

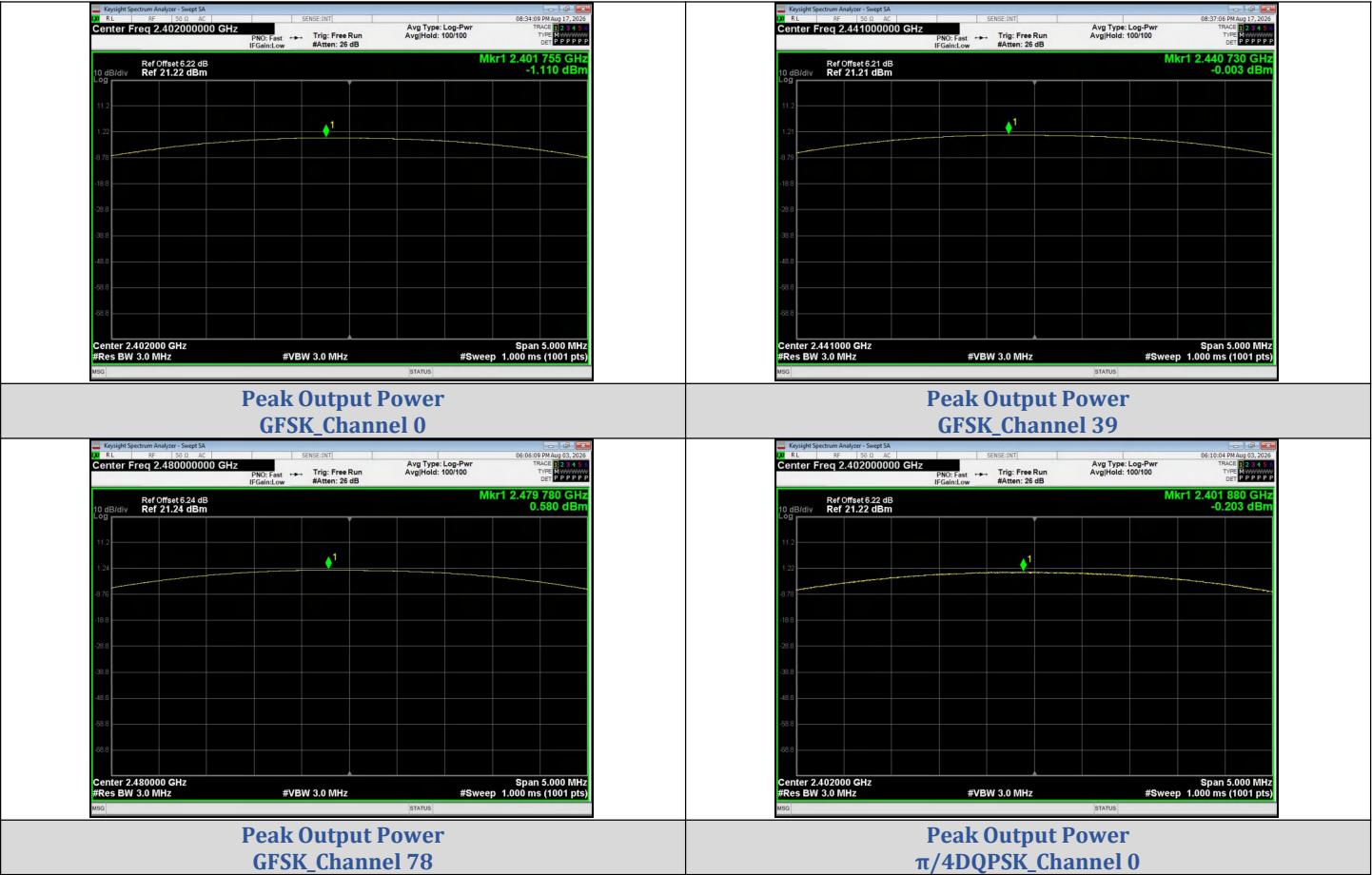
Appendix A: Test Results of Bluetooth BR & EDR

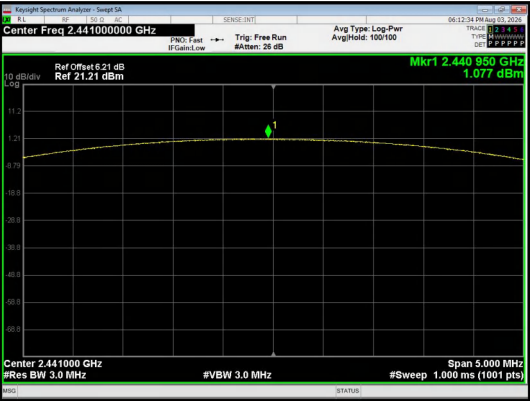
Conducted Output Power

Test Result

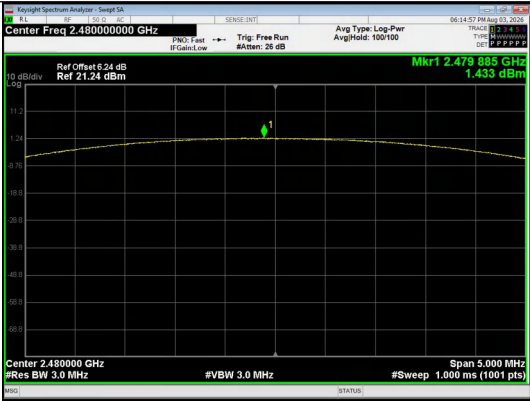
Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Max. Avg. Power (dBm)	Limit (dBm)	Verdict
GFSK	DH5	0	-1.110	0.77	None	30	PASS
		39	-0.003	1.00	None		PASS
		78	0.580	1.14	None		PASS
$\pi/4$ DQPSK	2-DH5	0	-0.203	0.95	None		PASS
		39	1.077	1.28	None		PASS
		78	1.433	1.39	None		PASS
8DPSK	3-DH5	0	-0.180	0.96	None		PASS
		39	1.122	1.29	None		PASS
		78	1.524	1.42	None		PASS

Test Graphs

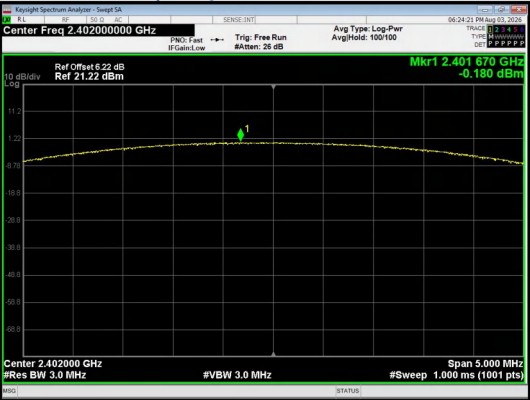




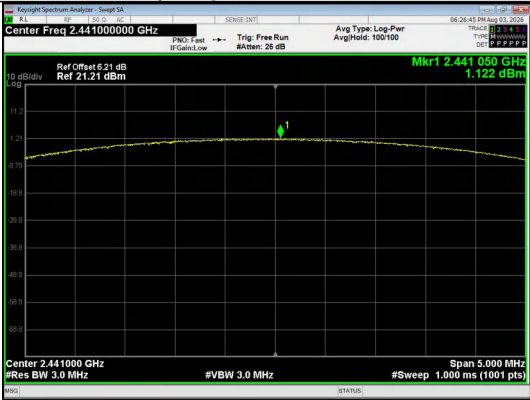
Peak Output Power
 $\pi/4$ DQPSK_Channel 39



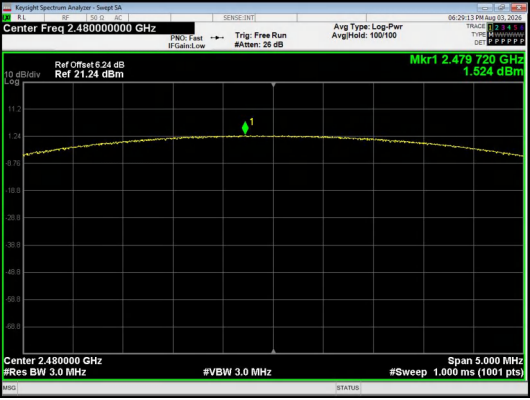
Peak Output Power
 $\pi/4$ DQPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 78



Peak Output Power
8DPSK_Channel 78

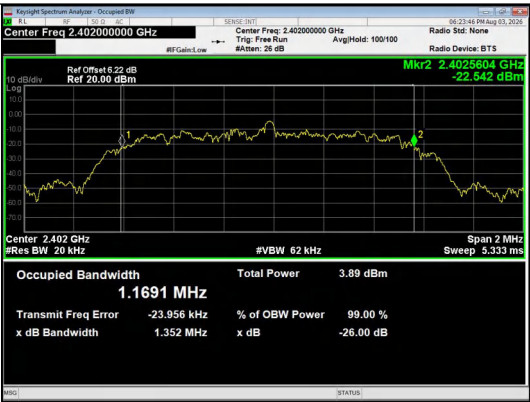
99% Bandwidth

Test Result

Modulation	Channel	Center Frequency (MHz)	99% BW (MHz)
GFSK	0	2402	0.83
	39	2441	0.86
	78	2480	0.86
$\pi/4$ DQPSK	0	2402	1.19
	39	2441	1.18
	78	2480	1.18
8DPSK	0	2402	1.17
	39	2441	1.16
	78	2480	1.19

Test Graphs

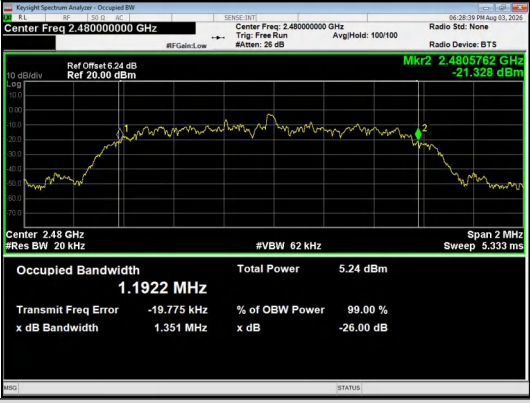




8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



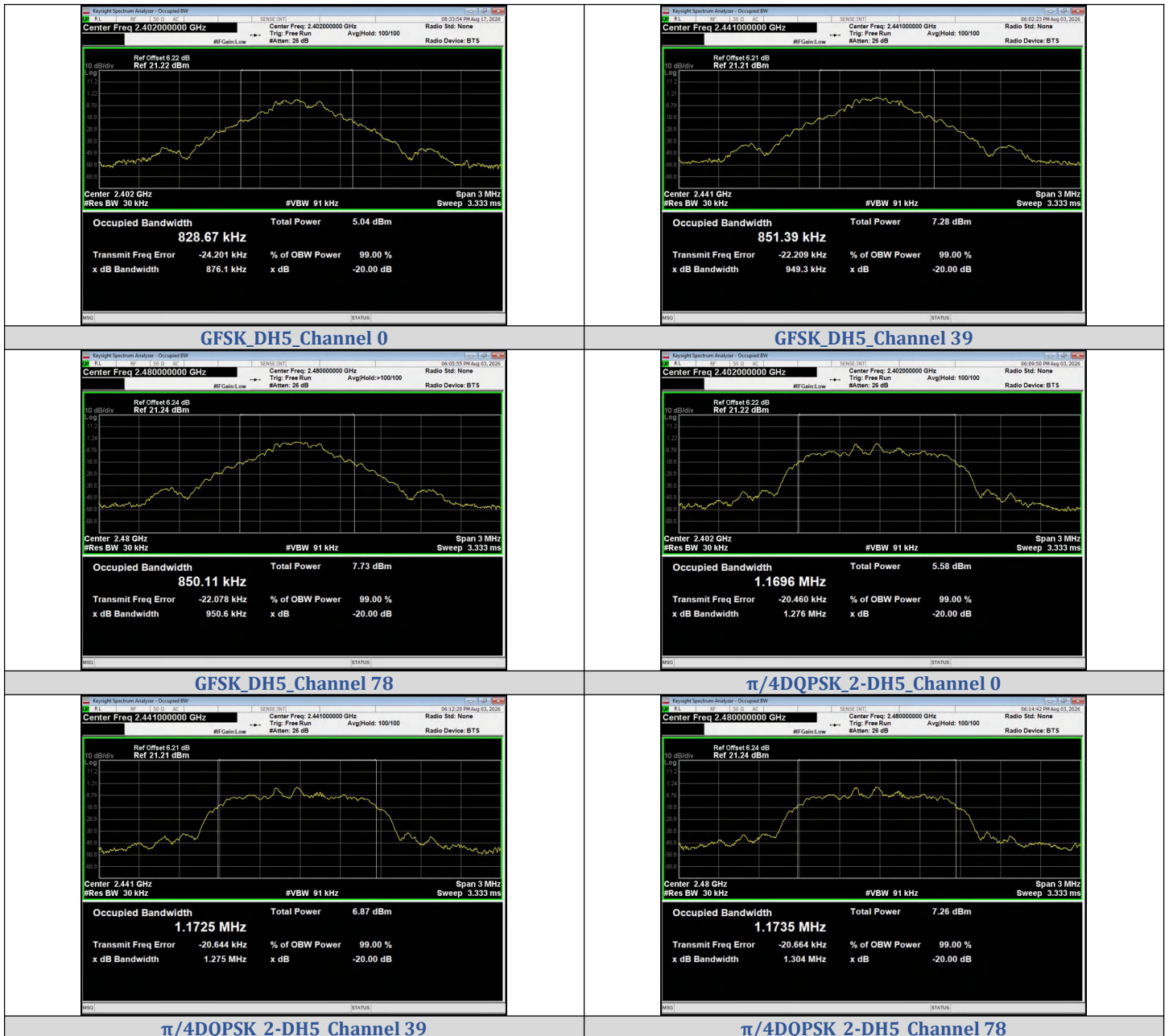
8DPSK_3-DH5_Channel 78

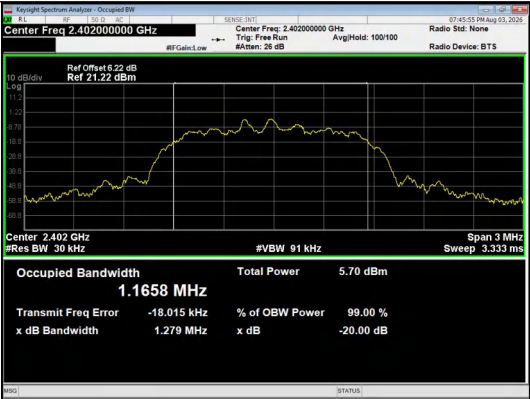
20dB Bandwidth

Test Result

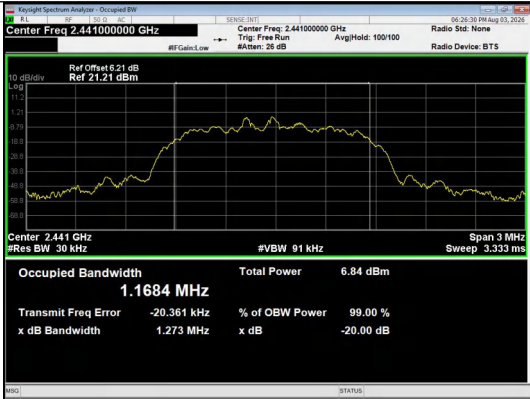
Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	0.8761
	39	2441 MHz	0.9493
	78	2480 MHz	0.9506
$\pi/4$ DQPSK	0	2402 MHz	1.276
	39	2441 MHz	1.275
	78	2480 MHz	1.304
8DPSK	0	2402 MHz	1.279
	39	2441 MHz	1.273
	78	2480 MHz	1.302

Test Graphs

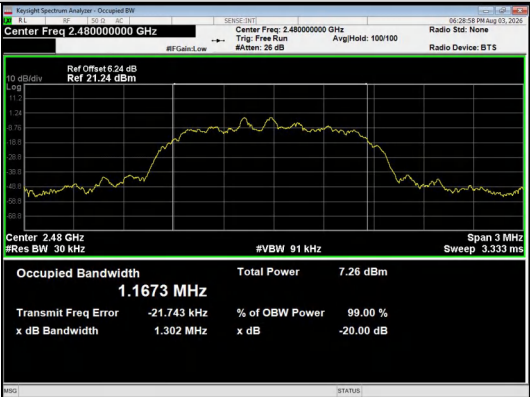




8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



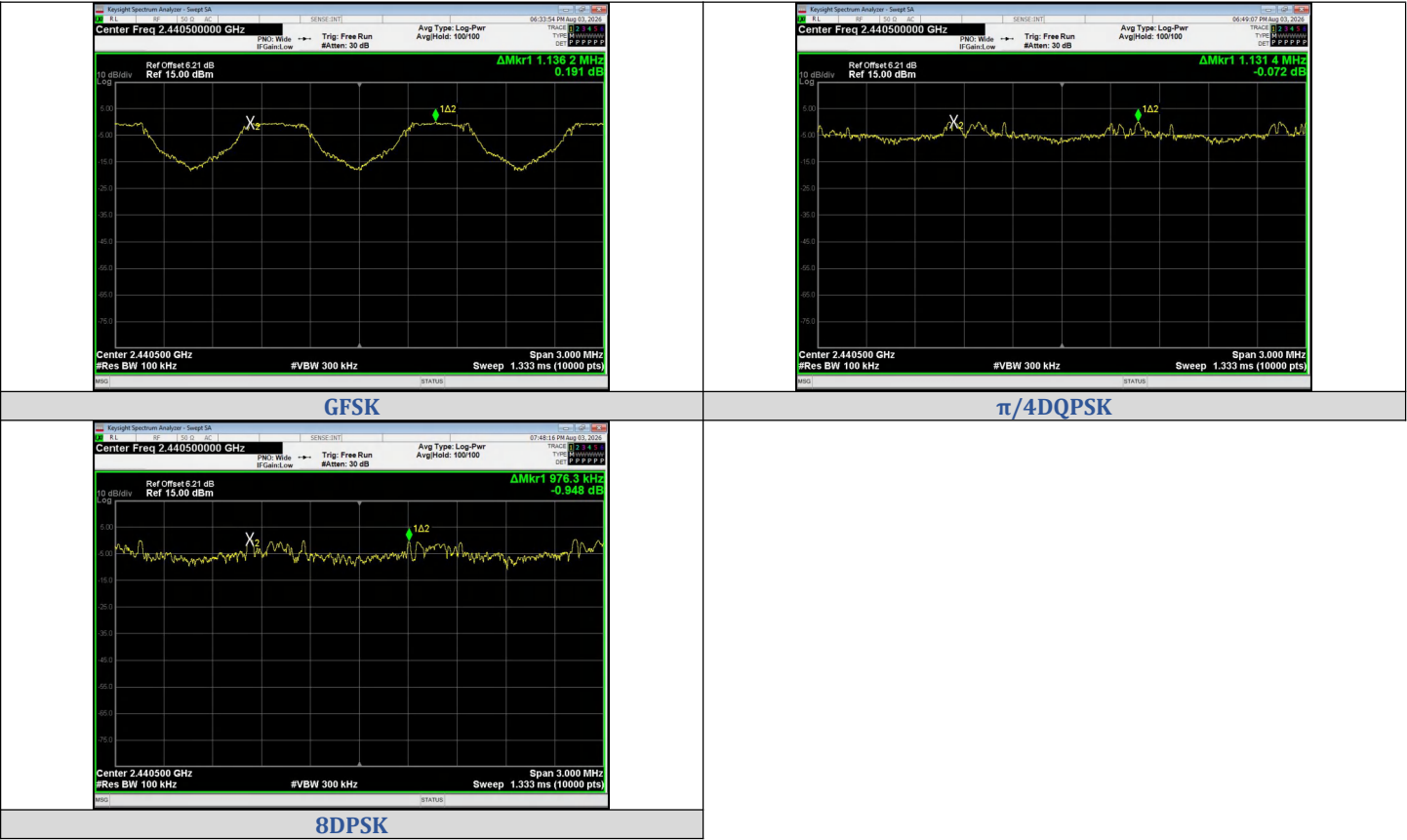
8DPSK_3-DH5_Channel 78

Carrier Frequencies Separation

Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Minimum Limit (MHz)	Verdict
GFSK	DH5	2439.8302	2440.9664	1.1362	0.634	PASS
$\pi/4$ DQPSK	2-DH5	2439.8371	2440.9685	1.1314	0.869	PASS
8DPSK	3-DH5	2439.8278	2440.8041	0.9763	0.868	PASS

Test Graphs



Conducted Spurious & Band Edge Emission

Test Result

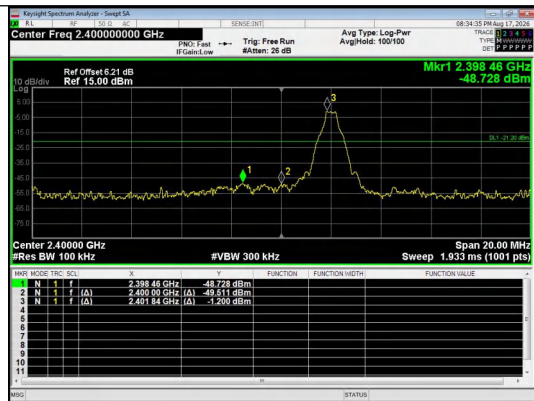
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Verdict
GFSK	DH5	0	2398.46	-48.727	-21.20	-27.527	PASS
			2400.00	-49.511	-21.20	-28.311	PASS
			2503.90	-39.355	-21.20	-18.155	PASS
		39	2503.90	-38.008	-20.04	-17.968	PASS
		78	2483.50	-50.662	-19.47	-31.192	PASS
			2528.25	-37.483	-19.47	-18.013	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-46.253	-21.12	-25.133	PASS
			2503.90	-39.991	-21.12	-18.871	PASS
		39	2503.90	-39.264	-20.03	-19.234	PASS
		78	2483.50	-51.954	-19.35	-32.604	PASS
			2503.90	-38.139	-19.35	-18.789	PASS
		8DPSK	3-DH5	0	2400.00	-46.436	-21.12
2503.90	-38.427				-21.12	-17.307	PASS
39	2503.90			-39.186	-20.07	-19.116	PASS
78	2483.50			-53.342	-19.41	-33.932	PASS
	2503.90			-38.758	-19.41	-19.348	PASS
Note: input compensation coefficient (dB)= Cable Loss (dB)							

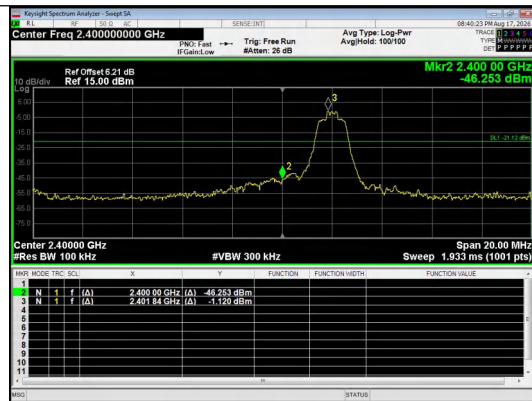
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Verdict
GFSK	DH5	Hopping	2385.99	-43.300	-21.17	-22.130	PASS
			2400.00	-44.793	-21.17	-23.623	PASS
			2483.50	-51.433	-19.47	-31.963	PASS
$\pi/4$ DQPSK	2-DH5		2391.88	-42.398	-20.96	-21.438	PASS
			2400.00	-43.996	-20.96	-23.036	PASS
			2483.50	-46.991	-19.18	-27.811	PASS
8DPSK	3-DH5		2396.81	-42.383	-20.77	-21.613	PASS
			2400.00	-43.827	-20.77	-23.057	PASS
			2483.50	-46.845	-19.06	-27.785	PASS
Note: input compensation coefficient (dB)= Cable Loss (dB)							

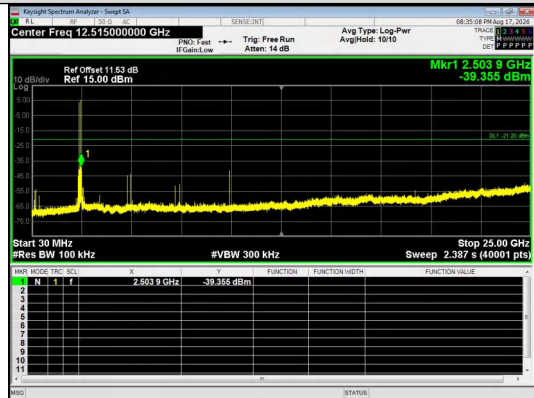
Test Graphs



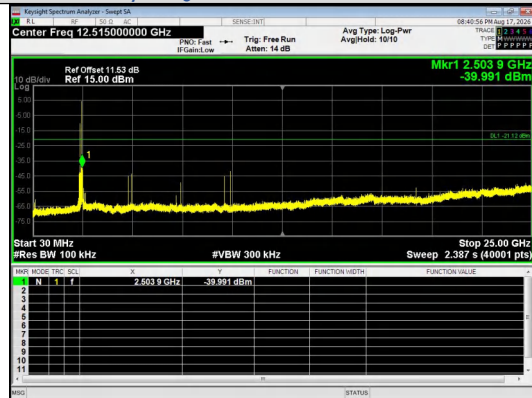
Out Of Band Emission
GFSK_DH5_Channel 0



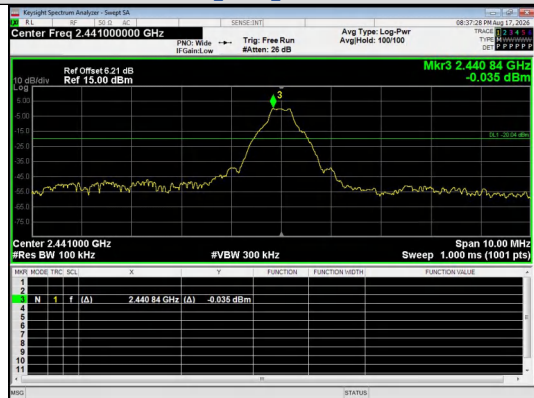
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0



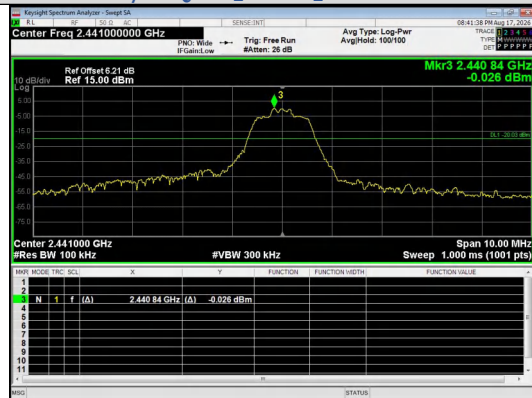
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



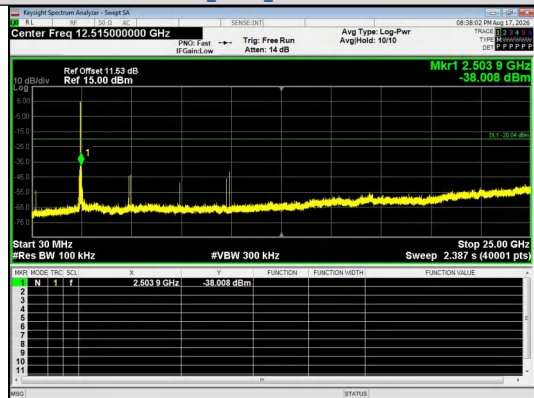
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



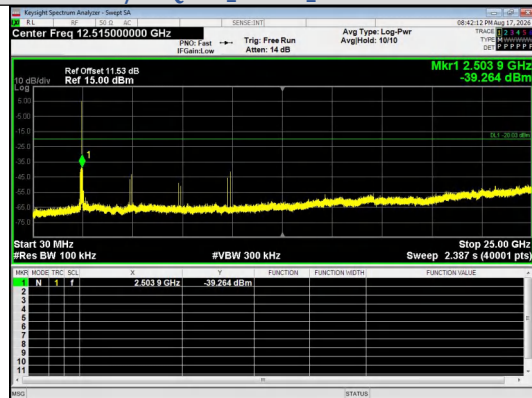
Out Of Band Emission
GFSK_DH5_Channel 39



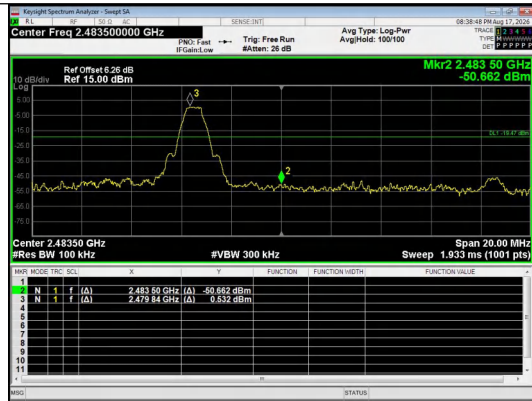
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



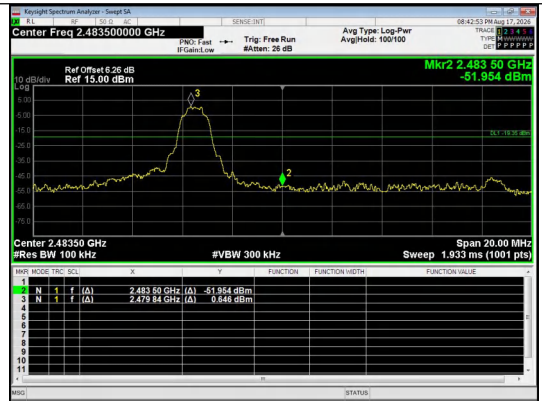
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



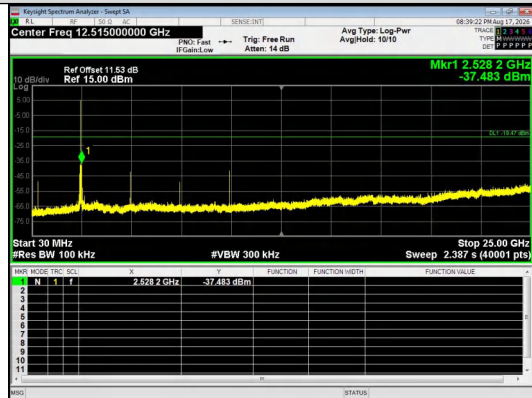
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39



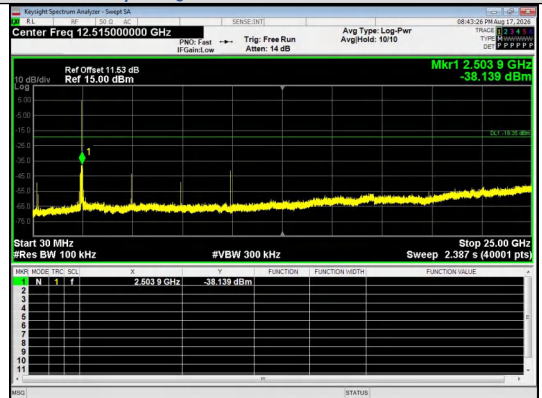
Out Of Band Emission
GFSK_DH5_Channel 78



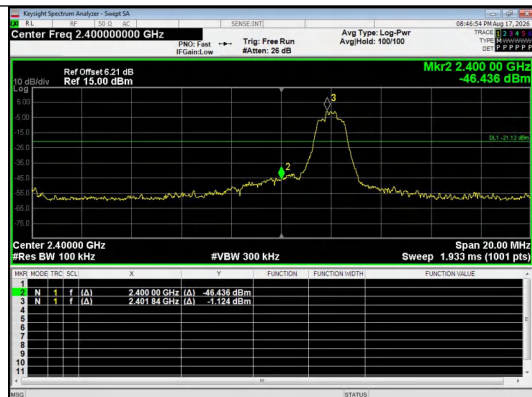
Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 78



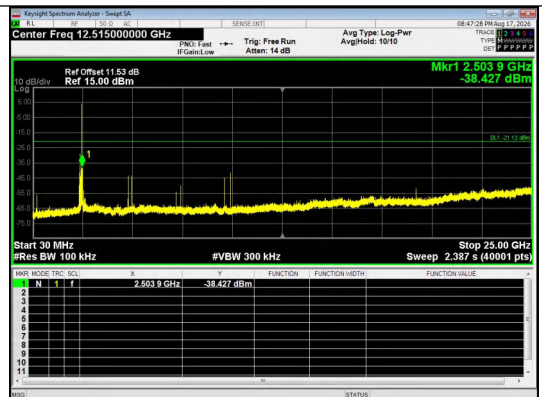
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



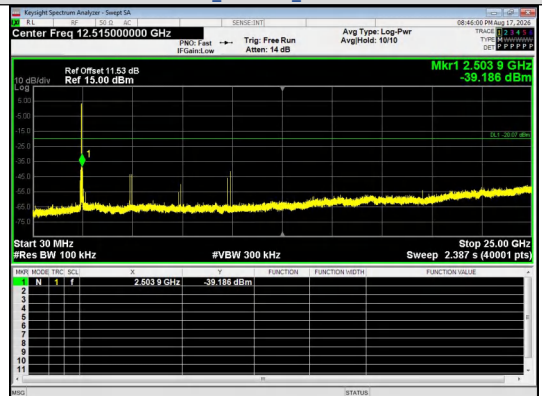
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 78

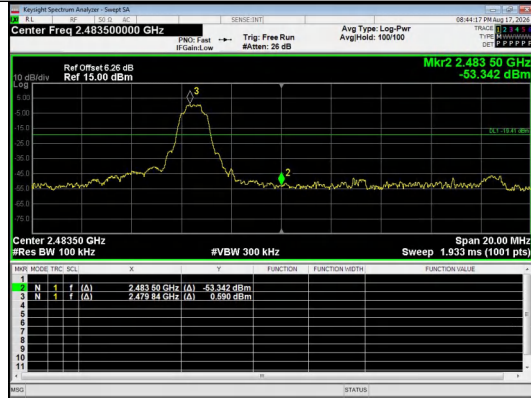
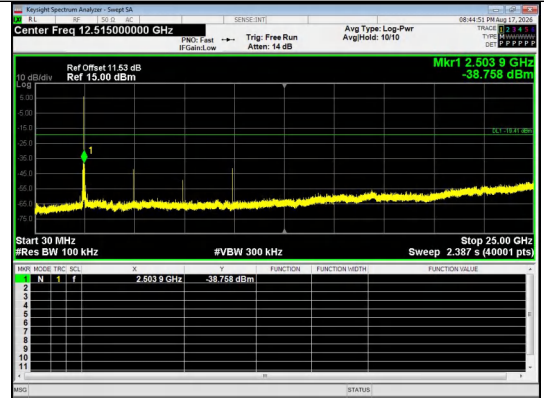
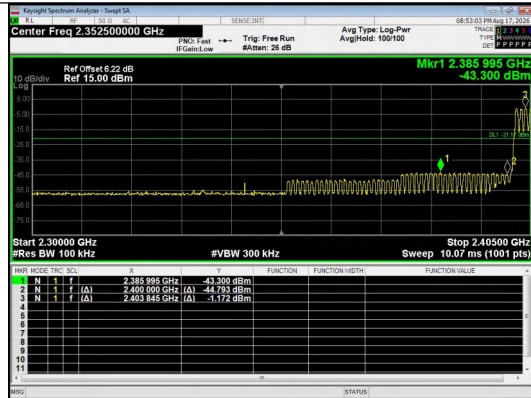
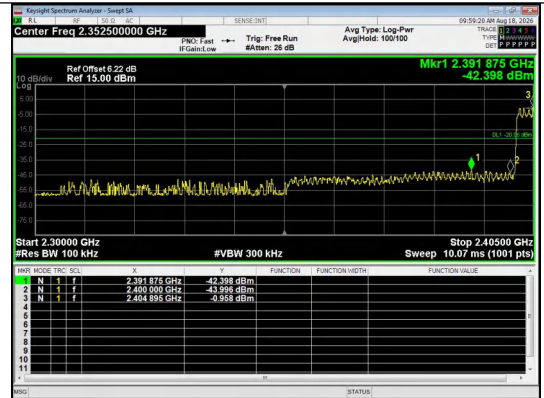
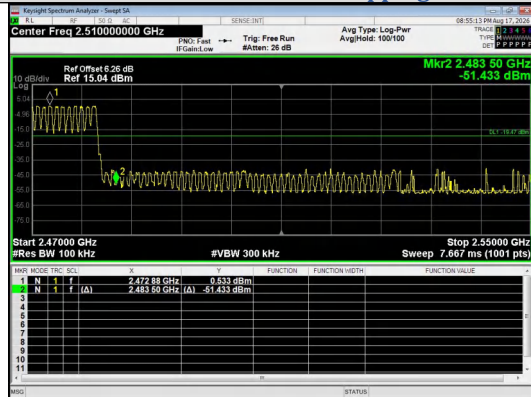
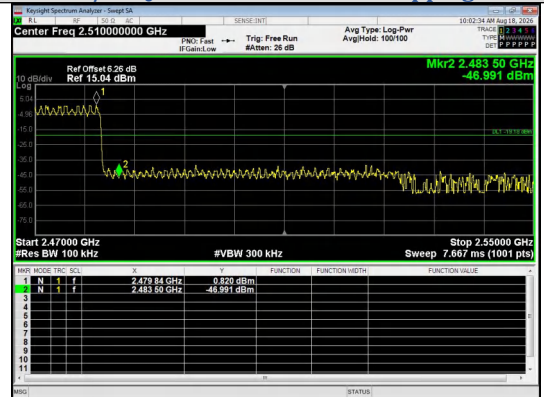


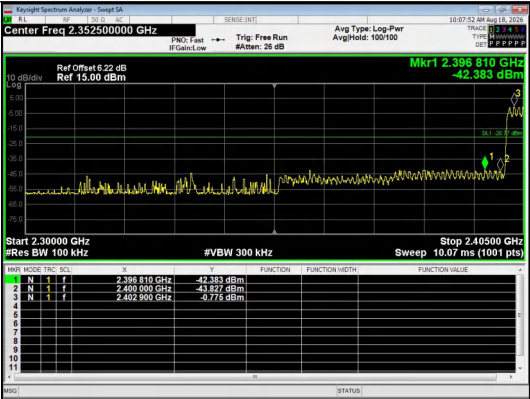
Out Of Band Emission
8DPSK_3-DH5_Channel 0



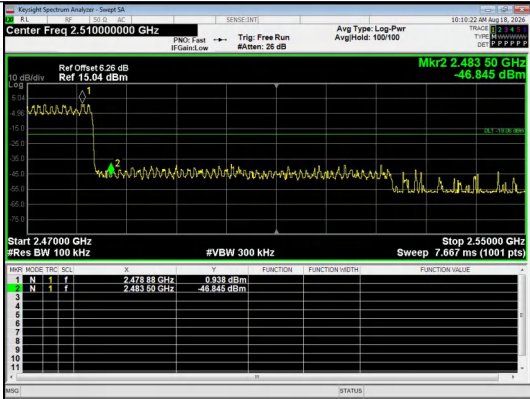
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



**Out Of Band Emission
8DPSK_3-DH5_Channel 39****Out Of Band Emission
8DPSK_3-DH5_Channel 78****30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39****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)
π/4DQPSK_2-DH5_Channel Hopping****Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping****Out Of Band Emission(Right)
π/4DQPSK_2-DH5_Channel Hopping**



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



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

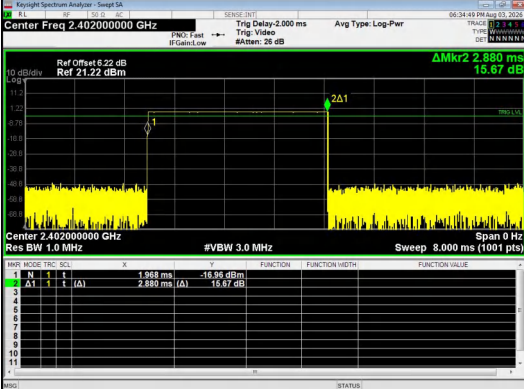
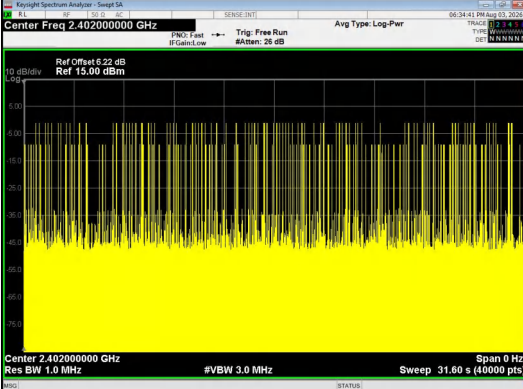
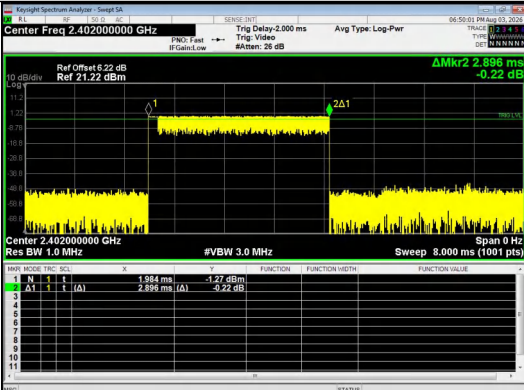
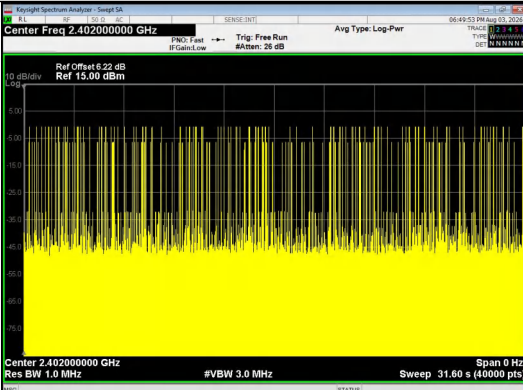
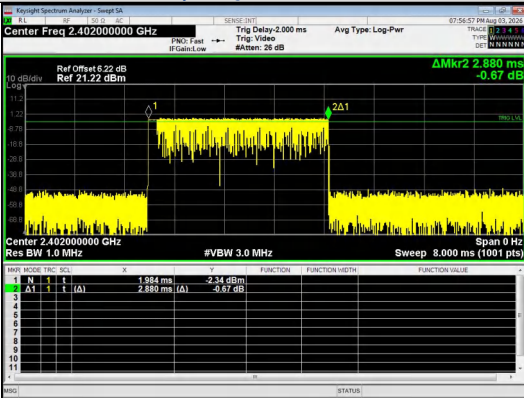
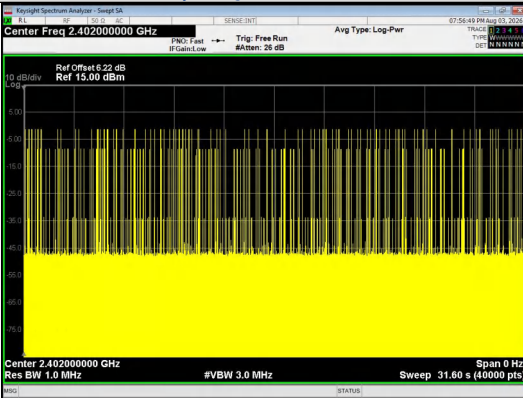
Dwell Time

Test Result

Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	DH5	Hopping	2.8800	105	302.4	< 400	PASS
$\pi/4$ DQPSK	2-DH5		2.8960	110	318.56		PASS
8DPSK	3-DH5		2.8800	100	288.0		PASS

Note: Dwell time=Pulse time(ms)*Number of Pulses in 31.6 seconds

Test Graphs

 Pulse Width GFSK_DH5	 Number of Pulses in 31.6 seconds GFSK_DH5
 Pulse Width $\pi/4$DQPSK_2-DH5	 Number of Pulses in 31.6 seconds $\pi/4$DQPSK_2-DH5
 Pulse Width 8DPSK_3-DH5	 Number of Pulses in 31.6 seconds 8DPSK_3-DH5

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

Keysight Spectrum Analyzer - Single SA

Center Freq 2.420500000 GHz

Ref Offset 6.22 dB
Ref 15.00 dBm

Start 2.40000 GHz
Stop 2.44100 GHz
Sweep 3.933 ms (1001 pts)
#VBW 300 kHz

Y-axis: dBm (10, 0, -10, -20, -30, -40, -50, -60, -70)

X-axis: Frequency (2.40, 2.41, 2.42, 2.43, 2.44 GHz)

[illegible]

Keysight Spectrum Analyzer - Simgo SA

Center Freq 2.420500000 GHz

Ref Offset 6.22 dB
Ref 15.00 dBm

PBW: Fast
IF Conv: Low

Trig: Free Run
#Sweep: 35

Avg Type: Log-Pwr
AveHld: 10/10

66:52:28 Wed Aug 14 2019

Resolution BW 100 kHz

TYPE: Noise

200

10 dB/div

0.00

-10.00

-20.00

-30.00

-40.00

-50.00

-60.00

-70.00

Start 2.40000 GHz
#Res BW 100 kHz

Stop 2.44100 GHz
#VBW 300 kHz

Sweep 3.933 ms (1001 pts)

MODE

STATUS

Center Freq 2.461750000 GHz
PBC: Fast
IF Conv: Low

Sense Unit

Avg Type: Log-Pwr
Avg Hold: 10/10

66.52 GHz Aug 13, 2018
New [F] Save [S]
Type [M] Preset [P]

Ref Offset: 6.22 dB
Ref: 15.00 dBm

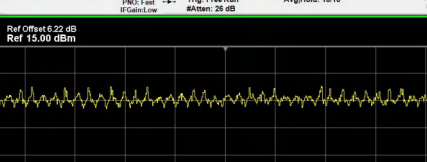
10 dB/div
Log

Start 2.44000 GHz
#Res BW 100 kHz

#VBW 300 kHz

Stop 2.48350 GHz
Sweep 4.290 ms (1001 pts)

MISC STATUS



Keysight Spectrum Analyzer - Sample DA

Center Freq 2.420500000 GHz

Span 4.1 MHz

RBW 300 Hz

VBW 300 kHz

Ref Offst 6.22 dB

Ref 15.00 dBm

Trig: Free Run

Avg Type: Log-Per

Avg/Hold: 10/10

0.147 dBm for 0.200s

Trace

Time

Dec

10 dB/div

5.00

0.00

-5.00

-10.00

-15.00

-20.00

-25.00

-30.00

-35.00

-40.00

-45.00

-50.00

-55.00

-60.00

-65.00

-70.00

Start 2.40000 GHz

Stop 2.44100 GHz

#Res BW 100 kHz

Sweep 3.933 ms (1001 pts)

#VBW 300 kHz

STATUS

Keysight Spectrum Analyzer - Sweep SA

Center Freq 2.461750000 GHz

Span 100 kHz

Ref Offset 6.22 dB

Ref 15.00 dBm

Trig: Free Run

Avg Type: Log-Pwr

Avg/Hold: 10/10

Trace 1

Trace 2

Trace 3

Trace 4

Trace 5

Trace 6

Trace 7

Trace 8

Trace 9

Trace 10

Trace 11

Trace 12

Trace 13

Trace 14

Trace 15

Trace 16

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