

Appendix A

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

Product Name: Bluetooth speaker

Trade Mark: HLX

Test Model: L01SW

Environmental Conditions

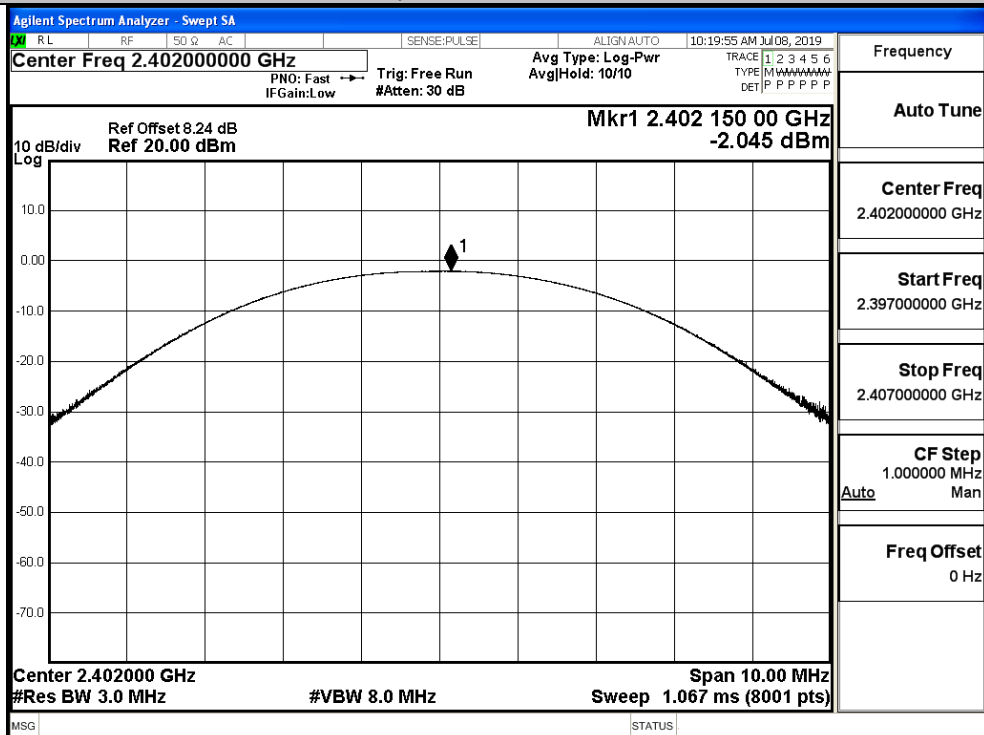
Temperature:	24.1° C
Relative Humidity:	53.8%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond.Lu
Supervised by:	Wang.Chuang

A.1 Maximum Conducted Peak Output Power

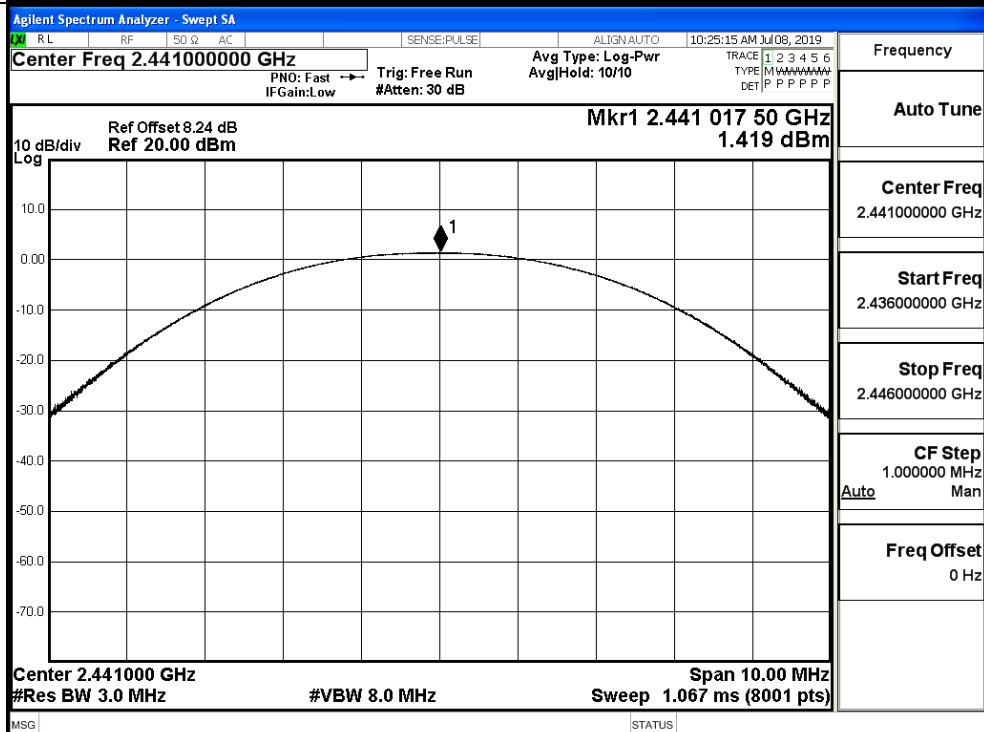
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-2.045	21	PASS
	MCH	1.419	21	PASS
	HCH	-0.589	21	PASS
$\pi/4$ DQPSK	LCH	-2.451	21	PASS
	MCH	-0.675	21	PASS
	HCH	-1.139	21	PASS

Test Graphs

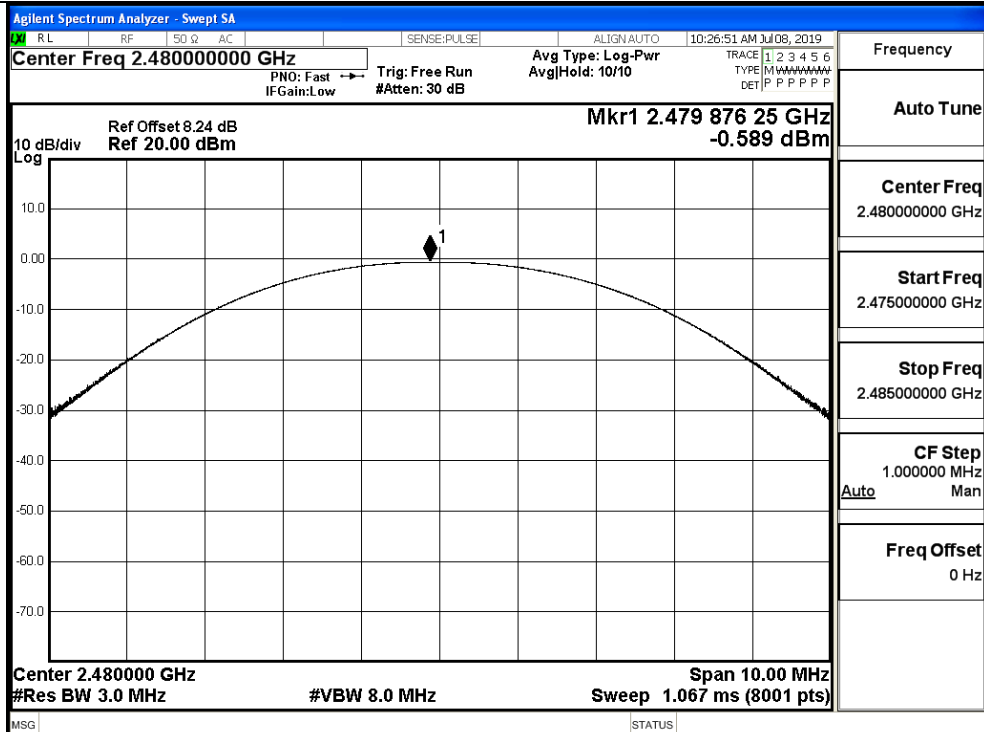
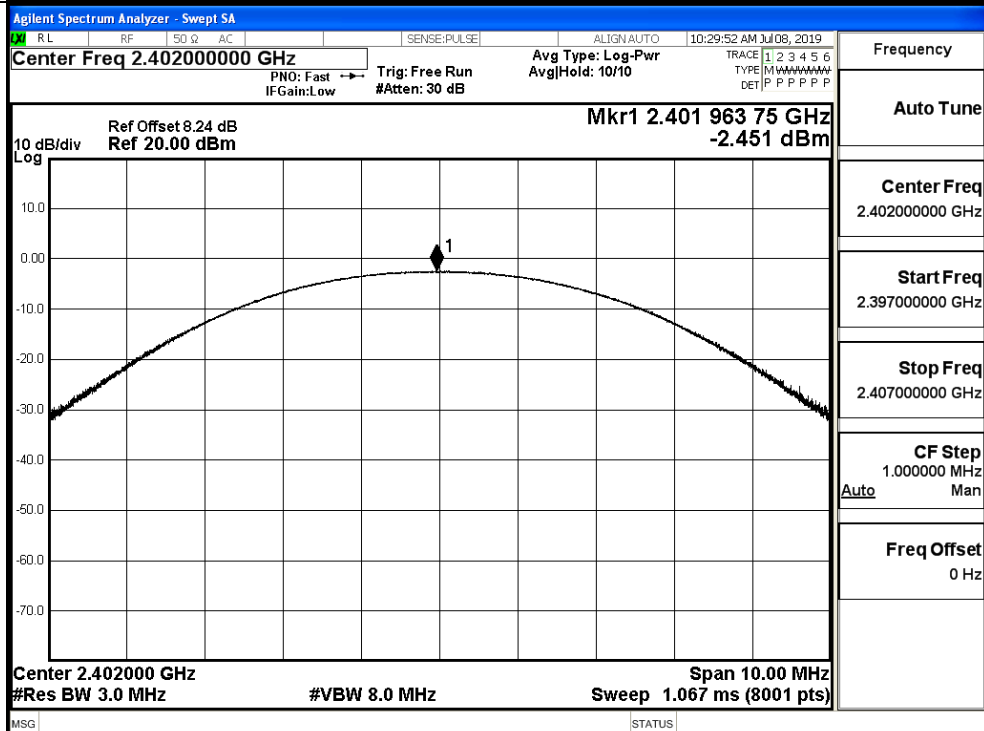
GFSK/LCH

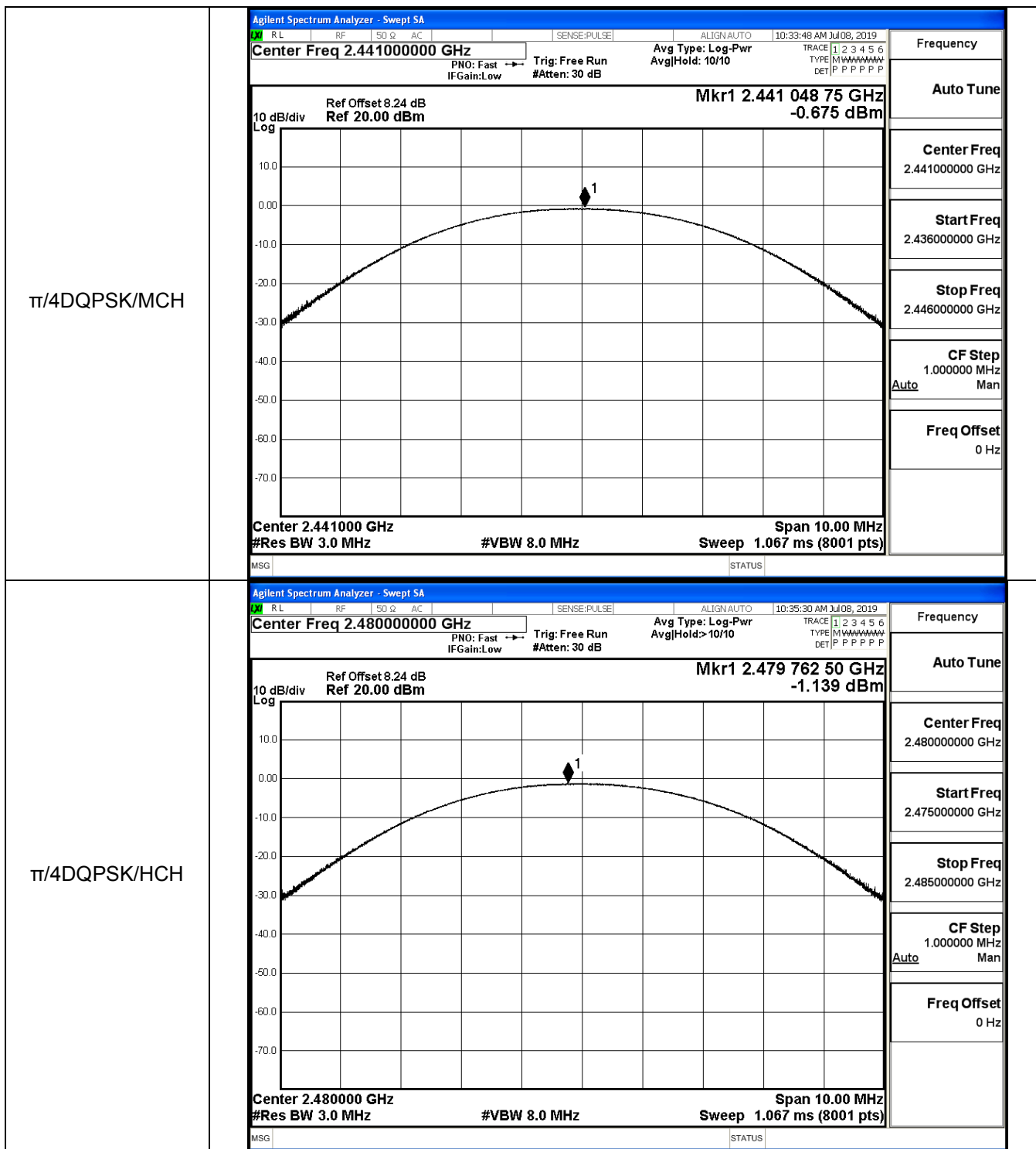


GFSK/MCH



GFSK/HCH

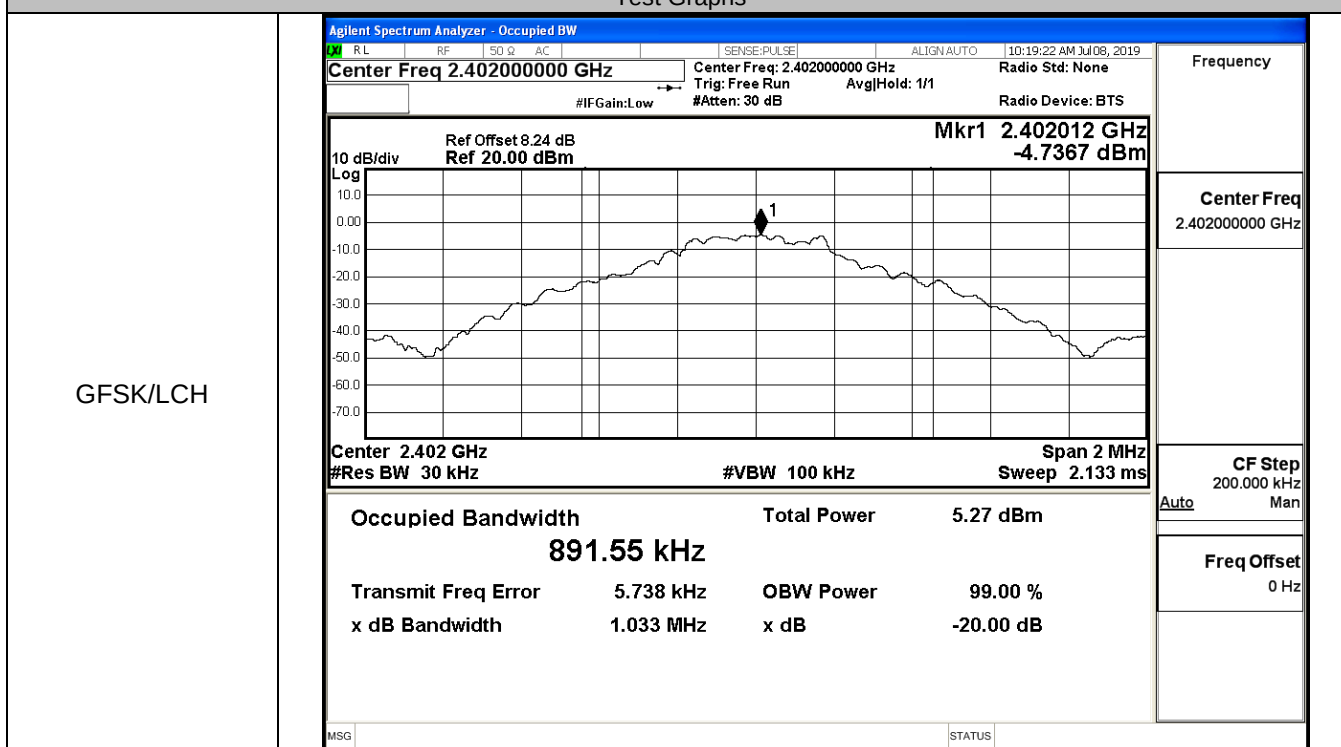
 π /4DQPSK/LCH



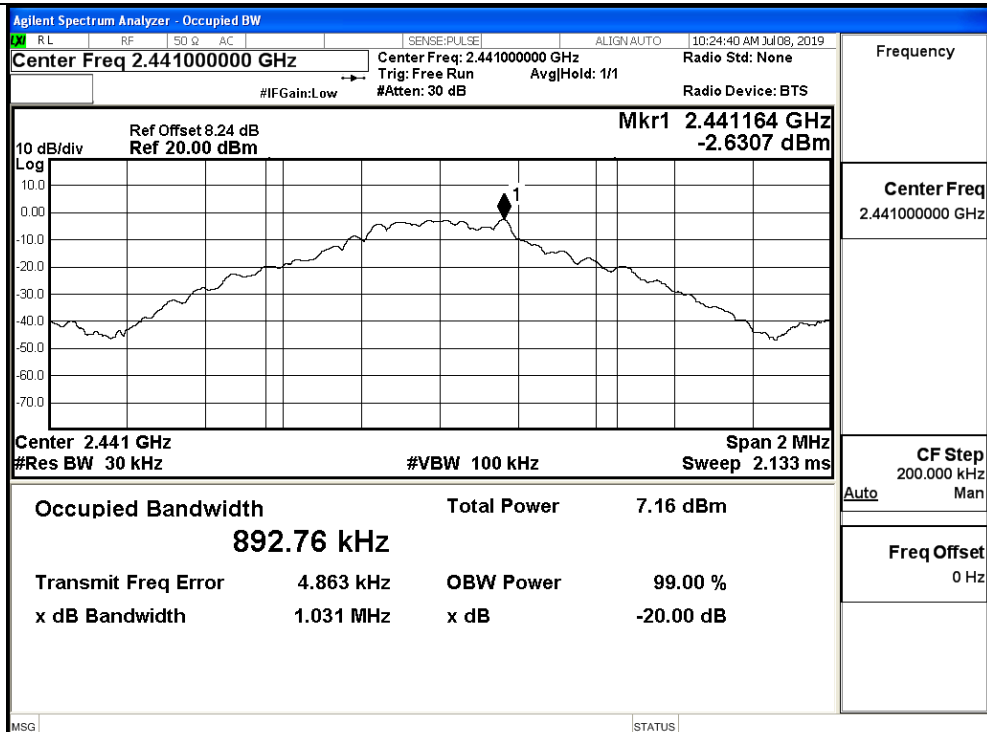
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.033	Not Specified	PASS
	MCH	1.031	Not Specified	PASS
	HCH	1.028	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.293	Not Specified	PASS
	MCH	1.291	Not Specified	PASS
	HCH	1.291	Not Specified	PASS

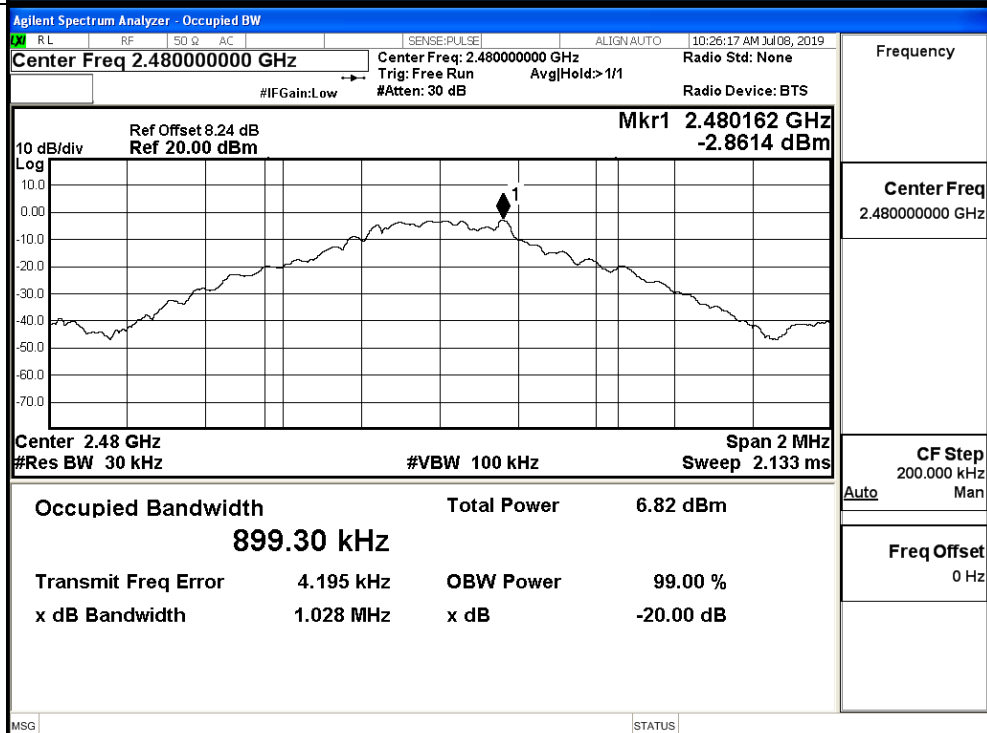
Test Graphs

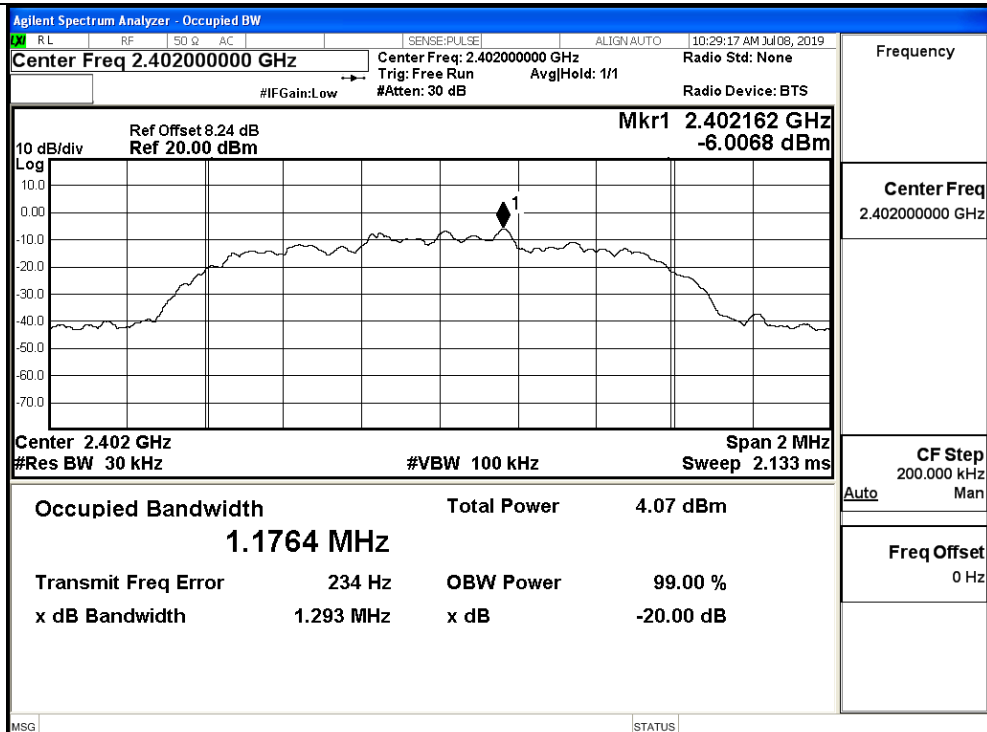
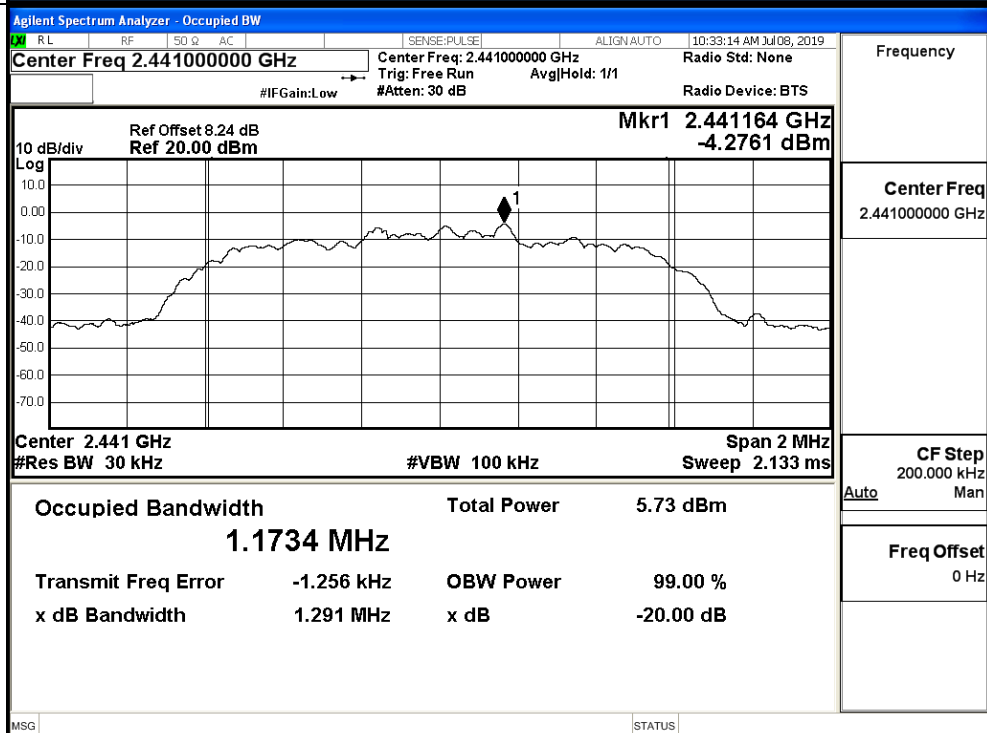


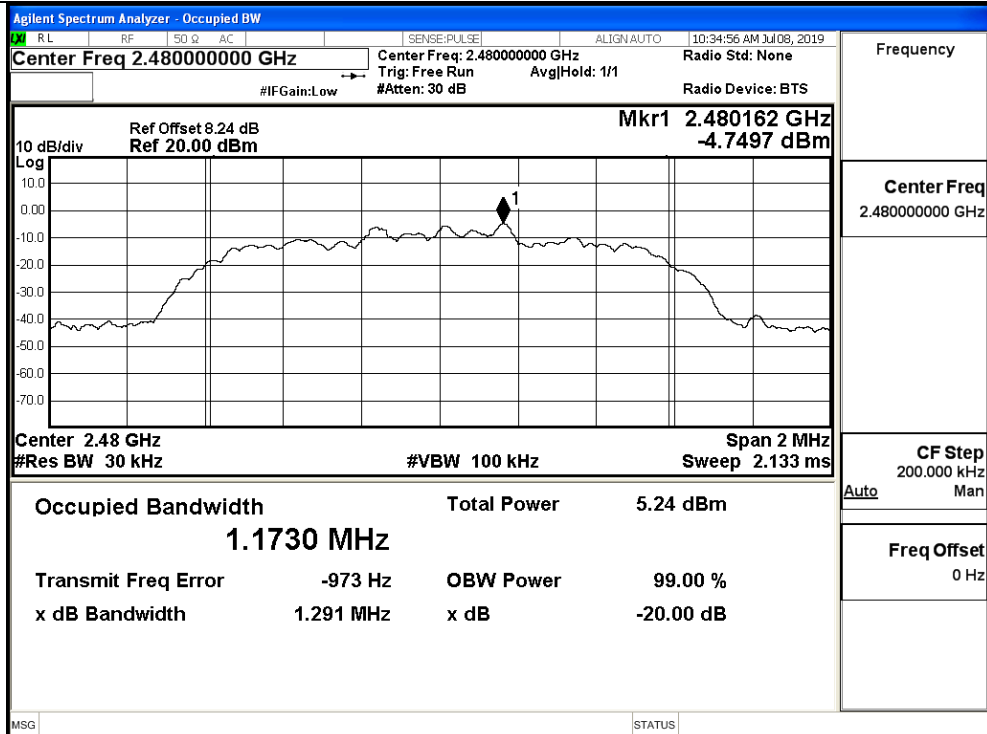
GFSK/MCH



GFSK/HCH



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

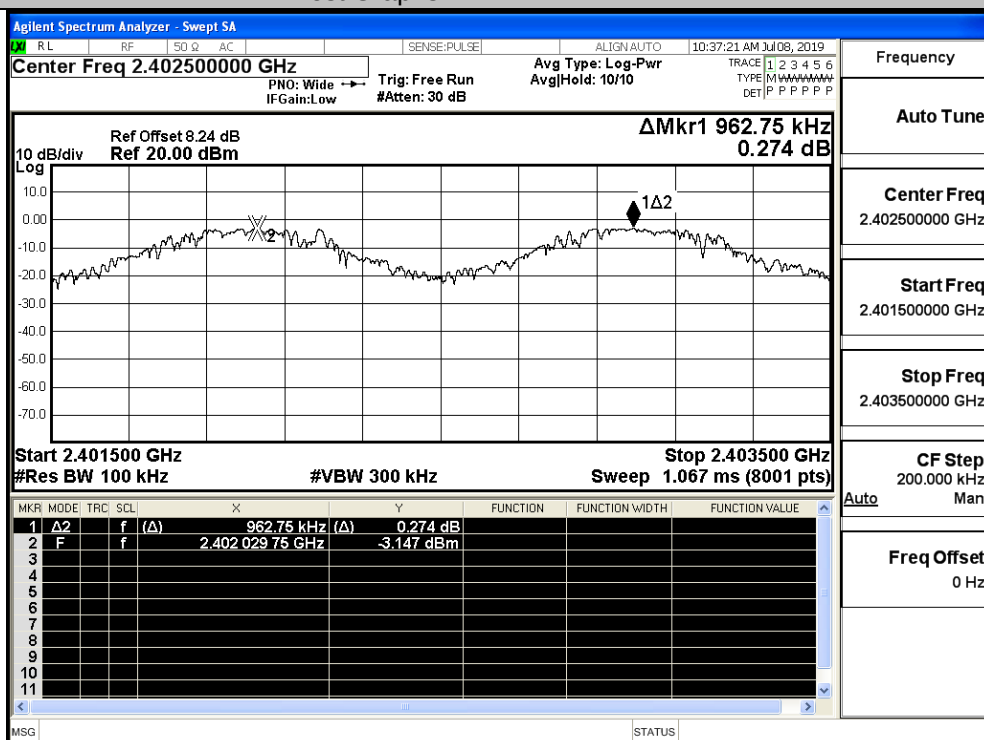
$\pi/4$ DQPSK/HCH

A.3 Carrier Frequency Separation

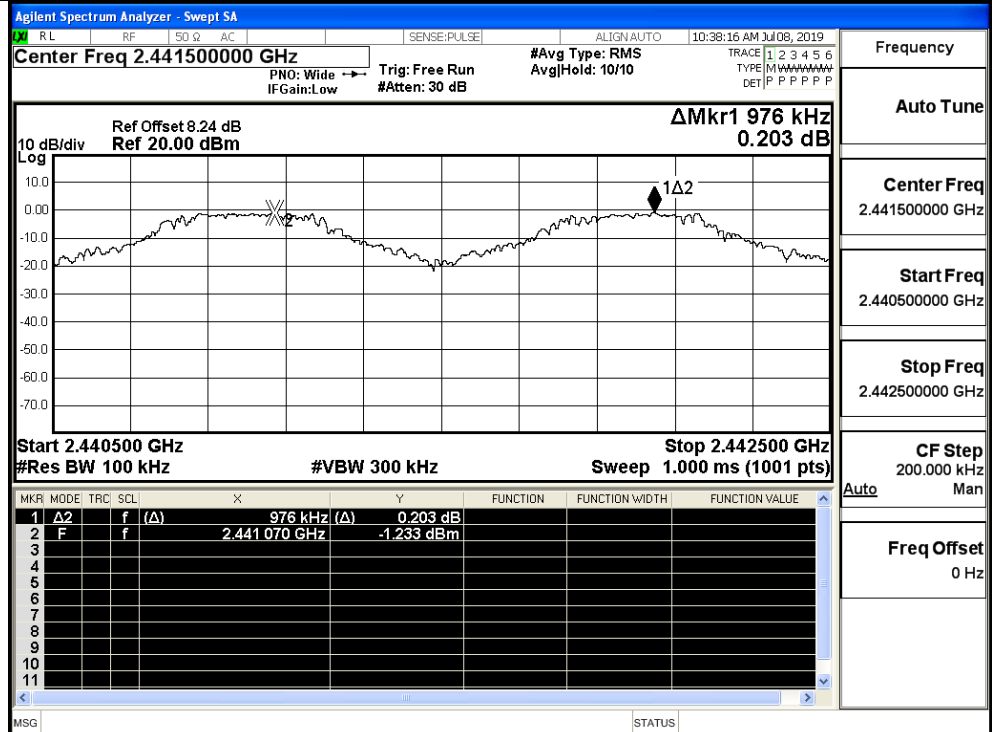
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.963	0.689	PASS
	MCH	0.976	0.689	PASS
	HCH	1.060	0.689	PASS
π /4DQPSK	LCH	0.894	0.862	PASS
	MCH	1.004	0.862	PASS
	HCH	1.136	0.862	PASS

Test Graphs

GFSK/LCH



GFSK/MCH

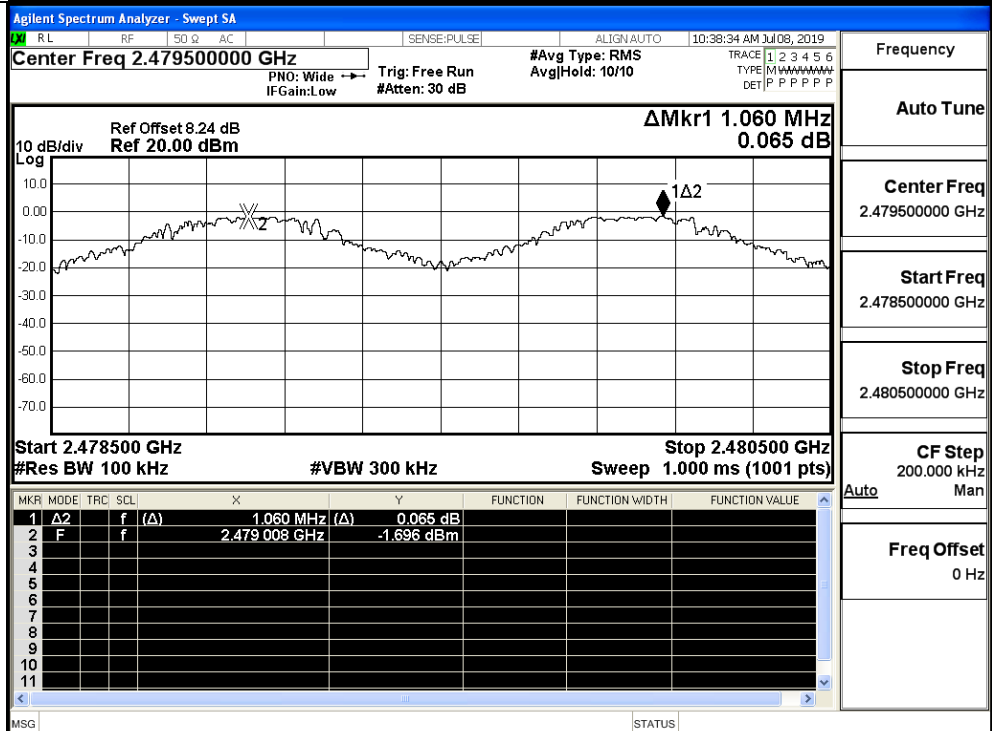


Frequency

Auto Tune

Center Freq
2.441500000 GHzStart Freq
2.440500000 GHzStop Freq
2.442500000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

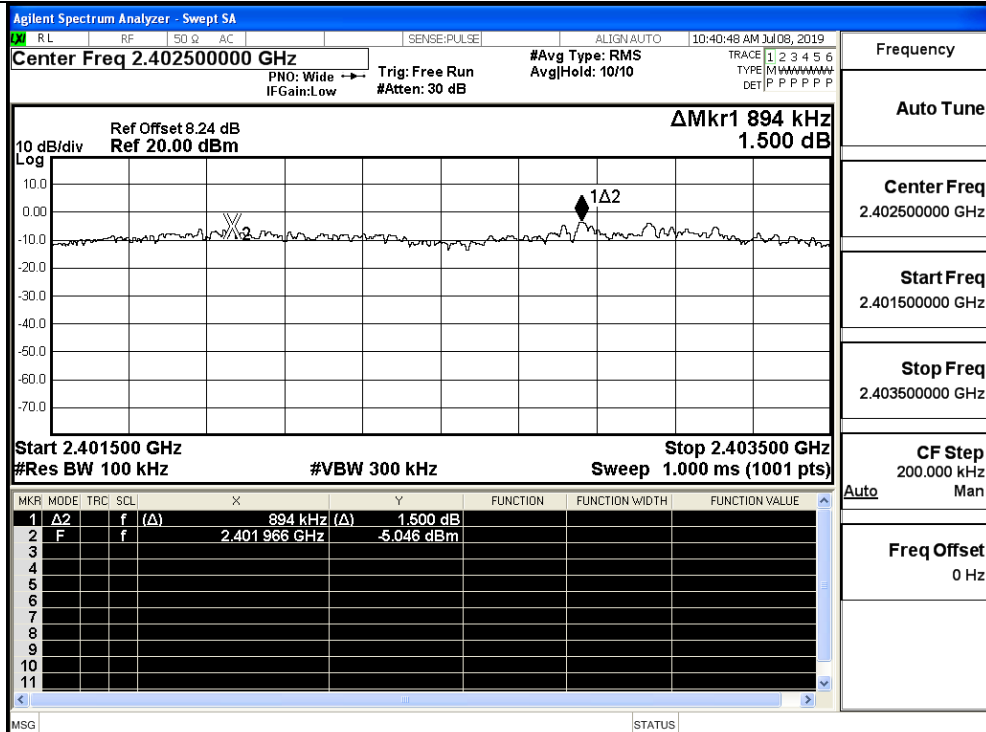
GFSK/HCH



Frequency

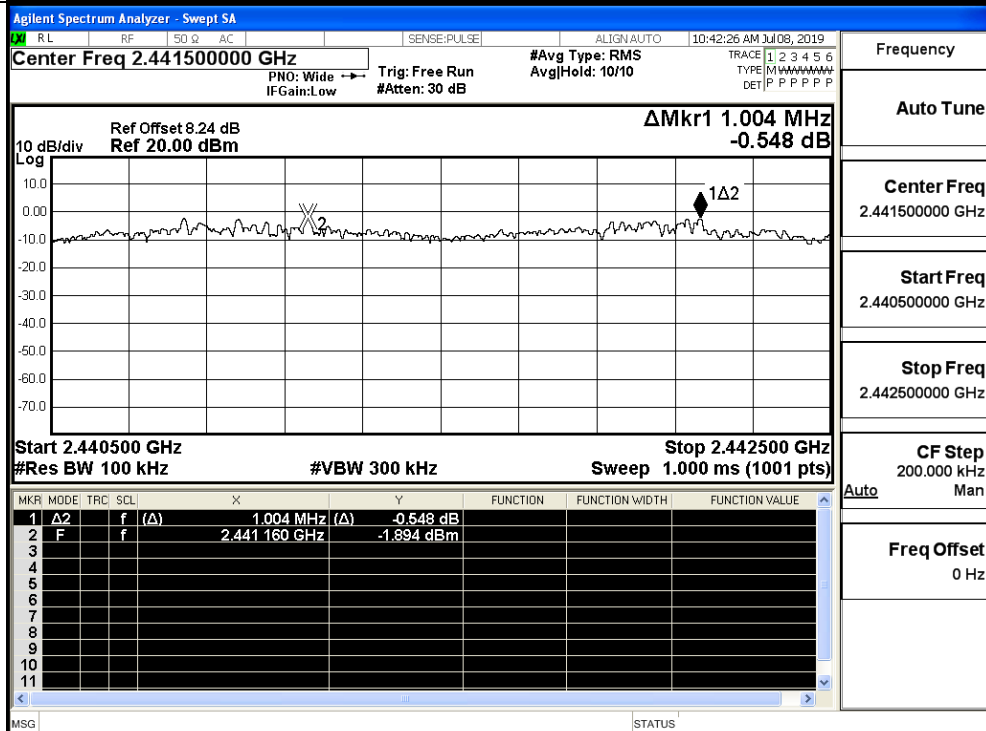
Auto Tune

Center Freq
2.479500000 GHzStart Freq
2.478500000 GHzStop Freq
2.480500000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

$\pi/4$ DQPSK/LCH

Frequency

Auto Tune

Center Freq
2.402500000 GHzStart Freq
2.401500000 GHzStop Freq
2.403500000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz $\pi/4$ DQPSK/MCH

Frequency

Auto Tune

Center Freq
2.441500000 GHzStart Freq
2.440500000 GHzStop Freq
2.442500000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

Agilent Spectrum Analyzer - Sweep SA

RL RF 50 Ω AC SENSE:PULSE ALIGN:AUTO 10:45:54 AM Jul 08, 2019

Center Freq 2.479500000 GHz

PNO: Wide IFGain: Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS AvgHold: 10/10

TRACE TYPE M P P P P P P DET P P P P P P P

Ref Offset 8.24 dB Ref 20.00 dBm ΔMkr1 1.136 MHz 2.767 dB

Start 2.478500 GHz Stop 2.480500 GHz
#Res BW 100 kHz #VBW 300 kHz Sweep 1.000 ms (1001 pts)

Mkri	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ2	f	(Δ)	1.136 MHz	(Δ) 2.767 dB			
2	F	f		2.479 040 GHz	-5.432 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

Auto Man

Freq Offset
0 Hz

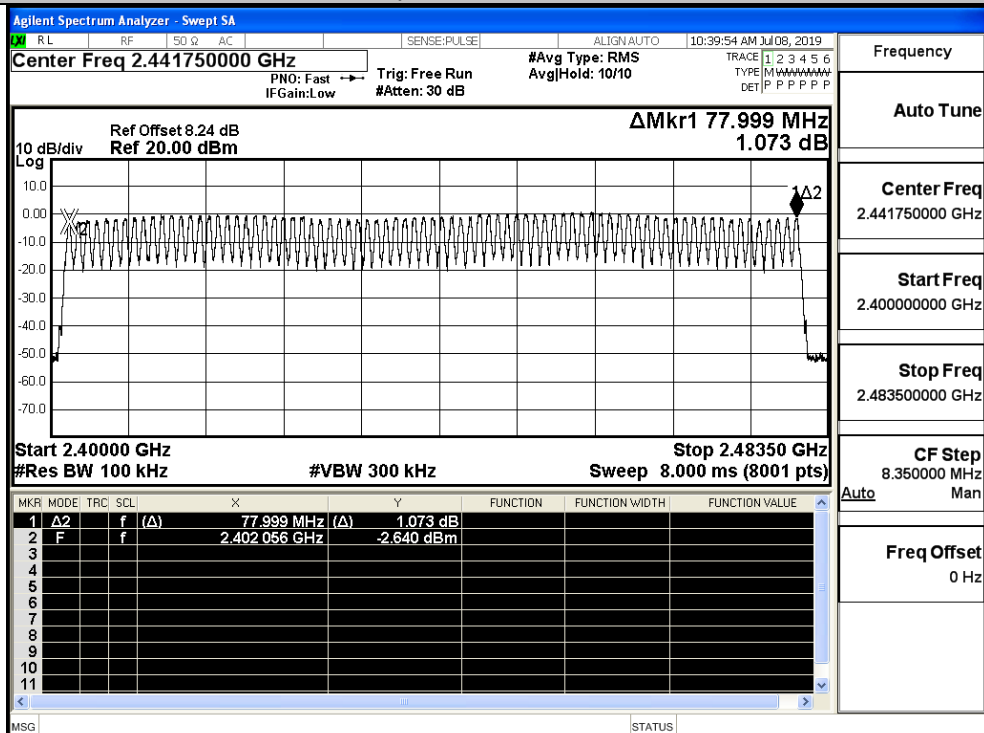
MSG STATUS

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

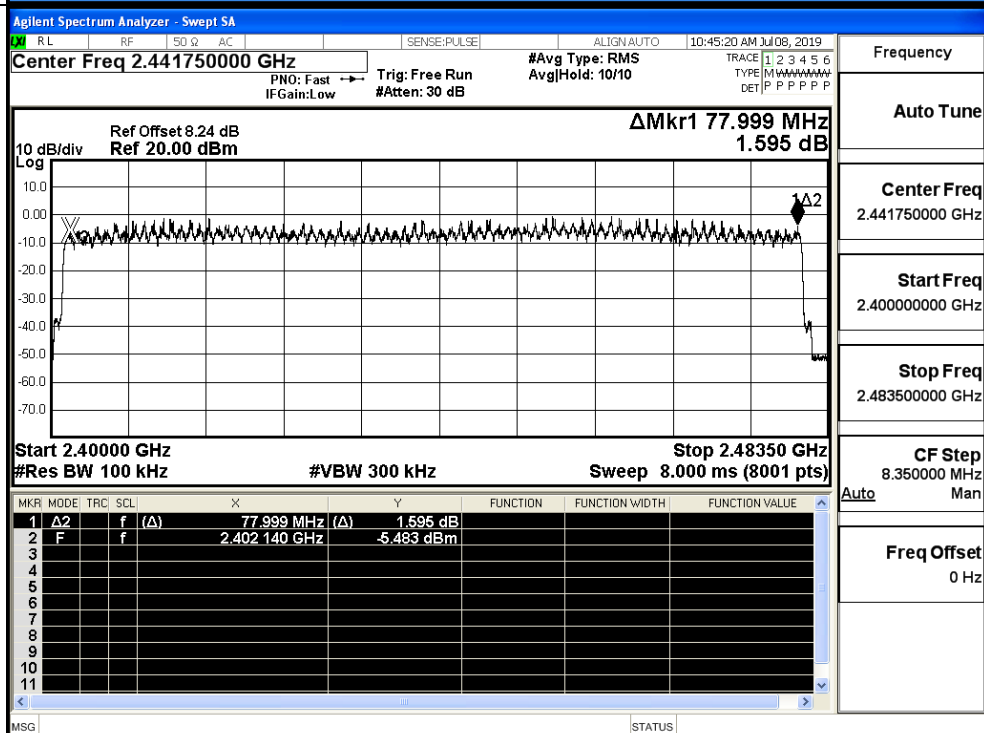
Test Graphs

GFSK/Hop



Frequency

Auto Tune

Center Freq
2.441750000 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

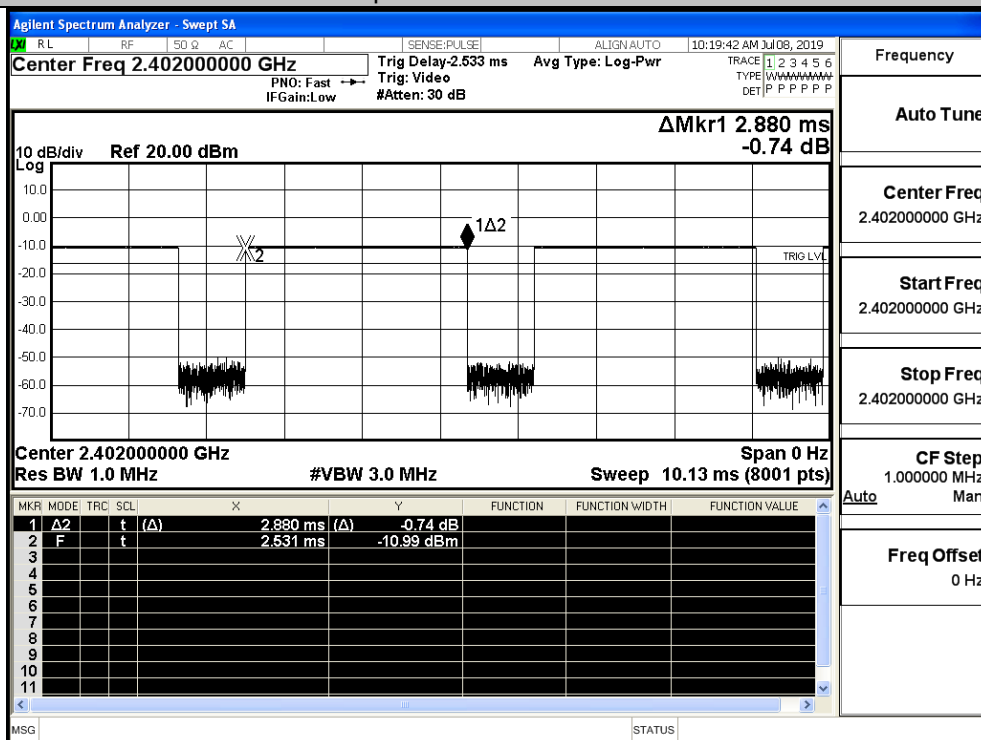
Center Freq
2.441750000 GHzStart Freq
2.400000000 GHzStop Freq
2.483500000 GHzCF Step
8.350000 MHz
Auto ManFreq Offset
0 Hz

A.5 Dwell Time

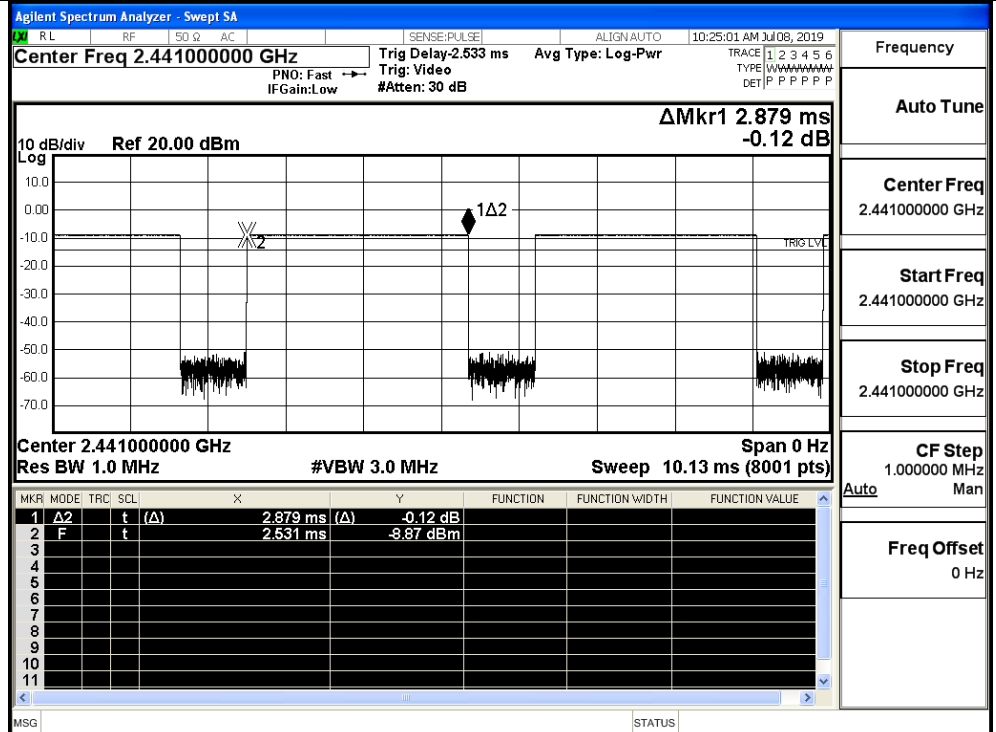
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88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

Test Graphs

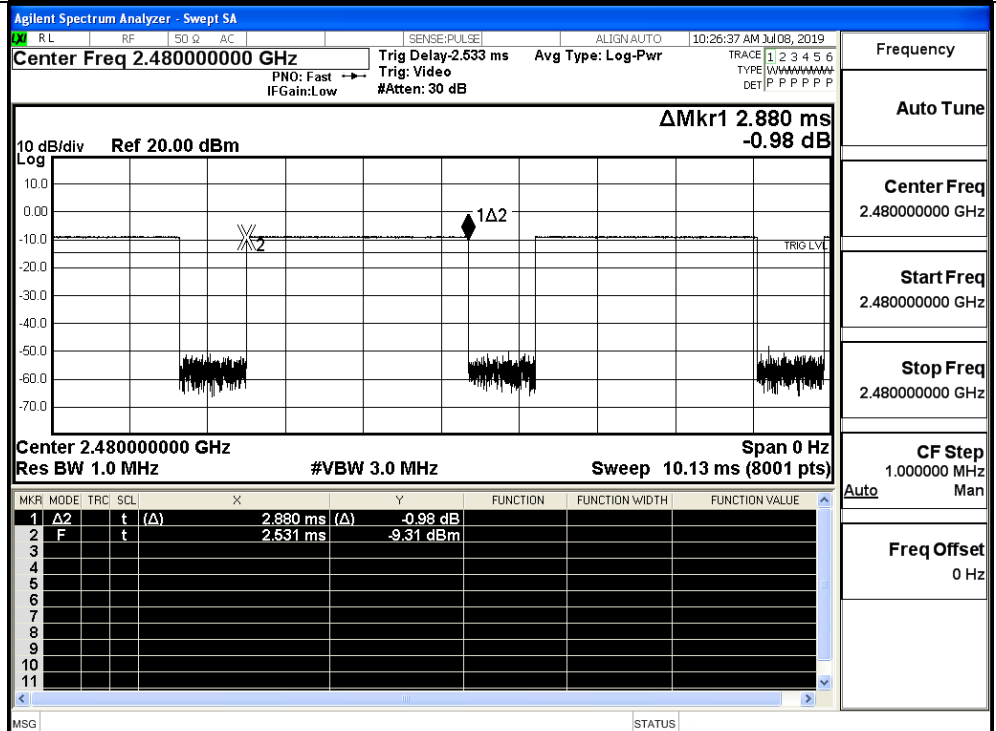
GFSK_DH5/LCH



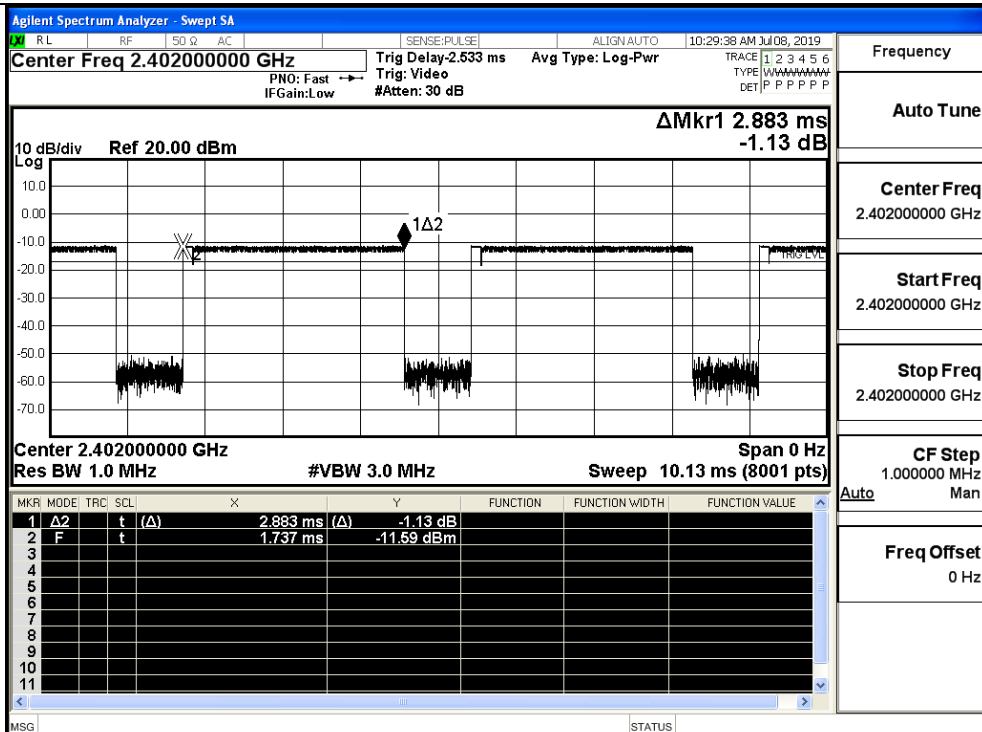
GFSK_DH5/MCH



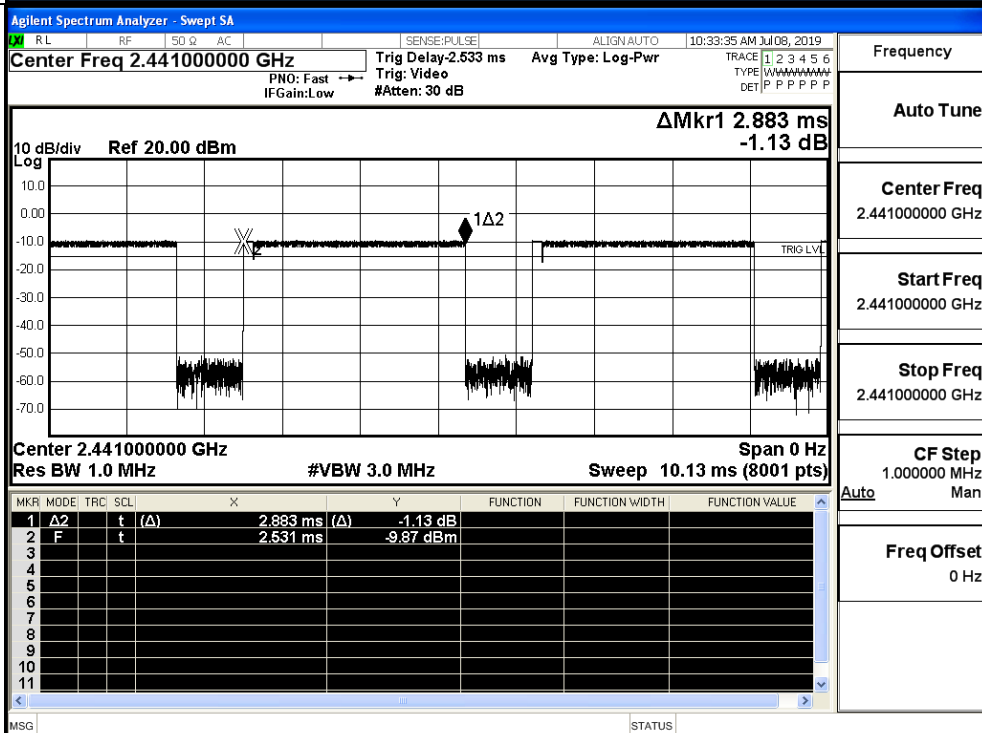
GFSK_DH5/HCH



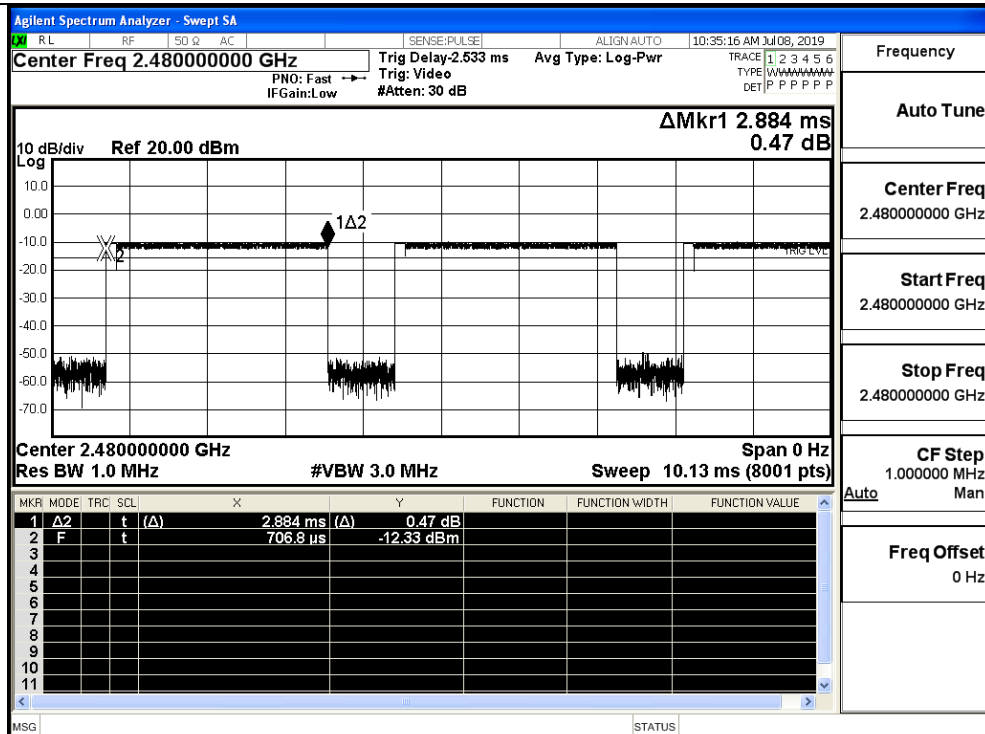
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH



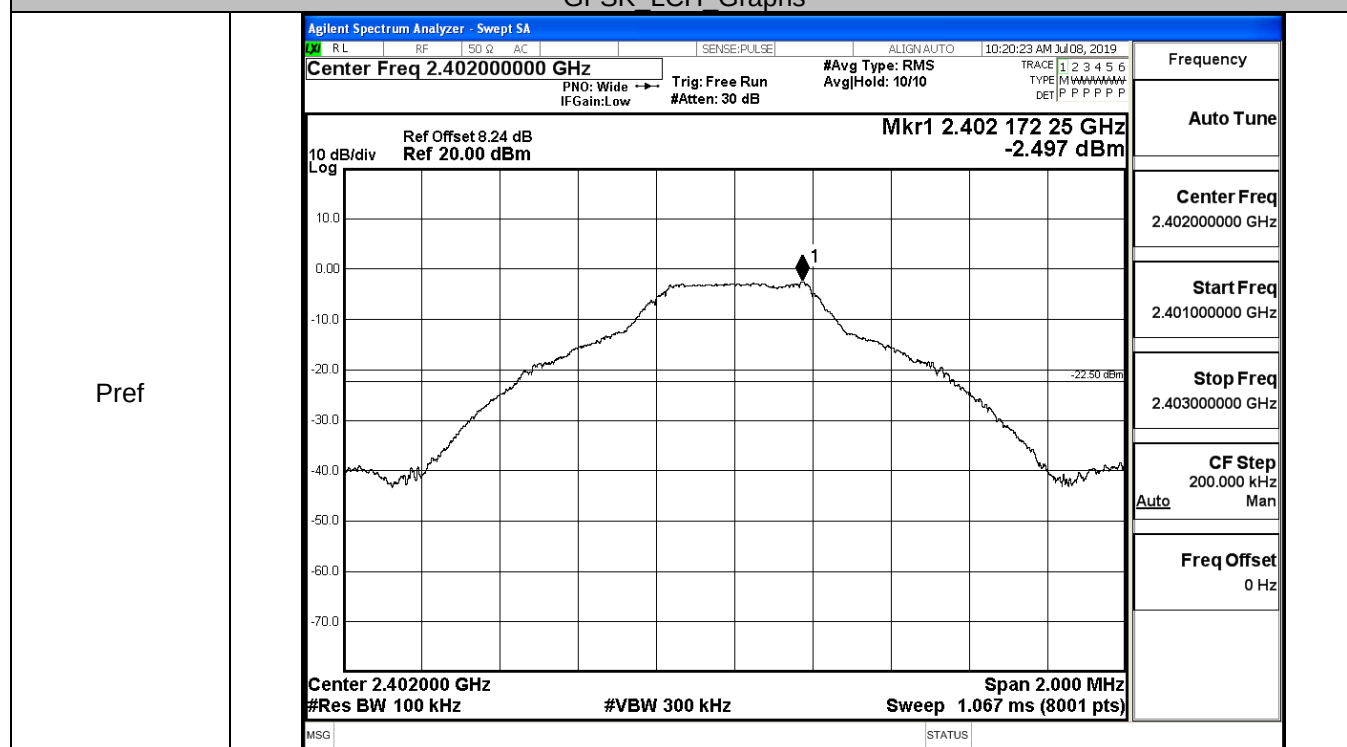
π/4DQPSK
_2DH5/HCH

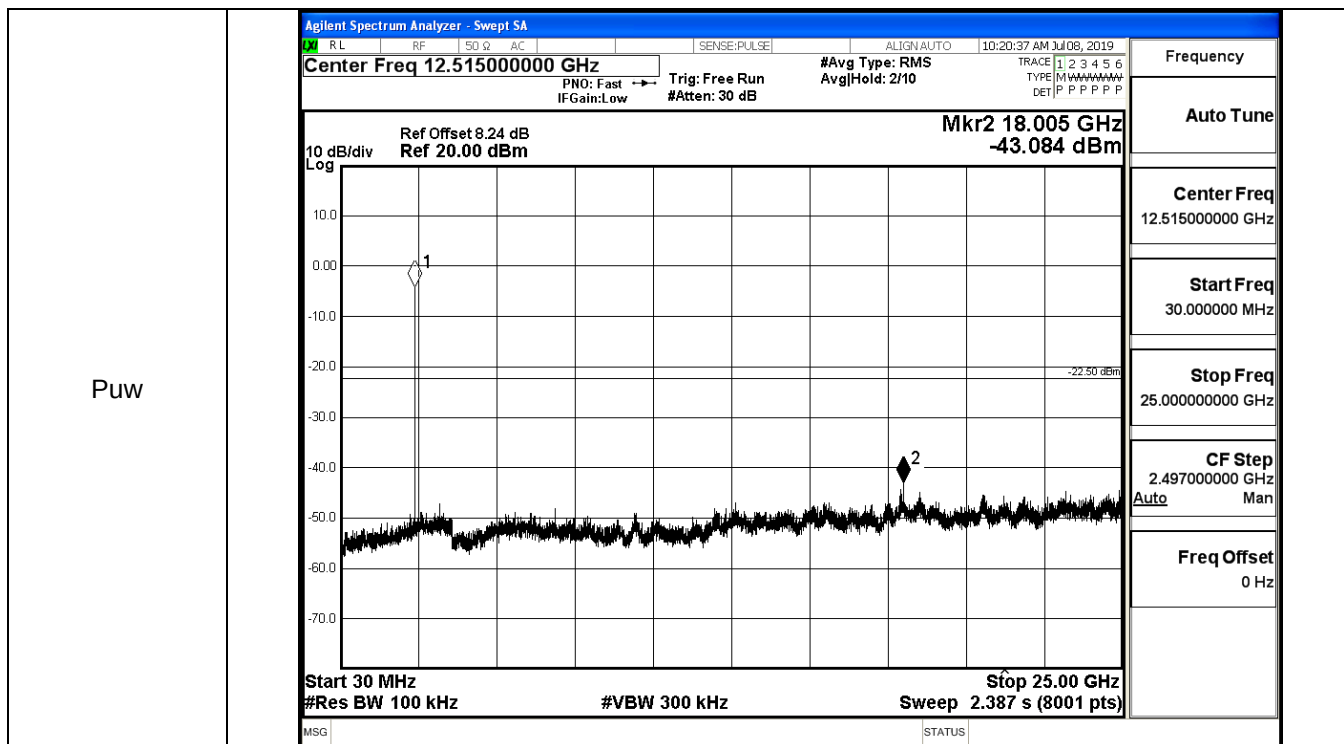


A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-2.497	-43.084	-22.497	PASS
	MCH	-0.256	-44.732	-20.256	PASS
	HCH	-0.866	-45.193	-20.866	PASS
$\pi/4$ DQPSK	LCH	-3.246	-44.580	-23.246	PASS
	MCH	-1.601	-44.803	-21.601	PASS
	HCH	-2.273	-45.078	-22.273	PASS

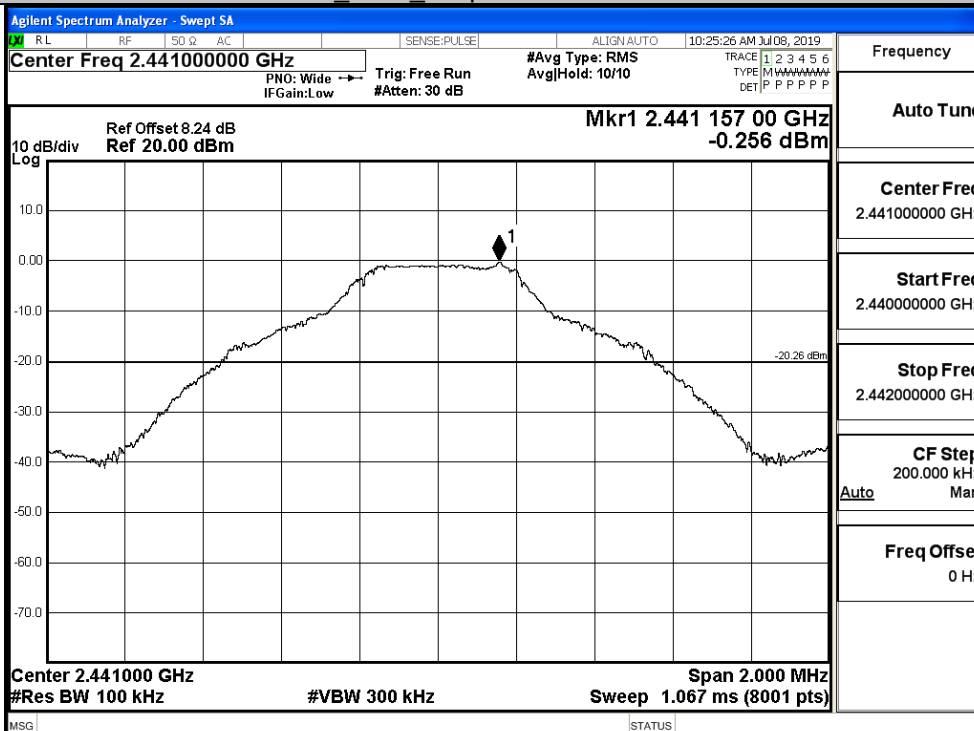
GFSK LCH Graphs



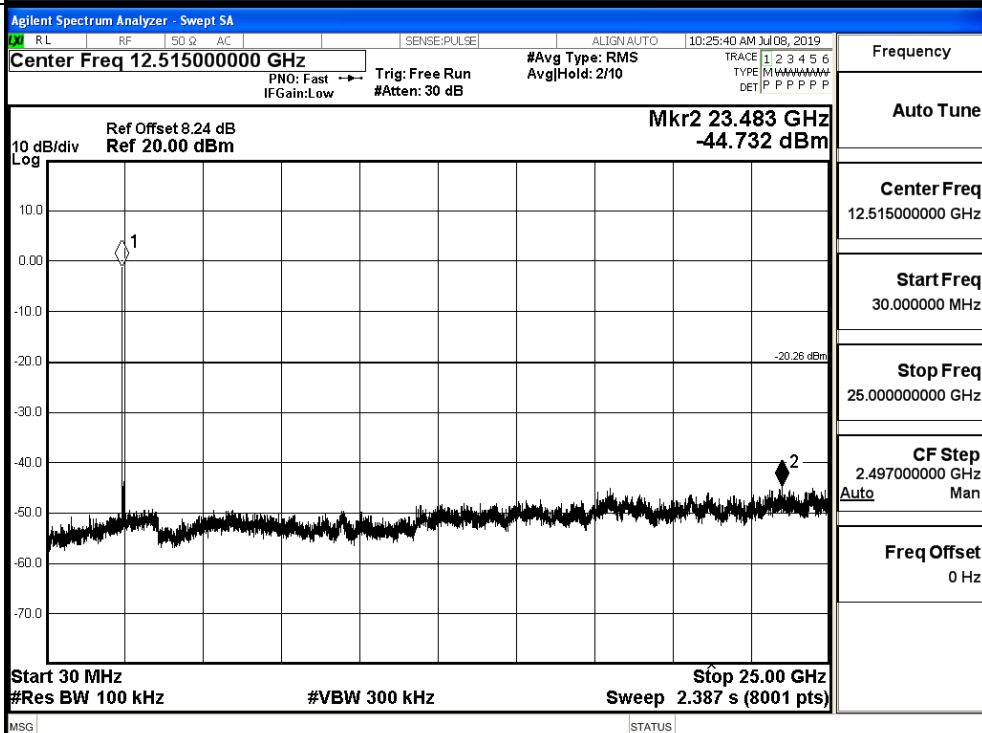


GFSK_MCH_Graphs

Pref

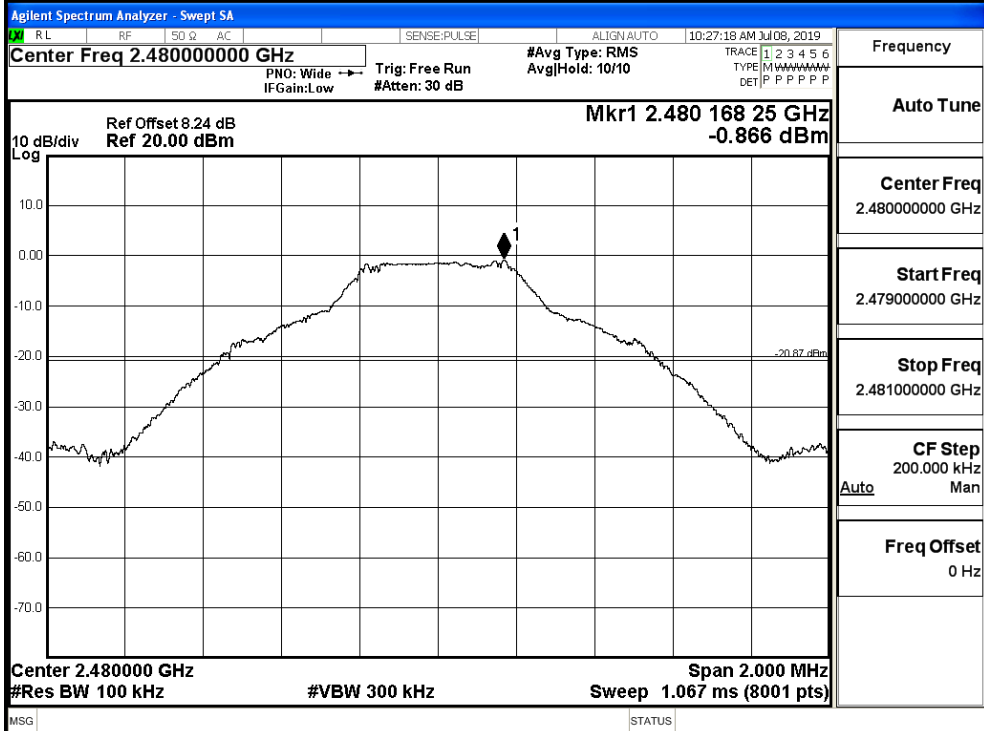


Puw

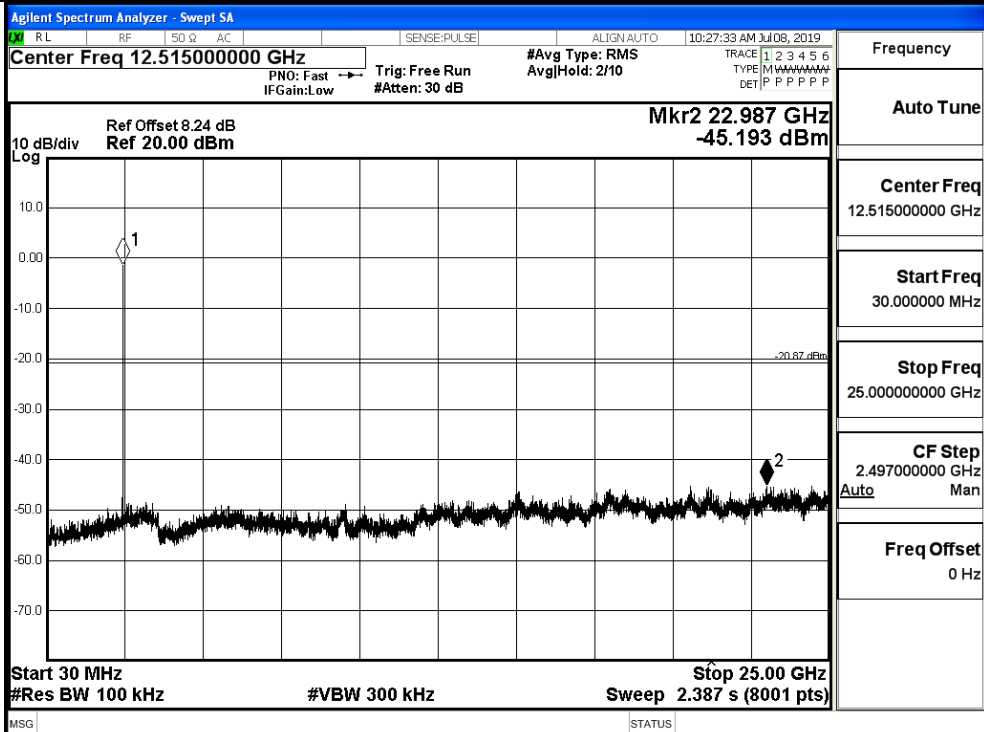


GFSK HCH_Graphs

Pref

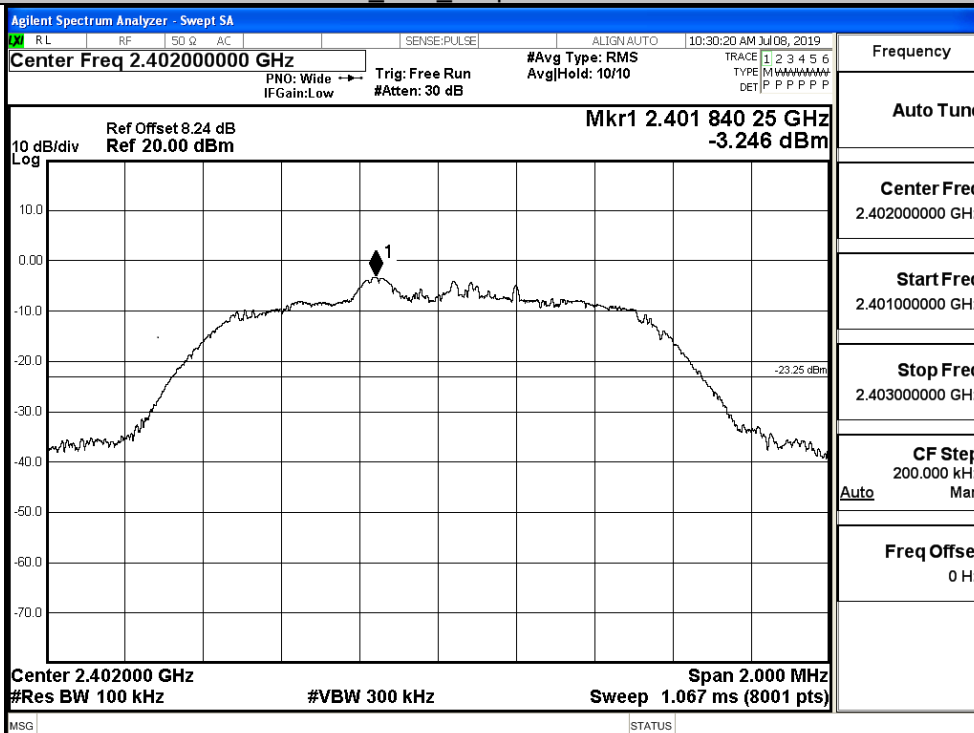


Puw

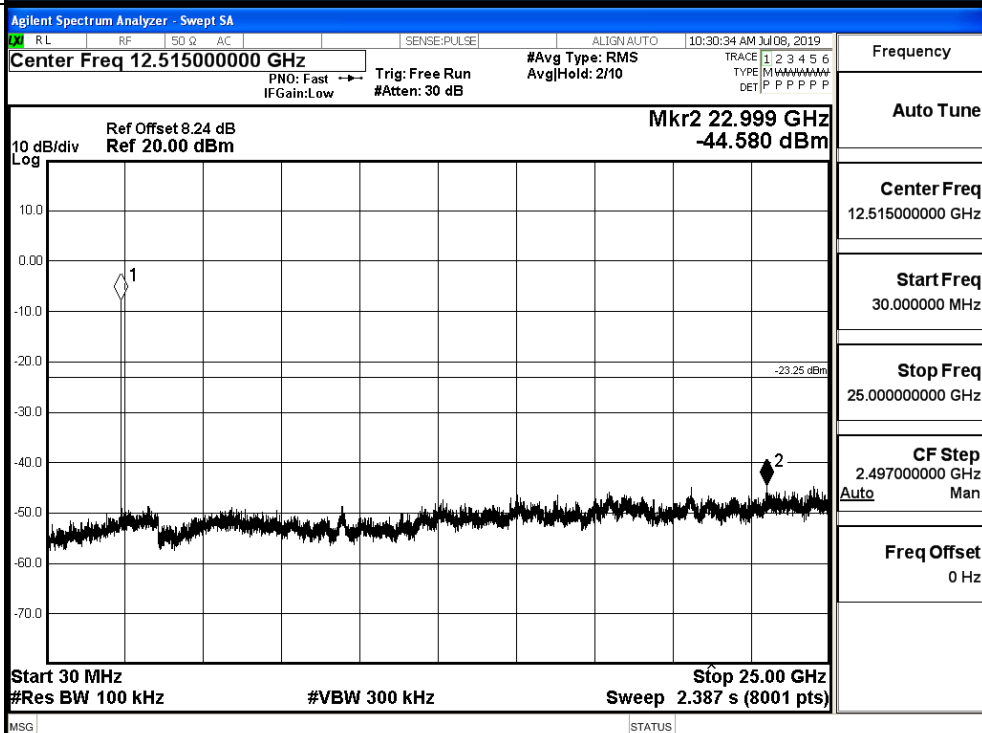


$\pi/4$ DQPSK_LCH_Graphs

Pref

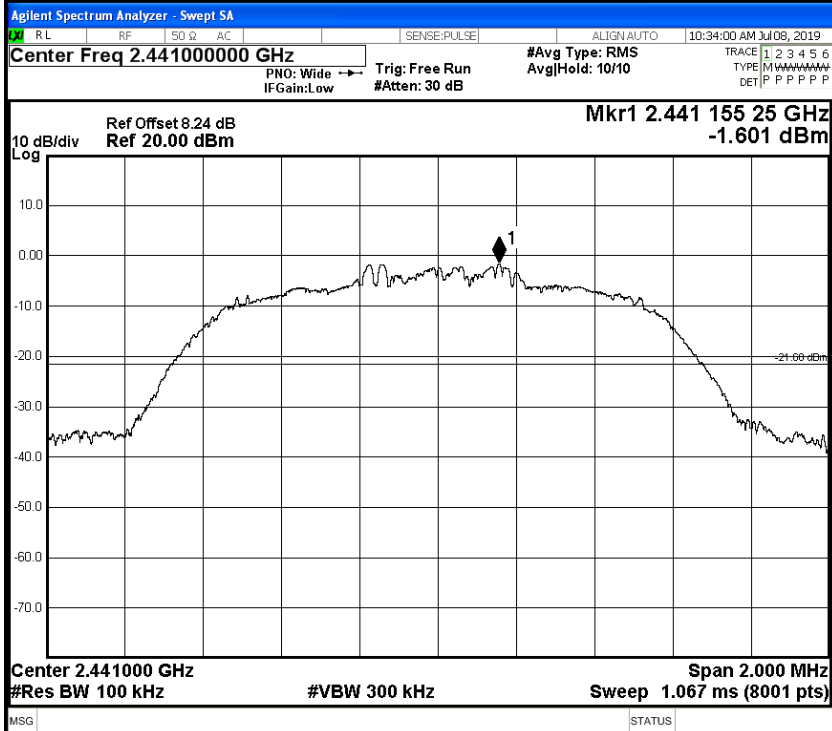


Puw



$\pi/4$ DQPSK_MCH_Graphs

Pref

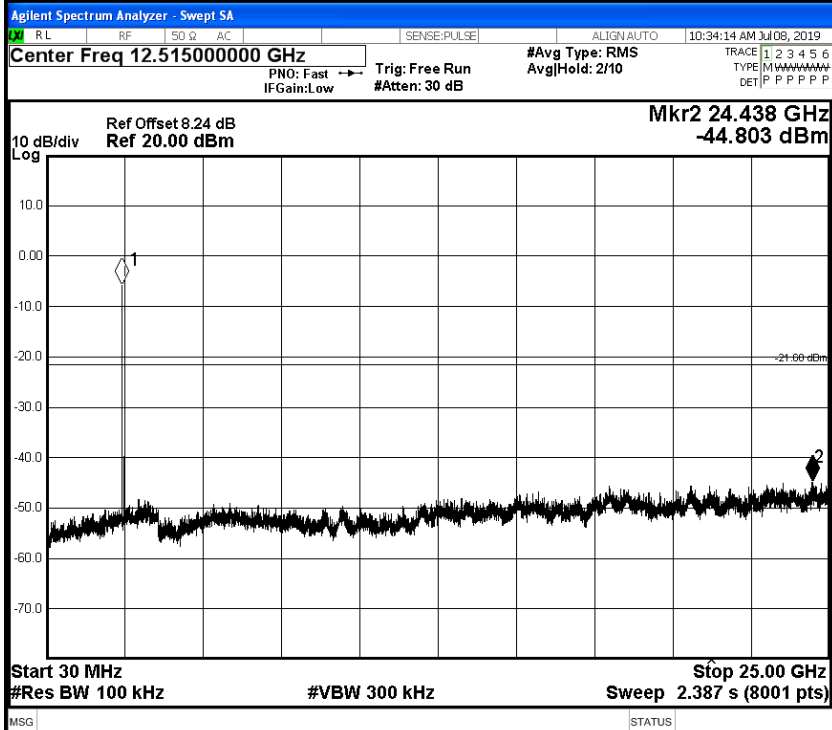


Frequency

Auto Tune

Center Freq
2.441000000 GHzStart Freq
2.440000000 GHzStop Freq
2.442000000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

Puw



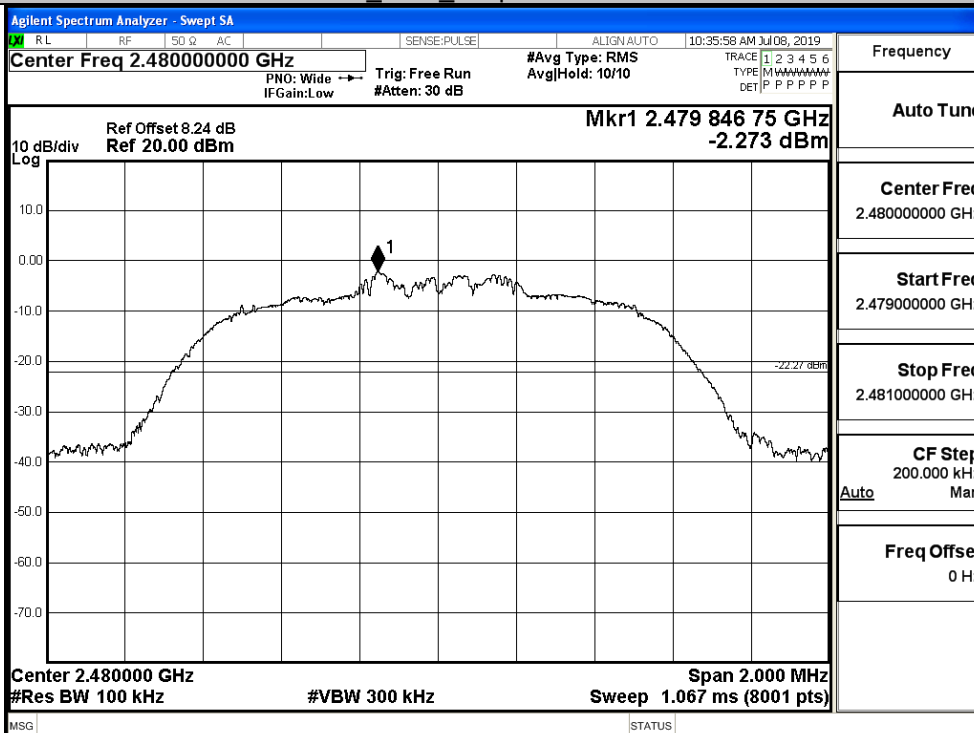
Frequency

Auto Tune

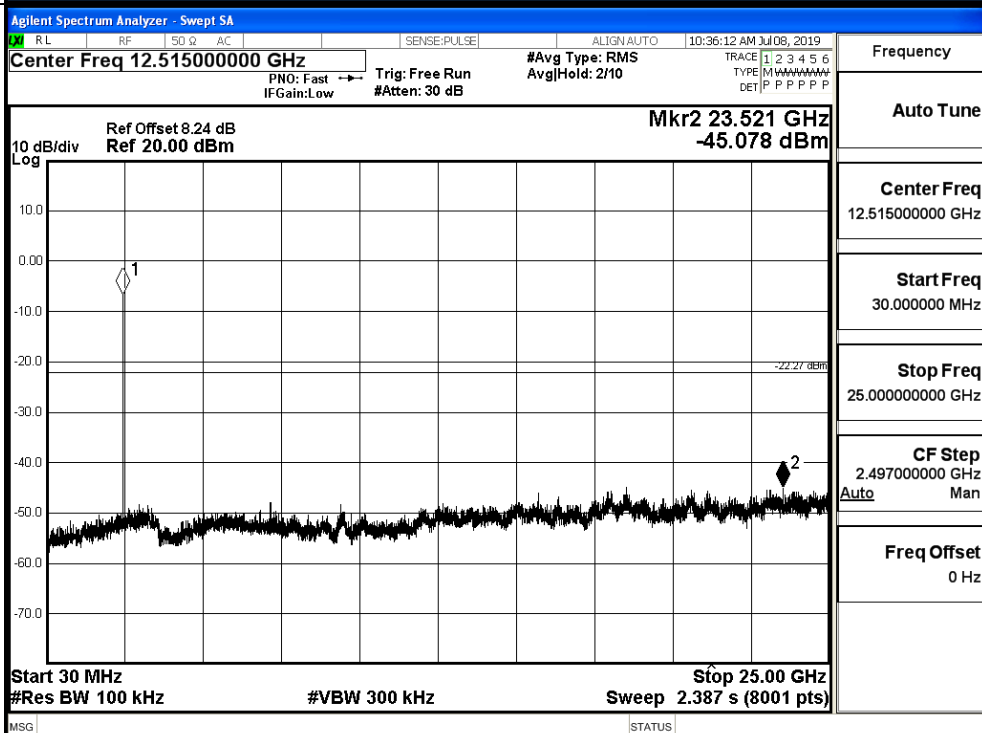
Center Freq
12.515000000 GHzStart Freq
30.0000000 MHzStop Freq
25.000000000 GHzCF Step
2.497000000 GHz
Auto ManFreq Offset
0 Hz

$\pi/4$ DQPSK_HCH_Graphs

Pref



Puw

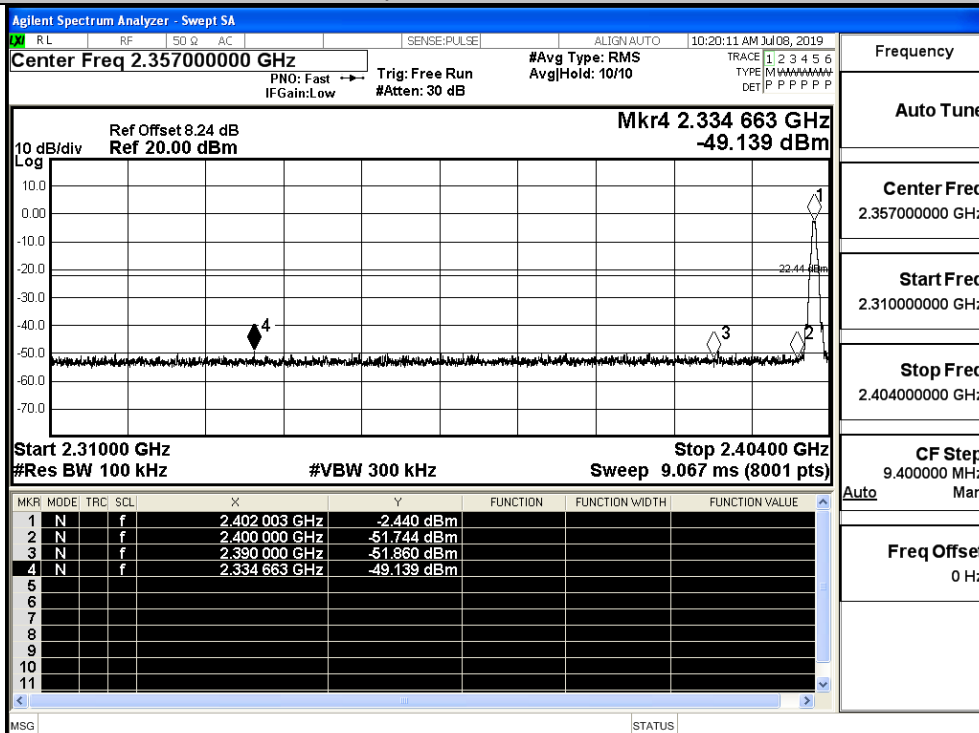


A.7 Band-edge for RF Conducted Emissions

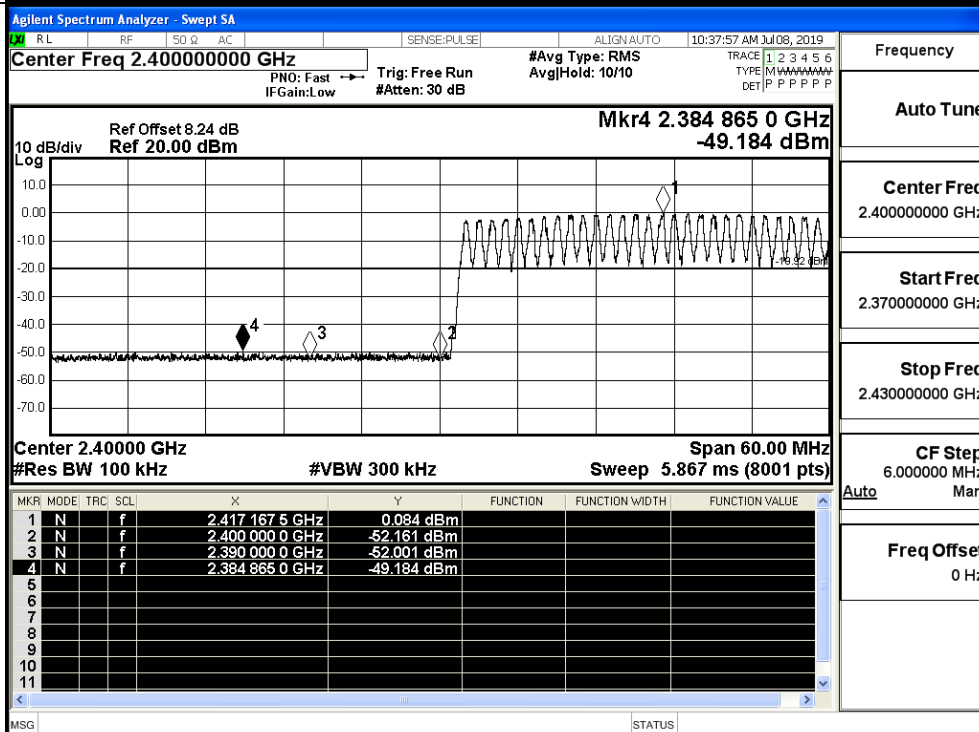
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-2.440	Off	-49.139	-22.44	PASS
			0.084	On	-49.184	-19.92	PASS
	HCH	2480	-0.784	Off	-49.692	-20.78	PASS
			0.738	On	-49.337	-19.26	PASS
$\pi/4$ DQPSK	LCH	2402	-3.276	Off	-49.552	-23.28	PASS
			-1.115	On	-49.253	-21.12	PASS
	HCH	2480	-0.277	Off	-49.220	-20.28	PASS
			-0.438	On	-49.034	-20.44	PASS

Test Graphs

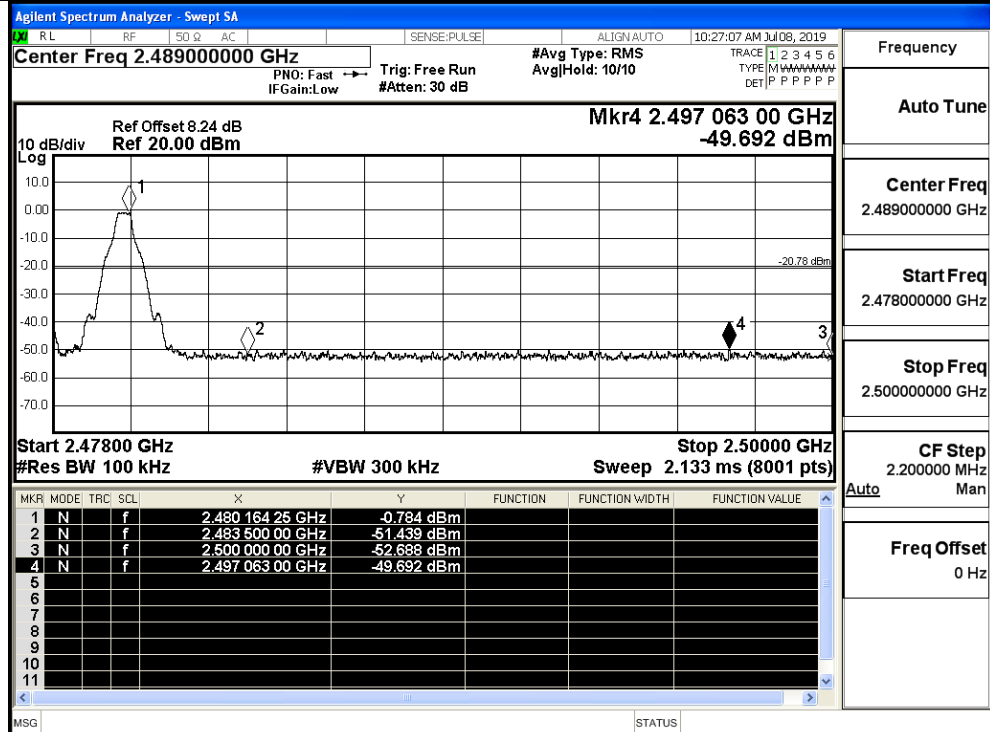
GFSK/LCH/No Hop



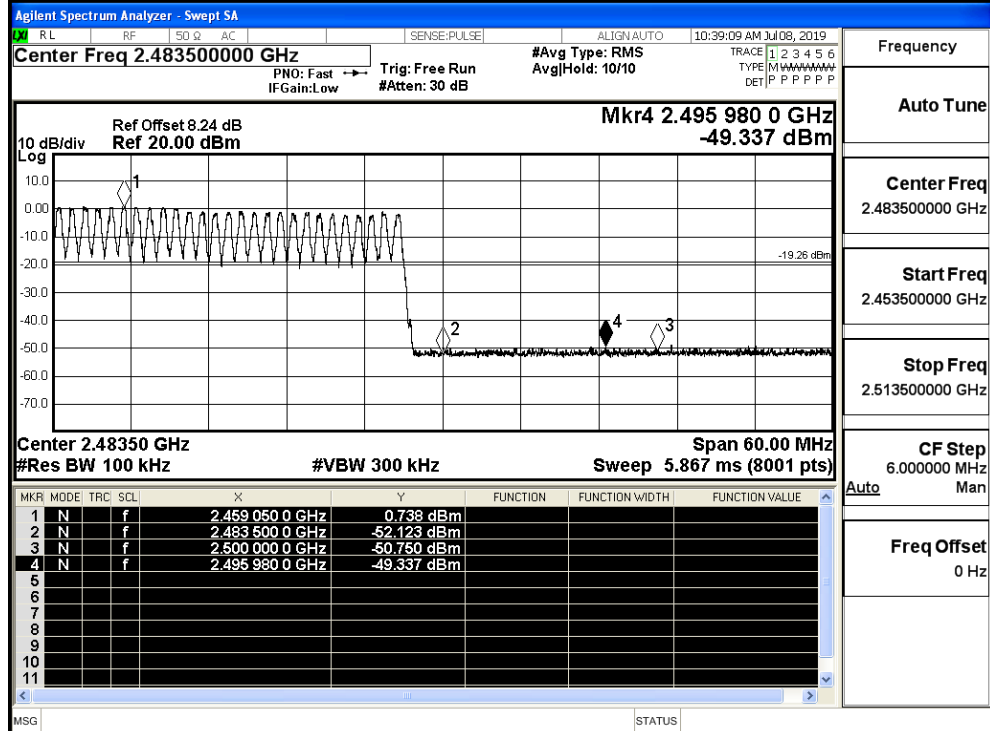
GFSK/LCH/Hop



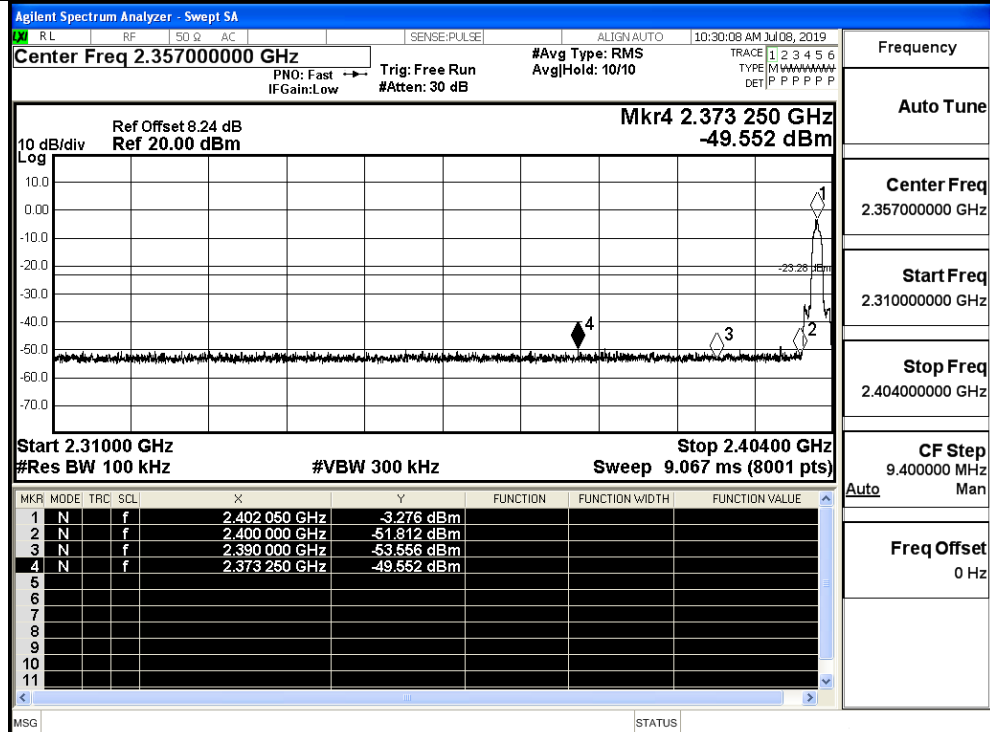
GFSK/HCH/No Hop



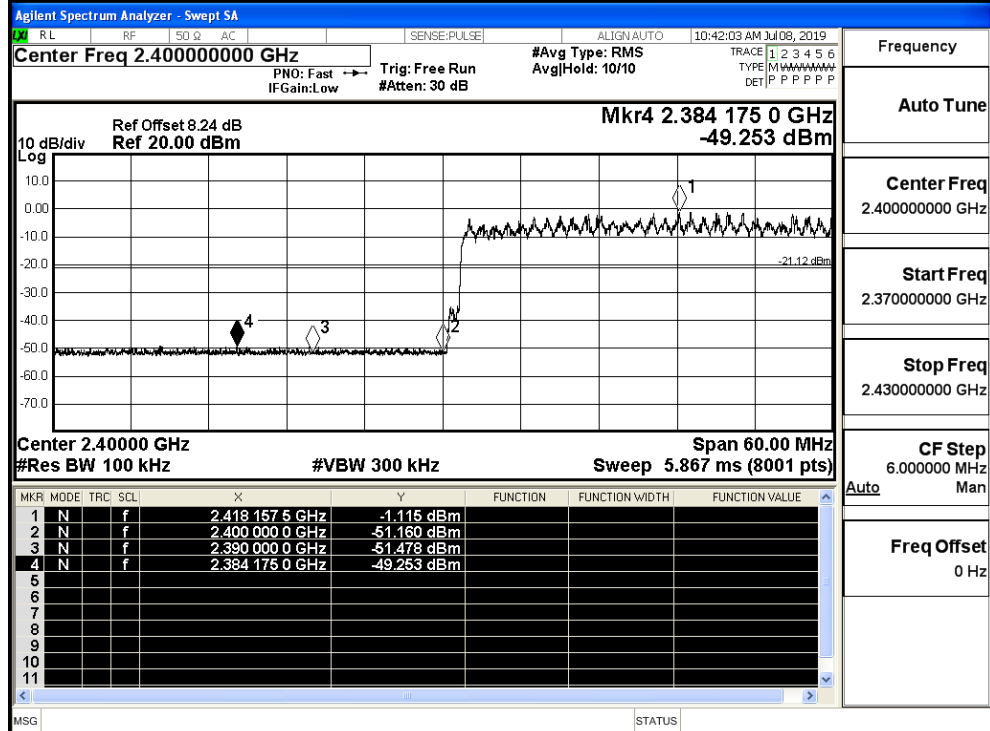
GFSK/HCH/Hop



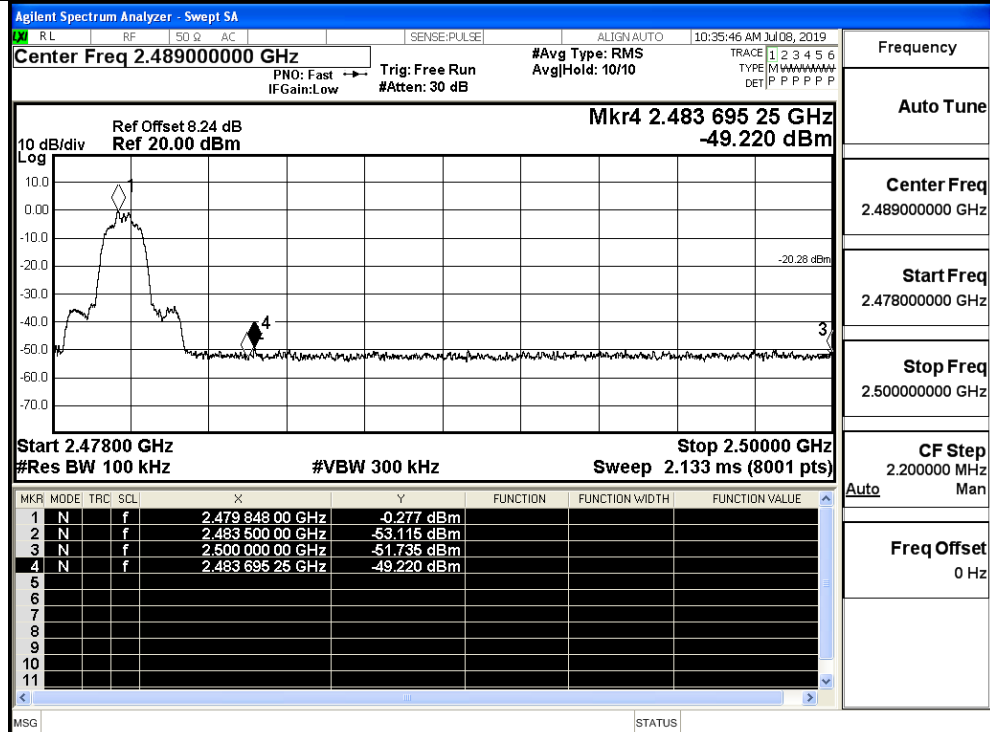
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop



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

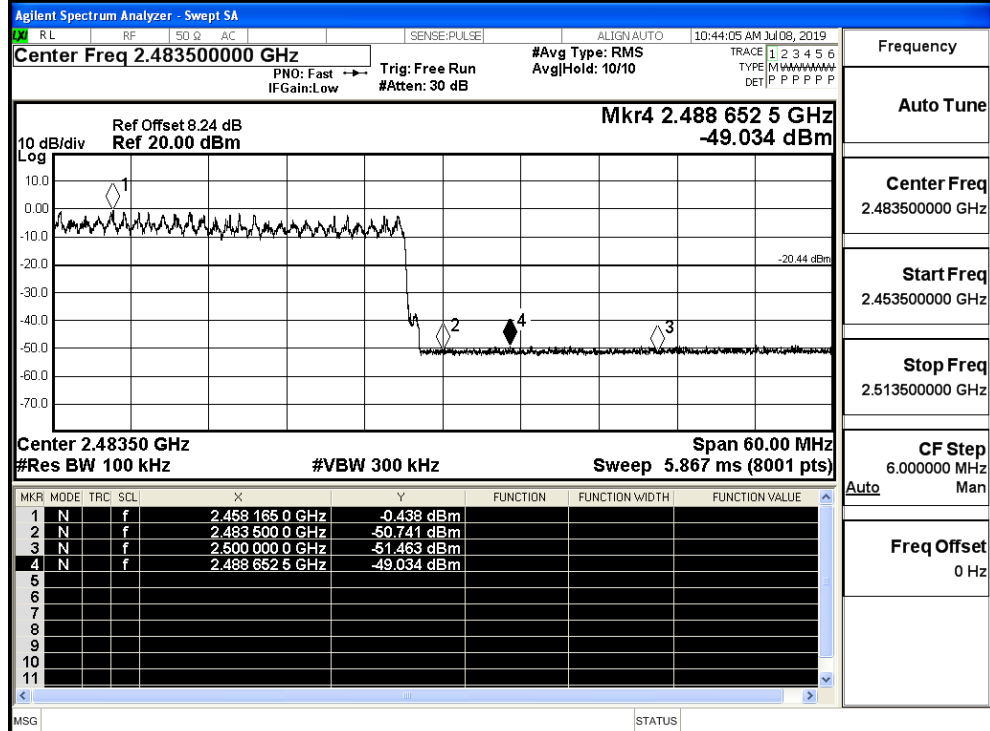


Frequency

Auto Tune

Center Freq
2.489000000 GHzStart Freq
2.478000000 GHzStop Freq
2.500000000 GHzCF Step
2.200000 MHz
Auto ManFreq Offset
0 Hz

$\pi/4$ DQPSK/HCH/Hop



Frequency

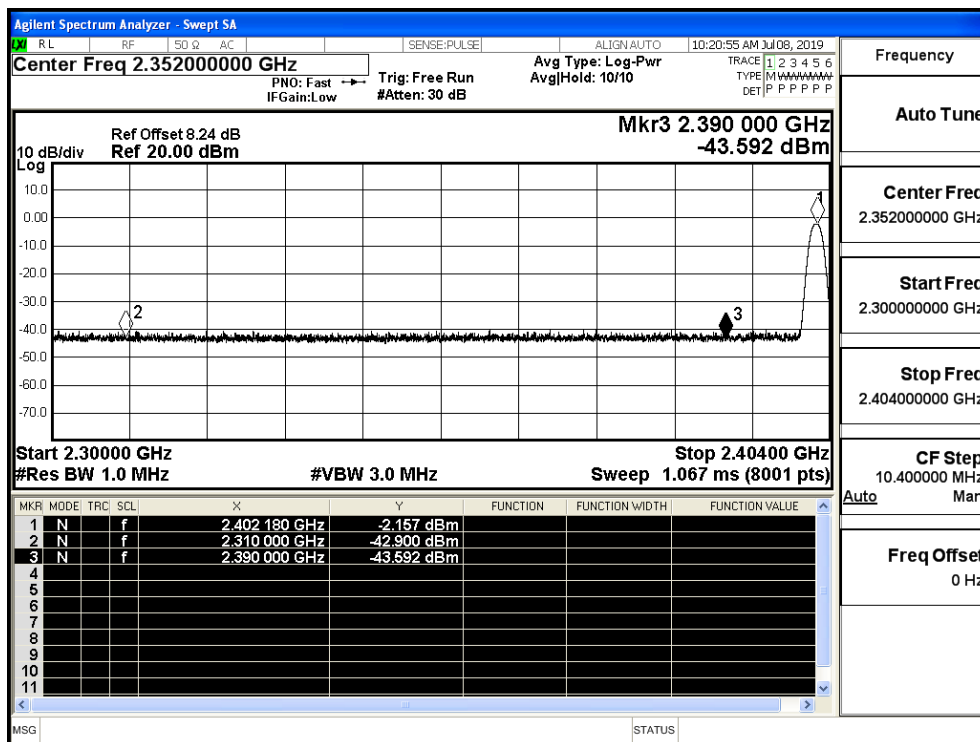
Auto Tune

Center Freq
2.483500000 GHzStart Freq
2.453500000 GHzStop Freq
2.513500000 GHzCF Step
6.000000 MHz
Auto ManFreq Offset
0 Hz

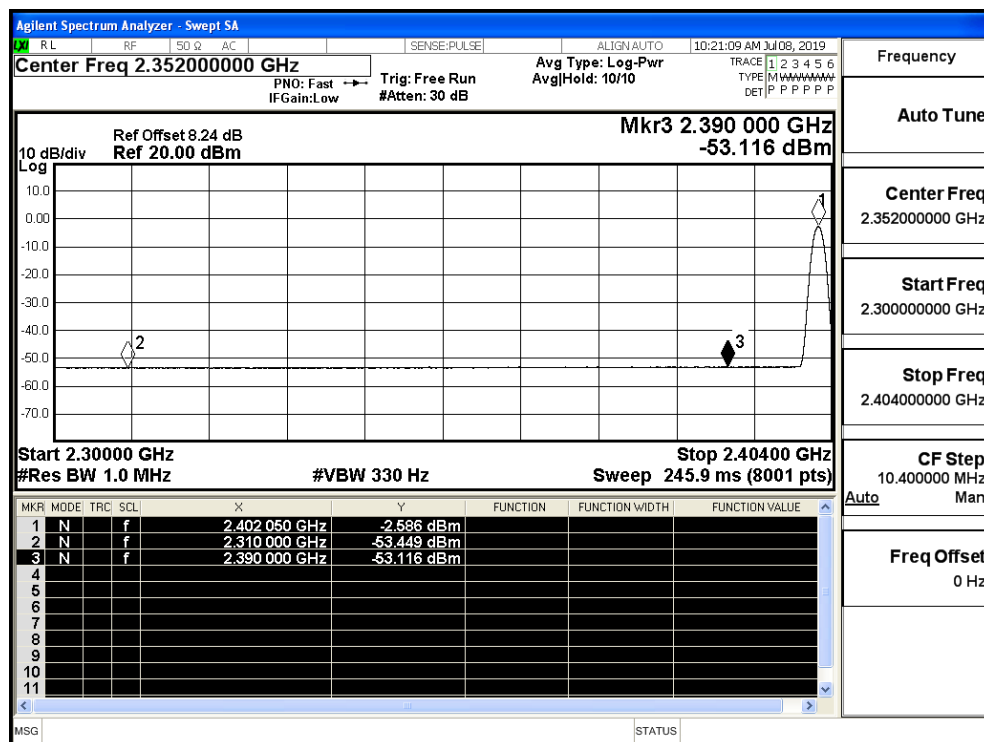
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.90	2.0	0	52.36	PEAK	74	PASS
	Off	2310.0	-53.45	2.0	0	41.81	AV	54	PASS
	Off	2390.0	-43.59	2.0	0	51.67	PEAK	74	PASS
	Off	2390.0	-53.12	2.0	0	42.14	AV	54	PASS
	Off	2483.5	-42.29	2.0	0	52.97	PEAK	74	PASS
	Off	2483.5	-52.86	2.0	0	42.40	AV	54	PASS
	Off	2500.0	-43.91	2.0	0	51.35	PEAK	74	PASS
	Off	2500.0	-52.72	2.0	0	42.54	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.39	2.0	0	52.87	PEAK	74	PASS
	Off	2310.0	-53.47	2.0	0	41.79	AV	54	PASS
	Off	2390.0	-43.45	2.0	0	51.81	PEAK	74	PASS
	Off	2390.0	-53.22	2.0	0	42.04	AV	54	PASS
	Off	2483.5	-43.44	2.0	0	51.82	PEAK	74	PASS
	Off	2483.5	-52.82	2.0	0	42.43	AV	54	PASS
	Off	2500.0	-43.02	2.0	0	52.24	PEAK	74	PASS
	Off	2500.0	-52.78	2.0	0	42.48	AV	54	PASS

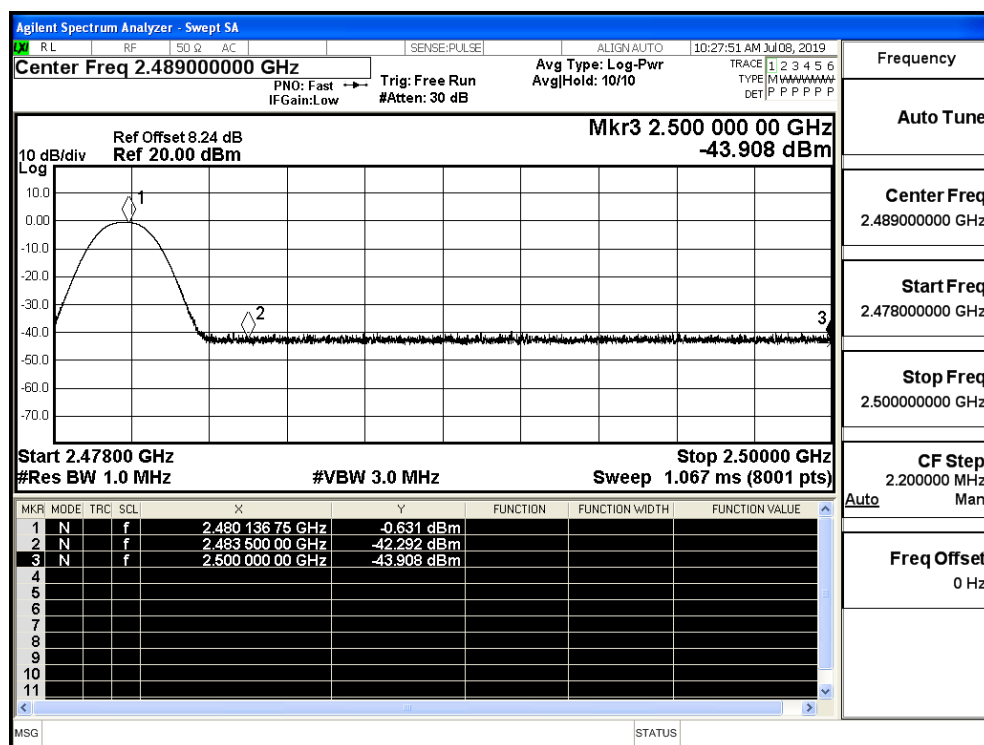
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



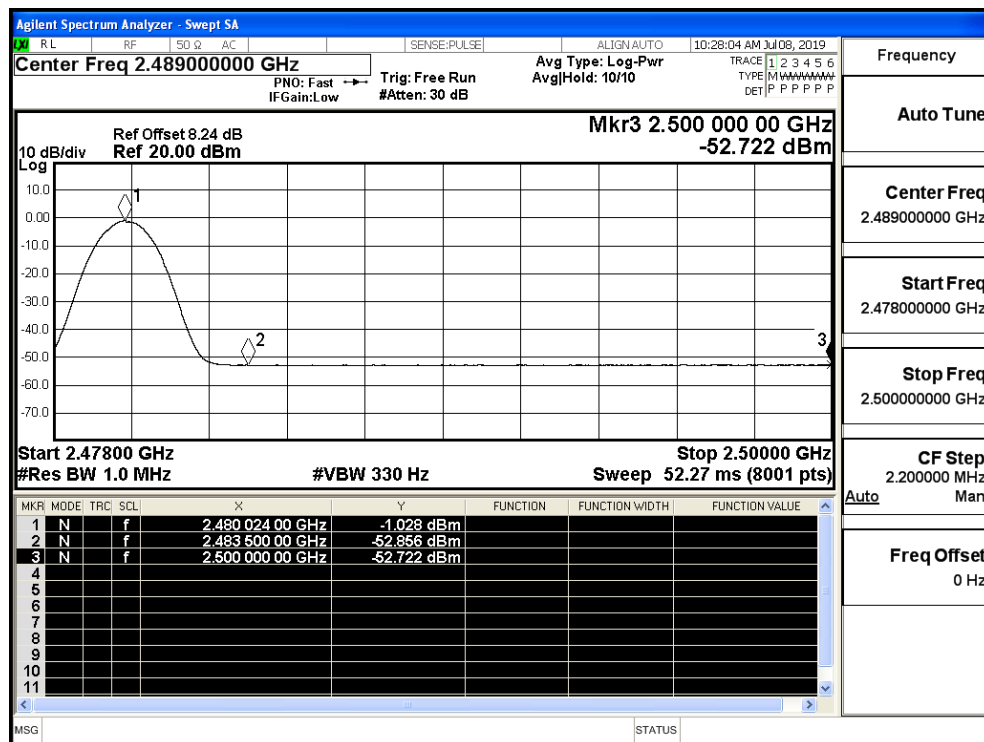
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

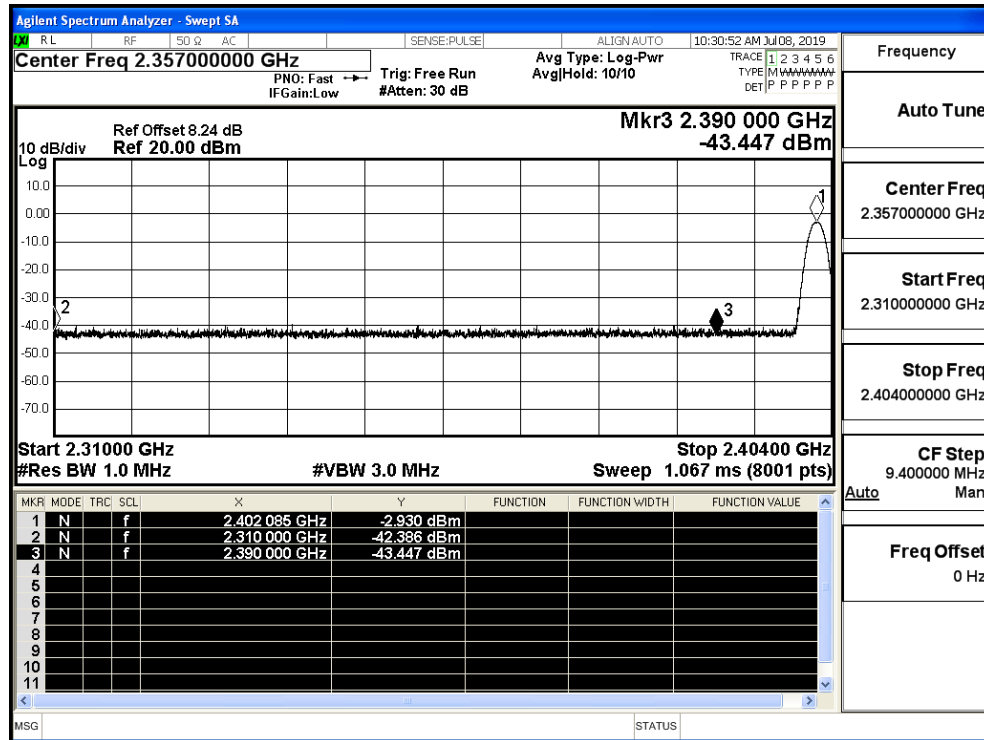
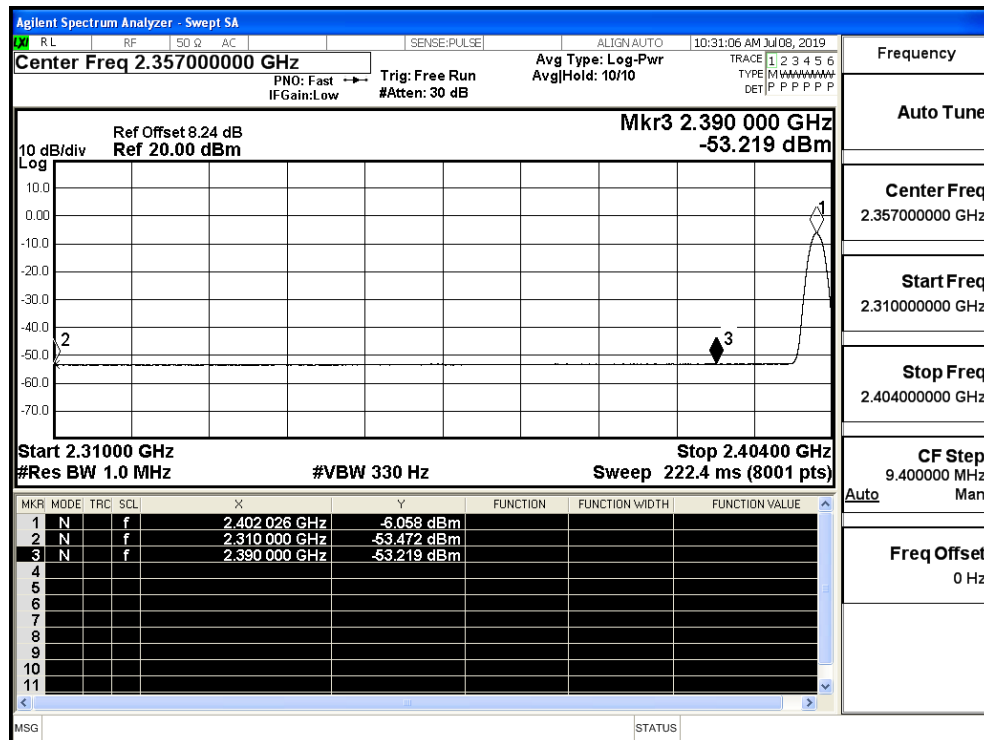


Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)

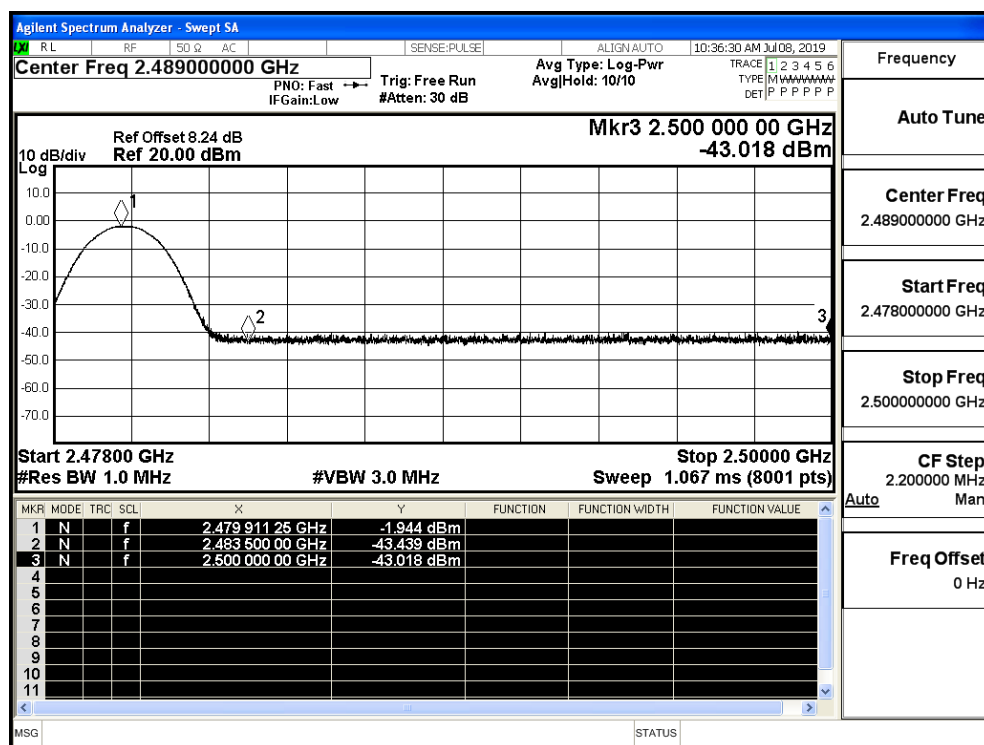


Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



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)

