

# Appendix Report

Report No.: CISRR25010702601

Test Engineer: Mark Fu

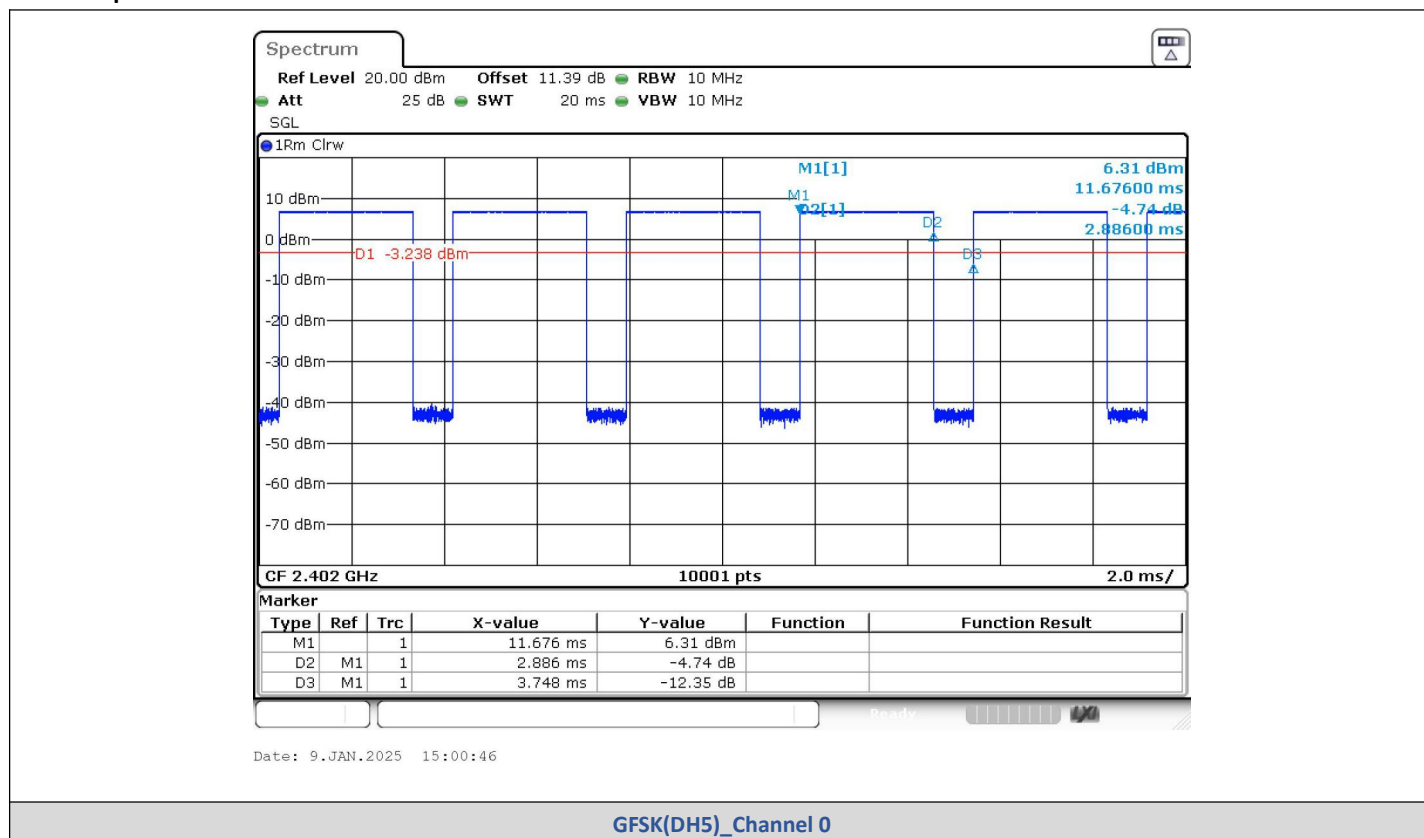
Supervised by: Rory Huang

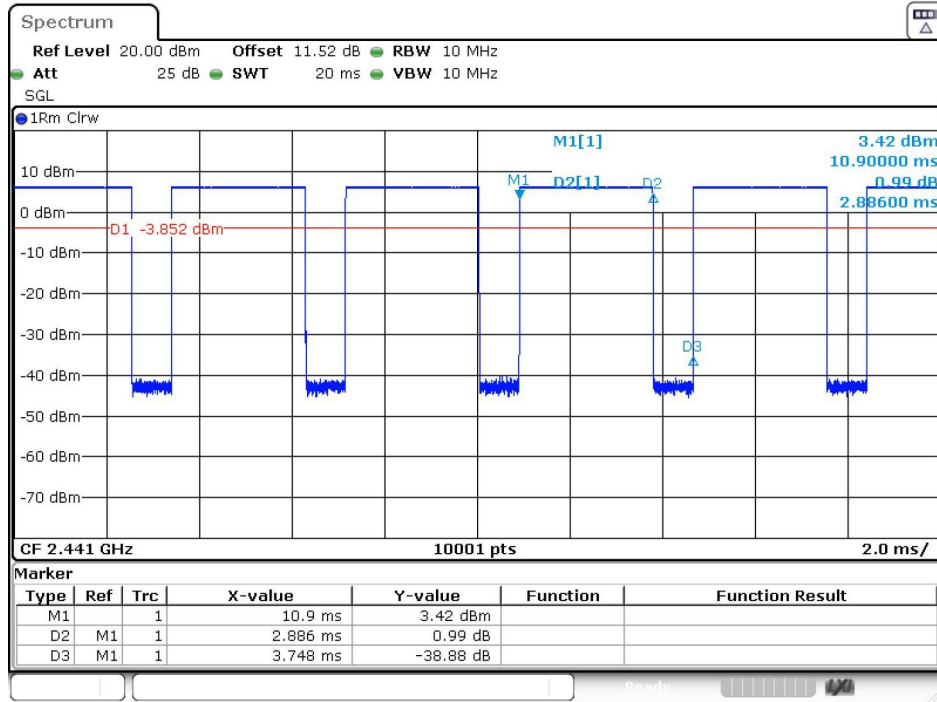
# 1) Duty Cycle

## Test Result

| Modulation    | Packets | Channel | On Time (ms) | Period (ms) | Duty Cycle (%) | Duty Cycle (linear) | Duty Cycle Factor (dB) | 1/T    |
|---------------|---------|---------|--------------|-------------|----------------|---------------------|------------------------|--------|
| GFSK          | DH5     | 0       | 2.886        | 3.748       | 77.00          | 0.7700              | 1.1351                 | 0.3465 |
|               |         | 39      | 2.886        | 3.748       | 77.00          | 0.7700              | 1.1351                 | 0.3465 |
|               |         | 78      | 2.888        | 3.748       | 77.05          | 0.7705              | 1.1323                 | 0.3463 |
| $\pi/4$ DQPSK | 2-DH5   | 0       | 2.890        | 3.748       | 77.11          | 0.7711              | 1.1289                 | 0.3460 |
|               |         | 39      | 2.890        | 3.748       | 77.11          | 0.7711              | 1.1289                 | 0.3460 |
|               |         | 78      | 2.892        | 3.748       | 77.16          | 0.7716              | 1.1261                 | 0.3458 |
| 8DPSK         | 3-DH5   | 0       | 2.892        | 3.748       | 77.16          | 0.7716              | 1.1261                 | 0.3458 |
|               |         | 39      | 2.894        | 3.748       | 77.21          | 0.7721              | 1.1233                 | 0.3455 |
|               |         | 78      | 2.892        | 3.748       | 77.16          | 0.7716              | 1.1261                 | 0.3458 |

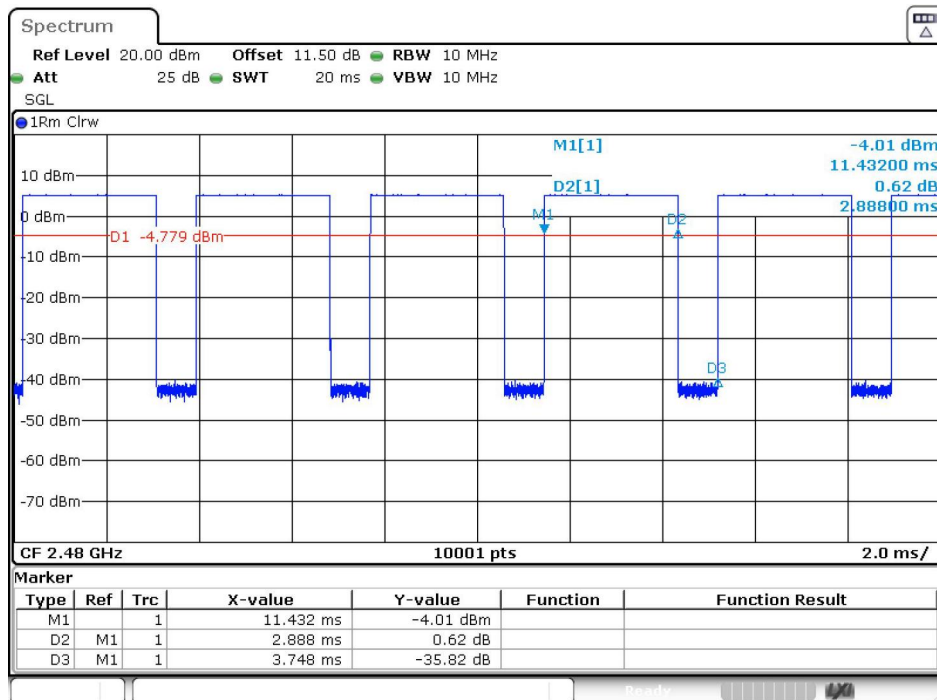
## Test Graphs





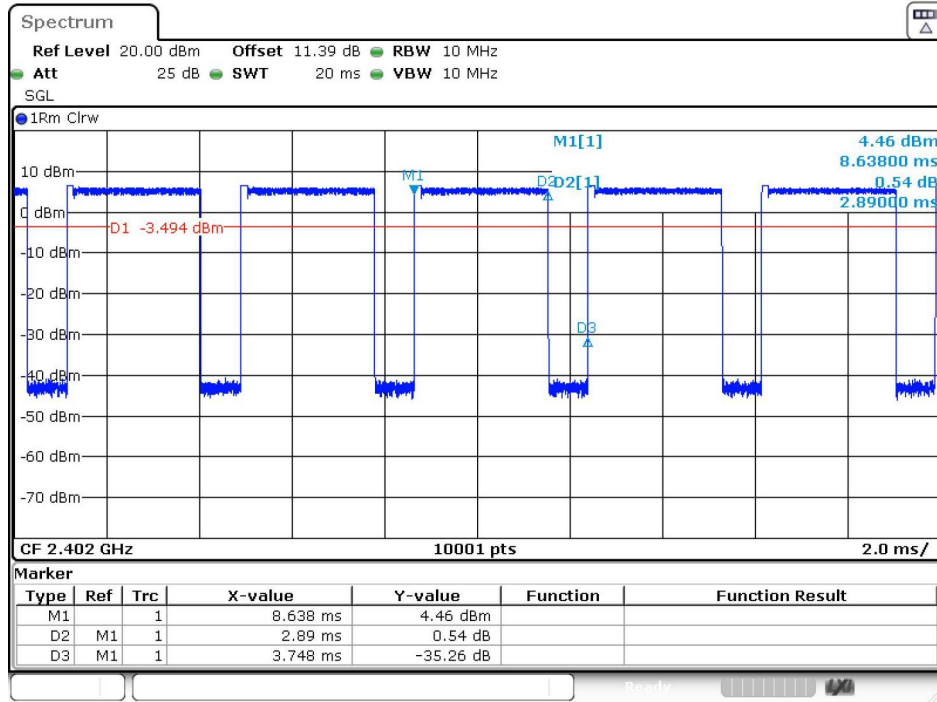
Date: 9.JAN.2025 15:17:51

### GFSK(DH5)\_Channel 39



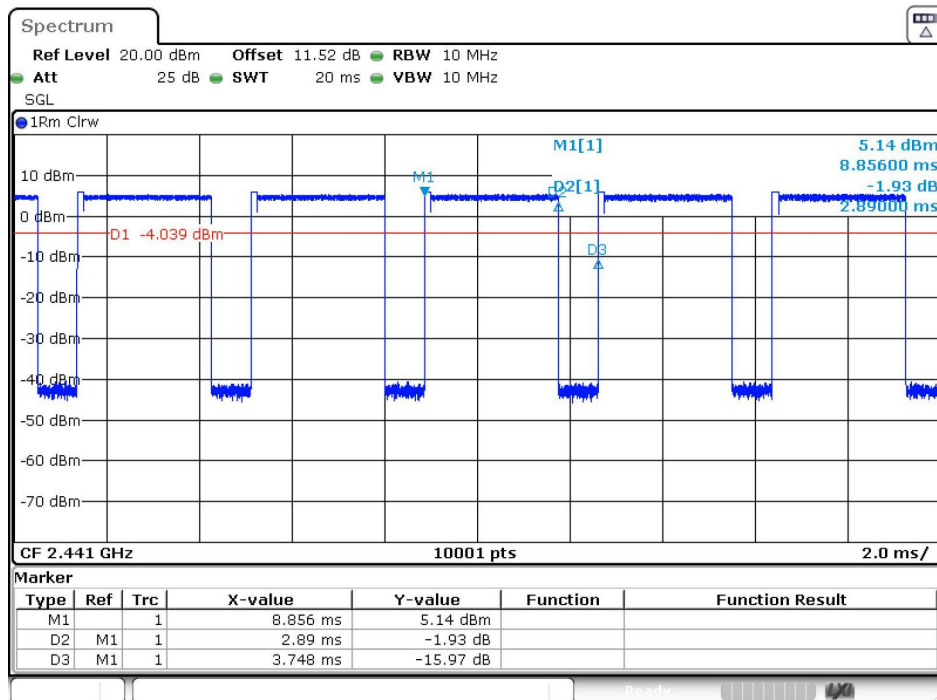
Date: 9.JAN.2025 15:19:42

### GFSK(DH5)\_Channel 78



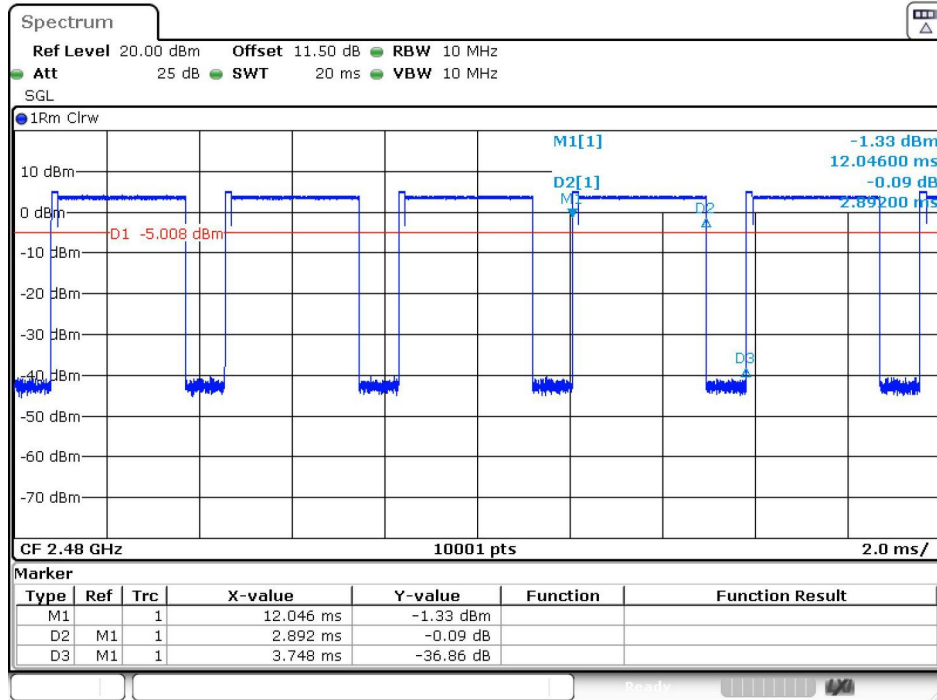
Date: 9.JAN.2025 15:22:55

$\pi/4$ QPSK(2-DH5)\_Channel 0



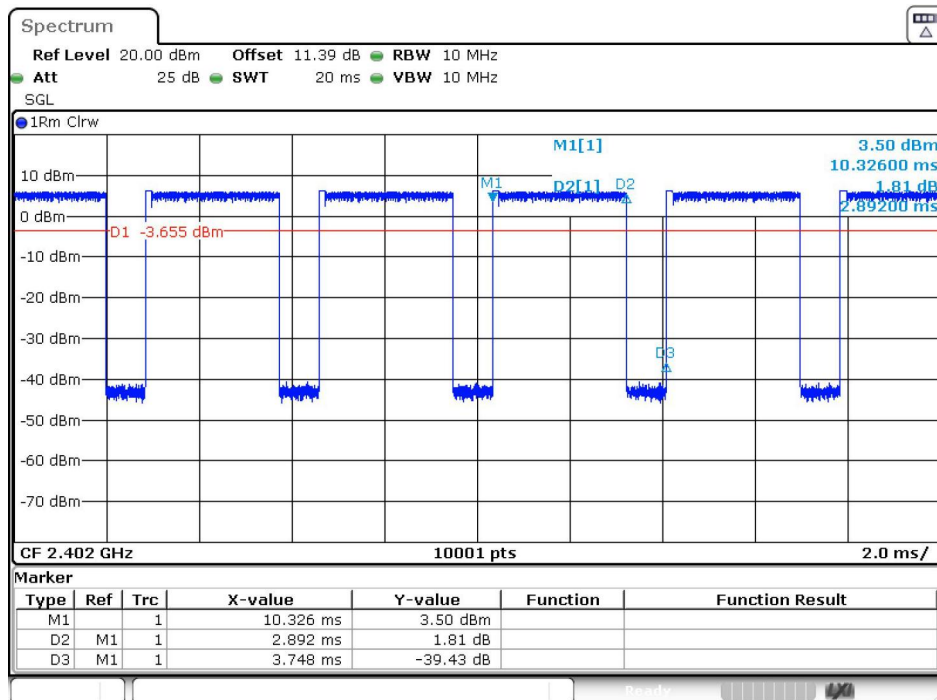
Date: 9.JAN.2025 15:31:30

$\pi/4$ QPSK(2-DH5)\_Channel 39



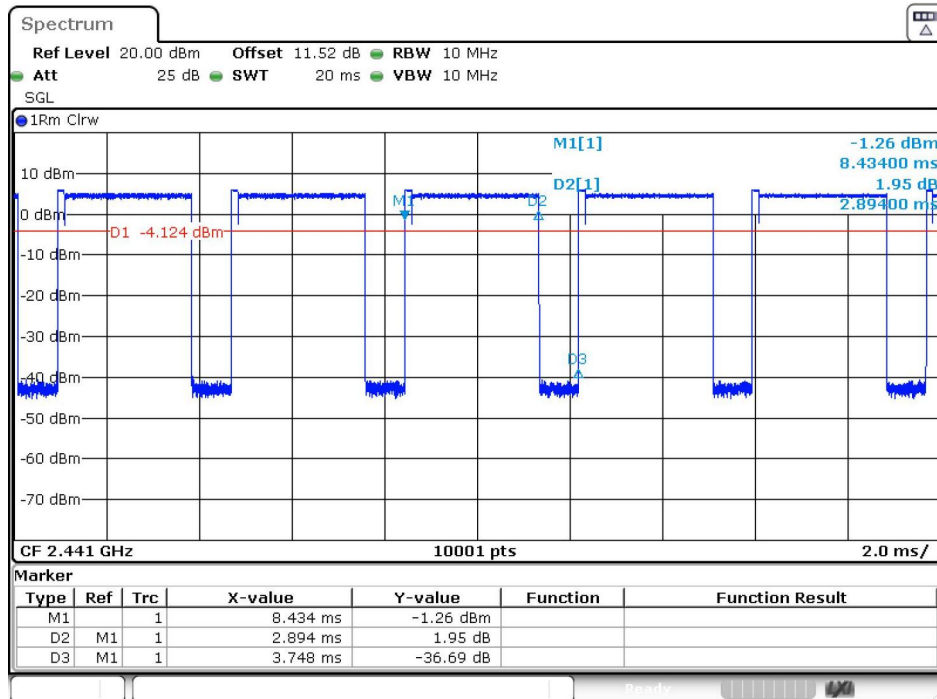
Date: 9.JAN.2025 15:34:21

**$\pi/4$ DQPSK(2-DH5)\_Channel 78**



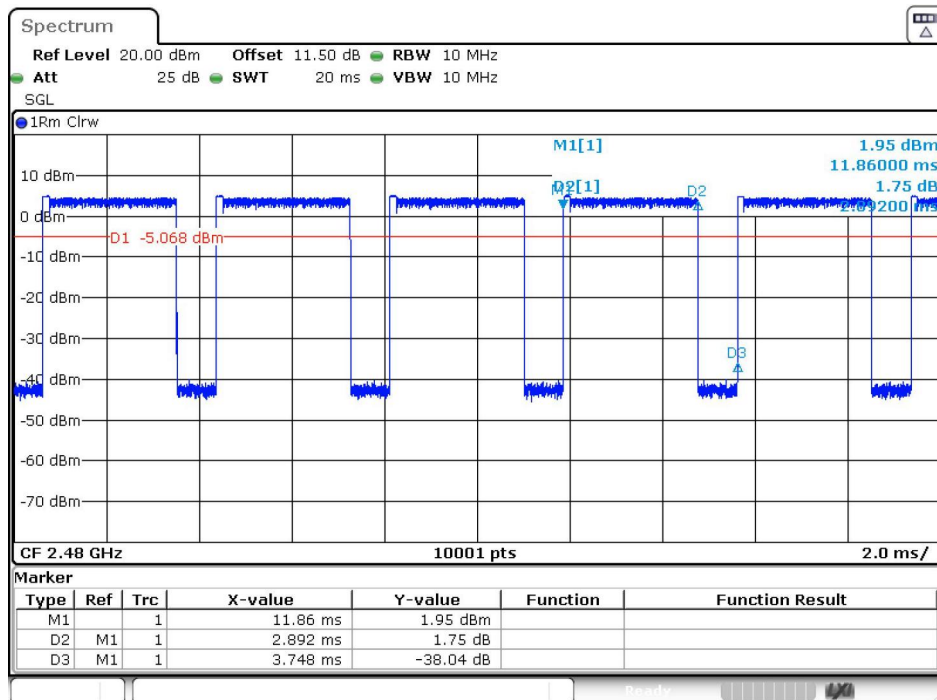
Date: 9.JAN.2025 15:36:20

**8DPSK(3-DH5)\_Channel 0**



Date: 9.JAN.2025 15:52:53

### 8DPSK(3-DH5)\_Channel 39



Date: 9.JAN.2025 15:54:52

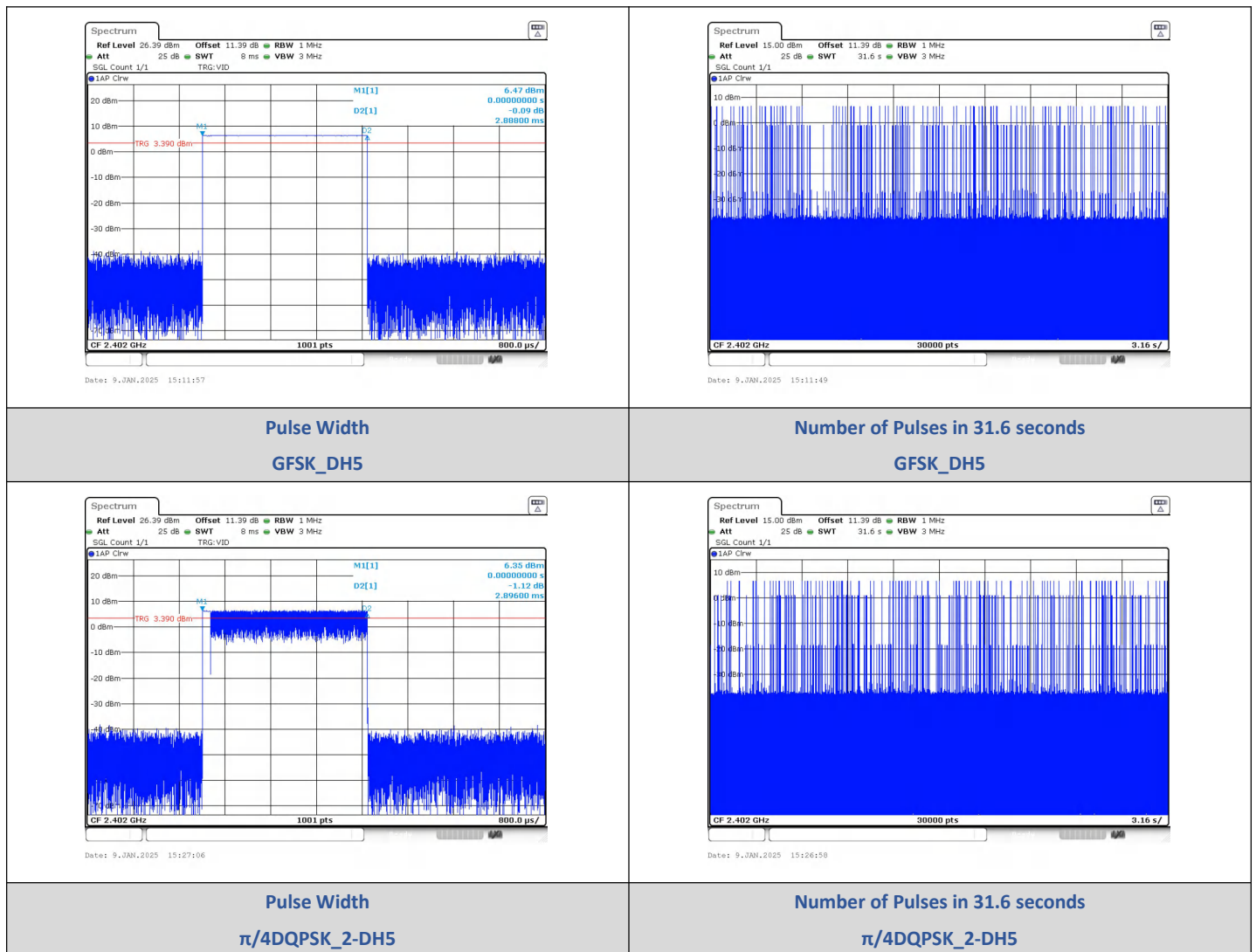
### 8DPSK(3-DH5)\_Channel 78

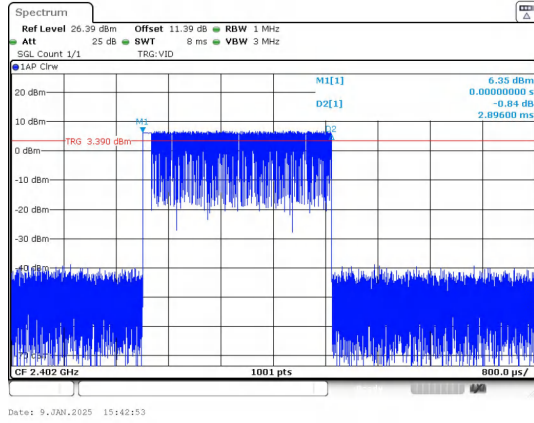
## 2) Dwell Time

### Test Result

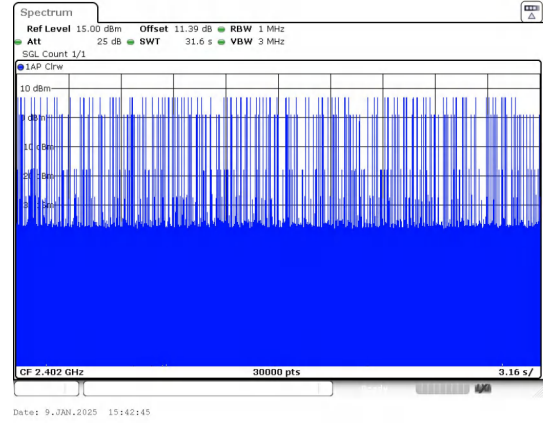
| Modulation    | Packet | Channel          | Pulse Width (ms) | Number of Pulses in 31.6 seconds | Dwell Time (ms) | Limit (ms) | Result |
|---------------|--------|------------------|------------------|----------------------------------|-----------------|------------|--------|
| GFSK          | DH5    | CH0<br>(2402MHz) | 2.888            | 105                              | 303.24          | < 400      | PASS   |
| $\pi/4$ DQPSK | 2-DH5  |                  | 2.896            | 109                              | 315.66          |            | PASS   |
| 8DPSK         | 3-DH5  |                  | 2.896            | 113                              | 327.25          |            | PASS   |

### Test Graphs





Pulse Width  
8DPSK\_3-DH5



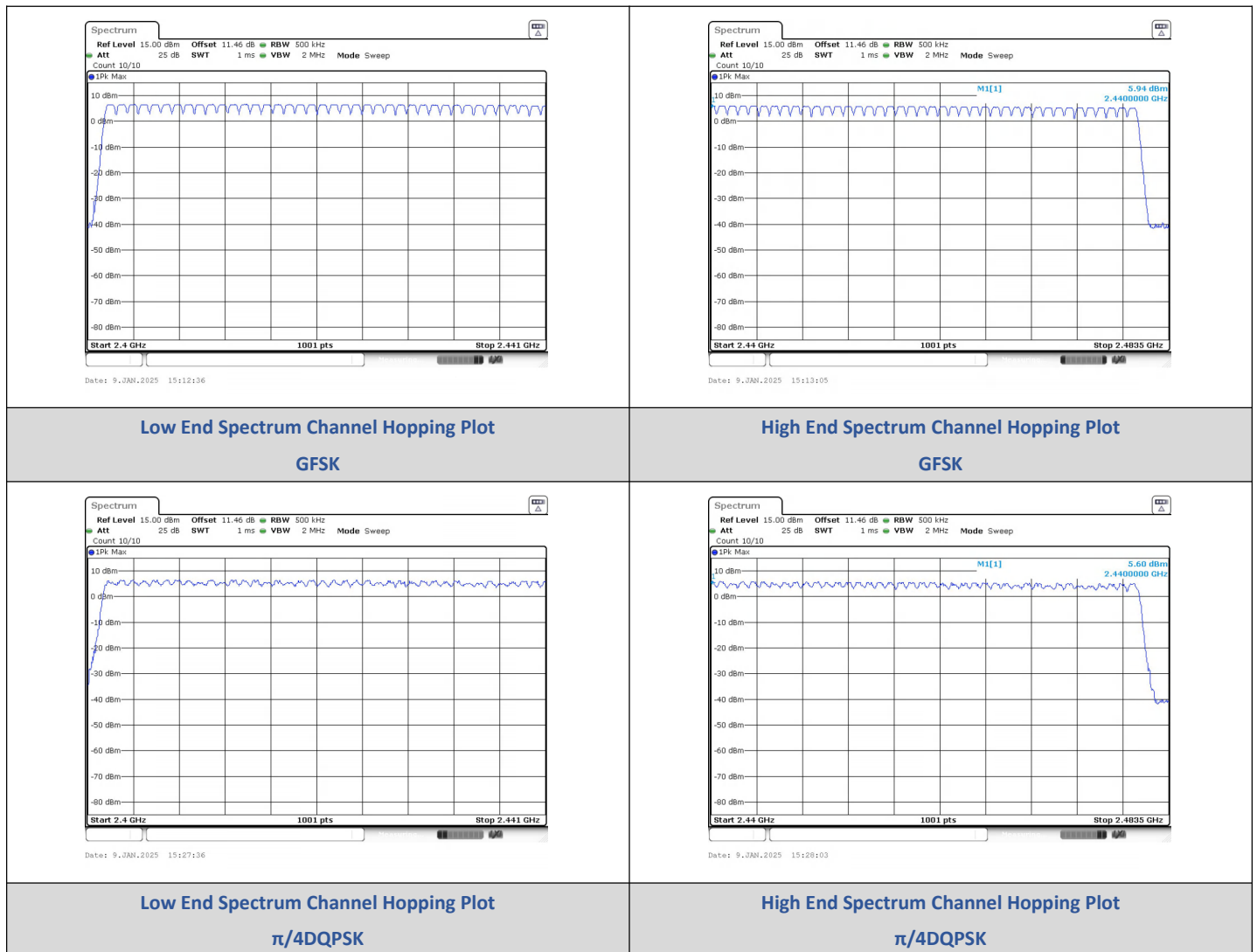
Number of Pulses in 31.6 seconds  
8DPSK\_3-DH5

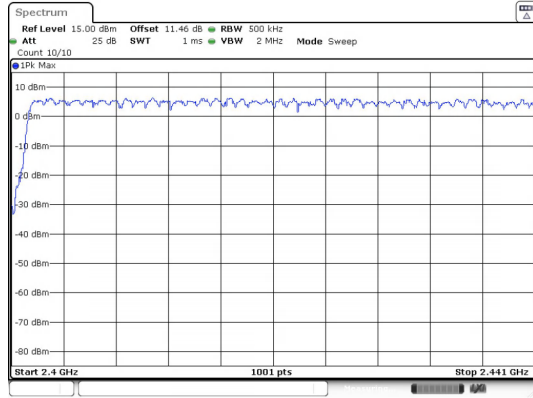
### 3) Number Of Hopping Channel

#### Test Result

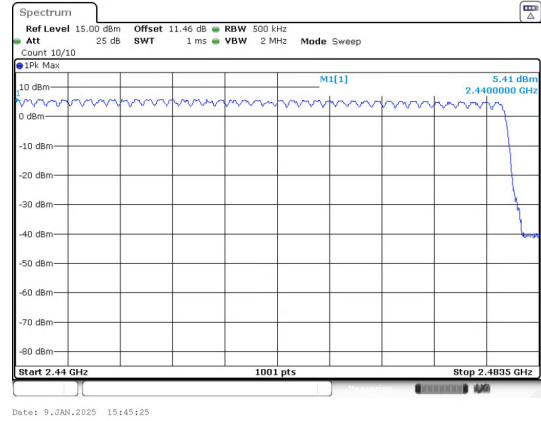
| Modulation    | Packet | Number of Hopping Channel | Limit | Result |
|---------------|--------|---------------------------|-------|--------|
| GFSK          | DH5    | 79                        | 15    | PASS   |
| $\pi/4$ DQPSK | 2-DH5  | 79                        | 15    | PASS   |
| 8DPSK         | 3-DH5  | 79                        | 15    | PASS   |

#### Test Graphs





Low End Spectrum Channel Hopping Plot  
8DPSK



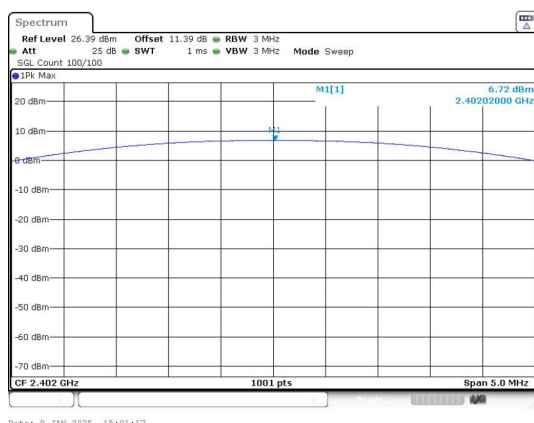
High End Spectrum Channel Hopping Plot  
8DPSK

## 4) Conducted Output Power

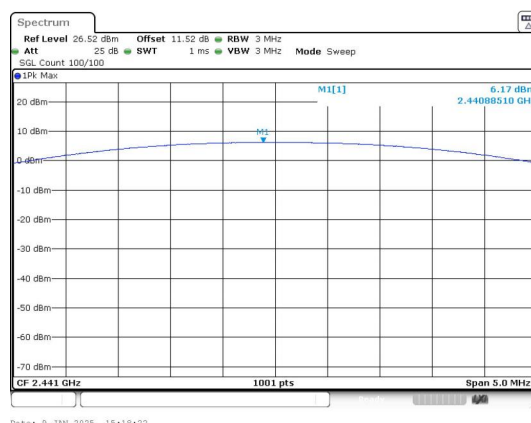
### Test Result

| Modulation    | Packet Type | Channel | Peak Output Power (dBm) | Peak Output Power (mW) | Limit (dBm) | Result |
|---------------|-------------|---------|-------------------------|------------------------|-------------|--------|
| GFSK          | DH5         | 0       | 6.72                    | 4.70                   | ≤30         | PASS   |
|               |             | 39      | 6.17                    | 4.14                   |             | PASS   |
|               |             | 78      | 5.21                    | 3.32                   |             | PASS   |
| $\pi/4$ DQPSK | 2-DH5       | 0       | 7.05                    | 5.07                   | ≤20.97      | PASS   |
|               |             | 39      | 6.64                    | 4.61                   |             | PASS   |
|               |             | 78      | 5.74                    | 3.75                   |             | PASS   |
| 8DPSK         | 3-DH5       | 0       | 7.14                    | 5.18                   |             | PASS   |
|               |             | 39      | 6.74                    | 4.72                   |             | PASS   |
|               |             | 78      | 5.87                    | 3.86                   |             | PASS   |

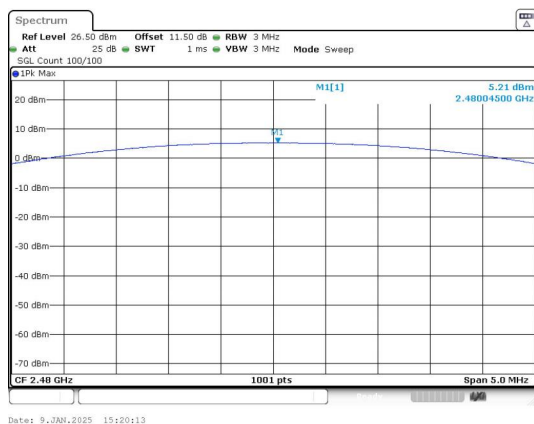
### Test Graphs



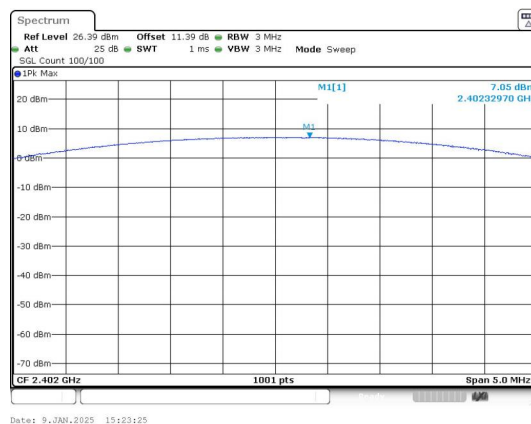
Peak Output Power  
GFSK\_Channel 0



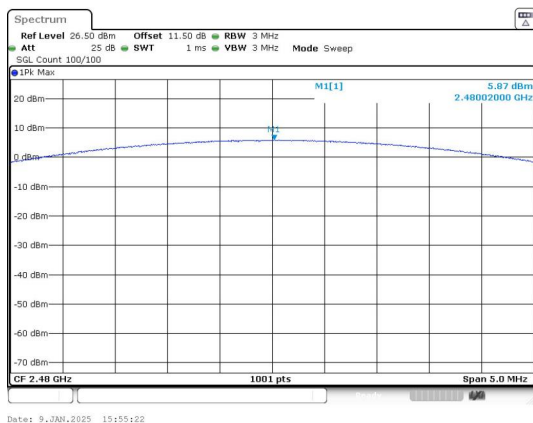
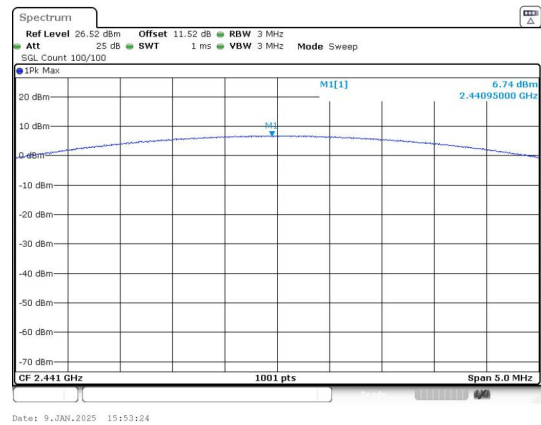
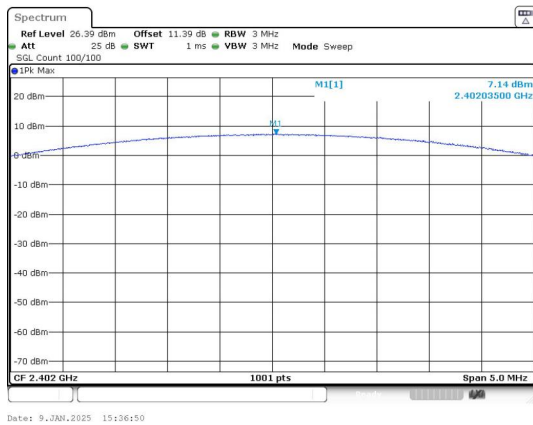
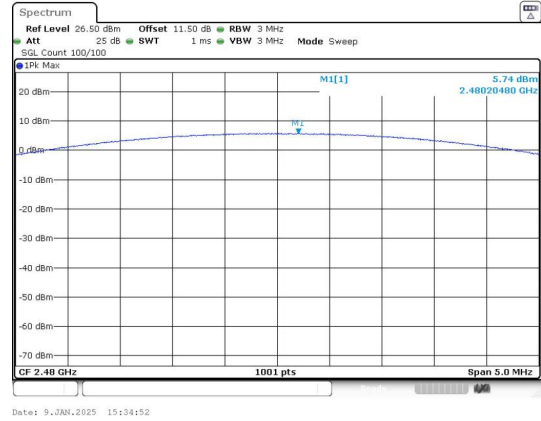
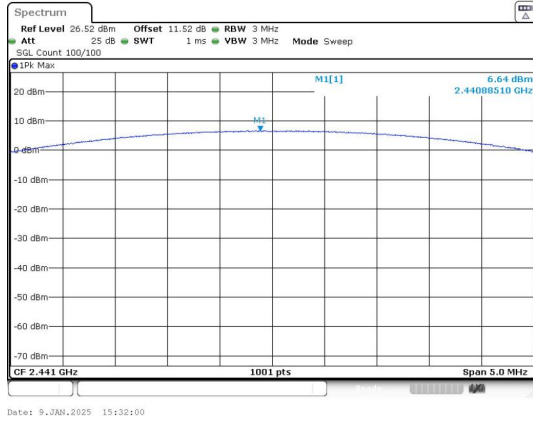
Peak Output Power  
GFSK\_Channel 39



Peak Output Power  
GFSK\_Channel 78



Peak Output Power  
 $\pi/4$ DQPSK\_Channel 0

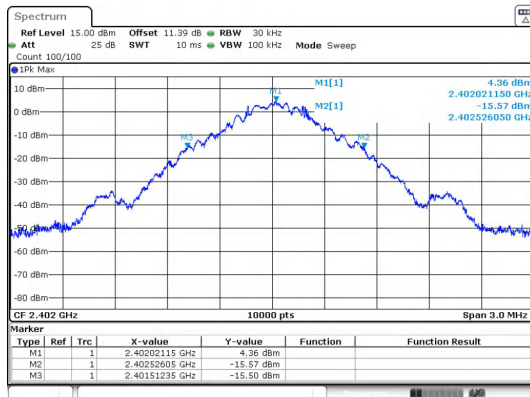


## 5) 20dB Bandwidth

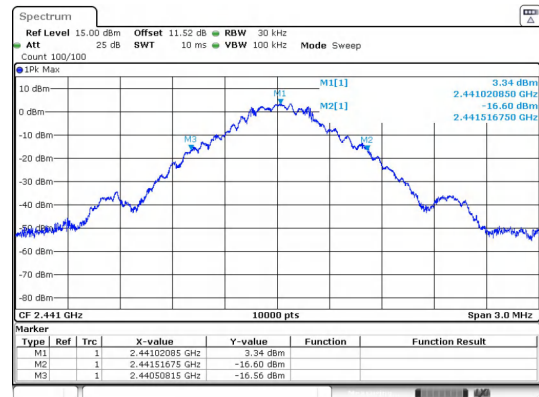
### Test Result

| Modulation    | Channel | Center Frequency (MHz) | 20 dB Bandwidth (MHz) |
|---------------|---------|------------------------|-----------------------|
| GFSK          | 0       | 2402 MHz               | 1.020                 |
|               | 39      | 2441 MHz               | 1.010                 |
|               | 78      | 2480 MHz               | 0.9900                |
| $\pi/4$ DQPSK | 0       | 2402 MHz               | 1.300                 |
|               | 39      | 2441 MHz               | 1.310                 |
|               | 78      | 2480 MHz               | 1.310                 |
| 8DPSK         | 0       | 2402 MHz               | 1.300                 |
|               | 39      | 2441 MHz               | 1.290                 |
|               | 78      | 2480 MHz               | 1.290                 |

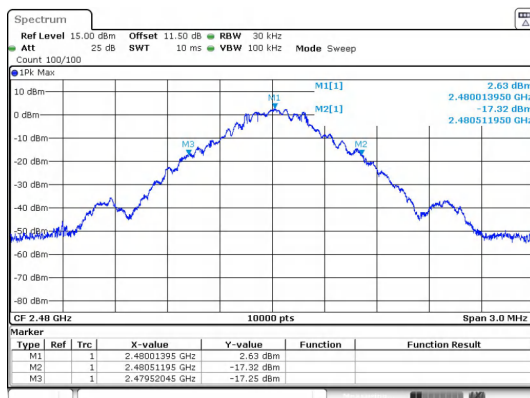
### Test Graphs



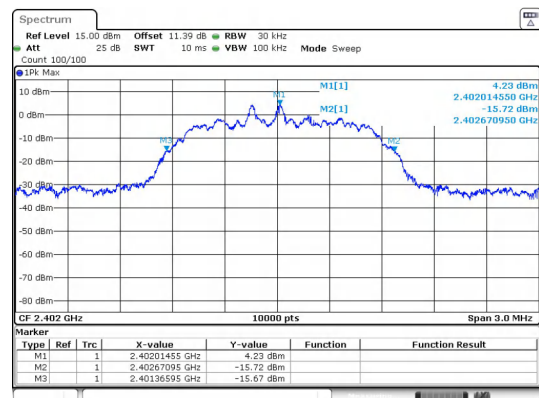
GFSK\_DH5\_Channel 0

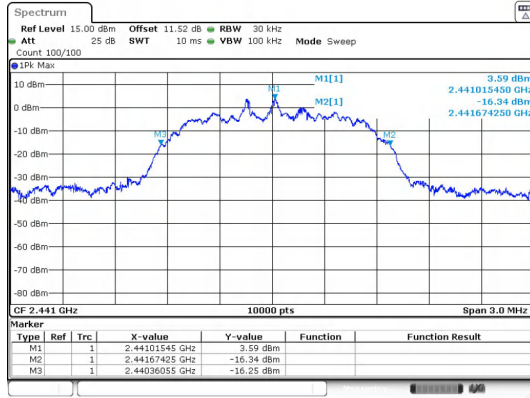


GFSK\_DH5\_Channel 39

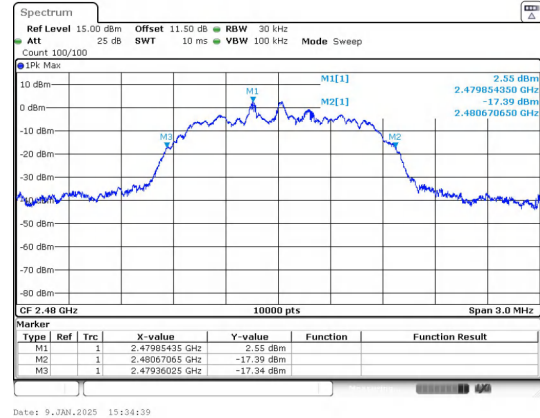


GFSK\_DH5\_Channel 78

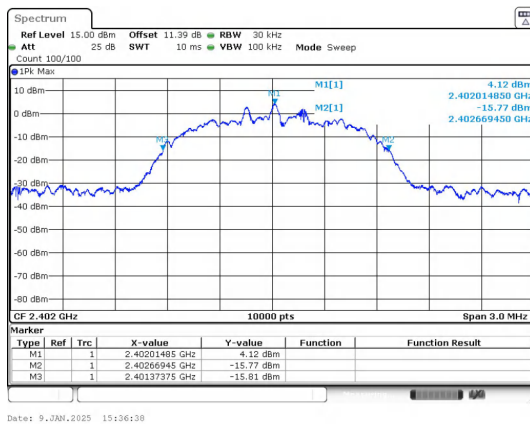

 $\pi/4$ DQPSK\_2-DH5\_Channel 0



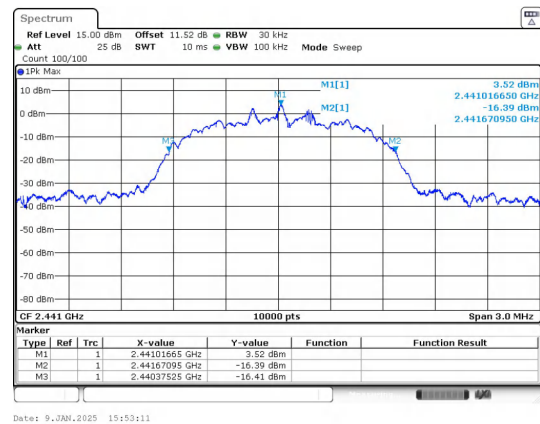
$\pi/4$ DQPSK\_2-DH5\_Channel 39



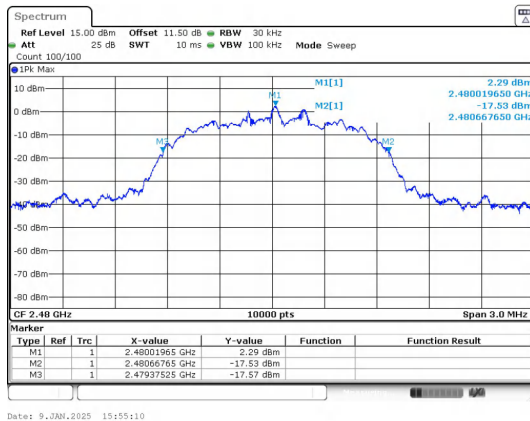
$\pi/4$ DQPSK\_2-DH5\_Channel 78



8DPSK\_3-DH5\_Channel 0



8DPSK\_3-DH5\_Channel 39



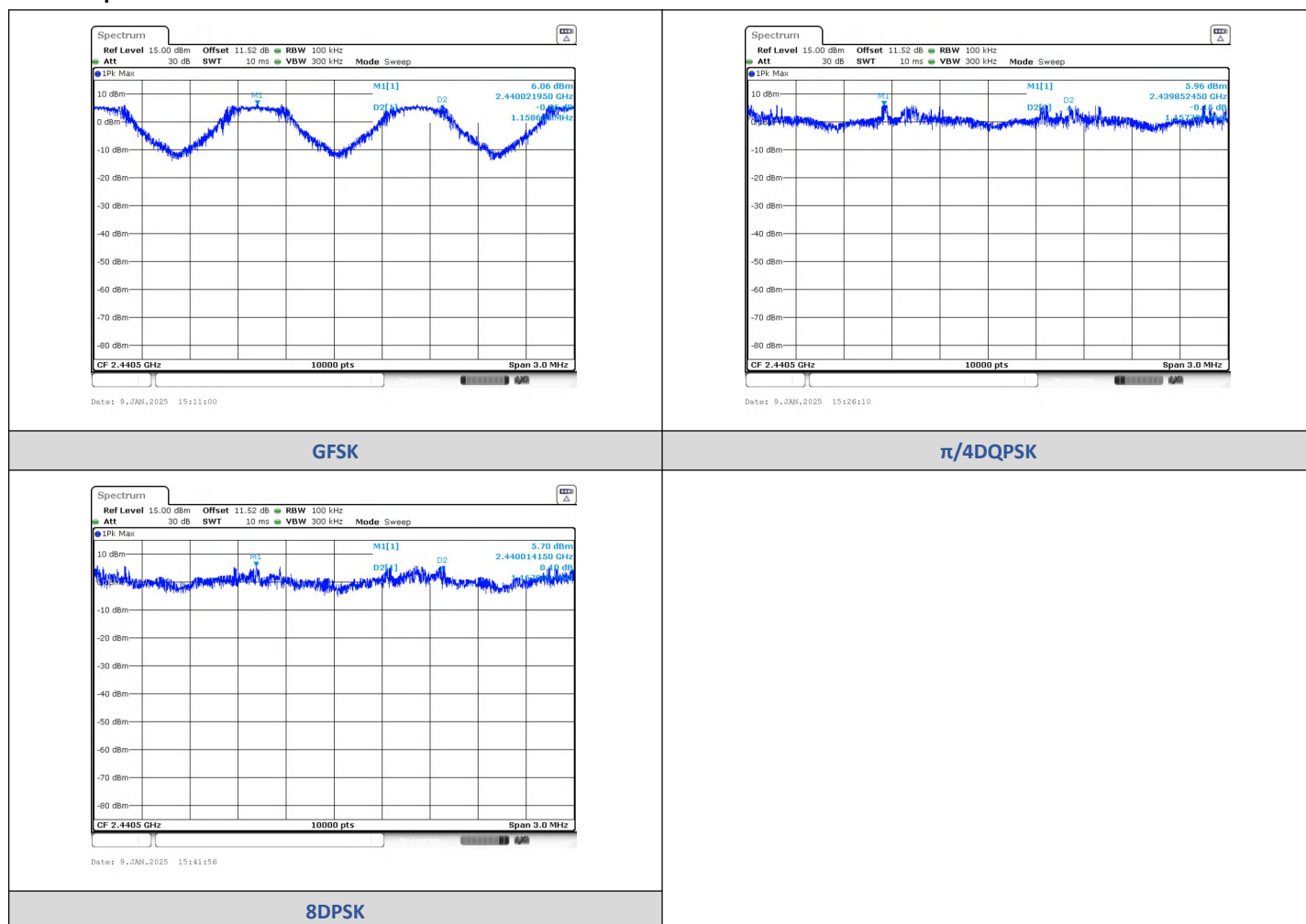
8DPSK\_3-DH5\_Channel 78

## 6) Carrier Frequencies Separation

### Test Result

| Modulation    | Packet | Left Center frequency (MHz) | Right Center frequency (MHz) | Hopping Frequency Separation (MHz) | Limit (MHz) | Result |
|---------------|--------|-----------------------------|------------------------------|------------------------------------|-------------|--------|
| GFSK          | DH5    | 2440.0219                   | 2441.1806                    | 1.1586                             | 1.02        | PASS   |
| $\pi/4$ DQPSK | 2-DH5  | 2439.8524                   | 2441.0102                    | 1.1577                             | 0.867       | PASS   |
| 8DPSK         | 3-DH5  | 2440.0141                   | 2441.1811                    | 1.1670                             | 0.867       | PASS   |

### Test Graphs



## 7) Conducted Out Of Band Emission

### Test Result

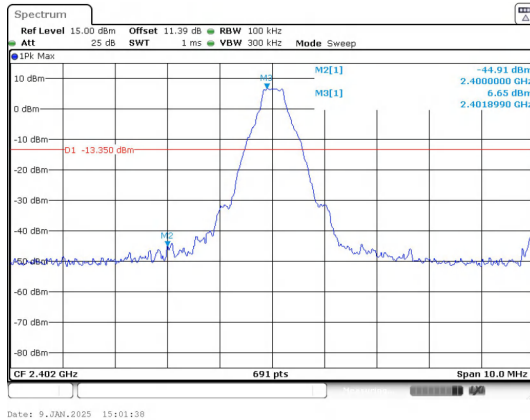
#### Non-Hopping

| Modulation    | Packet | Channel | OOB Emission Frequency (MHz) | OOB Emission Level (dBm) | Limit (dBm) | Over Limit (dB) | Result |
|---------------|--------|---------|------------------------------|--------------------------|-------------|-----------------|--------|
| GFSK          | DH5    | 0       | 2400.00                      | -44.910                  | -13.35      | -31.560         | PASS   |
|               |        |         | 7205.96                      | -39.347                  | -13.35      | -25.997         | PASS   |
|               |        | 39      | 9763.72                      | -39.208                  | -13.87      | -25.338         | PASS   |
|               |        | 78      | 2483.50                      | -49.650                  | -14.91      | -34.740         | PASS   |
|               |        |         | 9920.20                      | -38.512                  | -14.91      | -23.602         | PASS   |
| $\pi/4$ DQPSK | 2-DH5  | 0       | 2400.00                      | -41.810                  | -13.63      | -28.180         | PASS   |
|               |        |         | 7205.96                      | -35.864                  | -13.63      | -22.234         | PASS   |
|               |        | 39      | 9763.72                      | -39.947                  | -14.15      | -25.797         | PASS   |
|               |        | 78      | 2483.50                      | -50.320                  | -15.12      | -35.200         | PASS   |
|               |        |         | 9920.20                      | -37.498                  | -15.12      | -22.378         | PASS   |
| 8DPSK         | 3-DH5  | 0       | 2400.00                      | -42.540                  | -13.79      | -28.750         | PASS   |
|               |        |         | 9608.08                      | -41.405                  | -13.79      | -27.615         | PASS   |
|               |        | 39      | 9763.72                      | -39.618                  | -14.43      | -25.188         | PASS   |
|               |        | 78      | 2483.50                      | -50.770                  | -15.86      | -34.910         | PASS   |
|               |        |         | 9920.20                      | -37.732                  | -15.86      | -21.872         | PASS   |

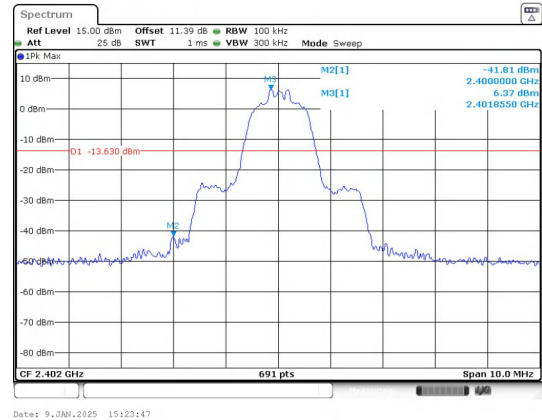
#### Hopping

| Modulation | Packet | Channel | OOB Emission<br>Frequency<br>(MHz) | OOB Emission<br>Level<br>(dBm) | Limit<br>(dBm) | Over Limit<br>(dB) | Result |
|------------|--------|---------|------------------------------------|--------------------------------|----------------|--------------------|--------|
| GFSK       | DH5    | Hopping | 2398.00                            | -47.088                        | -13.6          | -33.488            | PASS   |
|            |        |         | 2400.00                            | -47.680                        | -13.6          | -34.080            | PASS   |
|            |        |         | 2483.50                            | -47.990                        | -14.8          | -33.190            | PASS   |
| π/4DQPSK   | 2-DH5  |         | 2400.00                            | -47.960                        | -14.24         | -33.720            | PASS   |
|            |        |         | 2483.50                            | -49.310                        | -15.27         | -34.040            | PASS   |
| 8DPSK      | 3-DH5  |         | 2396.01                            | -47.626                        | -13.73         | -33.896            | PASS   |
|            |        |         | 2400.00                            | -48.900                        | -13.73         | -35.170            | PASS   |
|            |        |         | 2483.50                            | -49.510                        | -15.37         | -34.140            | PASS   |

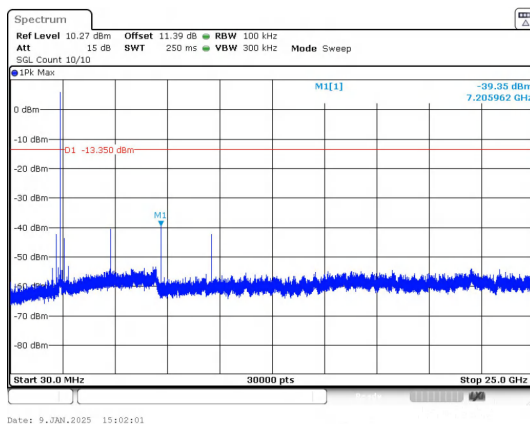
### Test Graphs



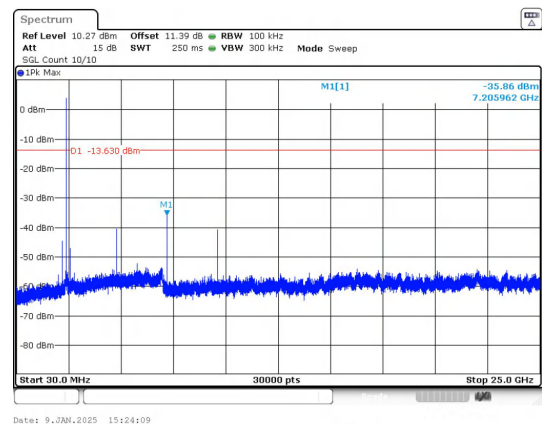
Out Of Band Emission  
GFSK\_DH5\_Channel 0



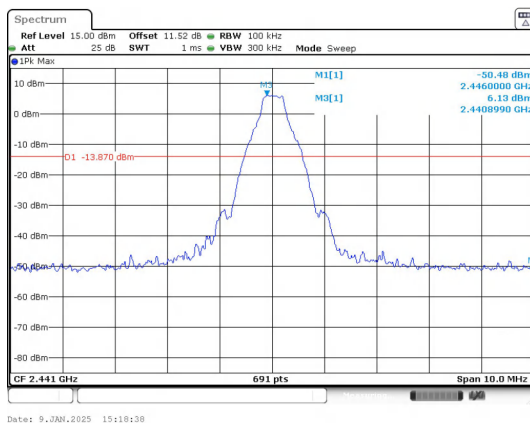
Out Of Band Emission  
 $\pi/4$ QPSK\_2-DH5\_Channel 0



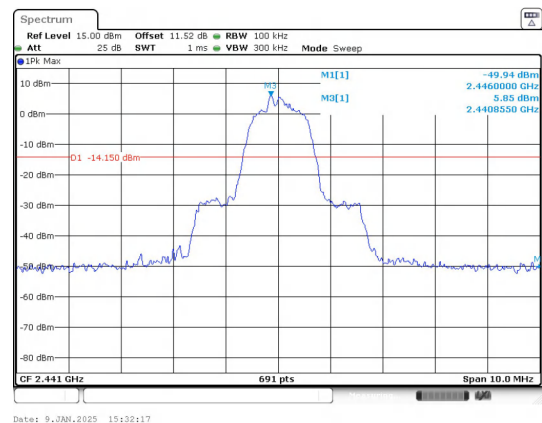
30.0 MHz - 25000.0 MHz  
GFSK\_DH5\_Channel 0



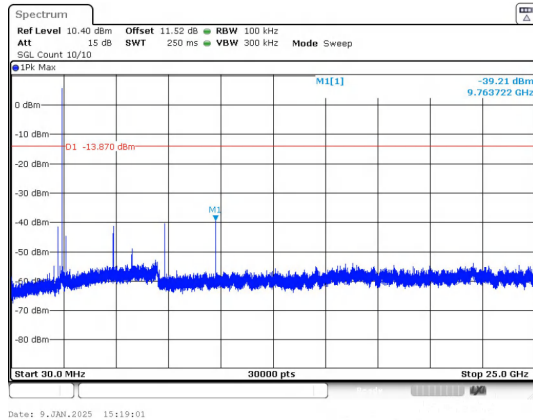
30.0 MHz - 25000.0 MHz  
 $\pi/4$ QPSK\_2-DH5\_Channel 0



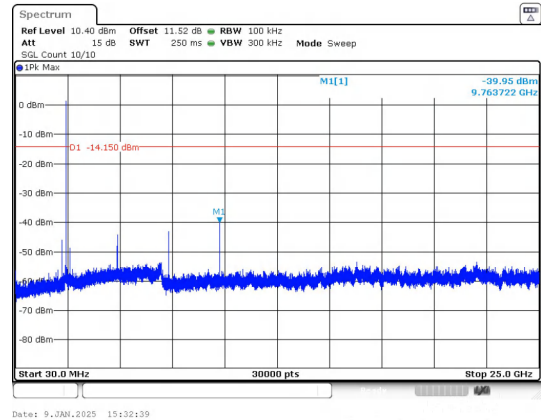
Out Of Band Emission  
GFSK\_DH5\_Channel 39



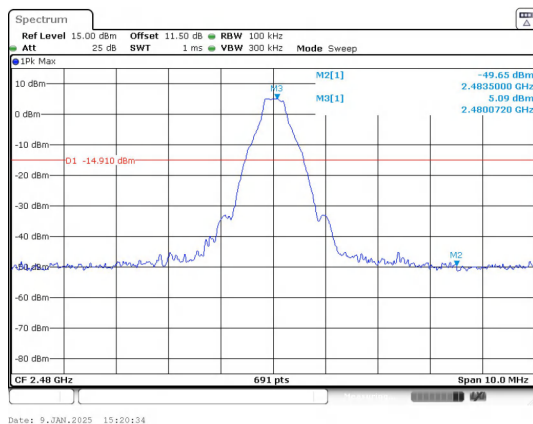
Out Of Band Emission  
 $\pi/4$ QPSK\_2-DH5\_Channel 39



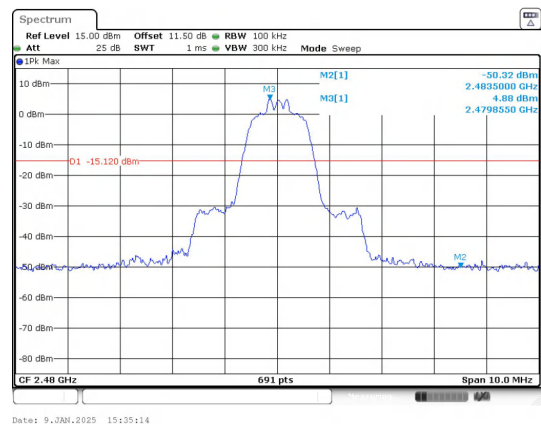
30.0 MHz - 25000.0 MHz  
GFSK\_DH5\_Channel 39



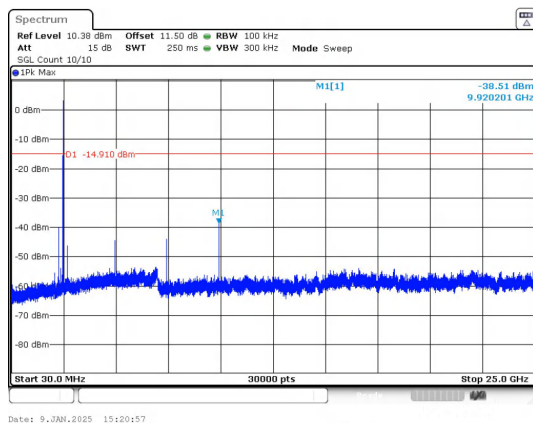
30.0 MHz - 25000.0 MHz  
 $\pi/4$ DQPSK\_2-DH5\_Channel 39



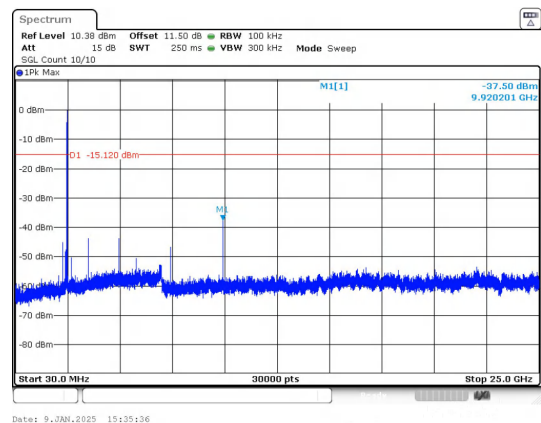
Out Of Band Emission  
GFSK\_DH5\_Channel 78



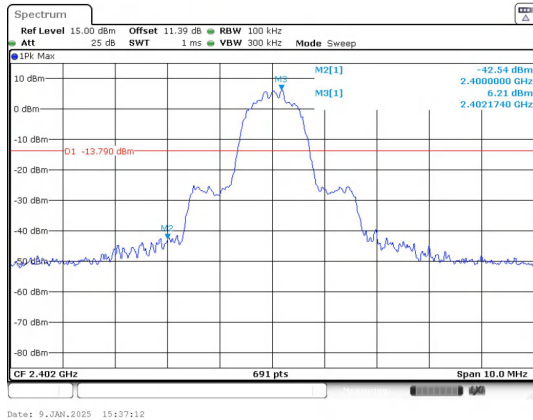
Out Of Band Emission  
 $\pi/4$ DQPSK\_2-DH5\_Channel 78



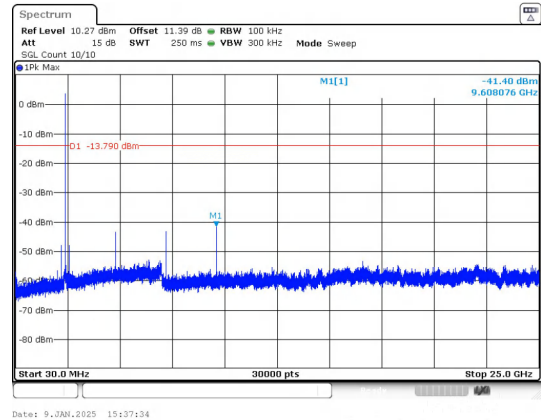
30.0 MHz - 25000.0 MHz  
GFSK\_DH5\_Channel 78



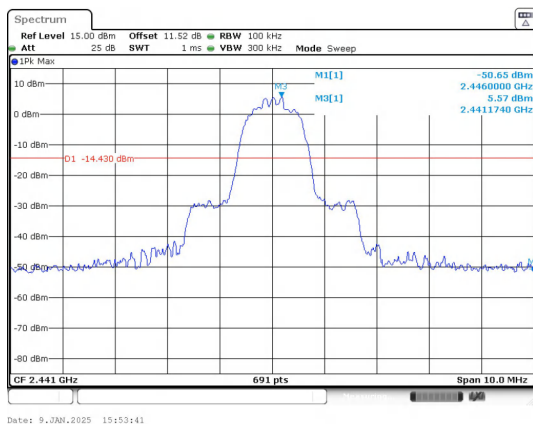
30.0 MHz - 25000.0 MHz  
 $\pi/4$ DQPSK\_2-DH5\_Channel 78



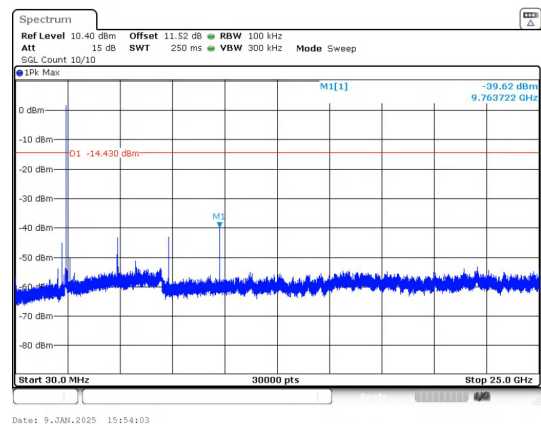
Out Of Band Emission  
8DPSK\_3-DH5\_Channel 0



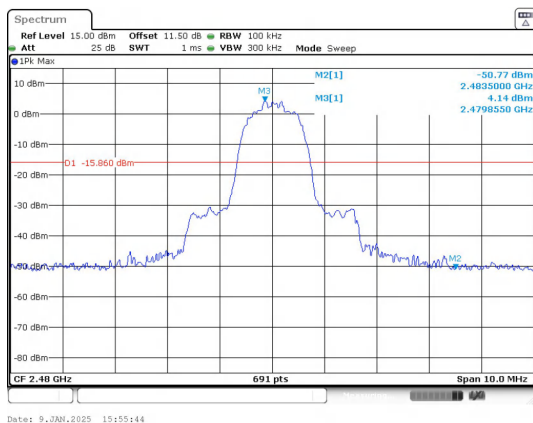
30.0 MHz - 25000.0 MHz  
8DPSK\_3-DH5\_Channel 0



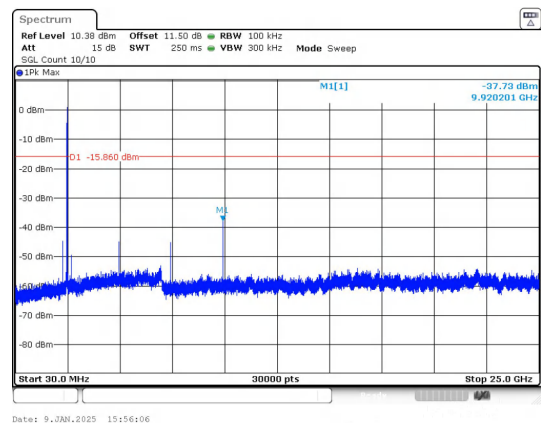
Out Of Band Emission  
8DPSK\_3-DH5\_Channel 39



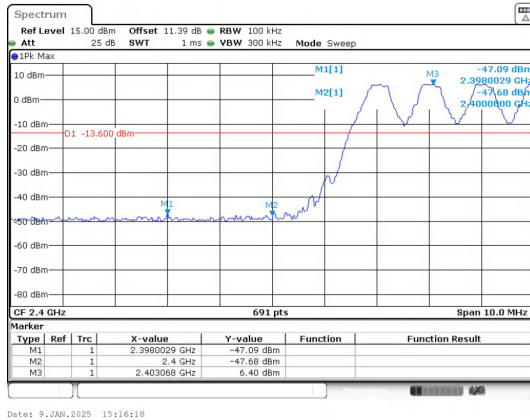
30.0 MHz - 25000.0 MHz  
8DPSK\_3-DH5\_Channel 39



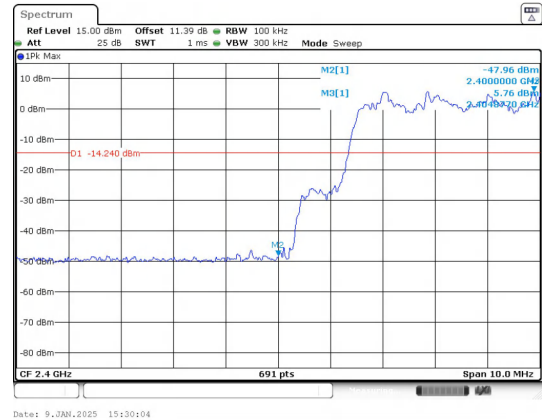
Out Of Band Emission  
8DPSK\_3-DH5\_Channel 78



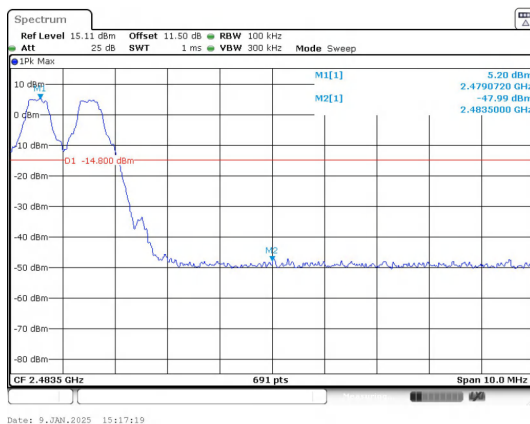
30.0 MHz - 25000.0 MHz  
8DPSK\_3-DH5\_Channel 78



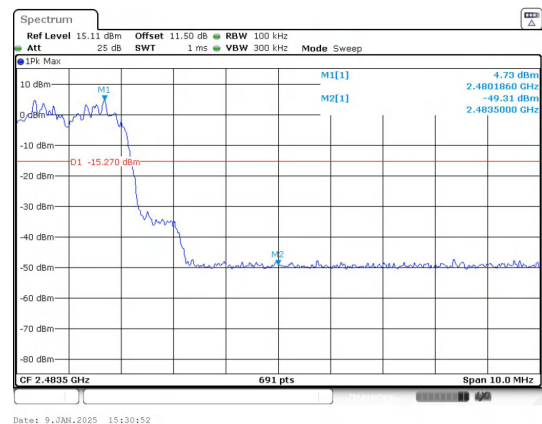
Out Of Band Emission(Left)  
GFSK\_DH5\_Channel Hopping



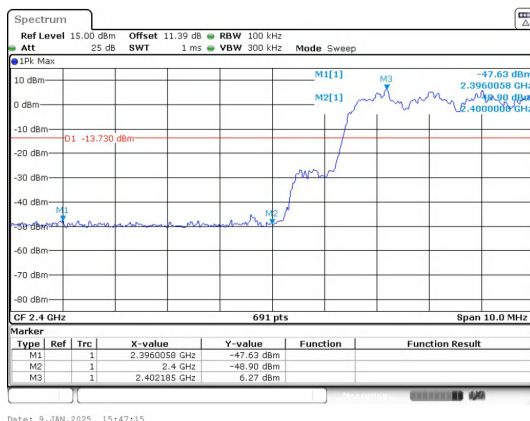
Out Of Band Emission(Left)  
 $\pi/4$ DQPSK\_2-DH5\_Channel Hopping



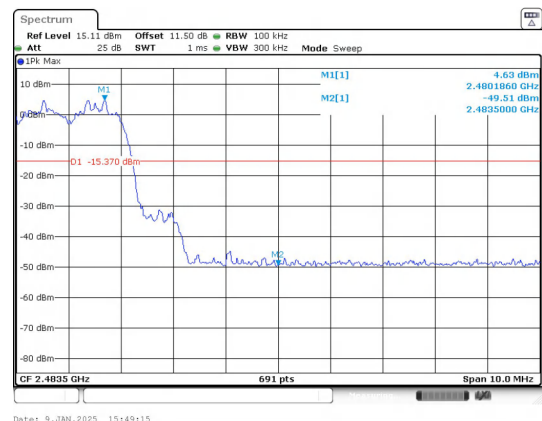
Out Of Band Emission(Right)  
GFSK\_DH5\_Channel Hopping



Out Of Band Emission(Right)  
 $\pi/4$ DQPSK\_2-DH5\_Channel Hopping



Out Of Band Emission(Left)  
8DPSK\_3-DH5\_Channel Hopping



Out Of Band Emission(Right)  
8DPSK\_3-DH5\_Channel Hopping

-----End of the report-----