

Appendix A

RF Test Data for BT V5.0(BDR/EDR) (Conducted Measurement)

Product Name: True wireless earbuds

Trade Mark: Happy Plugs

Test Model: Air 1 Zen

Environmental Conditions

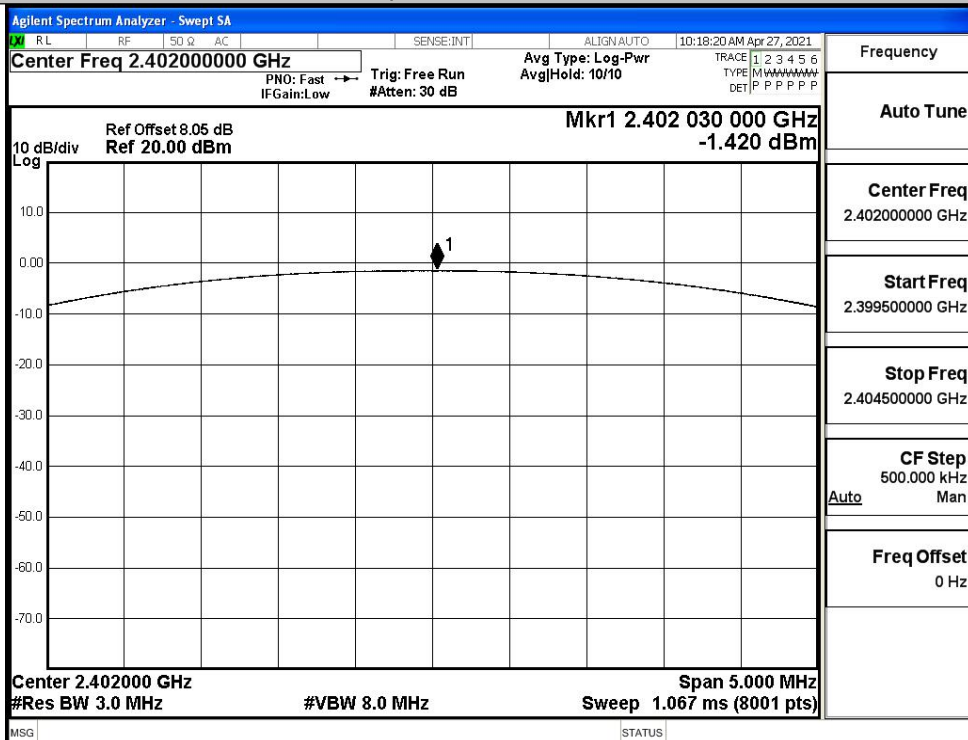
Temperature:	24.6 ° C
Relative Humidity:	54.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Kay Hu
Supervised by:	Li Huan

A.1 Maximum Conducted Peak Output Power

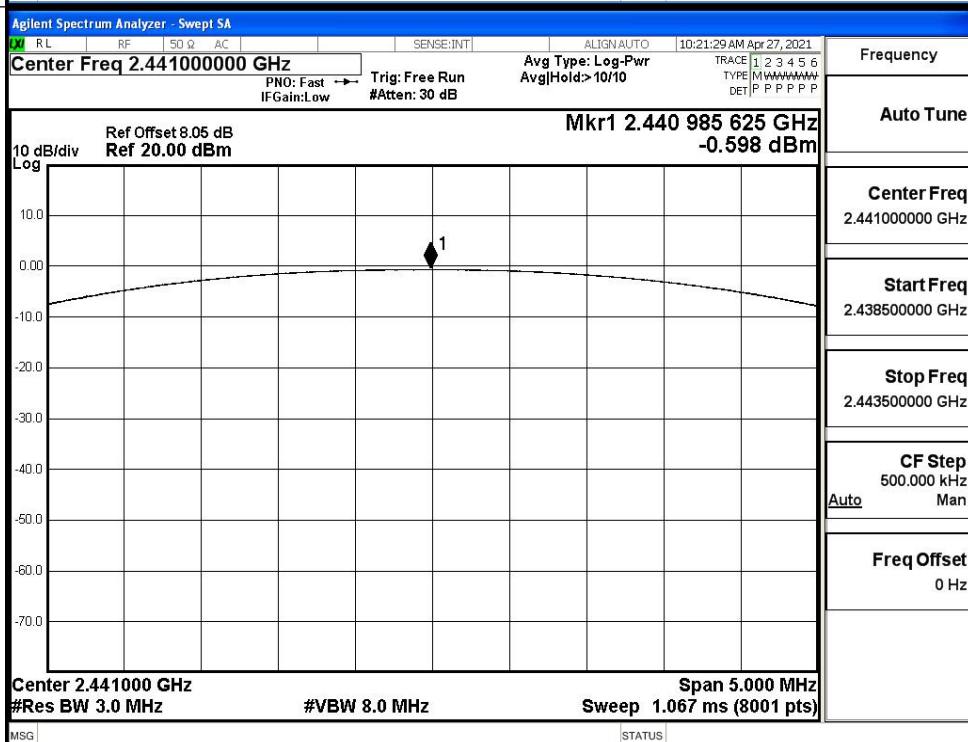
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.420	21	PASS
	MCH	-0.598	21	PASS
	HCH	-0.675	21	PASS
$\pi/4$ DQPSK	LCH	-1.423	21	PASS
	MCH	-0.672	21	PASS
	HCH	-0.739	21	PASS
8DPSK	LCH	-1.451	21	PASS
	MCH	-0.672	21	PASS
	HCH	-0.690	21	PASS

Test Graphs

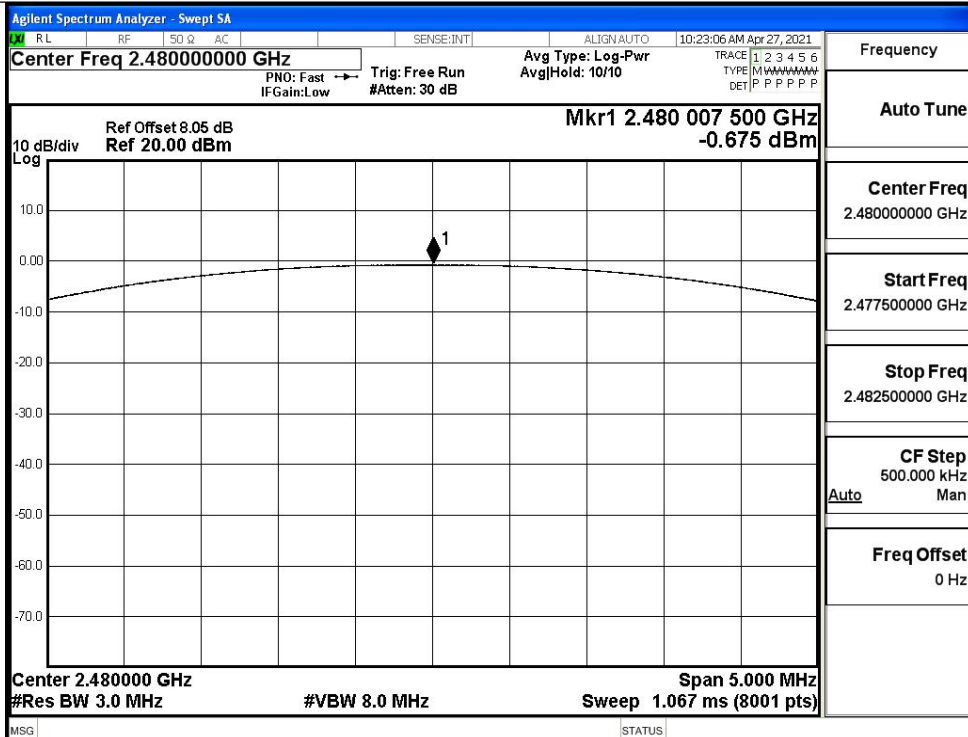
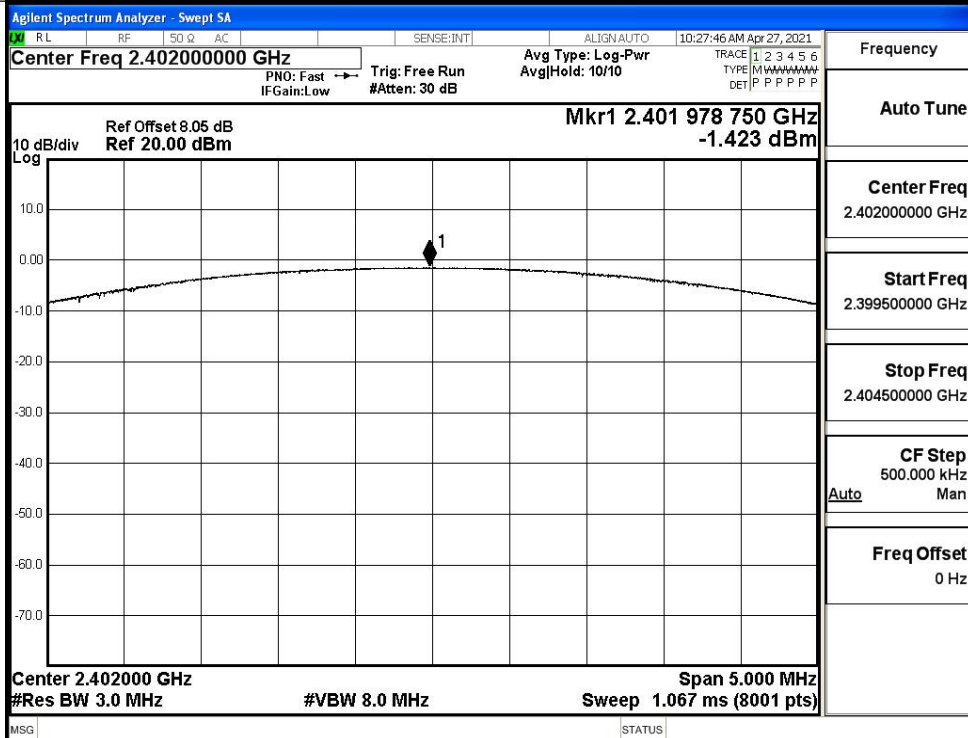
GFSK/LCH

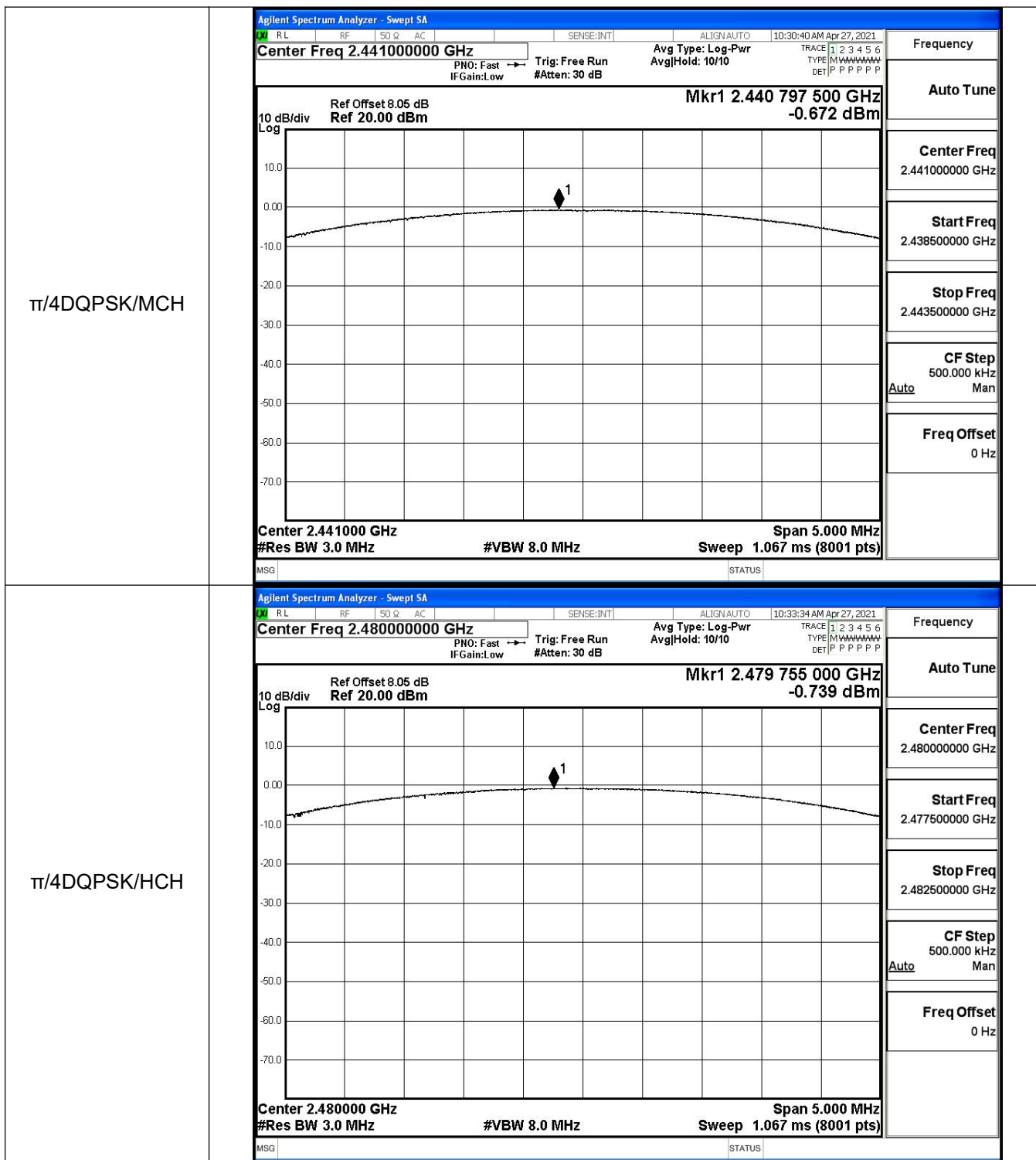


GFSK/MCH

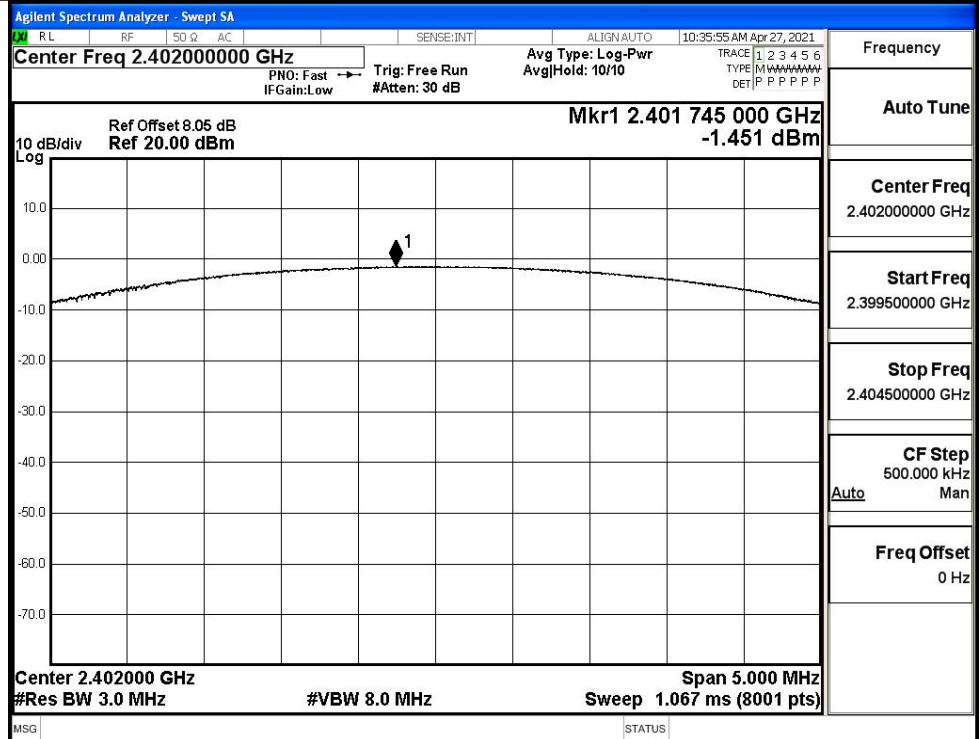


GFSK/HCH

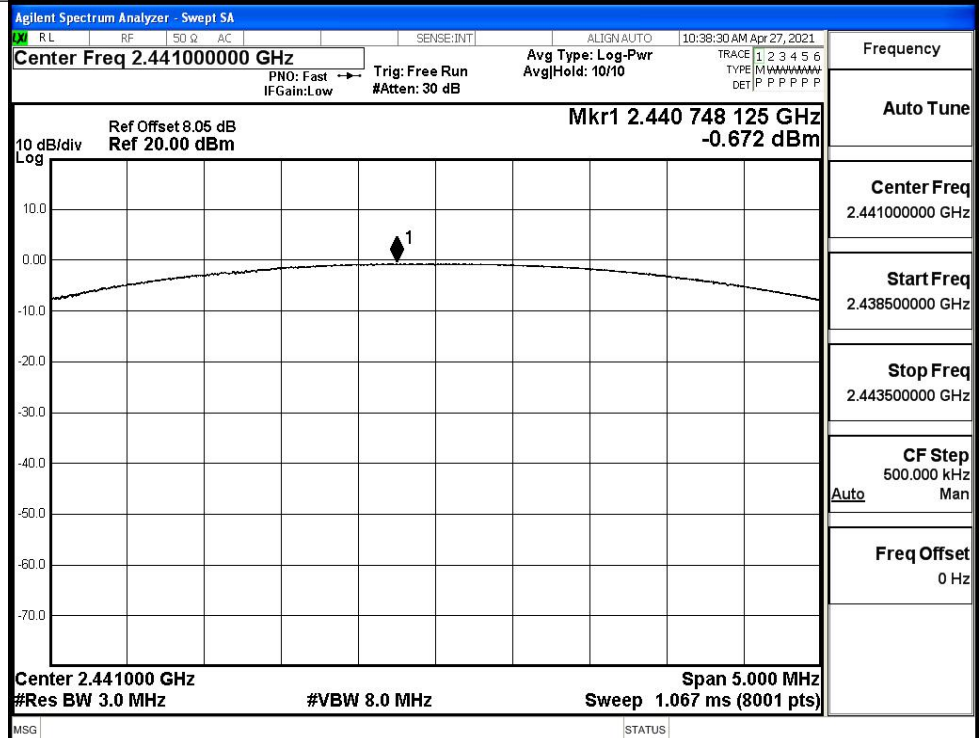
 π /4DQPSK/LCH



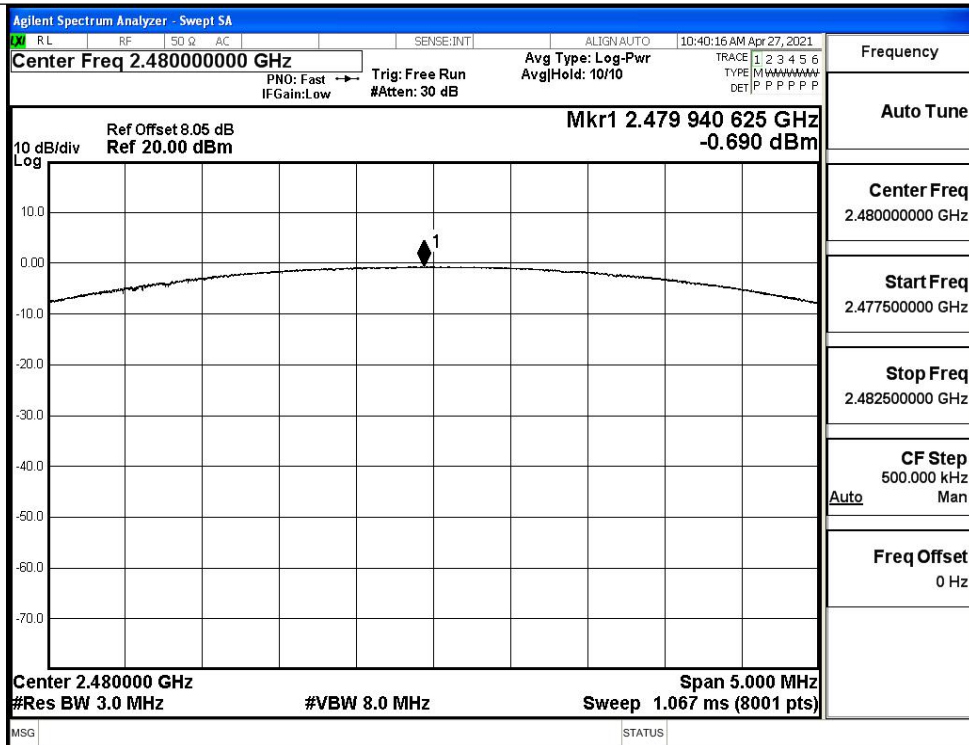
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

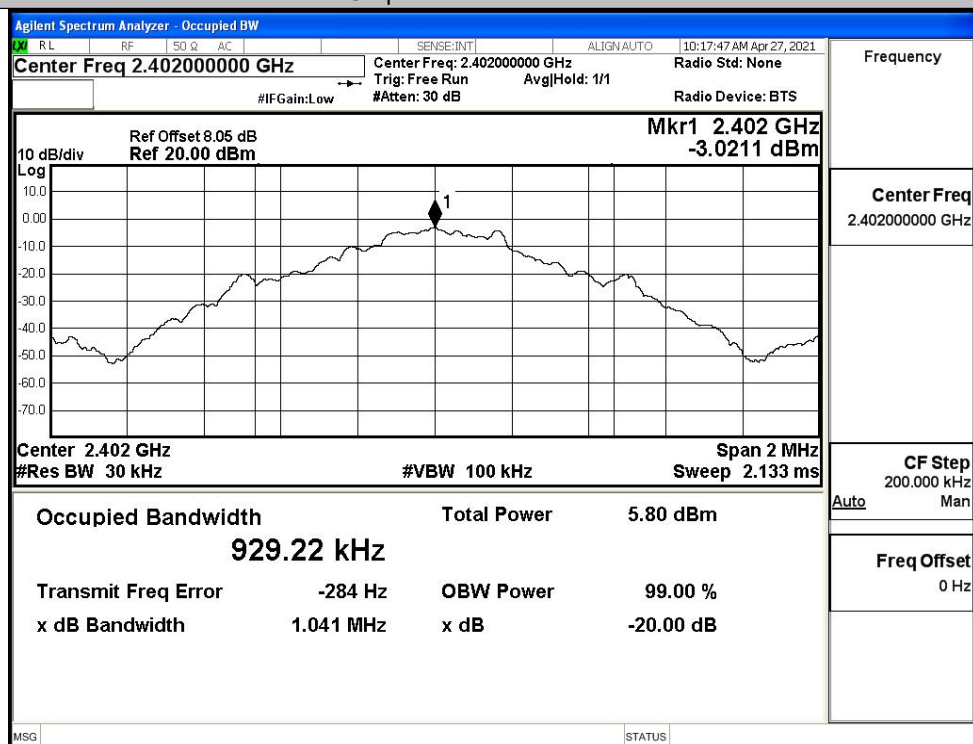


A.2 20dB Bandwidth

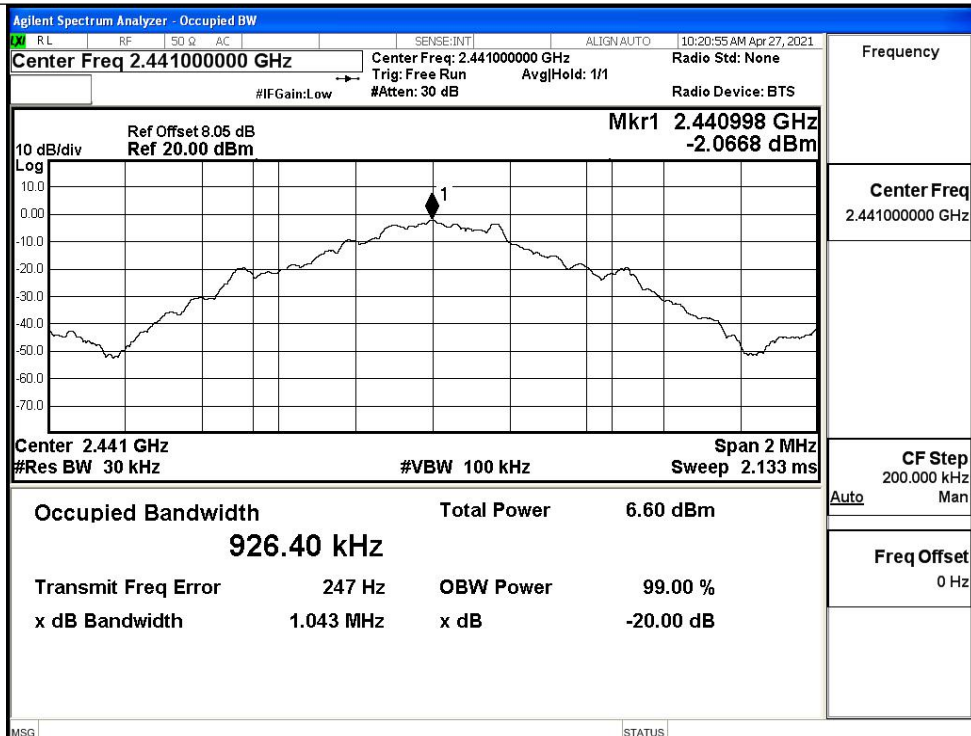
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.041	Not Specified	PASS
	MCH	1.043	Not Specified	PASS
	HCH	1.041	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.191	Not Specified	PASS
	MCH	1.191	Not Specified	PASS
	HCH	1.191	Not Specified	PASS
8DPSK	LCH	1.199	Not Specified	PASS
	MCH	1.201	Not Specified	PASS
	HCH	1.201	Not Specified	PASS

Test Graphs

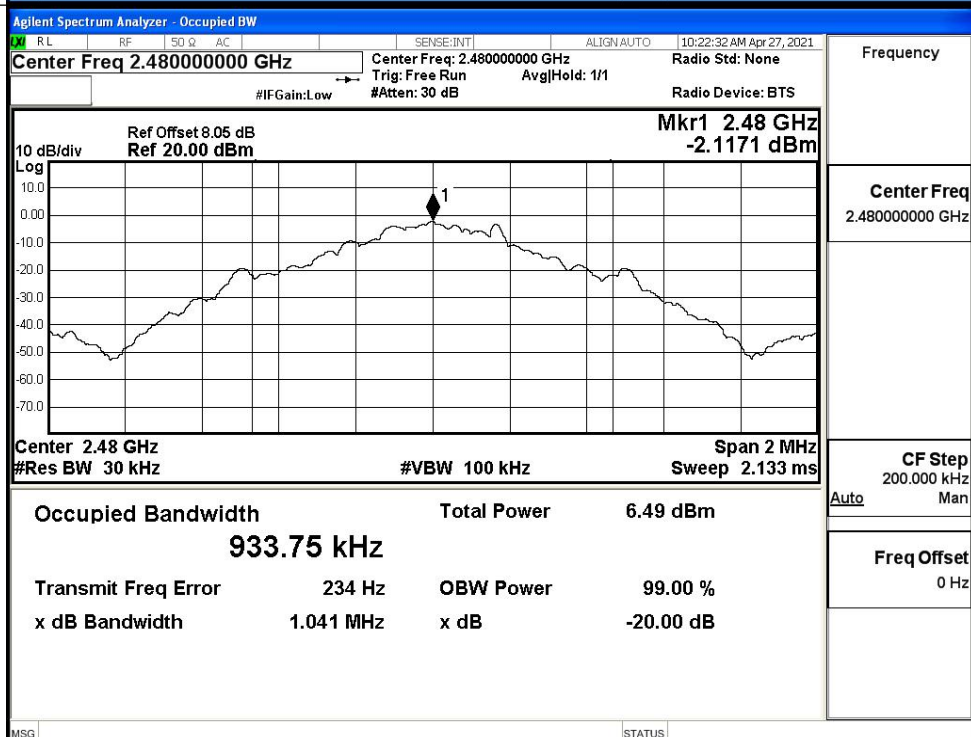
GFSK/LCH

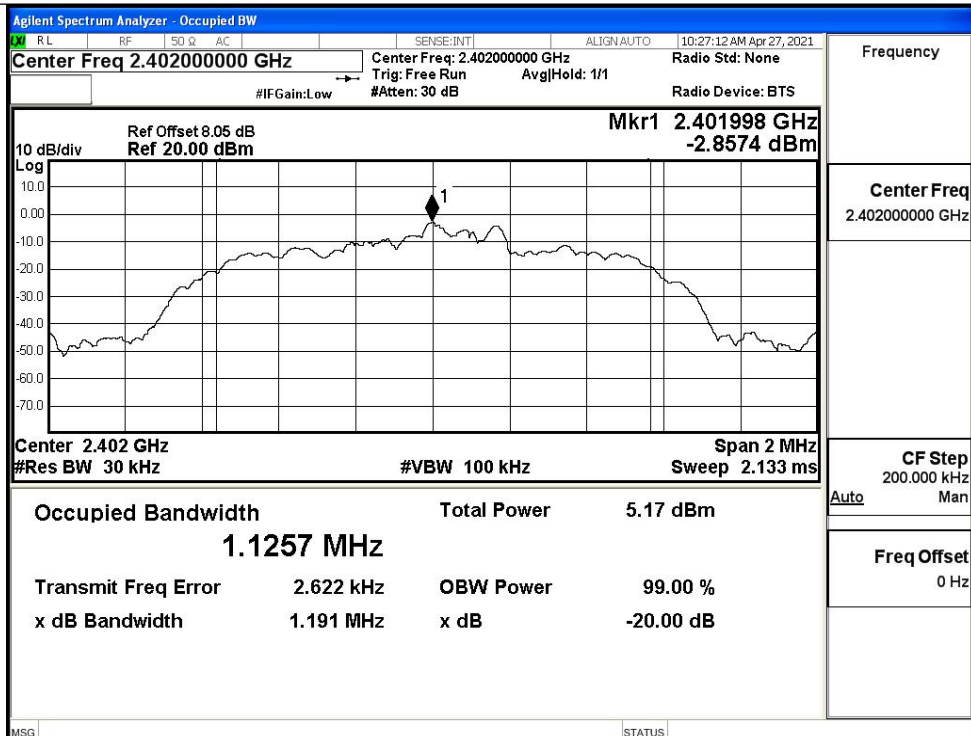
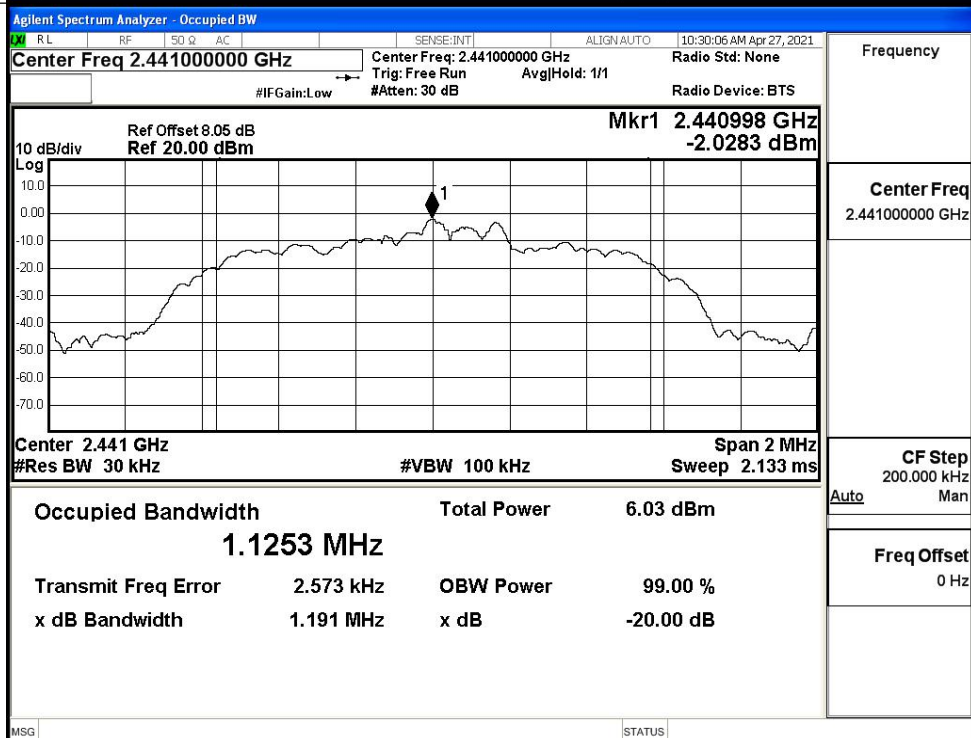


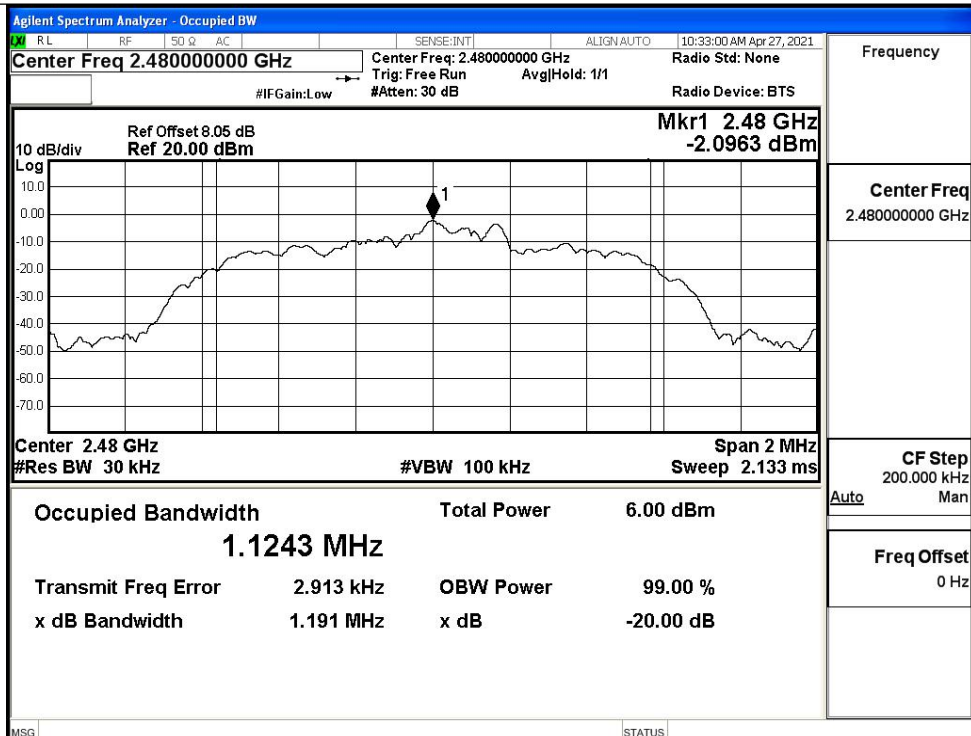
GFSK/MCH



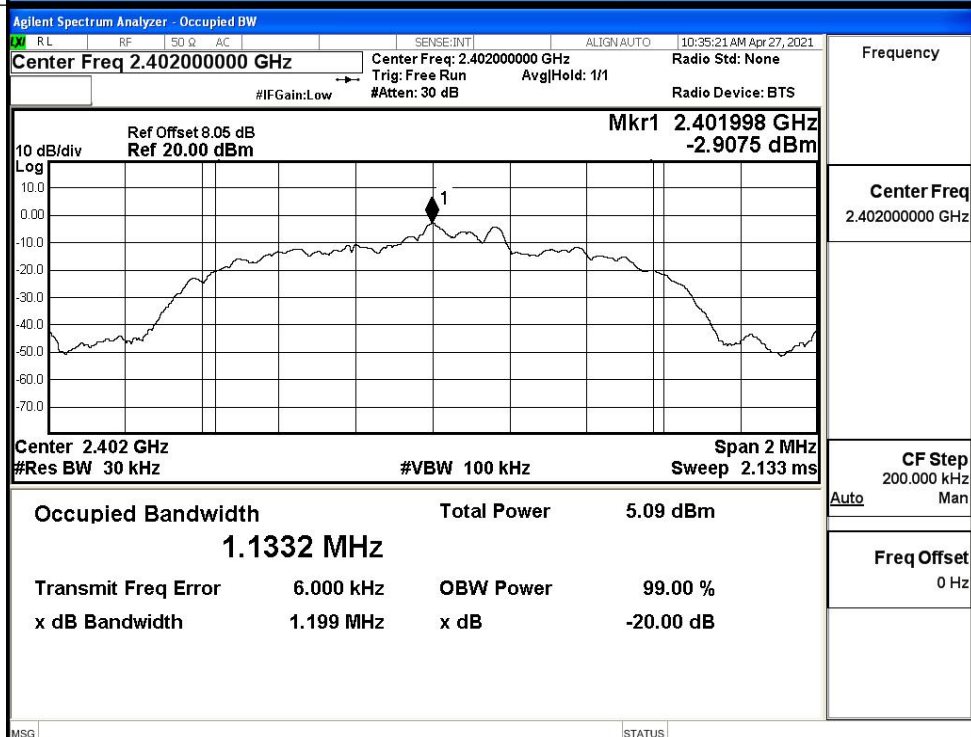
GFSK/HCH



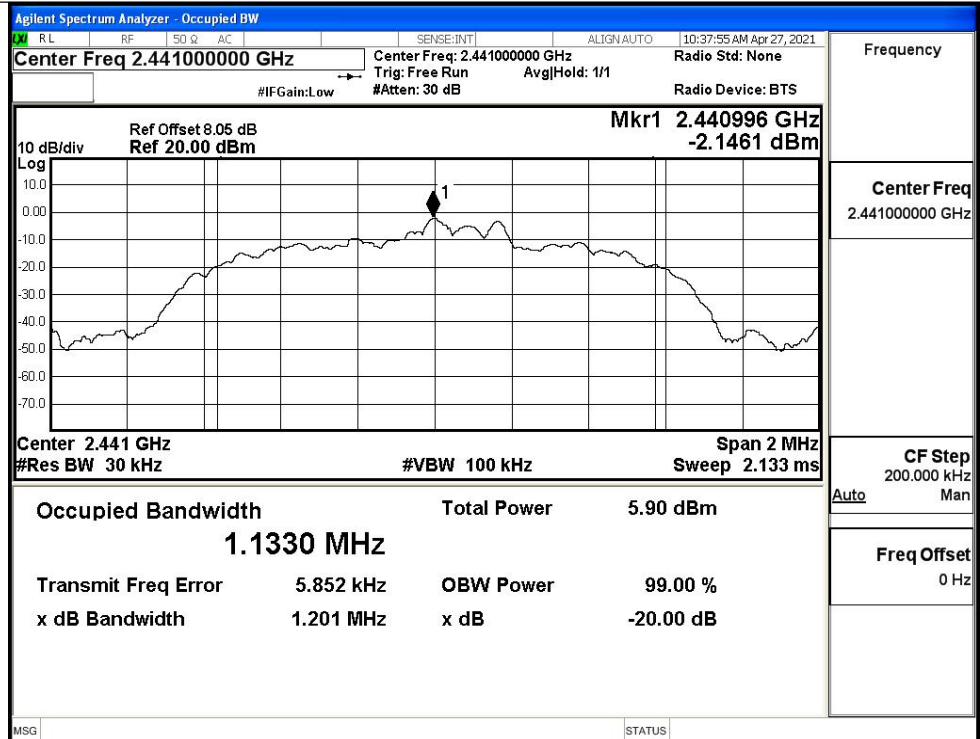
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

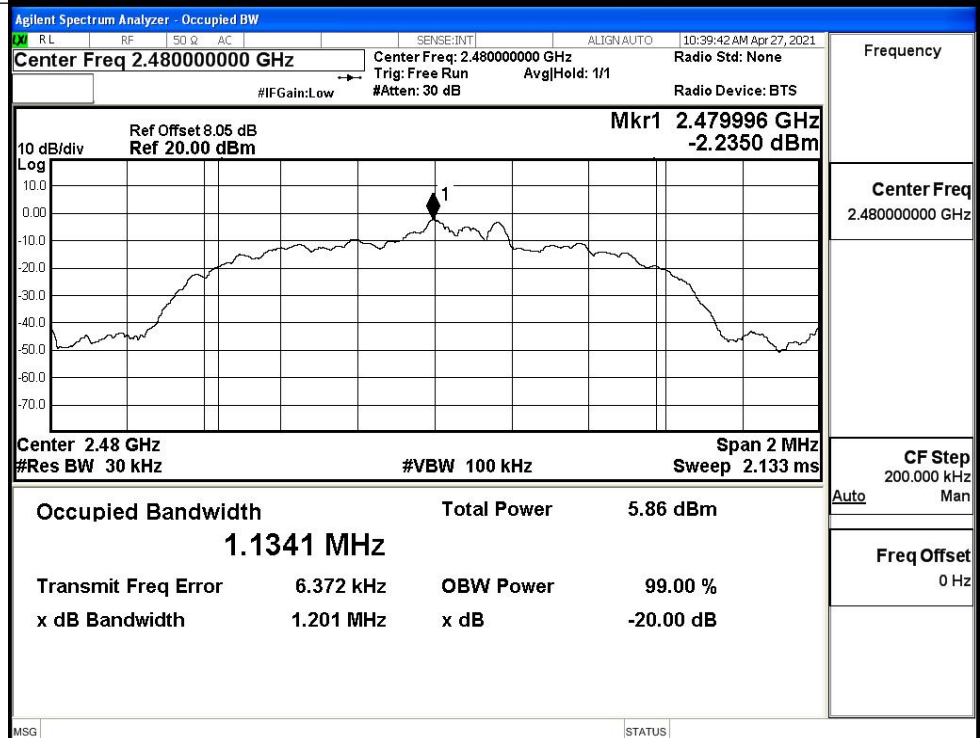
8DPSK/LCH



8DPSK/MCH



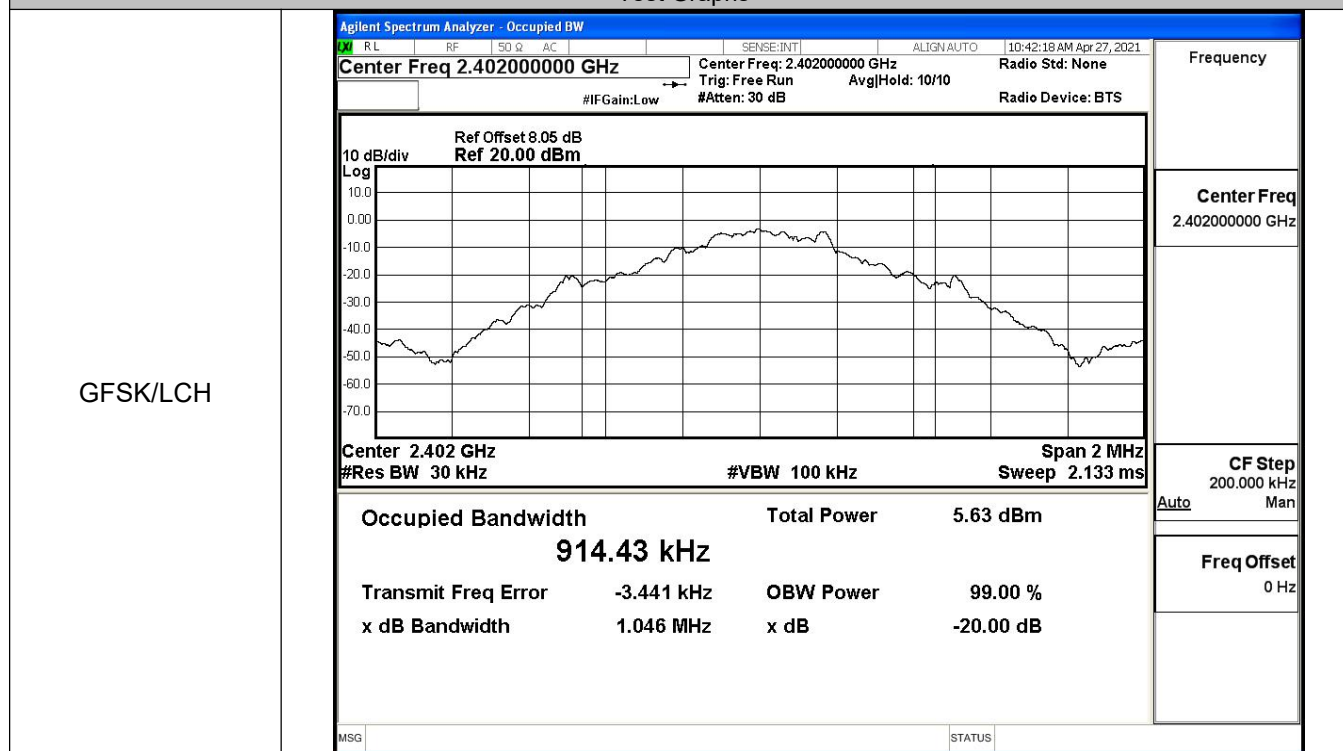
8DPSK/HCH



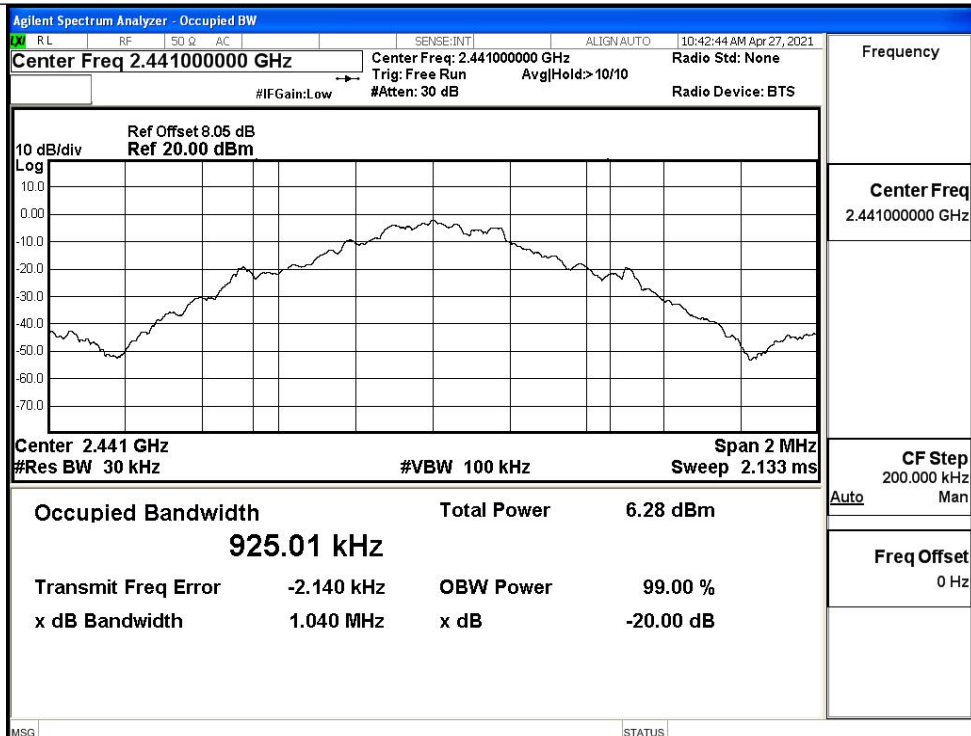
A.3 Occupied Bandwidth

Mode	Channel.	Occupied Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.91443	Not Specified	PASS
	MCH	0.92501	Not Specified	PASS
	HCH	0.91426	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.1388	Not Specified	PASS
	MCH	1.1261	Not Specified	PASS
	HCH	1.1249	Not Specified	PASS
8DPSK	LCH	1.1352	Not Specified	PASS
	MCH	1.1447	Not Specified	PASS
	HCH	1.1352	Not Specified	PASS

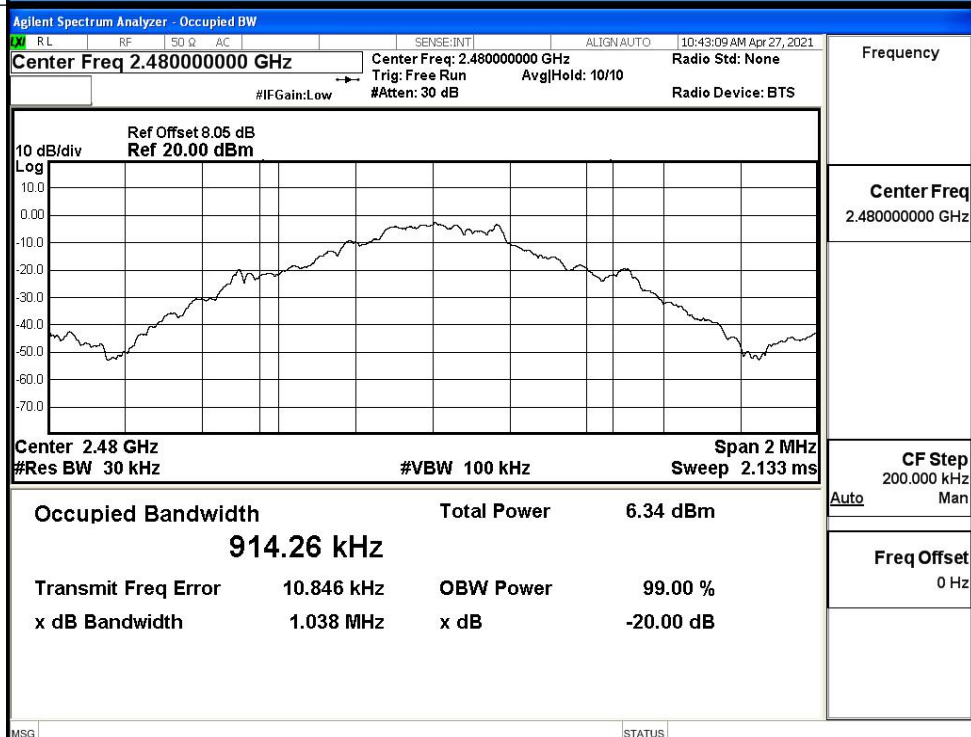
Test Graphs

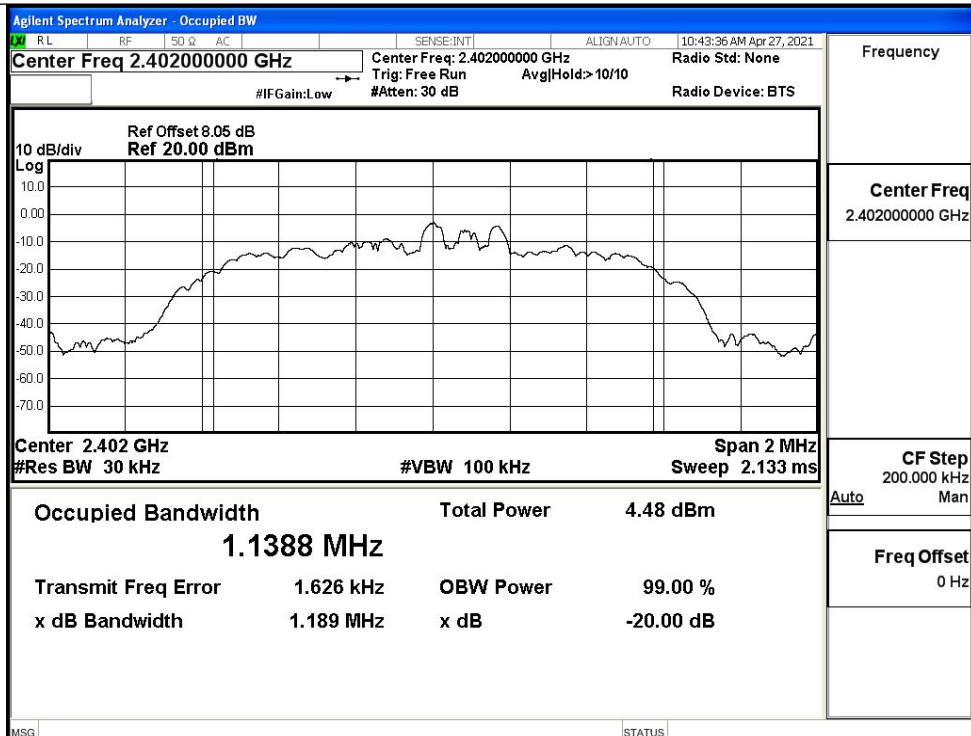


GFSK/MCH



GFSK/HCH

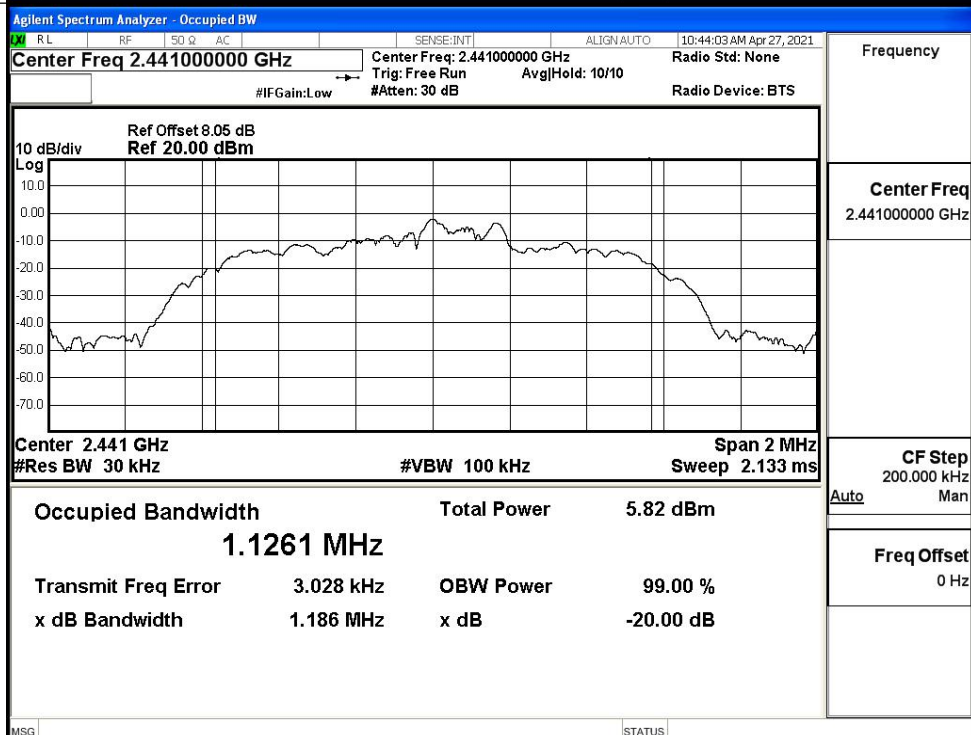


$\pi/4$ DQPSK/LCH

Frequency

Center Freq
2.40200000 GHzCF Step
200.000 kHz

Auto

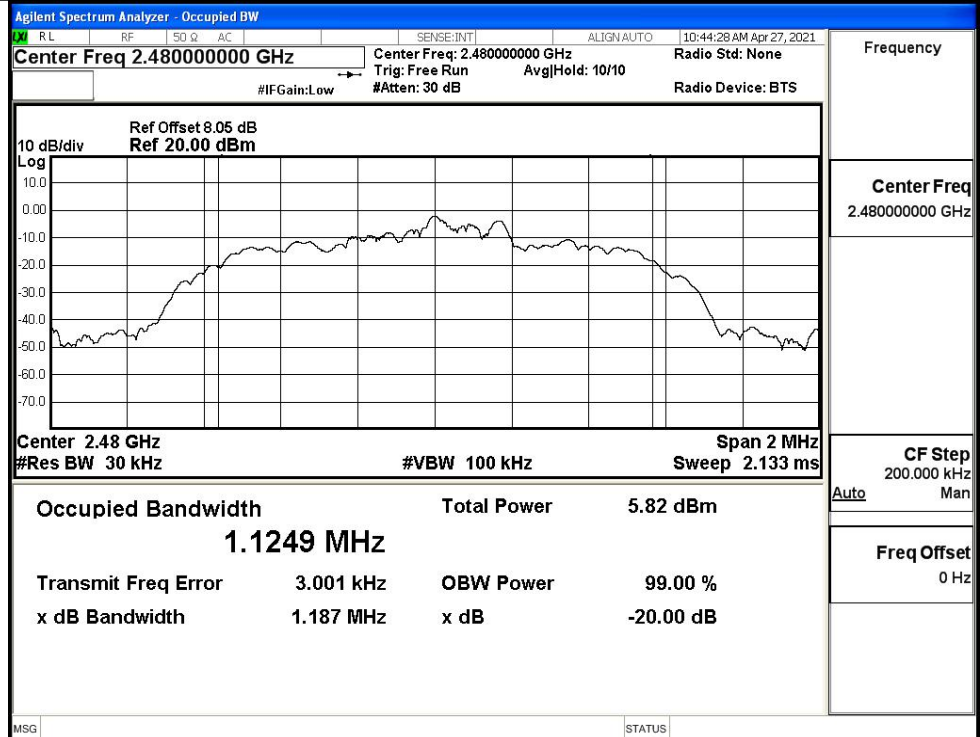
Freq Offset
0 Hz $\pi/4$ DQPSK/MCH

Frequency

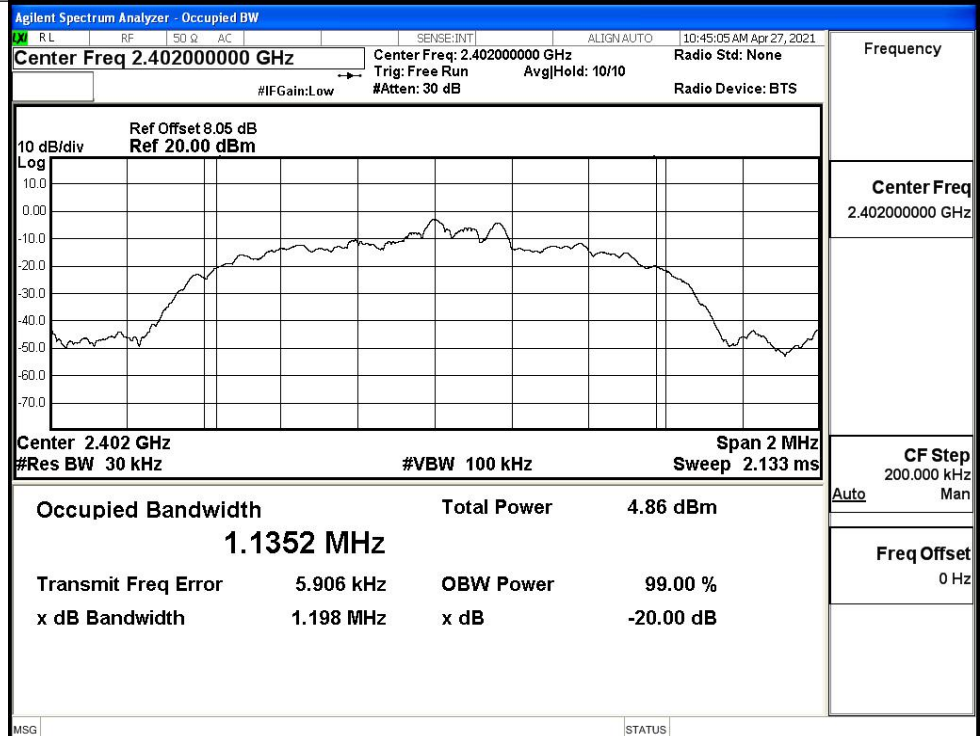
Center Freq
2.44100000 GHzCF Step
200.000 kHz

Auto

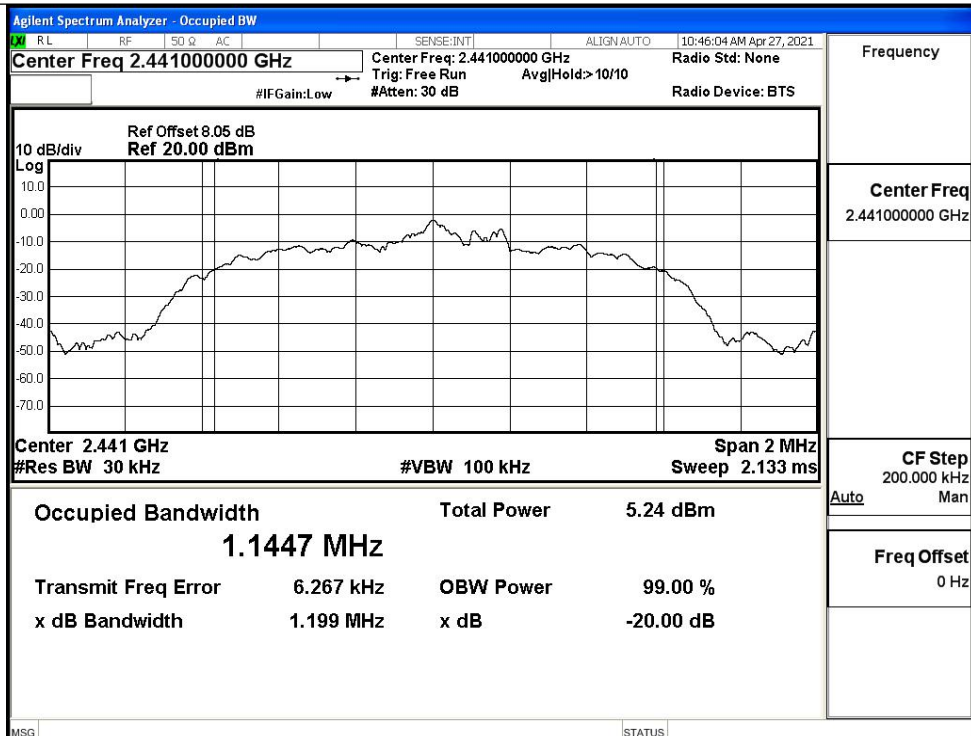
Freq Offset
0 Hz

$\pi/4$ DQPSK/HCH

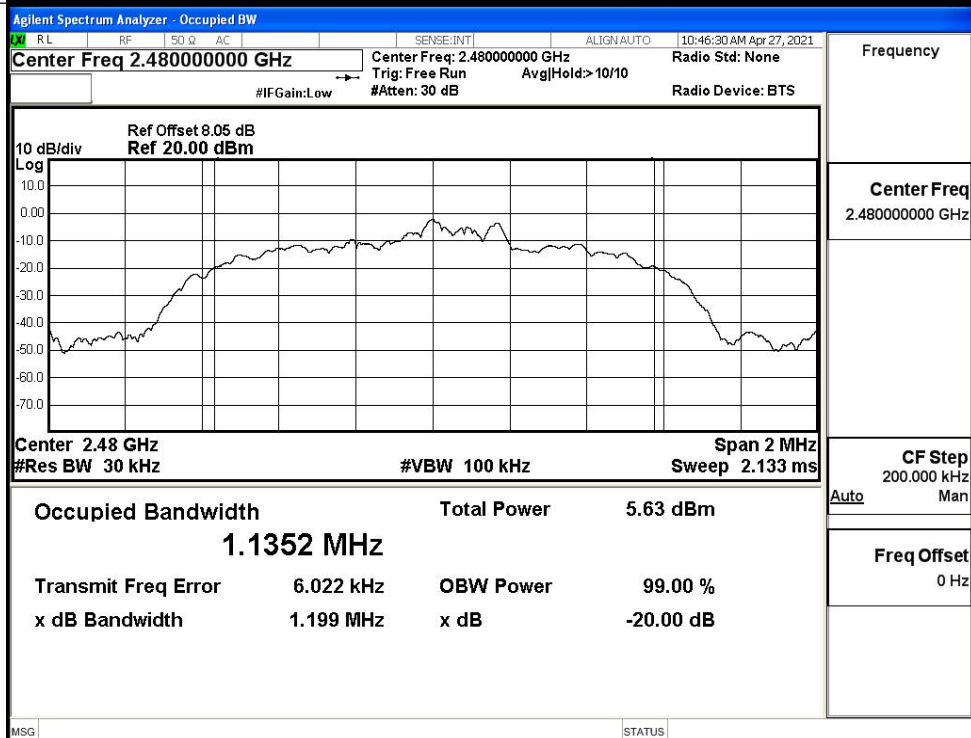
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

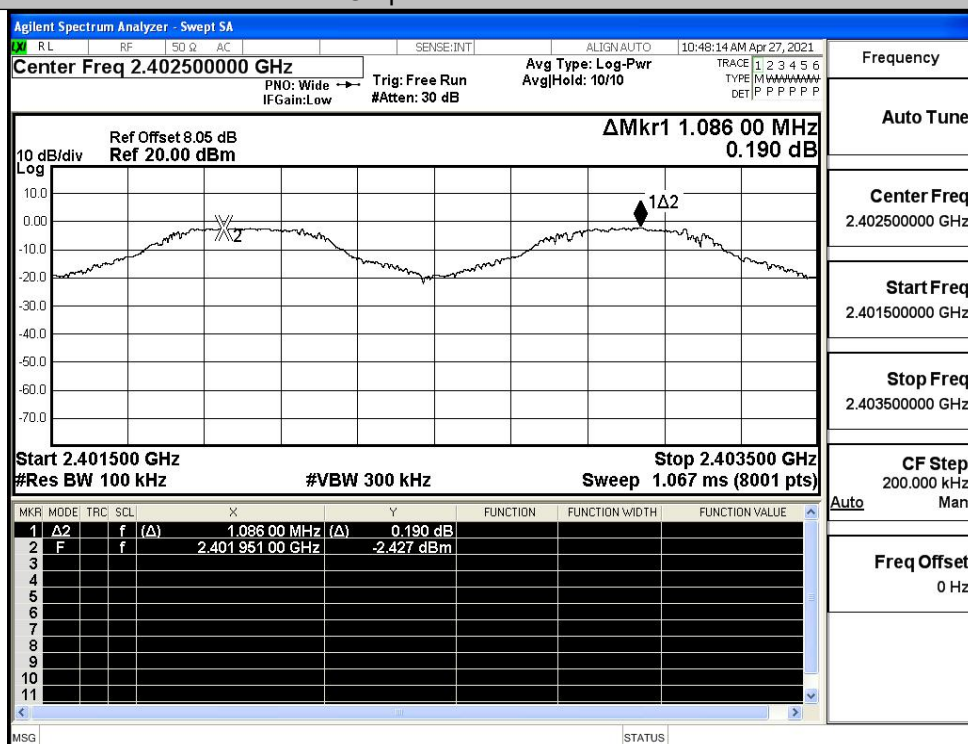


A.4 Carrier Frequency Separation

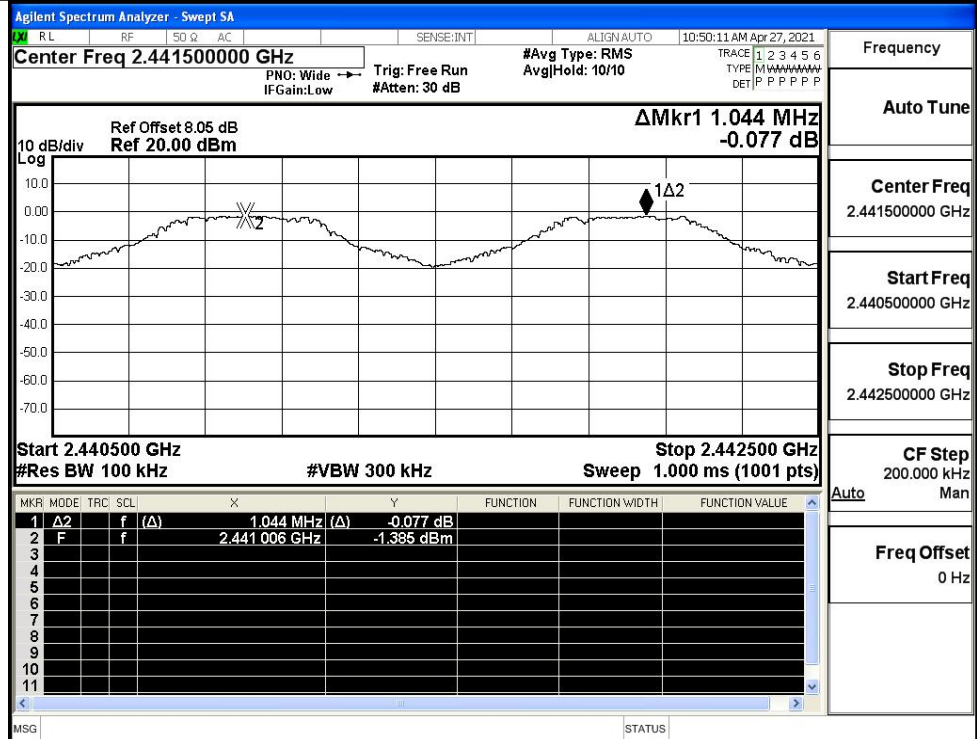
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.086	0.695	PASS
	MCH	1.044	0.695	PASS
	HCH	0.944	0.695	PASS
$\pi/4$ DQPSK	LCH	0.842	0.794	PASS
	MCH	1.144	0.794	PASS
	HCH	1.126	0.794	PASS
8DPSK	LCH	0.842	0.801	PASS
	MCH	0.856	0.801	PASS
	HCH	1.136	0.801	PASS

Test Graphs

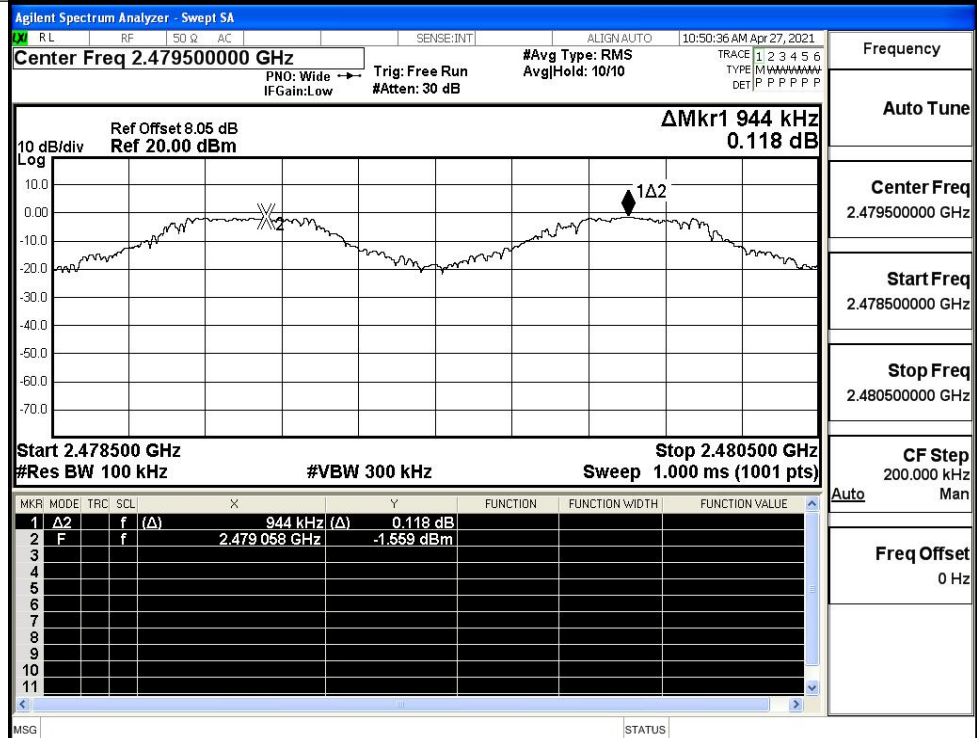
GFSK/LCH

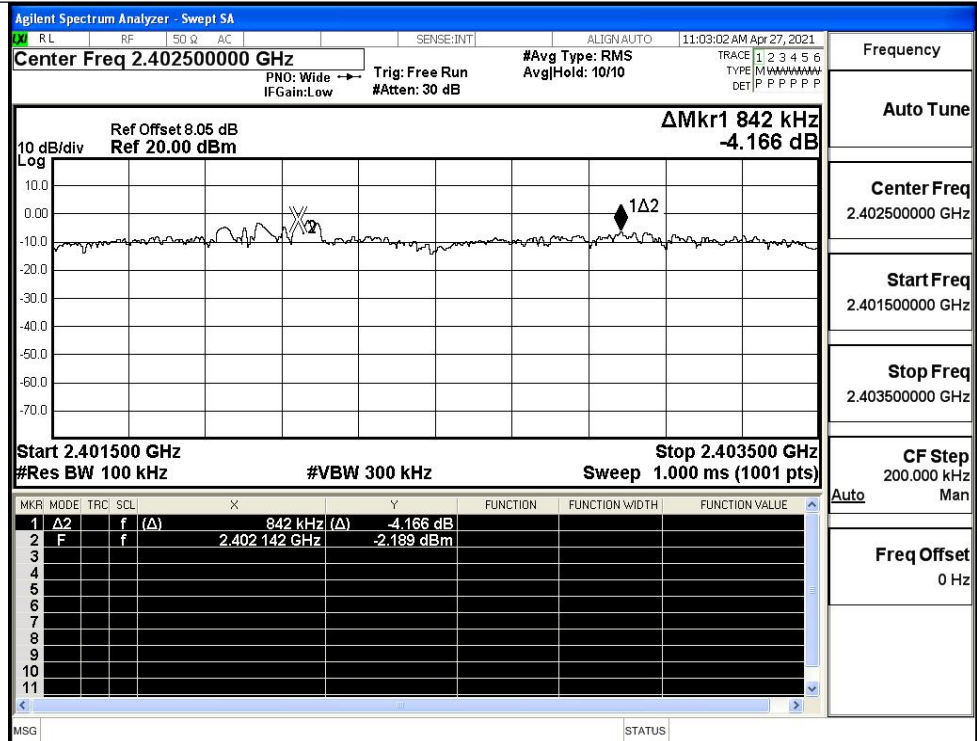
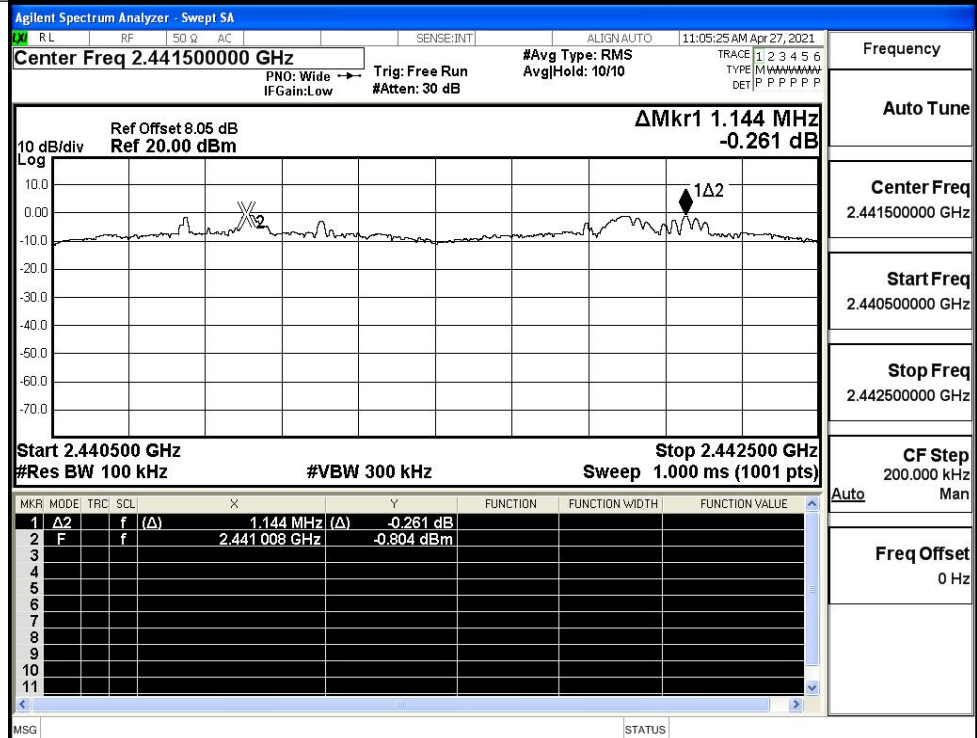


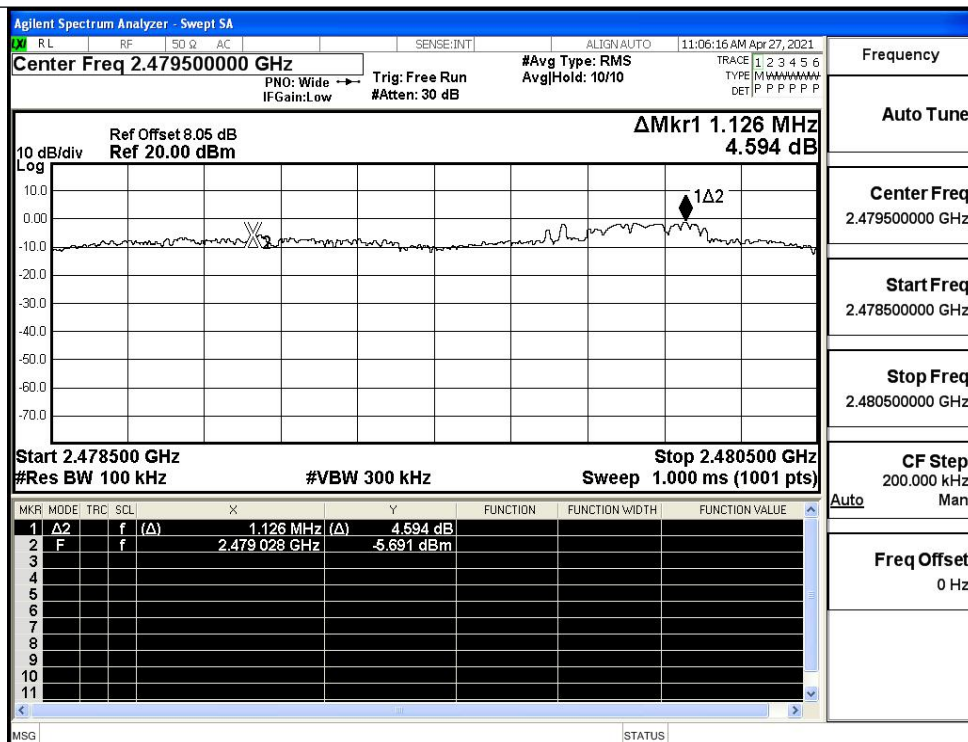
GFSK/MCH



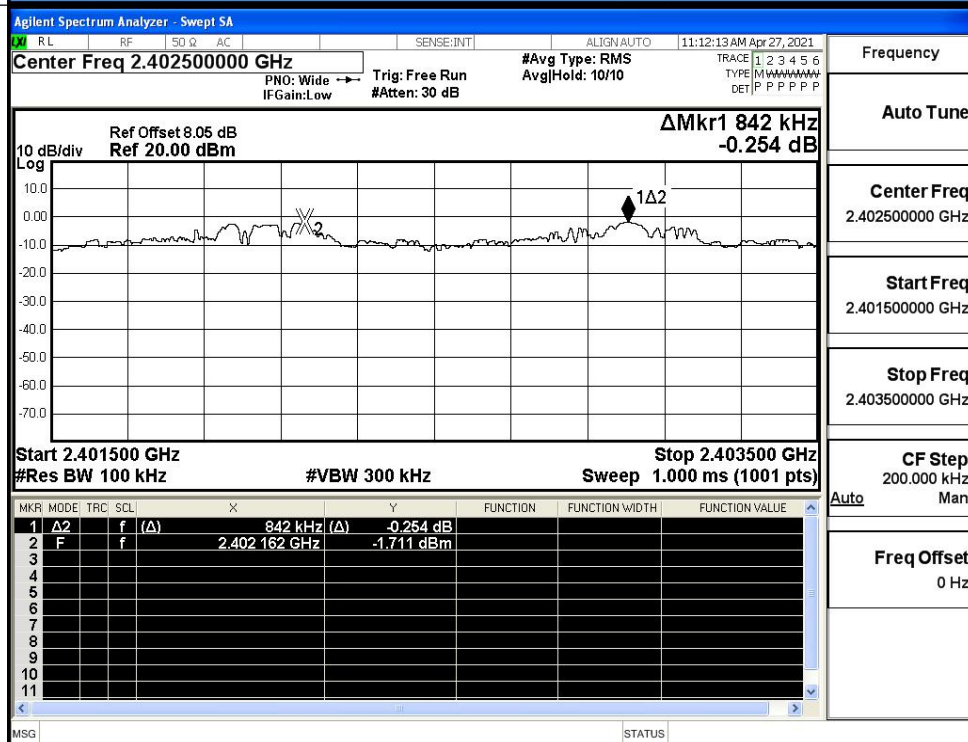
GFSK/HCH



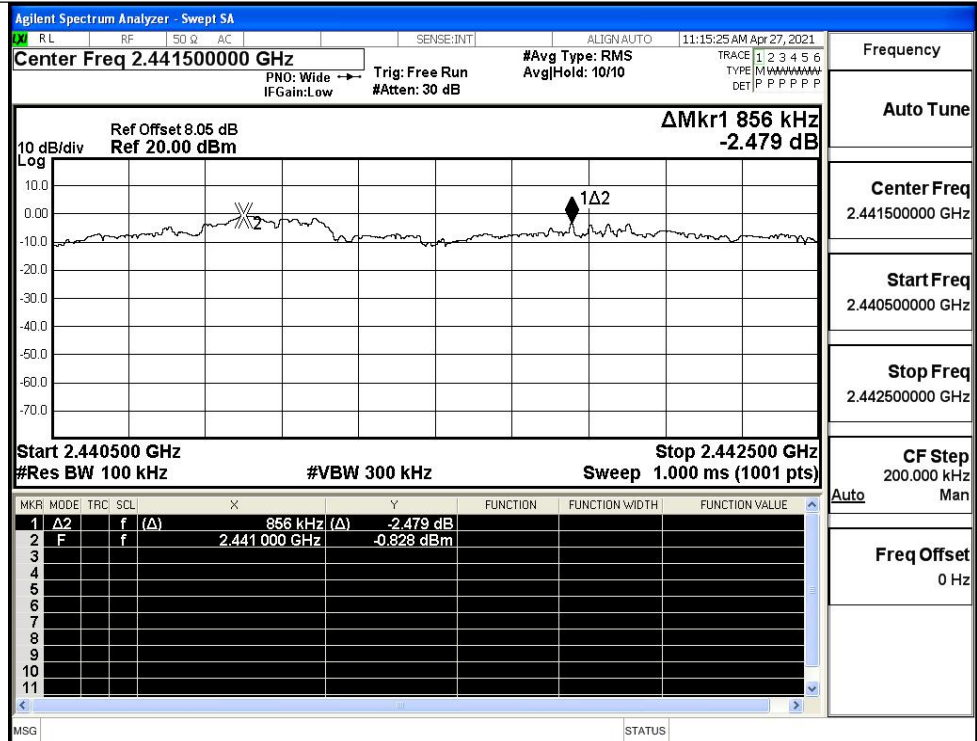
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

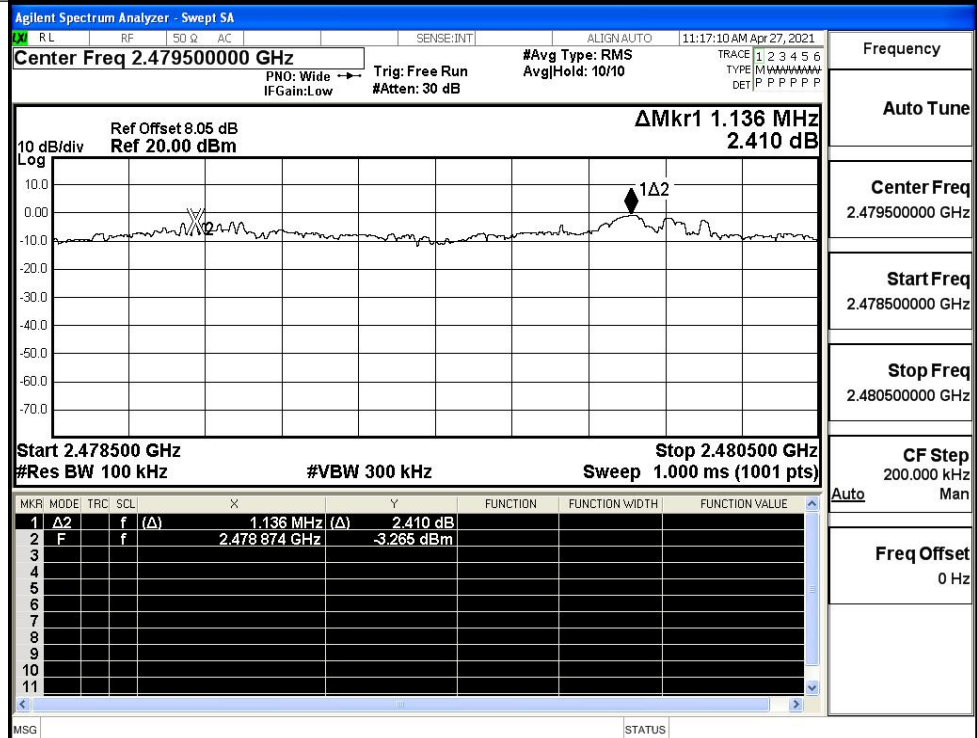
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

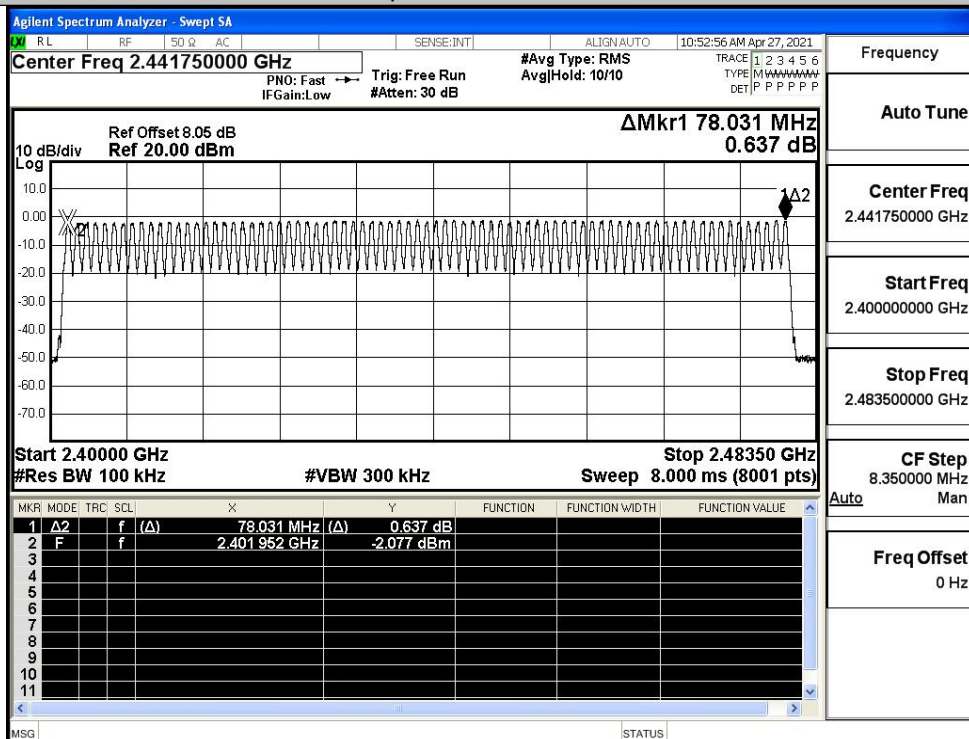


A.5 Hopping Channel Number

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

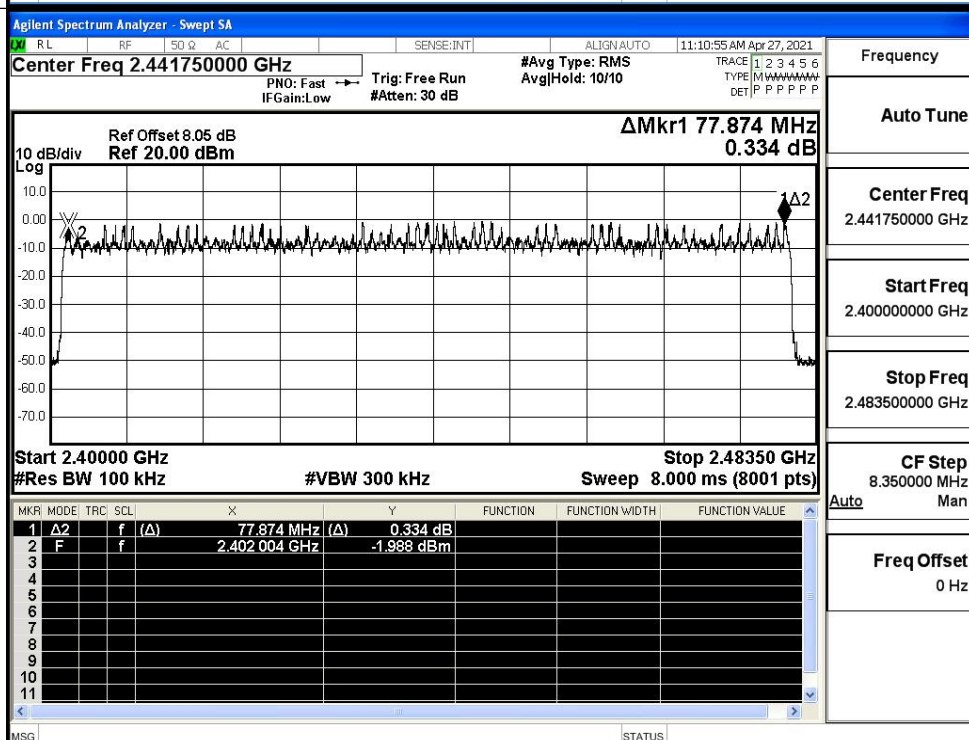
Test Graphs

GFSK/Hop



Frequency

Auto Tune

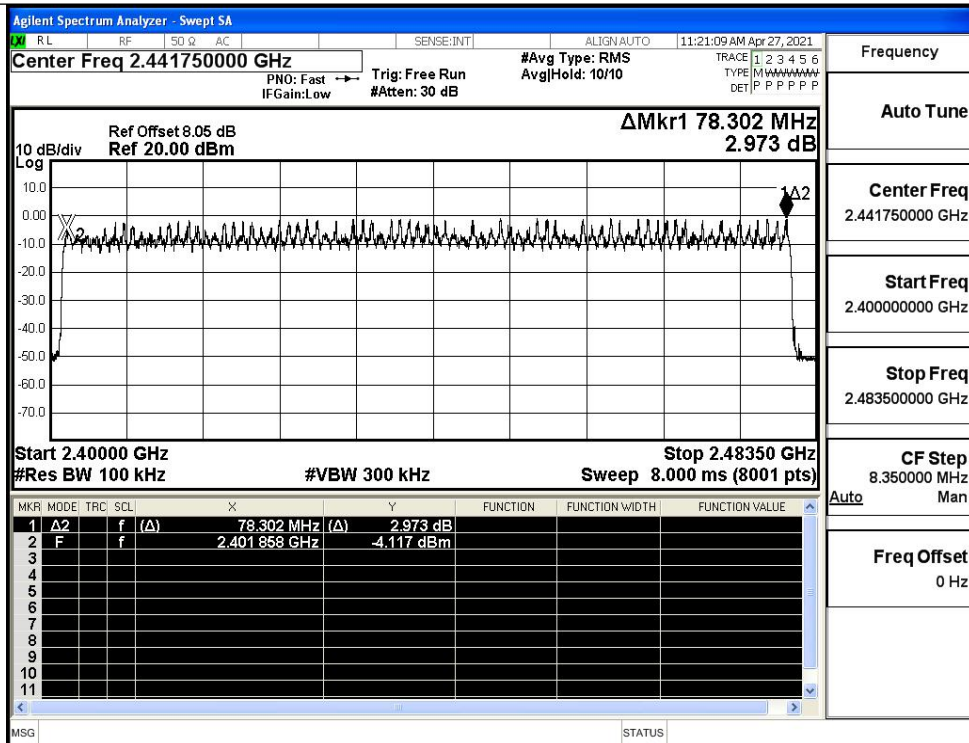
Center Freq
2.441750000 GHzStart Freq
2.400000000 GHzStop Freq
2.483500000 GHzCF Step
8.350000 MHz
Auto ManFreq Offset
0 Hz $\pi/4$ DQPSK/Hop

Frequency

Auto Tune

Center Freq
2.441750000 GHzStart Freq
2.400000000 GHzStop Freq
2.483500000 GHzCF Step
8.350000 MHz
Auto ManFreq Offset
0 Hz

8DPSK/Hop



A.6 Dwell Time

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.89	106.7	0.308	0.4	PASS
	DH5	MCH	2.89	106.7	0.308	0.4	PASS
	DH5	HCH	2.89	106.7	0.308	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.89	106.7	0.308	0.4	PASS
	2DH5	MCH	2.89	106.7	0.308	0.4	PASS
	2DH5	HCH	2.89	106.7	0.308	0.4	PASS
8DPSK	3DH5	LCH	2.89	106.7	0.309	0.4	PASS
	3DH5	MCH	2.89	106.7	0.308	0.4	PASS
	3DH5	HCH	2.89	106.7	0.308	0.4	PASS

Test Graphs

GFSK_DH5/LCH

