

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: RT19

FCC ID: 2ATOY-RT19

Environmental Conditions

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

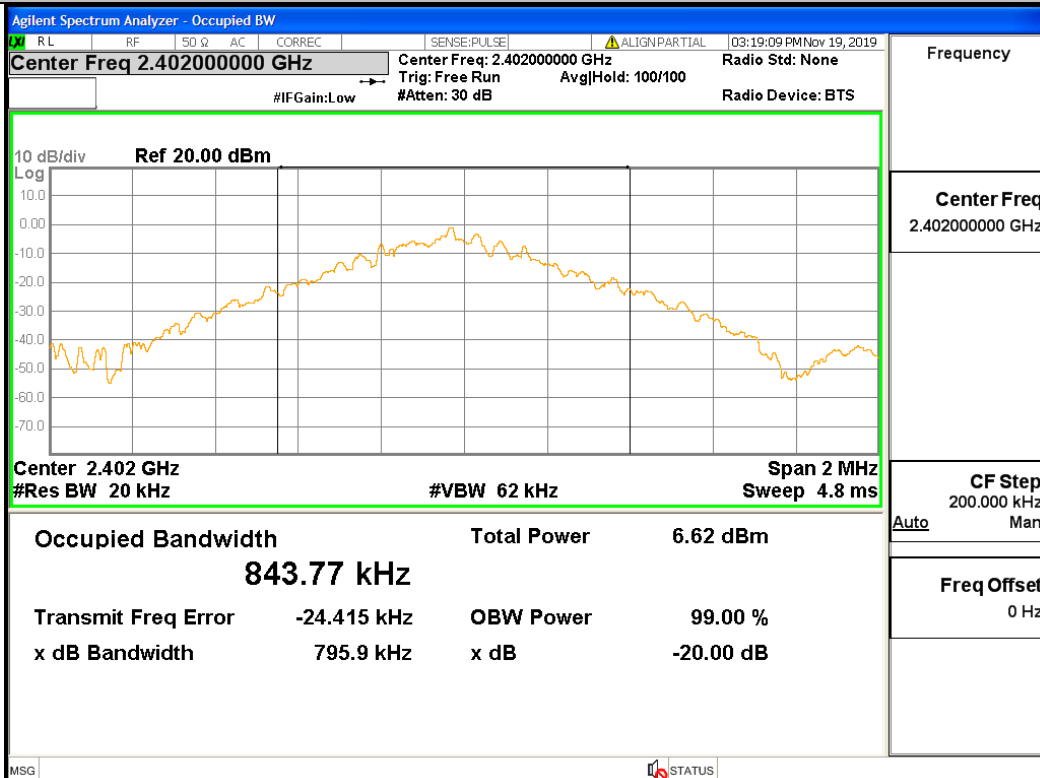
A.1 20 dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit(MHz)	Verdict
GFSK	LCH	0.796	Not Specified	PASS
GFSK	MCH	0.791	Not Specified	PASS
GFSK	HCH	0.797	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.195	Not Specified	PASS
$\pi/4$ DQPSK	MCH	1.197	Not Specified	PASS
$\pi/4$ DQPSK	HCH	1.192	Not Specified	PASS

Test Graph

Graphs

GFSK/LCH



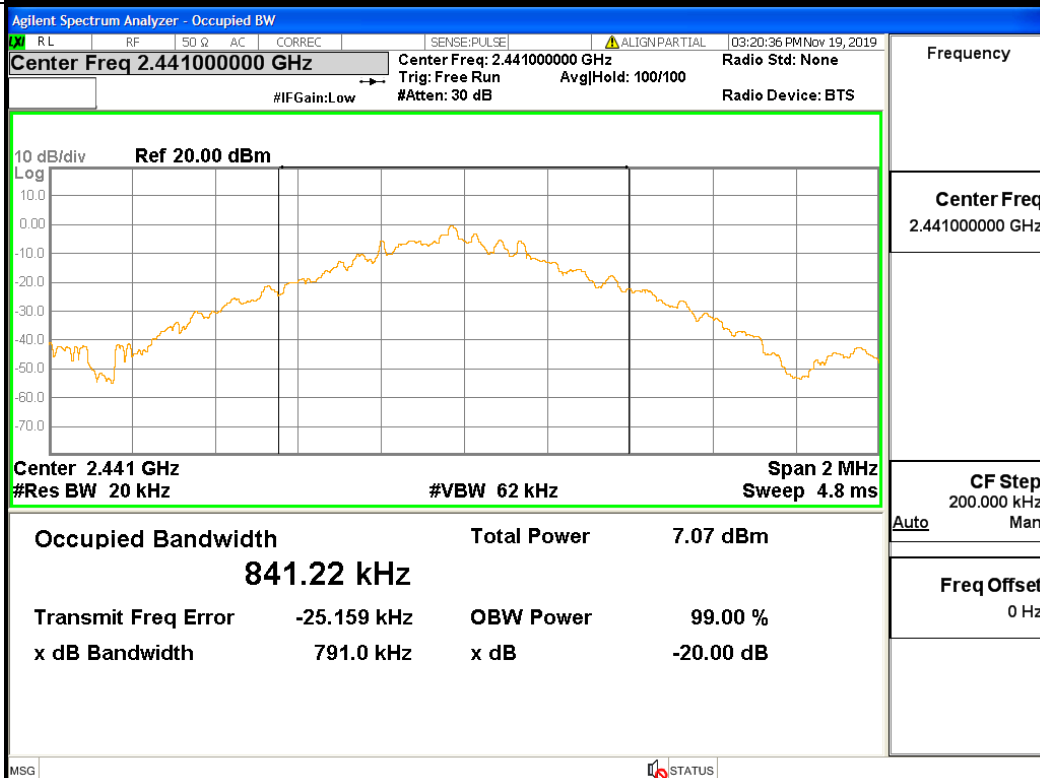
Frequency

Center Freq
2.40200000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

GFSK/MCH



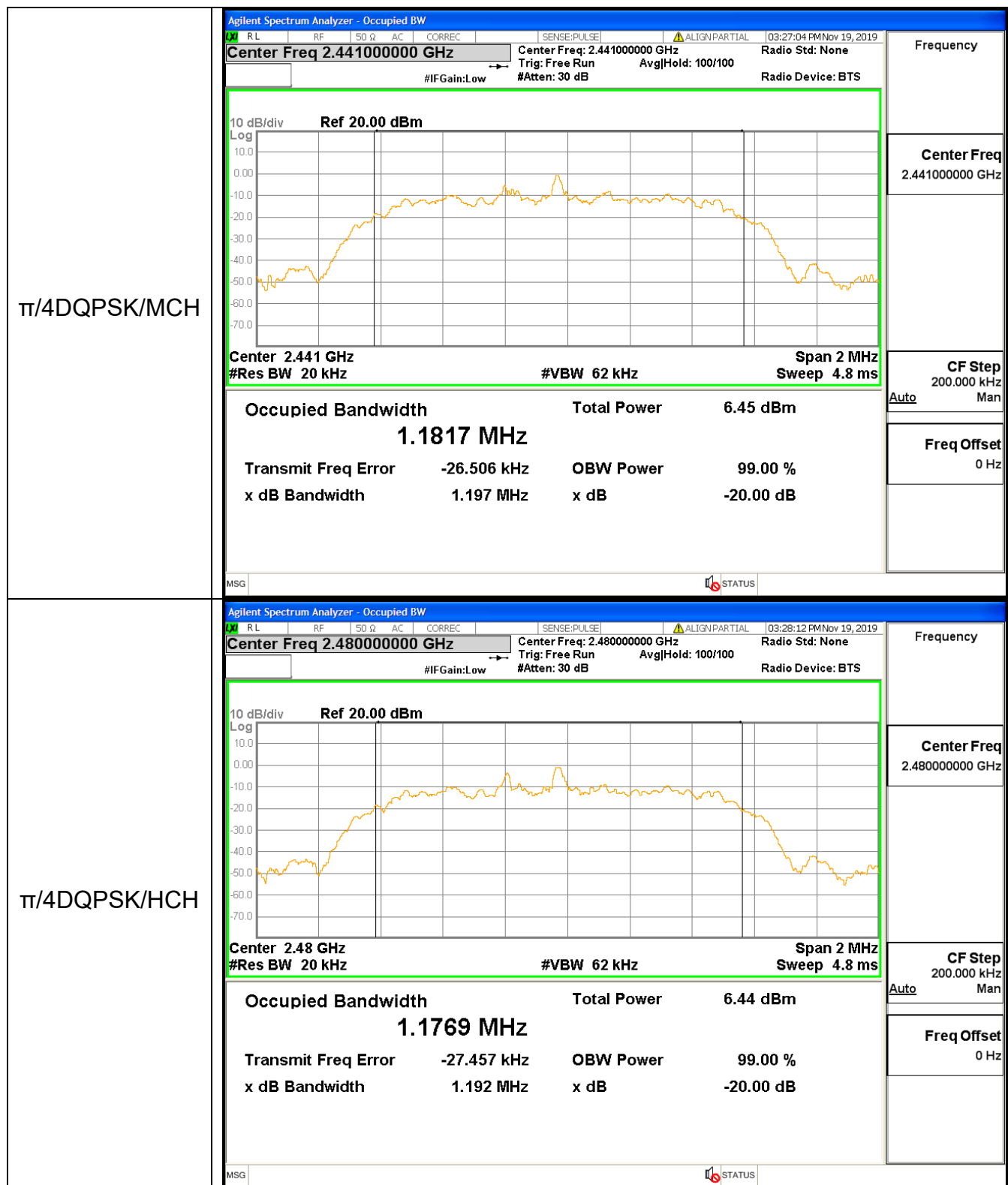
Frequency

Center Freq
2.44100000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

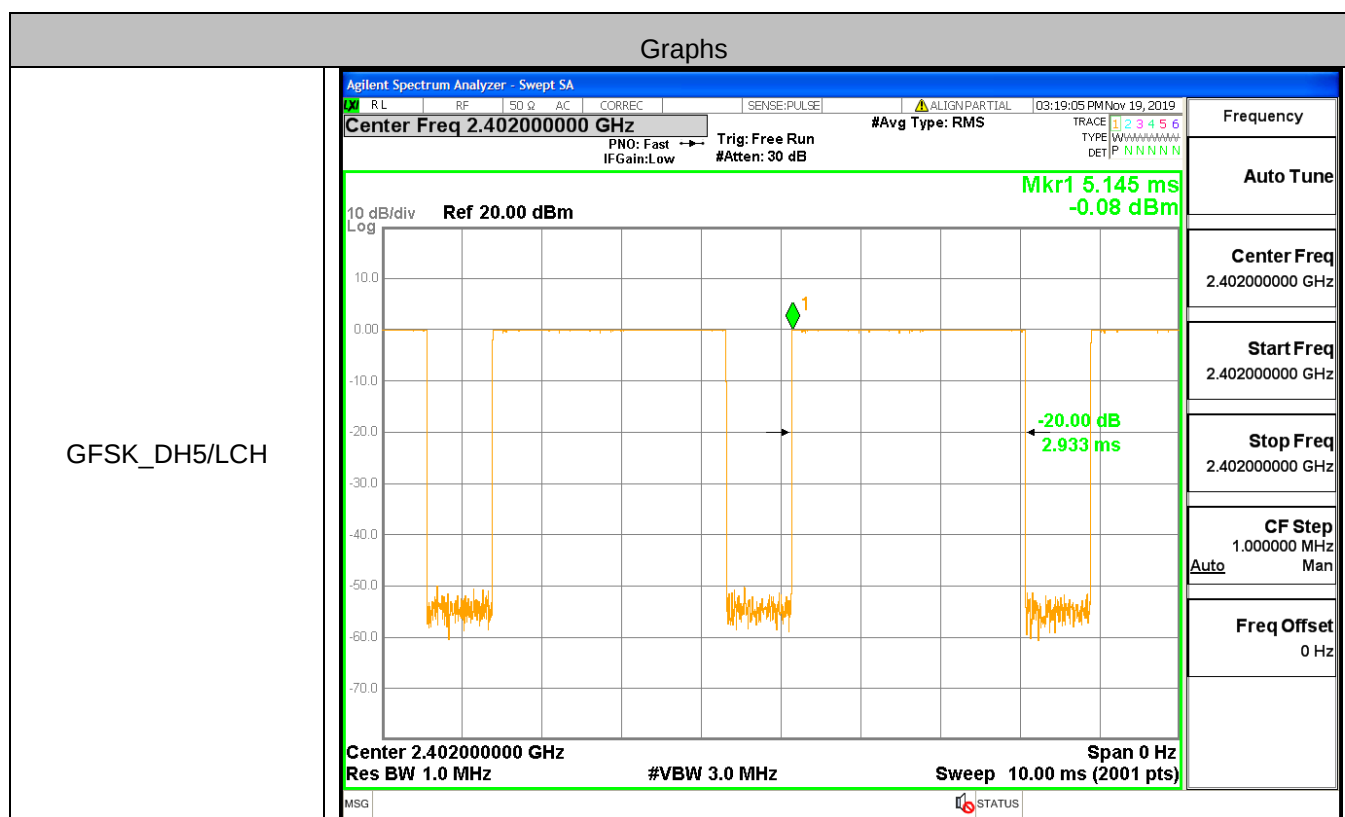
GFSK/HCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:PARTIAL 03:21:38 PM Nov 19, 2019 Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Trig: Free Run Avg Hold: 100/100 Radio Std: None #IFGain:Low #Atten: 30 dB Radio Device: BTS 10 dB/div Log Ref 20.00 dBm Center 2.48 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms Occupied Bandwidth 828.73 kHz Total Power 7.05 dBm Transmit Freq Error -26.467 kHz OBW Power 99.00 % x dB Bandwidth 797.1 kHz x dB -20.00 dB MSG STATUS
$\pi/4$DQPSK/LCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:PARTIAL 03:25:35 PM Nov 19, 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 Log Ref 20.00 dBm Center 2.402 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms Occupied Bandwidth 1.1751 MHz Total Power 6.38 dBm Transmit Freq Error -25.826 kHz OBW Power 99.00 % x dB Bandwidth 1.195 MHz x dB -20.00 dB MSG STATUS

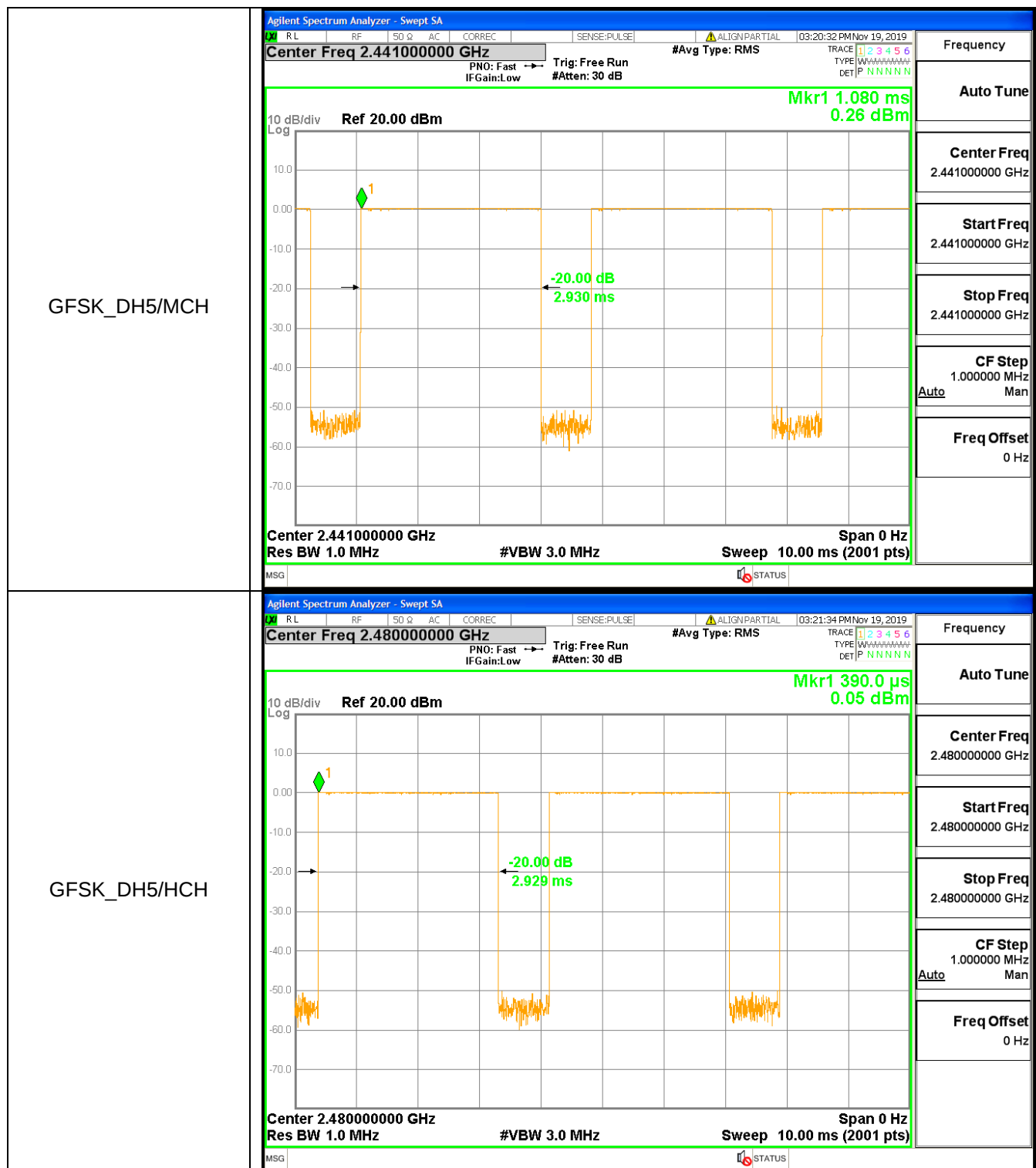


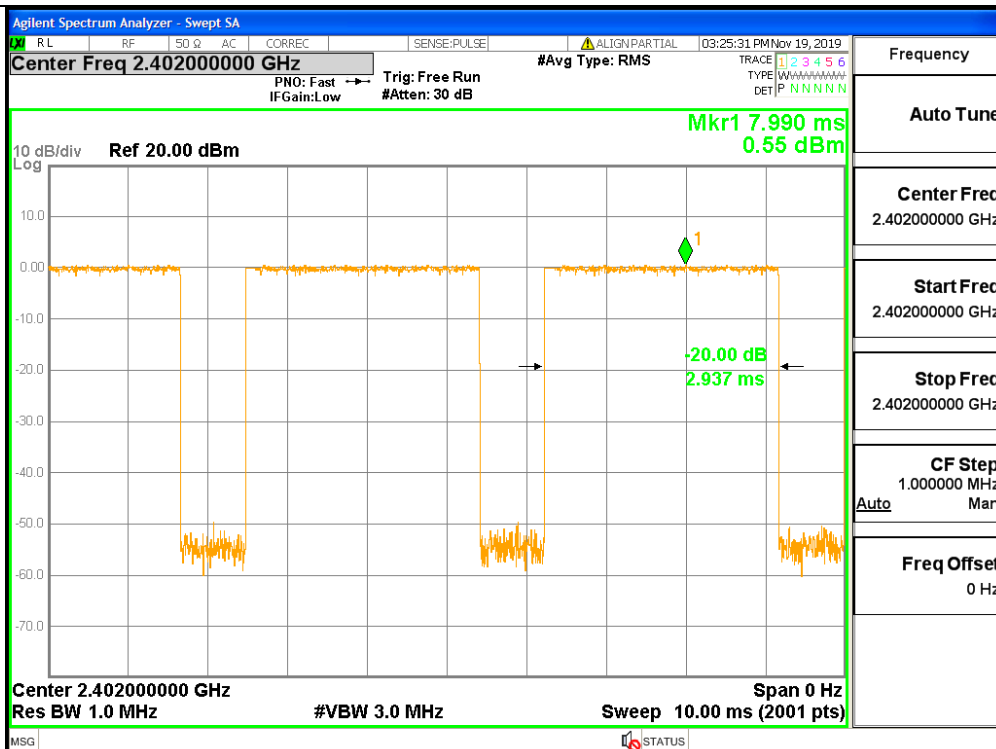
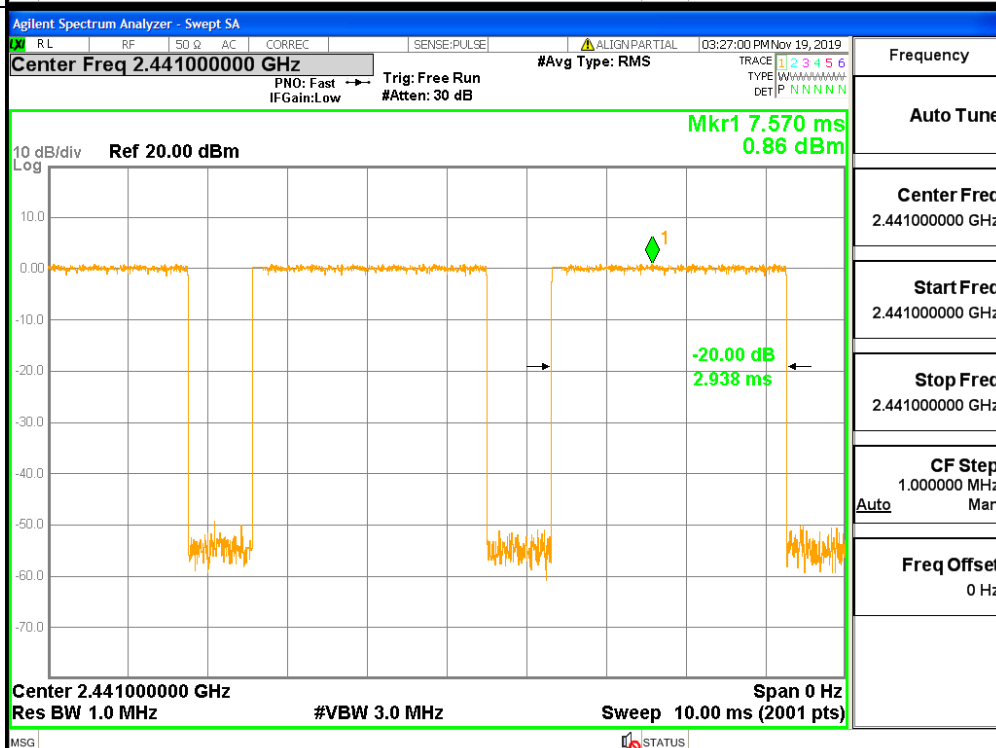
A.2 Dwell Time

Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.002933	106.7	0.312954	0.4	PASS
GFSK	DH5	MCH	0.002930	106.7	0.312628	0.4	PASS
GFSK	DH5	HCH	0.002929	106.7	0.312486	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	0.002937	106.7	0.313394	0.4	PASS
$\pi/4$ DQPSK	2DH5	MCH	0.002938	106.7	0.313501	0.4	PASS
$\pi/4$ DQPSK	2DH5	HCH	0.002938	106.7	0.313450	0.4	PASS

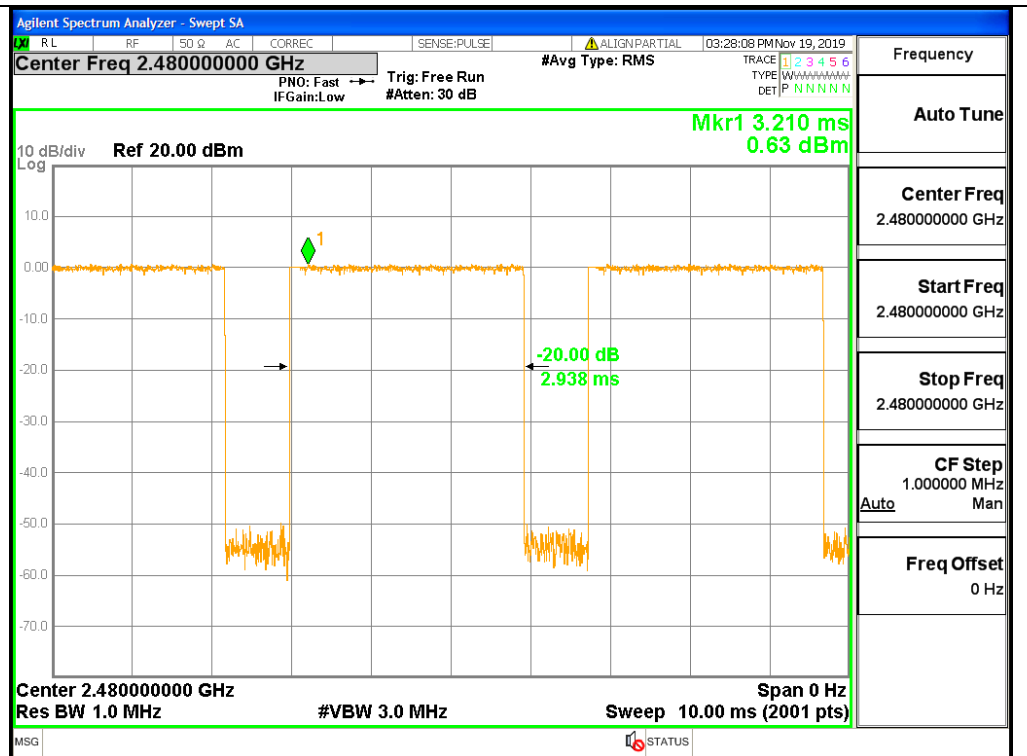
Test Graph





$\pi/4$ DQPSK
_2DH5/LCH $\pi/4$ DQPSK
_2DH5/MCH

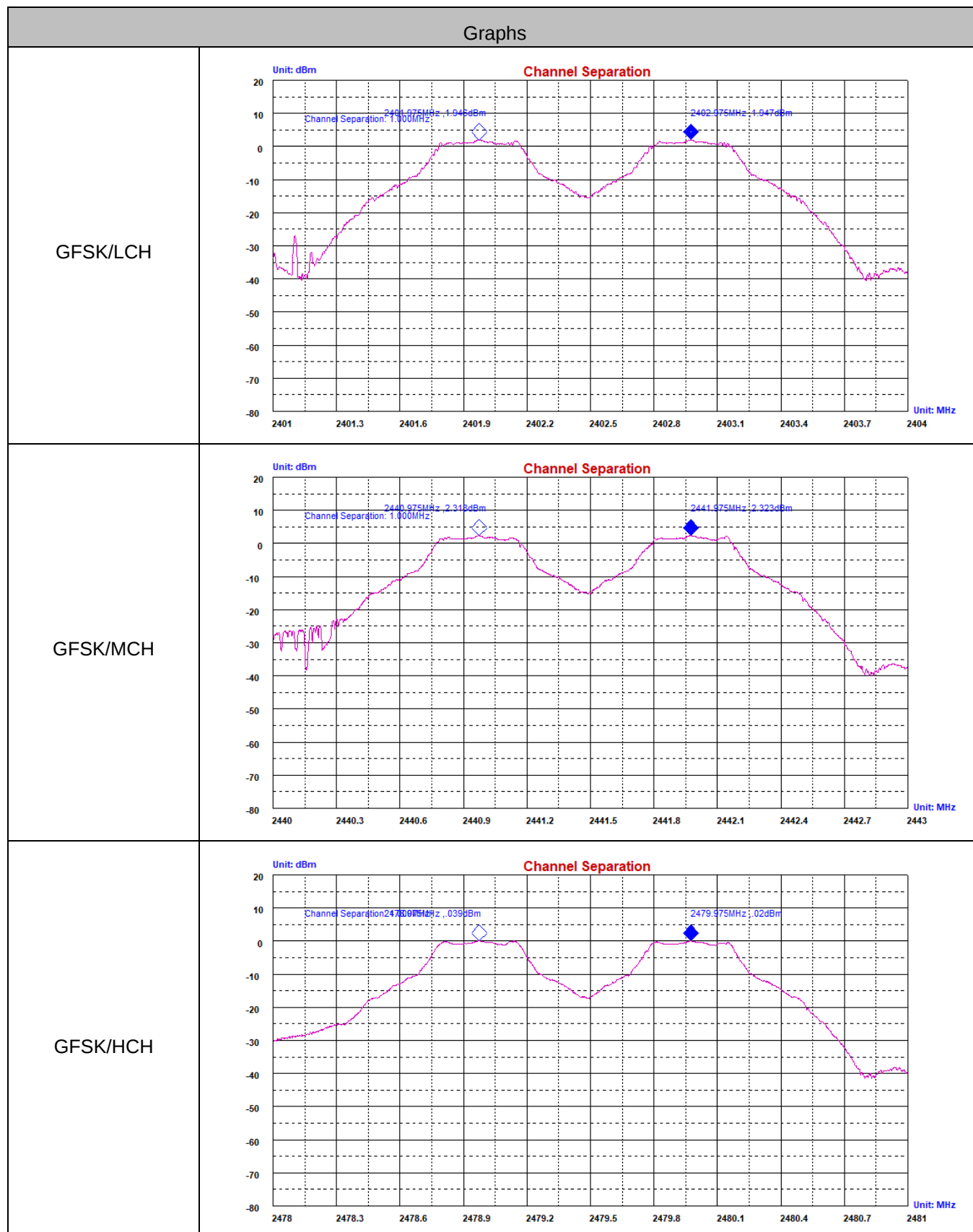
$\pi/4$ DQPSK
_2DH5/HCH

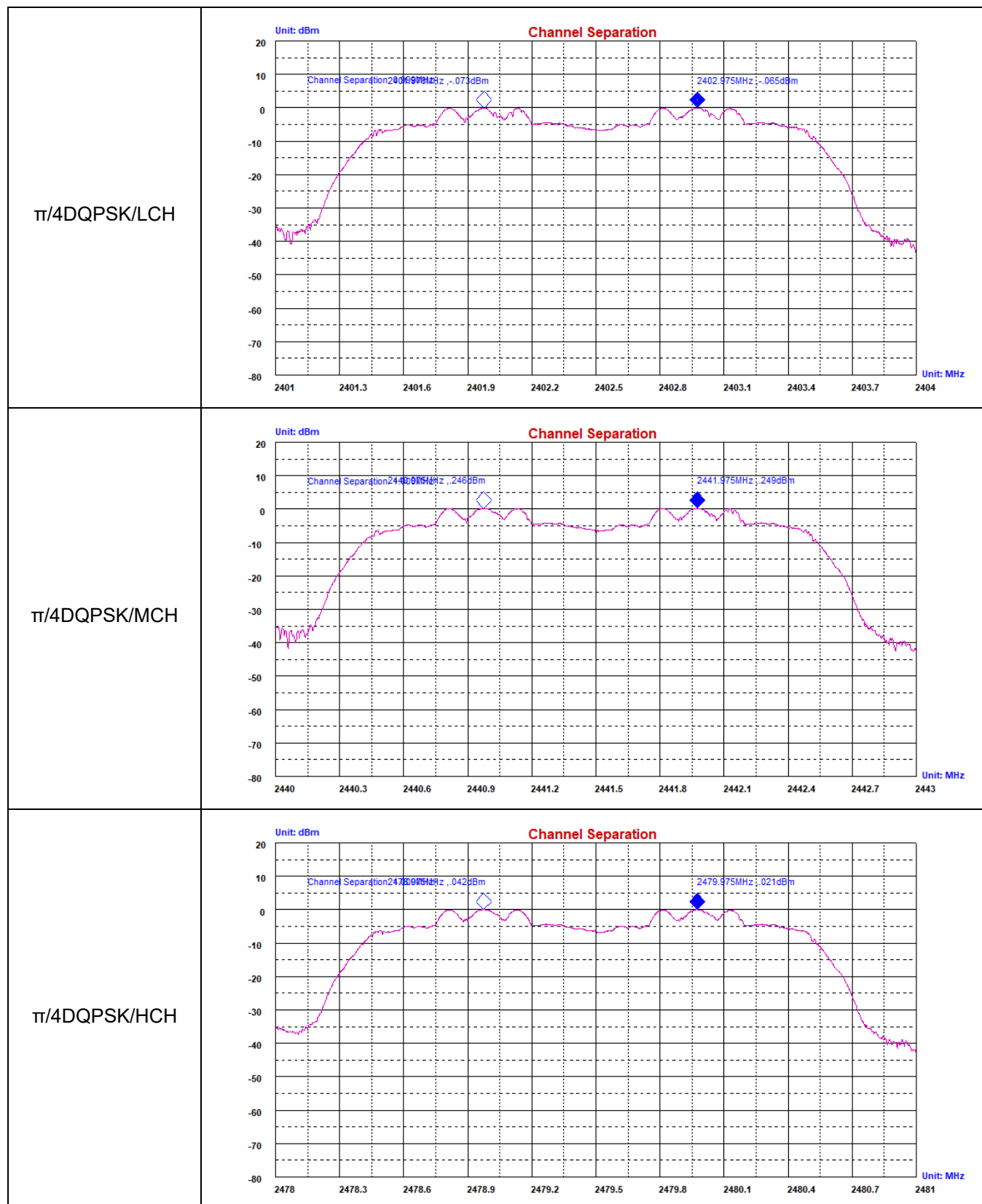


A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.000	0.820	PASS
GFSK	MCH	1.000	0.820	PASS
GFSK	HCH	1.000	0.531	PASS
$\pi/4$ DQPSK	LCH	0.999	0.797	PASS
$\pi/4$ DQPSK	MCH	1.000	0.798	PASS
$\pi/4$ DQPSK	HCH	1.000	0.795	PASS

Test Graph

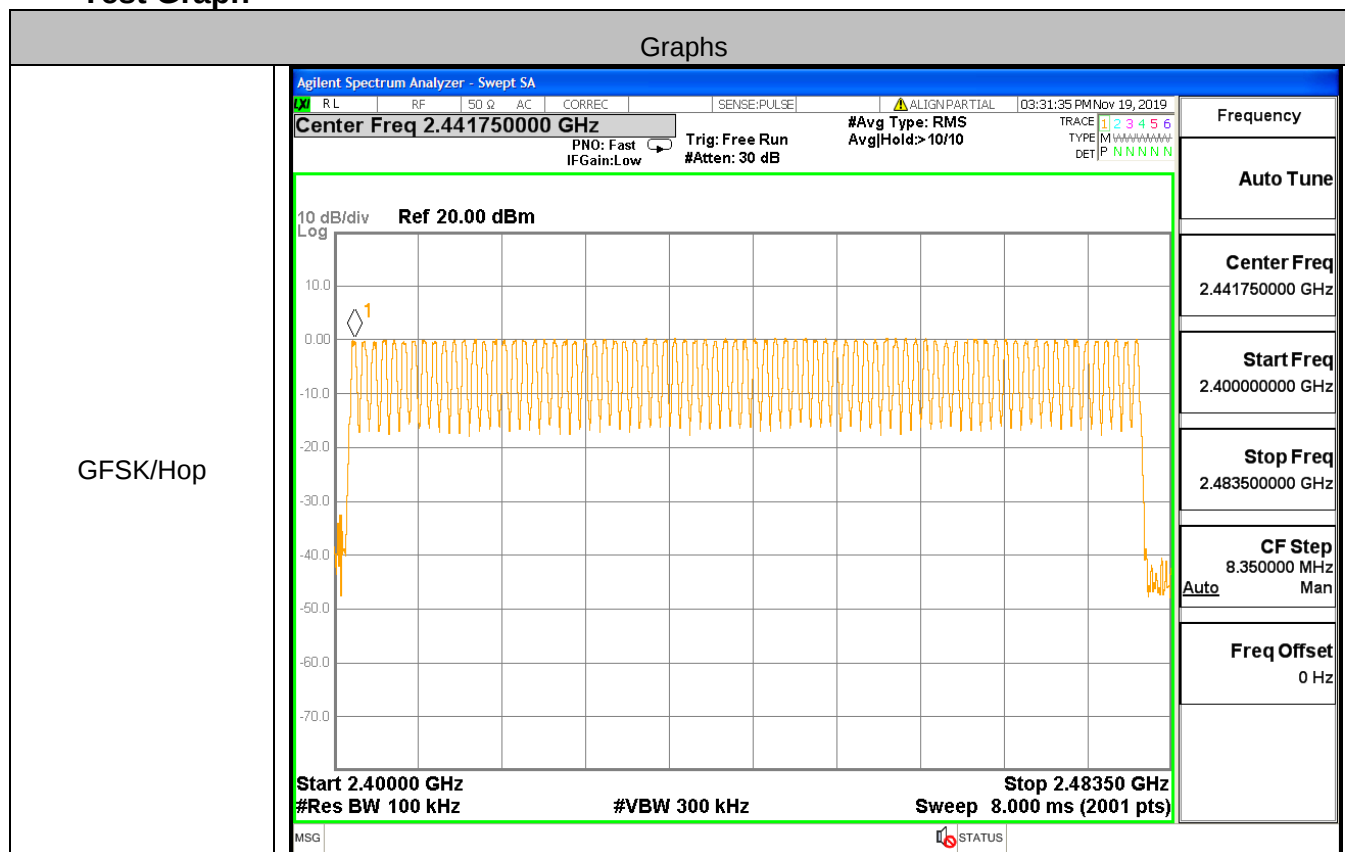


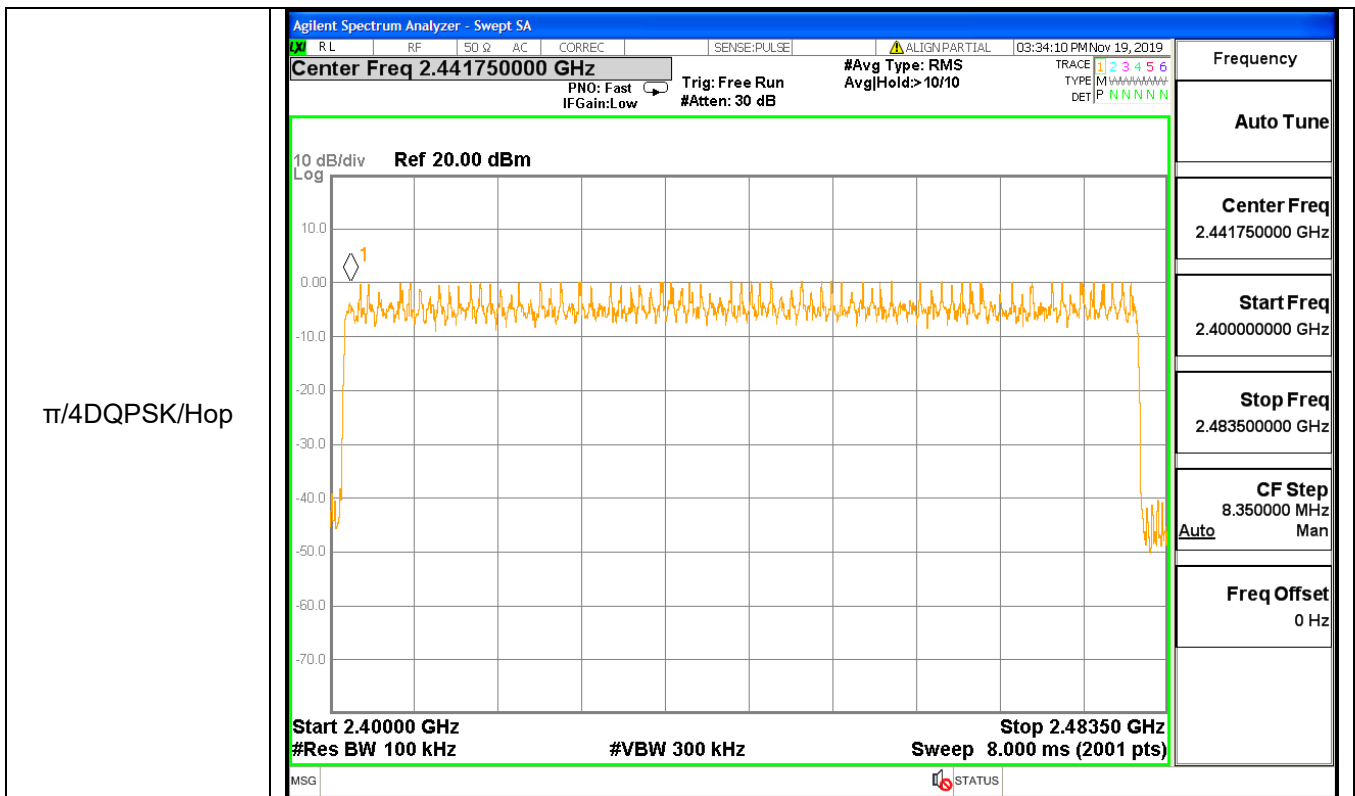


A.4 Hopping Channel Number

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

Test Graph

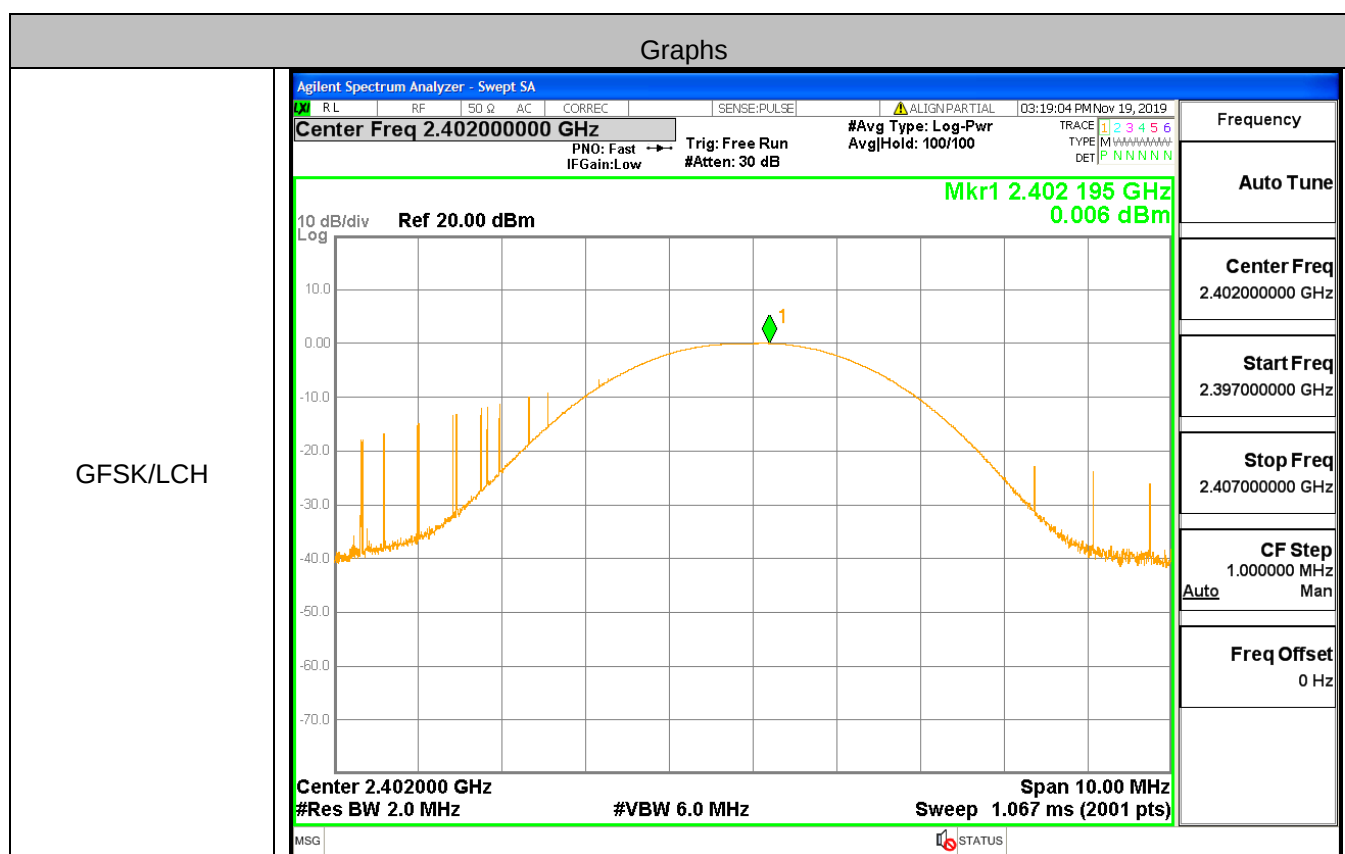


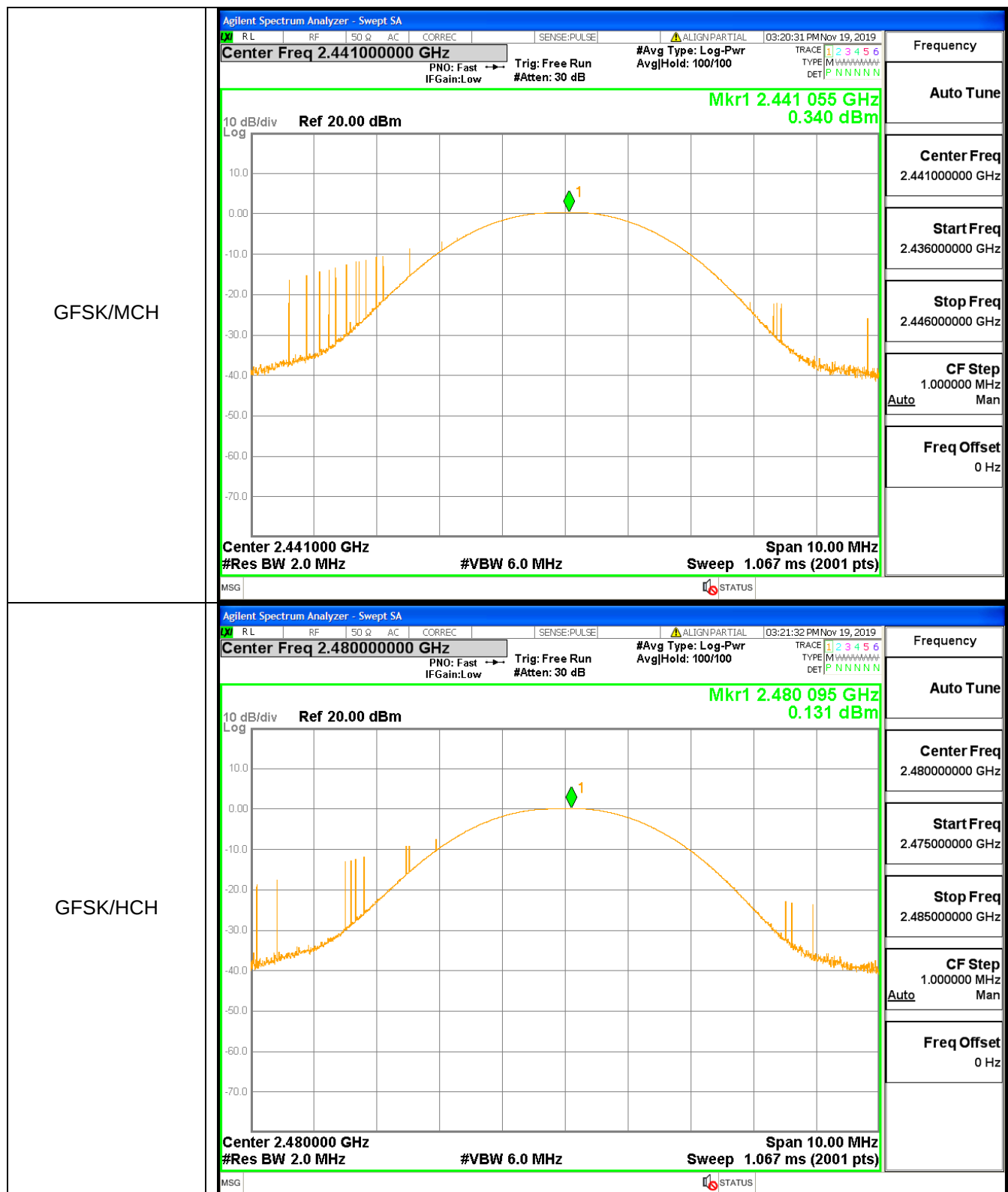


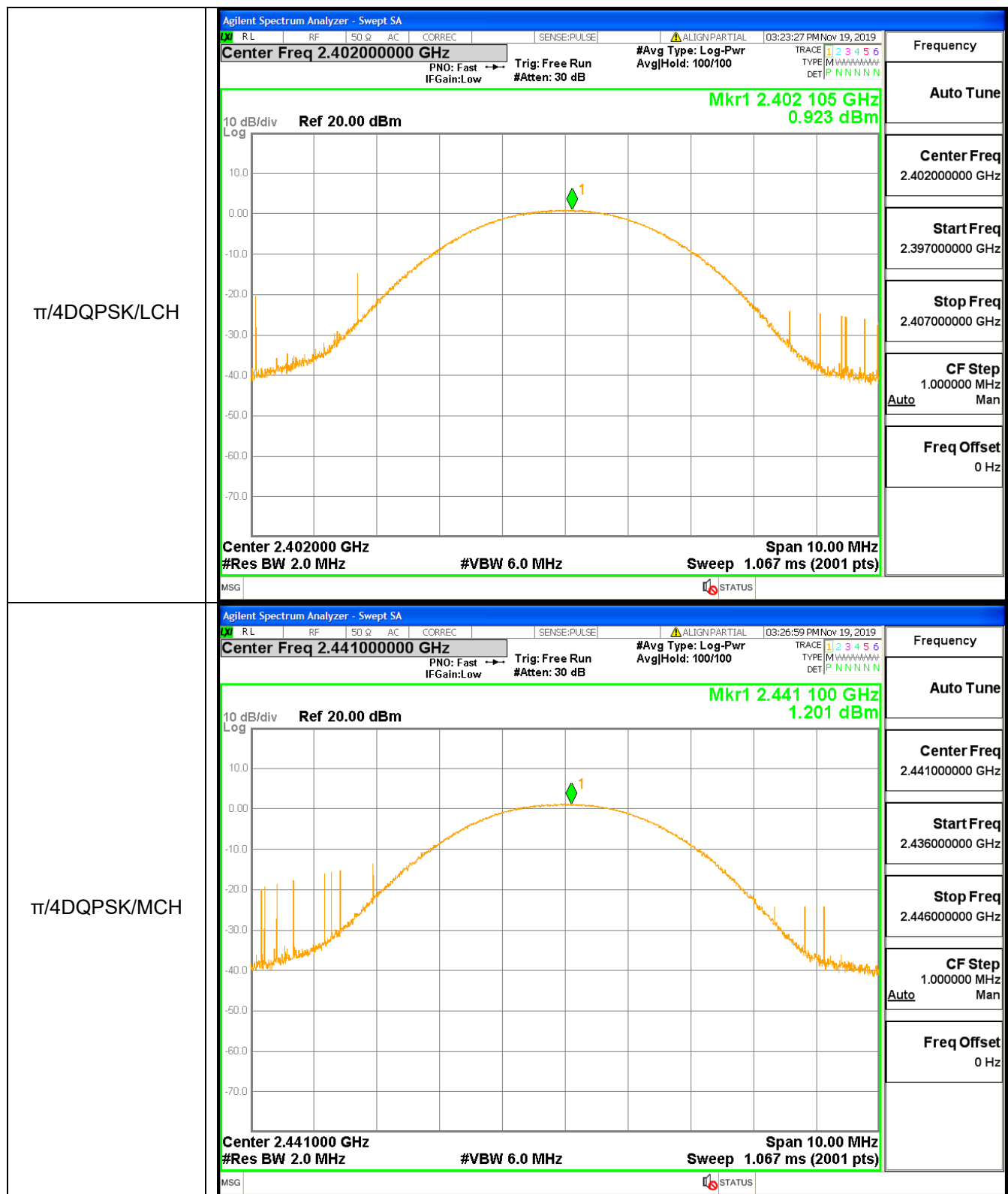
A.5 Conducted Peak Output Power

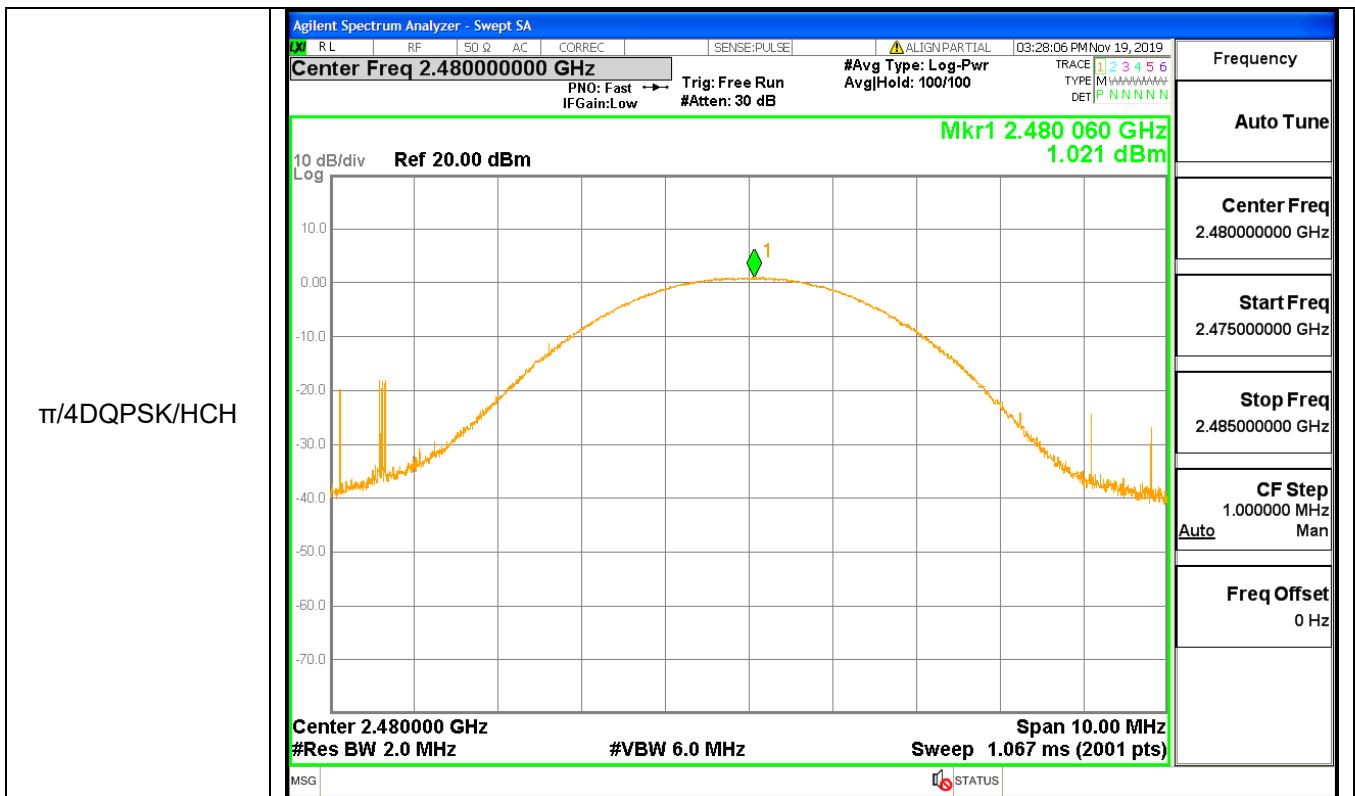
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.006	21	PASS
GFSK	MCH	0.340	21	PASS
GFSK	HCH	0.131	21	PASS
$\pi/4$ DQPSK	LCH	0.878	21	PASS
$\pi/4$ DQPSK	MCH	1.201	21	PASS
$\pi/4$ DQPSK	HCH	1.021	21	PASS

Test Graph









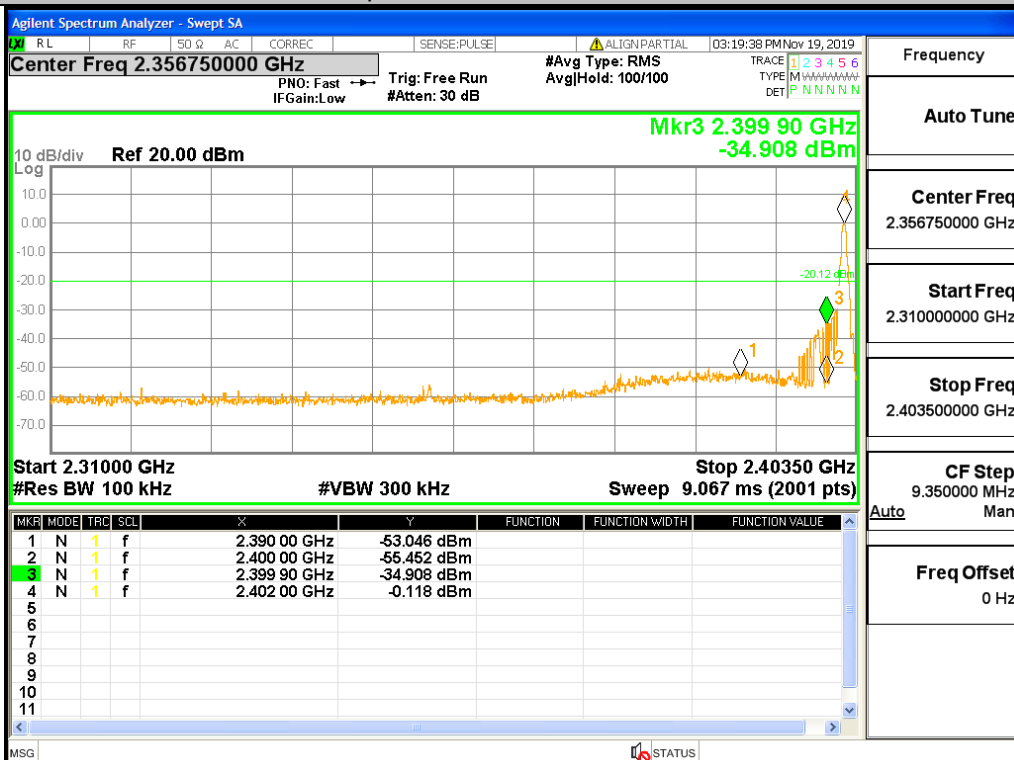
A.6 Band-edge for RF Conducted Emissions

Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
1DH5	2402	2399.9	-0.118	-34.908	-20.118	Pass
1DH5	2480	2483.5	0.003	-43.43	-19.997	Pass
2DH5	2402	2399.152	-3.711	-38.18	-23.711	Pass
2DH5	2480	2483.5	-0.434	-47.68	-20.434	Pass
1DH5-Hopping	2402	2399.91	0.217	-34.618	-19.783	Pass
1DH5-Hopping	2480	2483.5	0.355	-43.20	-19.645	Pass
2DH5-Hopping	2402	2398.98	0.149	-37.918	-19.851	Pass
2DH5-Hopping	2480	2483.5	0.218	-49.96	-19.782	Pass

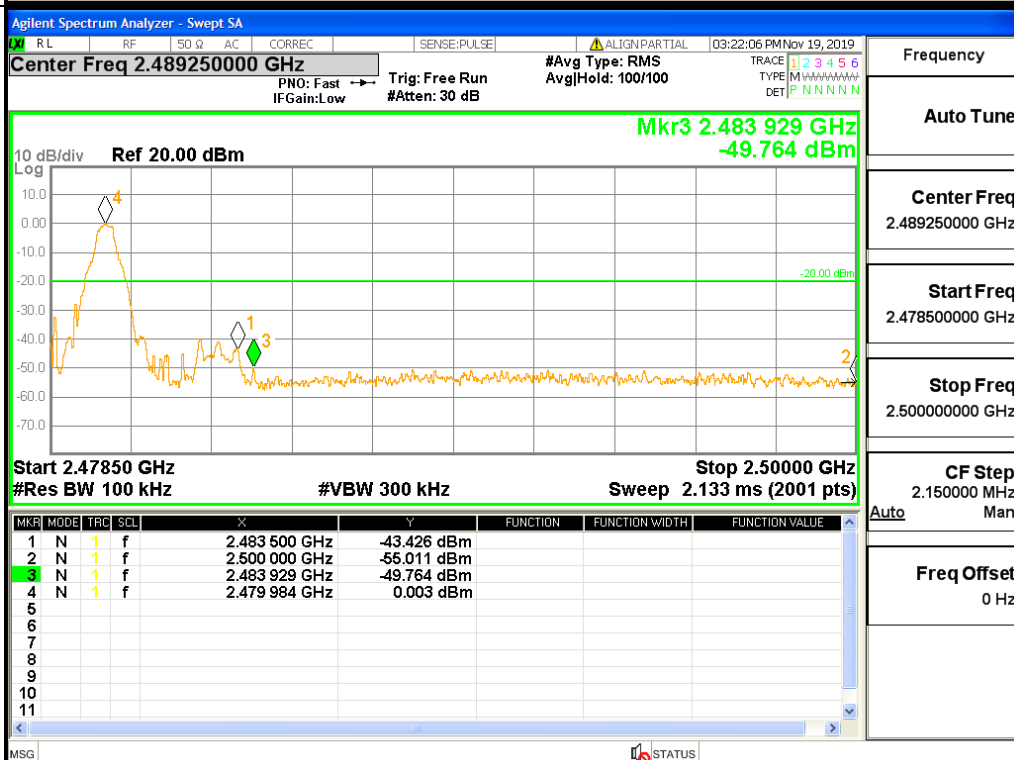
Test Graph

Graphs

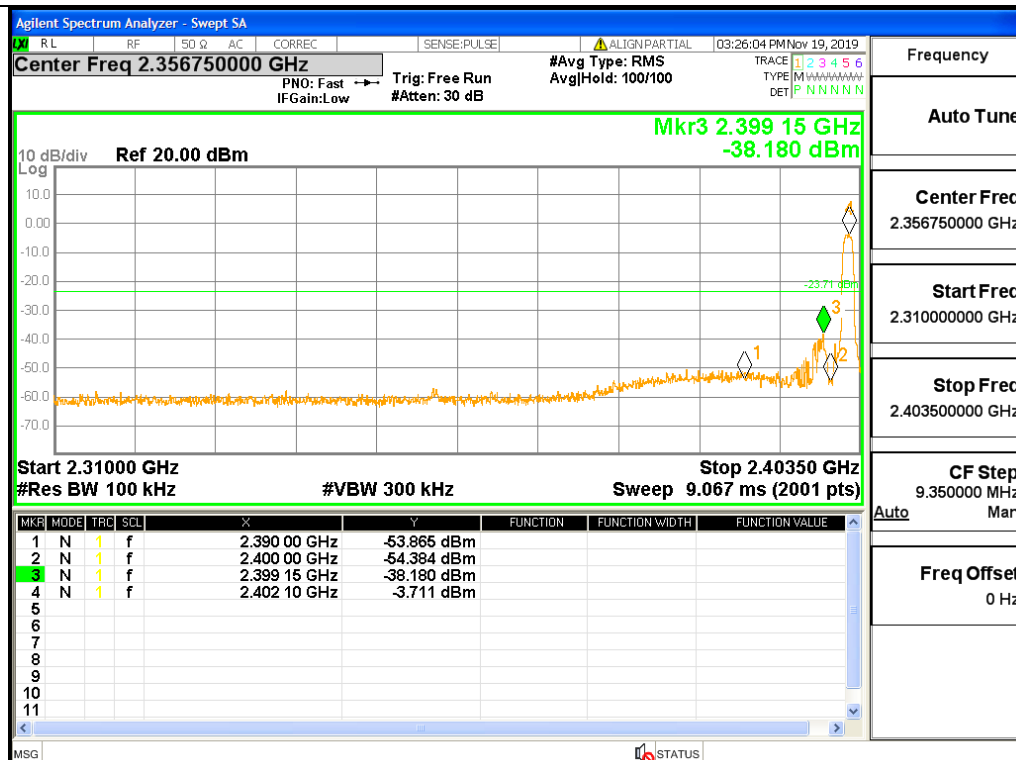
GFSK/LCH/No Hop



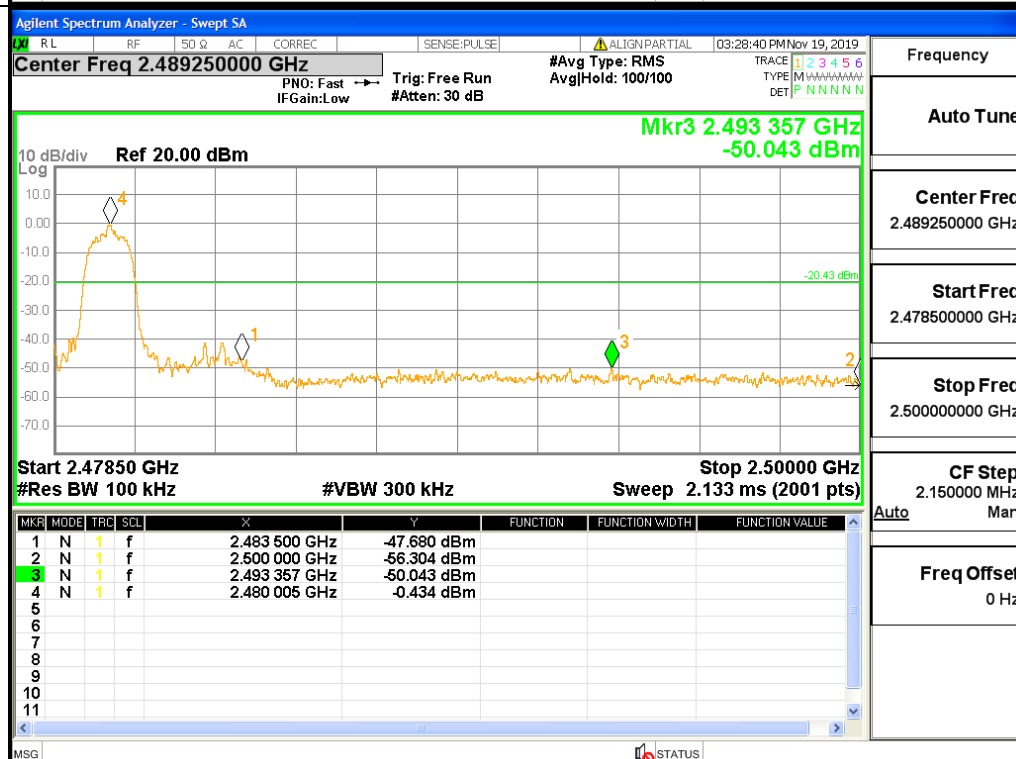
GFSK/HCH/No Hop



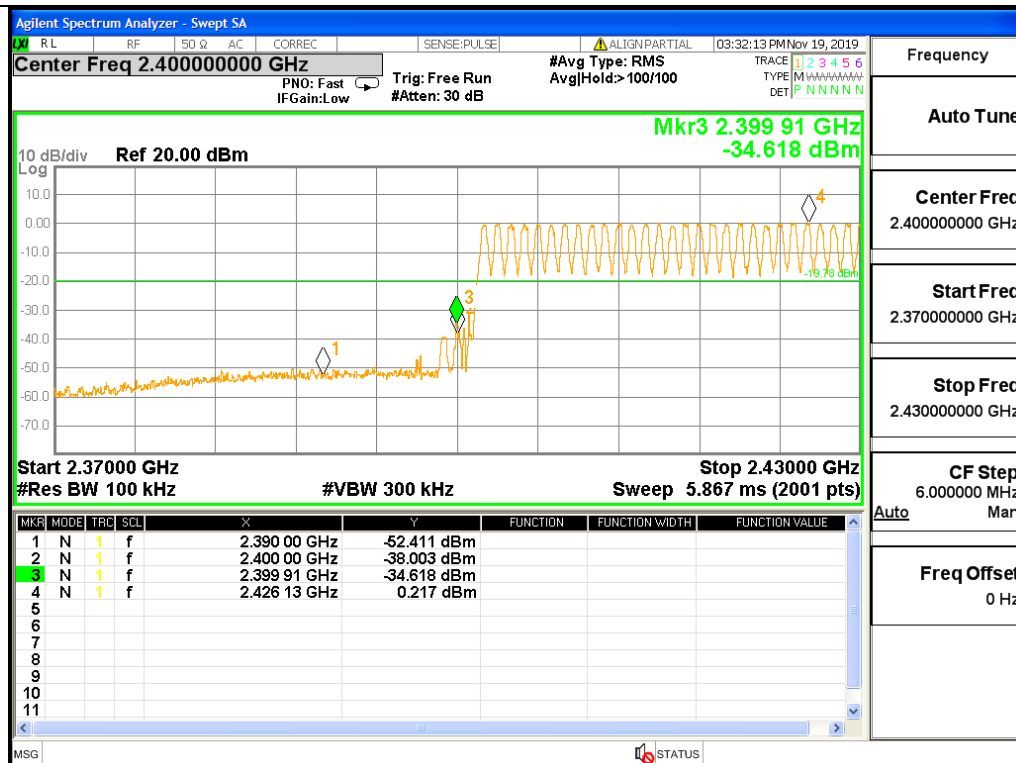
$\pi/4$ DQPSK/LCH/No
Hop



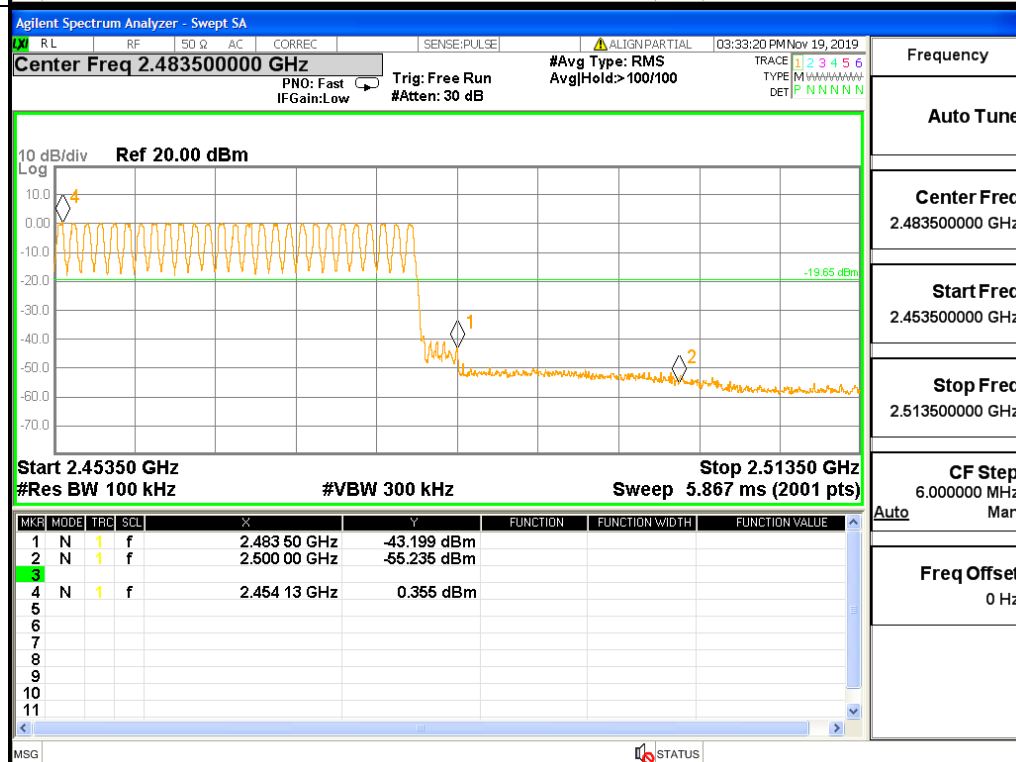
$\pi/4$ DQPSK/HCH/No
Hop

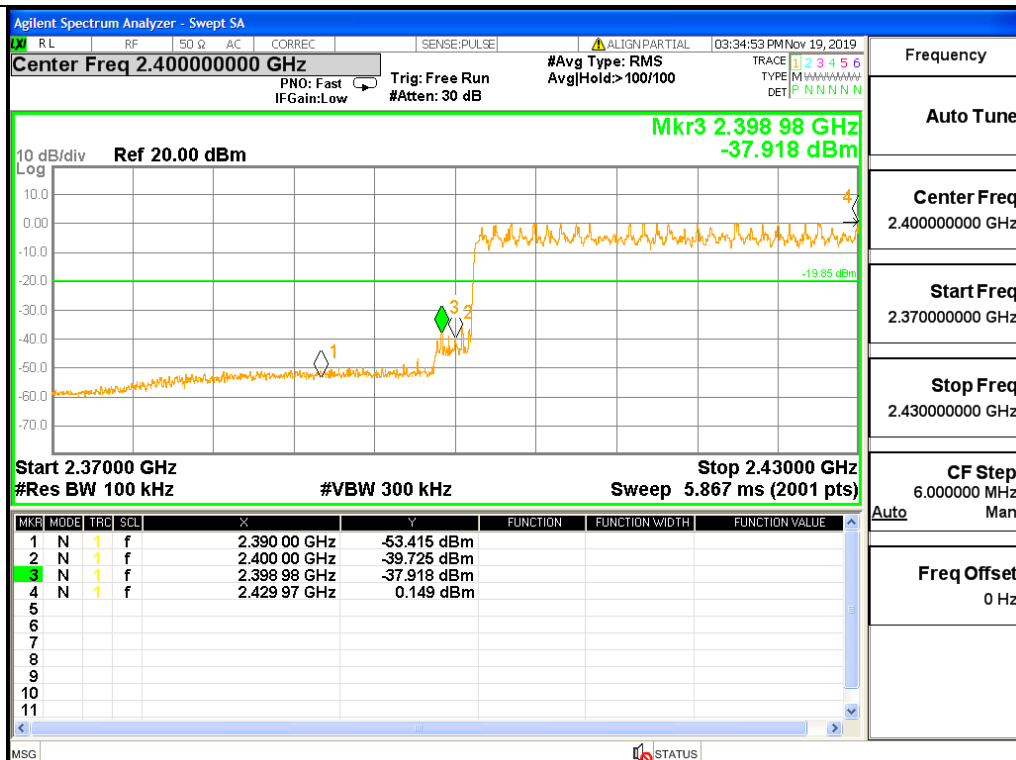
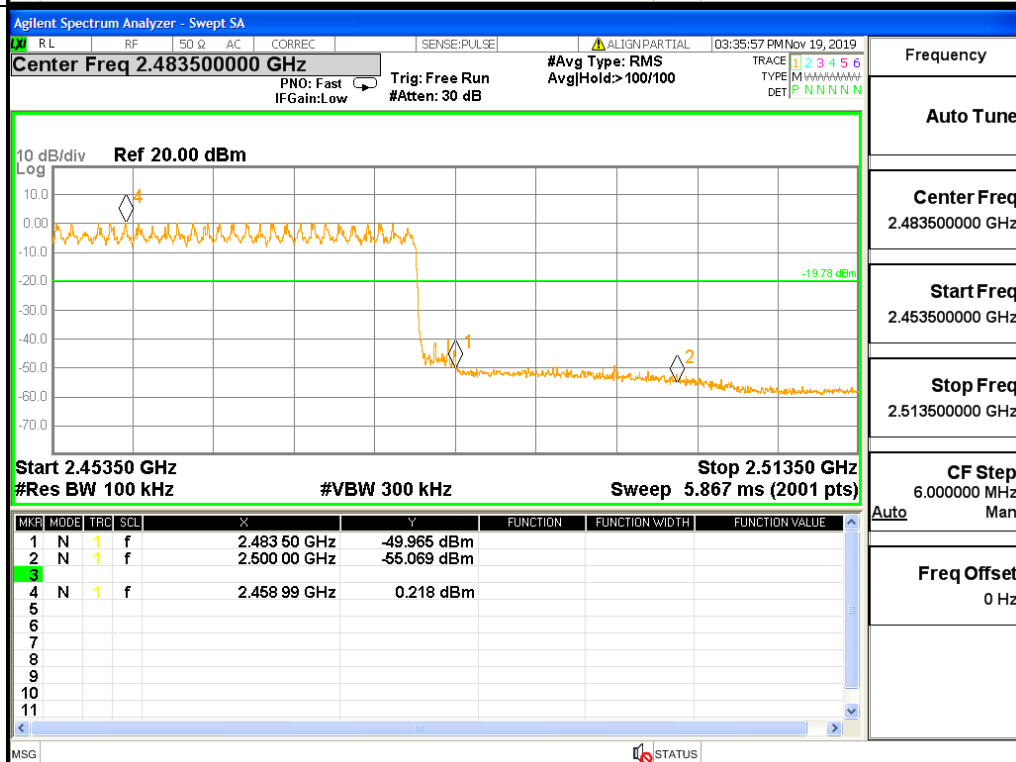


GFSK/LCH/Hop



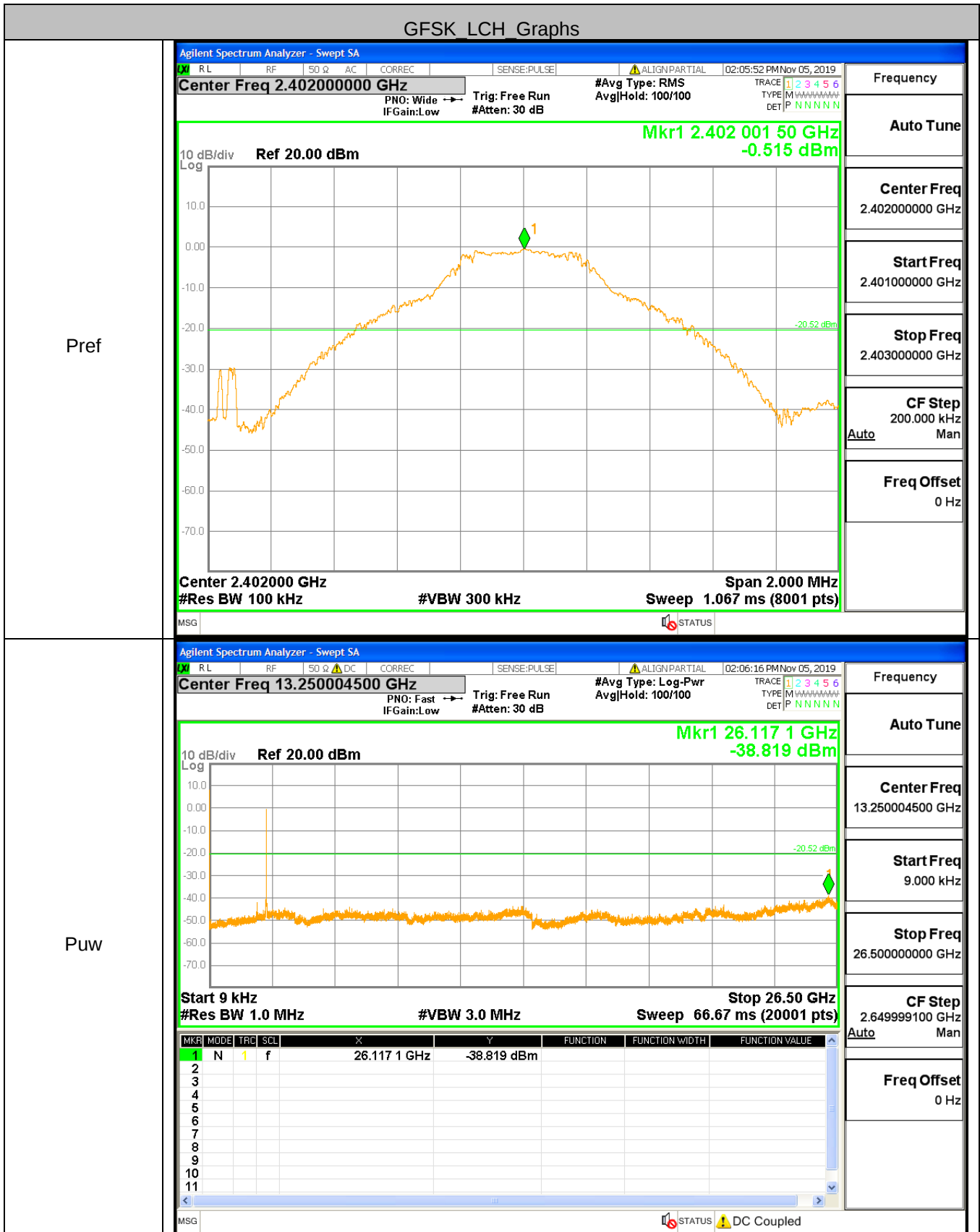
GFSK/HCH/Hop



$\pi/4$ DQPSK/LCH/Hop $\pi/4$ DQPSK/HCH/Hop

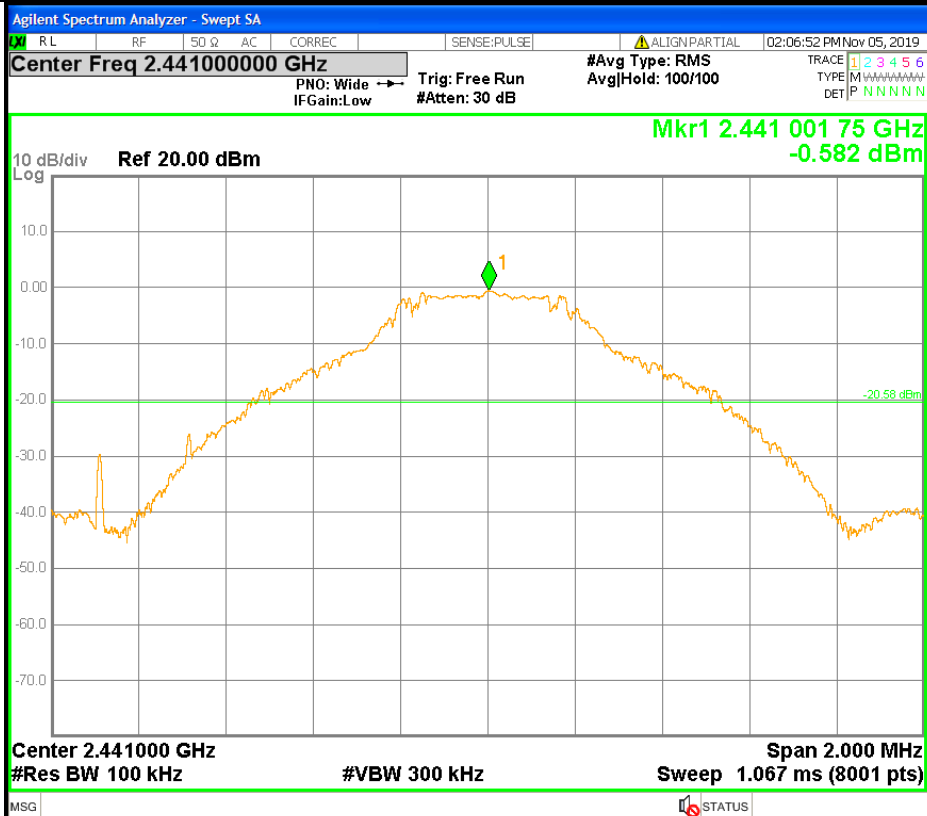
A.7 RF Conducted Spurious Emissions

Test Graph

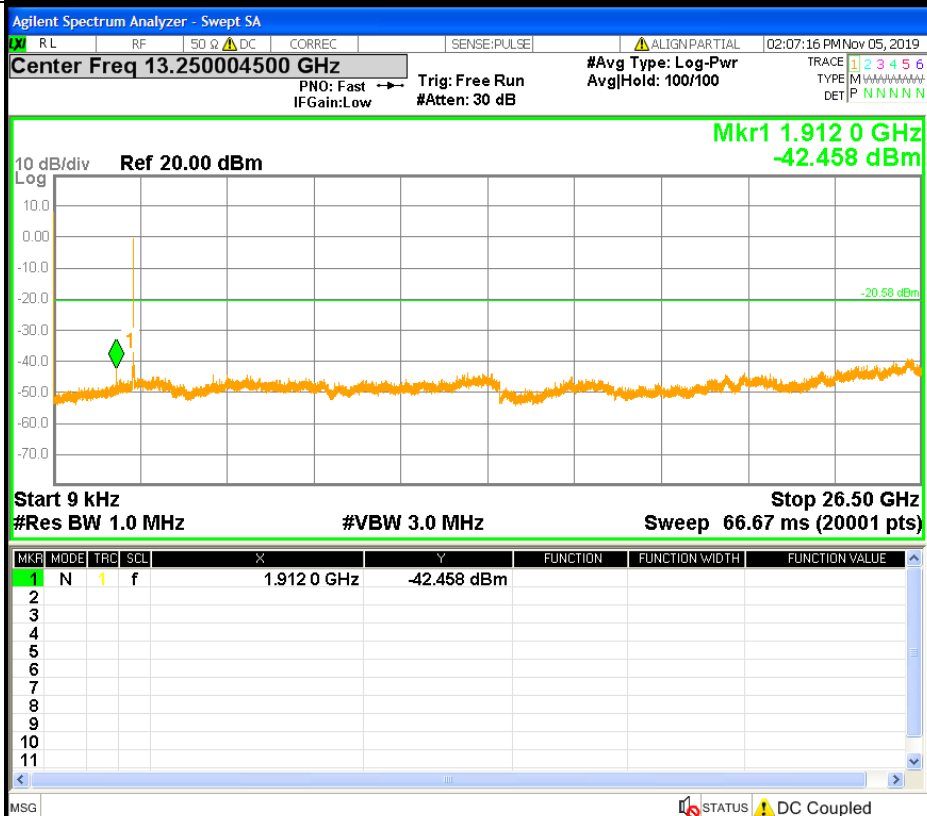


GFSK MCH Graphs

Pref

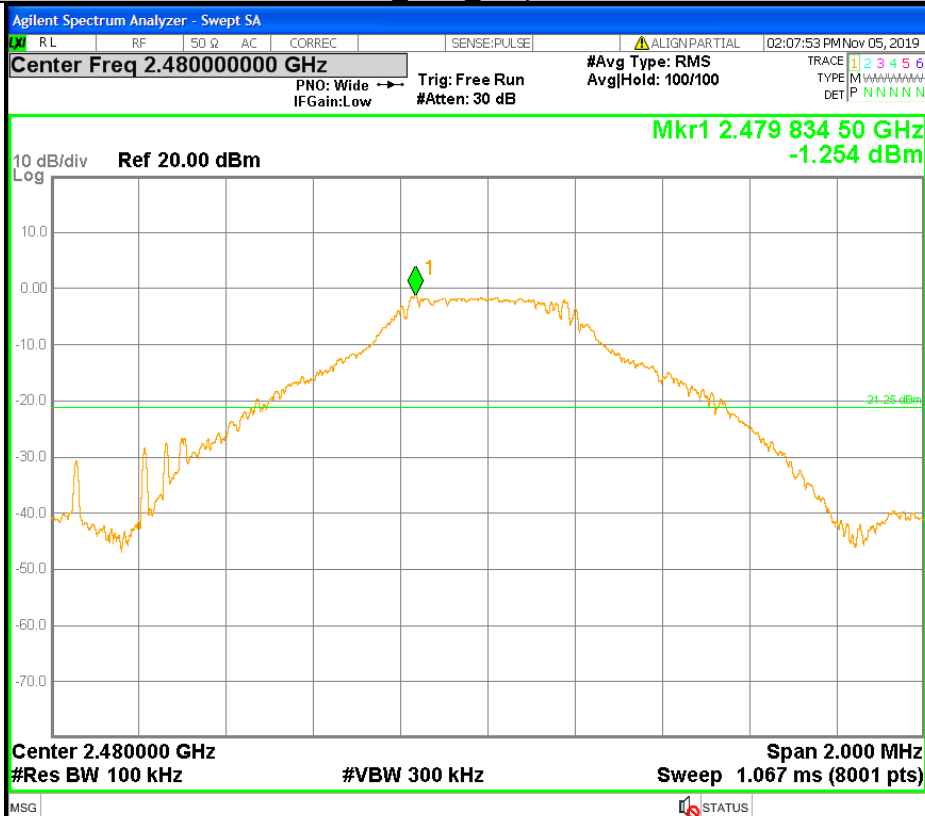


PuW

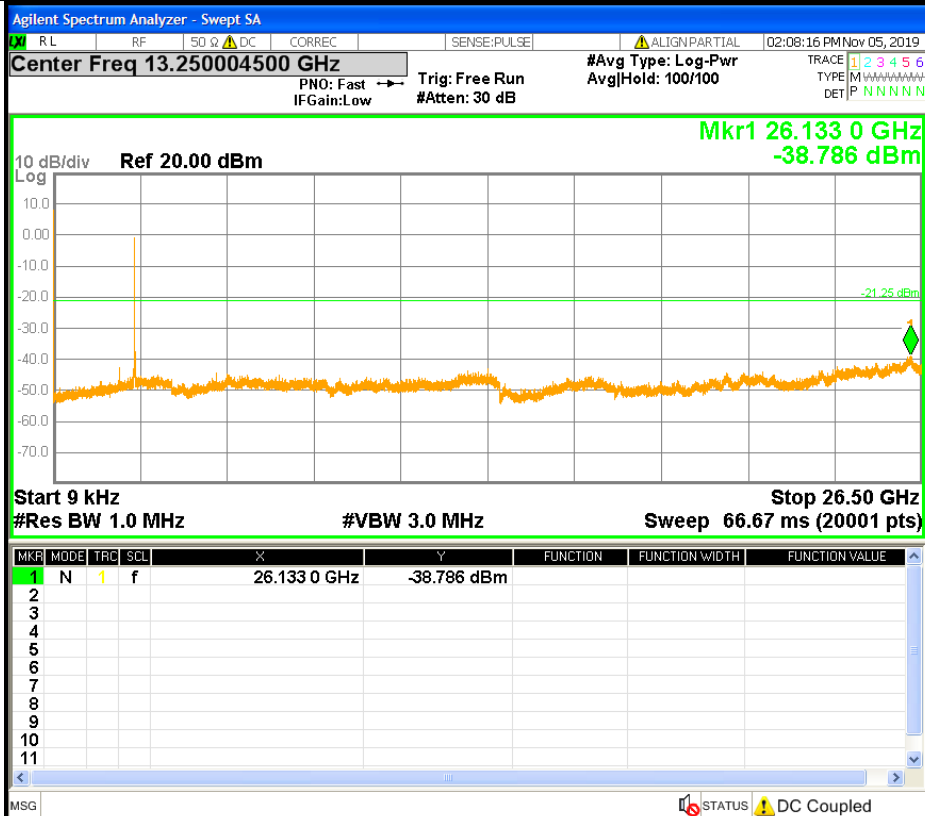


GFSK HCH Graphs

Pref

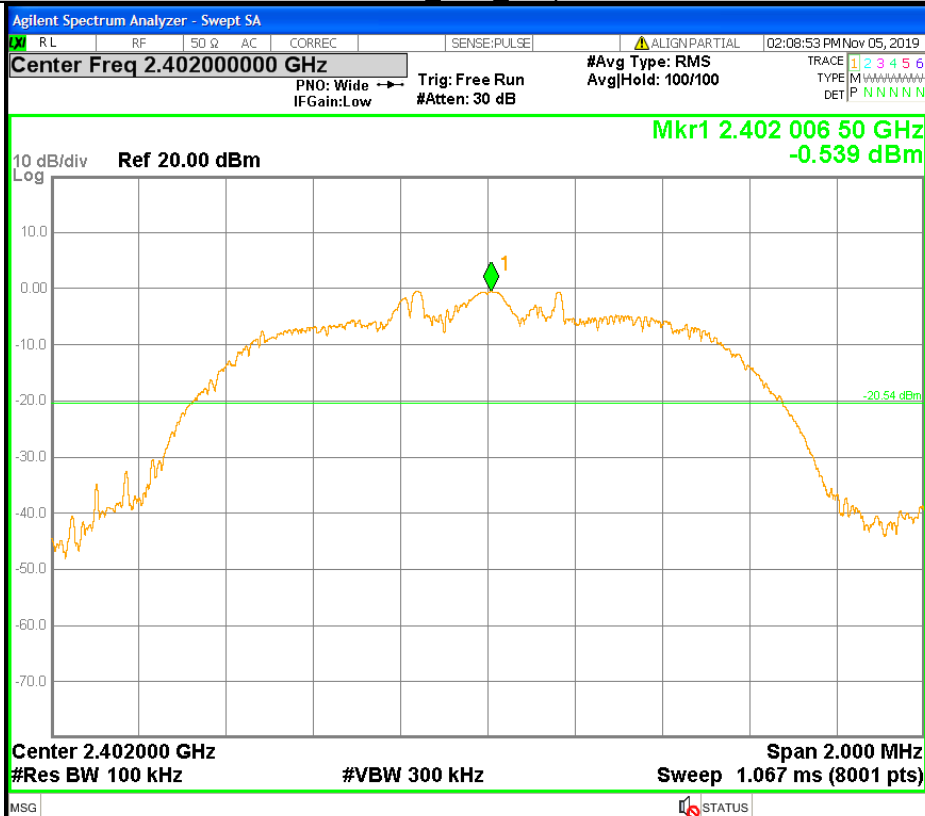


Puw

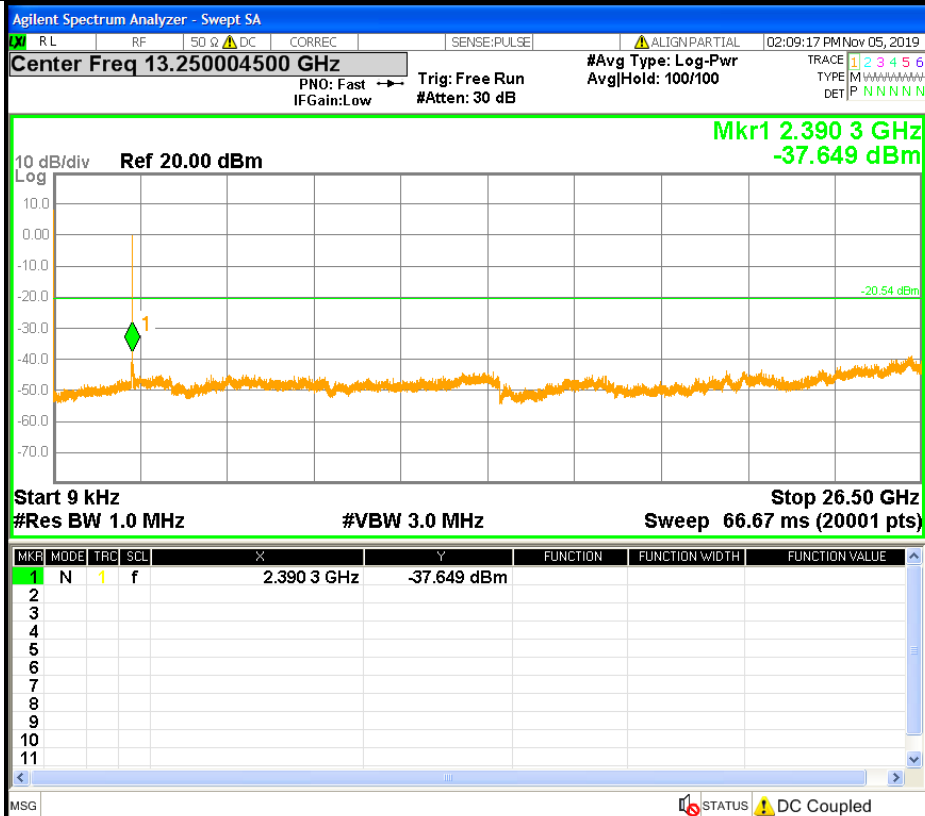


π /4DQPSK LCH Graphs

Pref

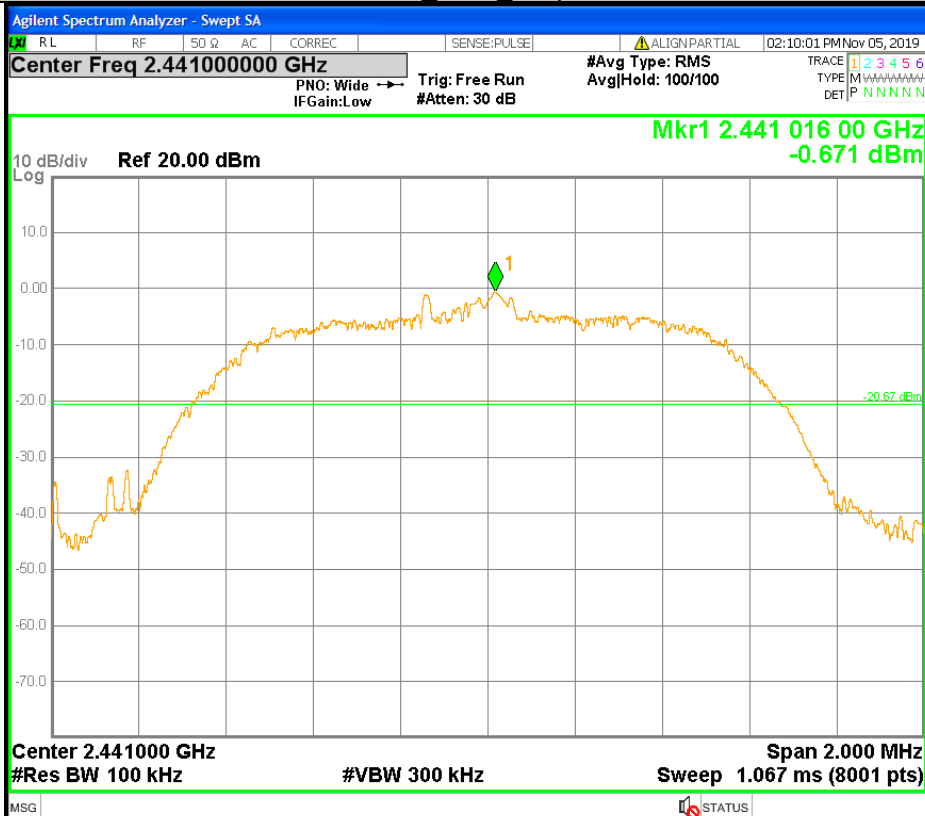


Puw

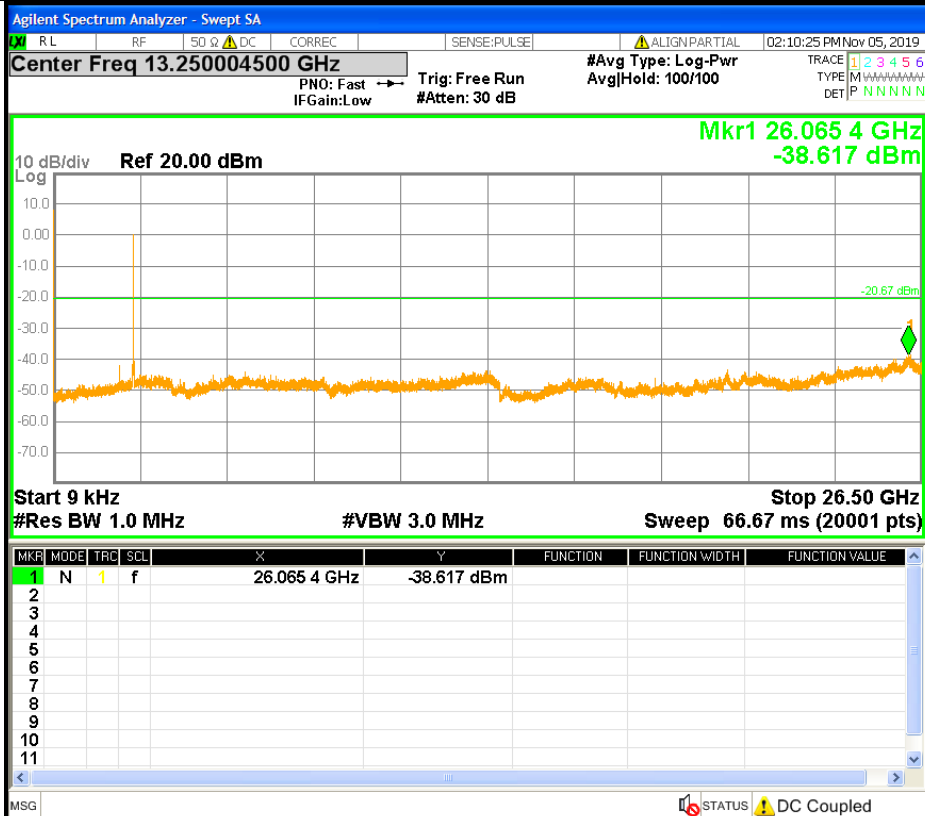


$\pi/4$ DQPSK MCH Graphs

Pref

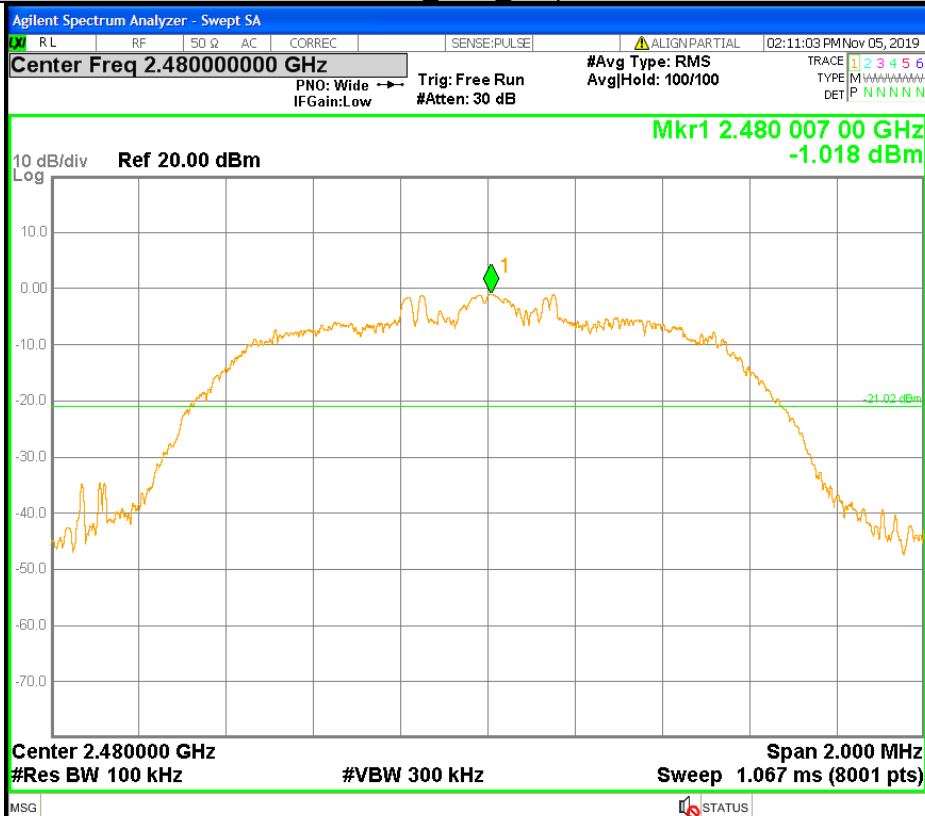


Puw



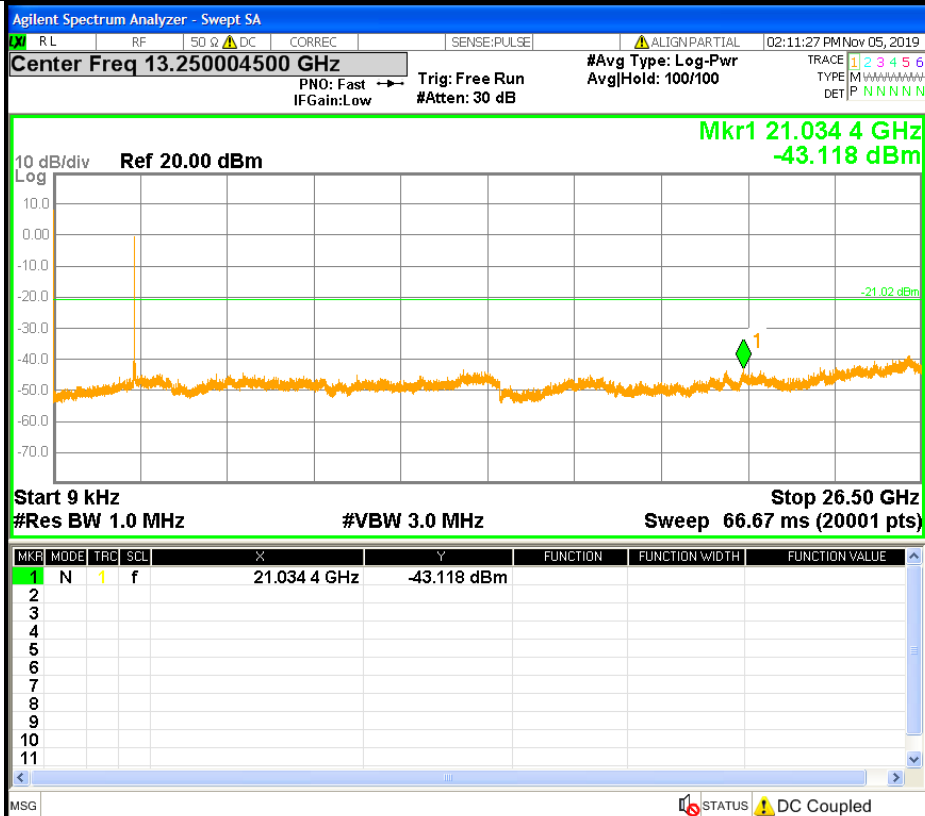
$\pi/4$ DQPSK HCH Graphs

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



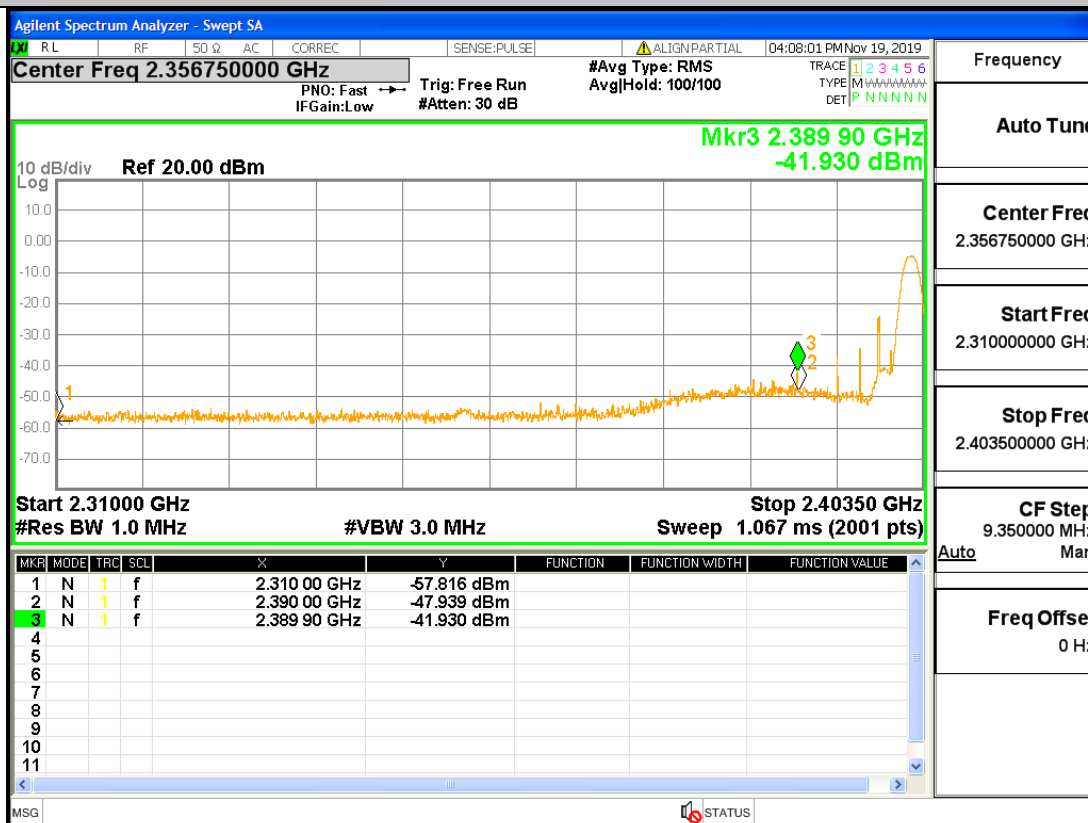
Frequency
Auto Tune
Center Freq 13.250004500 GHz
Start Freq 9.000 kHz
Stop Freq 26.500000000 GHz
CF Step 2.649999100 GHz Auto Man
Freq Offset 0 Hz

A.8 Restrict-band band-edge measurements

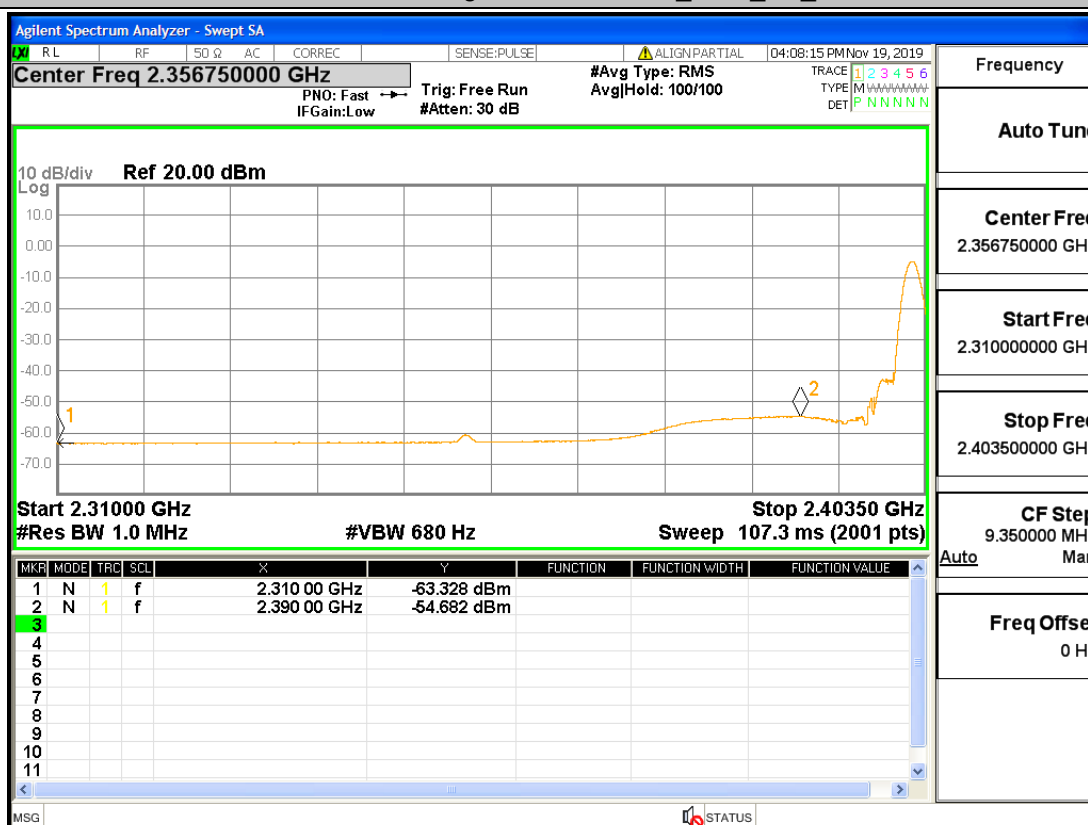
Type	Carrier Frequency (MHz)	Frequency(M Hz)	Gain	Ground Factor	Peak Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2389.896	5.54	0.00	-41.930	58.81	74	Pass
1DH5	2480	2484.671	5.54	0.00	-38.198	62.542	74	Pass
2DH5	2402	2390	5.54	0.00	-48.003	52.737	74	Pass
2DH5	2480	2485.262	5.54	0.00	-39.145	61.595	74	Pass

Type	Carrier Frequency (MHz)	Frequency(M Hz)	Gain	Ground Factor	Average Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2389.896	5.54	0.00	-54.682	46.058	54	Pass
1DH5	2480	2484.671	5.54	0.00	-47.859	52.881	54	Pass
2DH5	2402	2390	5.54	0.00	-54.687	46.053	54	Pass
2DH5	2480	2485.262	5.54	0.00	-49.802	50.938	54	Pass

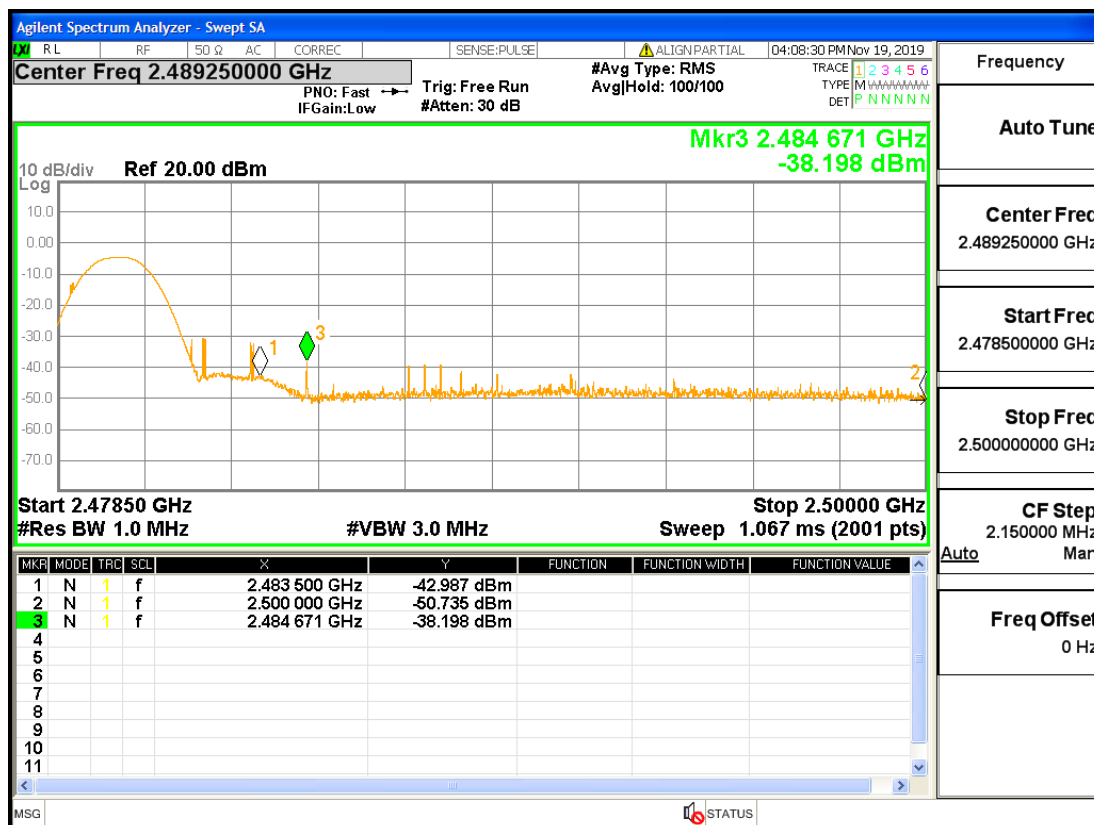
Restrict-band band-edge measurements_2402_PEAK_DH5



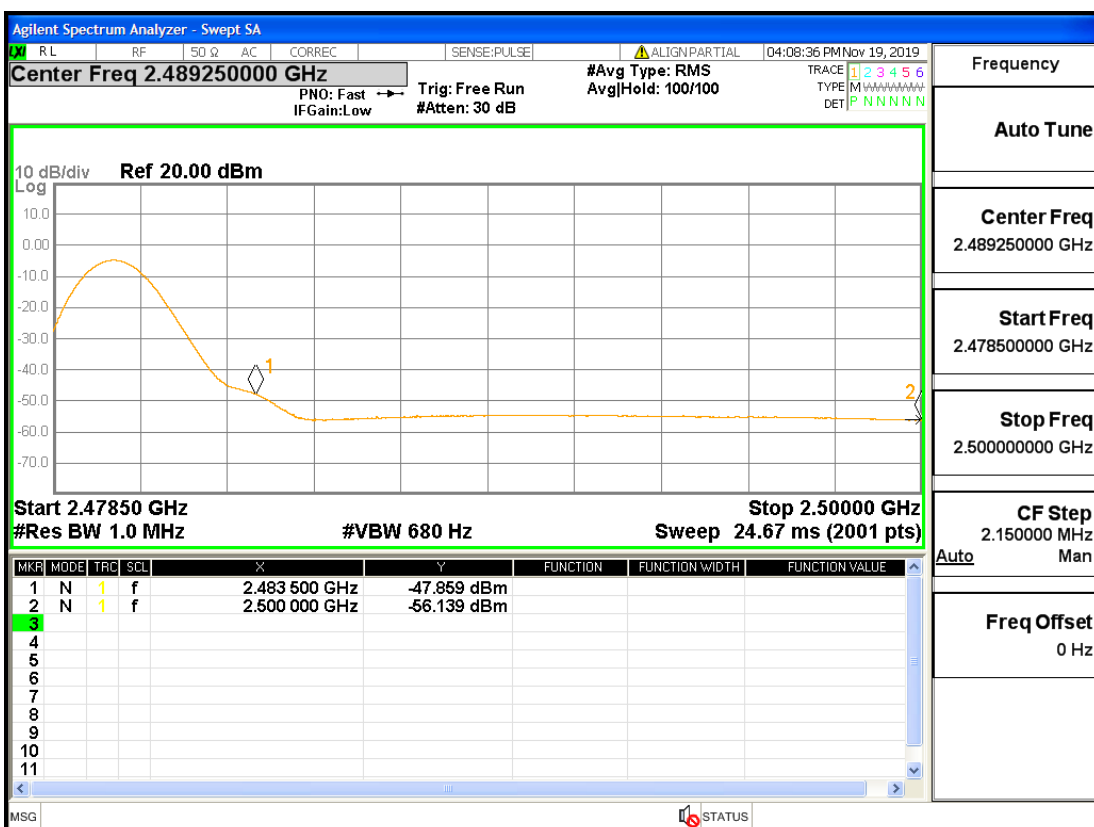
Restrict-band band-edge measurements_2402_AV_DH5



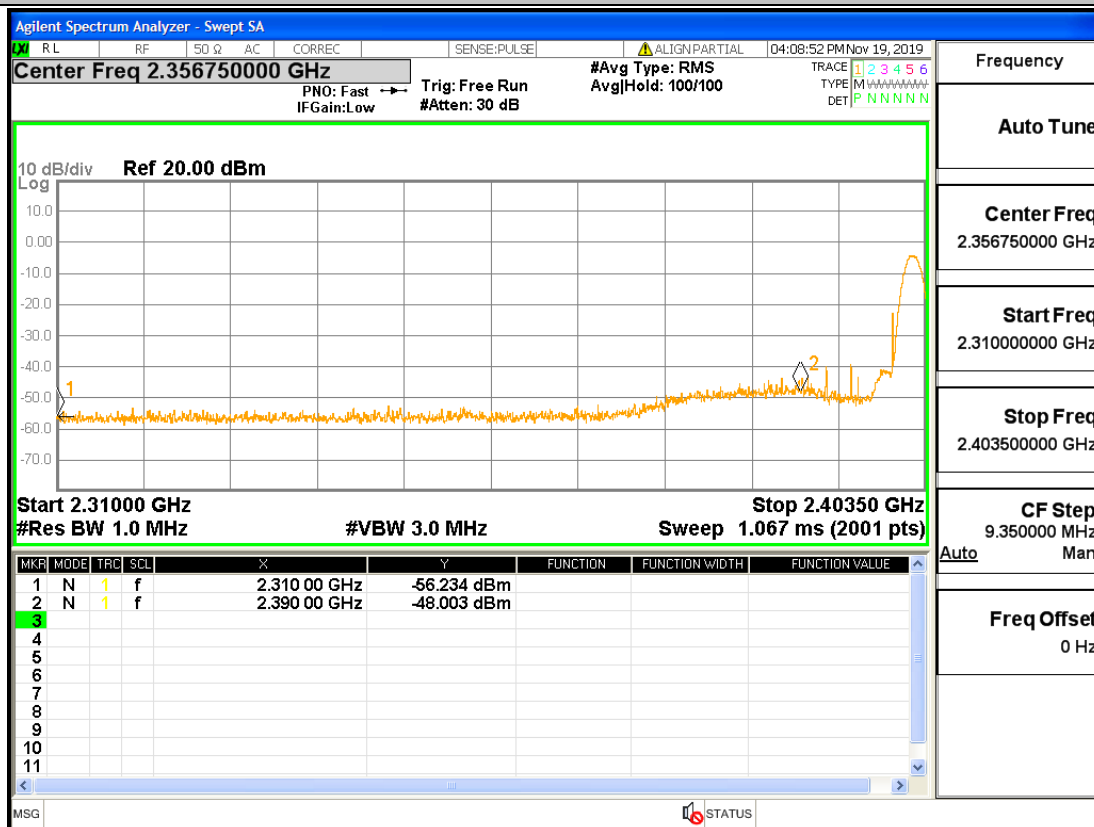
Restrict-band band-edge measurements_2480_PEAK_DH5



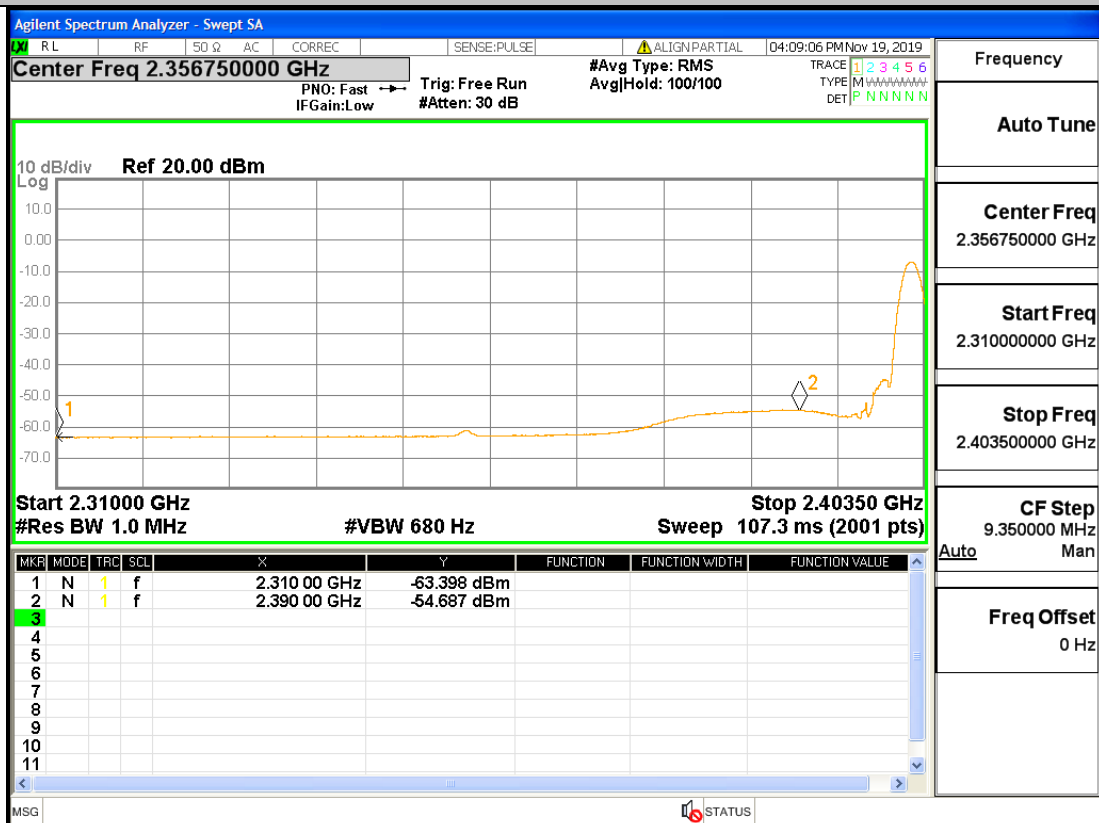
Restrict-band band-edge measurements_2480_AV_DH5



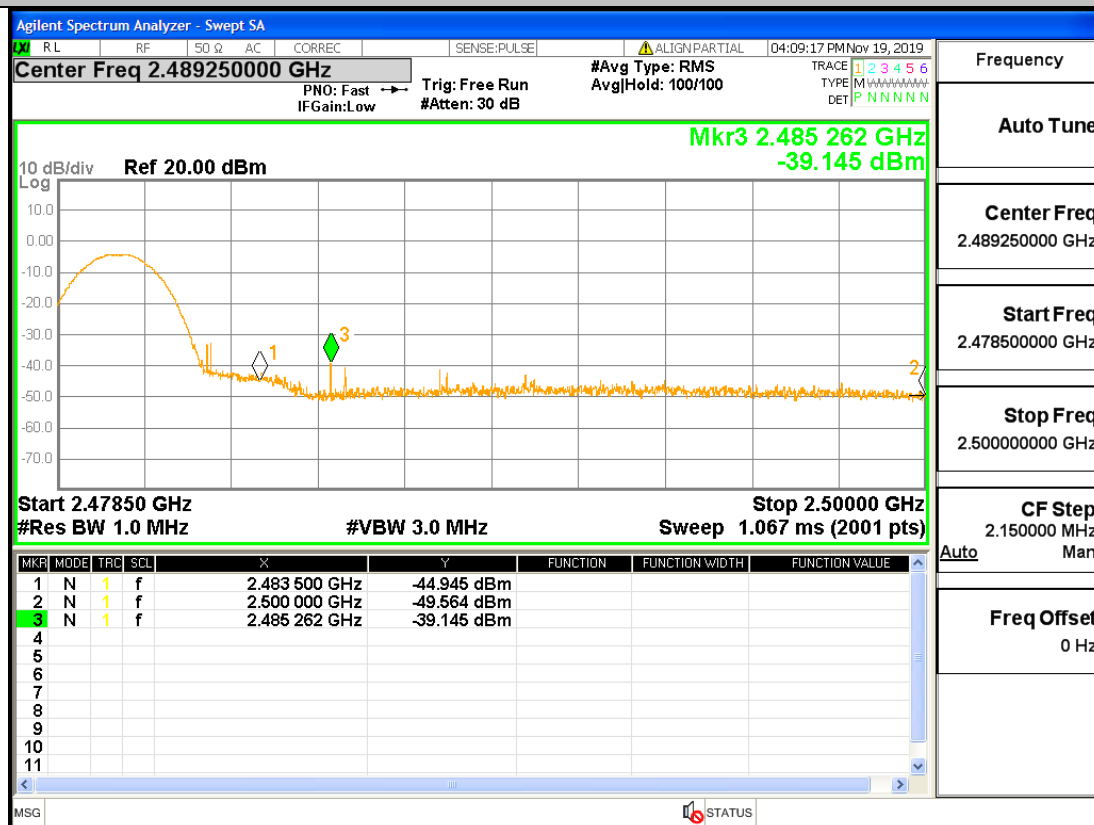
Restrict-band band-edge measurements_2402_PEAK_2DH5



Restrict-band band-edge measurements_2402_AV_2DH5



Restrict-band band-edge measurements_2480_PEAK_2DH5



Restrict-band band-edge measurements_2480_AV_2DH5

