

Appendix A

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

Product Name: PORTABLE KARAOKE PLAYER WITH BLUETOOTH

Trade Mark: singing machine

Test Model: SML640

Environmental Conditions

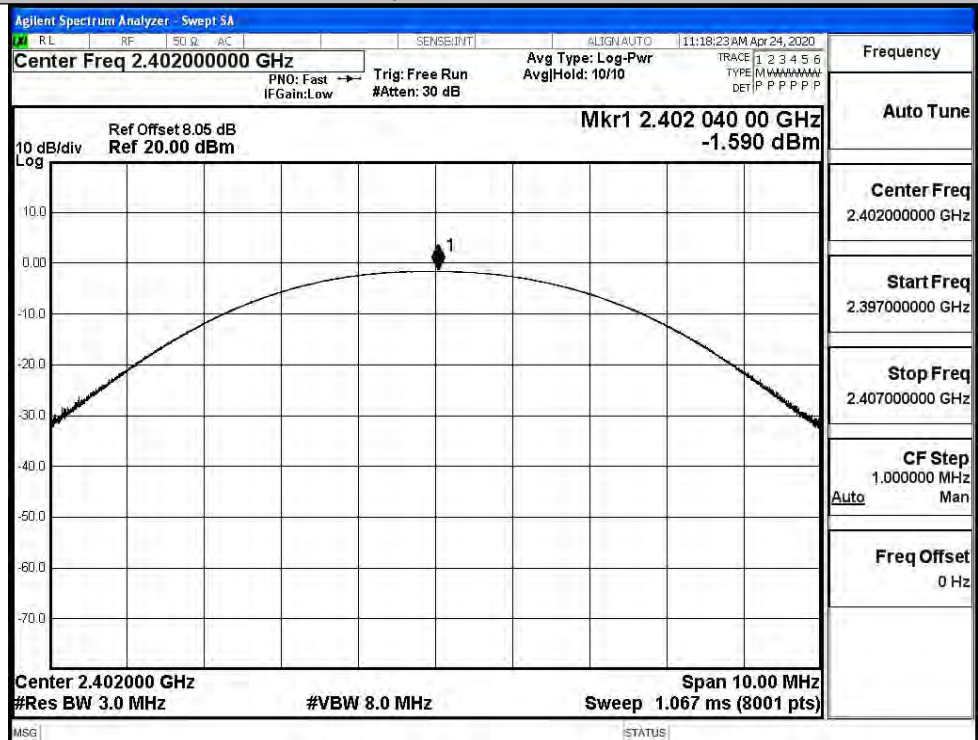
Temperature:	24.3 ° C
Relative Humidity:	52.6%
ATM Pressure:	100.0 kPa
Test Engineer:	Qu Xin
Supervised by:	Li Huan

A.1 Maximum Conducted Peak Output Power

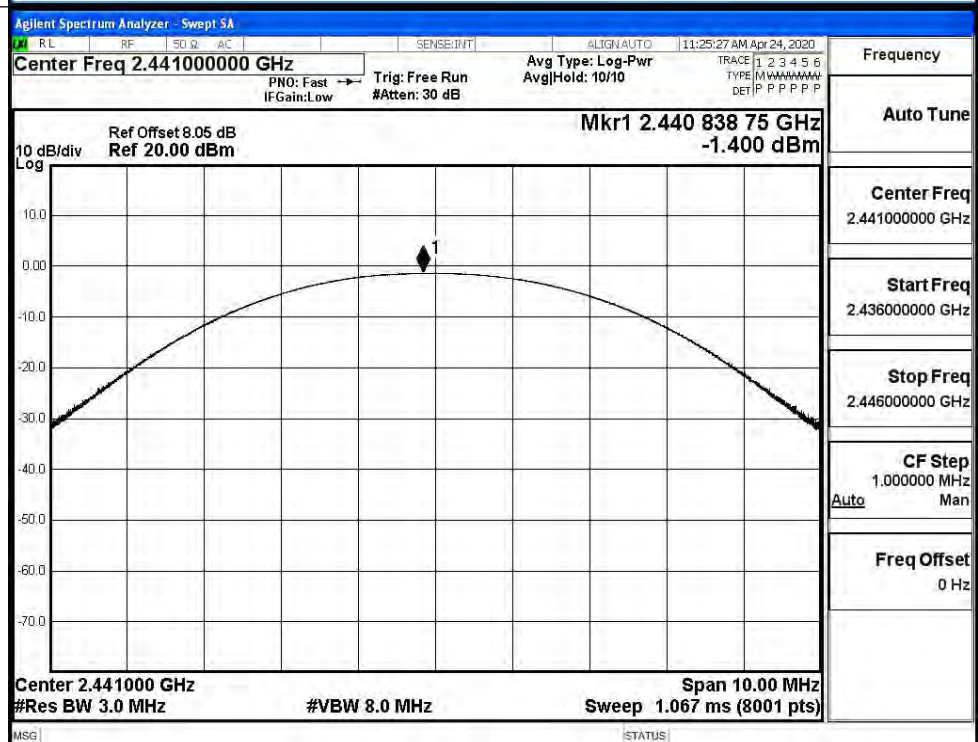
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.590	21	PASS
	MCH	-1.400	21	PASS
	HCH	-1.997	21	PASS
$\pi/4$ DQPSK	LCH	-0.054	21	PASS
	MCH	0.116	21	PASS
	HCH	-0.561	21	PASS

Test Graphs

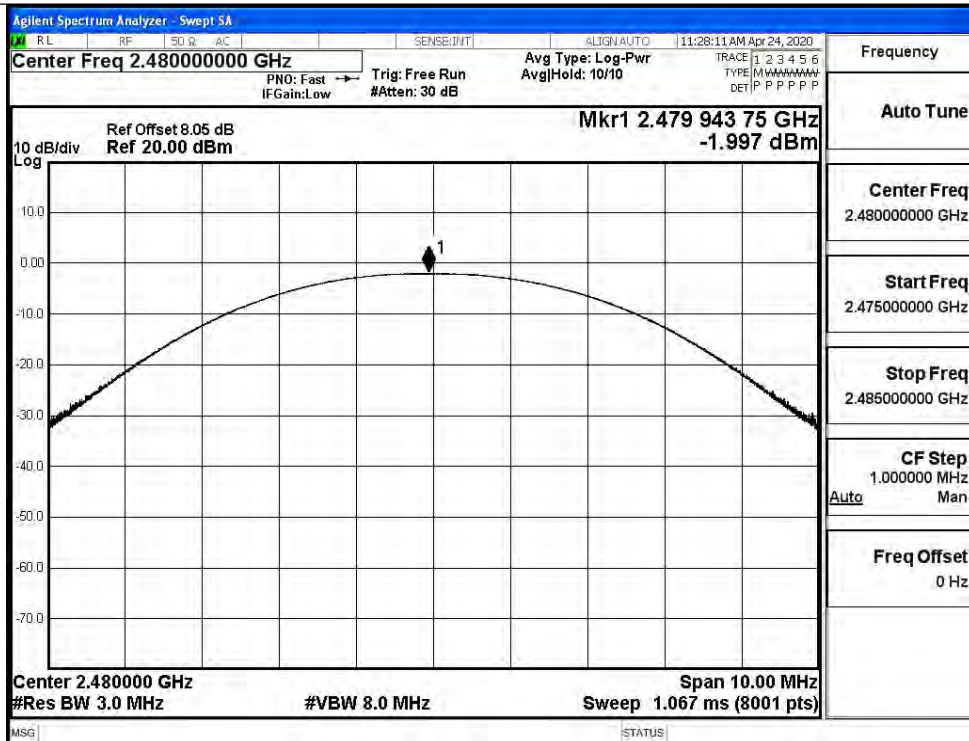
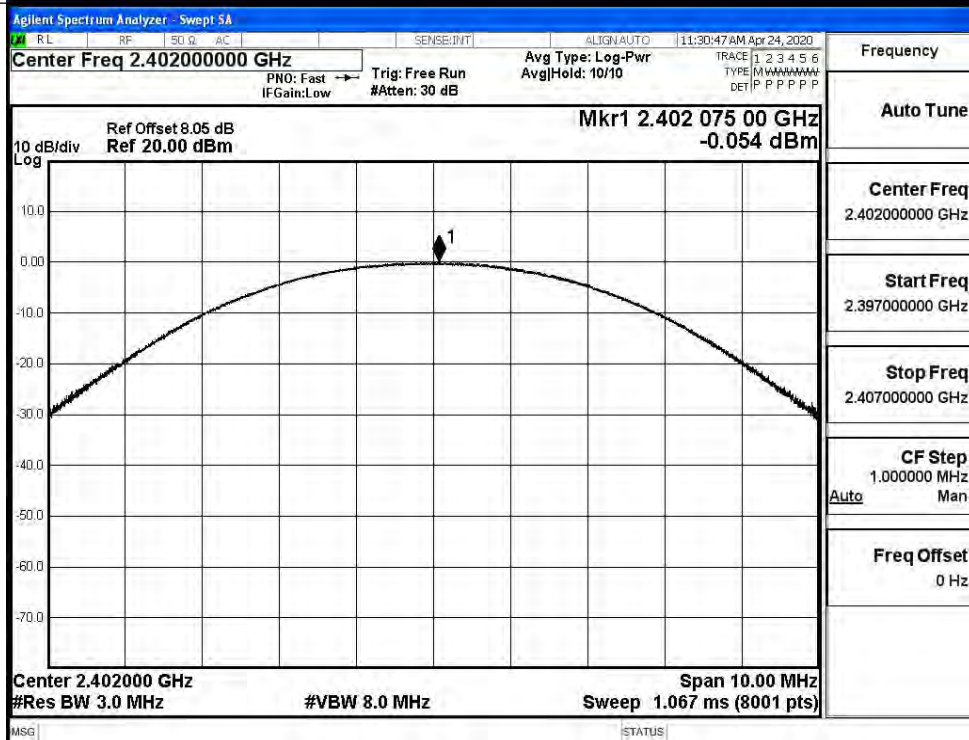
GFSK/LCH

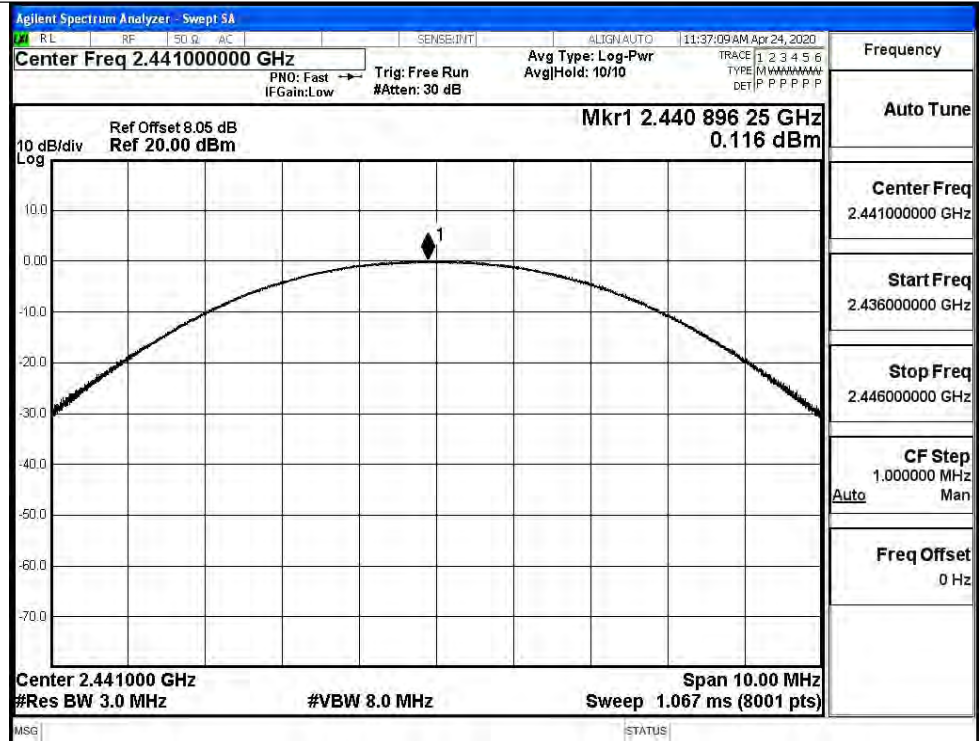
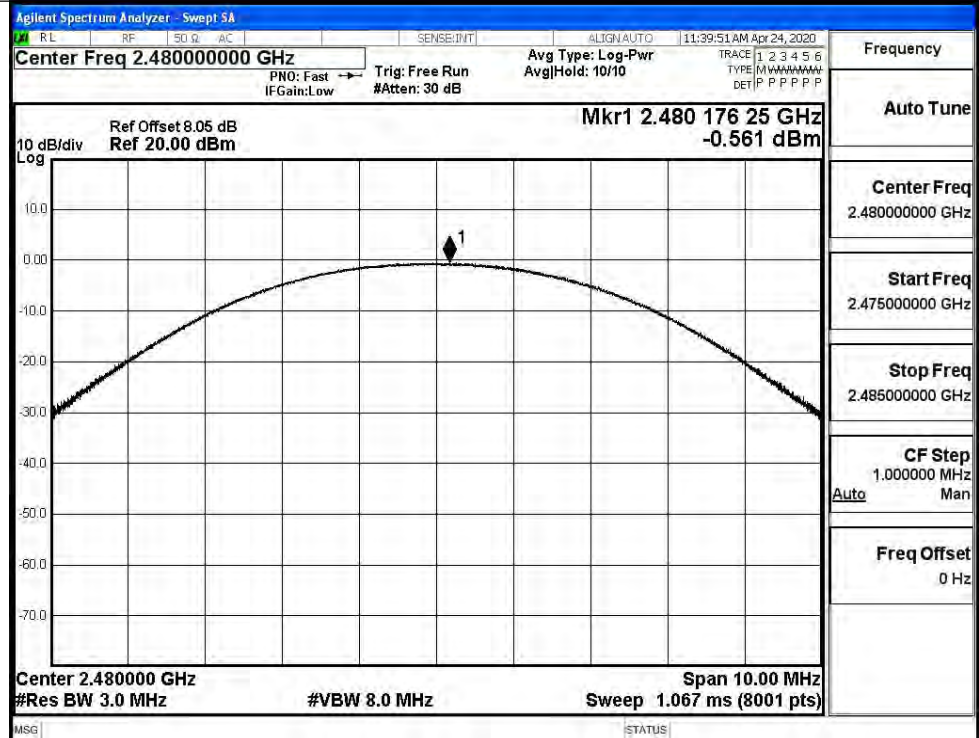


GFSK/MCH



GFSK/HCH

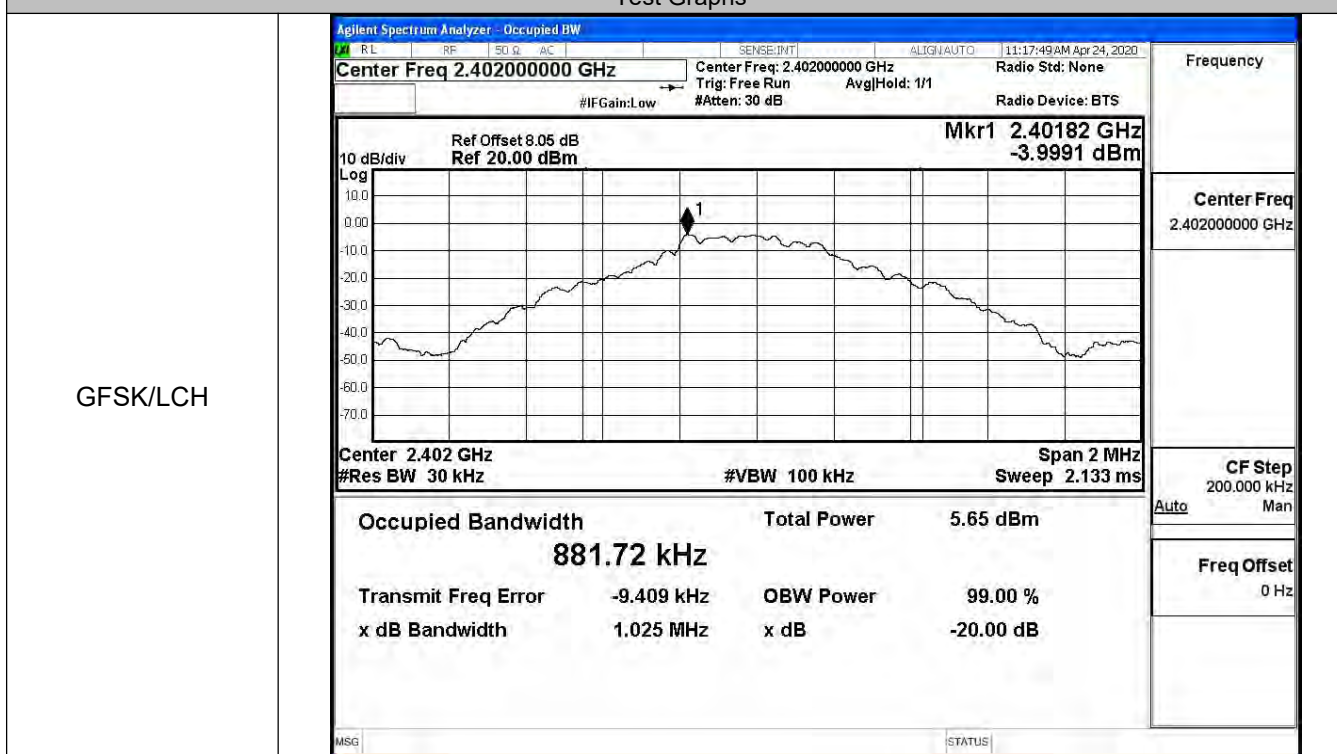
 $\pi/4$ DQPSK/LCH

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

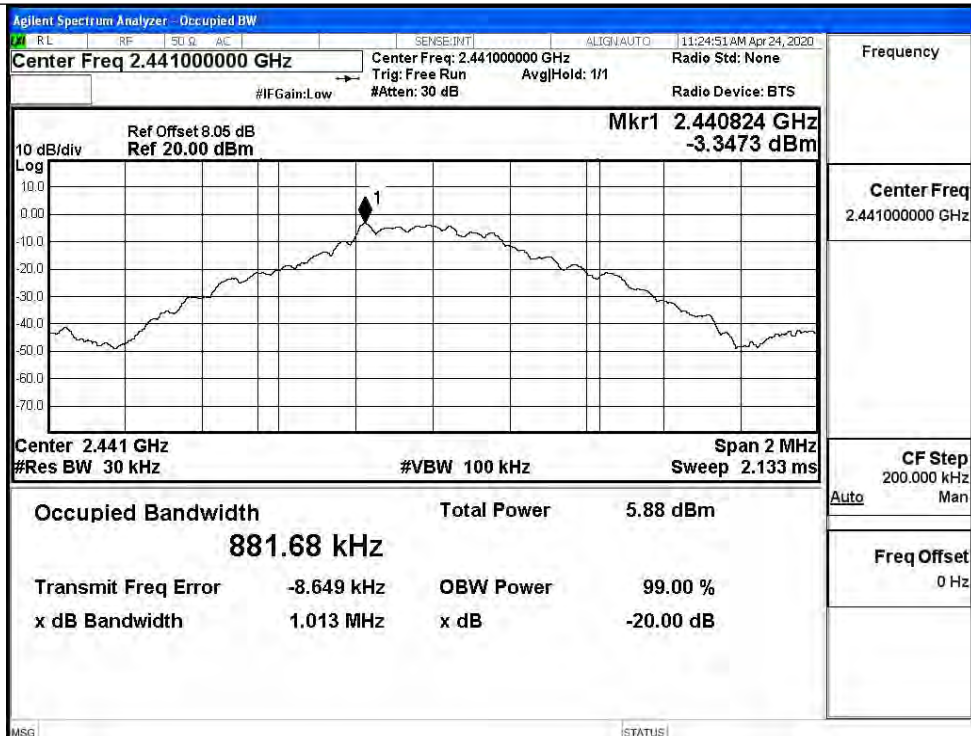
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.025	Not Specified	PASS
	MCH	1.013	Not Specified	PASS
	HCH	1.021	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.316	Not Specified	PASS
	MCH	1.320	Not Specified	PASS
	HCH	1.319	Not Specified	PASS

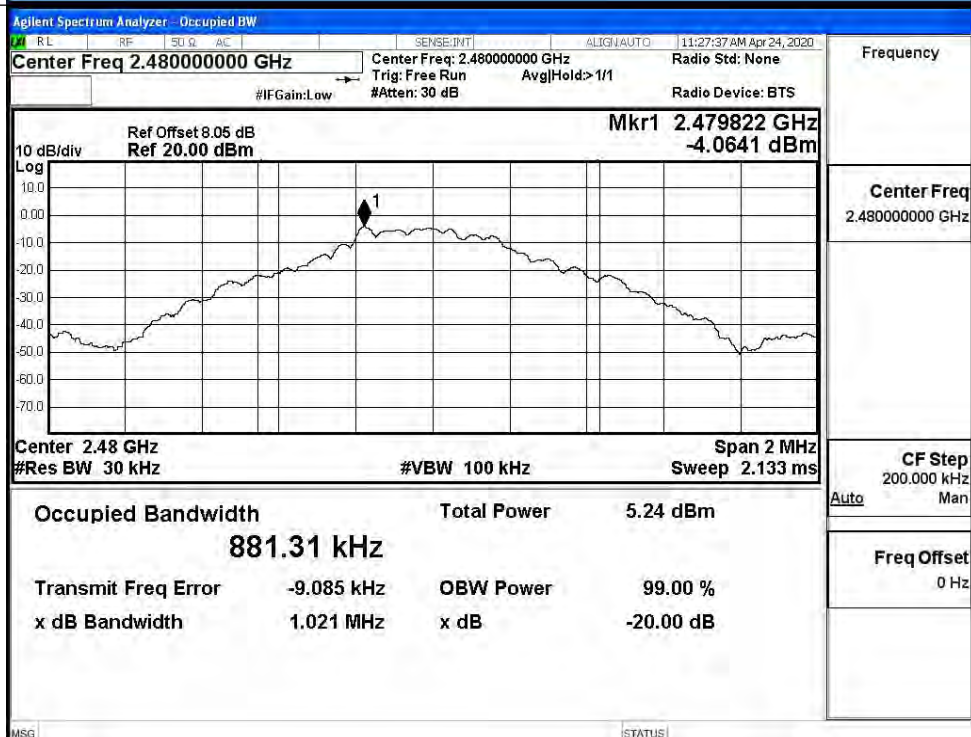
Test Graphs

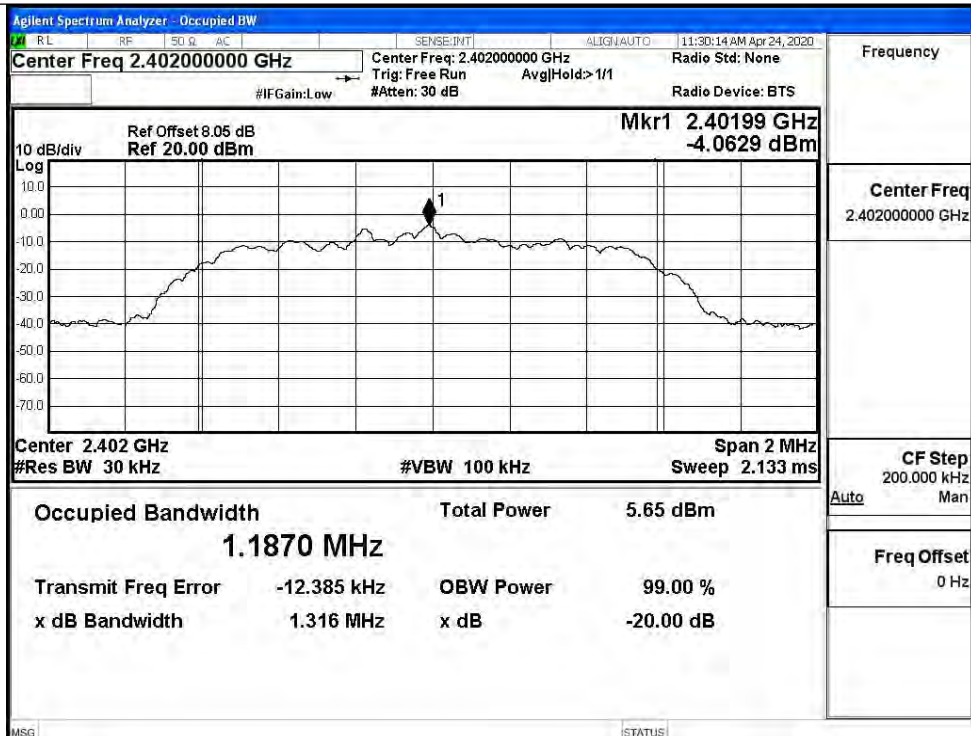
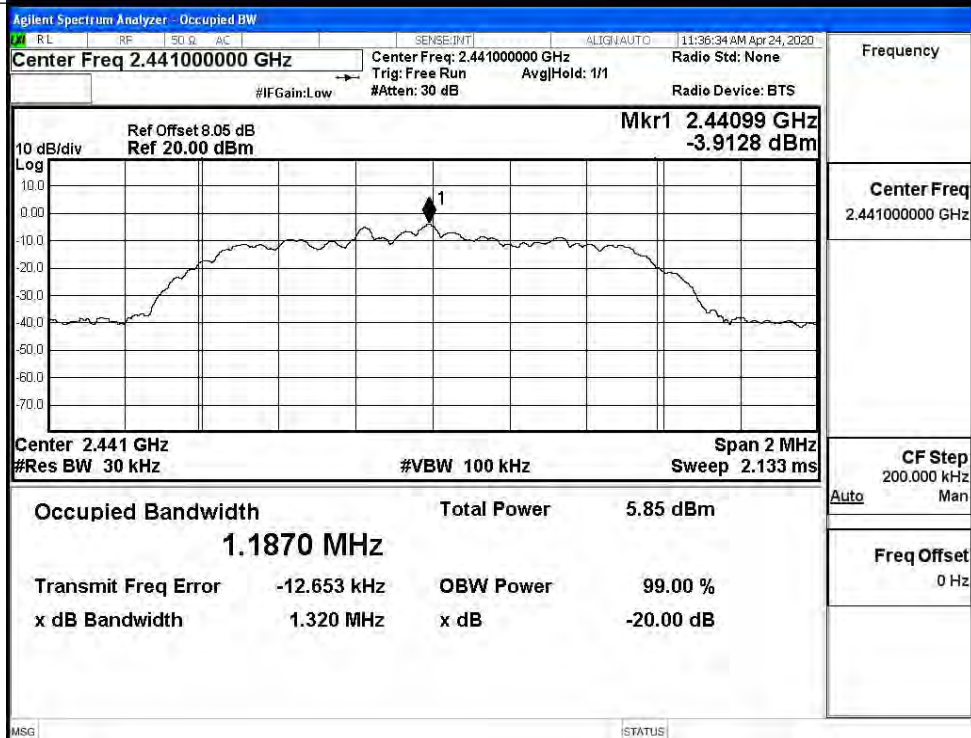


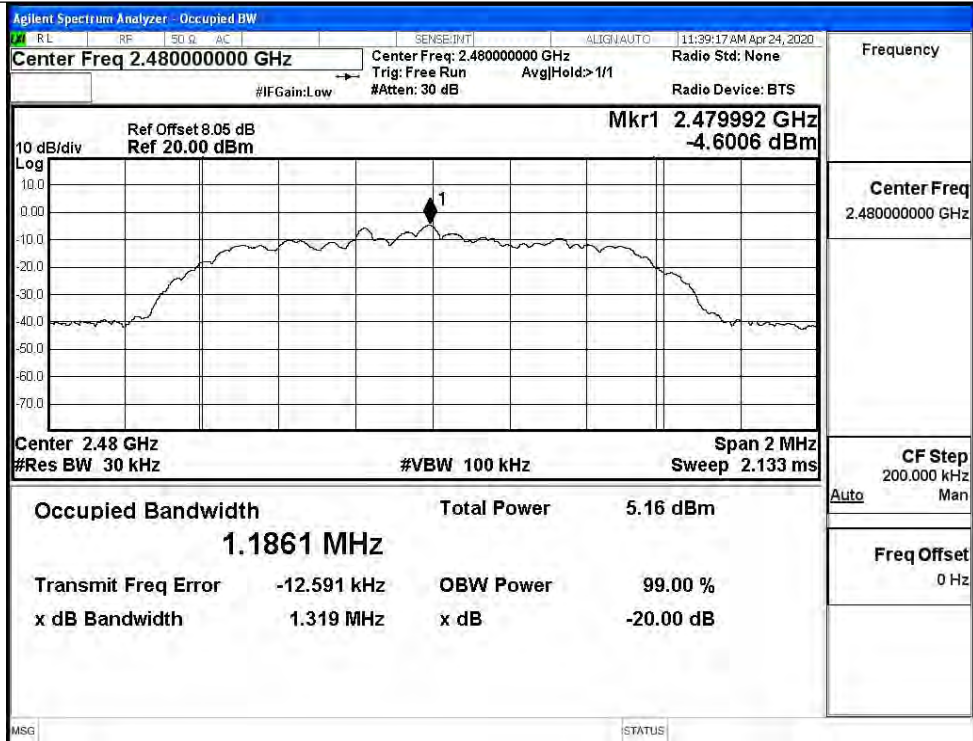
GFSK/MCH



GFSK/HCH



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

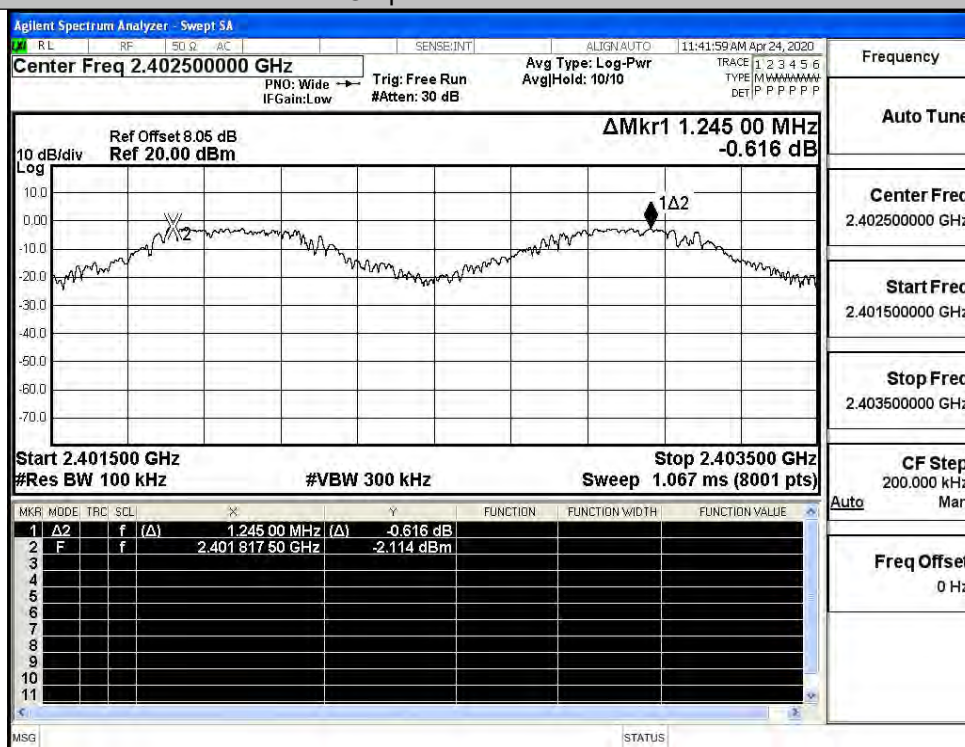
$\pi/4$ DQPSK/HCH

A.3 Carrier Frequency Separation

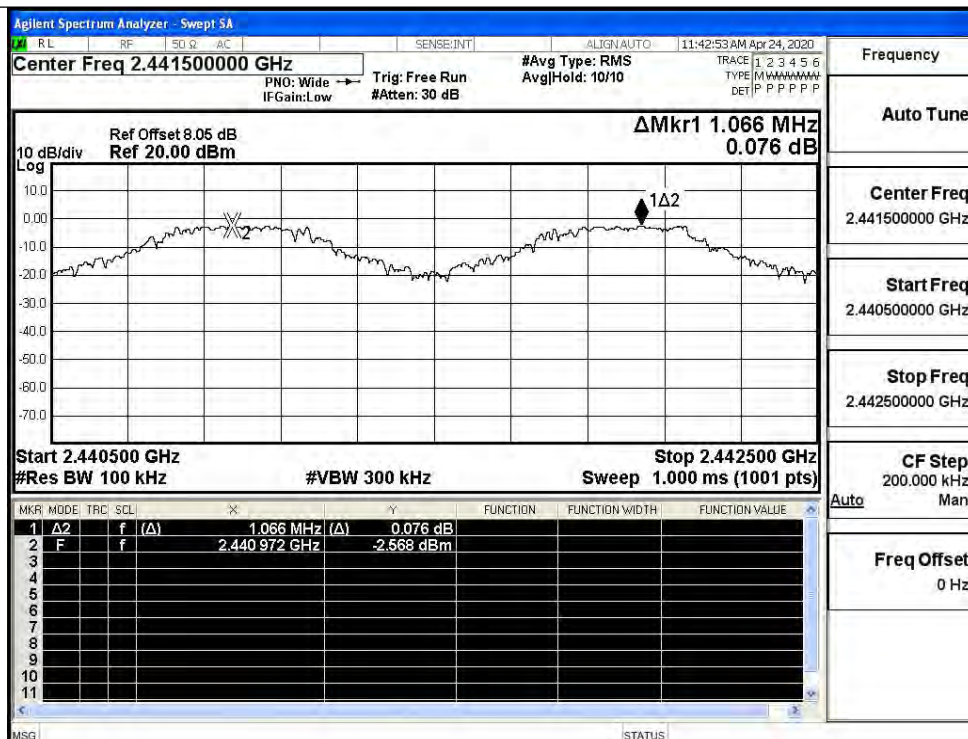
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.245	0.683	PASS
	MCH	1.066	0.675	PASS
	HCH	0.906	0.680	PASS
$\pi/4$ DQPSK	LCH	1.008	0.877	PASS
	MCH	1.180	0.880	PASS
	HCH	1.022	0.879	PASS

Test Graphs

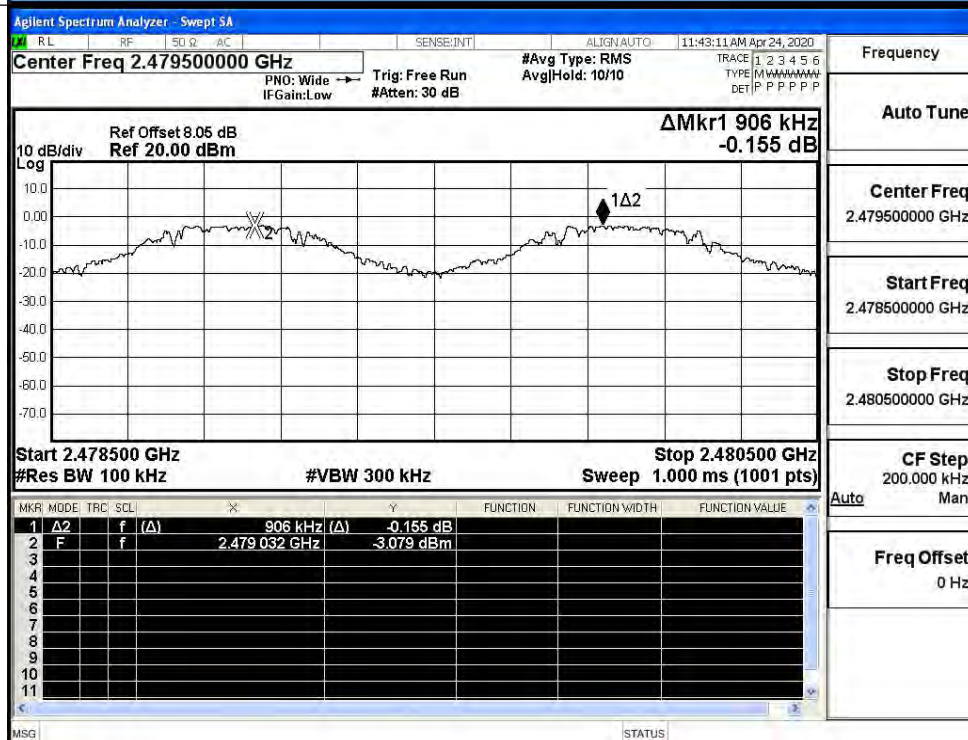
GFSK/LCH

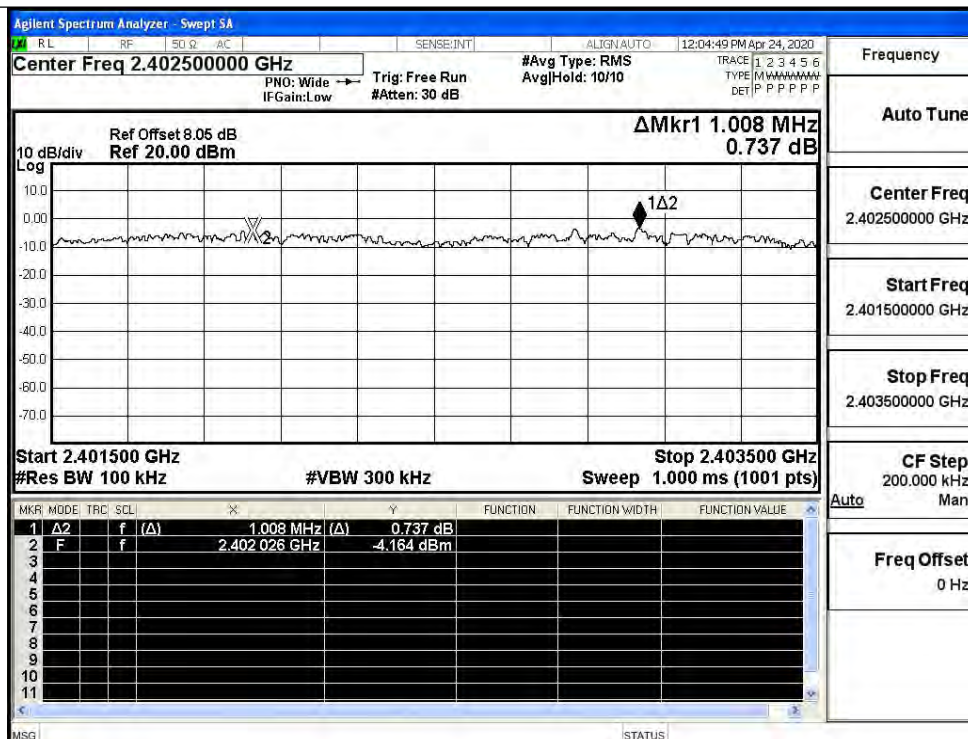
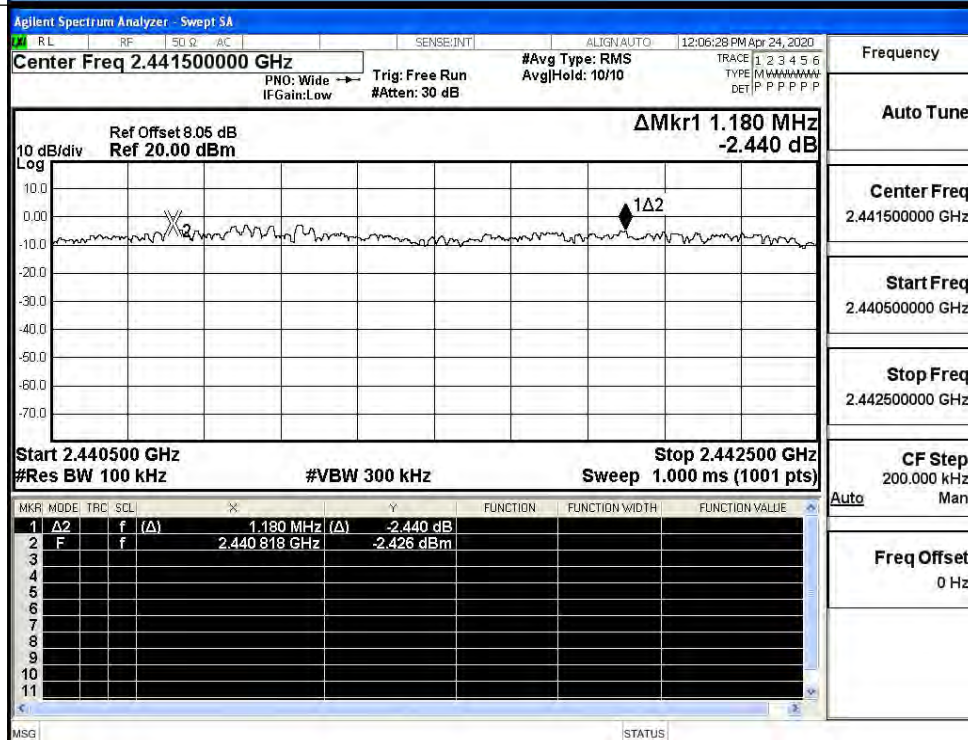


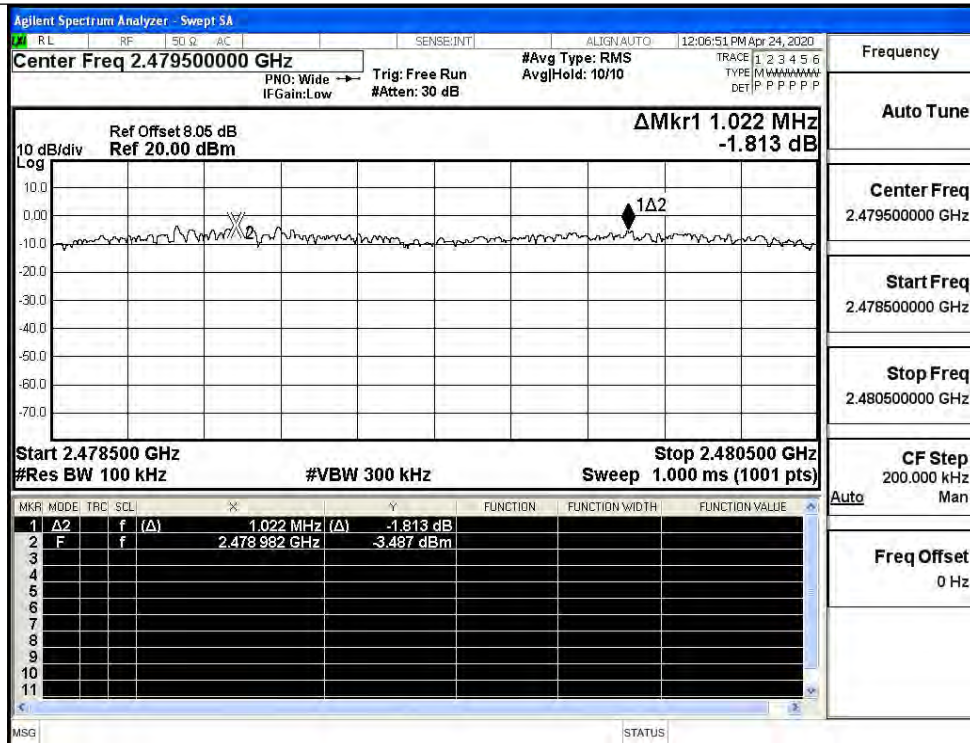
GFSK/MCH



GFSK/HCH



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

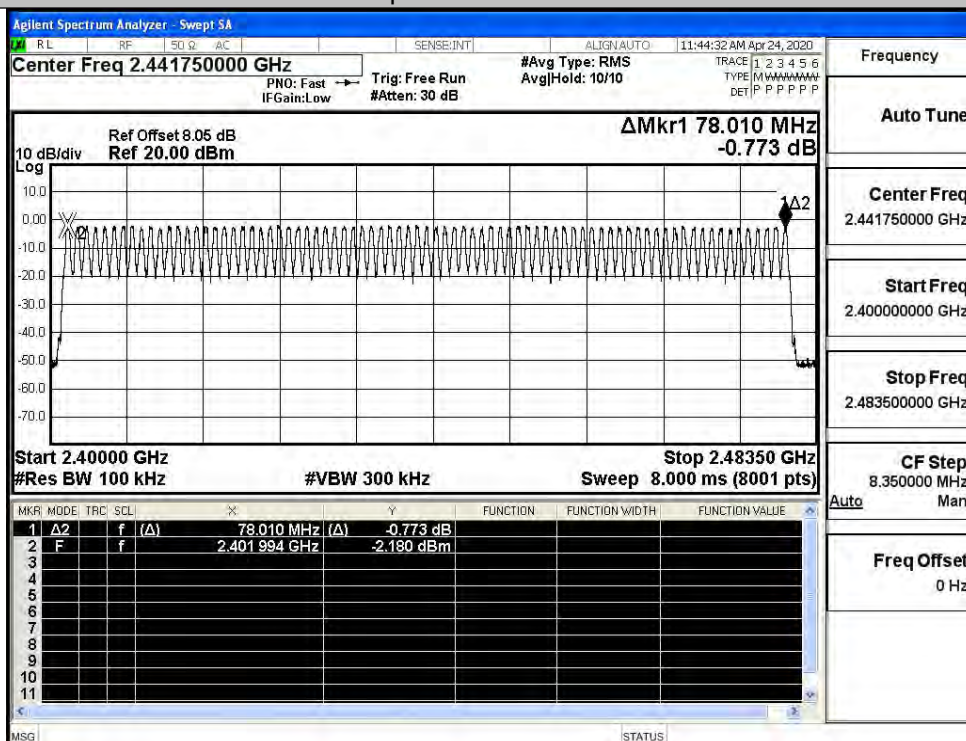
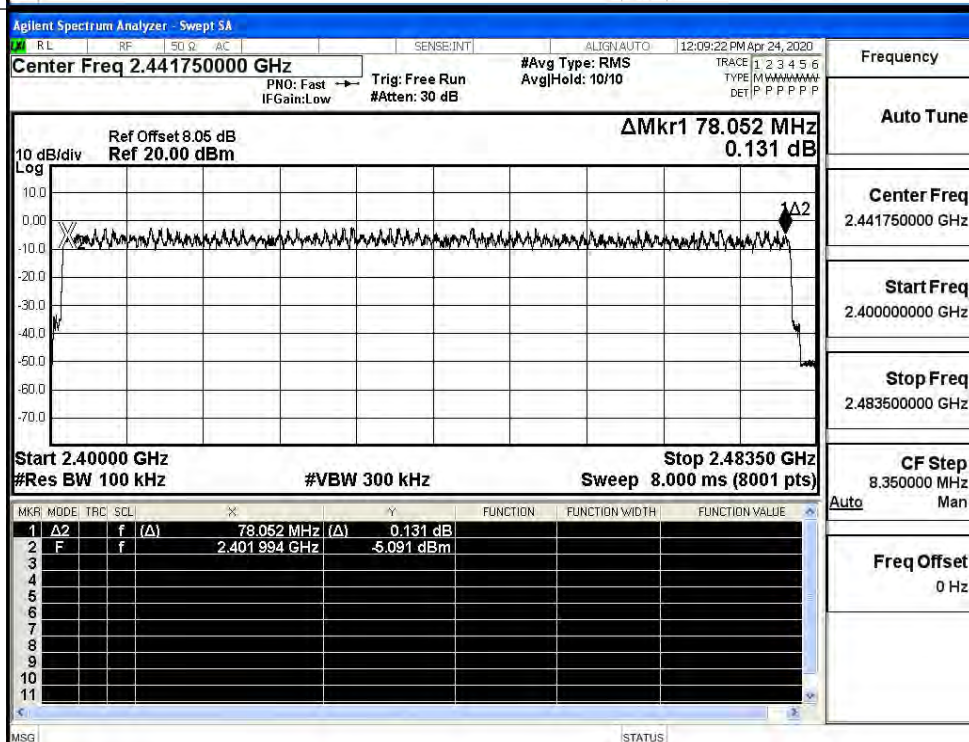
$\pi/4$ DQPSK/HCH

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

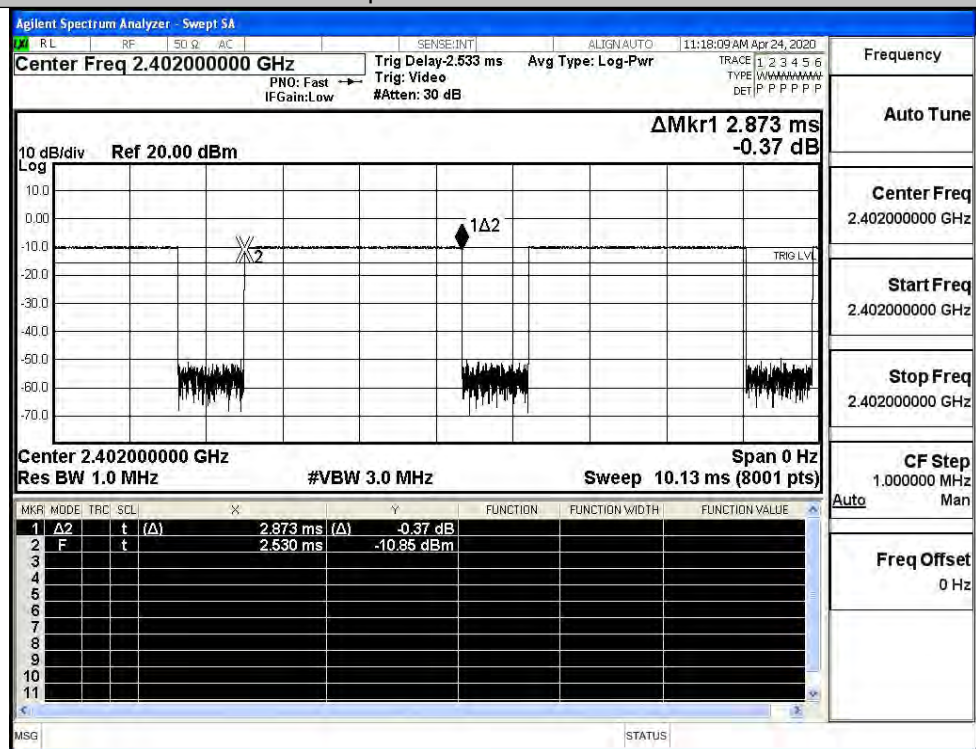
 $\pi/4$ DQPSK/Hop

A.5 Dwell Time

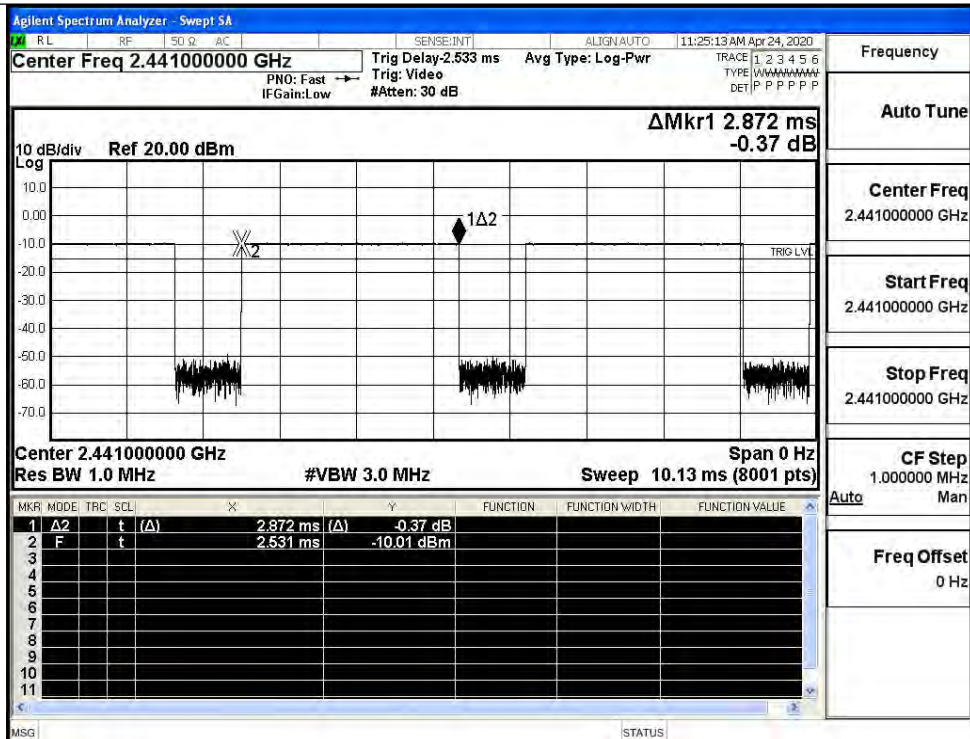
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.87	106.7	0.306	0.4	PASS
	DH5	MCH	2.87	106.7	0.306	0.4	PASS
	DH5	HCH	2.87	106.7	0.306	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.87	106.7	0.307	0.4	PASS
	2DH5	MCH	2.87	106.7	0.307	0.4	PASS
	2DH5	HCH	2.87	106.7	0.307	0.4	PASS

Test Graphs

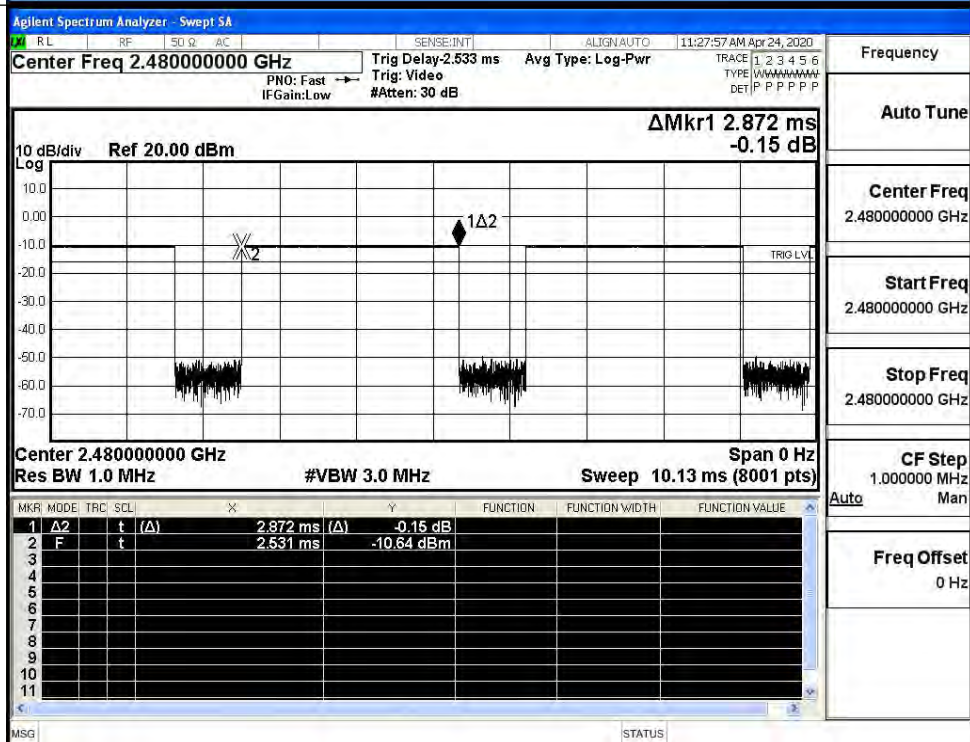
GFSK_DH5/LCH



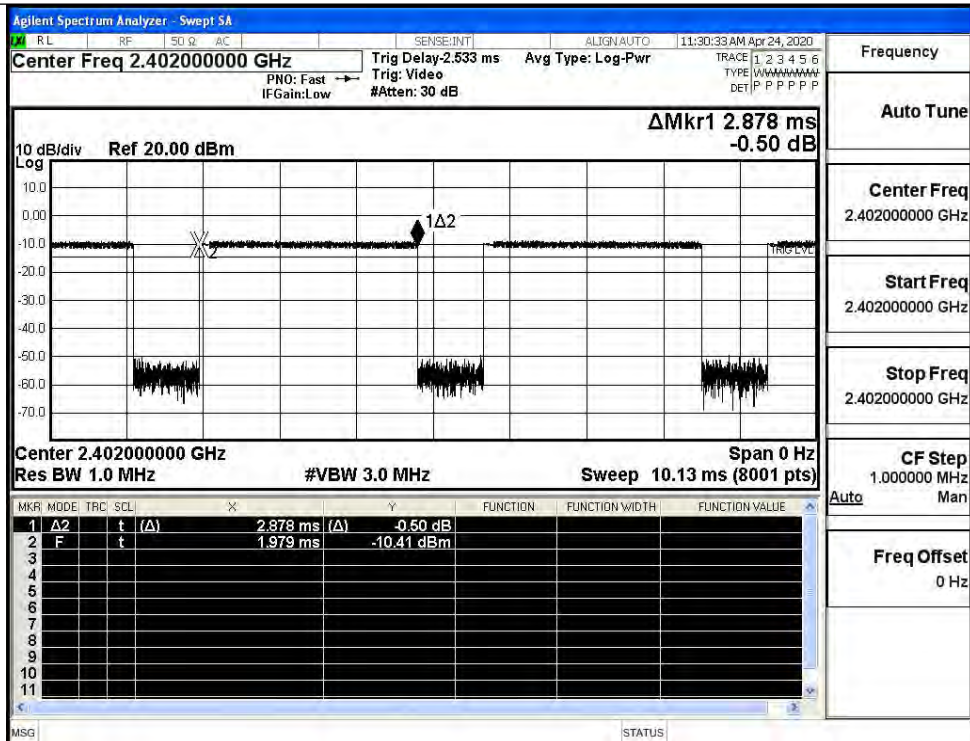
GFSK_DH5/MCH



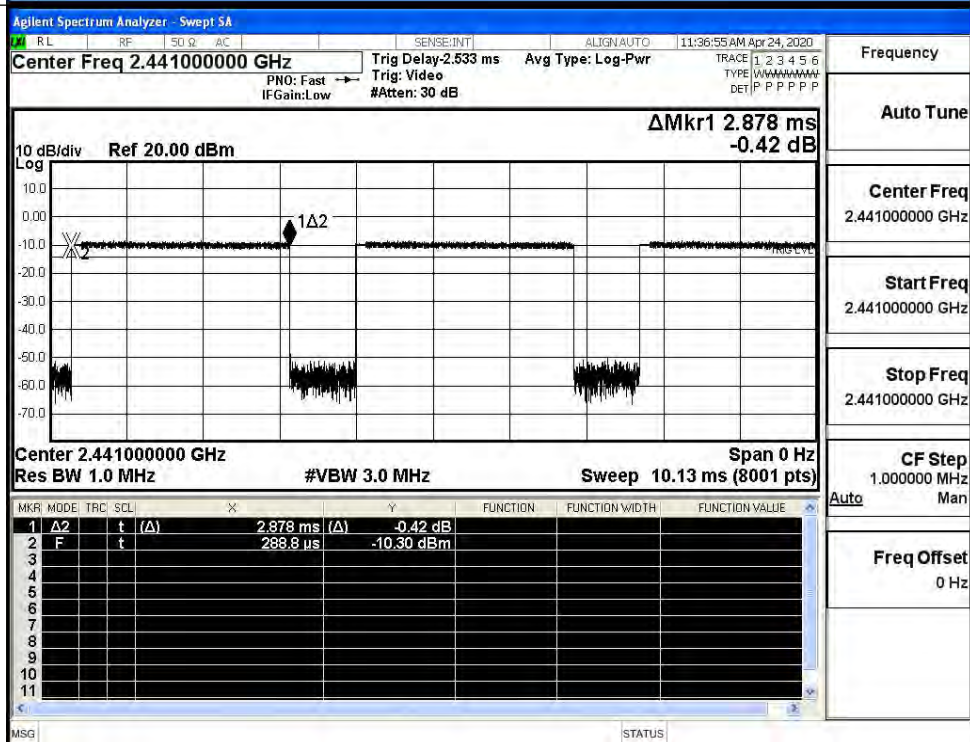
GFSK_DH5/HCH



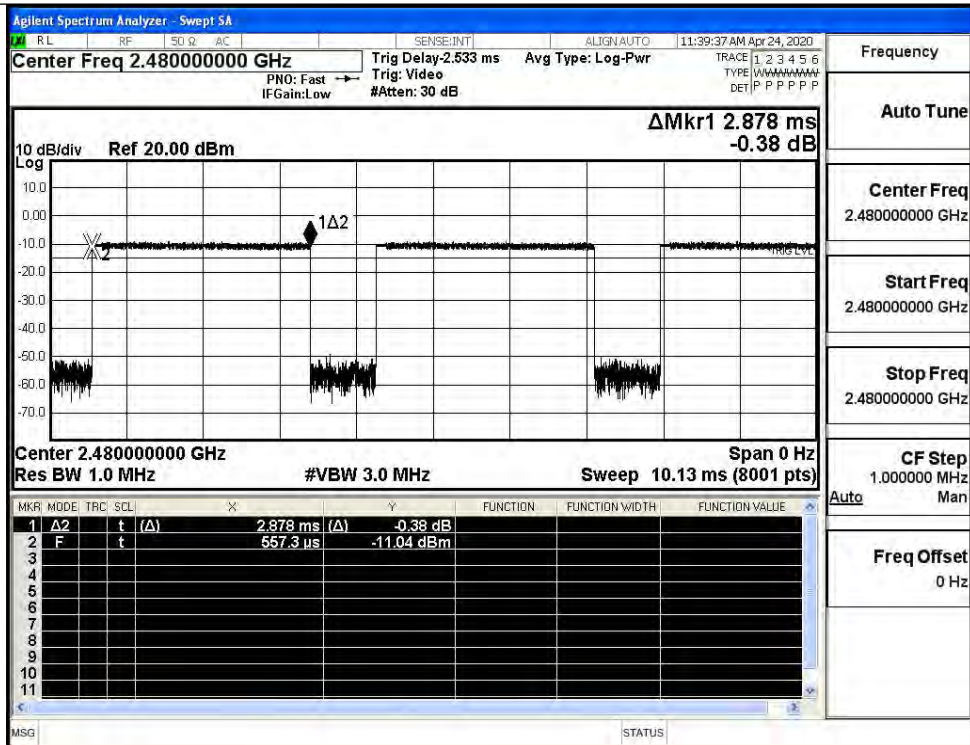
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH



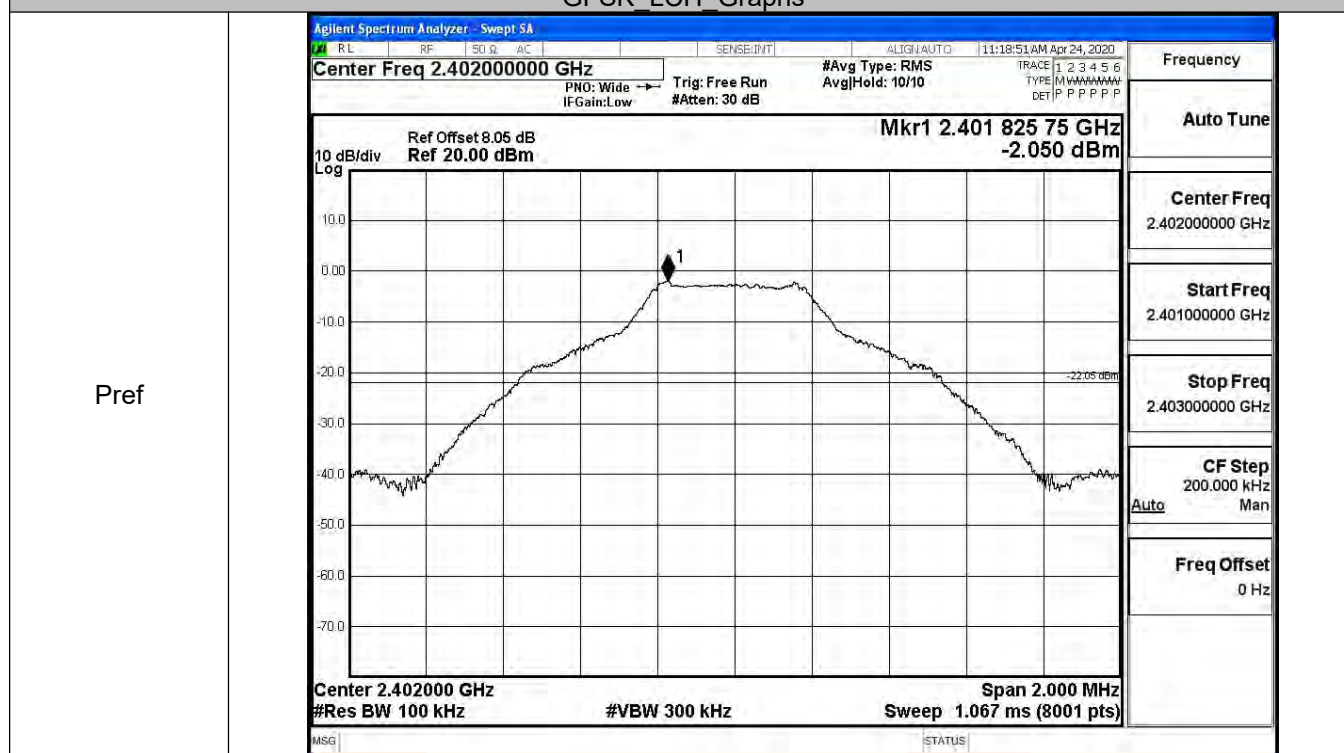
$\pi/4$ DQPSK
_2DH5/HCH



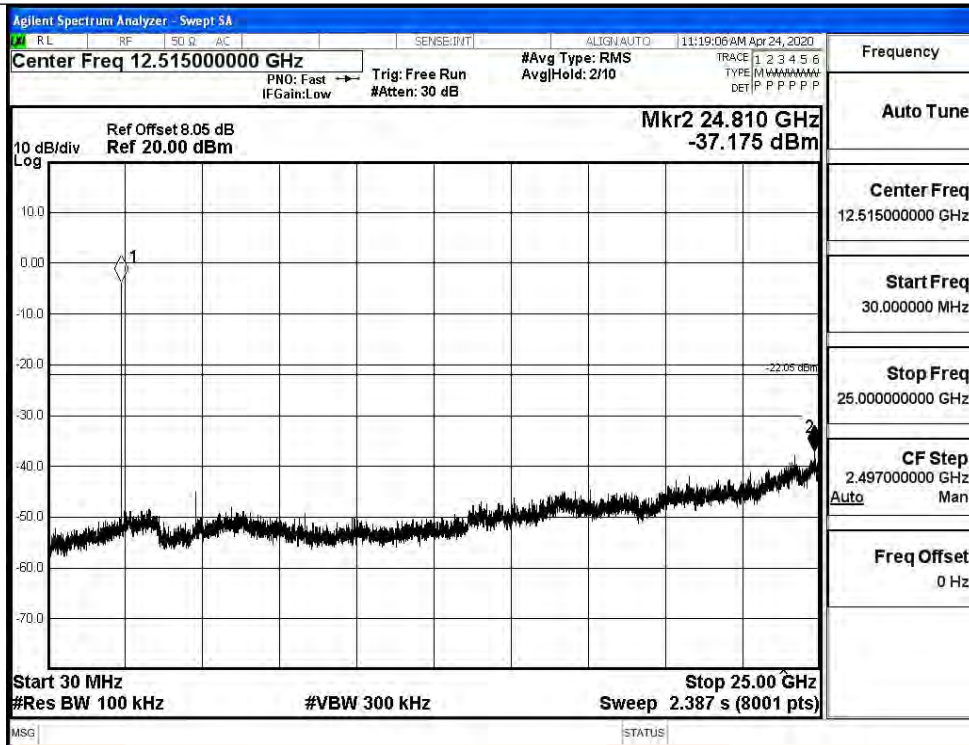
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-2.05	-37.175	-22.050	PASS
	MCH	-1.836	-37.840	-21.836	PASS
	HCH	-2.66	-37.665	-22.660	PASS
$\pi/4$ DQPSK	LCH	-2.235	-38.481	-22.235	PASS
	MCH	-2.254	-36.710	-22.254	PASS
	HCH	-2.663	-37.733	-22.663	PASS

GFSK LCH Graphs

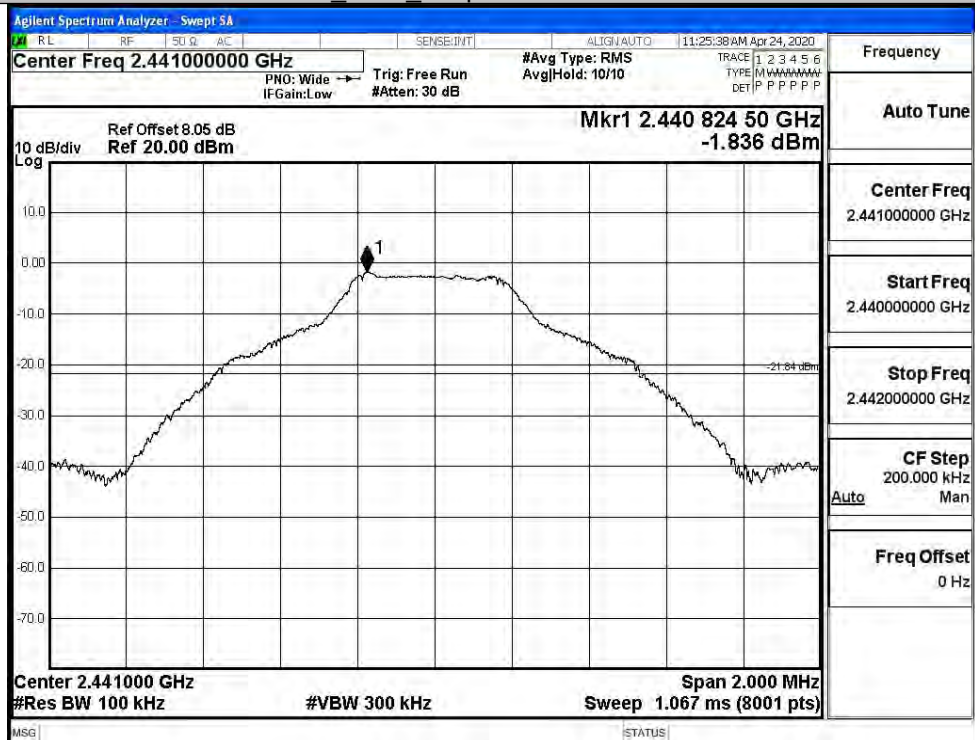


Puw

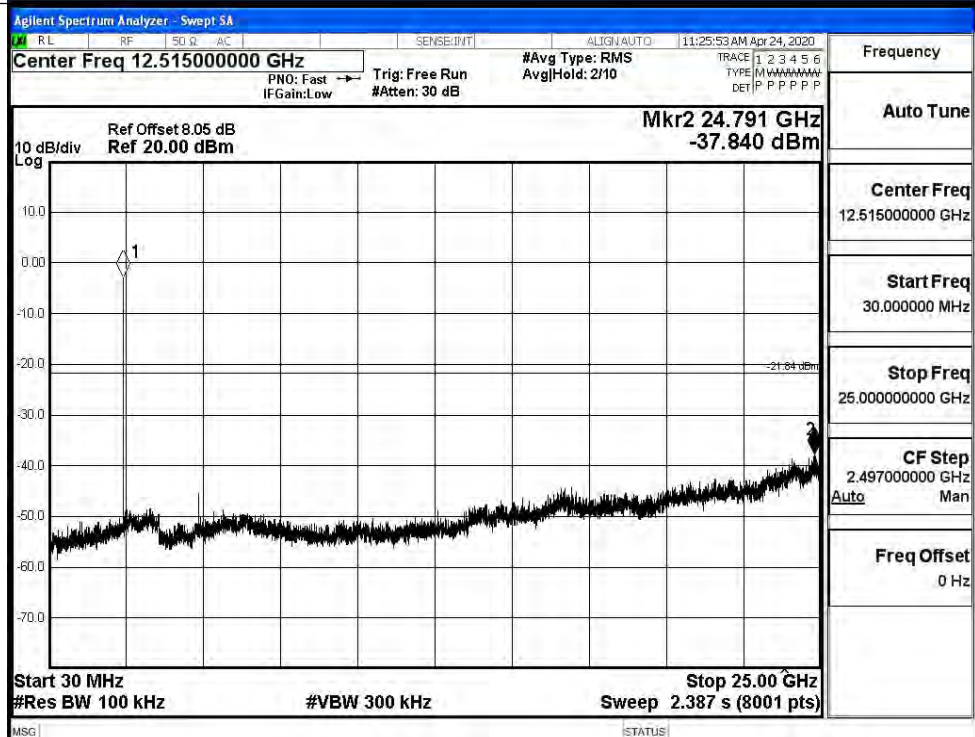


GFSK MCH Graphs

Pref

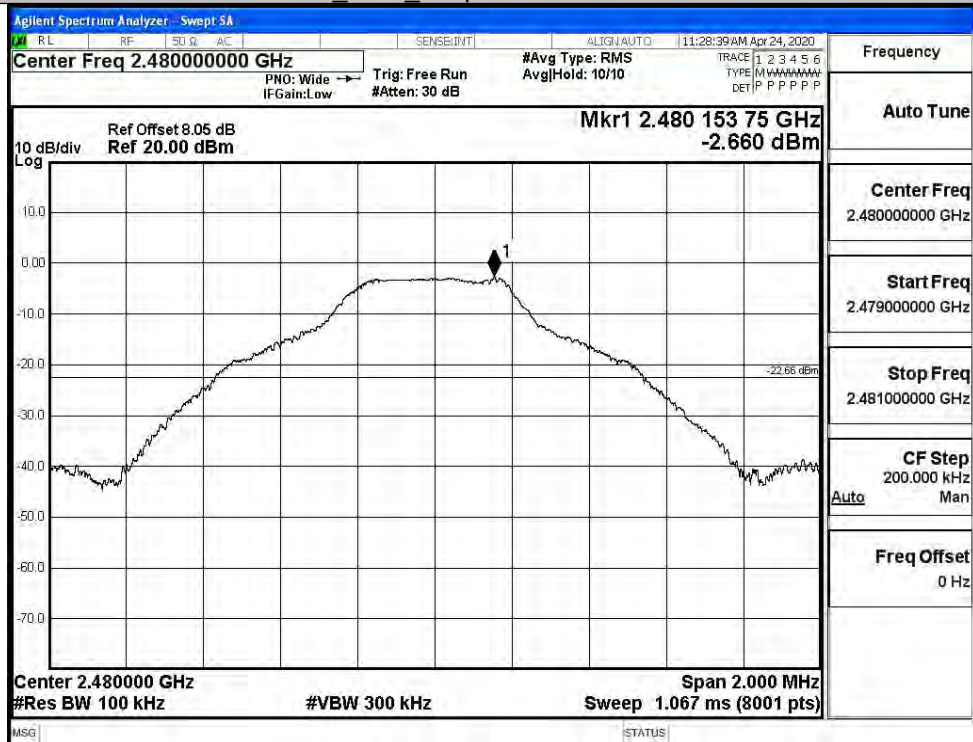


Puw

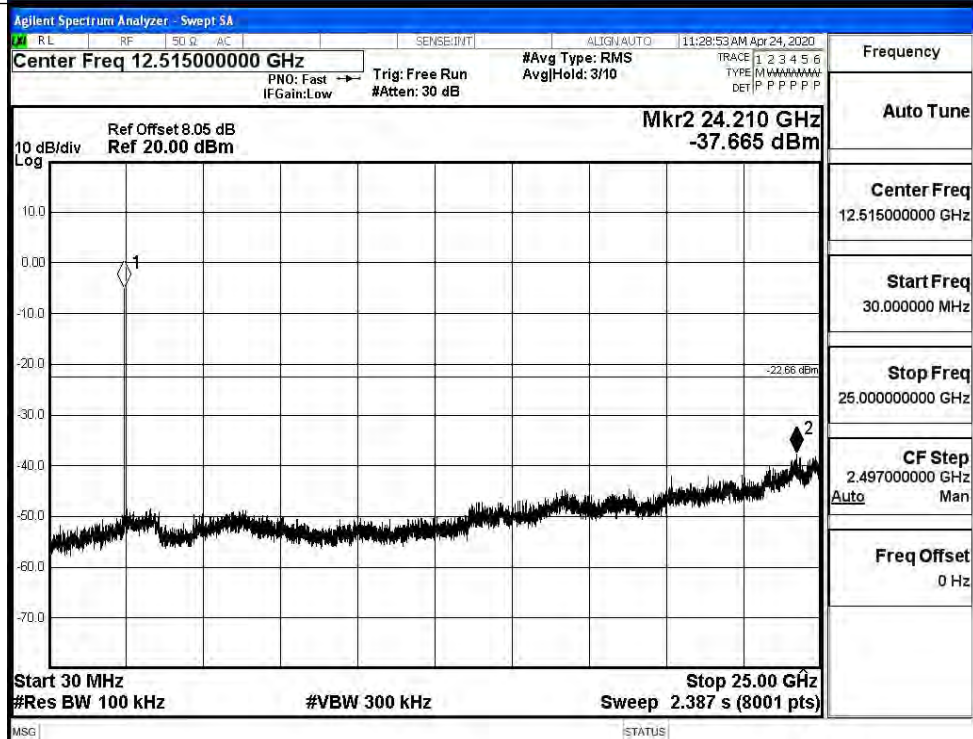


GFSK HCH Graphs

Pref

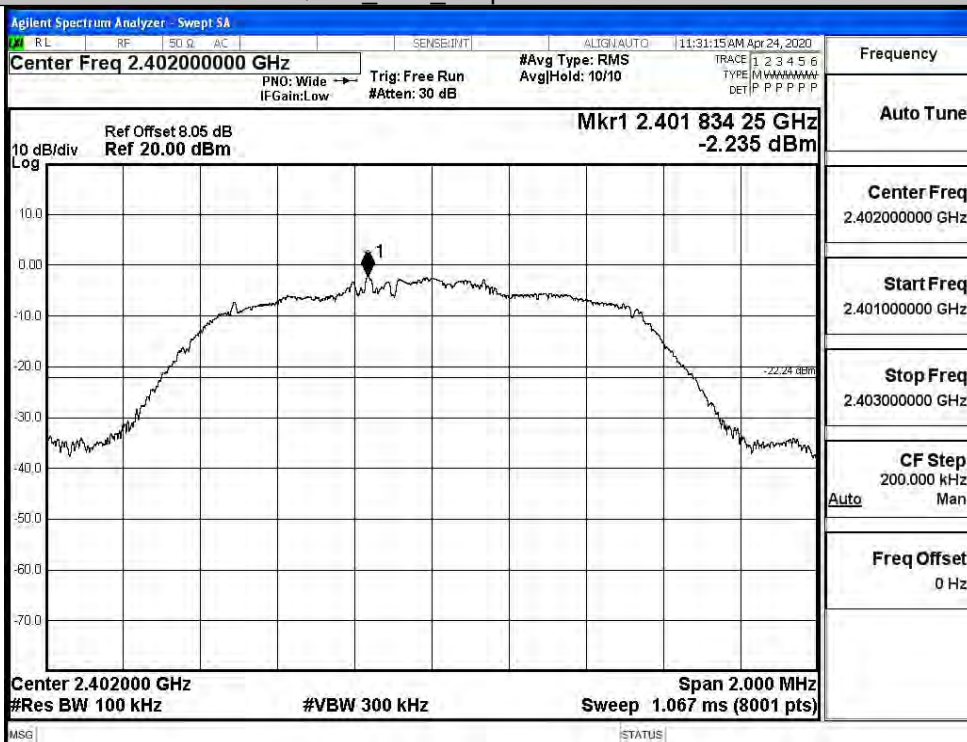


Puw

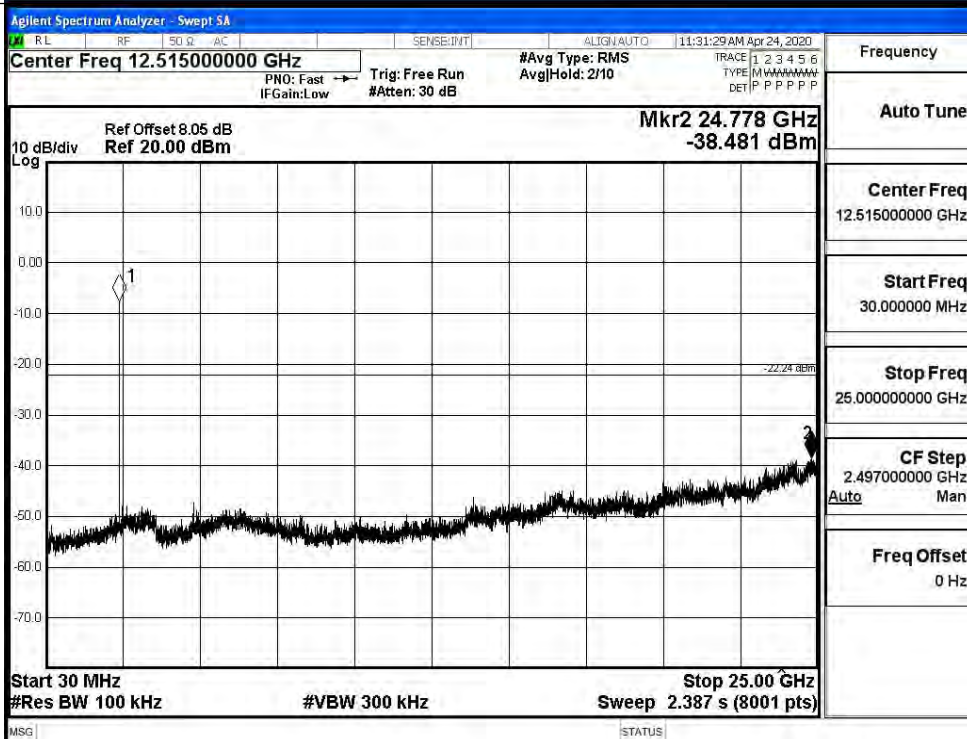


$\pi/4$ DQPSK LCH_Graphs

Pref

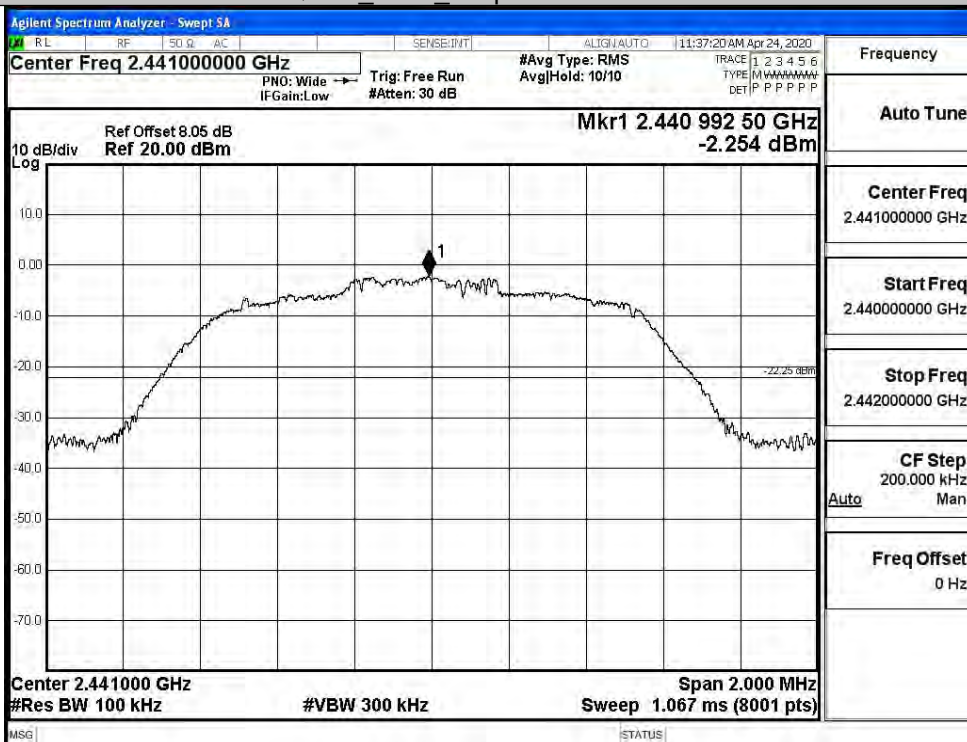


Puw

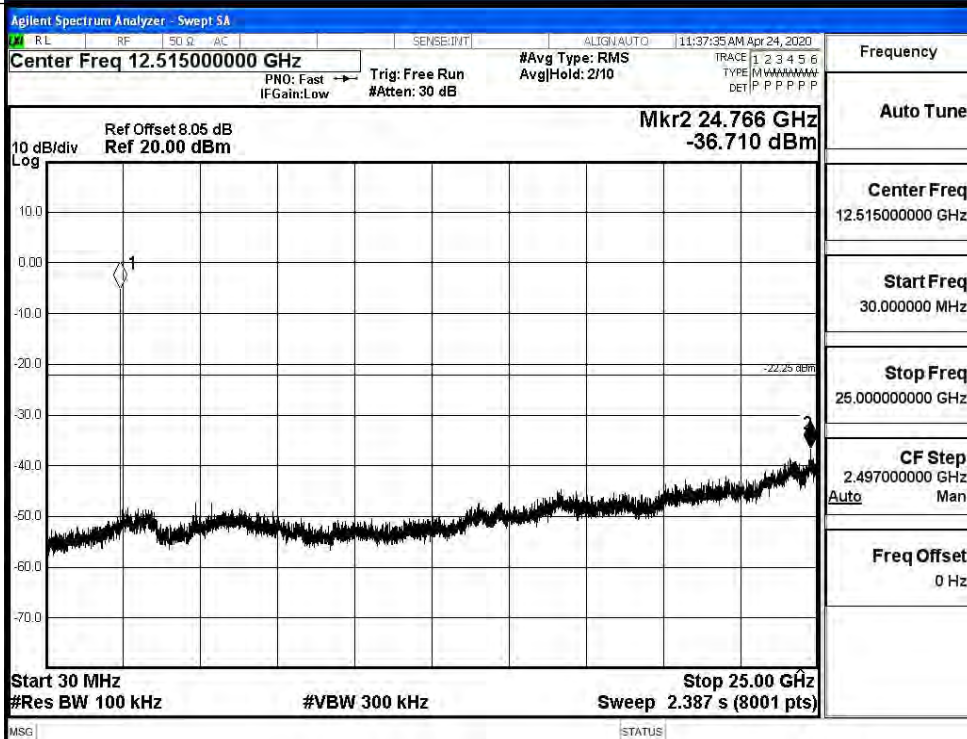


π /4DQPSK_MCH_Graphs

Pref

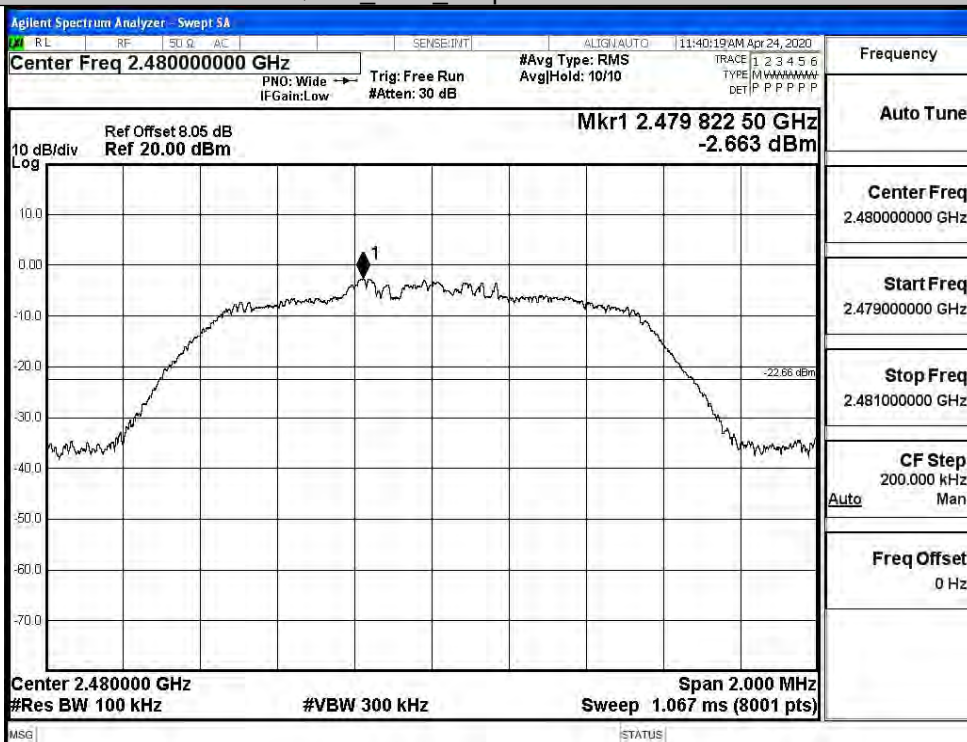


Puw

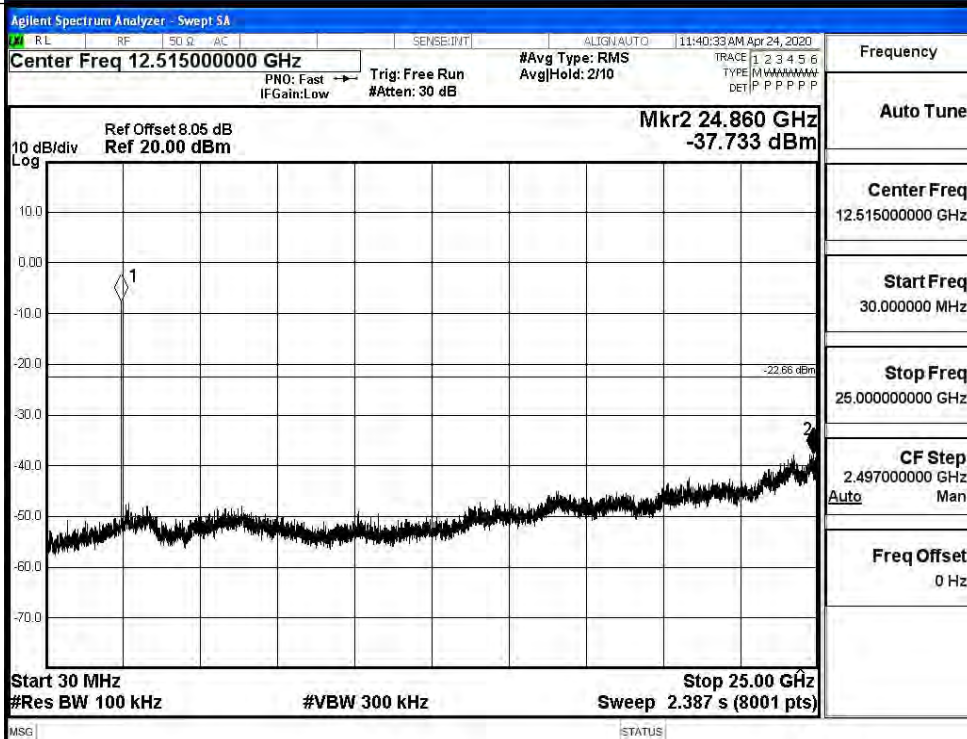


π /4DQPSK HCH_Graphs

Pref



Puw

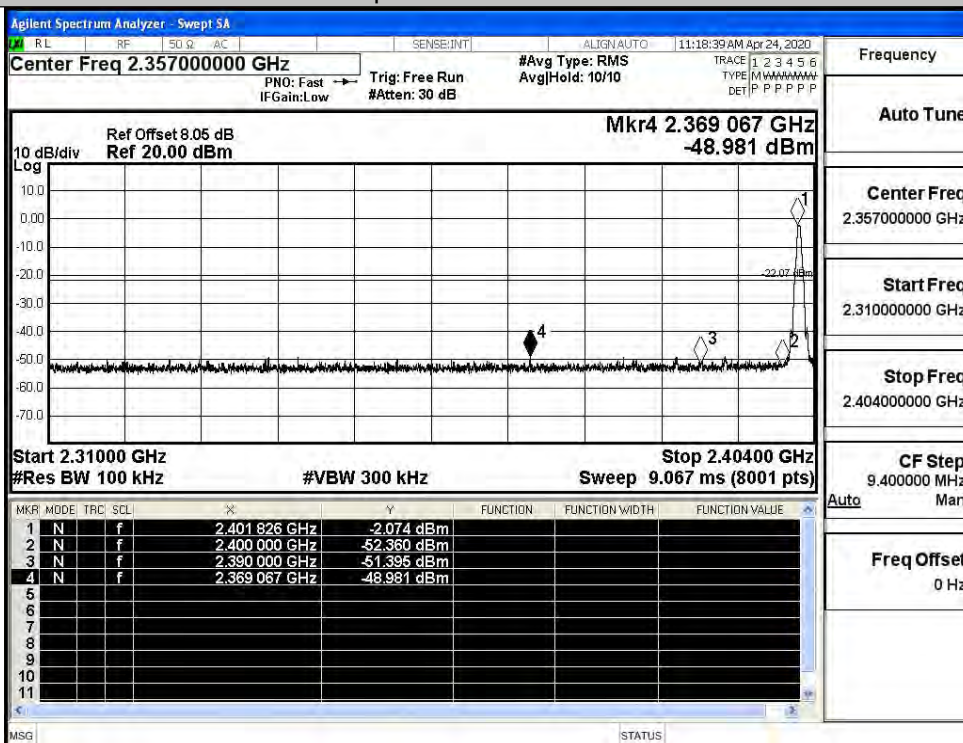


A.7 Band-edge for RF Conducted Emissions

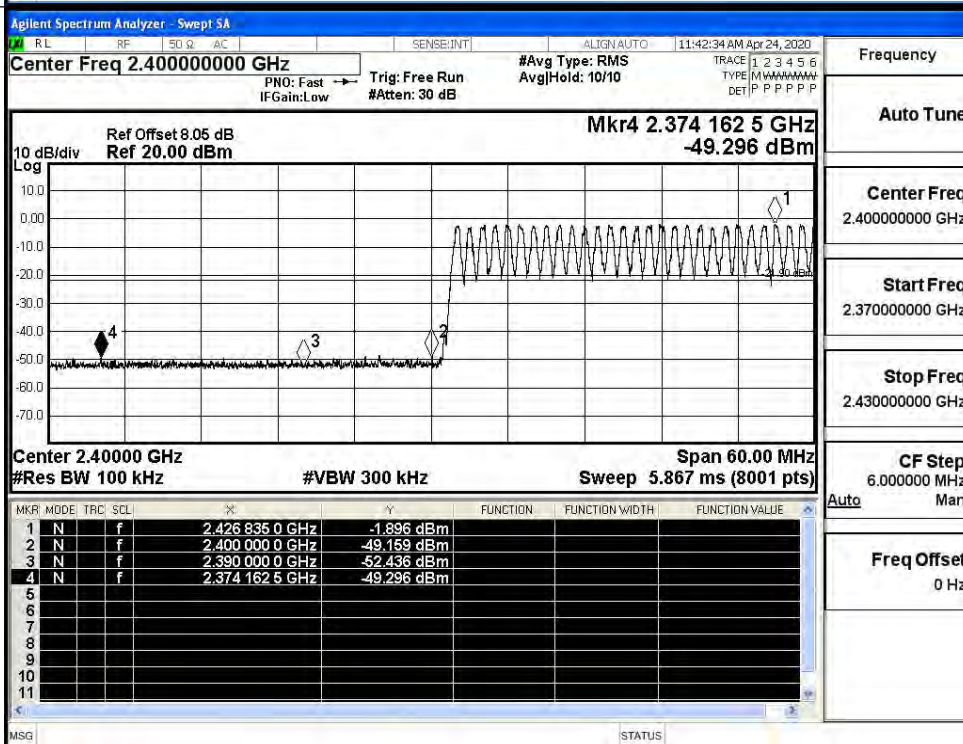
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-2.074	Off	-48.981	-22.07	PASS
			-1.896	On	-49.296	-21.9	PASS
	HCH	2480	-2.484	Off	-49.555	-22.48	PASS
			-2.095	On	-48.903	-22.1	PASS
$\pi/4$ DQPSK	LCH	2402	-2.587	Off	-49.078	-22.59	PASS
			-2.209	On	-48.940	-22.21	PASS
	HCH	2480	-2.639	Off	-48.666	-22.64	PASS
			-2.546	On	-48.517	-22.55	PASS

Test Graphs

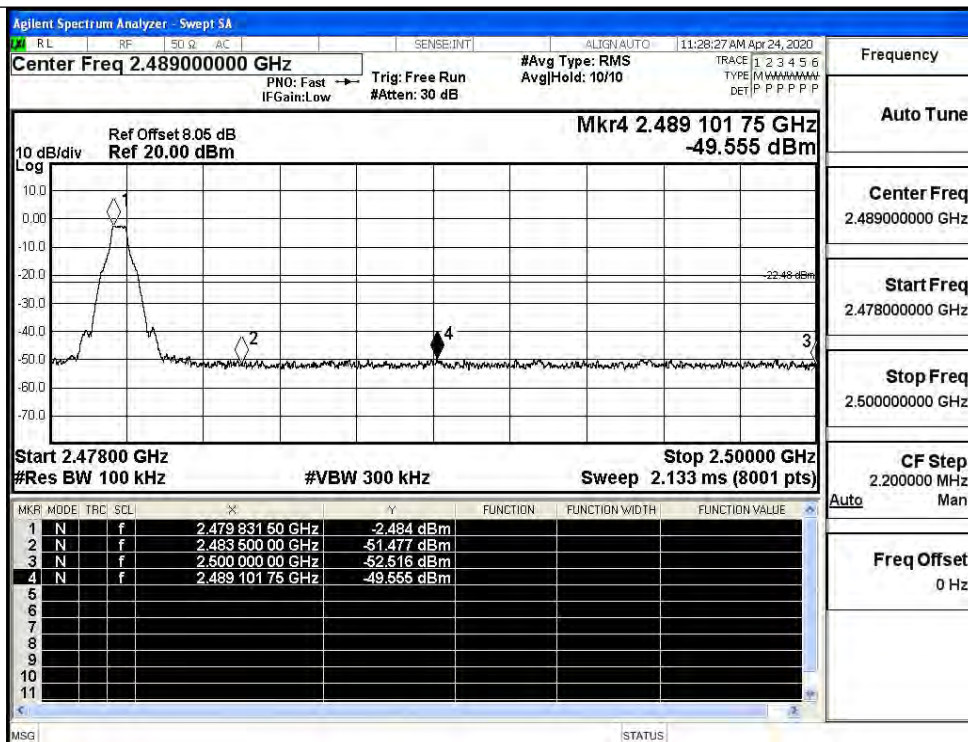
GFSK/LCH/No Hop



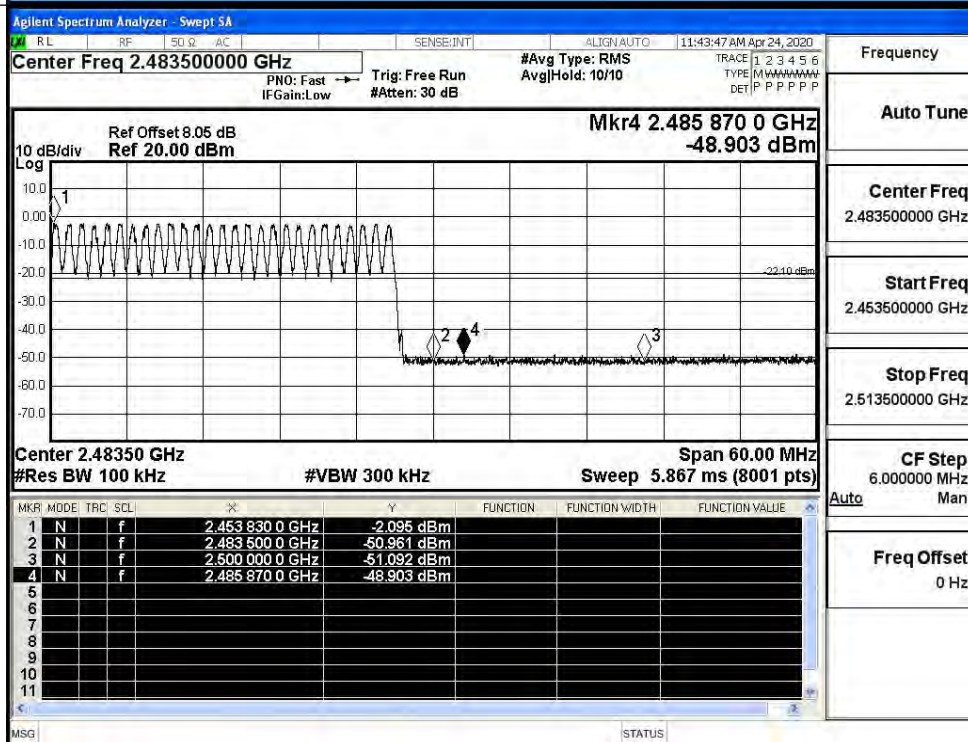
GFSK/LCH/Hop



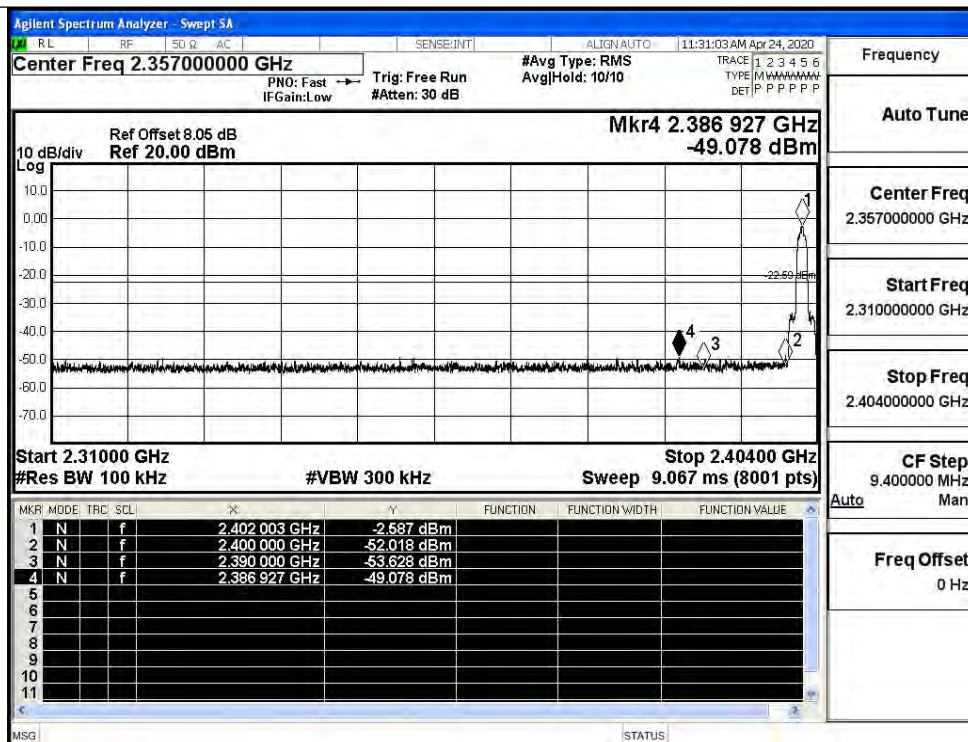
GFSK/HCH/No Hop



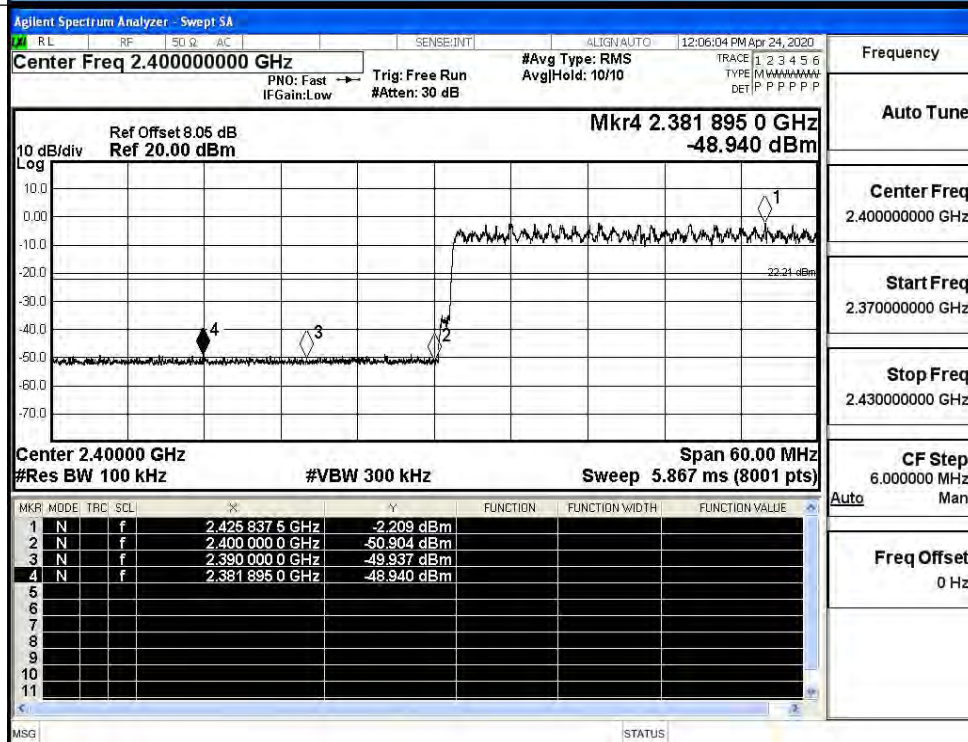
GFSK/HCH/Hop



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



$\pi/4$ DQPSK/LCH/Hop



Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 11:40:08 AM Apr 24, 2020

Center Freq 2.489000000 GHz PNO: Fast Trg: Free Run #Avg Type: RMS Avg|Hold: 10/10 TRACE 1 2 3 4 5 6
IF Gain: Low #Atten: 30 dB TYPE: M M M M M M M M M M DET: P P P P P P P P

Ref Offset 8.05 dB Mkr4 2.488 835 00 GHz
Ref 20.00 dBm -48.666 dBm

10 dB/div Log

Start 2.47800 GHz Stop 2.50000 GHz
#Res BW 100 kHz #VBW 300 kHz Sweep 2.133 ms (8001 pts)

MRK	MODE	TRC	SCL	F	P	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	f		2.479 826 00 GHz	-2.639 dBm			
2	N	f		2.483 500 00 GHz	-52.395 dBm			
3	N	f		2.500 000 00 GHz	-52.158 dBm			
4	N	f		2.488 835 00 GHz	-48.666 dBm			
5								
6								
7								
8								
9								
10								
11								

MSG STATUS

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

Agilent Spectrum Analyzer - Swept SA

F1 R L RF 50 Ω AC SENSE:INT ALIGN: AUTO 12:08:07 PM Apr 24, 2020
Center Freq 2.483500000 GHz #Avg Type: RMS #Atten: 30 dB Trg: Free Run
 PNO: Fast IF Gain: Low Avg Hold: 10/10 TYPE: M W A A A A A A A A
 DET: P P P P P P P P

Ref Offset 8.05 dB Mkr4 2.498 192 5 GHz
 Ref 20.00 dBm -48.517 dBm

Center 2.48350 GHz Span 60.00 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 5.867 ms (8001 pts)

MRK	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	f		2.453 837 5 GHz	-2.546 dBm			
2	N	f		2.483 500 0 GHz	-51.110 dBm			
3	N	f		2.500 000 0 GHz	-50.586 dBm			
4	N	f		2.498 192 5 GHz	-48.517 dBm			
5								
6								
7								
8								
9								
10								
11								

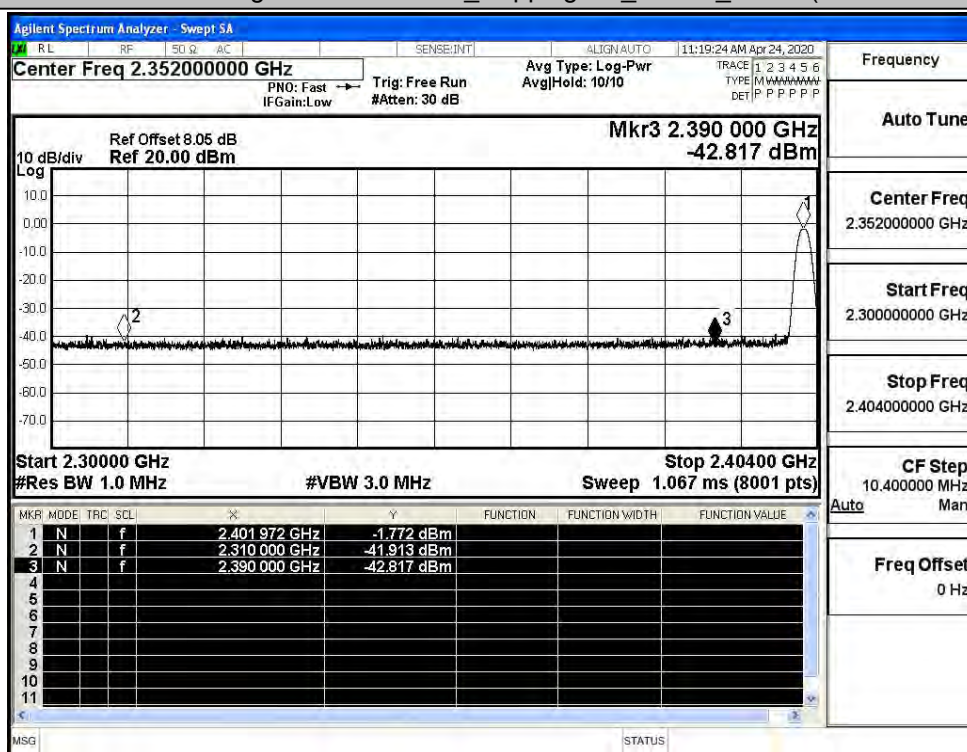
Frequency
 Auto Tune
 Center Freq
 2.483500000 GHz
 Start Freq
 2.453500000 GHz
 Stop Freq
 2.513500000 GHz
 CF Step
 6.000000 MHz
 Auto Man
 Freq Offset
 0 Hz

MSG STATUS

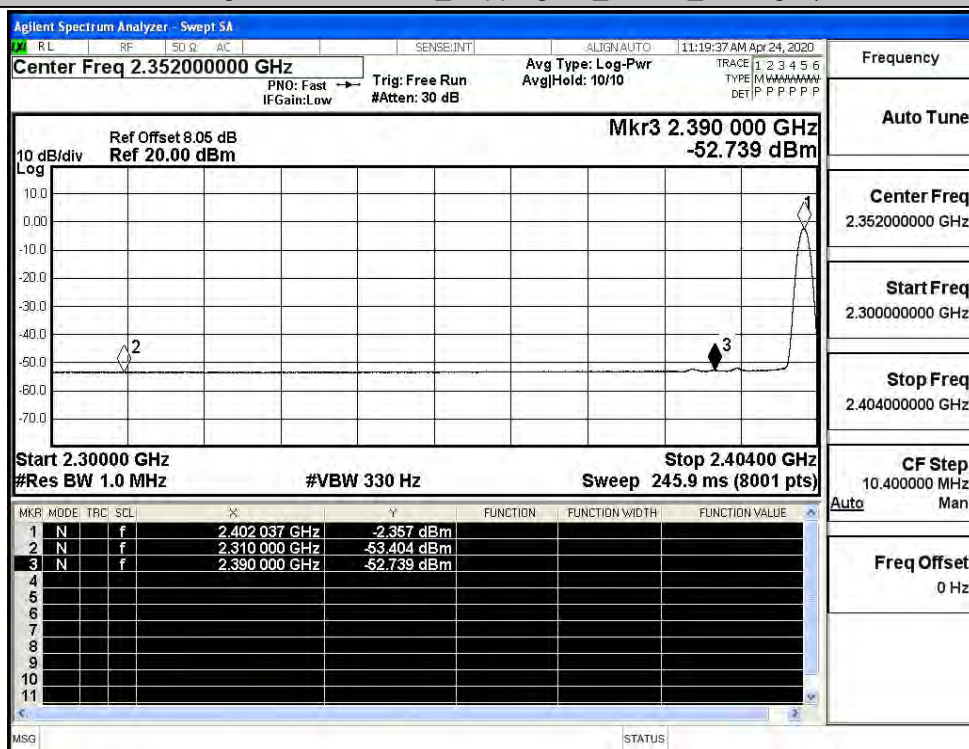
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-41.91	2.0	0	53.34	PEAK	74	PASS
	Off	2310.0	-53.40	2.0	0	41.85	AV	54	PASS
	Off	2390.0	-42.82	2.0	0	52.44	PEAK	74	PASS
	Off	2390.0	-52.74	2.0	0	42.52	AV	54	PASS
	Off	2483.5	-41.75	2.0	0	53.51	PEAK	74	PASS
	Off	2483.5	-52.21	2.0	0	43.05	AV	54	PASS
	Off	2500.0	-42.54	2.0	0	52.72	PEAK	74	PASS
	Off	2500.0	-52.36	2.0	0	42.90	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.24	2.0	0	52.02	PEAK	74	PASS
	Off	2310.0	-53.45	2.0	0	41.81	AV	54	PASS
	Off	2390.0	-43.23	2.0	0	52.02	PEAK	74	PASS
	Off	2390.0	-52.89	2.0	0	42.37	AV	54	PASS
	Off	2483.5	-41.42	2.0	0	53.84	PEAK	74	PASS
	Off	2483.5	-52.21	2.0	0	43.05	AV	54	PASS
	Off	2500.0	-42.62	2.0	0	52.64	PEAK	74	PASS
	Off	2500.0	-52.44	2.0	0	42.82	AV	54	PASS

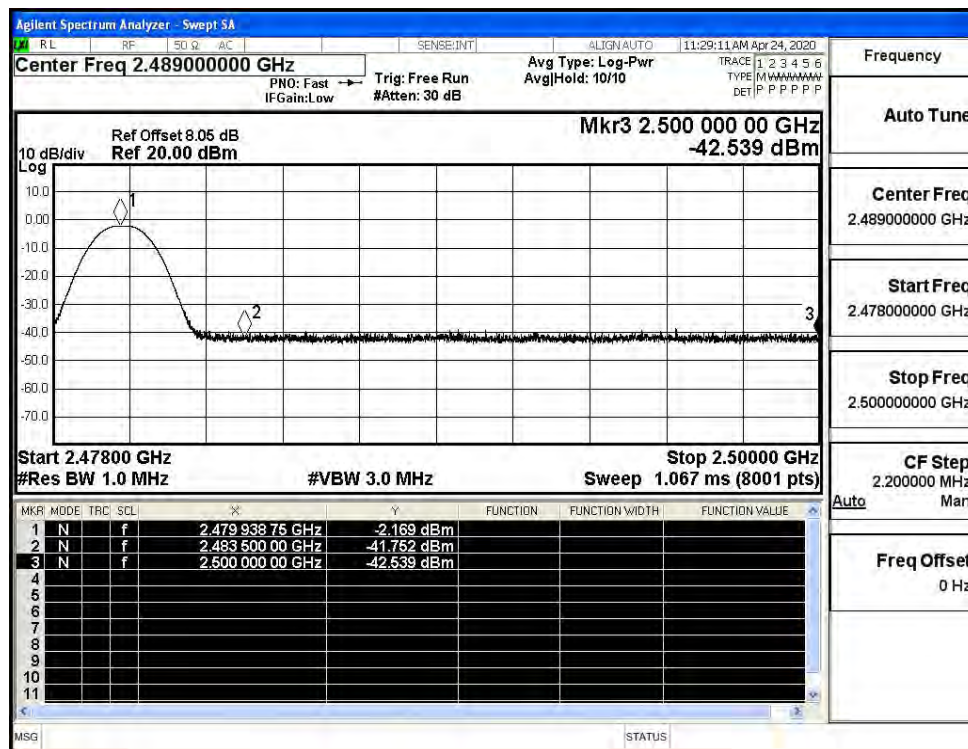
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



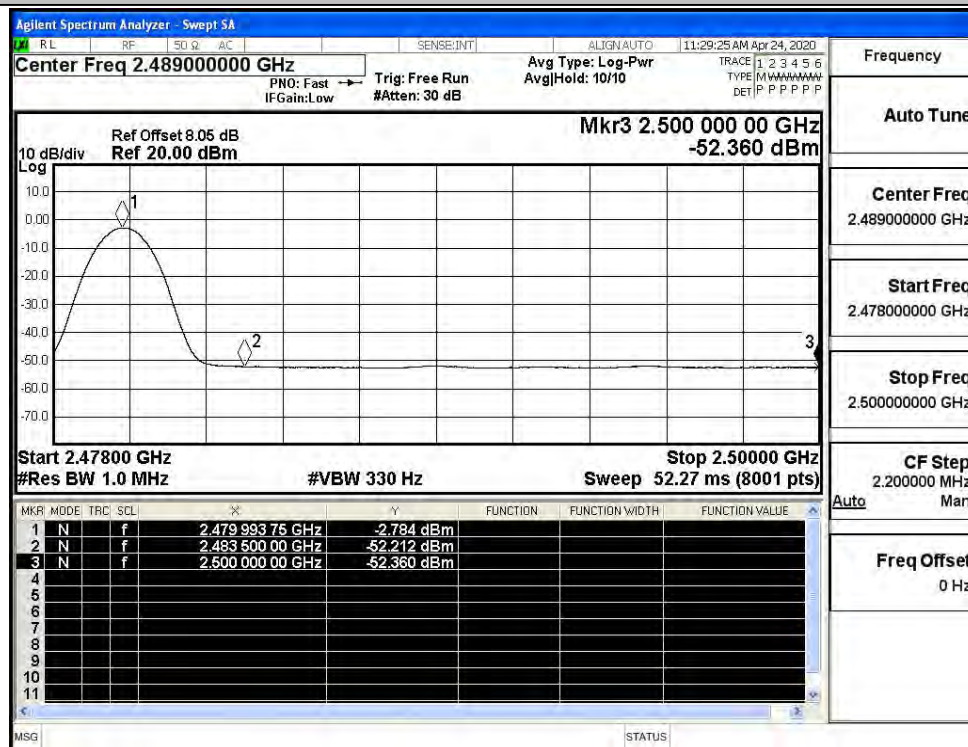
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



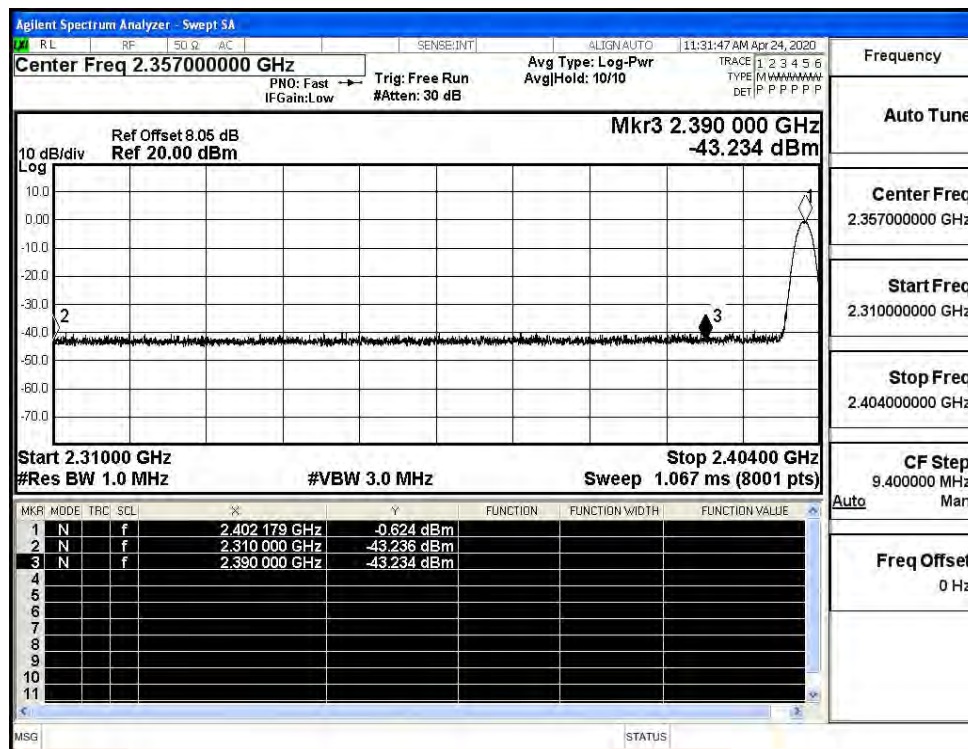
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



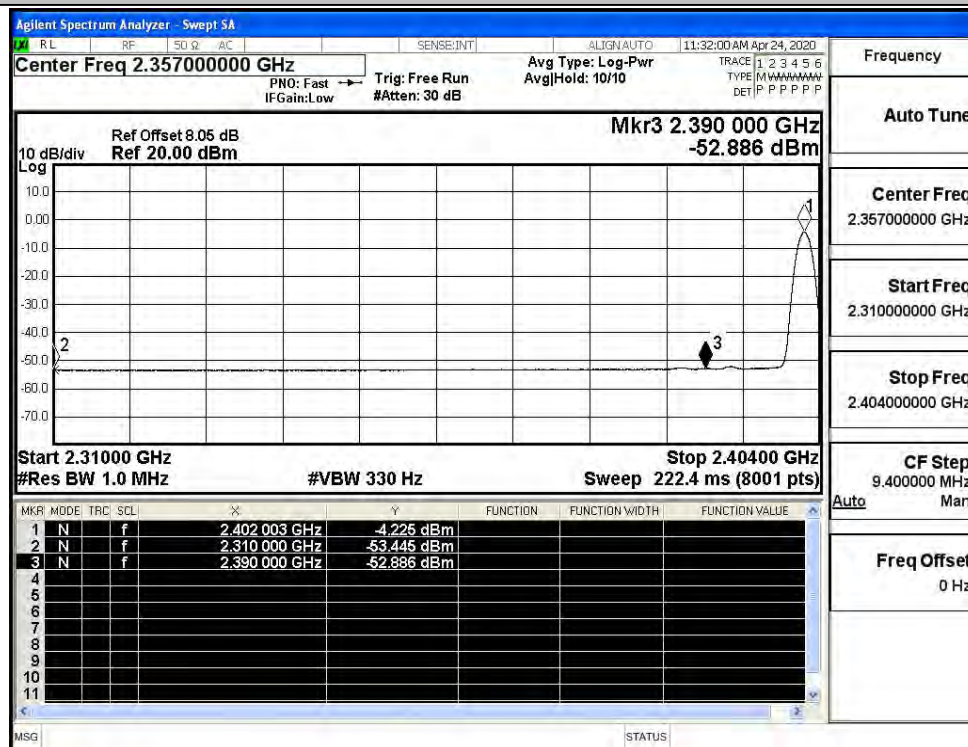
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)

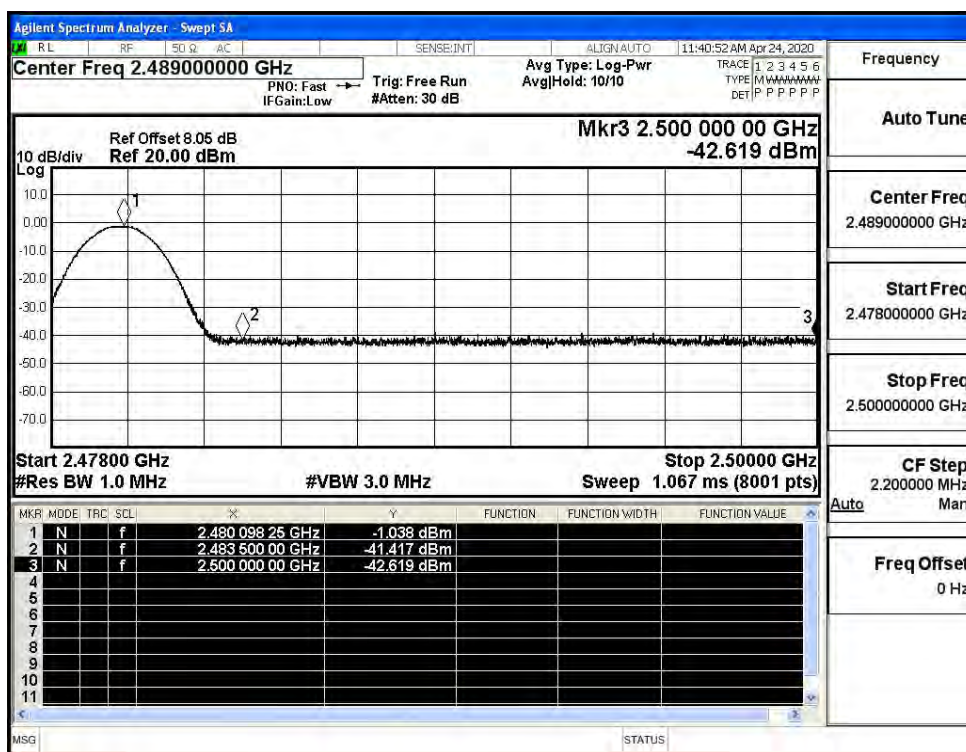


Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



Restrict-band band-edge measurements_Hopping Off_π/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)