

Appendix A

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

Product Name: CDG/BLUETOOTH KARAOKE PLAYER

Trade Mark: singing machine

Test Model: STVG785BTW

Environmental Conditions

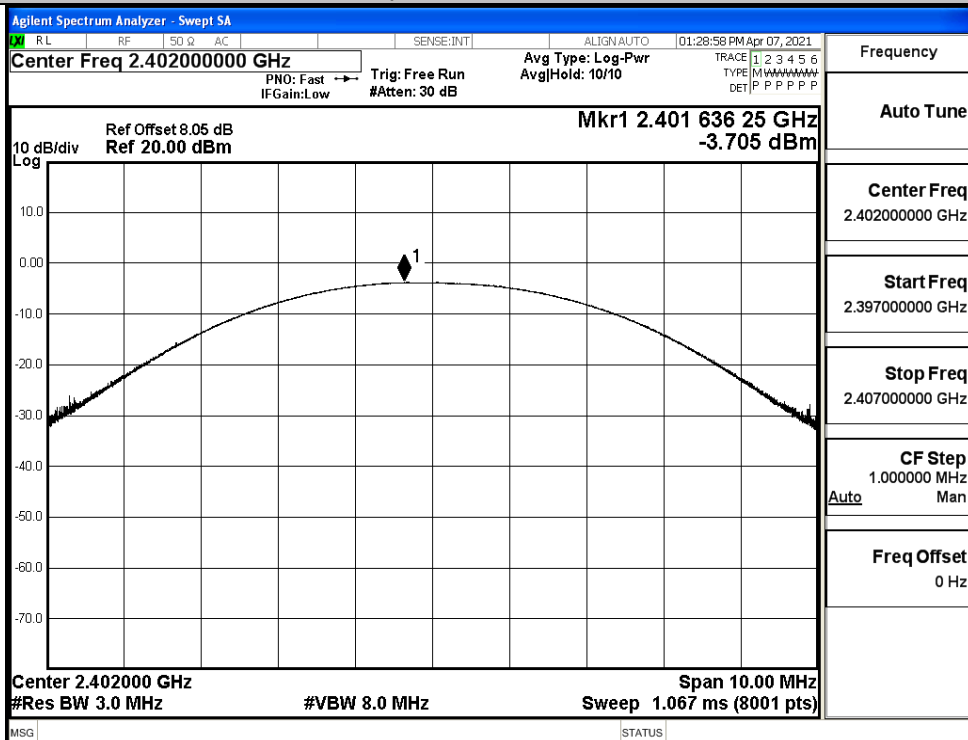
Temperature:	24.8°C
Relative Humidity:	56.5%
ATM Pressure:	100.0 kPa
Test Engineer:	Ben Jin
Supervised by:	Li Huan

A.1 Maximum Conducted Peak Output Power

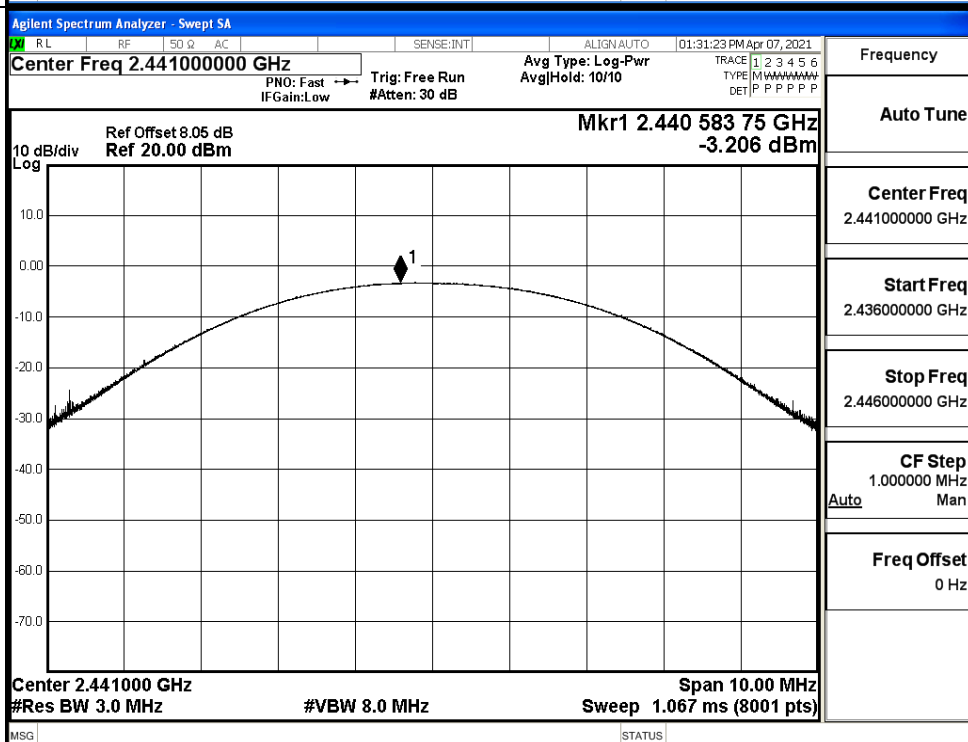
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-3.705	30	PASS
	MCH	-3.206	30	PASS
	HCH	-3.646	30	PASS
$\pi/4$ DQPSK	LCH	-2.913	21	PASS
	MCH	-2.449	21	PASS
	HCH	-2.861	21	PASS

Test Graphs

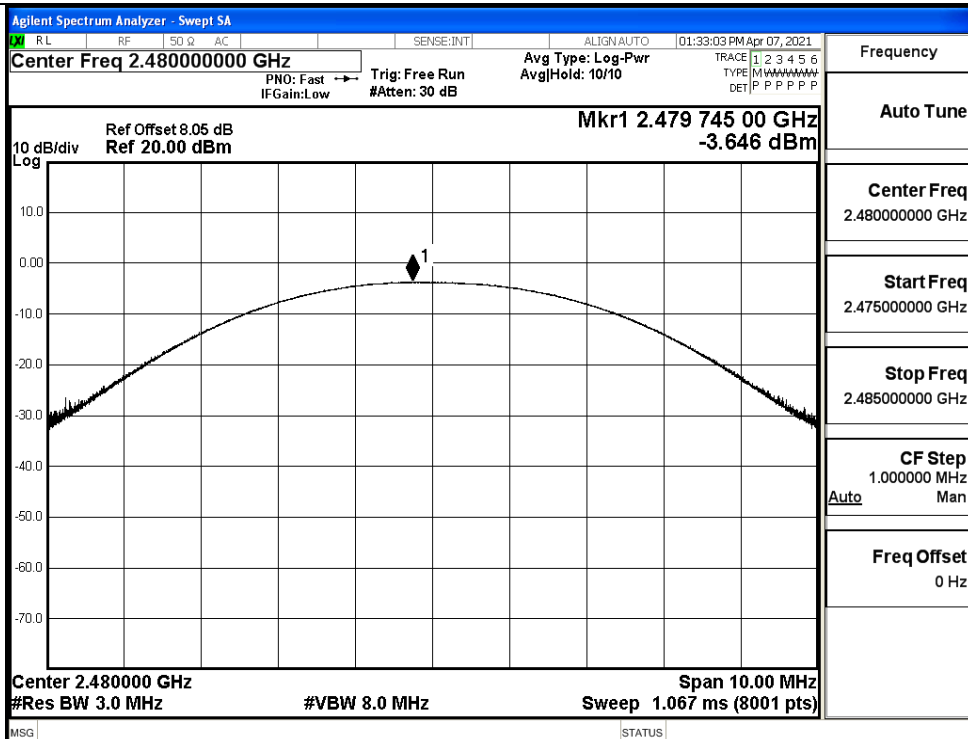
GFSK/LCH



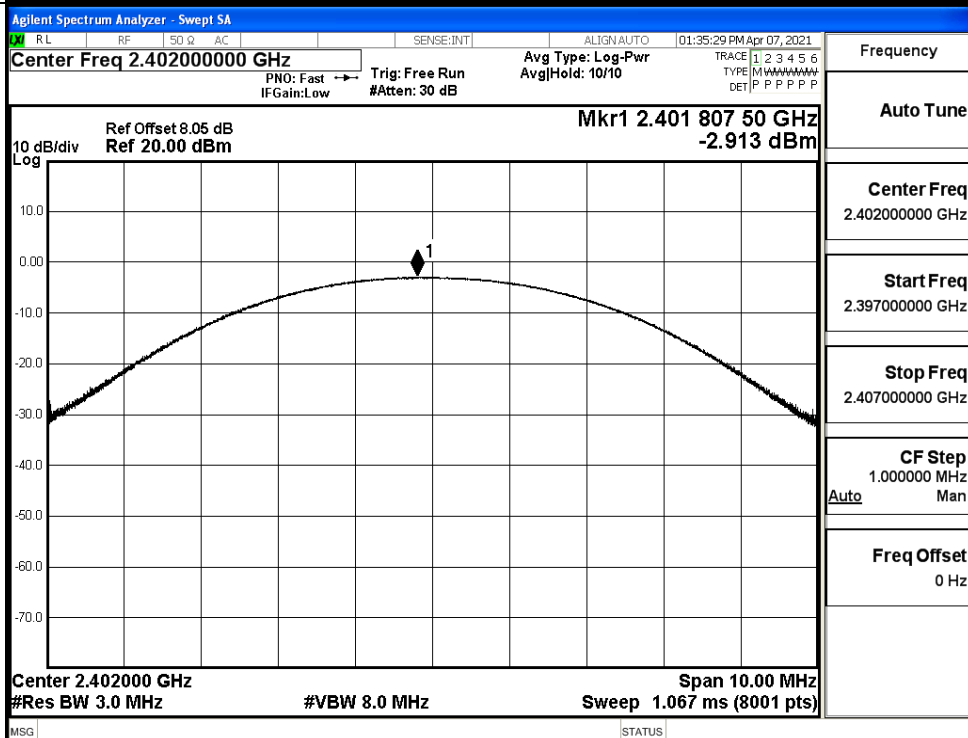
GFSK/MCH

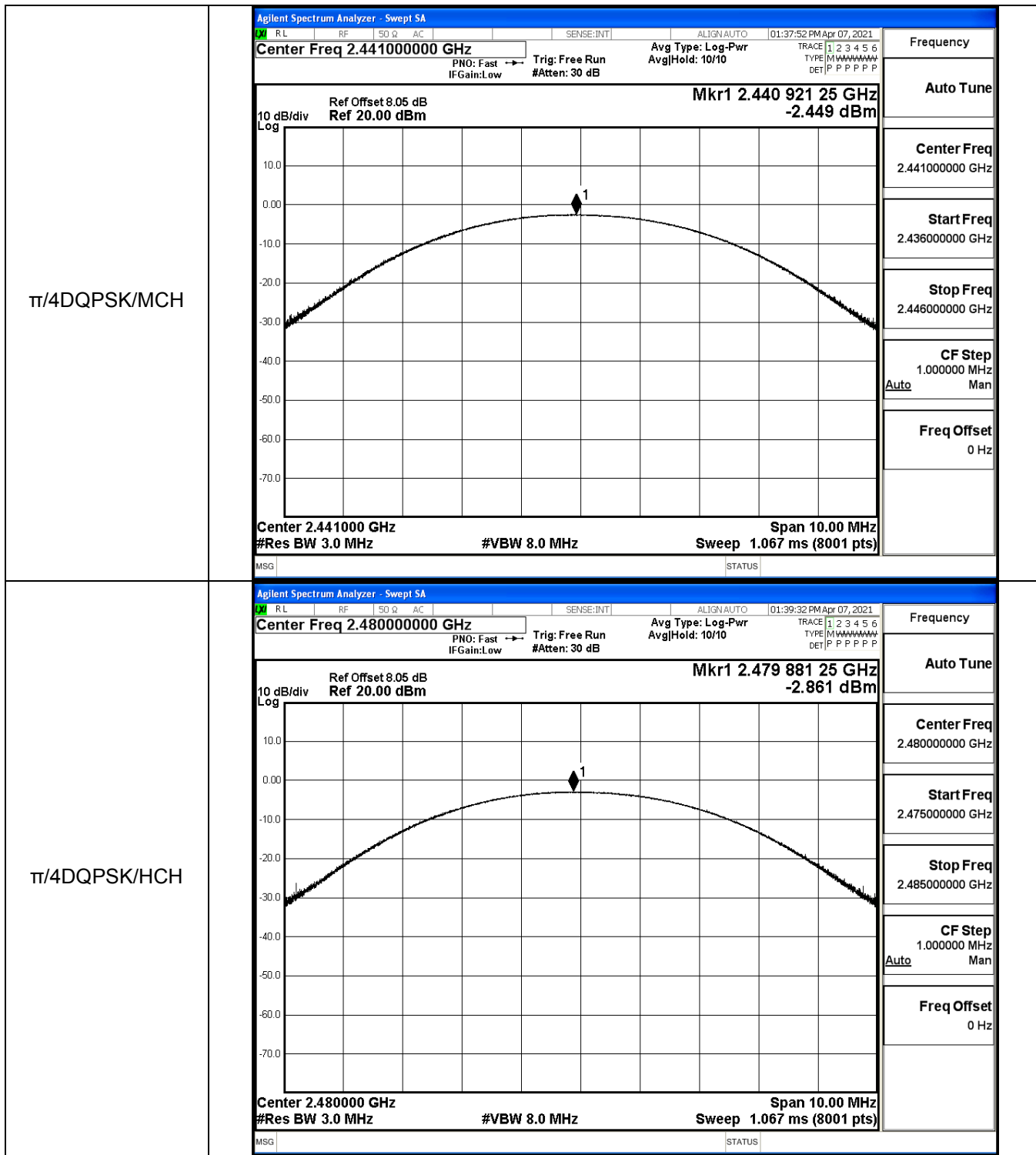


GFSK/HCH



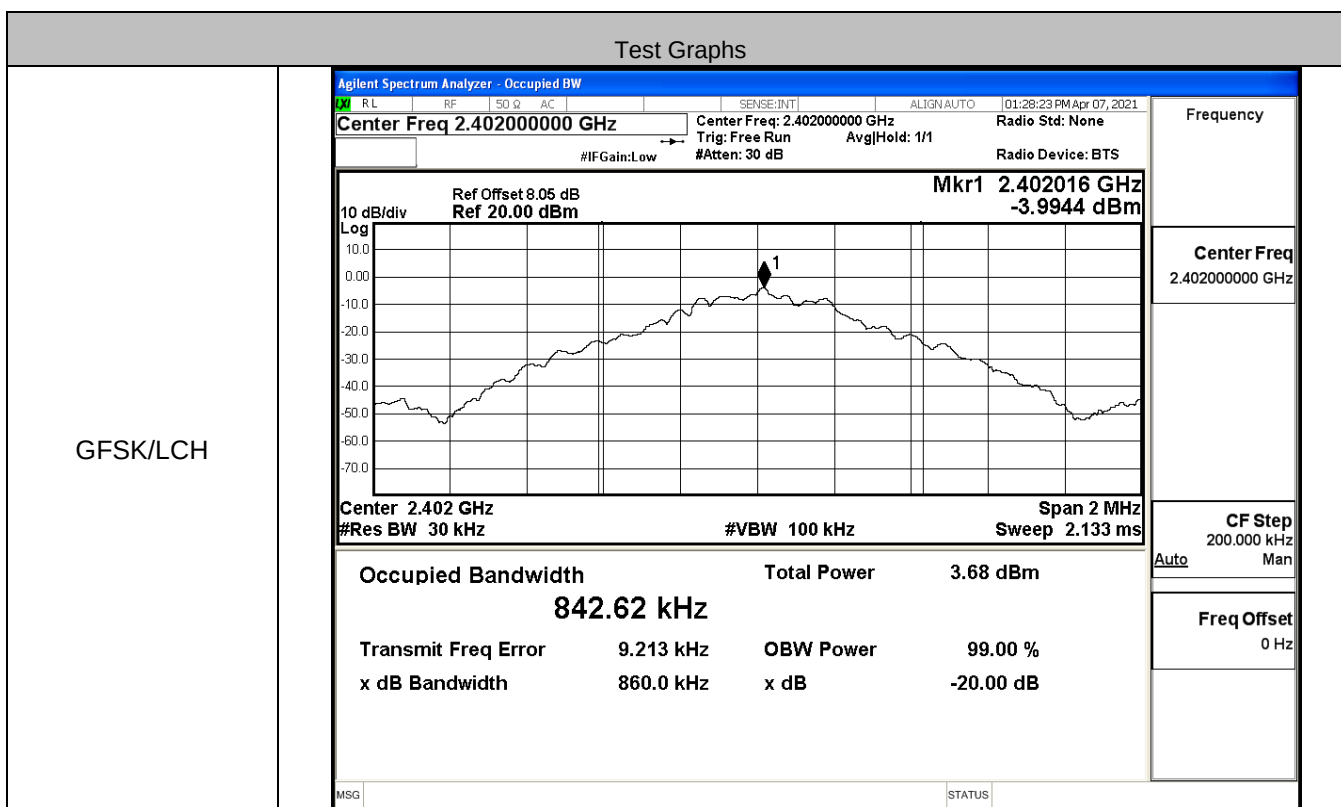
$\pi/4$ DQPSK/LCH



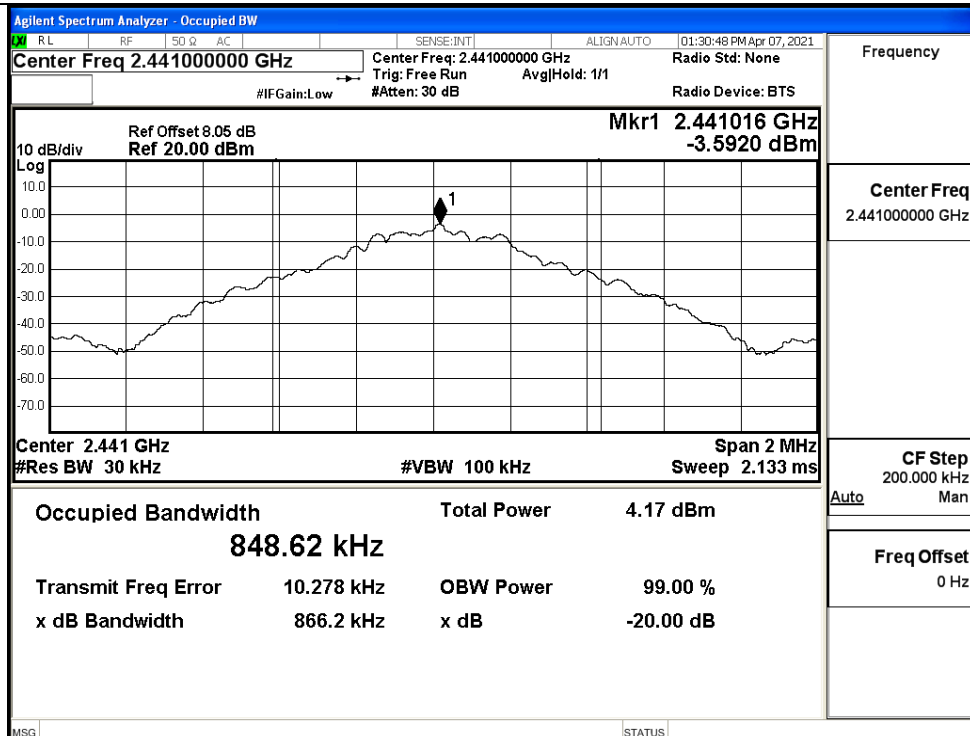


A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.8600	Not Specified	PASS
	MCH	0.8662	Not Specified	PASS
	HCH	0.8632	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.238	Not Specified	PASS
	MCH	1.225	Not Specified	PASS
	HCH	1.243	Not Specified	PASS



GFSK/MCH



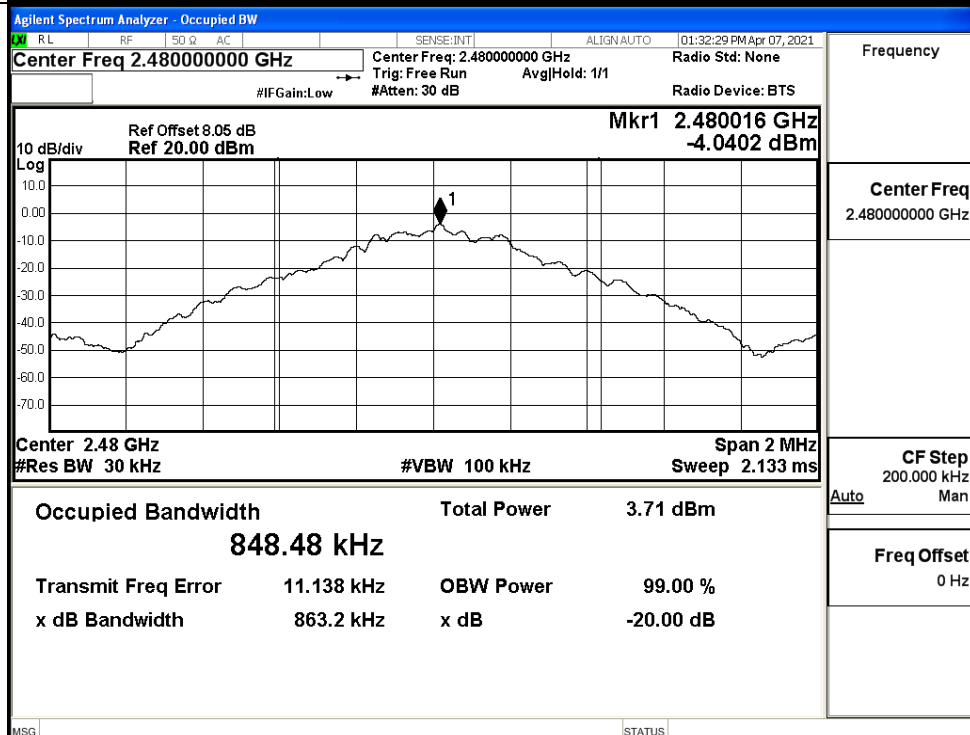
Frequency

Center Freq
2.441000000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

GFSK/HCH

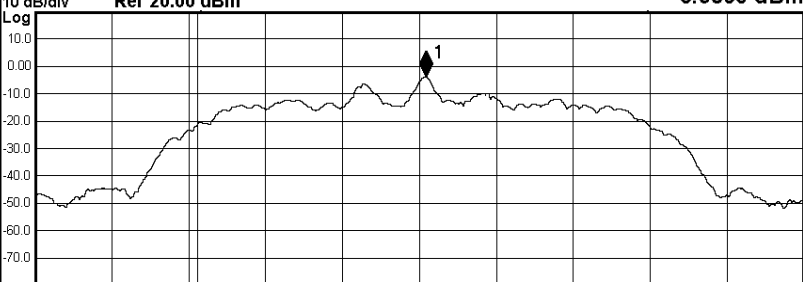
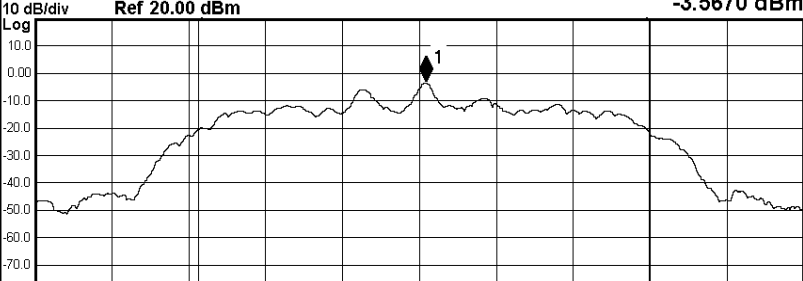


Frequency

Center Freq
2.480000000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

$\pi/4$DQPSK/LCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Q AC SENSE:INT ALIGN: AUTO 01:34:54 PM Apr 07, 2021 Center Freq 2.40200000 GHz Center Freq: 2.40200000 GHz Trig: Free Run Avg/Hold: 1/1 Radio Std: None #IFGain: Low #Atten: 30 dB Radio Device: BTS Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.402016 GHz -3.9865 dBm  Center 2.402 GHz #Res BW 30 kHz #VBW 100 kHz Span 2 MHz Sweep 2.133 ms Occupied Bandwidth 1.1702 MHz Total Power 3.37 dBm Transmit Freq Error 12.790 kHz OBW Power 99.00 % x dB Bandwidth 1.238 MHz x dB -20.00 dB Frequency Center Freq 2.40200000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz
$\pi/4$DQPSK/MCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Q AC SENSE:INT ALIGN: AUTO 01:37:18 PM Apr 07, 2021 Center Freq 2.44100000 GHz Center Freq: 2.44100000 GHz Trig: Free Run Avg/Hold: >1/1 Radio Std: None #IFGain: Low #Atten: 30 dB Radio Device: BTS Ref Offset 8.05 dB Ref 20.00 dBm Mkr1 2.441016 GHz -3.5670 dBm  Center 2.441 GHz #Res BW 30 kHz #VBW 100 kHz Span 2 MHz Sweep 2.133 ms Occupied Bandwidth 1.1693 MHz Total Power 3.88 dBm Transmit Freq Error 11.463 kHz OBW Power 99.00 % x dB Bandwidth 1.225 MHz x dB -20.00 dB

Frequency

Center Freq

2.44100000 GHz

CF Step

200.000 kHz

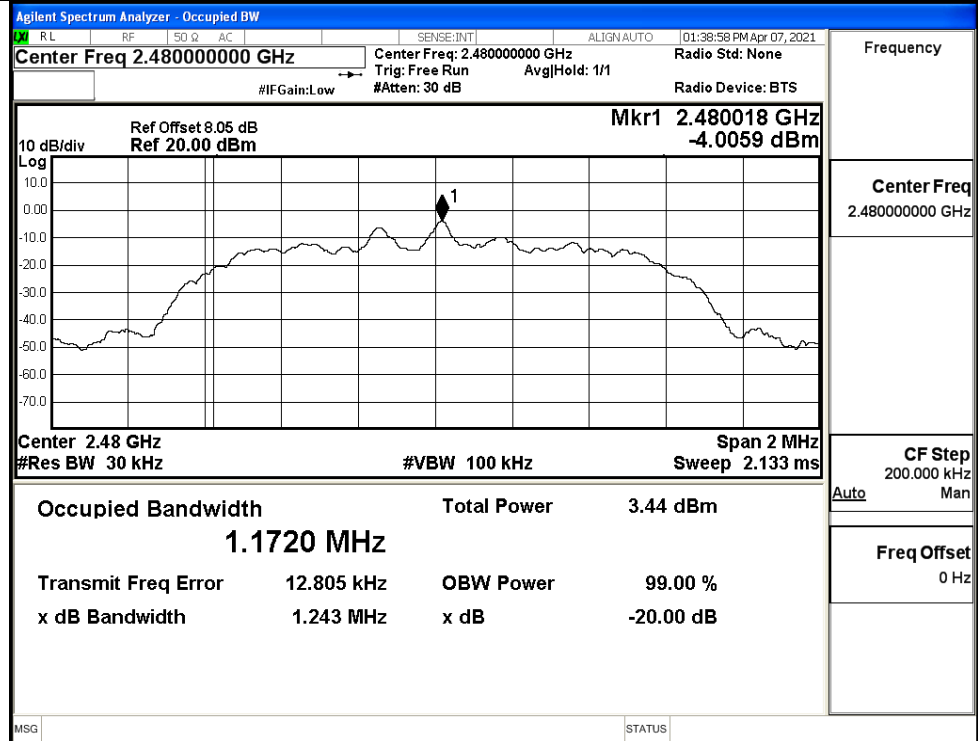
Auto

Man

Freq Offset

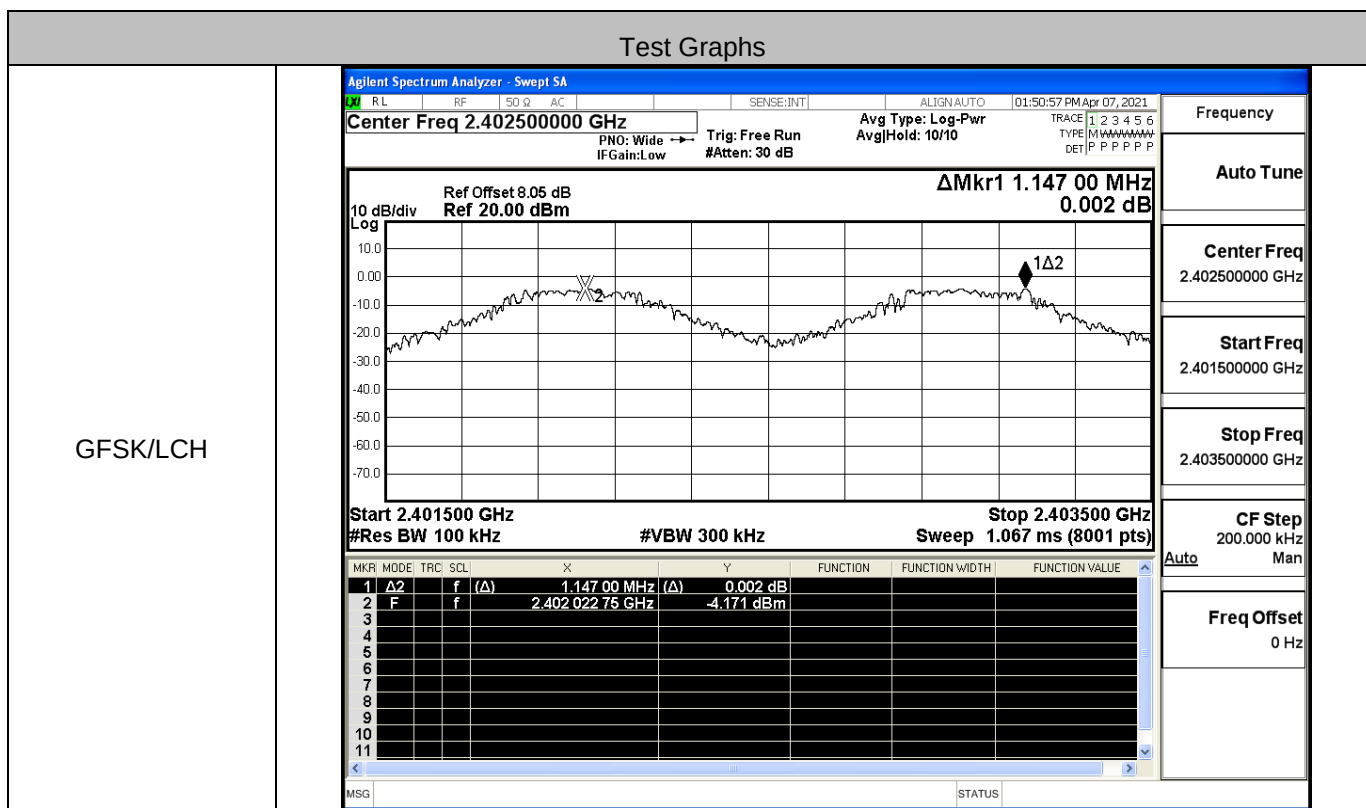
0 Hz

$\pi/4$ DQPSK/HCH

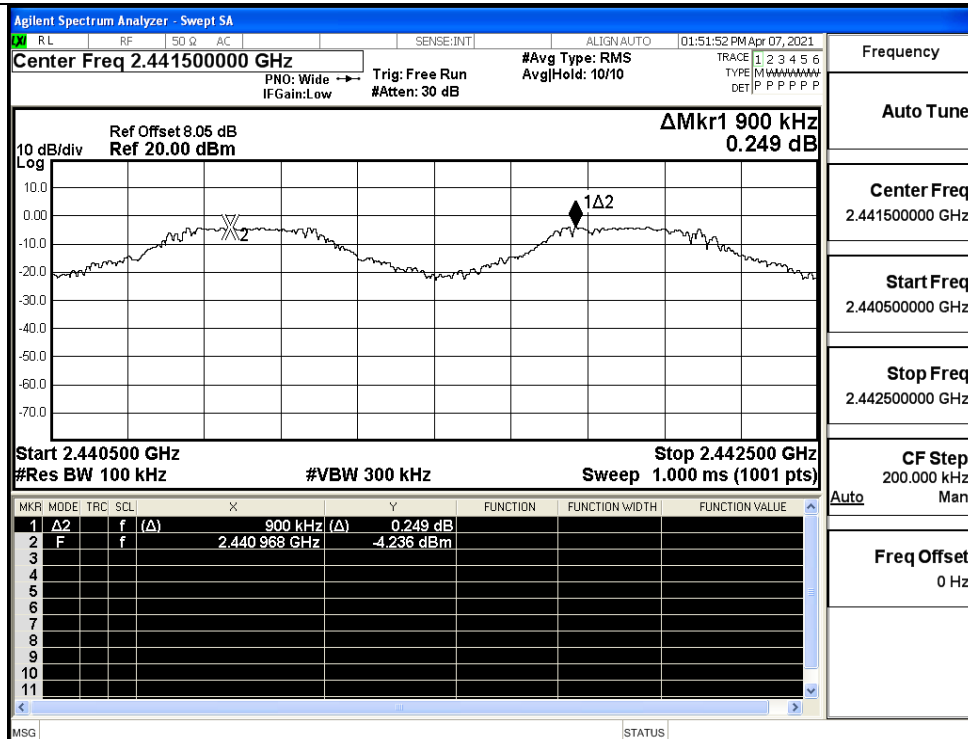


A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.147	0.577	PASS
	MCH	0.900	0.577	PASS
	HCH	0.834	0.577	PASS
π /4DQPSK	LCH	1.036	0.829	PASS
	MCH	1.126	0.829	PASS
	HCH	0.940	0.829	PASS



GFSK/MCH



Frequency

Auto Tune

Center Freq
2.441500000 GHz

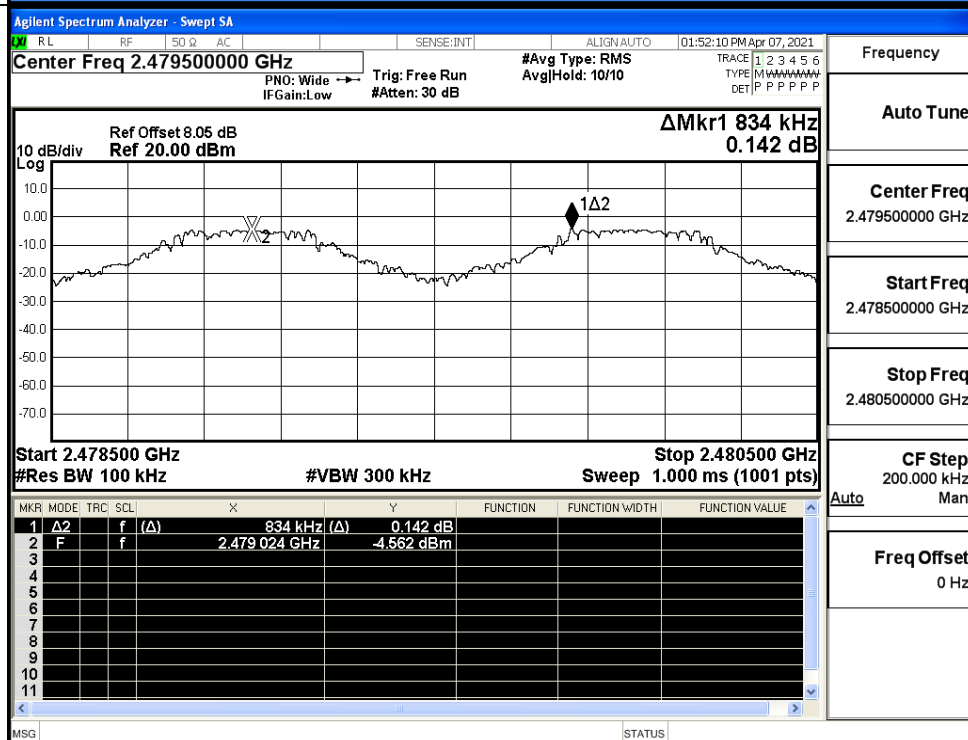
Start Freq
2.440500000 GHz

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

Agilent Spectrum Analyzer - Swept SA

Center Freq 2.402500000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.000 ms (1001 pts)

Ref Offset 8.05 dB
Ref 20.00 dBm

Δ Mkr1 1.036 MHz
1.318 dB

Start 2.401500 GHz
Stop 2.403500 GHz

MRK	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ 2	f	(Δ)	1.036 MHz	(Δ)	1.318 dB		
2	F	f		2.401980 GHz		-5.353 dBm		

Frequency: 2.402500000 GHz
Auto Tune
Start Freq: 2.401500000 GHz
Stop Freq: 2.403500000 GHz
CF Step: 200.000 kHz
Freq Offset: 0 Hz

Agilent Spectrum Analyzer - Swept SA

Center Freq 2.441500000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.000 ms (1001 pts)

Ref Offset 8.05 dB
Ref 20.00 dBm

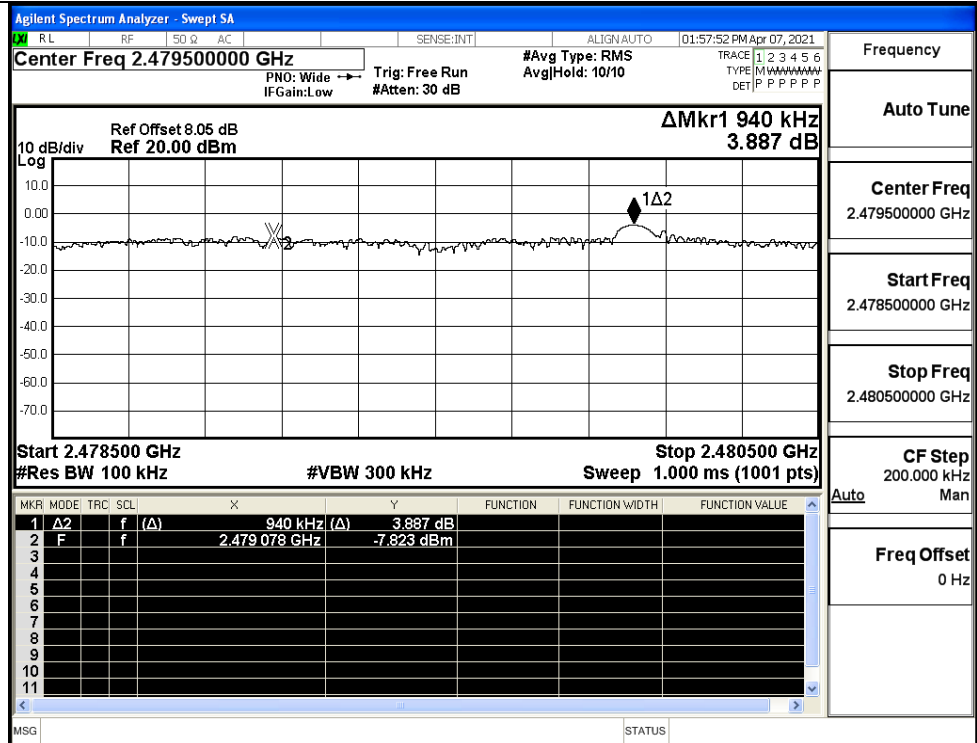
Δ Mkr1 1.126 MHz
-2.789 dB

Start 2.440500 GHz
Stop 2.442500 GHz

MRK	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ 2	f	(Δ)	1.126 MHz	(Δ)	-2.789 dB		
2	F	f		2.441014 GHz		-3.520 dBm		

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

$\pi/4$ DQPSK/HCH

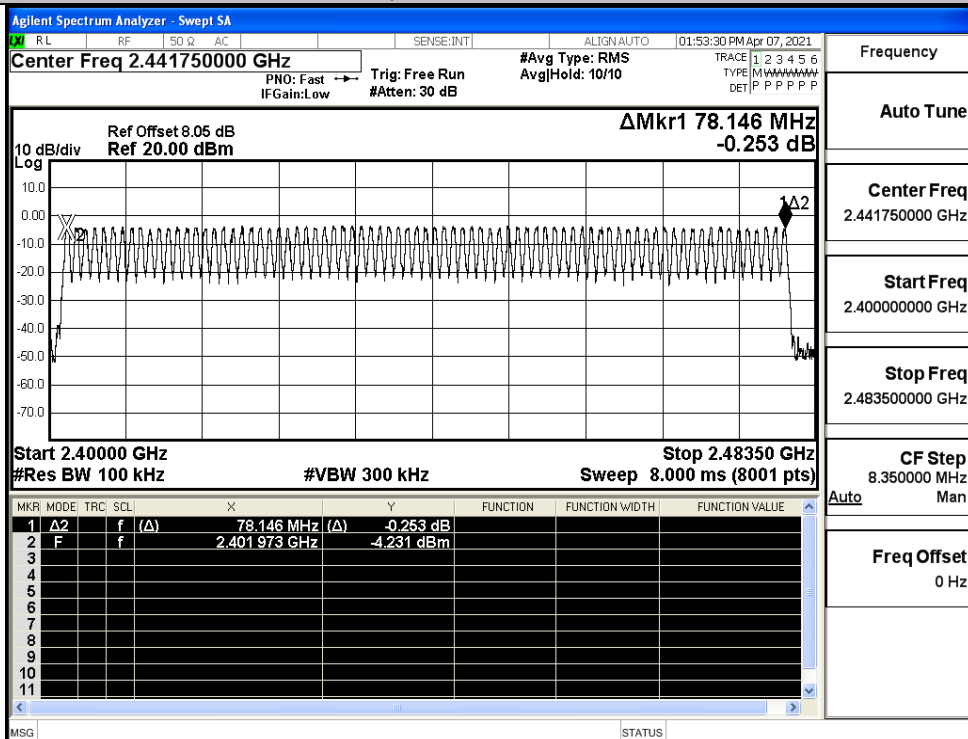
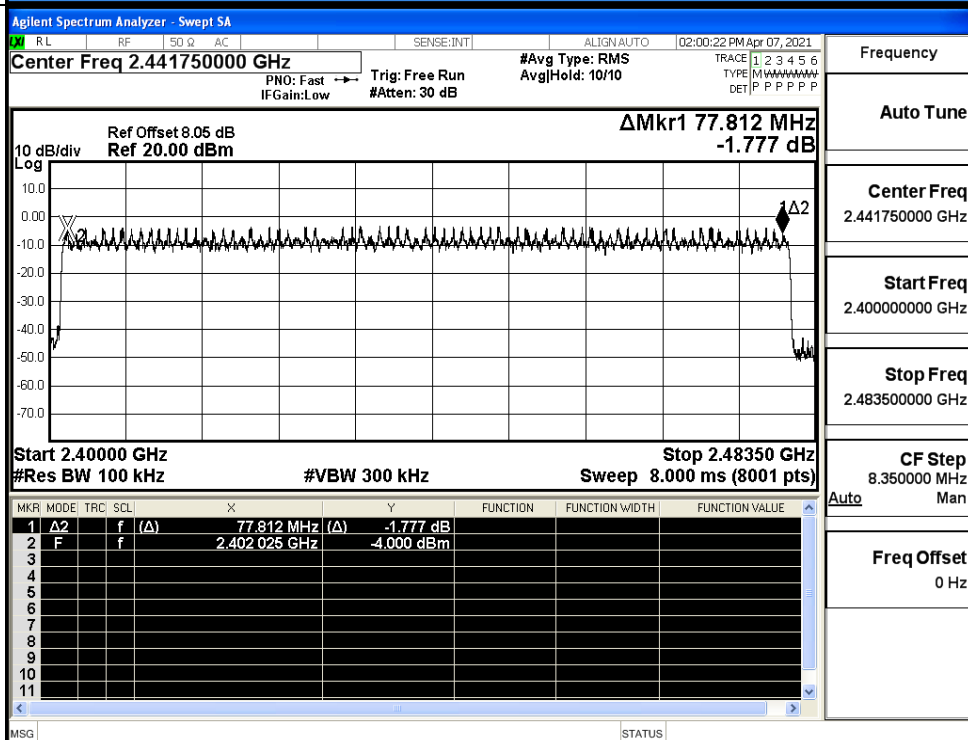


A.4 Hopping Channel Number

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

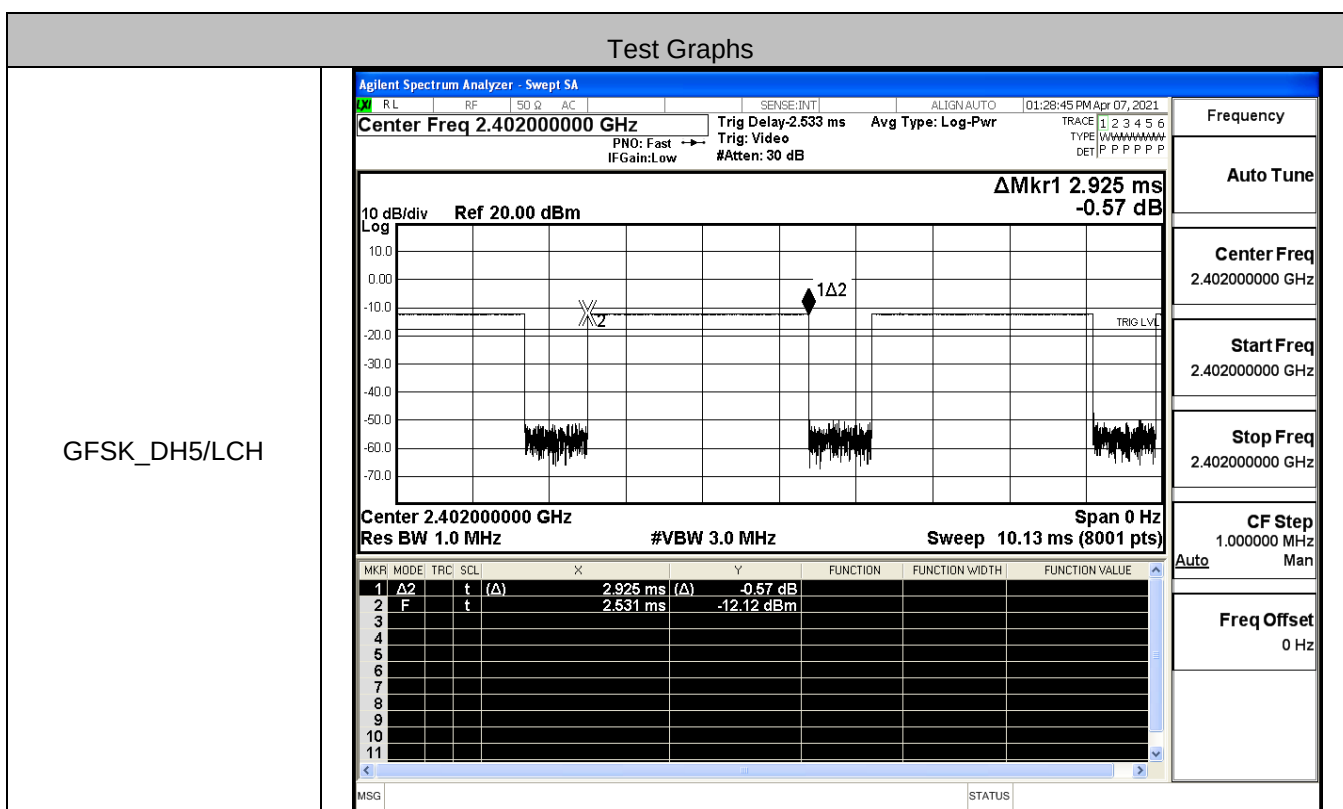
Test Graphs

GFSK/Hop

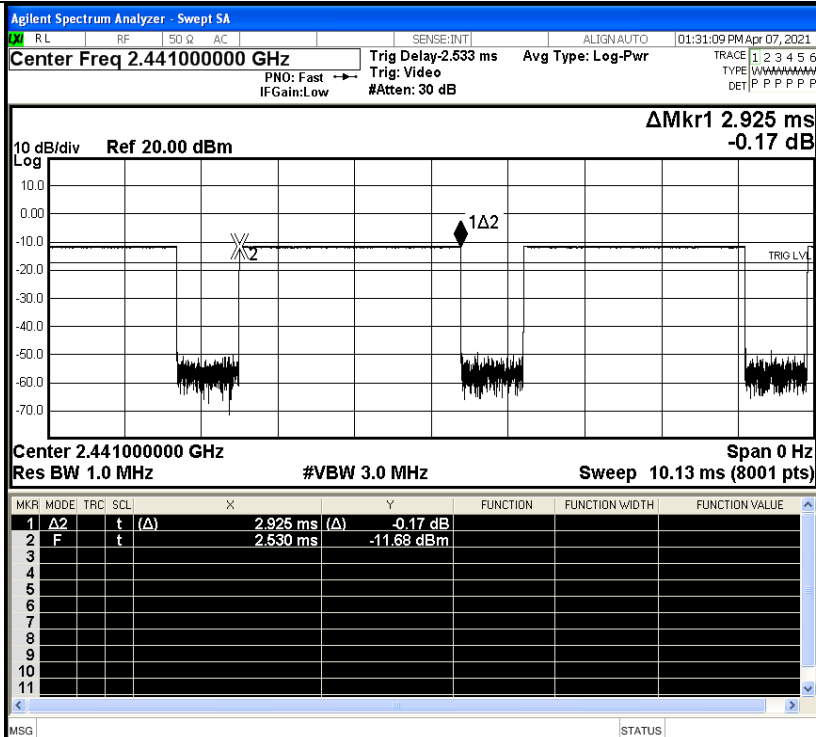
 $\pi/4$ DQPSK/Hop

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	2.92	106.7	0.312	0.4	PASS
	DH5	MCH	2.92	106.7	0.312	0.4	PASS
	DH5	HCH	2.92	106.7	0.312	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.92	106.7	0.313	0.4	PASS
	2DH5	MCH	2.92	106.7	0.313	0.4	PASS
	2DH5	HCH	2.92	106.7	0.313	0.4	PASS

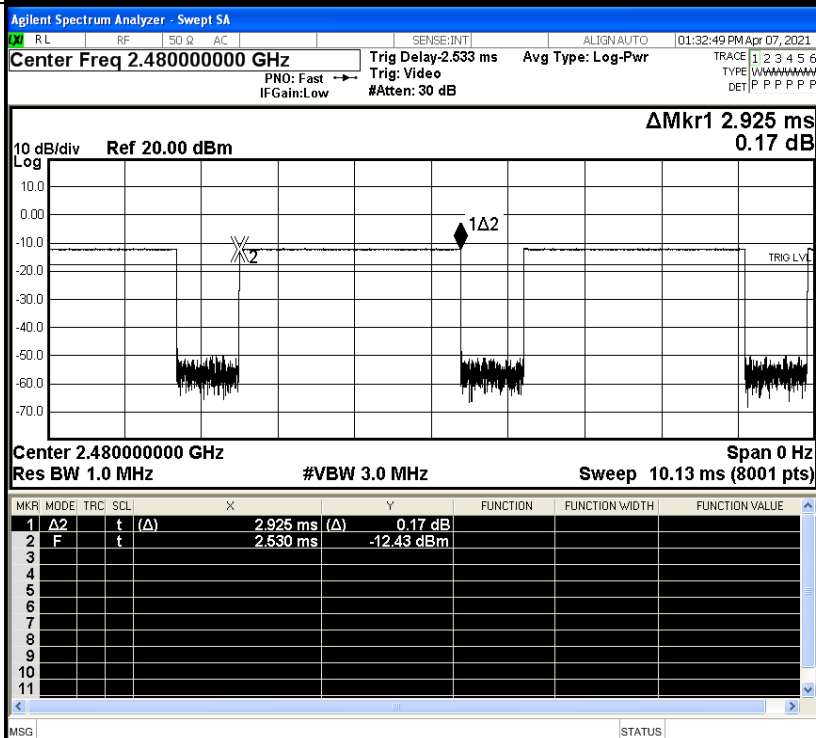


GFSK_DH5/MCH



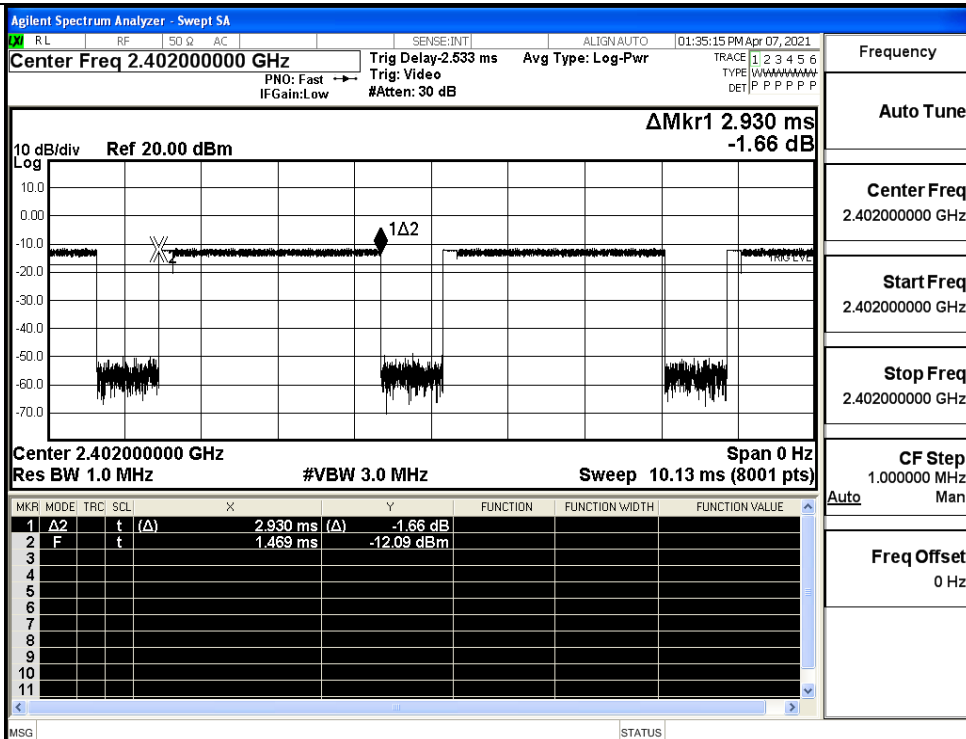
Frequency
Auto Tune
Center Freq 2.441000000 GHz
Start Freq 2.441000000 GHz
Stop Freq 2.441000000 GHz
CF Step 1.000000 MHz Auto
Freq Offset 0 Hz

GFSK_DH5/HCH

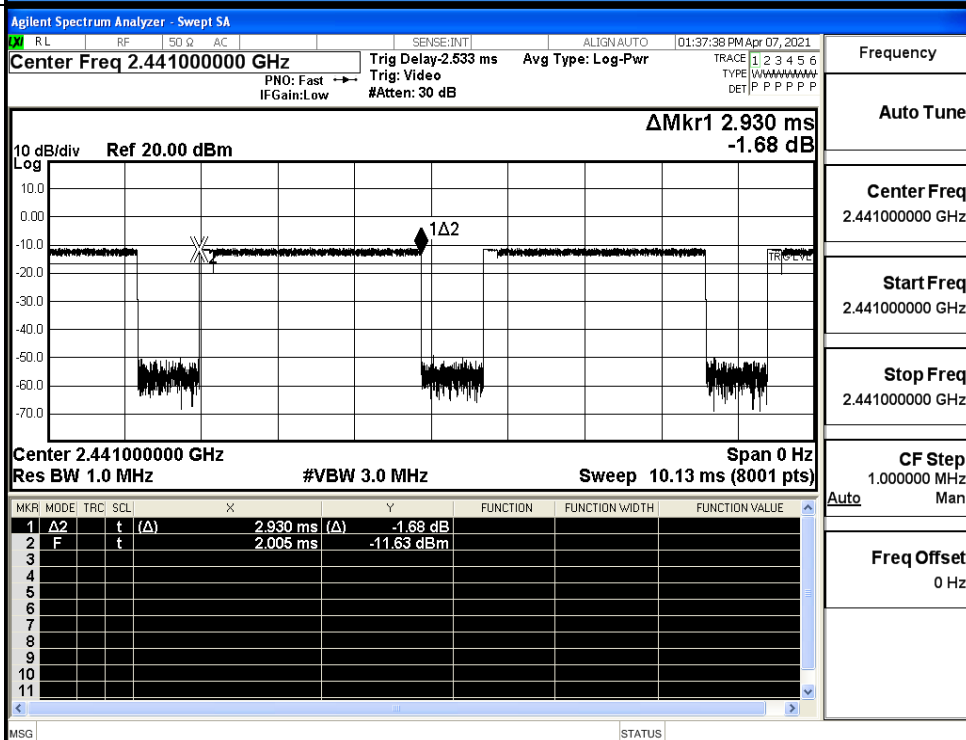


Frequency
Auto Tune
Center Freq 2.480000000 GHz
Start Freq 2.480000000 GHz
Stop Freq 2.480000000 GHz
CF Step 1.000000 MHz Auto
Freq Offset 0 Hz

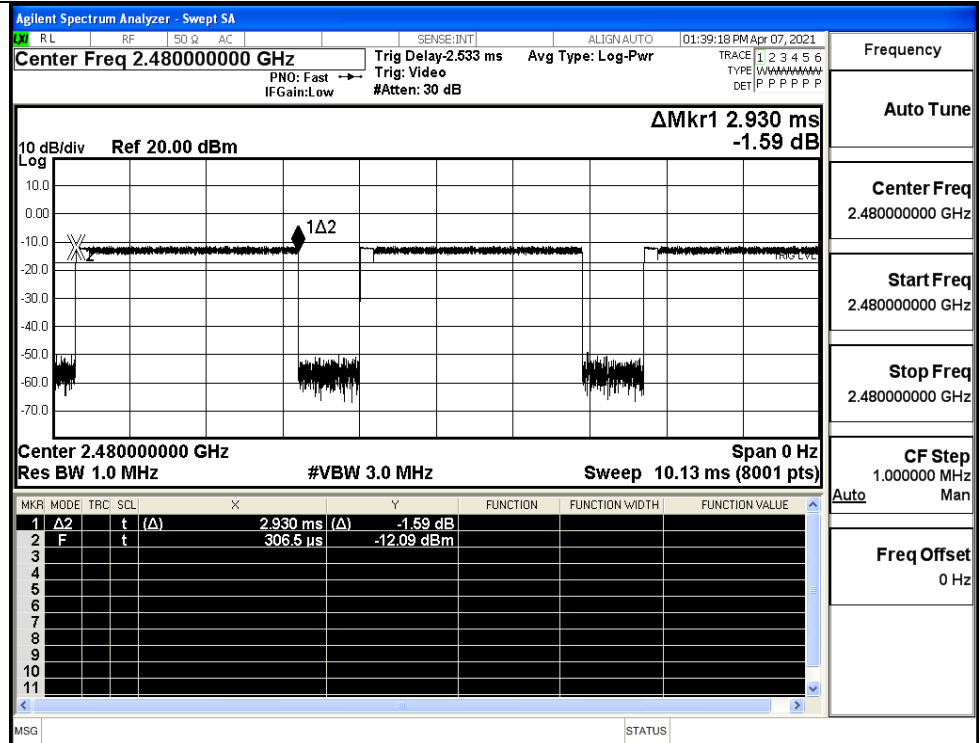
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH

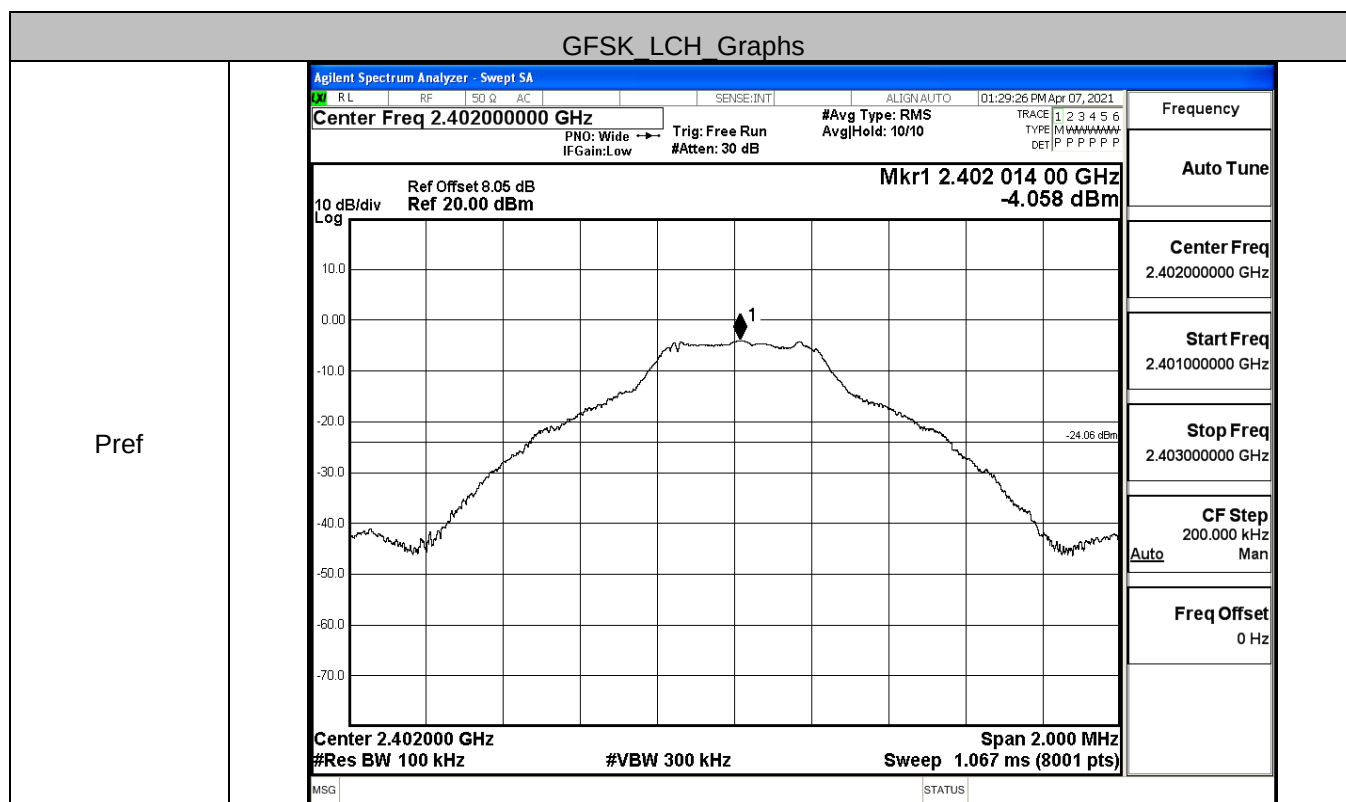


$\pi/4$ DQPSK
_2DH5/HCH

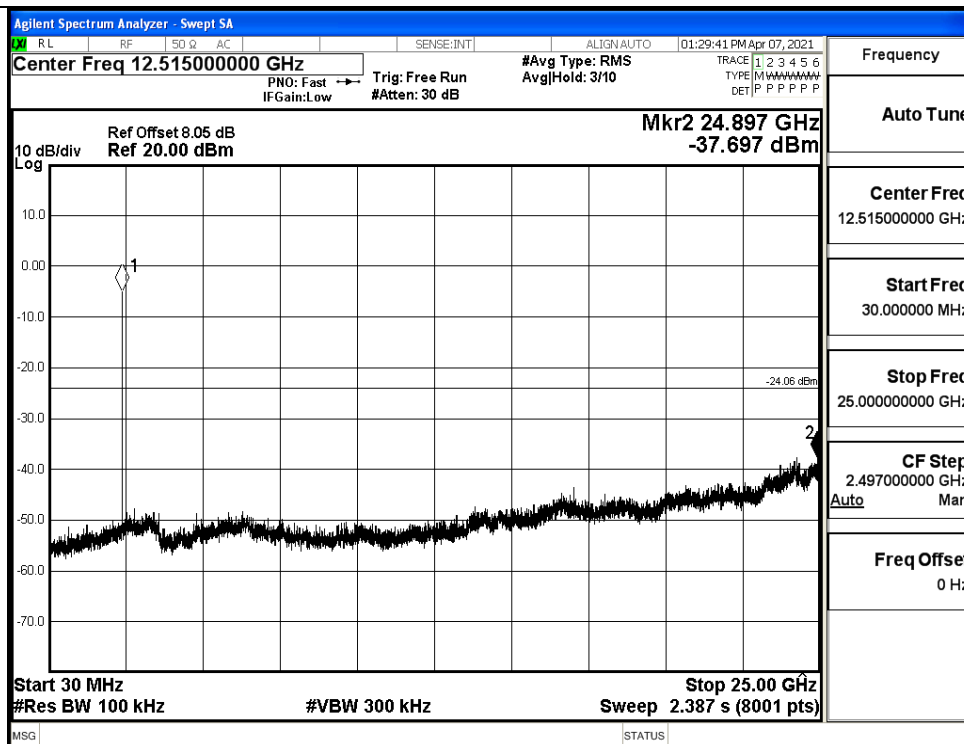


A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-4.058	-37.697	-24.058	PASS
	MCH	-3.578	-37.732	-23.578	PASS
	HCH	-3.995	-38.571	-23.995	PASS
$\pi/4$ DQPSK	LCH	-3.997	-38.138	-23.997	PASS
	MCH	-3.537	-37.679	-23.537	PASS
	HCH	-3.974	-37.811	-23.974	PASS

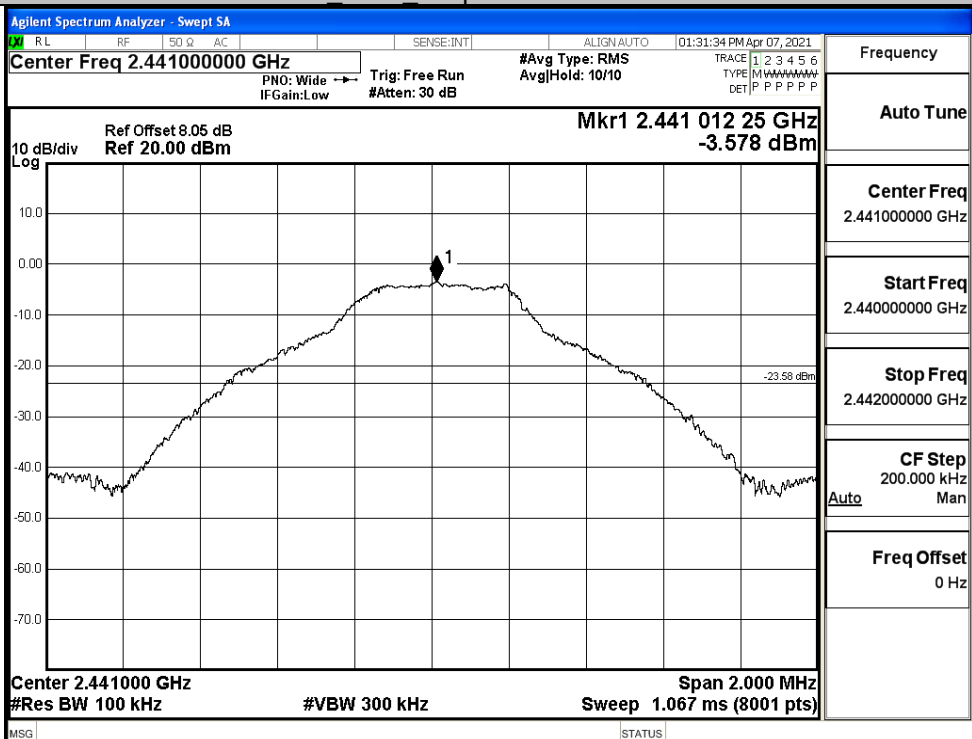


Puw

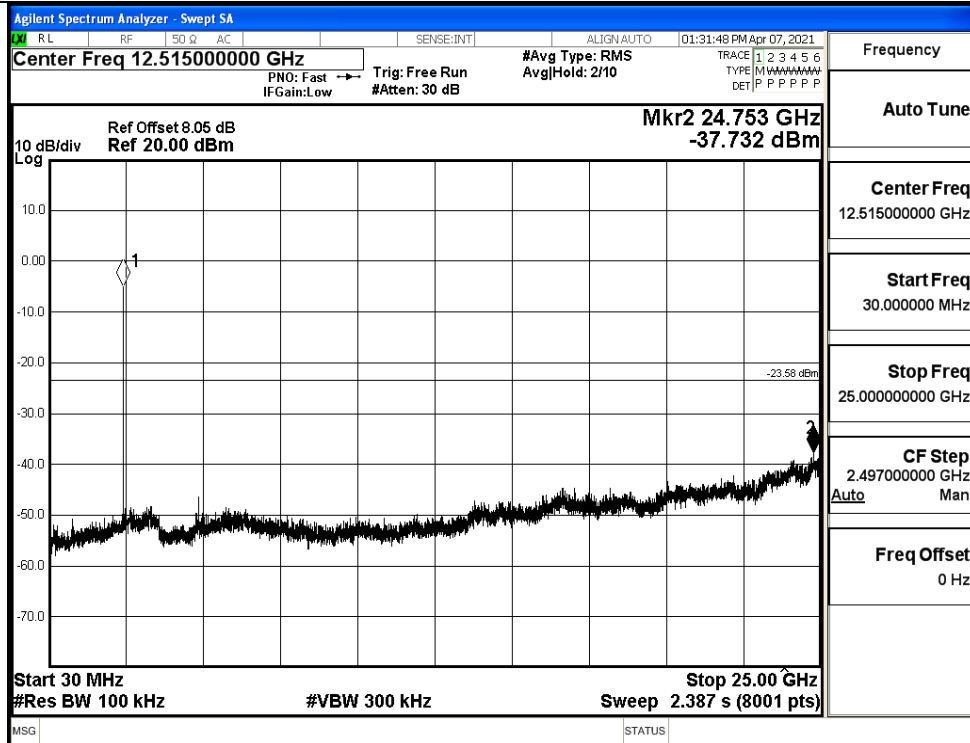


GFSK MCH Graphs

Pref

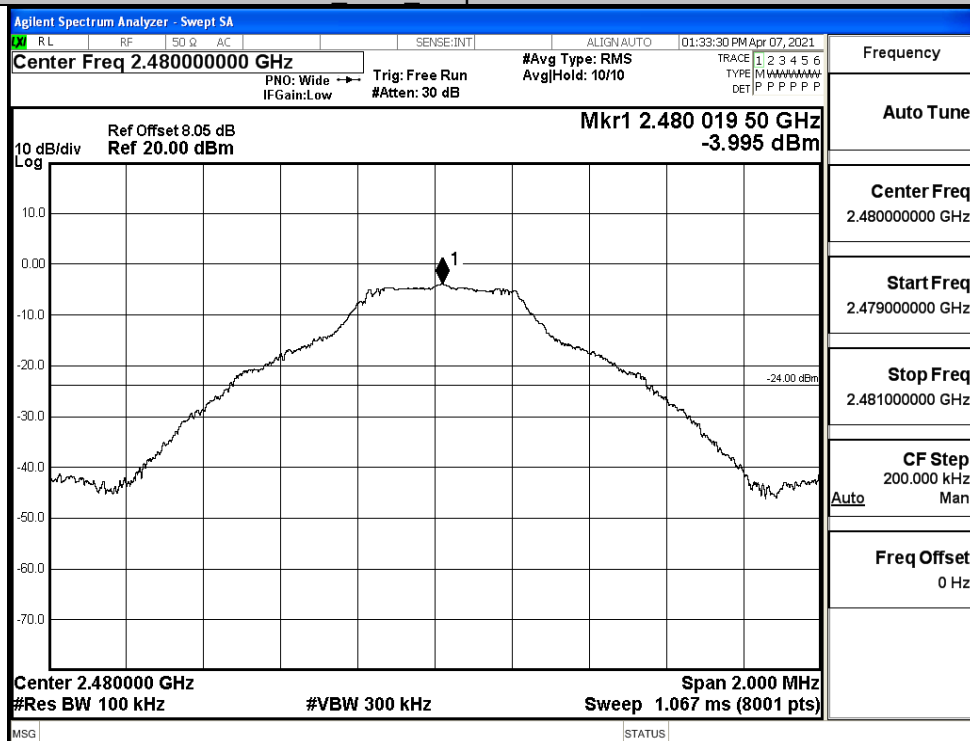


Puw

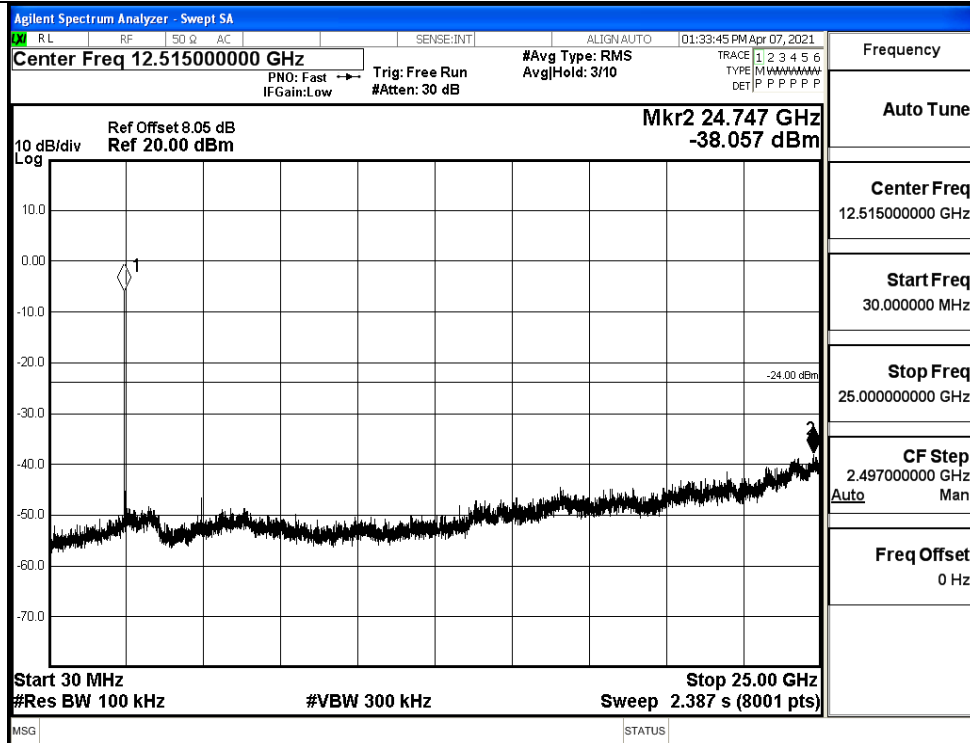


GFSK HCH Graphs

Pref

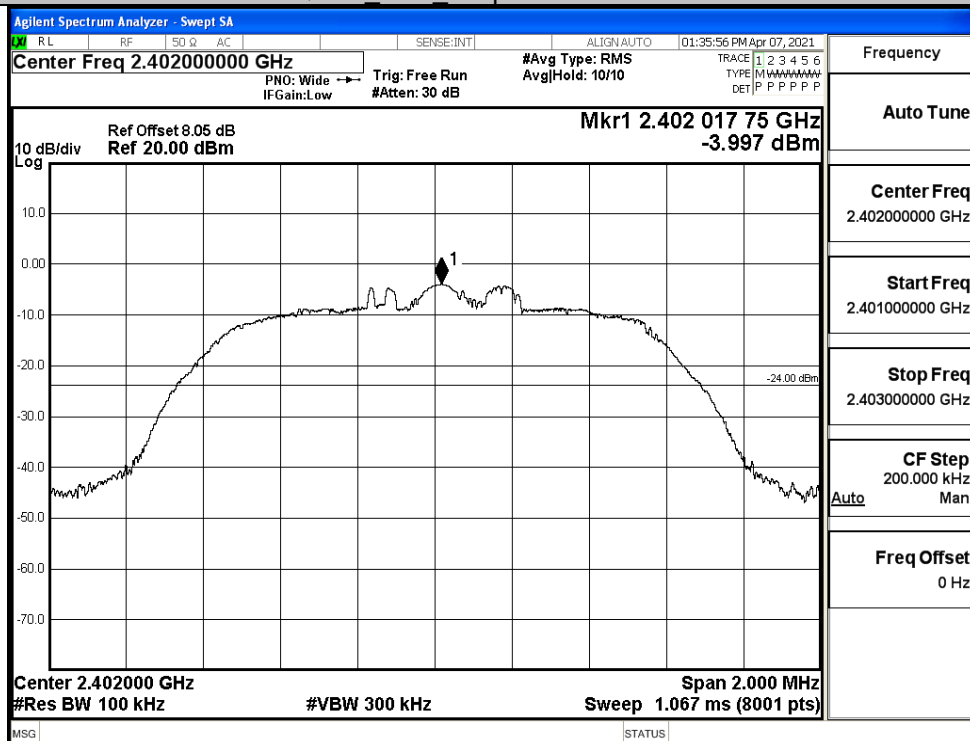


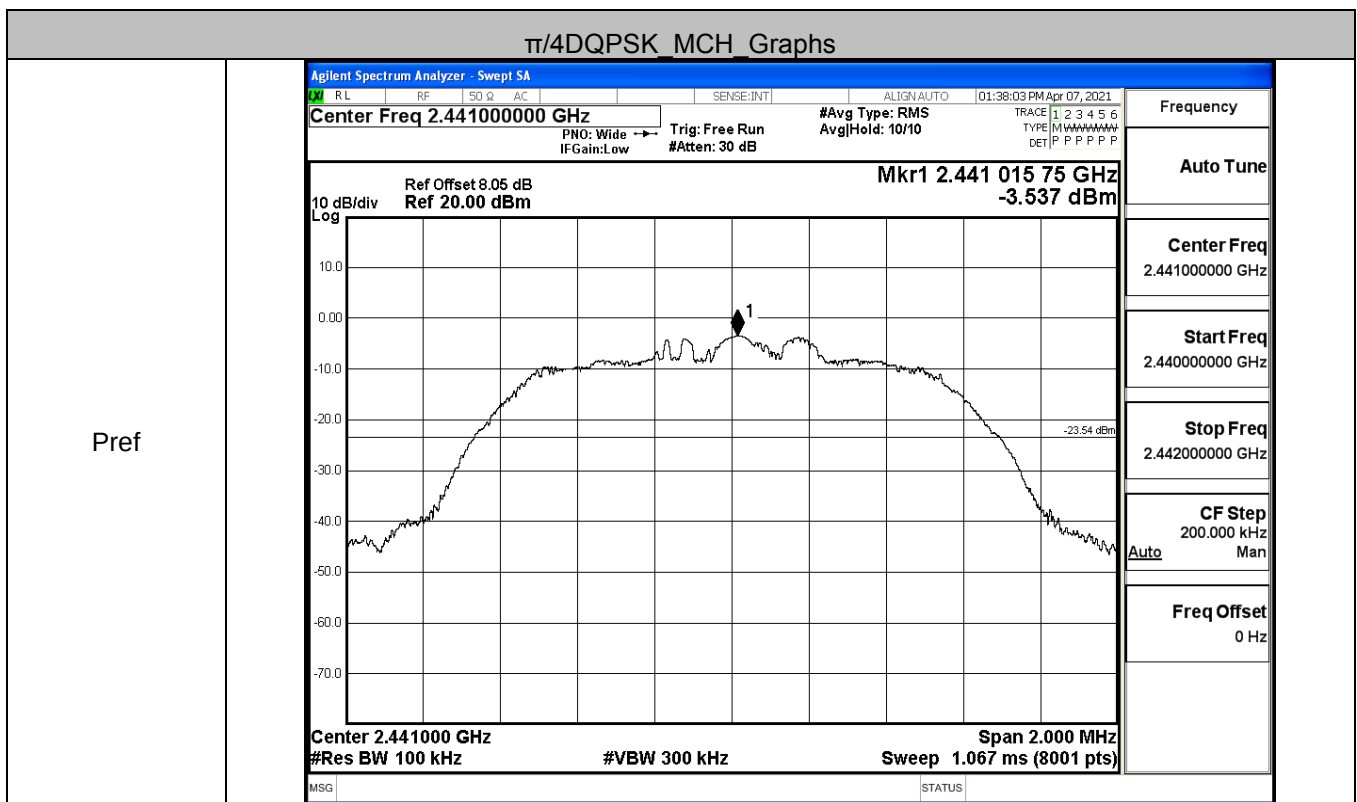
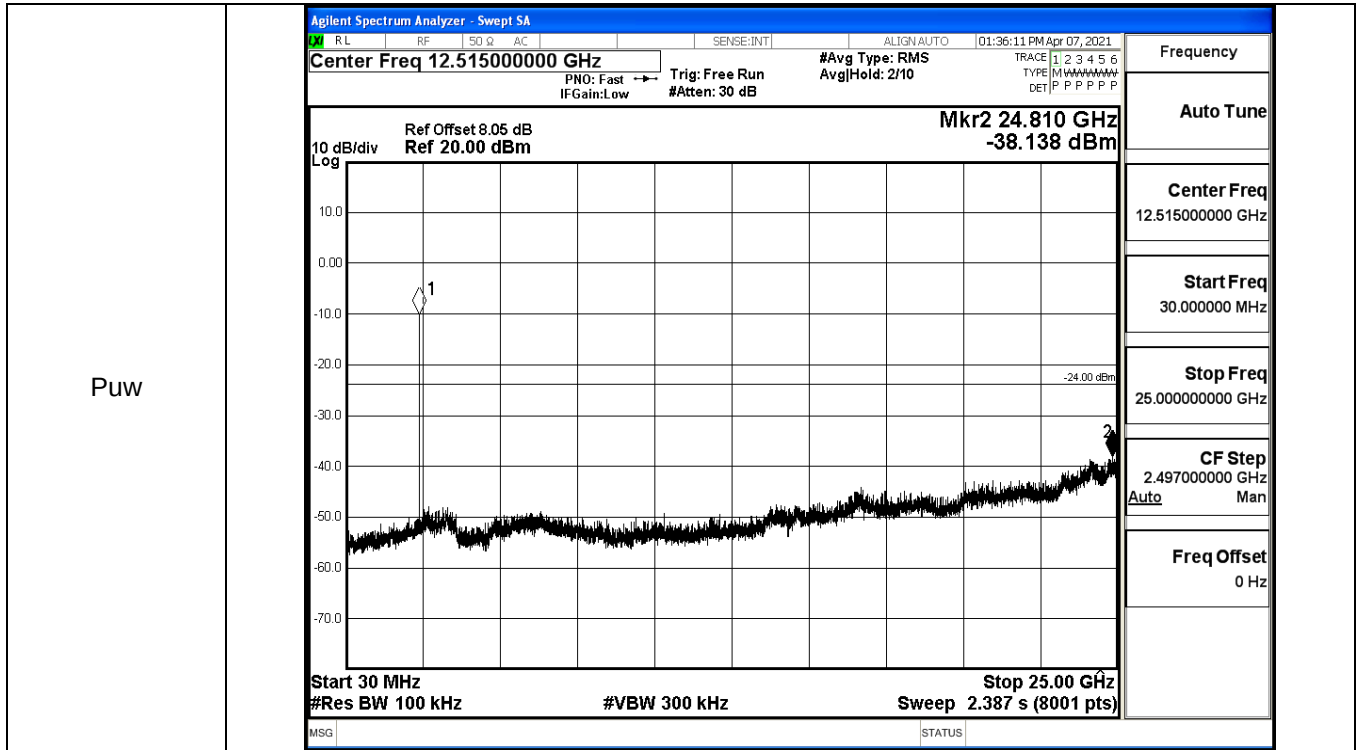
Puw



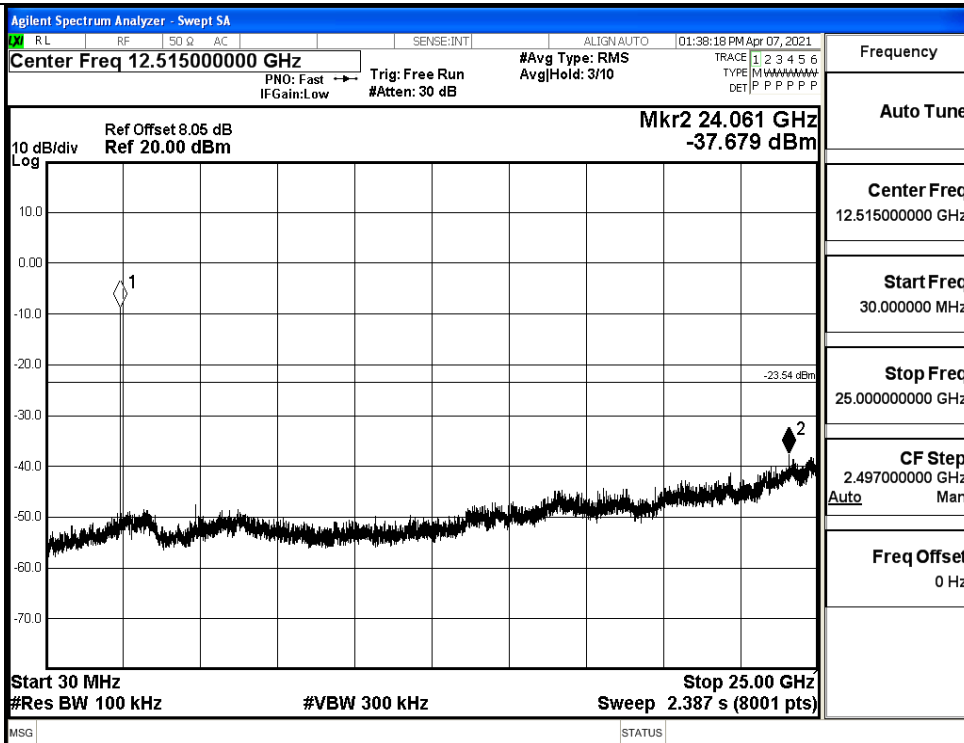
$\pi/4$ DQPSK LCH Graphs

Pref



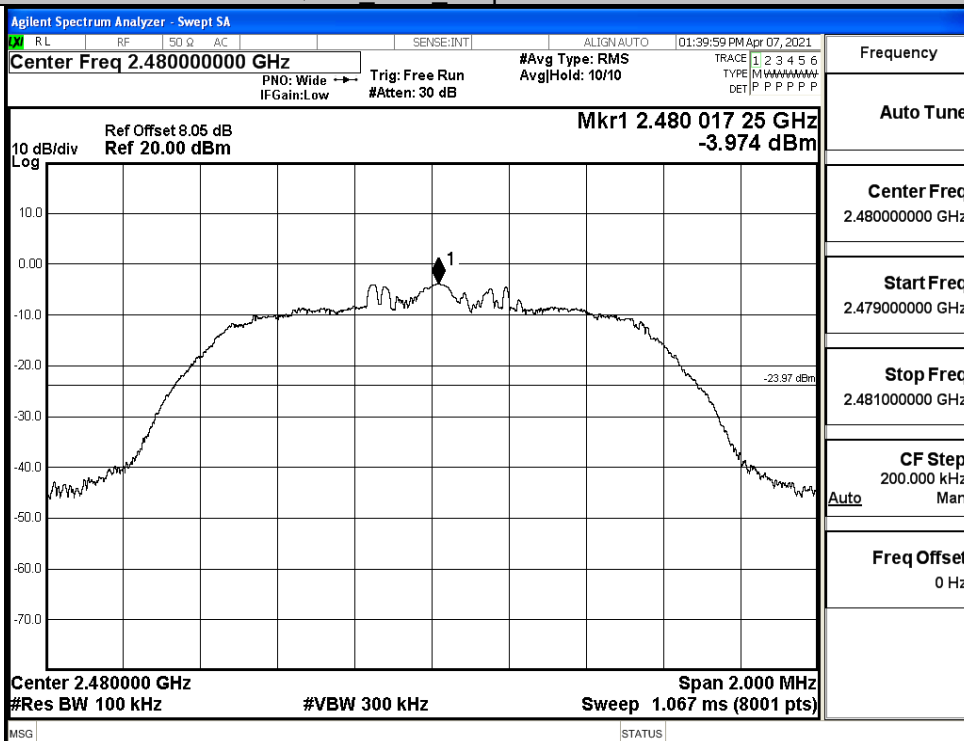


Puw

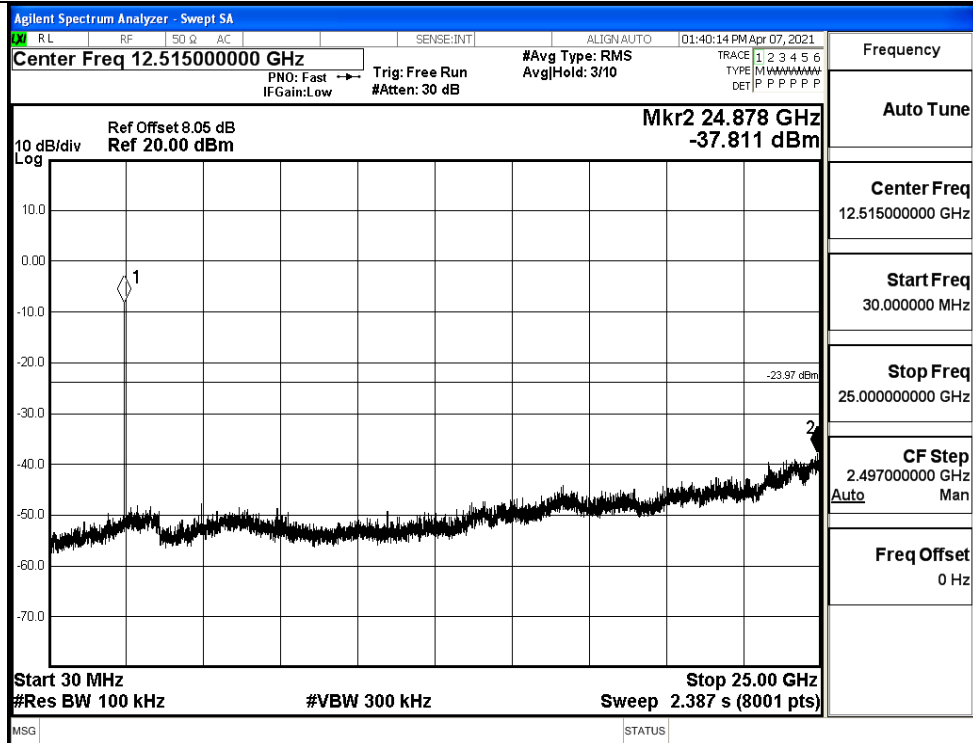


$\pi/4$ DQPSK HCH Graphs

Pref



Puw

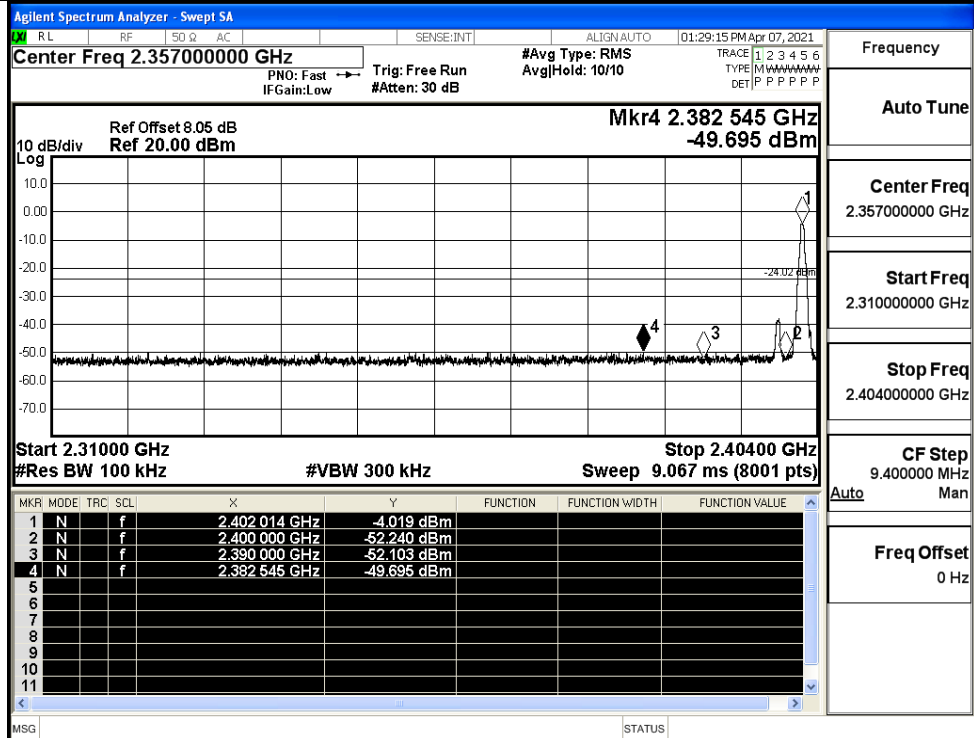


A.7 Band-edge for RF Conducted Emissions

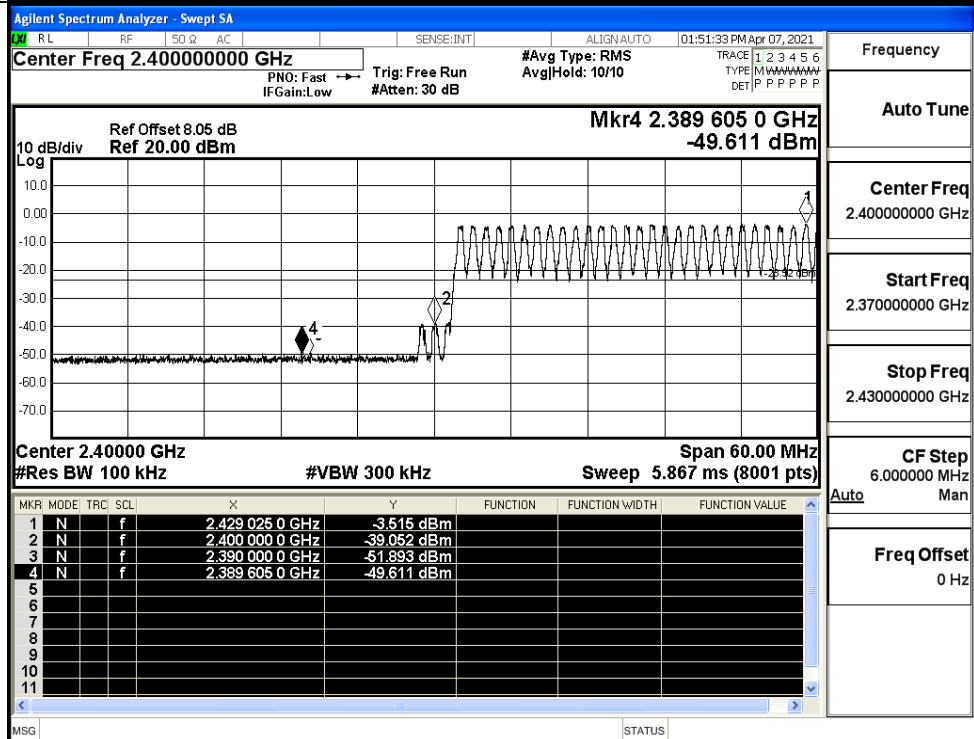
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-4.019	Off	-49.695	-24.02	PASS
			-3.515	On	-49.611	-23.52	PASS
	HCH	2480	-3.920	Off	-43.407	-23.92	PASS
			-3.831	On	-46.416	-23.83	PASS
$\pi/4$ DQPSK	LCH	2402	-3.948	Off	-48.994	-23.95	PASS
			-3.472	On	-48.838	-23.47	PASS
	HCH	2480	-3.882	Off	-45.794	-23.88	PASS
			-3.794	On	-46.653	-23.79	PASS

Test Graphs

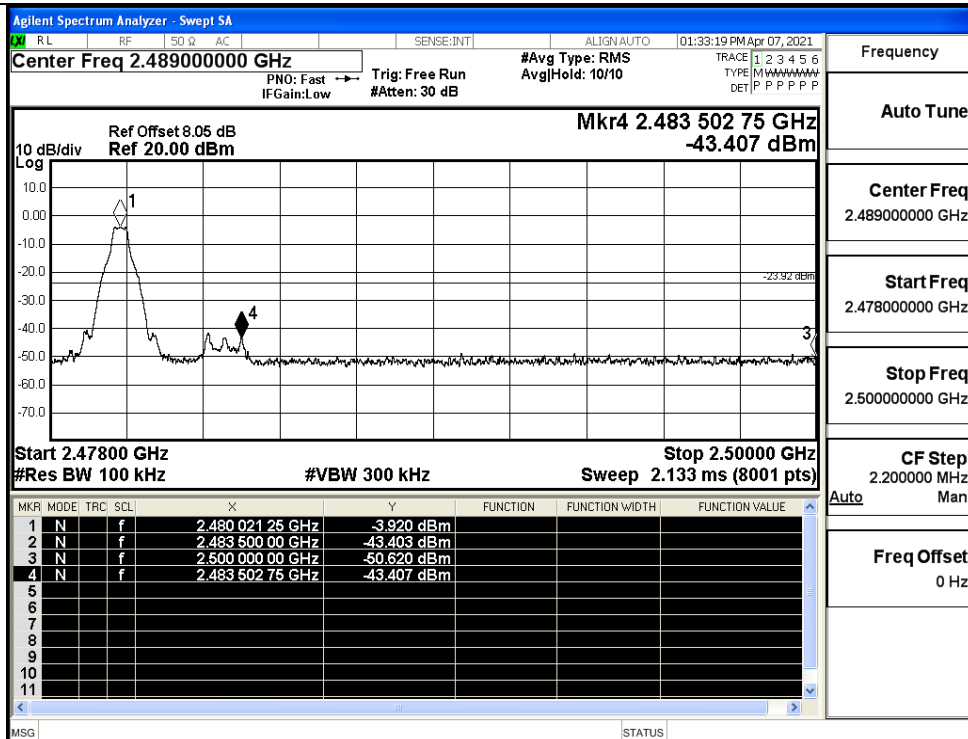
GFSK/LCH/No Hop



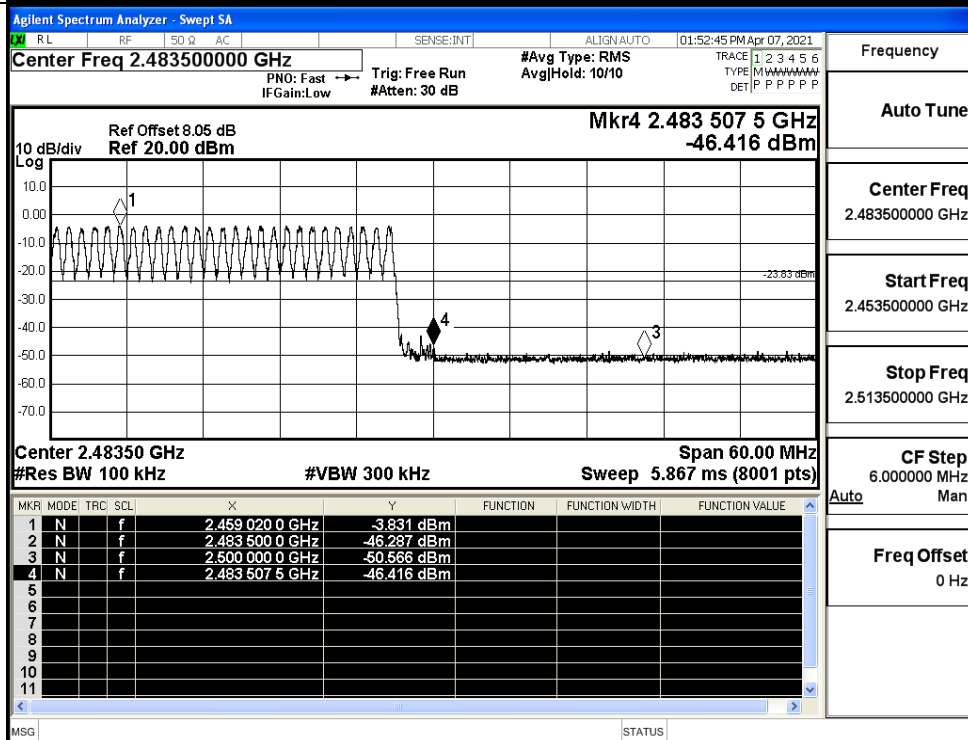
GFSK/LCH/Hop



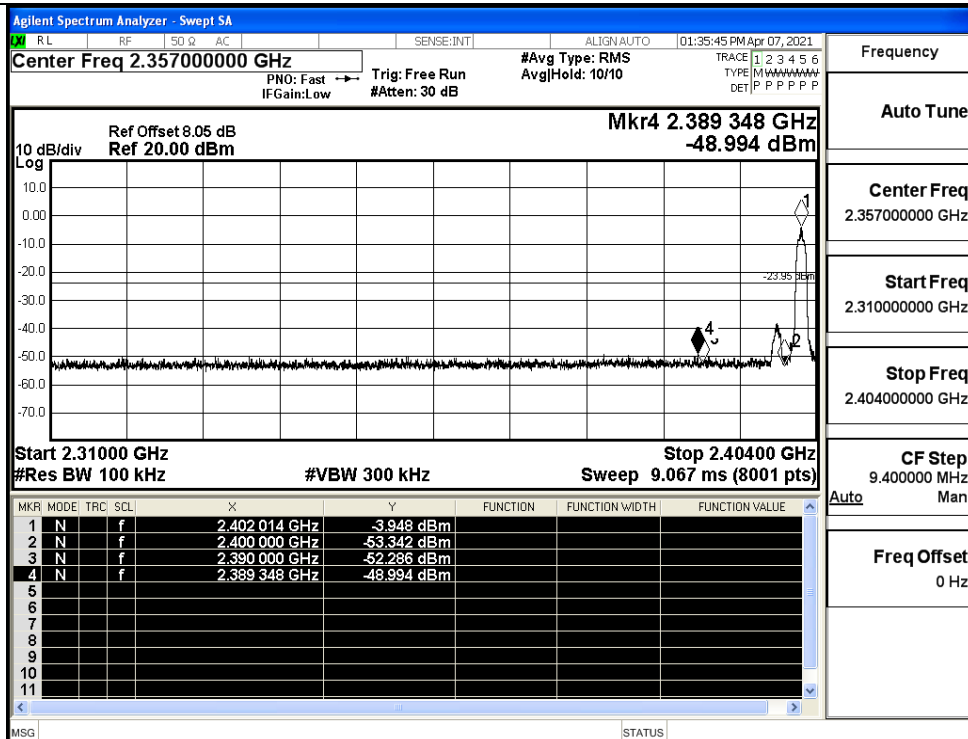
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq
2.357000000 GHz

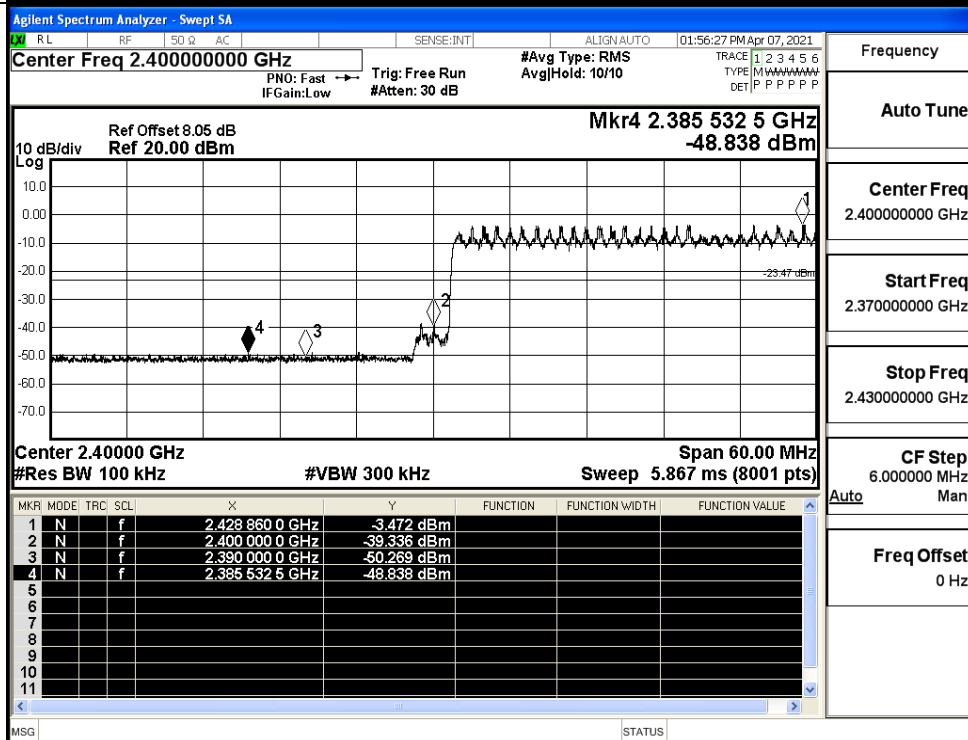
Start Freq
2.310000000 GHz

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

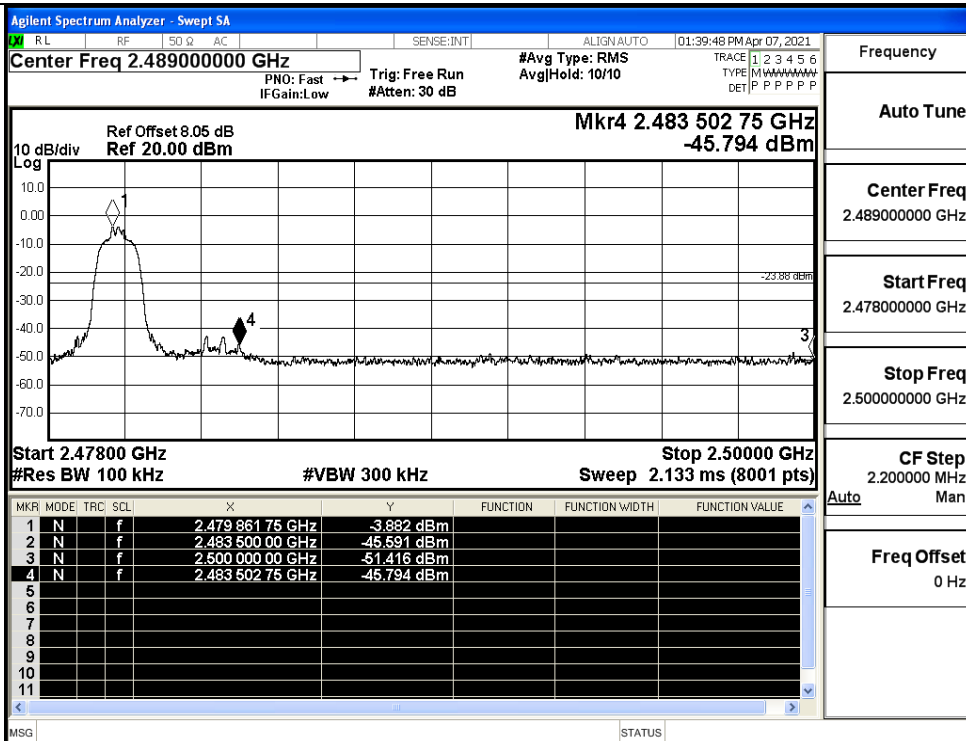
Start Freq
2.370000000 GHz

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

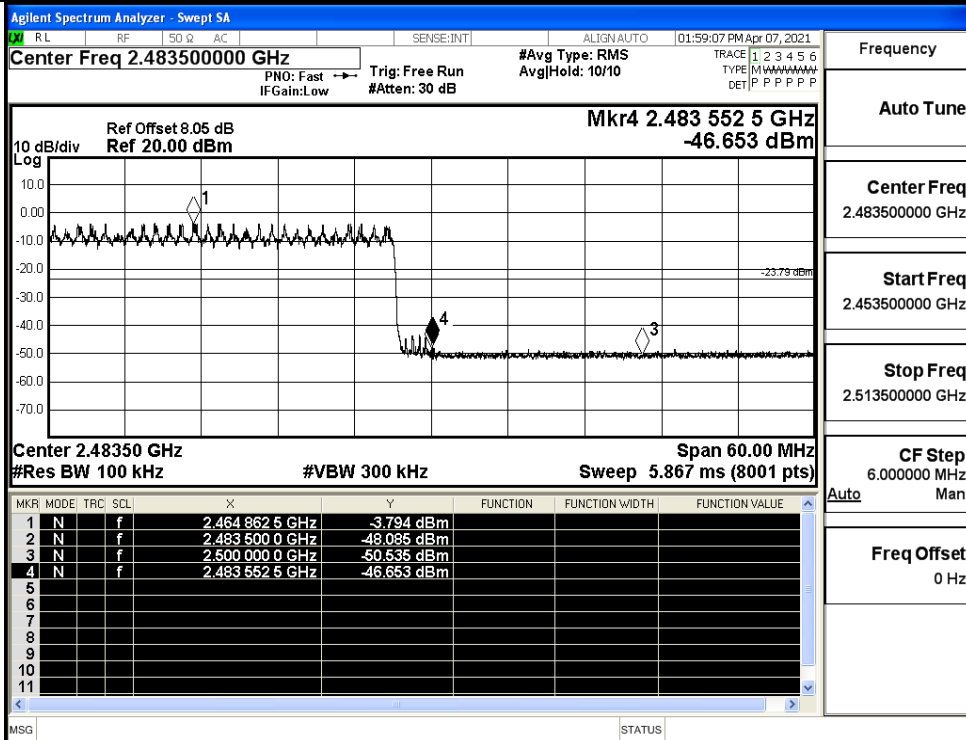
Start Freq
2.478000000 GHz

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

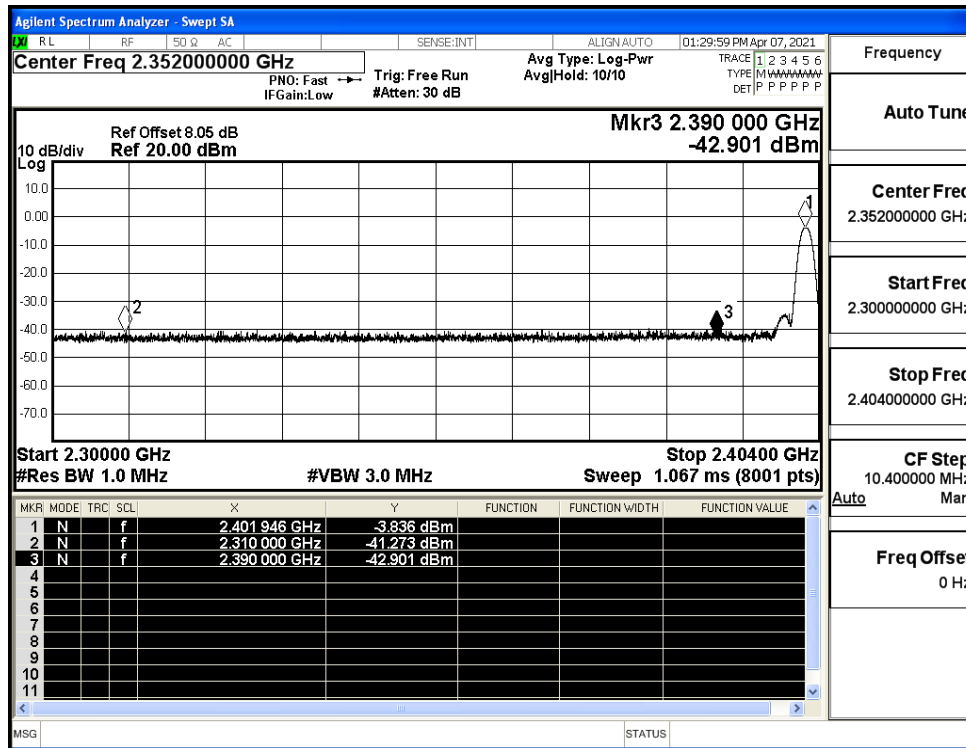
CF Step
6.000000 MHz

Freq Offset
0 Hz

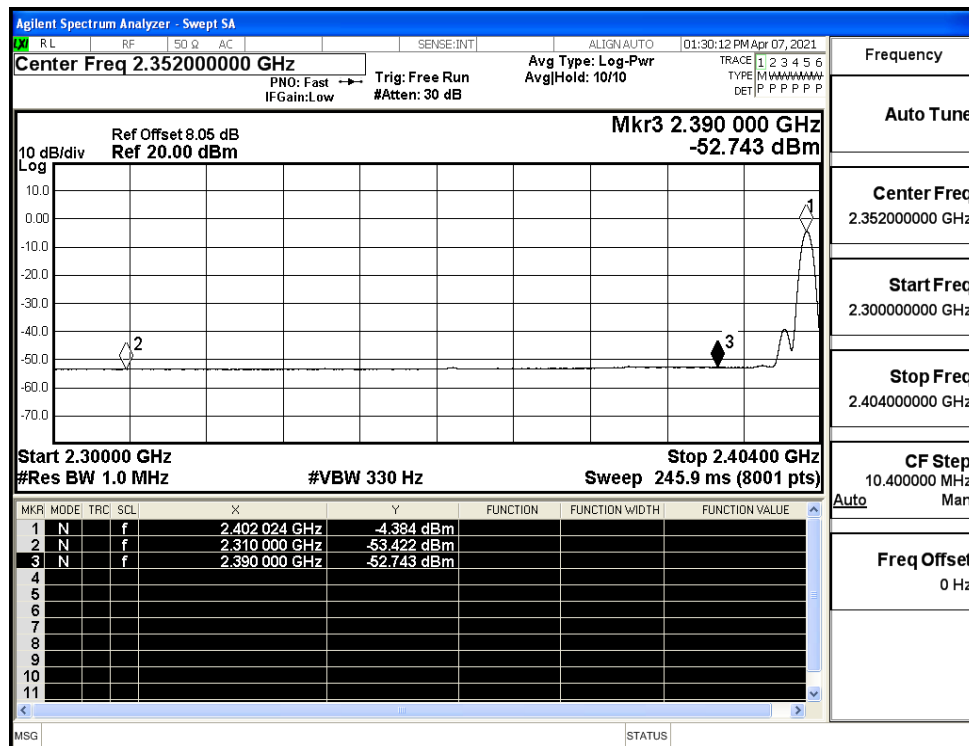
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-41.27	2.0	0	55.98	PEAK	74	PASS
	Off	2310.0	-53.42	2.0	0	43.84	AV	54	PASS
	Off	2390.0	-42.90	2.0	0	54.36	PEAK	74	PASS
	Off	2390.0	-52.74	2.0	0	44.51	AV	54	PASS
	Off	2483.5	-38.61	2.0	0	58.65	PEAK	74	PASS
	Off	2483.5	-47.23	2.0	0	50.03	AV	54	PASS
	Off	2500.0	-42.81	2.0	0	54.45	PEAK	74	PASS
	Off	2500.0	-51.95	2.0	0	45.31	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.76	2.0	0	53.5	PEAK	74	PASS
	Off	2310.0	-53.37	2.0	0	43.89	AV	54	PASS
	Off	2390.0	-41.69	2.0	0	55.57	PEAK	74	PASS
	Off	2390.0	-52.80	2.0	0	44.46	AV	54	PASS
	Off	2483.5	-39.97	2.0	0	57.29	PEAK	74	PASS
	Off	2483.5	-49.40	2.0	0	47.86	AV	54	PASS
	Off	2500.0	-40.50	2.0	0	56.76	PEAK	74	PASS
	Off	2500.0	-51.97	2.0	0	45.29	AV	54	PASS

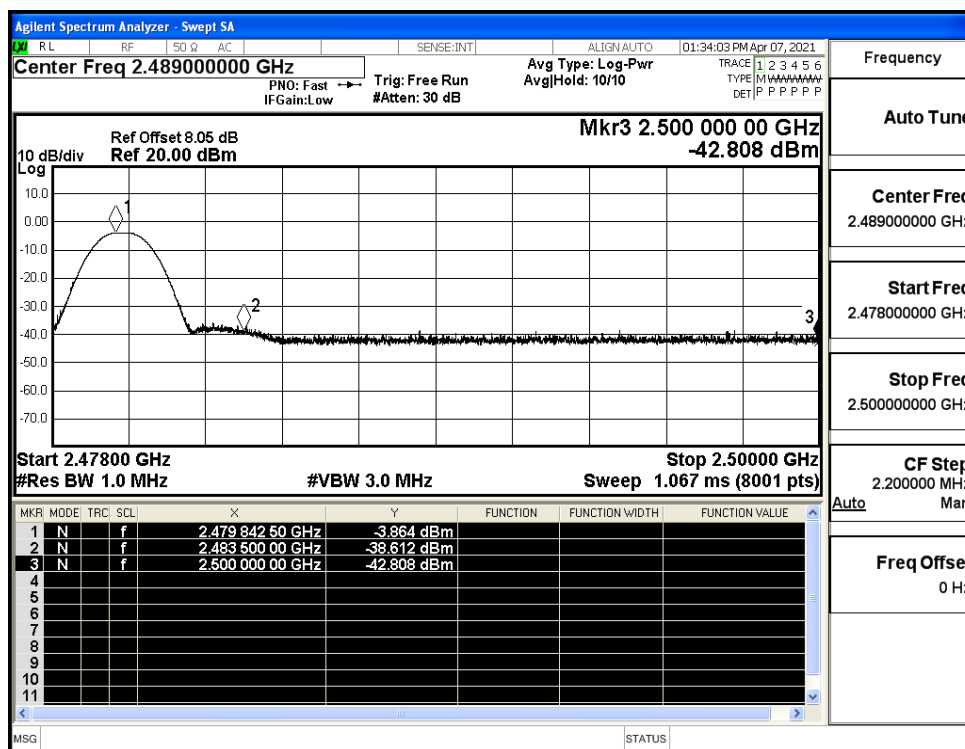
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



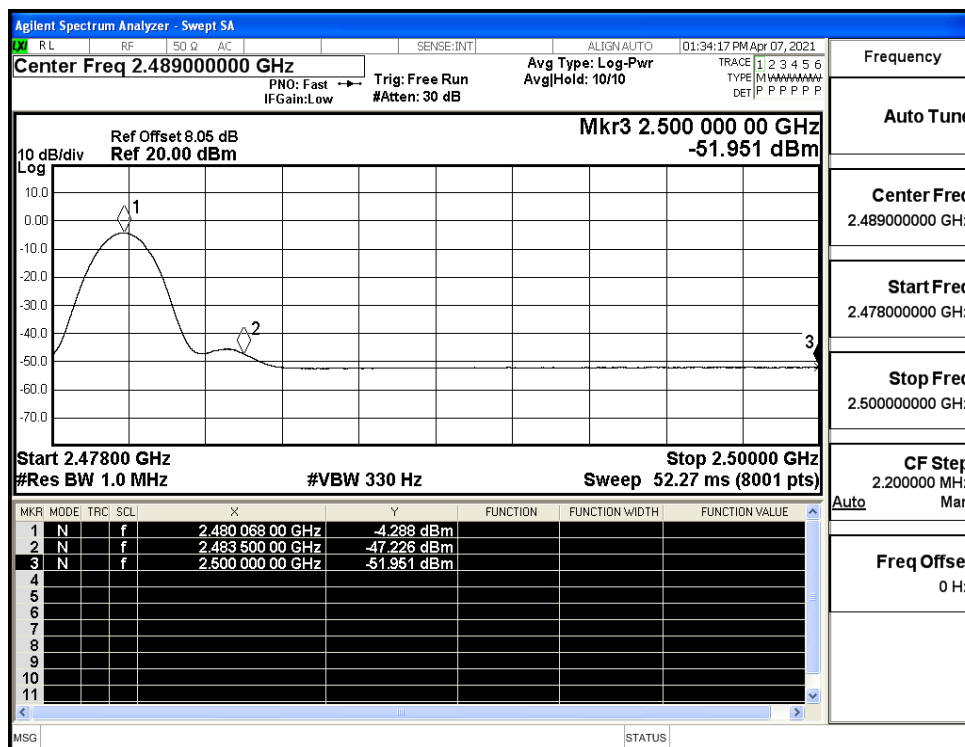
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



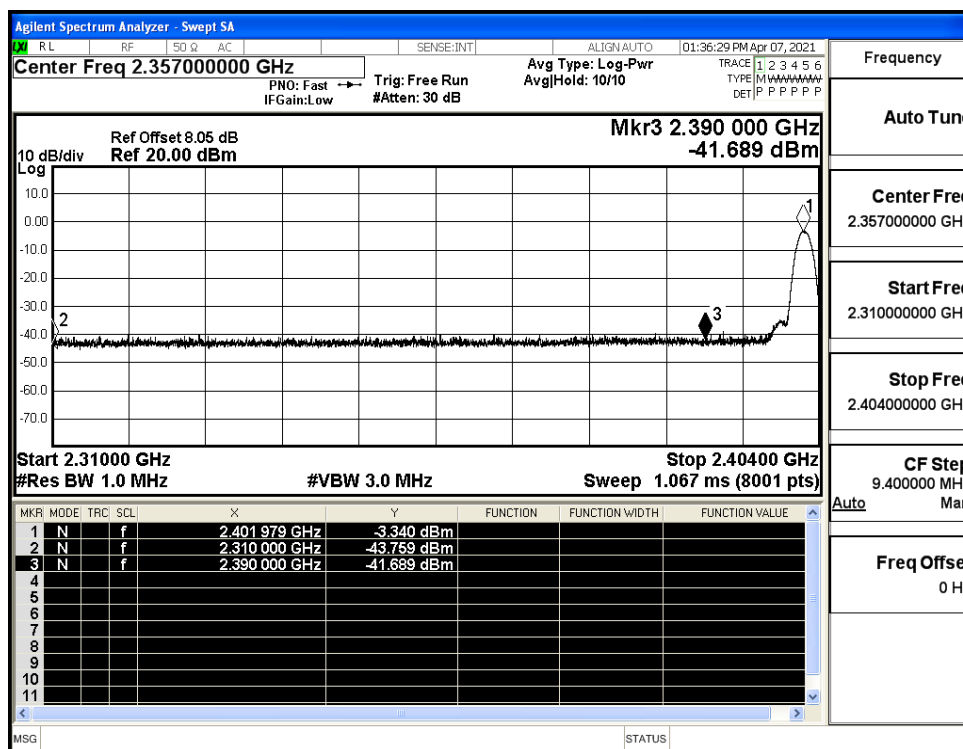
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



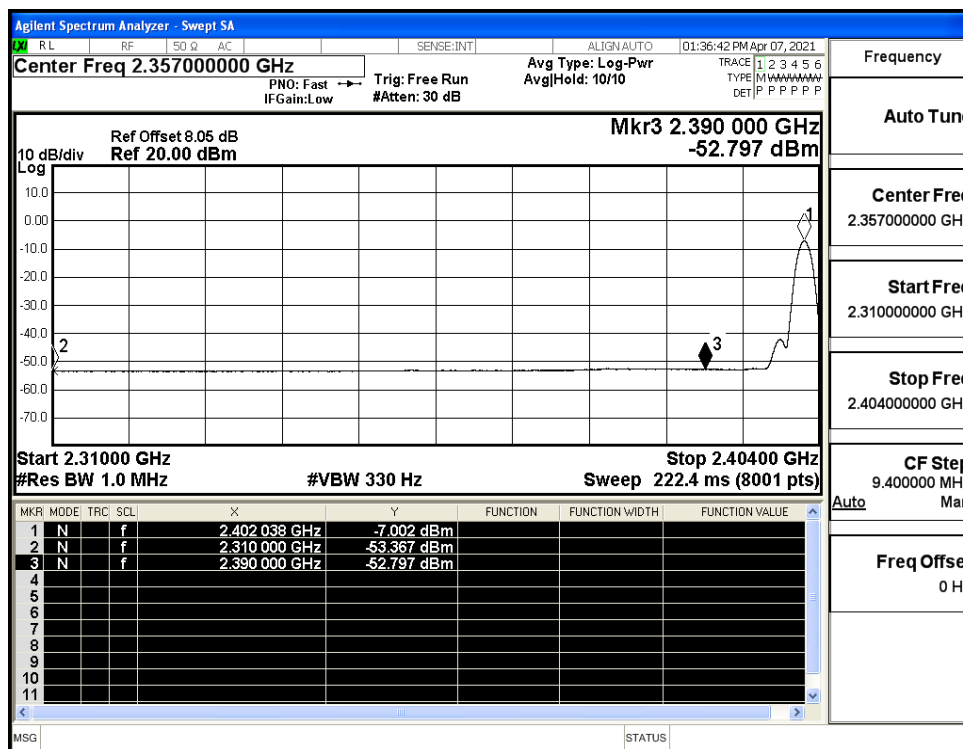
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



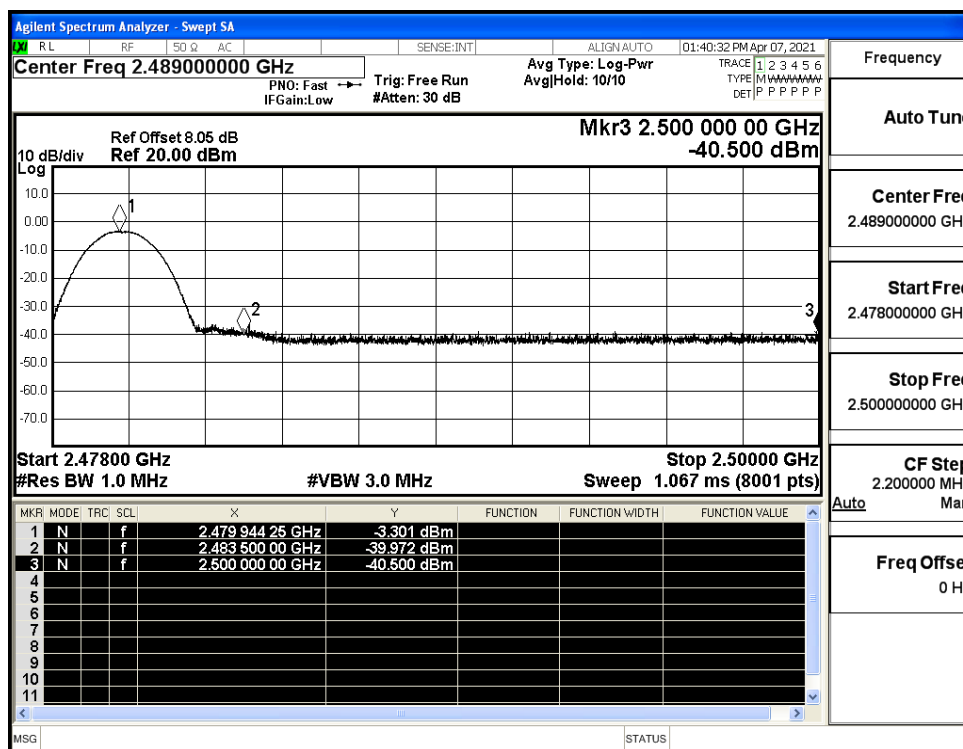
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



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)

