

Appendix A

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

Product Name: 30inch Bluetooth Soundbar Speaker with Wireless Subwoofer and Dolby

Trade Mark:

atune analog

Test Model: SBB-A5521

Environmental Conditions

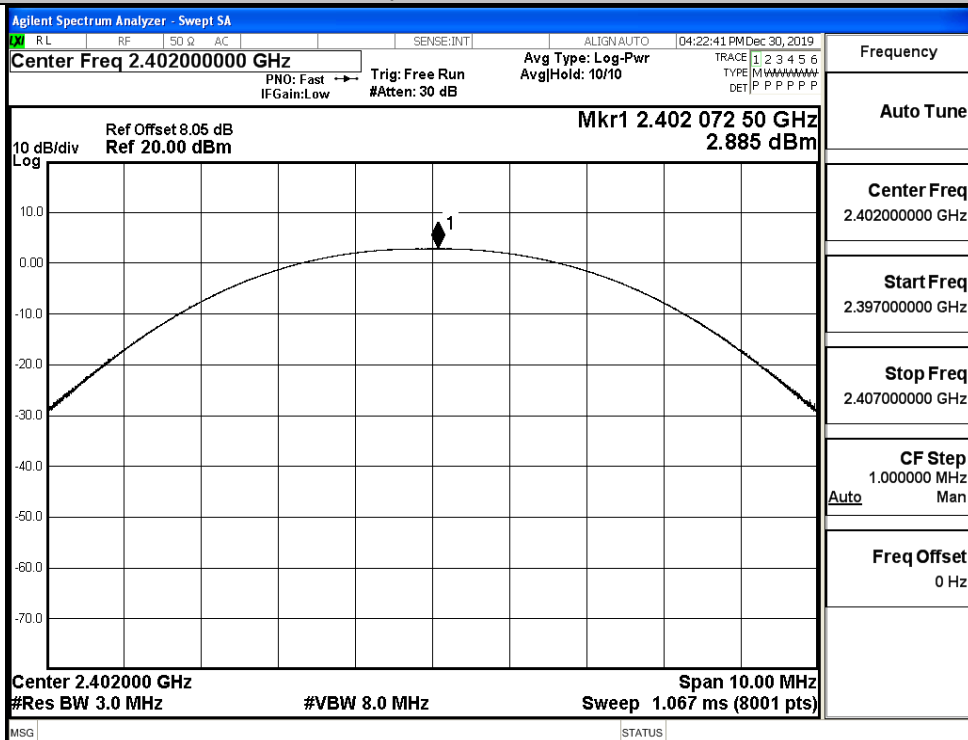
Temperature:	23.2°C
Relative Humidity:	54.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Zhuo Zhuo
Supervised by:	Tom.Liu

A.1 Maximum Conducted Peak Output Power

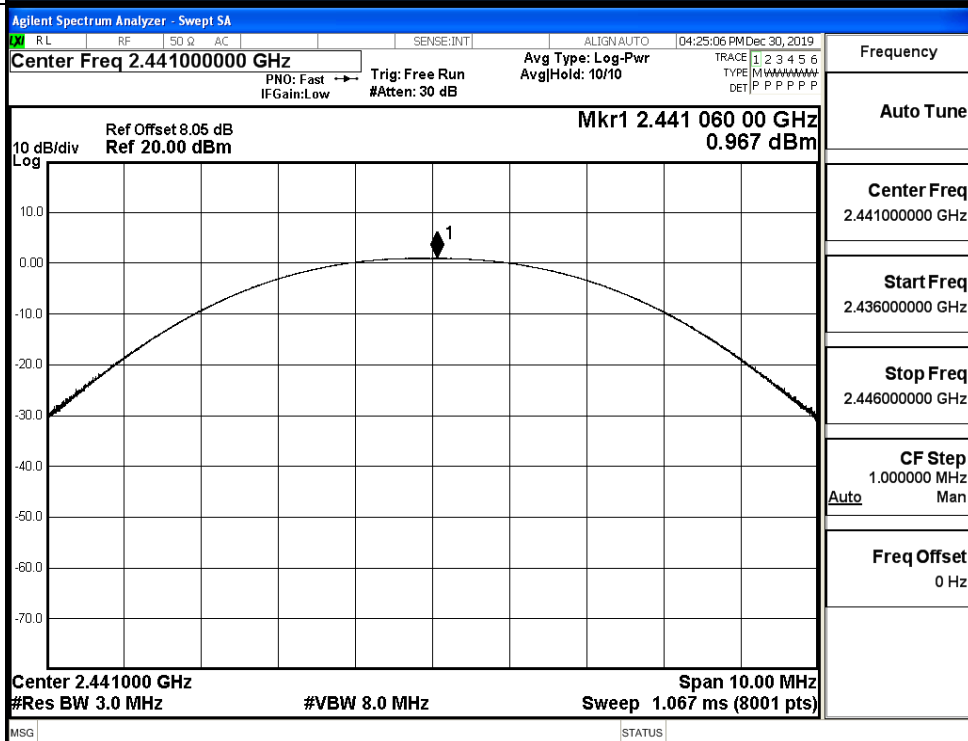
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2.885	21	PASS
	MCH	0.967	21	PASS
	HCH	2.181	21	PASS
$\pi/4$ DQPSK	LCH	2.172	21	PASS
	MCH	0.392	21	PASS
	HCH	1.423	21	PASS
8DPSK	LCH	2.312	21	PASS
	MCH	0.560	21	PASS
	HCH	1.639	21	PASS

Test Graphs

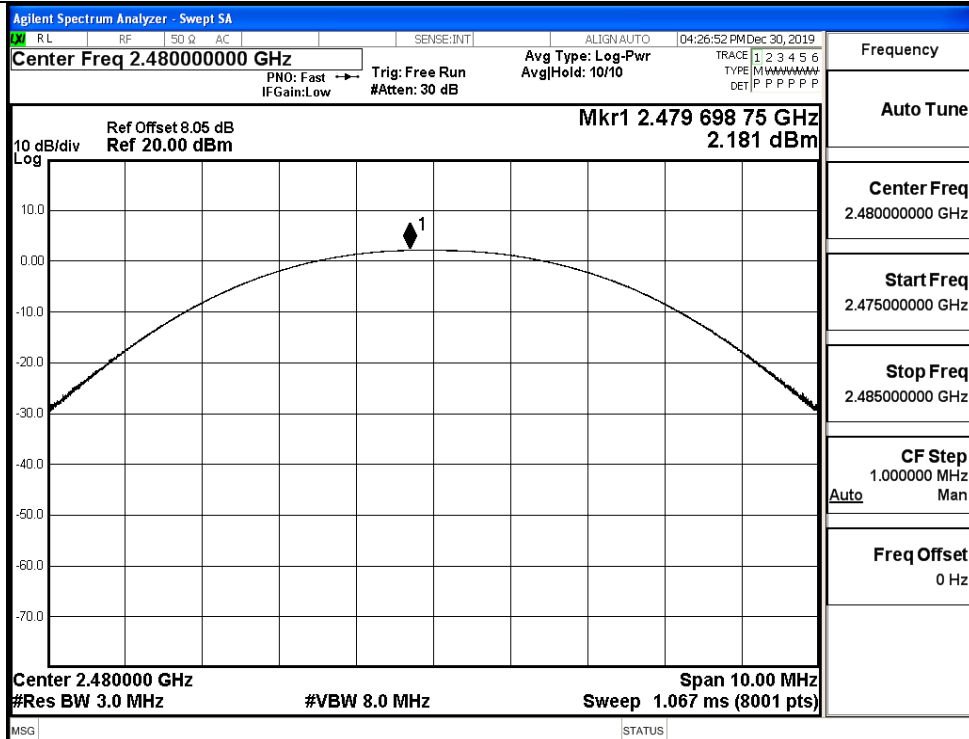
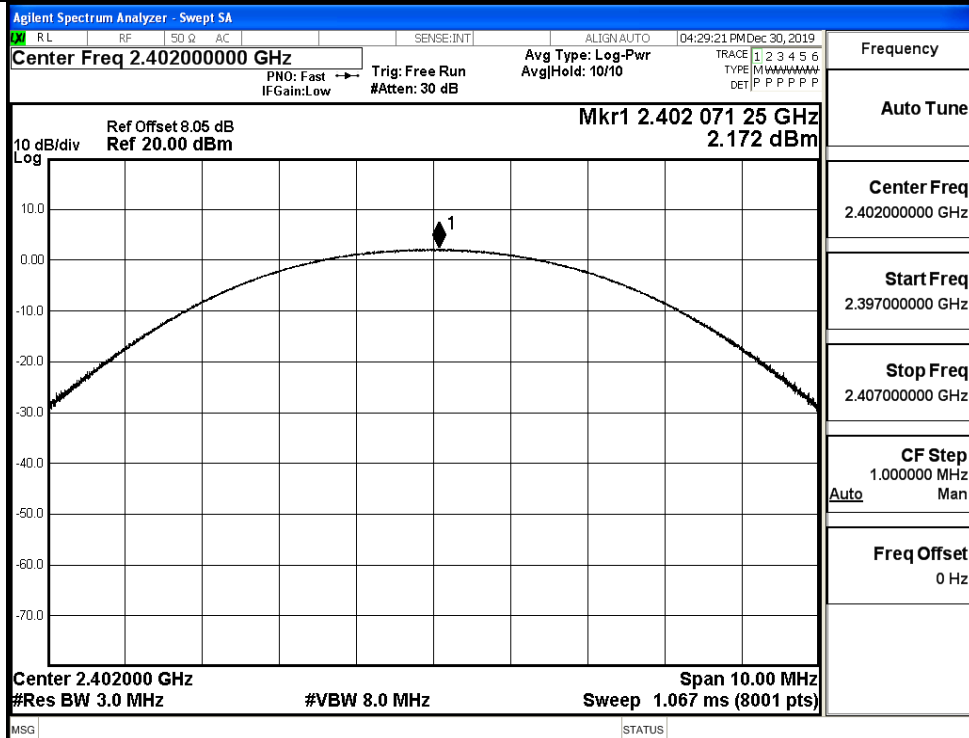
GFSK/LCH

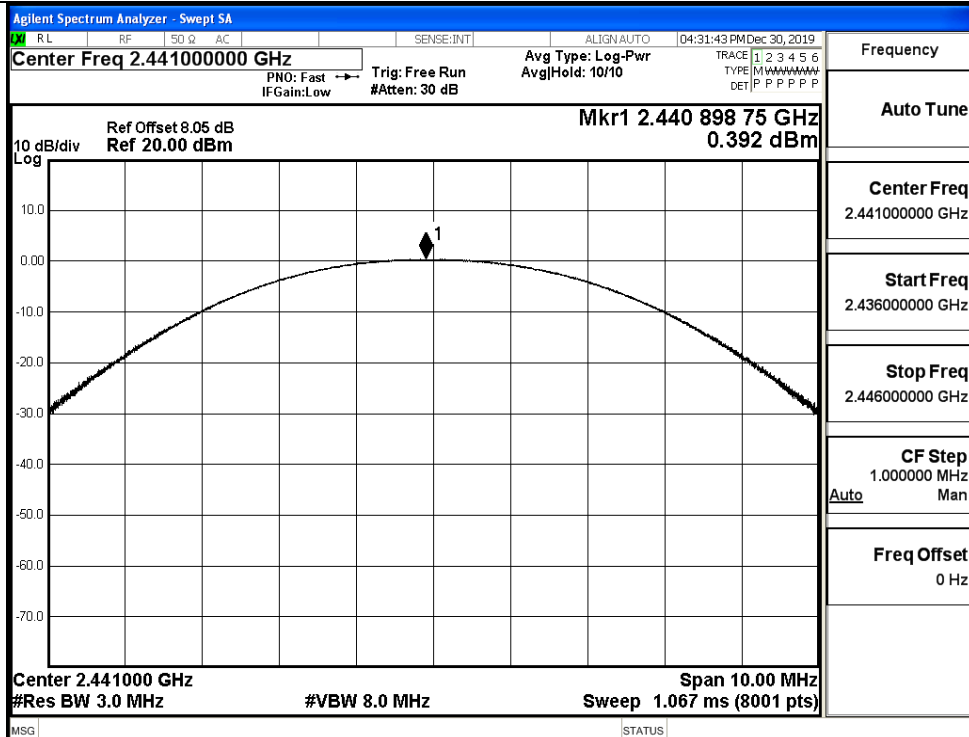
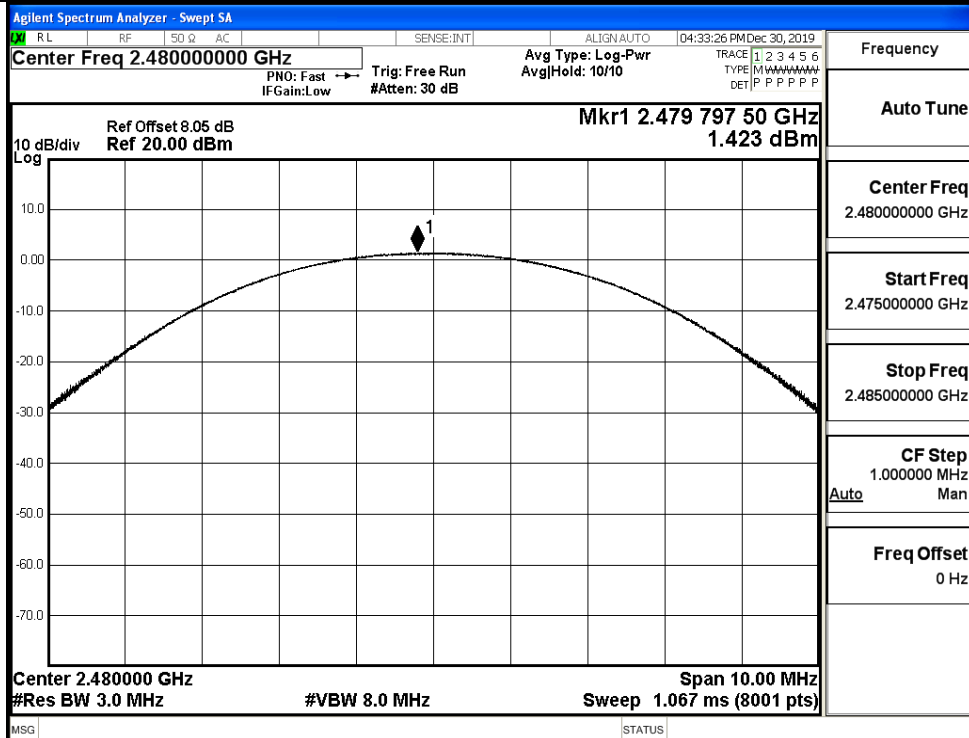


GFSK/MCH

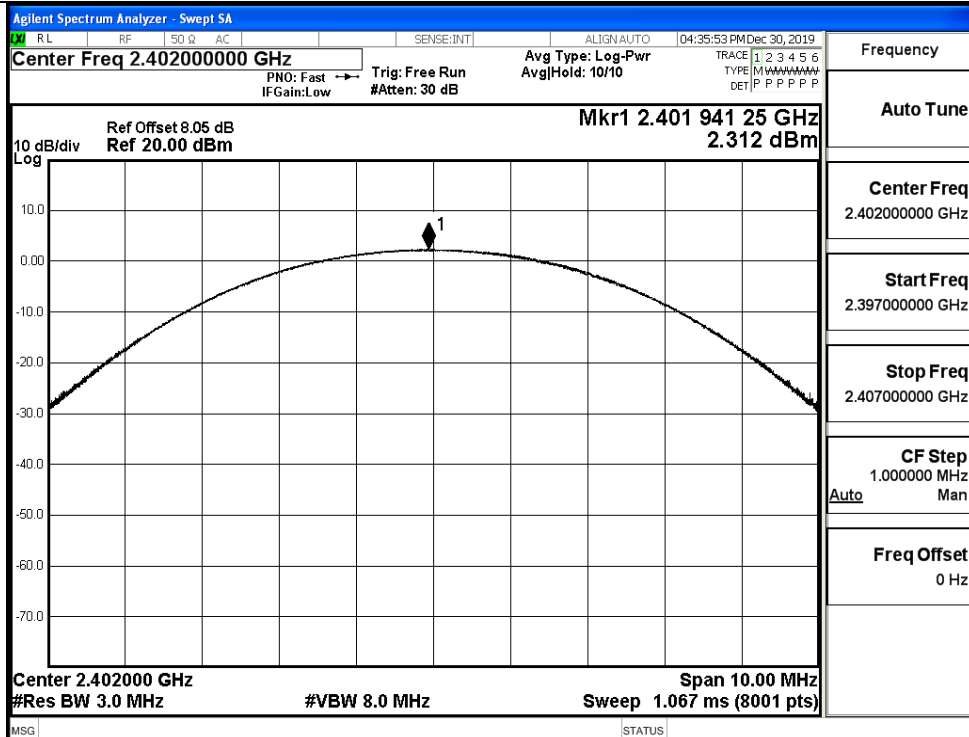


GFSK/HCH

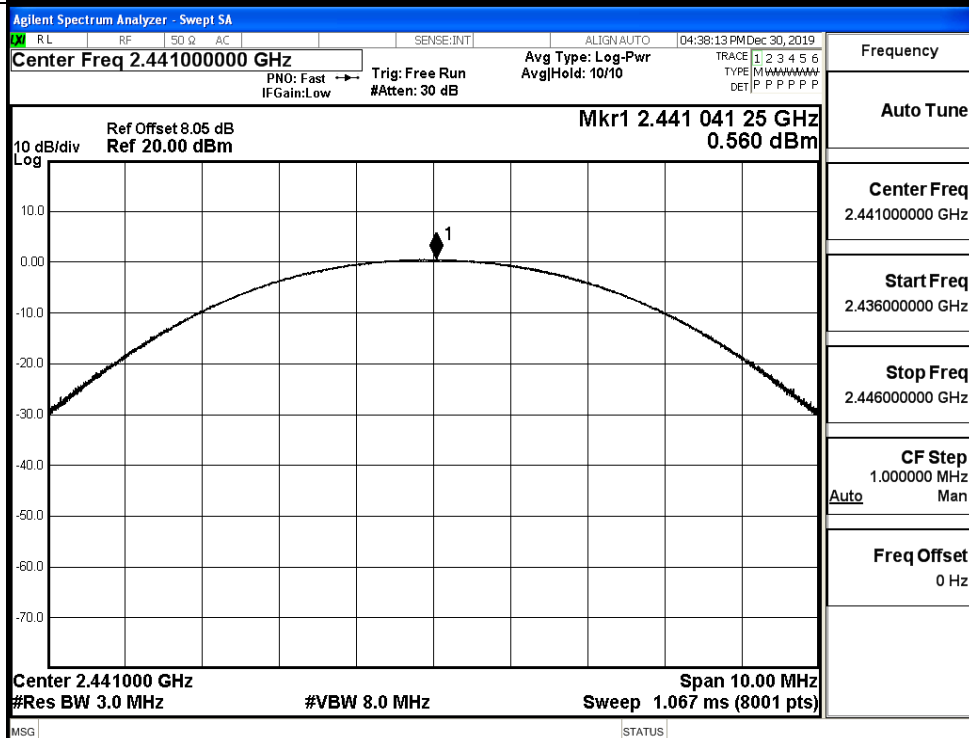
 π /4DQPSK/LCH

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

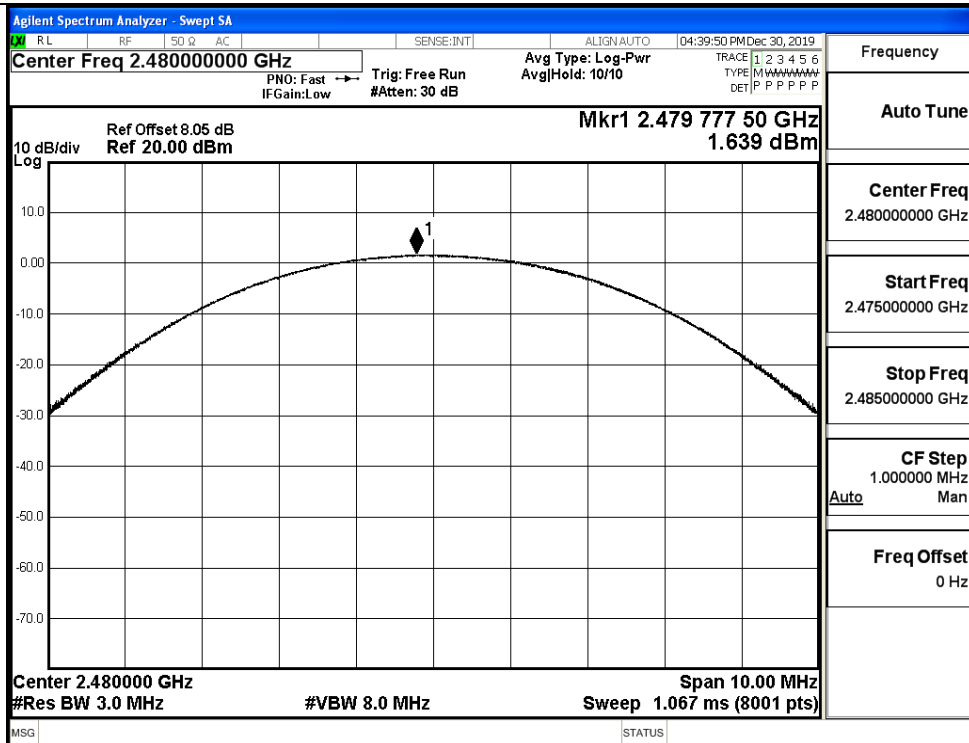
8DPSK/LCH



8DPSK/MCH



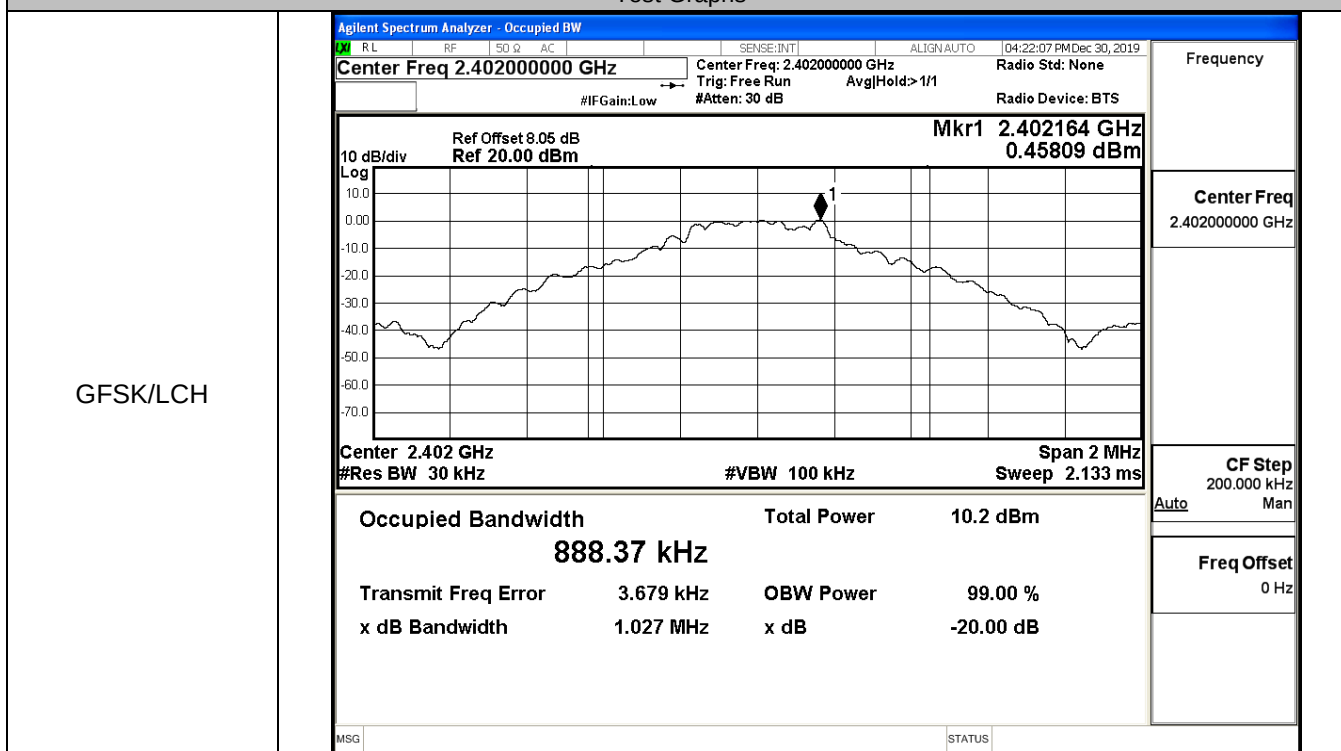
8DPSK/HCH



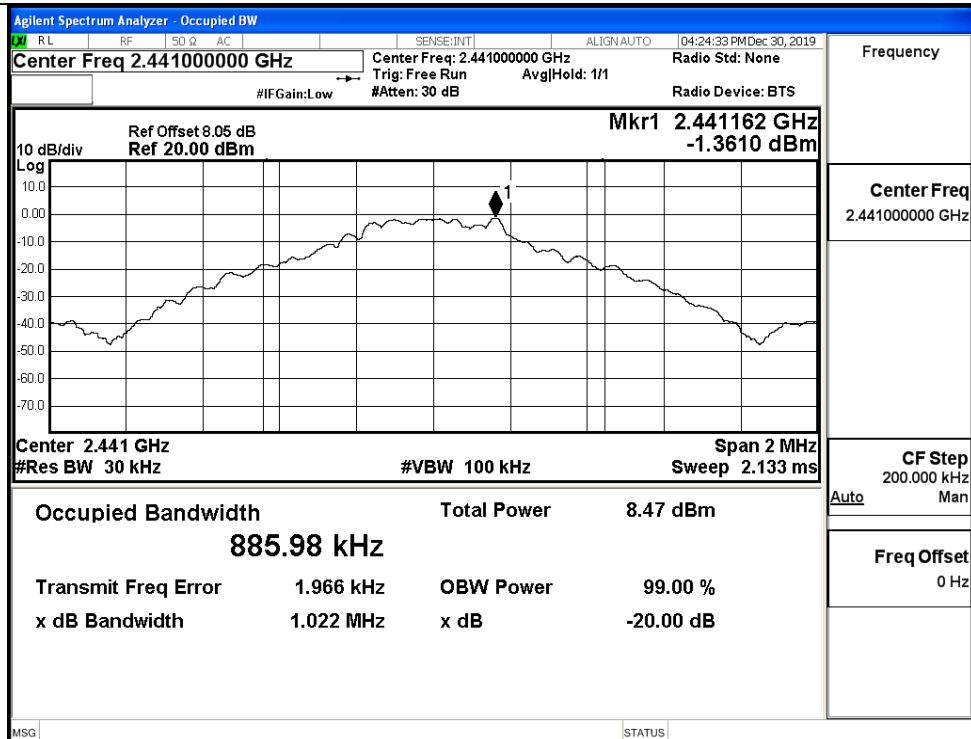
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.027	Not Specified	PASS
	MCH	1.022	Not Specified	PASS
	HCH	1.032	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.289	Not Specified	PASS
	MCH	1.315	Not Specified	PASS
	HCH	1.290	Not Specified	PASS
8DPSK	LCH	1.292	Not Specified	PASS
	MCH	1.298	Not Specified	PASS
	HCH	1.294	Not Specified	PASS

Test Graphs



GFSK/MCH



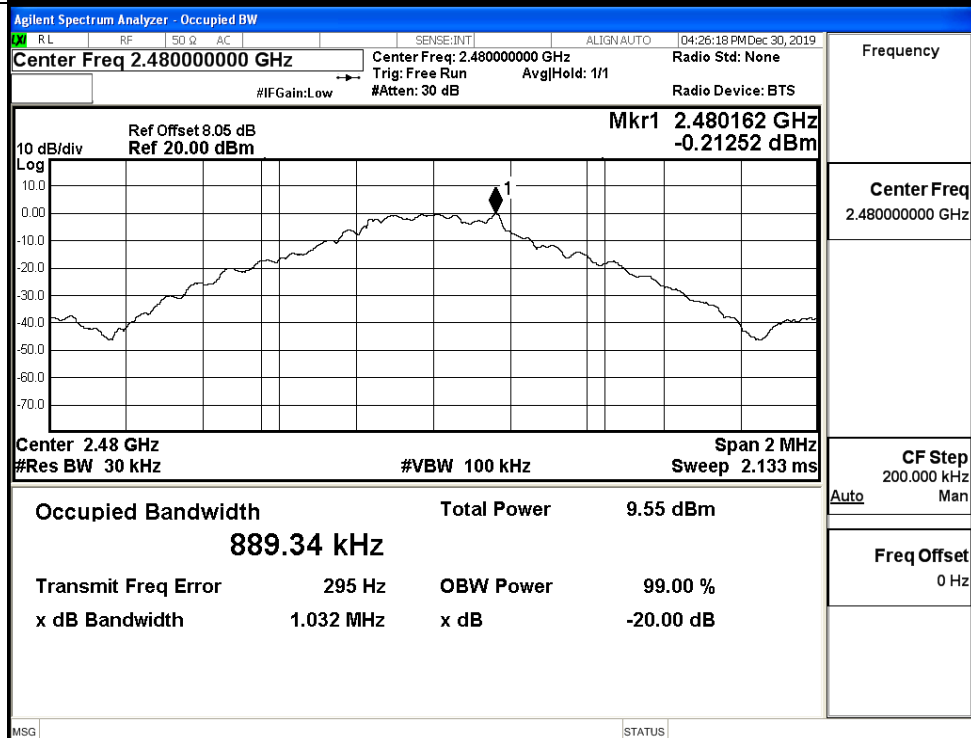
Frequency

Center Freq
2.441000000 GHzCF Step
200.000 kHz
Man

Auto

Freq Offset
0 Hz

GFSK/HCH

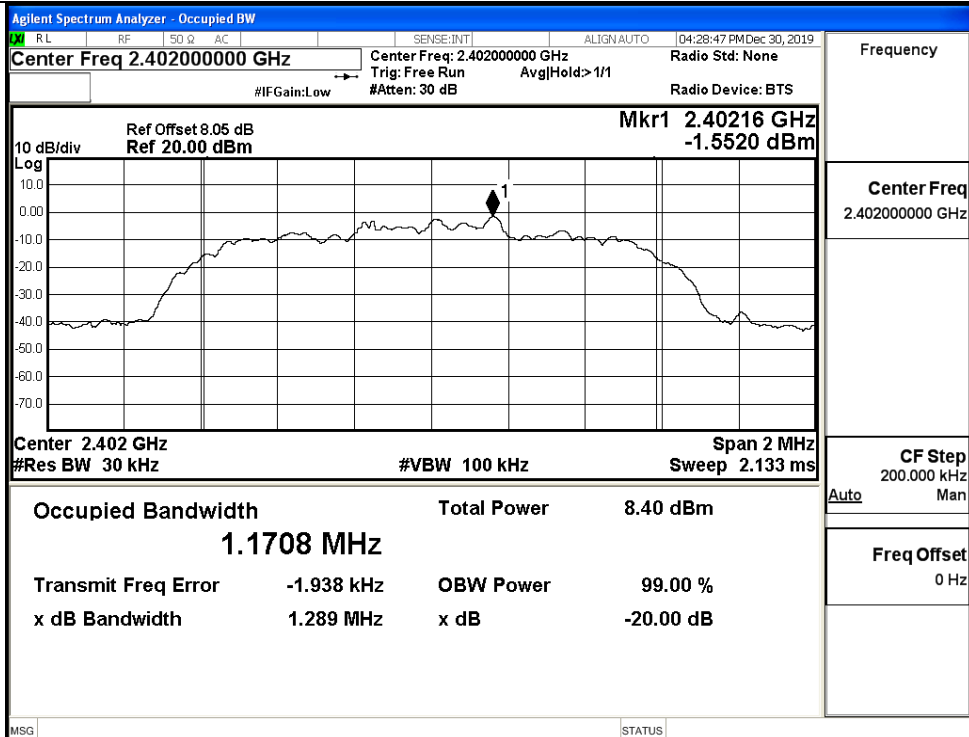
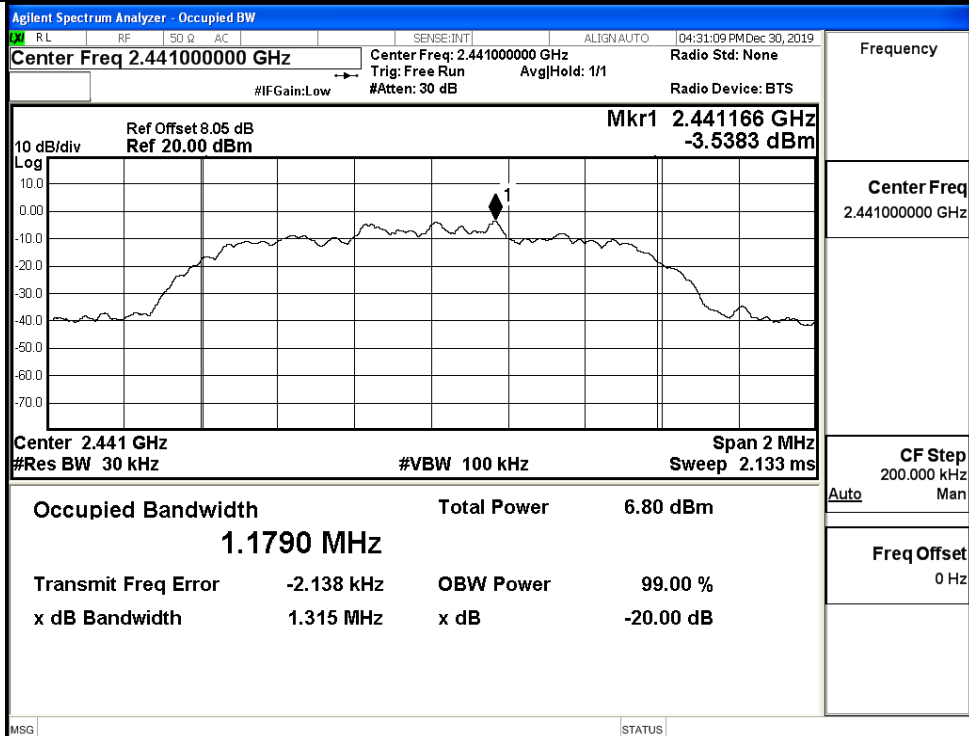


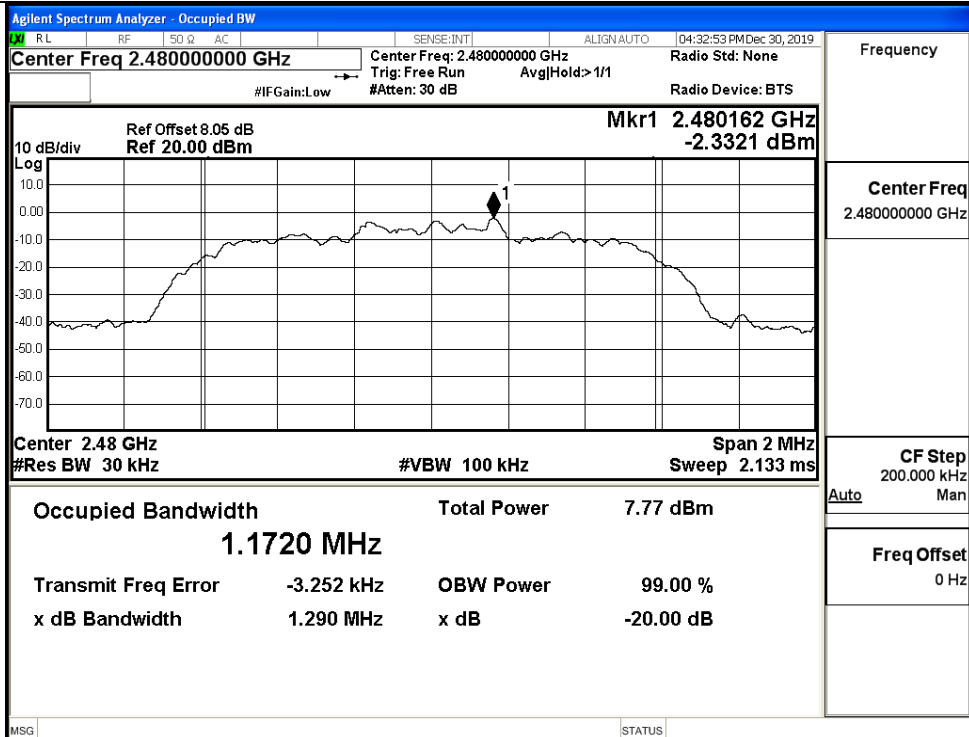
Frequency

Center Freq
2.480000000 GHzCF Step
200.000 kHz
Man

Auto

Freq Offset
0 Hz

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

$\pi/4$ DQPSK/HCH

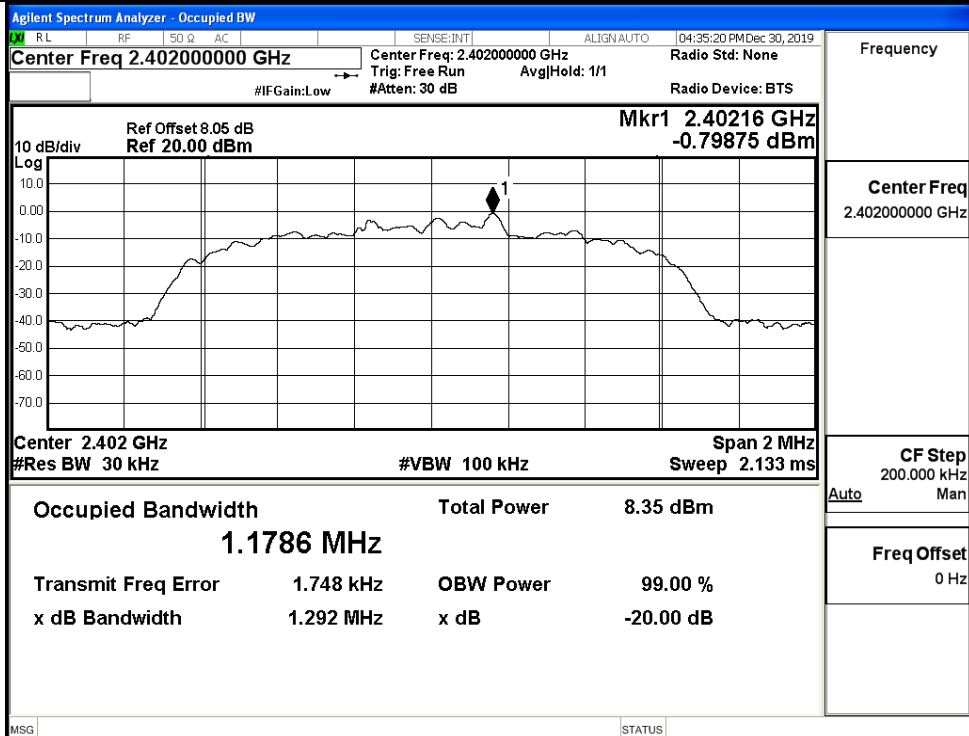
Frequency

Center Freq
2.480000000 GHzCF Step
200.000 kHz
Man

Auto

Freq Offset
0 Hz

8DPSK/LCH



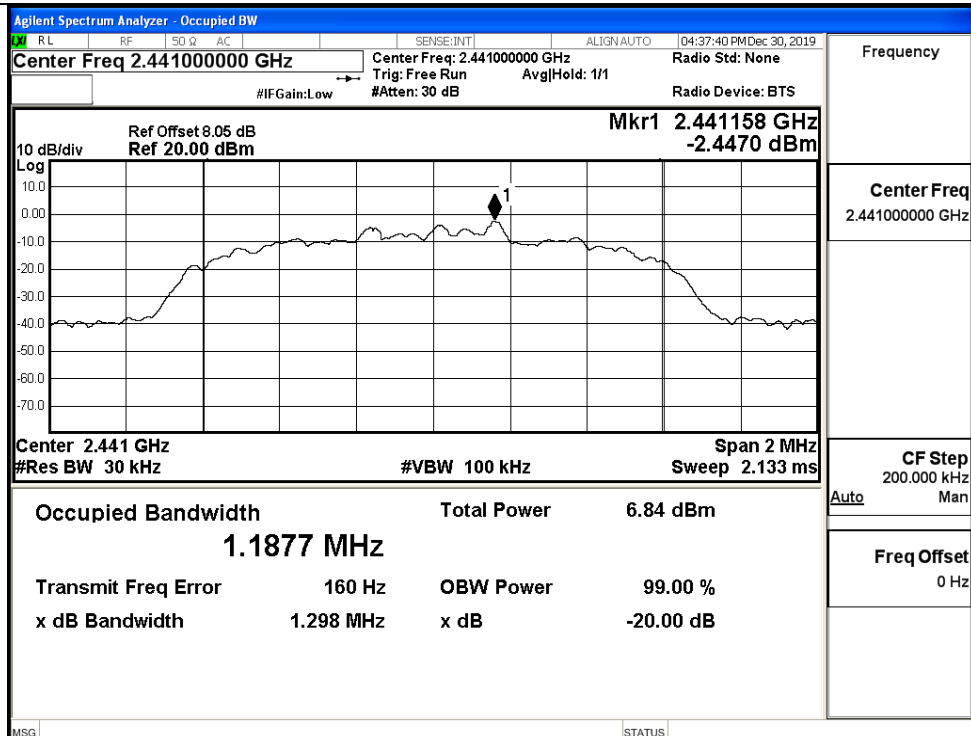
Frequency

Center Freq
2.402000000 GHzCF Step
200.000 kHz
Man

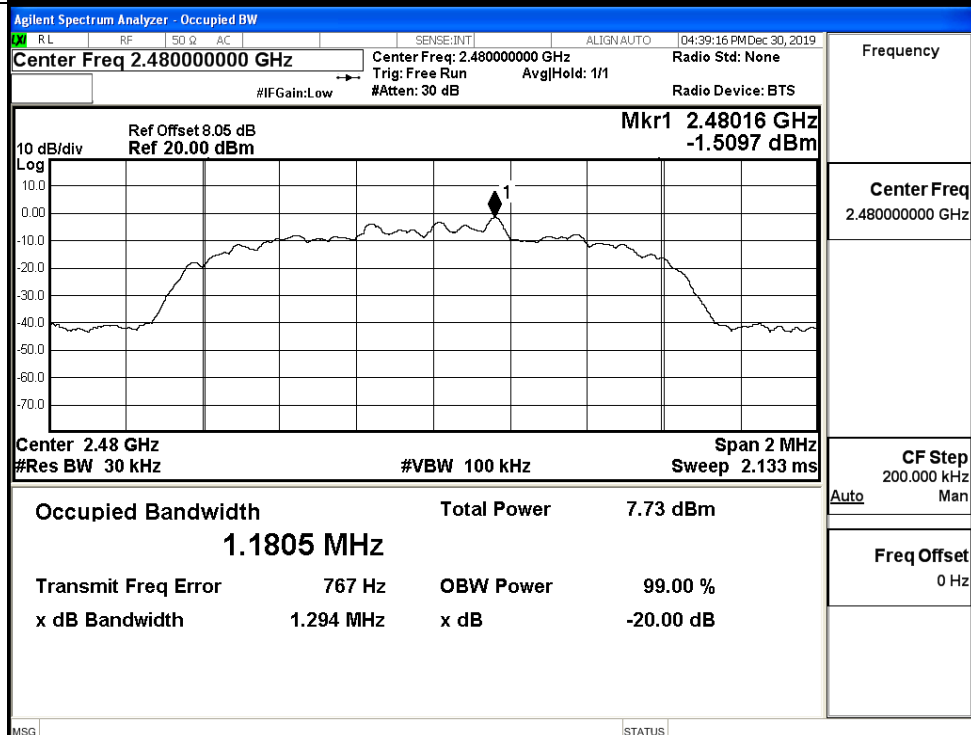
Auto

Freq Offset
0 Hz

8DPSK/MCH



8DPSK/HCH

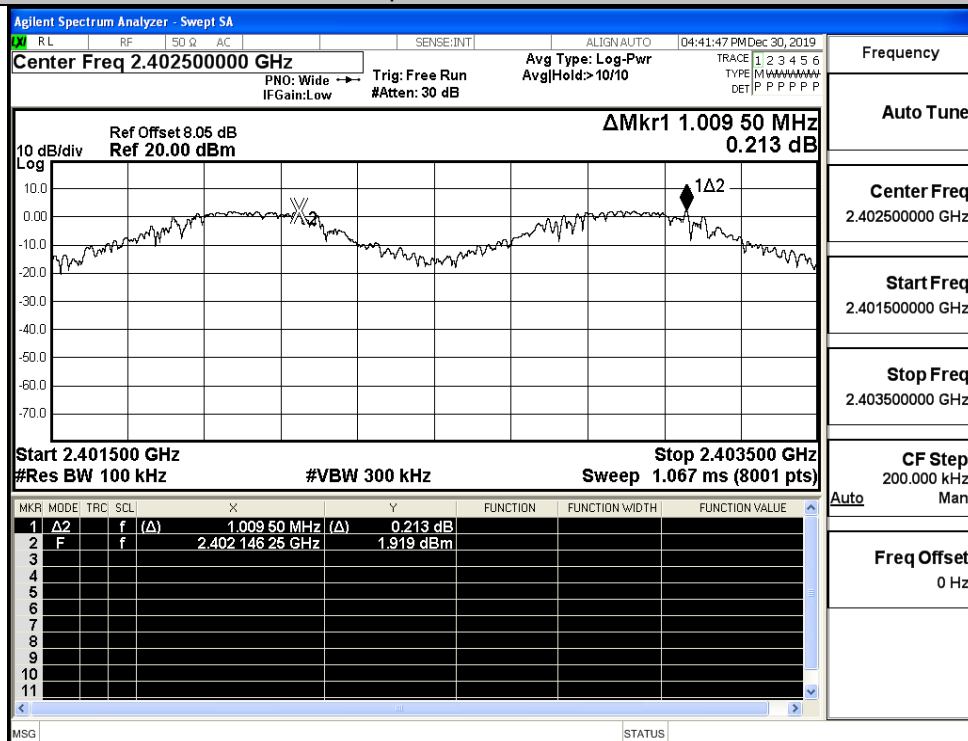


A.3 Carrier Frequency Separation

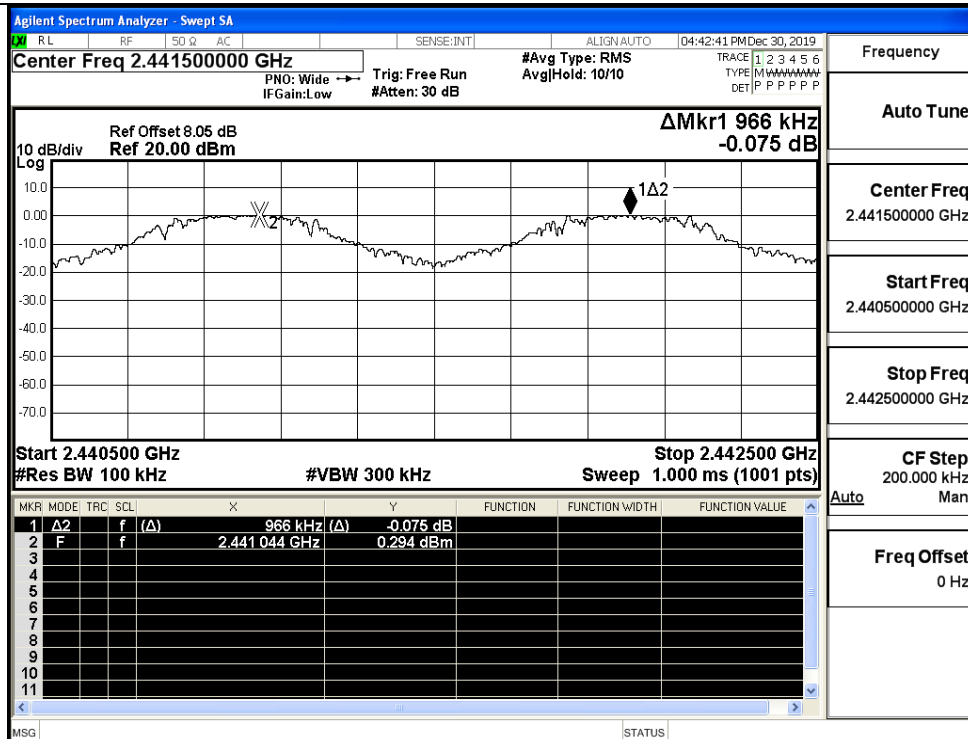
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.010	0.685	PASS
	MCH	0.966	0.681	PASS
	HCH	0.718	0.688	PASS
$\pi/4$ DQPSK	LCH	1.060	0.859	PASS
	MCH	1.124	0.877	PASS
	HCH	1.120	0.860	PASS
8DPSK	LCH	1.298	0.861	PASS
	MCH	1.018	0.865	PASS
	HCH	0.882	0.863	PASS

Test Graphs

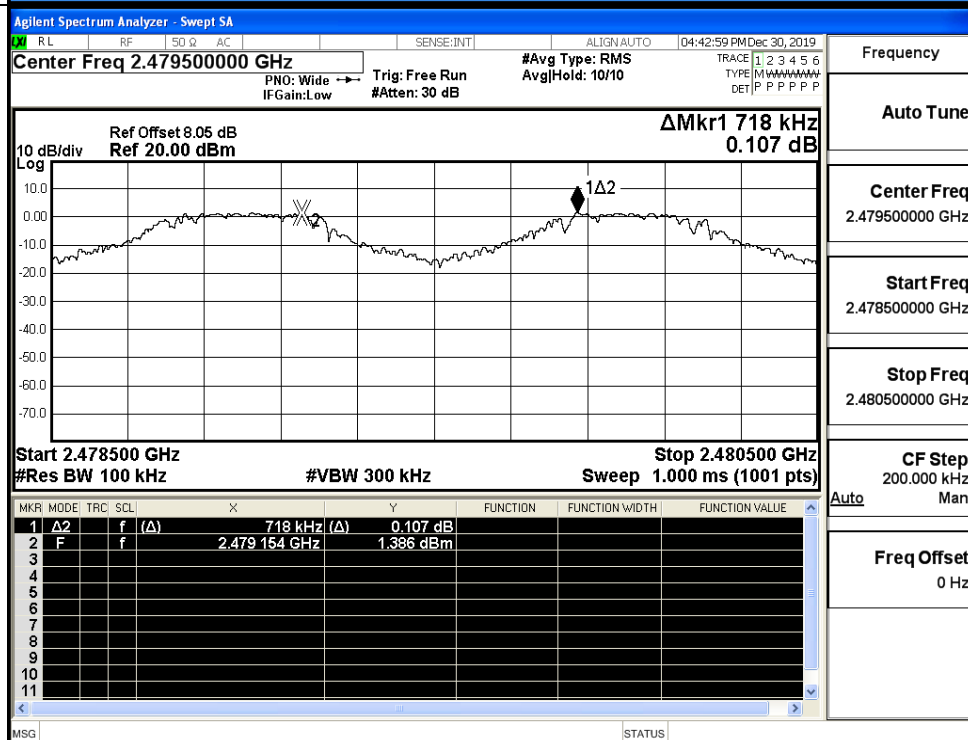
GFSK/LCH

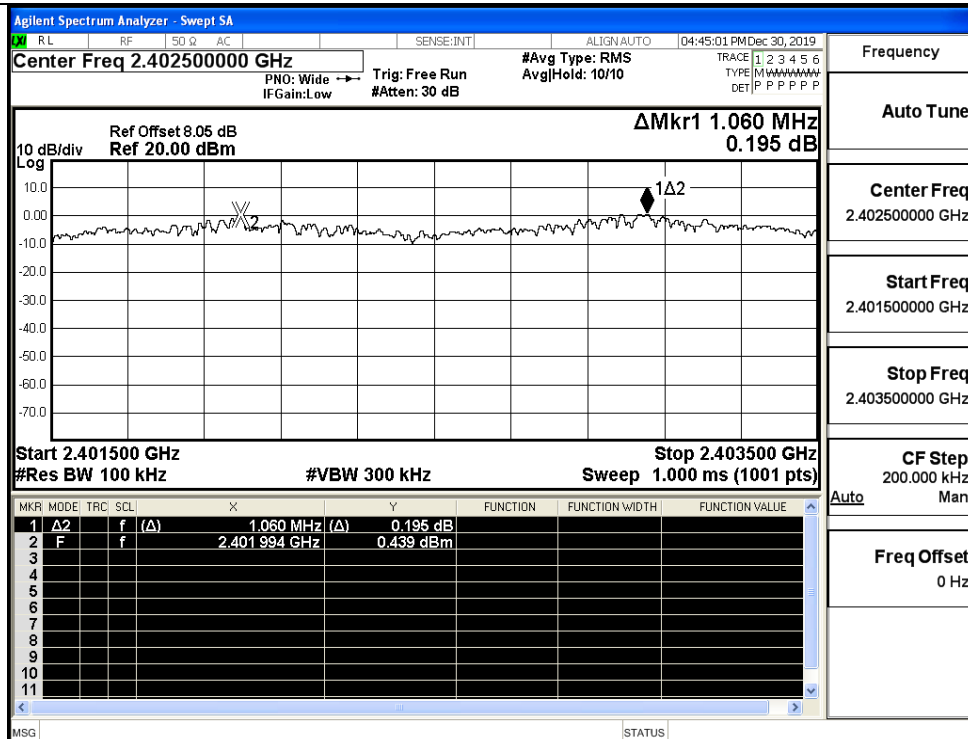
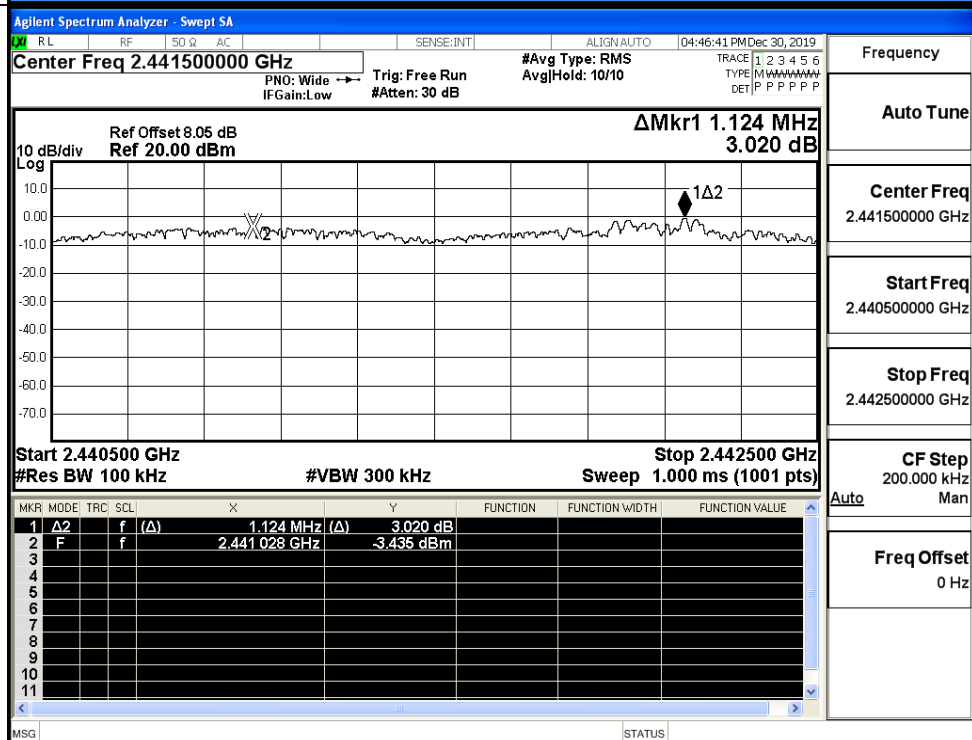


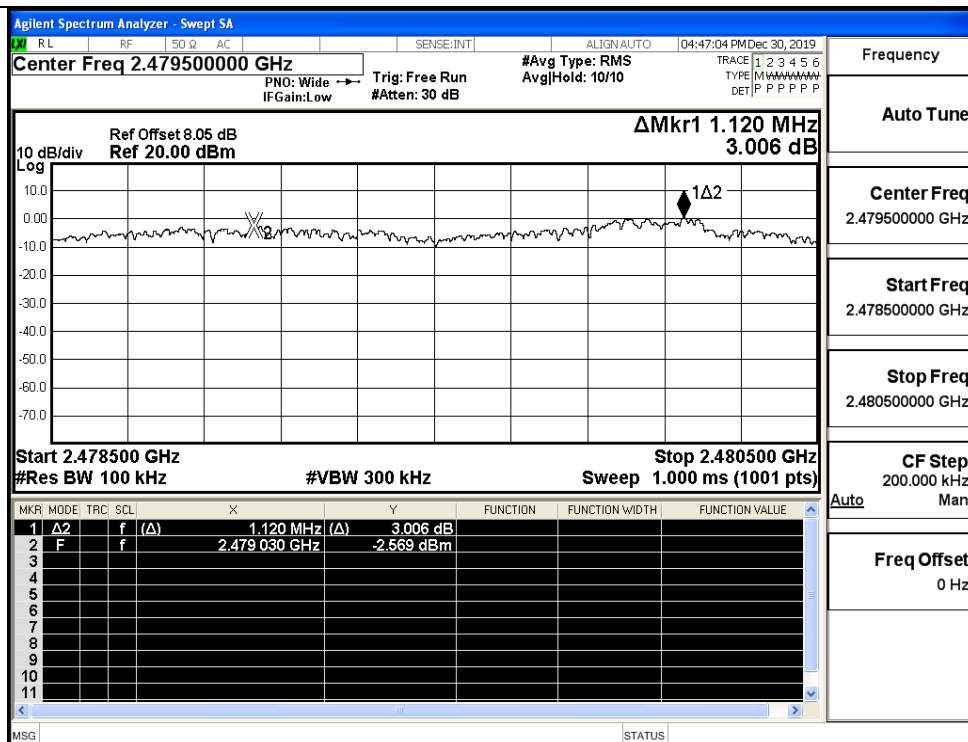
GFSK/MCH



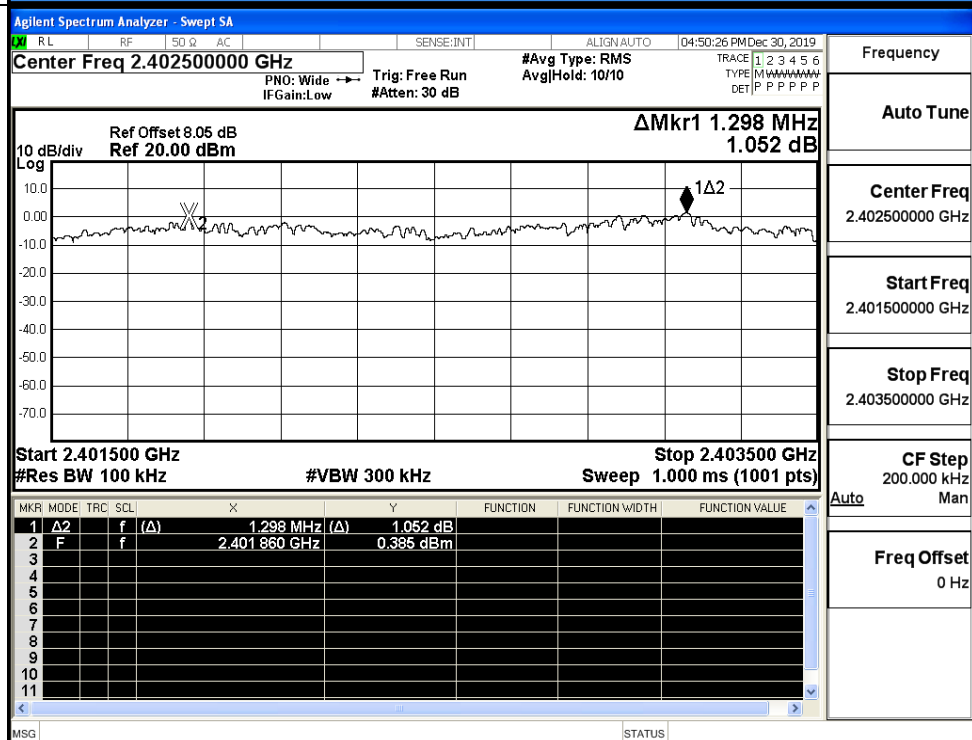
GFSK/HCH



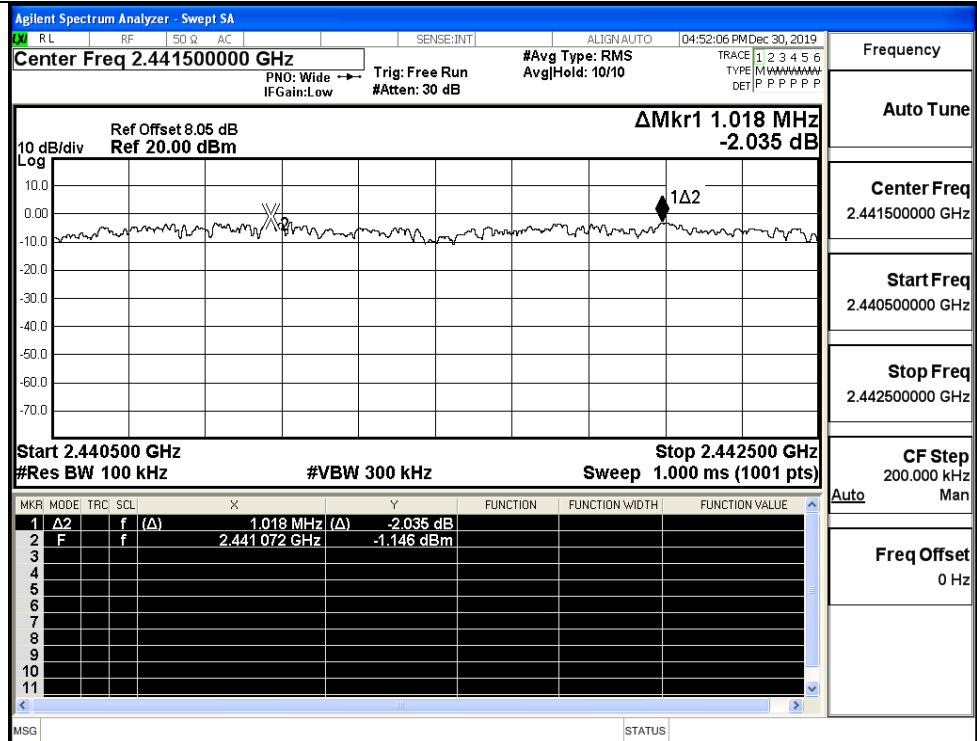
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

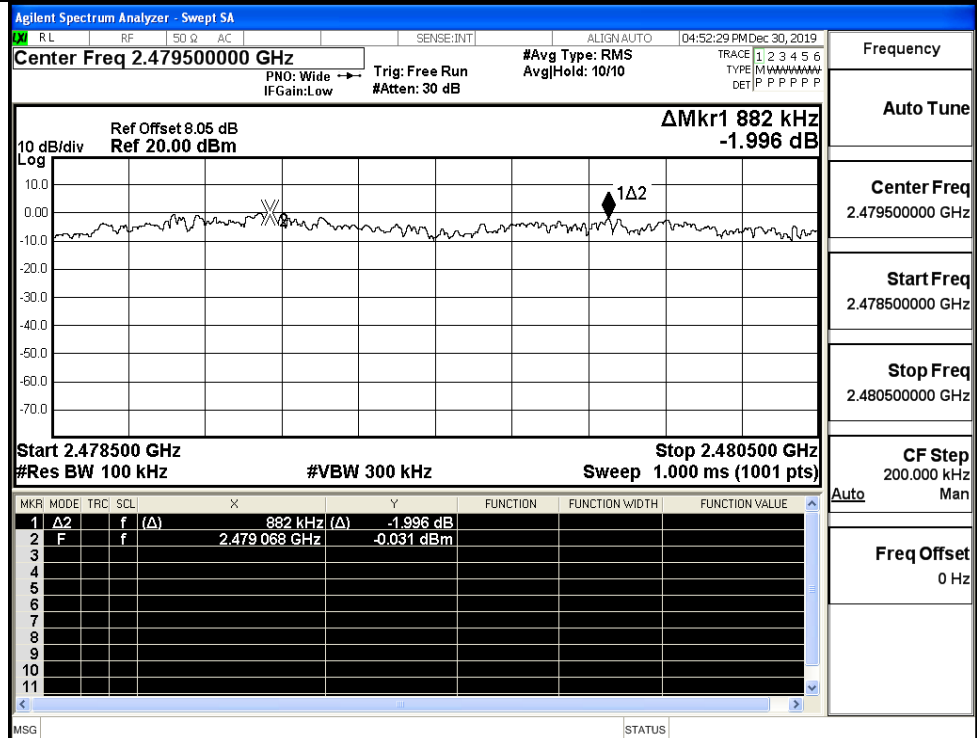
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

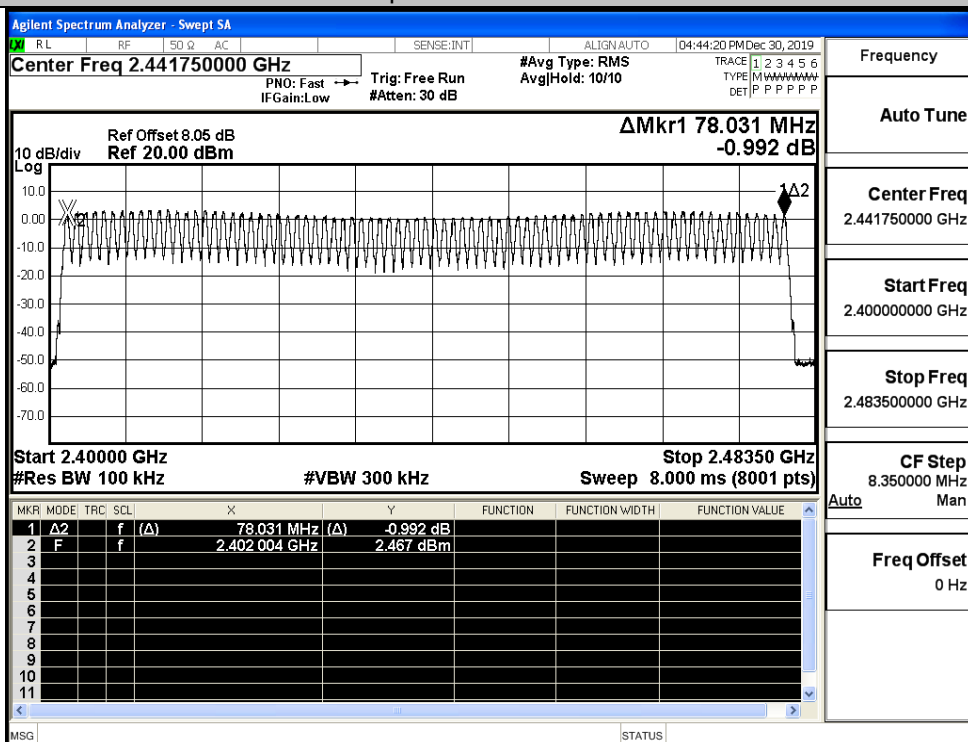


A.4 Hopping Channel Number

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

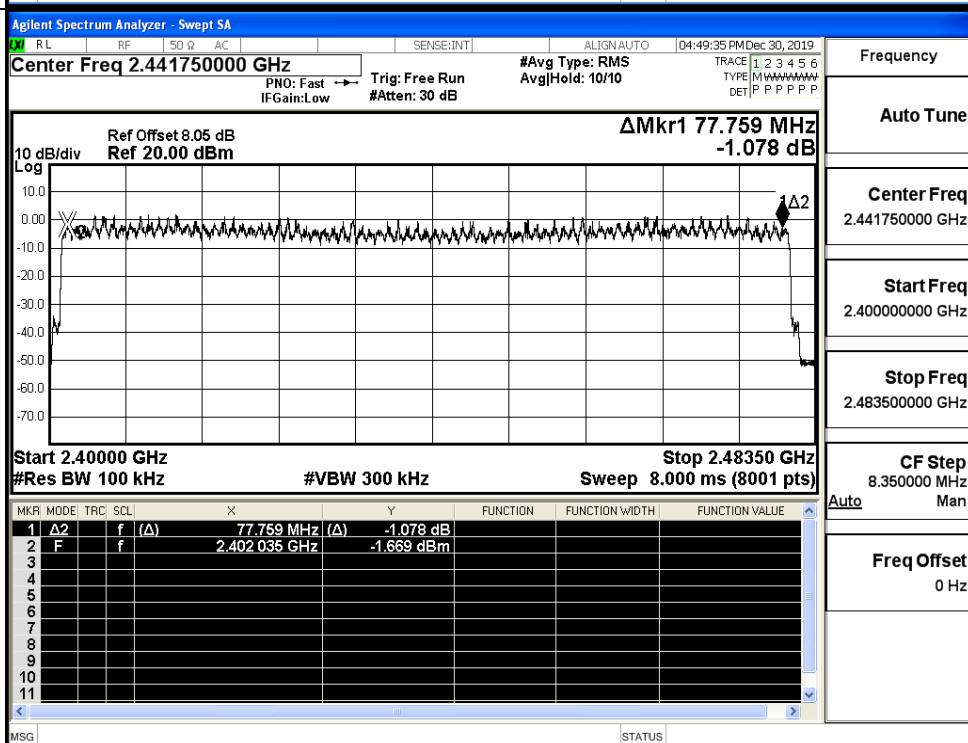
Test Graphs

GFSK/Hop



Frequency

Auto Tune

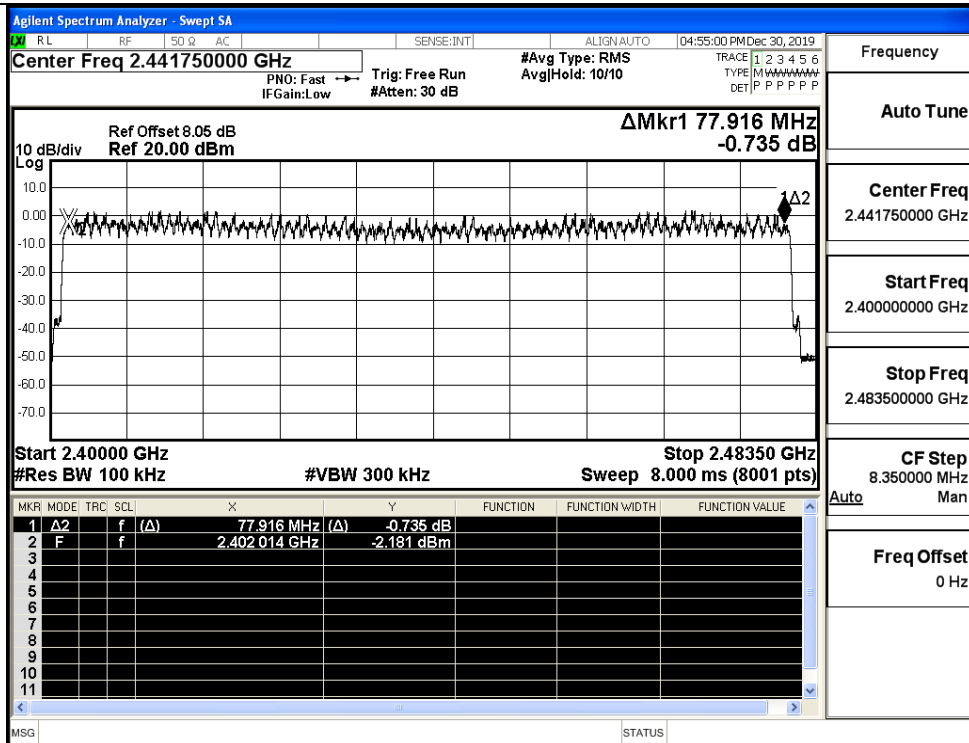
Center Freq
2.441750000 GHzStart Freq
2.400000000 GHzStop Freq
2.483500000 GHzCF Step
8.350000 MHz
ManFreq Offset
0 Hz $\pi/4$ DQPSK/Hop

Frequency

Auto Tune

Center Freq
2.441750000 GHzStart Freq
2.400000000 GHzStop Freq
2.483500000 GHzCF Step
8.350000 MHz
ManFreq Offset
0 Hz

8DPSK/Hop

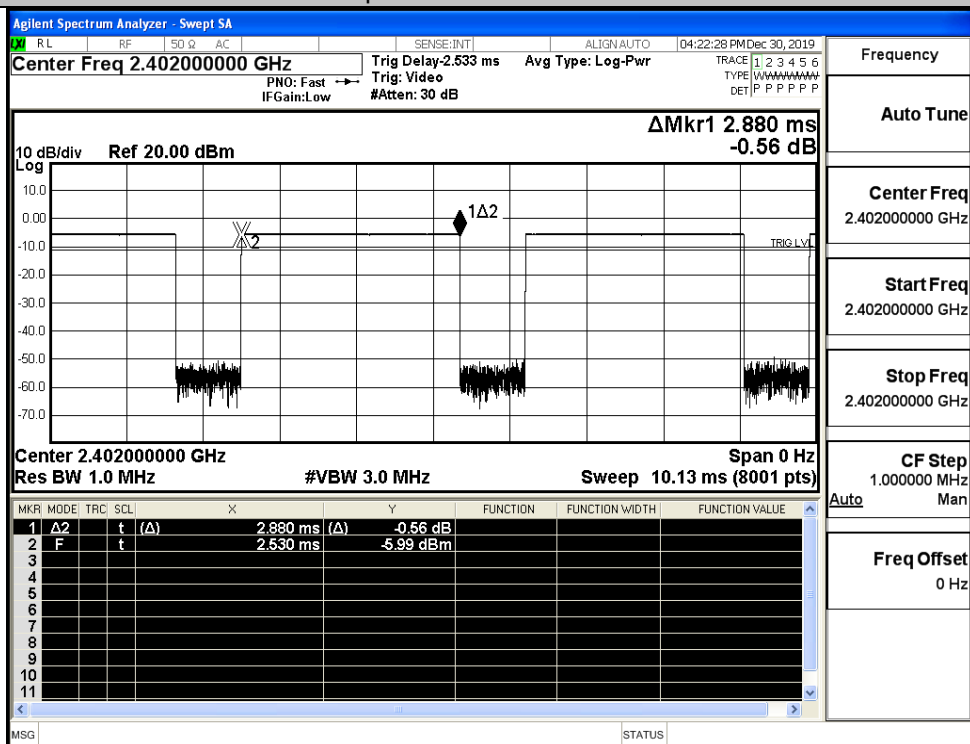


A.5 Dwell Time

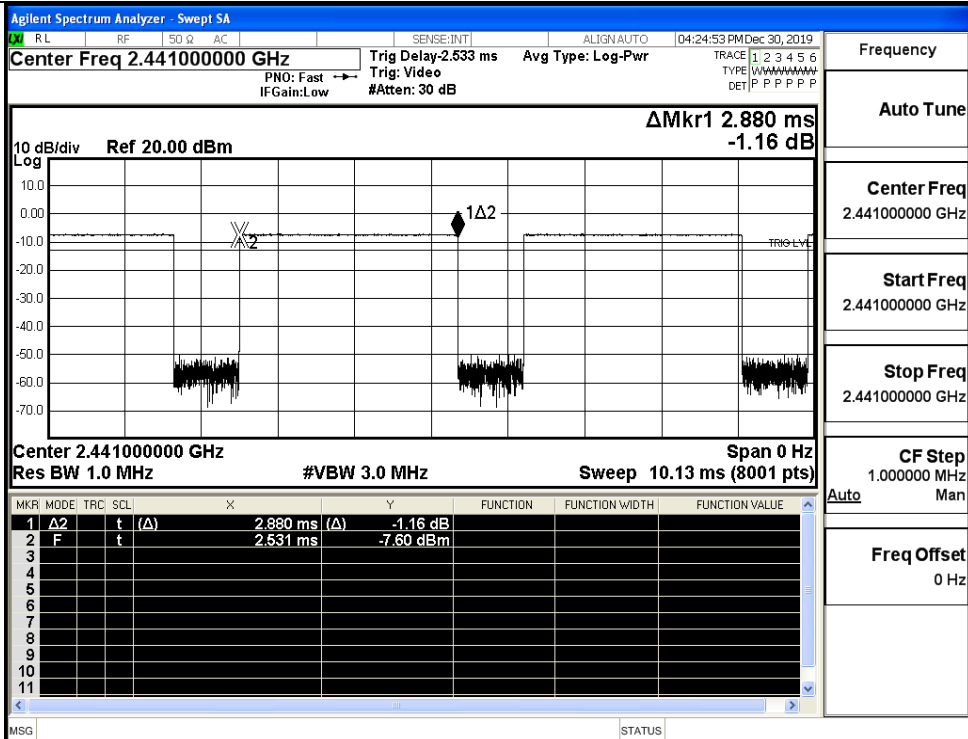
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88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

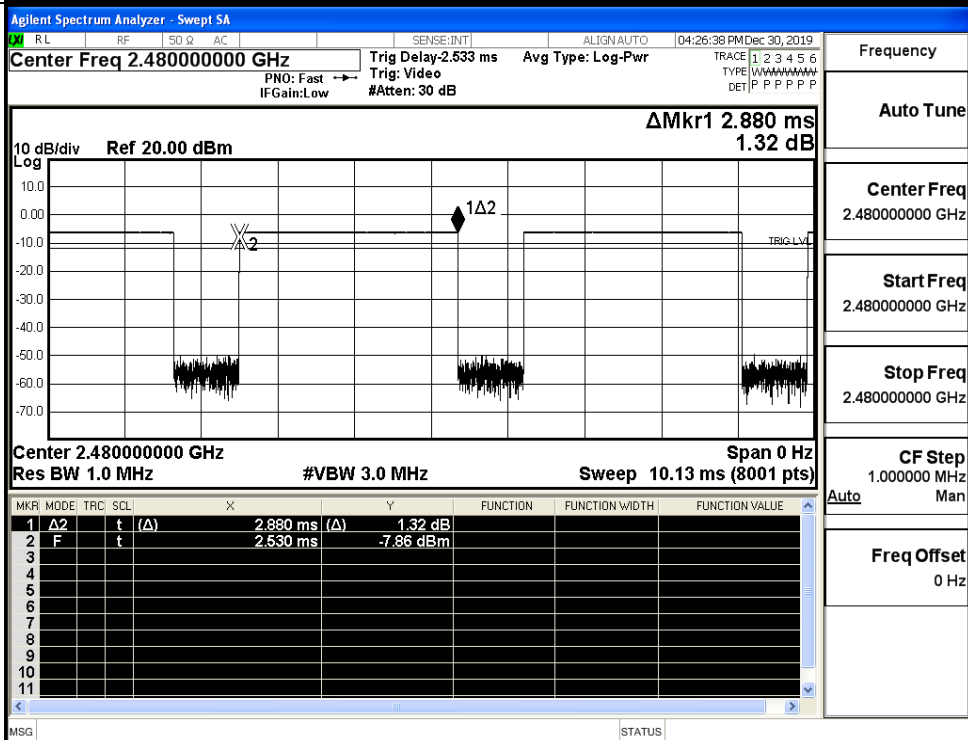
GFSK_DH5/LCH



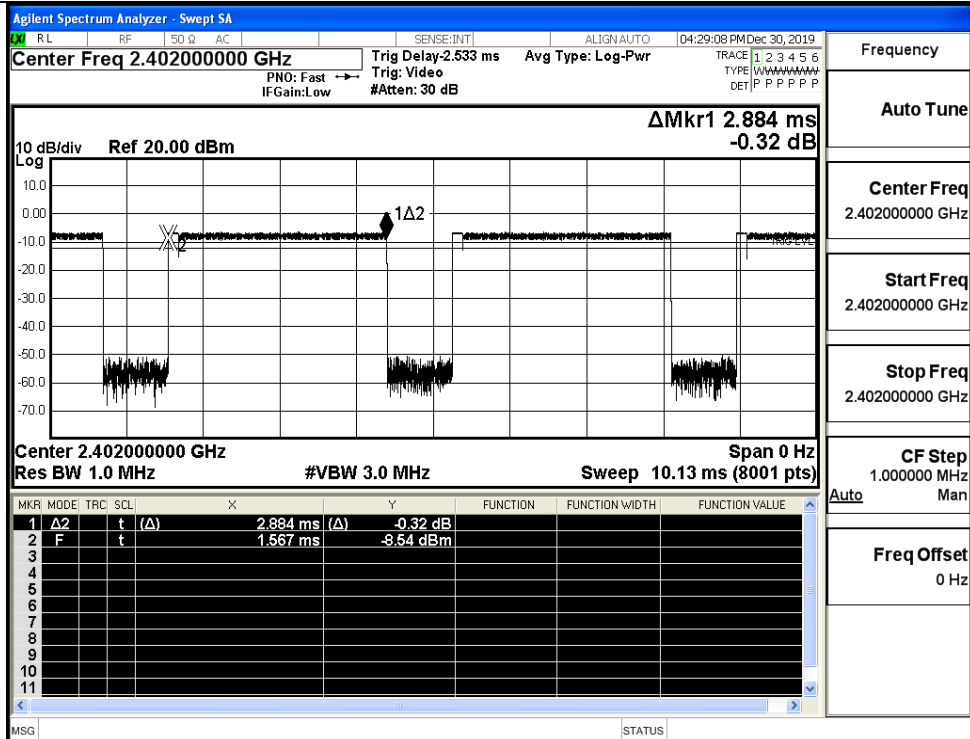
GFSK_DH5/MCH



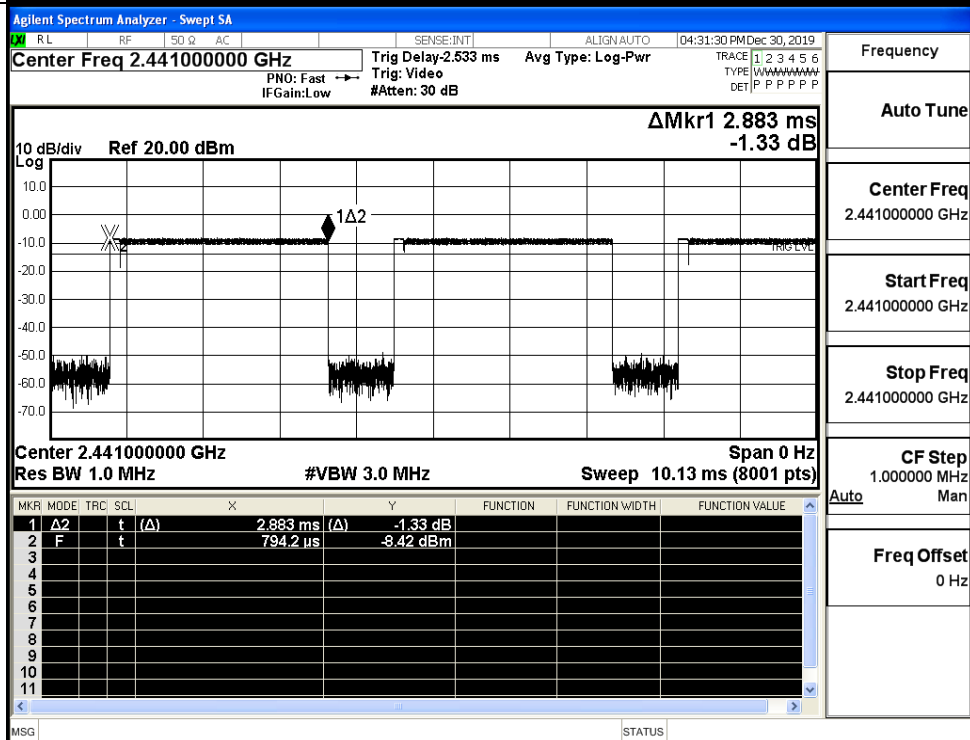
GFSK_DH5/HCH



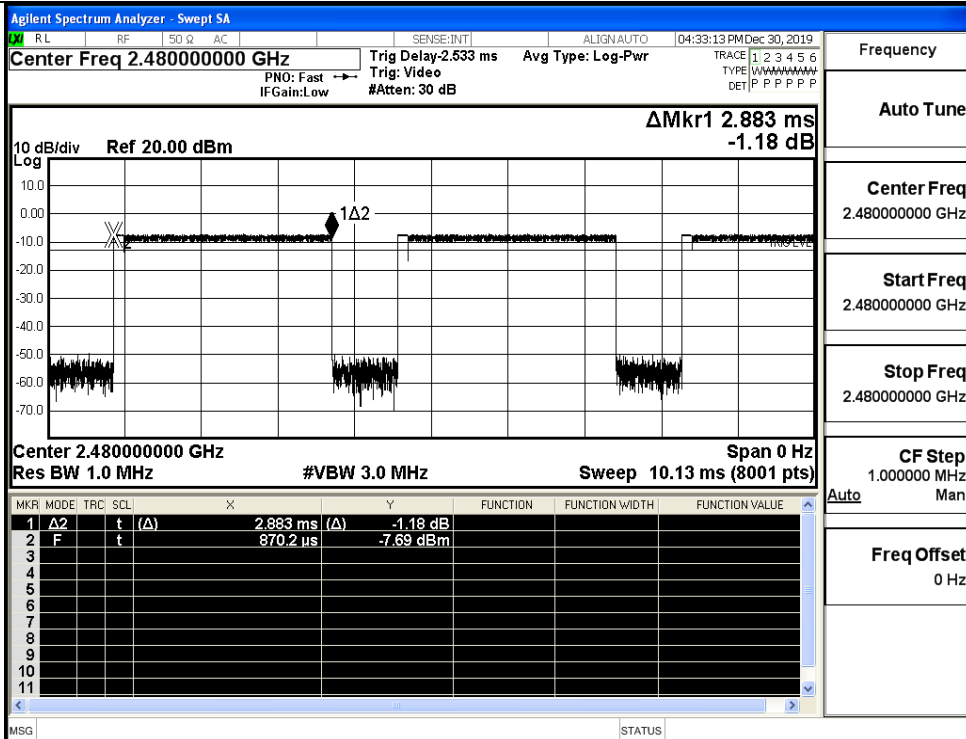
$\pi/4$ DQPSK
_2DH5/LCH



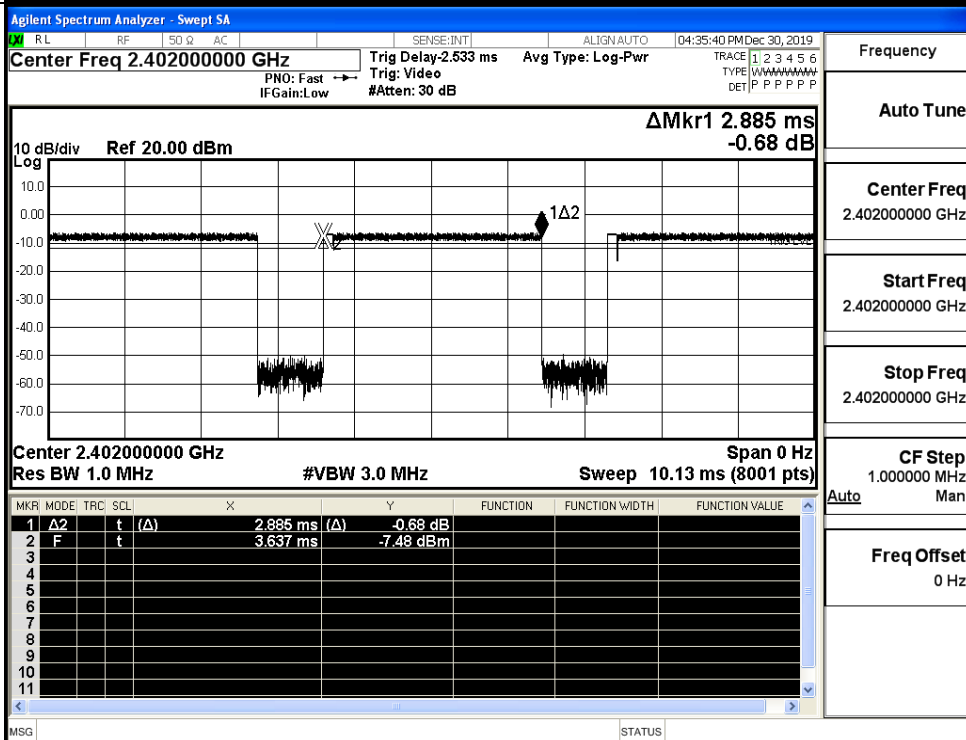
$\pi/4$ DQPSK
_2DH5/MCH



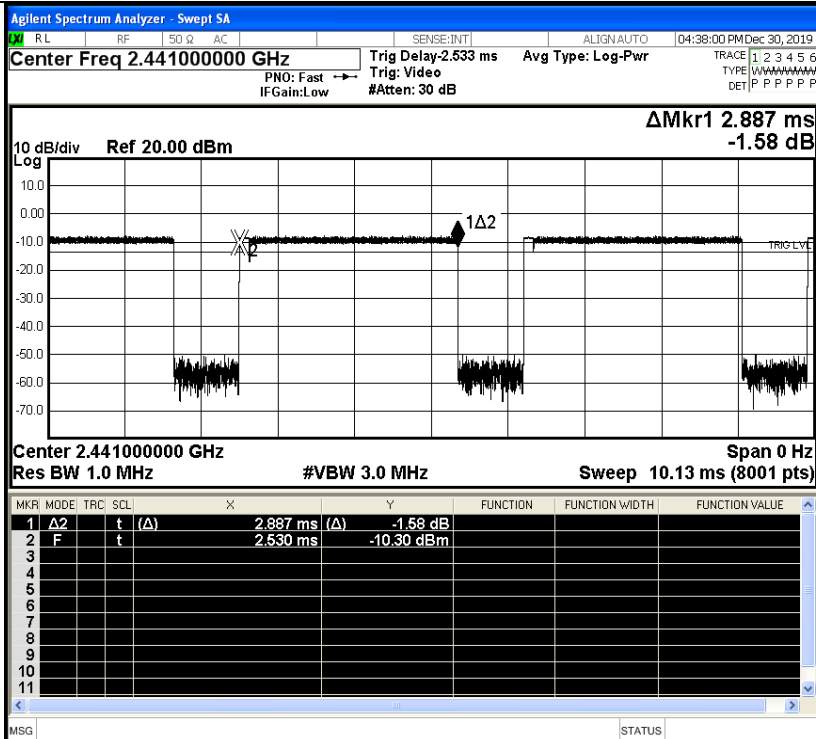
$\pi/4$ DQPSK
_2DH5/HCH



8DPSK _3DH5/LCH



8DPSK_3DH5/MCH

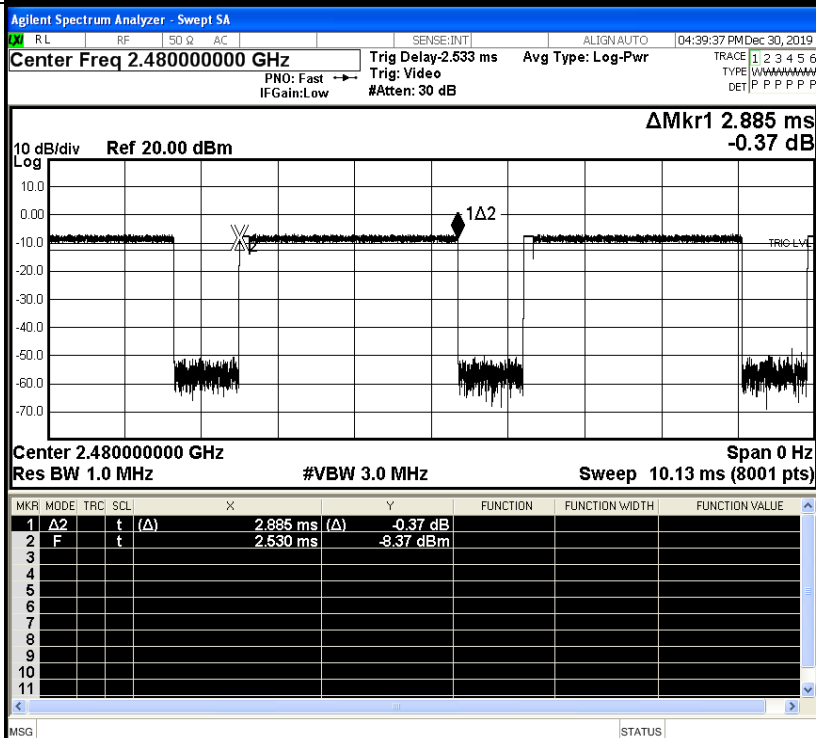


Frequency

Auto Tune

Center Freq
2.441000000 GHzStart Freq
2.441000000 GHzStop Freq
2.441000000 GHzCF Step
1.000000 MHz
Auto ManFreq Offset
0 Hz

8DPSK_3DH5/HCH



Frequency

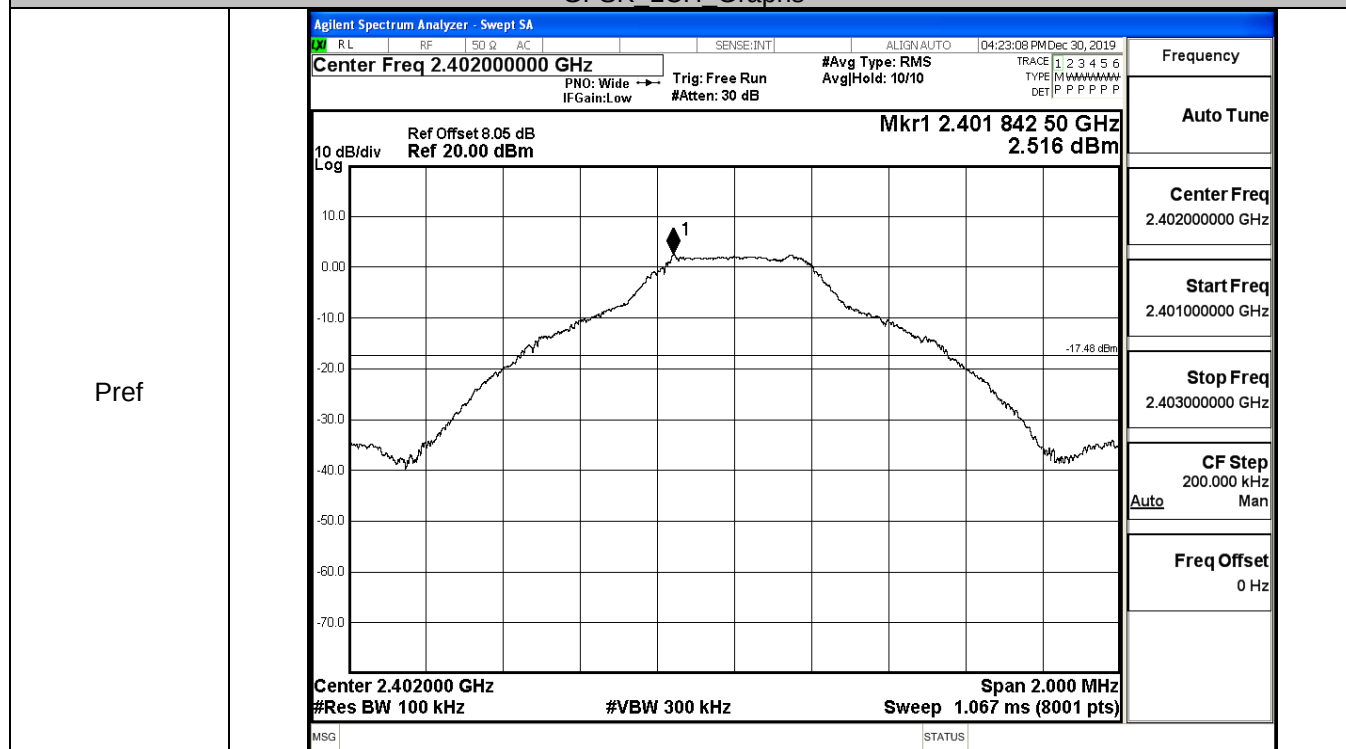
Auto Tune

Center Freq
2.480000000 GHzStart Freq
2.480000000 GHzStop Freq
2.480000000 GHzCF Step
1.000000 MHz
Auto ManFreq Offset
0 Hz

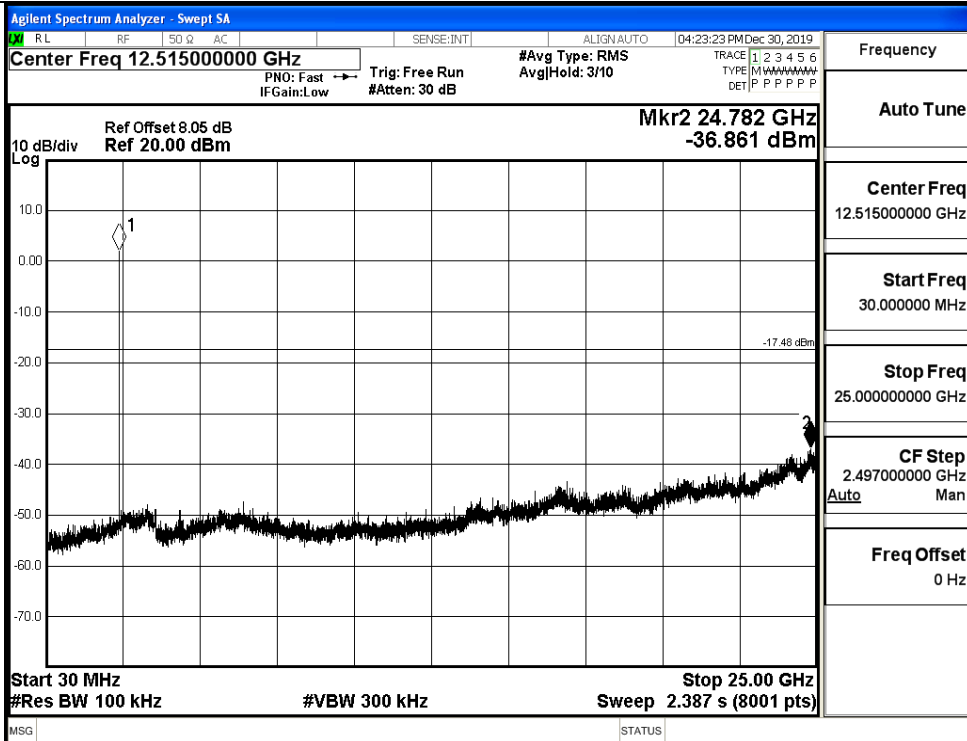
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2.516	-36.861	-17.484	PASS
	MCH	0.757	-37.396	-19.243	PASS
	HCH	1.84	-36.961	-18.160	PASS
$\pi/4$ DQPSK	LCH	0.68	-37.652	-19.320	PASS
	MCH	-0.344	-35.829	-20.344	PASS
	HCH	0.61	-38.061	-19.390	PASS
8DPSK	LCH	1.29	-37.507	-18.710	PASS
	MCH	-0.402	-36.927	-20.402	PASS
	HCH	0.531	-37.425	-19.469	PASS

GFSK LCH Graphs

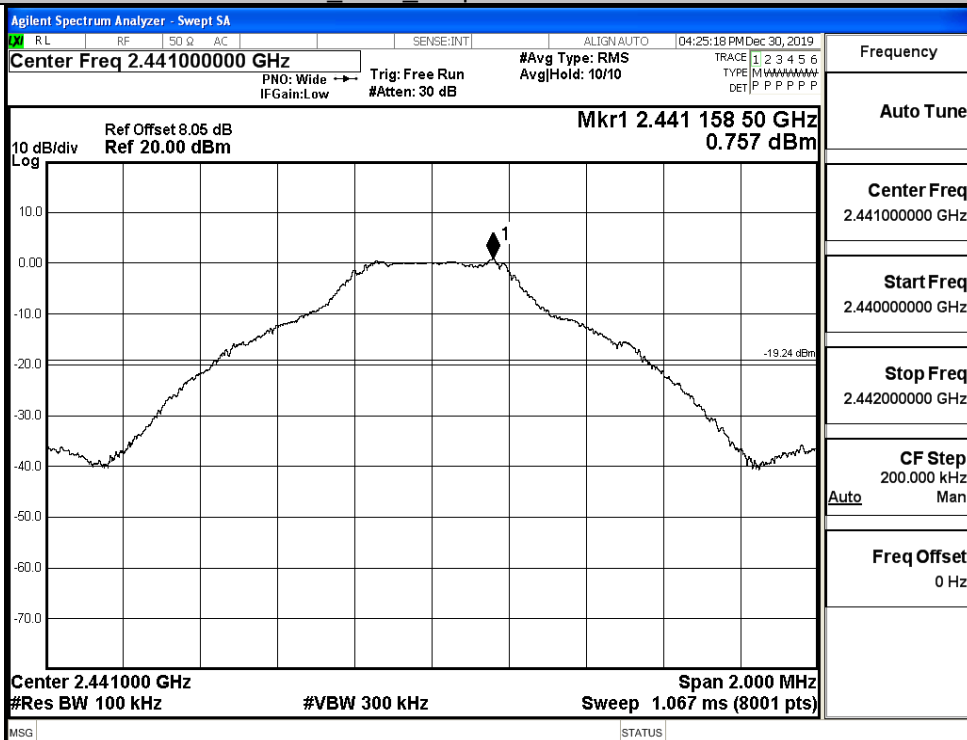


Puw

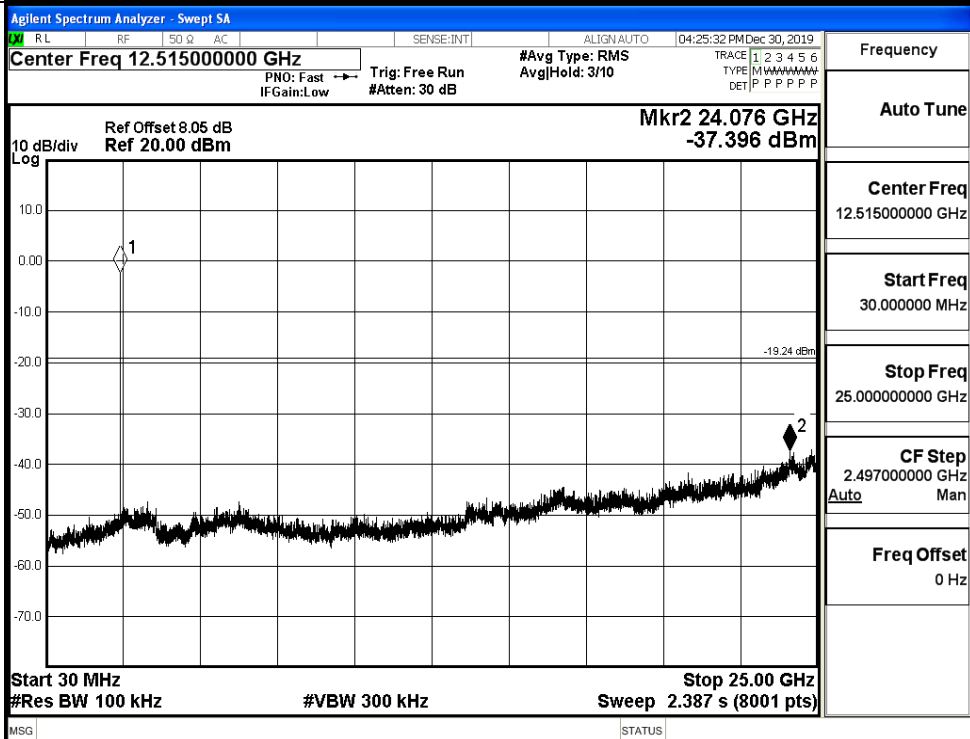


GFSK_MCH_Graphs

Pref

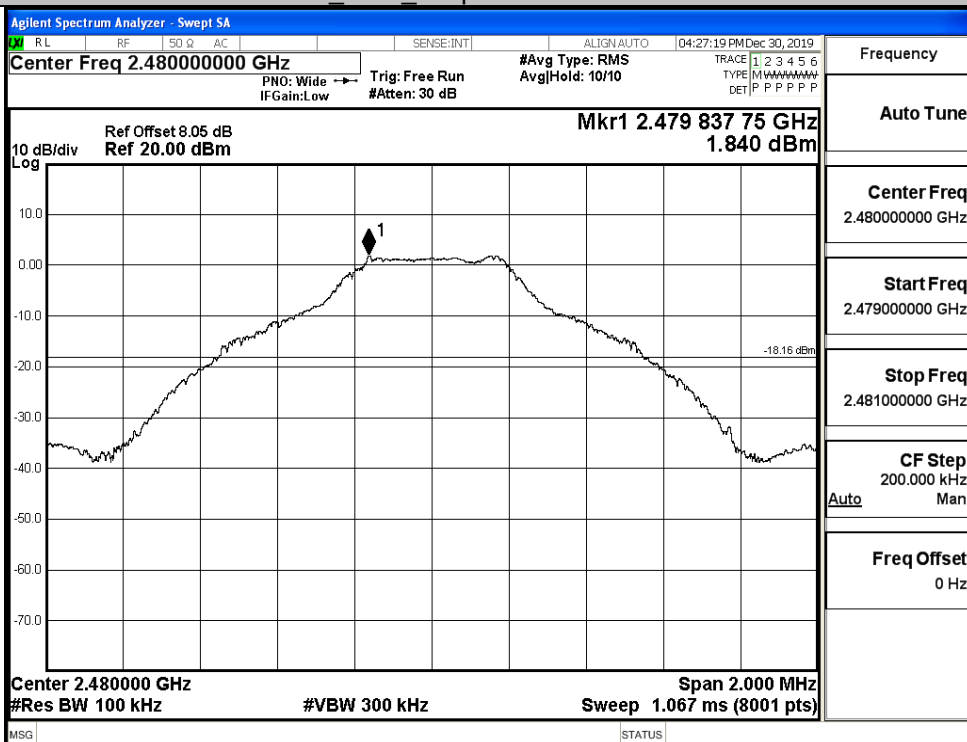


Puw

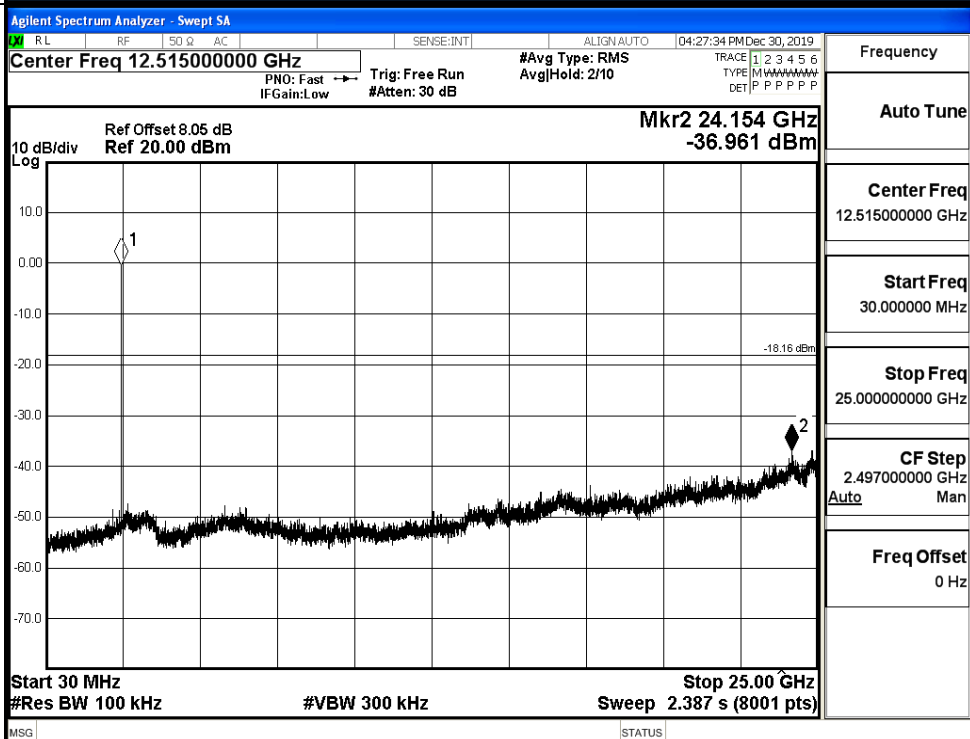


GFSK HCH_Graphs

Pref

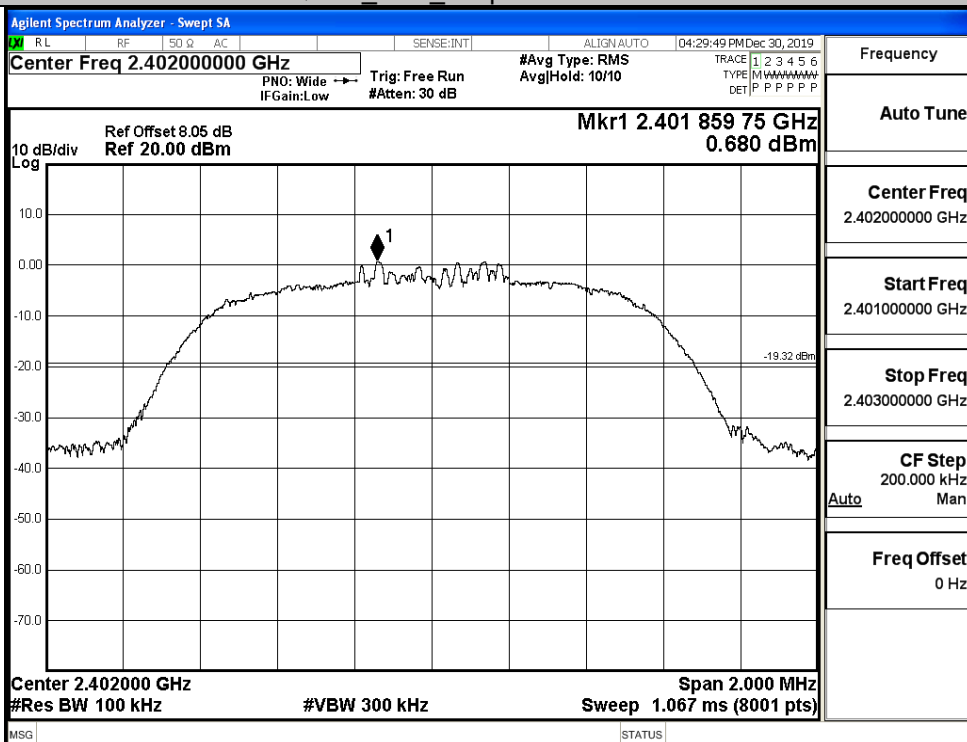


Puw

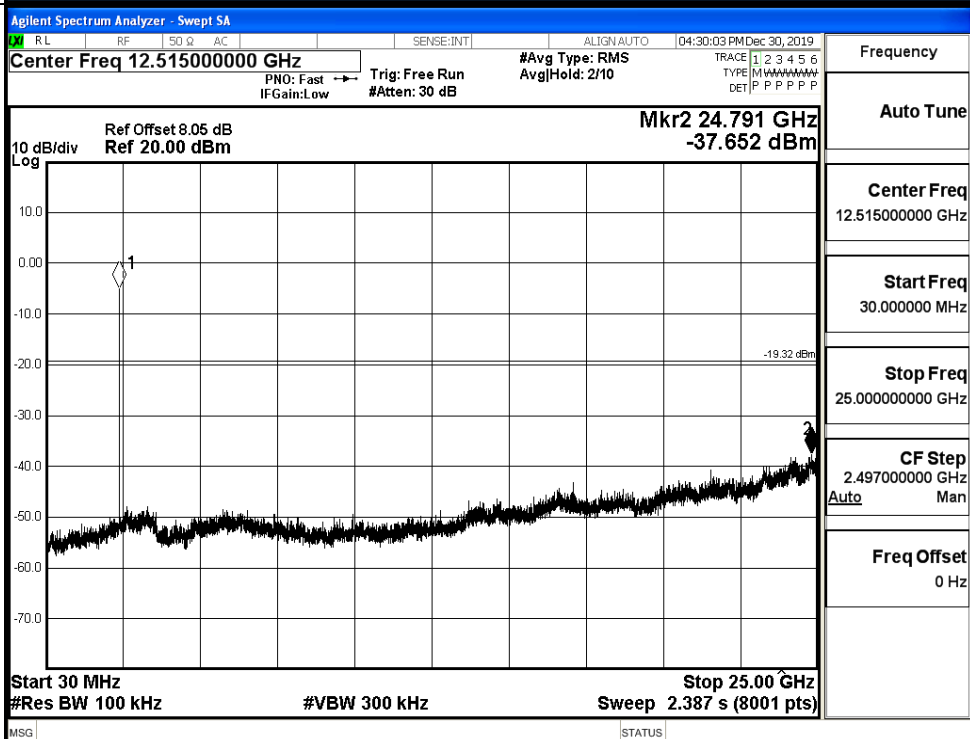


π /4DQPSK_LCH_Graphs

Pref

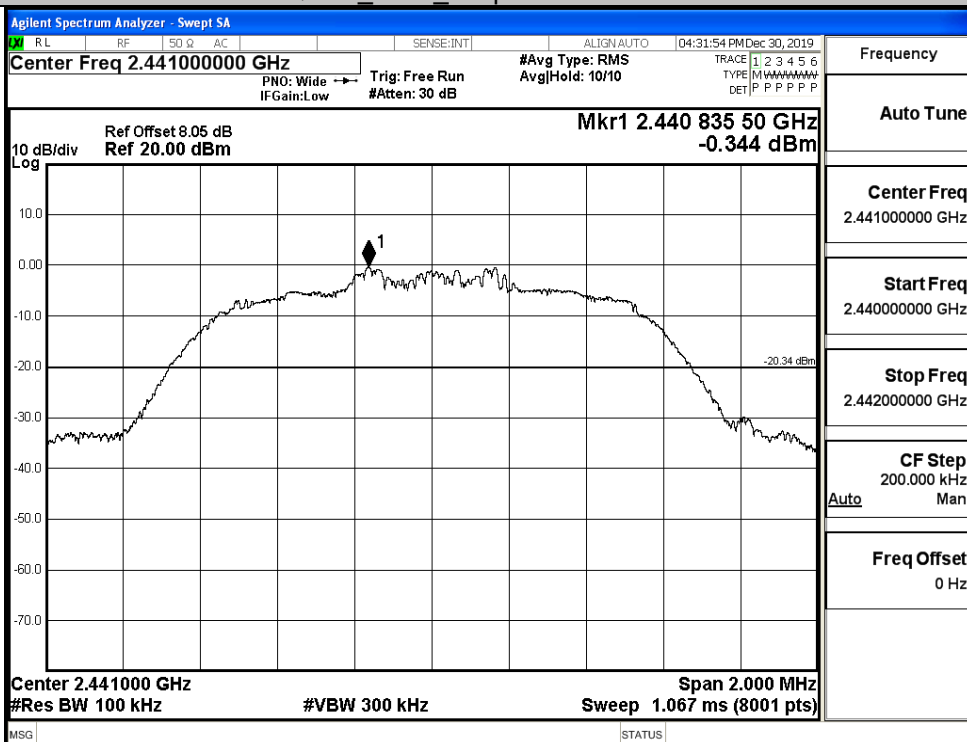


Puw

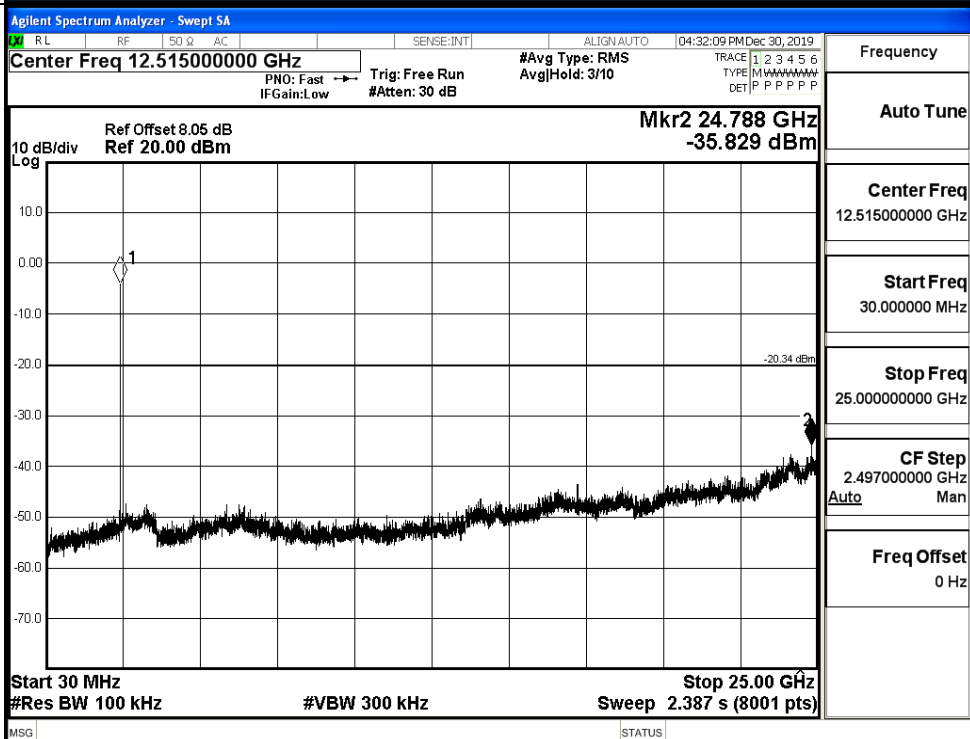


π /4DQPSK_MCH_Graphs

Pref

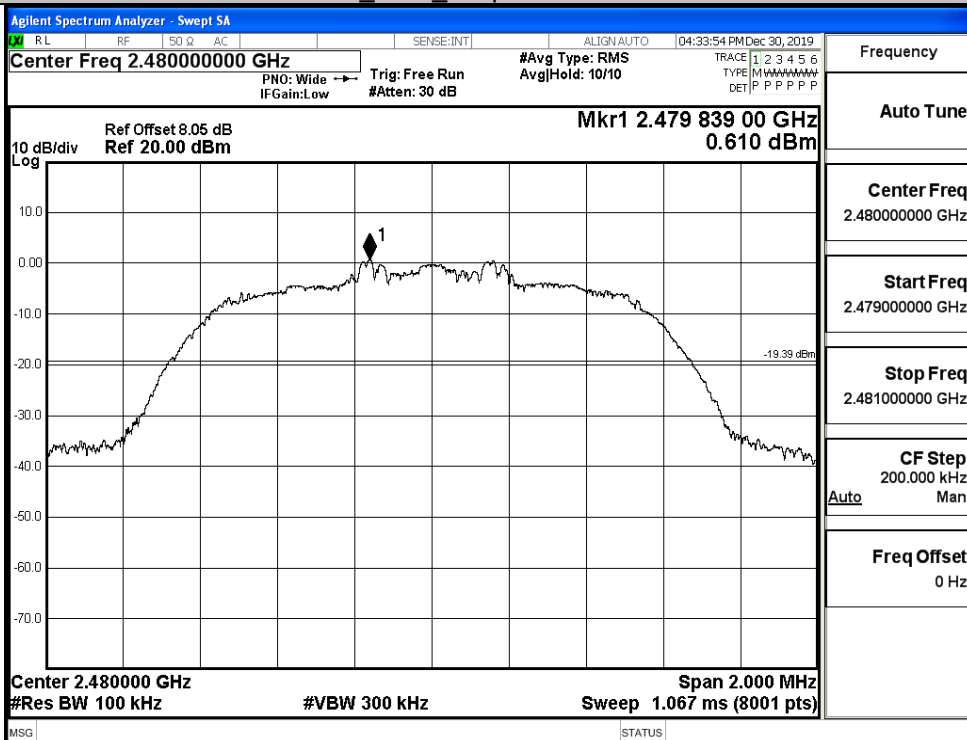


Puw

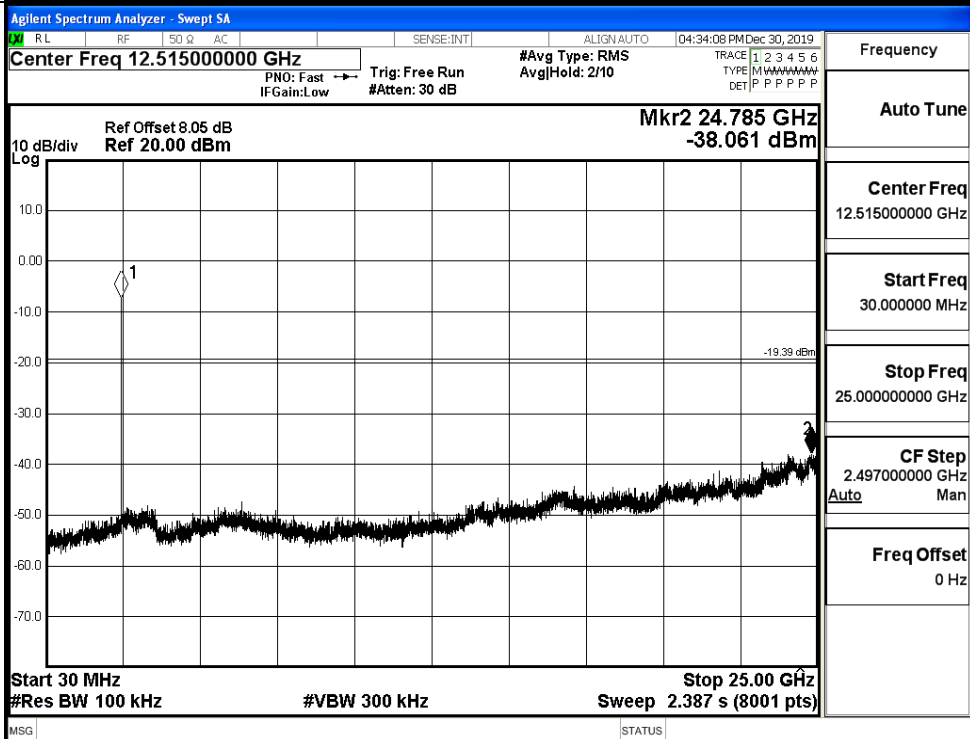


π /4DQPSK_HCH_Graphs

Pref

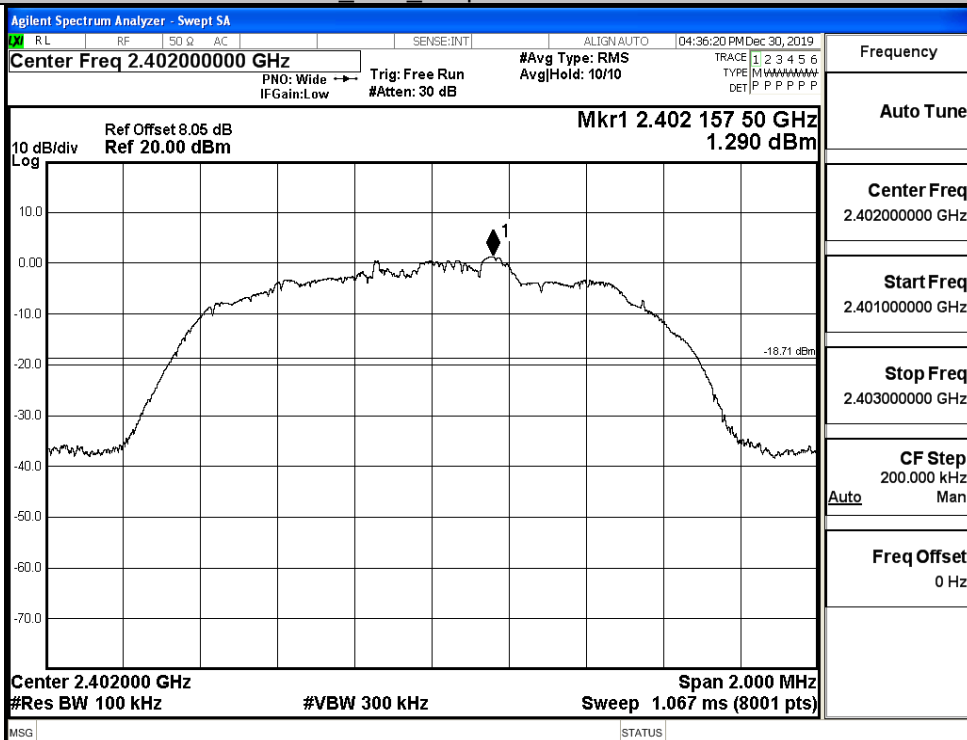


Puw

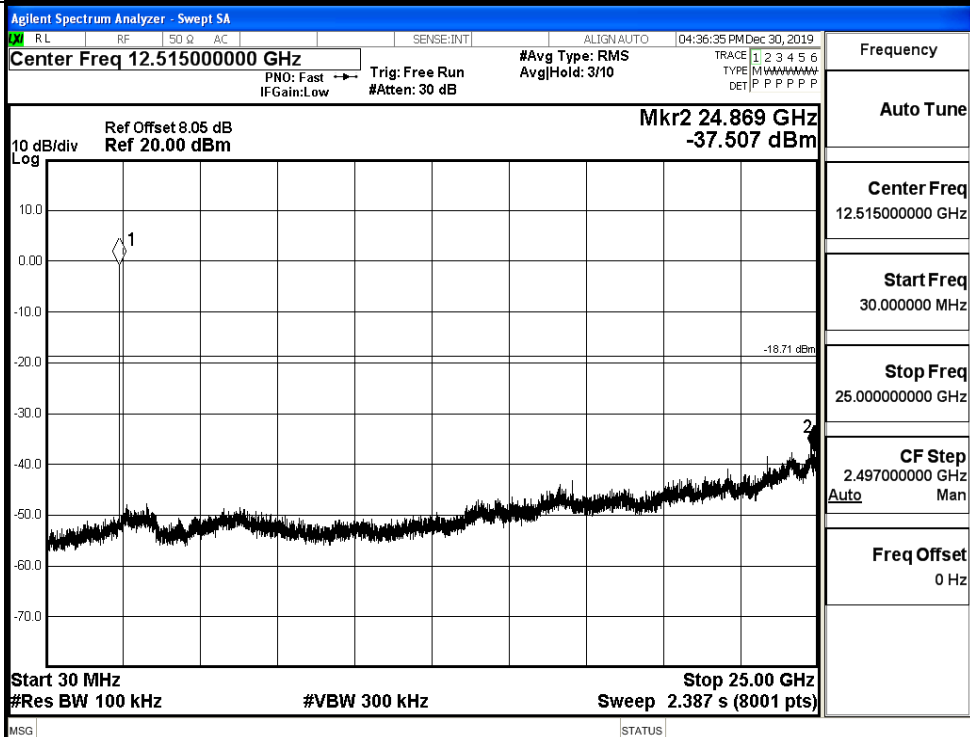


8DPSK_LCH_Graphs

Pref

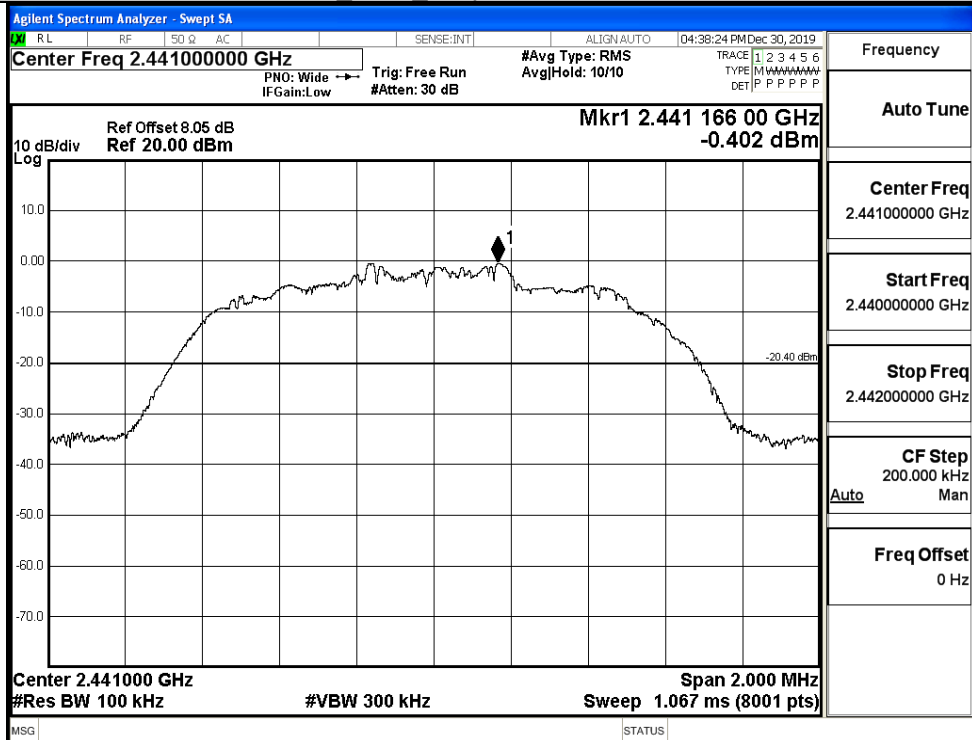


Puw

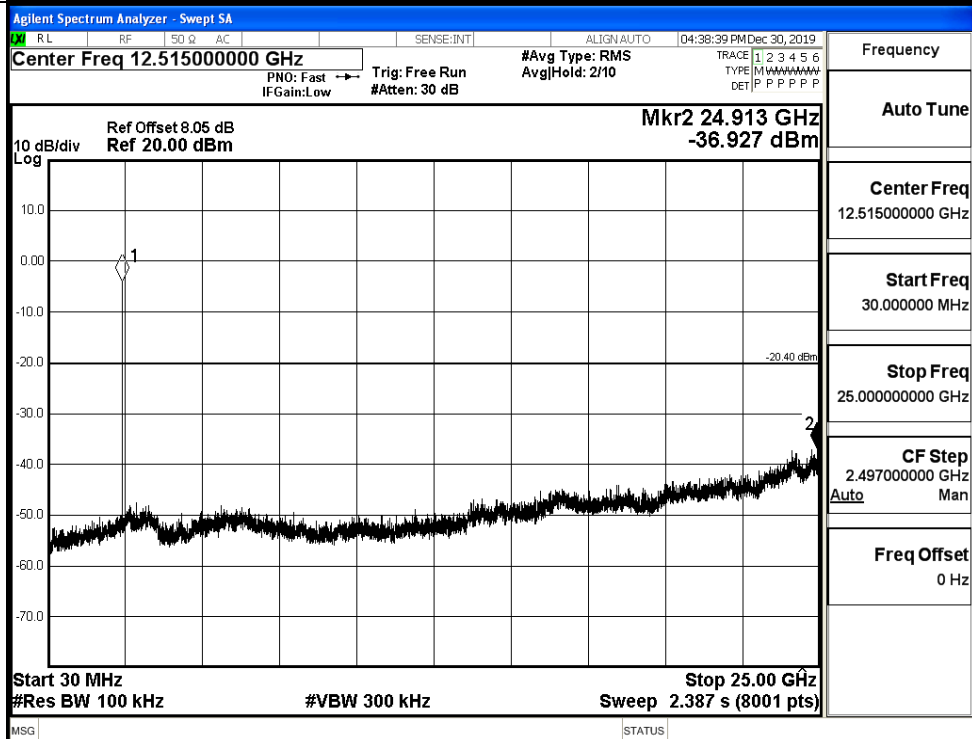


8DPSK_MCH_Graphs

Pref

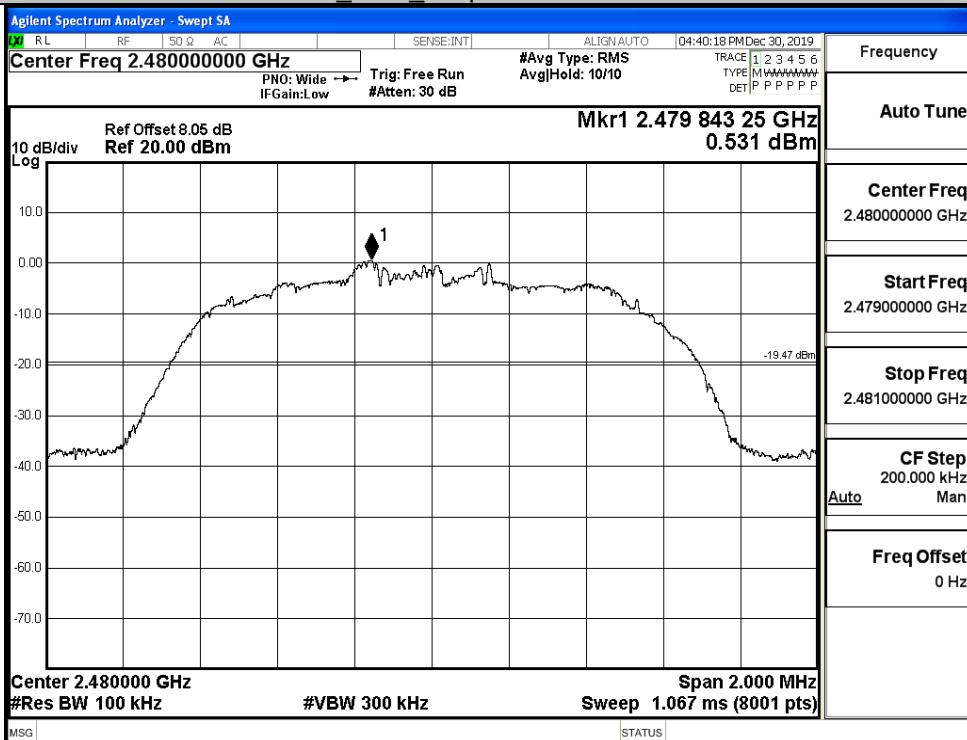


Puw

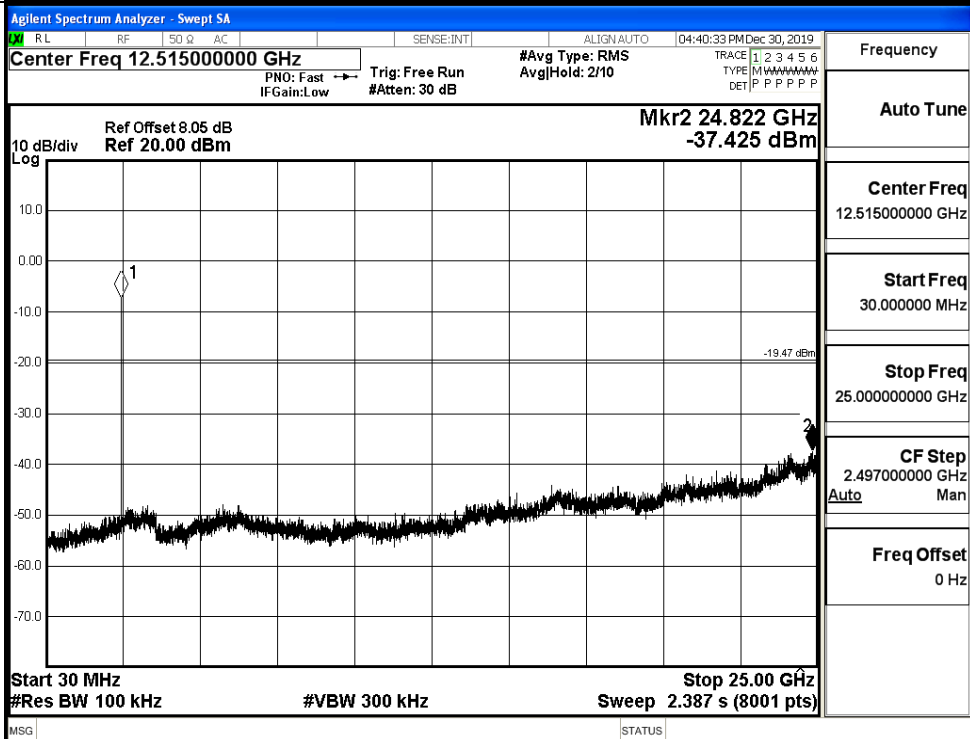


8DPSK_HCH_Graphs

Pref



Puw

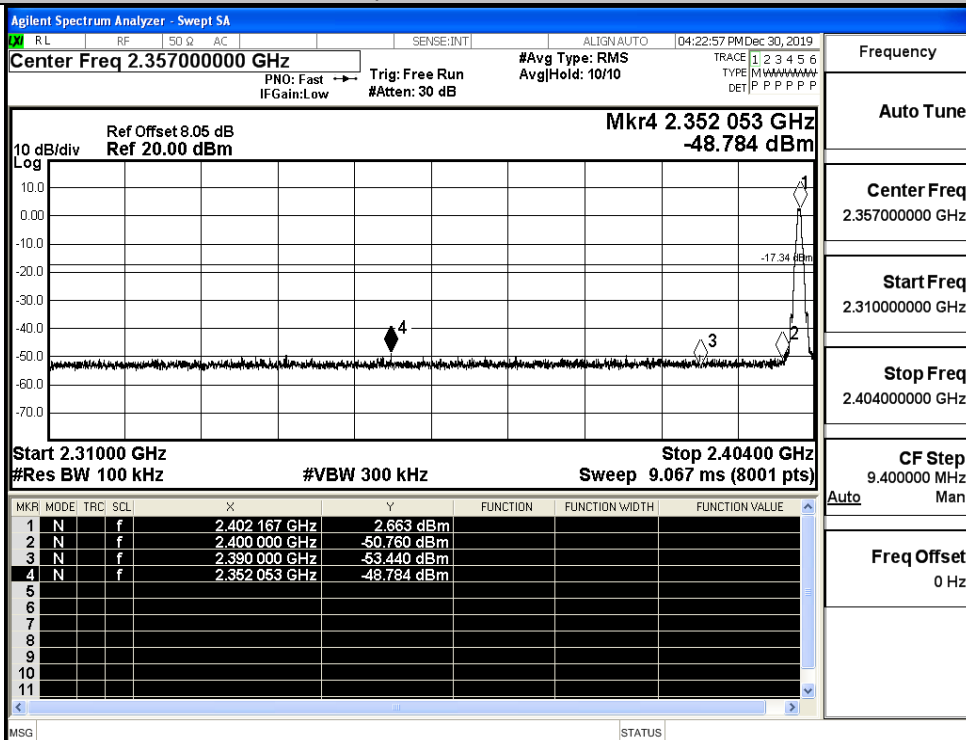


A.7 Band-edge for RF Conducted Emissions

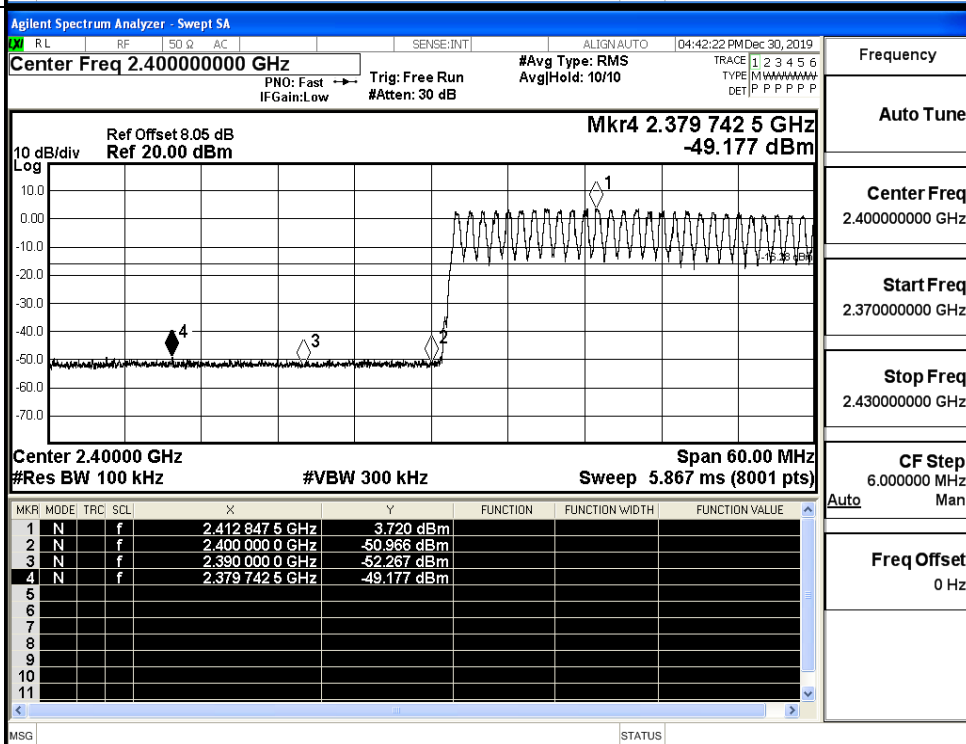
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	2.663	Off	-48.784	-17.34	PASS
			3.720	On	-49.177	-16.28	PASS
	HCH	2480	1.850	Off	-49.091	-18.15	PASS
			3.187	On	-48.890	-16.81	PASS
$\pi/4$ DQPSK	LCH	2402	1.010	Off	-49.364	-18.99	PASS
			2.075	On	-49.074	-17.93	PASS
	HCH	2480	0.668	Off	-49.445	-19.33	PASS
			1.865	On	-48.814	-18.14	PASS
8DPSK	LCH	2402	0.269	Off	-49.712	-19.73	PASS
			2.059	On	-49.191	-17.94	PASS
	HCH	2480	0.614	Off	-48.717	-19.39	PASS
			1.471	On	-48.563	-18.53	PASS

Test Graphs

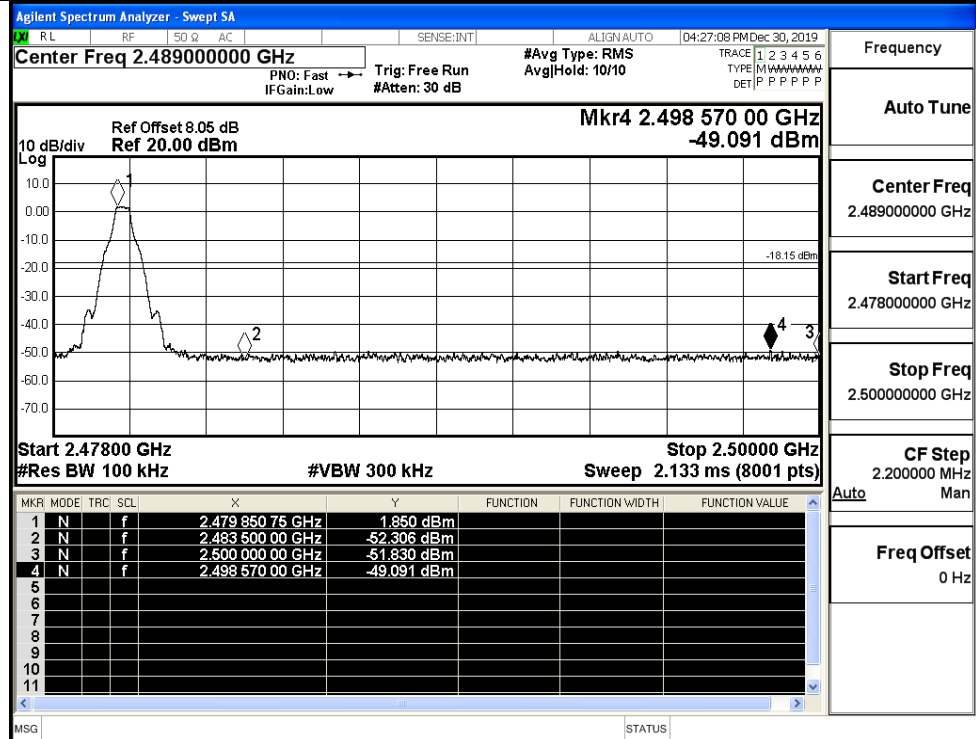
GFSK/LCH/No Hop



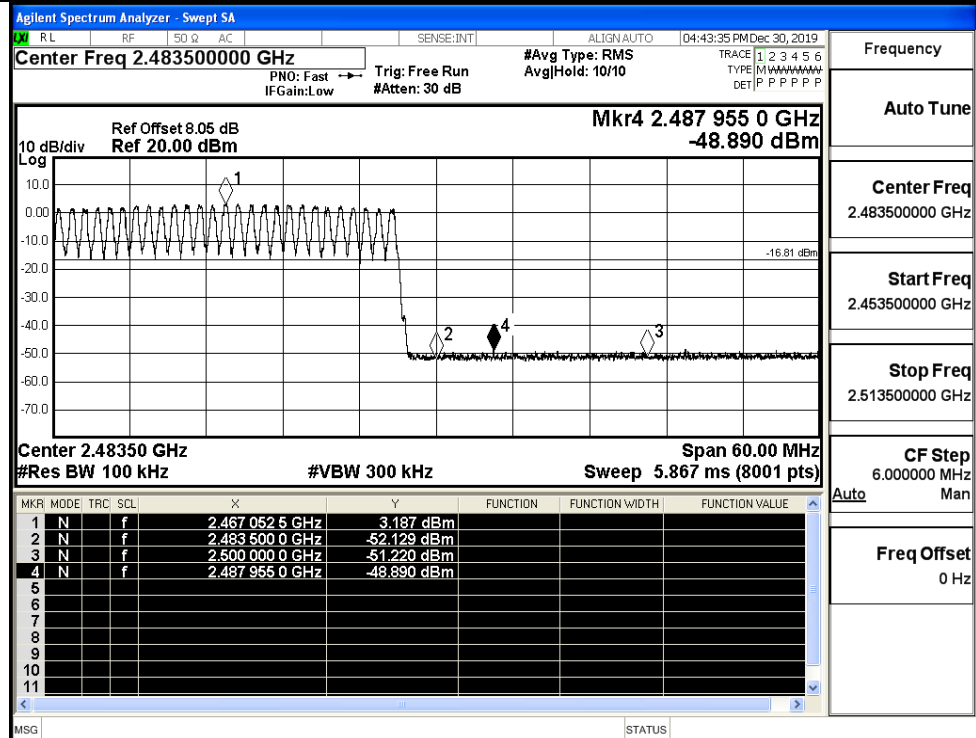
GFSK/LCH/Hop



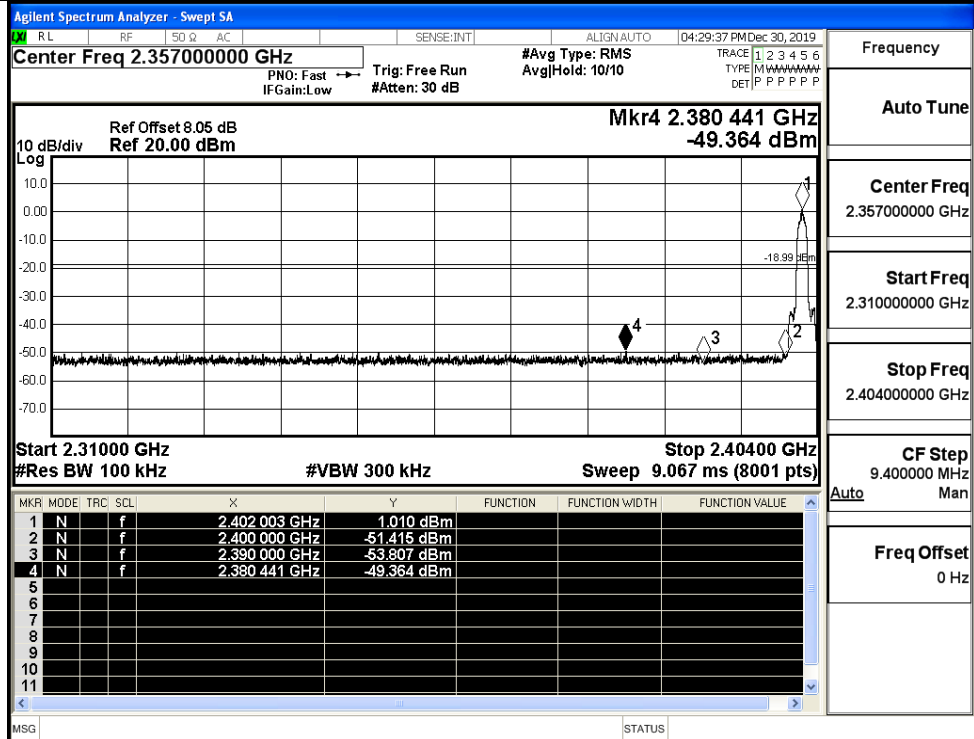
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq
2.357000000 GHz

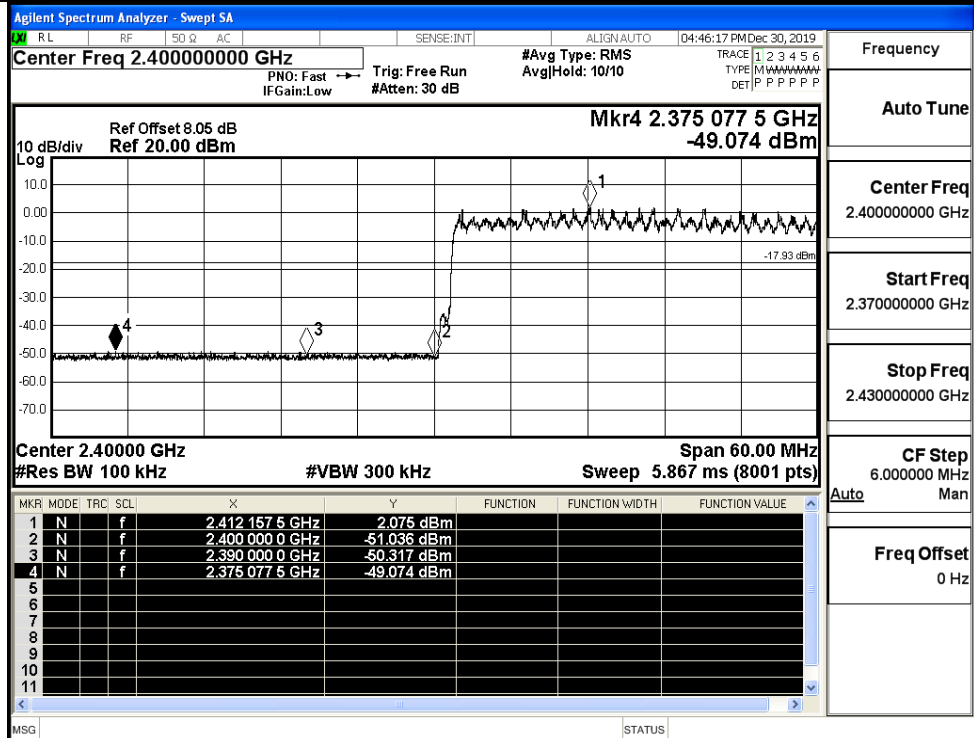
Start Freq
2.310000000 GHz

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

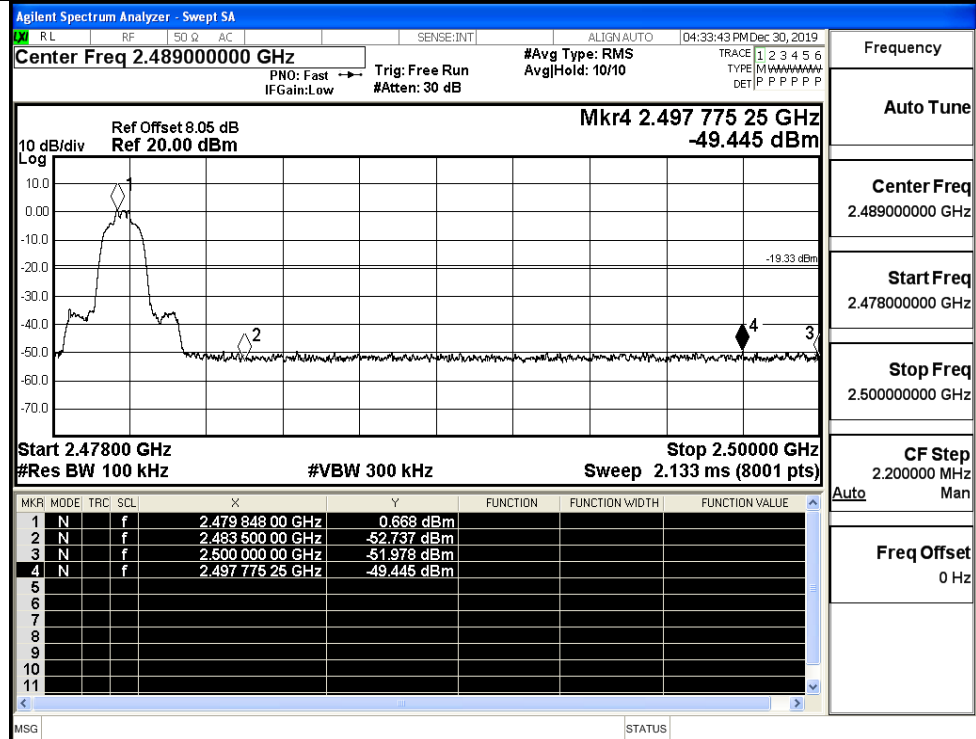
Start Freq
2.370000000 GHz

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

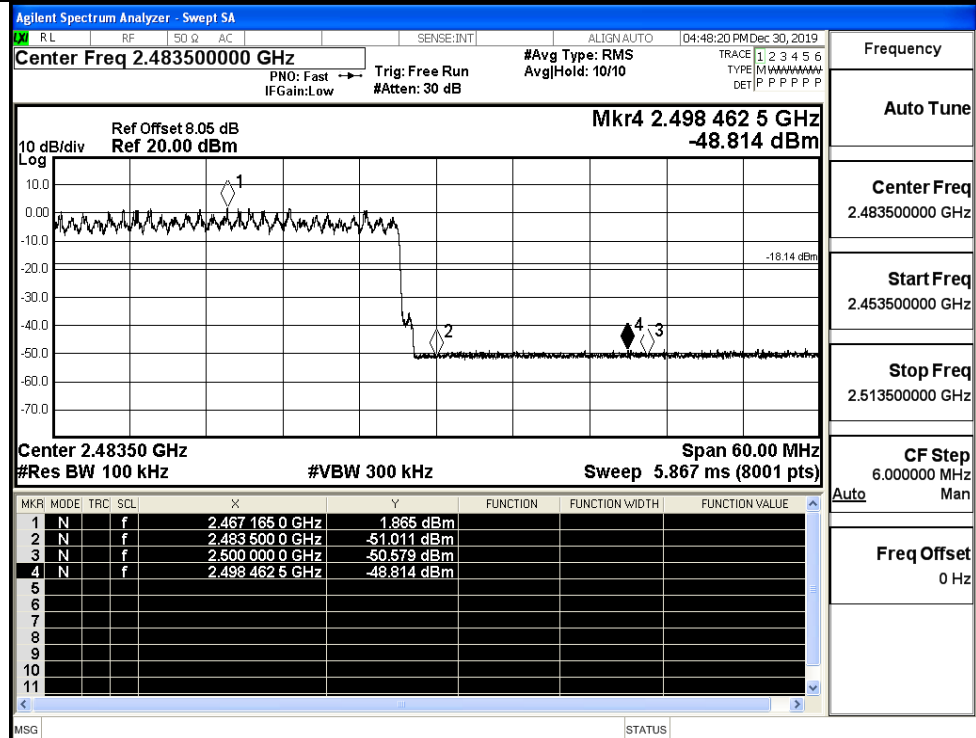
Start Freq
2.478000000 GHz

Stop Freq
2.500000000 GHz

CF Step
2.200000 MHz

Freq Offset
0 Hz

$\pi/4$ DQPSK/HCH/Hop



Frequency

Auto Tune

Center Freq
2.483500000 GHz

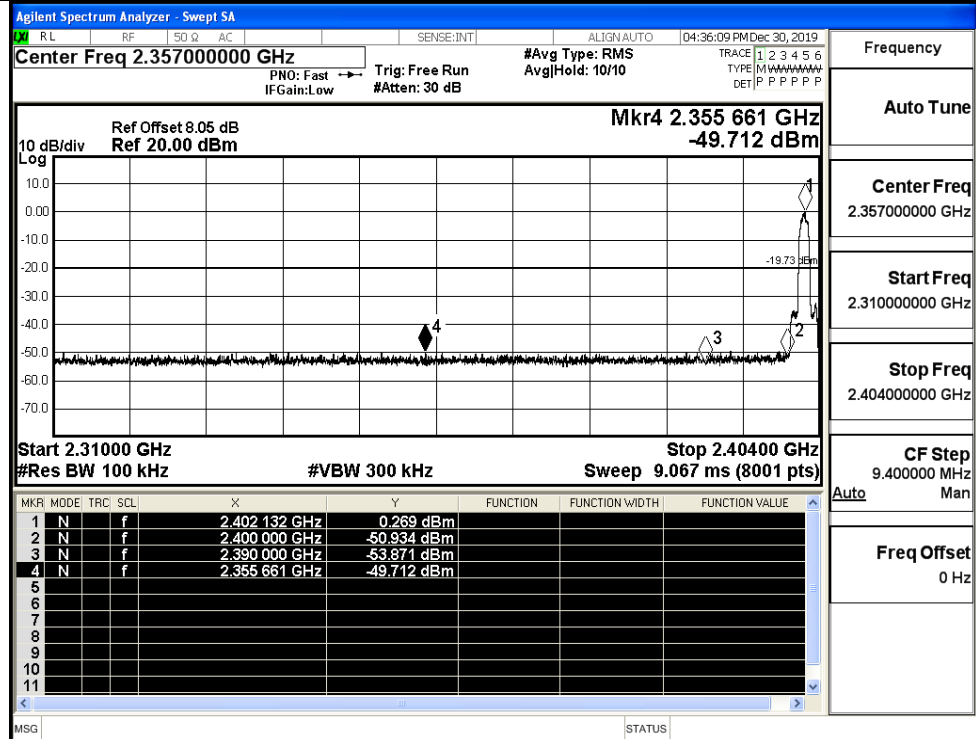
Start Freq
2.453500000 GHz

Stop Freq
2.513500000 GHz

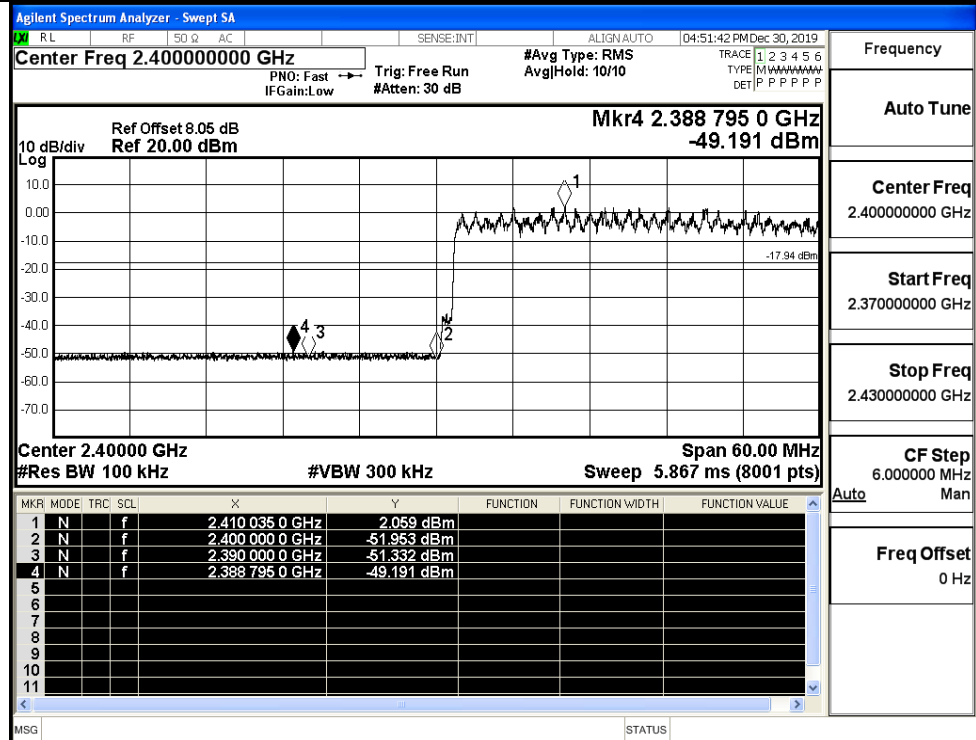
CF Step
6.000000 MHz

Freq Offset
0 Hz

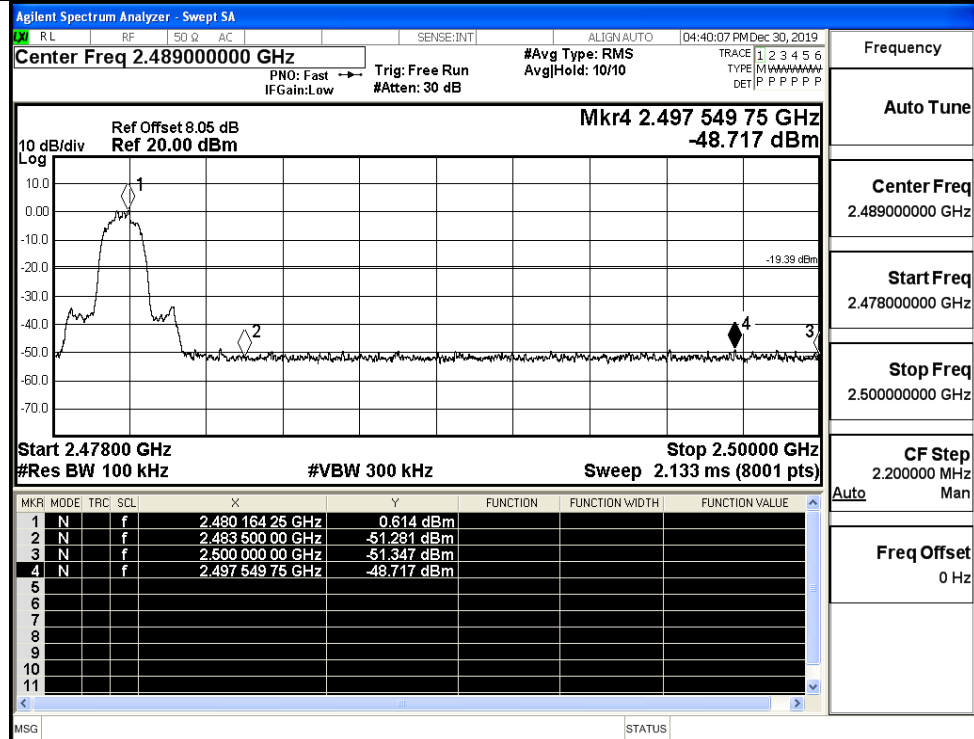
8DPSK/LCH/No Hop



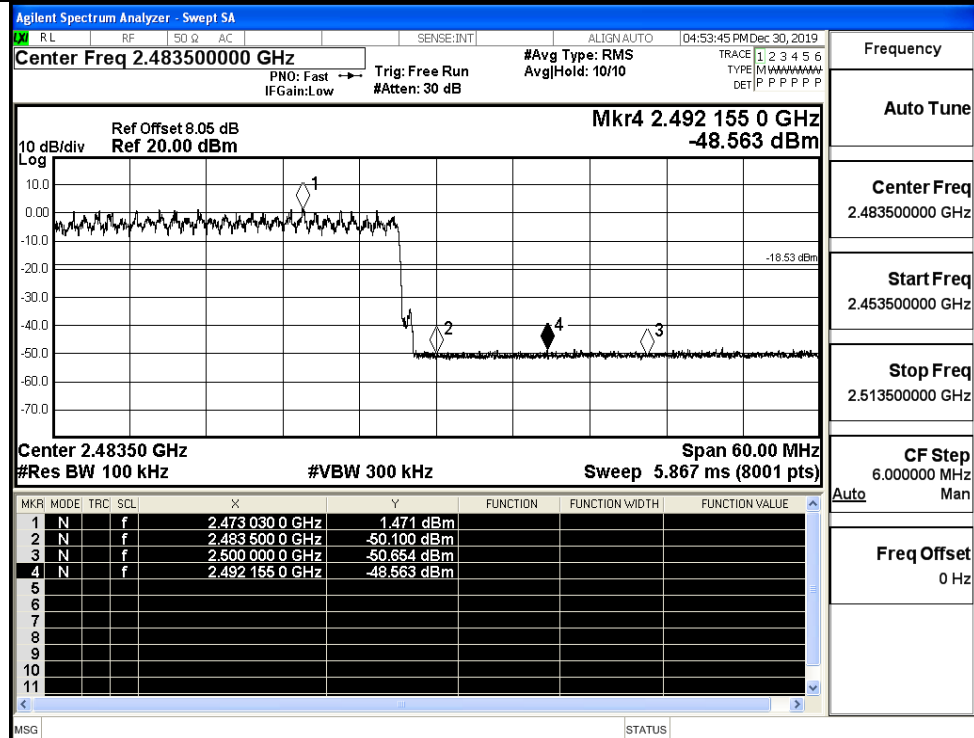
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



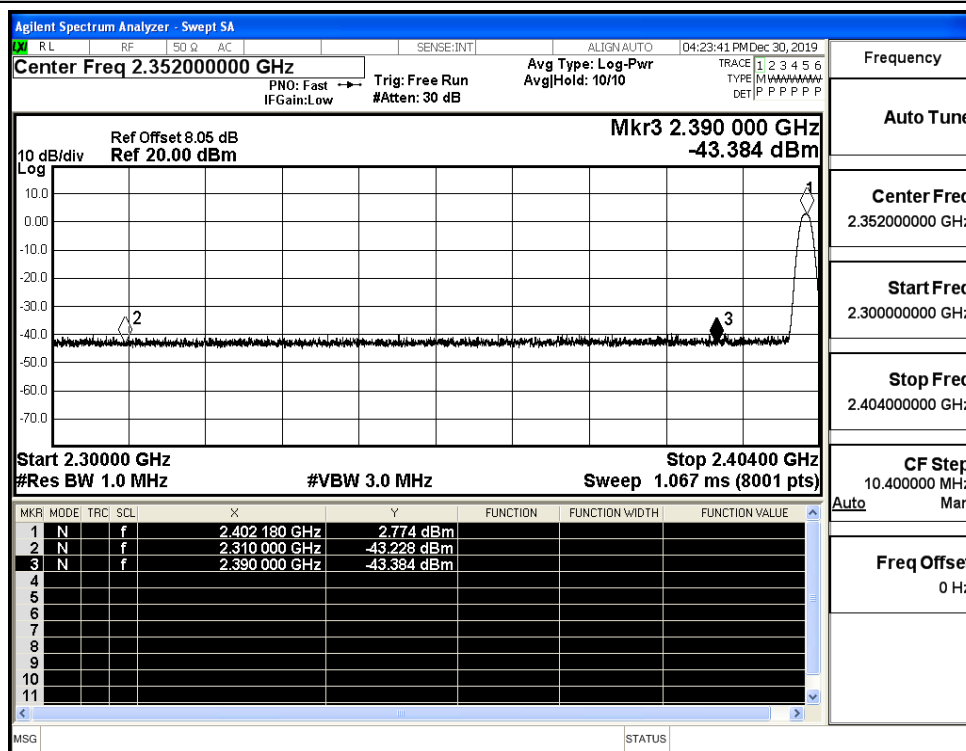
8DPSK/HCH/Hop



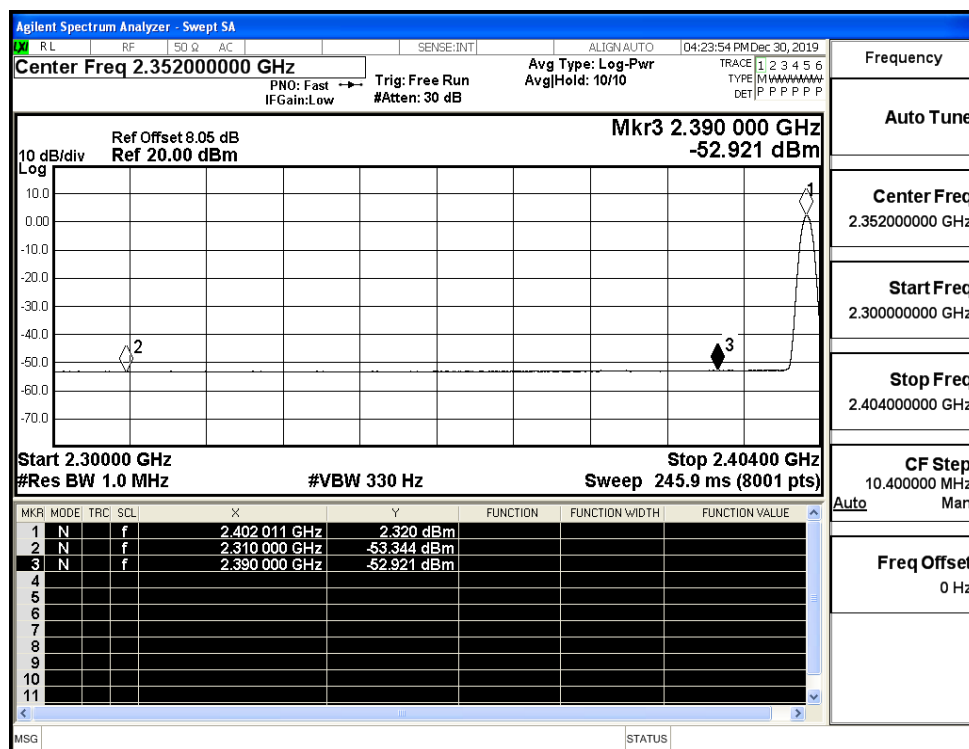
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.23	0	0	54.03	PEAK	74	PASS
	Off	2310.0	-53.34	0	0	43.91	AV	54	PASS
	Off	2390.0	-43.38	0	0	53.87	PEAK	74	PASS
	Off	2390.0	-52.92	0	0	44.34	AV	54	PASS
	Off	2483.5	-42.39	0	0	54.87	PEAK	74	PASS
	Off	2483.5	-52.39	0	0	44.87	AV	54	PASS
	Off	2500.0	-42.32	0	0	54.94	PEAK	74	PASS
	Off	2500.0	-52.36	0	0	44.90	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.59	0	0	53.66	PEAK	74	PASS
	Off	2310.0	-53.36	0	0	43.90	AV	54	PASS
	Off	2390.0	-42.91	0	0	54.35	PEAK	74	PASS
	Off	2390.0	-52.84	0	0	44.42	AV	54	PASS
	Off	2483.5	-42.63	0	0	54.63	PEAK	74	PASS
	Off	2483.5	-52.35	0	0	44.91	AV	54	PASS
	Off	2500.0	-42.31	0	0	54.95	PEAK	74	PASS
	Off	2500.0	-52.29	0	0	44.96	AV	54	PASS
8DPSK	Off	2310.0	-43.76	0	0	53.49	PEAK	74	PASS
	Off	2310.0	-53.33	0	0	43.92	AV	54	PASS
	Off	2390.0	-43.78	0	0	53.48	PEAK	74	PASS
	Off	2390.0	-52.77	0	0	44.49	AV	54	PASS
	Off	2483.5	-42.13	0	0	55.13	PEAK	74	PASS
	Off	2483.5	-52.35	0	0	44.91	AV	54	PASS
	Off	2500.0	-42.49	0	0	54.77	PEAK	74	PASS
	Off	2500.0	-52.33	0	0	44.93	AV	54	PASS

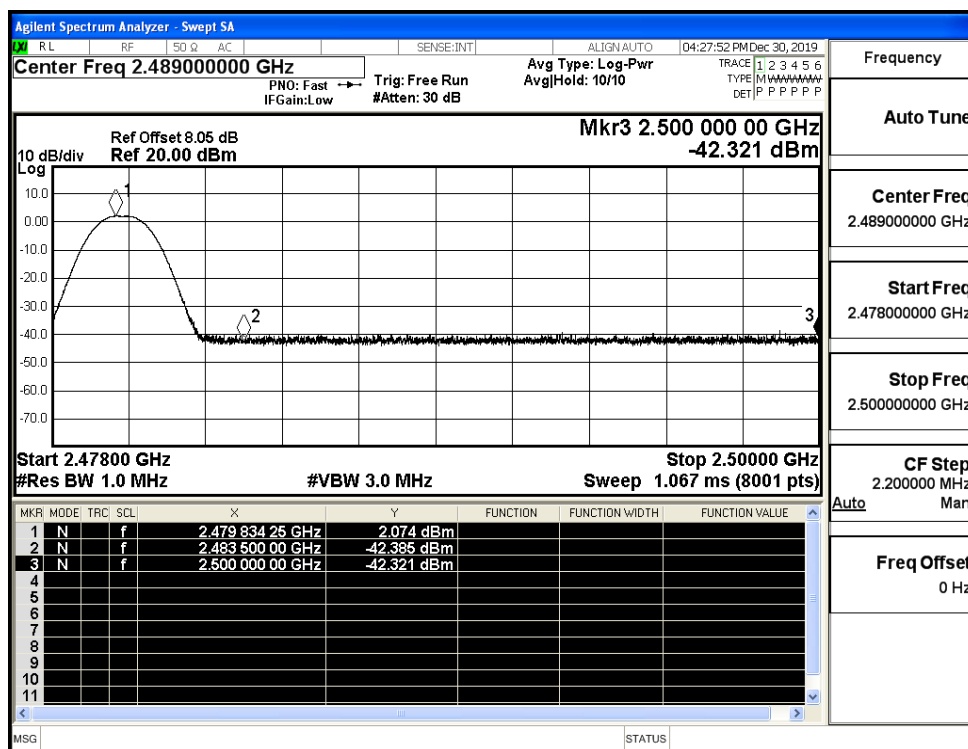
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



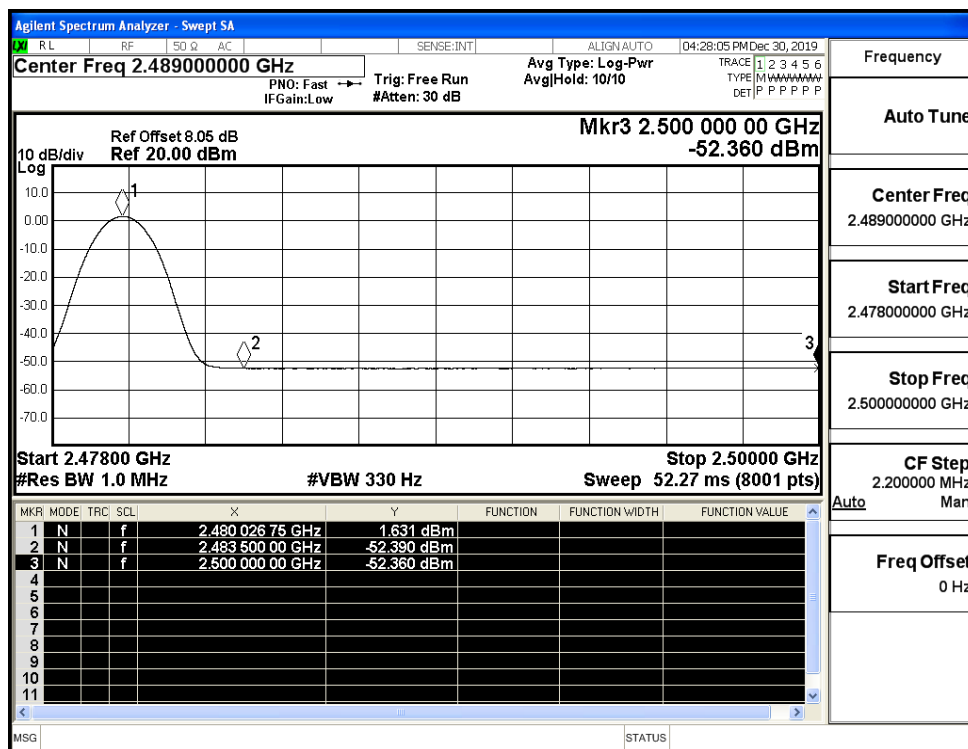
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

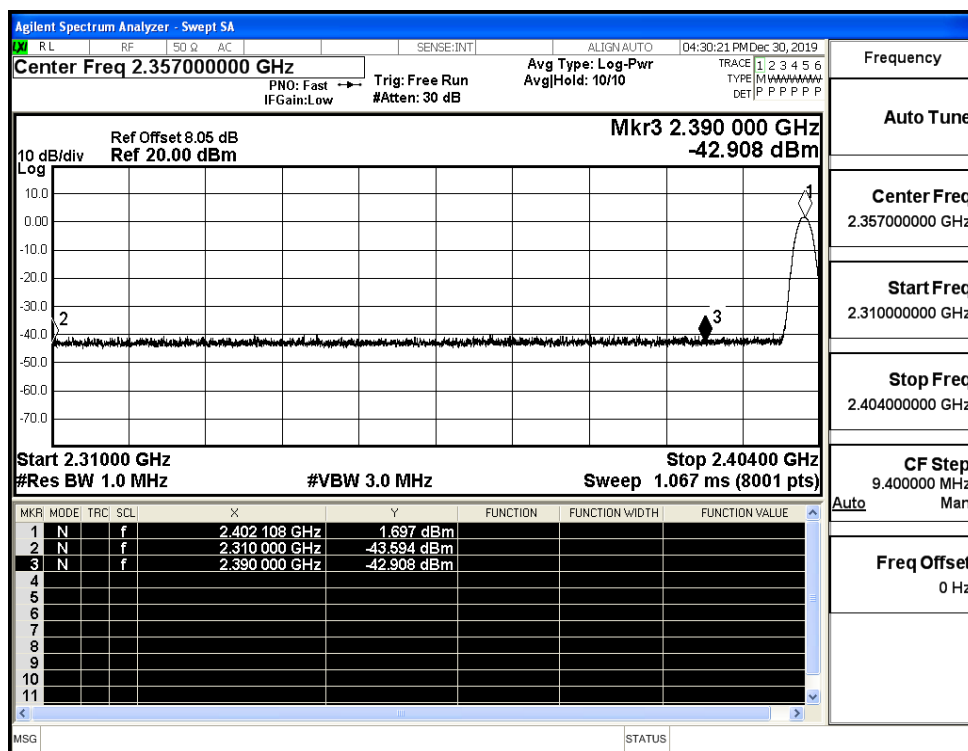
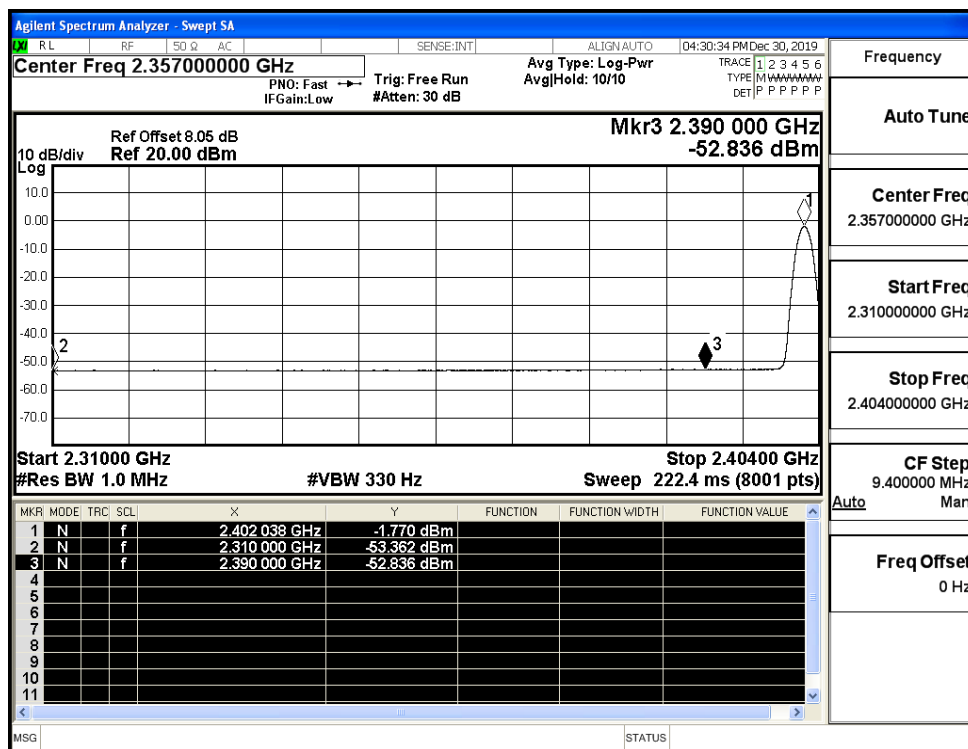


Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)

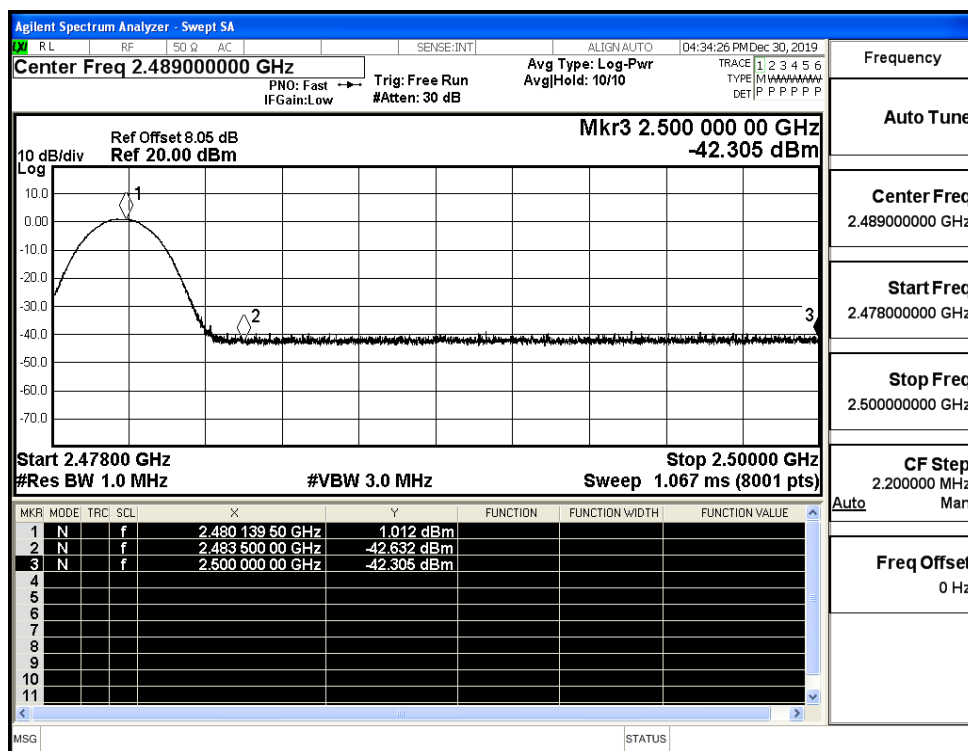


Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)

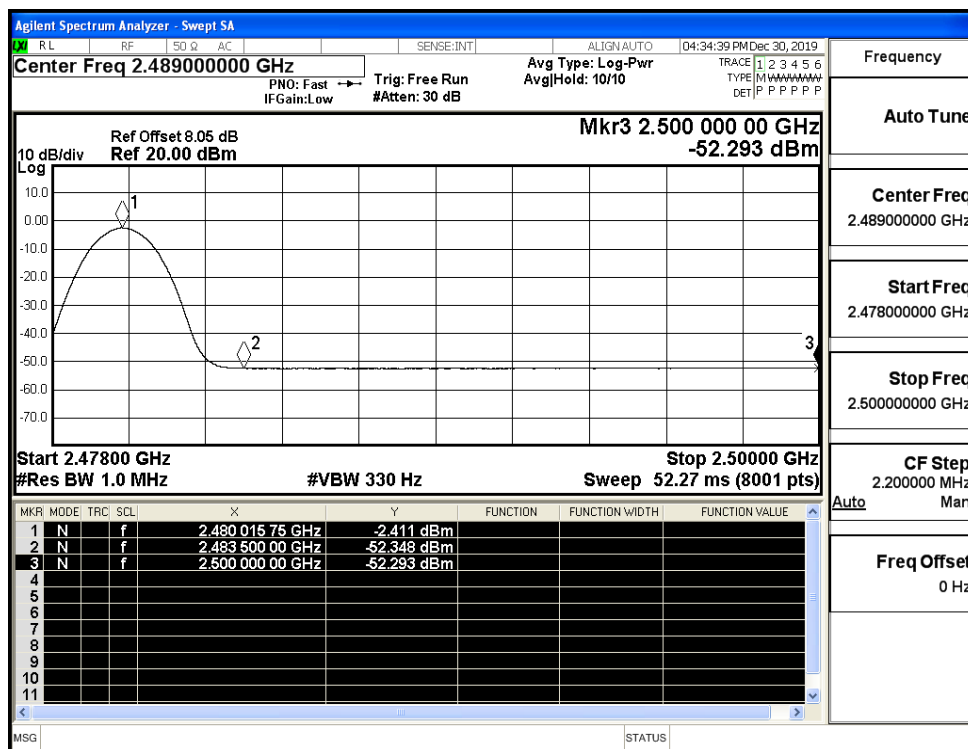


Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

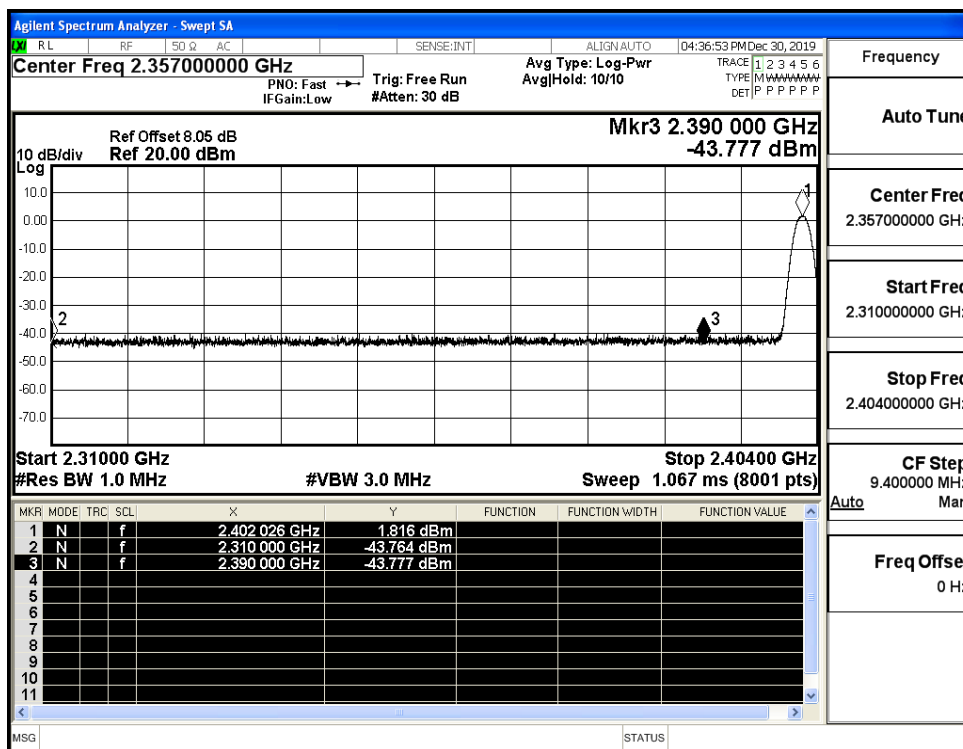
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



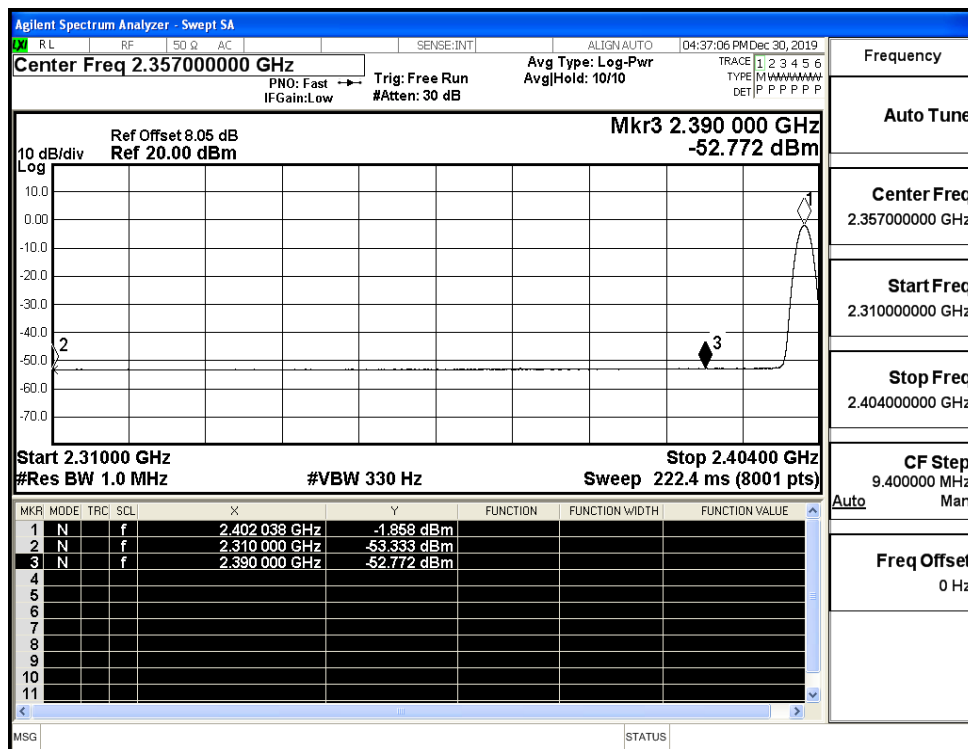
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



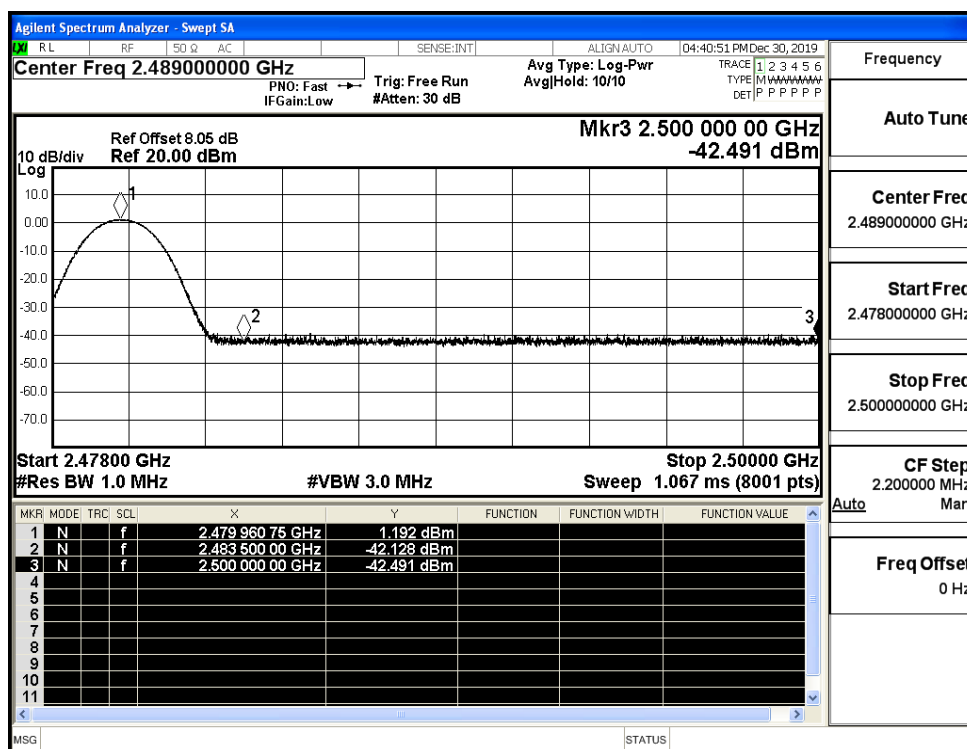
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

