

Appendix A

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

Product Name: WIRELESS EARPHONES

Trade Mark: Humixx

Test Model: HEHZ34

Environmental Conditions

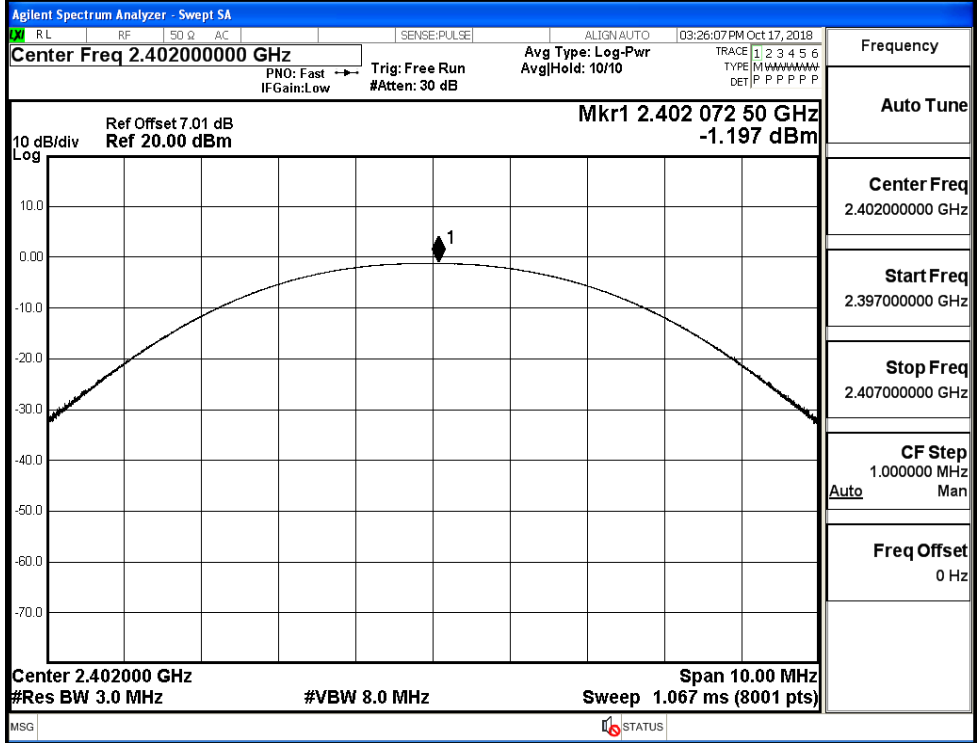
Temperature:	23.5 ° C
Relative Humidity:	53.4%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond.Lu
Supervised by:	Jayden.Zhuo

A.1 Maximum Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.197	21	PASS
	MCH	0.017	21	PASS
	HCH	0.347	21	PASS
$\pi/4$ DQPSK	LCH	-1.356	21	PASS
	MCH	-0.154	21	PASS
	HCH	-0.165	21	PASS
8DPSK	LCH	-1.306	21	PASS
	MCH	-0.055	21	PASS
	HCH	0.223	21	PASS

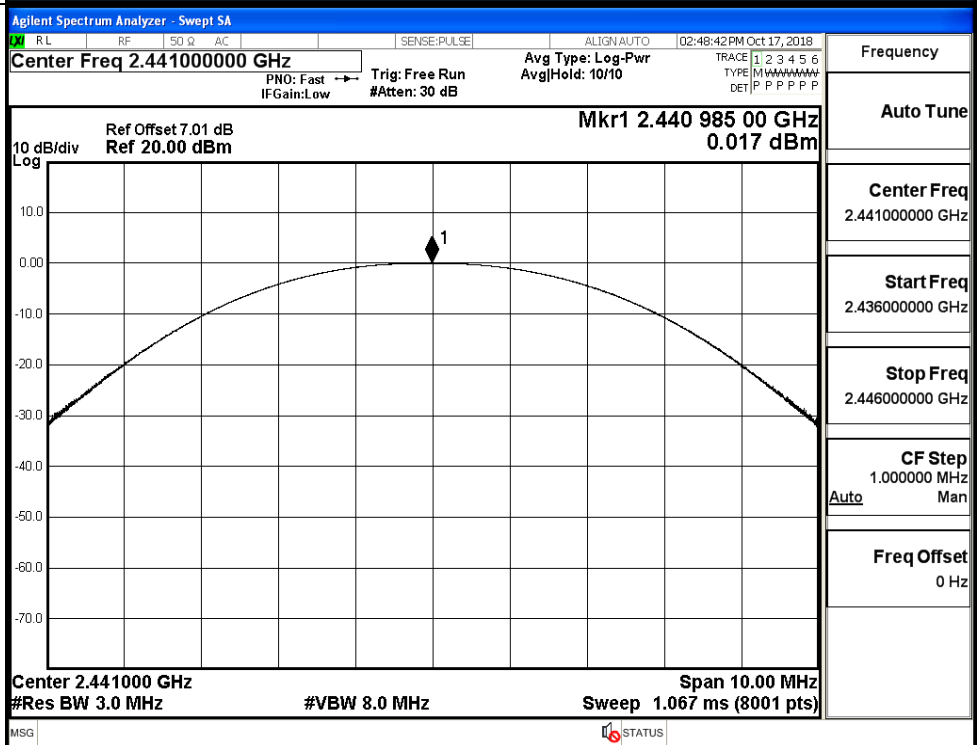
Test Graphs

GFSK/LCH



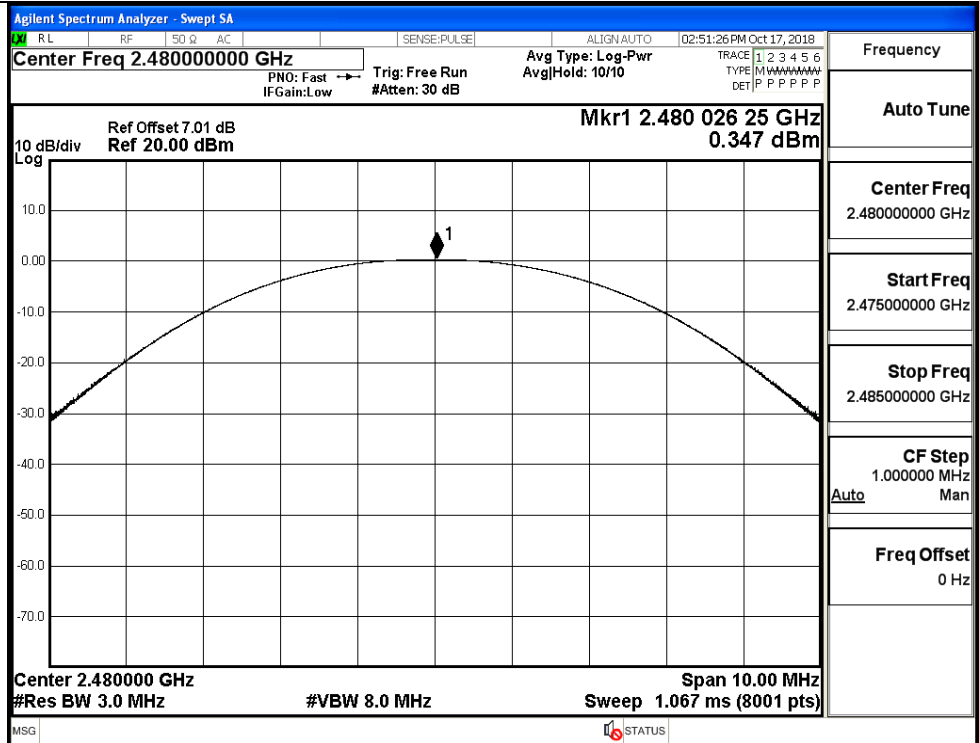
Frequency	2.402000000 GHz
Auto Tune	
Center Freq	2.402000000 GHz
Start Freq	2.397000000 GHz
Stop Freq	2.407000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

GFSK/MCH

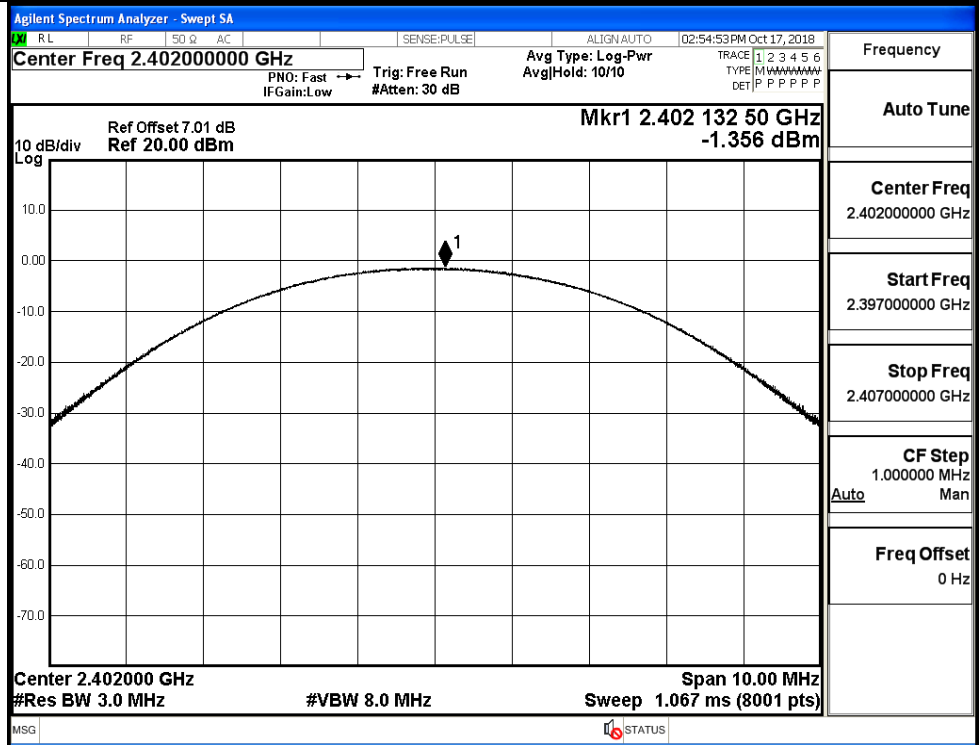


Frequency	2.441000000 GHz
Auto Tune	
Center Freq	2.441000000 GHz
Start Freq	2.436000000 GHz
Stop Freq	2.446000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

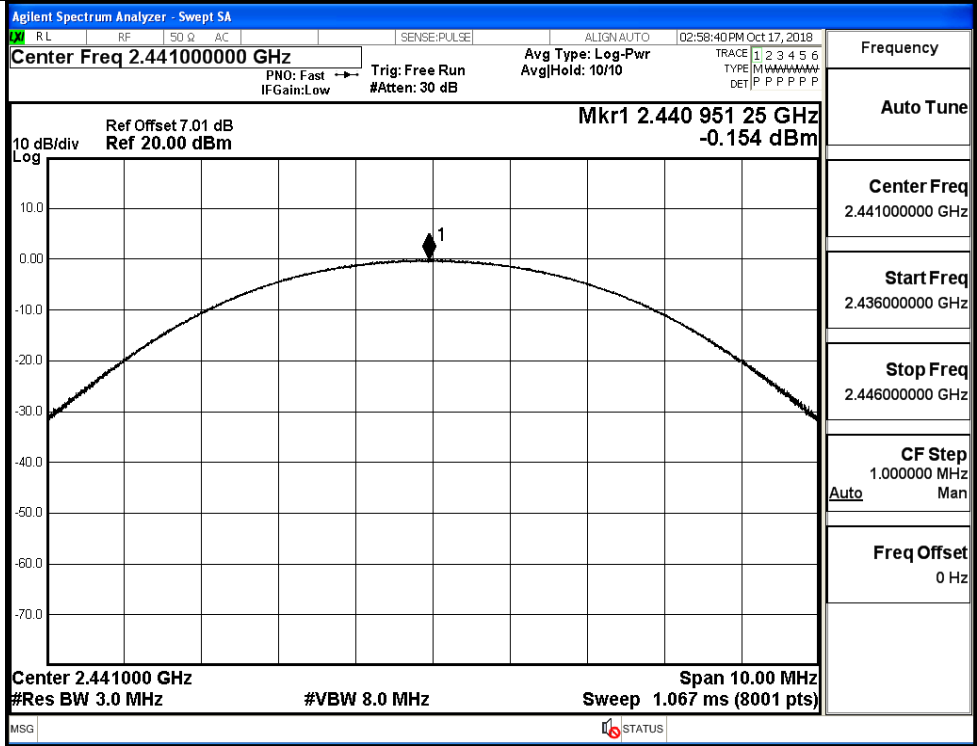
GFSK/HCH



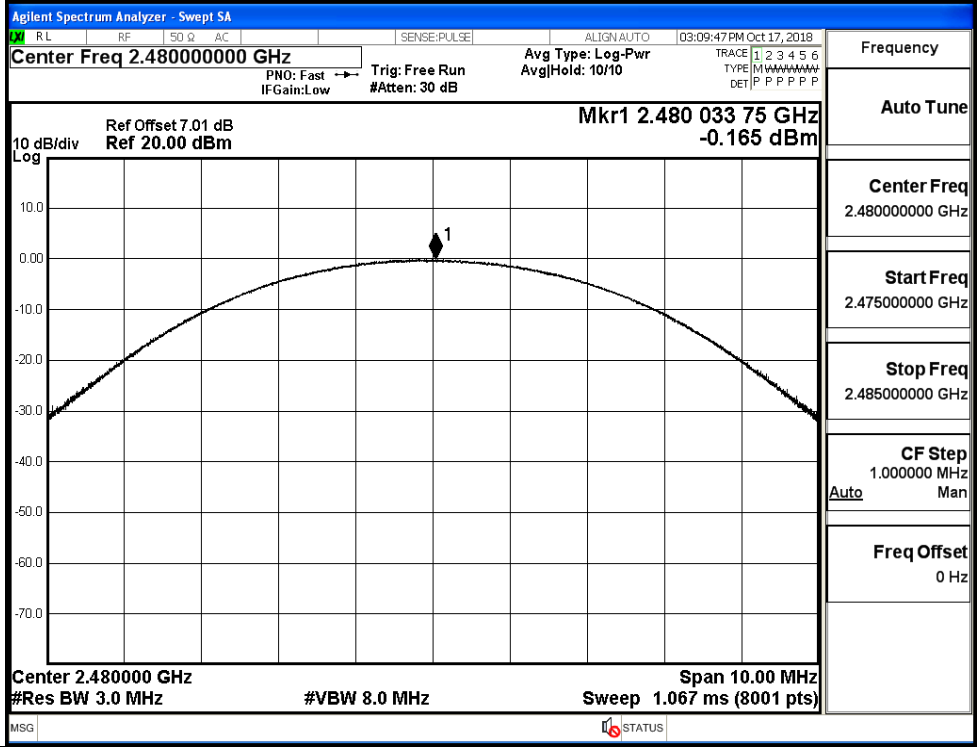
π /4DQPSK/LCH



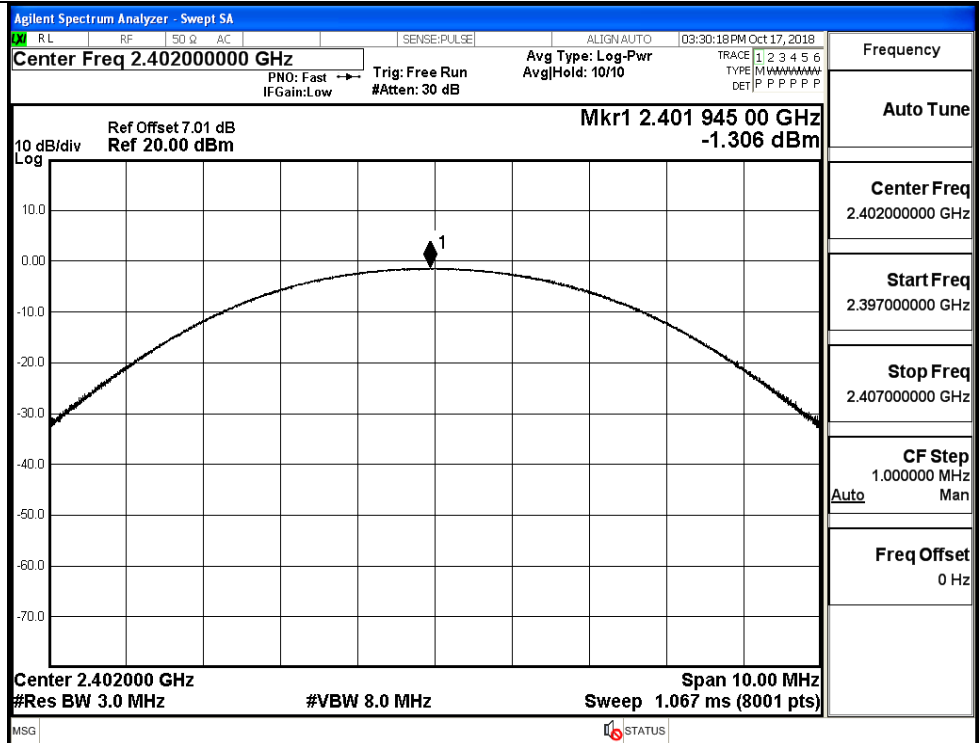
π /4DQPSK/MCH



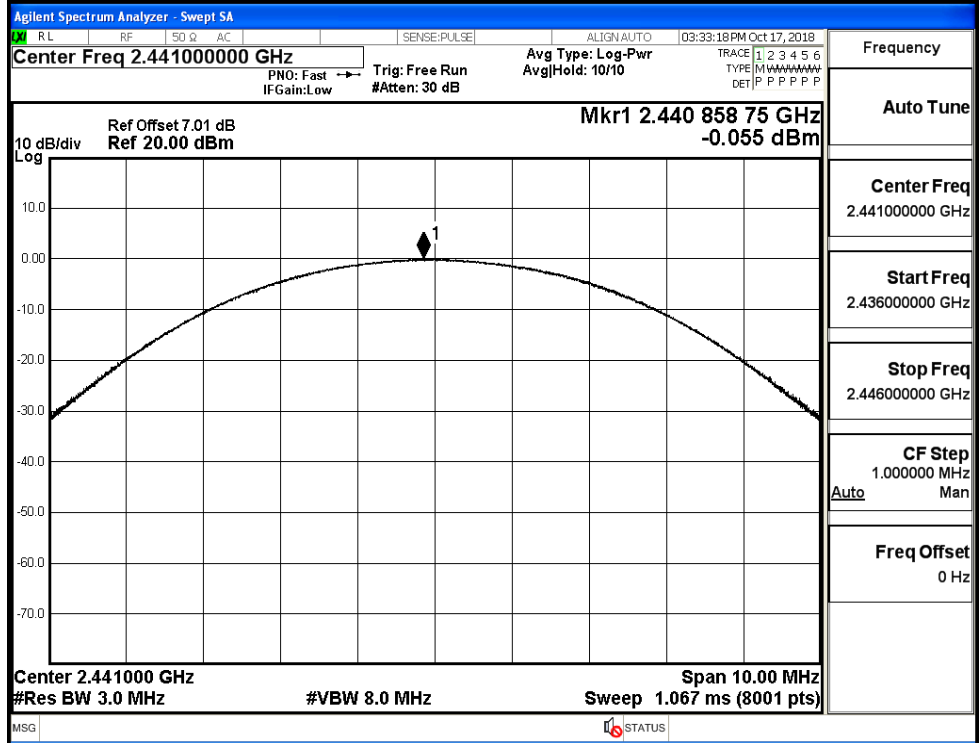
π /4DQPSK/HCH



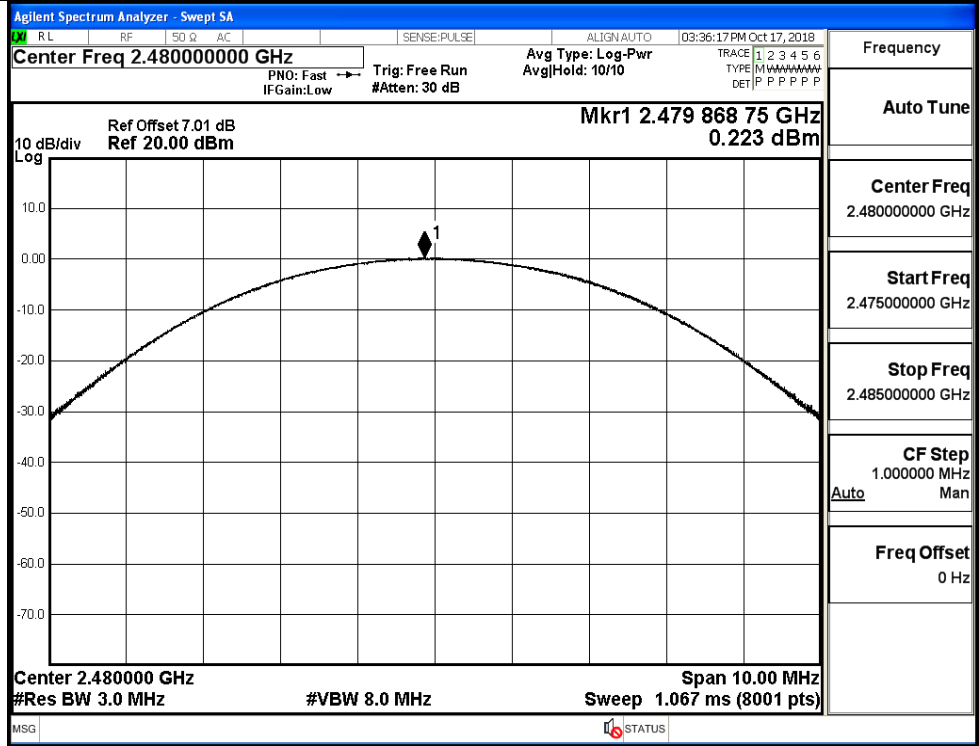
8DPSK/LCH



8DPSK/MCH

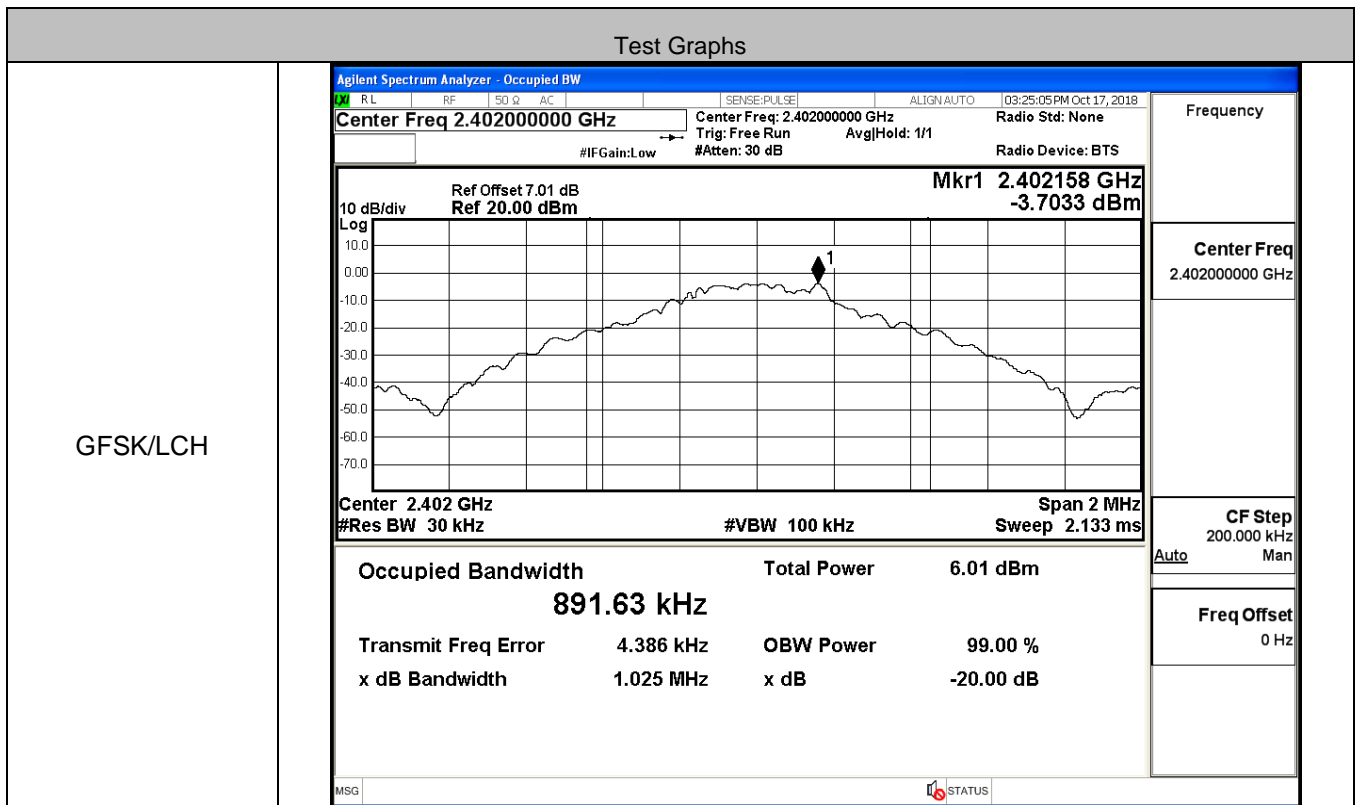


8DPSK/HCH

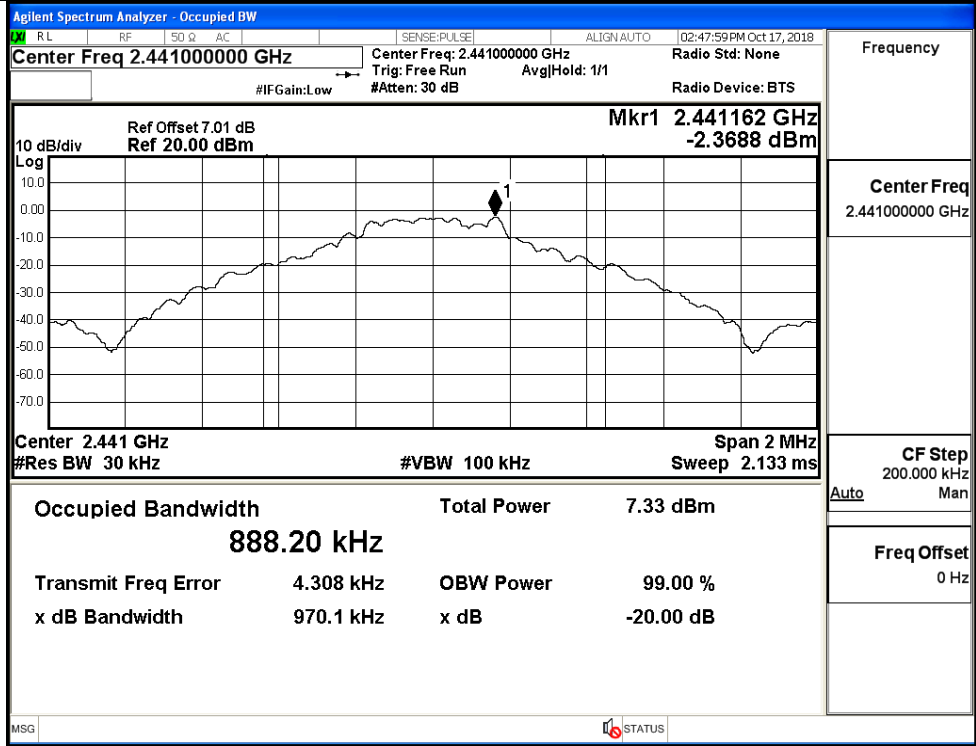


A.2 99% and 20dB Bandwidth

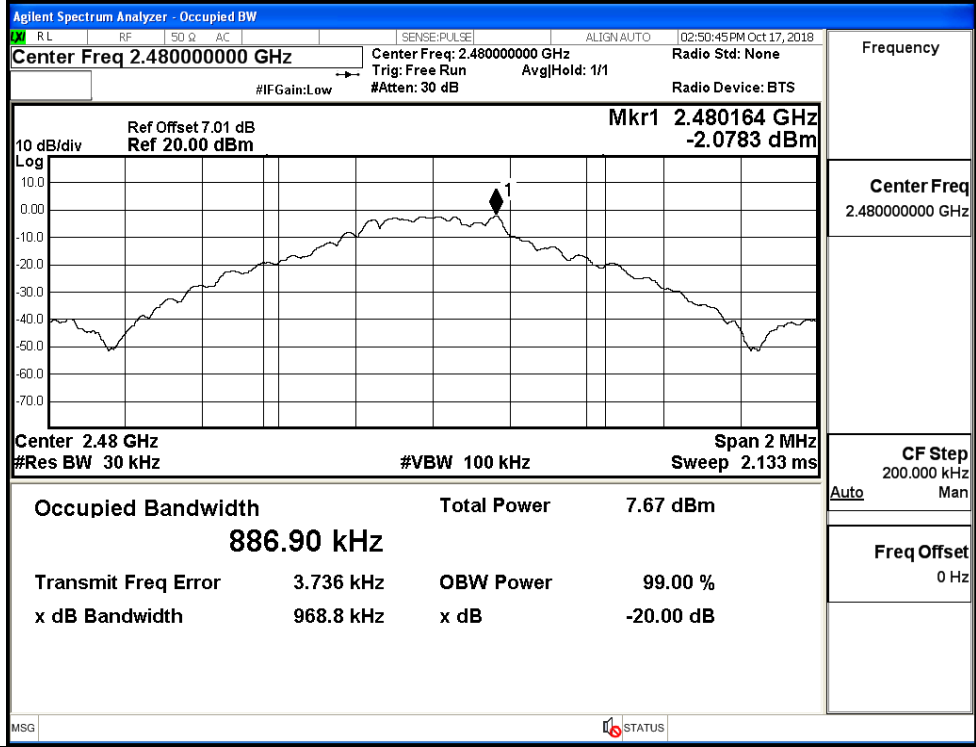
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.89163	1.025	Not Specified	PASS
	MCH	0.88820	0.9701	Not Specified	PASS
	HCH	0.88690	0.9688	Not Specified	PASS
π/4DQPSK	LCH	1.1655	1.286	Not Specified	PASS
	MCH	1.1678	1.287	Not Specified	PASS
	HCH	1.1650	1.287	Not Specified	PASS
8DPSK	LCH	1.1724	1.288	Not Specified	PASS
	MCH	1.1716	1.288	Not Specified	PASS
	HCH	1.1703	1.287	Not Specified	PASS



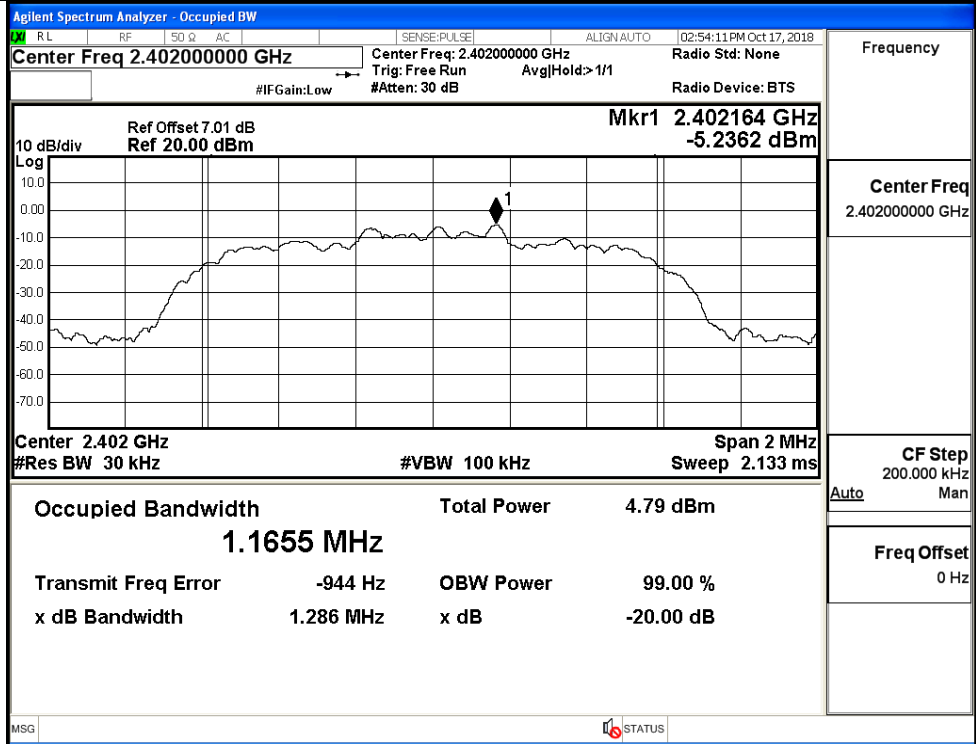
GFSK/MCH



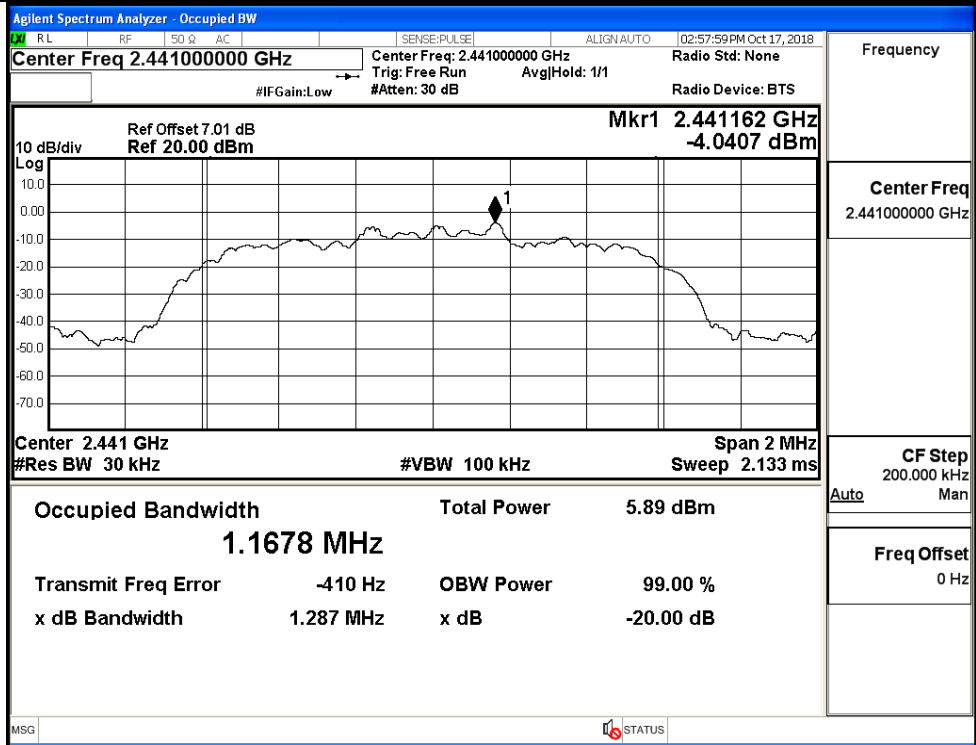
GFSK/HCH



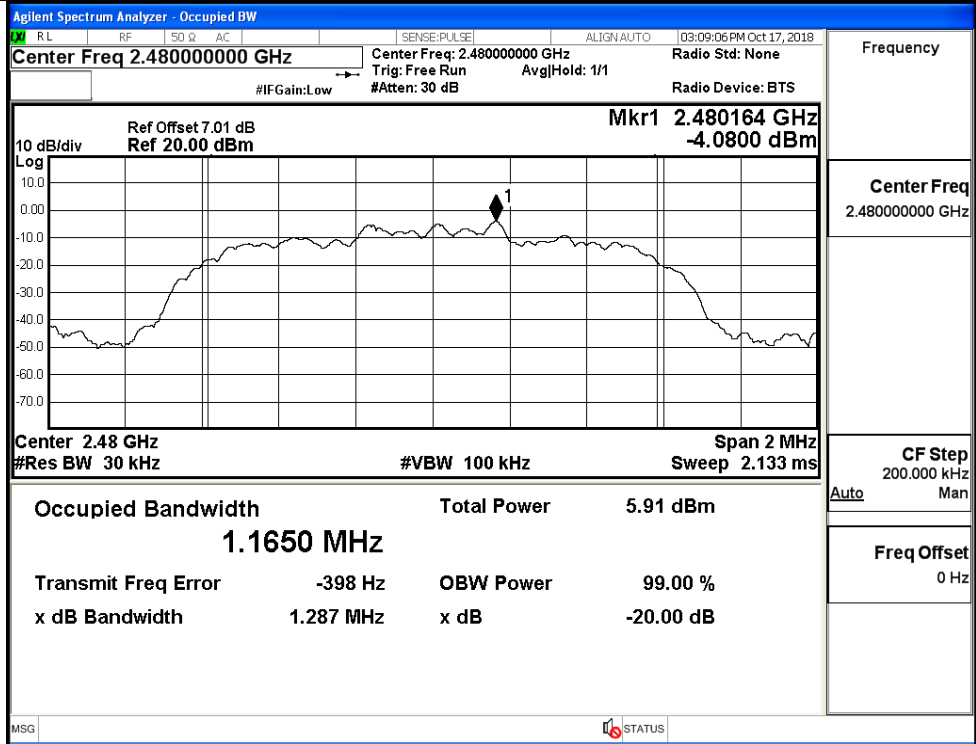
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH

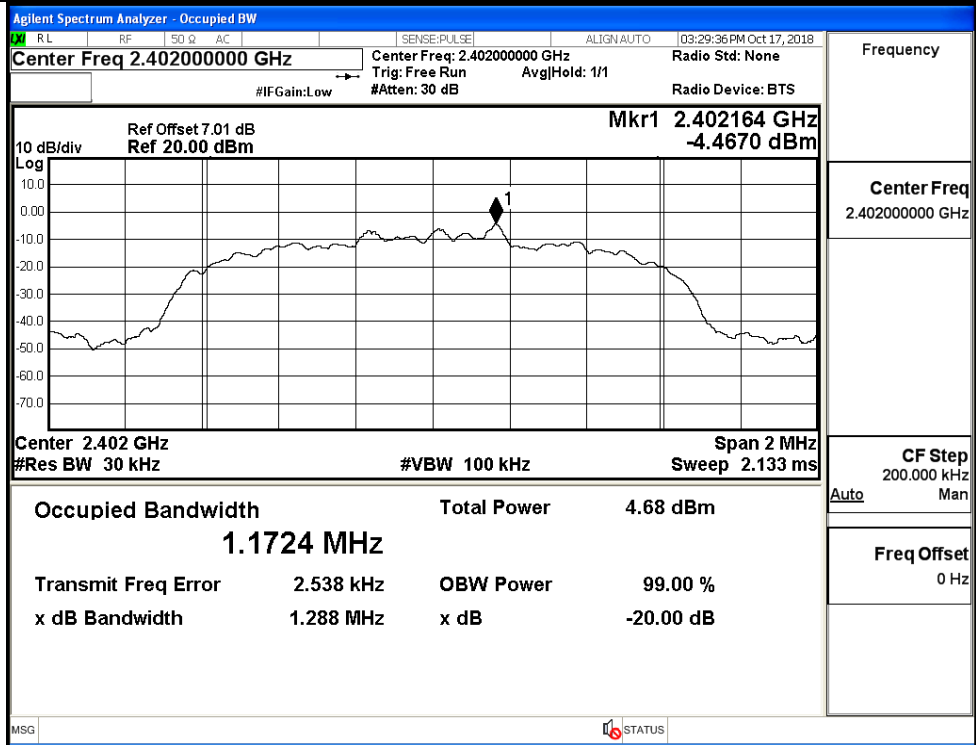


$\pi/4$ DQPSK/HCH



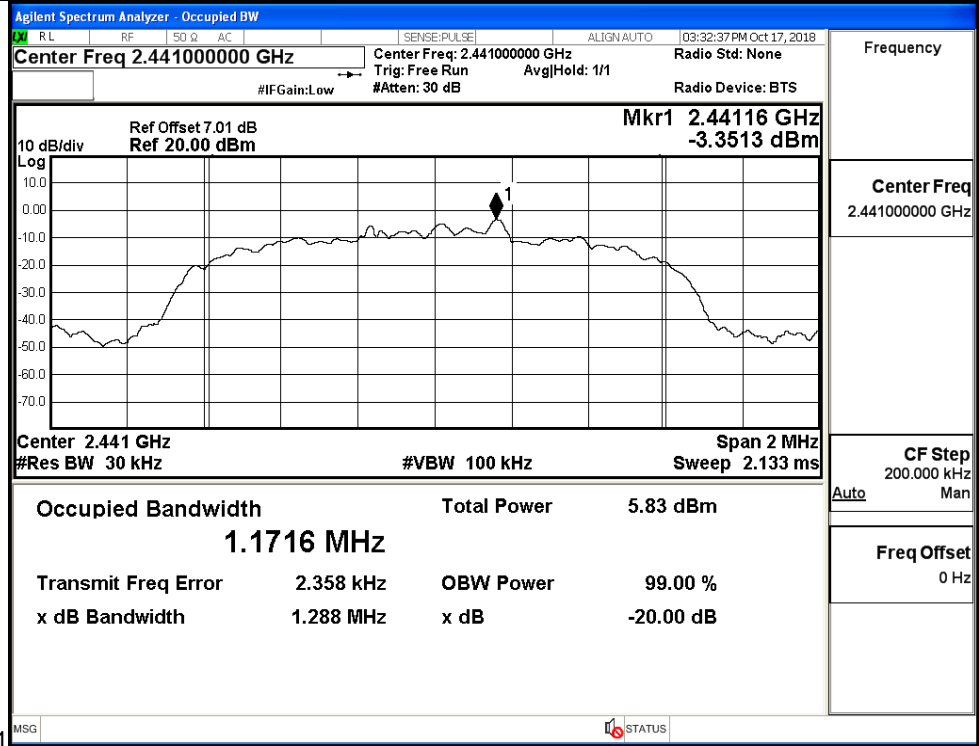
Frequency	2.48000000 GHz
Center Freq	2.48000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

8DPSK/LCH



Frequency	2.40200000 GHz
Center Freq	2.40200000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

8DPSK/MCH



Frequency

Center Freq
2.441000000 GHz

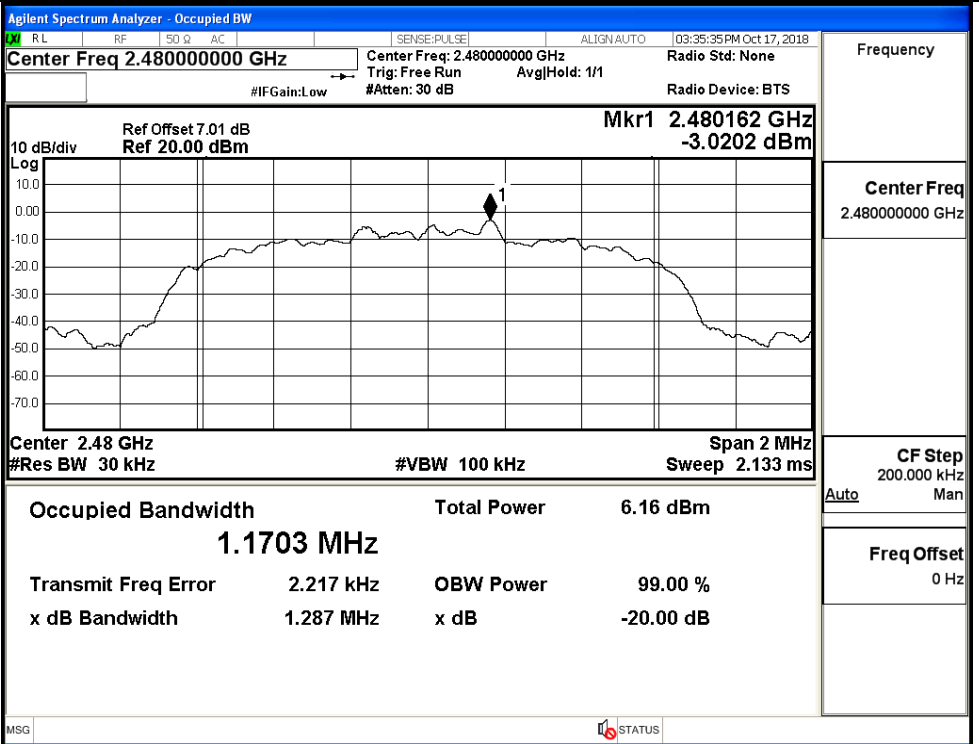
CF Step
200.000 kHz

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	1.047	0.683	PASS
	MCH	0.980	0.683	PASS
	HCH	1.086	0.683	PASS
π/4DQPSK	LCH	1.306	0.858	PASS
	MCH	0.992	0.858	PASS
	HCH	1.144	0.858	PASS
8DPSK	LCH	0.734	0.859	PASS
	MCH	1.188	0.859	PASS
	HCH	0.862	0.859	PASS

Test Graphs

GFSK/LCH

Agilent Spectrum Analyzer - Swept SA

Center Freq 2.402500000 GHz

Ref Offset 7.01 dB
Ref 20.00 dBm

ΔMkr1 1.046 75 MHz
0.148 dB

Start 2.401500 GHz
#Res BW 100 kHz

Stop 2.403500 GHz
Sweep 1.067 ms (8001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ2	f	(Δ)	1.046 75 MHz (Δ)	0.148 dB			
2	F	f		2.402 002 50 GHz	-2.269 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

Frequency

Auto Tune

Center Freq
2.402500000 GHz

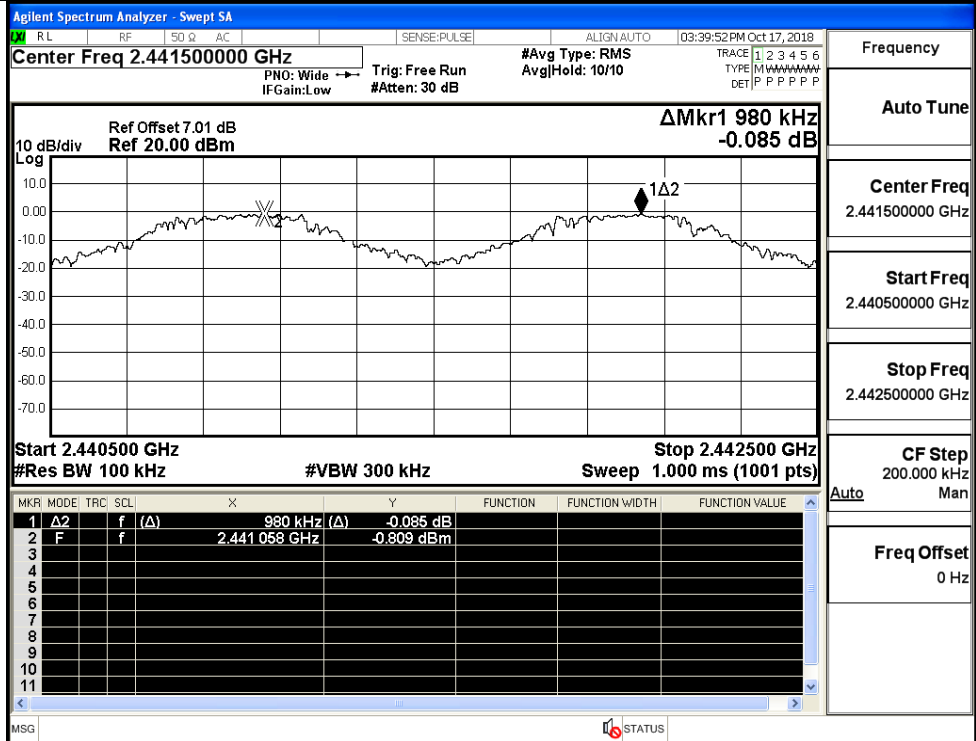
Start Freq
2.401500000 GHz

Stop Freq
2.403500000 GHz

CF Step
200.000 kHz
Auto Man

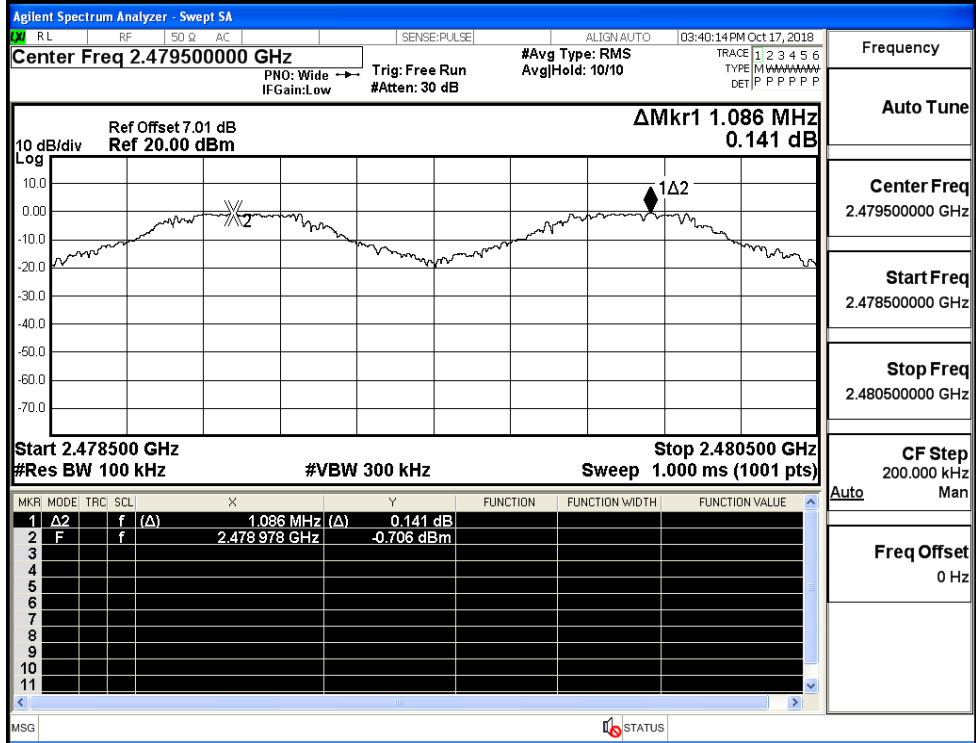
Freq Offset
0 Hz

GFSK/MCH



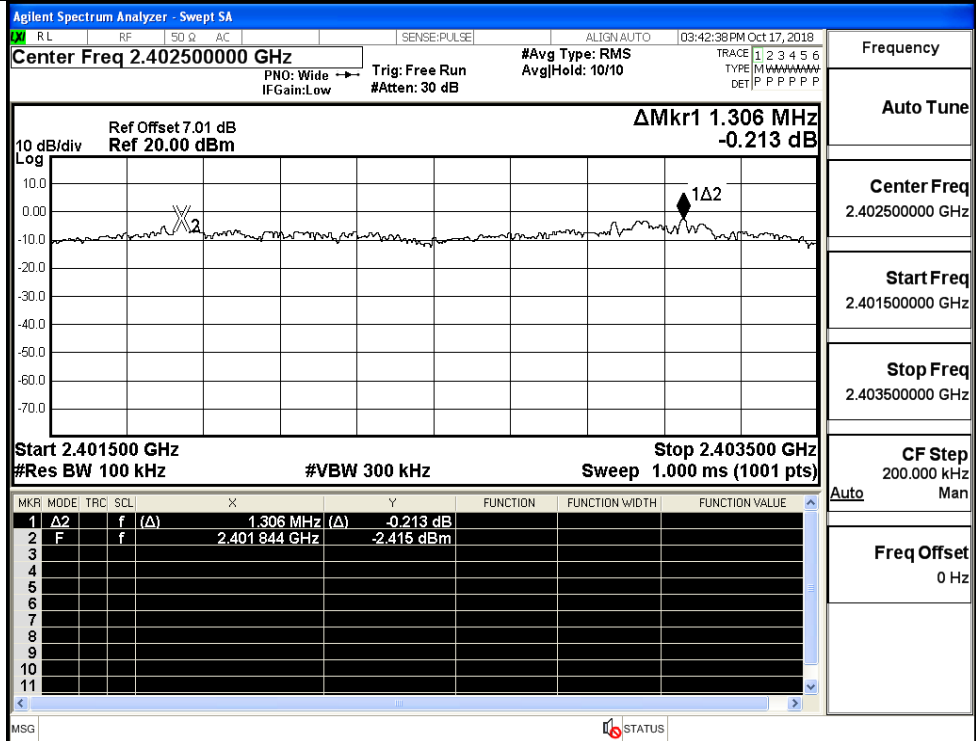
Frequency
Auto Tune
Center Freq
2.441500000 GHz
Start Freq
2.440500000 GHz
Stop Freq
2.442500000 GHz
CF Step
200.000 kHz
Man
Freq Offset
0 Hz

GFSK/HCH

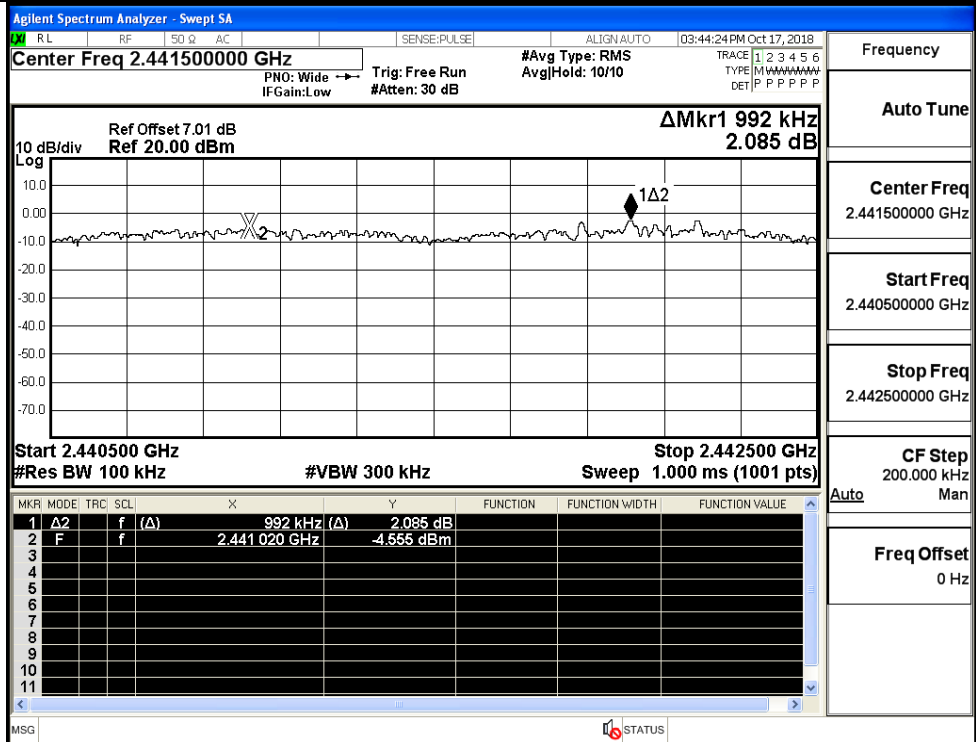


Frequency
Auto Tune
Center Freq
2.479500000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.480500000 GHz
CF Step
200.000 kHz
Man
Freq Offset
0 Hz

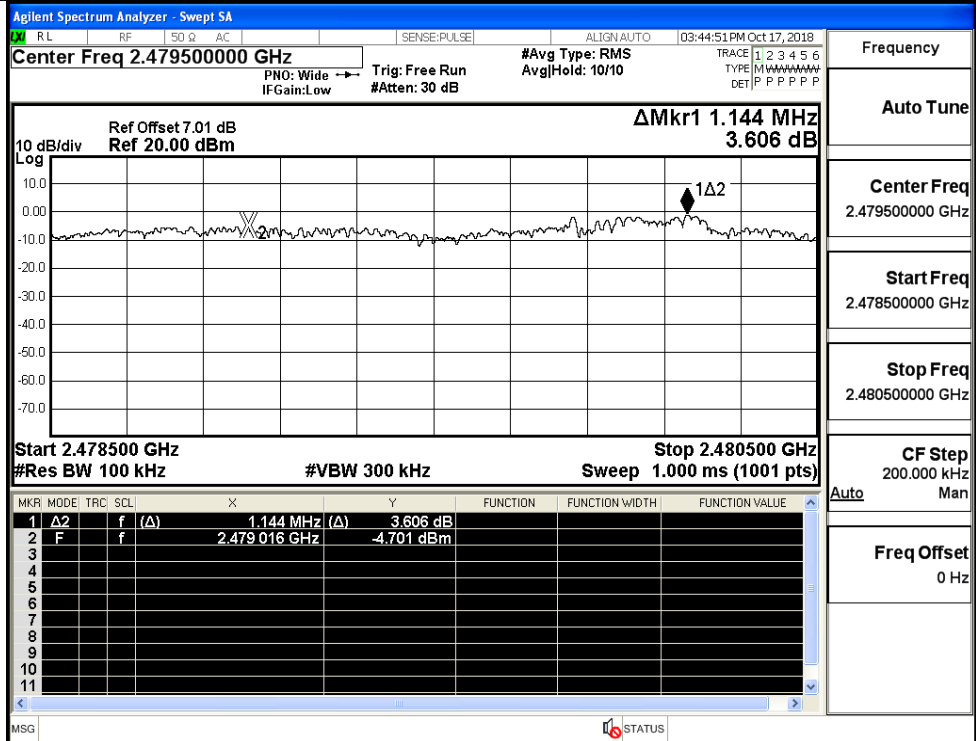
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH



π/4DQPSK/HCH



Frequency

Auto Tune

Center Freq
2.479500000 GHz

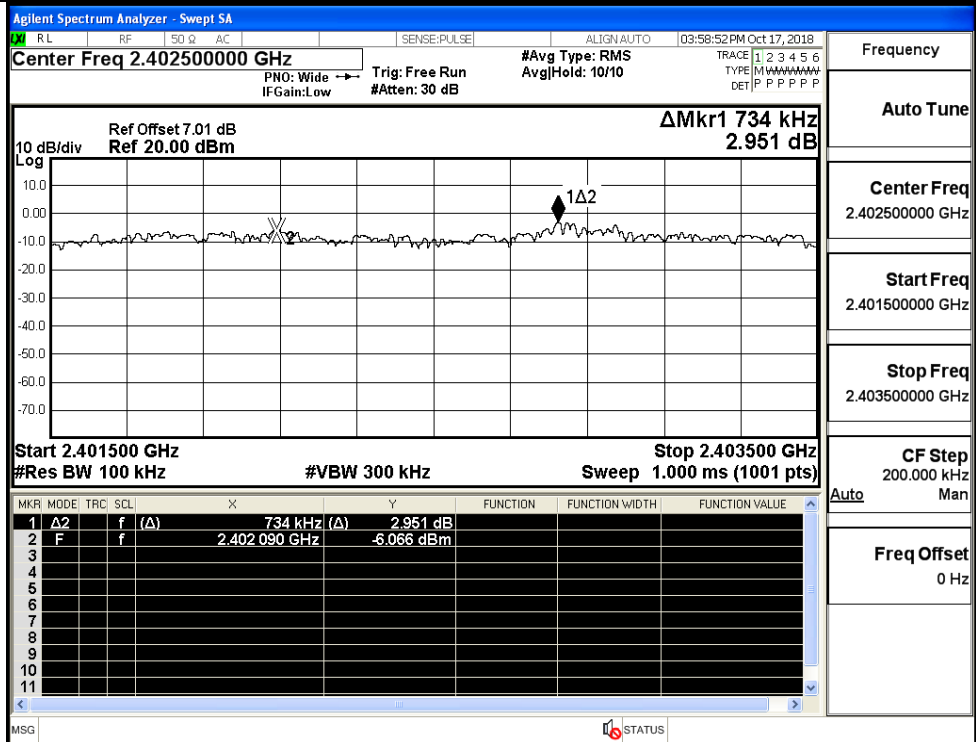
Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

CF Step
200.000 kHz

Freq Offset
0 Hz

8DPSK/LCH



Frequency

Auto Tune

Center Freq
2.402500000 GHz

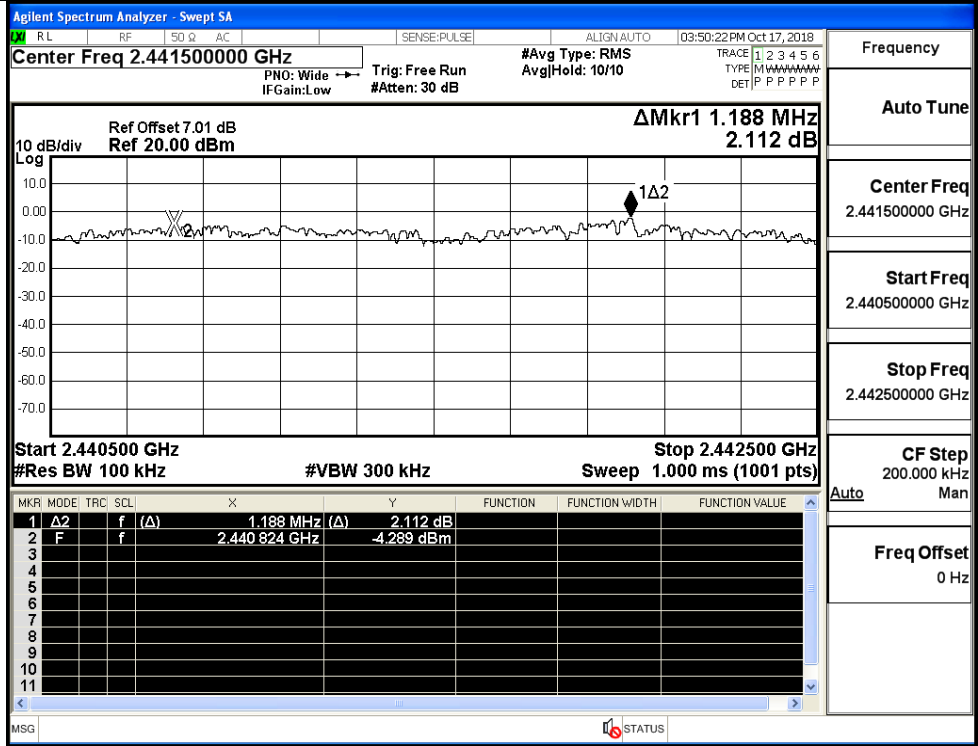
Start Freq
2.401500000 GHz

Stop Freq
2.403500000 GHz

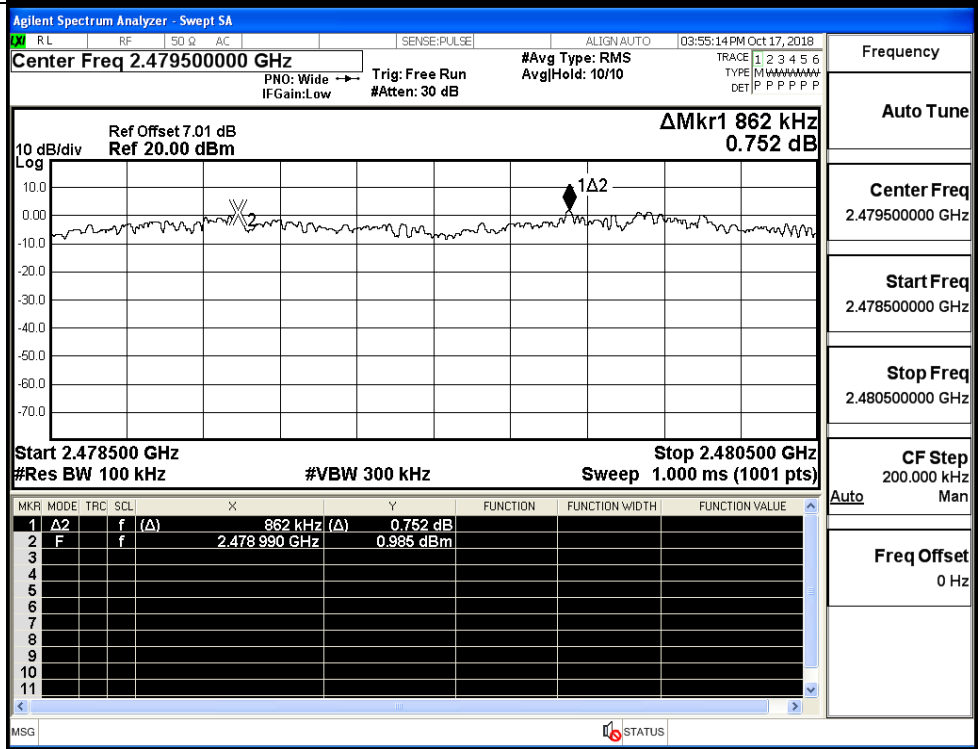
CF Step
200.000 kHz

Freq Offset
0 Hz

8DPSK/MCH



8DPSK/HCH

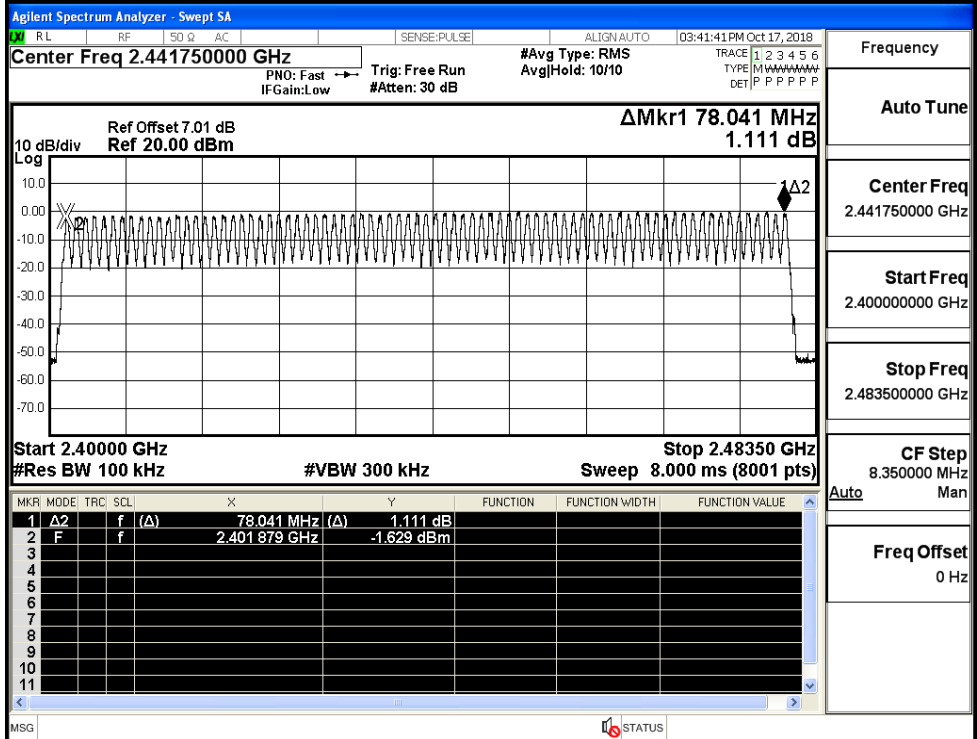


A.4 Hopping Channel Number

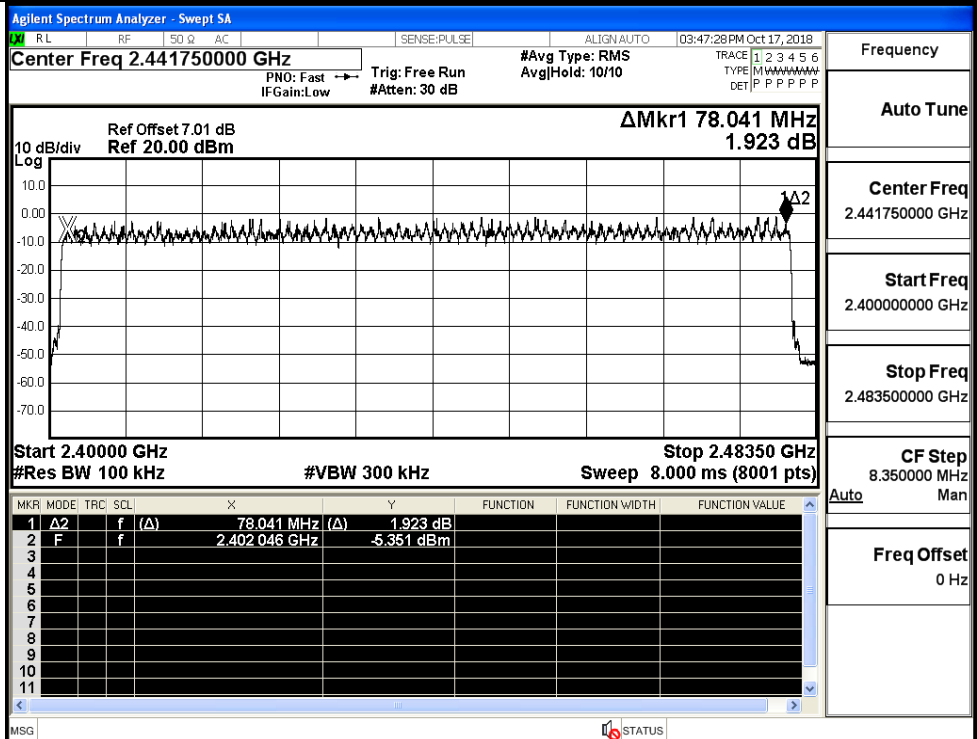
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graphs

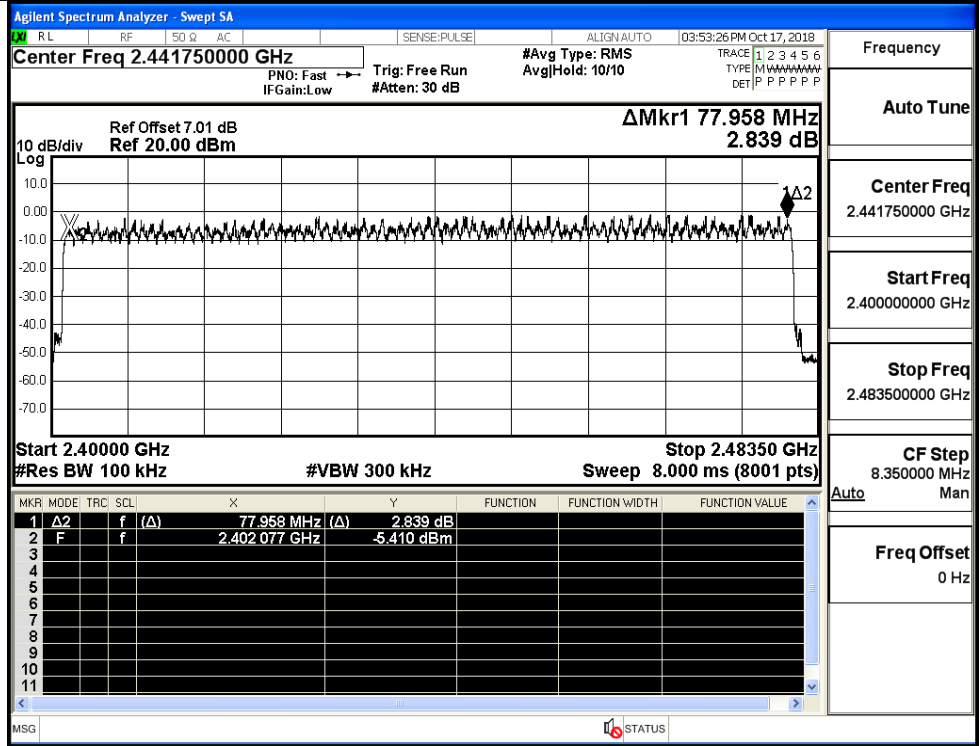
GFSK/Hop



$\pi/4$ DQPSK/Hop

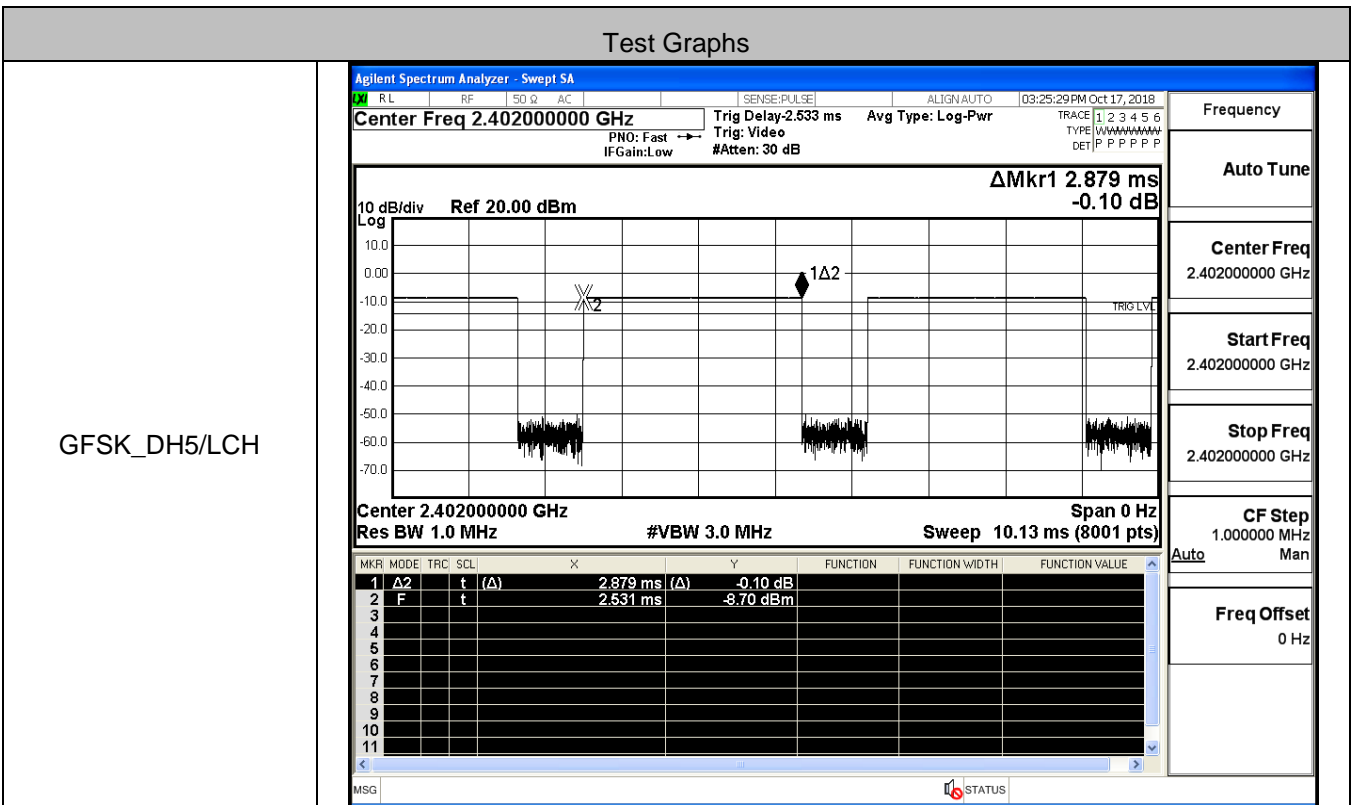


8DPSK/Hop

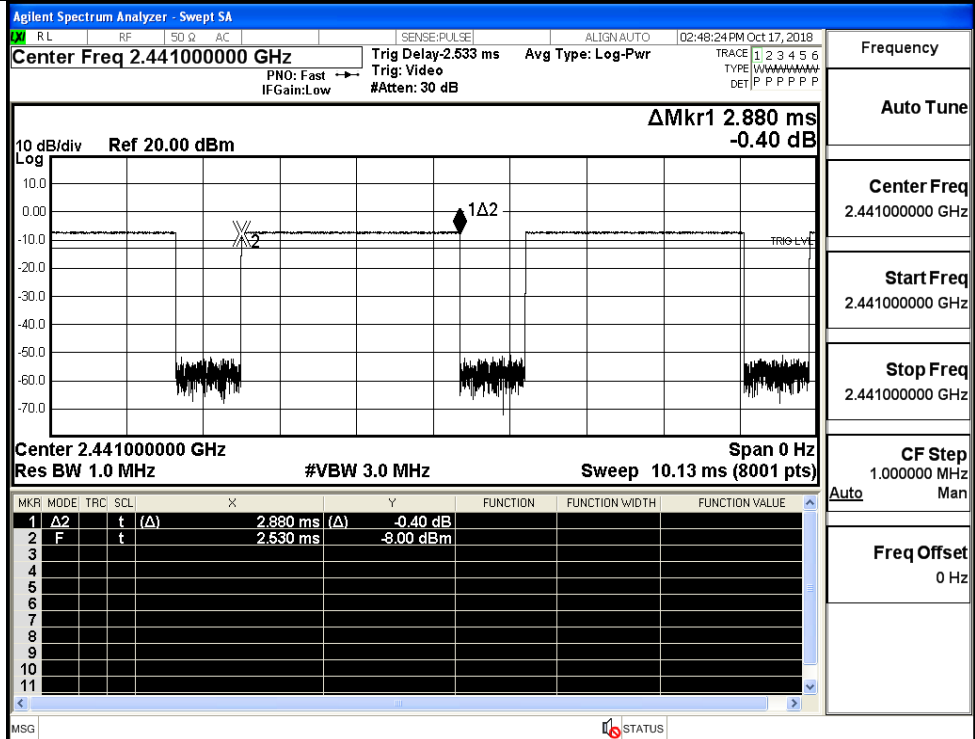


A.5 Dwell Time

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	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
π/4DQPSK	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	2.89	106.7	0.308	0.4	PASS
	3DH5	MCH	2.89	106.7	0.308	0.4	PASS
	3DH5	HCH	2.89	106.7	0.308	0.4	PASS

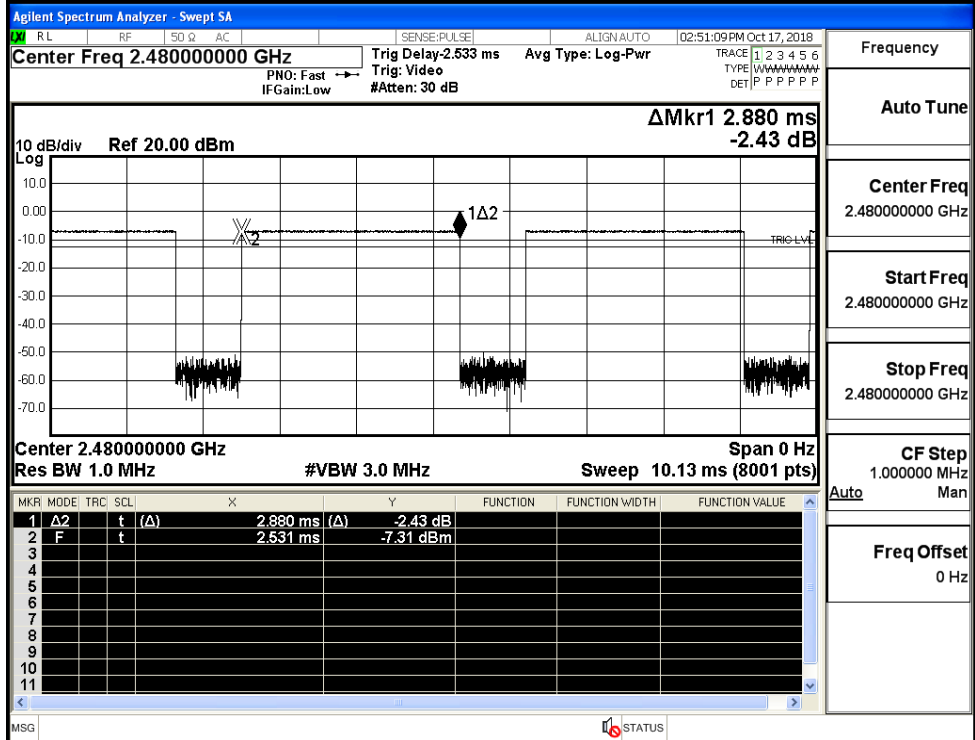


GFSK_DH5/MCH



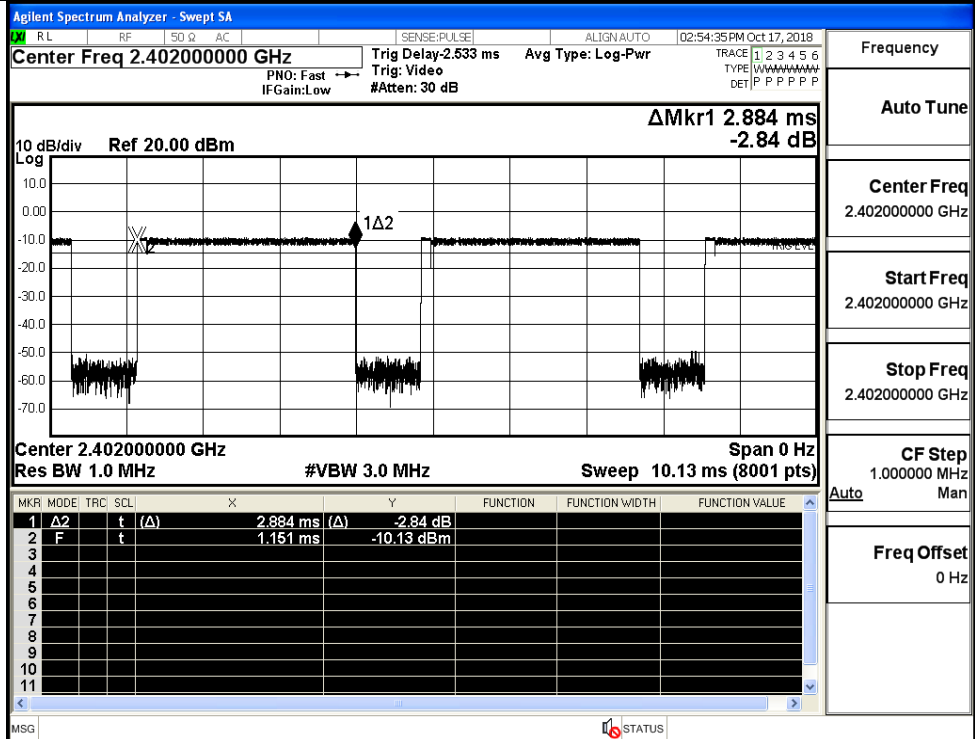
Frequency	
Auto Tune	
Center Freq	2.441000000 GHz
Start Freq	2.441000000 GHz
Stop Freq	2.441000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

GFSK_DH5/HCH

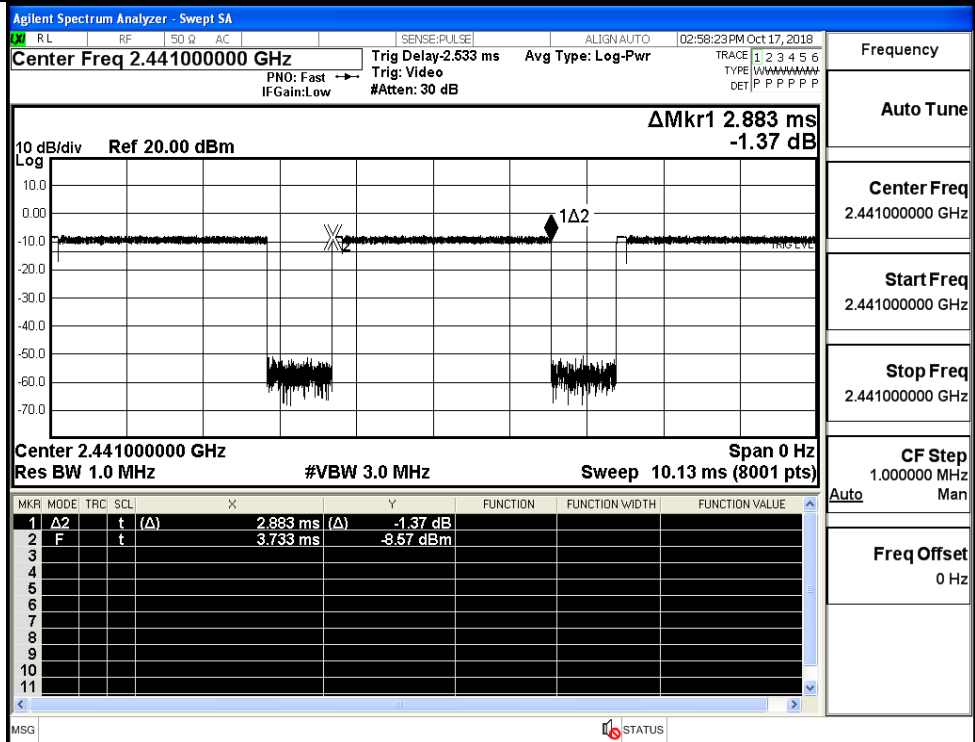


Frequency	
Auto Tune	
Center Freq	2.480000000 GHz
Start Freq	2.480000000 GHz
Stop Freq	2.480000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

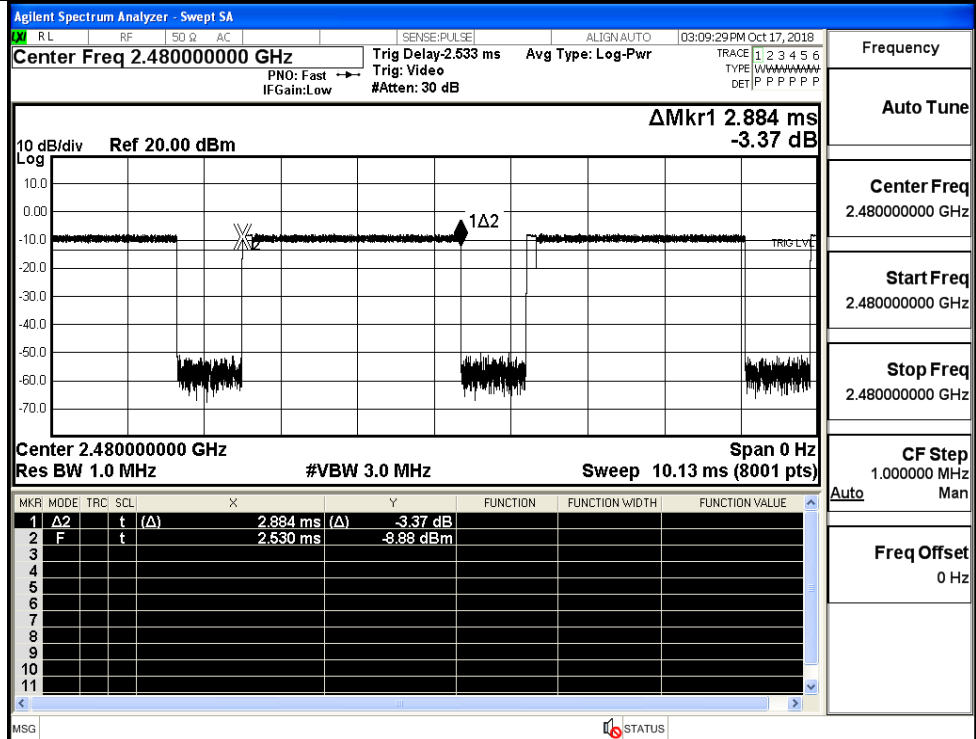
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH

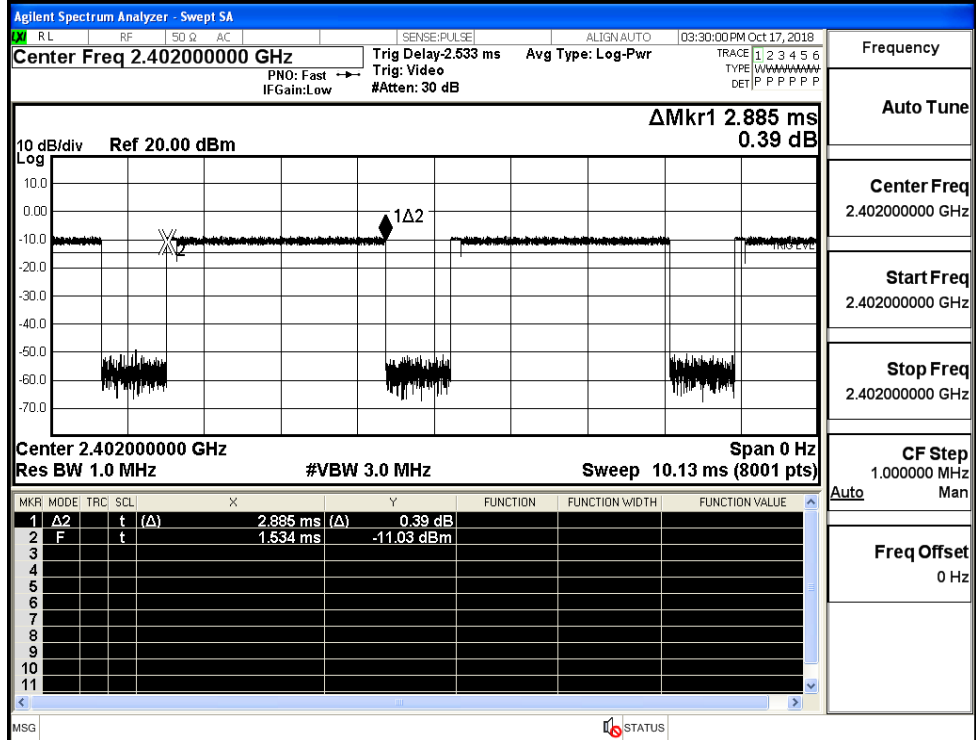


$\pi/4$ DQPSK
_2DH5/HCH



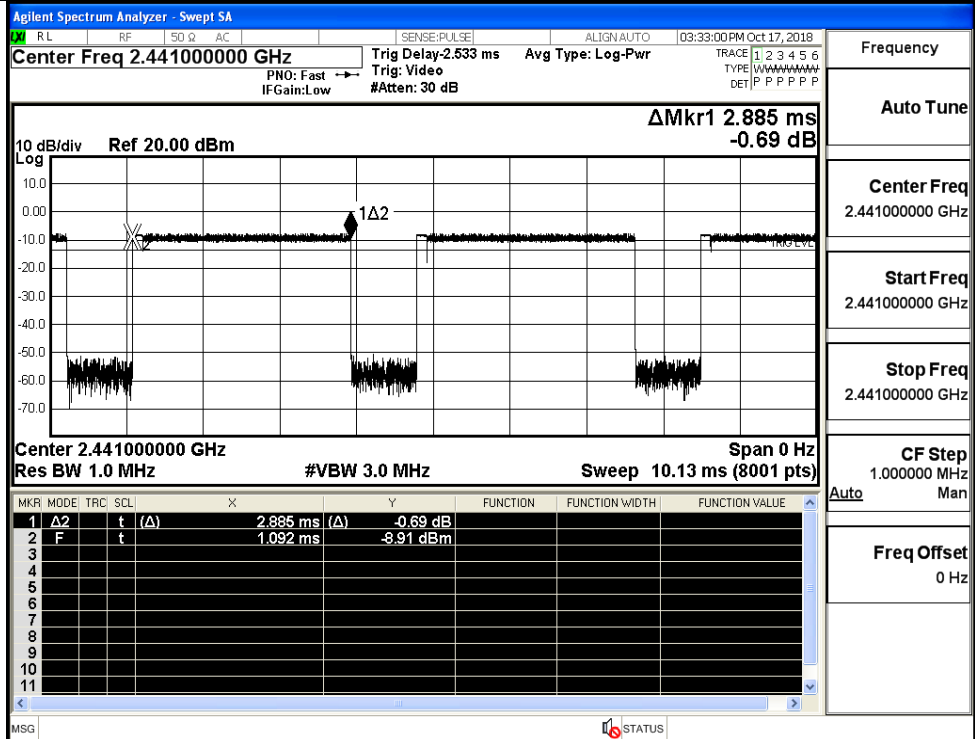
Frequency	2.480000000 GHz
Auto Tune	
Center Freq	2.480000000 GHz
Start Freq	2.480000000 GHz
Stop Freq	2.480000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

8DPSK_3DH5/LCH



Frequency	2.402000000 GHz
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

8DPSK_3DH5/MCH



Frequency

Auto Tune

Center Freq 2.441000000 GHz

Start Freq 2.441000000 GHz

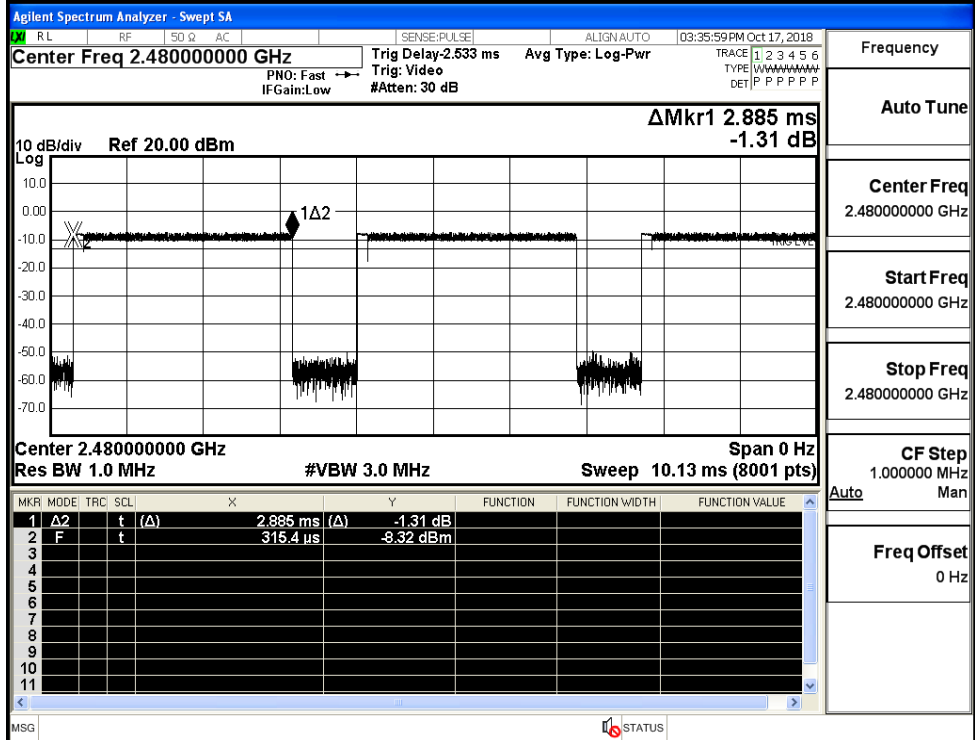
Stop Freq 2.441000000 GHz

CF Step 1.000000 MHz

Auto Man

Freq Offset 0 Hz

8DPSK_3DH5/HCH



Frequency

Auto Tune

Center Freq 2.480000000 GHz

Start Freq 2.480000000 GHz

Stop Freq 2.480000000 GHz

CF Step 1.000000 MHz

Auto Man

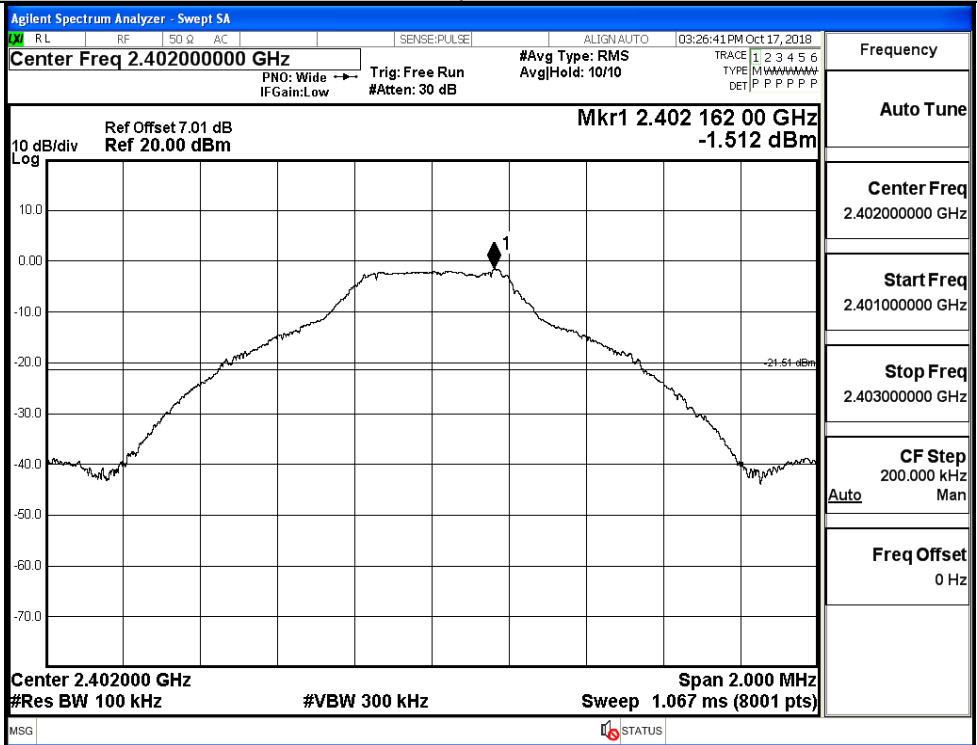
Freq Offset 0 Hz

A.6 RF Conducted Spurious Emissions

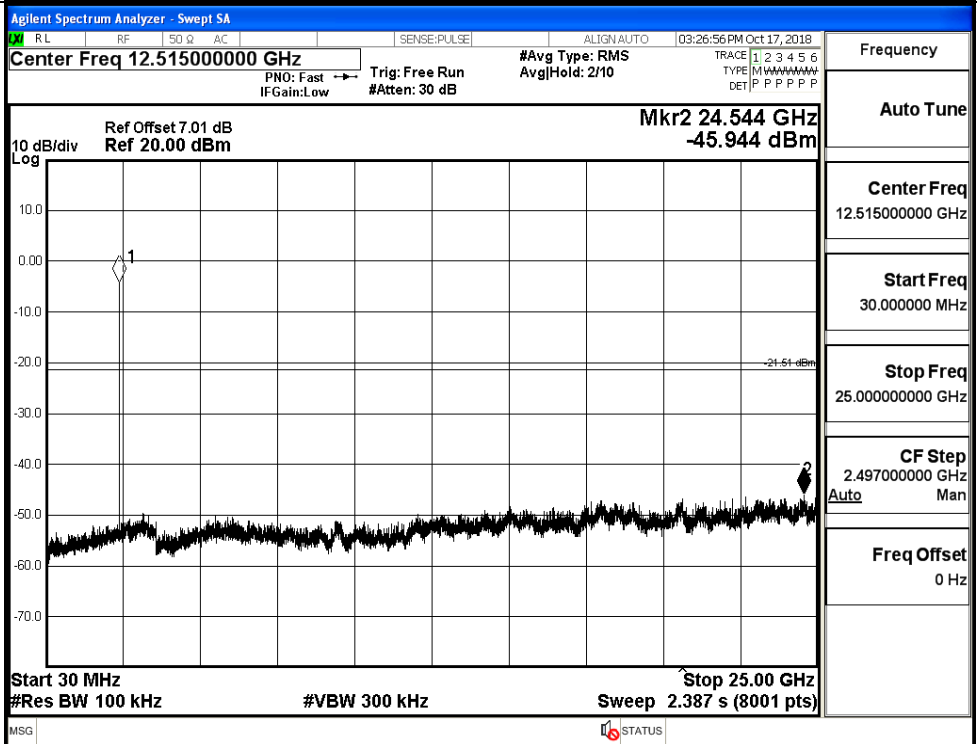
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.512	-45.944	-21.512	PASS
	MCH	-0.279	-45.775	-20.279	PASS
	HCH	-0.076	-45.840	-20.076	PASS
$\pi/4$ DQPSK	LCH	-2.385	-45.582	-22.385	PASS
	MCH	-1.203	-46.094	-21.203	PASS
	HCH	-1.334	-46.210	-21.334	PASS
8DPSK	LCH	-2.74	-46.231	-22.740	PASS
	MCH	-1.2	-46.162	-21.200	PASS
	HCH	-1.134	-45.887	-21.134	PASS

GFSK_LCH_Graphs

Pref

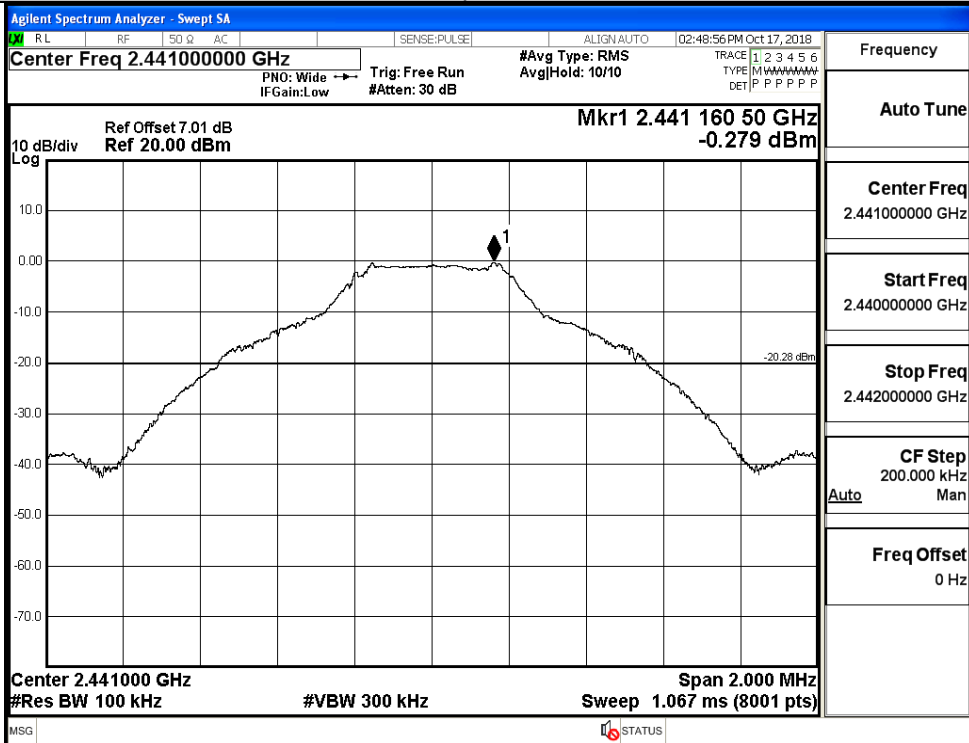


Puw

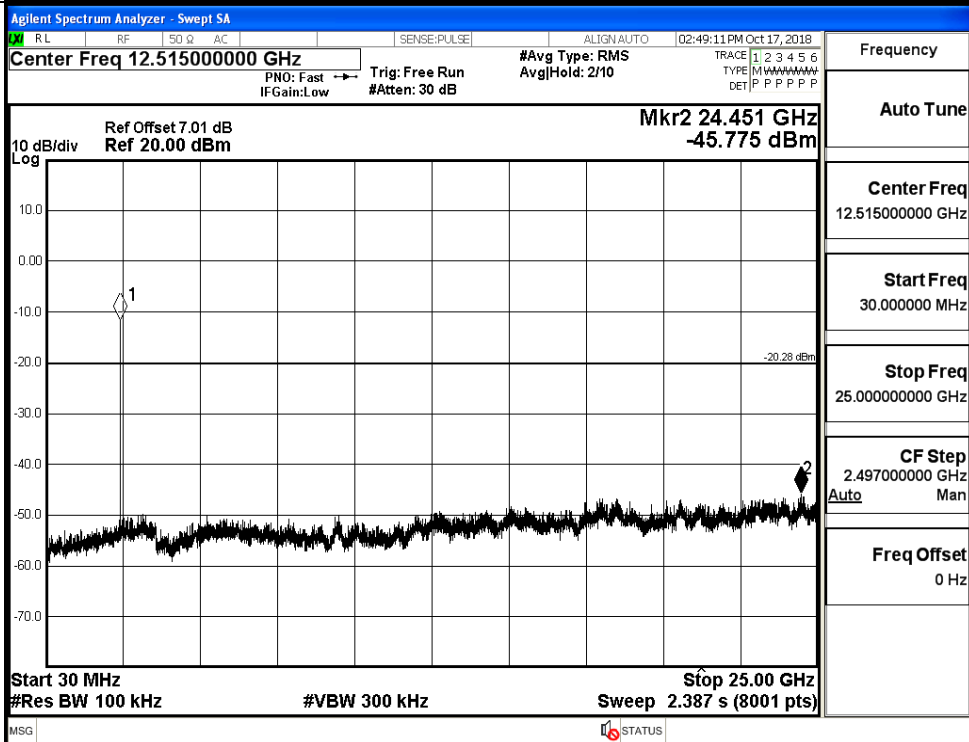


GFSK_MCH_Graphs

Pref

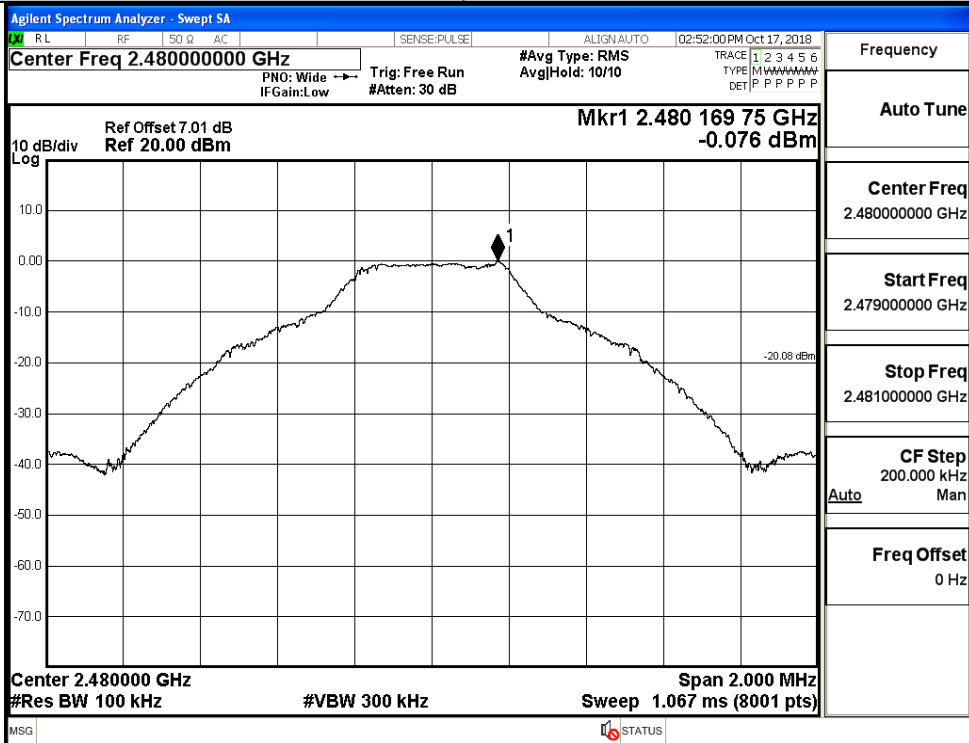


Puw

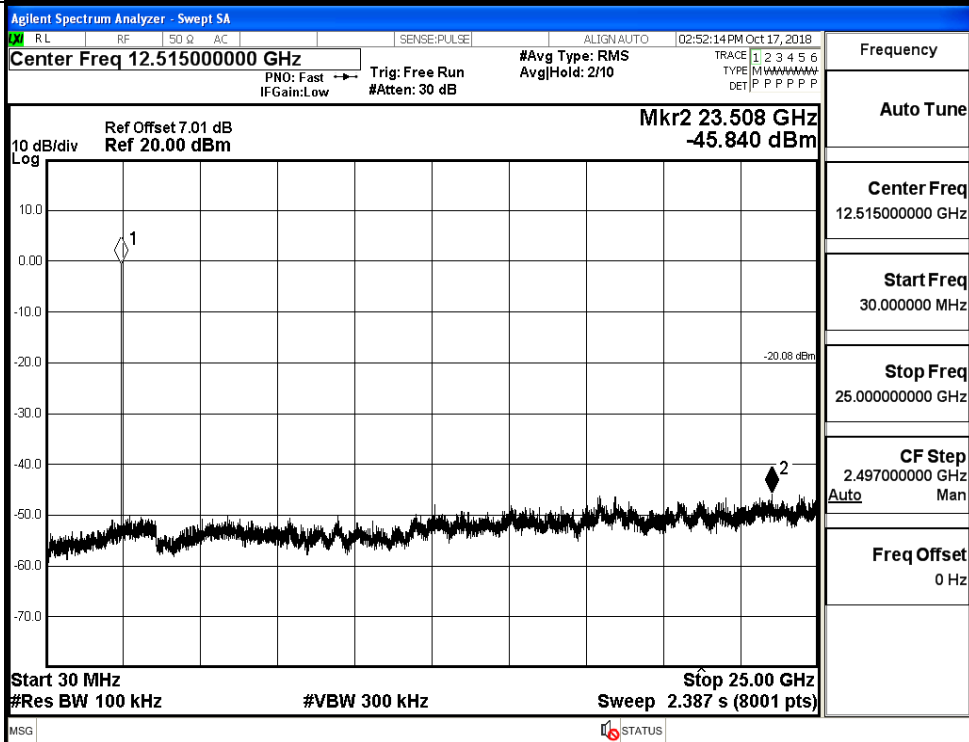


GFSK_HCH_Graphs

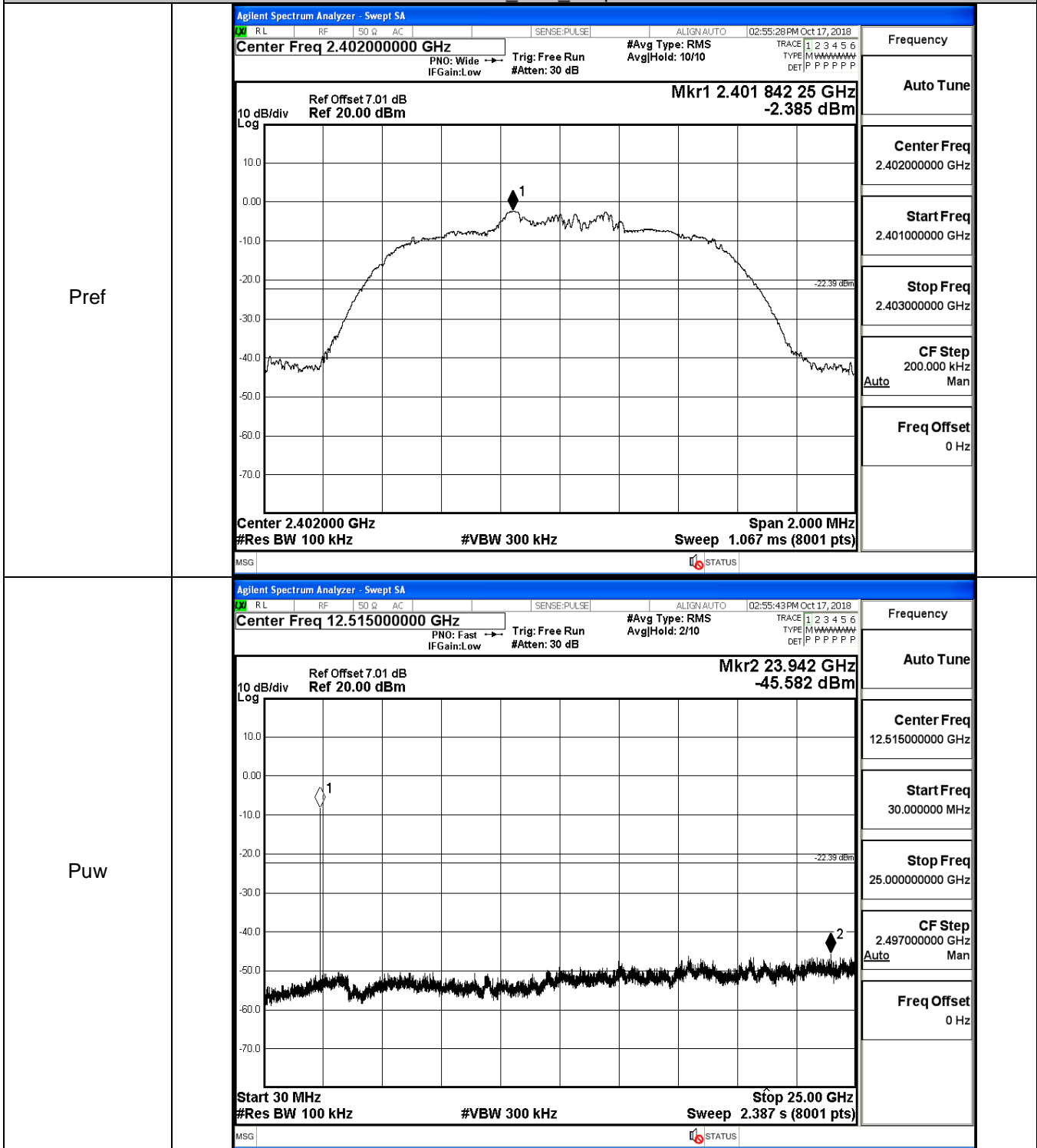
Pref



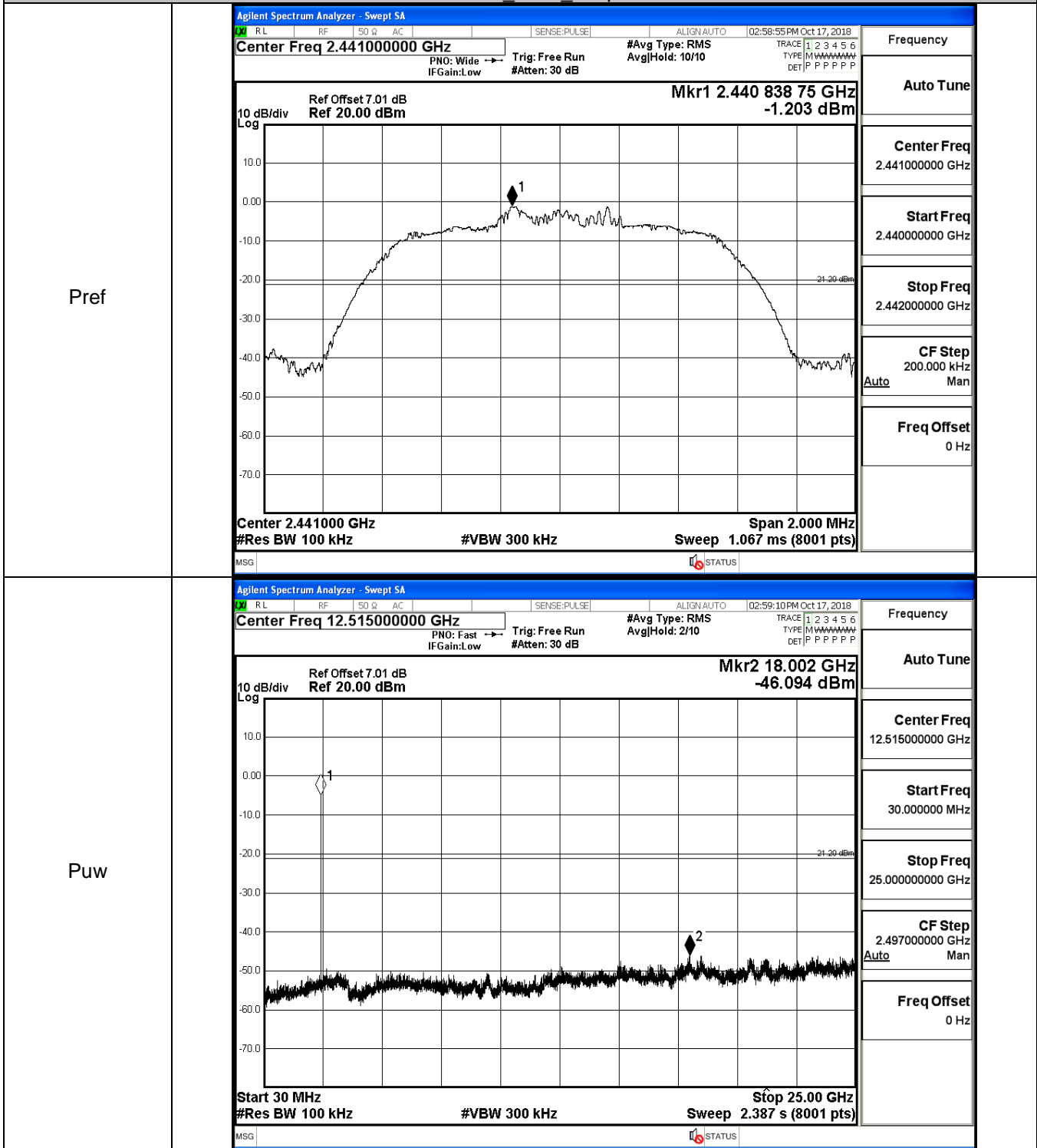
Puw



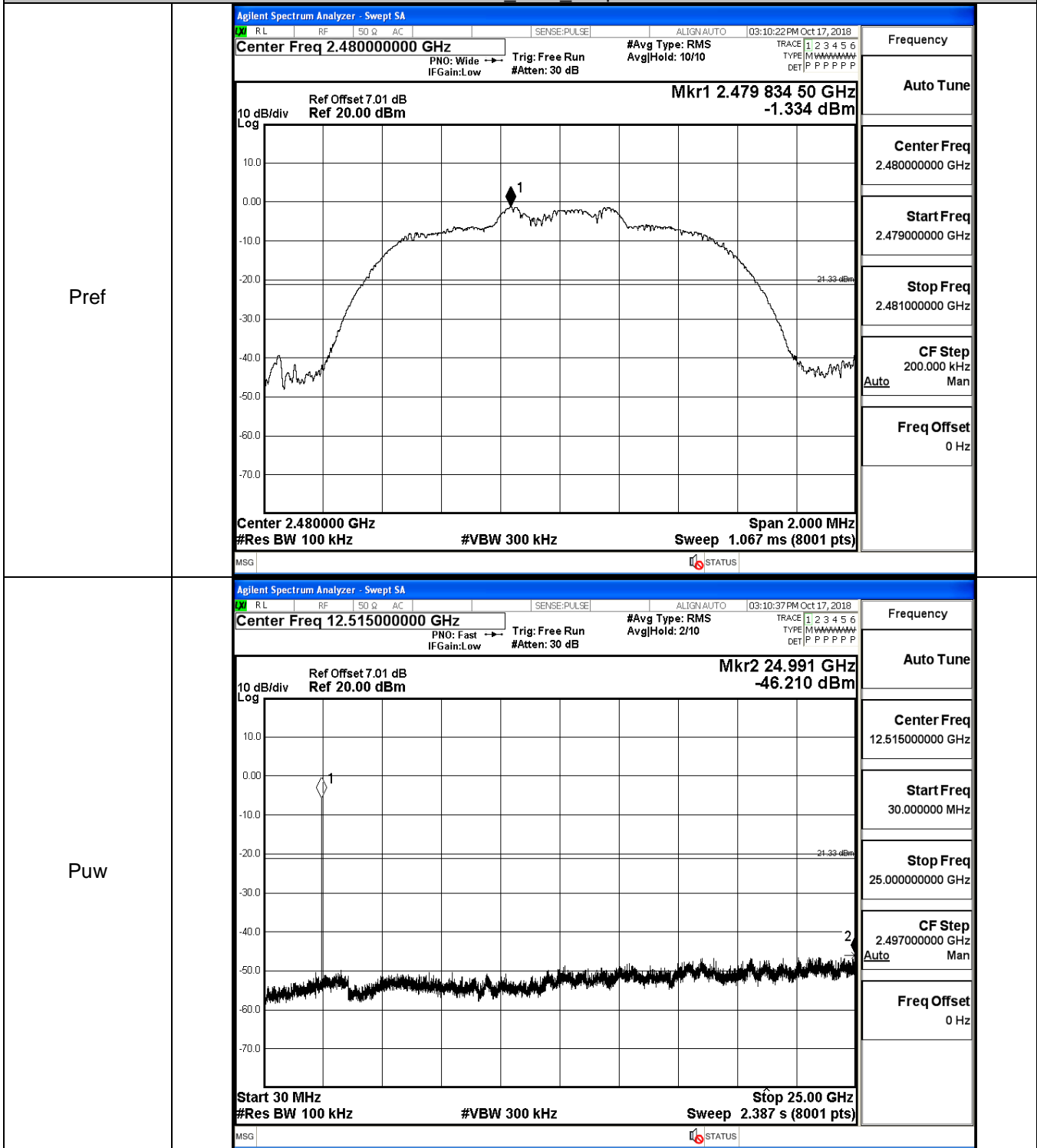
$\pi/4$ DQPSK LCH_Graphs



$\pi/4$ DQPSK_MCH_Graphs

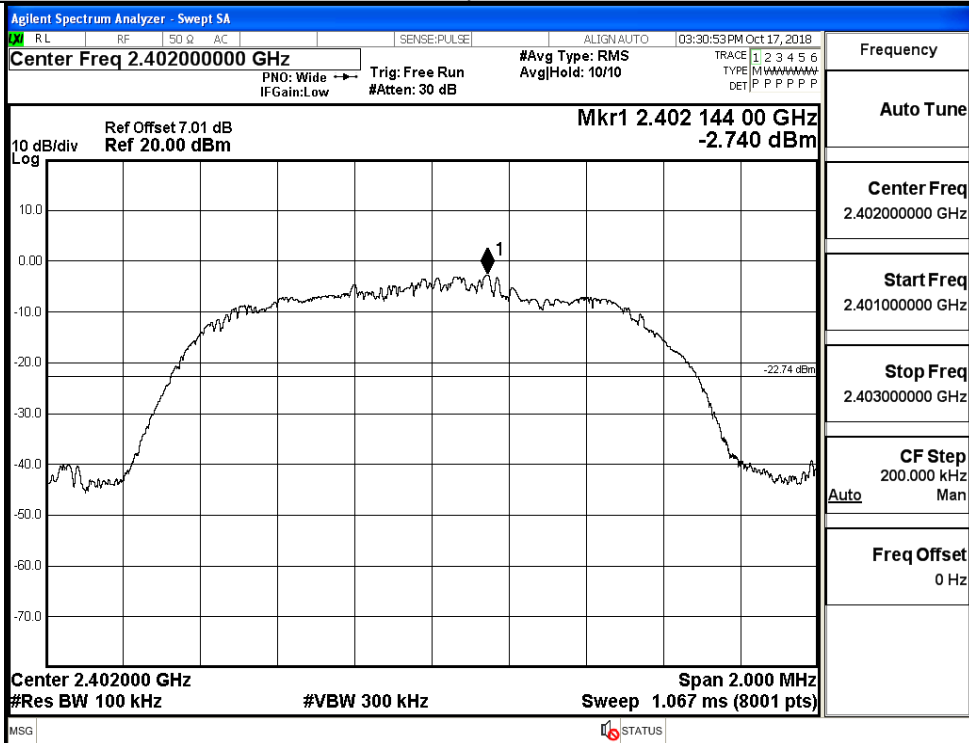


$\pi/4$ DQPSK_HCH_Graphs

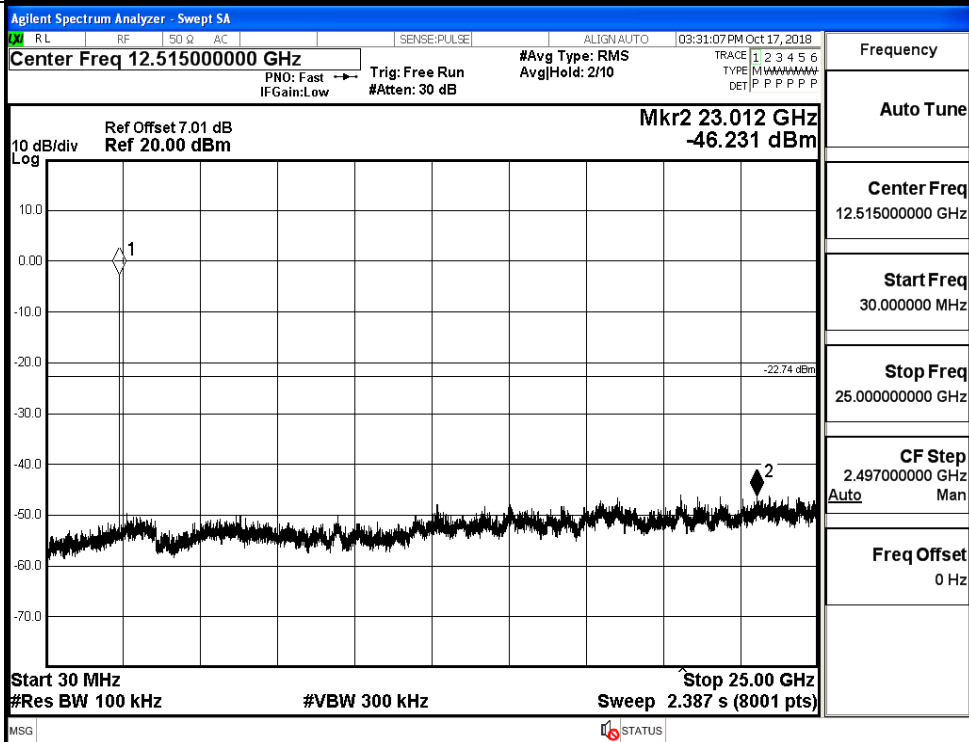


8DPSK_LCH_Graphs

Pref

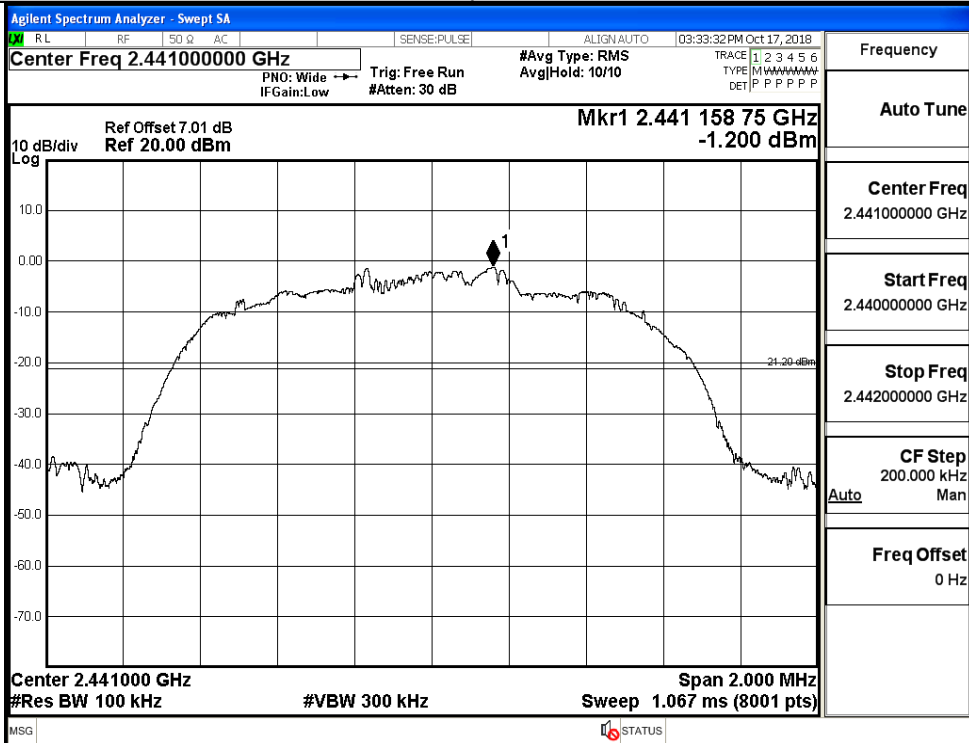


Puw

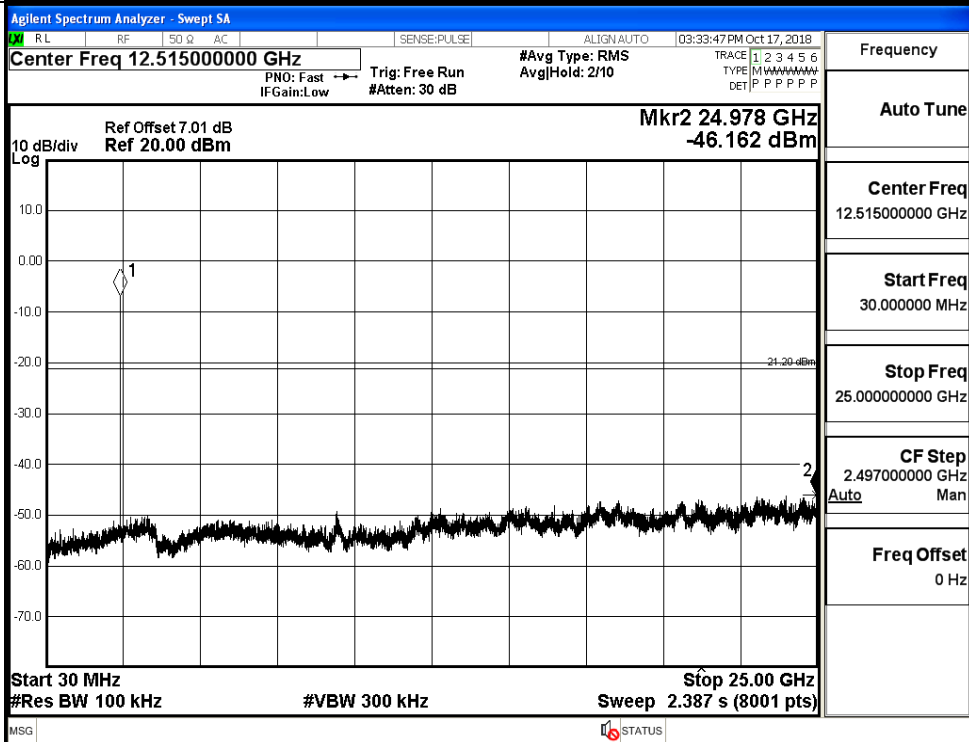


8DPSK_MCH_Graphs

Pref

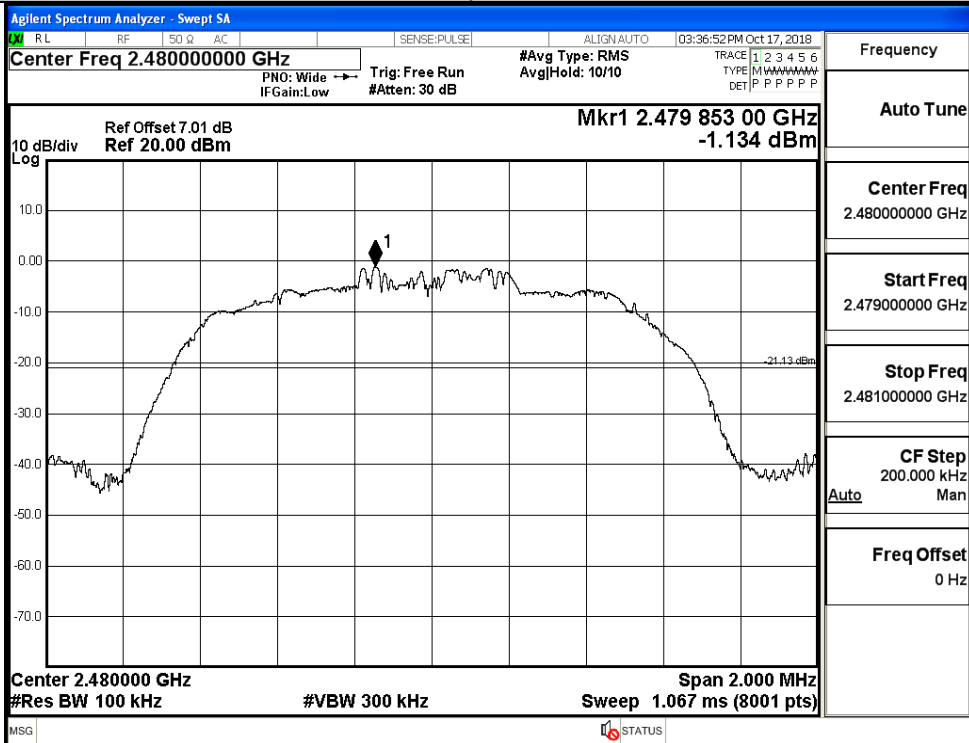


Puw

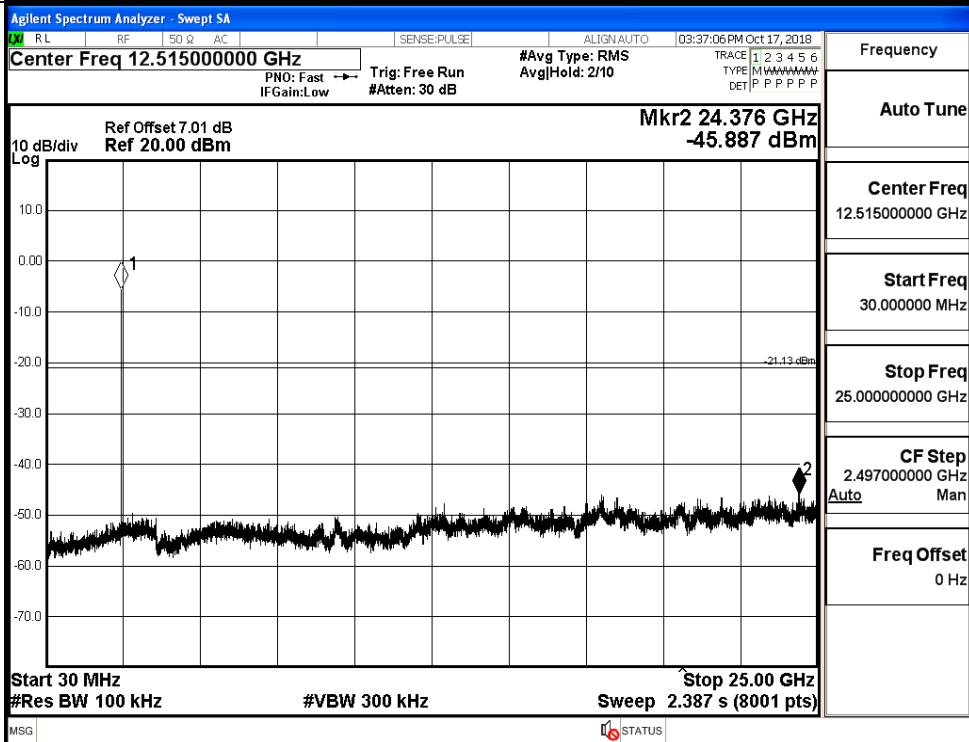


8DPSK_HCH_Graphs

Pref



Puw

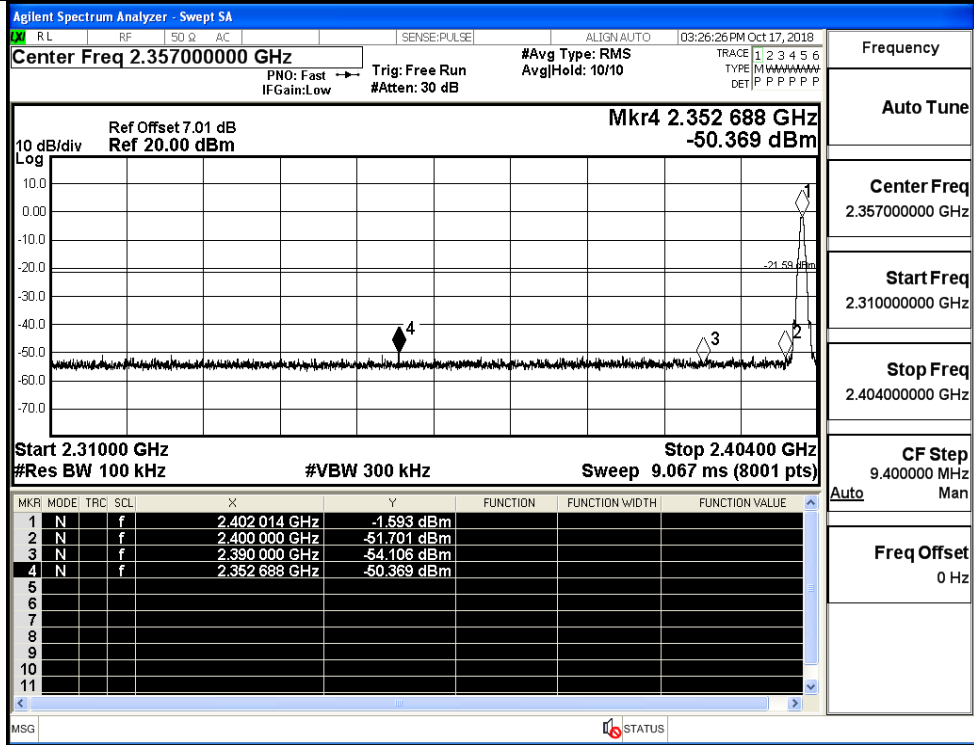


A.7 Band-edge for RF Conducted Emissions

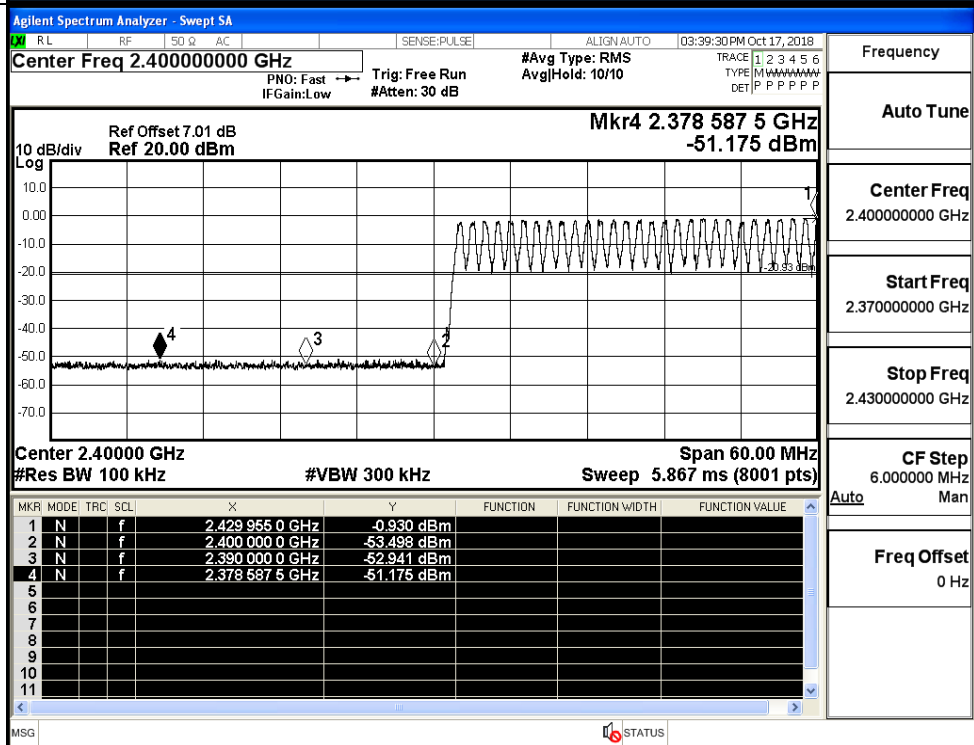
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-1.593	Off	-50.369	-21.59	PASS
			-0.930	On	-51.175	-20.93	PASS
	HCH	2480	0.118	Off	-51.008	-19.88	PASS
			-0.180	On	-49.864	-20.18	PASS
$\pi/4$ DQPSK	LCH	2402	-2.465	Off	-51.269	-22.47	PASS
			-1.826	On	-50.663	-21.83	PASS
	HCH	2480	-1.253	Off	-50.979	-21.25	PASS
			-1.026	On	-50.048	-21.03	PASS
8DPSK	LCH	2402	-2.488	Off	-51.077	-22.49	PASS
			-1.790	On	-50.155	-21.79	PASS
	HCH	2480	-0.918	Off	-51.182	-20.92	PASS
			-1.016	On	-50.079	-21.02	PASS

Test Graphs

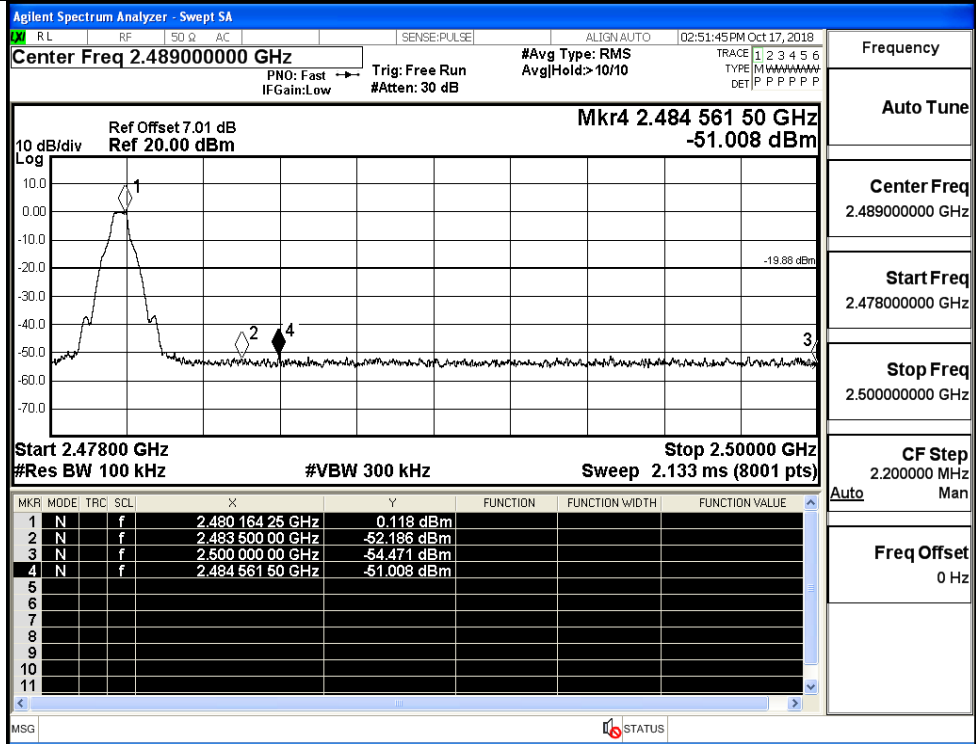
GFSK/LCH/No Hop



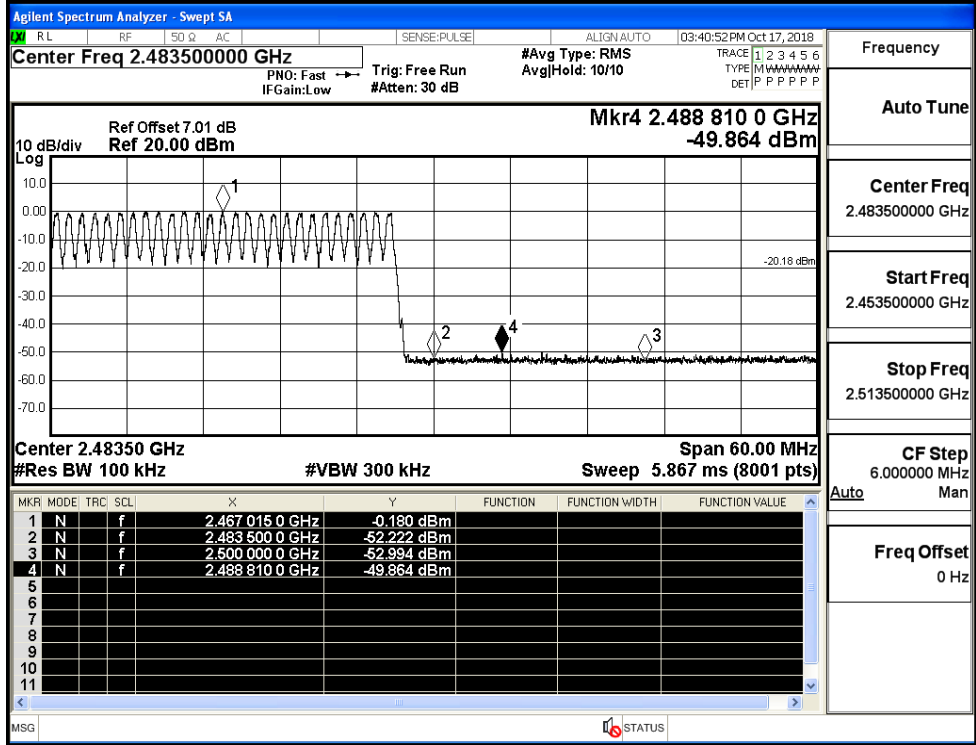
GFSK/LCH/Hop



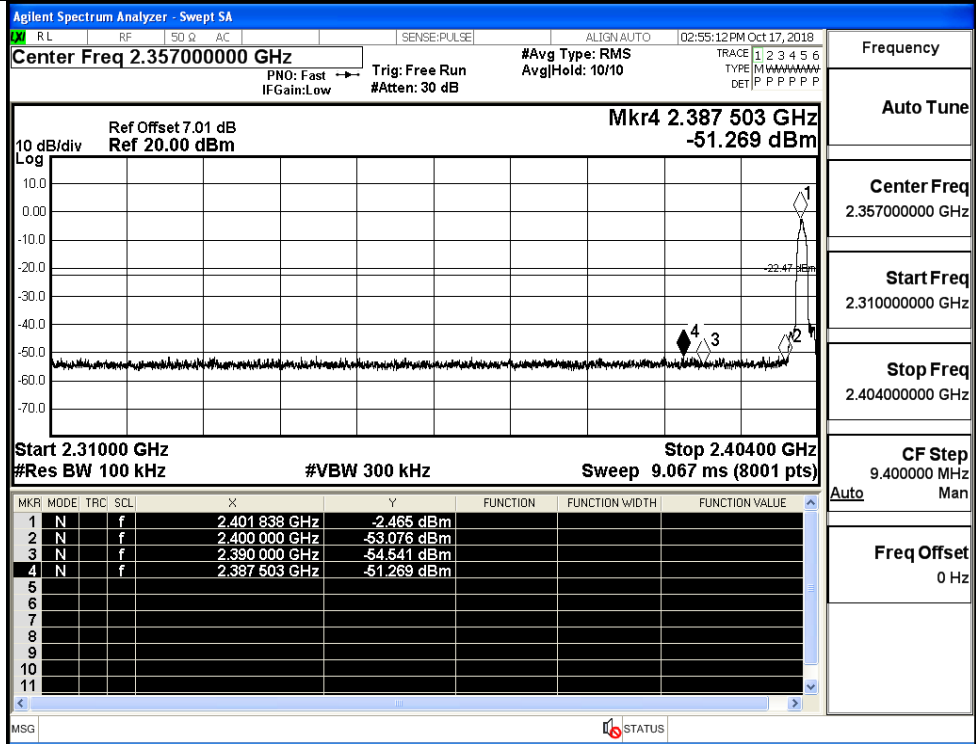
GFSK/HCH/No Hop



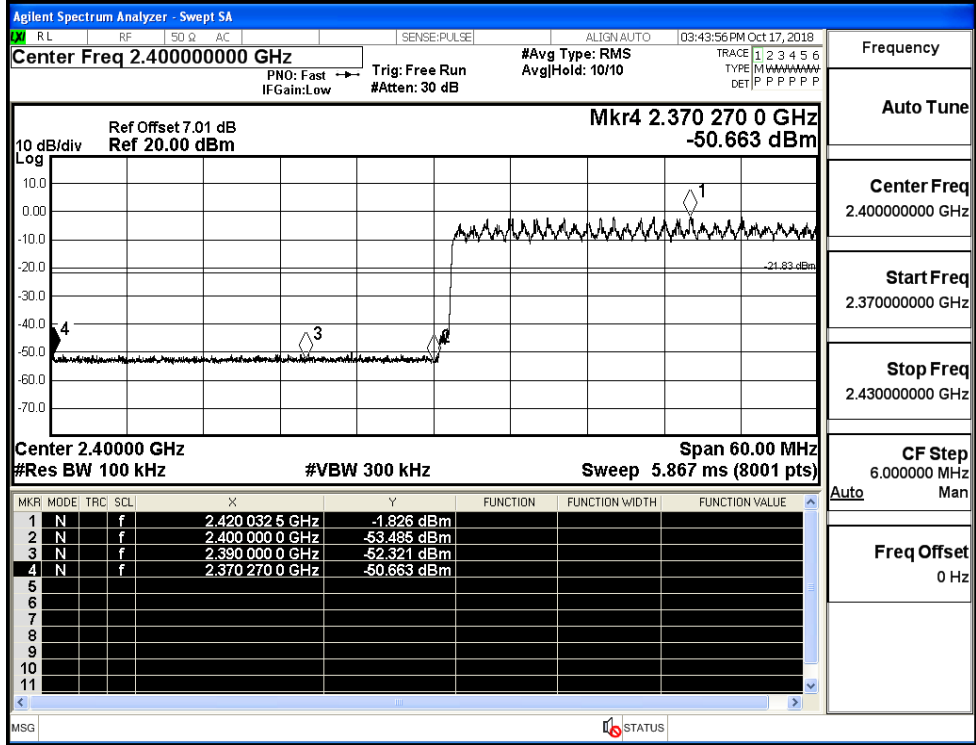
GFSK/HCH/Hop



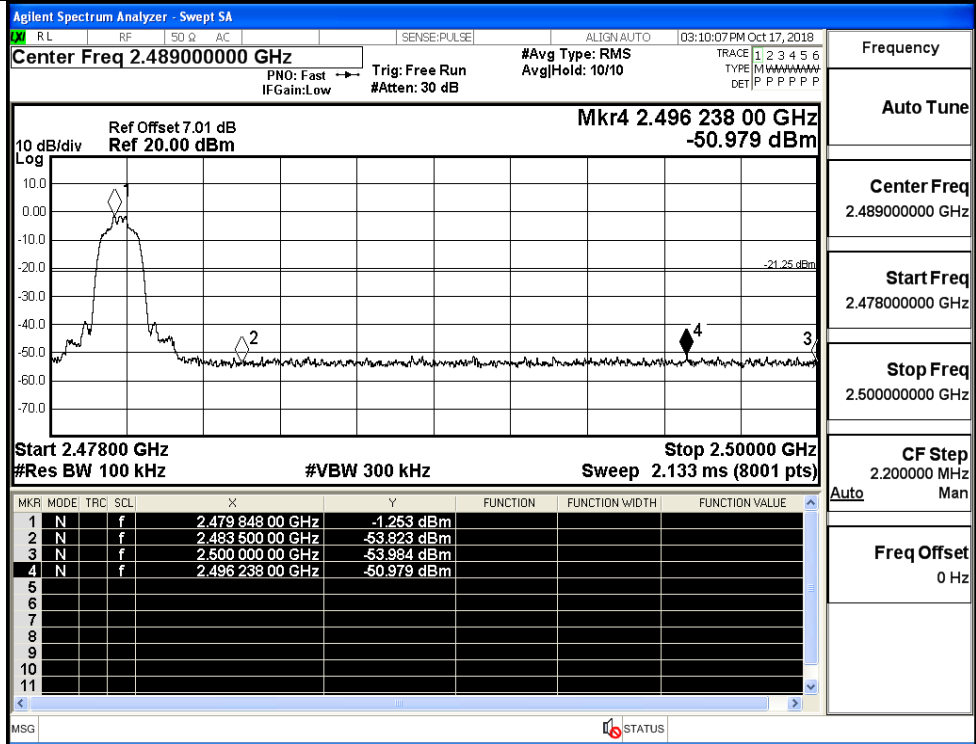
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop

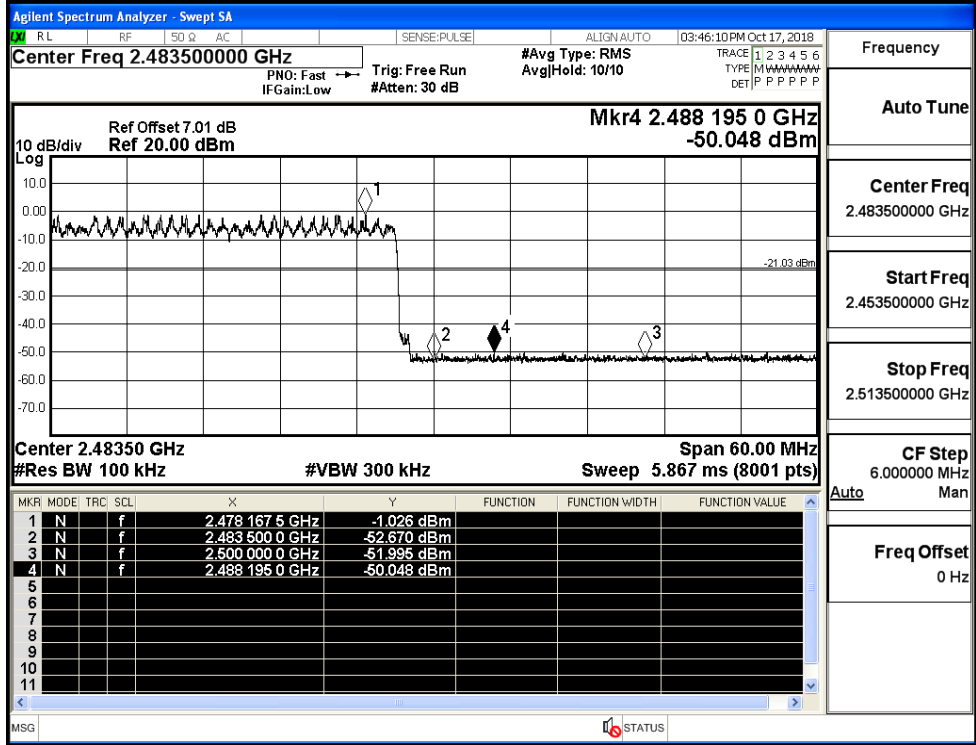


π /4DQPSK/HCH/No
Hop



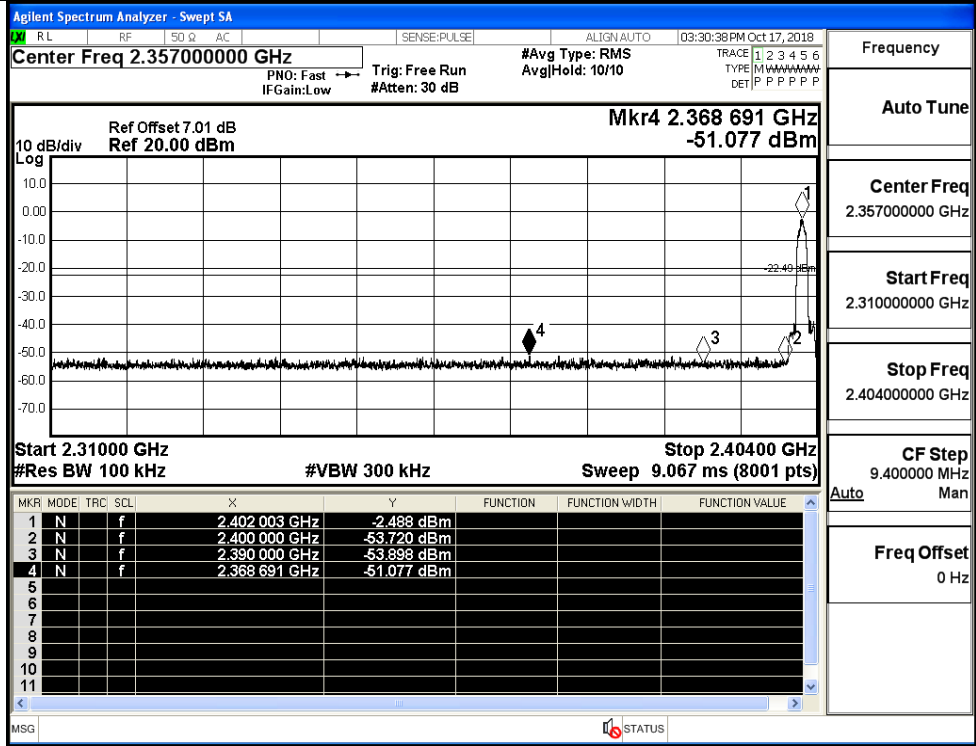
Frequency
Auto Tune
Center Freq 2.489000000 GHz
Start Freq 2.478000000 GHz
Stop Freq 2.500000000 GHz
CF Step 2.200000 MHz
Auto
Man
Freq Offset 0 Hz

π /4DQPSK/HCH/Hop



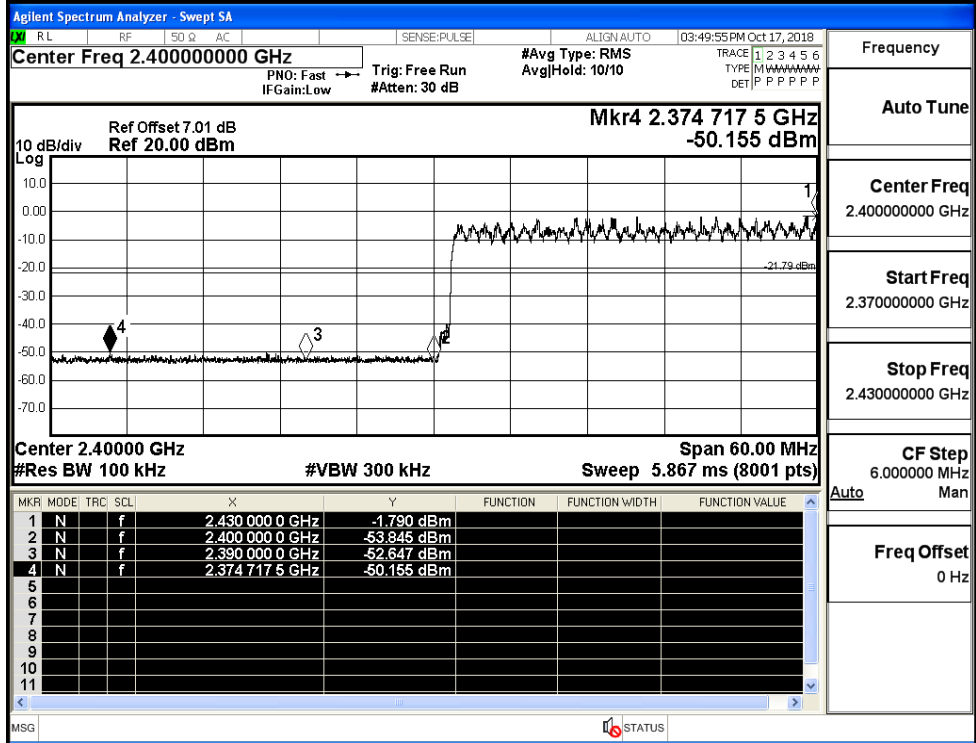
Frequency
Auto Tune
Center Freq 2.483500000 GHz
Start Freq 2.453500000 GHz
Stop Freq 2.513500000 GHz
CF Step 6.000000 MHz
Auto
Man
Freq Offset 0 Hz

8DPSK/LCH/No Hop



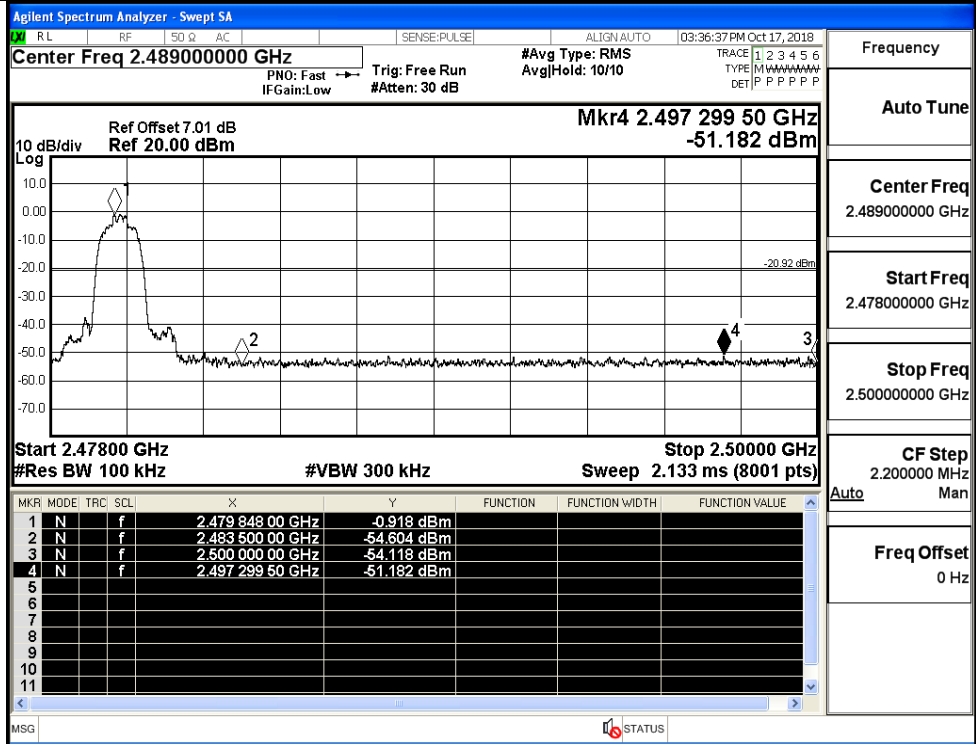
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/LCH/Hop



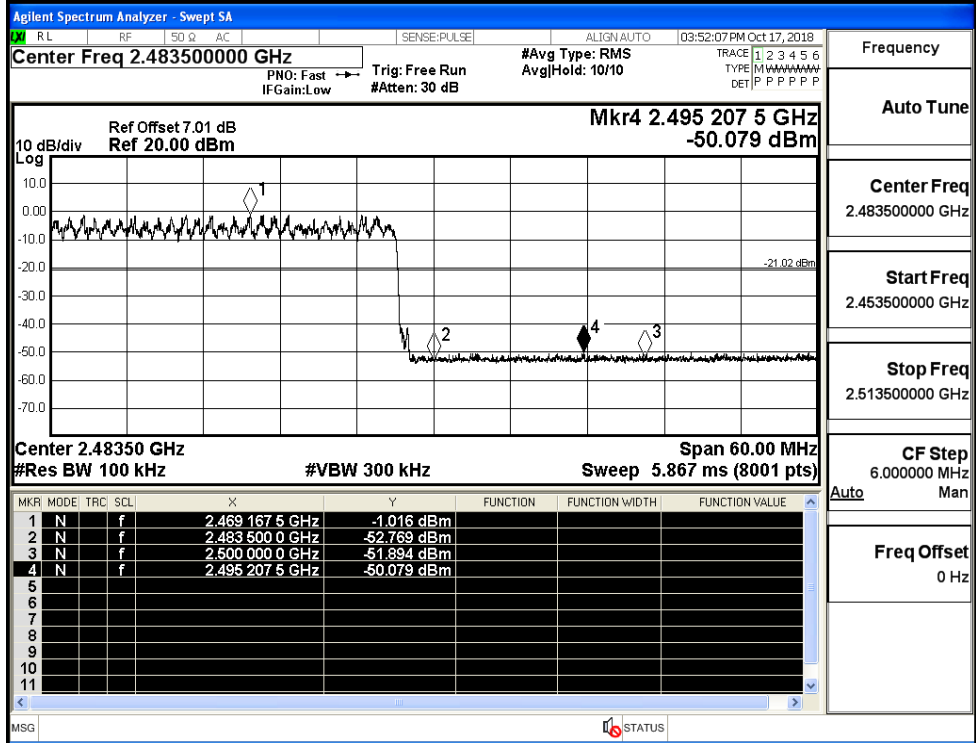
Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.370000000 GHz
Stop Freq
2.430000000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/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

8DPSK/HCH/Hop

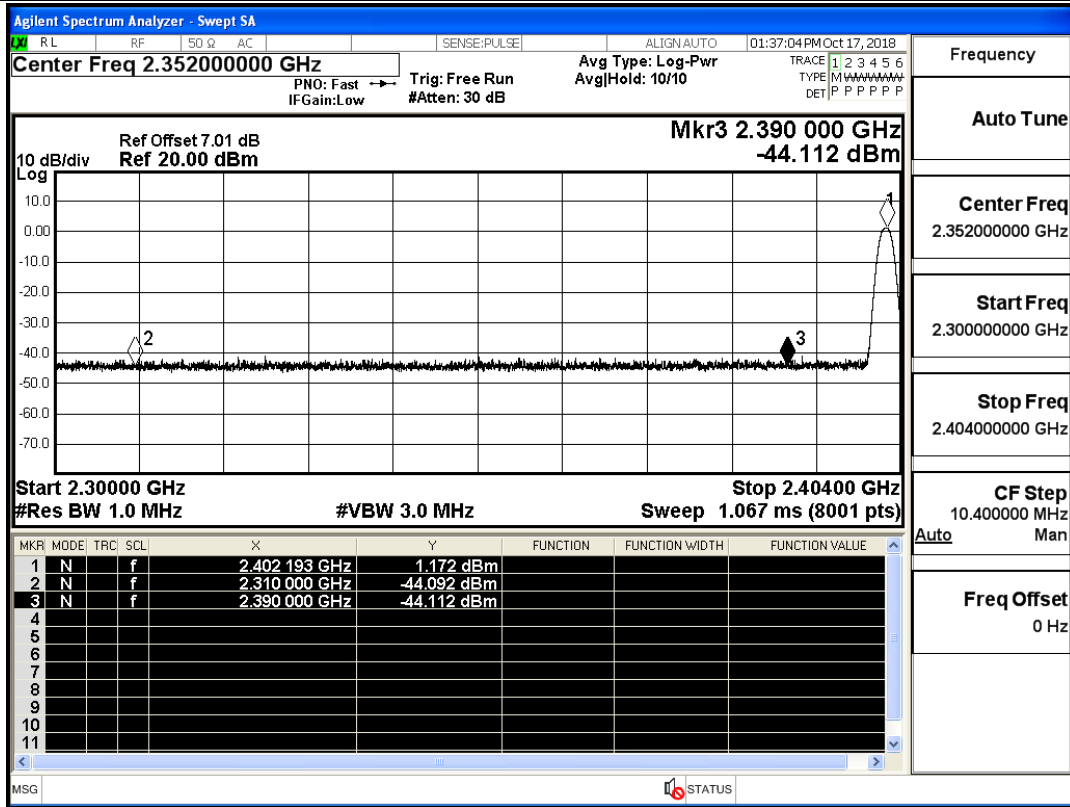


Frequency	
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.453500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Freq Offset	0 Hz

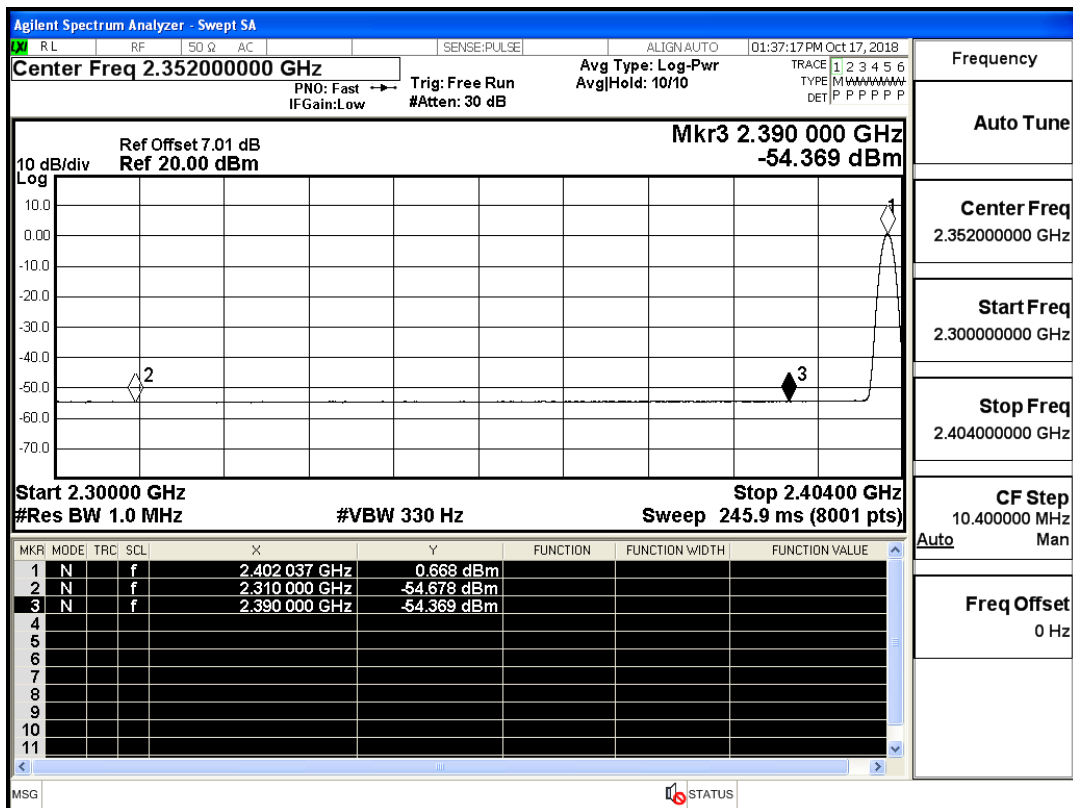
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.09	2.0	0	53.17	PEAK	74	PASS
	Off	2310.0	-54.68	2.0	0	42.58	AV	54	PASS
	Off	2390.0	-44.11	2.0	0	53.15	PEAK	74	PASS
	Off	2390.0	-54.37	2.0	0	42.89	AV	54	PASS
	Off	2483.5	-44.63	2.0	0	50.62	PEAK	74	PASS
	Off	2483.5	-54.27	2.0	0	40.99	AV	54	PASS
	Off	2500.0	-43.83	2.0	0	51.43	PEAK	74	PASS
	Off	2500.0	-54.08	2.0	0	41.18	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.69	2.0	0	52.57	PEAK	74	PASS
	Off	2310.0	-54.60	2.0	0	40.66	AV	54	PASS
	Off	2390.0	-44.29	2.0	0	50.97	PEAK	74	PASS
	Off	2390.0	-54.28	2.0	0	40.98	AV	54	PASS
	Off	2483.5	-44.58	2.0	0	50.68	PEAK	74	PASS
	Off	2483.5	-54.16	2.0	0	41.10	AV	54	PASS
	Off	2500.0	-43.91	2.0	0	51.34	PEAK	74	PASS
	Off	2500.0	-54.13	2.0	0	41.13	AV	54	PASS
8DPSK	Off	2310.0	-45.35	2.0	0	49.91	PEAK	74	PASS
	Off	2310.0	-54.74	2.0	0	40.52	AV	54	PASS
	Off	2390.0	-44.74	2.0	0	50.52	PEAK	74	PASS
	Off	2390.0	-54.52	2.0	0	40.74	AV	54	PASS
	Off	2483.5	-44.04	2.0	0	51.22	PEAK	74	PASS
	Off	2483.5	-54.14	2.0	0	41.11	AV	54	PASS
	Off	2500.0	-43.36	2.0	0	51.90	PEAK	74	PASS
	Off	2500.0	-54.10	2.0	0	41.16	AV	54	PASS

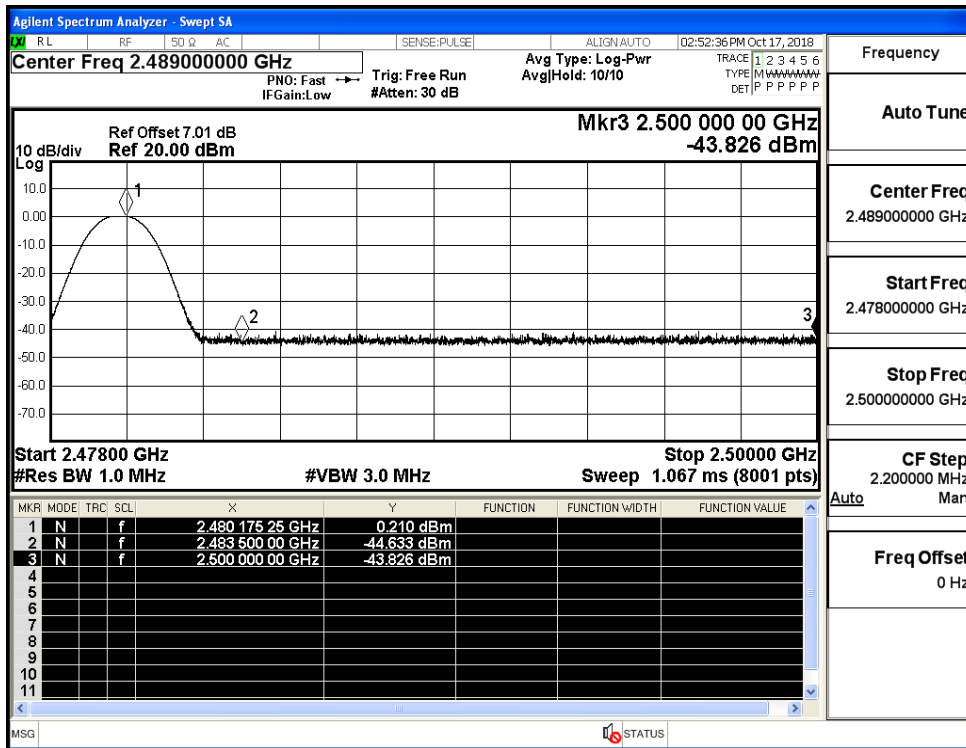
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



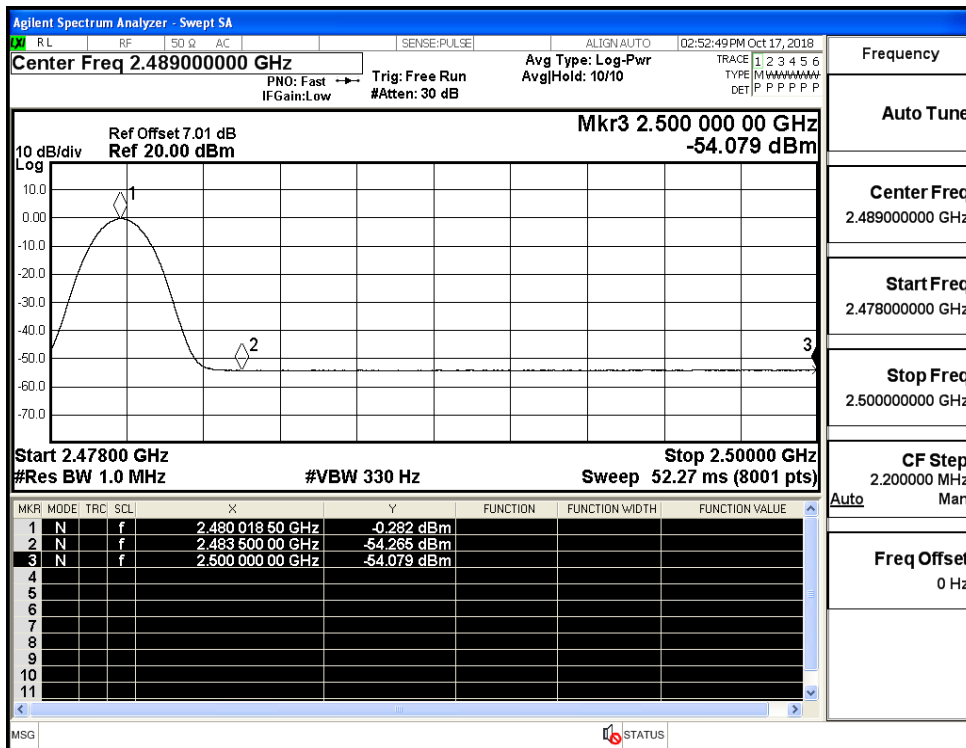
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



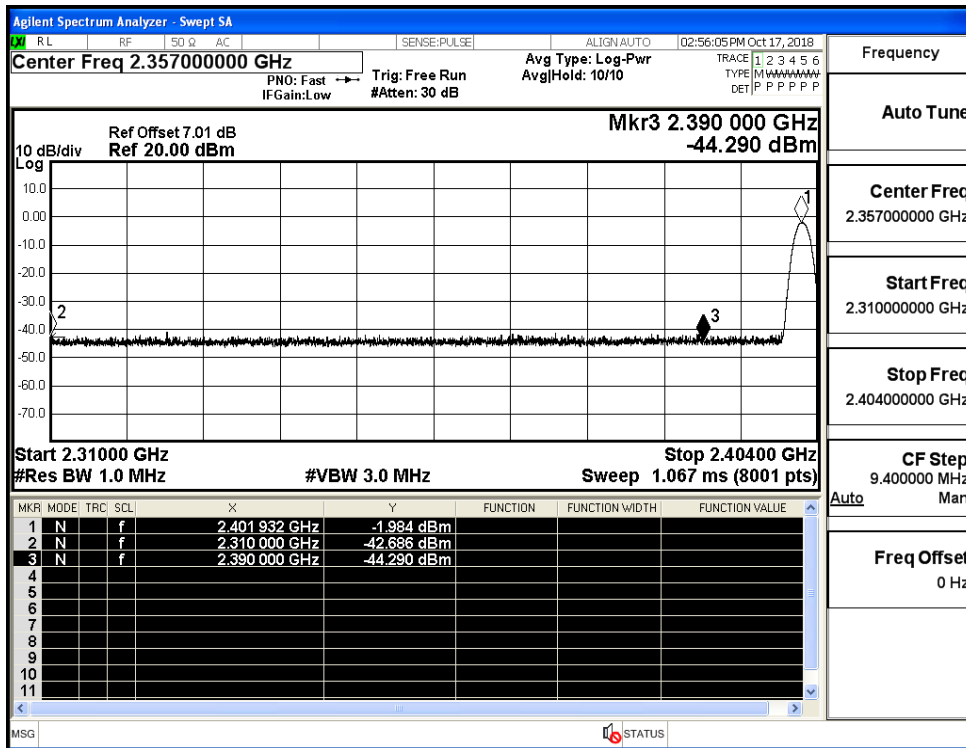
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



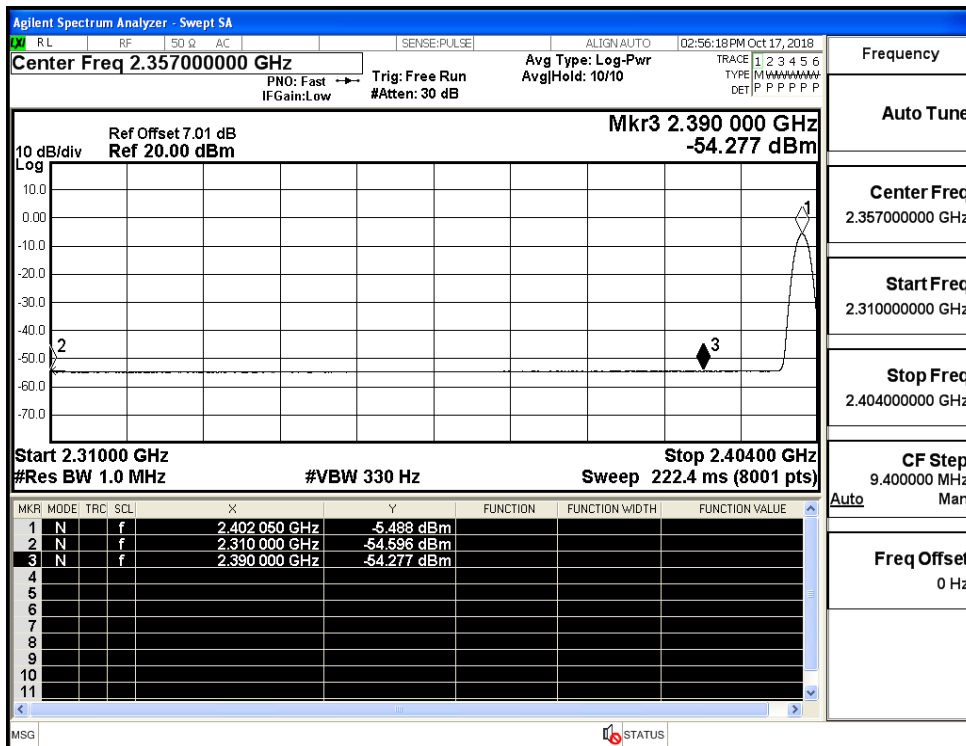
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



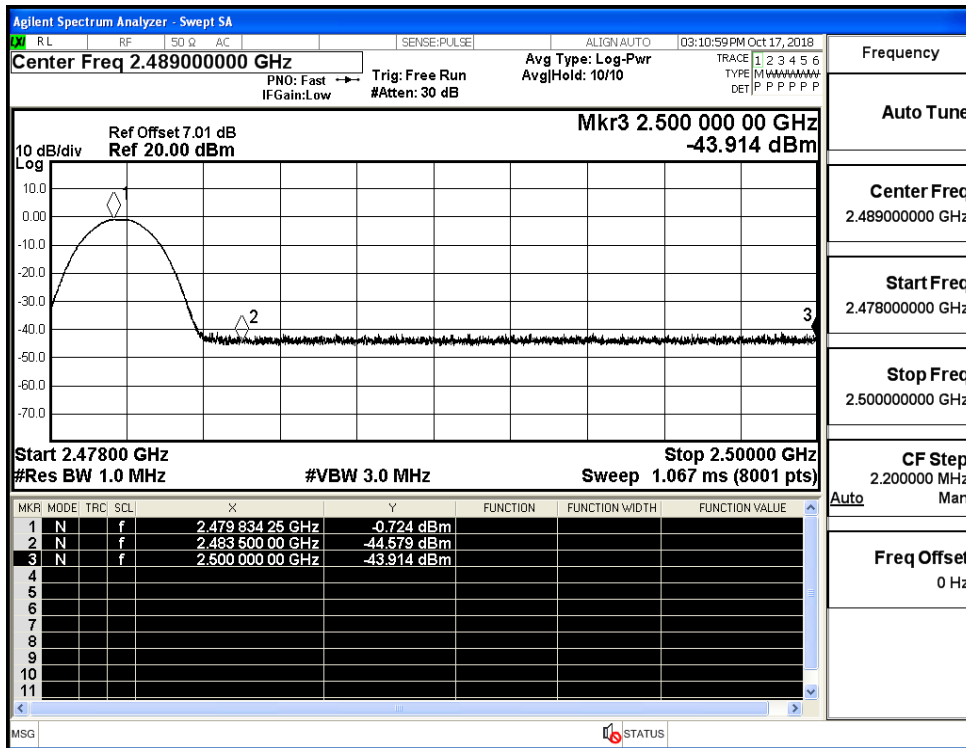
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



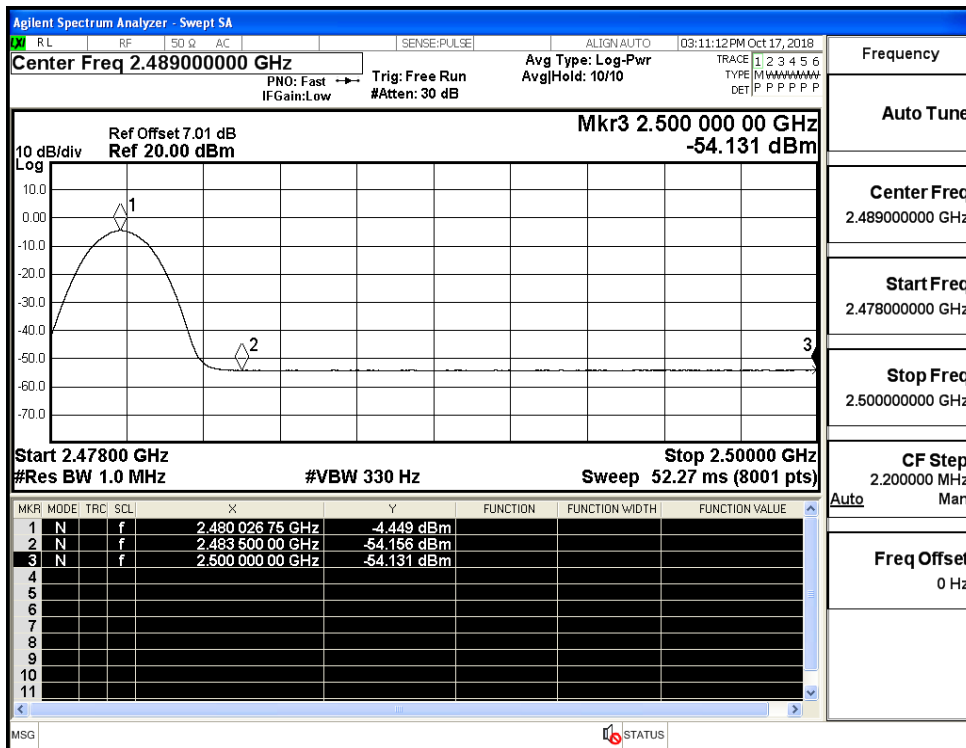
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



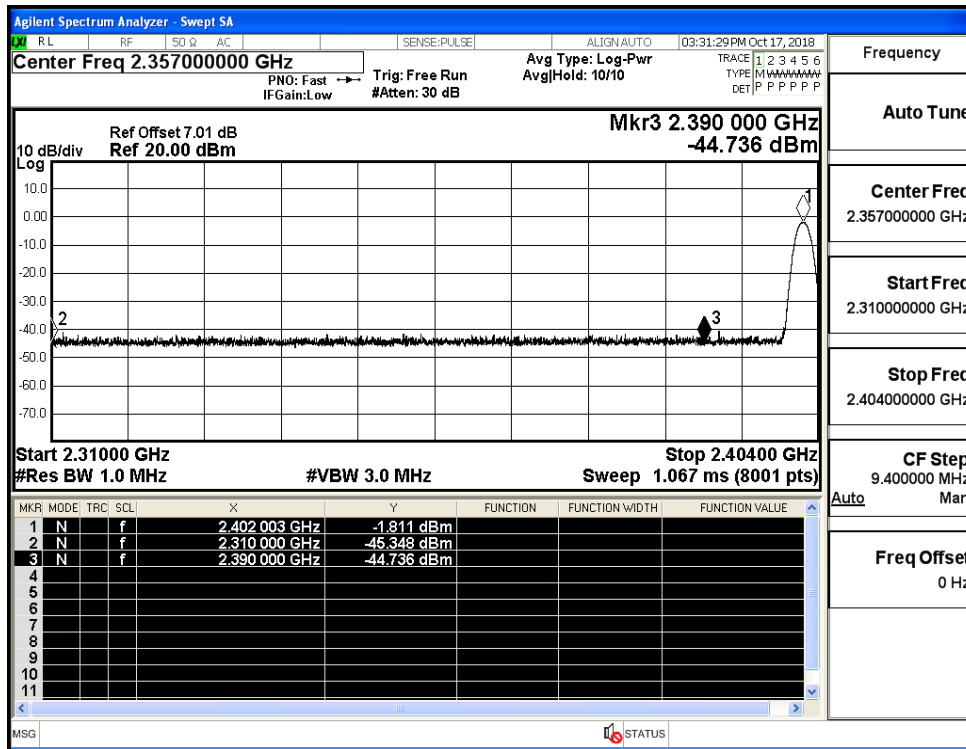
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (High Channel)



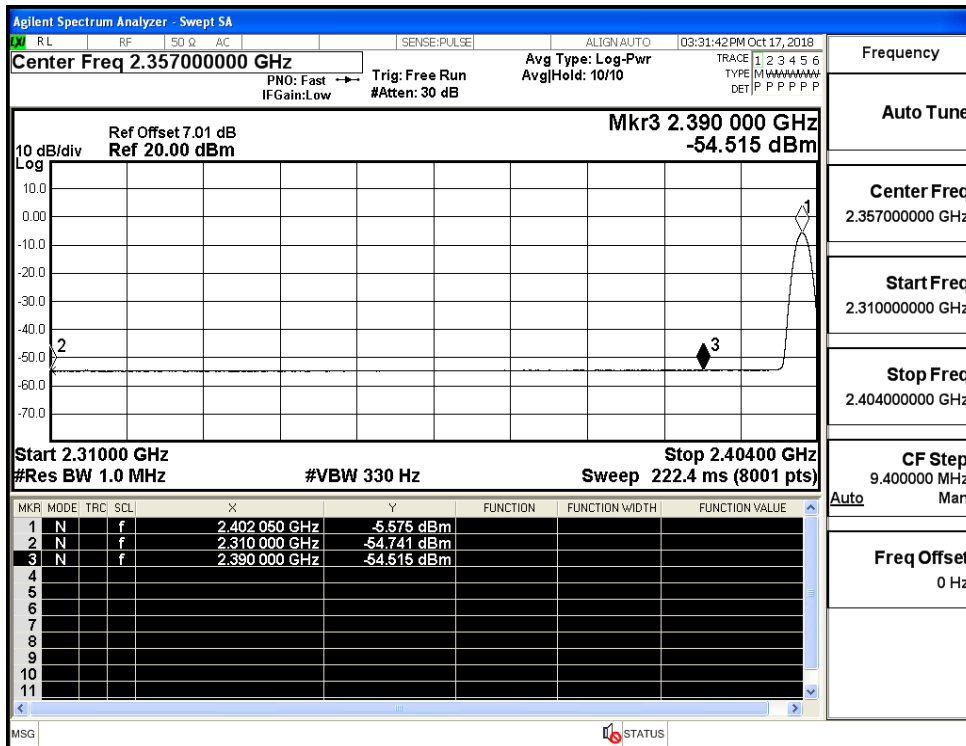
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (High Channel)



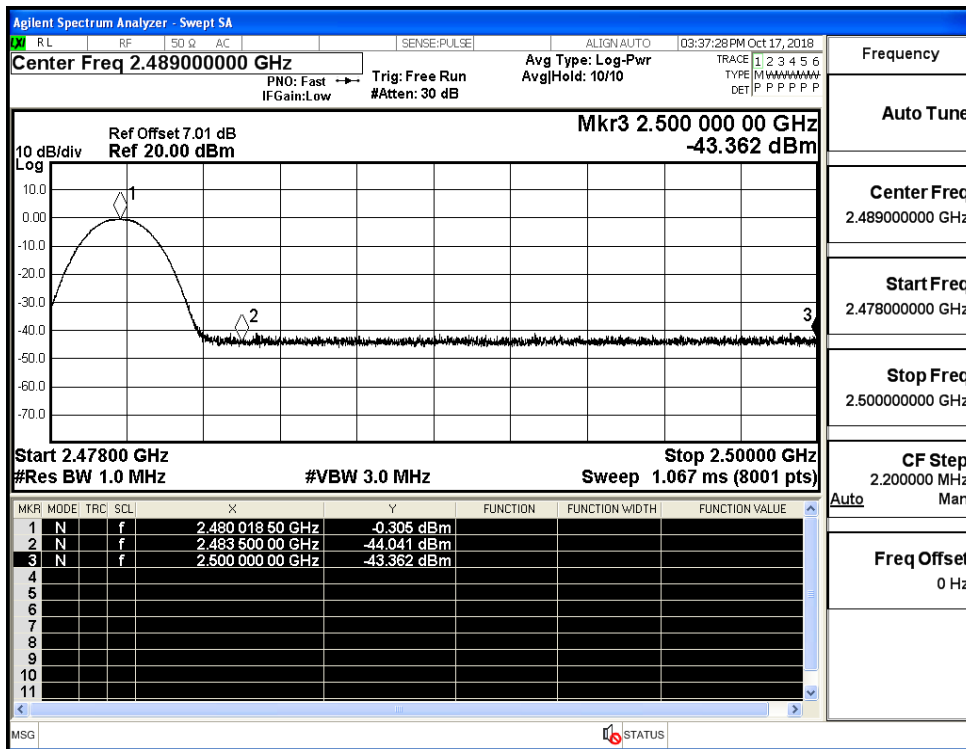
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

