

Appendix A

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

Product Name: Bluetooth Earphones

Trade Mark: Altec Lansing

Test Model: MZX857

FCC ID: 2AL9B-MZX857

Environmental Conditions

Temperature:	23.1 ° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Gary Qian
Supervised by:	Eden Hu

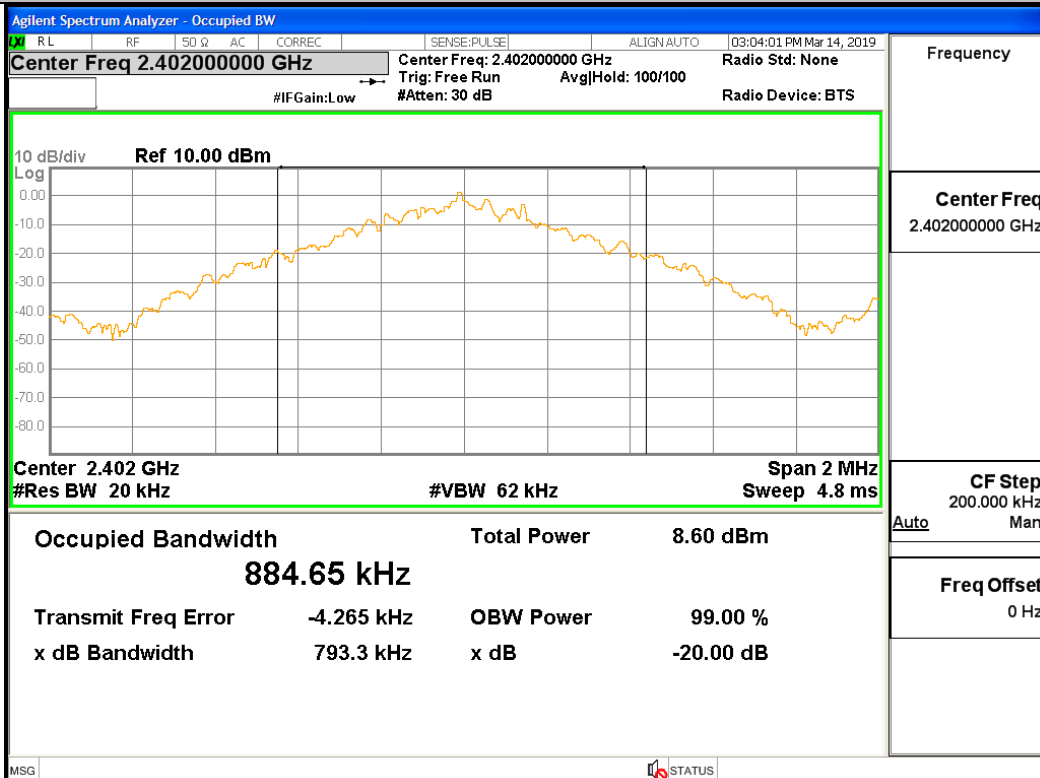
A.1 20 dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit(MHz)	Verdict
GFSK	LCH	0.793	Not Specified	PASS
GFSK	MCH	0.847	Not Specified	PASS
GFSK	HCH	0.937	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.246	Not Specified	PASS
$\pi/4$ DQPSK	MCH	1.201	Not Specified	PASS
$\pi/4$ DQPSK	HCH	1.199	Not Specified	PASS
8DPSK	LCH	1.263	Not Specified	PASS
8DPSK	MCH	1.239	Not Specified	PASS
8DPSK	HCH	1.241	Not Specified	PASS

Test Graph

Graphs

GFSK/LCH



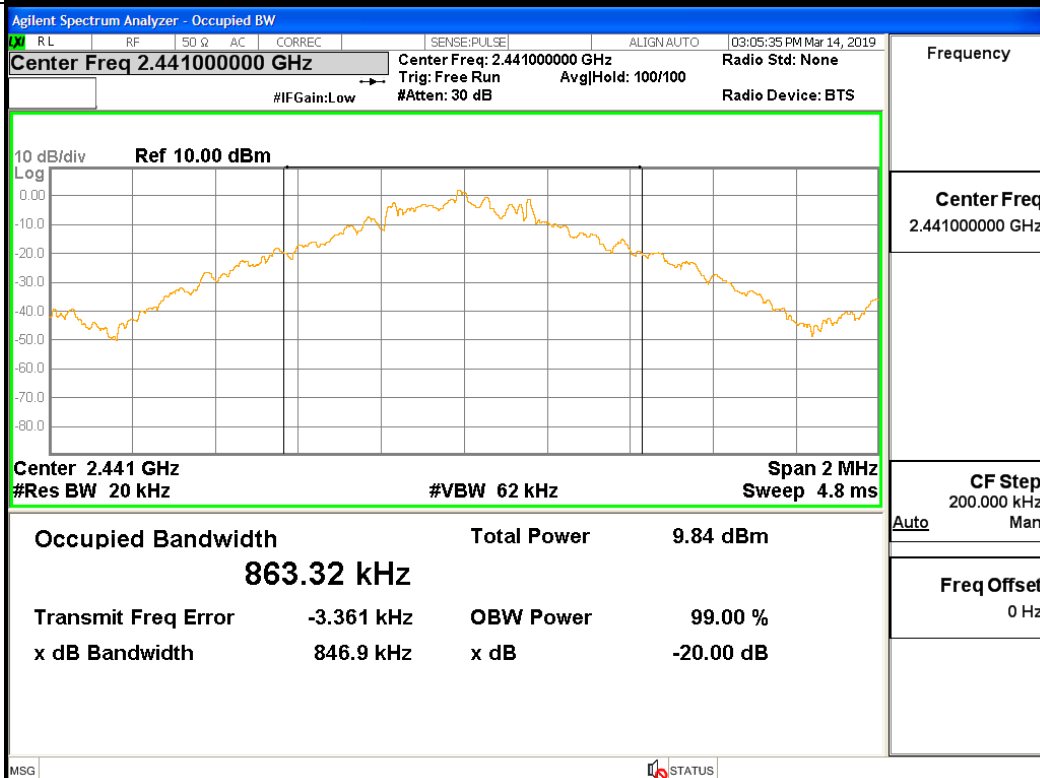
Frequency

Center Freq
2.40200000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

GFSK/MCH

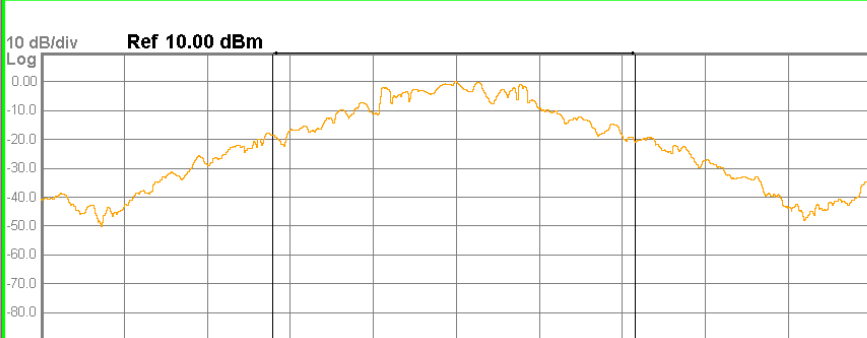
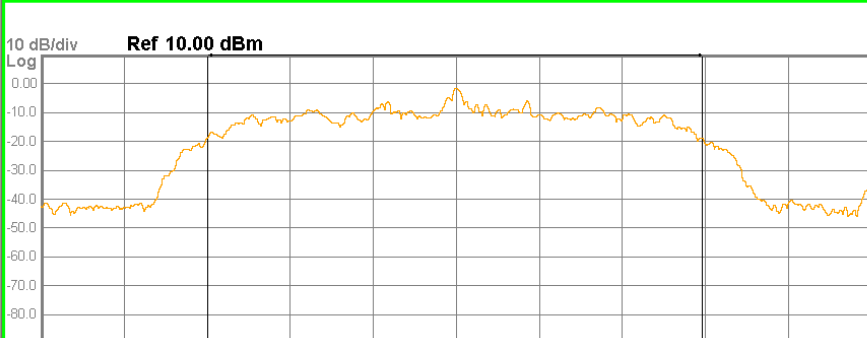


Frequency

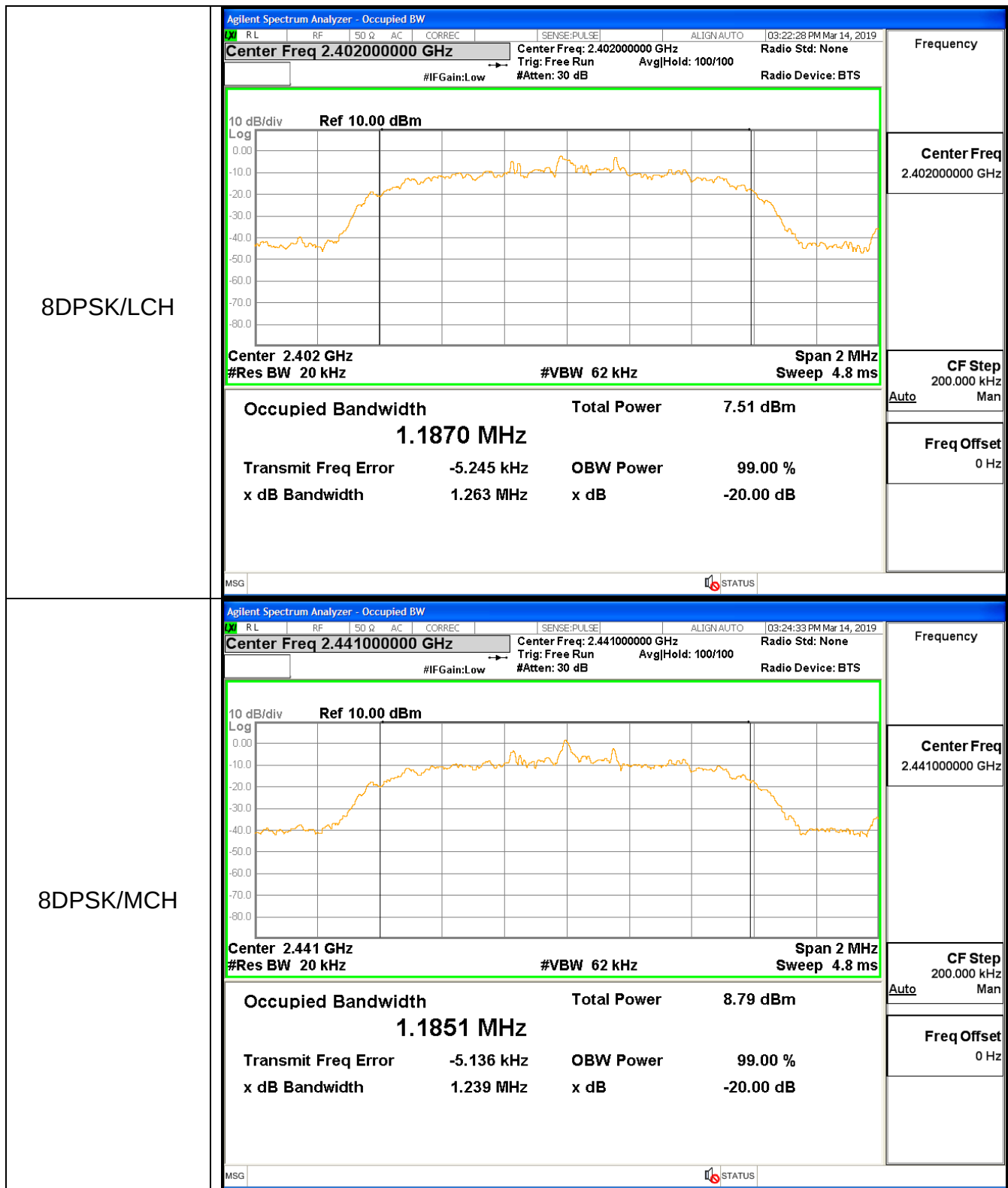
Center Freq
2.44100000 GHz

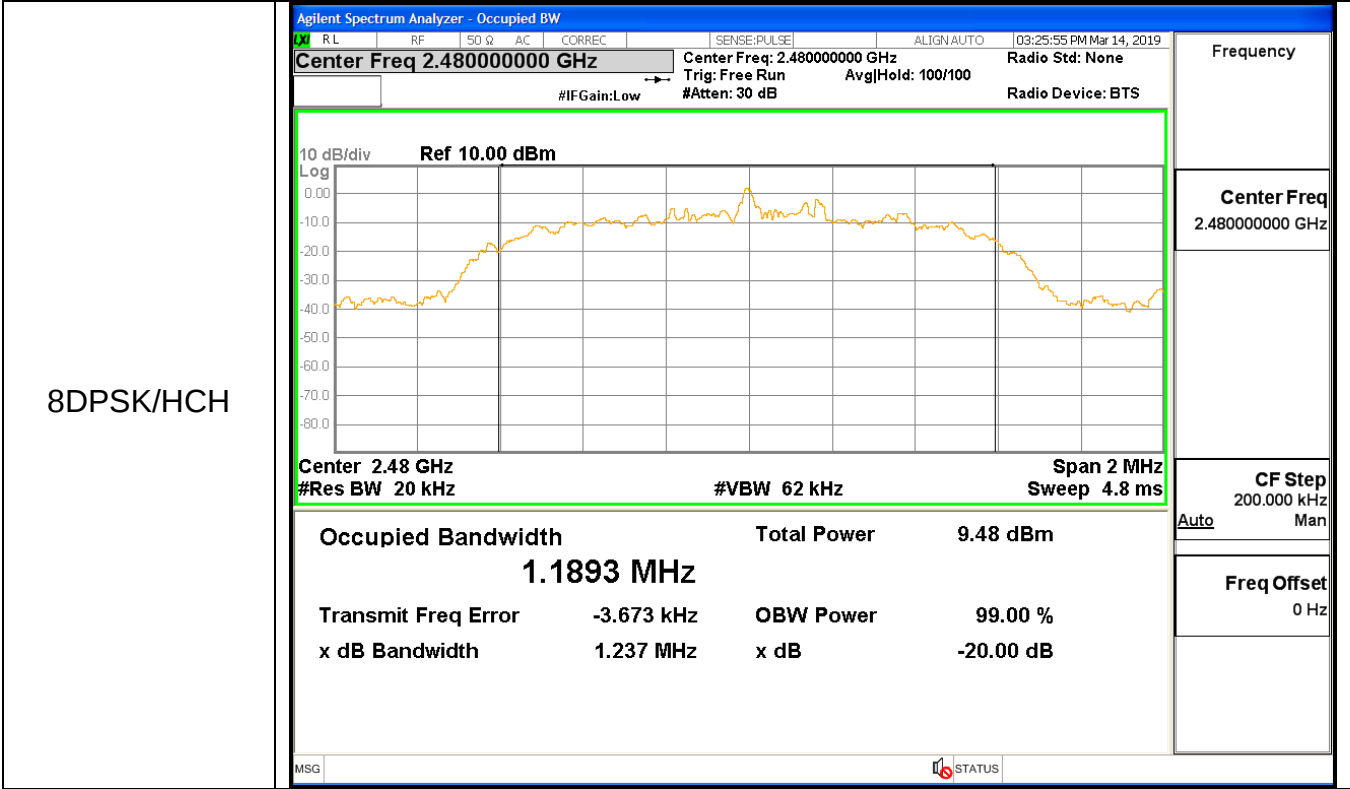
CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

GFSK/HCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN AUTO 03:07:41 PM Mar 14, 2019 Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Radio Std: None #IFGain:Low #Atten: 30 dB AvgHold: 100/100 Radio Device: BTS  10 dB/div Ref 10.00 dBm Center 2.48 GHz Span 2 MHz #Res BW 20 kHz #VBW 62 kHz Sweep 4.8 ms Occupied Bandwidth 870.79 kHz Total Power 10.2 dBm Transmit Freq Error -5.521 kHz OBW Power 99.00 % x dB Bandwidth 936.8 kHz x dB -20.00 dB MSG STATUS	Frequency Center Freq 2.480000000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz
	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN AUTO 03:09:25 PM Mar 14, 2019 Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Radio Std: None #IFGain:Low #Atten: 30 dB AvgHold: 100/100 Radio Device: BTS  10 dB/div Ref 10.00 dBm Center 2.402 GHz Span 2 MHz #Res BW 20 kHz #VBW 62 kHz Sweep 4.8 ms Occupied Bandwidth 1.1870 MHz Total Power 7.20 dBm Transmit Freq Error -1.553 kHz OBW Power 99.00 % x dB Bandwidth 1.246 MHz x dB -20.00 dB MSG STATUS	Frequency Center Freq 2.402000000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz



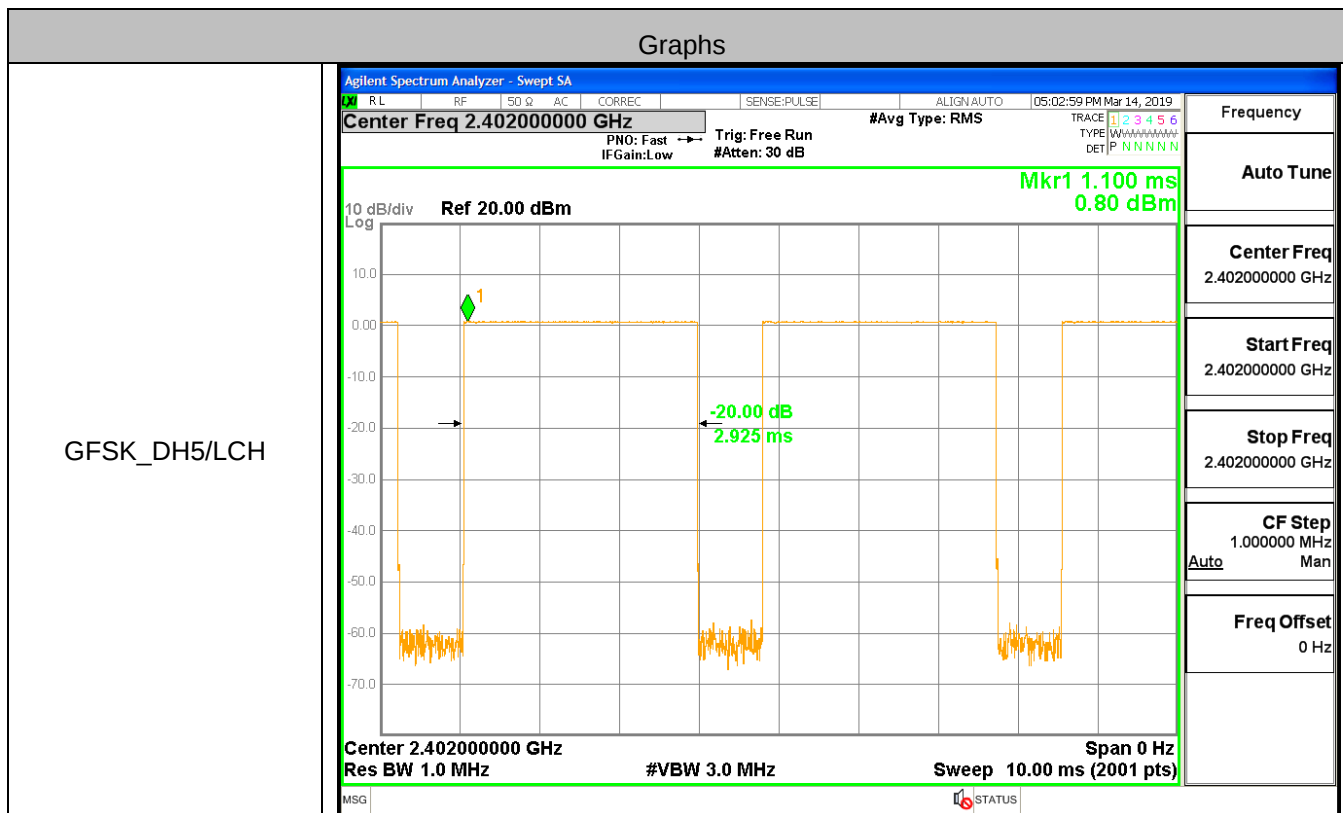


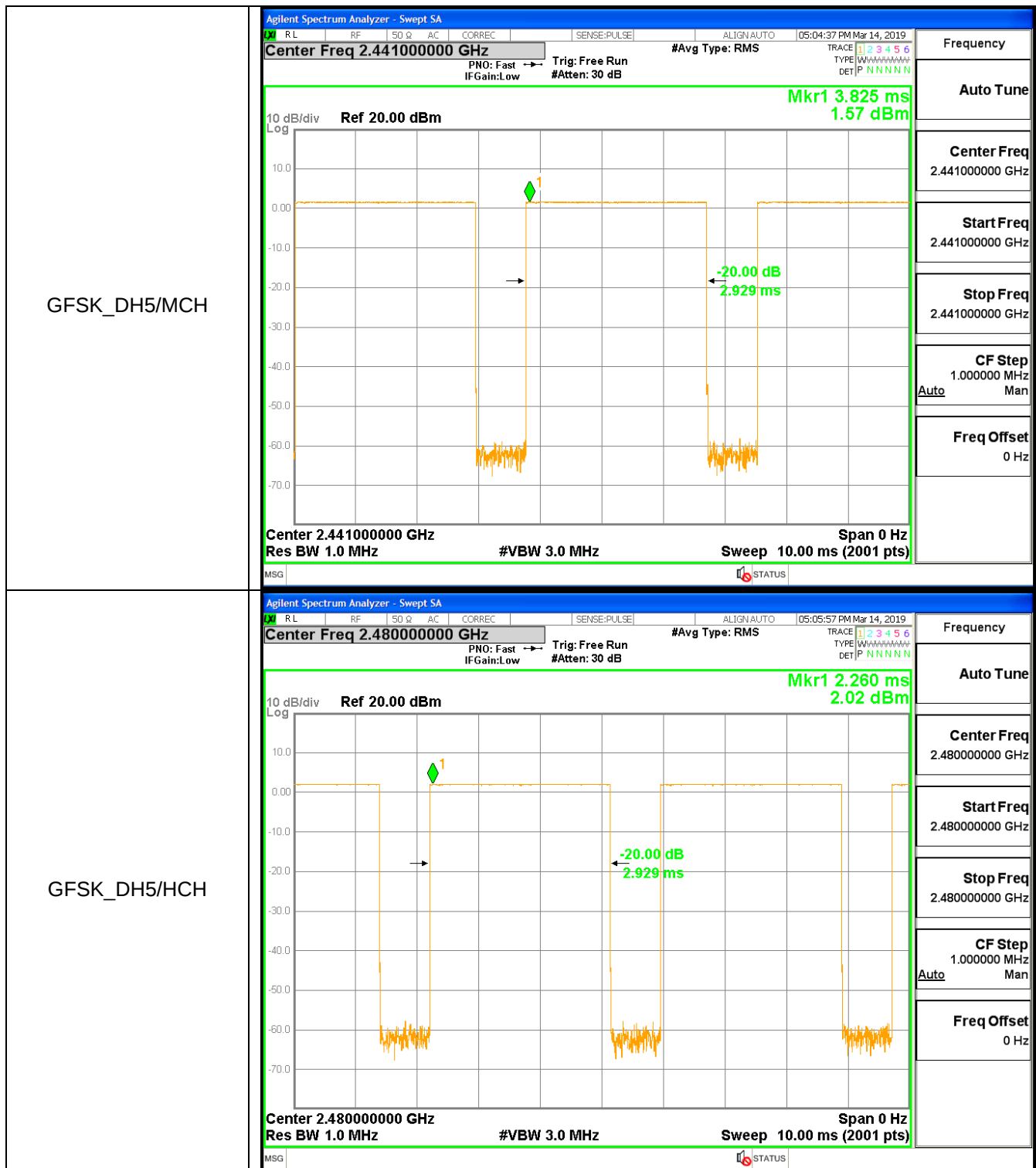


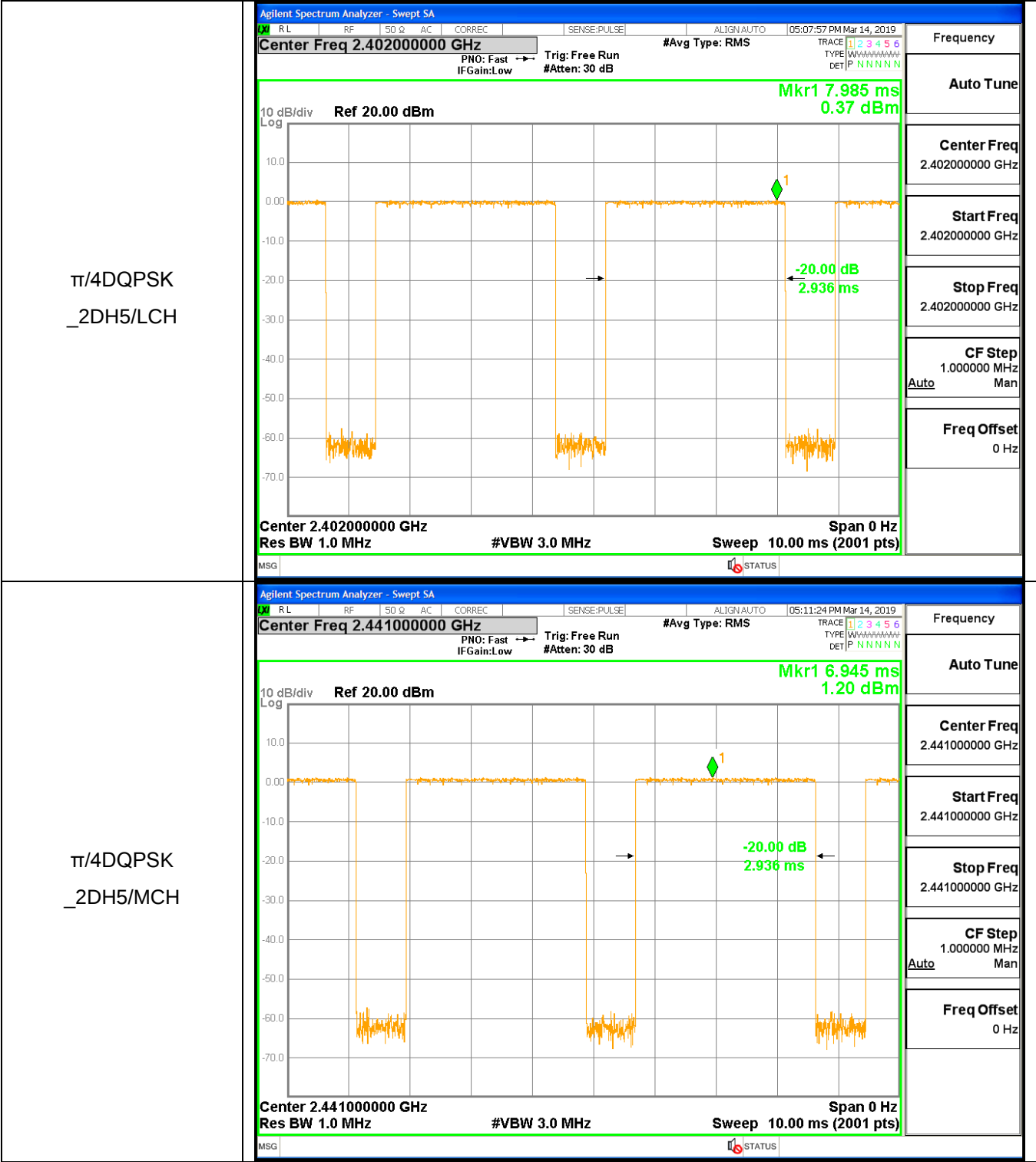
A.2 Dwell Time

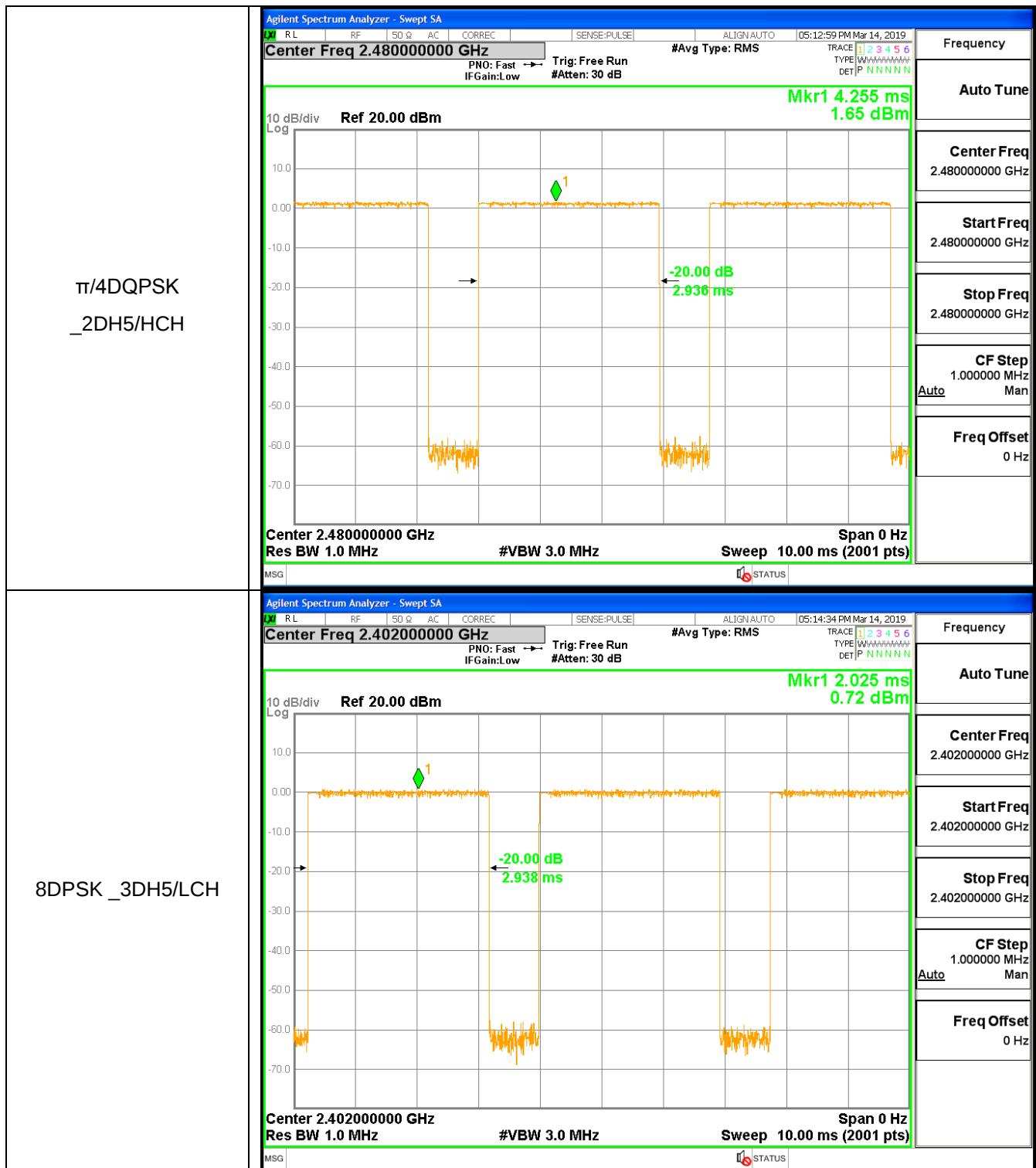
Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.002925	106.7	0.312112	0.4	PASS
GFSK	DH5	MCH	0.002929	106.7	0.312483	0.4	PASS
GFSK	DH5	HCH	0.002929	106.7	0.31249	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	0.002936	106.7	0.313253	0.4	PASS
$\pi/4$ DQPSK	2DH5	MCH	0.002936	106.7	0.313237	0.4	PASS
$\pi/4$ DQPSK	2DH5	HCH	0.002936	106.7	0.313303	0.4	PASS
8DPSK	3DH5	LCH	0.002938	106.7	0.313441	0.4	PASS
8DPSK	3DH5	MCH	0.002935	106.7	0.313167	0.4	PASS
8DPSK	3DH5	HCH	0.002936	106.7	0.313324	0.4	PASS

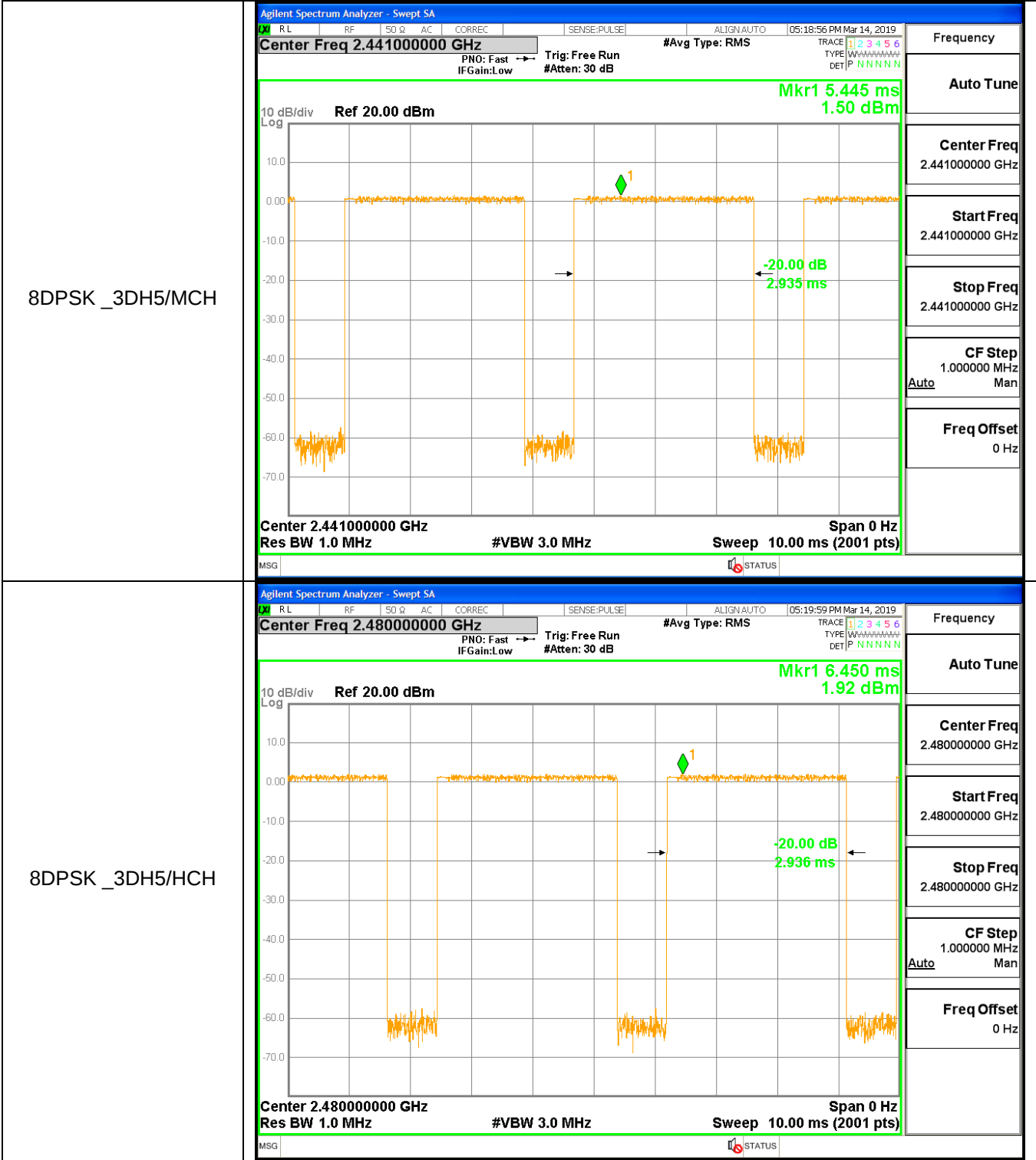
Test Graph







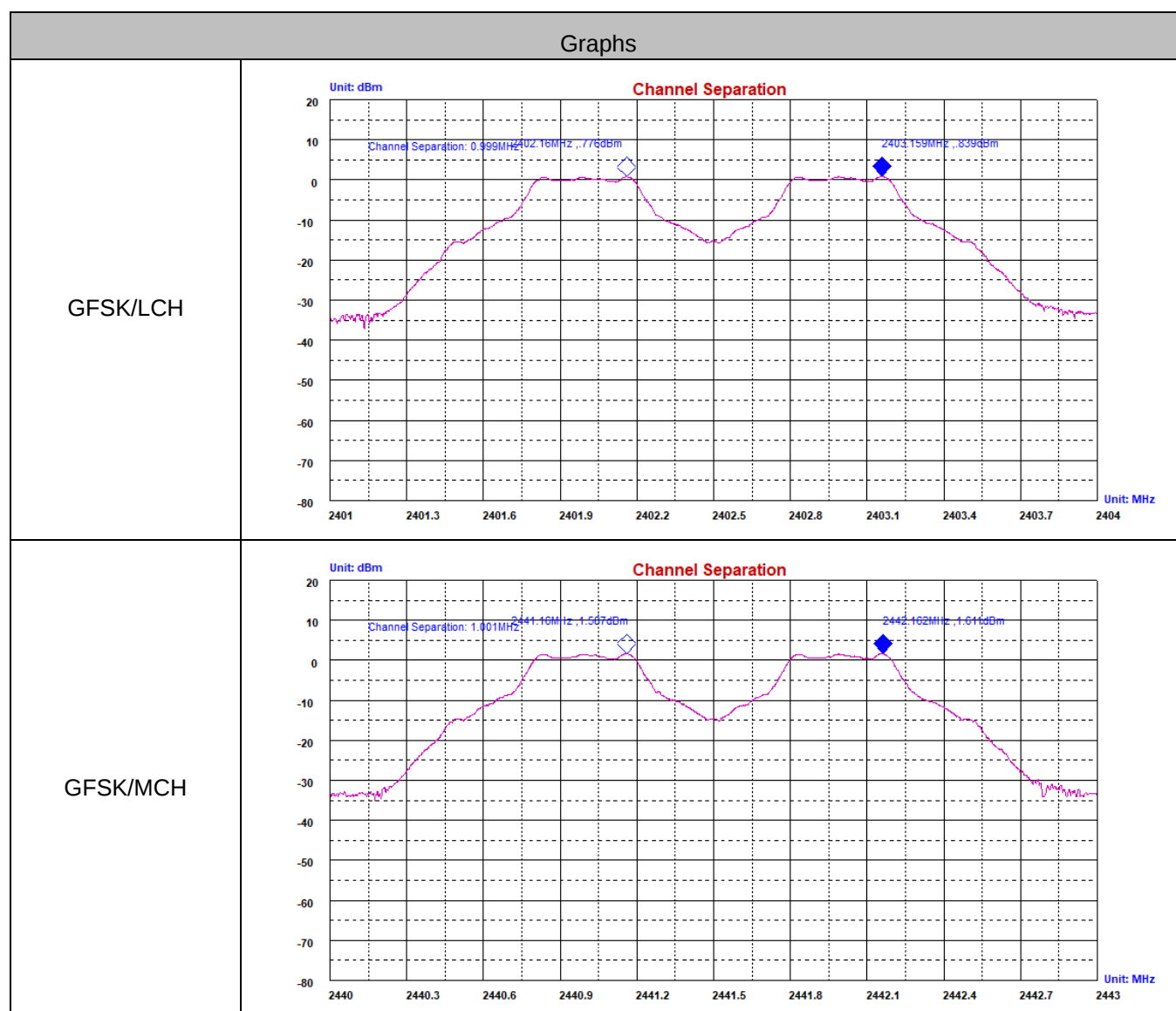


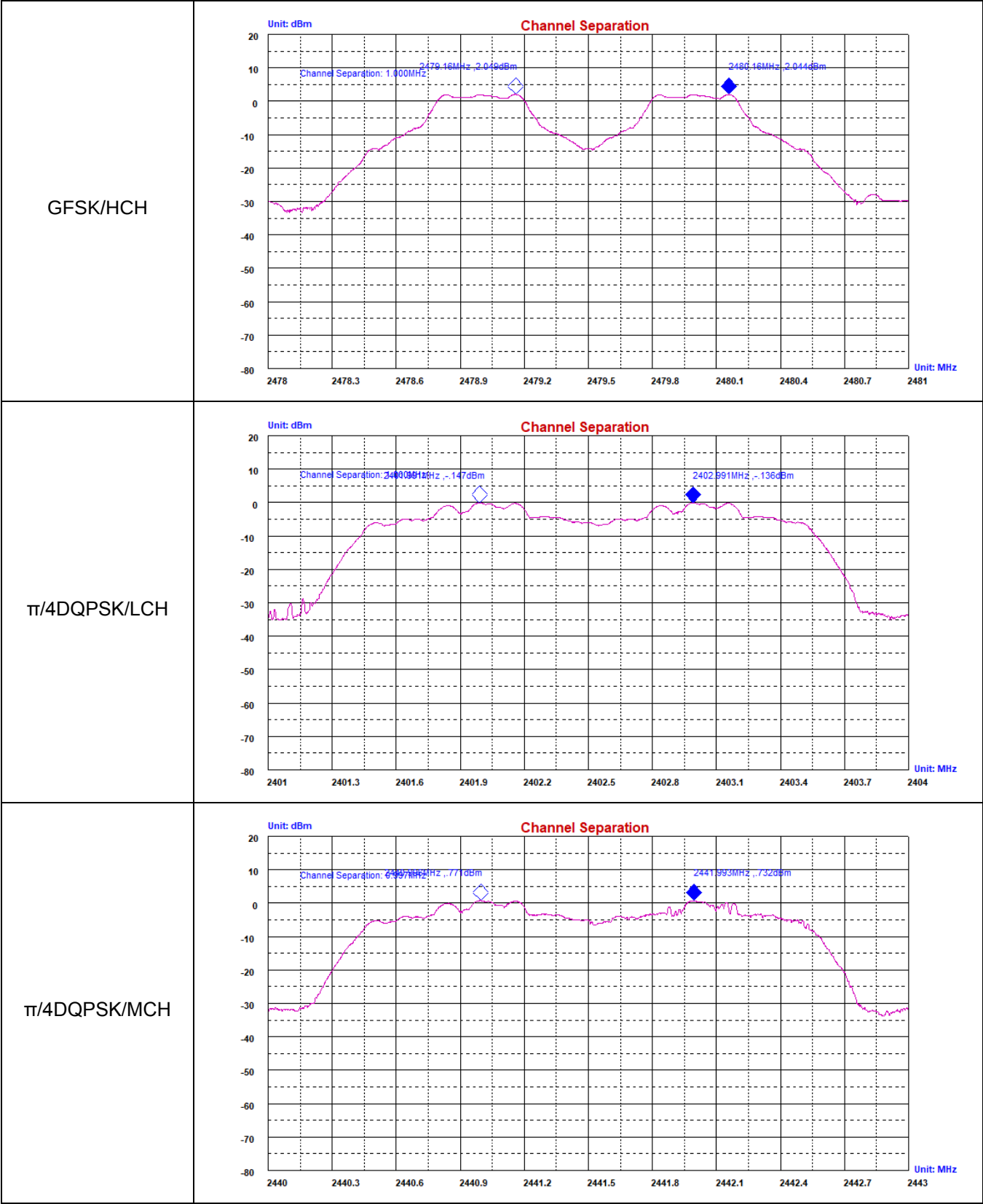


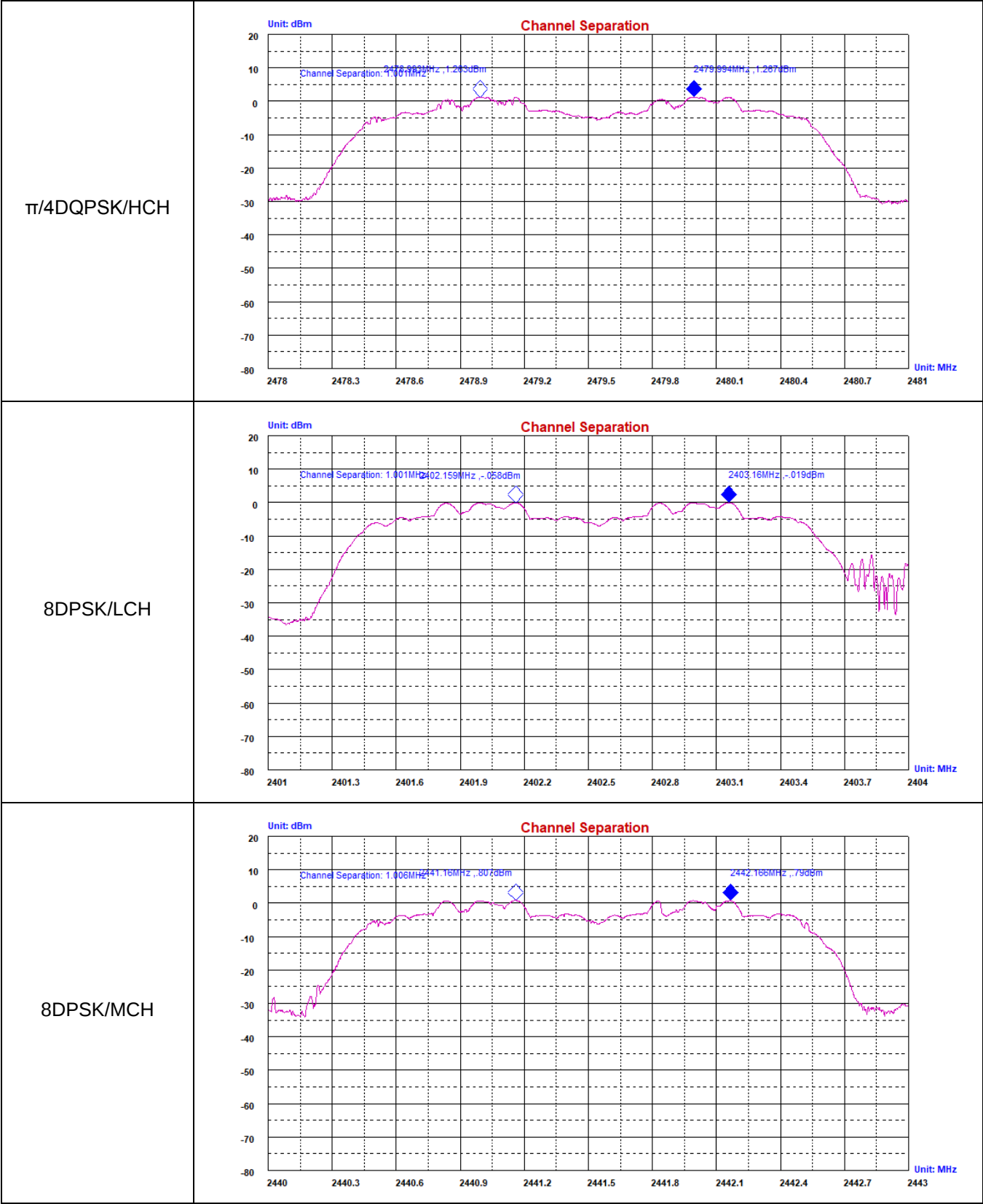
A.3 Carrier Frequency Separation

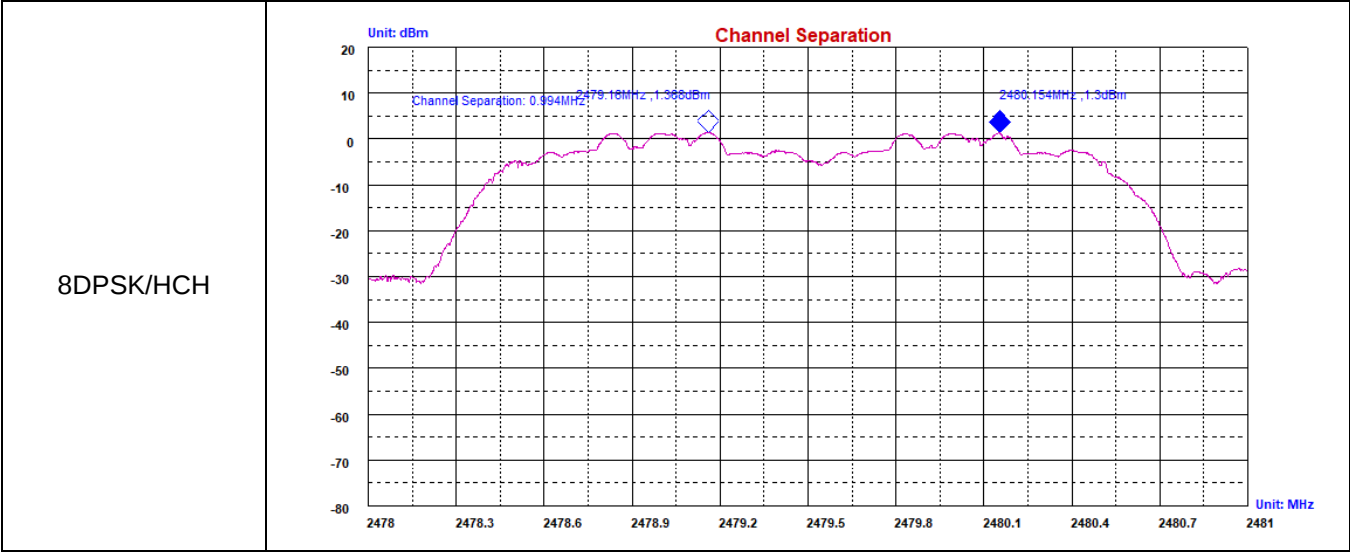
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.999	0.529	PASS
GFSK	MCH	1.001	0.565	PASS
GFSK	HCH	1.000	0.625	PASS
$\pi/4$ DQPSK	LCH	1.000	0.831	PASS
$\pi/4$ DQPSK	MCH	0.997	0.801	PASS
$\pi/4$ DQPSK	HCH	1.001	0.799	PASS
8DPSK	LCH	1.001	0.842	PASS
8DPSK	MCH	1.006	0.826	PASS
8DPSK	HCH	0.994	0.827	PASS

Test Graph





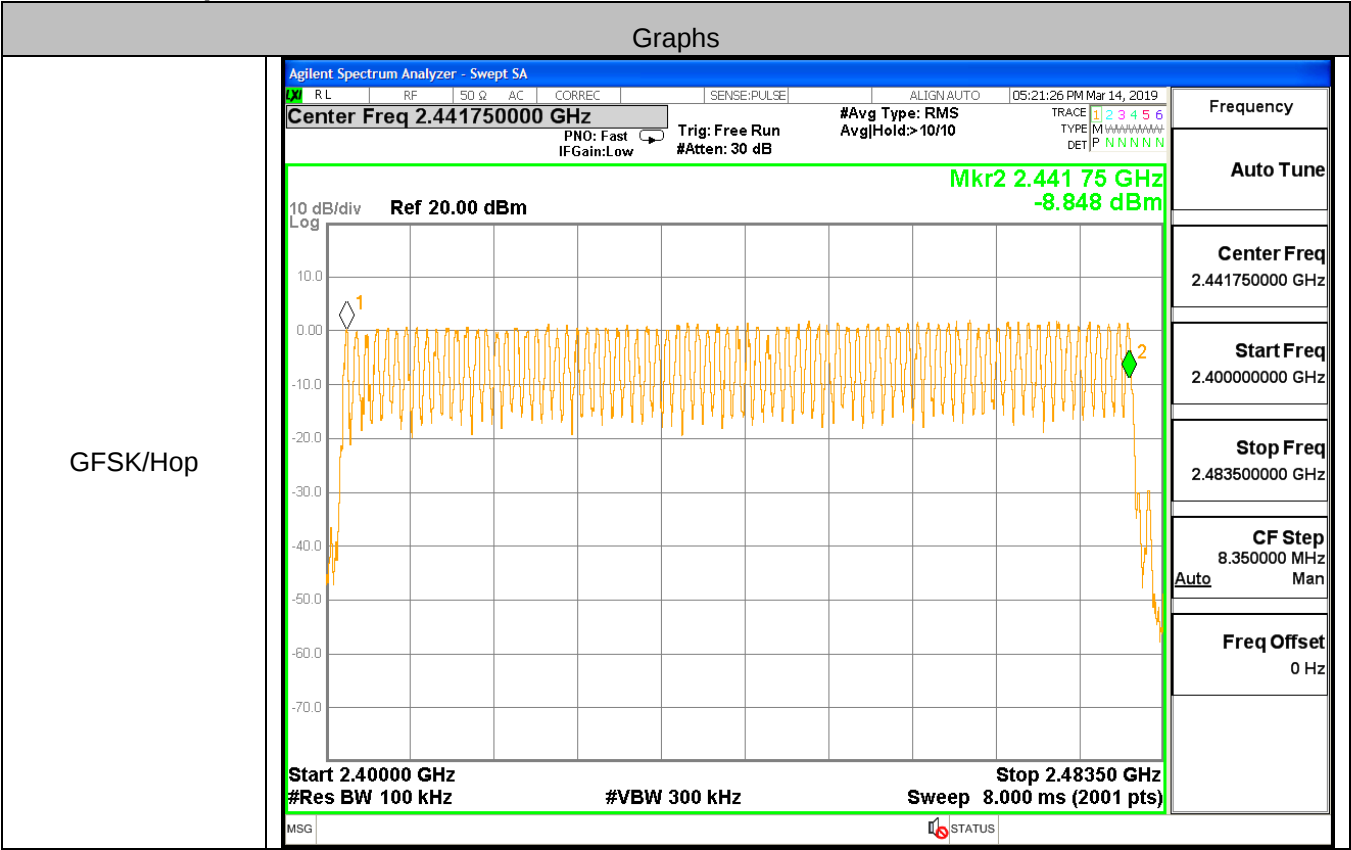


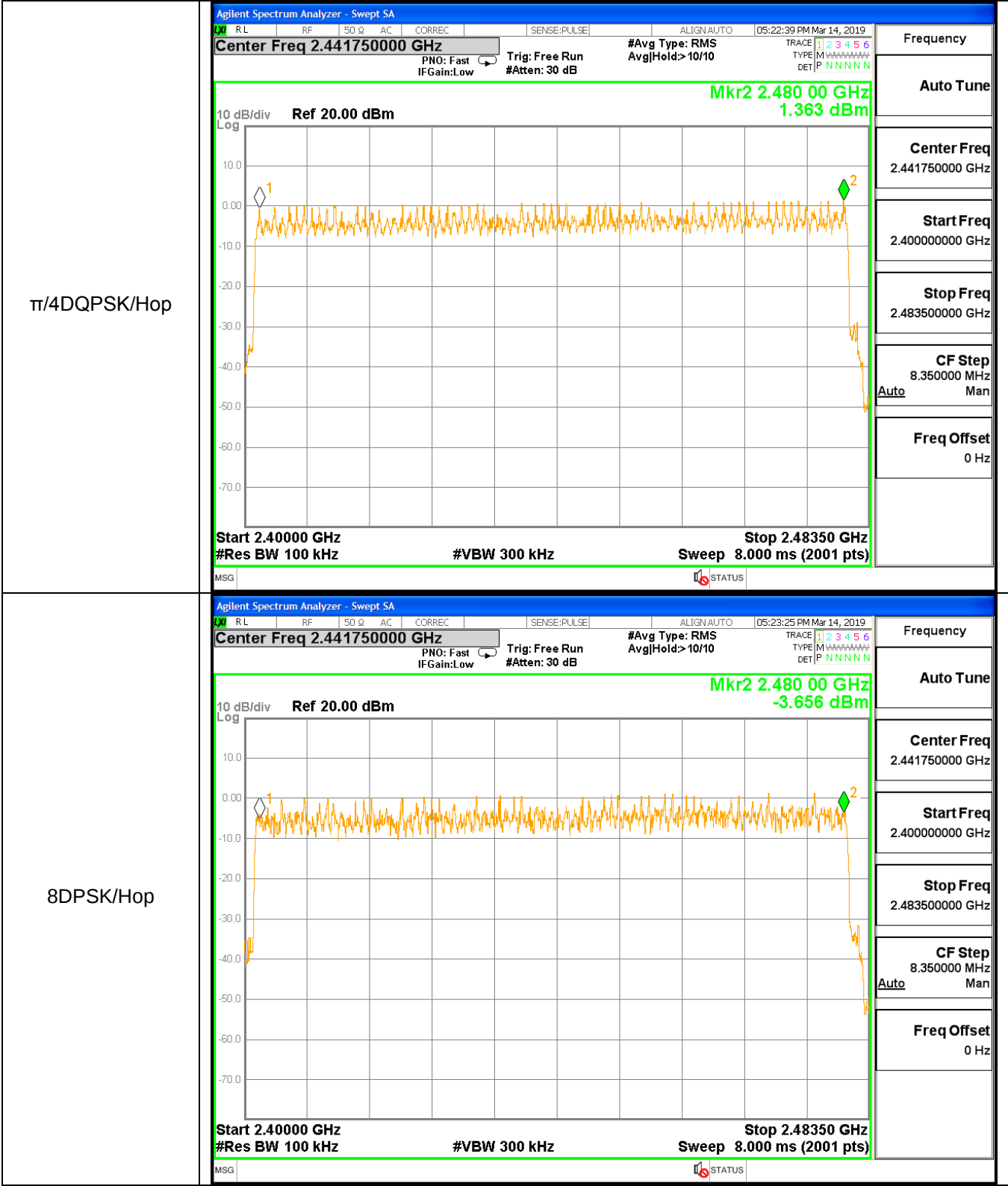


A.4 Hopping Channel Number

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

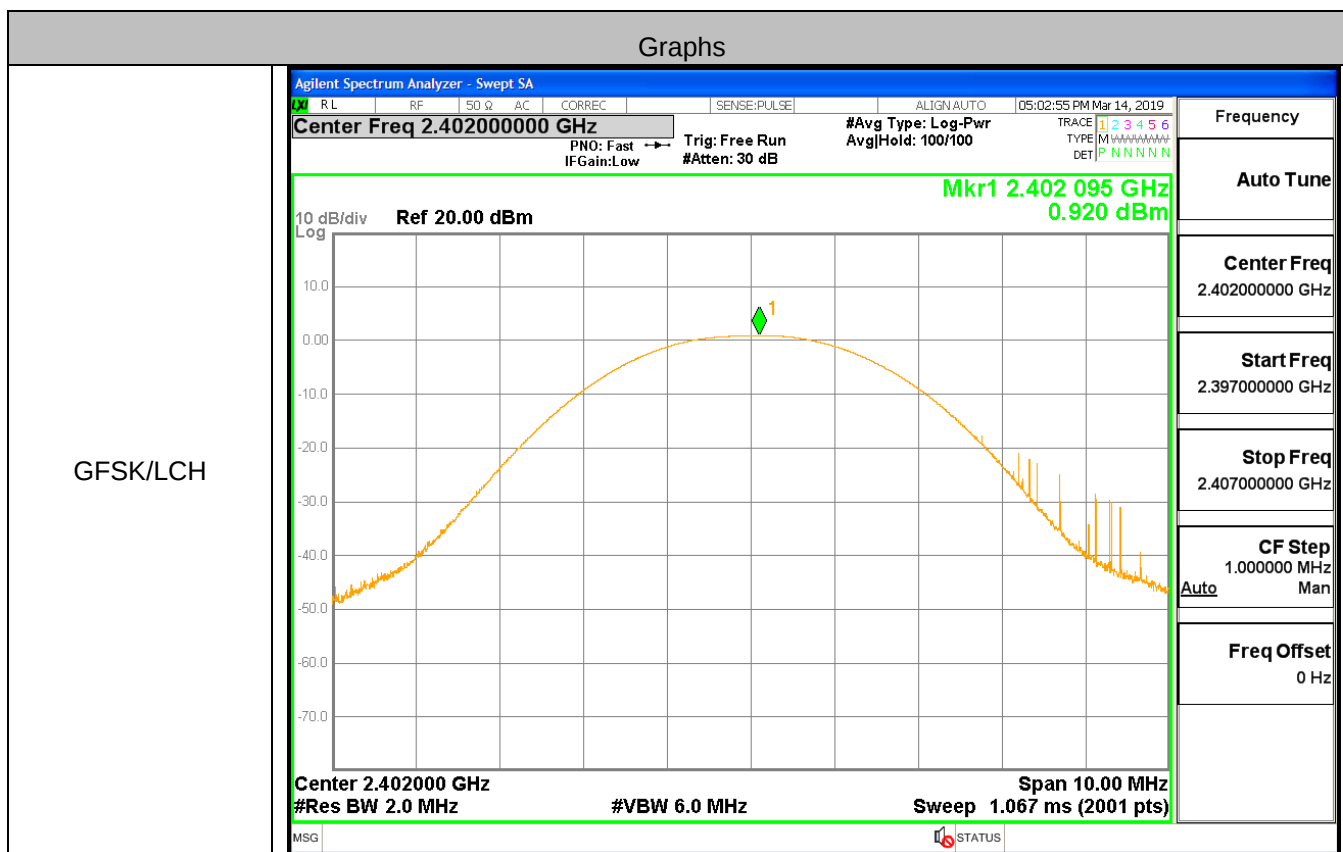


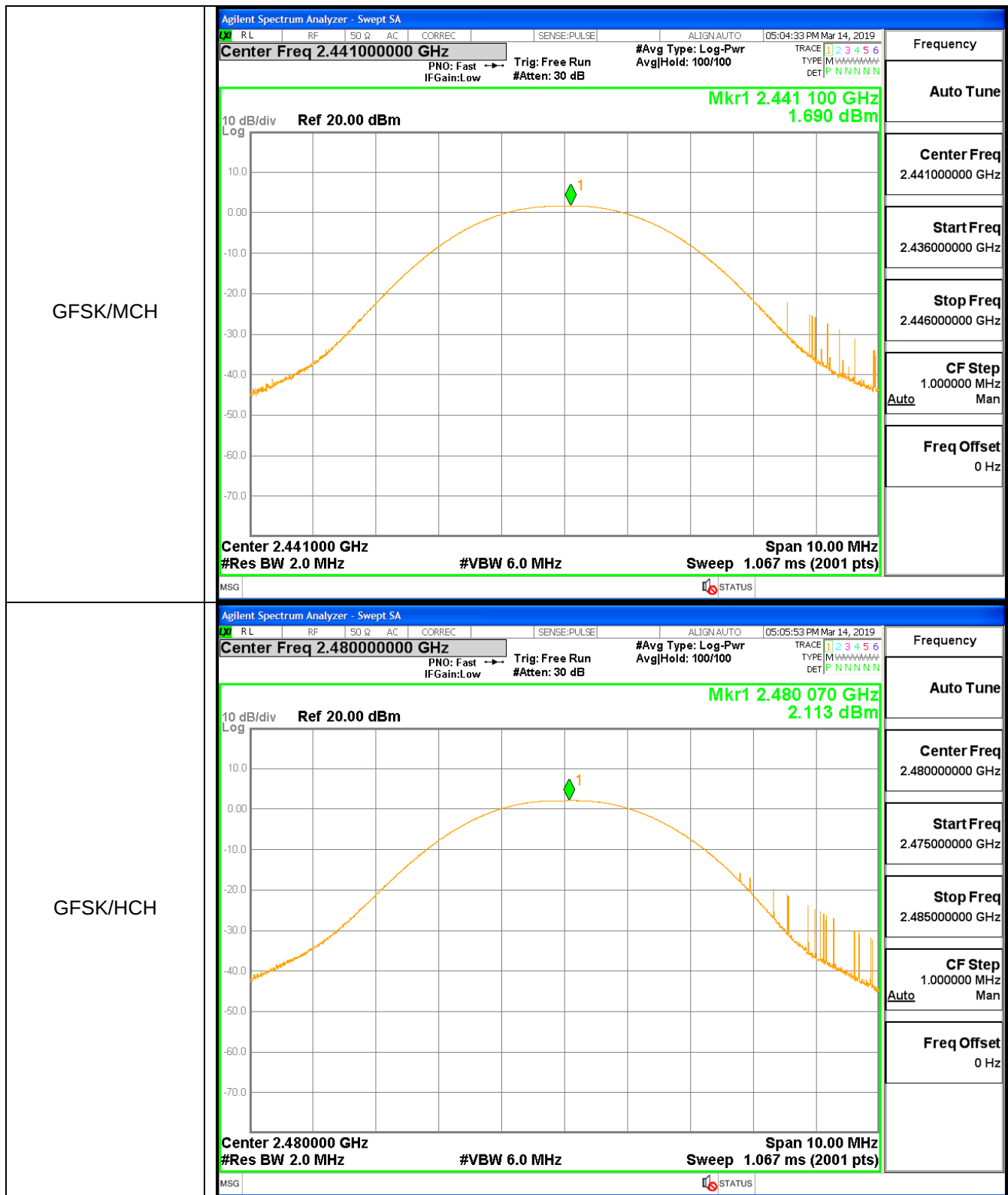


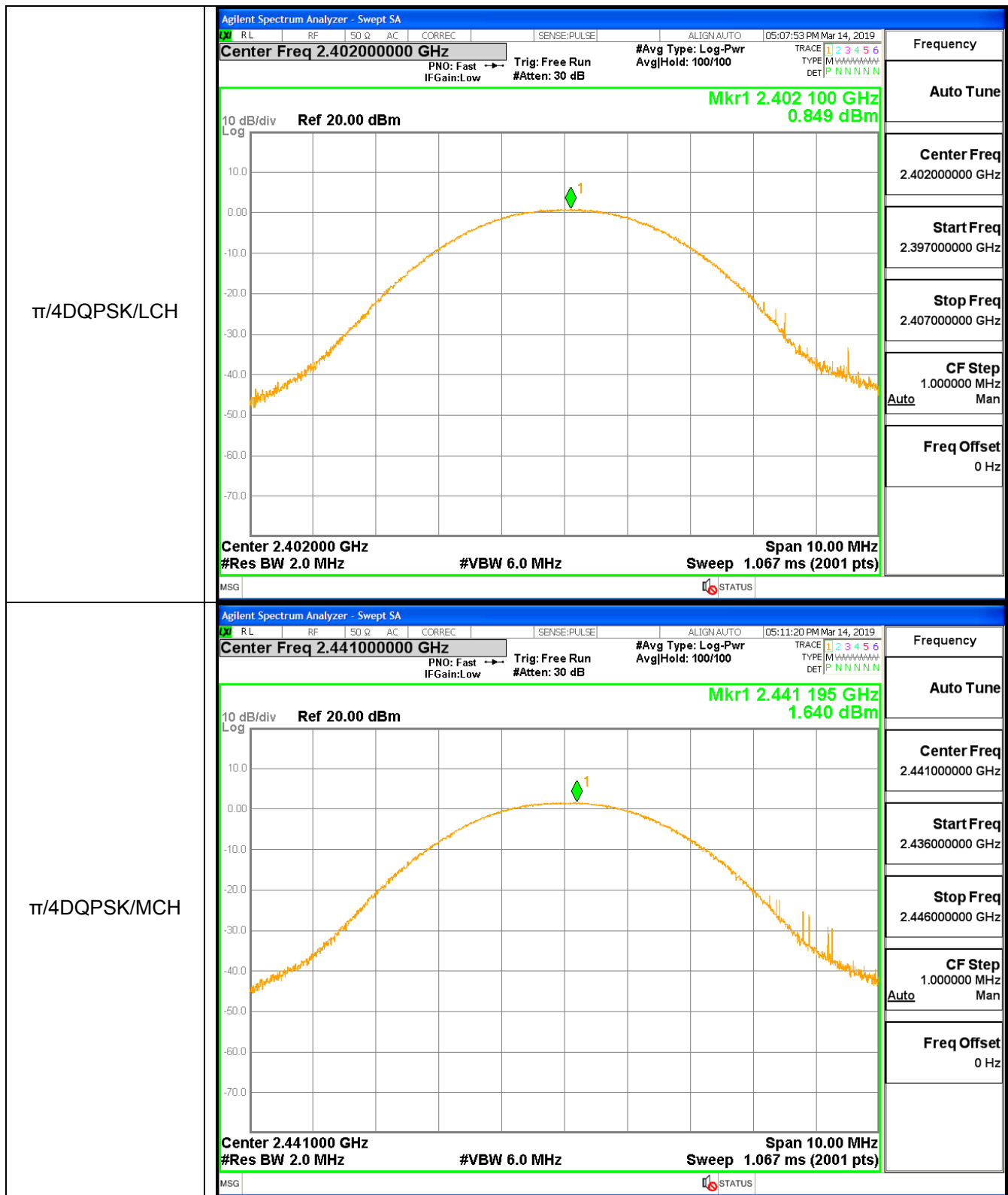
A.5 Conducted Peak Output Power

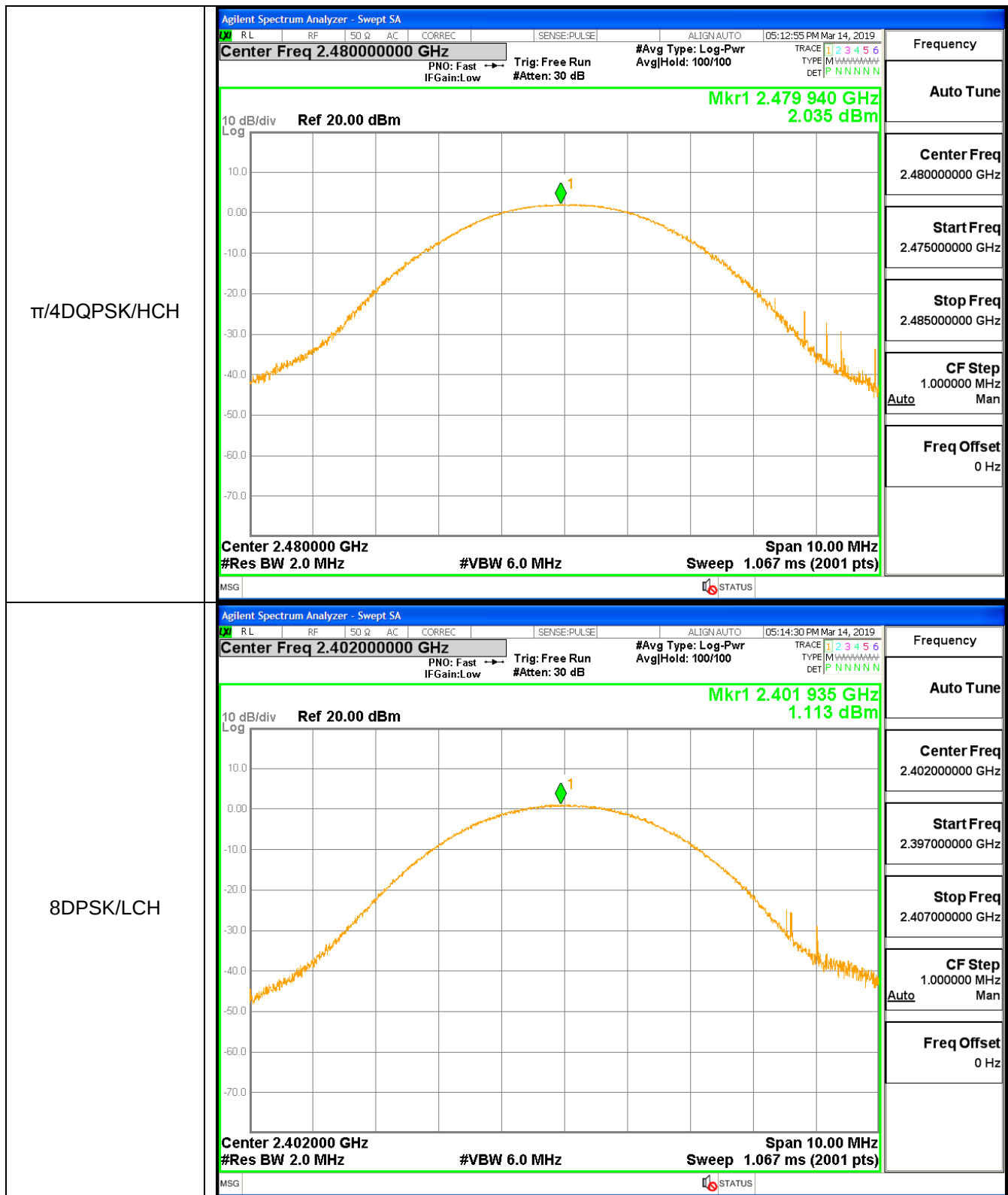
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.920	21	PASS
GFSK	MCH	1.690	21	PASS
GFSK	HCH	2.113	21	PASS
$\pi/4$ DQPSK	LCH	0.849	21	PASS
$\pi/4$ DQPSK	MCH	1.640	21	PASS
$\pi/4$ DQPSK	HCH	2.035	21	PASS
8DPSK	LCH	1.113	21	PASS
8DPSK	MCH	1.817	21	PASS
8DPSK	HCH	2.193	21	PASS

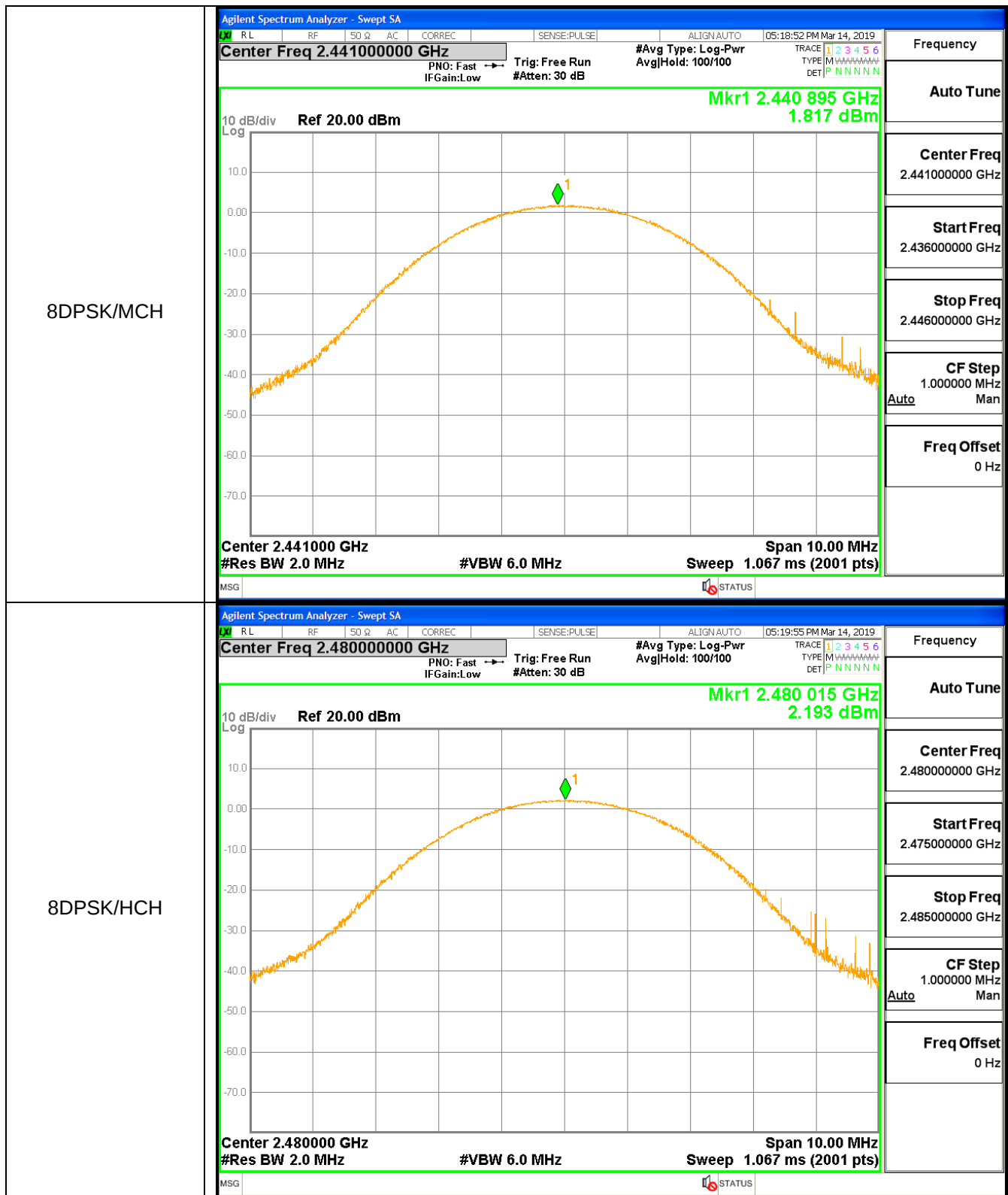
Test Graph







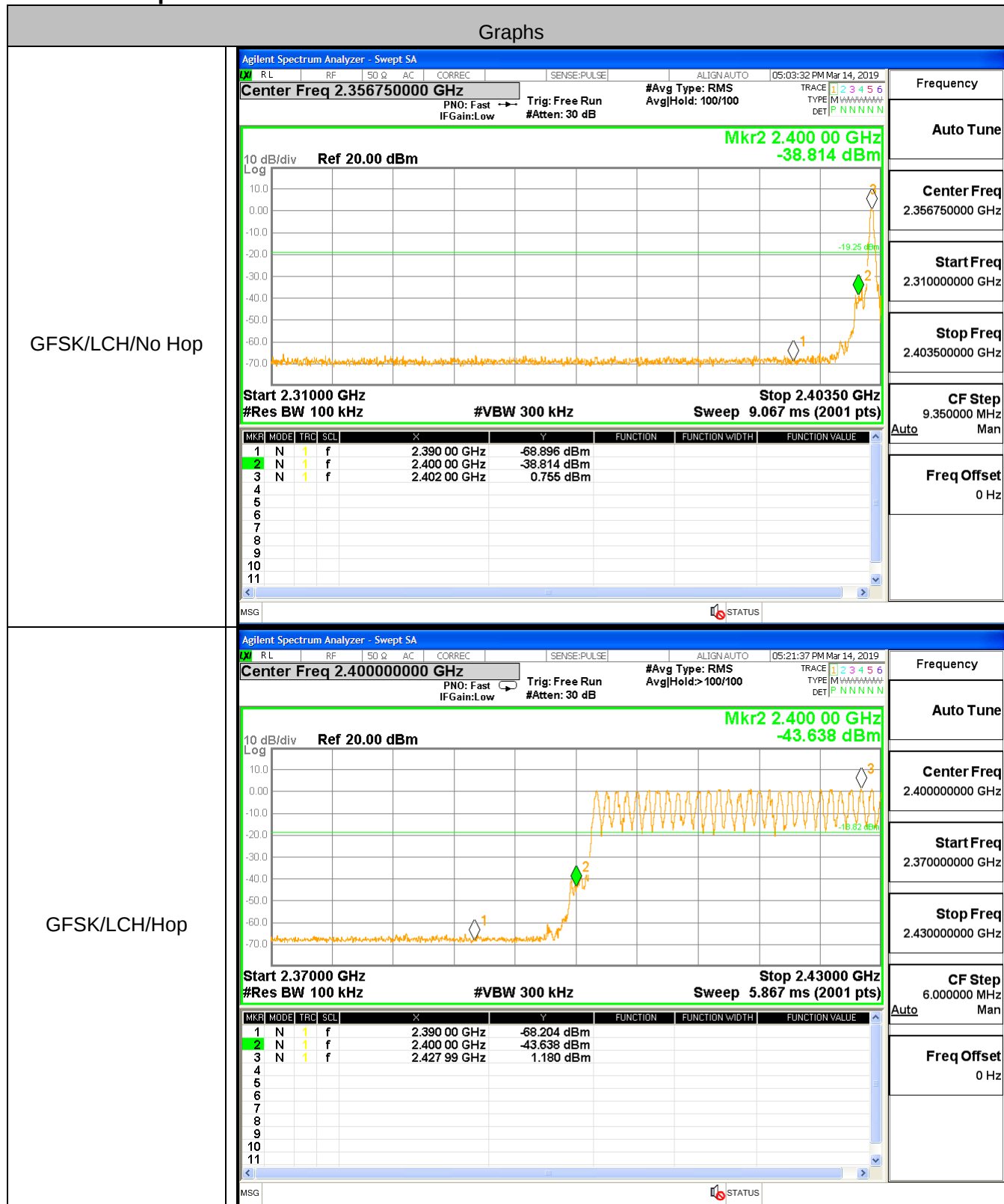




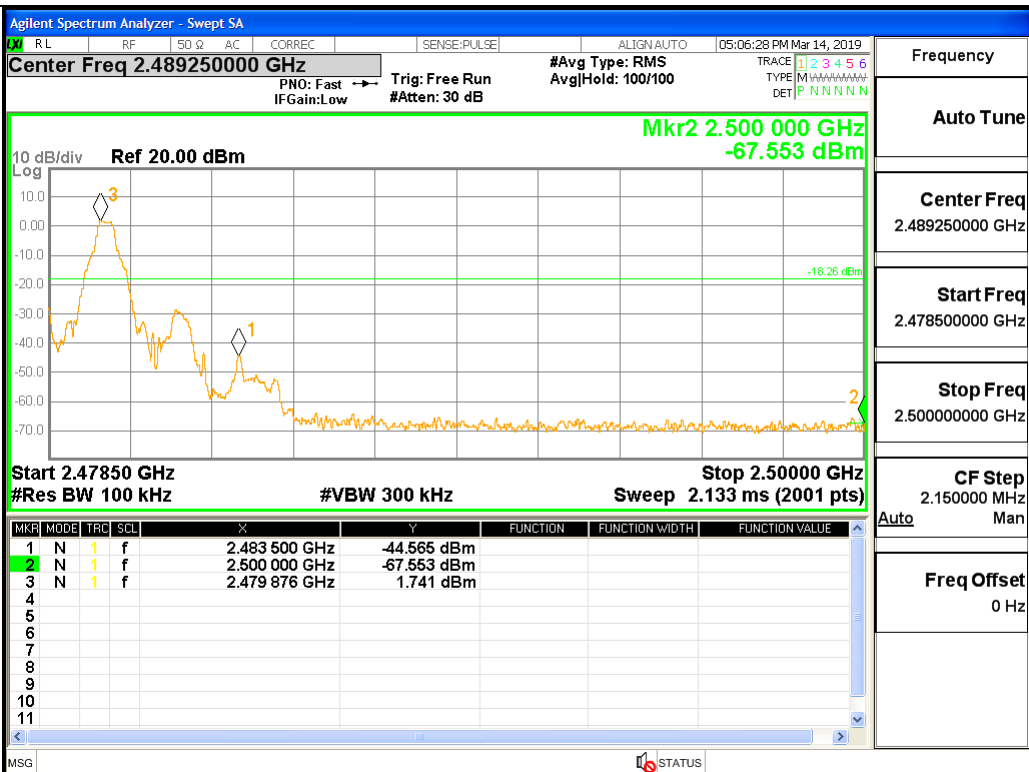
A.6 Band-edge for RF Conducted Emissions

Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
1DH5	2402	2390	0.75	-68.90	-19.25	Pass
1DH5	2402	2400	0.75	-38.81	-19.25	Pass
1DH5-Hopping	2402	2390	1.18	-68.20	-18.82	Pass
1DH5-Hopping	2402	2400	1.18	-43.64	-18.82	Pass
1DH5	2480	2483.5	1.74	-44.56	-18.26	Pass
1DH5	2480	2500	1.74	-67.55	-18.26	Pass
1DH5-Hopping	2480	2483.5	2.00	-46.88	-18.00	Pass
1DH5-Hopping	2480	2500	2.00	-65.45	-18.00	Pass
2DH5	2402	2390	-0.13	-67.92	-20.13	Pass
2DH5	2402	2400	-0.13	-41.87	-20.13	Pass
2DH5-Hopping	2402	2390	1.06	-48.11	-18.94	Pass
2DH5-Hopping	2402	2400	1.06	-67.64	-18.94	Pass
2DH5	2480	2483.5	1.04	-48.27	-18.96	Pass
2DH5	2480	2500	1.04	-68.10	-18.96	Pass
2DH5-Hopping	2480	2483.5	0.04	-68.51	-19.96	Pass
2DH5-Hopping	2480	2500	0.04	-40.94	-19.96	Pass
3DH5	2402	2390	-0.05	-68.73	-20.05	Pass
3DH5	2402	2400	-0.05	-34.56	-20.05	Pass
3DH5-Hopping	2402	2390	0.10	-66.94	-19.90	Pass
3DH5-Hopping	2402	2400	0.10	-36.06	-19.90	Pass
3DH5	2480	2483.5	1.16	-45.89	-18.84	Pass
3DH5	2480	2500	1.16	-69.92	-18.84	Pass
3DH5-Hopping	2480	2483.5	1.10	-55.84	-18.90	Pass
3DH5-Hopping	2480	2500	1.10	-66.84	-18.90	Pass

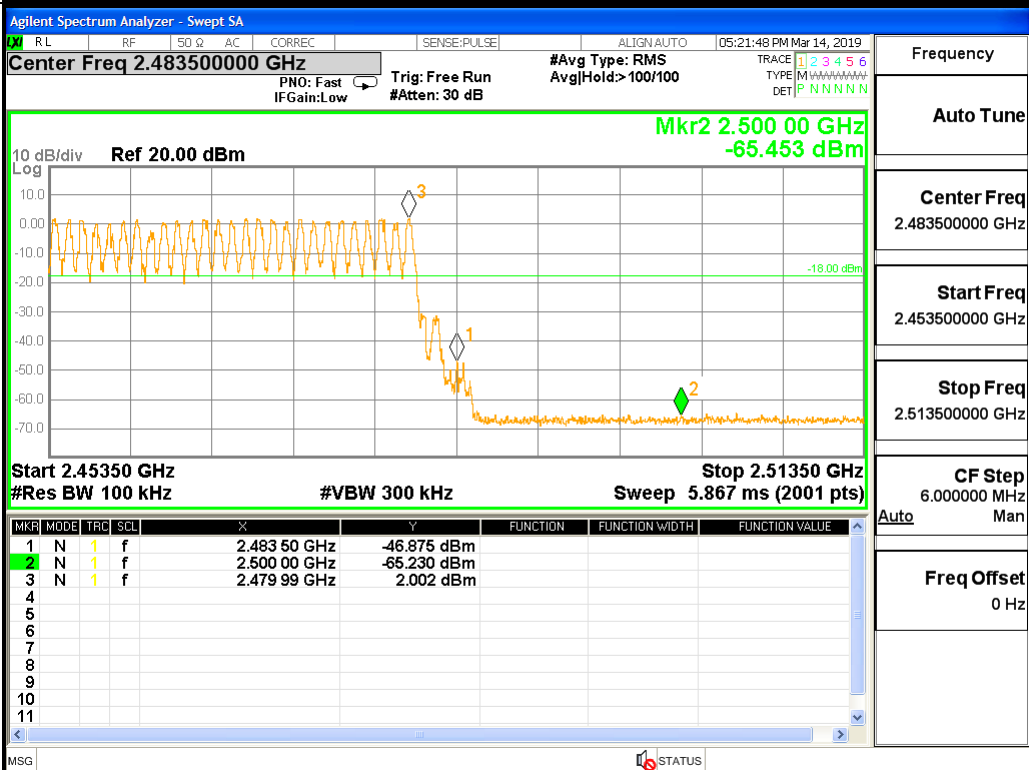
Test Graph

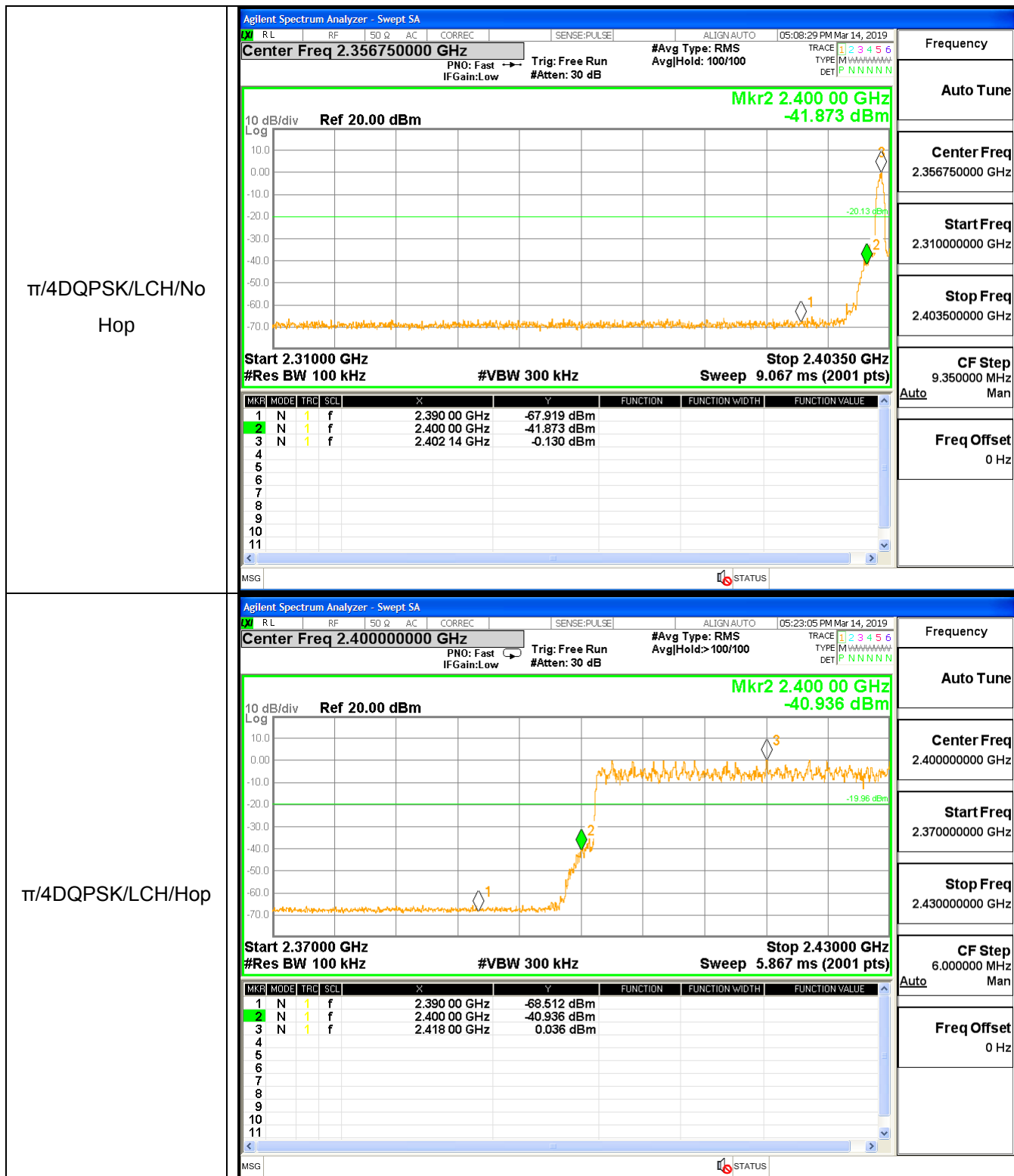


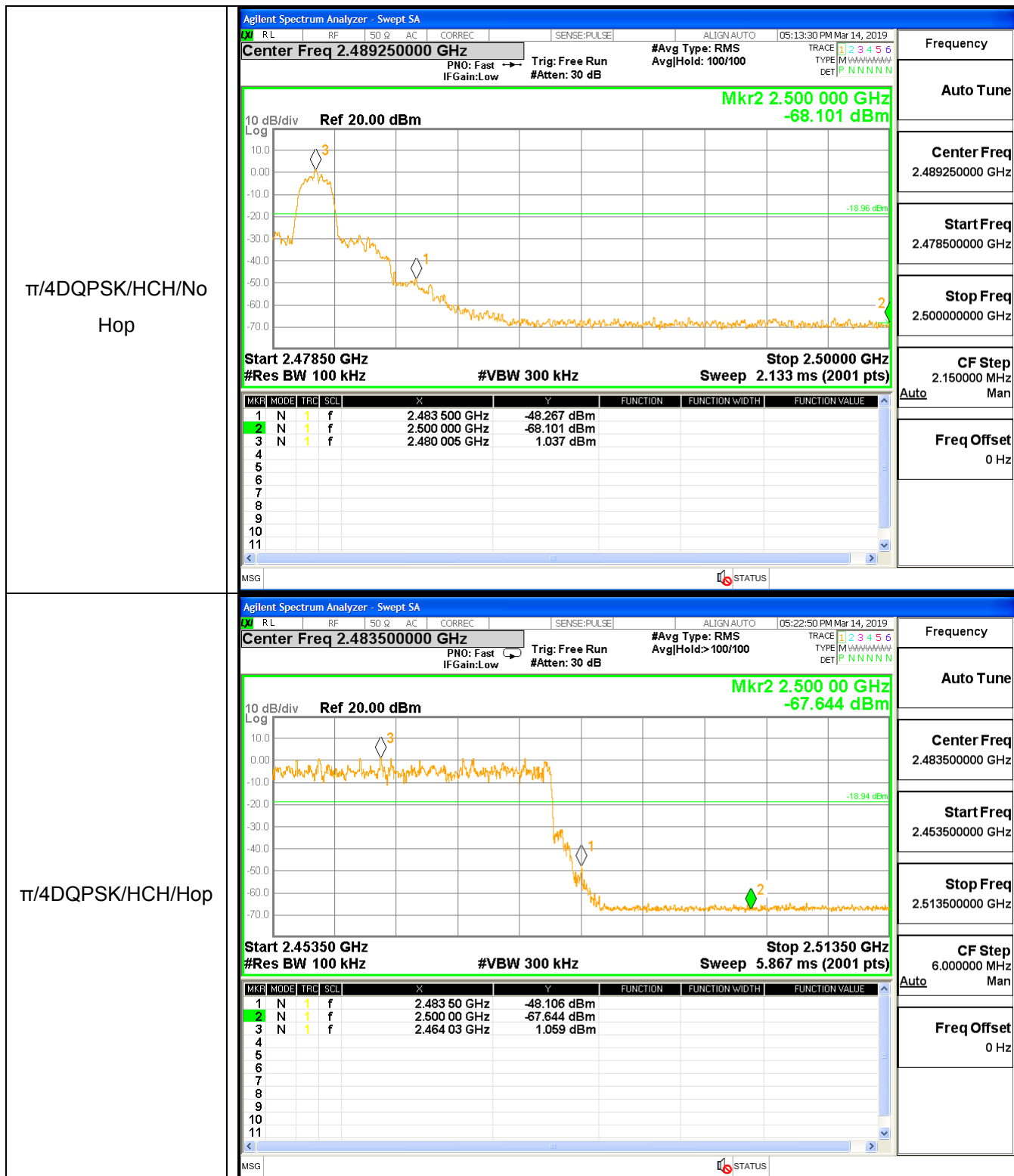
GFSK/HCH/No Hop



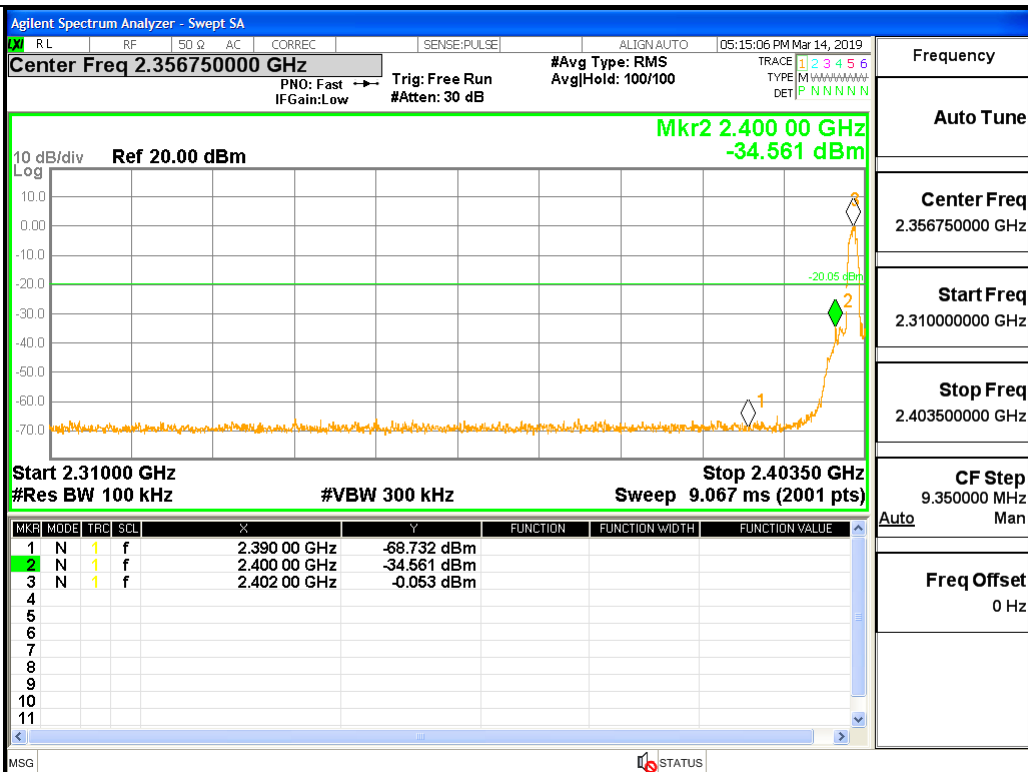
GFSK/HCH/Hop



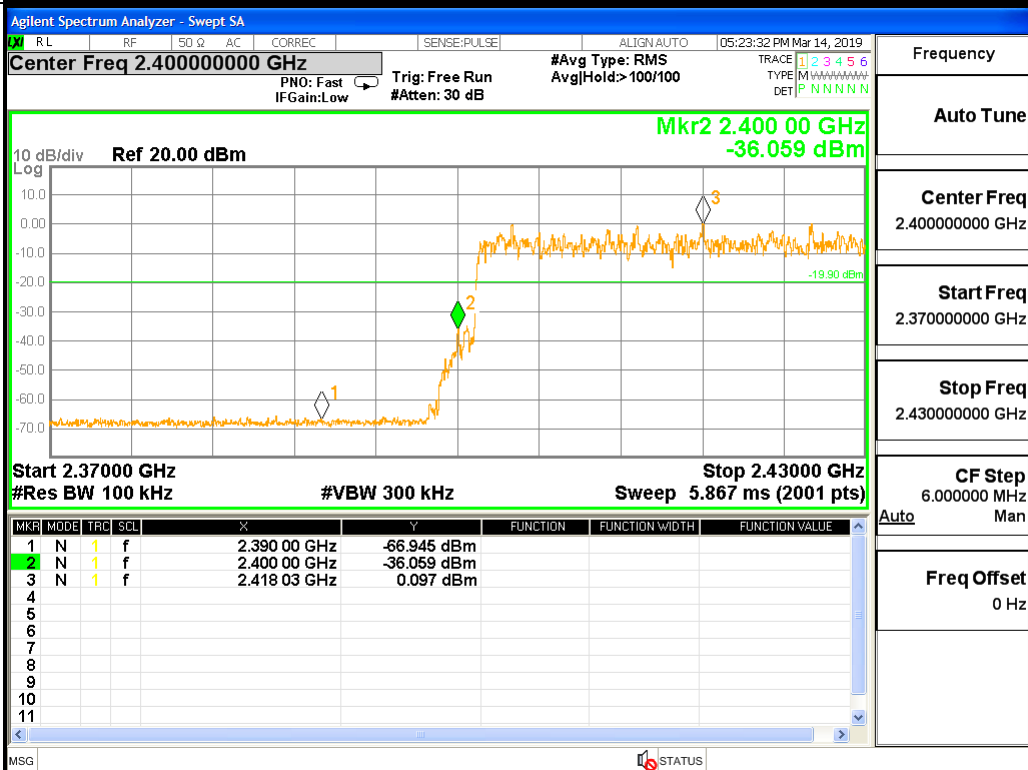




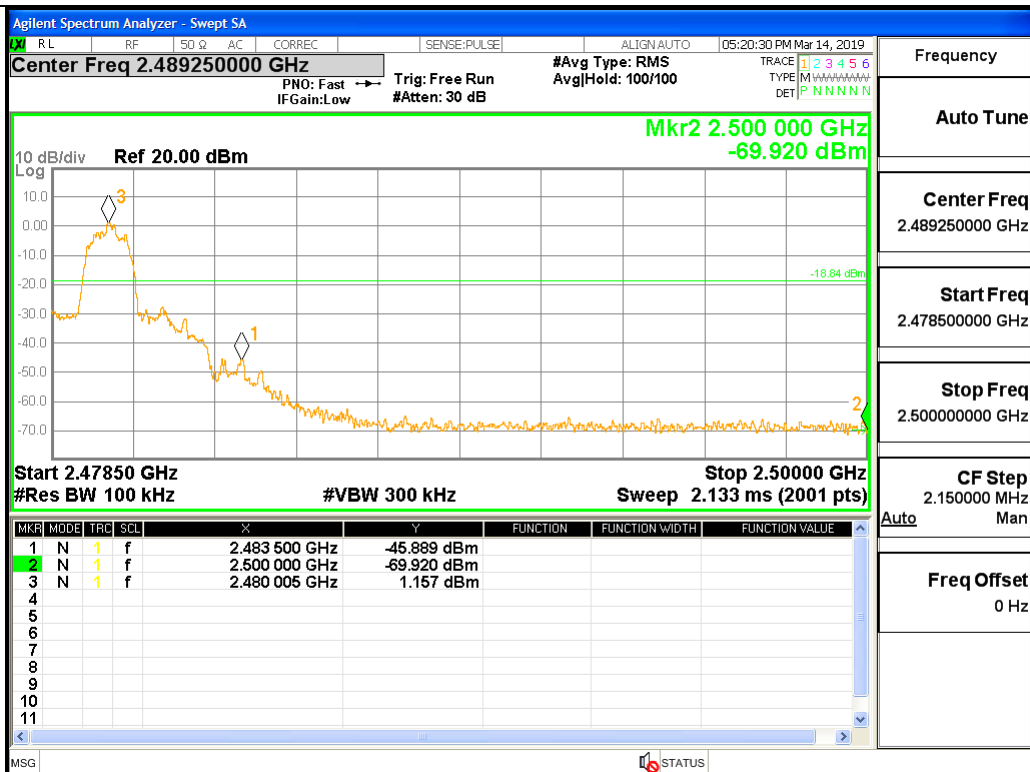
8DPSK/LCH/No Hop



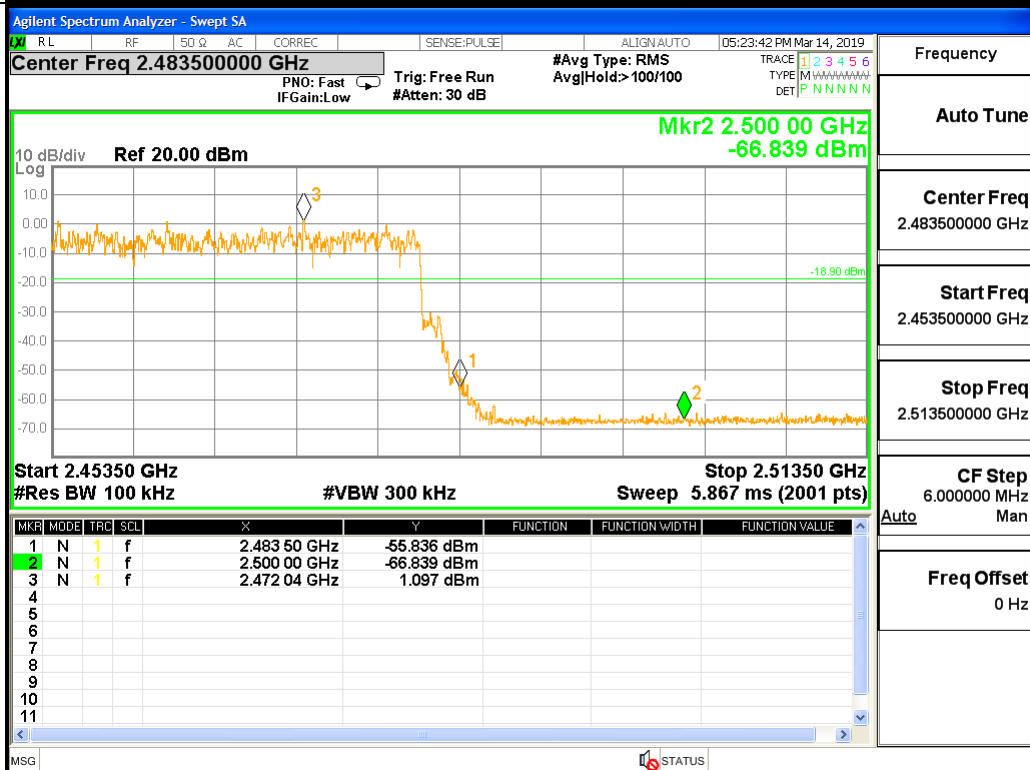
8DPSK/LCH/Hop



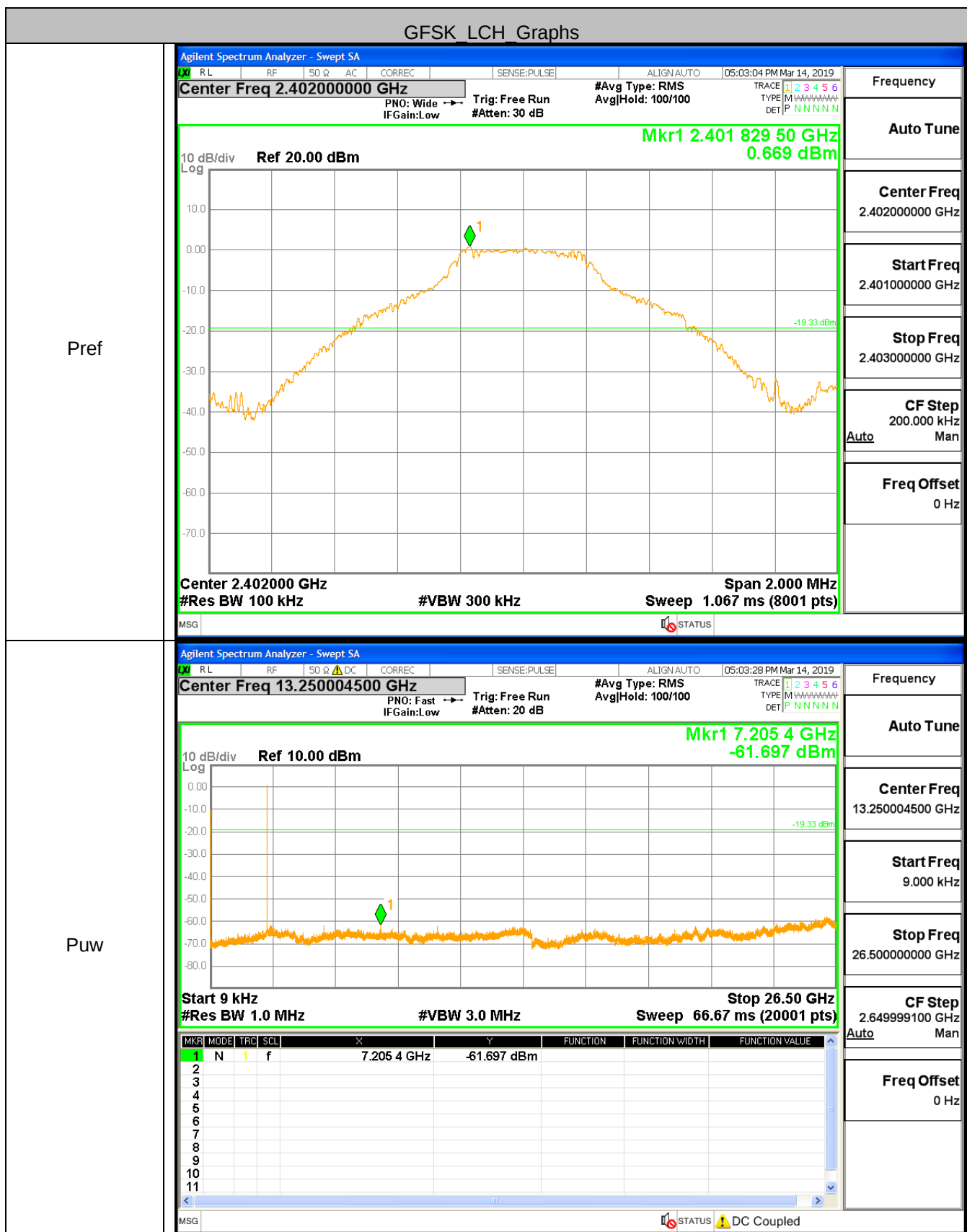
8DPSK/HCH/No Hop

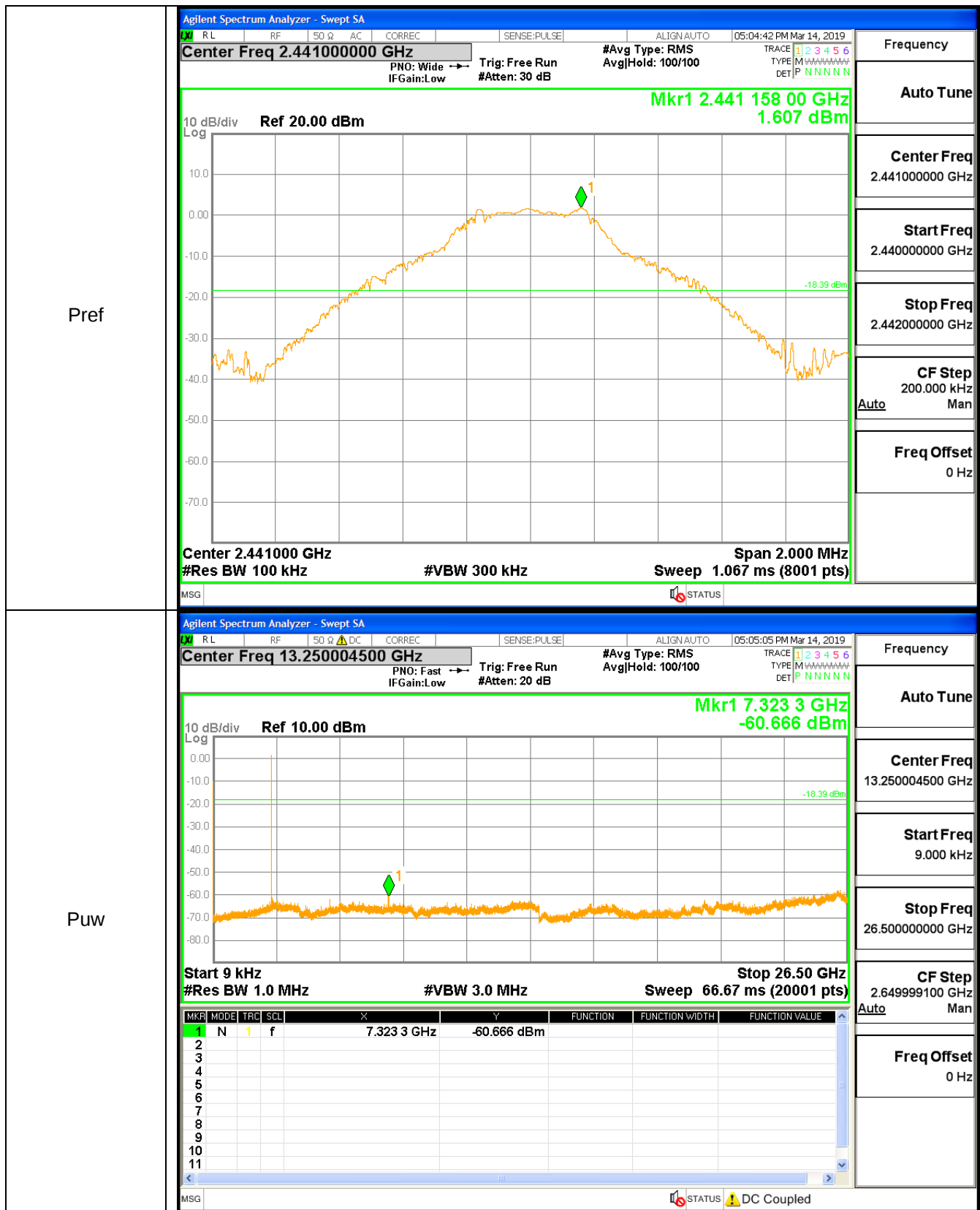


8DPSK/HCH/Hop



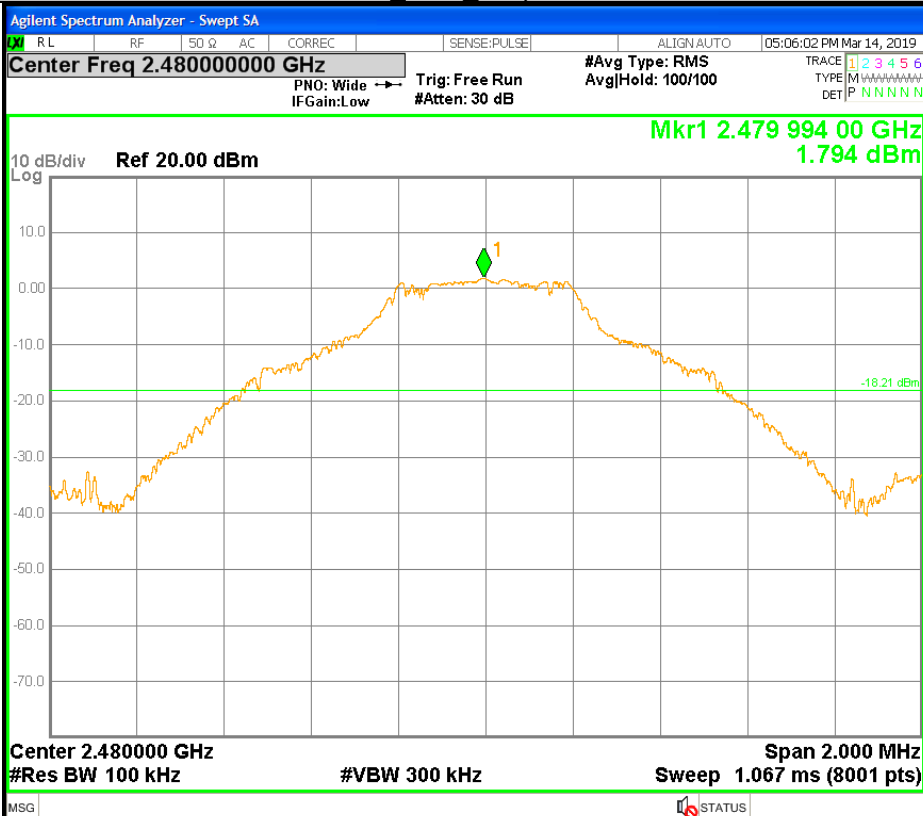
A.7 RF Conducted Spurious Emissions Test Graph



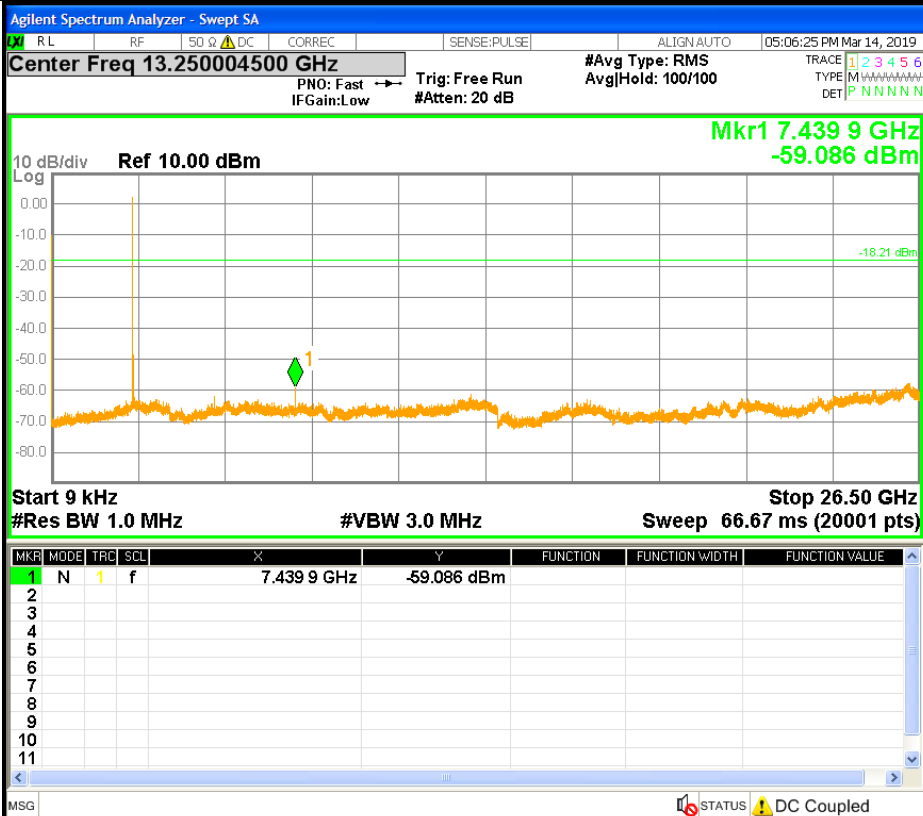


GFSK HCH Graphs

Pref

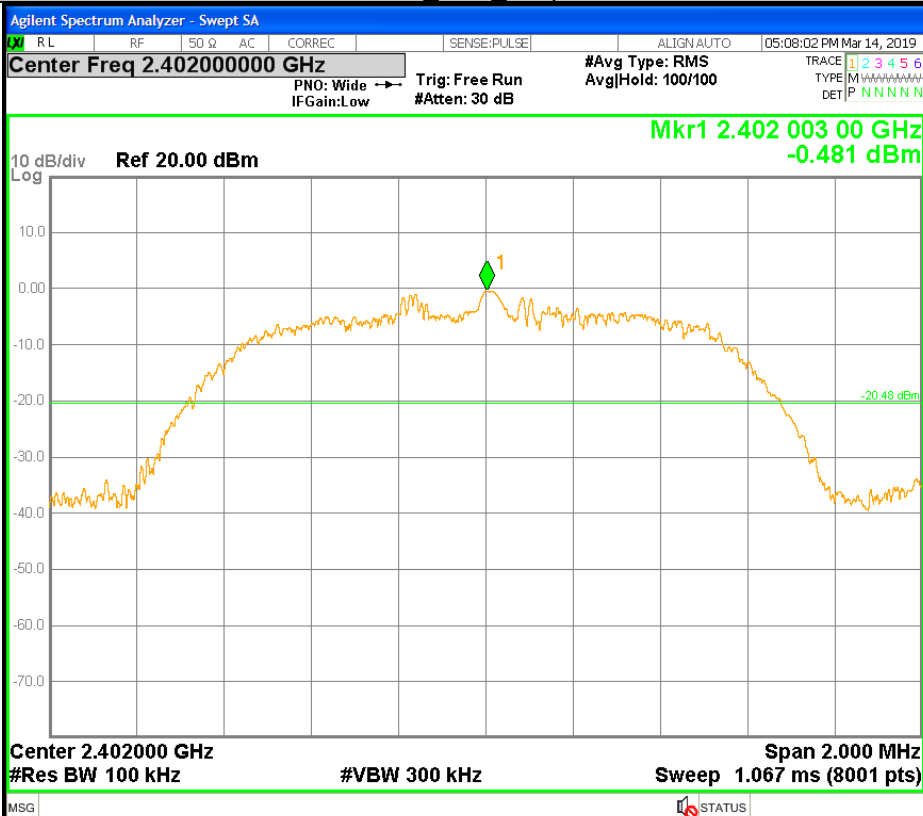


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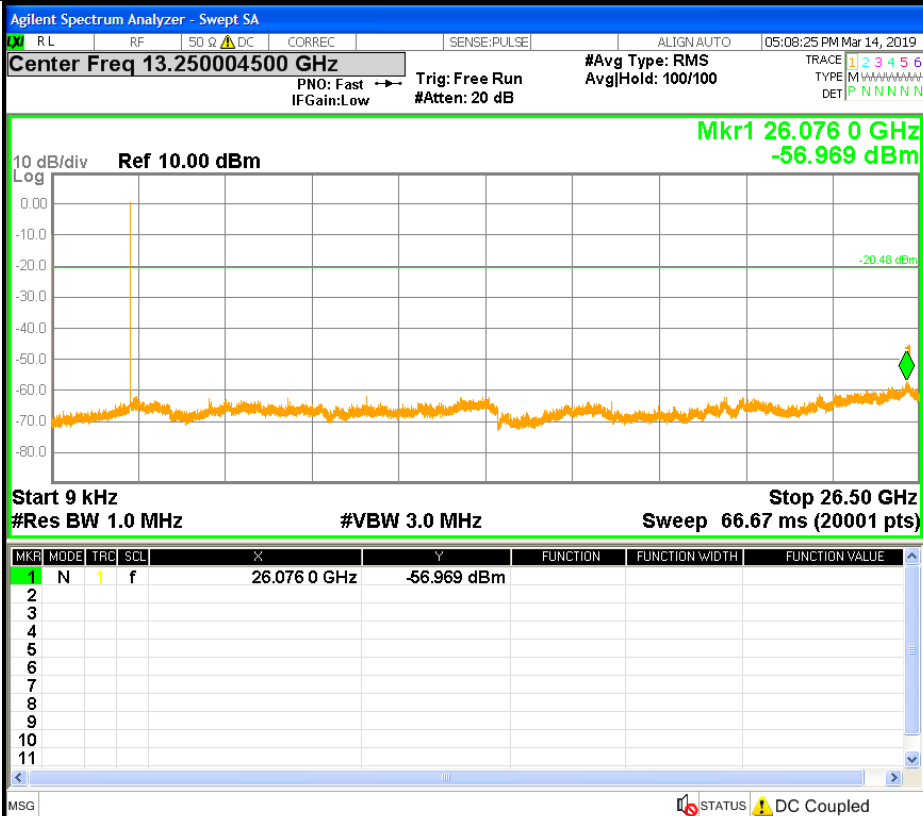


$\pi/4$ DQPSK LCH Graphs

Pref

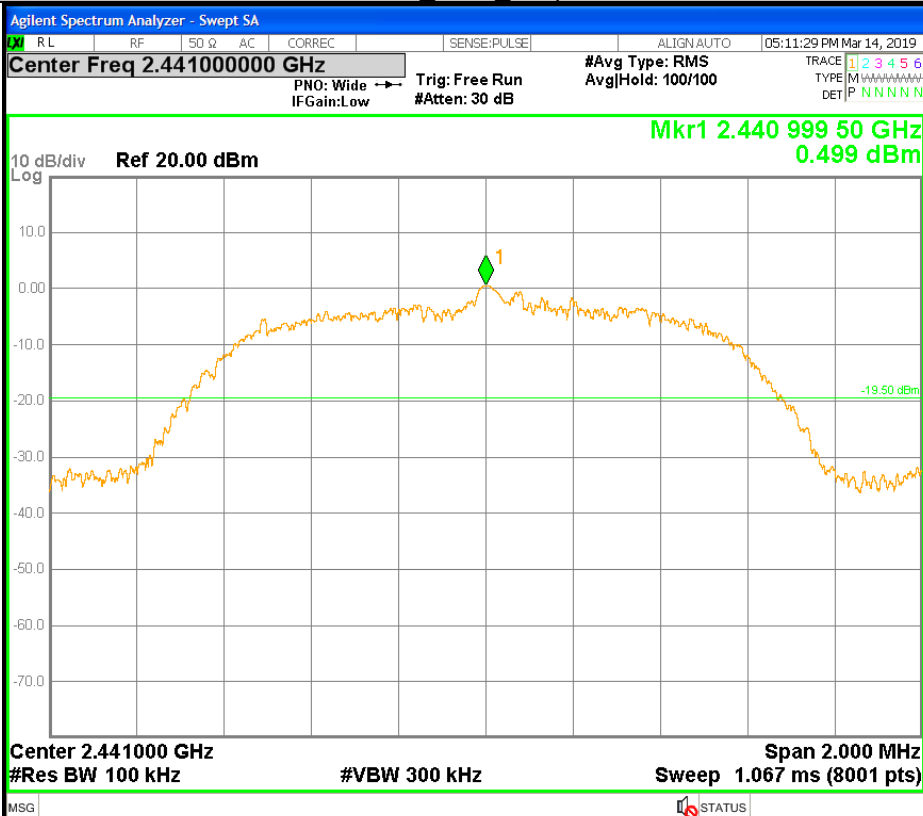


Puw



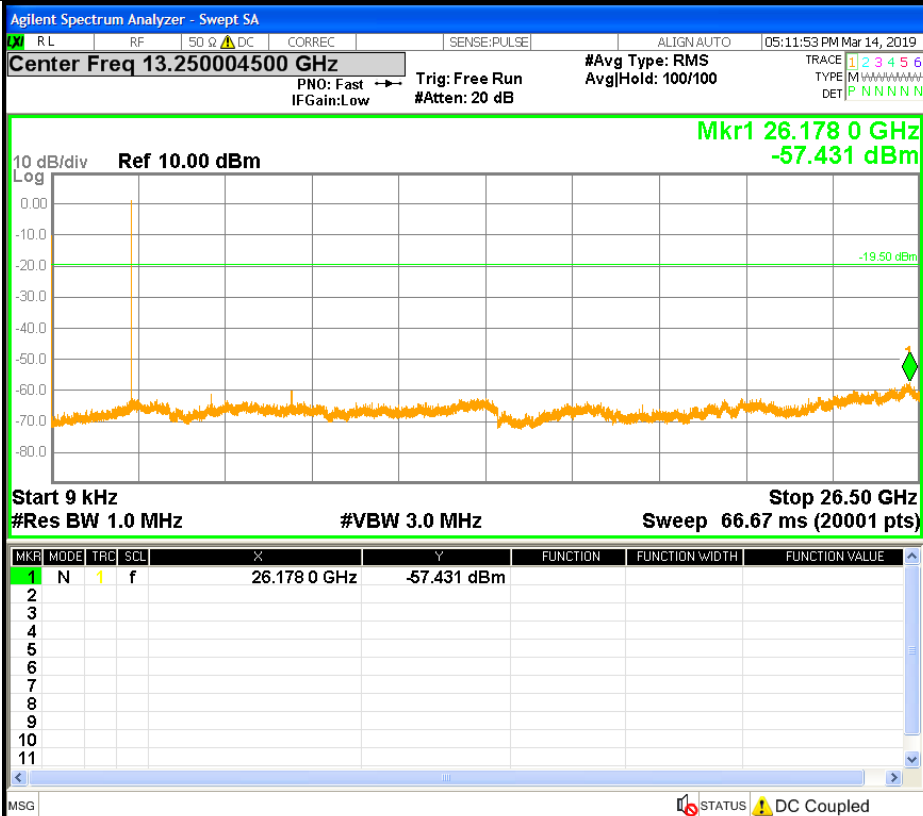
$\pi/4$ DQPSK MCH Graphs

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

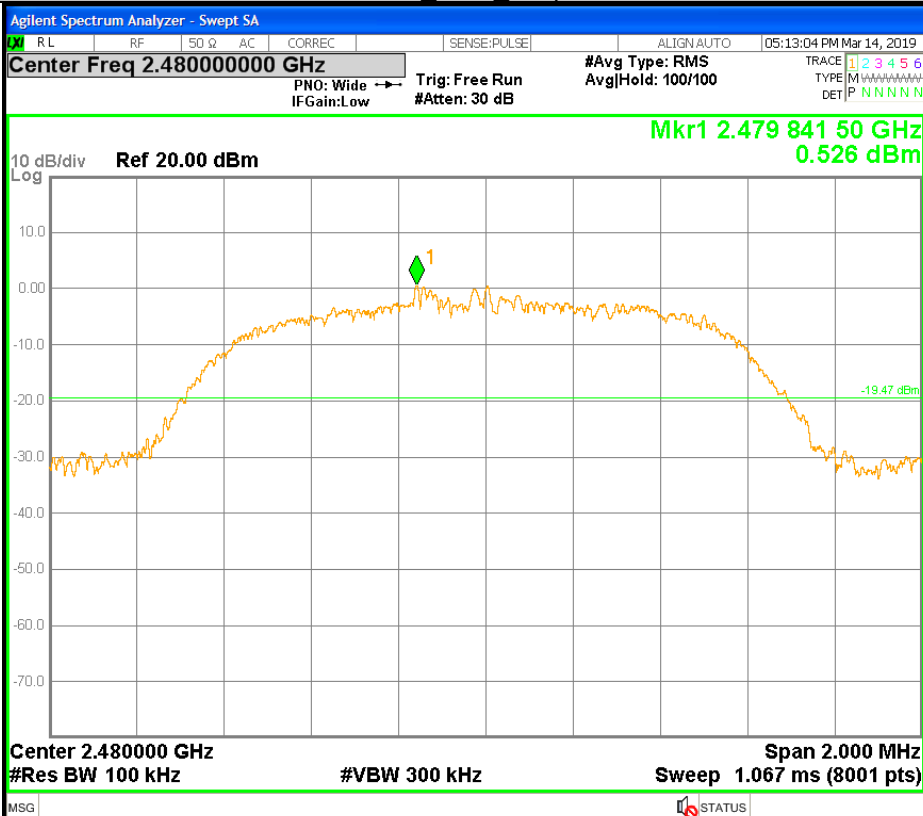
Puw



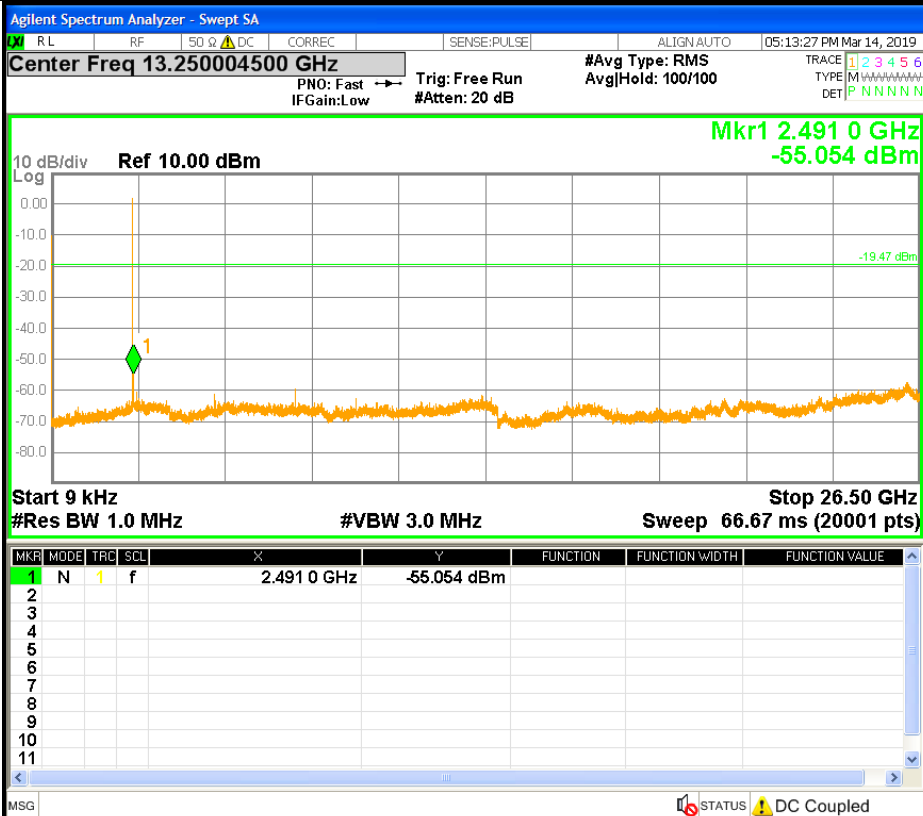
Frequency
Auto Tune
Center Freq 13.250004500 GHz
Start Freq 9.000 kHz
Stop Freq 26.500000000 GHz
CF Step 2.649999100 GHz Auto Man
Freq Offset 0 Hz

$\pi/4$ DQPSK HCH Graphs

Pref

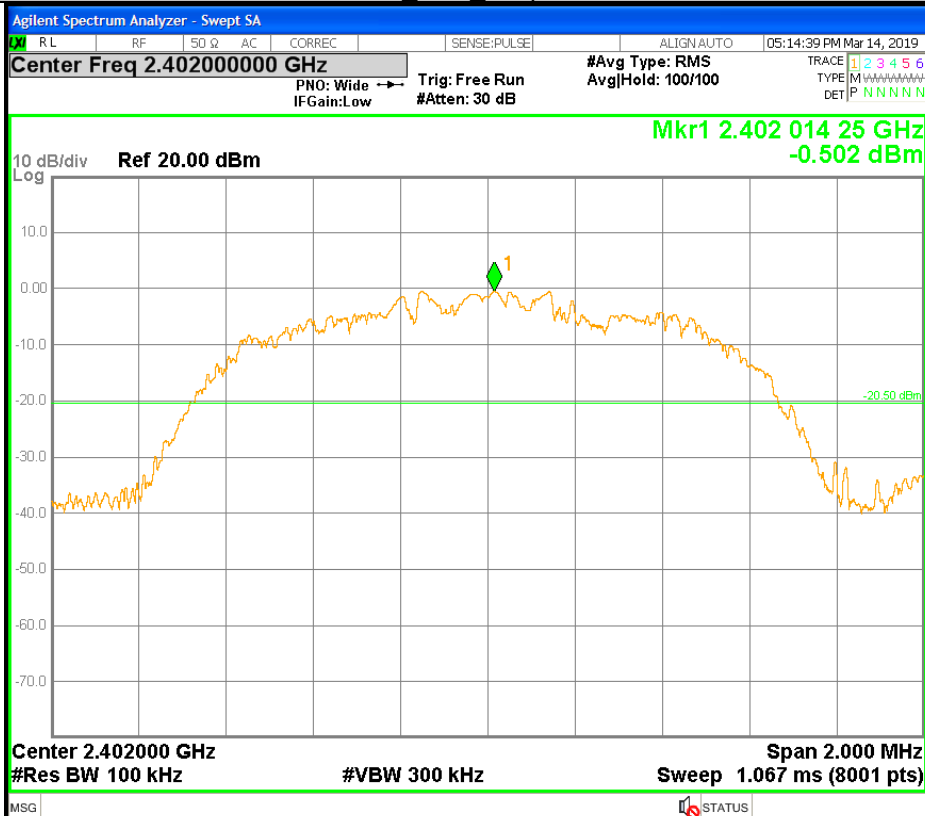


Puw

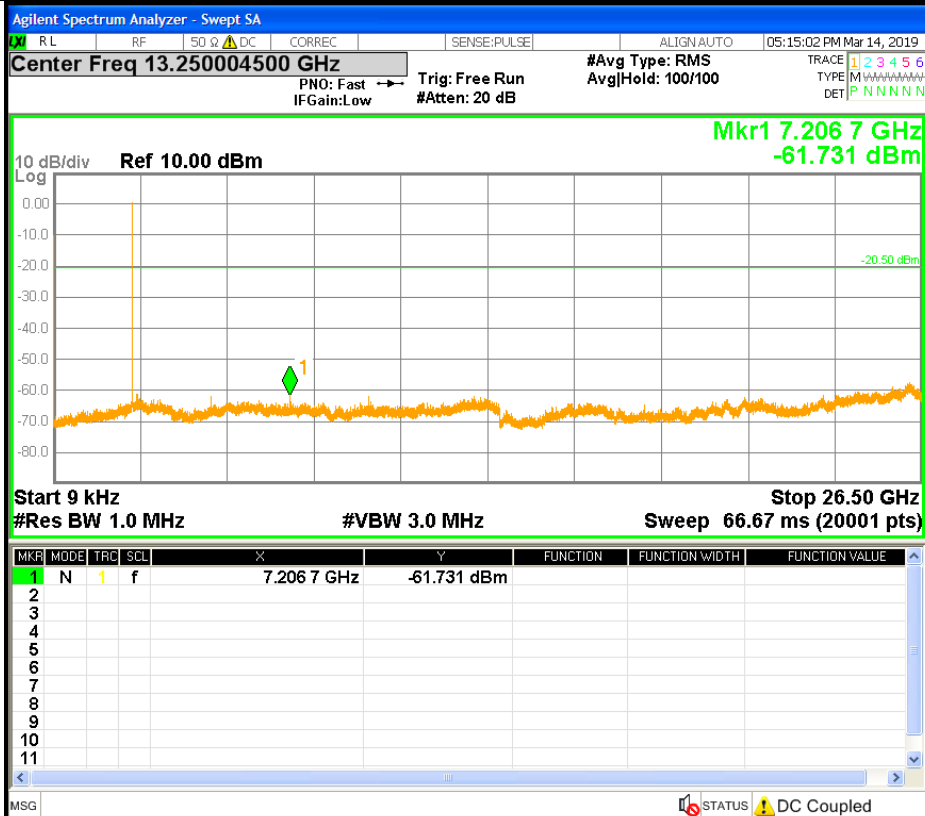


8DPSK LCH Graphs

Pref

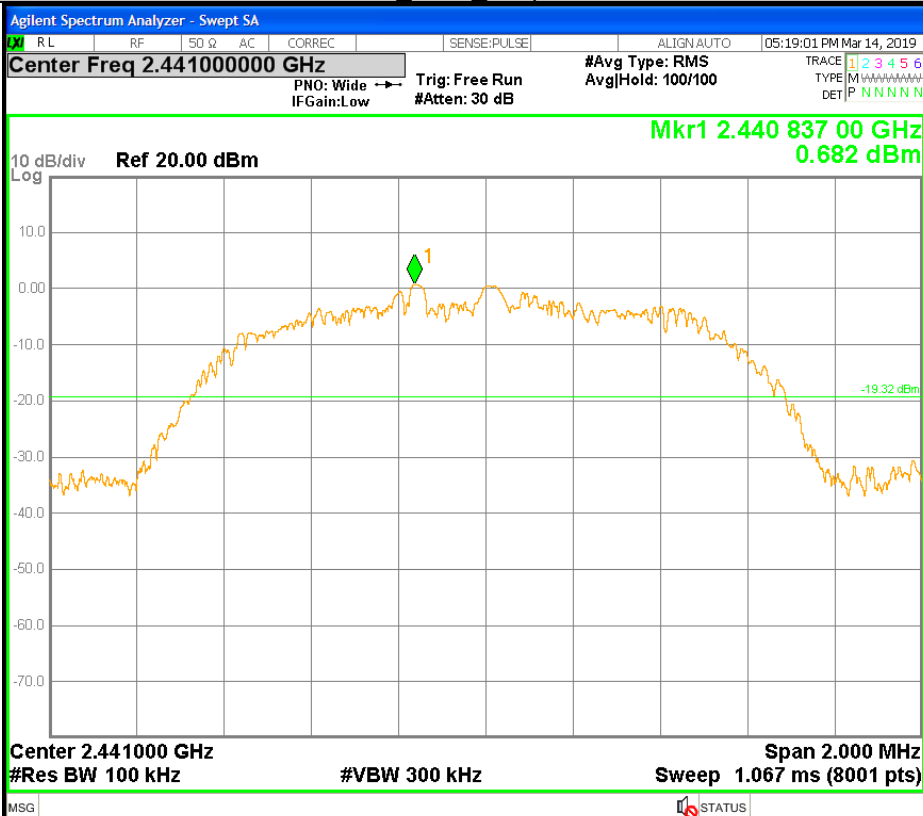


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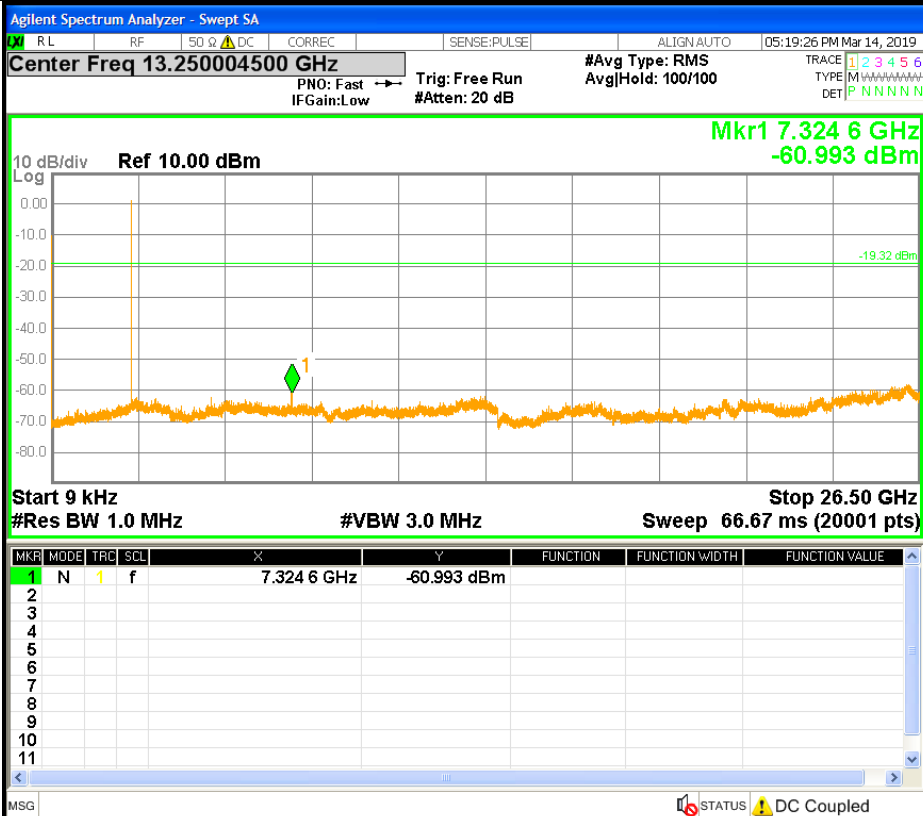


8DPSK MCH Graphs

Pref

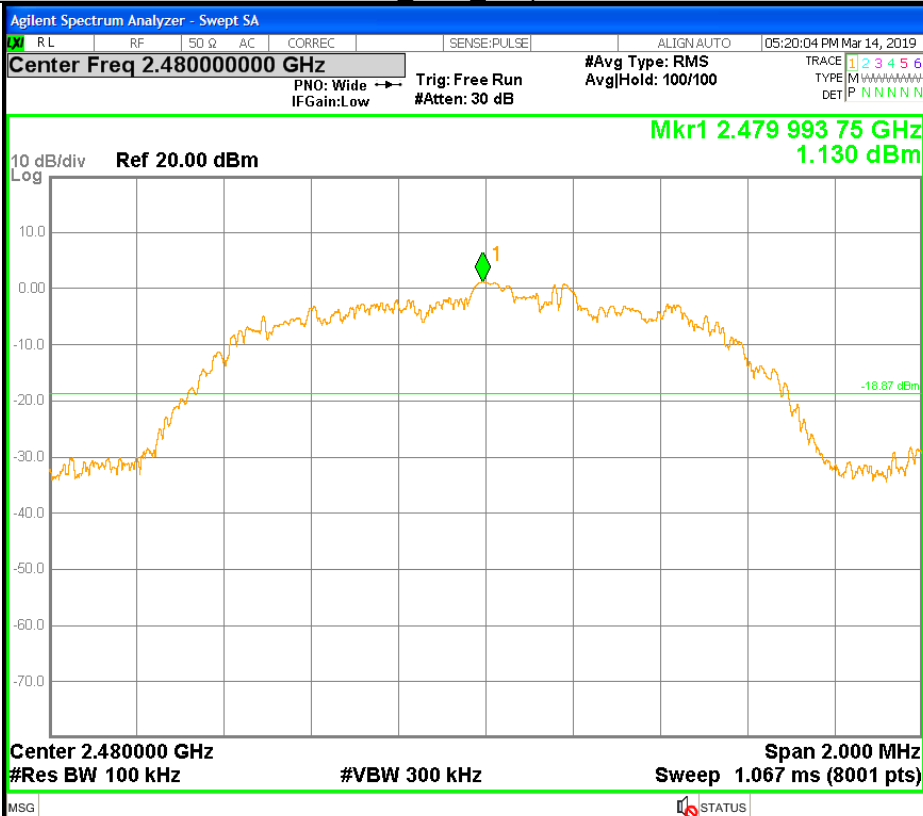


Puw



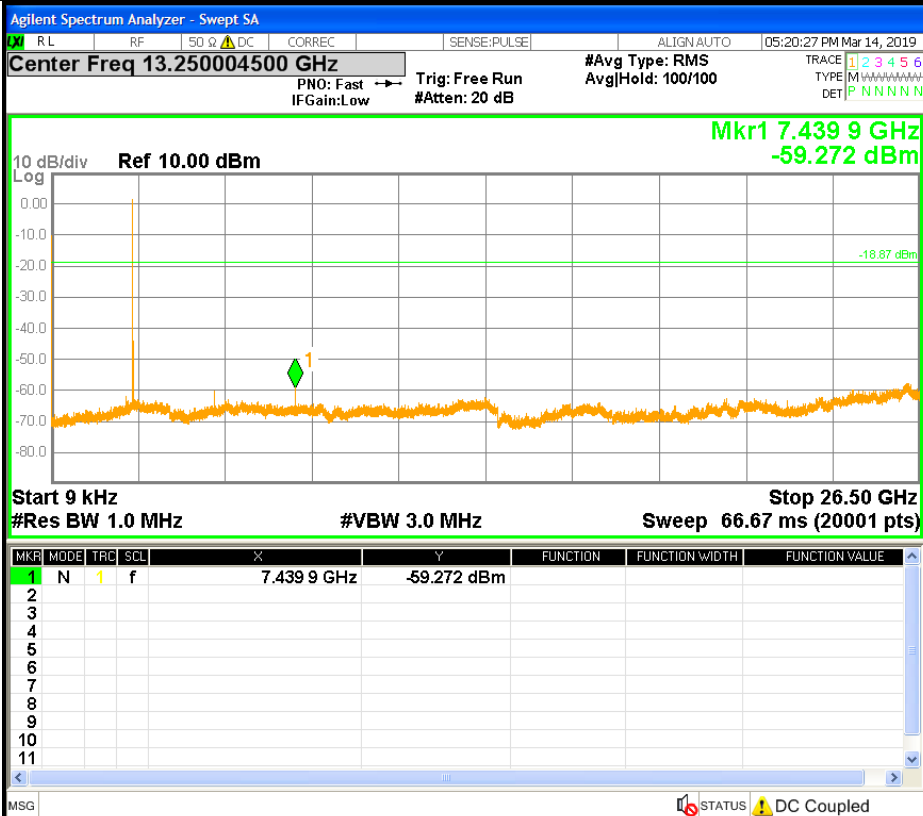
8DPSK HCH Graphs

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

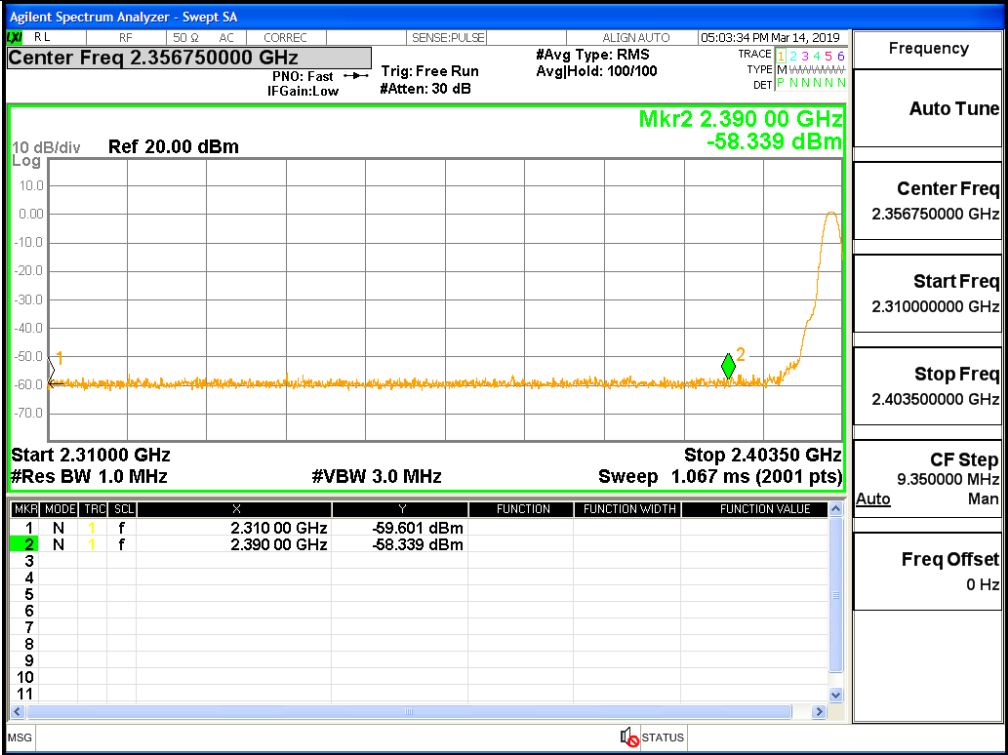


Frequency
Auto Tune
Center Freq 13.250004500 GHz
Start Freq 9.000 kHz
Stop Freq 26.500000000 GHz
CF Step 2.649999100 GHz Auto Man
Freq Offset 0 Hz

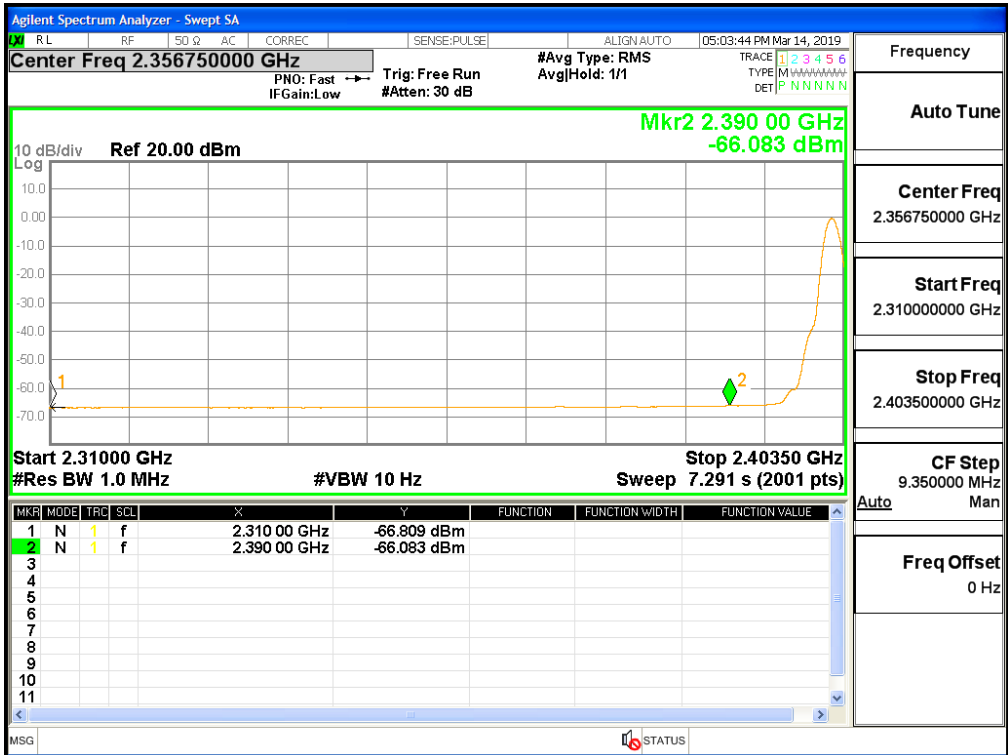
A.8 Restrict-band band-edge measurements

Type	Carrier Frequency (MHz)	Frequency(MHz)	Gain	Ground Factor	Peak Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Average Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2310	2.00	0.00	-59.60	37.6	74	-66.81	30.39	54	Pass
1DH5	2402	2390	2.00	0.00	-58.34	38.86	74	-66.08	31.12	54	Pass
1DH5	2480	2483.5	2.00	0.00	-41.97	55.23	74	-45.97	51.23	54	Pass
1DH5	2480	2500	2.00	0.00	-58.78	38.42	74	-65.8	31.40	54	Pass
2DH5	2402	2310	2.00	0.00	-58.13	39.07	74	-66.82	30.38	54	Pass
2DH5	2402	2390	2.00	0.00	-59.39	37.81	74	-66.26	30.94	54	Pass
2DH5	2480	2483.5	2.00	0.00	-41.48	55.72	74	-46.7	50.50	54	Pass
2DH5	2480	2500	2.00	0.00	-59.39	37.81	74	-65.81	31.39	54	Pass
3DH5	2402	2310	2.00	0.00	-58.36	38.84	74	-66.81	30.39	54	Pass
3DH5	2402	2390	2.00	0.00	-59.89	37.31	74	-66.23	30.97	54	Pass
3DH5	2480	2483.5	2.00	0.00	-40.11	57.09	74	-46.65	50.55	54	Pass
3DH5	2480	2500	2.00	0.00	-59.24	37.96	74	-65.83	31.37	54	Pass

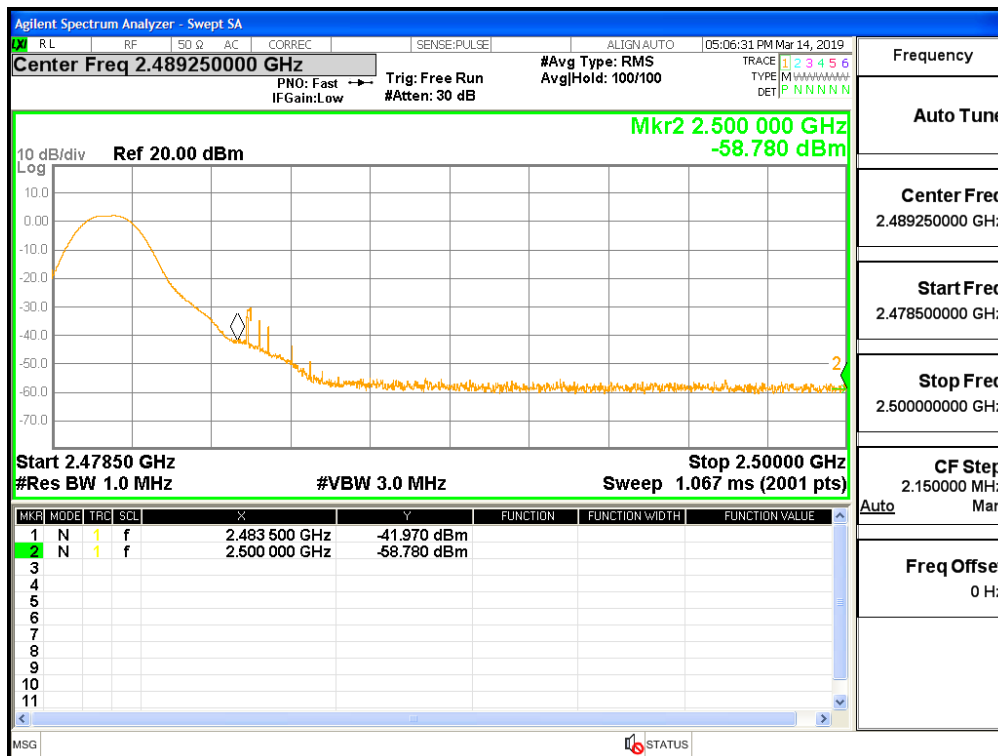
Restrict-band band-edge measurements_2402_PEAK_DH5



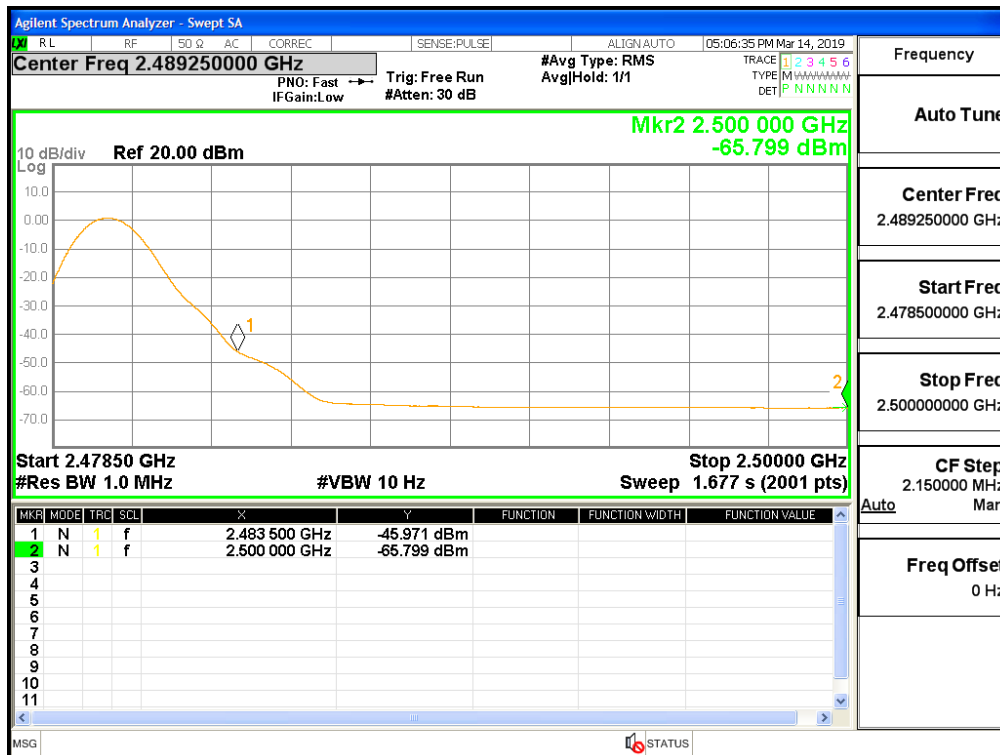
Restrict-band band-edge measurements_2402_AV_DH5



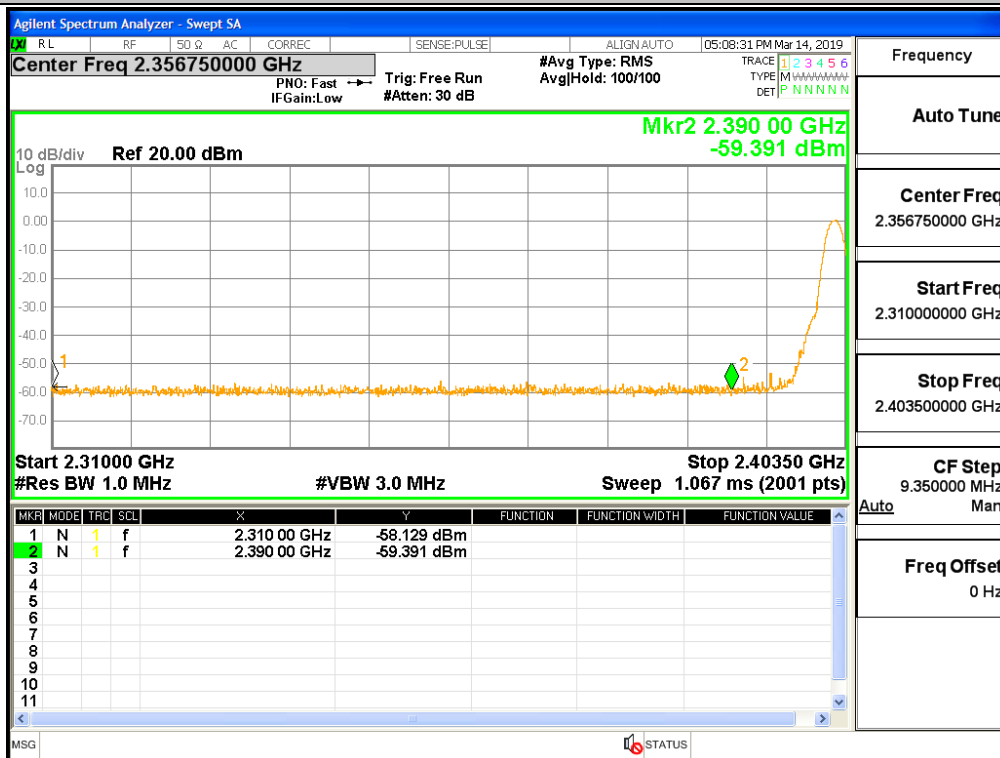
Restrict-band band-edge measurements_2480_PEAK_DH5



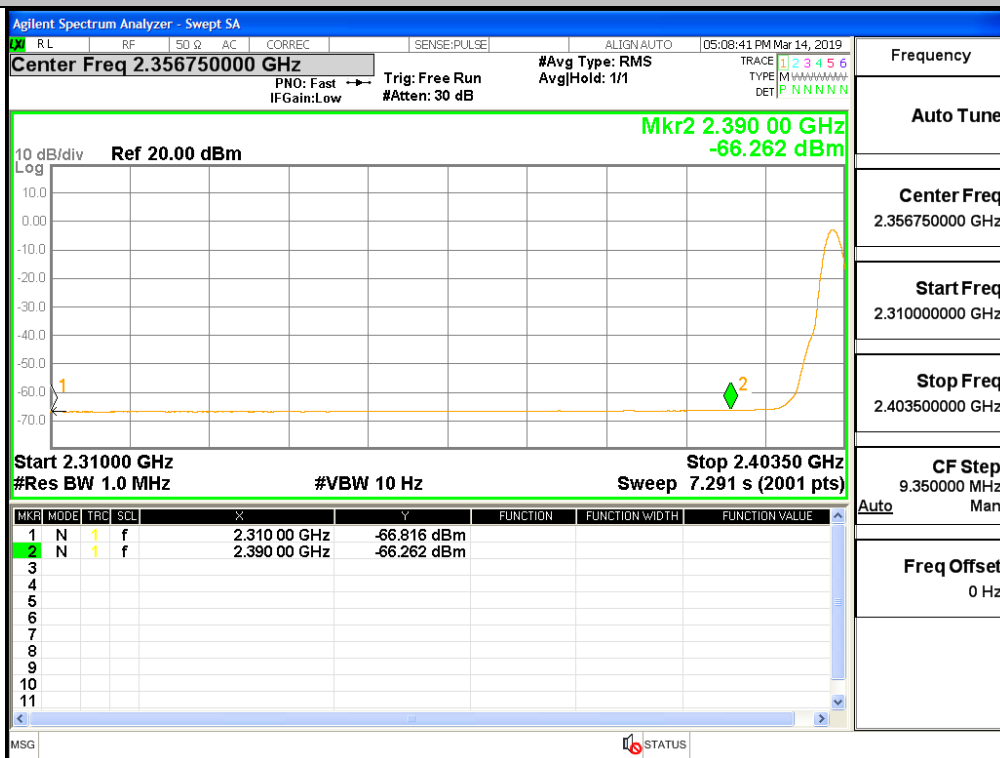
Restrict-band band-edge measurements_2480_AV_DH5



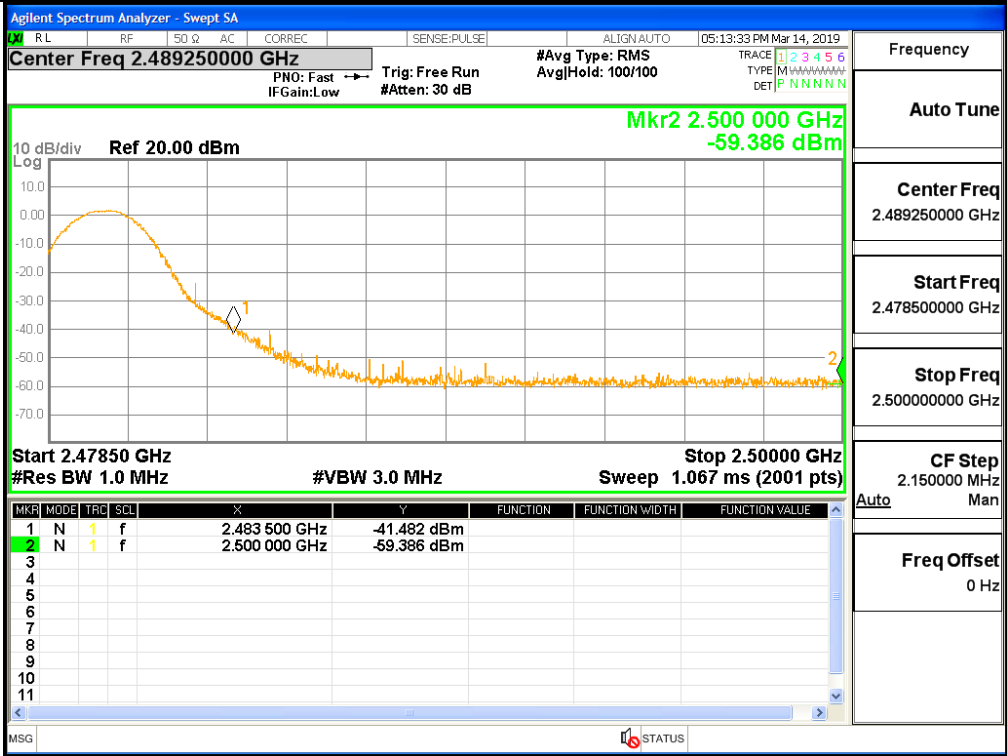
Restrict-band band-edge measurements_2402_PEAK_2DH5



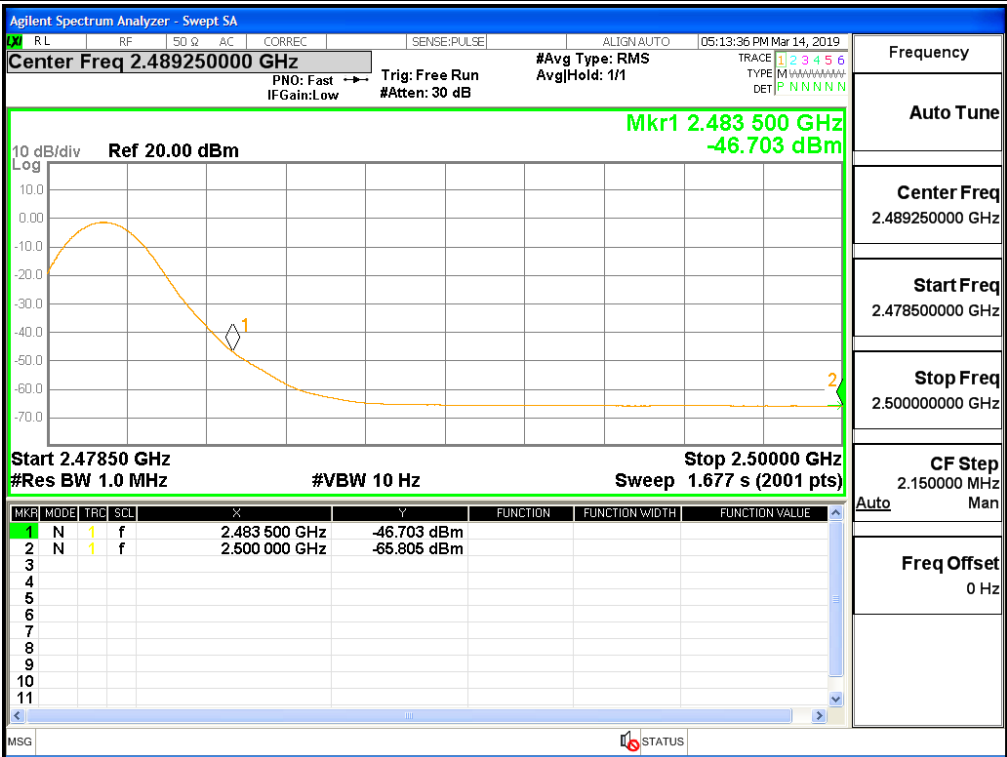
Restrict-band band-edge measurements_2402_AV_2DH5



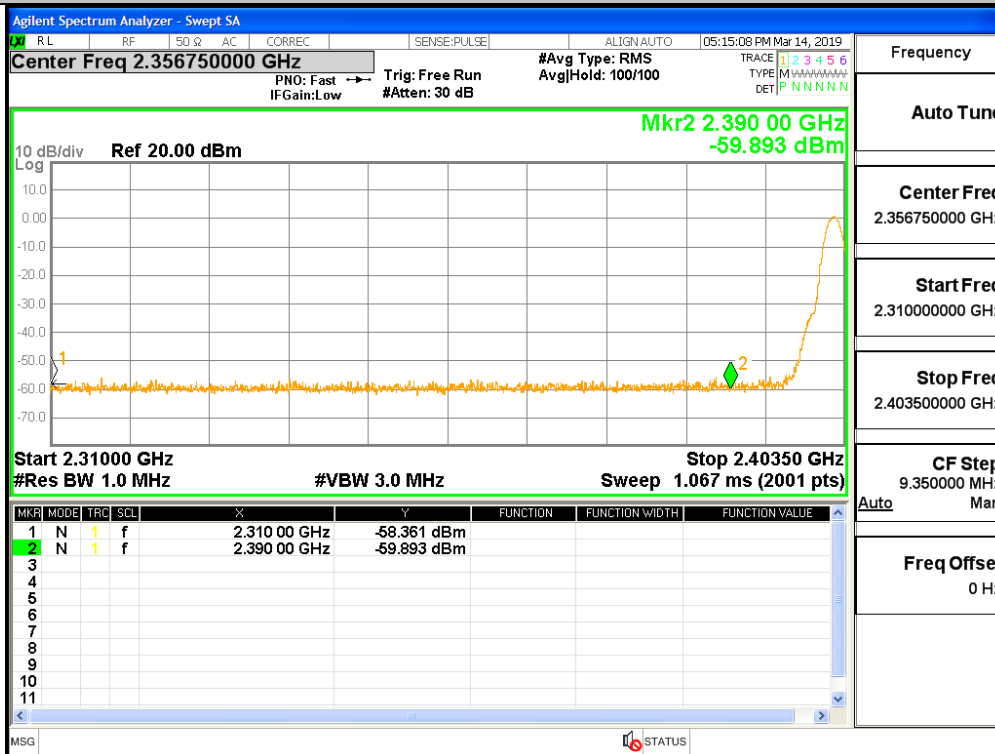
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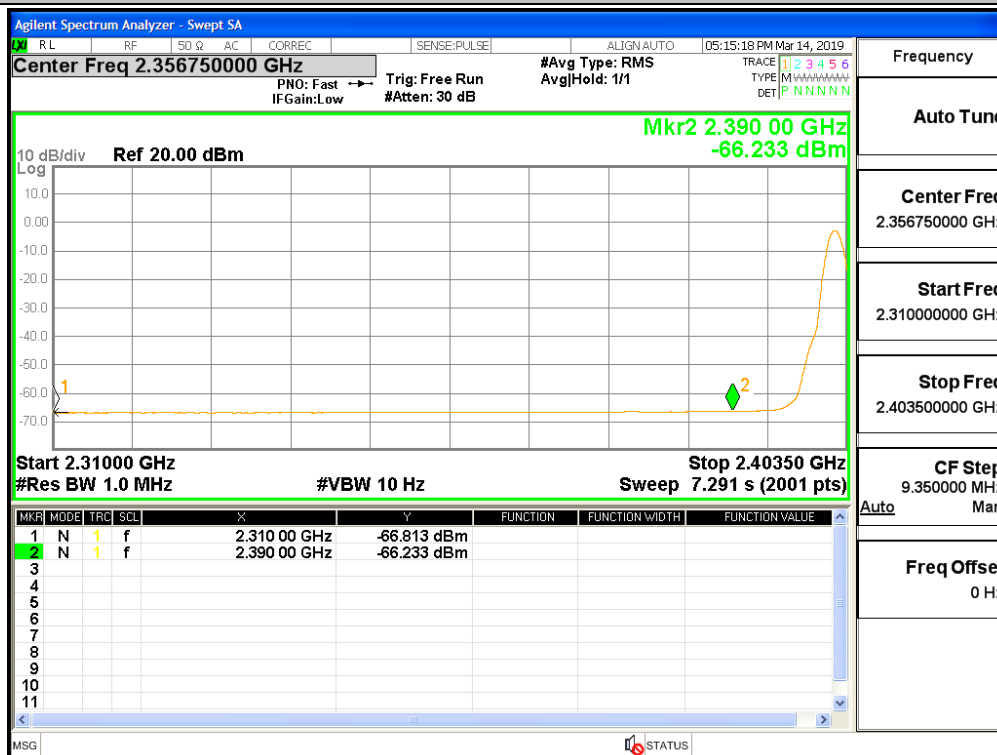
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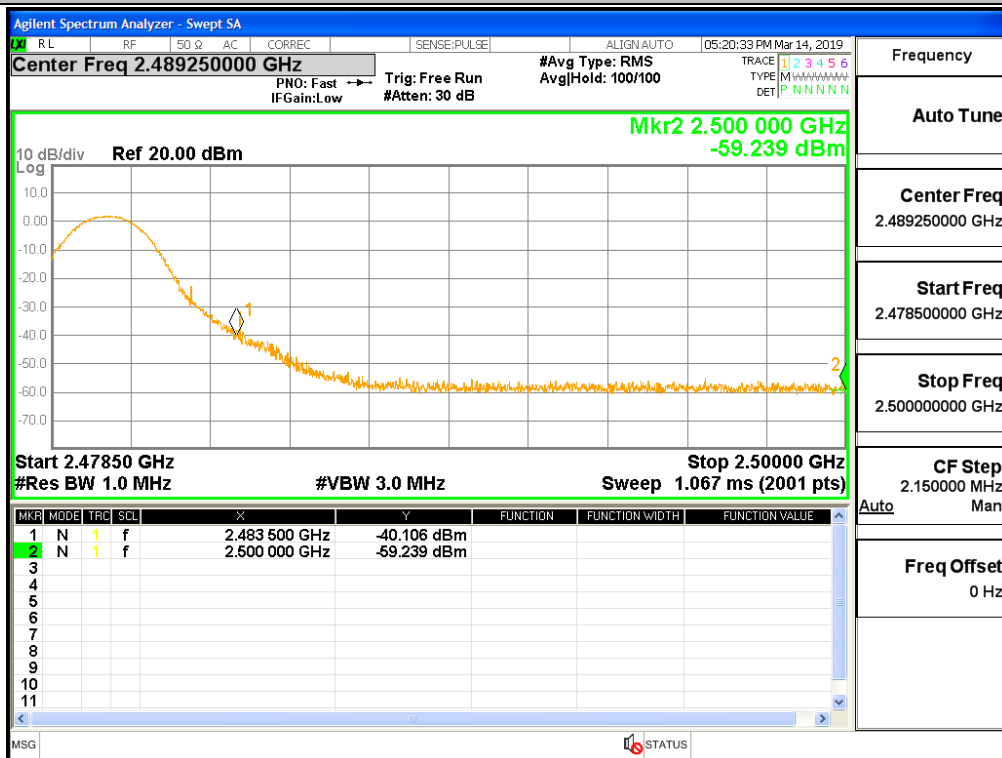
Restrict-band band-edge measurements_2402_PEAK_3DH5



Restrict-band band-edge measurements_2402_AV_3DH5



Restrict-band band-edge measurements_2480_PEAK_3DH5



Restrict-band band-edge measurements_2480_AV_3DH5

