

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

Product Name: Bluetooth Earphones

Trade Mark: Altec Lansing

Test Model: MZW101

FCC ID: 2AL9B-MZW101

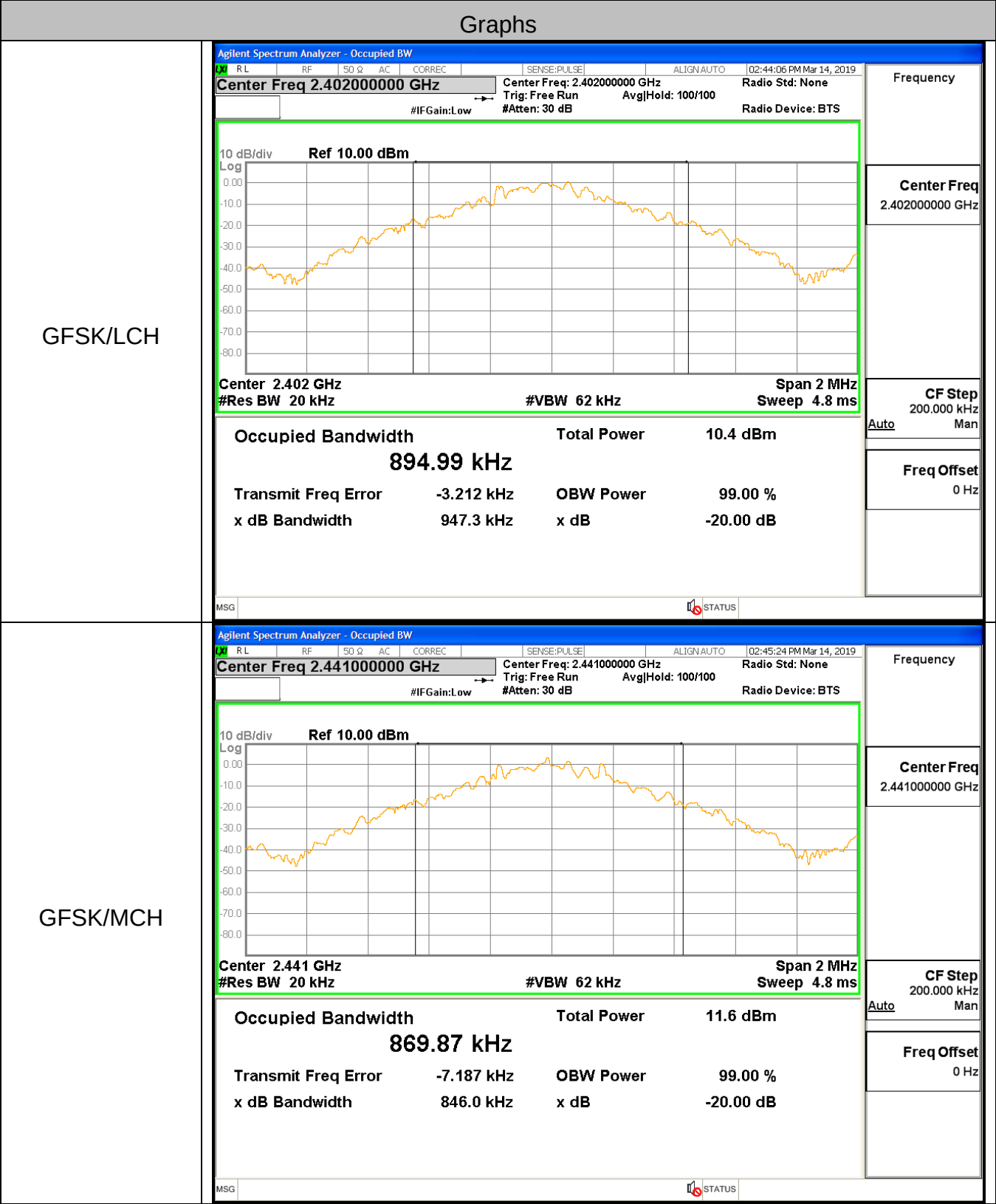
Environmental Conditions

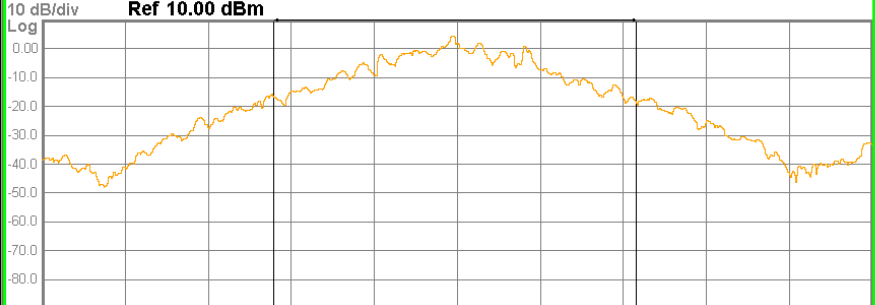
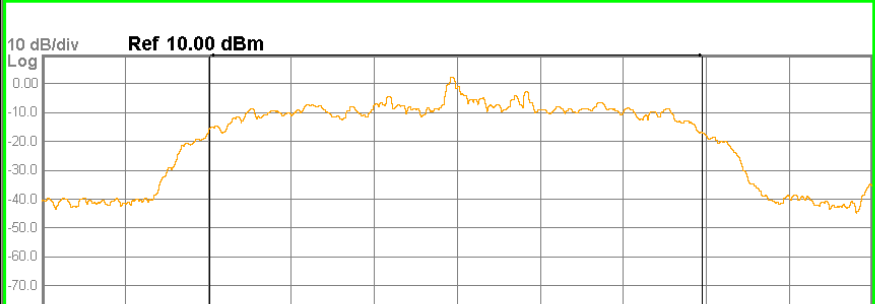
Temperature:	23.2 °C
Relative Humidity:	55%
ATM Pressure:	100.0 kPa
Test Engineer:	Gary Qian
Supervised by:	Eden Hu

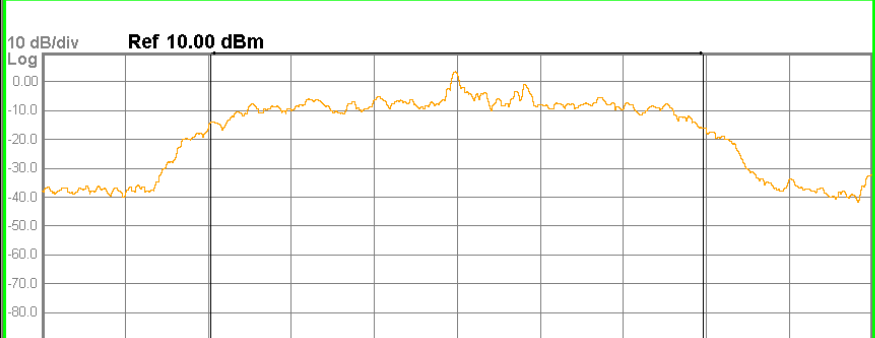
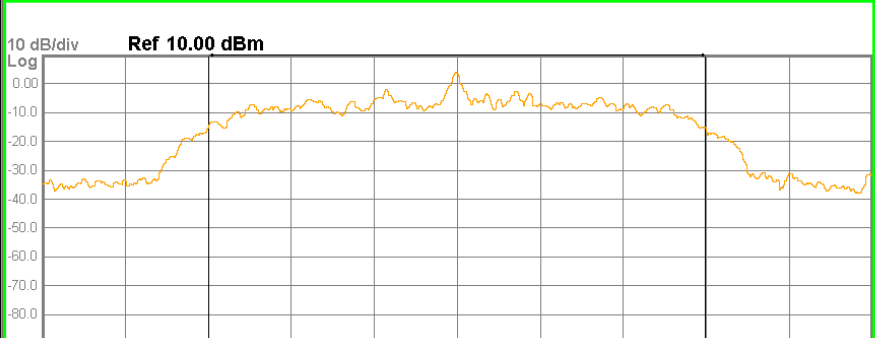
A.1 20 dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit(MHz)	Verdict
GFSK	LCH	0.947	Not Specified	PASS
GFSK	MCH	0.846	Not Specified	PASS
GFSK	HCH	0.800	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.201	Not Specified	PASS
$\pi/4$ DQPSK	MCH	1.200	Not Specified	PASS
$\pi/4$ DQPSK	HCH	1.204	Not Specified	PASS

Test Graph



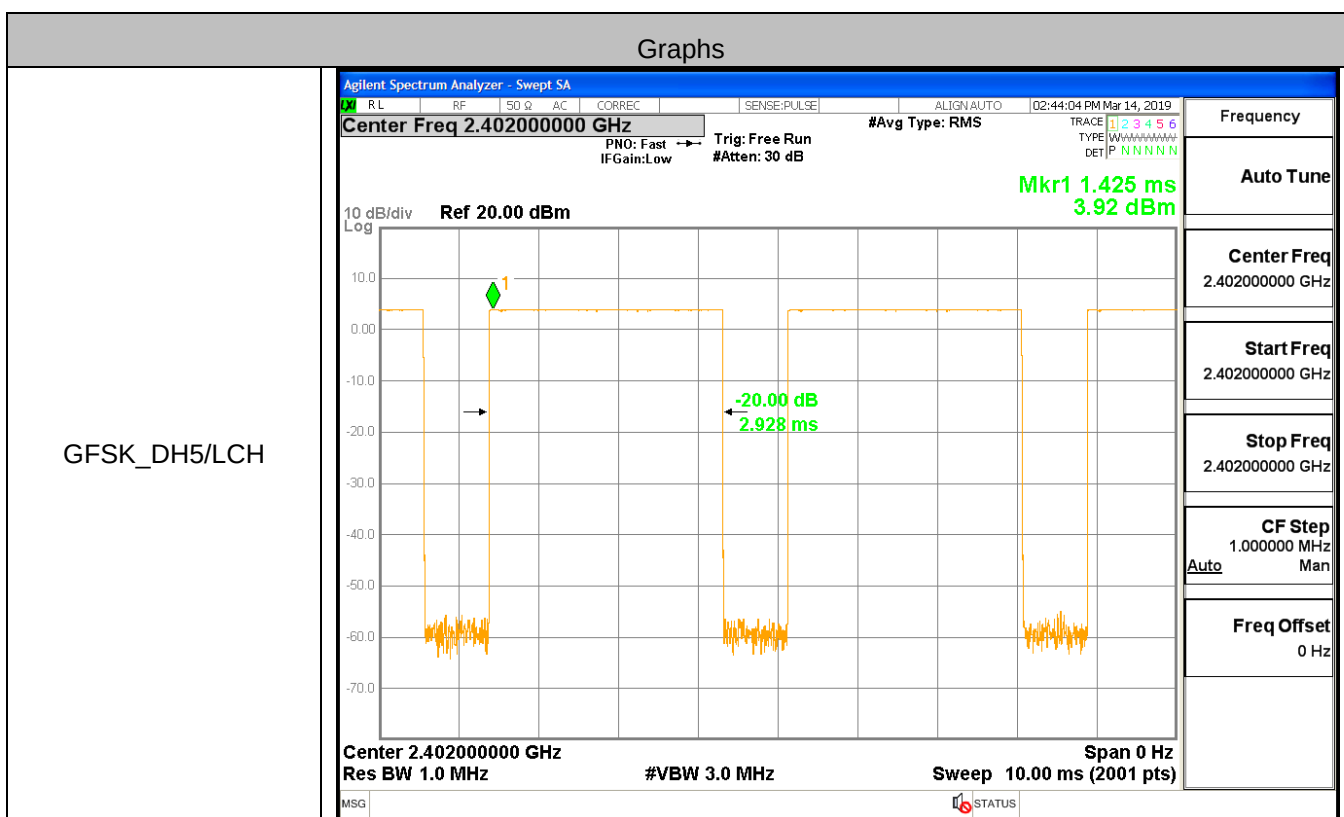
GFSK/HCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:AUTO 02:46:27 PM Mar 14, 2019 Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Trig: Free Run Avg/Hold: 100/100 Radio Std: None #IFGain:Low #Atten: 30 dB Radio Device: BTS 10 dB/div Ref 10.00 dBm  Center 2.48 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms Occupied Bandwidth 870.65 kHz Total Power 12.1 dBm Transmit Freq Error -4.398 kHz OBW Power 99.00 % x dB Bandwidth 800.2 kHz x dB -20.00 dB MSG  STATUS
π/4DQPSK/LCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:AUTO 02:48:06 PM Mar 14, 2019 Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Trig: Free Run Avg/Hold: 100/100 Radio Std: None #IFGain:Low #Atten: 30 dB Radio Device: BTS 10 dB/div Ref 10.00 dBm  Center 2.402 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms Occupied Bandwidth 1.1828 MHz Total Power 9.59 dBm Transmit Freq Error -1.429 kHz OBW Power 99.00 % x dB Bandwidth 1.201 MHz x dB -20.00 dB MSG  STATUS

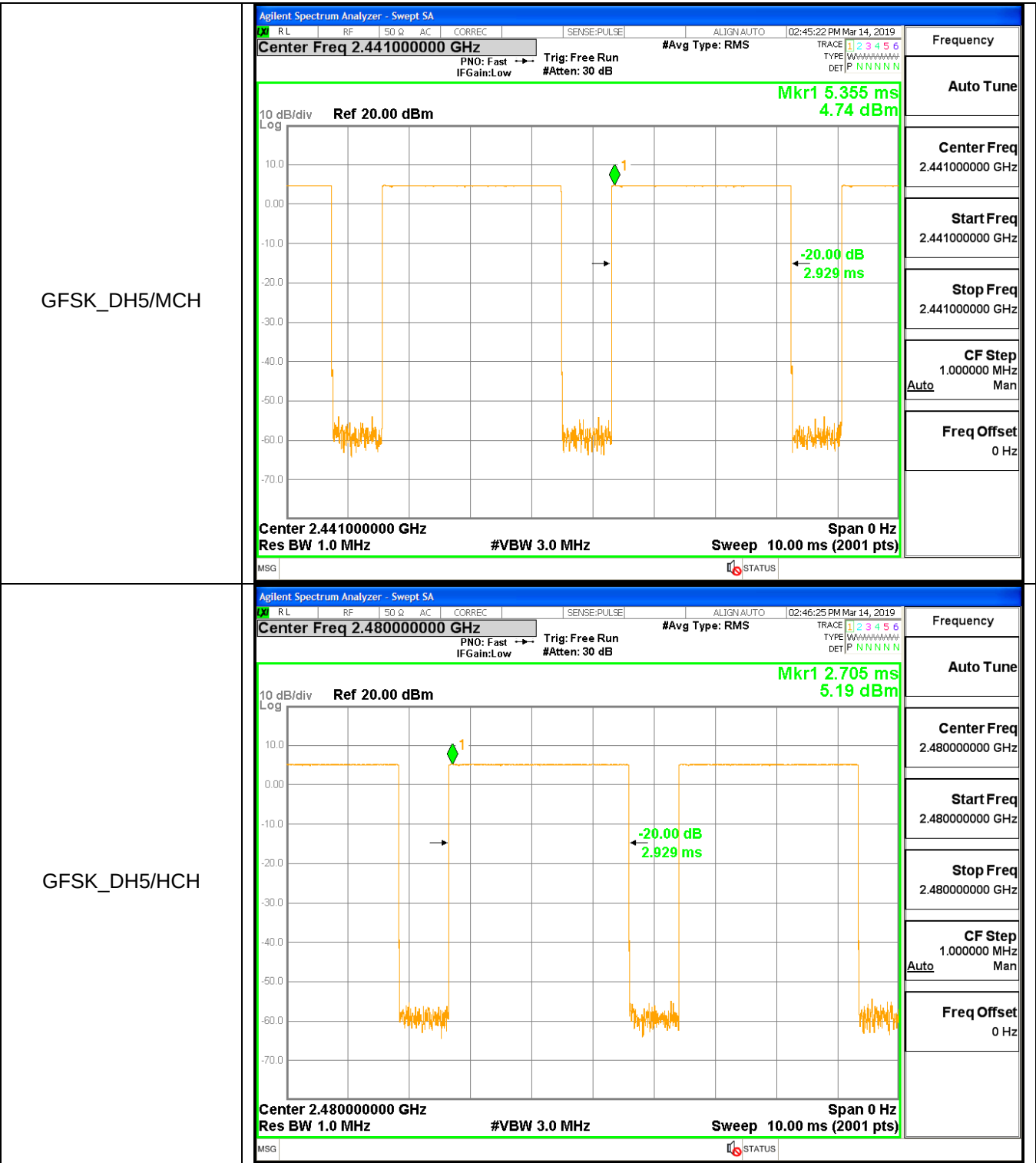
π/4DQPSK/MCH	Agilent Spectrum Analyzer - Occupied BW Center Freq 2.441000000 GHz Center Freq: 2.441000000 GHz Trig: Free Run Avg/Hold: 100/100 Radio Std: None Radio Device: BTS 10 dB/div Ref 10.00 dBm  Center 2.441 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms Occupied Bandwidth 1.1865 MHz Total Power 10.5 dBm Transmit Freq Error -610 Hz OBW Power 99.00 % x dB Bandwidth 1.200 MHz x dB -20.00 dB MSG STATUS
π/4DQPSK/HCH	Agilent Spectrum Analyzer - Occupied BW Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Trig: Free Run Avg/Hold: 100/100 Radio Std: None Radio Device: BTS 10 dB/div Ref 10.00 dBm  Center 2.48 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms Occupied Bandwidth 1.1947 MHz Total Power 11.0 dBm Transmit Freq Error -351 Hz OBW Power 99.00 % x dB Bandwidth 1.204 MHz x dB -20.00 dB MSG STATUS

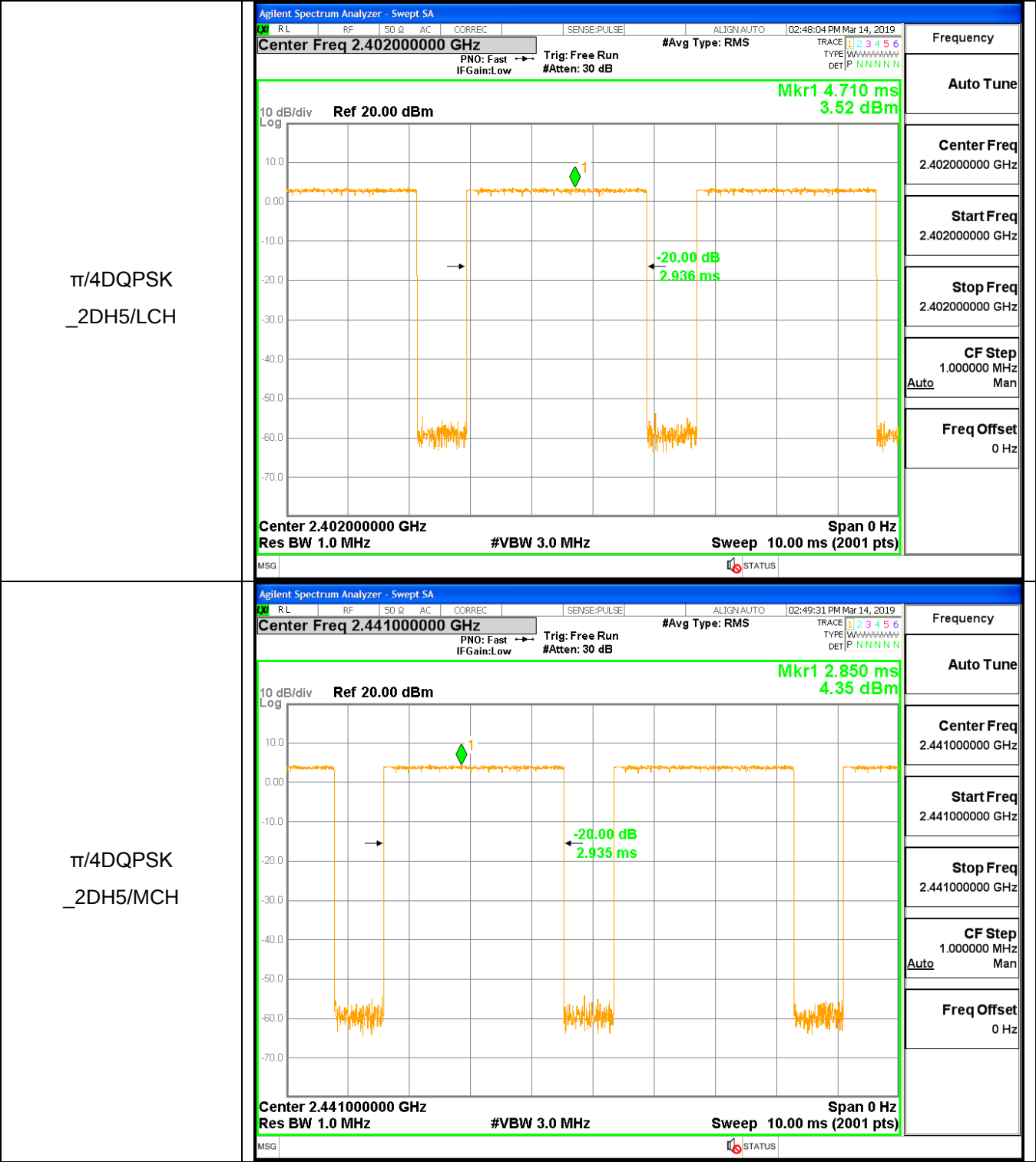
A.2 Dwell Time

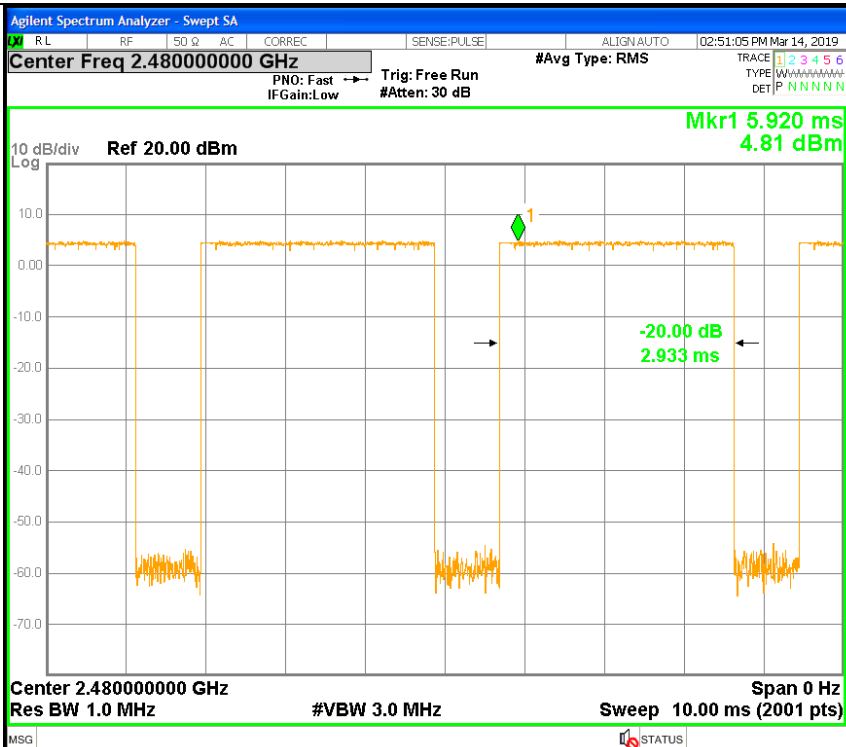
Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.002928	106.7	0.31242	0.4	PASS
GFSK	DH5	MCH	0.002929	106.7	0.312472	0.4	PASS
GFSK	DH5	HCH	0.002929	106.7	0.312493	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	0.002936	106.7	0.313274	0.4	PASS
$\pi/4$ DQPSK	2DH5	MCH	0.002935	106.7	0.31312	0.4	PASS
$\pi/4$ DQPSK	2DH5	HCH	0.002933	106.7	0.31295	0.4	PASS

Test Graph





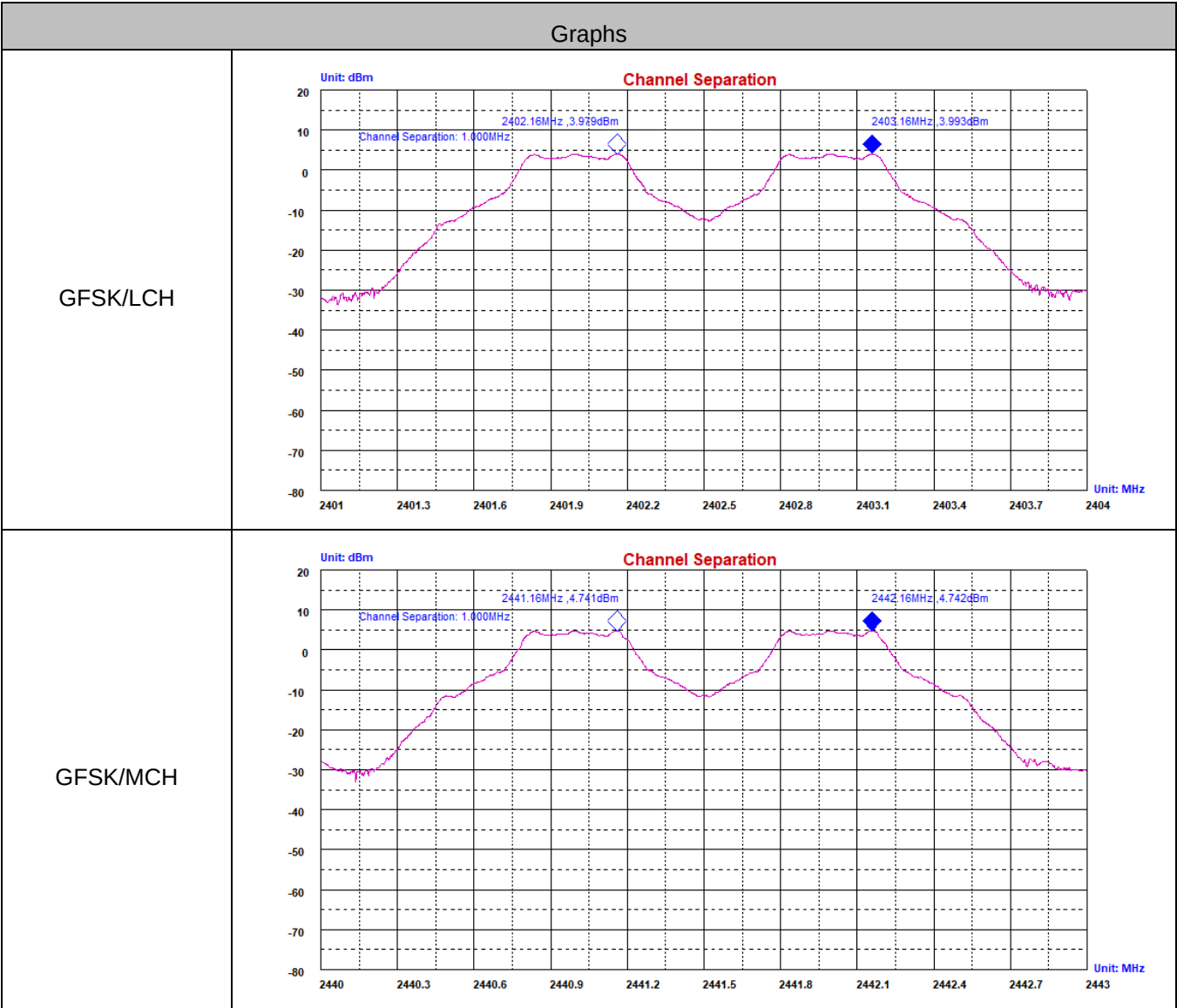


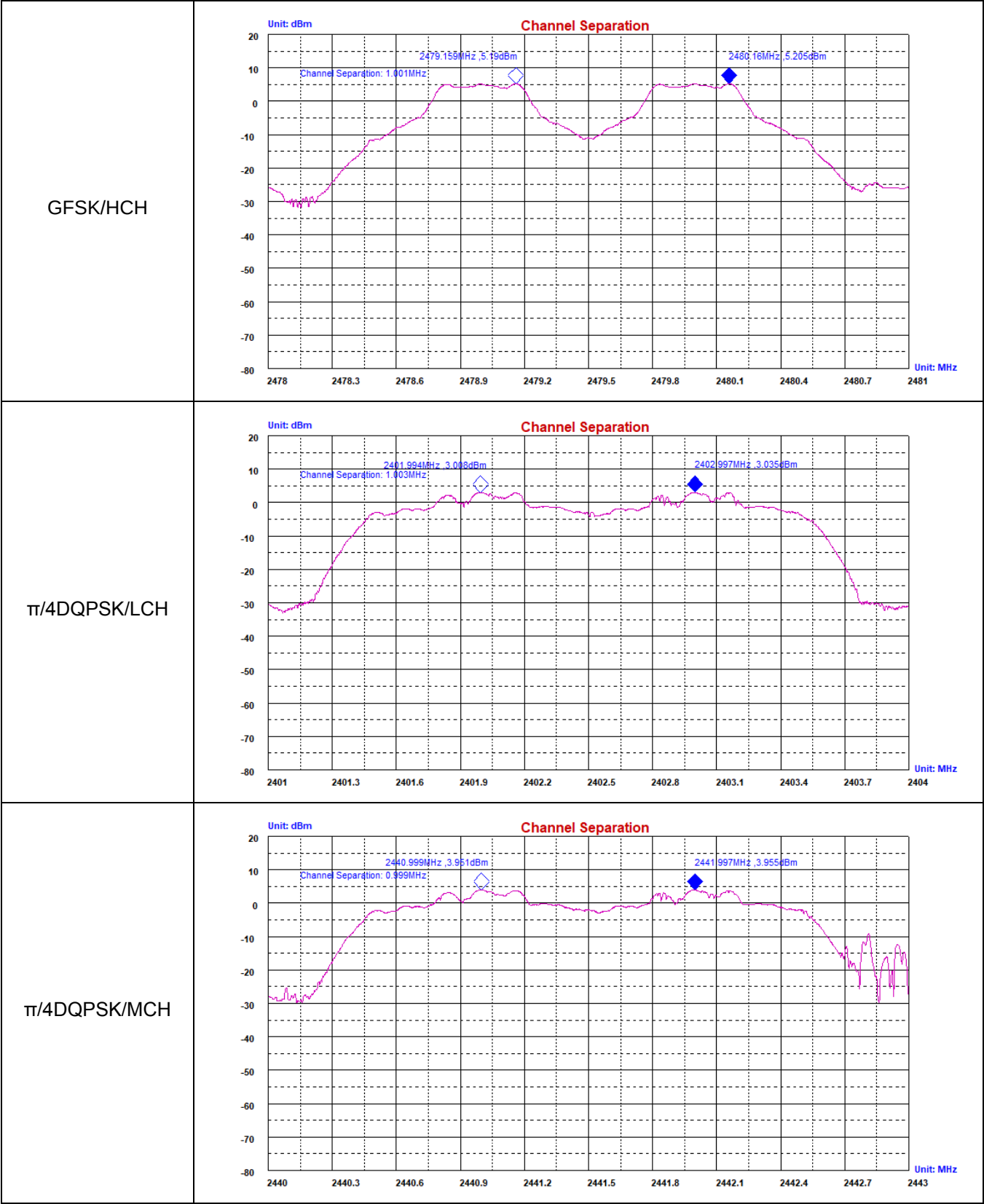


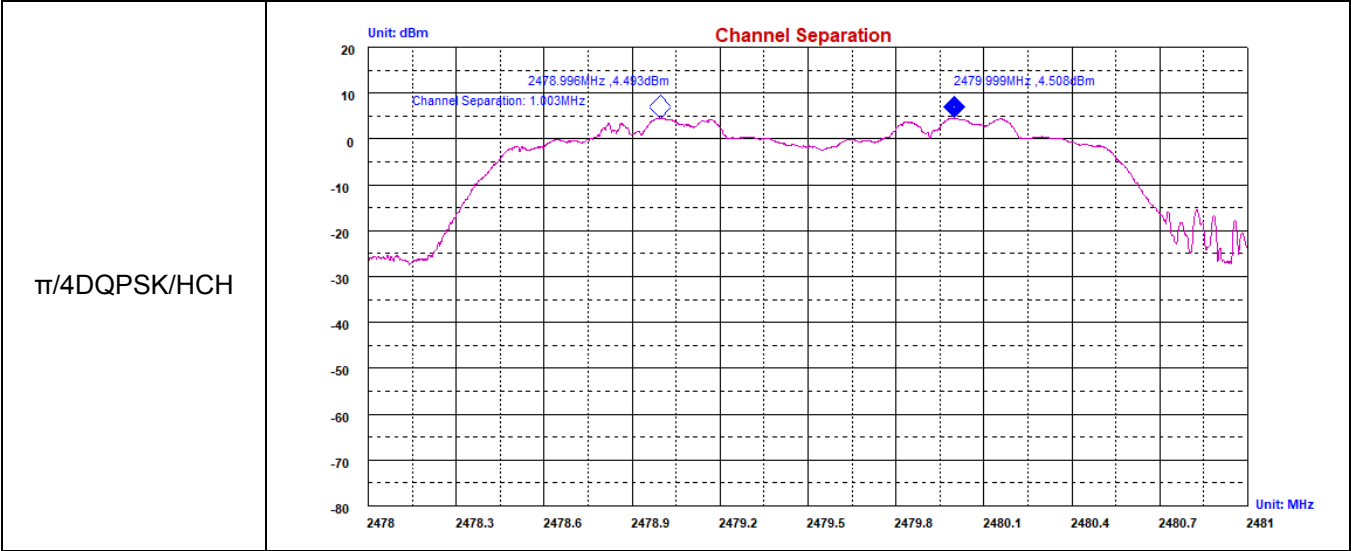
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.000	0.631	PASS
GFSK	MCH	1.000	0.564	PASS
GFSK	HCH	1.001	0.533	PASS
π /4DQPSK	LCH	1.003	0.801	PASS
π /4DQPSK	MCH	0.999	0.800	PASS
π /4DQPSK	HCH	1.003	0.803	PASS

Test Graph



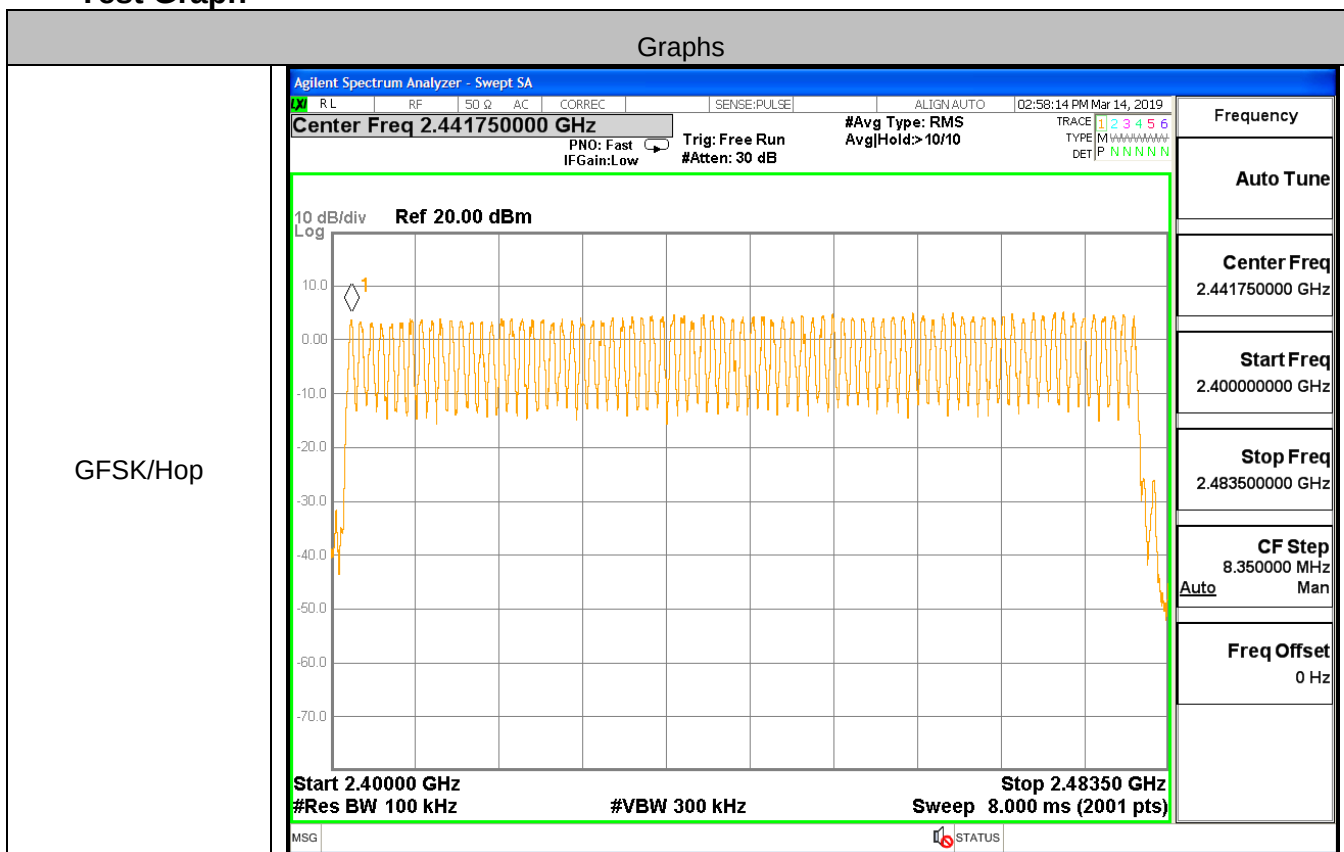


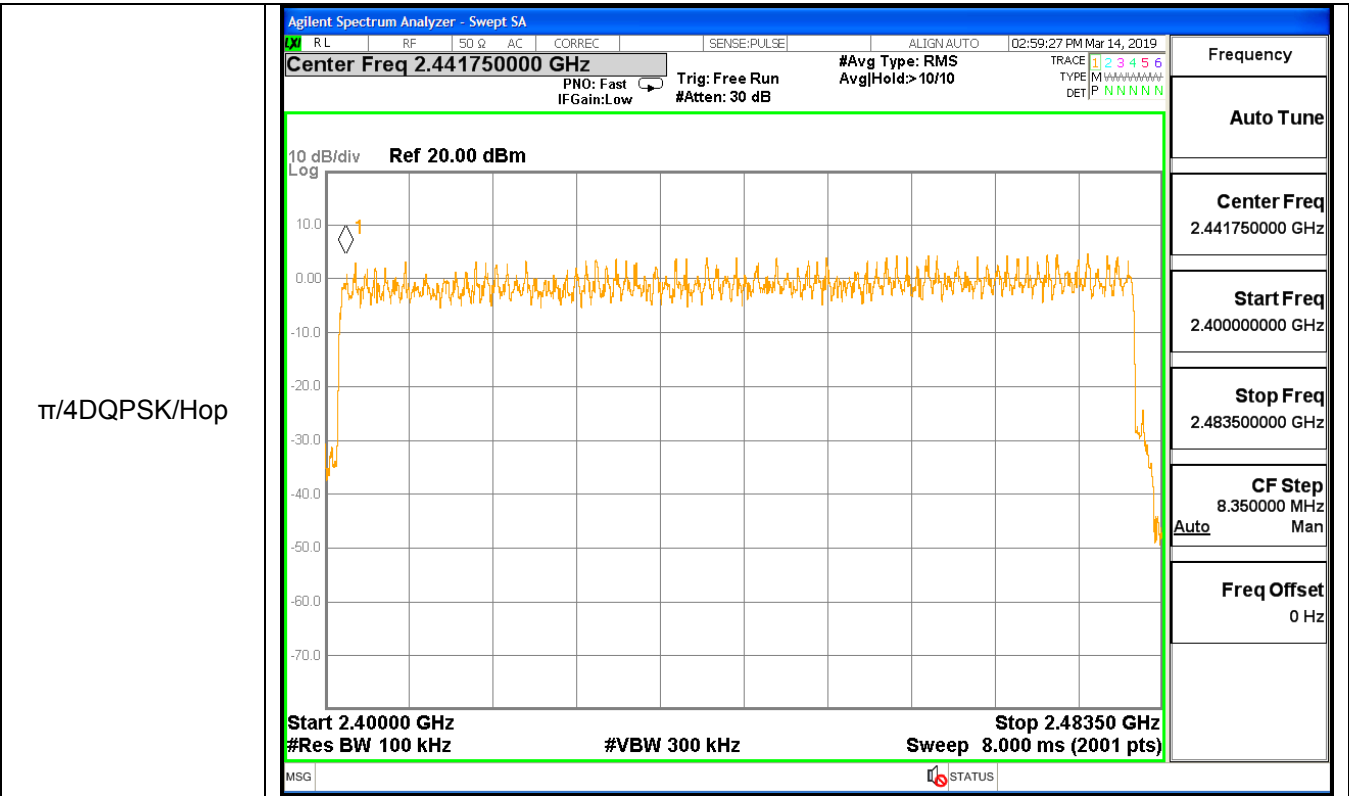


A.4 Hopping Channel Number

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

Test Graph

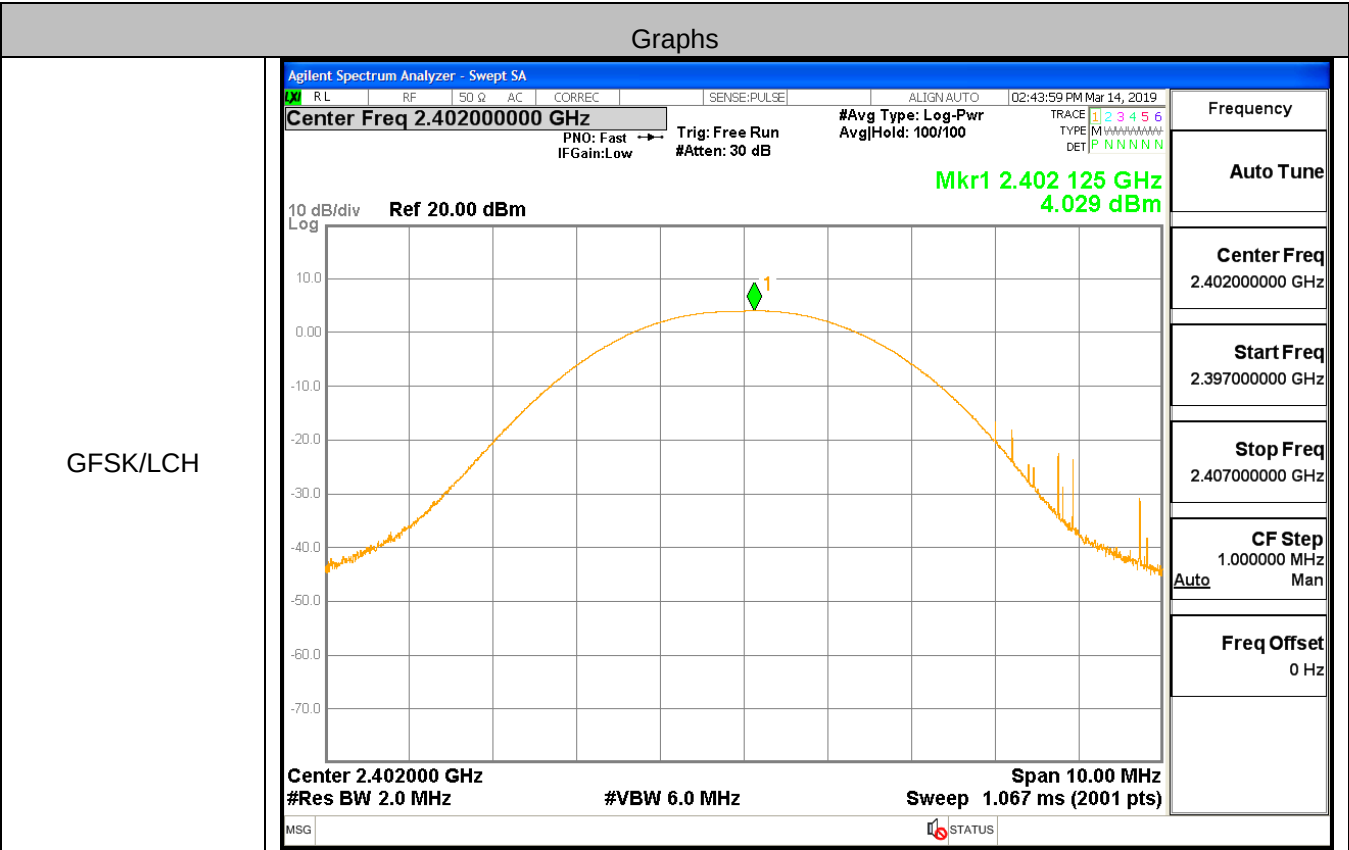


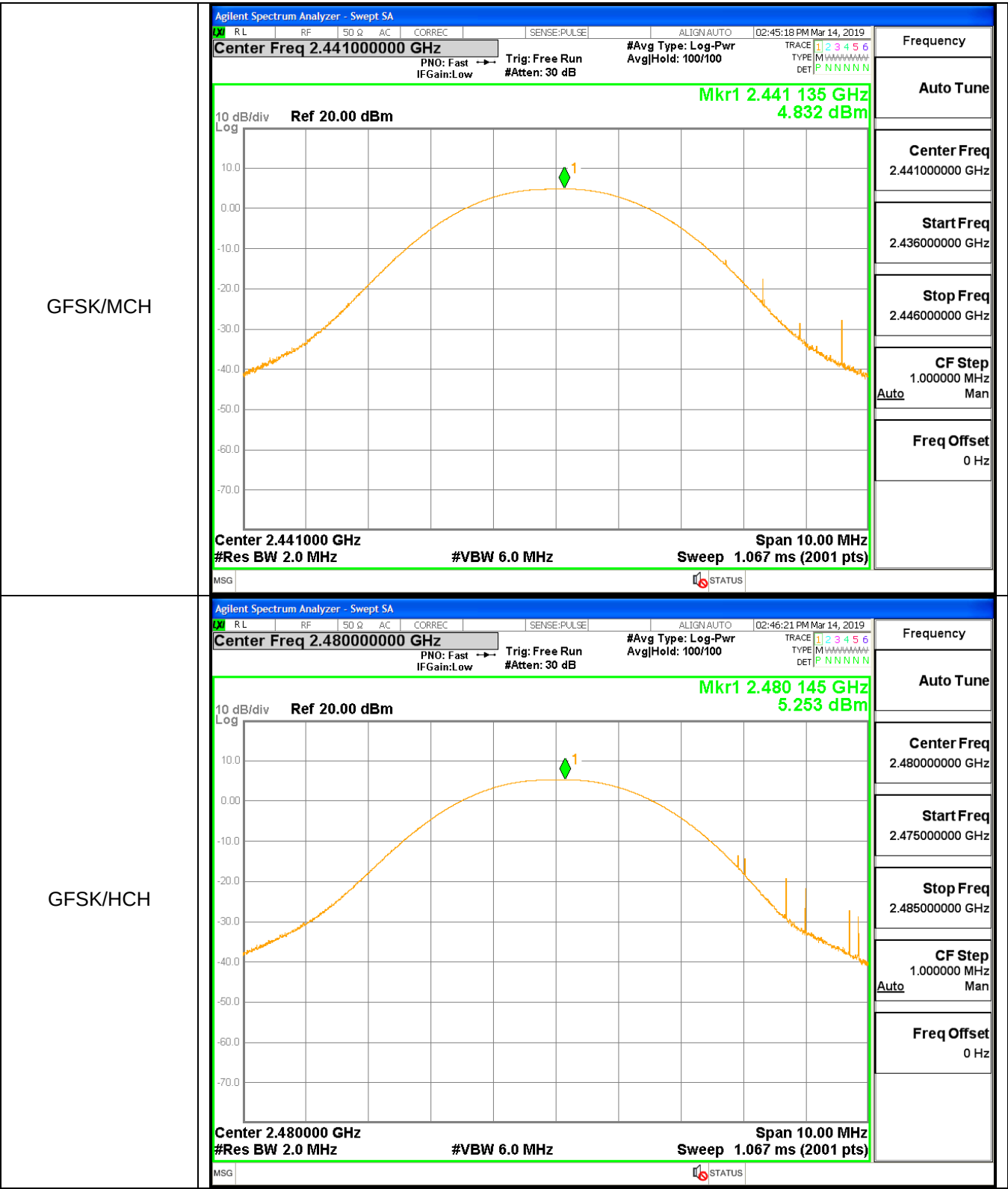


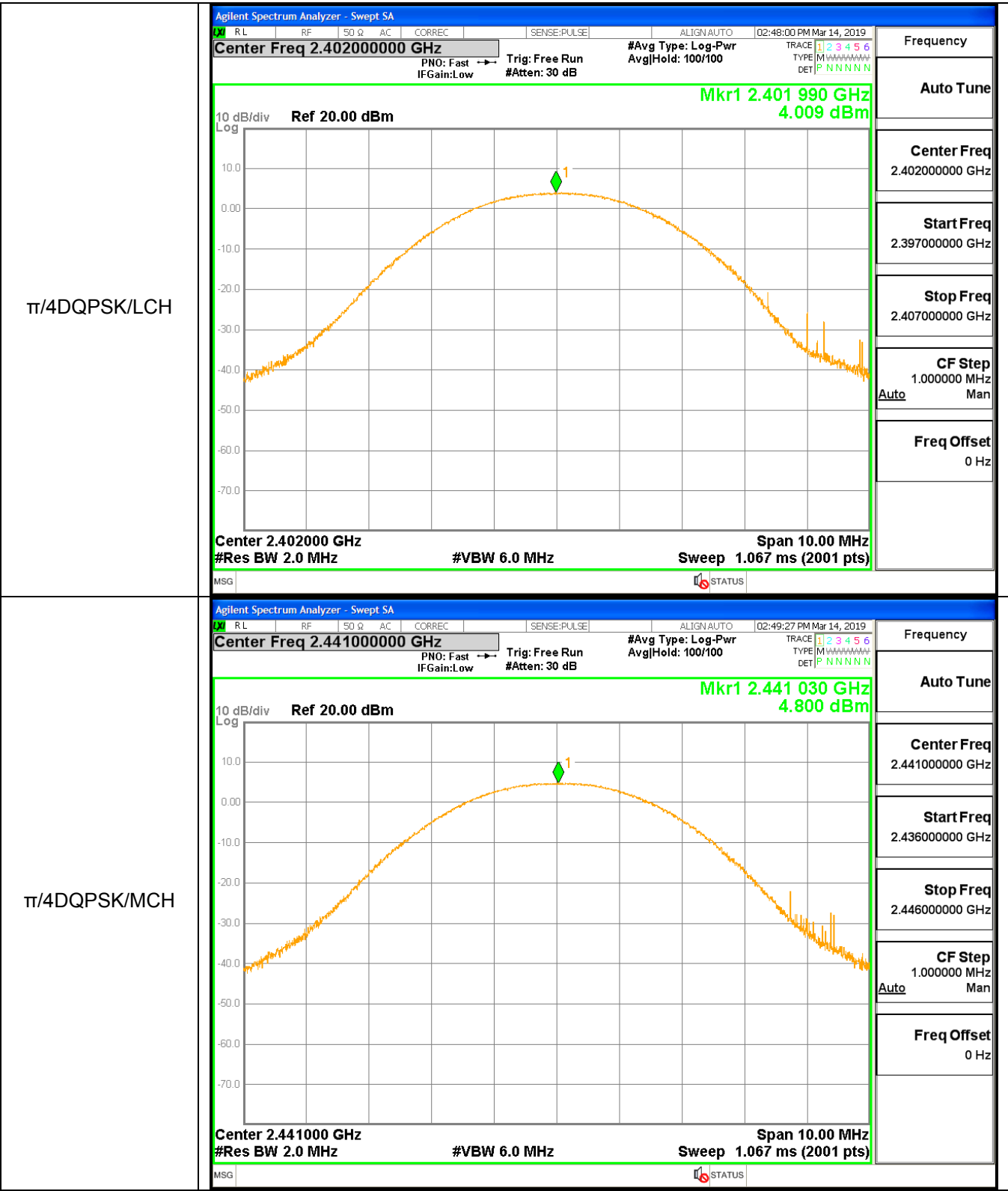
A.5 Conducted Peak Output Power

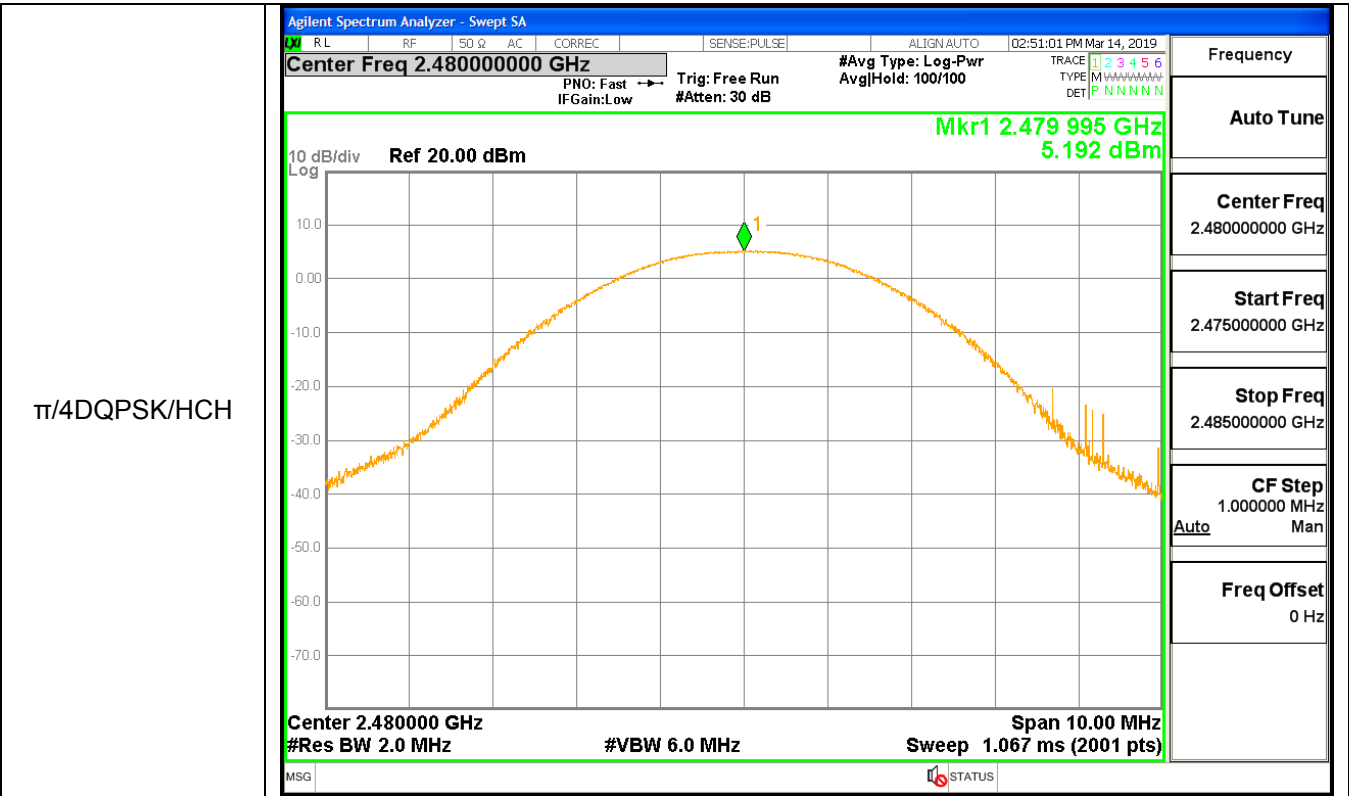
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.029	21	PASS
GFSK	MCH	4.832	21	PASS
GFSK	HCH	5.253	21	PASS
$\pi/4$ DQPSK	LCH	4.009	21	PASS
$\pi/4$ DQPSK	MCH	4.800	21	PASS
$\pi/4$ DQPSK	HCH	5.192	21	PASS

Test Graph





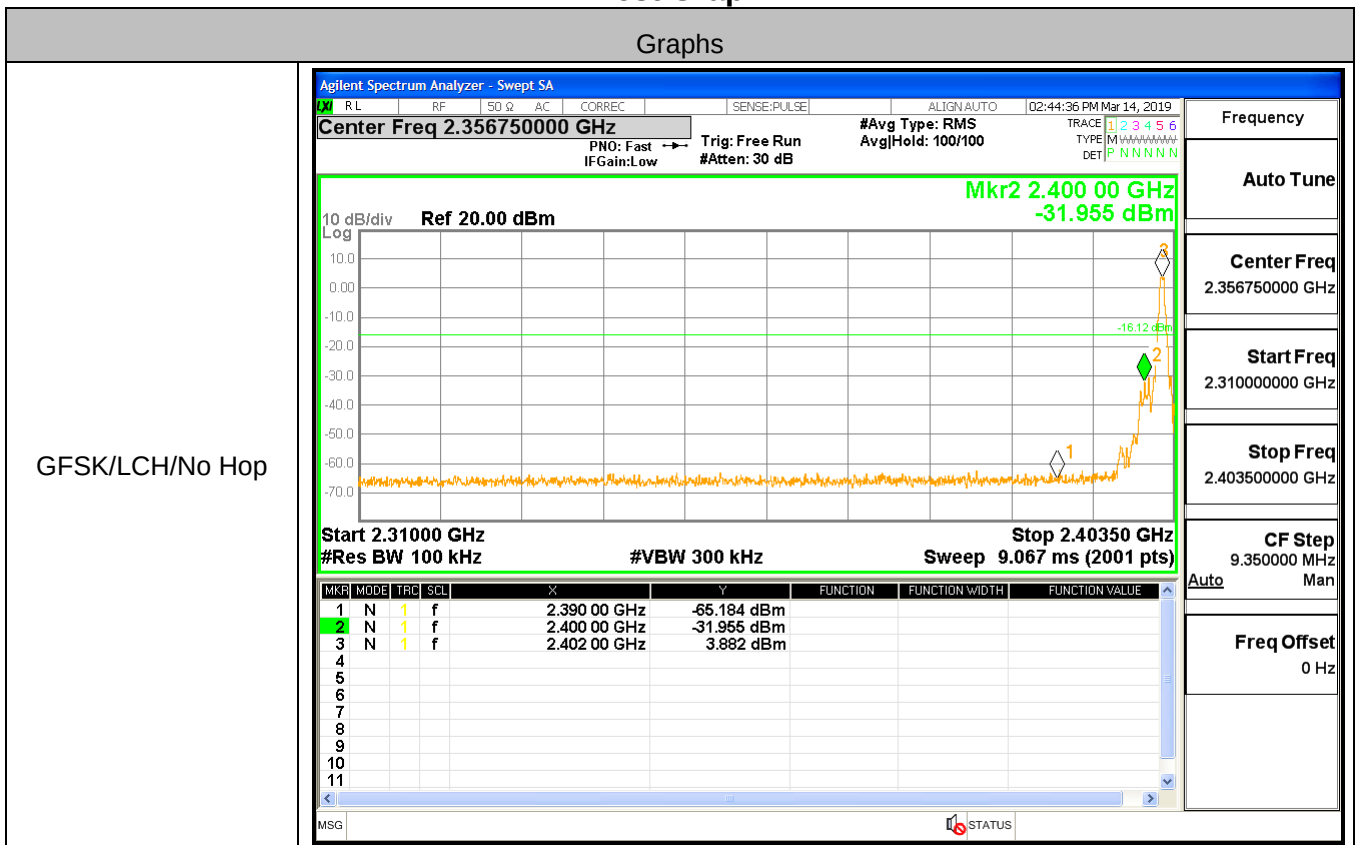


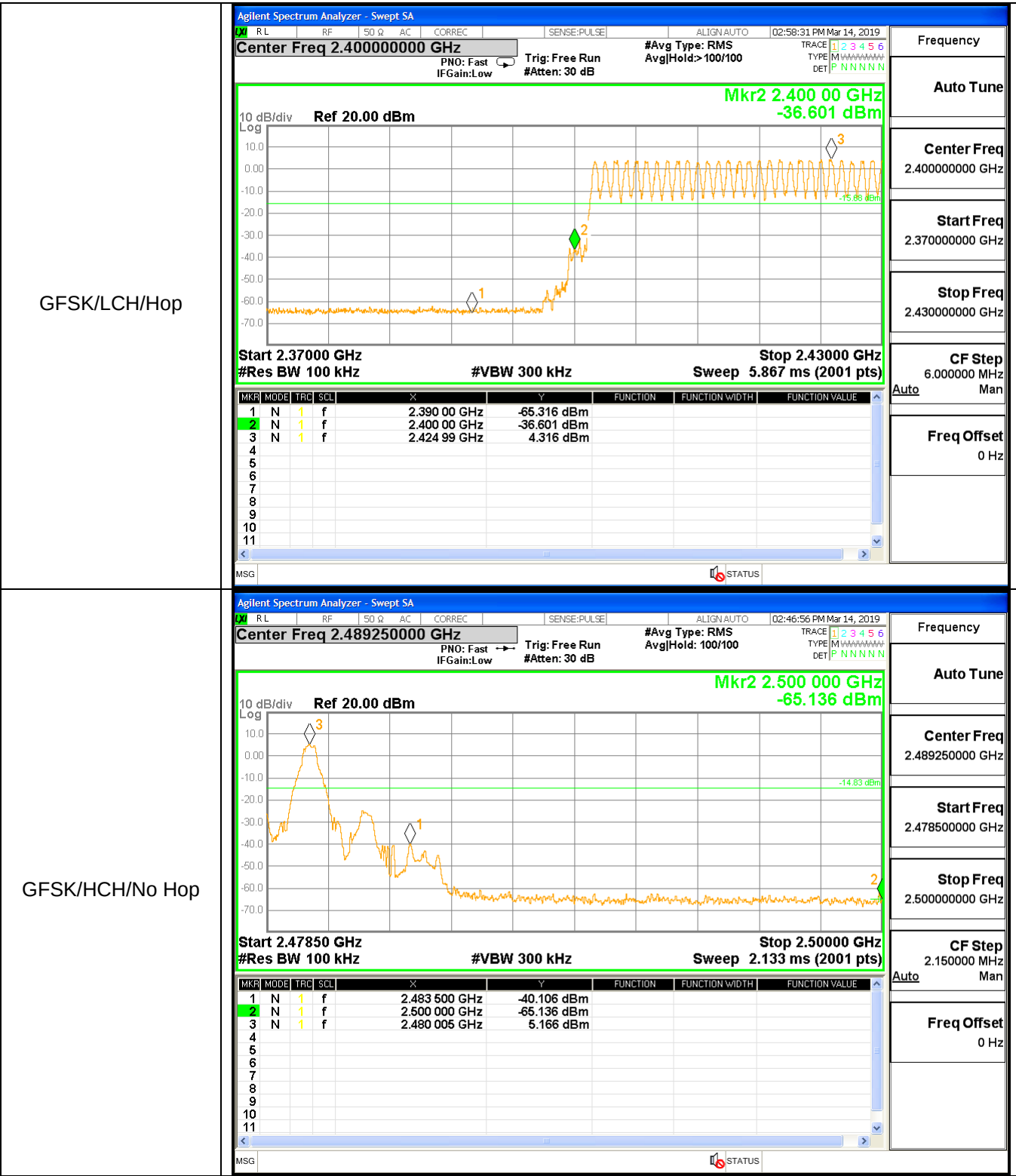


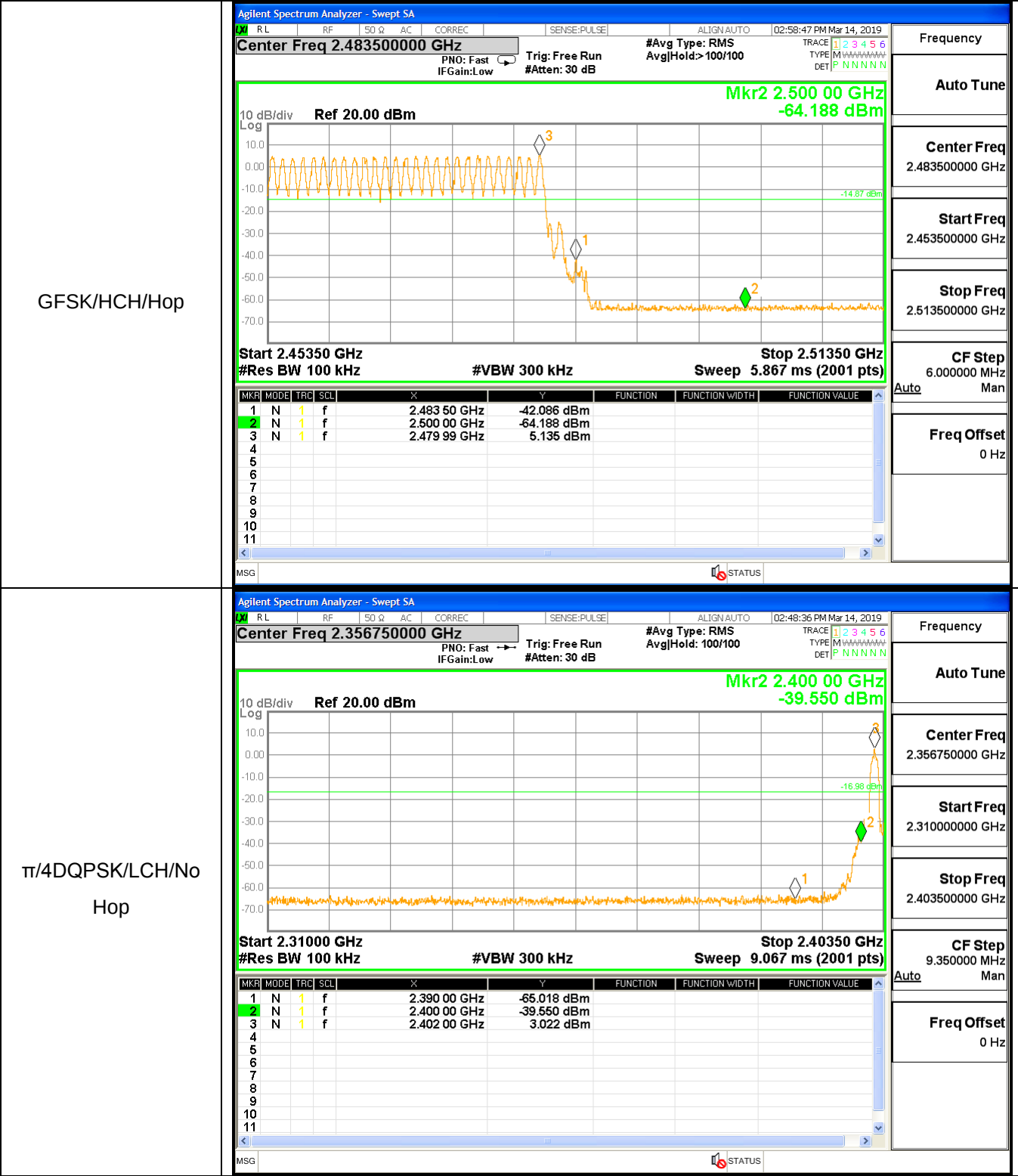
A.6 Band-edge for RF Conducted Emissions

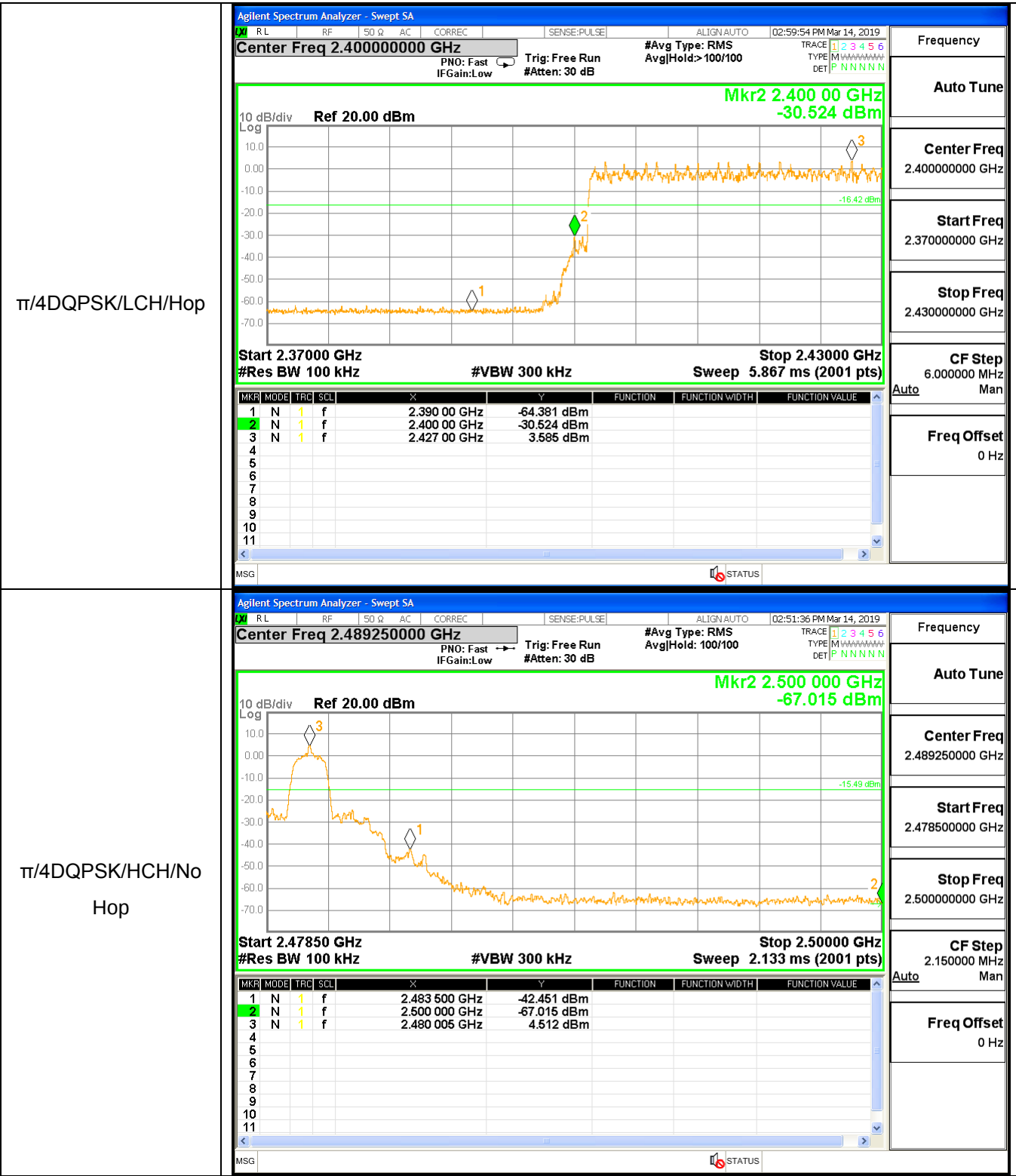
Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
1DH5	2402	2390	3.88	-65.18	-16.12	Pass
1DH5	2402	2400	3.88	-31.96	-16.12	Pass
1DH5-Hopping	2402	2390	4.32	-65.32	-15.68	Pass
1DH5-Hopping	2402	2400	4.32	-36.60	-15.68	Pass
1DH5	2480	2483.5	5.17	-40.11	-14.83	Pass
1DH5	2480	2500	5.17	-65.14	-14.83	Pass
1DH5-Hopping	2480	2483.5	5.14	-42.09	-14.87	Pass
1DH5-Hopping	2480	2500	5.14	-64.19	-14.87	Pass
2DH5	2402	2390	3.02	-65.02	-16.98	Pass
2DH5	2402	2400	3.02	-39.55	-16.98	Pass
2DH5-Hopping	2402	2390	3.59	-51.15	-15.69	Pass
2DH5-Hopping	2402	2400	3.59	-63.69	-15.69	Pass
2DH5	2480	2483.5	4.51	-42.45	-15.49	Pass
2DH5	2480	2500	4.51	-67.02	-15.49	Pass
2DH5-Hopping	2480	2483.5	4.31	-64.38	-16.42	Pass
2DH5-Hopping	2480	2500	4.31	-30.52	-16.42	Pass

Test Graph

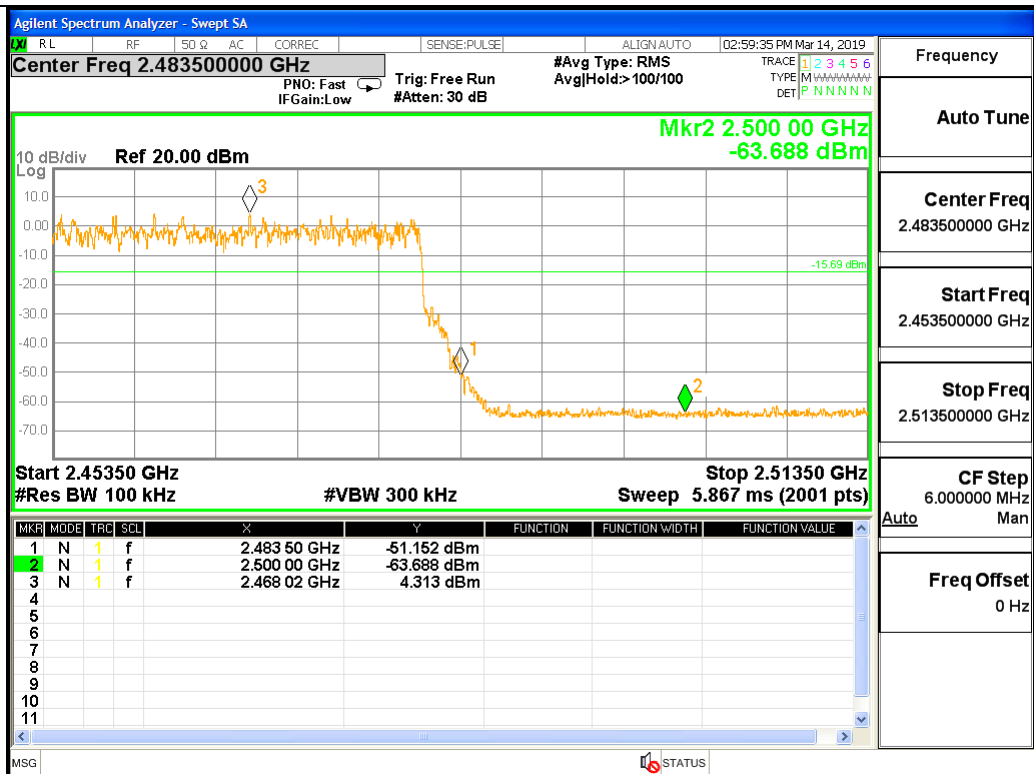




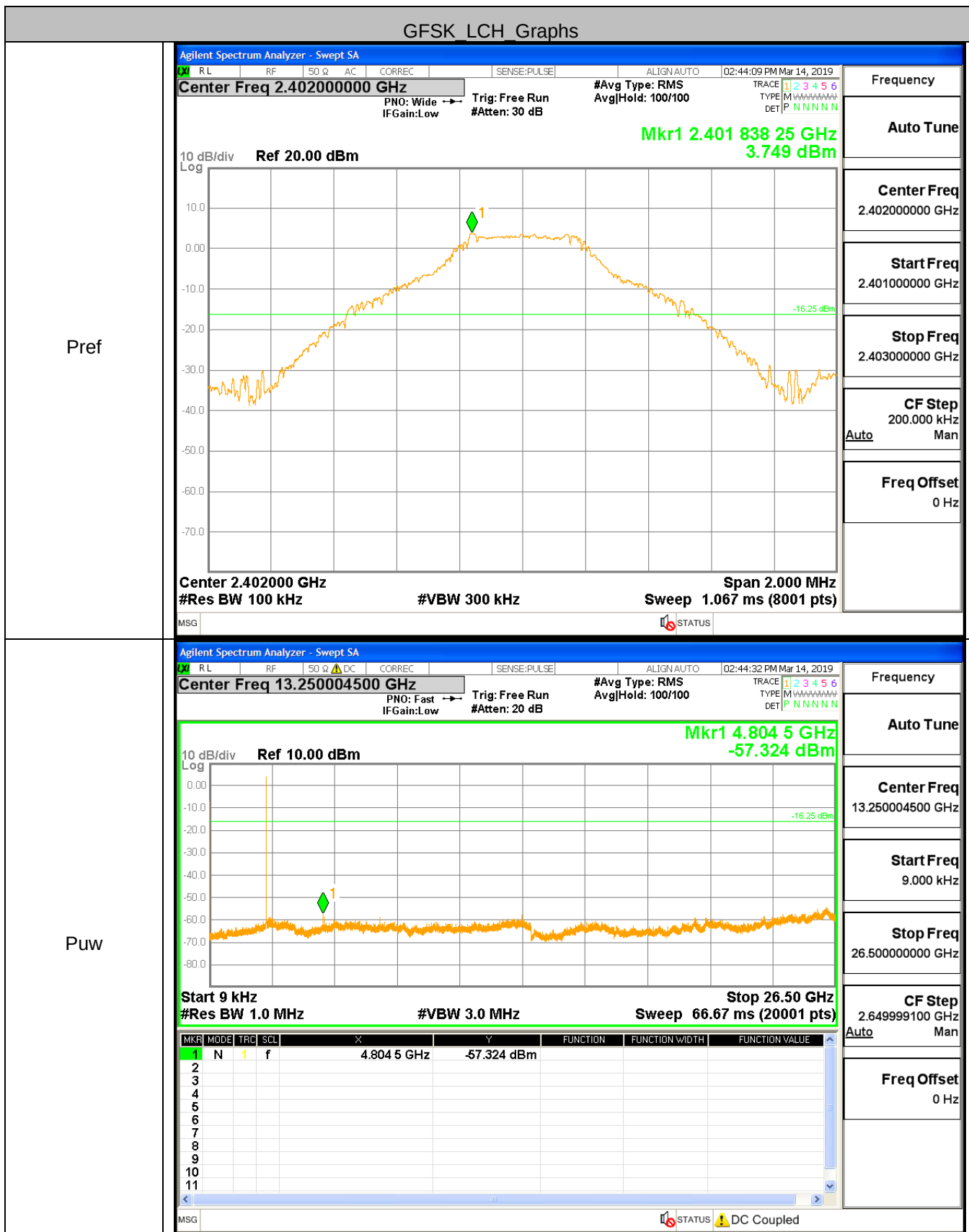




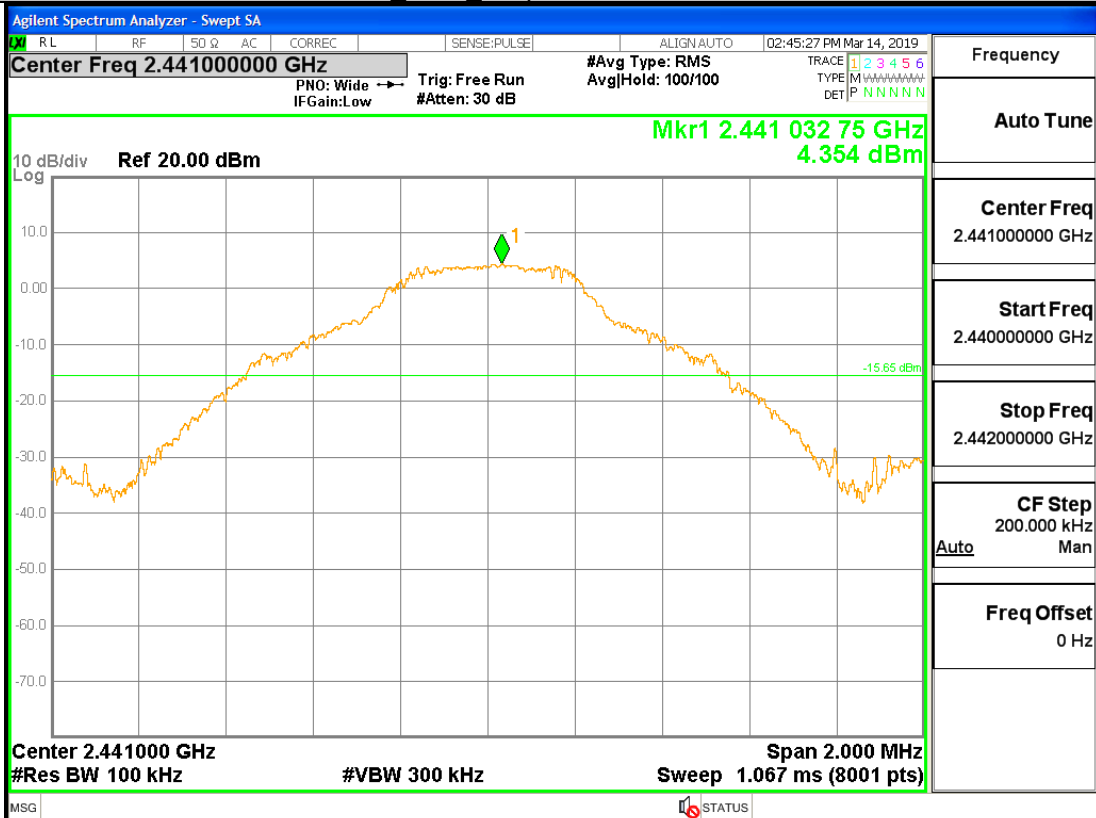
$\pi/4$ DQPSK/HCH/Hop



Test Graph

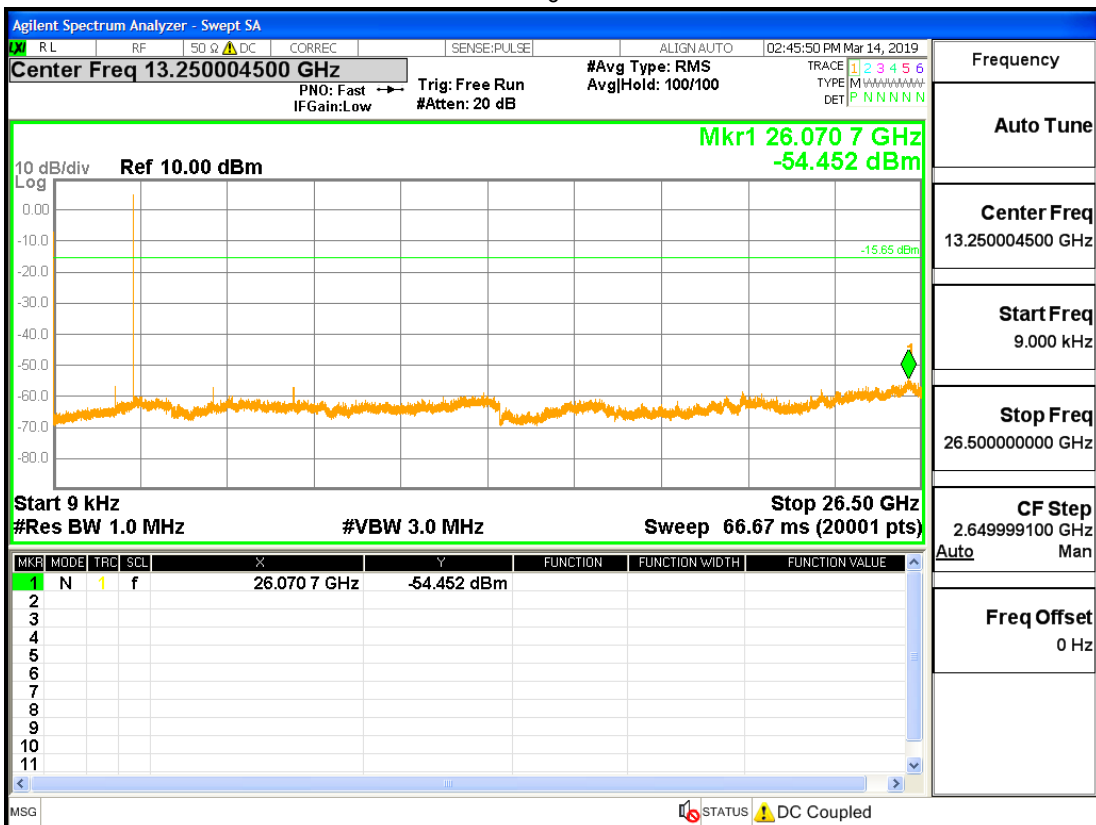


GFSK MCH Graphs

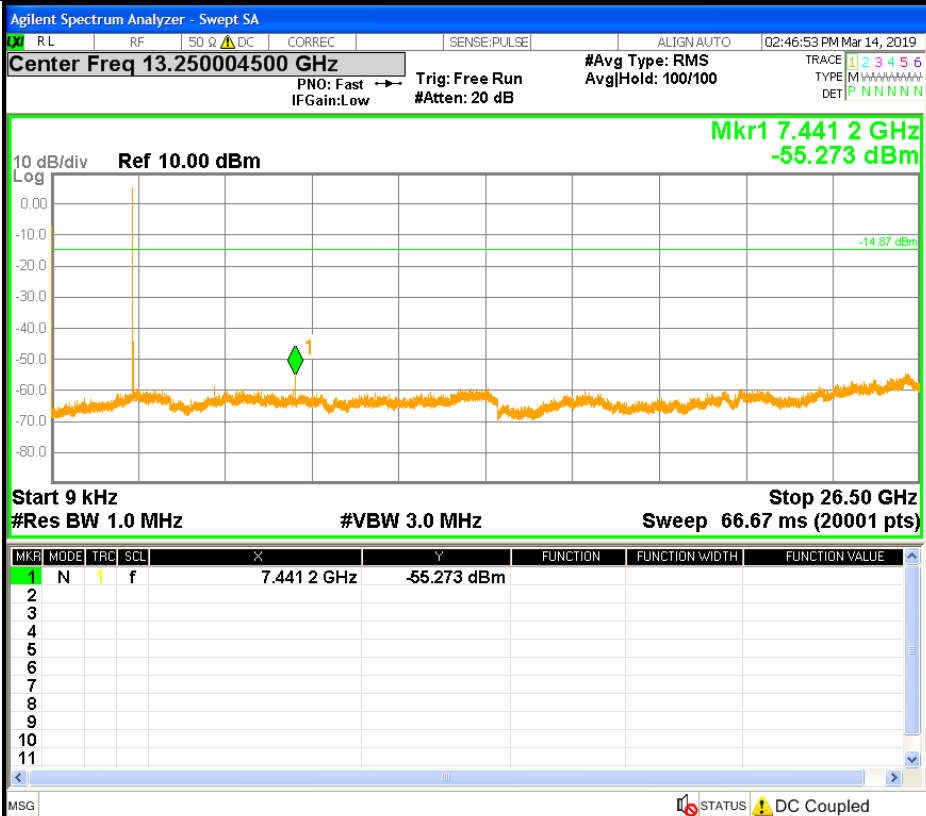
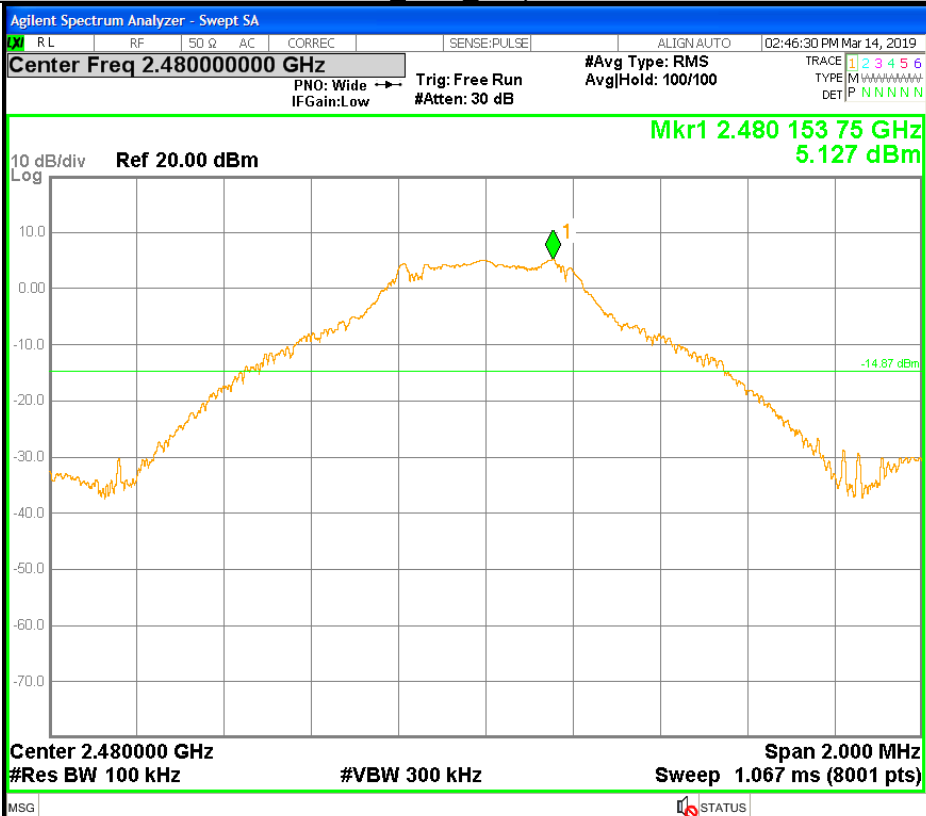


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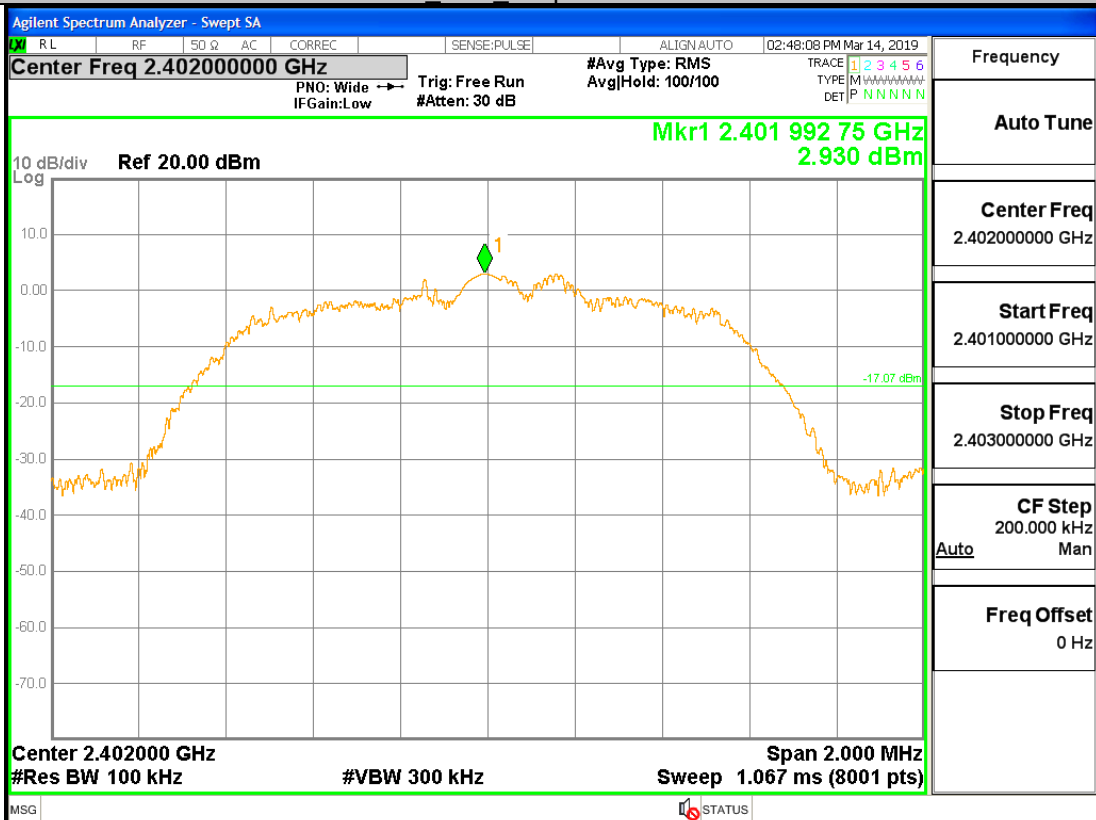
Puw



GFSK HCH Graphs



$\pi/4$ DQPSK LCH Graphs



Agilent Spectrum Analyzer - Swept SA

Center Freq 13.250004500 GHz

Ref 10.00 dBm

10 dB/div

Log

Mkr1 26.077 3 GHz
-54.391 dBm

Start 9 kHz

#Res BW 1.0 MHz

#VBW 3.0 MHz

Stop 26.50 GHz

Sweep 66.67 ms (20001 pts)

MkR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	26.077 3 GHz	-54.391 dBm			
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

Frequency

Auto Tune

Center Freq 13.250004500 GHz

Start Freq 9.000 kHz

Stop Freq 26.500000000 GHz

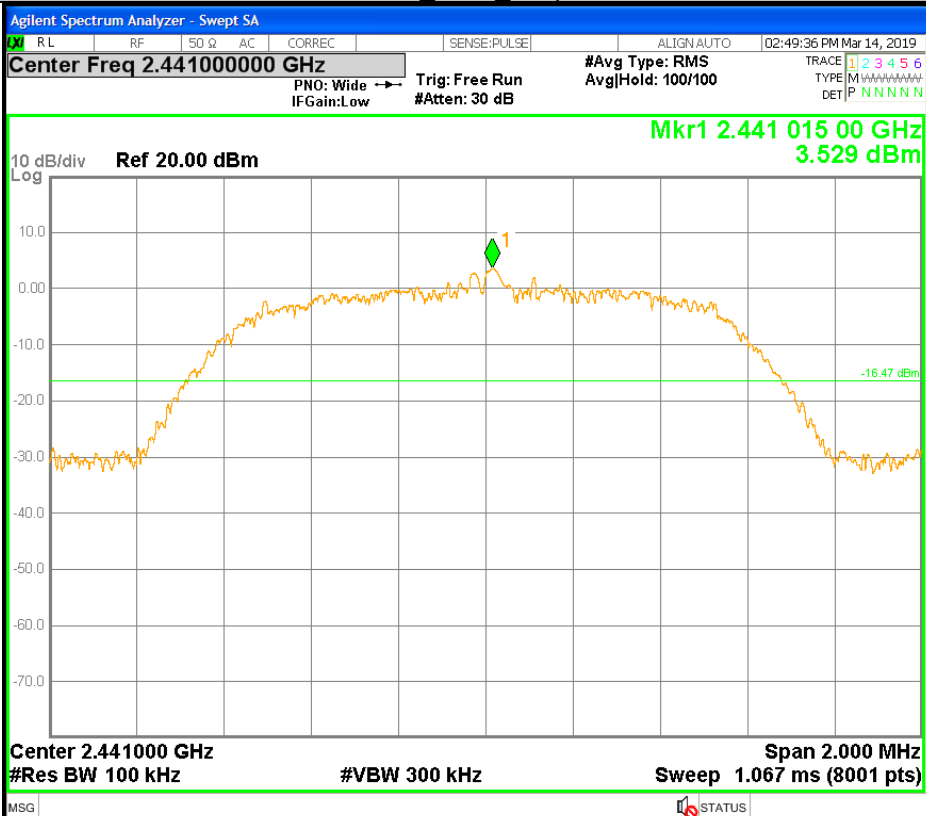
CF Step 2.649999100 GHz

Auto Man

Freq Offset 0 Hz

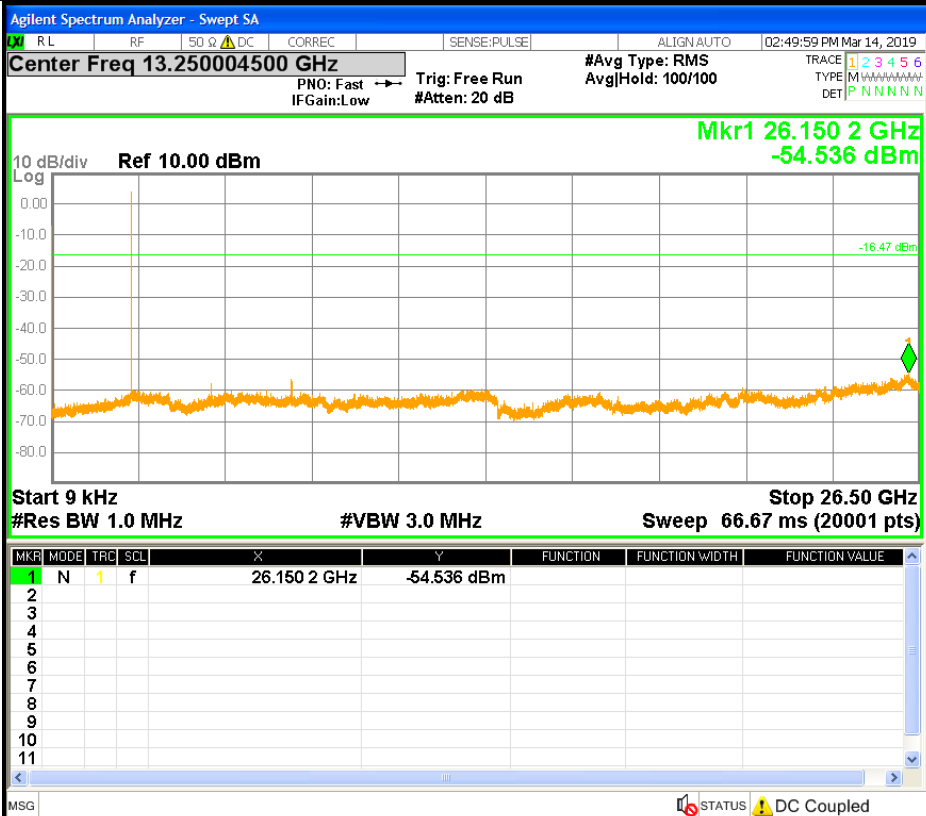
STATUS DC Coupled

$\pi/4$ DQPSK MCH Graphs



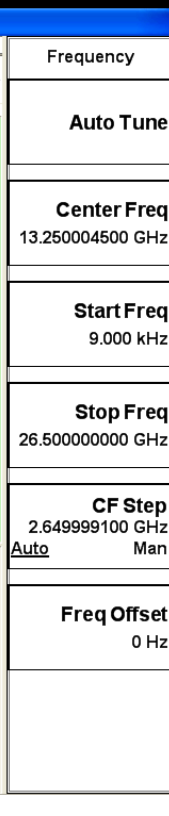
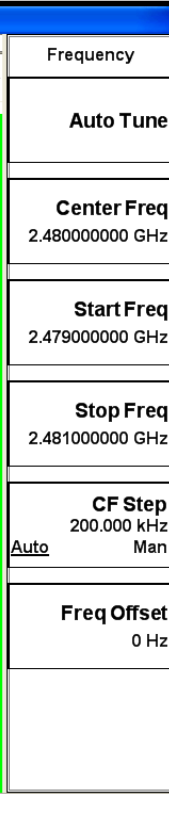
Frequency
Auto Tune
Center Freq 2.441000000 GHz
Start Freq 2.440000000 GHz
Stop Freq 2.442000000 GHz
CF Step 200.000 kHz
Auto Man
Freq Offset 0 Hz

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



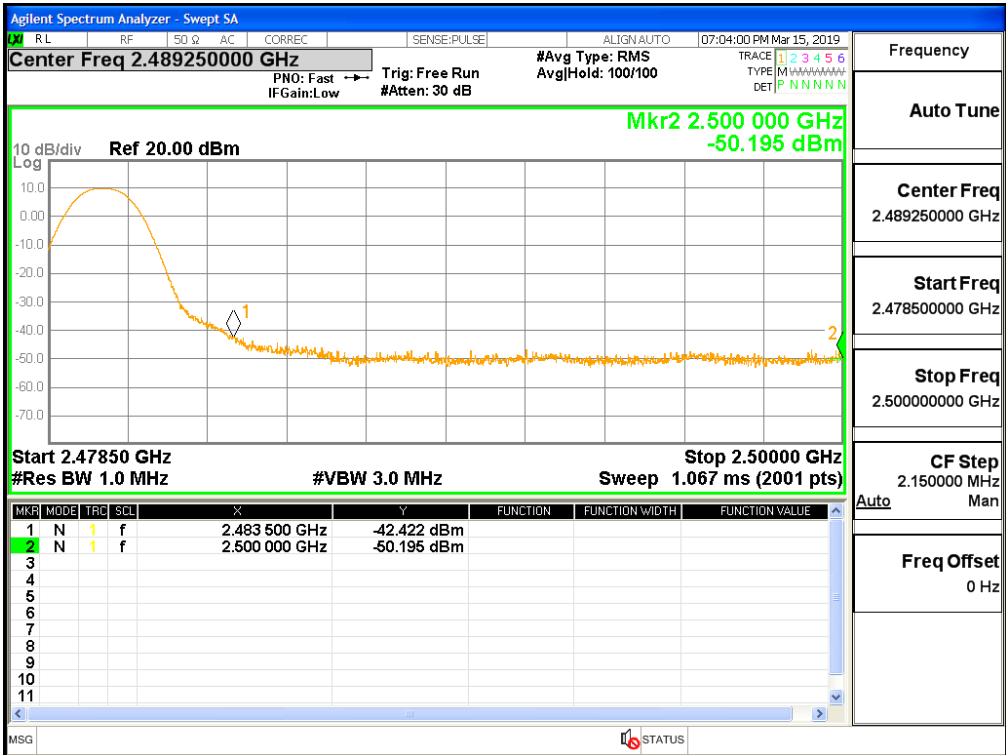
A.8 Restrict-band measurements

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	-57.14	40.06	74	-63.78	33.42	54	Pass
1DH5	2402	2390	2.00	0.00	-55.48	41.72	74	-63.06	34.14	54	Pass
1DH5	2480	2483.5	2.00	0.00	-42.42	54.78	74	-47.75	49.45	54	Pass
1DH5	2480	2500	2.00	0.00	-50.2	47	74	-57.66	39.54	54	Pass
2DH5	2402	2310	2.00	0.00	-50.92	46.28	74	-58.86	38.34	54	Pass
2DH5	2402	2390	2.00	0.00	-51.78	45.42	74	-58.41	38.79	54	Pass
2DH5	2480	2483.5	2.00	0.00	-43.65	53.55	74	-50.3	46.9	54	Pass
2DH5	2480	2500	2.00	0.00	-50.89	46.31	74	-57.8	39.4	54	Pass

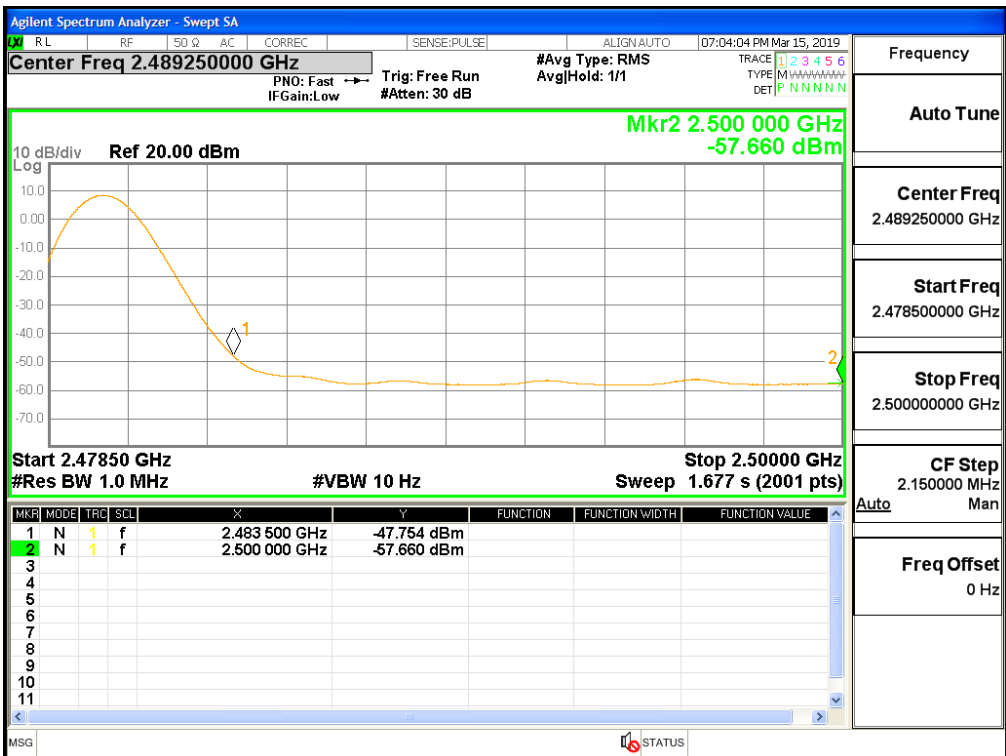
Test Graph



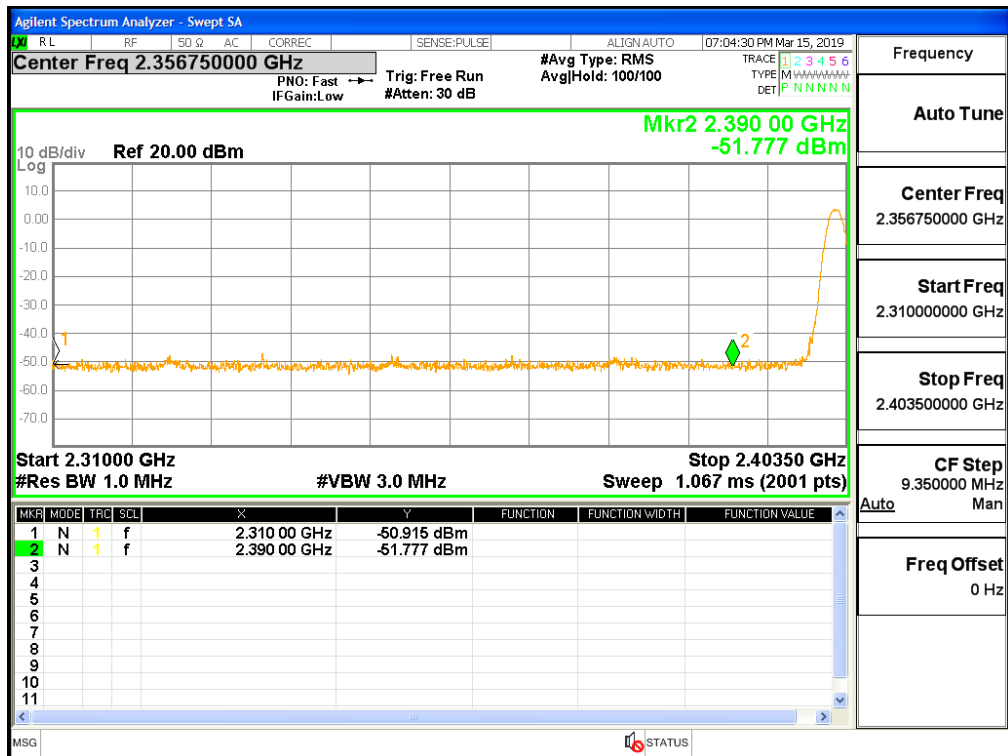
Restrict-band band-edge measurements_2480_PEAK_DH5



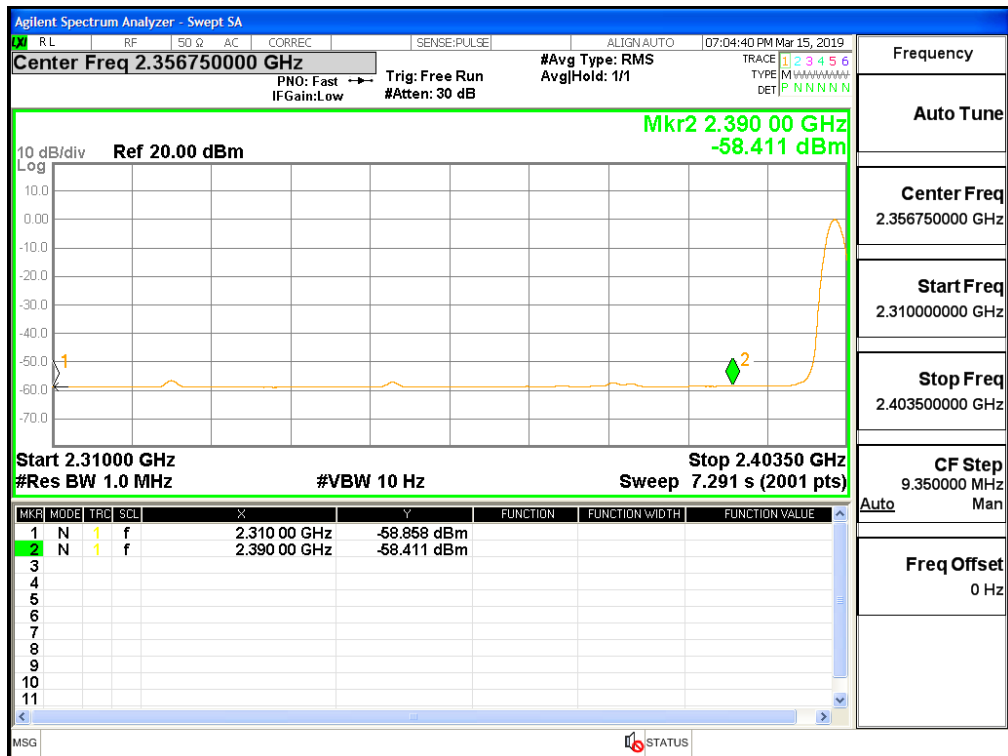
Restrict-band band-edge measurements_2480_AV_DH5



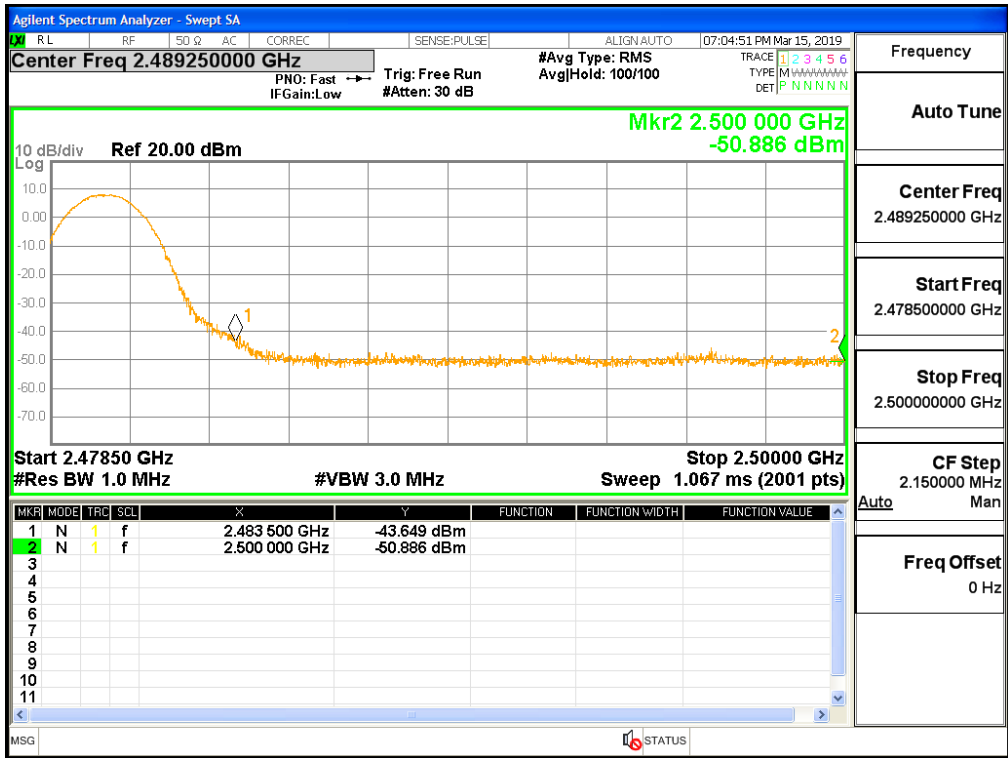
Restrict-band band-edge measurements_2402_PEAK_2DH5



Restrict-band band-edge measurements_2402_AV_2DH5



Restrict-band band-edge measurements_2480_PEAK_2DH5



Restrict-band band-edge measurements_2480_AV_2DH5

