

# Appendix Report

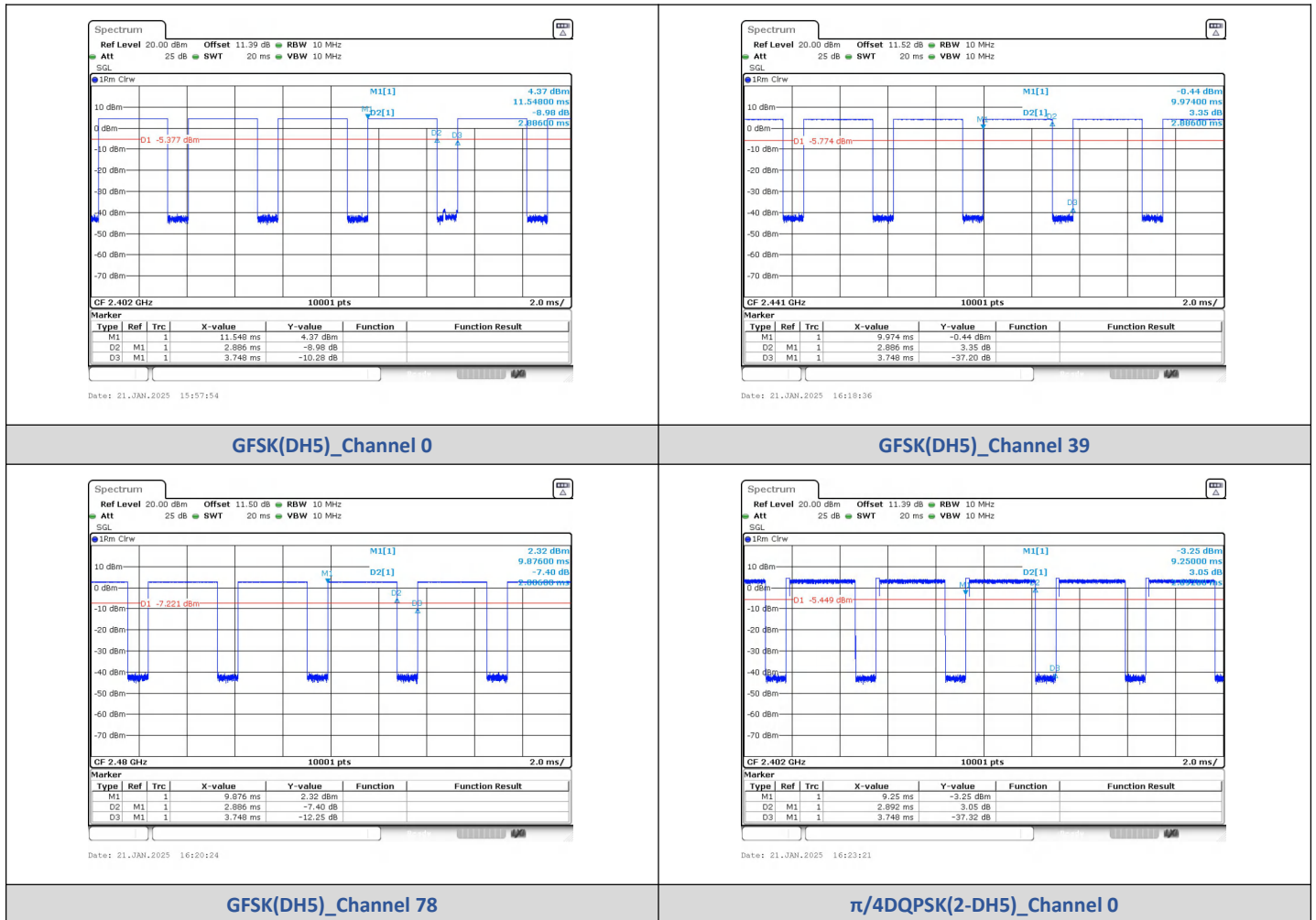
|                |                  |
|----------------|------------------|
| Report No.:    | CISRR25011716004 |
| Test Engineer: | Mark Fu          |
| Supervised by: | Rory Huang       |

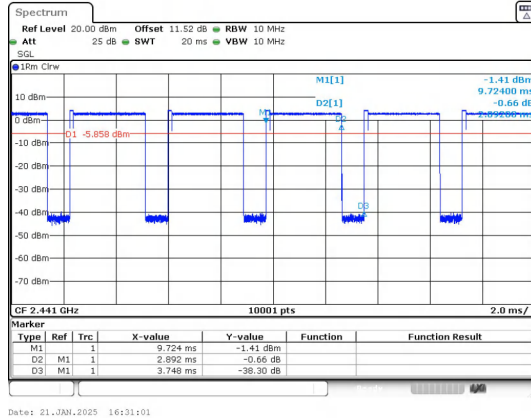
# 1) Duty Cycle

## Test Result

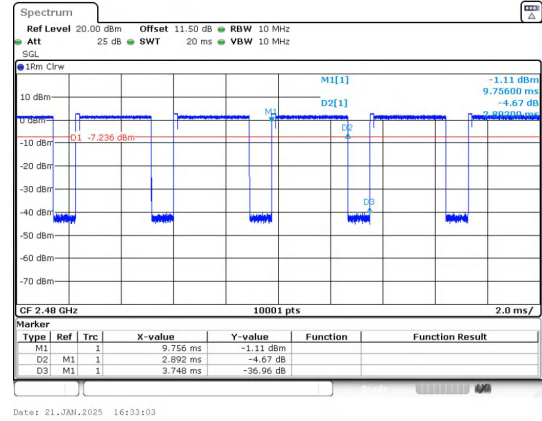
| Modulation    | Packets | Channel | On Time (ms) | Period (ms) | Duty Cycle (%) | Duty Cycle (linear) | Duty Cycle Factor (dB) | 1/T    |
|---------------|---------|---------|--------------|-------------|----------------|---------------------|------------------------|--------|
| GFSK          | DH5     | 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      | 2.886        | 3.748       | 77.00          | 0.7700              | 1.1351                 | 0.3465 |
| $\pi/4$ DQPSK | 2-DH5   | 0       | 2.892        | 3.748       | 77.16          | 0.7716              | 1.1261                 | 0.3458 |
|               |         | 39      | 2.892        | 3.748       | 77.16          | 0.7716              | 1.1261                 | 0.3458 |
|               |         | 78      | 2.892        | 3.748       | 77.16          | 0.7716              | 1.1261                 | 0.3458 |

## Test Graphs





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



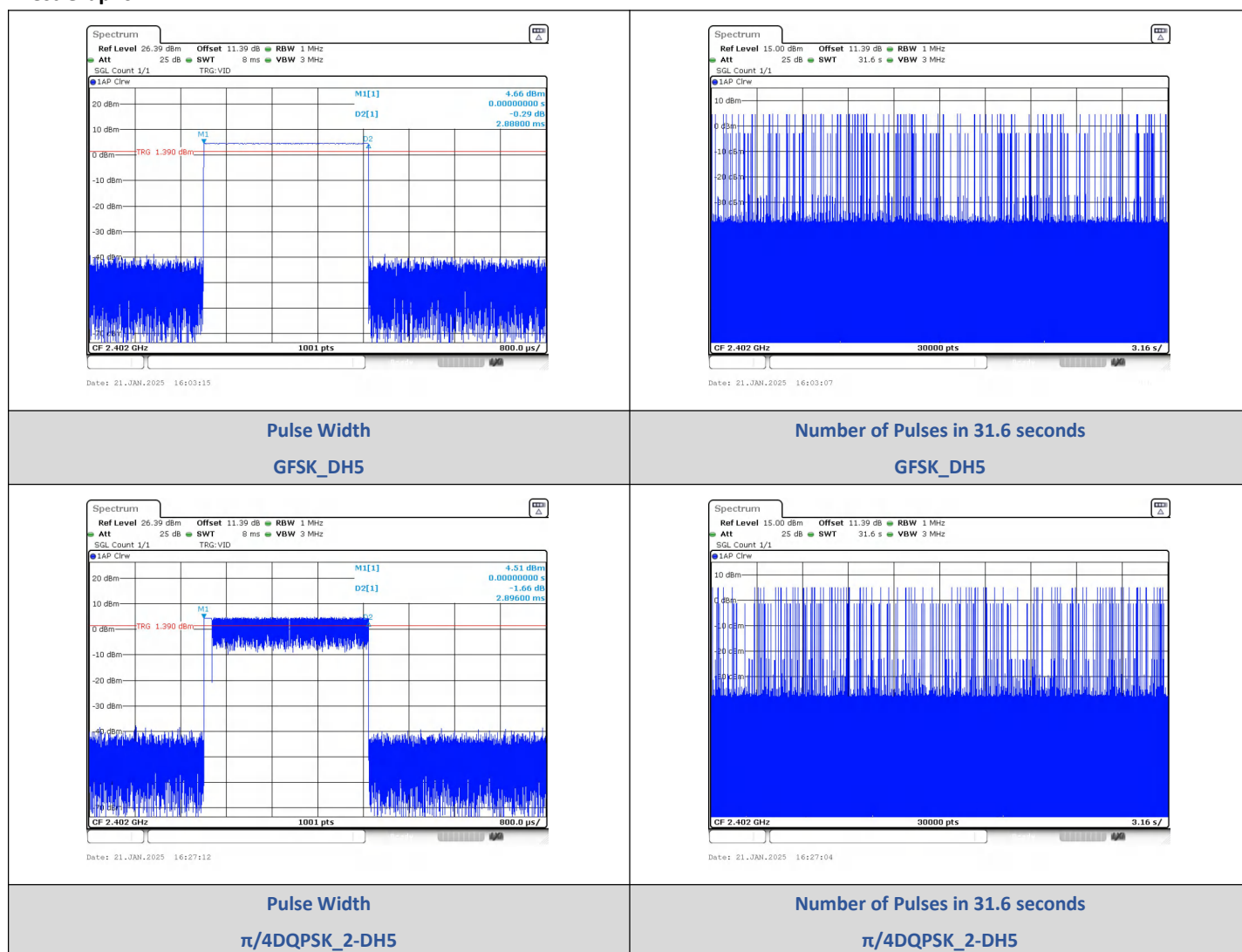
$\pi/4$ DQPSK(2-DH5)\_Channel 78

## 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       | 2.888            | 109                              | 314.79          | < 400      | PASS   |
| $\pi/4$ DQPSK | 2-DH5  | (2402MHz) | 2.896            | 97                               | 280.91          |            | PASS   |

### Test Graphs

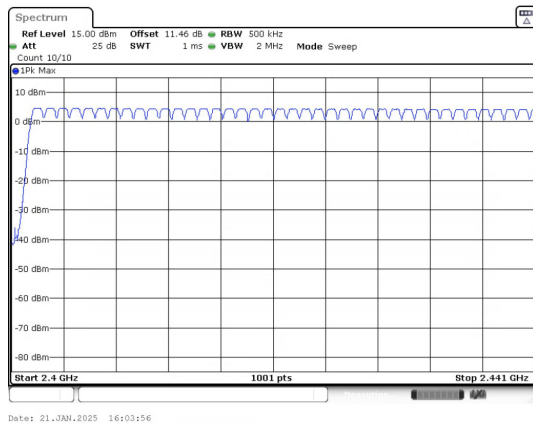


### 3) Number Of Hopping Channel

#### Test Result

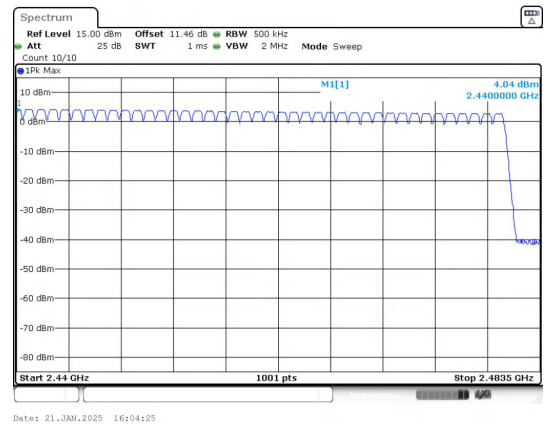
| Modulation    | Packet | Number of Hopping Channel | Limit | Result |
|---------------|--------|---------------------------|-------|--------|
| GFSK          | DH5    | 79                        | 15    | PASS   |
| $\pi/4$ DQPSK | 2-DH5  | 79                        | 15    | PASS   |

#### Test Graphs



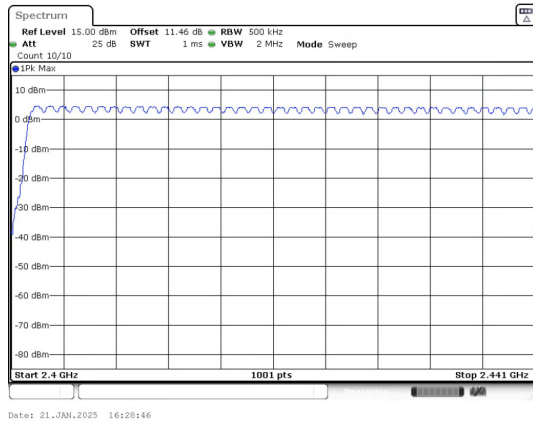
Low End Spectrum Channel Hopping Plot

GFSK



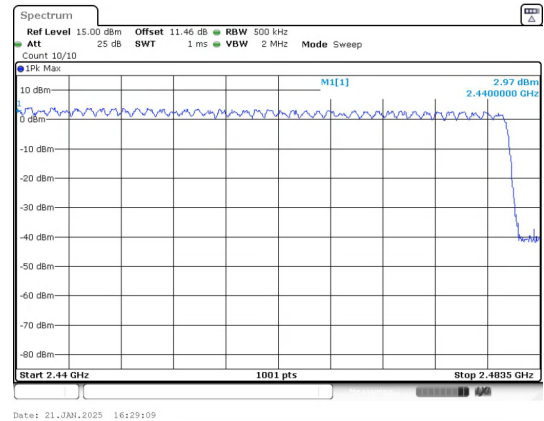
High End Spectrum Channel Hopping Plot

GFSK



Low End Spectrum Channel Hopping Plot

$\pi/4$ DQPSK



High End Spectrum Channel Hopping Plot

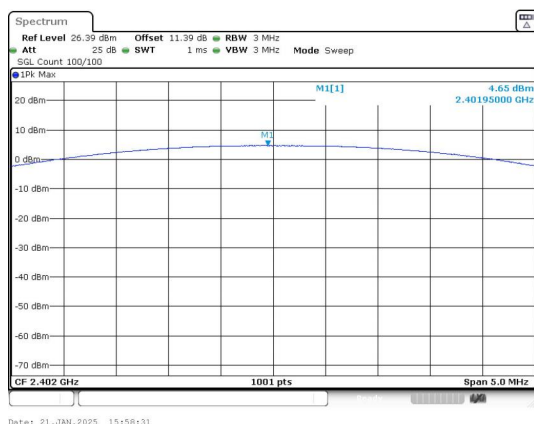
$\pi/4$ DQPSK

## 4) Conducted Output Power

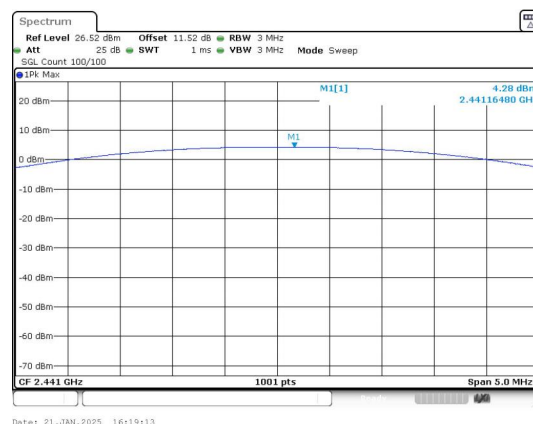
### Test Result

| Modulation    | Packet Type | Channel | Peak Output Power (dBm) | Peak Output Power (mW) | Limit (dBm) | Result |
|---------------|-------------|---------|-------------------------|------------------------|-------------|--------|
| GFSK          | DH5         | 0       | 4.65                    | 2.92                   | ≤30         | PASS   |
|               |             | 39      | 4.28                    | 2.68                   |             | PASS   |
|               |             | 78      | 2.85                    | 1.93                   |             | PASS   |
| $\pi/4$ DQPSK | 2-DH5       | 0       | 5.36                    | 3.44                   | ≤20.97      | PASS   |
|               |             | 39      | 5.06                    | 3.21                   |             | PASS   |
|               |             | 78      | 3.67                    | 2.33                   |             | PASS   |

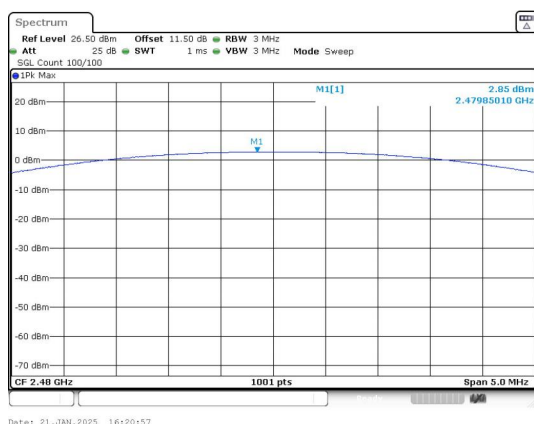
### Test Graphs



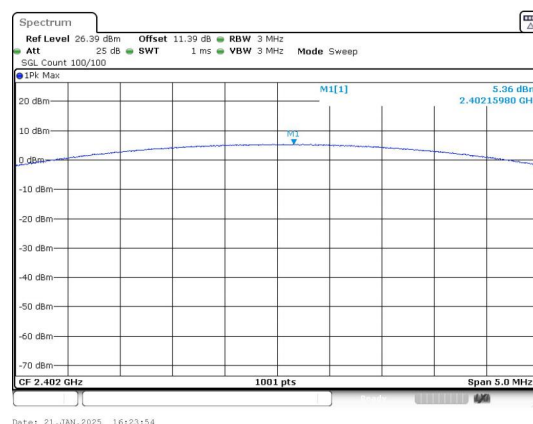
Peak Output Power  
GFSK\_Channel 0



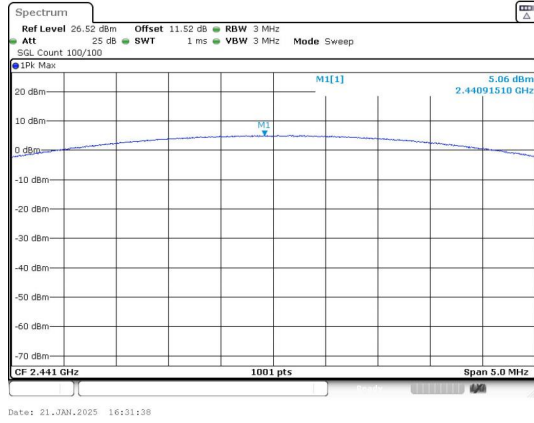
Peak Output Power  
GFSK\_Channel 39



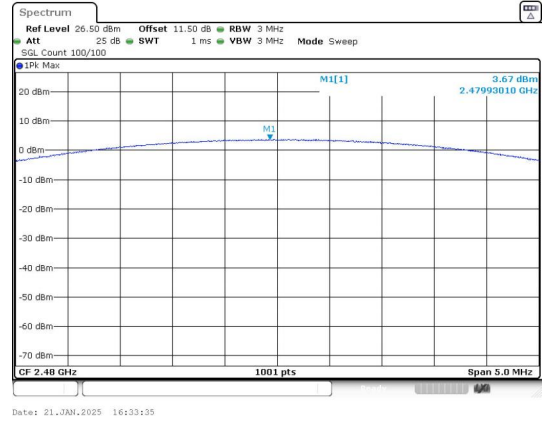
Peak Output Power  
GFSK\_Channel 78



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



Peak Output Power  
 $\pi/4$ DQPSK\_Channel 39



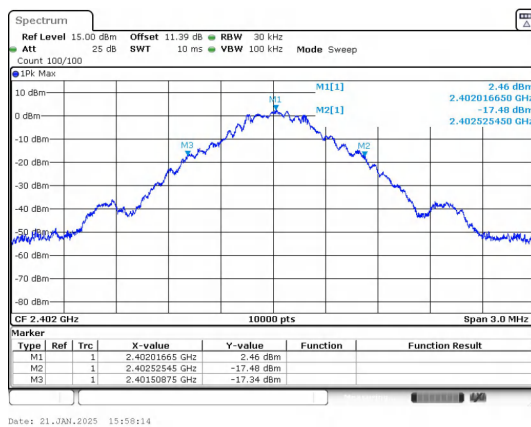
Peak Output Power  
 $\pi/4$ DQPSK\_Channel 78

## 5) 20dB Bandwidth

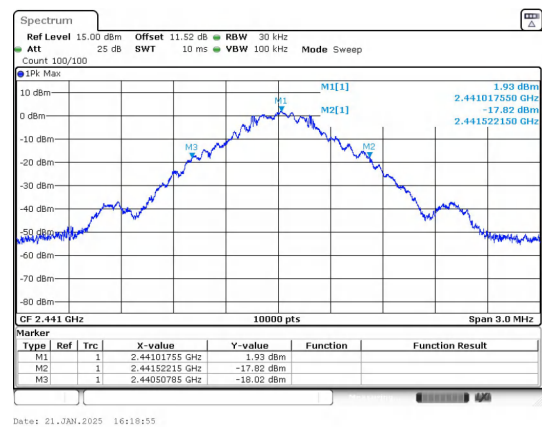
### Test Result

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

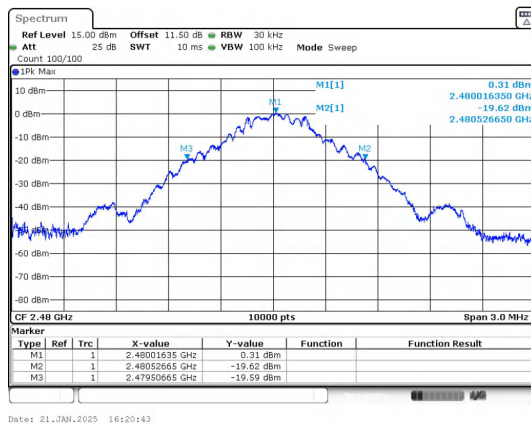
### Test Graphs



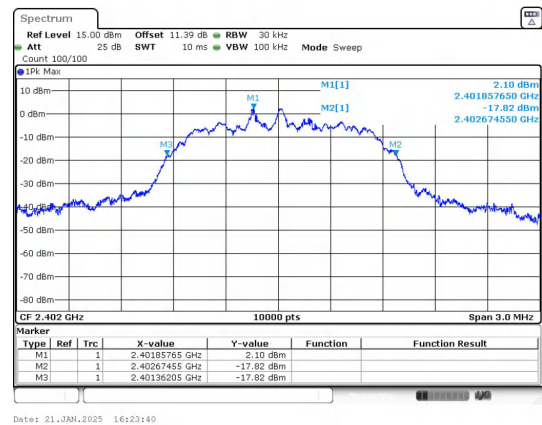
GFSK\_DH5\_Channel 0



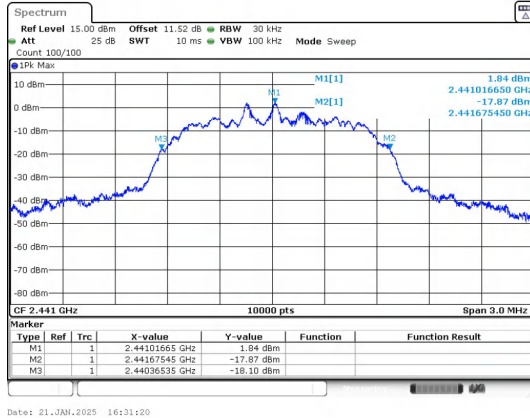
GFSK\_DH5\_Channel 39



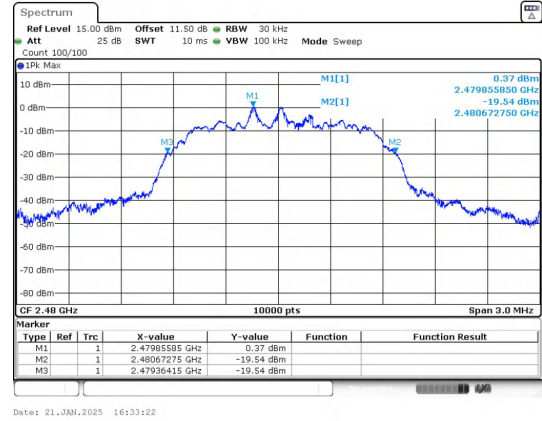
GFSK\_DH5\_Channel 78


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





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



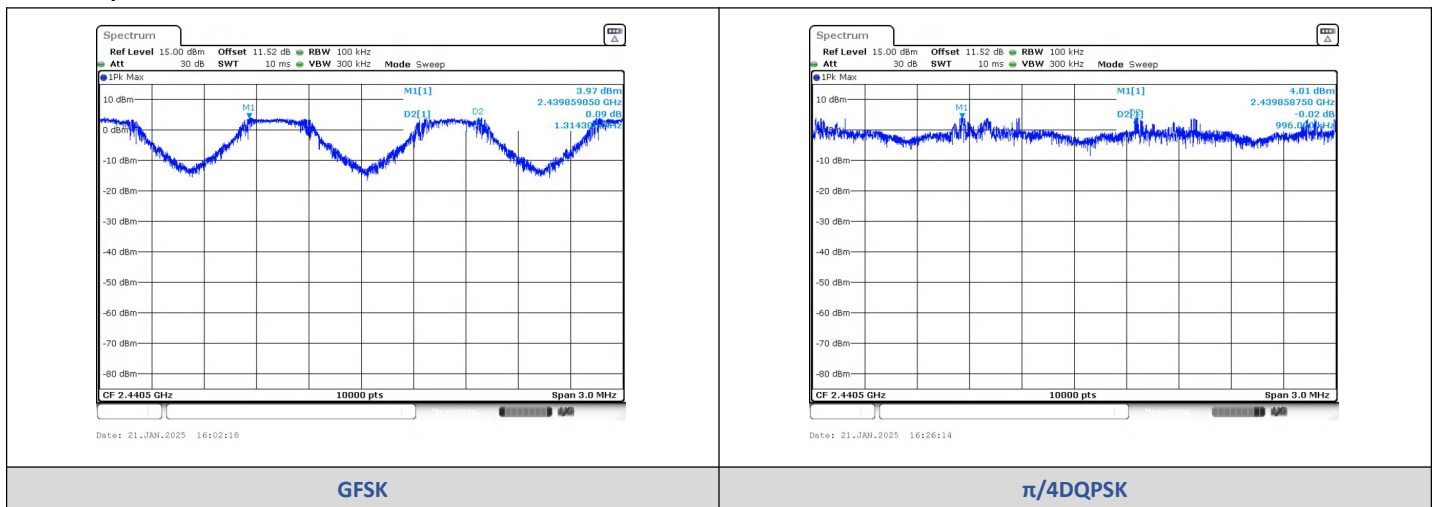
$\pi/4$ DQPSK\_2-DH5\_Channel 78

## 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    | 2439.8591                   | 2441.1734                    | 1.3143                             | 1.02        | PASS   |
| $\pi/4$ DQPSK | 2-DH5  | 2439.8587                   | 2440.8547                    | 0.9960                             | 0.873       | PASS   |

### Test Graphs



## 7) Conducted Out Of Band Emission

### Test Result

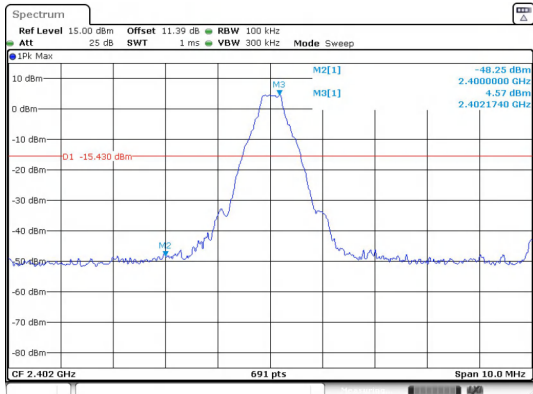
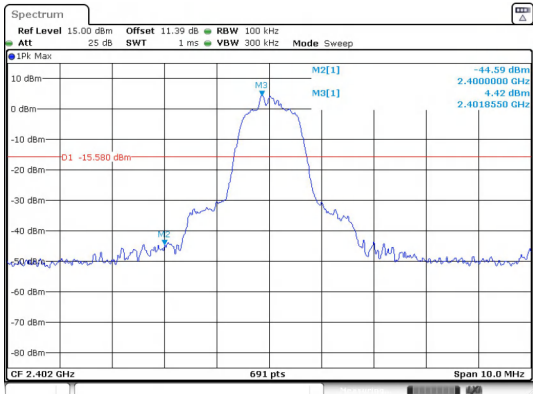
#### Non-Hopping

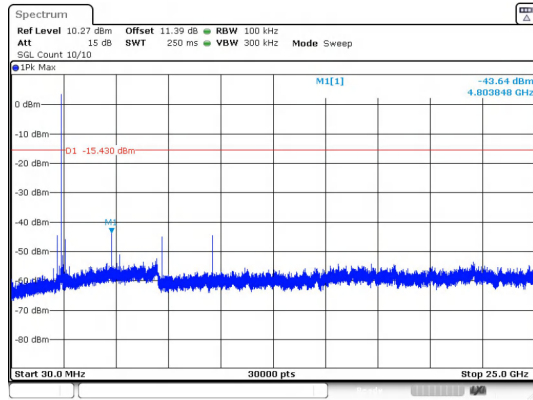
| Modulation    | Packet | Channel | OOB Emission Frequency (MHz) | OOB Emission Level (dBm) | Limit (dBm) | Over Limit (dB) | Result |
|---------------|--------|---------|------------------------------|--------------------------|-------------|-----------------|--------|
| GFSK          | DH5    | 0       | 2400.00                      | -48.250                  | -15.43      | -32.820         | PASS   |
|               |        |         | 4803.85                      | -43.636                  | -15.43      | -28.206         | PASS   |
|               |        | 39      | 2248.58                      | -42.511                  | -15.82      | -26.691         | PASS   |
|               |        | 78      | 2483.50                      | -49.560                  | -17.29      | -32.270         | PASS   |
|               |        |         | 9920.20                      | -39.902                  | -17.29      | -22.612         | PASS   |
| $\pi$ /4DQPSK | 2-DH5  | 0       | 2400.00                      | -44.590                  | -15.58      | -29.010         | PASS   |
|               |        |         | 9608.08                      | -44.339                  | -15.58      | -28.759         | PASS   |
|               |        | 39      | 2249.42                      | -42.547                  | -15.9       | -26.647         | PASS   |
|               |        | 78      | 2483.50                      | -50.510                  | -17.36      | -33.150         | PASS   |
|               |        |         | 9920.20                      | -39.699                  | -17.36      | -22.339         | 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 | 2398.93                            | -47.626                        | -15.46         | -32.166            | PASS   |
|               |        |         | 2400.00                            | -47.970                        | -15.46         | -32.510            | PASS   |
|               |        |         | 2483.50                            | -49.750                        | -17.53         | -32.220            | PASS   |
| $\pi$ /4DQPSK | 2-DH5  |         | 2398.94                            | -48.112                        | -16.55         | -31.562            | PASS   |
|               |        |         | 2400.00                            | -50.570                        | -16.55         | -34.020            | PASS   |
|               |        |         | 2483.50                            | -50.030                        | -18.79         | -31.240            | PASS   |

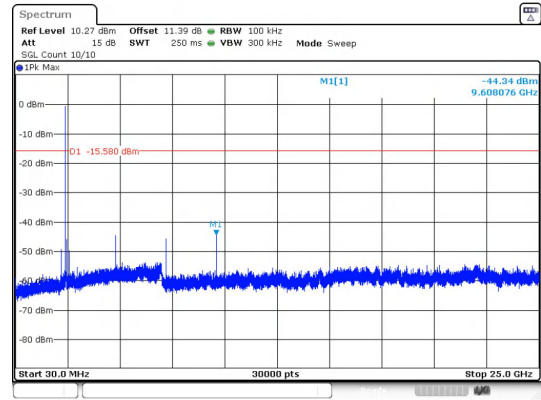
### Test Graphs

|                                                                                                                                        |                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Out Of Band Emission<br/>GFSK_DH5_Channel 0</p> |  <p>Out Of Band Emission<br/><math>\pi</math>/4DQPSK_2-DH5_Channel 0</p> |
|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|



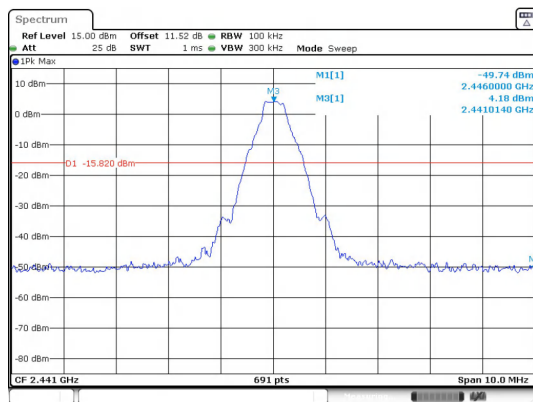
Date: 21.JAN.2025 15:59:16

30.0 MHz - 25000.0 MHz  
GFSK\_DH5\_Channel 0



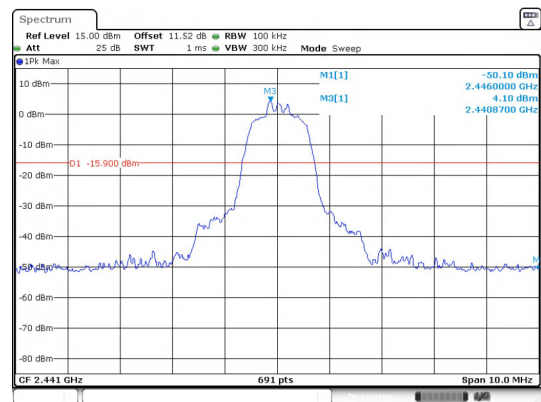
Date: 21.JAN.2025 16:24:39

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



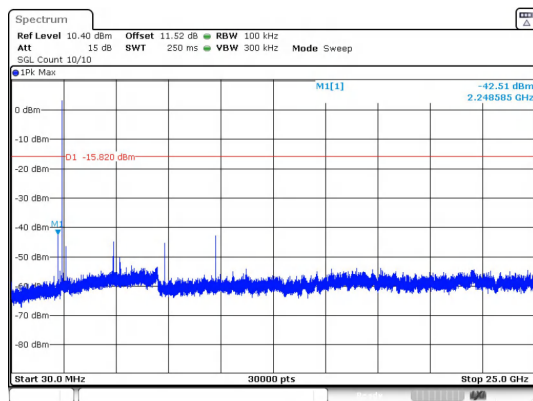
Date: 21.JAN.2025 16:19:31

Out Of Band Emission  
GFSK\_DH5\_Channel 39



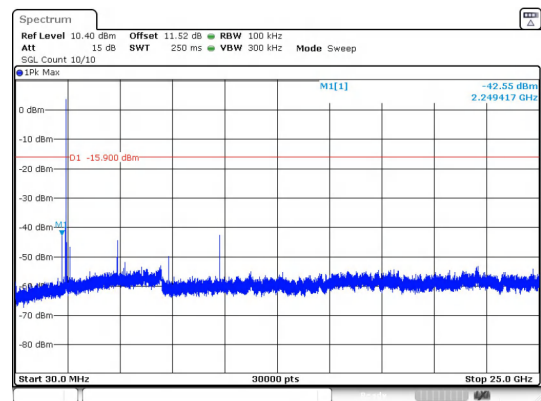
Date: 21.JAN.2025 16:31:56

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



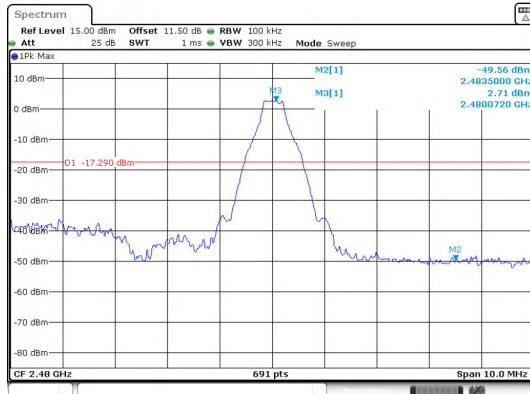
Date: 21.JAN.2025 16:19:53

30.0 MHz - 25000.0 MHz  
GFSK\_DH5\_Channel 39



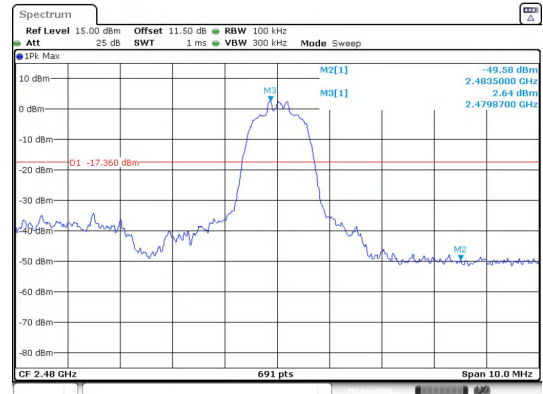
Date: 21.JAN.2025 16:32:18

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



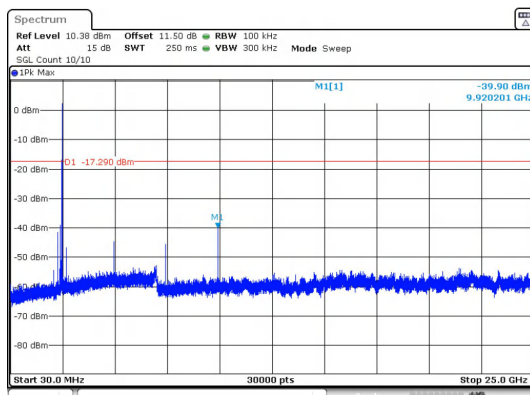
Date: 21.JAN.2025 16:21:20

**Out Of Band Emission**  
**GFSK\_DH5\_Channel 78**



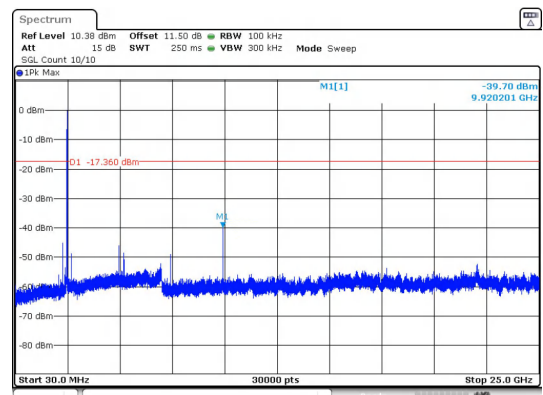
Date: 21.JAN.2025 16:33:58

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



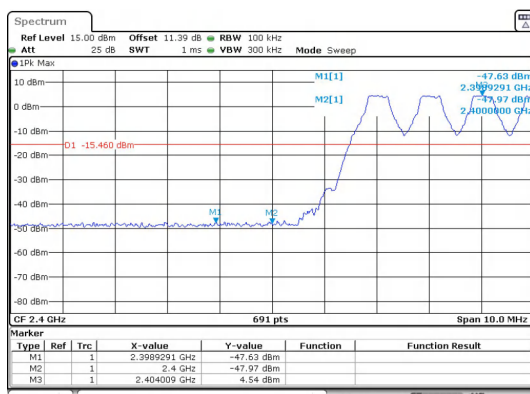
Date: 21.JAN.2025 16:21:42

**30.0 MHz - 25000.0 MHz**  
**GFSK\_DH5\_Channel 78**



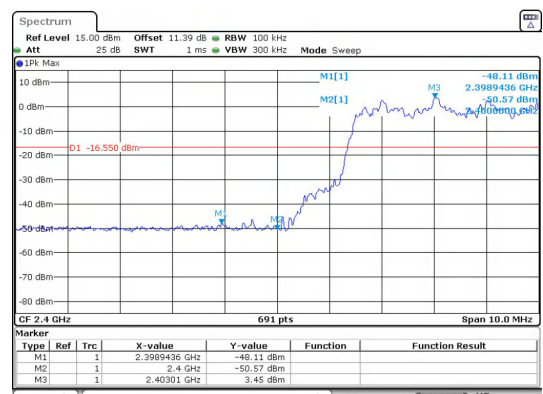
Date: 21.JAN.2025 16:34:21

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



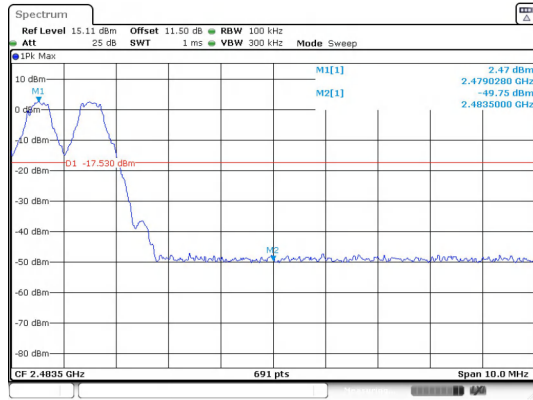
Date: 21.JAN.2025 16:16:55

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

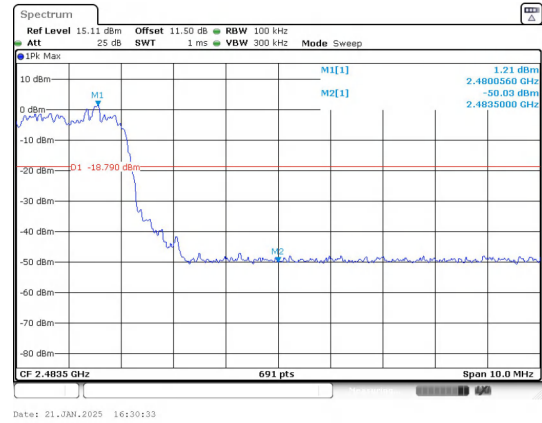


Date: 21.JAN.2025 16:29:54

**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

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