

Appendix A

RF Test Data for BT V3.0(BDR/EDR) (Conducted Measurement)

Product Name: Auto Diagnostic TOOL

Trade Mark: XTOOL

Test Model: Anyscan A30

Environmental Conditions

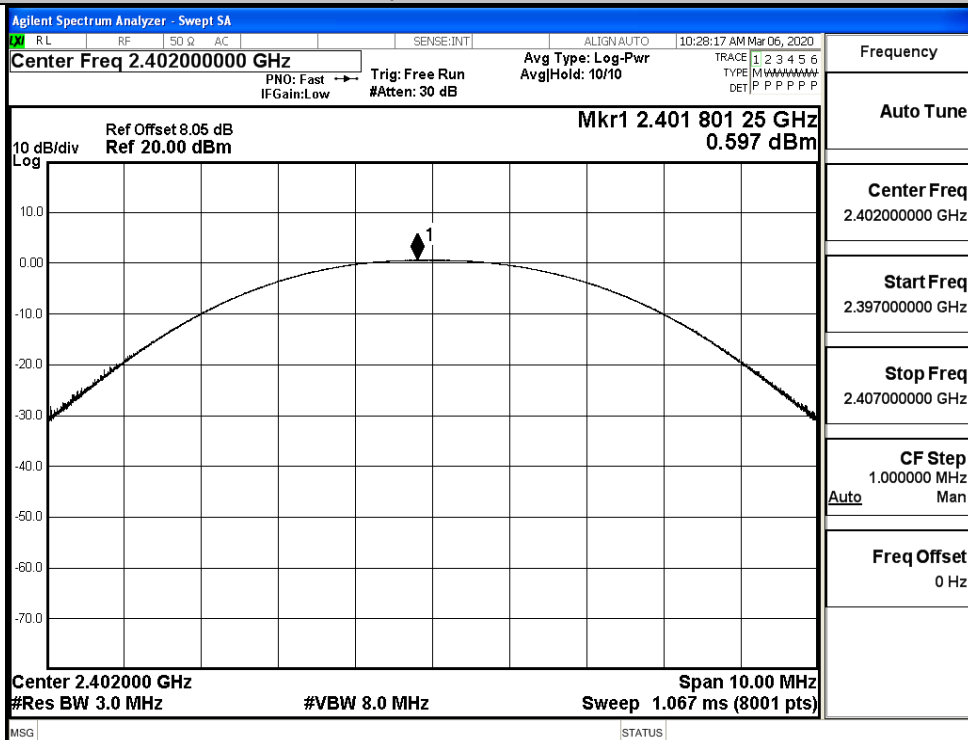
Temperature:	23.7°C
Relative Humidity:	52.4%
ATM Pressure:	100.0 kPa
Test Engineer:	Scout Wu
Supervised by:	Tom.Liu

A.1 Maximum Conducted Peak Output Power

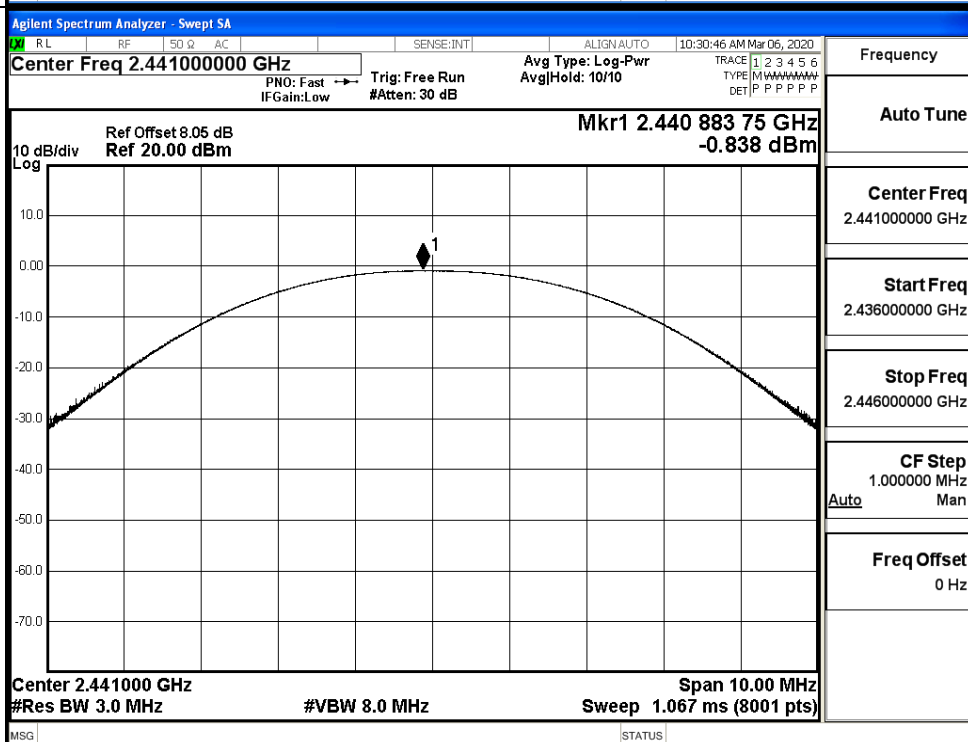
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.597	21	PASS
	MCH	-0.838	21	PASS
	HCH	-2.494	21	PASS
$\pi/4$ DQPSK	LCH	2.964	21	PASS
	MCH	1.426	21	PASS
	HCH	-0.280	21	PASS
8DPSK	LCH	3.391	21	PASS
	MCH	1.868	21	PASS
	HCH	0.149	21	PASS

Test Graphs

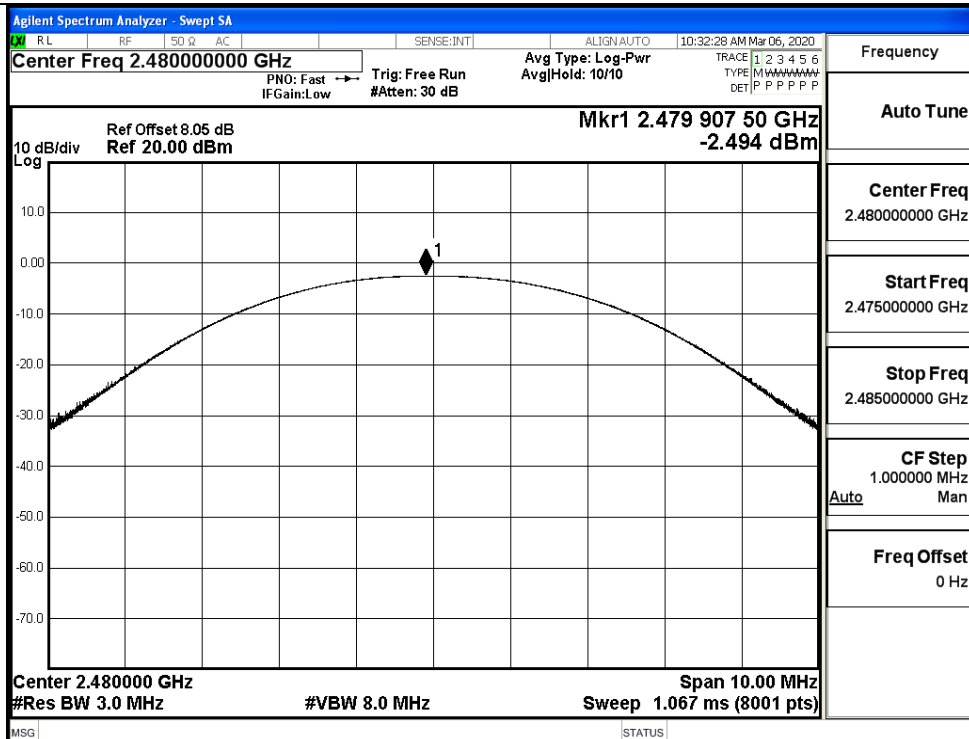
GFSK/LCH



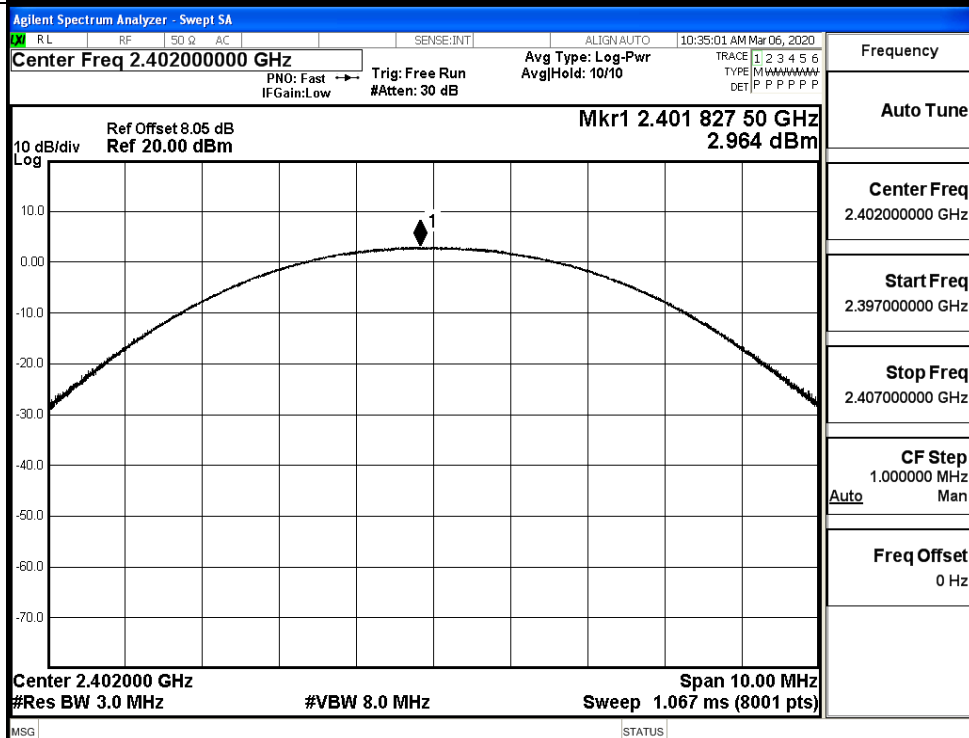
GFSK/MCH

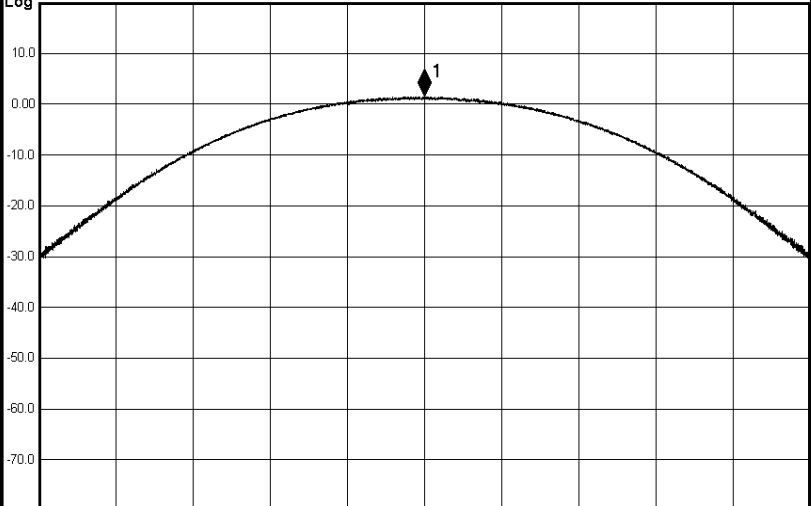
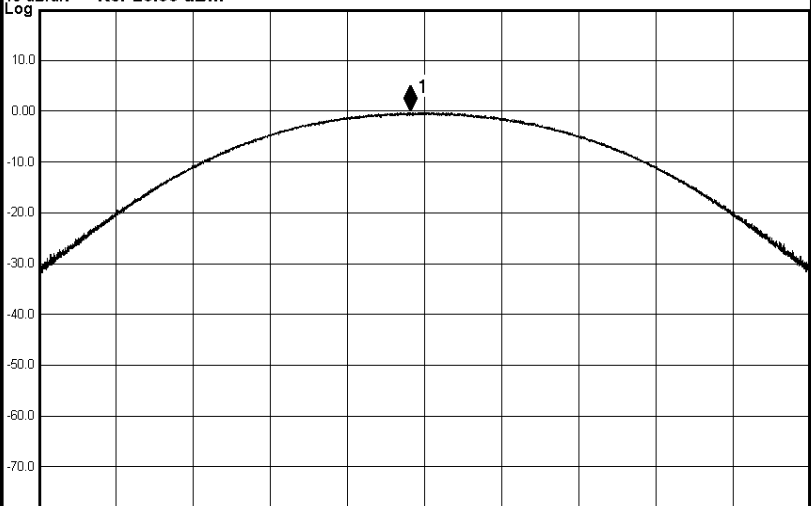


GFSK/HCH

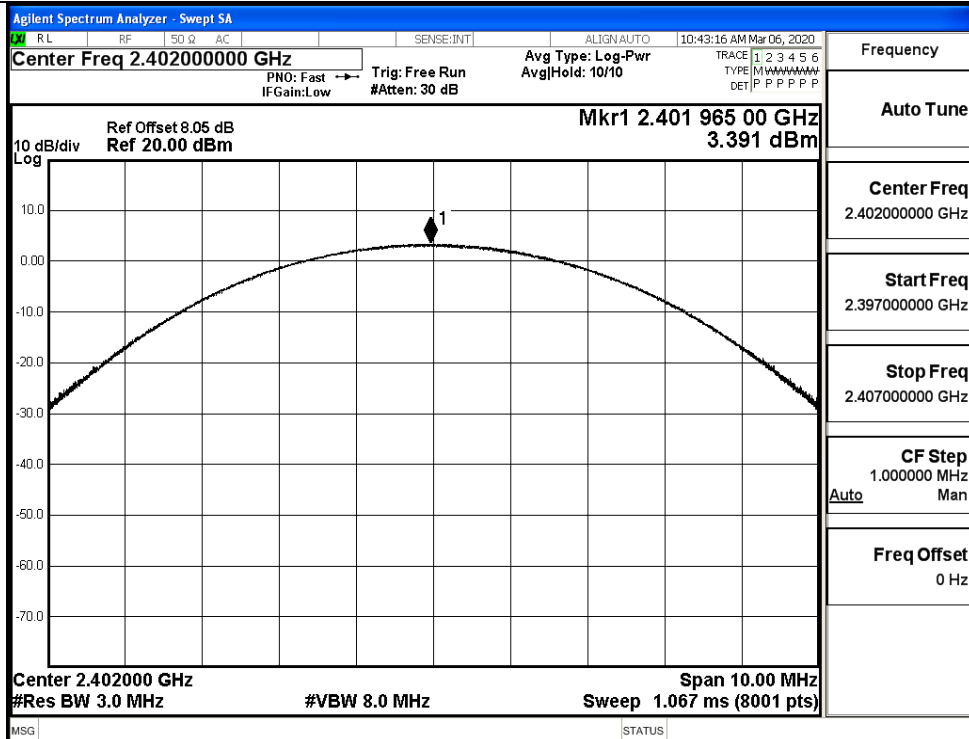


$\pi/4$ DQPSK/LCH

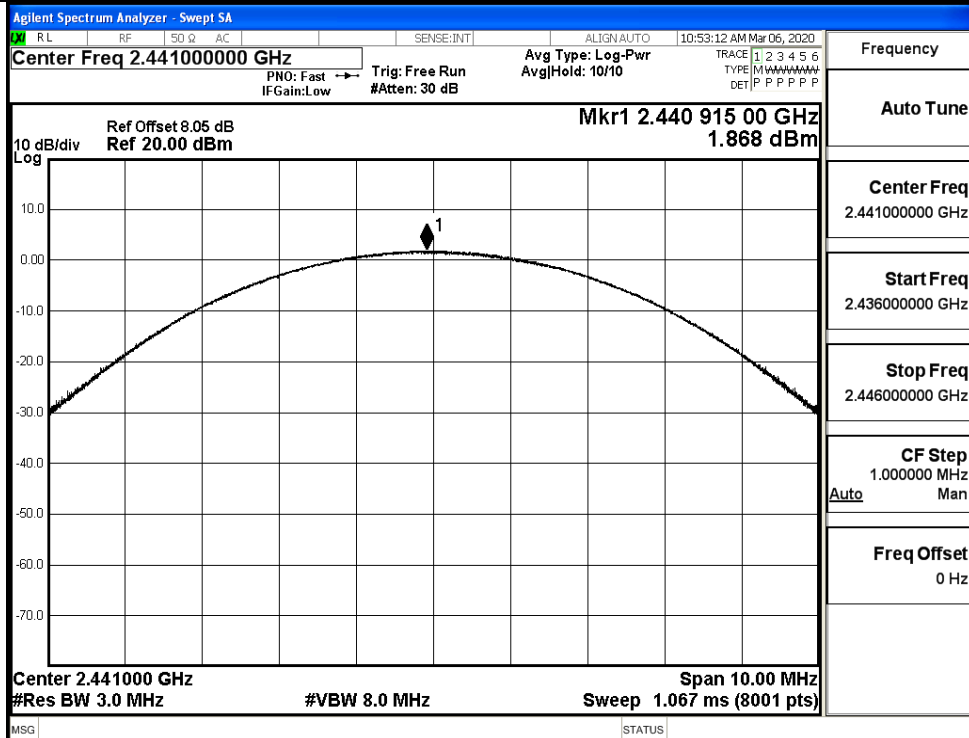


$\pi/4$DQPSK/MCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Q AC SENSE:INT ALIGN:AUTO 10:37:47 AM Mar 06, 2020 Center Freq 2.441000000 GHz PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg/Hold: 10/10 TRACE 1 2 3 4 5 6 TYPE: M W W W W W W W DET: P P P P P P P Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.440 998 75 GHz 1.426 dBm  Center 2.441000 GHz #Res BW 3.0 MHz #VBW 8.0 MHz Sweep 1.067 ms (8001 pts) MSG STATUS	Frequency Auto Tune Center Freq 2.441000000 GHz Start Freq 2.436000000 GHz Stop Freq 2.446000000 GHz CF Step 1.000000 MHz Auto Man Freq Offset 0 Hz
$\pi/4$DQPSK/HCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Q AC SENSE:INT ALIGN:AUTO 10:40:36 AM Mar 06, 2020 Center Freq 2.480000000 GHz PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr 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 P Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.479 820 00 GHz -0.280 dBm  Center 2.480000 GHz #Res BW 3.0 MHz #VBW 8.0 MHz Sweep 1.067 ms (8001 pts) MSG STATUS	Frequency Auto Tune Center Freq 2.480000000 GHz Start Freq 2.475000000 GHz Stop Freq 2.485000000 GHz CF Step 1.000000 MHz Auto Man Freq Offset 0 Hz

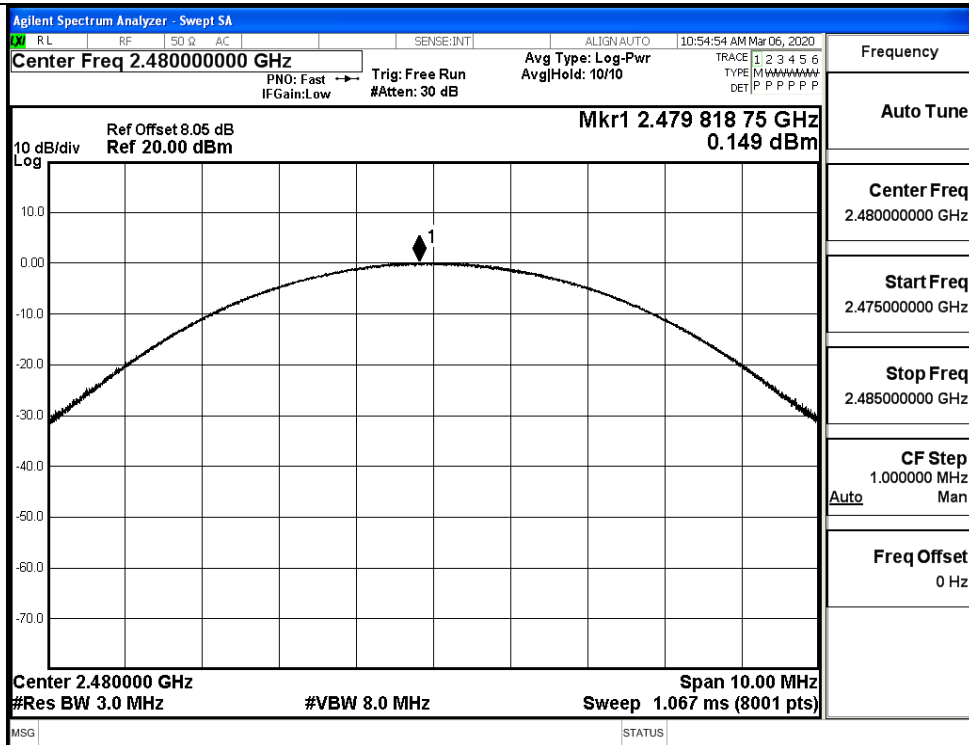
8DPSK/LCH



8DPSK/MCH



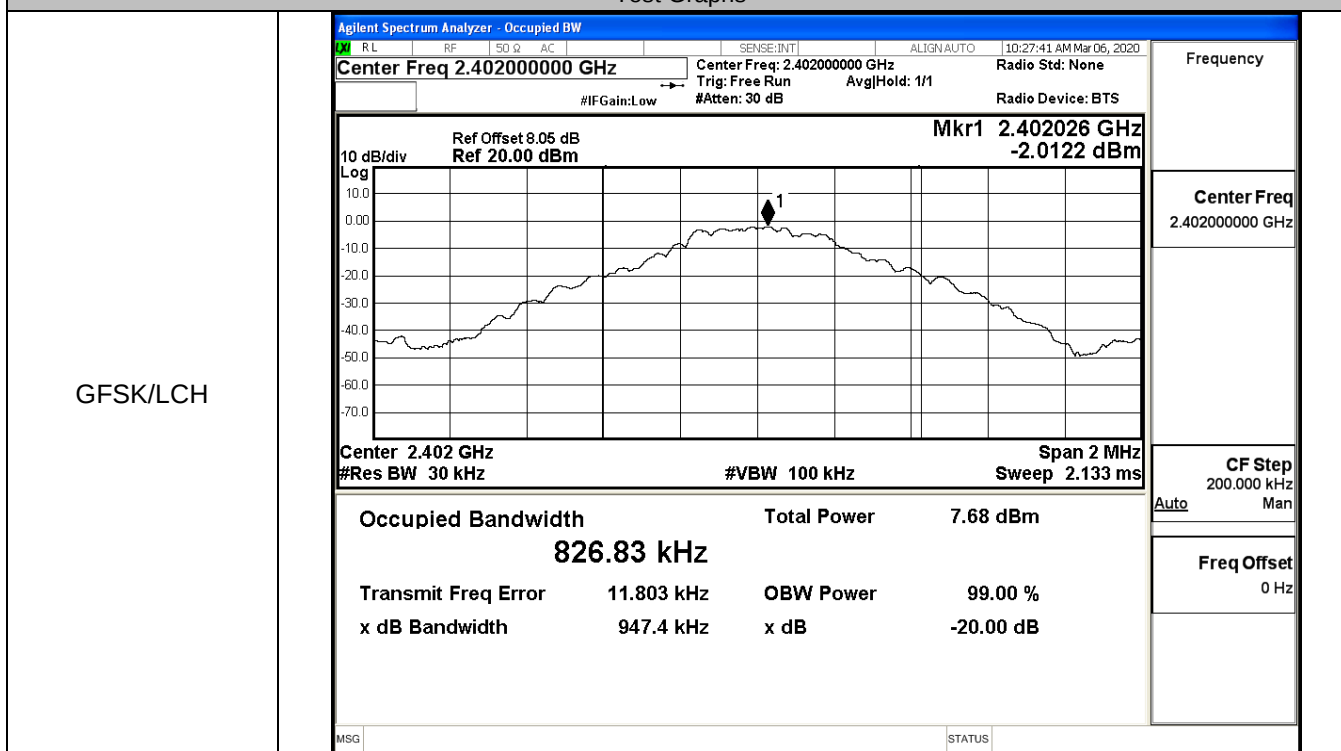
8DPSK/HCH



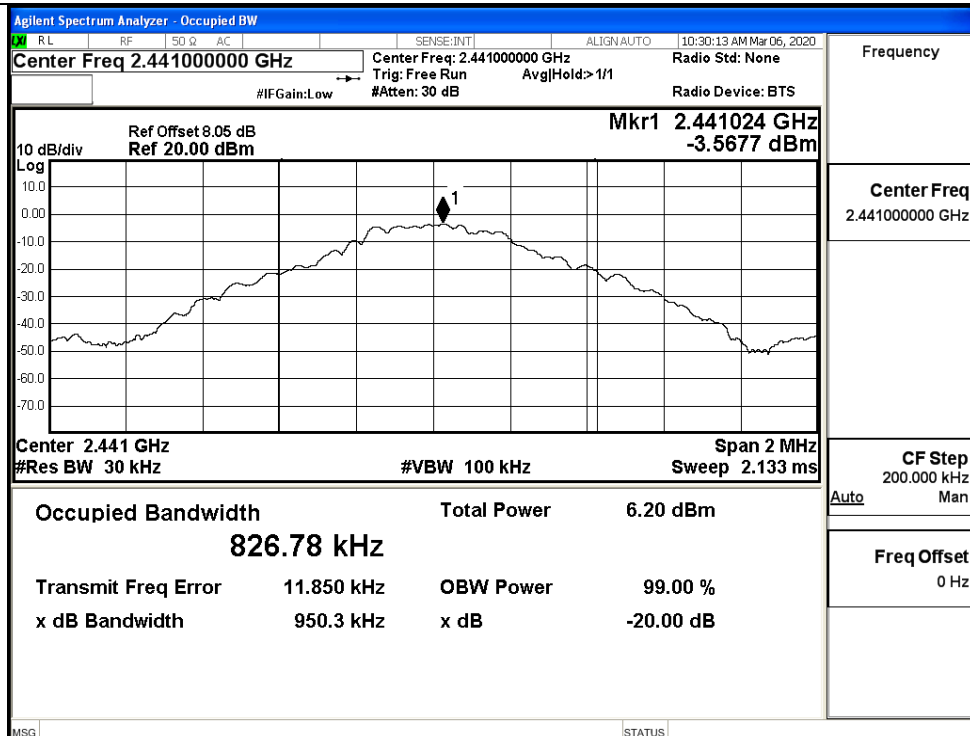
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9474	Not Specified	PASS
	MCH	0.9503	Not Specified	PASS
	HCH	0.9471	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.322	Not Specified	PASS
	MCH	1.324	Not Specified	PASS
	HCH	1.323	Not Specified	PASS
8DPSK	LCH	1.297	Not Specified	PASS
	MCH	1.298	Not Specified	PASS
	HCH	1.298	Not Specified	PASS

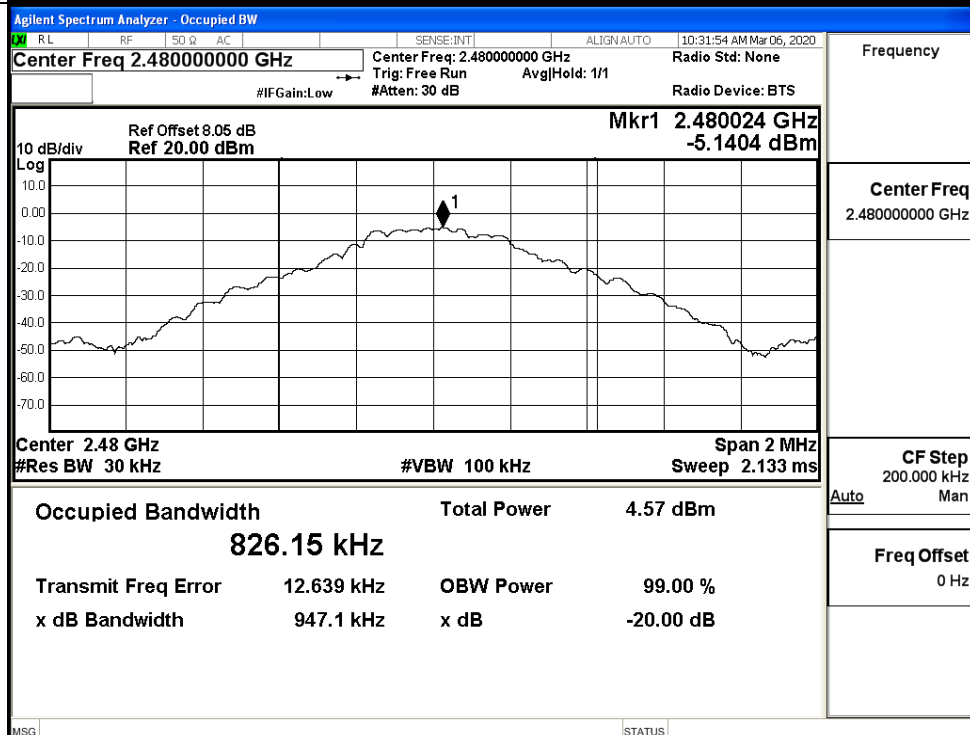
Test Graphs



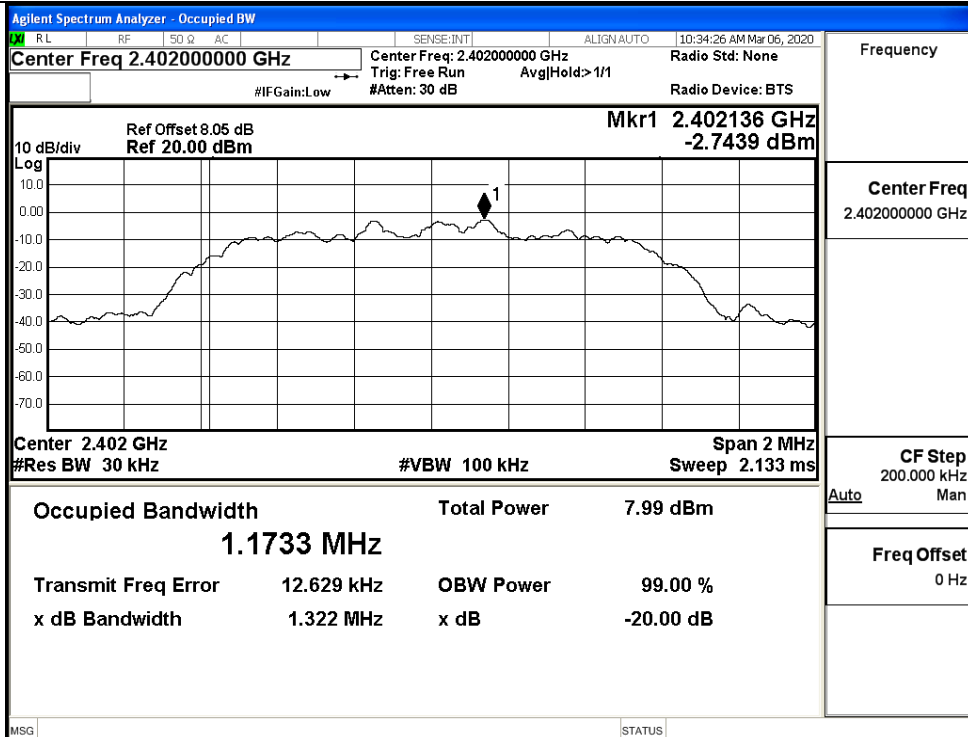
GFSK/MCH



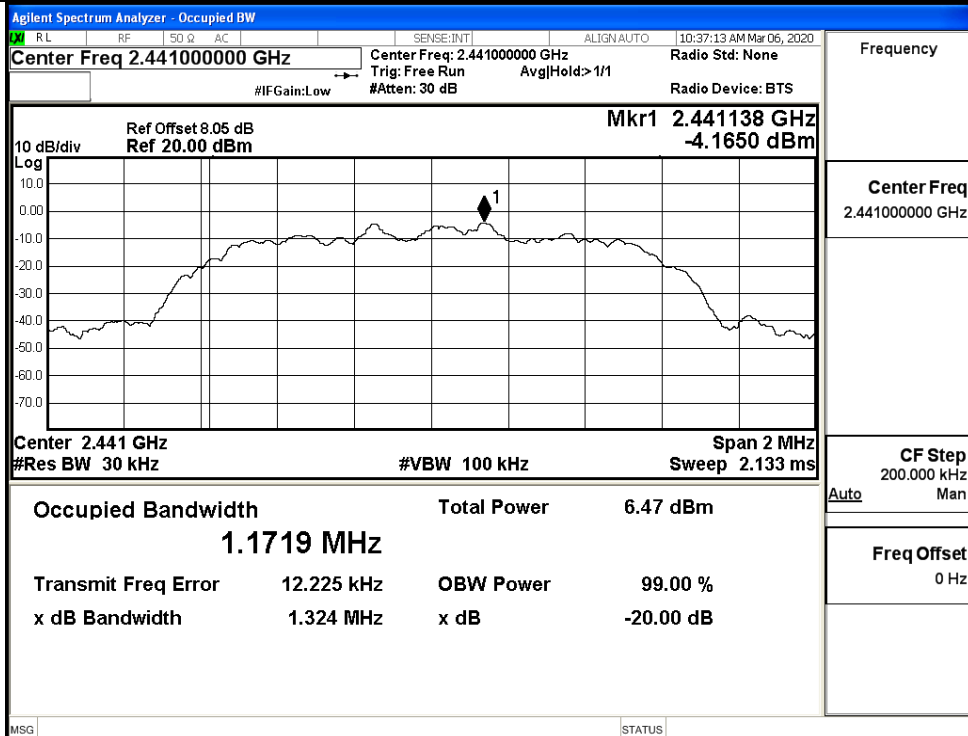
GFSK/HCH



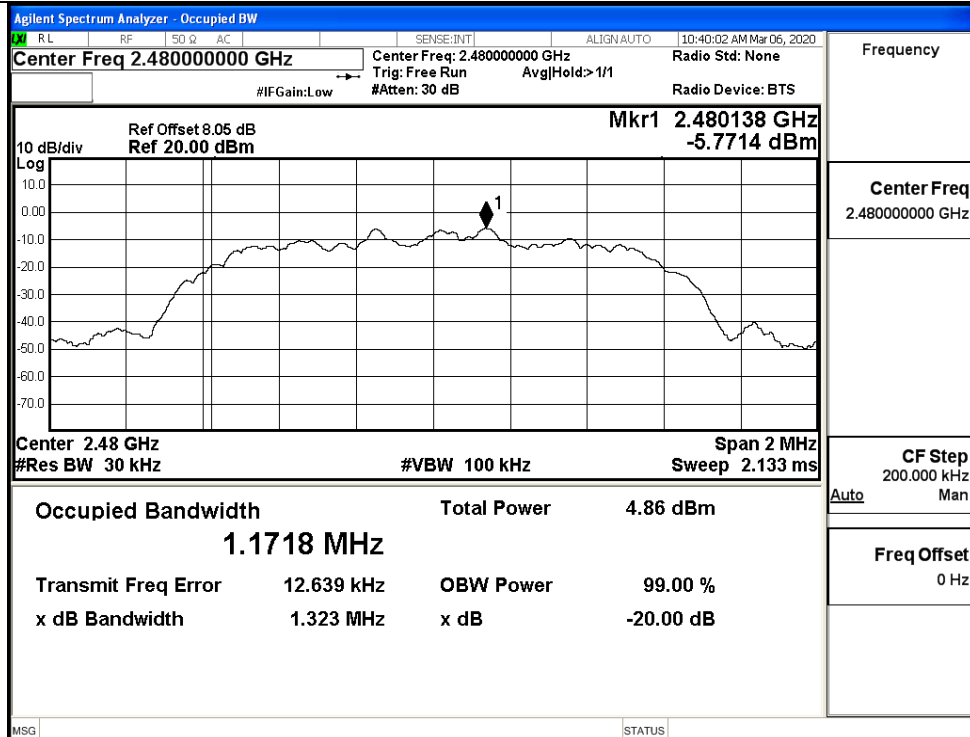
$\pi/4$ DQPSK/LCH



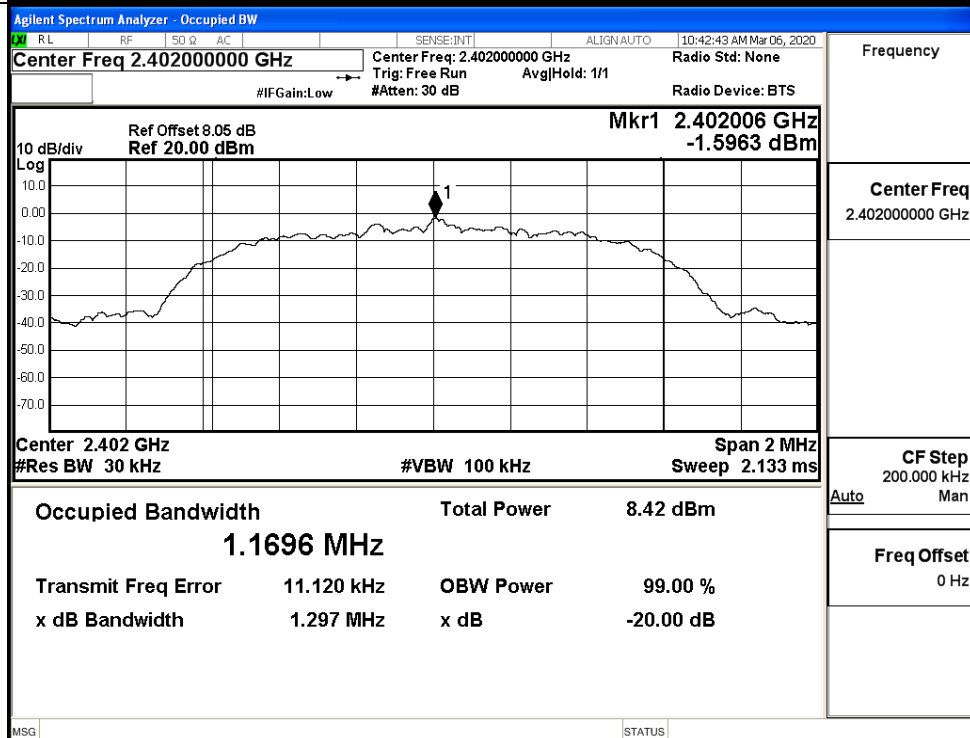
$\pi/4$ DQPSK/MCH



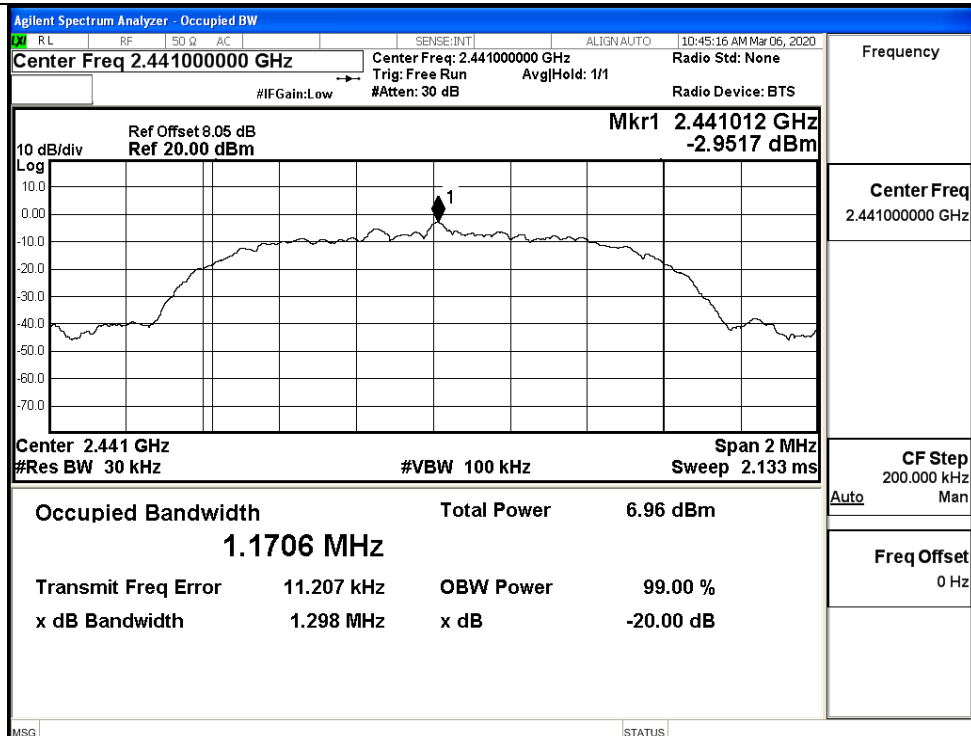
$\pi/4$ DQPSK/HCH



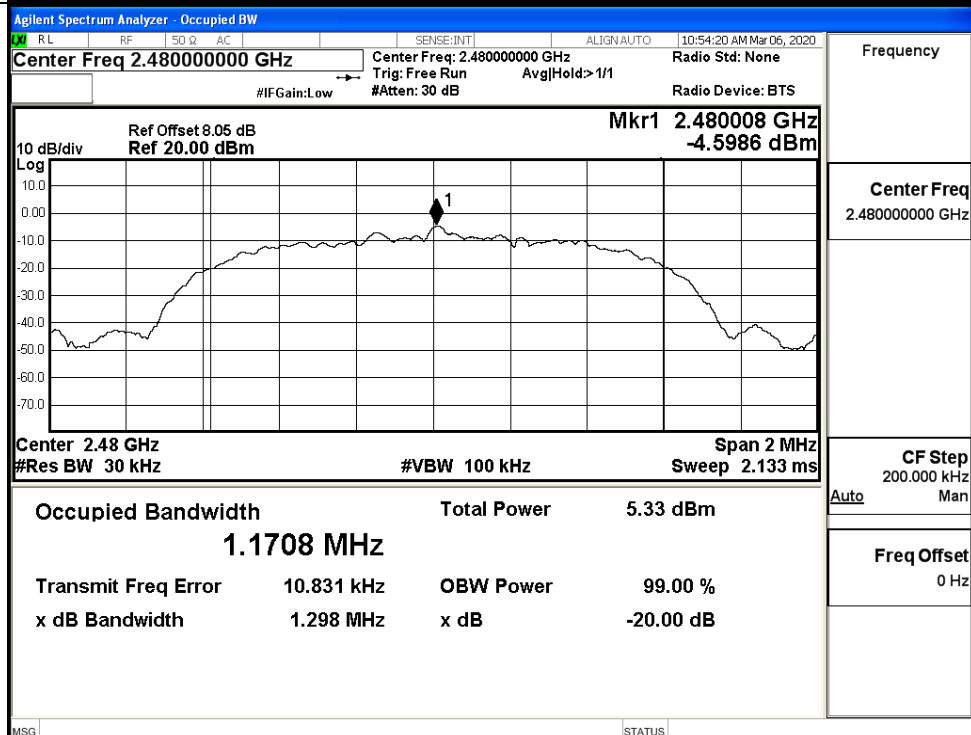
8DPSK/LCH



8DPSK/MCH



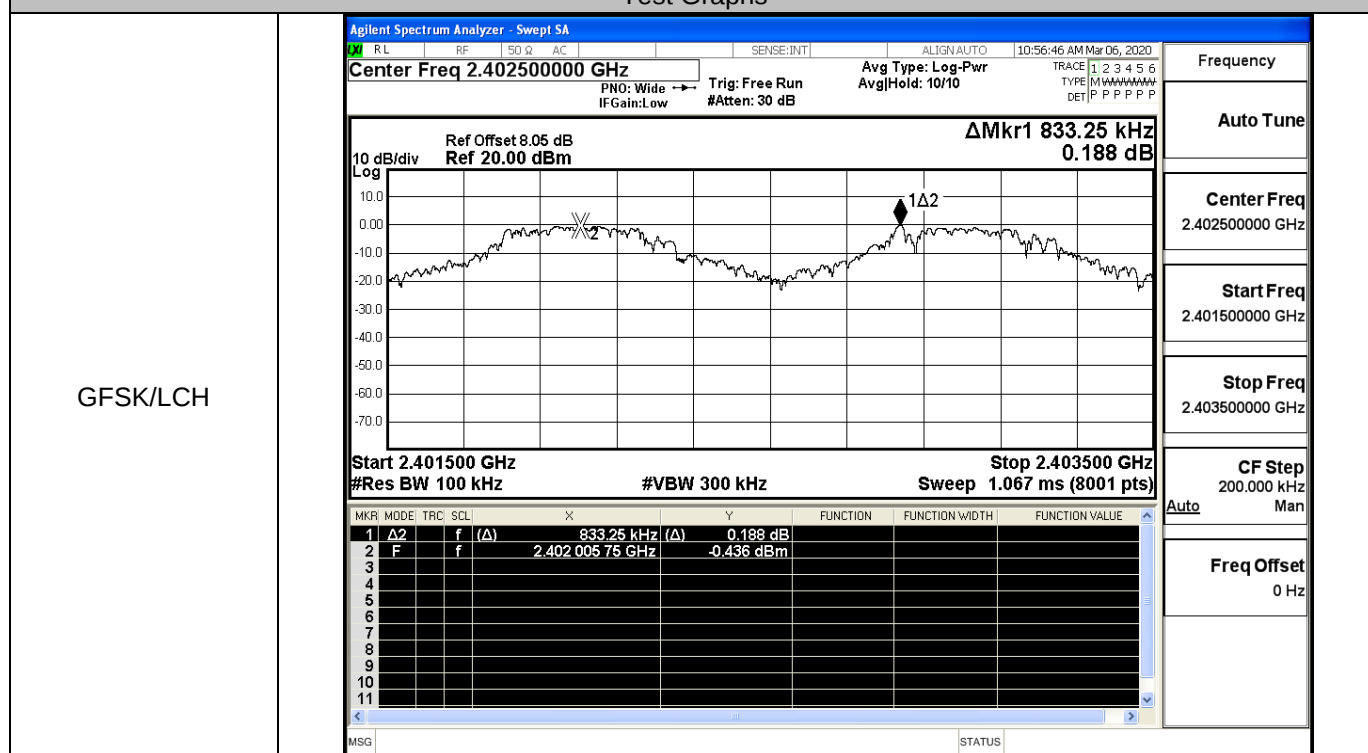
8DPSK/HCH



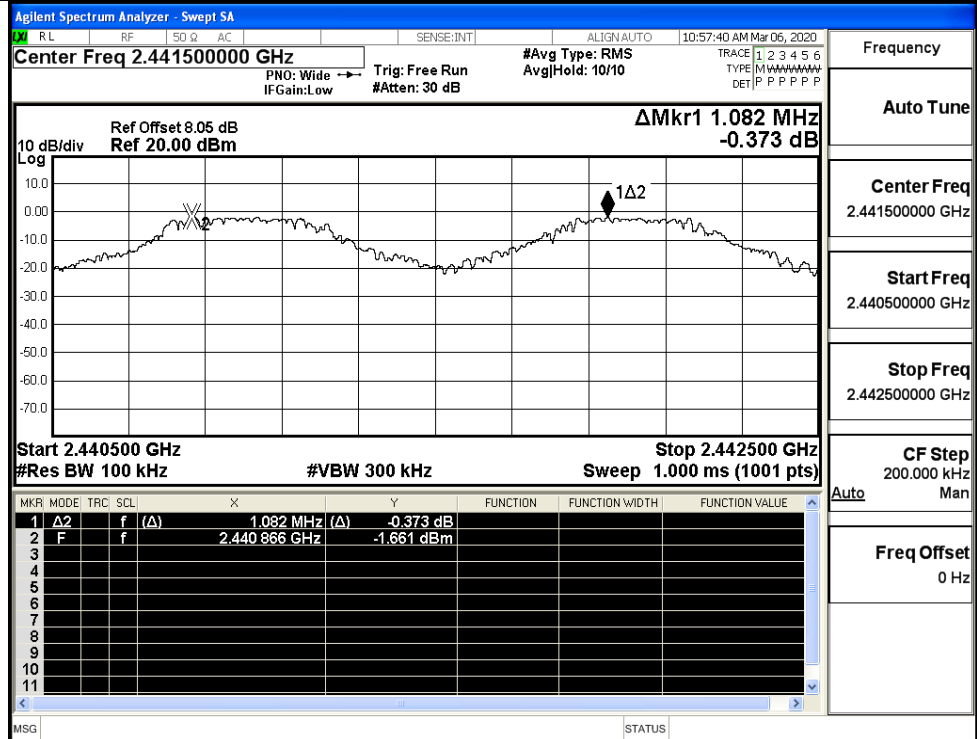
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.833	0.634	PASS
	MCH	1.082	0.634	PASS
	HCH	1.010	0.634	PASS
$\pi/4$ DQPSK	LCH	1.214	0.883	PASS
	MCH	1.008	0.883	PASS
	HCH	1.102	0.883	PASS
8DPSK	LCH	0.988	0.865	PASS
	MCH	1.168	0.865	PASS
	HCH	1.024	0.865	PASS

Test Graphs



GFSK/MCH



Frequency

Auto Tune

Center Freq
2.441500000 GHz

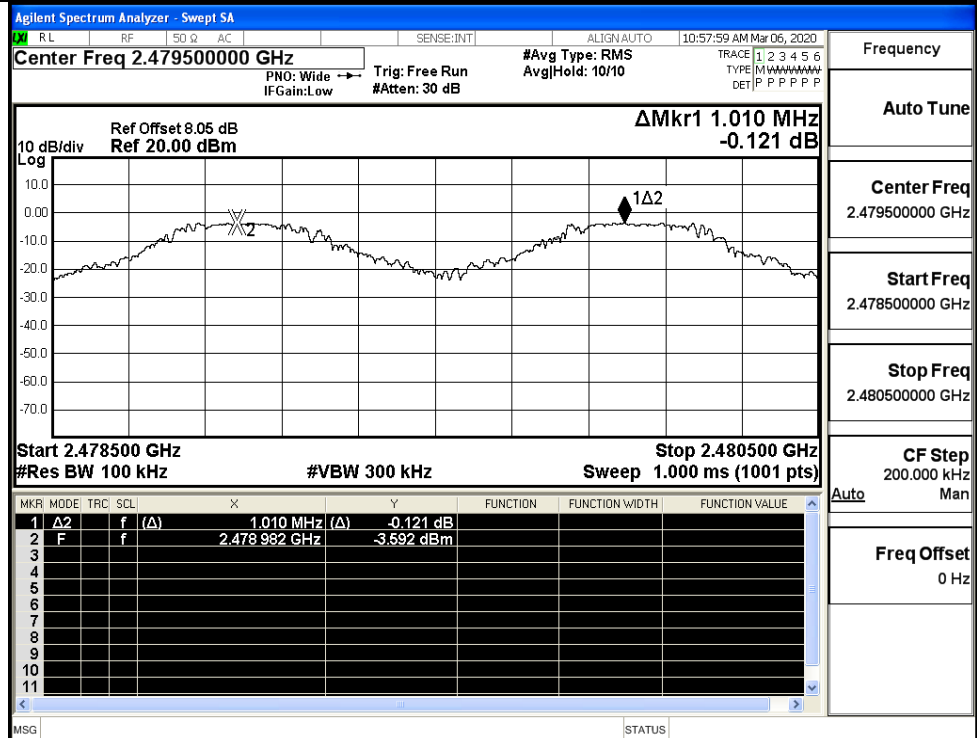
Start Freq
2.440500000 GHz

Stop Freq
2.442500000 GHz

CF Step
200.000 kHz
Man

Freq Offset
0 Hz

GFSK/HCH



Frequency

Auto Tune

Center Freq
2.479500000 GHz

Start Freq
2.478500000 GHz

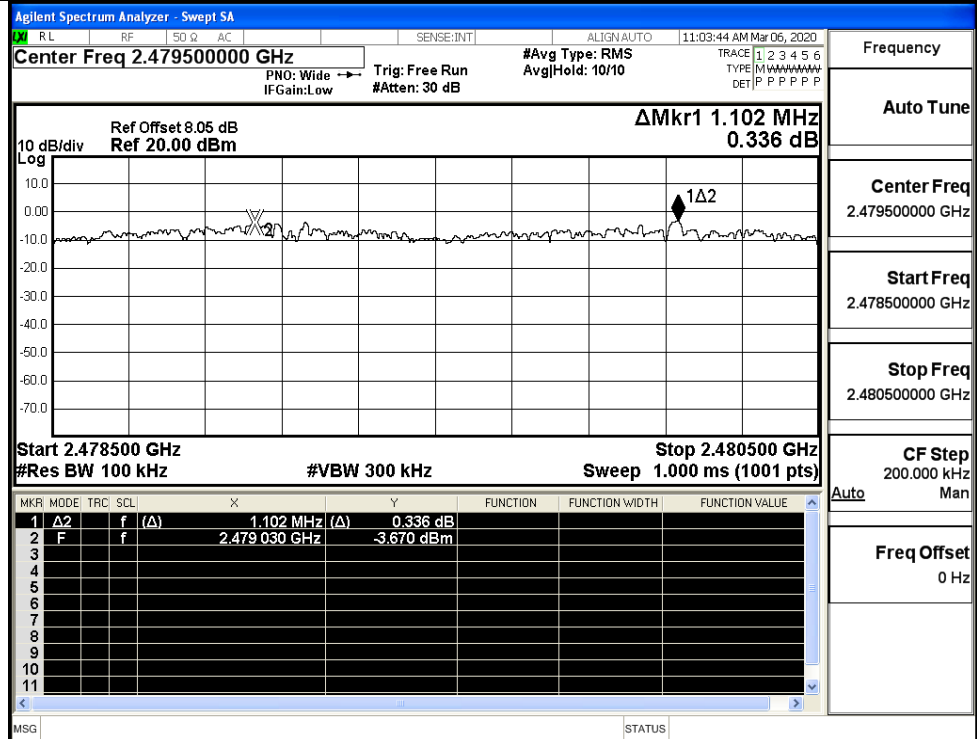
Stop Freq
2.480500000 GHz

CF Step
200.000 kHz
Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/LCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Q AC SENSE:INT ALIGN AUTO 10:59:58 AM Mar 06, 2020 Center Freq 2.402500000 GHz PNO: Wide IF Gain: Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS AvgHld: 10/10 TRACE 1 2 3 4 5 6 TYPE M W W W W W W DET P P P P P P P Ref Offset 8.05 dB Ref 20.00 dBm ΔMkr1 1.214 MHz -2.206 dB 10 dB/div Log Start 2.401500 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.403500 GHz Sweep 1.000 ms (1001 pts) <table><tr><th>MR</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>1.214 MHz (Δ)</td><td>-2.206 dB</td><td></td><td></td><td></td></tr><tr><td>2</td><td>F</td><td>f</td><td></td><td>2.401858 GHz</td><td>-0.073 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 2.402500000 GHz Start Freq 2.401500000 GHz Stop Freq 2.403500000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz	MR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ 2	f	(Δ)	1.214 MHz (Δ)	-2.206 dB				2	F	f		2.401858 GHz	-0.073 dBm				3									4									5									6									7									8									9									10									11								
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$\pi/4$ DQPSK/MCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Q AC SENSE:INT ALIGN AUTO 11:03:21 AM Mar 06, 2020 Center Freq 2.441500000 GHz PNO: Wide IF Gain: Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS AvgHld: 10/10 TRACE 1 2 3 4 5 6 TYPE M W W W W W W DET P P P P P P P Ref Offset 8.05 dB Ref 20.00 dBm ΔMkr1 1.008 MHz 0.208 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>MR</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>1.008 MHz (Δ)</td><td>0.208 dB</td><td></td><td></td><td></td></tr><tr><td>2</td><td>F</td><td>f</td><td></td><td>2.440840 GHz</td><td>-1.858 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 Man Freq Offset 0 Hz	MR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ 2	f	(Δ)	1.008 MHz (Δ)	0.208 dB				2	F	f		2.440840 GHz	-1.858 dBm				3									4									5									6									7									8									9									10									11								
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$\pi/4$ DQPSK/HCH



Frequency

Auto Tune

Center Freq
2.479500000 GHz

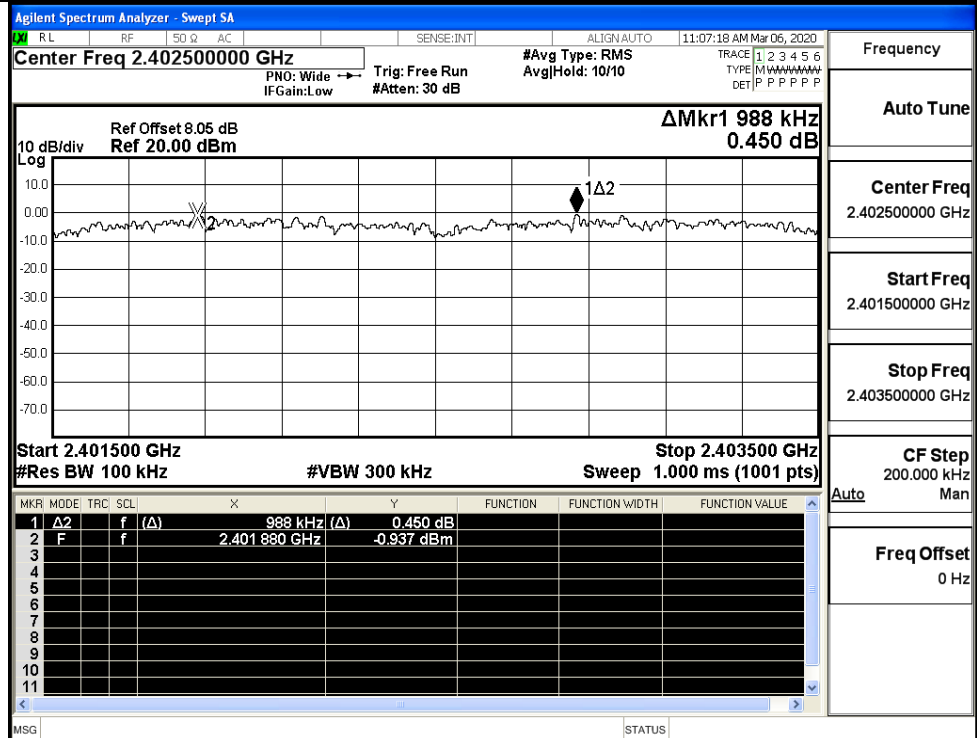
Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

CF Step
200.000 kHz
Man

Freq Offset
0 Hz

8DPSK/LCH



Frequency

Auto Tune

Center Freq
2.402500000 GHz

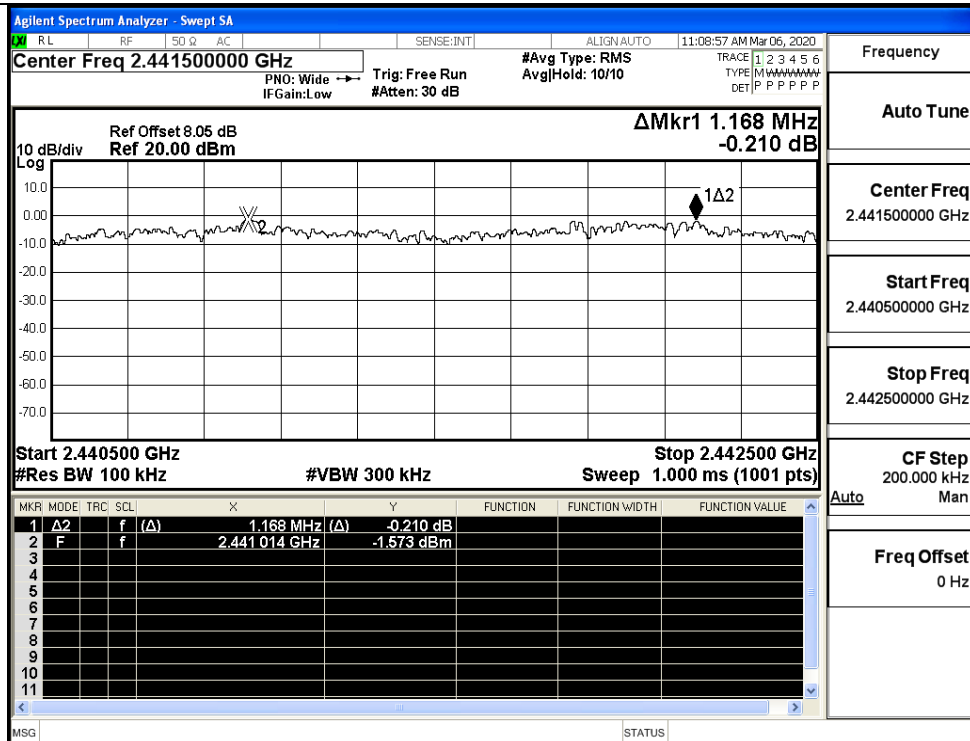
Start Freq
2.401500000 GHz

Stop Freq
2.403500000 GHz

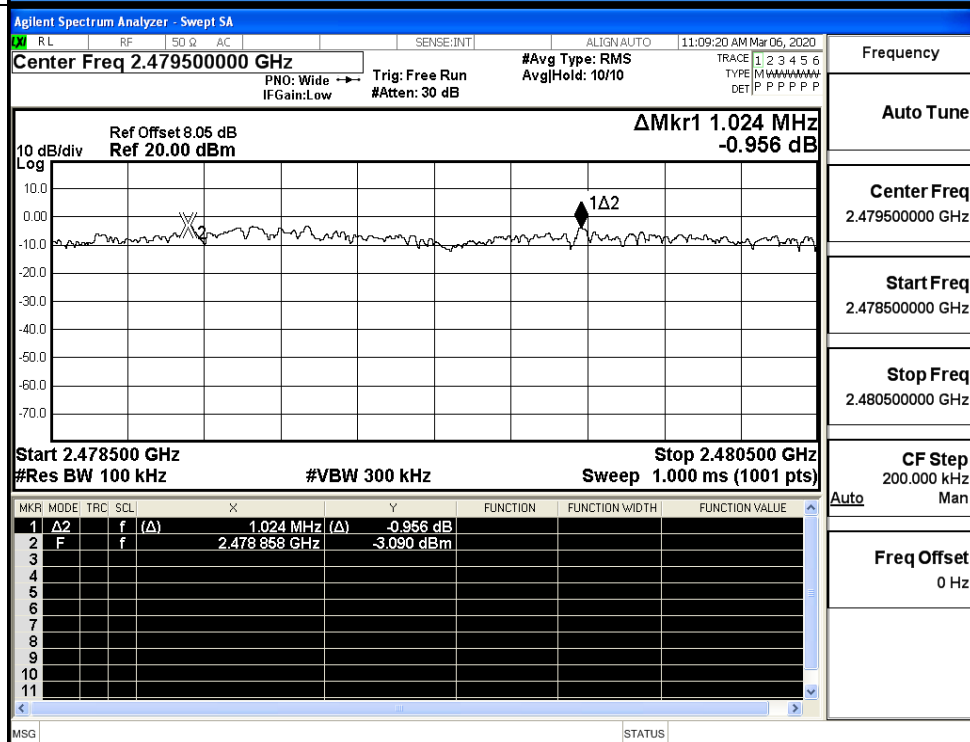
CF Step
200.000 kHz
Man

Freq Offset
0 Hz

8DPSK/MCH



8DPSK/HCH

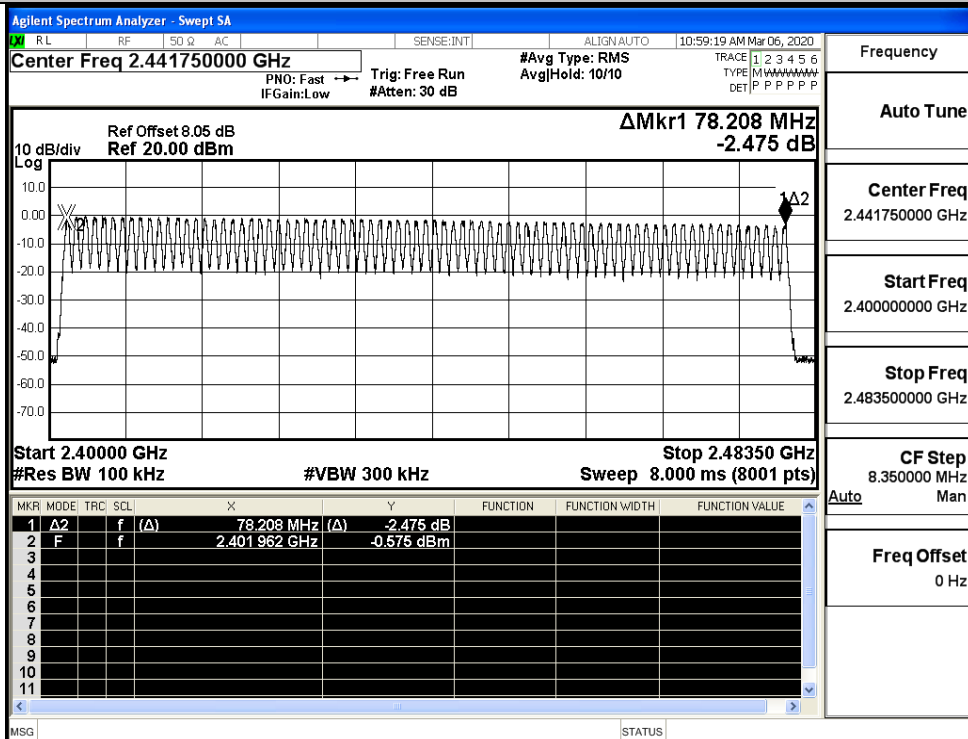
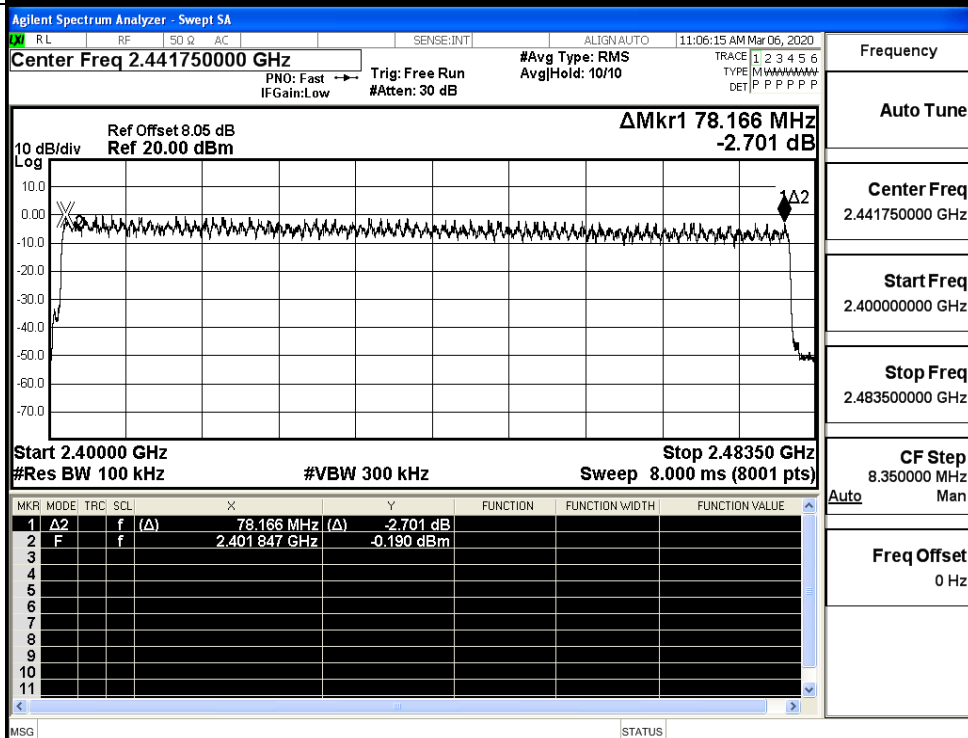


A.4 Hopping Channel Number

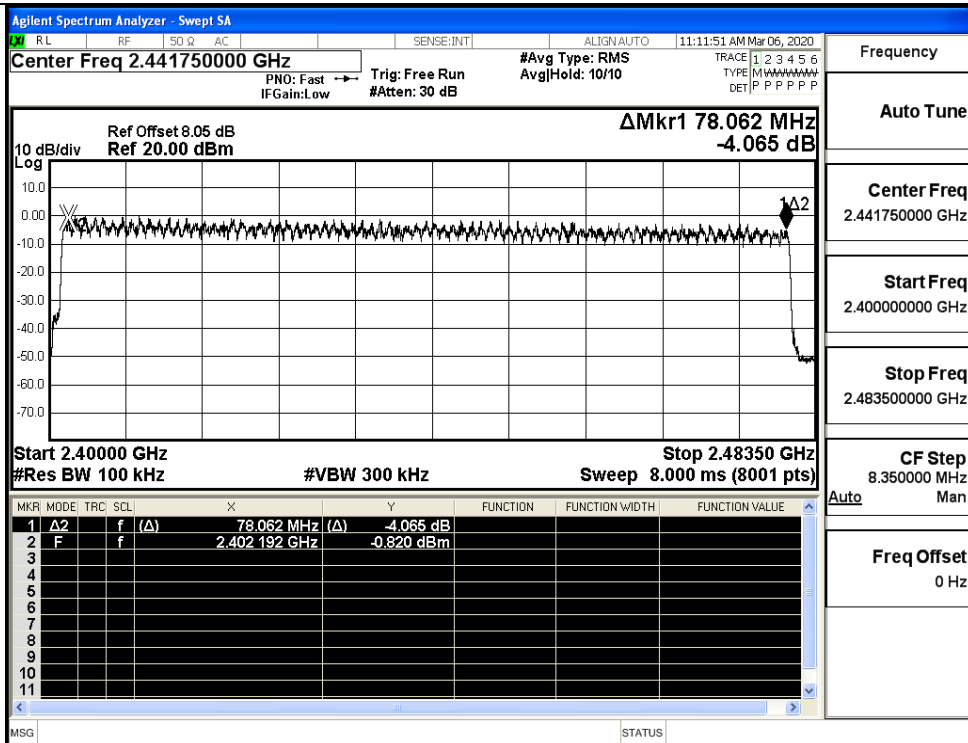
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

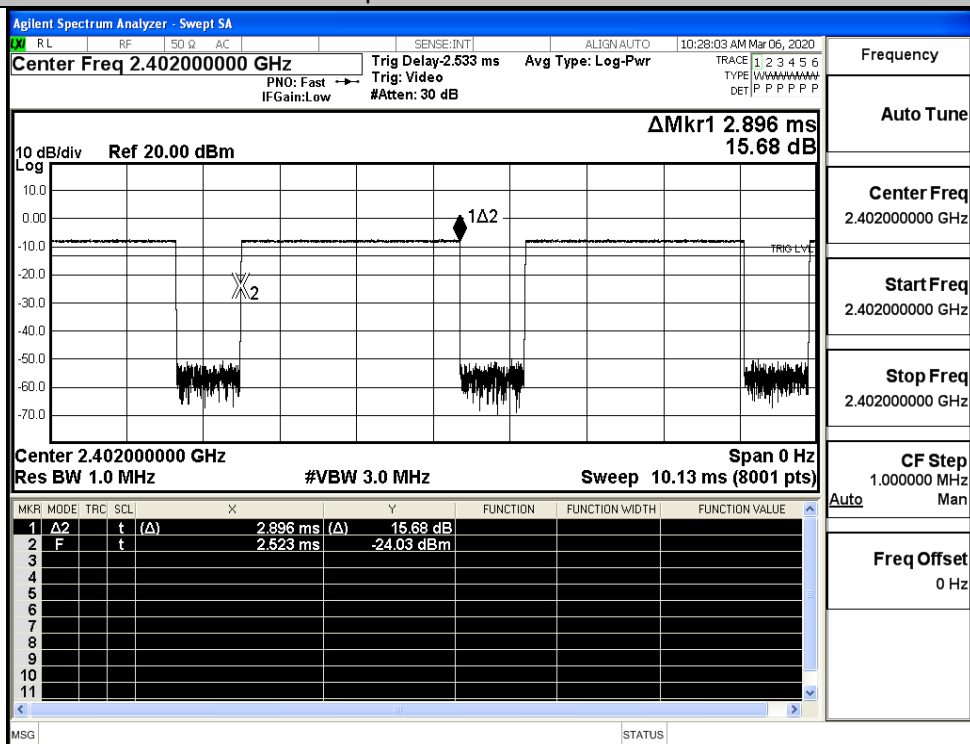


A.5 Dwell Time

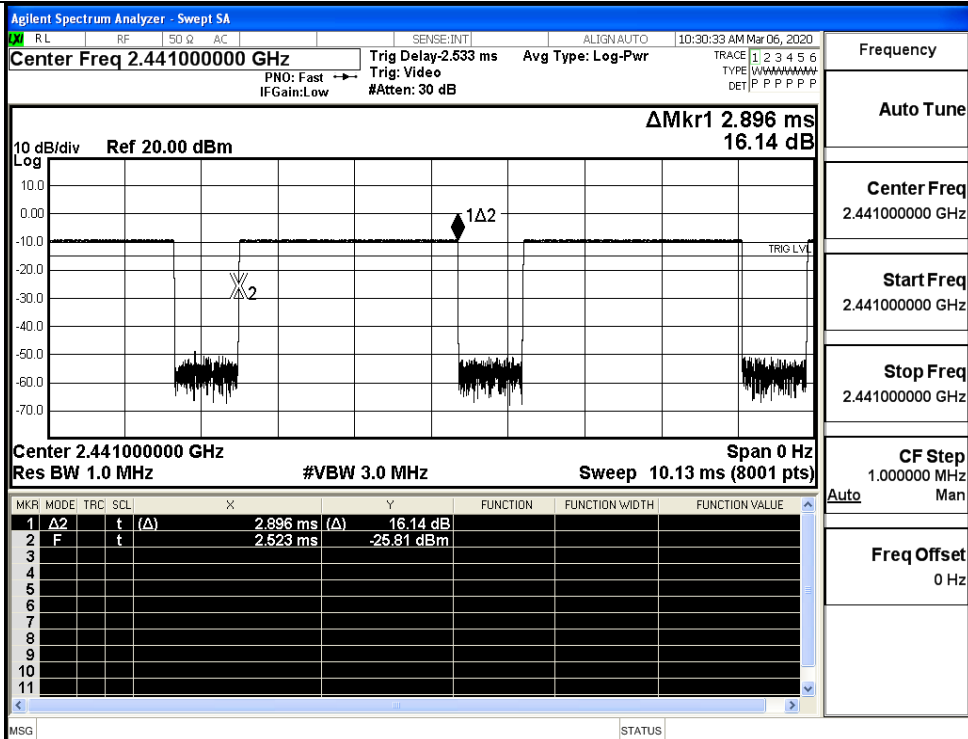
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.9	106.7	0.309	0.4	PASS
	DH5	MCH	2.9	106.7	0.309	0.4	PASS
	DH5	HCH	2.9	106.7	0.309	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.9	106.7	0.309	0.4	PASS
	2DH5	MCH	2.9	106.7	0.309	0.4	PASS
	2DH5	HCH	2.9	106.7	0.309	0.4	PASS
8DPSK	3DH5	LCH	2.9	106.7	0.309	0.4	PASS
	3DH5	MCH	2.9	106.7	0.309	0.4	PASS
	3DH5	HCH	2.9	106.7	0.309	0.4	PASS

Test Graphs

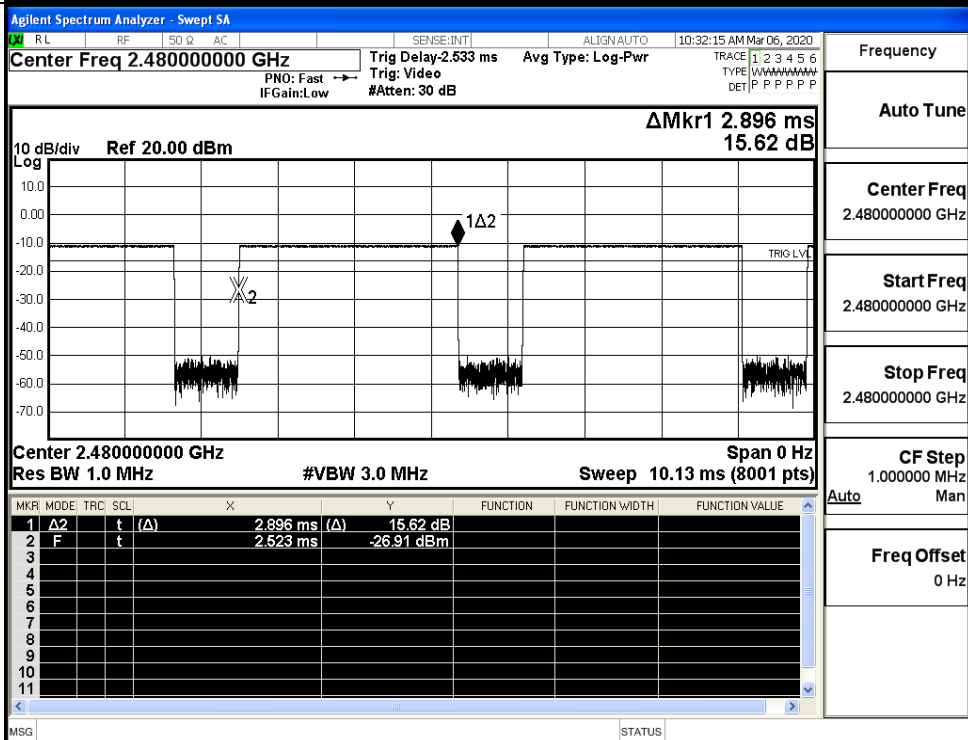
GFSK_DH5/LCH



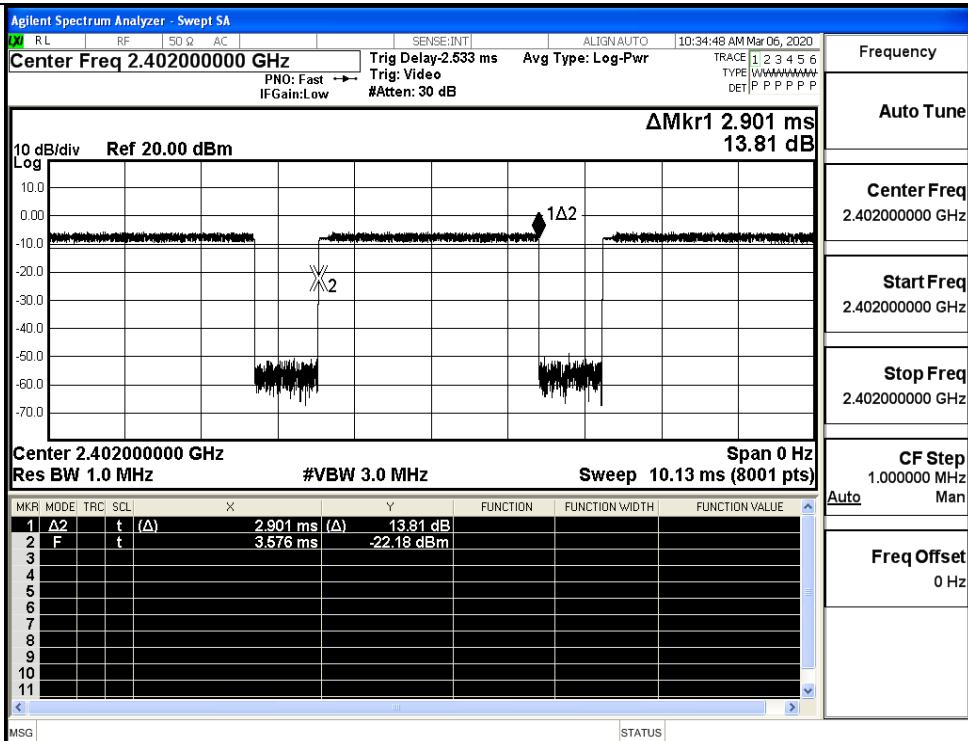
GFSK_DH5/MCH



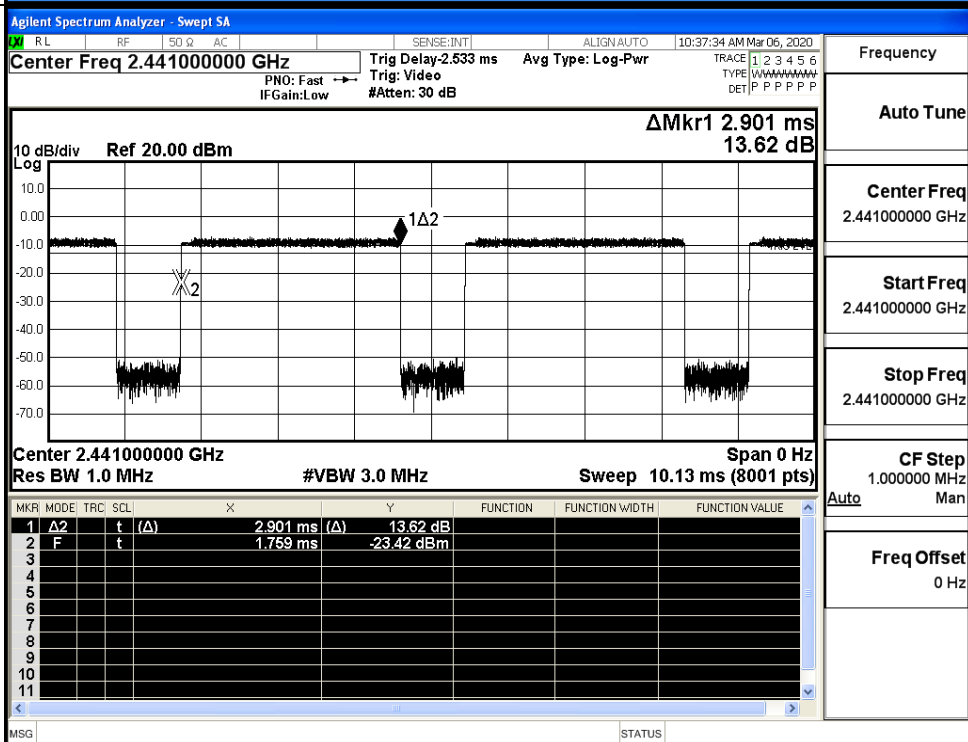
GFSK_DH5/HCH



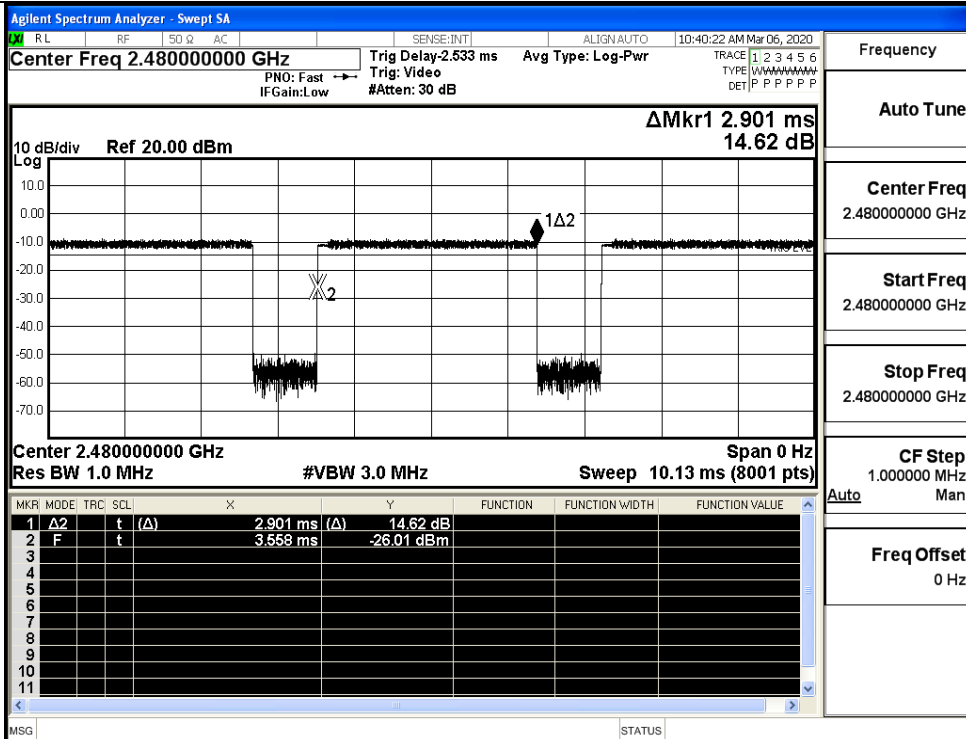
$\pi/4$ DQPSK
_2DH5/LCH



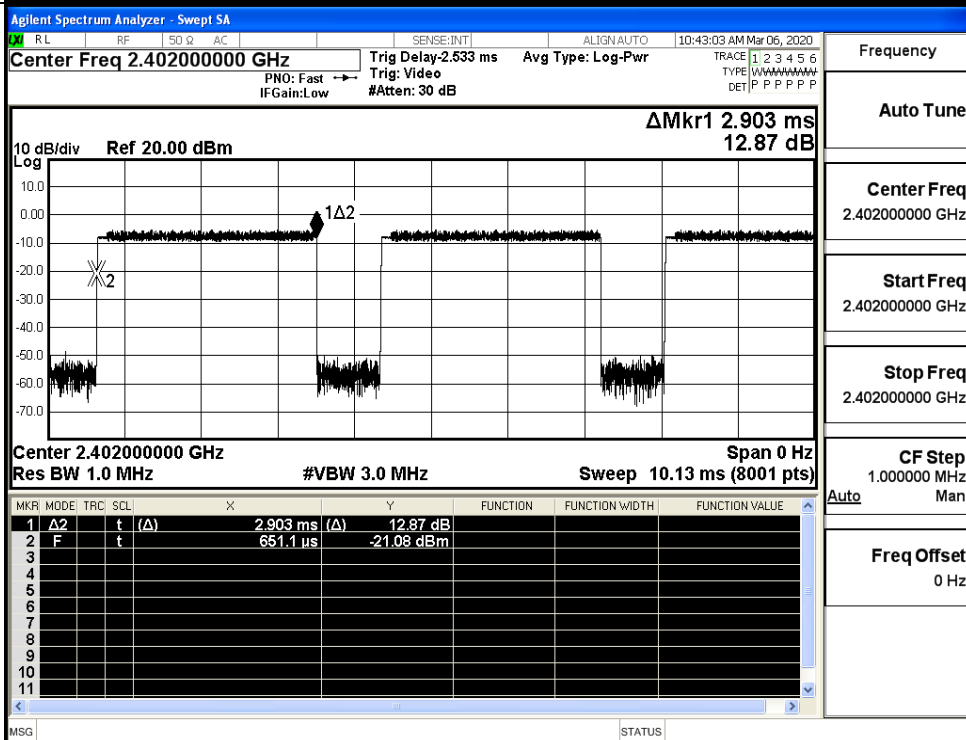
$\pi/4$ DQPSK
_2DH5/MCH



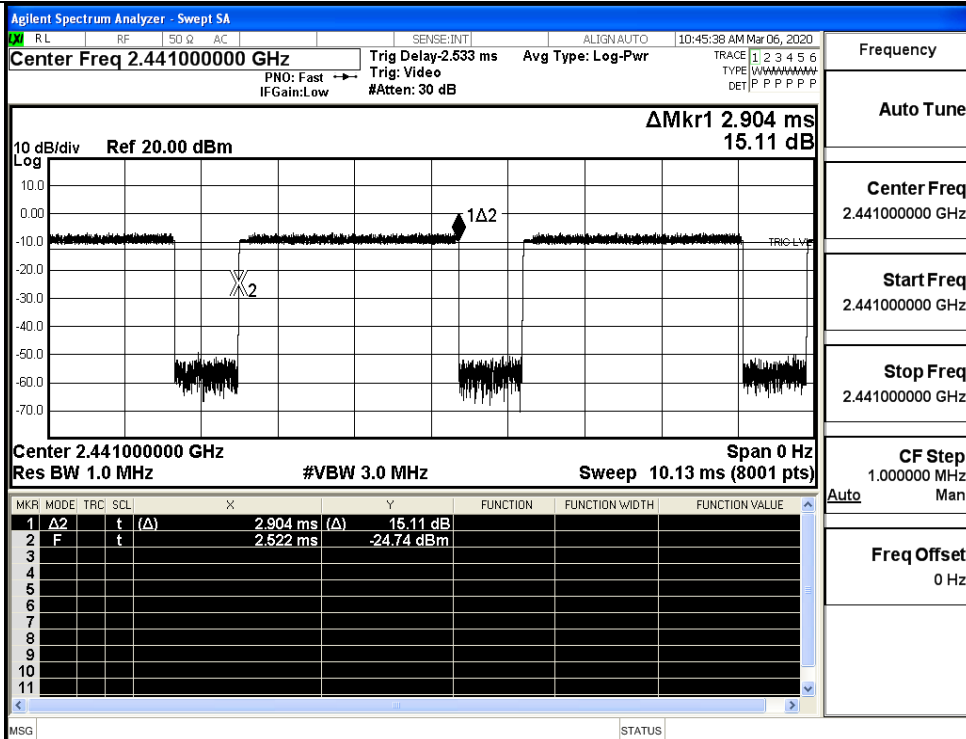
$\pi/4$ DQPSK
_2DH5/HCH



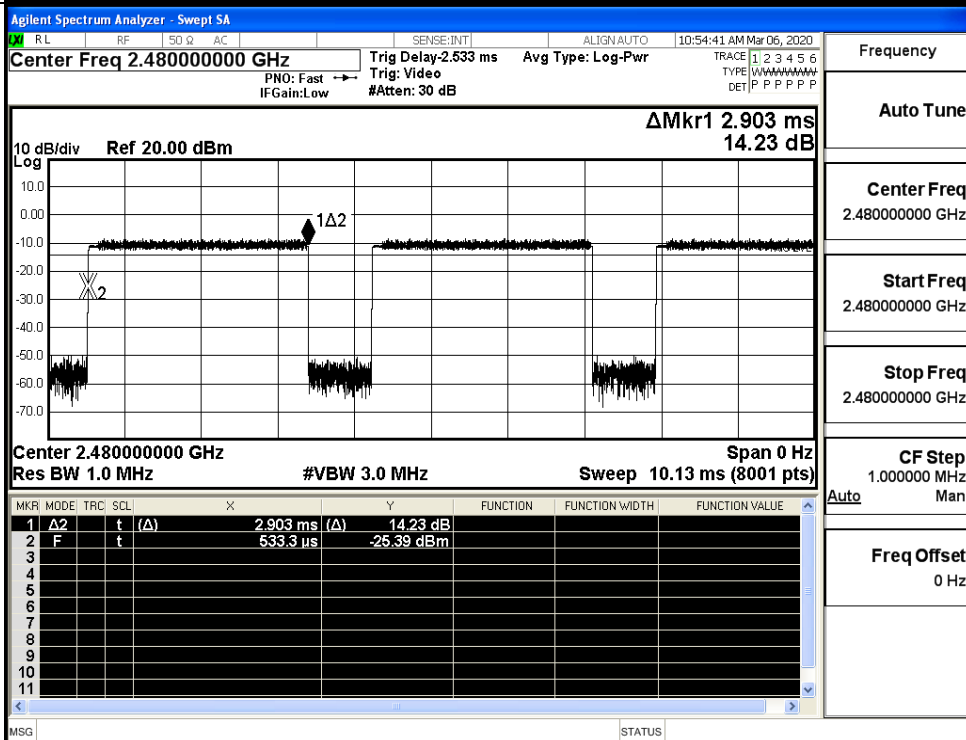
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



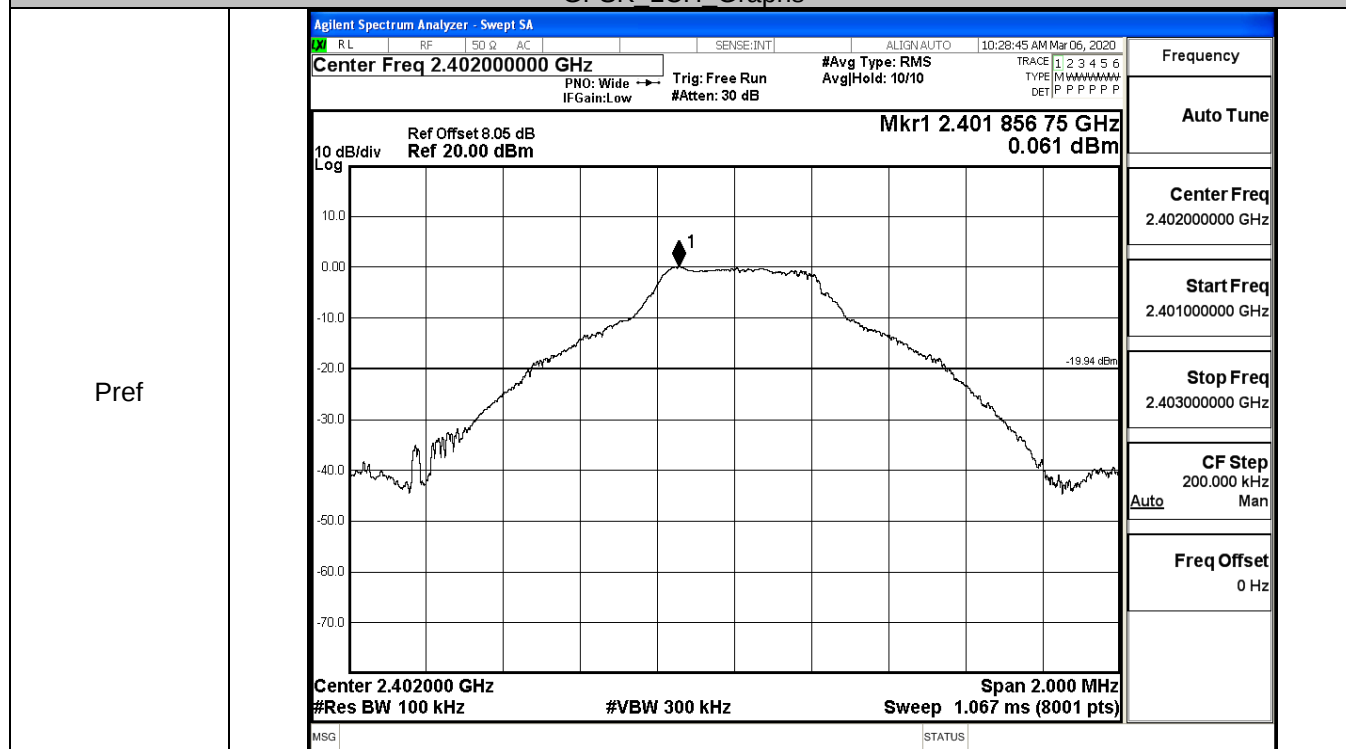
8DPSK_3DH5/HCH

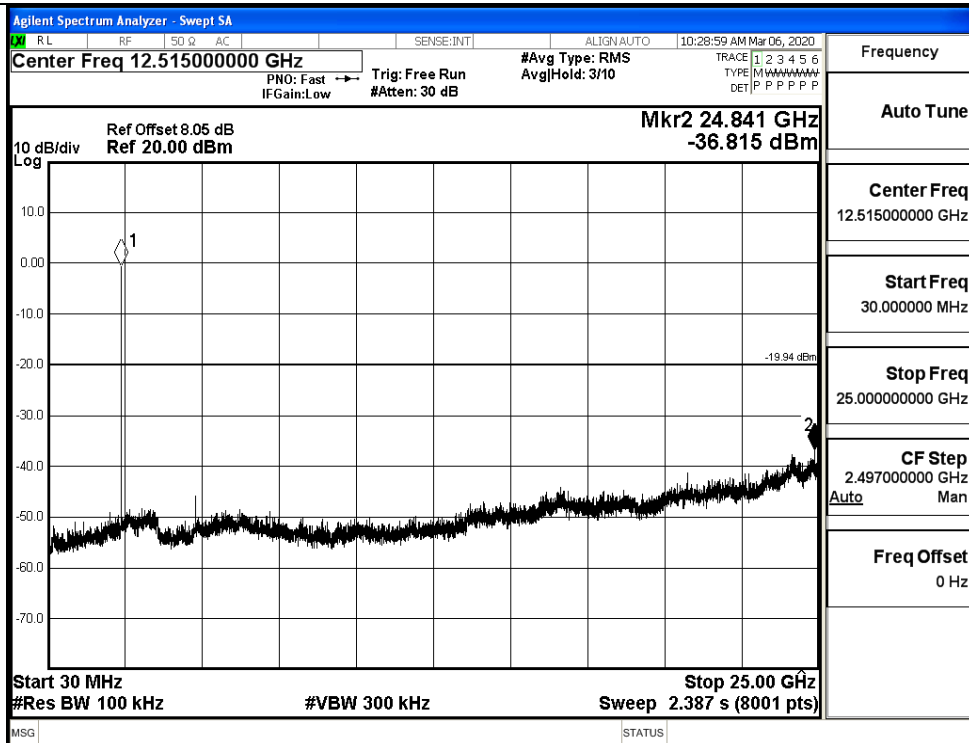


A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.061	-36.815	-19.939	PASS
	MCH	-1.436	-37.253	-21.436	PASS
	HCH	-3.026	-37.556	-23.026	PASS
$\pi/4$ DQPSK	LCH	-0.076	-37.895	-20.076	PASS
	MCH	-1.553	-38.320	-21.553	PASS
	HCH	-3.197	-36.984	-23.197	PASS
8DPSK	LCH	-0.012	-37.544	-20.012	PASS
	MCH	-1.441	-37.895	-21.441	PASS
	HCH	-3.084	-37.317	-23.084	PASS

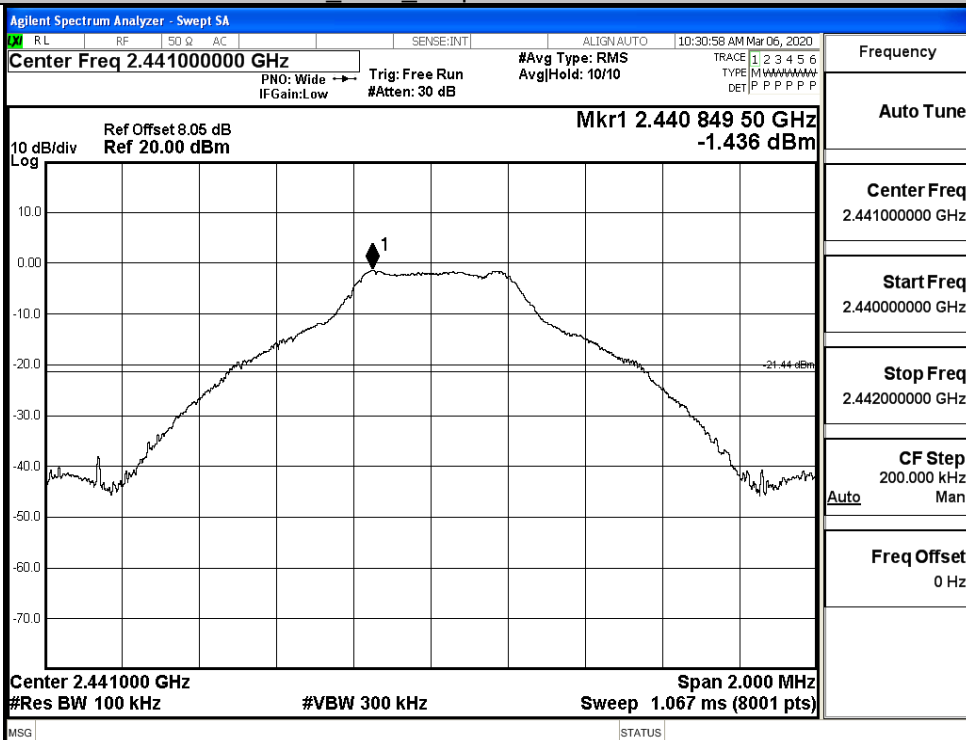
GFSK LCH Graphs



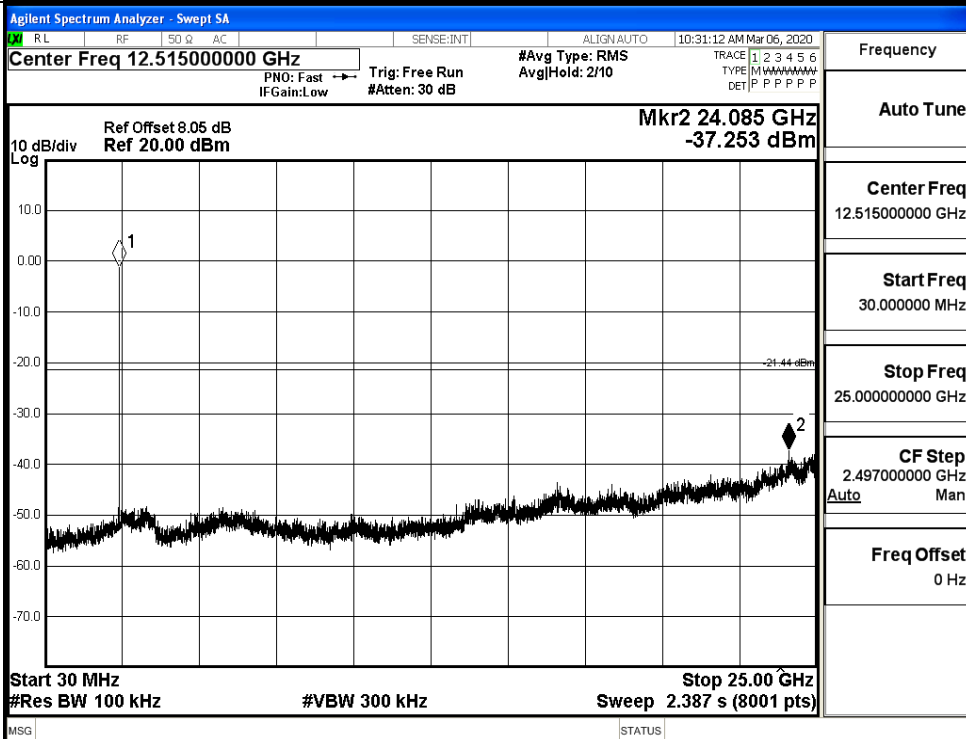


GFSK_MCH_Graphs

Pref

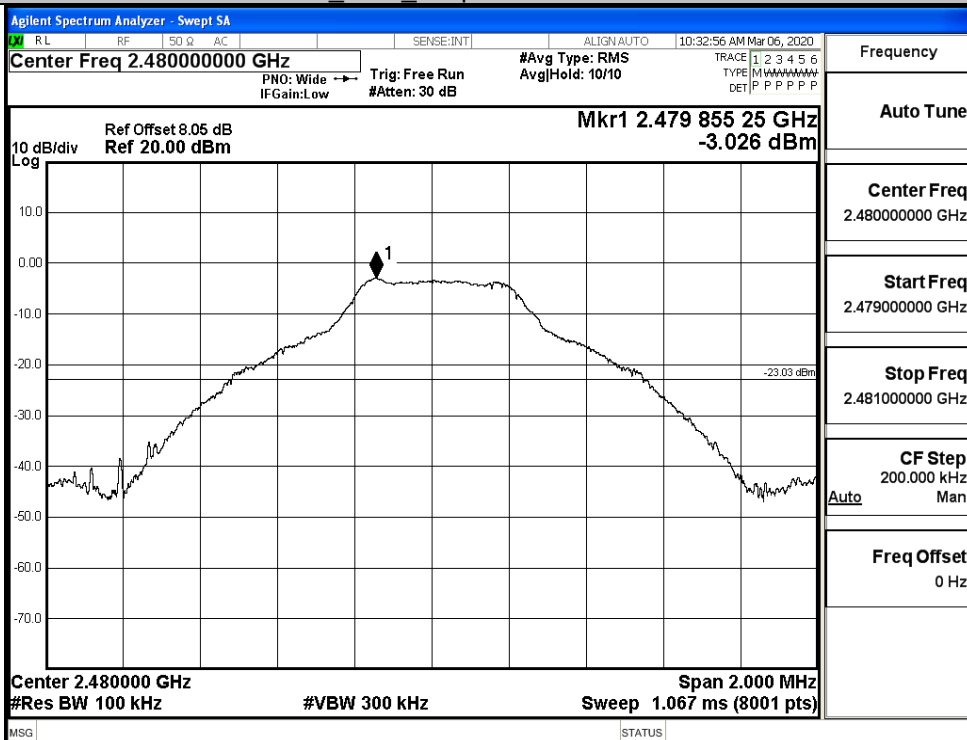


Puw

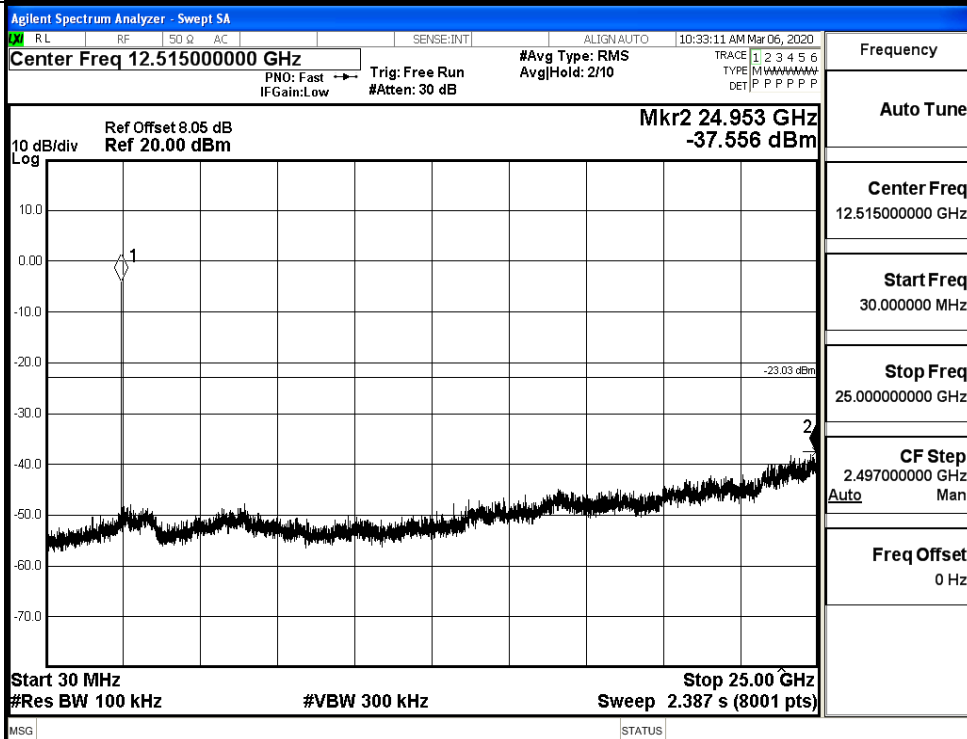


GFSK HCH_Graphs

Pref

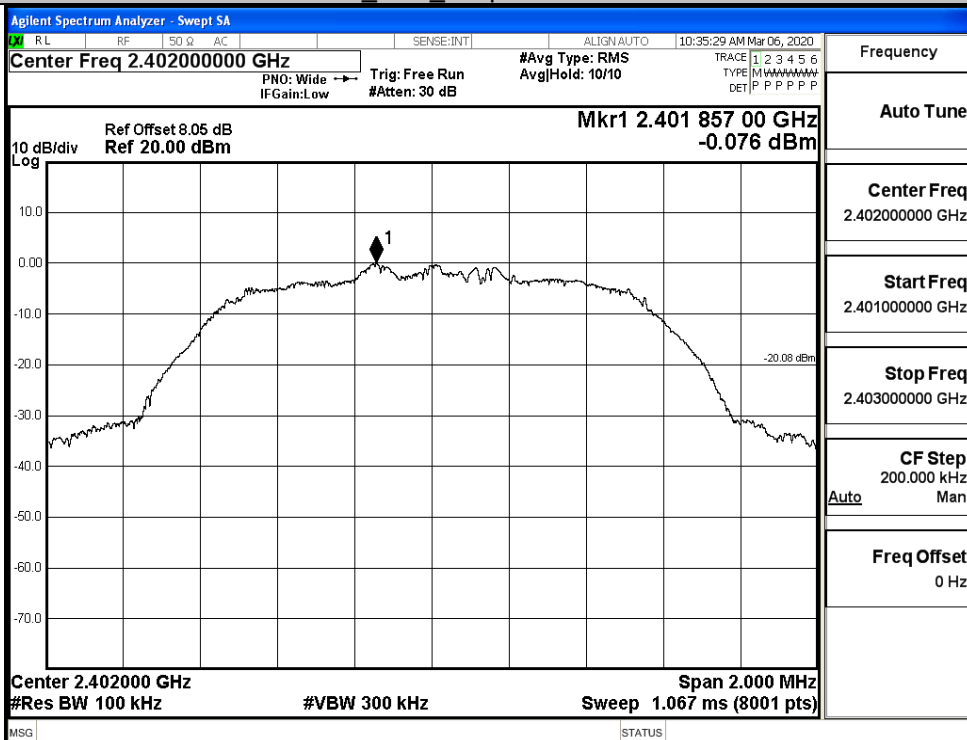


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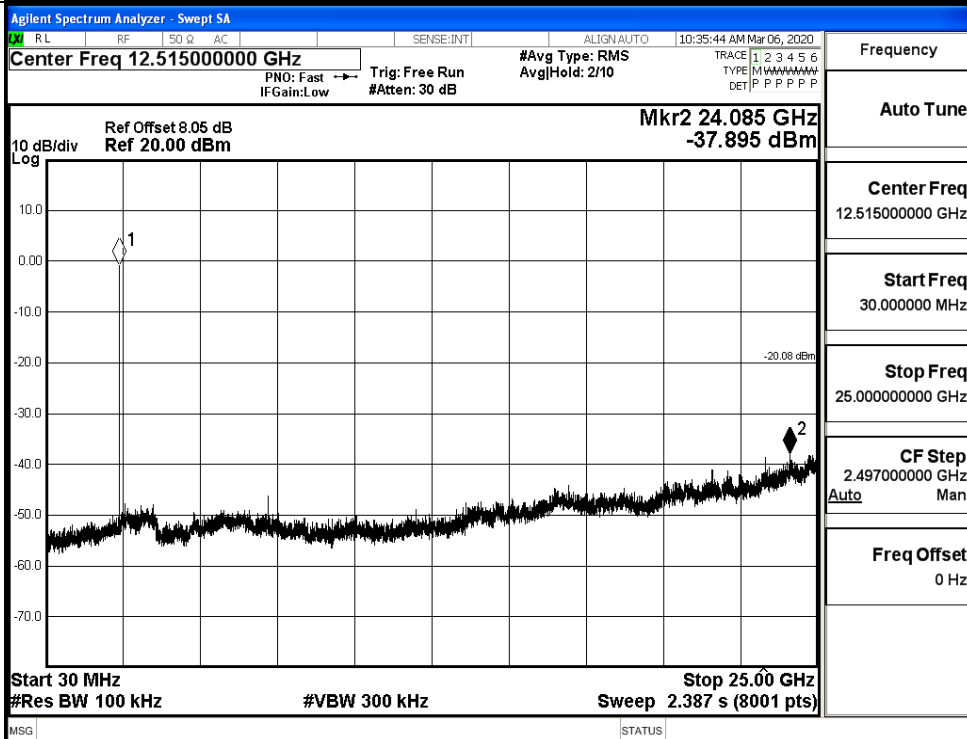


$\pi/4$ DQPSK_LCH_Graphs

Pref

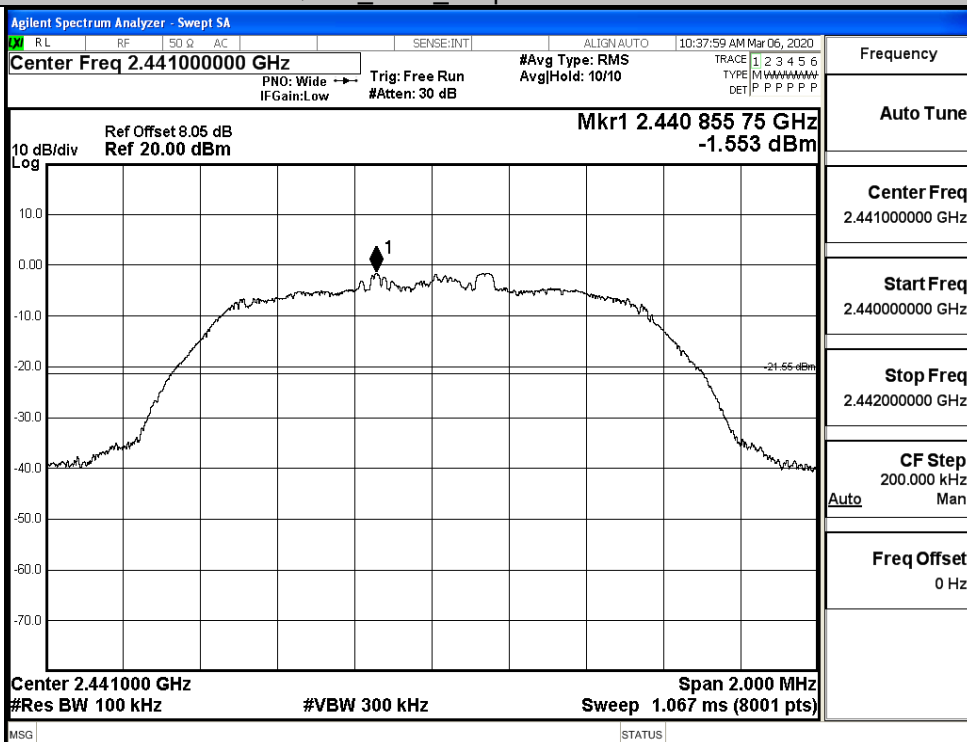


Puw

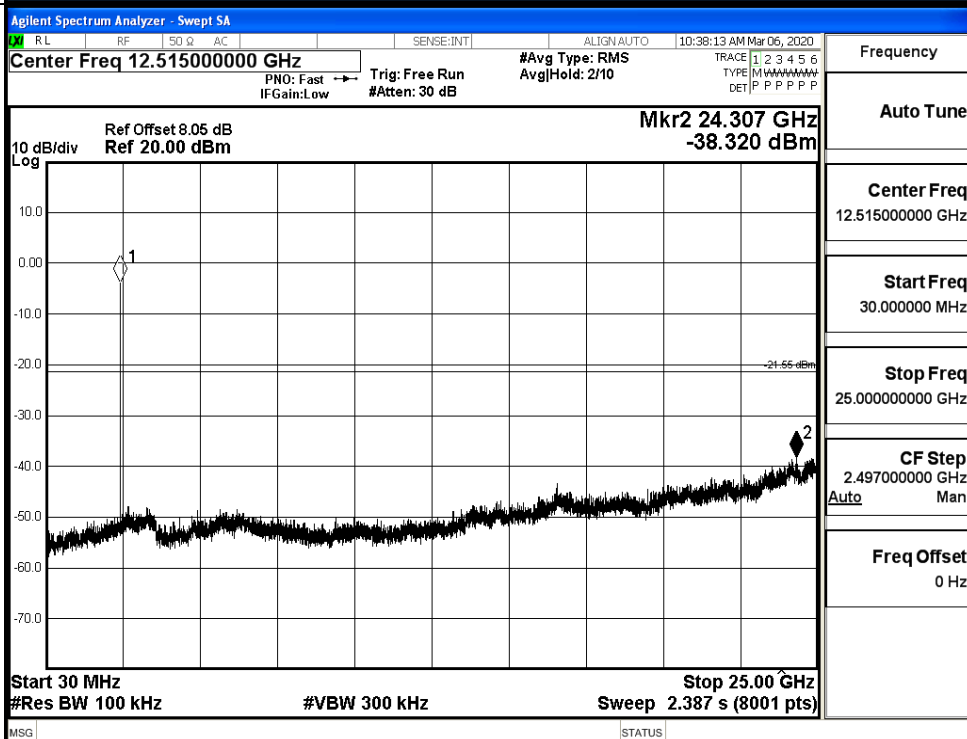


$\pi/4$ DQPSK_MCH_Graphs

Pref

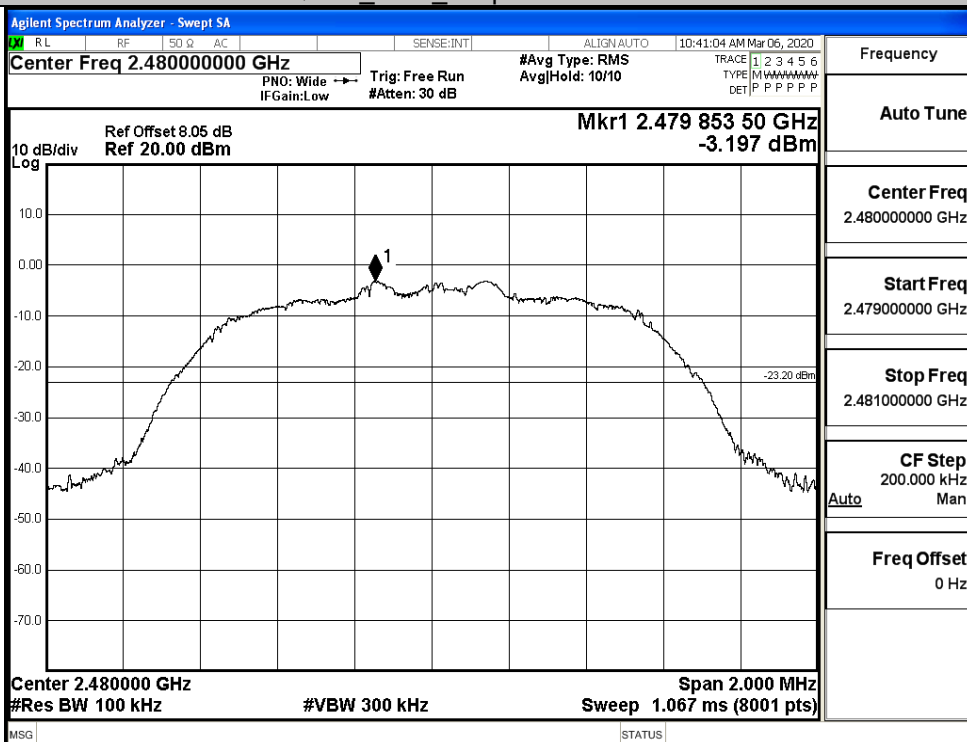


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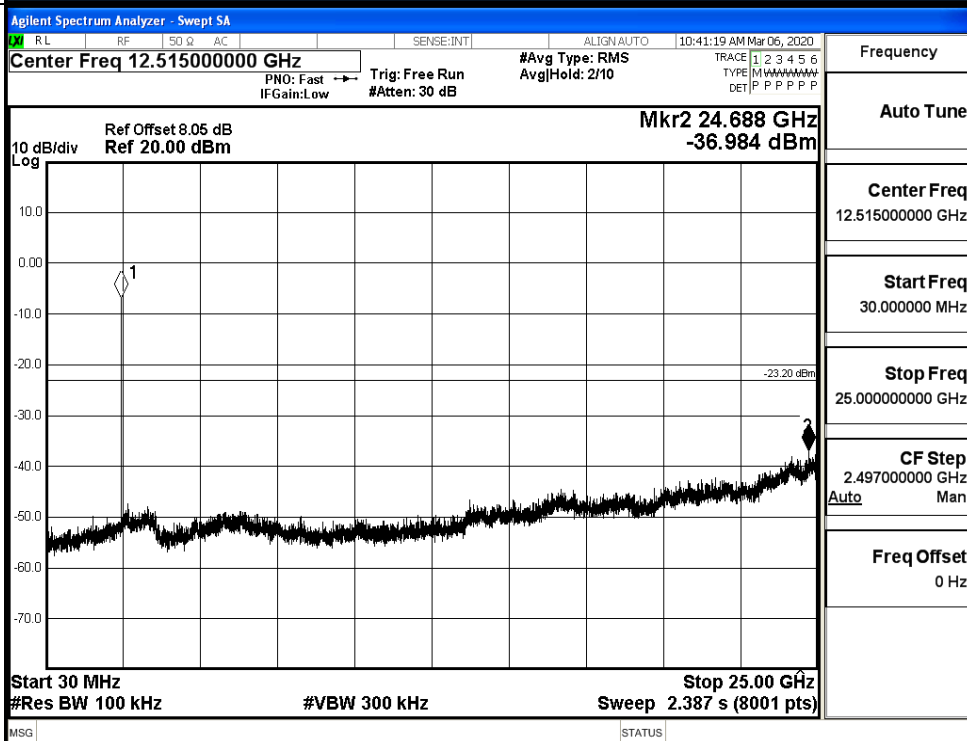


$\pi/4$ DQPSK_HCH_Graphs

Pref

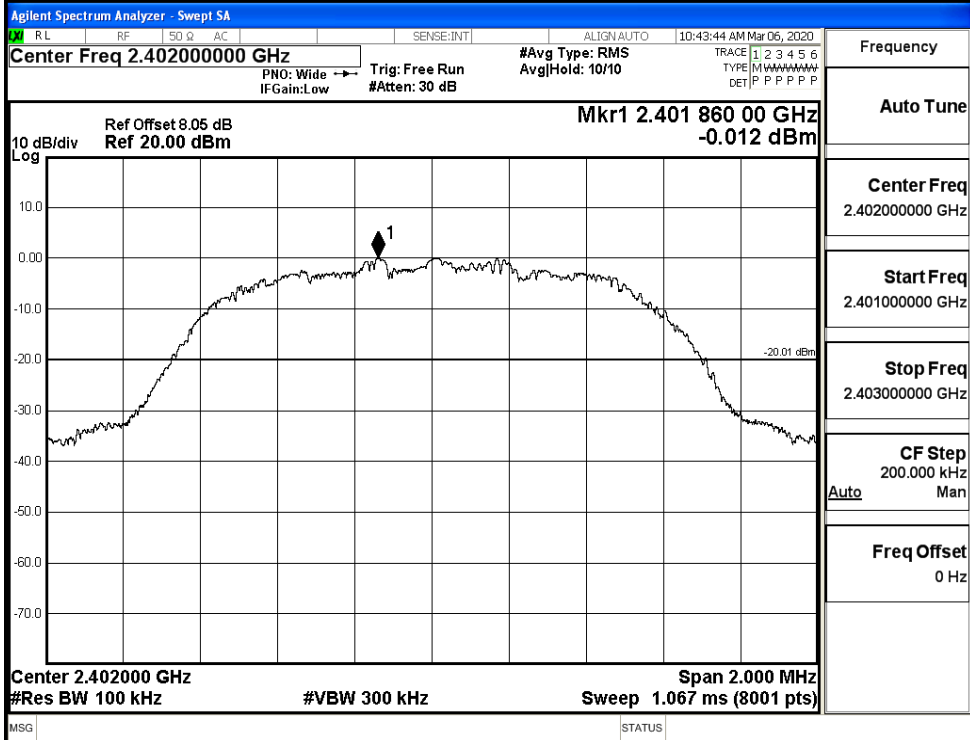


Puw

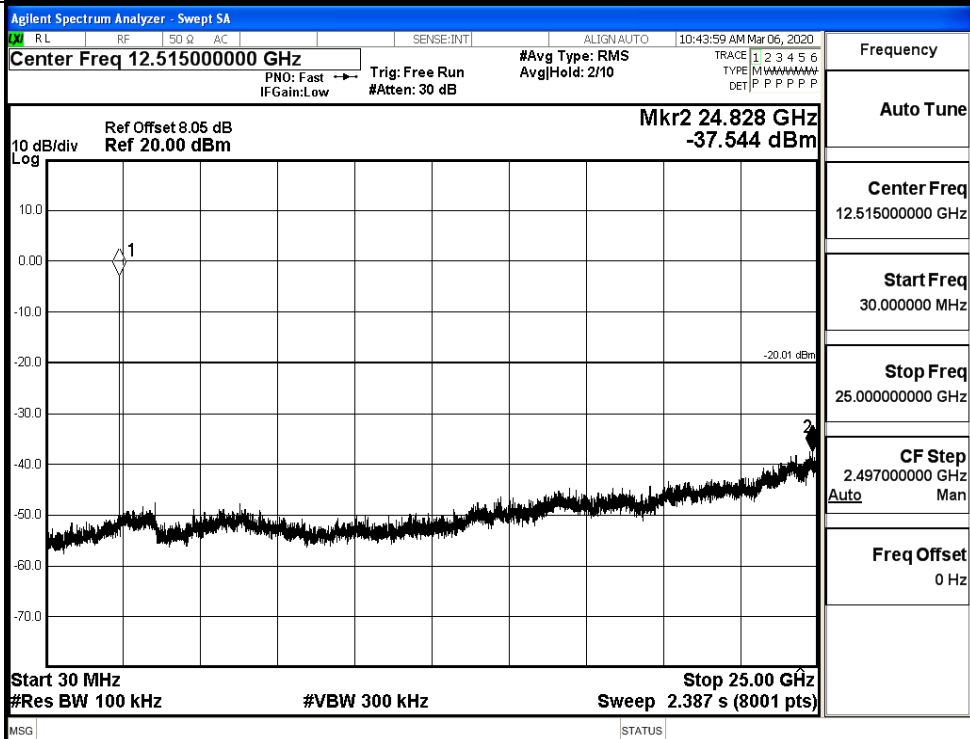


8DPSK_LCH_Graphs

Pref

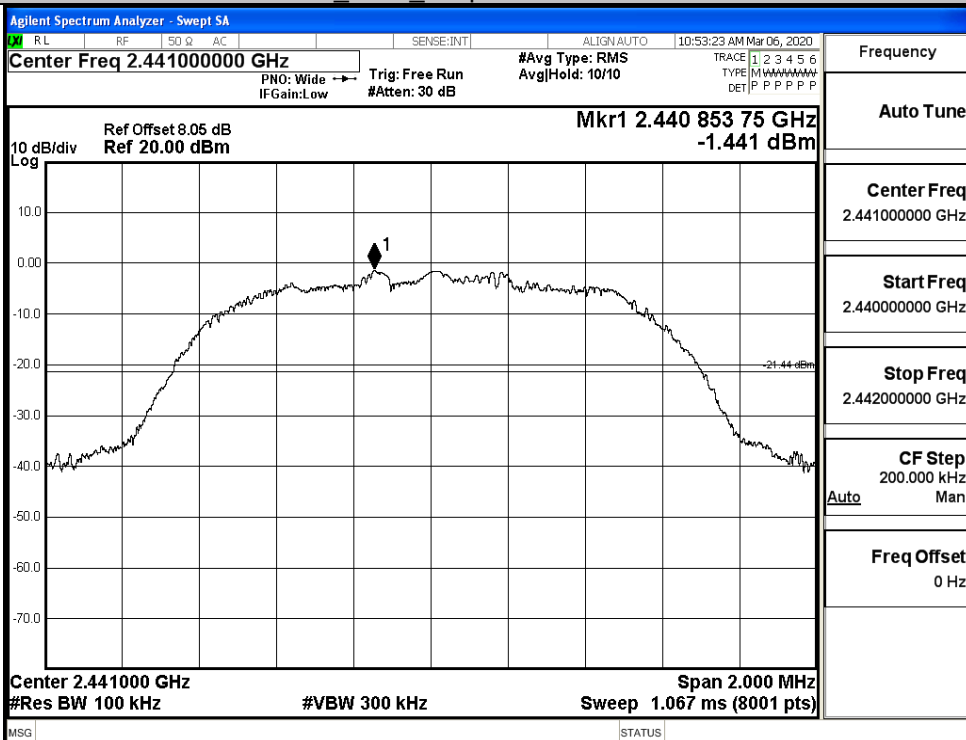


Puw

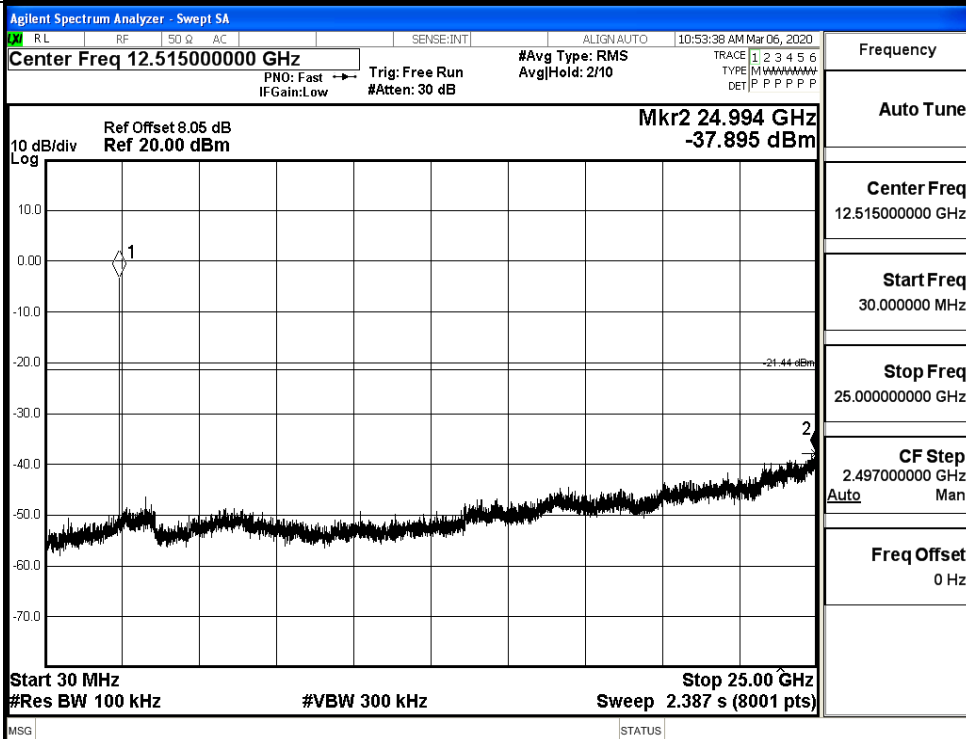


8DPSK_MCH_Graphs

Pref

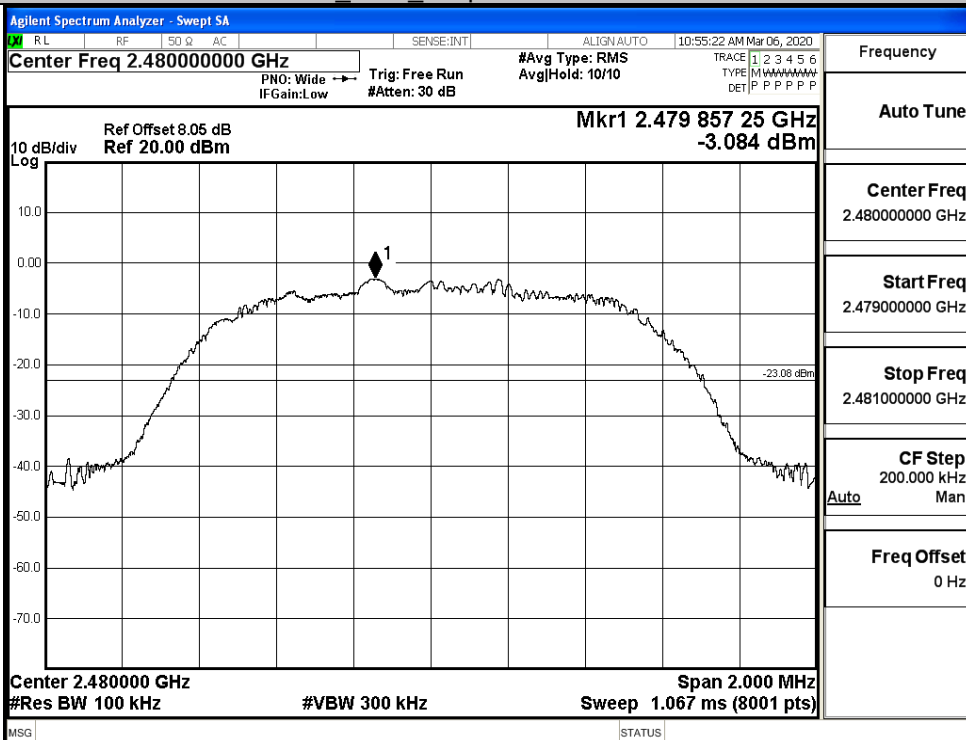


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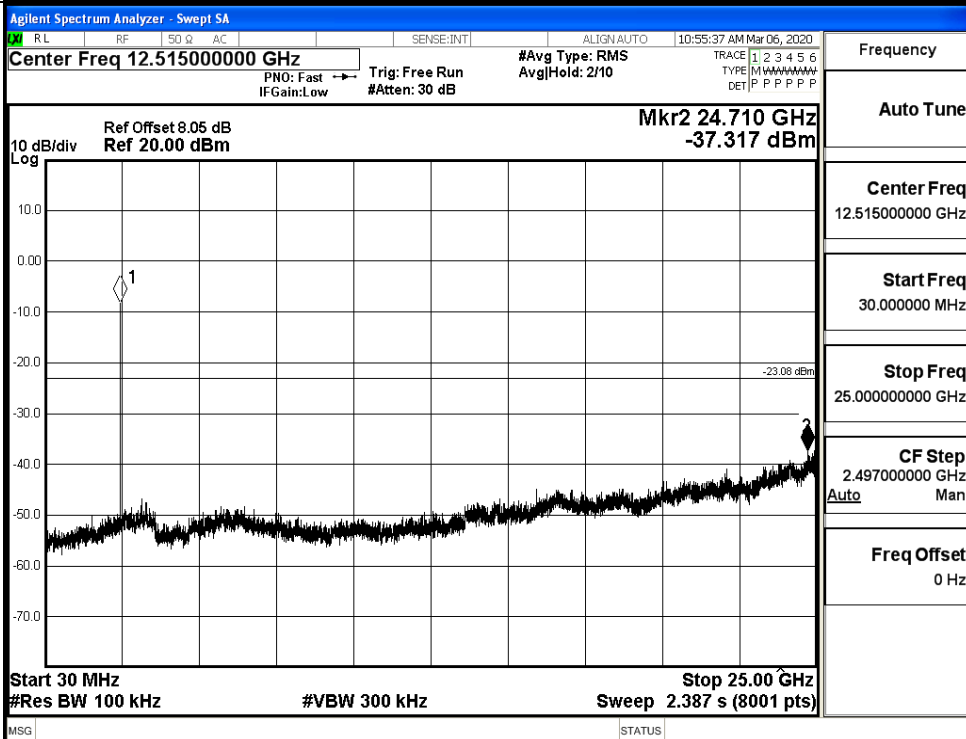


8DPSK_HCH_Graphs

Pref



Puw

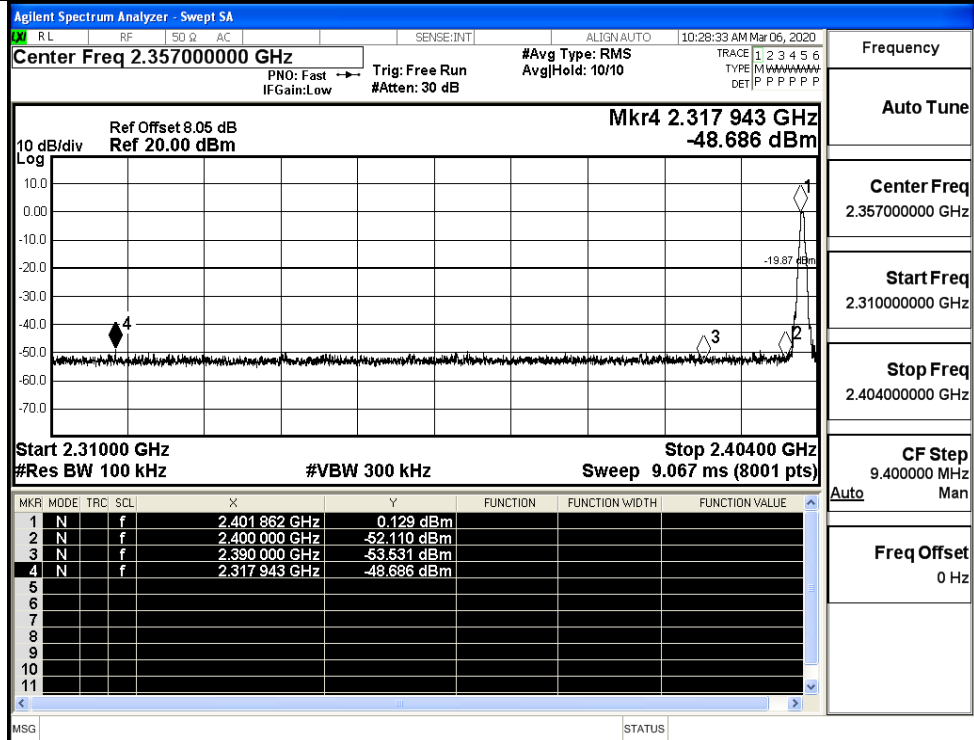


A.7 Band-edge for RF Conducted Emissions

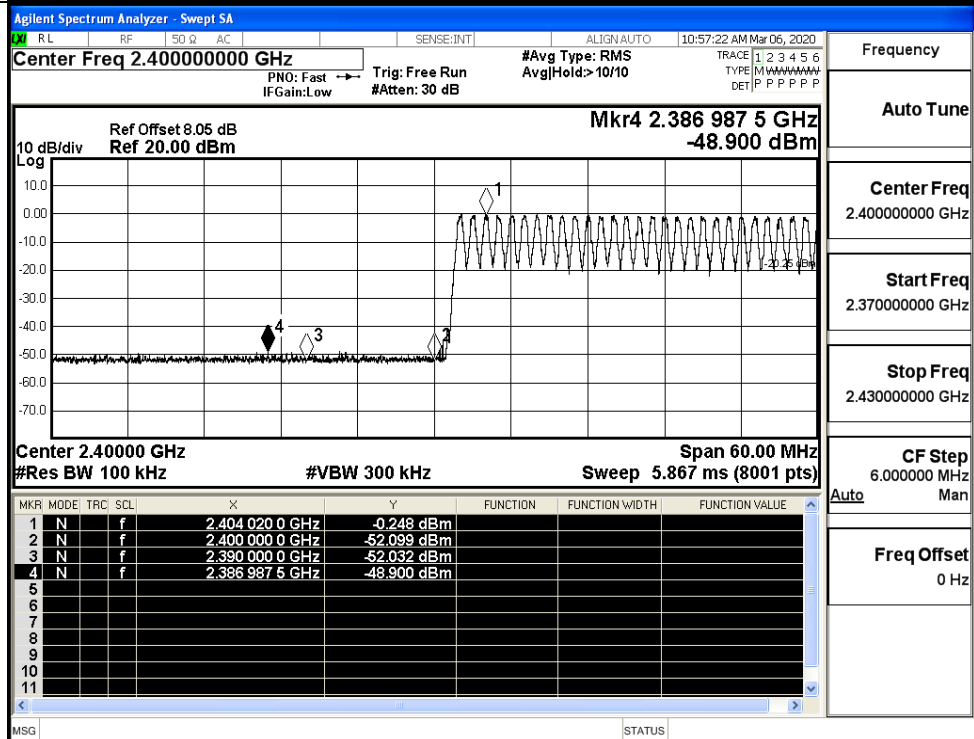
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	0.129	Off	-48.686	-19.87	PASS
			-0.248	On	-48.900	-20.25	PASS
	HCH	2480	-3.078	Off	-49.100	-23.08	PASS
			-2.373	On	-48.722	-22.37	PASS
$\pi/4$ DQPSK	LCH	2402	-0.085	Off	-48.808	-20.09	PASS
			0.071	On	-48.220	-19.93	PASS
	HCH	2480	-3.028	Off	-48.803	-23.03	PASS
			-2.284	On	-48.224	-22.28	PASS
8DPSK	LCH	2402	0.104	Off	-49.375	-19.9	PASS
			0.106	On	-48.842	-19.89	PASS
	HCH	2480	-3.106	Off	-48.938	-23.11	PASS
			-2.291	On	-48.531	-22.29	PASS

Test Graphs

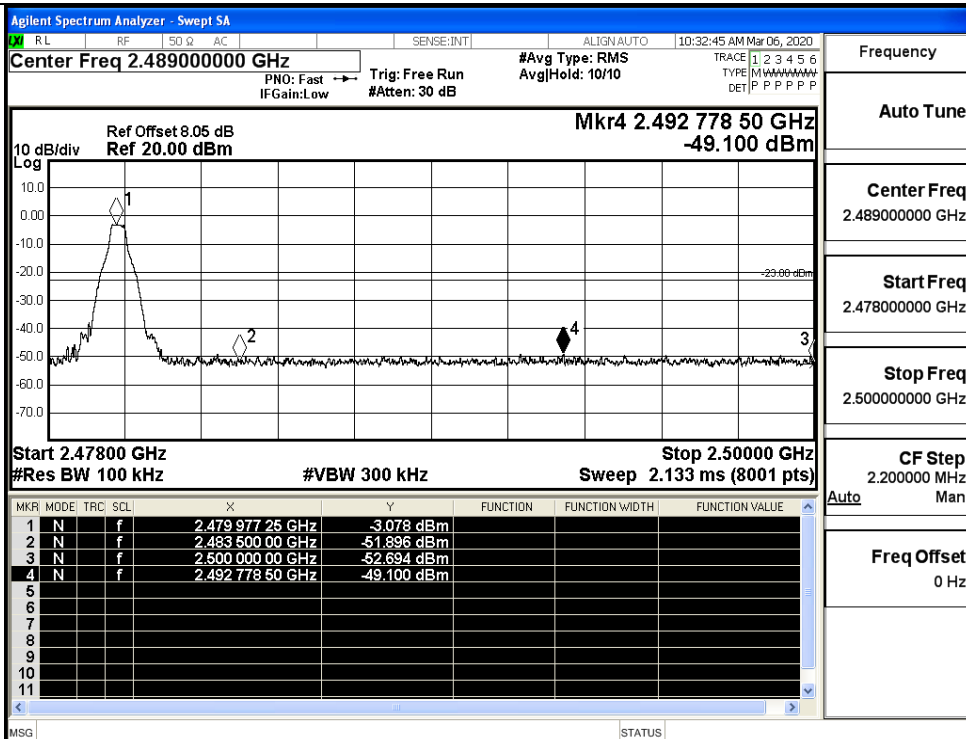
GFSK/LCH/No Hop



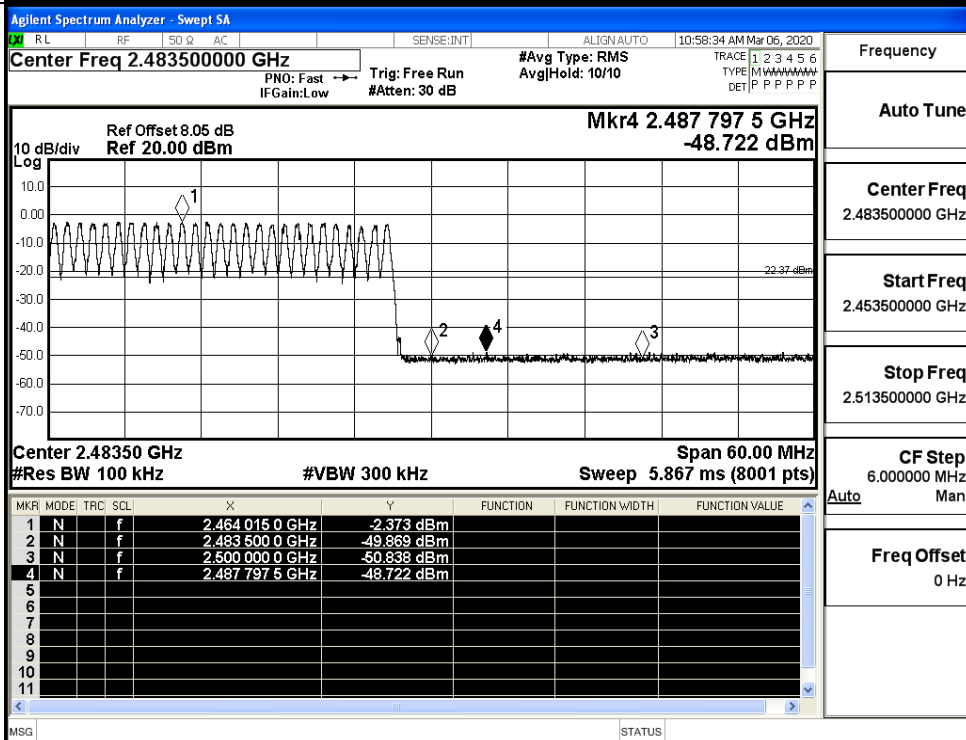
GFSK/LCH/Hop



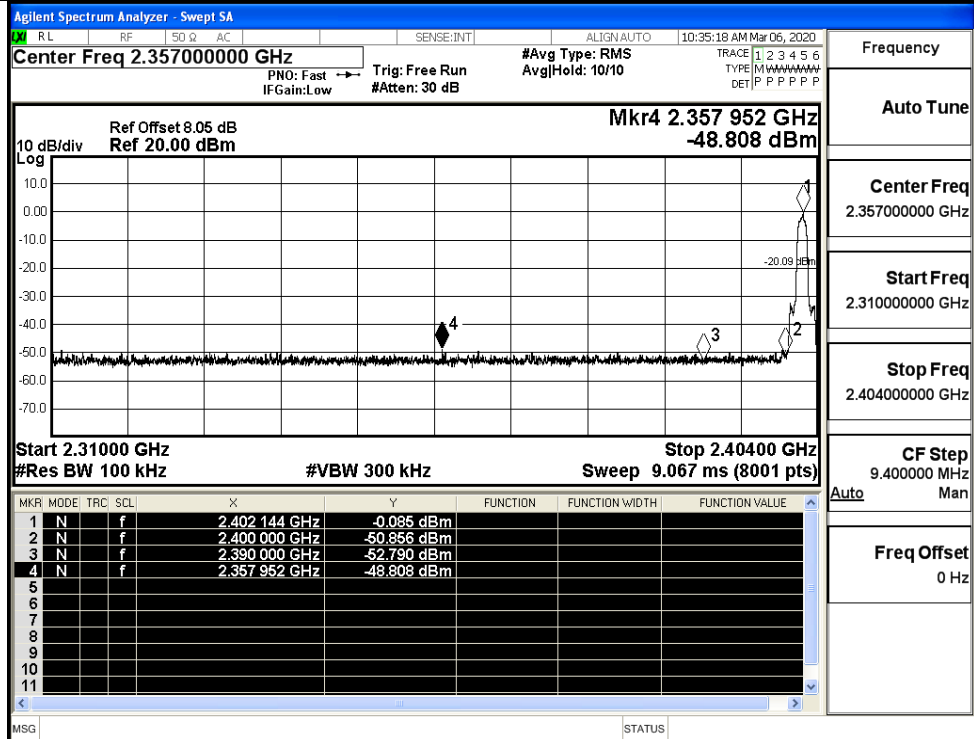
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq
2.357000000 GHz

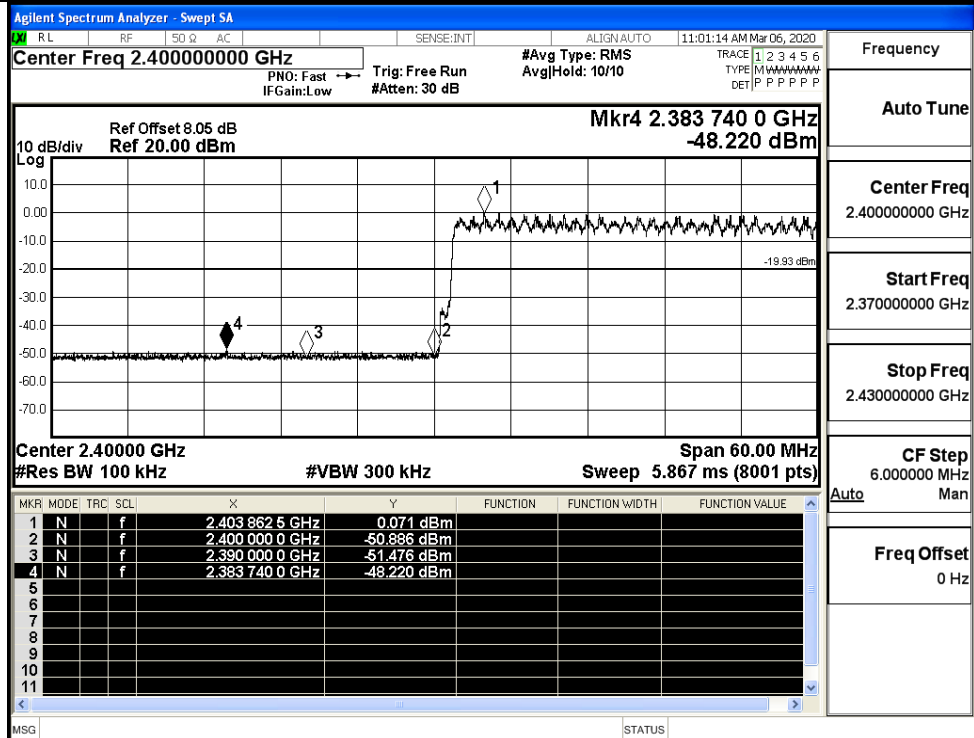
Start Freq
2.310000000 GHz

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

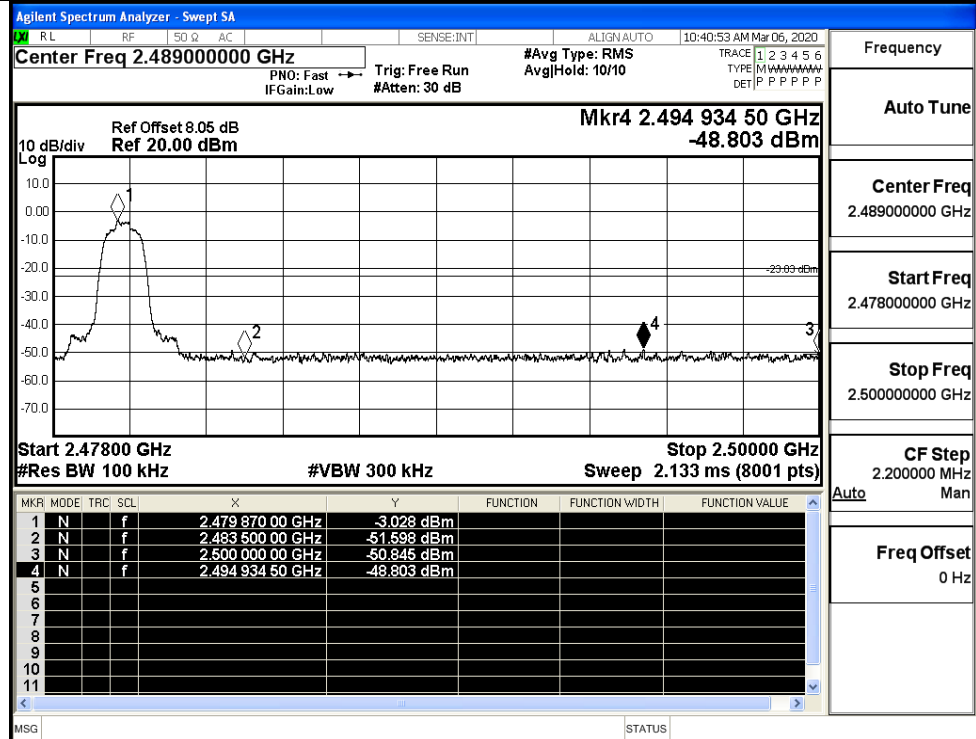
Start Freq
2.370000000 GHz

Stop Freq
2.430000000 GHz

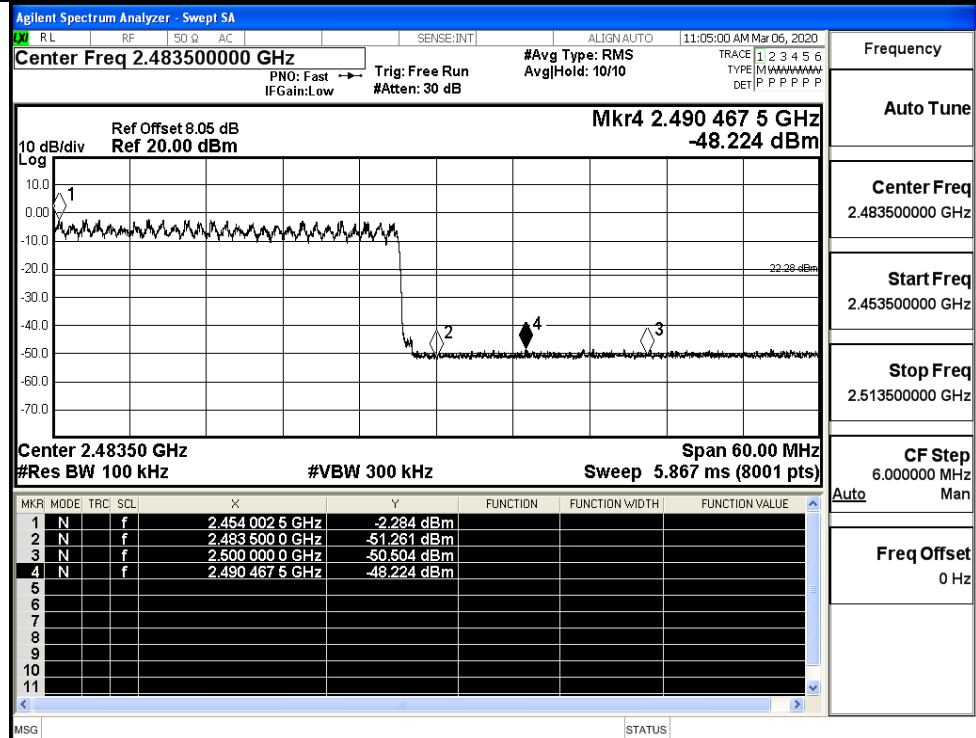
CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

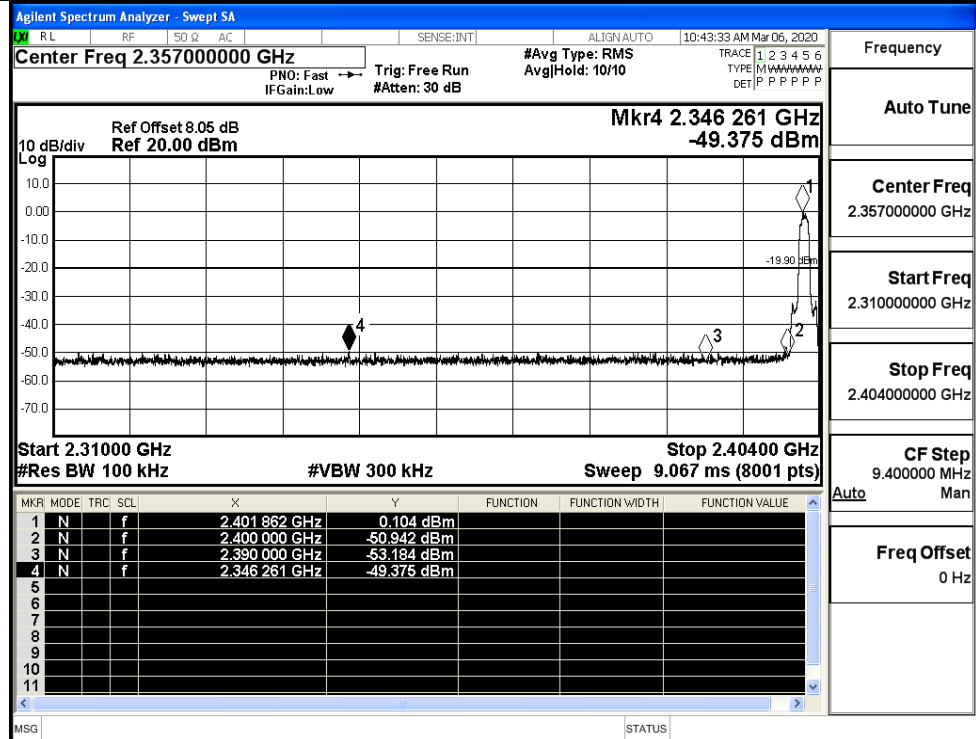
$\pi/4$ DQPSK/HCH/No
Hop



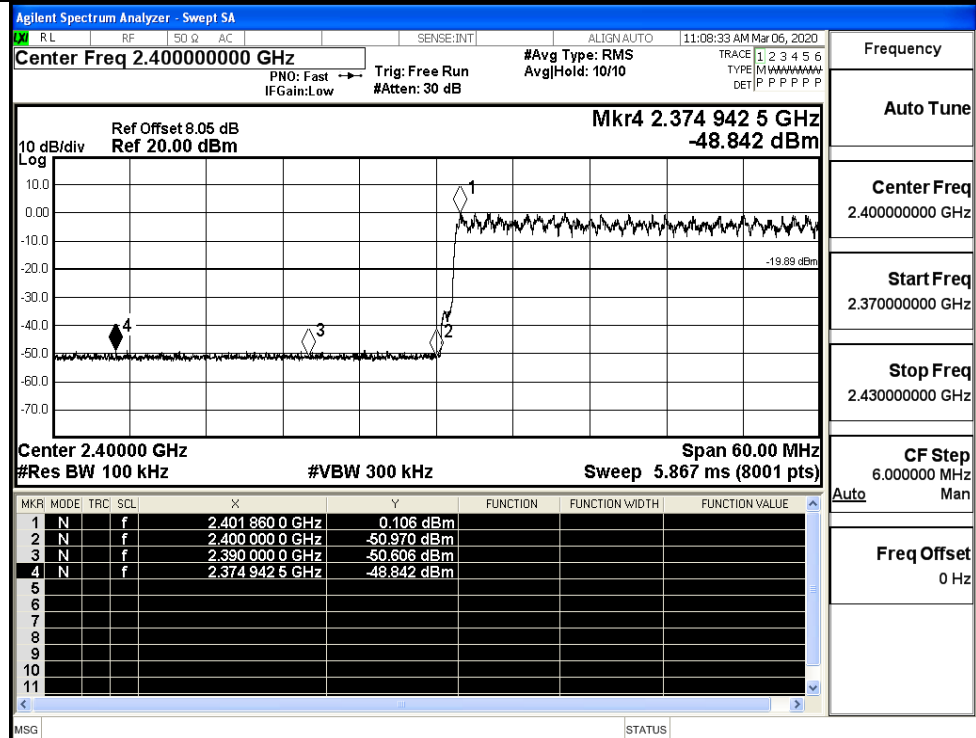
$\pi/4$ DQPSK/HCH/Hop



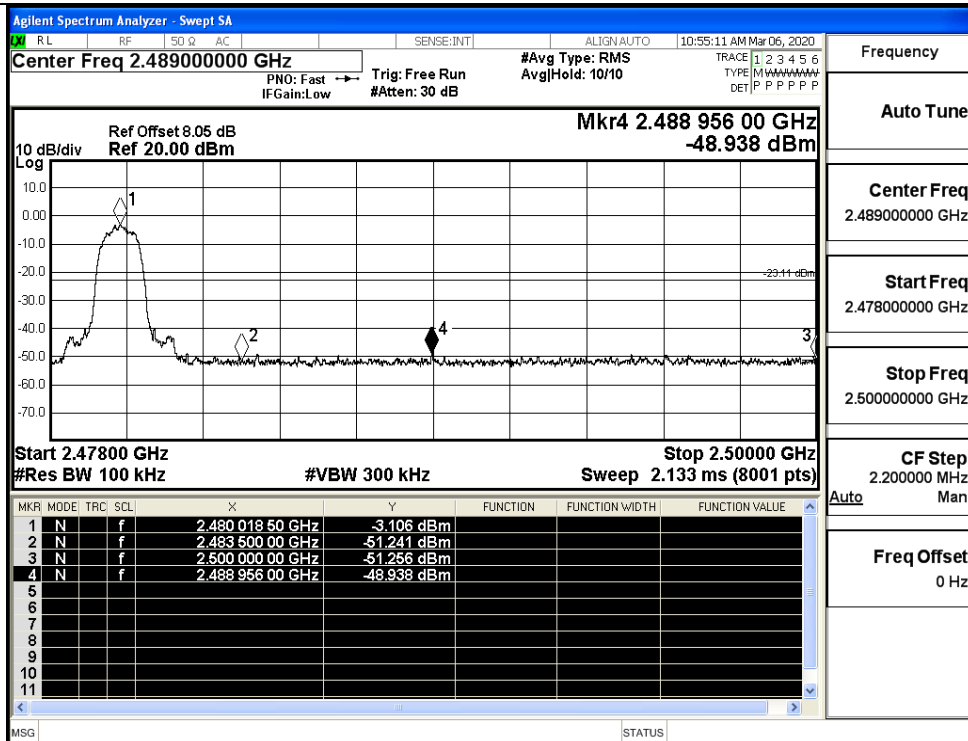
8DPSK/LCH/No Hop



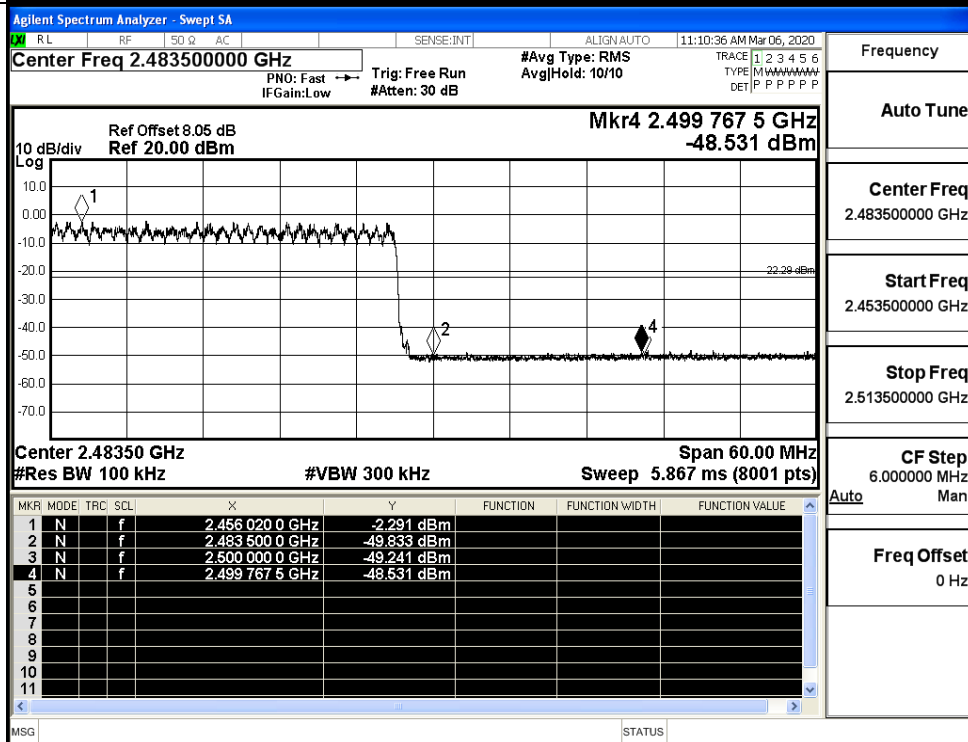
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



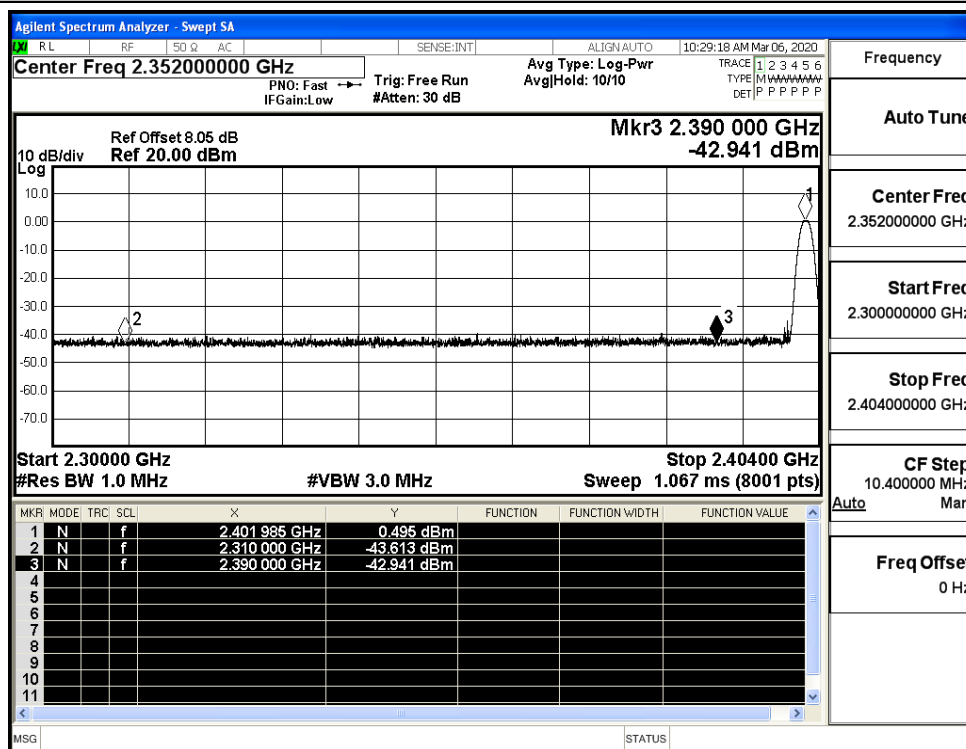
8DPSK/HCH/Hop



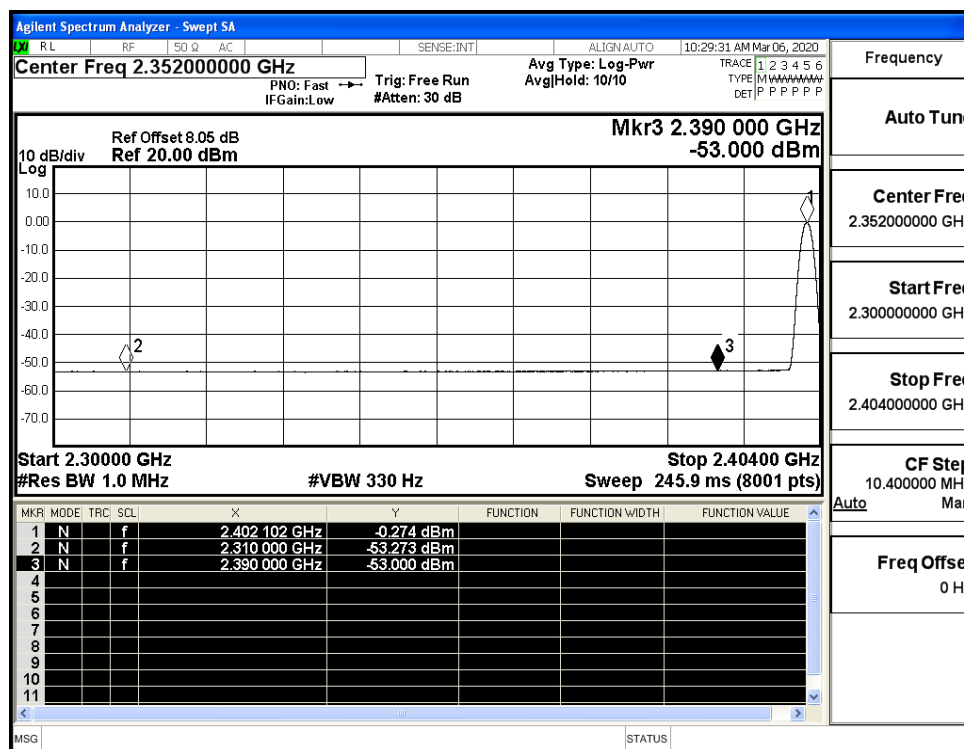
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.61	2.0	0	53.62	PEAK	74	PASS
	Off	2310.0	-53.27	2.0	0	43.96	AV	54	PASS
	Off	2390.0	-42.94	2.0	0	54.29	PEAK	74	PASS
	Off	2390.0	-53.00	2.0	0	44.23	AV	54	PASS
	Off	2483.5	-41.84	2.0	0	55.39	PEAK	74	PASS
	Off	2483.5	-52.50	2.0	0	44.73	AV	54	PASS
	Off	2500.0	-42.33	2.0	0	54.90	PEAK	74	PASS
	Off	2500.0	-52.30	2.0	0	44.93	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.91	2.0	0	54.32	PEAK	74	PASS
	Off	2310.0	-53.22	2.0	0	44.01	AV	54	PASS
	Off	2390.0	-42.17	2.0	0	55.06	PEAK	74	PASS
	Off	2390.0	-52.96	2.0	0	44.27	AV	54	PASS
	Off	2483.5	-42.45	2.0	0	54.78	PEAK	74	PASS
	Off	2483.5	-52.38	2.0	0	44.85	AV	54	PASS
	Off	2500.0	-42.79	2.0	0	54.44	PEAK	74	PASS
	Off	2500.0	-52.31	2.0	0	44.92	AV	54	PASS
8DPSK	Off	2310.0	-42.54	2.0	0	54.69	PEAK	74	PASS
	Off	2310.0	-53.33	2.0	0	43.90	AV	54	PASS
	Off	2390.0	-43.73	2.0	0	53.50	PEAK	74	PASS
	Off	2390.0	-52.88	2.0	0	44.35	AV	54	PASS
	Off	2483.5	-41.90	2.0	0	55.33	PEAK	74	PASS
	Off	2483.5	-52.45	2.0	0	44.78	AV	54	PASS
	Off	2500.0	-42.22	2.0	0	55.01	PEAK	74	PASS
	Off	2500.0	-52.21	2.0	0	45.02	AV	54	PASS

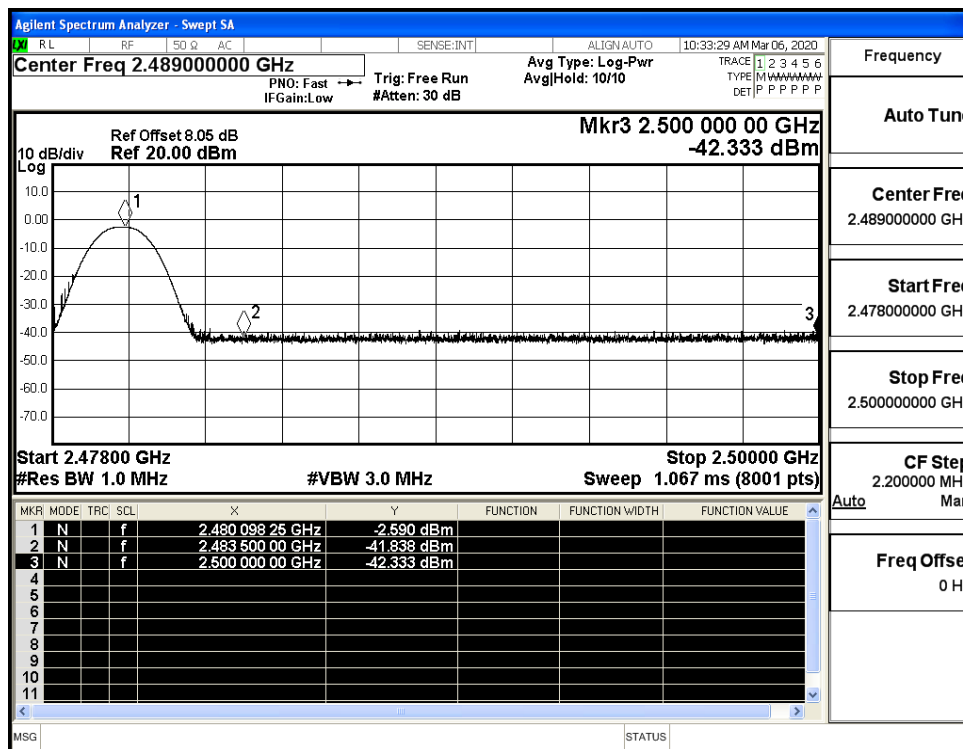
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



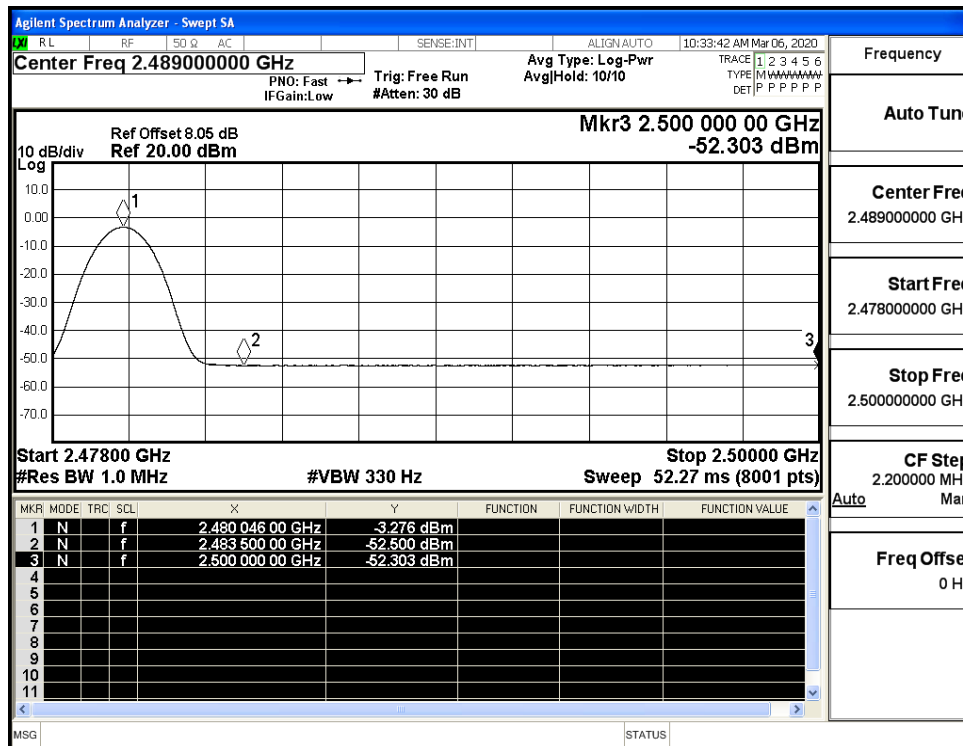
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

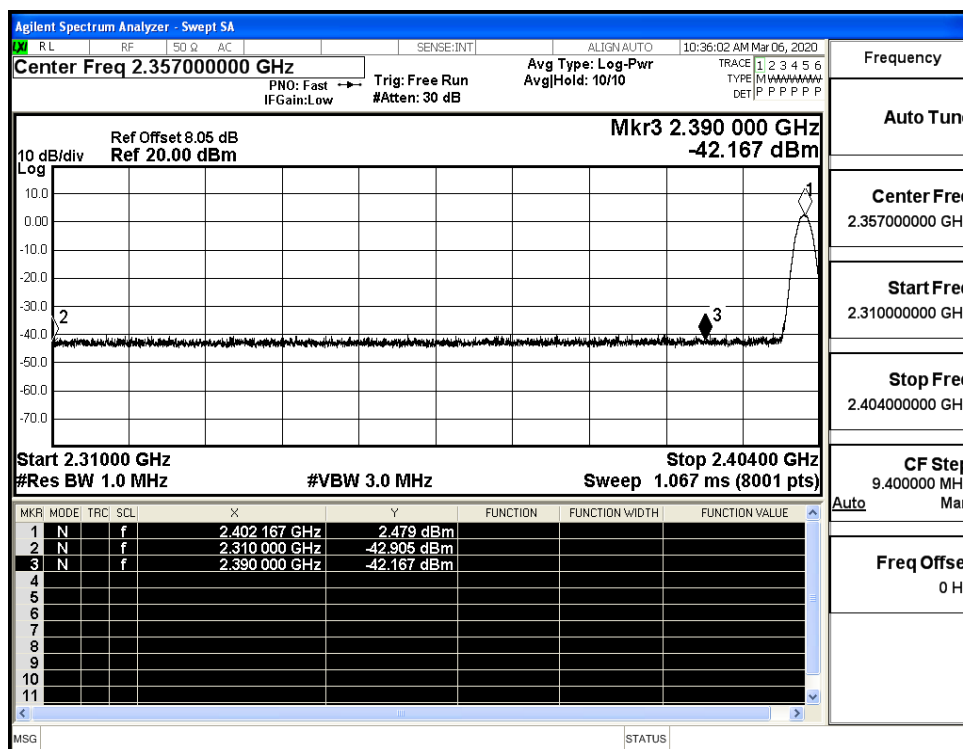
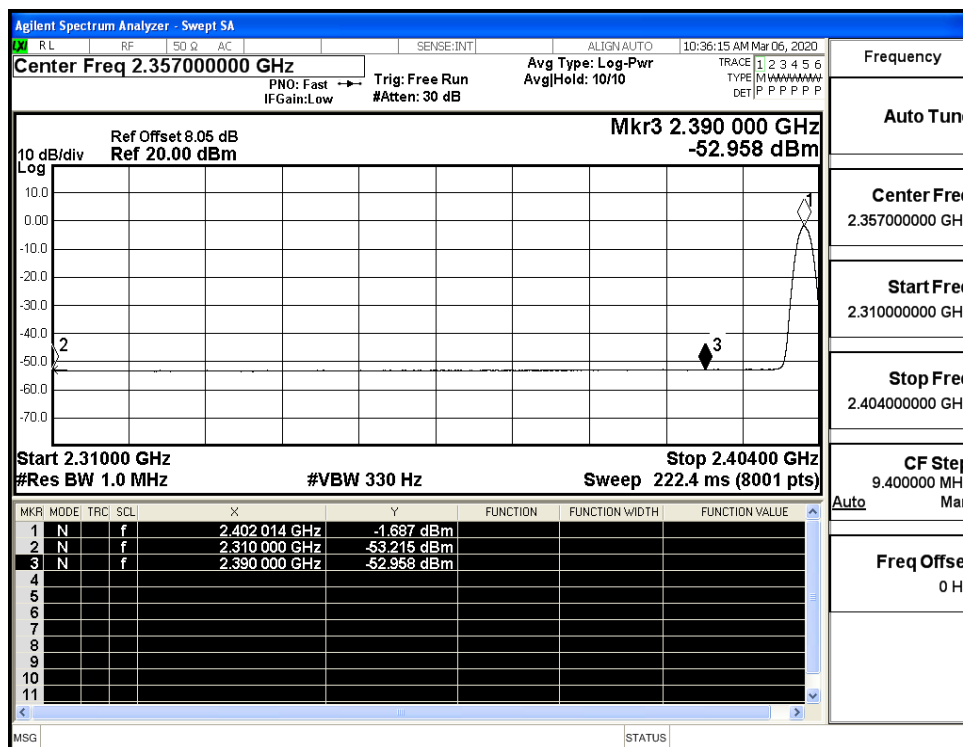


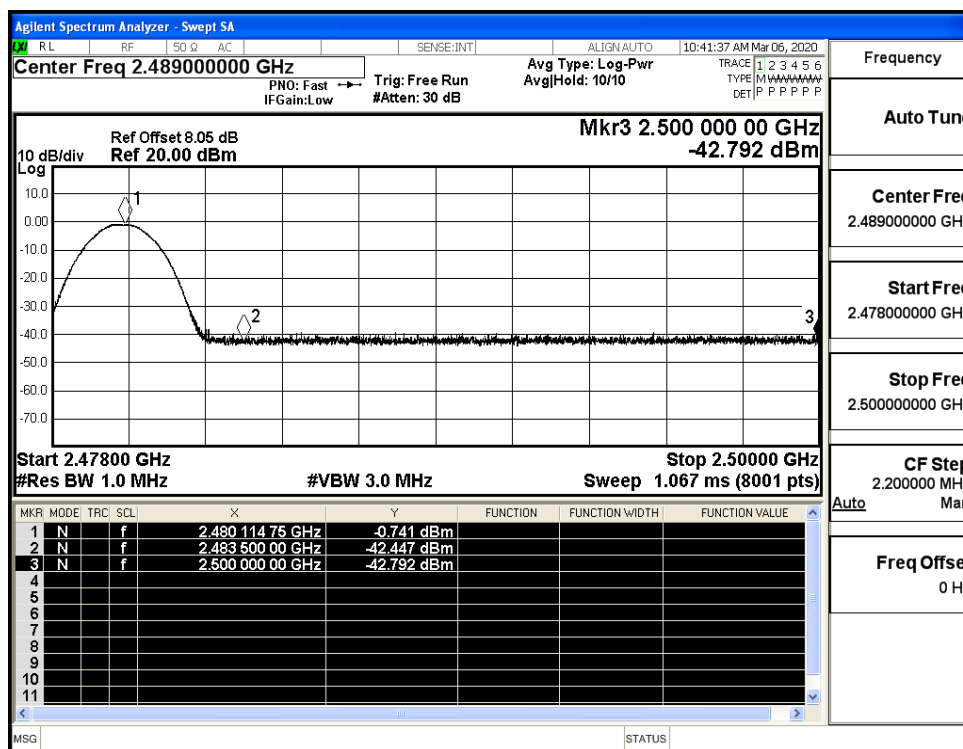
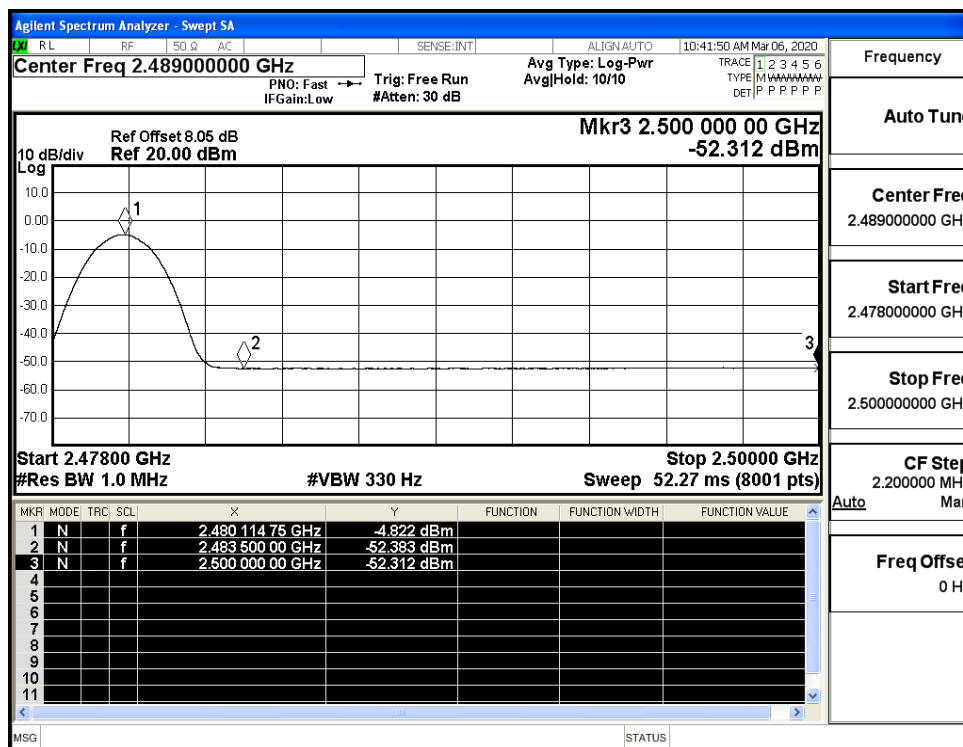
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



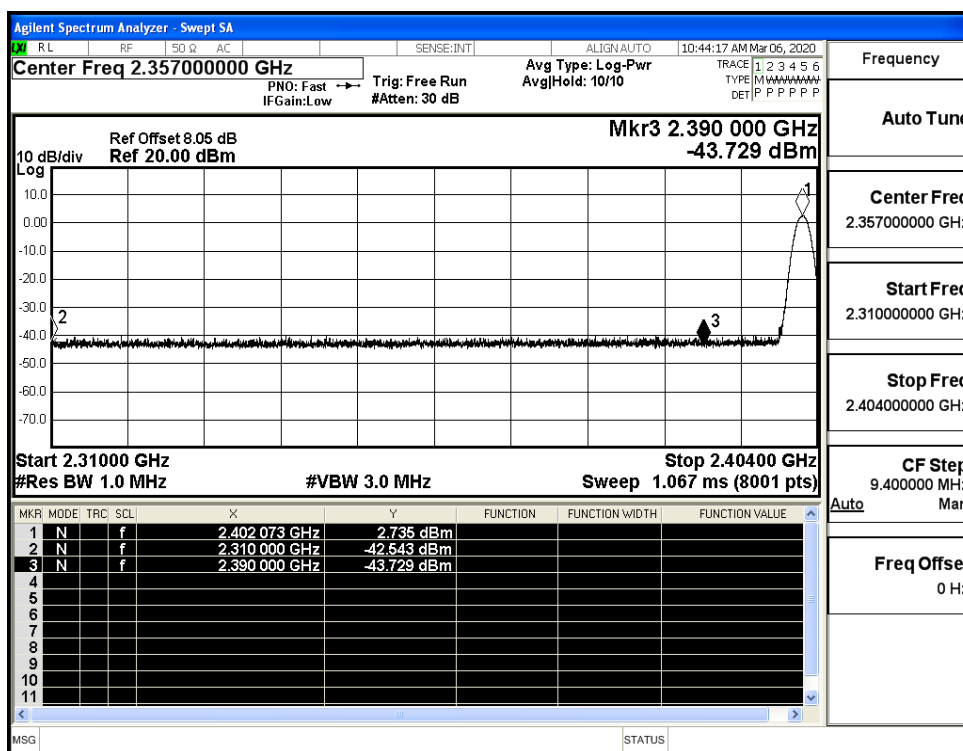
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



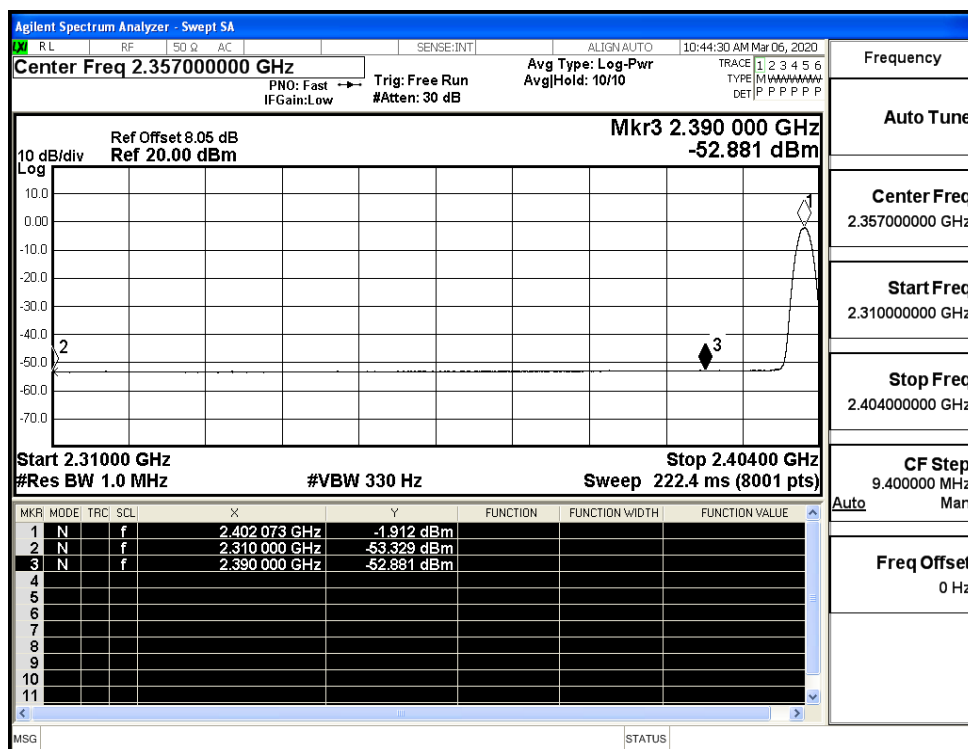
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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

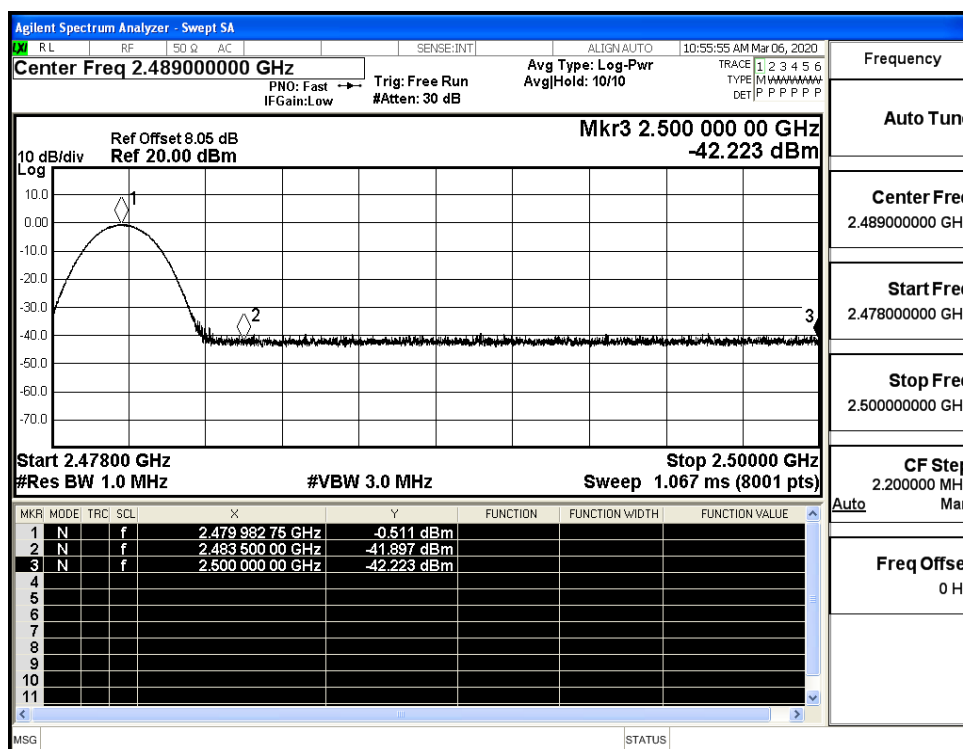
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

