

Appendix A

RF Test Data for BT V4.1(BDR/EDR) (Conducted Measurement)

Product Name: Wireless stereo Bluetooth headphones

Trade Mark: FS-BT210

Test Model: N/A

Environmental Conditions

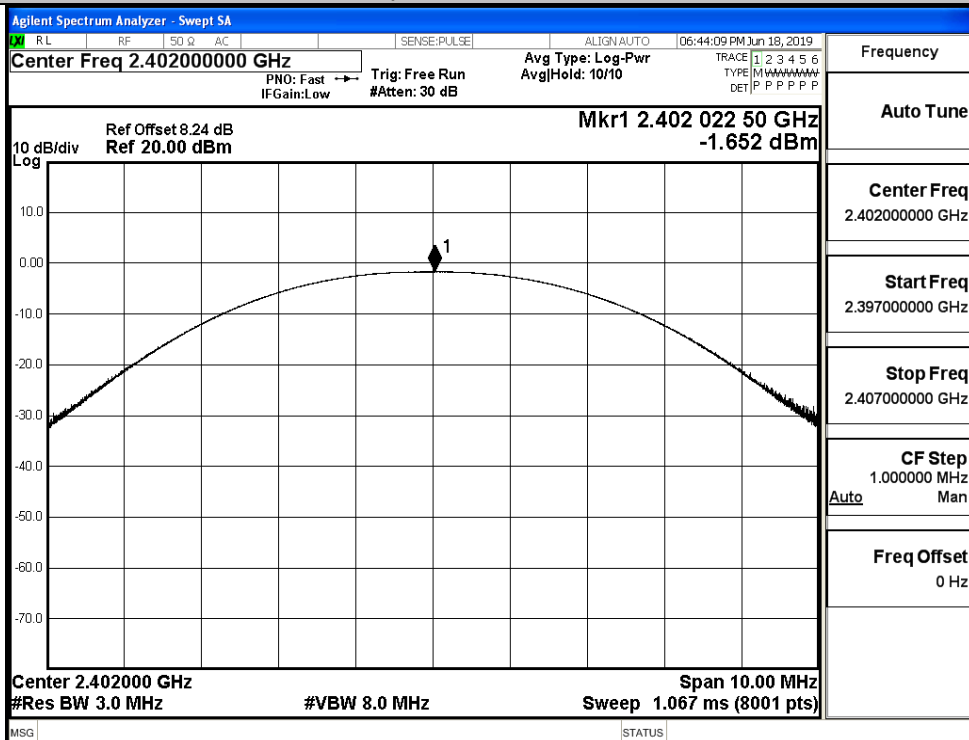
Temperature:	24.6 ° C
Relative Humidity:	53.7%
ATM Pressure:	100.0 kPa
Test Engineer:	LI HUAN
Supervised by:	WANGCHUANG

A.1 Maximum Conducted Peak Output Power

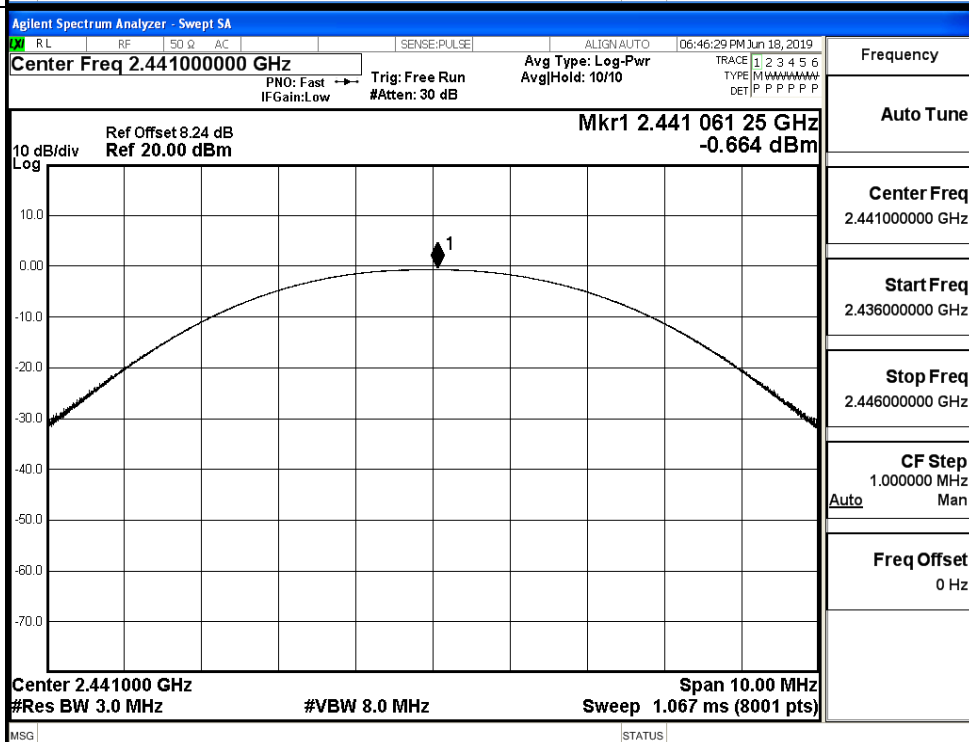
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.652	21	PASS
	MCH	-0.664	21	PASS
	HCH	-1.619	21	PASS
$\pi/4$ DQPSK	LCH	-2.302	21	PASS
	MCH	-1.212	21	PASS
	HCH	-2.372	21	PASS
8DPSK	LCH	-0.117	21	PASS
	MCH	-1.085	21	PASS
	HCH	-2.182	21	PASS

Test Graphs

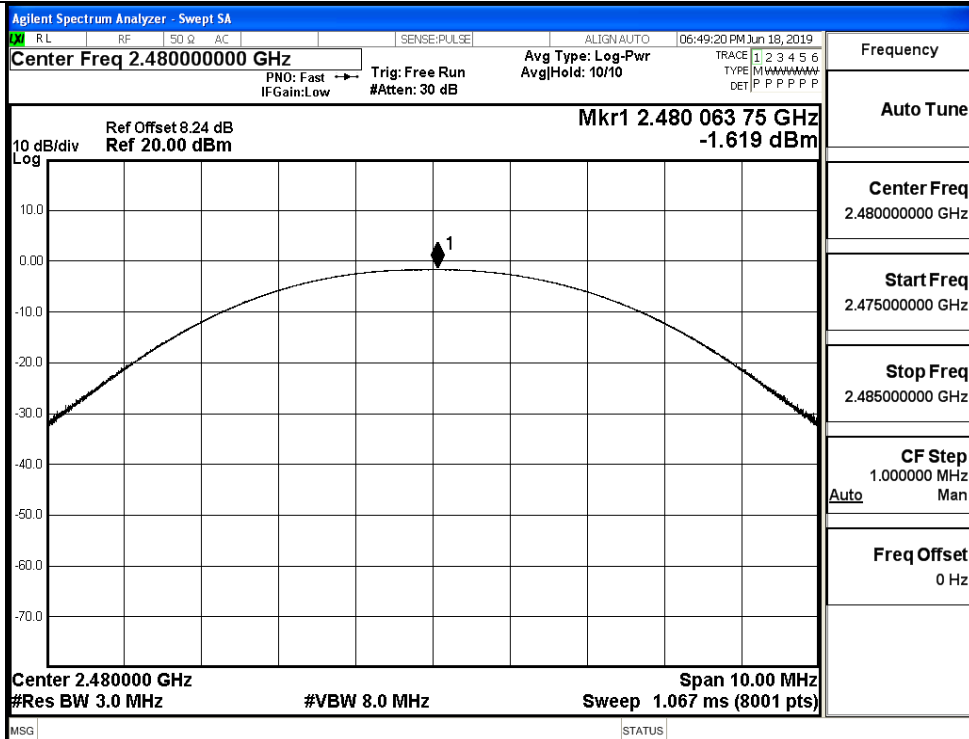
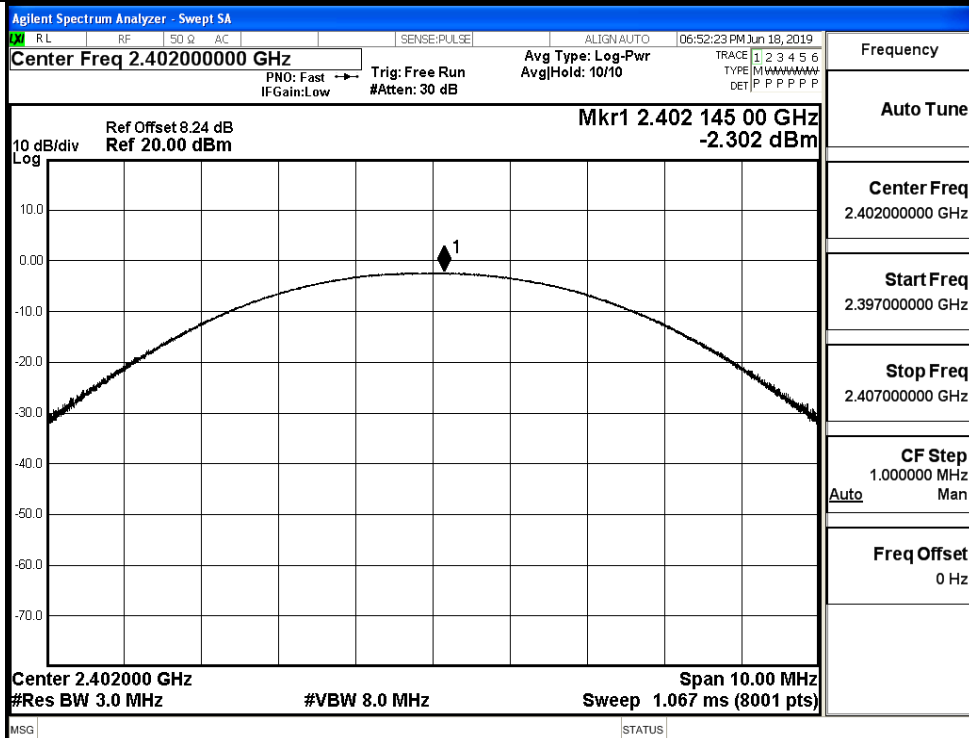
GFSK/LCH

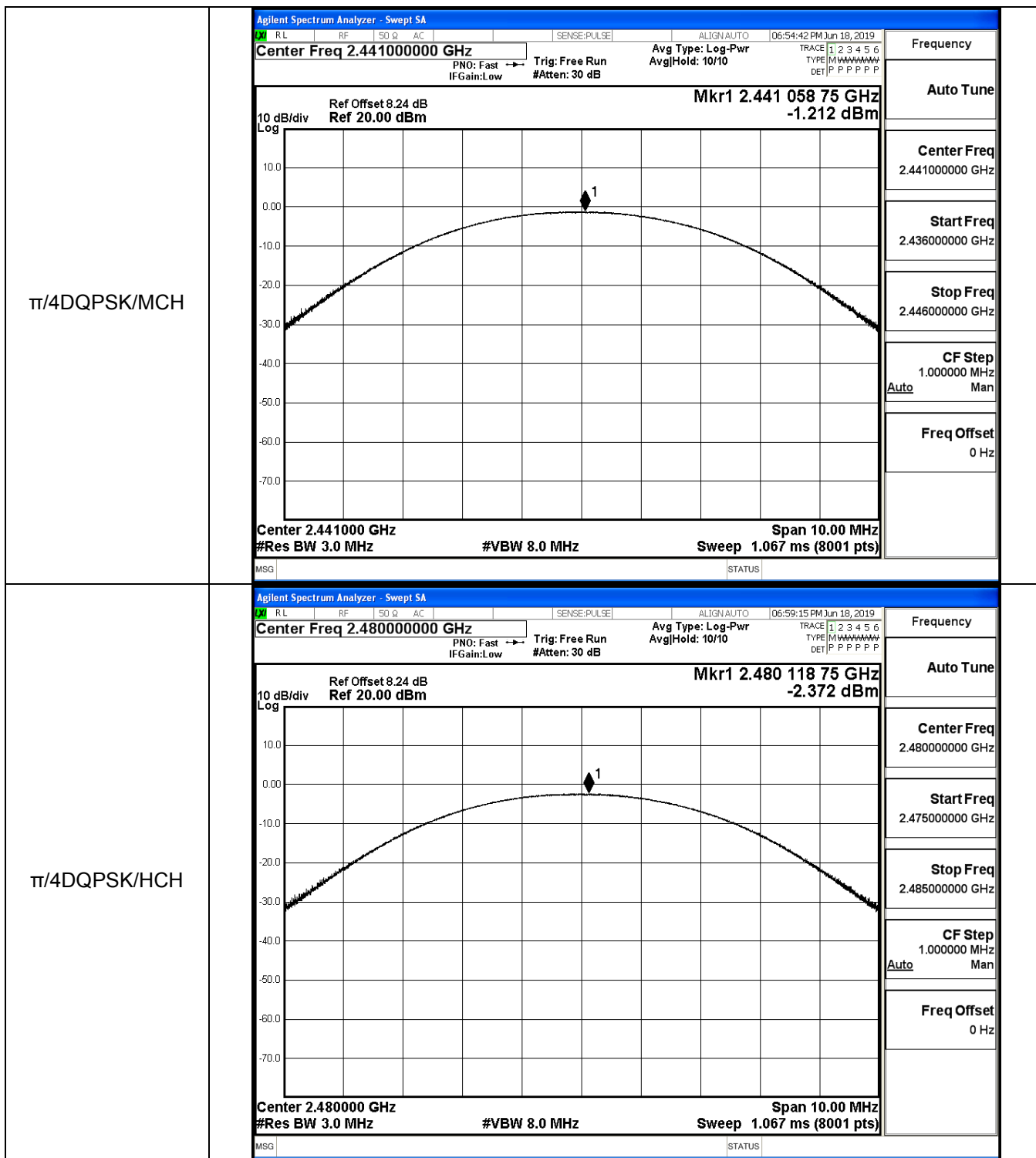


GFSK/MCH

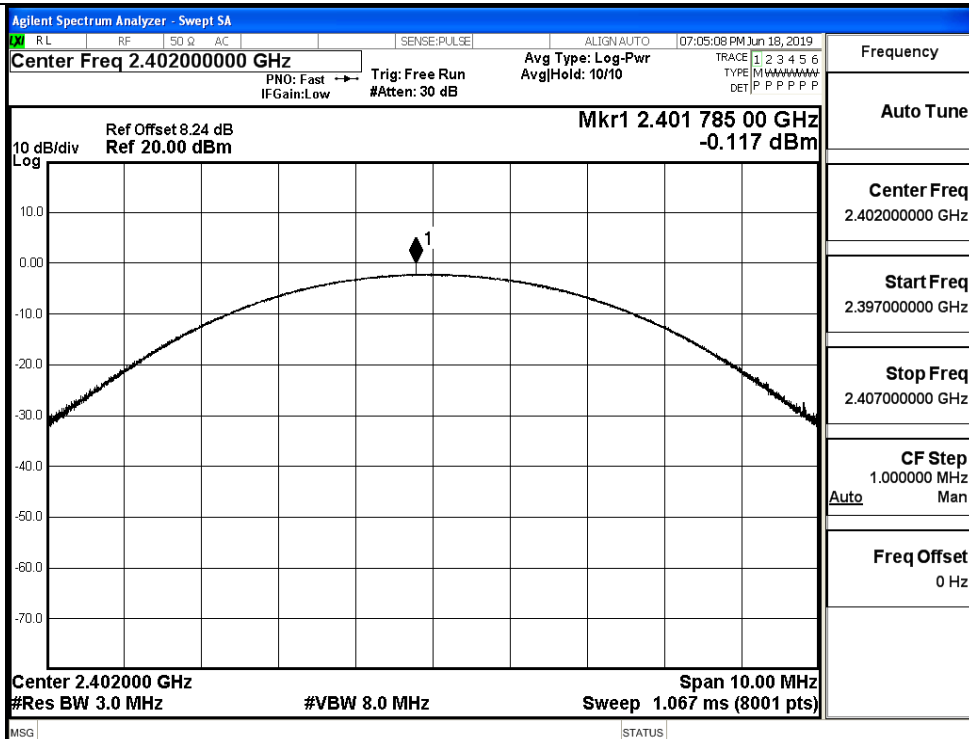


GFSK/HCH

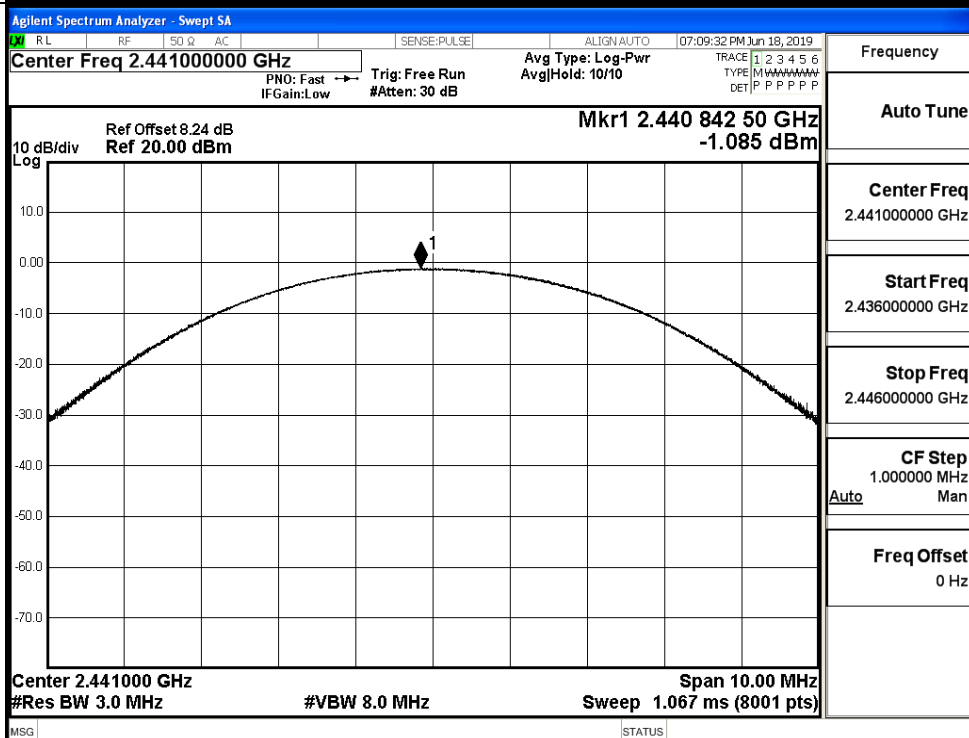
 π /4DQPSK/LCH



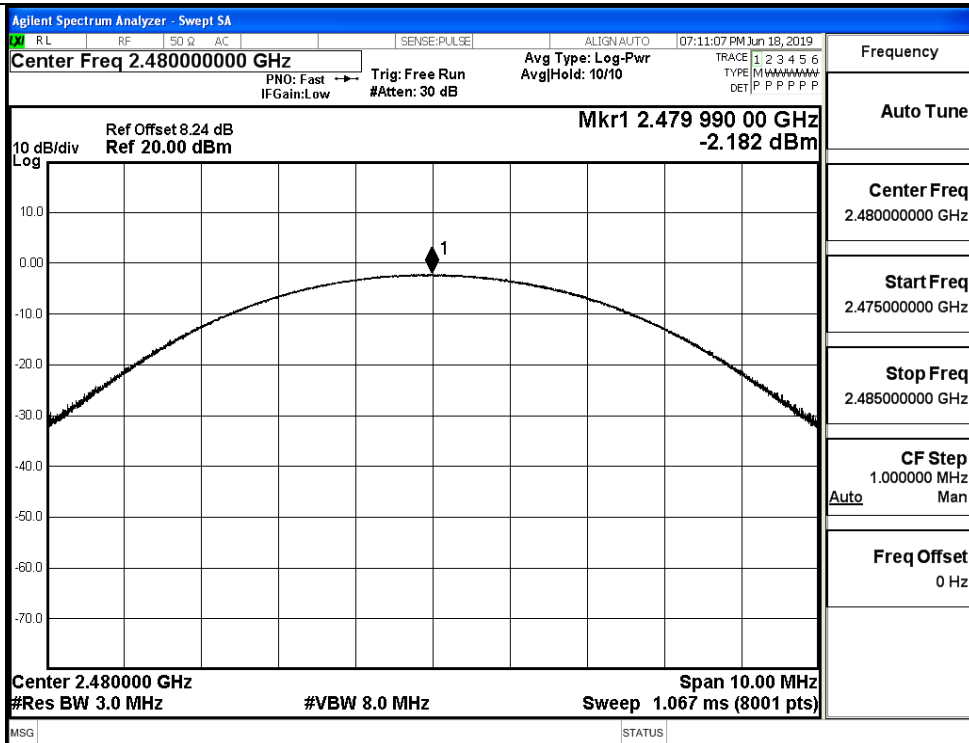
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

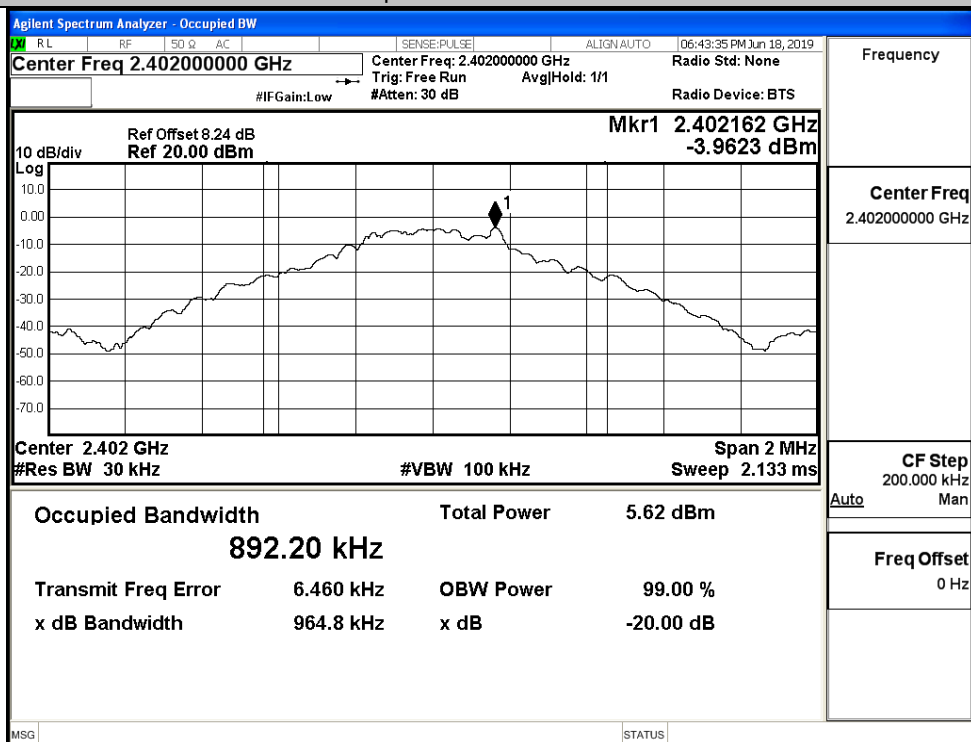


A.2 20dB Bandwidth

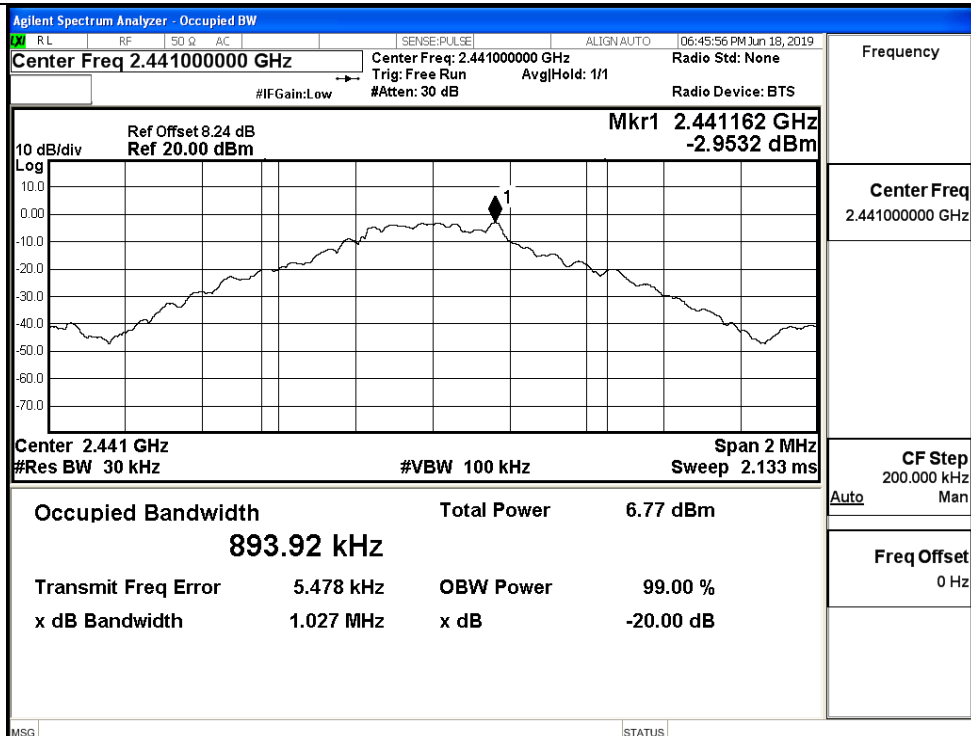
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9648	Not Specified	PASS
	MCH	1.027	Not Specified	PASS
	HCH	1.029	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.291	Not Specified	PASS
	MCH	1.311	Not Specified	PASS
	HCH	1.311	Not Specified	PASS
8DPSK	LCH	1.312	Not Specified	PASS
	MCH	1.298	Not Specified	PASS
	HCH	1.298	Not Specified	PASS

Test Graphs

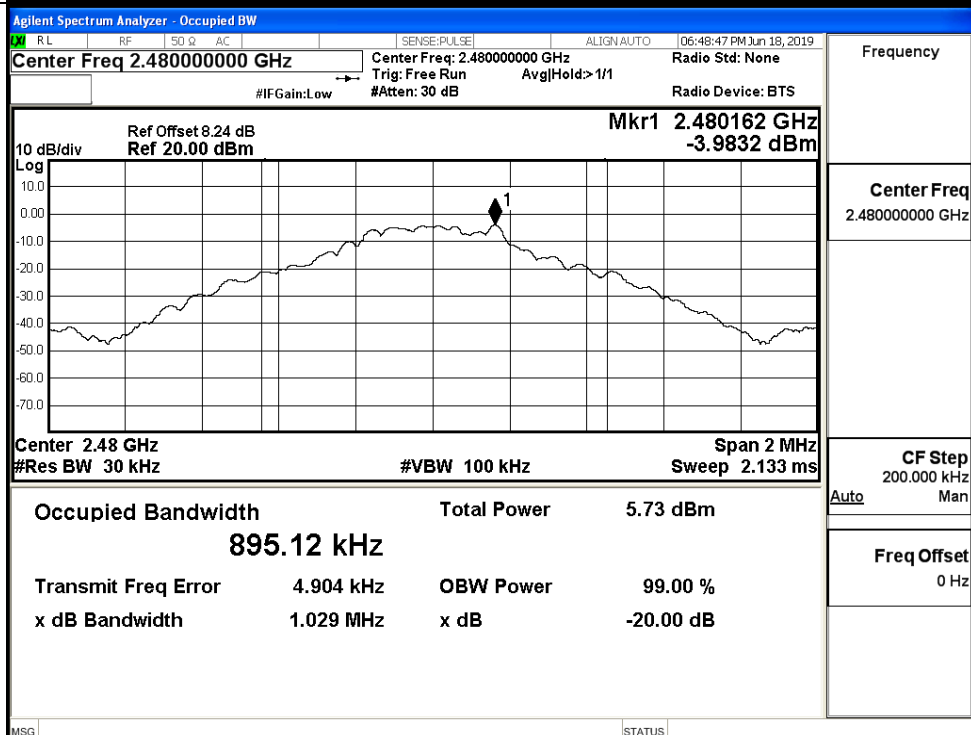
GFSK/LCH

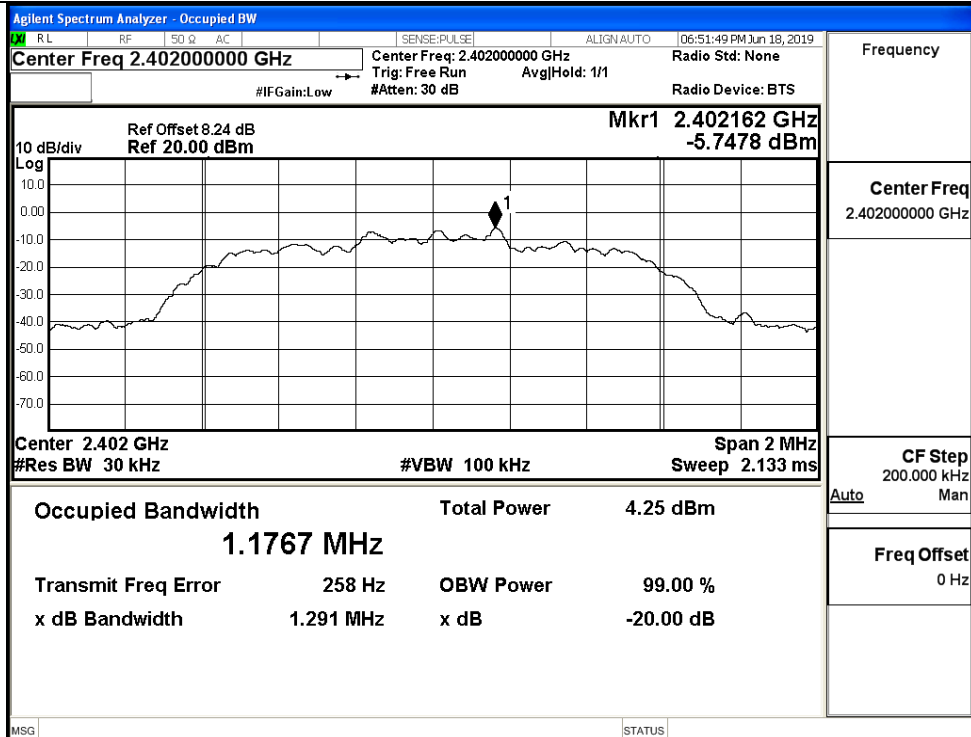
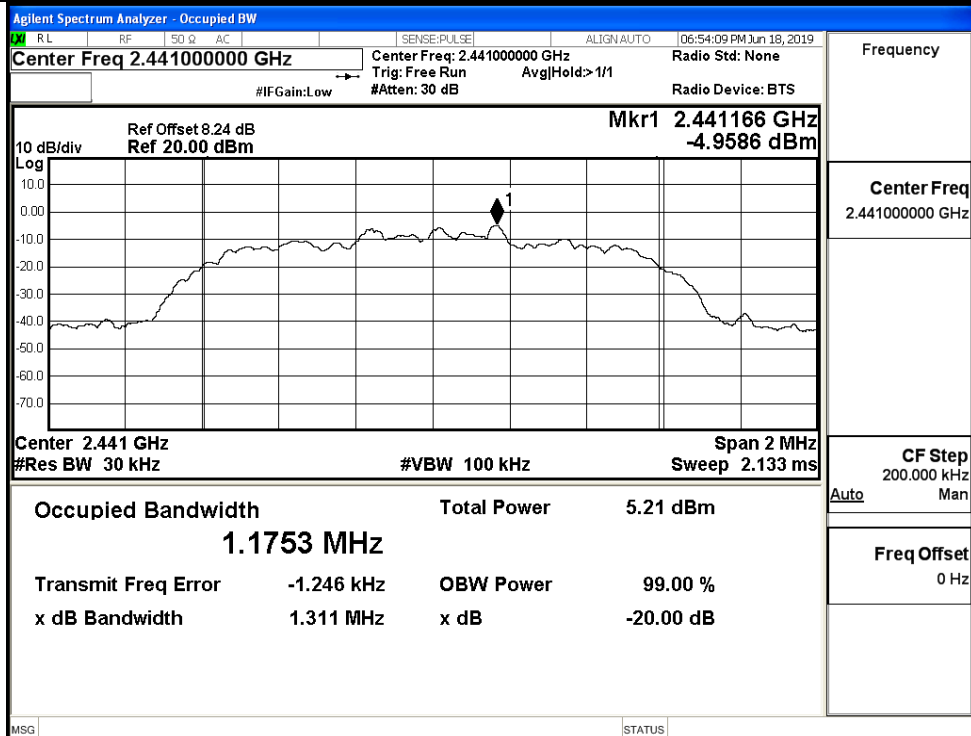


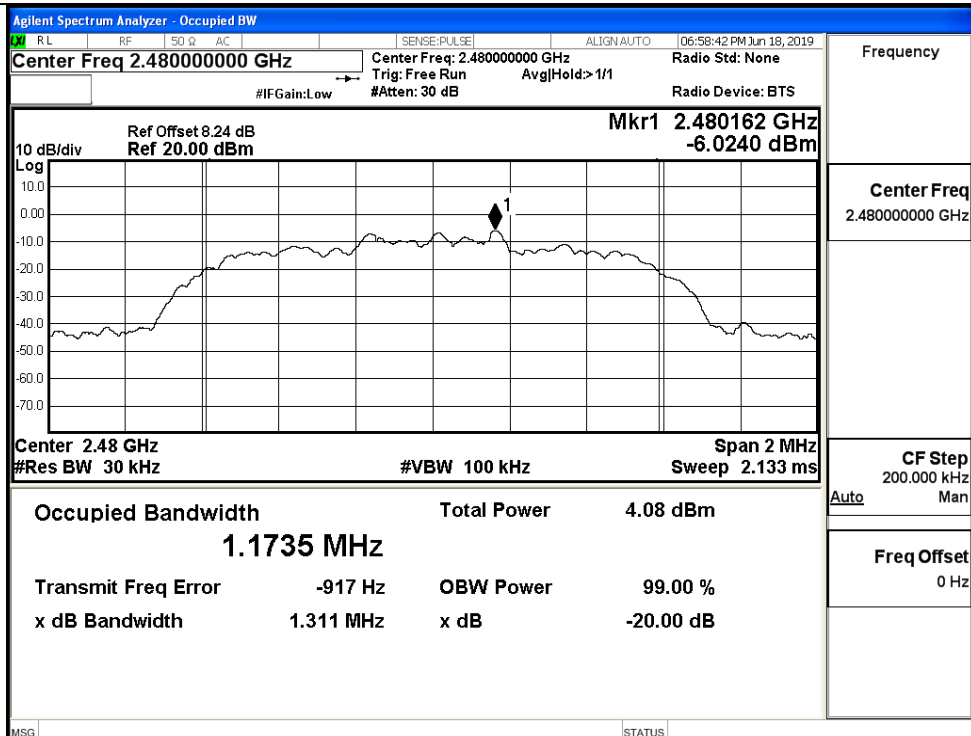
GFSK/MCH



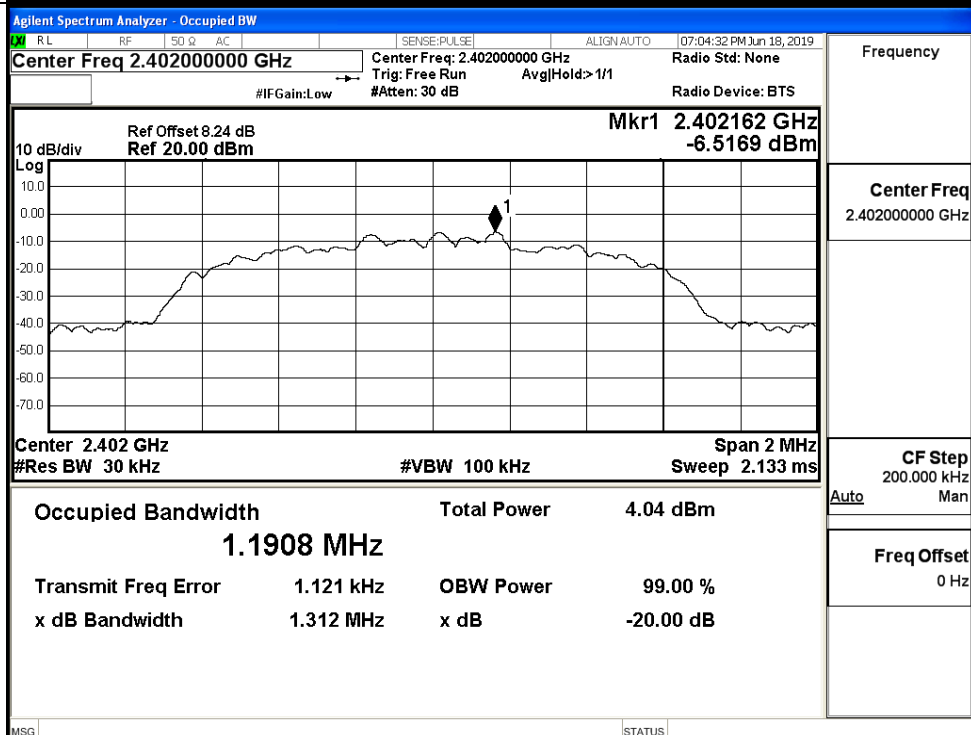
GFSK/HCH



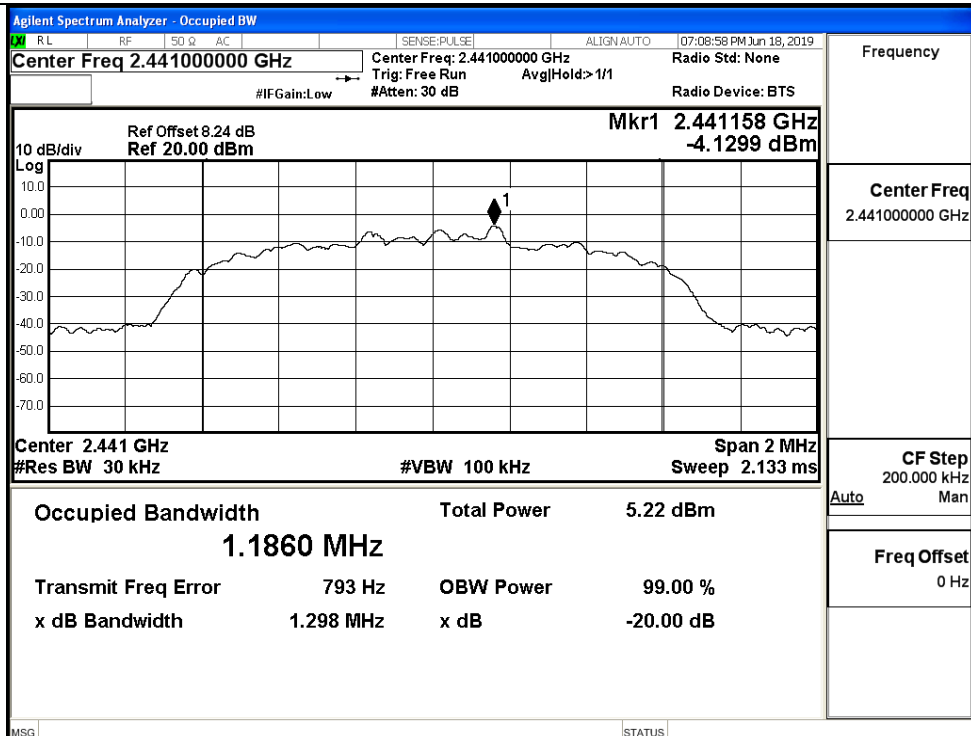
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

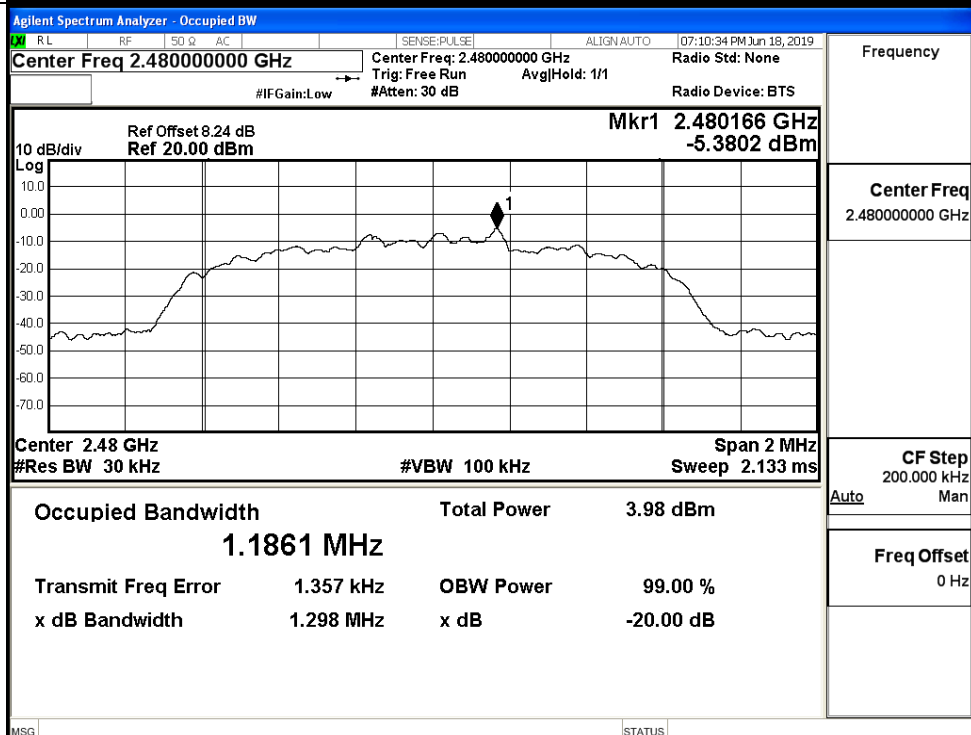
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

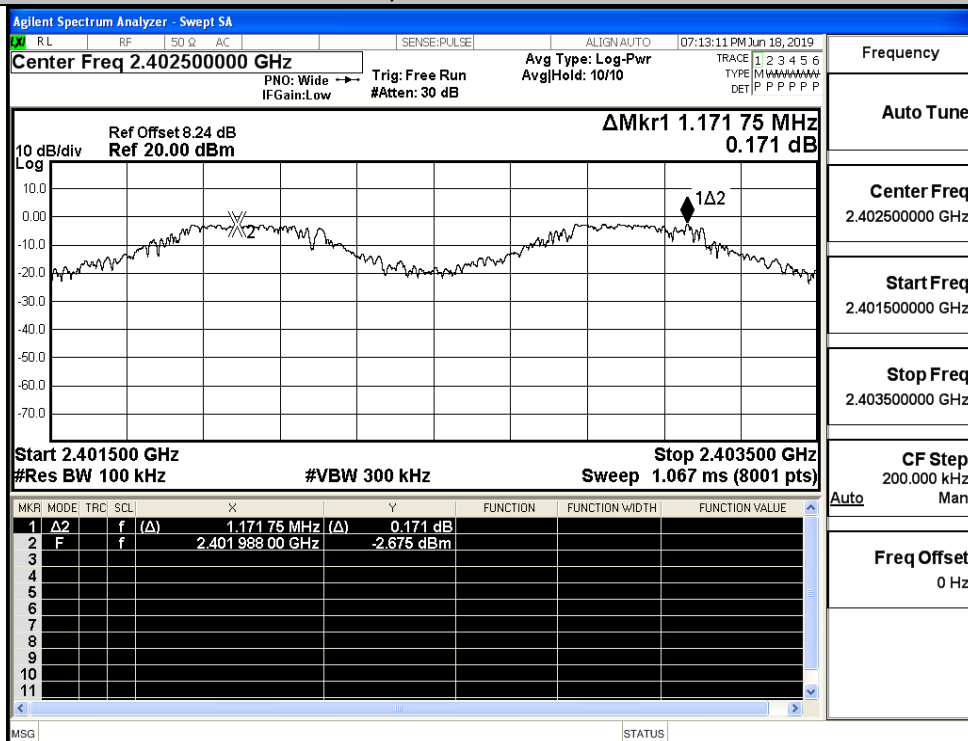


A.3 Carrier Frequency Separation

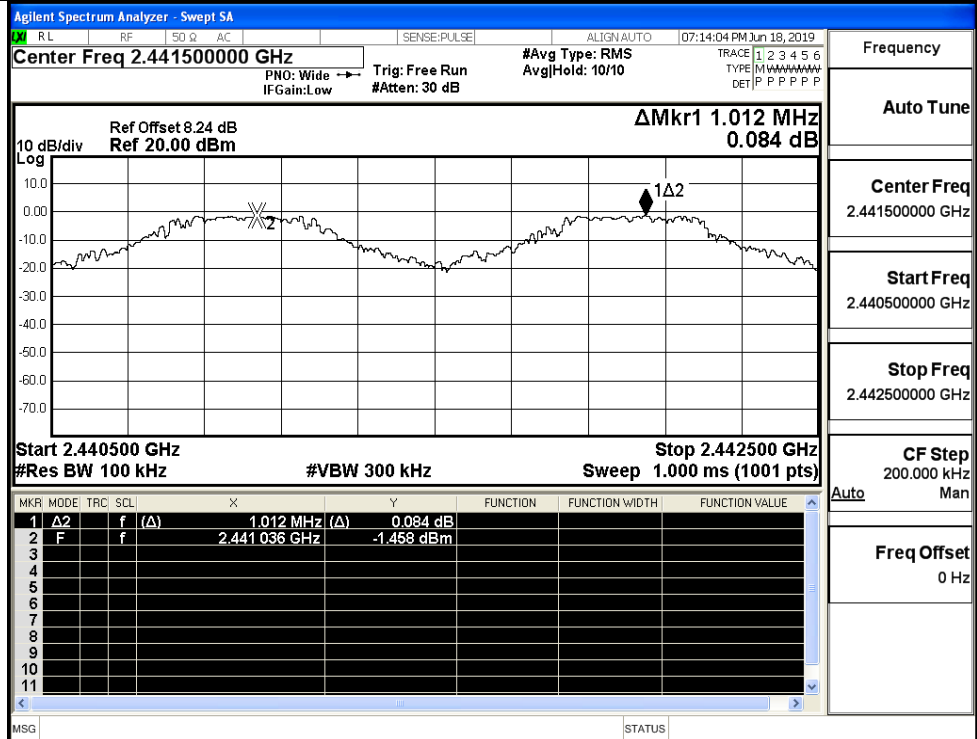
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.172	0.686	PASS
	MCH	1.012	0.686	PASS
	HCH	1.164	0.686	PASS
$\pi/4$ DQPSK	LCH	0.980	0.874	PASS
	MCH	1.128	0.874	PASS
	HCH	1.330	0.874	PASS
8DPSK	LCH	1.218	0.875	PASS
	MCH	1.178	0.875	PASS
	HCH	1.134	0.875	PASS

Test Graphs

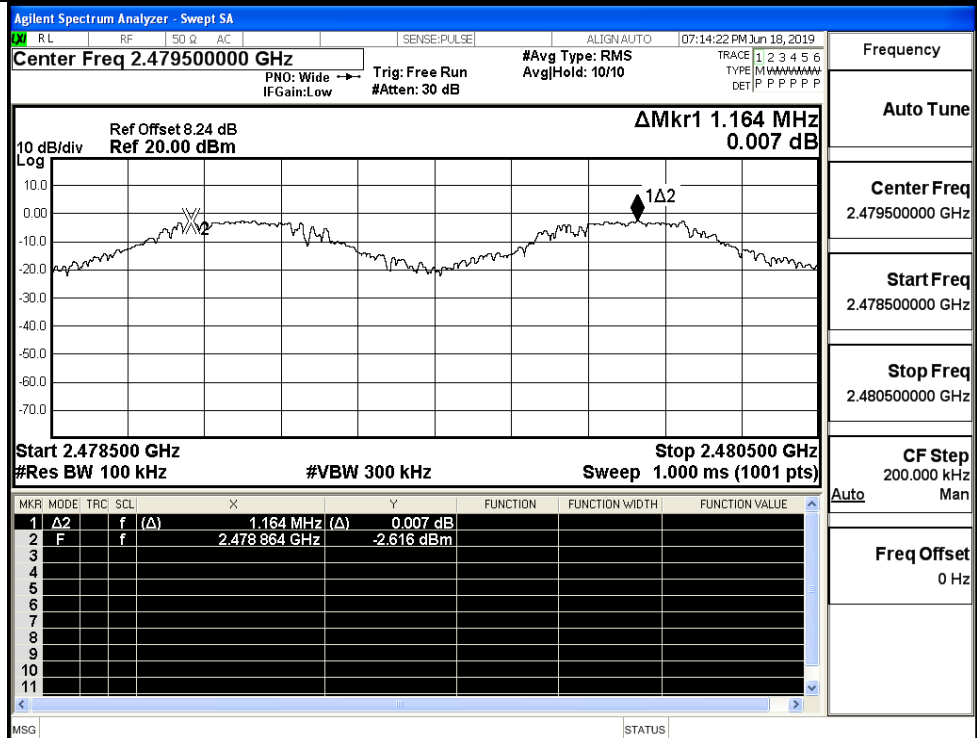
GFSK/LCH

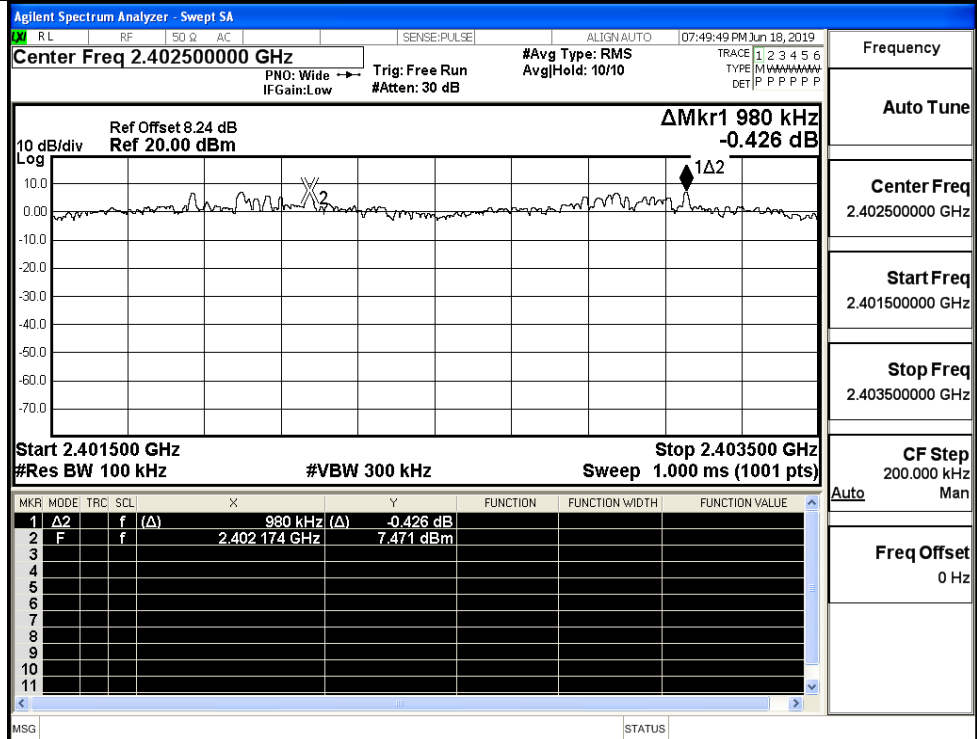
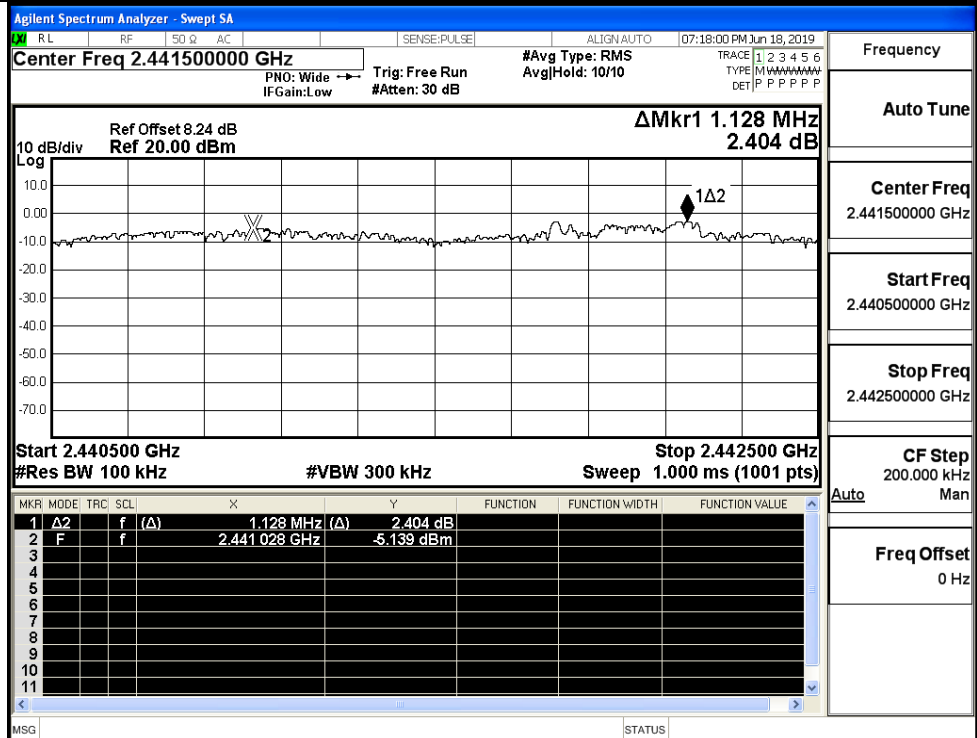


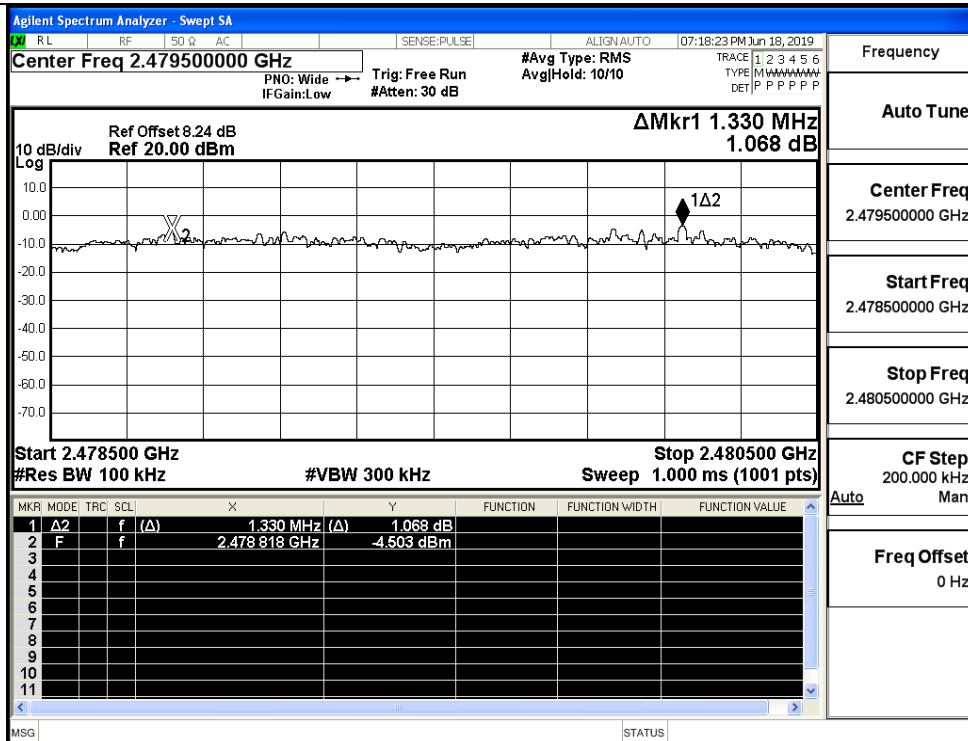
GFSK/MCH



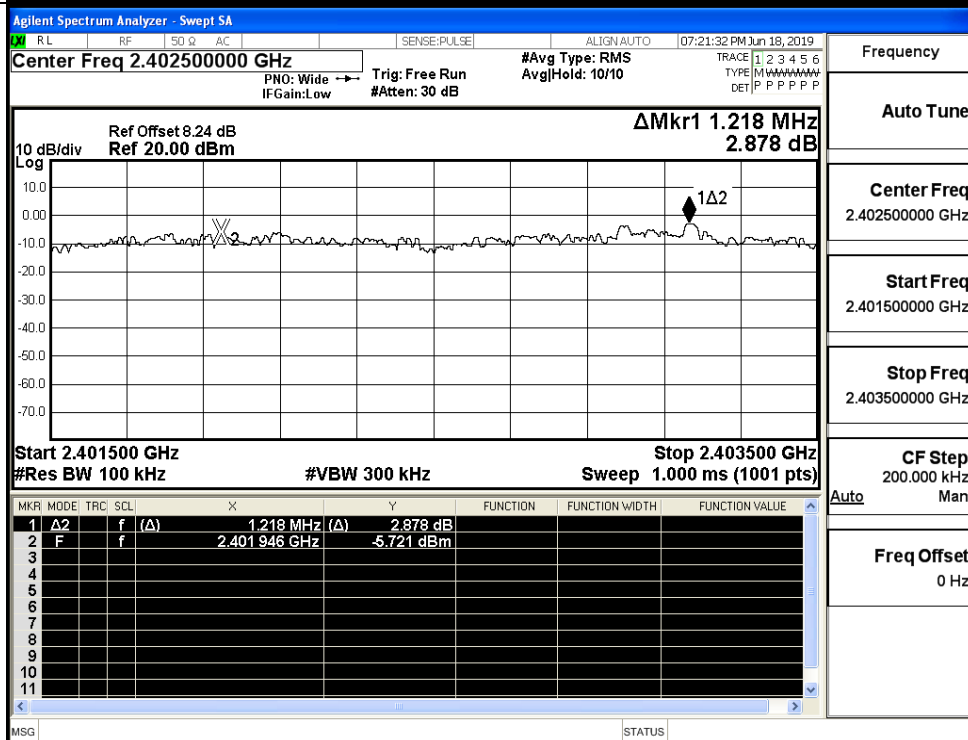
GFSK/HCH



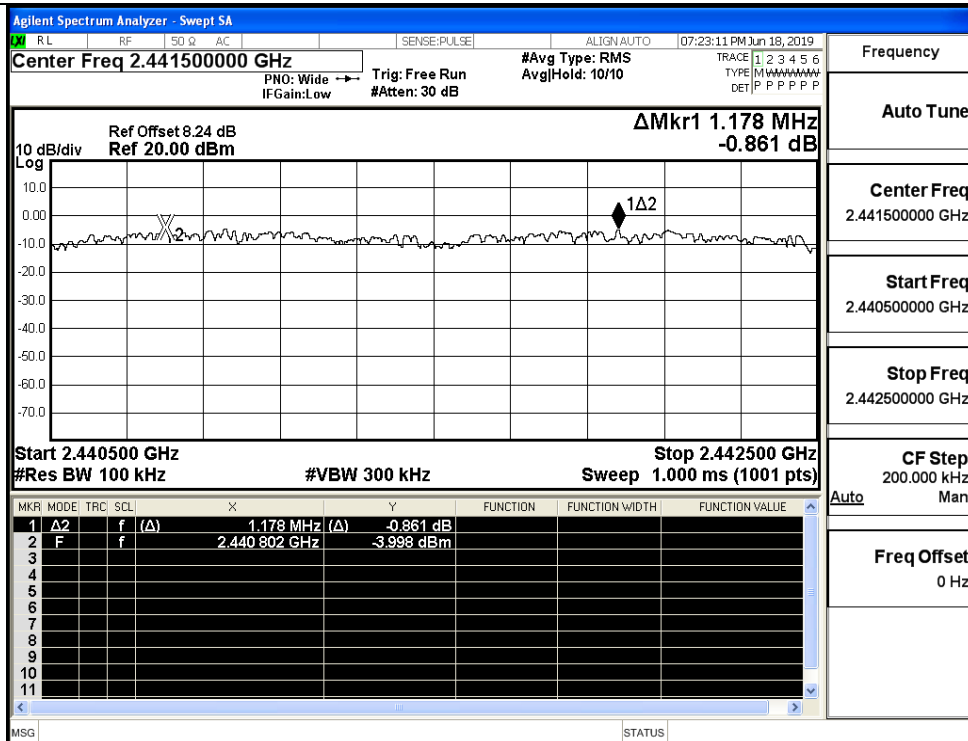
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

8DPSK/LCH



8DPSK/MCH



Frequency

Auto Tune

Center Freq
2.441500000 GHz

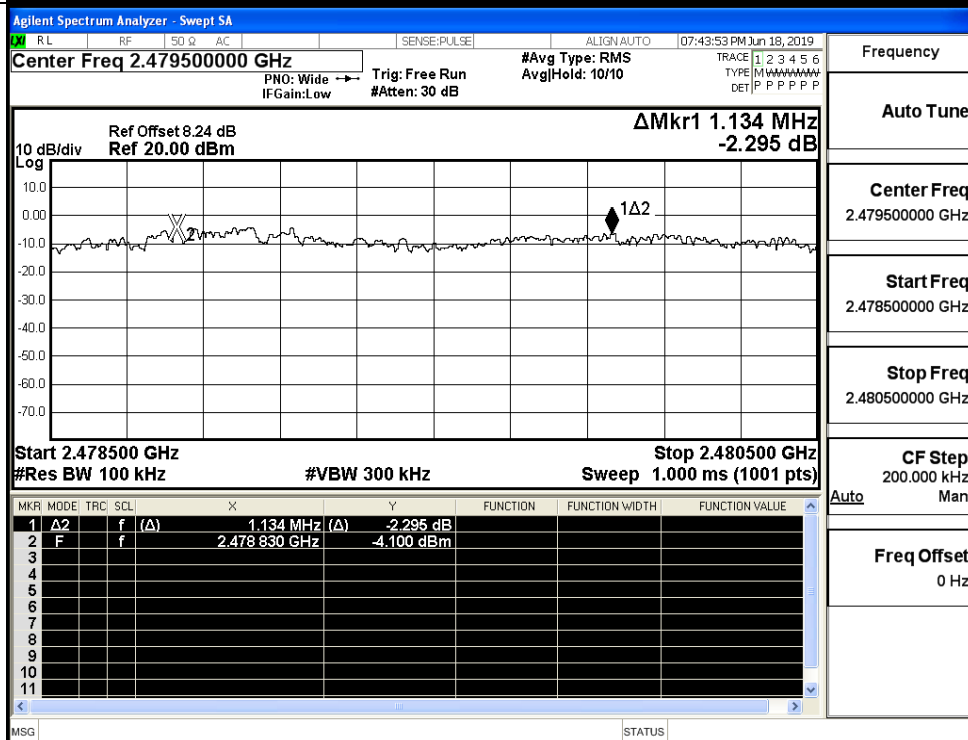
Start Freq
2.440500000 GHz

Stop Freq
2.442500000 GHz

CF Step
200.000 kHz
Man

Freq Offset
0 Hz

8DPSK/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

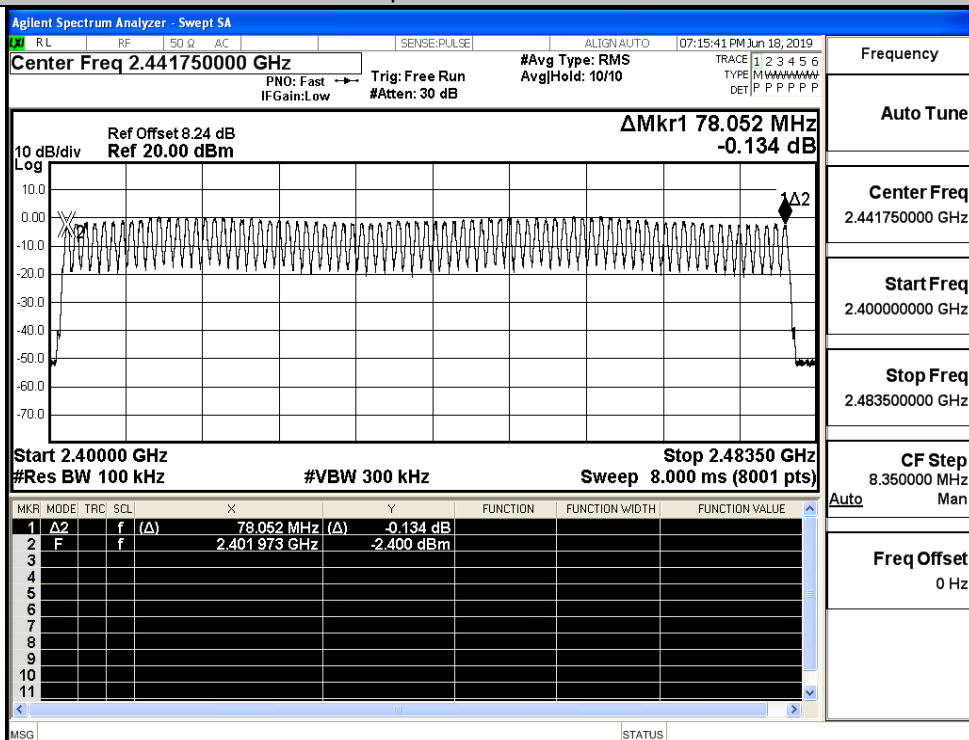
Freq Offset
0 Hz

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

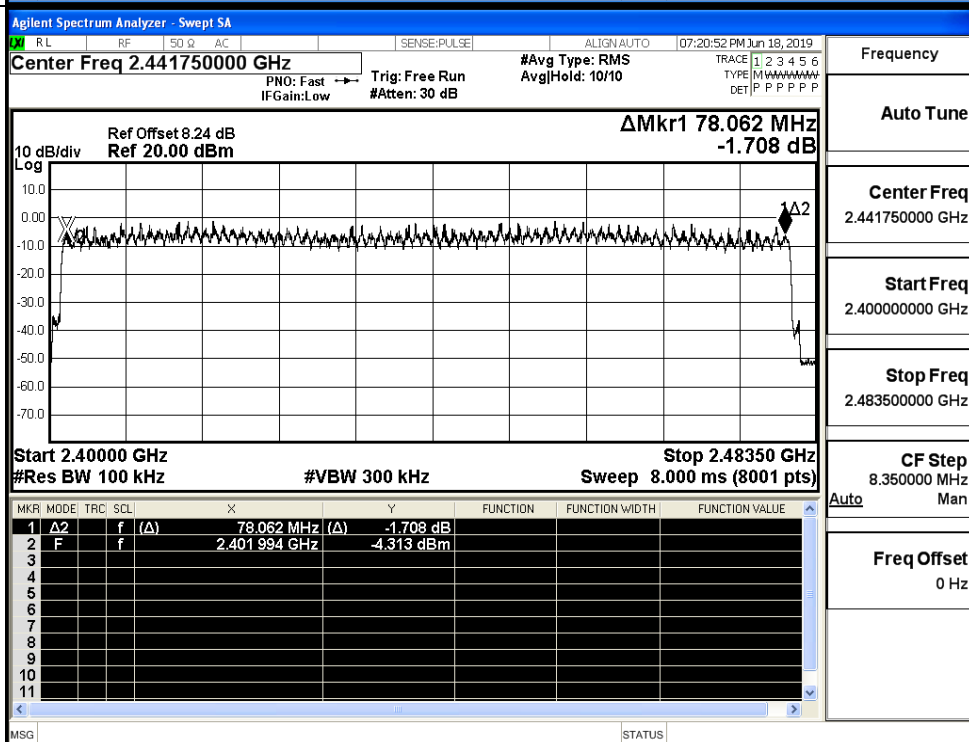
Test Graphs

GFSK/Hop



Frequency

Auto Tune

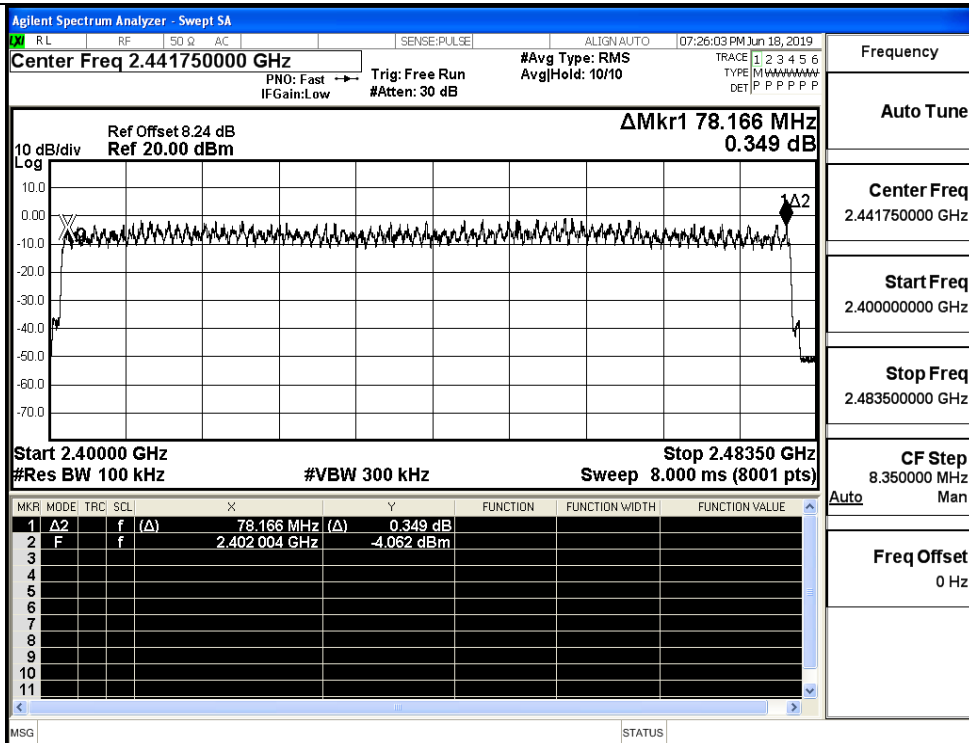
Center Freq
2.441750000 GHzStart Freq
2.400000000 GHzStop Freq
2.483500000 GHzCF Step
8.350000 MHz
Auto ManFreq Offset
0 Hz $\pi/4$ DQPSK/Hop

Frequency

Auto Tune

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

8DPSK/Hop

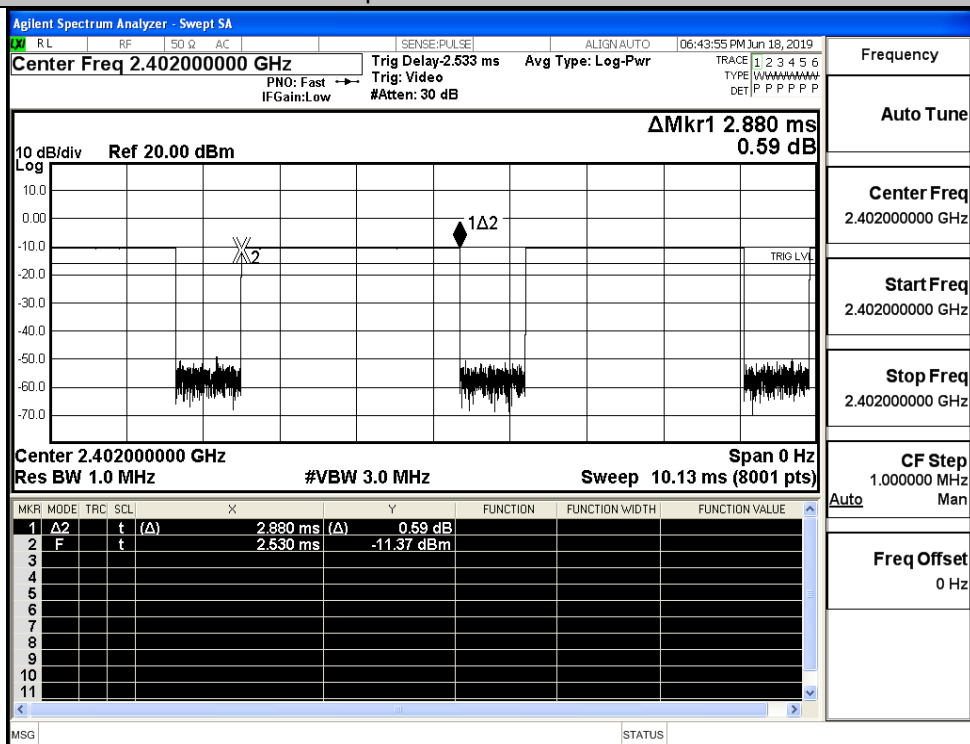


A.5 Dwell Time

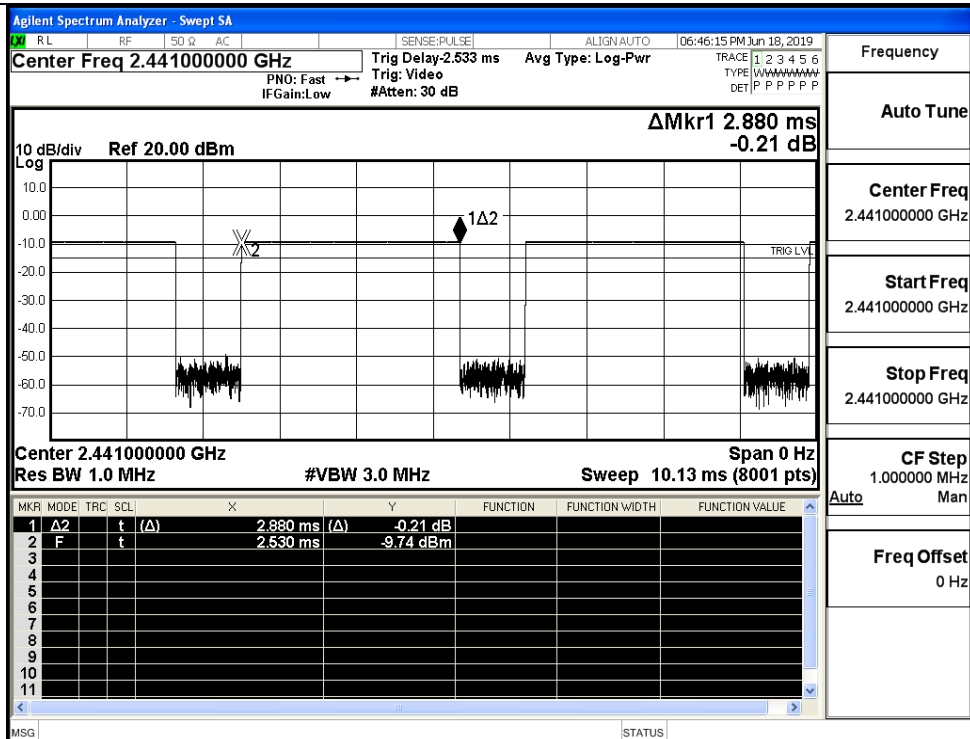
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88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

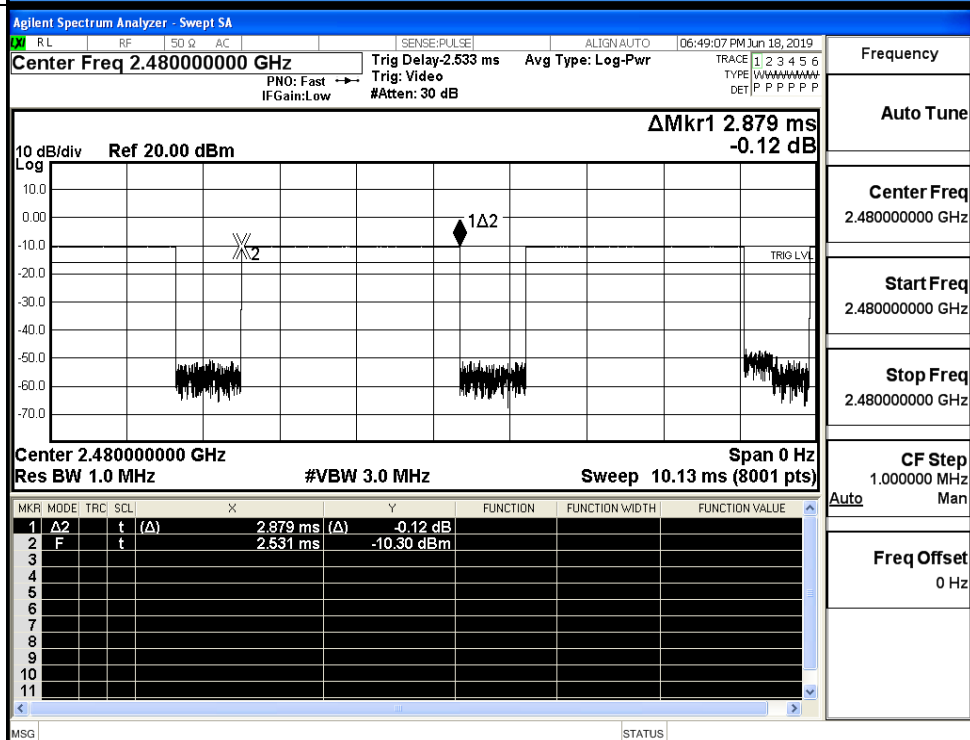
GFSK_DH5/LCH



GFSK_DH5/MCH



GFSK_DH5/HCH



Agilent Spectrum Analyzer - Swept SA

RL RF SO Q AC SENSE:PULSE ALIGN:AUTO 06:52:09 PM Jun 18, 2019

Center Freq 2.402000000 GHz Trig Delay: 2.533 ms Avg Type: Log-Pwr
 PNO: Fast IF Gain: Low Trig: Video #Atten: 30 dB TRACE 1 2 3 4 5 6
 TYPE W W W W W W W W
 DET P P P P P P P

ΔMkr1 2.883 ms -1.00 dB

Log Ref 20.00 dBm

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	Δ2	t	(Δ)	2.883 ms	(Δ) -1.00 dB			
2	F	t		1.269 ms	-11.44 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

Frequency Auto Tune

Center Freq 2.402000000 GHz

Start Freq 2.402000000 GHz

Stop Freq 2.402000000 GHz

CF Step 1.000000 MHz Man

Freq Offset 0 Hz

MSG STATUS

Agilent Spectrum Analyzer - Swept SA

RL RF 50 Q AC SENSE:PULSE ALIGN:AUTO 06:54:29 PM Jun 18, 2019

Center Freq 2.441000000 GHz Trig Delay: 2.533 ms Avg Type: Log-Pwr PNO: Fast IF Gain: Low Trig: Video #Atten: 30 dB TRACE 1 2 3 4 5 6 TYPE: W W W W W W W W DET: P P P P P P P

10 dB/div Ref 20.00 dBm Δ Mkr1 2.883 ms -1.11 dB

Center 2.441000000 GHz Span 0 Hz
Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.13 ms (8001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ 2	t	(Δ)	2.883 ms	(Δ) -1.11 dB			
2	F	t		3.417 ms	-10.40 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG STATUS

Auto Tune

Center Freq 2.441000000 GHz

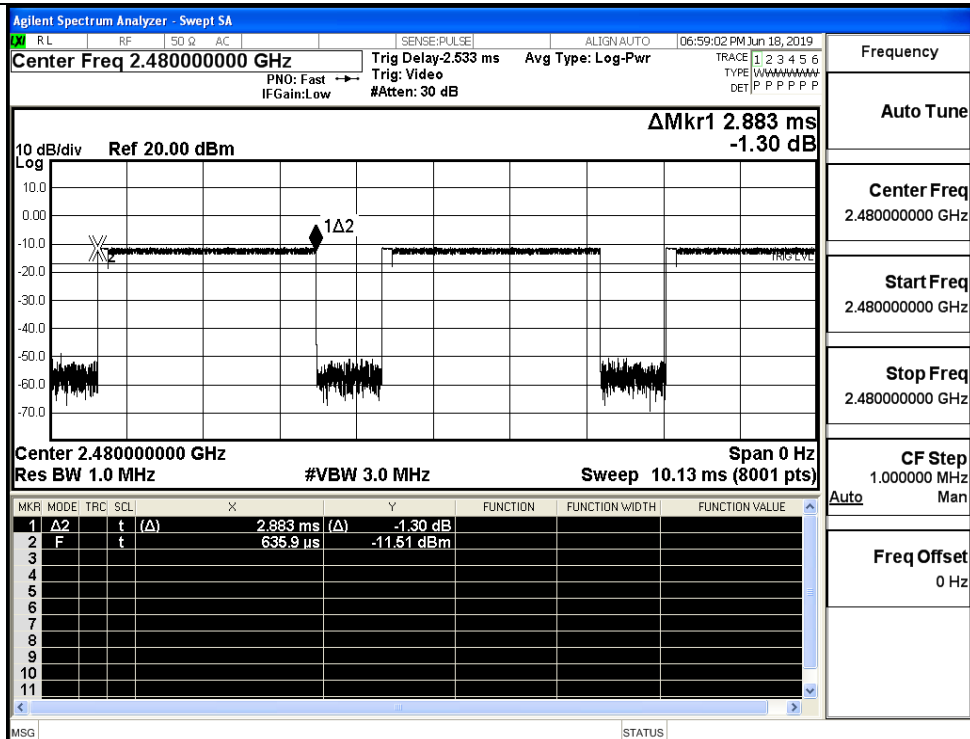
Start Freq 2.441000000 GHz

Stop Freq 2.441000000 GHz

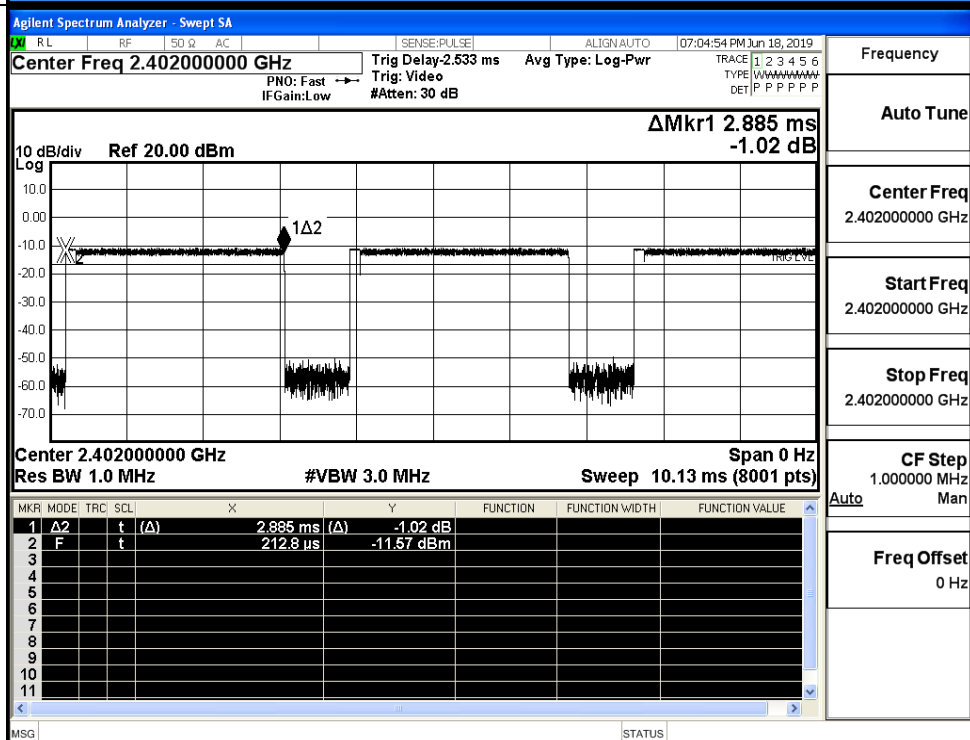
CF Step 1.000000 MHz Man

Freq Offset 0 Hz

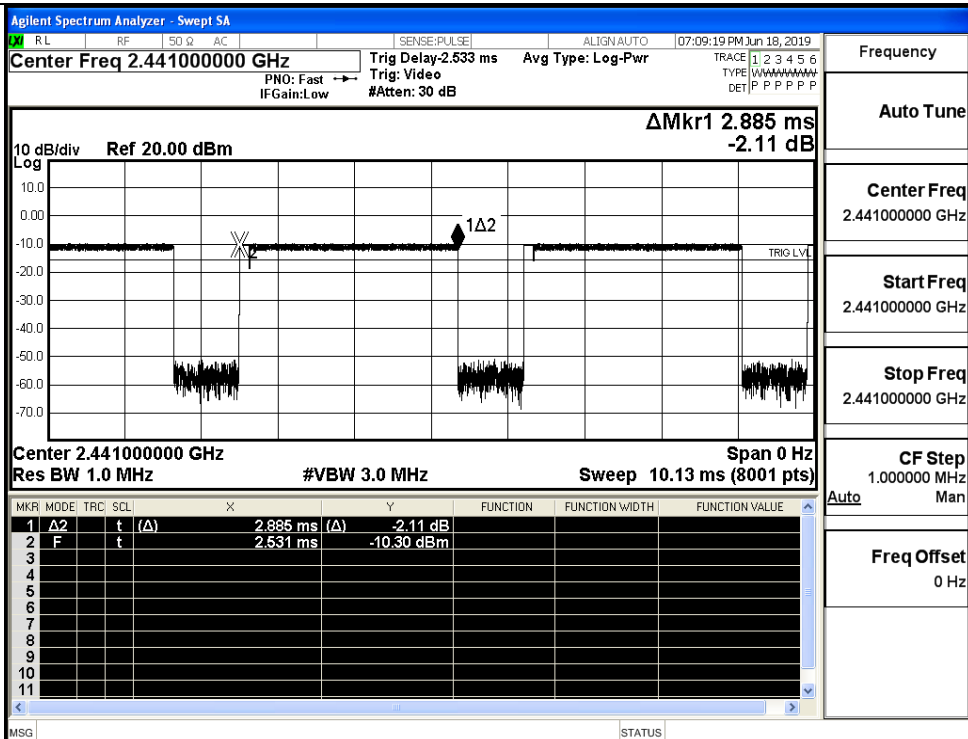
$\pi/4$ DQPSK
_2DH5/HCH



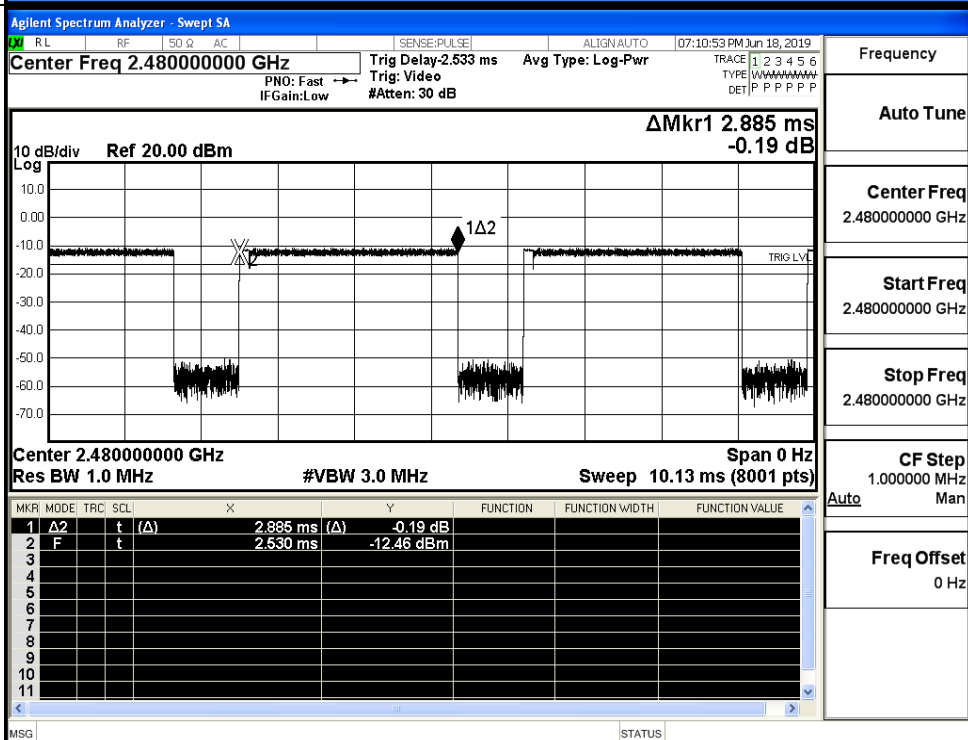
8DPSK _3DH5/LCH



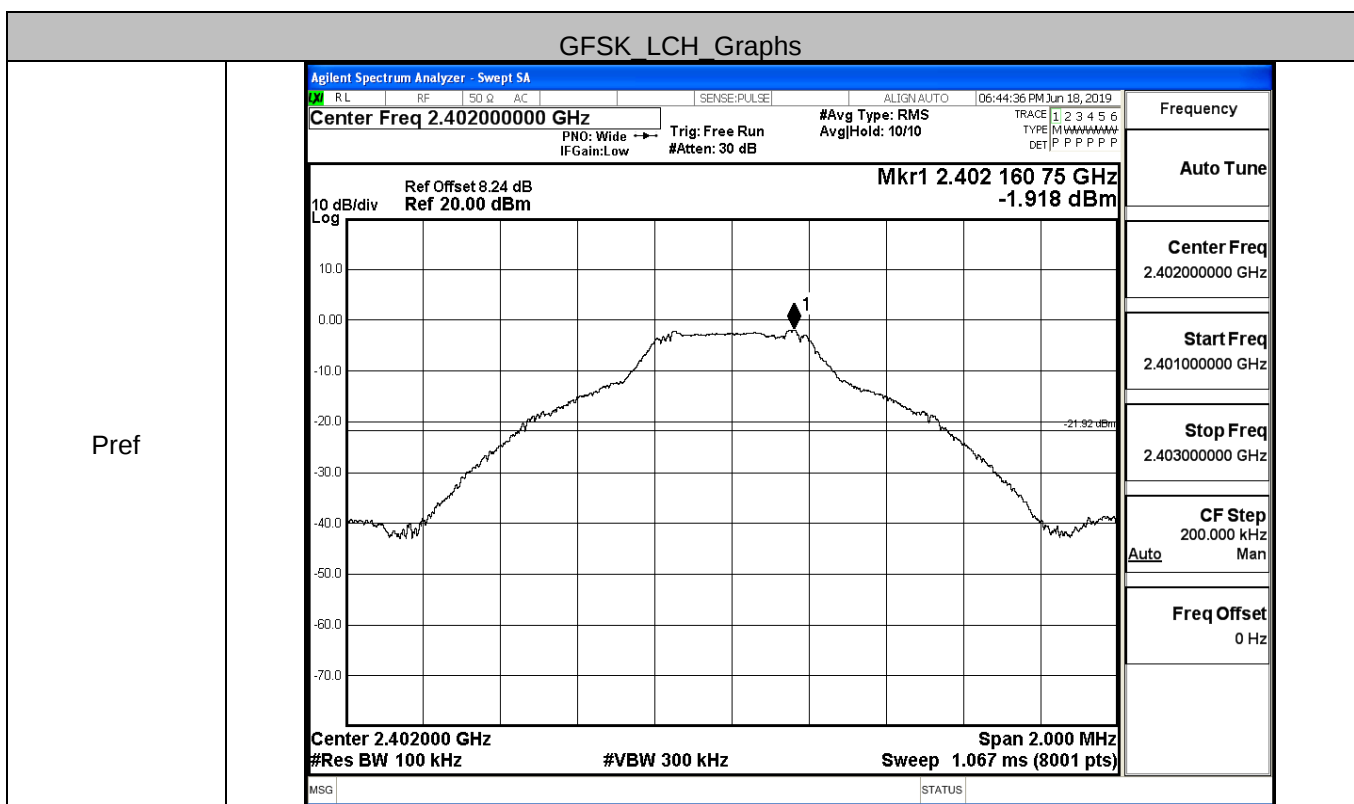
8DPSK_3DH5/MCH



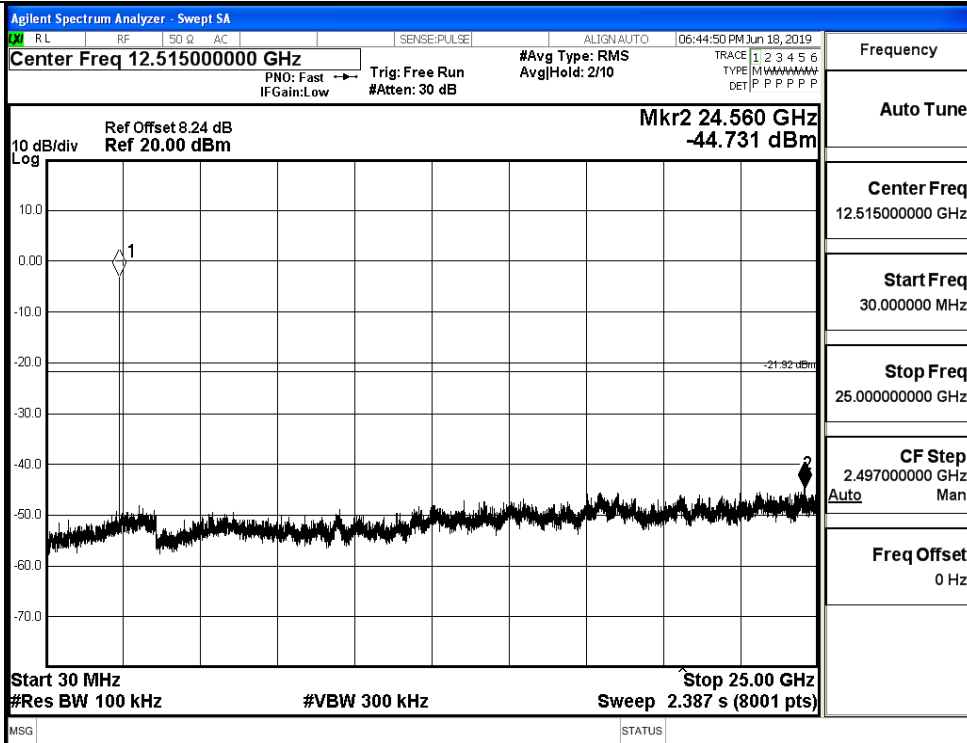
8DPSK_3DH5/HCH



Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.918	-44.731	-21.918	PASS
	MCH	-0.988	-44.400	-20.988	PASS
	HCH	-1.879	-44.455	-21.879	PASS
$\pi/4$ DQPSK	LCH	-3.132	-44.859	-23.132	PASS
	MCH	-2.175	-44.396	-22.175	PASS
	HCH	-3.46	-43.872	-23.460	PASS
8DPSK	LCH	-3.003	-44.878	-23.003	PASS
	MCH	-1.991	-44.672	-21.991	PASS
	HCH	-3.219	-44.271	-23.219	PASS

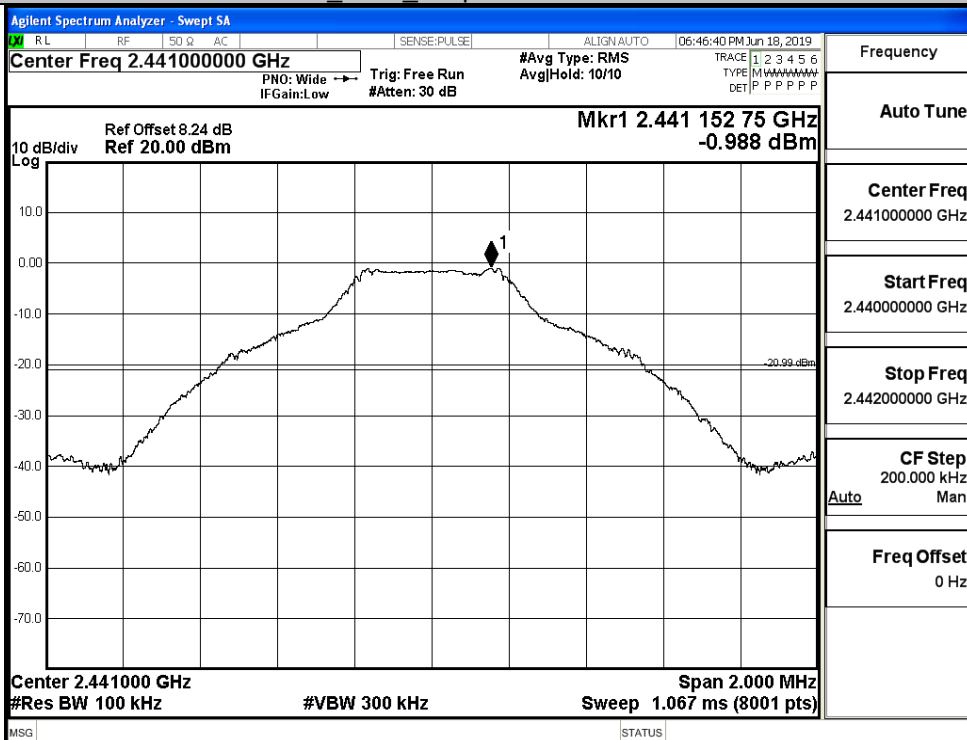


Puw

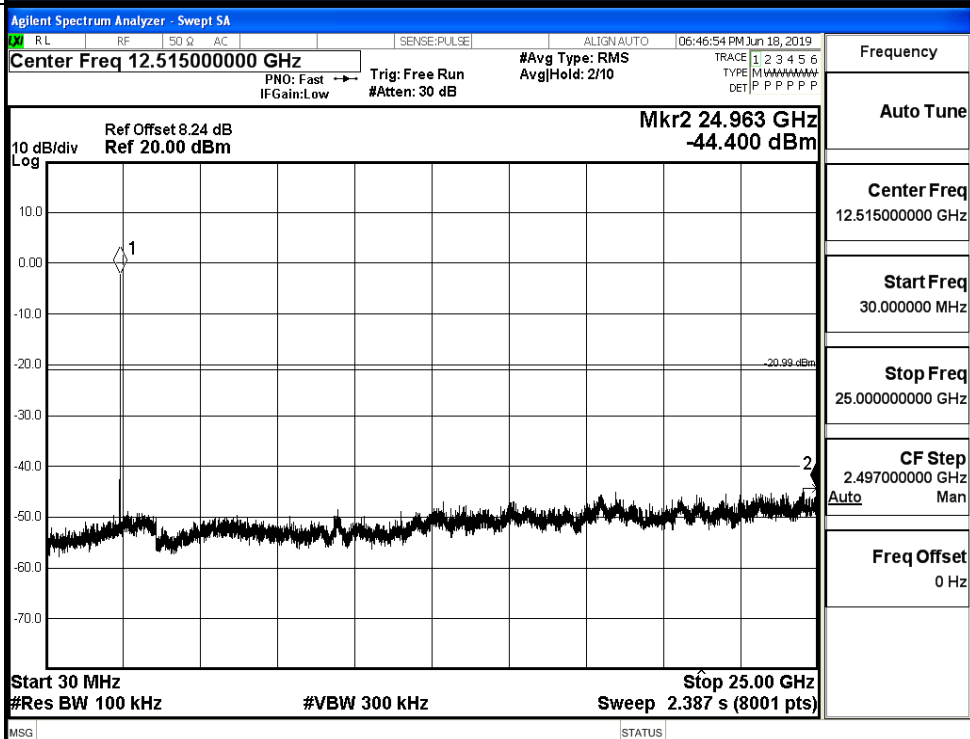


GFSK_MCH_Graphs

Pref

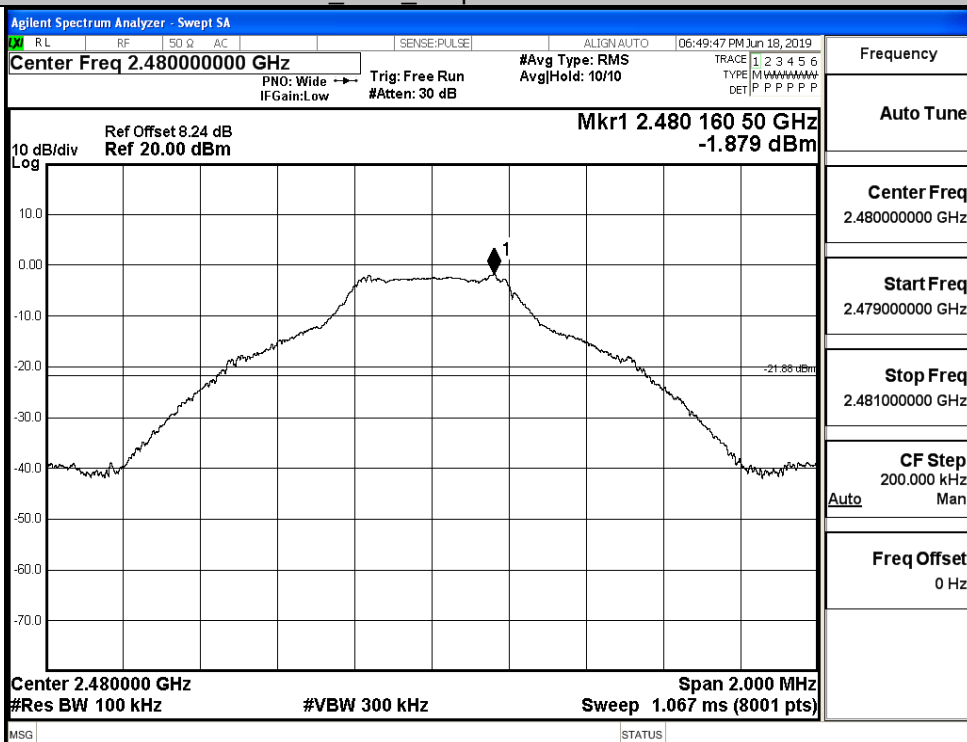


Puw

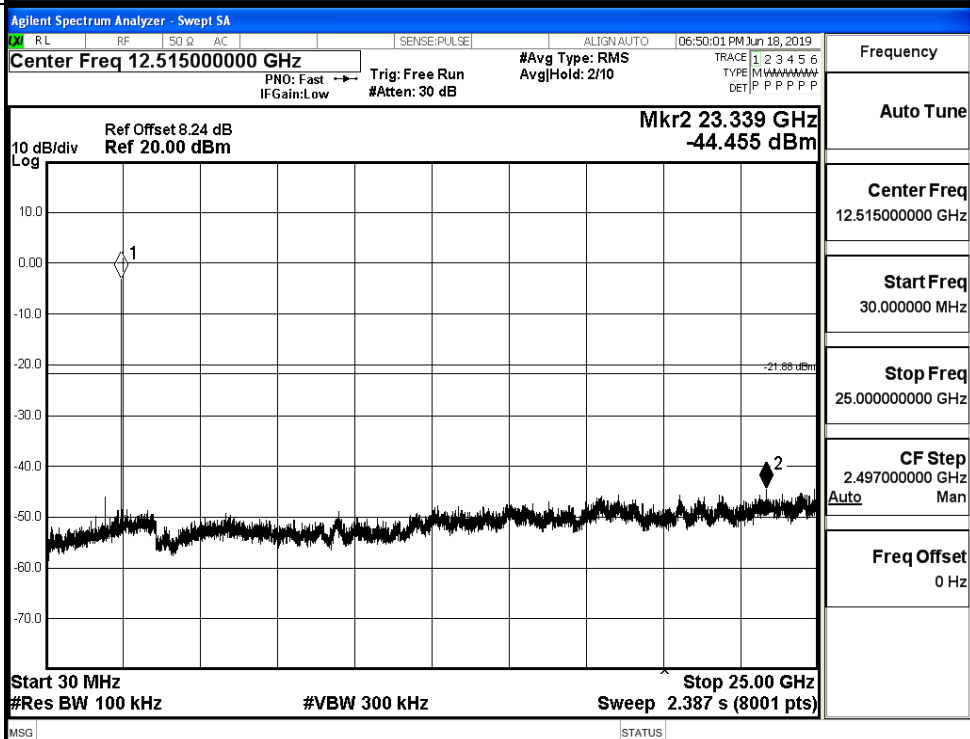


GFSK HCH_Graphs

Pref

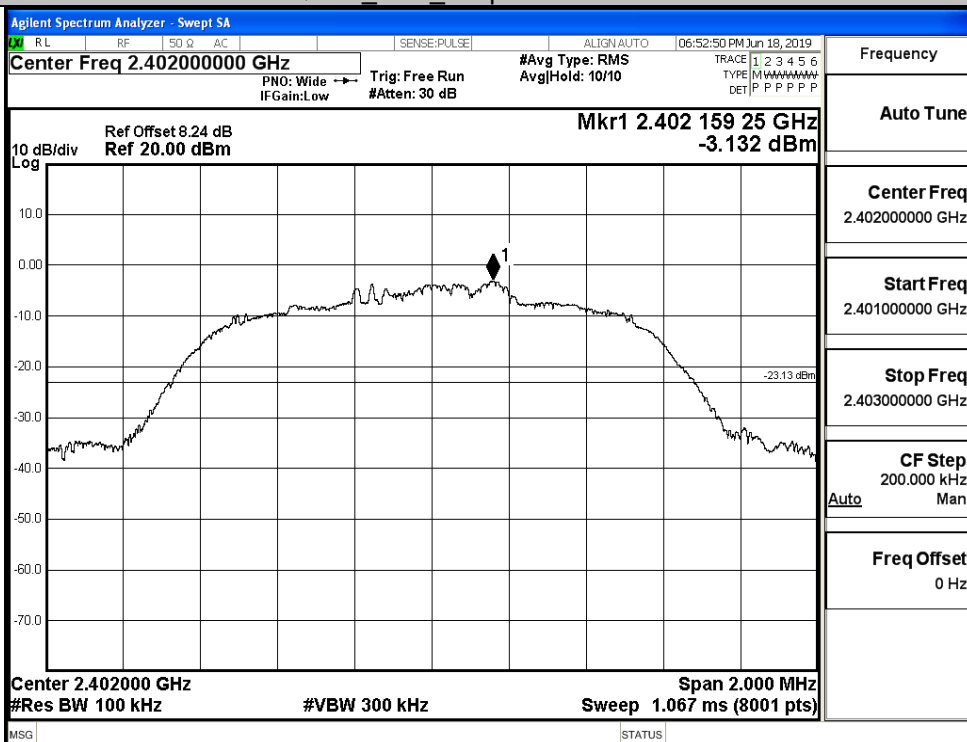


Puw

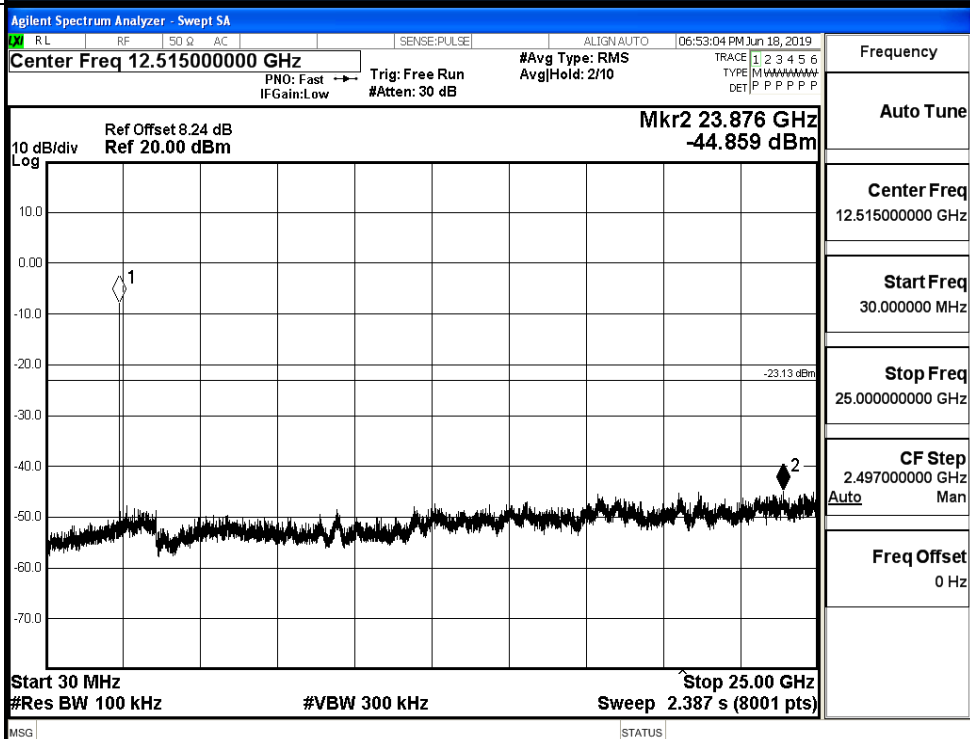


$\pi/4$ DQPSK_LCH_Graphs

Pref

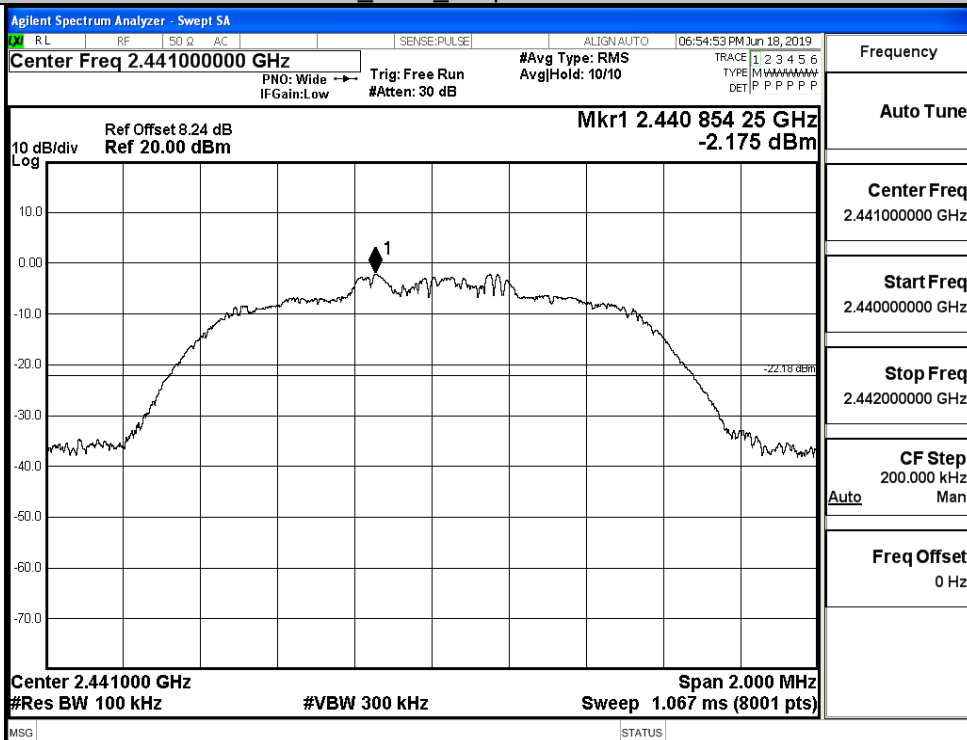


Puw

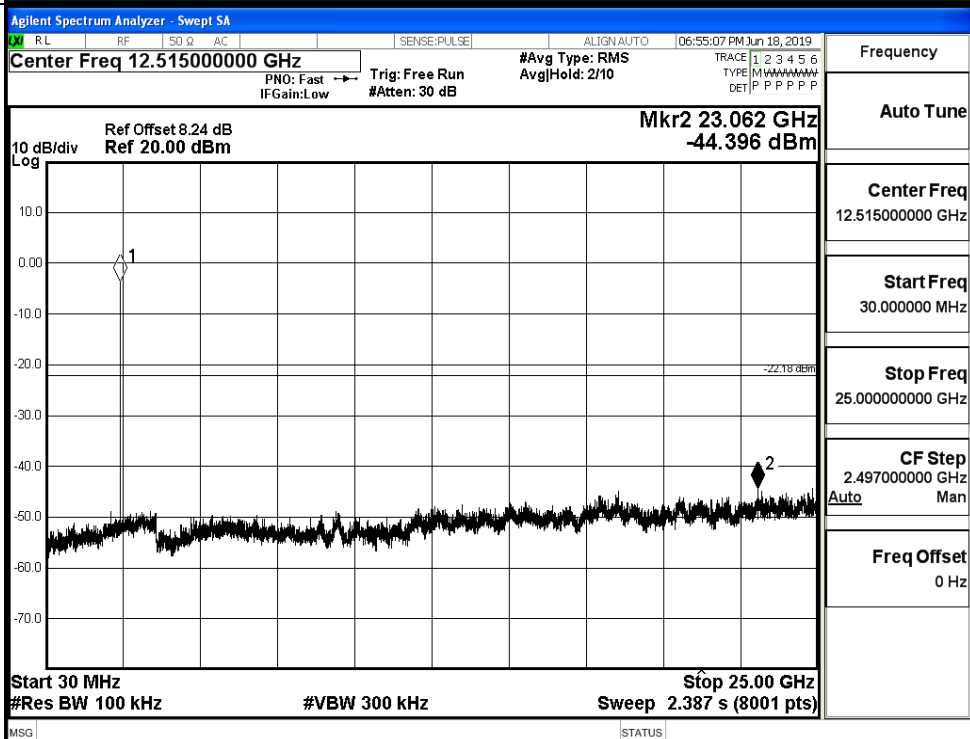


π /4DQPSK_MCH_Graphs

Pref

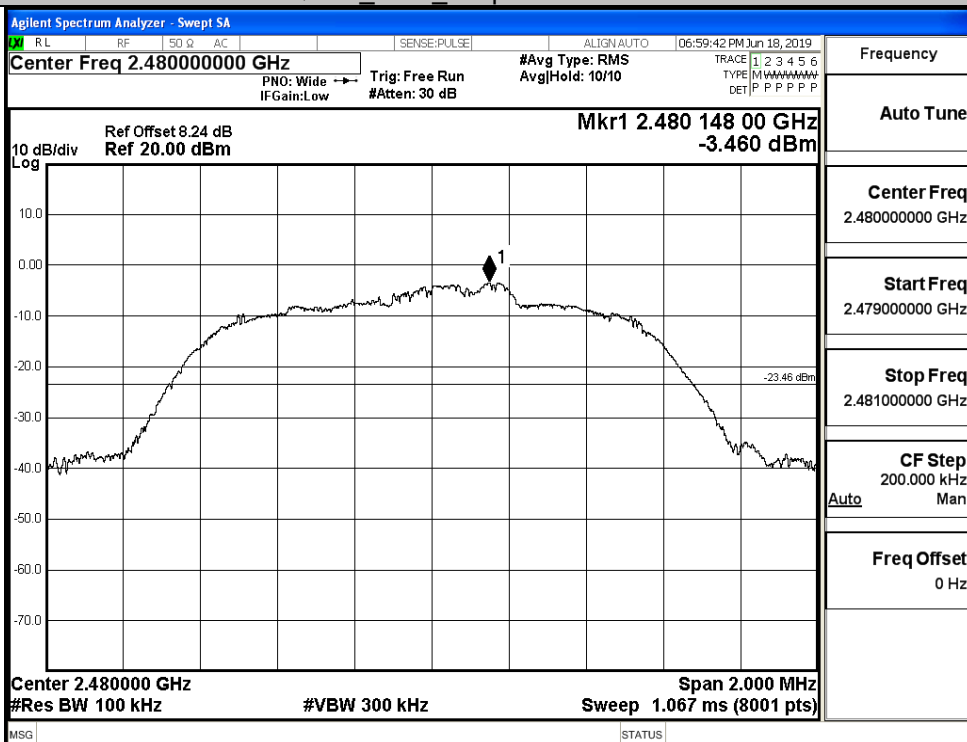


Puw

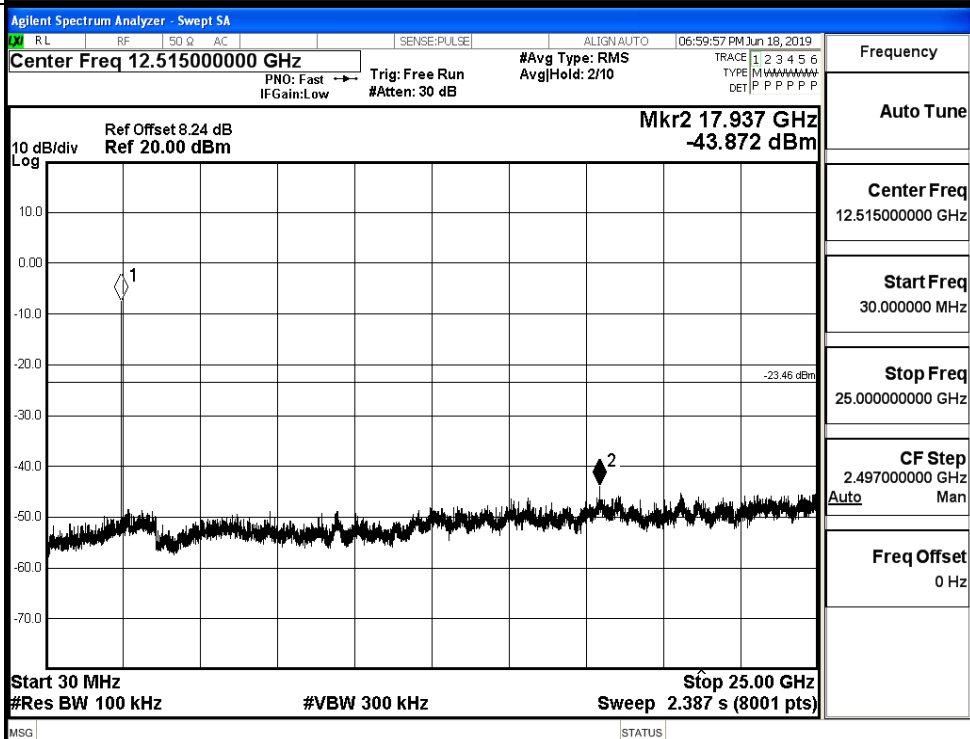


$\pi/4$ DQPSK_HCH_Graphs

Pref

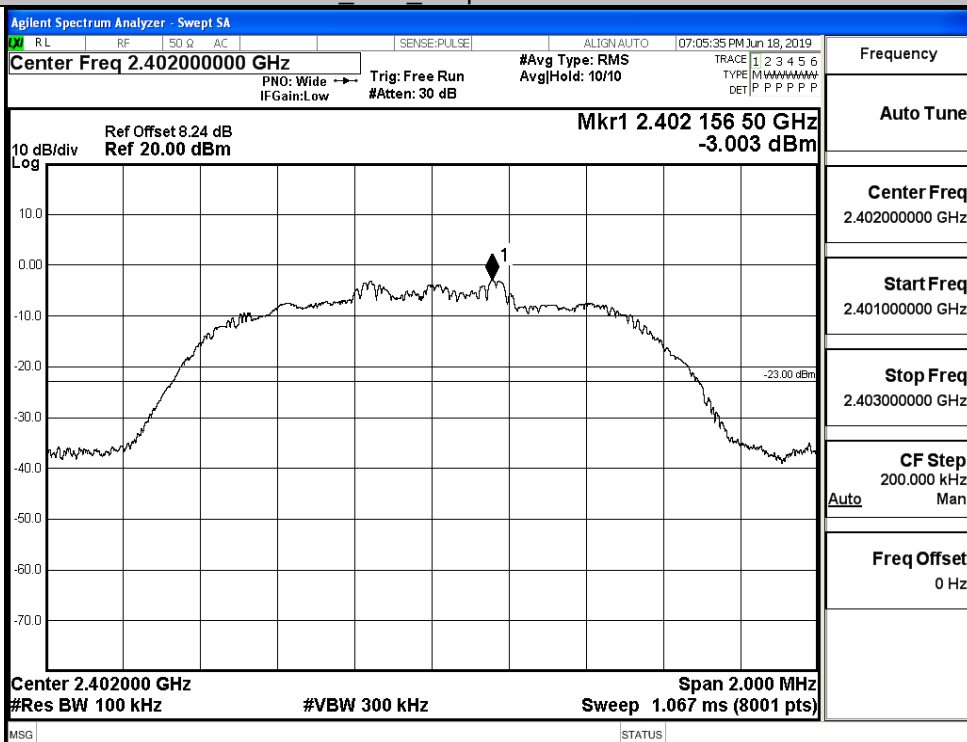


Puw

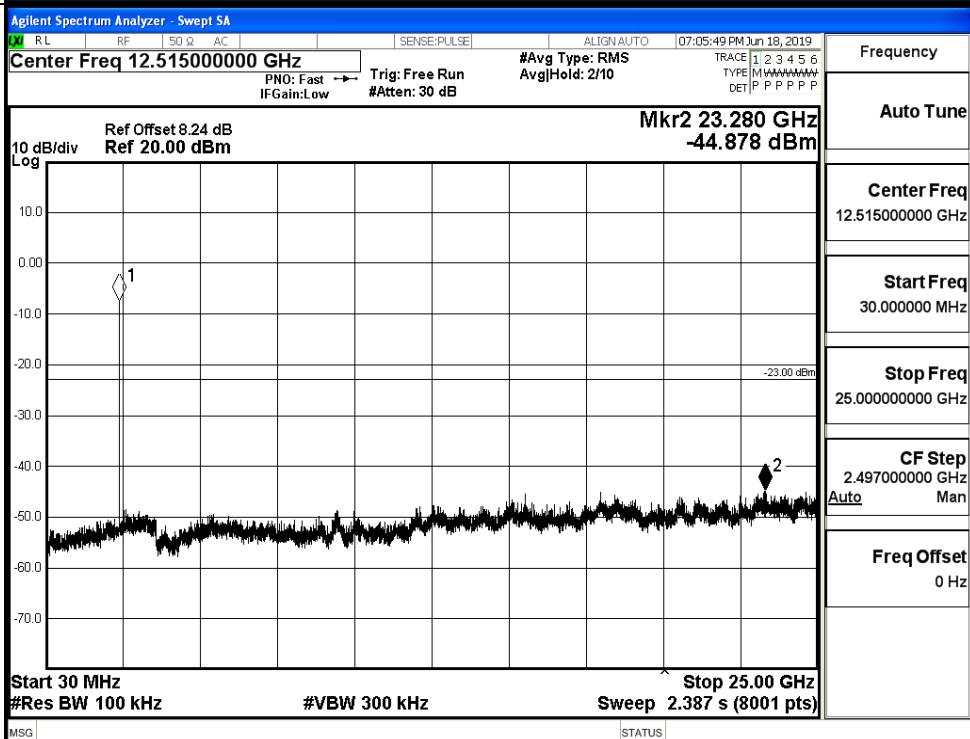


8DPSK_LCH_Graphs

Pref

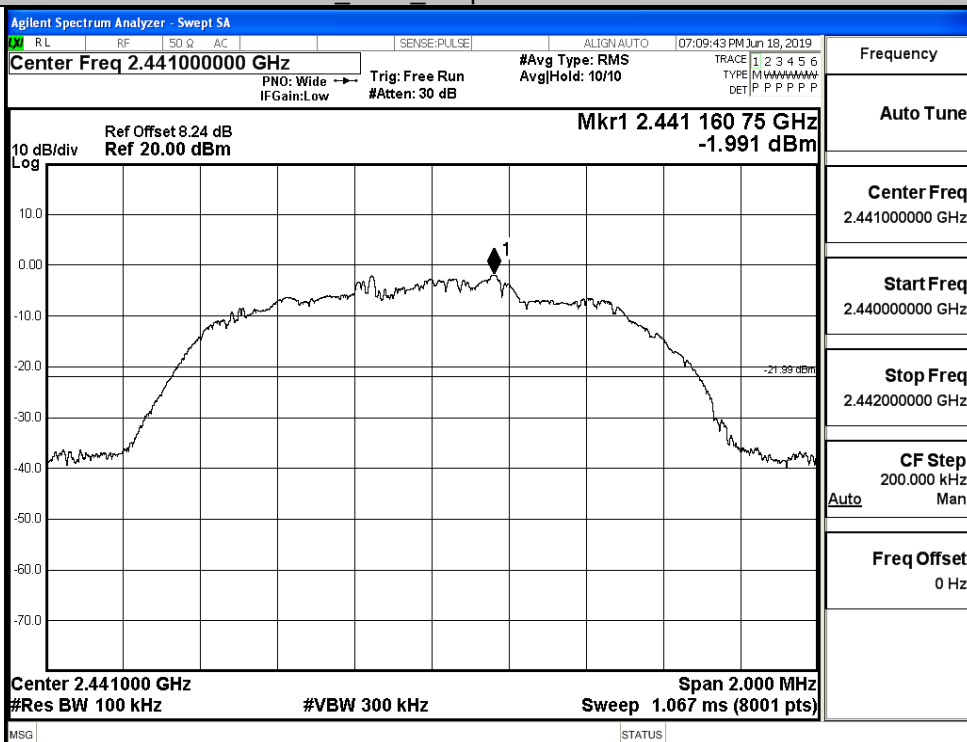


Puw

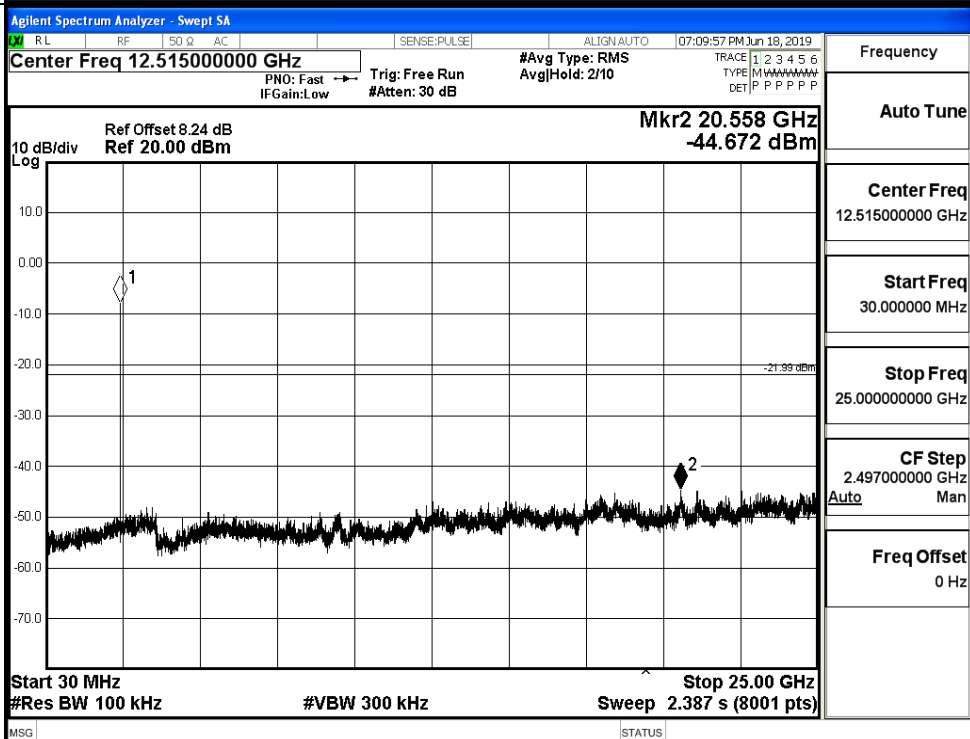


8DPSK_MCH_Graphs

Pref

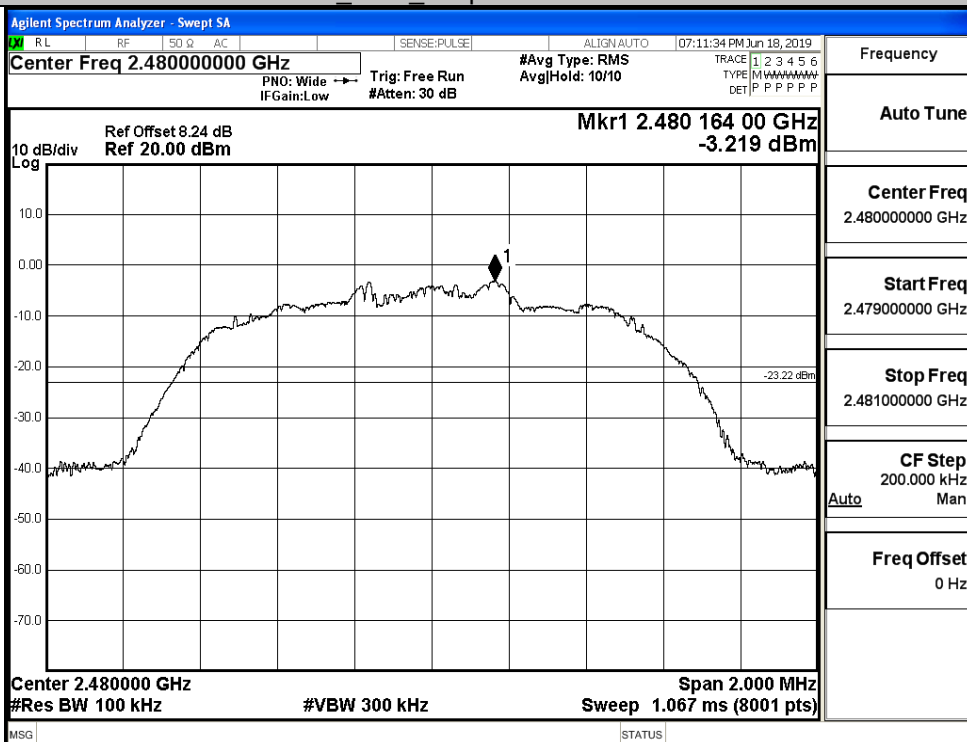


Puw

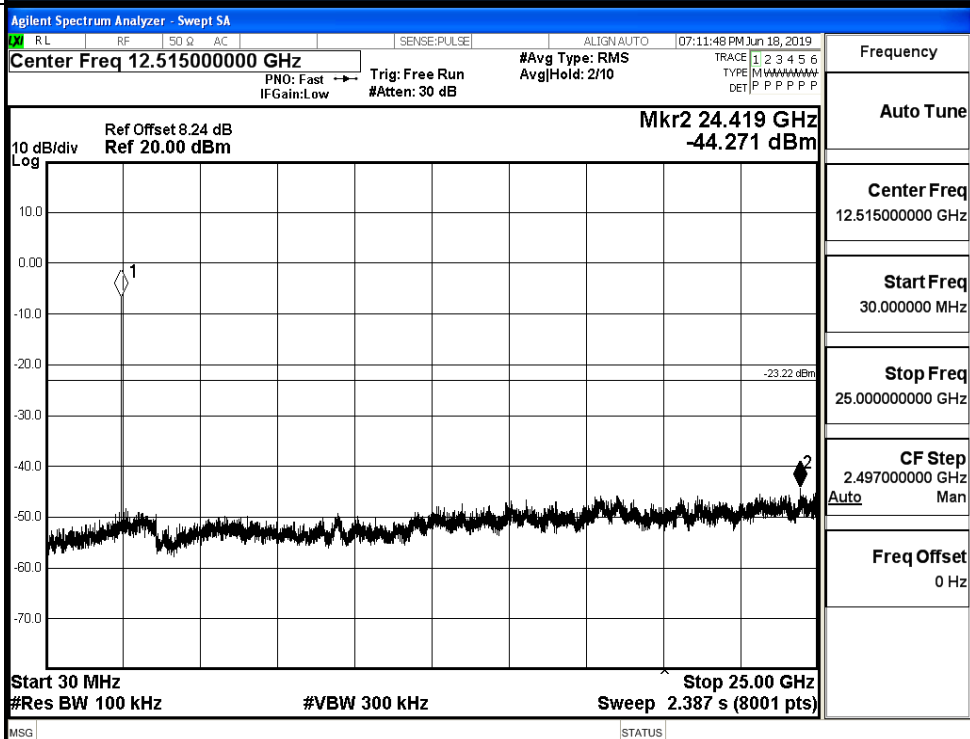


8DPSK_HCH_Graphs

Pref



Puw

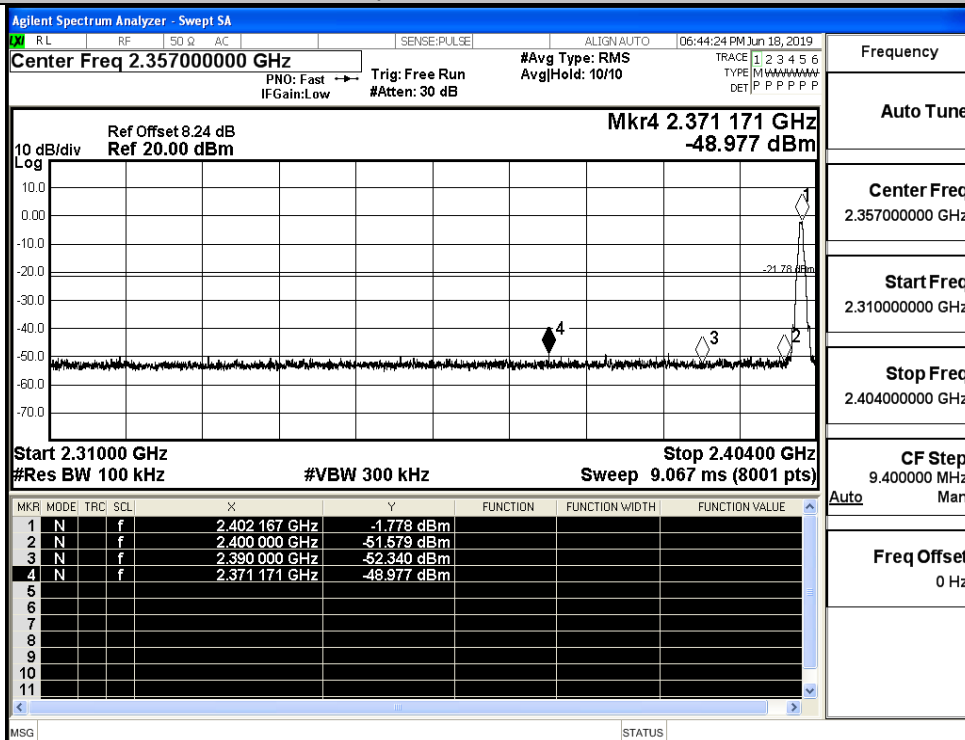


A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-1.778	Off	-48.977	-21.78	PASS
			0.354	On	-48.399	-19.65	PASS
	HCH	2480	-1.955	Off	-49.203	-21.96	PASS
			0.515	On	-48.747	-19.49	PASS
$\pi/4$ DQPSK	LCH	2402	-2.966	Off	-49.440	-22.97	PASS
			-1.220	On	-48.912	-21.22	PASS
	HCH	2480	-3.117	Off	-49.373	-23.12	PASS
			-0.811	On	-48.474	-20.81	PASS
8DPSK	LCH	2402	-2.939	Off	-50.169	-22.94	PASS
			-0.866	On	-48.978	-20.87	PASS
	HCH	2480	-3.129	Off	-49.993	-23.13	PASS
			-0.766	On	-48.852	-20.77	PASS

Test Graphs

GFSK/LCH/No Hop

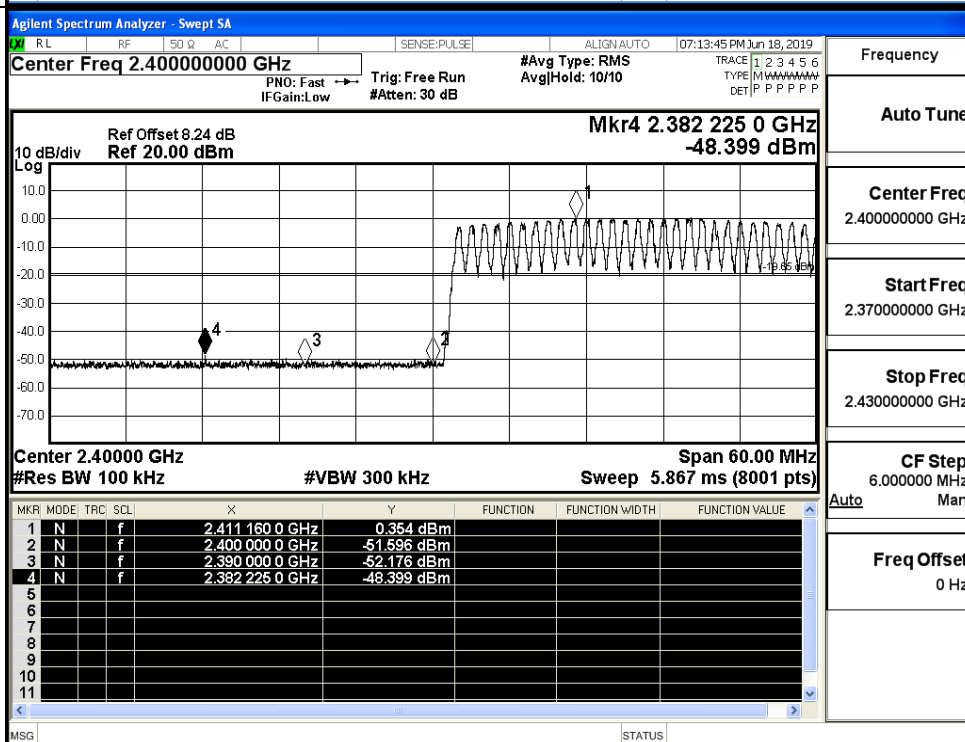


Frequency

Auto Tune

Center Freq
2.357000000 GHzStart Freq
2.310000000 GHzStop Freq
2.404000000 GHzCF Step
9.400000 MHz
Auto ManFreq Offset
0 Hz

GFSK/LCH/Hop

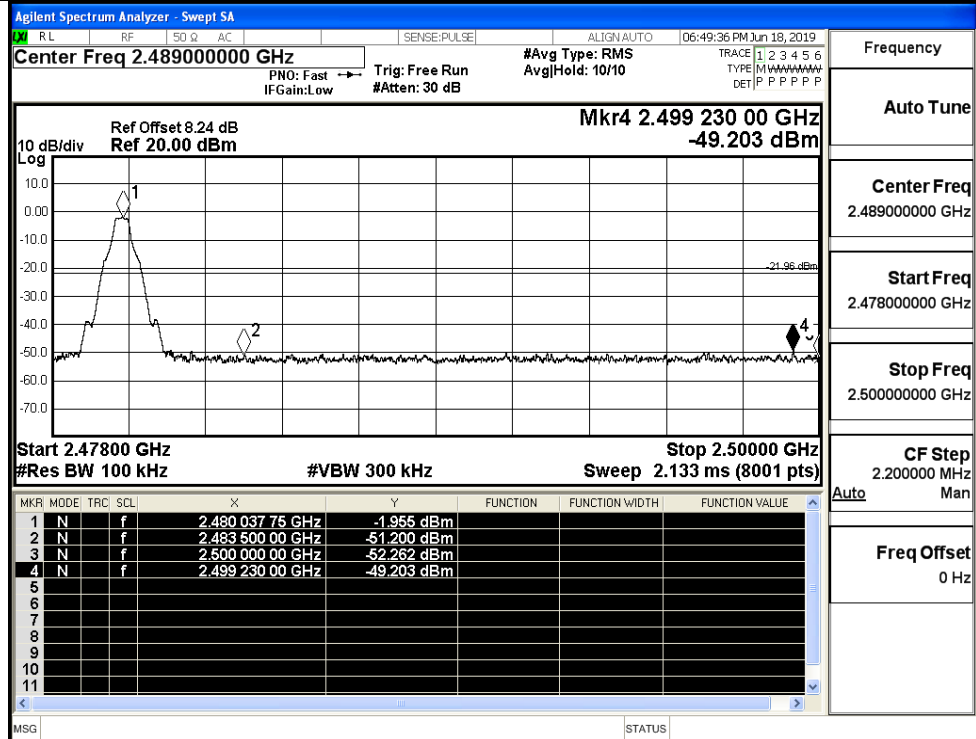


Frequency

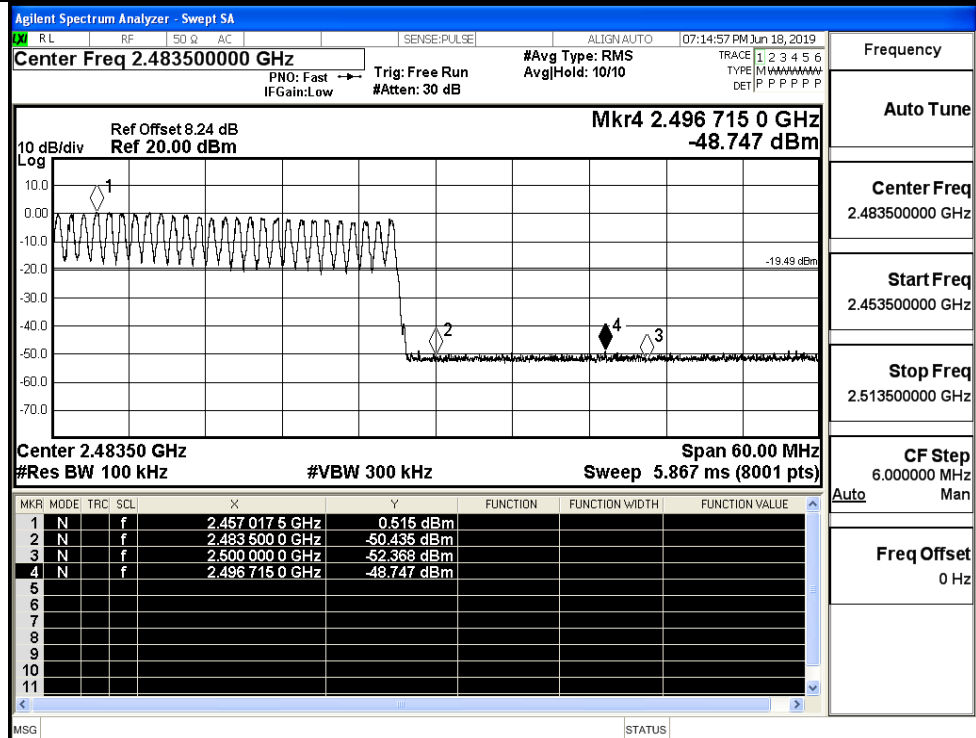
Auto Tune

Center Freq
2.400000000 GHzStart Freq
2.370000000 GHzStop Freq
2.430000000 GHzCF Step
6.000000 MHz
Auto ManFreq Offset
0 Hz

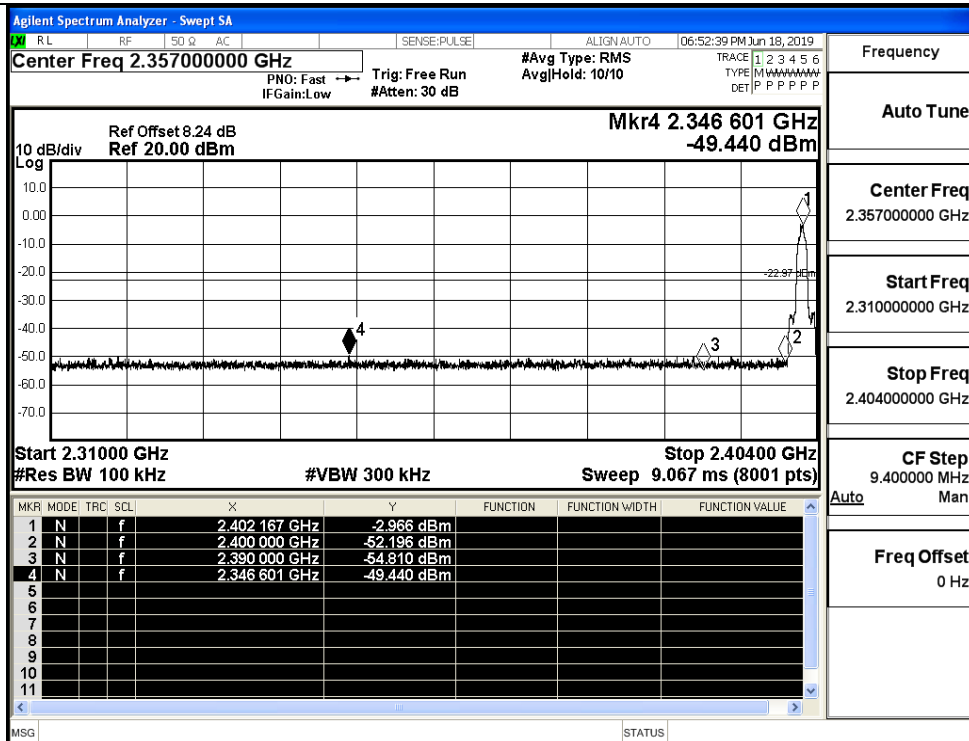
GFSK/HCH/No Hop



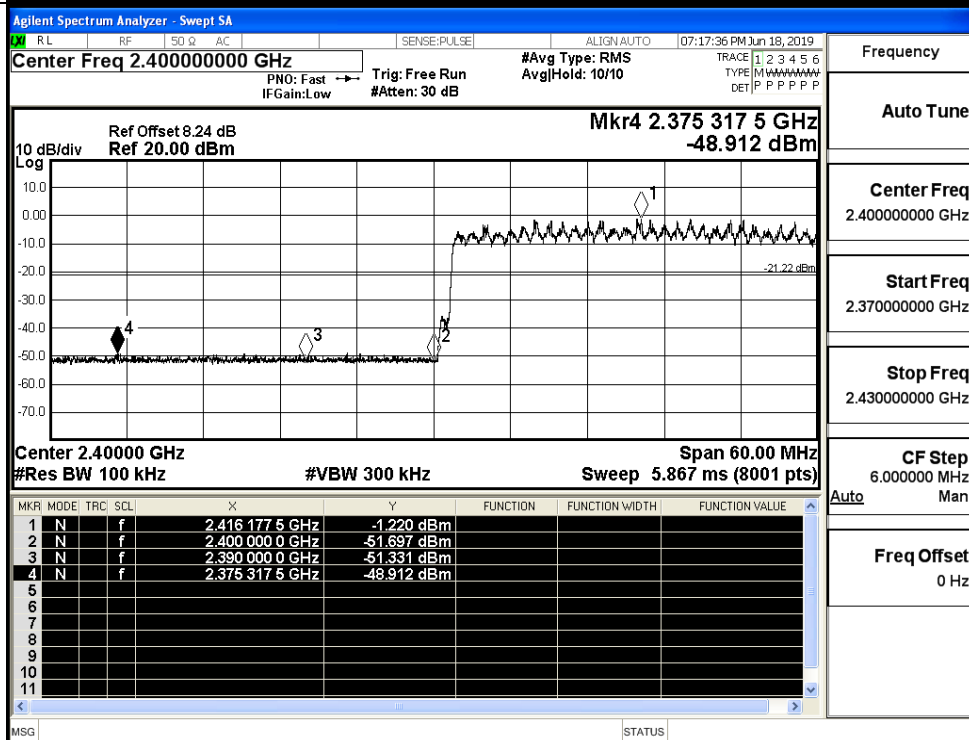
GFSK/HCH/Hop



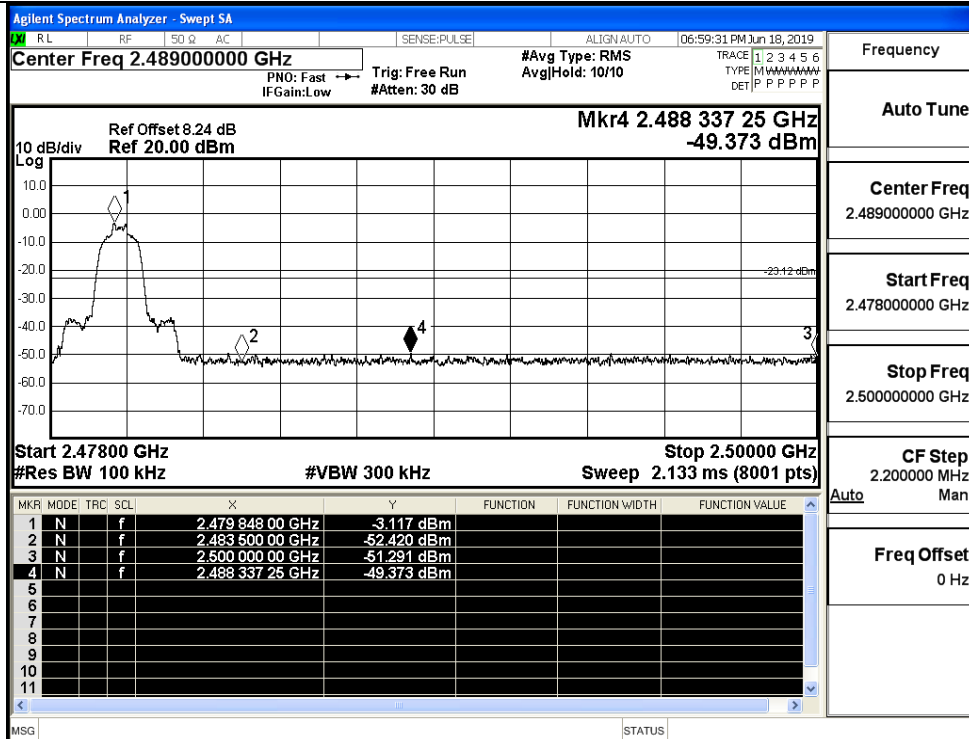
$\pi/4$ DQPSK/LCH/No
Hop



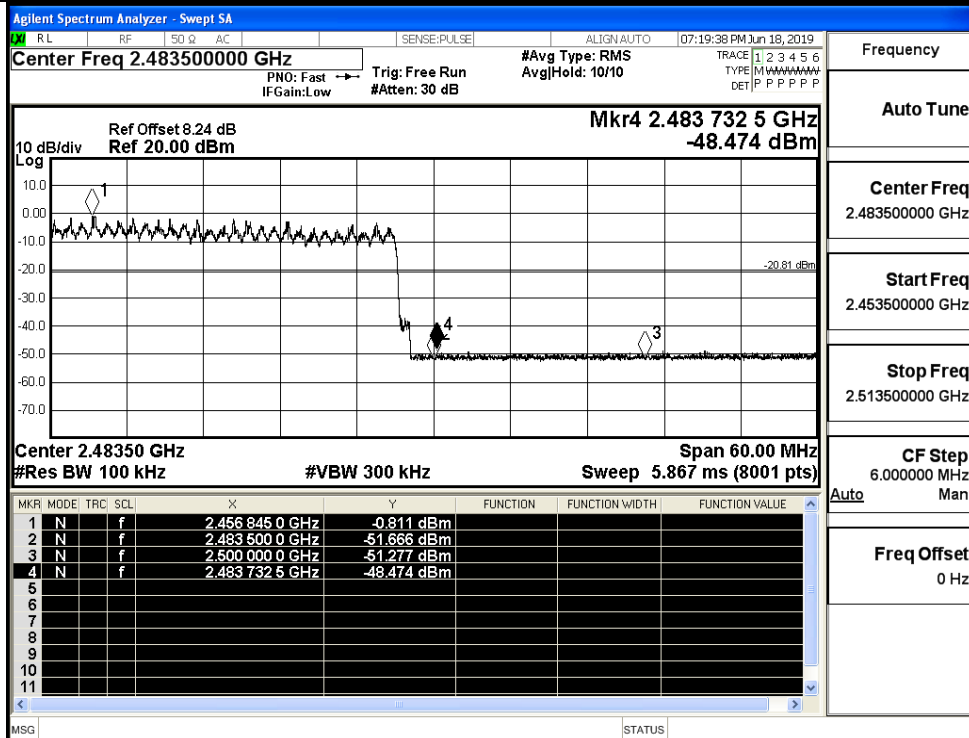
$\pi/4$ DQPSK/LCH/Hop



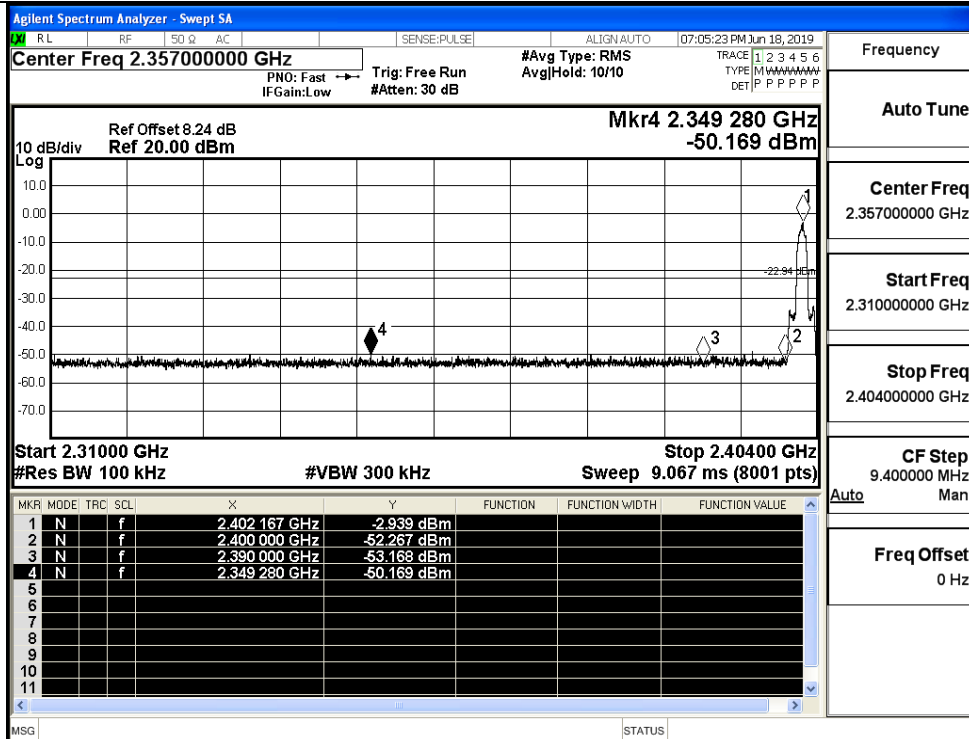
$\pi/4$ DQPSK/HCH/No
Hop



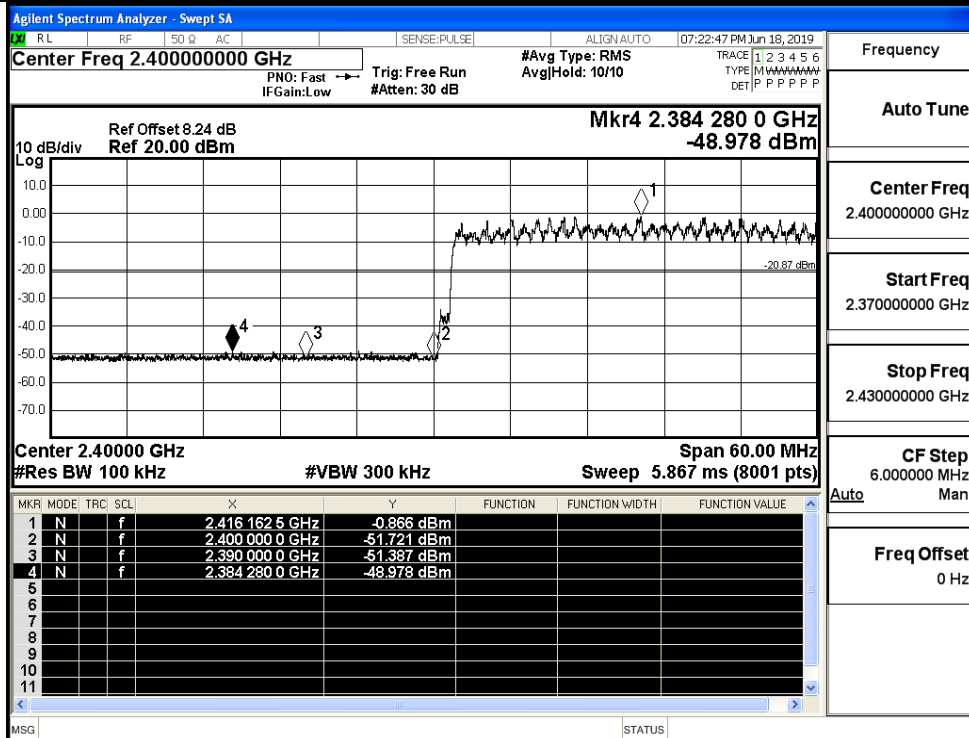
$\pi/4$ DQPSK/HCH/Hop



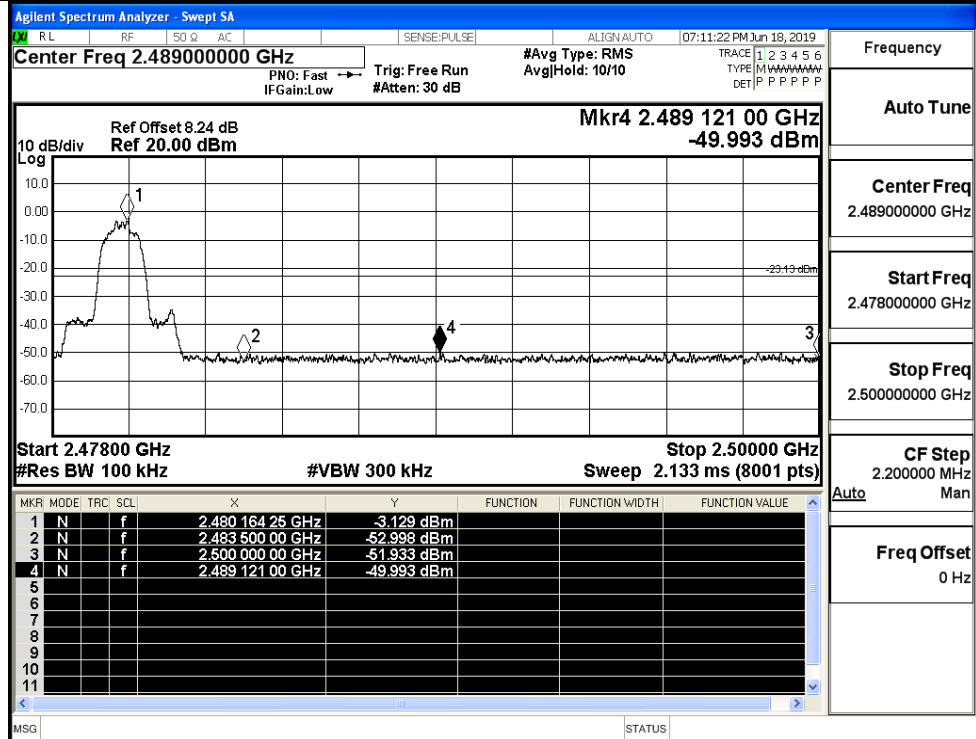
8DPSK/LCH/No Hop



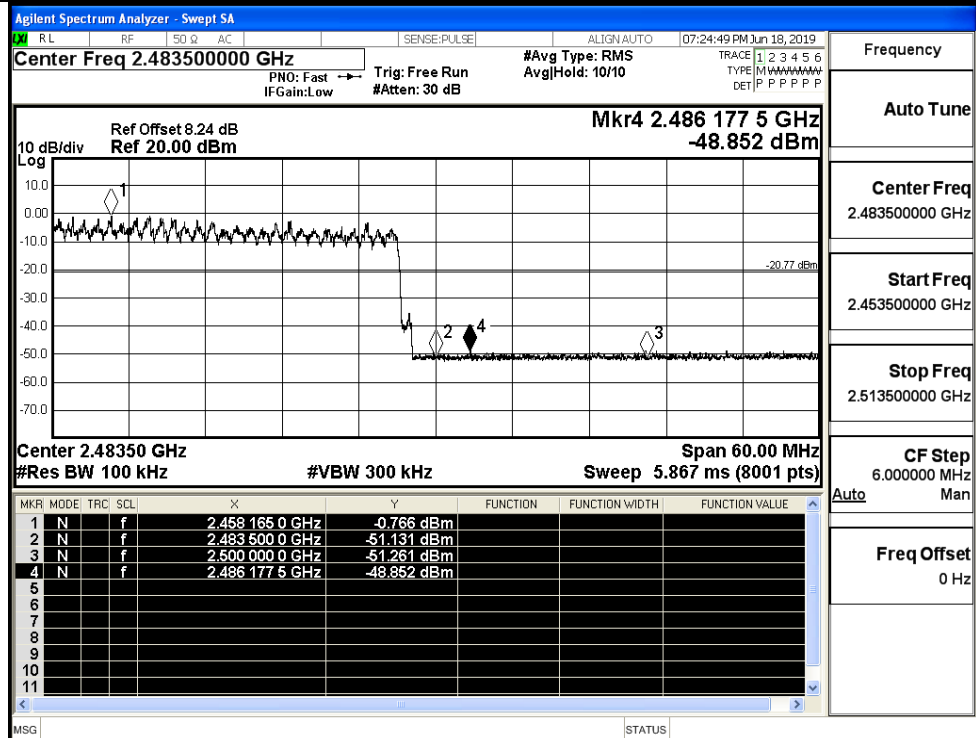
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



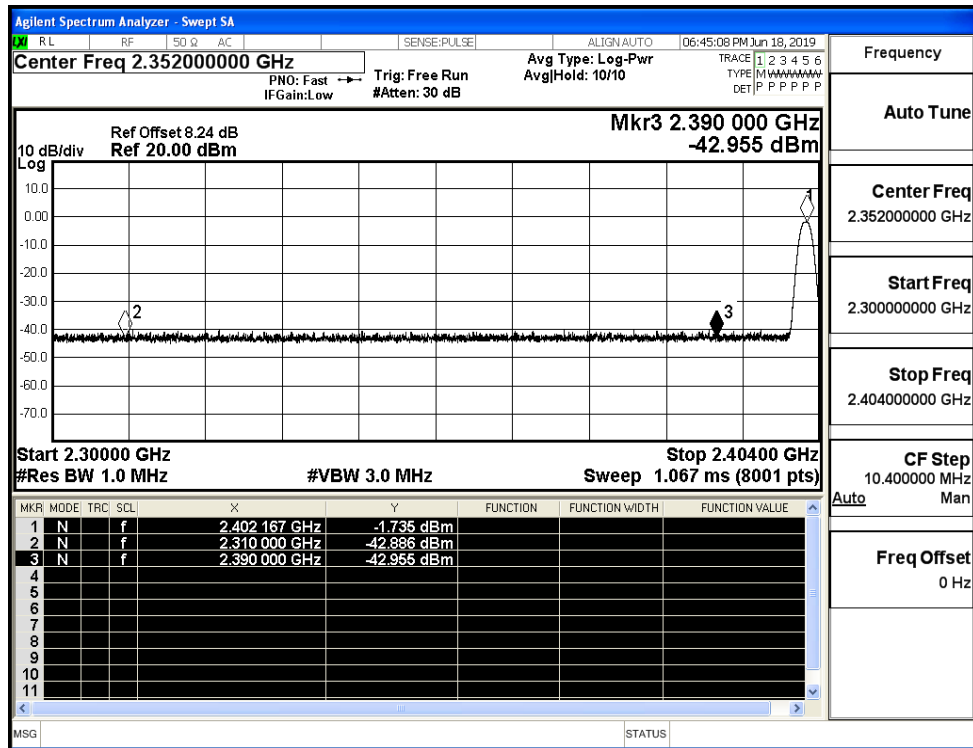
8DPSK/HCH/Hop



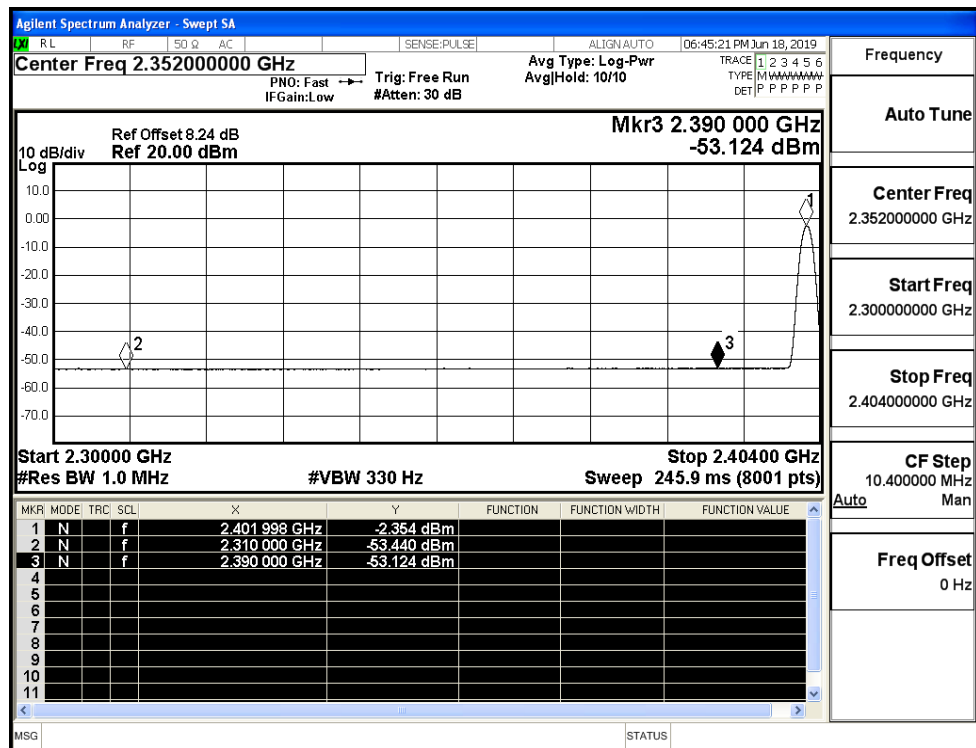
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.89	2.0	0	52.37	PEAK	74	PASS
	Off	2310.0	-53.44	2.0	0	41.82	AV	54	PASS
	Off	2390.0	-42.96	2.0	0	52.30	PEAK	74	PASS
	Off	2390.0	-53.12	2.0	0	42.13	AV	54	PASS
	Off	2483.5	-43.88	2.0	0	51.38	PEAK	74	PASS
	Off	2483.5	-52.91	2.0	0	42.35	AV	54	PASS
	Off	2500.0	-41.75	2.0	0	53.50	PEAK	74	PASS
	Off	2500.0	-52.77	2.0	0	42.49	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.08	2.0	0	52.18	PEAK	74	PASS
	Off	2310.0	-53.22	2.0	0	42.04	AV	54	PASS
	Off	2390.0	-43.99	2.0	0	51.27	PEAK	74	PASS
	Off	2390.0	-53.14	2.0	0	42.12	AV	54	PASS
	Off	2483.5	-42.33	2.0	0	52.93	PEAK	74	PASS
	Off	2483.5	-52.75	2.0	0	42.51	AV	54	PASS
	Off	2500.0	-43.24	2.0	0	52.02	PEAK	74	PASS
	Off	2500.0	-52.77	2.0	0	42.49	AV	54	PASS
8DPSK	Off	2310.0	-42.81	2.0	0	52.45	PEAK	74	PASS
	Off	2310.0	-53.47	2.0	0	41.79	AV	54	PASS
	Off	2390.0	-41.91	2.0	0	53.35	PEAK	74	PASS
	Off	2390.0	-53.20	2.0	0	42.06	AV	54	PASS
	Off	2483.5	-43.04	2.0	0	52.21	PEAK	74	PASS
	Off	2483.5	-52.84	2.0	0	42.42	AV	54	PASS
	Off	2500.0	-42.78	2.0	0	52.48	PEAK	74	PASS
	Off	2500.0	-52.70	2.0	0	42.55	AV	54	PASS

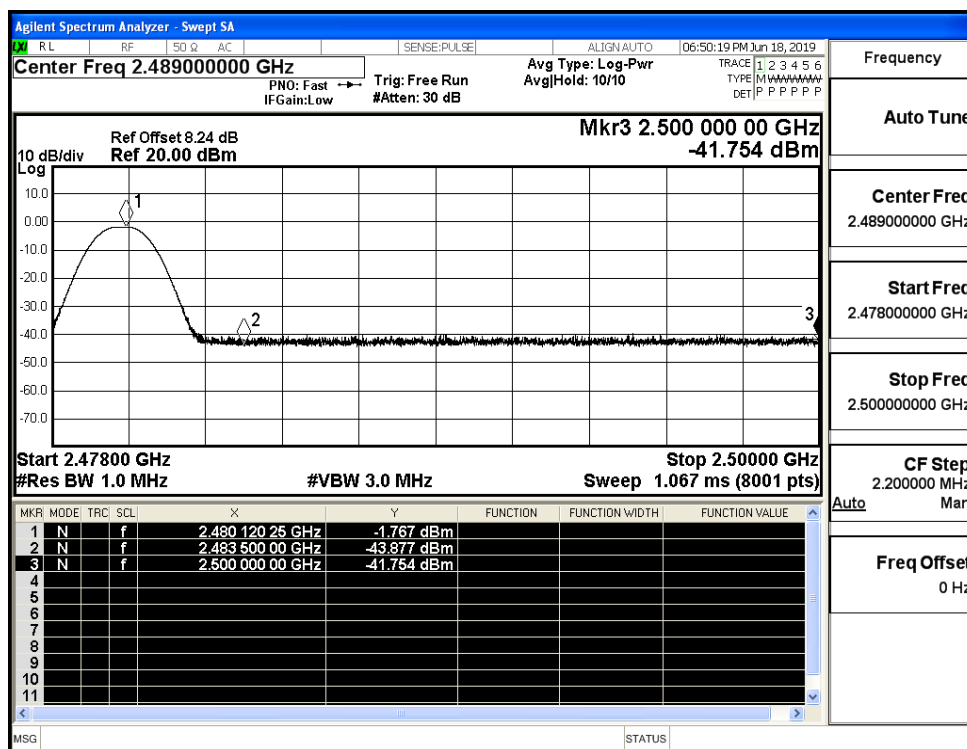
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



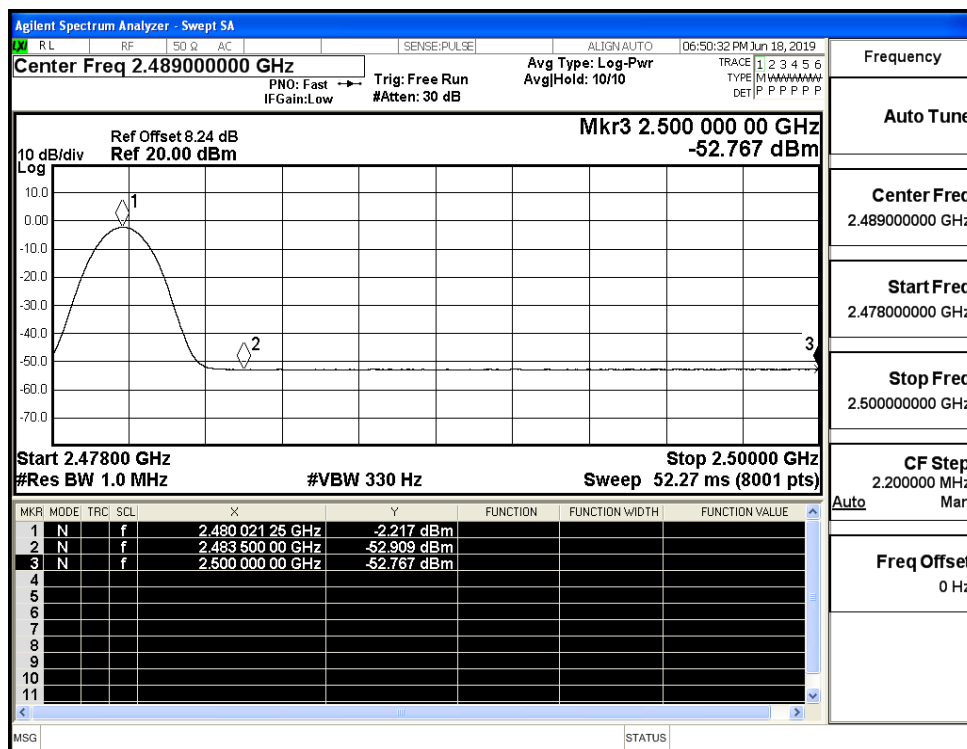
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

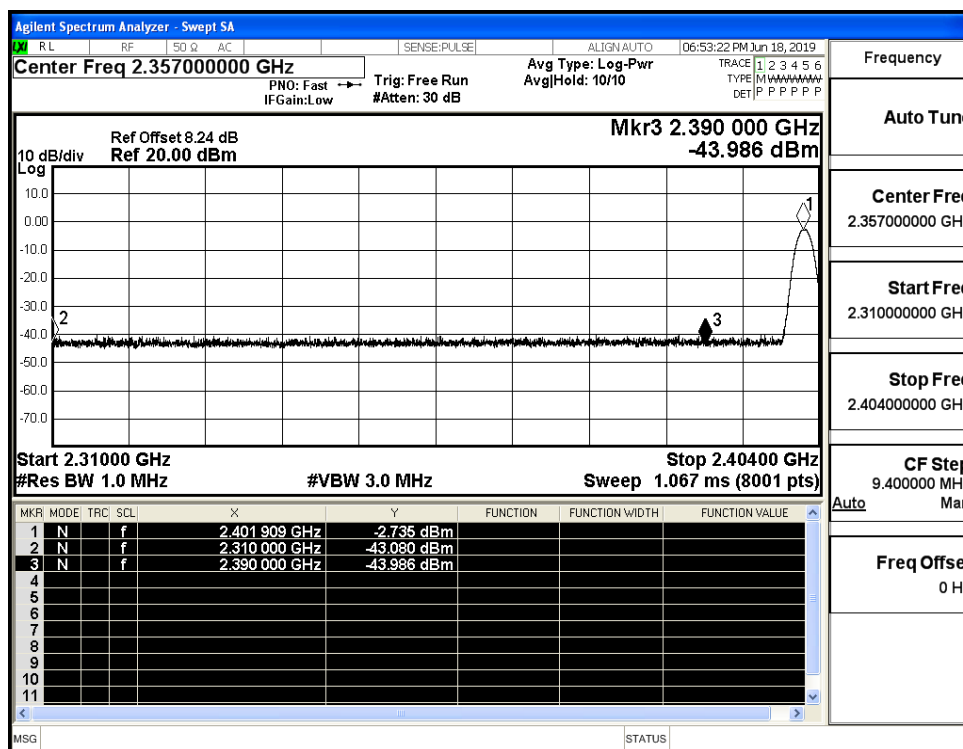
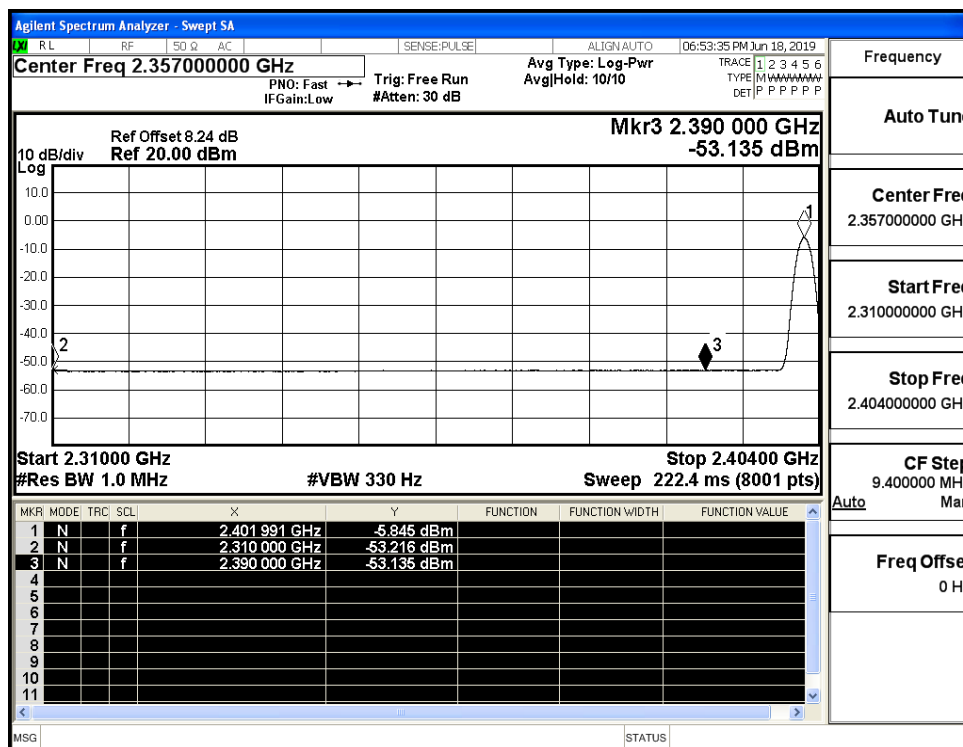


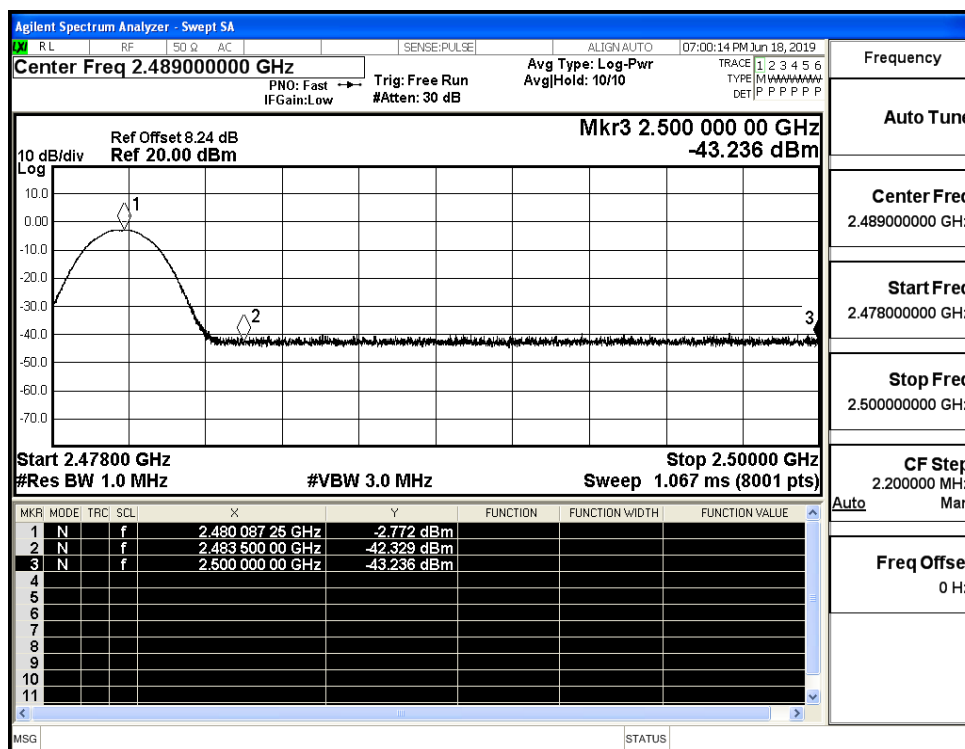
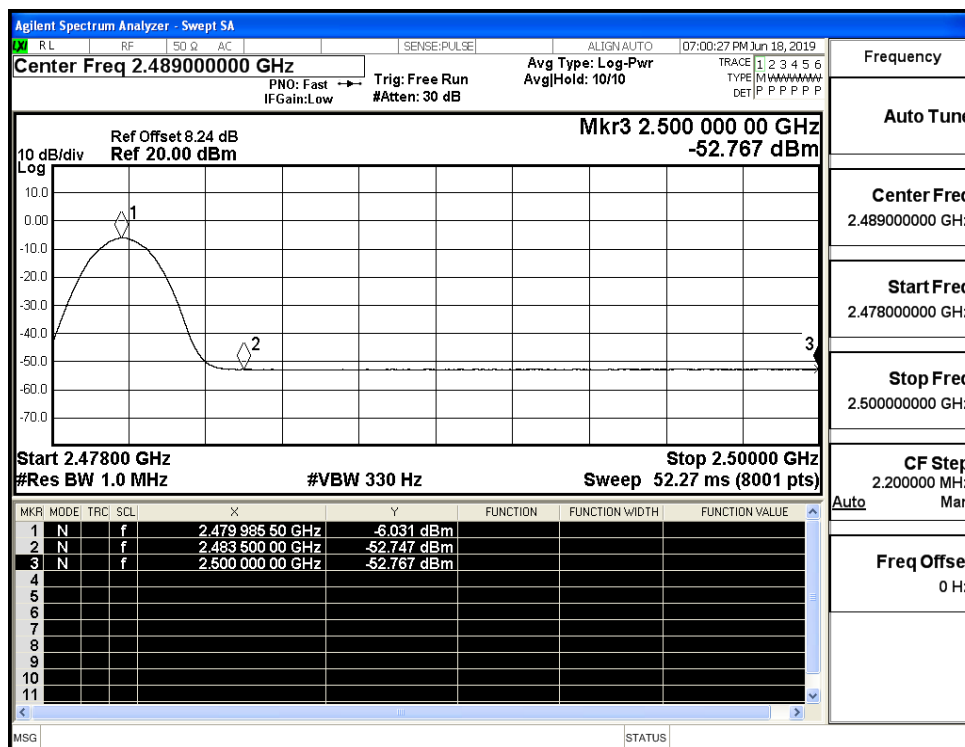
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



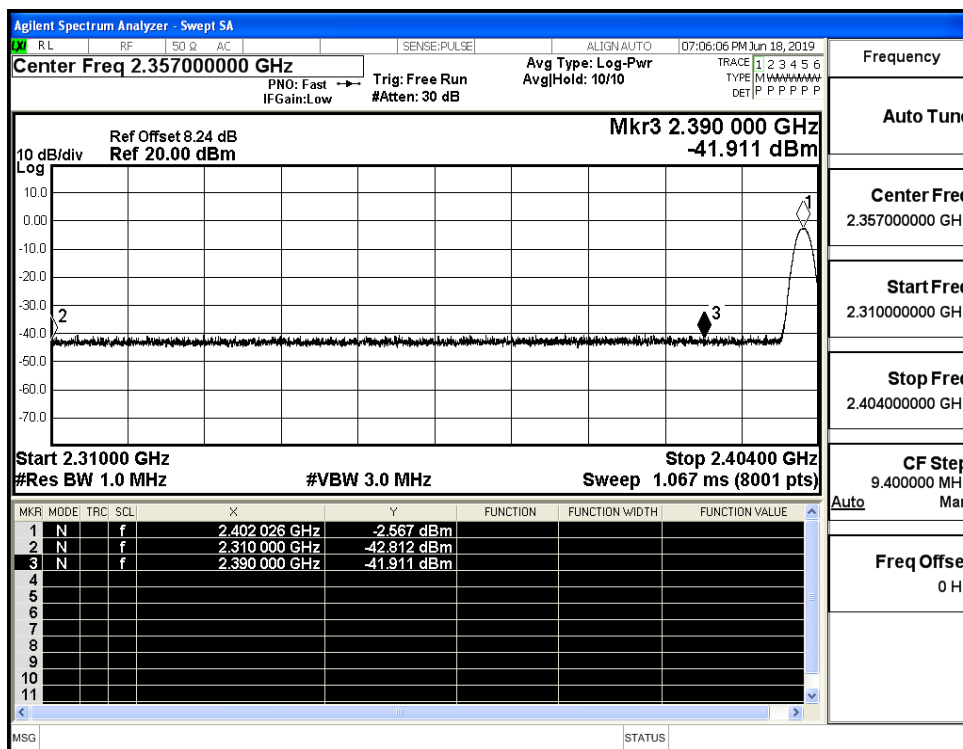
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



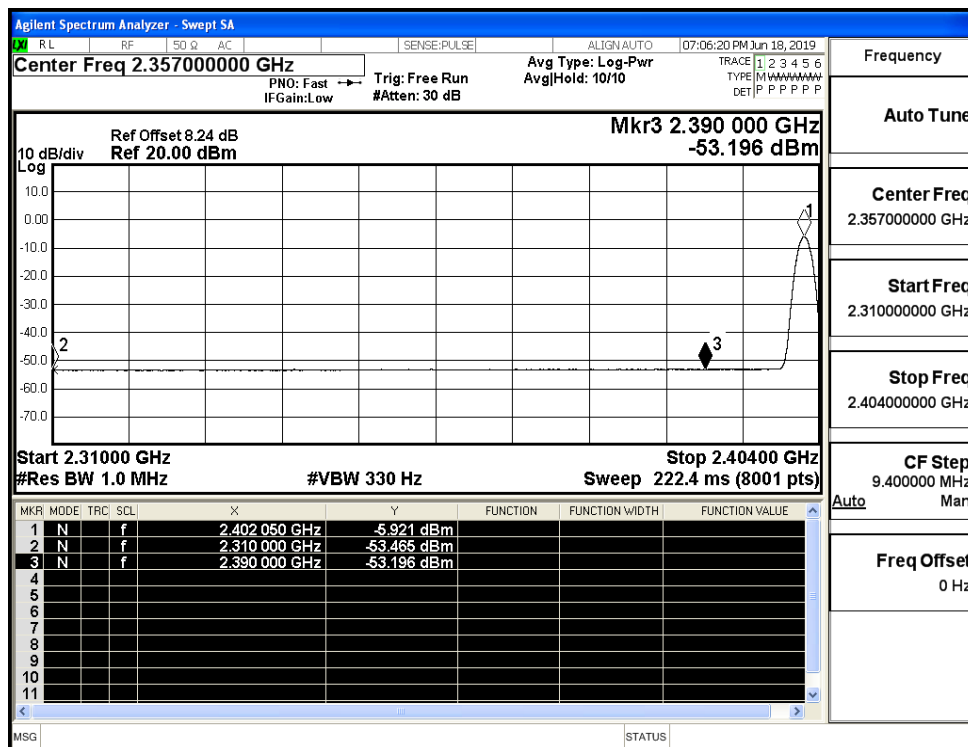
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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)

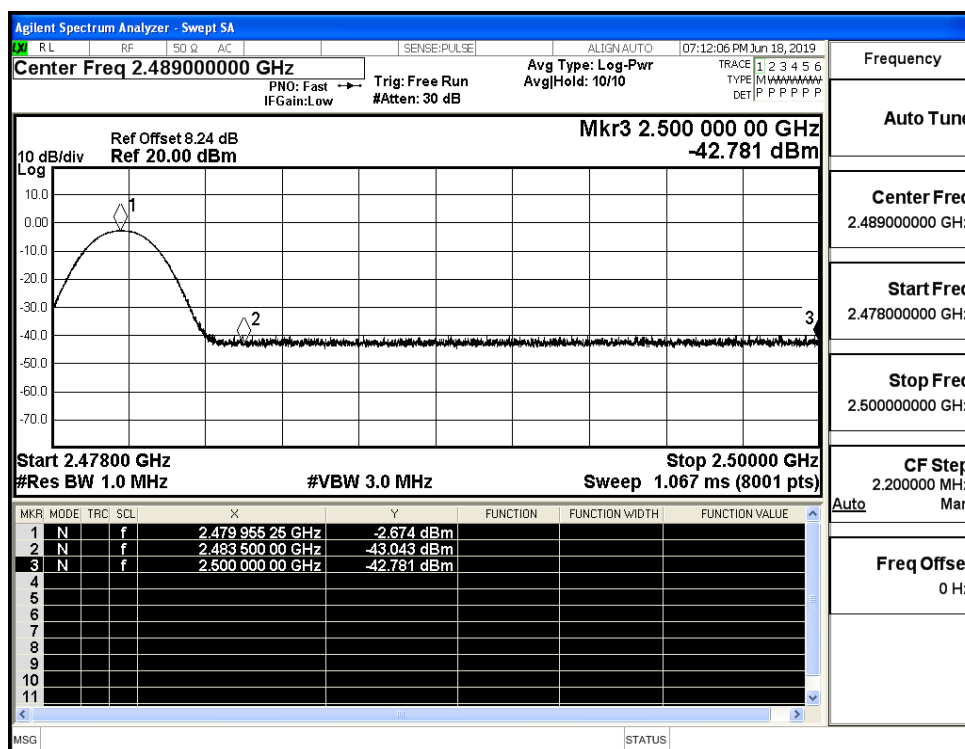
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

