

# Appendix Report

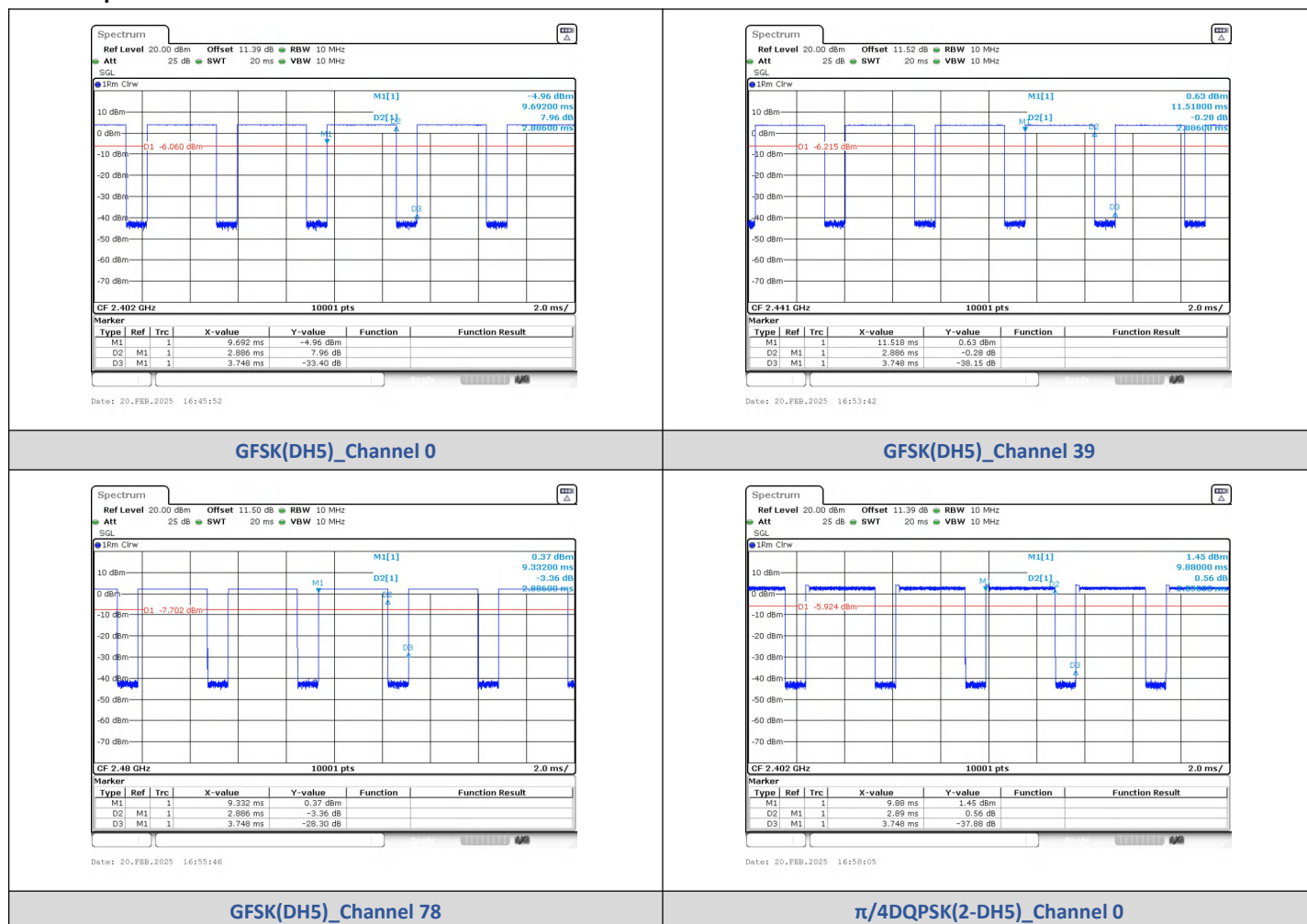
|                |                  |
|----------------|------------------|
| Report No.:    | CISRR25021806304 |
| Test Engineer: | Mark Fu          |
| Supervised by: | Rory Huang       |

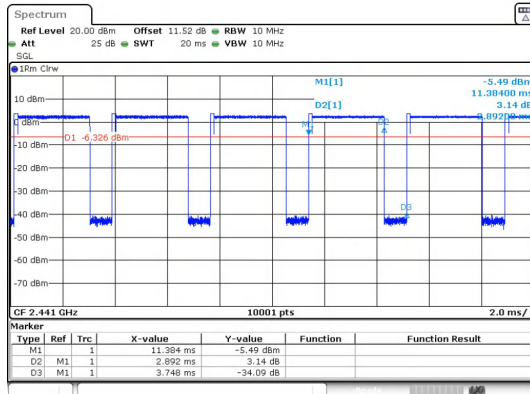
# 1) Duty Cycle

## Test Result

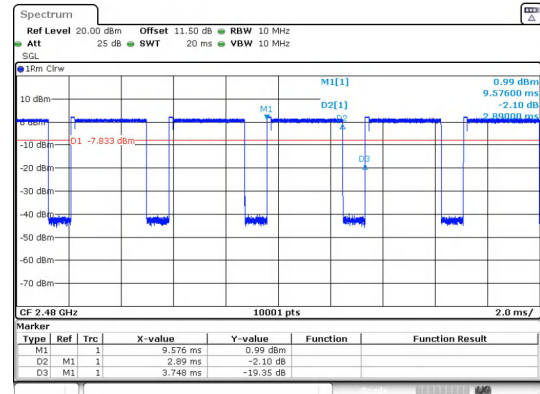
| Modulation    | Packets | Channel | On Time (ms) | Period (ms) | Duty Cycle (%) | Duty Cycle (linear) | Duty Cycle Factor (dB) | 1/T    |
|---------------|---------|---------|--------------|-------------|----------------|---------------------|------------------------|--------|
| GFSK          | DH5     | 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       | 2.890        | 3.748       | 77.11          | 0.7711              | 1.1289                 | 0.3460 |
|               |         | 39      | 2.892        | 3.748       | 77.16          | 0.7716              | 1.1261                 | 0.3458 |
|               |         | 78      | 2.890        | 3.748       | 77.11          | 0.7711              | 1.1289                 | 0.3460 |
| 8DPSK         | 3-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

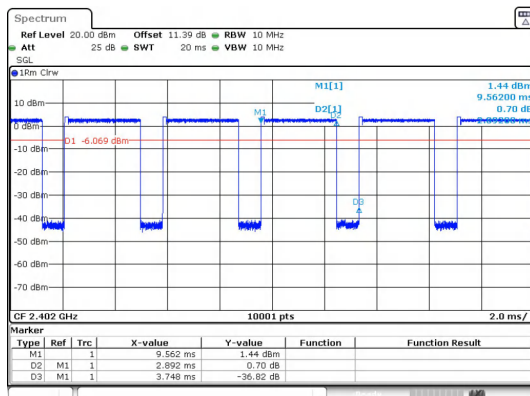




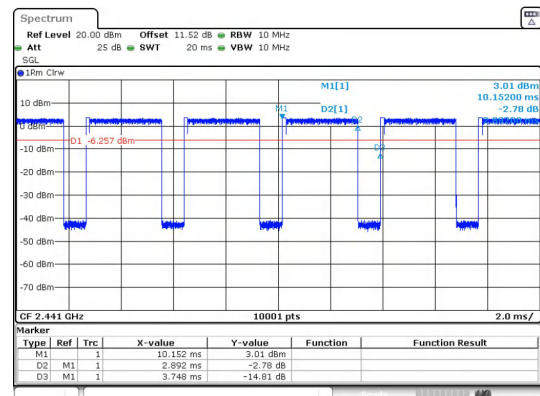
$\pi/4$ DQPSK(2-DH5)\_Channel 39



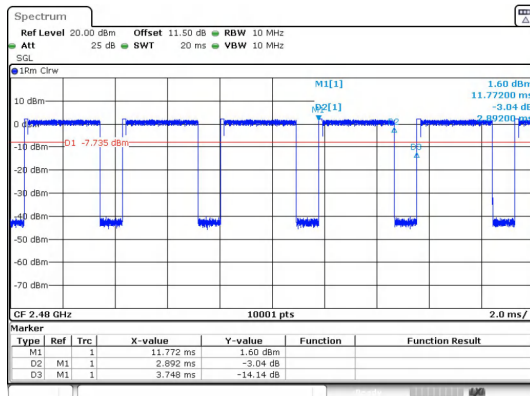
$\pi/4$ DQPSK(2-DH5)\_Channel 78



8DPSK(3-DH5)\_Channel 0



8DPSK(3-DH5)\_Channel 39



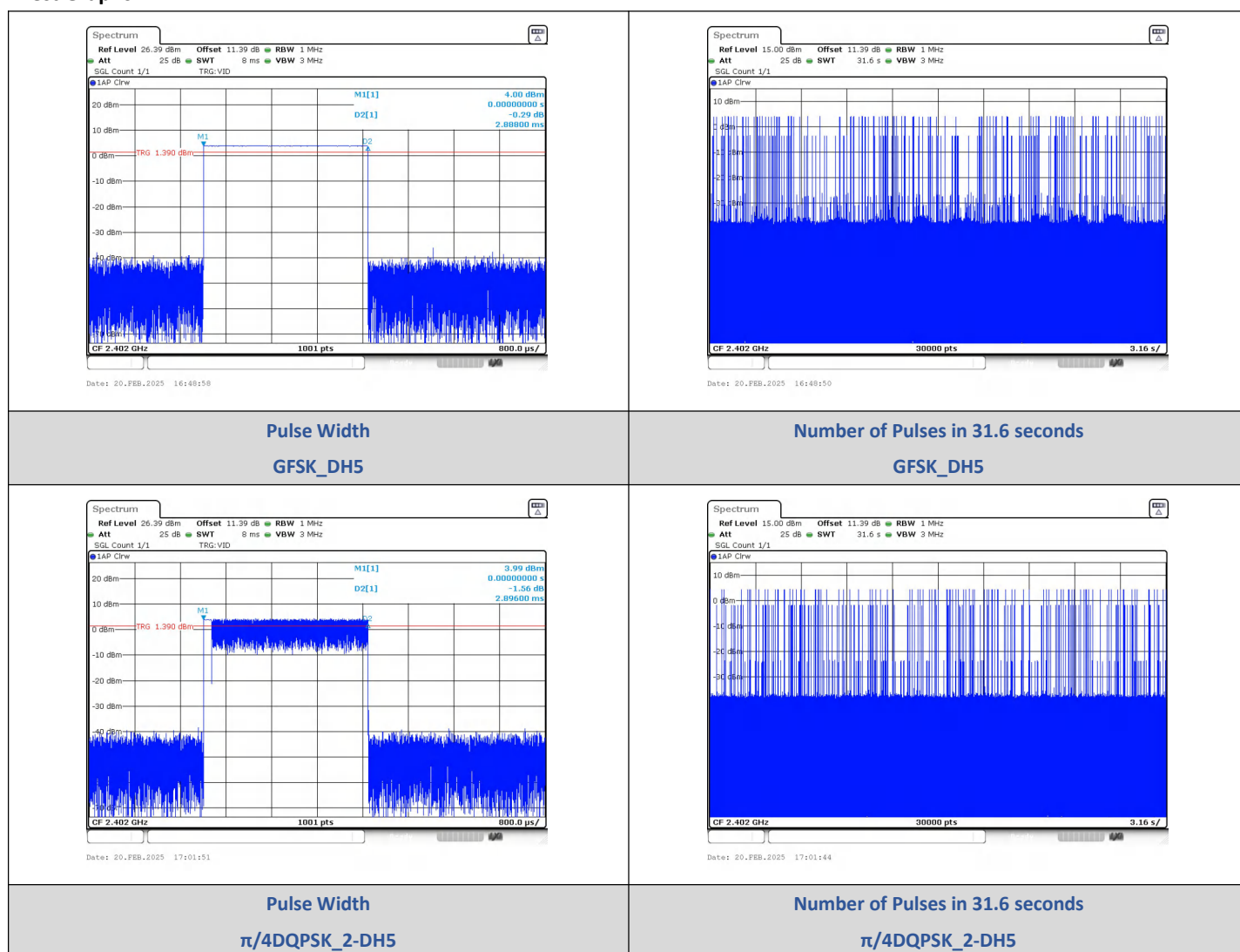
8DPSK(3-DH5)\_Channel 78

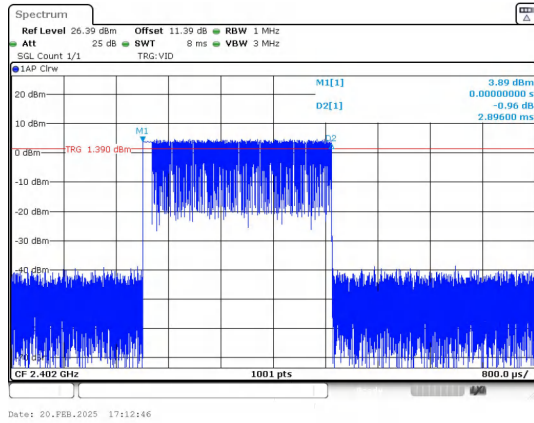
## 2) Dwell Time

### Test Result

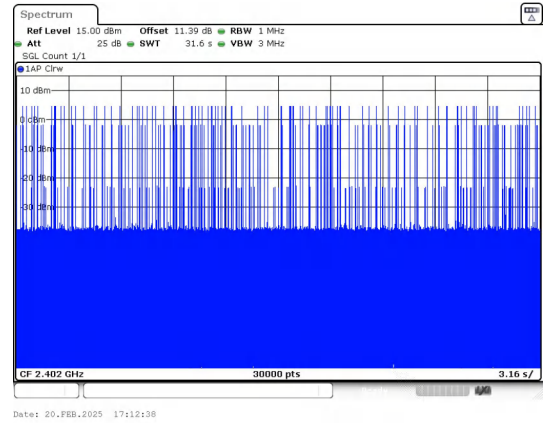
| Modulation    | Packet | Channel          | Pulse Width (ms) | Number of Pulses in 31.6 seconds | Dwell Time (ms) | Limit (ms) | Result |
|---------------|--------|------------------|------------------|----------------------------------|-----------------|------------|--------|
| GFSK          | DH5    | CH0<br>(2402MHz) | 2.888            | 112                              | 323.46          | < 400      | PASS   |
| $\pi/4$ DQPSK | 2-DH5  |                  | 2.896            | 104                              | 301.18          |            | PASS   |
| 8DPSK         | 3-DH5  |                  | 2.896            | 95                               | 275.12          |            | PASS   |

### Test Graphs





Pulse Width  
8DPSK\_3-DH5



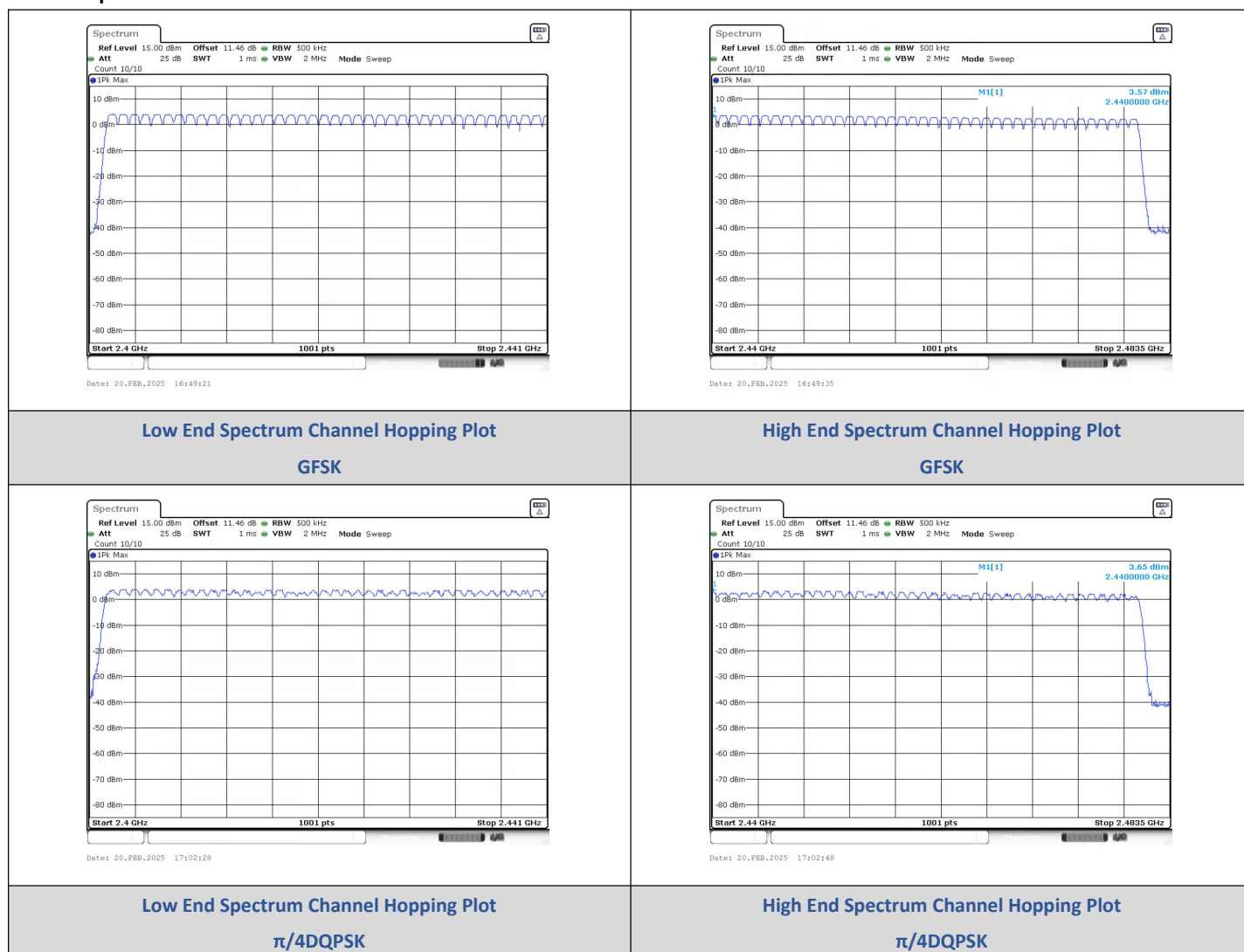
Number of Pulses in 31.6 seconds  
8DPSK\_3-DH5

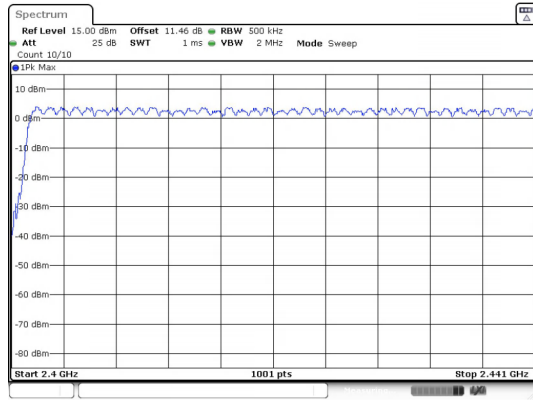
### 3) Number Of Hopping Channel

#### Test Result

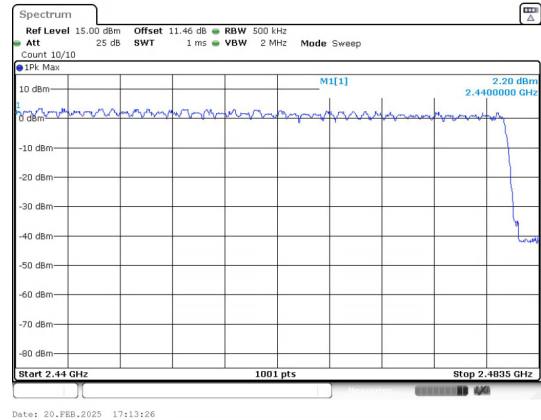
| Modulation    | Packet | Number of Hopping Channel | Limit | Result |
|---------------|--------|---------------------------|-------|--------|
| GFSK          | DH5    | 79                        | 15    | PASS   |
| $\pi/4$ DQPSK | 2-DH5  | 79                        | 15    | PASS   |
| 8DPSK     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

#### Test Graphs





Low End Spectrum Channel Hopping Plot  
8DPSK



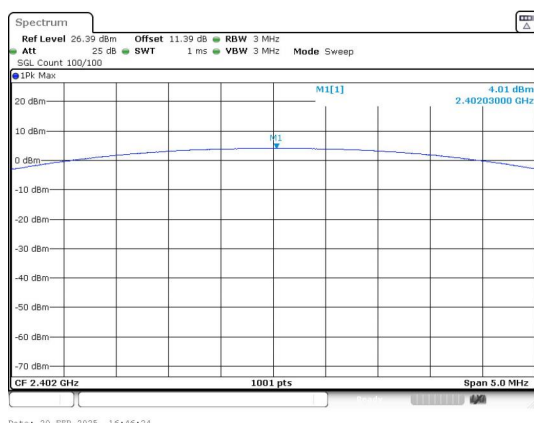
High End Spectrum Channel Hopping Plot  
8DPSK

## 4) Conducted Output Power

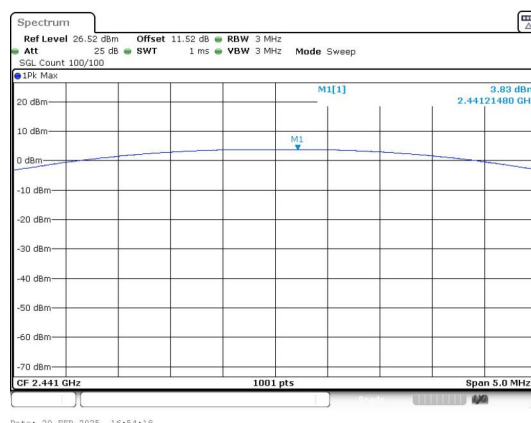
### Test Result

| Modulation    | Packet Type | Channel | Peak Output Power (dBm) | Peak Output Power (mW) | Limit (dBm) | Result |
|---------------|-------------|---------|-------------------------|------------------------|-------------|--------|
| GFSK          | DH5         | 0       | 4.01                    | 2.52                   | ≤30         | PASS   |
|               |             | 39      | 3.83                    | 2.42                   |             | PASS   |
|               |             | 78      | 2.35                    | 1.72                   |             | PASS   |
| $\pi/4$ DQPSK | 2-DH5       | 0       | 4.87                    | 3.07                   | ≤20.97      | PASS   |
|               |             | 39      | 4.55                    | 2.85                   |             | PASS   |
|               |             | 78      | 3.05                    | 2.02                   |             | PASS   |
| 8DPSK         | 3-DH5       | 0       | 5.05                    | 3.20                   |             | PASS   |
|               |             | 39      | 4.92                    | 3.10                   |             | PASS   |
|               |             | 78      | 3.47                    | 2.22                   |             | PASS   |

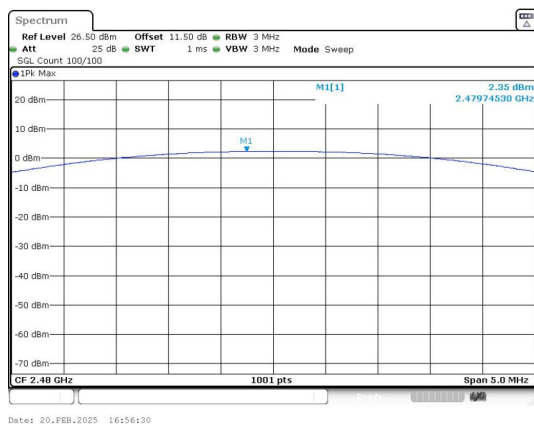
### Test Graphs



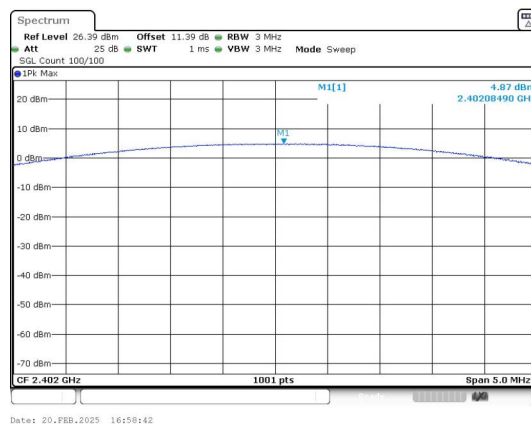
Peak Output Power  
GFSK\_Channel 0



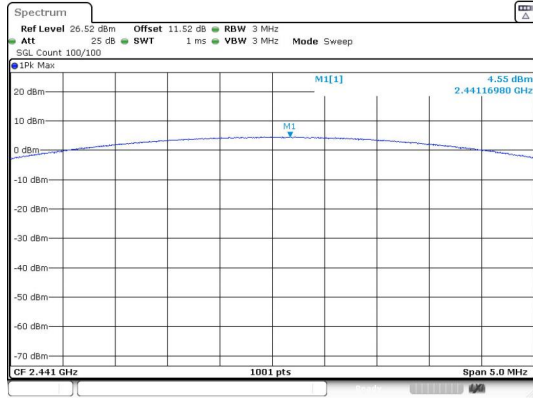
Peak Output Power  
GFSK\_Channel 39



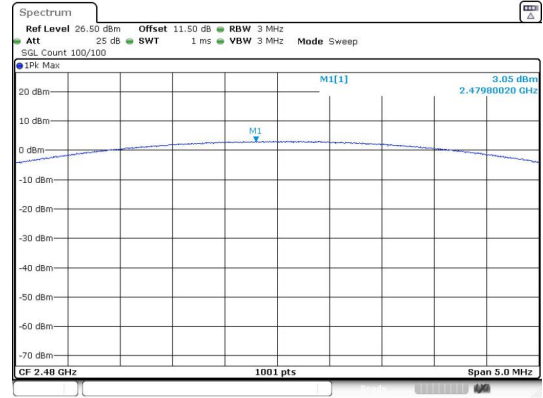
Peak Output Power  
GFSK\_Channel 78



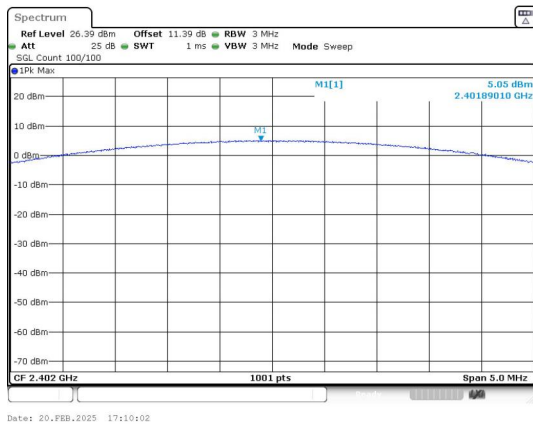
Peak Output Power  
 $\pi/4$ DQPSK\_Channel 0



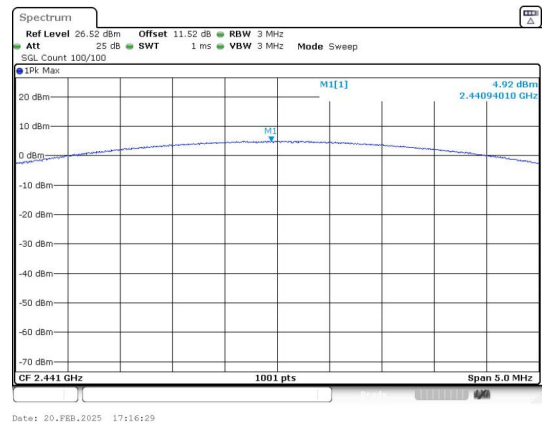
**Peak Output Power**  
 **$\pi/4$ DQPSK\_Channel 39**



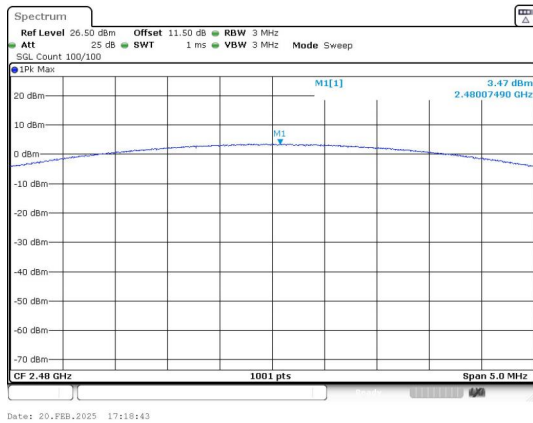
**Peak Output Power**  
 **$\pi/4$ DQPSK\_Channel 78**



**Peak Output Power**  
**8DPSK\_Channel 0**



**Peak Output Power**  
**8DPSK\_Channel 39**



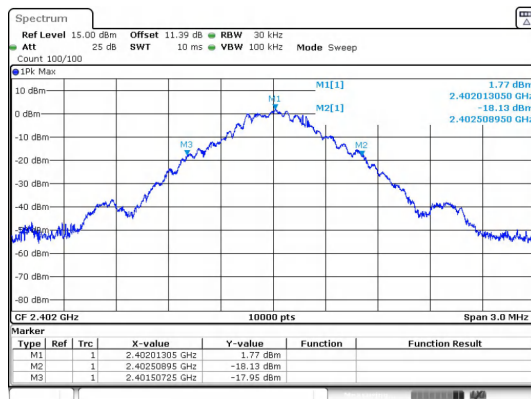
**Peak Output Power**  
**8DPSK\_Channel 78**

## 5) 20dB Bandwidth

### Test Result

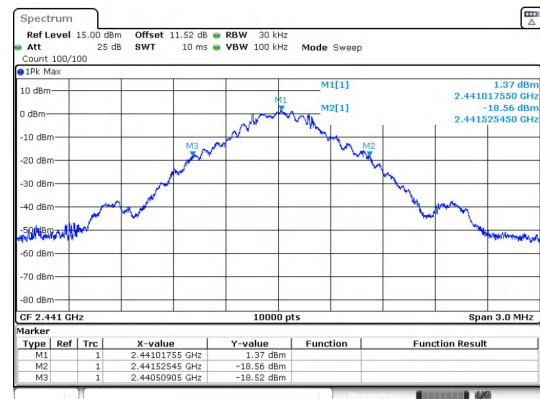
| Modulation    | Channel | Center Frequency (MHz) | 20 dB Bandwidth (MHz) |
|---------------|---------|------------------------|-----------------------|
| GFSK          | 0       | 2402 MHz               | 1.000                 |
|               | 39      | 2441 MHz               | 1.020                 |
|               | 78      | 2480 MHz               | 1.010                 |
| $\pi/4$ DQPSK | 0       | 2402 MHz               | 1.320                 |
|               | 39      | 2441 MHz               | 1.280                 |
|               | 78      | 2480 MHz               | 1.300                 |
| 8DPSK         | 0       | 2402 MHz               | 1.290                 |
|               | 39      | 2441 MHz               | 1.290                 |
|               | 78      | 2480 MHz               | 1.290                 |

### Test Graphs



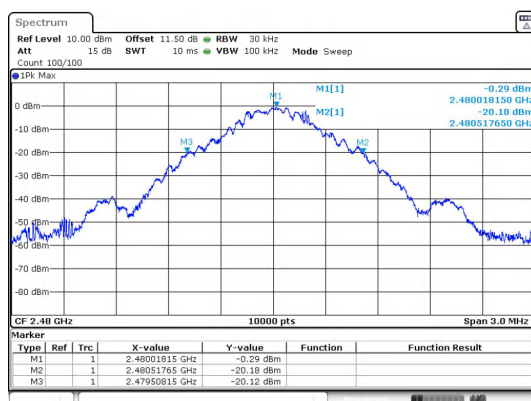
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GFSK\_DH5\_Channel 0



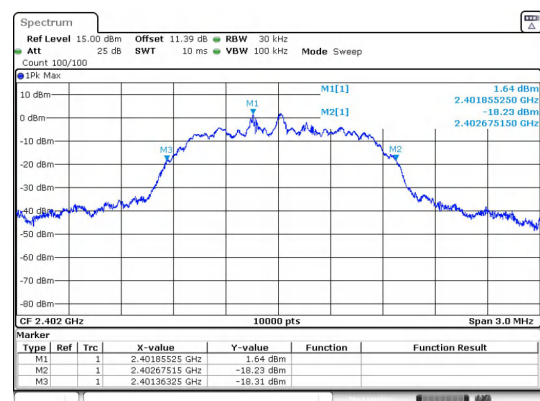
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GFSK\_DH5\_Channel 39



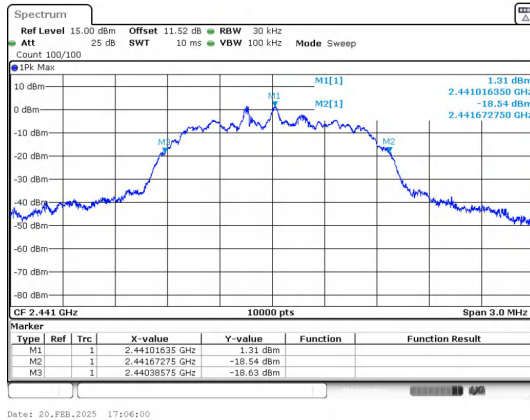
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GFSK\_DH5\_Channel 78

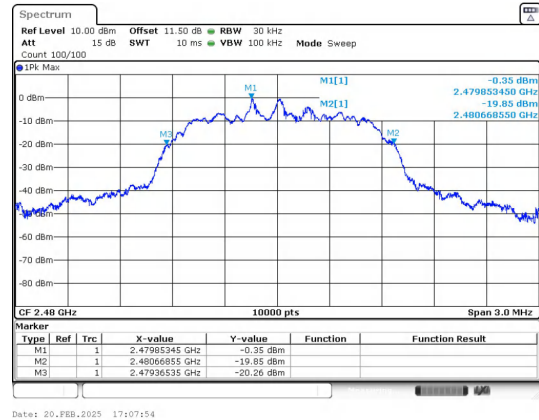


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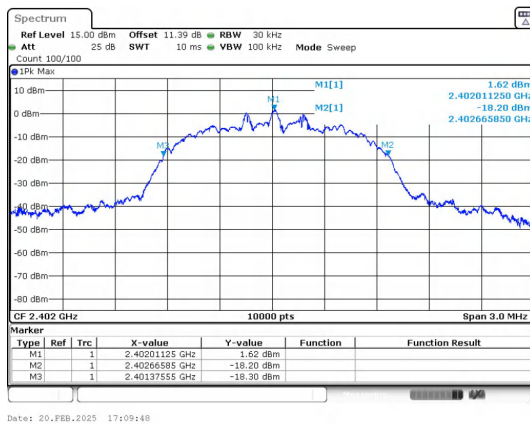
 $\pi/4$ DQPSK\_2-DH5\_Channel 0



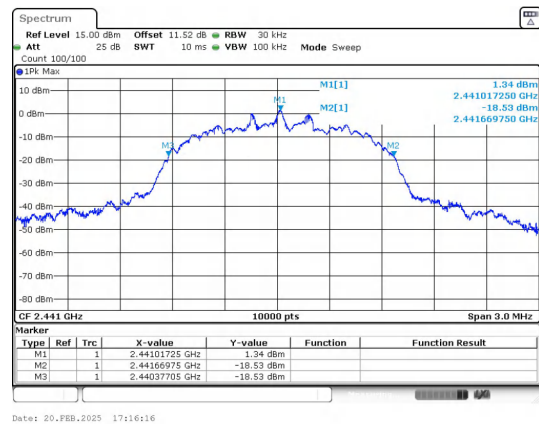
$\pi/4$ DQPSK\_2-DH5\_Channel 39



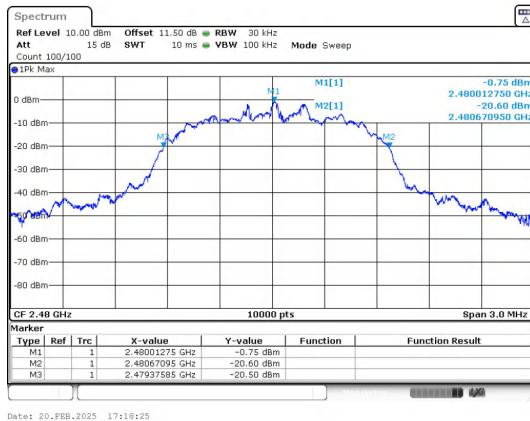
$\pi/4$ DQPSK\_2-DH5\_Channel 78



8DPSK\_3-DH5\_Channel 0



8DPSK\_3-DH5\_Channel 39



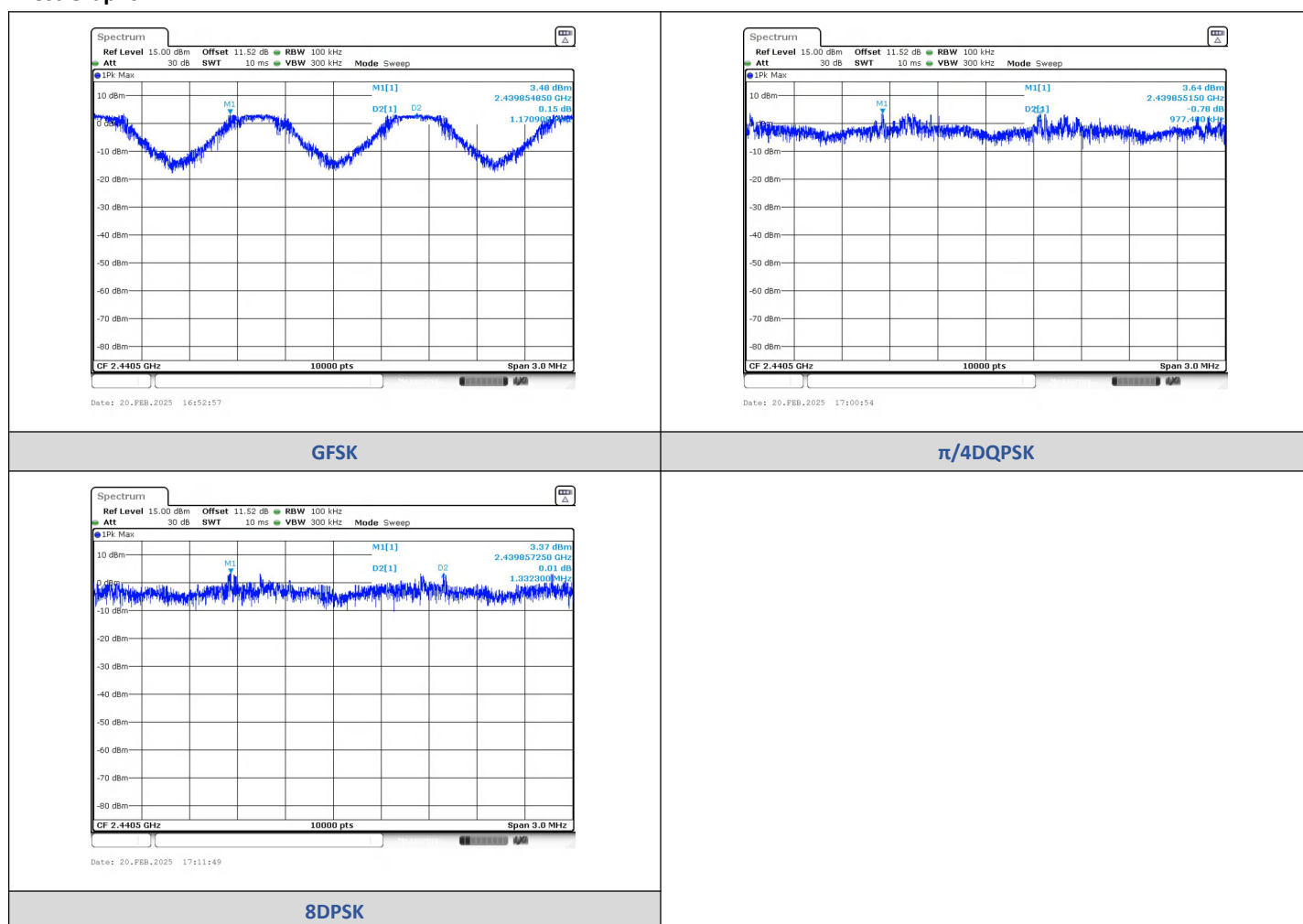
8DPSK\_3-DH5\_Channel 78

## 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    | 2439.8549                   | 2441.0257                    | 1.1709                             | 1.0         | PASS   |
| $\pi/4$ DQPSK | 2-DH5  | 2439.8551                   | 2440.8326                    | 0.9774                             | 0.88        | PASS   |
| 8DPSK         | 3-DH5  | 2439.8573                   | 2441.1896                    | 1.3323                             | 0.86        | PASS   |

### Test Graphs



## 7) Conducted Out Of Band Emission

### Test Result

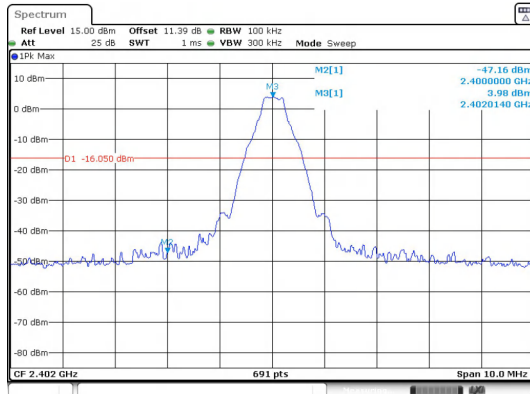
#### Non-Hopping

| Modulation    | Packet | Channel | OOB Emission Frequency (MHz) | OOB Emission Level (dBm) | Limit (dBm) | Over Limit (dB) | Result |
|---------------|--------|---------|------------------------------|--------------------------|-------------|-----------------|--------|
| GFSK          | DH5    | 0       | 2400.00                      | -47.160                  | -16.05      | -31.110         | PASS   |
|               |        |         | 9608.08                      | -42.893                  | -16.05      | -26.843         | PASS   |
|               |        | 39      | 9763.72                      | -41.559                  | -16.3       | -25.259         | PASS   |
|               |        | 78      | 2483.50                      | -50.790                  | -17.78      | -33.010         | PASS   |
|               |        |         | 9920.20                      | -38.766                  | -17.78      | -20.986         | PASS   |
| $\pi/4$ DQPSK | 2-DH5  | 0       | 2400.00                      | -45.970                  | -16.06      | -29.910         | PASS   |
|               |        |         | 9608.08                      | -43.098                  | -16.06      | -27.038         | PASS   |
|               |        | 39      | 9763.72                      | -41.352                  | -16.43      | -24.922         | PASS   |
|               |        | 78      | 2483.50                      | -50.420                  | -17.97      | -32.450         | PASS   |
|               |        |         | 9920.20                      | -38.720                  | -17.97      | -20.750         | PASS   |
| 8DPSK         | 3-DH5  | 0       | 2400.00                      | -43.640                  | -16.2       | -27.440         | PASS   |
|               |        |         | 9608.08                      | -42.902                  | -16.2       | -26.702         | PASS   |
|               |        | 39      | 1765.83                      | -36.404                  | -16.44      | -19.964         | PASS   |
|               |        | 78      | 2483.50                      | -50.240                  | -17.89      | -32.350         | PASS   |
|               |        |         | 9920.20                      | -38.683                  | -17.89      | -20.793         | PASS   |

#### Hopping

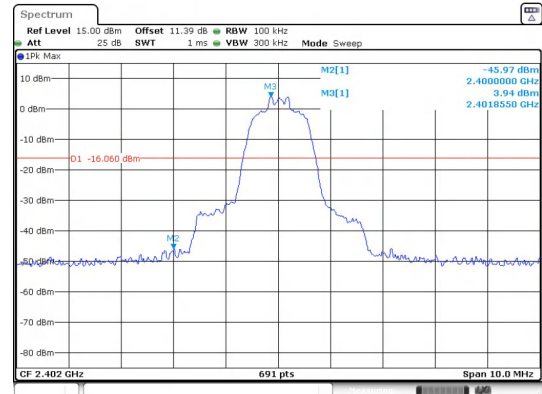
| Modulation    | Packet | Channel | OOB Emission<br>Frequency<br>(MHz) | OOB Emission<br>Level<br>(dBm) | Limit<br>(dBm) | Over Limit<br>(dB) | Result |
|---------------|--------|---------|------------------------------------|--------------------------------|----------------|--------------------|--------|
| GFSK          | DH5    | Hopping | 2397.50                            | -48.154                        | -16.04         | -32.114            | PASS   |
|               |        |         | 2400.00                            | -49.660                        | -16.04         | -33.620            | PASS   |
|               |        |         | 2483.50                            | -49.950                        | -17.96         | -31.990            | PASS   |
| $\pi/4$ DQPSK | 2-DH5  |         | 2398.35                            | -48.294                        | -16.47         | -31.824            | PASS   |
|               |        |         | 2400.00                            | -48.480                        | -16.47         | -32.010            | PASS   |
|               |        |         | 2483.50                            | -50.050                        | -18.32         | -31.730            | PASS   |
| 8DPSK         | 3-DH5  |         | 2397.58                            | -48.430                        | -16.75         | -31.680            | PASS   |
|               |        |         | 2400.00                            | -50.300                        | -16.75         | -33.550            | PASS   |
|               |        |         | 2483.50                            | -48.970                        | -18.27         | -30.700            | PASS   |

### Test Graphs



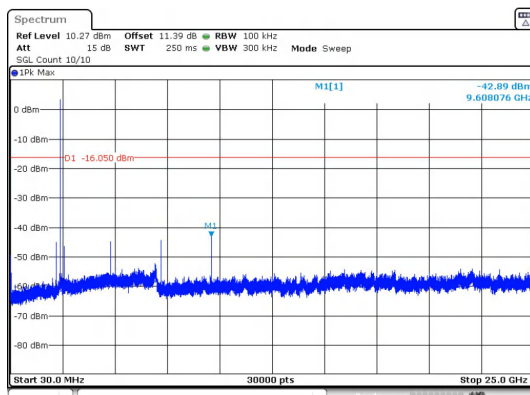
Date: 20.FEB.2025 16:46:47

Out Of Band Emission  
GFSK\_DH5\_Channel 0



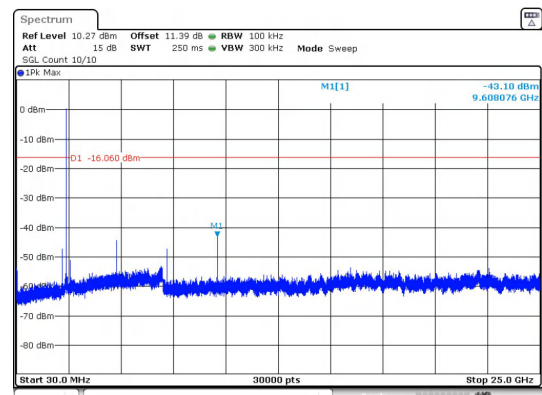
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Out Of Band Emission  
 $\pi/4$ DQPSK\_2-DH5\_Channel 0



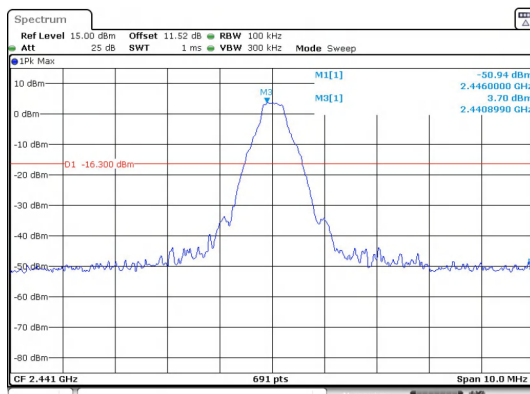
Date: 20.FEB.2025 16:47:10

30.0 MHz - 25000.0 MHz  
GFSK\_DH5\_Channel 0



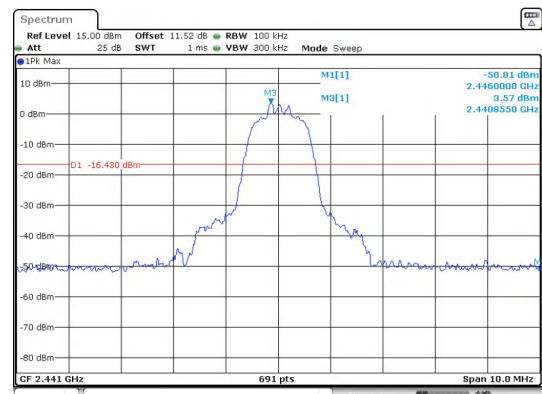
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30.0 MHz - 25000.0 MHz  
 $\pi/4$ DQPSK\_2-DH5\_Channel 0



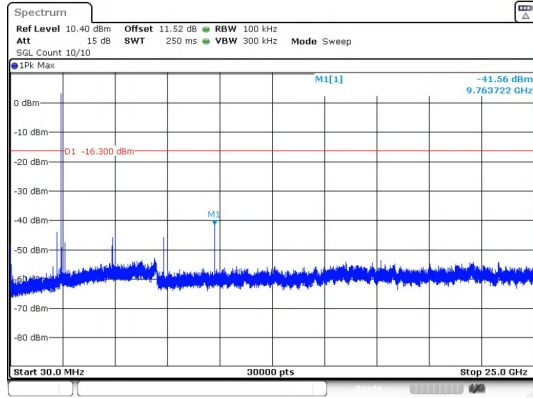
Date: 20.FEB.2025 16:54:36

Out Of Band Emission  
GFSK\_DH5\_Channel 39

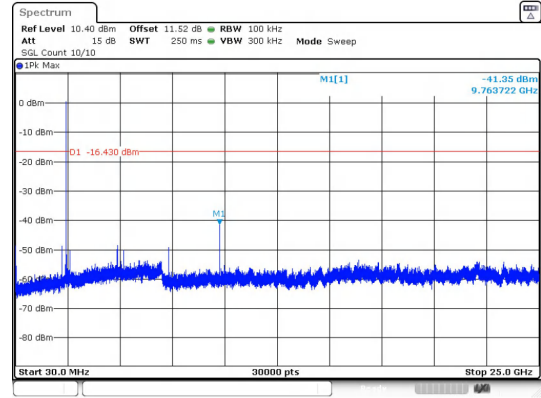


Date: 20.FEB.2025 17:06:35

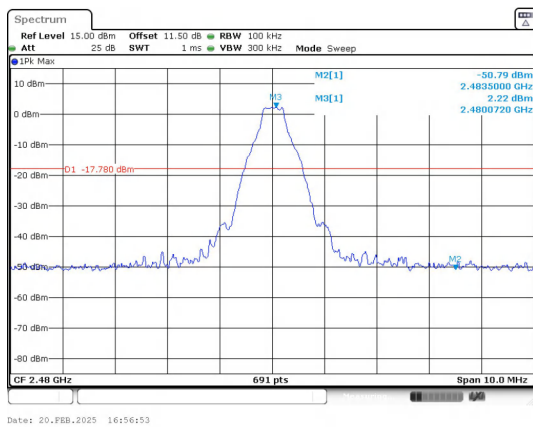
Out Of Band Emission  
 $\pi/4$ DQPSK\_2-DH5\_Channel 39



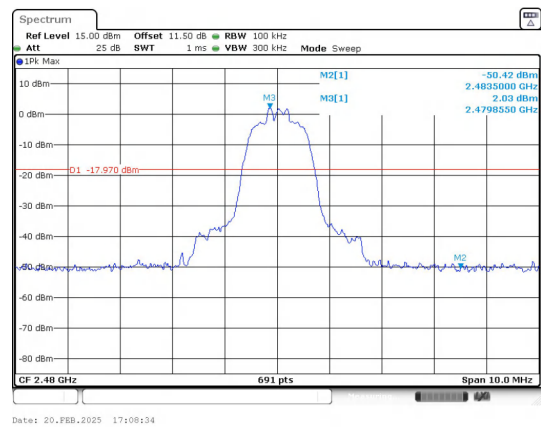
30.0 MHz - 25000.0 MHz  
GFSK\_DH5\_Channel 39



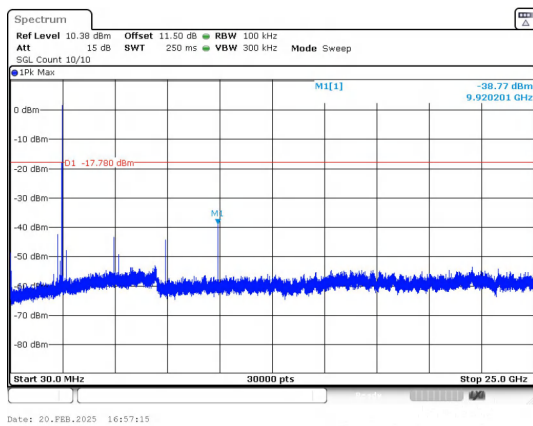
30.0 MHz - 25000.0 MHz  
 $\pi/4$ DQPSK\_2-DH5\_Channel 39



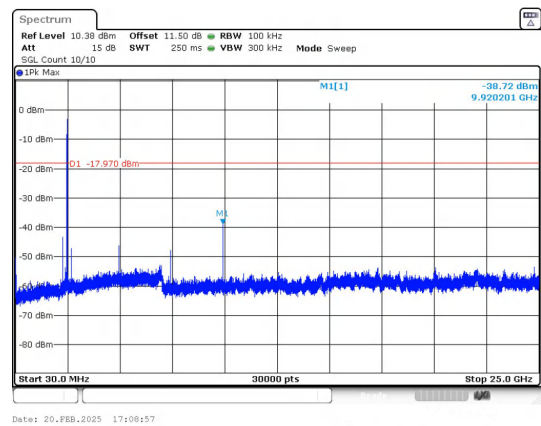
Out Of Band Emission  
GFSK\_DH5\_Channel 78



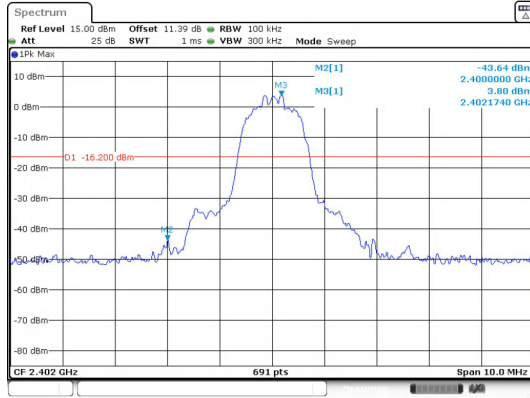
Out Of Band Emission  
 $\pi/4$ DQPSK\_2-DH5\_Channel 78



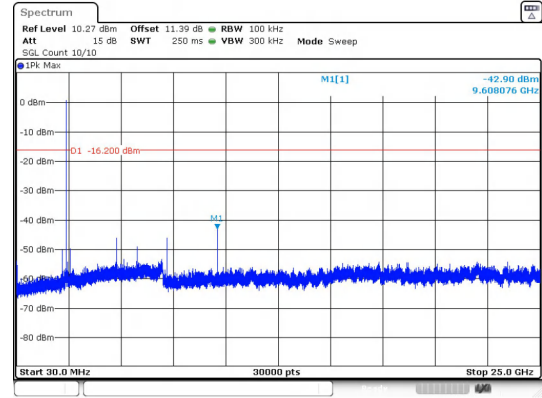
30.0 MHz - 25000.0 MHz  
GFSK\_DH5\_Channel 78



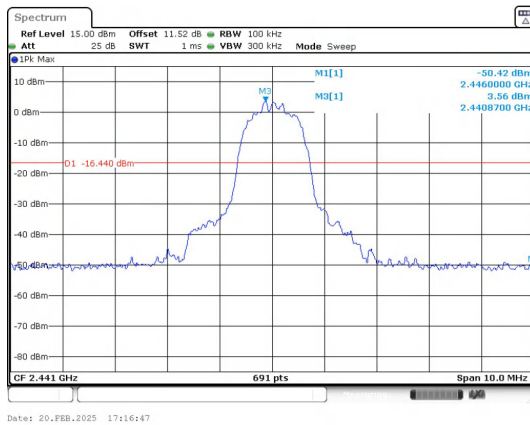
30.0 MHz - 25000.0 MHz  
 $\pi/4$ DQPSK\_2-DH5\_Channel 78



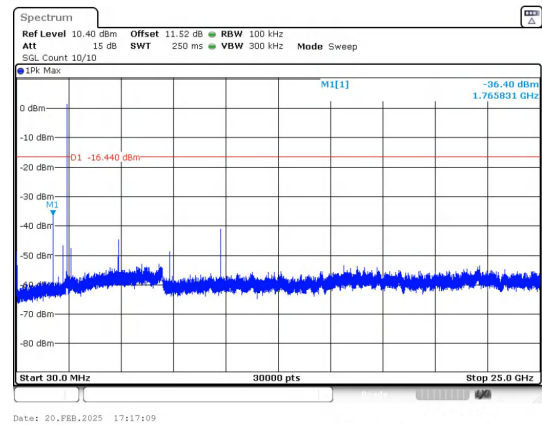
**Out Of Band Emission**  
**8DPSK\_3-DH5\_Channel 0**



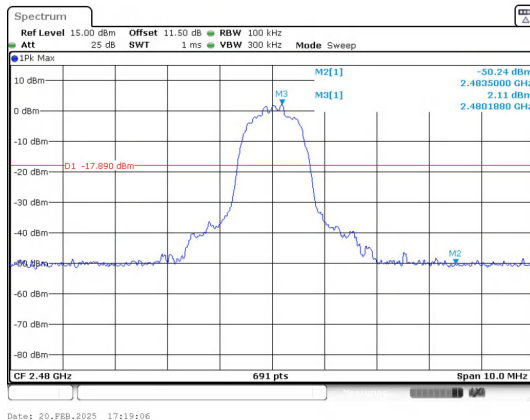
**30.0 MHz - 25000.0 MHz**  
**8DPSK\_3-DH5\_Channel 0**



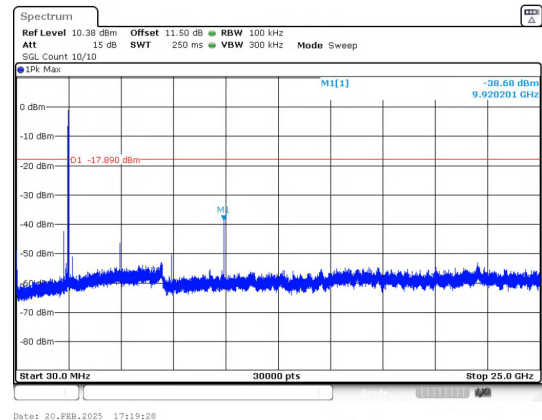
**Out Of Band Emission**  
**8DPSK\_3-DH5\_Channel 39**



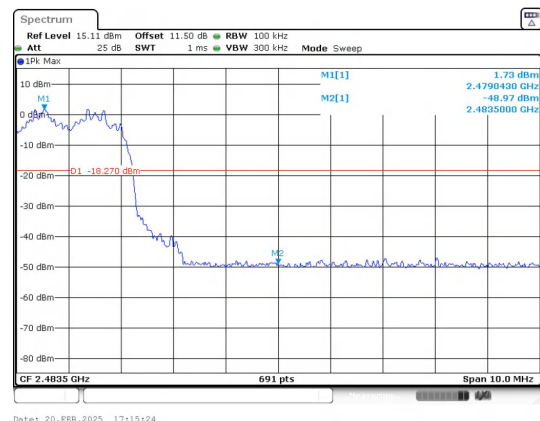
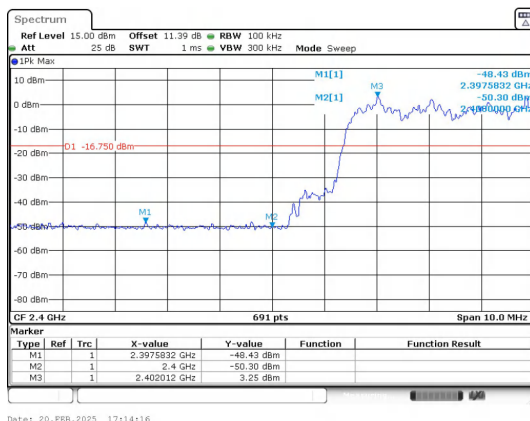
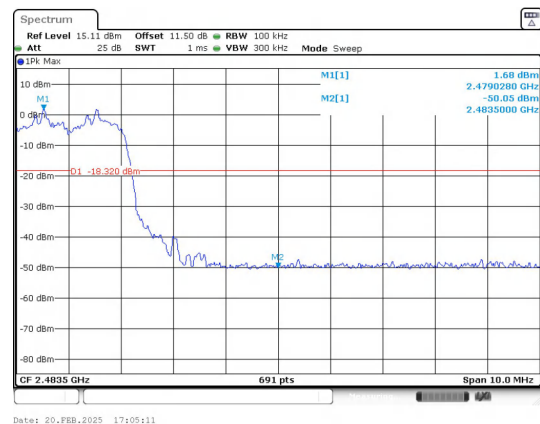
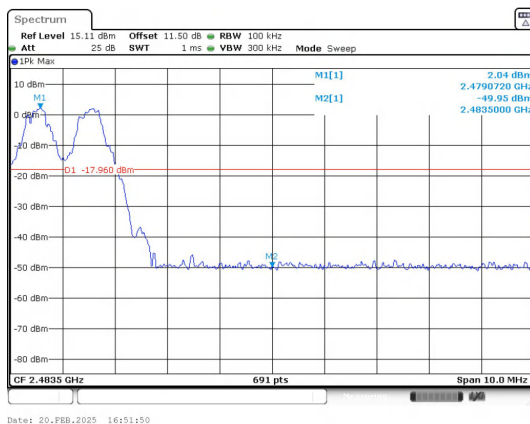
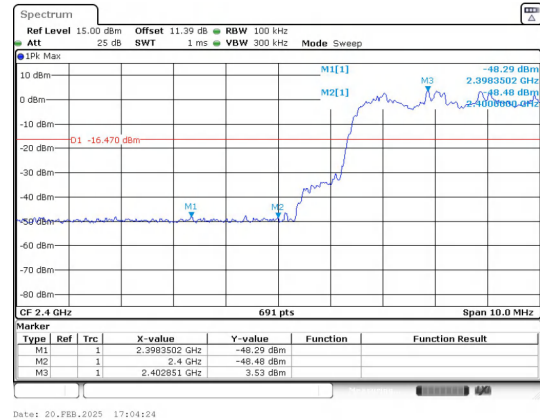
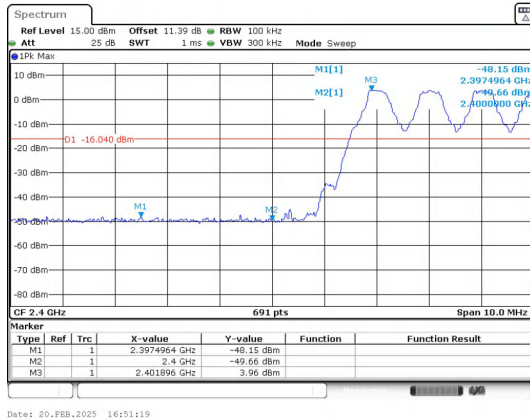
**30.0 MHz - 25000.0 MHz**  
**8DPSK\_3-DH5\_Channel 39**



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



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



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