

## Appendix A

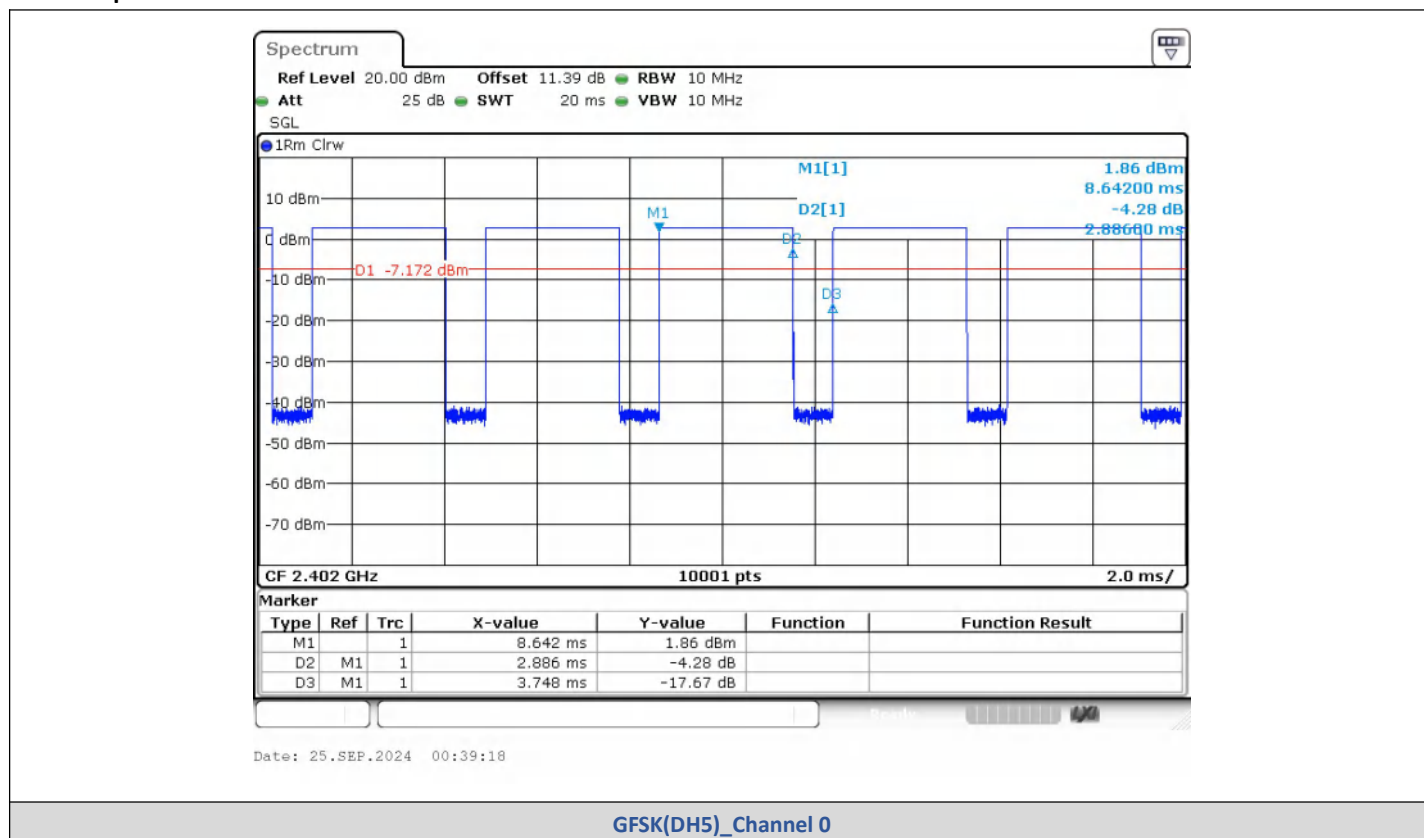
|                |                           |
|----------------|---------------------------|
| Report No.:    | CISRR240924229            |
| FCC ID:        | 2BET4-K60                 |
| Product Name:  | Wireless Karaoke Speakers |
| Model No.:     | K60                       |
| Test Engineer: | Mark Fu                   |
| Supervised by: | Rory Huang                |

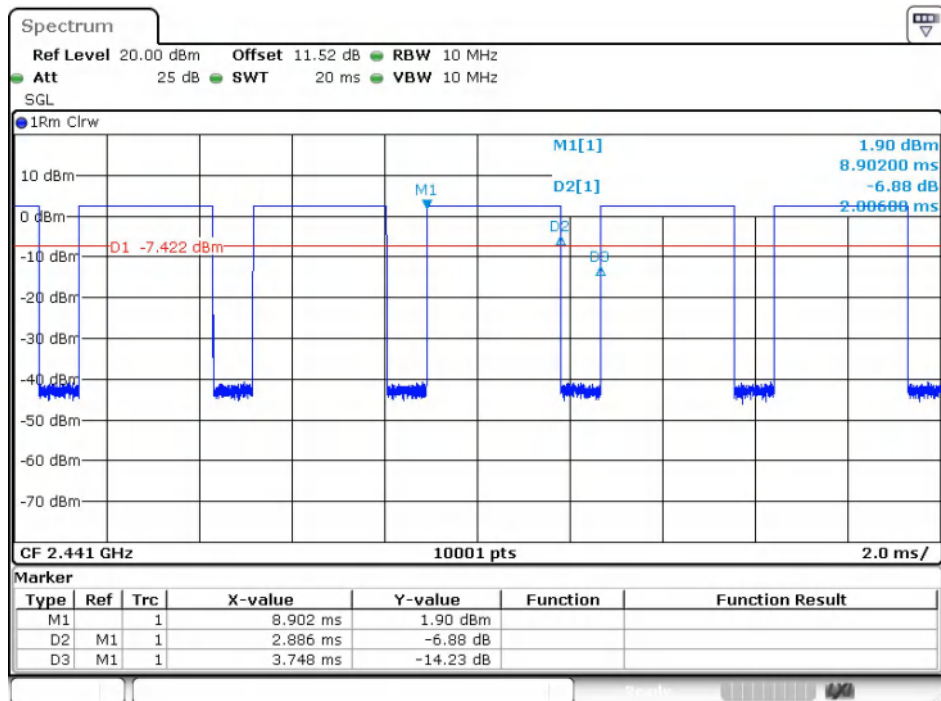
# 1) Duty Cycle

## 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                 | 0.35 |
|               |         | 39      | 2.886        | 3.748       | 77.00          | 0.7700              | 1.1351                 | 0.35 |
|               |         | 78      | 2.886        | 3.748       | 77.00          | 0.7700              | 1.1351                 | 0.35 |
| $\pi/4$ DQPSK | 2-DH5   | 0       | 2.892        | 3.748       | 77.16          | 0.7716              | 1.1261                 | 0.35 |
|               |         | 39      | 2.890        | 3.748       | 77.11          | 0.7711              | 1.1289                 | 0.35 |
|               |         | 78      | 2.892        | 3.748       | 77.16          | 0.7716              | 1.1261                 | 0.35 |
| 8DPSK         | 3-DH5   | 0       | 2.894        | 3.748       | 77.21          | 0.7721              | 1.1233                 | 0.35 |
|               |         | 39      | 2.894        | 3.748       | 77.21          | 0.7721              | 1.1233                 | 0.35 |
|               |         | 78      | 2.892        | 3.748       | 77.16          | 0.7716              | 1.1261                 | 0.35 |

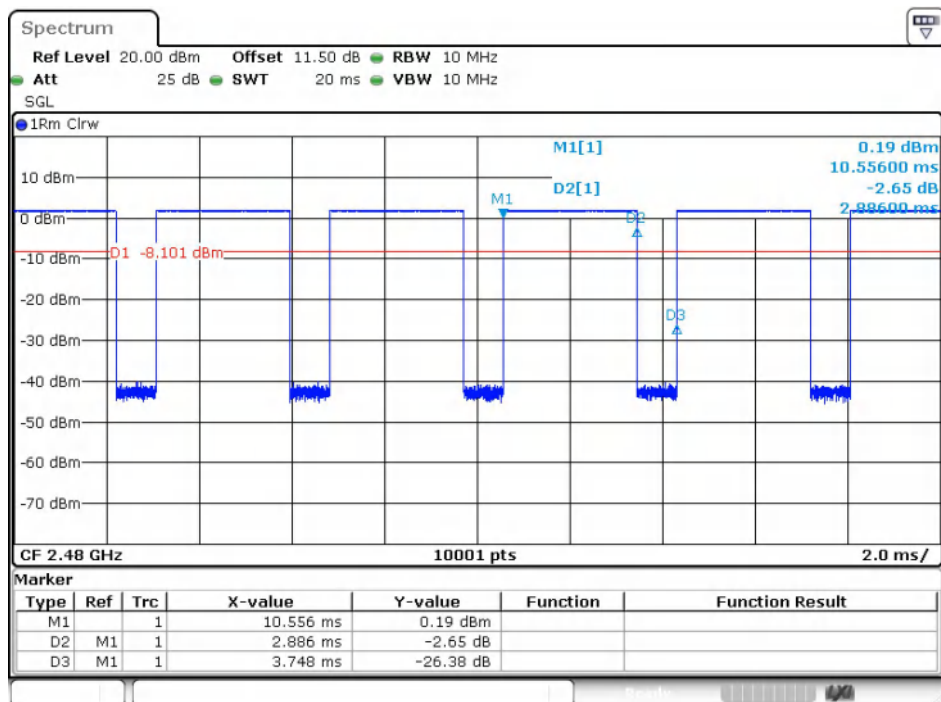
## Test Graphs





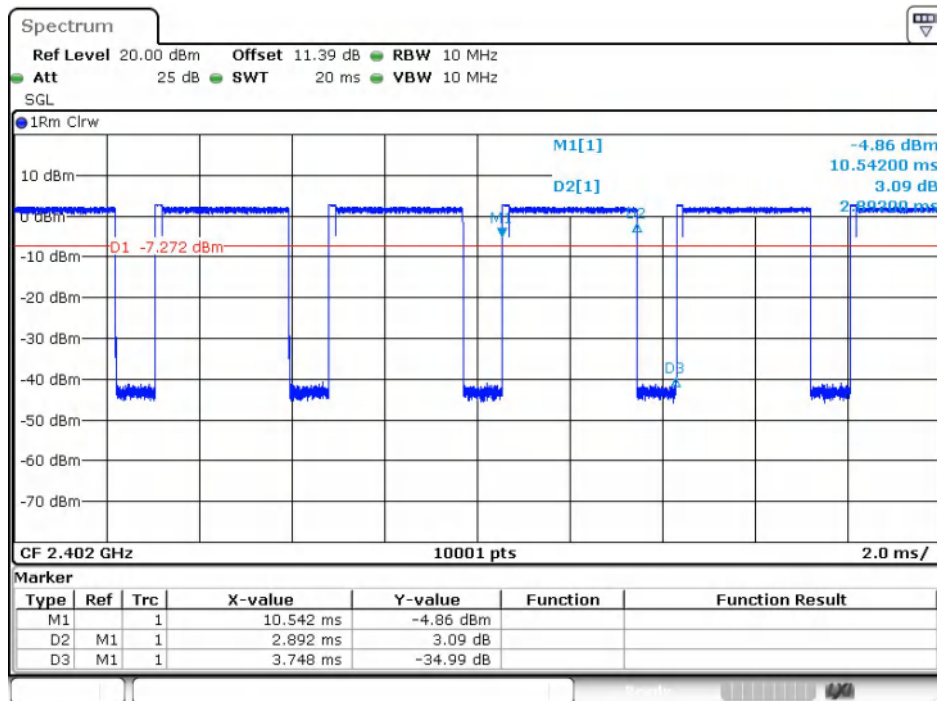
Date: 25.SEP.2024 00:47:50

### GFSK(DH5)\_Channel 39



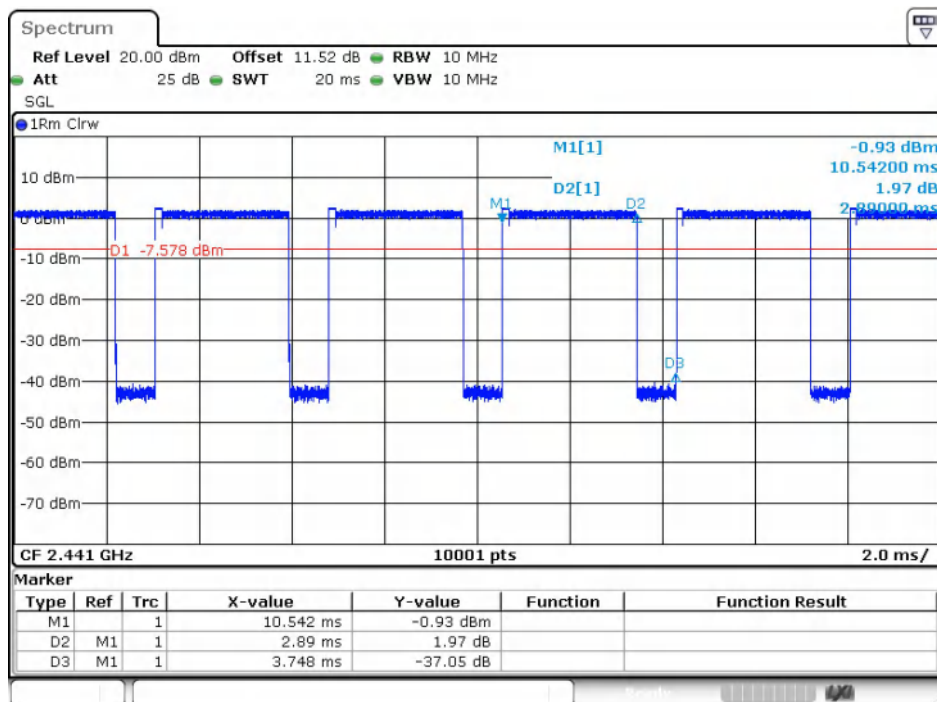
Date: 25.SEP.2024 00:50:00

### GFSK(DH5)\_Channel 78



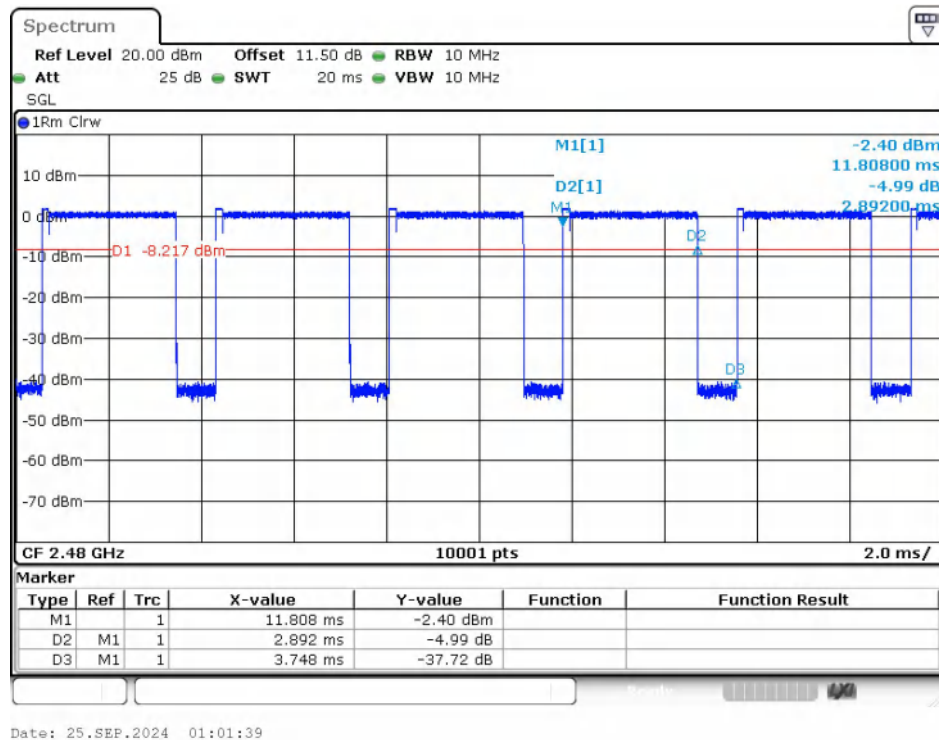
Date: 25.SEP.2024 00:52:36

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

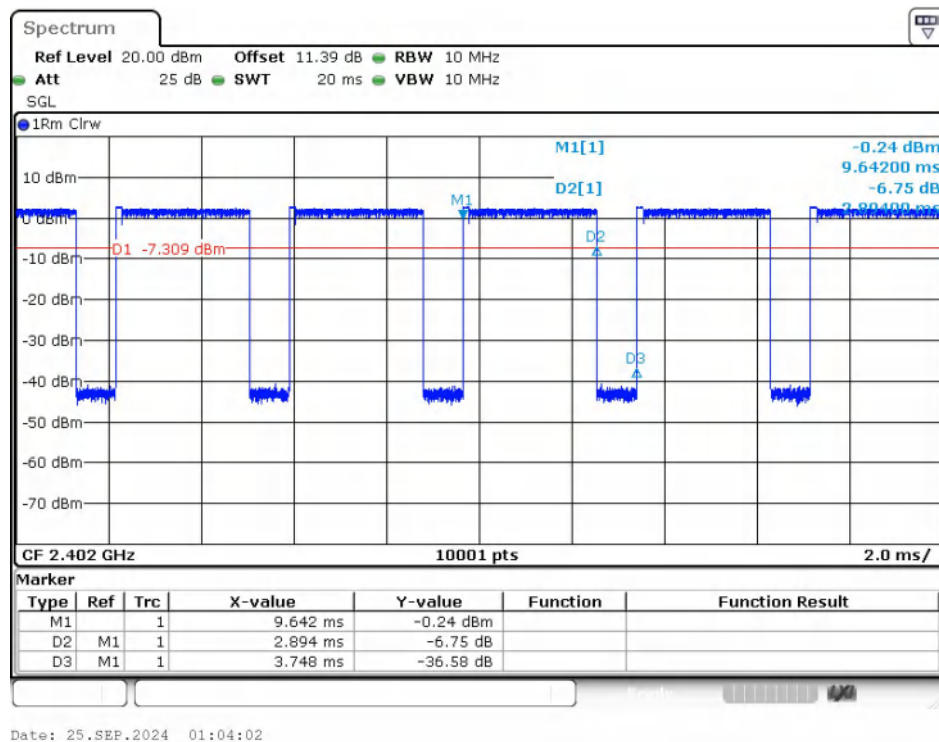


Date: 25.SEP.2024 00:58:53

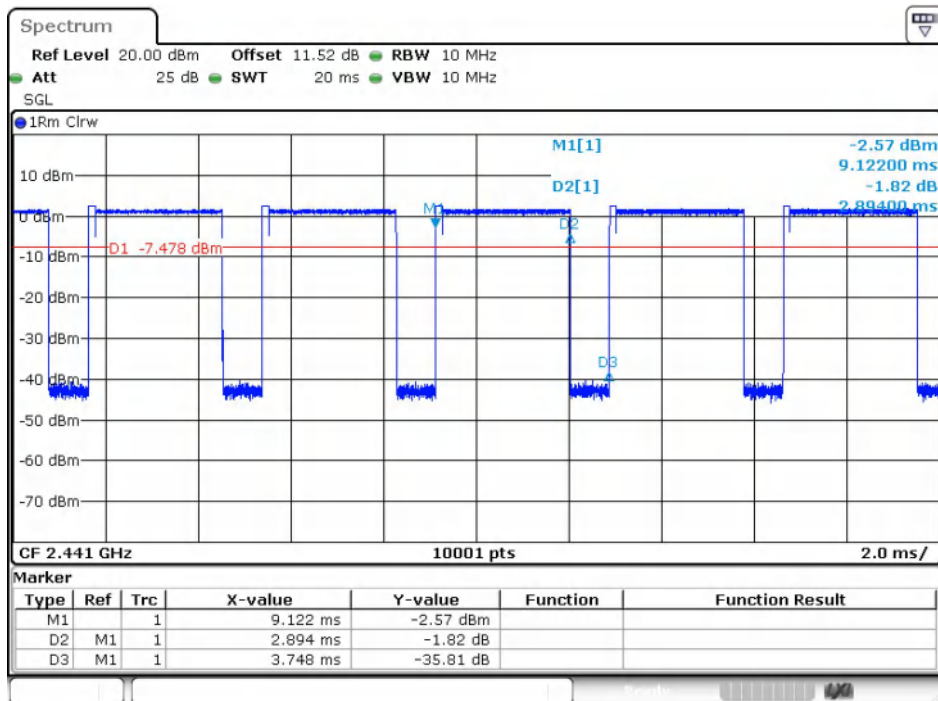
$\pi/4$ DQPSK(2-DH5)\_Channel 39



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

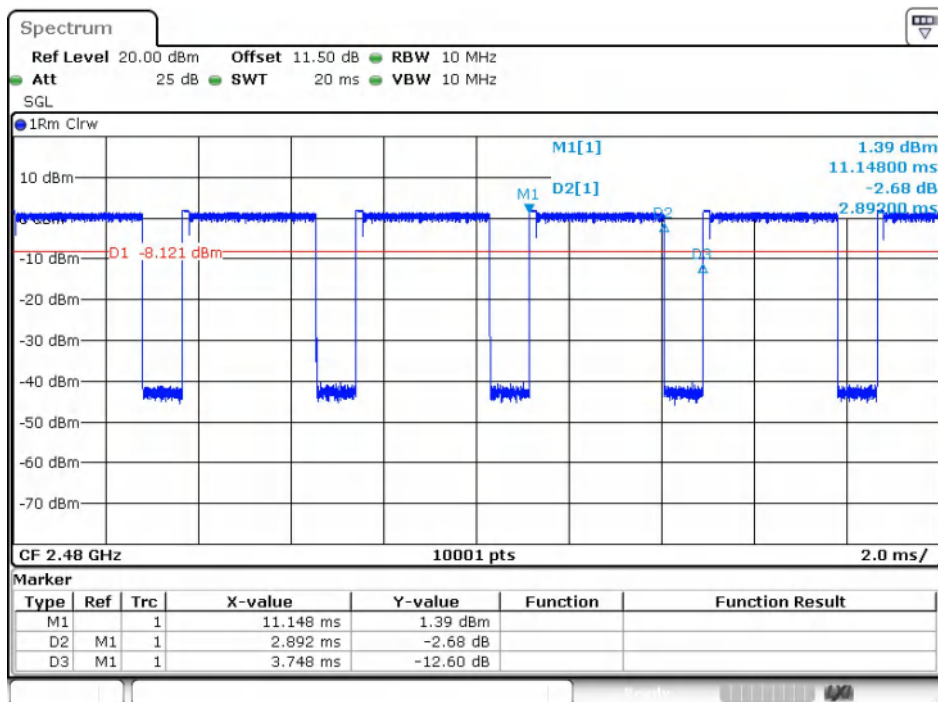


8DPSK(3-DH5)\_Channel 0



Date: 25.SEP.2024 01:10:37

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



Date: 25.SEP.2024 01:12:55

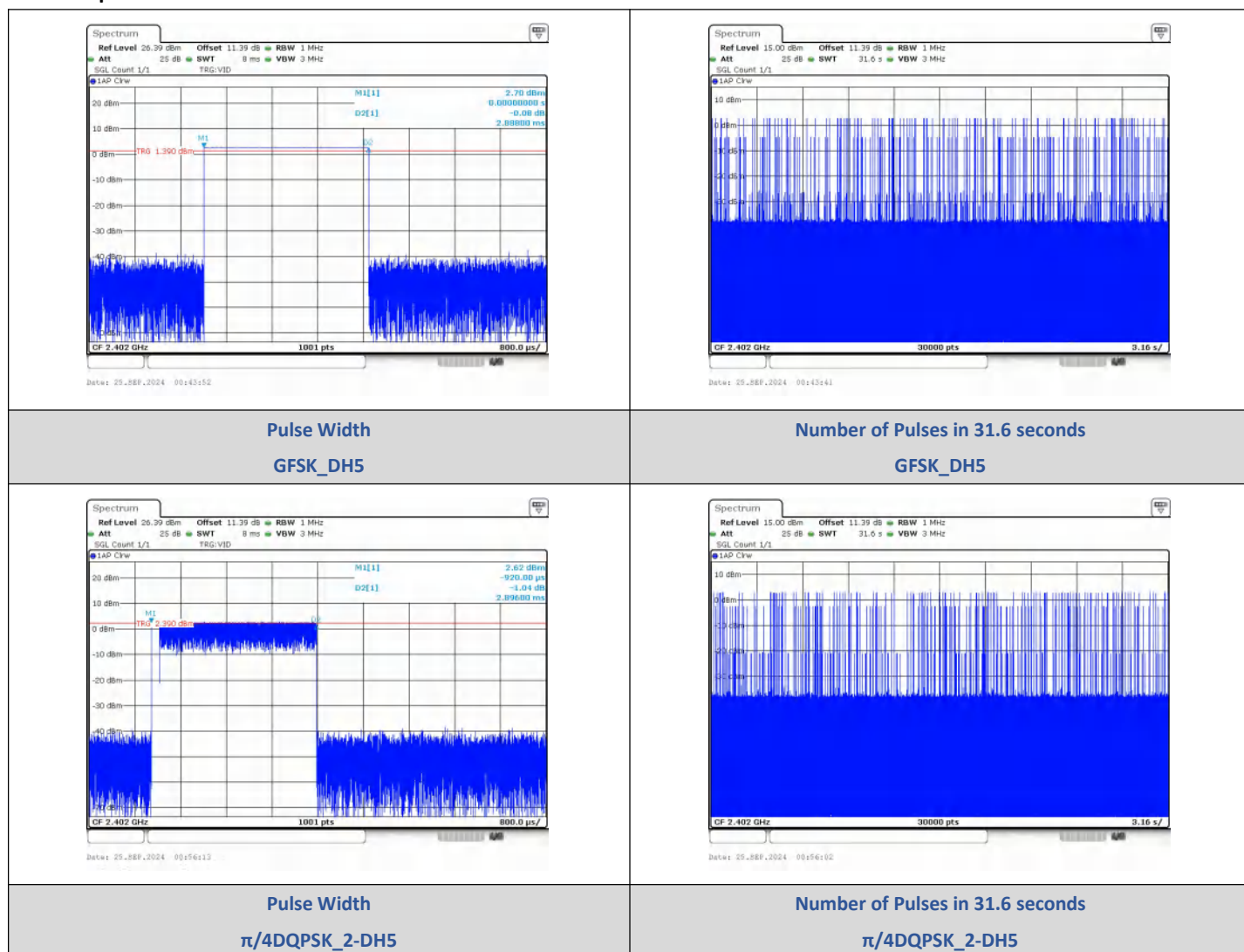
### 8DPSK(3-DH5)\_Channel 78

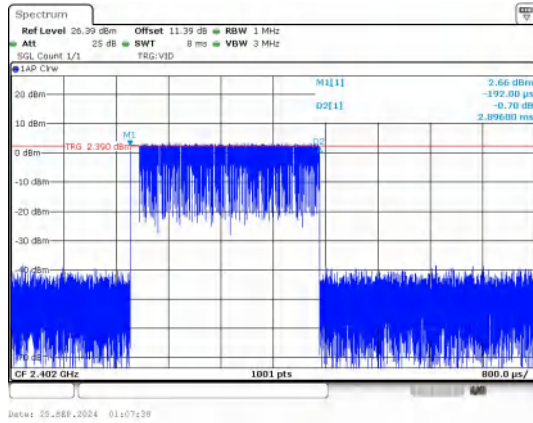
## 2) Dwell Time

### Test Result

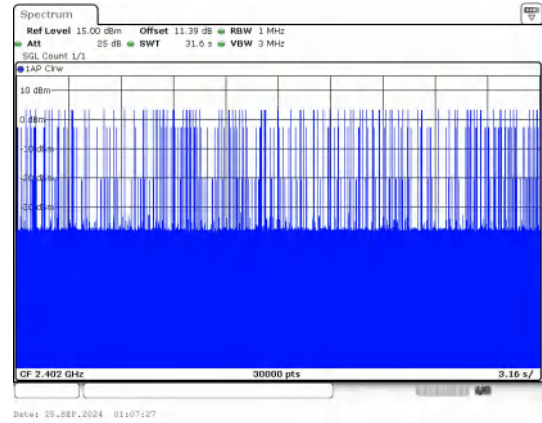
| Modulation    | Packet | Channel          | Pulse Width (ms) | Number of Pulses in 31.6 seconds | Dwell Time (ms) | Limit (ms) | Result |
|---------------|--------|------------------|------------------|----------------------------------|-----------------|------------|--------|
| GFSK          | DH5    | CH0<br>(2402MHz) | 2.888            | 109                              | 314.79          | < 400      | PASS   |
| $\pi/4$ DQPSK | 2-DH5  |                  | 2.896            | 114                              | 330.14          |            | PASS   |
| 8DPSK         | 3-DH5  |                  | 2.896            | 101                              | 292.5           |            | PASS   |

### Test Graphs





**Pulse Width**  
**8DPSK\_3-DH5**



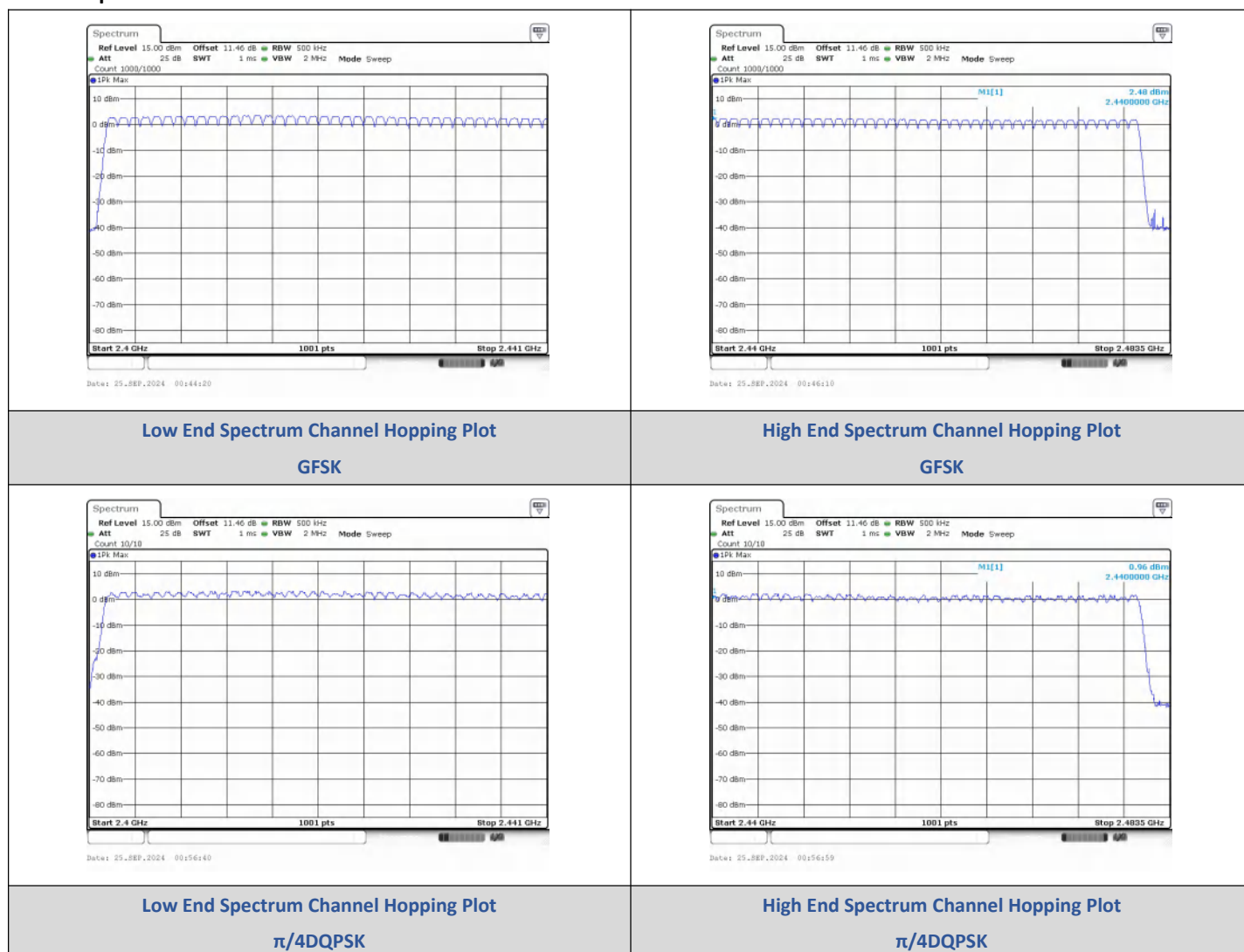
**Number of Pulses in 31.6 seconds**  
**8DPSK\_3-DH5**

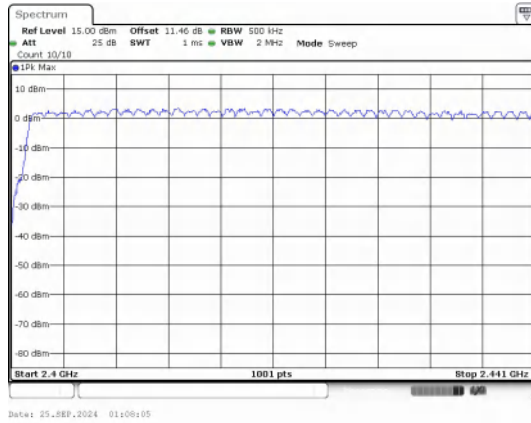
### 3) Number Of Hopping Channel

#### Test Result

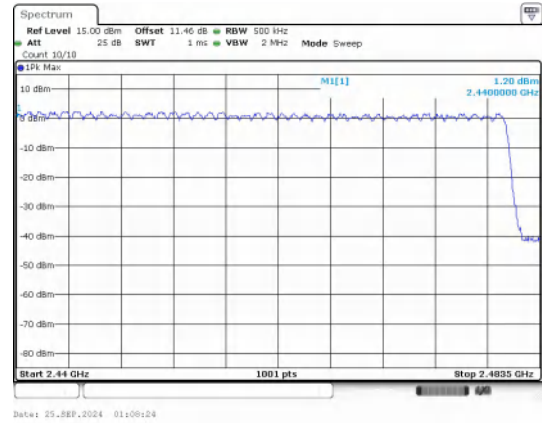
| Modulation    | Packet | Number of Hopping Channel | Limit | Result |
|---------------|--------|---------------------------|-------|--------|
| GFSK          | DH5    | 79                        | 15    | PASS   |
| $\pi/4$ DQPSK | 2-DH5  | 79                        | 15    | PASS   |
| 8DPSK     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

#### Test Graphs





Low End Spectrum Channel Hopping Plot  
8DPSK



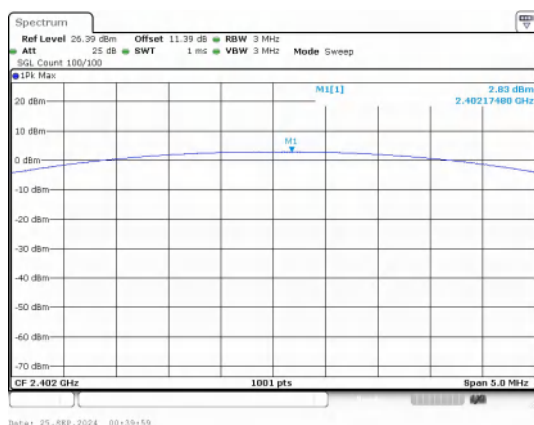
High End Spectrum Channel Hopping Plot  
8DPSK

## 4) Conducted Peak Output Power

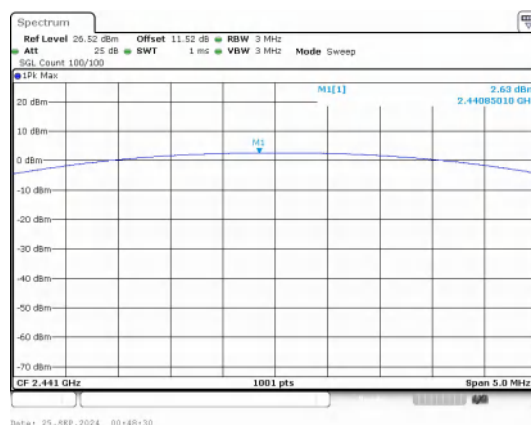
### Test Result

| Modulation    | Packet Type | Channel | Peak Output Power (dBm) | Peak Output Power (mW) | Limit (dBm) | Result |
|---------------|-------------|---------|-------------------------|------------------------|-------------|--------|
| GFSK          | DH5         | 0       | 2.83                    | 1.92                   | ≤30         | PASS   |
|               |             | 39      | 2.63                    | 1.83                   |             | PASS   |
|               |             | 78      | 1.95                    | 1.57                   |             | PASS   |
| $\pi/4$ DQPSK | 2-DH5       | 0       | 3.27                    | 2.12                   | ≤20.97      | PASS   |
|               |             | 39      | 3.13                    | 2.06                   |             | PASS   |
|               |             | 78      | 2.64                    | 1.84                   |             | PASS   |
| 8DPSK         | 3-DH5       | 0       | 3.42                    | 2.20                   |             | PASS   |
|               |             | 39      | 3.01                    | 2.00                   |             | PASS   |
|               |             | 78      | 3.46                    | 2.22                   |             | PASS   |

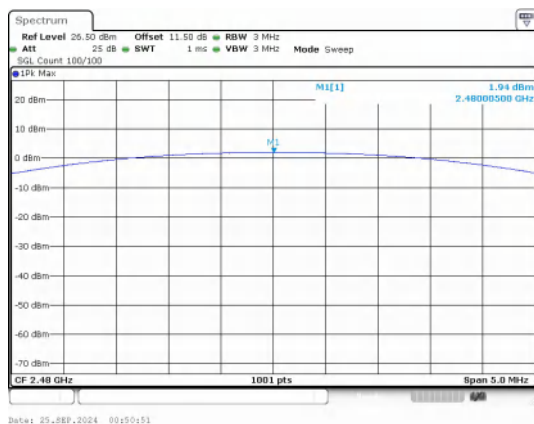
### Test Graphs



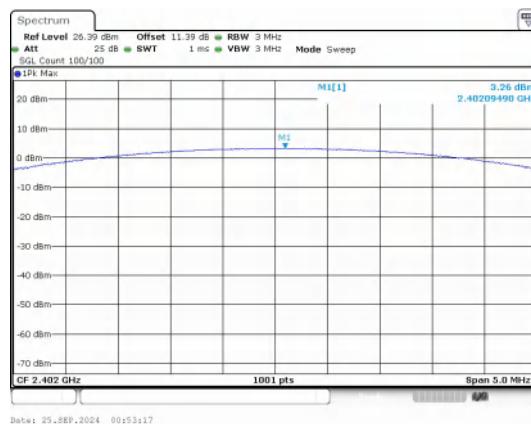
Peak Output Power  
GFSK\_Channel 0



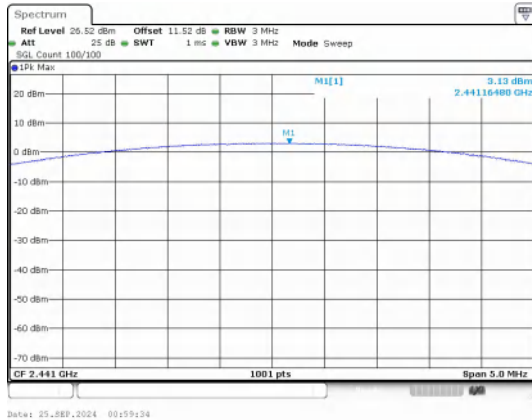
Peak Output Power  
GFSK\_Channel 39



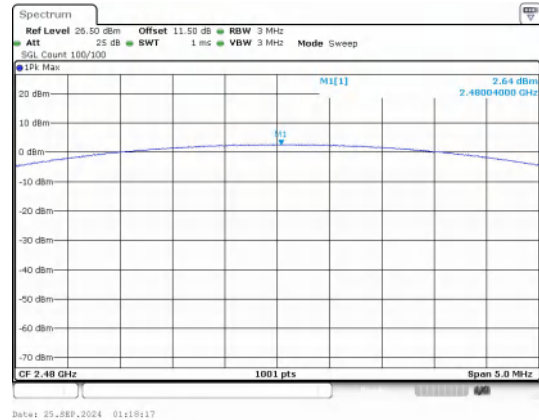
Peak Output Power  
GFSK\_Channel 78



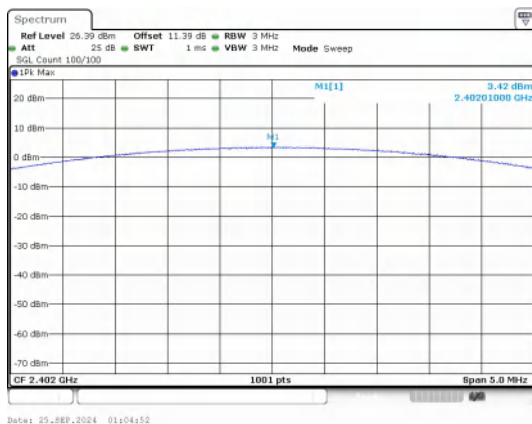
Peak Output Power  
 $\pi/4$ DQPSK\_Channel 0



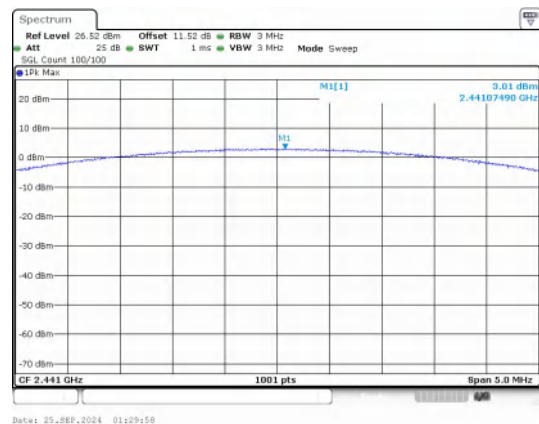
Peak Output Power  
 $\pi/4$ DQPSK\_Channel 39



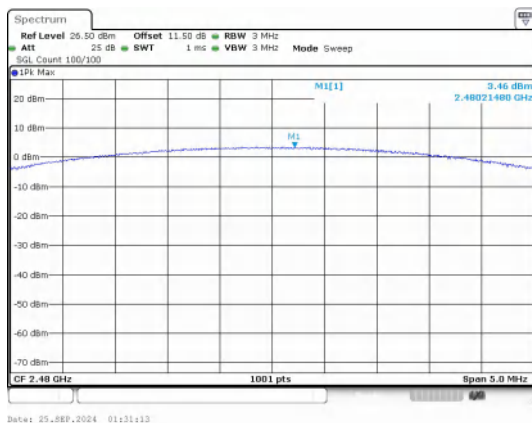
Peak Output Power  
 $\pi/4$ DQPSK\_Channel 78



Peak Output Power  
8DPSK\_Channel 0



Peak Output Power  
8DPSK\_Channel 39



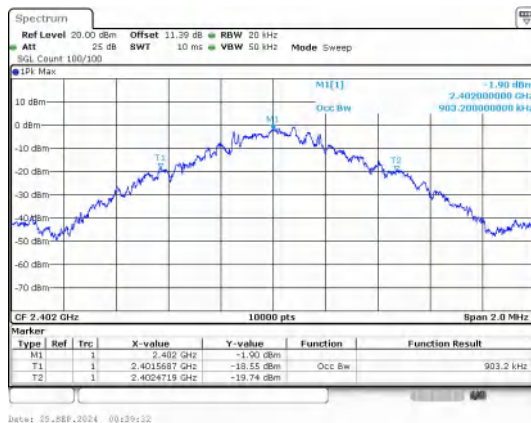
Peak Output Power  
8DPSK\_Channel 78

## 5) 99% Bandwidth

### Test Result

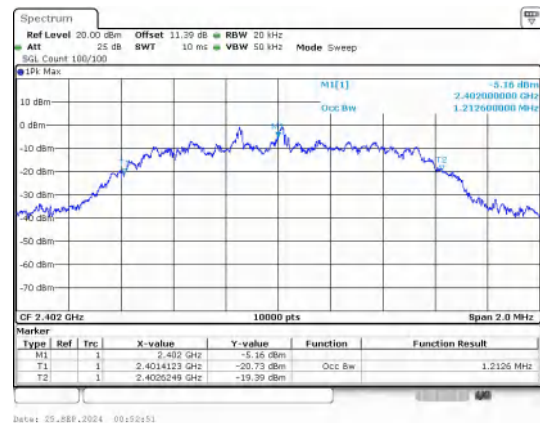
| Modulation    | Channel | Center Frequency (MHz) | 99% BW (MHz) |
|---------------|---------|------------------------|--------------|
| GFSK          | 0       | 2402                   | 0.90320      |
|               | 39      | 2441                   | 0.90420      |
|               | 78      | 2480                   | 0.89200      |
| $\pi/4$ DQPSK | 0       | 2402                   | 1.2126       |
|               | 39      | 2441                   | 1.2072       |
|               | 78      | 2480                   | 1.2056       |
| 8DPSK         | 0       | 2402                   | 1.2190       |
|               | 39      | 2441                   | 1.2146       |
|               | 78      | 2480                   | 1.2146       |

### Test Graphs

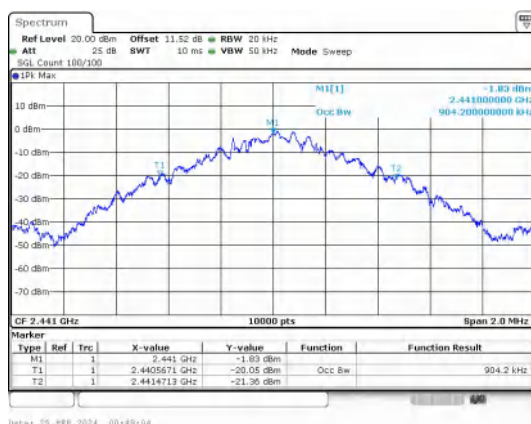


Date: 25\_SEP\_2024 00:19:12

GFSK\_DH5\_Channel 0

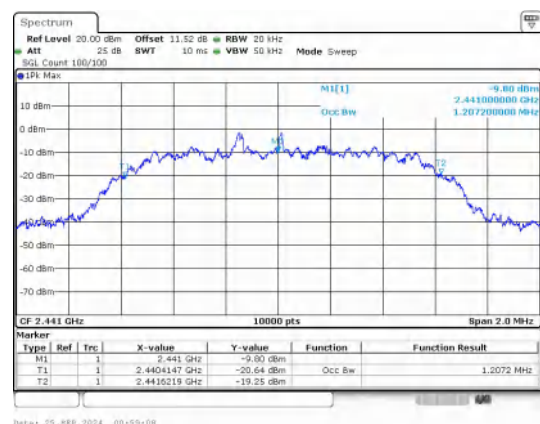


Date: 25\_SEP\_2024 00:19:51

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


Date: 25\_SEP\_2024 00:19:04

GFSK\_DH5\_Channel 39

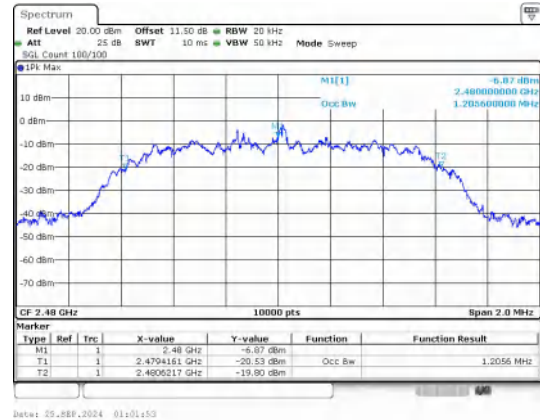


Date: 25\_SEP\_2024 00:19:08

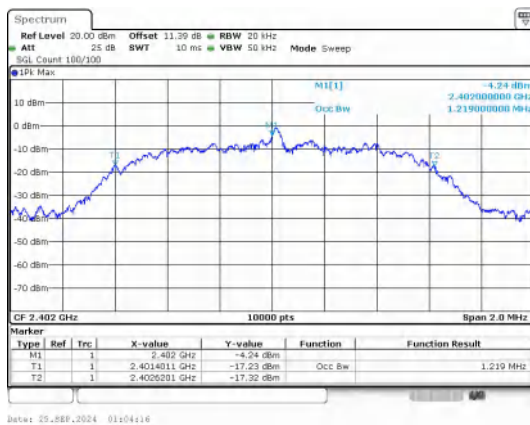
 $\pi/4$ DQPSK\_2-DH5\_Channel 39



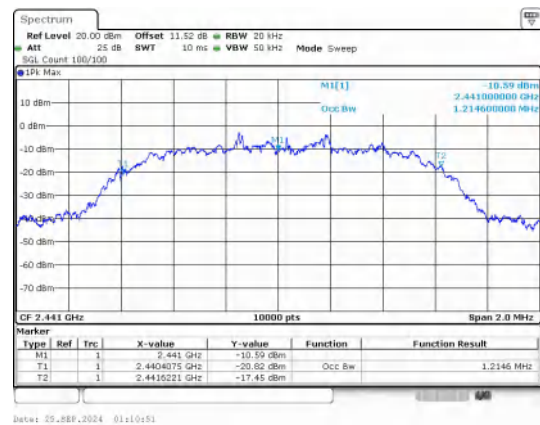
GFSK\_DH5\_Channel 78



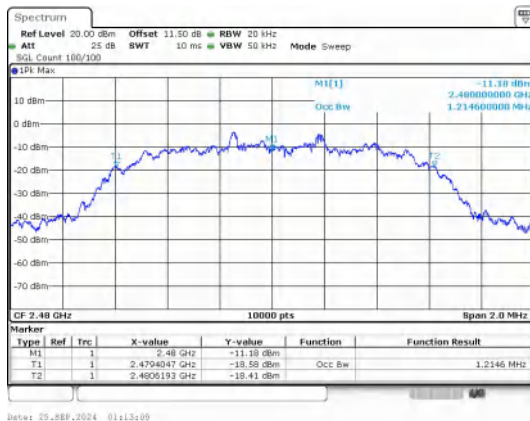
$\pi/4$ DQPSK\_2-DH5\_Channel 78



8DPSK\_3-DH5\_Channel 0



8DPSK\_3-DH5\_Channel 39



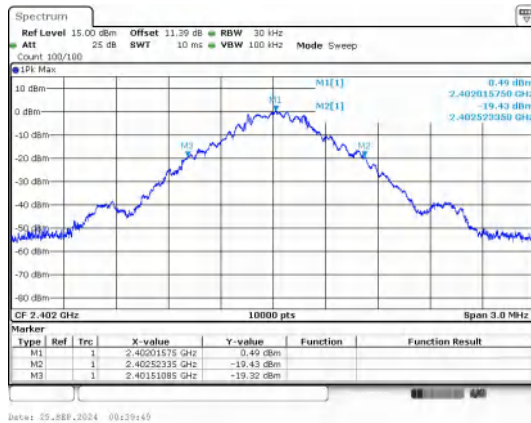
8DPSK\_3-DH5\_Channel 78

## 6) 20dB Bandwidth

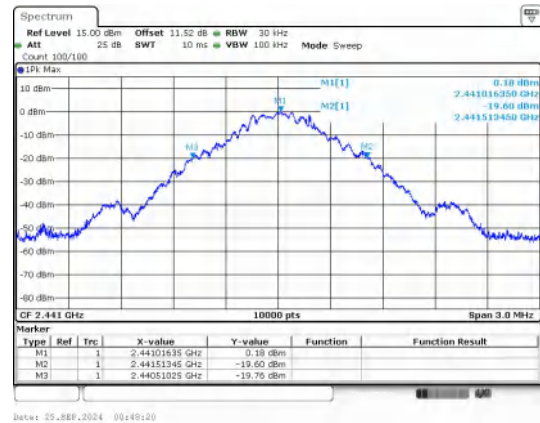
### Test Result

| Modulation    | Channel | Center Frequency (MHz) | 20 dB Bandwidth (MHz) |
|---------------|---------|------------------------|-----------------------|
| GFSK          | 0       | 2402 MHz               | 1.010                 |
|               | 39      | 2441 MHz               | 1.000                 |
|               | 78      | 2480 MHz               | 1.030                 |
| $\pi/4$ DQPSK | 0       | 2402 MHz               | 1.310                 |
|               | 39      | 2441 MHz               | 1.310                 |
|               | 78      | 2480 MHz               | 1.320                 |
| 8DPSK         | 0       | 2402 MHz               | 1.300                 |
|               | 39      | 2441 MHz               | 1.290                 |
|               | 78      | 2480 MHz               | 1.300                 |

### Test Graphs



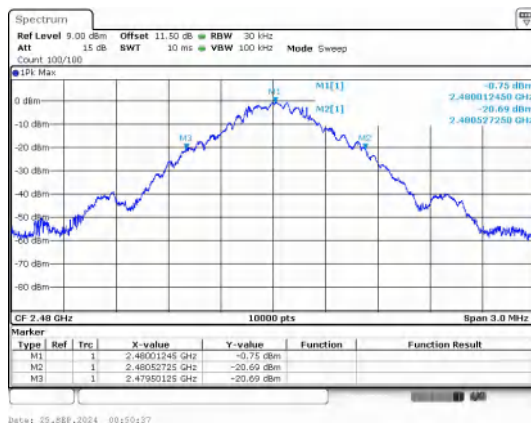
Date: 25\_SEP\_2024 09:19:49



Date: 25\_SEP\_2024 09:19:20

GFSK\_DH5\_Channel 0

GFSK\_DH5\_Channel 39



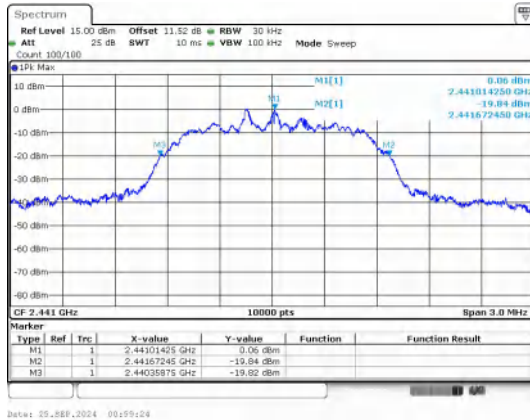
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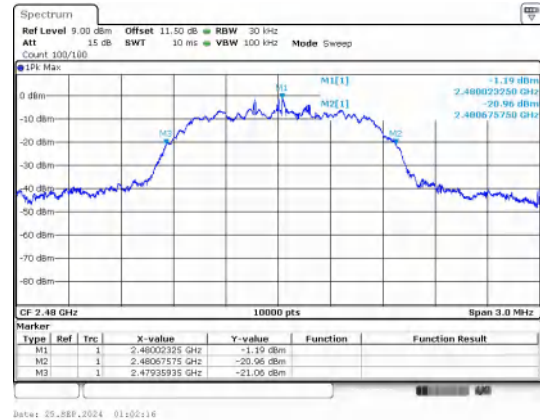
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GFSK\_DH5\_Channel 78

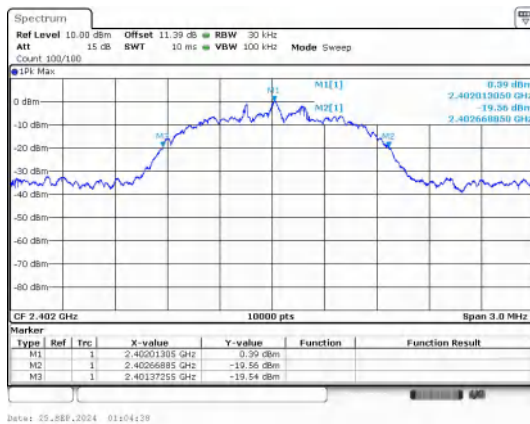
 $\pi/4$ DQPSK\_2-DH5\_Channel 0



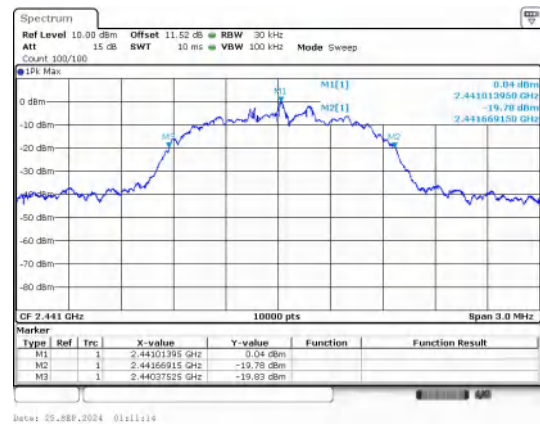
$\pi/4$ DQPSK\_2-DH5\_Channel 39



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



8DPSK\_3-DH5\_Channel 0



8DPSK\_3-DH5\_Channel 39



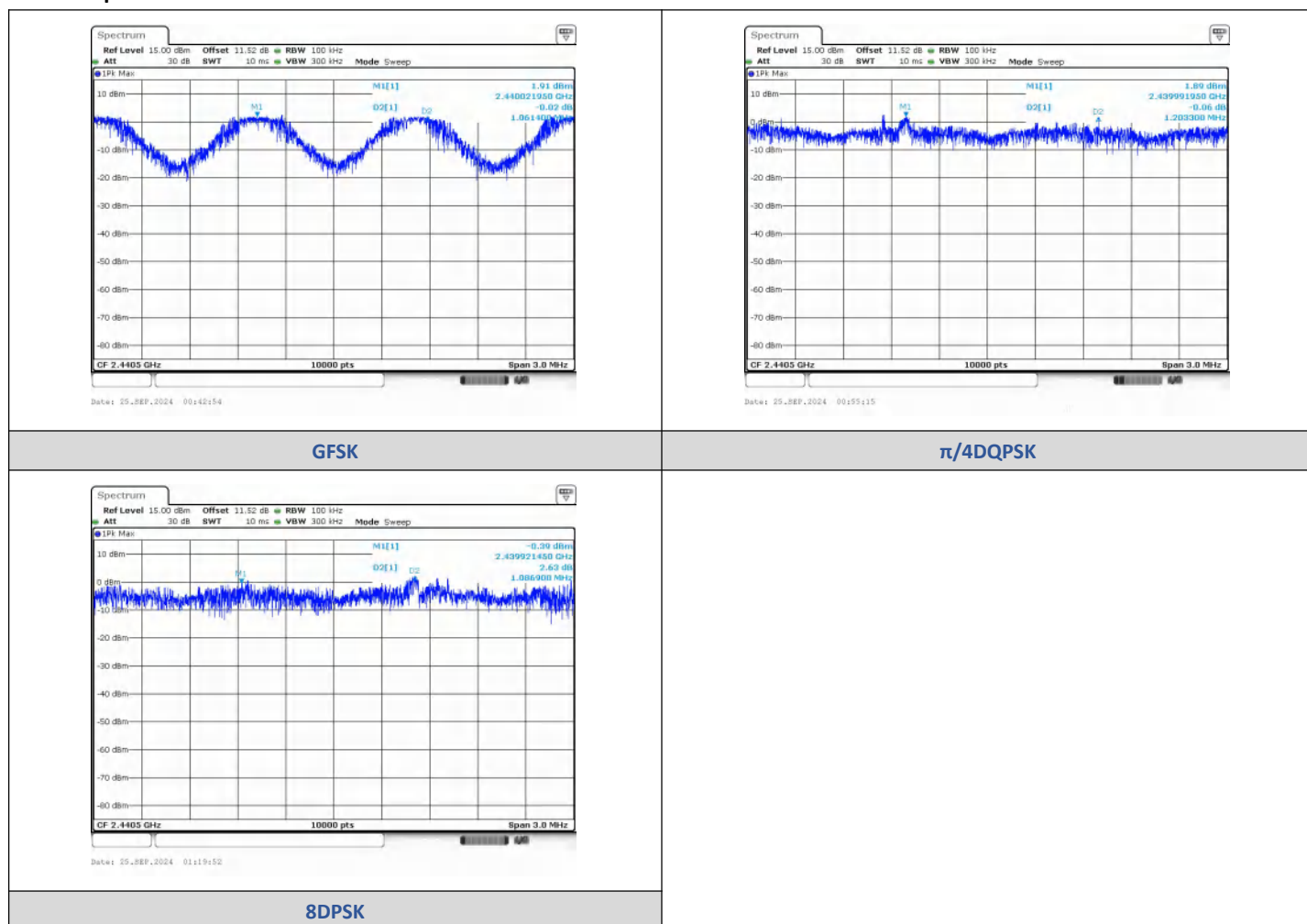
8DPSK\_3-DH5\_Channel 78

## 7) 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                   | 2441.0833                    | 1.0614                             | 1.030       | PASS   |
| $\pi/4$ DQPSK | 2-DH5  | 2439.992                    | 2441.1953                    | 1.2033                             | 0.873       | PASS   |
| 8DPSK         | 3-DH5  | 2439.9214                   | 2441.0084                    | 1.0869                             | 0.867       | PASS   |

### Test Graphs



## 8) Conducted Out Of Band Emission

### Test Result

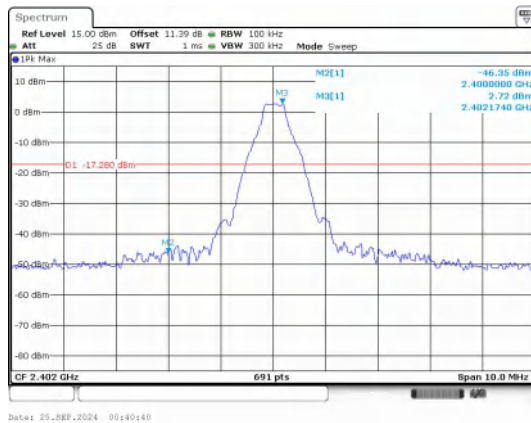
#### Non-Hopping

| Modulation    | Packet | Channel | OOB Emission Frequency (MHz) | OOB Emission Level (dBm) | Limit (dBm) | Over Limit (dB) | Result |
|---------------|--------|---------|------------------------------|--------------------------|-------------|-----------------|--------|
| GFSK          | DH5    | 0       | 2400.00                      | -46.348                  | -17.28      | -29.068         | PASS   |
|               |        |         | 7206.79                      | -38.276                  | -17.28      | -20.996         | PASS   |
|               |        | 39      | 9763.72                      | -39.911                  | -17.56      | -22.351         | PASS   |
|               |        | 78      | 2483.50                      | -50.469                  | -18.2       | -32.269         | PASS   |
|               |        |         | 9920.20                      | -38.840                  | -18.2       | -20.640         | PASS   |
| $\pi/4$ DQPSK | 2-DH5  | 0       | 2400.00                      | -45.282                  | -17.35      | -27.932         | PASS   |
|               |        |         | 7206.79                      | -42.145                  | -17.35      | -24.795         | PASS   |
|               |        | 39      | 9763.72                      | -39.968                  | -17.69      | -22.278         | PASS   |
|               |        | 78      | 2483.50                      | -48.454                  | -18.25      | -30.204         | PASS   |
|               |        |         | 9920.20                      | -39.027                  | -18.25      | -20.777         | PASS   |
| 8DPSK         | 3-DH5  | 0       | 2400.00                      | -46.209                  | -17.36      | -28.849         | PASS   |
|               |        |         | 7205.96                      | -42.098                  | -17.36      | -24.738         | PASS   |
|               |        | 39      | 9763.72                      | -41.607                  | -17.91      | -23.697         | PASS   |
|               |        | 78      | 2483.50                      | -50.066                  | -17.54      | -32.526         | PASS   |
|               |        |         | 9920.20                      | -43.905                  | -17.54      | -26.365         | PASS   |

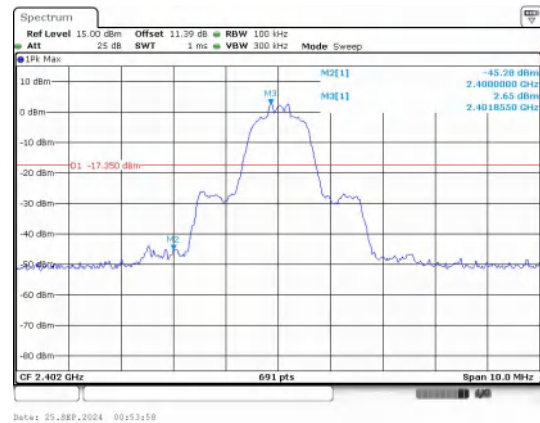
#### Hopping

| 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 | 2395.82                            | -48.831                        | -17.28         | -31.551            | PASS   |
|               |        |         | 2400.00                            | -50.278                        | -17.28         | -32.998            | PASS   |
|               |        |         | 2483.50                            | -50.487                        | -18.53         | -31.957            | PASS   |
| $\pi/4$ DQPSK | 2-DH5  |         | 2396.45                            | -48.769                        | -17.81         | -30.959            | PASS   |
|               |        |         | 2400.00                            | -49.592                        | -17.81         | -31.782            | PASS   |
|               |        |         | 2483.50                            | -49.774                        | -18.52         | -31.254            | PASS   |
| 8DPSK         | 3-DH5  |         | 2395.96                            | -48.169                        | -18.58         | -29.589            | PASS   |
|               |        |         | 2400.00                            | -50.328                        | -18.58         | -31.748            | PASS   |
|               |        |         | 2483.50                            | -49.603                        | -19.21         | -30.393            | PASS   |

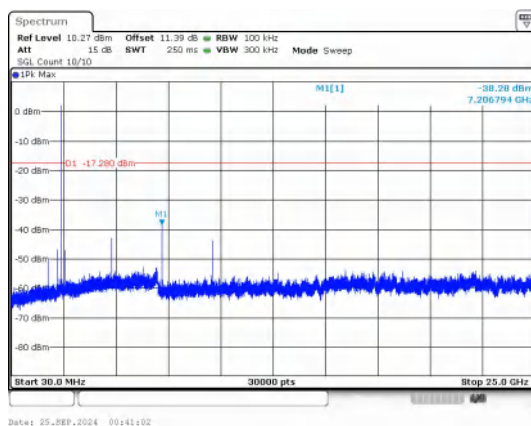
### Test Graphs



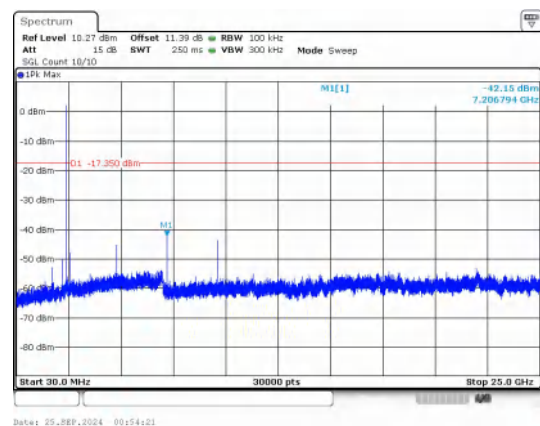
Out Of Band Emission  
GFSK\_DH5\_Channel 0



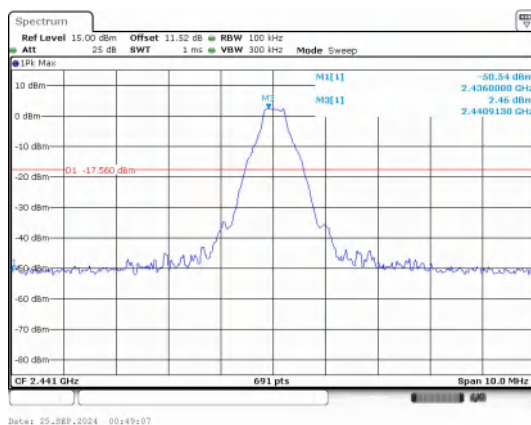
Out Of Band Emission  
 $\pi/4$ QPSK\_2-DH5\_Channel 0



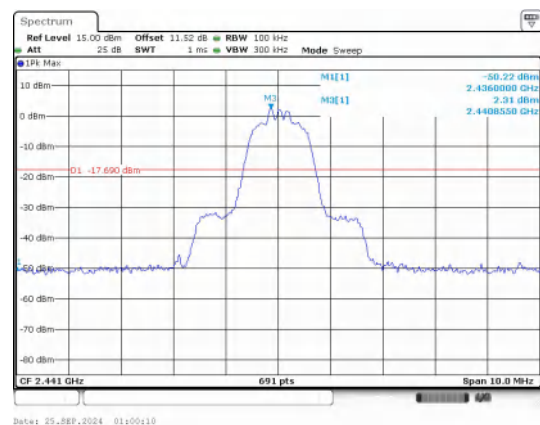
30.0 MHz - 25000.0 MHz  
GFSK\_DH5\_Channel 0



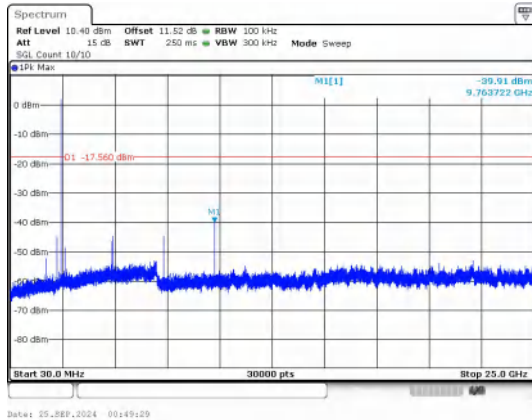
30.0 MHz - 25000.0 MHz  
 $\pi/4$ QPSK\_2-DH5\_Channel 0



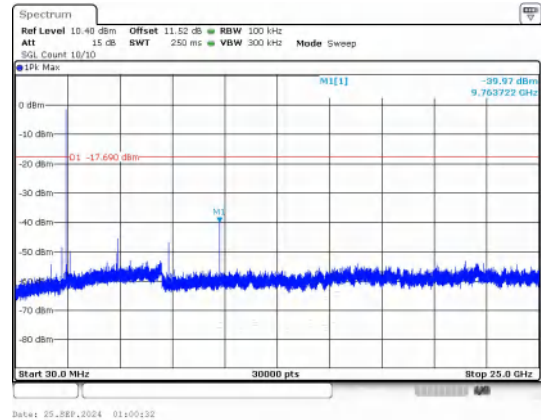
Out Of Band Emission  
GFSK\_DH5\_Channel 39



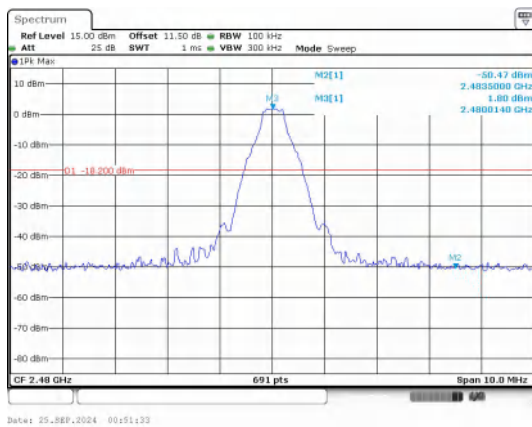
Out Of Band Emission  
 $\pi/4$ QPSK\_2-DH5\_Channel 39



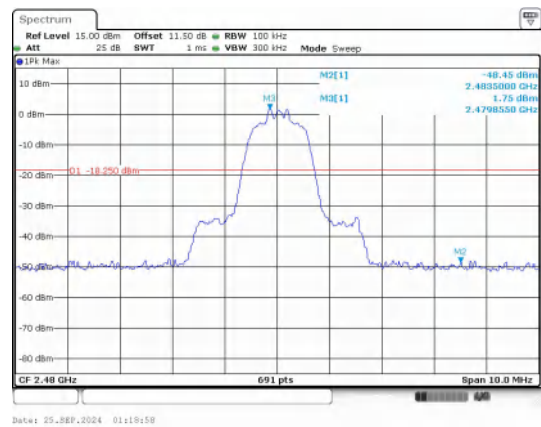
30.0 MHz - 25000.0 MHz  
GFSK\_DH5\_Channel 39



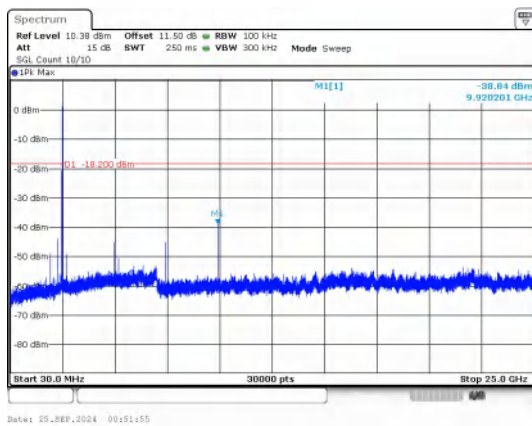
30.0 MHz - 25000.0 MHz  
 $\pi/4$ DQPSK\_2-DH5\_Channel 39



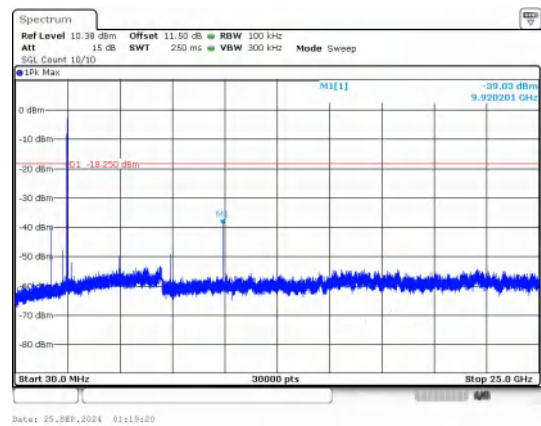
Out Of Band Emission  
GFSK\_DH5\_Channel 78



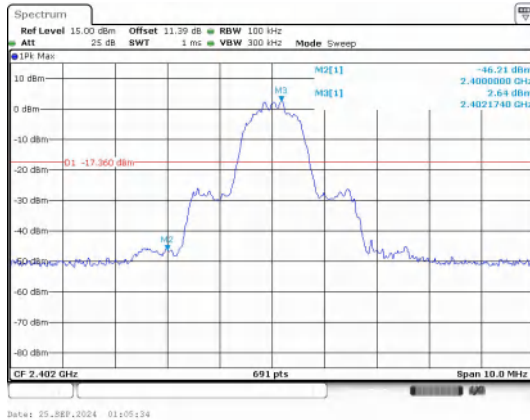
Out Of Band Emission  
 $\pi/4$ DQPSK\_2-DH5\_Channel 78



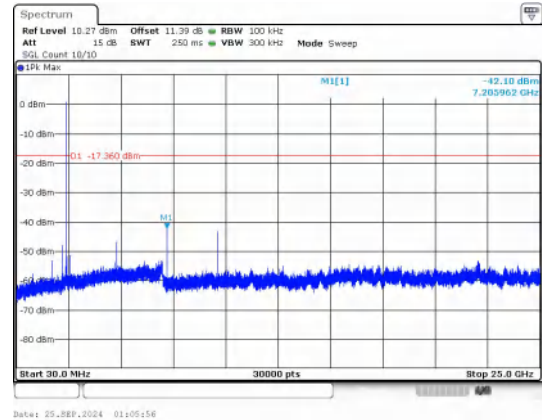
30.0 MHz - 25000.0 MHz  
GFSK\_DH5\_Channel 78



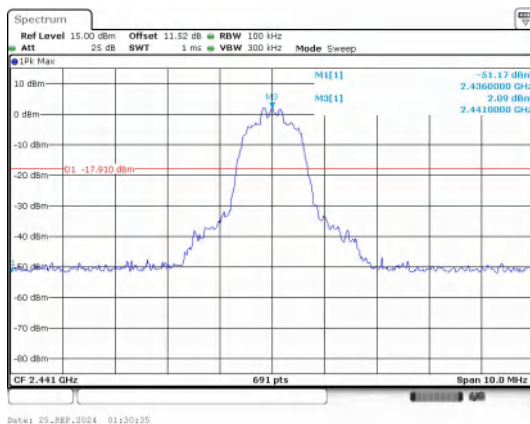
30.0 MHz - 25000.0 MHz  
 $\pi/4$ DQPSK\_2-DH5\_Channel 78



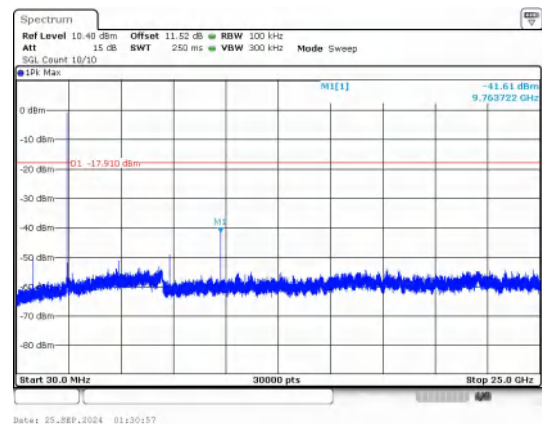
Out Of Band Emission  
8DPSK\_3-DH5\_Channel 0



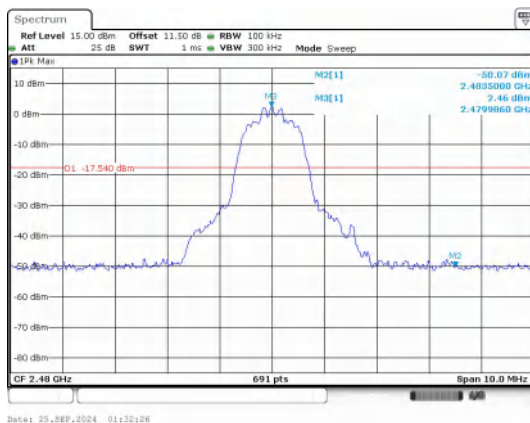
30.0 MHz - 25000.0 MHz  
8DPSK\_3-DH5\_Channel 0



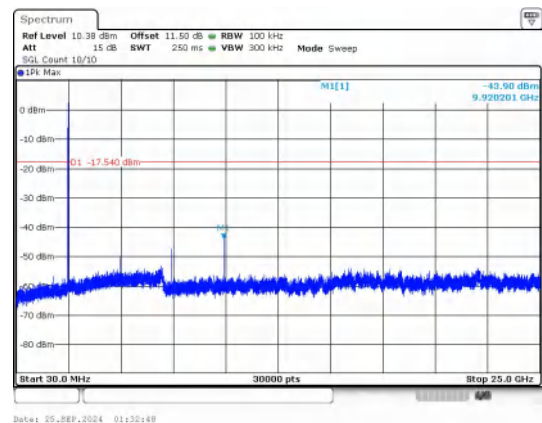
Out Of Band Emission  
8DPSK\_3-DH5\_Channel 39



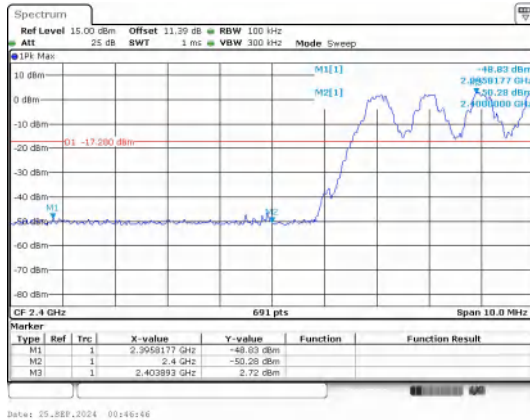
30.0 MHz - 25000.0 MHz  
8DPSK\_3-DH5\_Channel 39



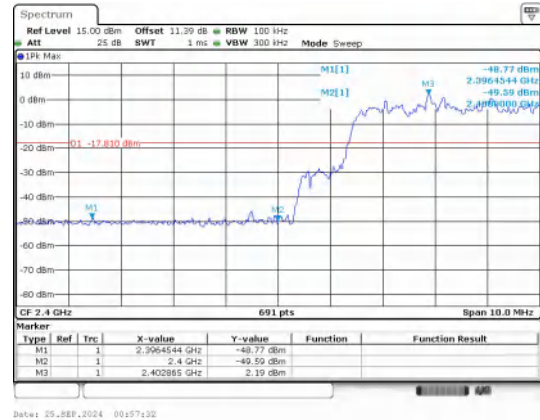
Out Of Band Emission  
8DPSK\_3-DH5\_Channel 78



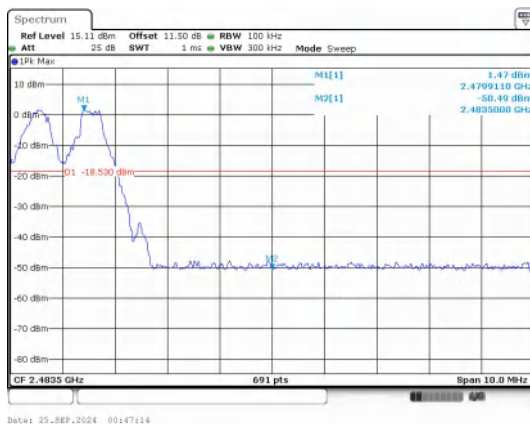
30.0 MHz - 25000.0 MHz  
8DPSK\_3-DH5\_Channel 78



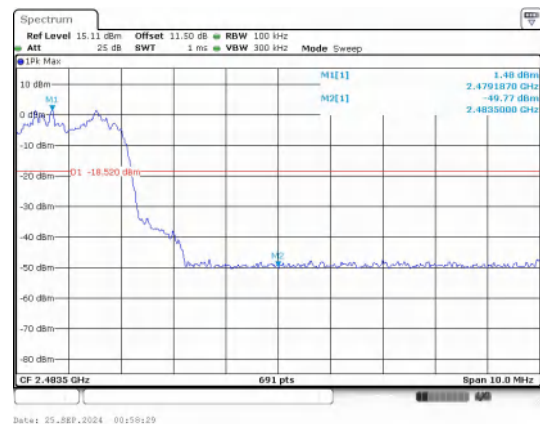
Out Of Band Emission(Left)  
GFSK\_DH5\_Channel Hopping



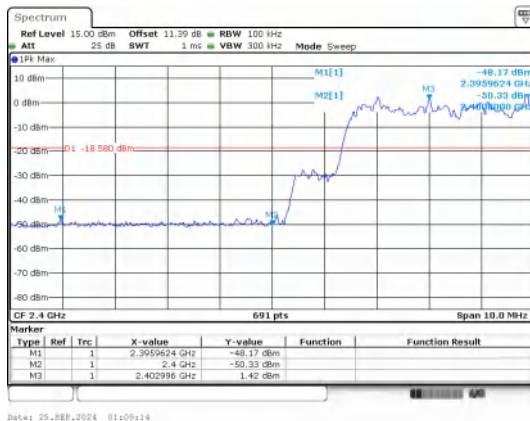
Out Of Band Emission(Left)  
 $\pi/4$ DQPSK\_2-DH5\_Channel Hopping



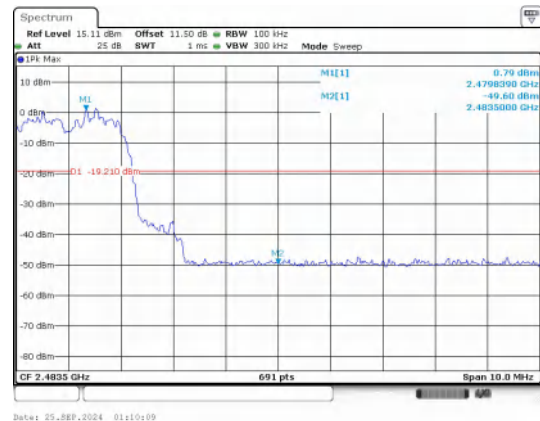
Out Of Band Emission(Right)  
GFSK\_DH5\_Channel Hopping



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