

Appendix A

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

Product Name: TRUE WIRELESS EARBUDS WITH CHARGING CASE

Trade Mark: N/A

Test Model: RT02B

FCC ID: 2ATOY-RT02B

Environmental Conditions

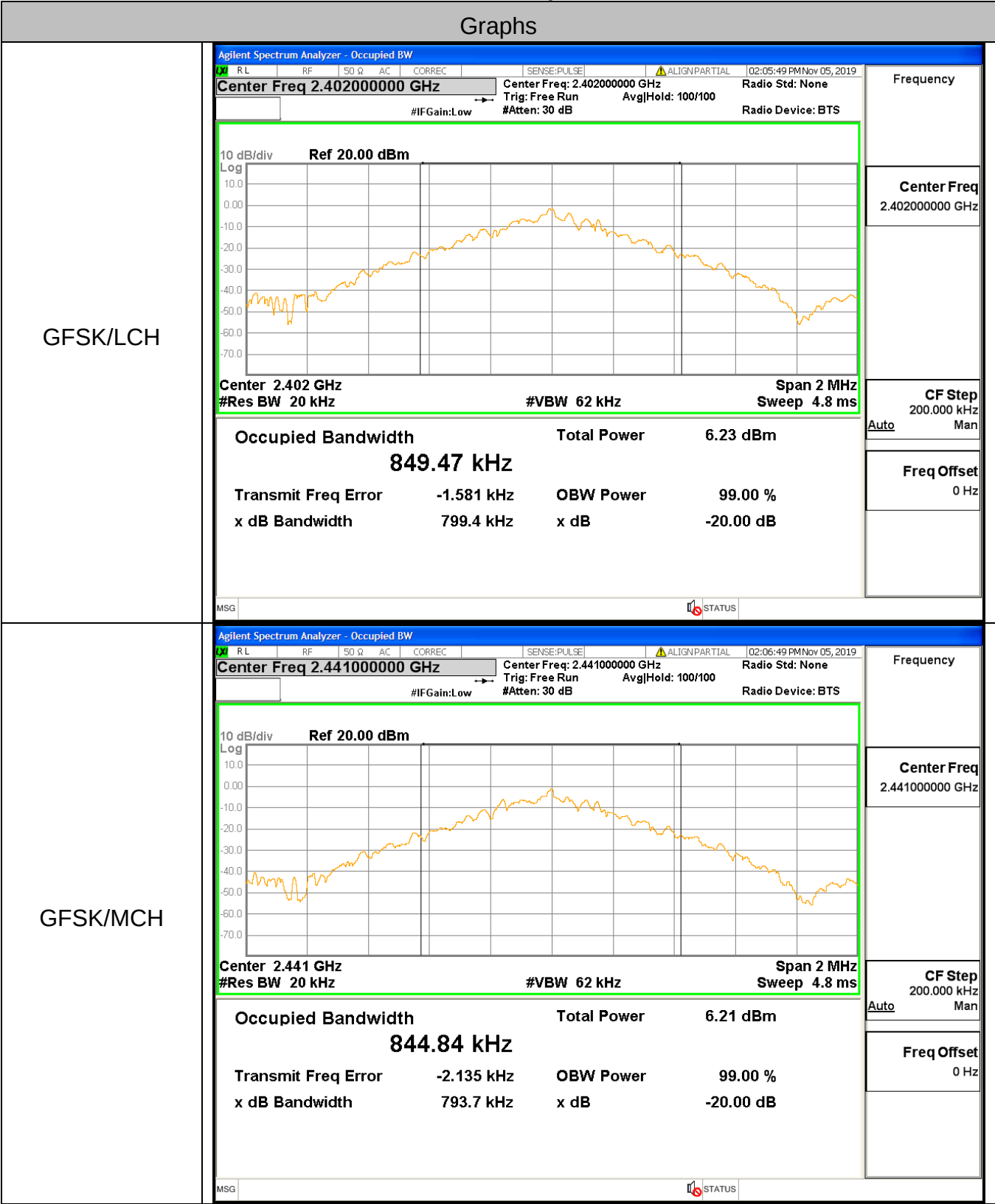
Temperature:	22.7° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Gary Qian
Supervised by:	Eden Hu

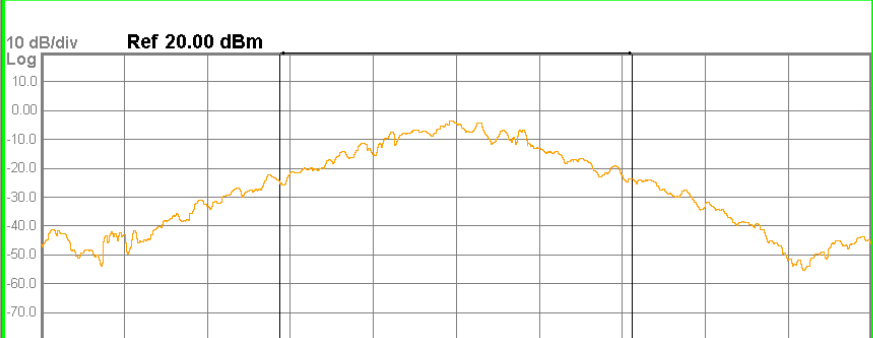
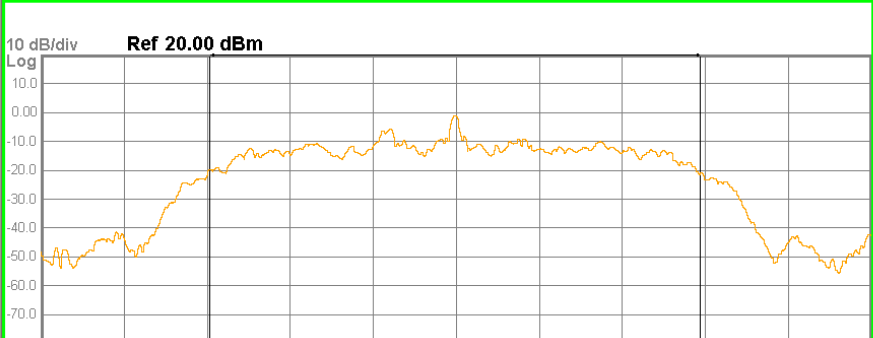
A.1 20 dB Bandwidth

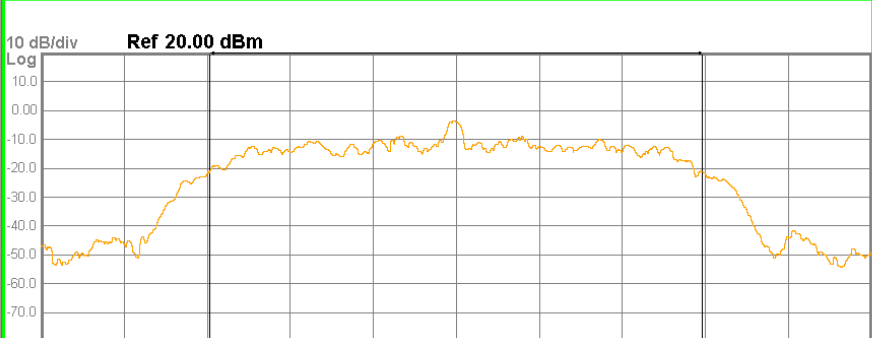
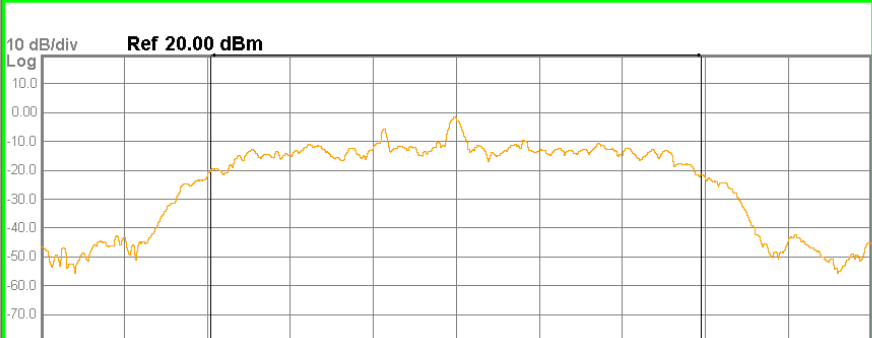
Mode	Channel.	20dB Bandwidth [MHz]	Limit(MHz)	Verdict
GFSK	LCH	0.799	Not Specified	PASS
GFSK	MCH	0.794	Not Specified	PASS
GFSK	HCH	0.857	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.190	Not Specified	PASS
$\pi/4$ DQPSK	MCH	1.255	Not Specified	PASS
$\pi/4$ DQPSK	HCH	1.192	Not Specified	PASS

Test Graph

Graphs



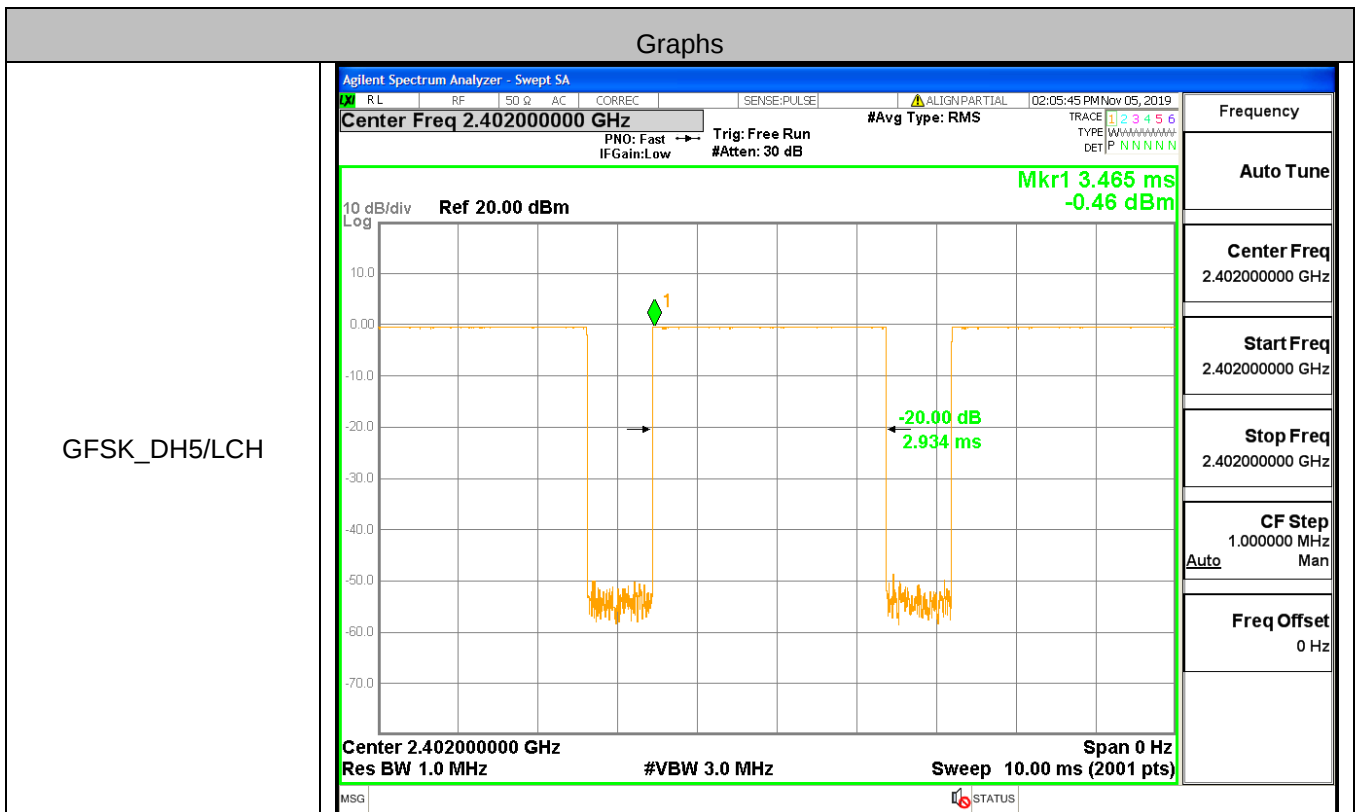
GFSK/HCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:PARTIAL 02:07:50 PM Nov 05, 2019 Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Radio Std: None #IFGain:Low Trig: Free Run AvgHold: 100/100 Radio Device: BTS				Frequency
					Center Freq 2.480000000 GHz
	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 849.43 kHz Total Power 5.76 dBm Transmit Freq Error -745 Hz OBW Power 99.00 % x dB Bandwidth 857.4 kHz x dB -20.00 dB				Freq Offset 0 Hz
π/4DQPSK/LCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:PARTIAL 02:08:50 PM Nov 05, 2019 Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Radio Std: None #IFGain:Low Trig: Free Run AvgHold: 100/100 Radio Device: BTS				Frequency
					Center Freq 2.402000000 GHz
	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 1.1765 MHz Total Power 5.83 dBm Transmit Freq Error -1.223 kHz OBW Power 99.00 % x dB Bandwidth 1.190 MHz x dB -20.00 dB				Freq Offset 0 Hz

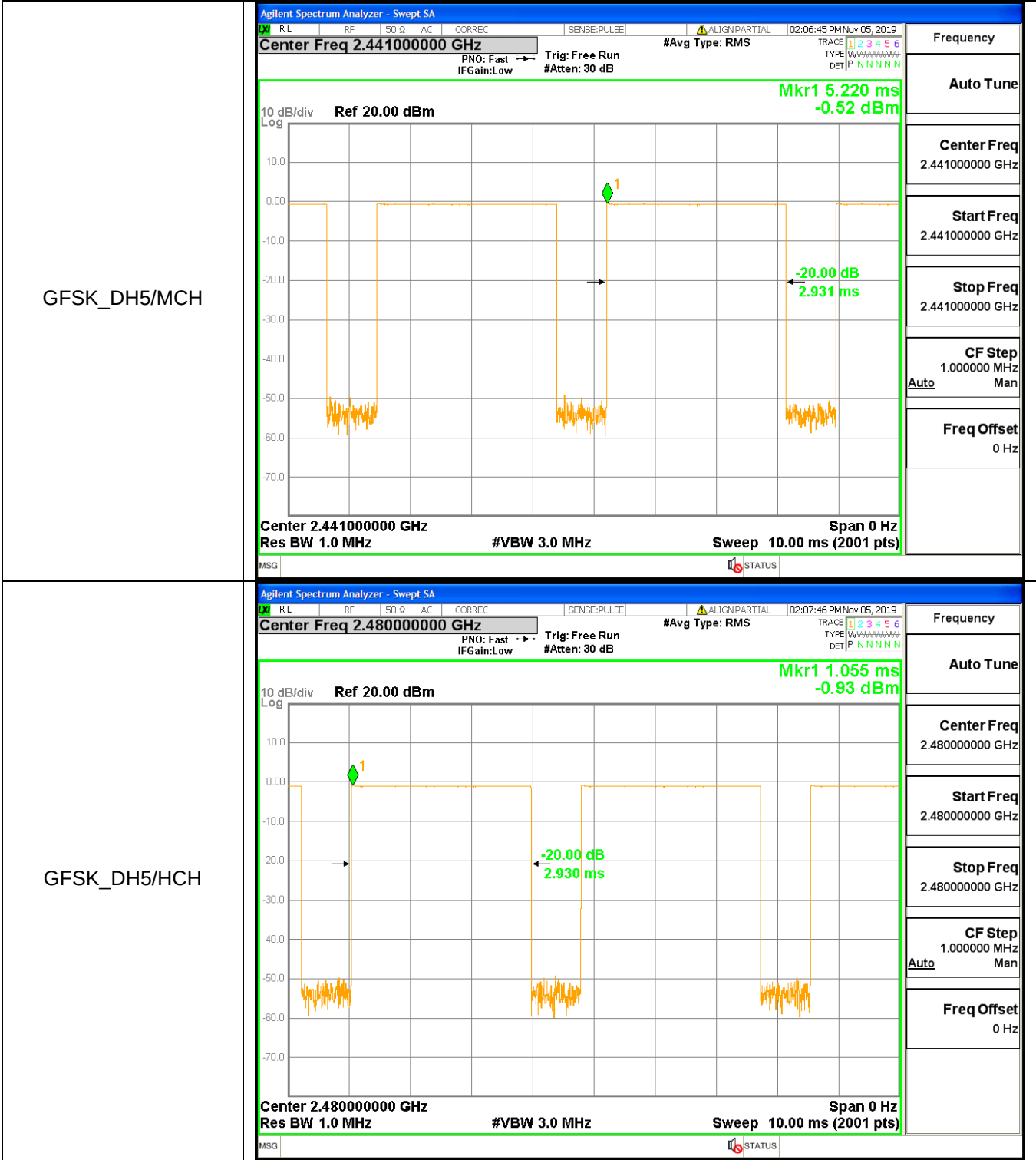
$\pi/4$DQPSK/MCH	Agilent Spectrum Analyzer - Occupied BW Center Freq 2.441000000 GHz Center Freq: 2.441000000 GHz Trig: Free Run #IFGain: Low #Atten: 30 dB AvgHold: 100/100 Radio Std: None Radio Device: BTS  Ref 20.00 dBm Center 2.441 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms Occupied Bandwidth 1.1849 MHz Total Power 5.39 dBm Transmit Freq Error 395 Hz OBW Power 99.00 % x dB Bandwidth 1.255 MHz x dB -20.00 dB	Frequency Center Freq 2.441000000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz
$\pi/4$DQPSK/HCH	Agilent Spectrum Analyzer - Occupied BW Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Trig: Free Run #IFGain: Low #Atten: 30 dB AvgHold: 100/100 Radio Std: None Radio Device: BTS  Ref 20.00 dBm Center 2.48 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms Occupied Bandwidth 1.1789 MHz Total Power 5.35 dBm Transmit Freq Error -914 Hz OBW Power 99.00 % x dB Bandwidth 1.192 MHz x dB -20.00 dB	Frequency Center Freq 2.480000000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz

A.2 Dwell Time

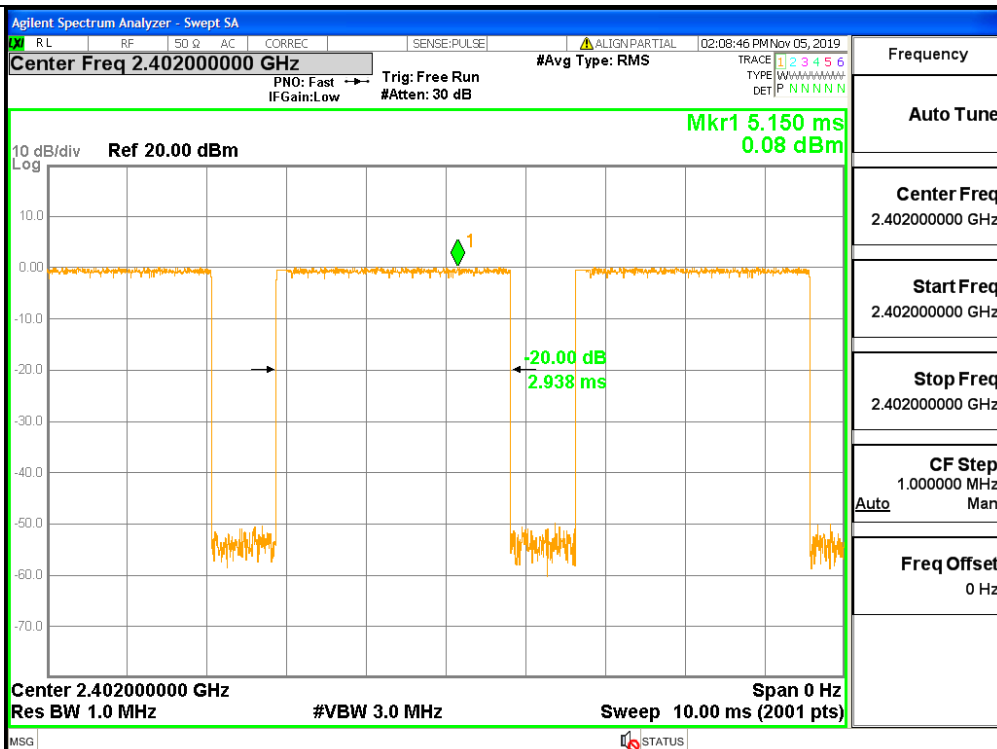
Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.002934	106.7	0.313013	0.4	PASS
GFSK	DH5	MCH	0.002931	106.7	0.312731	0.4	PASS
GFSK	DH5	HCH	0.002930	106.7	0.312642	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	0.002938	106.7	0.313522	0.4	PASS
$\pi/4$ DQPSK	2DH5	MCH	0.002936	106.7	0.313223	0.4	PASS
$\pi/4$ DQPSK	2DH5	HCH	0.002938	106.7	0.313515	0.4	PASS

Test Graph

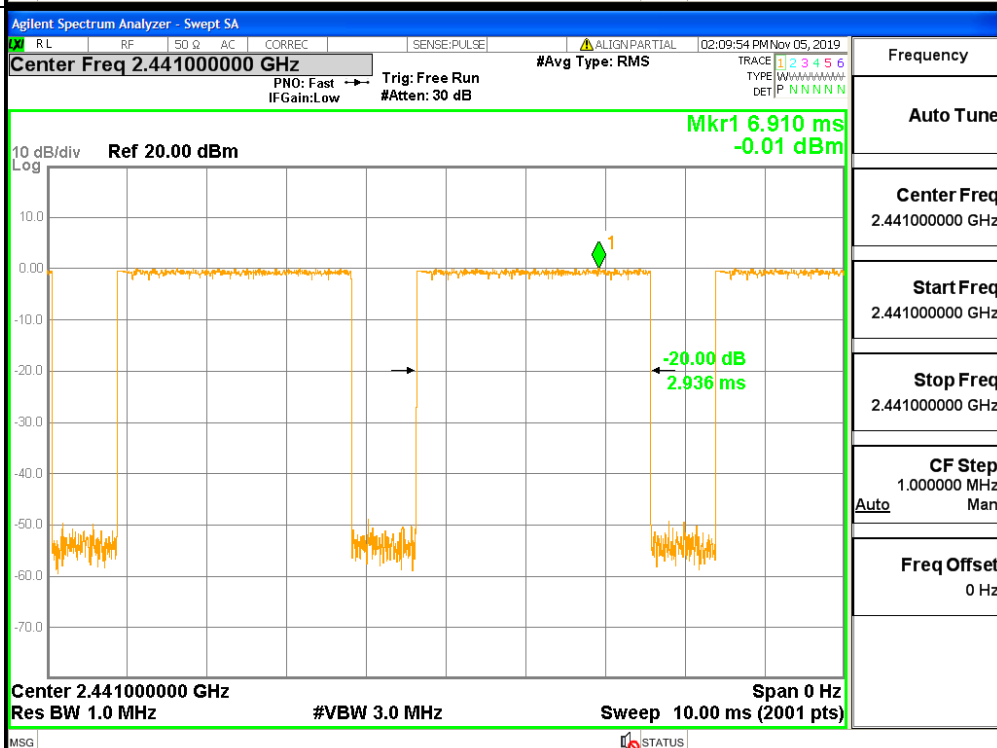




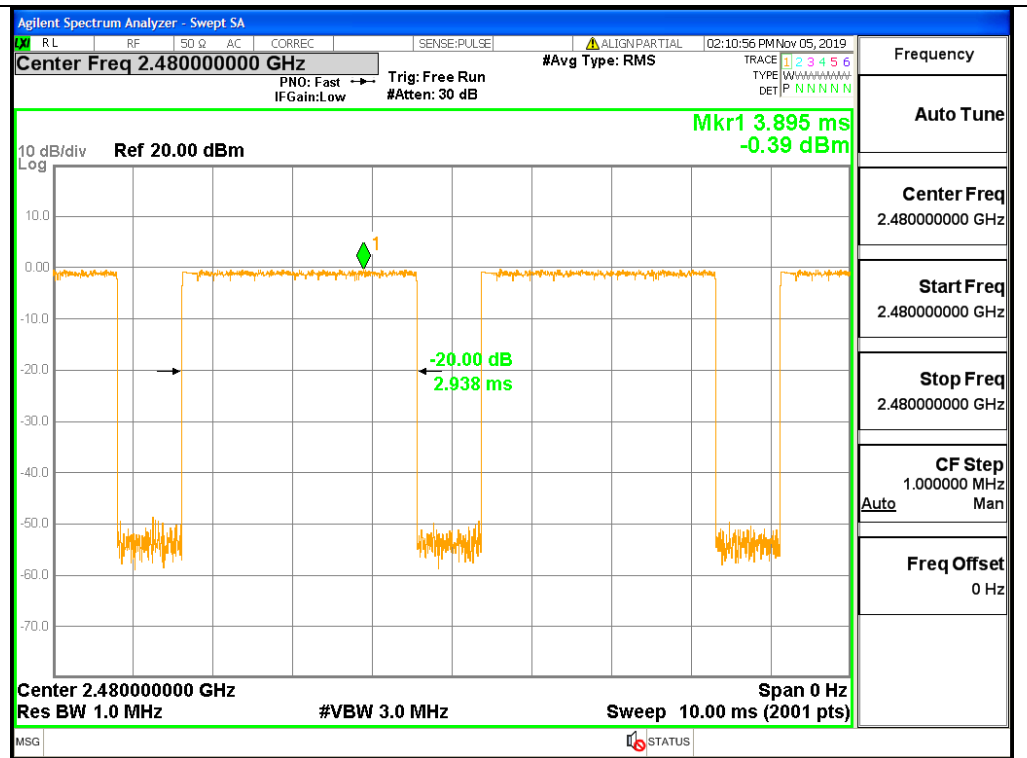
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH



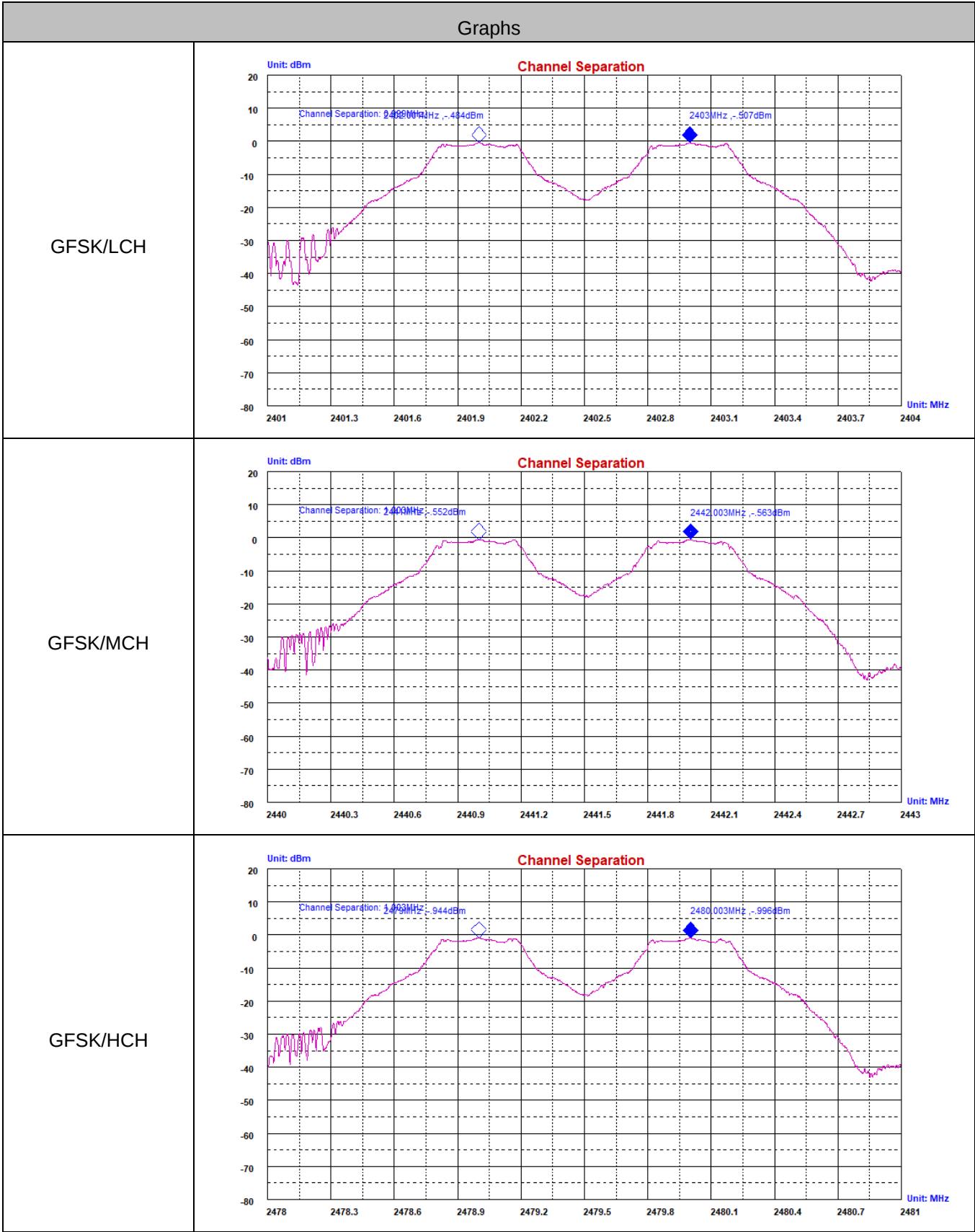
$\pi/4$ DQPSK
_2DH5/HCH

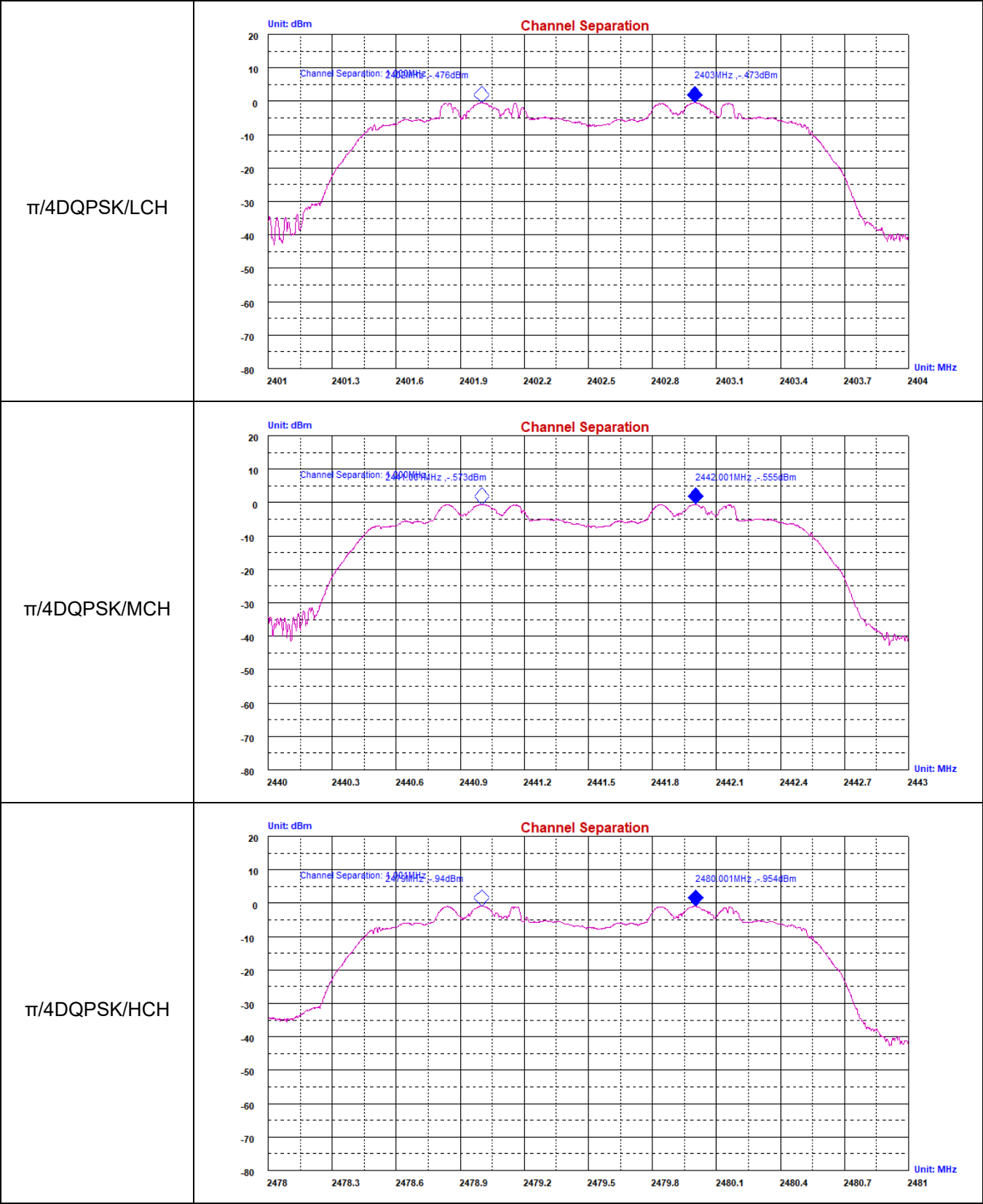


A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.999	0.533	PASS
GFSK	MCH	1.003	0.529	PASS
GFSK	HCH	1.003	0.571	PASS
$\pi/4$ DQPSK	LCH	1.000	0.793	PASS
$\pi/4$ DQPSK	MCH	1.000	0.837	PASS
$\pi/4$ DQPSK	HCH	1.001	0.795	PASS

Test Graph

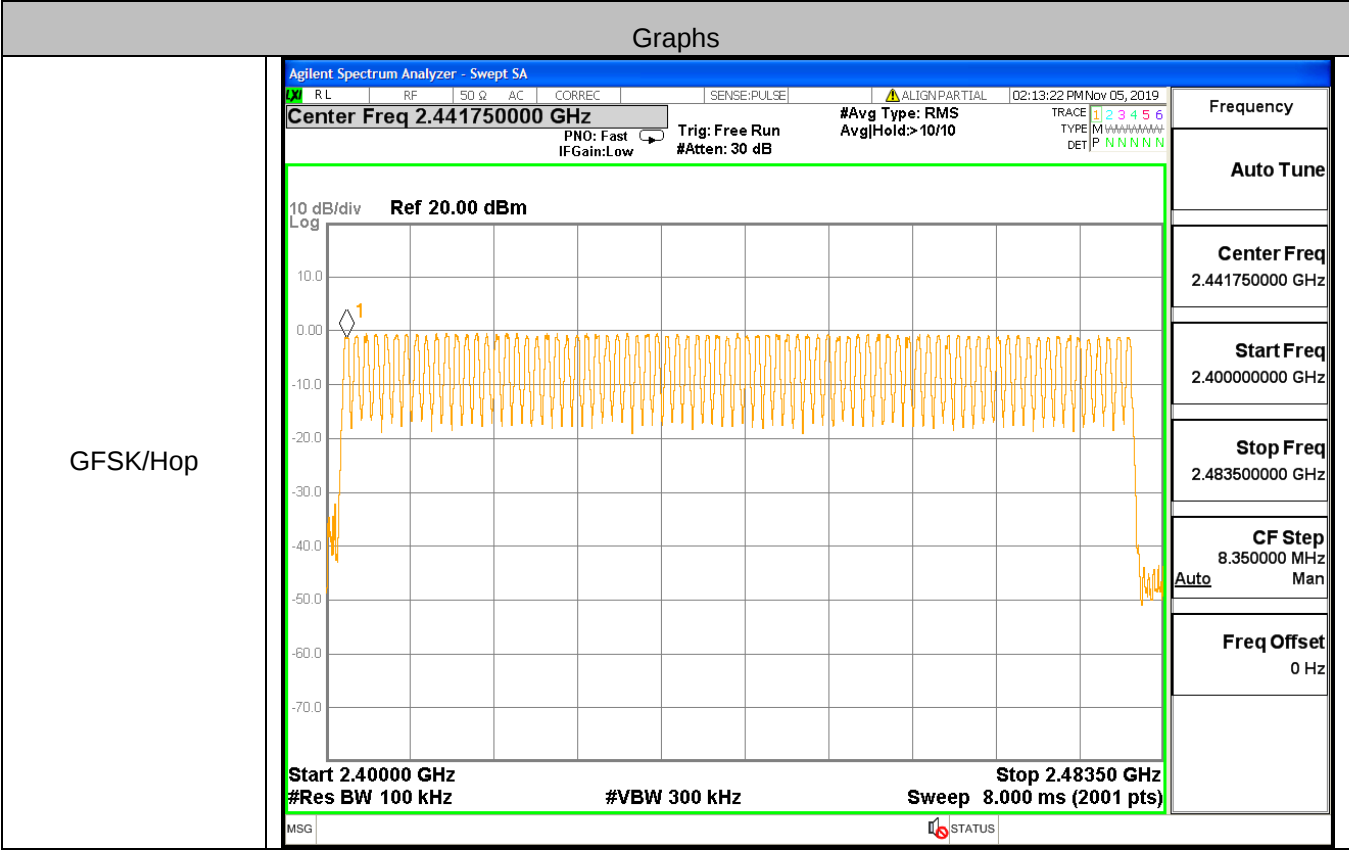


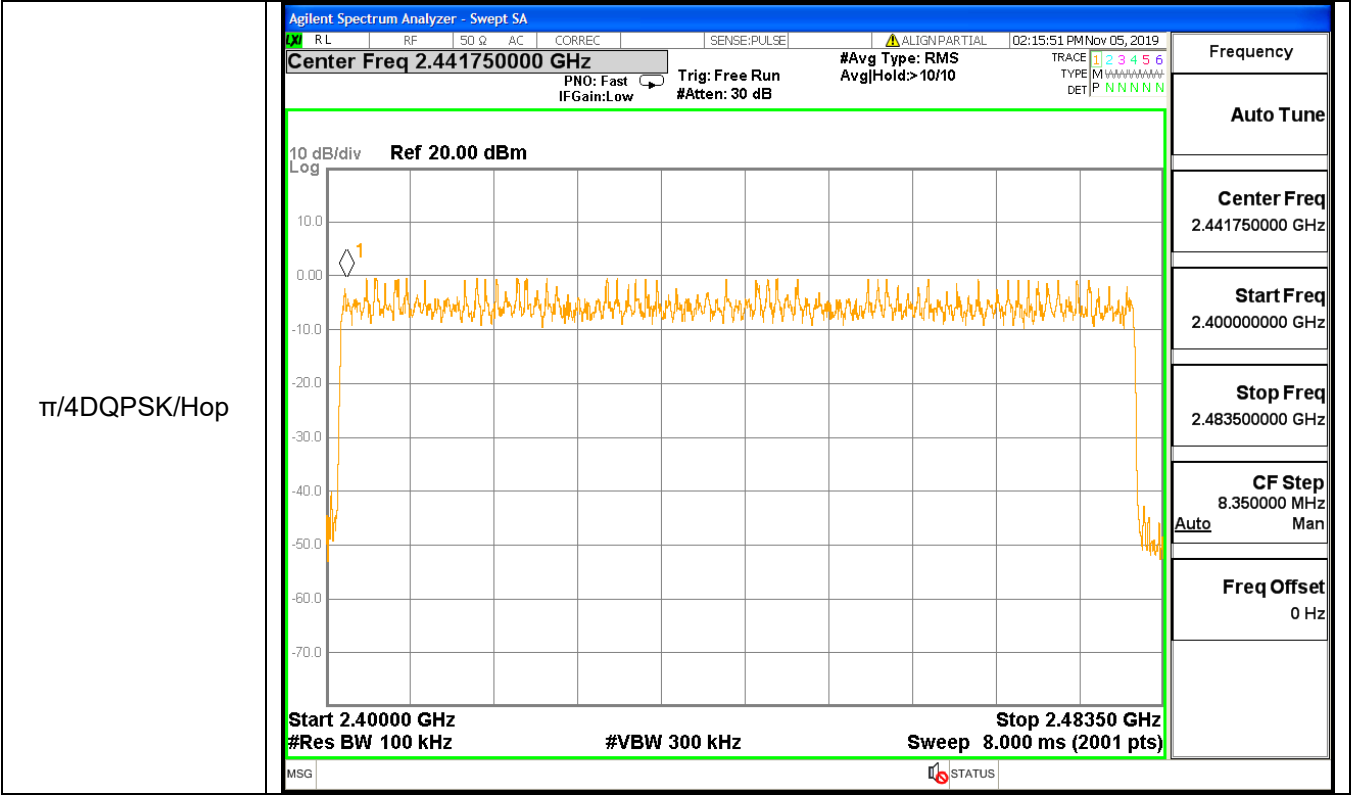


A.4 Hopping Channel Number

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

Test Graph

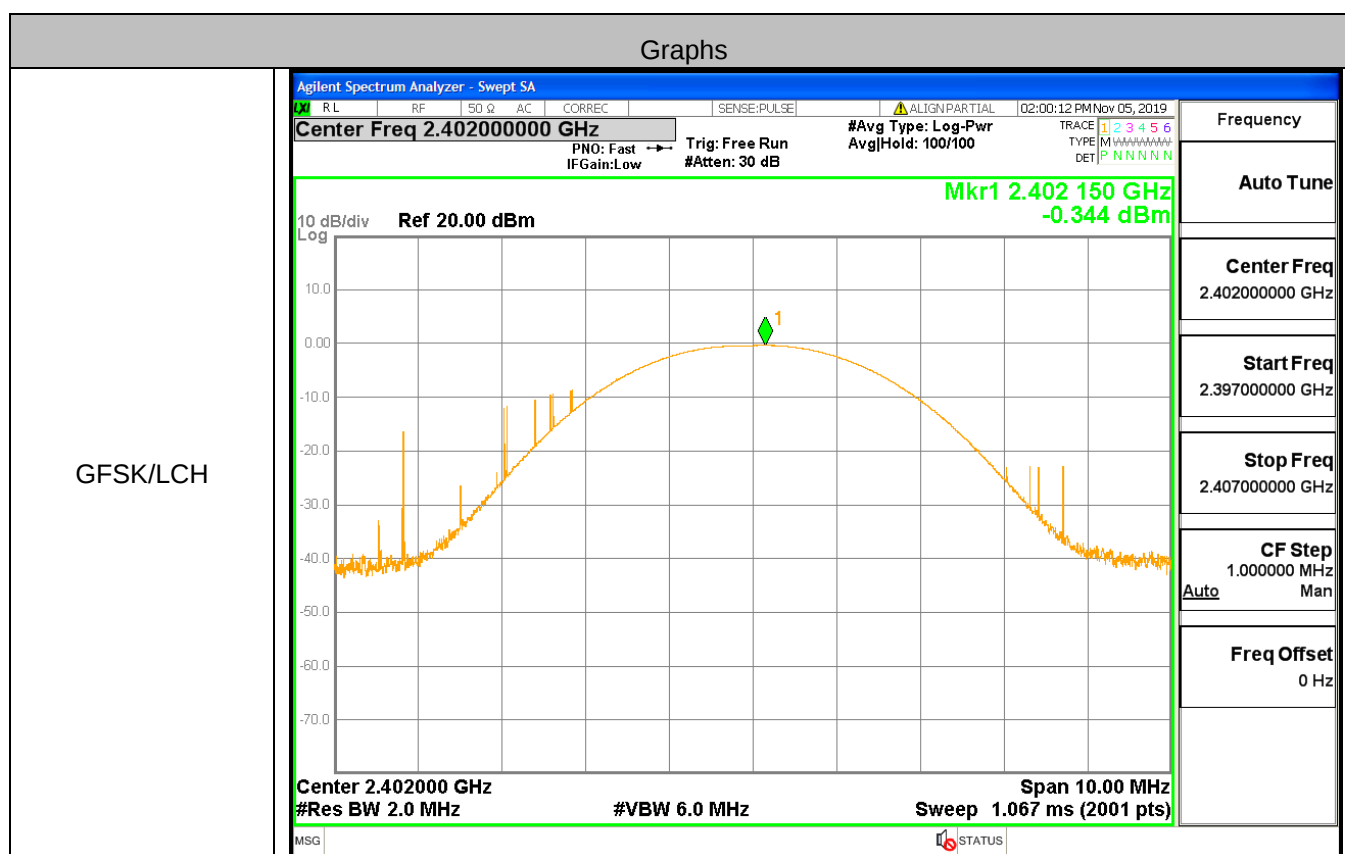




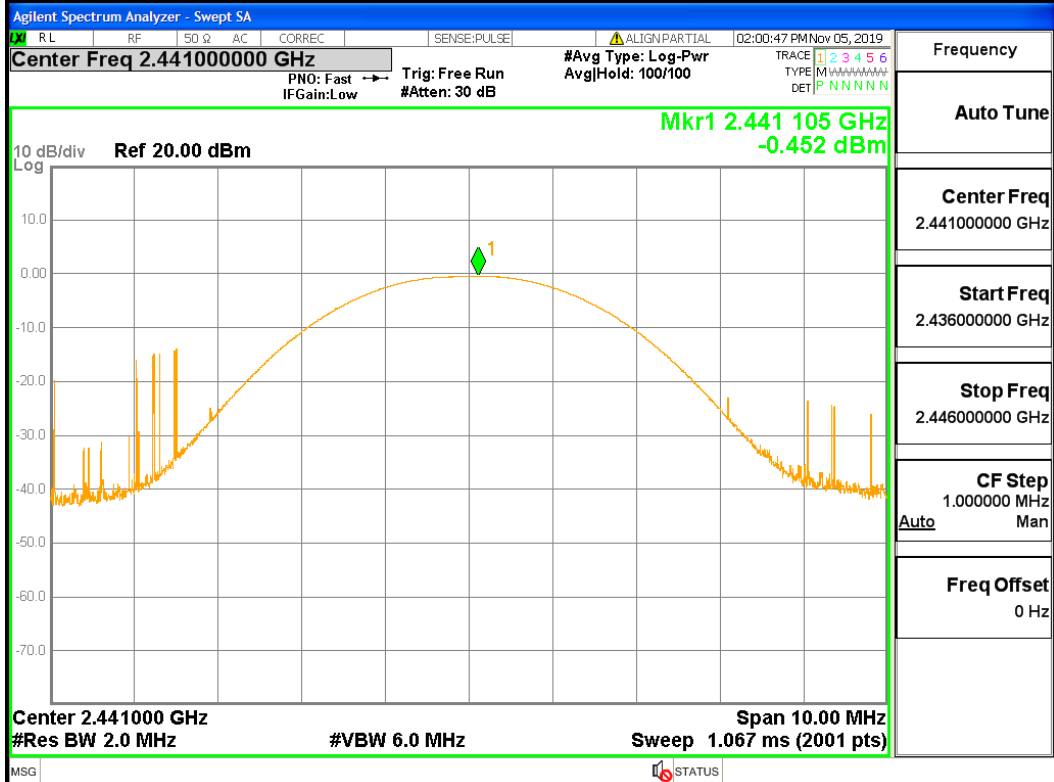
A.5 Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.344	21	PASS
GFSK	MCH	-0.452	21	PASS
GFSK	HCH	-0.836	21	PASS
$\pi/4$ DQPSK	LCH	0.494	21	PASS
$\pi/4$ DQPSK	MCH	0.403	21	PASS
$\pi/4$ DQPSK	HCH	0.020	21	PASS

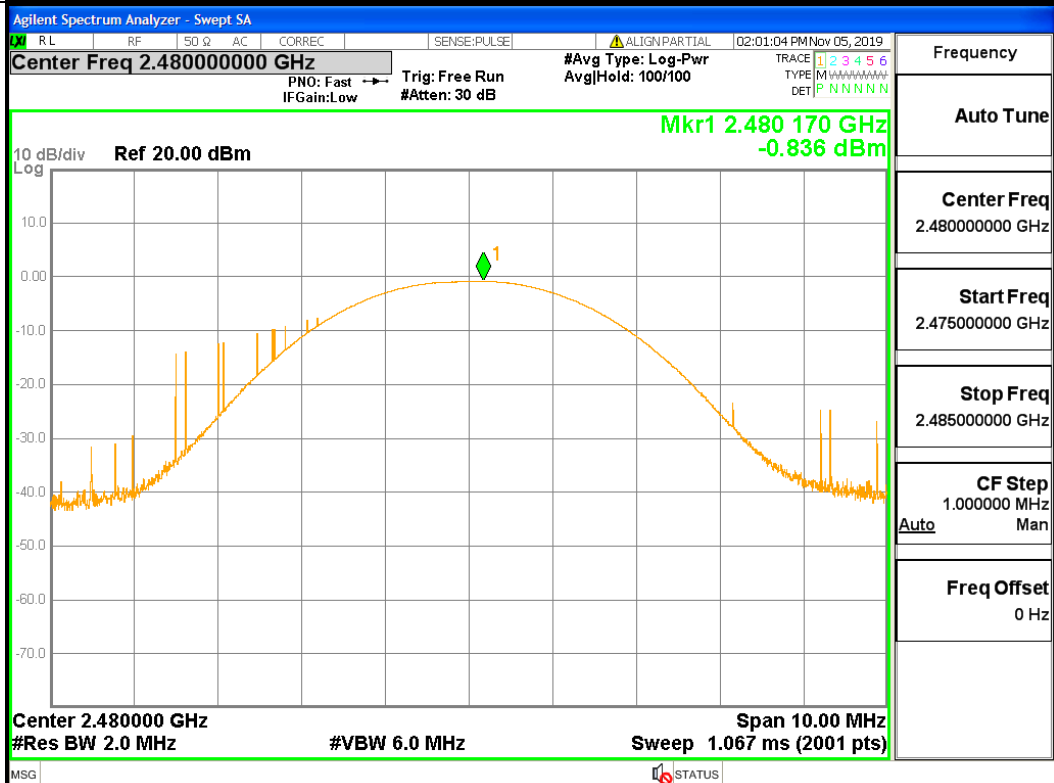
Test Graph

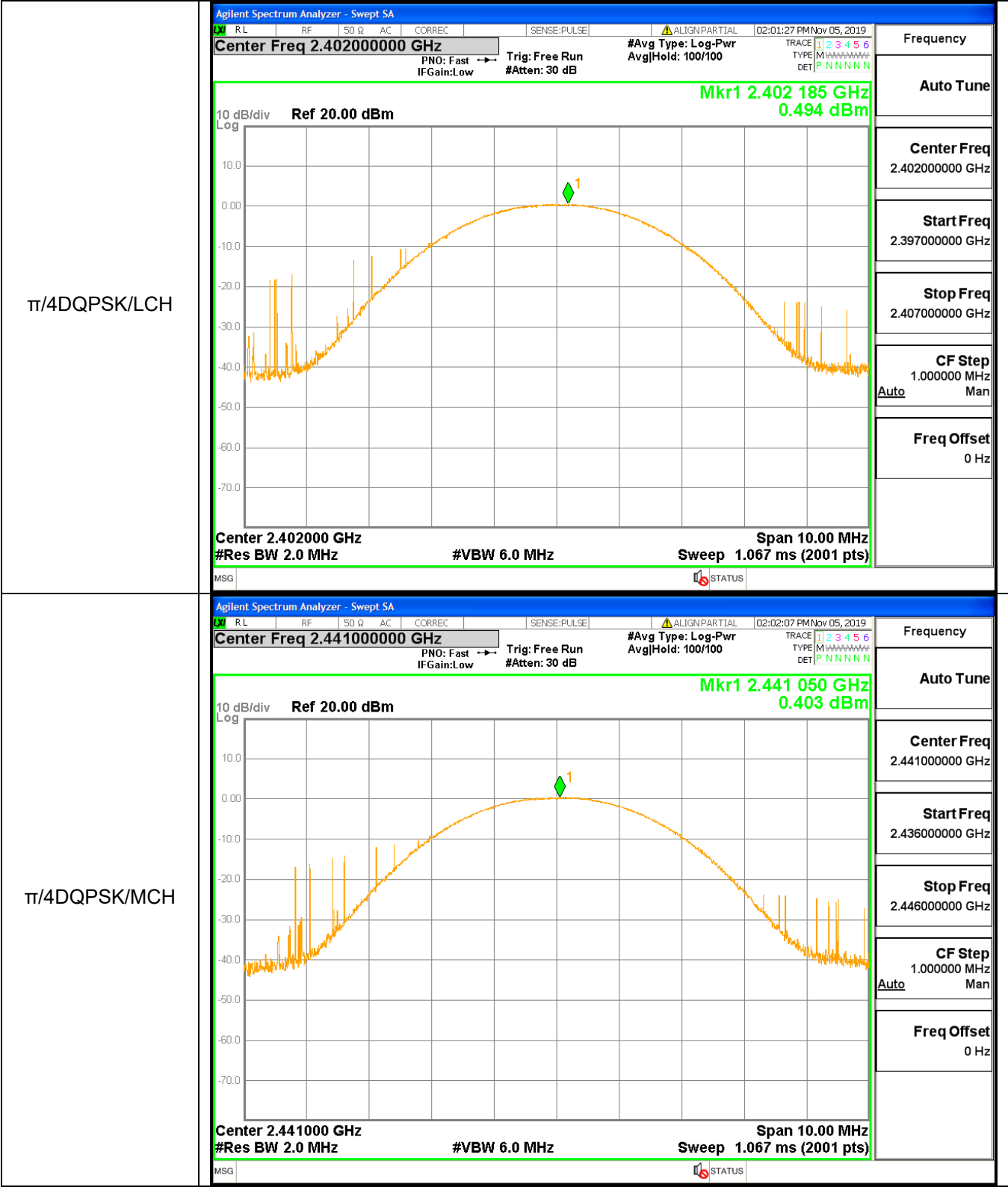


GFSK/MCH



GFSK/HCH



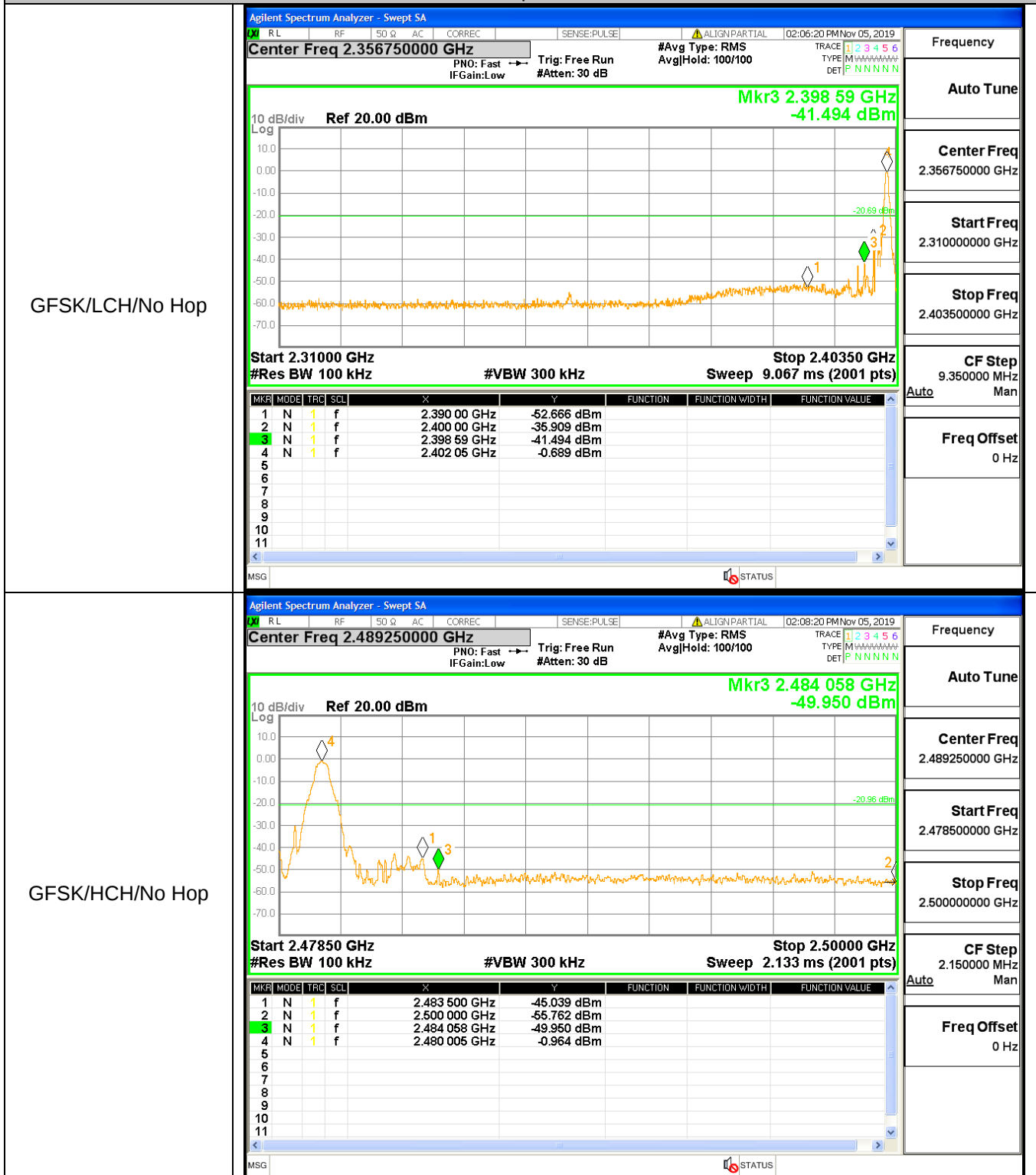


A.6 Band-edge for RF Conducted Emissions

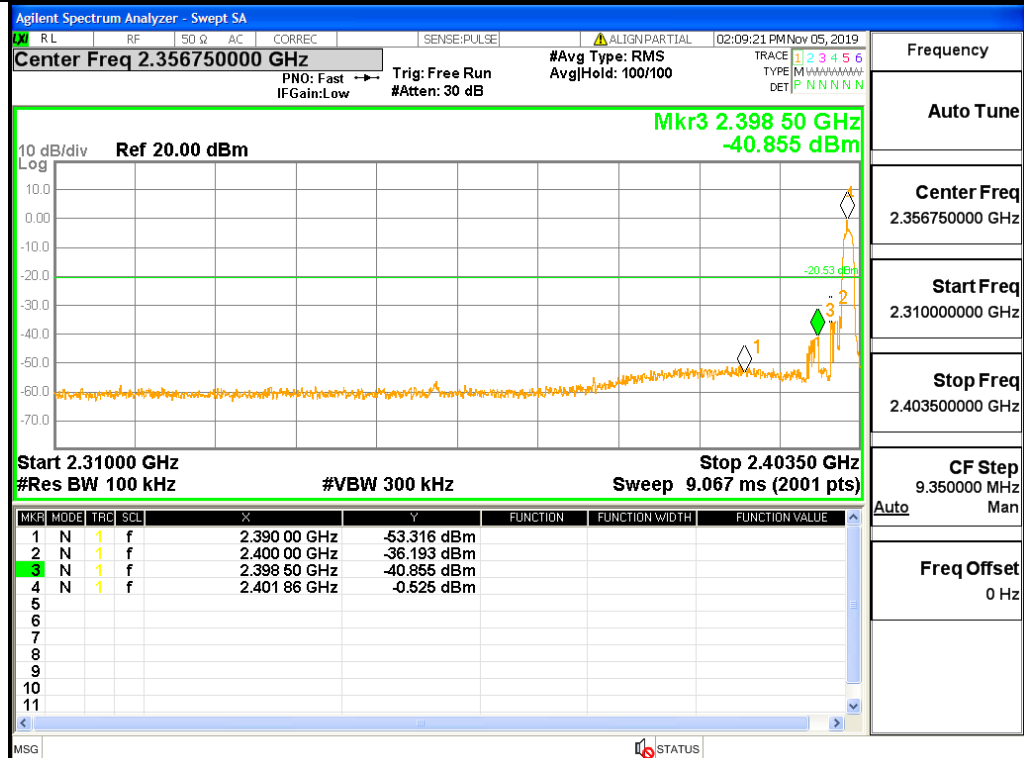
Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
1DH5	2402	2400	-0.689	-35.910	-20.689	Pass
1DH5	2480	2483.5	-0.964	-45.040	-20.964	Pass
2DH5	2402	2400	-0.525	-36.190	-20.525	Pass
2DH5	2480	2489.121	-1.141	-50.218	-21.141	Pass
1DH5-Hopping	2402	2399.88	-0.377	-36.199	-20.377	Pass
1DH5-Hopping	2480	2483.5	-0.789	-45.367	-20.789	Pass
2DH5-Hopping	2402	2398.47	-0.497	-41.287	-20.497	Pass
2DH5-Hopping	2480	2483.5	-0.683	-49.520	-20.683	Pass

Test Graph

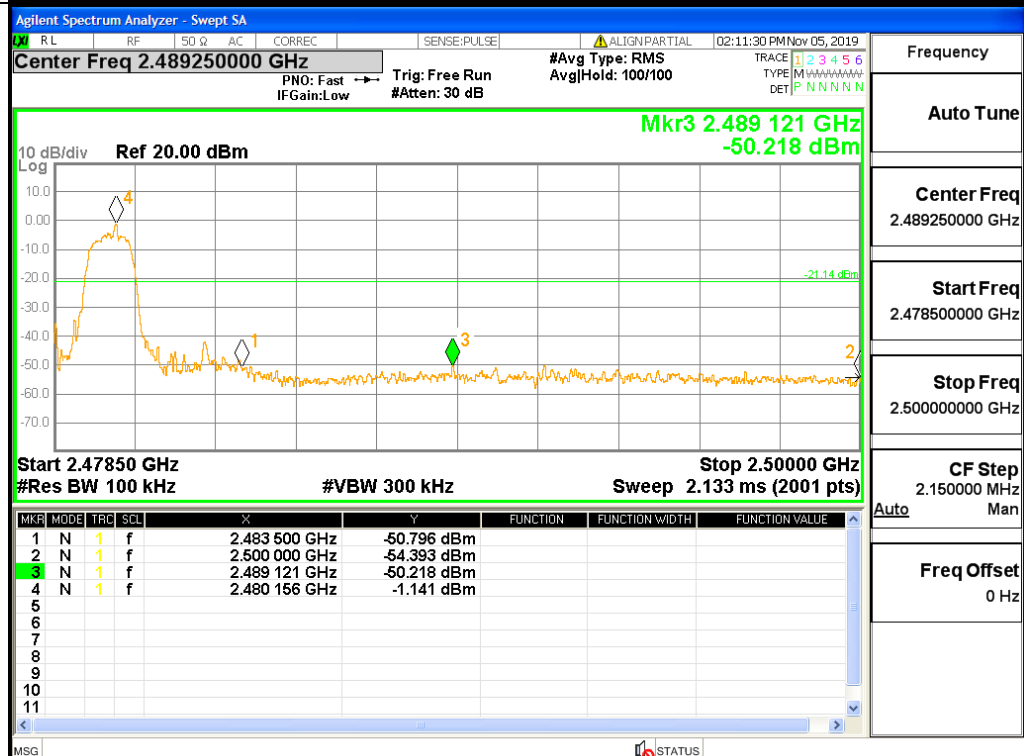
Graphs



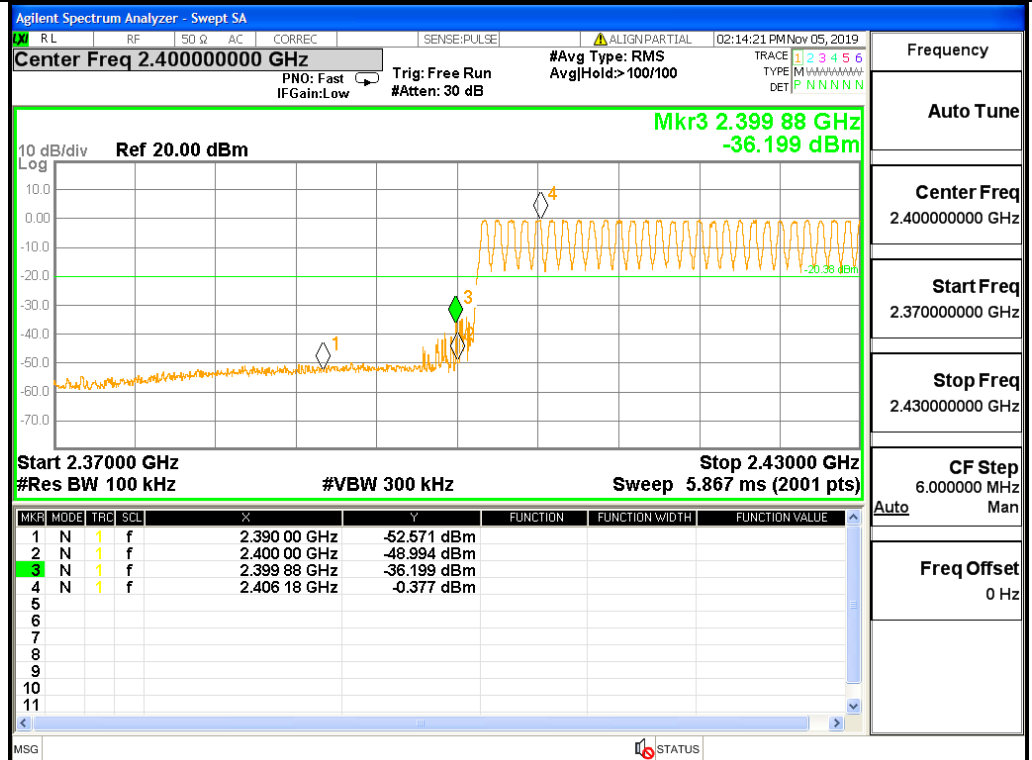
$\pi/4$ DQPSK/LCH/No
Hop



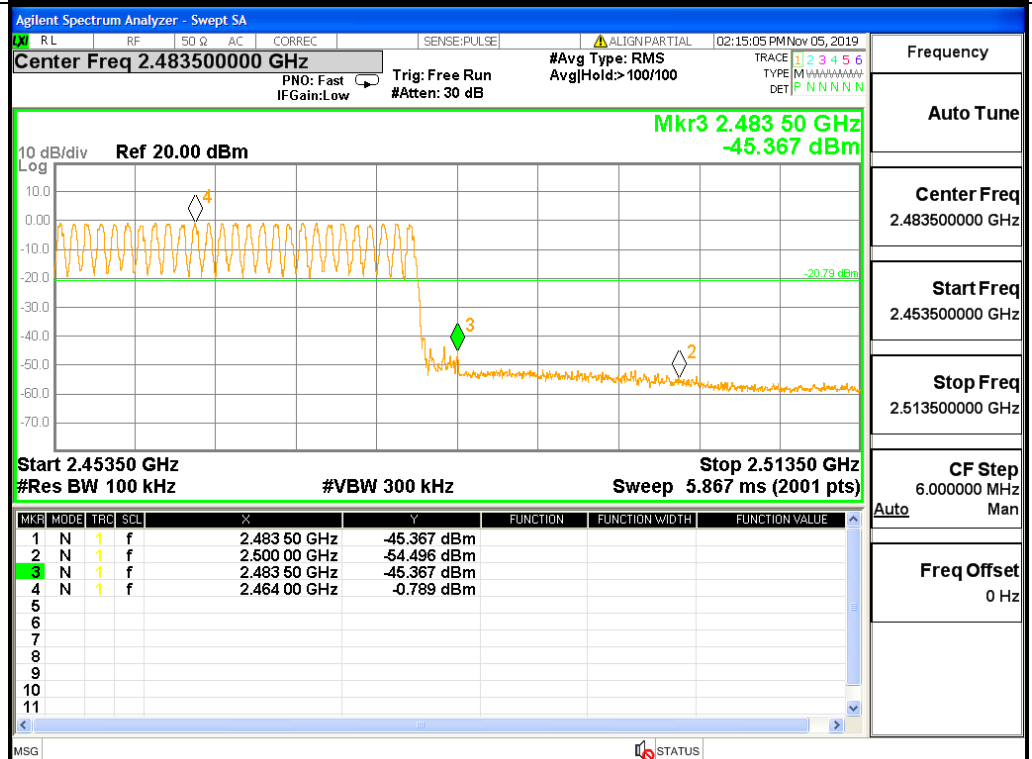
$\pi/4$ DQPSK/HCH/No
Hop



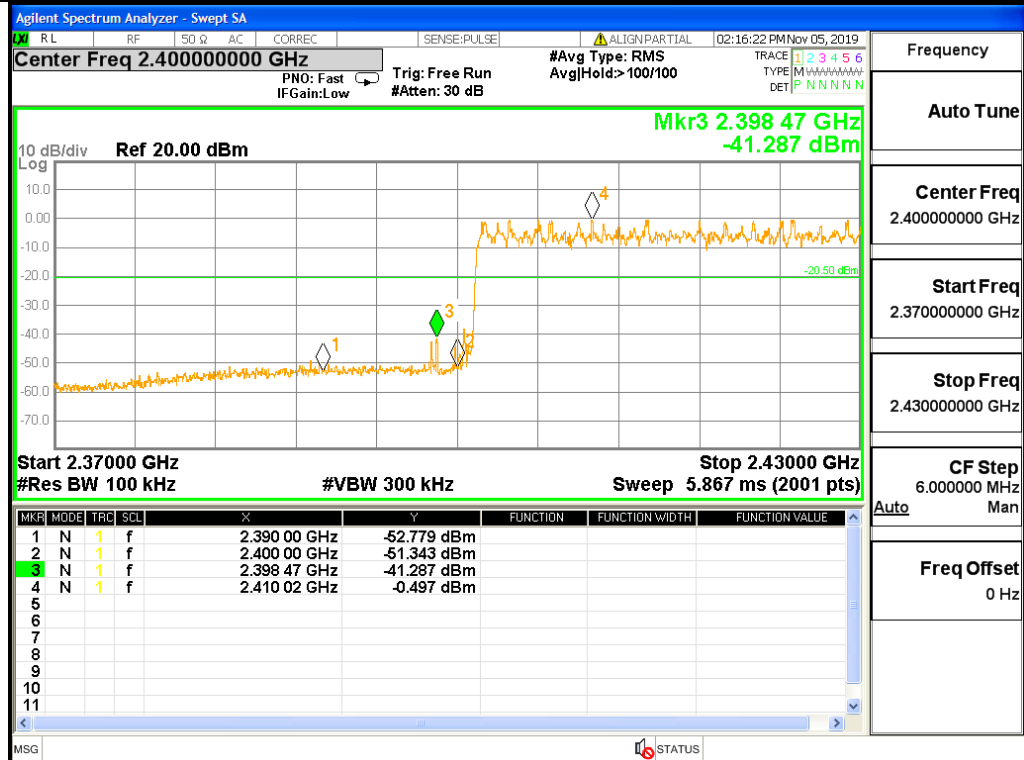
GFSK/LCH/Hop



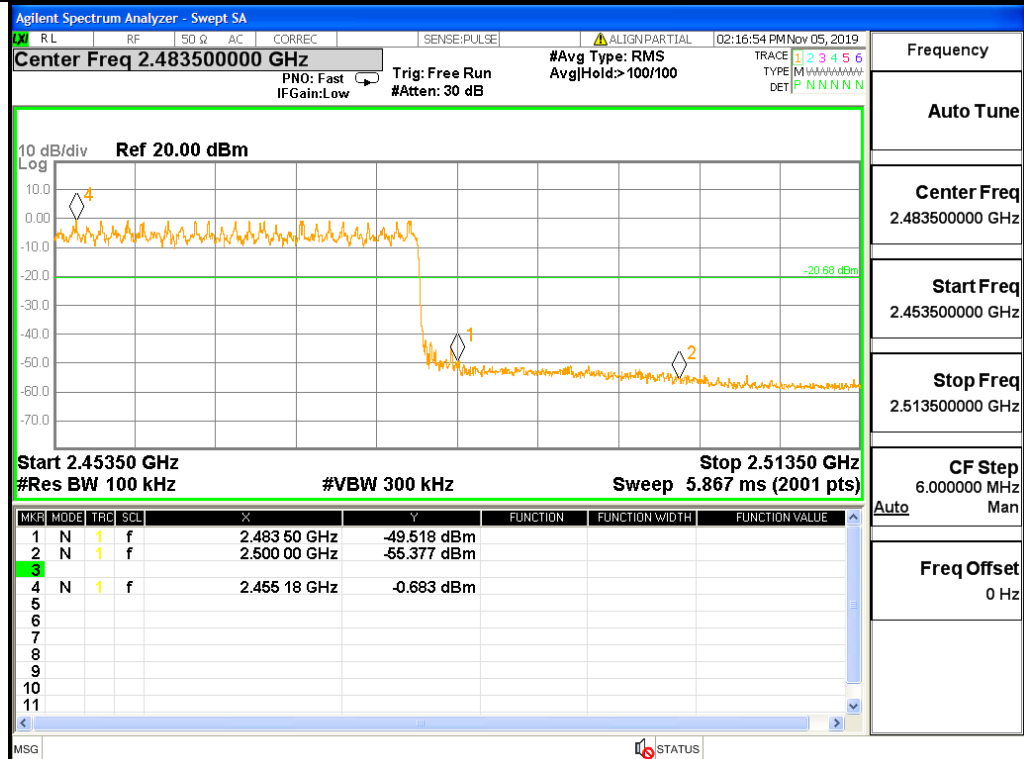
GFSK/HCH/Hop



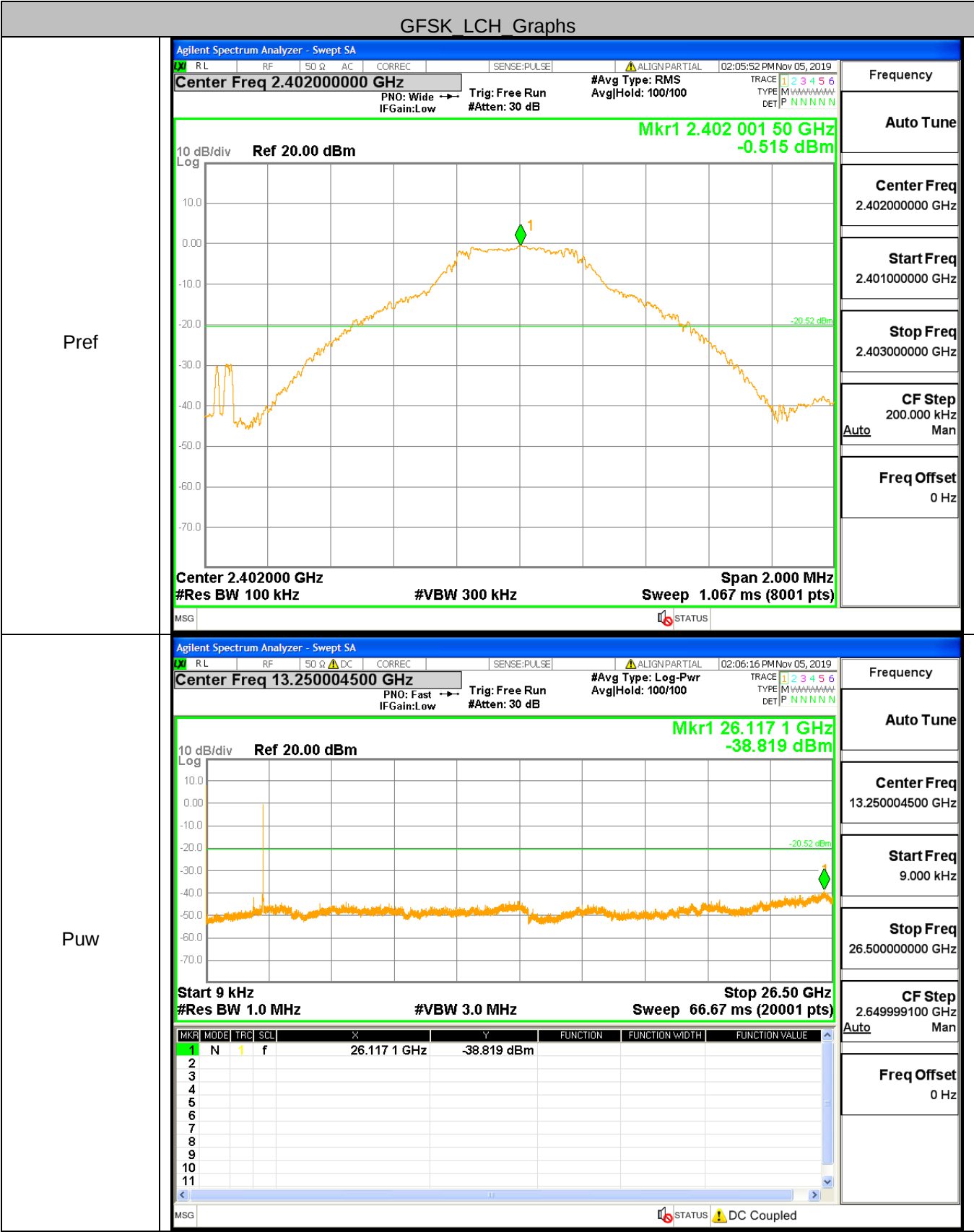
$\pi/4$ DQPSK/LCH/Hop



$\pi/4$ DQPSK/HCH/Hop

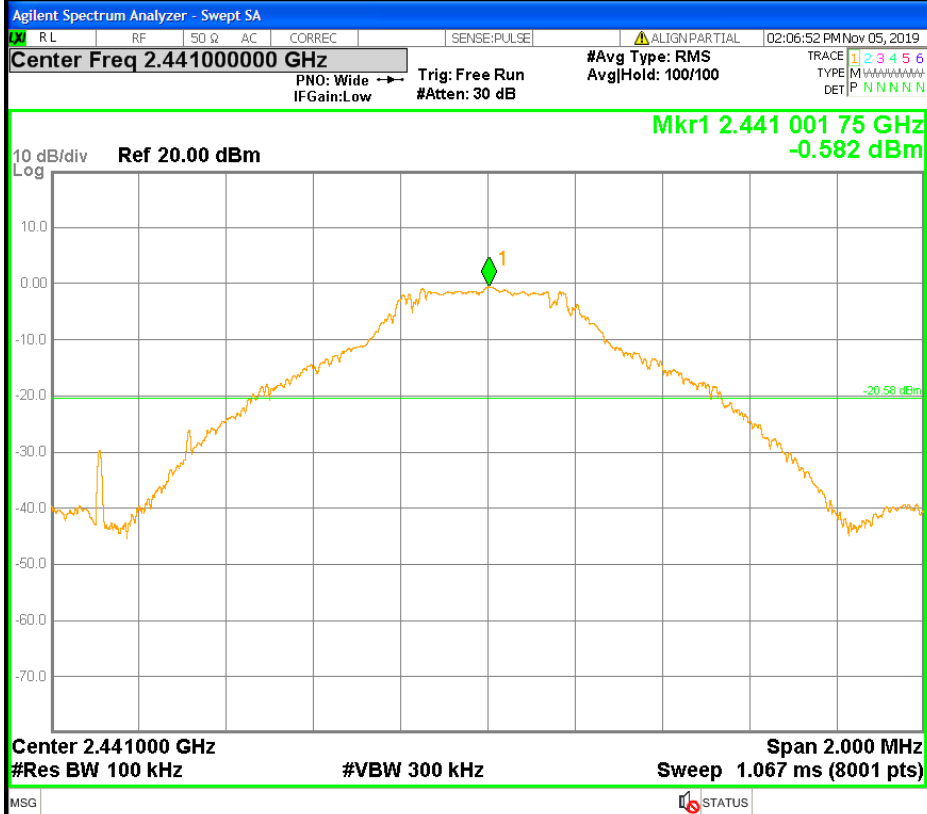


A.7 RF Conducted Spurious Emissions
Test Graph



GFSK MCH Graphs

Pref



Frequency

Auto Tune

Center Freq
2.441000000 GHz

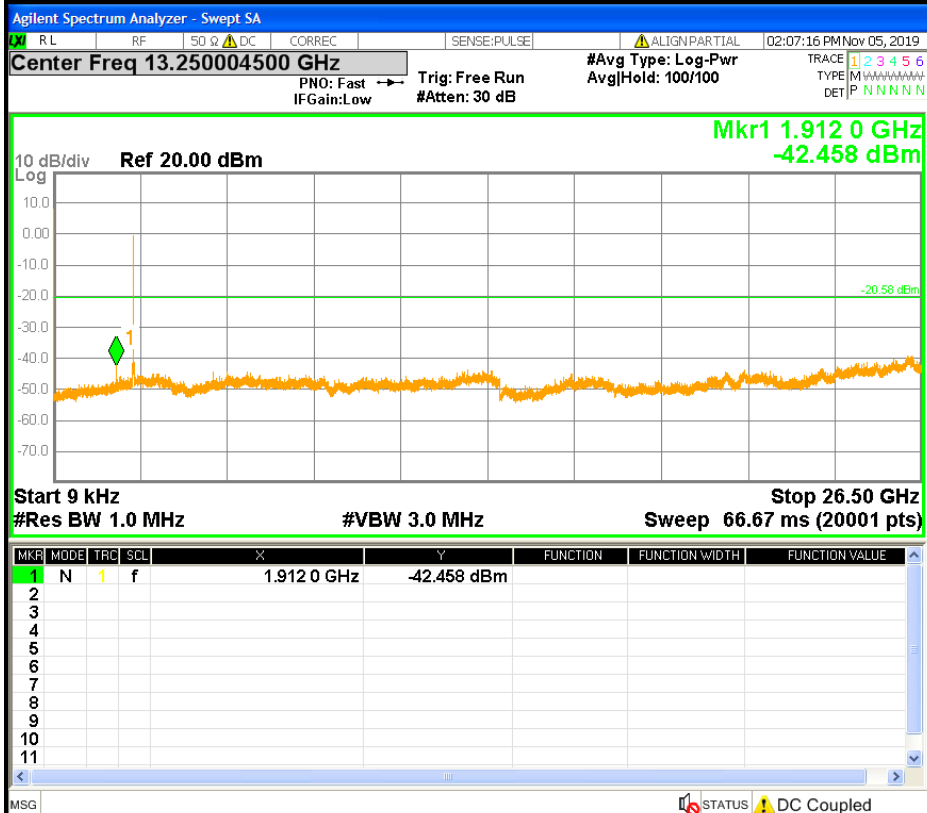
Start Freq
2.440000000 GHz

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

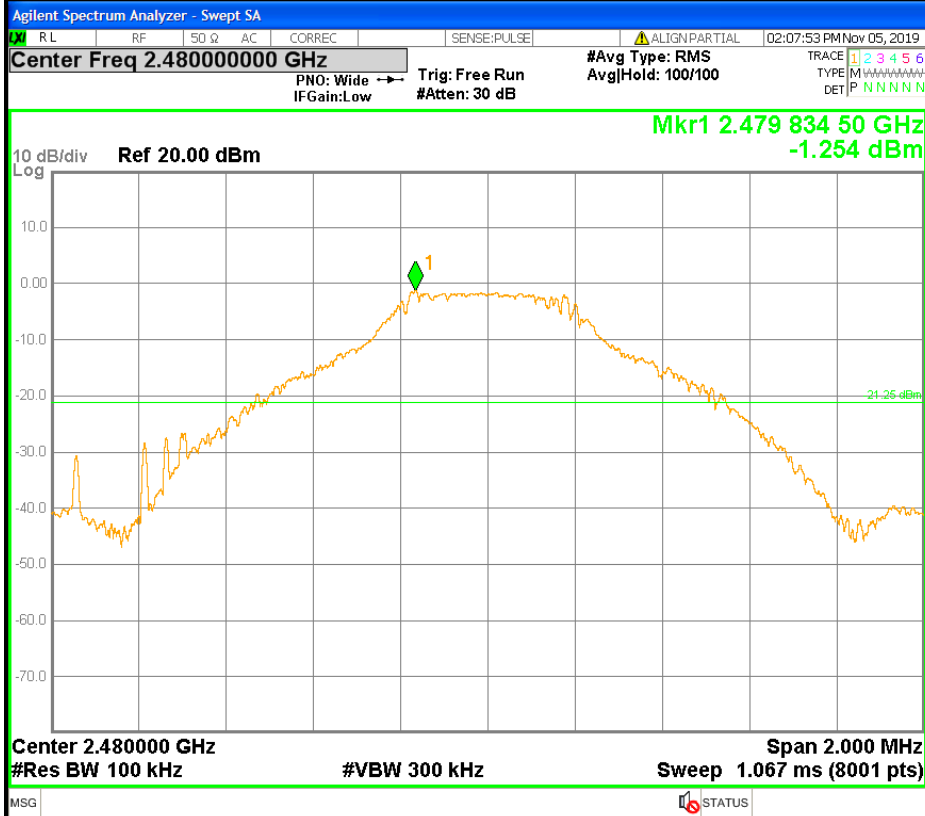
Stop Freq
26.500000000 GHz

CF Step
2.649999100 GHz
Auto Man

Freq Offset
0 Hz

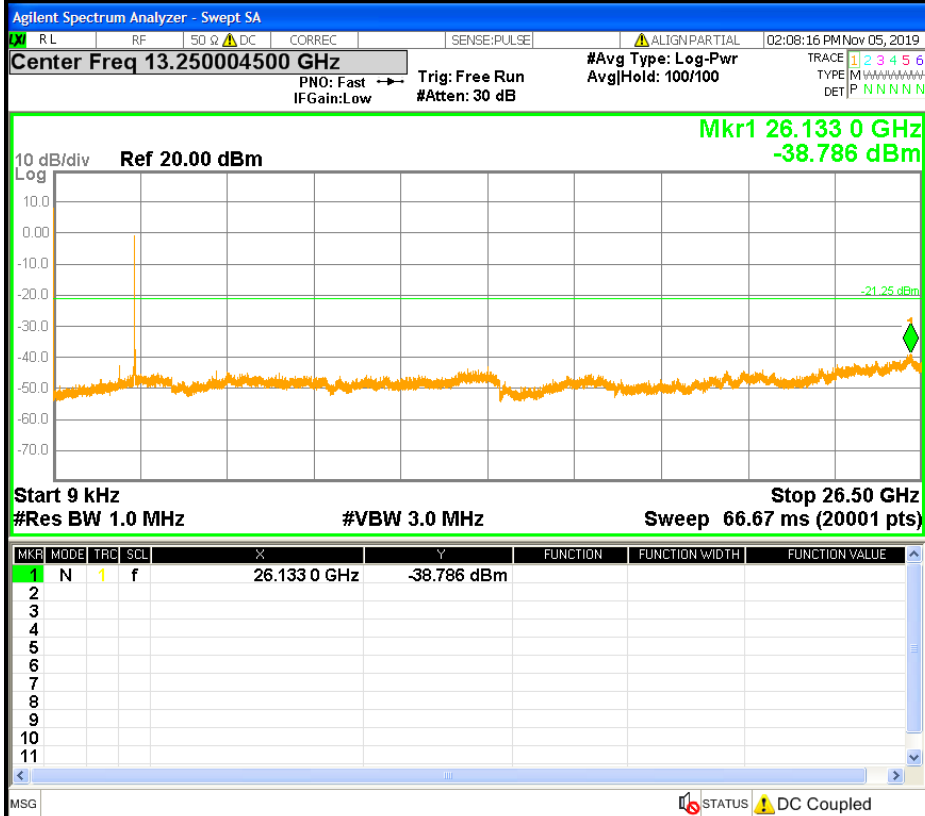
GFSK HCH Graphs

Pref



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

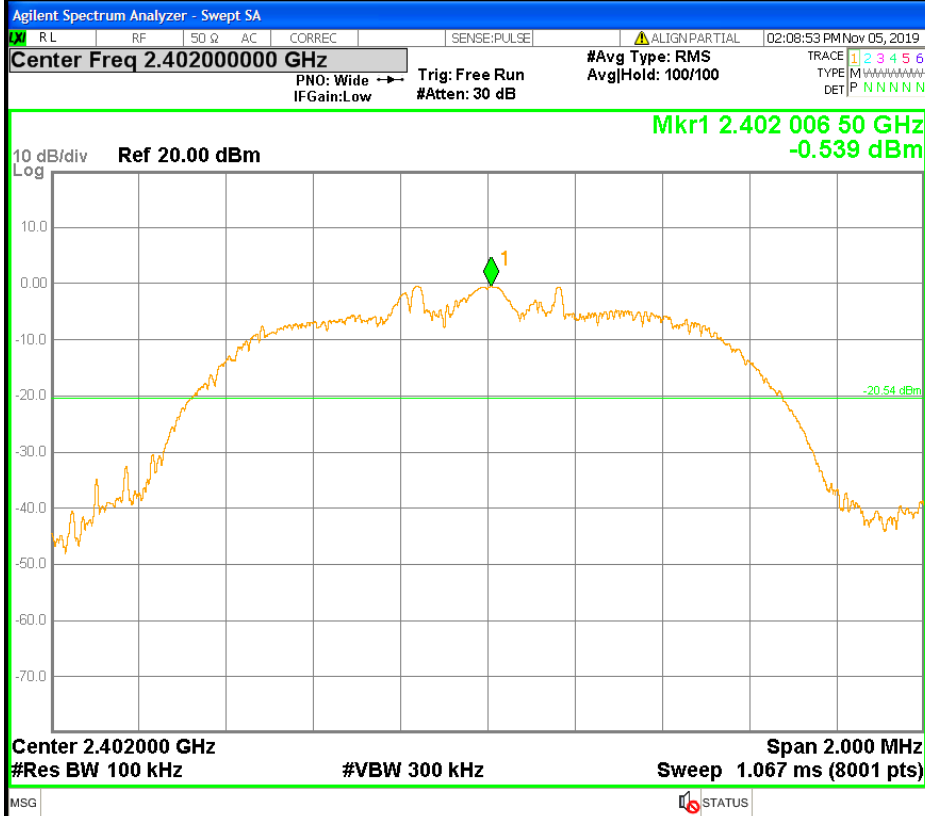
Puw



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

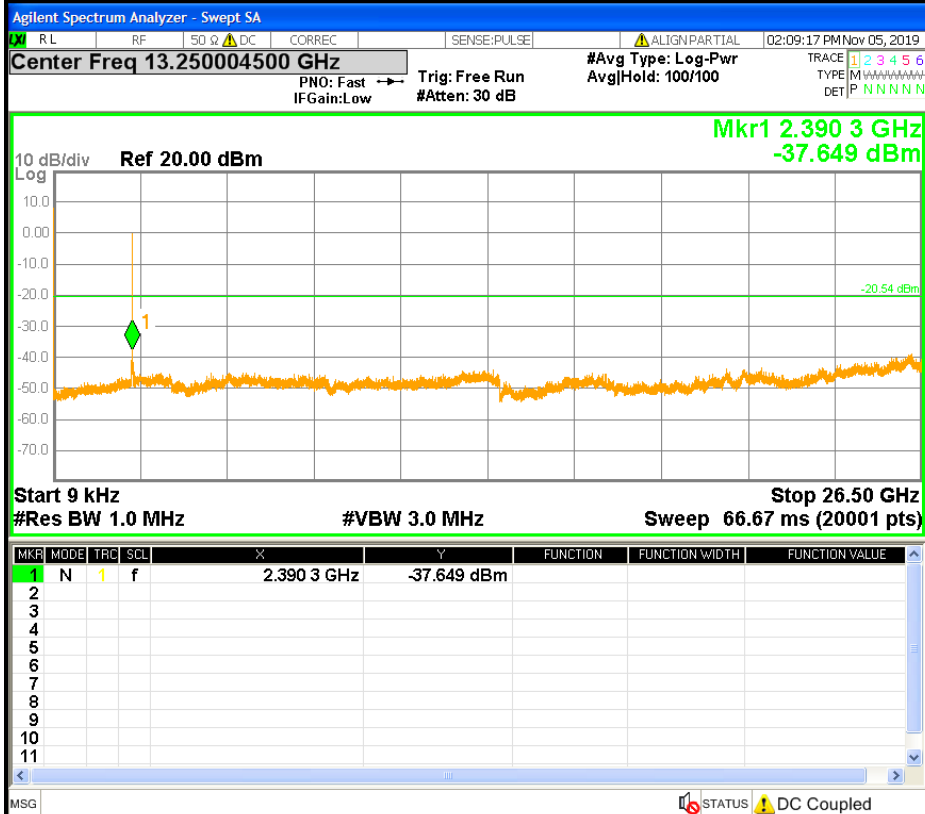
π /4DQPSK LCH Graphs

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

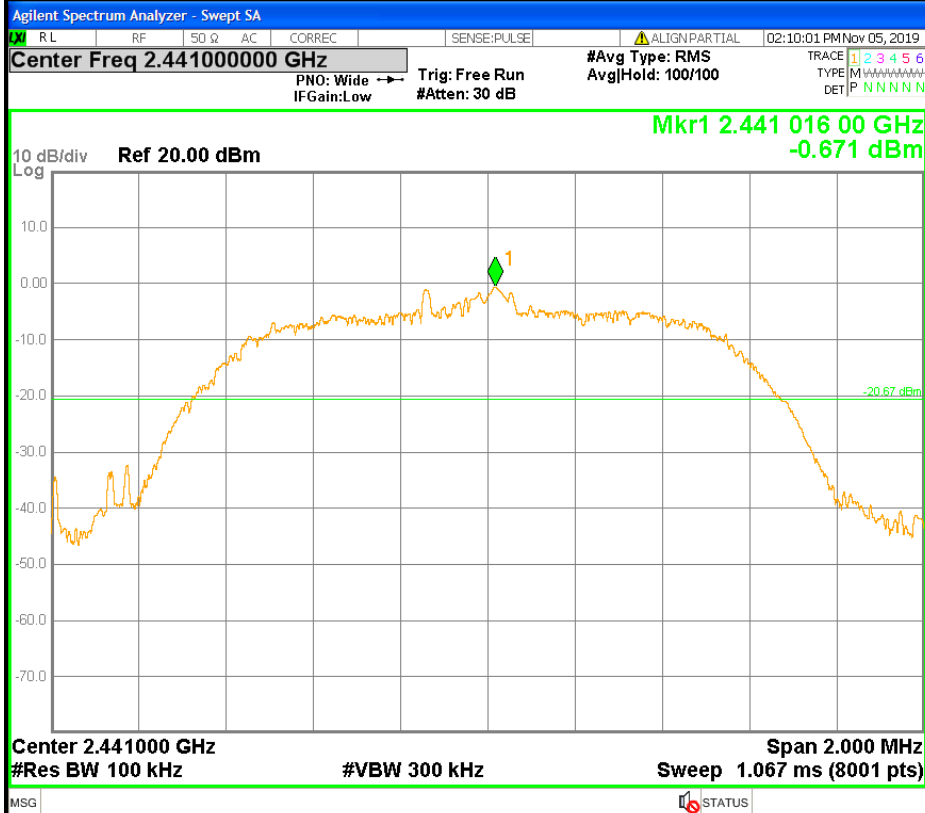
Puw



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

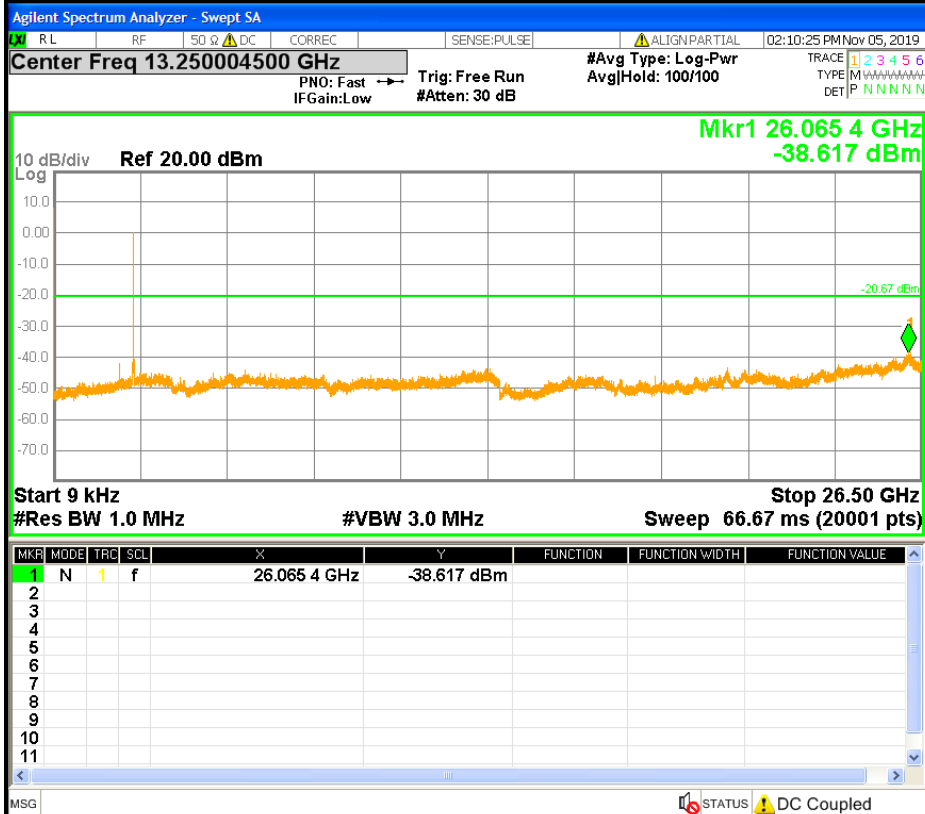
$\pi/4$ DQPSK MCH Graphs

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
Freq Offset 0 Hz

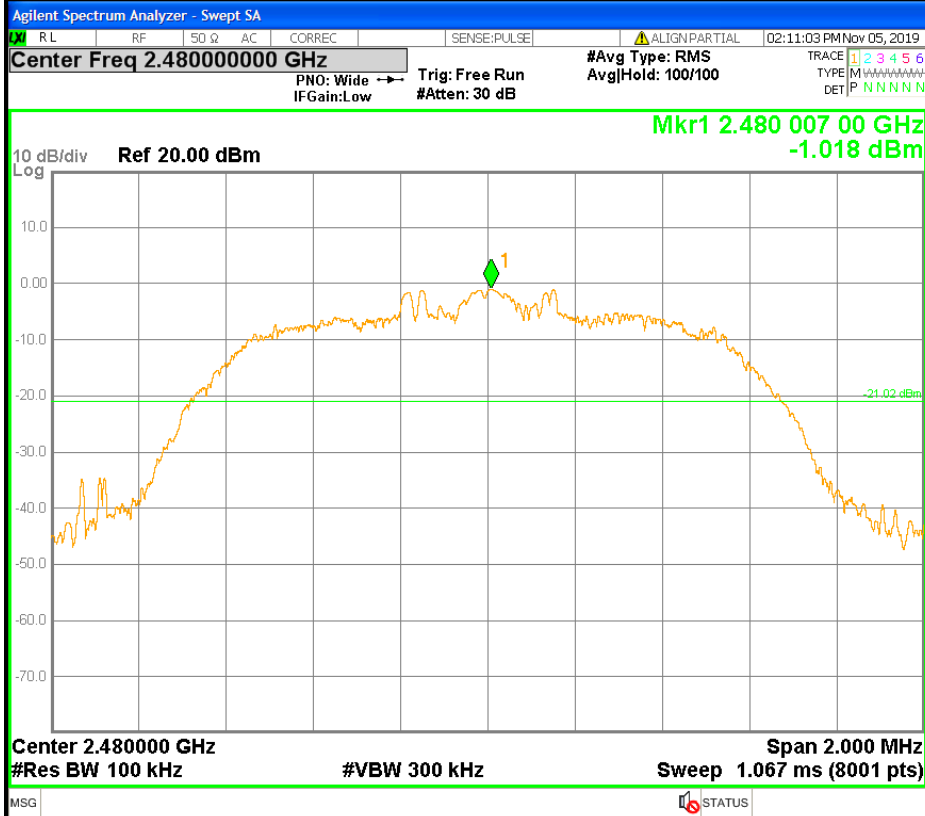
Puw



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

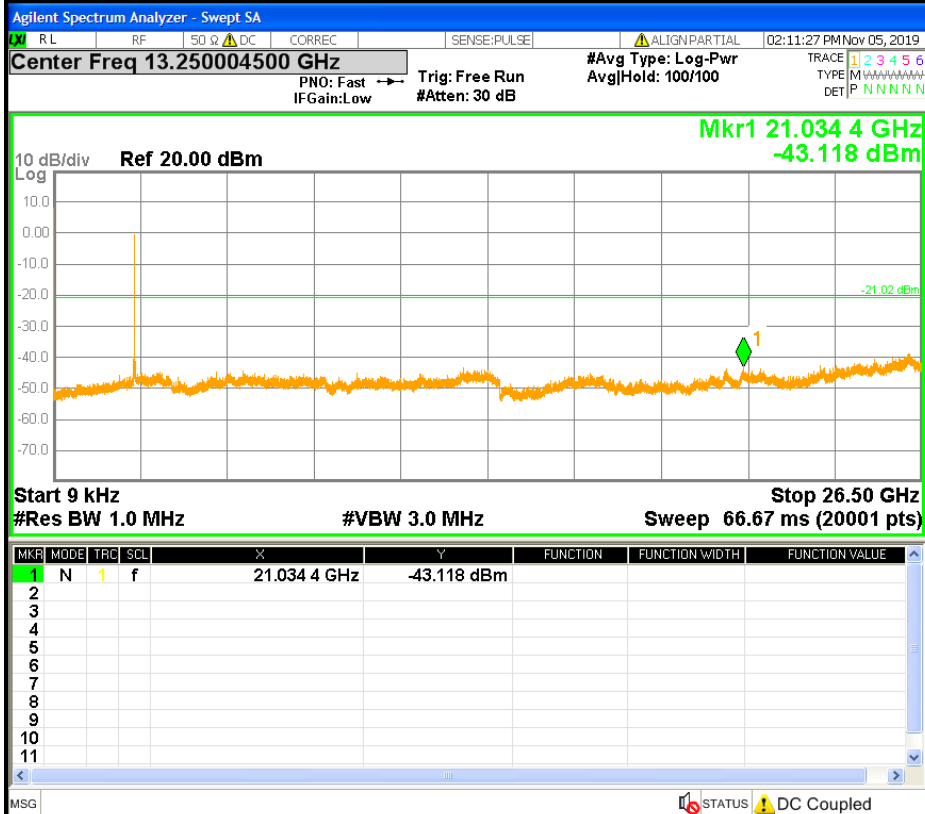
$\pi/4$ DQPSK HCH Graphs

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
Freq Offset 0 Hz

Puw



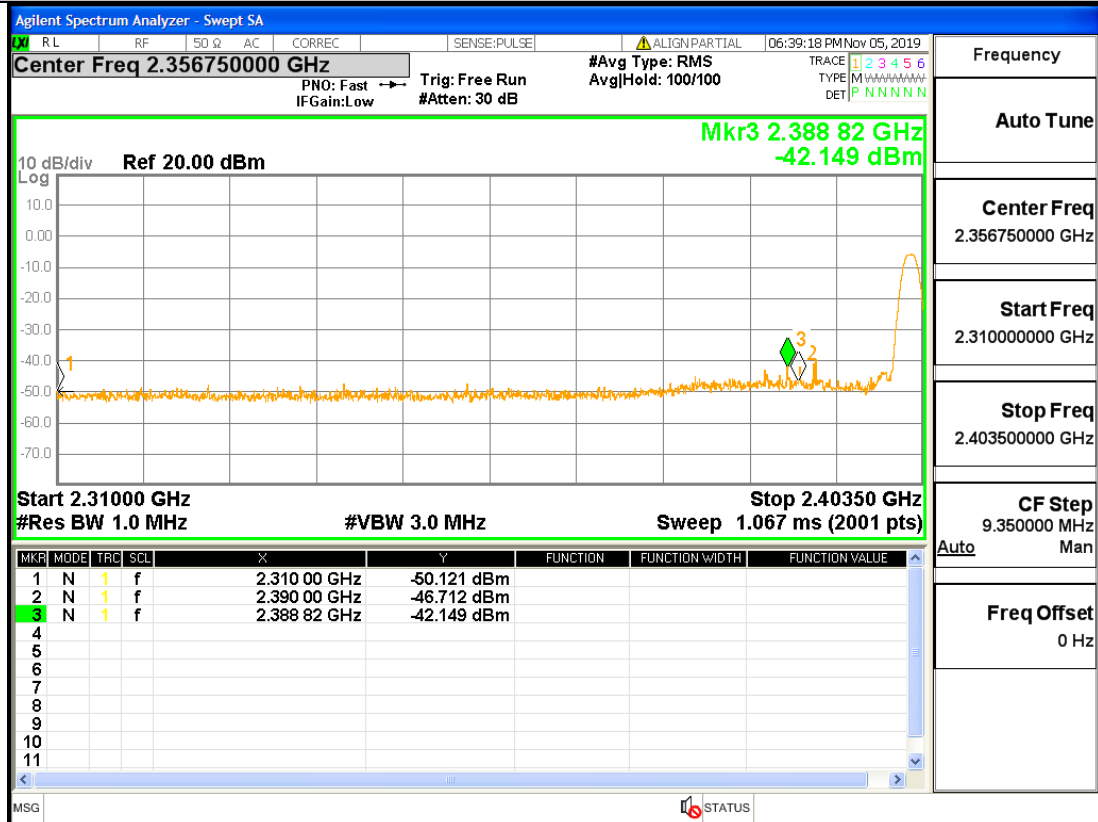
Frequency
Auto Tune
Center Freq 13.250004500 GHz
Start Freq 9.000 kHz
Stop Freq 26.500000000 GHz
CF Step 2.649999100 GHz Auto
Freq Offset 0 Hz

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	2388.821	5.54	0.00	-42.149	58.591	74	Pass
1DH5	2480	2483.821	5.54	0.00	-34.564	66.176	74	Pass
2DH5	2402	2386.670	5.54	0.00	-44.068	56.672	74	Pass
2DH5	2480	2483.907	5.54	0.00	-34.638	66.102	74	Pass

Type	Carrier Frequency (MHz)	Frequency(M Hz)	Gain	Ground Factor	Average Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2388.821	5.54	0.00	-53.924	46.816	54	Pass
1DH5	2480	2483.821	5.54	0.00	-49.284	51.456	54	Pass
2DH5	2402	2386.670	5.54	0.00	-53.893	46.847	54	Pass
2DH5	2480	2483.907	5.54	0.00	-51.119	49.621	54	Pass

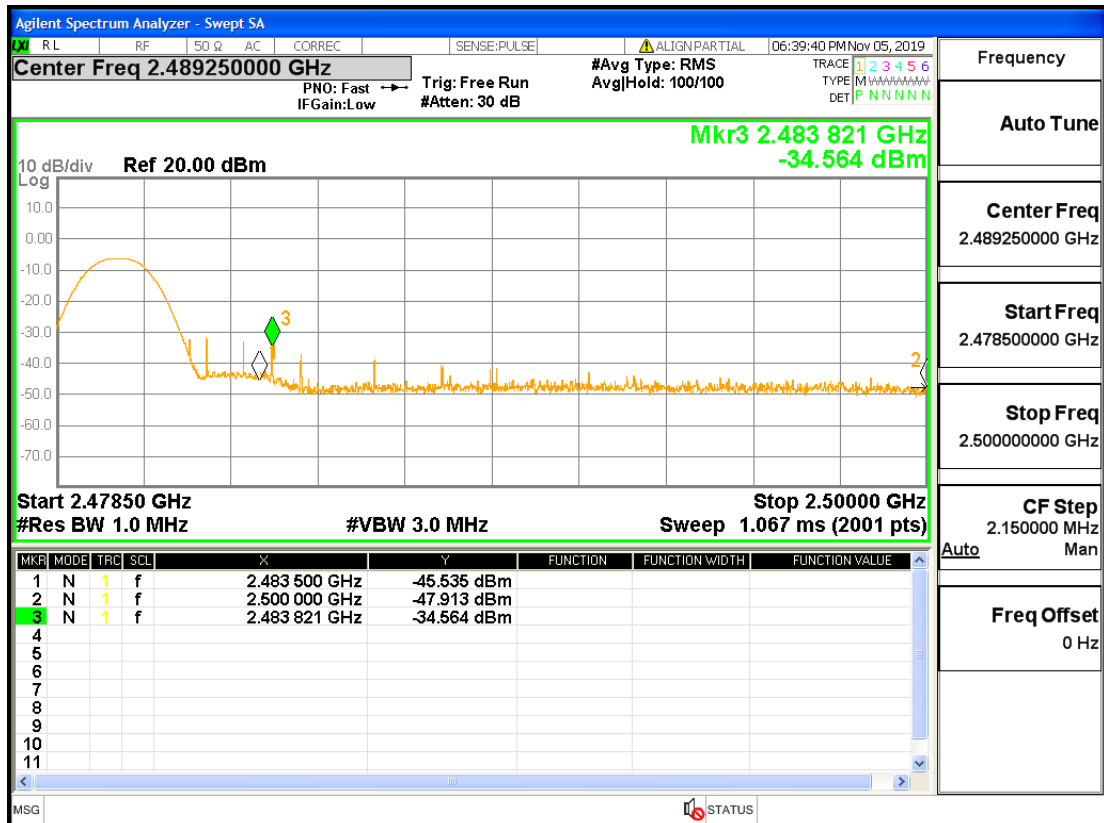
Restrict-band band-edge measurements_2402_PEAK_DH5



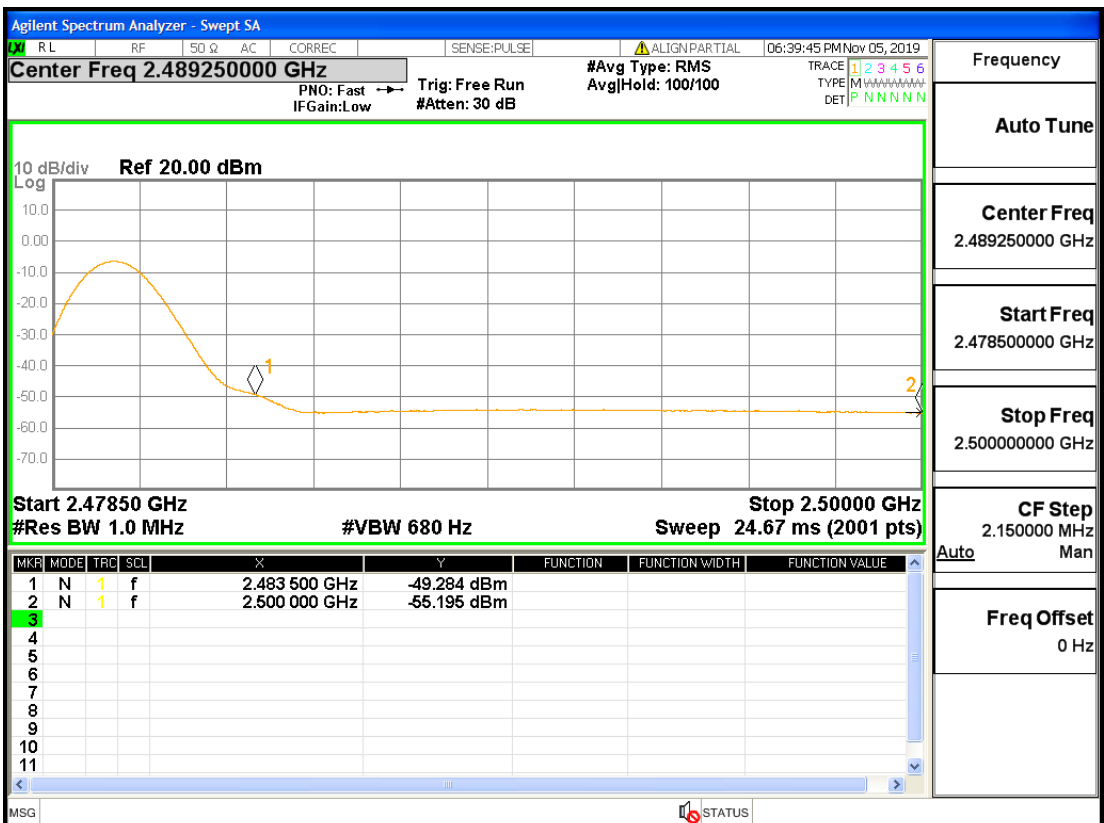
Restrict-band band-edge measurements_2402_AV_DH5



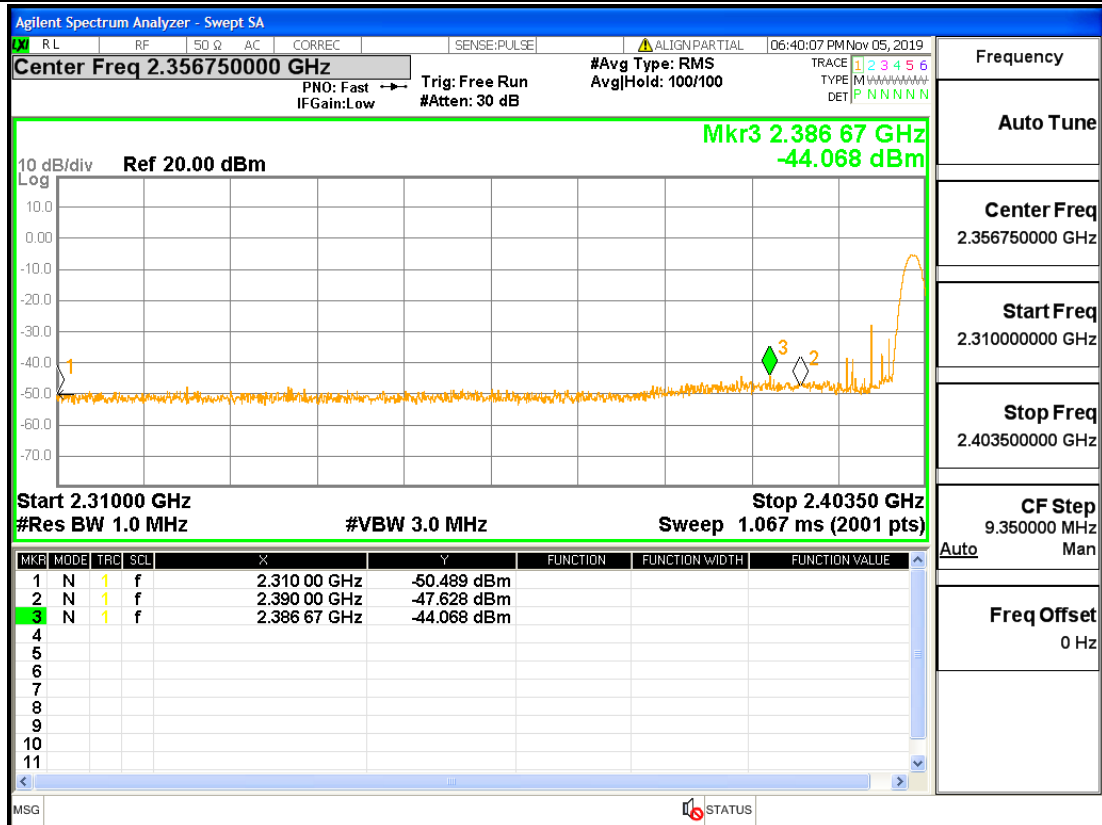
Restrict-band band-edge measurements_2480_PEAK_DH5



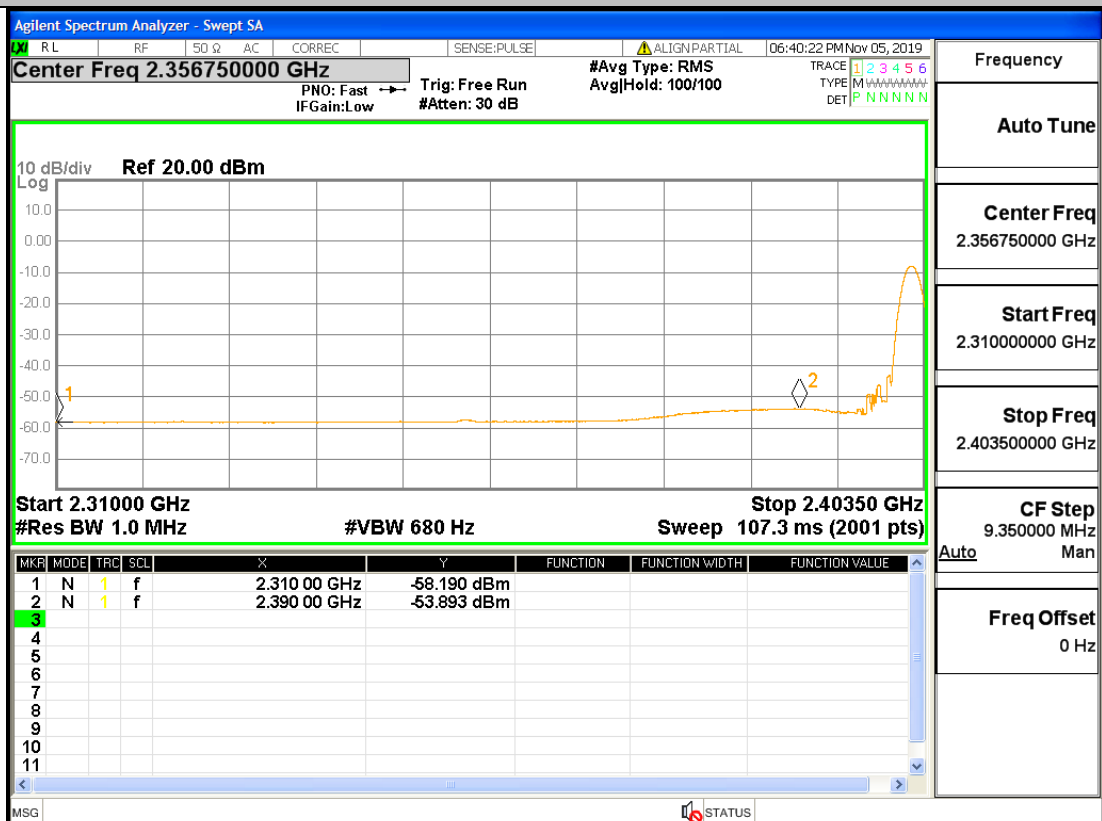
Restrict-band band-edge measurements_2480_AV_DH5



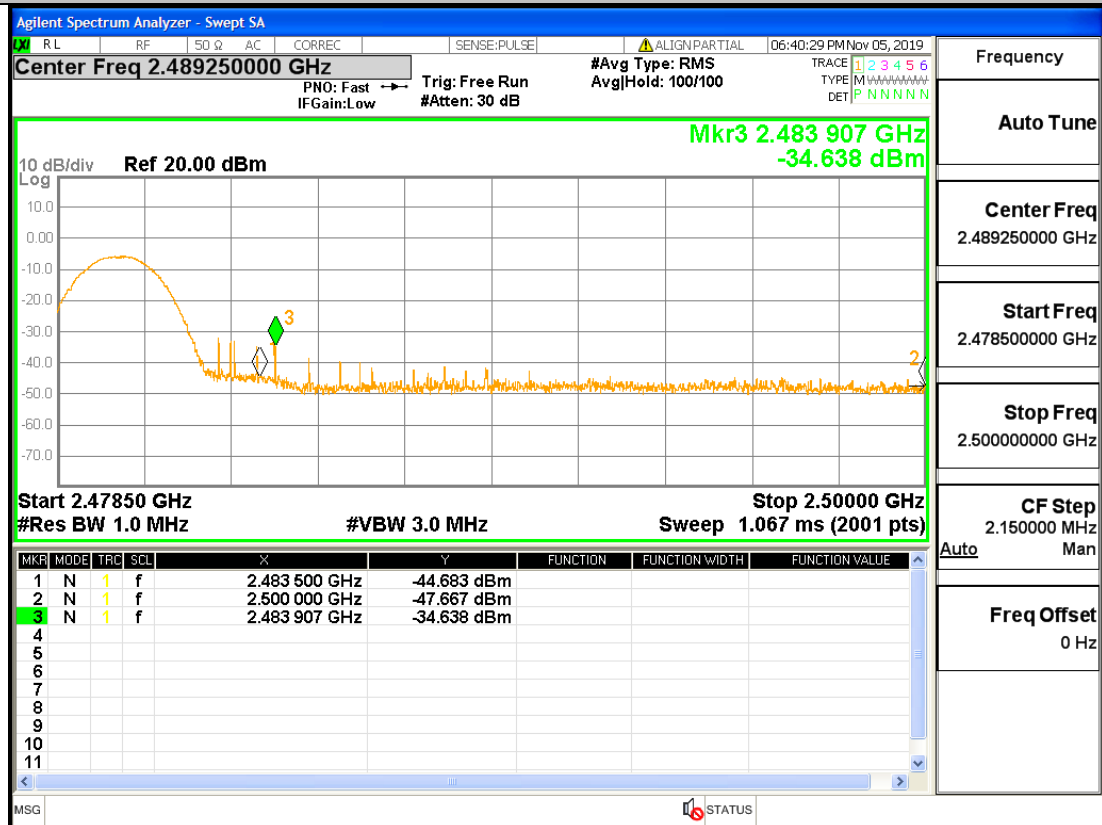
Restrict-band band-edge measurements_2402_PEAK_2DH5



Restrict-band band-edge measurements_2402_AV_2DH5



Restrict-band band-edge measurements_2480_PEAK_2DH5



Restrict-band band-edge measurements_2480_AV_2DH5

