

Appendix A

RF Test Data for BT V4.1(BDR/EDR) (Conducted Measurement)

Product Name: Vivi Wireless Presentation

Trade Mark: Vivi

Test Model: VWP-200-16

Environmental Conditions

Temperature:	24.5°C
Relative Humidity:	52.8%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond.Lu
Supervised by:	Wang Chuang

A.1 Maximum Conducted Peak Output Power

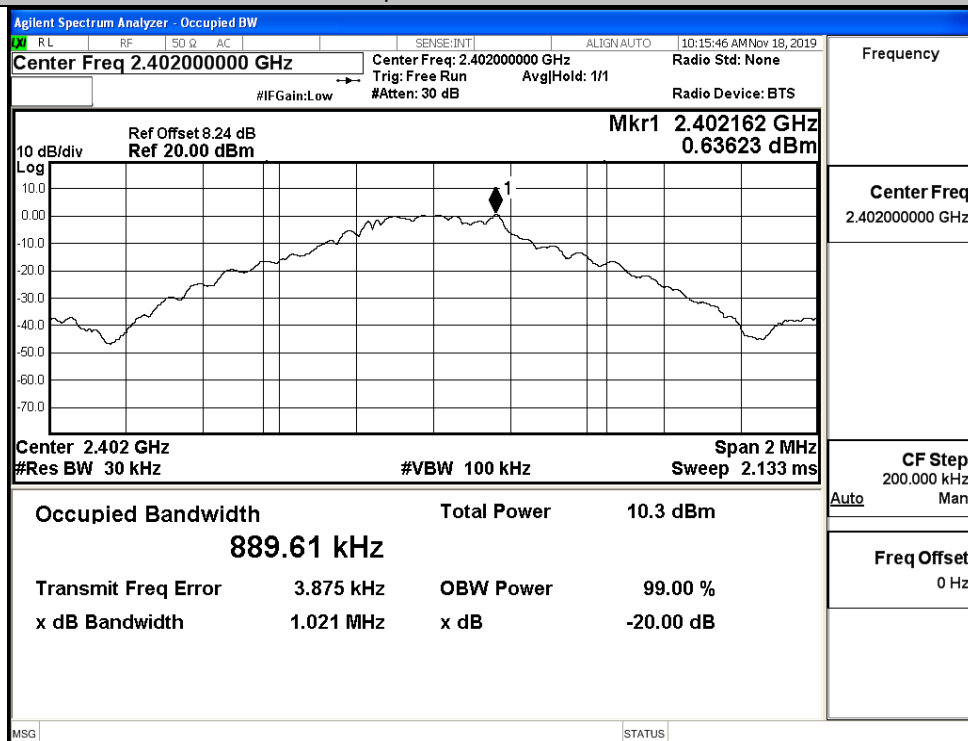
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2.980	21	PASS
	MCH	1.074	21	PASS
	HCH	2.251	21	PASS
$\pi/4$ DQPSK	LCH	2.194	21	PASS
	MCH	0.456	21	PASS
	HCH	1.497	21	PASS
8DPSK	LCH	2.415	21	PASS
	MCH	0.633	21	PASS
	HCH	1.797	21	PASS

A.2 20dB Bandwidth And 99% Bandwidth

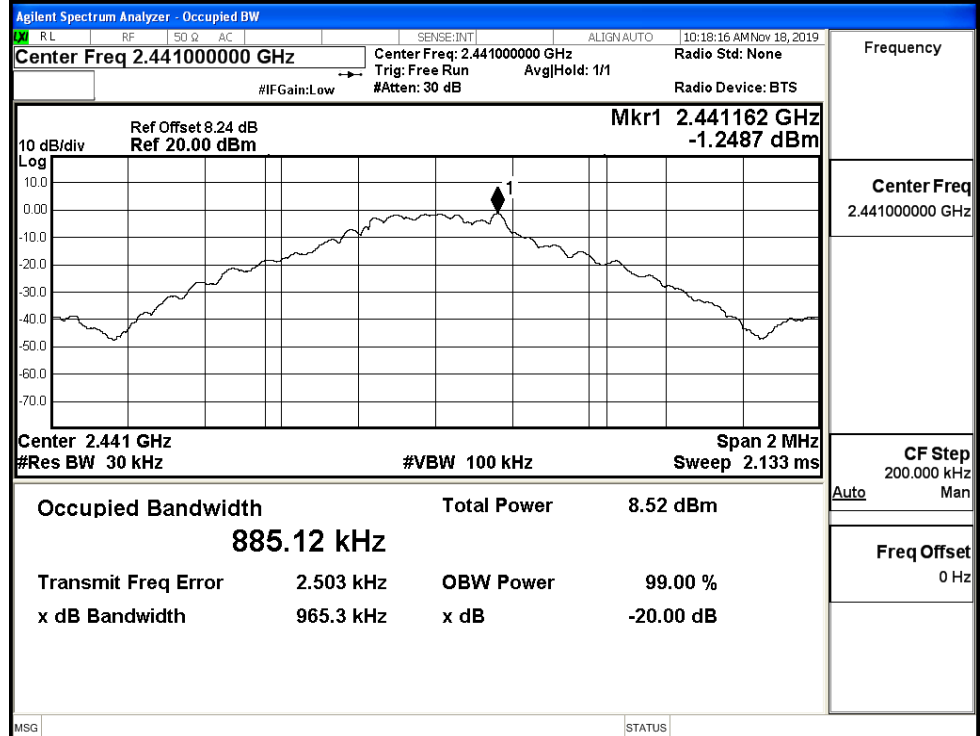
Mode	Channel.	20dB Bandwidth [MHz]	99% Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.021	0.890	Not Specified	PASS
	MCH	0.9653	0.885	Not Specified	PASS
	HCH	1.030	0.889	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.290	1.171	Not Specified	PASS
	MCH	1.294	1.178	Not Specified	PASS
	HCH	1.290	1.171	Not Specified	PASS
8DPSK	LCH	1.296	1.178	Not Specified	PASS
	MCH	1.299	1.188	Not Specified	PASS
	HCH	1.310	1.184	Not Specified	PASS

Test Graphs

GFSK/LCH



GFSK/MCH



Frequency

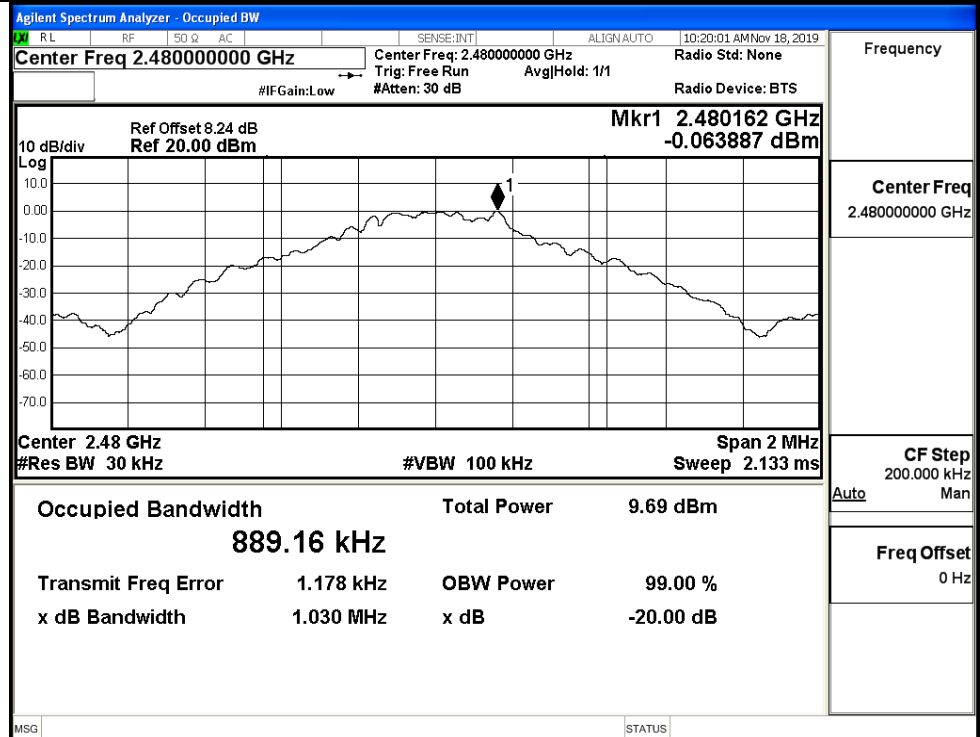
Center Freq
2.441000000 GHz

CF Step
200.000 kHz
Man

Auto

Freq Offset
0 Hz

GFSK/HCH



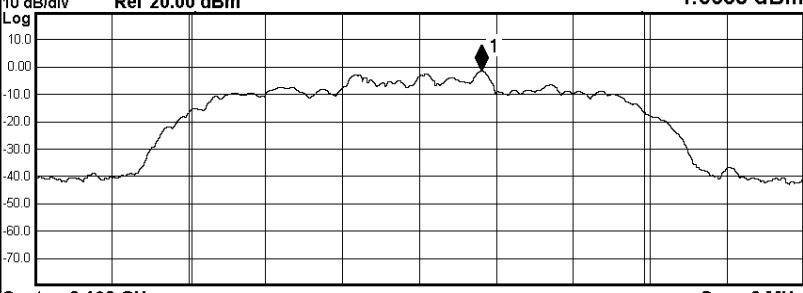
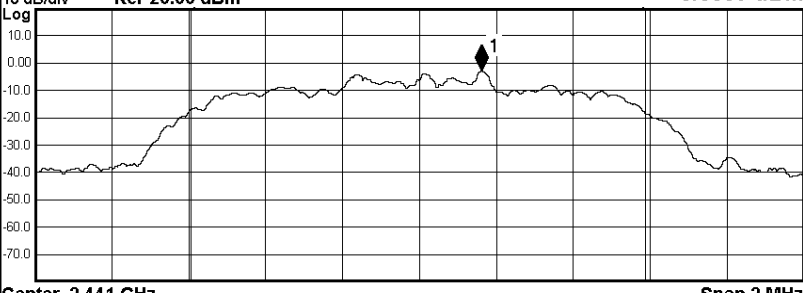
Frequency

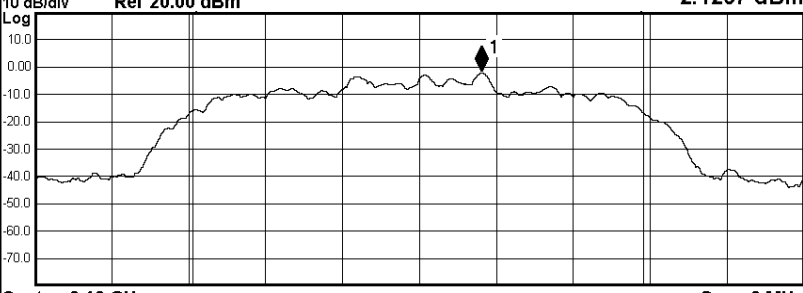
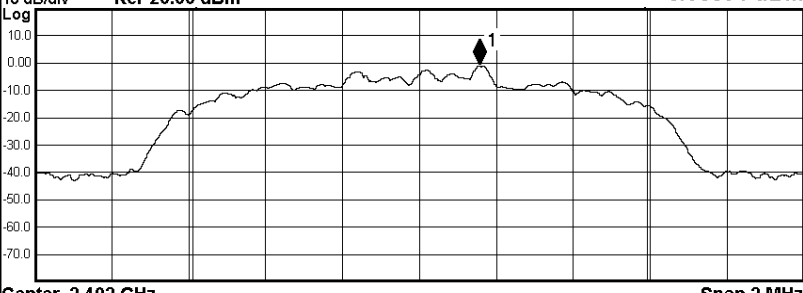
Center Freq
2.480000000 GHz

CF Step
200.000 kHz
Man

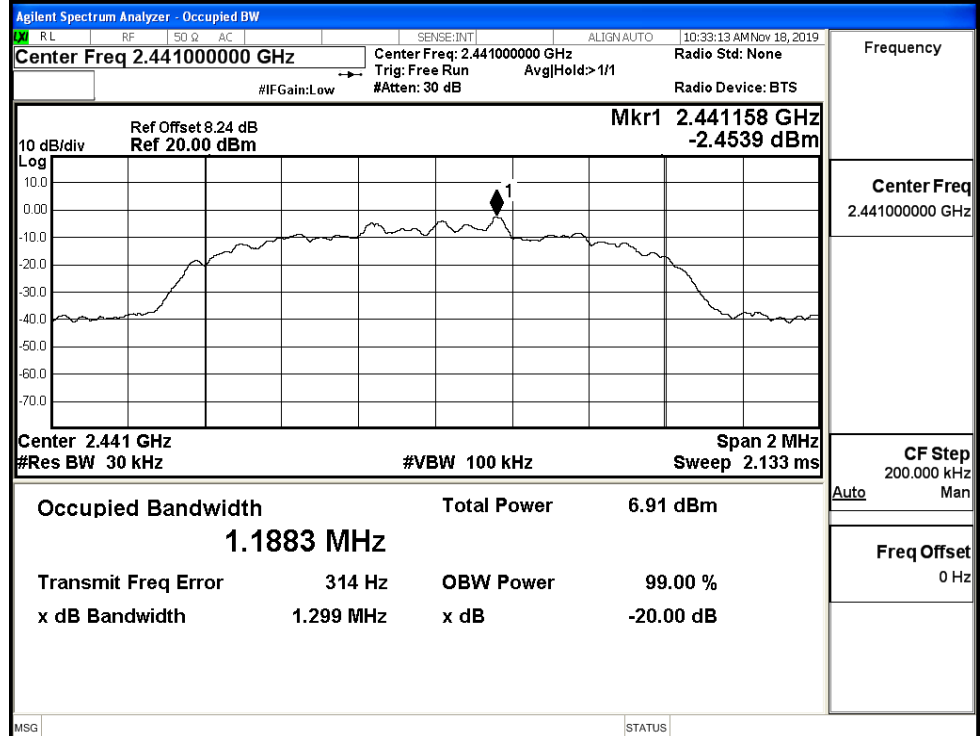
Auto

Freq Offset
0 Hz

$\pi/4$DQPSK/LCH	Agilent Spectrum Analyzer - Occupied BW Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Trig: Free Run #Atten: 30 dB Radio Std: None AvgJHold: 1/1 Radio Device: BTS Ref Offset 8.24 dB Ref 20.00 dBm Mkr1 2.402162 GHz -1.5638 dBm  Center 2.402 GHz #Res BW 30 kHz #VBW 100 kHz Span 2 MHz Sweep 2.133 ms Occupied Bandwidth 1.1712 MHz Total Power 8.50 dBm Transmit Freq Error -1.228 kHz OBW Power 99.00 % x dB Bandwidth 1.290 MHz x dB -20.00 dB
$\pi/4$DQPSK/MCH	Agilent Spectrum Analyzer - Occupied BW Center Freq 2.441000000 GHz Center Freq: 2.441000000 GHz Trig: Free Run #Atten: 30 dB Radio Std: None AvgJHold: 1/1 Radio Device: BTS Ref Offset 8.24 dB Ref 20.00 dBm Mkr1 2.441162 GHz -3.0359 dBm  Center 2.441 GHz #Res BW 30 kHz #VBW 100 kHz Span 2 MHz Sweep 2.133 ms Occupied Bandwidth 1.1784 MHz Total Power 6.96 dBm Transmit Freq Error -1.675 kHz OBW Power 99.00 % x dB Bandwidth 1.294 MHz x dB -20.00 dB

$\pi/4$DQPSK/HCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 10:27:11 AM Nov 18, 2019 Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Radio Std: None Trig: Free Run Avg/Hold: 1/1 Radio Device: BTS #IFGain: Low #Atten: 30 dB Ref Offset 8.24 dB Ref 20.00 dBm Mkr1 2.480162 GHz -2.1267 dBm  Center 2.48 GHz #Res BW 30 kHz #VBW 100 kHz Span 2 MHz Sweep 2.133 ms Occupied Bandwidth 1.1712 MHz Total Power 7.91 dBm Transmit Freq Error -2.706 kHz OBW Power 99.00 % x dB Bandwidth 1.290 MHz x dB -20.00 dB MSG STATUS
8DPSK/LCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 10:30:06 AM Nov 18, 2019 Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Radio Std: None Trig: Free Run Avg/Hold: 1/1 Radio Device: BTS #IFGain: Low #Atten: 30 dB Ref Offset 8.24 dB Ref 20.00 dBm Mkr1 2.402156 GHz -0.98394 dBm  Center 2.402 GHz #Res BW 30 kHz #VBW 100 kHz Span 2 MHz Sweep 2.133 ms Occupied Bandwidth 1.1781 MHz Total Power 8.47 dBm Transmit Freq Error 2.150 kHz OBW Power 99.00 % x dB Bandwidth 1.296 MHz x dB -20.00 dB MSG STATUS

8DPSK/MCH



Frequency

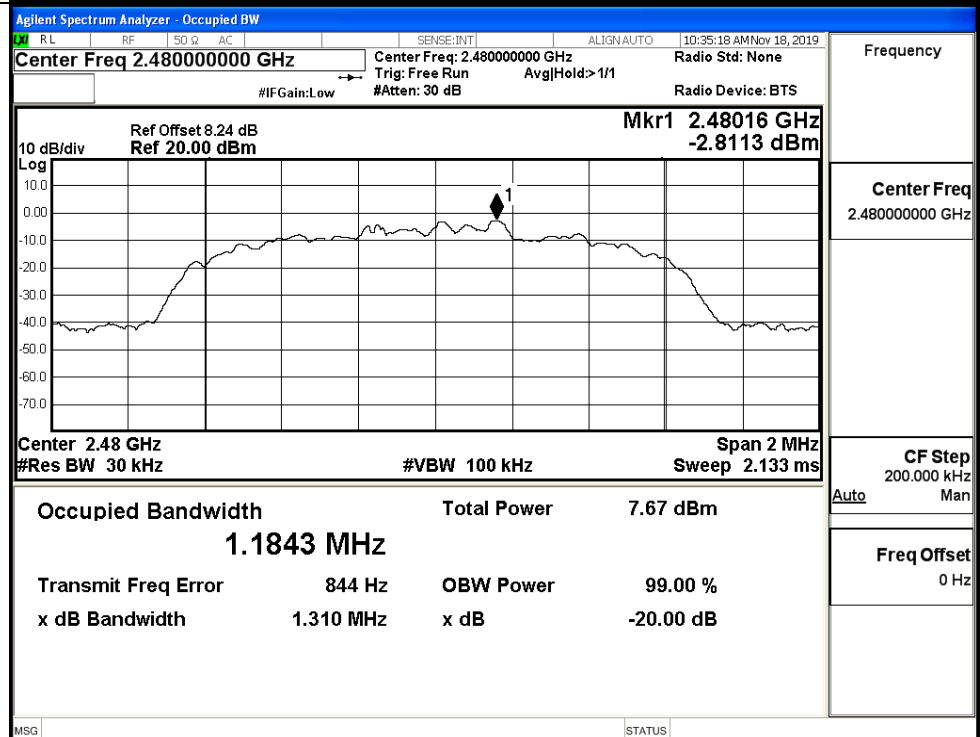
Center Freq
2.441000000 GHz

CF Step
200.000 kHz
Man

Auto

Freq Offset
0 Hz

8DPSK/HCH



Frequency

Center Freq
2.480000000 GHz

CF Step
200.000 kHz
Man

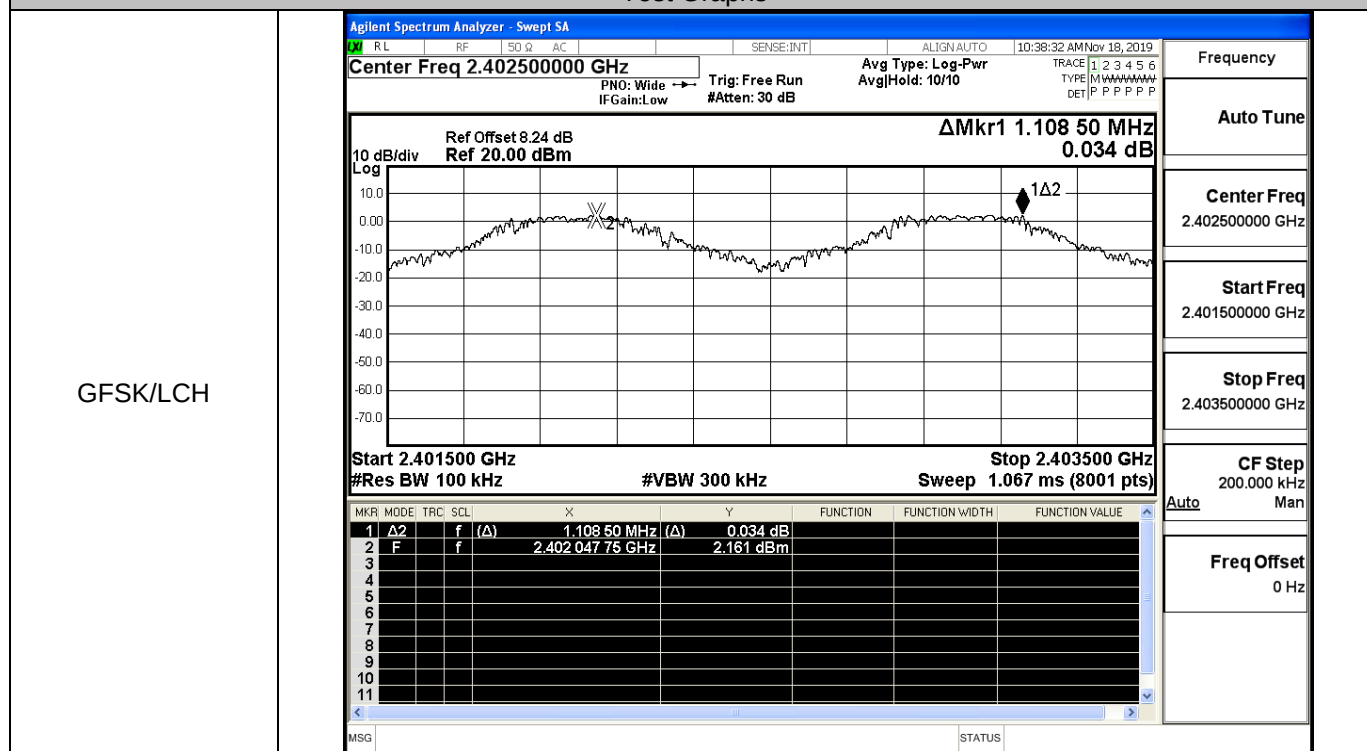
Auto

Freq Offset
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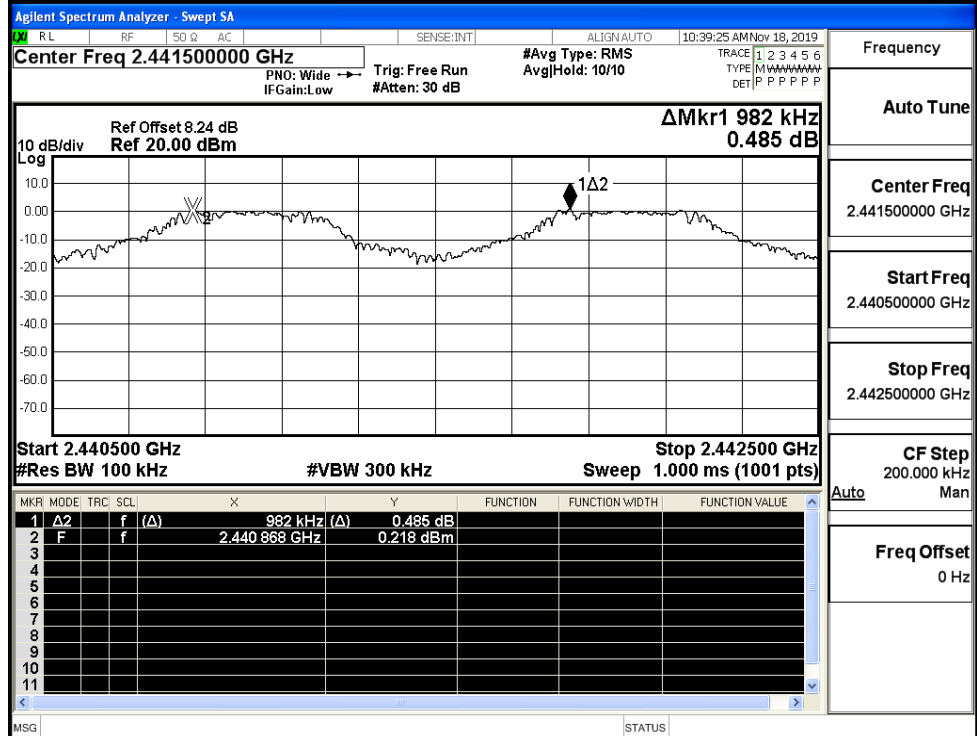
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.108	0.687	PASS
	MCH	0.982	0.687	PASS
	HCH	0.804	0.687	PASS
$\pi/4$ DQPSK	LCH	1.132	0.863	PASS
	MCH	1.238	0.863	PASS
	HCH	0.914	0.863	PASS
8DPSK	LCH	0.978	0.873	PASS
	MCH	0.952	0.873	PASS
	HCH	1.144	0.873	PASS

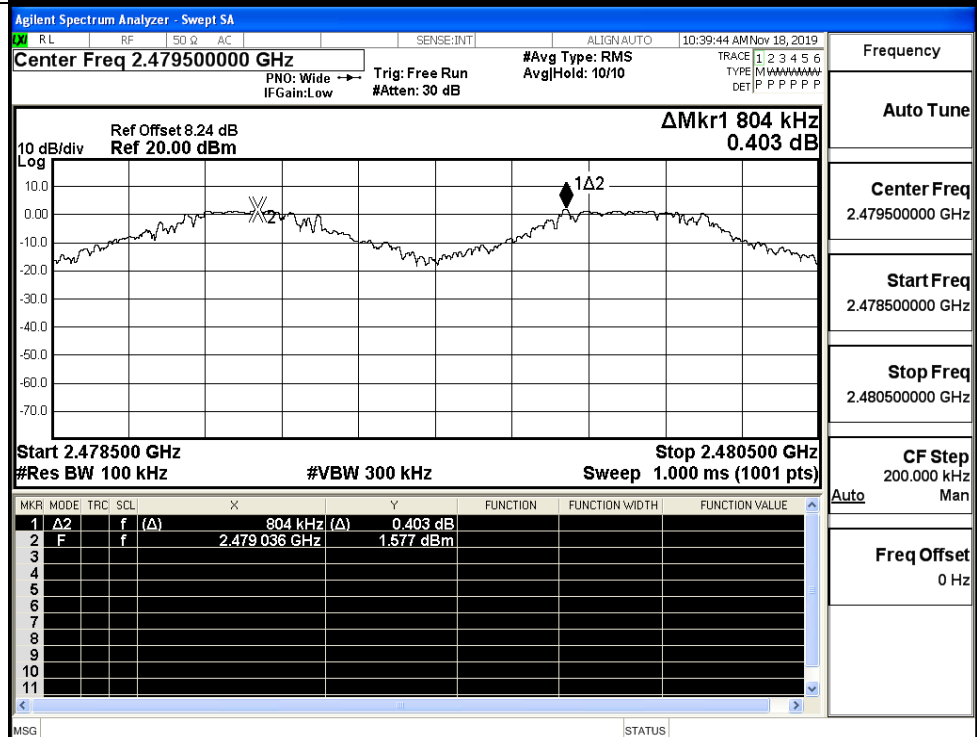
Test Graphs



GFSK/MCH



GFSK/HCH



8DPSK/MCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 10:52:13 AM Nov 18, 2019 Center Freq 2.441500000 GHz PN0: Wide → IF Gain: Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS Avg/Hold: 10/10 TRACE 1 2 3 4 5 6 TYPE M W W W W W W W DET P P P P P P Ref Offset 8.24 dB Ref 20.00 dBm ΔMkr1 952 kHz -0.169 dB 10 dB/div Log Start 2.440500 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.442500 GHz Sweep 1.000 ms (1001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>Δ2</td><td>f</td><td>(Δ)</td><td>952 kHz (Δ)</td><td>-0.169 dB</td><td></td><td></td><td></td></tr><tr><td>2</td><td>F</td><td>f</td><td></td><td>2.440 862 GHz</td><td>-0.962 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> MSG STATUS Frequency Auto Tune Center Freq 2.441500000 GHz Start Freq 2.440500000 GHz Stop Freq 2.442500000 GHz CF Step 200.000 kHz Auto Freq Offset 0 Hz	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ2	f	(Δ)	952 kHz (Δ)	-0.169 dB				2	F	f		2.440 862 GHz	-0.962 dBm				3									4									5									6									7									8									9									10									11								
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8DPSK/HCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 10:53:42 AM Nov 18, 2019 Center Freq 2.479500000 GHz PN0: Wide → IF Gain: Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS Avg/Hold: 10/10 TRACE 1 2 3 4 5 6 TYPE M W W W W W W W DET P P P P P P Ref Offset 8.24 dB Ref 20.00 dBm ΔMkr1 1.144 MHz -3.590 dB 10 dB/div Log Start 2.478500 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.480500 GHz Sweep 1.000 ms (1001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>Δ2</td><td>f</td><td>(Δ)</td><td>1.144 MHz (Δ)</td><td>-3.590 dB</td><td></td><td></td><td></td></tr><tr><td>2</td><td>F</td><td>f</td><td></td><td>2.478 854 GHz</td><td>0.566 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> MSG STATUS Frequency Auto Tune Center Freq 2.479500000 GHz Start Freq 2.478500000 GHz Stop Freq 2.480500000 GHz CF Step 200.000 kHz Auto Freq Offset 0 Hz	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ2	f	(Δ)	1.144 MHz (Δ)	-3.590 dB				2	F	f		2.478 854 GHz	0.566 dBm				3									4									5									6									7									8									9									10									11								
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Frequency

Auto Tune

Center Freq
2.479500000 GHz

Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

CF Step
200.000 kHz

Auto

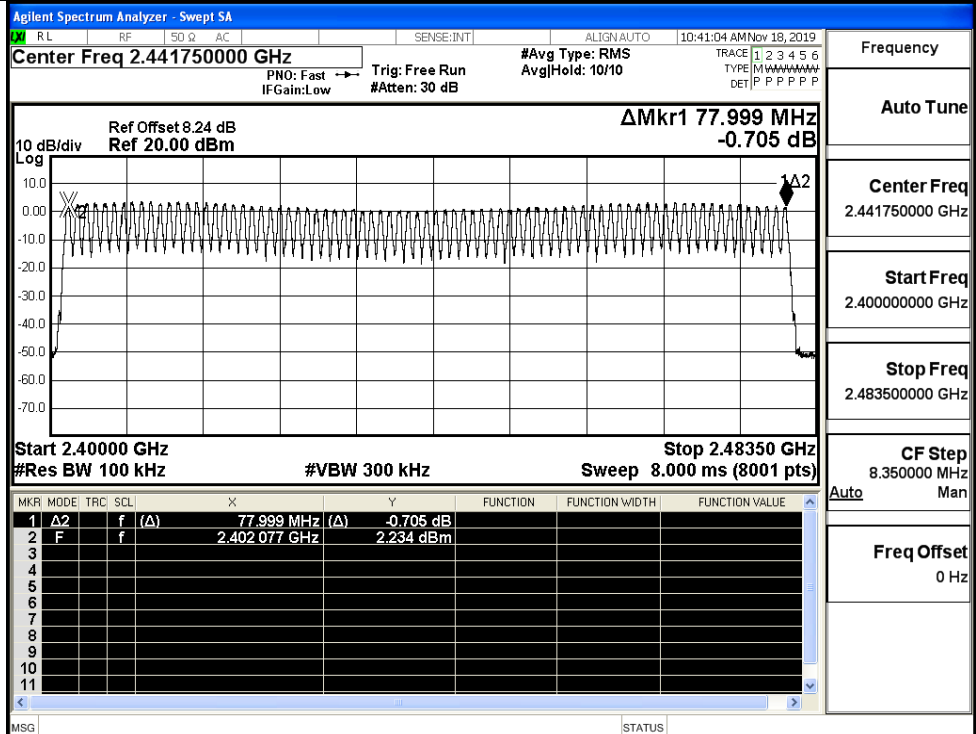
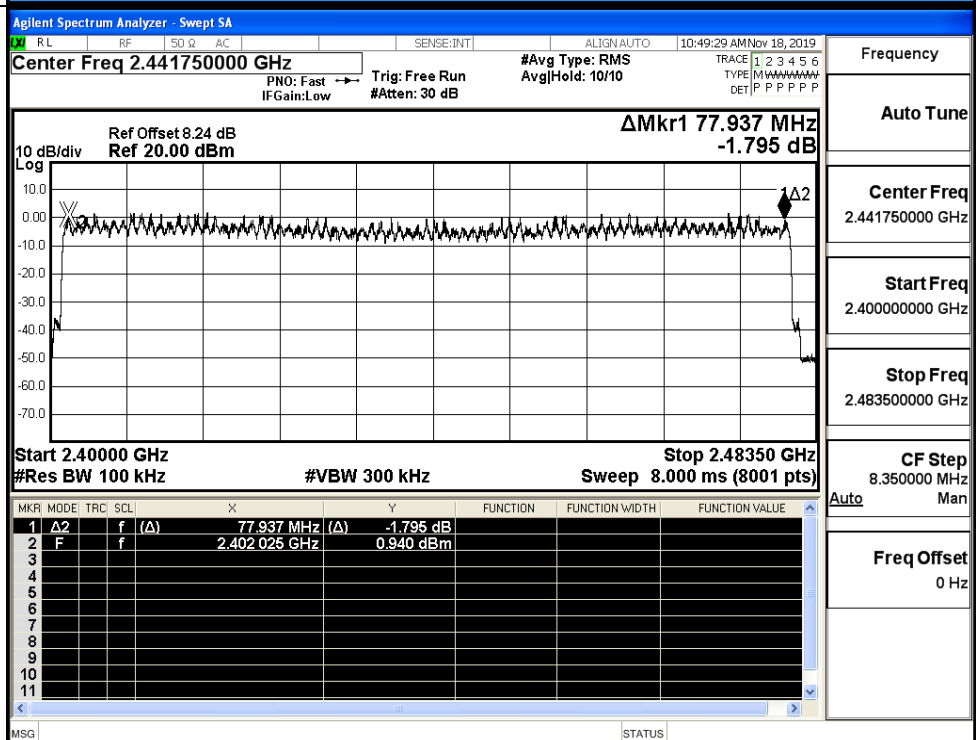
Freq Offset
0 Hz

A.4 Hopping Channel Number

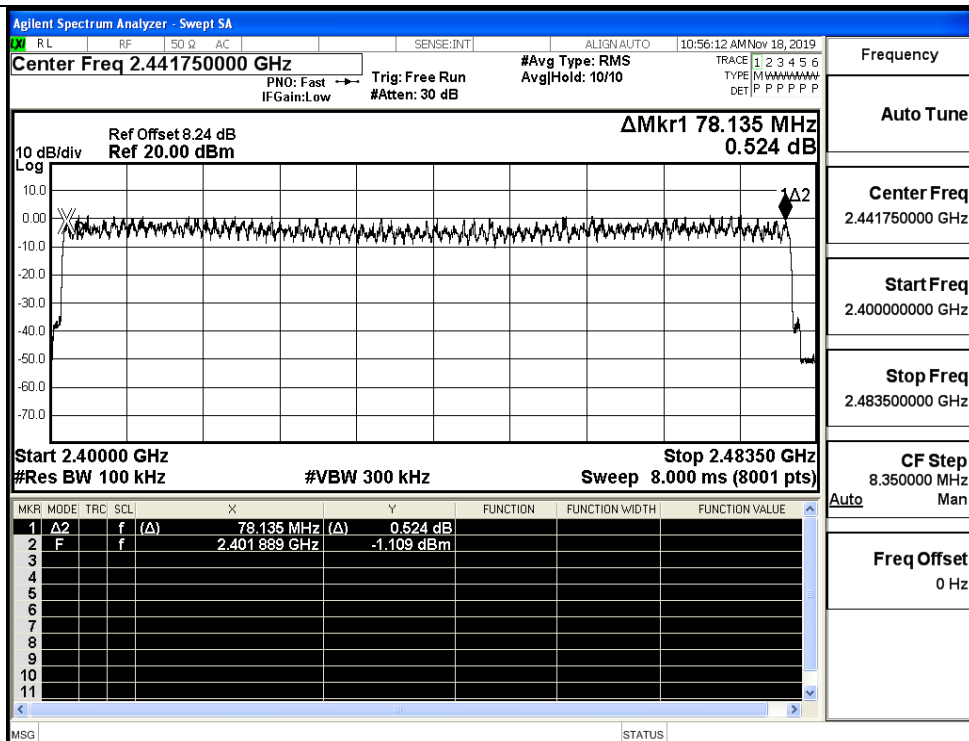
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

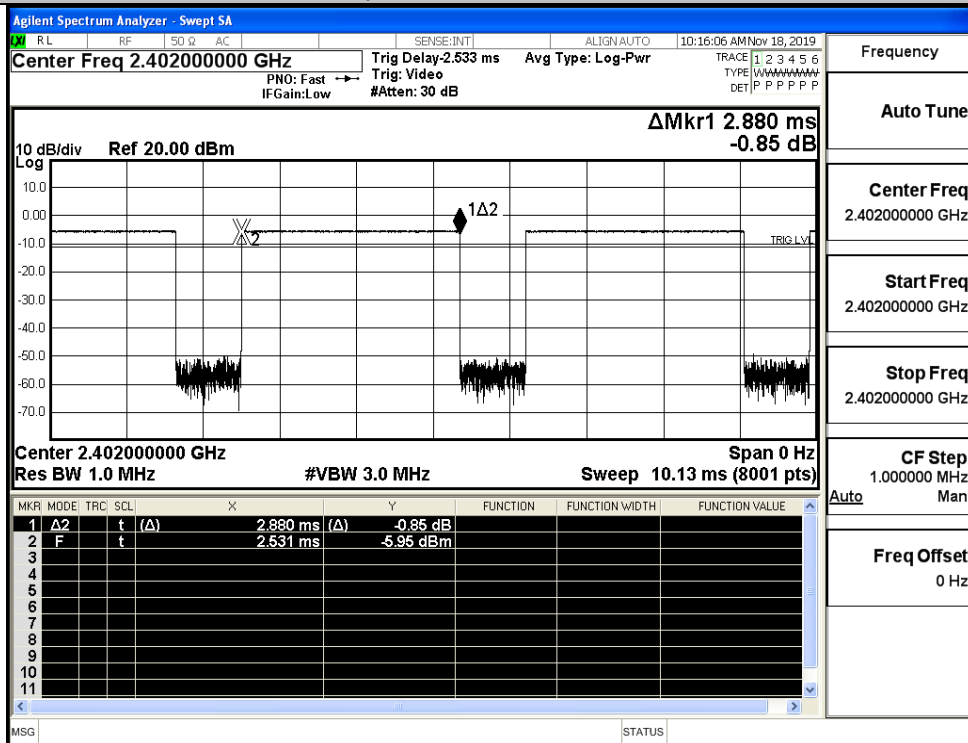


A.5 Dwell Time

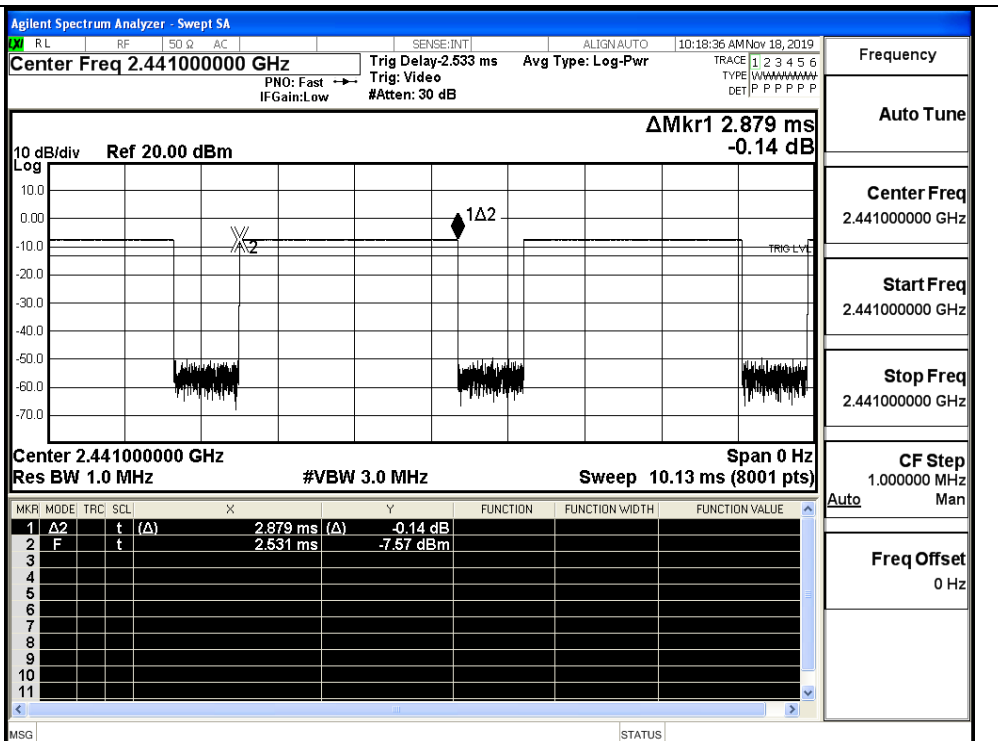
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7	0.307	0.4	PASS
8DPSK	3DH5	LCH	2.88	106.7	0.308	0.4	PASS
	3DH5	MCH	2.88	106.7	0.308	0.4	PASS
	3DH5	HCH	2.88	106.7	0.308	0.4	PASS

Test Graphs

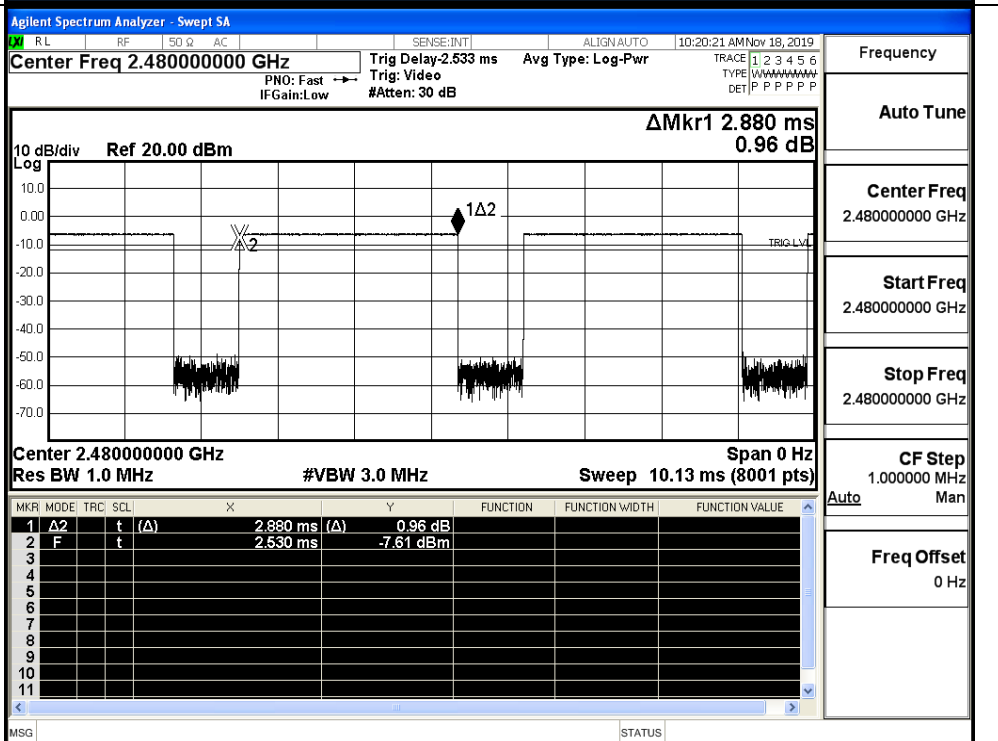
GFSK_DH5/LCH



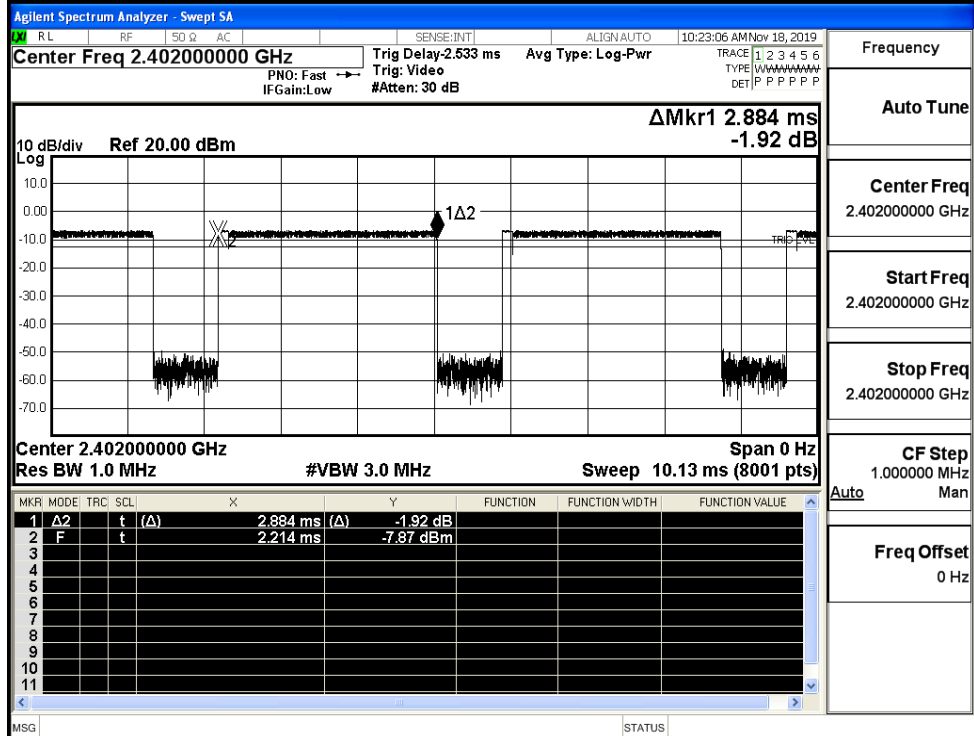
GFSK_DH5/MCH



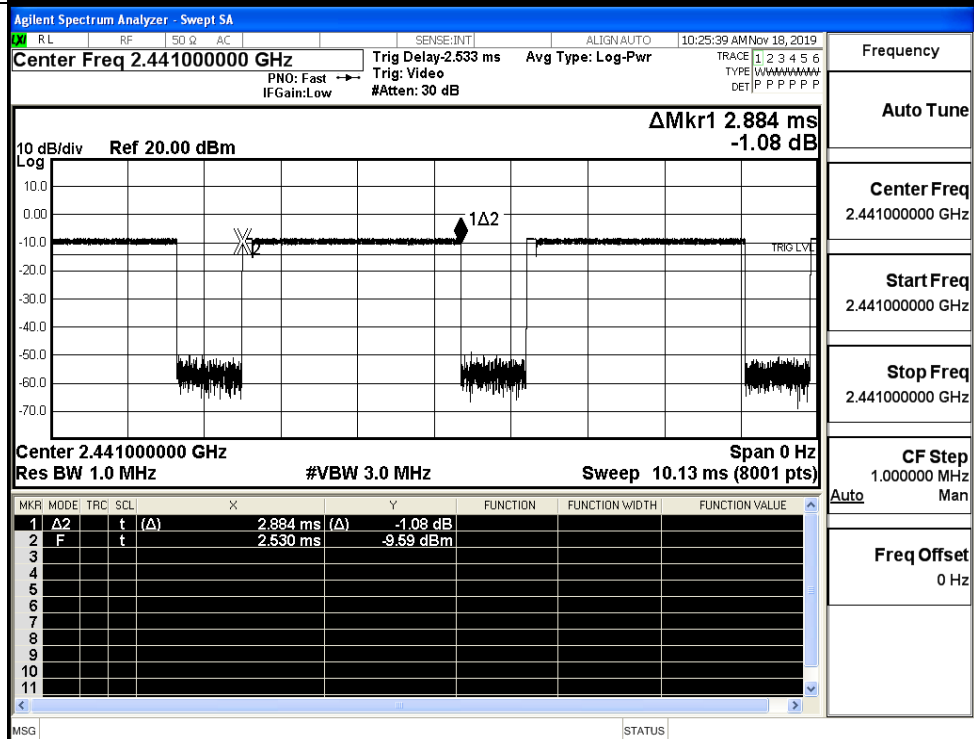
GFSK_DH5/HCH



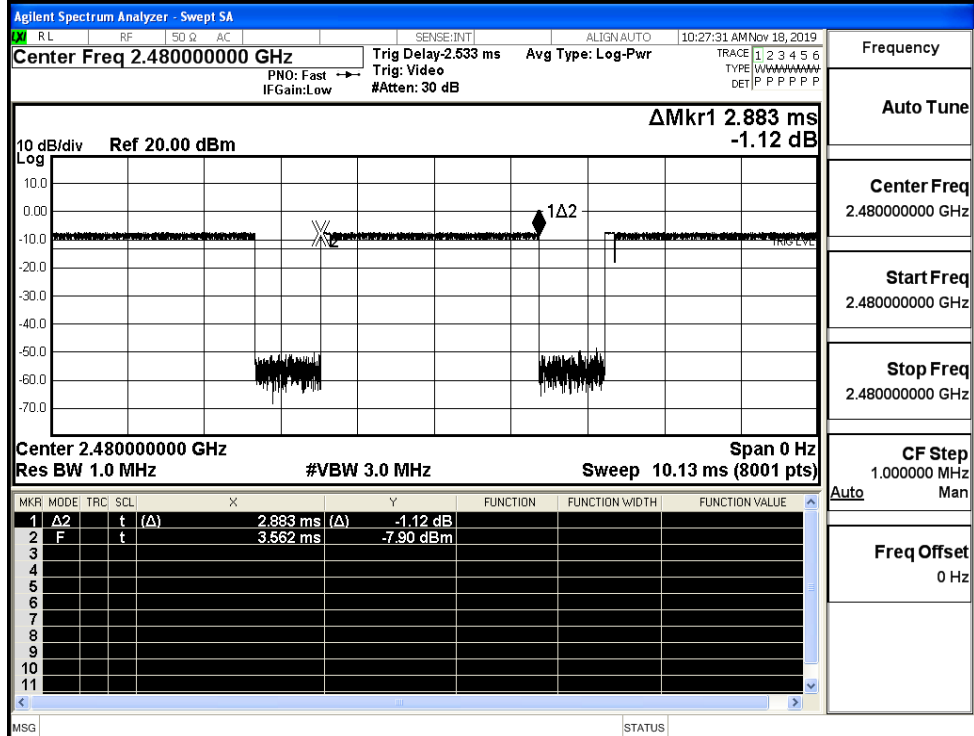
$\pi/4$ DQPSK
_2DH5/LCH



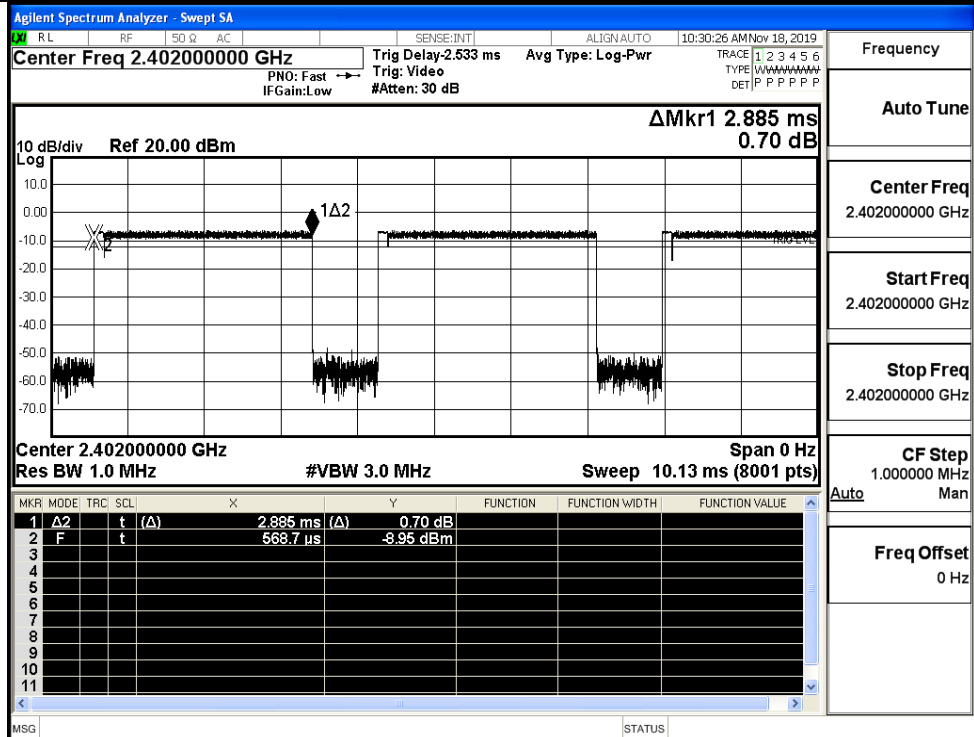
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_2DH5/MCH



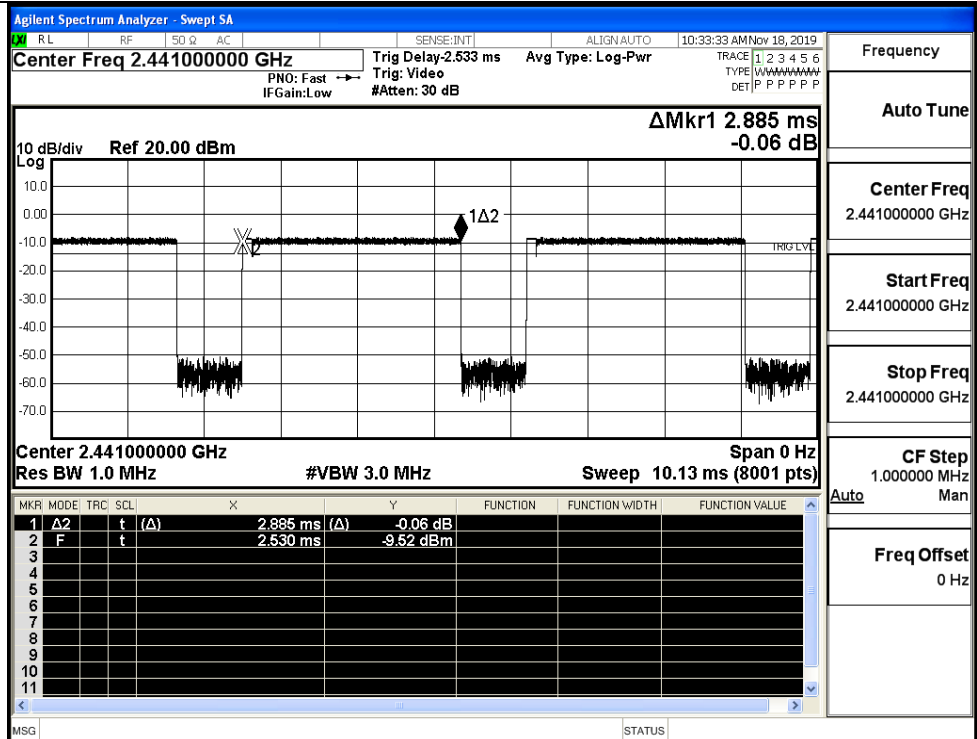
π /4DQPSK
_2DH5/HCH



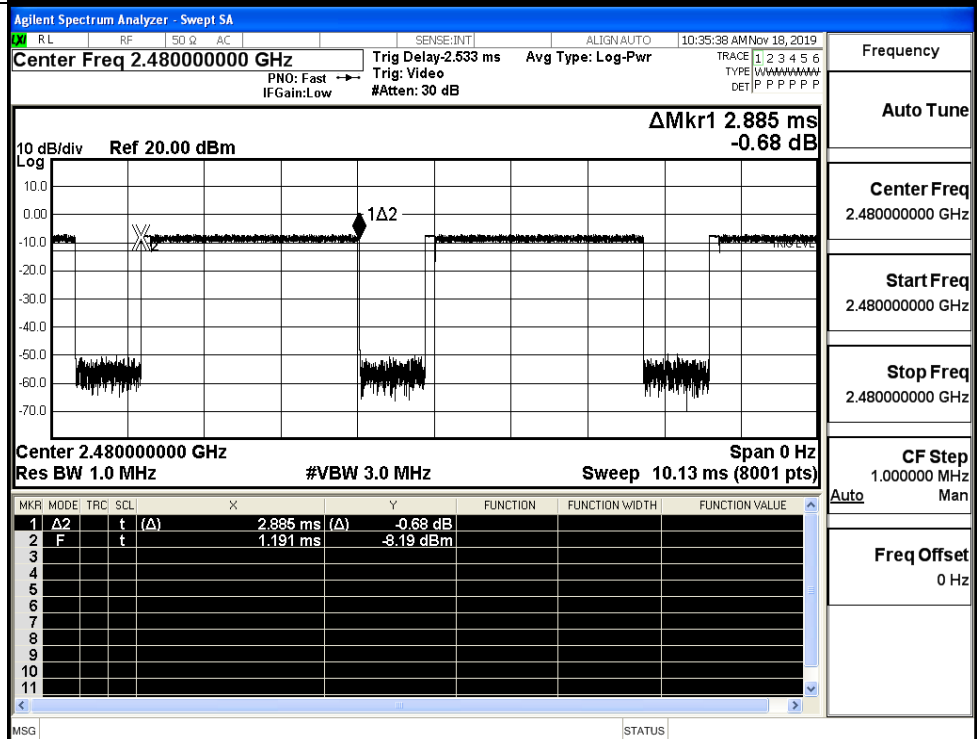
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



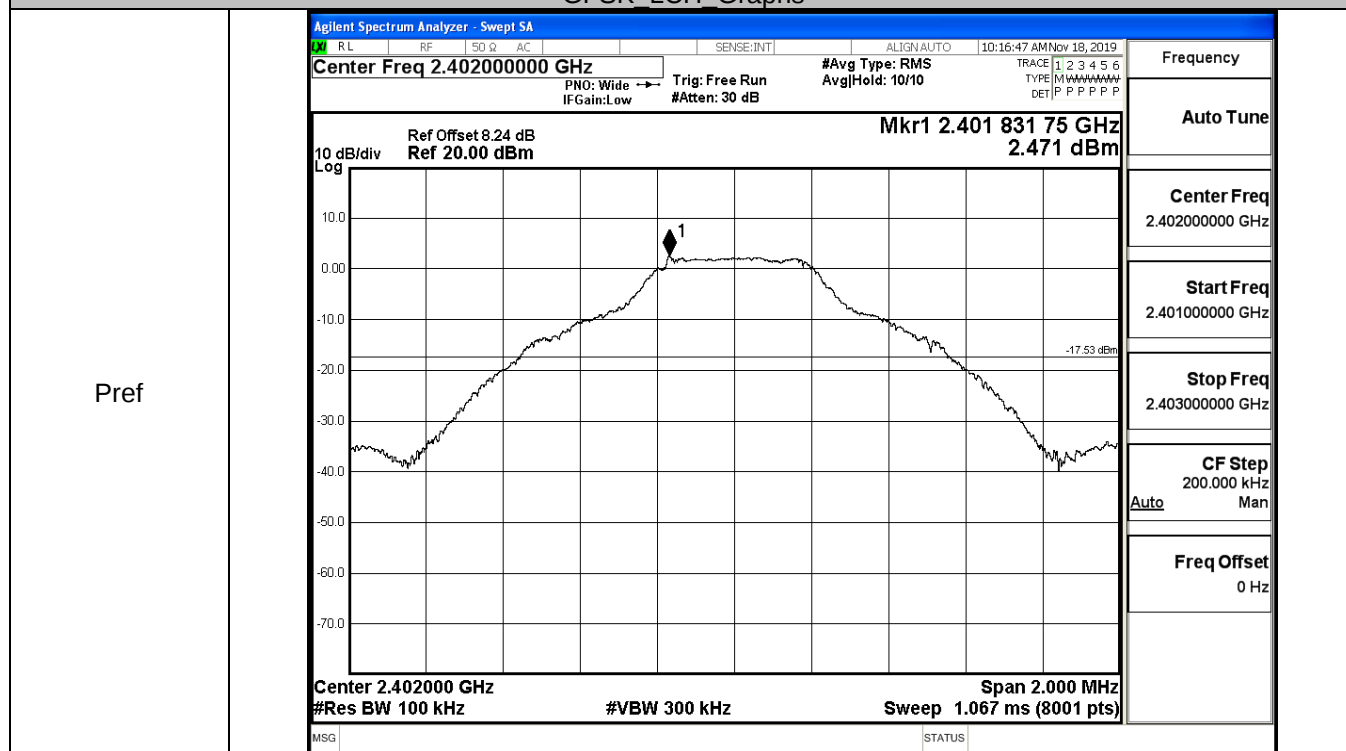
8DPSK_3DH5/HCH



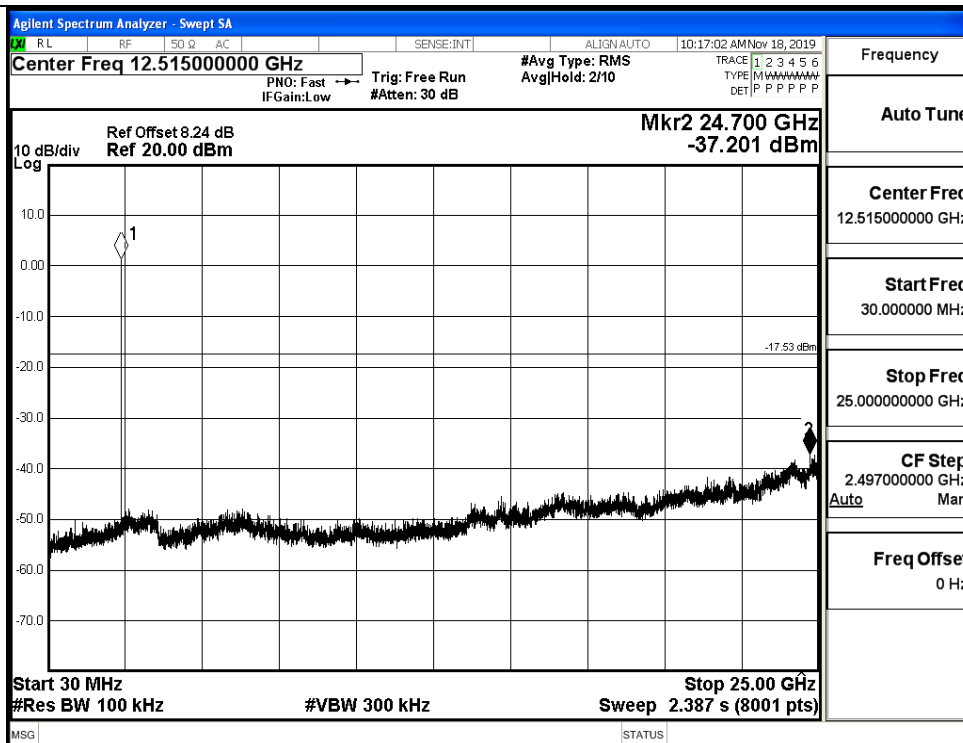
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2.471	-37.201	-17.529	PASS
	MCH	0.392	-37.587	-19.608	PASS
	HCH	1.945	-36.828	-18.055	PASS
$\pi/4$ DQPSK	LCH	0.661	-37.442	-19.339	PASS
	MCH	-0.252	-37.556	-20.252	PASS
	HCH	0.666	-37.538	-19.334	PASS
8DPSK	LCH	1.373	-37.846	-18.627	PASS
	MCH	-0.237	-37.752	-20.237	PASS
	HCH	0.595	-37.718	-19.405	PASS

GFSK LCH Graphs

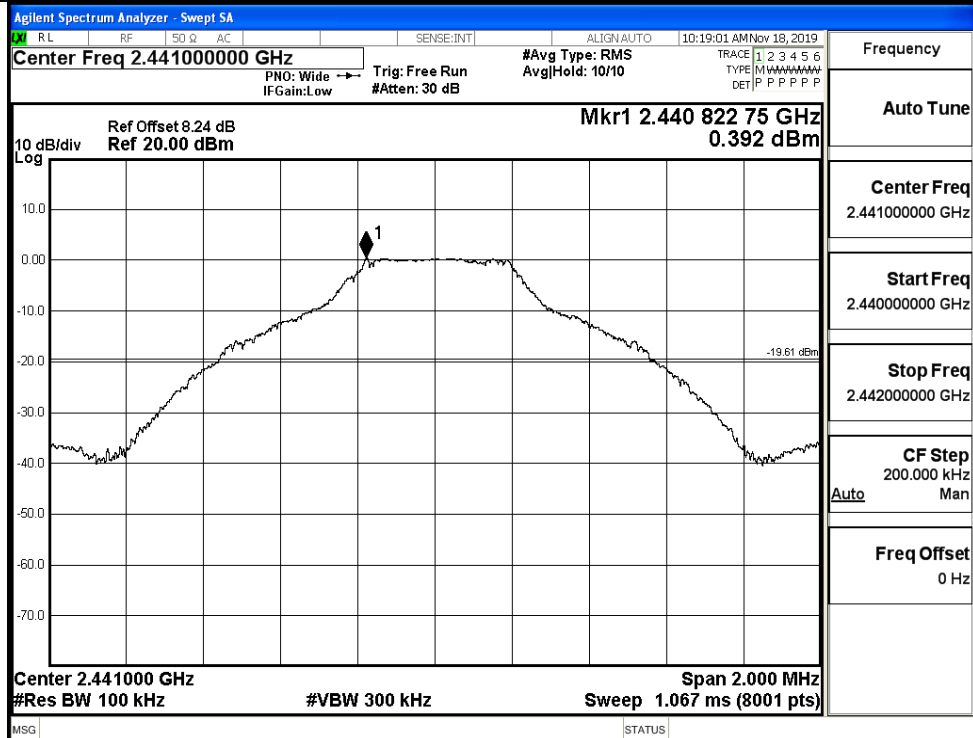


Puw

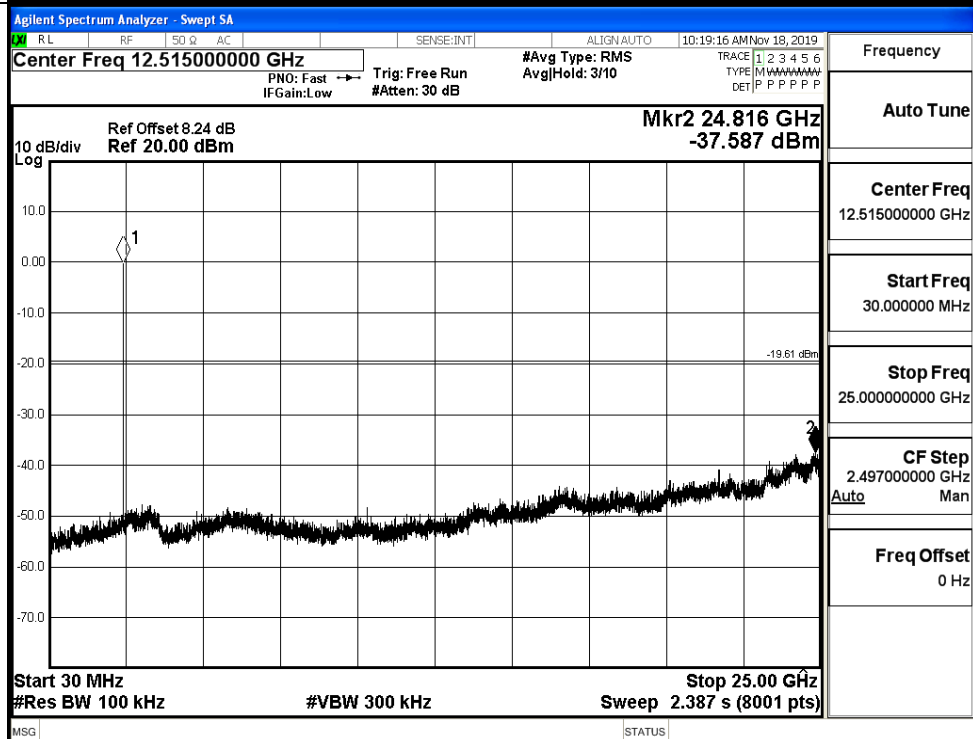


GFSK MCH Graphs

Pref

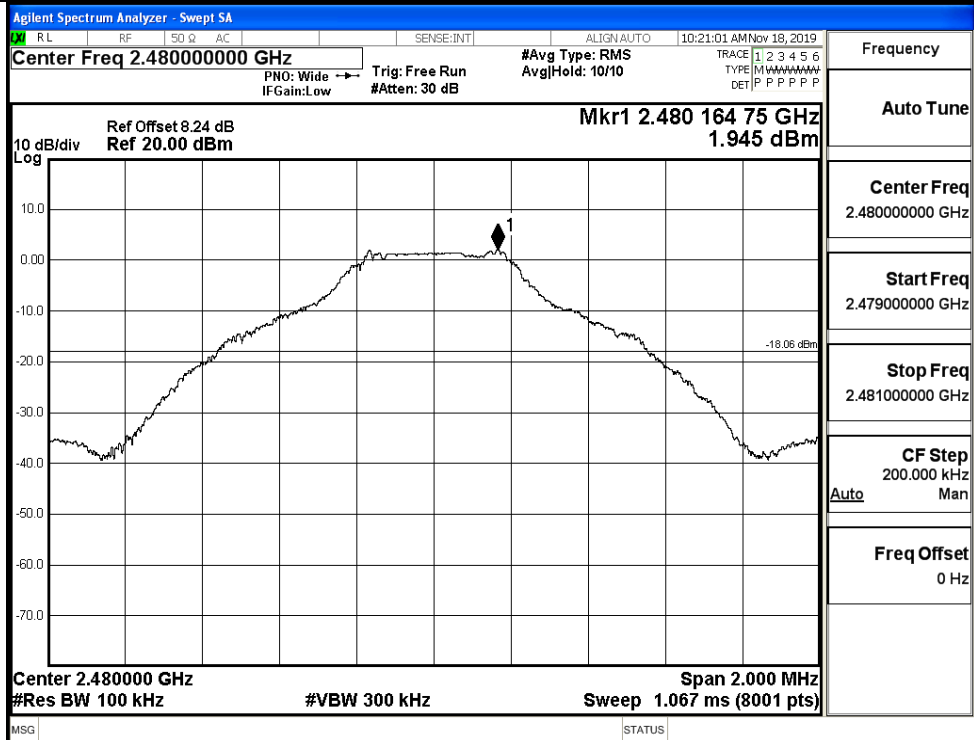


Puw

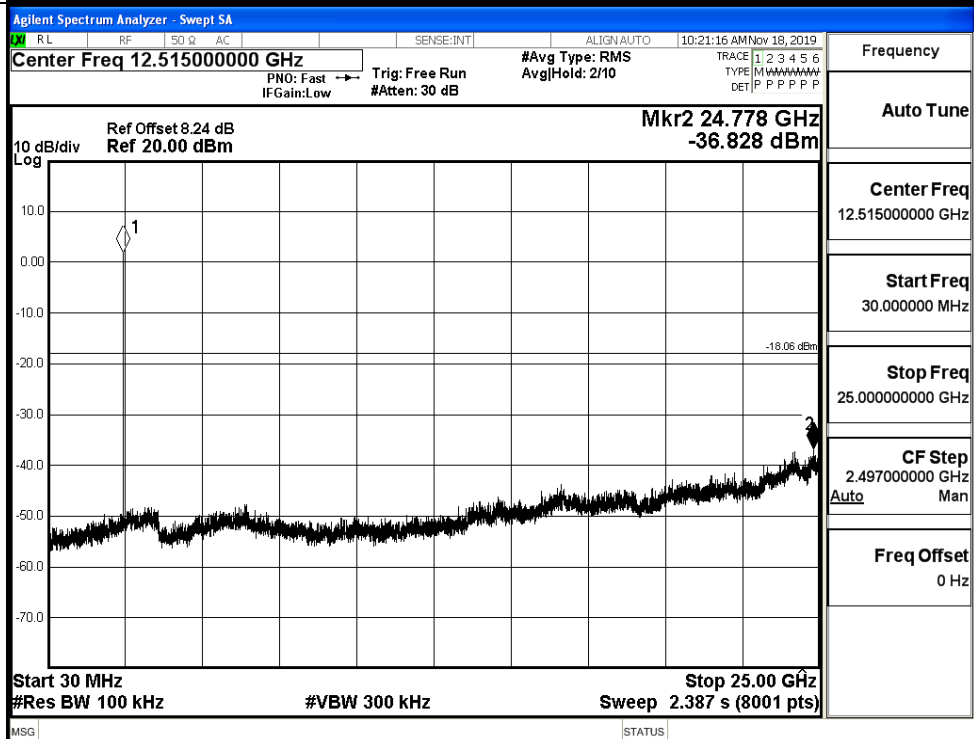


GFSK HCH Graphs

Pref

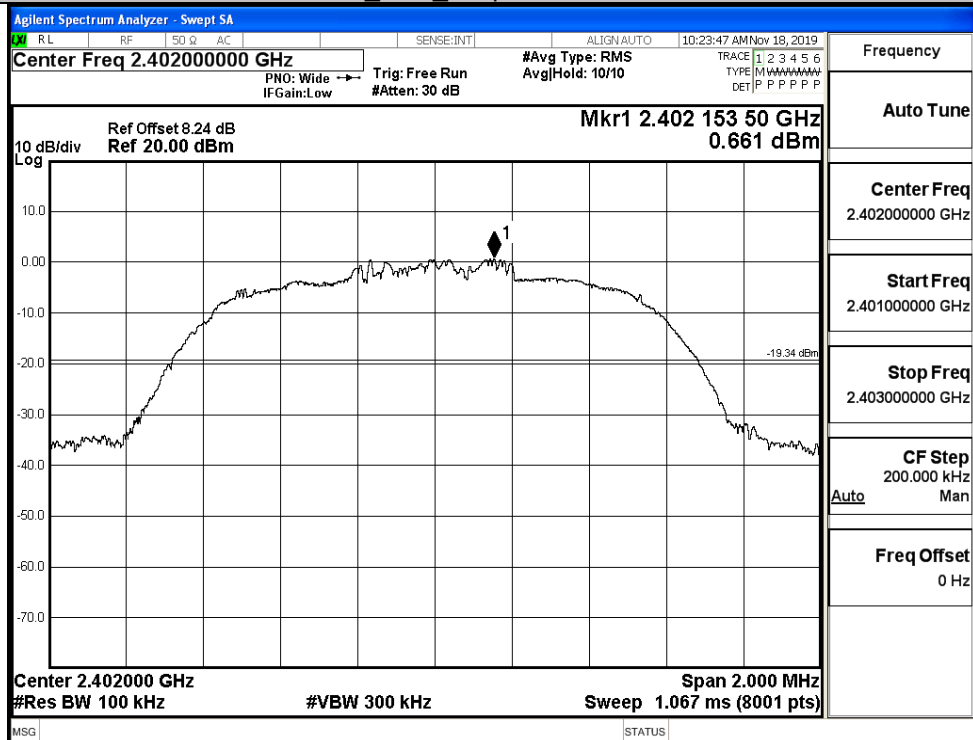


Puw

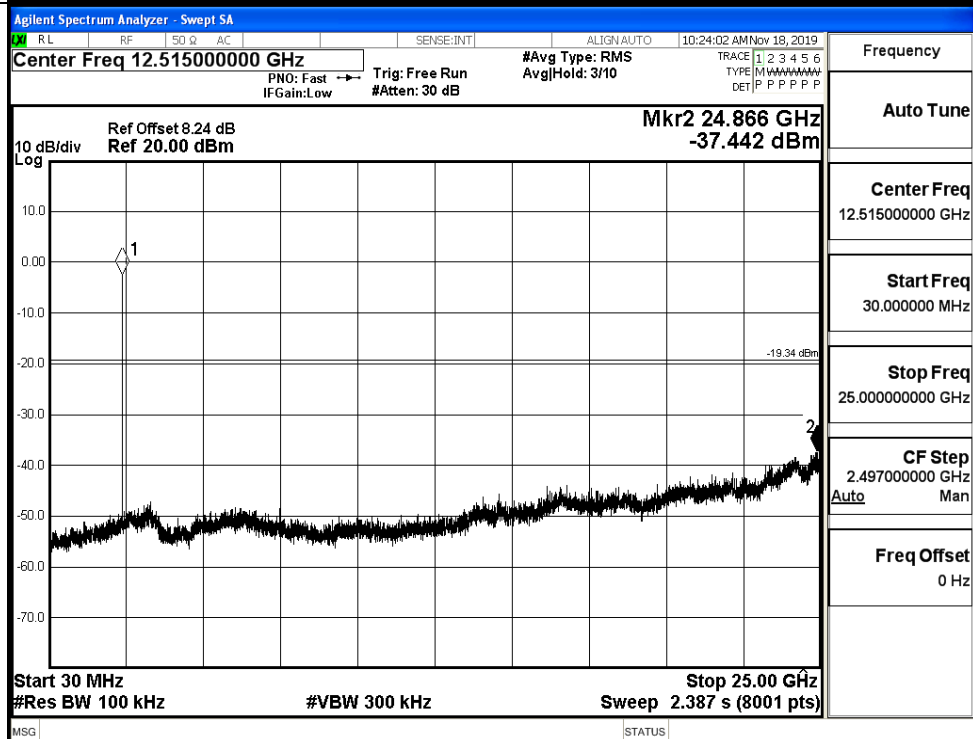


$\pi/4$ DQPSK LCH_Graphs

Pref

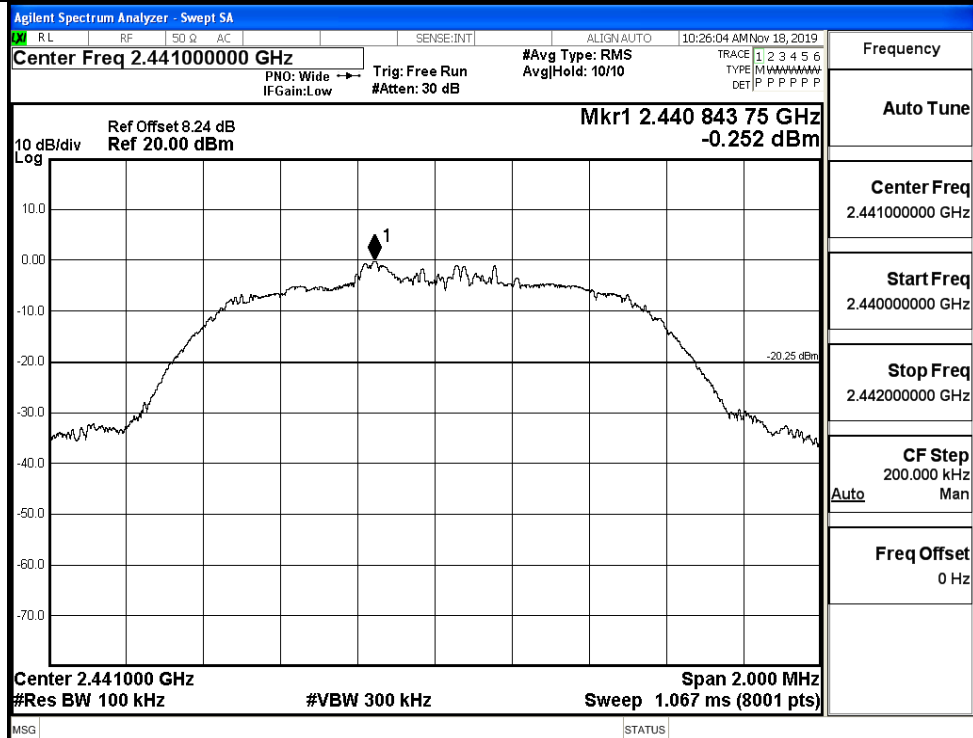


Puw

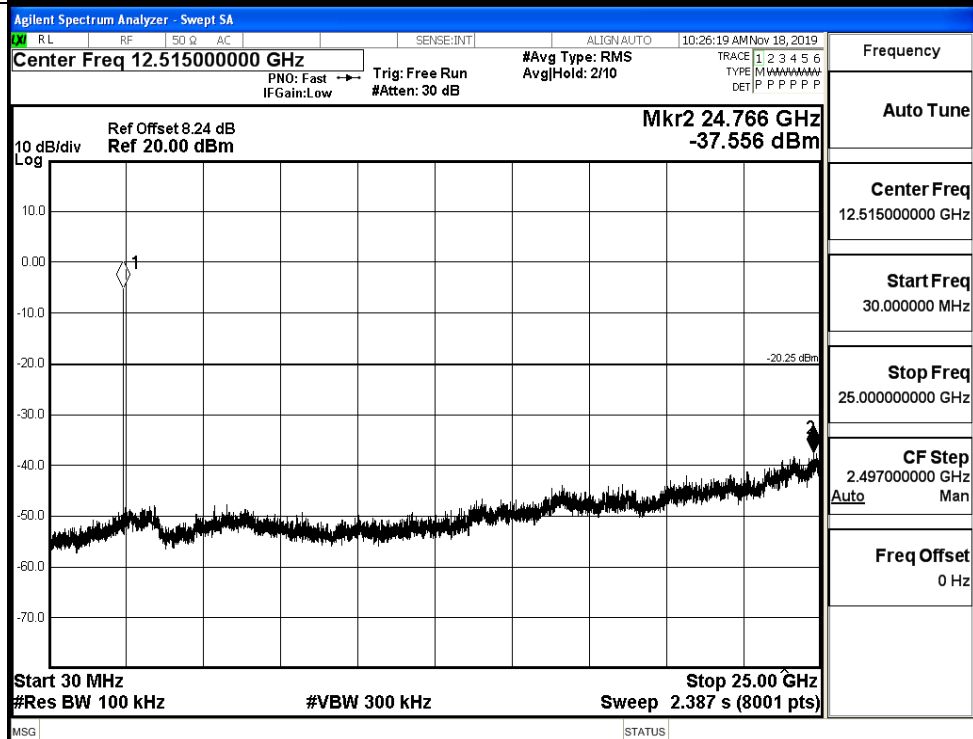


$\pi/4$ DQPSK_MCH_Graphs

Pref

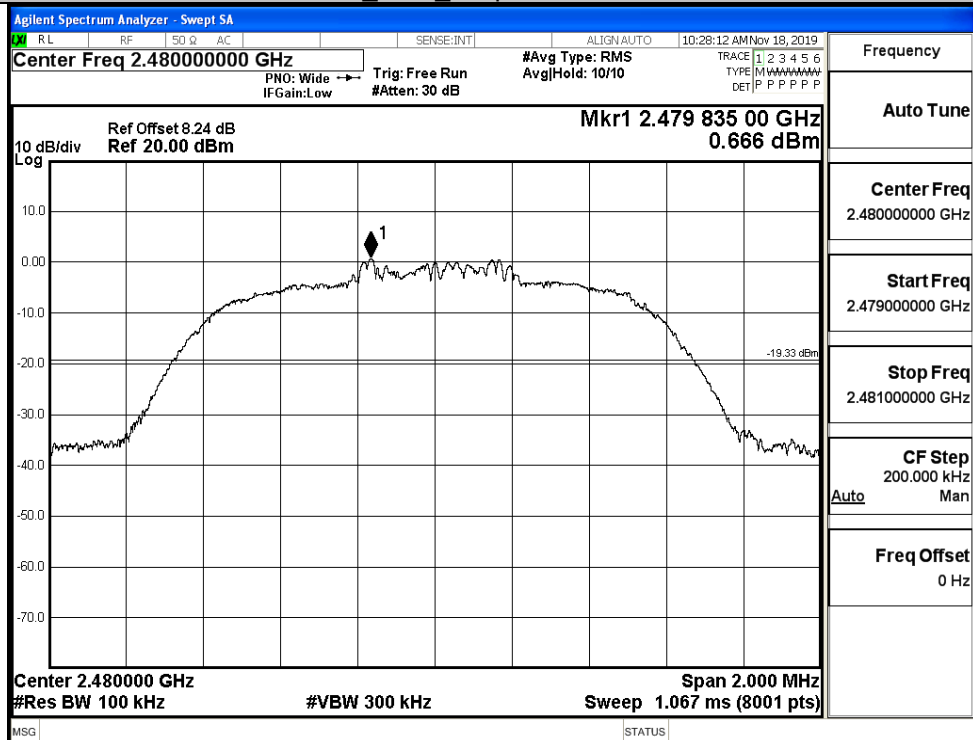


Puw

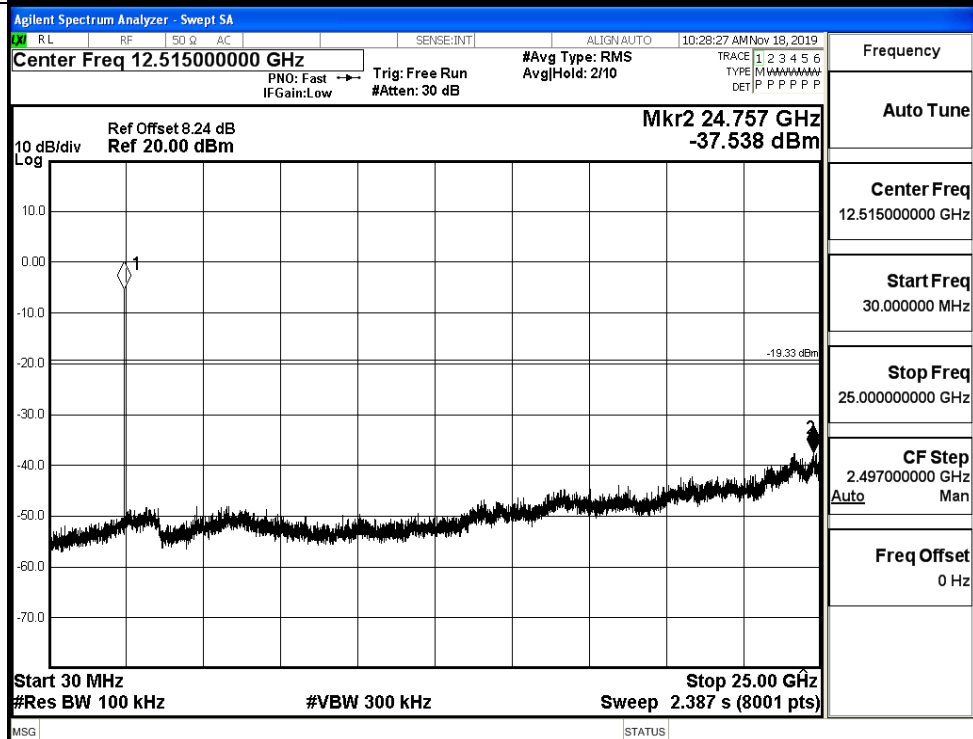


$\pi/4$ DQPSK_HCH_Graphs

Pref

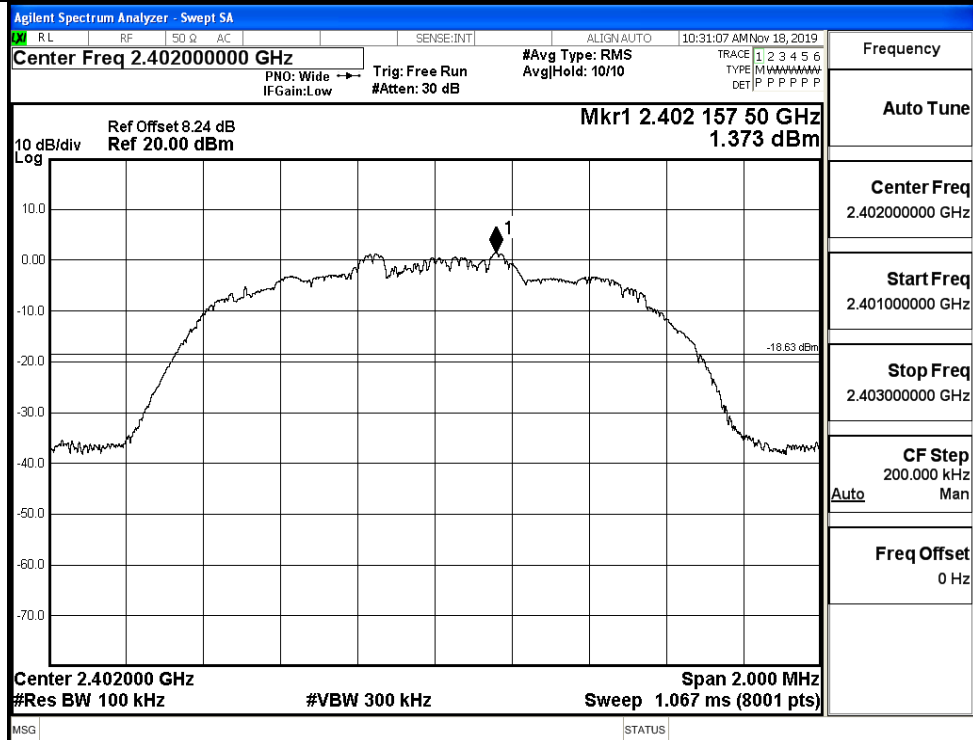


Puw

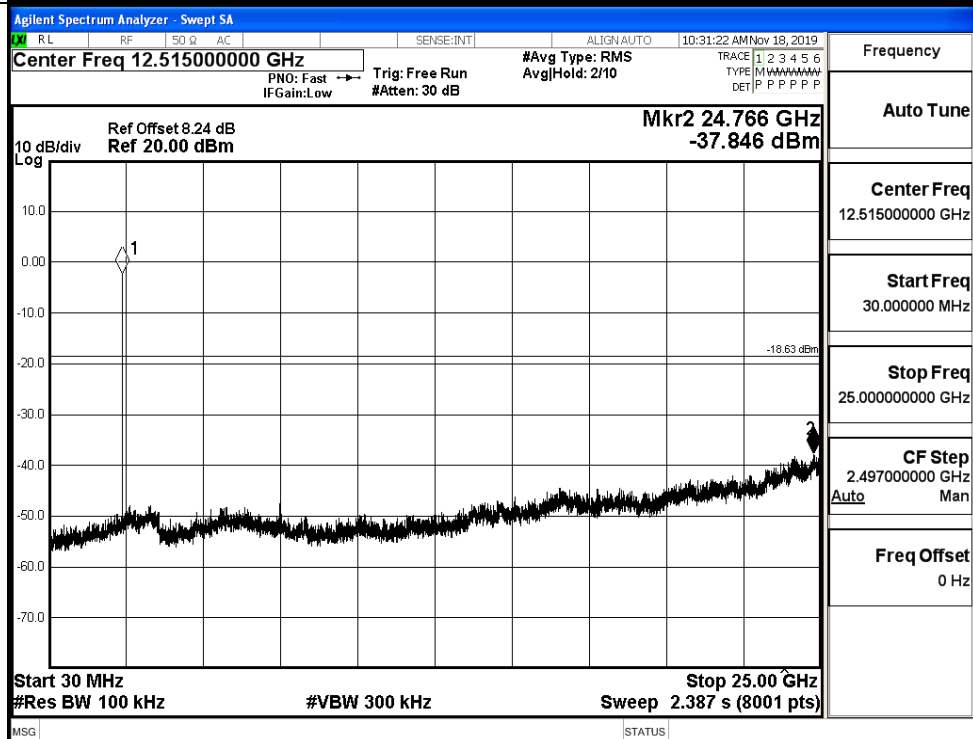


8DPSK LCH Graphs

Pref

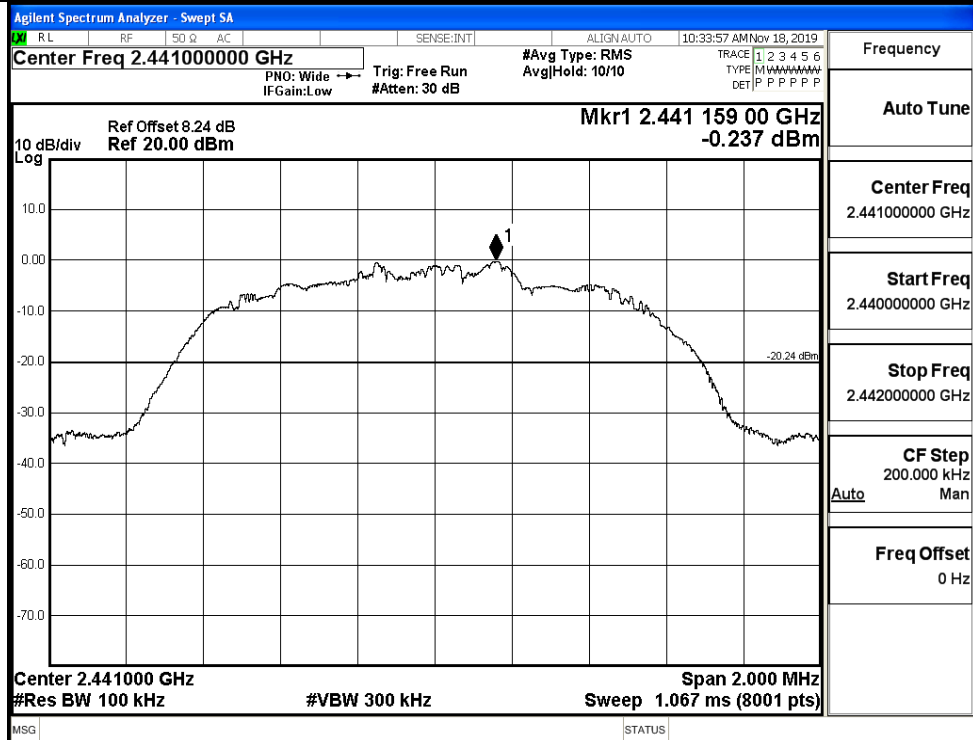


Puw

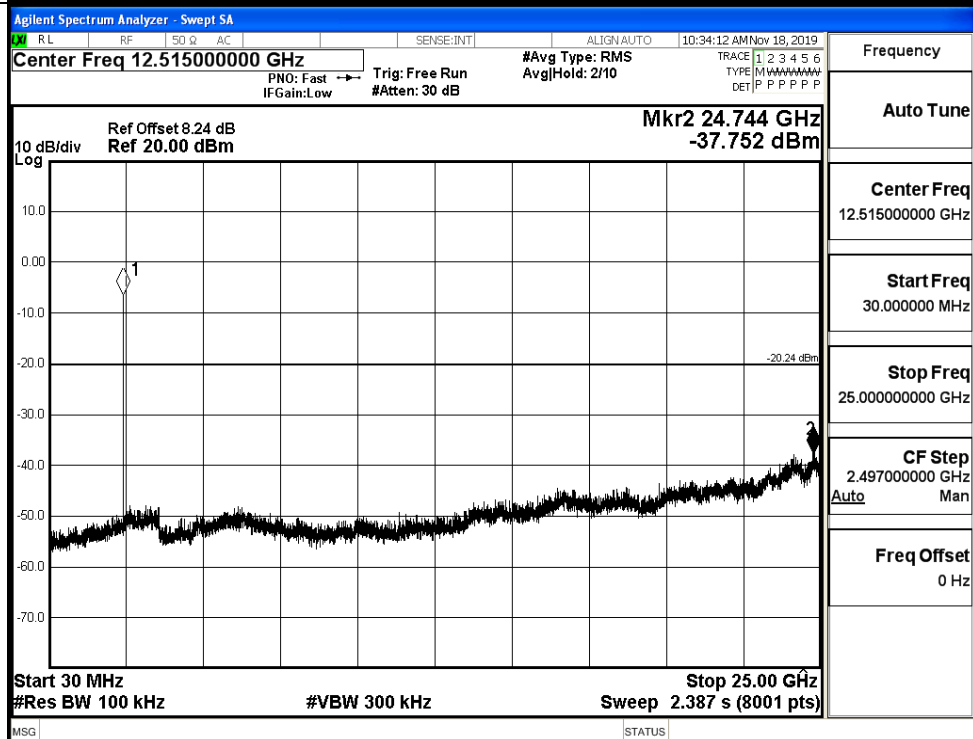


8DPSK MCH_Graphs

Pref

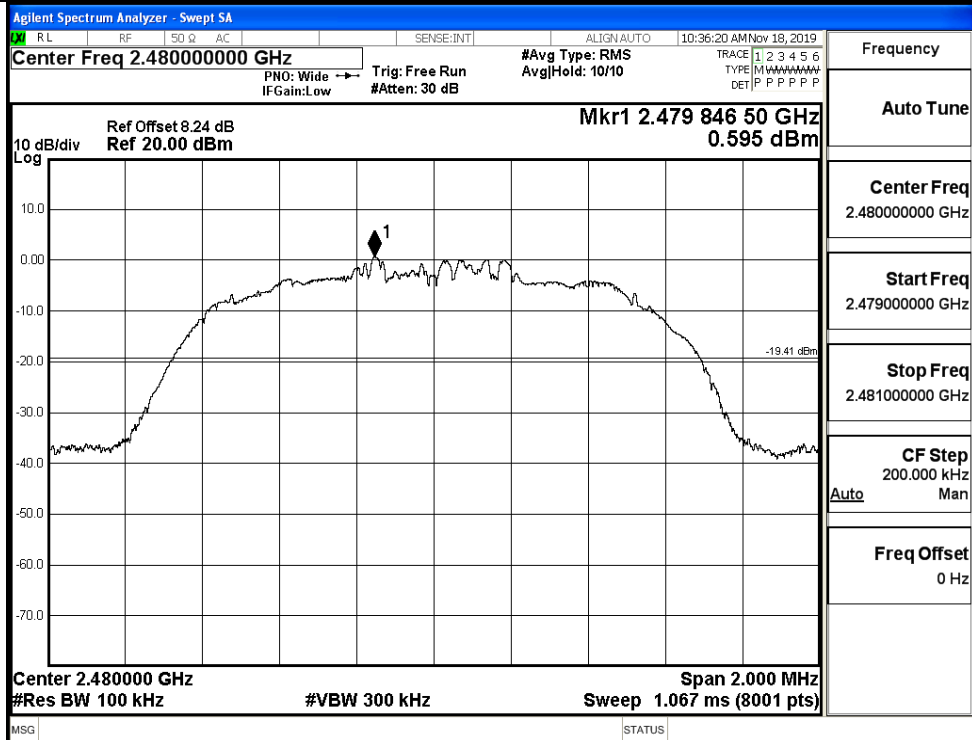


Puw

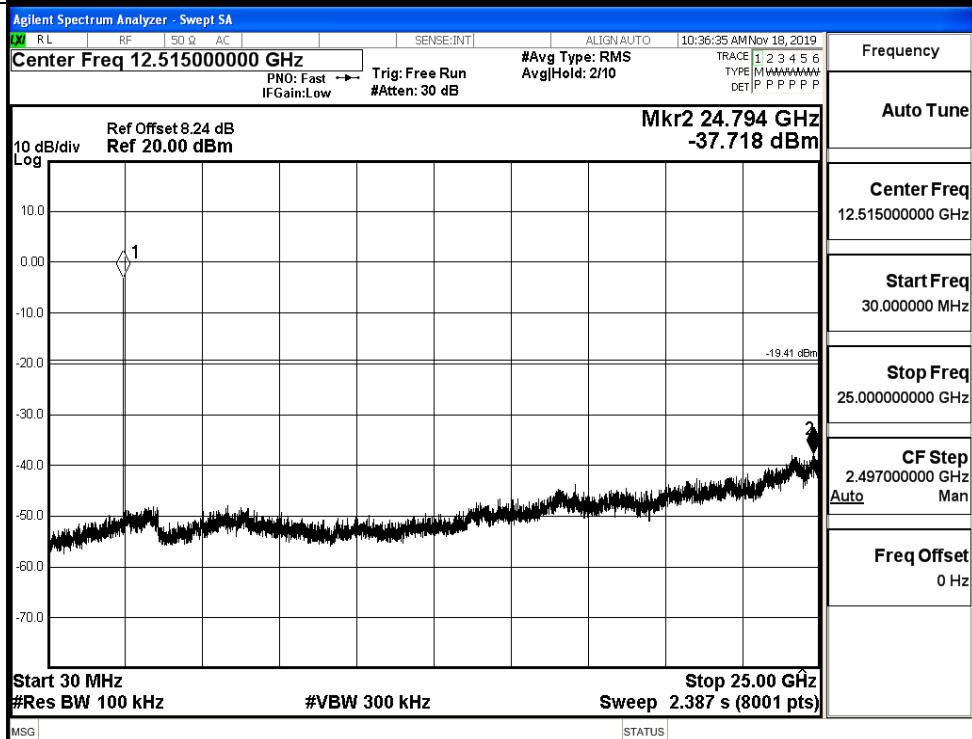


8DPSK_HCH_Graphs

Pref



Puw

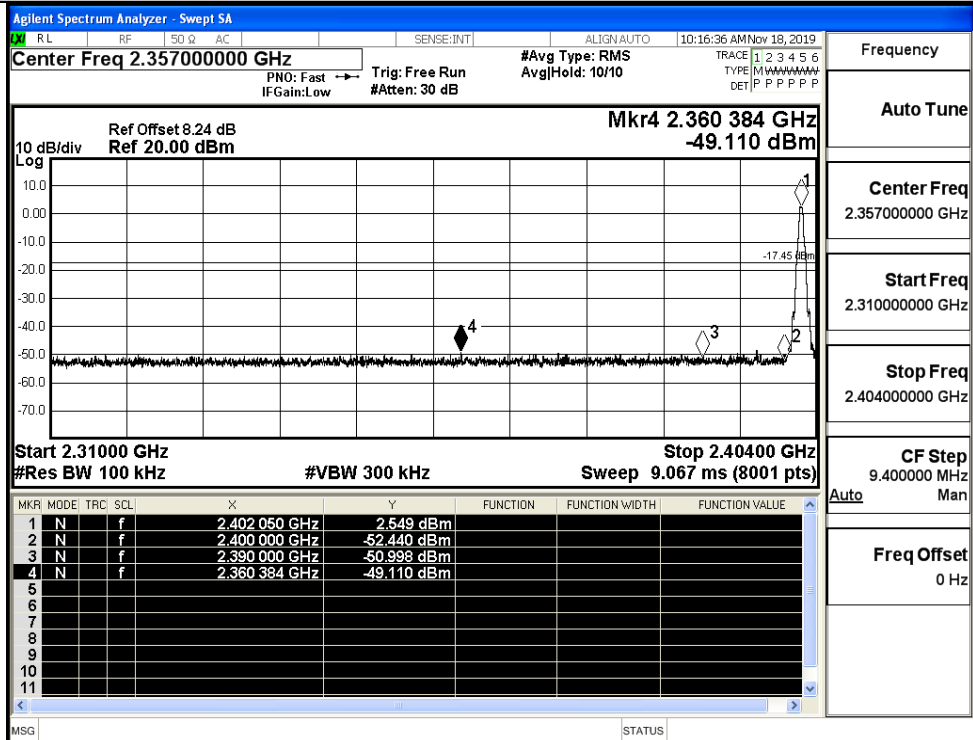


A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	2.549	Off	-49.110	-17.45	PASS
			3.719	On	-49.067	-16.28	PASS
	HCH	2480	1.853	Off	-48.735	-18.15	PASS
			3.218	On	-49.141	-16.78	PASS
$\pi/4$ DQPSK	LCH	2402	1.380	Off	-49.605	-18.62	PASS
			1.928	On	-48.836	-18.07	PASS
	HCH	2480	0.604	Off	-47.851	-19.4	PASS
			1.769	On	-48.176	-18.23	PASS
8DPSK	LCH	2402	1.277	Off	-49.035	-18.72	PASS
			2.139	On	-48.508	-17.86	PASS
	HCH	2480	0.735	Off	-47.901	-19.27	PASS
			1.825	On	-48.652	-18.18	PASS

Test Graphs

GFSK/LCH/No Hop



Frequency

Auto Tune

Center Freq
2.357000000 GHz

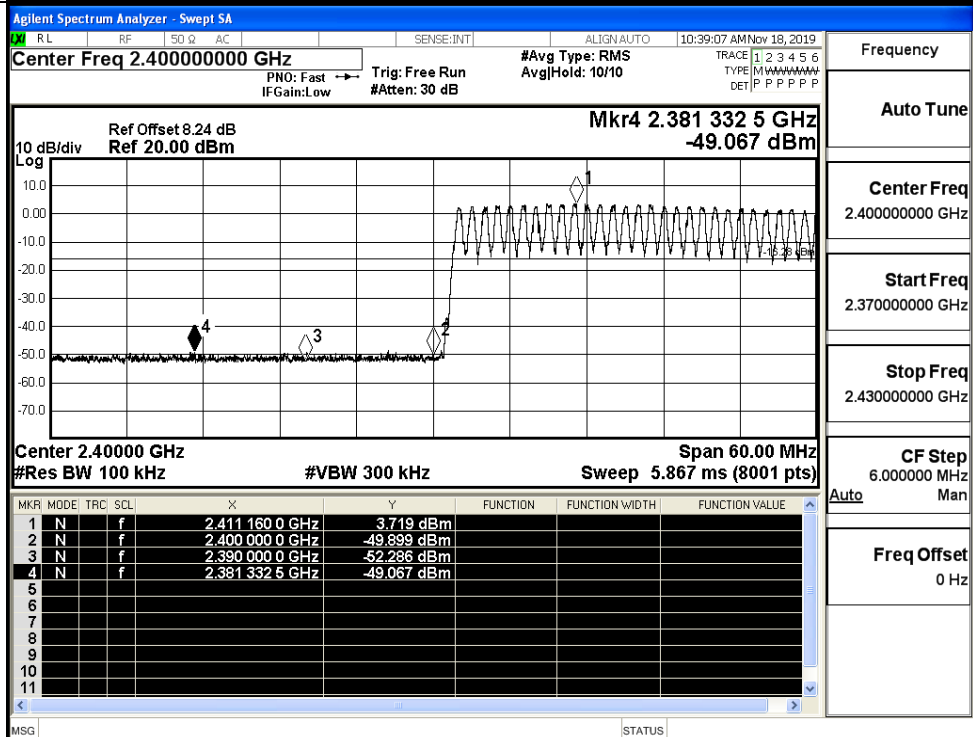
Start Freq
2.310000000 GHz

Stop Freq
2.404000000 GHz

CF Step
9.400000 MHz
Man

Freq Offset
0 Hz

GFSK/LCH/Hop



Frequency

Auto Tune

Center Freq
2.400000000 GHz

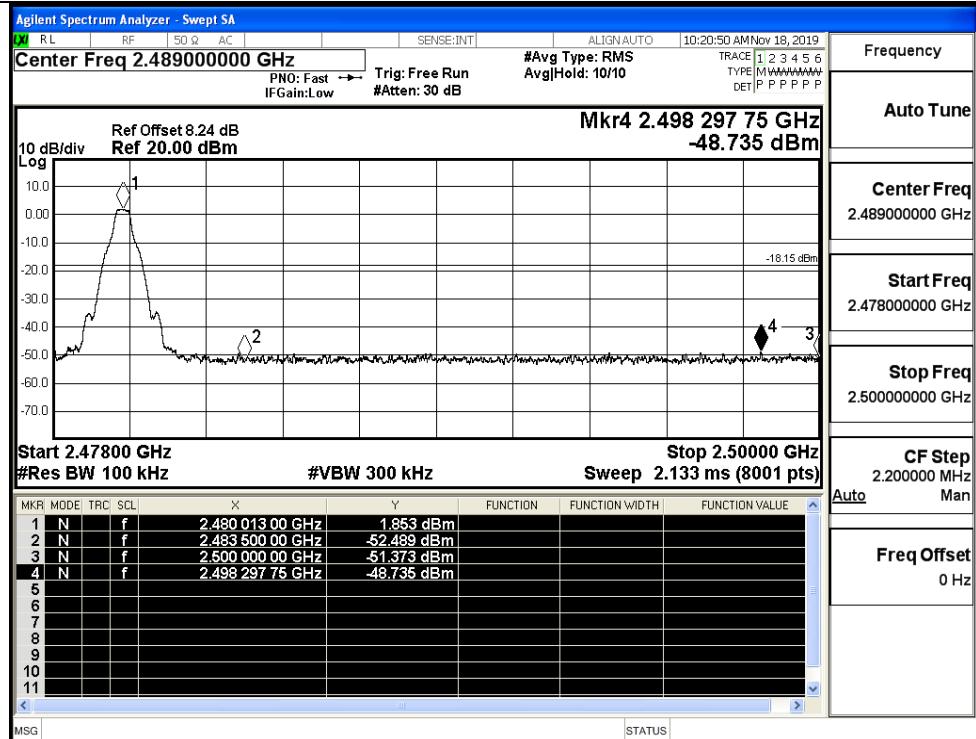
Start Freq
2.370000000 GHz

Stop Freq
2.430000000 GHz

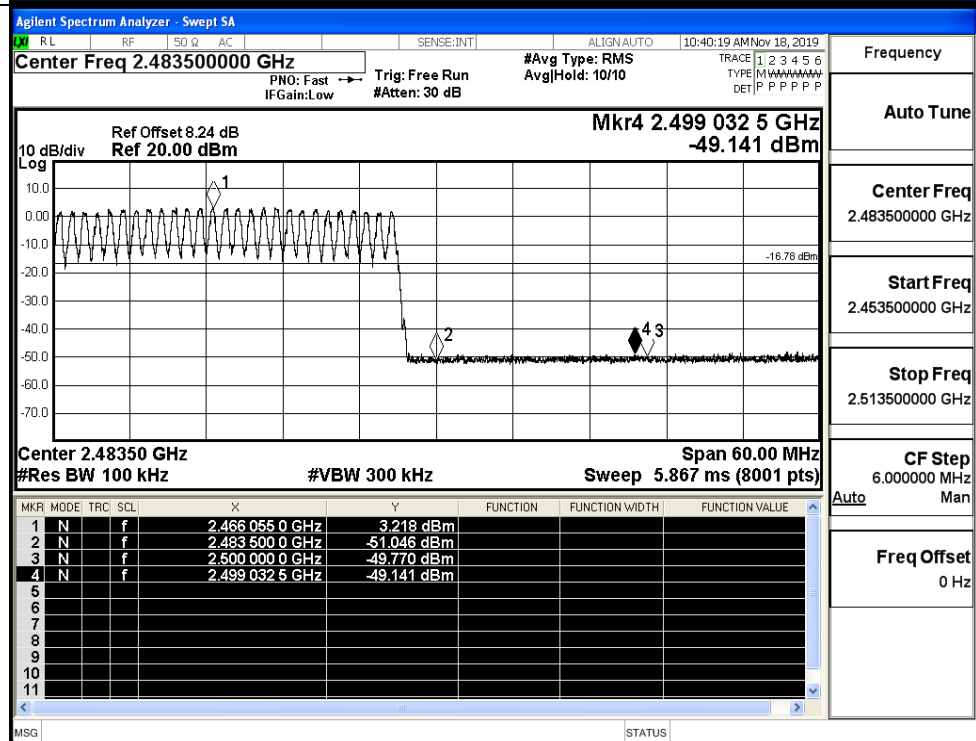
CF Step
6.000000 MHz
Man

Freq Offset
0 Hz

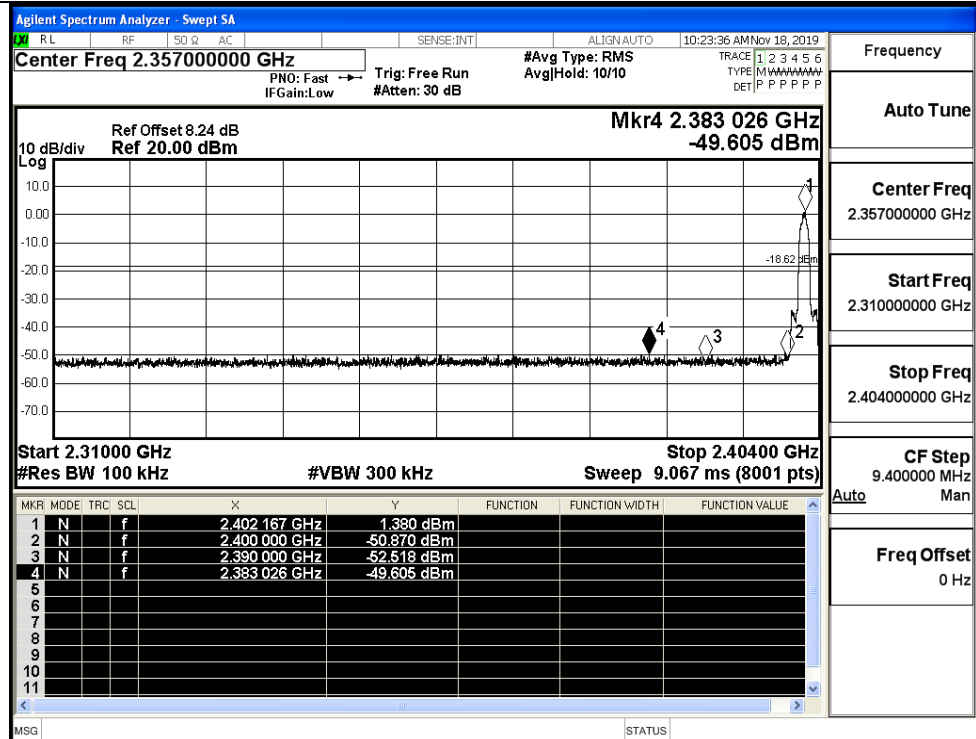
GFSK/HCH/No Hop



GFSK/HCH/Hop



$\pi/4$ DQPSK/LCH/No
Hop



Frequency

Auto Tune

Center Freq
2.357000000 GHz

Start Freq
2.310000000 GHz

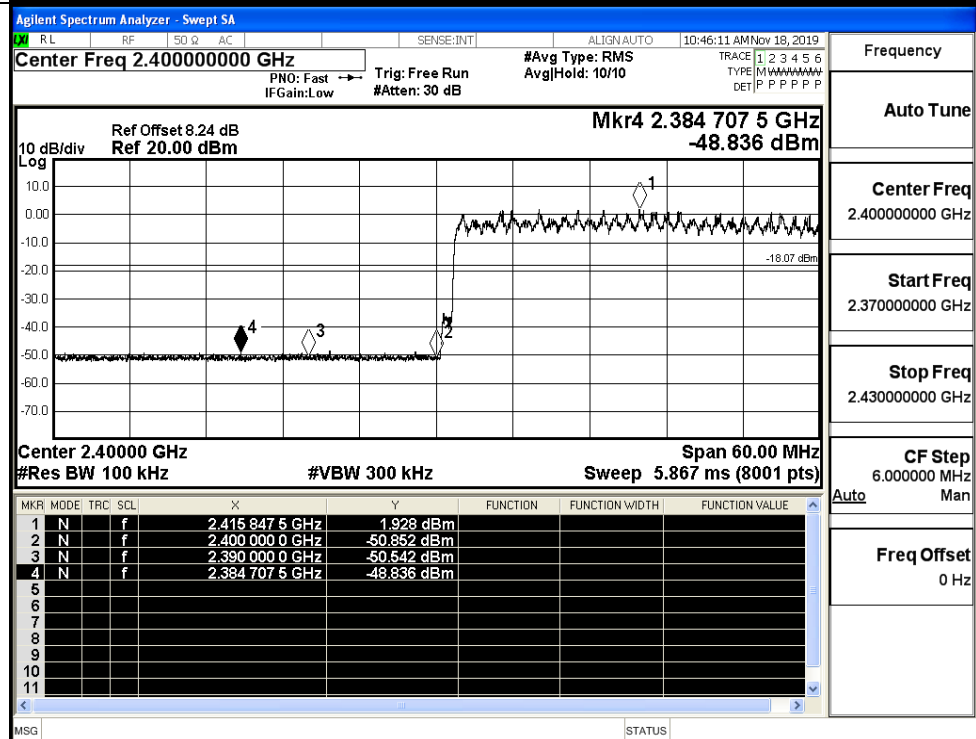
Stop Freq
2.404000000 GHz

CF Step
9.400000 MHz

Auto Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/LCH/Hop



Frequency

Auto Tune

Center Freq
2.400000000 GHz

Start Freq
2.370000000 GHz

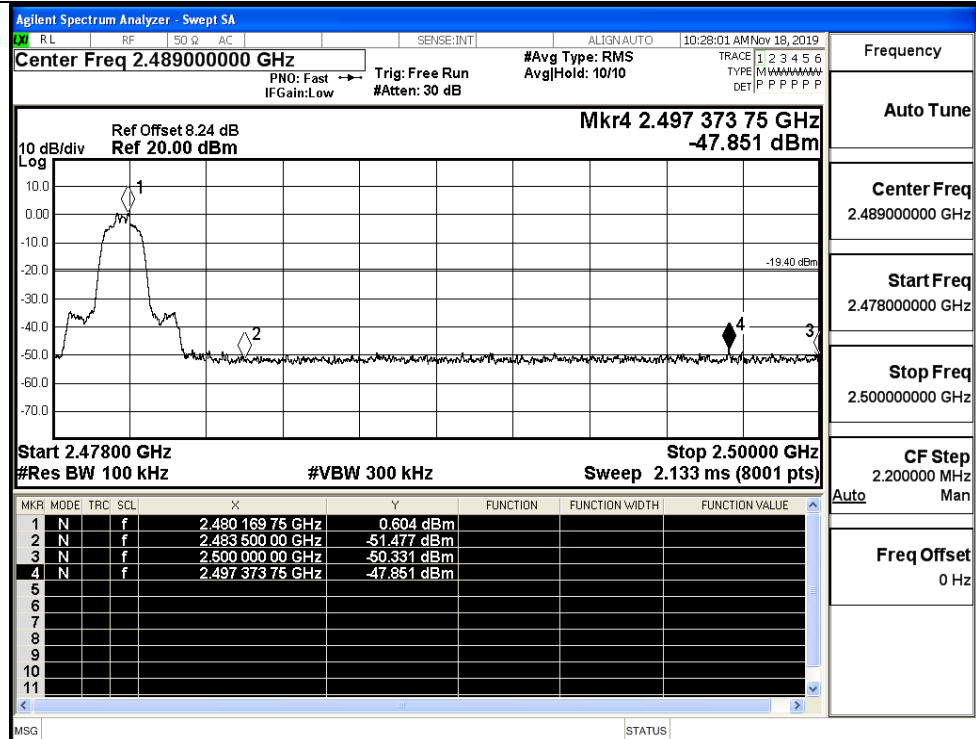
Stop Freq
2.430000000 GHz

CF Step
6.000000 MHz

Auto Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/HCH/No
Hop



Frequency

Auto Tune

Center Freq
2.489000000 GHz

Start Freq
2.478000000 GHz

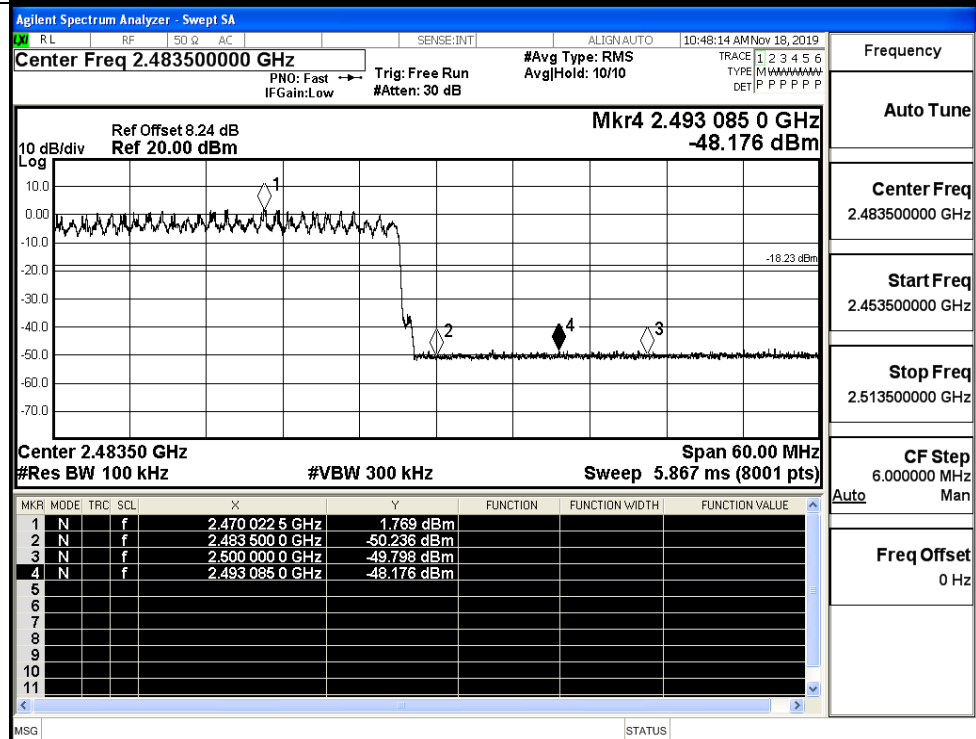
Stop Freq
2.500000000 GHz

CF Step
2.200000 MHz

Auto Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/HCH/Hop



Frequency

Auto Tune

Center Freq
2.483500000 GHz

Start Freq
2.453500000 GHz

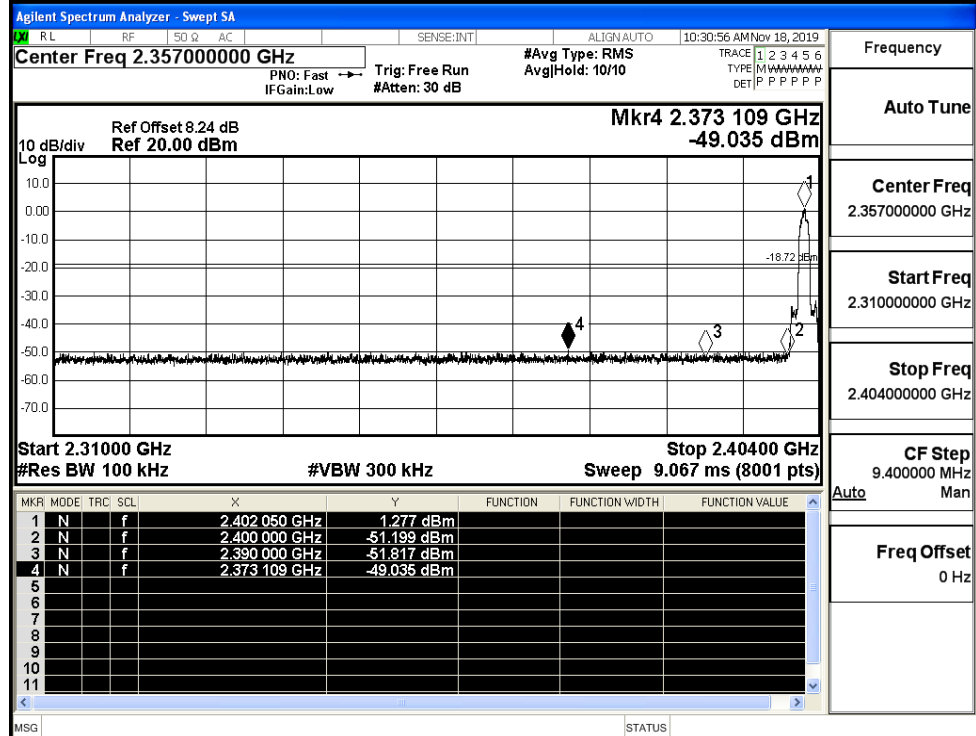
Stop Freq
2.513500000 GHz

CF Step
6.000000 MHz

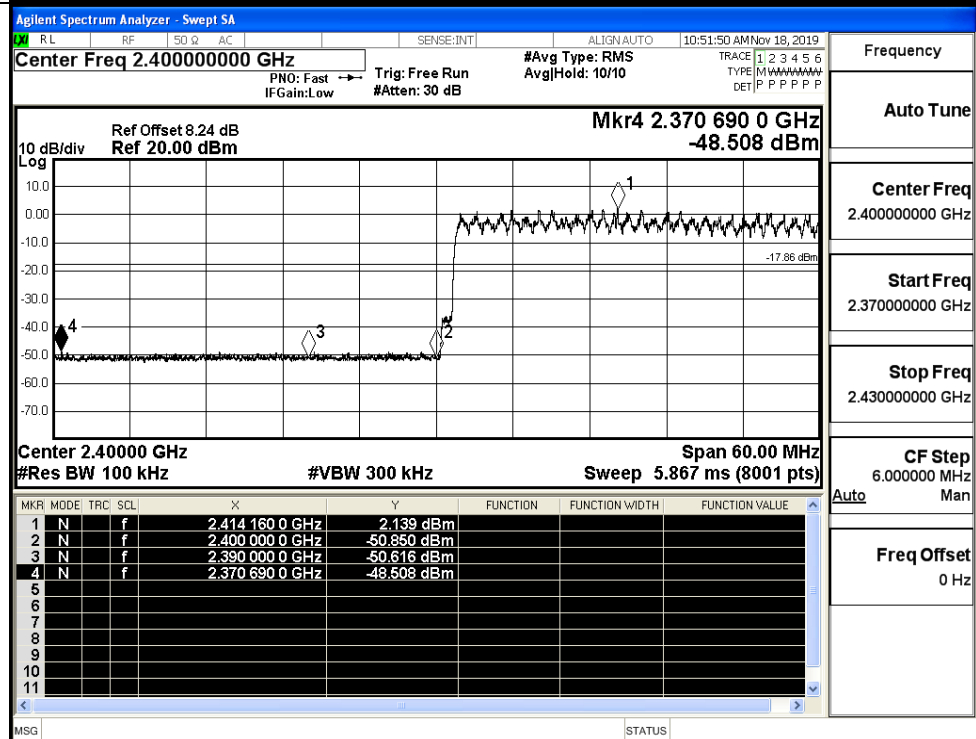
Auto Man

Freq Offset
0 Hz

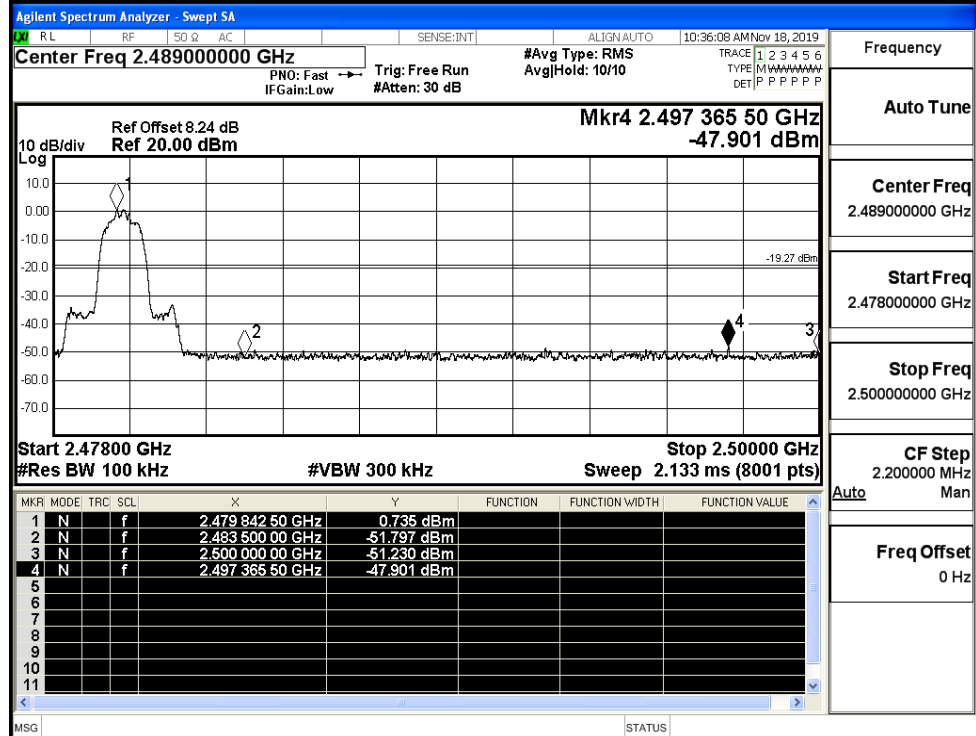
8DPSK/LCH/No Hop



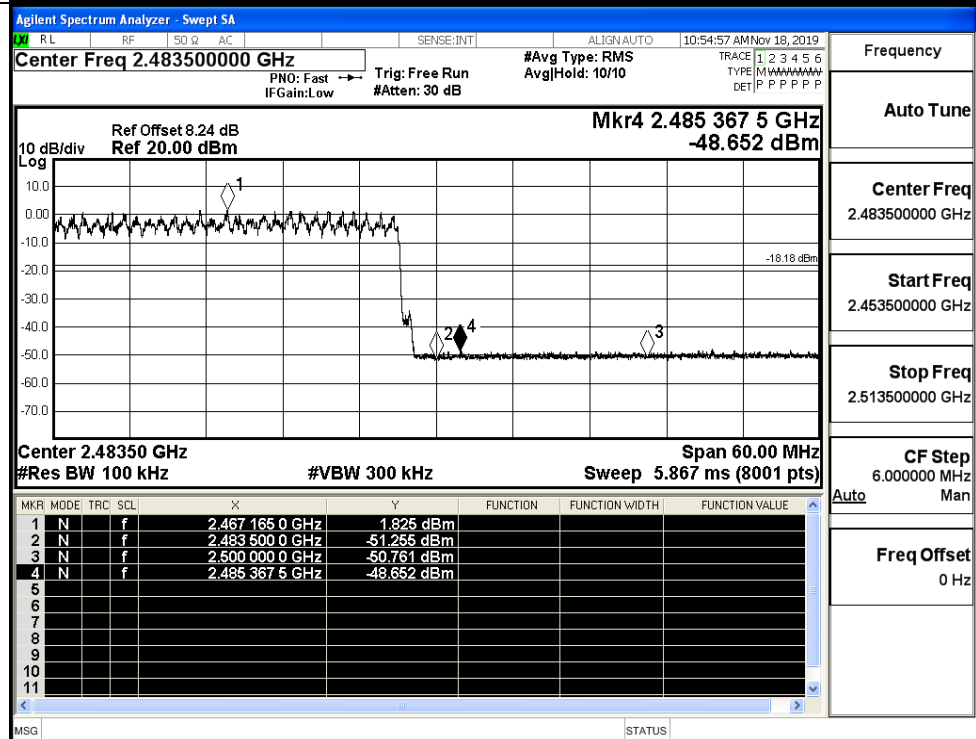
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



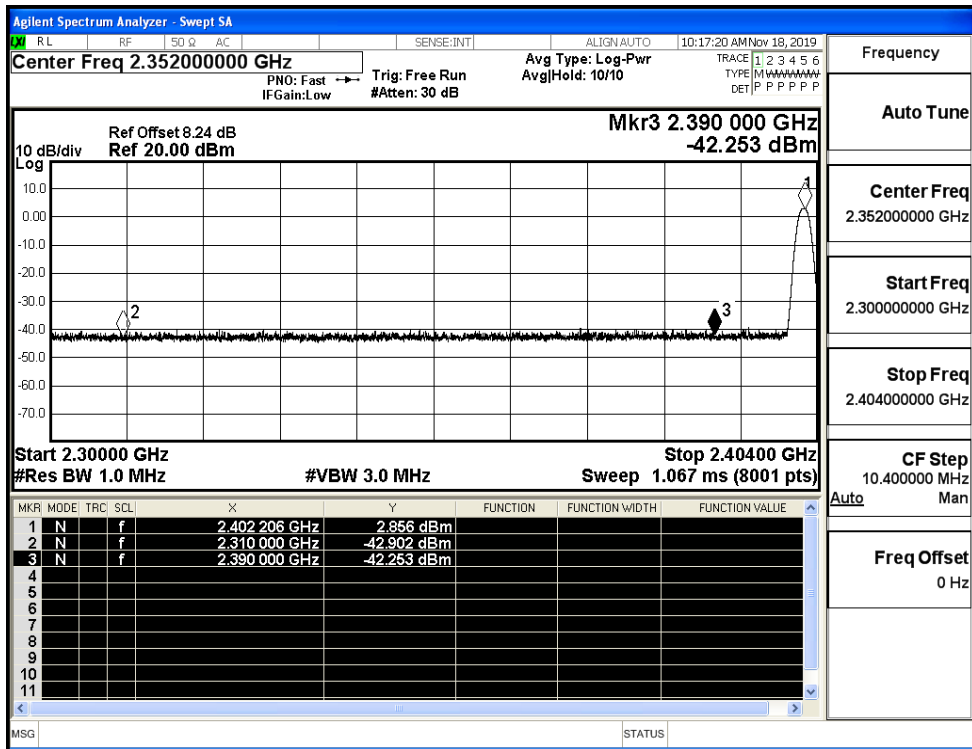
8DPSK/HCH/Hop



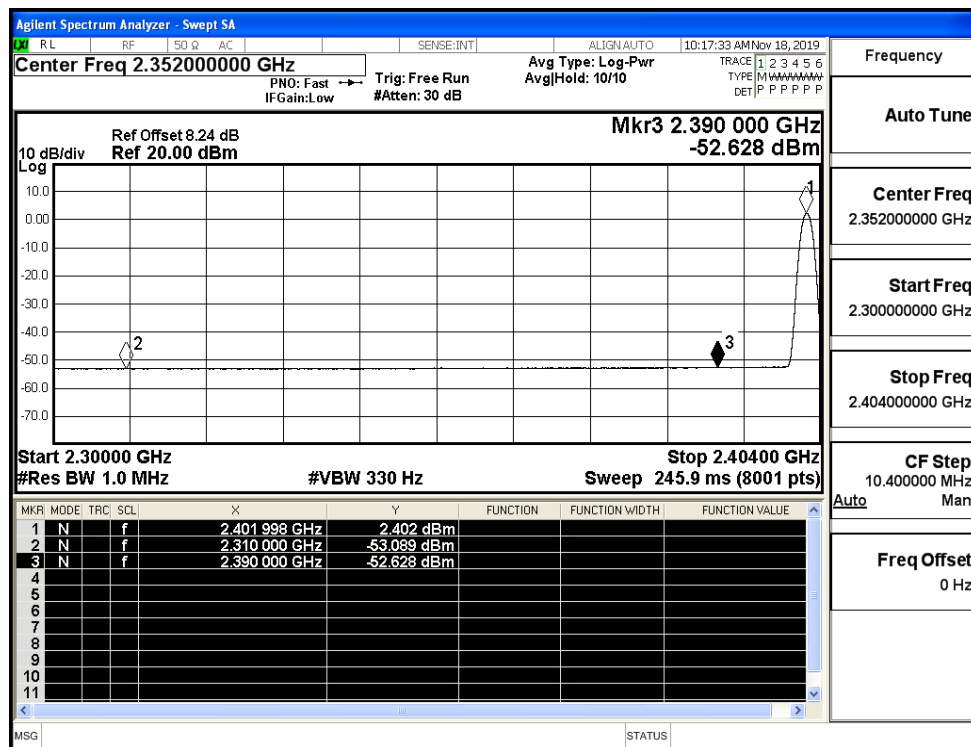
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.90	3.0	0	55.36	PEAK	74	PASS
	Off	2310.0	-53.09	3.0	0	45.17	AV	54	PASS
	Off	2390.0	-42.25	3.0	0	56.01	PEAK	74	PASS
	Off	2390.0	-52.63	3.0	0	45.63	AV	54	PASS
	Off	2483.5	-42.60	3.0	0	55.66	PEAK	74	PASS
	Off	2483.5	-52.18	3.0	0	46.08	AV	54	PASS
	Off	2500.0	-38.74	3.0	0	59.52	PEAK	74	PASS
	Off	2500.0	-52.09	3.0	0	46.17	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.38	3.0	0	54.88	PEAK	74	PASS
	Off	2310.0	-53.09	3.0	0	45.17	AV	54	PASS
	Off	2390.0	-43.04	3.0	0	55.22	PEAK	74	PASS
	Off	2390.0	-52.67	3.0	0	45.59	AV	54	PASS
	Off	2483.5	-41.04	3.0	0	57.22	PEAK	74	PASS
	Off	2483.5	-52.13	3.0	0	46.13	AV	54	PASS
	Off	2500.0	-39.64	3.0	0	58.62	PEAK	74	PASS
	Off	2500.0	-52.03	3.0	0	46.23	AV	54	PASS
8DPSK	Off	2310.0	-42.90	3.0	0	55.36	PEAK	74	PASS
	Off	2310.0	-53.00	3.0	0	45.26	AV	54	PASS
	Off	2390.0	-41.99	3.0	0	56.27	PEAK	74	PASS
	Off	2390.0	-52.72	3.0	0	45.54	AV	54	PASS
	Off	2483.5	-41.49	3.0	0	56.77	PEAK	74	PASS
	Off	2483.5	-52.01	3.0	0	46.25	AV	54	PASS
	Off	2500.0	-41.99	3.0	0	56.27	PEAK	74	PASS
	Off	2500.0	-52.07	3.0	0	46.19	AV	54	PASS

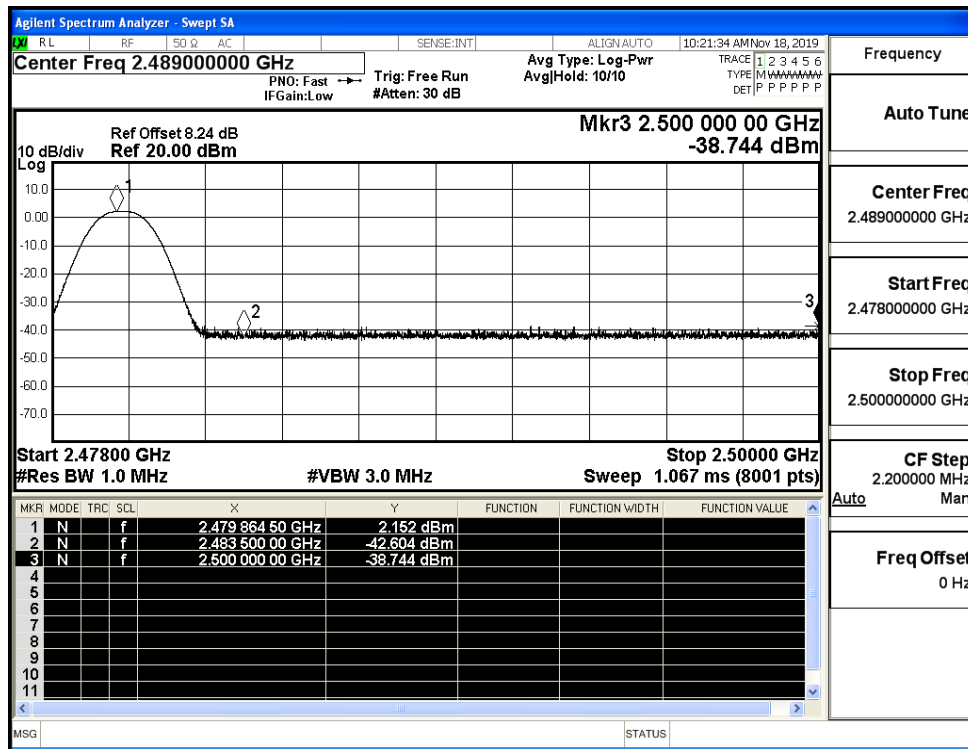
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



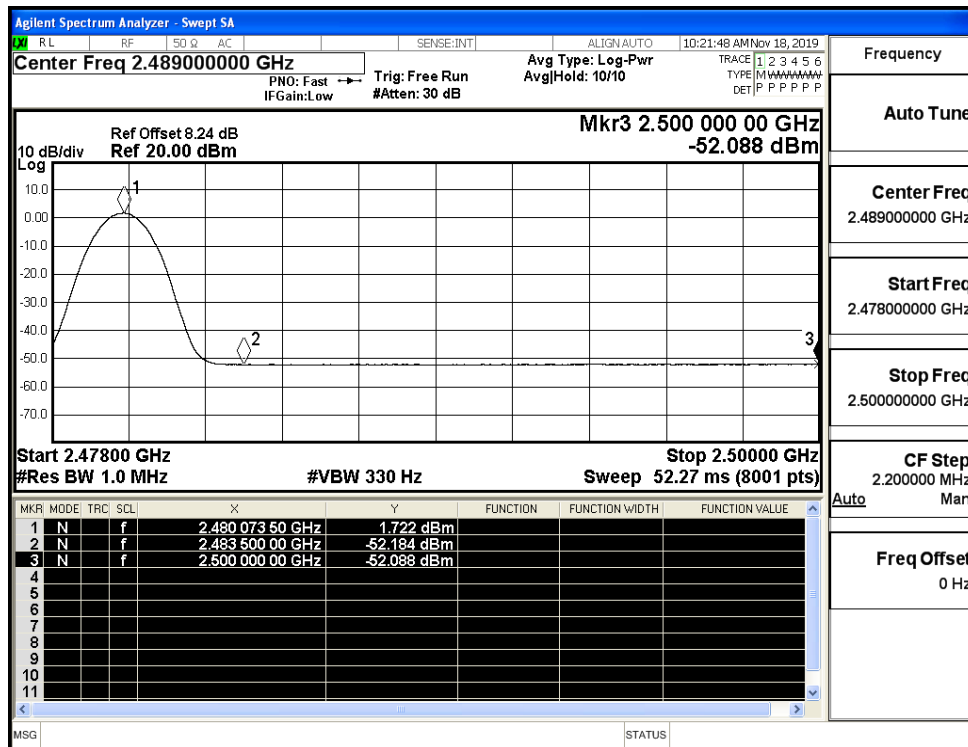
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

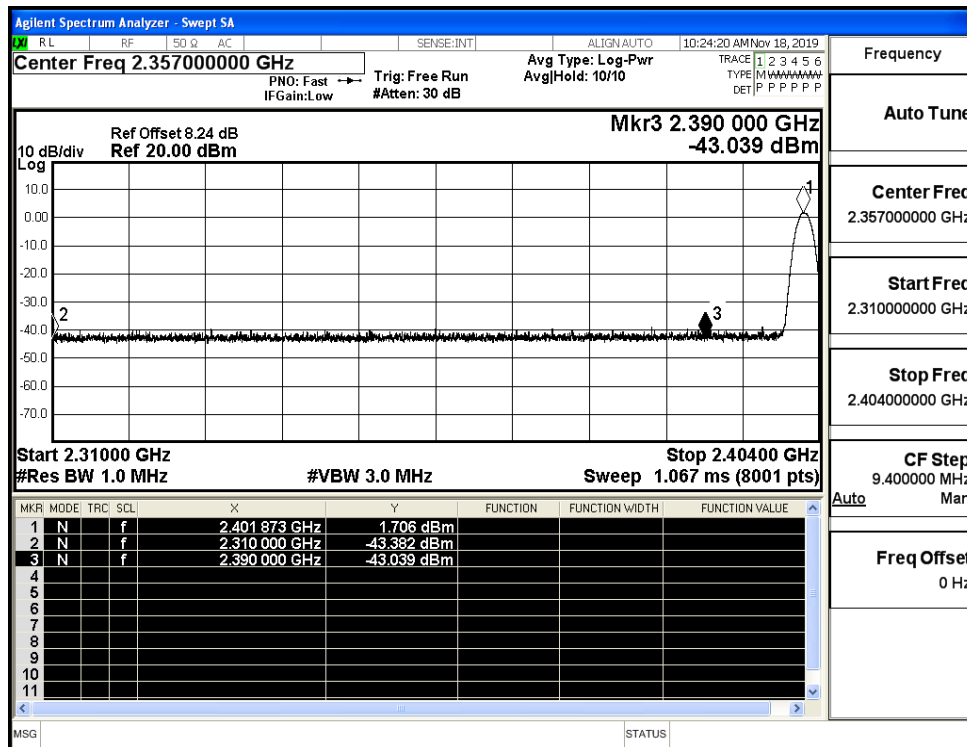
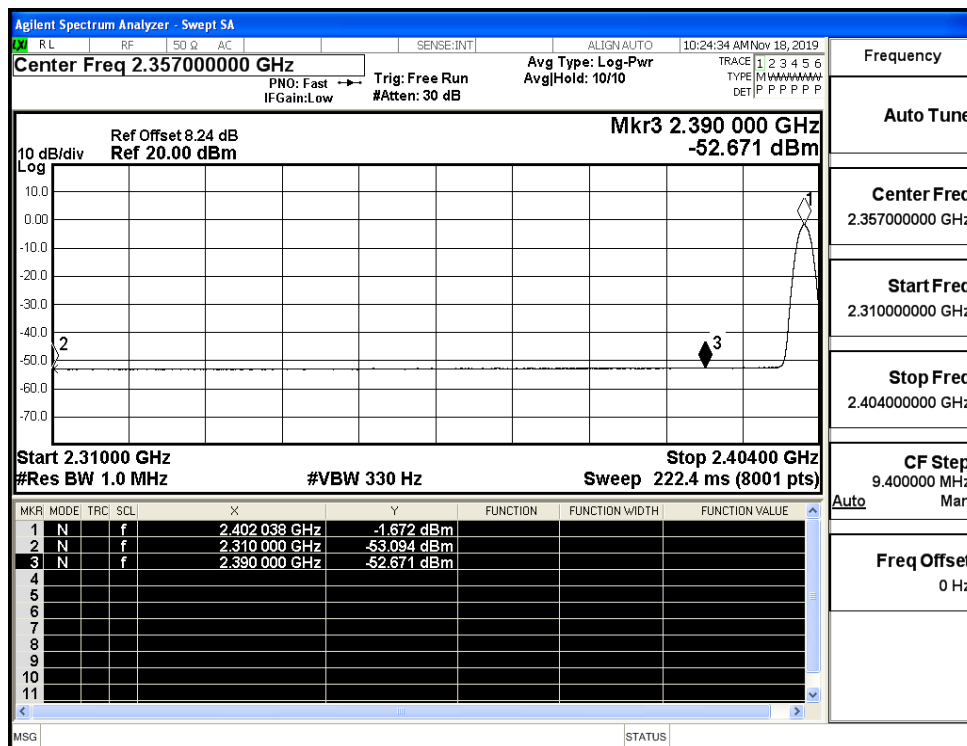


Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)

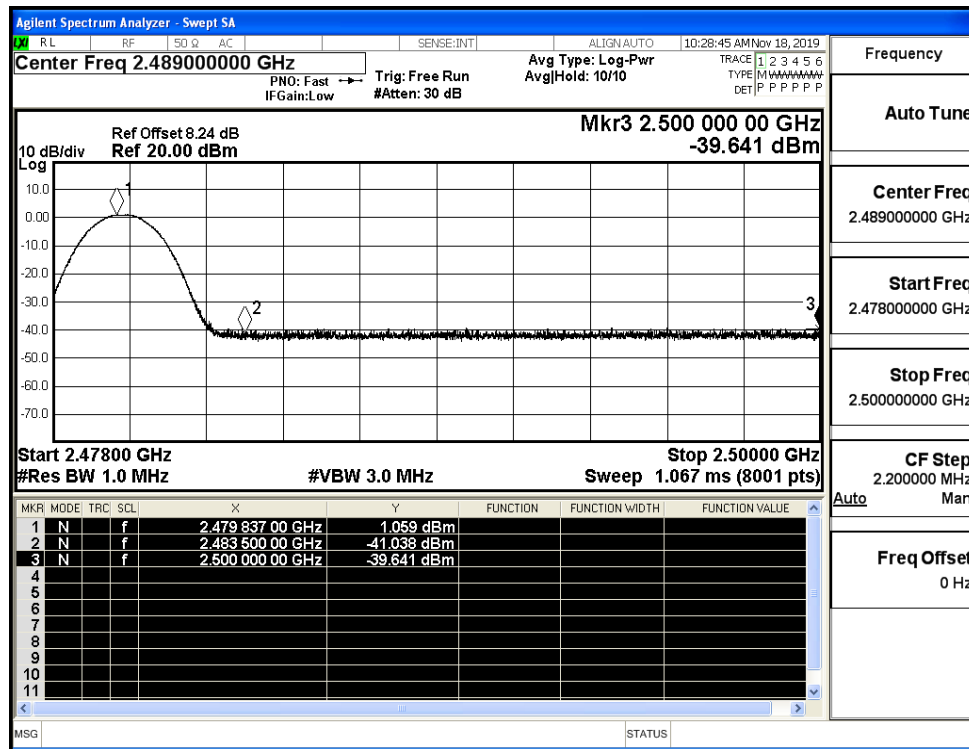


Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)

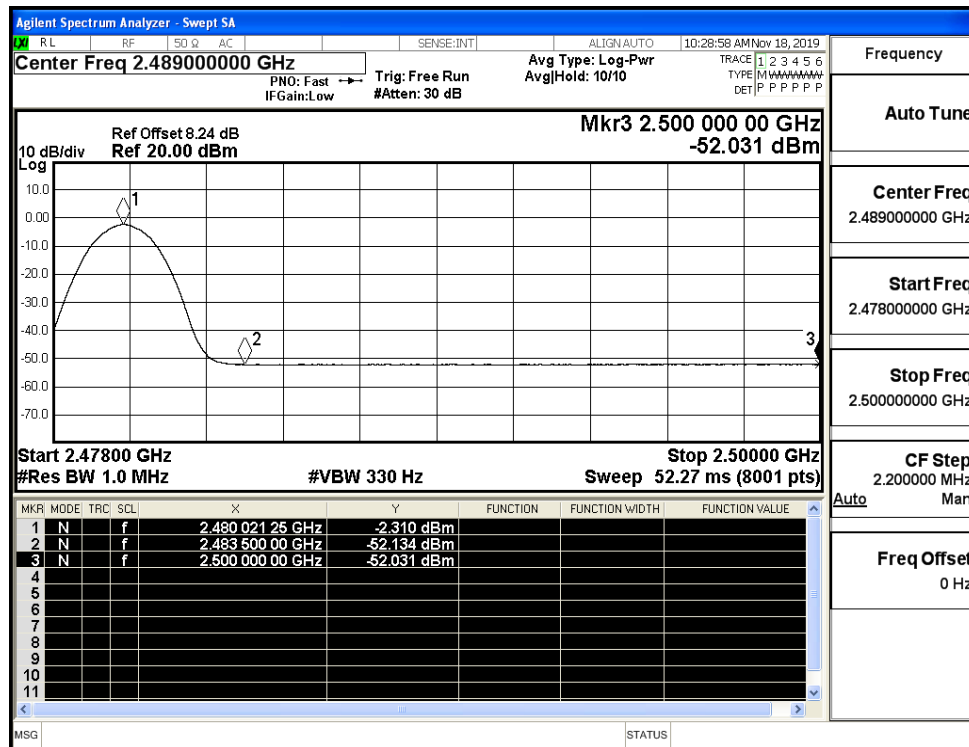


Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

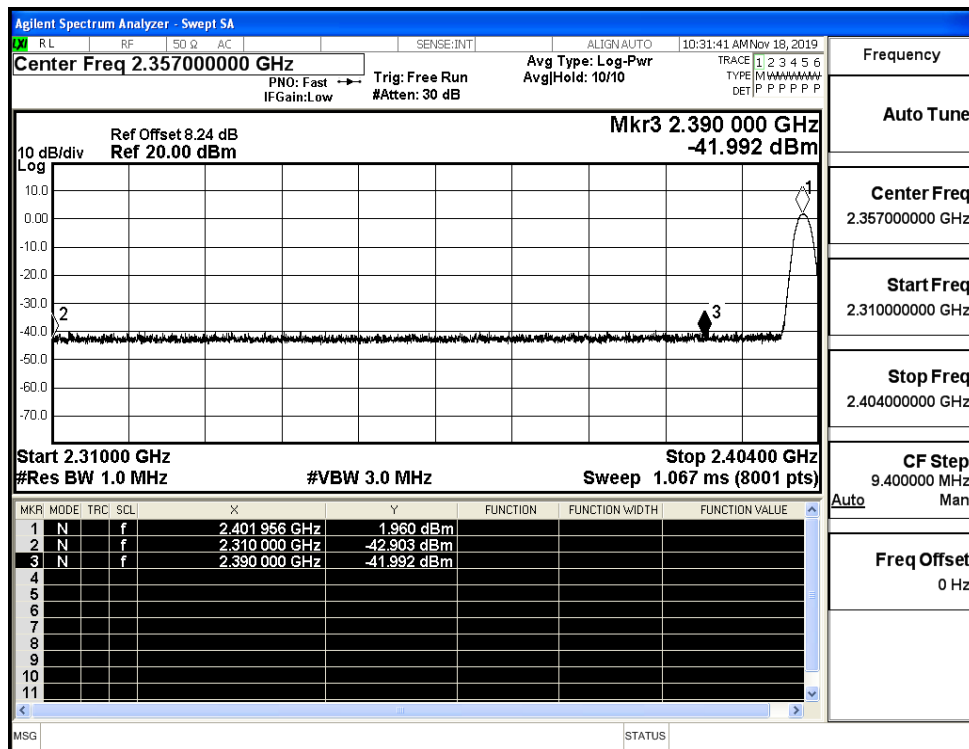
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



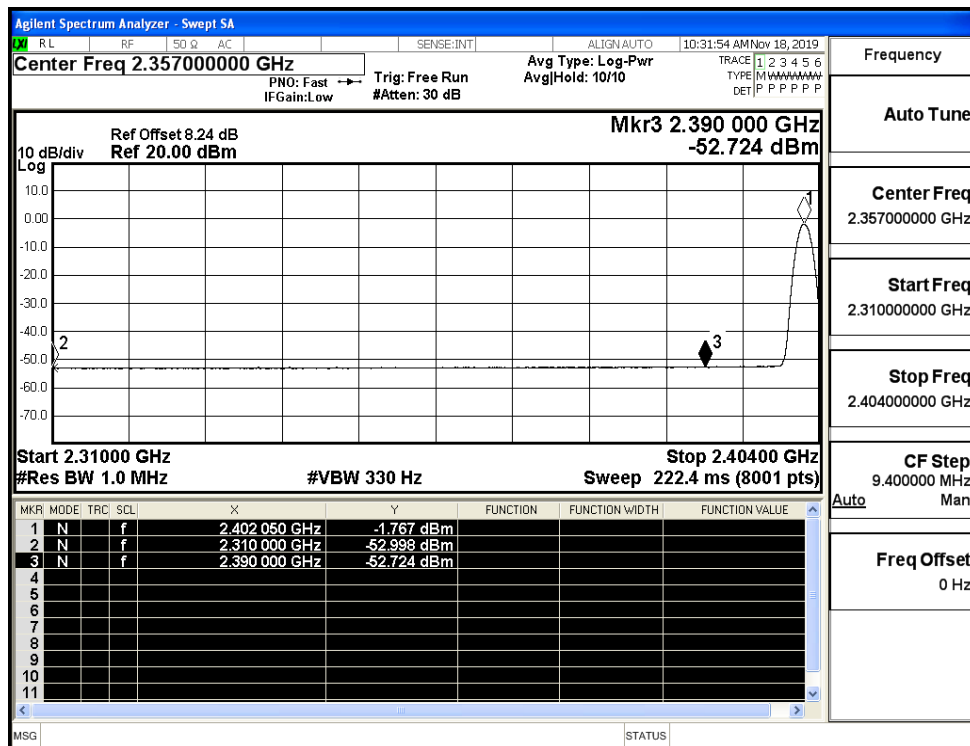
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



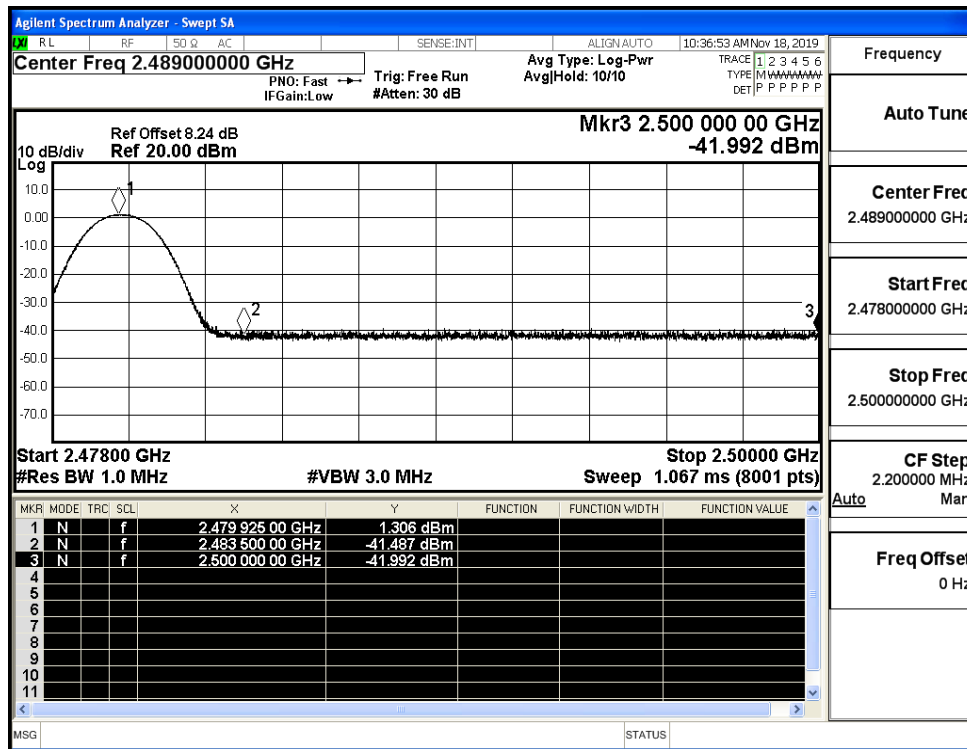
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



Restrict-band band-edge measurements_Hopping Off_8DPSK_Average (Low Channel)



Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (High Channel)



Restrict-band band-edge measurements_Hopping Off_8DPSK_Average (High Channel)

