

Appendix A

RF Test Data for BT V5.0(BDR/EDR) (Conducted Measurement)

Product Name: Wireless Speaker

Trade Mark: N/A

Test Model: BB2773

Environmental Conditions

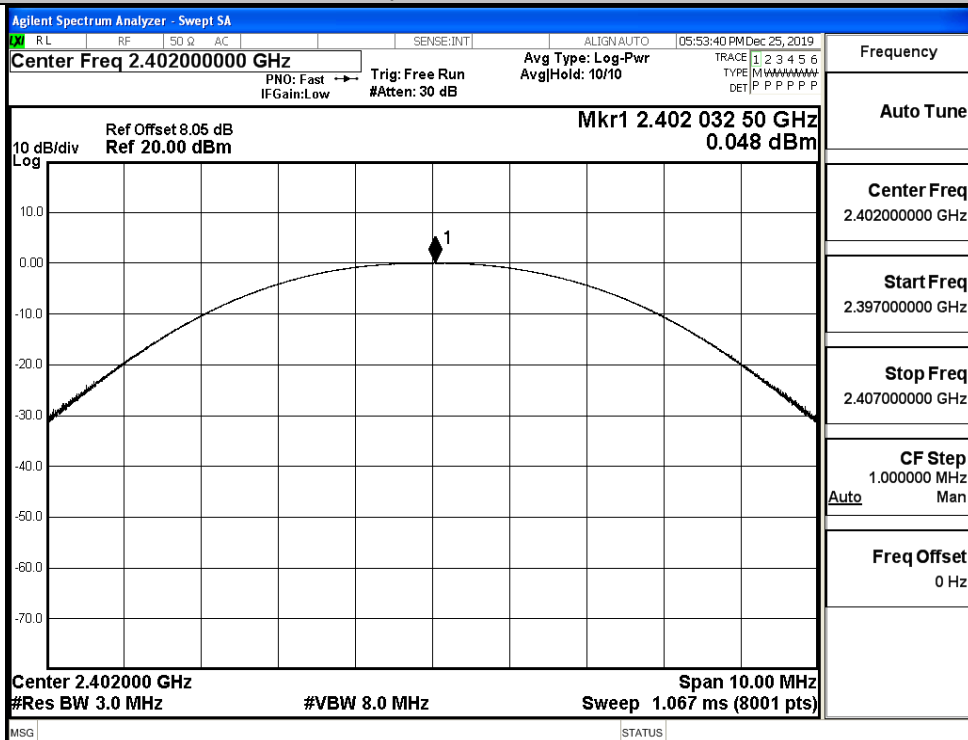
Temperature:	23.7 ° C
Relative Humidity:	53.8%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond Lu
Supervised by:	Wang Chuang

A.1 Maximum Conducted Peak Output Power

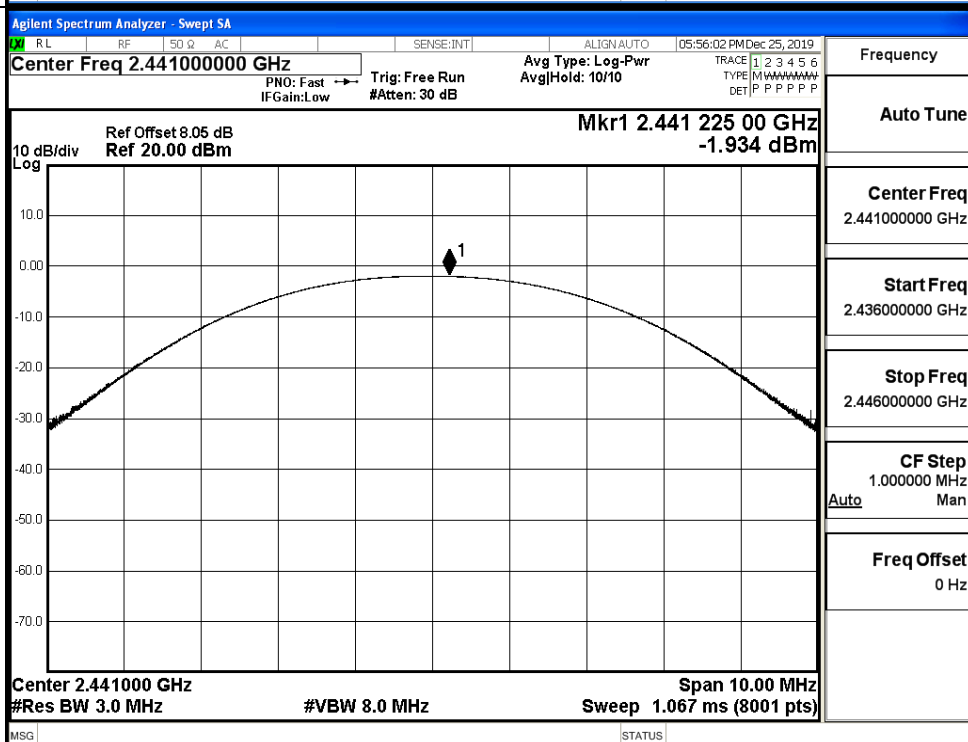
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.048	21	PASS
	MCH	-1.934	21	PASS
	HCH	-0.729	21	PASS
$\pi/4$ DQPSK	LCH	-0.704	21	PASS
	MCH	-2.787	21	PASS
	HCH	-1.739	21	PASS
8DPSK	LCH	-1.008	21	PASS
	MCH	-2.839	21	PASS
	HCH	-1.728	21	PASS

Test Graphs

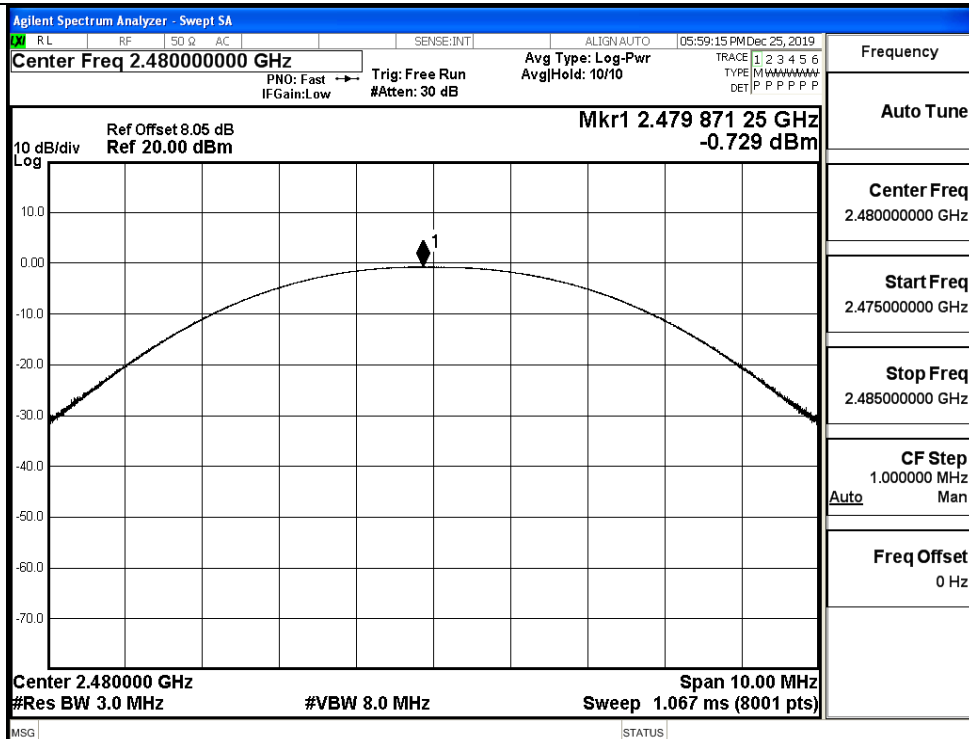
GFSK/LCH



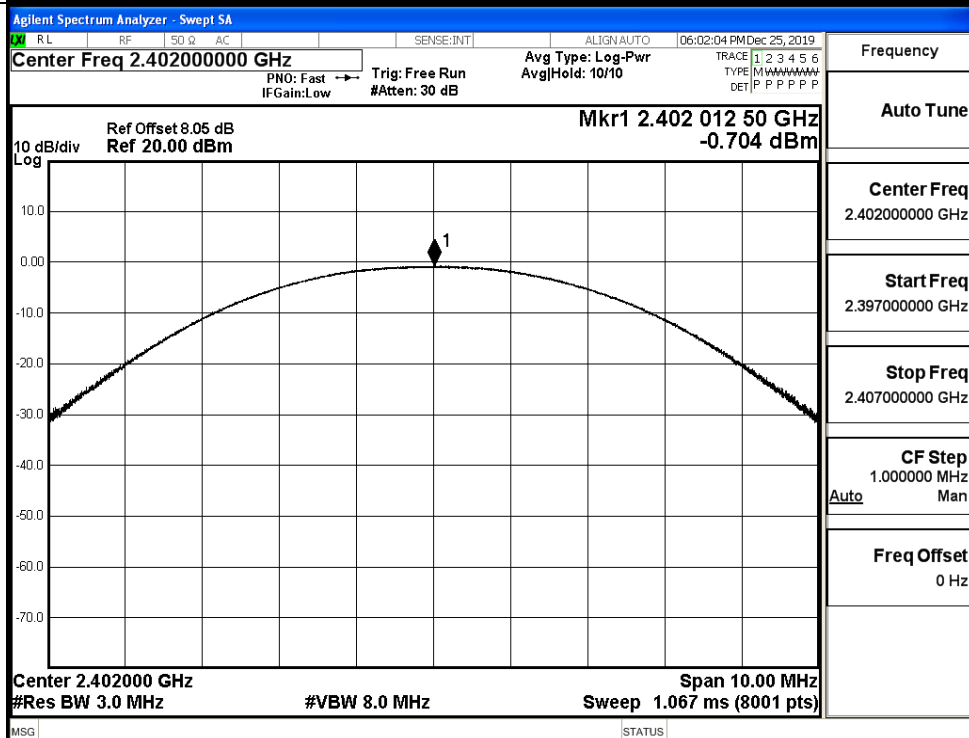
GFSK/MCH

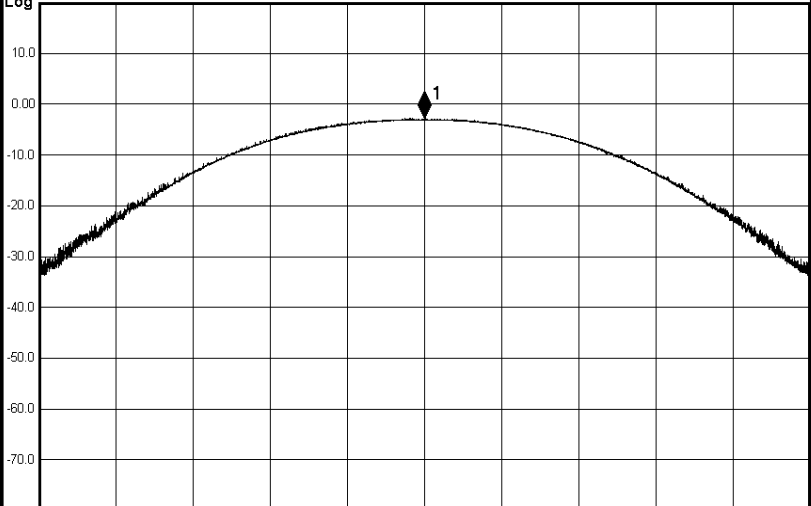
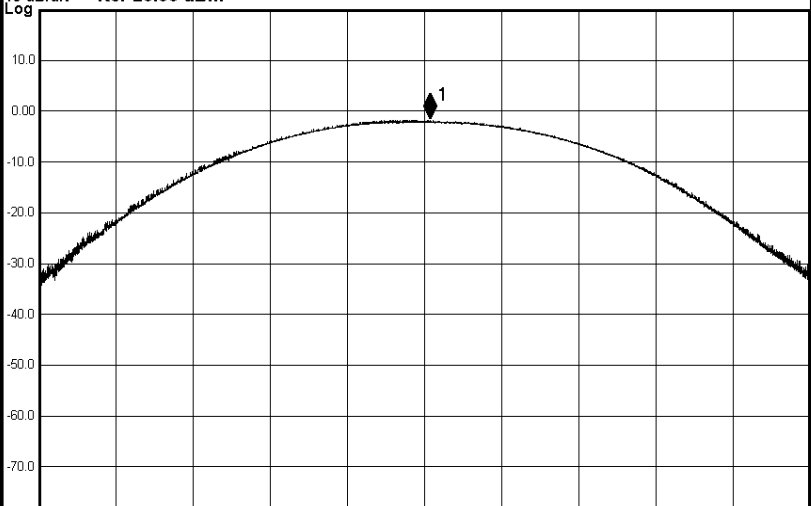


GFSK/HCH

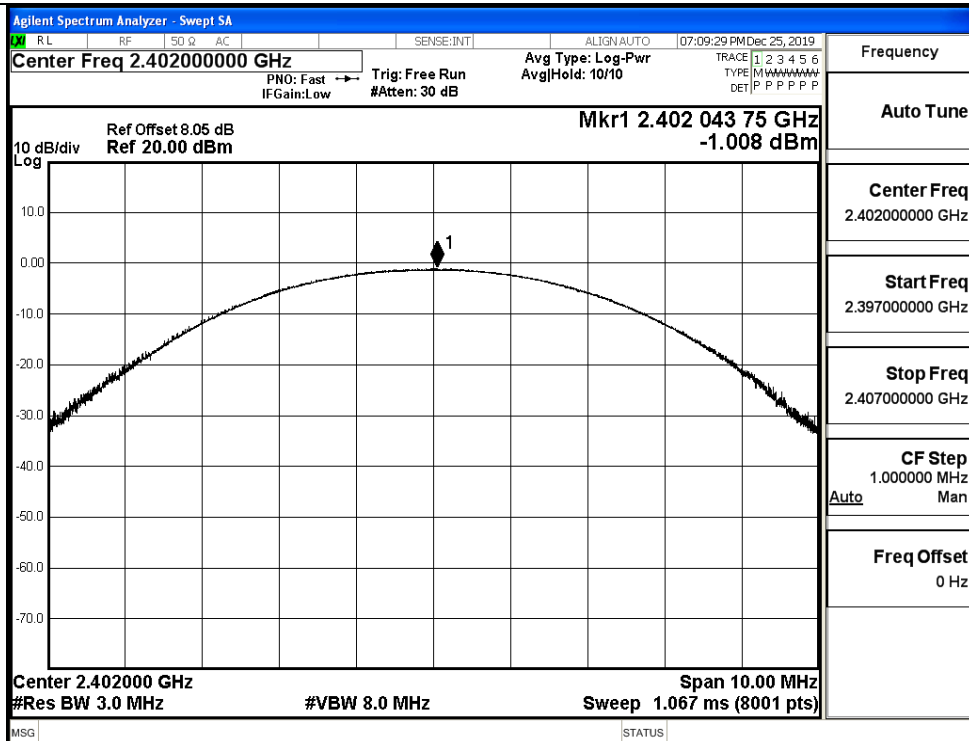


$\pi/4$ DQPSK/LCH

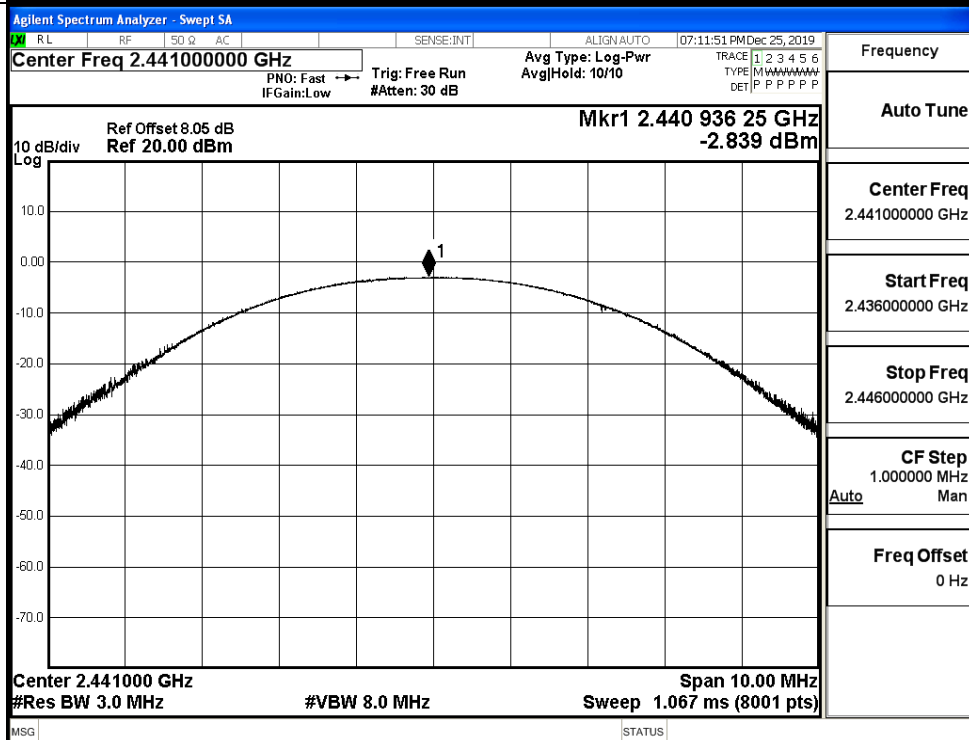


$\pi/4$DQPSK/MCH	Agilent Spectrum Analyzer - Swept SA X R L RF 50 Q AC SENSE:INT ALIGN:AUTO 07:05:17 PM Dec 25, 2019 Center Freq 2.441000000 GHz PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg/Hold: 10/10 Mkr1 2.441 001 25 GHz 10 dB/div Ref Offset 8.05 dB Ref 20.00 dBm Log  Center 2.441000 GHz #Res BW 3.0 MHz #VBW 8.0 MHz Span 10.00 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 X R L RF 50 Q AC SENSE:INT ALIGN:AUTO 07:06:55 PM Dec 25, 2019 Center Freq 2.480000000 GHz PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg/Hold: 10/10 Mkr1 2.480 071 25 GHz 10 dB/div Ref Offset 8.05 dB Ref 20.00 dBm Log  Center 2.480000 GHz #Res BW 3.0 MHz #VBW 8.0 MHz Span 10.00 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

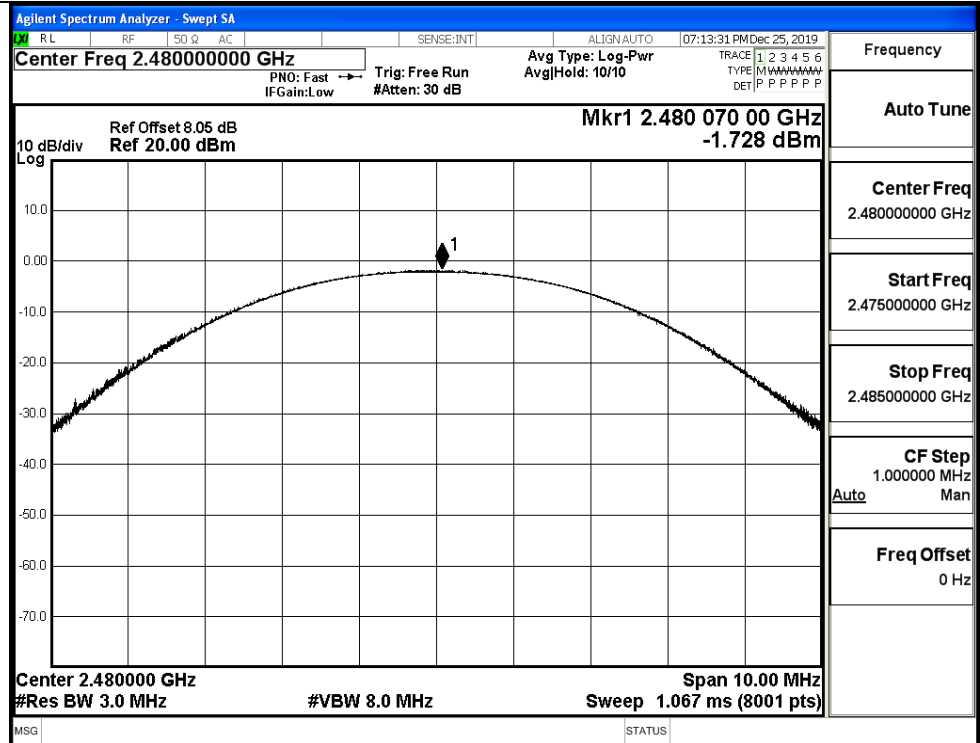
8DPSK/LCH



8DPSK/MCH



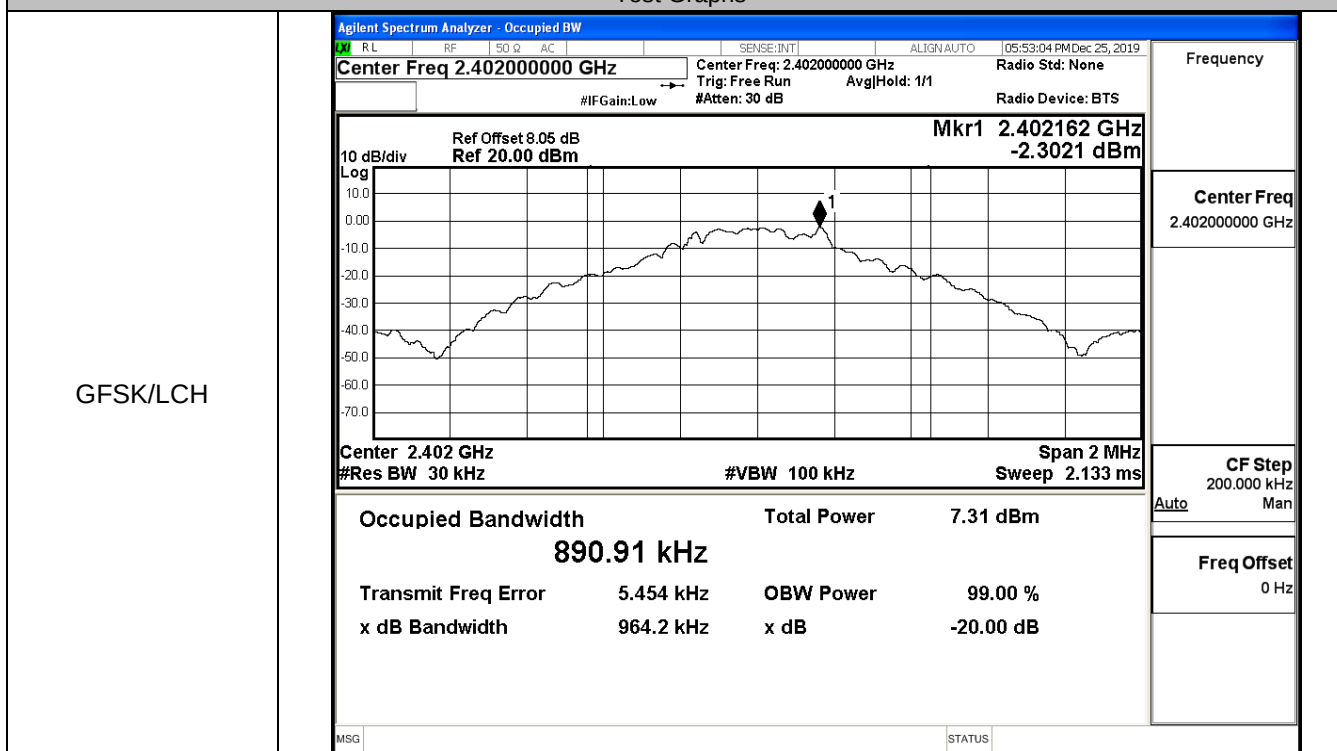
8DPSK/HCH



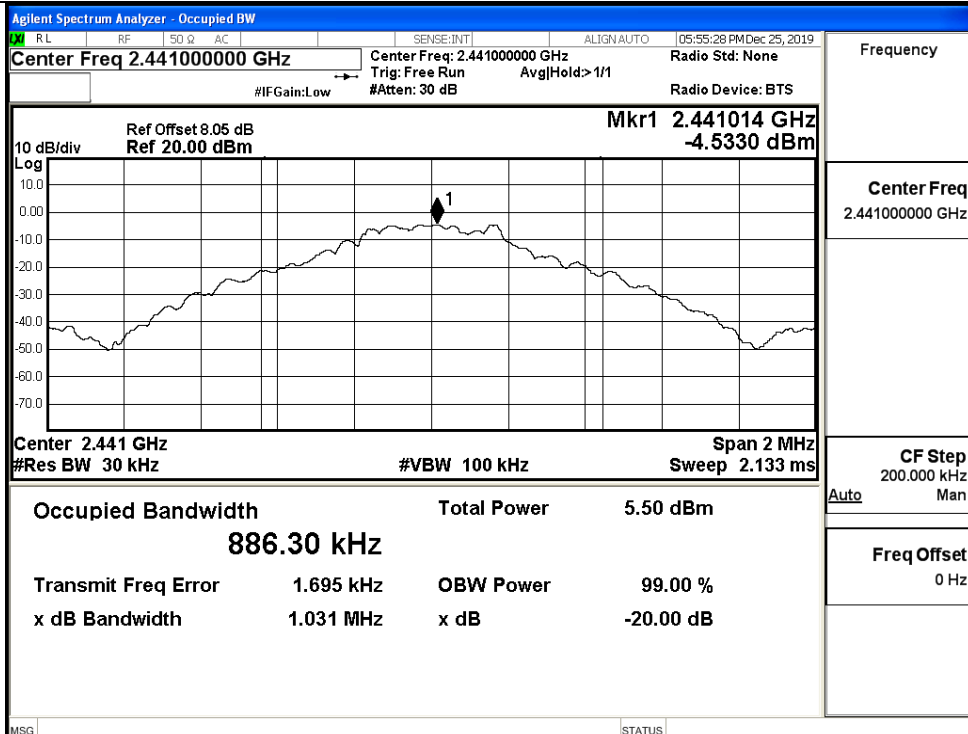
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9642	Not Specified	PASS
	MCH	1.031	Not Specified	PASS
	HCH	1.035	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.287	Not Specified	PASS
	MCH	1.117	Not Specified	PASS
	HCH	1.122	Not Specified	PASS
8DPSK	LCH	1.132	Not Specified	PASS
	MCH	1.117	Not Specified	PASS
	HCH	1.136	Not Specified	PASS

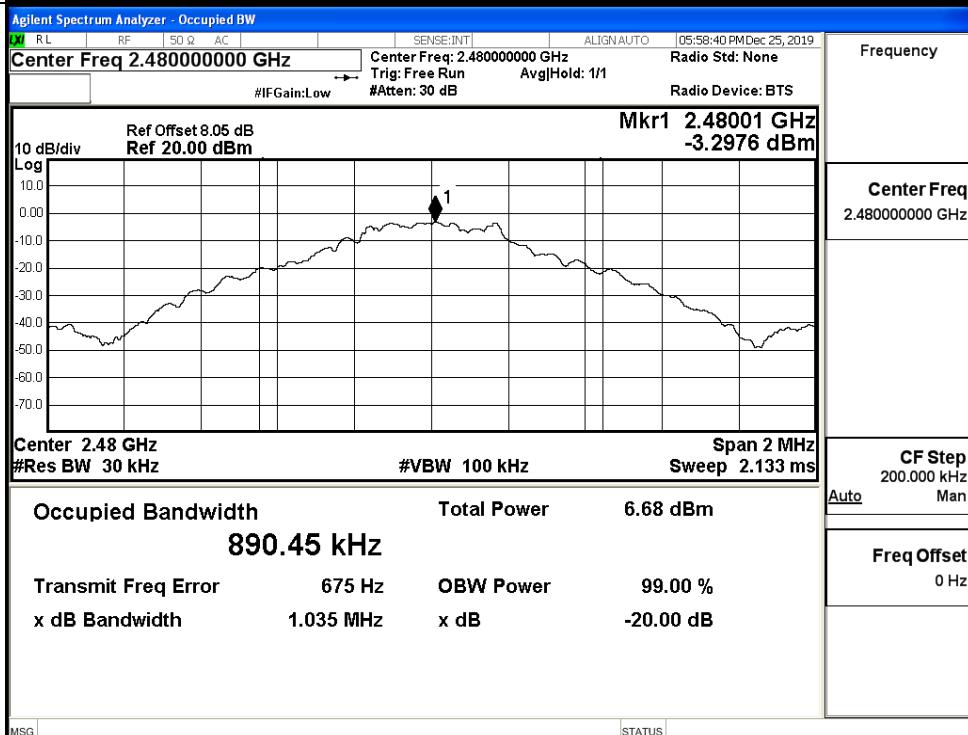
Test Graphs

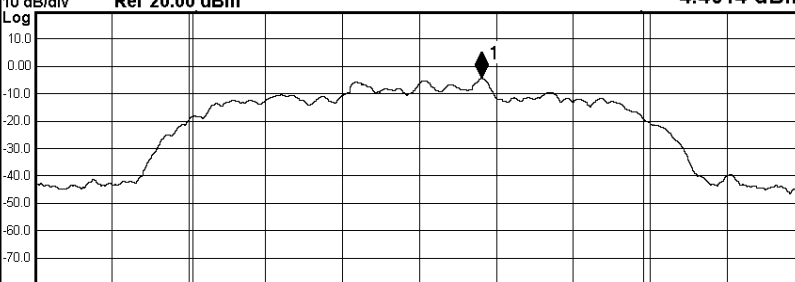
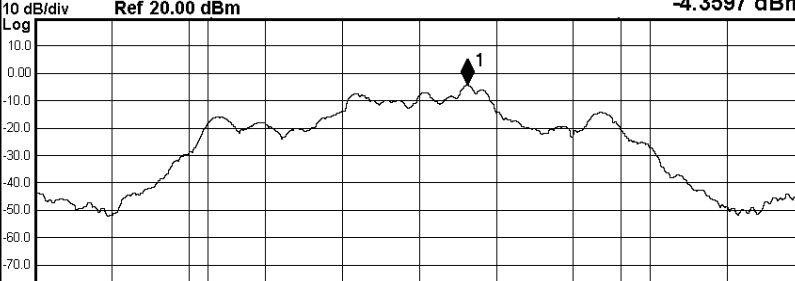


GFSK/MCH

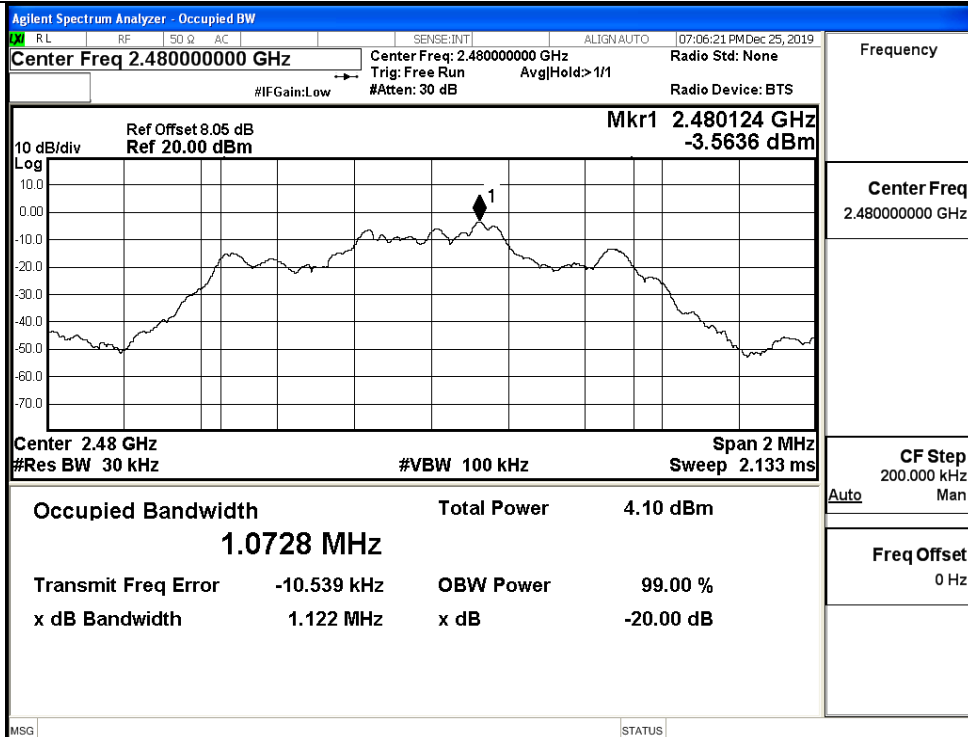


GFSK/HCH

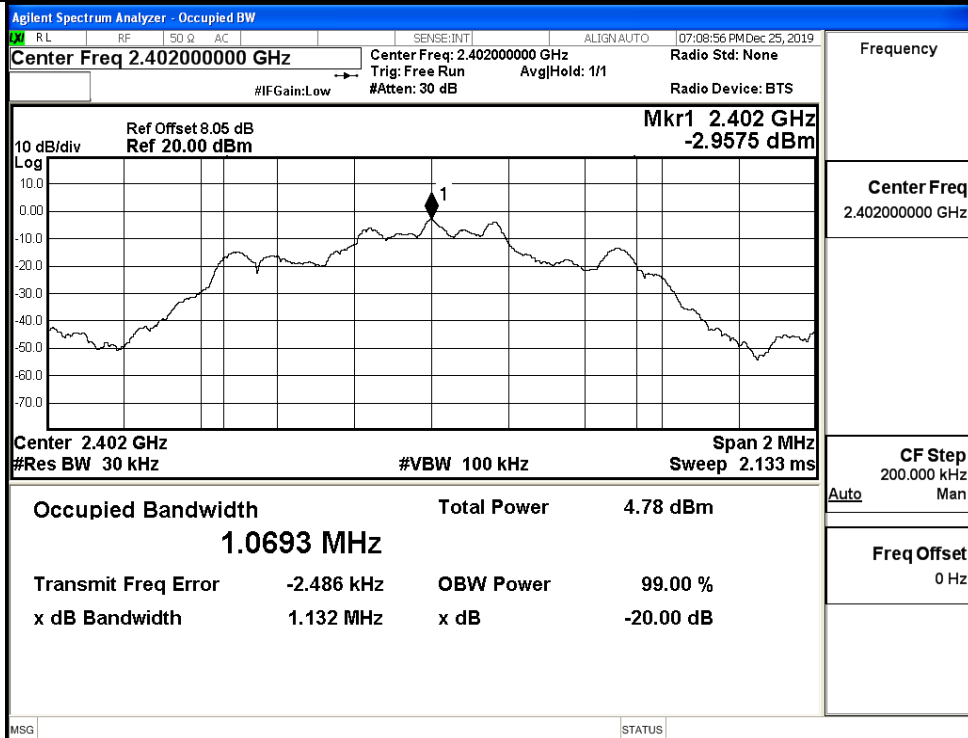


$\pi/4$DQPSK/LCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 06:01:30 PM Dec 25, 2019 Center Freq 2.40200000 GHz Center Freq: 2.40200000 GHz Trig: Free Run Avg/Hold: 1/1 Radio Std: None #IFGain: Low #Atten: 30 dB Radio Device: BTS Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.402162 GHz -4.4014 dBm  Center 2.402 GHz #Res BW 30 kHz #VBW 100 kHz Span 2 MHz Sweep 2.133 ms Occupied Bandwidth 1.1694 MHz Total Power 5.57 dBm Transmit Freq Error -1.612 kHz OBW Power 99.00 % x dB Bandwidth 1.287 MHz x dB -20.00 dB	Frequency Center Freq 2.40200000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz
$\pi/4$DQPSK/MCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 07:04:43 PM Dec 25, 2019 Center Freq 2.44100000 GHz Center Freq: 2.44100000 GHz Trig: Free Run Avg/Hold: >1/1 Radio Std: None #IFGain: Low #Atten: 30 dB Radio Device: BTS Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.441124 GHz -4.3597 dBm  Center 2.441 GHz #Res BW 30 kHz #VBW 100 kHz Span 2 MHz Sweep 2.133 ms Occupied Bandwidth 1.0712 MHz Total Power 3.27 dBm Transmit Freq Error -11.361 kHz OBW Power 99.00 % x dB Bandwidth 1.117 MHz x dB -20.00 dB	Frequency Center Freq 2.44100000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz

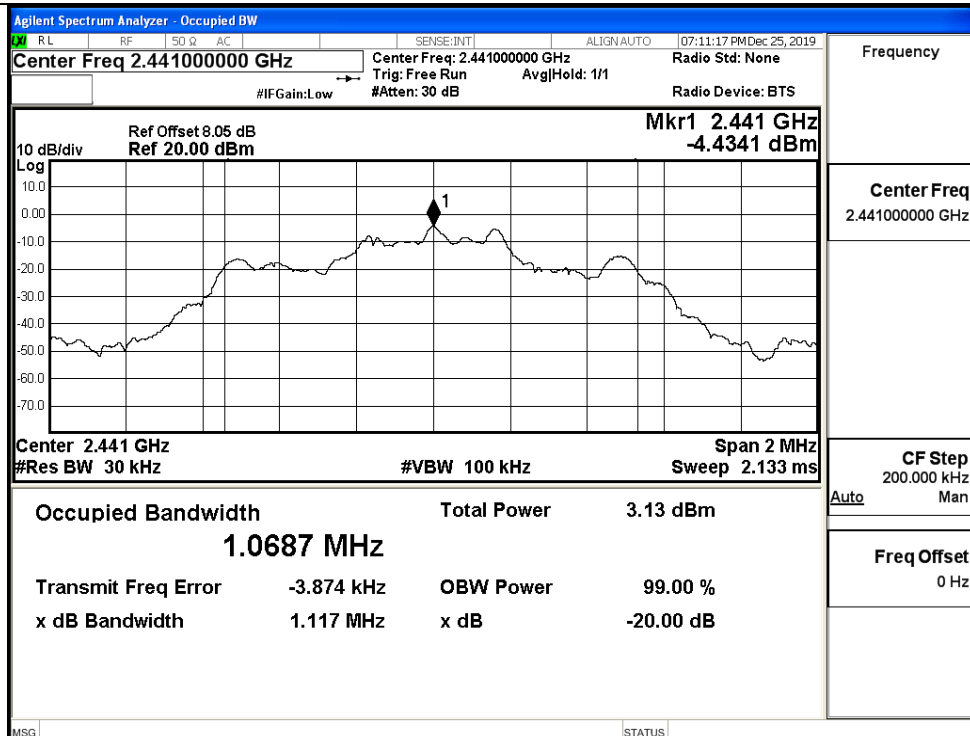
$\pi/4$ DQPSK/HCH



8DPSK/LCH



8DPSK/MCH



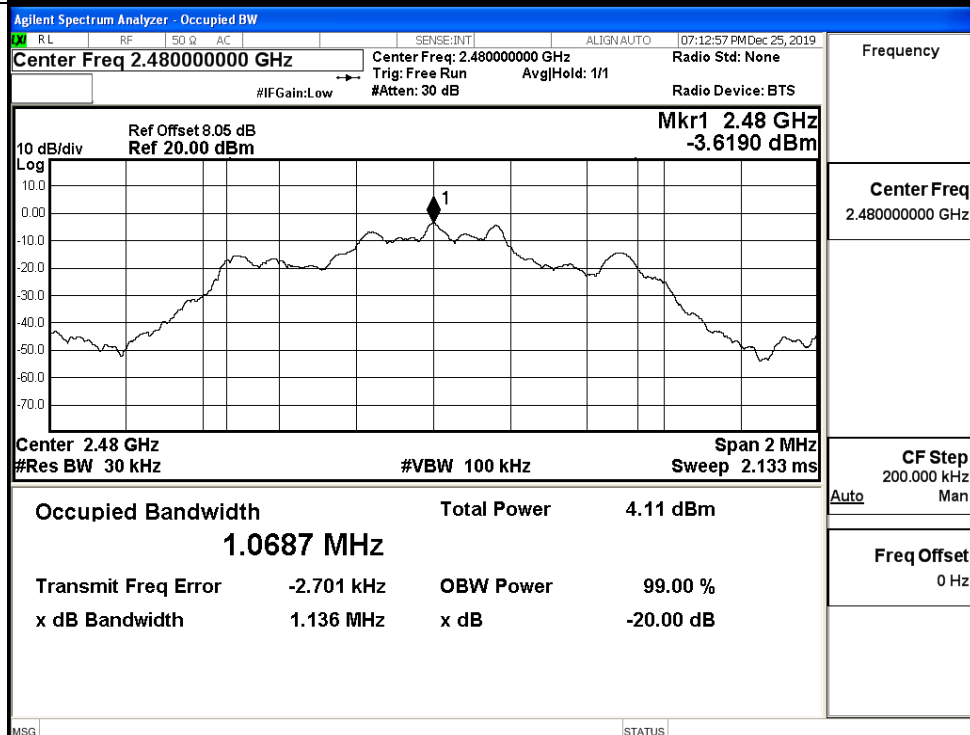
Frequency

Center Freq
2.441000000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

8DPSK/HCH



Frequency

Center Freq
2.480000000 GHz

CF Step
200.000 kHz
Auto Man

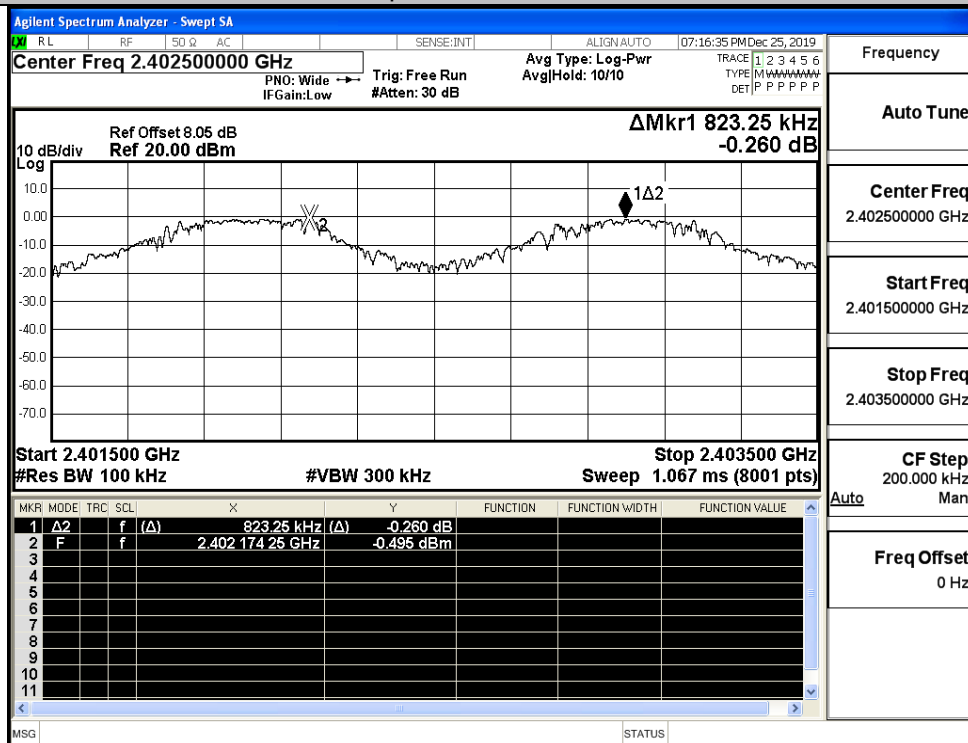
Freq Offset
0 Hz

A.3 Carrier Frequency Separation

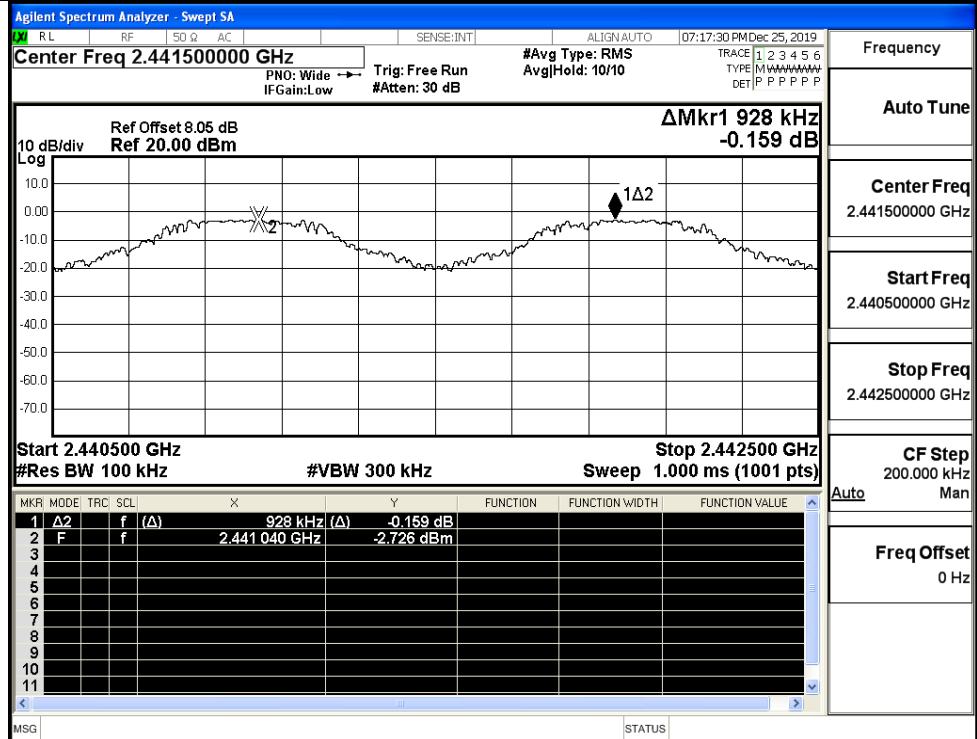
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.823	0.690	PASS
	MCH	0.928	0.690	PASS
	HCH	1.172	0.690	PASS
$\pi/4$ DQPSK	LCH	1.098	0.858	PASS
	MCH	1.204	0.858	PASS
	HCH	1.184	0.858	PASS
8DPSK	LCH	1.096	0.757	PASS
	MCH	1.182	0.757	PASS
	HCH	0.862	0.757	PASS

Test Graphs

GFSK/LCH



GFSK/MCH



Frequency

Auto Tune

Center Freq

2.441500000 GHz

Start Freq

2.440500000 GHz

Stop Freq

2.442500000 GHz

CF Step

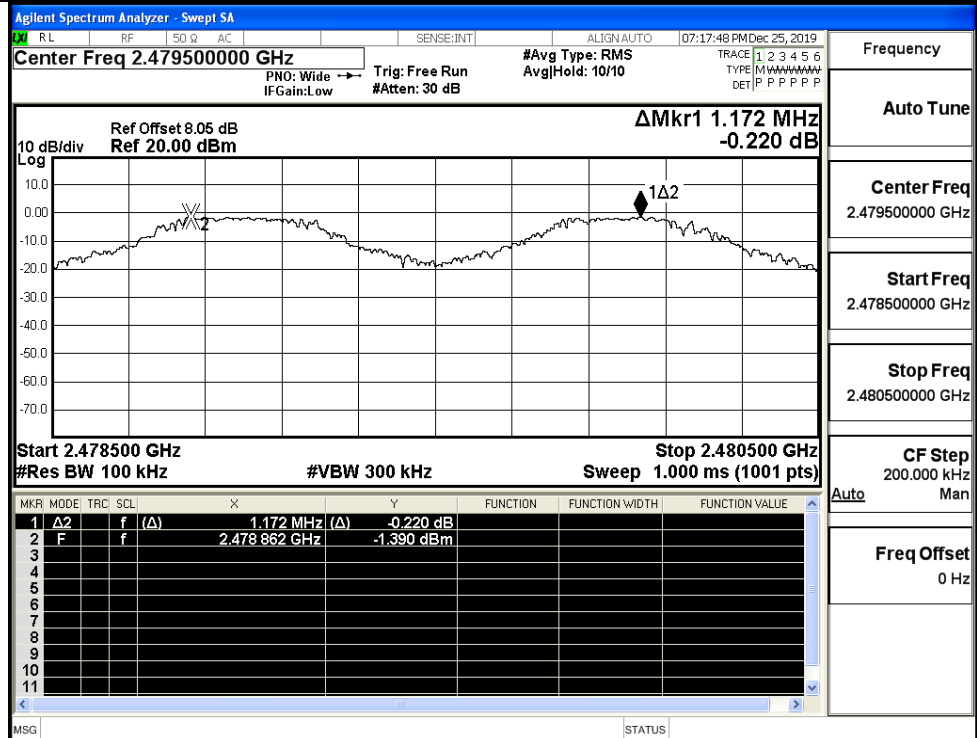
200.000 kHz

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

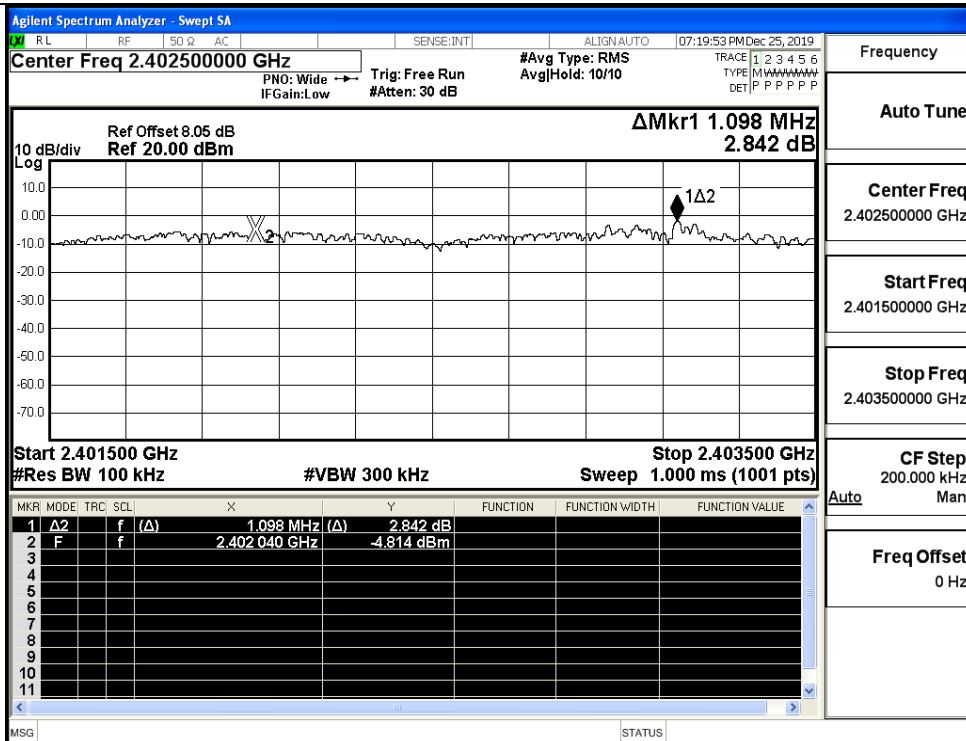
200.000 kHz

Man

Freq Offset

0 Hz

$\pi/4$ DQPSK/LCH



Frequency

Auto Tune

Center Freq
2.402500000 GHz

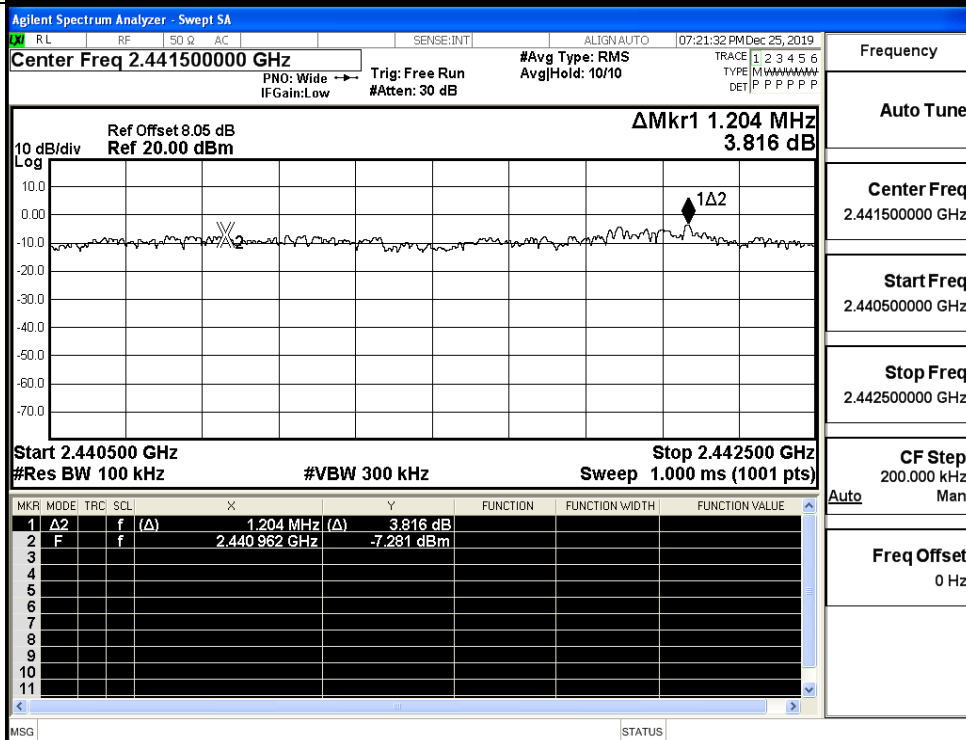
Start Freq
2.401500000 GHz

Stop Freq
2.403500000 GHz

CF Step
200.000 kHz
Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/MCH



Frequency

Auto Tune

Center Freq
2.441500000 GHz

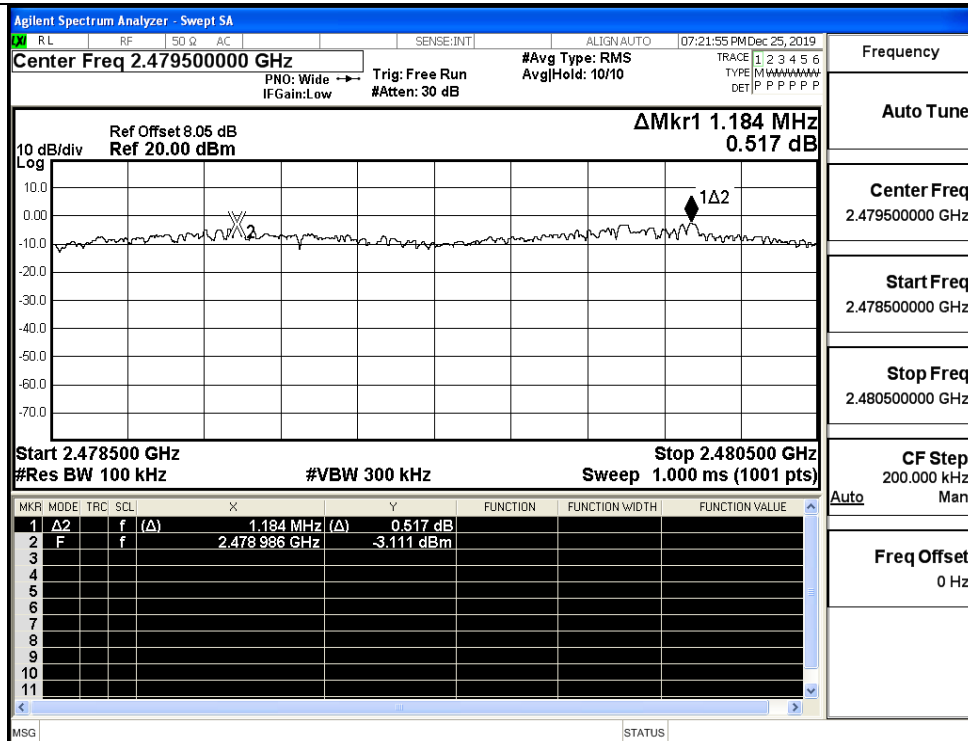
Start Freq
2.440500000 GHz

Stop Freq
2.442500000 GHz

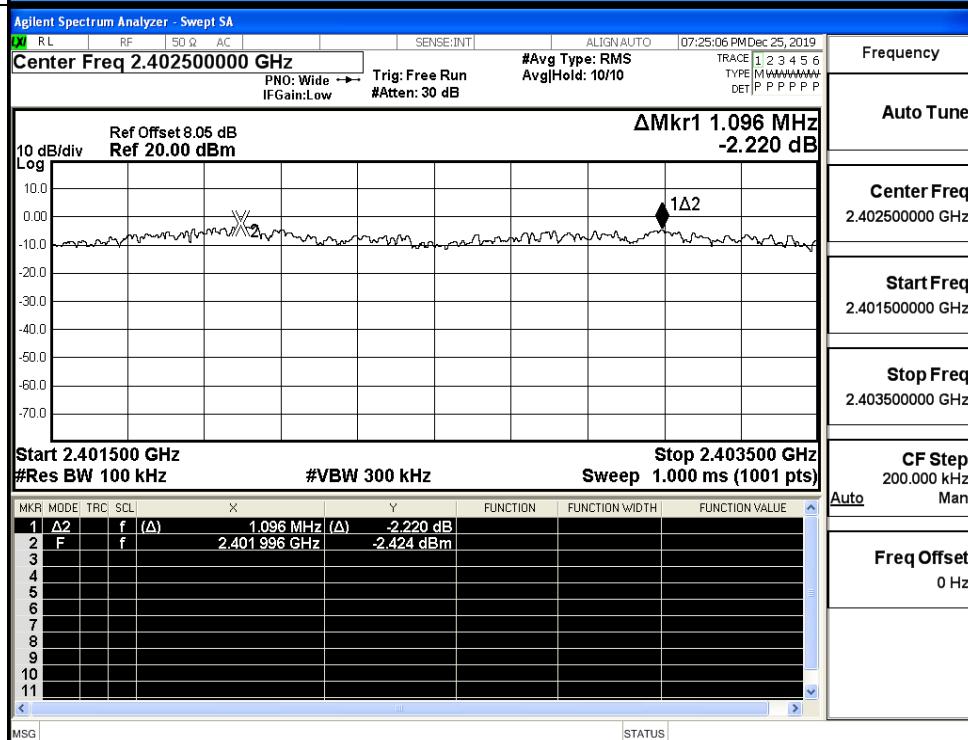
CF Step
200.000 kHz
Man

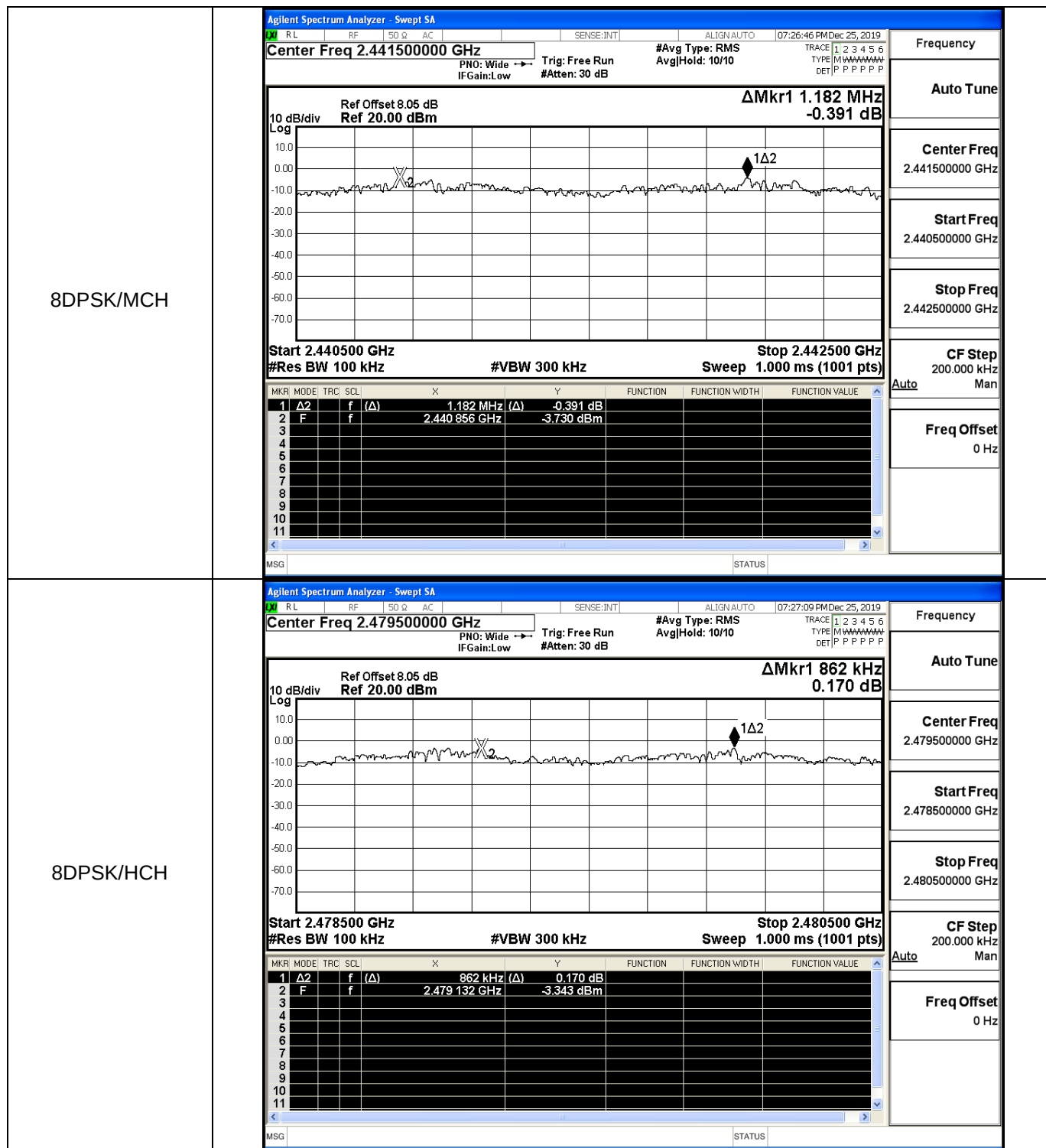
Freq Offset
0 Hz

$\pi/4$ DQPSK/HCH



8DPSK/LCH



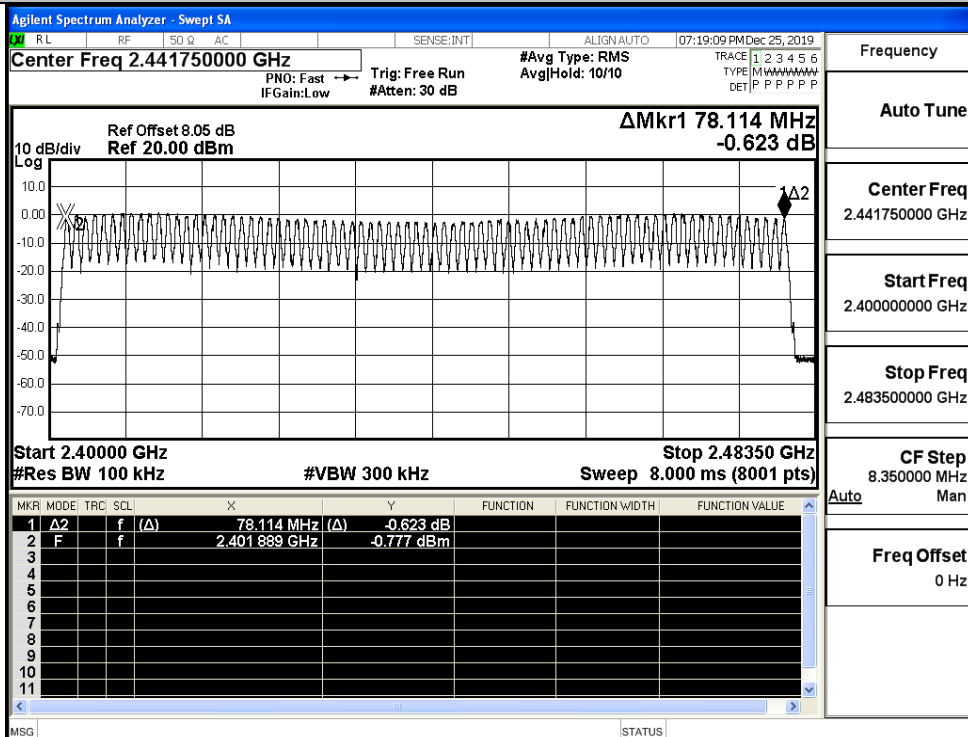


A.4 Hopping Channel Number

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



Frequency

Auto Tune

Center Freq
2.441750000 GHz

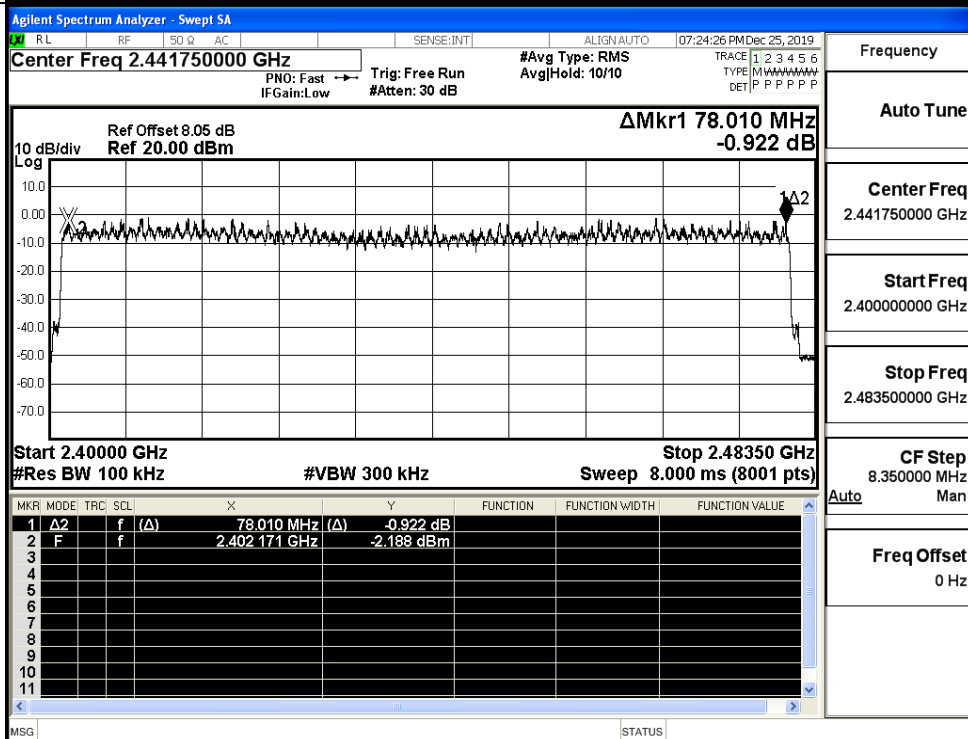
Start Freq
2.400000000 GHz

Stop Freq
2.483500000 GHz

CF Step
8.350000 MHz
Auto Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/Hop



Frequency

Auto Tune

Center Freq
2.441750000 GHz

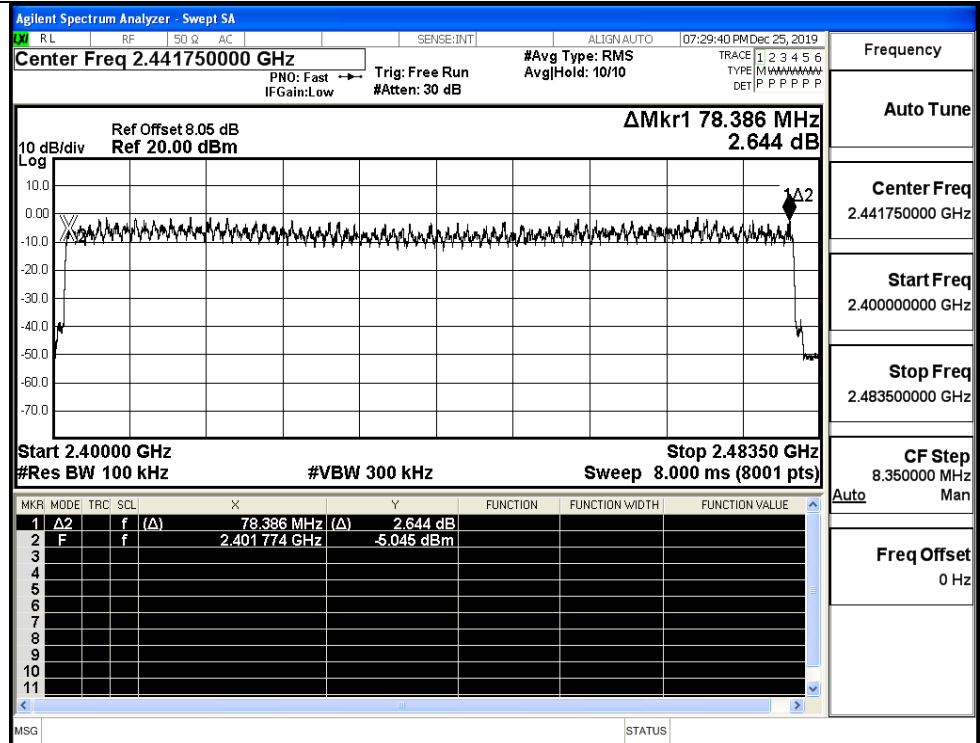
Start Freq
2.400000000 GHz

Stop Freq
2.483500000 GHz

CF Step
8.350000 MHz
Auto Man

Freq Offset
0 Hz

8DPSK/Hop

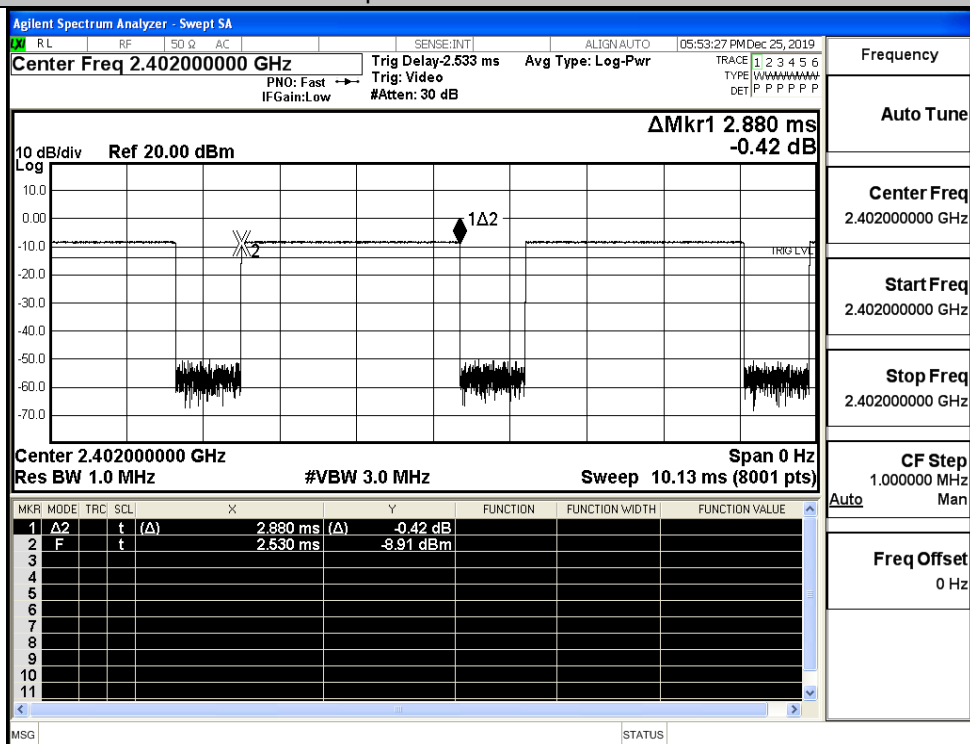


A.5 Dwell Time

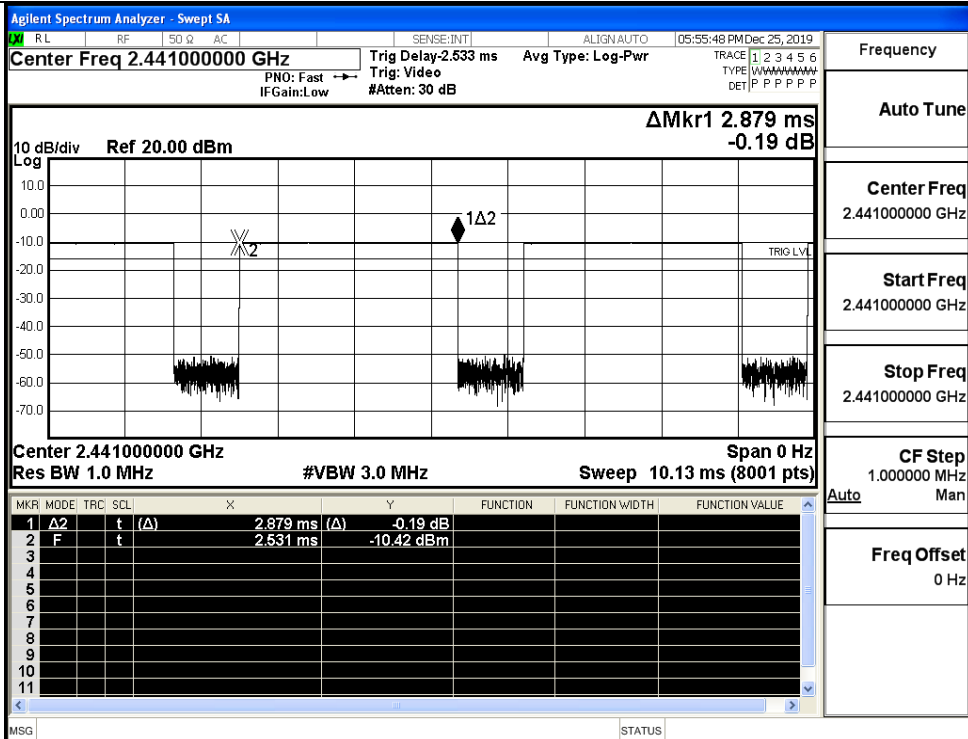
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88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

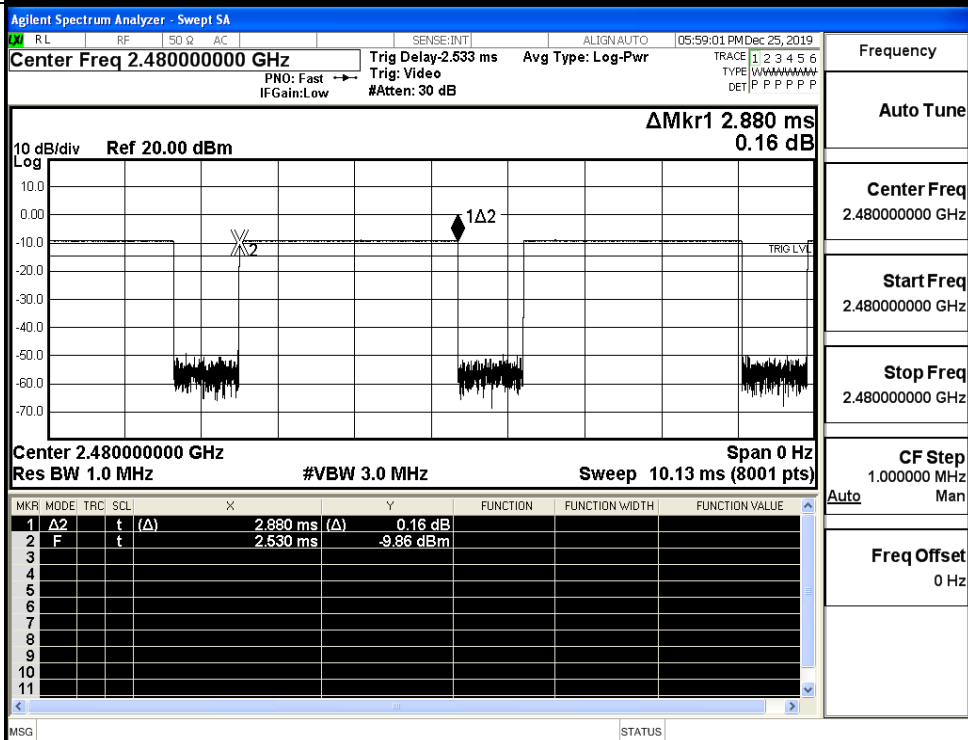
GFSK_DH5/LCH



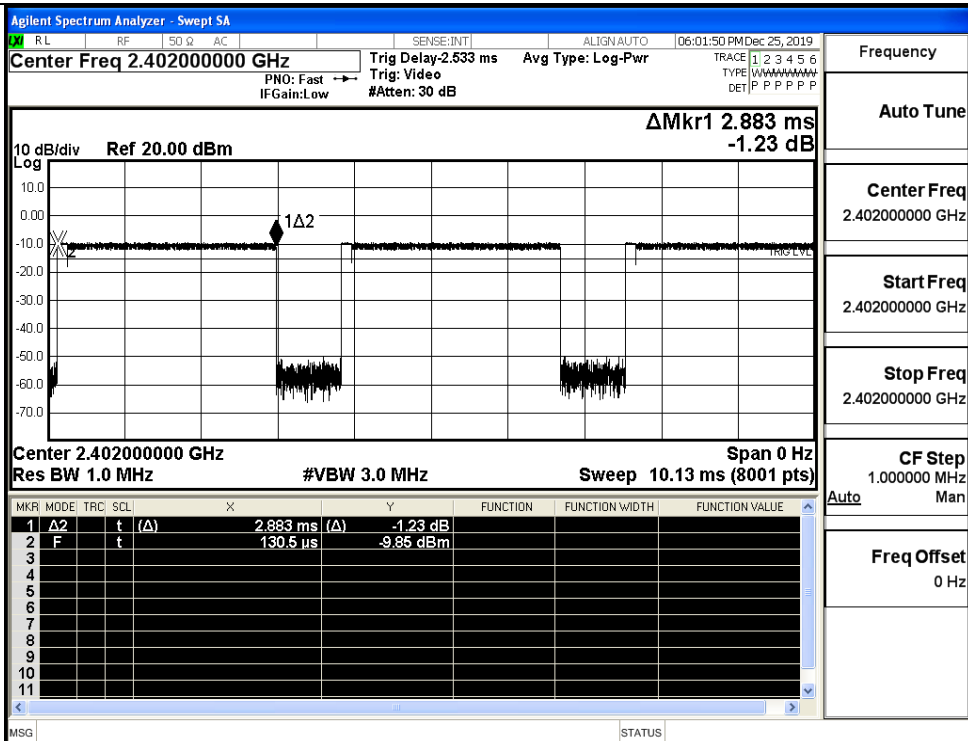
GFSK_DH5/MCH



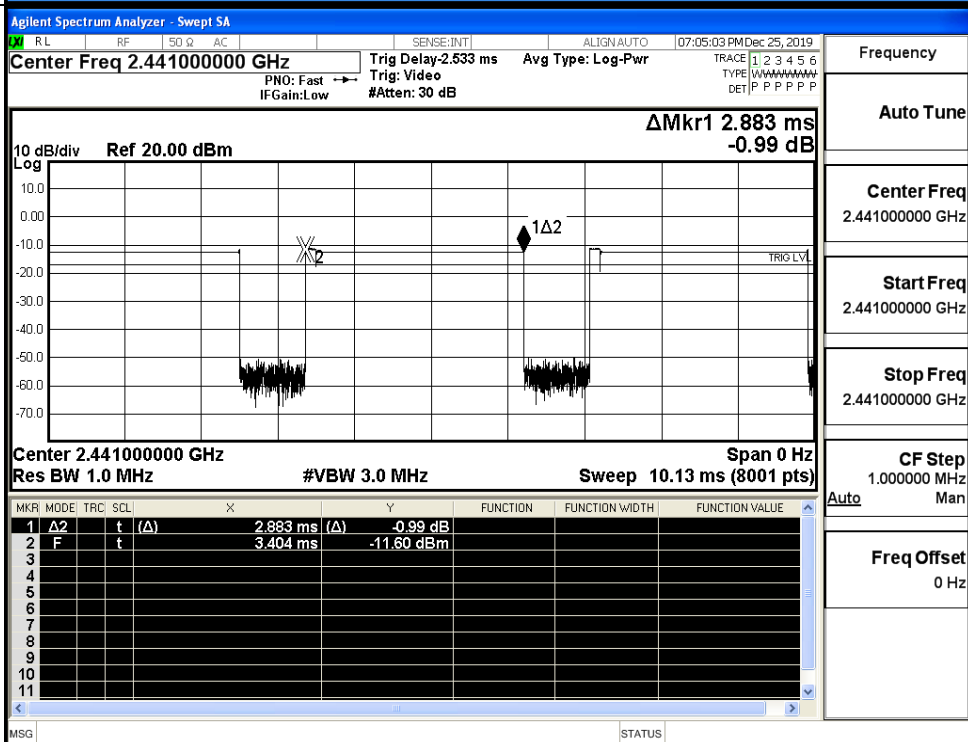
GFSK_DH5/HCH



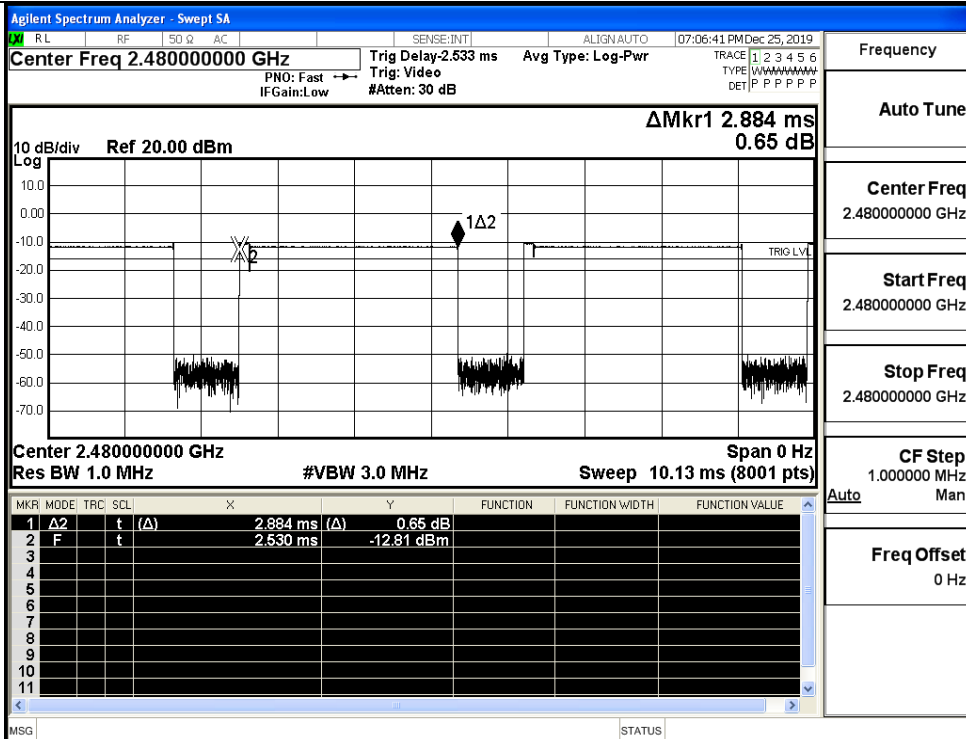
$\pi/4$ DQPSK
_2DH5/LCH



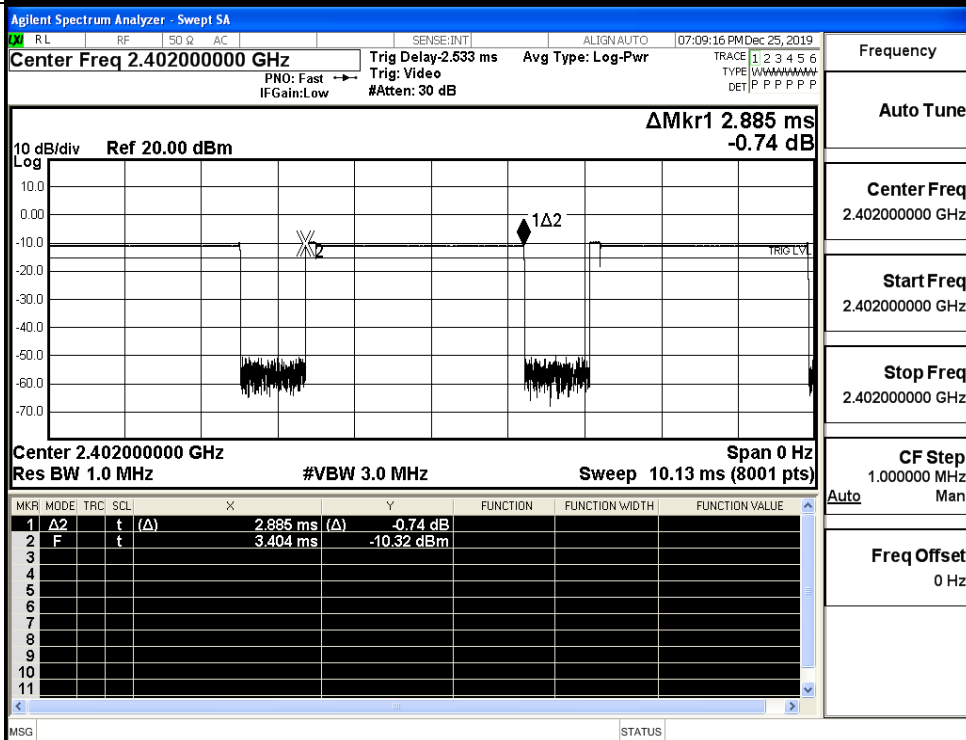
$\pi/4$ DQPSK
_2DH5/MCH



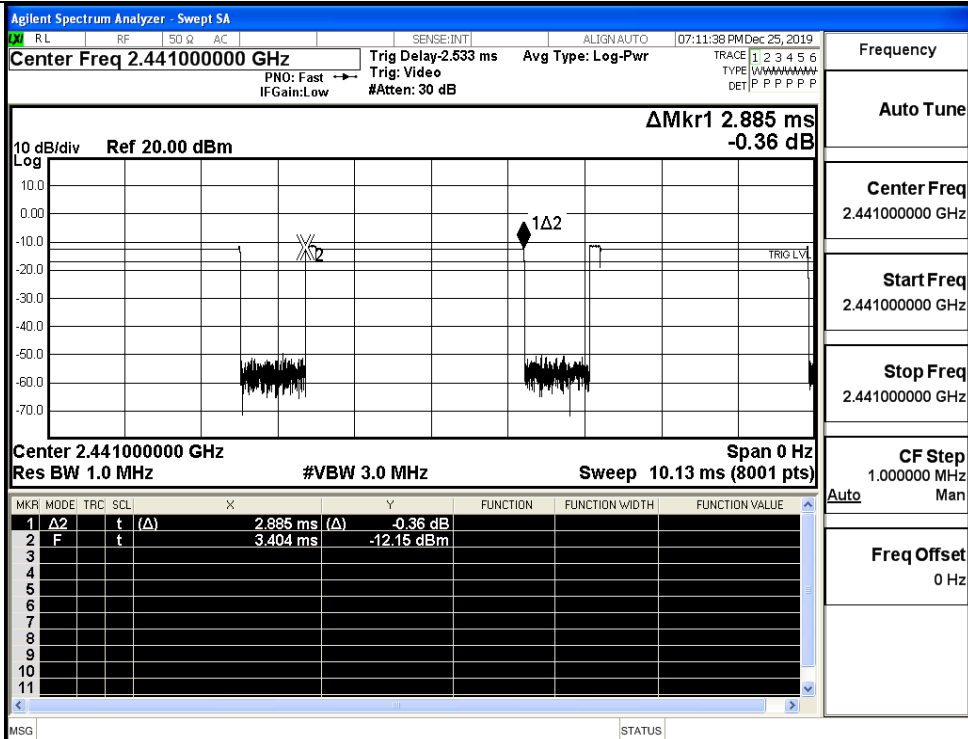
$\pi/4$ DQPSK
_2DH5/HCH



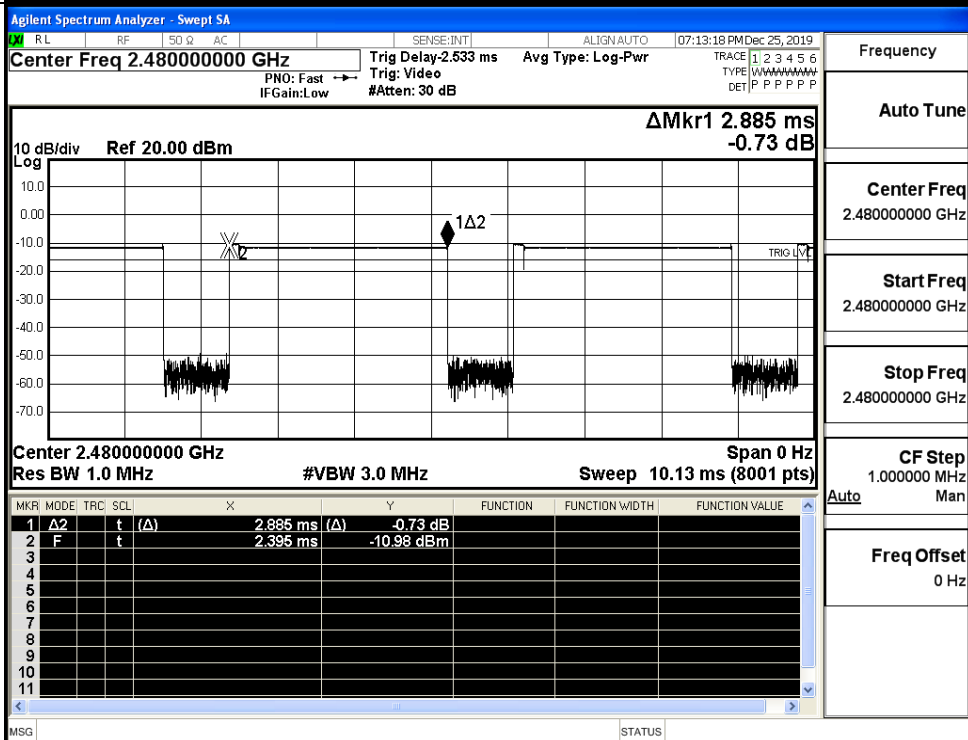
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



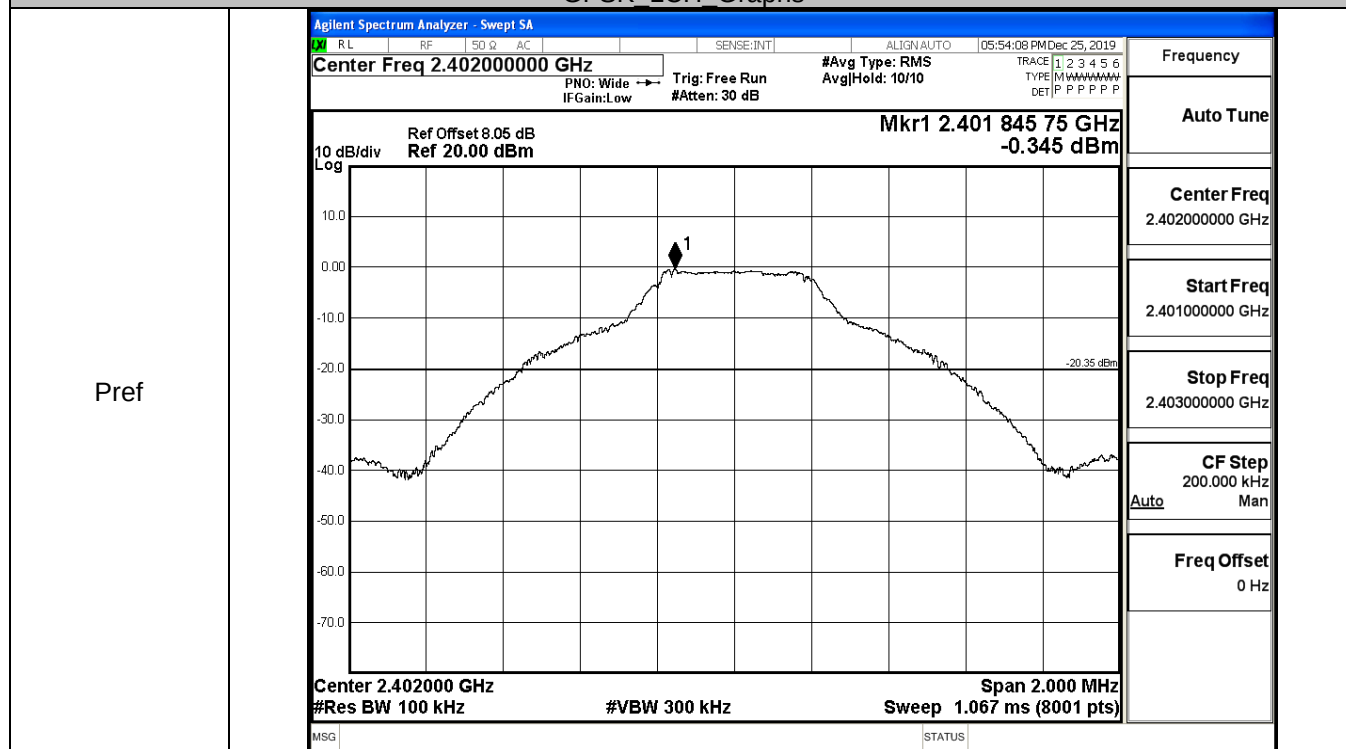
8DPSK_3DH5/HCH



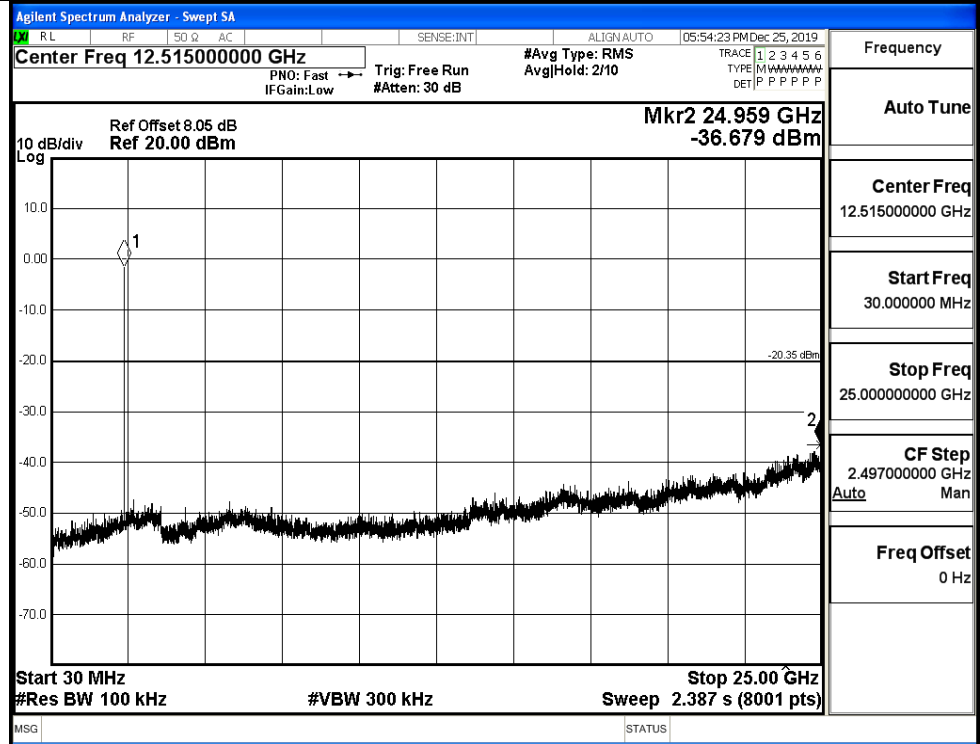
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.345	-36.679	-20.345	PASS
	MCH	-2.207	-36.730	-22.207	PASS
	HCH	-1.051	-36.240	-21.051	PASS
$\pi/4$ DQPSK	LCH	-1.664	-36.824	-21.664	PASS
	MCH	-3.597	-37.181	-23.597	PASS
	HCH	-2.323	-38.084	-22.323	PASS
8DPSK	LCH	-1.734	-36.998	-21.734	PASS
	MCH	-3.285	-36.874	-23.285	PASS
	HCH	-2.396	-37.416	-22.396	PASS

GFSK LCH Graphs

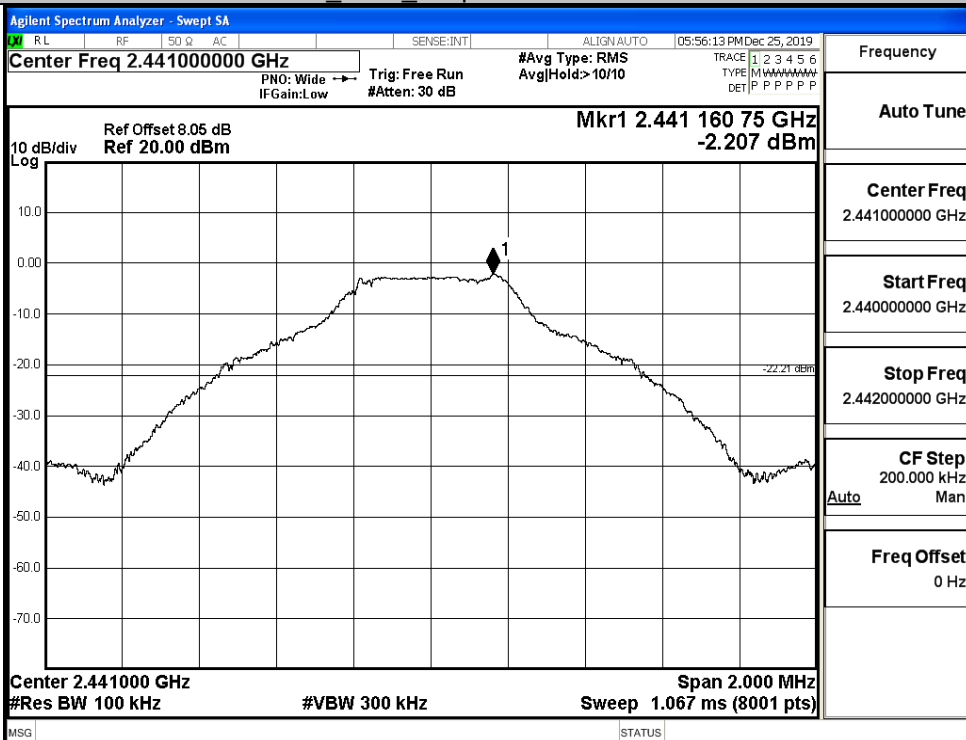


Puw

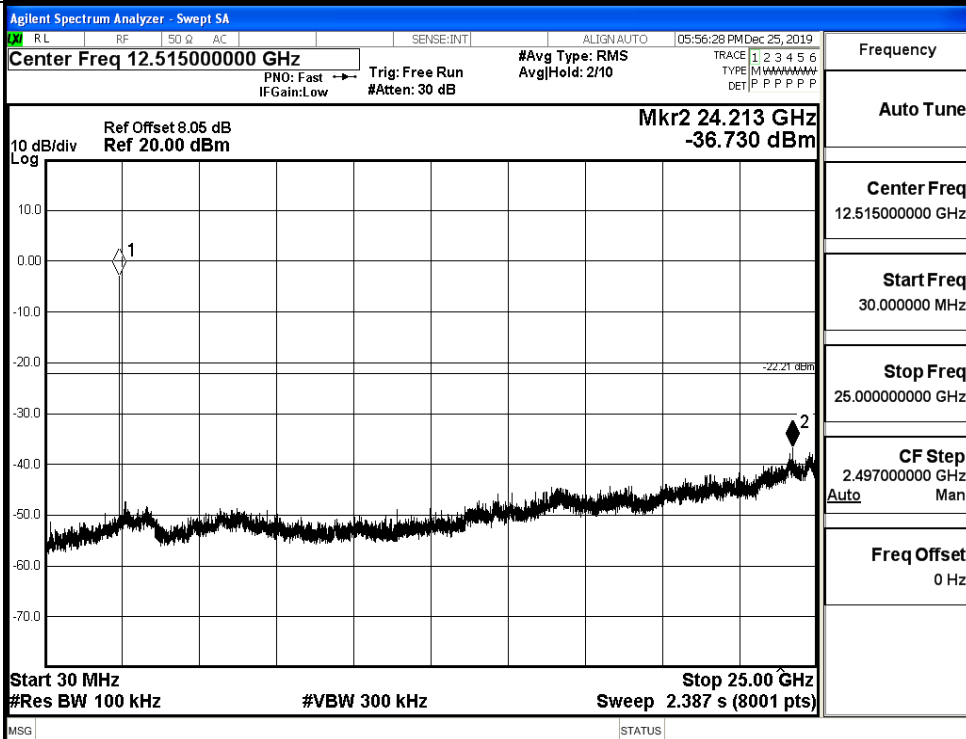


GFSK_MCH_Graphs

Pref

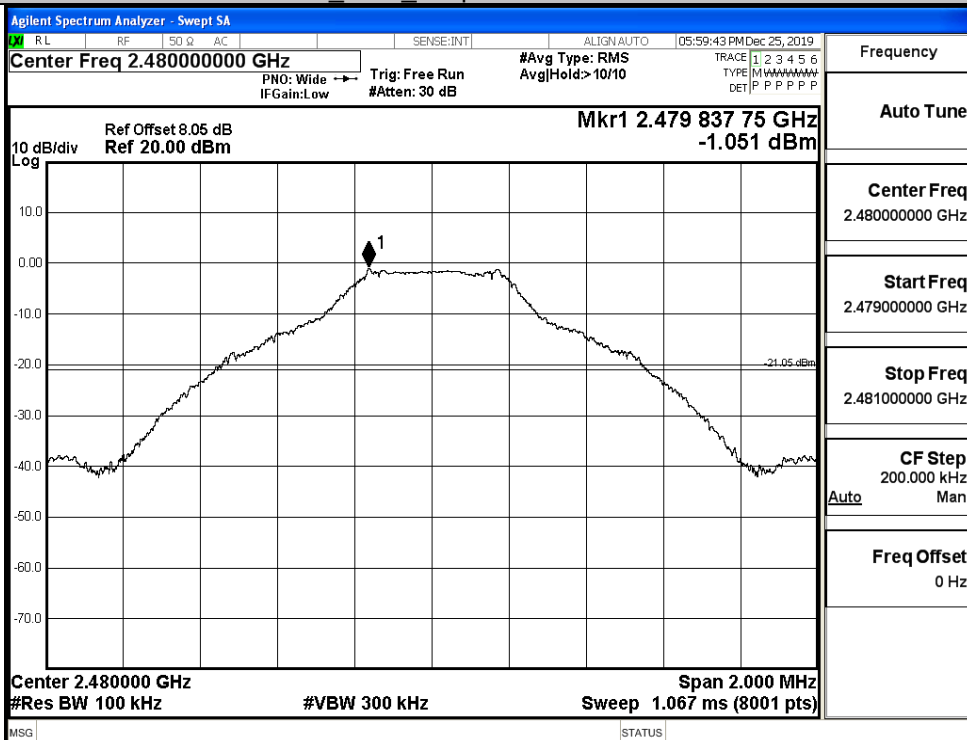


Puw

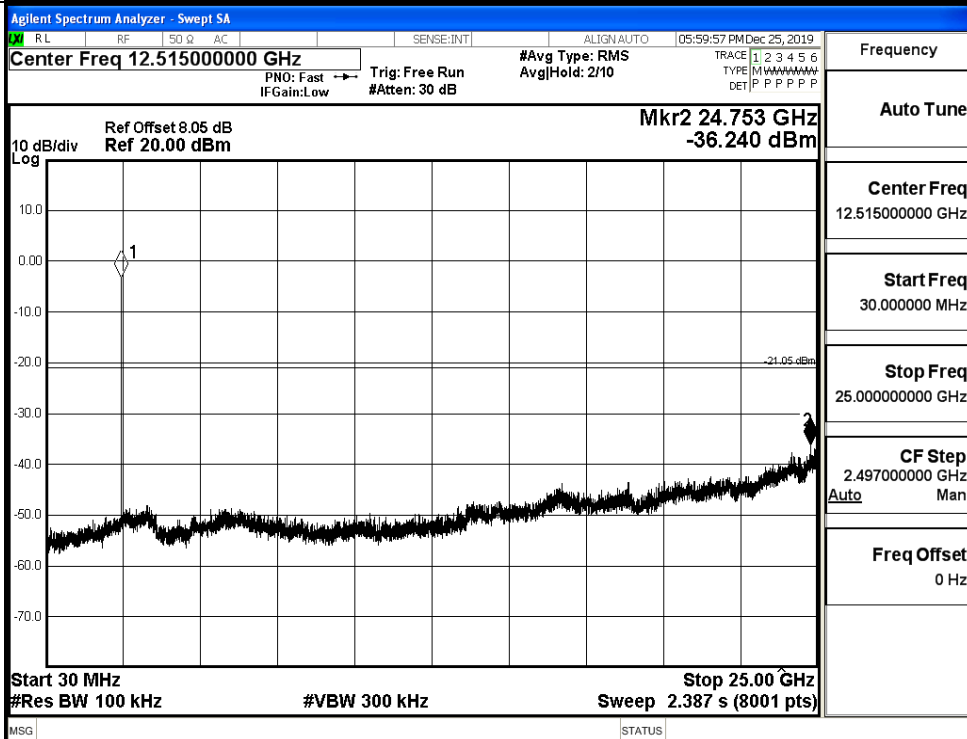


GFSK HCH_Graphs

Pref

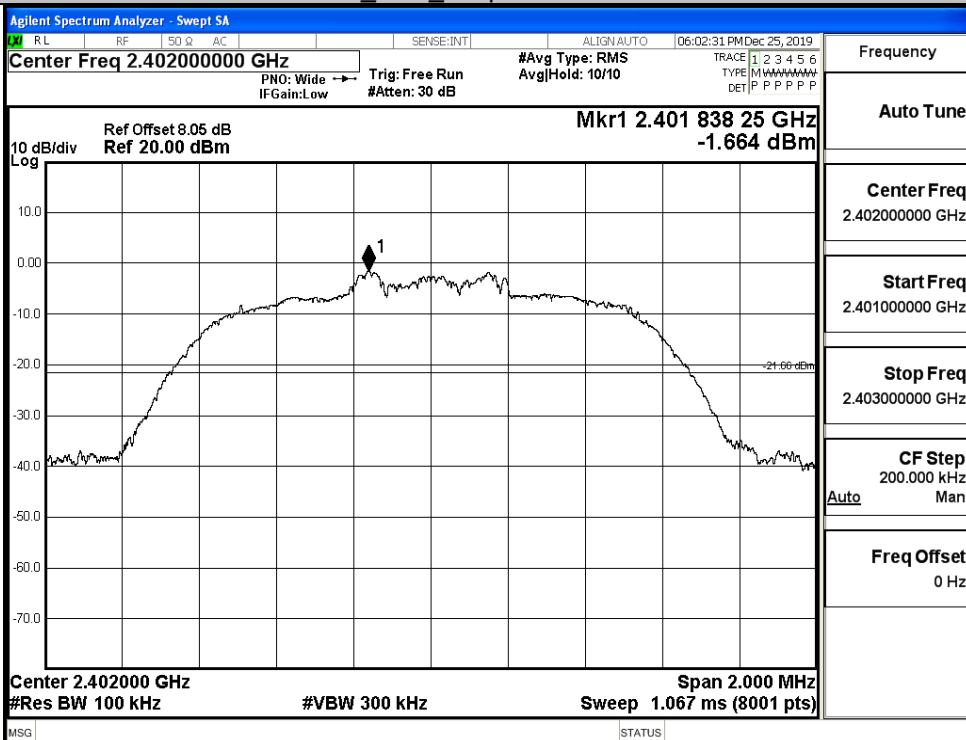


Puw

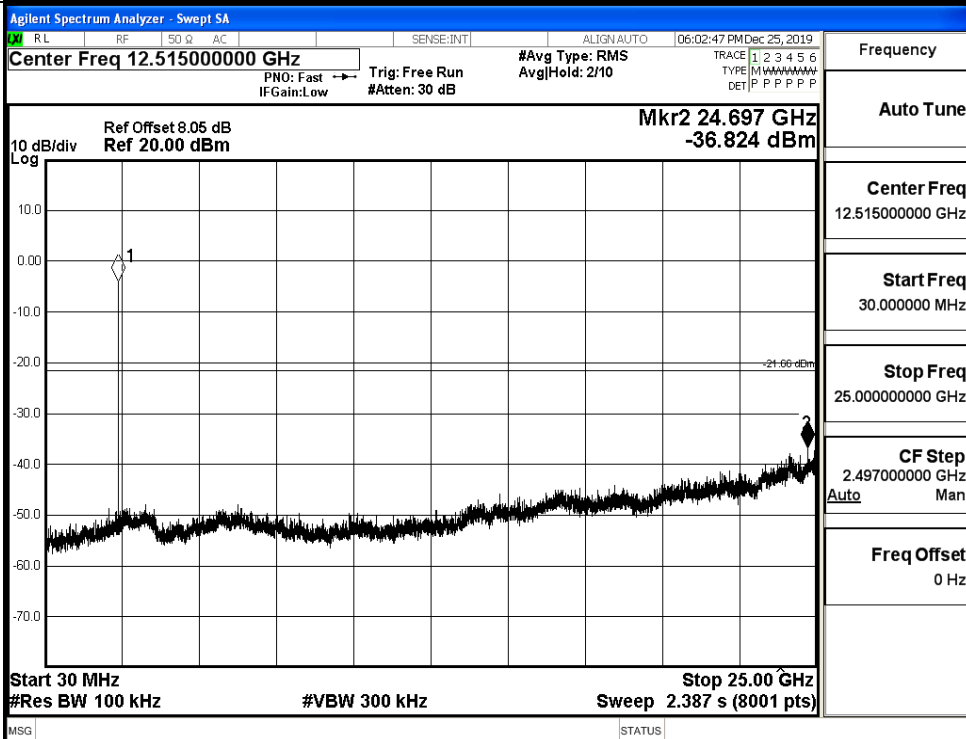


$\pi/4$ DQPSK_LCH_Graphs

Pref

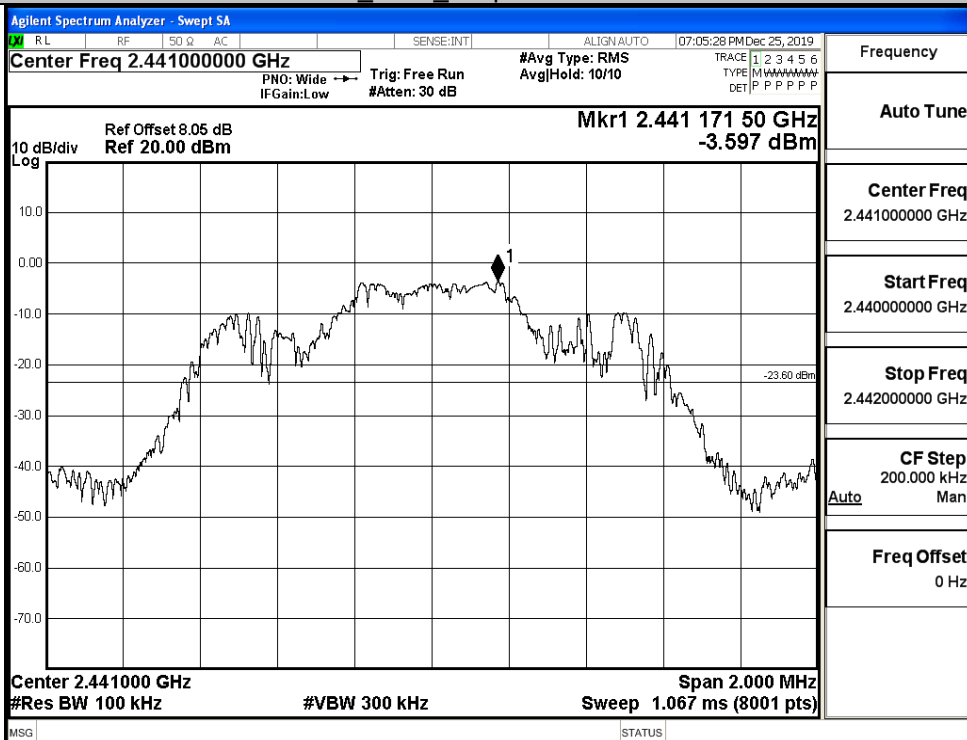


Puw

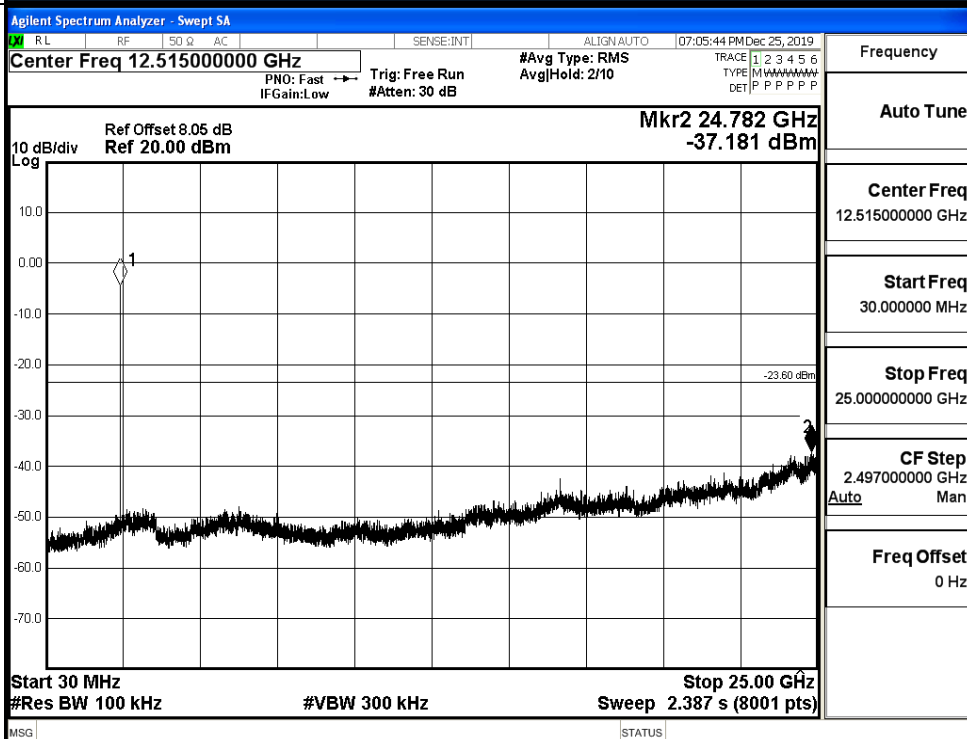


$\pi/4$ DQPSK_MCH_Graphs

Pref

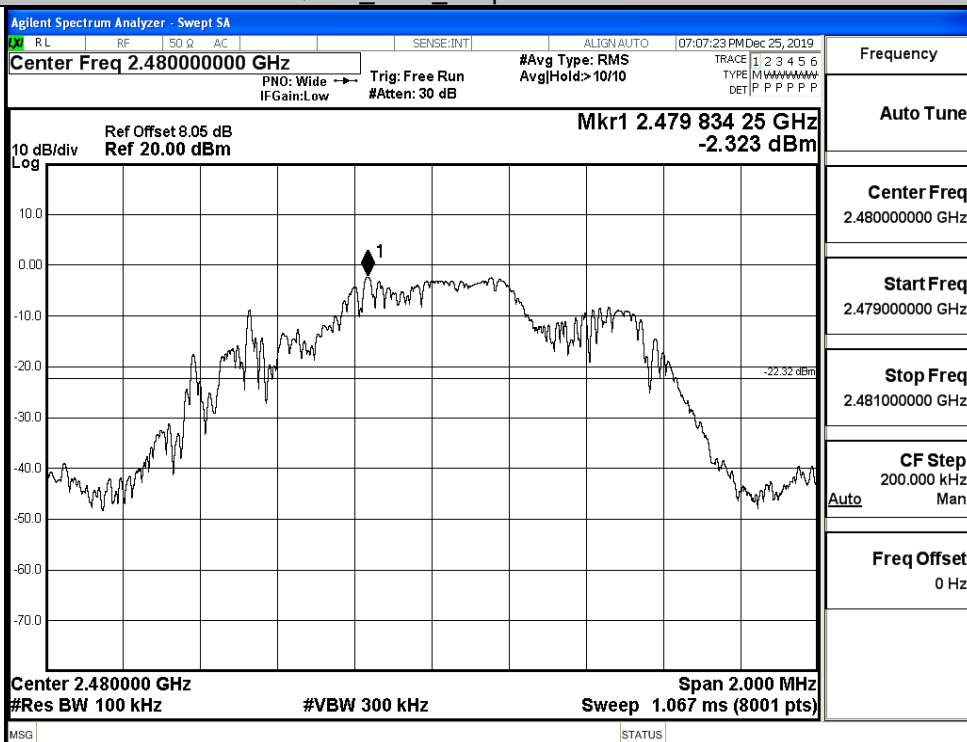


Puw

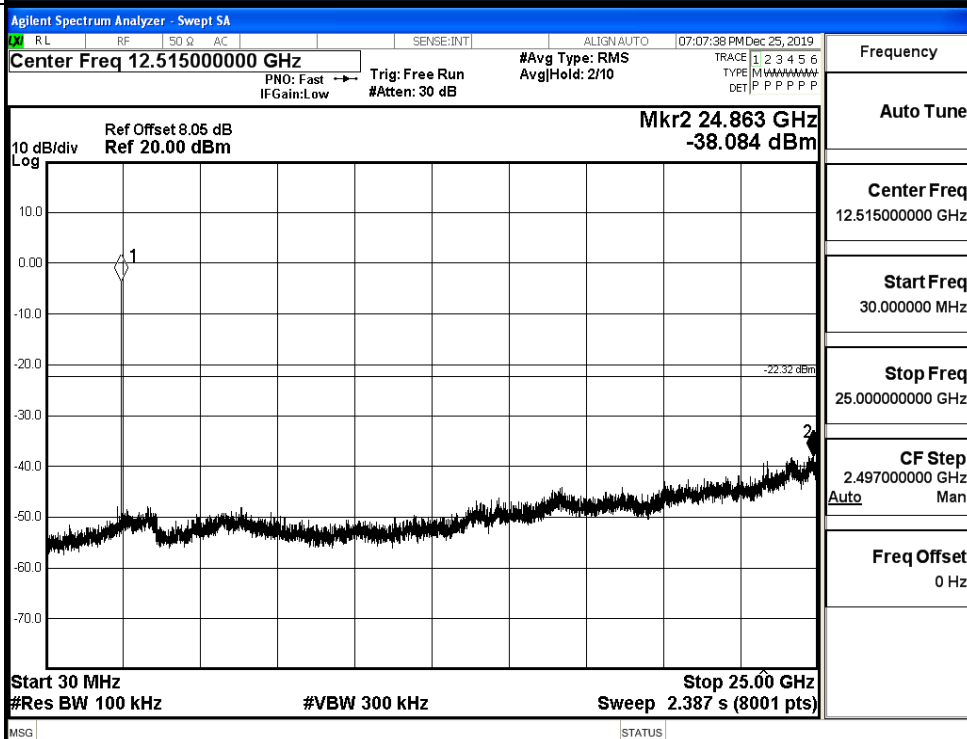


$\pi/4$ DQPSK_HCH_Graphs

Pref

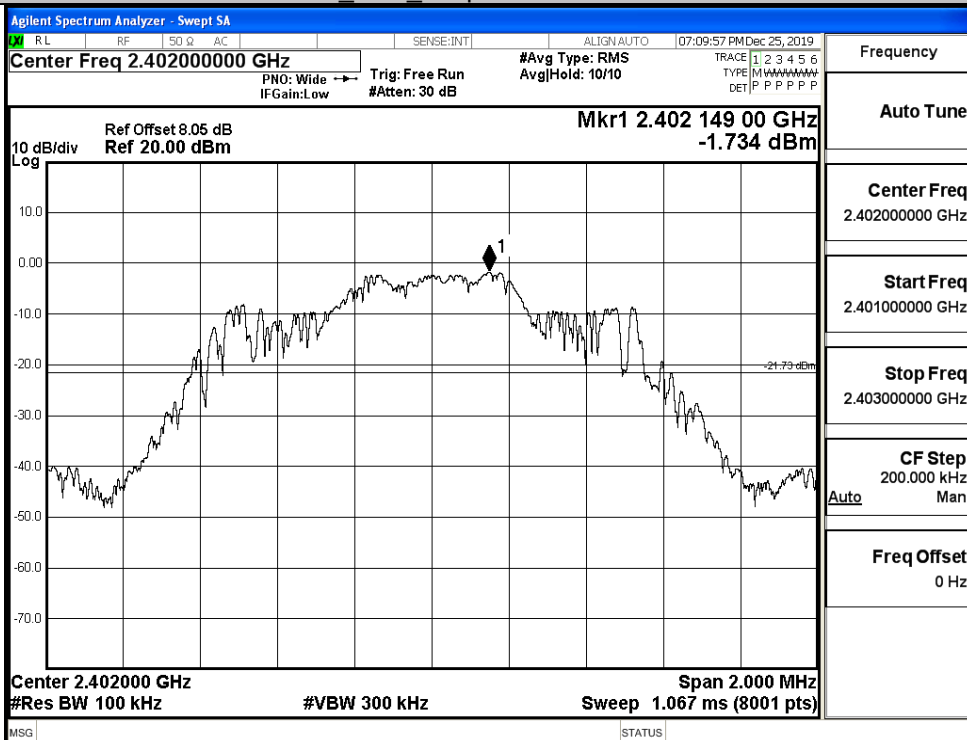


Puw

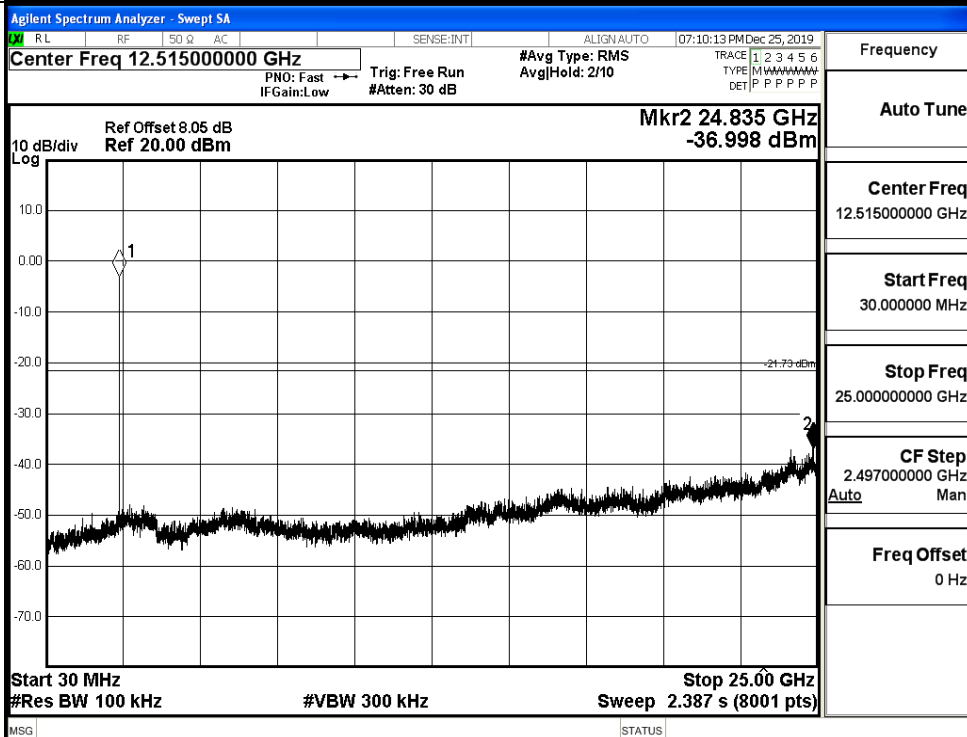


8DPSK_LCH_Graphs

Pref

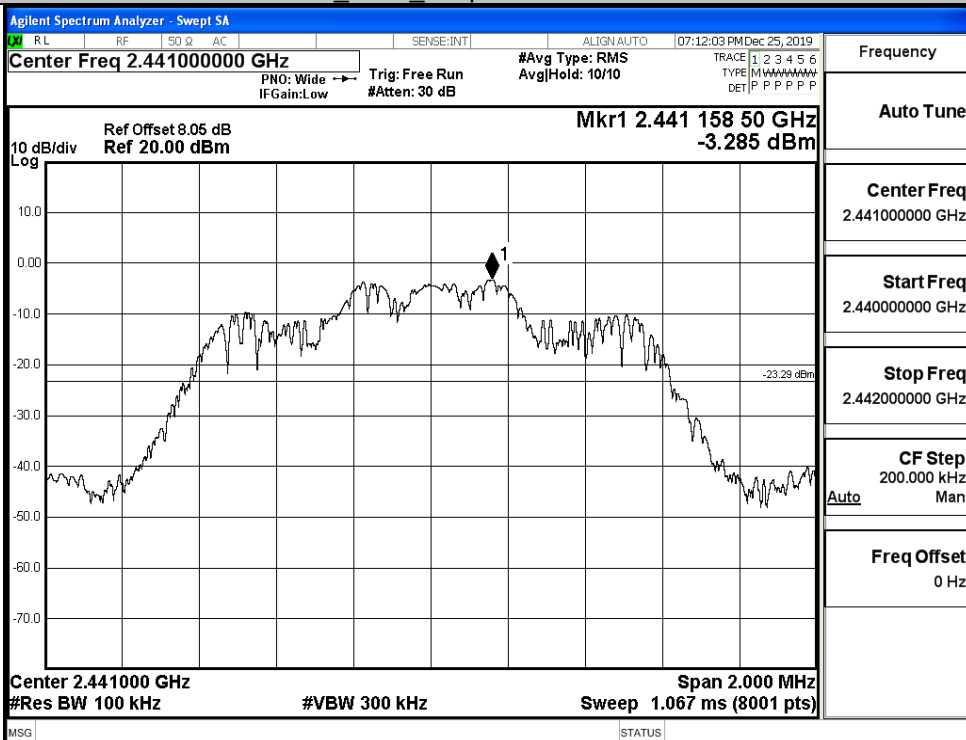


Puw

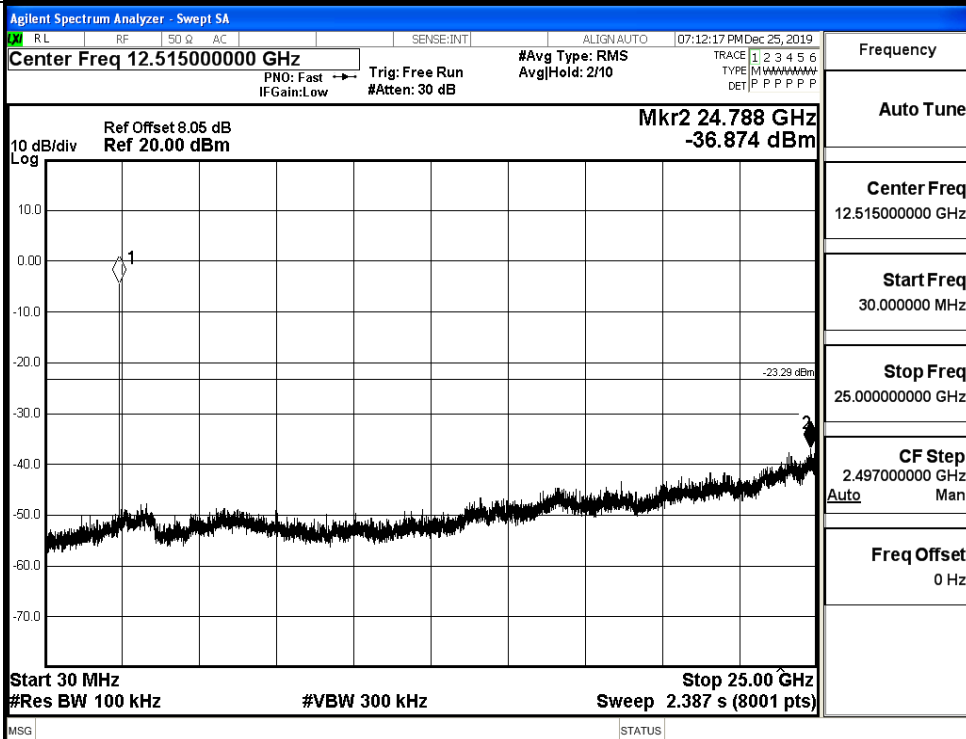


8DPSK_MCH_Graphs

Pref

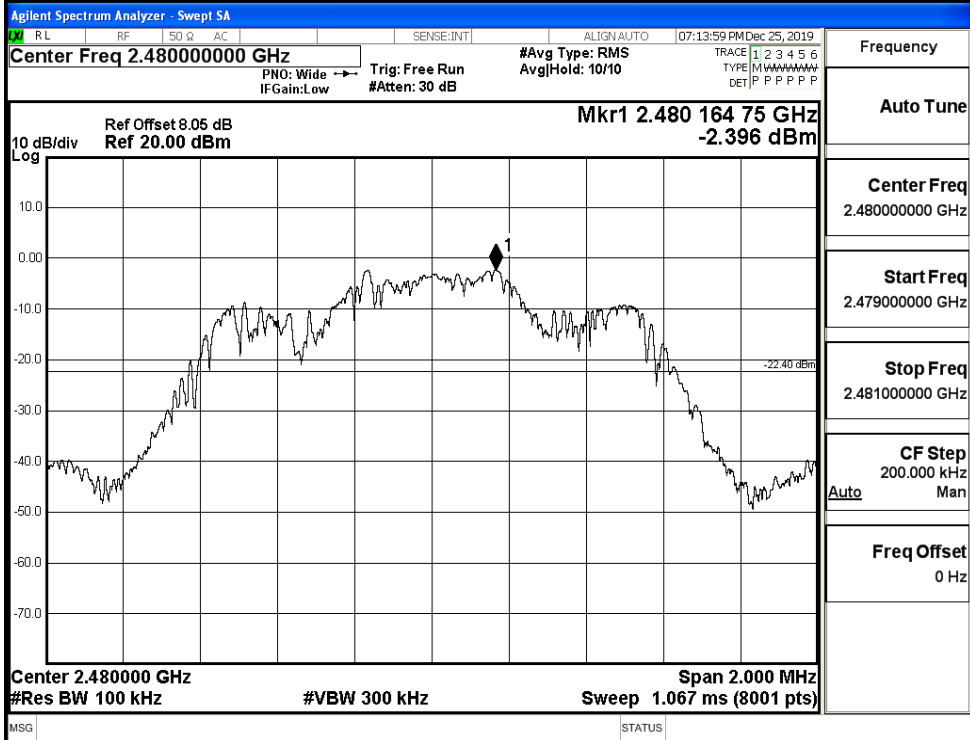


Puw

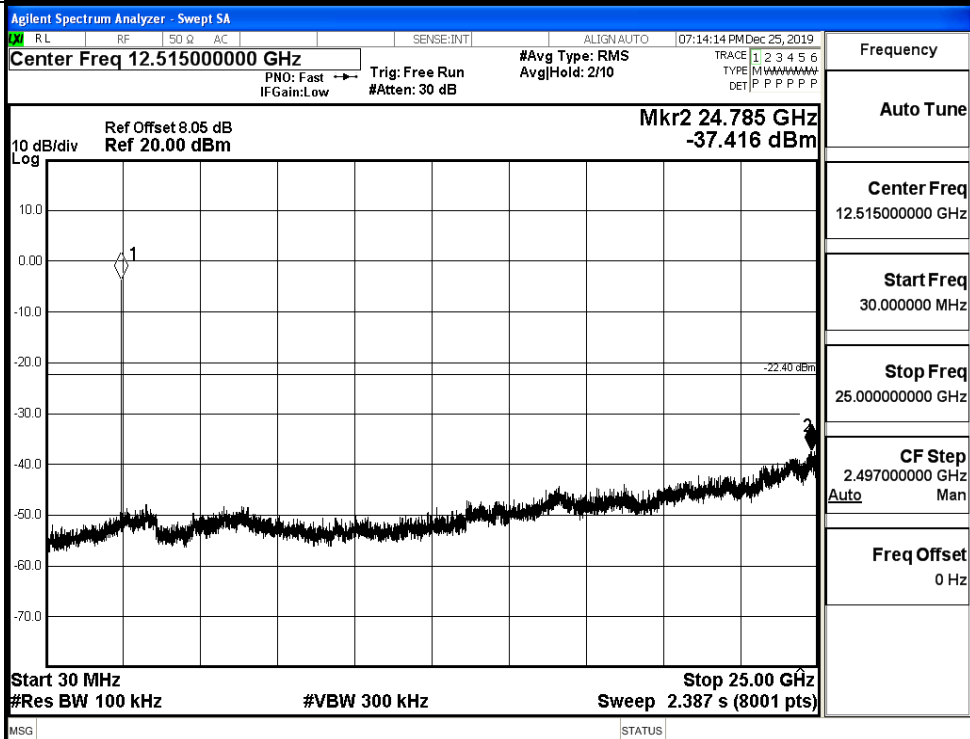


8DPSK_HCH_Graphs

Pref



Puw

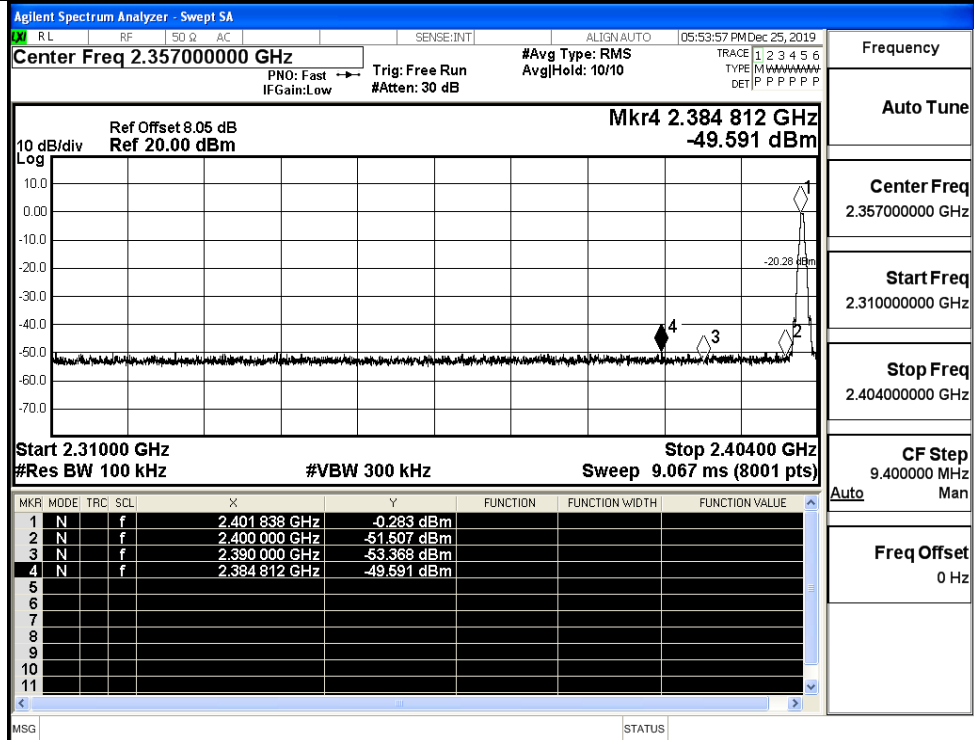


A.7 Band-edge for RF Conducted Emissions

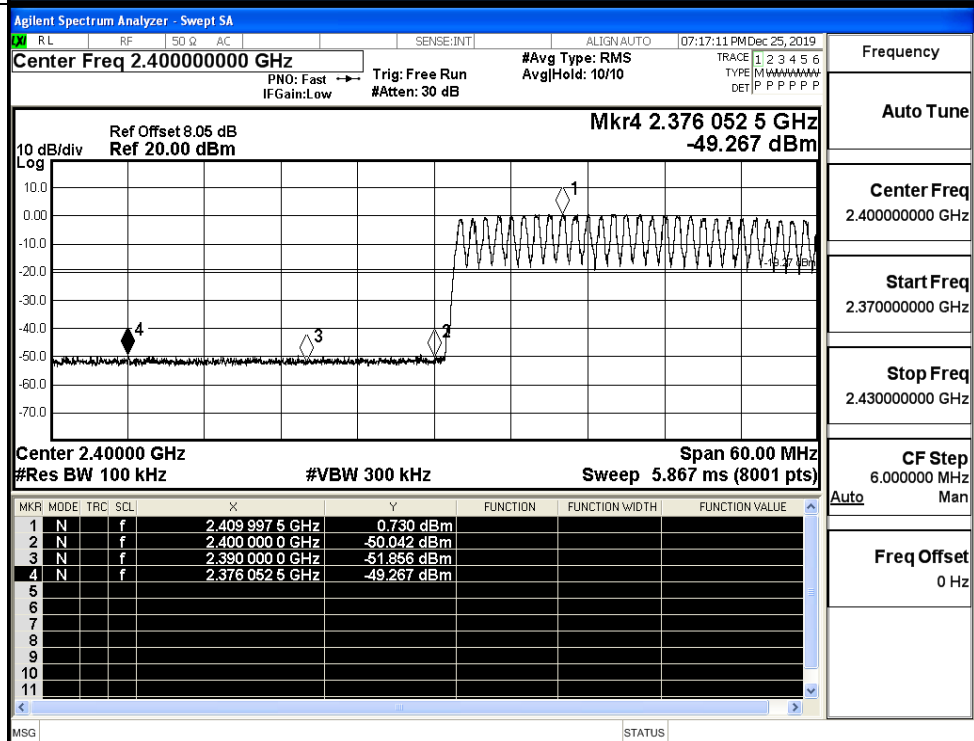
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-0.283	Off	-49.591	-20.28	PASS
			0.730	On	-49.267	-19.27	PASS
	HCH	2480	-1.074	Off	-49.081	-21.07	PASS
			0.388	On	-48.129	-19.61	PASS
$\pi/4$ DQPSK	LCH	2402	-1.685	Off	-49.682	-21.69	PASS
			-0.795	On	-48.989	-20.8	PASS
	HCH	2480	-2.317	Off	-49.103	-22.32	PASS
			-1.199	On	-48.214	-21.2	PASS
8DPSK	LCH	2402	-1.533	Off	-49.069	-21.53	PASS
			-0.647	On	-49.196	-20.65	PASS
	HCH	2480	-2.338	Off	-48.687	-22.34	PASS
			-1.287	On	-48.262	-21.29	PASS

Test Graphs

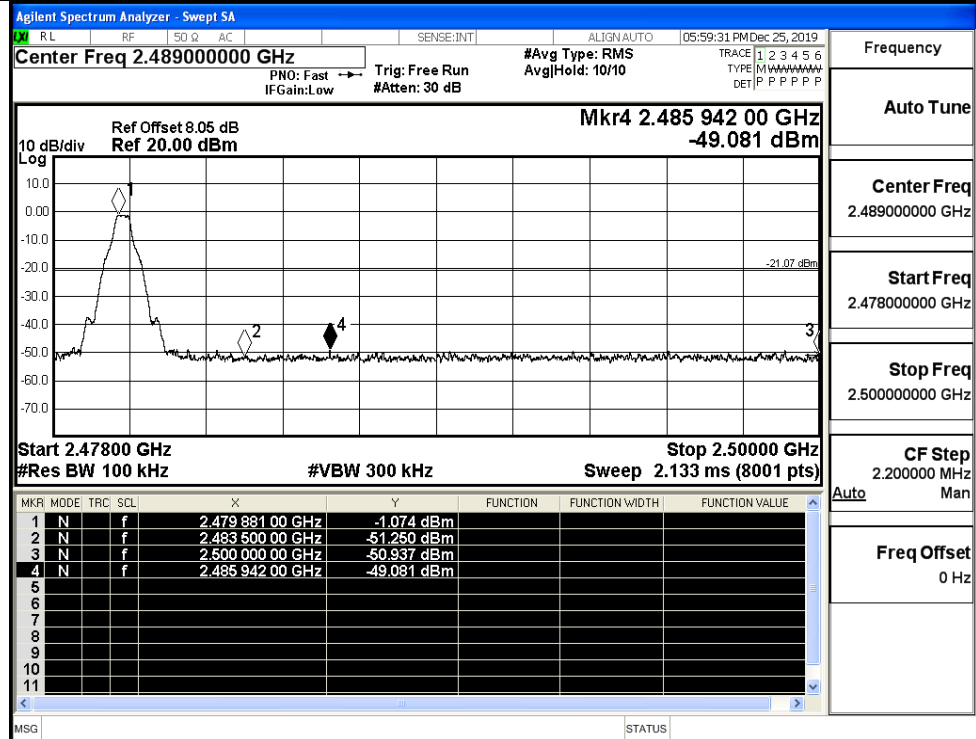
GFSK/LCH/No Hop



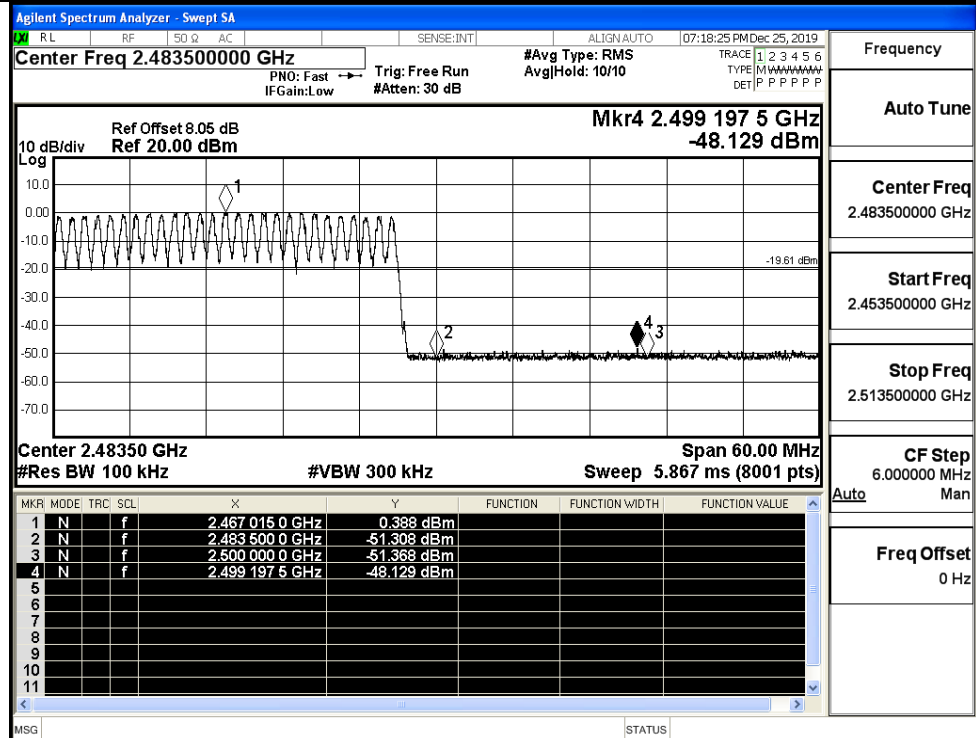
GFSK/LCH/Hop



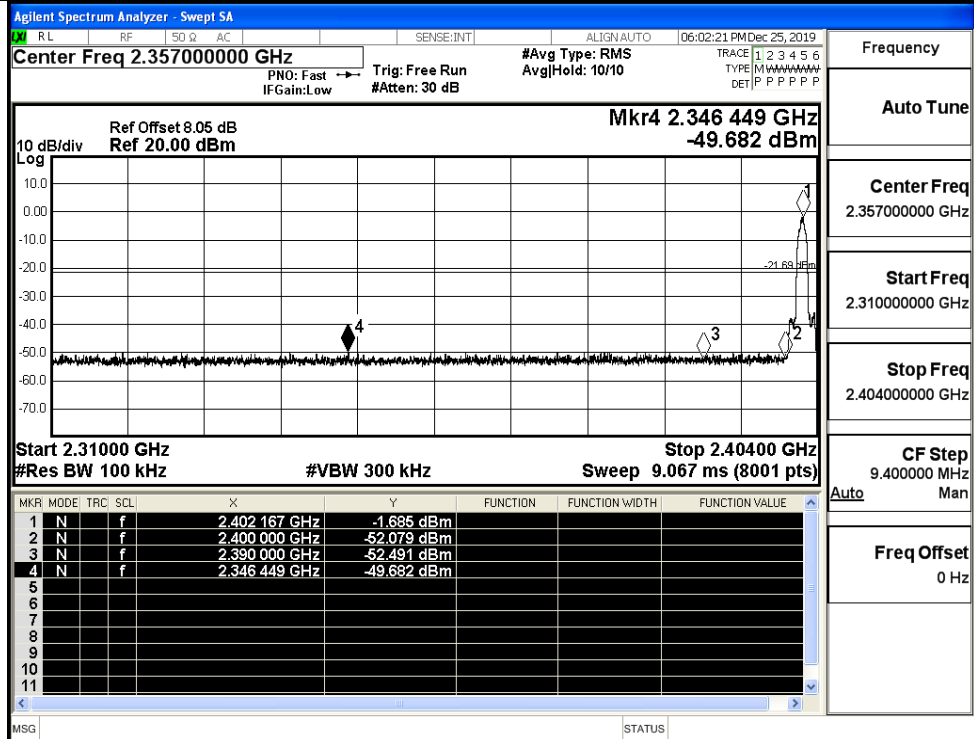
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq
2.357000000 GHz

Start Freq
2.310000000 GHz

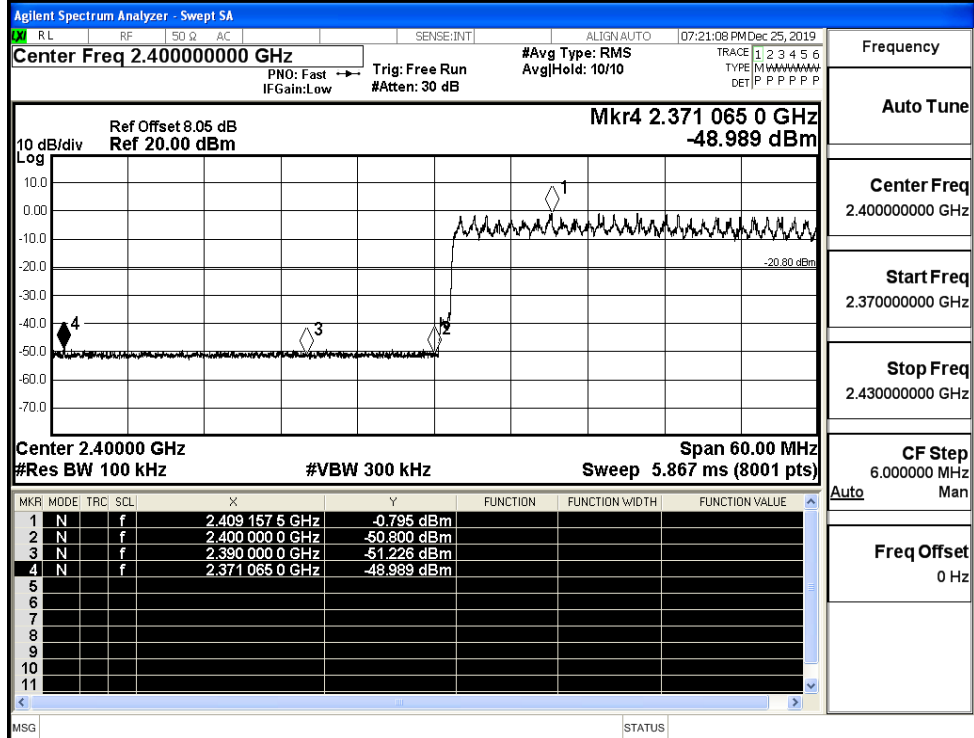
Stop Freq
2.404000000 GHz

CF Step
9.400000 MHz

Auto

Freq Offset
0 Hz

$\pi/4$ DQPSK/LCH/Hop



Frequency

Auto Tune

Center Freq
2.400000000 GHz

Start Freq
2.370000000 GHz

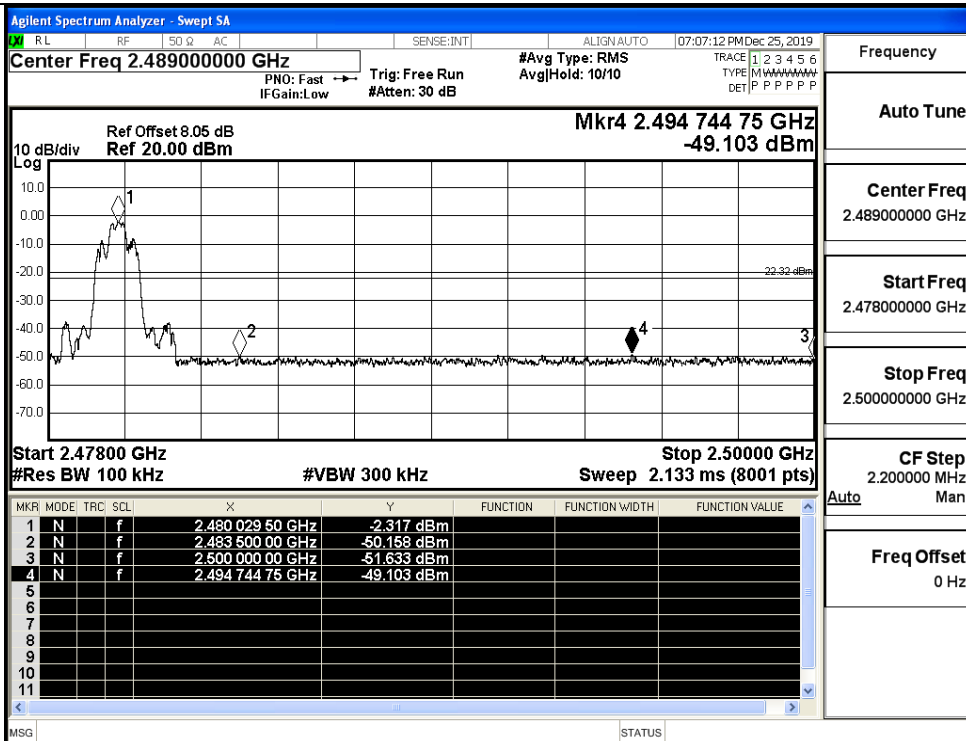
Stop Freq
2.430000000 GHz

CF Step
6.000000 MHz

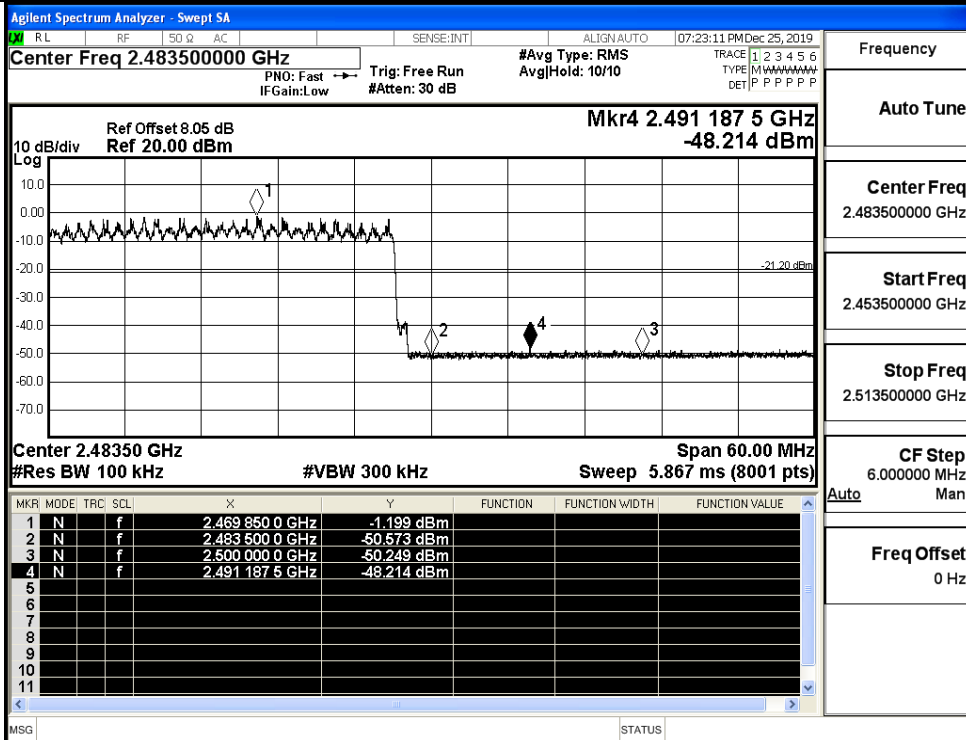
Auto

Freq Offset
0 Hz

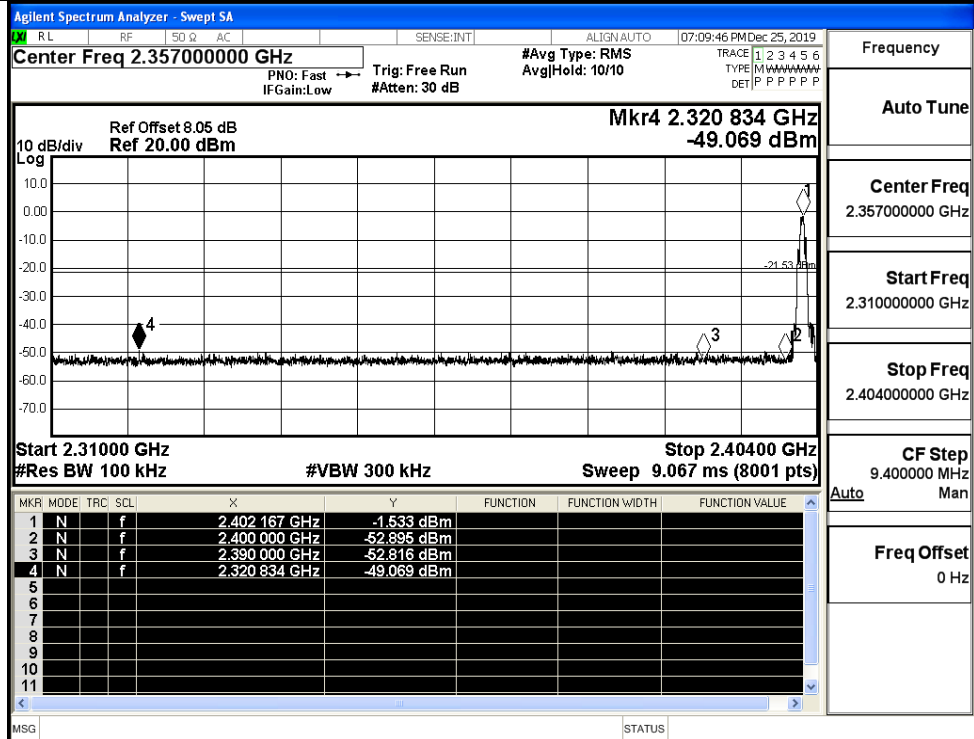
$\pi/4$ DQPSK/HCH/No
Hop



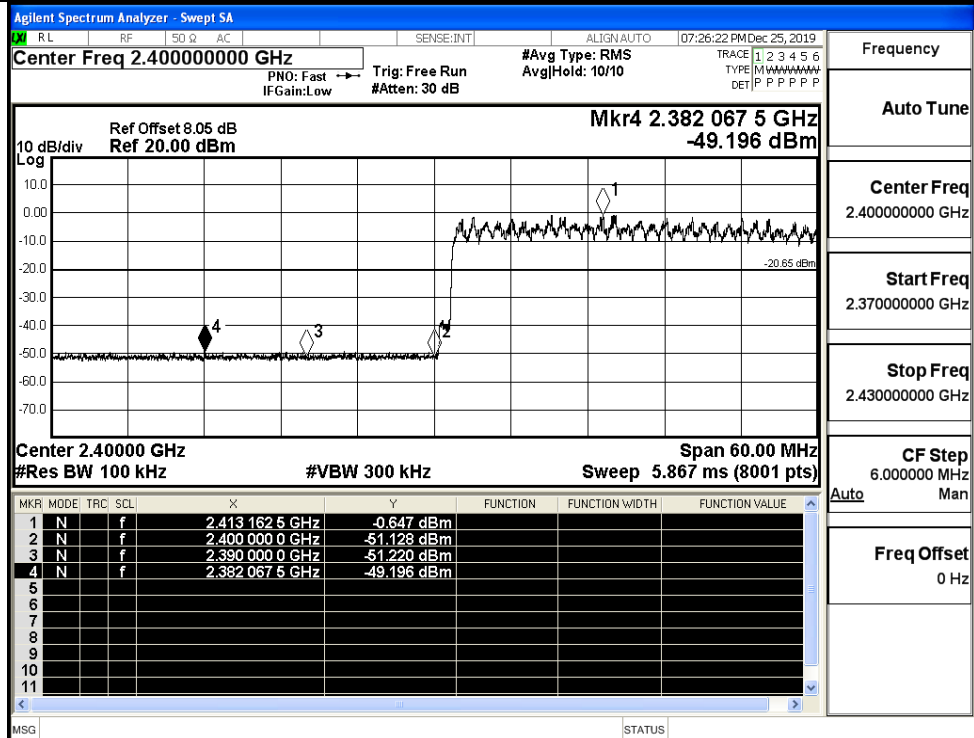
$\pi/4$ DQPSK/HCH/Hop



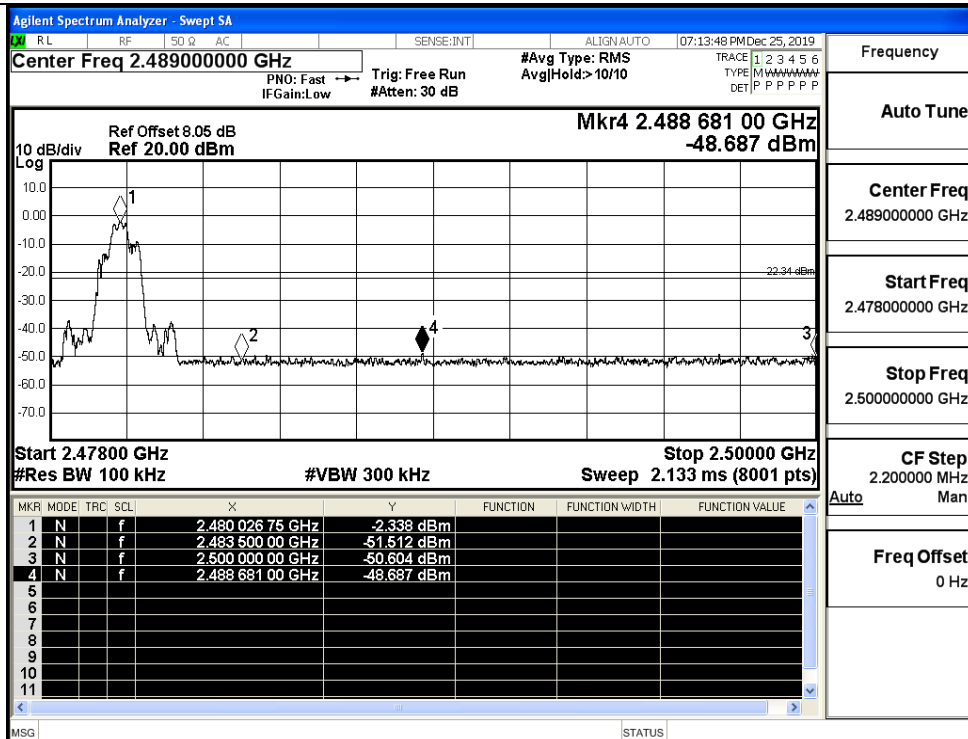
8DPSK/LCH/No Hop



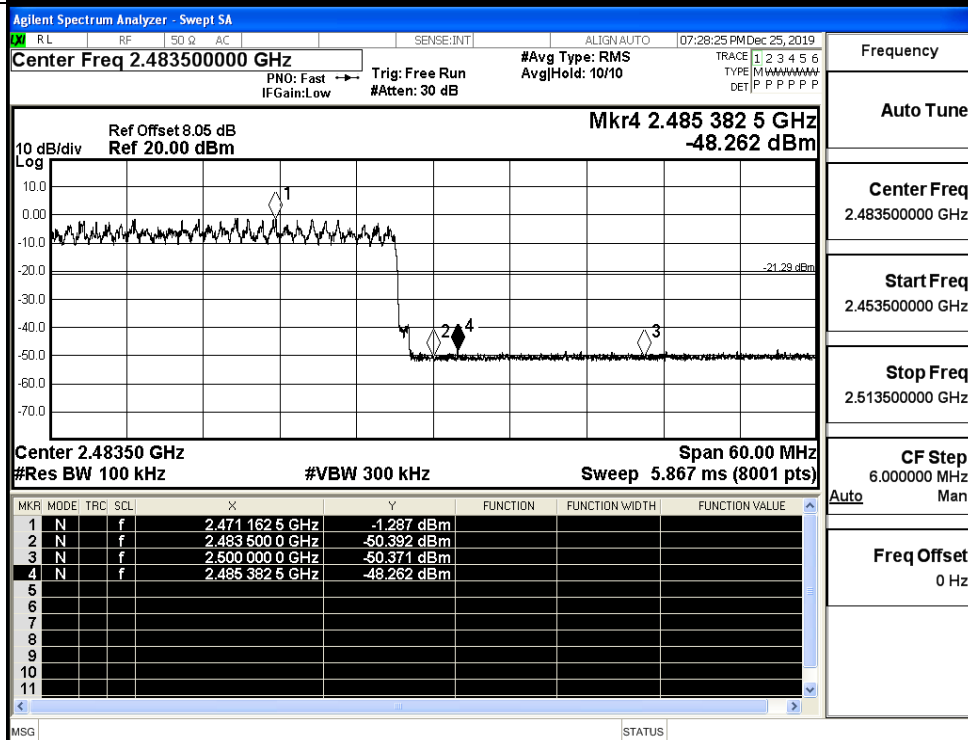
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



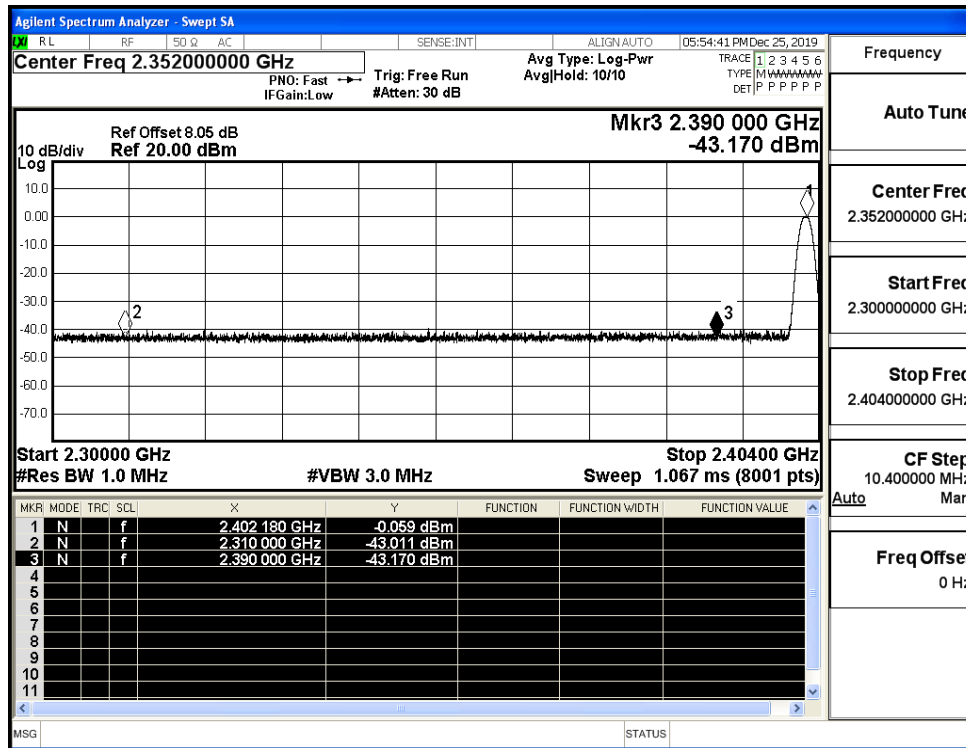
8DPSK/HCH/Hop



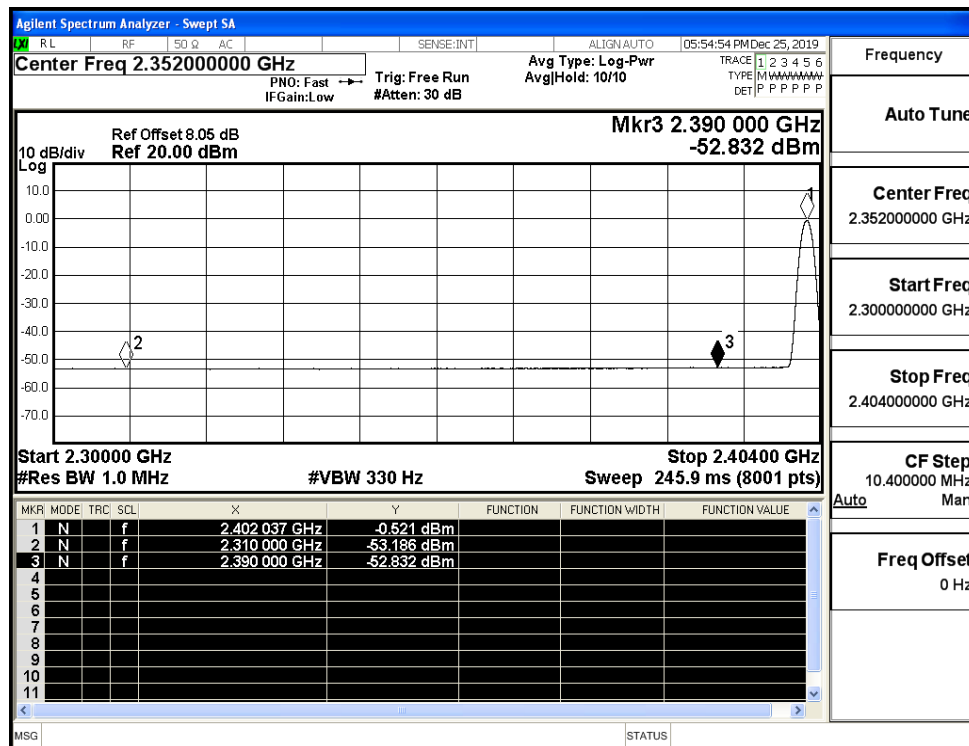
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.01	2.0	0	54.25	PEAK	74	PASS
	Off	2310.0	-53.19	2.0	0	44.07	AV	54	PASS
	Off	2390.0	-43.17	2.0	0	54.09	PEAK	74	PASS
	Off	2390.0	-52.83	2.0	0	44.43	AV	54	PASS
	Off	2483.5	-42.36	2.0	0	54.90	PEAK	74	PASS
	Off	2483.5	-52.49	2.0	0	44.76	AV	54	PASS
	Off	2500.0	-41.43	2.0	0	55.83	PEAK	74	PASS
	Off	2500.0	-52.32	2.0	0	44.94	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.85	2.0	0	54.41	PEAK	74	PASS
	Off	2310.0	-53.29	2.0	0	43.97	AV	54	PASS
	Off	2390.0	-43.70	2.0	0	53.56	PEAK	74	PASS
	Off	2390.0	-52.95	2.0	0	44.31	AV	54	PASS
	Off	2483.5	-42.72	2.0	0	54.54	PEAK	74	PASS
	Off	2483.5	-52.49	2.0	0	44.76	AV	54	PASS
	Off	2500.0	-43.20	2.0	0	54.06	PEAK	74	PASS
	Off	2500.0	-52.31	2.0	0	44.95	AV	54	PASS
8DPSK	Off	2310.0	-42.51	2.0	0	54.75	PEAK	74	PASS
	Off	2310.0	-53.27	2.0	0	43.99	AV	54	PASS
	Off	2390.0	-42.37	2.0	0	54.89	PEAK	74	PASS
	Off	2390.0	-52.87	2.0	0	44.39	AV	54	PASS
	Off	2483.5	-43.62	2.0	0	53.64	PEAK	74	PASS
	Off	2483.5	-52.46	2.0	0	44.80	AV	54	PASS
	Off	2500.0	-41.85	2.0	0	55.41	PEAK	74	PASS
	Off	2500.0	-52.21	2.0	0	45.05	AV	54	PASS

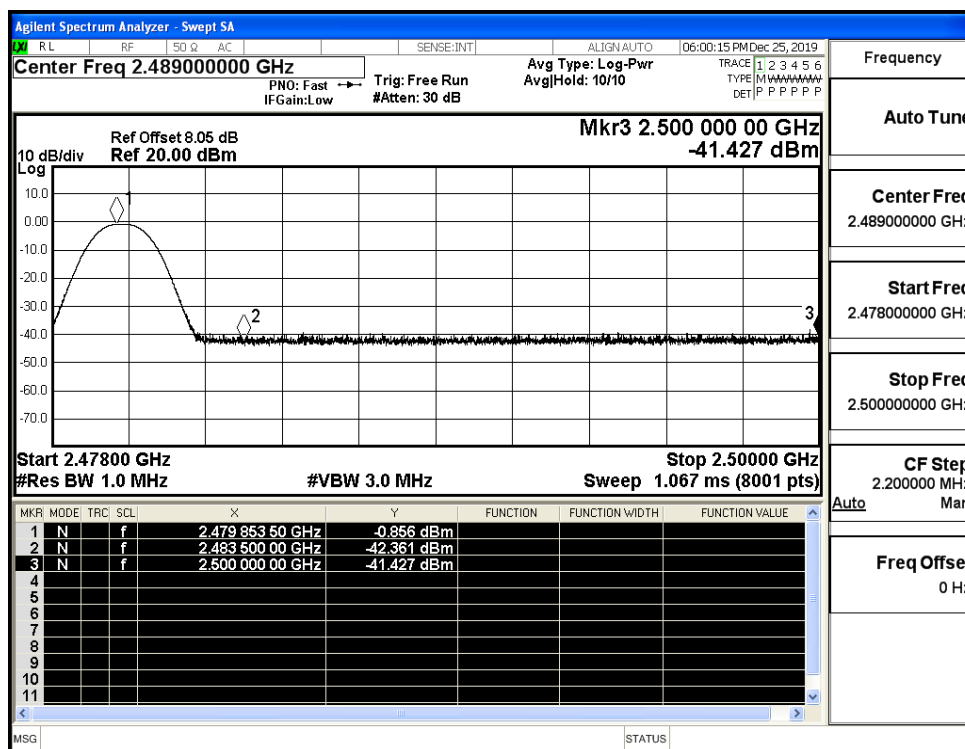
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



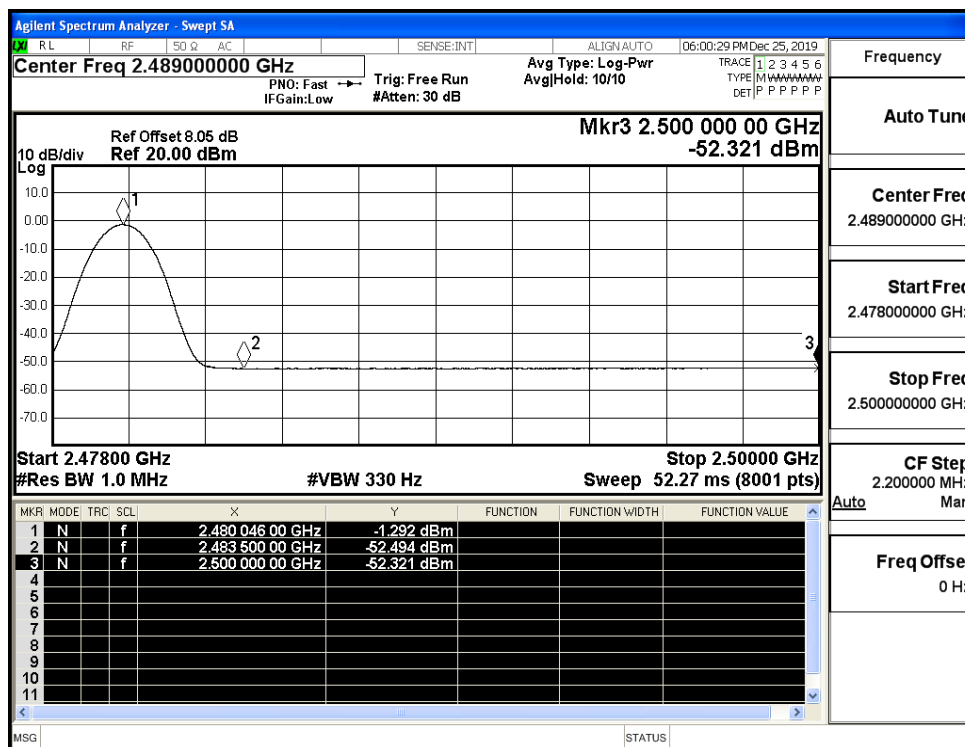
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



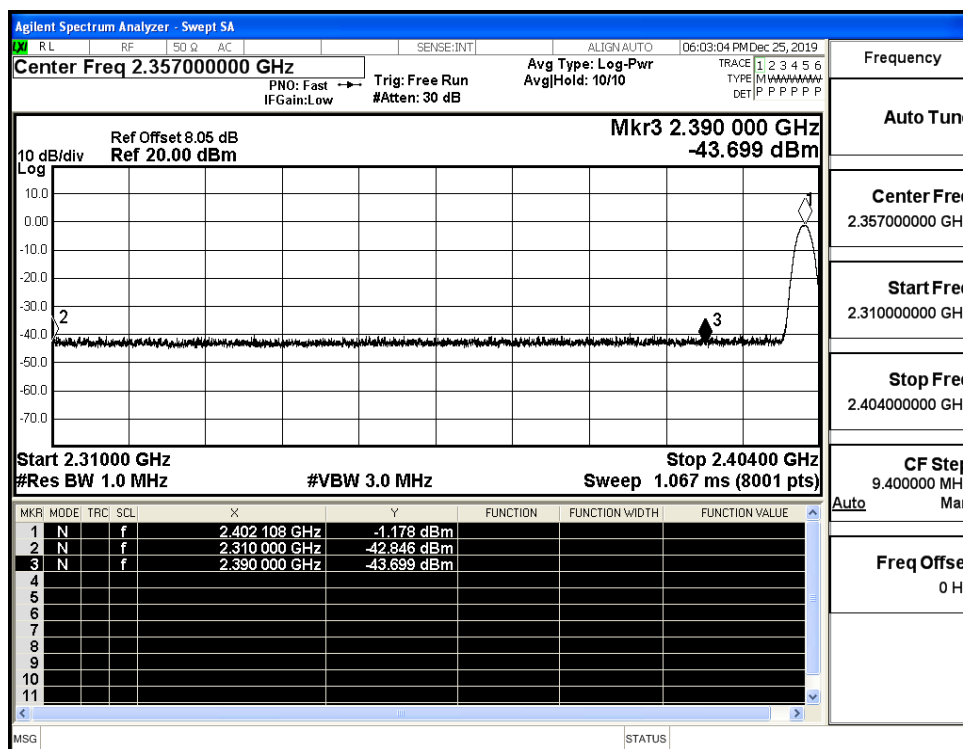
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



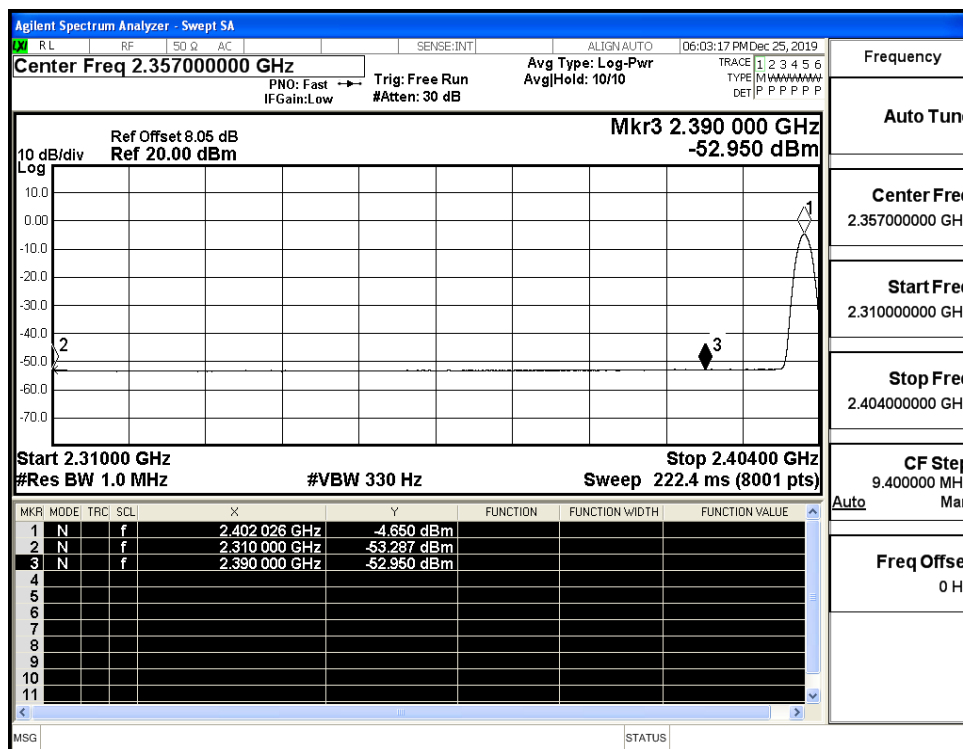
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



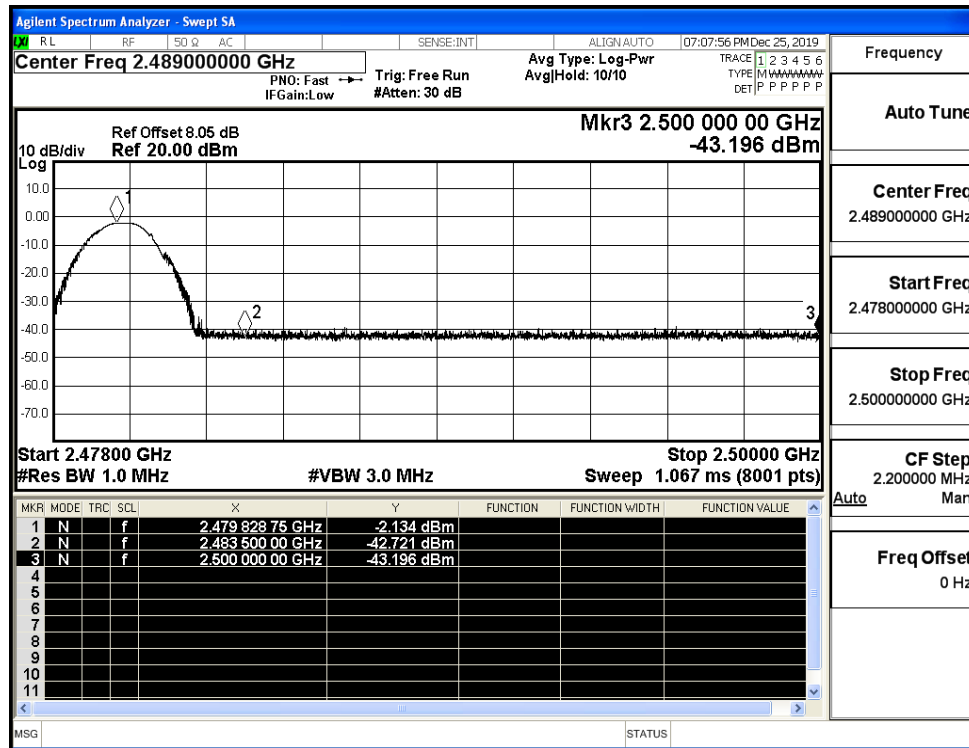
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



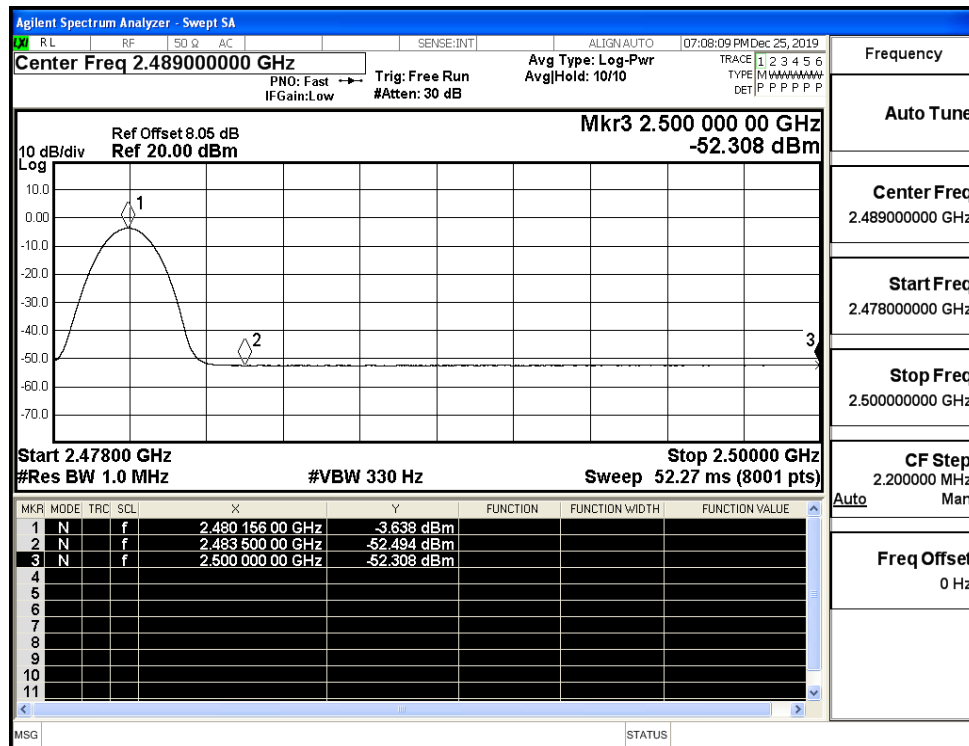
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



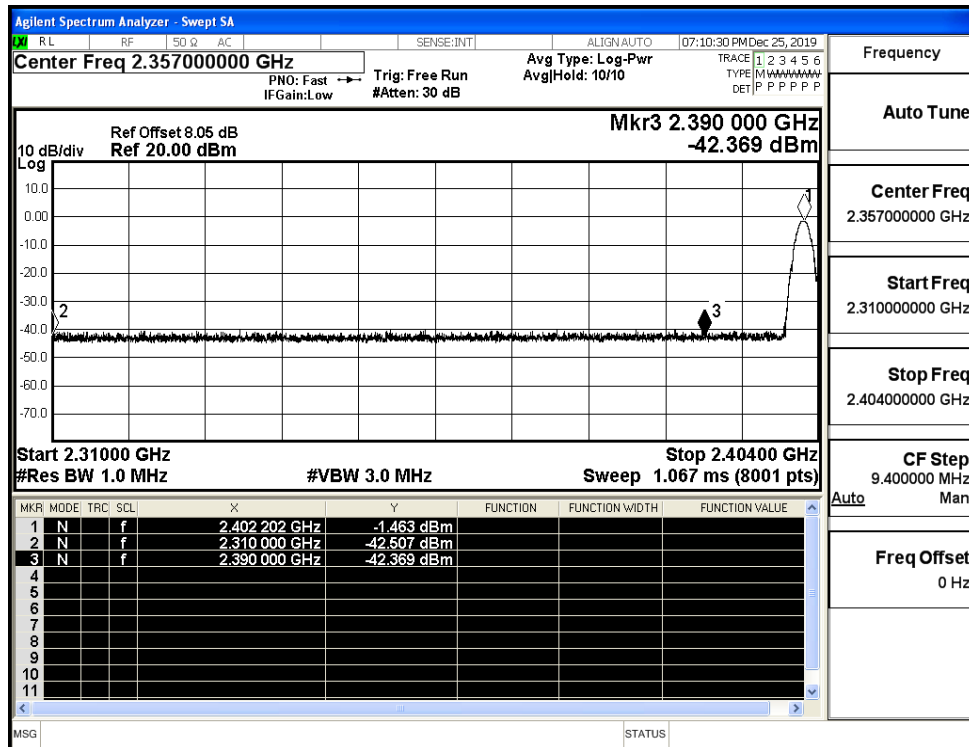
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



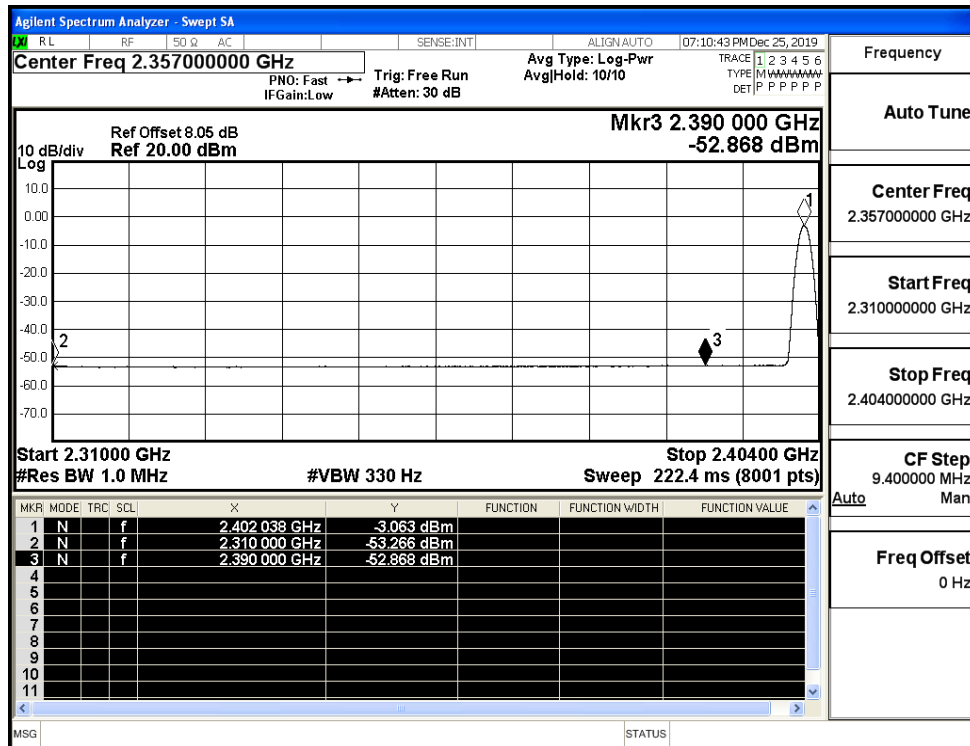
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



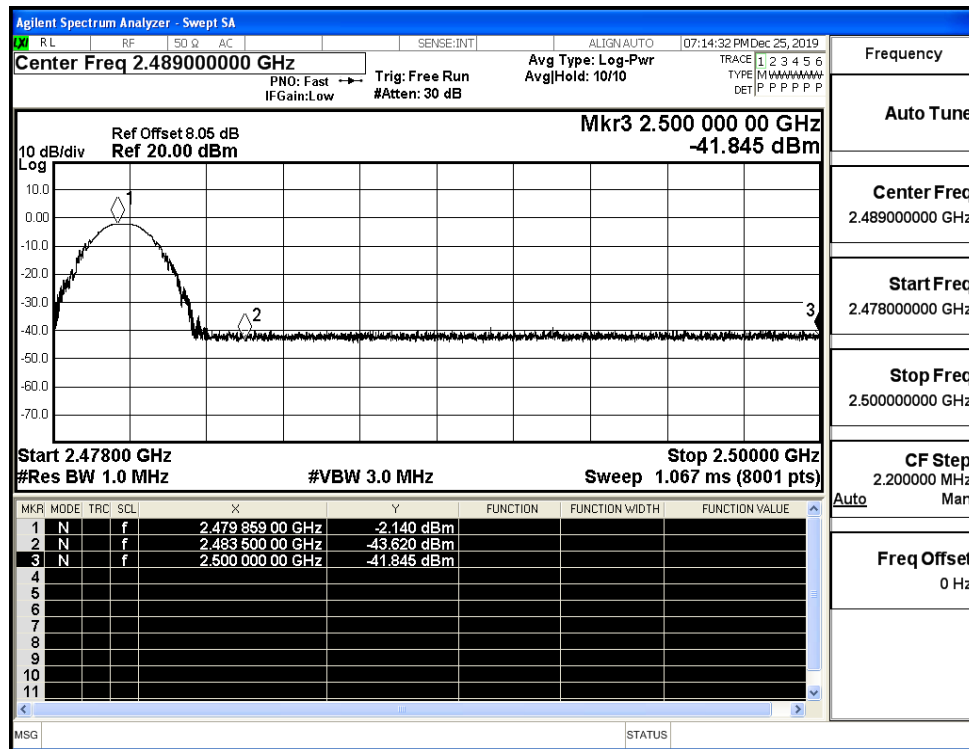
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

