

# Appendix Report

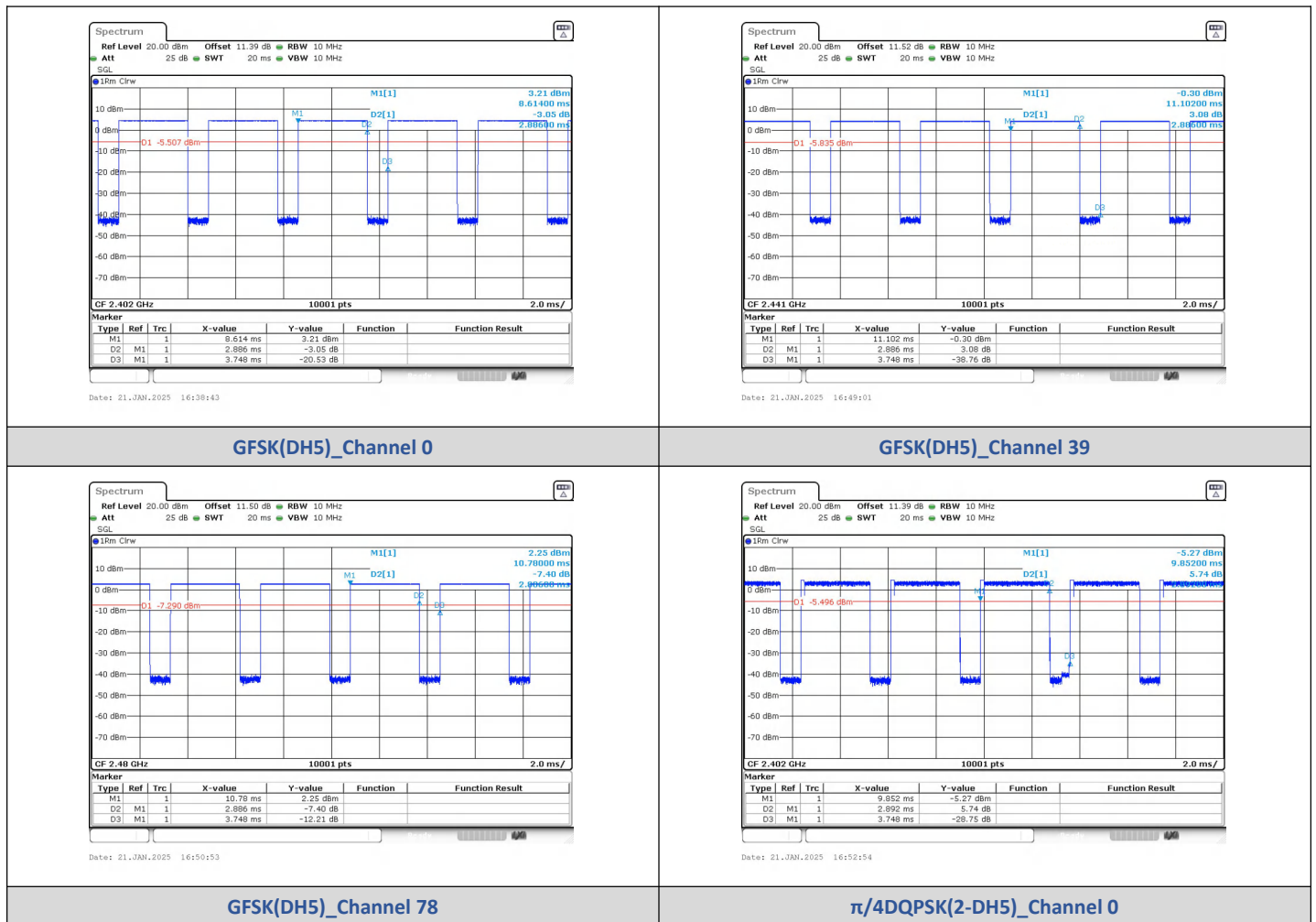
|                |                  |
|----------------|------------------|
| Report No.:    | CISRR25011716104 |
| Test Engineer: | Mark Fu          |
| Supervised by: | Rory Huang       |

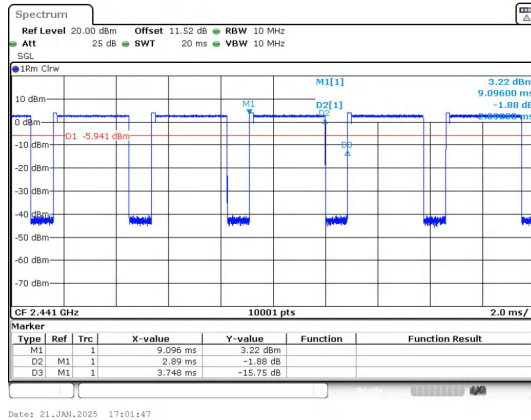
# 1) Duty Cycle

## Test Result

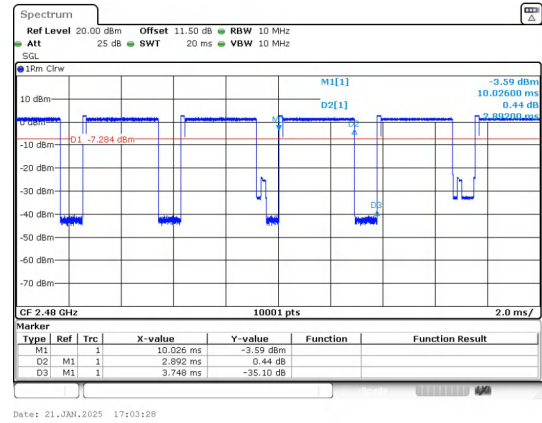
| Modulation    | Packets | Channel | On Time (ms) | Period (ms) | Duty Cycle (%) | Duty Cycle (linear) | Duty Cycle Factor (dB) | 1/T    |
|---------------|---------|---------|--------------|-------------|----------------|---------------------|------------------------|--------|
| GFSK          | DH5     | 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      | 2.890        | 3.748       | 77.11          | 0.7711              | 1.1289                 | 0.3460 |
|               |         | 78      | 2.892        | 3.748       | 77.16          | 0.7716              | 1.1261                 | 0.3458 |

## Test Graphs





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



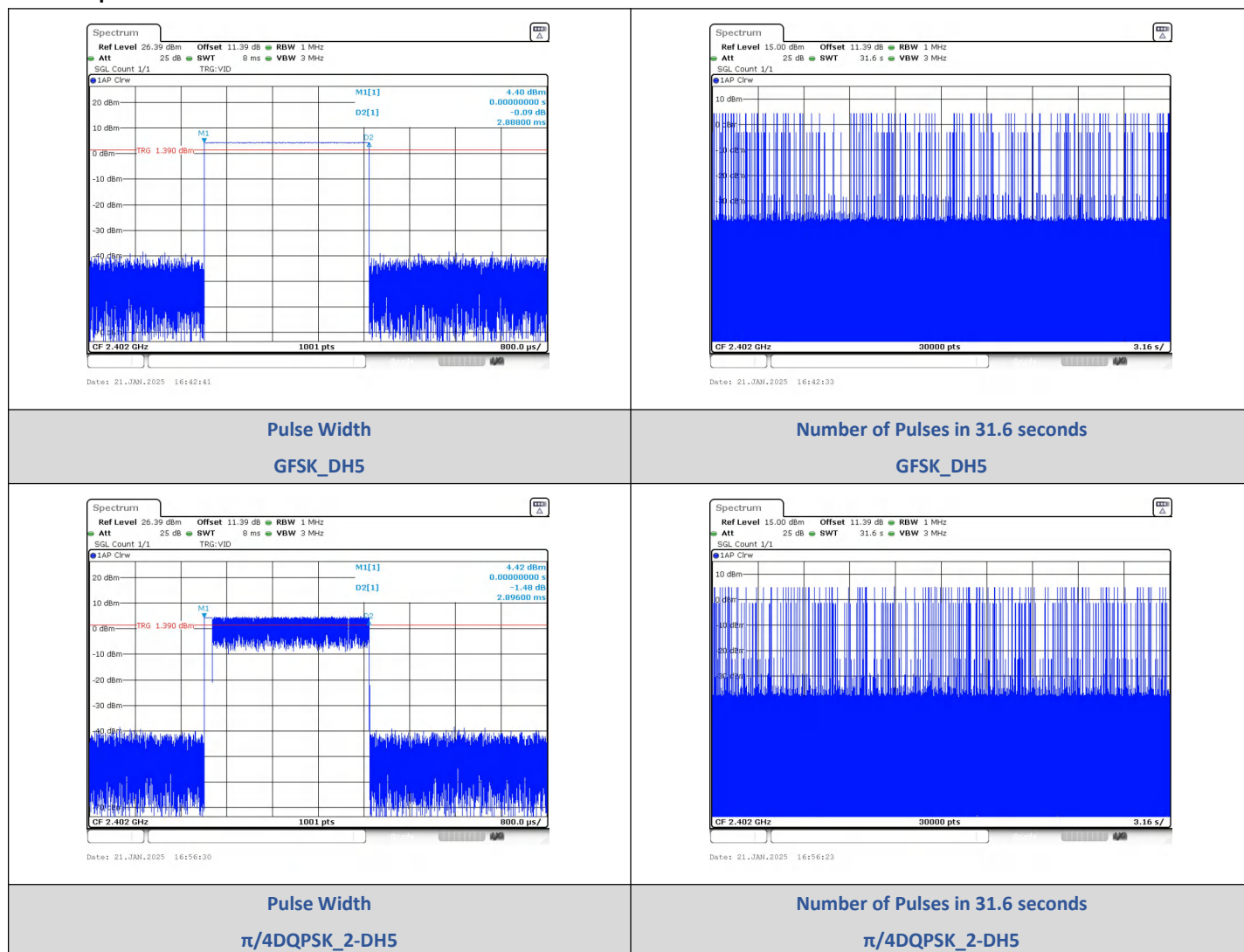
$\pi/4$ DQPSK(2-DH5)\_Channel 78

## 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            | 117                              | 337.9           | < 400      | PASS   |
| $\pi/4$ DQPSK | 2-DH5  | (2402MHz) | 2.896            | 118                              | 341.73          |            | PASS   |

### Test Graphs

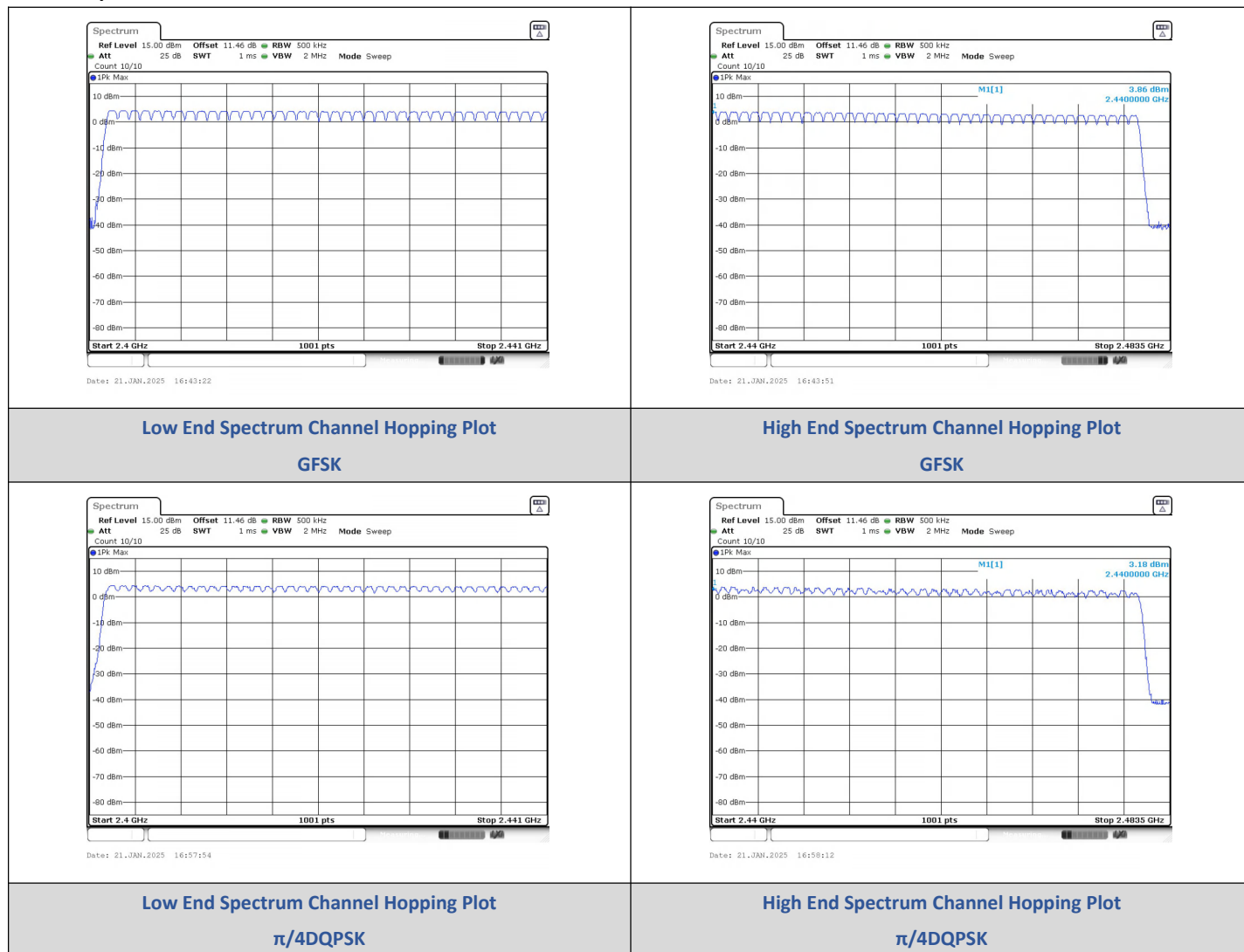


### 3) Number Of Hopping Channel

#### 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

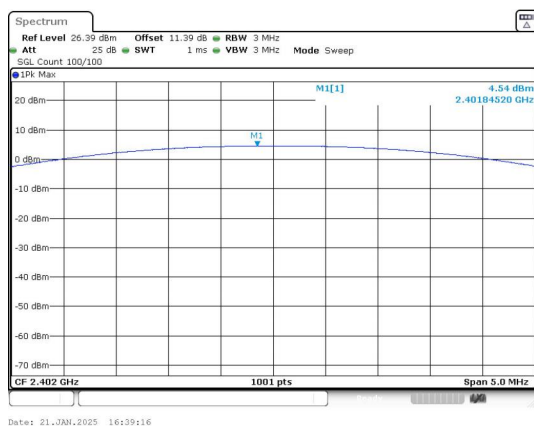


## 4) Conducted Output Power

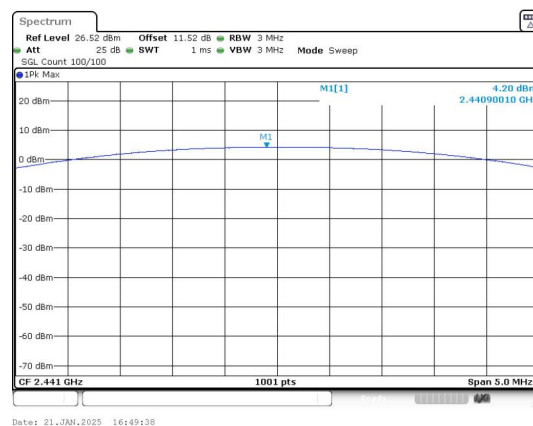
### Test Result

| Modulation    | Packet Type | Channel | Peak Output Power (dBm) | Peak Output Power (mW) | Limit (dBm) | Result |
|---------------|-------------|---------|-------------------------|------------------------|-------------|--------|
| GFSK          | DH5         | 0       | 4.54                    | 2.84                   | ≤30         | PASS   |
|               |             | 39      | 4.20                    | 2.63                   |             | PASS   |
|               |             | 78      | 2.75                    | 1.88                   |             | PASS   |
| $\pi/4$ DQPSK | 2-DH5       | 0       | 5.28                    | 3.37                   | ≤20.97      | PASS   |
|               |             | 39      | 4.96                    | 3.13                   |             | PASS   |
|               |             | 78      | 3.60                    | 2.29                   |             | PASS   |

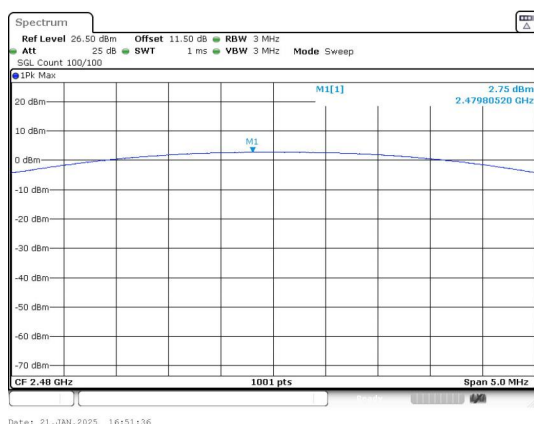
### Test Graphs



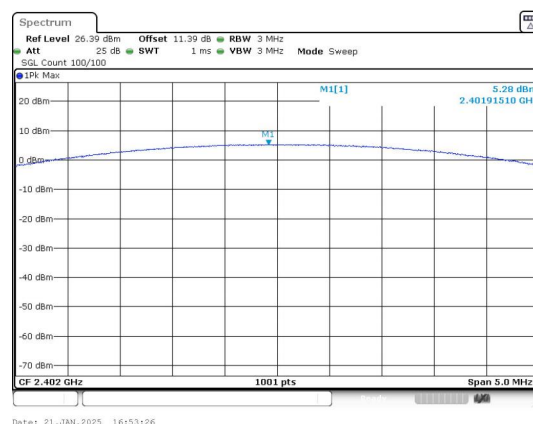
Peak Output Power  
GFSK\_Channel 0



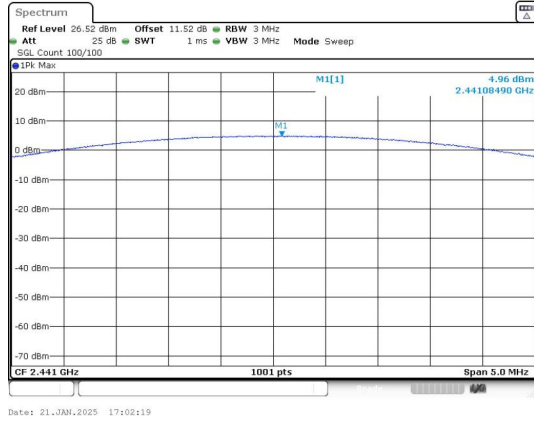
Peak Output Power  
GFSK\_Channel 39



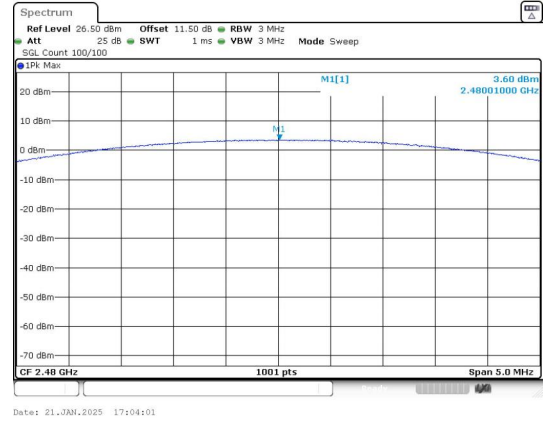
Peak Output Power  
GFSK\_Channel 78



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



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



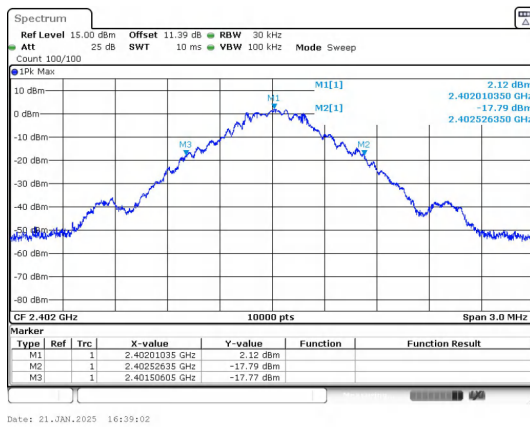
Peak Output Power  
 $\pi/4$ DQPSK\_Channel 78

## 5) 20dB Bandwidth

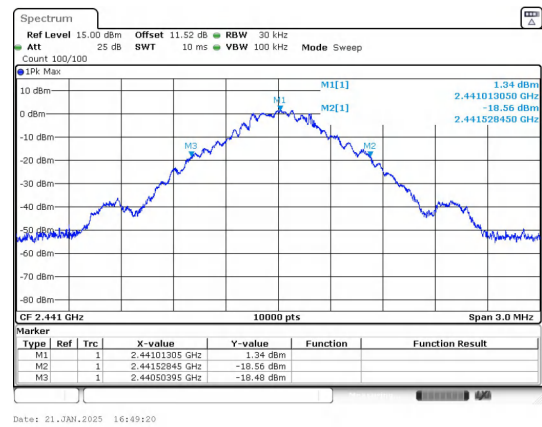
### Test Result

| Modulation    | Channel | Center Frequency (MHz) | 20 dB Bandwidth (MHz) |
|---------------|---------|------------------------|-----------------------|
| GFSK          | 0       | 2402 MHz               | 1.020                 |
|               | 39      | 2441 MHz               | 1.030                 |
|               | 78      | 2480 MHz               | 1.010                 |
| $\pi$ /4DQPSK | 0       | 2402 MHz               | 1.280                 |
|               | 39      | 2441 MHz               | 1.310                 |
|               | 78      | 2480 MHz               | 1.290                 |

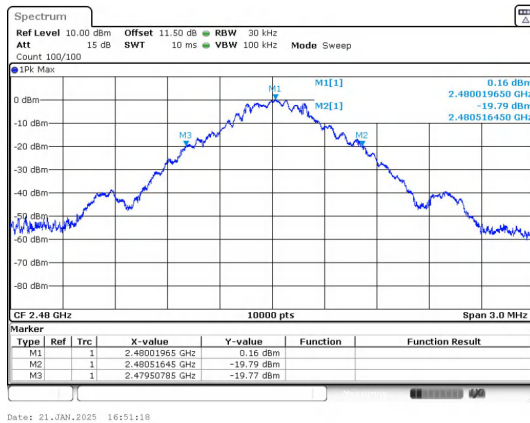
### Test Graphs



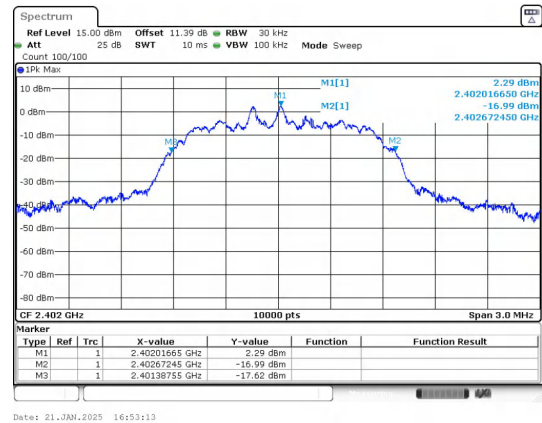
GFSK\_DH5\_Channel 0

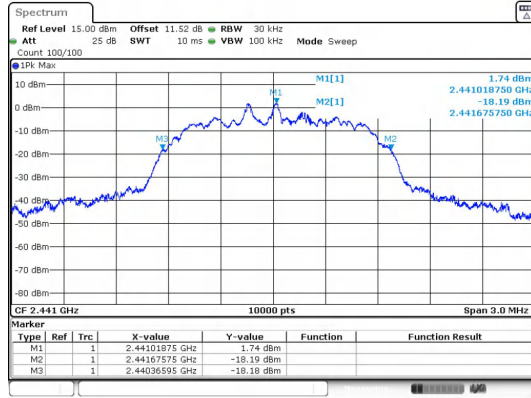


GFSK\_DH5\_Channel 39

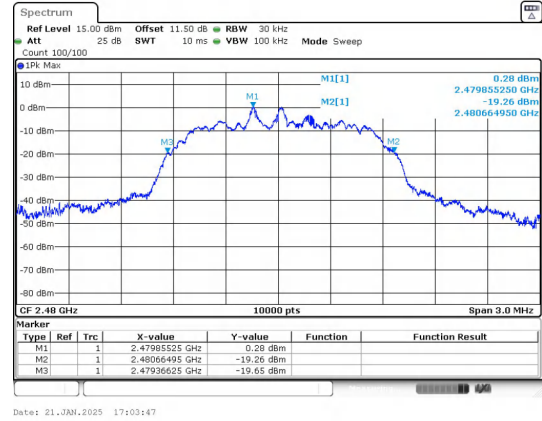


GFSK\_DH5\_Channel 78


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



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



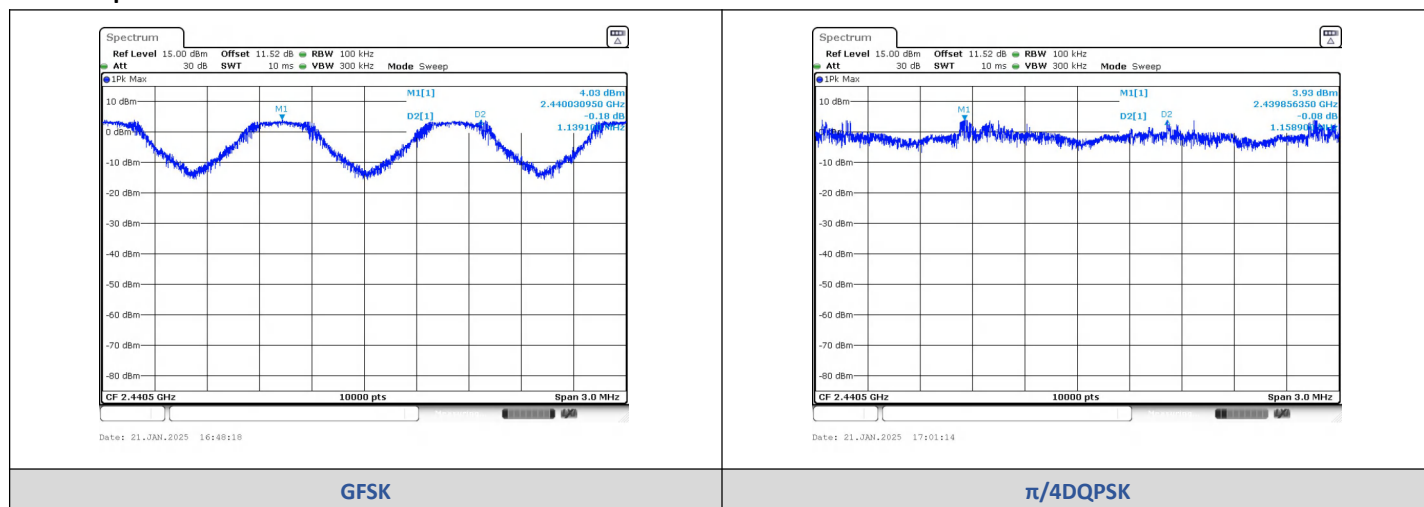
$\pi/4$ DQPSK\_2-DH5\_Channel 78

## 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    | 2440.0309                   | 2441.1701                    | 1.1391                             | 1.02        | PASS   |
| $\pi/4$ DQPSK | 2-DH5  | 2439.8564                   | 2441.0152                    | 1.1589                             | 0.853       | PASS   |

### Test Graphs



## 7) Conducted Out Of Band Emission

### Test Result

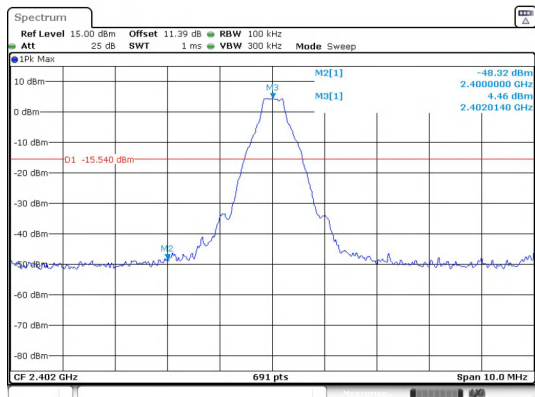
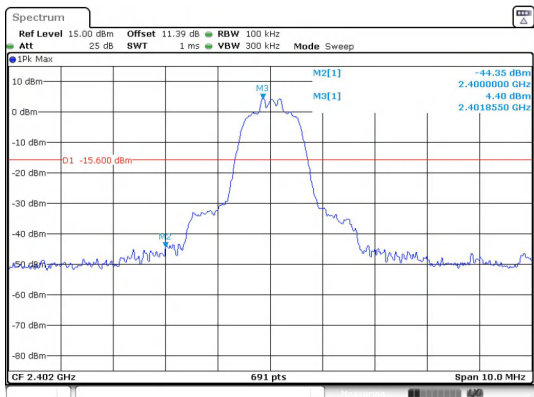
#### Non-Hopping

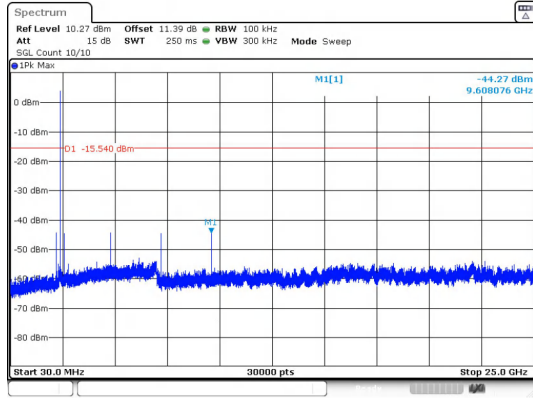
| Modulation    | Packet | Channel | OOB Emission Frequency (MHz) | OOB Emission Level (dBm) | Limit (dBm) | Over Limit (dB) | Result |
|---------------|--------|---------|------------------------------|--------------------------|-------------|-----------------|--------|
| GFSK          | DH5    | 0       | 2400.00                      | -48.320                  | -15.54      | -32.780         | PASS   |
|               |        |         | 9608.08                      | -44.275                  | -15.54      | -28.735         | PASS   |
|               |        | 39      | 2249.42                      | -43.444                  | -15.91      | -27.534         | PASS   |
|               |        | 78      | 2483.50                      | -50.850                  | -17.38      | -33.470         | PASS   |
|               |        |         | 9920.20                      | -39.858                  | -17.38      | -22.478         | PASS   |
| $\pi$ /4DQPSK | 2-DH5  | 0       | 2400.00                      | -44.350                  | -15.6       | -28.750         | PASS   |
|               |        |         | 9608.08                      | -44.453                  | -15.6       | -28.853         | PASS   |
|               |        | 39      | 9763.72                      | -42.360                  | -16.03      | -26.330         | PASS   |
|               |        | 78      | 2483.50                      | -49.620                  | -17.42      | -32.200         | PASS   |
|               |        |         | 9920.20                      | -39.803                  | -17.42      | -22.383         | PASS   |

#### Hopping

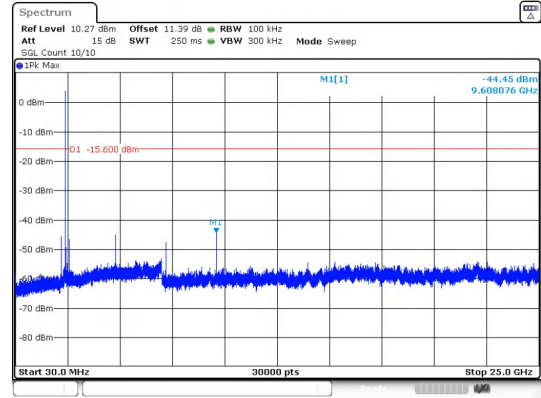
| Modulation    | Packet | Channel | OOB Emission<br>Frequency<br>(MHz) | OOB Emission<br>Level<br>(dBm) | Limit<br>(dBm) | Over Limit<br>(dB) | Result |
|---------------|--------|---------|------------------------------------|--------------------------------|----------------|--------------------|--------|
| GFSK          | DH5    | Hopping | 2396.56                            | -47.031                        | -15.57         | -31.461            | PASS   |
|               |        |         | 2400.00                            | -49.250                        | -15.57         | -33.680            | PASS   |
|               |        |         | 2483.50                            | -50.340                        | -17.8          | -32.540            | PASS   |
| $\pi$ /4DQPSK | 2-DH5  |         | 2396.43                            | -47.928                        | -16.02         | -31.908            | PASS   |
|               |        |         | 2400.00                            | -50.490                        | -16.02         | -34.470            | PASS   |
|               |        |         | 2483.50                            | -48.840                        | -18.49         | -30.350            | PASS   |

### Test Graphs

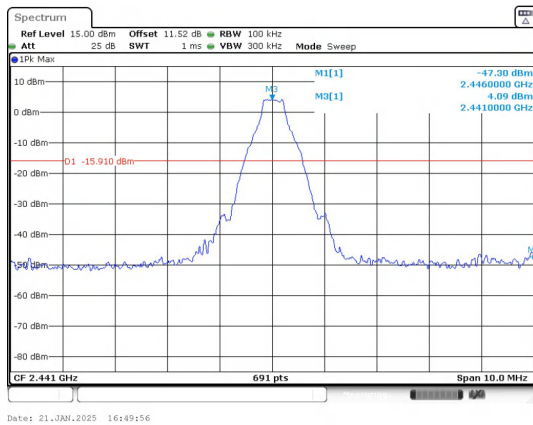
|                                                                                                                       |                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
|  <p>Date: 21.JAN.2025 16:39:39</p> |  <p>Date: 21.JAN.2025 16:53:49</p> |
| <p><b>Out Of Band Emission</b><br/><b>GFSK_DH5_Channel 0</b></p>                                                      | <p><b>Out Of Band Emission</b><br/><b><math>\pi</math>/4DQPSK_2-DH5_Channel 0</b></p>                                  |



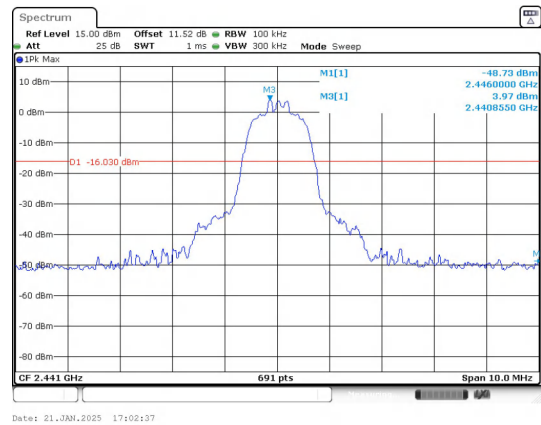
30.0 MHz - 25000.0 MHz  
GFSK\_DH5\_Channel 0



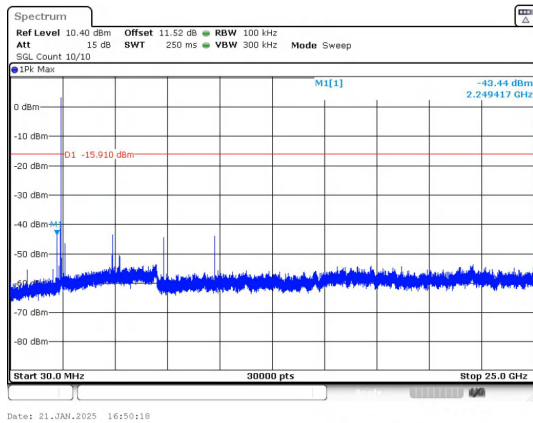
30.0 MHz - 25000.0 MHz  
 $\pi/4$ DQPSK\_2-DH5\_Channel 0



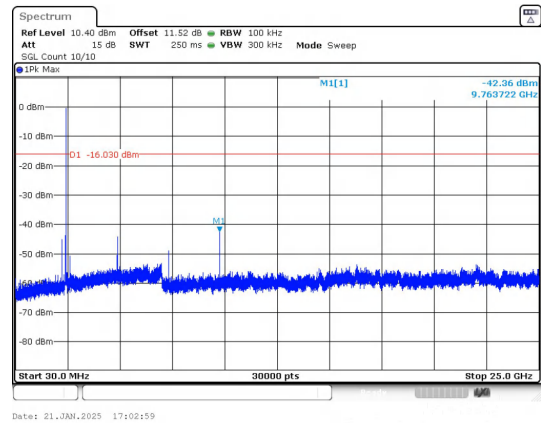
Out Of Band Emission  
GFSK\_DH5\_Channel 39



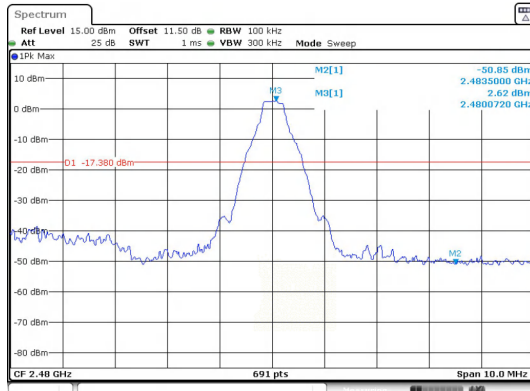
Out Of Band Emission  
 $\pi/4$ DQPSK\_2-DH5\_Channel 39



30.0 MHz - 25000.0 MHz  
GFSK\_DH5\_Channel 39

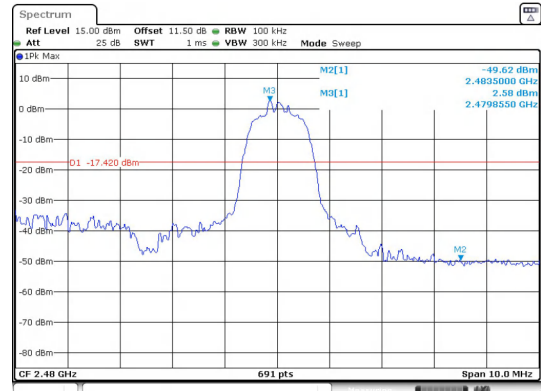


30.0 MHz - 25000.0 MHz  
 $\pi/4$ DQPSK\_2-DH5\_Channel 39



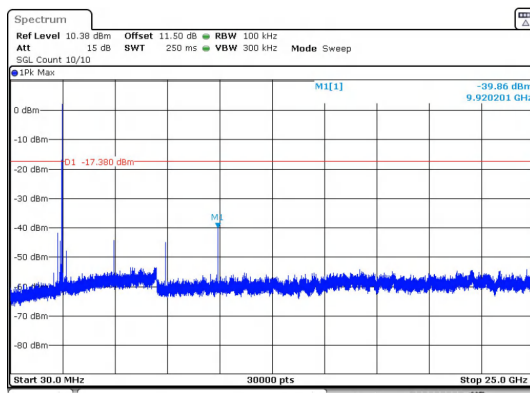
Date: 21.JAN.2025 16:51:59

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



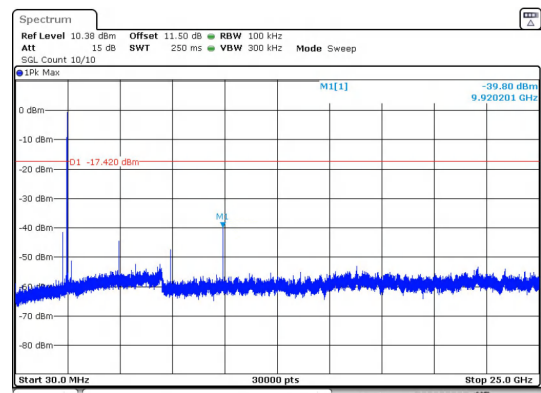
Date: 21.JAN.2025 17:04:23

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



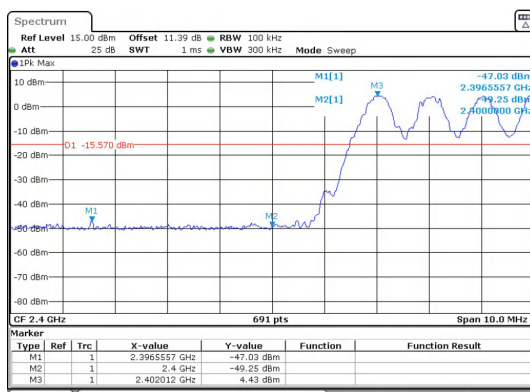
Date: 21.JAN.2025 16:52:21

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



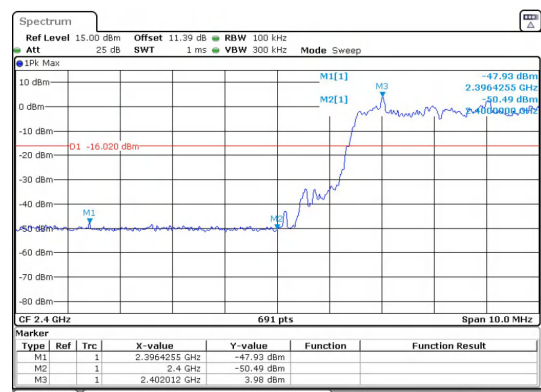
Date: 21.JAN.2025 17:04:46

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



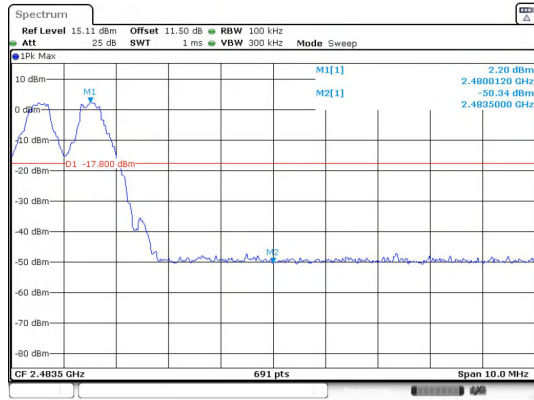
Date: 21.JAN.2025 16:45:43

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

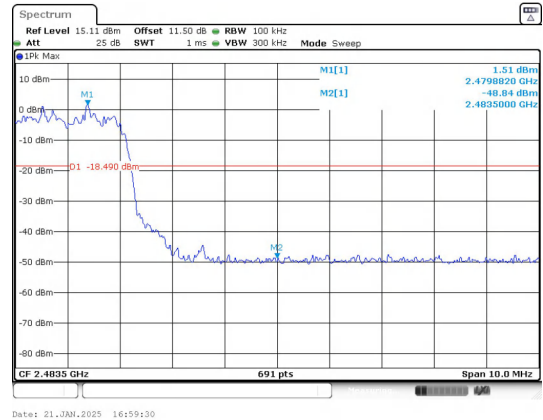


Date: 21.JAN.2025 16:58:55

**Out Of Band Emission(Left)**  
**π/4DQPSK\_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-----