

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

Product Name: WIRELESS EARBUDS

Trade Mark: AT&T

Test Model: BE10

FCC ID: 2AF5N-BE10

Environmental Conditions

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

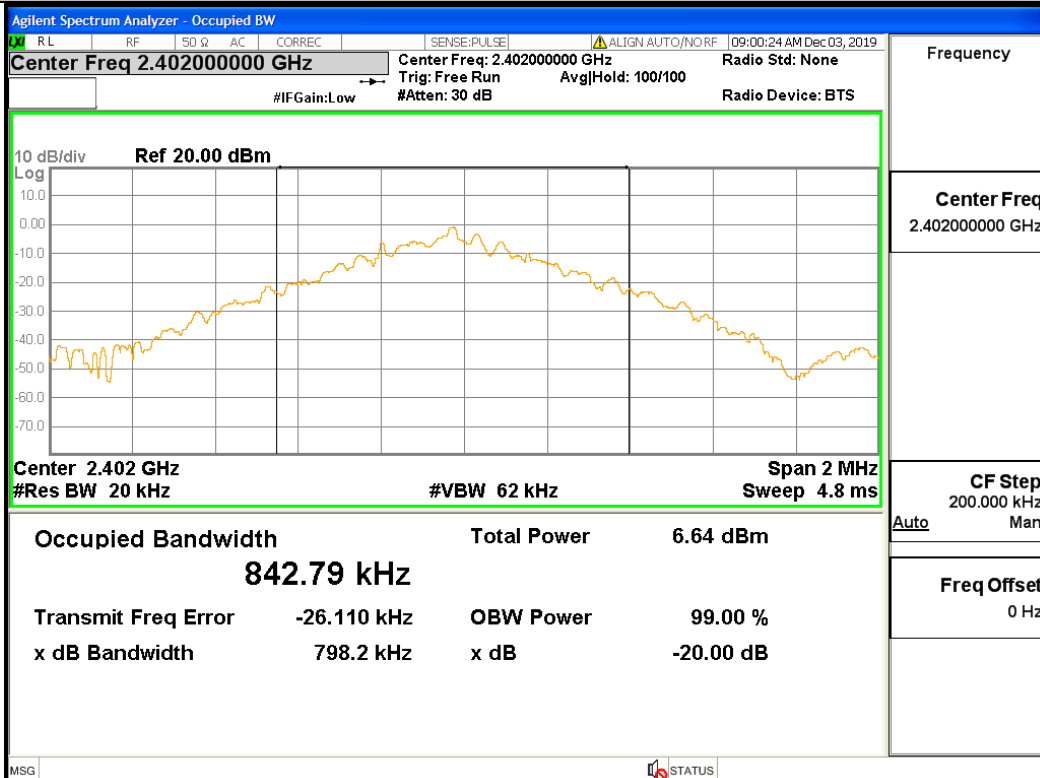
A.1 20 dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit(MHz)	Verdict
GFSK	LCH	0.798	Not Specified	PASS
GFSK	MCH	0.794	Not Specified	PASS
GFSK	HCH	0.794	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.184	Not Specified	PASS
$\pi/4$ DQPSK	MCH	1.175	Not Specified	PASS
$\pi/4$ DQPSK	HCH	1.192	Not Specified	PASS

Test Graph

Graphs

GFSK/LCH



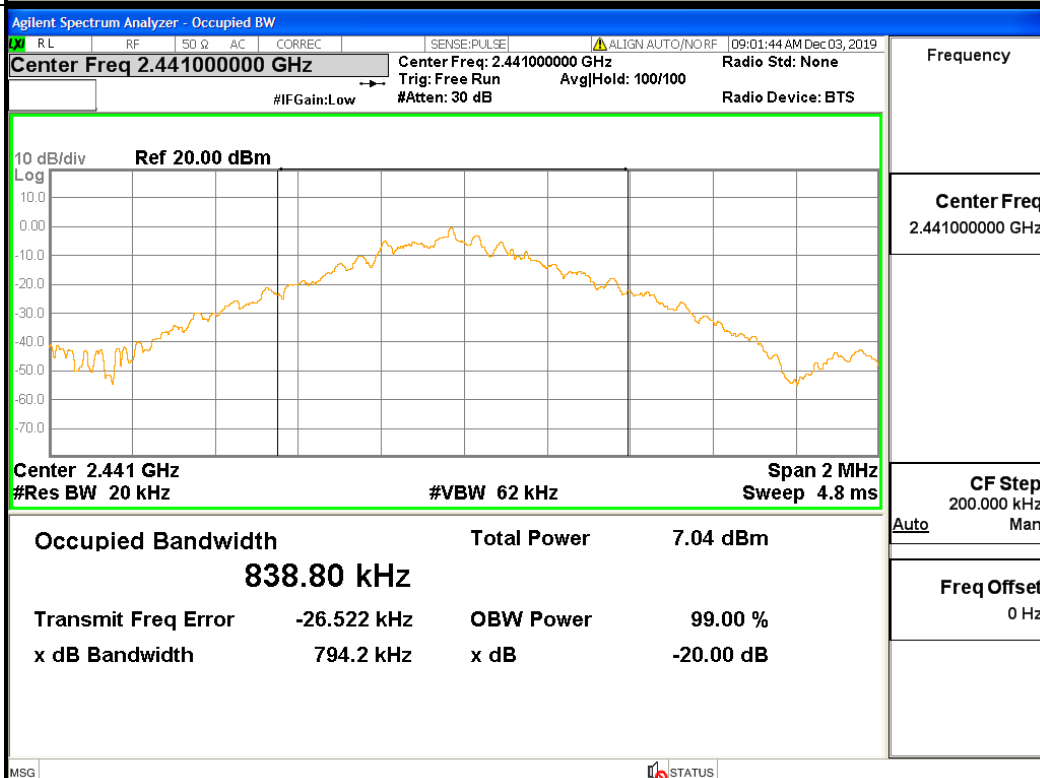
Frequency

Center Freq
2.40200000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

GFSK/MCH



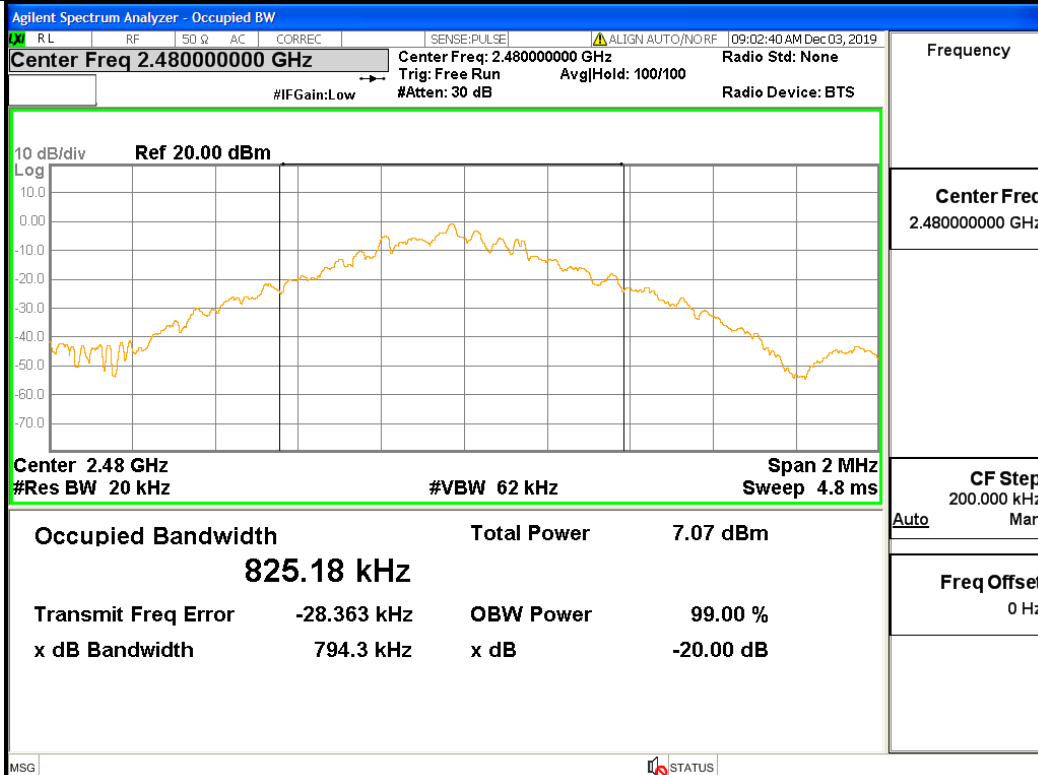
Frequency

Center Freq
2.44100000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

GFSK/HCH



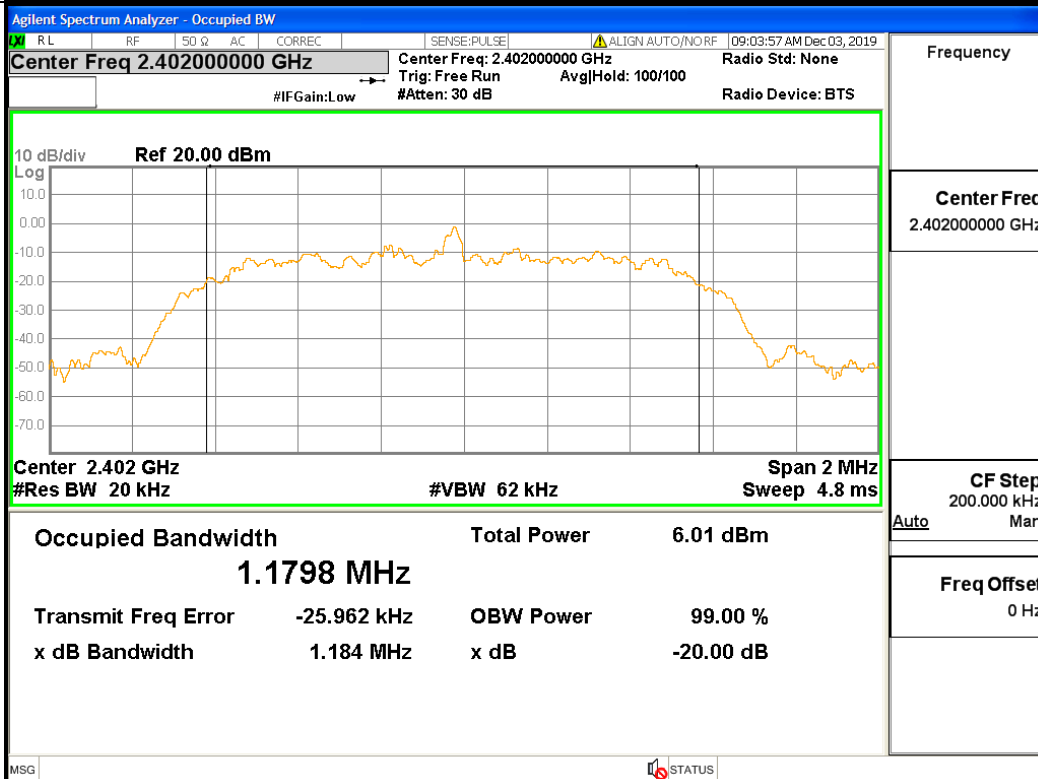
Frequency

Center Freq
2.480000000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

π /4DQPSK/LCH



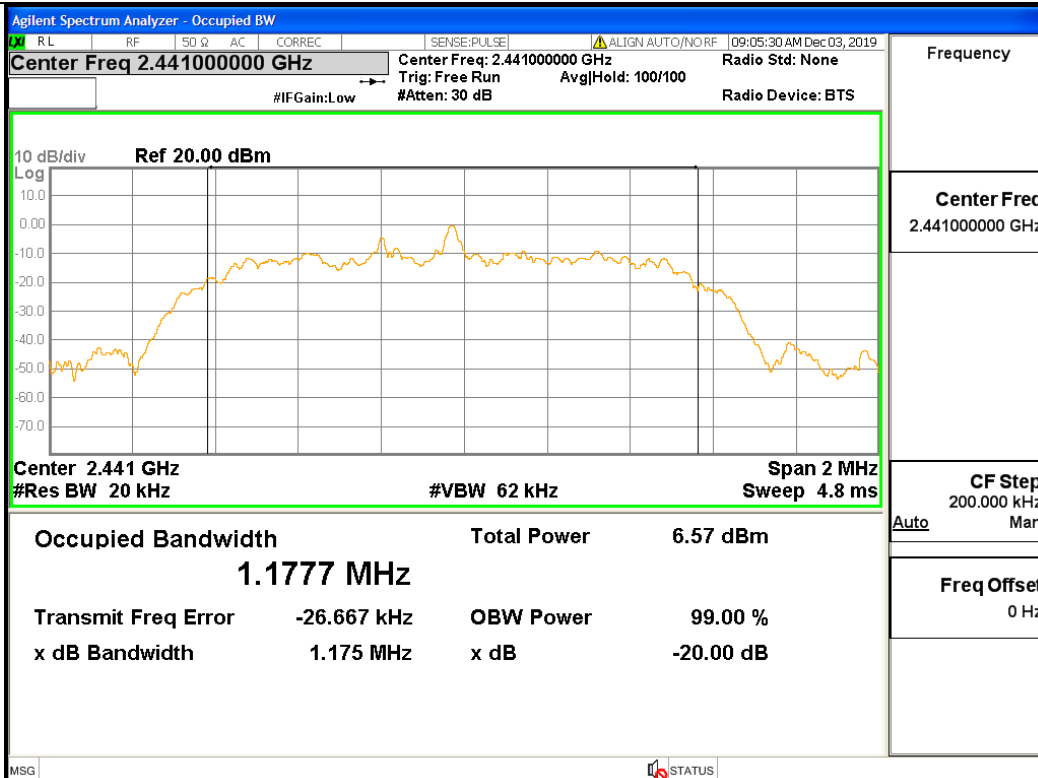
Frequency

Center Freq
2.402000000 GHz

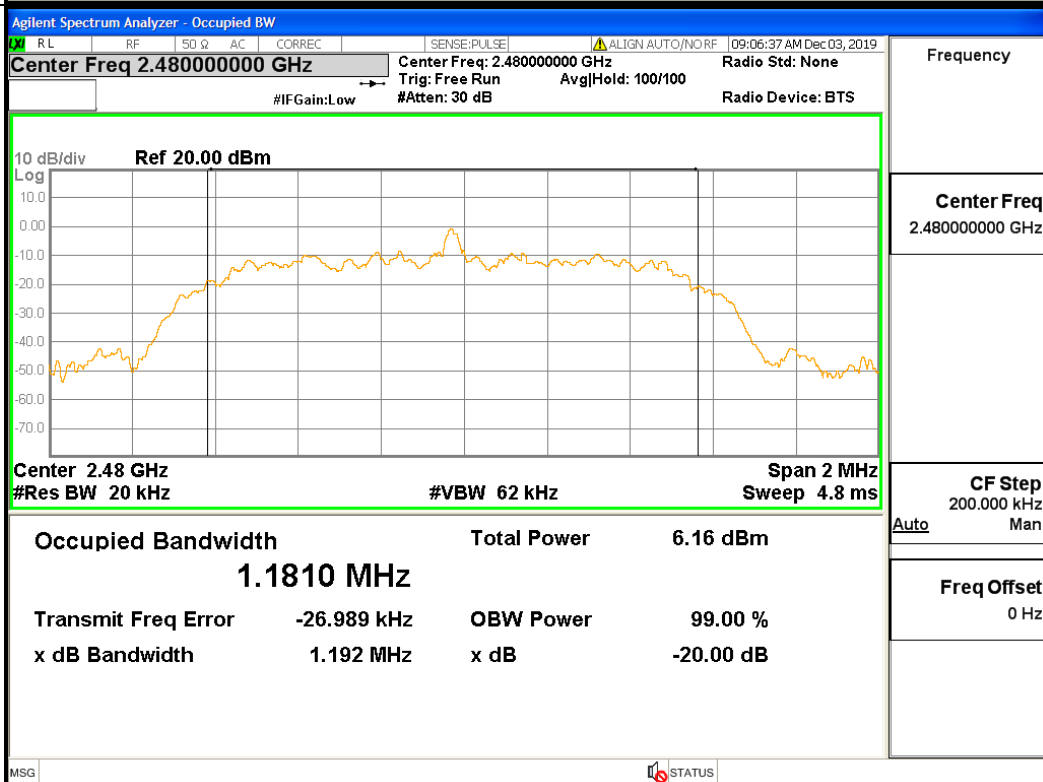
CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/MCH



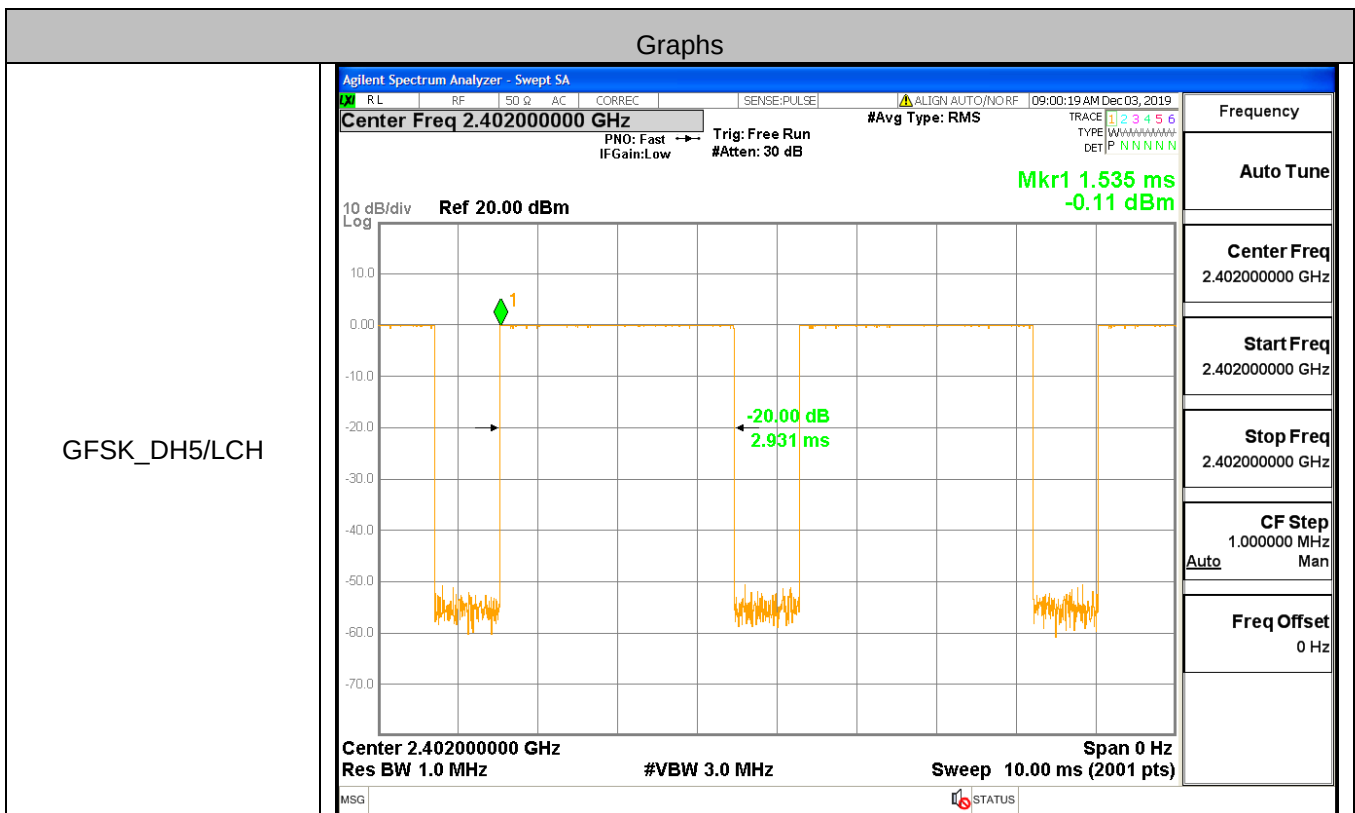
$\pi/4$ DQPSK/HCH



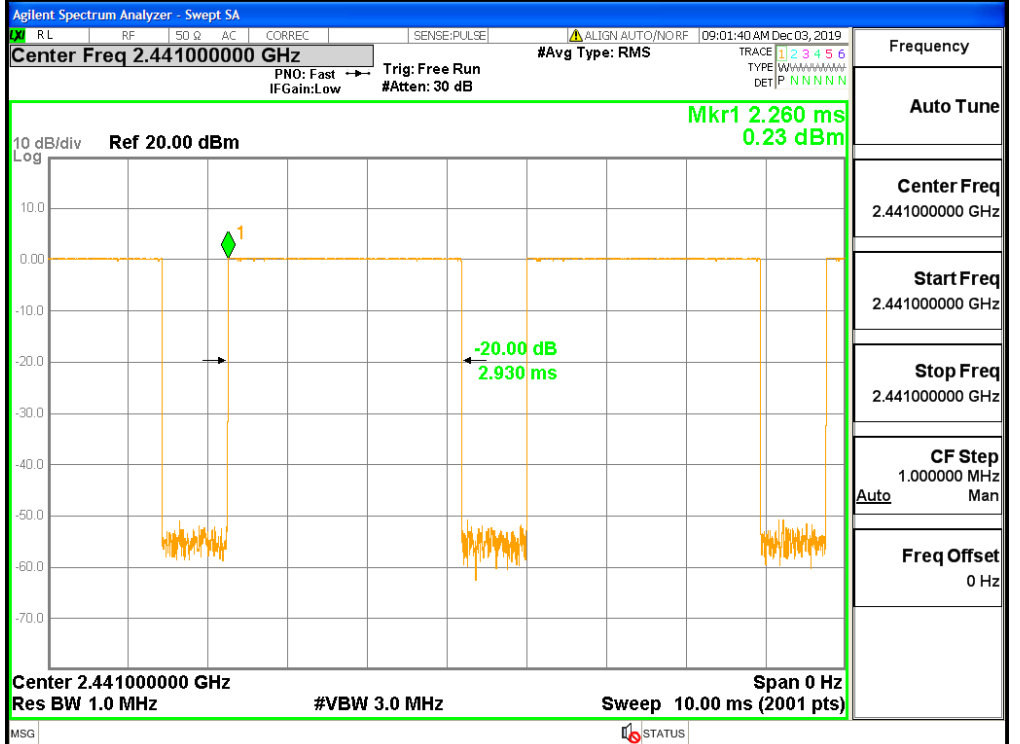
A.2 Dwell Time

Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.002931	106.7	0.312762	0.4	PASS
GFSK	DH5	MCH	0.00293	106.7	0.312622	0.4	PASS
GFSK	DH5	HCH	0.00293	106.7	0.312616	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	0.002938	106.7	0.313462	0.4	PASS
$\pi/4$ DQPSK	2DH5	MCH	0.002935	106.7	0.313129	0.4	PASS
$\pi/4$ DQPSK	2DH5	HCH	0.002935	106.7	0.313141	0.4	PASS

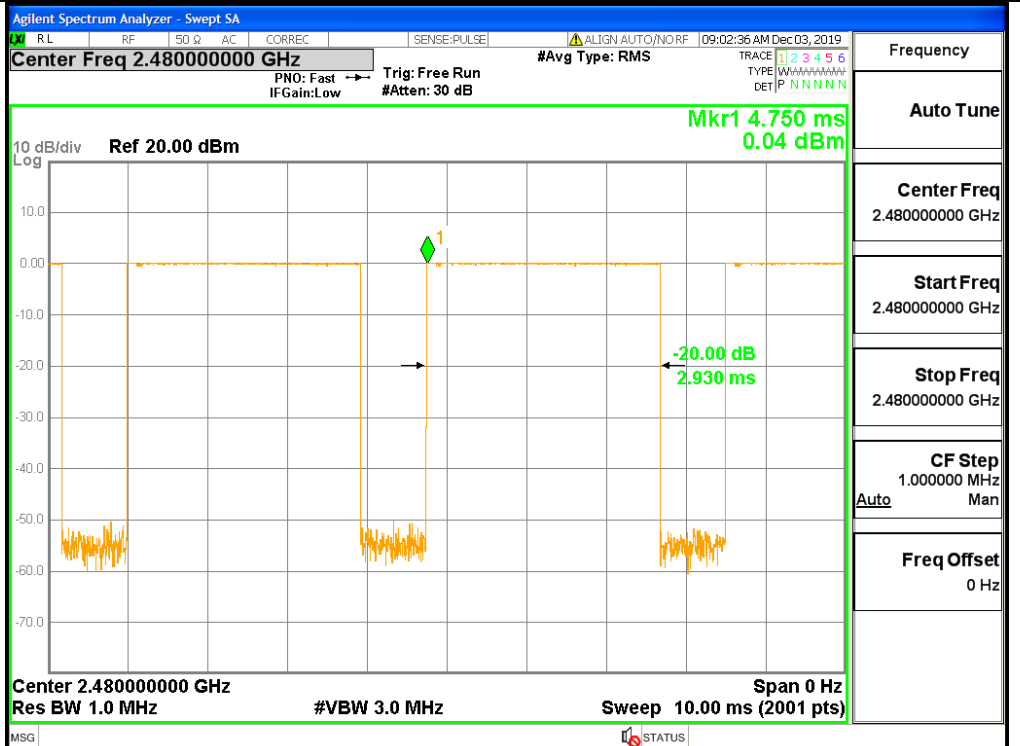
Test Graph



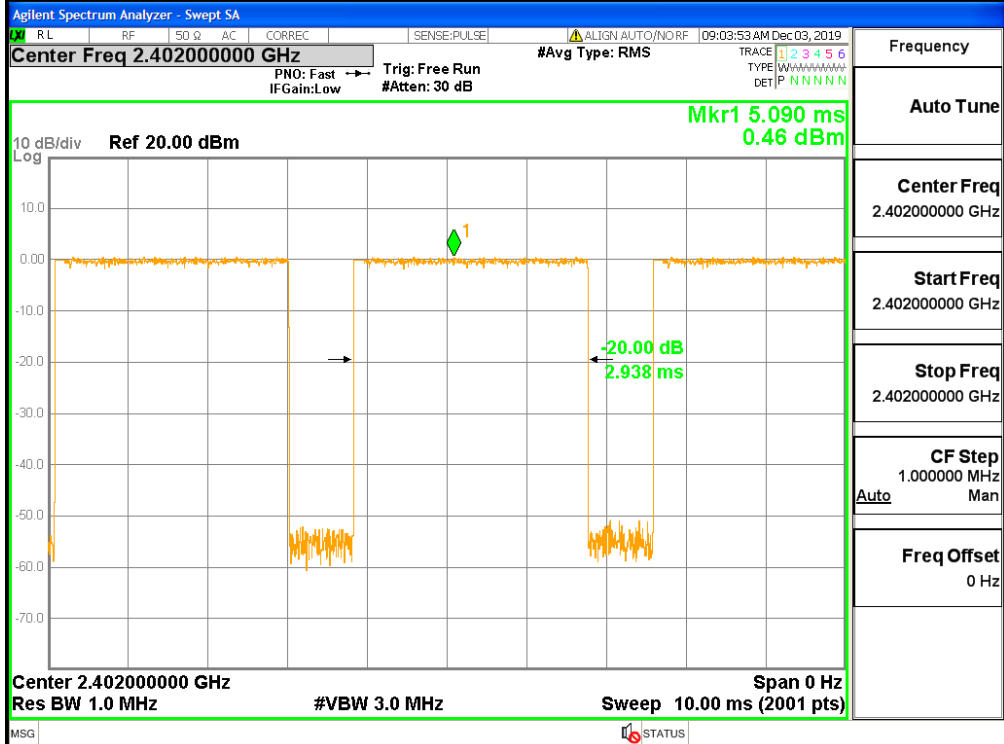
GFSK_DH5/MCH



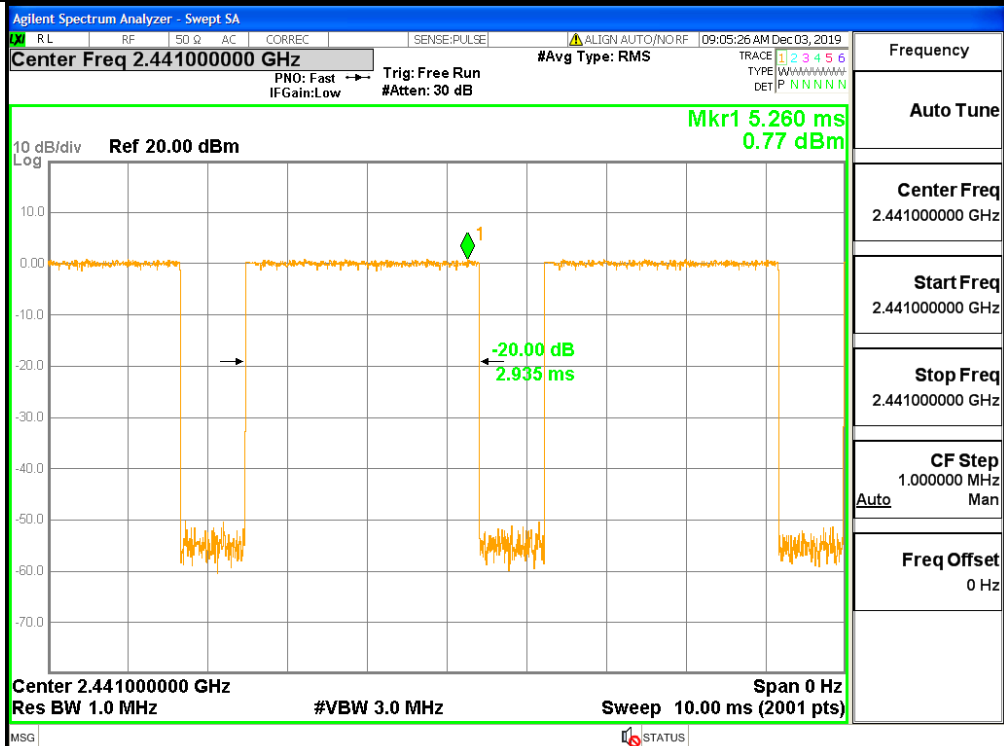
GFSK_DH5/HCH



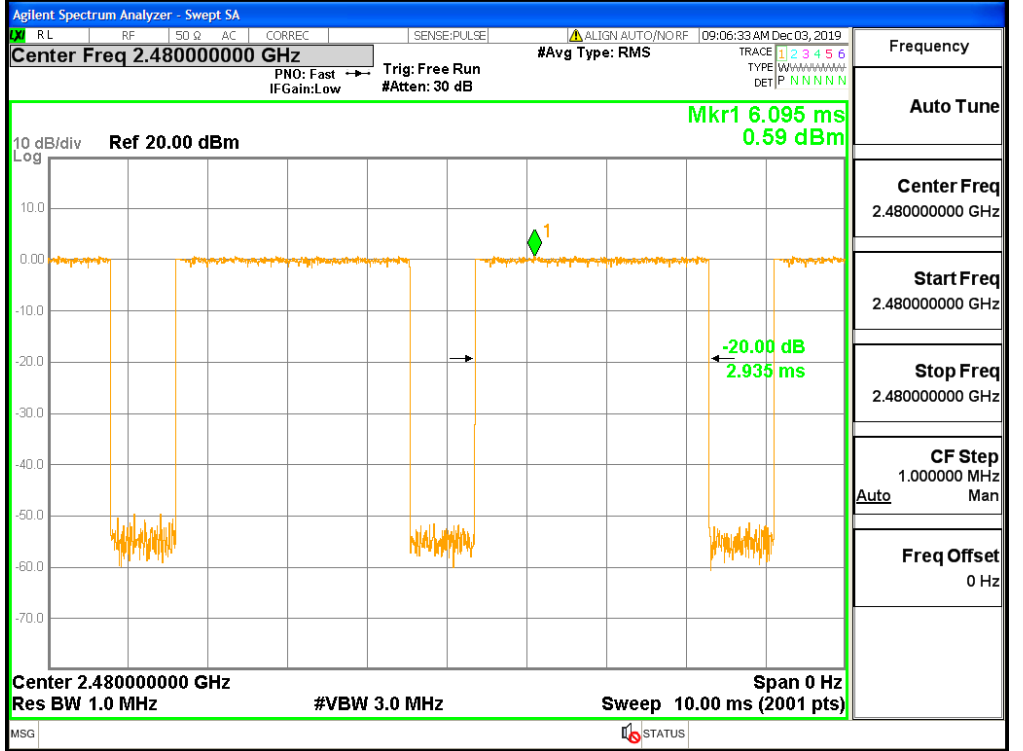
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH



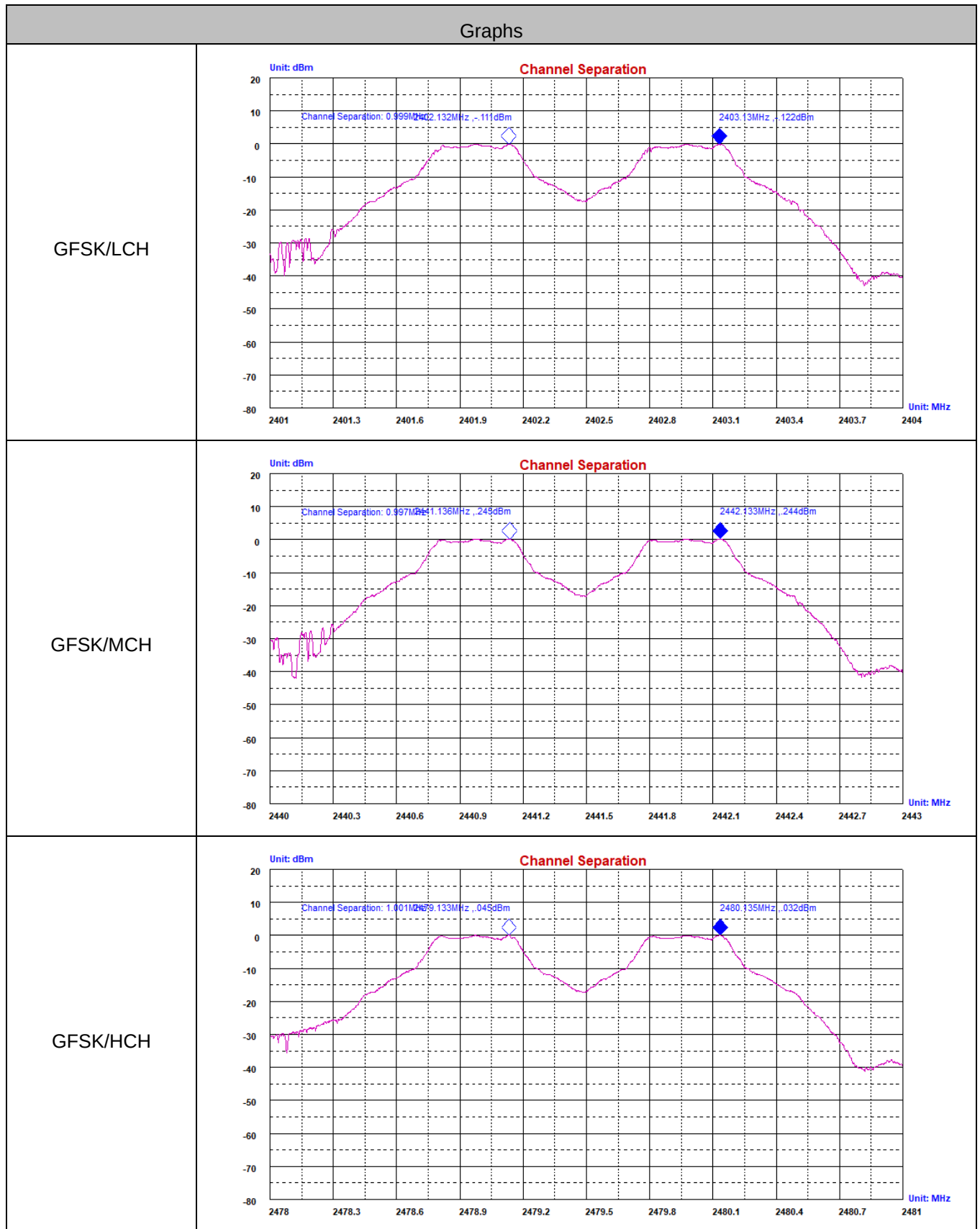
$\pi/4$ DQPSK
_2DH5/HCH

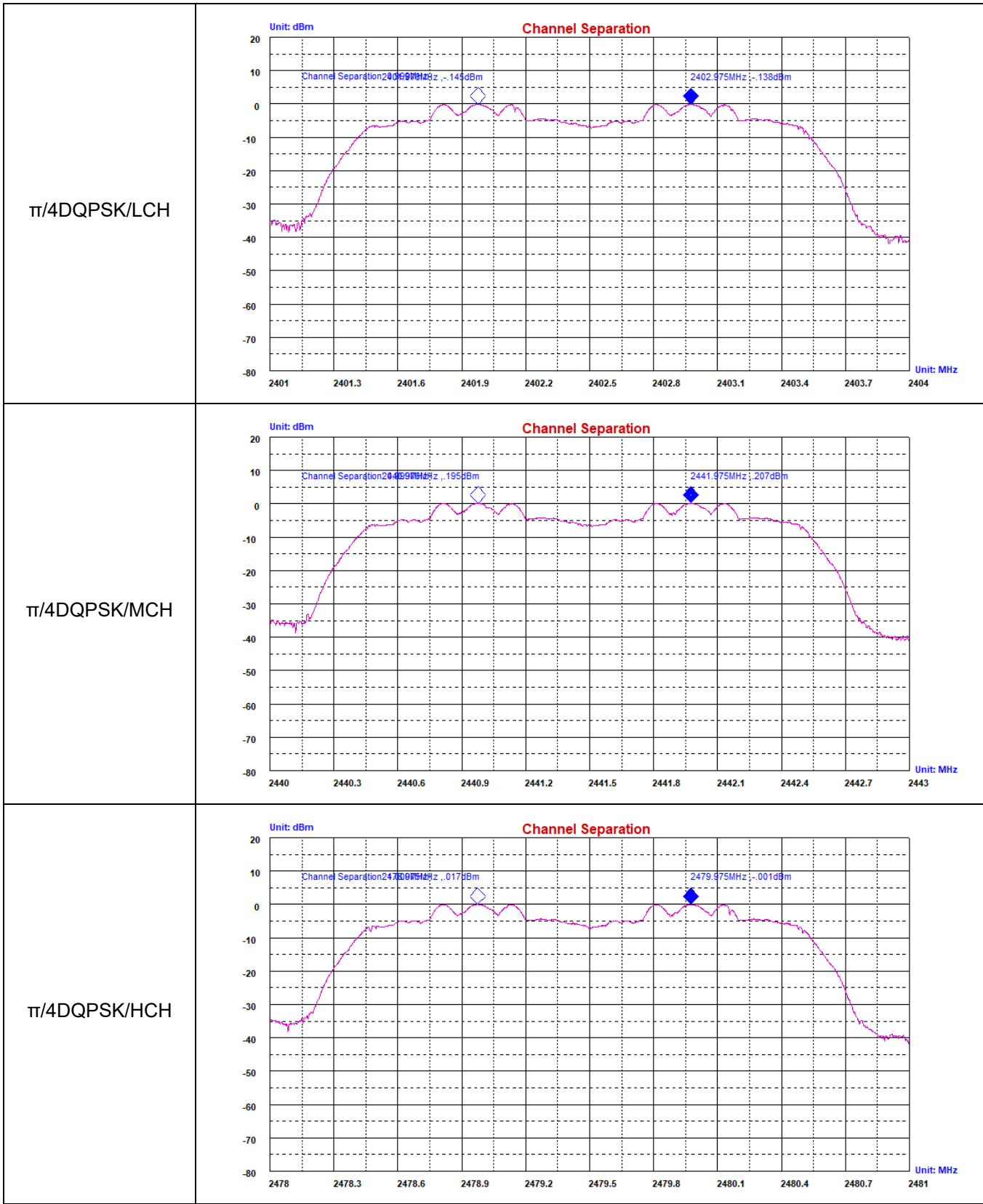


A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.999	0.532	PASS
GFSK	MCH	0.997	0.529	PASS
GFSK	HCH	1.001	0.529	PASS
$\pi/4$ DQPSK	LCH	0.999	0.789	PASS
$\pi/4$ DQPSK	MCH	0.999	0.783	PASS
$\pi/4$ DQPSK	HCH	1.000	0.795	PASS

Test Graph

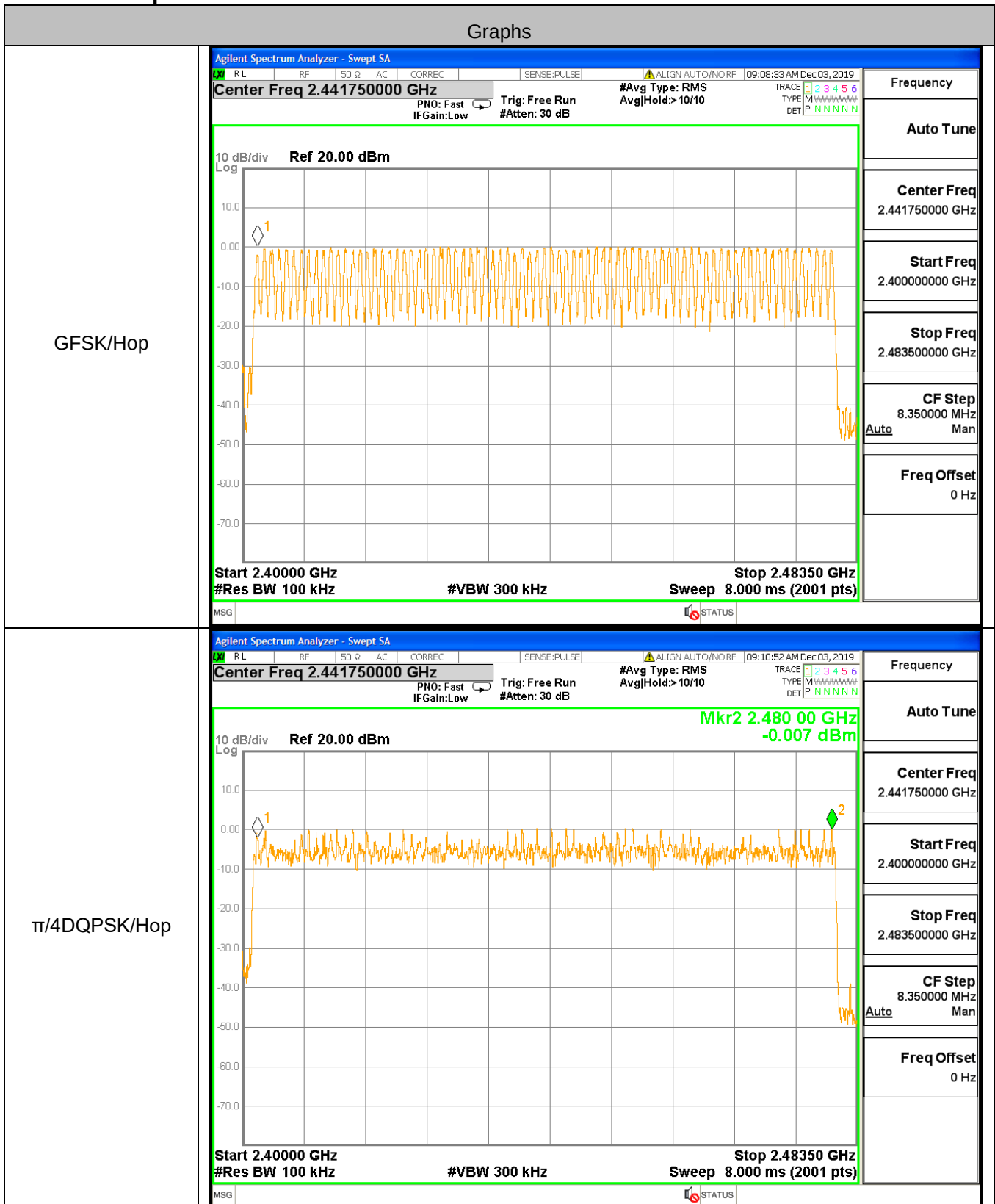




A.4 Hopping Channel Number

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

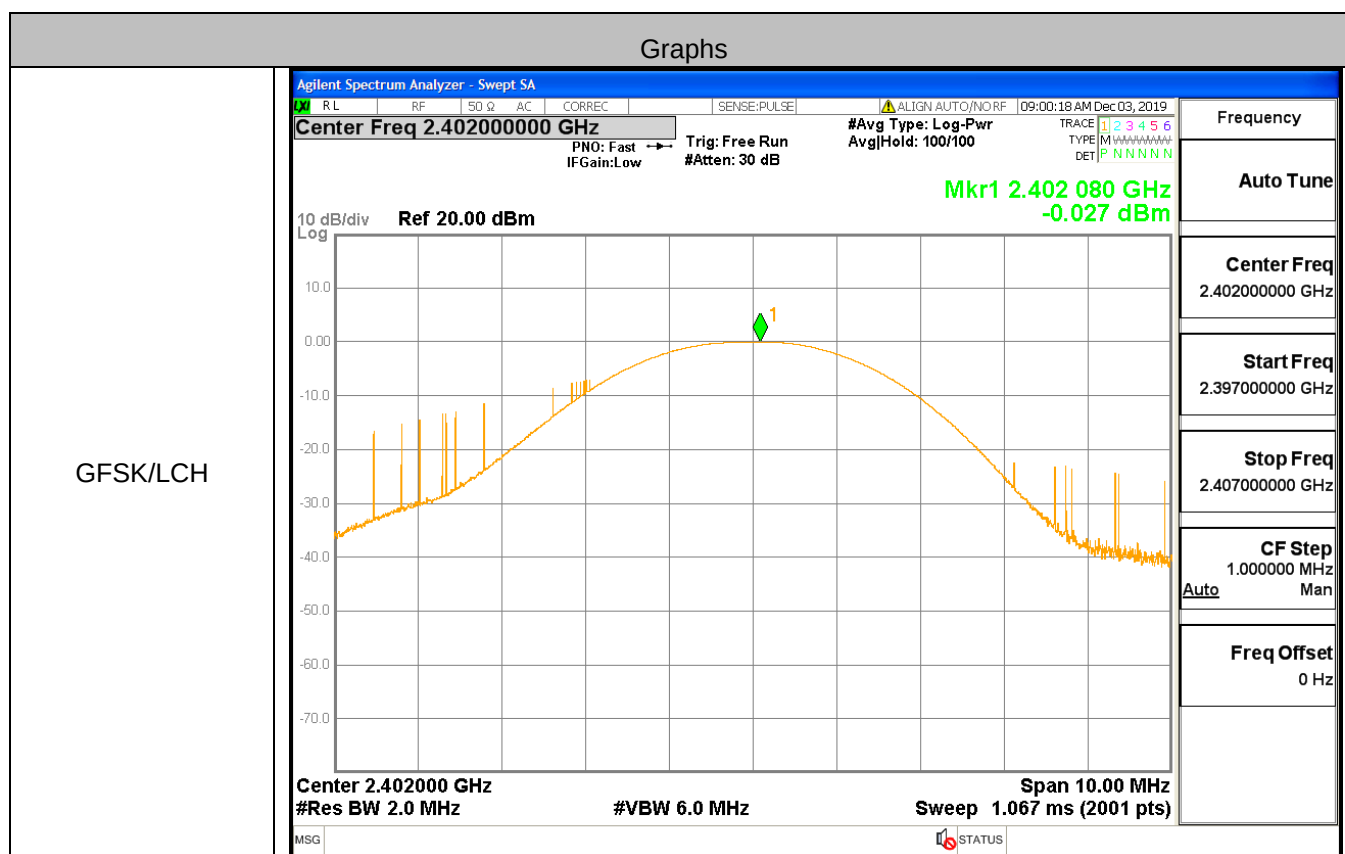
Test Graph



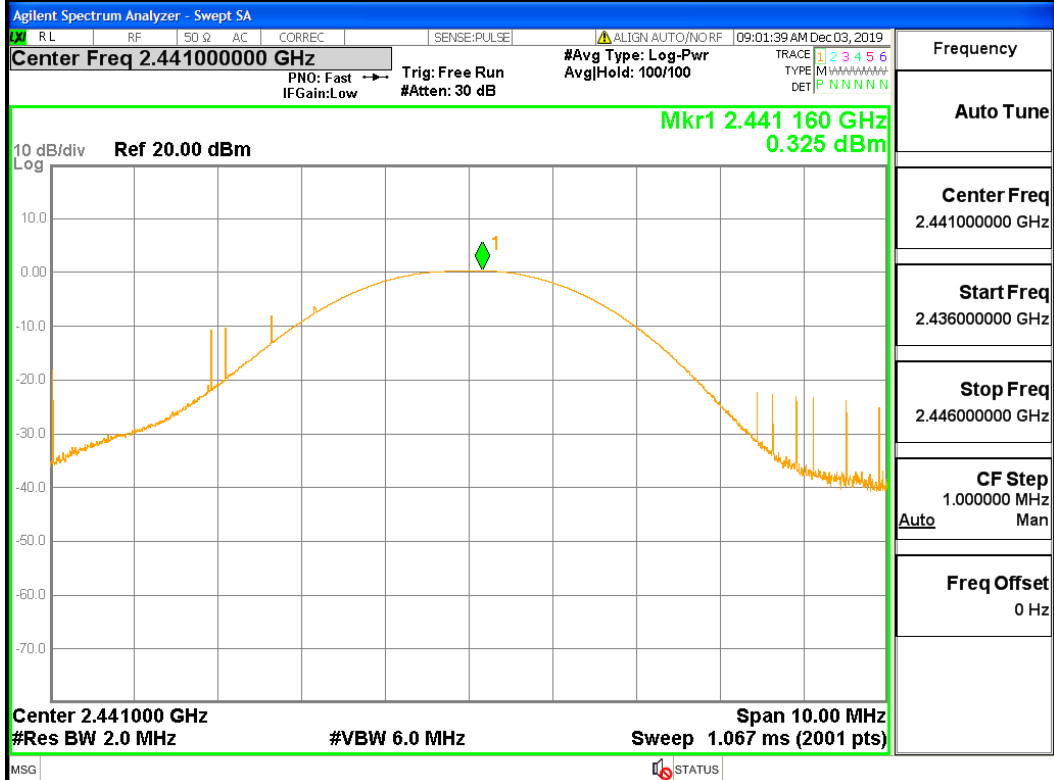
A.5 Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.027	21	PASS
GFSK	MCH	0.325	21	PASS
GFSK	HCH	0.125	21	PASS
$\pi/4$ DQPSK	LCH	0.748	21	PASS
$\pi/4$ DQPSK	MCH	1.123	21	PASS
$\pi/4$ DQPSK	HCH	0.928	21	PASS

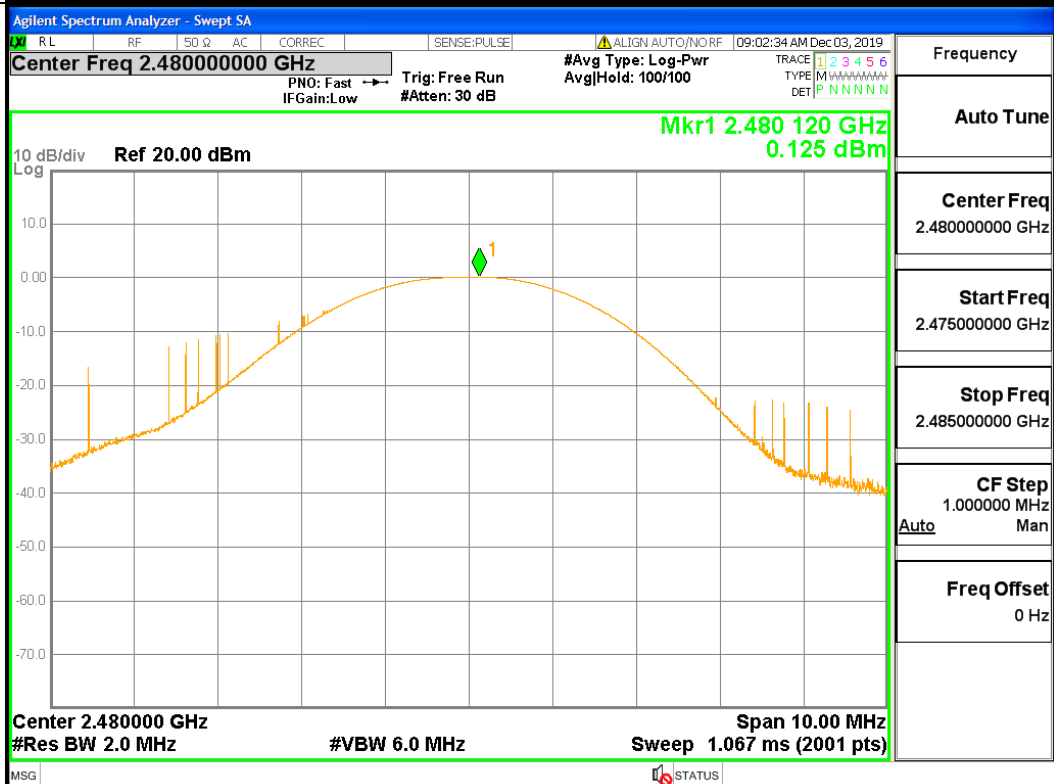
Test Graph



GFSK/MCH



GFSK/HCH



Agilent Spectrum Analyzer - Swept SA

Center Freq 2.402000000 GHz

PN0: Fast IFGain: Low Trig: Free Run #Atten: 30 dB

#Avg Type: Log-Pwr AvgHold: 100/100

ALIGN AUTO/NO RF

09:03:52 AM Dec 03, 2019

TRACE 1 2 3 4 5 6 TYPE M N N N N N N DET P N N N N N N

Frequency

Auto Tune

Center Freq 2.402000000 GHz

Start Freq 2.397000000 GHz

Stop Freq 2.407000000 GHz

CF Step 1.000000 MHz Auto Man

Freq Offset 0 Hz

10 dB/div Ref 20.00 dBm

Mkr1 2.401 985 GHz 0.748 dBm

1

Center 2.402000 GHz Span 10.00 MHz

#Res BW 2.0 MHz #VBW 6.0 MHz Sweep 1.067 ms (2001 pts)

MSG STATUS

$\pi/4$ DQPSK/LCH

Agilent Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz

Mkr1 2.441 055 GHz 1.123 dBm

Ref 20.00 dBm

10 dB/div Log

Center 2.441000 GHz

#Res BW 2.0 MHz

#VBW 6.0 MHz

Span 10.00 MHz

Sweep 1.067 ms (2001 pts)

Frequency

Auto Tune

Center Freq 2.441000000 GHz

Start Freq 2.436000000 GHz

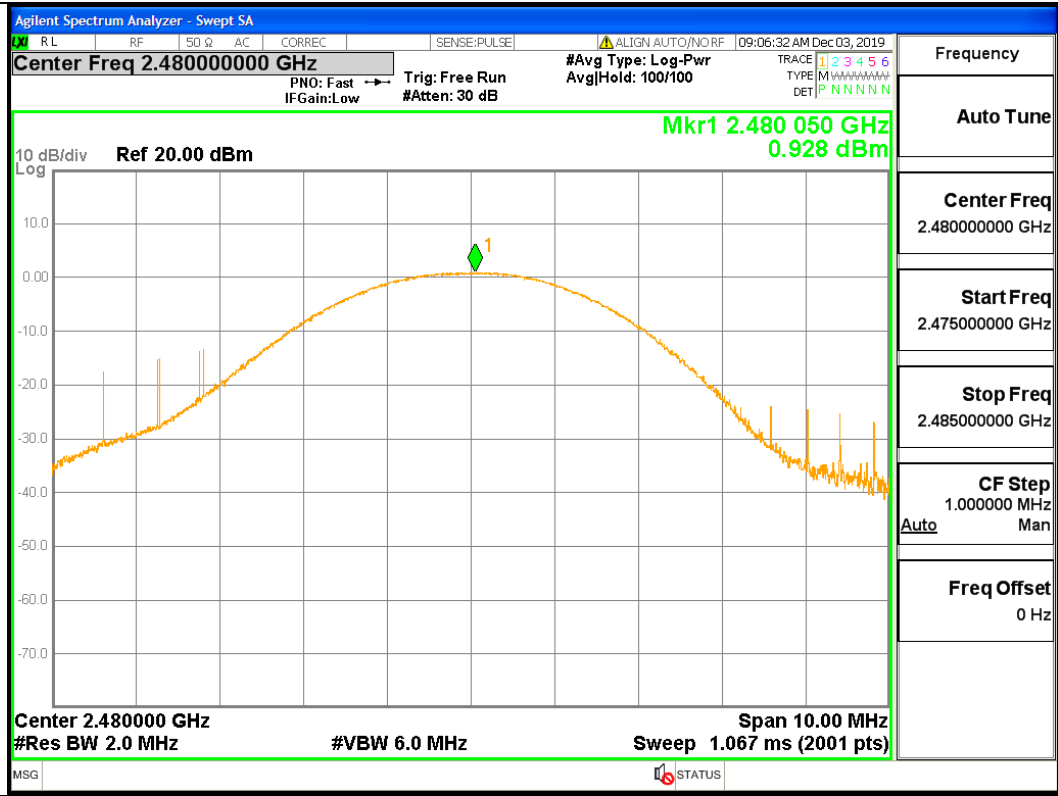
Stop Freq 2.446000000 GHz

CF Step 1.000000 MHz

Auto

Freq Offset 0 Hz

$\pi/4$ DQPSK/HCH



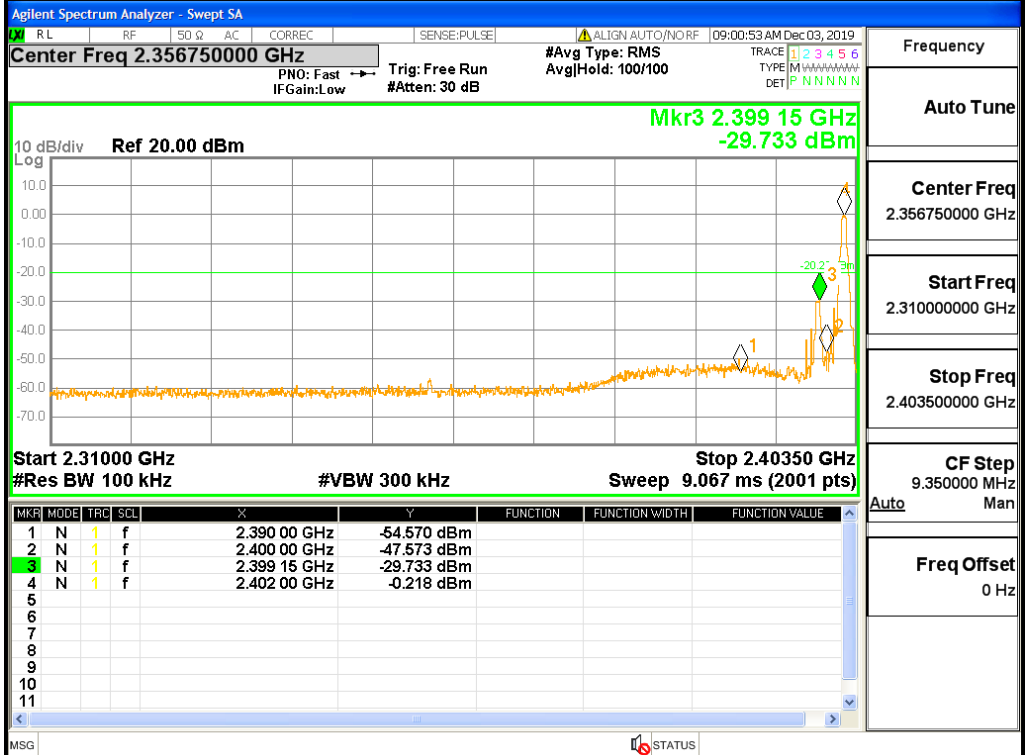
A.6 Band-edge for RF Conducted Emissions

Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
1DH5	2402	2399.152	-0.218	-29.733	-20.218	Pass
1DH5	2480	2483.5	-0.234	-41.88	-20.234	Pass
2DH5	2402	2399.152	-0.17	-29.945	-20.17	Pass
2DH5	2480	2483.5	-2.996	-46.35	-22.996	Pass
1DH5-Hopping	2402	2399.01	0.021	-30.434	-19.979	Pass
1DH5-Hopping	2480	2483.5	0.218	-42.83	-19.782	Pass
2DH5-Hopping	2402	2398.98	0.071	-29.661	-19.929	Pass
2DH5-Hopping	2480	2483.5	0.11	-49.48	-19.89	Pass

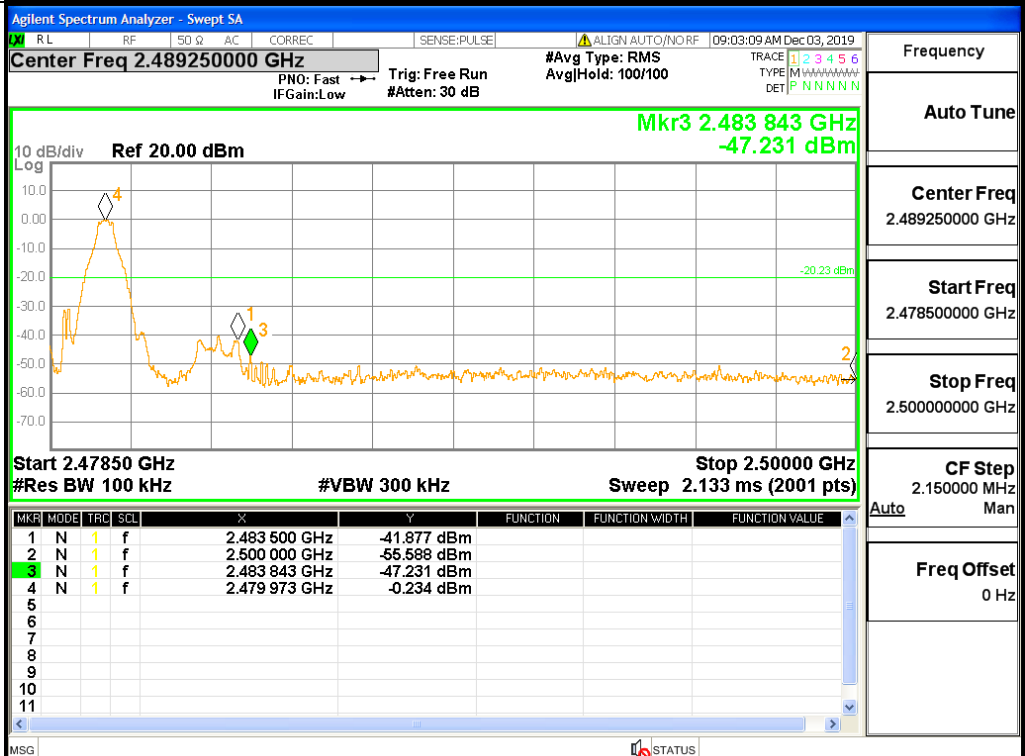
Test Graph

Graphs

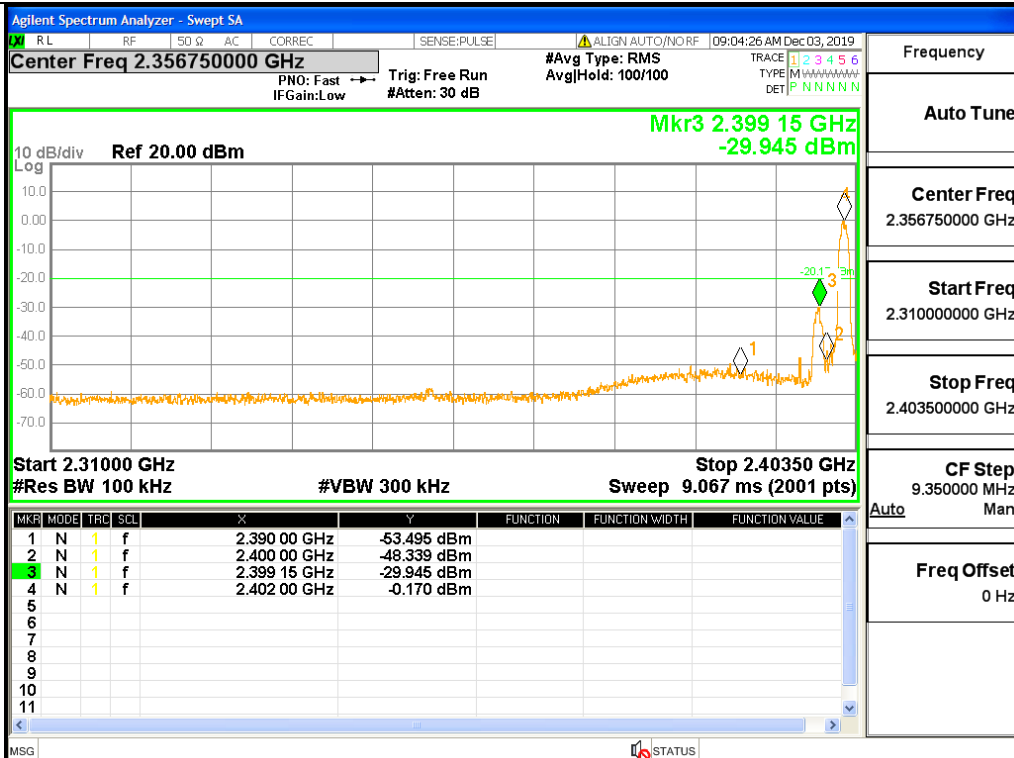
GFSK/LCH/No Hop



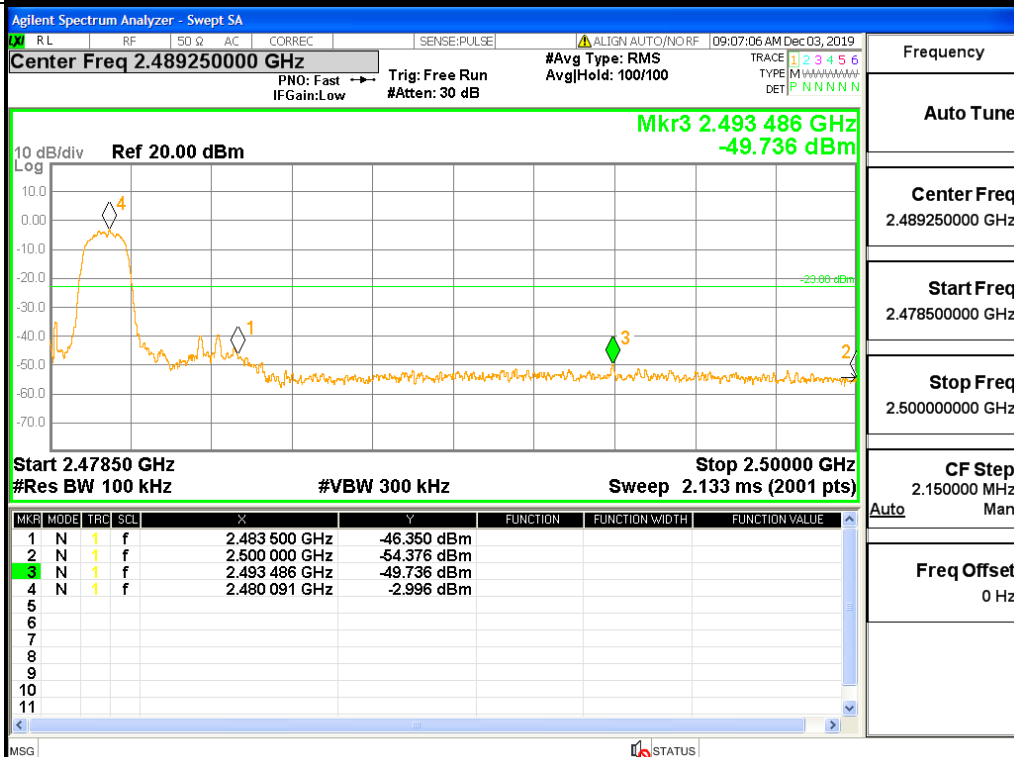
GFSK/HCH/No Hop



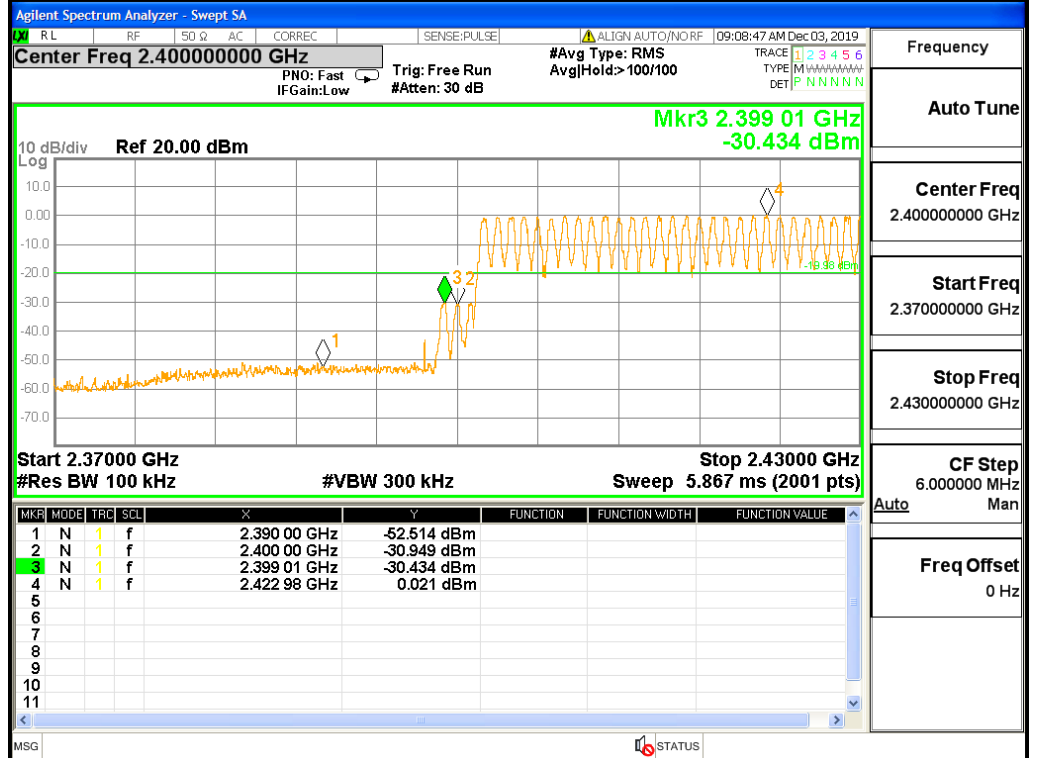
$\pi/4$ DQPSK/LCH/No
Hop



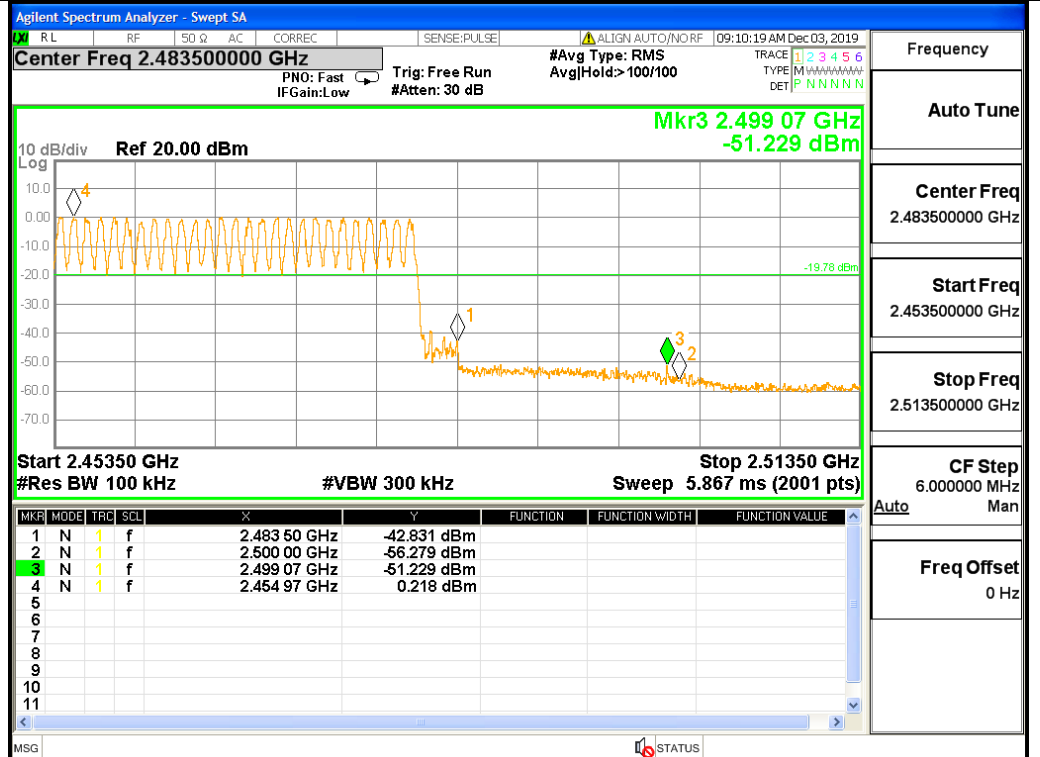
$\pi/4$ DQPSK/HCH/No
Hop



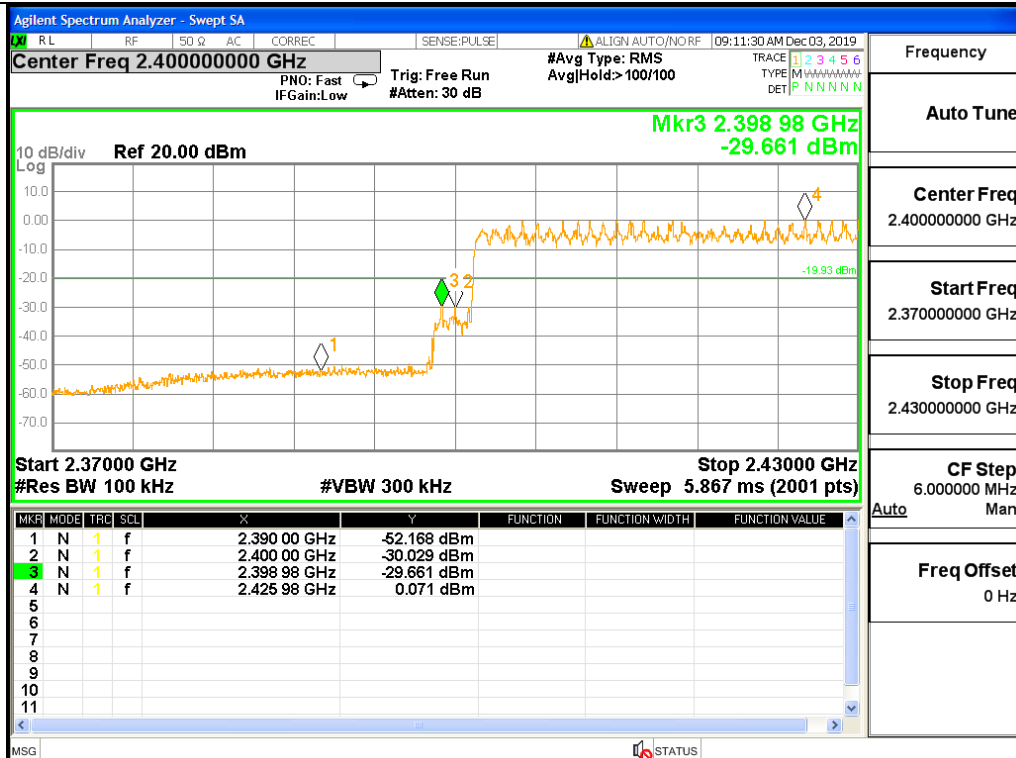
GFSK/LCH/Hop



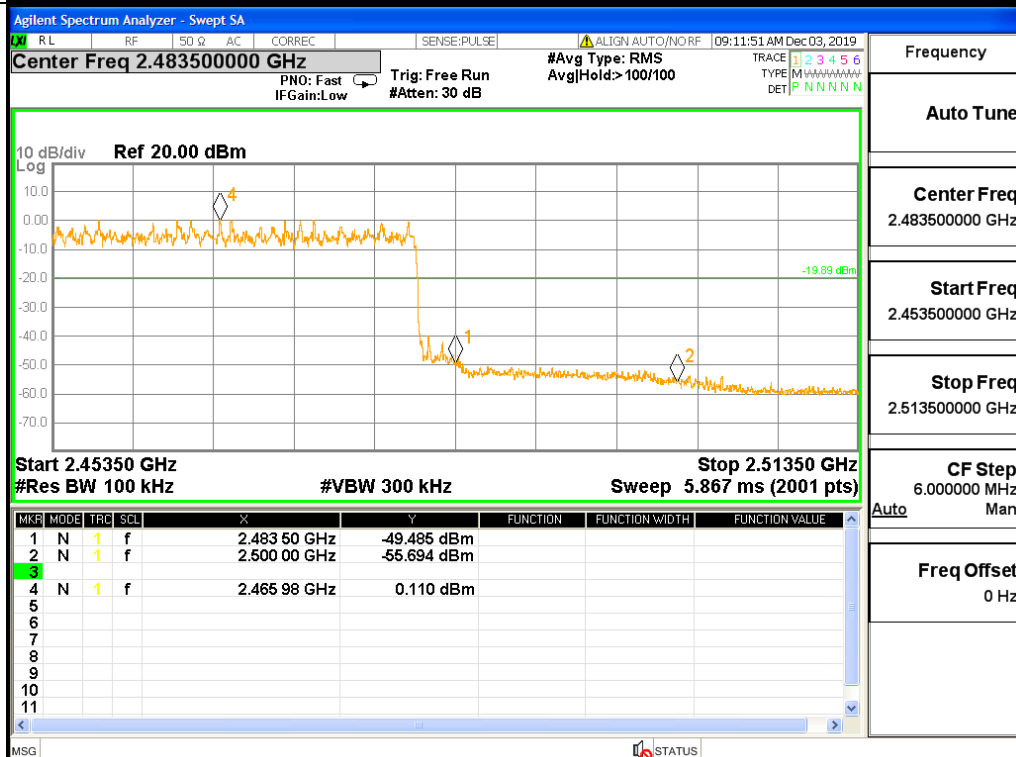
GFSK/HCH/Hop



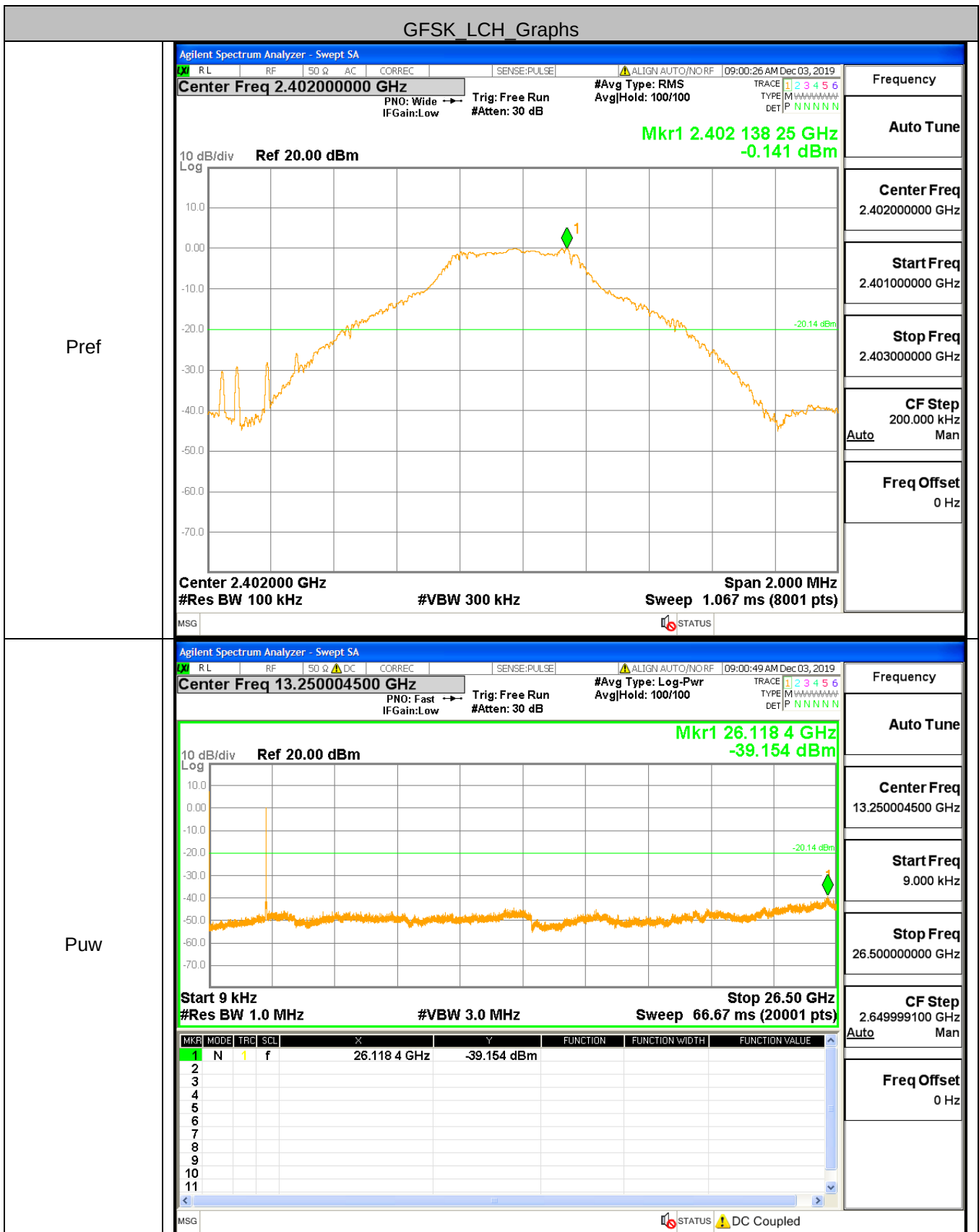
$\pi/4$ DQPSK/LCH/Hop



$\pi/4$ DQPSK/HCH/Hop

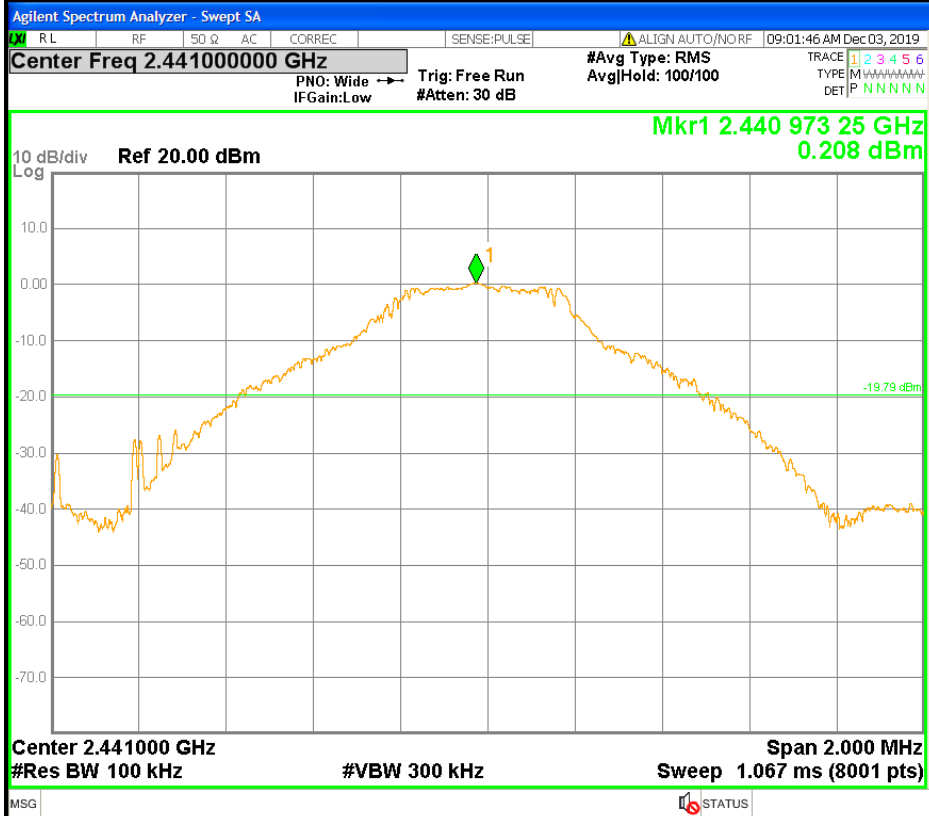


A.7 RF Conducted Spurious Emissions Test Graph



GFSK MCH Graphs

Pref



Frequency

Auto Tune

Center Freq
2.441000000 GHz

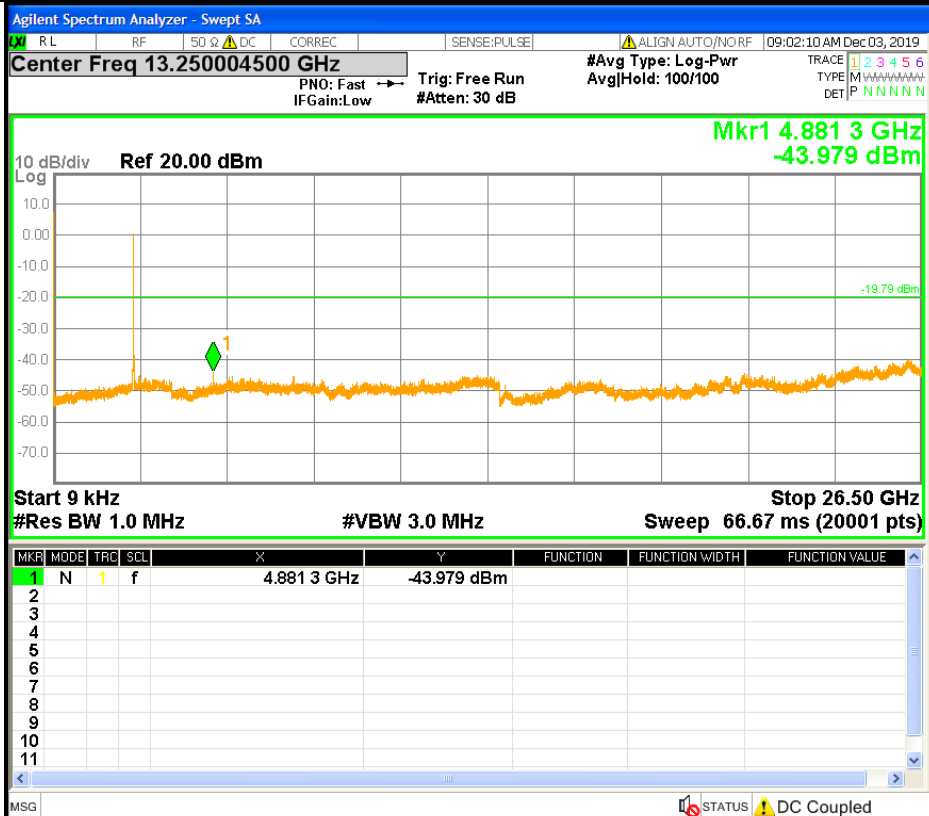
Start Freq
2.440000000 GHz

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

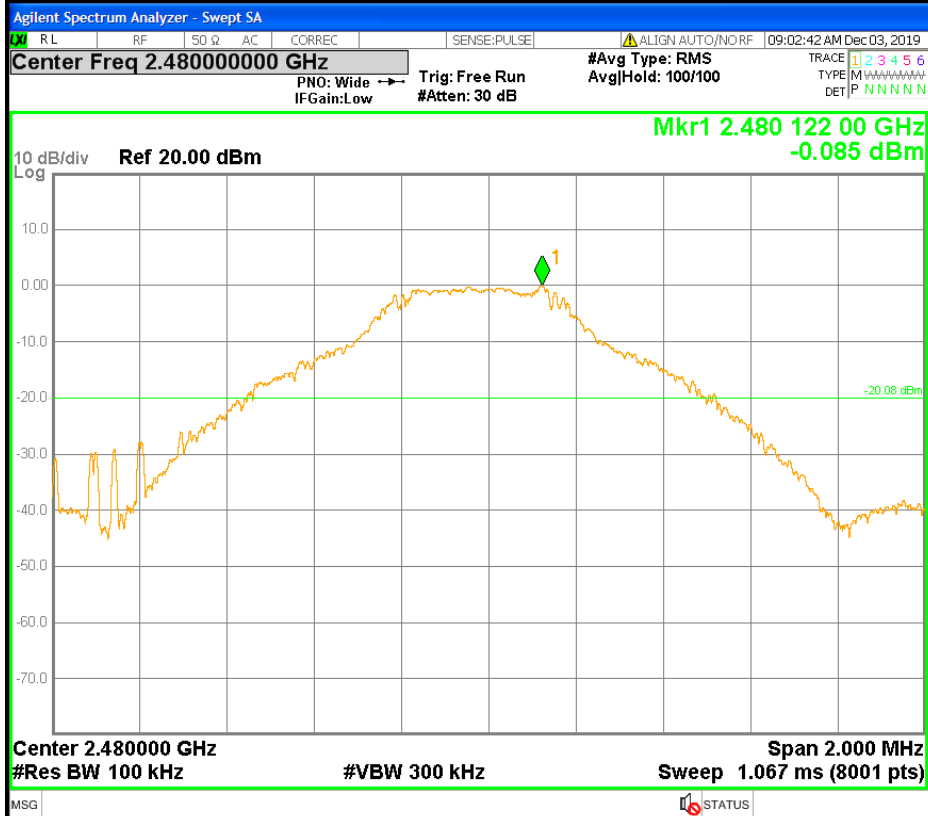
Stop Freq
26.500000000 GHz

CF Step
2.649999100 GHz
Auto Man

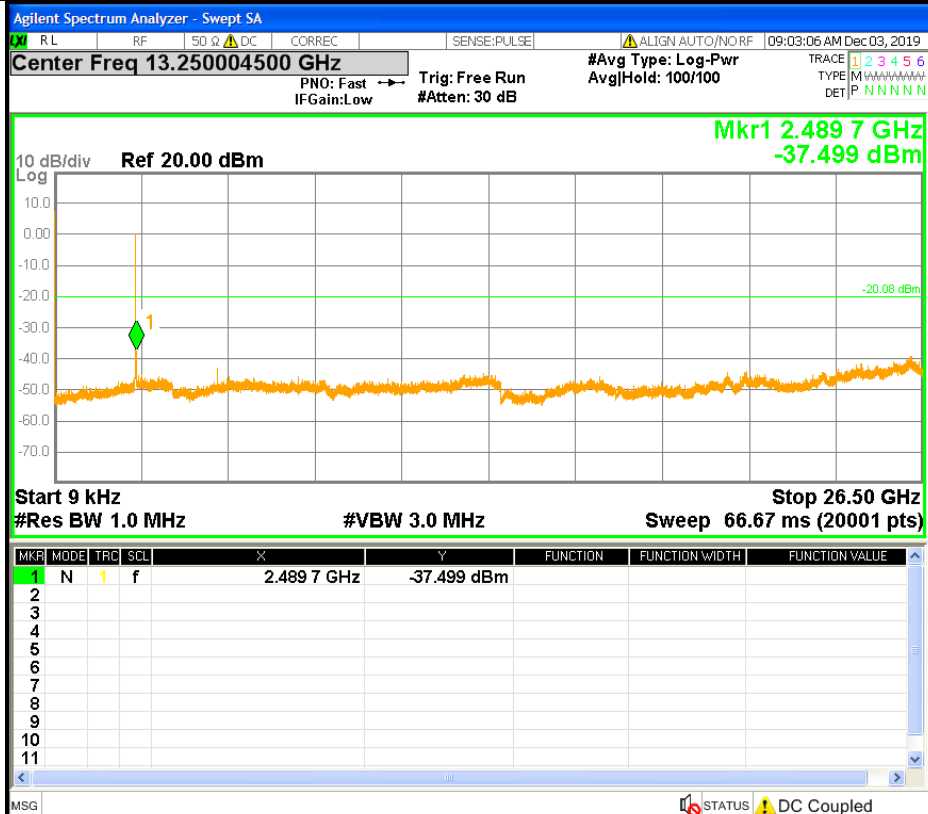
Freq Offset
0 Hz

GFSK HCH Graphs

Pref

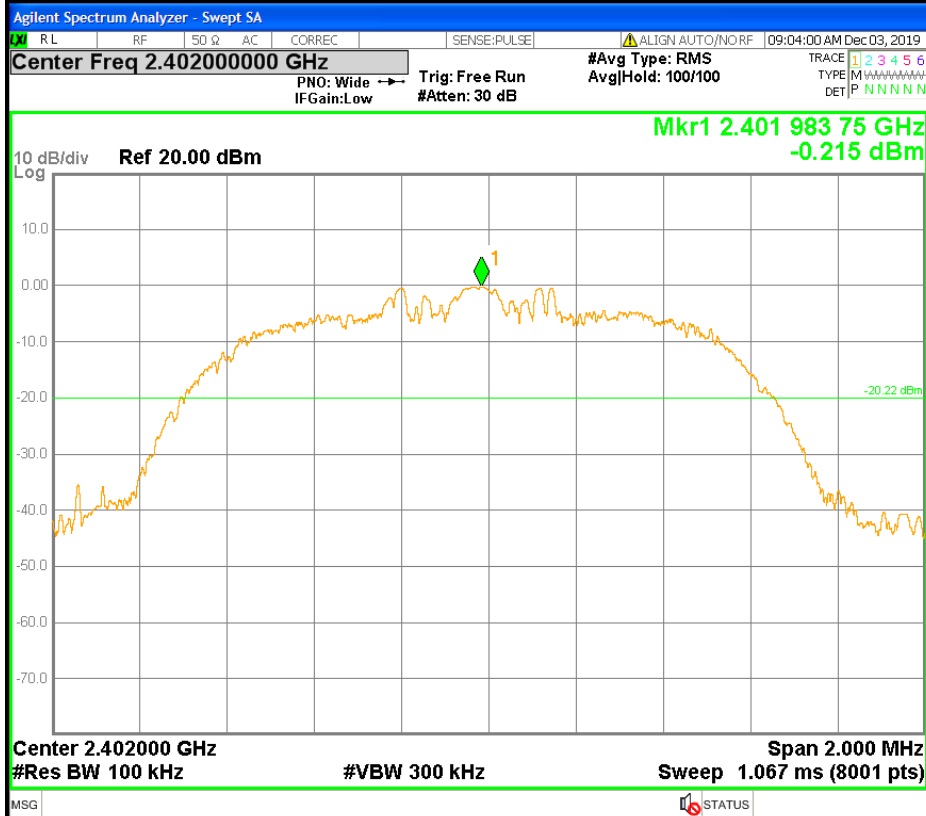


Puw



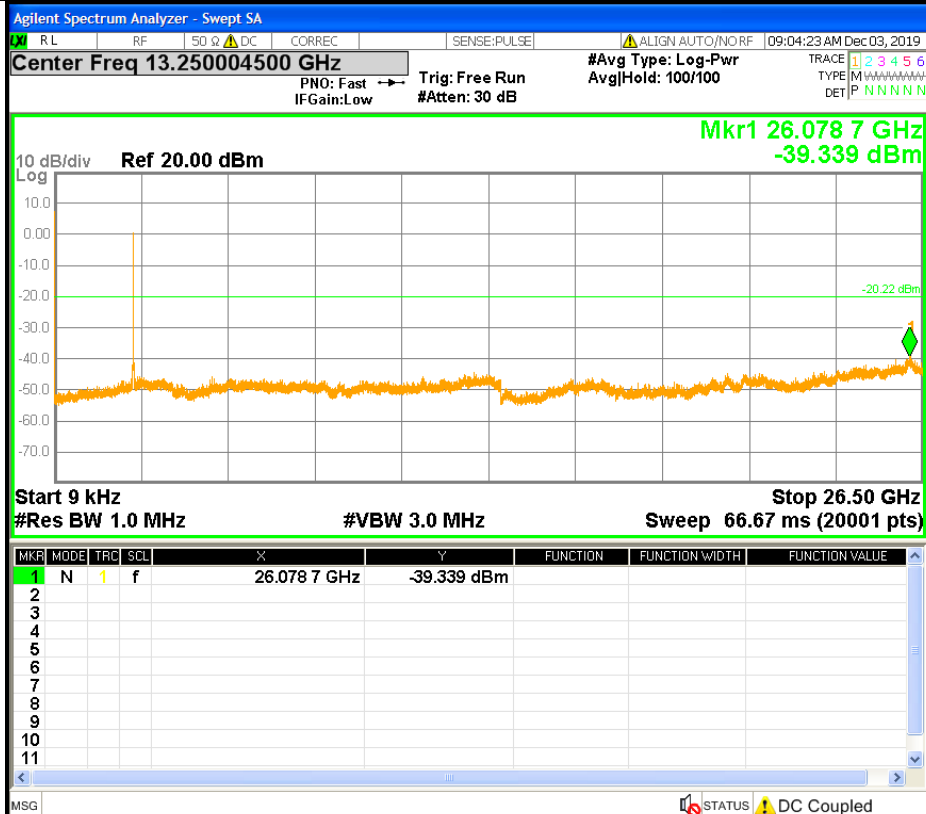
$\pi/4$ DQPSK LCH_Graphs

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

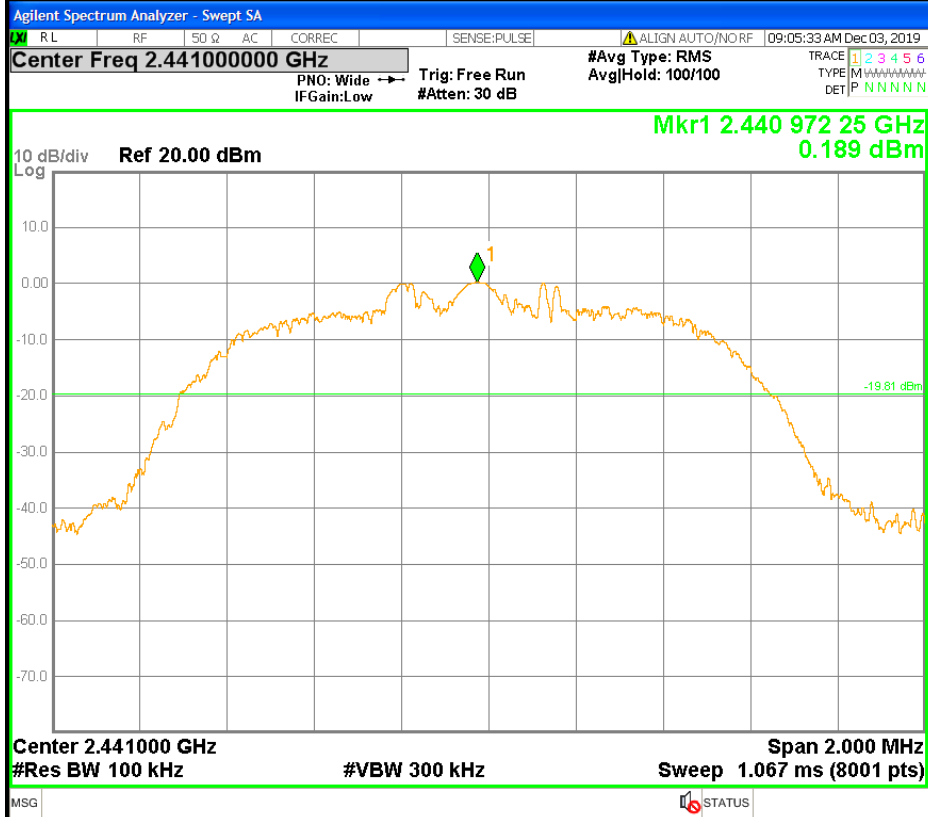
Puw



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

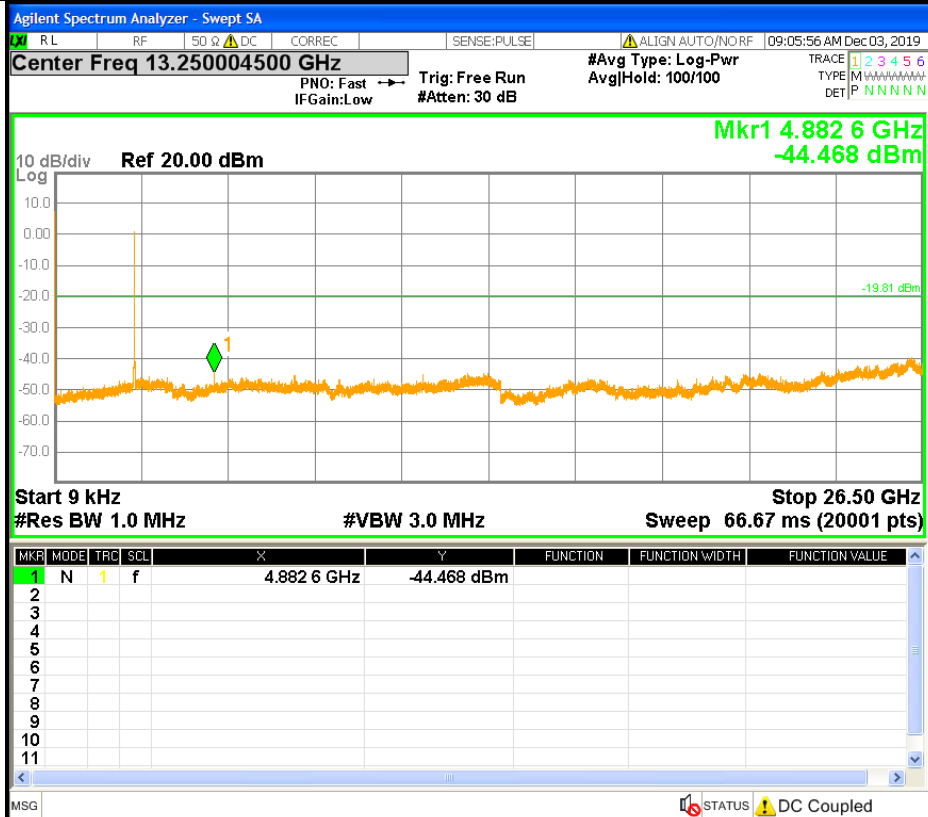
$\pi/4$ DQPSK MCH Graphs

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

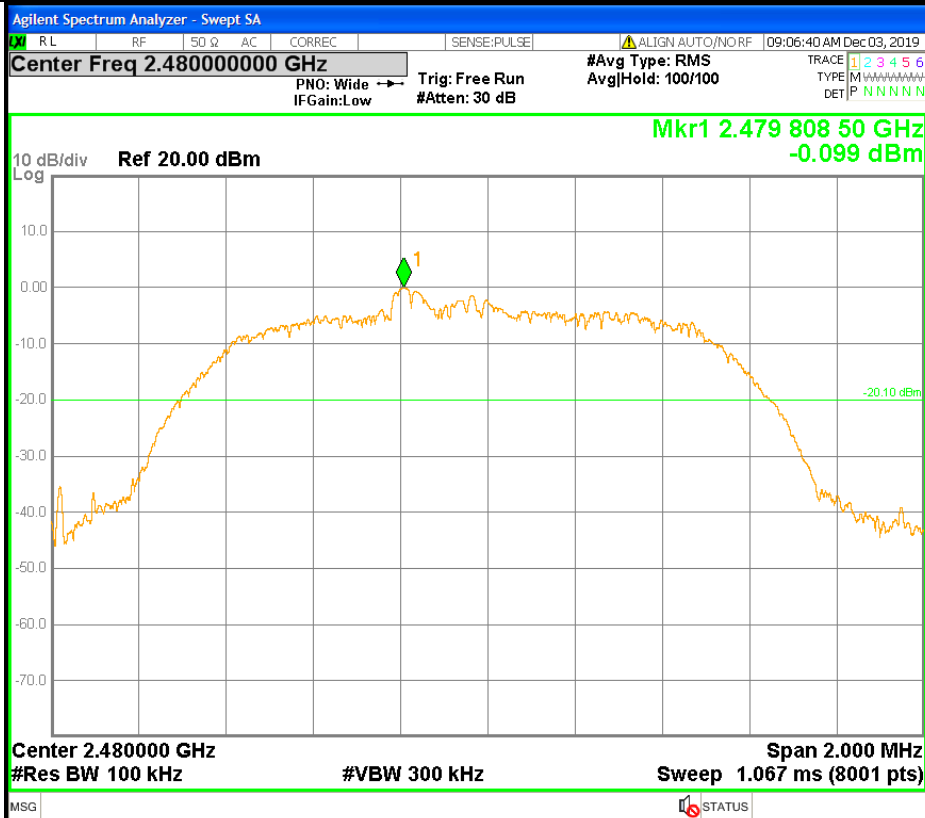
Puw



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

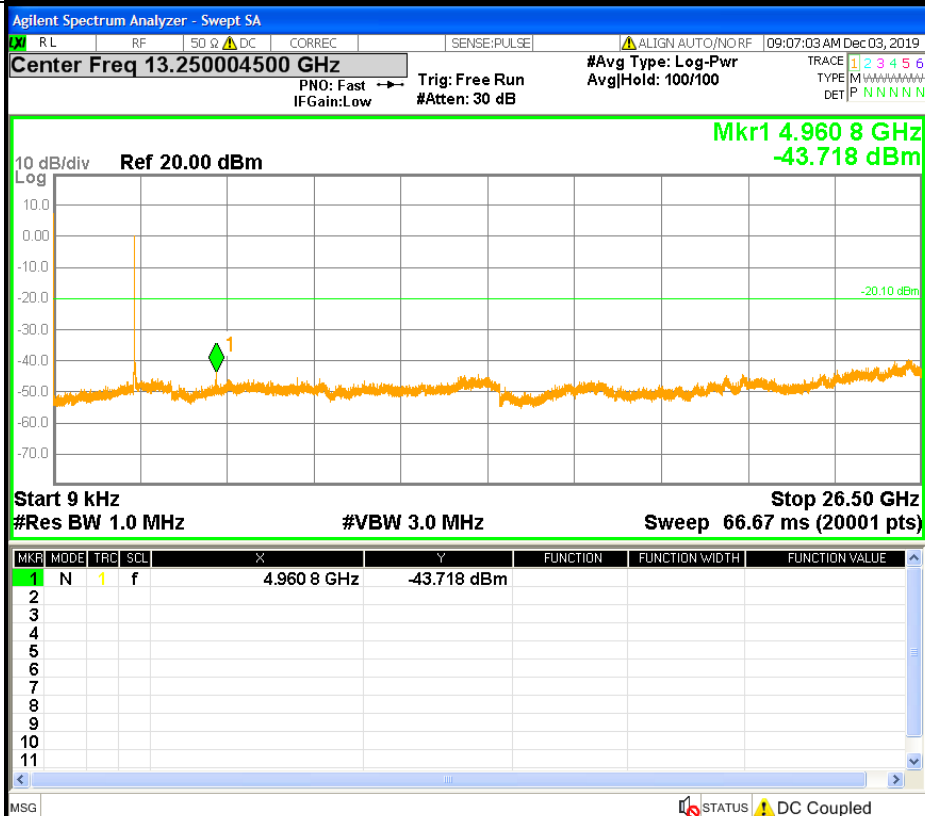
$\pi/4$ DQPSK HCH Graphs

Pref



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



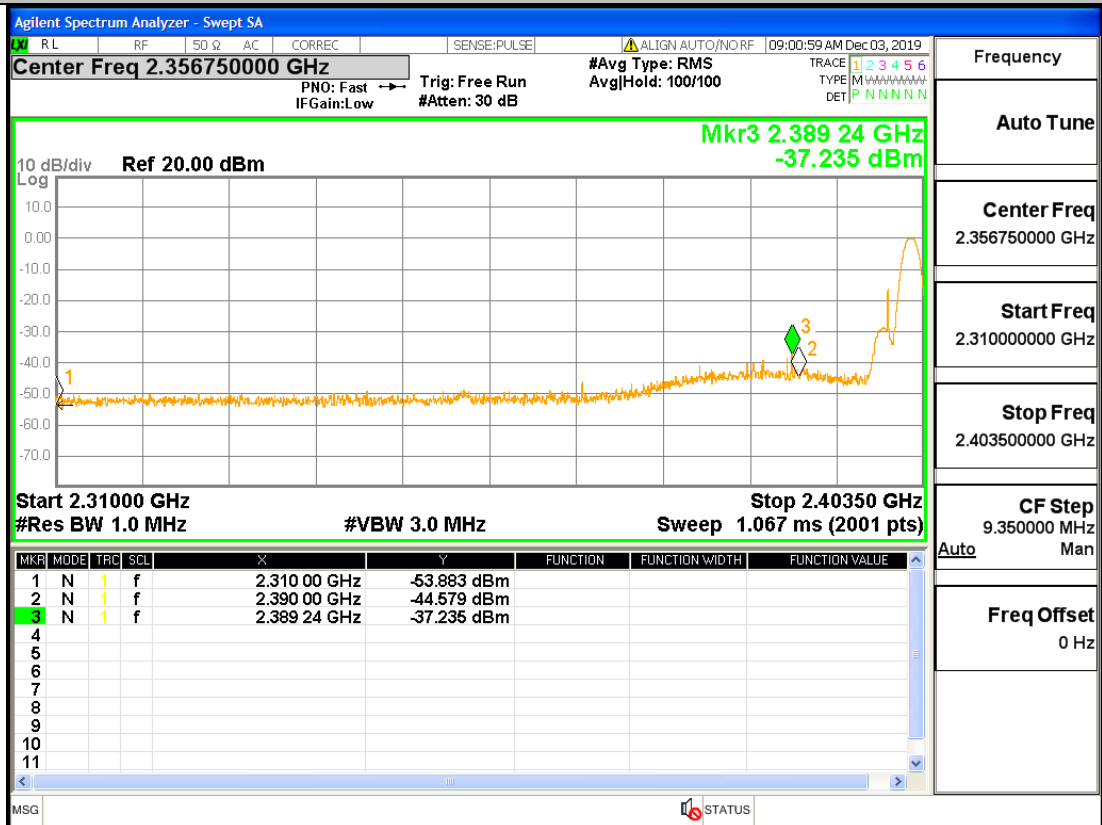
Frequency
Auto Tune
Center Freq 13.250004500 GHz
Start Freq 9.000 kHz
Stop Freq 26.500000000 GHz
CF Step 2.649999100 GHz Auto Man
Freq Offset 0 Hz

A.8 Restrict-band band-edge measurements

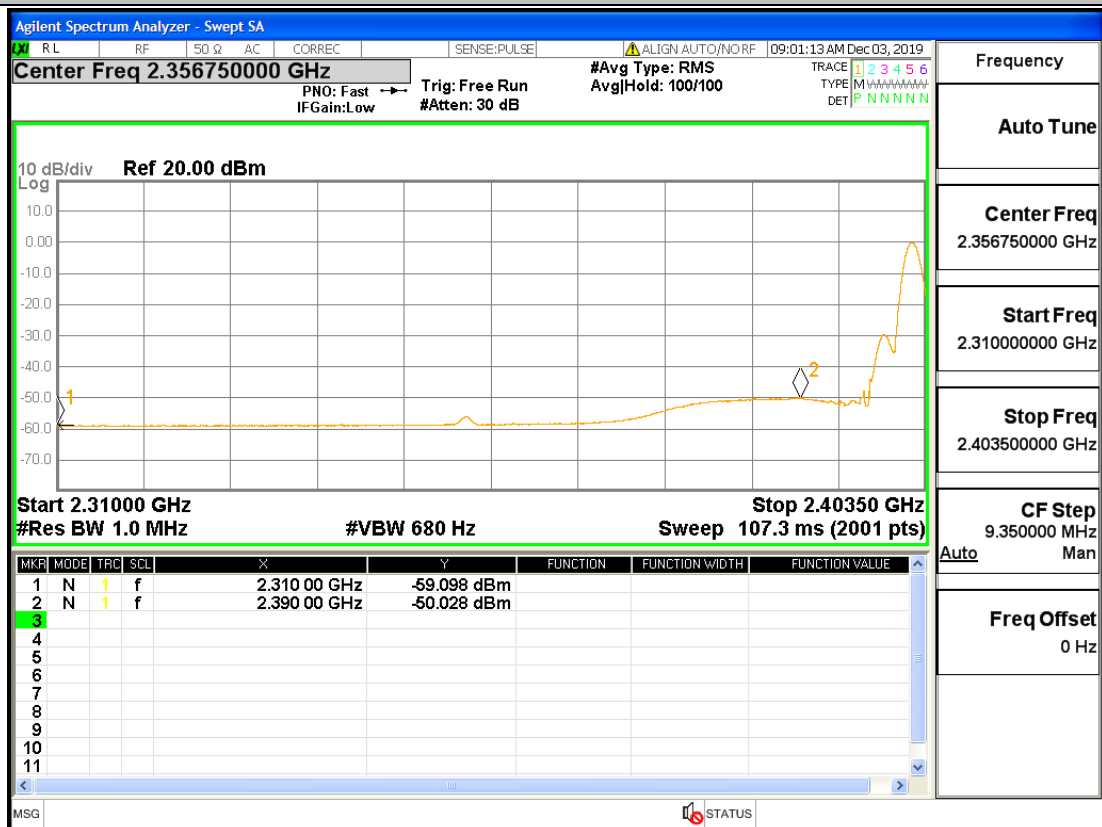
Type	Carrier Frequency (MHz)	Frequency(M Hz)	Gain (dBi)	Ground Factor(dB)	Peak Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2389.241	2.00	0.00	-37.235	59.965	74	Pass
1DH5	2480	2483.617	2.00	0.00	-28.449	68.751	74	Pass
2DH5	2402	2390	2.00	0.00	-41.693	55.507	74	Pass
2DH5	2480	2484.886	2.00	0.00	-32.637	64.563	74	Pass

Type	Carrier Frequency (MHz)	Frequency(M Hz)	Gain (dBi)	Ground Factor(dB)	Average Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2389.241	2.00	0.00	-50.028	47.172	54	Pass
1DH5	2480	2483.617	2.00	0.00	-42.174	55.026	54	Pass
2DH5	2402	2390	2.00	0.00	-50.063	47.137	54	Pass
2DH5	2480	2484.886	2.00	0.00	-44.465	52.735	54	Pass

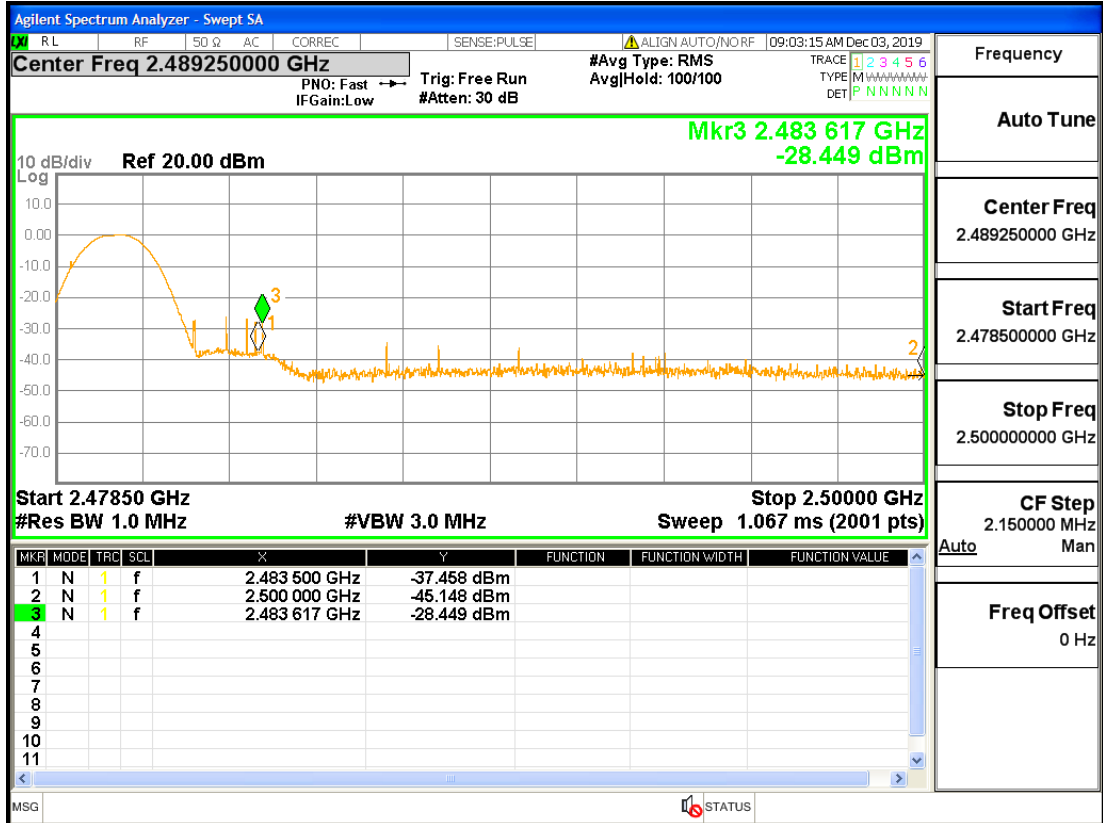
Restrict-band band-edge measurements_2402_PEAK_DH5



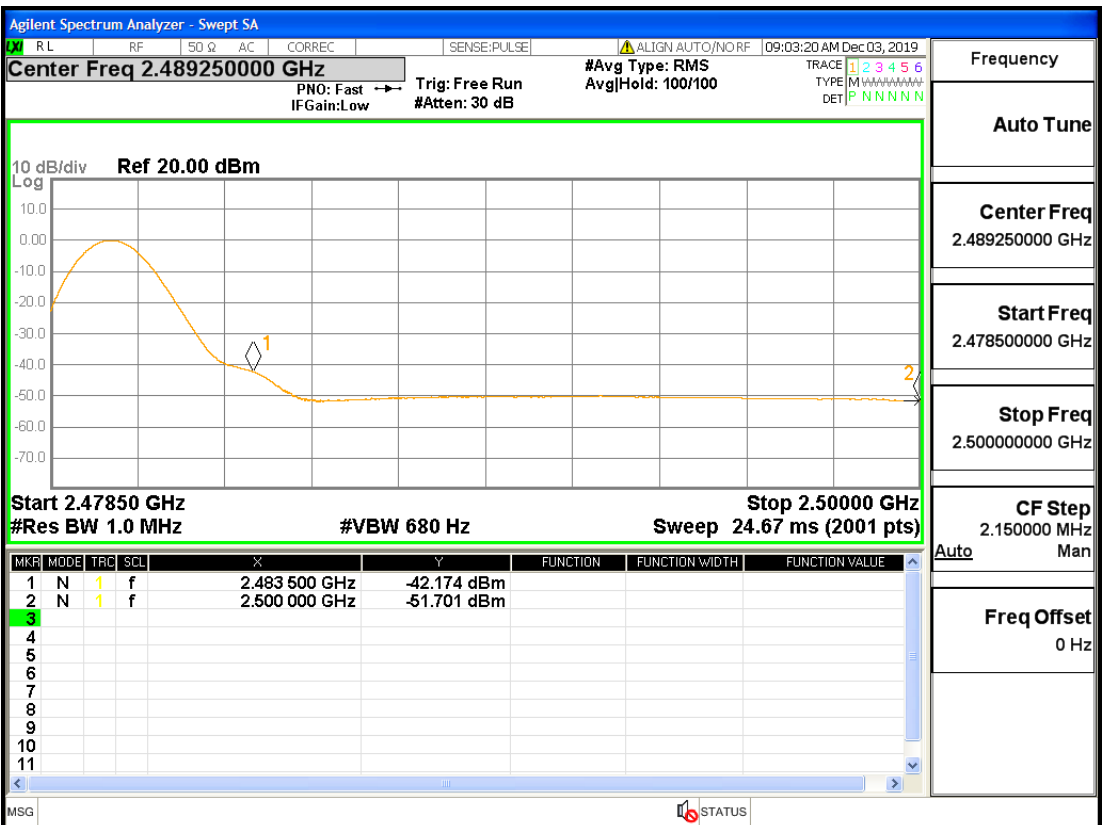
Restrict-band band-edge measurements_2402_AV_DH5



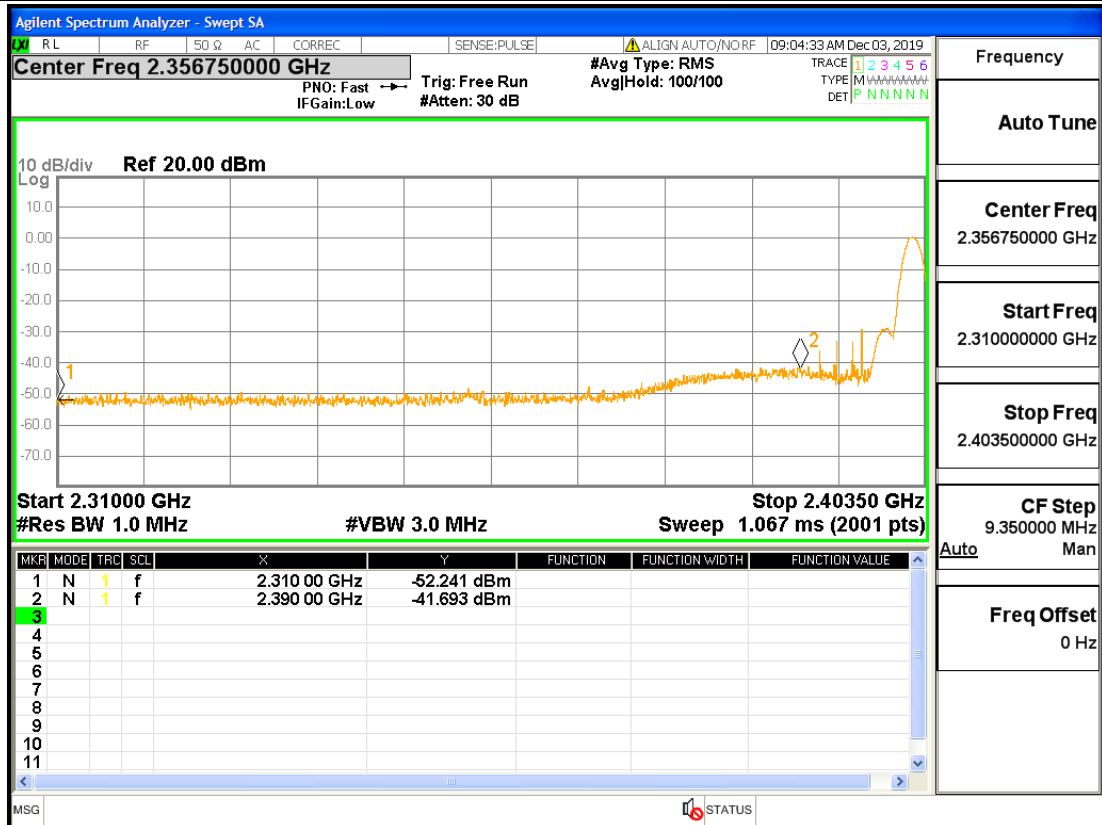
Restrict-band band-edge measurements_2480_PEAK_DH5



Restrict-band band-edge measurements_2480_AV_DH5



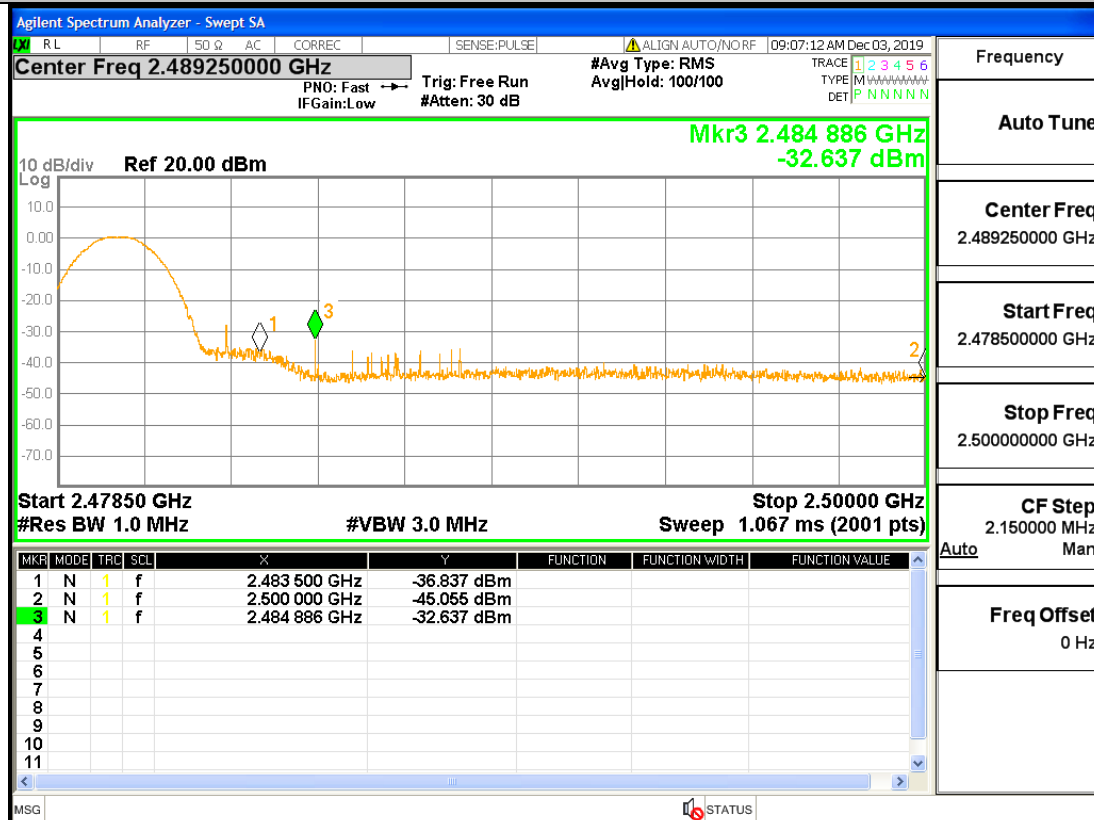
Restrict-band band-edge measurements_2402_PEAK_2DH5



Restrict-band band-edge measurements_2402_AV_2DH5



Restrict-band band-edge measurements_2480_PEAK_2DH5



Restrict-band band-edge measurements_2480_AV_2DH5

