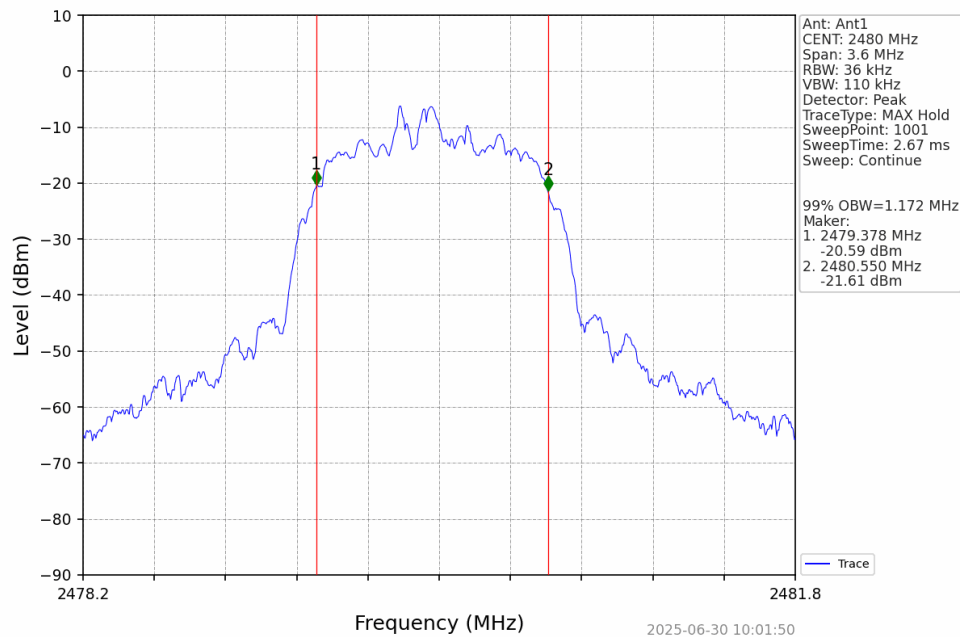
# Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



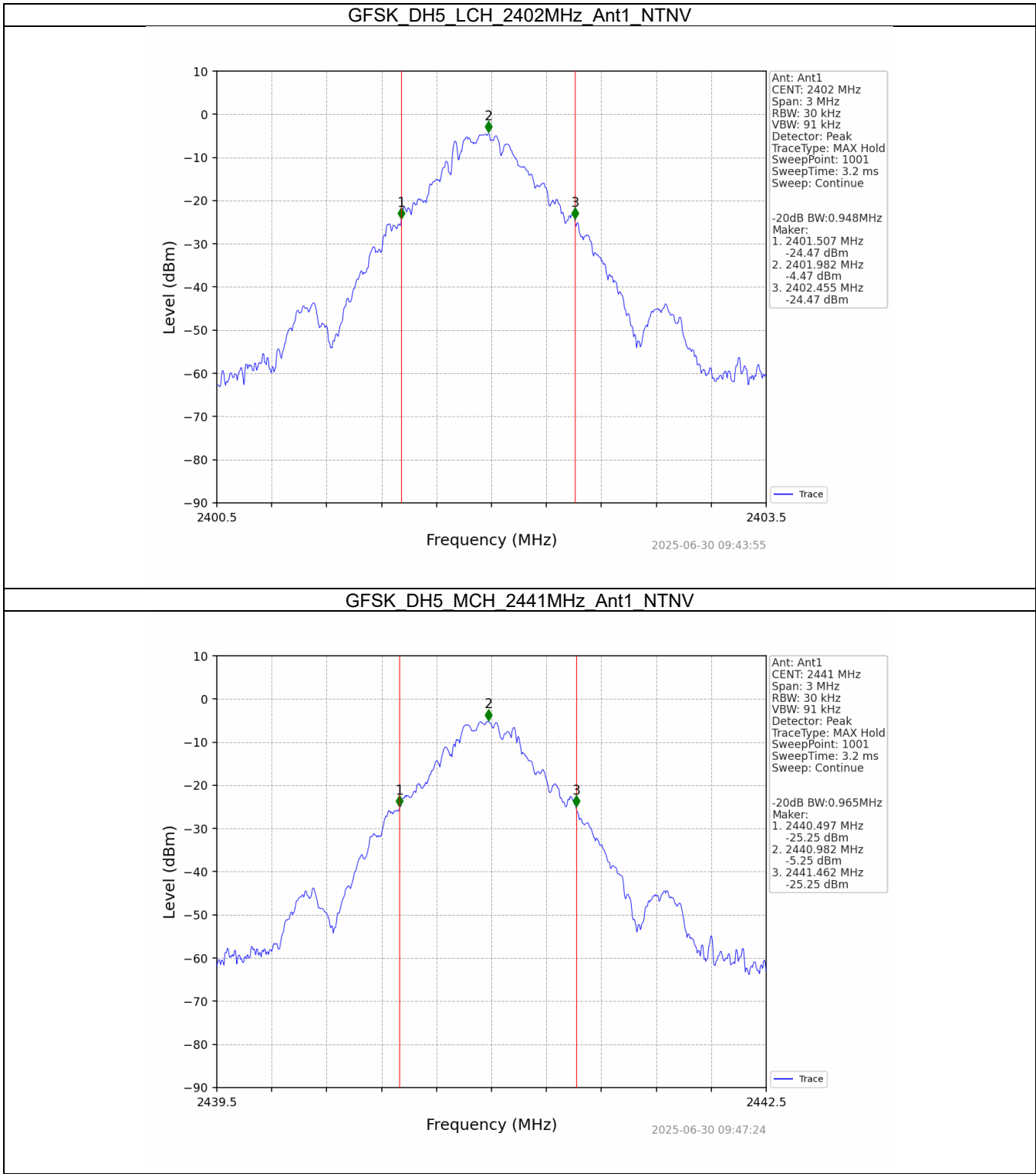
Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



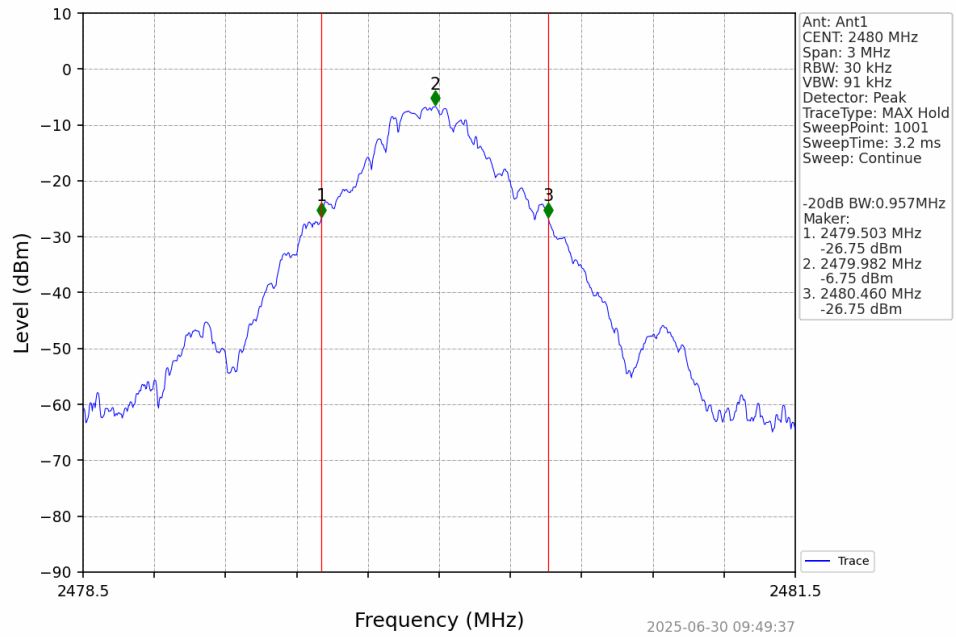
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



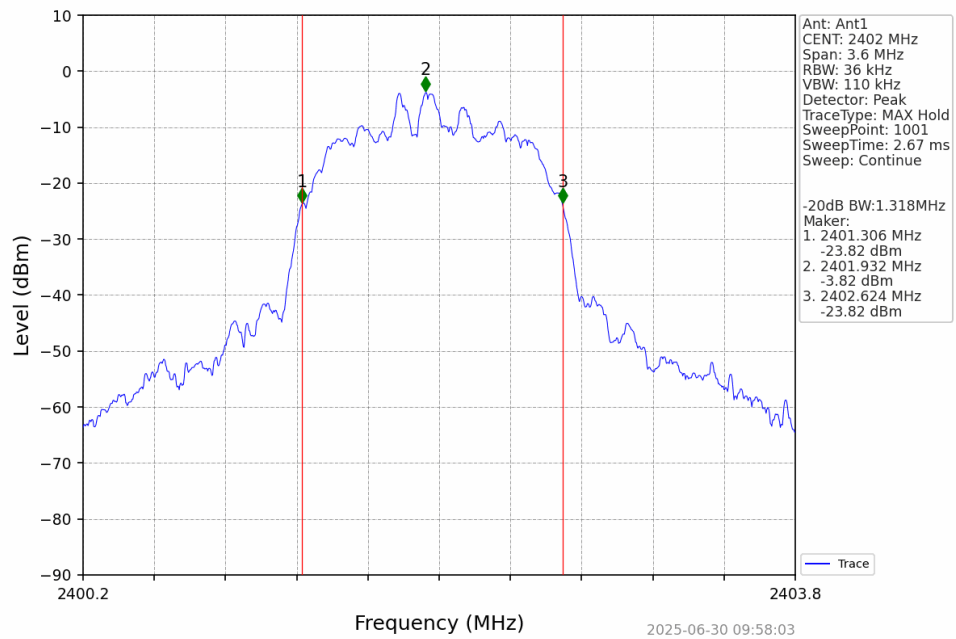
2.2.2 20dB BW



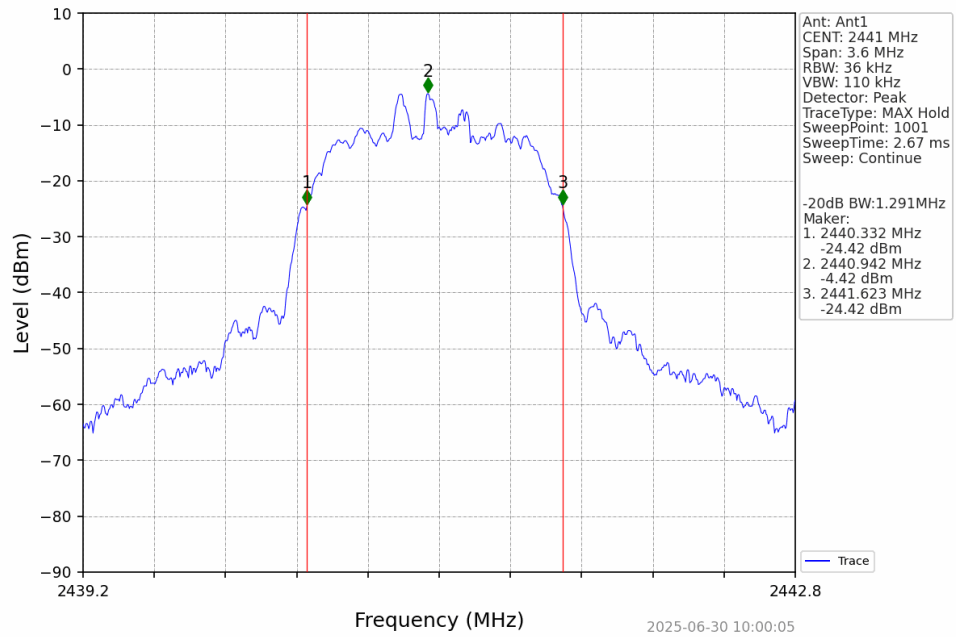
# GFSK DH5\_HCH\_2480MHz\_Ant1\_NTNV



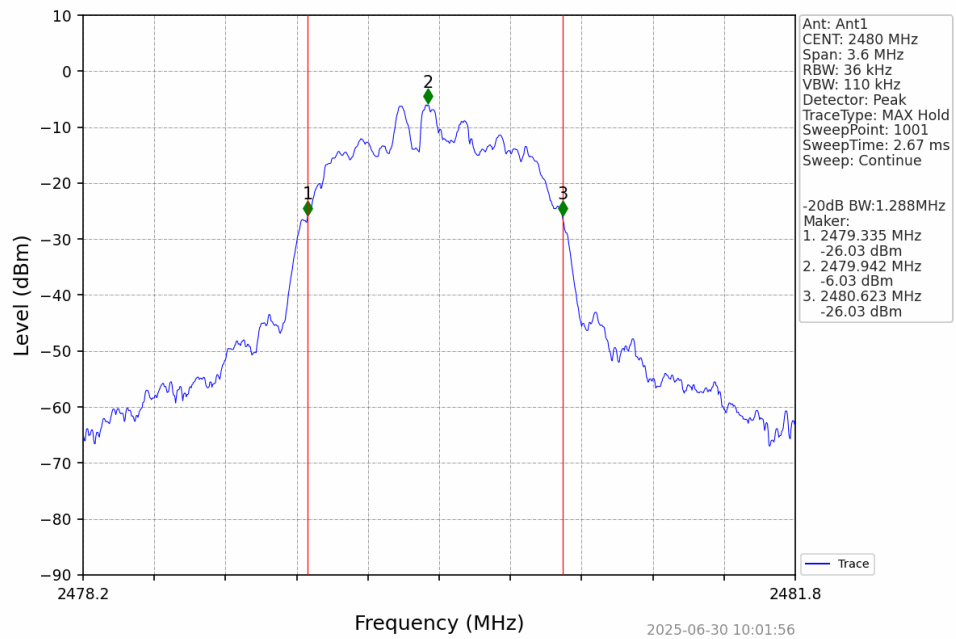
# Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



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



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



### 3. Maximum Conducted Output Power

#### 3.1 Test Result

##### 3.1.1 Power

Left side:

| Mode      | TX Type | Frequency (MHz) | Packet Type | Maximum Peak Conducted Output Power (dBm) |         | Verdict |
|-----------|---------|-----------------|-------------|-------------------------------------------|---------|---------|
|           |         |                 |             | ANT1                                      | Limit   |         |
| GFSK      | SISO    | 2402            | DH5         | -1.98                                     | <=30    | Pass    |
|           |         | 2441            | DH5         | -2.70                                     | <=30    | Pass    |
|           |         | 2480            | DH5         | -4.29                                     | <=30    | Pass    |
| Pi/4DQPSK | SISO    | 2402            | 2DH5        | -0.93                                     | <=20.97 | Pass    |
|           |         | 2441            | 2DH5        | -1.64                                     | <=20.97 | Pass    |
|           |         | 2480            | 2DH5        | -3.31                                     | <=20.97 | Pass    |

Right side:

| Mode      | TX Type | Frequency (MHz) | Packet Type | Maximum Peak Conducted Output Power (dBm) |         | Verdict |
|-----------|---------|-----------------|-------------|-------------------------------------------|---------|---------|
|           |         |                 |             | ANT1                                      | Limit   |         |
| GFSK      | SISO    | 2402            | DH5         | -2.09                                     | <=30    | Pass    |
|           |         | 2441            | DH5         | -3.48                                     | <=30    | Pass    |
|           |         | 2480            | DH5         | -5.28                                     | <=30    | Pass    |
| Pi/4DQPSK | SISO    | 2402            | 2DH5        | -1.11                                     | <=20.97 | Pass    |
|           |         | 2441            | 2DH5        | -2.09                                     | <=20.97 | Pass    |
|           |         | 2480            | 2DH5        | -4.16                                     | <=20.97 | Pass    |

## 4. Carrier Frequency Separation

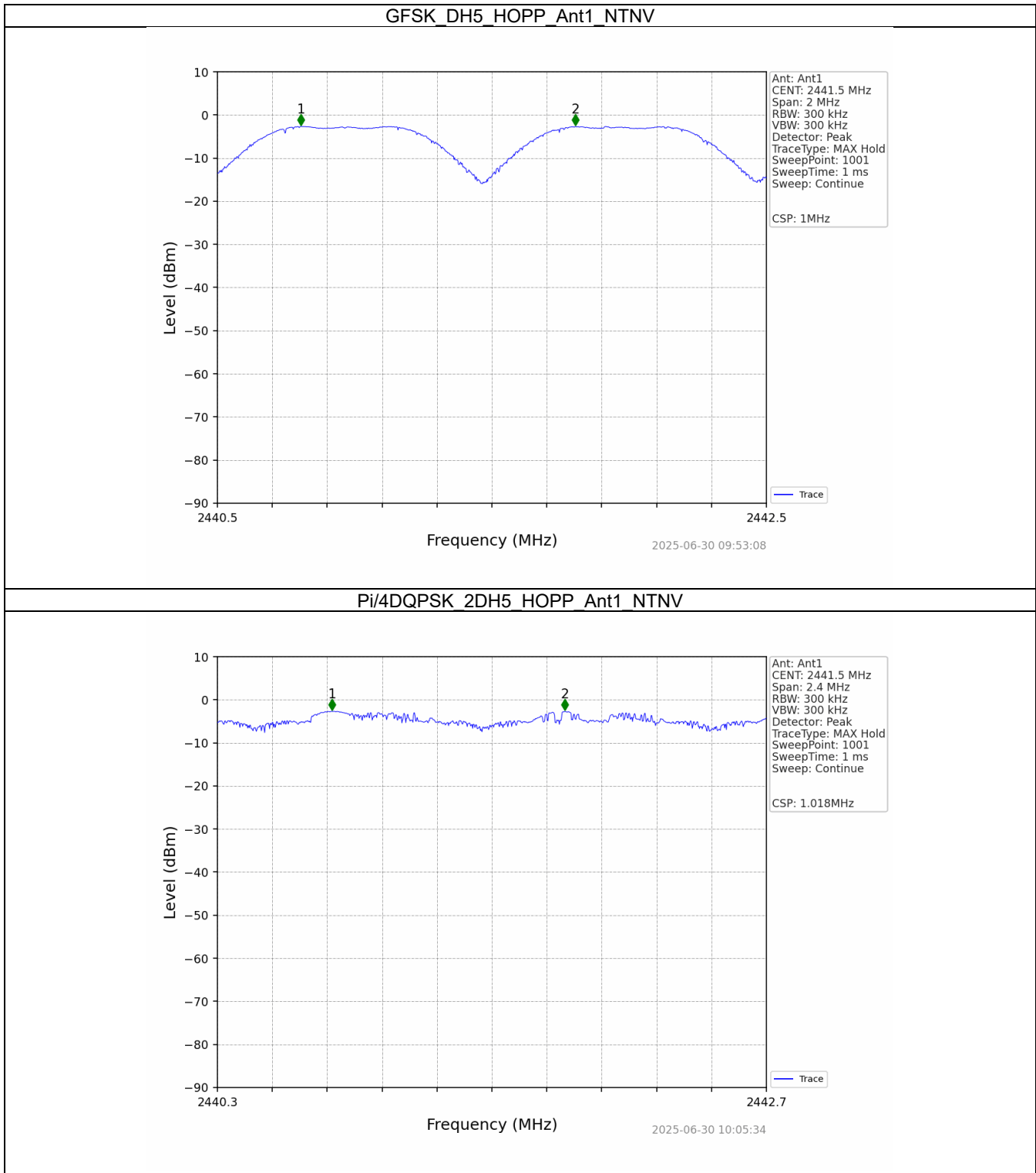
### 4.1 Test Result

#### 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         | 1.000                    | 0.965                | $\geq 0.965$ | Pass    |
| Pi/4DQPSK | SISO    | HOPP            | 2DH5        | 1.018                    | 1.318                | $\geq 0.879$ | Pass    |

# 4.2 Test Graph

## 4.2.1 Ant1



## 5. Number of Hopping Frequencies

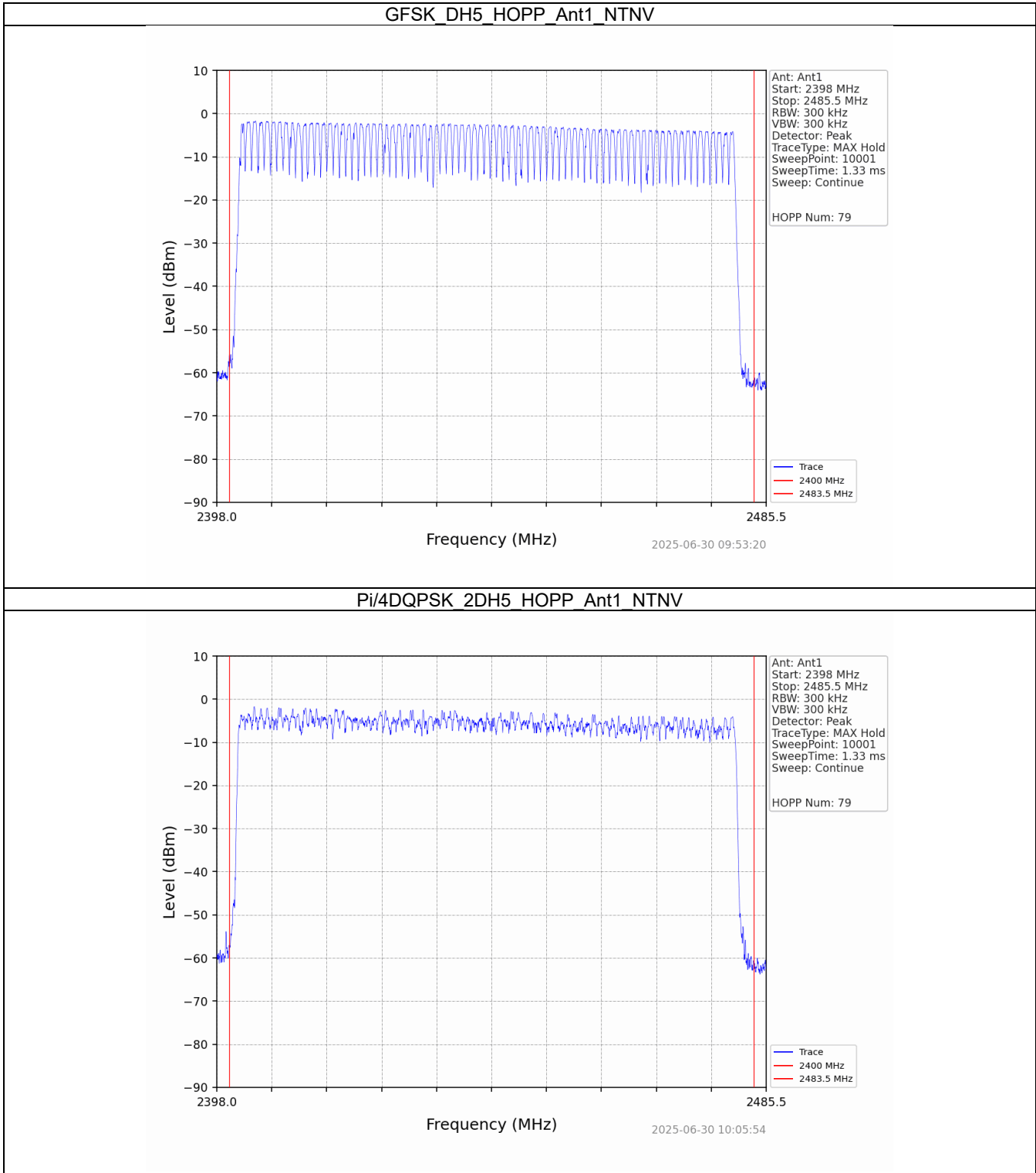
### 5.1 Test Result

#### 5.1.1 HoppNum

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

5.2 Test Graph

5.2.1 HoppNum



## 6. Time of Occupancy (Dwell Time)

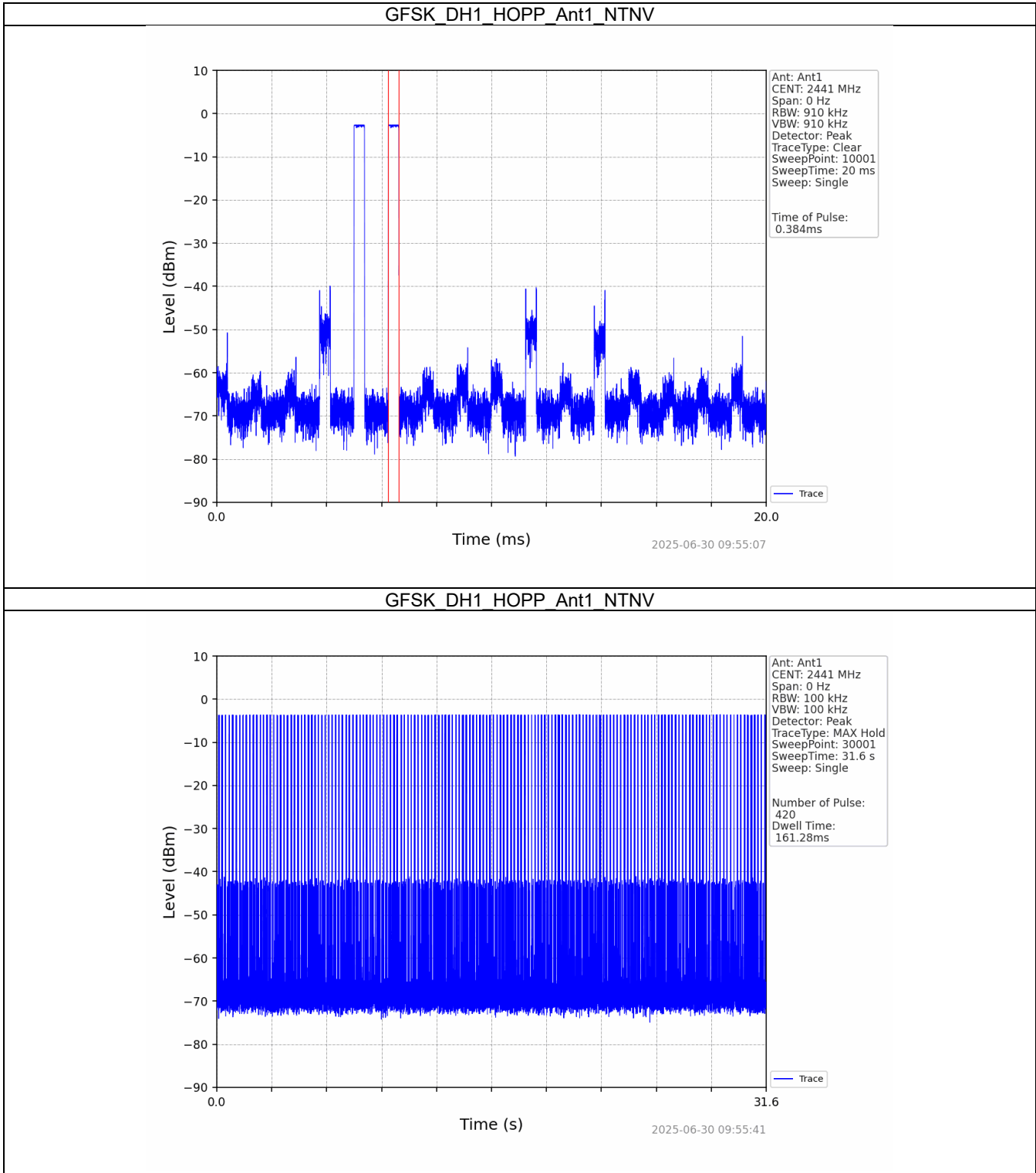
### 6.1 Test Result

#### 6.1.1 Ant1

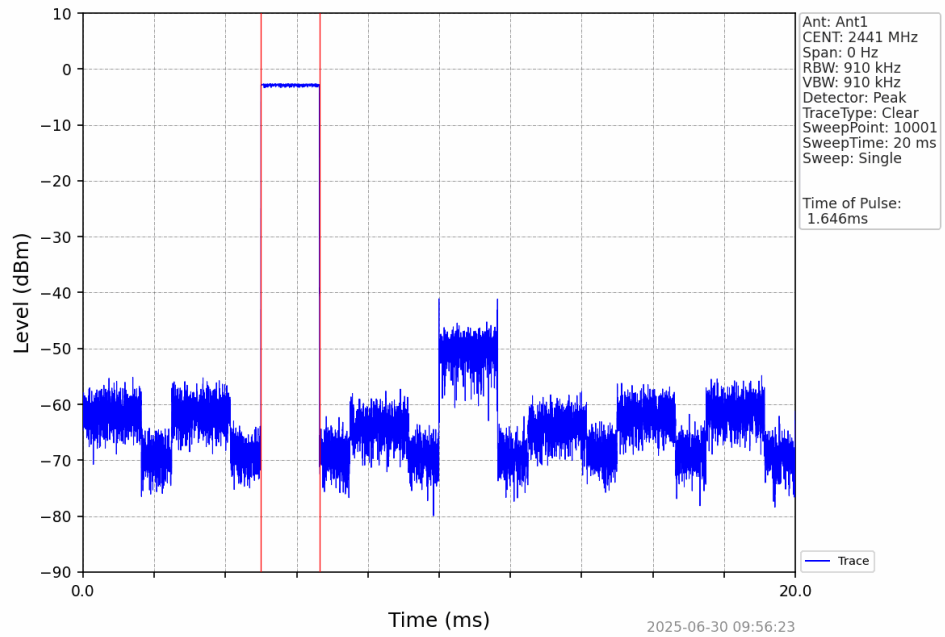
| Ant1      |         |                 |             |                               |                        |                                    |                 |            |         |
|-----------|---------|-----------------|-------------|-------------------------------|------------------------|------------------------------------|-----------------|------------|---------|
| 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         | 0.384                         | 31.600                 | 420                                | 161.280         | <=400      | Pass    |
|           |         |                 | DH3         | 1.646                         | 31.600                 | 156                                | 256.776         | <=400      | Pass    |
|           |         |                 | DH5         | 2.896                         | 31.600                 | 105                                | 304.080         | <=400      | Pass    |
| Pi/4DQPSK | SISO    | HOPP            | 2DH1        | 0.396                         | 31.600                 | 317                                | 125.532         | <=400      | Pass    |
|           |         |                 | 2DH3        | 1.648                         | 31.600                 | 174                                | 286.752         | <=400      | Pass    |
|           |         |                 | 2DH5        | 2.892                         | 31.600                 | 103                                | 297.876         | <=400      | Pass    |

6.2 Test Graph

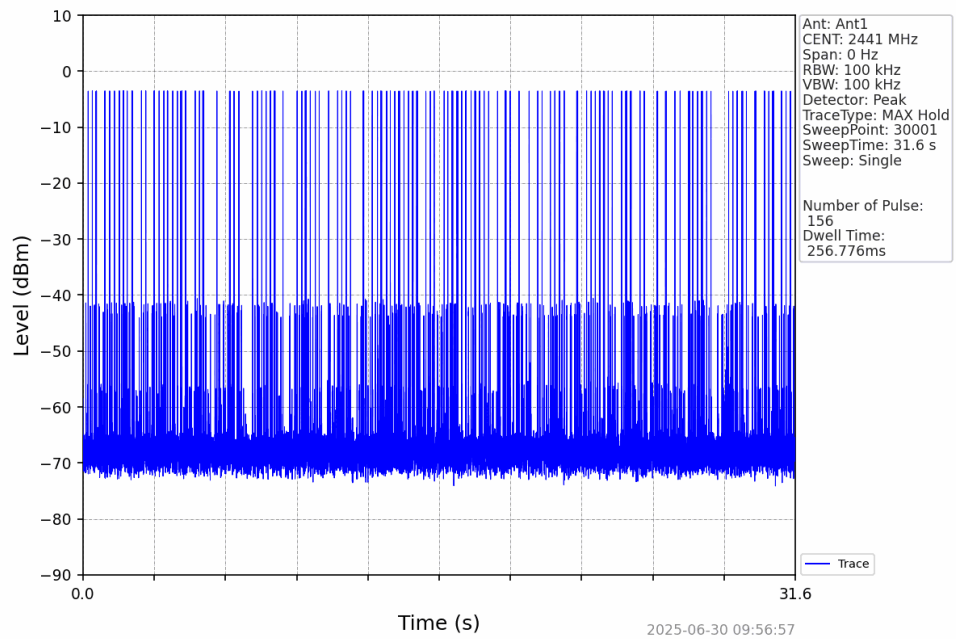
6.2.1 Ant1



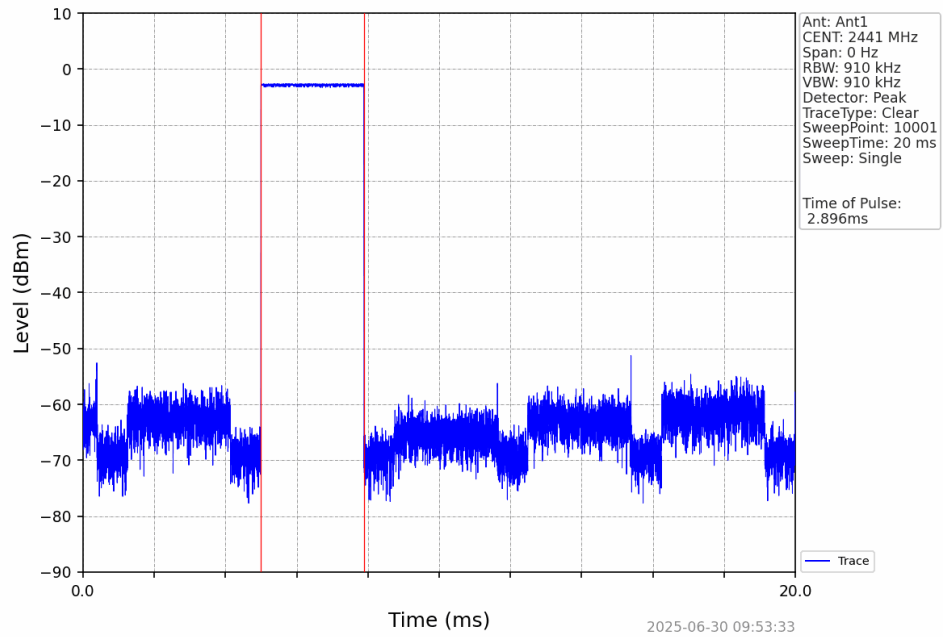
# GFSK\_DH3\_HOPP\_Ant1\_NTNV



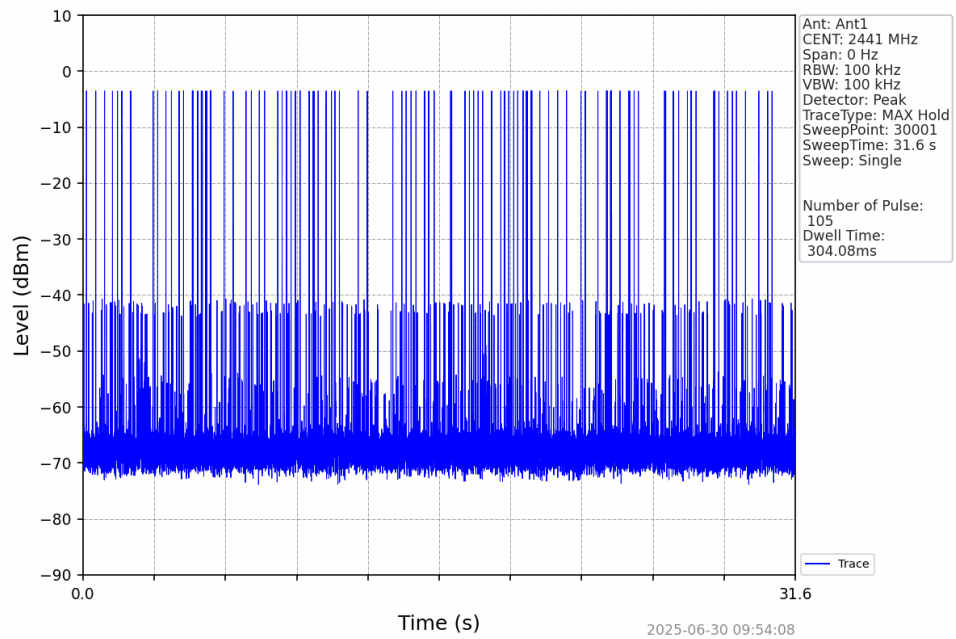
# GFSK\_DH3\_HOPP\_Ant1\_NTNV



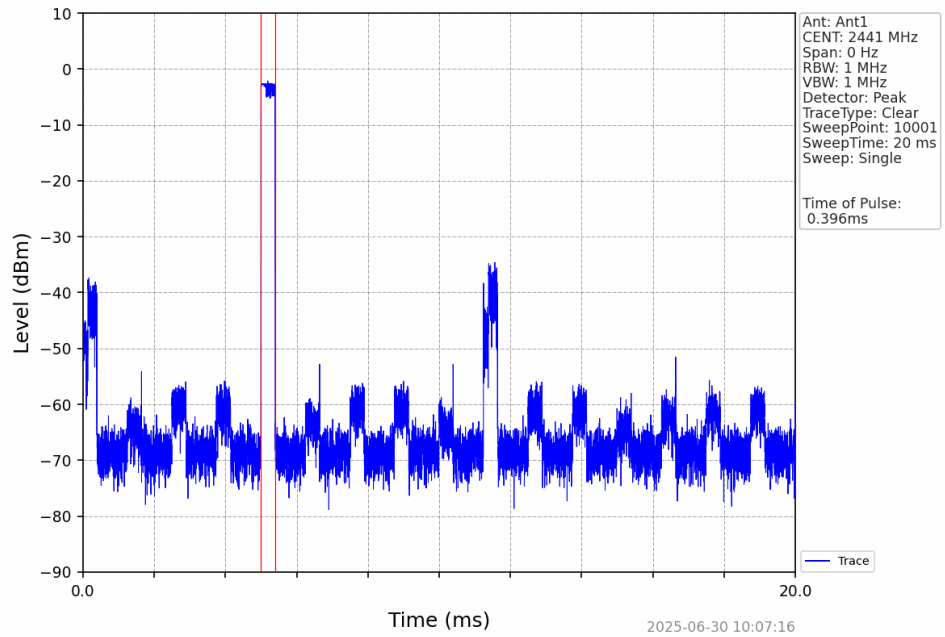
# GFSK\_DH5\_HOPP\_Ant1\_NTNV



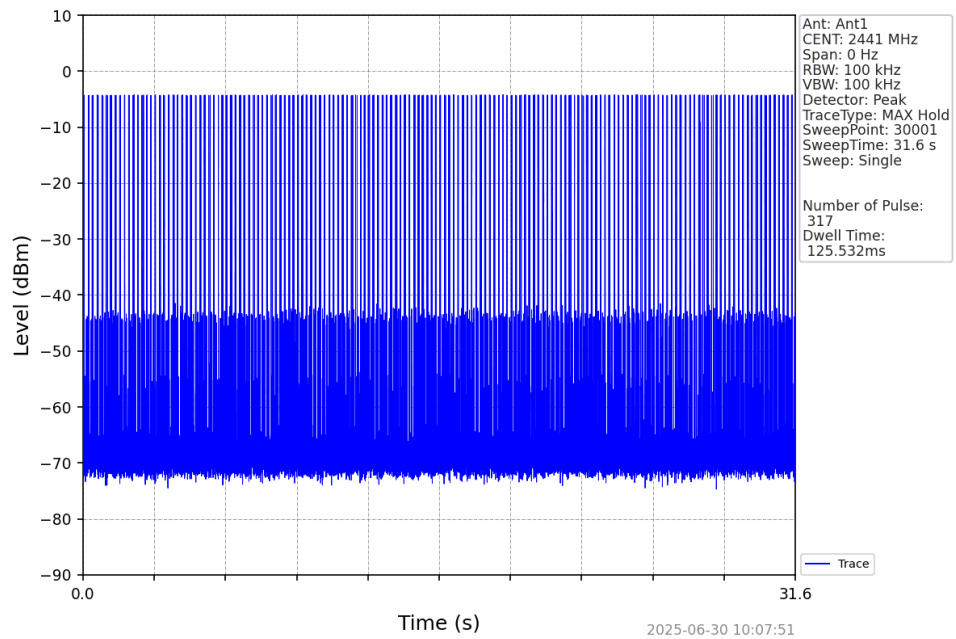
# GFSK\_DH5\_HOPP\_Ant1\_NTNV



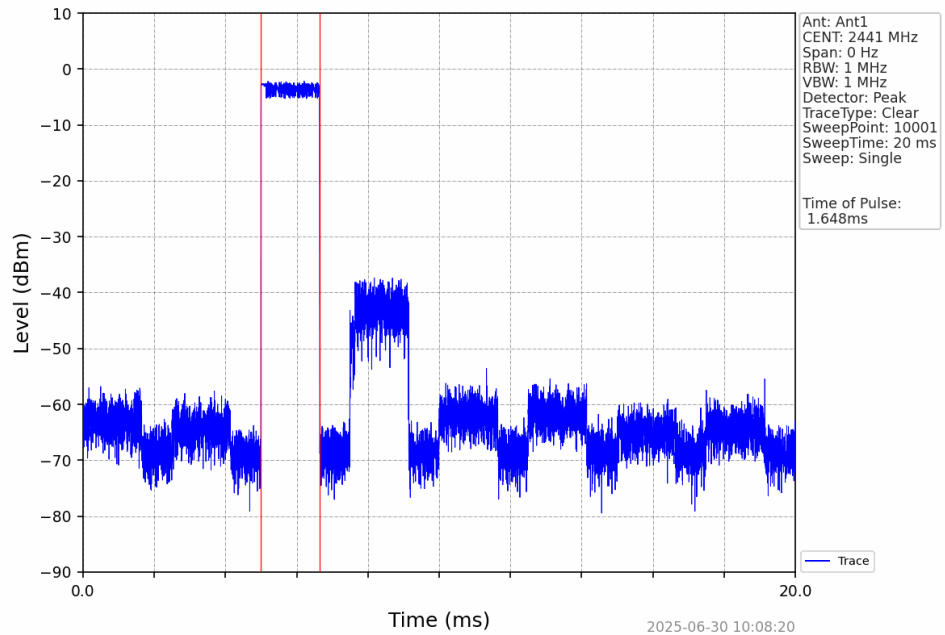
# Pi/4DQPSK\_2DH1\_HOPP\_Ant1\_NTNV



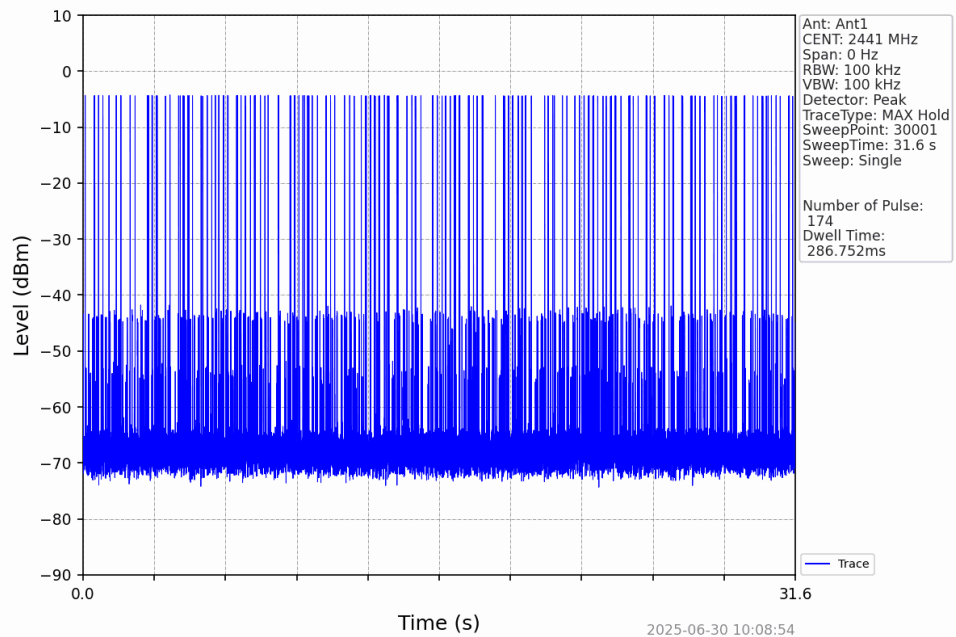
# Pi/4DQPSK\_2DH1\_HOPP\_Ant1\_NTNV



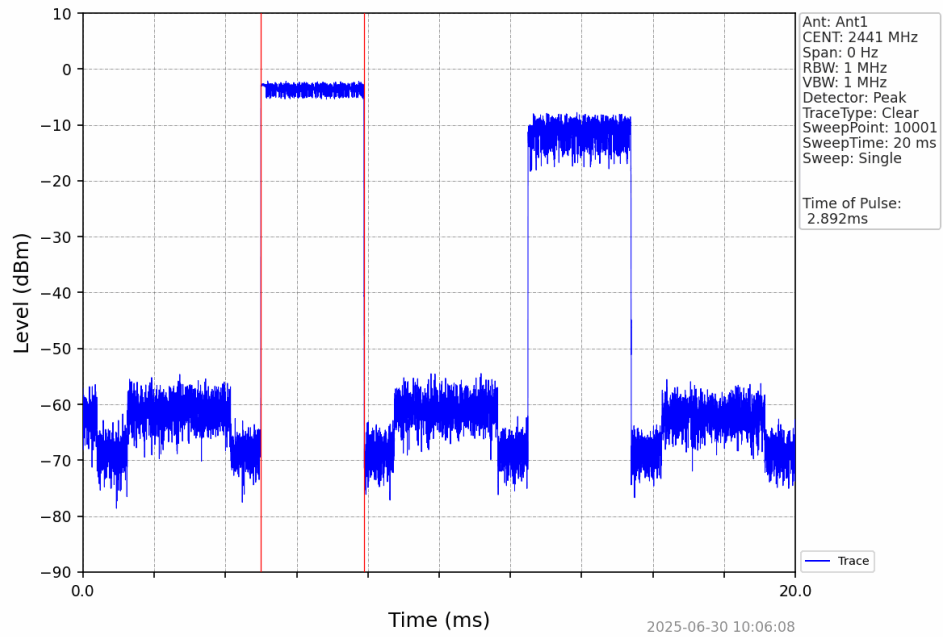
# Pi/4DQPSK\_2DH3\_HOPP\_Ant1\_NTNV



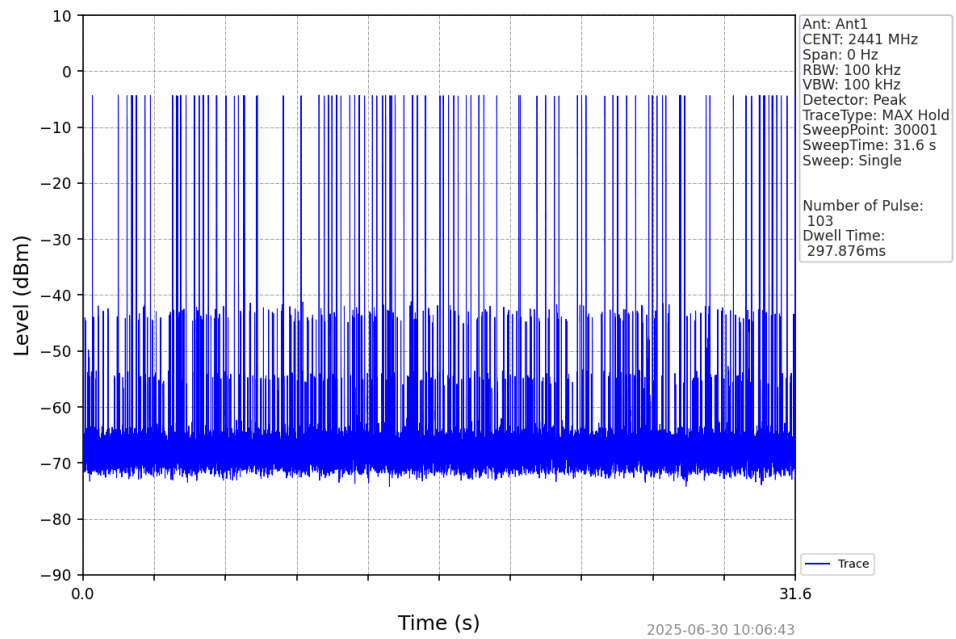
# Pi/4DQPSK\_2DH3\_HOPP\_Ant1\_NTNV



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



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



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

### 7.1 Test Result

#### 7.1.1 Ref

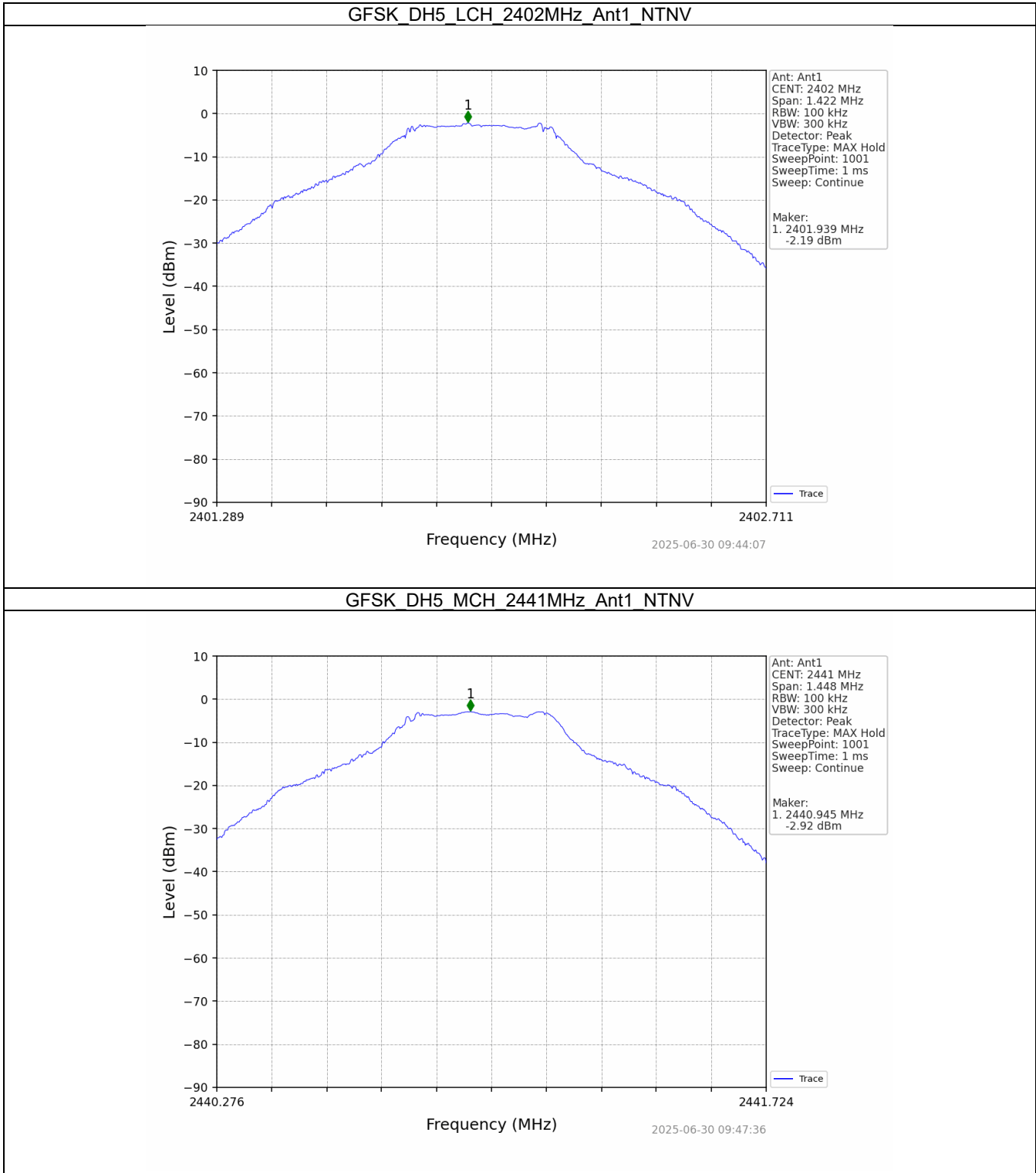
| Mode                                                                                                                                            | TX Type | Frequency (MHz) | Packet Type | ANT | Level of Reference (dBm) |
|-------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------------|-------------|-----|--------------------------|
| GFSK                                                                                                                                            | SISO    | 2402            | DH5         | 1   | -2.19                    |
|                                                                                                                                                 |         | 2441            | DH5         | 1   | -2.92                    |
|                                                                                                                                                 |         | 2480            | DH5         | 1   | -4.47                    |
| Pi/4DQPSK                                                                                                                                       | SISO    | 2402            | 2DH5        | 1   | -2.05                    |
|                                                                                                                                                 |         | 2441            | 2DH5        | 1   | -2.79                    |
|                                                                                                                                                 |         | 2480            | 2DH5        | 1   | -4.45                    |
| 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. |         |                 |             |     |                          |

#### 7.1.2 CSE

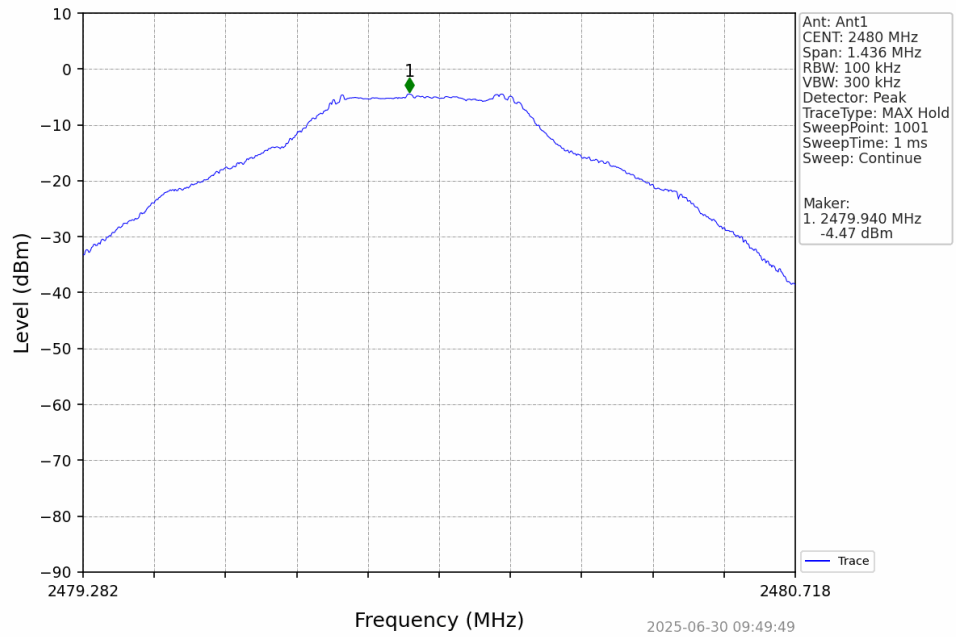
| Mode                                                                                                                                            | TX Type | Frequency (MHz) | Packet Type | ANT | Level of Reference (dBm) | Limit (dBm) | Verdict |
|-------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------------|-------------|-----|--------------------------|-------------|---------|
| GFSK                                                                                                                                            | SISO    | 2402            | DH5         | 1   | -2.19                    | -22.19      | Pass    |
|                                                                                                                                                 |         | 2441            | DH5         | 1   | -2.19                    | -22.19      | Pass    |
|                                                                                                                                                 |         | 2480            | DH5         | 1   | -2.19                    | -22.19      | Pass    |
|                                                                                                                                                 |         | HOPP            | DH5         | 1   | -2.19                    | -22.19      | Pass    |
|                                                                                                                                                 |         |                 |             |     | -2.19                    | -22.19      | Pass    |
| Pi/4DQPSK                                                                                                                                       | SISO    | 2402            | 2DH5        | 1   | -2.05                    | -22.05      | Pass    |
|                                                                                                                                                 |         | 2441            | 2DH5        | 1   | -2.05                    | -22.05      | Pass    |
|                                                                                                                                                 |         | 2480            | 2DH5        | 1   | -2.05                    | -22.05      | Pass    |
|                                                                                                                                                 |         | HOPP            | 2DH5        | 1   | -2.05                    | -22.05      | Pass    |
|                                                                                                                                                 |         |                 |             |     | -2.05                    | -22.05      | 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. |         |                 |             |     |                          |             |         |

7.2 Test Graph

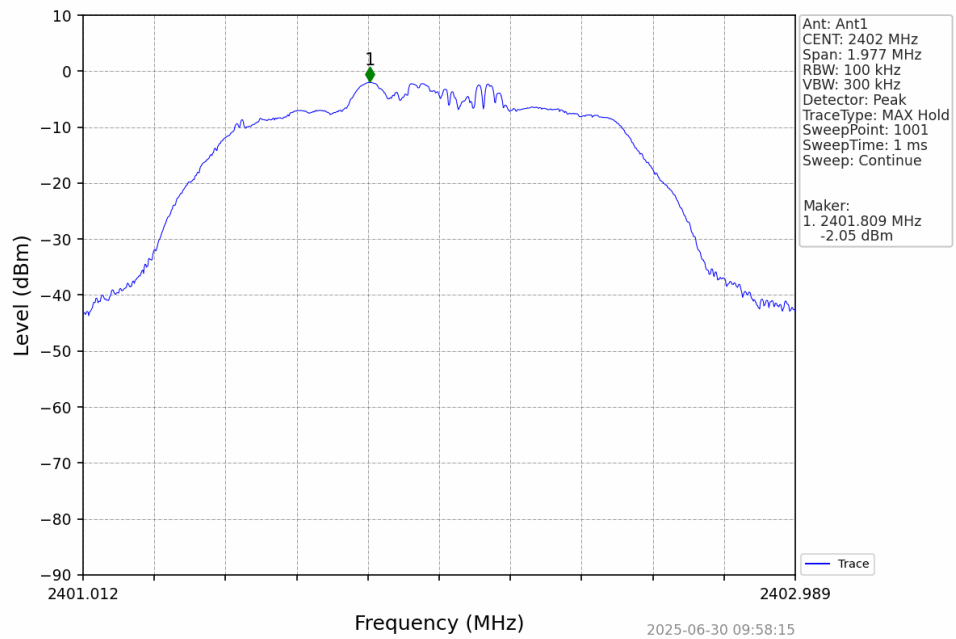
7.2.1 Ref



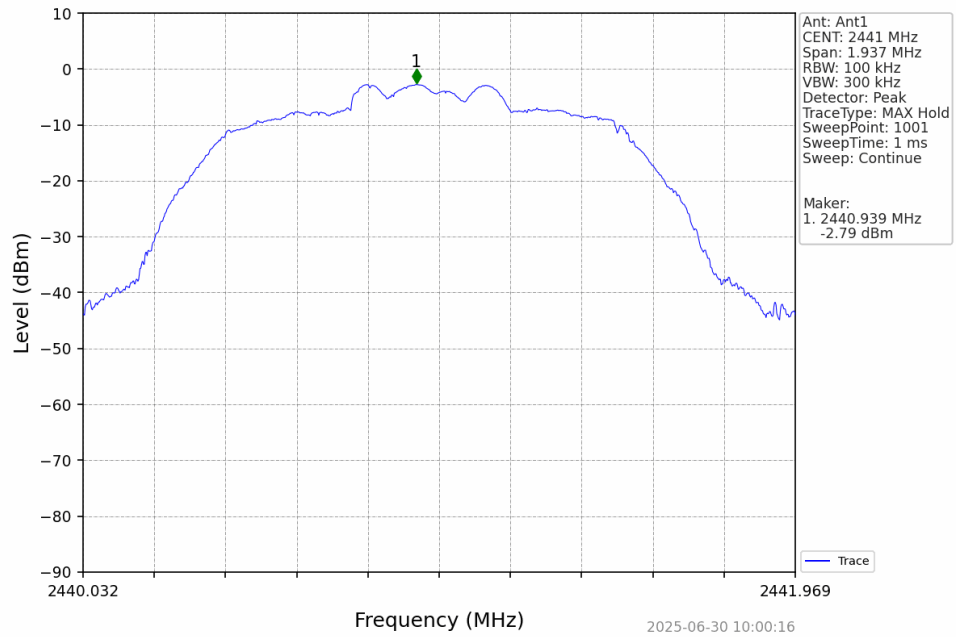
# GFSK DH5\_HCH\_2480MHz\_Ant1\_NTNV



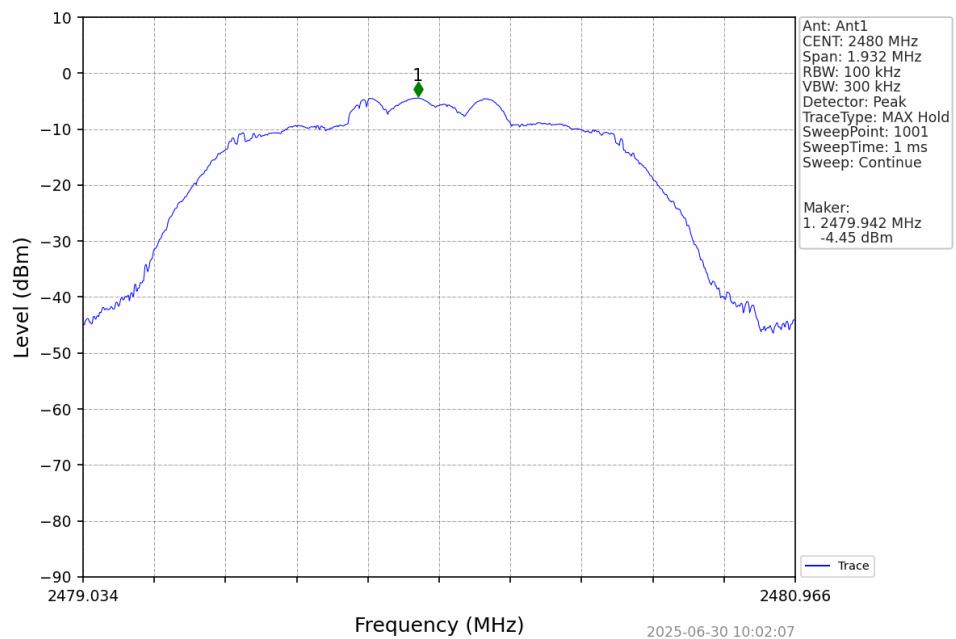
# Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



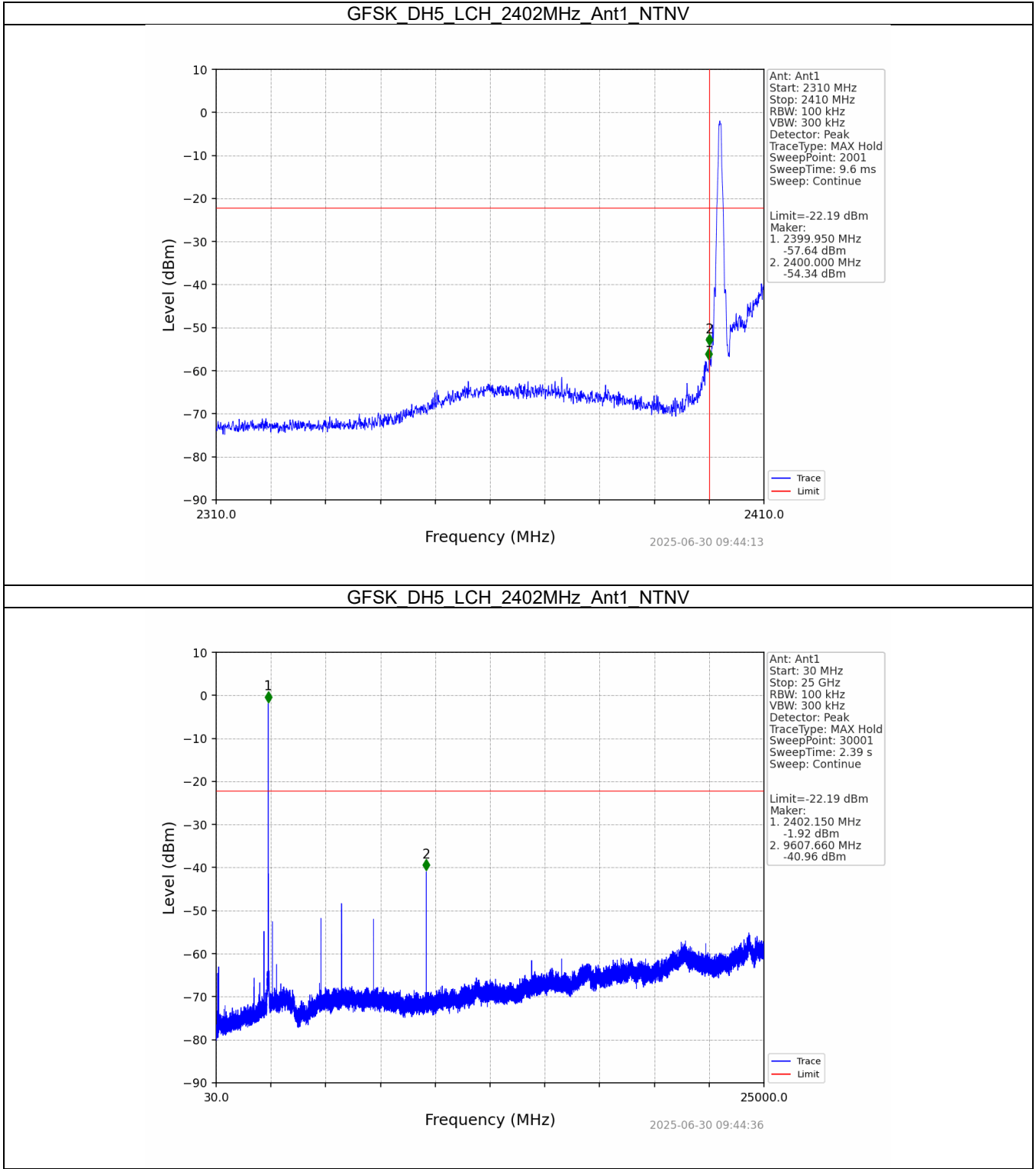
Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



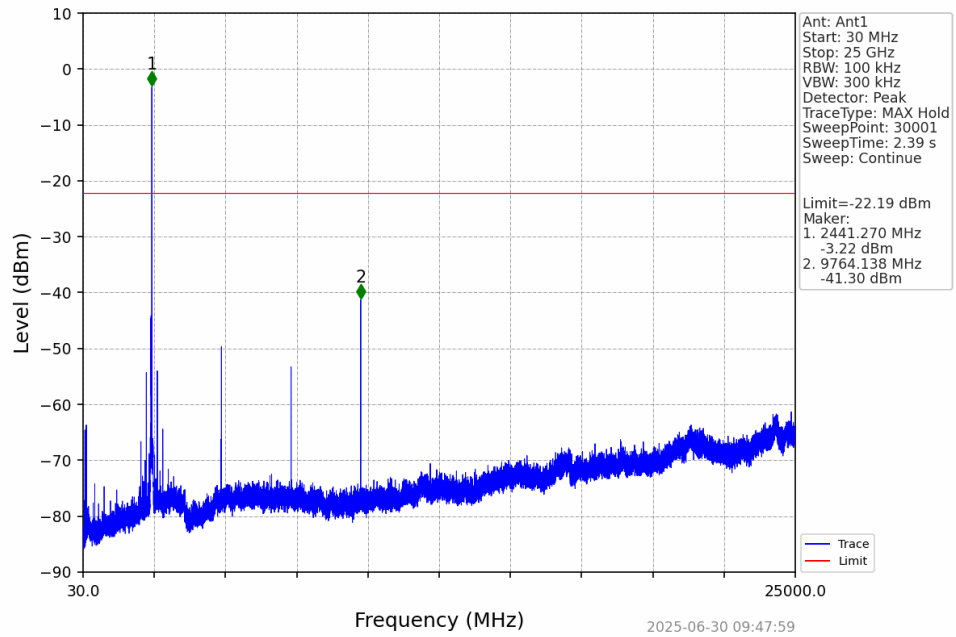
Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



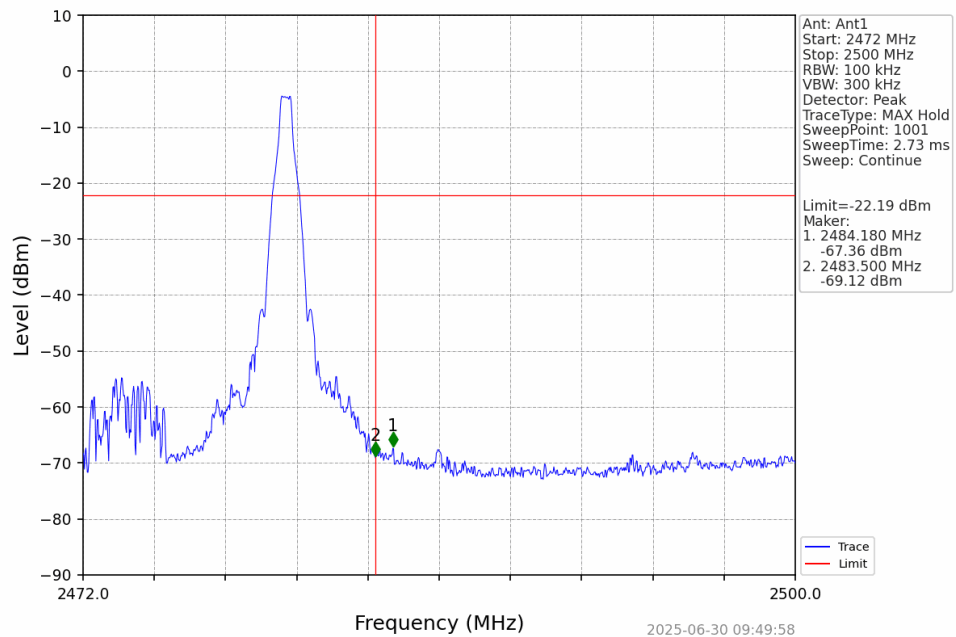
7.2.2 CSE



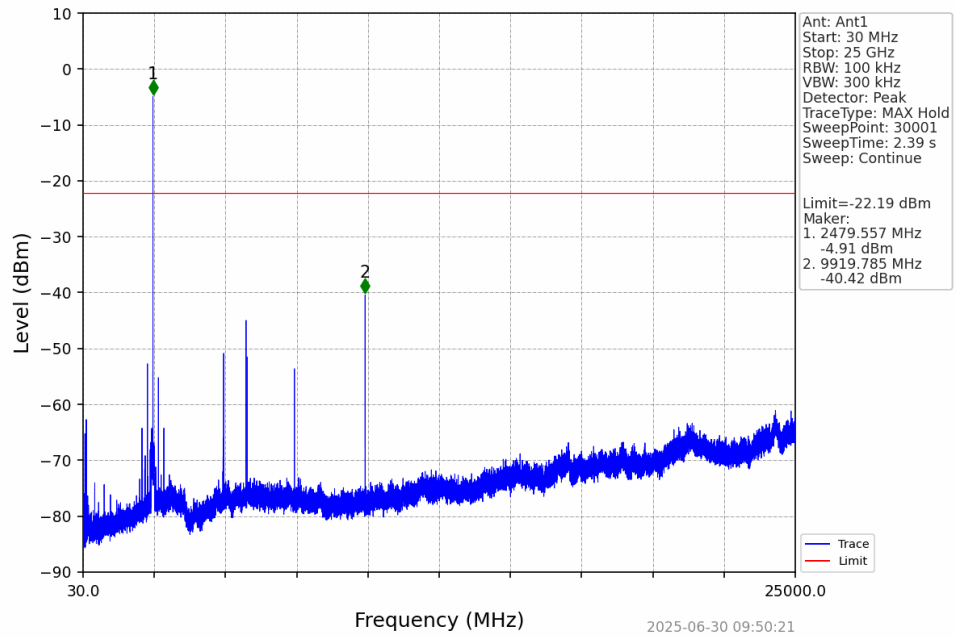
### GFSK\_DH5\_MCH\_2441MHz\_Ant1\_NTNV



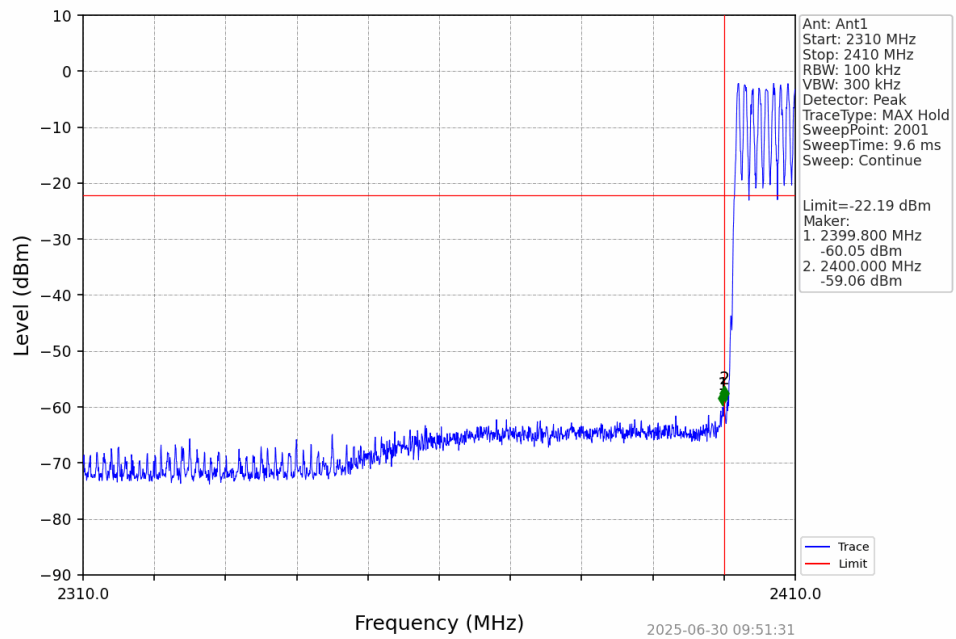
### GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



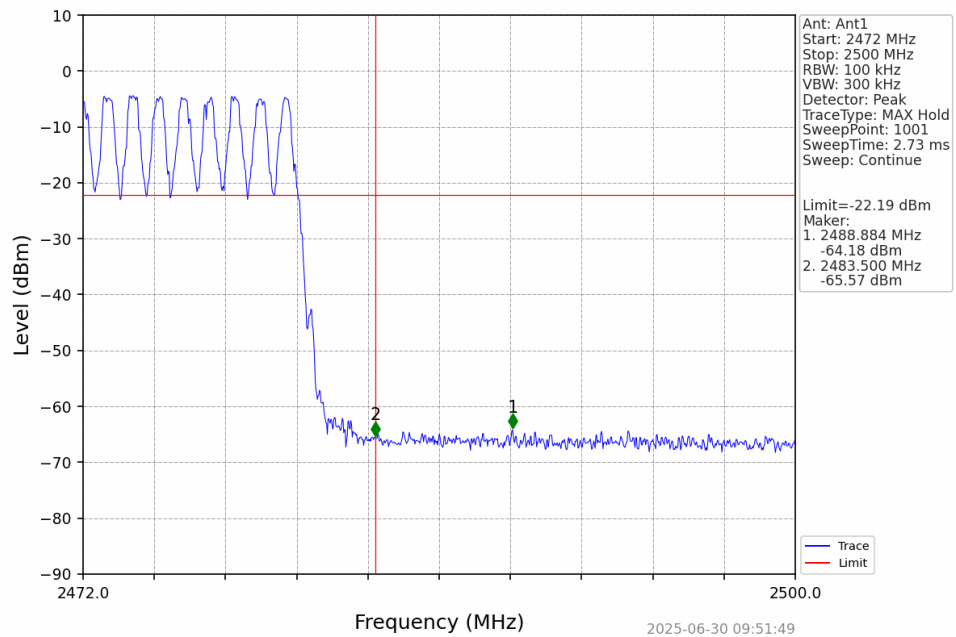
# GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



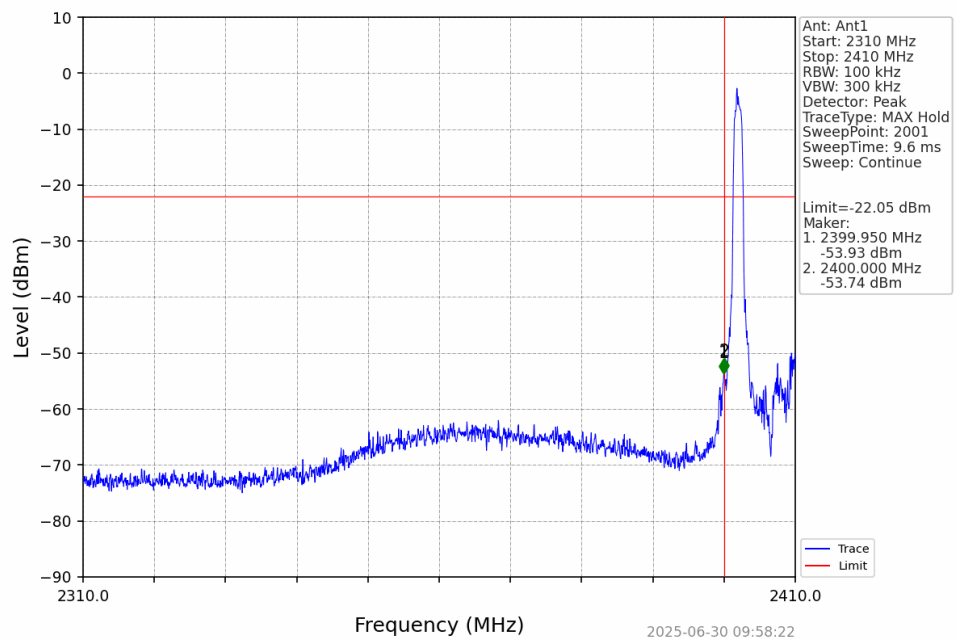
# GFSK\_DH5\_HOPP\_Ant1\_NTNV



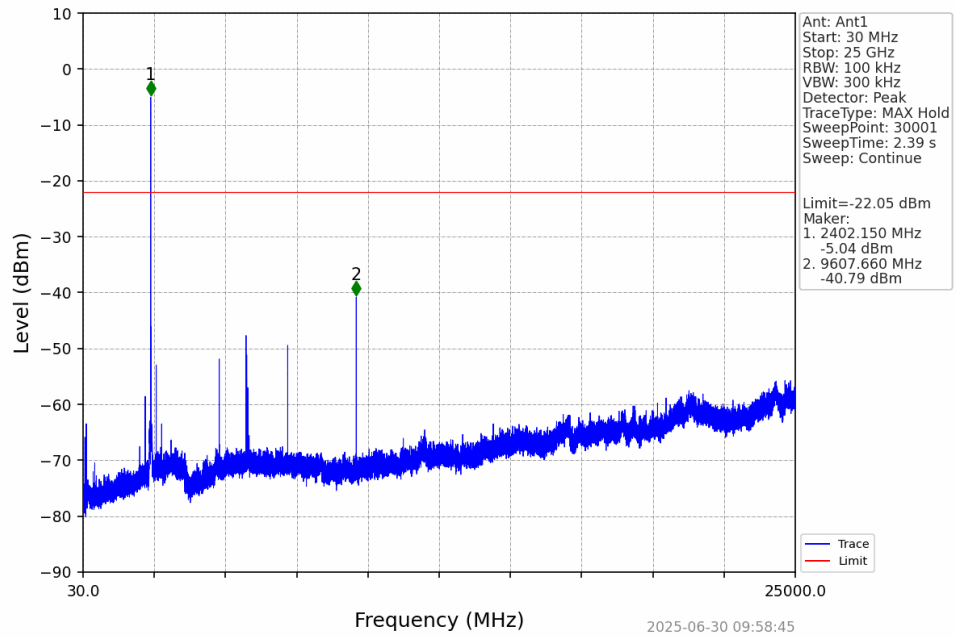
### GFSK\_DH5\_HOPP\_Ant1\_NTNV



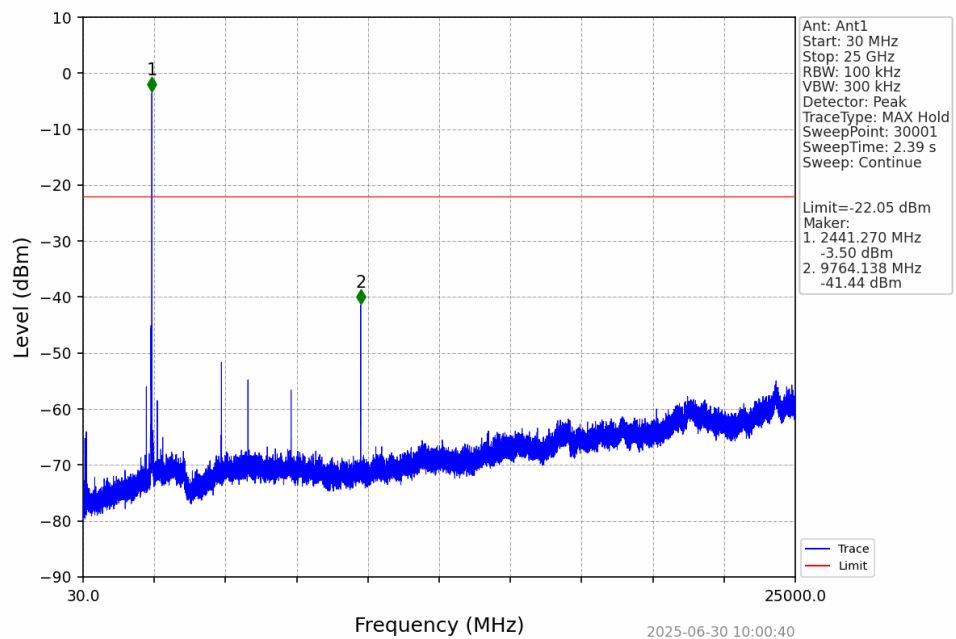
### Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



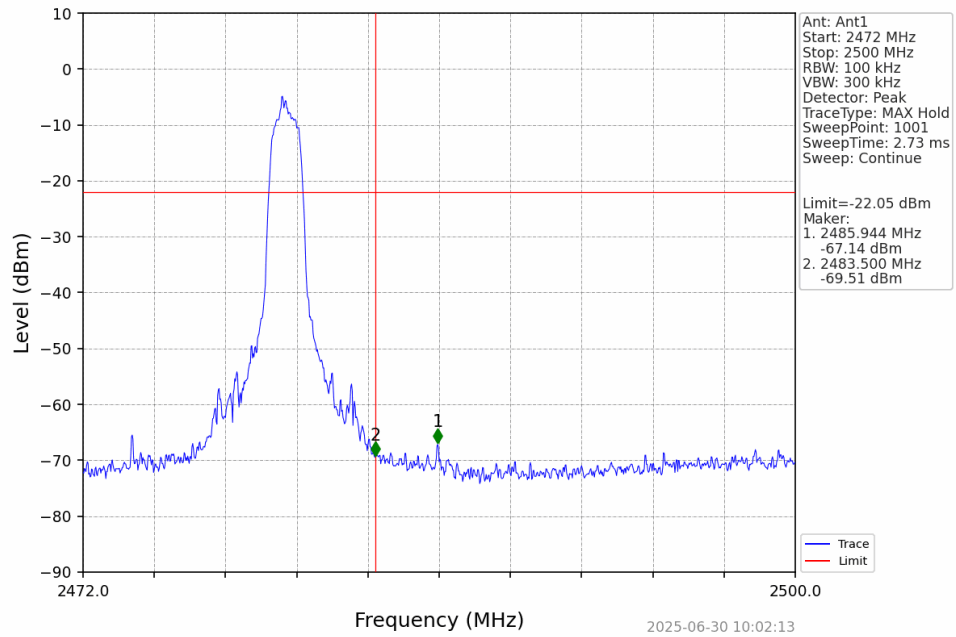
# Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



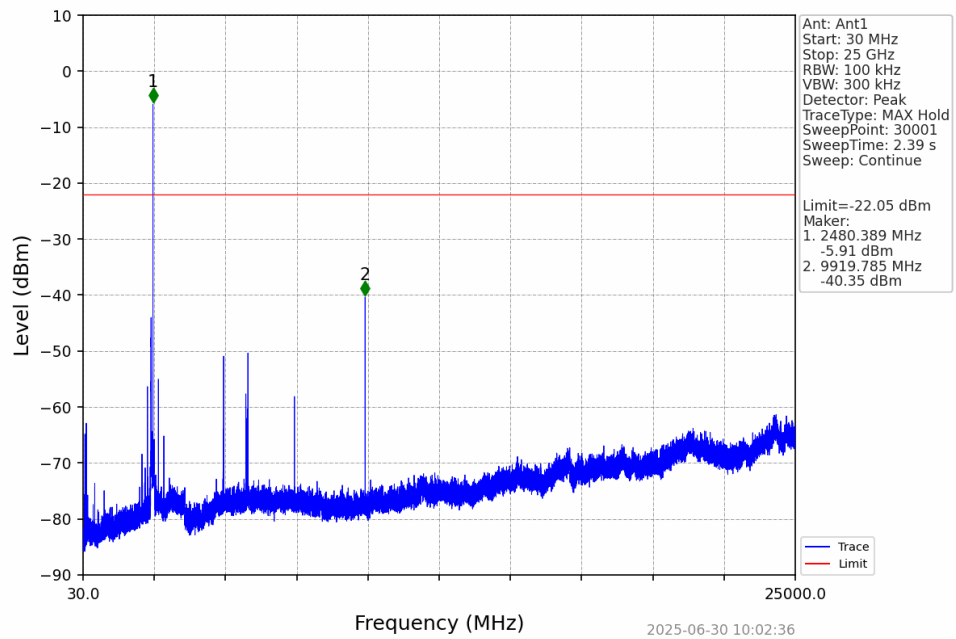
# Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



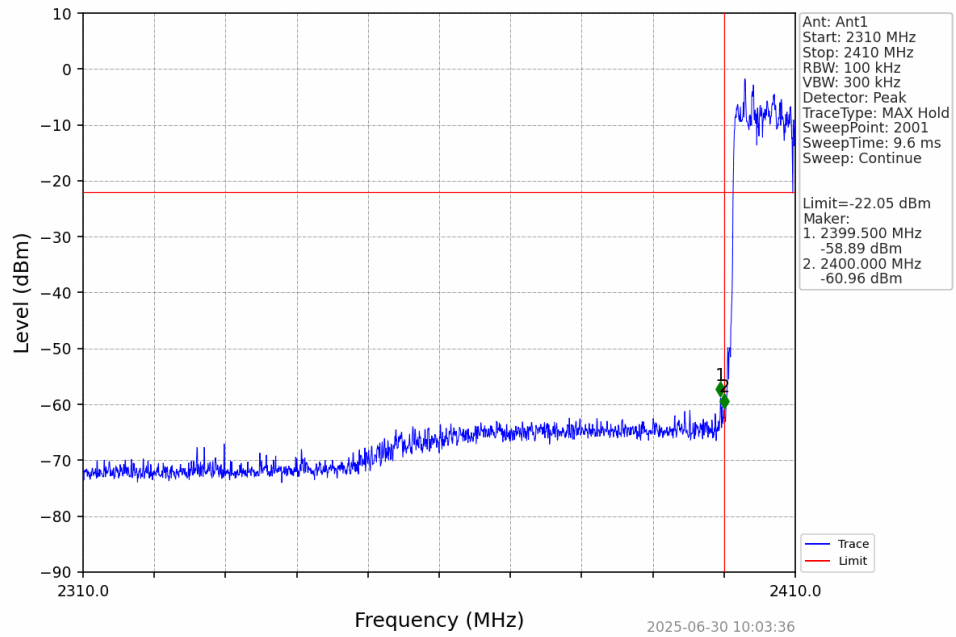
# Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



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



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



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

