

Appendix A
RF Test Data for BT V5.0(BDR/EDR) (Conducted Measurement)
Product Name: Wireless earbuds
Trade Mark: Polaroid
Test Model: PBTE103

Environmental Conditions

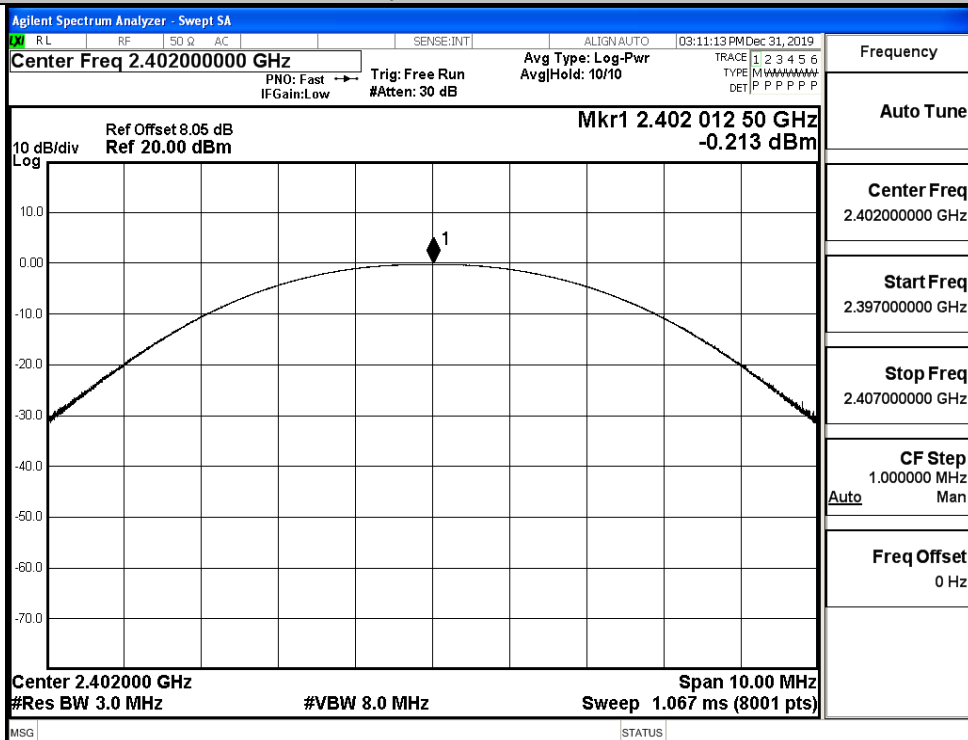
Temperature:	24.3 ° C
Relative Humidity:	53.5%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond Lu
Supervised by:	Wang Chuang

A.1 Maxmum Conducted Peak Output Power

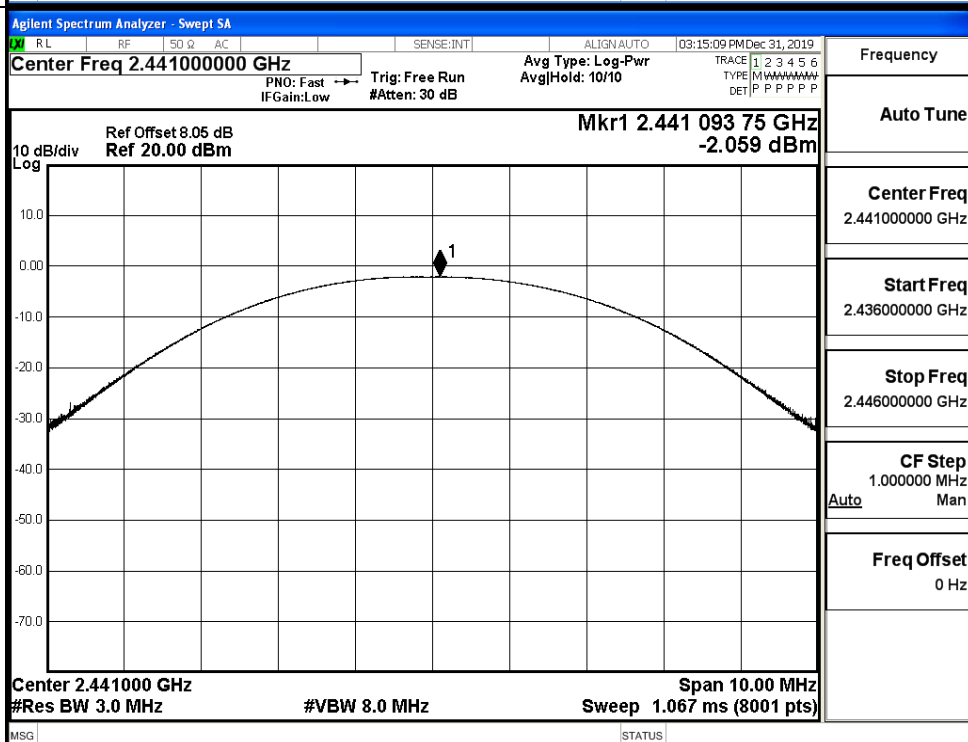
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.213	30	PASS
	MCH	-2.059	30	PASS
	HCH	-0.881	30	PASS
$\pi/4$ DQPSK	LCH	-0.960	21	PASS
	MCH	-2.664	21	PASS
	HCH	-1.668	21	PASS
8DPSK	LCH	-0.747	21	PASS
	MCH	-2.491	21	PASS
	HCH	-1.392	21	PASS

Test Graphs

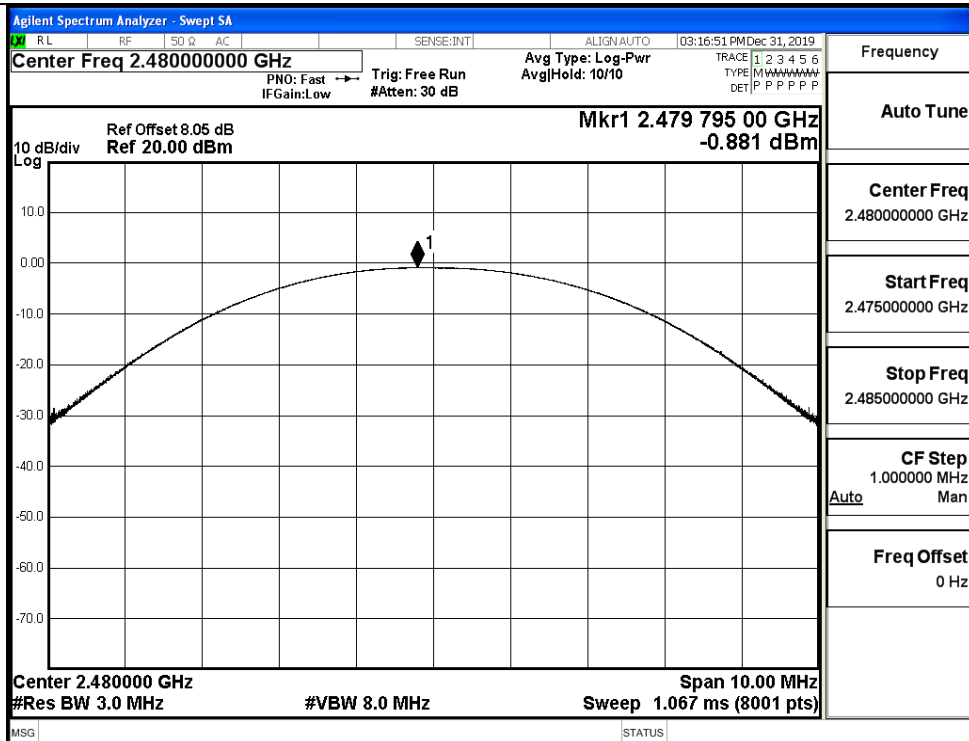
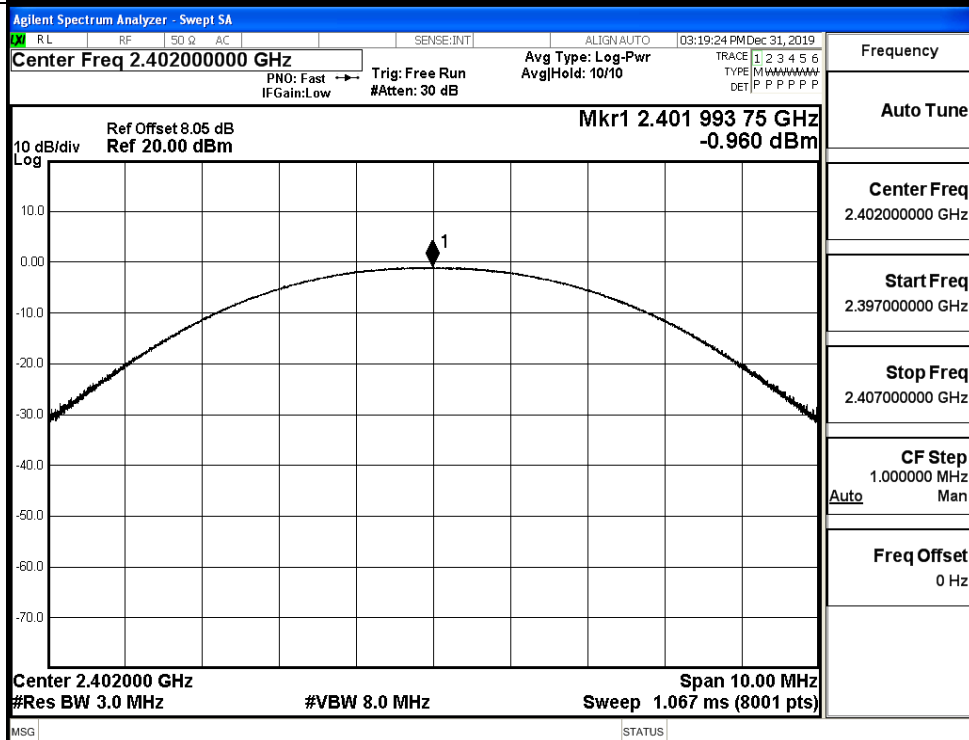
GFSK/LCH

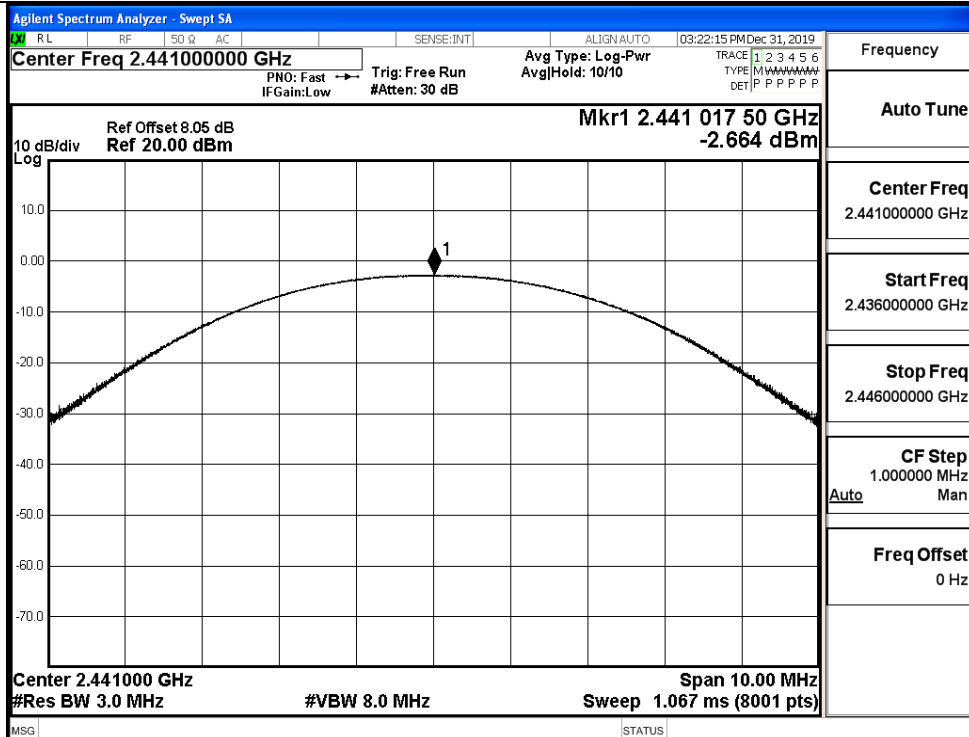
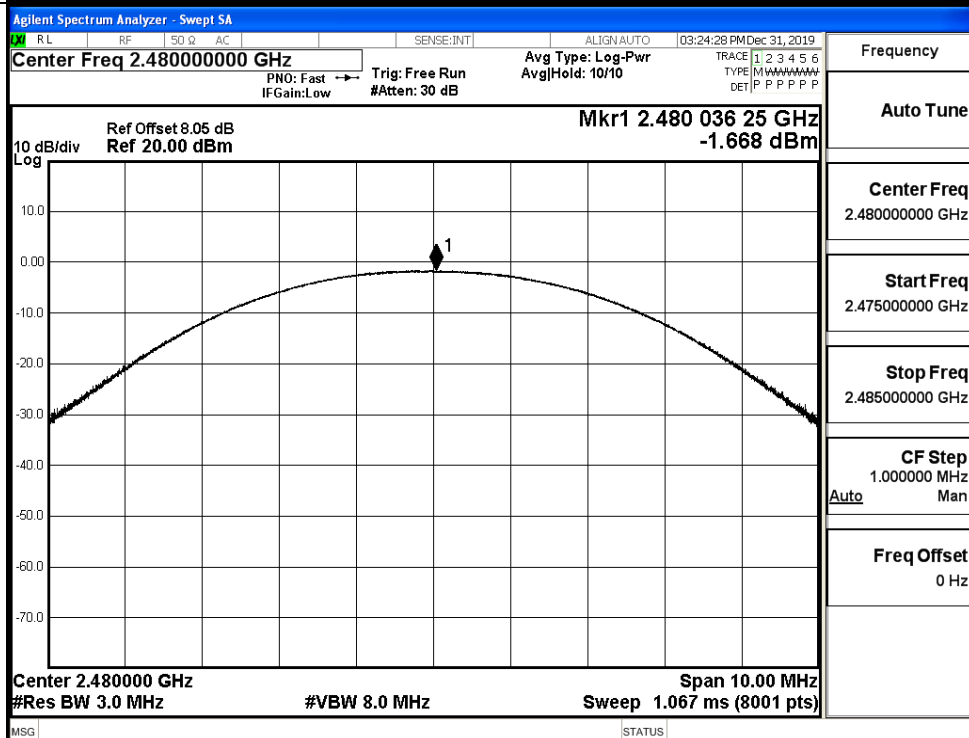


GFSK/MCH

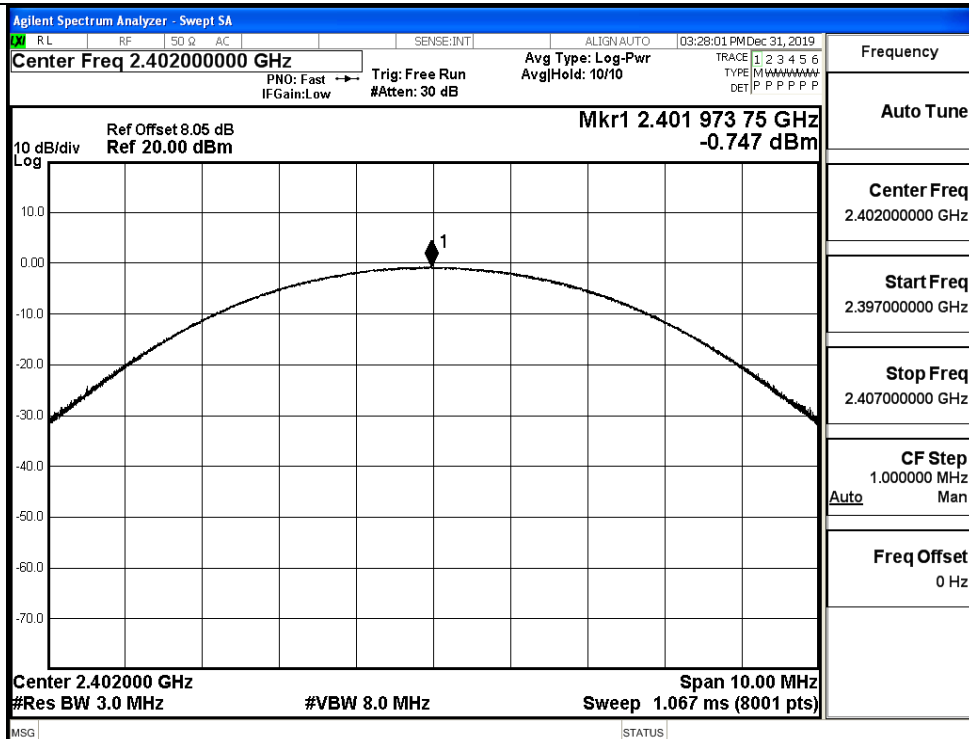


GFSK/HCH

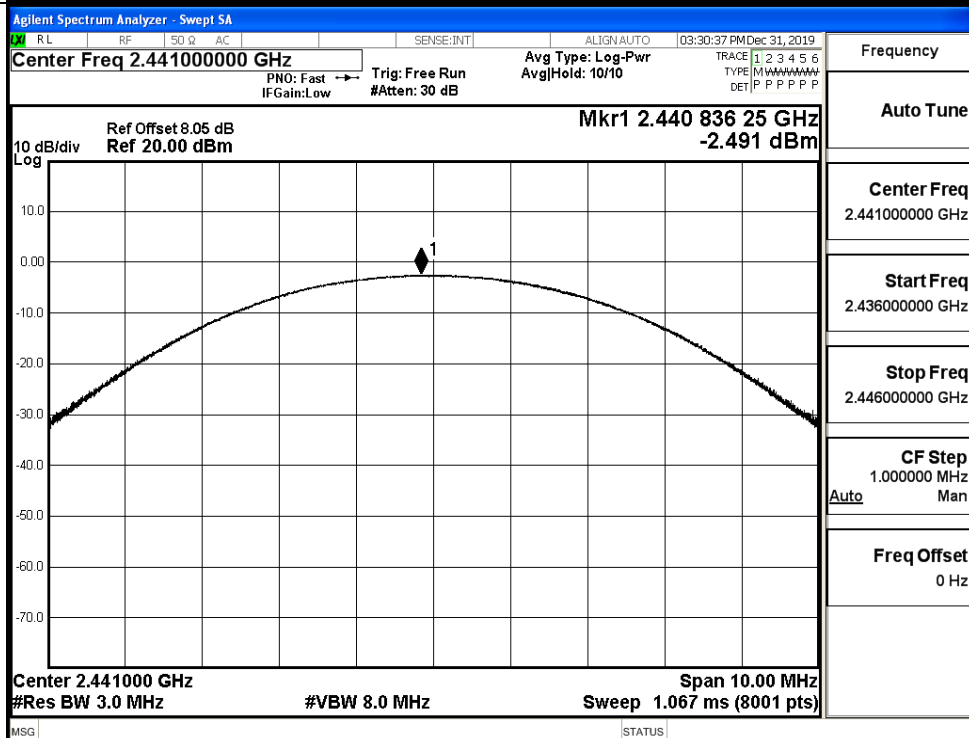
 $\pi/4$ DQPSK/LCH

$\pi/4$ DQPSK/MCH $\pi/4$ DQPSK/HCH

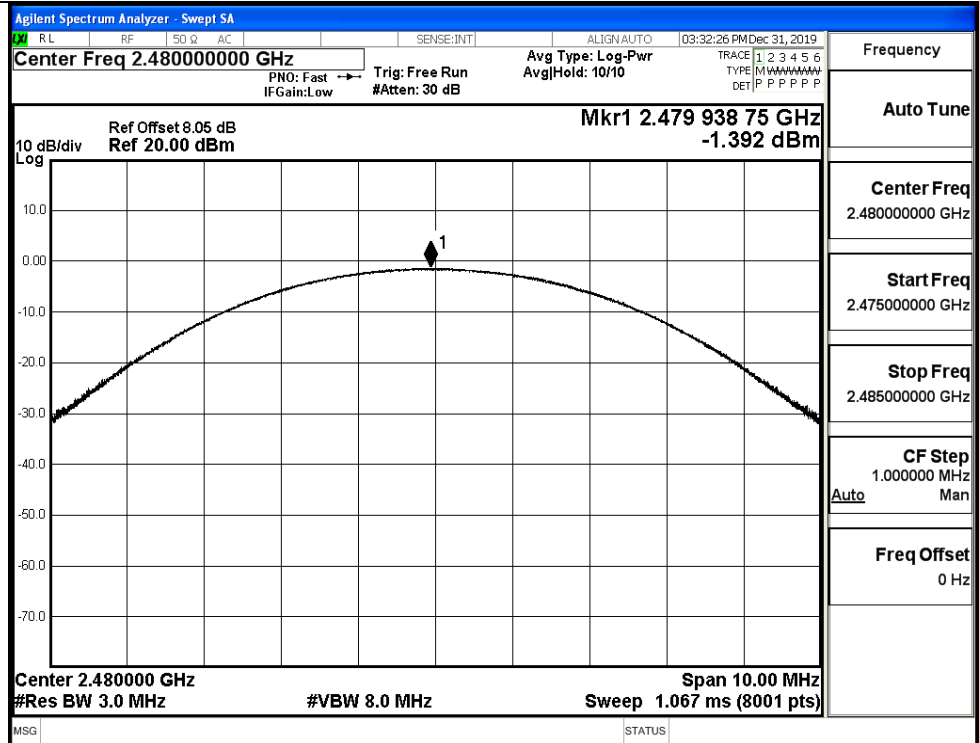
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

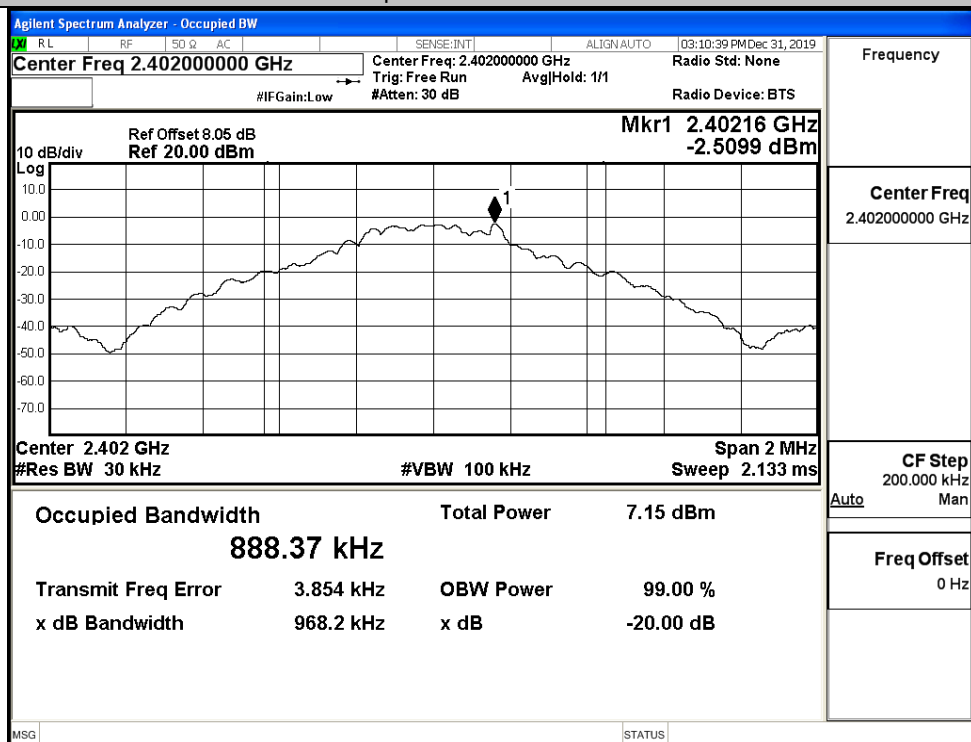


A.2 20dB Bandwidth

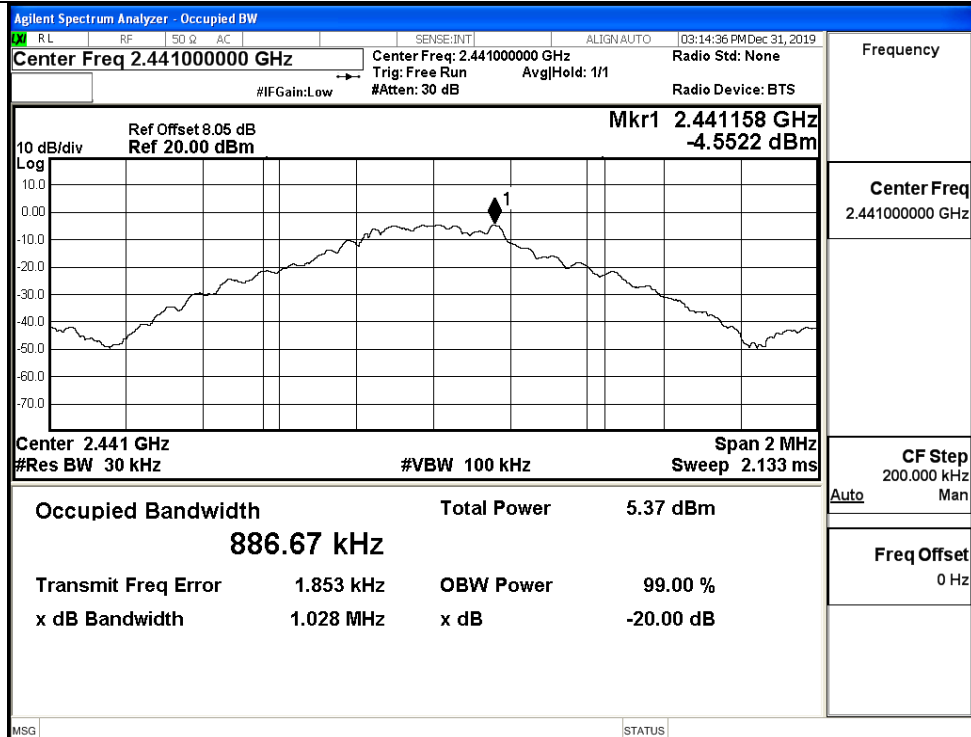
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9682	Not Specified	PASS
	MCH	1.028	Not Specified	PASS
	HCH	1.029	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.289	Not Specified	PASS
	MCH	1.292	Not Specified	PASS
	HCH	1.307	Not Specified	PASS
8DPSK	LCH	1.298	Not Specified	PASS
	MCH	1.298	Not Specified	PASS
	HCH	1.294	Not Specified	PASS

Test Graphs

GFSK/LCH



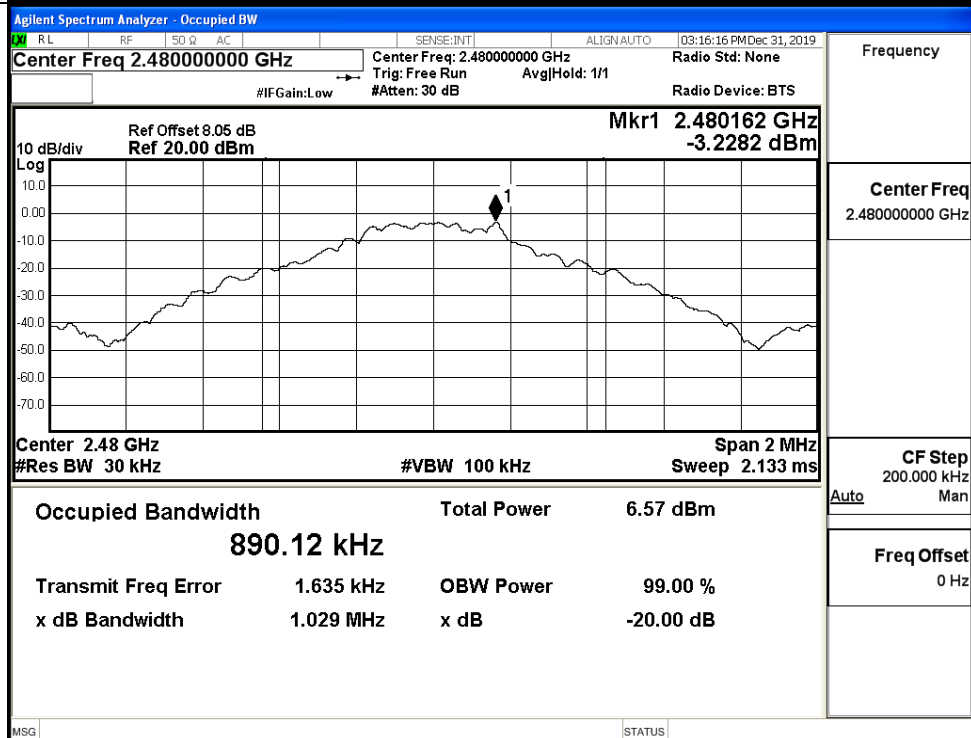
GFSK/MCH



Frequency

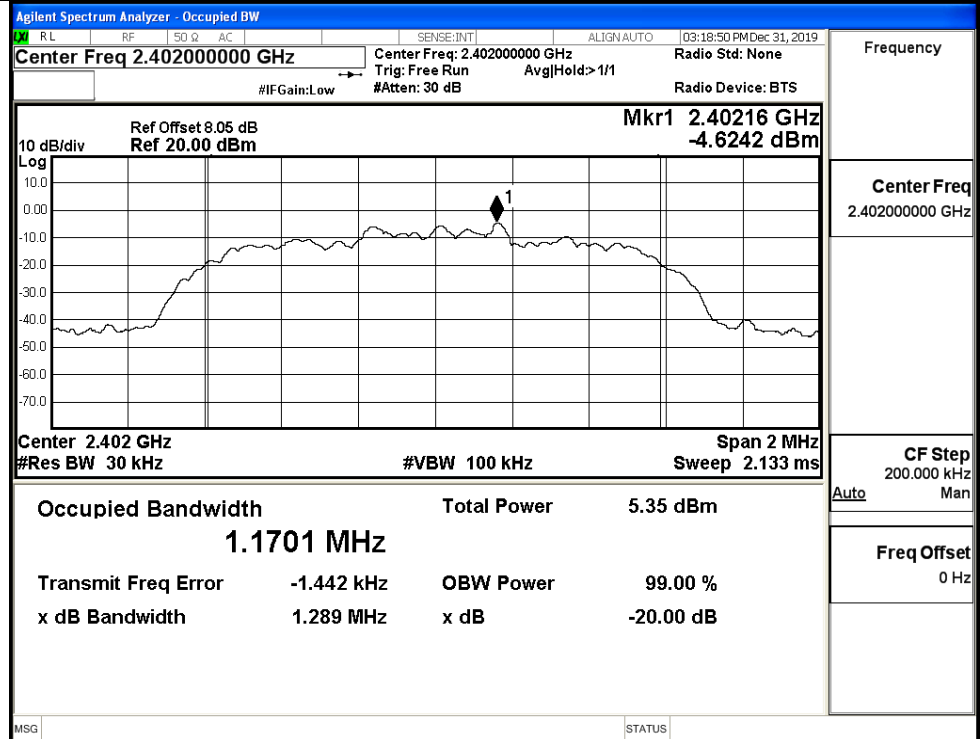
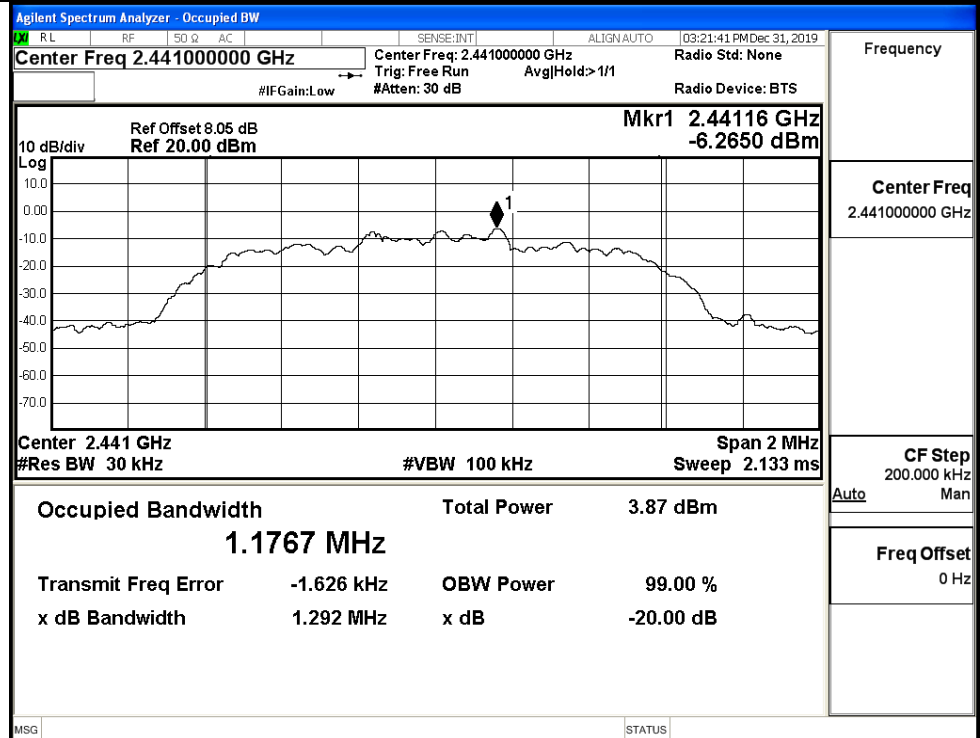
Center Freq
2.441000000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

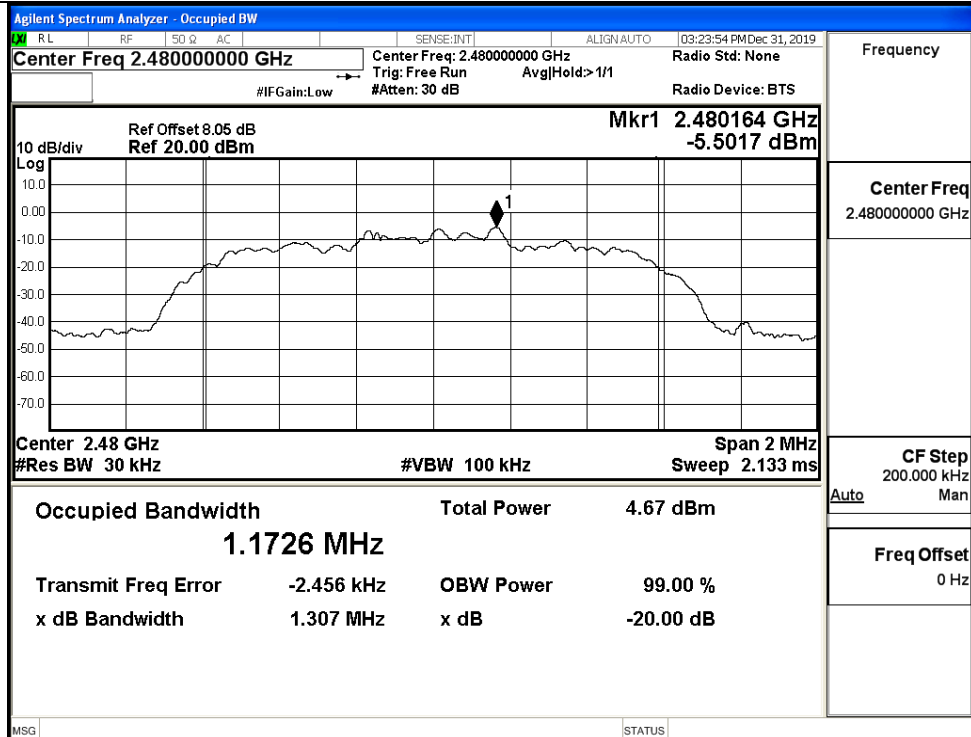
GFSK/HCH



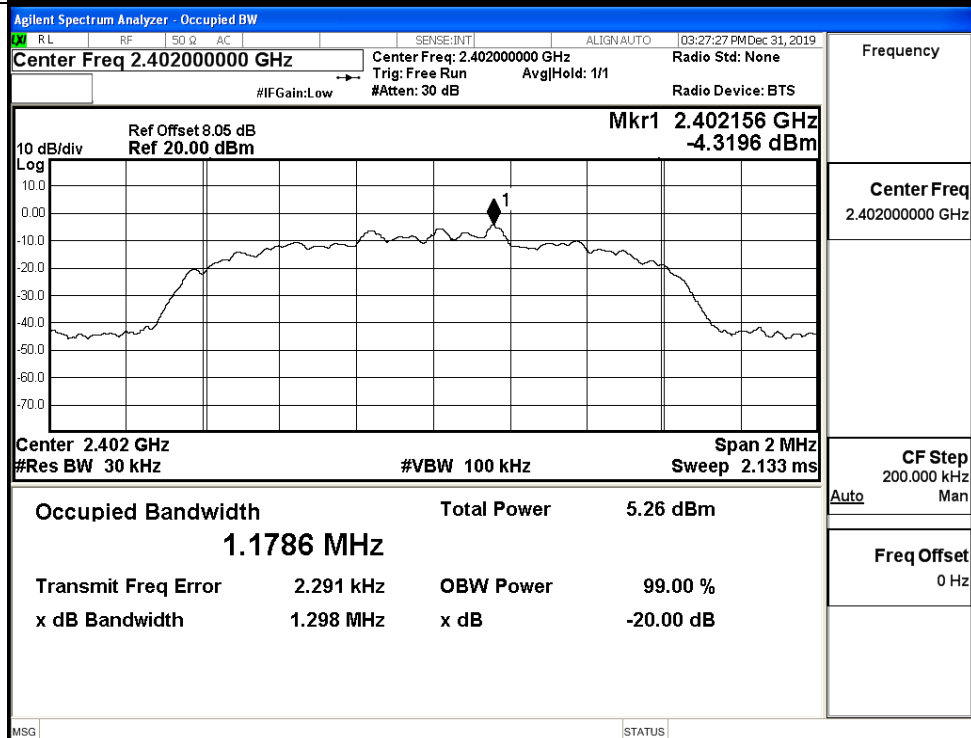
Frequency

Center Freq
2.480000000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

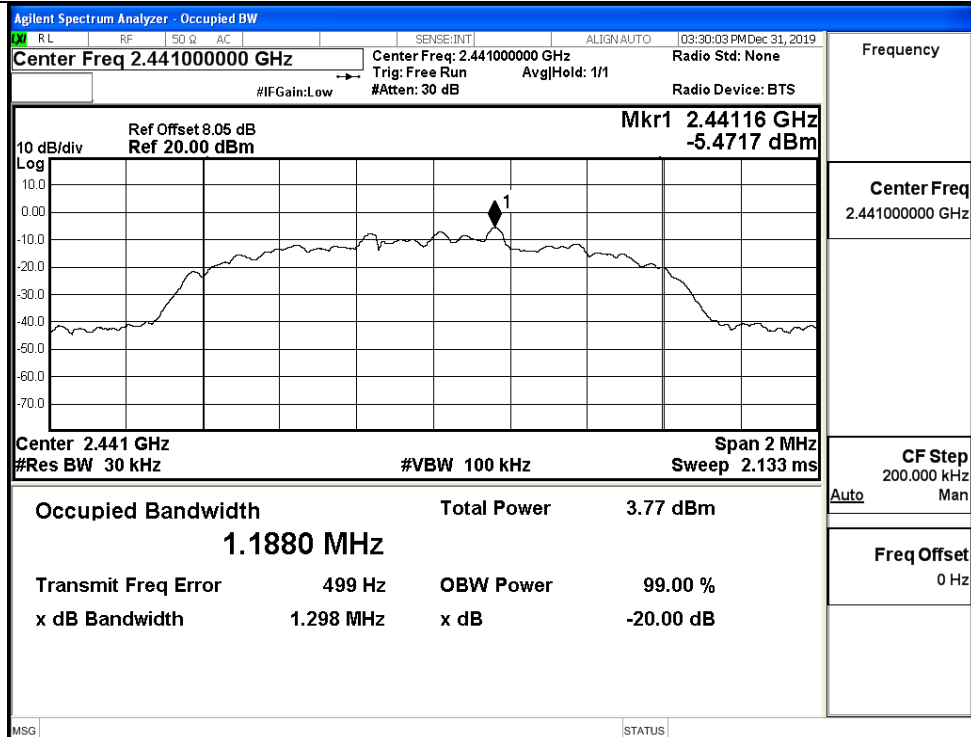
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

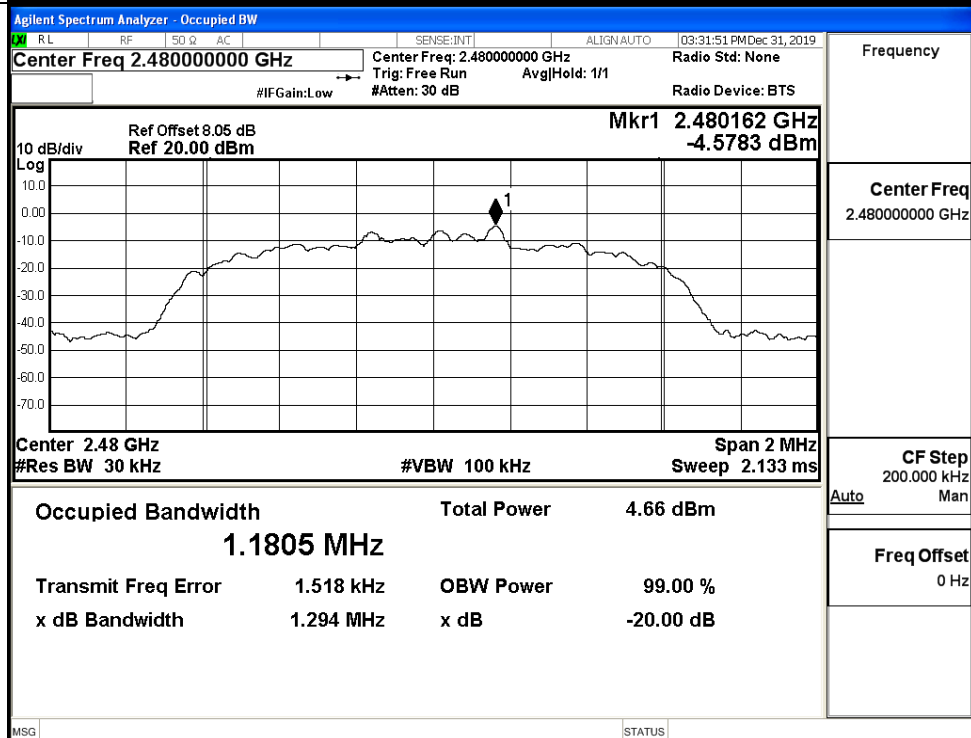
8DPSK/LCH



8DPSK/MCH



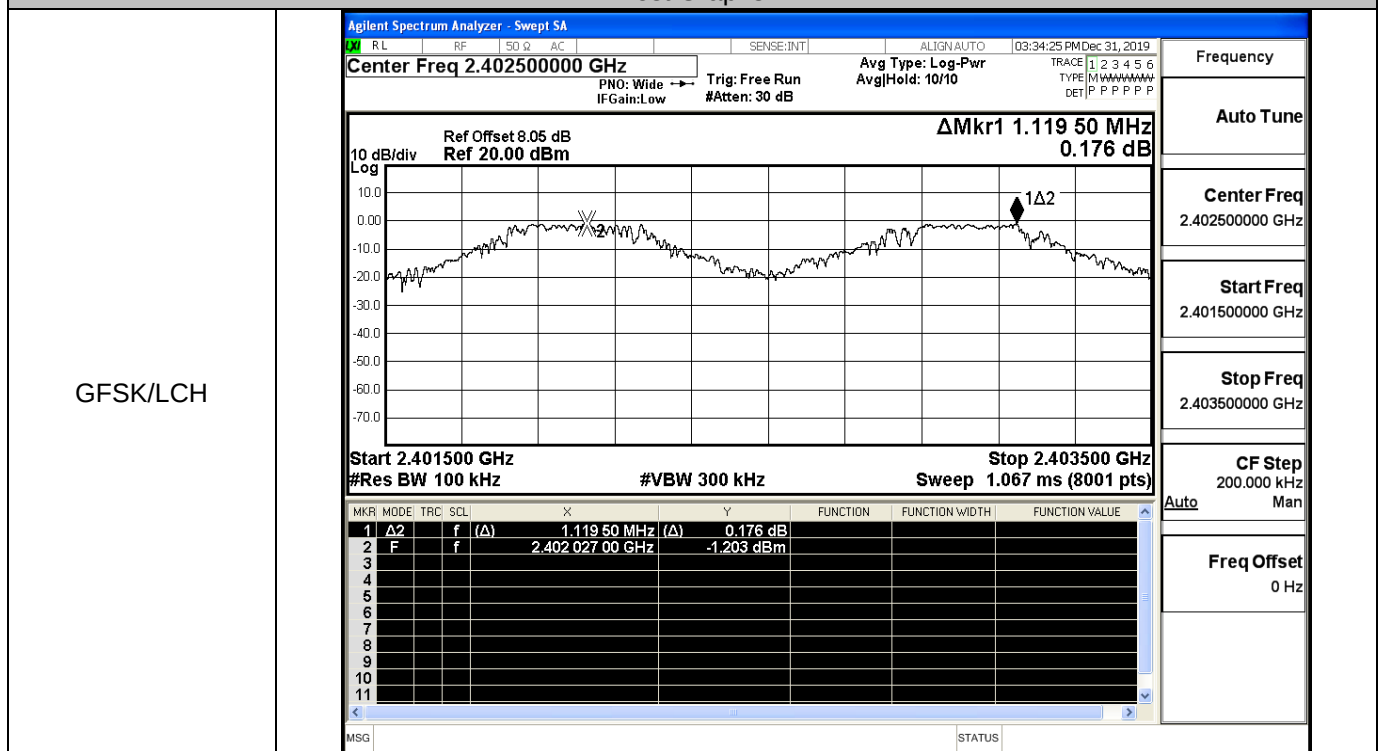
8DPSK/HCH



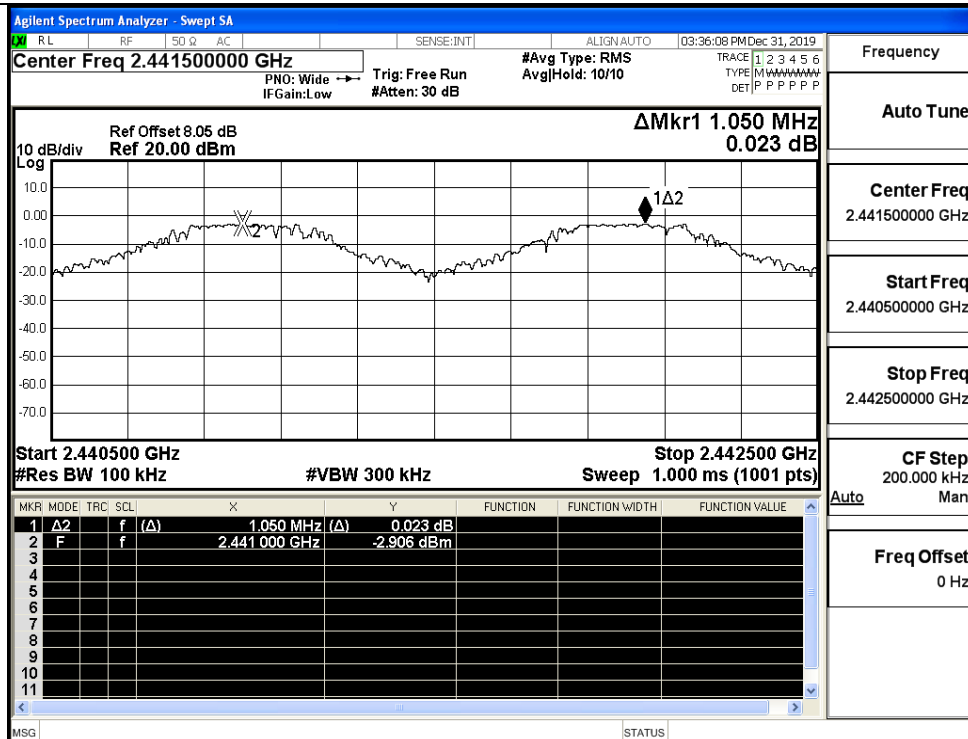
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.119	0.686	PASS
	MCH	1.050	0.686	PASS
	HCH	0.838	0.686	PASS
$\pi/4$ DQPSK	LCH	1.138	0.871	PASS
	MCH	0.980	0.871	PASS
	HCH	0.970	0.871	PASS
8DPSK	LCH	1.112	0.865	PASS
	MCH	0.914	0.865	PASS
	HCH	1.174	0.865	PASS

Test Graphs



GFSK/MCH

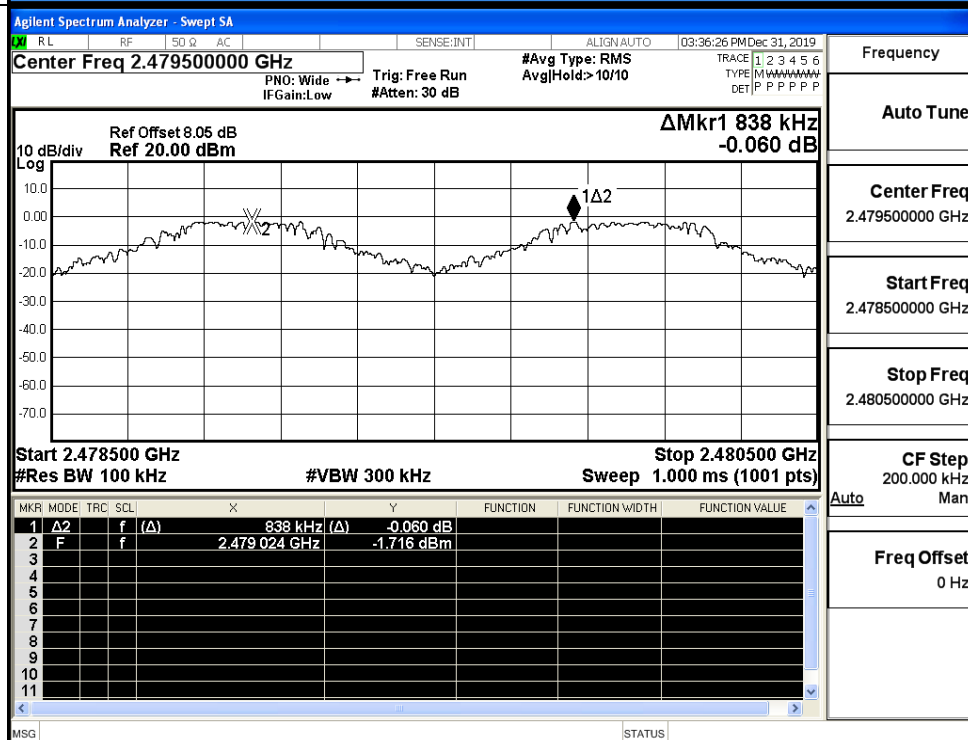


Frequency

Auto Tune

Center Freq
2.441500000 GHzStart Freq
2.440500000 GHzStop Freq
2.442500000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz

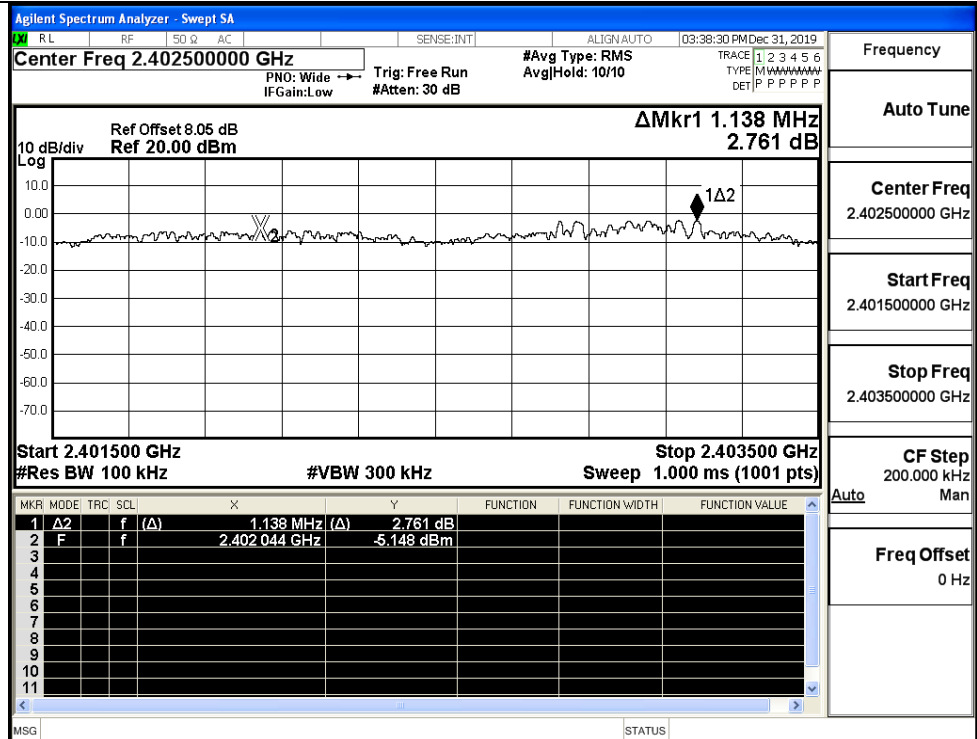
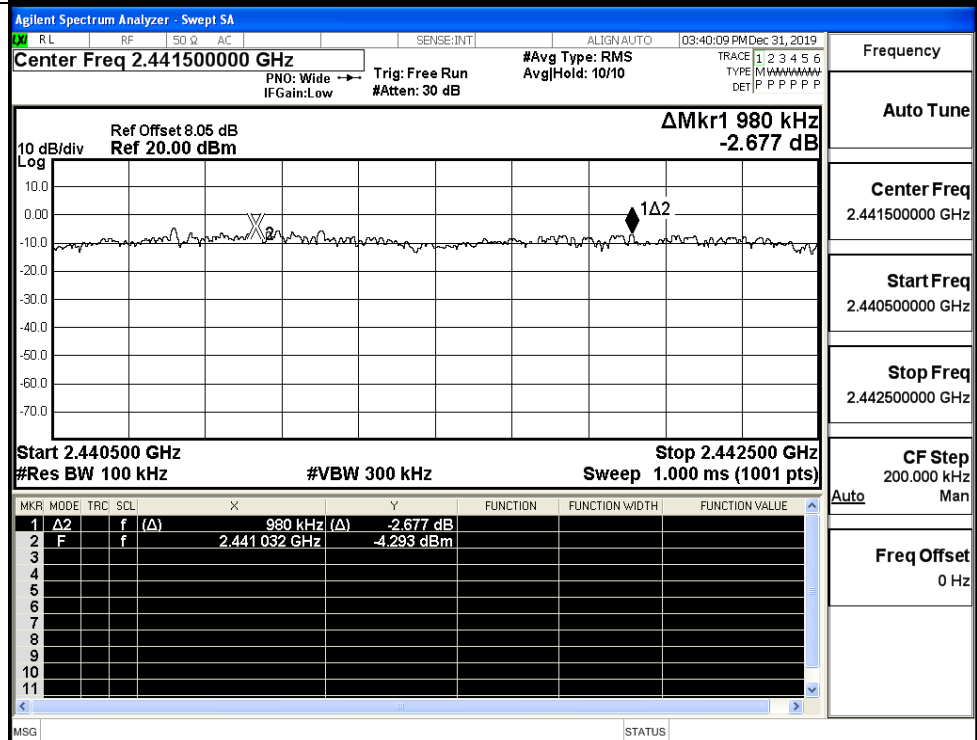
GFSK/HCH

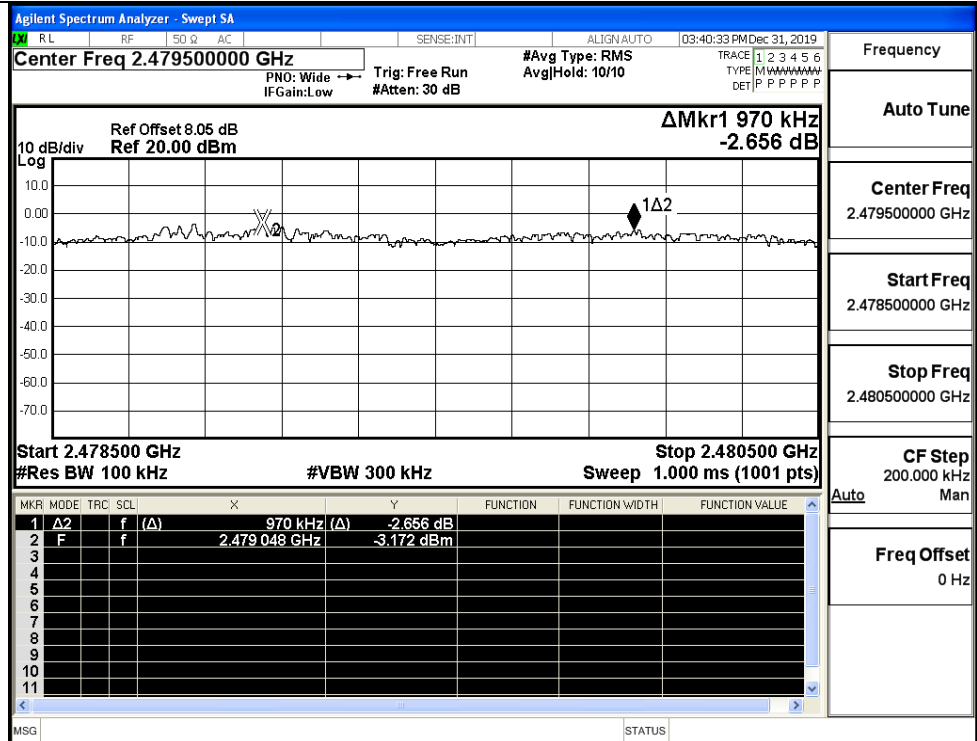


Frequency

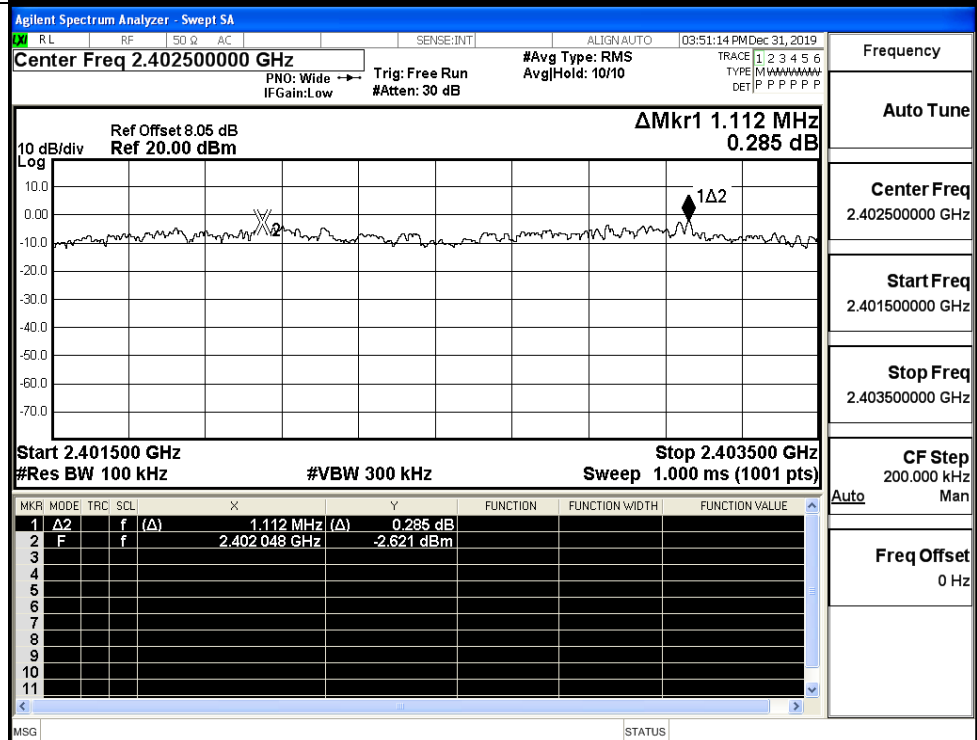
Auto Tune

Center Freq
2.479500000 GHzStart Freq
2.478500000 GHzStop Freq
2.480500000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz

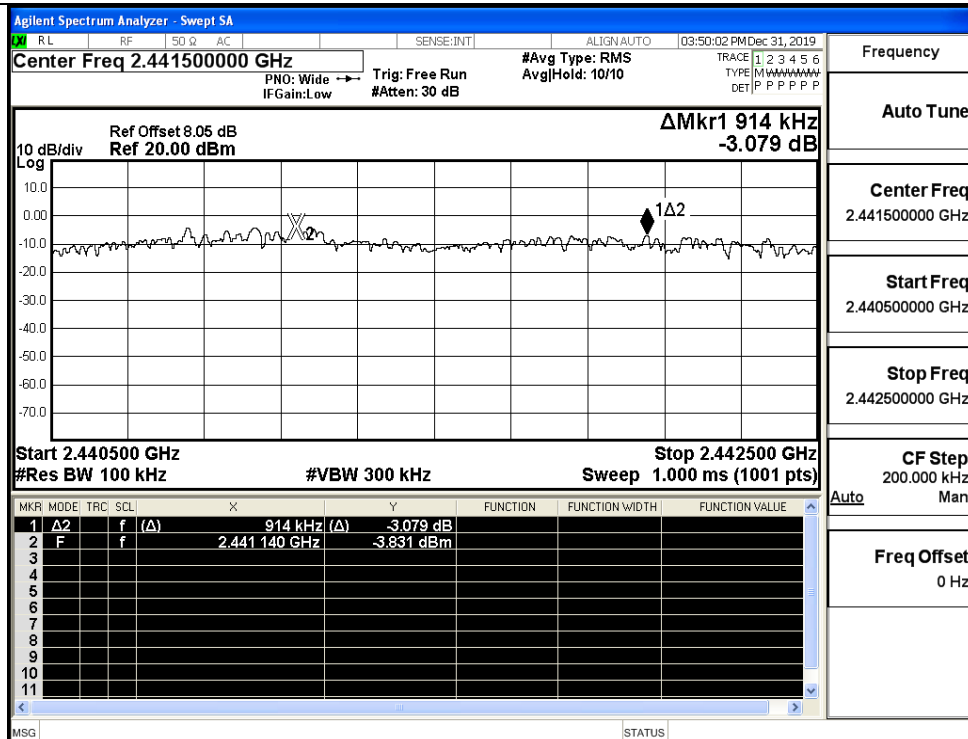
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

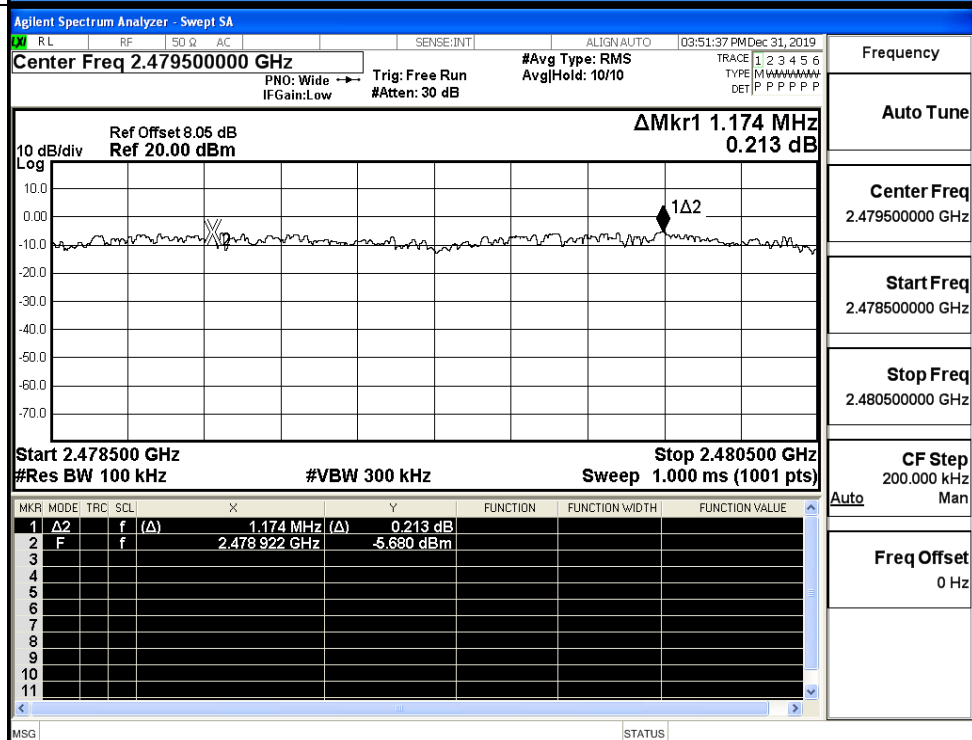
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

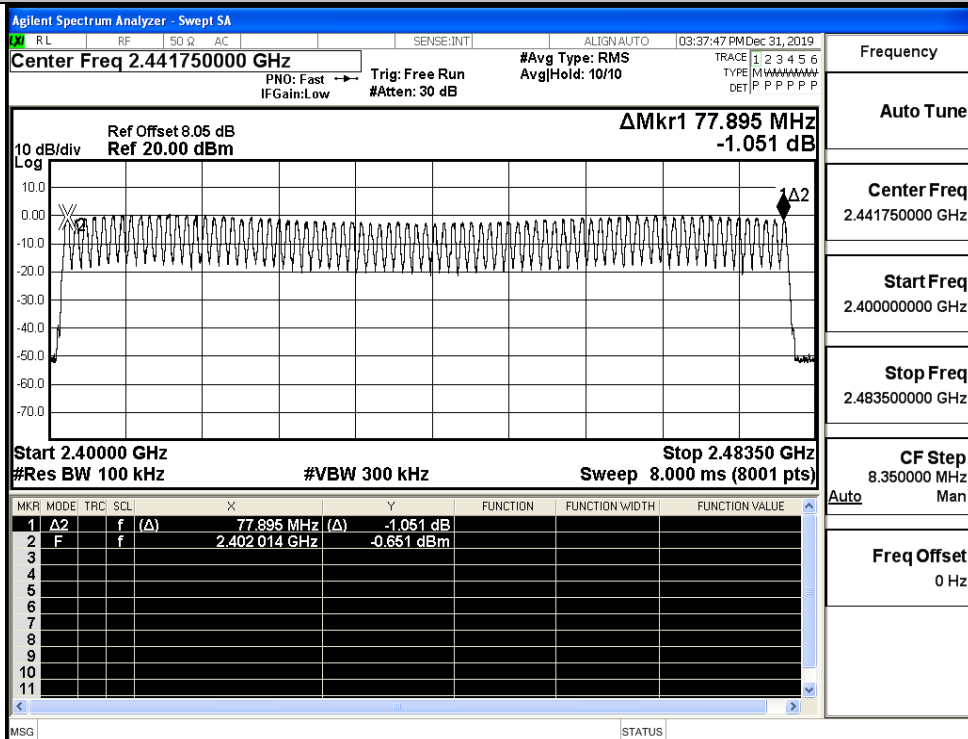
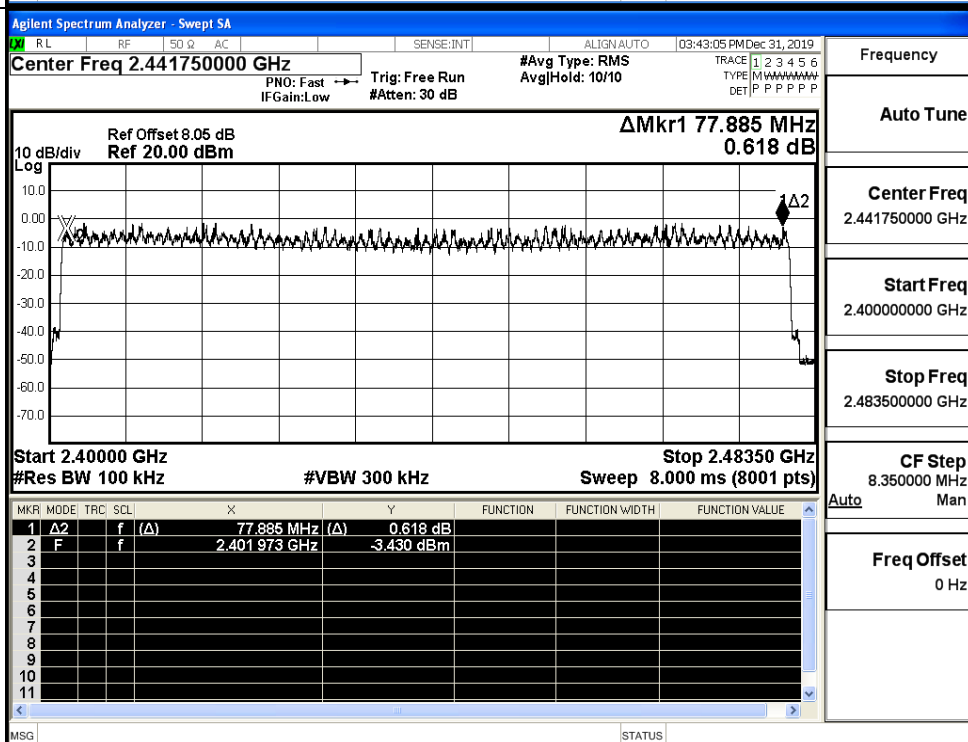


A.4 Hopping Channel Number

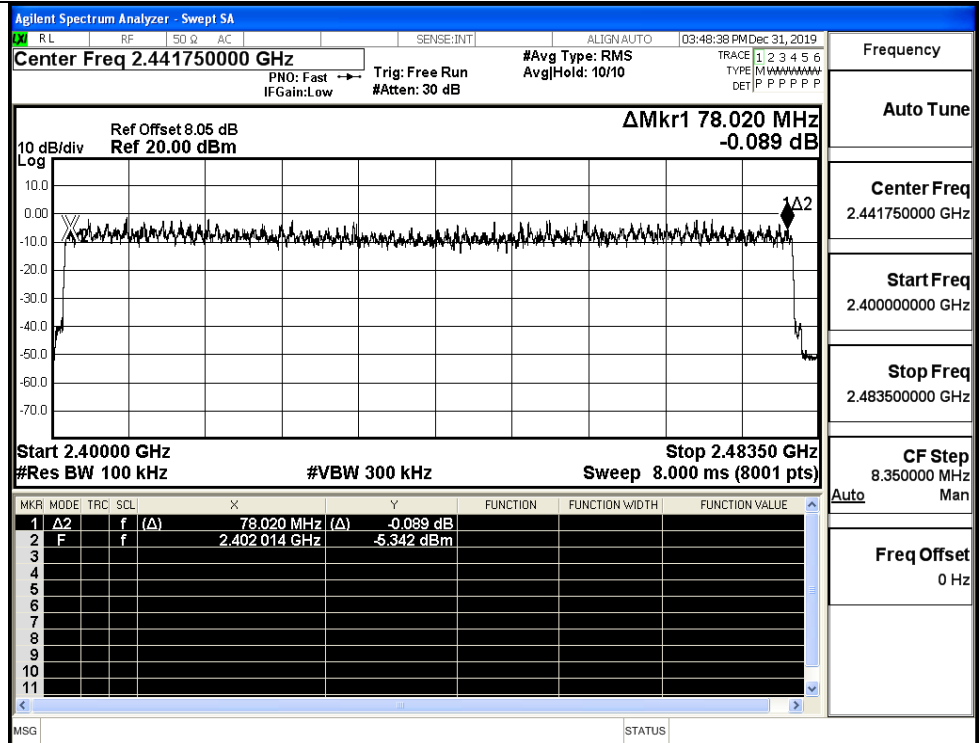
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ DQPSK	Hop	79	≥ 15	PASS
8DPSK	Hop	79	≥ 15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

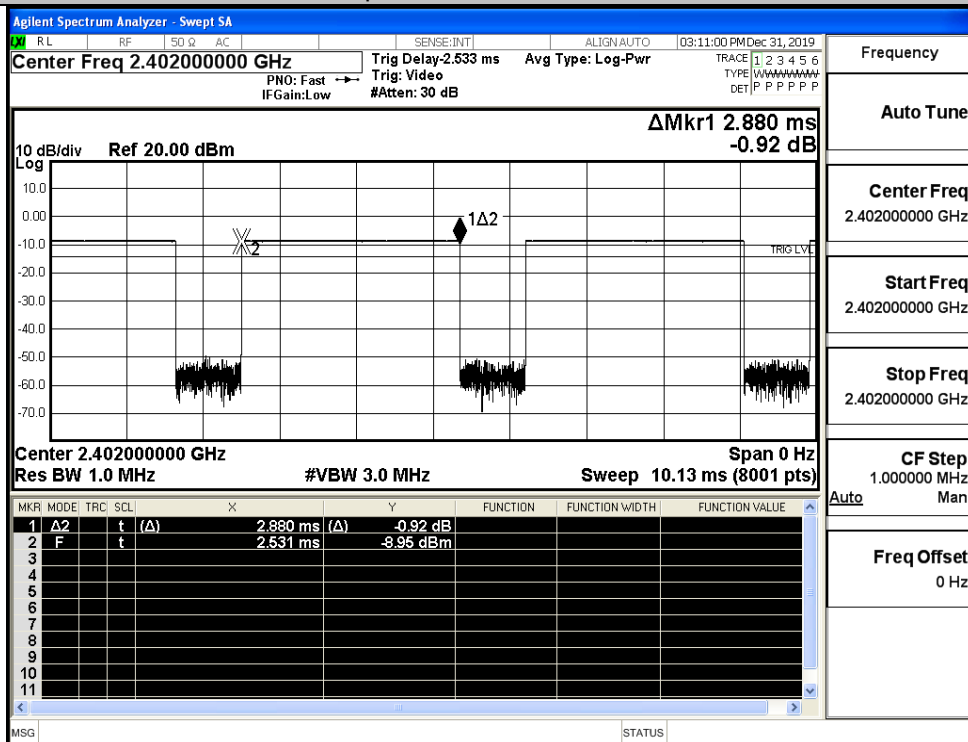


A.5 Dwell Time

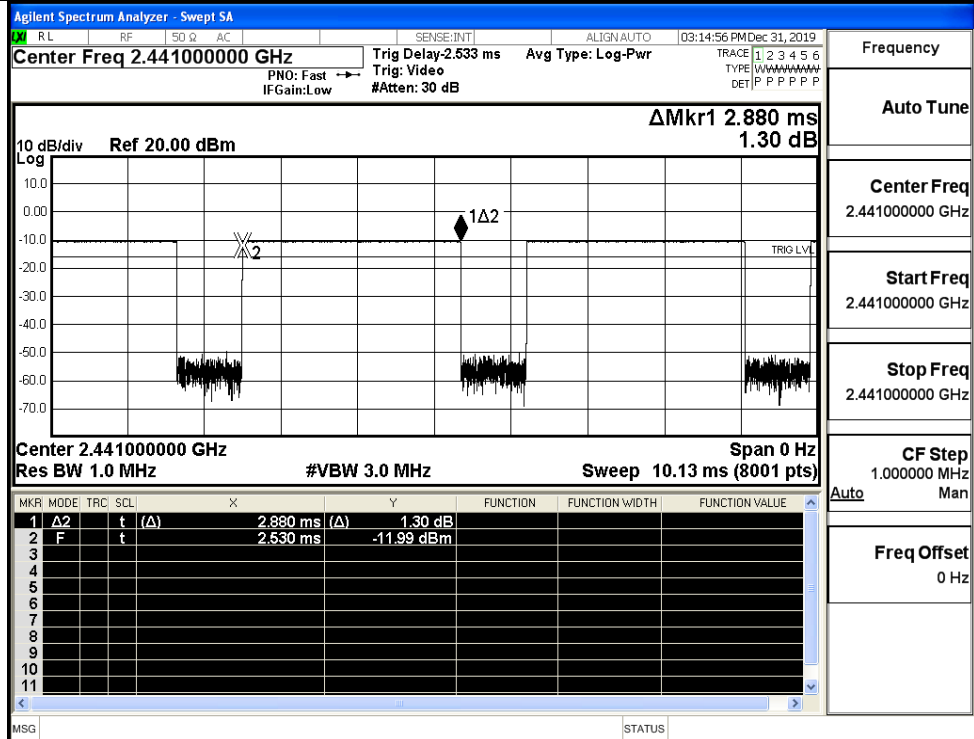
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88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

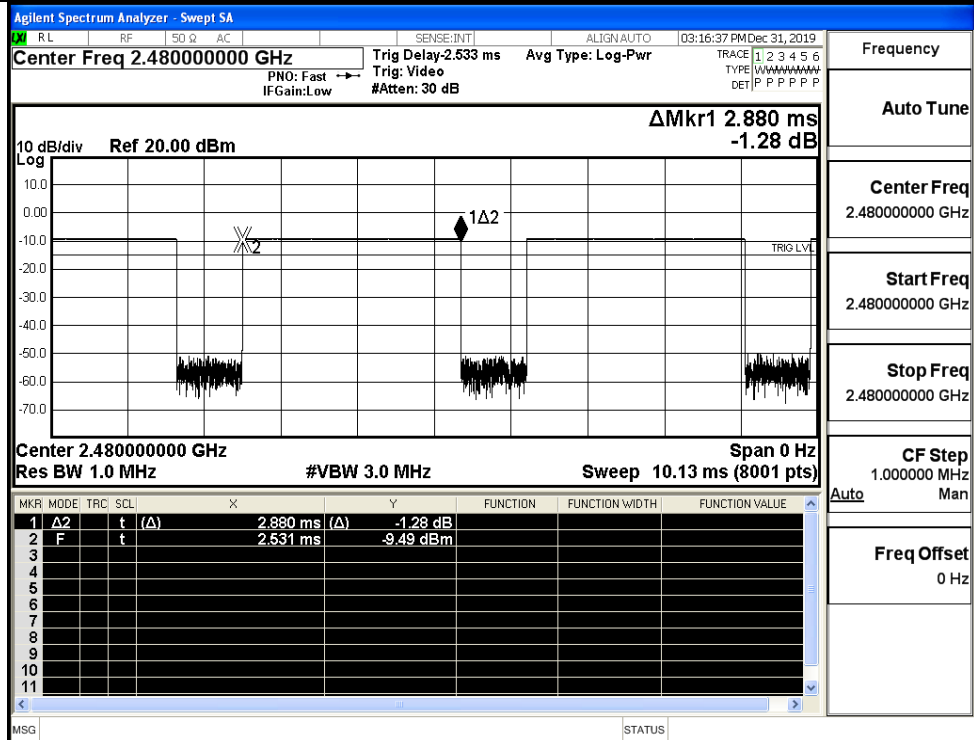
GFSK_DH5/LCH



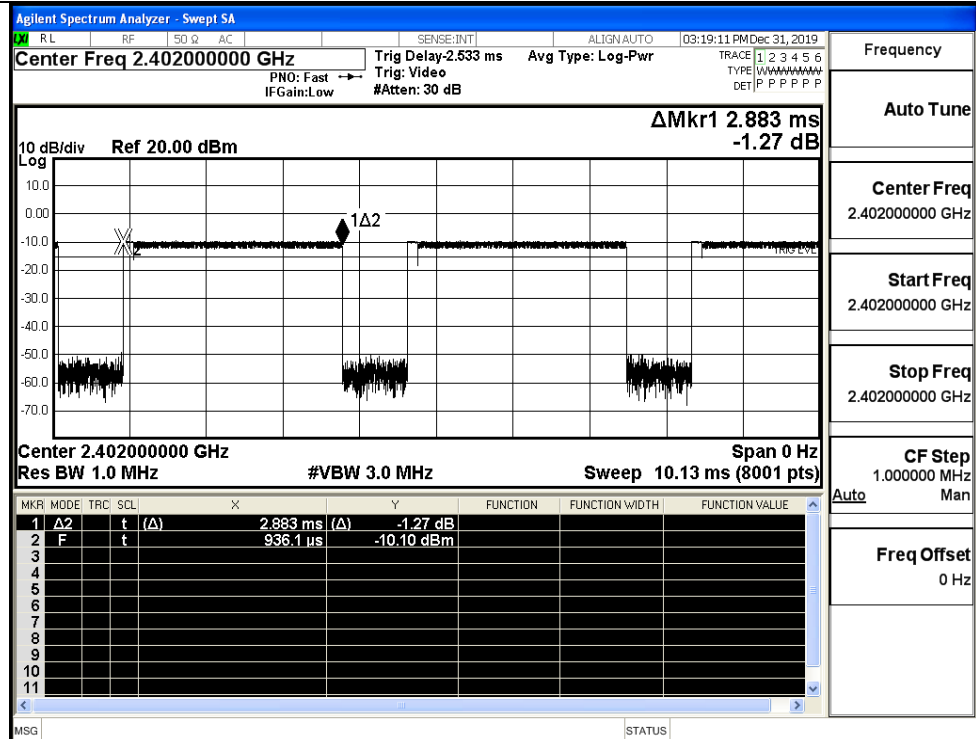
GFSK_DH5/MCH



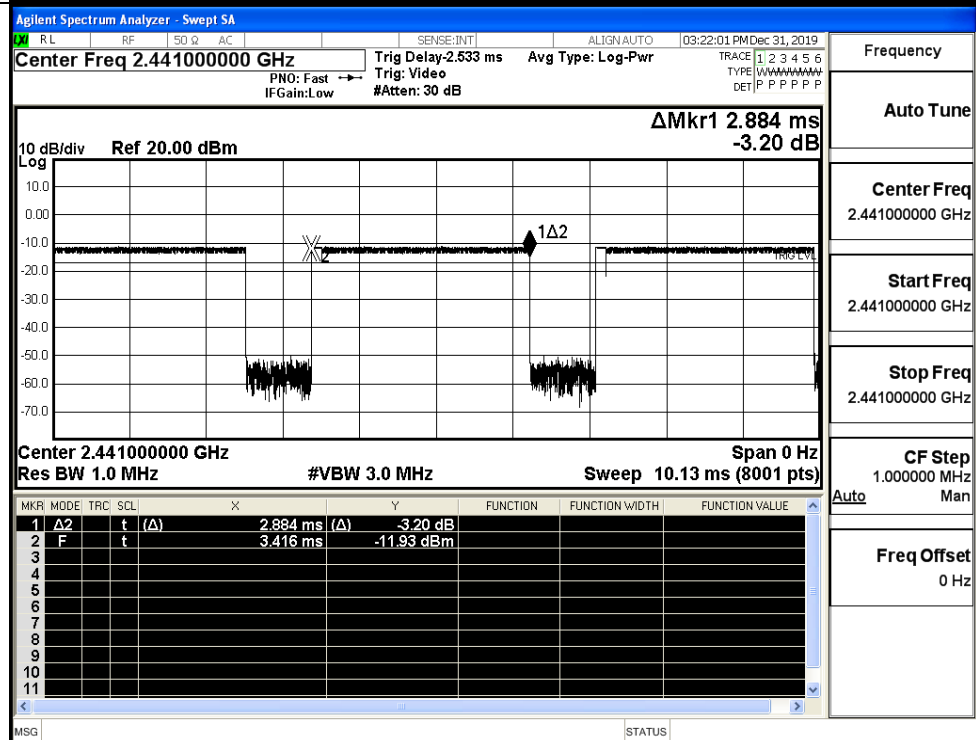
GFSK_DH5/HCH



$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH



[illegible]

Agilent Spectrum Analyzer - Swept SA

RL RF SO Q AC

Center Freq 2.402000000 GHz

Trig Delay: 2.533 ms

Avg Type: Log-Pwr

Trace 1 2 3 4 5 6

Type: W W W W W W W W

Det: P P P P P P P

Frequency

Auto Tune

Center Freq 2.402000000 GHz

Start Freq 2.402000000 GHz

Stop Freq 2.402000000 GHz

CF Step 1.000000 MHz

Auto Man

Freq Offset 0 Hz

10 dB/div Ref 20.00 dBm

Log

Δ Mkr1 2.885 ms

-1.38 dB

1 Δ 2

Center 2.402000000 GHz

Res BW 1.0 MHz

#VBW 3.0 MHz

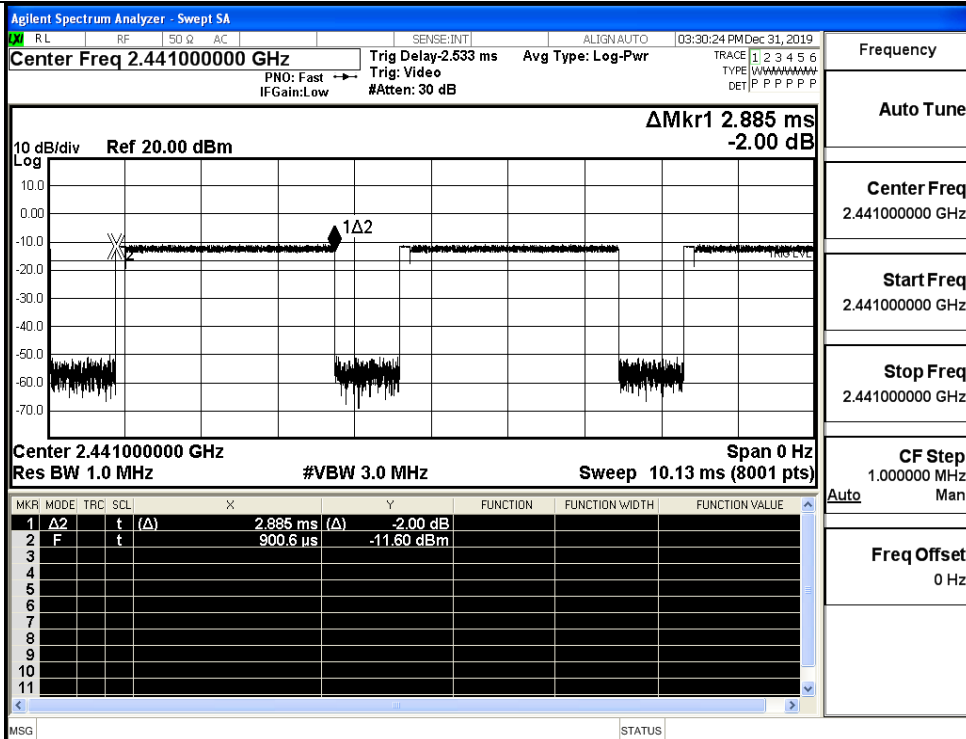
Sweep 10.13 ms (8001 pts)

Span 0 Hz

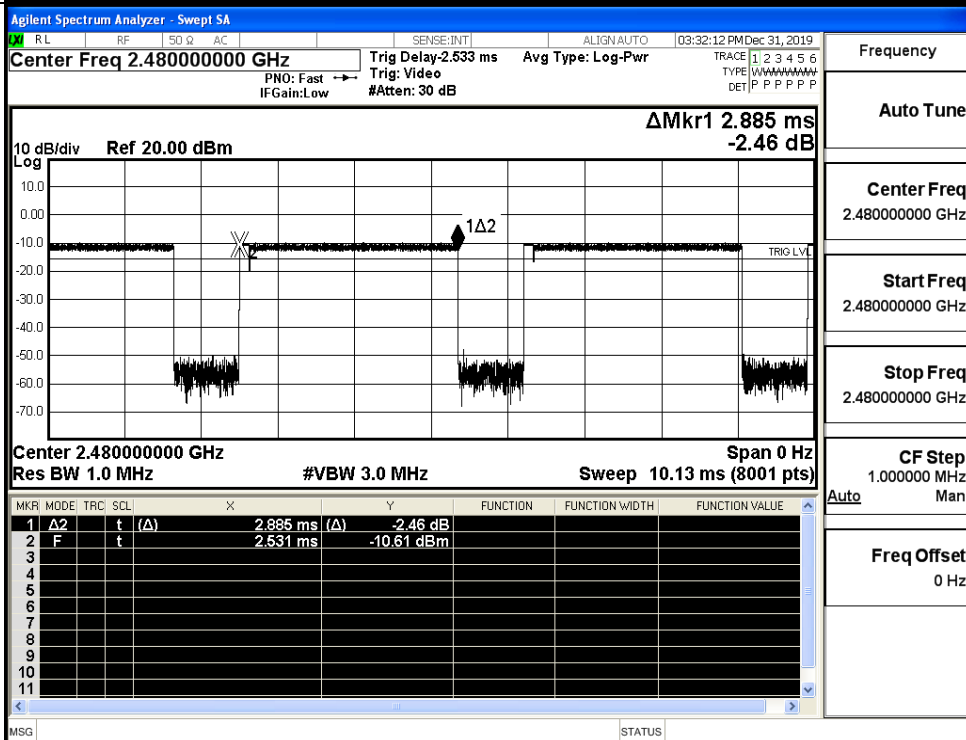
MkR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ 2	t	(Δ)	2.885 ms	(Δ) -1.38 dB			
2	F	t		2.531 ms	-10.21 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG STATUS

8DPSK_3DH5/MCH



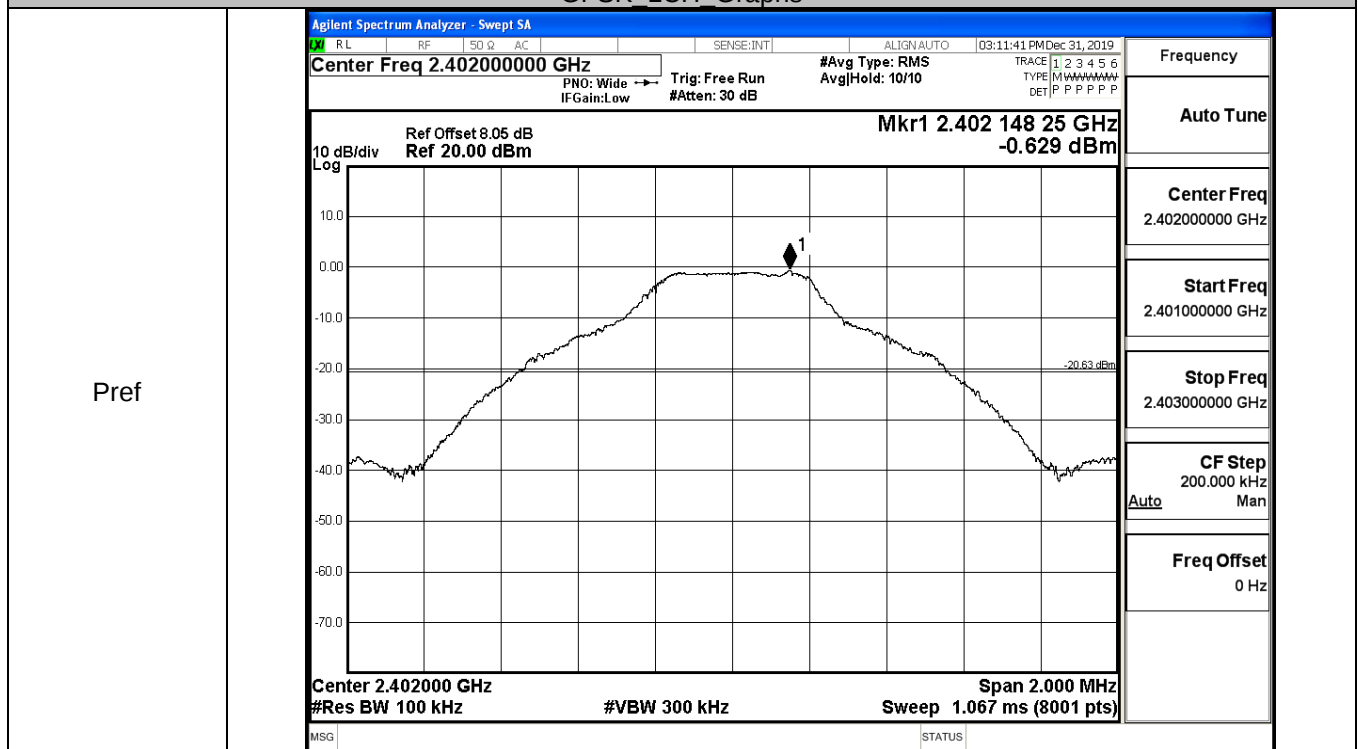
8DPSK_3DH5/HCH



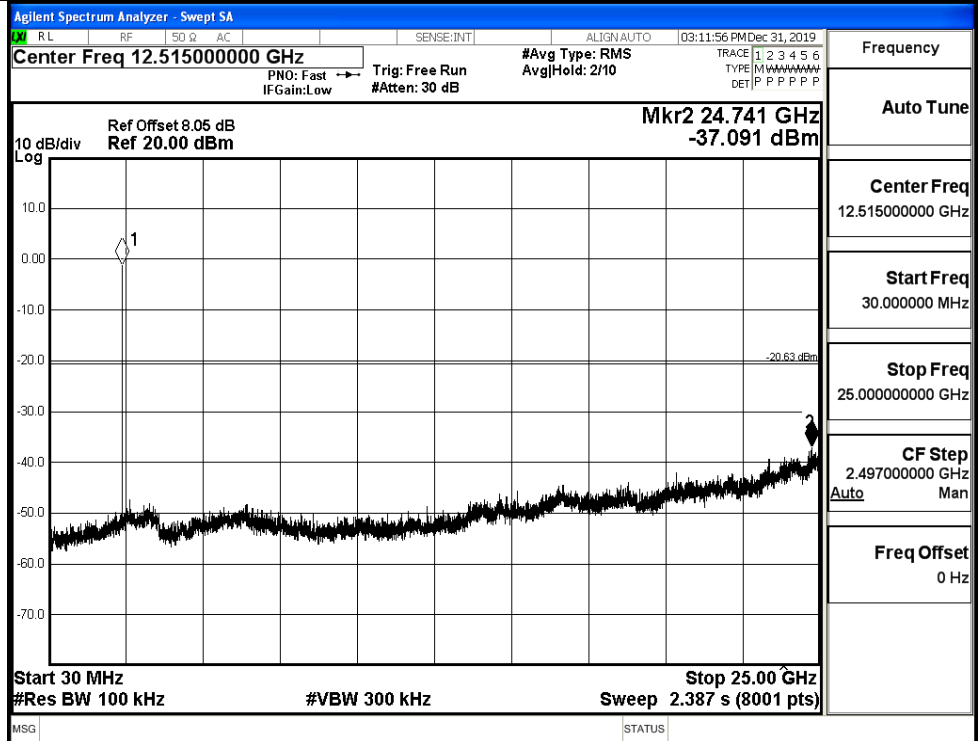
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.629	-37.091	-20.629	PASS
	MCH	-2.346	-37.962	-22.346	PASS
	HCH	-1.508	-37.830	-21.508	PASS
$\pi/4$ DQPSK	LCH	-2.027	-37.578	-22.027	PASS
	MCH	-4.169	-37.357	-24.169	PASS
	HCH	-2.49	-37.173	-22.490	PASS
8DPSK	LCH	-1.954	-37.023	-21.954	PASS
	MCH	-3.414	-37.287	-23.414	PASS
	HCH	-2.576	-37.396	-22.576	PASS

GFSK LCH Graphs

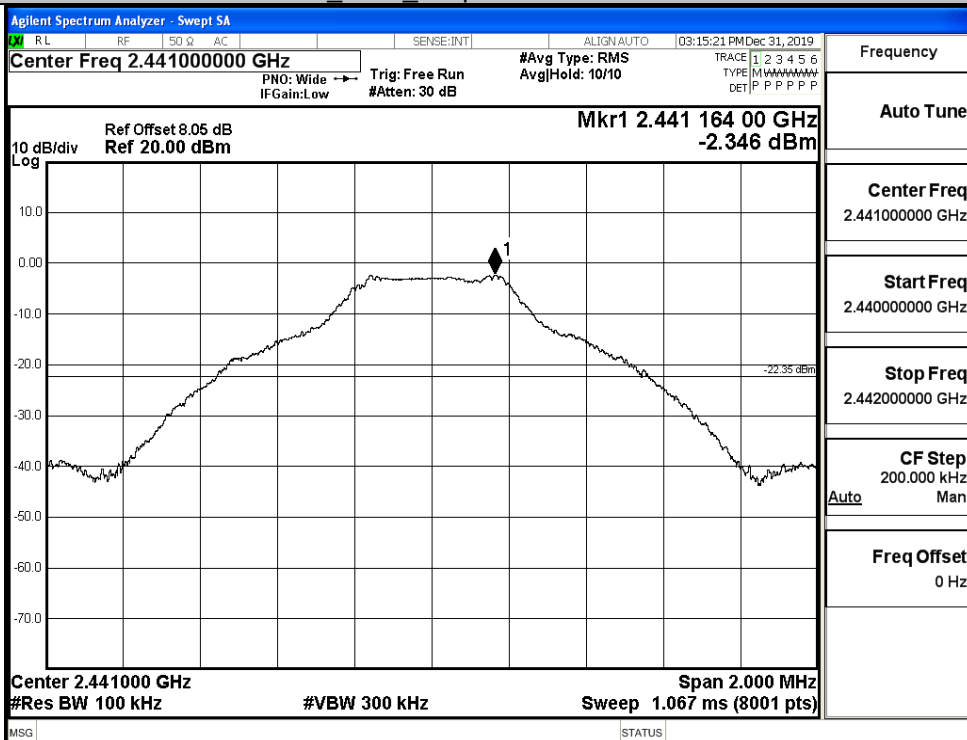


Puw

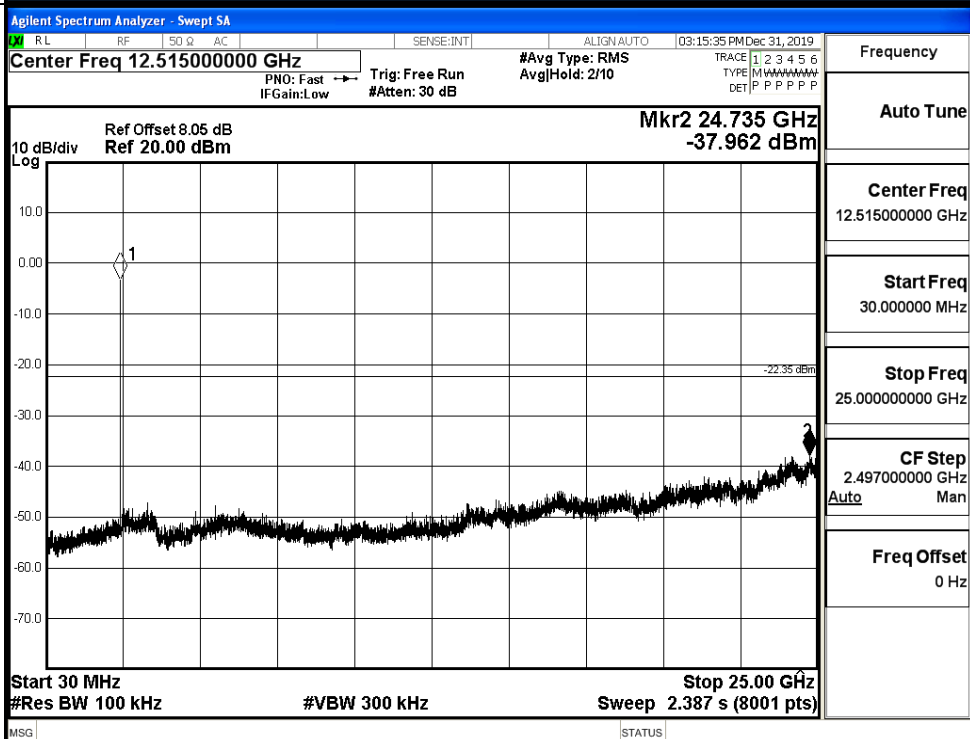


GFSK_MCH_Graphs

Pref

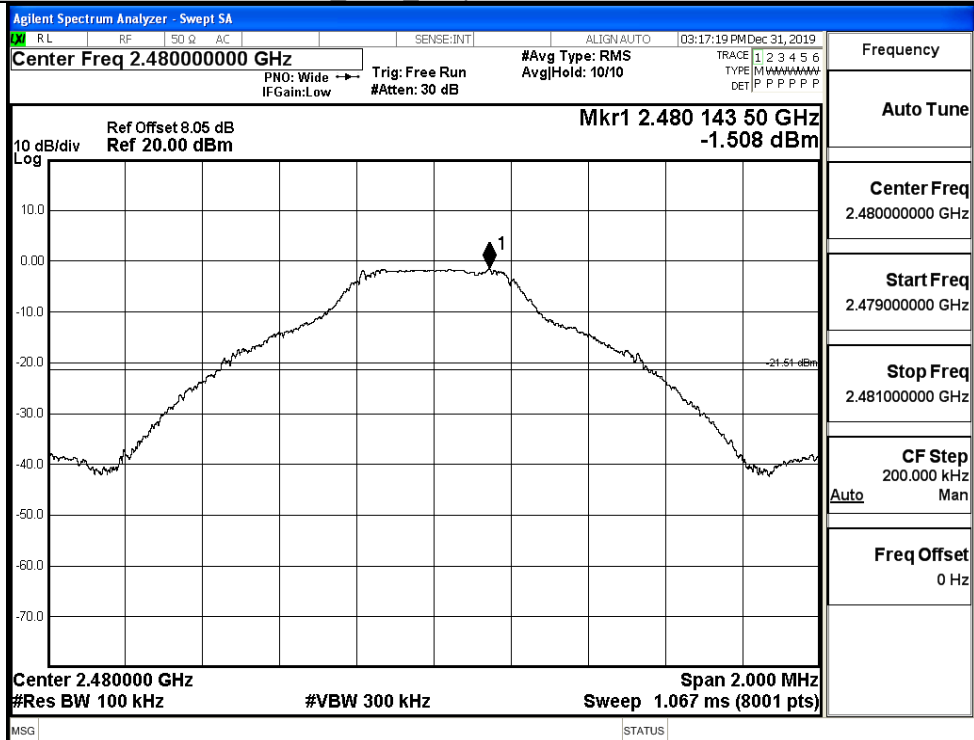


Puw

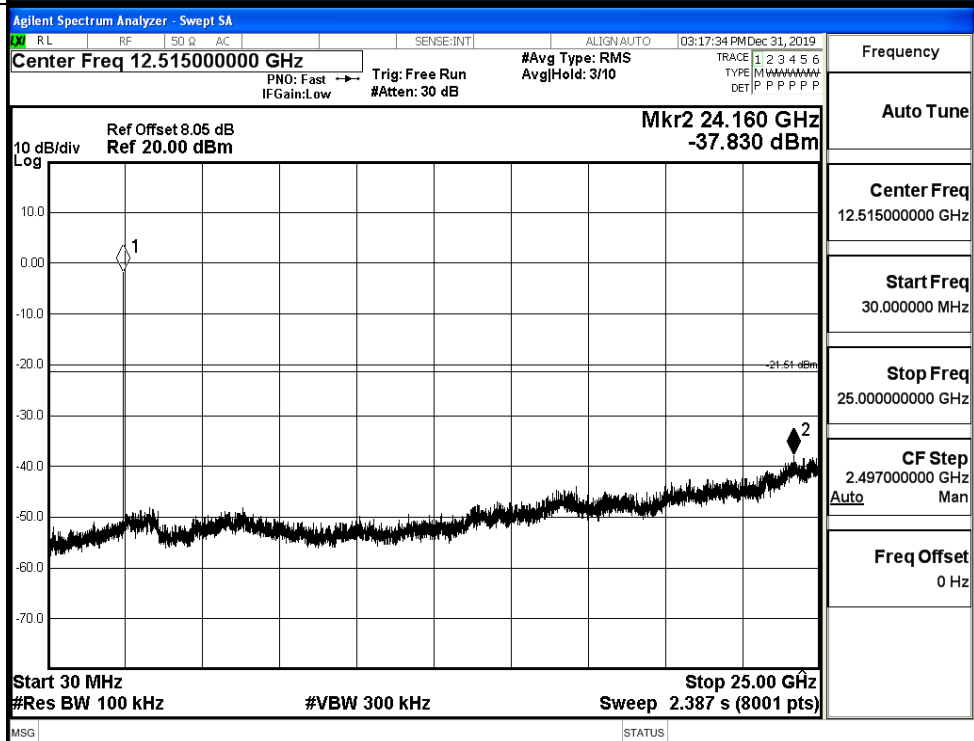


GFSK_HCH_Graphs

Pref

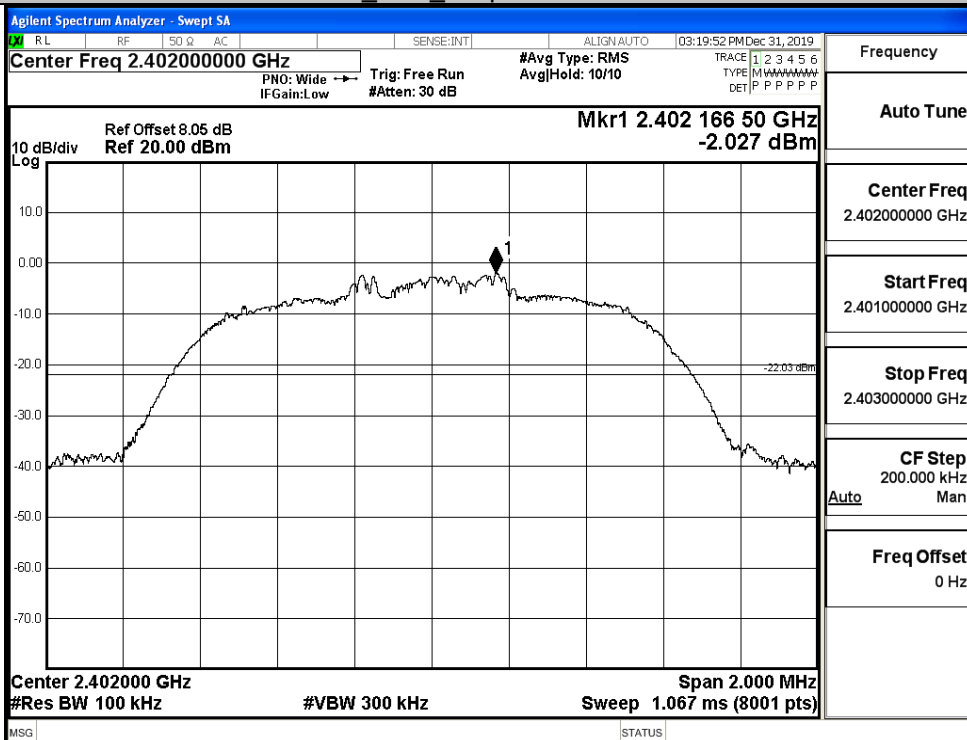


Puw

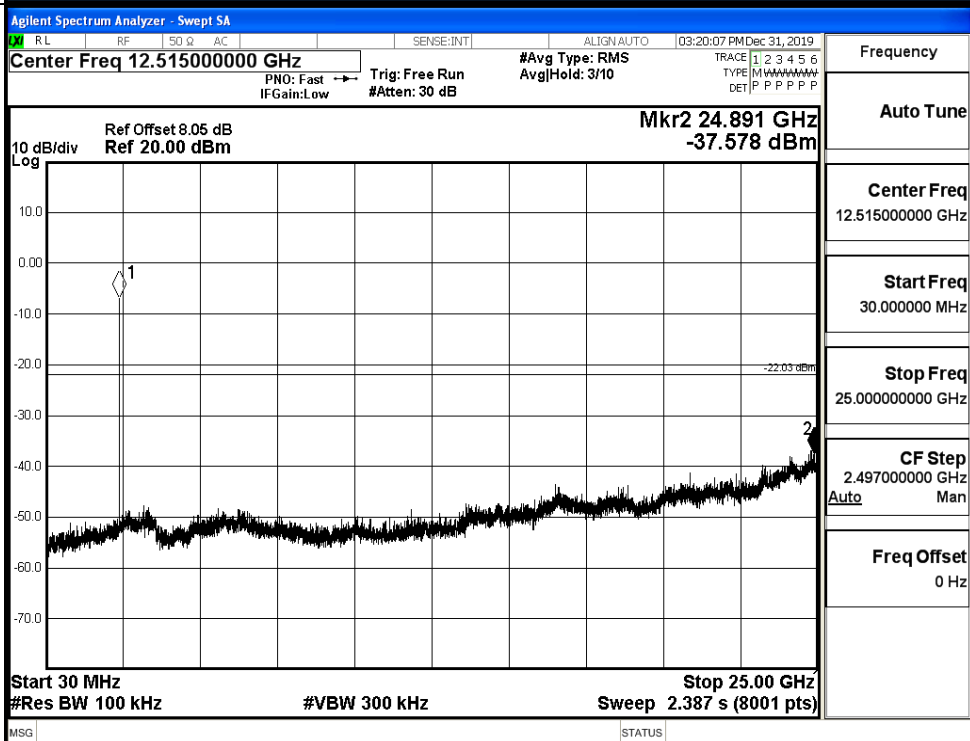


$\pi/4$ DQPSK_LCH_Graphs

Pref

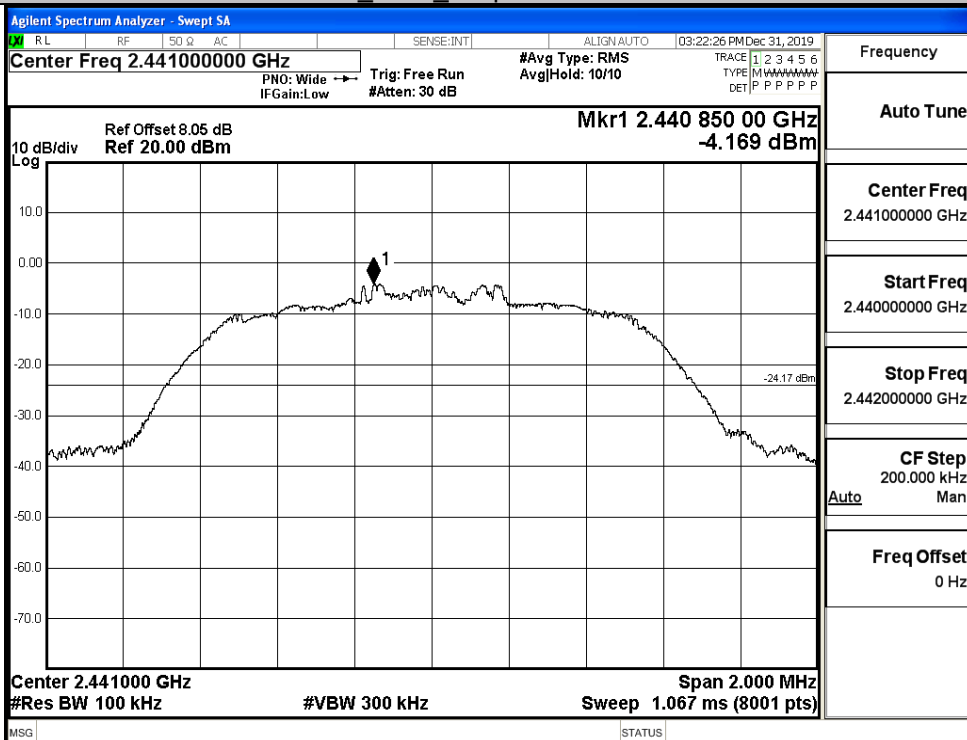


Puw

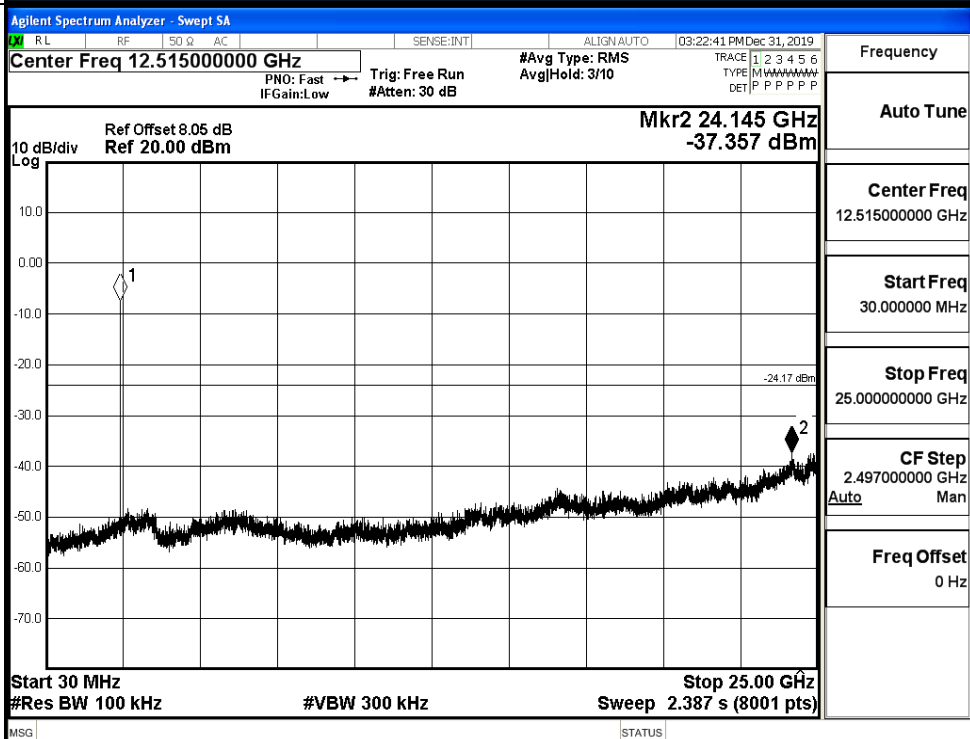


π /4DQPSK_MCH_Graphs

Pref

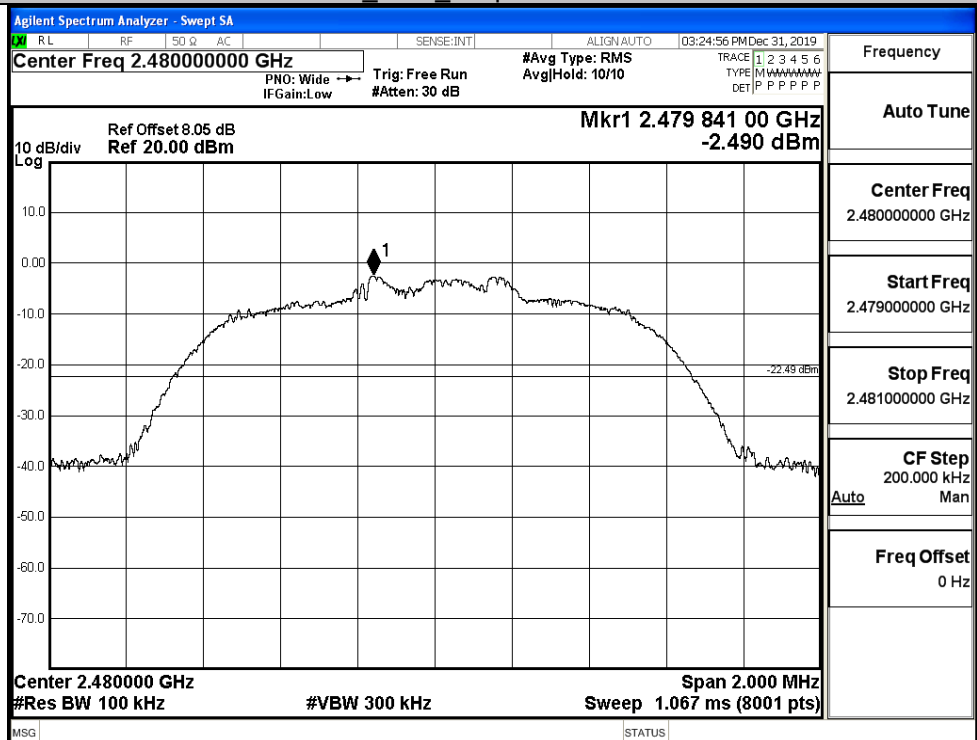


Puw

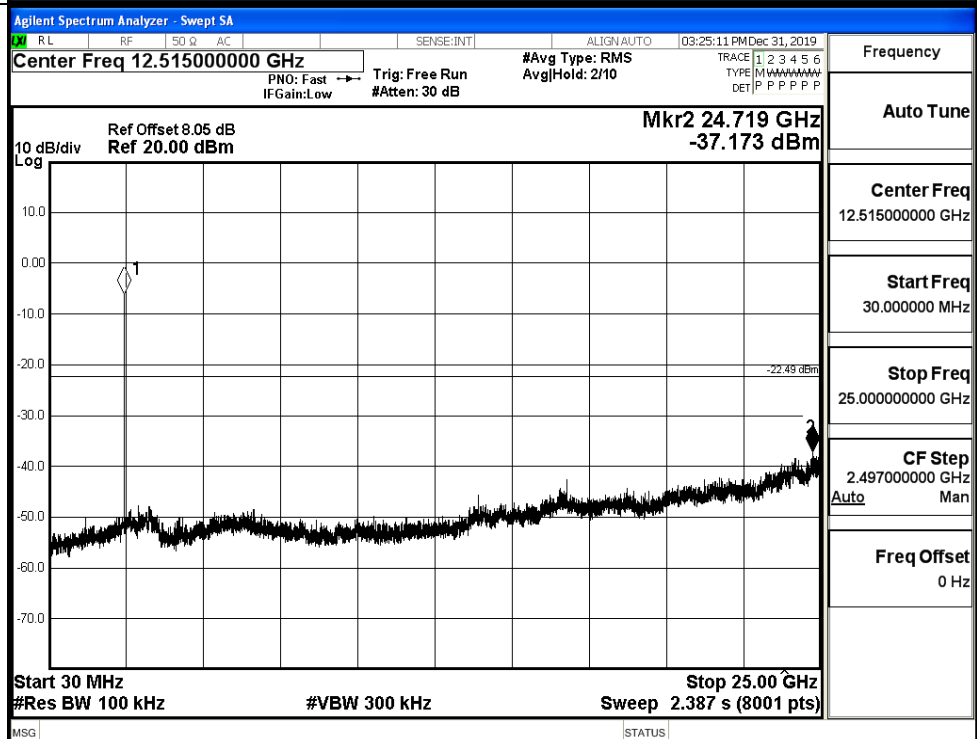


π /4DQPSK_HCH_Graphs

Pref

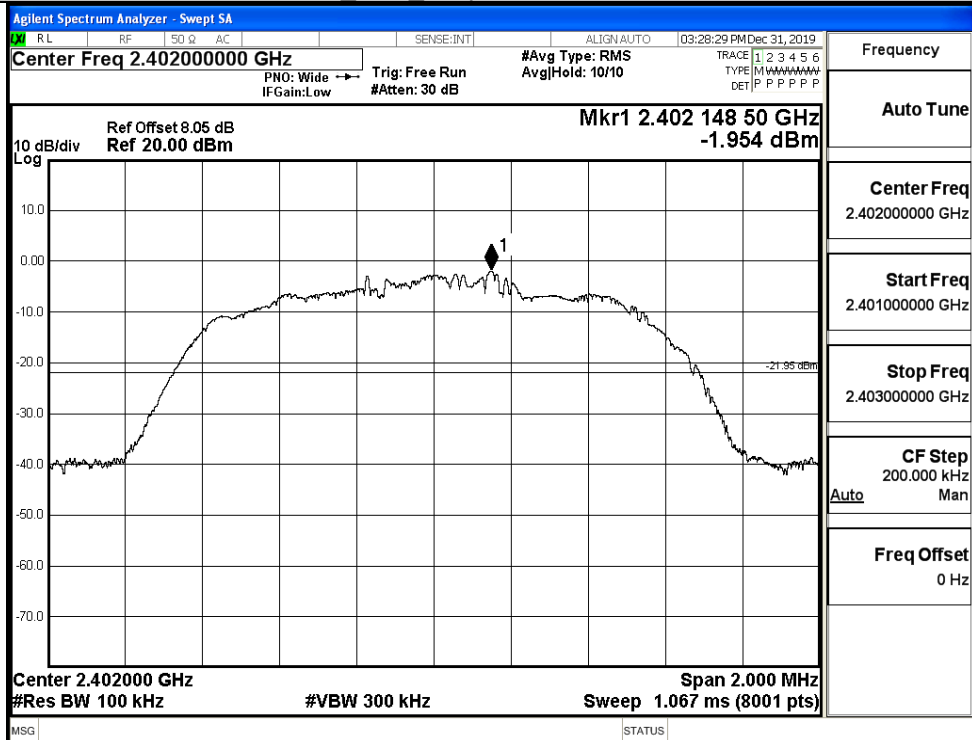


Puw

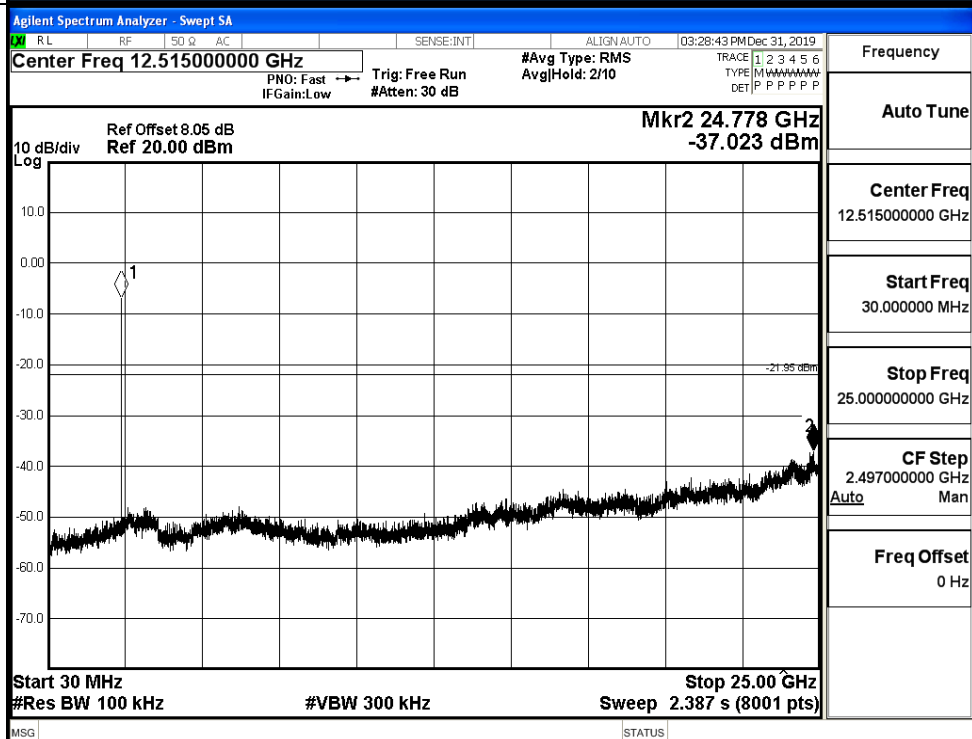


8DPSK_LCH_Graphs

Pref

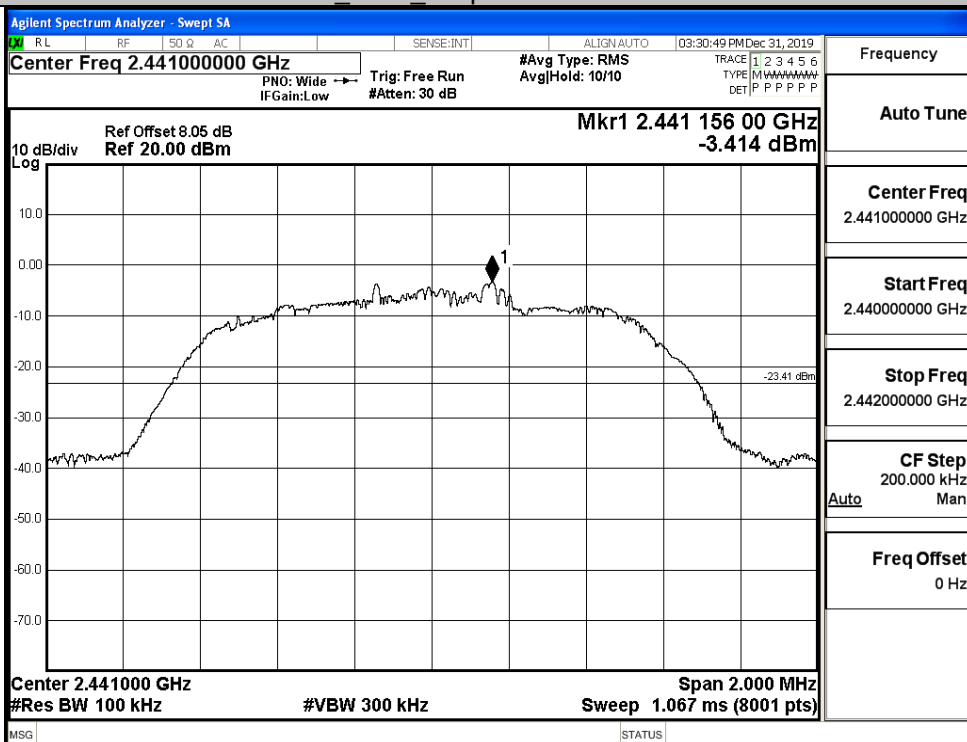


Puw

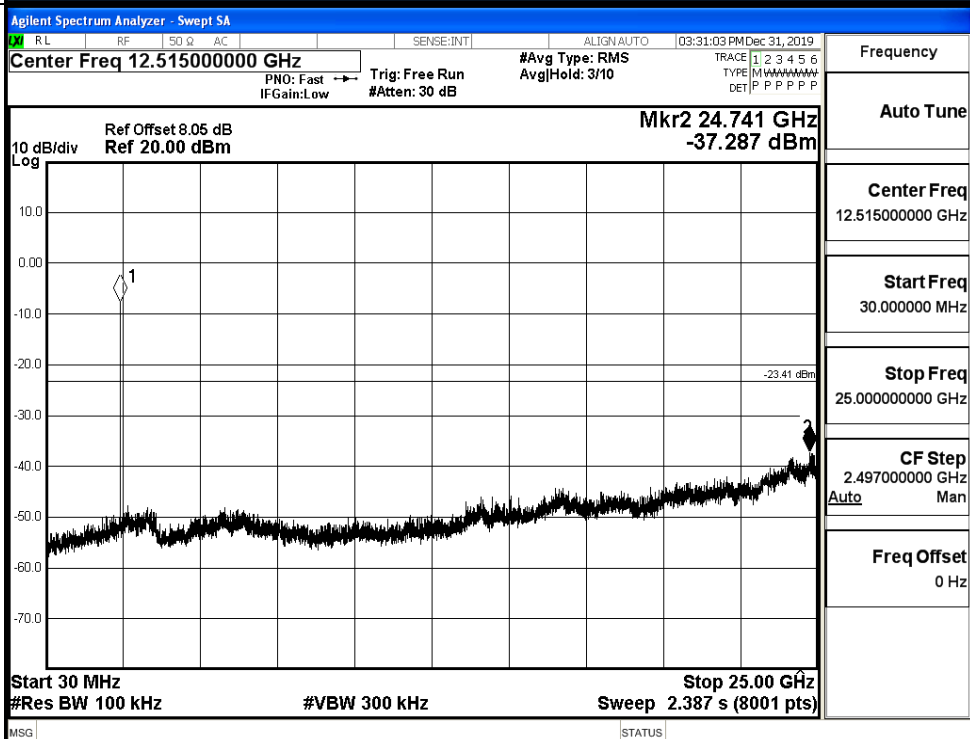


8DPSK_MCH_Graphs

Pref

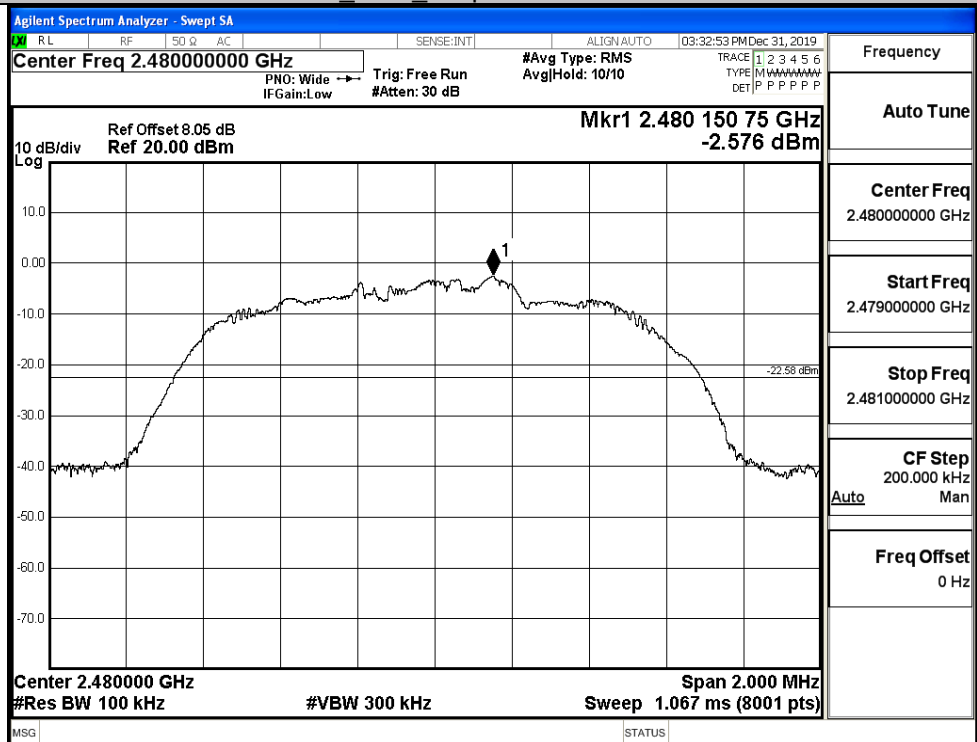


Puw



8DPSK_HCH_Graphs

Pref



Puw

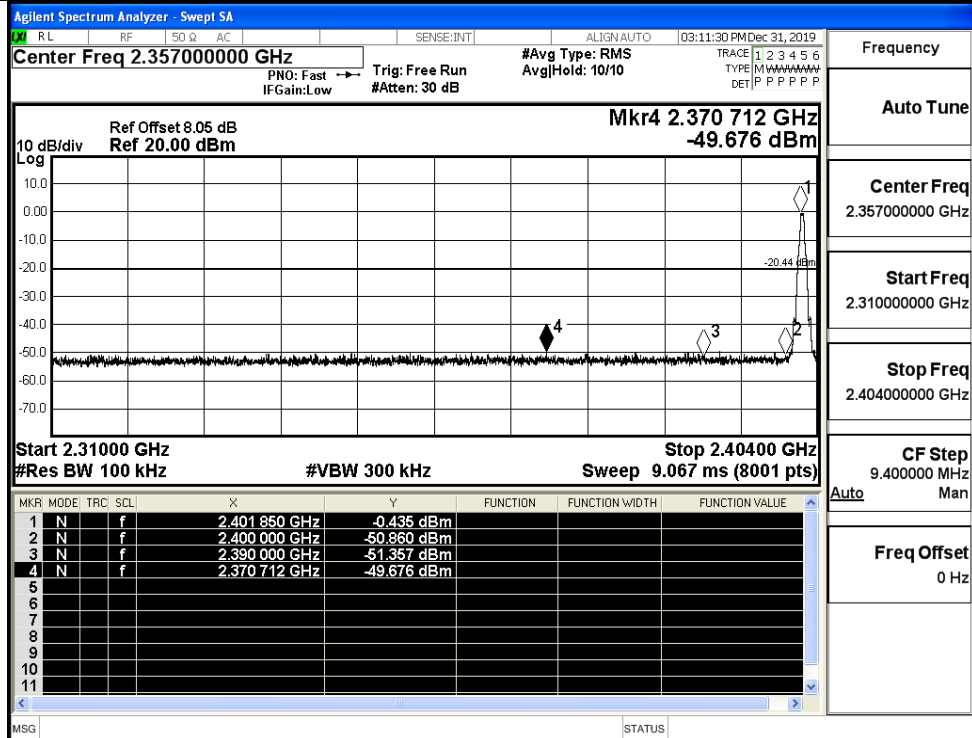


A.7 Band-edge for RF Conducted Emissions

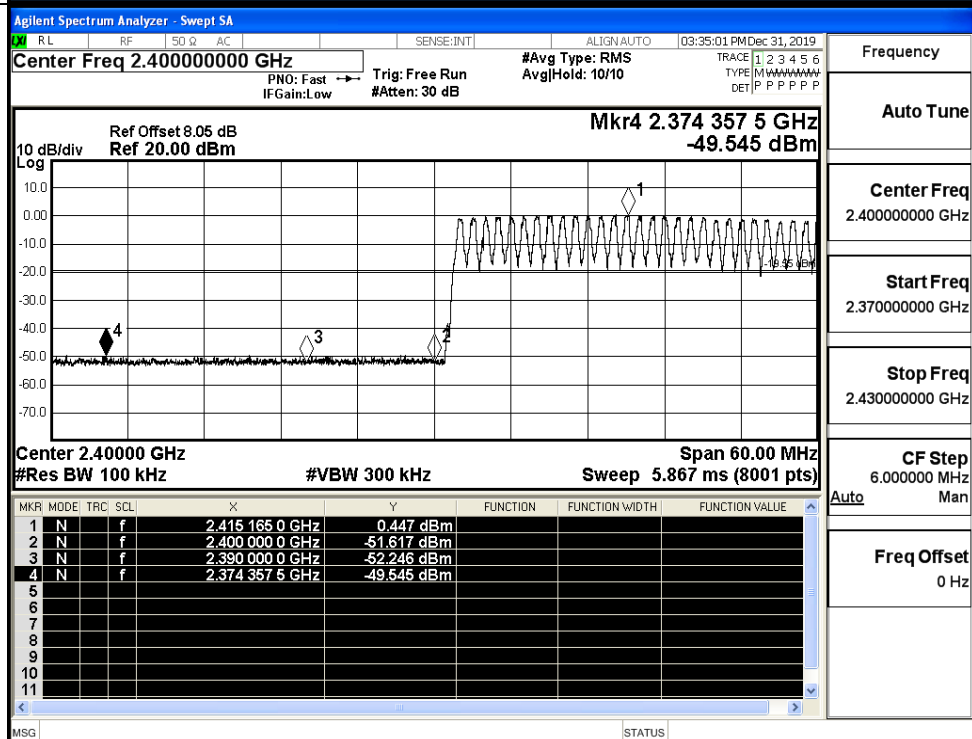
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-0.435	Off	-49.676	-20.44	PASS
			0.447	On	-49.545	-19.55	PASS
	HCH	2480	-1.175	Off	-49.485	-21.18	PASS
			0.059	On	-48.819	-19.94	PASS
$\pi/4$ DQPSK	LCH	2402	-2.096	Off	-49.172	-22.1	PASS
			-1.007	On	-48.107	-21.01	PASS
	HCH	2480	-2.520	Off	-48.412	-22.52	PASS
			-1.508	On	-47.662	-21.51	PASS
8DPSK	LCH	2402	-1.949	Off	-49.932	-21.95	PASS
			-1.302	On	-48.729	-21.3	PASS
	HCH	2480	-2.541	Off	-49.588	-22.54	PASS
			-1.182	On	-48.223	-21.18	PASS

Test Graphs

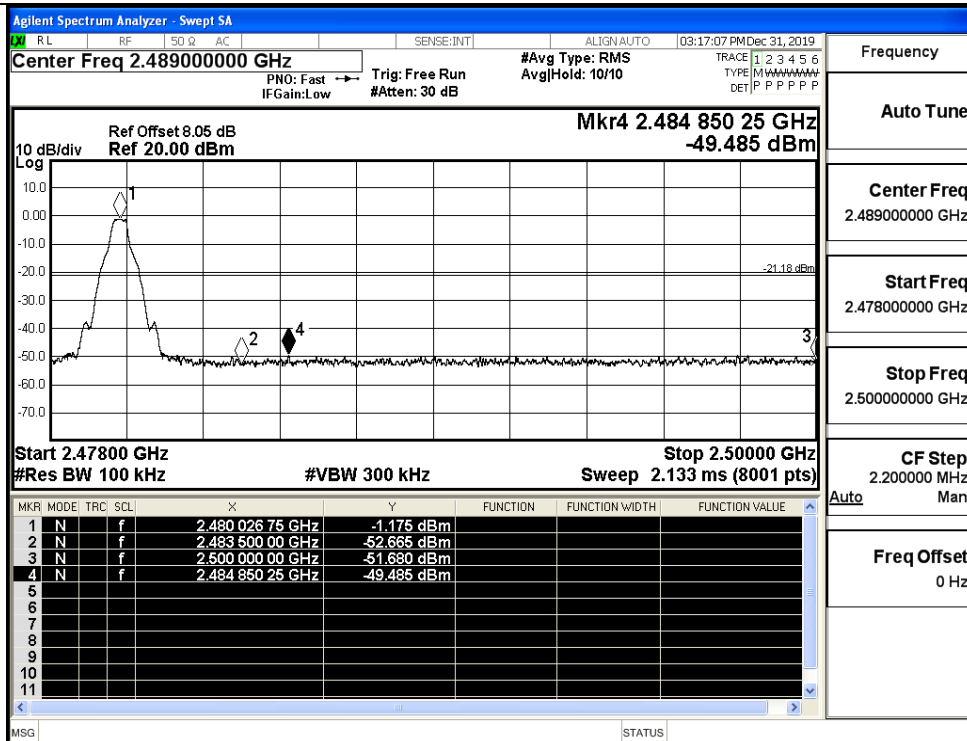
GFSK/LCH/No Hop



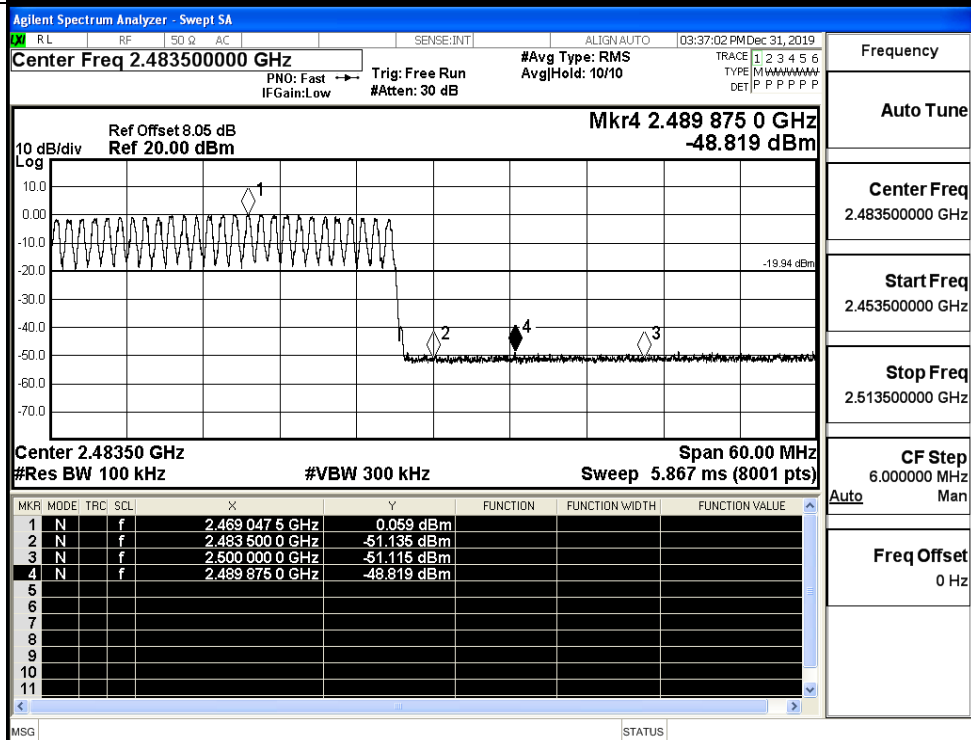
GFSK/LCH/Hop



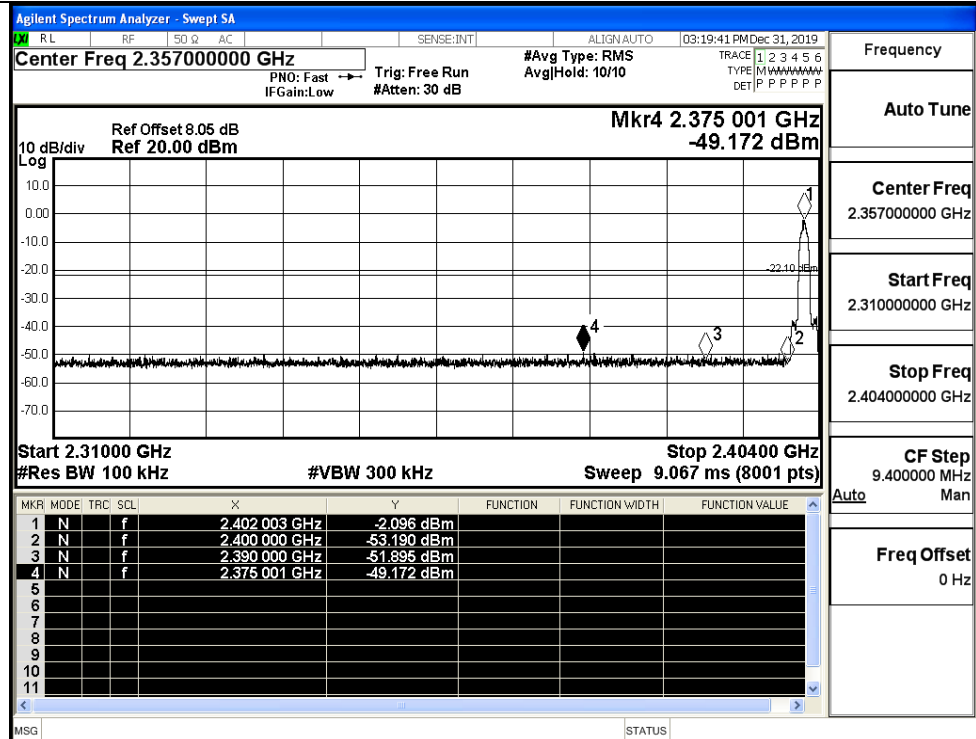
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq
2.357000000 GHz

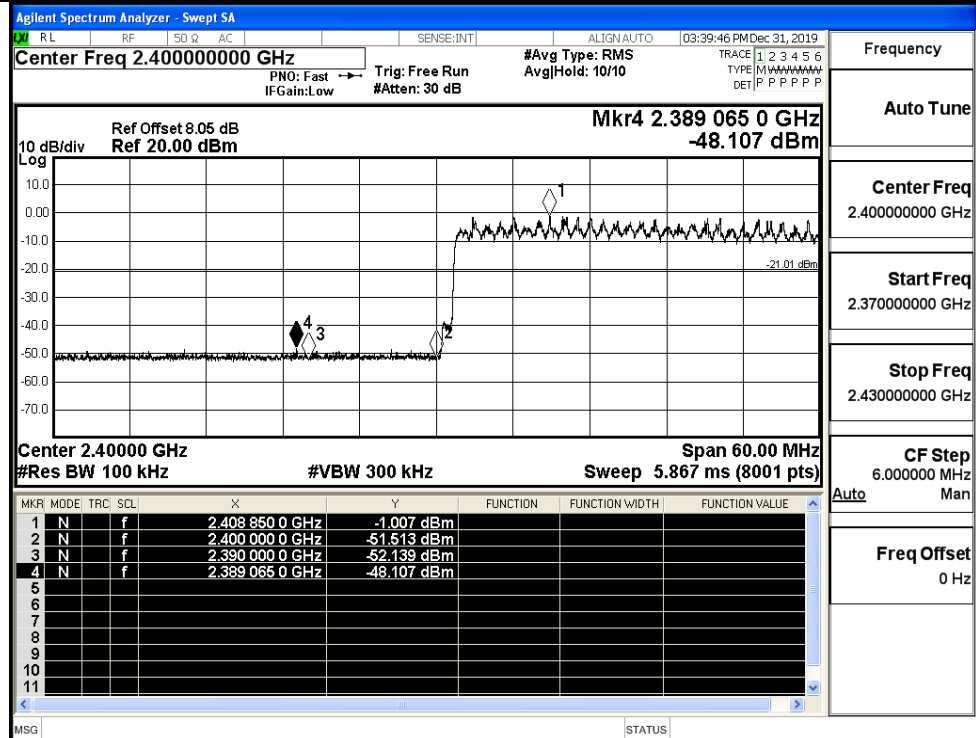
Start Freq
2.310000000 GHz

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

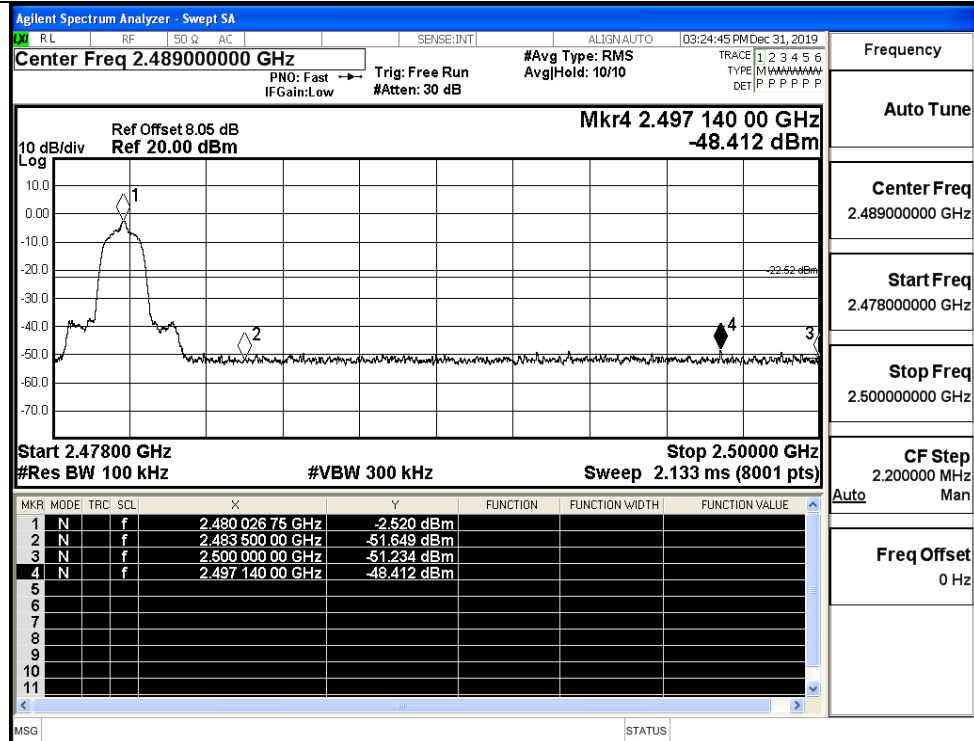
Start Freq
2.370000000 GHz

Stop Freq
2.430000000 GHz

CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

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



Frequency

Auto Tune

Center Freq
2.489000000 GHz

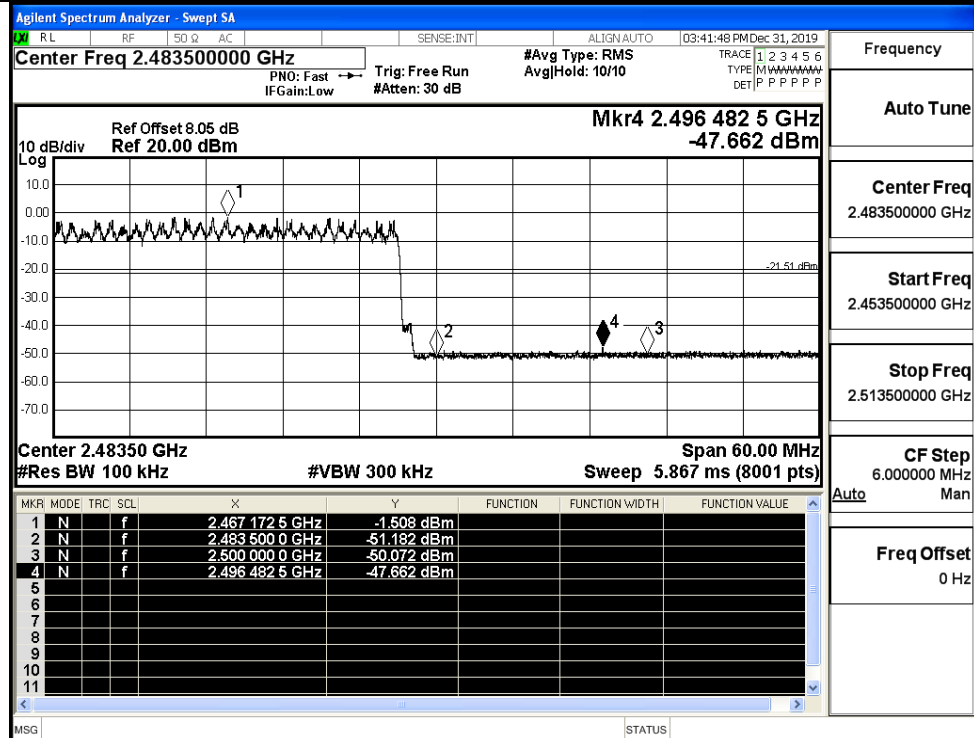
Start Freq
2.478000000 GHz

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

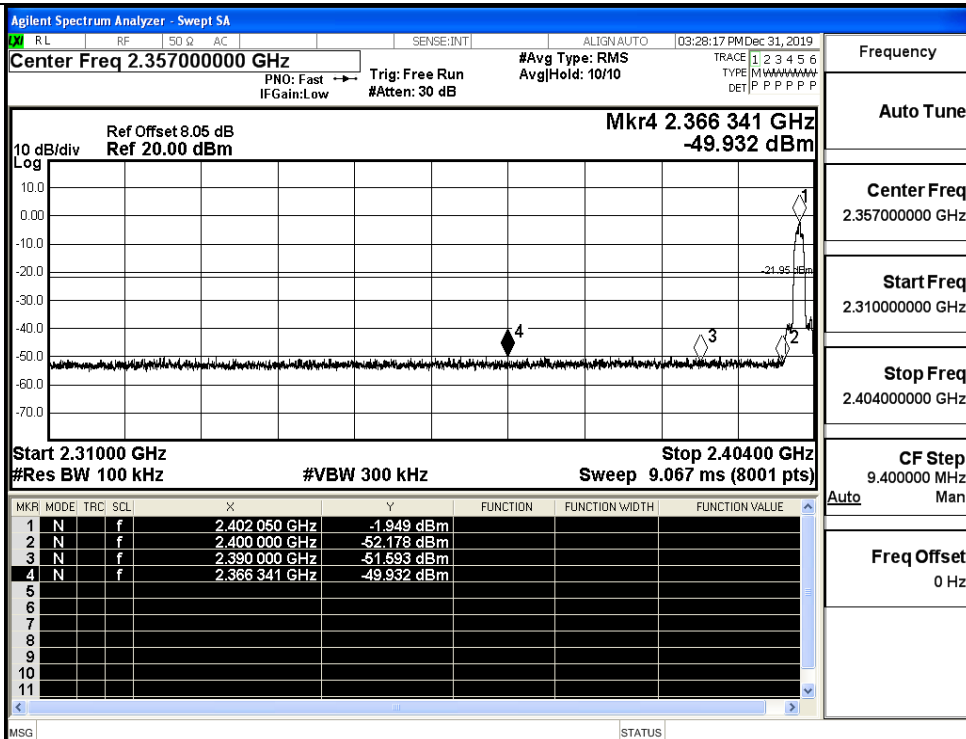
Start Freq
2.453500000 GHz

Stop Freq
2.513500000 GHz

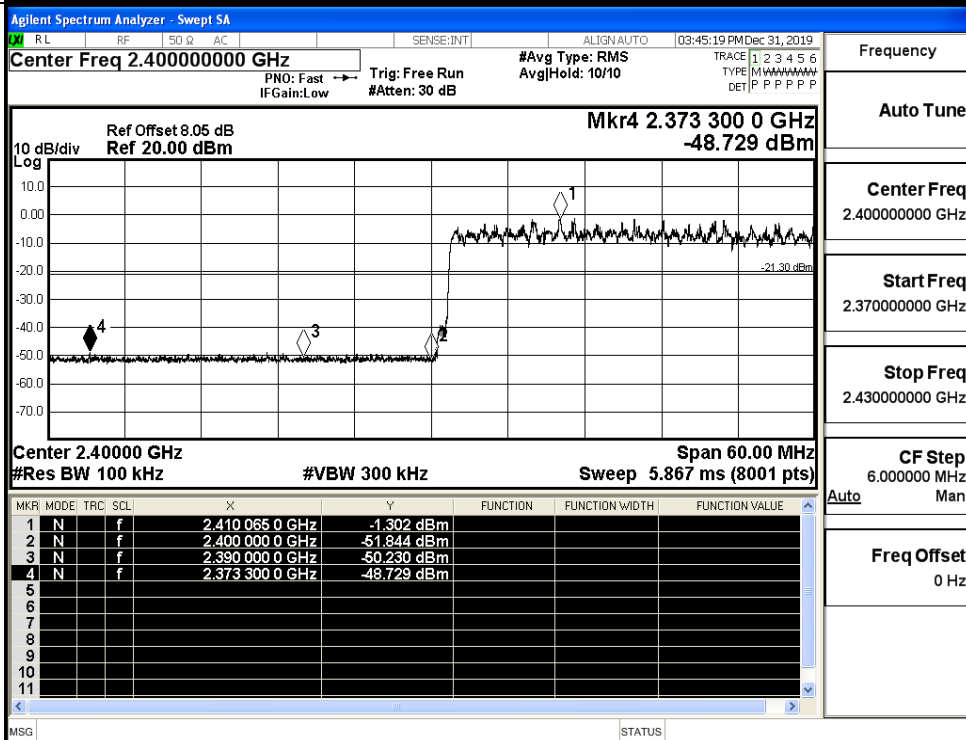
CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

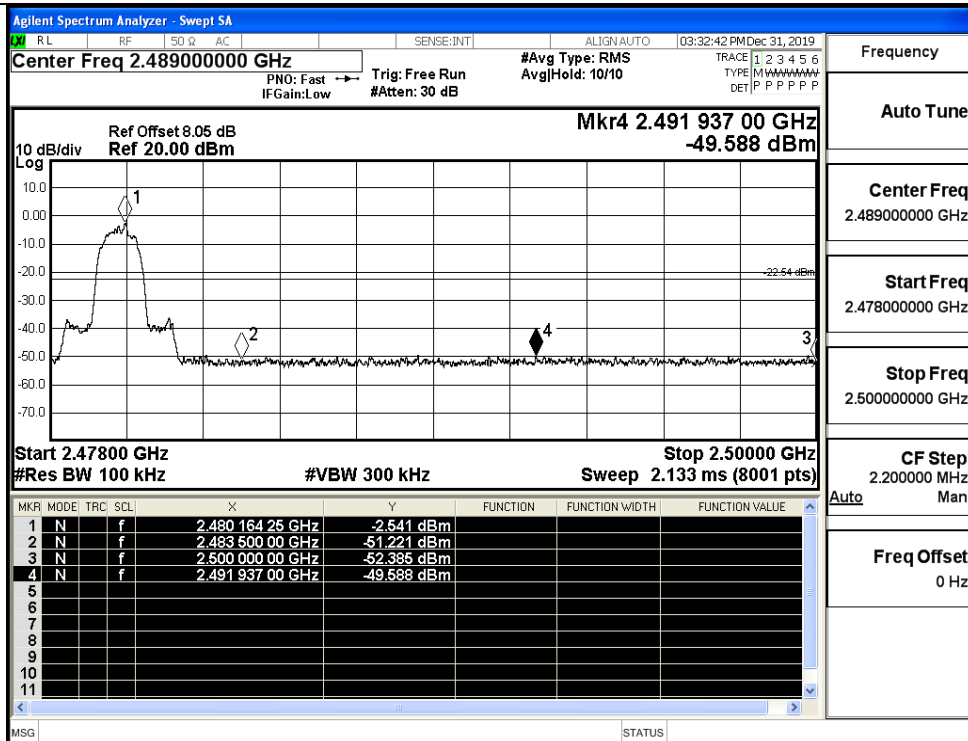
8DPSK/LCH/No Hop



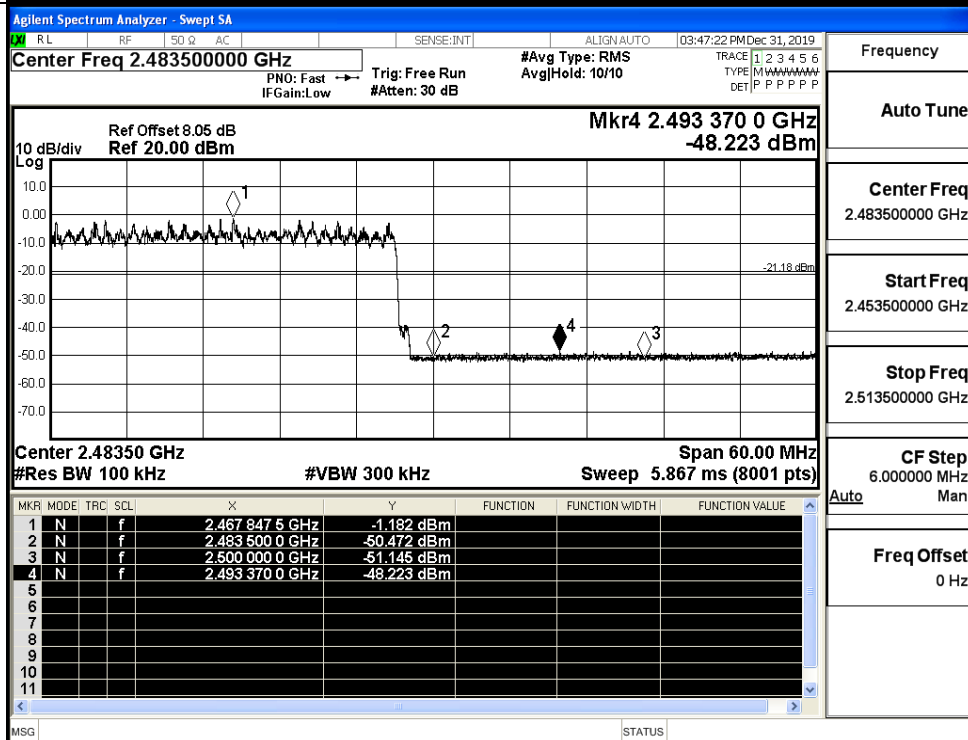
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



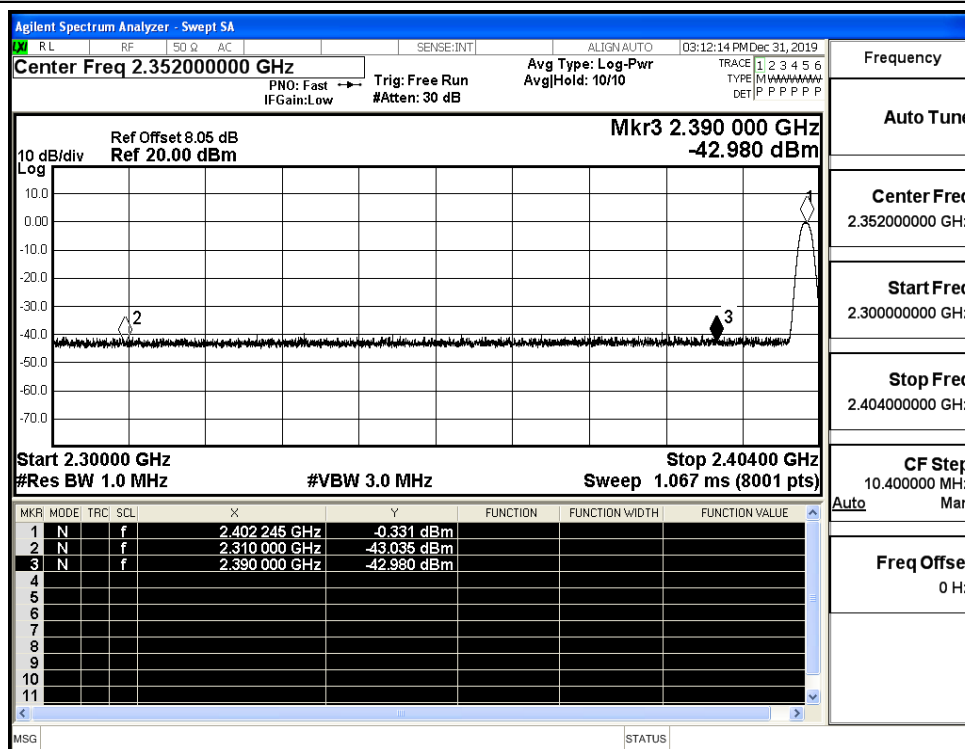
8DPSK/HCH/Hop



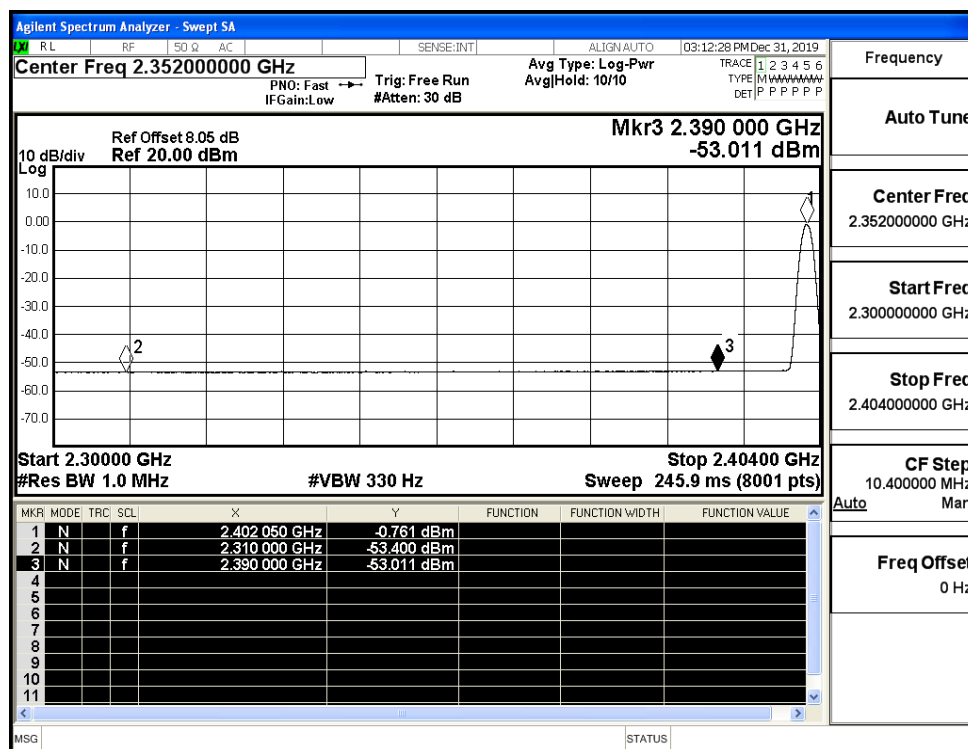
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.04	2.0	0	54.22	PEAK	74	PASS
	Off	2310.0	-53.40	2.0	0	43.86	AV	54	PASS
	Off	2390.0	-42.98	2.0	0	54.28	PEAK	74	PASS
	Off	2390.0	-53.01	2.0	0	44.25	AV	54	PASS
	Off	2483.5	-41.17	2.0	0	56.09	PEAK	74	PASS
	Off	2483.5	-52.60	2.0	0	44.65	AV	54	PASS
	Off	2500.0	-41.41	2.0	0	55.85	PEAK	74	PASS
	Off	2500.0	-52.42	2.0	0	44.84	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.47	2.0	0	53.79	PEAK	74	PASS
	Off	2310.0	-53.47	2.0	0	43.79	AV	54	PASS
	Off	2390.0	-43.29	2.0	0	53.96	PEAK	74	PASS
	Off	2390.0	-52.98	2.0	0	44.28	AV	54	PASS
	Off	2483.5	-41.08	2.0	0	56.18	PEAK	74	PASS
	Off	2483.5	-52.43	2.0	0	44.82	AV	54	PASS
	Off	2500.0	-42.32	2.0	0	54.94	PEAK	74	PASS
	Off	2500.0	-52.34	2.0	0	44.92	AV	54	PASS
8DPSK	Off	2310.0	-43.54	2.0	0	53.72	PEAK	74	PASS
	Off	2310.0	-53.33	2.0	0	43.93	AV	54	PASS
	Off	2390.0	-43.55	2.0	0	53.71	PEAK	74	PASS
	Off	2390.0	-53.02	2.0	0	44.23	AV	54	PASS
	Off	2483.5	-41.09	2.0	0	56.16	PEAK	74	PASS
	Off	2483.5	-52.42	2.0	0	44.84	AV	54	PASS
	Off	2500.0	-42.13	2.0	0	55.13	PEAK	74	PASS
	Off	2500.0	-52.36	2.0	0	44.90	AV	54	PASS

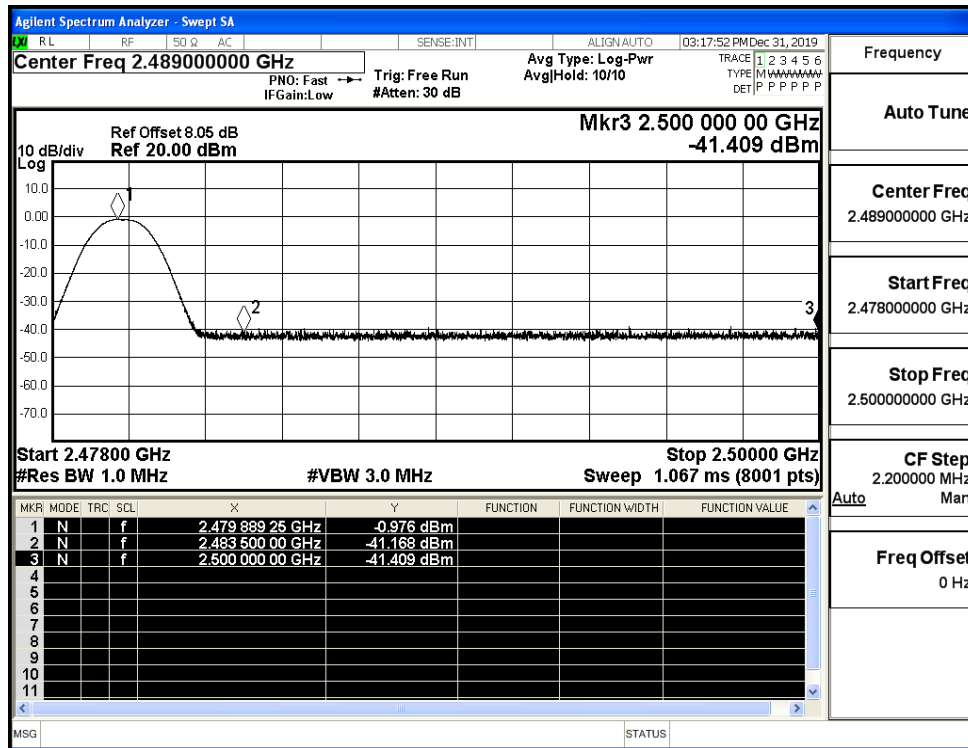
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



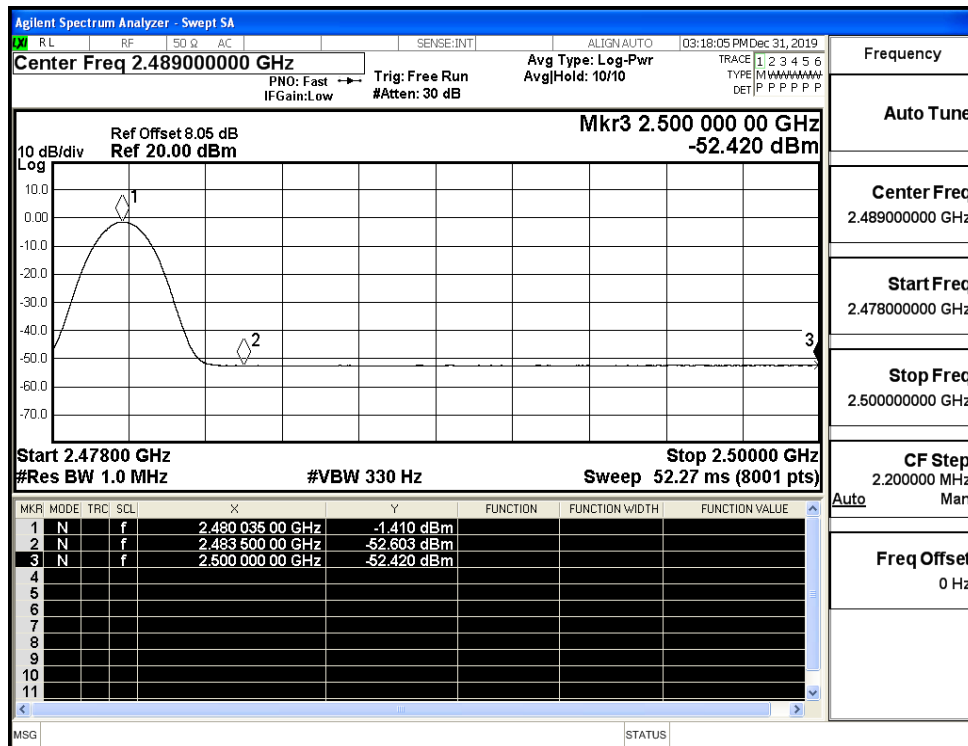
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

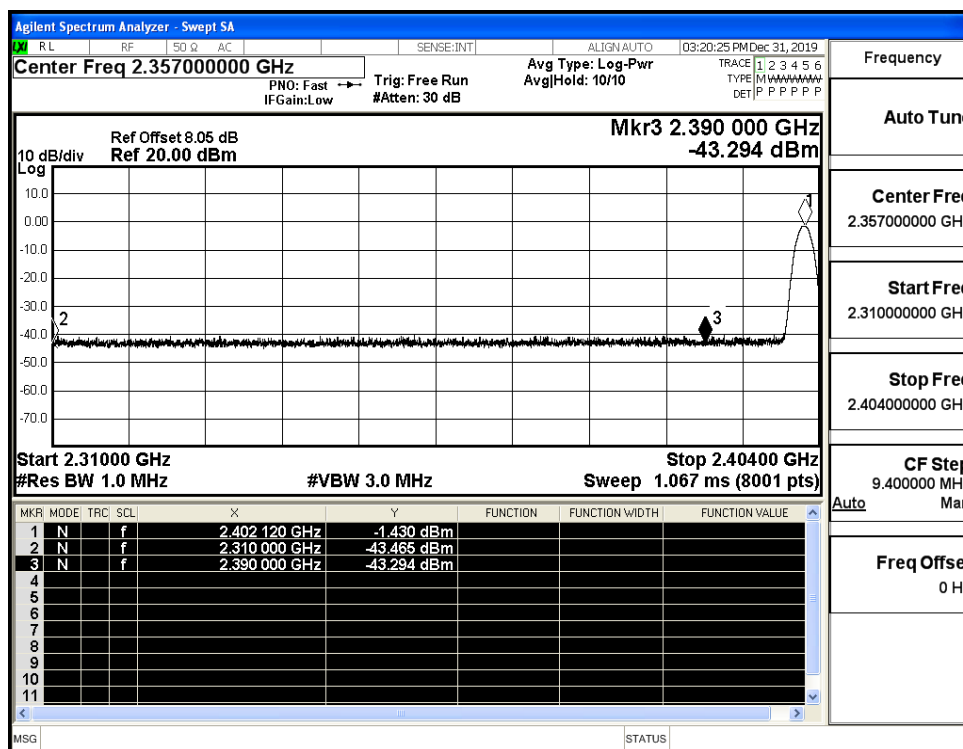
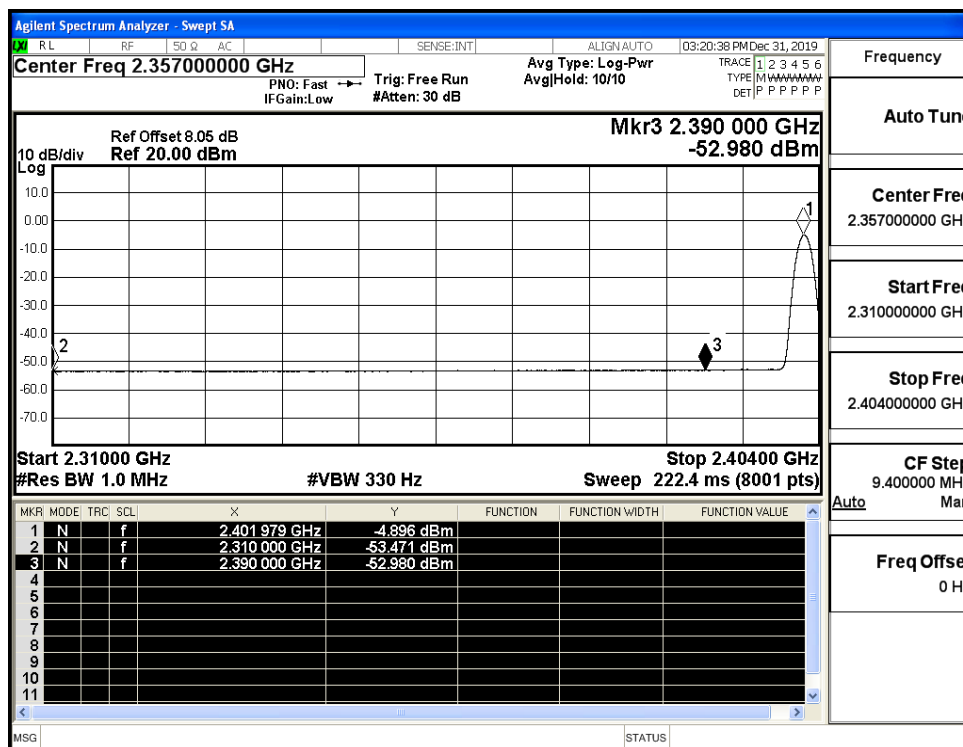


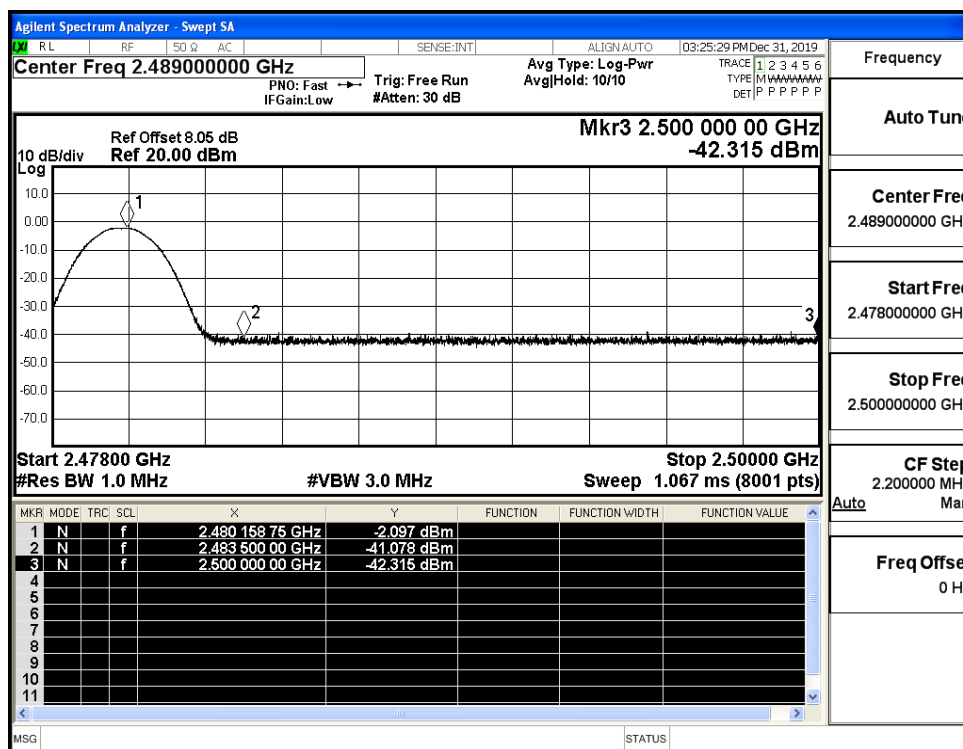
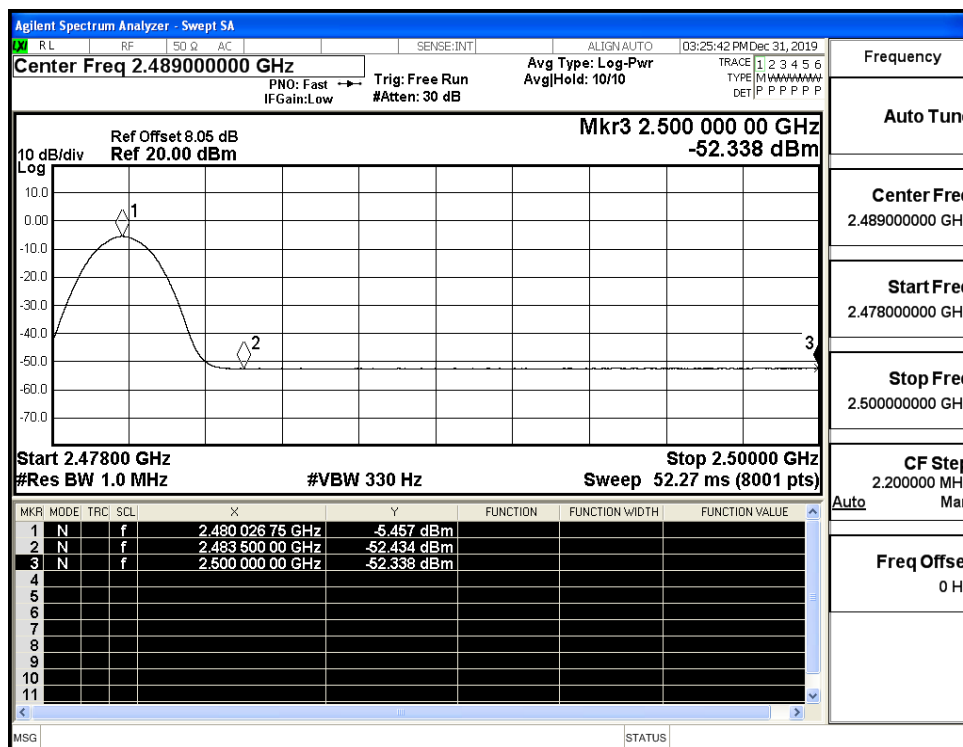
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



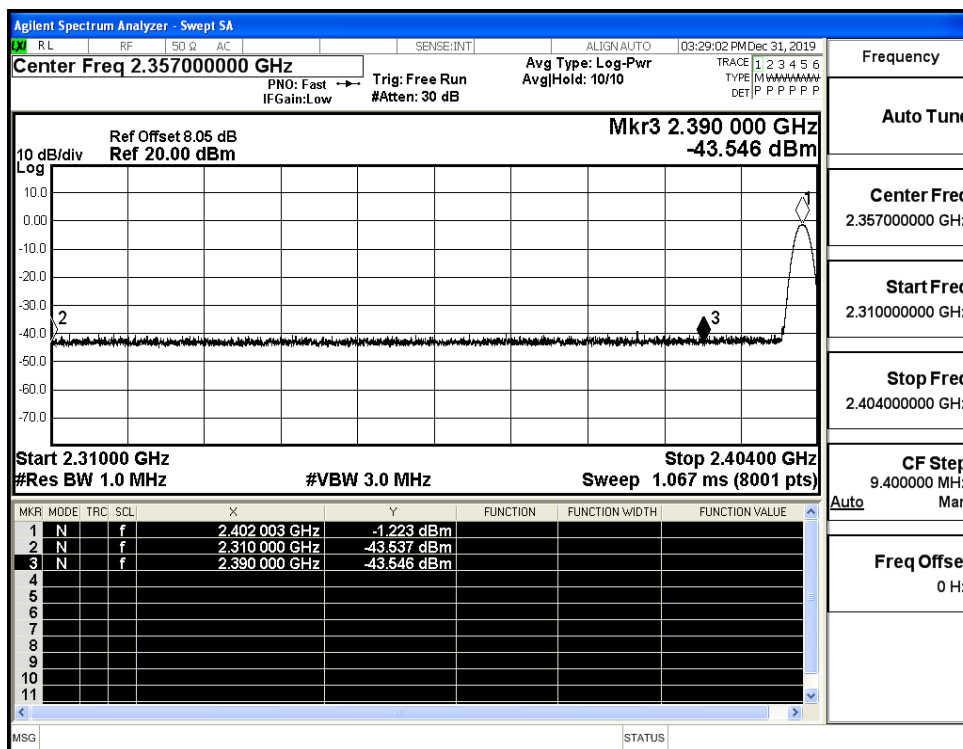
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



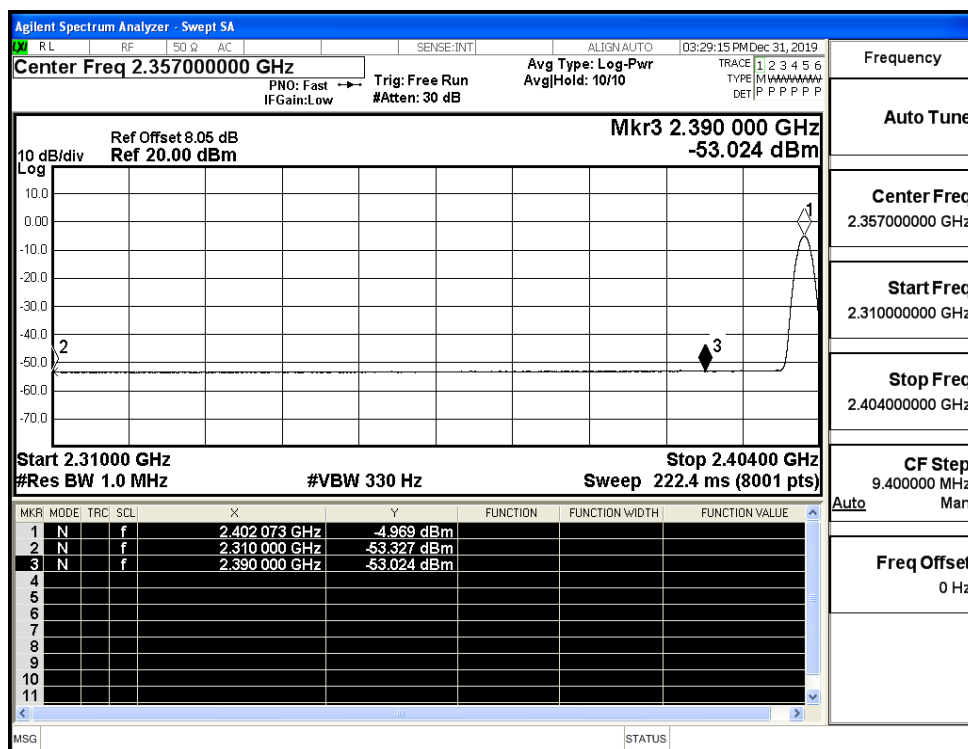
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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)

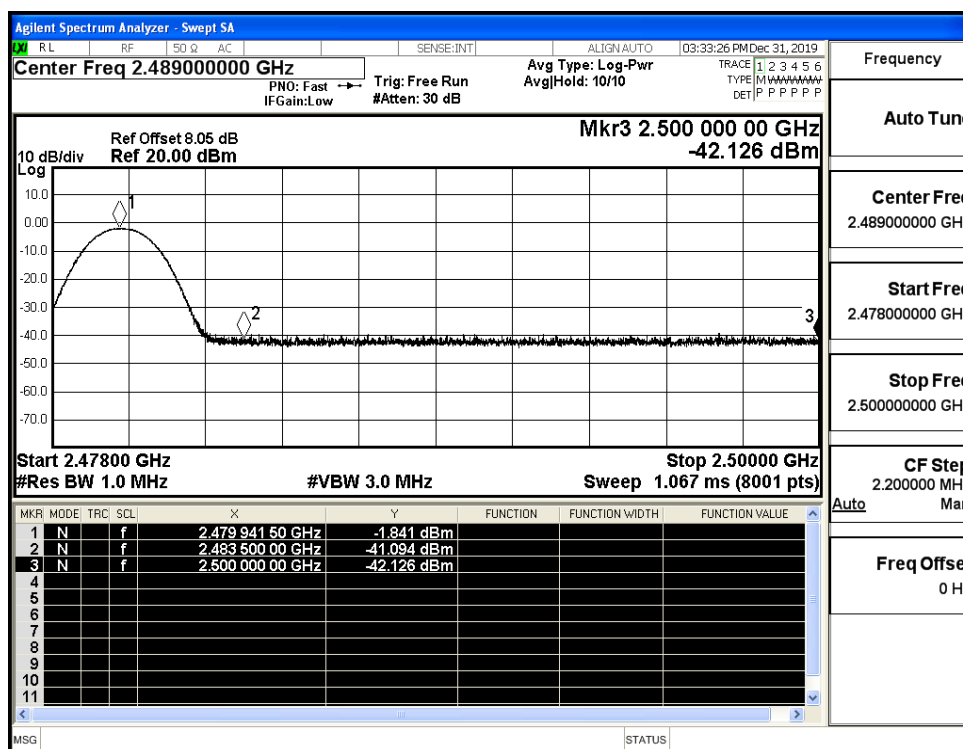
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

