

Appendix A

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

Product Name: Bluetooth CDG Karaoke with Special Light Effects

Trade Mark: singing machine

Test Model: SML625BTBK

Environmental Conditions

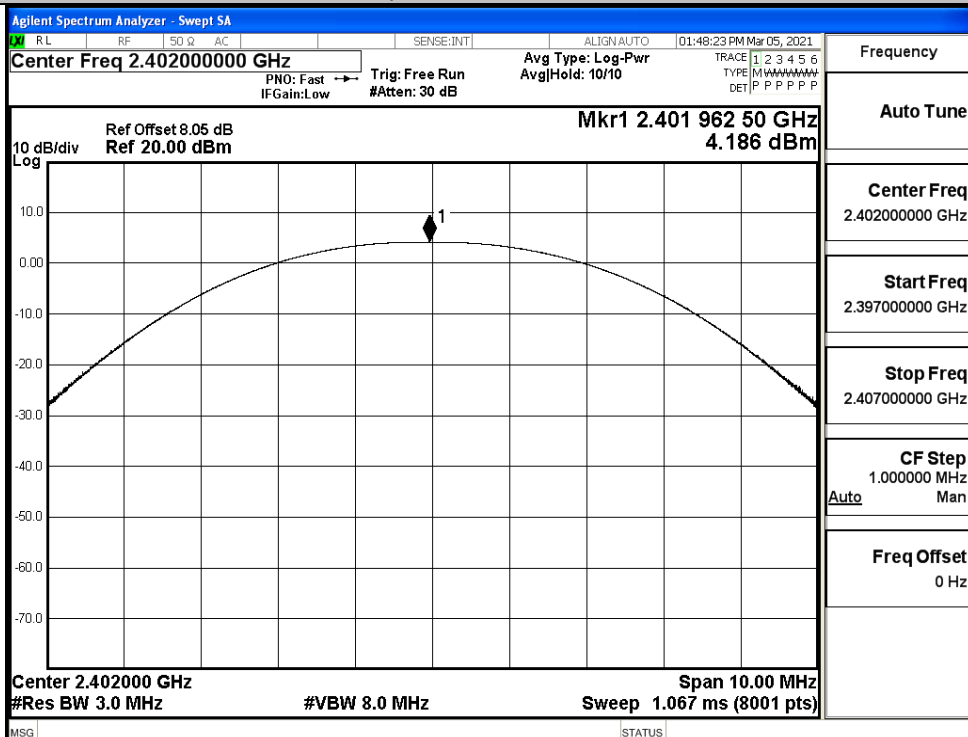
Temperature:	24.2° C
Relative Humidity:	54.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Li Huan
Supervised by:	Li Huan

A.1 Maximum Conducted Peak Output Power

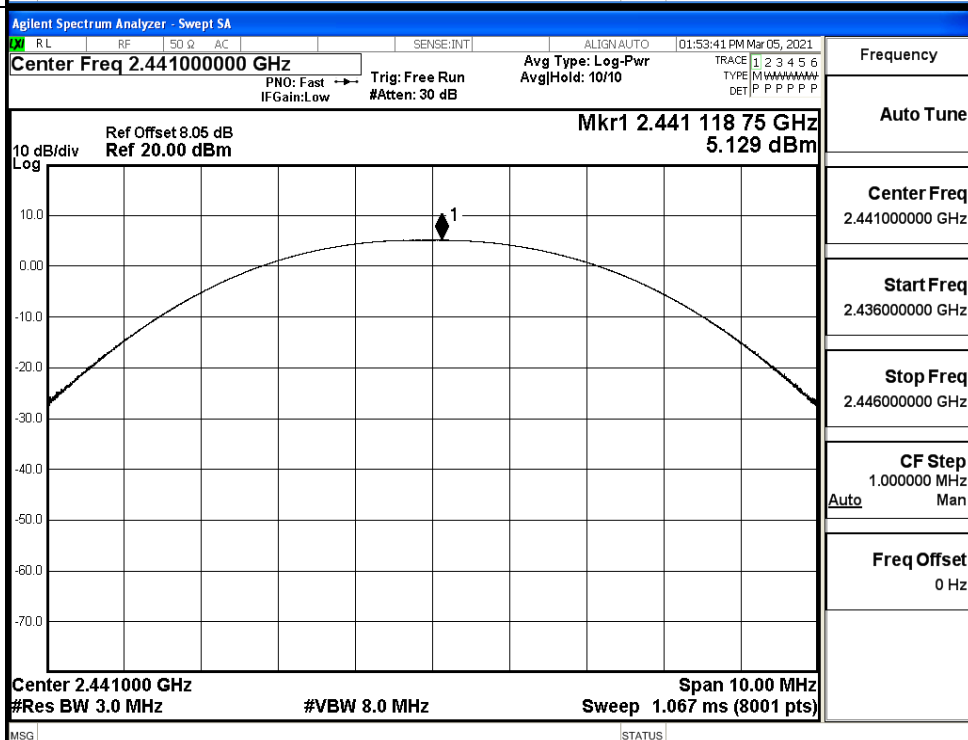
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.186	21	PASS
	MCH	5.129	21	PASS
	HCH	5.539	21	PASS
$\pi/4$ DQPSK	LCH	7.430	21	PASS
	MCH	7.430	21	PASS
	HCH	7.821	21	PASS

Test Graphs

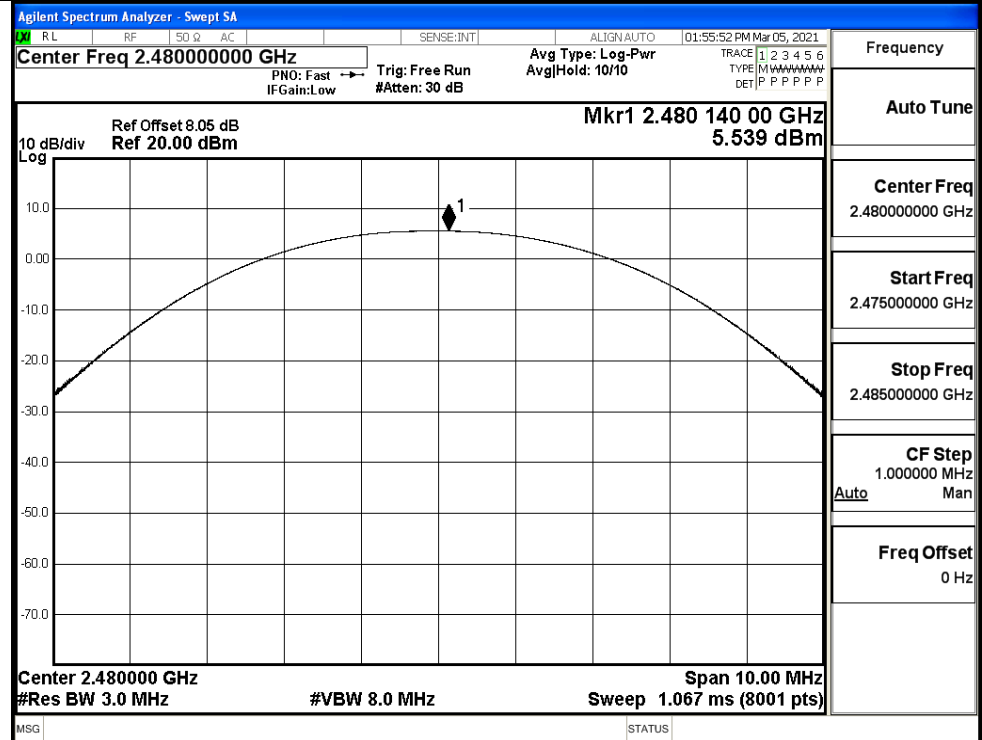
GFSK/LCH



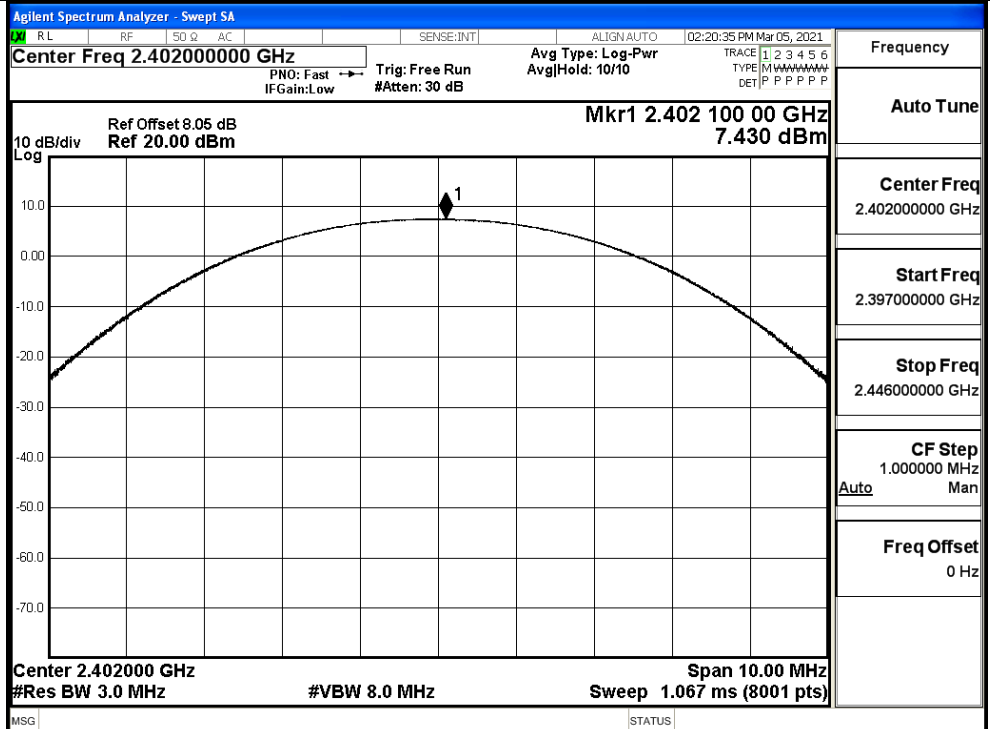
GFSK/MCH

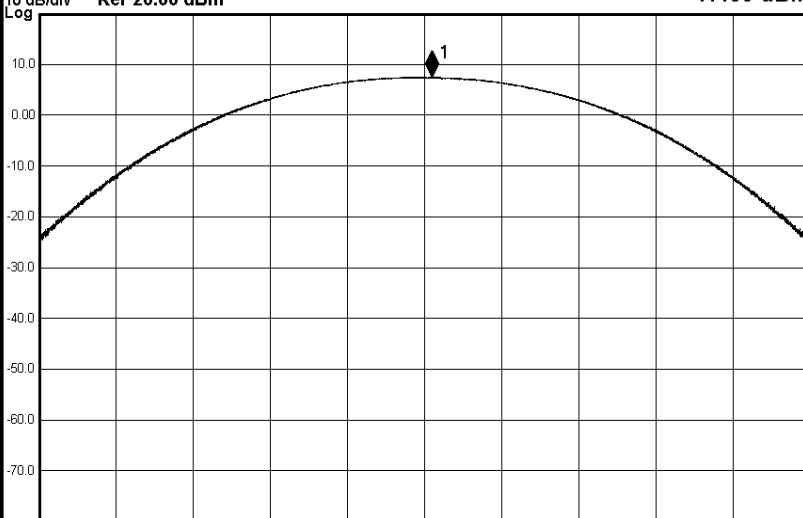
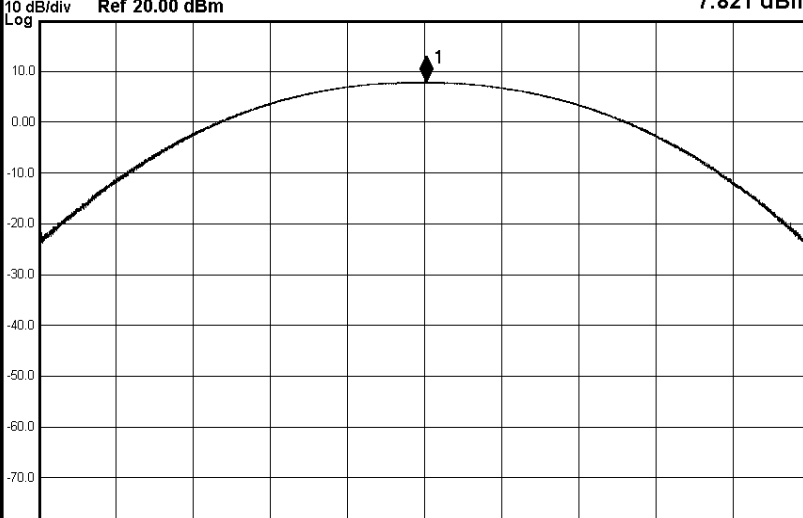


GFSK/HCH



π /4DQPSK/LCH

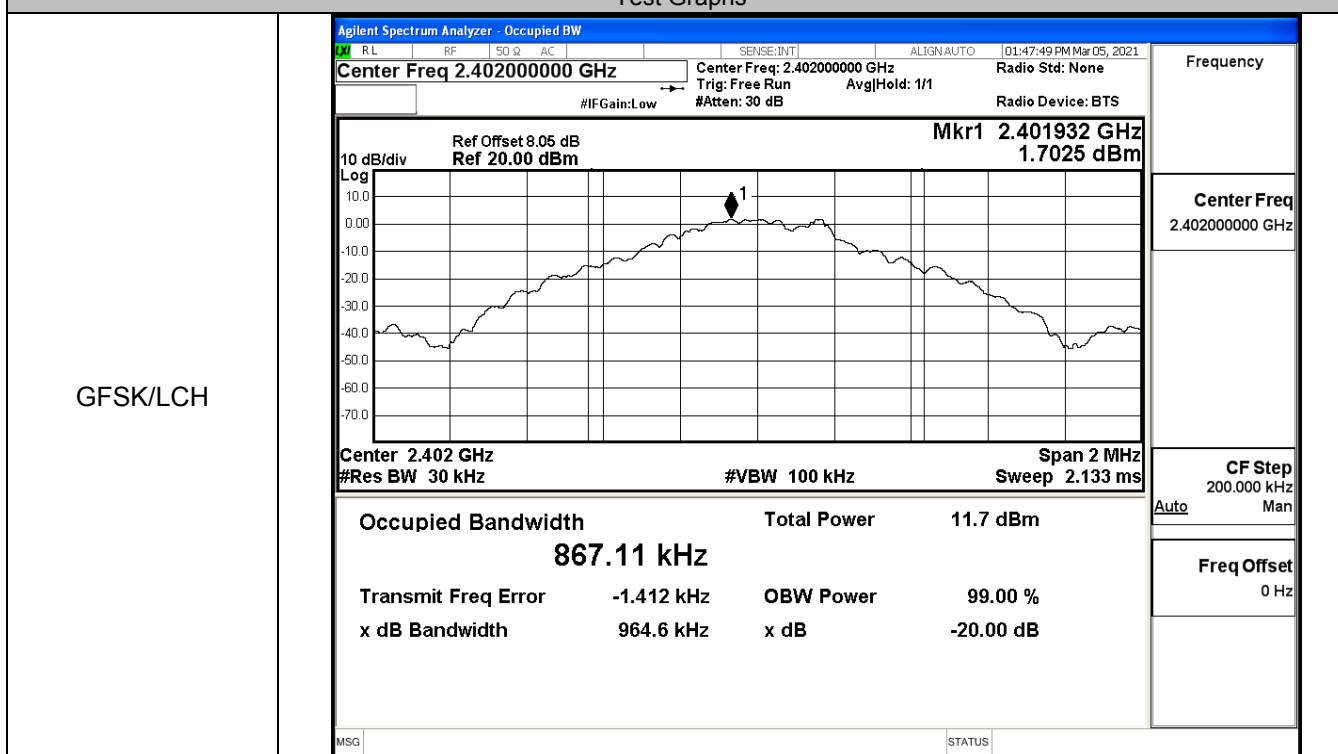


$\pi/4$DQPSK/MCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Q AC SENSE:INT ALIGN: AUTO 02:20:35 PM Mar 05, 2021 Center Freq 2.441000000 GHz PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr AvgHold: 10/10 TRACE 1 2 3 4 5 6 TYPE M W W W W W W W W DET P P P P P P P Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.441 100 00 GHz 7.430 dBm 10 dB/div Log  Center 2.441000 GHz #Res BW 3.0 MHz #VBW 8.0 MHz Span 10.00 MHz Sweep 1.067 ms (8001 pts) MSG STATUS Frequency Auto Tune Center Freq 2.441000000 GHz Start Freq 2.436000000 GHz Stop Freq 2.446000000 GHz CF Step 1.000000 MHz Auto Man Freq Offset 0 Hz
$\pi/4$DQPSK/HCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Q AC SENSE:INT ALIGN: AUTO 02:22:47 PM Mar 05, 2021 Center Freq 2.480000000 GHz PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr AvgHold: 10/10 TRACE 1 2 3 4 5 6 TYPE M W W W W W W W W DET P P P P P P P Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.480 018 75 GHz 7.821 dBm 10 dB/div Log  Center 2.480000 GHz #Res BW 3.0 MHz #VBW 8.0 MHz Span 10.00 MHz Sweep 1.067 ms (8001 pts) MSG STATUS Frequency Auto Tune Center Freq 2.480000000 GHz Start Freq 2.475000000 GHz Stop Freq 2.485000000 GHz CF Step 1.000000 MHz Auto Man Freq Offset 0 Hz

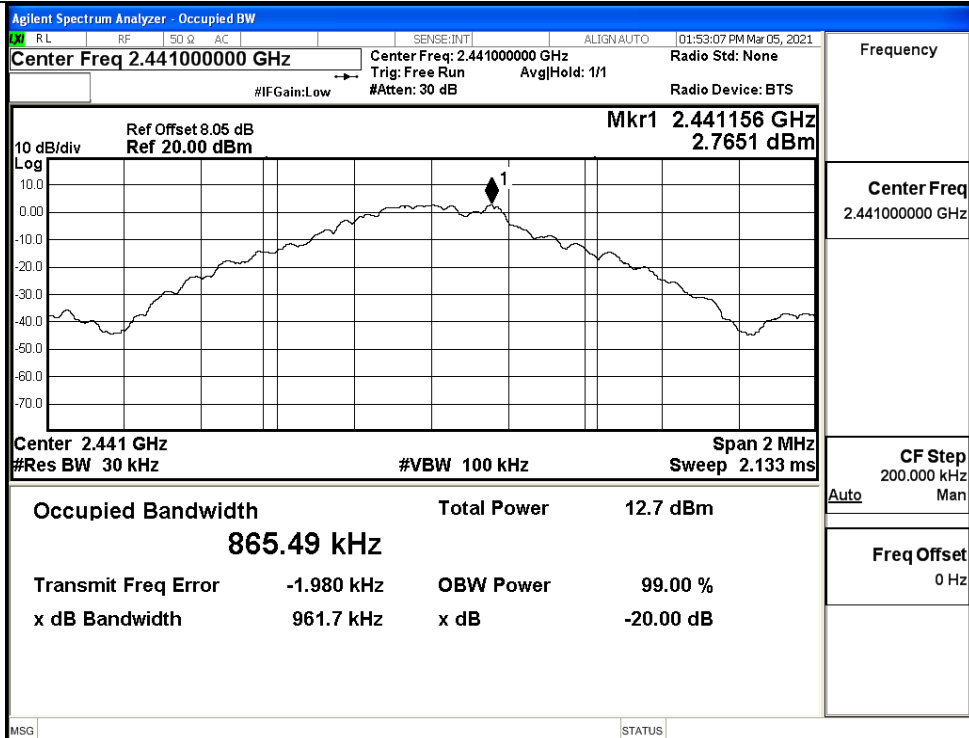
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9646	Not Specified	PASS
	MCH	0.9617	Not Specified	PASS
	HCH	0.9607	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.335	Not Specified	PASS
	MCH	1.336	Not Specified	PASS
	HCH	1.335	Not Specified	PASS

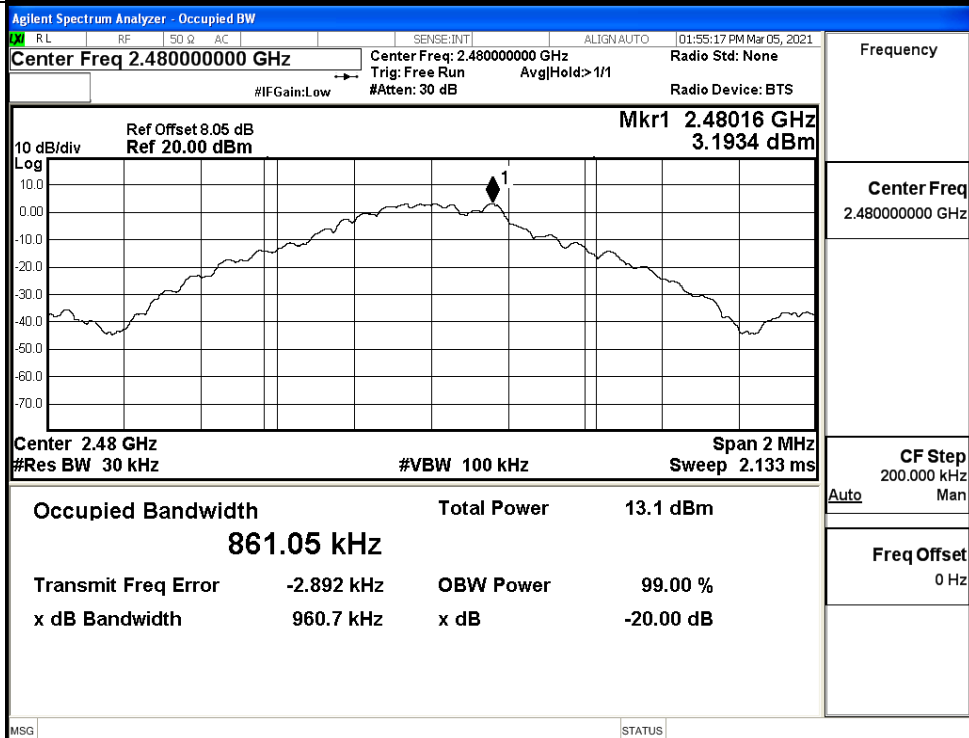
Test Graphs



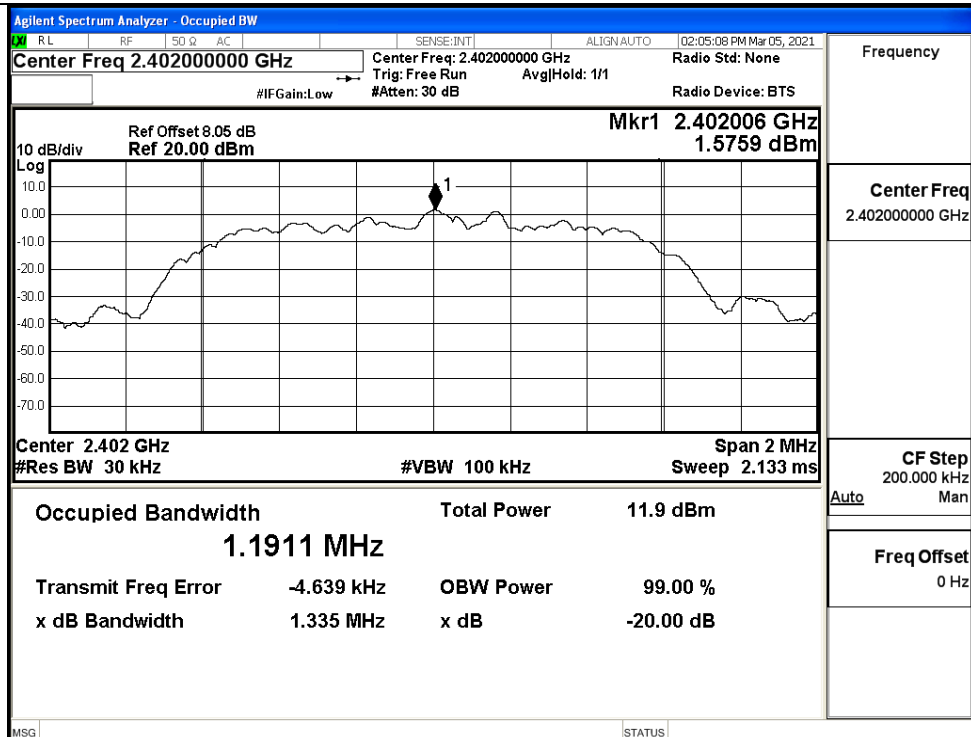
GFSK/MCH



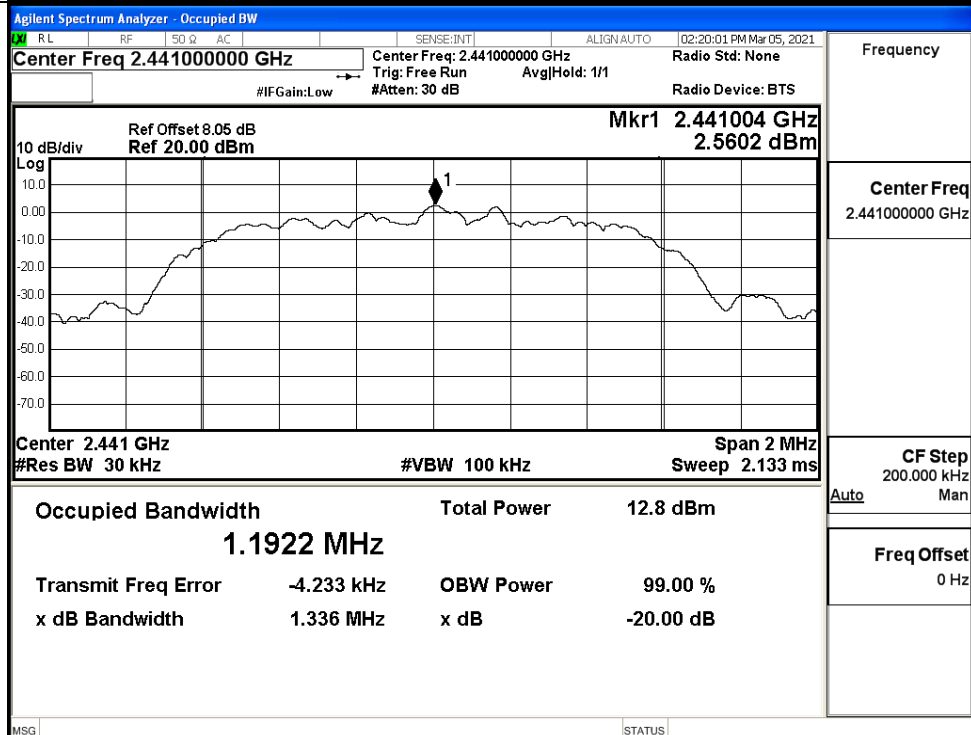
GFSK/HCH



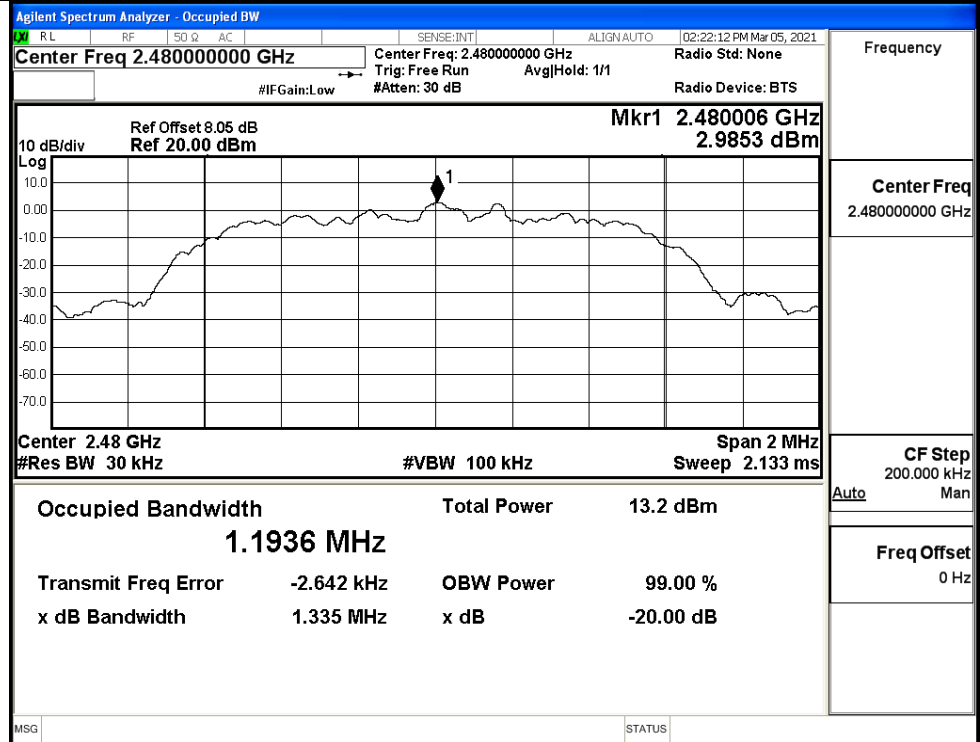
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH



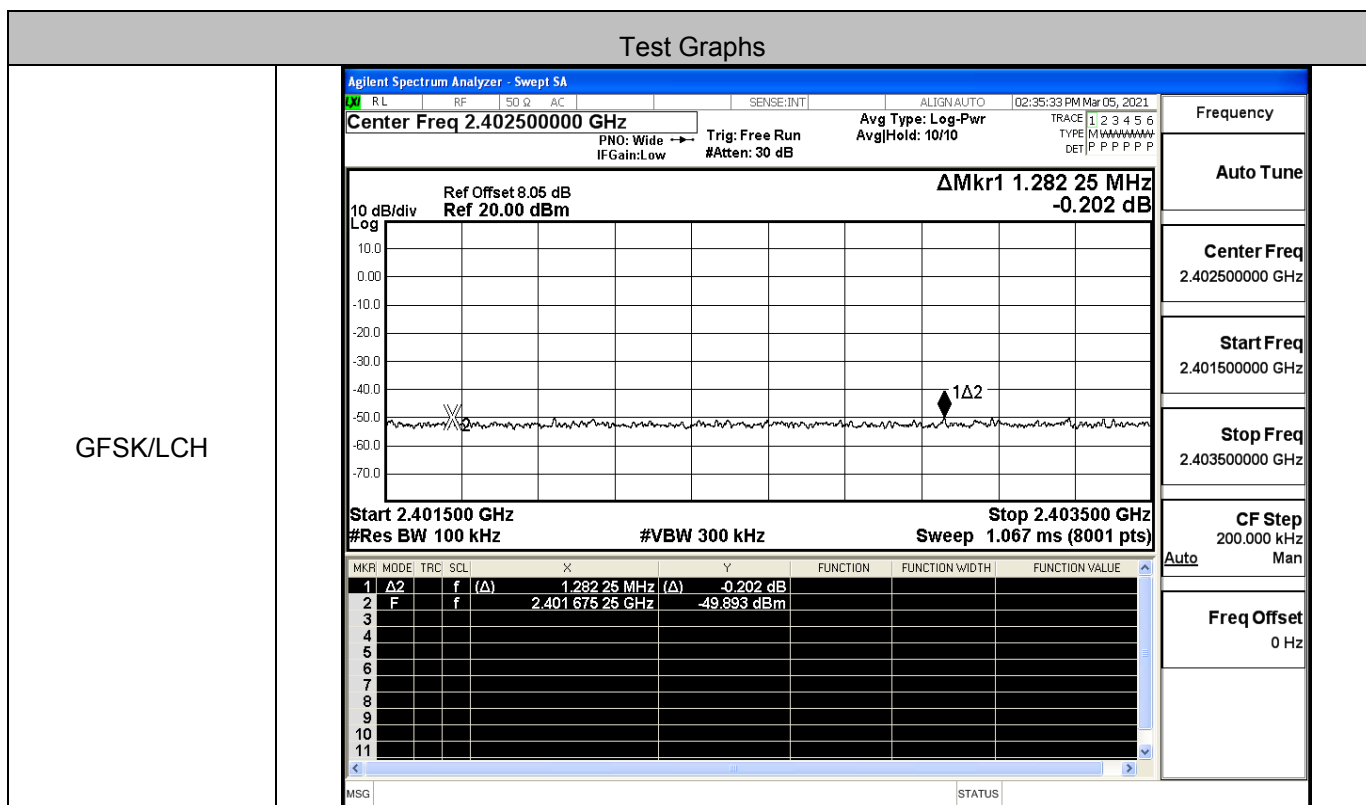
$\pi/4$ DQPSK/HCH



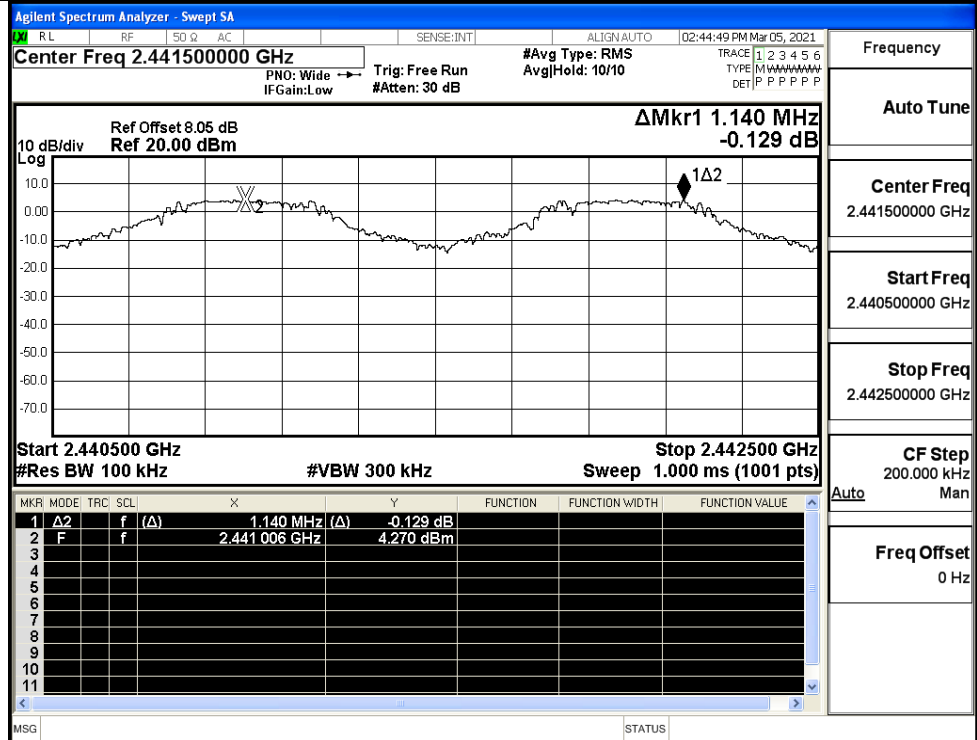
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.282	0.643	PASS
	MCH	1.140	0.643	PASS
	HCH	1.022	0.643	PASS
π /4DQPSK	LCH	1.134	0.891	PASS
	MCH	1.012	0.891	PASS
	HCH	0.974	0.891	PASS

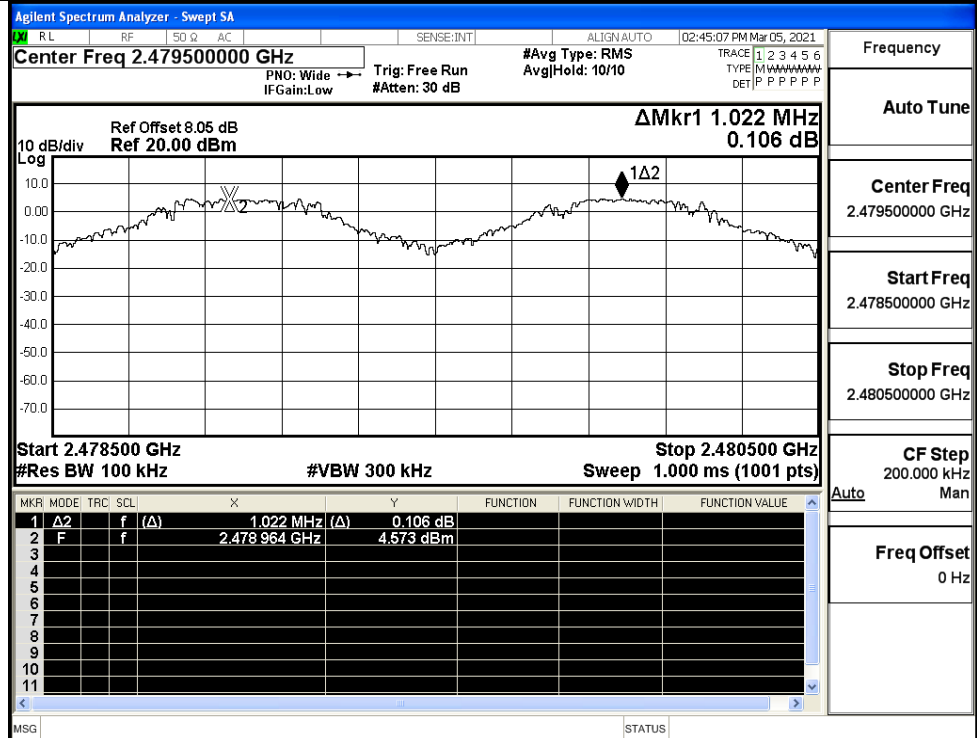
Test Graphs

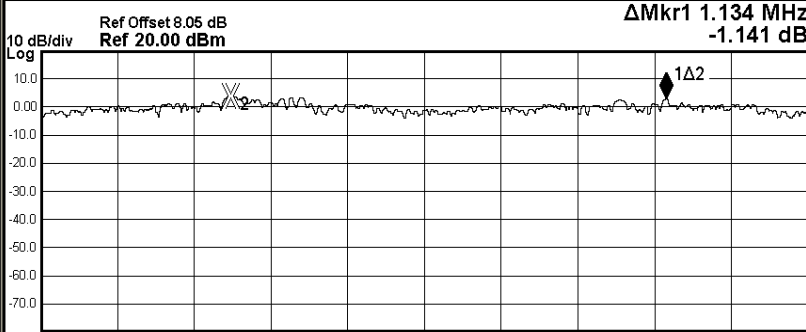
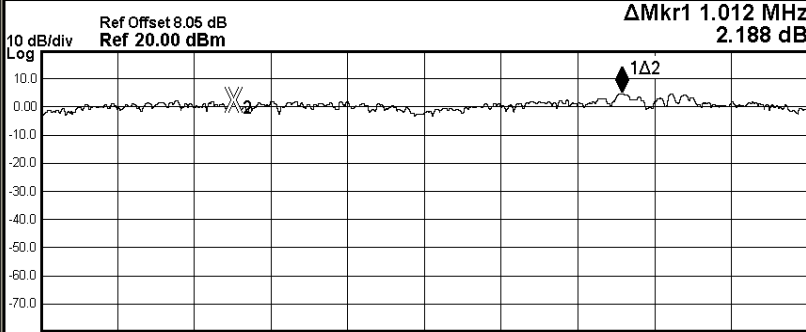


GFSK/MCH

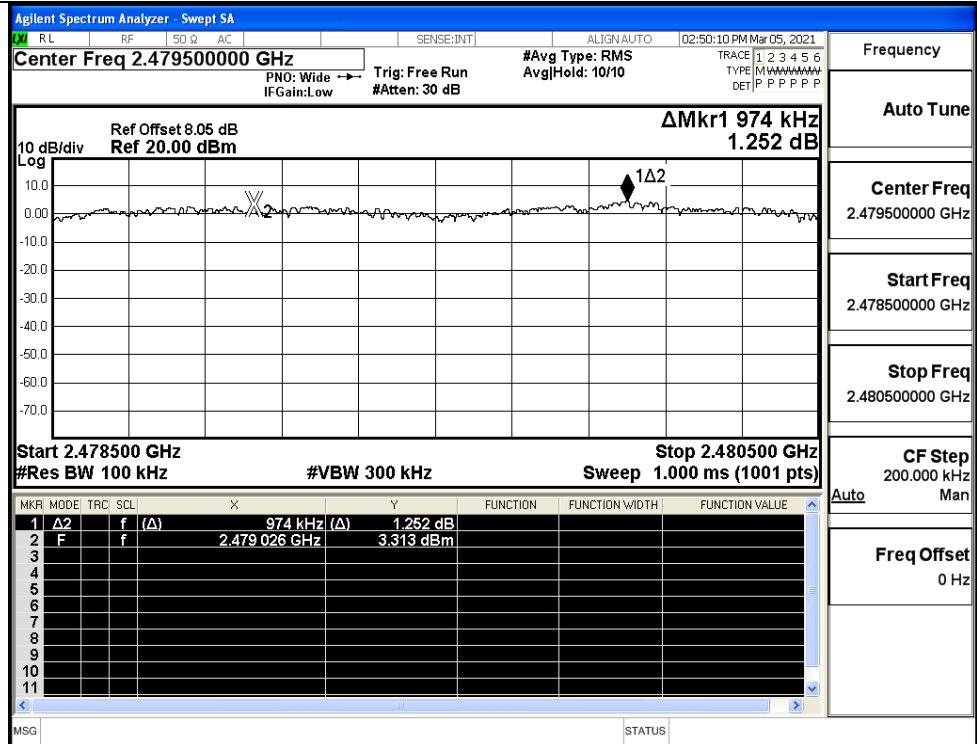


GFSK/HCH



$\pi/4$DQPSK/LCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Q AC SENSE:INT ALIGN AUTO 02:48:08 PM Mar 05, 2021 Center Freq 2.402500000 GHz PNO: Wide IFGain:Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS AvgHold: 10/10 TRACE 1 2 3 4 5 6 TYPE M W W W W W W W DET P P P P P P P 10 dB/div Ref Offset 8.05 dB Ref 20.00 dBm Log  ΔMkr1 1.134 MHz -1.141 dB Start 2.401500 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.403500 GHz Sweep 1.000 ms (1001 pts) MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE 1 Δ2 f (Δ) 1.134 MHz (Δ) -1.141 dB 2 F f 2.401996 GHz 3.856 dBm 3 4 5 6 7 8 9 10 11 MSG STATUS Frequency Auto Tune Center Freq 2.402500000 GHz Start Freq 2.401500000 GHz Stop Freq 2.403500000 GHz CF Step 200.000 kHz Man Freq Offset 0 Hz
$\pi/4$DQPSK/MCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Q AC SENSE:INT ALIGN AUTO 02:49:47 PM Mar 05, 2021 Center Freq 2.441500000 GHz PNO: Wide IFGain:Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS AvgHold: 10/10 TRACE 1 2 3 4 5 6 TYPE M W W W W W W W DET P P P P P P P 10 dB/div Ref Offset 8.05 dB Ref 20.00 dBm Log  ΔMkr1 1.012 MHz 2.188 dB Start 2.440500 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.442500 GHz Sweep 1.000 ms (1001 pts) MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE 1 Δ2 f (Δ) 1.012 MHz (Δ) 2.188 dB 2 F f 2.441002 GHz 2.408 dBm 3 4 5 6 7 8 9 10 11 MSG STATUS Frequency Auto Tune Center Freq 2.441500000 GHz Start Freq 2.440500000 GHz Stop Freq 2.442500000 GHz CF Step 200.000 kHz Man Freq Offset 0 Hz

$\pi/4$ DQPSK/HCH

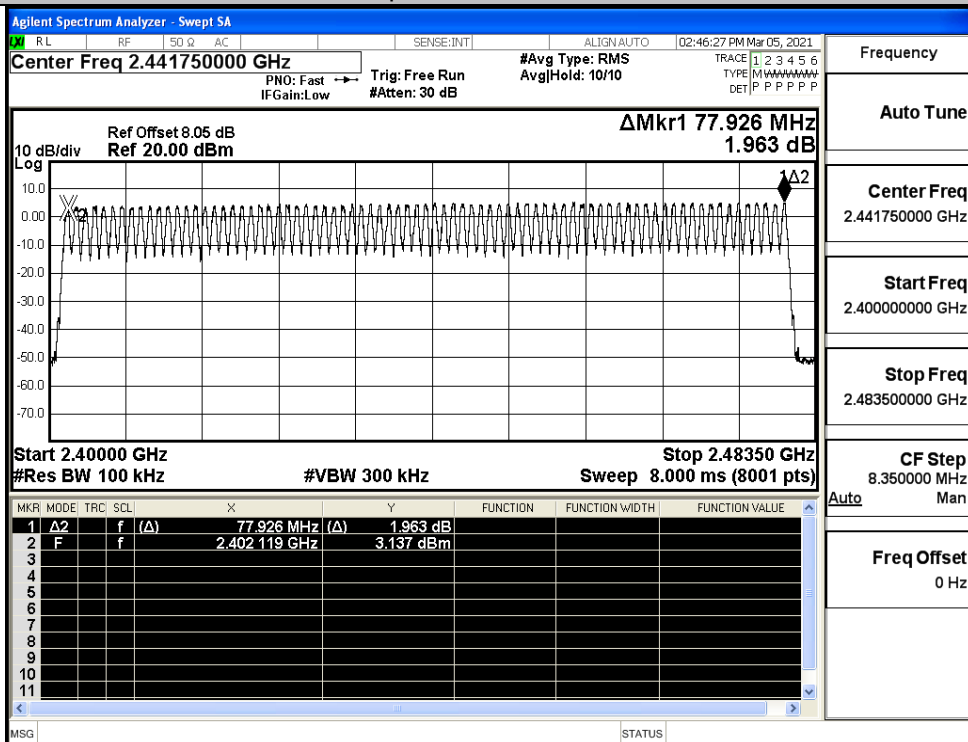


A.4 Hopping Channel Number

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

Test Graphs

GFSK/Hop



Frequency

Auto Tune

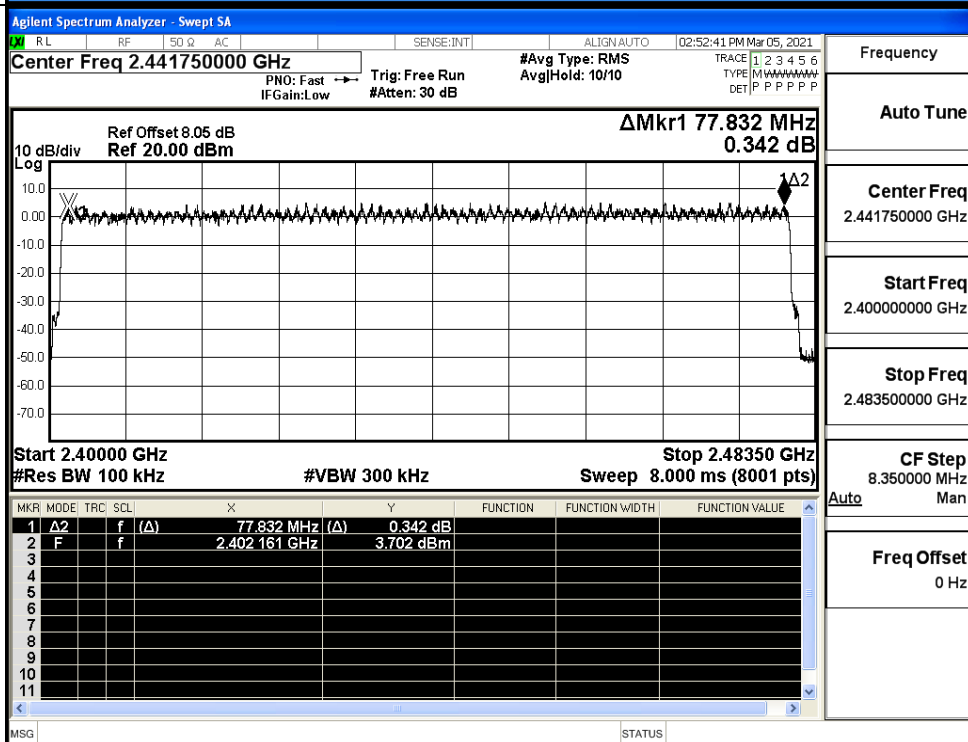
Center Freq
2.441750000 GHz

Start Freq
2.400000000 GHz

Stop Freq
2.483500000 GHz

CF Step
8.350000 MHz
Man

Freq Offset
0 Hz

 $\pi/4$ DQPSK/Hop

Frequency

Auto Tune

Center Freq
2.441750000 GHz

Start Freq
2.400000000 GHz

Stop Freq
2.483500000 GHz

CF Step
8.350000 MHz
Man

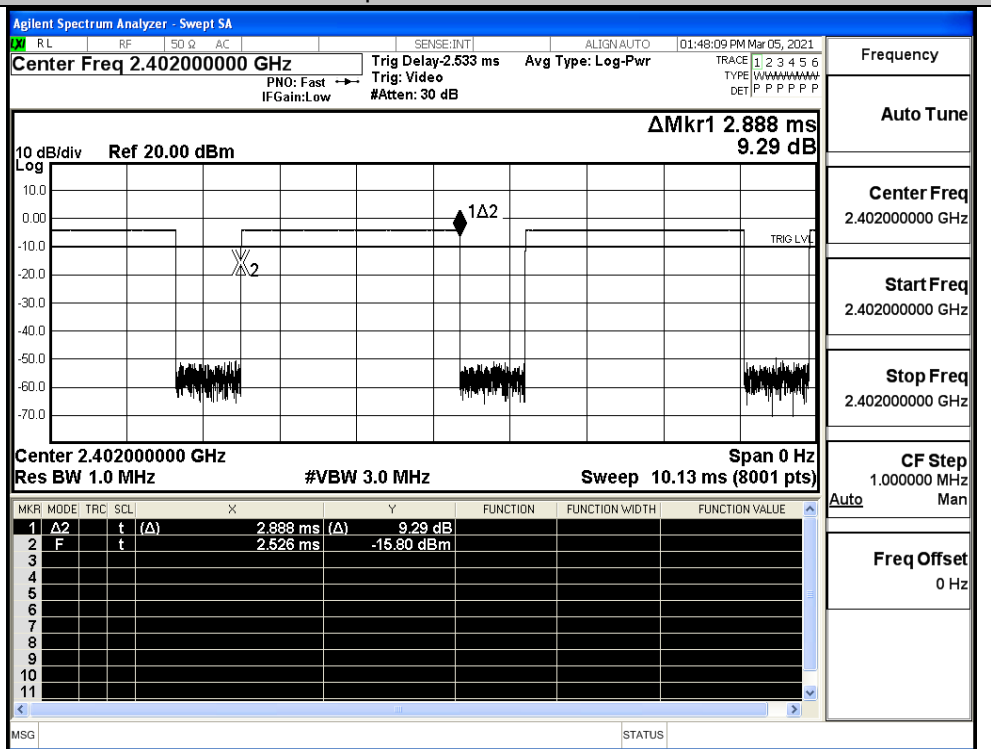
Freq Offset
0 Hz

A.5 Dwell Time

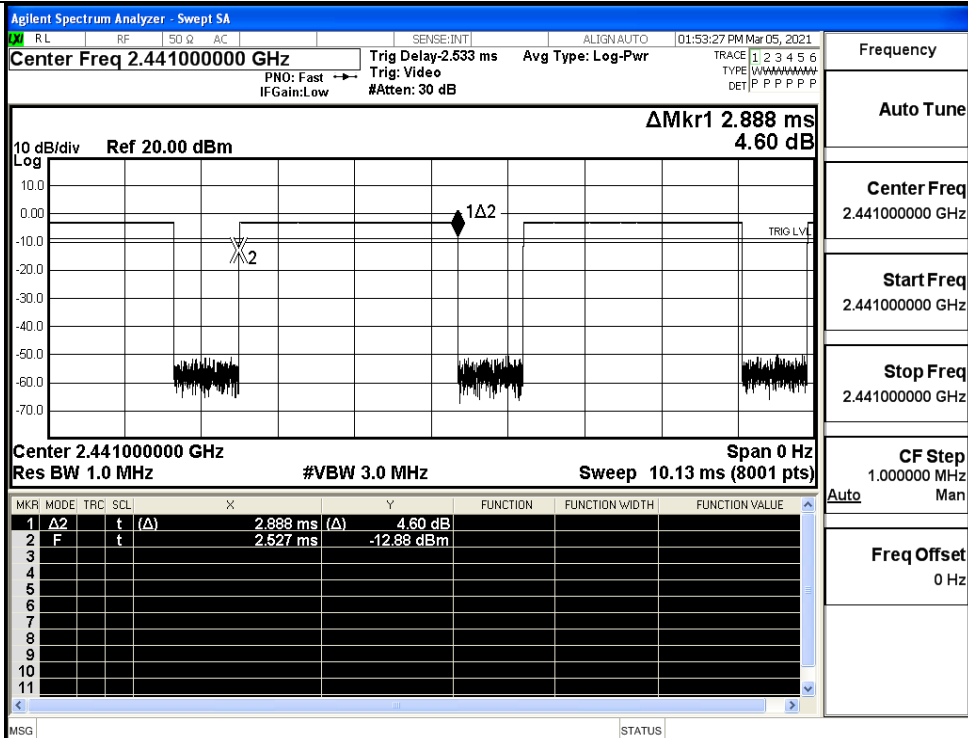
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.89	106.7	0.308	0.4	PASS
	DH5	MCH	2.89	106.7	0.308	0.4	PASS
	DH5	HCH	2.89	106.7	0.308	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.89	106.7	0.018	0.4	PASS
	2DH5	MCH	2.89	106.7	0.308	0.4	PASS
	2DH5	HCH	2.89	106.7	0.308	0.4	PASS

Test Graphs

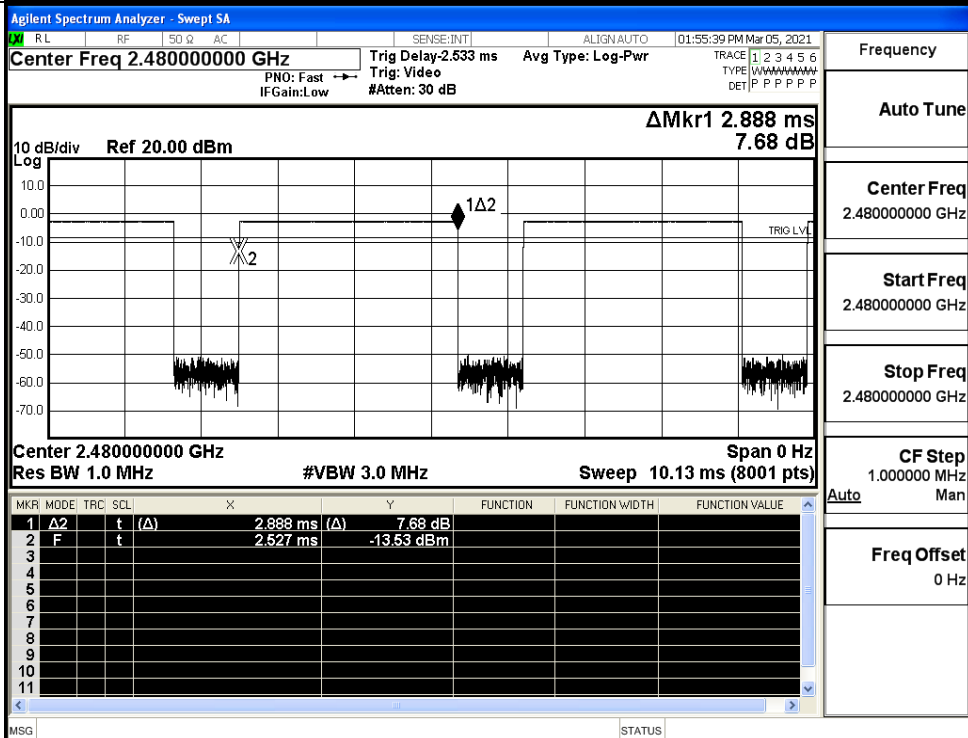
GFSK_DH5/LCH



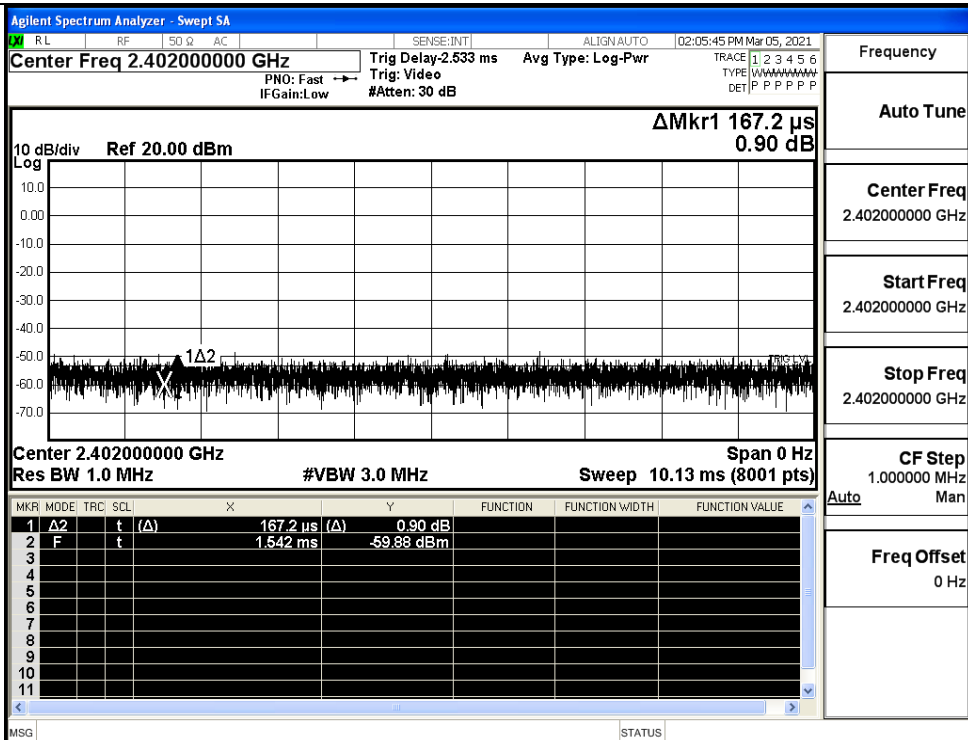
GFSK_DH5/MCH



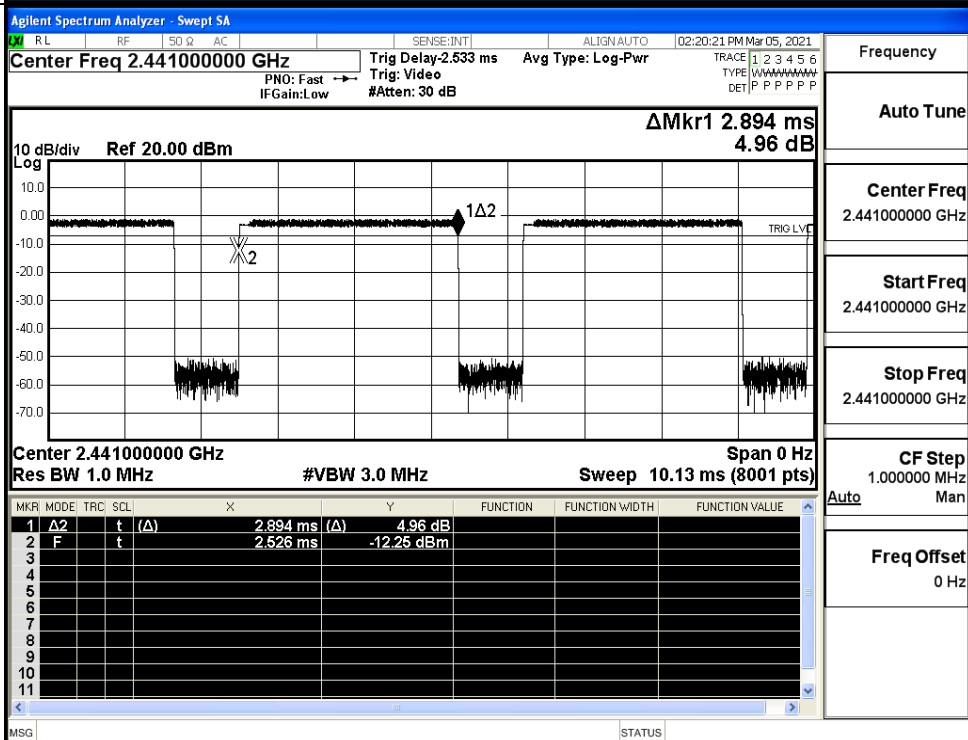
GFSK_DH5/HCH



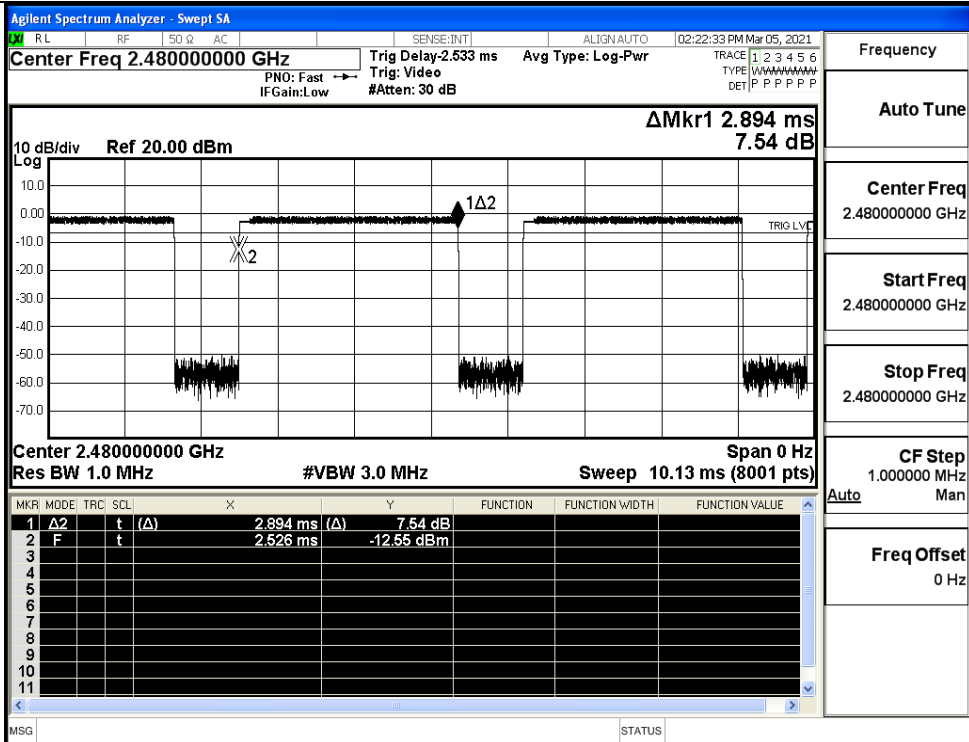
π/4DQPSK
2DH5/LCH



π/4DQPSK
2DH5/MCH

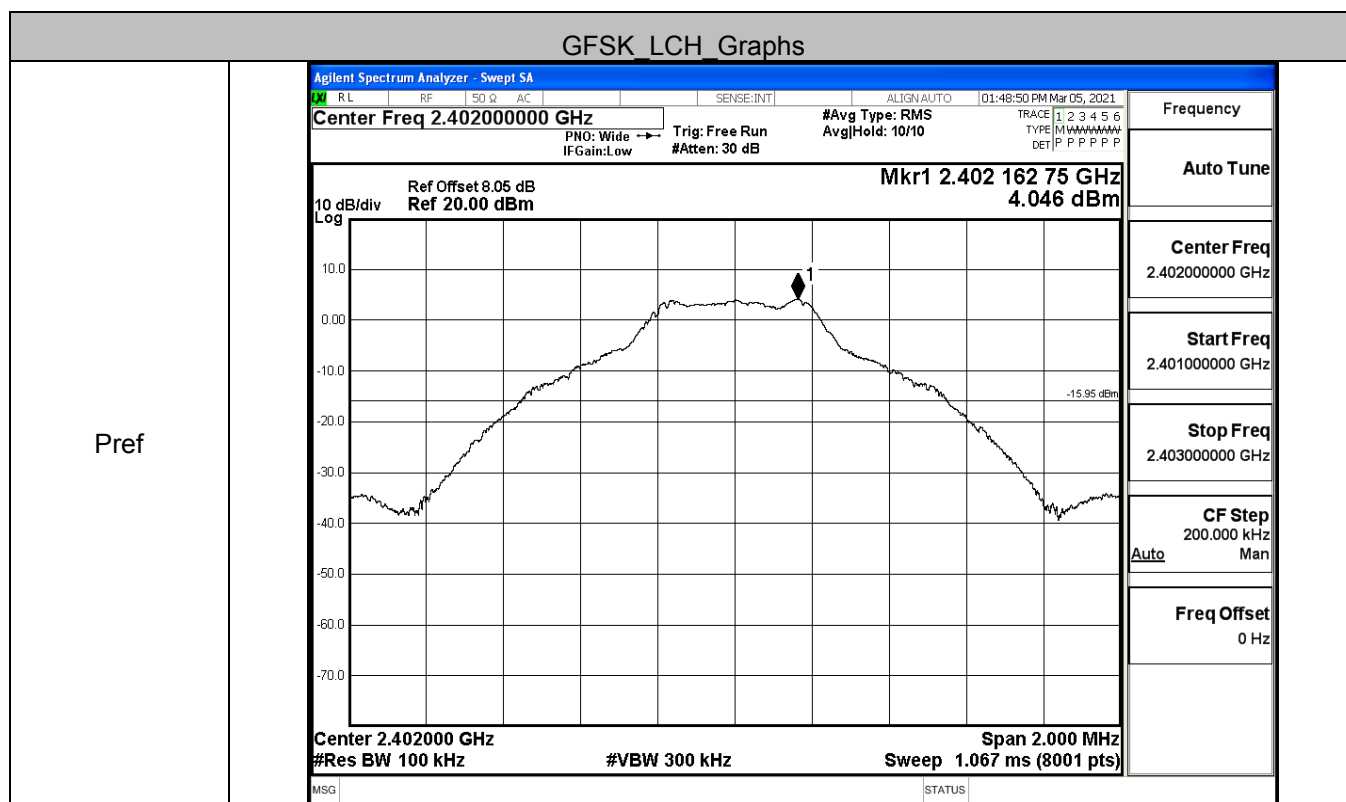


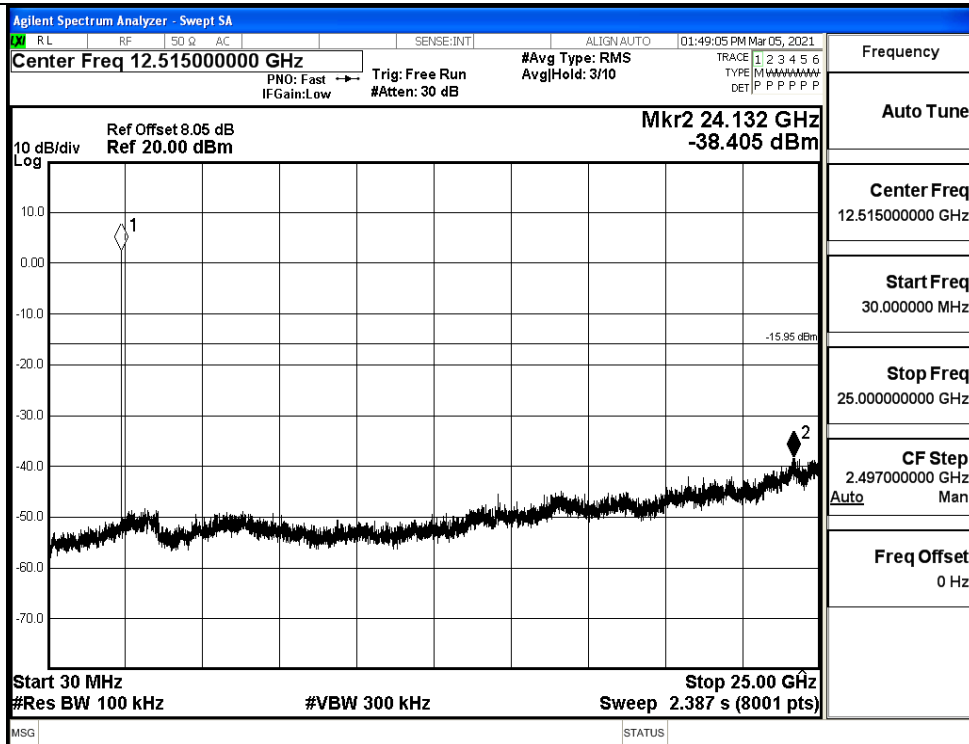
π/4DQPSK
_2DH5/HCH



A.6 RF Conducted Spurious Emissions

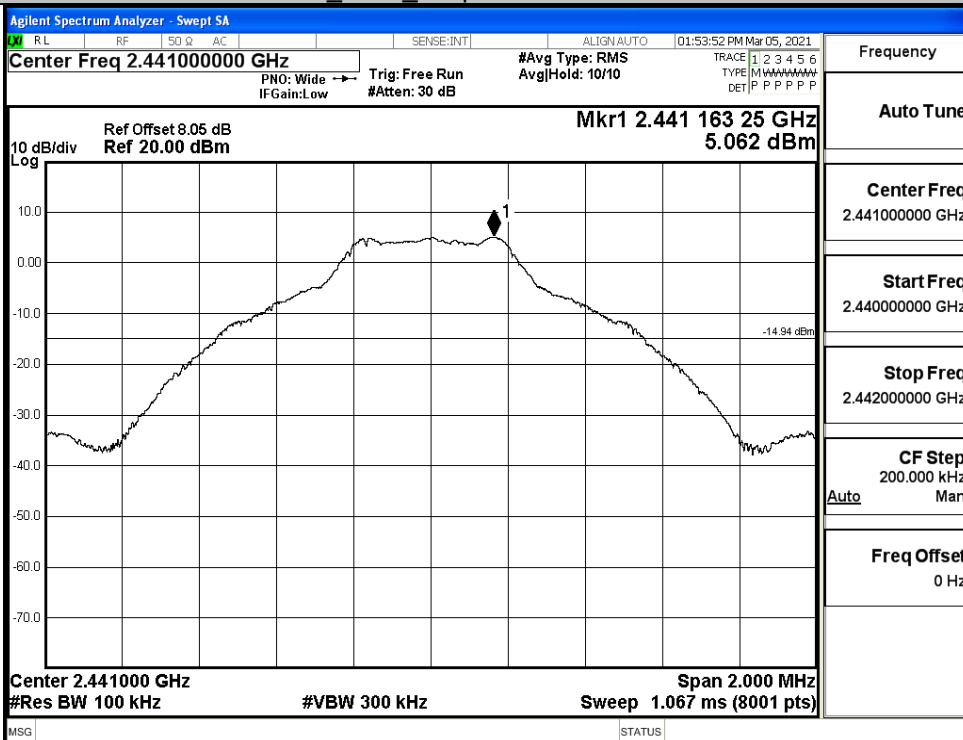
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.046	-38.405	-15.954	PASS
	MCH	5.062	-37.607	-14.938	PASS
	HCH	5.459	-37.205	-14.541	PASS
$\pi/4$ DQPSK	LCH	4.012	-37.779	-15.988	PASS
	MCH	4.827	-37.574	-15.173	PASS
	HCH	5.175	-37.944	-14.825	PASS



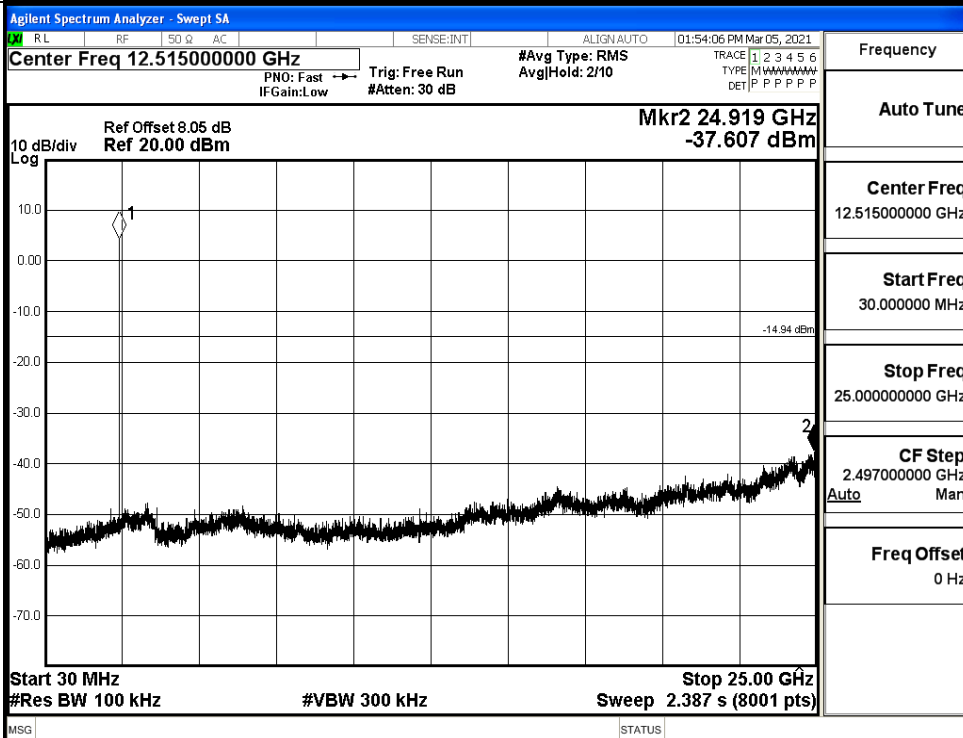


GFSK_MCH_Graphs

Pref

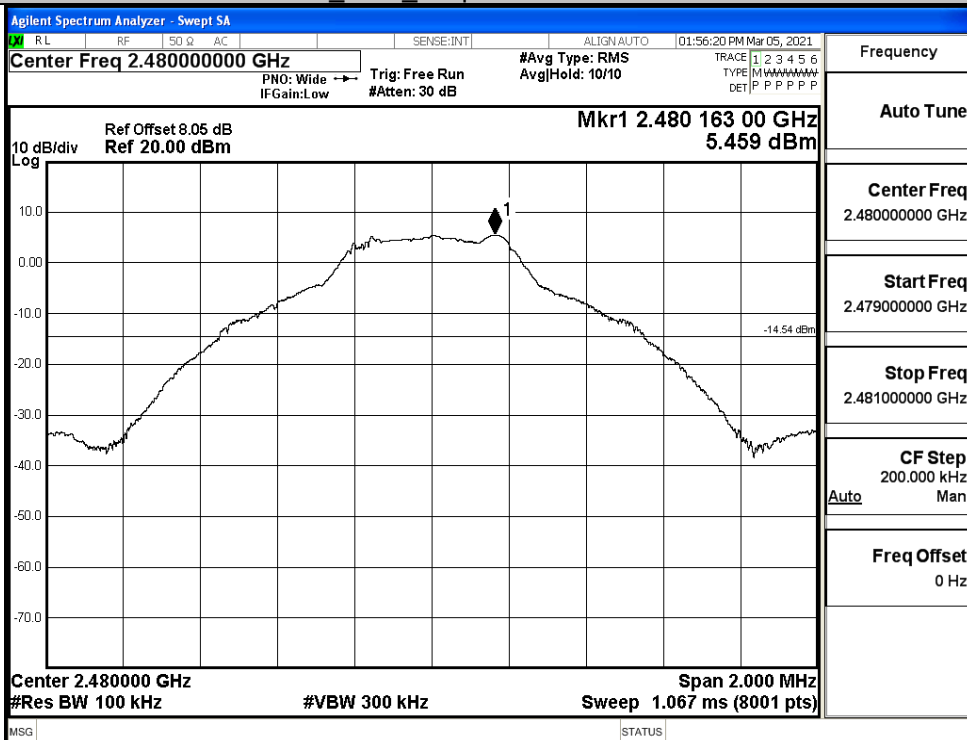


Puw

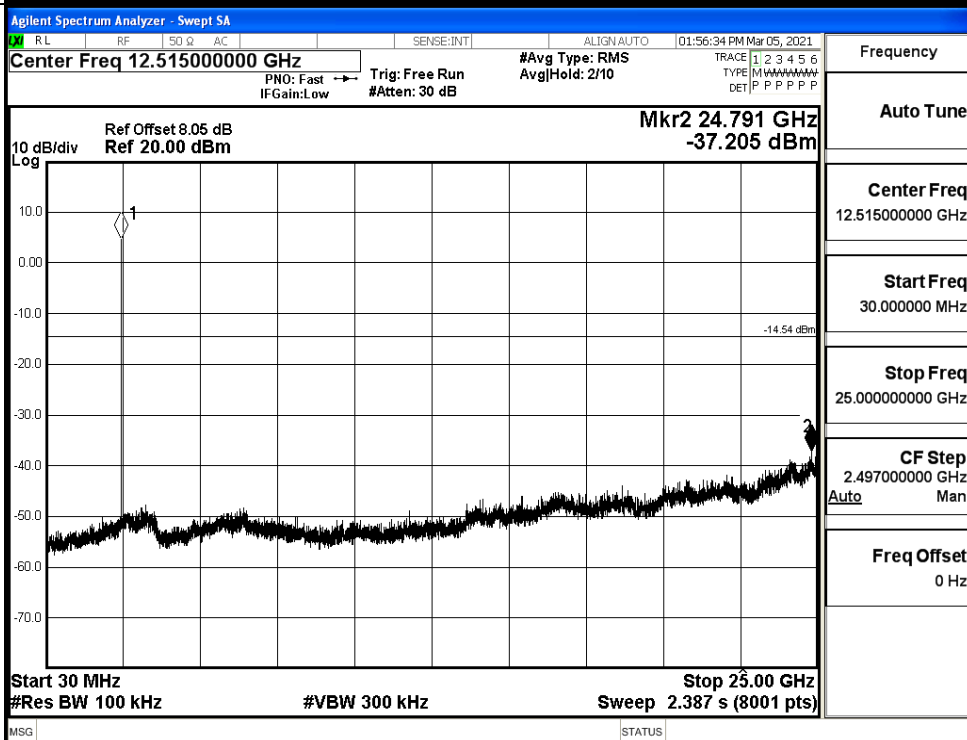


GFSK_HCH_Graphs

Pref

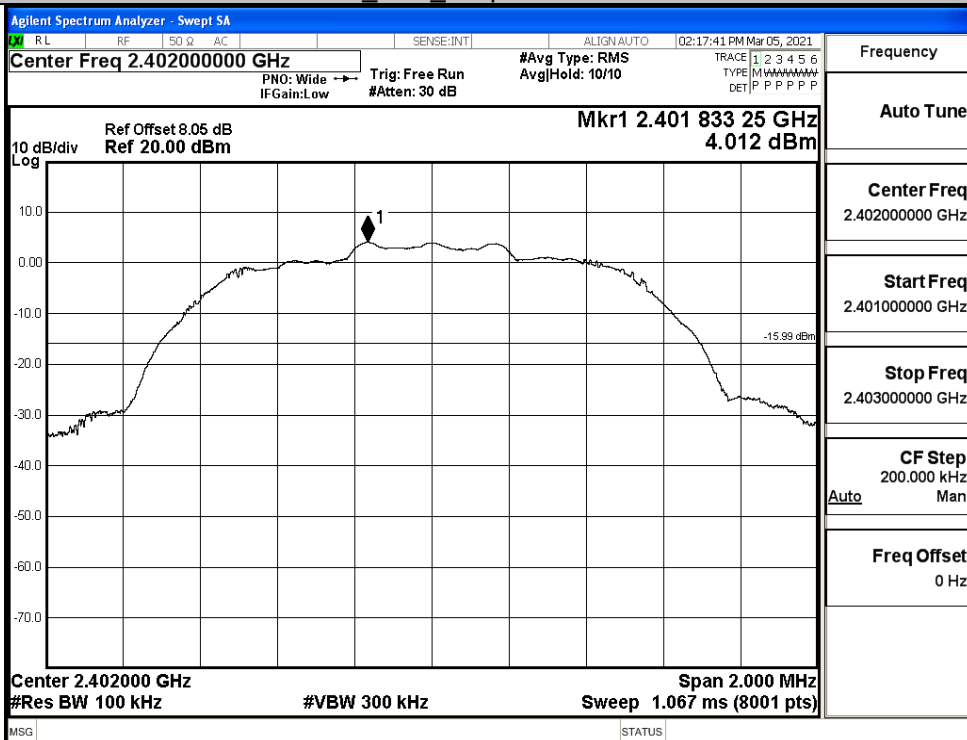


Puw

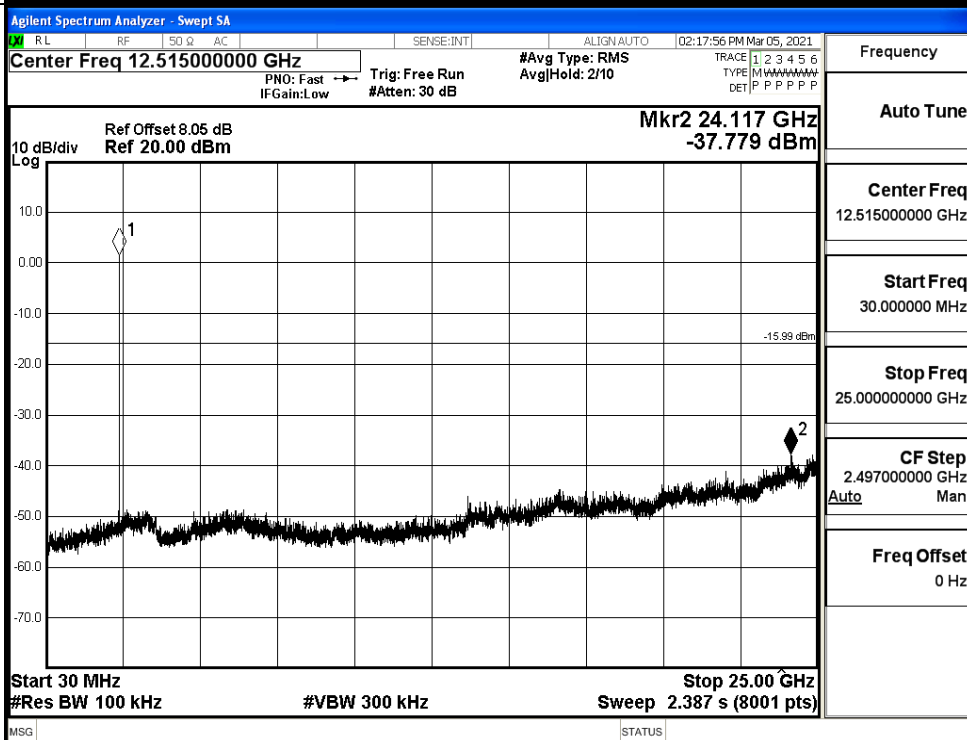


$\pi/4$ DQPSK_LCH_Graphs

Pref

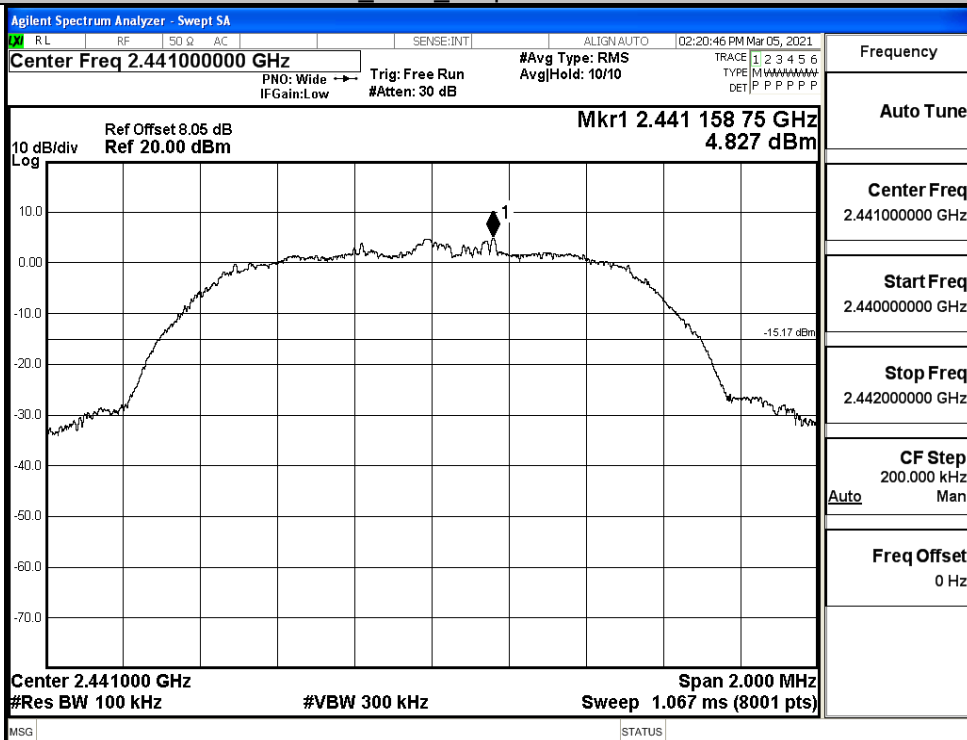


Puw

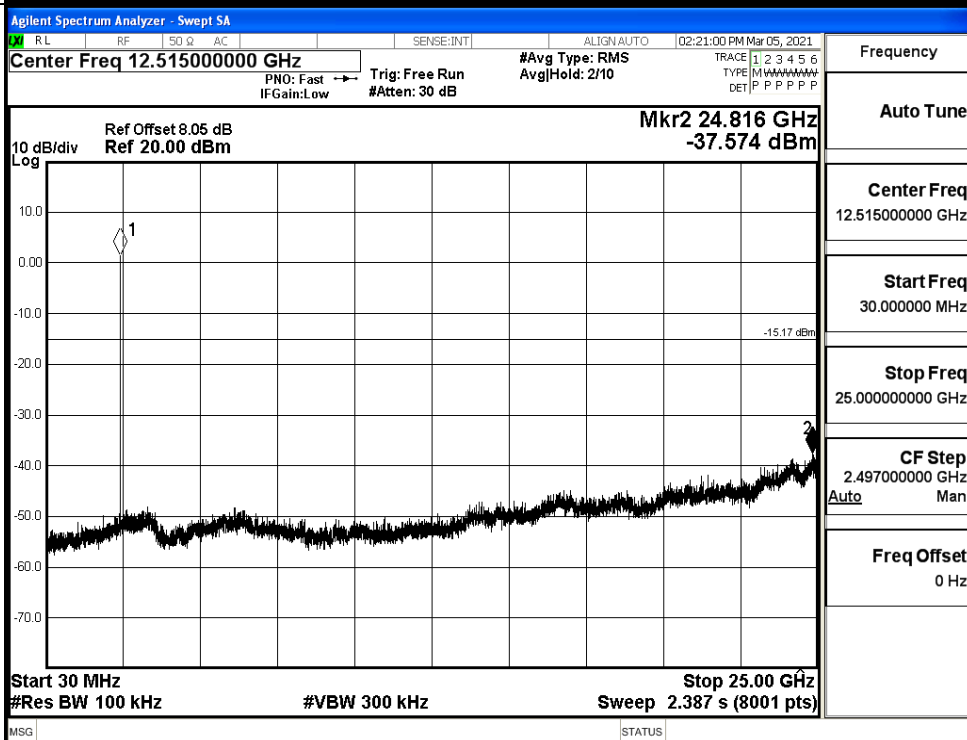


π /4DQPSK_MCH_Graphs

Pref

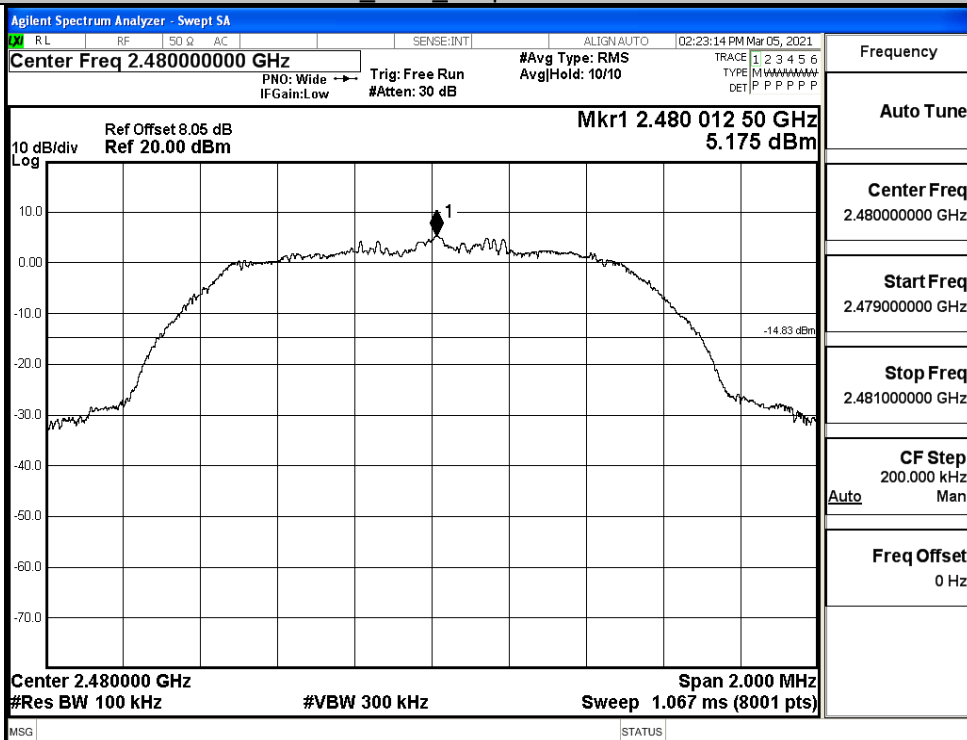


Puw

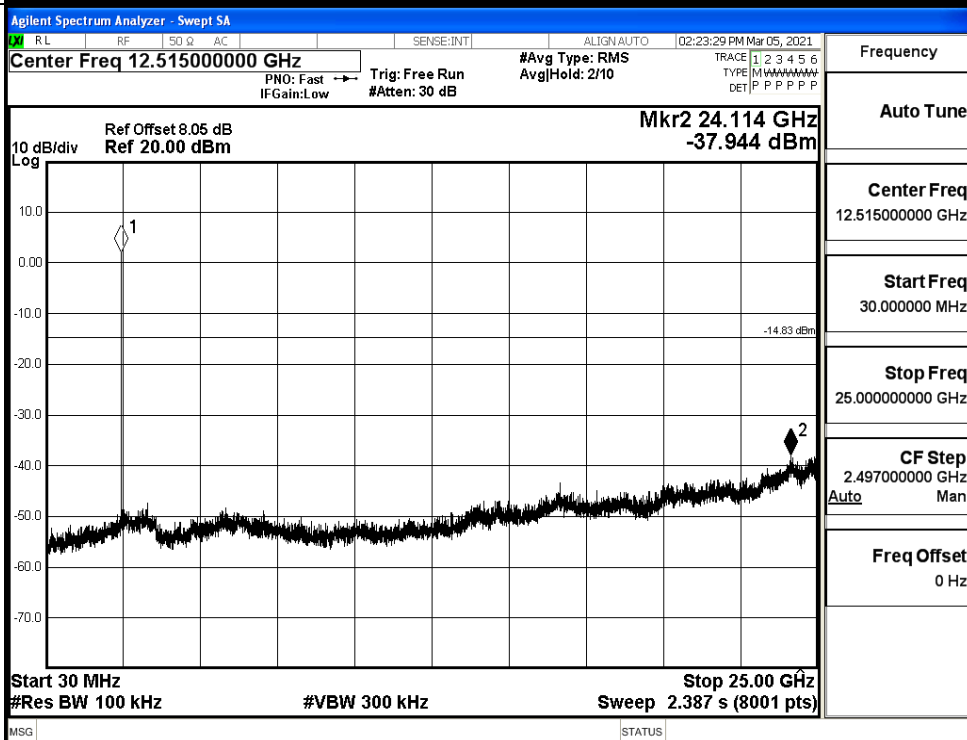


$\pi/4$ DQPSK_HCH_Graphs

Pref



Puw

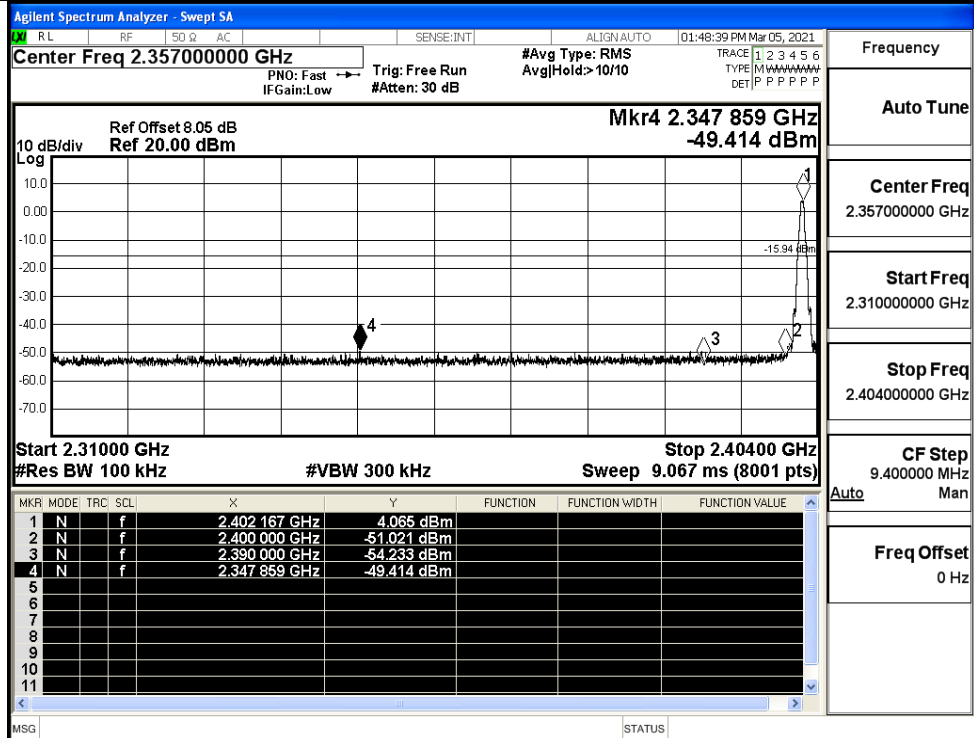


A.7 Band-edge for RF Conducted Emissions

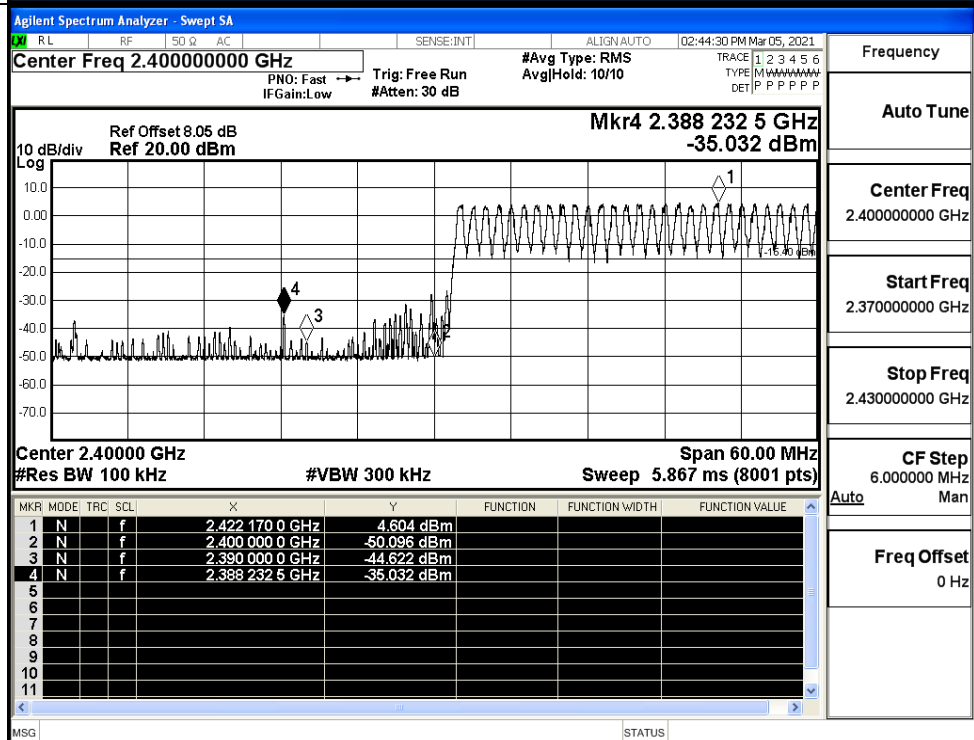
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	4.065	Off	-49.414	-15.94	PASS
			4.604	On	-35.032	-15.4	PASS
	HCH	2480	5.414	Off	-49.348	-14.59	PASS
			5.232	On	-48.650	-14.77	PASS
$\pi/4$ DQPSK	LCH	2402	-21.370	Off	-48.473	-41.37	PASS
			4.730	On	-49.096	-15.27	PASS
	HCH	2480	5.279	Off	-47.503	-14.72	PASS
			5.226	On	-48.420	-14.77	PASS

Test Graphs

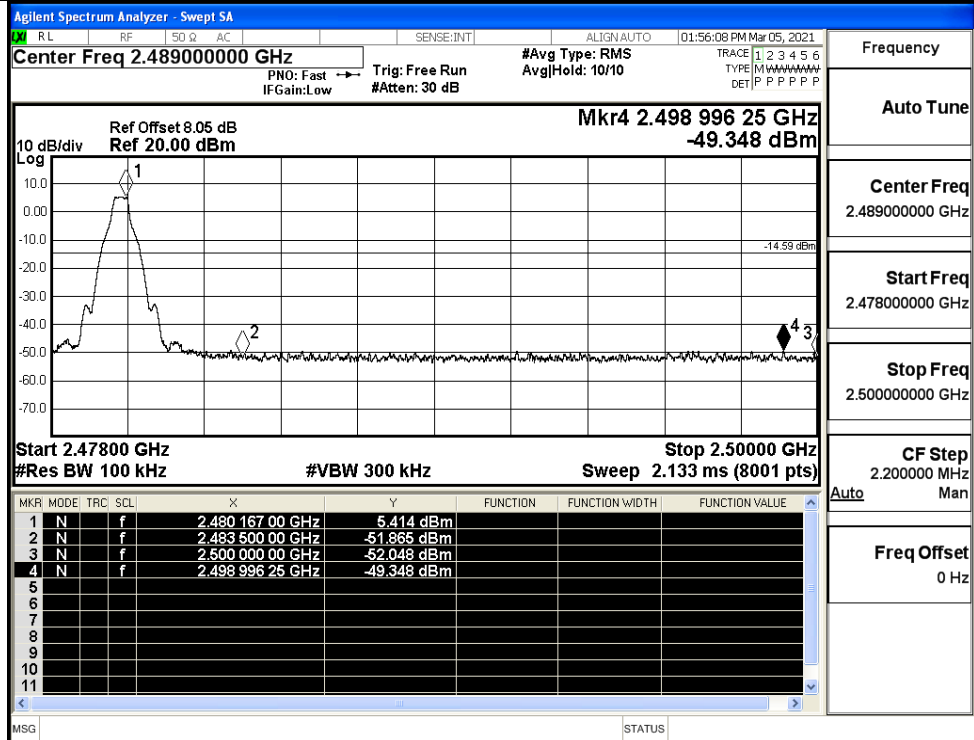
GFSK/LCH/No Hop



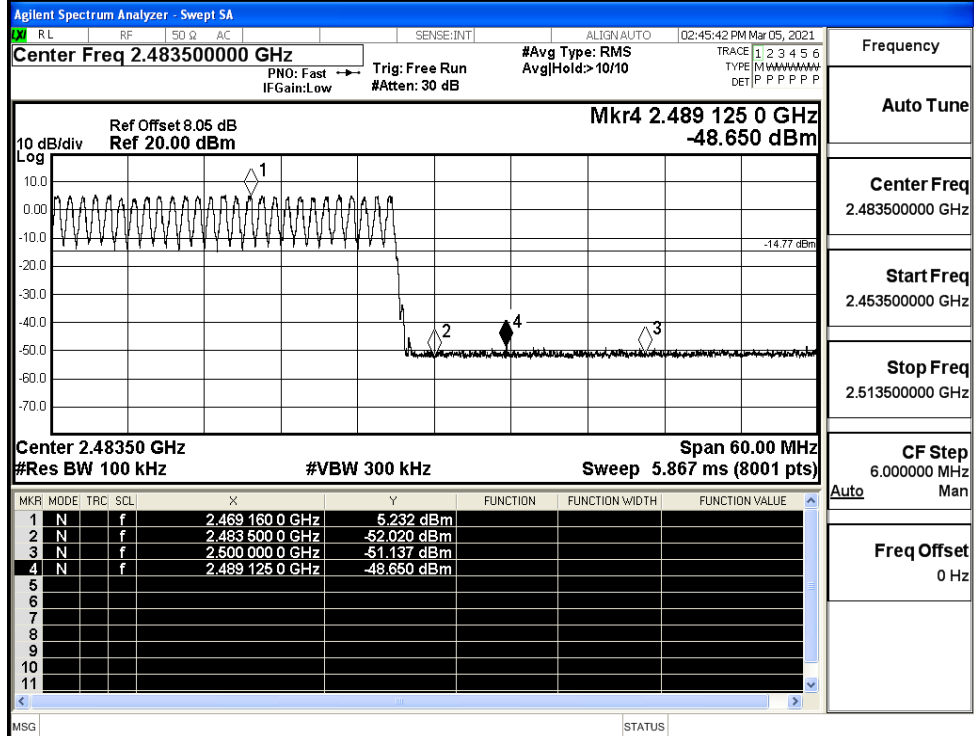
GFSK/LCH/Hop



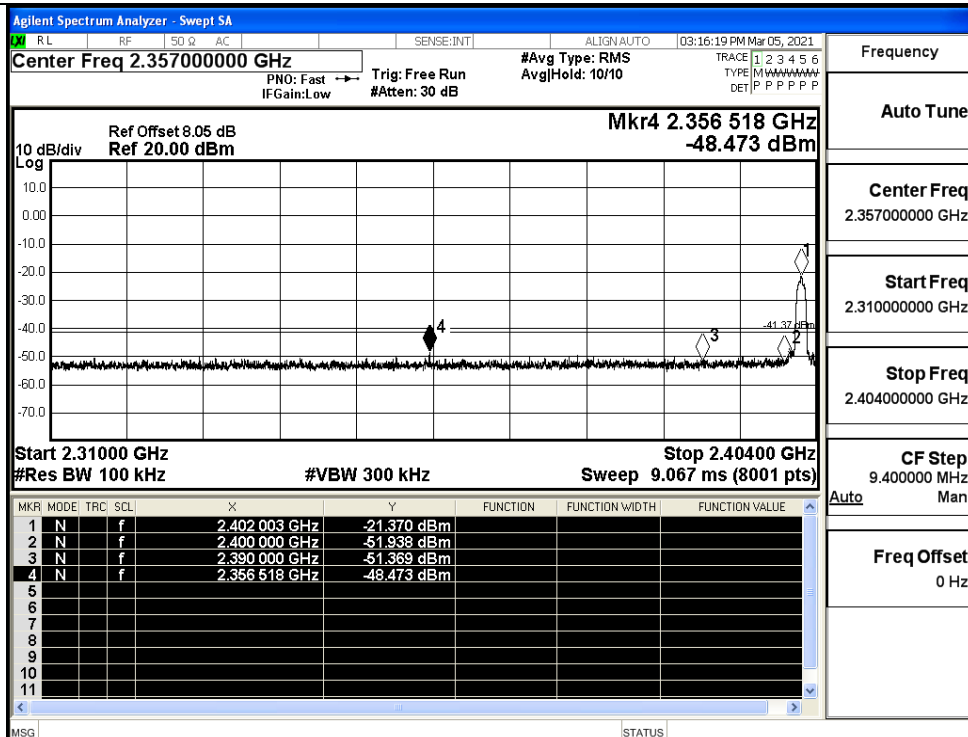
GFSK/HCH/No Hop



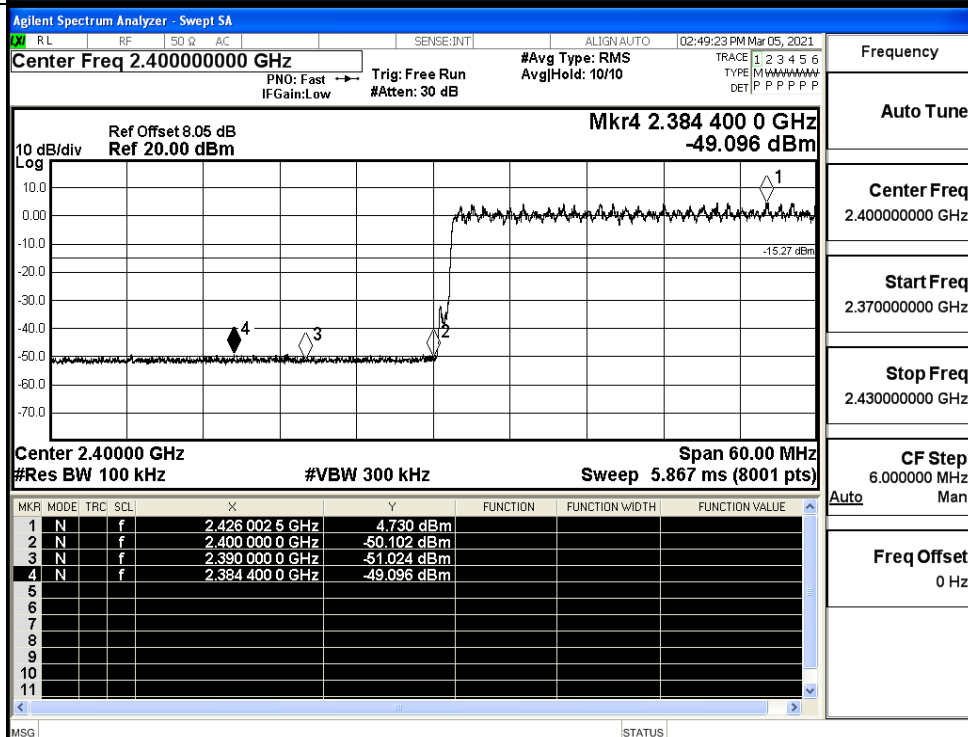
GFSK/HCH/Hop



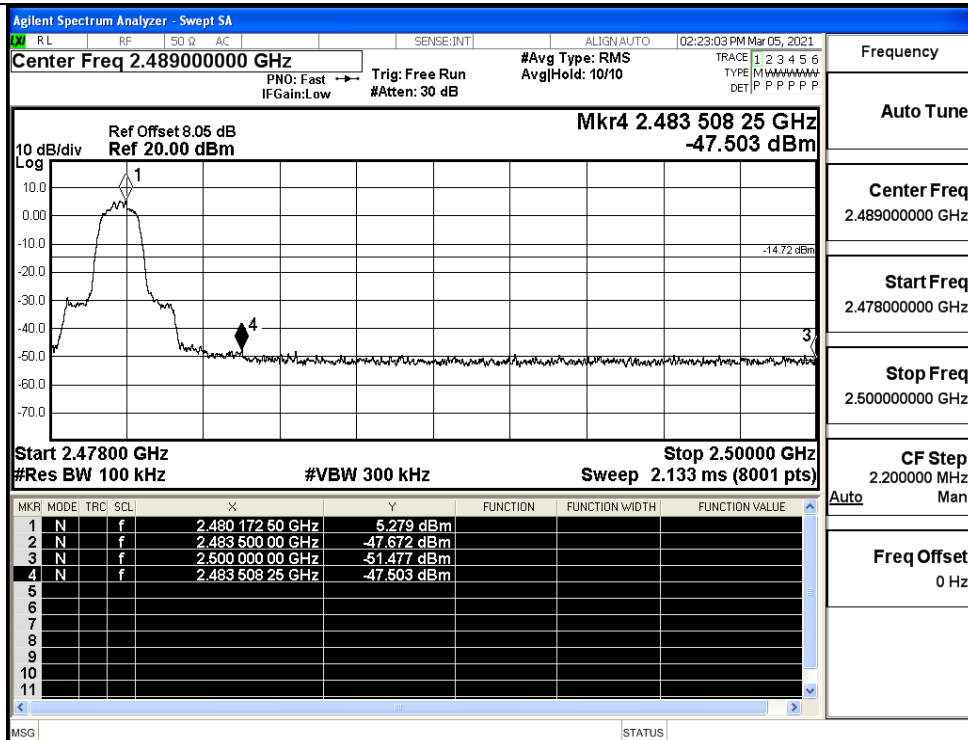
$\pi/4$ DQPSK/LCH/No
Hop



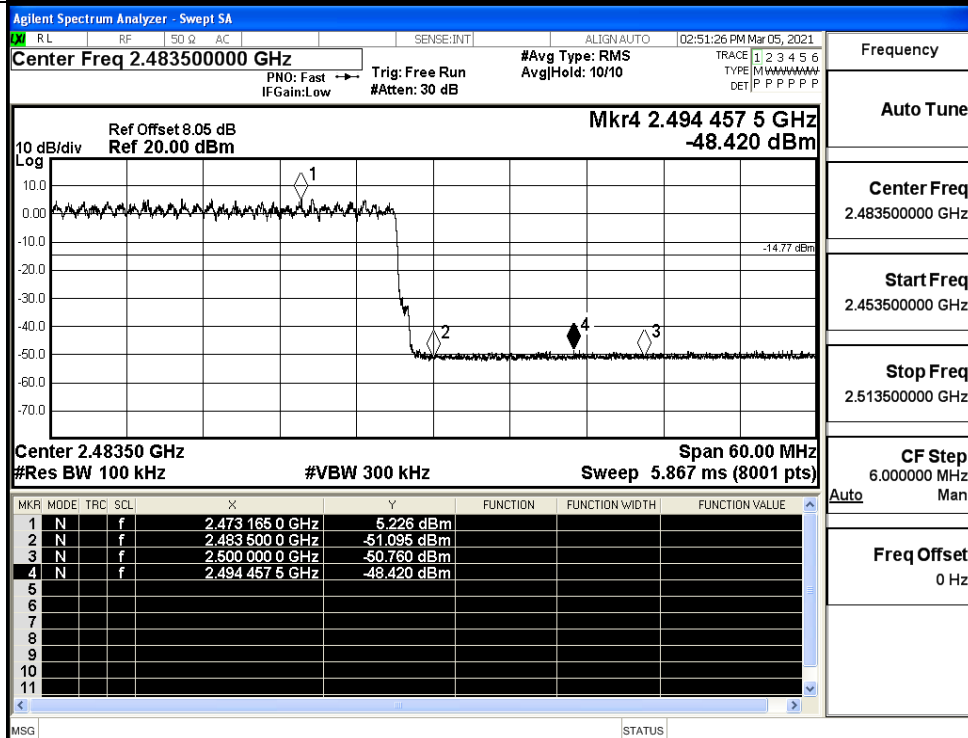
$\pi/4$ DQPSK/LCH/Hop



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



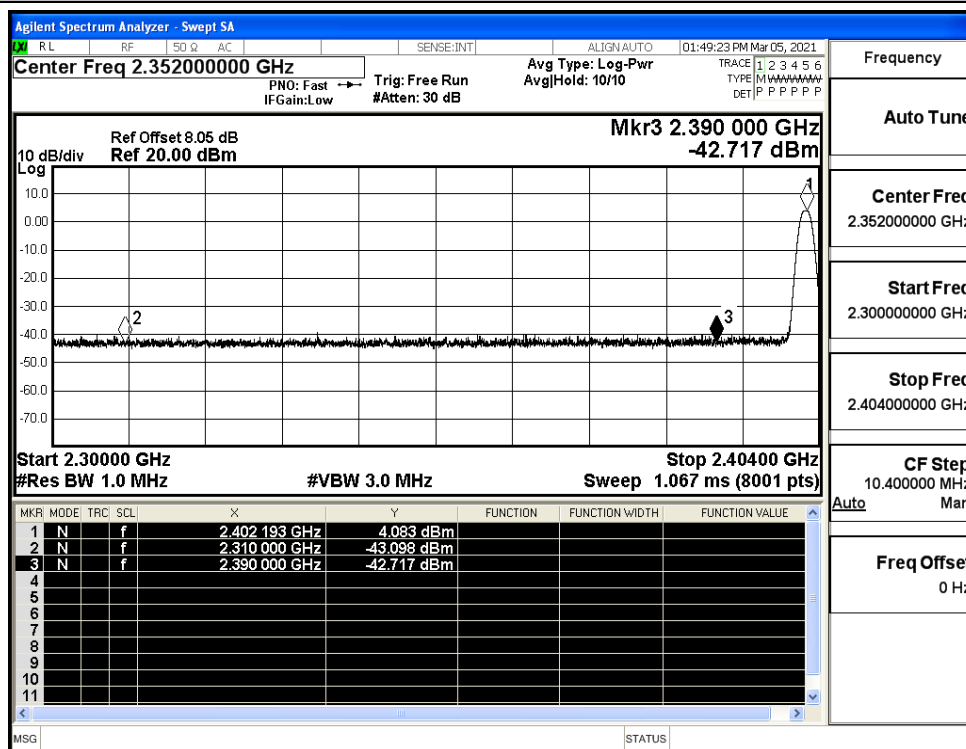
$\pi/4$ DQPSK/HCH/Hop



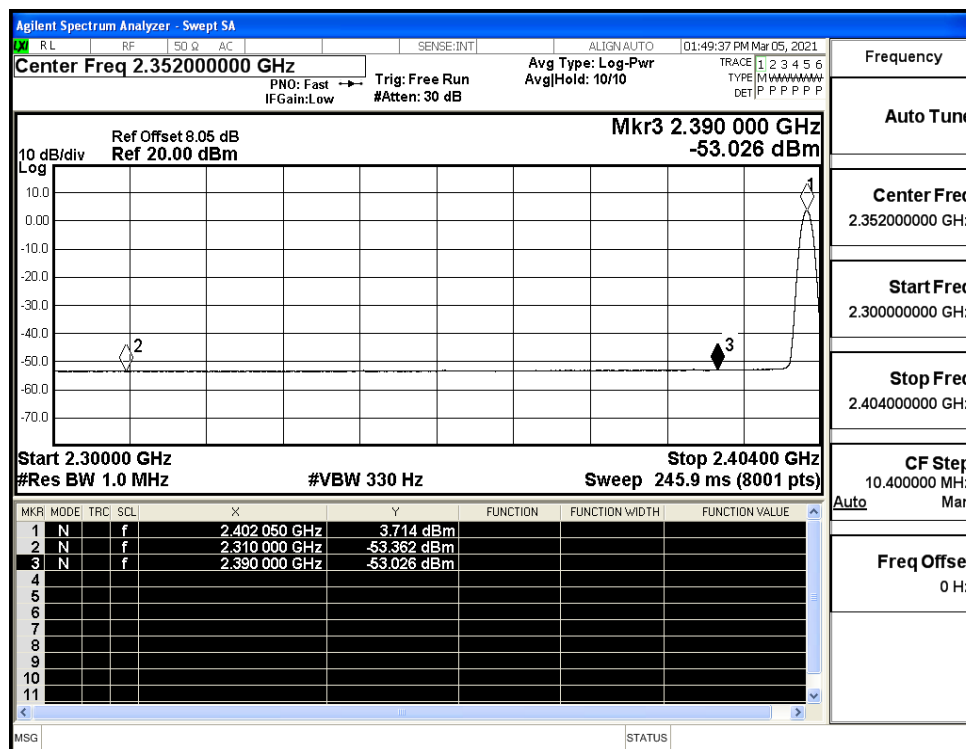
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.10	2.0	0	52.16	PEAK	74	PASS
	Off	2310.0	-53.36	2.0	0	41.90	AV	54	PASS
	Off	2390.0	-42.72	2.0	0	52.54	PEAK	74	PASS
	Off	2390.0	-53.03	2.0	0	42.23	AV	54	PASS
	Off	2483.5	-41.68	2.0	0	53.58	PEAK	74	PASS
	Off	2483.5	-51.95	2.0	0	43.31	AV	54	PASS
	Off	2500.0	-41.95	2.0	0	53.31	PEAK	74	PASS
	Off	2500.0	-52.34	2.0	0	42.92	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.39	2.0	0	51.87	PEAK	74	PASS
	Off	2310.0	-53.50	2.0	0	41.76	AV	54	PASS
	Off	2390.0	-42.62	2.0	0	52.64	PEAK	74	PASS
	Off	2390.0	-53.04	2.0	0	42.22	AV	54	PASS
	Off	2483.5	-39.99	2.0	0	55.26	PEAK	74	PASS
	Off	2483.5	-50.55	2.0	0	44.70	AV	54	PASS
	Off	2500.0	-43.08	2.0	0	52.18	PEAK	74	PASS
	Off	2500.0	-52.25	2.0	0	43.01	AV	54	PASS

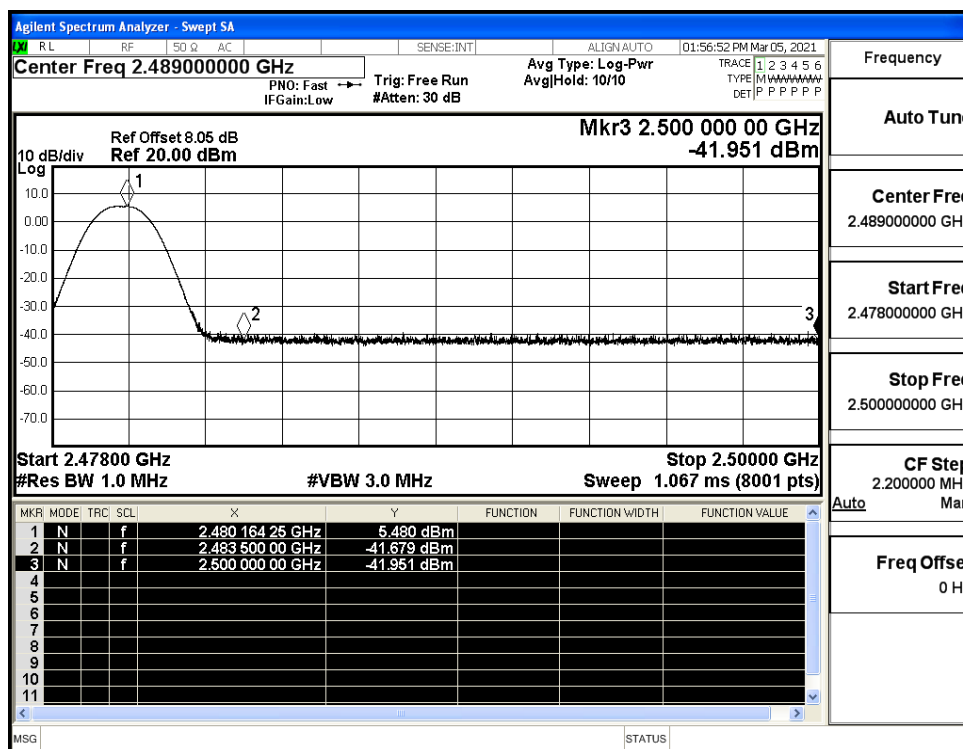
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



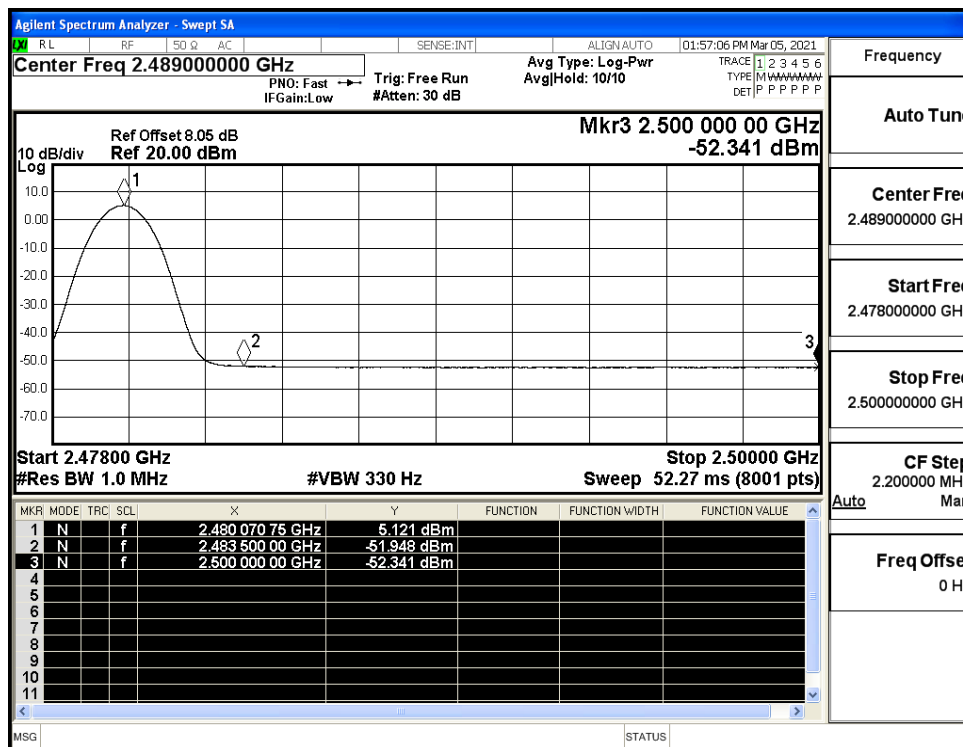
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

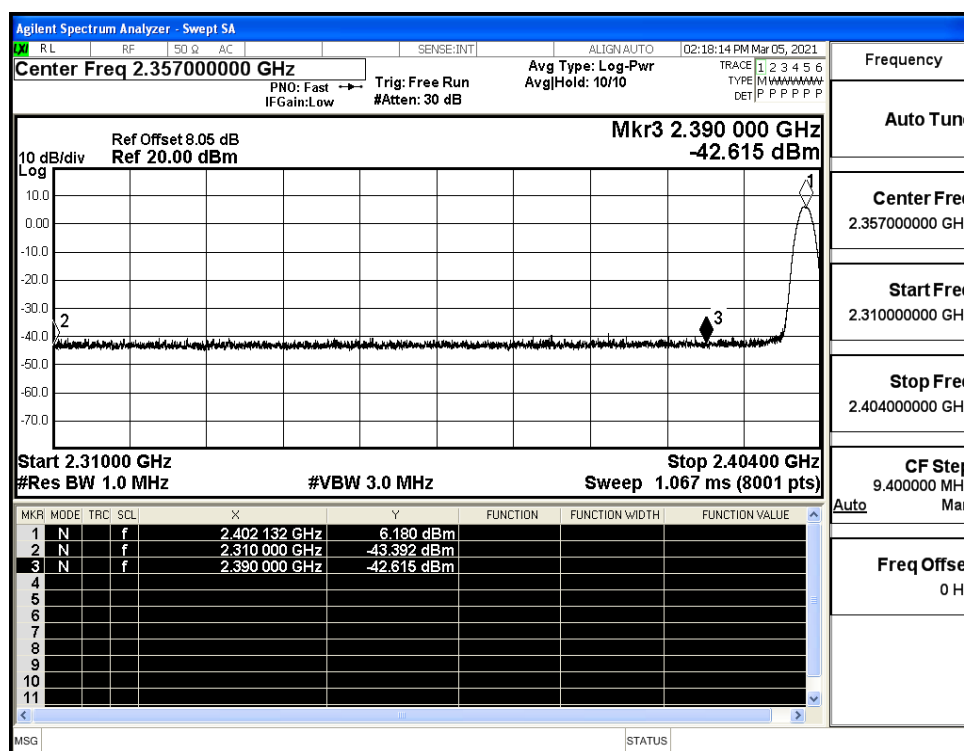
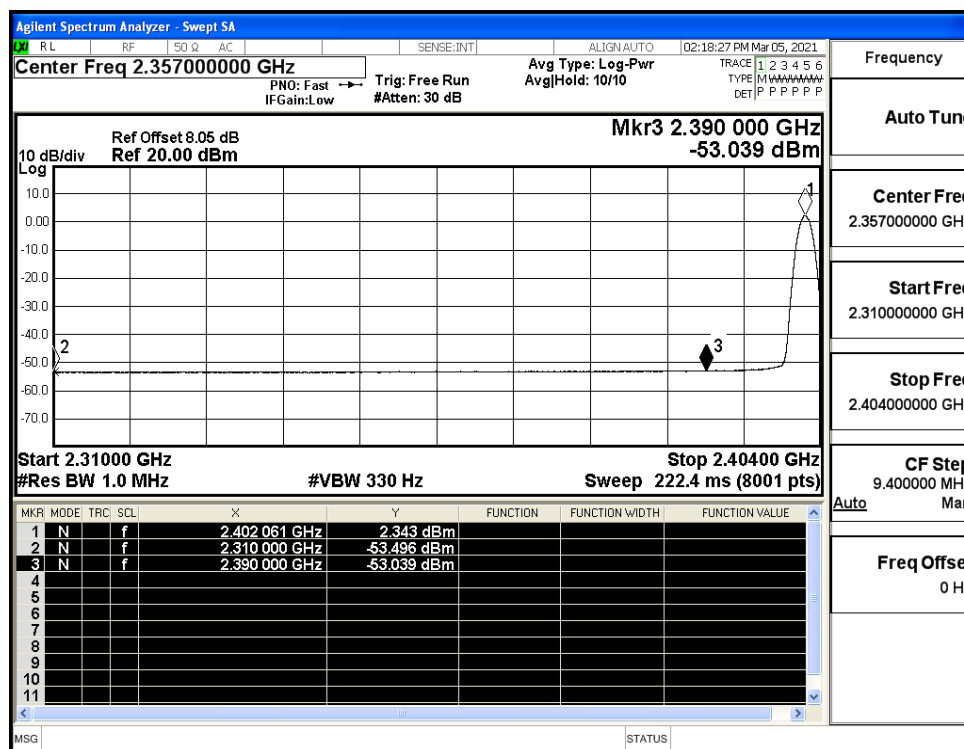


Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)

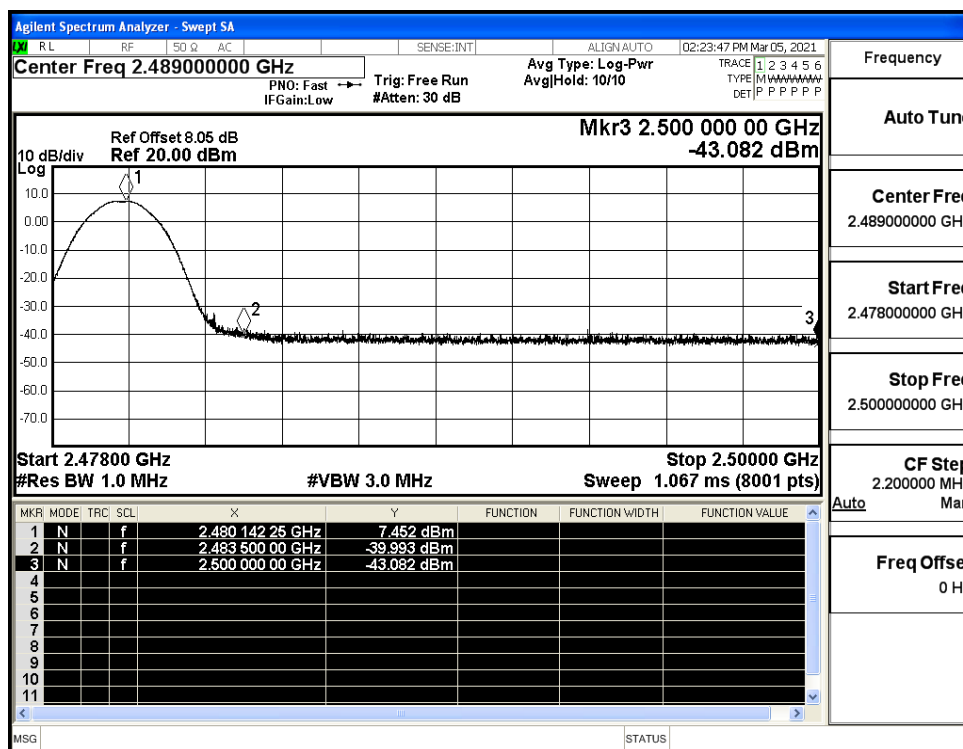


Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



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)

