

Appendix A

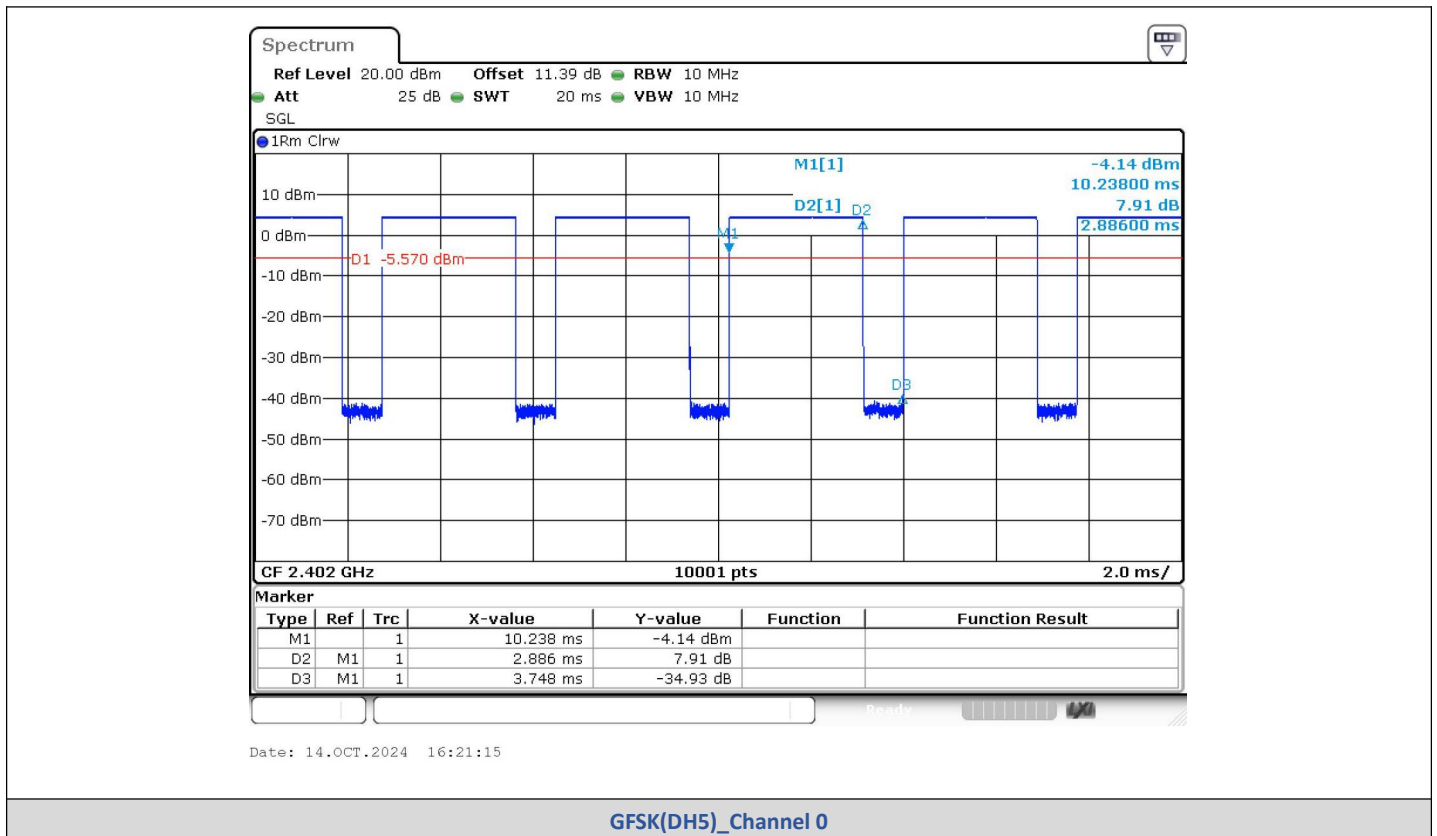
| | |
|----------------|---------------------------------|
| Report No.: | CISRR241009021 |
| FCC ID: | 2BLOE-TYD-SM-001 |
| Product Name: | Jellyfish Ocean Projection Lamp |
| Model No.: | TYD-SM-001 |
| Test Engineer: | Lucas Huang |
| Supervised by: | Rory Huang |

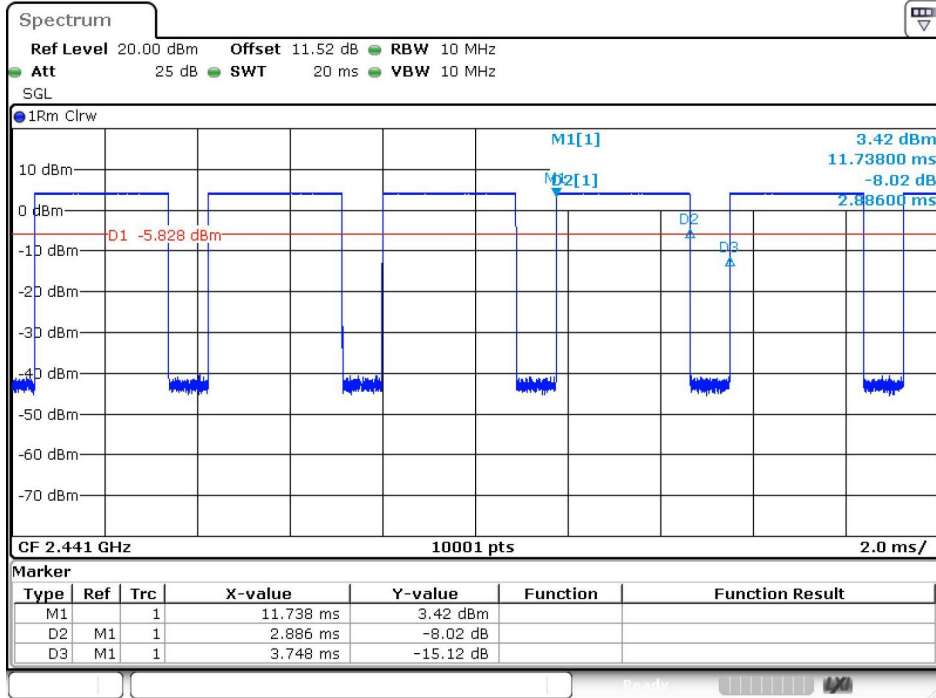
1) Duty Cycle

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 | 2.890 | 3.748 | 77.11 | 0.7711 | 1.1289 | 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 | 2.892 | 3.748 | 77.16 | 0.7716 | 1.1261 | 0.35 |
| | | 78 | 2.894 | 3.748 | 77.21 | 0.7721 | 1.1233 | 0.35 |

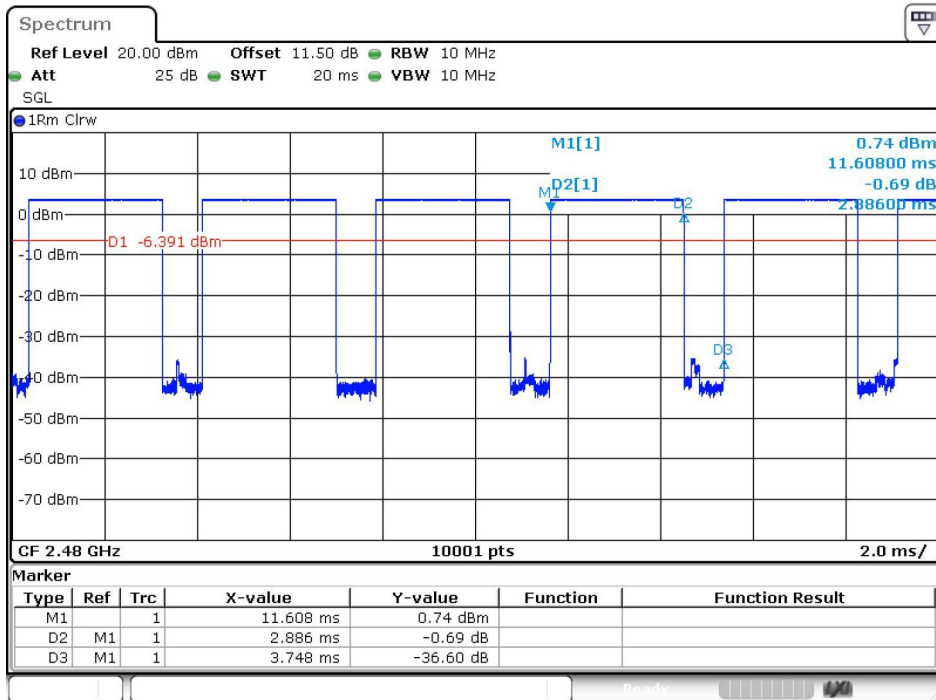
Test Graphs





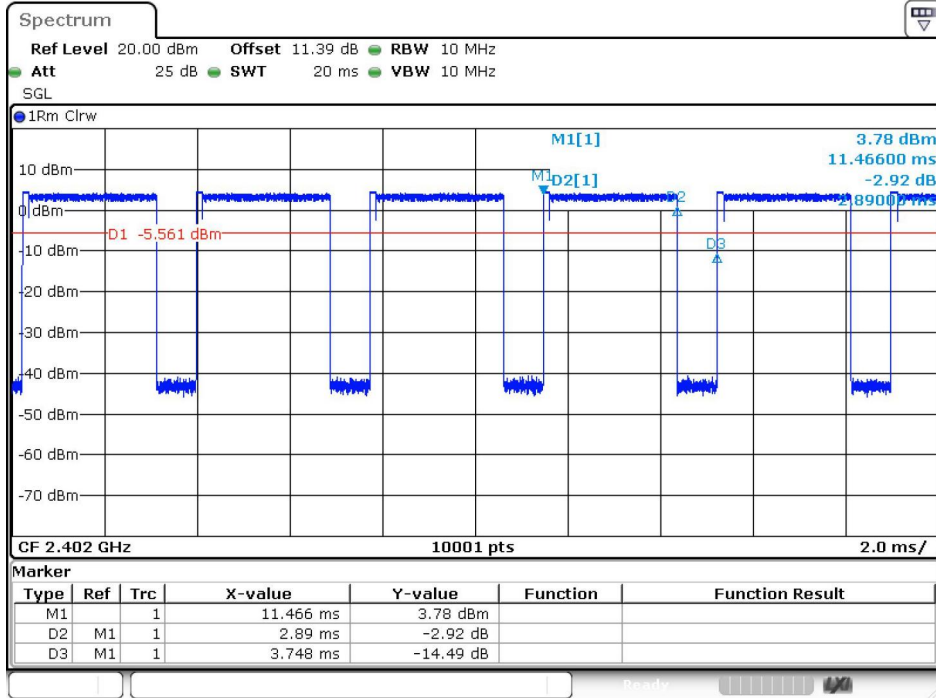
Date: 14.OCT.2024 16:27:06

GFSK(DH5)_Channel 39



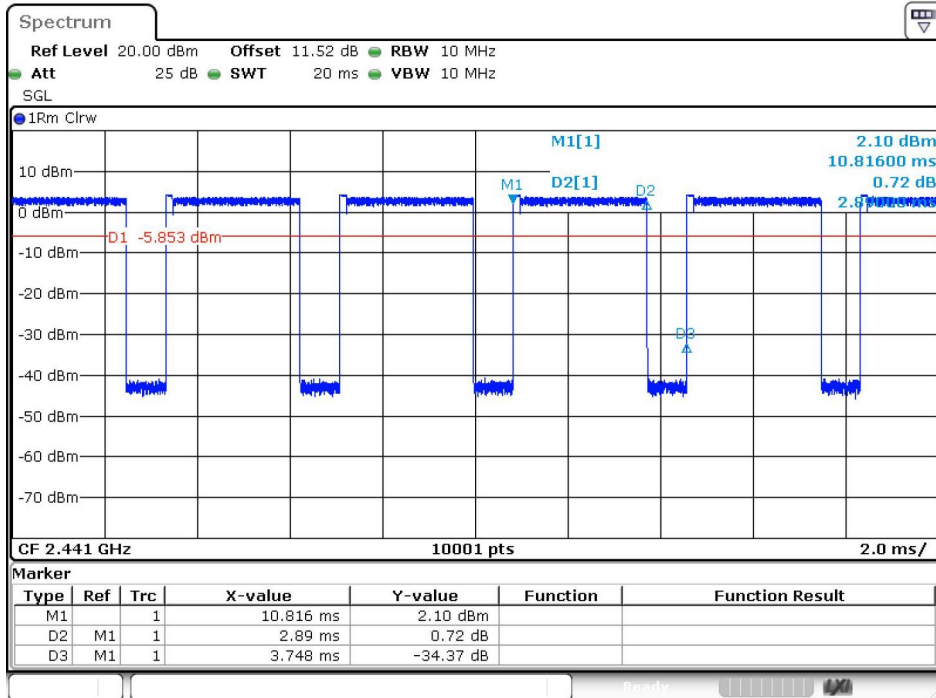
Date: 14.OCT.2024 16:31:52

GFSK(DH5)_Channel 78



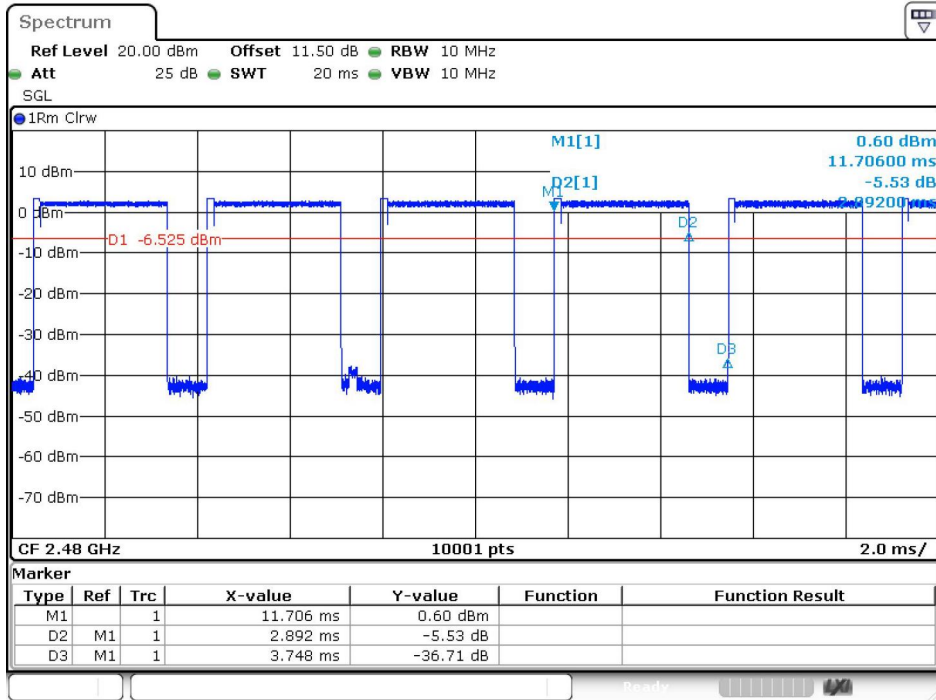
Date: 14.OCT.2024 17:15:27

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



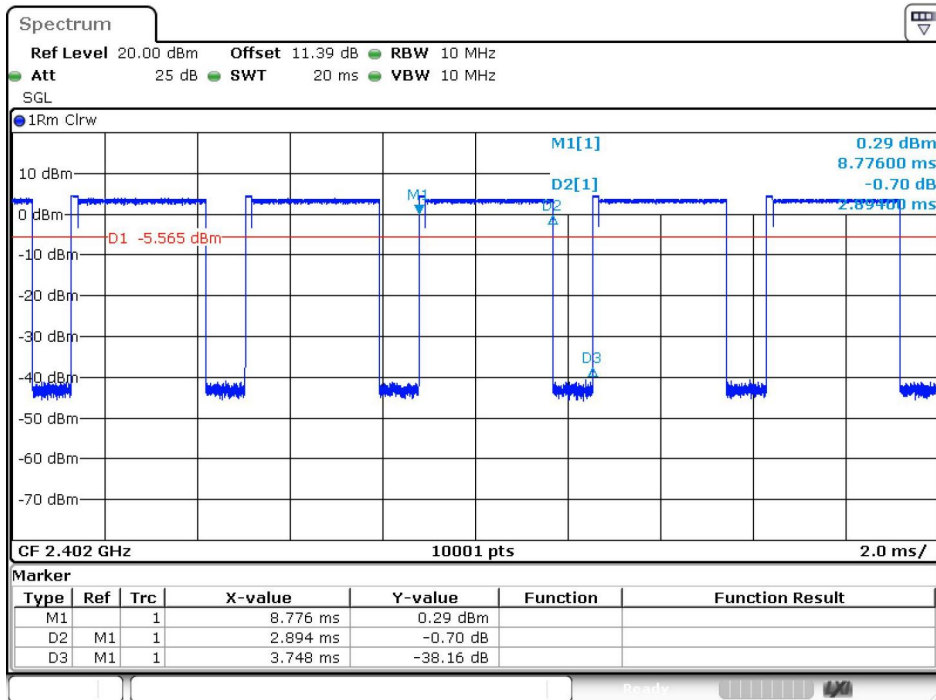
Date: 14.OCT.2024 16:43:47

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



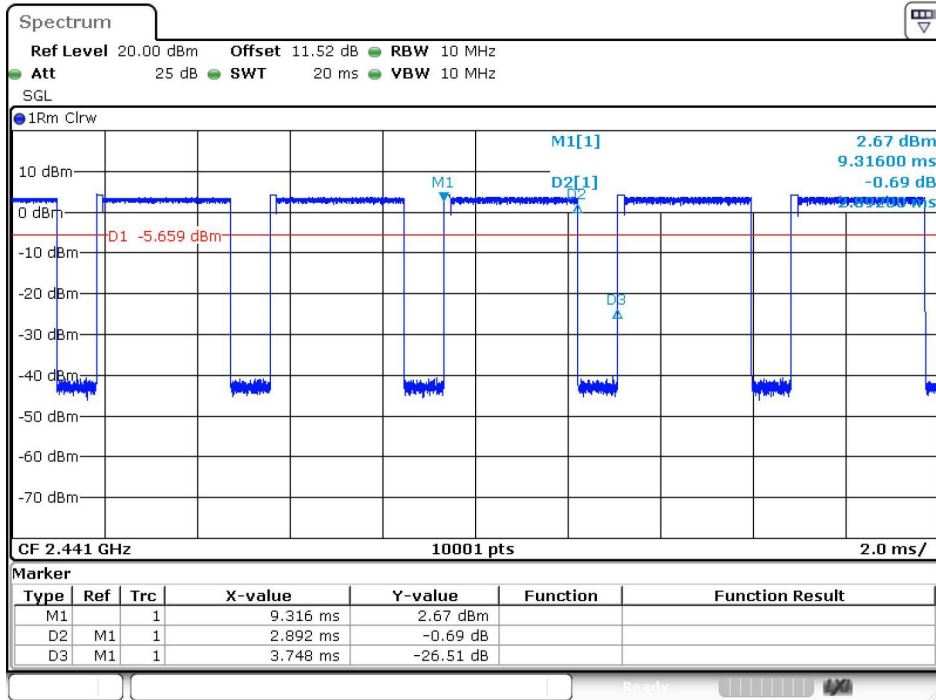
Date: 14.OCT.2024 16:46:17

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



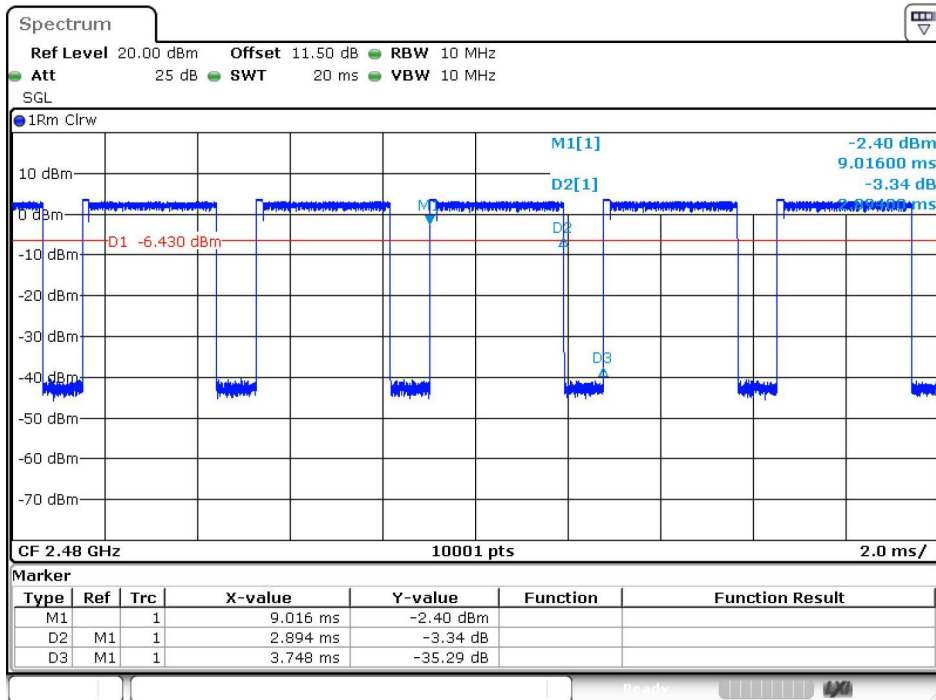
Date: 14.OCT.2024 16:48:39

8DPSK(3-DH5)_Channel 0



Date: 14.OCT.2024 17:01:49

8DPSK(3-DH5)_Channel 39



Date: 14.OCT.2024 17:05:33

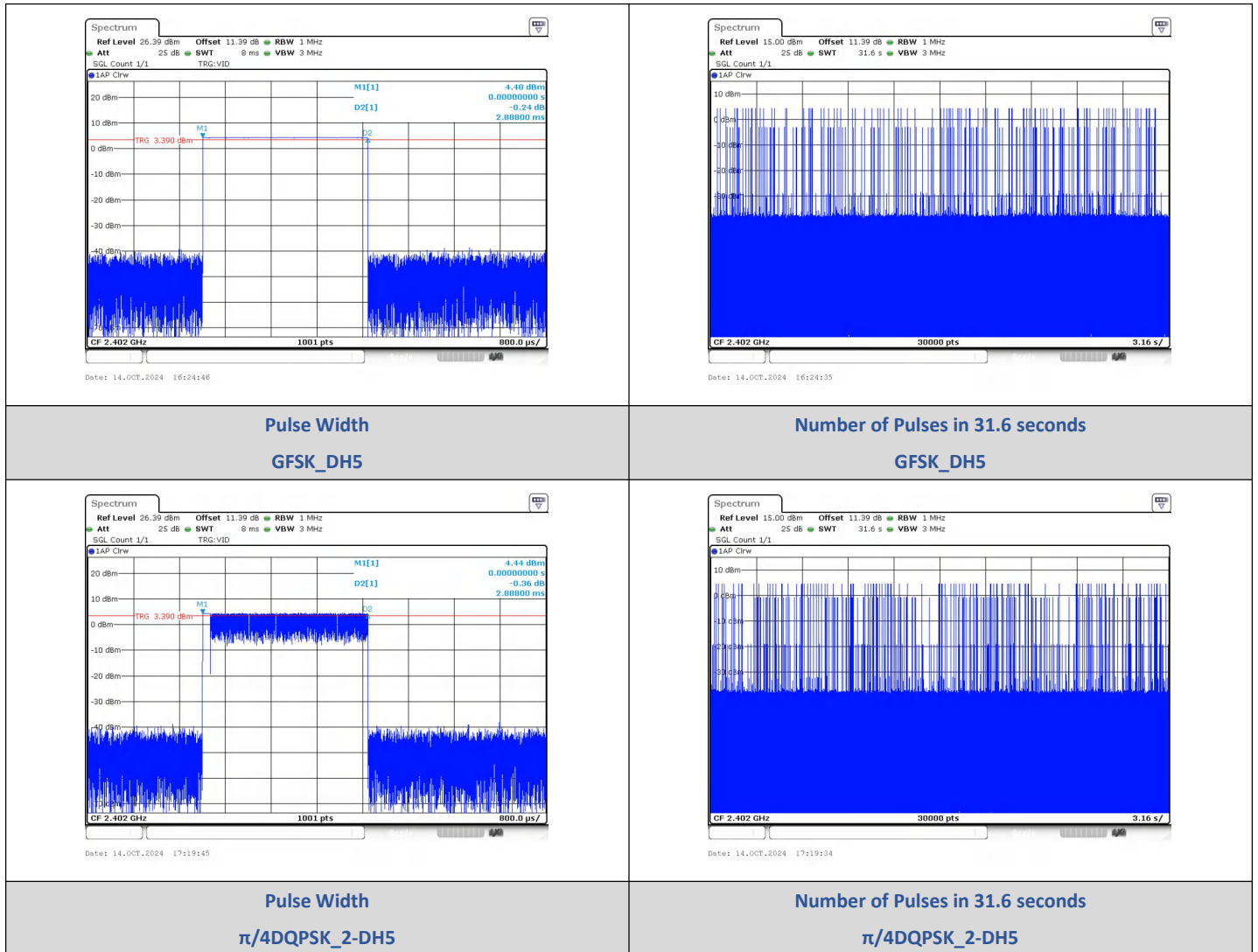
8DPSK(3-DH5)_Channel 78

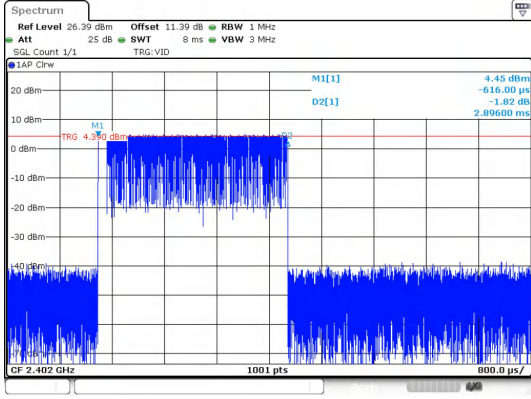
2) Dwell Time

Test Result

| Modulation | Packet | Channel | Pulse Width (ms) | Number of Pulses in 31.6 seconds | Dwell Time (ms) | Limit (ms) | Result |
|---------------|--------|------------------|------------------|----------------------------------|-----------------|------------|--------|
| GFSK | DH5 | CHO (2402MHz) | 2.888 | 100 | 288.8 | < 400 | PASS |
| $\pi/4$ DQPSK | 2-DH5 | | 2.888 | 110 | 317.68 | | PASS |
| 8DPSK | 3-DH5 | | 2.896 | 95 | 275.12 | | PASS |

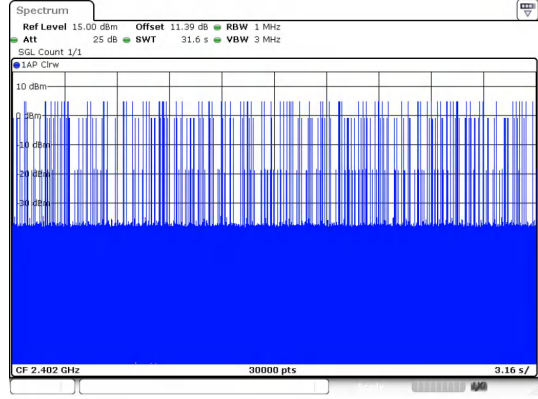
Test Graphs





Date: 14.OCT.2024 17:09:25

Pulse Width
8DPSK_3-DH5



Date: 14.OCT.2024 17:09:15

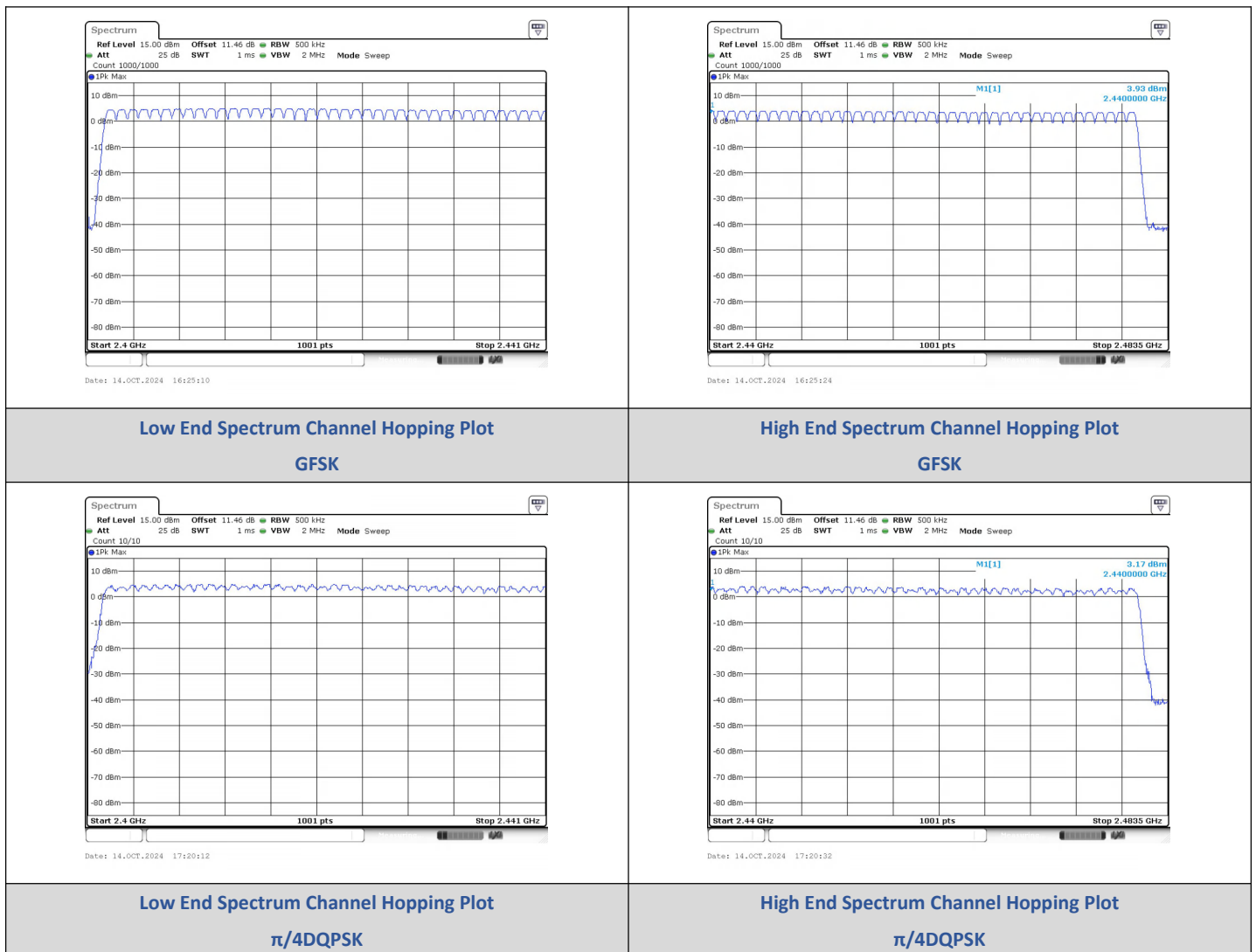
Number of Pulses in 31.6 seconds
8DPSK_3-DH5

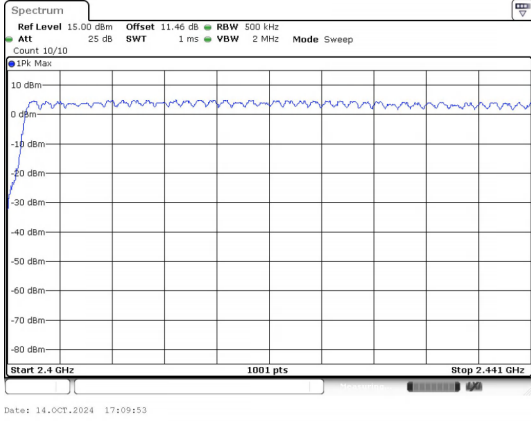
3) Number Of Hopping Channel

Test Result

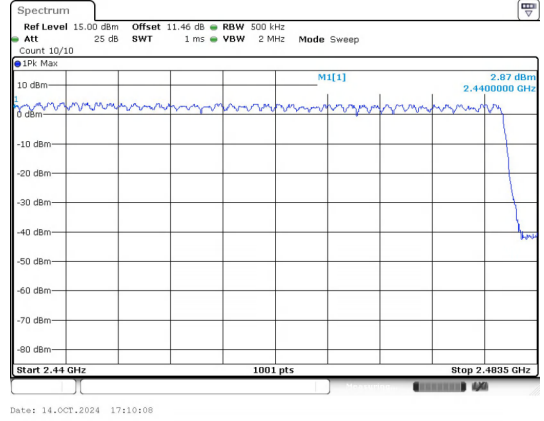
| Modulation | Packet | Number of Hopping Channel | Limit | Result |
|---------------|--------|---------------------------|-------|--------|
| GFSK | DH5 | 79 | 15 | PASS |
| $\pi/4$ DQPSK | 2-DH5 | 79 | 15 | PASS |
| 8DPSK | 3-DH5 | 79 | 15 | PASS |

Test Graphs





Low End Spectrum Channel Hopping Plot
 8DPSK



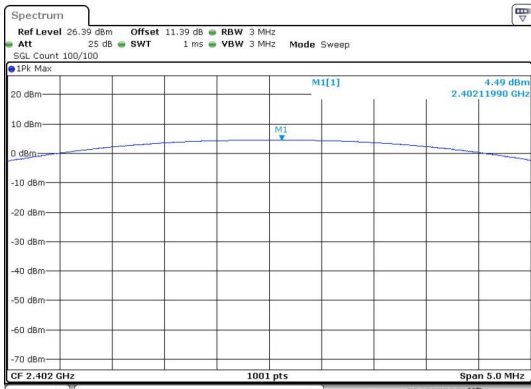
High End Spectrum Channel Hopping Plot
 8DPSK

4) Conducted Peak Output Power

Test Result

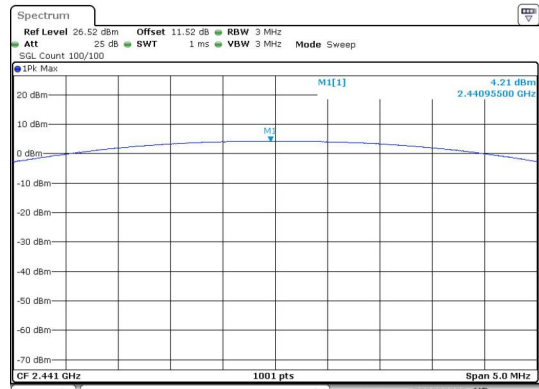
| Modulation | Packet Type | Channel | Peak Output Power (dBm) | Peak Output Power (mW) | Limit (dBm) | Result |
|------------|-------------|---------|-------------------------|------------------------|-------------|--------|
| GFSK | DH5 | 0 | 4.49 | 2.81 | ≤30 | PASS |
| | | 39 | 4.21 | 2.64 | | PASS |
| | | 78 | 3.66 | 2.32 | | PASS |
| π/4DQPSK | 2-DH5 | 0 | 5.01 | 3.17 | ≤20.97 | PASS |
| | | 39 | 4.83 | 3.04 | | PASS |
| | | 78 | 4.26 | 2.67 | | PASS |
| 8DPSK | 3-DH5 | 0 | 5.17 | 3.28 | ≤20.97 | PASS |
| | | 39 | 4.51 | 2.83 | | PASS |
| | | 78 | 4.06 | 2.55 | | PASS |

Test Graphs



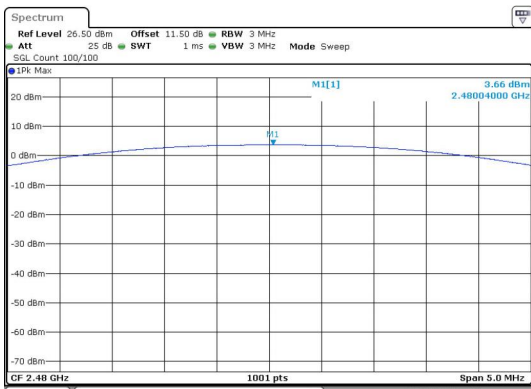
Date: 14.OCT.2024 16:21:56

Peak Output Power
GFSK_Channel 0



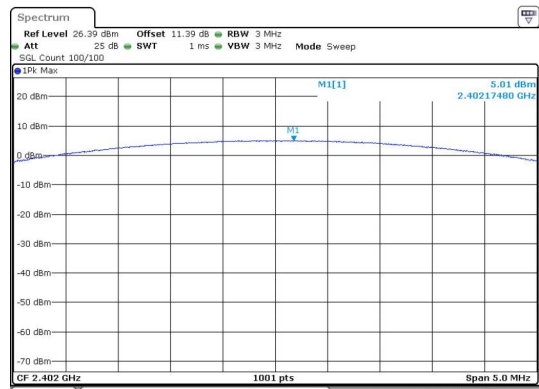
Date: 14.OCT.2024 16:27:47

Peak Output Power
GFSK_Channel 39



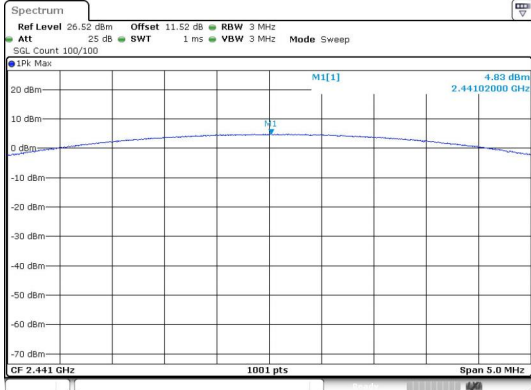
Date: 14.OCT.2024 16:32:33

Peak Output Power
GFSK_Channel 78



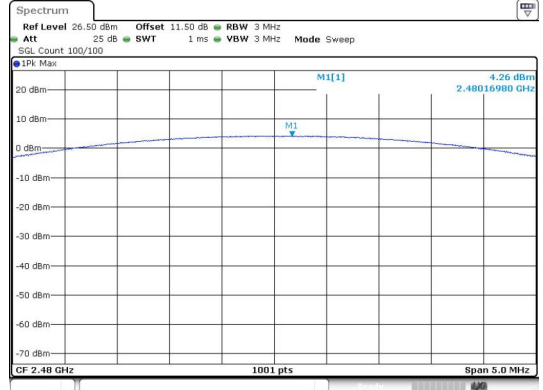
Date: 14.OCT.2024 17:16:09

Peak Output Power
π/4DQPSK_Channel 0



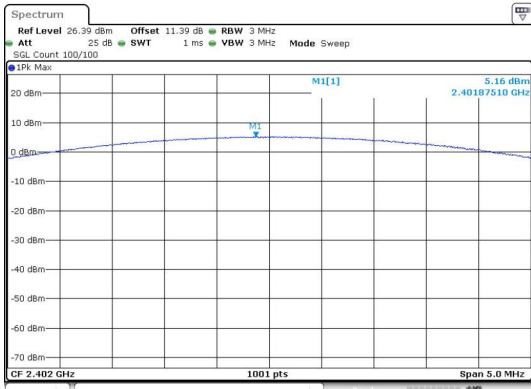
Date: 14.OCT.2024 16:44:27

Peak Output Power
 $\pi/4$ DQPSK_Channel 39



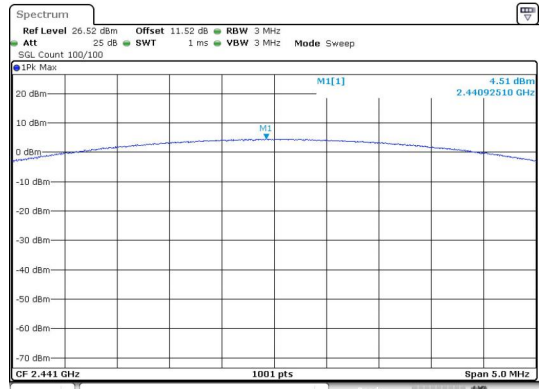
Date: 14.OCT.2024 16:46:58

Peak Output Power
 $\pi/4$ DQPSK_Channel 78



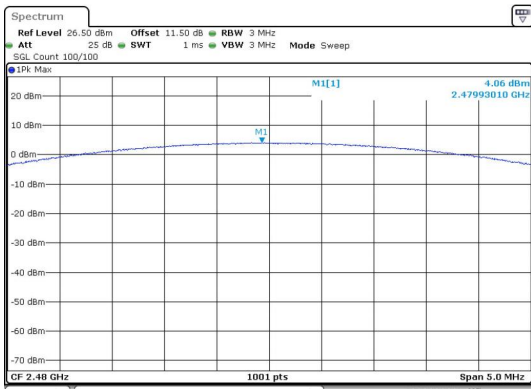
Date: 14.OCT.2024 16:49:20

Peak Output Power
8DPSK_Channel 0



Date: 15.OCT.2024 15:00:36

Peak Output Power
8DPSK_Channel 39



Date: 15.OCT.2024 15:02:49

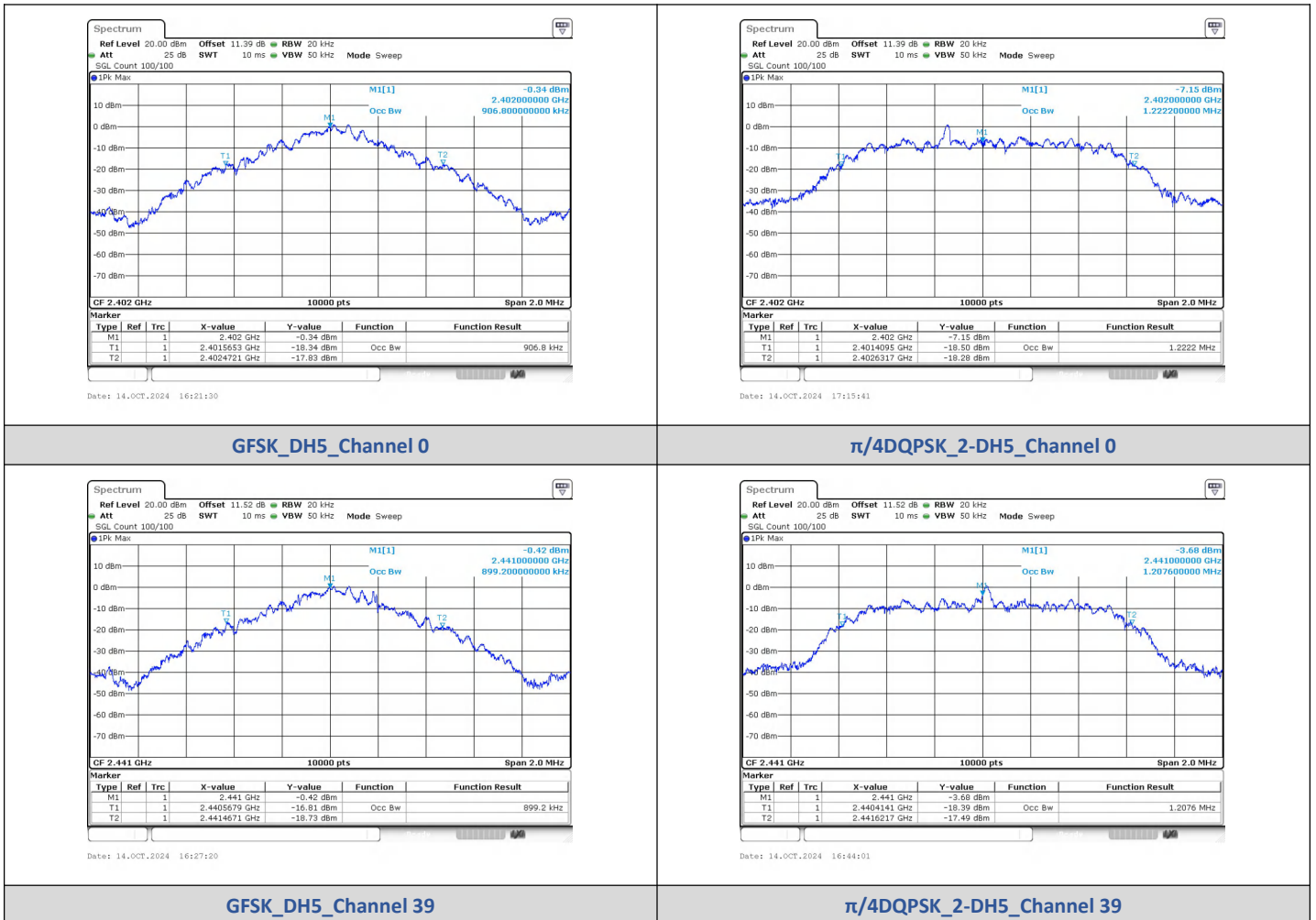
Peak Output Power
8DPSK_Channel 78

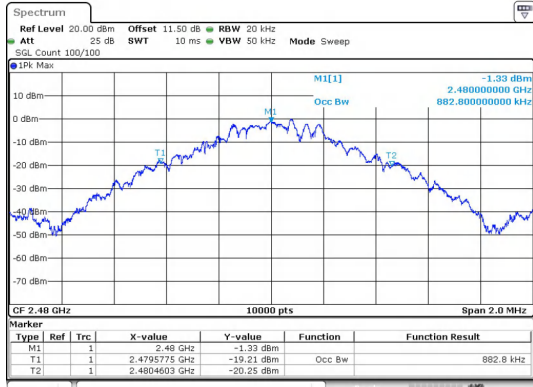
5) 99% Bandwidth

Test Result

| Modulation | Channel | Center Frequency (MHz) | 99% BW (MHz) |
|---------------|---------|------------------------|--------------|
| GFSK | 0 | 2402 | 0.90680 |
| | 39 | 2441 | 0.89920 |
| | 78 | 2480 | 0.88280 |
| $\pi/4$ DQPSK | 0 | 2402 | 1.2220 |
| | 39 | 2441 | 1.2080 |
| | 78 | 2480 | 1.2090 |
| 8DPSK | 0 | 2402 | 1.2190 |
| | 39 | 2441 | 1.2220 |
| | 78 | 2480 | 1.2140 |

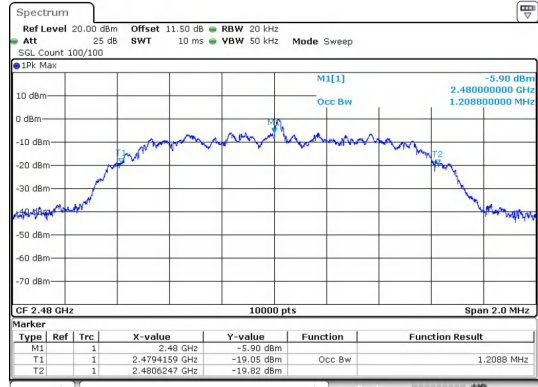
Test Graphs





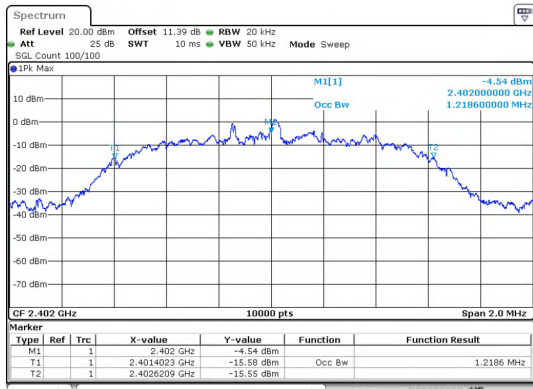
Date: 14.OCT.2024 16:32:06

GFSK_DH5_Channel 78



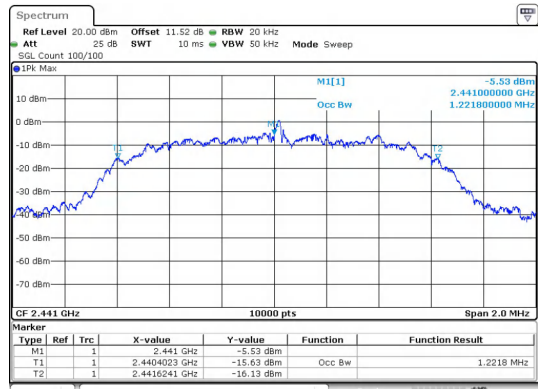
Date: 14.OCT.2024 16:46:32

$\pi/4$ DQPSK_2-DH5_Channel 78



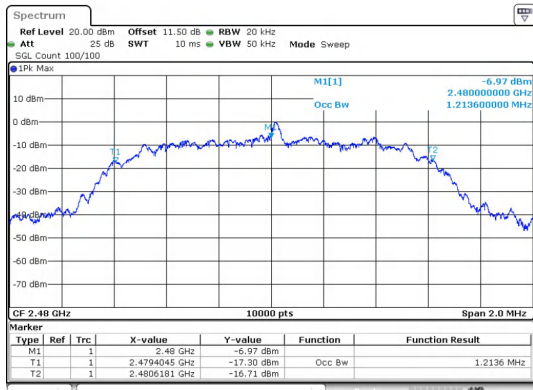
Date: 14.OCT.2024 16:48:53

8DPSK_3-DH5_Channel 0



Date: 14.OCT.2024 17:02:03

8DPSK_3-DH5_Channel 39



Date: 14.OCT.2024 17:05:48

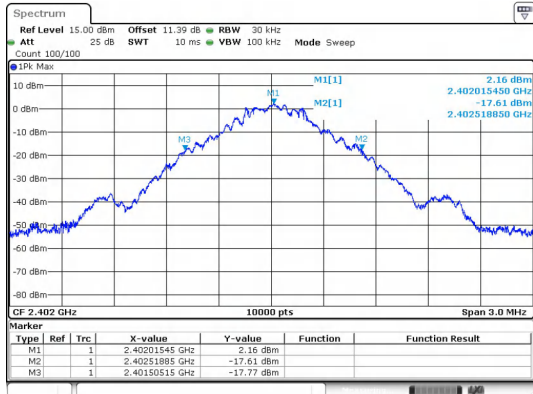
8DPSK_3-DH5_Channel 78

6) 20dB Bandwidth

Test Result

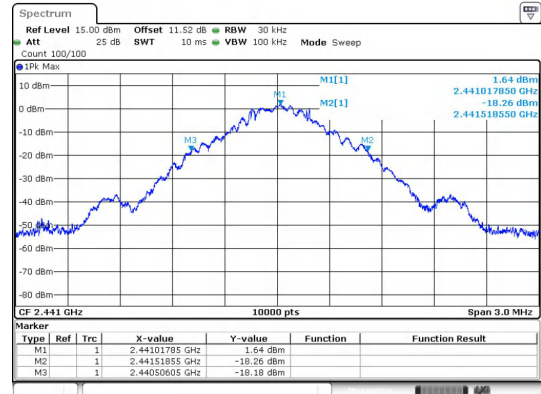
| Modulation | Channel | Center Frequency (MHz) | 20 dB Bandwidth (MHz) |
|---------------|---------|------------------------|-----------------------|
| GFSK | 0 | 2402 MHz | 1.010 |
| | 39 | 2441 MHz | 1.010 |
| | 78 | 2480 MHz | 1.000 |
| $\pi/4$ DQPSK | 0 | 2402 MHz | 1.320 |
| | 39 | 2441 MHz | 1.320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

Test Graphs



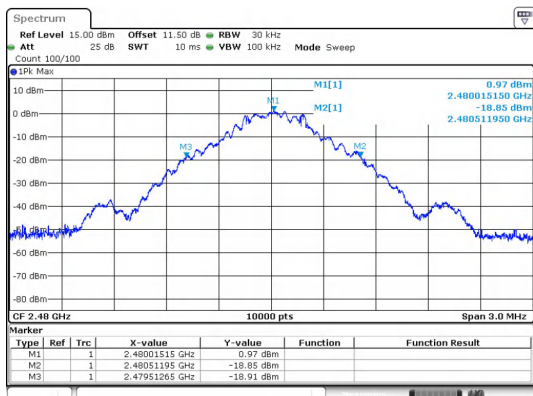
Date: 14.OCT.2024 16:21:46

GFSK_DH5_Channel 0



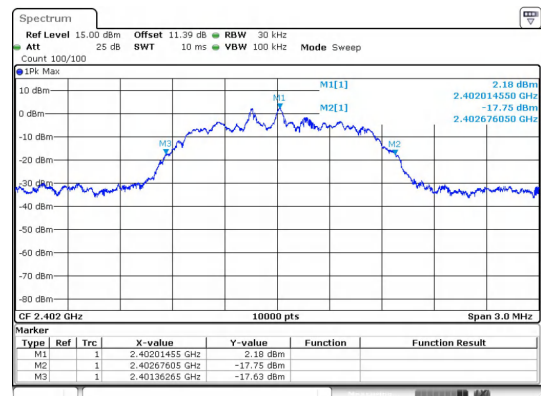
Date: 14.OCT.2024 16:27:36

GFSK_DH5_Channel 39



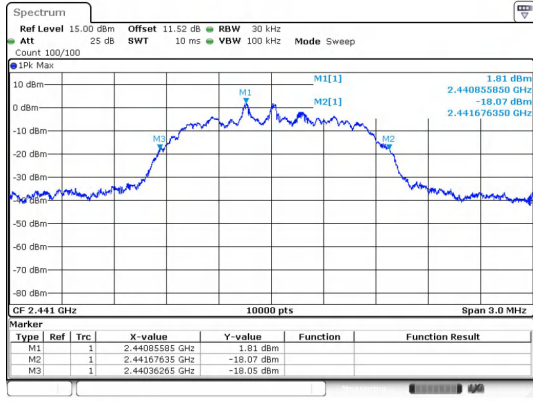
Date: 14.OCT.2024 16:32:22

GFSK_DH5_Channel 78



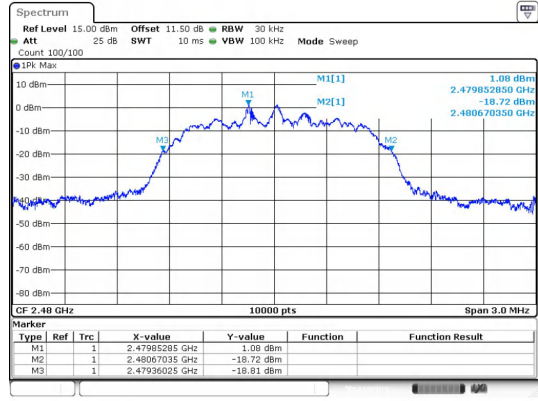
Date: 14.OCT.2024 17:12:57

$\pi/4$ DQPSK_2-DH5_Channel 0



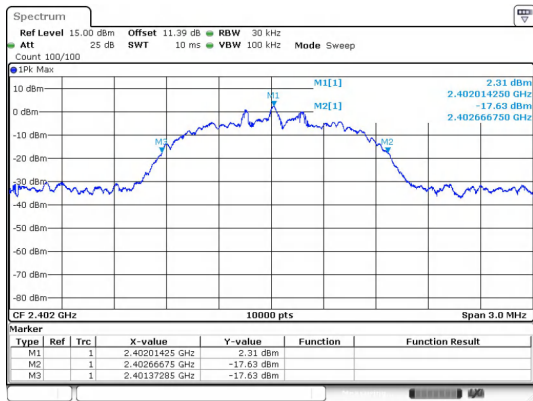
Date: 14.OCT.2024 16:44:17

$\pi/4$ DQPSK_2-DH5_Channel 39



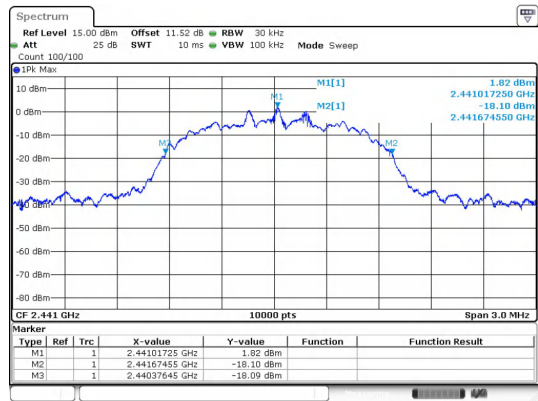
Date: 14.OCT.2024 16:46:47

$\pi/4$ DQPSK_2-DH5_Channel 78



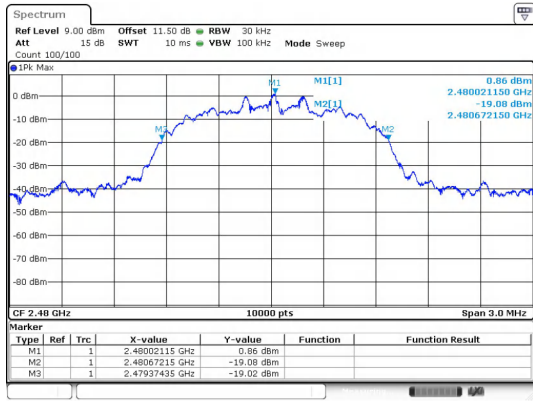
Date: 14.OCT.2024 16:49:09

8DPSK_3-DH5_Channel 39



Date: 14.OCT.2024 17:02:19

8DPSK_3-DH5_Channel 39



Date: 14.OCT.2024 17:06:10

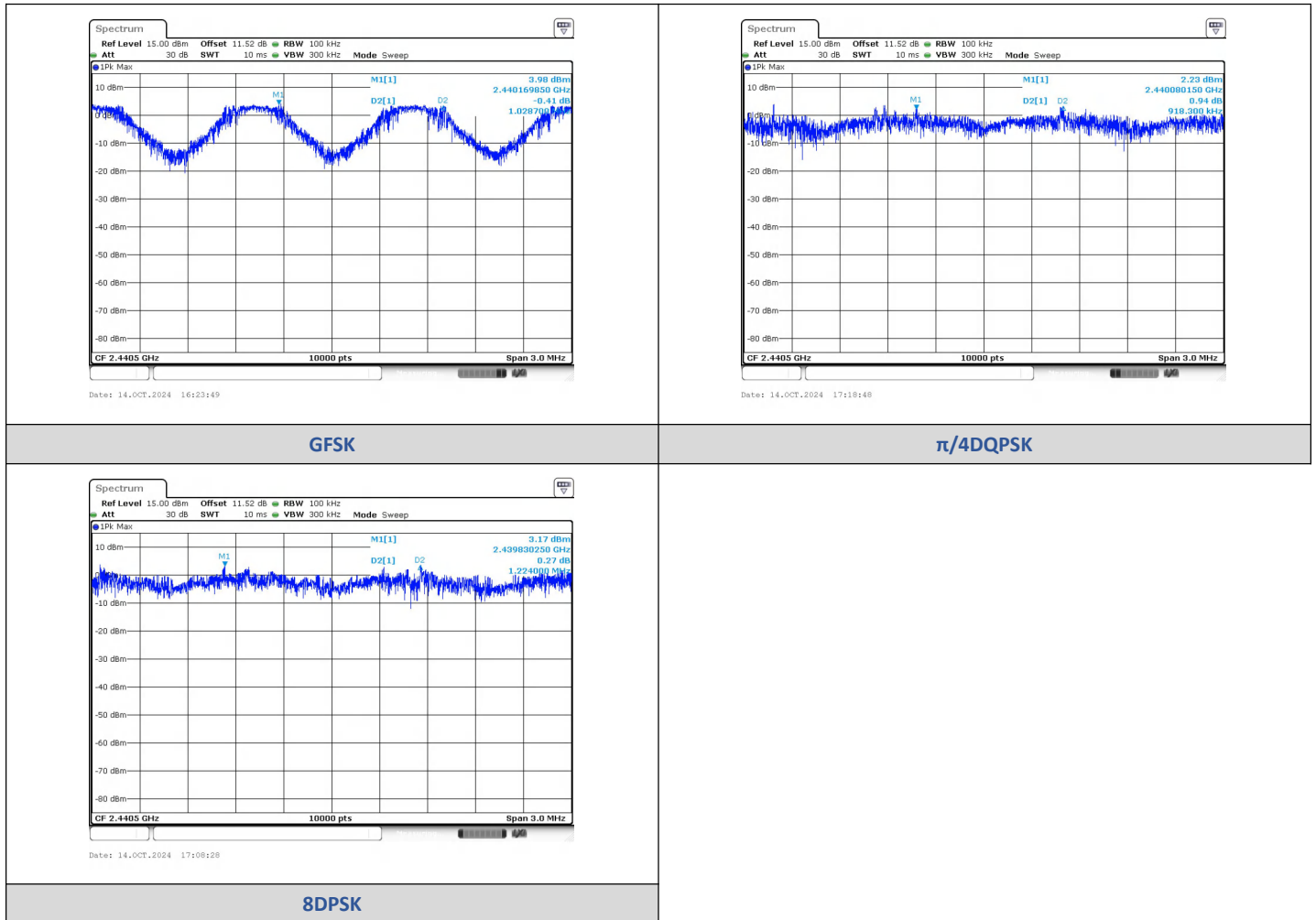
8DPSK_3-DH5_Channel 78

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 | 2440.1699 | 2441.1986 | 1.0287 | 1.01 | PASS |
| $\pi/4$ DQPSK | 2-DH5 | 2440.0801 | 2440.9985 | 0.9183 | 0.88 | PASS |
| 8DPSK | 3-DH5 | 2439.8302 | 2441.0543 | 1.2240 | 0.87 | PASS |

Test Graphs



8) Conducted Out Of Band Emission

Test Result

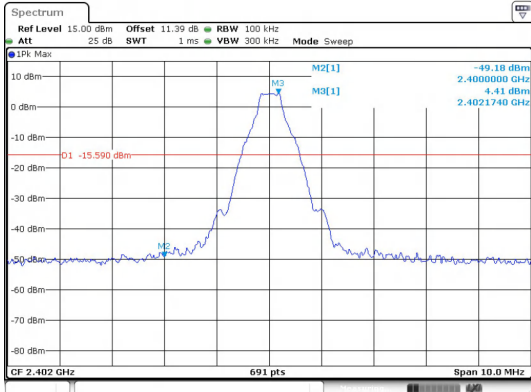
Non-Hopping

| Modulation | Packet | Channel | OOB Emission Frequency (MHz) | OOB Emission Level (dBm) | Limit (dBm) | Over Limit (dB) | Result |
|---------------|--------|---------|------------------------------|--------------------------|-------------|-----------------|--------|
| GFSK | DH5 | 0 | 2400.00 | -49.183 | -15.59 | -33.593 | PASS |
| | | | 7205.96 | -38.382 | -15.59 | -22.792 | PASS |
| | | 39 | 5743.55 | -38.282 | -15.88 | -22.402 | PASS |
| | | 78 | 2483.50 | -50.125 | -16.44 | -33.685 | PASS |
| | | | 9920.20 | -37.932 | -16.44 | -21.492 | PASS |
| $\pi/4$ DQPSK | 2-DH5 | 0 | 2400.00 | -43.453 | -15.7 | -27.753 | PASS |
| | | | 7205.96 | -38.040 | -15.7 | -22.340 | PASS |
| | | 39 | 9763.72 | -40.180 | -15.97 | -24.210 | PASS |
| | | 78 | 2483.50 | -50.293 | -16.53 | -33.763 | PASS |
| | | | 9920.20 | -38.298 | -16.53 | -21.768 | PASS |
| 8DPSK | 3-DH5 | 0 | 2400.00 | -45.827 | -15.57 | -30.257 | PASS |
| | | | 7205.96 | -42.855 | -15.57 | -27.285 | PASS |
| | | 39 | 9763.72 | -39.906 | -15.94 | -23.966 | PASS |
| | | 78 | 2483.50 | -49.069 | -16.83 | -32.239 | PASS |
| | | | 9920.20 | -38.869 | -16.83 | -22.039 | PASS |

Hopping

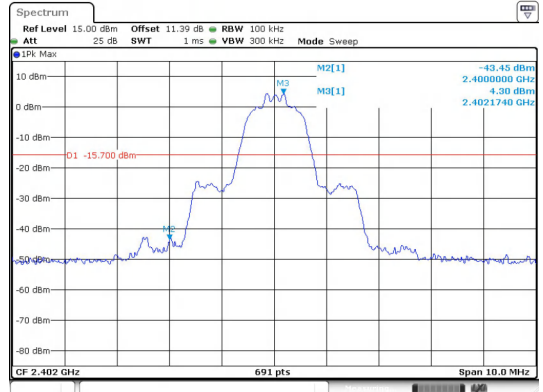
| Modulation | Packet | Channel | OOB Emission Frequency (MHz) | OOB Emission Level (dBm) | Limit (dBm) | Over Limit (dB) | Result |
|---------------|--------|---------|------------------------------|--------------------------|-------------|-----------------|--------|
| GFSK | DH5 | Hopping | 2398.39 | -47.874 | -16.04 | -31.834 | PASS |
| | | | 2400.00 | -49.265 | -16.04 | -33.225 | PASS |
| | | | 2483.50 | -49.887 | -16.87 | -33.017 | PASS |
| $\pi/4$ DQPSK | 2-DH5 | | 2398.74 | -48.031 | -15.52 | -32.511 | PASS |
| | | | 2400.00 | -50.211 | -15.52 | -34.691 | PASS |
| | | | 2483.50 | -48.658 | -16.56 | -32.099 | PASS |
| 8DPSK | 3-DH5 | | 2400.00 | -47.240 | -15.61 | -31.630 | PASS |
| | | | 2483.50 | -48.684 | -17.95 | -30.734 | PASS |

Test Graphs



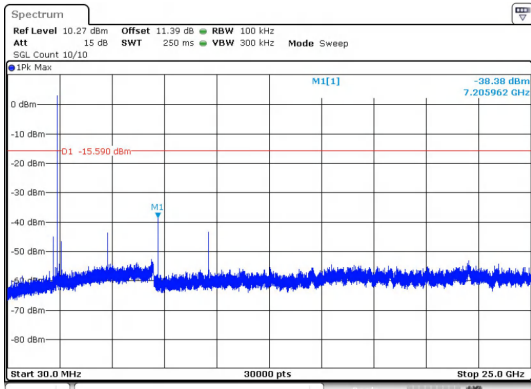
Date: 14.OCT.2024 16:22:38

**Out Of Band Emission
GFSK_DH5_Channel 0**



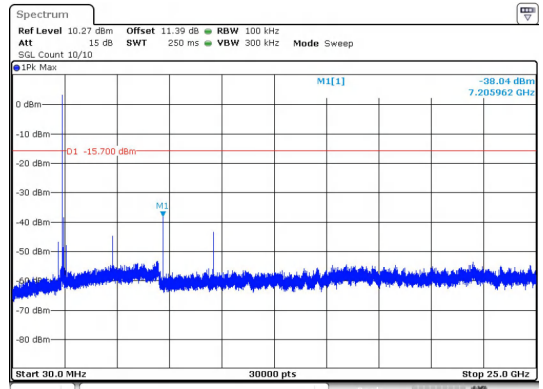
Date: 14.OCT.2024 17:16:51

**Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0**



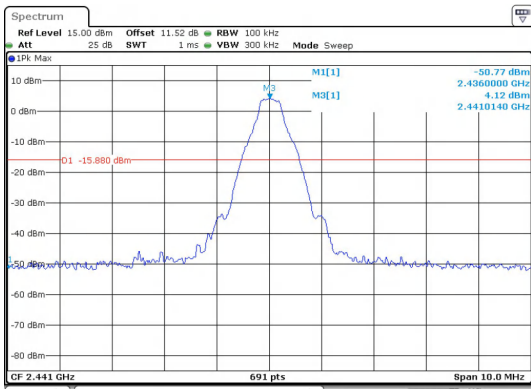
Date: 14.OCT.2024 16:23:00

**30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0**



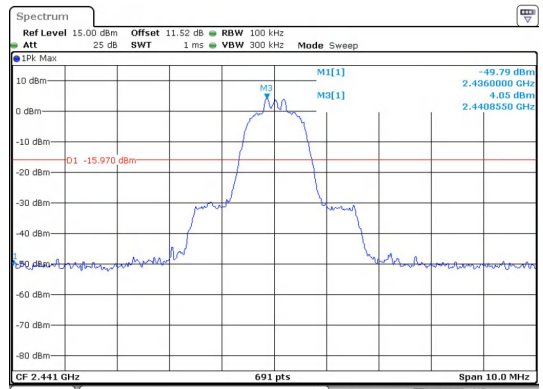
Date: 14.OCT.2024 17:17:13

**30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0**



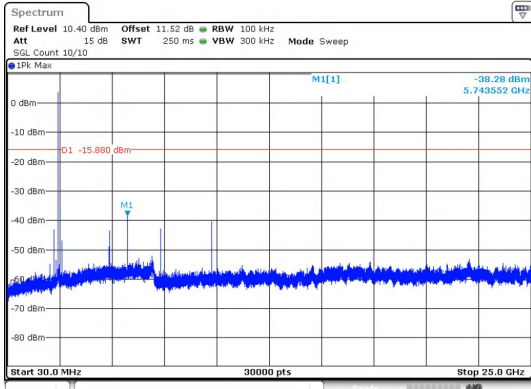
Date: 14.OCT.2024 16:28:24

**Out Of Band Emission
GFSK_DH5_Channel 39**



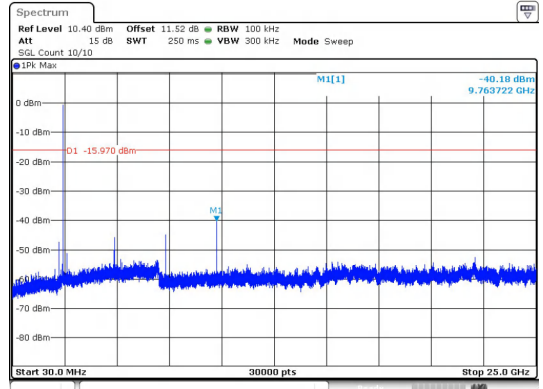
Date: 14.OCT.2024 16:45:03

**Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39**



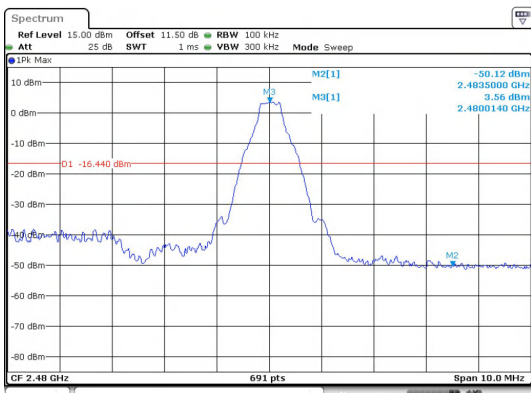
Date: 14.OCT.2024 16:28:46

30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



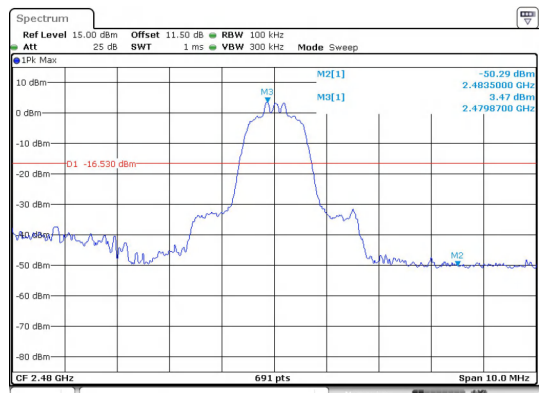
Date: 14.OCT.2024 16:45:25

30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



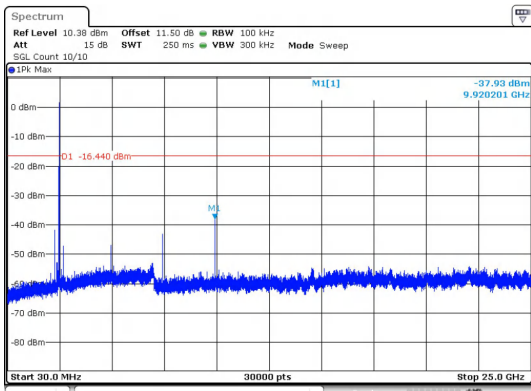
Date: 14.OCT.2024 16:33:14

Out Of Band Emission
GFSK_DH5_Channel 78



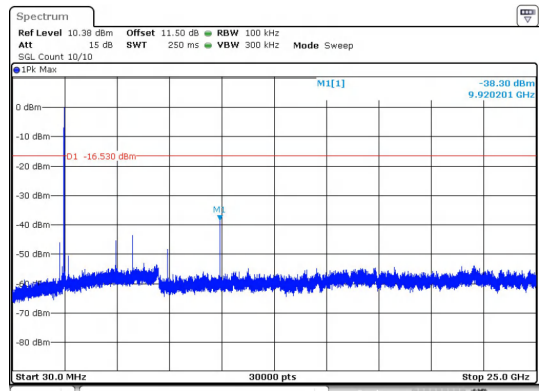
Date: 14.OCT.2024 16:47:39

Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



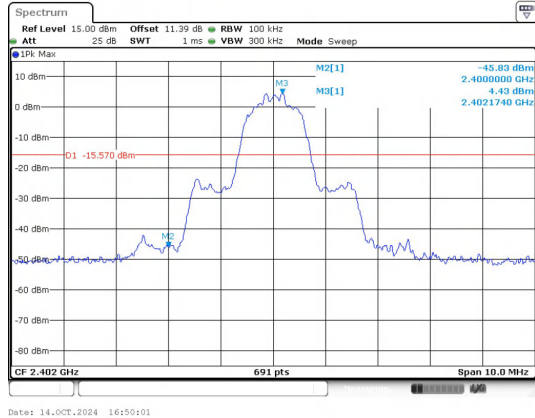
Date: 14.OCT.2024 16:33:36

30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



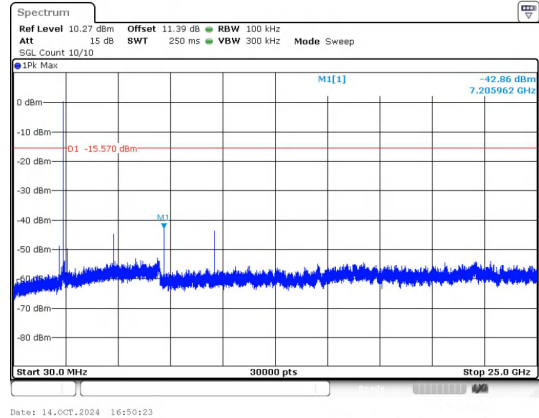
Date: 14.OCT.2024 16:48:01

30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78



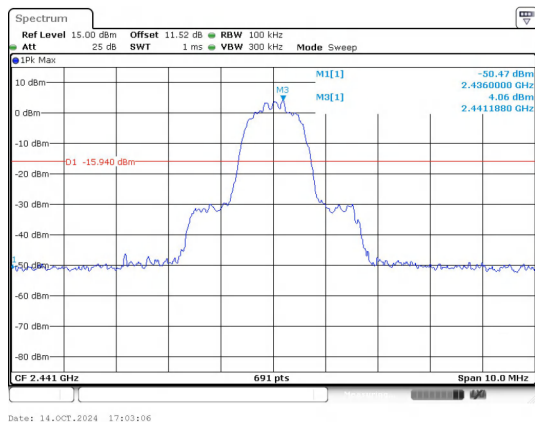
Date: 14.OCT.2024 16:50:01

Out Of Band Emission
8DPSK_3-DH5_Channel 0



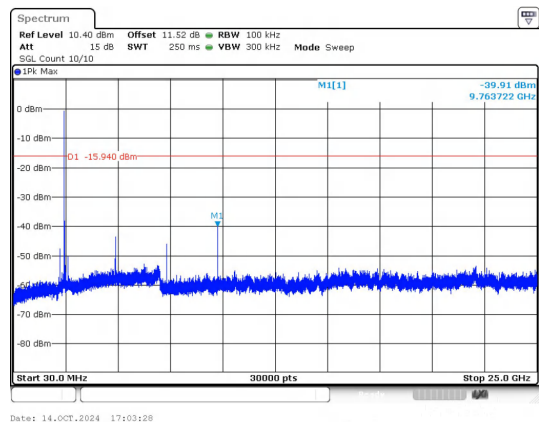
Date: 14.OCT.2024 16:50:23

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



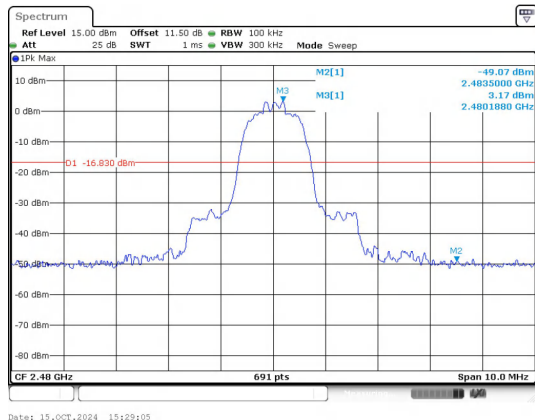
Date: 14.OCT.2024 17:03:06

Out Of Band Emission
8DPSK_3-DH5_Channel 39



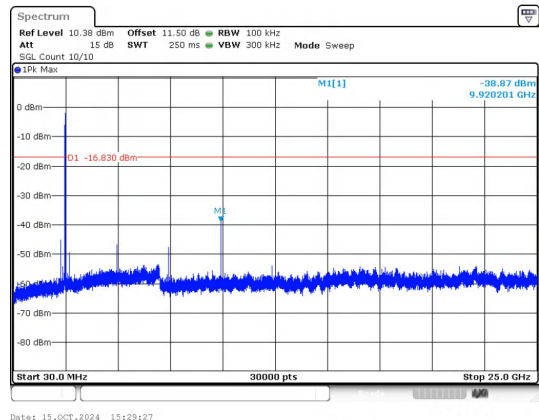
Date: 14.OCT.2024 17:03:28

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



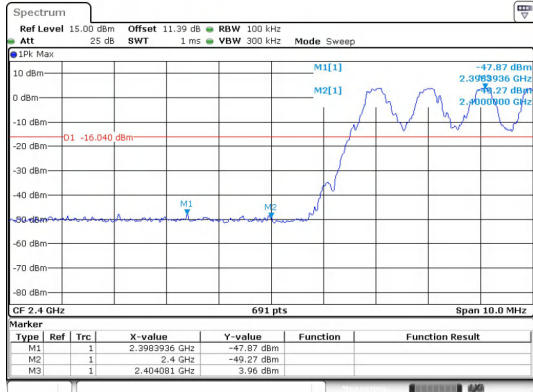
Date: 15.OCT.2024 15:29:05

Out Of Band Emission
8DPSK_3-DH5_Channel 78



Date: 15.OCT.2024 15:29:27

30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



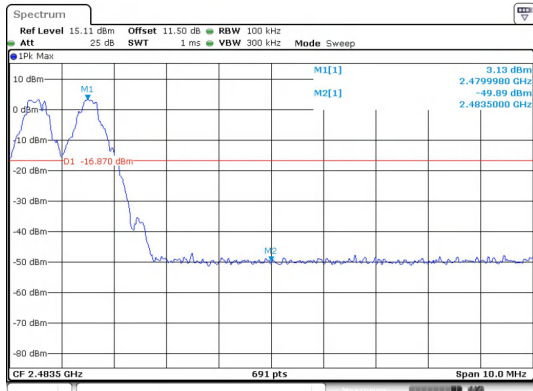
Date: 14.OCT.2024 16:26:06

Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



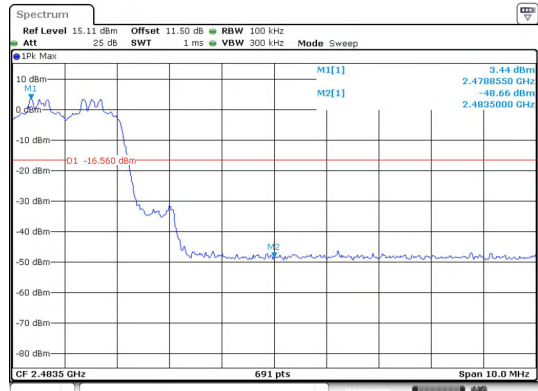
Date: 14.OCT.2024 17:21:29

Out Of Band Emission(Left)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



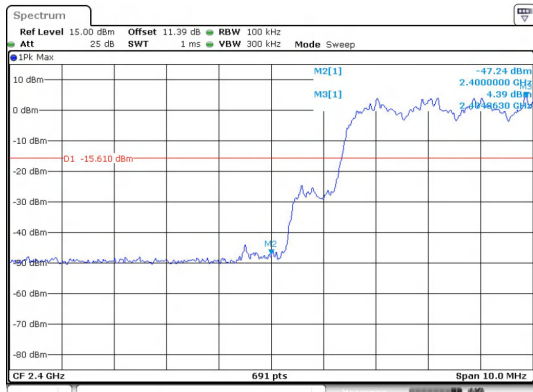
Date: 14.OCT.2024 16:26:29

Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



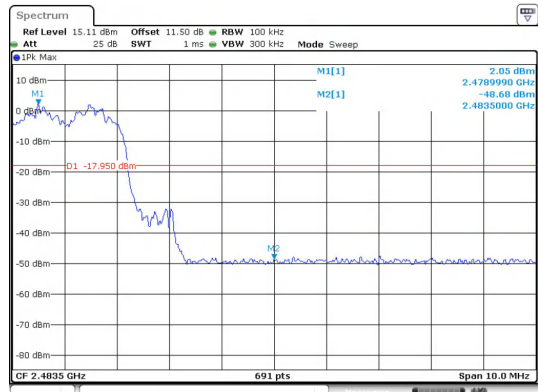
Date: 14.OCT.2024 17:28:01

Out Of Band Emission(Right)
 $\pi/4$ DQPSK_2-DH5_Channel Hopping



Date: 14.OCT.2024 17:13:28

Out Of Band Emission(Left)
8DPSK_3-DH5_Channel Hopping



Date: 14.OCT.2024 17:14:36

Out Of Band Emission(Right)
8DPSK_3-DH5_Channel Hopping