

Appendix A

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

Product Name: Wireless bluetooth earphones

Trade Mark: N/A

Test Model: F9,T15

FCC ID: 2AVRU-F9

Environmental Conditions

Temperature:	22.7° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Gary Qian
Supervised by:	Eden Hu

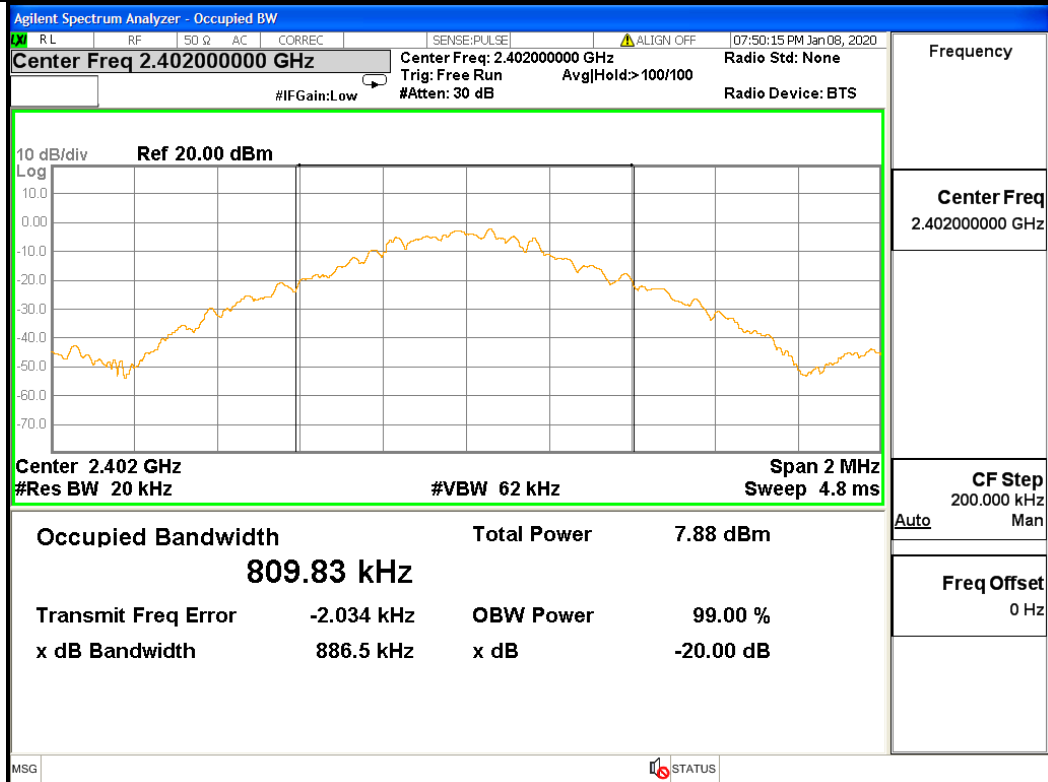
A.1 20 dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit(MHz)	Verdict
GFSK	LCH	0.887	Not Specified	PASS
GFSK	MCH	0.887	Not Specified	PASS
GFSK	HCH	0.886	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.315	Not Specified	PASS
$\pi/4$ DQPSK	MCH	1.250	Not Specified	PASS
$\pi/4$ DQPSK	HCH	1.253	Not Specified	PASS
8DPSK	LCH	1.301	Not Specified	PASS
8DPSK	MCH	1.302	Not Specified	PASS
8DPSK	HCH	1.283	Not Specified	PASS

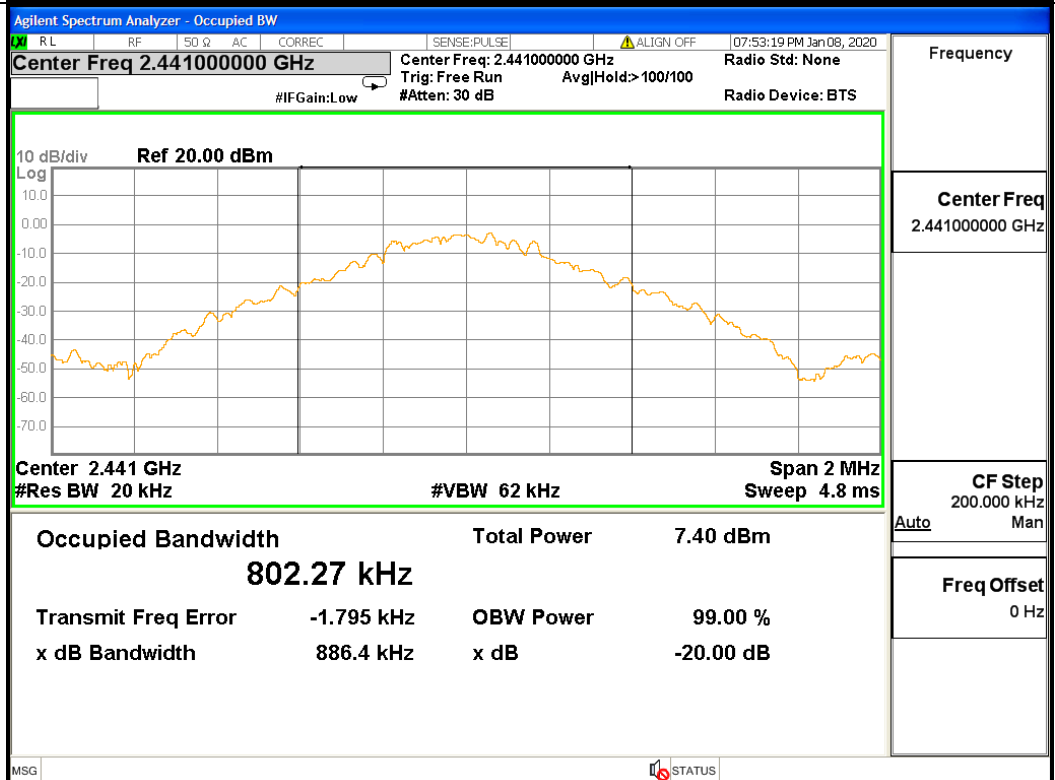
Test Graph

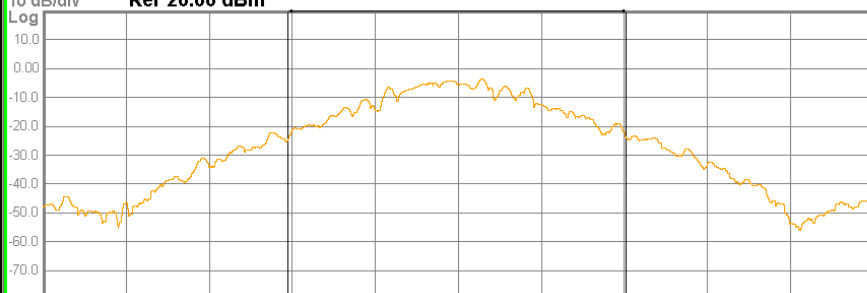
Graphs

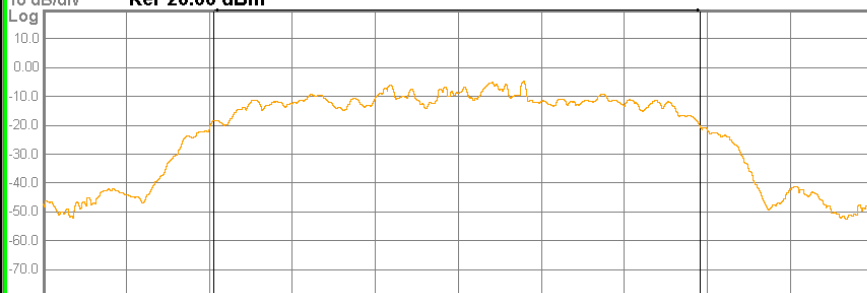
GFSK/LCH



GFSK/MCH



GFSK/HCH	Agilent Spectrum Analyzer - Occupied BW				RLRF50 ΩACCORRECSENSE:PULSEALIGN OFF07:59:11 PM Jan 08, 2020				Frequency	
	Center Freq 2.480000000 GHz				Center Freq: 2.480000000 GHz Trig: Free Run #Atten: 30 dB				Radio Std: None Radio Device: BTS	Center Freq 2.480000000 GHz
	#IFGain:Low									
										
	Center 2.48 GHz #Res BW 20 kHz				#VBW 62 kHz				Span 2 MHz Sweep 4.8 ms	CF Step 200.000 kHz Auto Man
Occupied Bandwidth				Total Power				6.49 dBm		
809.39 kHz										
Transmit Freq Error				-1.736 kHz				OBW Power		99.00 %
x dB Bandwidth				886.4 kHz				x dB		-20.00 dB
MSG				STATUS						

π/4DQPSK/LCH	Agilent Spectrum Analyzer - Occupied BW				RLRF50 ΩACCORRECSENSE:PULSEALIGN OFF08:03:48 PM Jan 08, 2020				Frequency	
	Center Freq 2.402000000 GHz				Center Freq: 2.402000000 GHz Trig: Free Run #Atten: 30 dB				Radio Std: None Radio Device: BTS	Center Freq 2.402000000 GHz
	#IFGain:Low									
										
	Center 2.402 GHz #Res BW 20 kHz				#VBW 62 kHz				Span 2 MHz Sweep 4.8 ms	CF Step 200.000 kHz Auto Man
Occupied Bandwidth				Total Power				6.68 dBm		
1.1696 MHz										
Transmit Freq Error				-3.470 kHz				OBW Power		99.00 %
x dB Bandwidth				1.315 MHz				x dB		-20.00 dB
MSG				STATUS						

Center Freq 2.402000000 GHz

Center Freq: 2.402000000 GHz

Radio Std: None

#IFGain:Low

Trig: Free Run

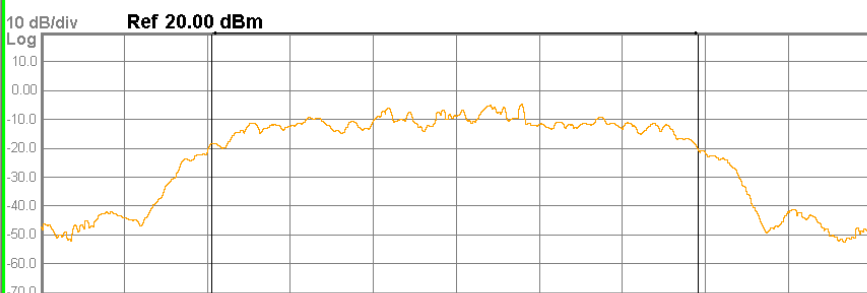
Avg|Hold>100/100

Radio Device: BTS

#Atten: 30 dB

10 dB/div

Ref 20.00 dBm



Center 2.402 GHz

#Res BW 20 kHz

#VBW 62 kHz

Span 2 MHz

Sweep 4.8 ms

Occupied Bandwidth

1.1696 MHz

Total Power

6.68 dBm

Transmit Freq Error

-3.470 kHz

OBW Power

99.00 %

x dB Bandwidth

1.315 MHz

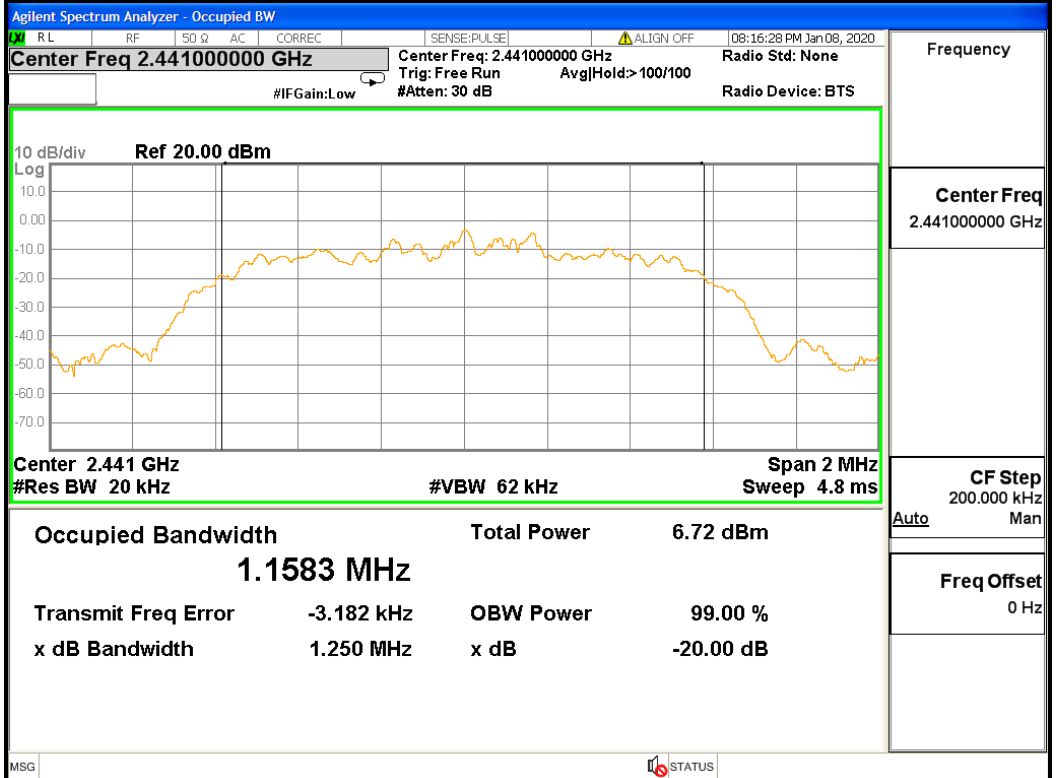
x dB

-20.00 dB

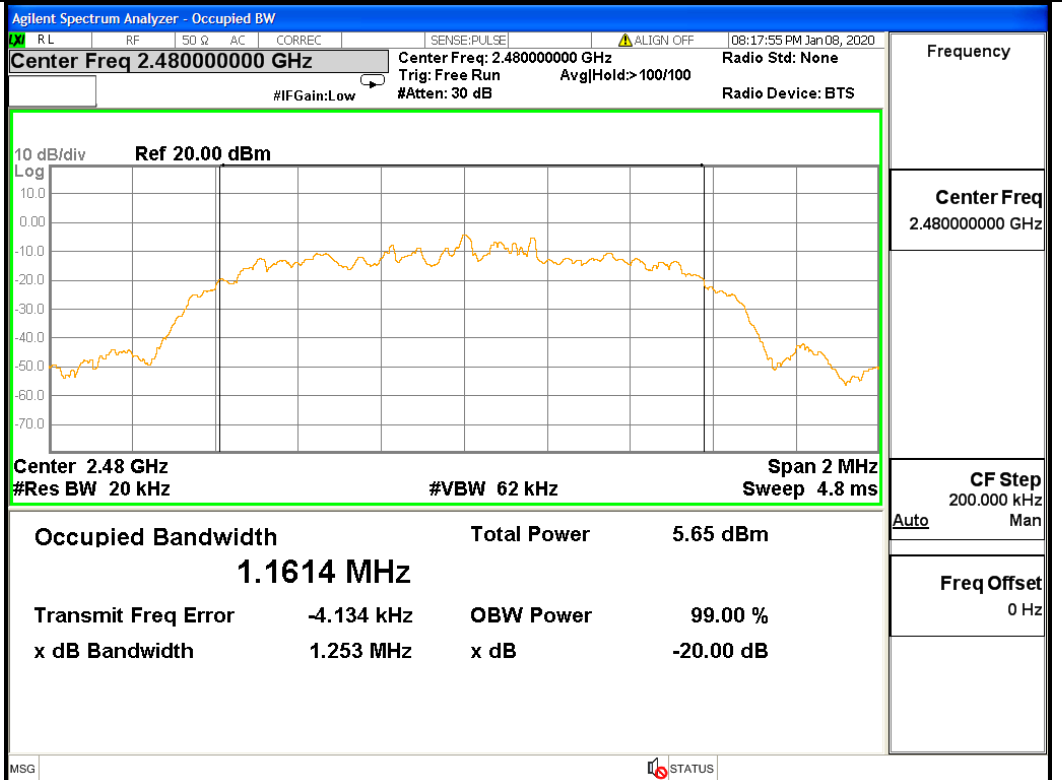
MSG

STATUS

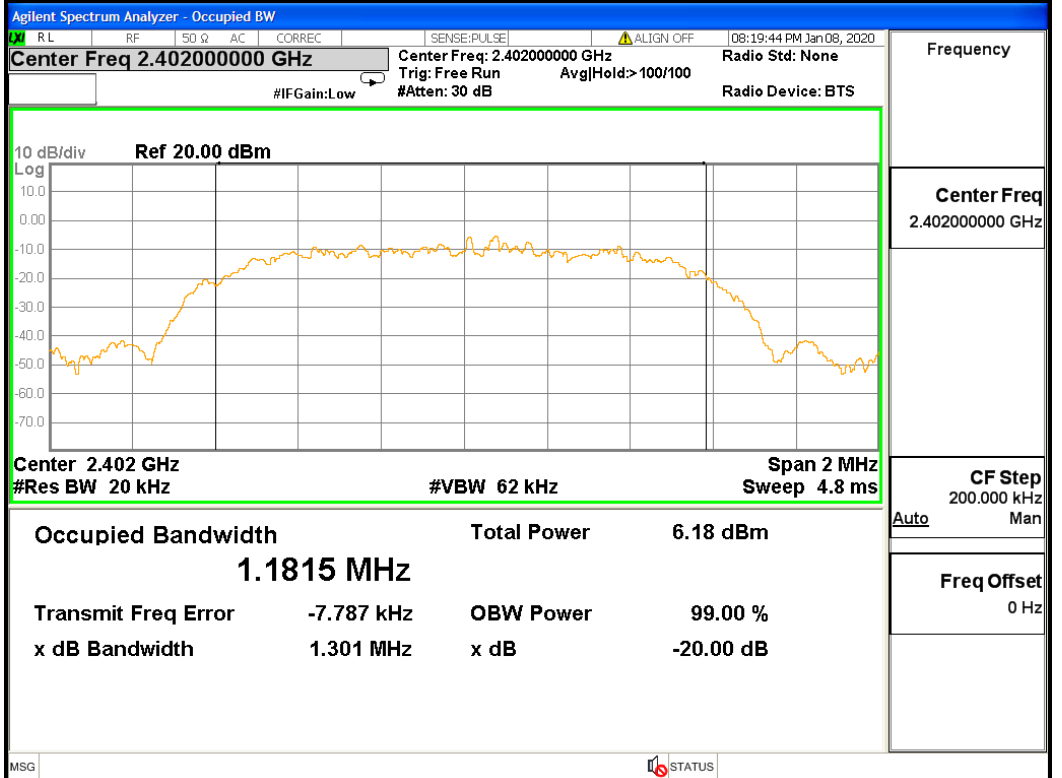
$\pi/4$ DQPSK/MCH



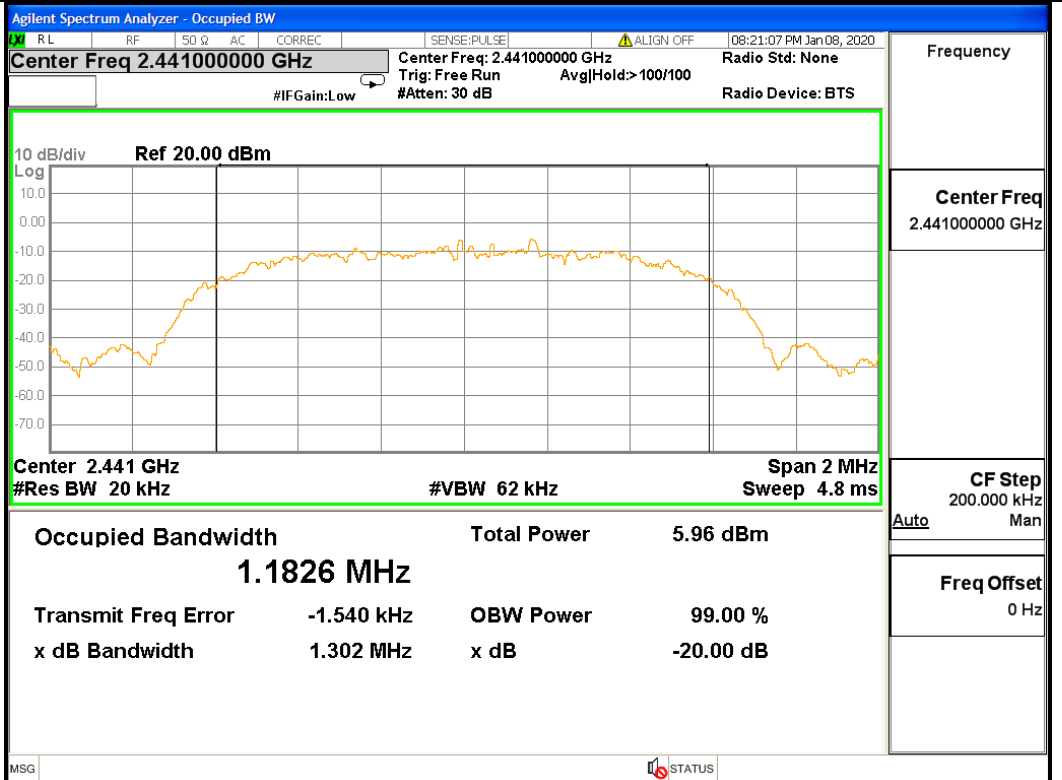
$\pi/4$ DQPSK/HCH

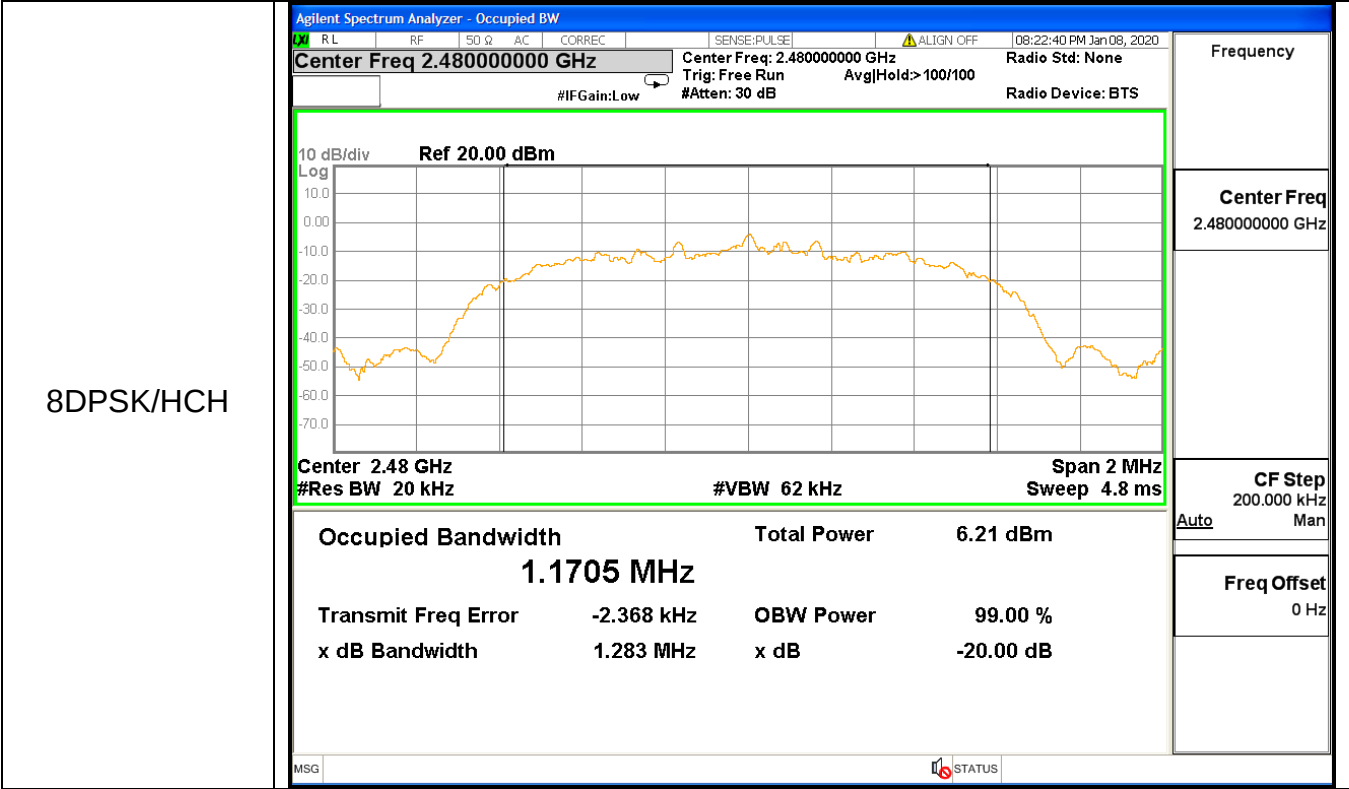


8DPSK/LCH



8DPSK/MCH

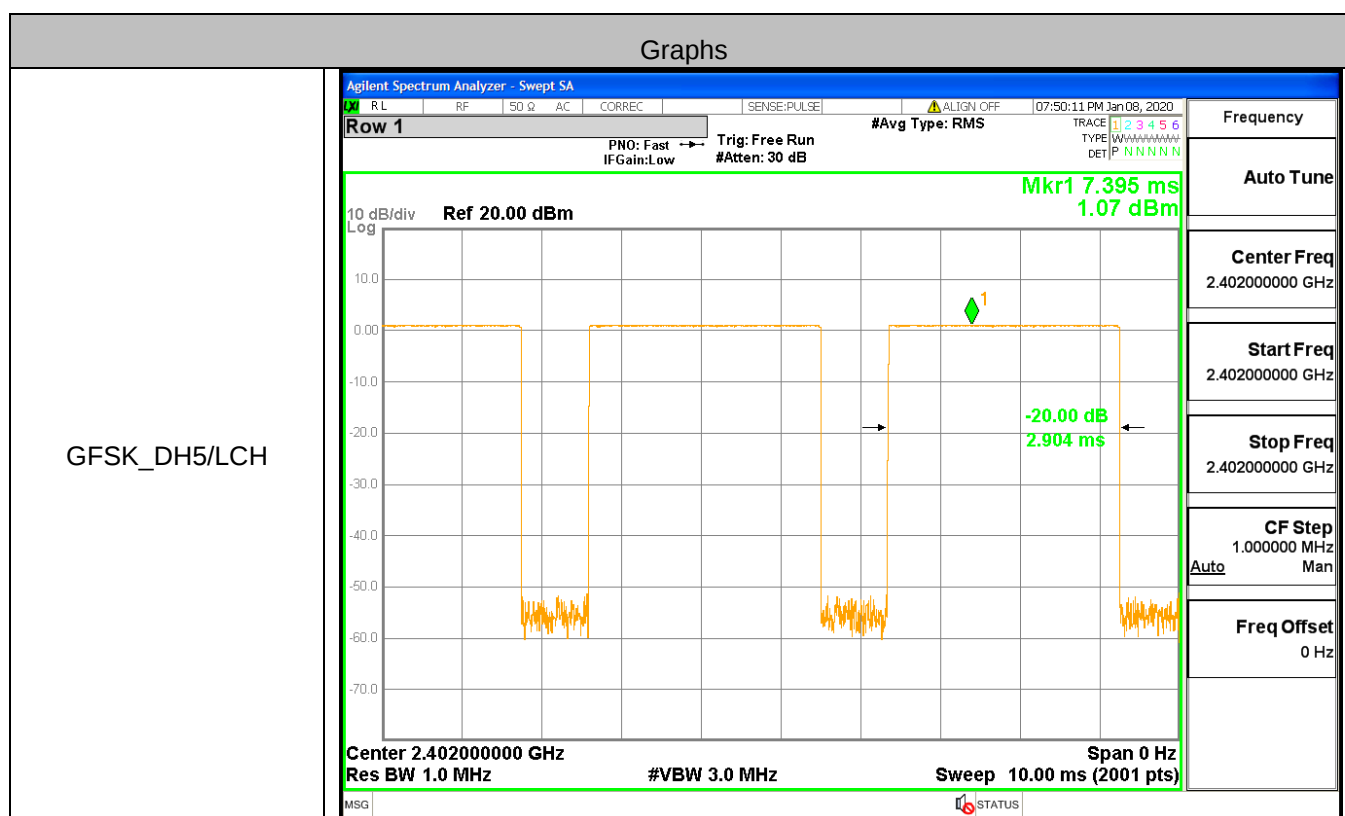




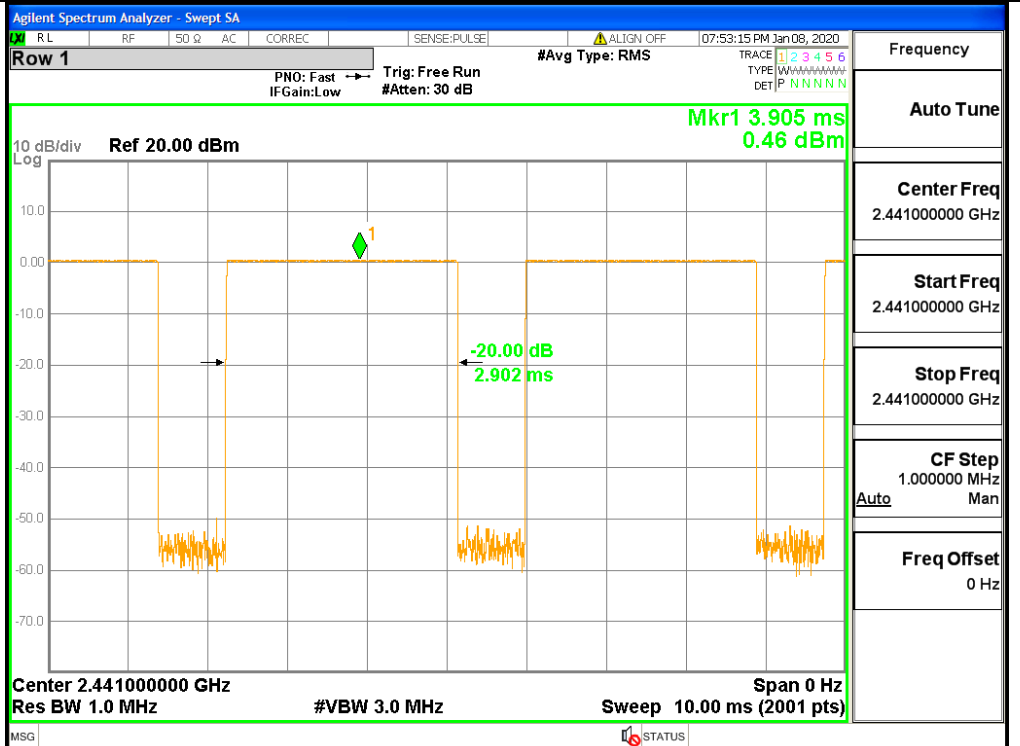
A.2 Dwell Time

Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.002904	106.7	0.309833	0.4	PASS
GFSK	DH5	MCH	0.002902	106.7	0.309634	0.4	PASS
GFSK	DH5	HCH	0.002902	106.7	0.309645	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	0.002909	106.7	0.310379	0.4	PASS
$\pi/4$ DQPSK	2DH5	MCH	0.002910	106.7	0.31049	0.4	PASS
$\pi/4$ DQPSK	2DH5	HCH	0.002911	106.7	0.310575	0.4	PASS
8DPSK	3DH5	LCH	0.002912	106.7	0.310702	0.4	PASS
8DPSK	3DH5	MCH	0.002912	106.7	0.310743	0.4	PASS
8DPSK	3DH5	HCH	0.002912	106.7	0.310701	0.4	PASS

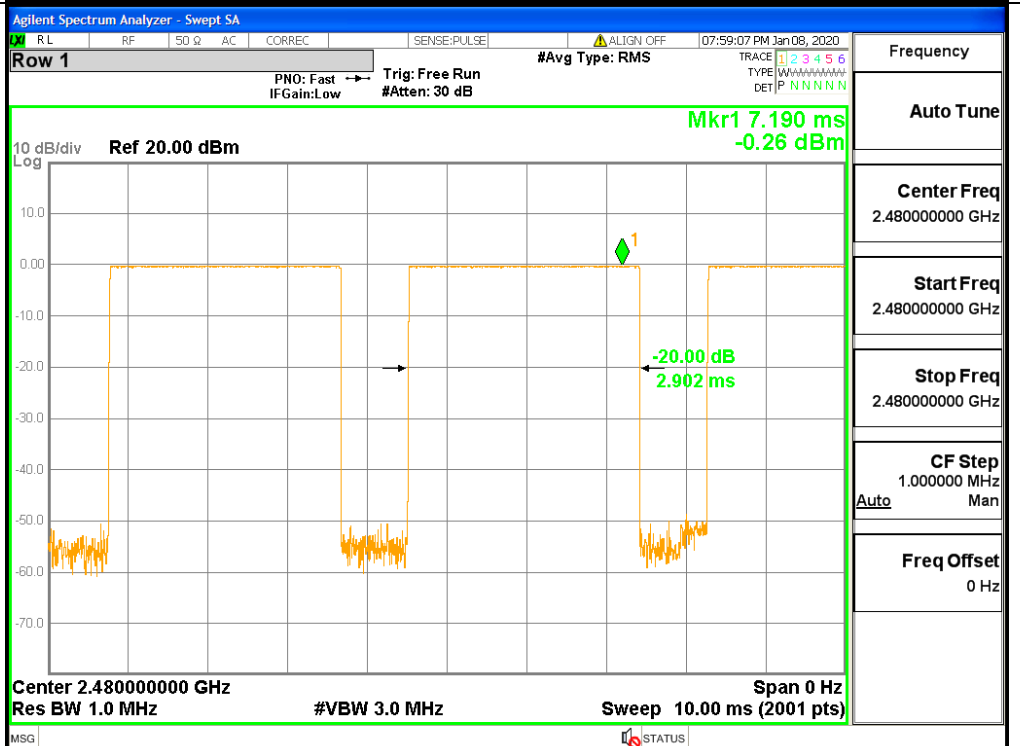
Test Graph



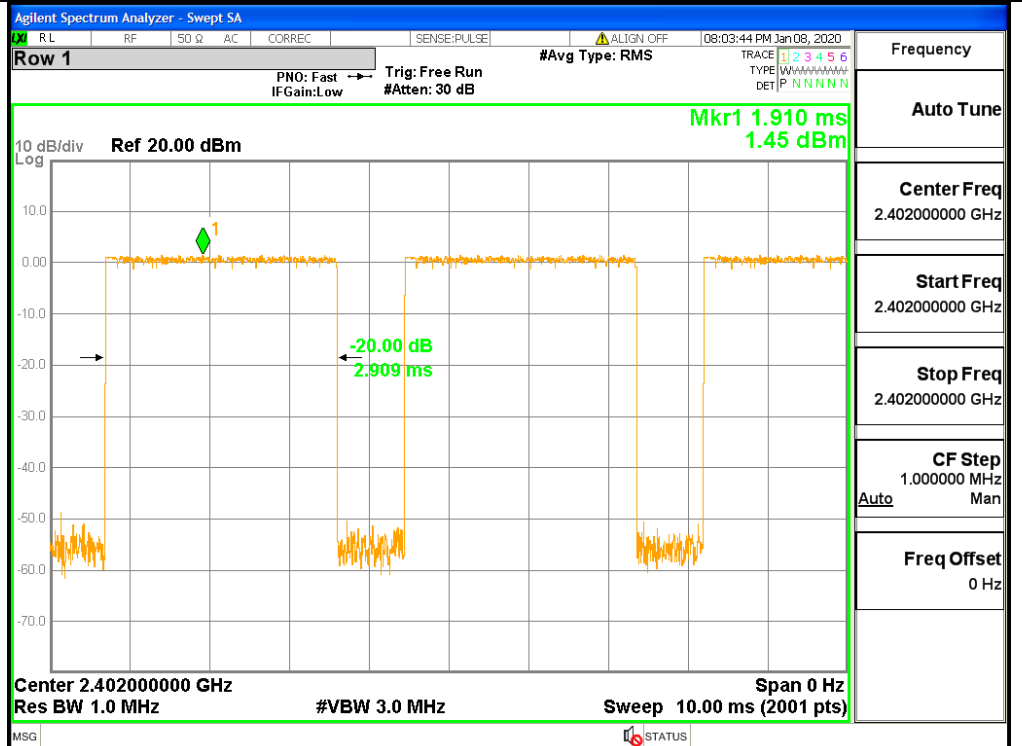
GFSK_DH5/MCH



GFSK_DH5/HCH



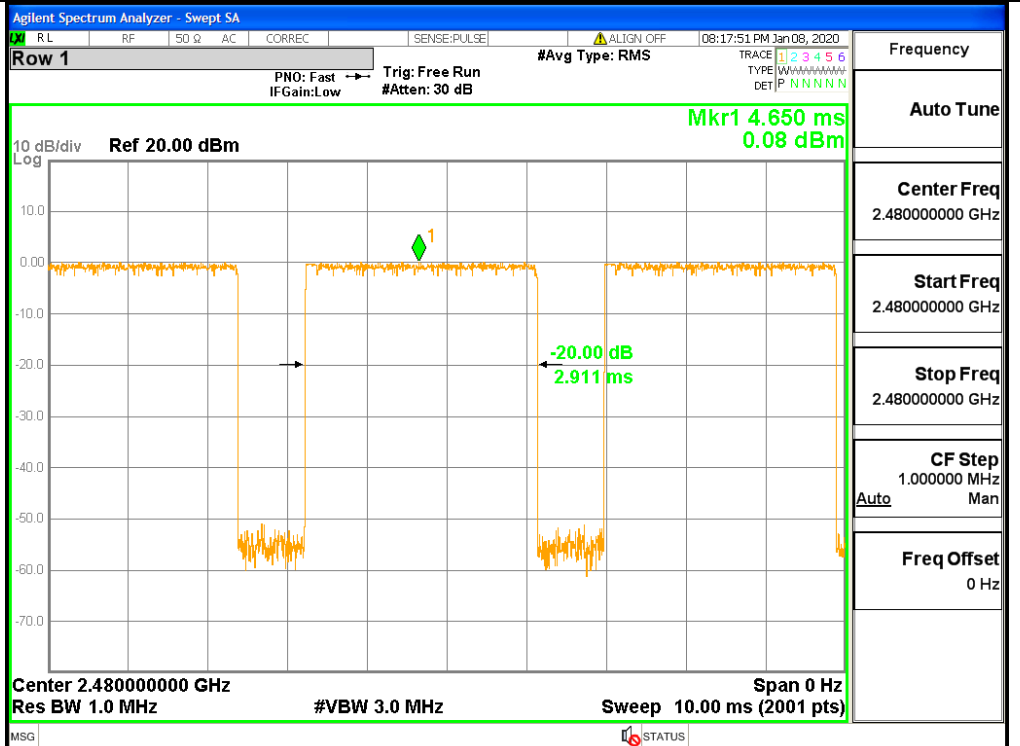
$\pi/4$ DQPSK
_2DH5/LCH



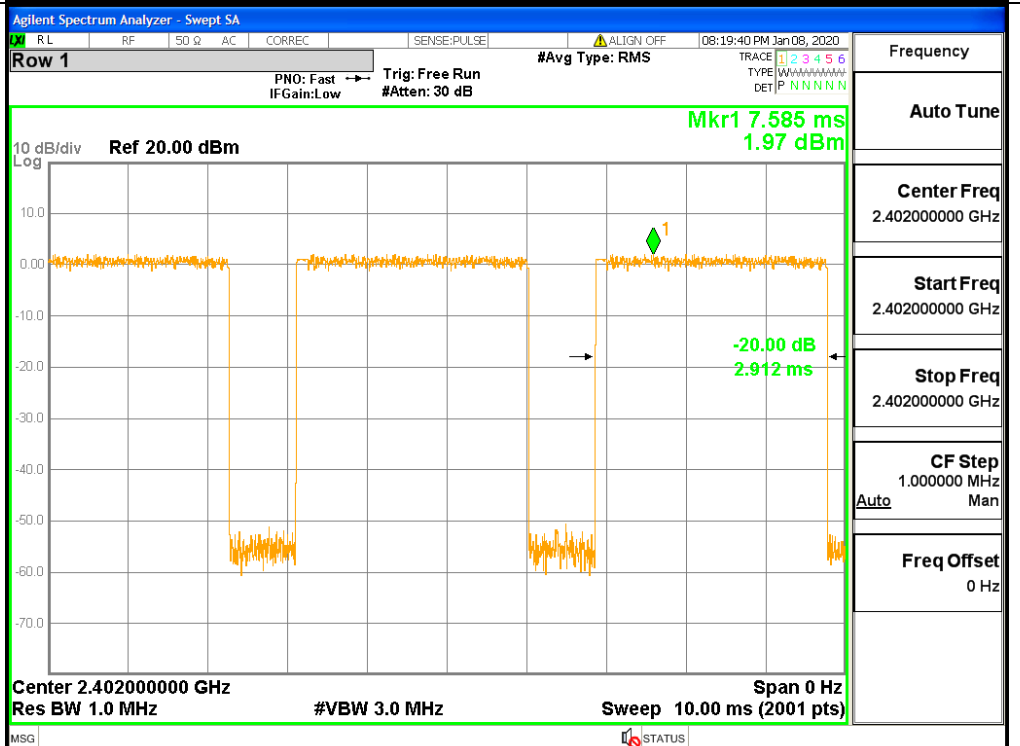
$\pi/4$ DQPSK
_2DH5/MCH

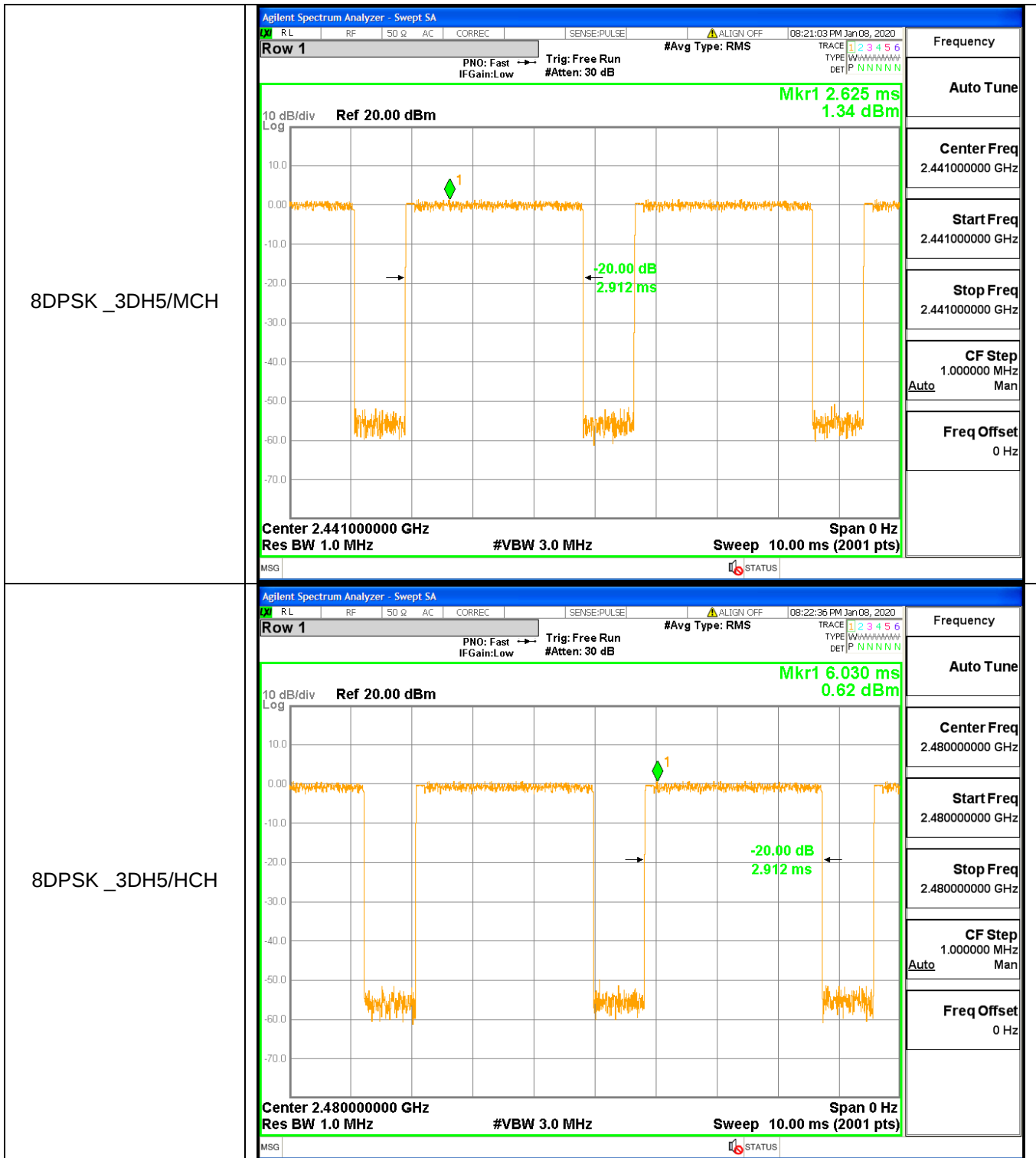


$\pi/4$ DQPSK
_2DH5/HCH



8DPSK_3DH5/LCH

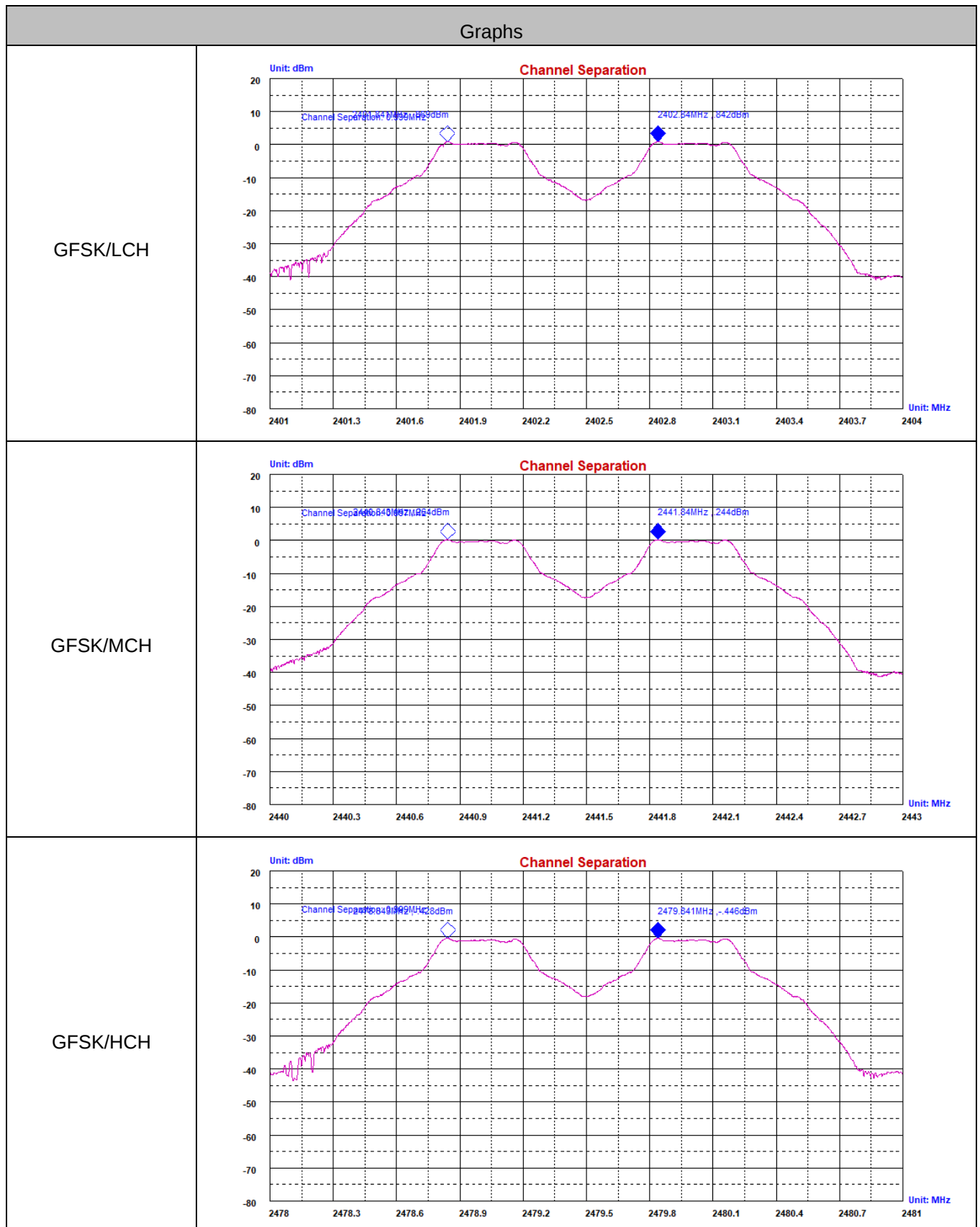


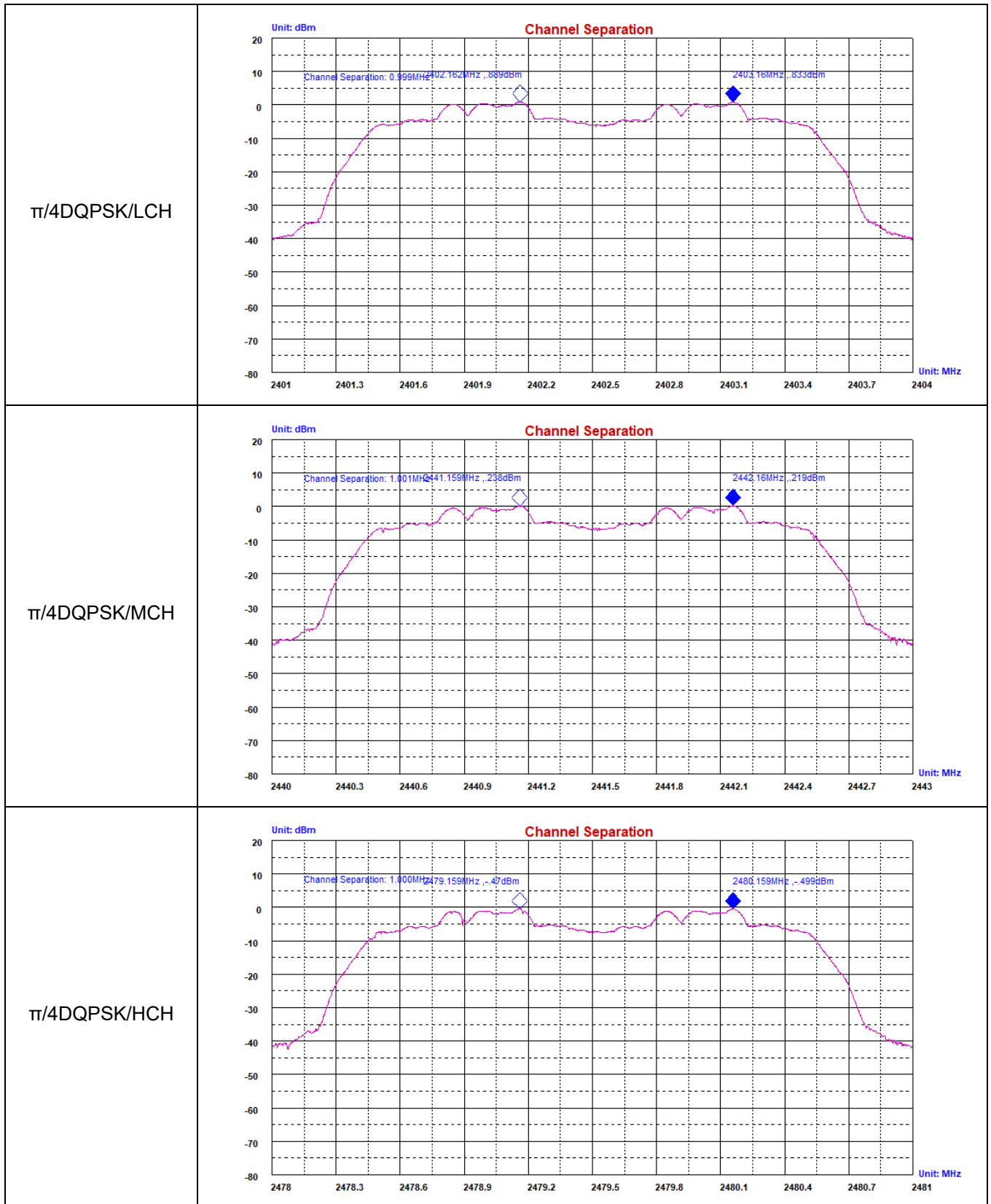


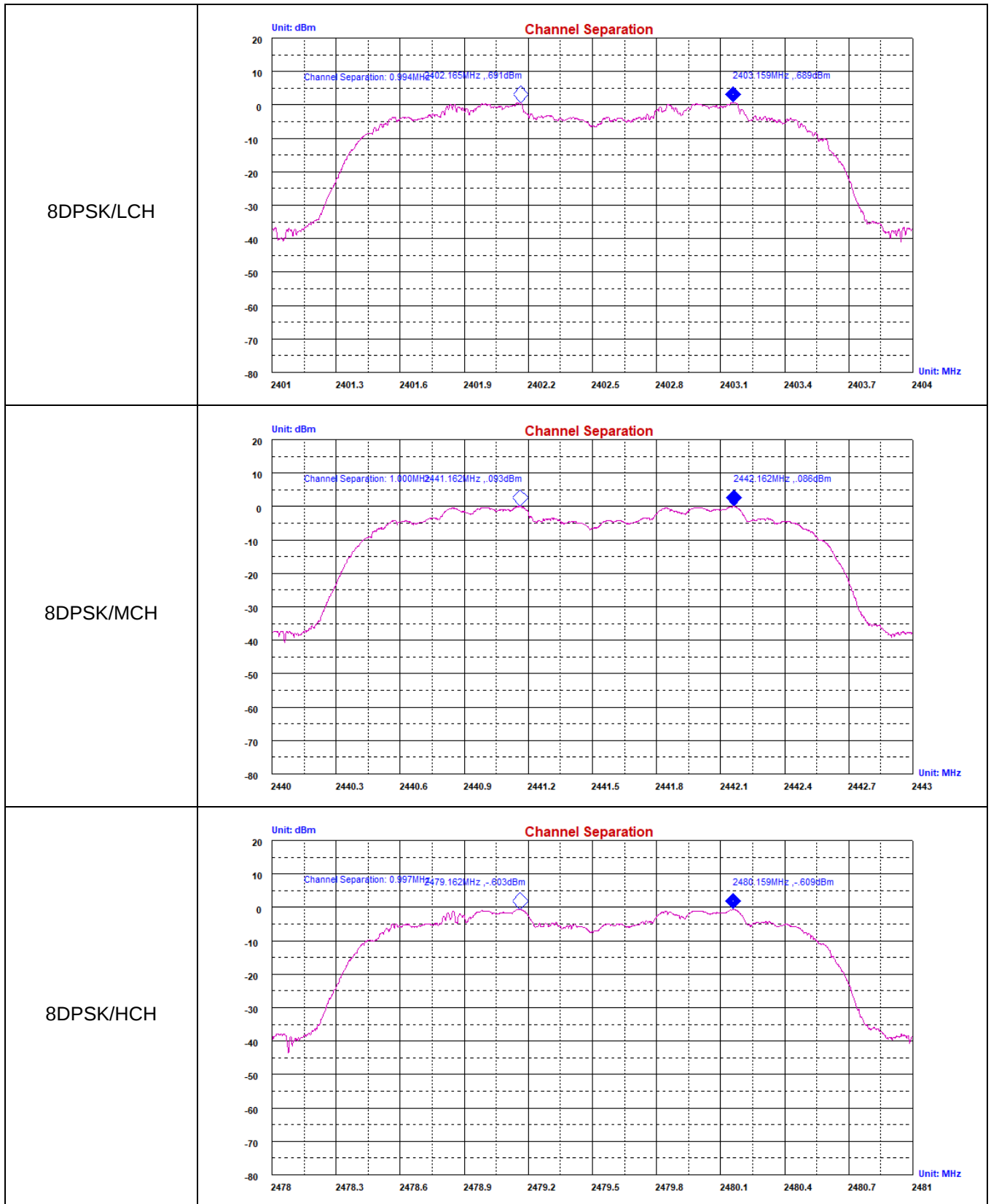
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.999	0.591	PASS
GFSK	MCH	0.997	0.591	PASS
GFSK	HCH	0.999	0.591	PASS
$\pi/4$ DQPSK	LCH	0.999	0.877	PASS
$\pi/4$ DQPSK	MCH	1.001	0.835	PASS
$\pi/4$ DQPSK	HCH	1.000	0.835	PASS
8DPSK	LCH	0.994	0.870	PASS
8DPSK	MCH	1.000	0.868	PASS
8DPSK	HCH	0.997	0.855	PASS

Test Graph



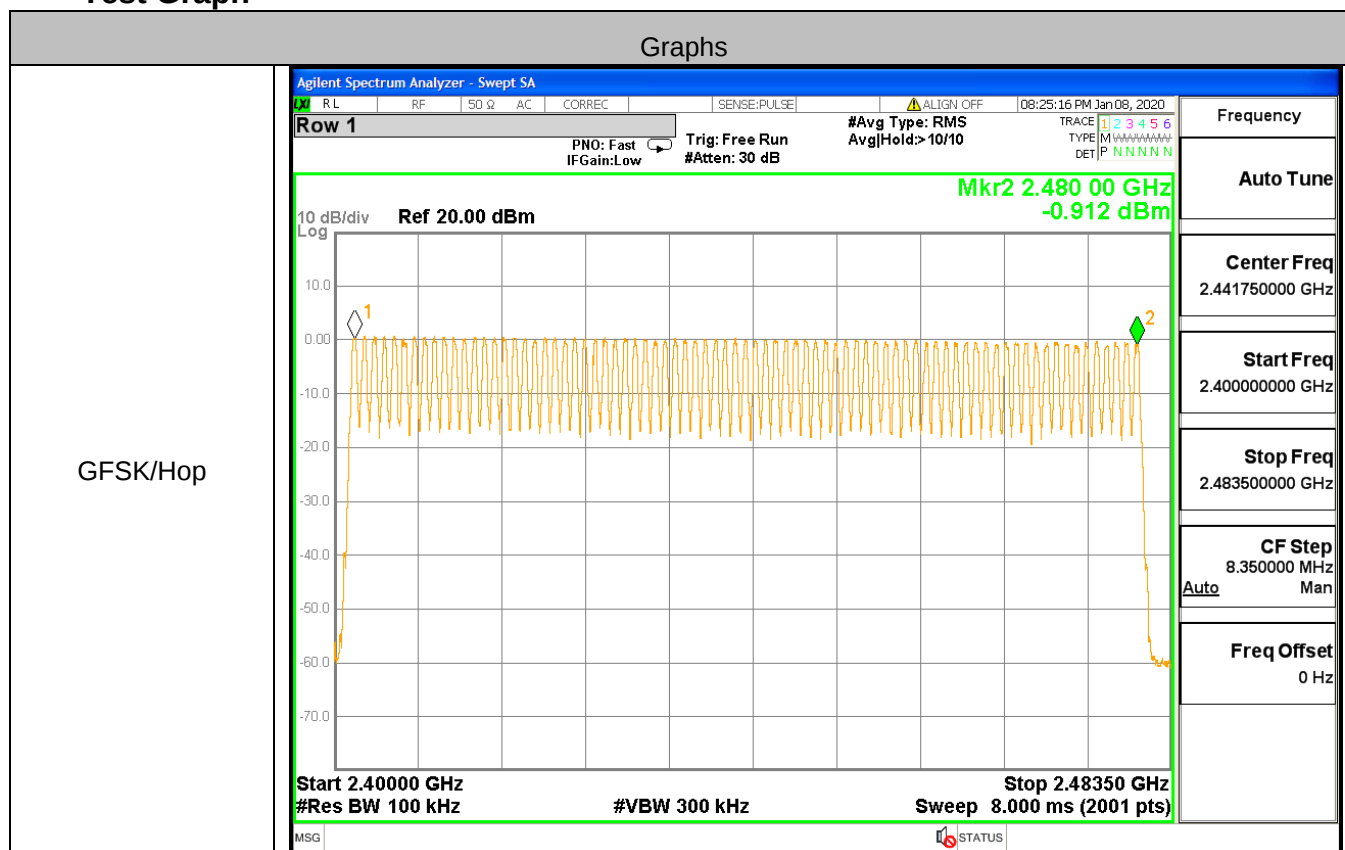


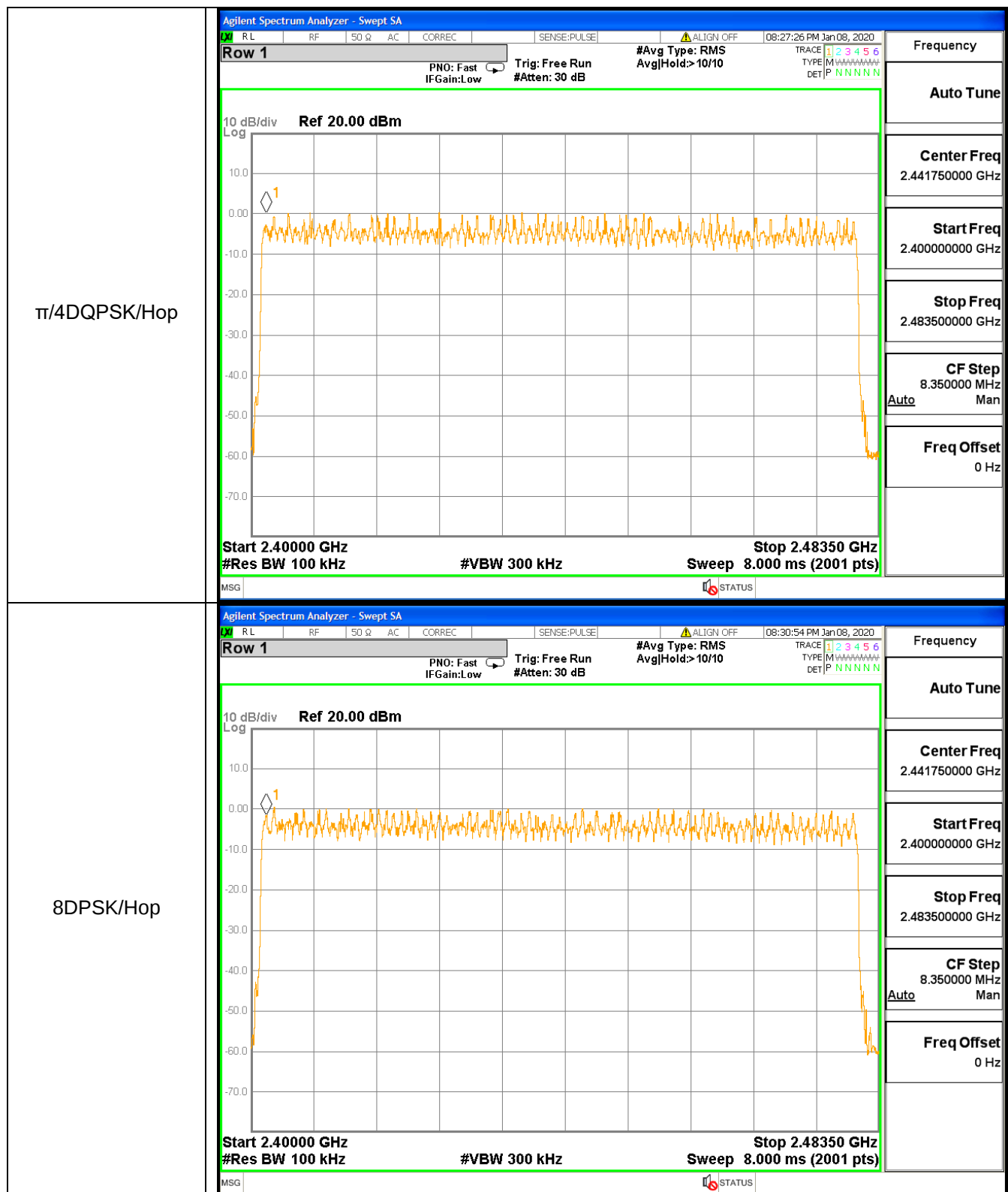


A.4 Hopping Channel Number

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 Graph

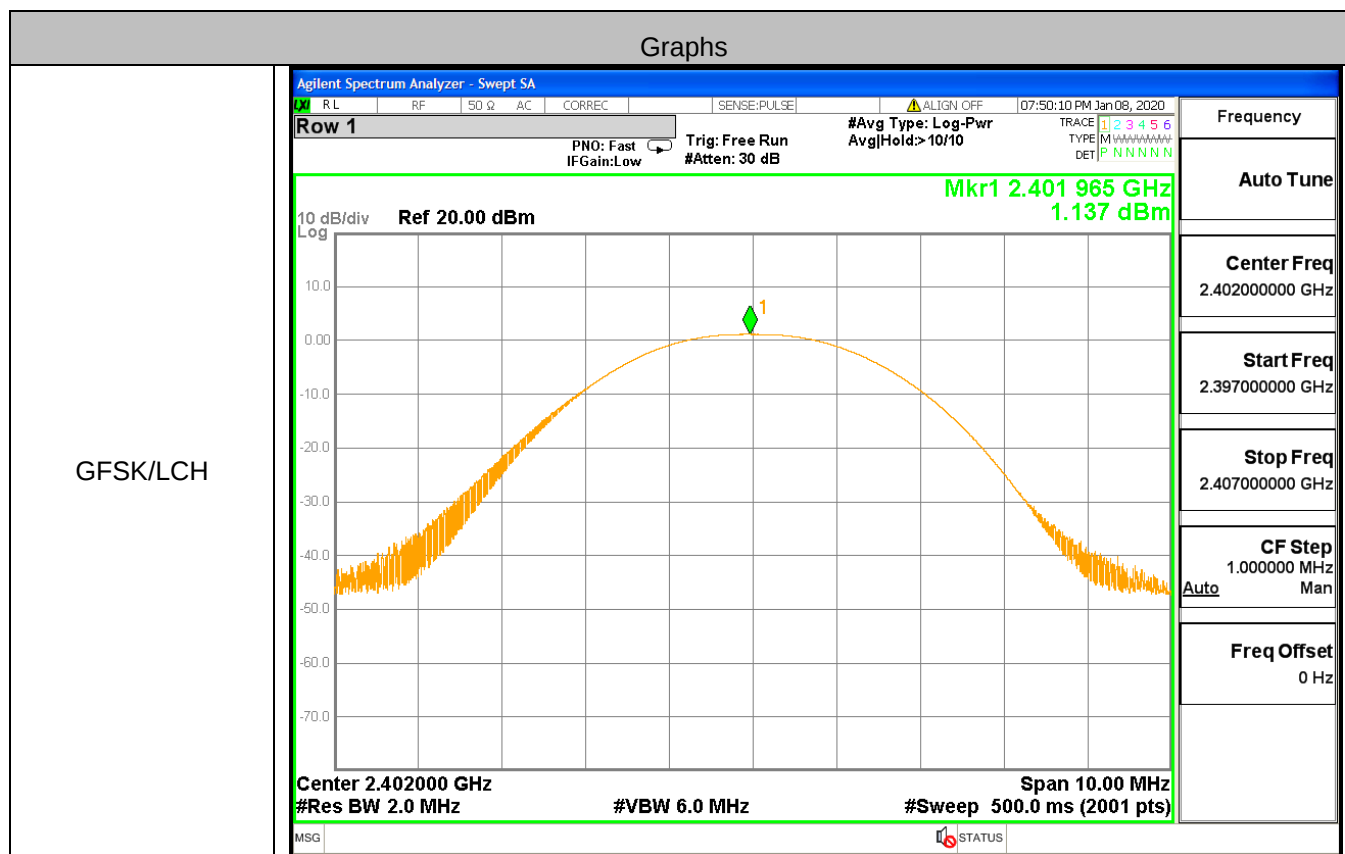


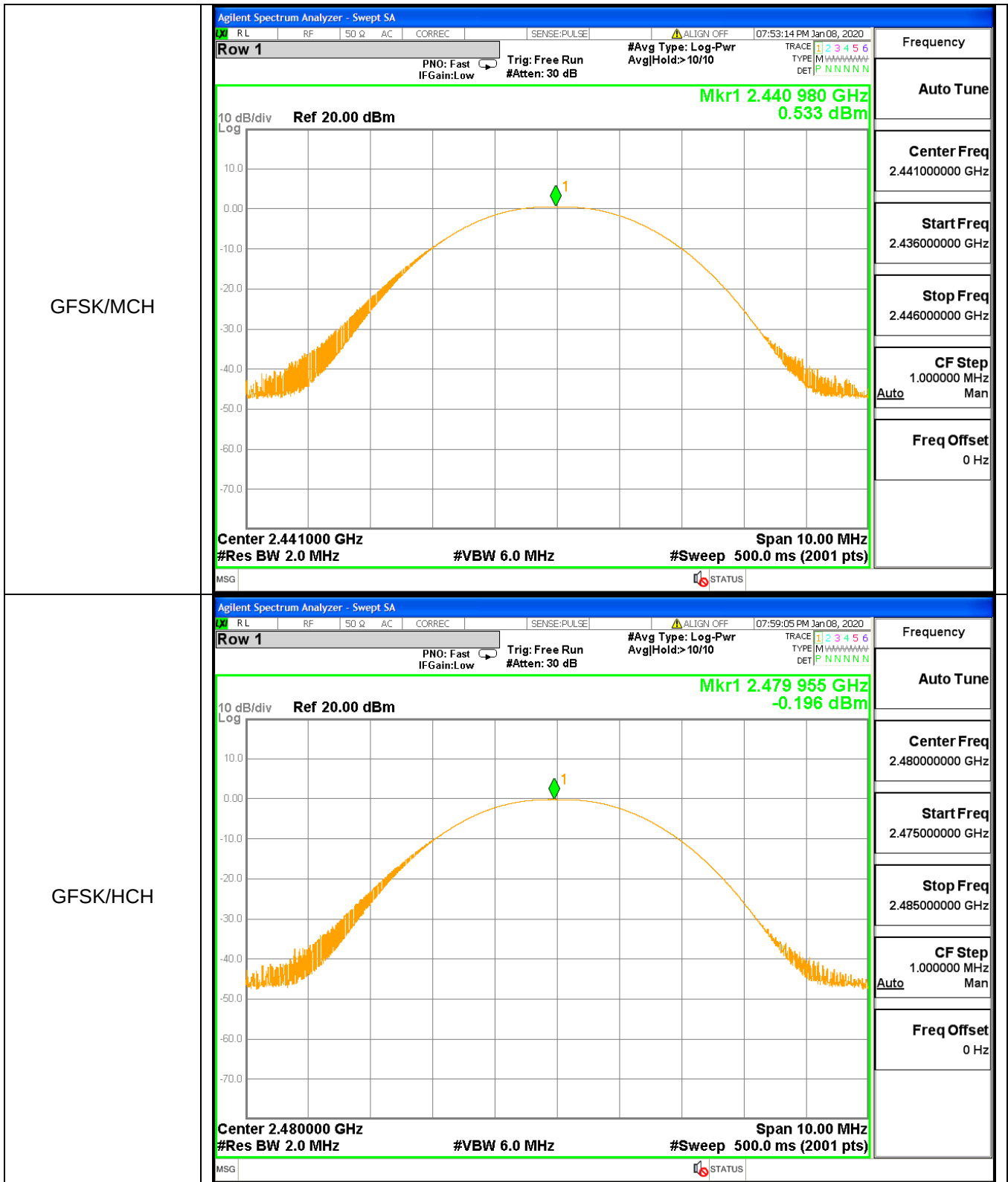


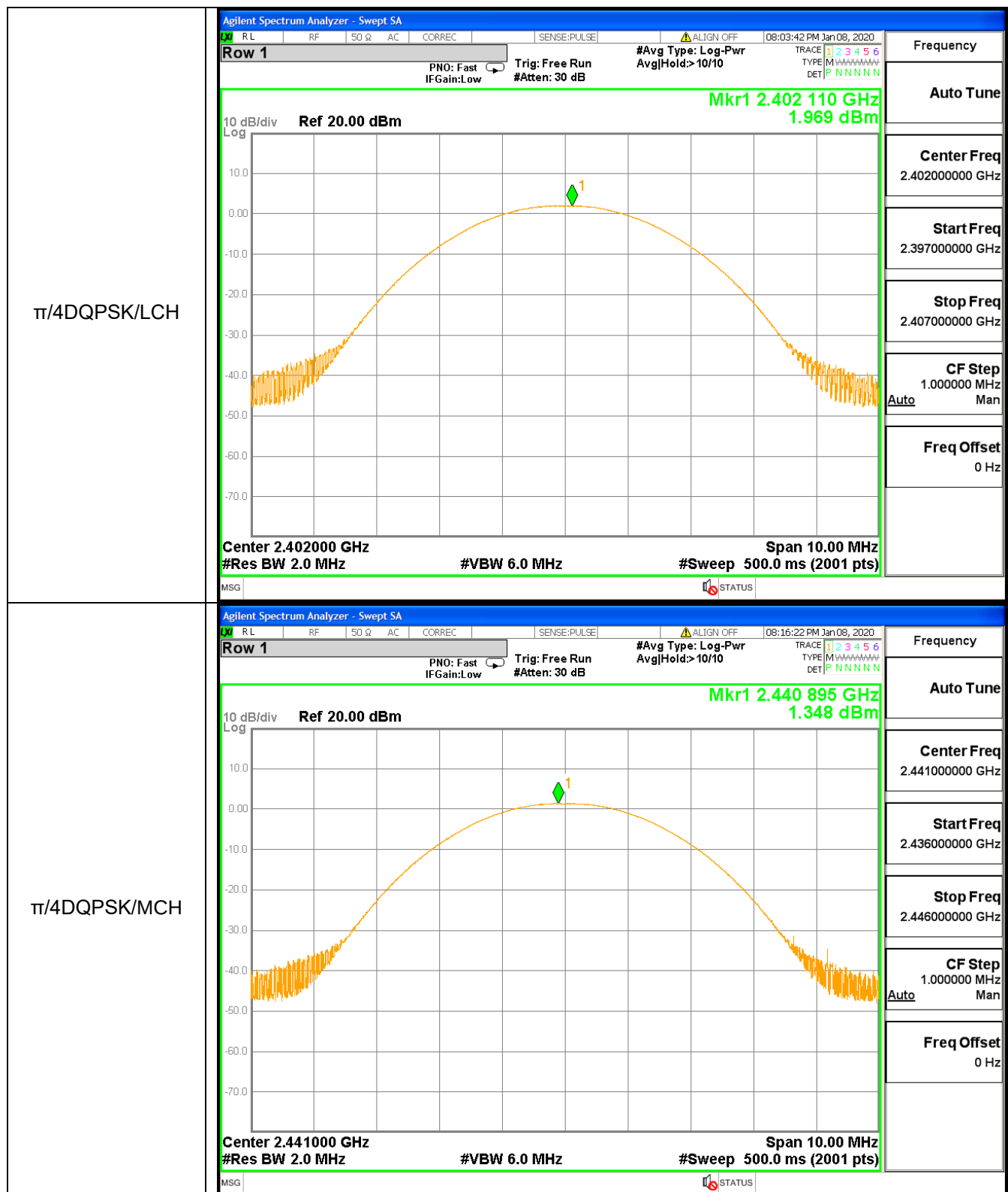
A.5 Conducted Peak Output Power

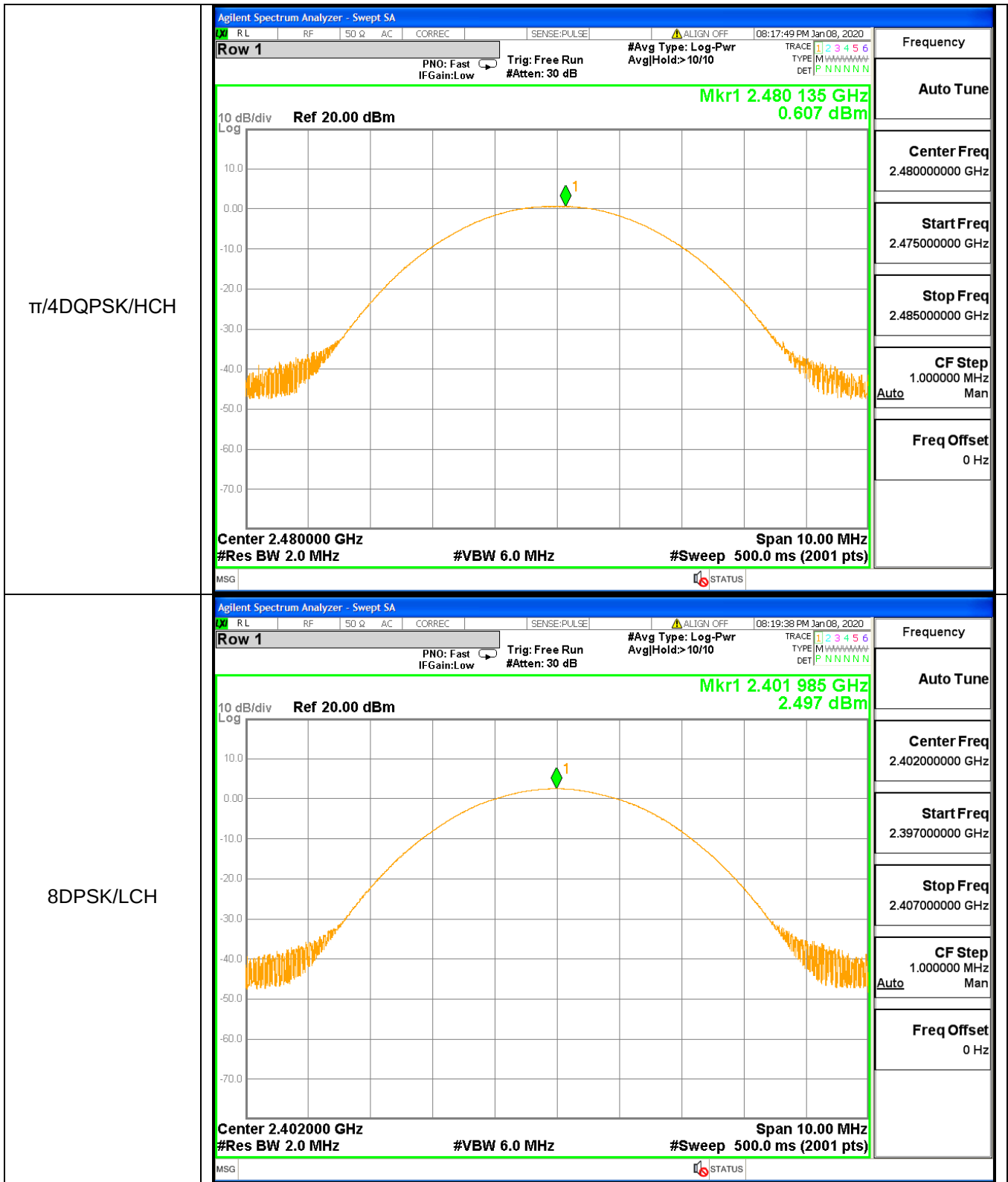
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.137	21	PASS
GFSK	MCH	0.533	21	PASS
GFSK	HCH	-0.196	21	PASS
$\pi/4$ DQPSK	LCH	1.969	21	PASS
$\pi/4$ DQPSK	MCH	1.348	21	PASS
$\pi/4$ DQPSK	HCH	0.607	21	PASS
8DPSK	LCH	2.497	21	PASS
8DPSK	MCH	1.881	21	PASS
8DPSK	HCH	1.126	21	PASS

Test Graph

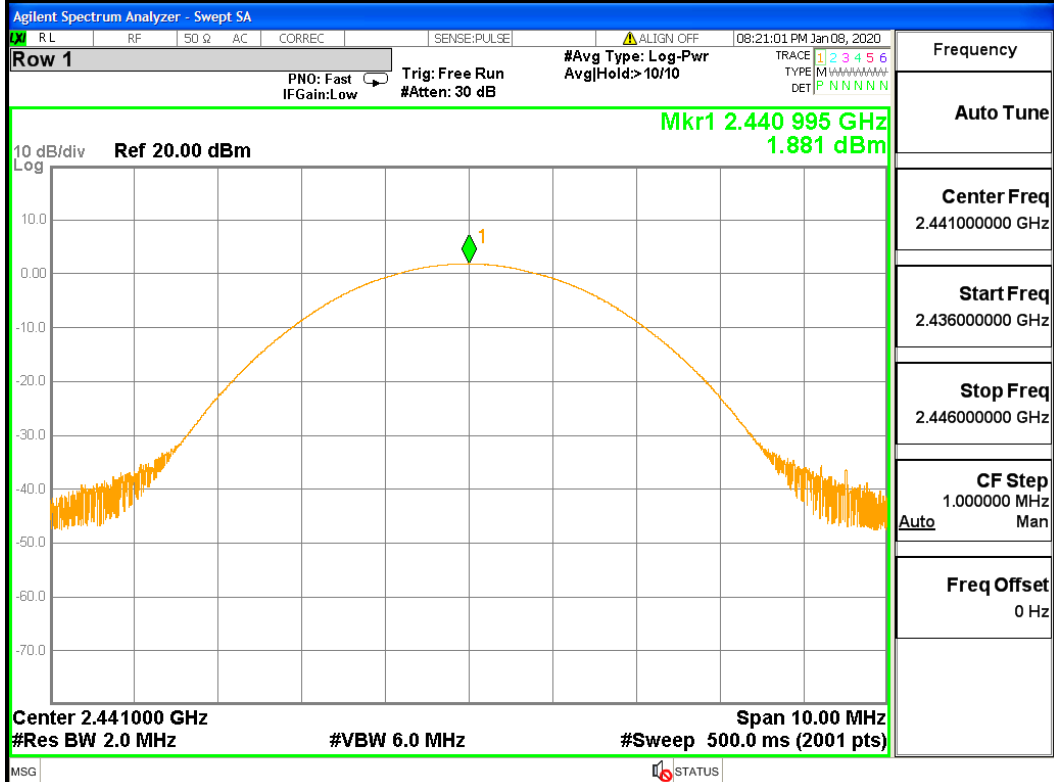




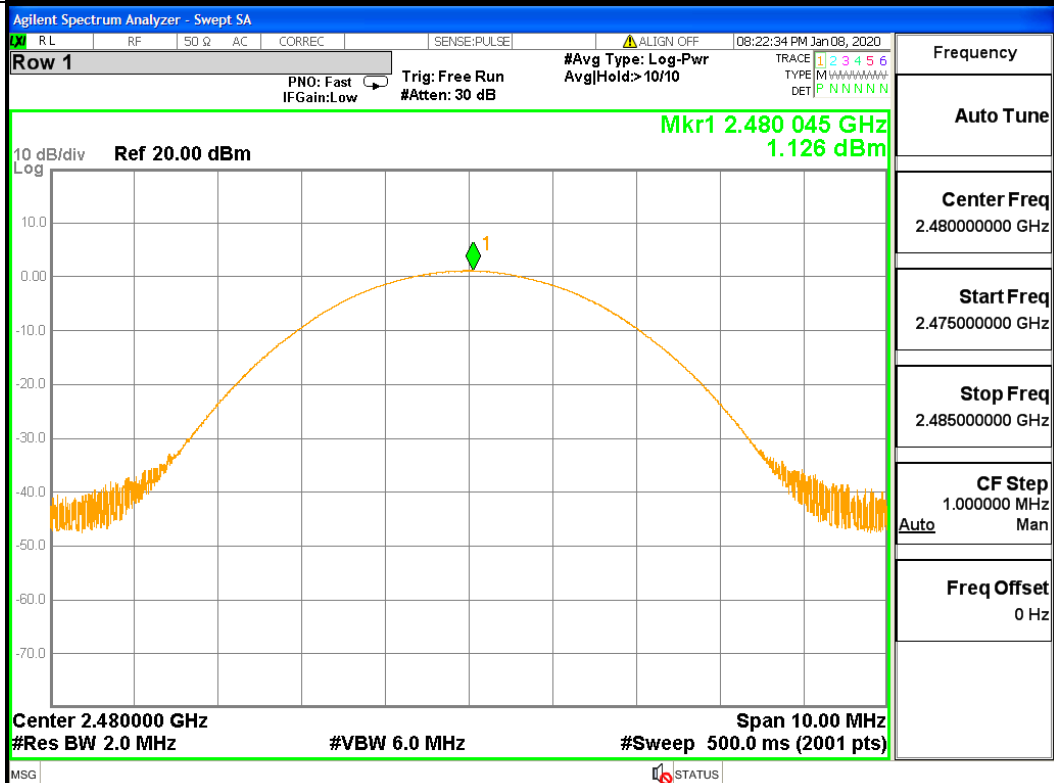




8DPSK/MCH



8DPSK/HCH



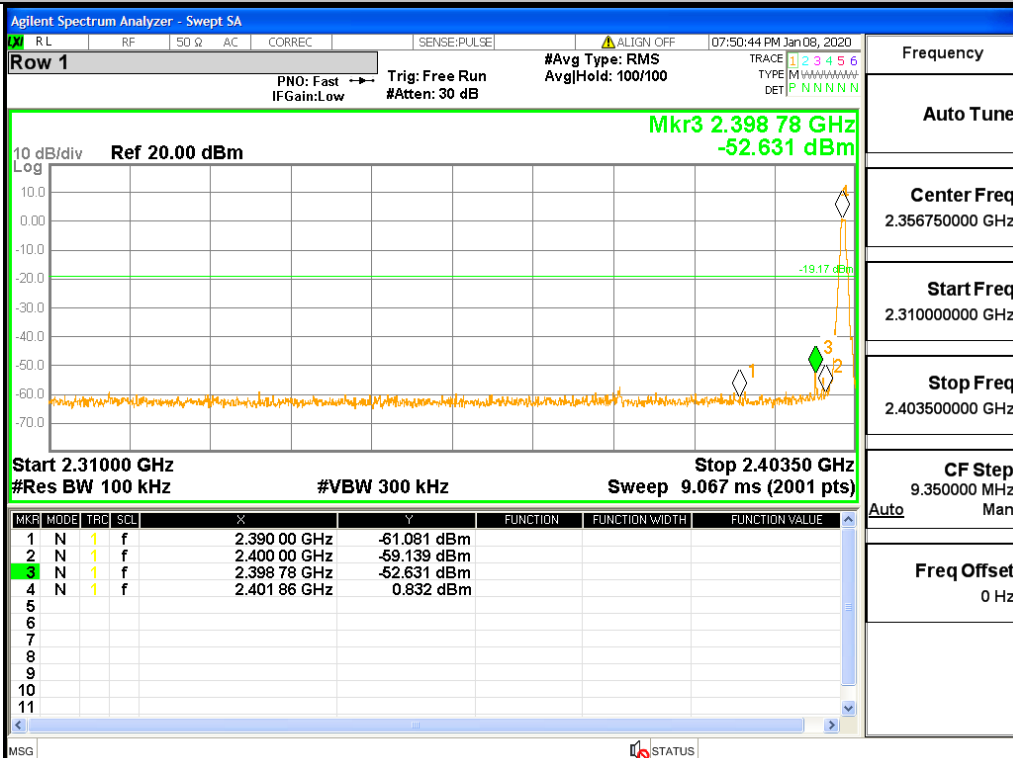
A.6 Band-edge for RF Conducted Emissions

Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
1DH5	2402	2398.778	0.832	-52.631	-19.168	Pass
1DH5	2480	2500	-0.662	-61.14	-20.662	Pass
2DH5	2402	2398.825	-2.242	-55.337	-22.242	Pass
2DH5	2480	2489.981	-0.843	-58.631	-20.843	Pass
3DH5	2402	2400	0.324	-59.07	-19.676	Pass
3DH5	2480	2483.5	-0.582	-61.75	-20.582	Pass
1DH5-Hopping	2402	2399.82	0.66	-52.667	-19.34	Pass
1DH5-Hopping	2480	2500	-0.107	-57.9	-20.107	Pass
2DH5-Hopping	2402	2399.79	0.78	-53.181	-19.22	Pass
2DH5-Hopping	2480	2500	-0.117	-58.59	-20.117	Pass
3DH5-Hopping	2402	2400	0.598	-58.42	-19.402	Pass
3DH5-Hopping	2480	2483.5	-0.172	-59.84	-20.172	Pass

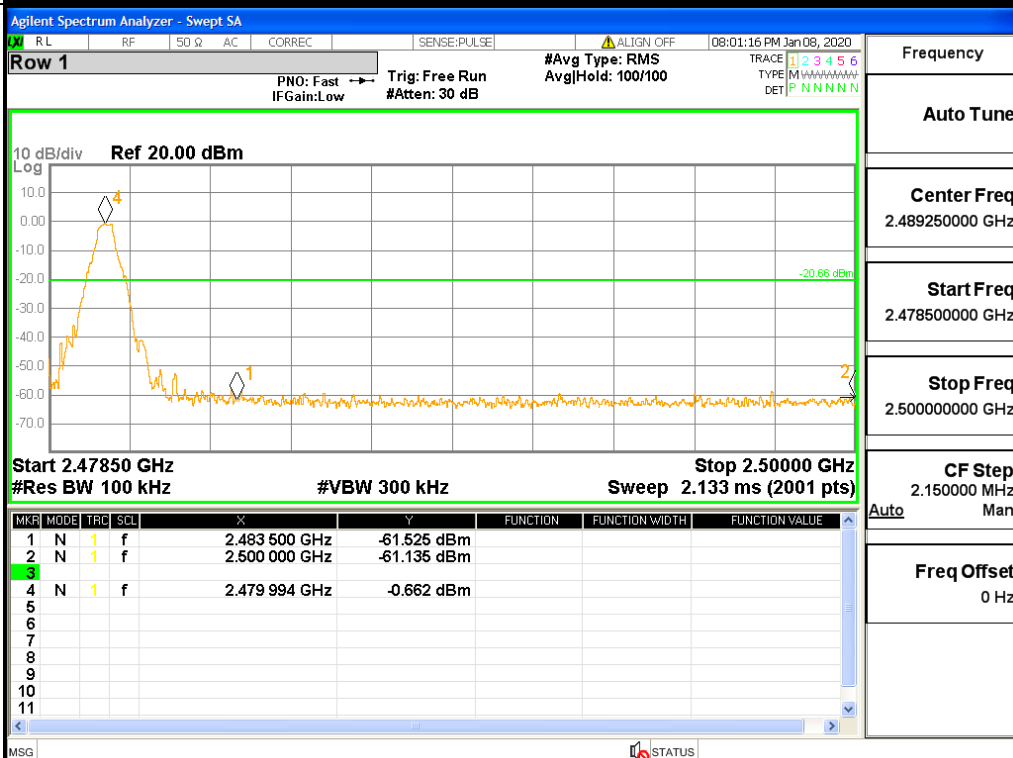
Test Graph

Graphs

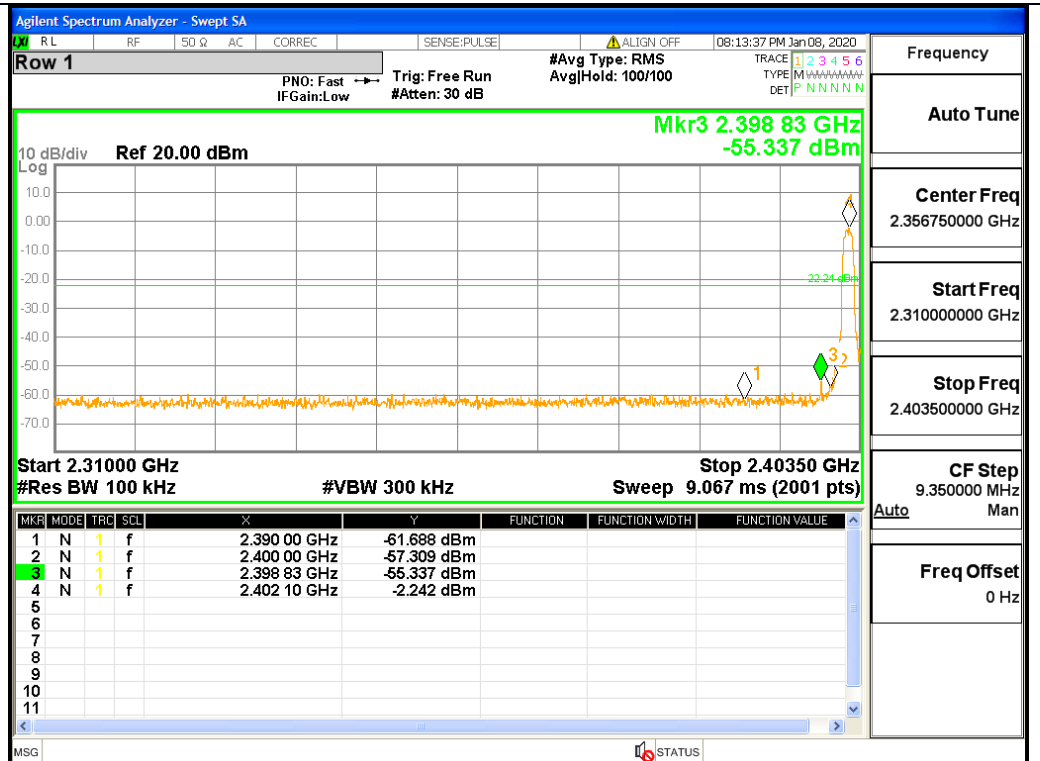
GFSK/LCH/No Hop



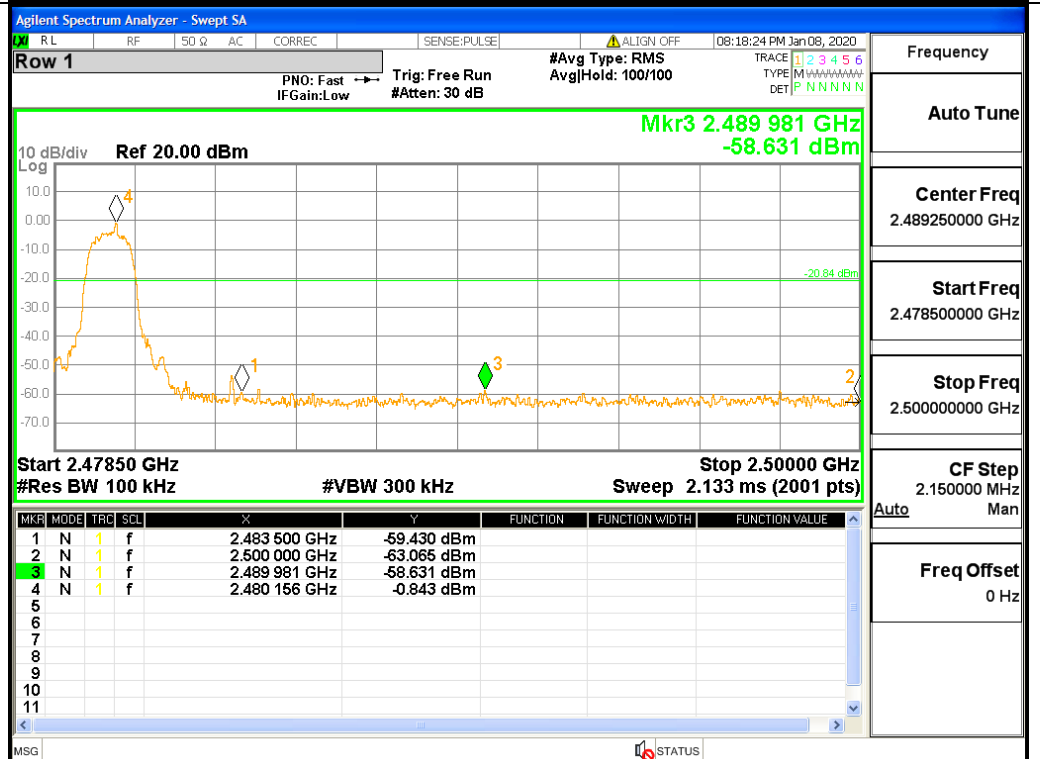
GFSK/HCH/No Hop



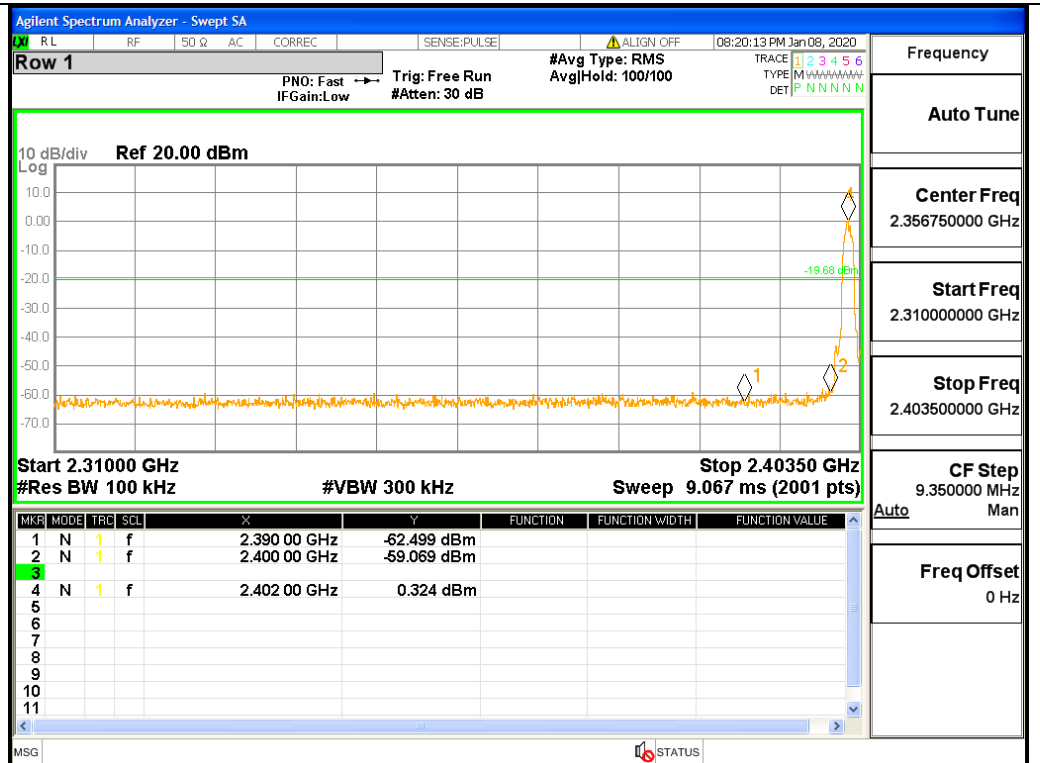
$\pi/4$ DQPSK/LCH/No
Hop



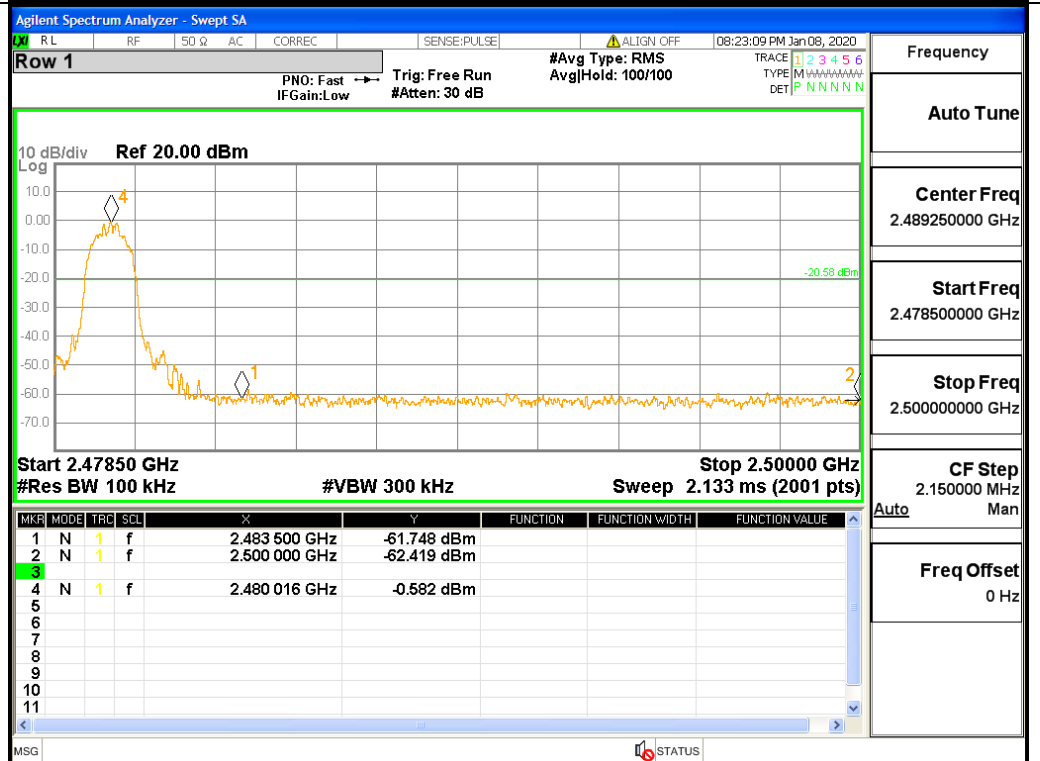
$\pi/4$ DQPSK/HCH/No
Hop



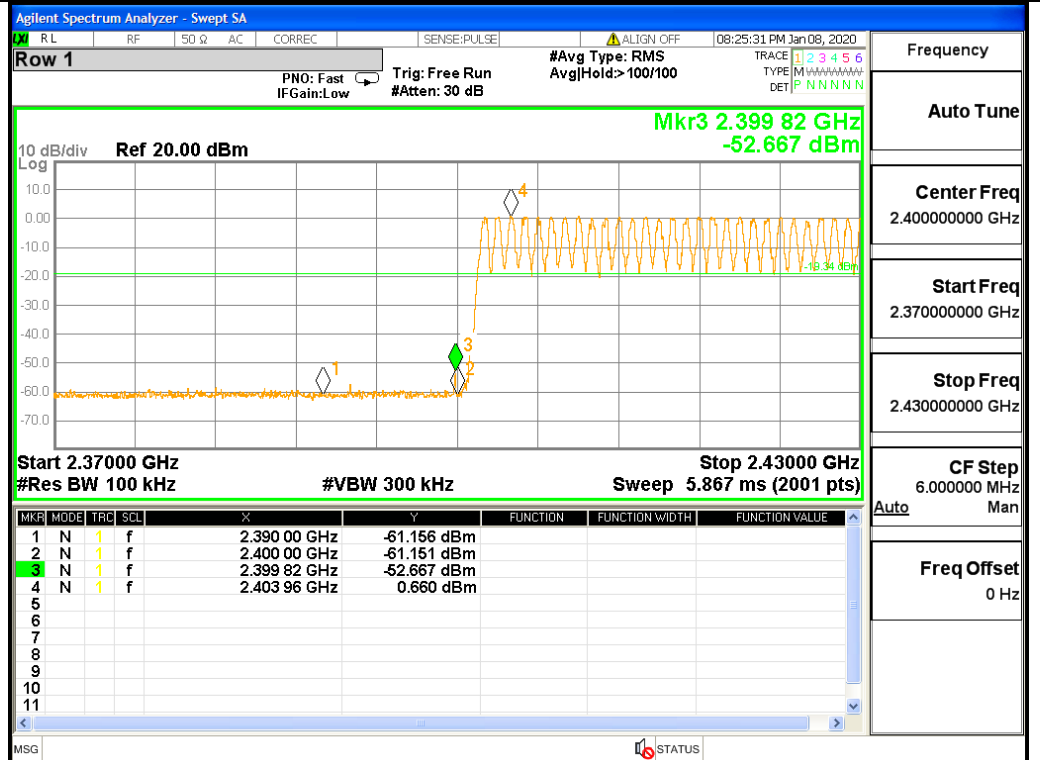
8DPSK/LCH/No Hop



8DPSK/HCH/No Hop



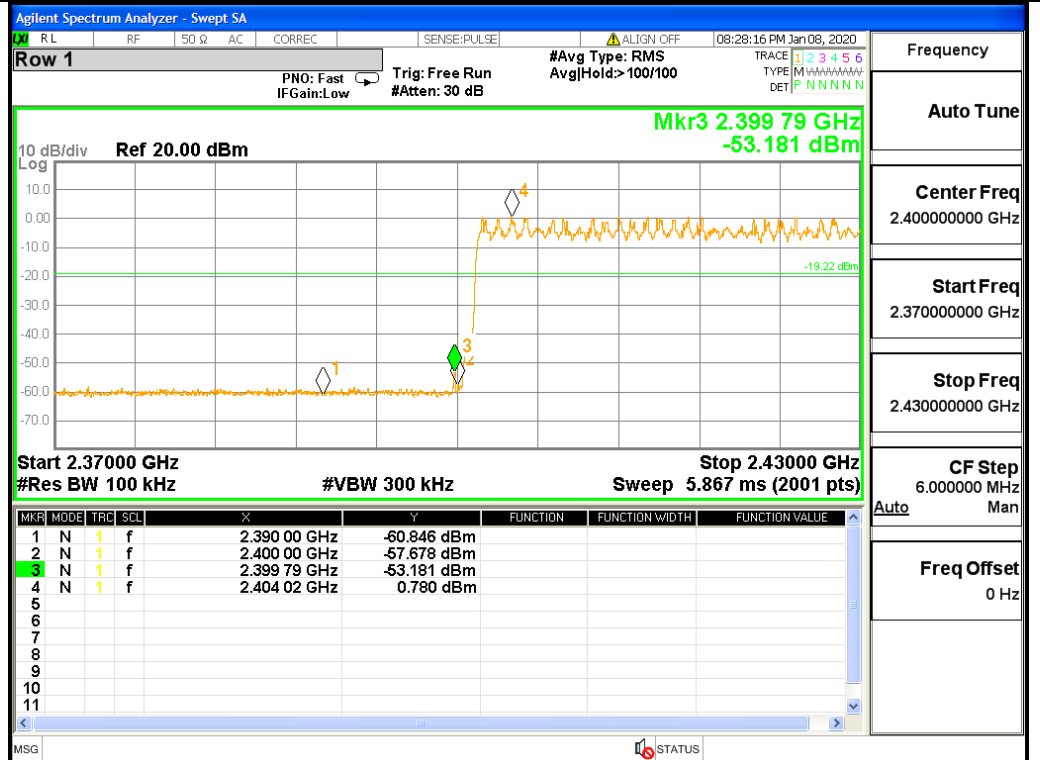
GFSK/LCH/Hop



GFSK/HCH/Hop



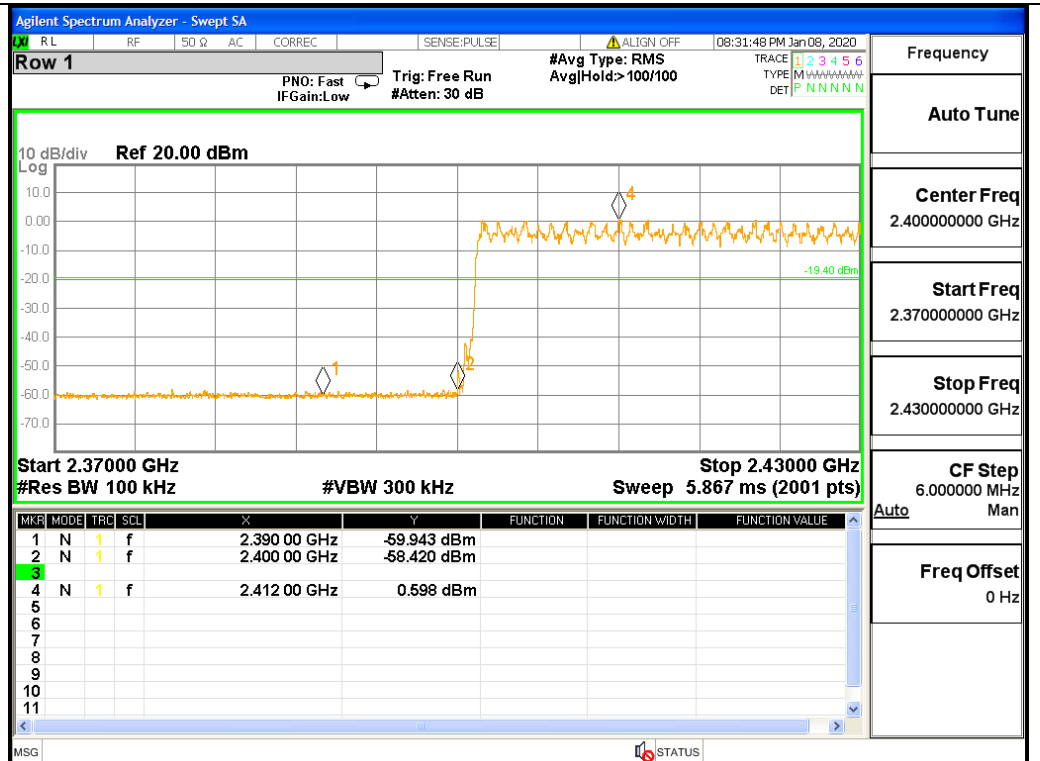
$\pi/4$ DQPSK/LCH/Hop



$\pi/4$ DQPSK/HCH/Hop



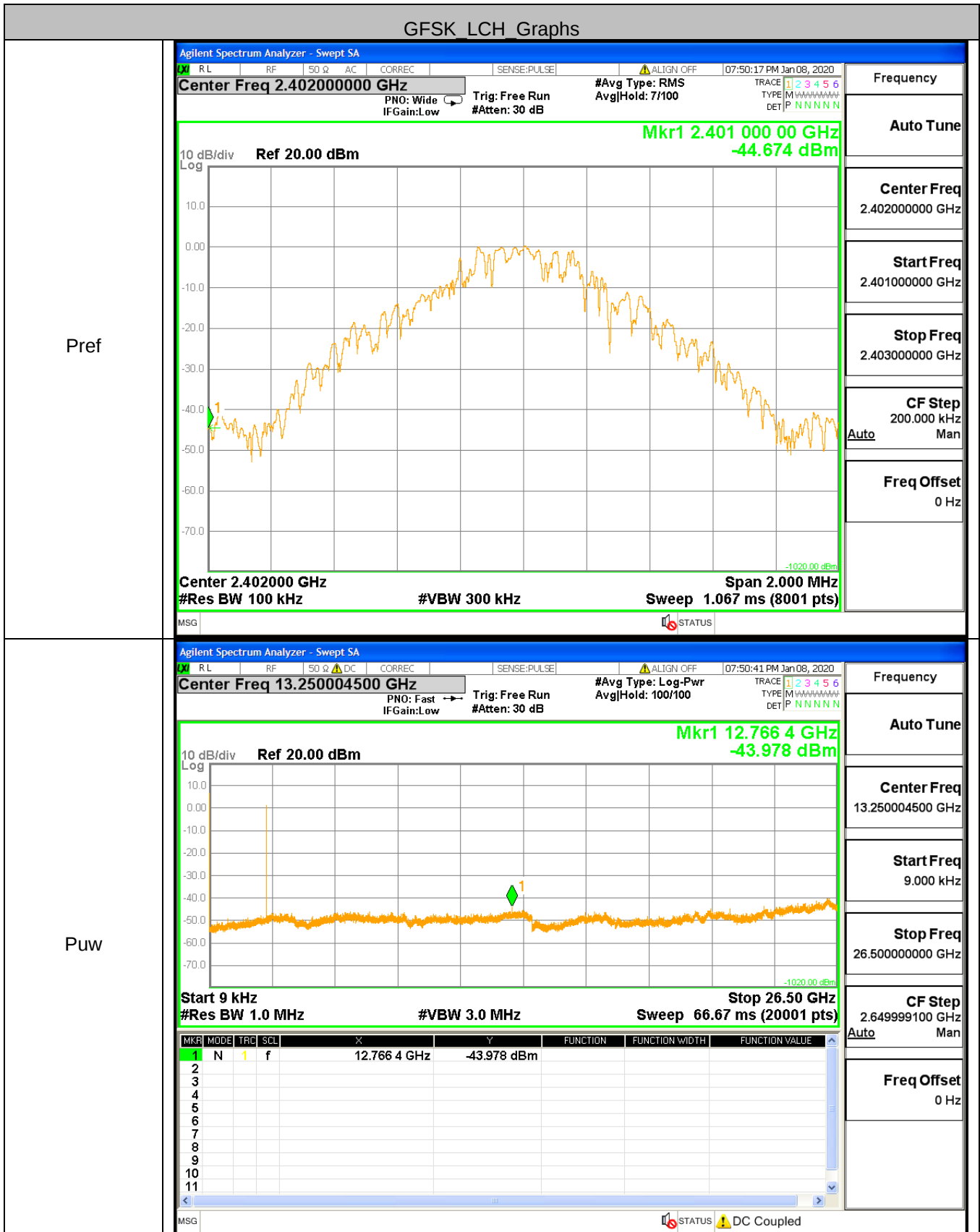
8DPSK/LCH/Hop

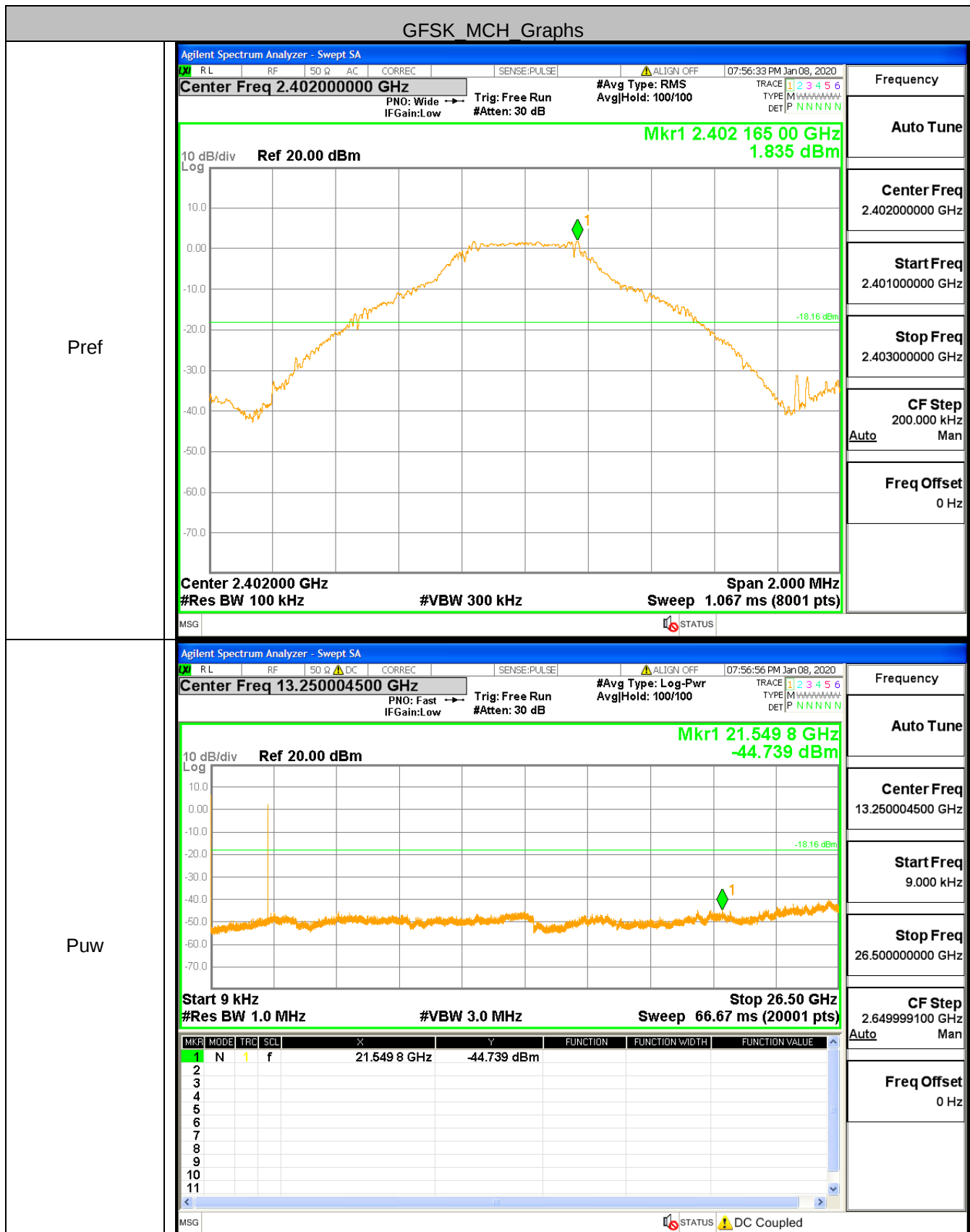


8DPSK/HCH/Hop



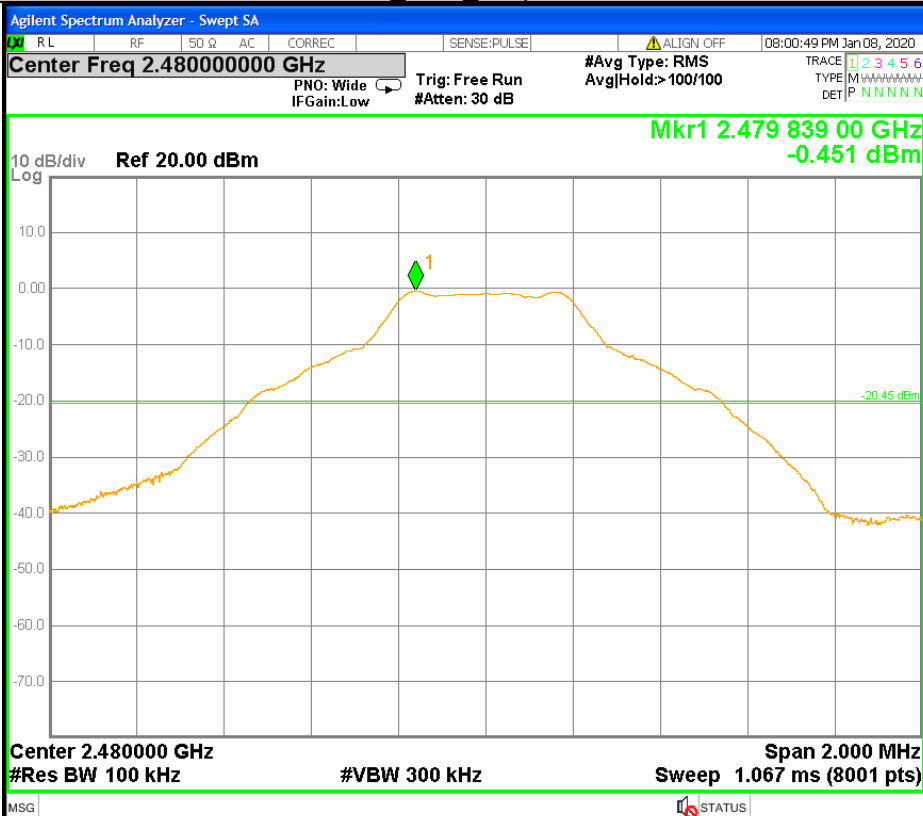
A.7 RF Conducted Spurious Emissions Test Graph



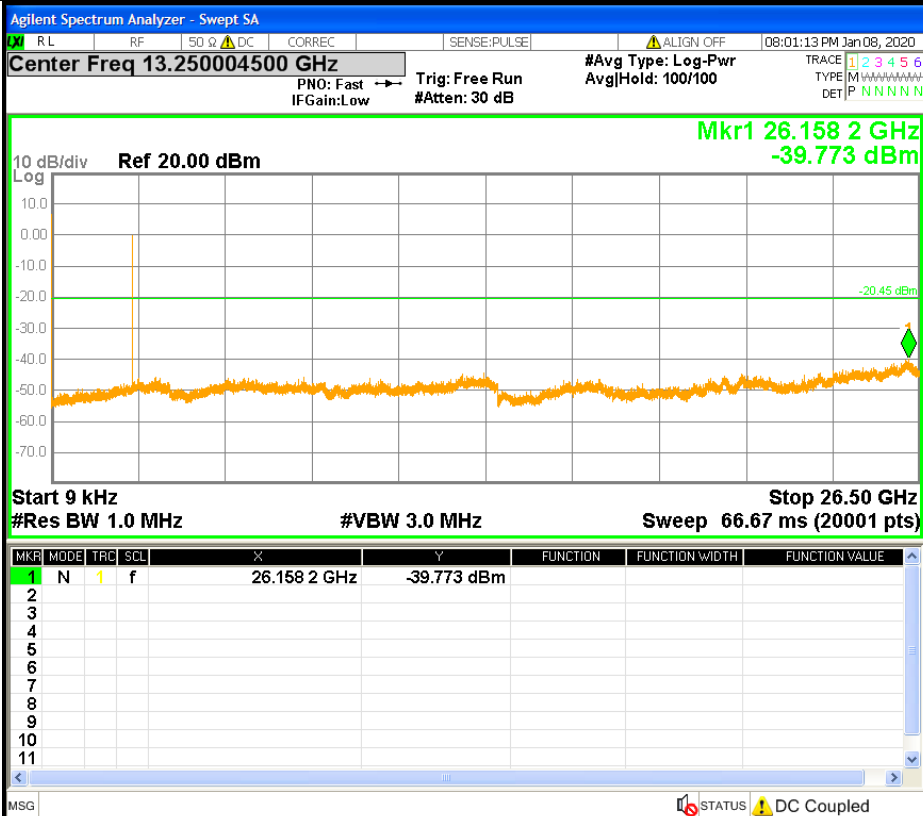


GFSK HCH Graphs

Pref

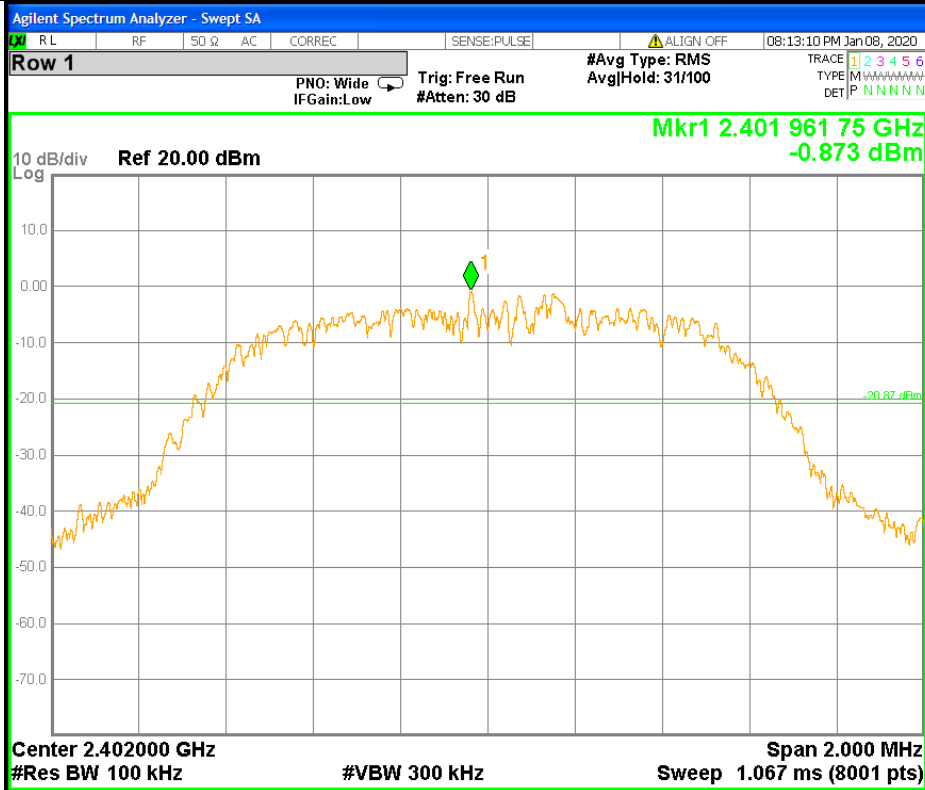


Puw



$\pi/4$ DQPSK LCH Graphs

Pref



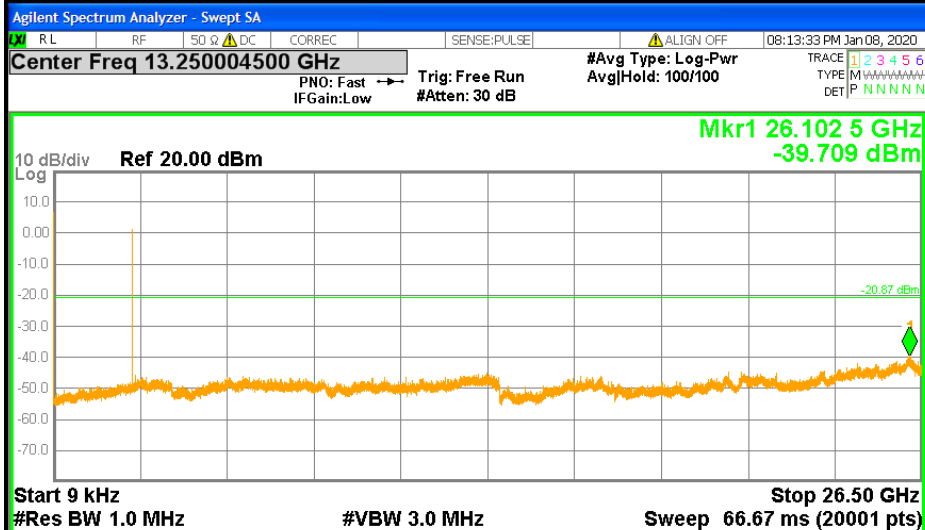
User Preset

User Preset

User Preset All Modes

Save User Preset

Puw



Frequency

Auto Tune

Center Freq 13.250004500 GHz

Start Freq 9.000 kHz

Stop Freq 26.500000000 GHz

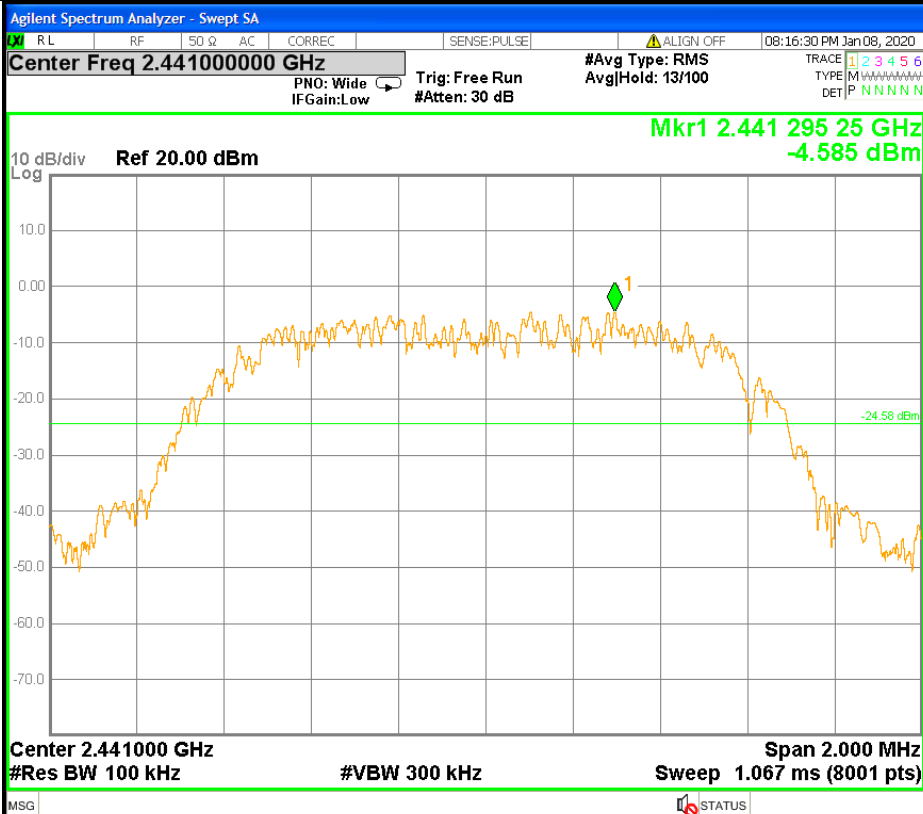
CF Step 2.649999100 GHz Man

Freq Offset 0 Hz

MR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	26.102 5 GHz	-39.709 dBm			
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

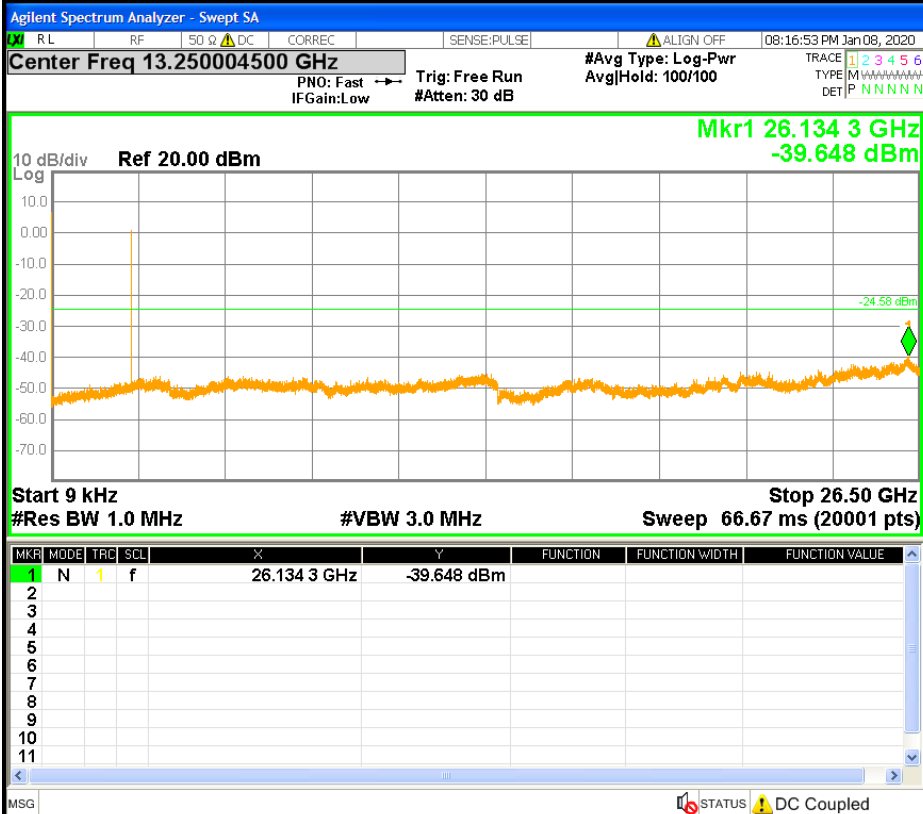
$\pi/4$ DQPSK MCH Graphs

Pref



Frequency
Auto Tune
Center Freq 2.441000000 GHz
Start Freq 2.440000000 GHz
Stop Freq 2.442000000 GHz
CF Step 200.000 kHz Auto
Freq Offset 0 Hz

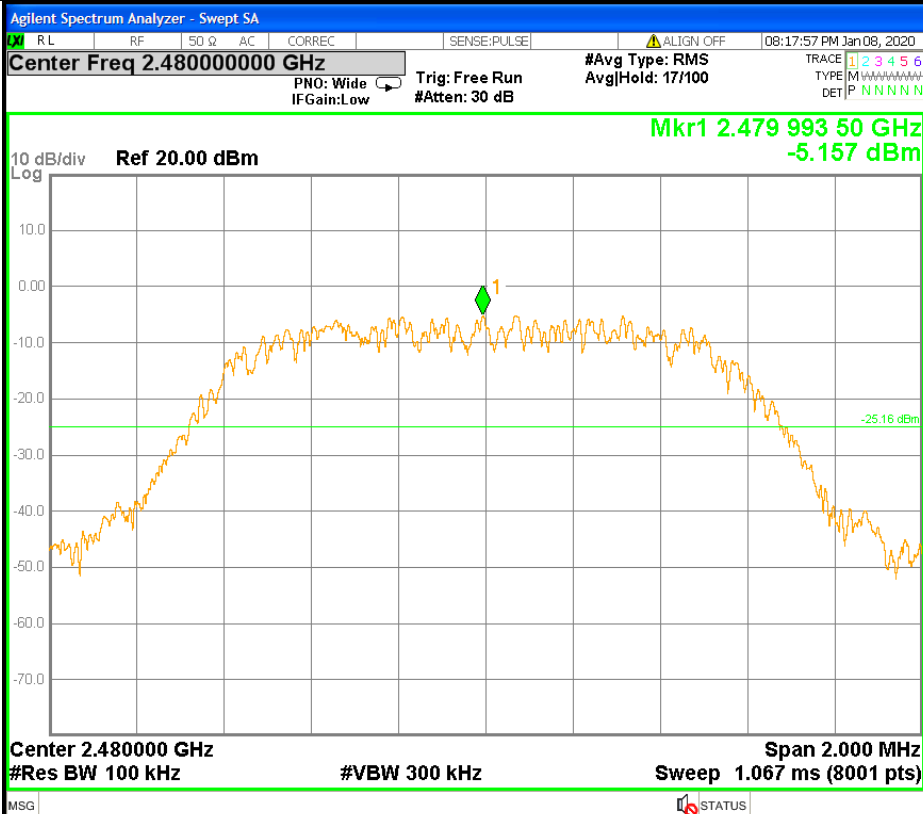
Puw



Frequency
Auto Tune
Center Freq 13.250004500 GHz
Start Freq 9.000 kHz
Stop Freq 26.500000000 GHz
CF Step 2.649999100 GHz Auto
Freq Offset 0 Hz

$\pi/4$ DQPSK HCH Graphs

Pref



Frequency

Auto Tune

Center Freq
2.480000000 GHz

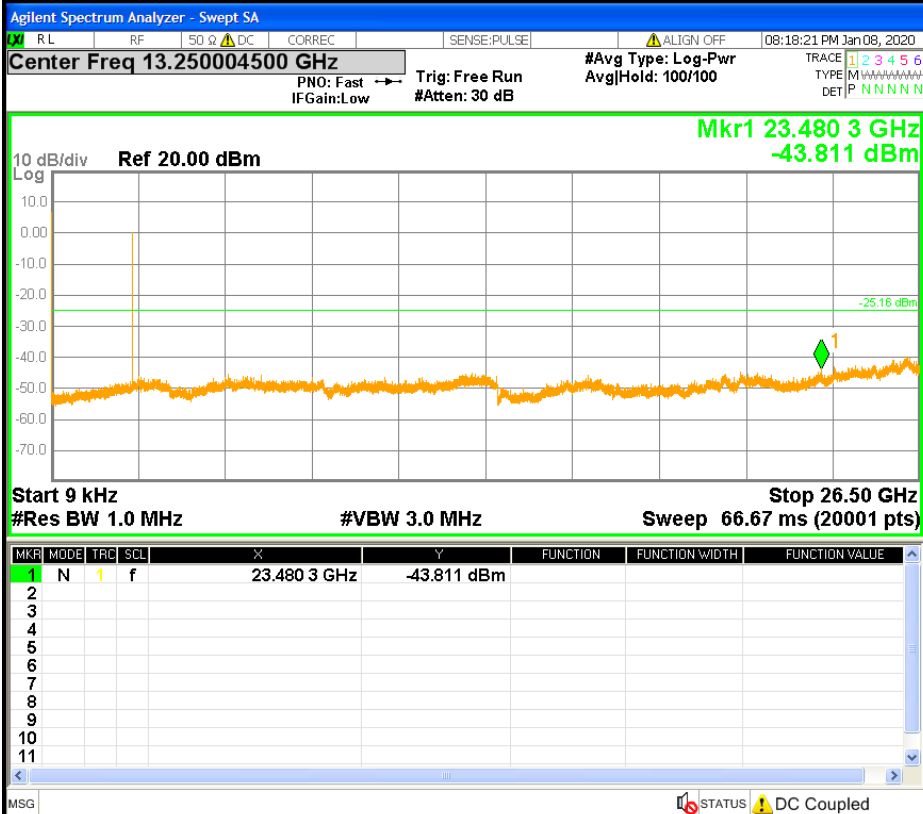
Start Freq
2.479000000 GHz

Stop Freq
2.481000000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

Puw



Frequency

Auto Tune

Center Freq
13.250004500 GHz

Start Freq
9.000 kHz

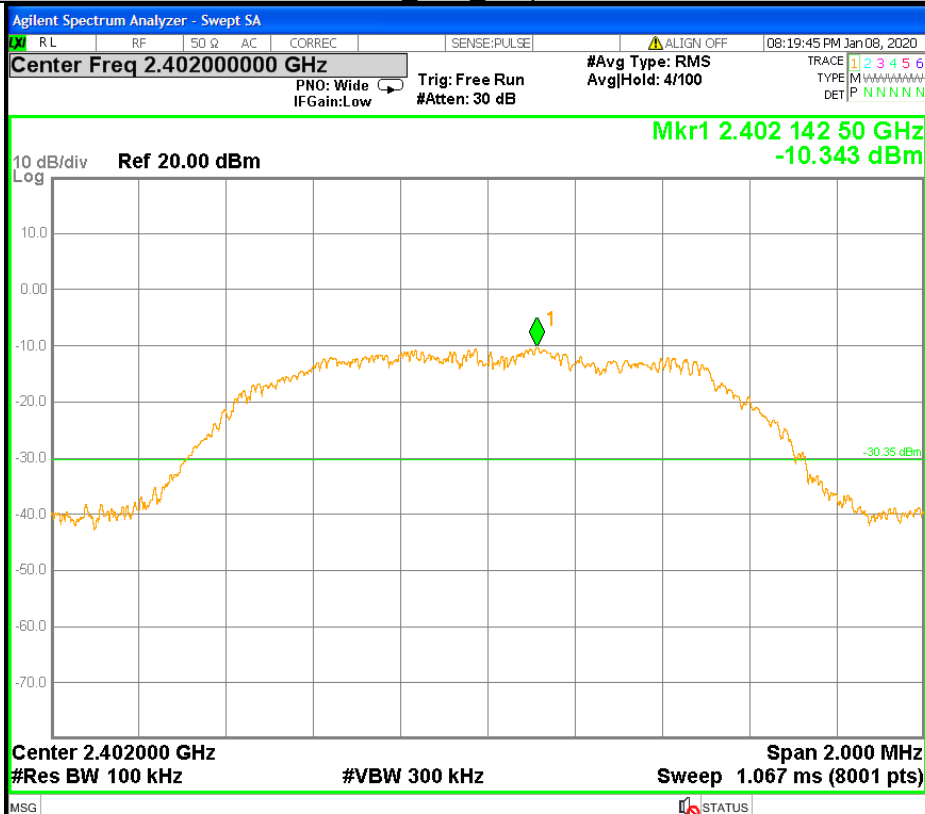
Stop Freq
26.500000000 GHz

CF Step
2.649999100 GHz
Auto Man

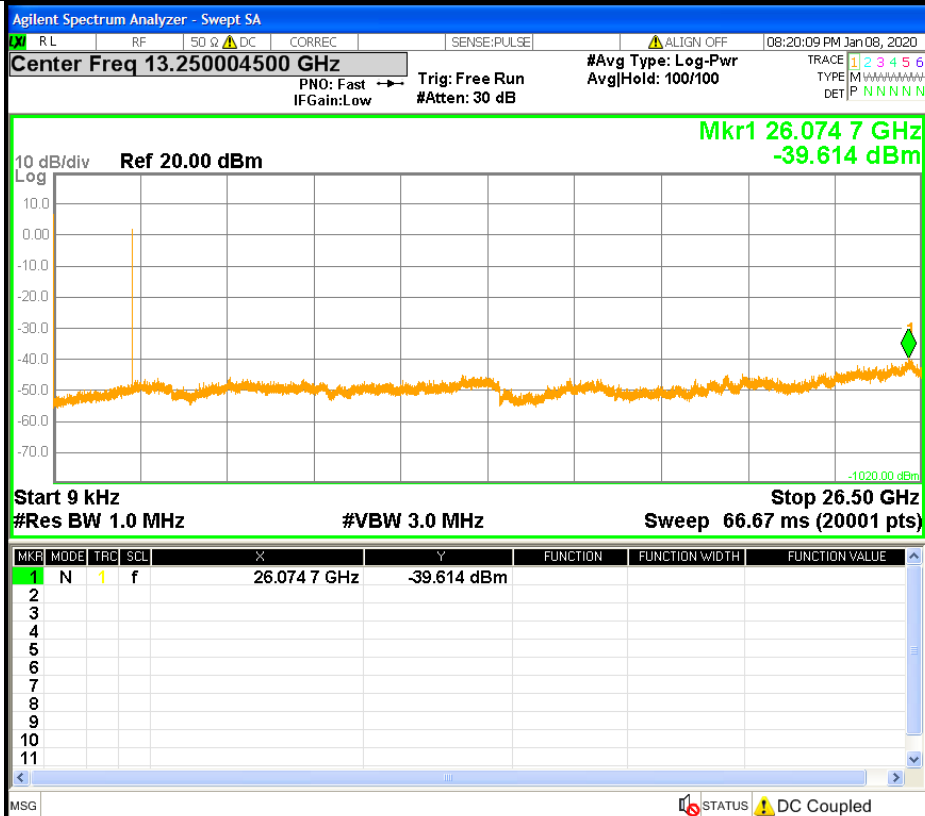
Freq Offset
0 Hz

8DPSK LCH Graphs

Pref

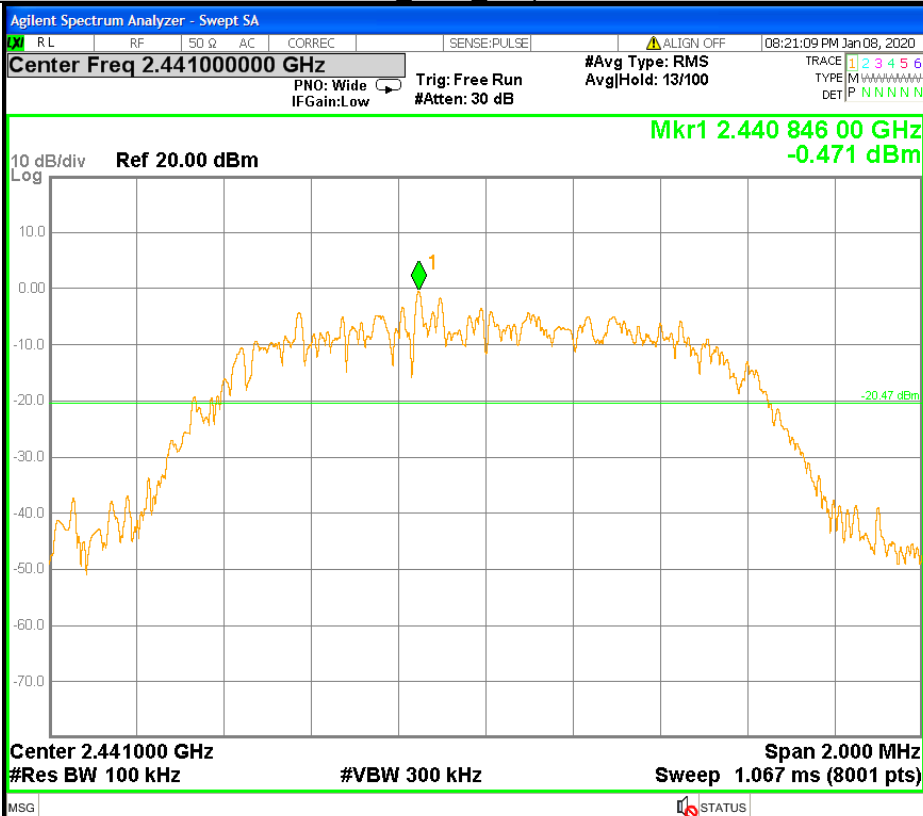


Puw



8DPSK MCH Graphs

Pref



Frequency

Auto Tune

Center Freq
2.441000000 GHz

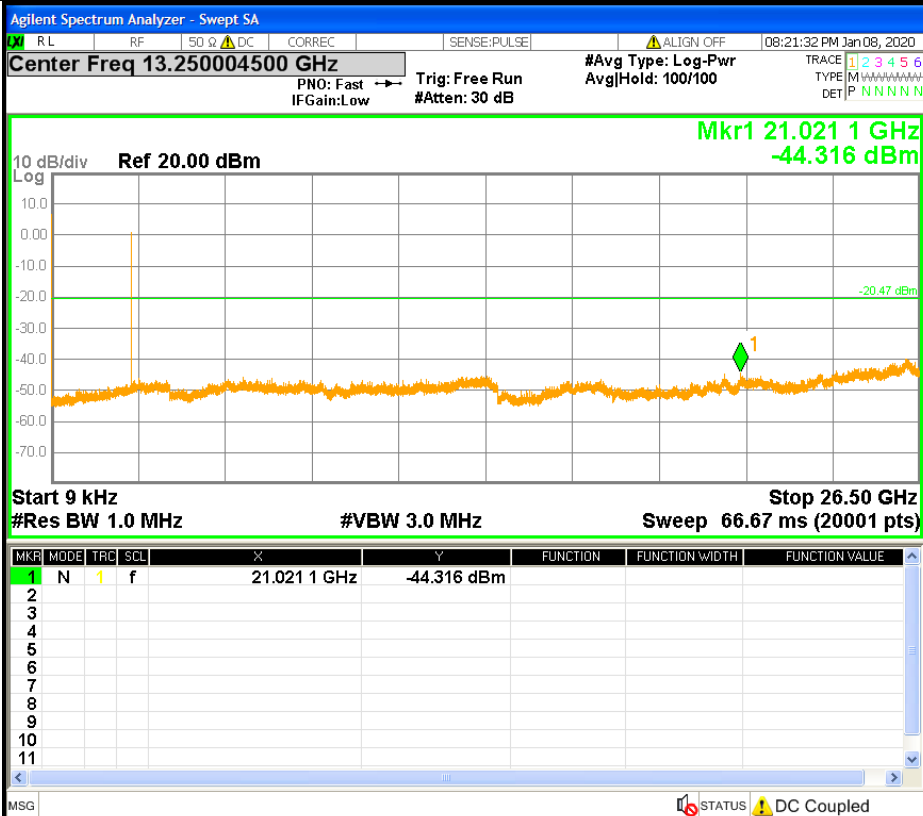
Start Freq
2.440000000 GHz

Stop Freq
2.442000000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

Puw



Frequency

Auto Tune

Center Freq
13.250004500 GHz

Start Freq
9.000 kHz

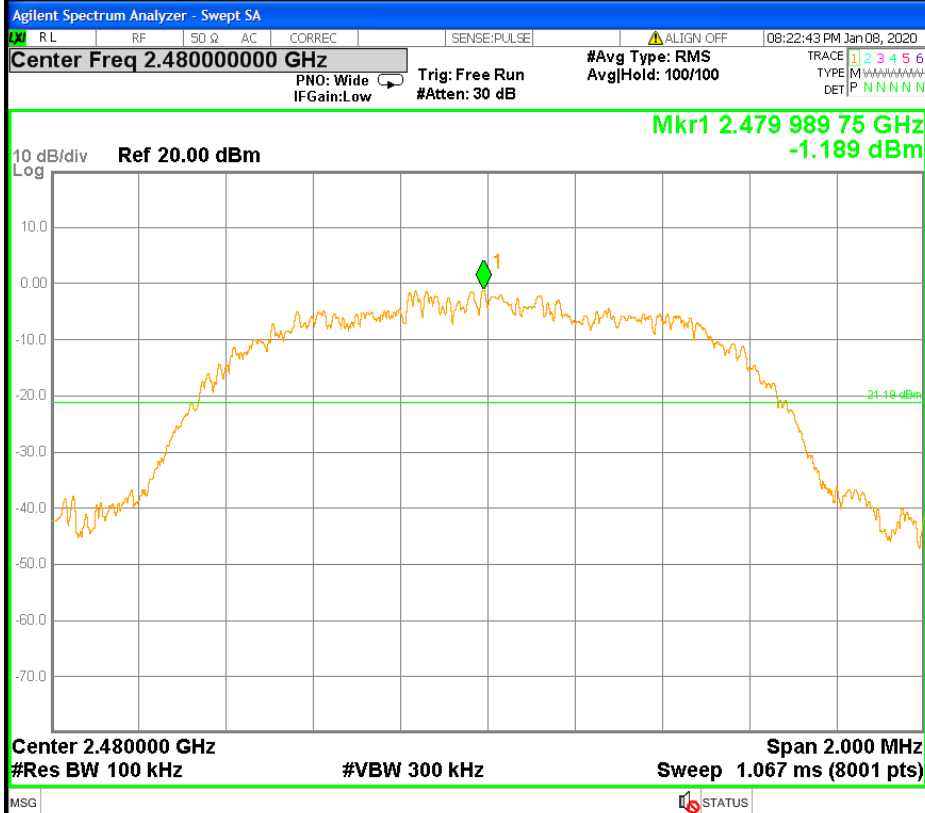
Stop Freq
26.500000000 GHz

CF Step
2.649999100 GHz
Auto Man

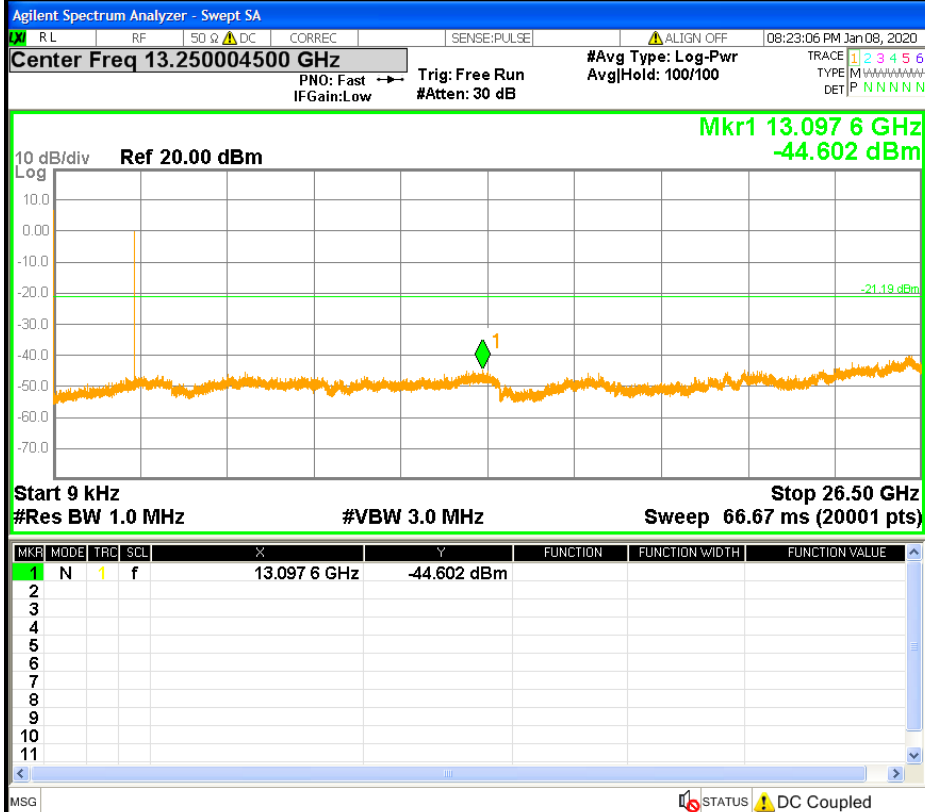
Freq Offset
0 Hz

8DPSK HCH Graphs

Pref



Puw

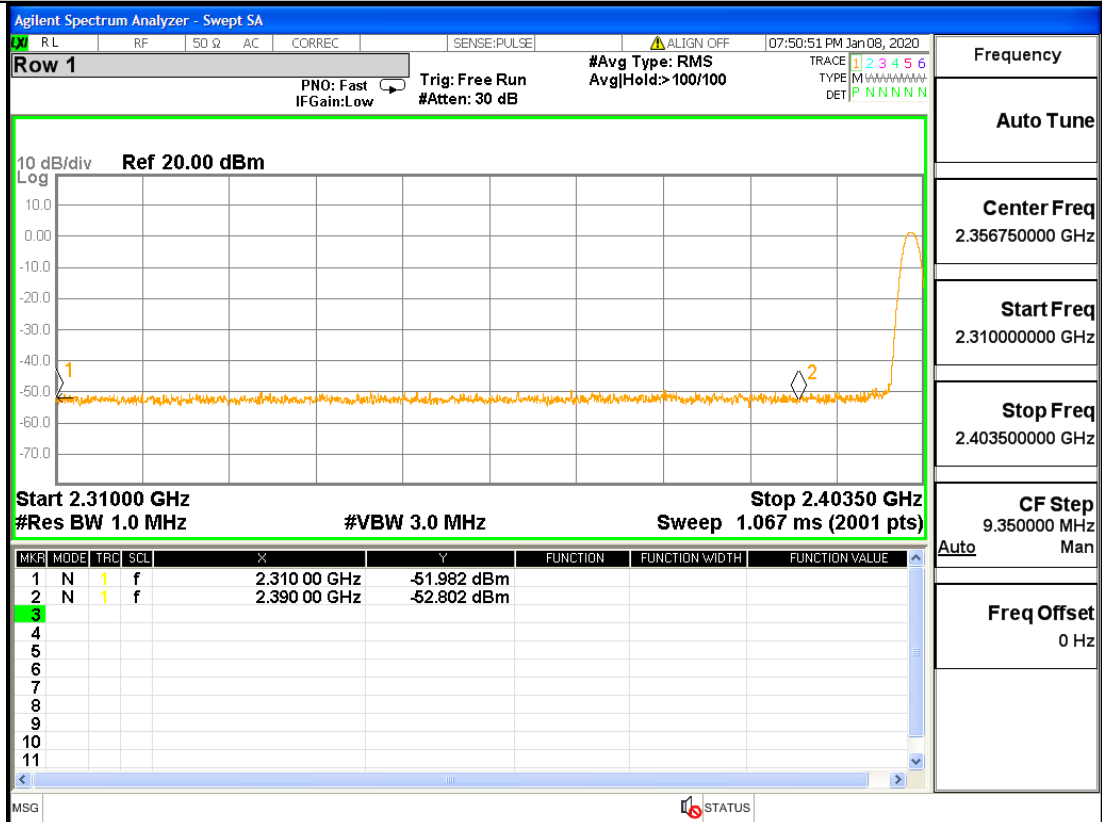


A.8 Restrict-band band-edge measurements

Type	Carrier Frequency (MHz)	Frequency (MHz)	Gain	Ground Factor	Peak Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2310	5	0.00	-52.149	48.051	74	Pass
1DH5	2480	2483.5	5	0.00	-50.569	49.631	74	Pass
2DH5	2402	2390	5	0.00	-52.715	47.485	74	Pass
2DH5	2480	2483.5	5	0.00	-52.185	48.015	74	Pass
3DH5	2402	2310	5	0.00	-52	48.2	74	Pass
3DH5	2480	2483.746	5	0.00	-43.622	56.578	74	Pass

Type	Carrier Frequency (MHz)	Frequency(MHz)	Gain	Ground Factor	Average Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2310	5	0.00	-59.474	40.726	54	Pass
1DH5	2480	2483.5	5	0.00	-55.423	44.777	54	Pass
2DH5	2402	2390	5	0.00	-59.522	40.678	54	Pass
2DH5	2480	2483.5	5	0.00	-55.086	45.114	54	Pass
3DH5	2402	2310	5	0.00	-59.587	40.613	54	Pass
3DH5	2480	2483.746	5	0.00	-55.01	45.19	54	Pass

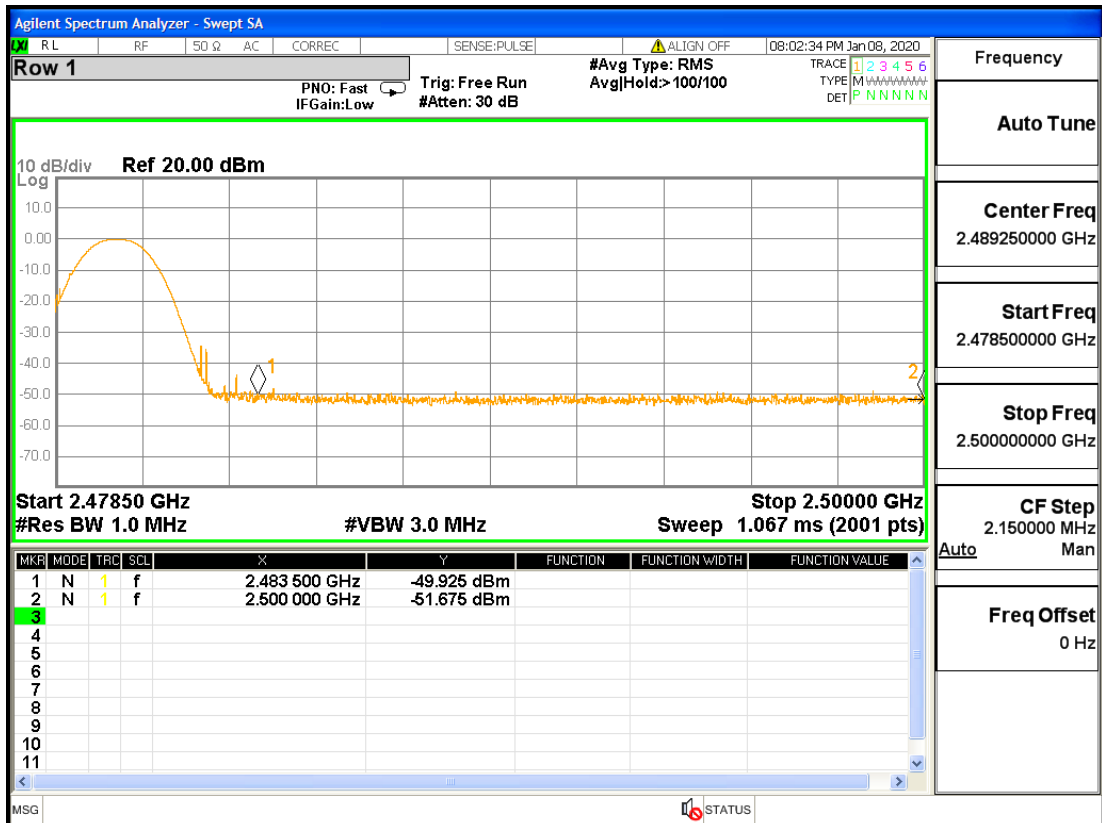
Restrict-band band-edge measurements_2402_PEAK_DH5



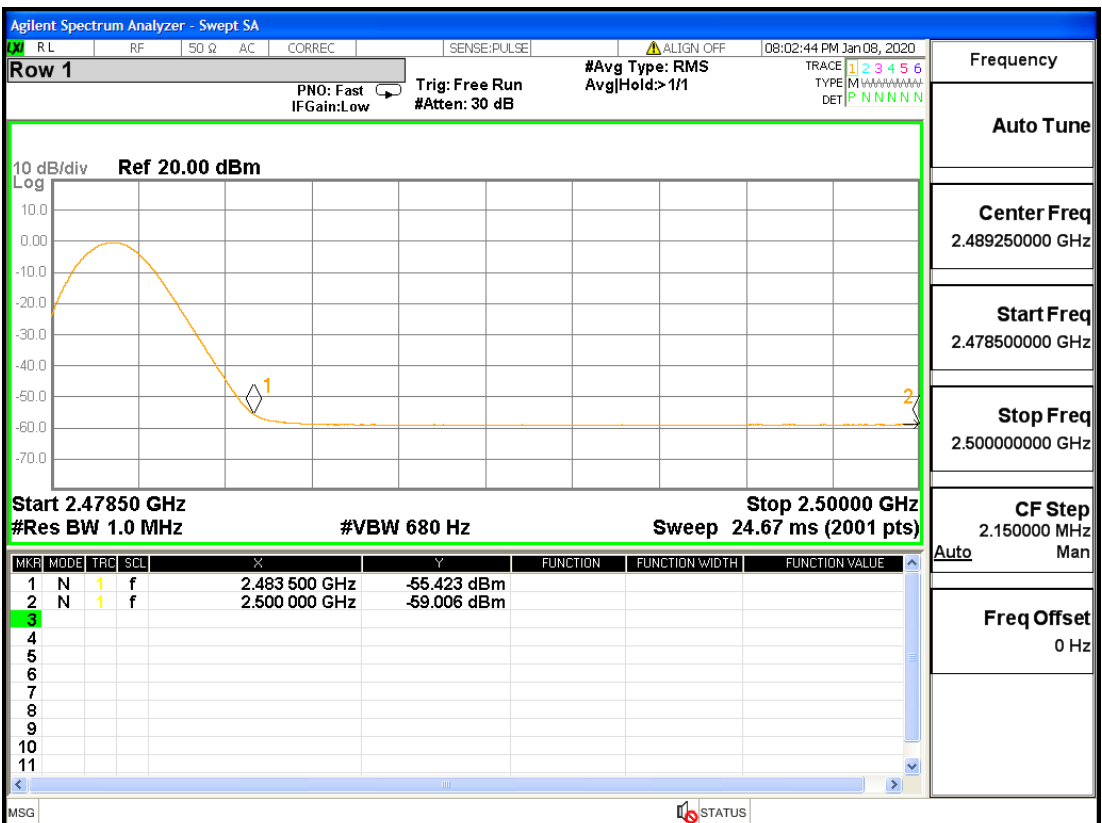
Restrict-band band-edge measurements_2402_AV_DH5



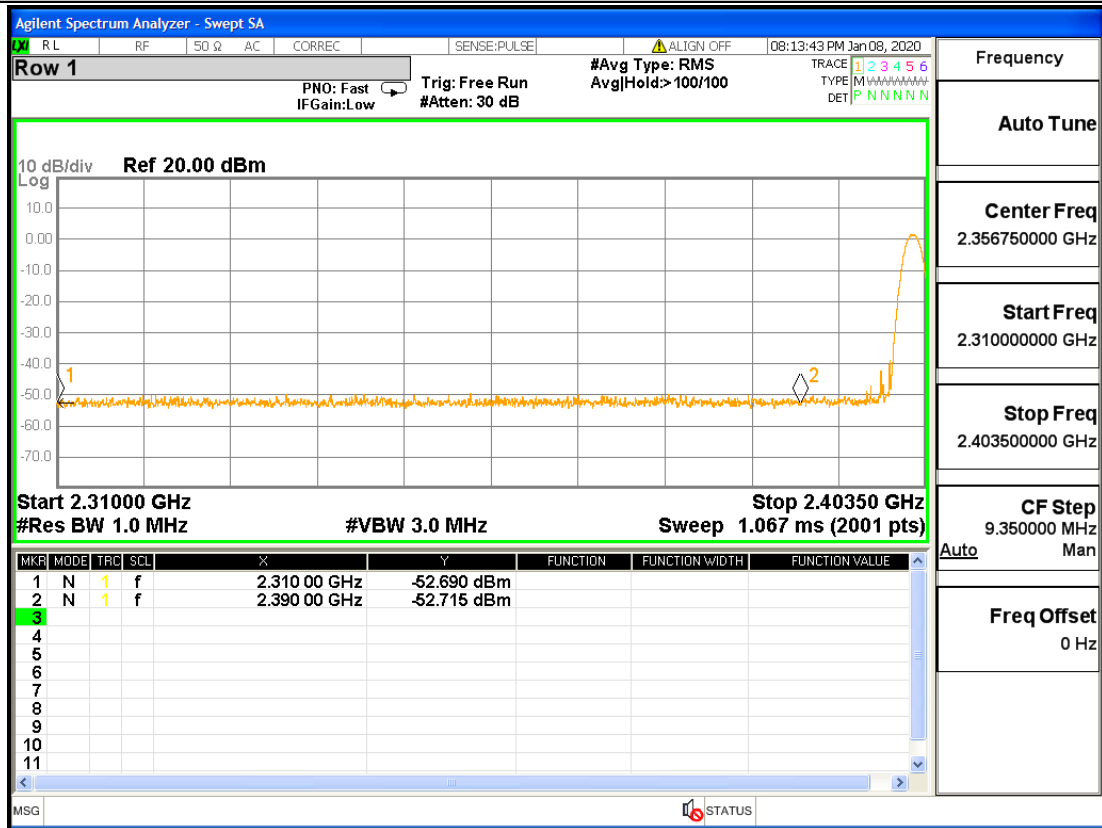
Restrict-band band-edge measurements_2480_PEAK_DH5



Restrict-band band-edge measurements_2480_AV_DH5



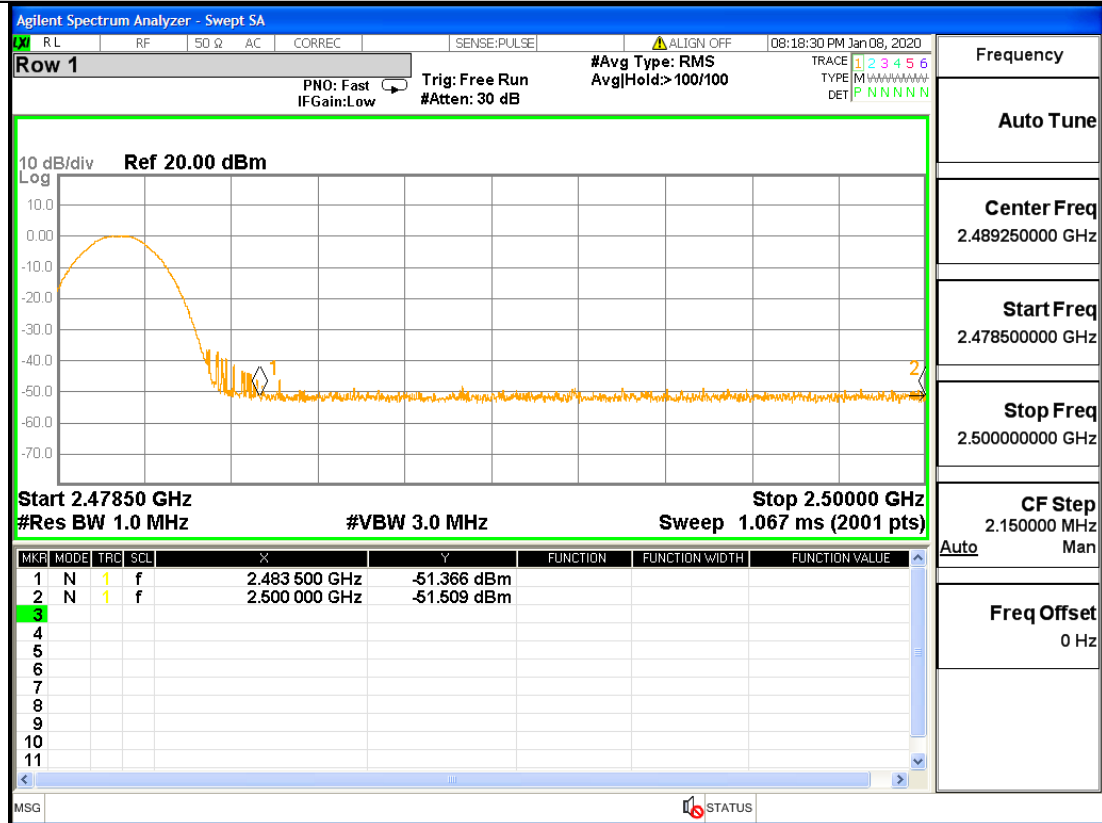
Restrict-band band-edge measurements_2402_PEAK_2DH5



Restrict-band band-edge measurements_2402_AV_2DH5



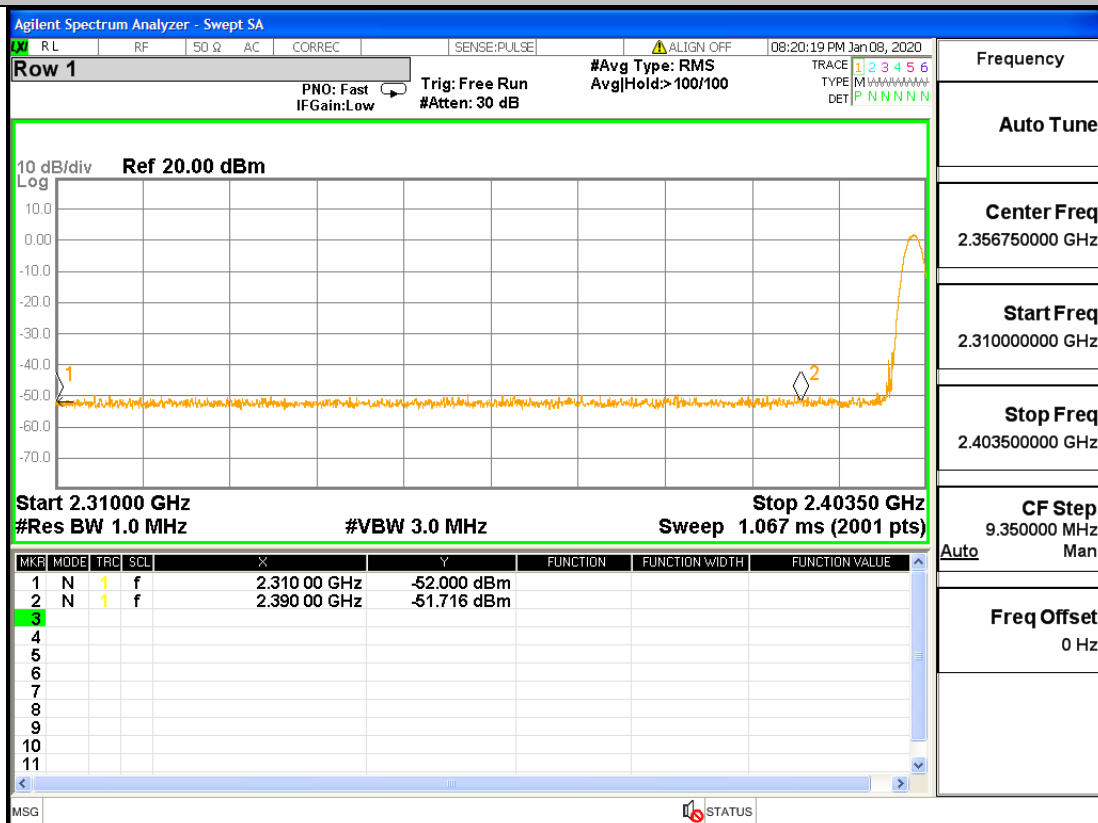
Restrict-band band-edge measurements_2480_PEAK_2DH5



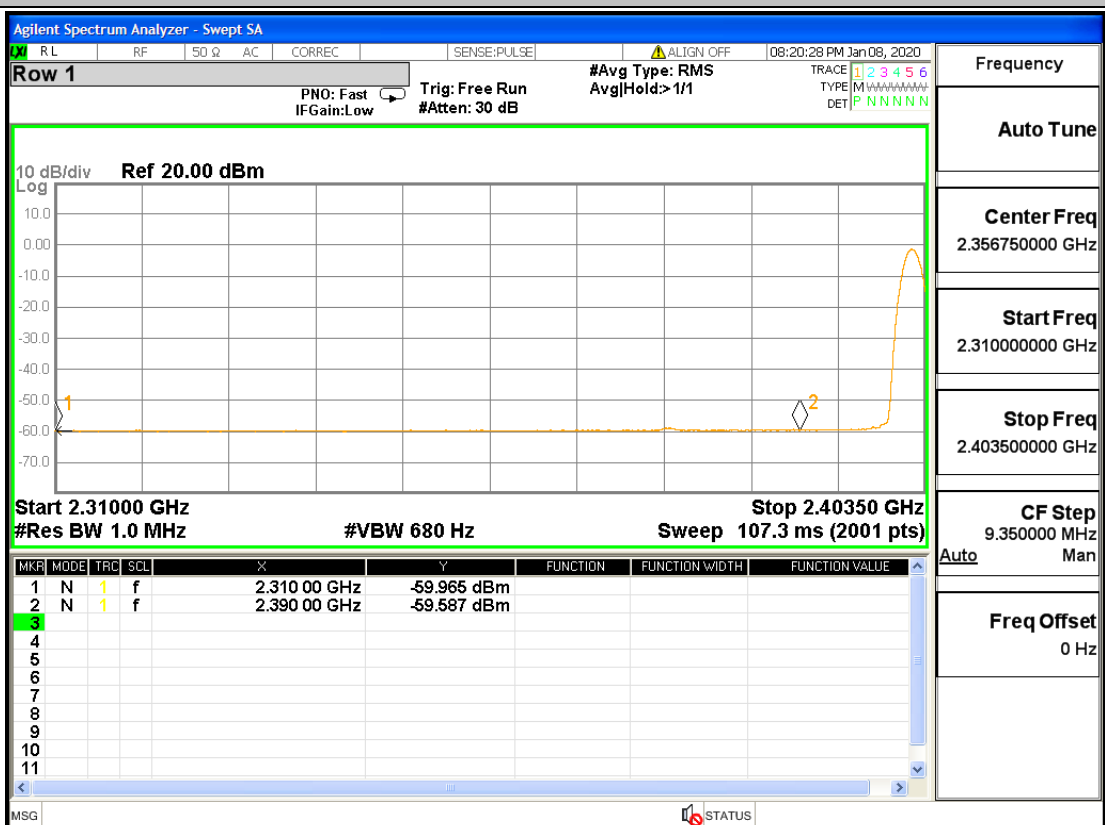
Restrict-band band-edge measurements_2480_AV_2DH5



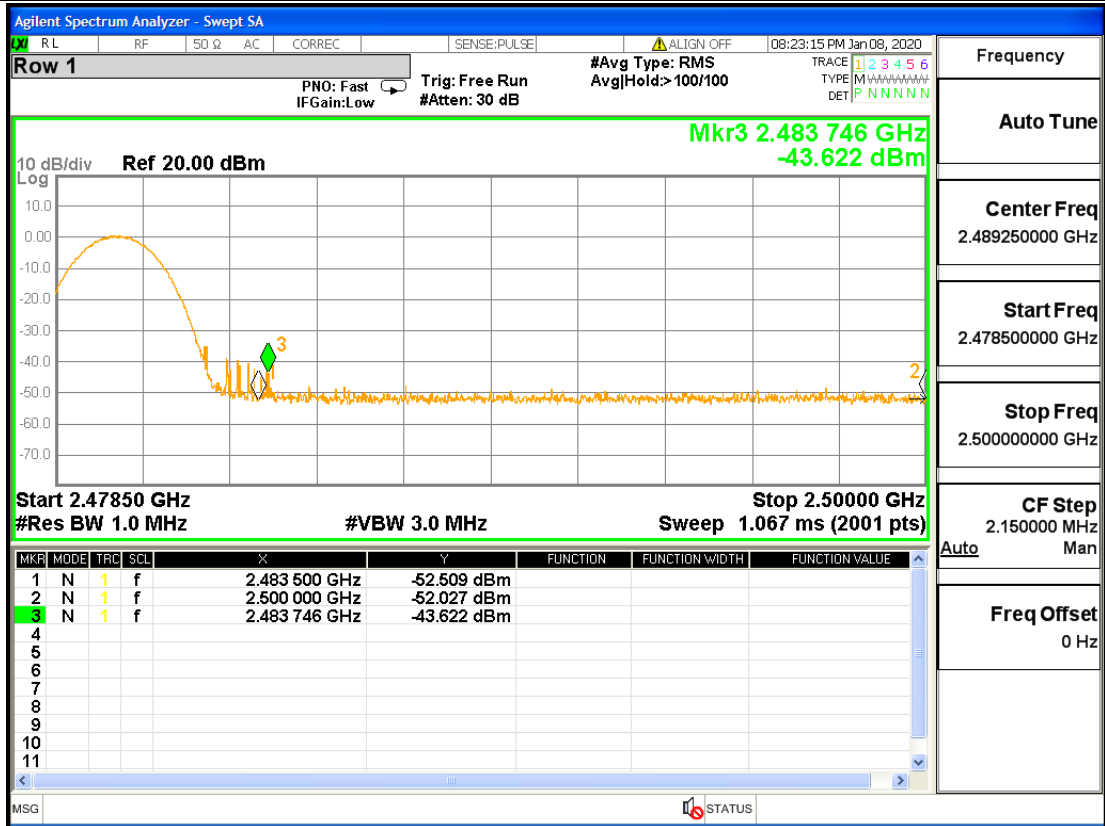
Restrict-band band-edge measurements 2402 PEAK 3DH5



Restrict-band band-edge measurements 2402 AV 3DH5



Restrict-band band-edge measurements_2480_PEAK_3DH5



Restrict-band band-edge measurements_2480_AV_3DH5

