

Appendix A

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

Product Name: Bluetooth earphone

Trade Mark: saiyo

Test Model: SY-TWS1

FCC ID: 2AT3WSY-TWS1

Environmental Conditions

Temperature:	23.5° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Gary Qian
Supervised by:	Eden Hu

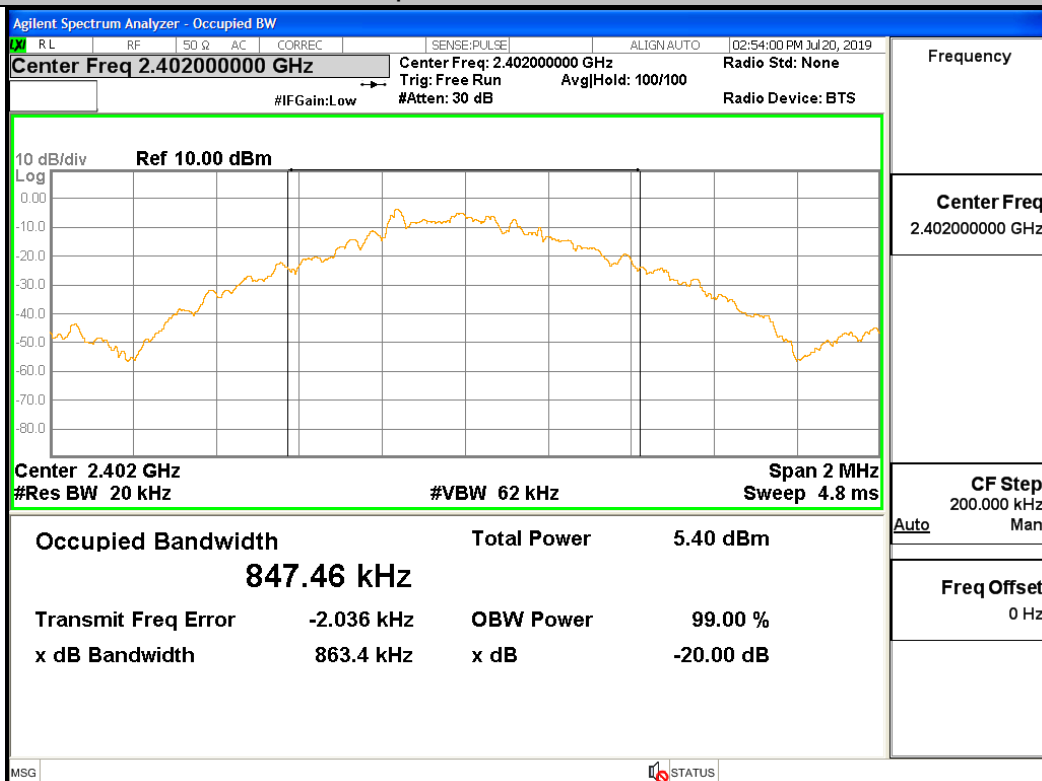
A.1 20 dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit(MHz)	Verdict
GFSK	LCH	0.863	Not Specified	PASS
GFSK	MCH	0.863	Not Specified	PASS
GFSK	HCH	0.888	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.226	Not Specified	PASS
$\pi/4$ DQPSK	MCH	1.287	Not Specified	PASS
$\pi/4$ DQPSK	HCH	1.218	Not Specified	PASS
8DPSK	LCH	1.233	Not Specified	PASS
8DPSK	MCH	1.235	Not Specified	PASS
8DPSK	HCH	1.233	Not Specified	PASS

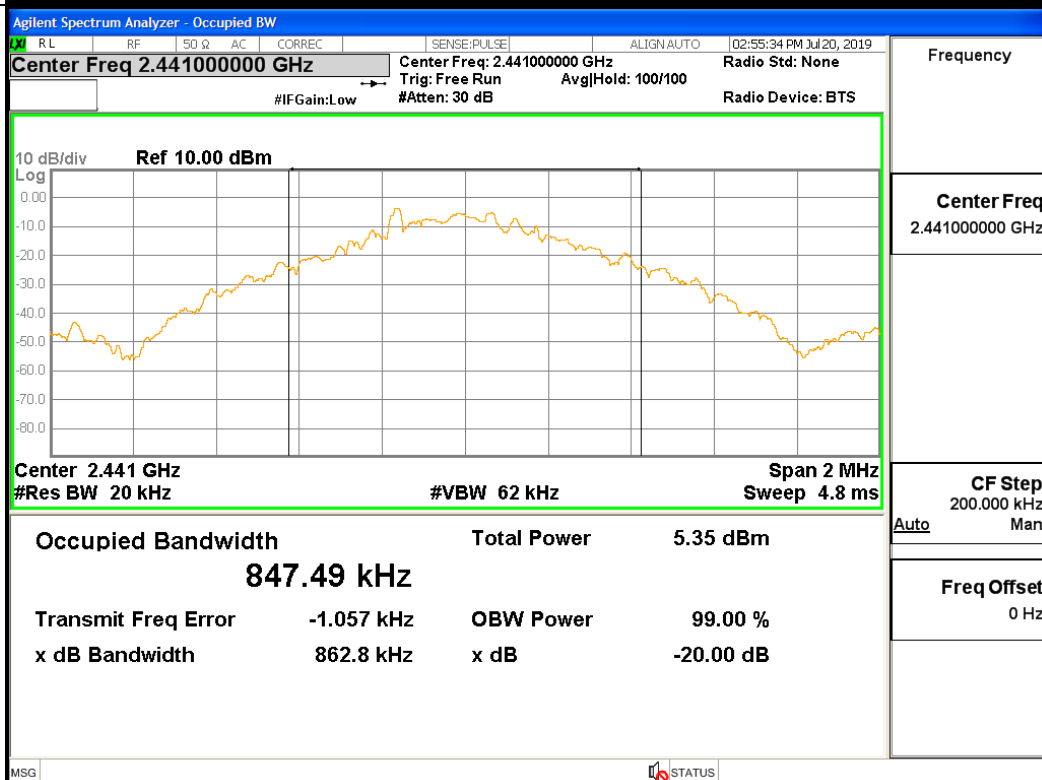
Test Graph

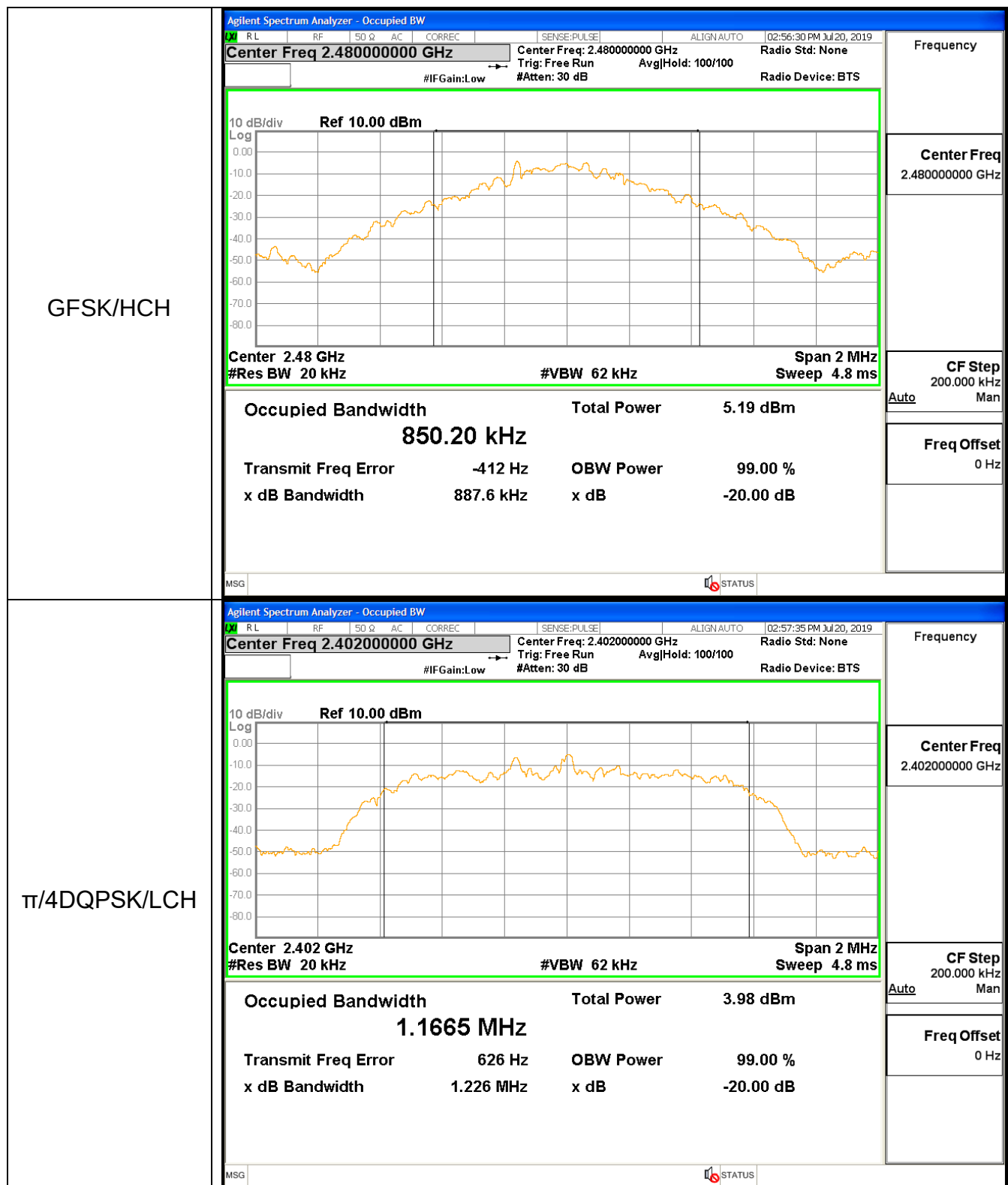
Graphs

GFSK/LCH

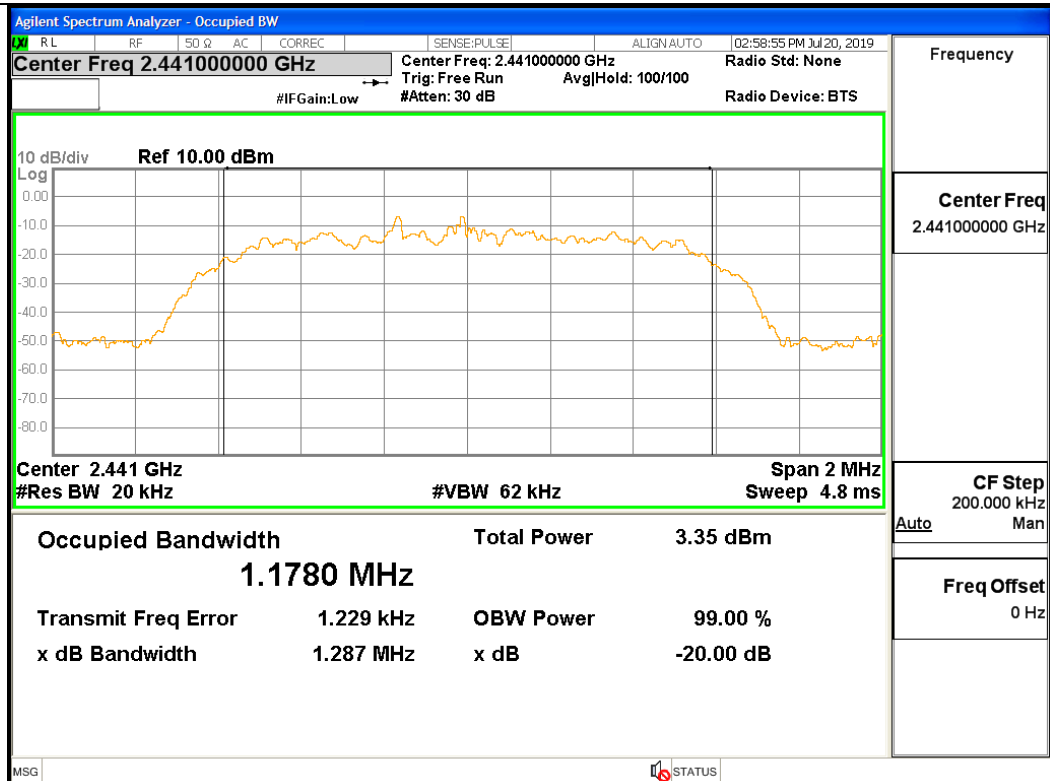


GFSK/MCH

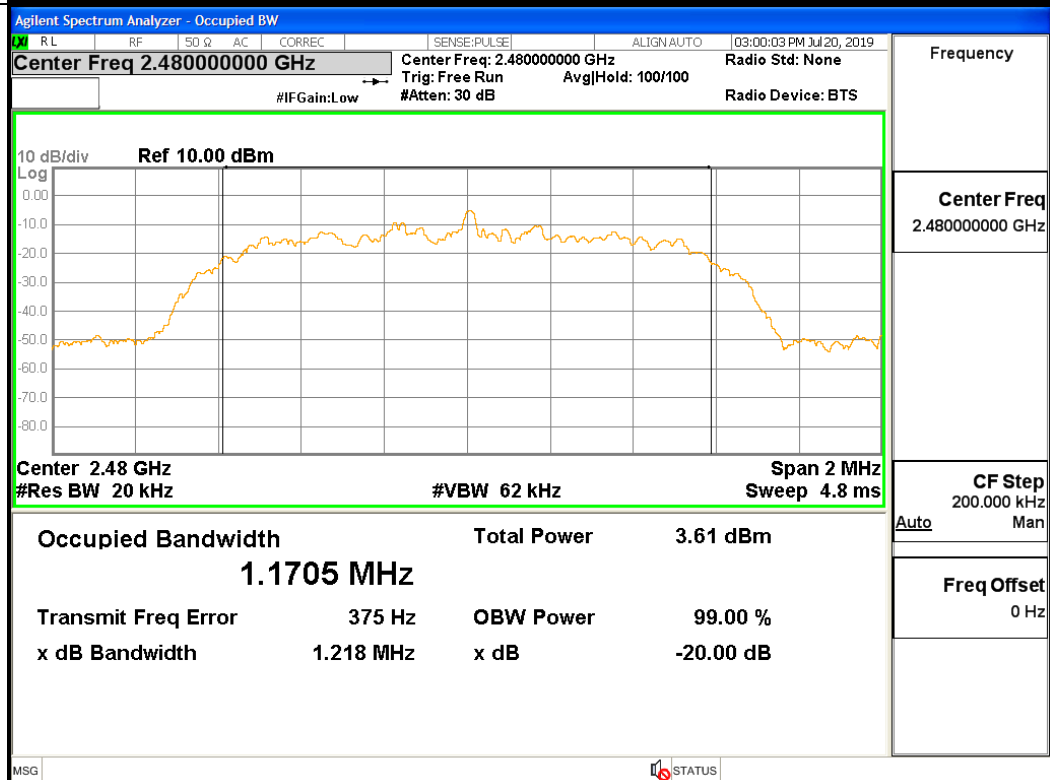




$\pi/4$ DQPSK/MCH

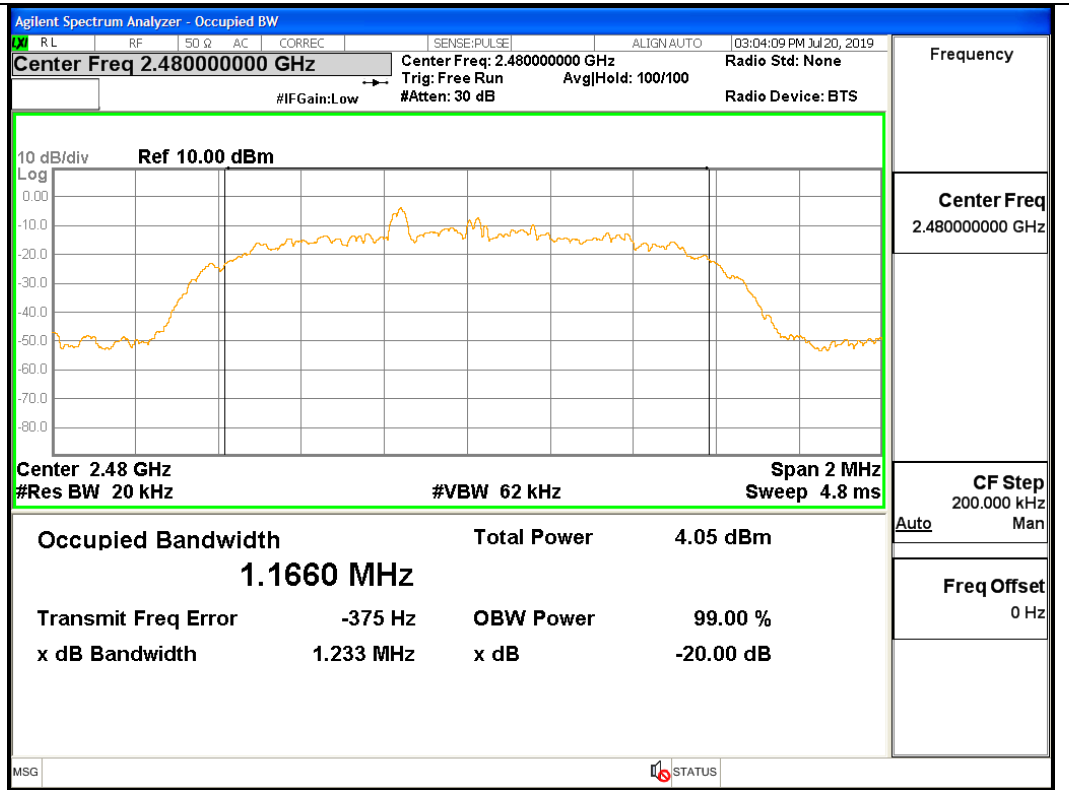


$\pi/4$ DQPSK/HCH





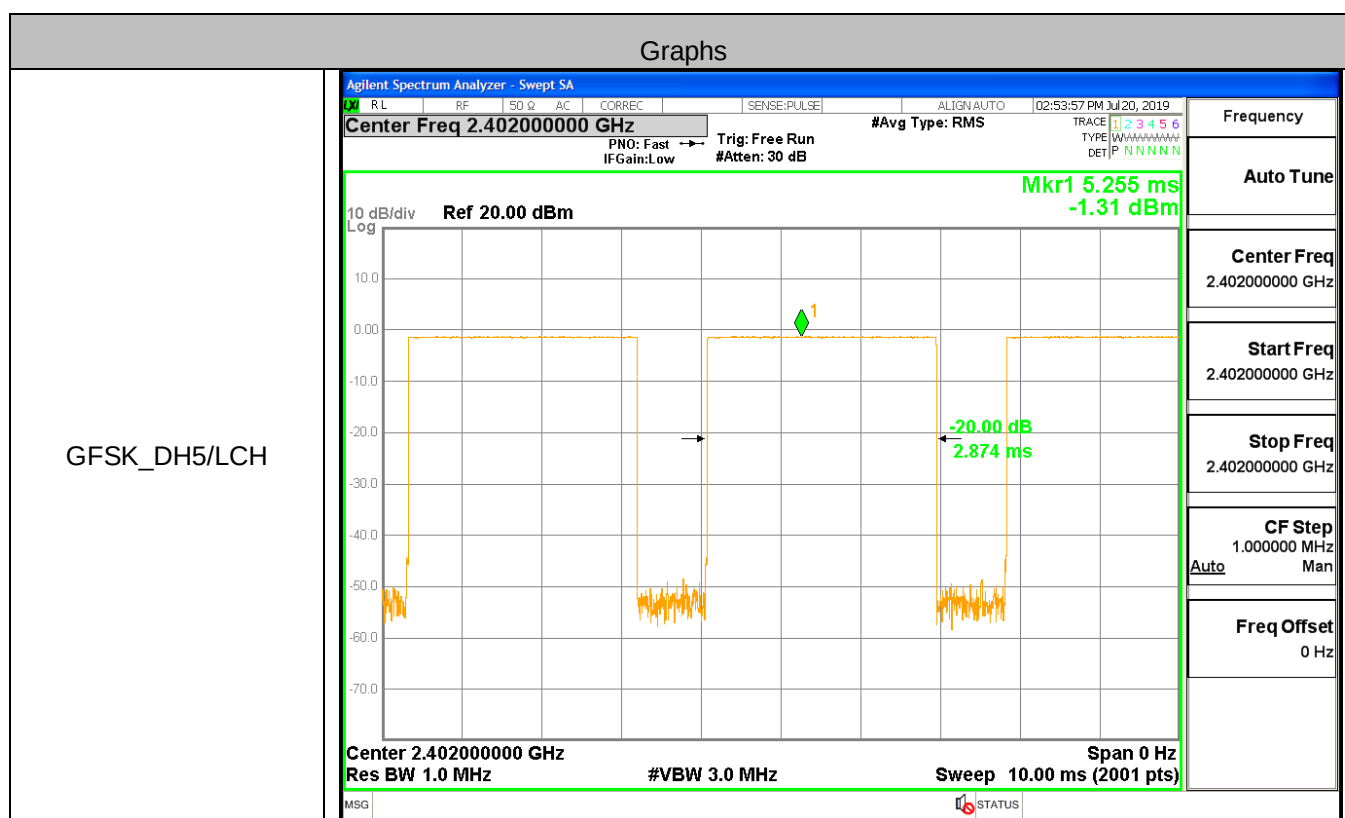
8DPSK/HCH

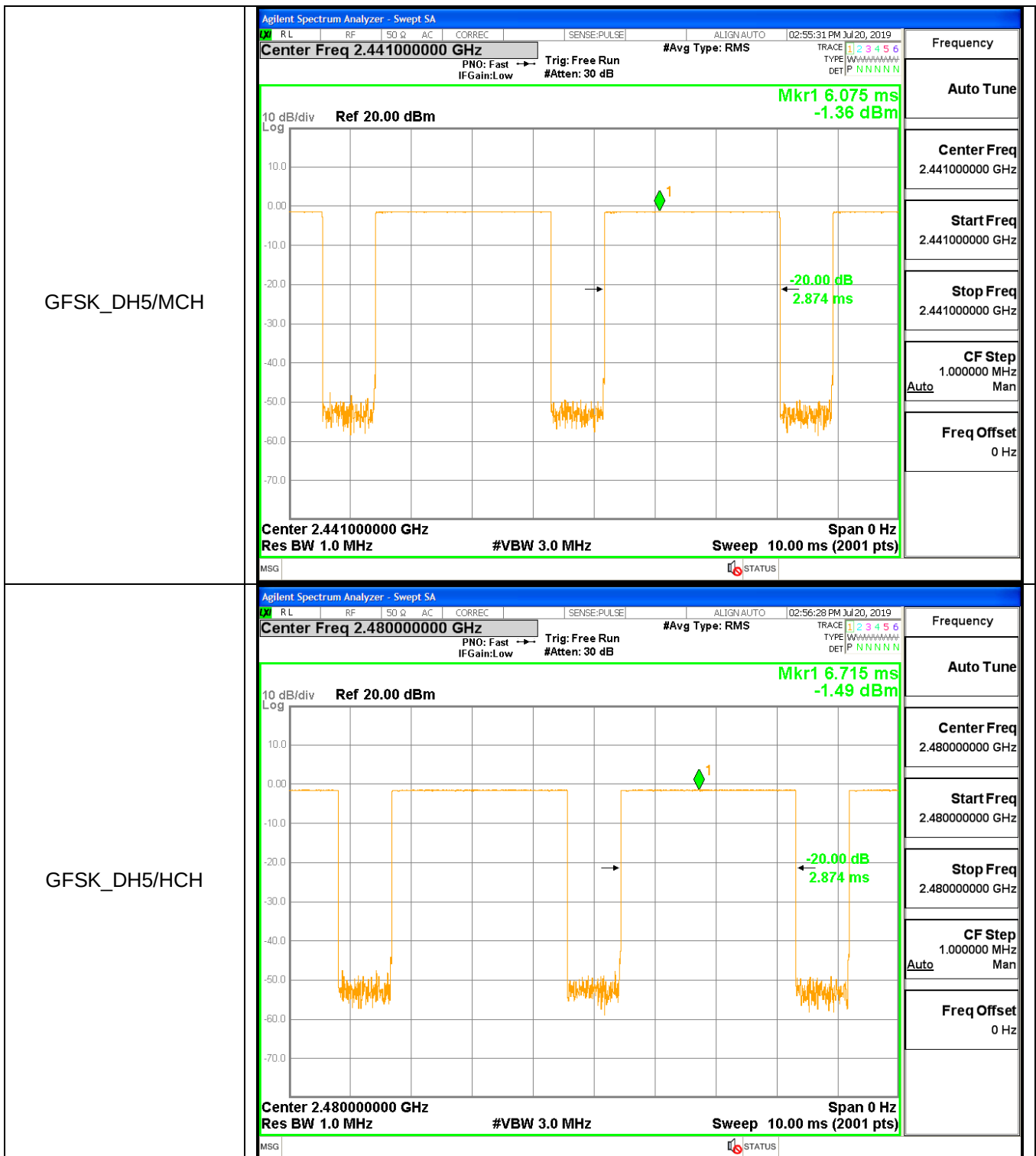


A.2 Dwell Time

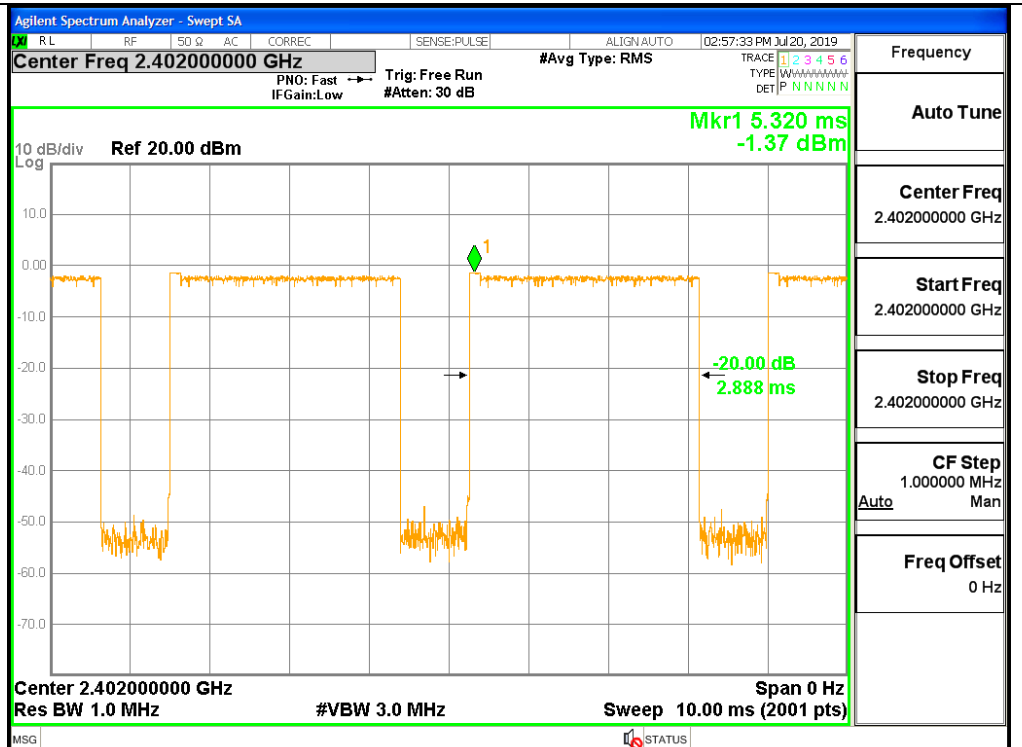
Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.002874	106.7	0.306653	0.4	PASS
GFSK	DH5	MCH	0.002874	106.7	0.306666	0.4	PASS
GFSK	DH5	HCH	0.002874	106.7	0.306646	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	0.002888	106.7	0.308124	0.4	PASS
$\pi/4$ DQPSK	2DH5	MCH	0.002884	106.7	0.307747	0.4	PASS
$\pi/4$ DQPSK	2DH5	HCH	0.002884	106.7	0.307738	0.4	PASS
8DPSK	3DH5	LCH	0.002884	106.7	0.307736	0.4	PASS
8DPSK	3DH5	MCH	0.002885	106.7	0.307799	0.4	PASS
8DPSK	3DH5	HCH	0.002889	106.7	0.308237	0.4	PASS

Test Graph

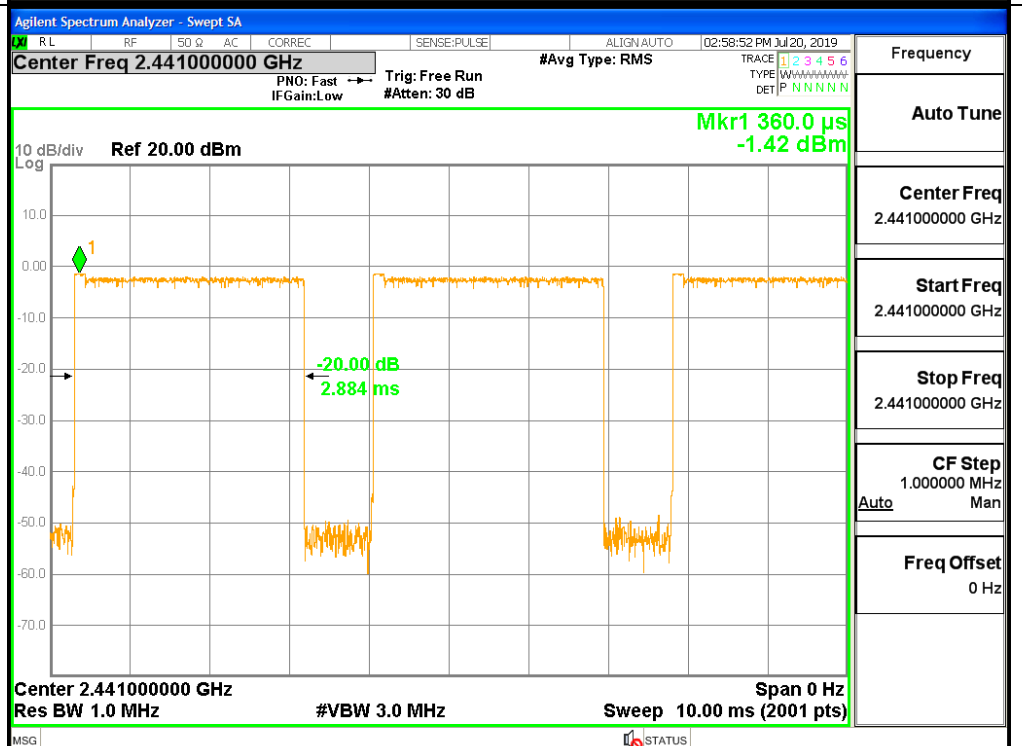




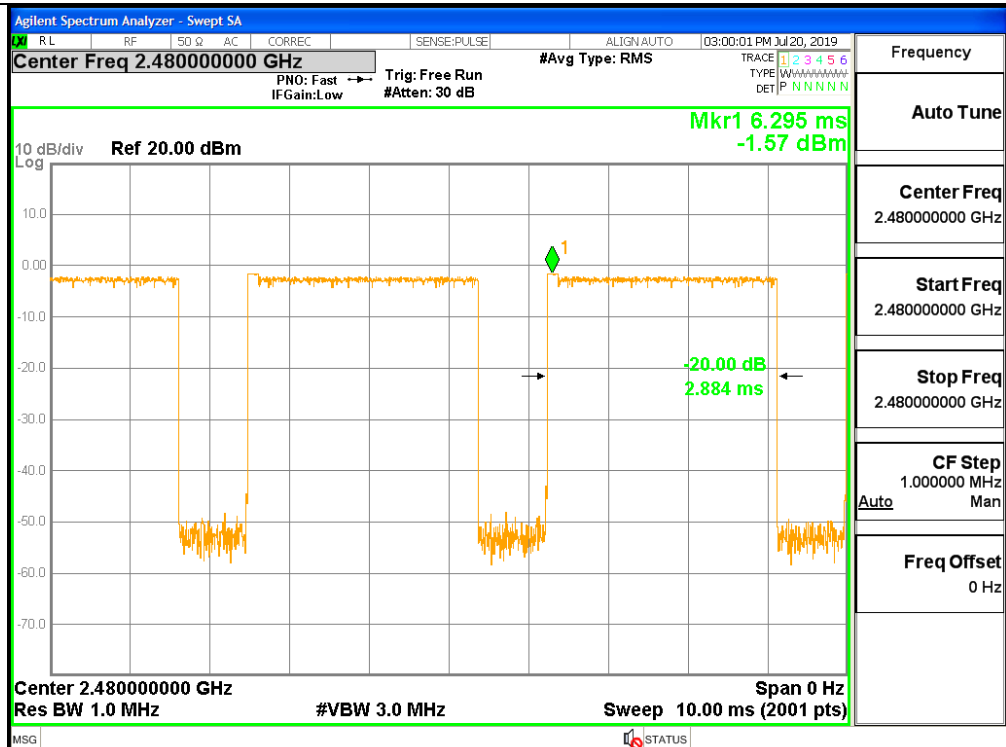
$\pi/4$ DQPSK
_2DH5/LCH



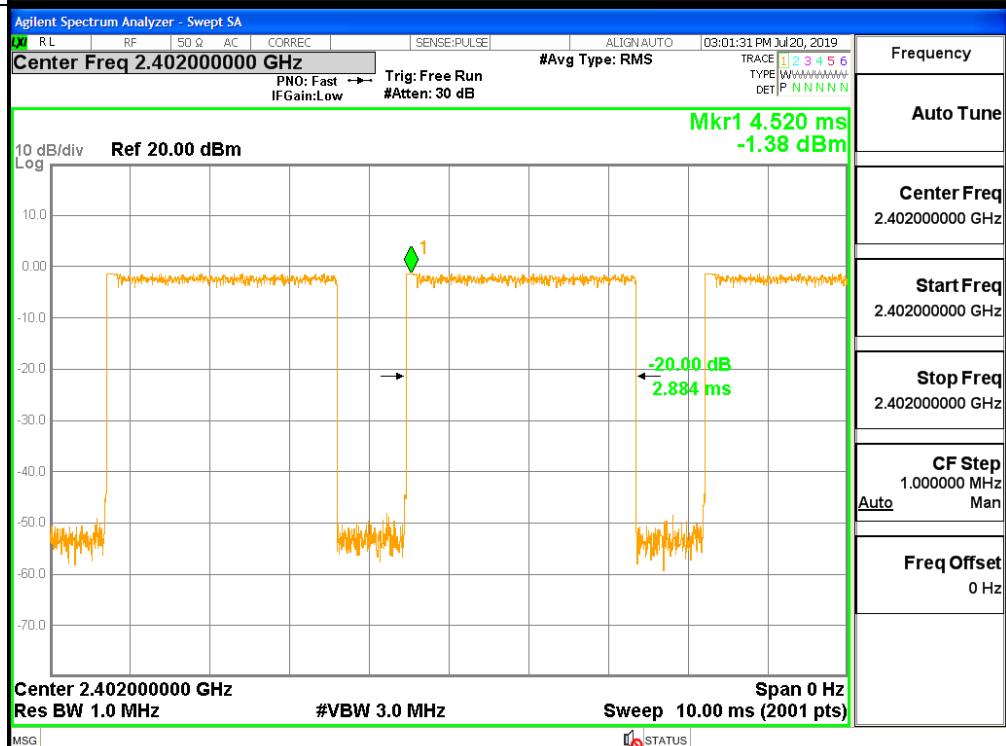
$\pi/4$ DQPSK
_2DH5/MCH

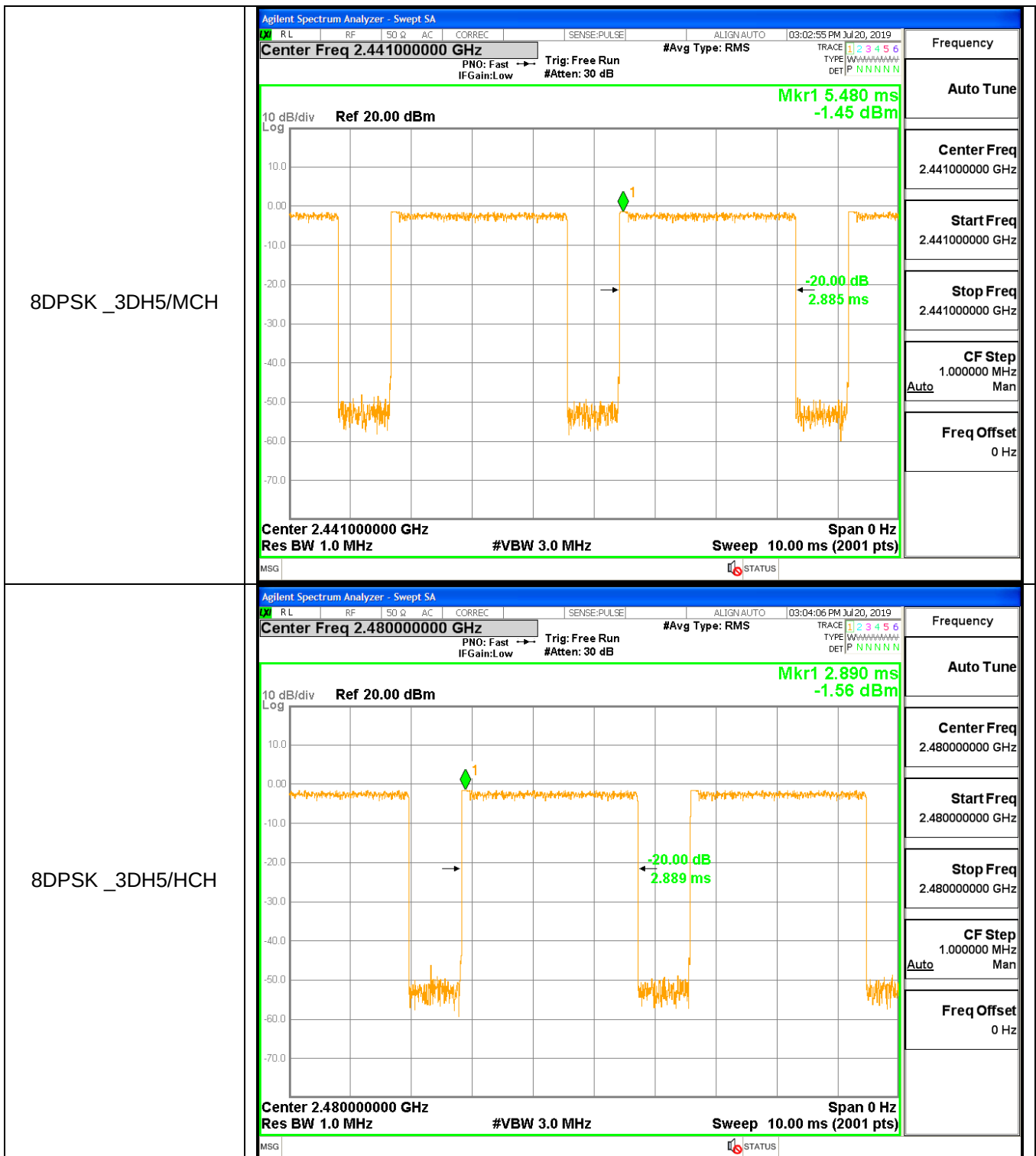


$\pi/4$ DQPSK
_2DH5/HCH



8DPSK_3DH5/LCH

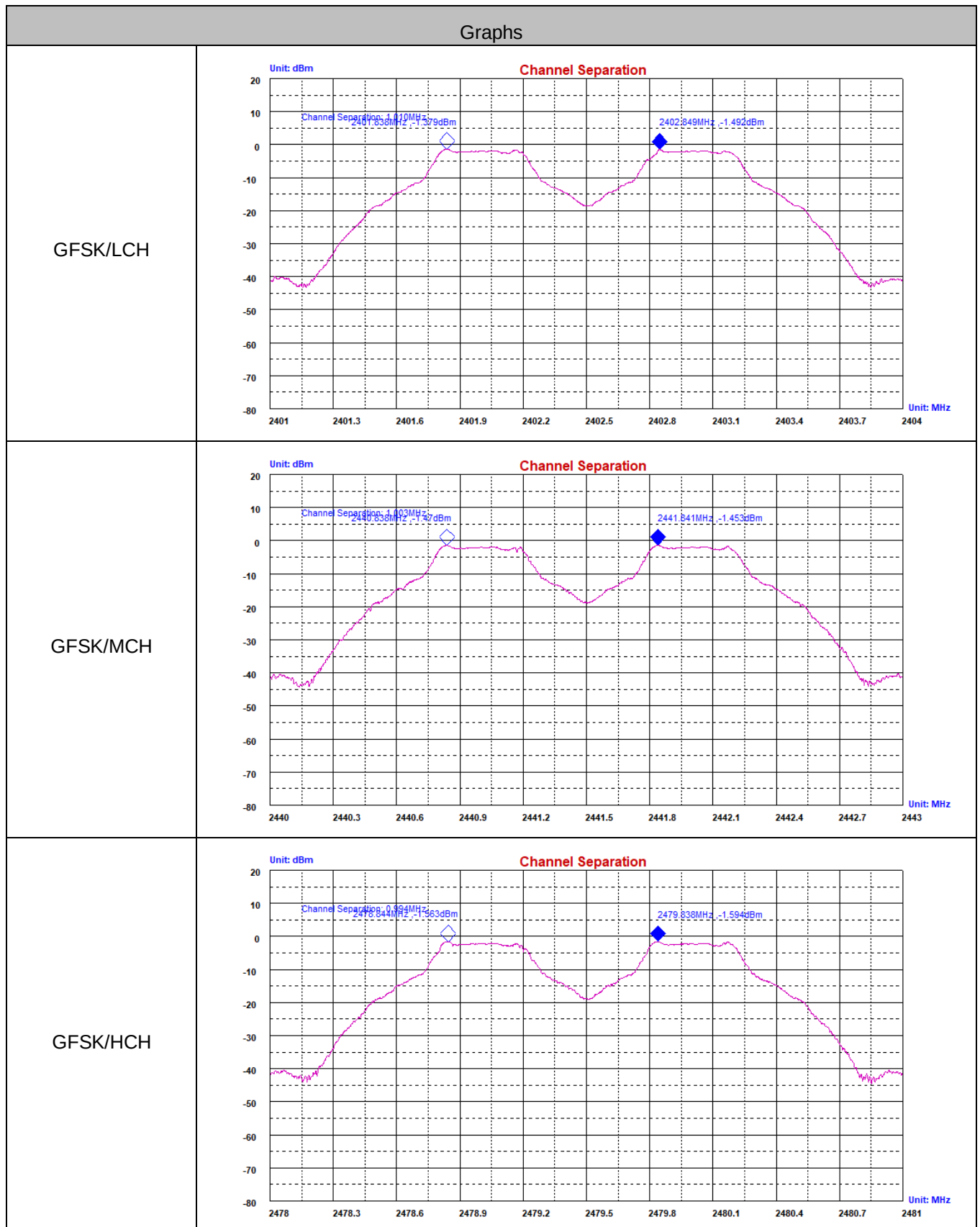


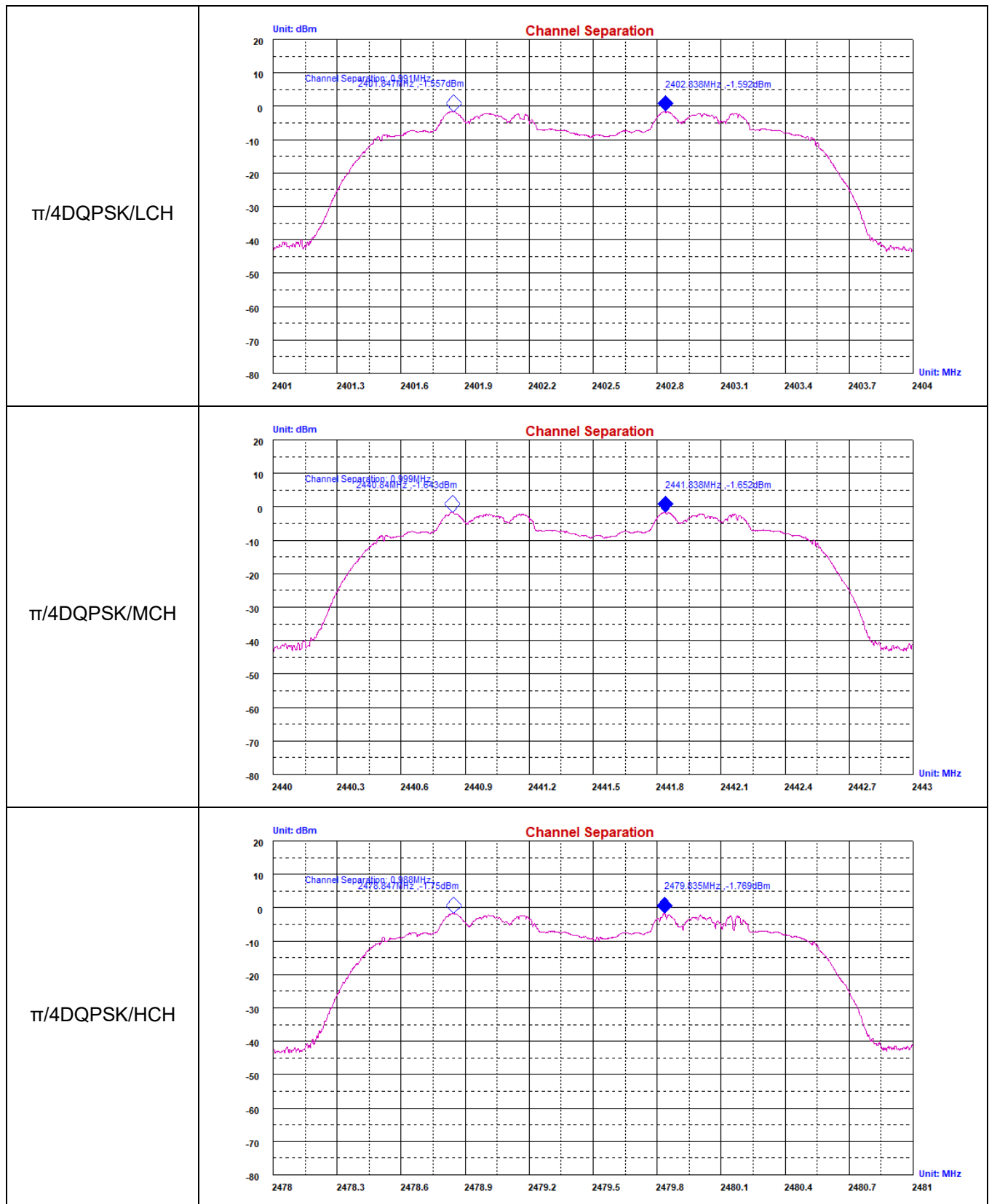


A.3 Carrier Frequency Separation

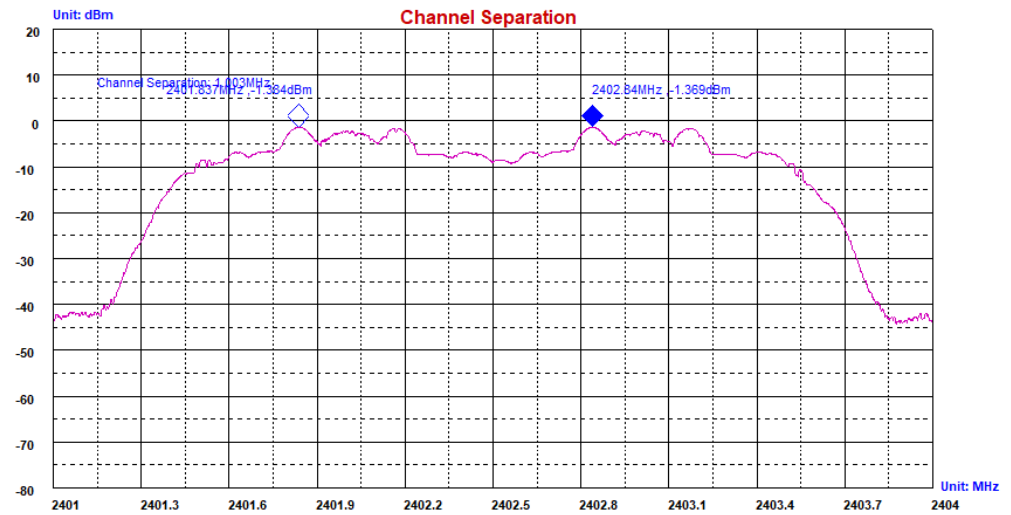
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.010	0.575	PASS
GFSK	MCH	1.003	0.575	PASS
GFSK	HCH	0.994	0.592	PASS
$\pi/4$ DQPSK	LCH	0.991	0.817	PASS
$\pi/4$ DQPSK	MCH	0.999	0.858	PASS
$\pi/4$ DQPSK	HCH	0.988	0.812	PASS
8DPSK	LCH	1.003	0.822	PASS
8DPSK	MCH	1.007	0.823	PASS
8DPSK	HCH	0.994	0.822	PASS

Test Graph

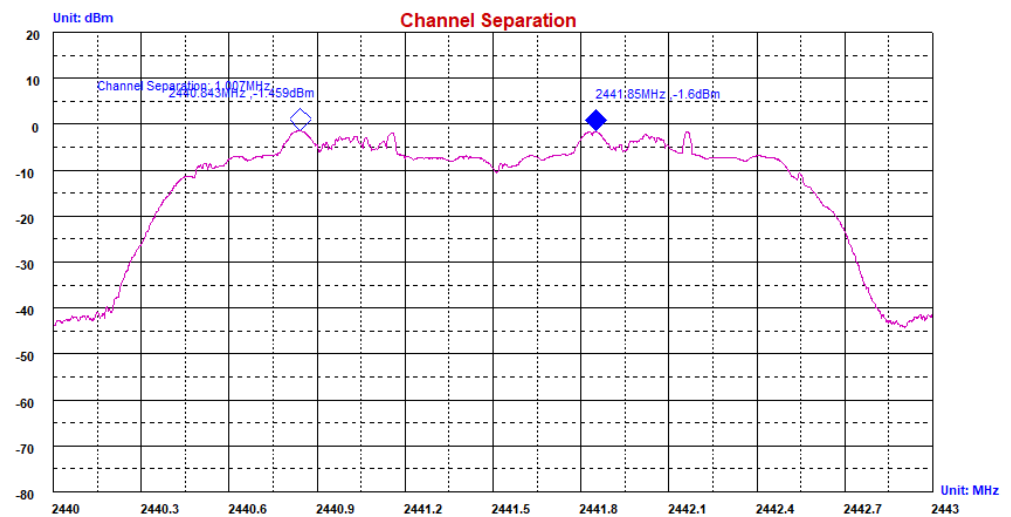




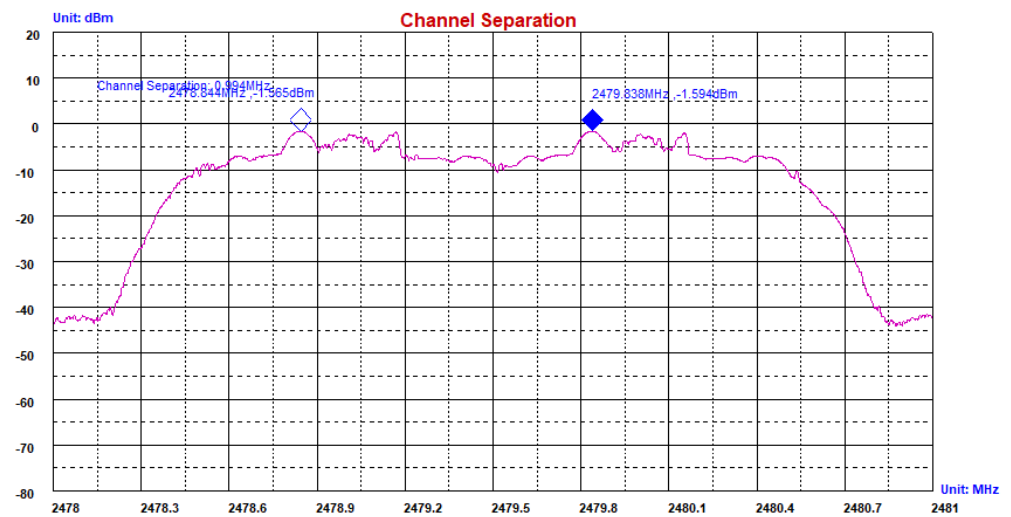
8DPSK/LCH



8DPSK/MCH



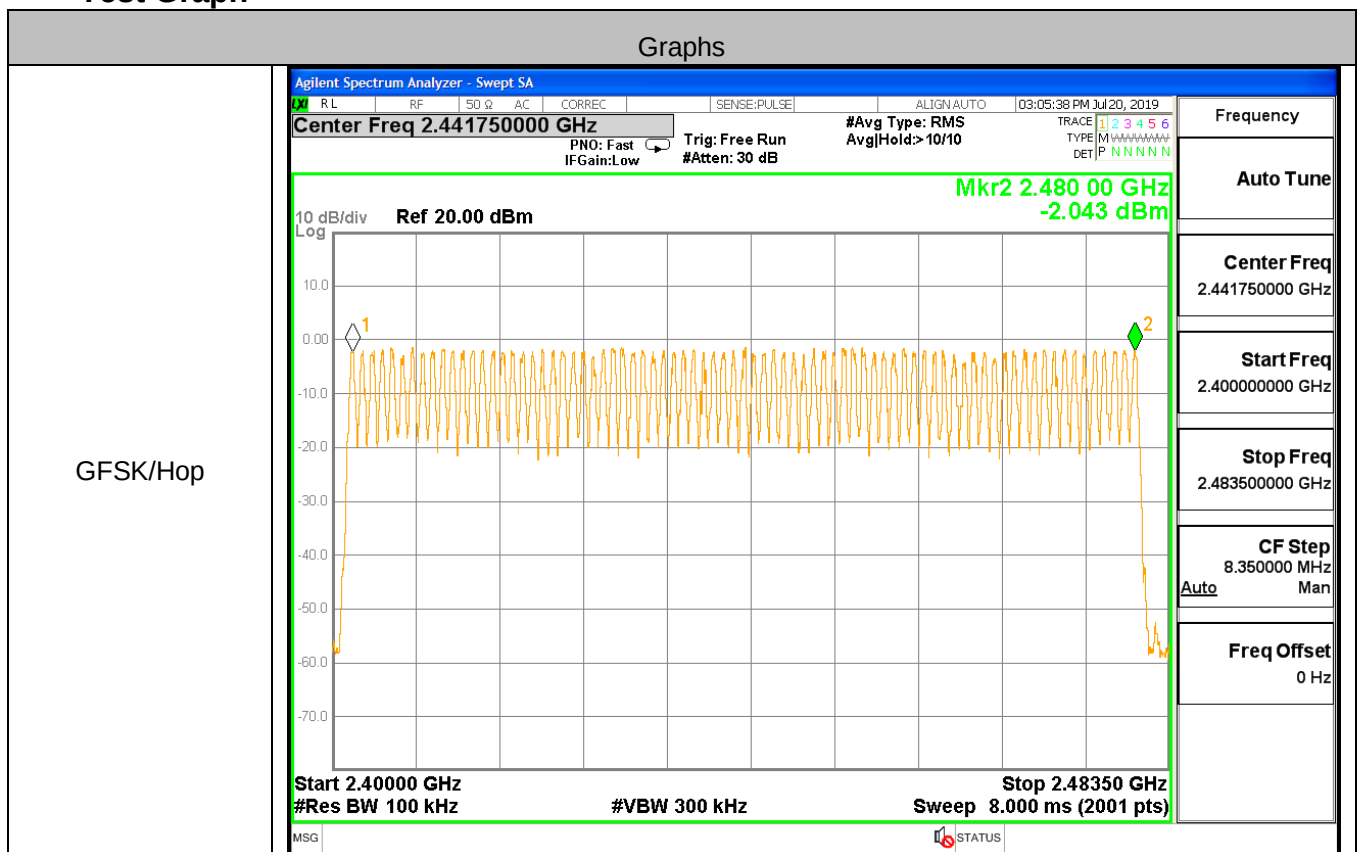
8DPSK/HCH

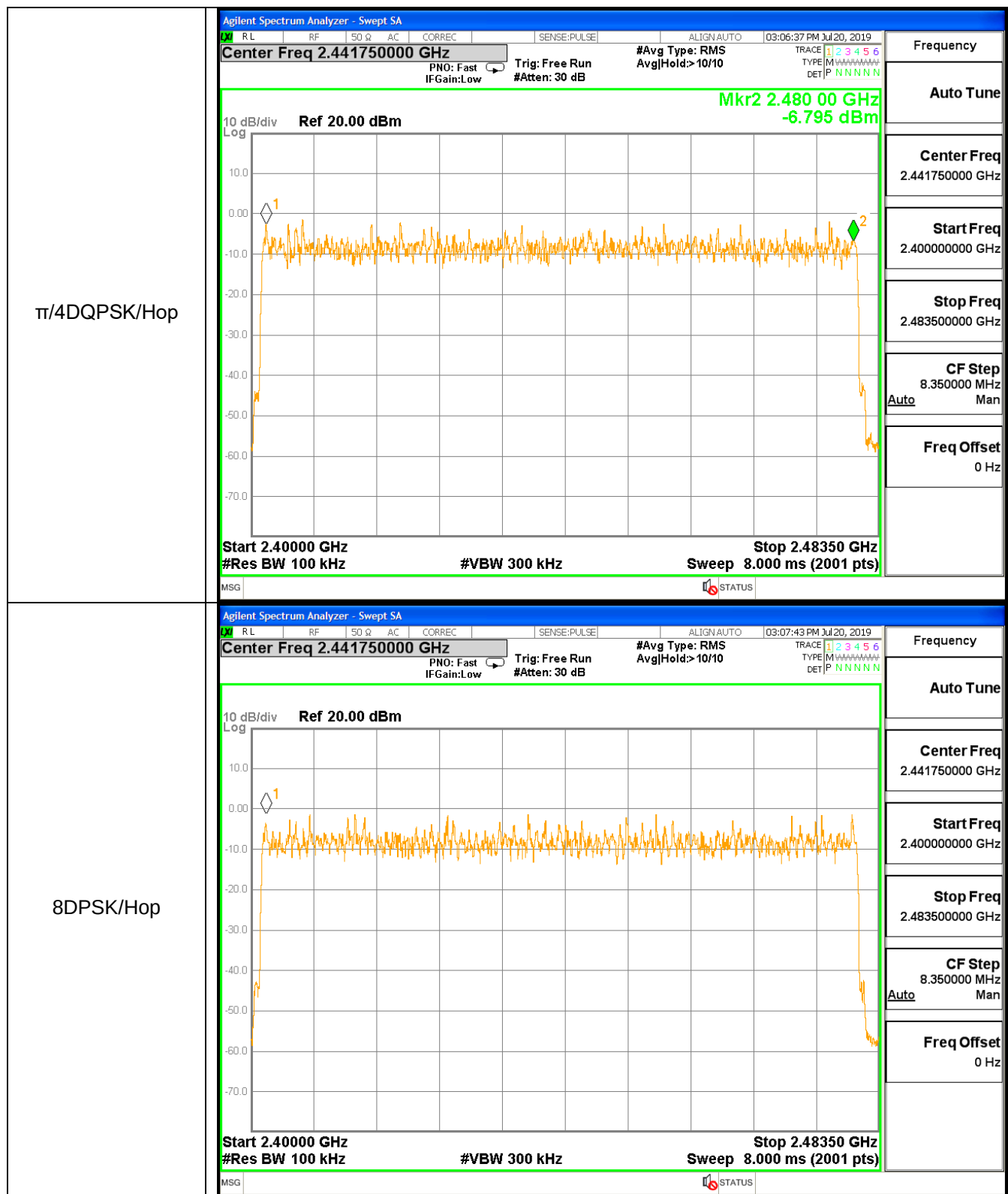


A.4 Hopping Channel Number

Mode	Channel.	Number of Hopping Channel[N]	Limit[N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graph

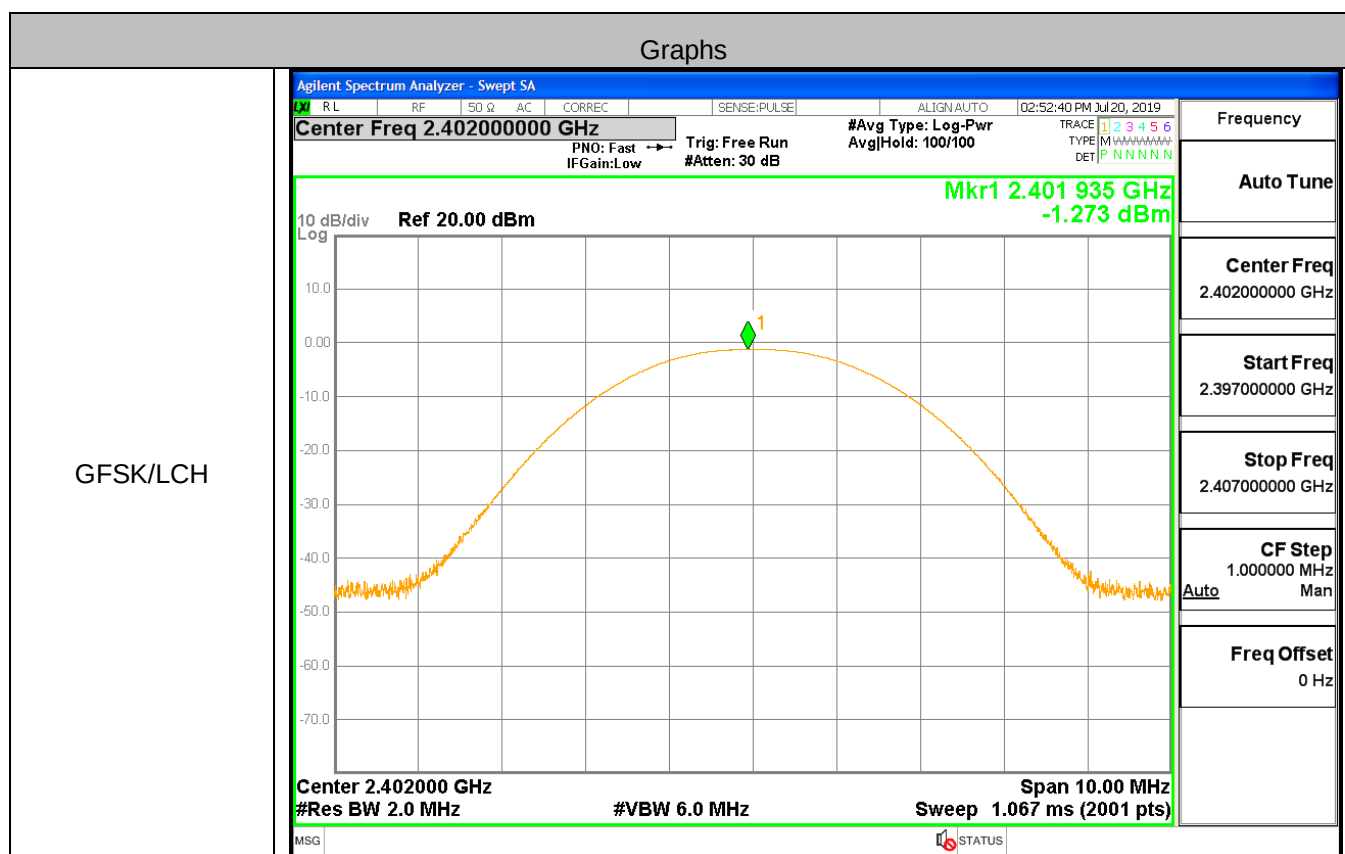




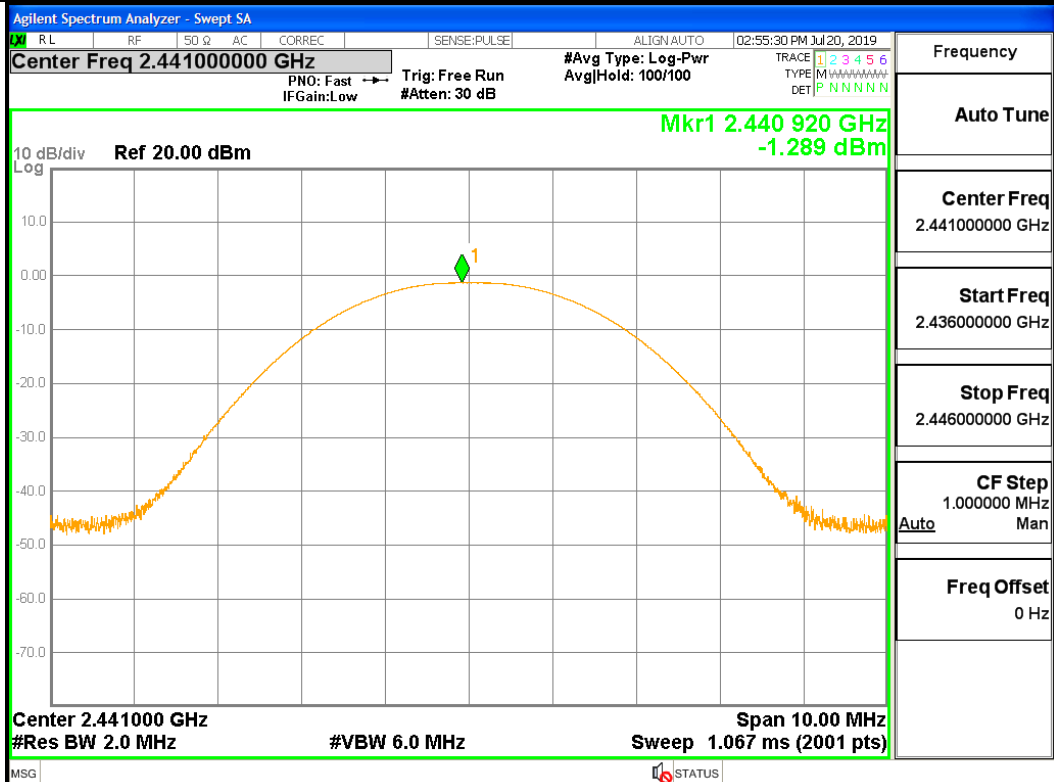
A.5 Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.273	21	PASS
GFSK	MCH	-1.289	21	PASS
GFSK	HCH	-1.417	21	PASS
$\pi/4$ DQPSK	LCH	-1.293	21	PASS
$\pi/4$ DQPSK	MCH	-1.372	21	PASS
$\pi/4$ DQPSK	HCH	-1.503	21	PASS
8DPSK	LCH	-1.092	21	PASS
8DPSK	MCH	-1.104	21	PASS
8DPSK	HCH	-1.234	21	PASS

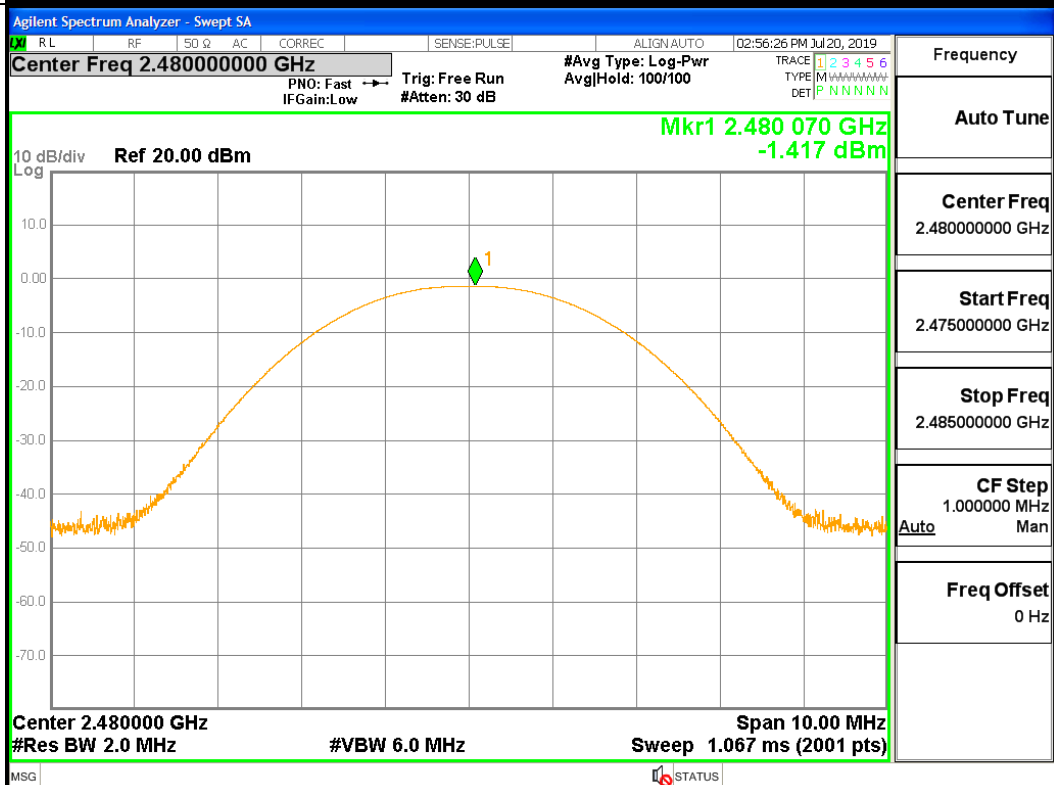
Test Graph

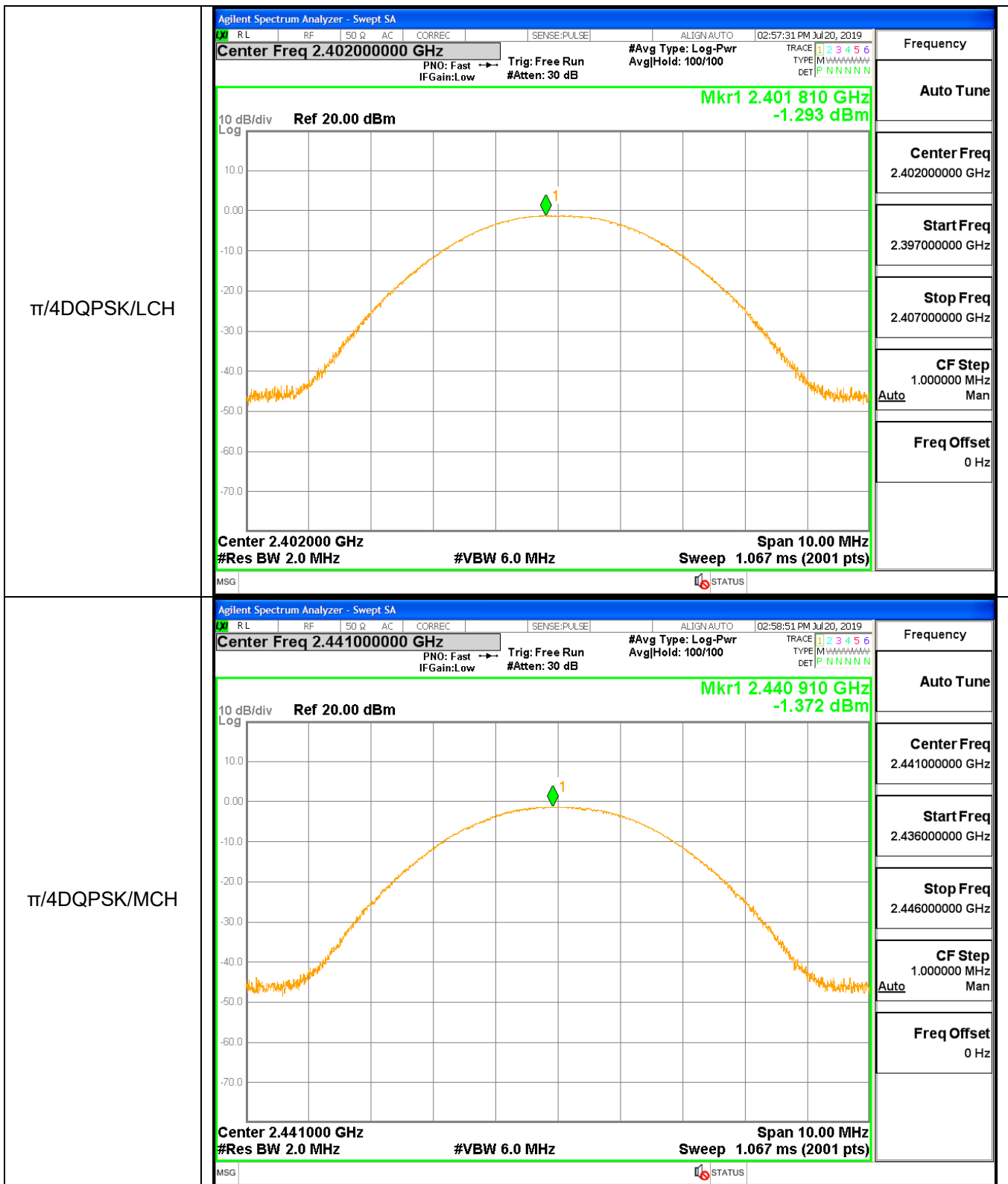


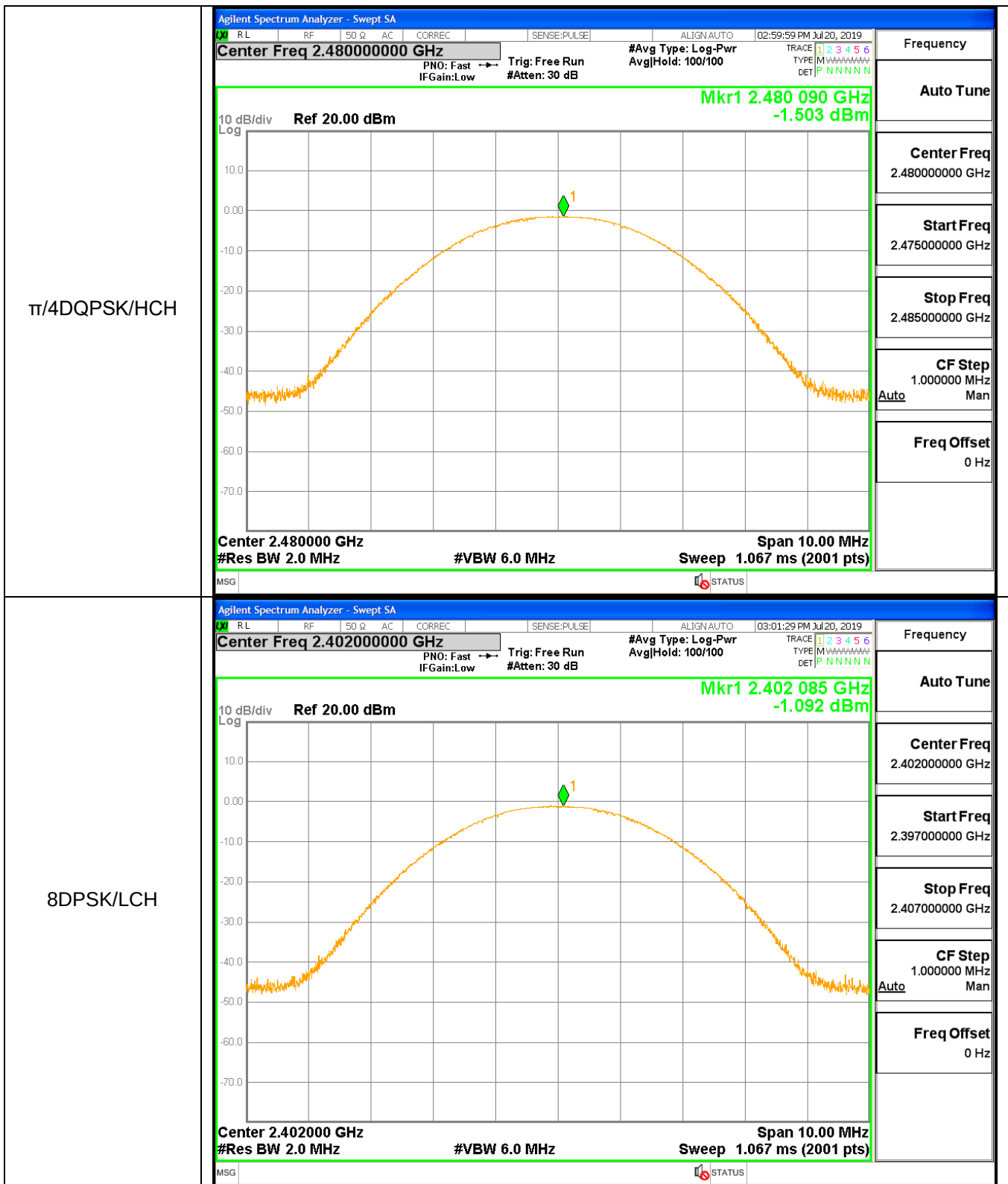
GFSK/MCH



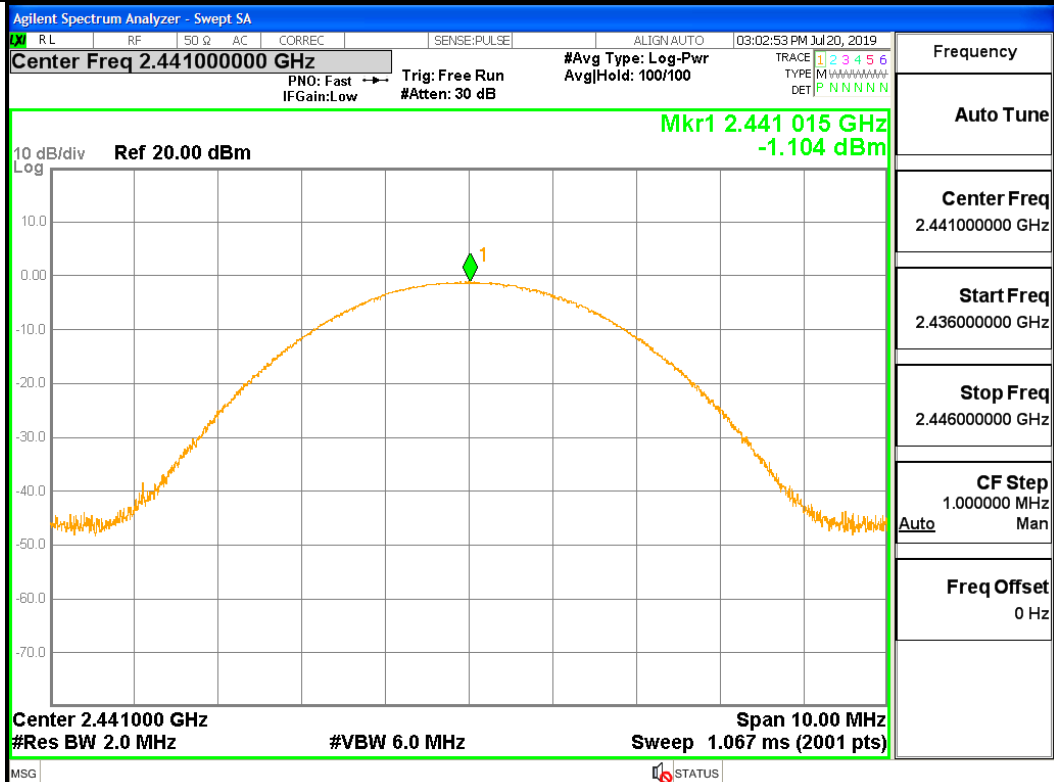
GFSK/HCH



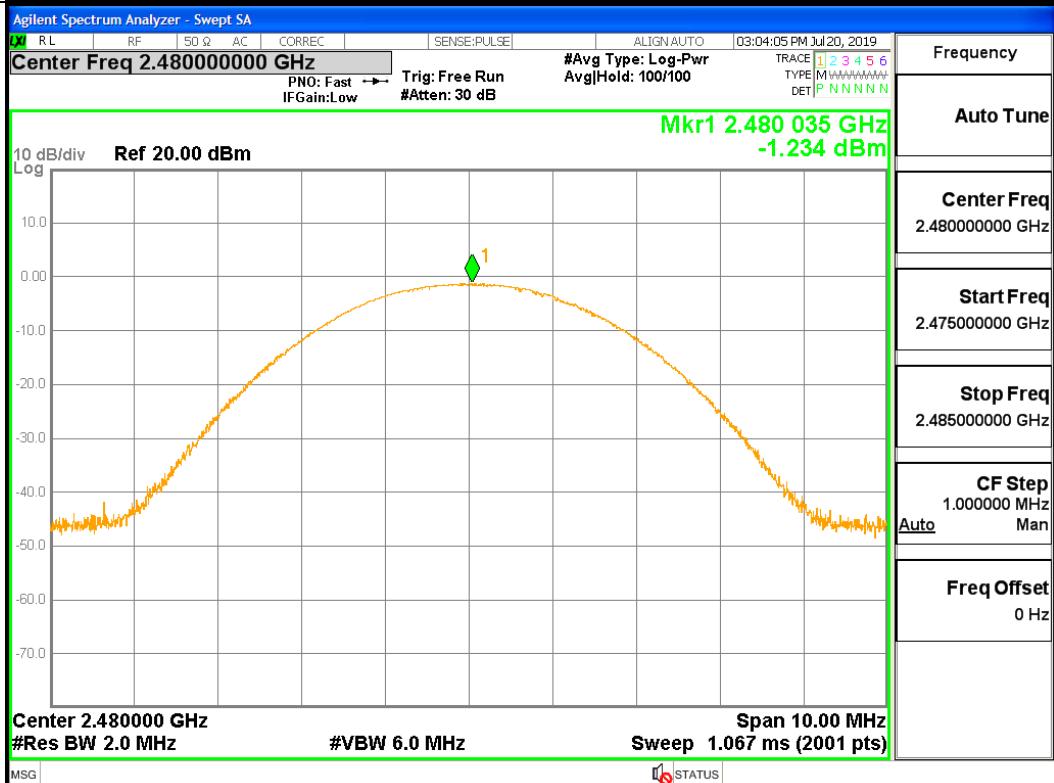




8DPSK/MCH



8DPSK/HCH



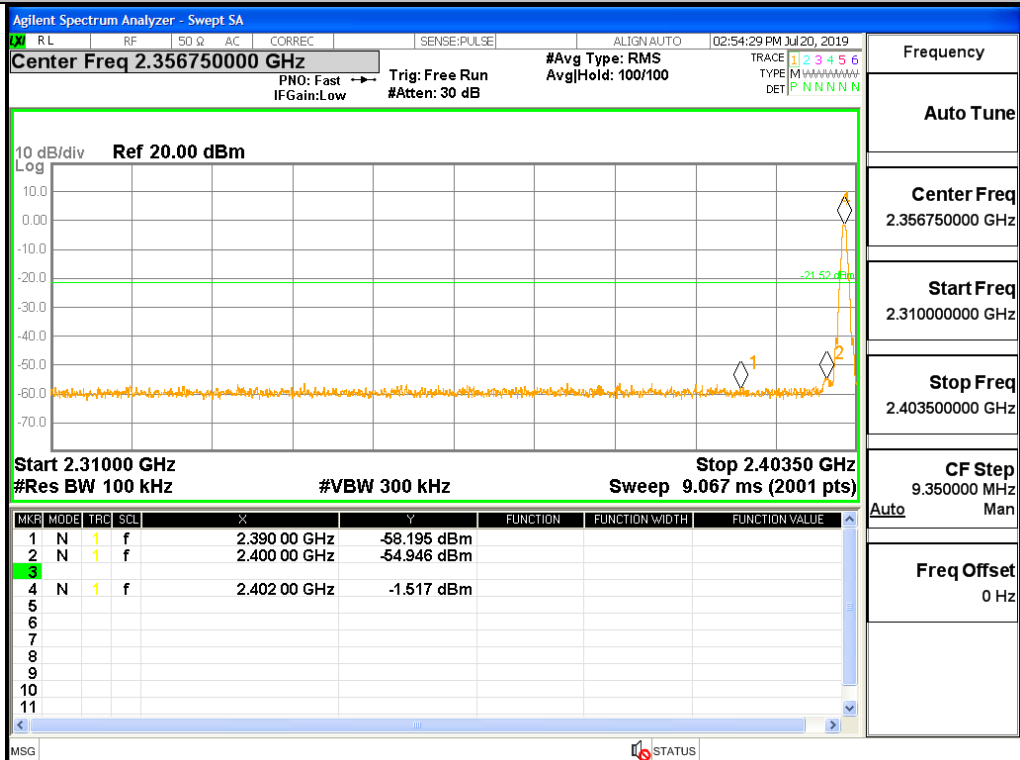
A.6 Band-edge for RF Conducted Emissions

Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
1DH5	2402	2400	-1.517	-54.95	-21.517	Pass
1DH5	2480	2486.412	-1.74	-56.091	-21.74	Pass
2DH5	2402	2400	-1.544	-55.75	-21.544	Pass
2DH5	2480	2500	-5.498	-58.71	-25.498	Pass
3DH5	2402	2400	-5.467	-54.95	-25.467	Pass
3DH5	2480	2500	-1.508	-58.3	-21.508	Pass
1DH5-Hopping	2402	2400	-1.626	-55.98	-21.626	Pass
1DH5-Hopping	2480	2483.5	-1.478	-57.73	-21.478	Pass
2DH5-Hopping	2402	2400	-2.875	-57.81	-22.875	Pass
2DH5-Hopping	2480	2500	-2.233	-57.2	-22.233	Pass
3DH5-Hopping	2402	2400	-1.431	-57.02	-21.431	Pass
3DH5-Hopping	2480	2500	-1.669	-57.35	-21.669	Pass

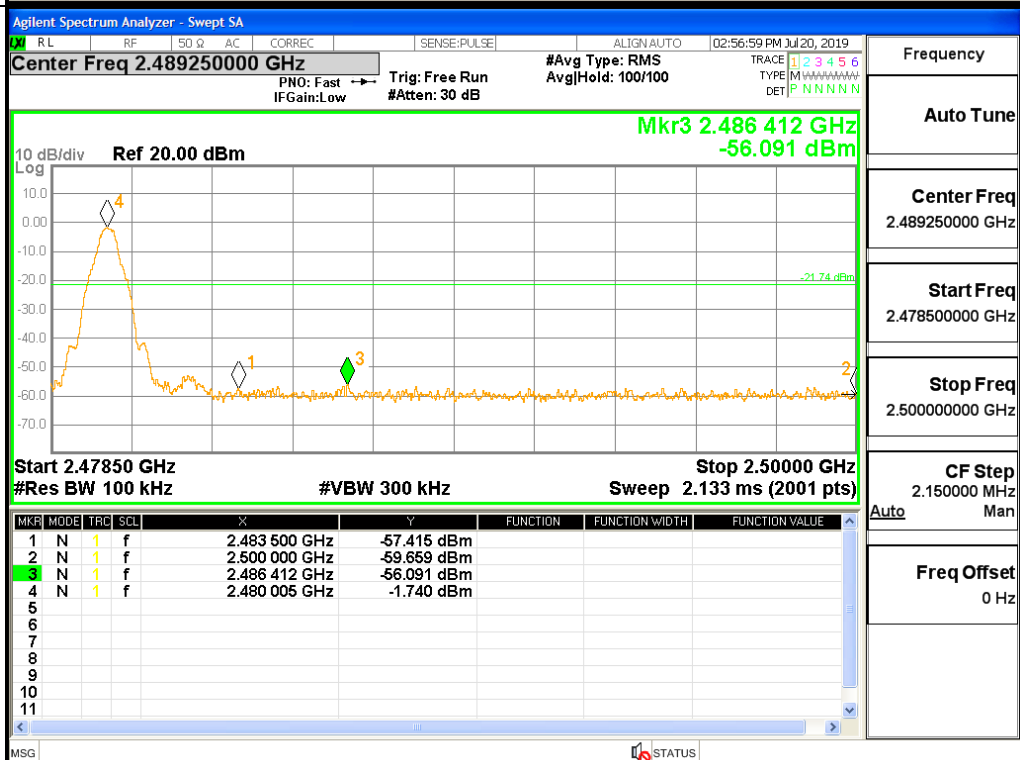
Test Graph

Graphs

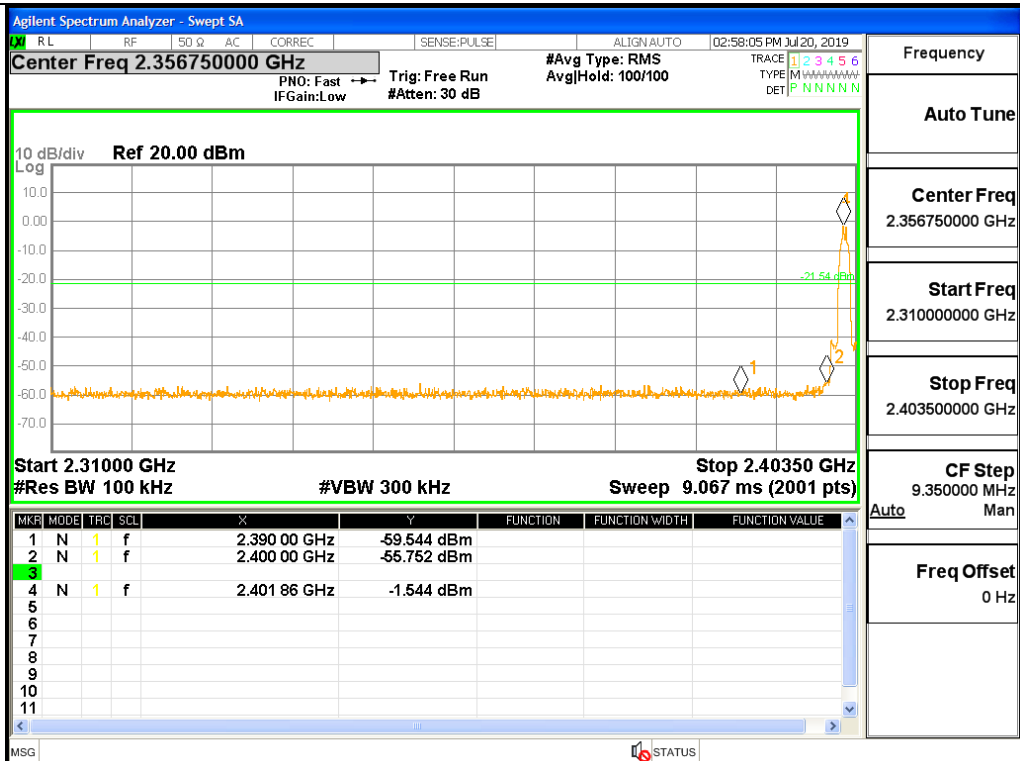
GFSK/LCH/No Hop



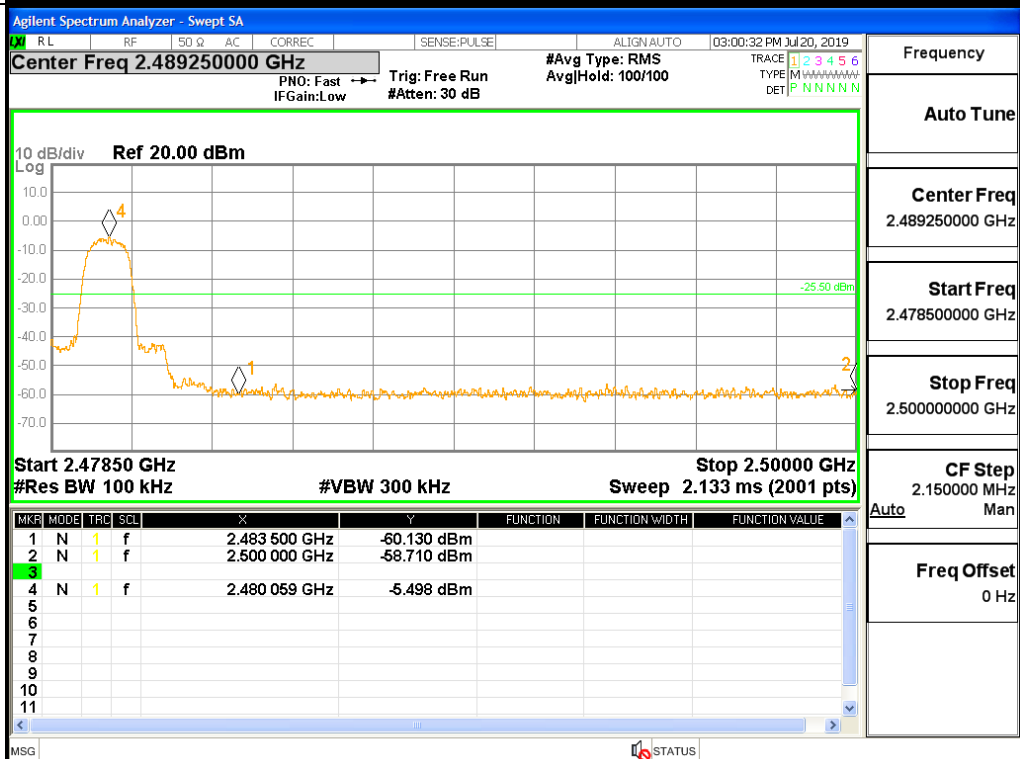
GFSK/HCH/No Hop



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



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



8DPSK/LCH/No Hop

Agilent Spectrum Analyzer - Swept SA

Center Freq 2.356750000 GHz

Start 2.31000 GHz Stop 2.40350 GHz

#Res BW 100 kHz #VBW 300 kHz Sweep 9.067 ms (2001 pts)

Mkr	Mode	Trc	Scl	X	Y	Function	Function Width	Function Value
1	N	1	f	2.390 00 GHz	-59.897 dBm			
2	N	1	f	2.400 00 GHz	-54.954 dBm			
3	N	1	f	2.401 96 GHz	-5.467 dBm			

8DPSK/HCH/No Hop

Agilent Spectrum Analyzer - Swept SA

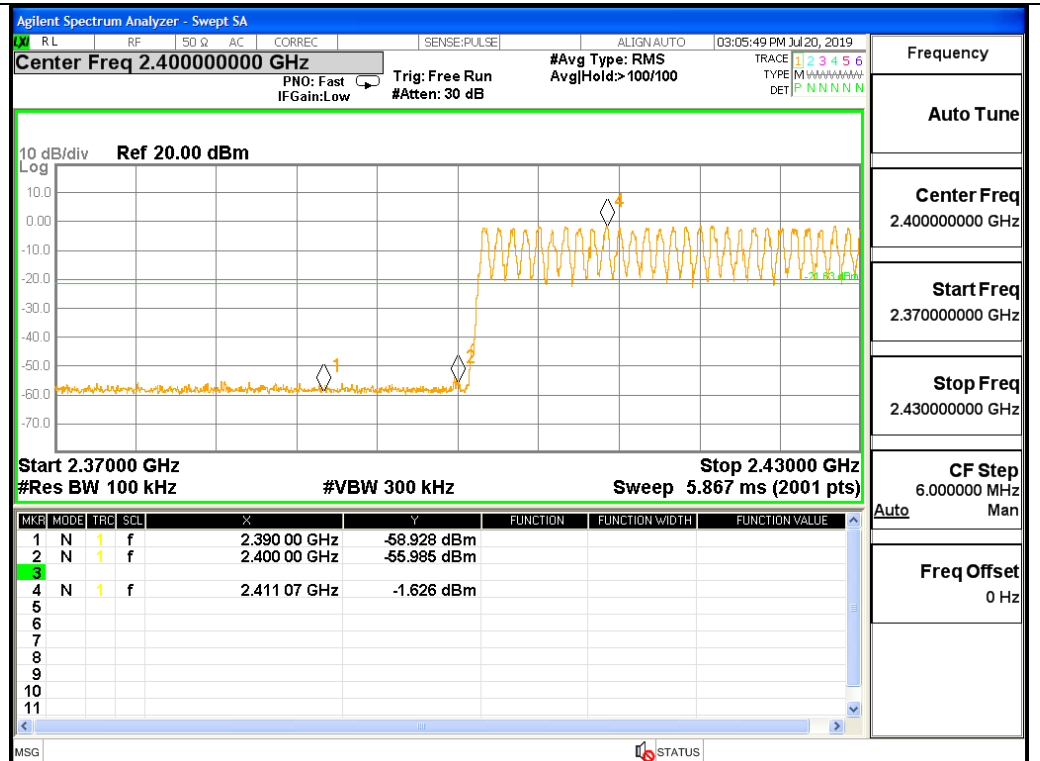
Center Freq 2.489250000 GHz

Start 2.47850 GHz Stop 2.50000 GHz

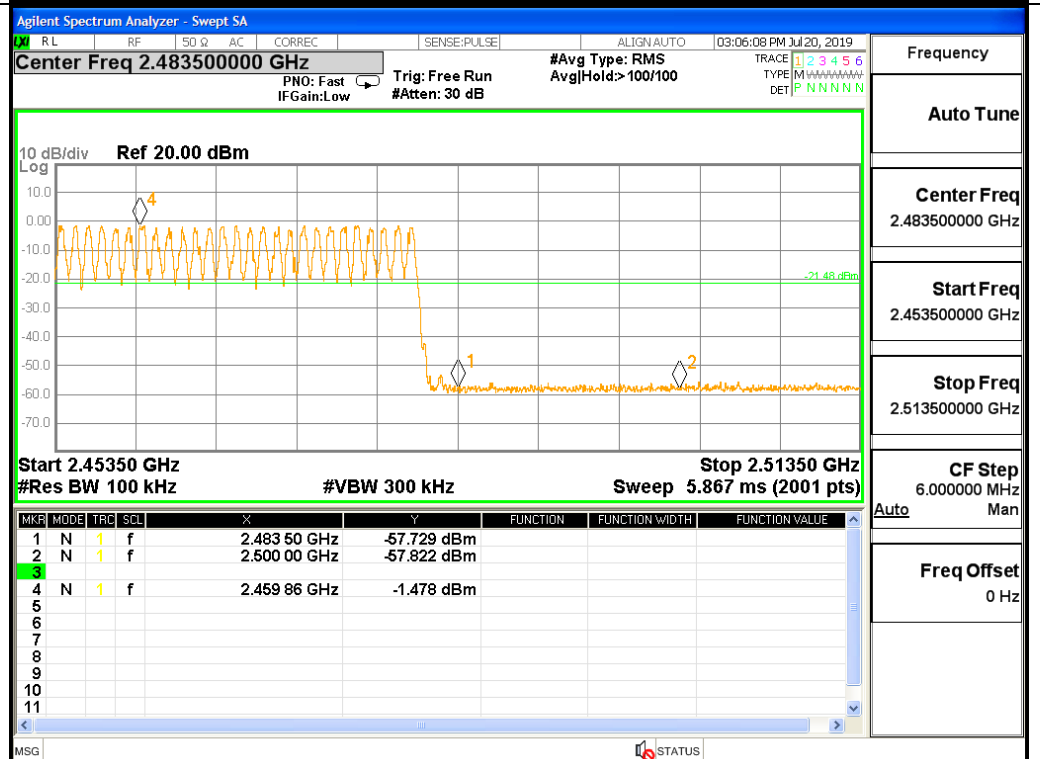
#Res BW 100 kHz #VBW 300 kHz Sweep 2.133 ms (2001 pts)

Mkr	Mode	Trc	Scl	X	Y	Function	Function Width	Function Value
1	N	1	f	2.483 500 GHz	-59.789 dBm			
2	N	1	f	2.500 000 GHz	-58.301 dBm			
3	N	1	f	2.479 844 GHz	-1.508 dBm			

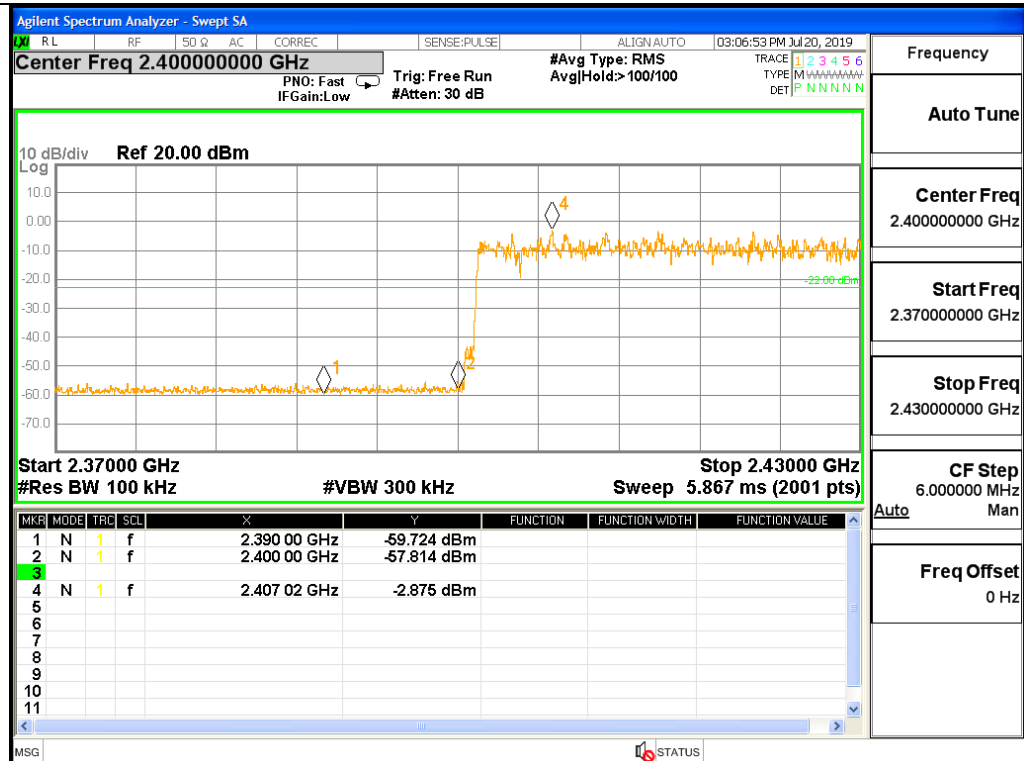
GFSK/LCH/Hop



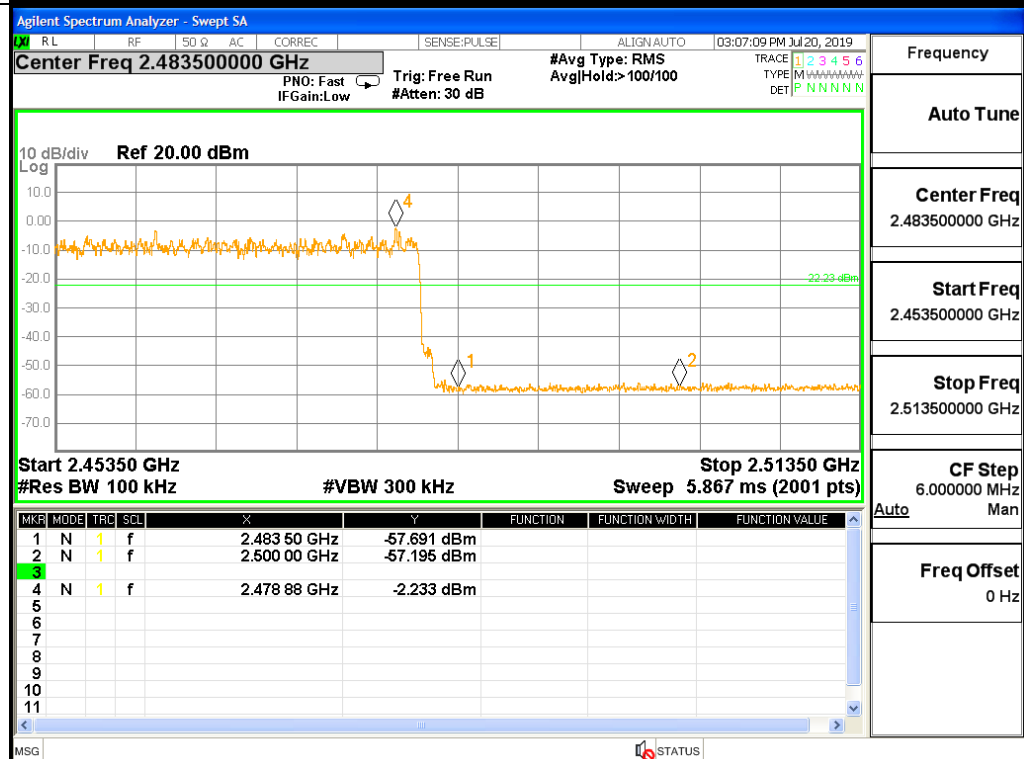
GFSK/HCH/Hop



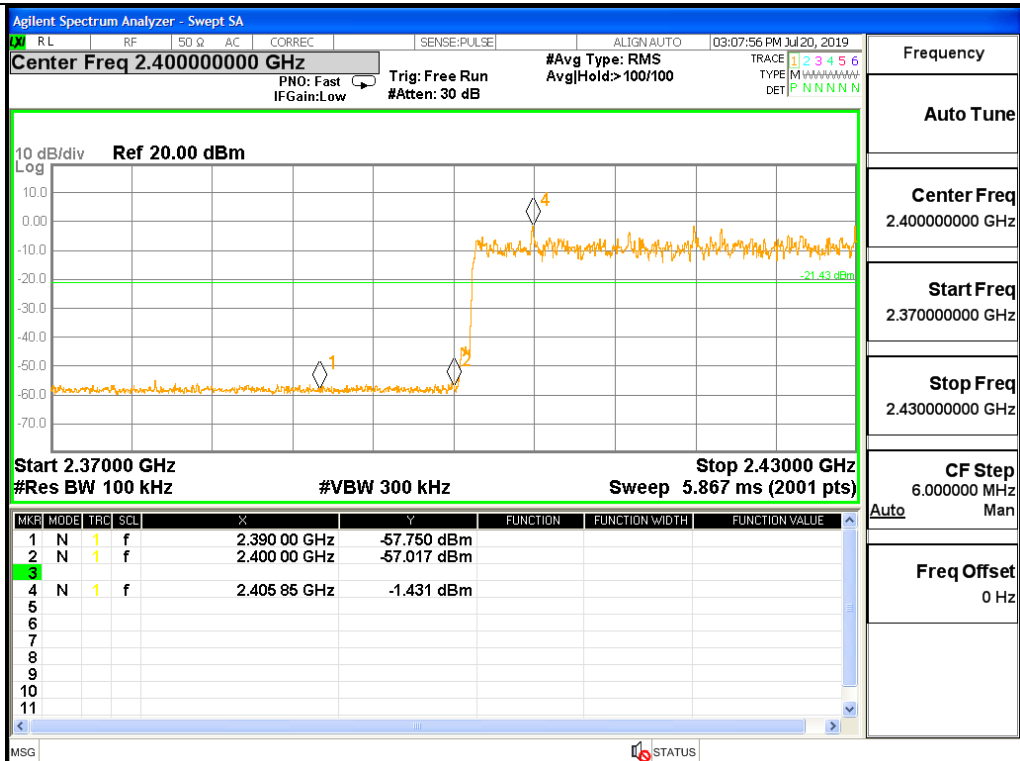
$\pi/4$ DQPSK/LCH/Hop



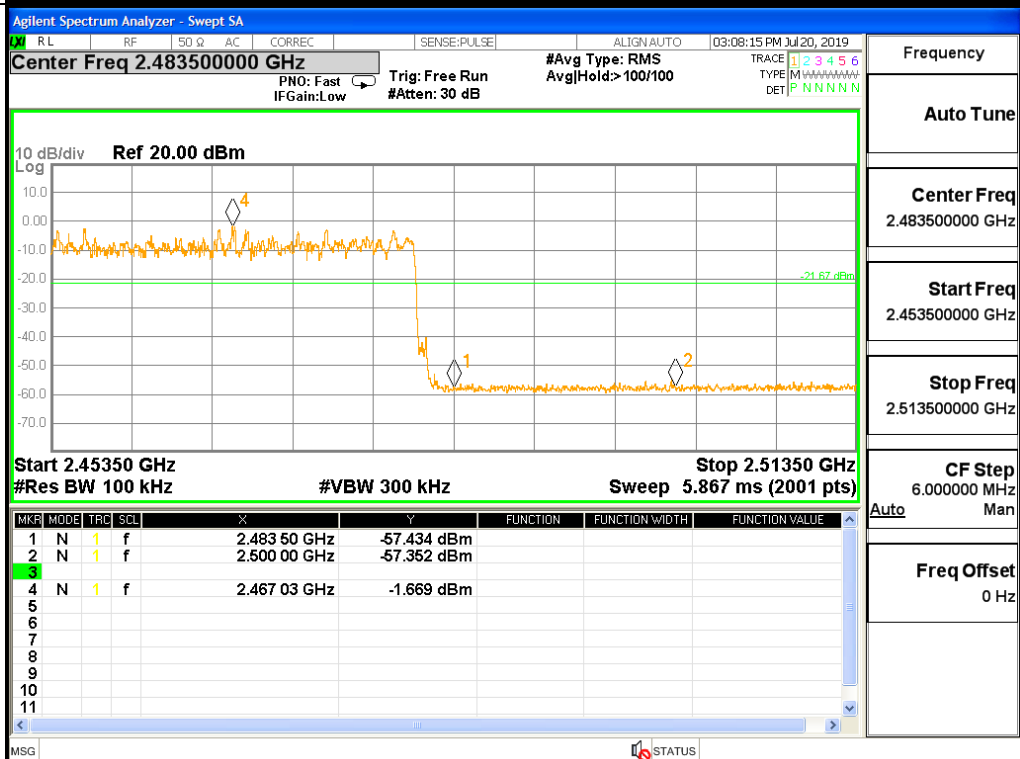
$\pi/4$ DQPSK/HCH/Hop



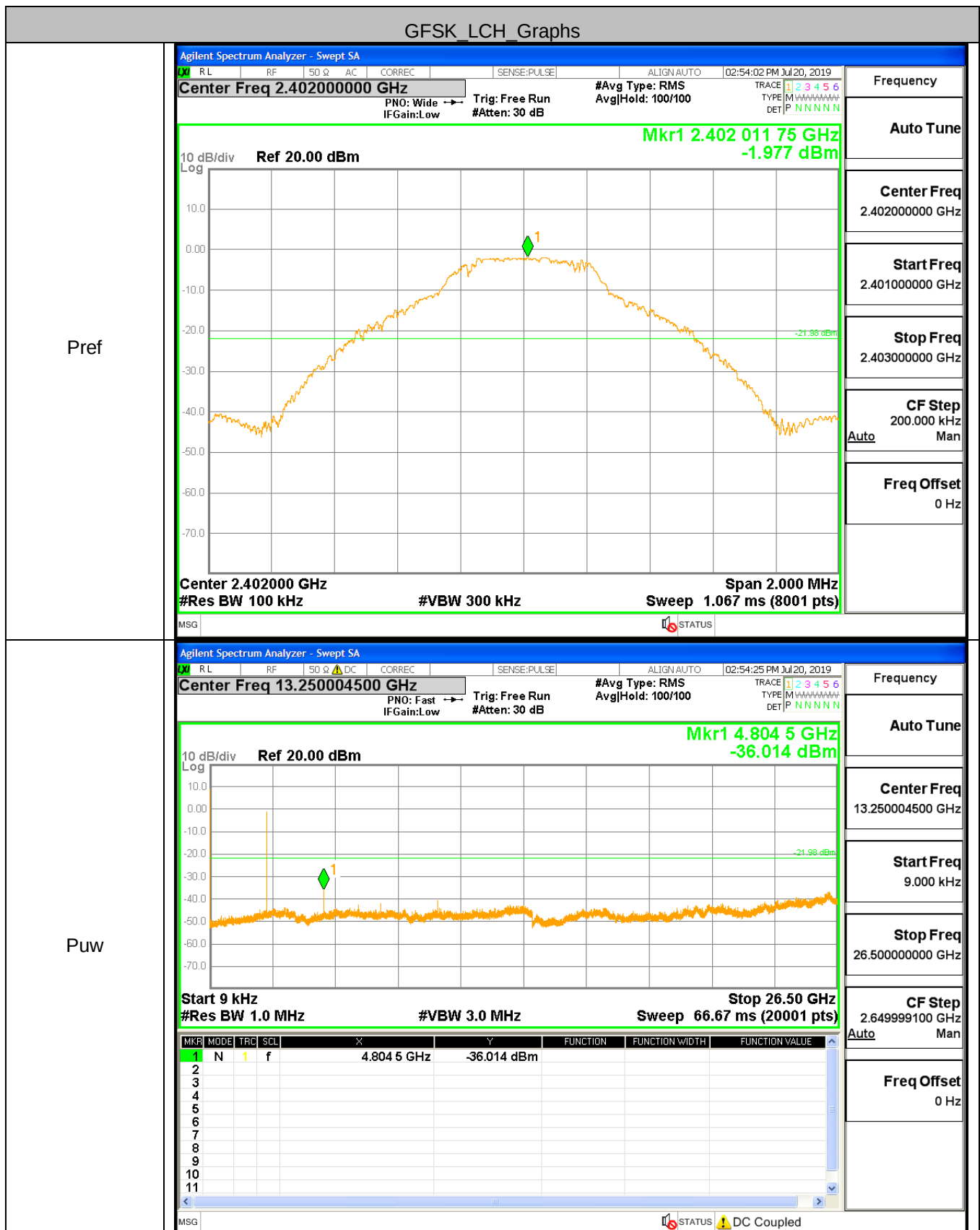
8DPSK/LCH/Hop



8DPSK/HCH/Hop

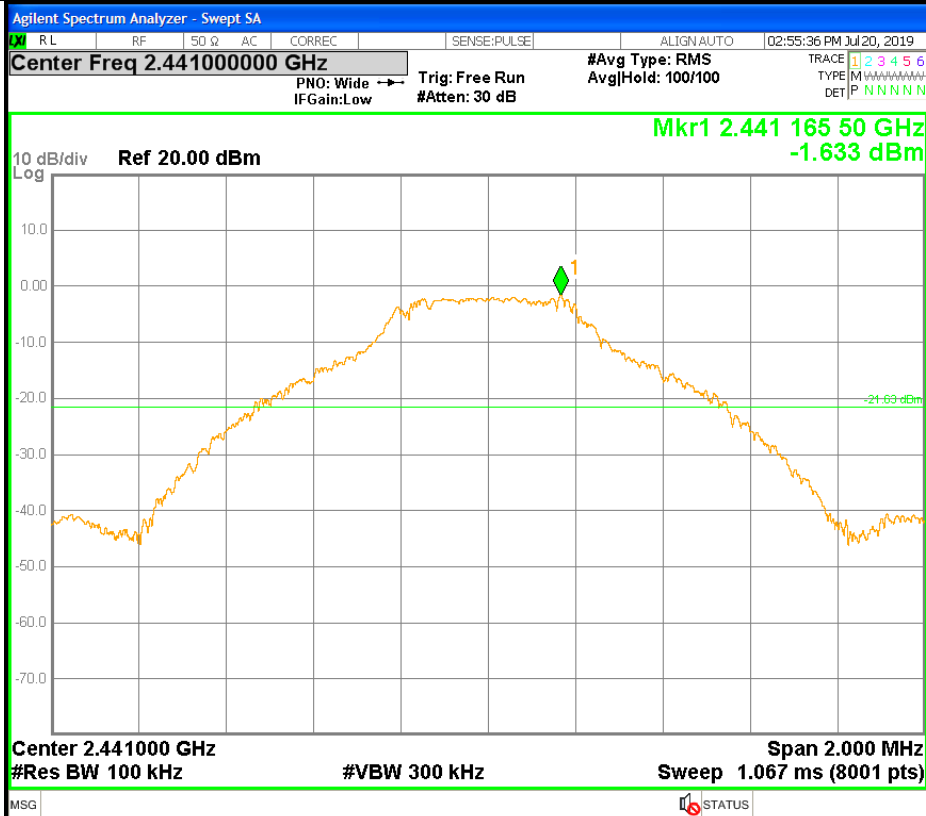


A.7 RF Conducted Spurious Emissions Test Graph



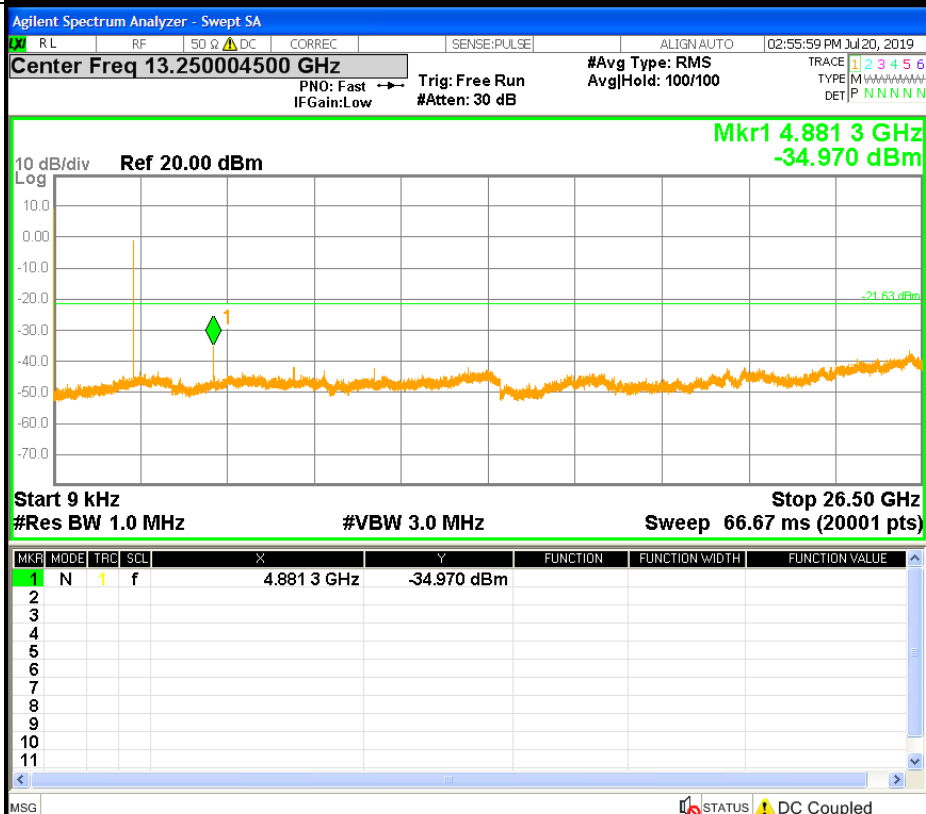
GFSK MCH Graphs

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

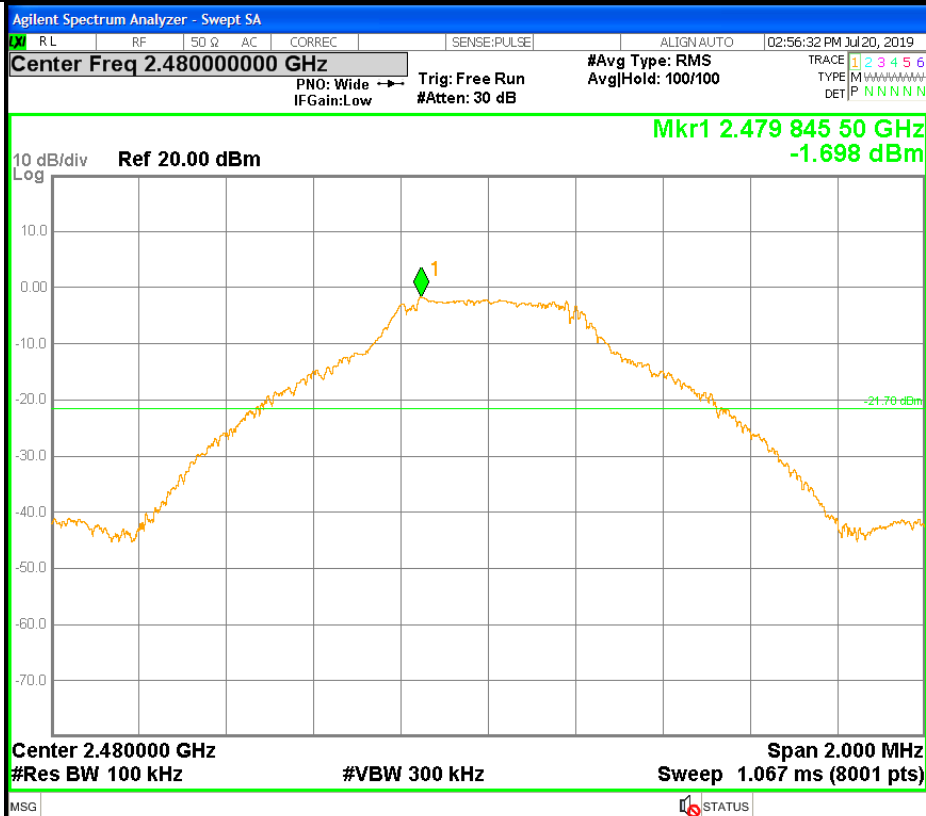
Puw



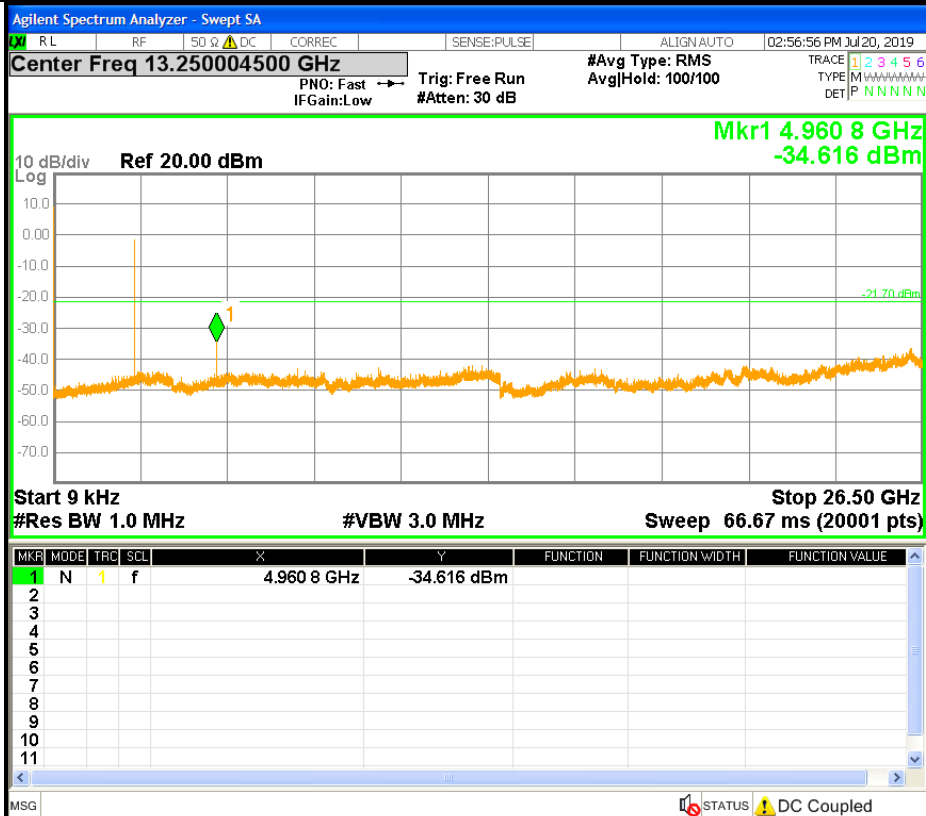
Frequency
Auto Tune
Center Freq 13.250004500 GHz
Start Freq 9.000 kHz
Stop Freq 26.500000000 GHz
CF Step 2.649999100 GHz Auto Man
Freq Offset 0 Hz

GFSK HCH Graphs

Pref

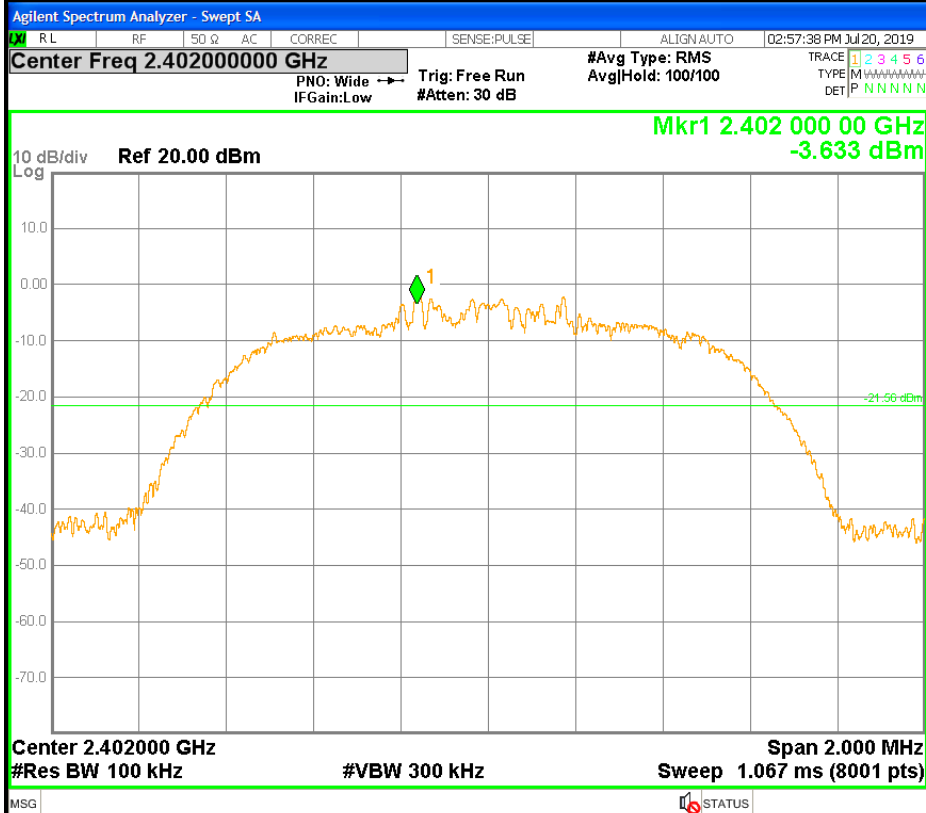


Puw



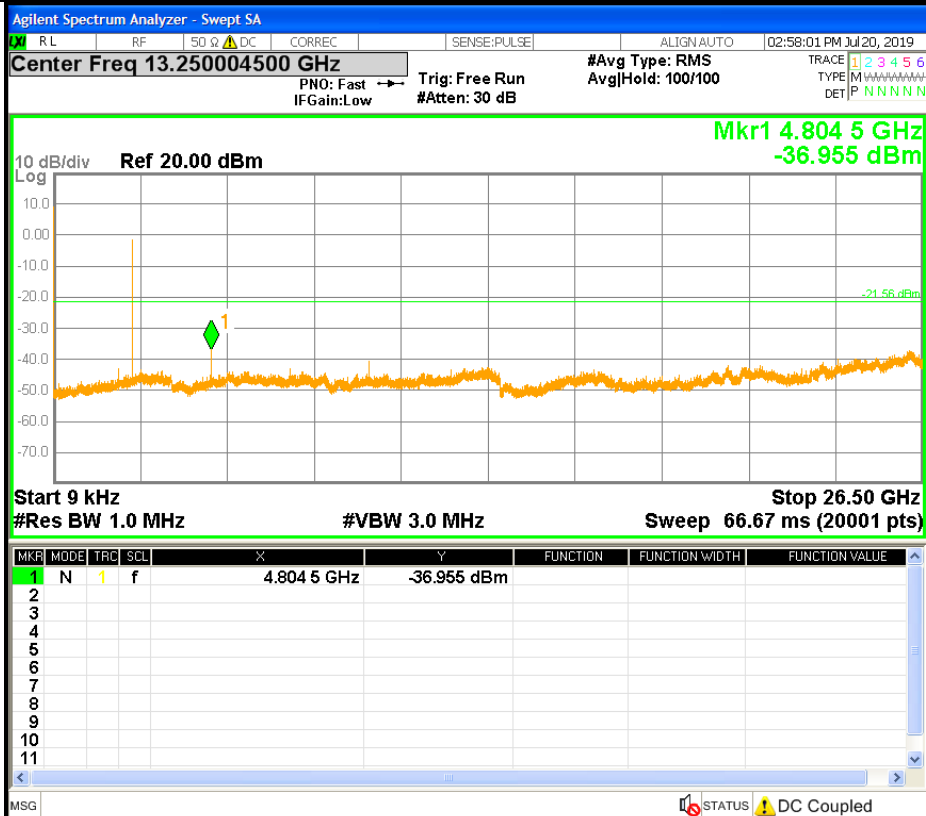
$\pi/4$ DQPSK LCH_Graphs

Pref



Frequency
Auto Tune
Center Freq 2.402000000 GHz
Start Freq 2.401000000 GHz
Stop Freq 2.403000000 GHz
CF Step 200.000 kHz Auto Man
Freq Offset 0 Hz

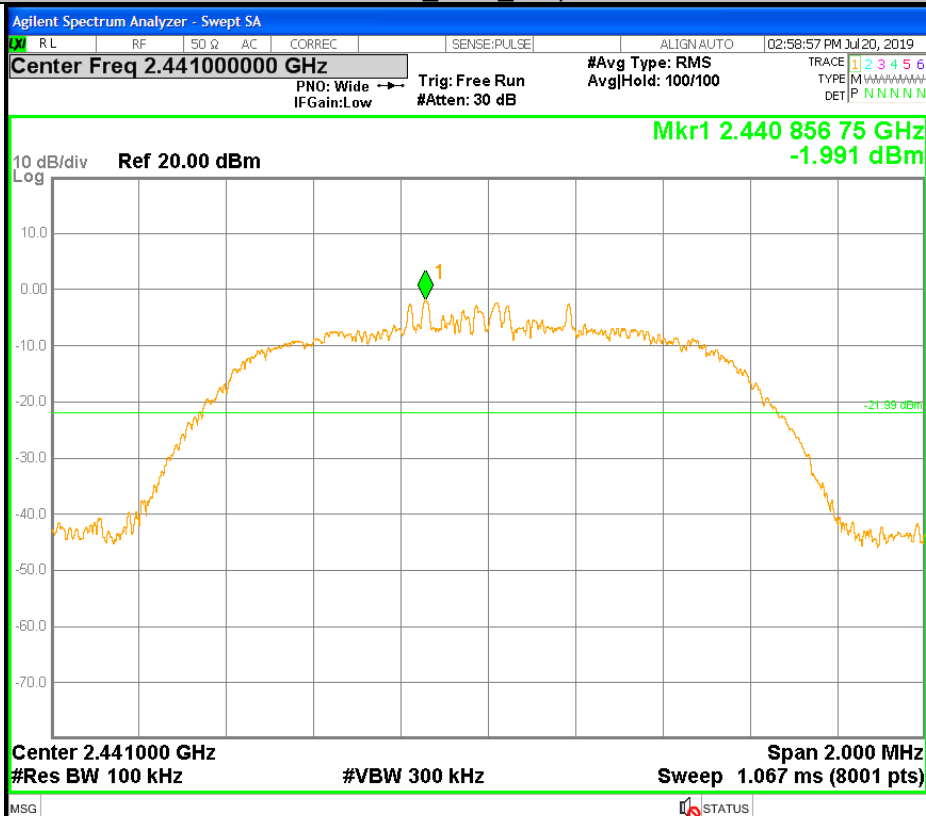
Puw



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

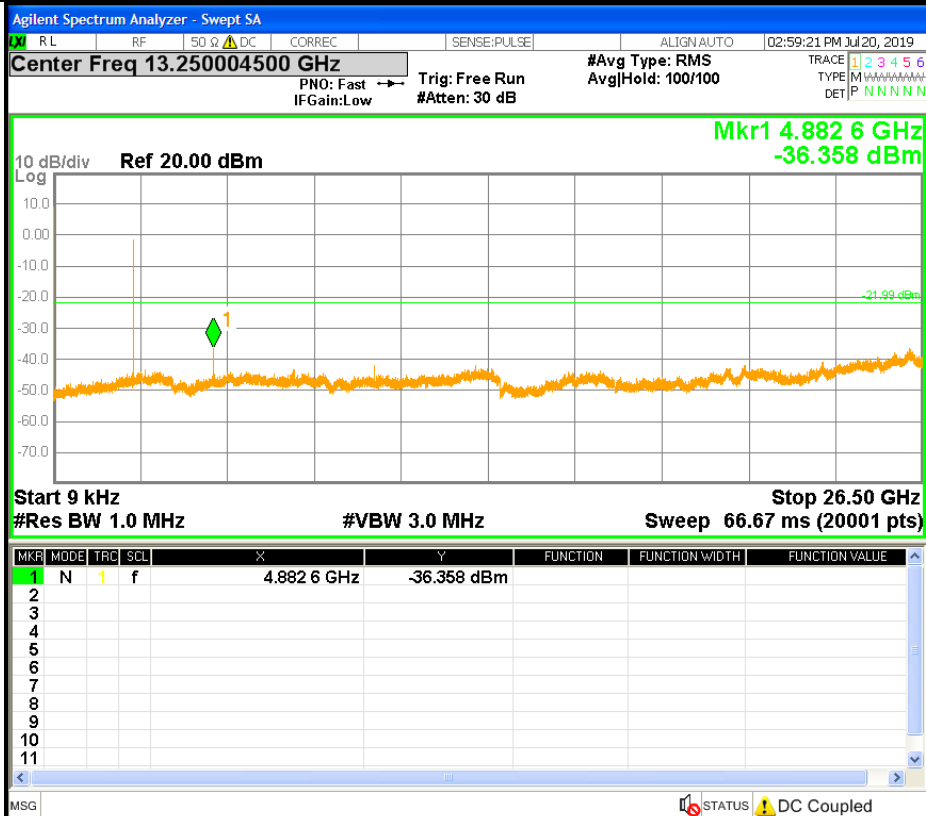
$\pi/4$ DQPSK MCH Graphs

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 Man
Freq Offset 0 Hz

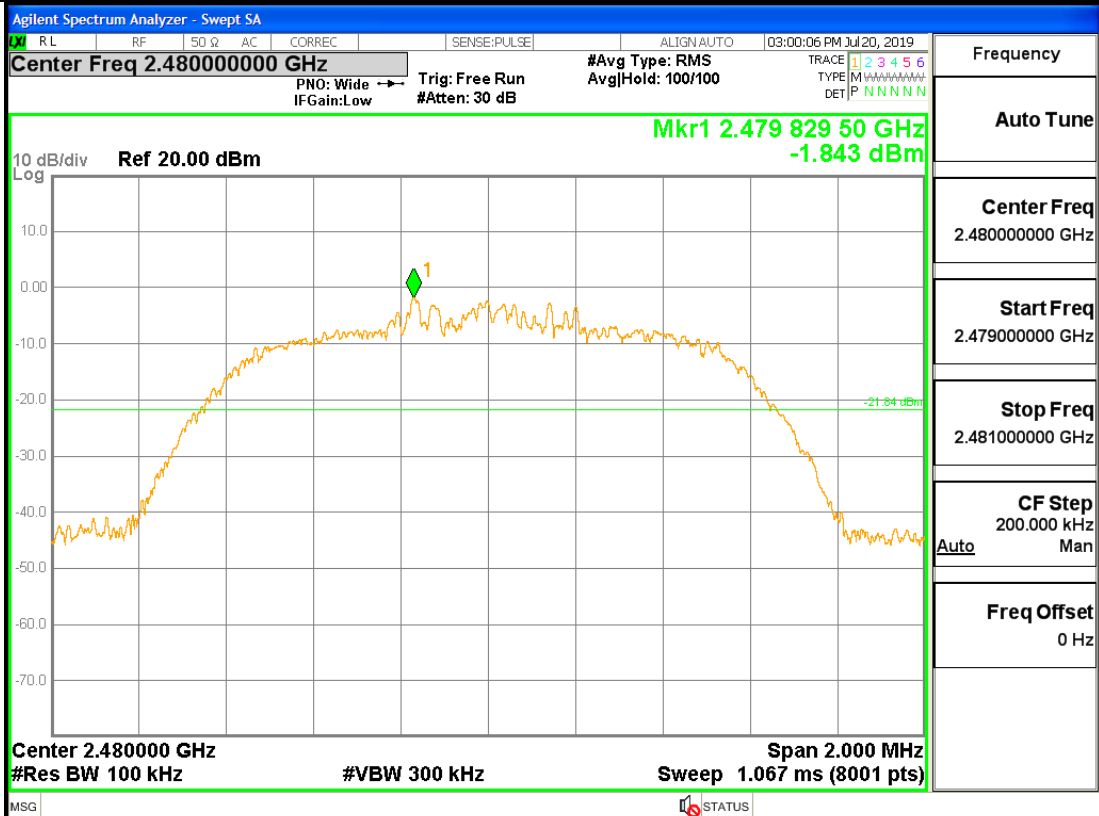
Puw



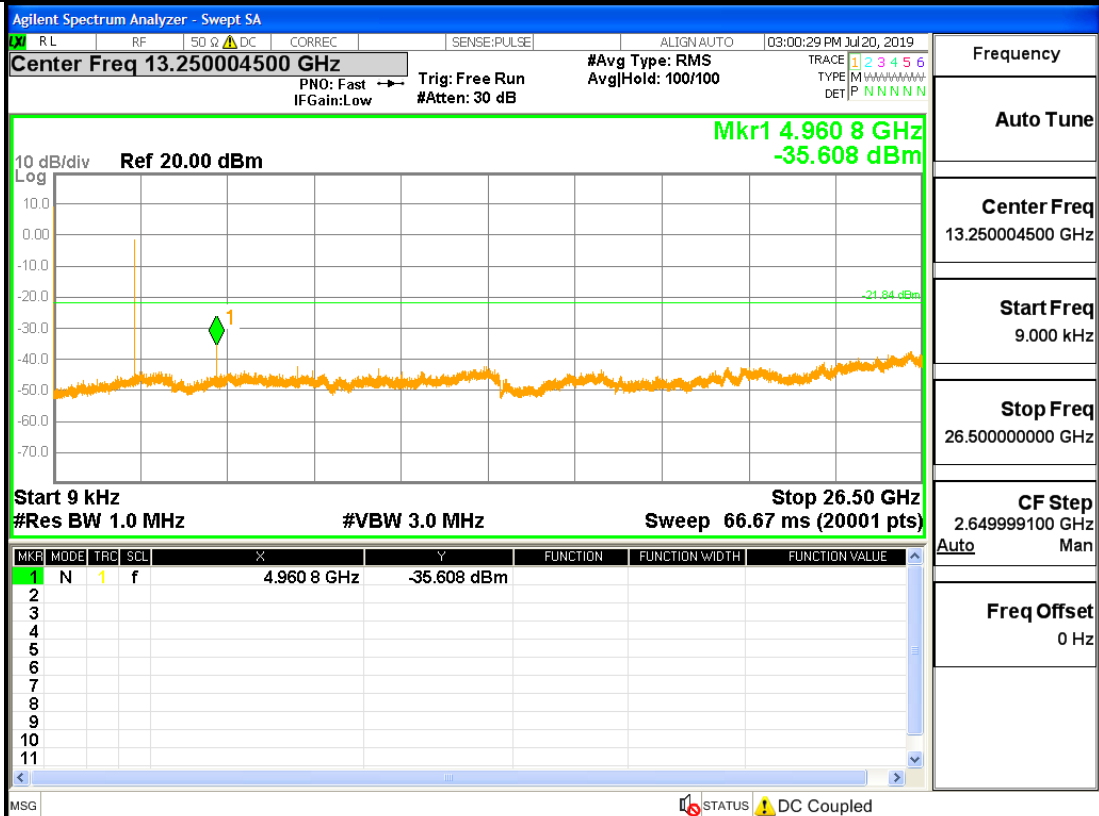
Frequency
Auto Tune
Center Freq 13.250004500 GHz
Start Freq 9.000 kHz
Stop Freq 26.500000000 GHz
CF Step 2.649999100 GHz Auto Man
Freq Offset 0 Hz

$\pi/4$ DQPSK HCH Graphs

Pref

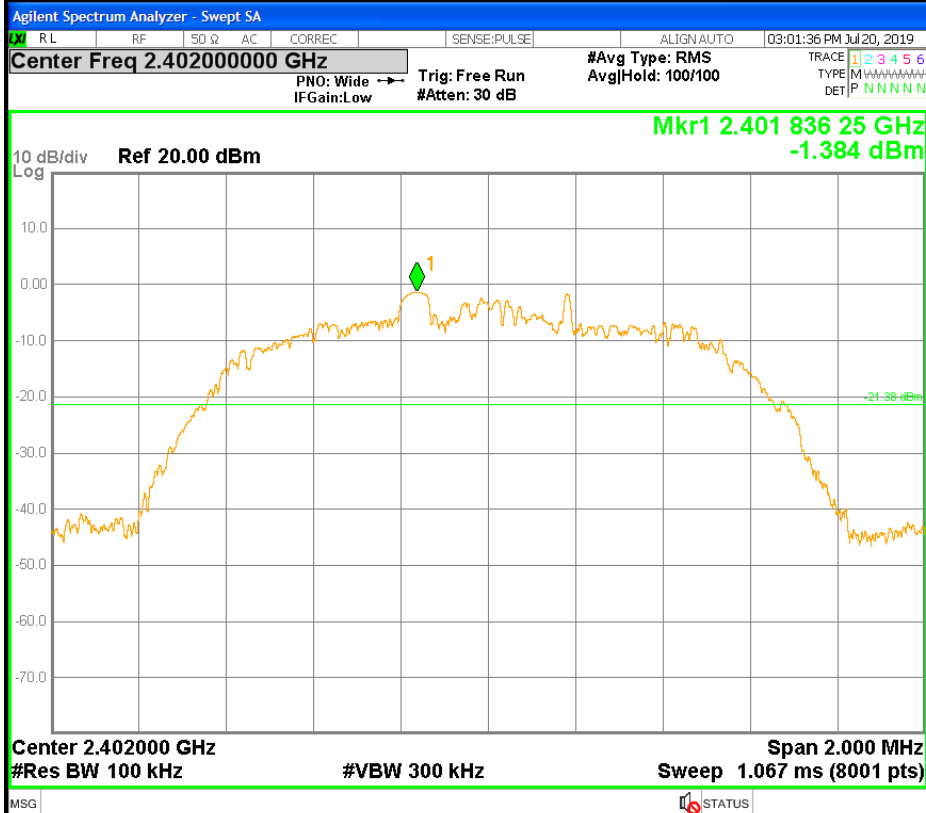


Puw

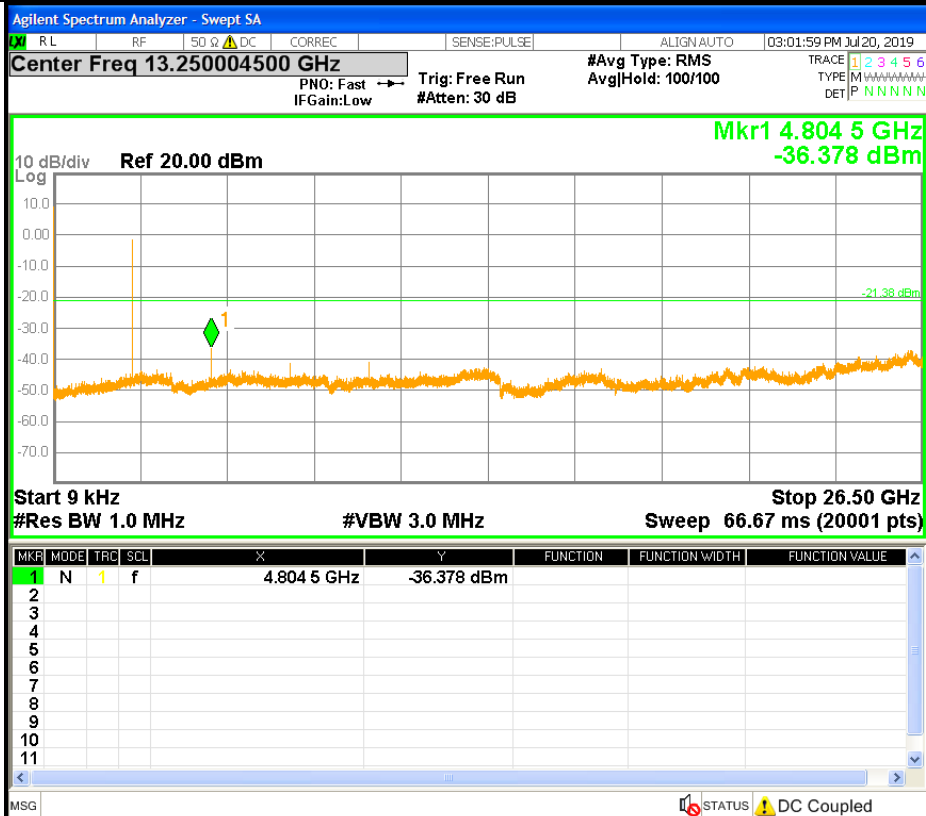


8DPSK LCH_Graphs

Pref

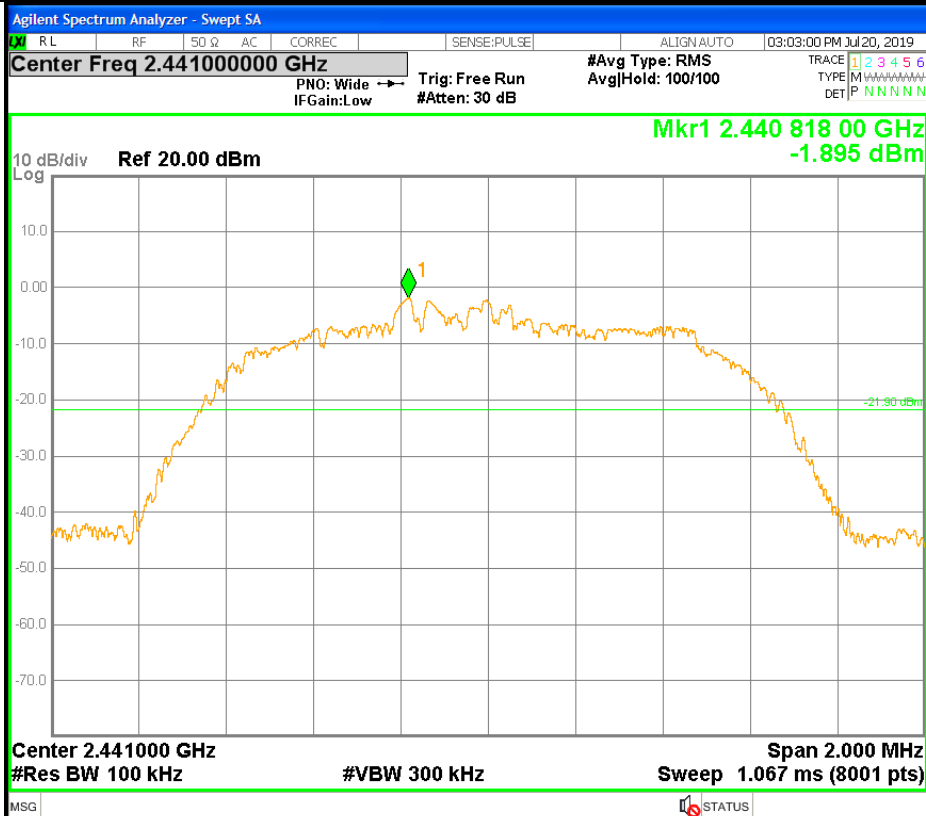


Puw



8DPSK_MCH_Graphs

Pref



Frequency

Auto Tune

Center Freq
2.441000000 GHz

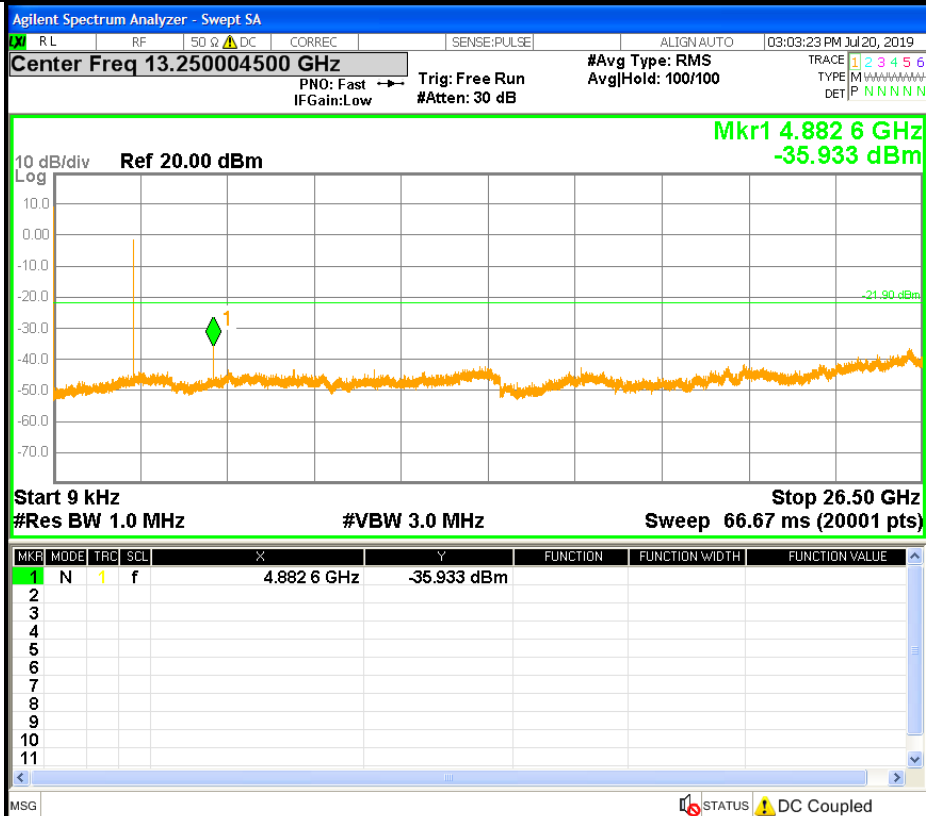
Start Freq
2.440000000 GHz

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

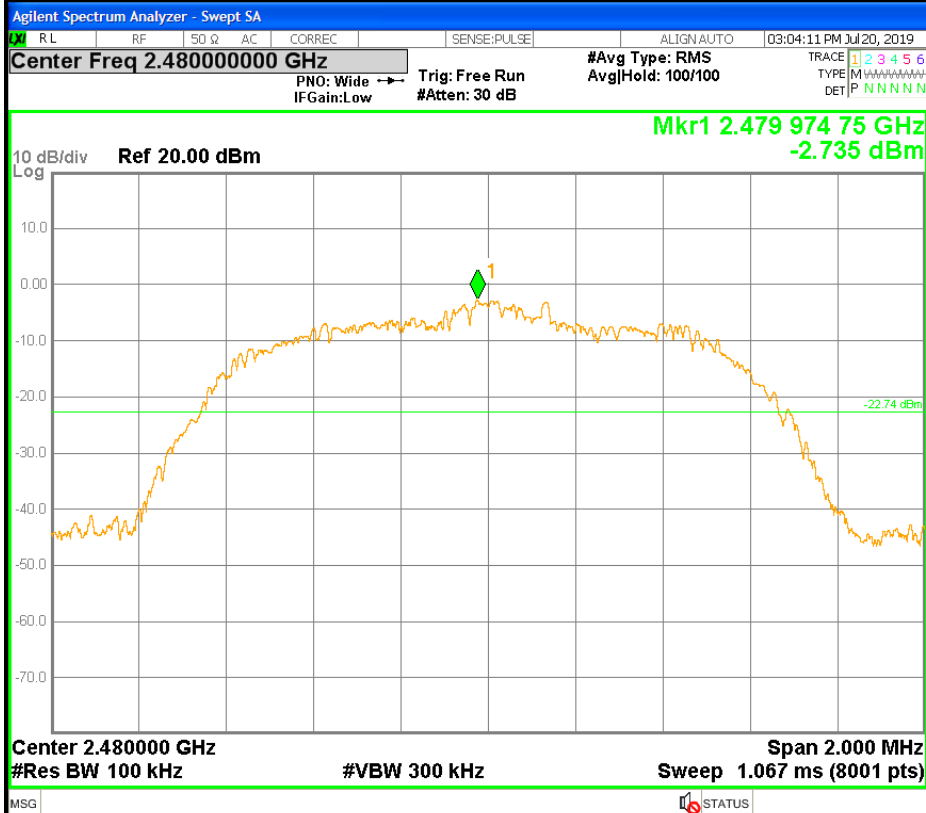
Stop Freq
26.500000000 GHz

CF Step
2.649999100 GHz
Auto Man

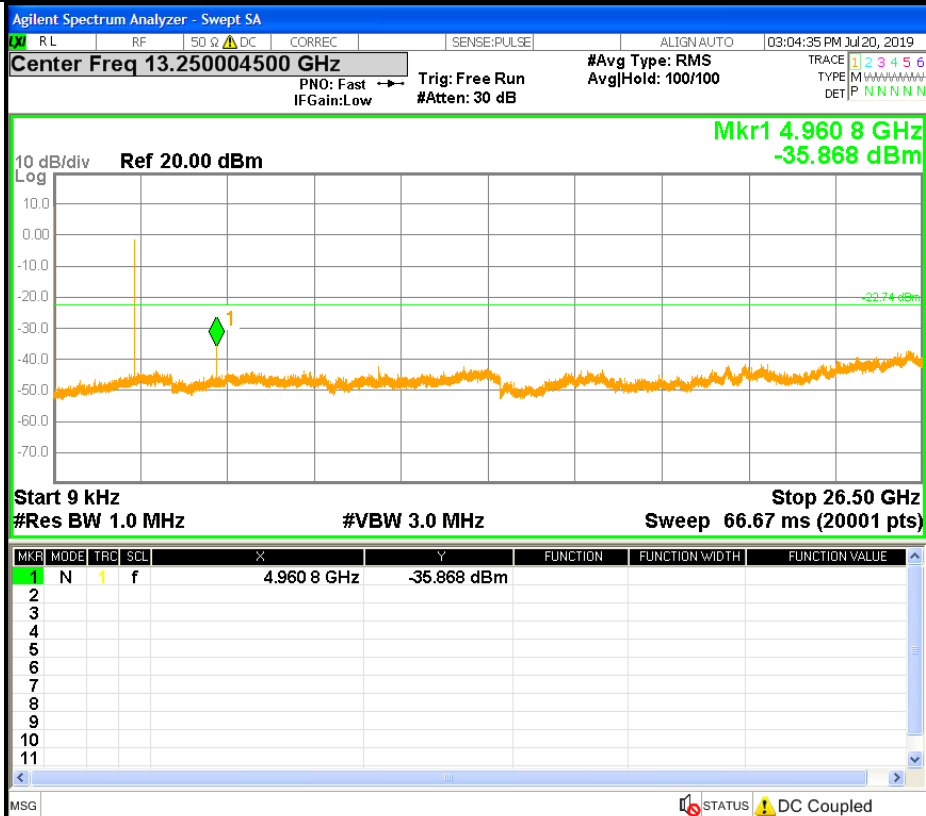
Freq Offset
0 Hz

8DPSK HCH_Graphs

Pref



Puw

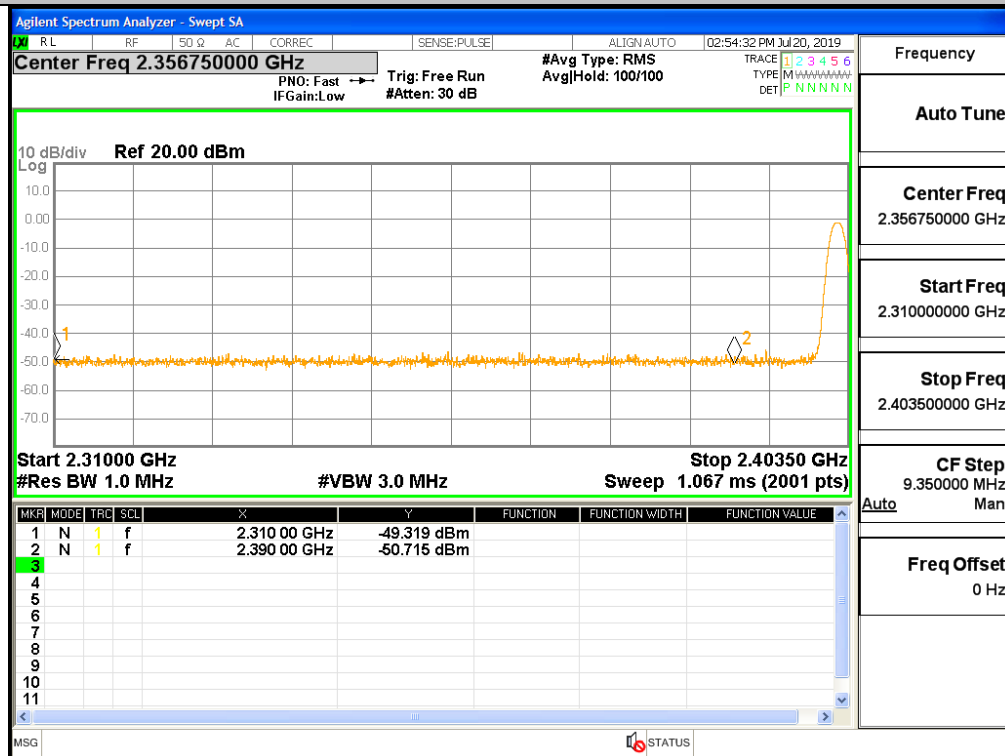


A.8 Restrict-band band-edge measurements

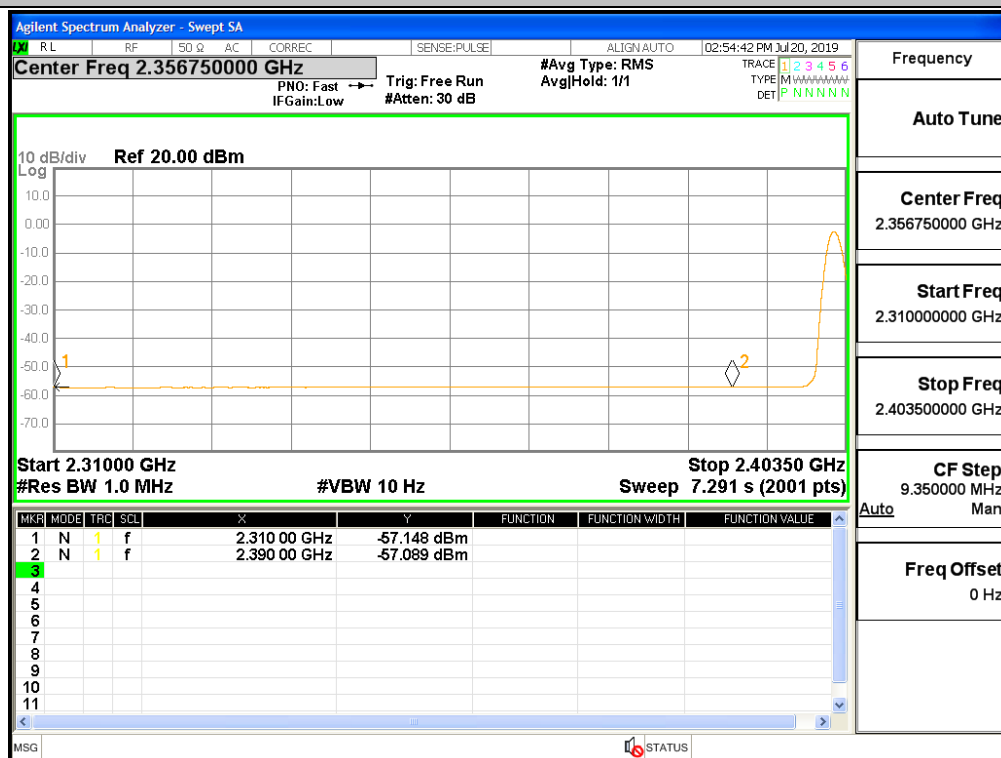
Type	Carrier Frequency (MHz)	Frequency(M Hz)	Gain	Ground Factor	Peak Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2310.00	2.50	0.00	-49.32	48.38	74.00	Pass
1DH5	2480	2498.18	2.50	0.00	-44.97	52.73	74.00	Pass
2DH5	2402	2310.00	2.50	0.00	-49.25	48.45	74.00	Pass
2DH5	2480	2500.00	2.50	0.00	-48.77	48.93	74.00	Pass
3DH5	2402	2310.00	2.50	0.00	-47.86	49.84	74.00	Pass
3DH5	2480	2483.50	2.50	0.00	-49.12	48.58	74.00	Pass

Type	Carrier Frequency (MHz)	Frequency(M Hz)	Gain	Ground Factor	Average Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2390.00	2.50	0.00	-57.09	40.61	54	Pass
1DH5	2480	2483.50	2.50	0.00	-55.81	41.89	54	Pass
2DH5	2402	2390.00	2.50	0.00	-57.18	40.52	54	Pass
2DH5	2480	2483.50	2.50	0.00	-55.76	41.94	54	Pass
3DH5	2402	2390.00	2.50	0.00	-57.18	40.52	54	Pass
3DH5	2480	2483.50	2.50	0.00	-55.72	41.98	54	Pass

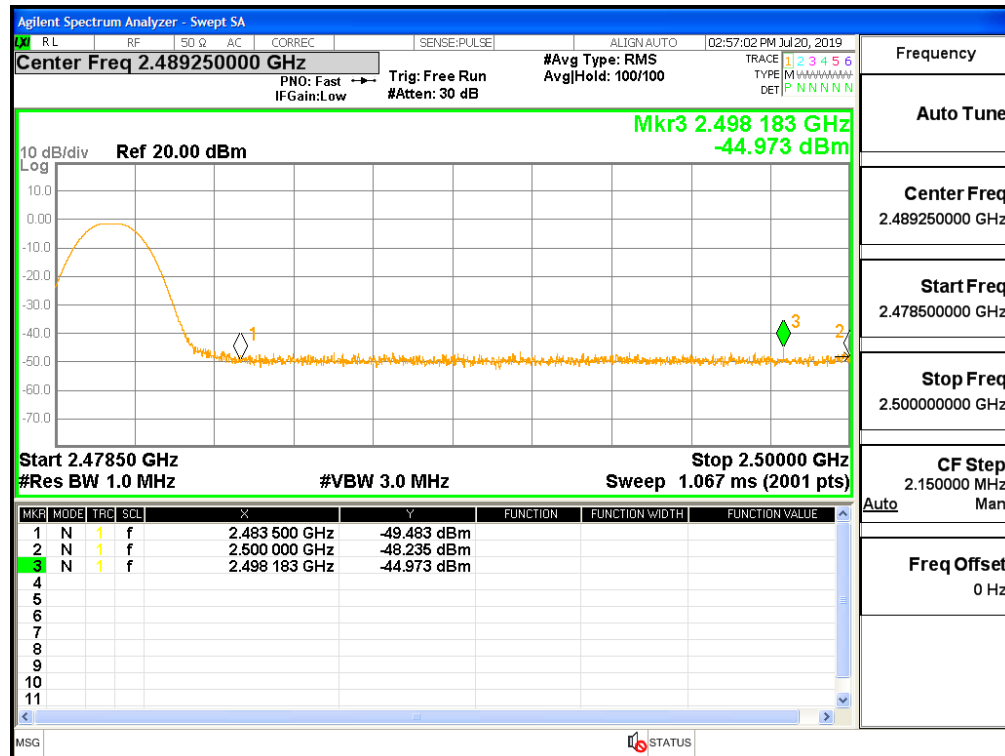
Restrict-band band-edge measurements_2402_PEAK_DH5



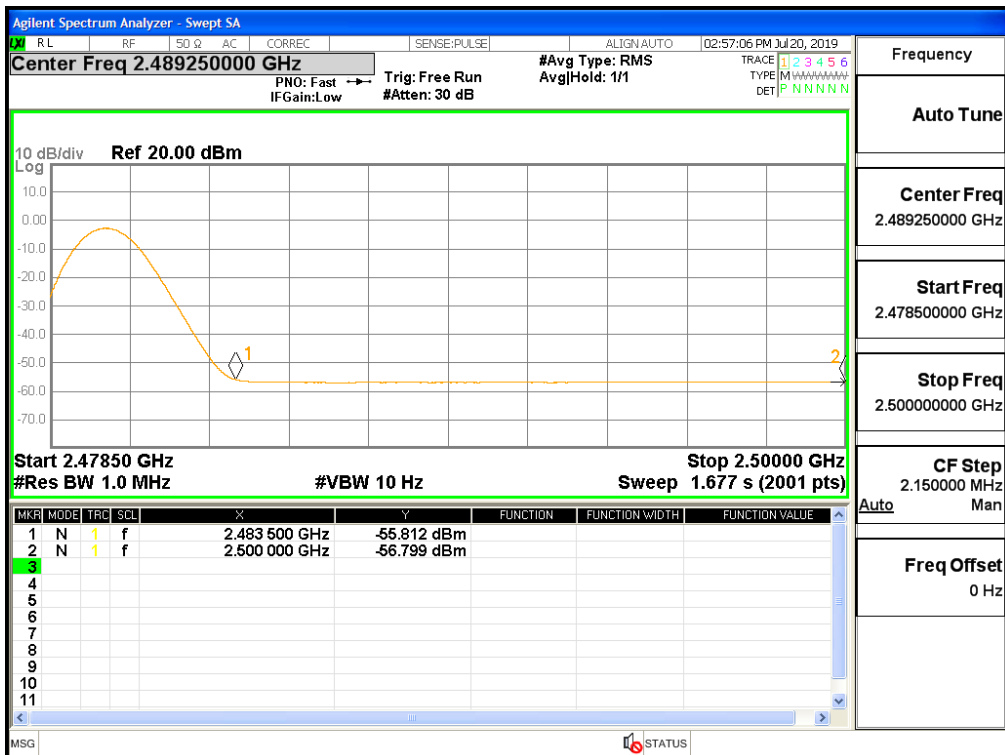
Restrict-band band-edge measurements_2402_AV_DH5



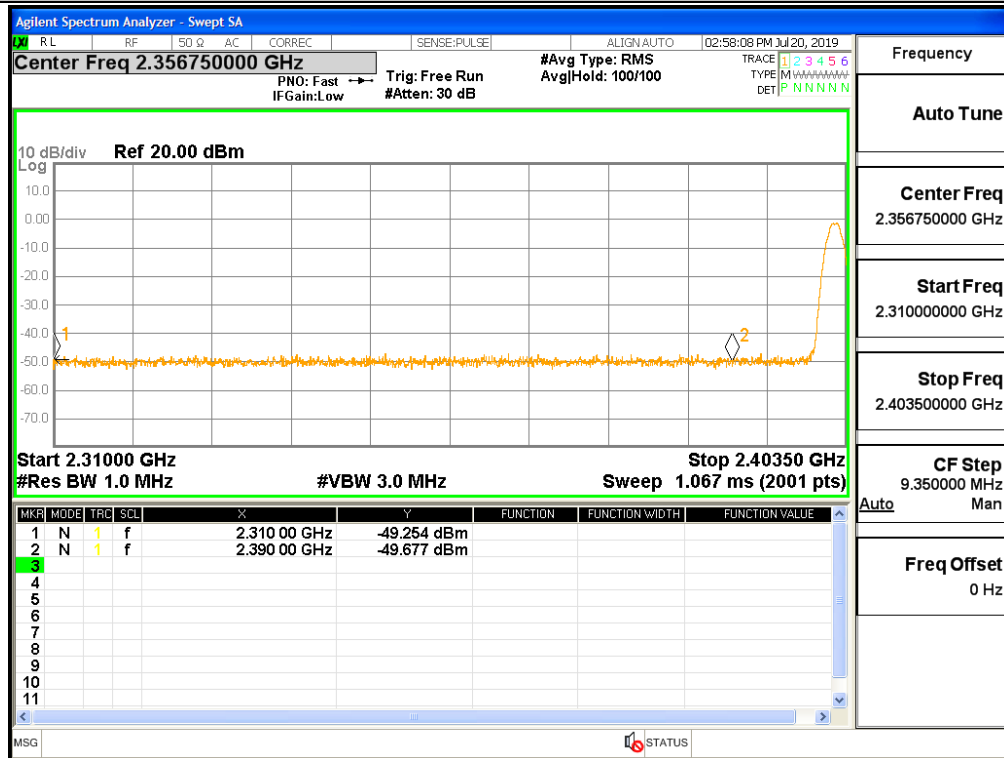
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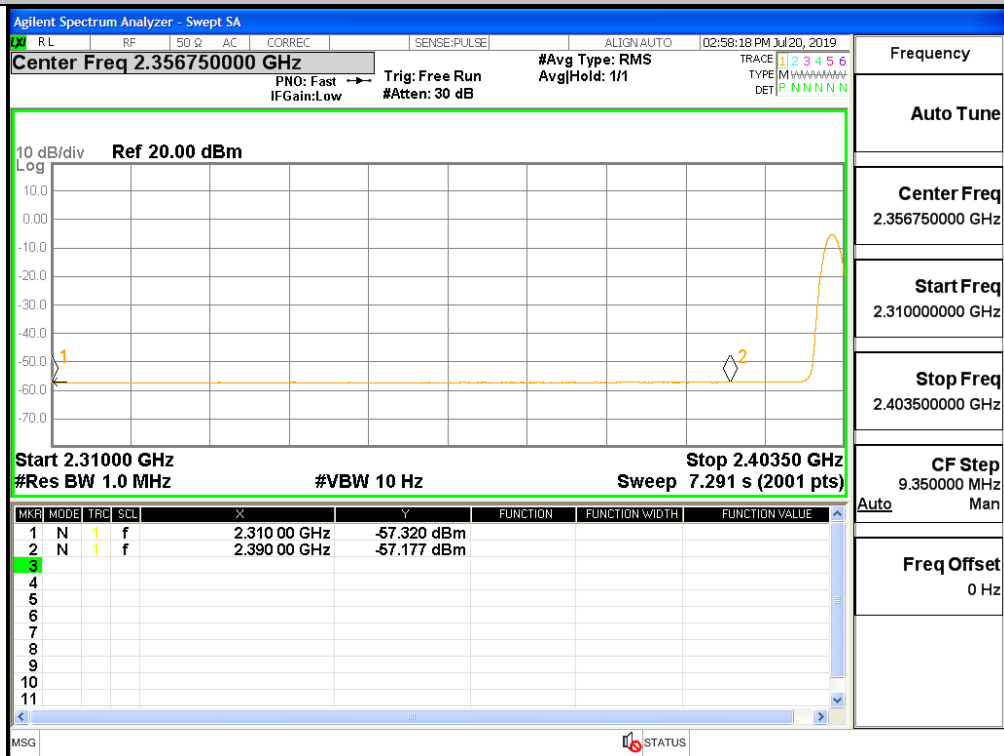
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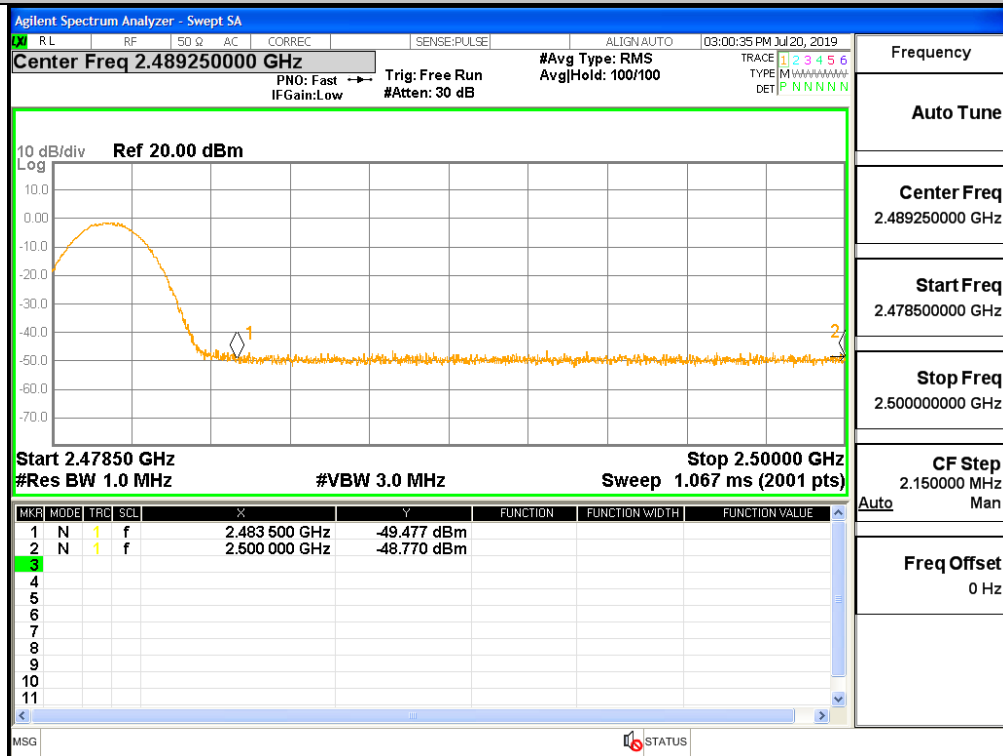
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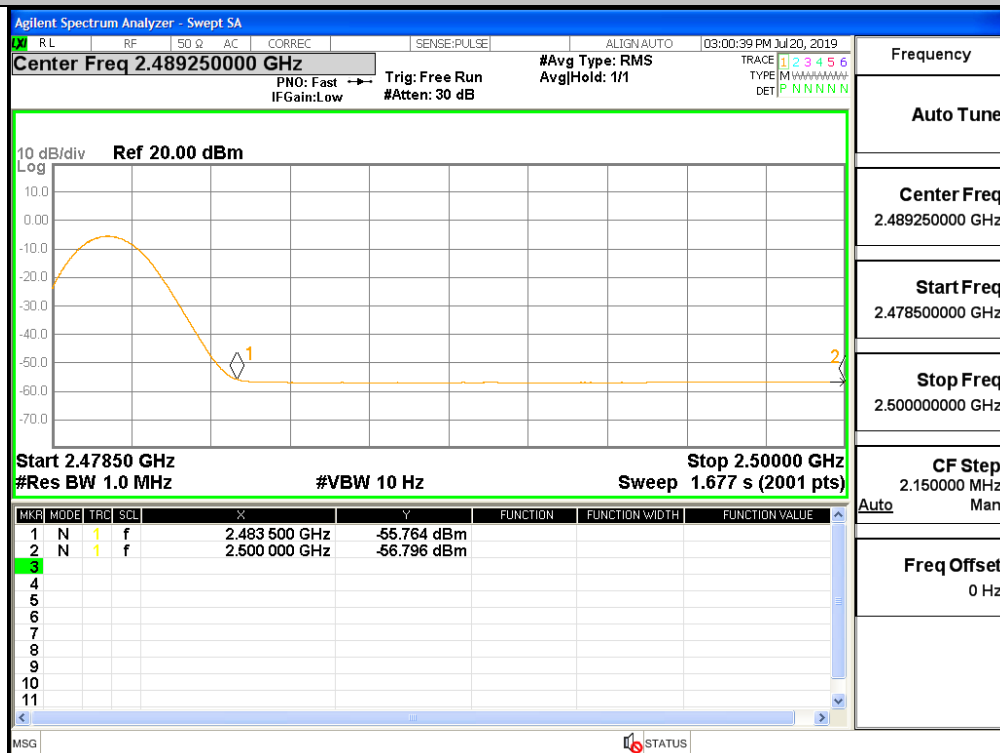
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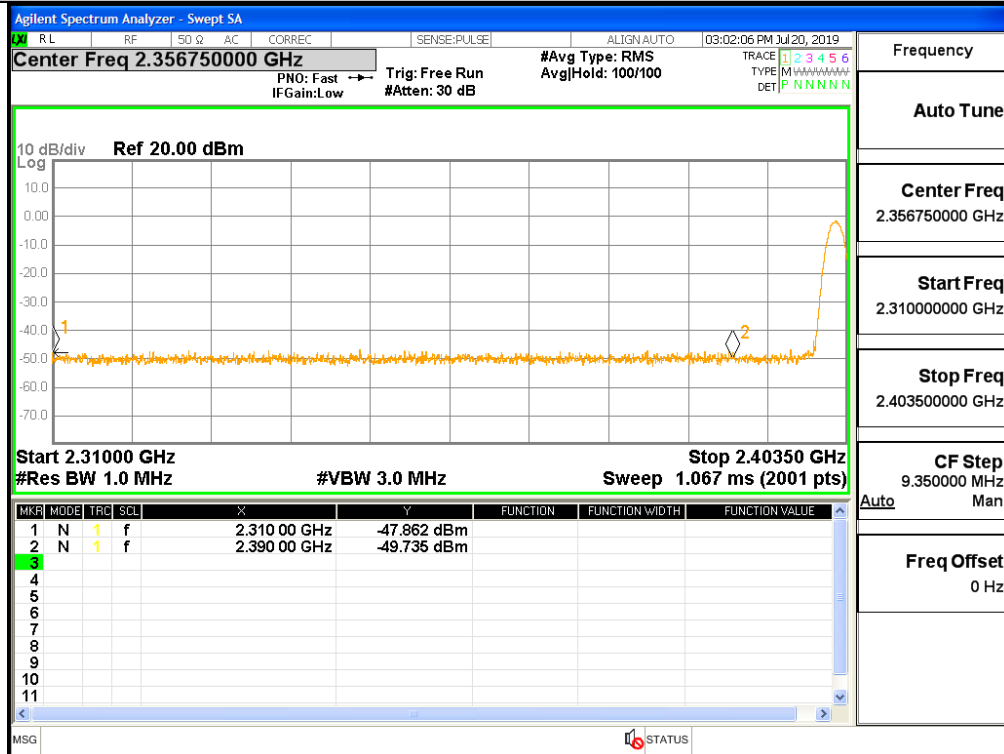
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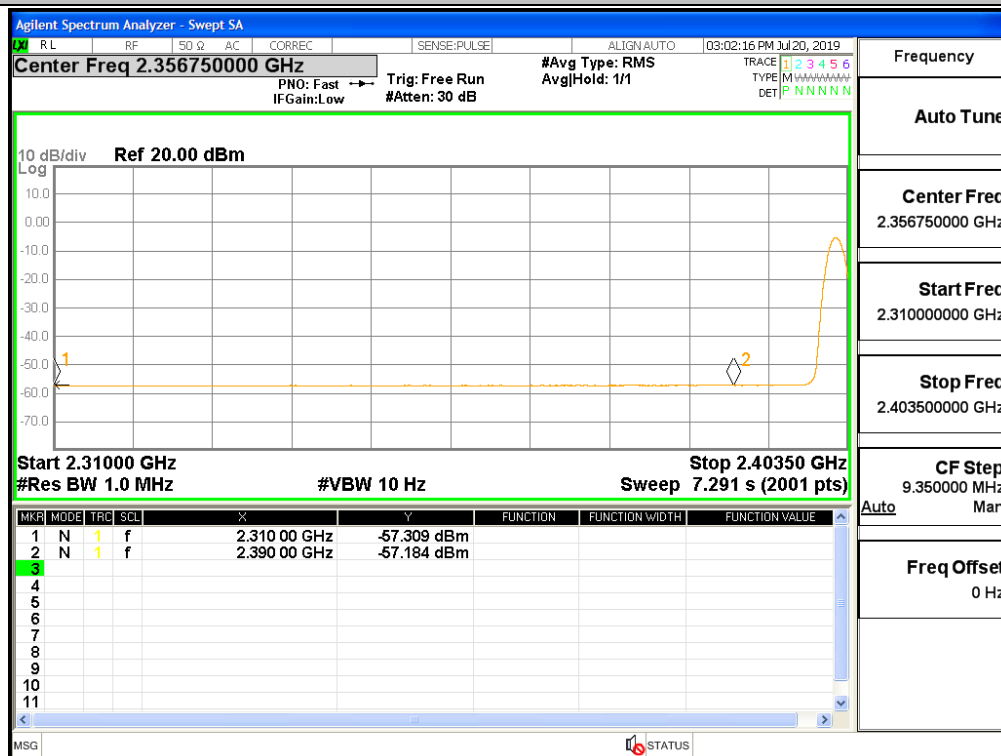
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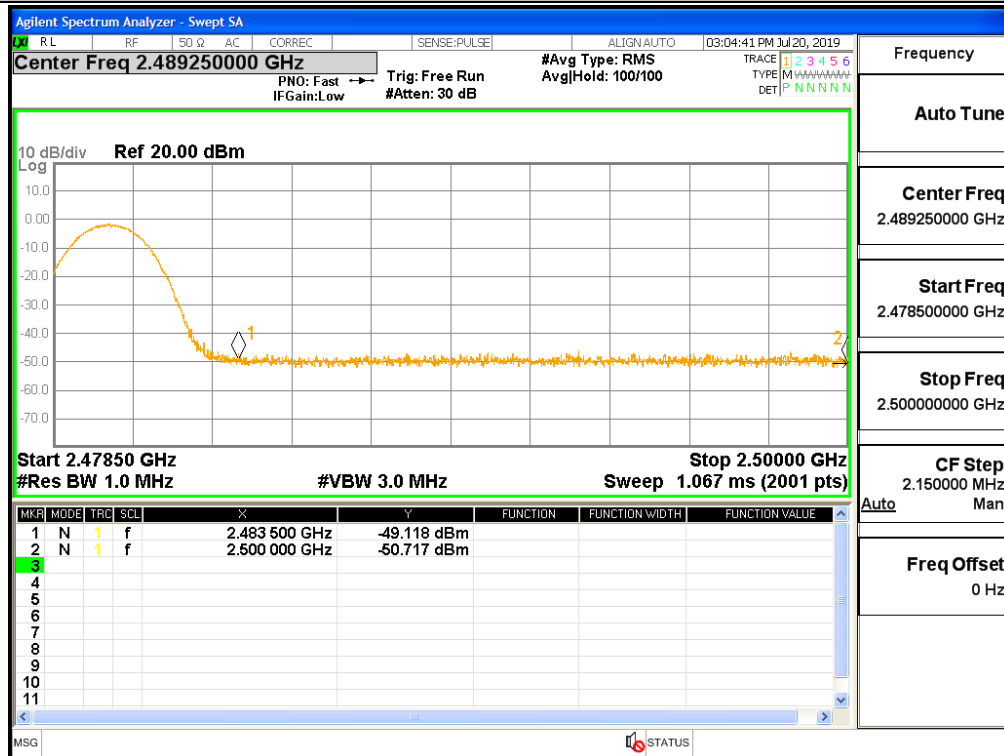
Restrict-band band-edge measurements_2402_PEAK_3DH5



Restrict-band band-edge measurements_2402_AV_3DH5



Restrict-band band-edge measurements_2480_PEAK_3DH5



Restrict-band band-edge measurements_2480_AV_3DH5

