



7. Test of Conducted Spurious Emission

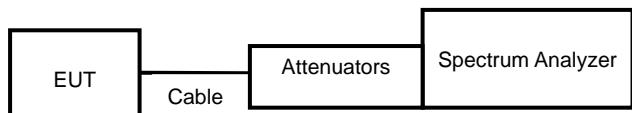
7.1 Test Limit

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

7.2 Test Procedure

- a. The transmitter output was connected to the spectrum analyzer via a low loss cable.
- b. Set RBW of spectrum analyzer to 100 KHz and VBW of spectrum analyzer to 300 KHz with convenient frequency span including 100 KHz bandwidth from band edge.
- c. The band edges was measured and recorded.

7.3 Test Setup Layout

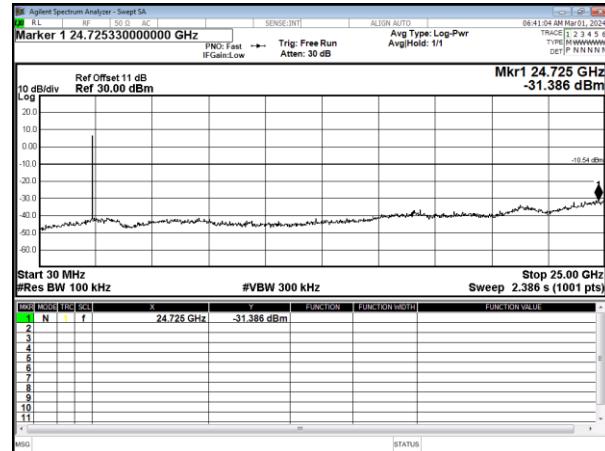
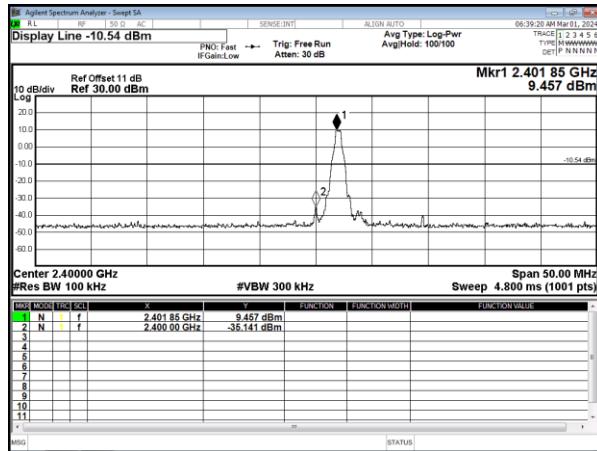


7.4 Test Result and Data

Note: Test plots refer to the following pages.

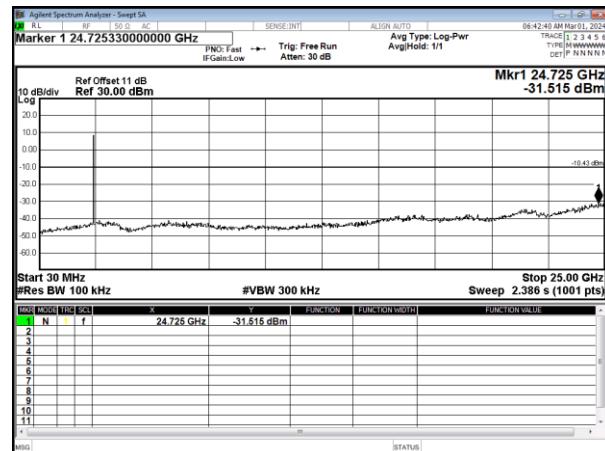
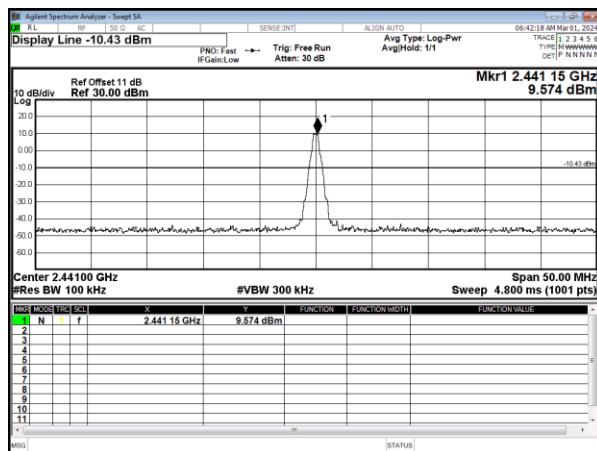
**Single test**

Modulation Standard: GFSK (1Mbps)
Channel: 00



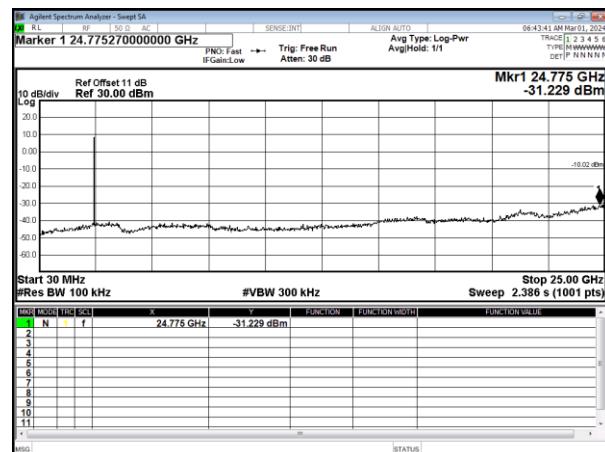
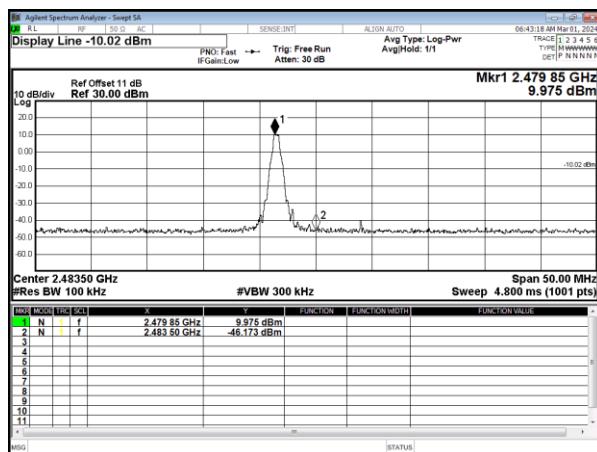
Modulation Standard: GFSK (1Mbps)

Channel: 39



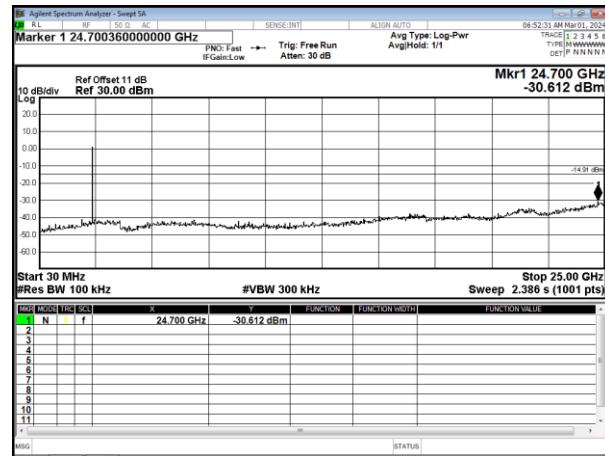
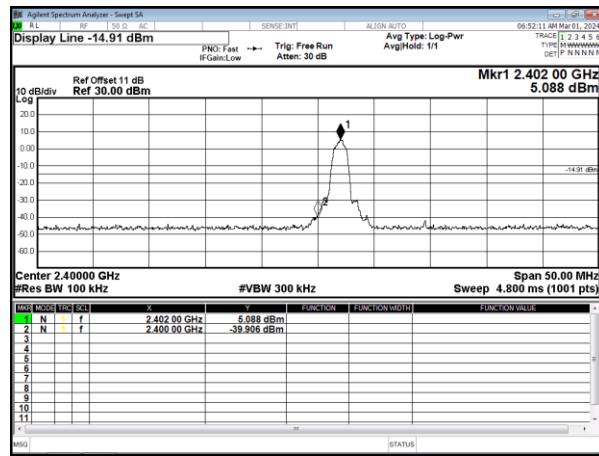
Modulation Standard: GFSK (1Mbps)

Channel: 78

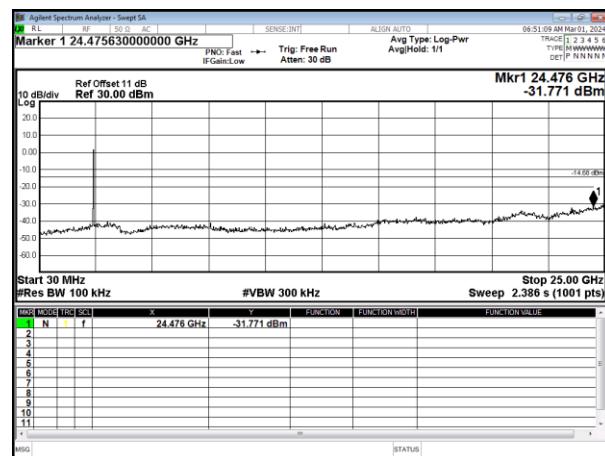
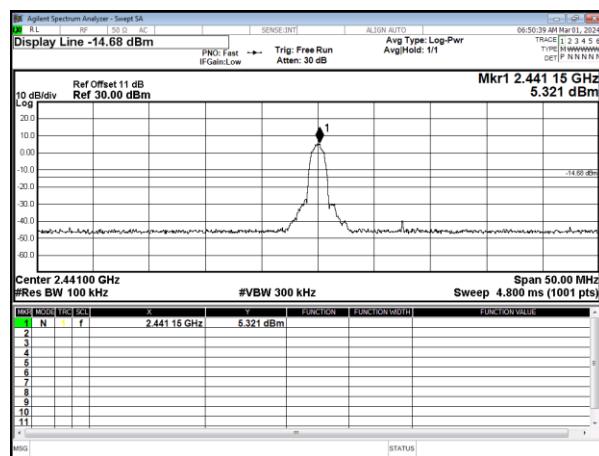


Modulation Standard: $\pi/4$ DQPSK (2Mbps)

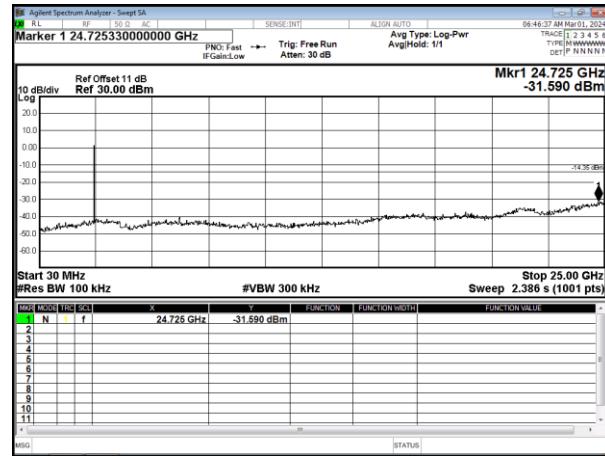
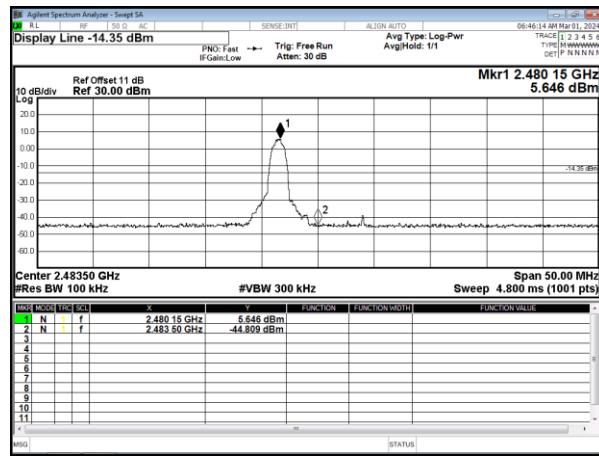
Channel: 00

Modulation Standard: $\pi/4$ DQPSK (2Mbps)

Channel: 39

Modulation Standard: $\pi/4$ DQPSK (2Mbps)

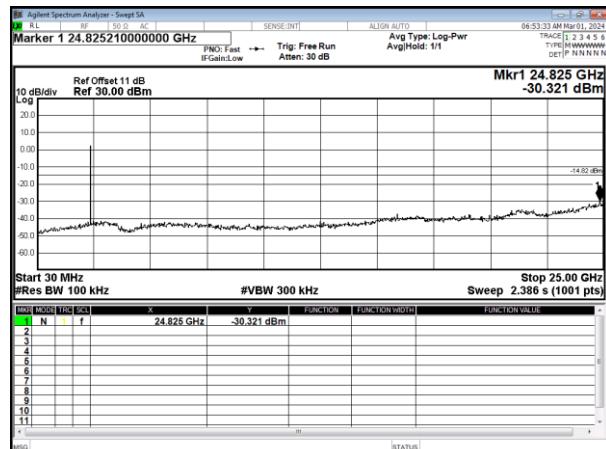
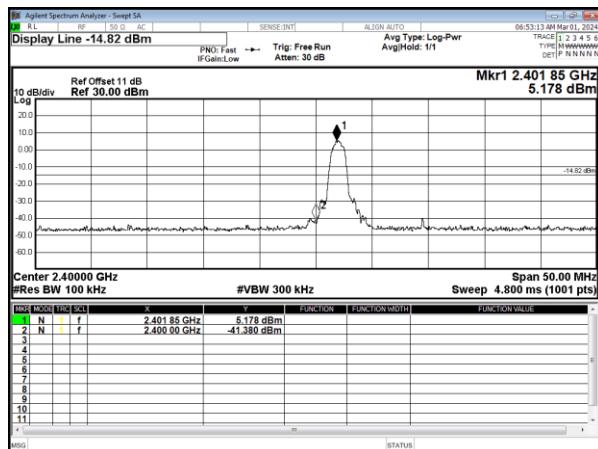
Channel: 78





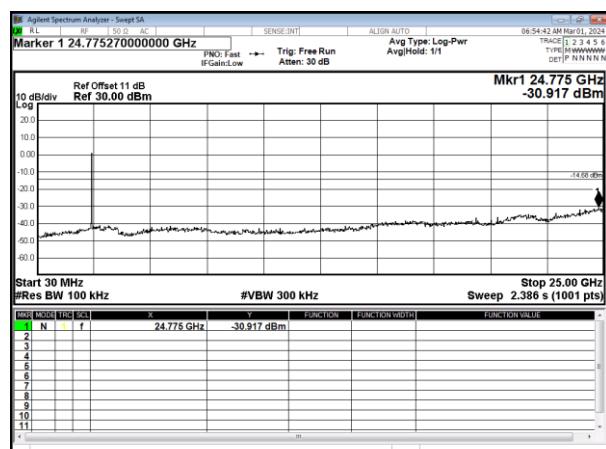
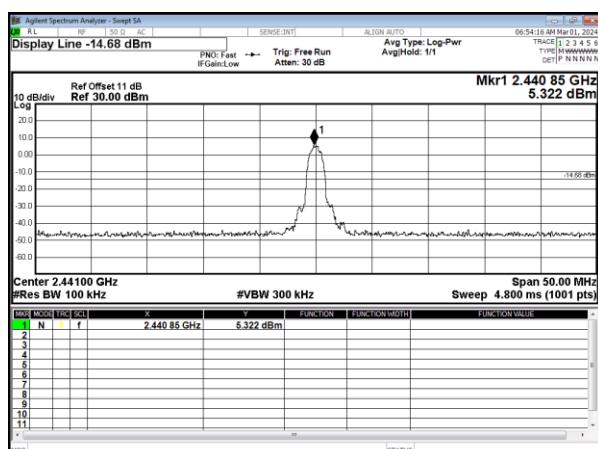
Modulation Standard: 8DPSK (3Mbps)

Channel: 00



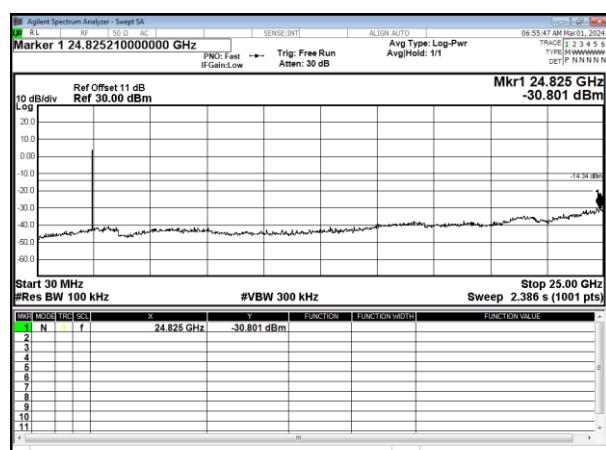
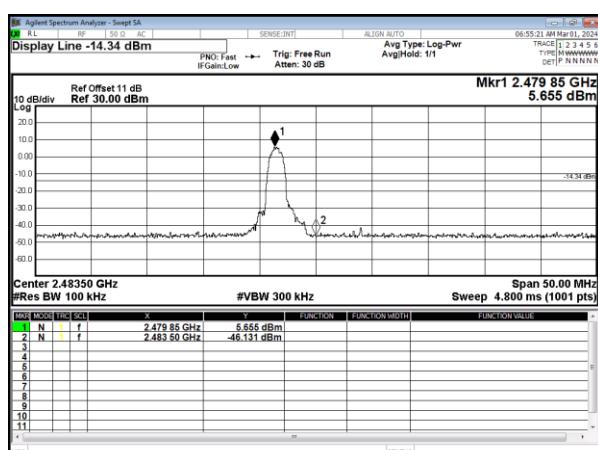
Modulation Standard: 8DPSK (3Mbps)

Channel: 39



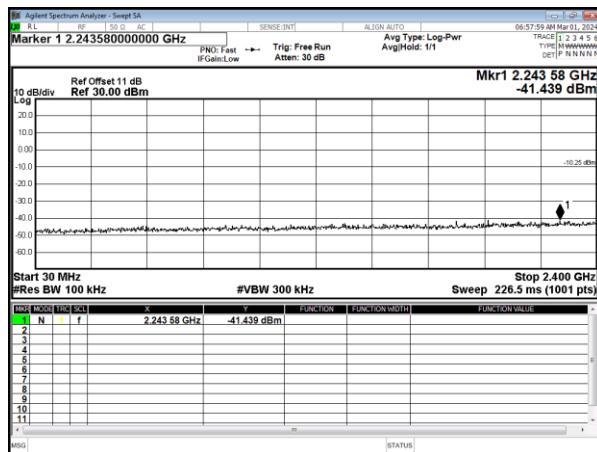
Modulation Standard: 8DPSK (3Mbps)

Channel: 78

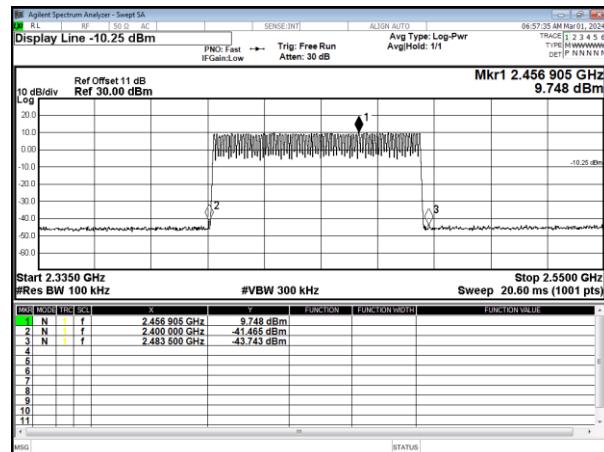


**Hopping test**

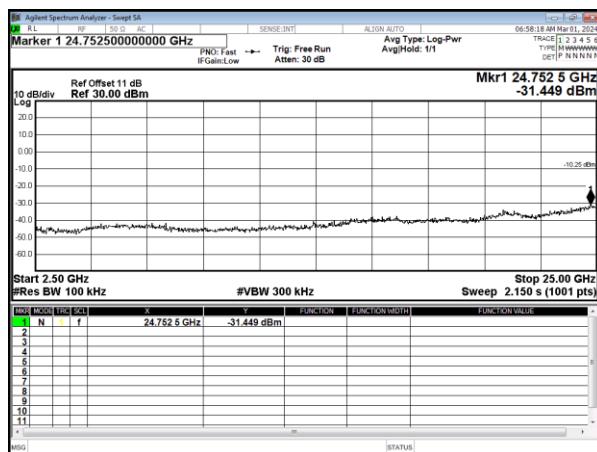
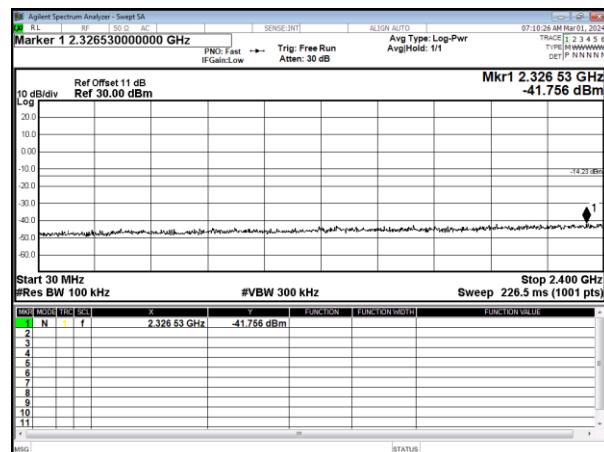
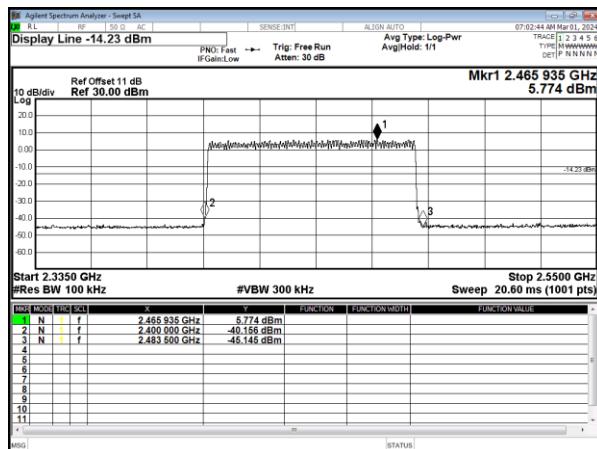
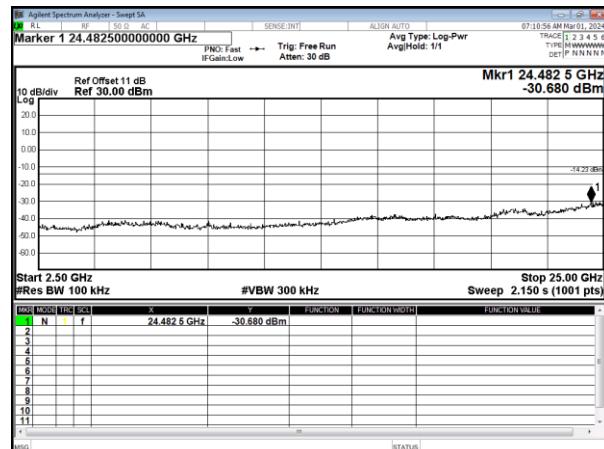
Modulation Standard: GFSK (1Mbps)



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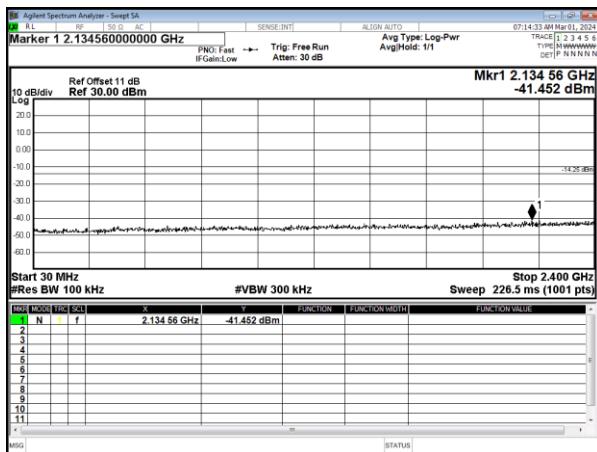


Modulation Standard: GFSK (1Mbps)

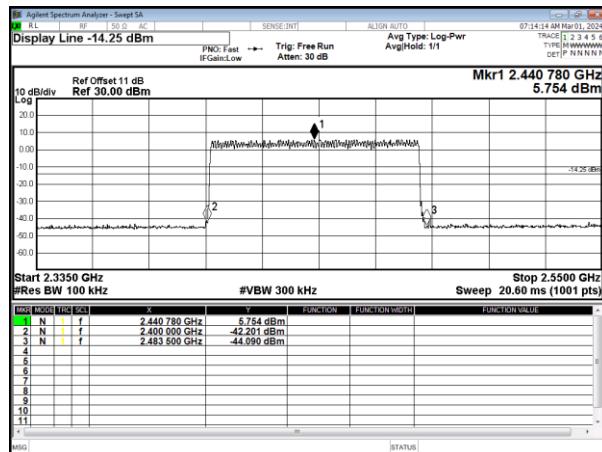
Modulation Standard: $\pi/4$ DQPSK (2Mbps)Modulation Standard: $\pi/4$ DQPSK (2Mbps)Modulation Standard: $\pi/4$ DQPSK (2Mbps)



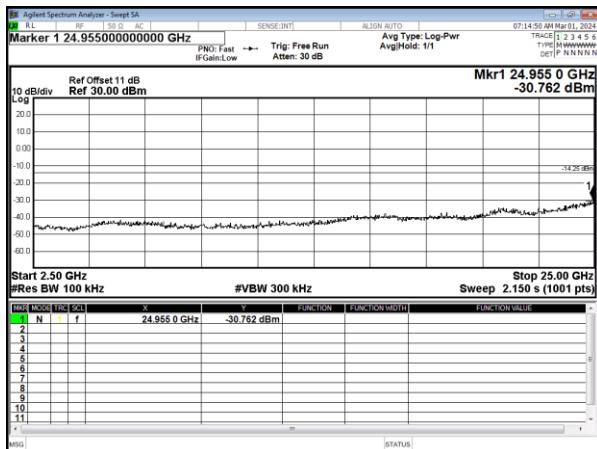
Modulation Standard: 8DPSK (3Mbps)



Modulation Standard: 8DPSK (3Mbps)



Modulation Standard: 8DPSK (3Mbps)





8. 20dB Bandwidth Measurement Data

8.1 Test Limit

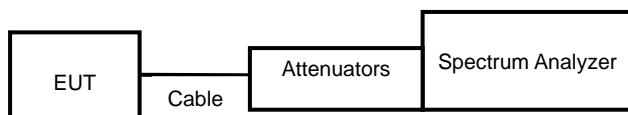
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

8.2 Test Procedures

- a. The transmitter output was connected to the spectrum analyzer.
- b. Set RBW of spectrum analyzer to 30 KHz and VBW to 100 KHz.
- c. The 20 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20 dB.

8.3 Test Setup Layout

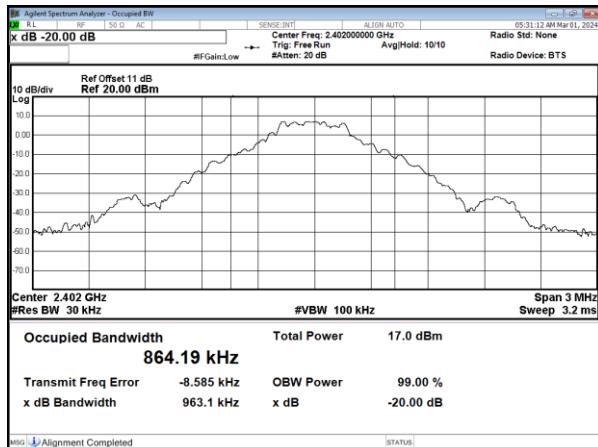


8.4 Test Result and Data

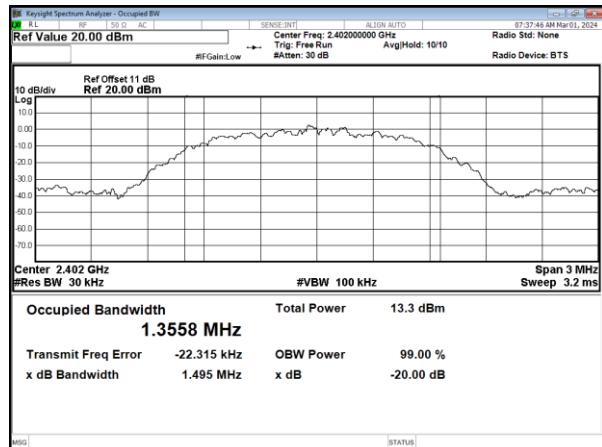
Modulation Type	Channel	Frequency (MHz)	20dB Bandwidth (MHz)	2/3 20dB Bandwidth(MHz)
GFSK (1Mbps)	00	2402	0.963	0.642
	39	2441	0.965	0.643
	78	2480	0.964	0.642
$\pi/4$ -DQPSK (2Mbps)	00	2402	1.495	0.997
	39	2441	1.494	0.996
	78	2480	1.492	0.995
8DPSK (3Mbps)	00	2402	1.488	0.992
	39	2441	1.489	0.993
	78	2480	1.493	0.995
Note	2/3*20dB Bandwidth=20dB Bandwidth x 2/3			



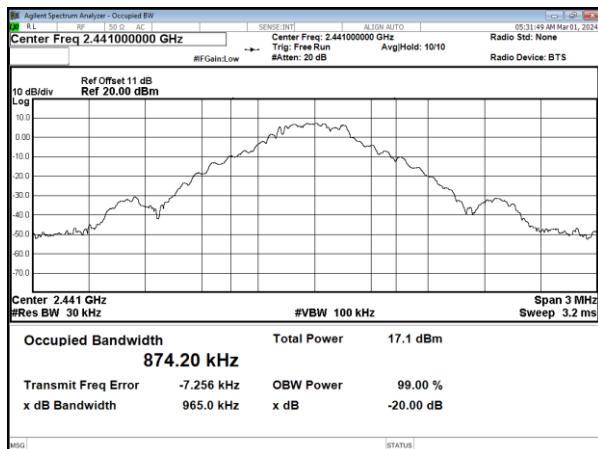
Modulation Type: GFSK (1Mbps)
Channel: 00



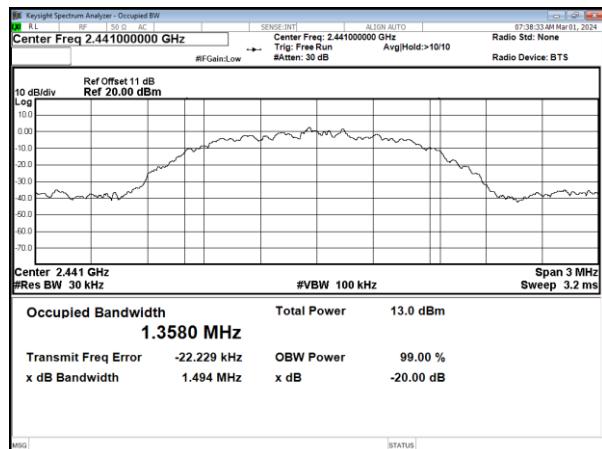
Modulation Type: $\pi/4$ -DQPSK (2Mbps)
Channel: 00



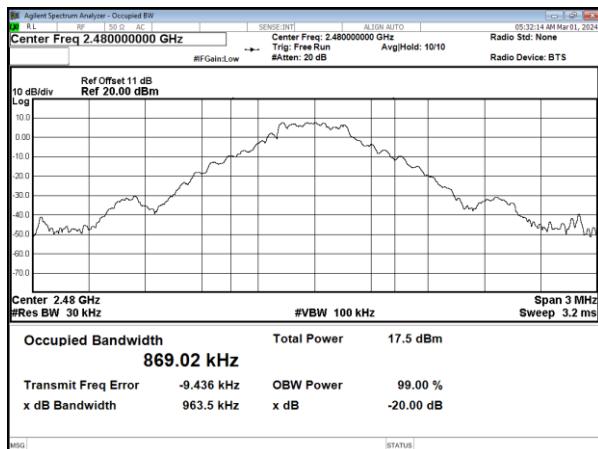
CH39



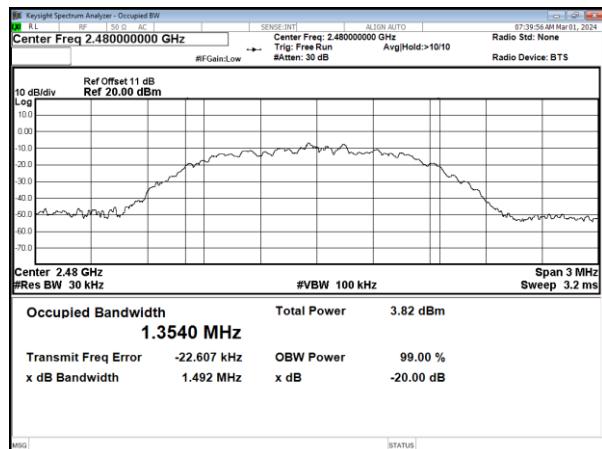
CH39



CH78



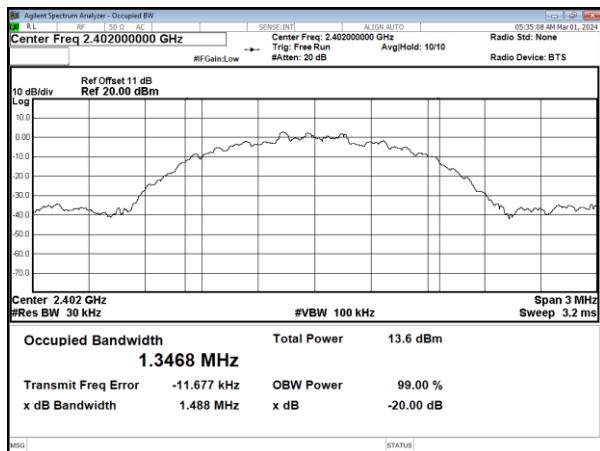
CH78



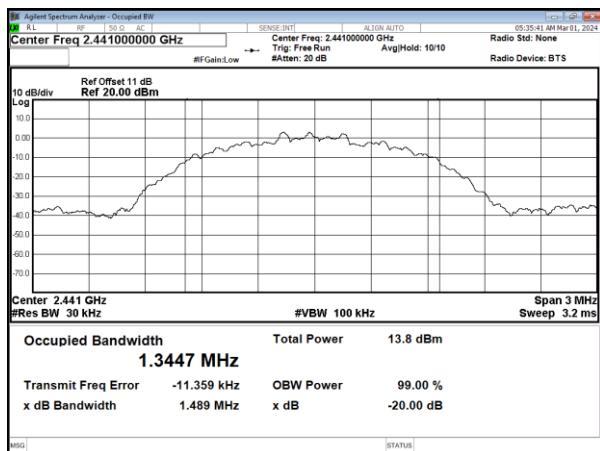


Modulation Type: 8DPSK (3Mbps)

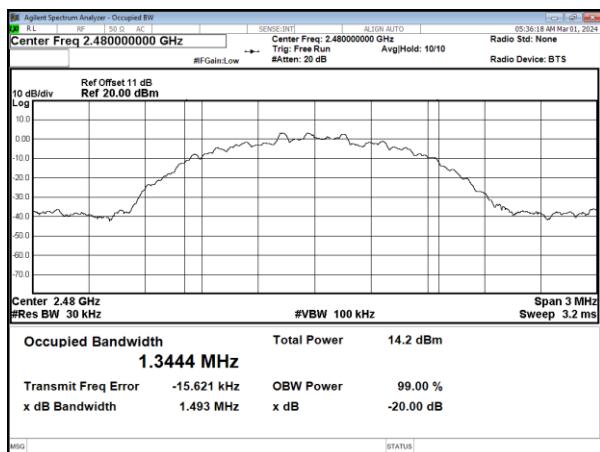
Channel: 00



CH39



CH78





9. Frequencies Separation

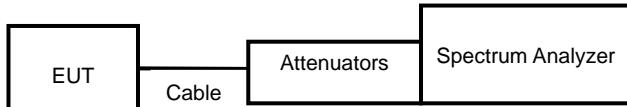
9.1 Test Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

9.2 Test Procedures

- a. The transmitter output was connected to the spectrum analyzer.
- b. Set RBW of spectrum analyzer to 30 KHz and VBW to 100 KHz.
- c. By using the MaxHold function record the separation of two adjacent channels.
- d. Measure the frequency difference of these two adjacent channels.

9.3 Test Setup Layout

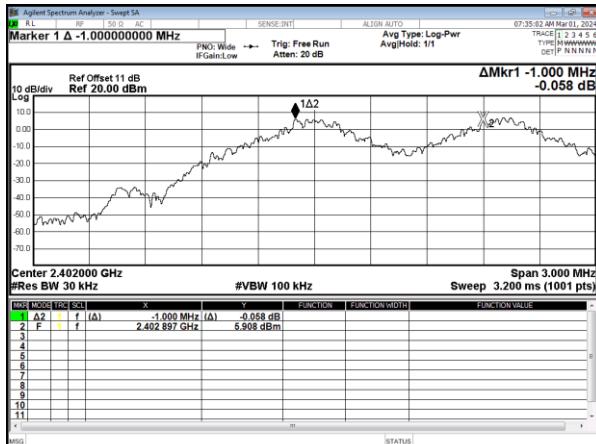


9.4 Test Result and Data

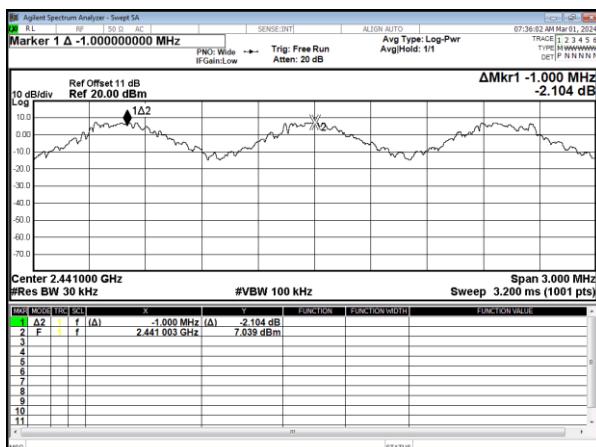
Modulation Type	Channel	Channel Separation (MHz)	Limit (MHz)
GFSK	00	1.000	0.642
	39	1.000	0.643
	78	1.000	0.642
$\pi/4$ -DQPSK	00	1.000	0.997
	39	1.000	0.996
	78	1.000	0.995
8DPSK	00	1.000	0.992
	39	1.000	0.993
	78	1.000	0.995



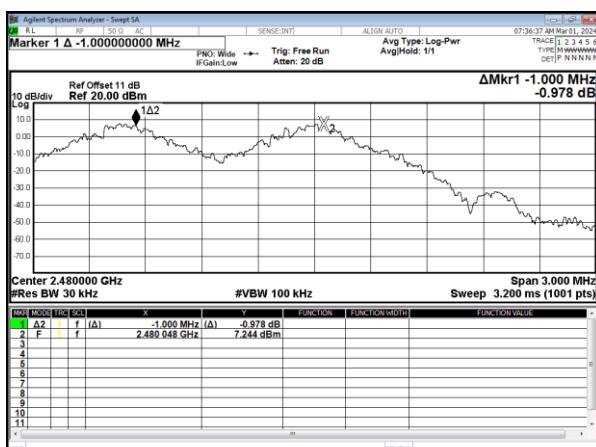
Modulation Type: GFSK (1Mbps)
Channel: 00



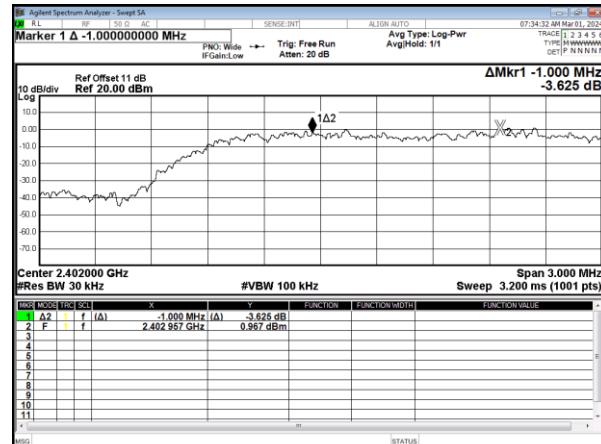
CH39



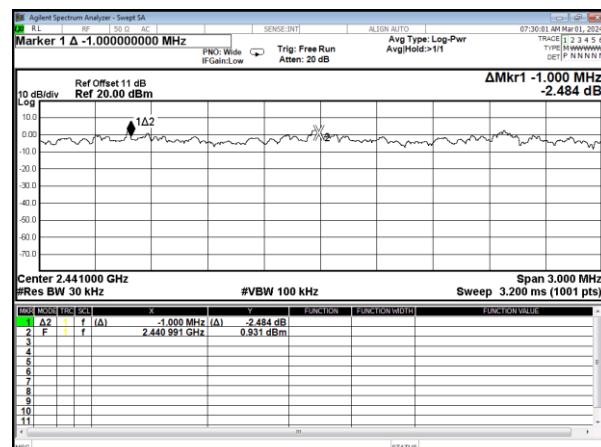
CH78



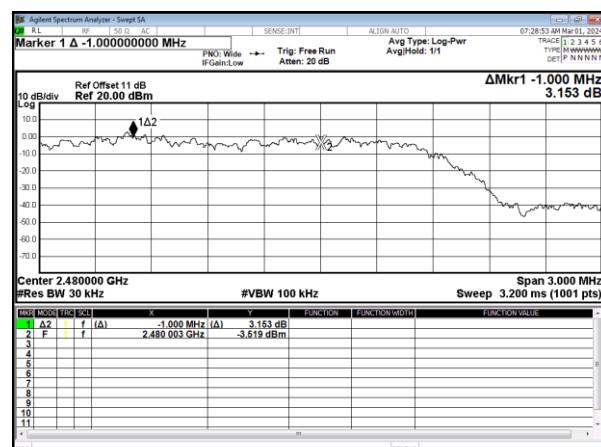
Modulation Type: $\pi/4$ -DQPSK (2Mbps)
Channel: 00



CH39

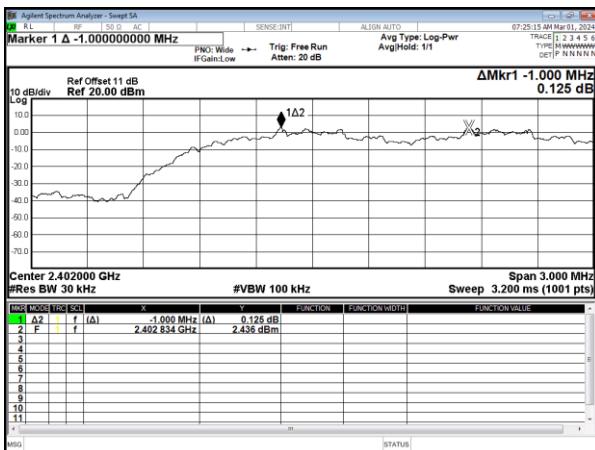


CH78

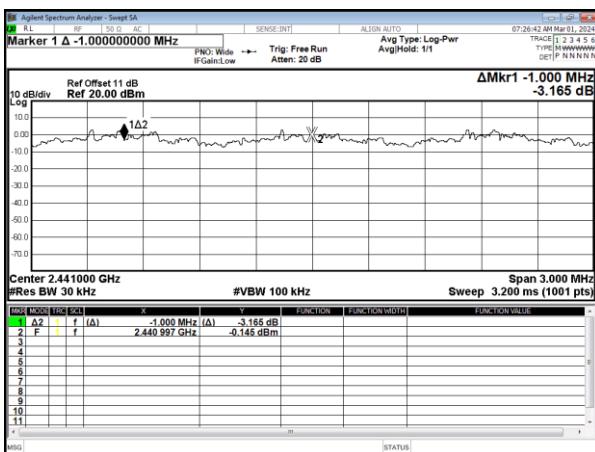




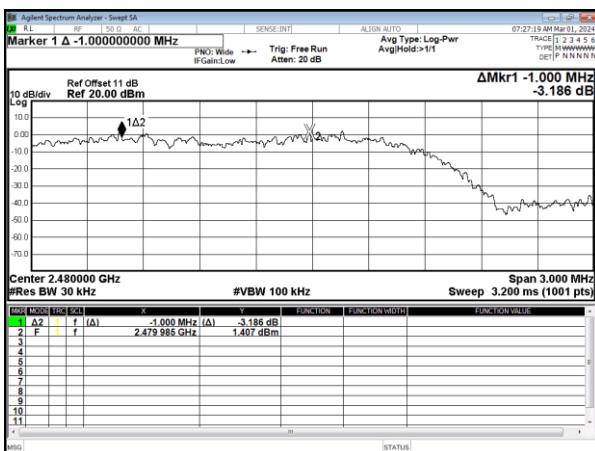
Modulation Type: 8DPSK (3Mbps)
Channel: 00



CH39



CH78





10. Dwell Time on each channel

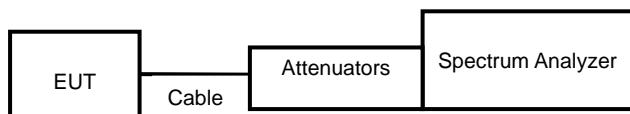
10.1 Test Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

10.2 Test Procedures

1. The transmitter output was connected to the spectrum analyzer.
2. Adjust the center frequency to measure frequency, then set zero span mode.
2. Set RBW of spectrum analyzer to 1 MHz and VBW to 1 MHz.
4. Measure the time duration of one transmission on the measured frequency.

10.3 Test Setup Layout



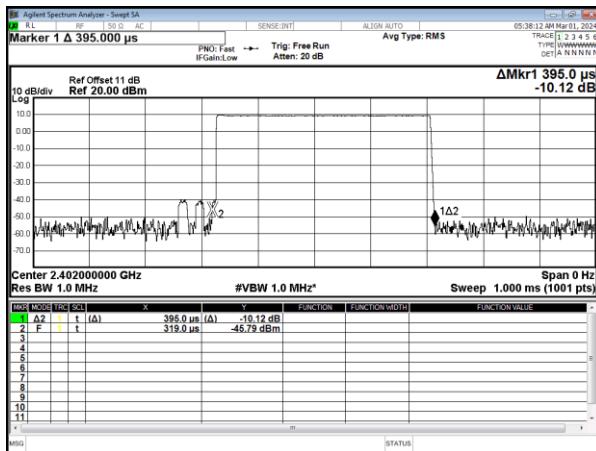
10.4 Test Result and Data

Test Period = 0.4 (second/ channel) x 79 Channel = 31.6 sec

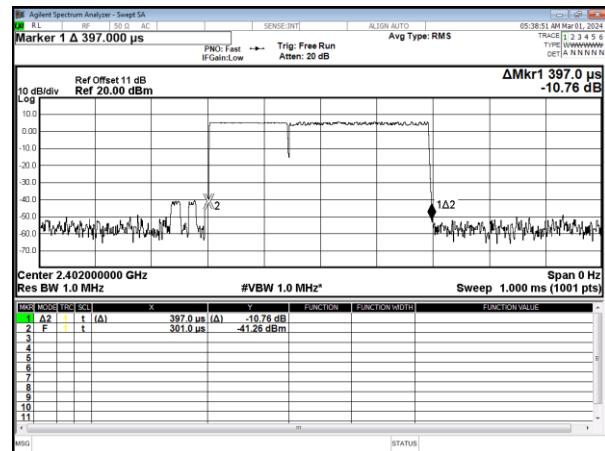
Modulation Type	Frequency (MHz)	Length of transmission time (ms)	Number of transmission in a 31.6 (79 Hopping*0.4)	Dwell Time (ms)	Limit (ms)
GFSK (DH1)	2402	0.395	320.00	126.40	400
GFSK (DH3)	2402	1.650	160.00	264.00	400
GFSK (DH5)	2402	2.905	106.67	309.87	400
$\pi/4$ -DQPSK (DH1)	2402	0.397	320.00	127.04	400
$\pi/4$ -DQPSK (DH3)	2402	1.656	160.00	264.96	400
$\pi/4$ -DQPSK (DH5)	2402	2.905	106.67	309.87	400
8DPSK (DH1)	2402	0.403	320.00	128.96	400
8DPSK (DH3)	2402	1.656	160.00	264.96	400
8DPSK (DH5)	2402	2.905	106.67	309.87	400



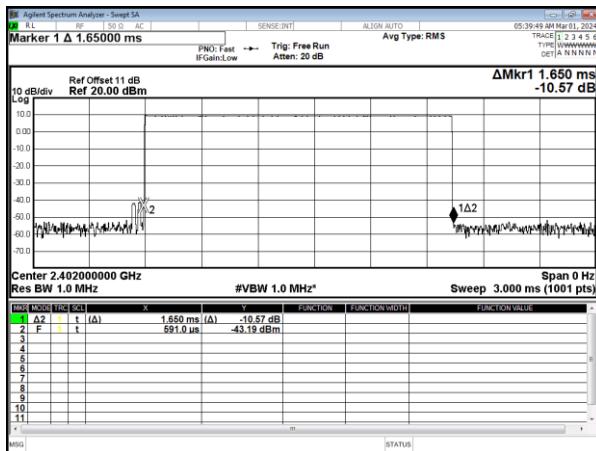
Modulation Type: GFSK (1Mbps)
DH1



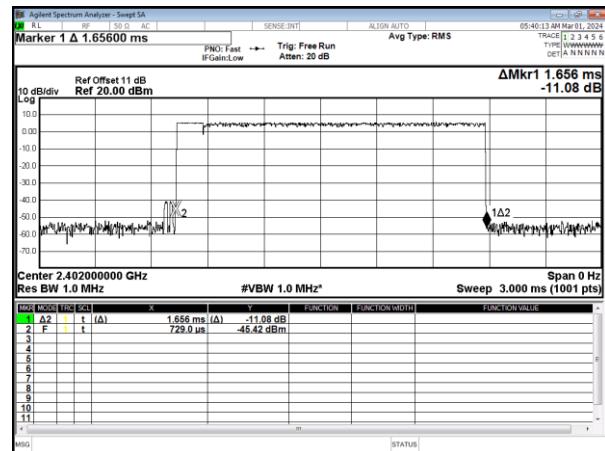
Modulation Type: $\pi/4$ -DQPSK (2Mbps)
DH1



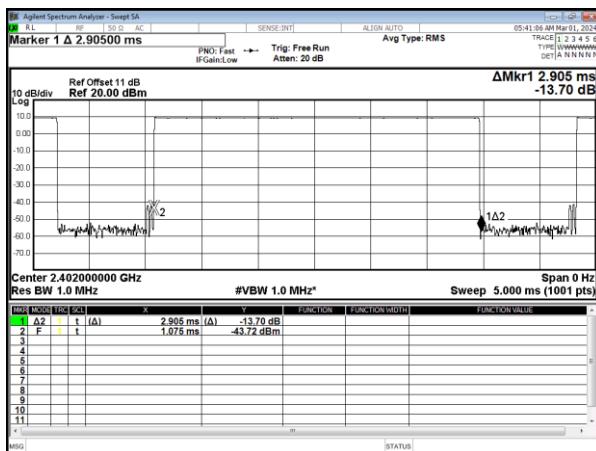
DH3



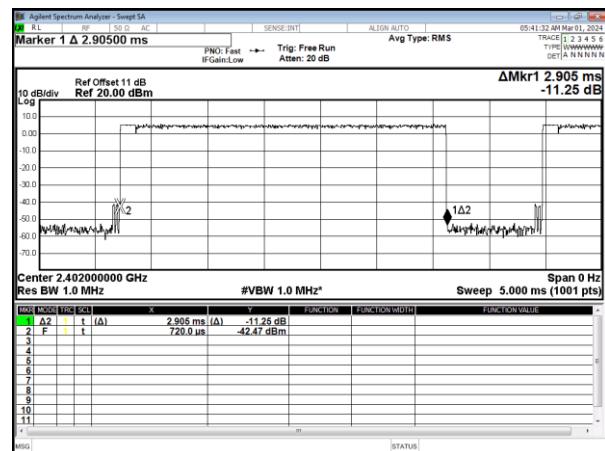
DH3



DH5

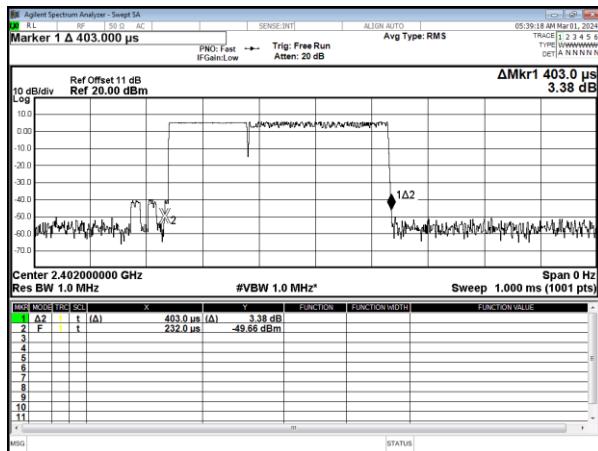


DH5

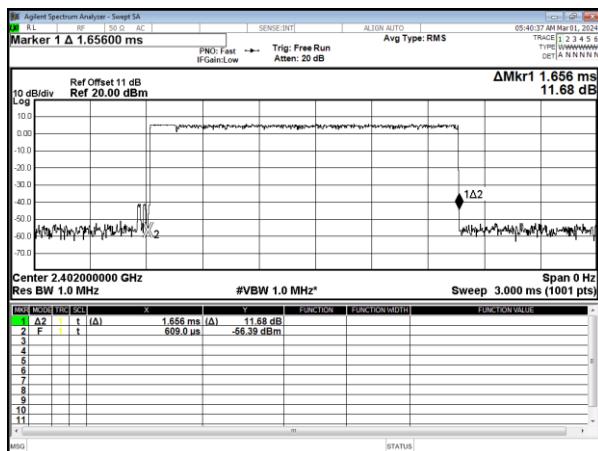




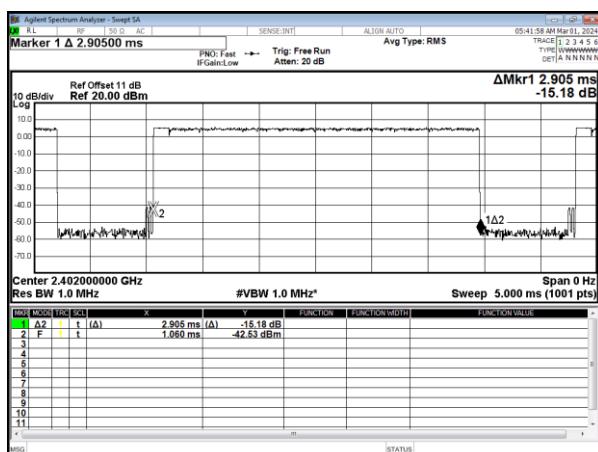
Modulation Type: 8DPSK (3Mbps)
DH1



DH3



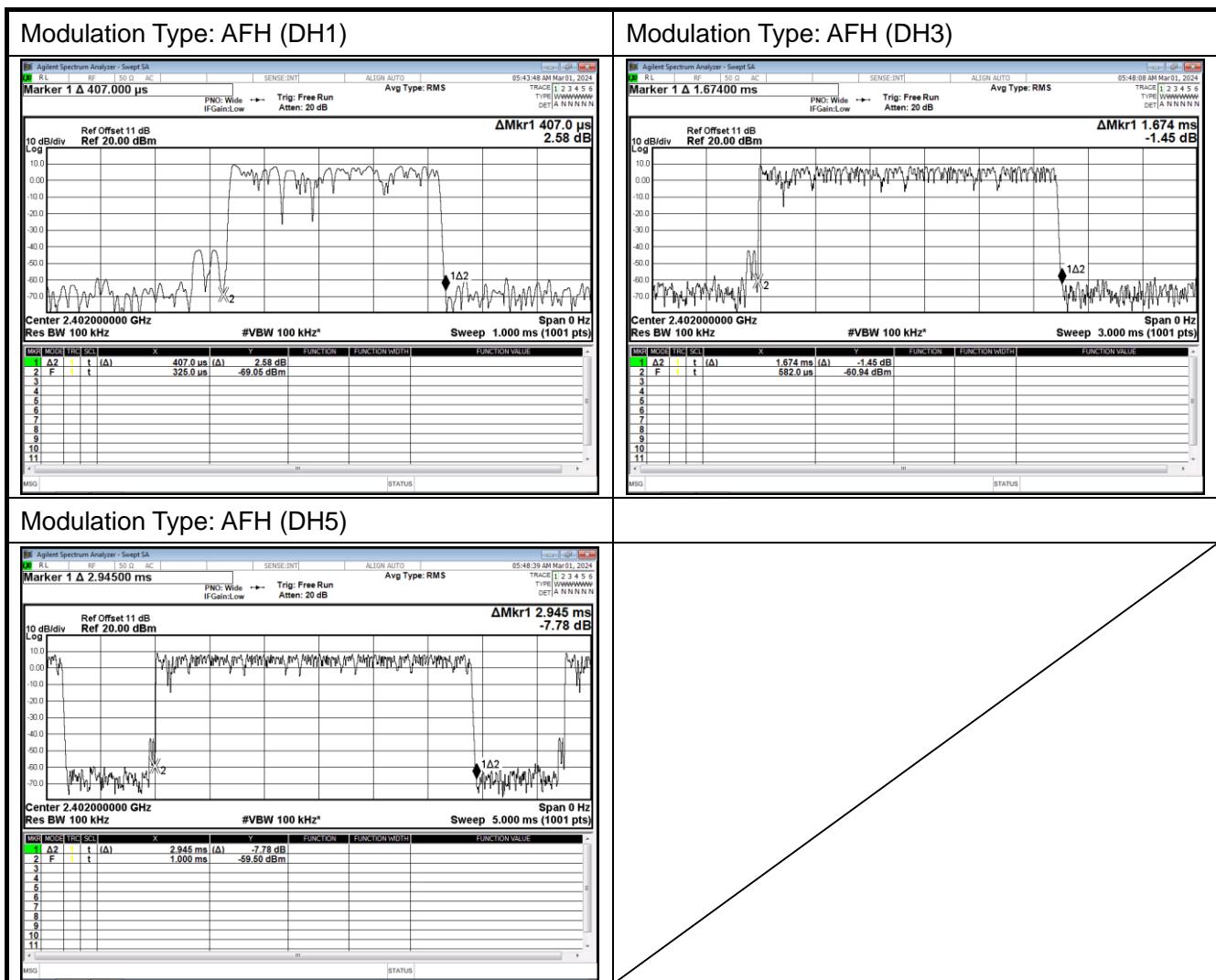
DH5





Test Period = 0.4 (second/ channel) x 20 Channel = 8 sec

Modulation Type	Frequency (MHz)	Length of transmission time (ms)	Number of transmission in a 8 (20 Hopping*0.4)	Dwell Time (ms)	Limit (ms)
AFH (DH1)	2402-2421	0.407	160	65.12	400
AFH (DH3)	2402-2421	1.674	80	133.92	400
AFH (DH5)	2402-2421	2.945	53.33	157.06	400





11. Number of Hopping Channels

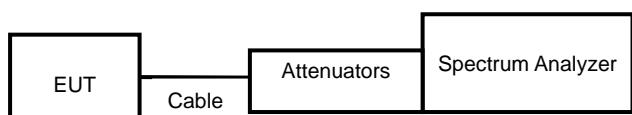
11.1 Test Limit

Frequency hopping systems in the 2400 ~ 2483.5 MHz band shall use at least 15 channels.

11.2 Test Procedures

- a. The transmitter output was connected to the spectrum analyzer.
- b. Set RBW of spectrum analyzer to 300 KHz and VBW to 300 KHz.
- c. Set the MaxHold function, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been record.

11.3 Test Setup Layout

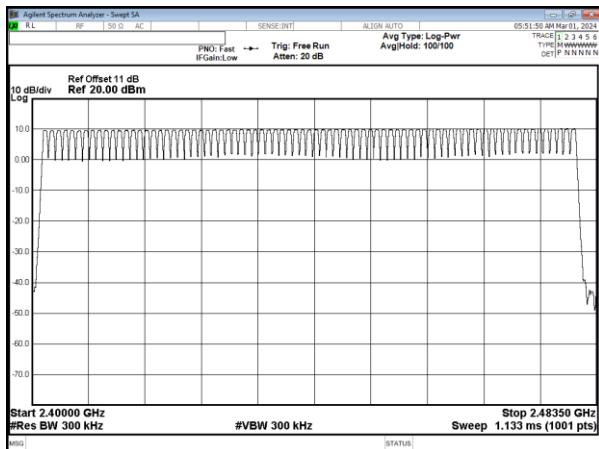
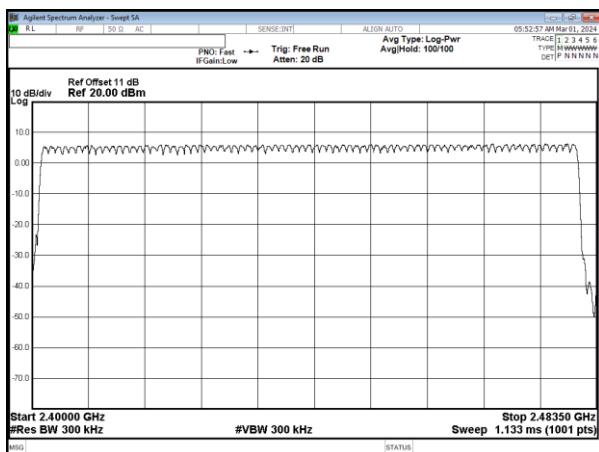


11.4 Test Result and Data

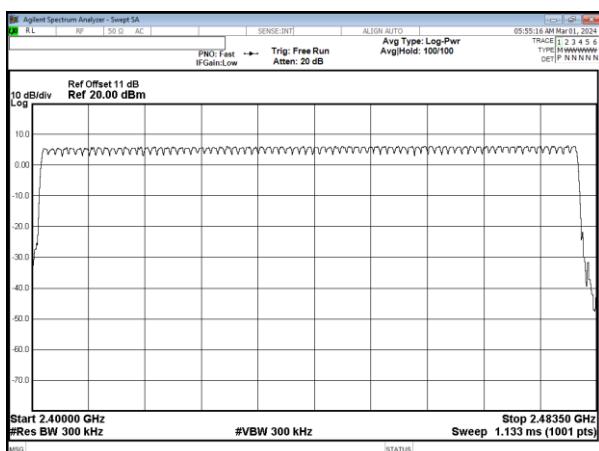
Modulation Type	Number of hopping channels
GFSK	79
$\pi/4$ -DQPSK	79
8DPSK	79



Modulation Standard: GFSK (1Mbps)

Modulation Standard: $\pi/4$ -DQPSK (2Mbps)

Modulation Standard: 8DPSK (3Mbps)





12. Maximum Peak Output Power

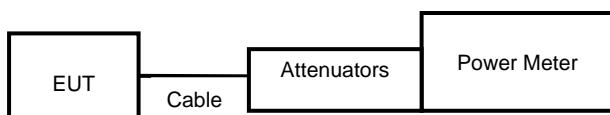
12.1 Test Limit

The Maximum Peak Output Power Measurement is 21dBm.

12.2 Test Procedures

The antenna port(RF output)of the EUT was connected to the input(RF input)of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

12.3 Test Setup Layout



12.4 Test Result and Data

Modulation Type	Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Output (mW)
GFSK (1Mbps)	00	2402	10.142	10.332
	39	2441	10.055	10.127
	78	2480	10.018	10.042
$\pi/4$ DQPSK (2Mbps)	00	2402	7.245	5.303
	39	2441	7.421	5.522
	78	2480	7.670	5.848
8DPSK (3Mbps)	00	2402	7.275	5.339
	39	2441	7.392	5.485
	78	2480	7.672	5.851

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