

Appendix A

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

Product Name: WIRELESS SPORT EARBUDS

Trade Mark: N/A

Test Model: 17LY86BK

Environmental Conditions

Temperature:	24.3 ° C
Relative Humidity:	53.1%
ATM Pressure:	100.0 kPa
Test Engineer:	QuXin
Supervised by:	Wang.Chuang

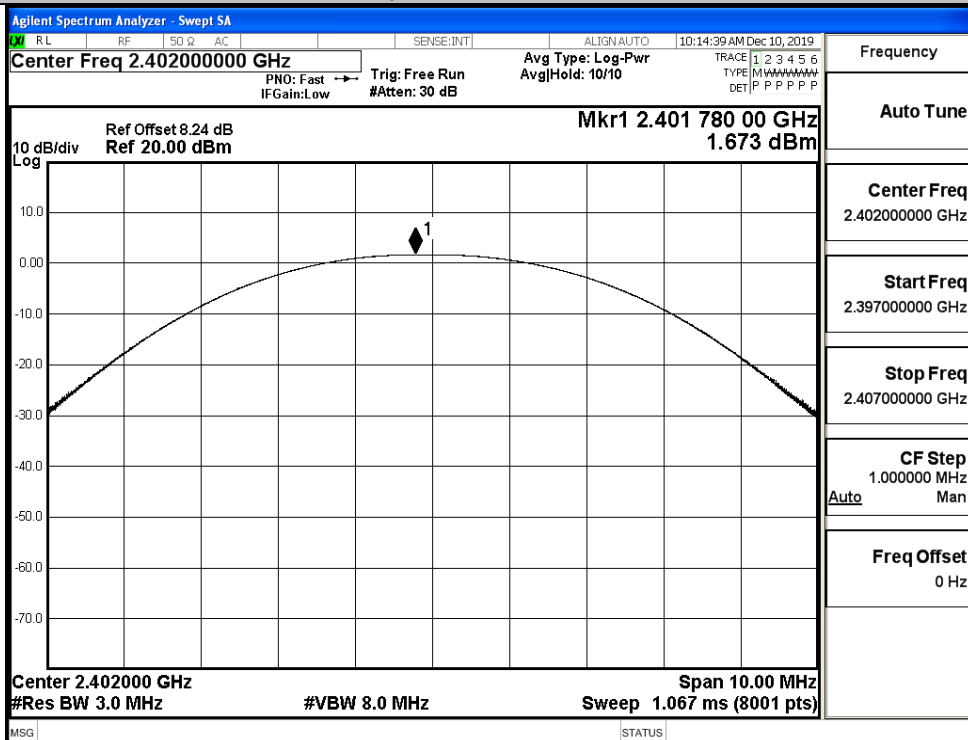
A.1 Maximum Conducted Peak Output Power

Left Ear

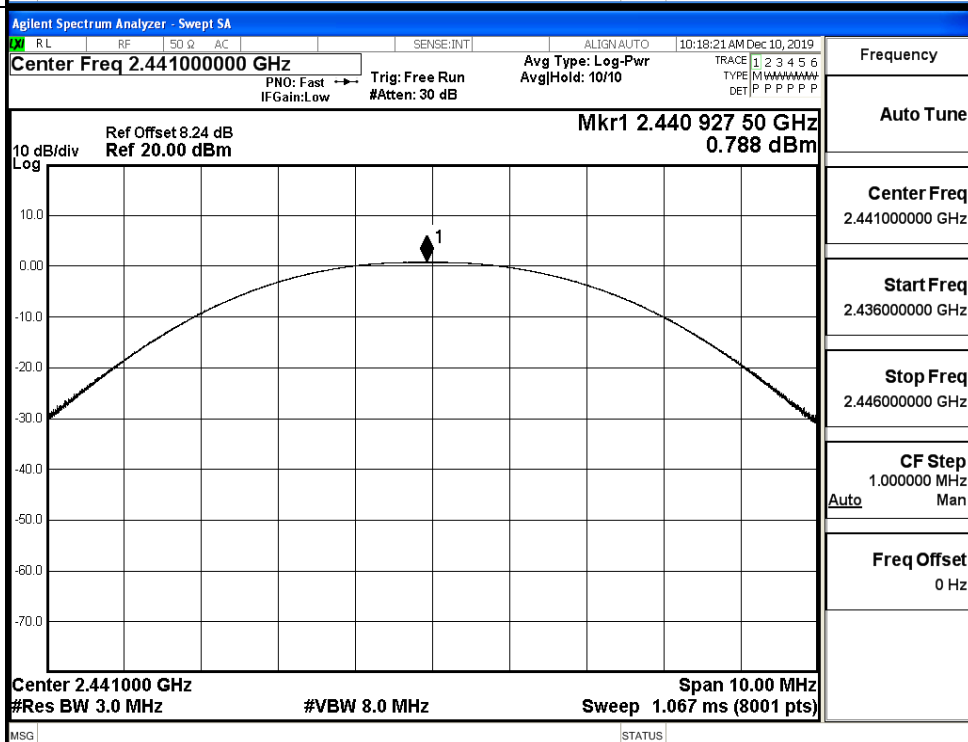
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.673	30	PASS
	MCH	0.788	30	PASS
	HCH	0.229	30	PASS
$\pi/4$ DQPSK	LCH	2.504	21	PASS
	MCH	1.442	21	PASS
	HCH	0.380	21	PASS
8DPSK	LCH	2.528	21	PASS
	MCH	1.057	21	PASS
	HCH	0.460	21	PASS

Test Graphs

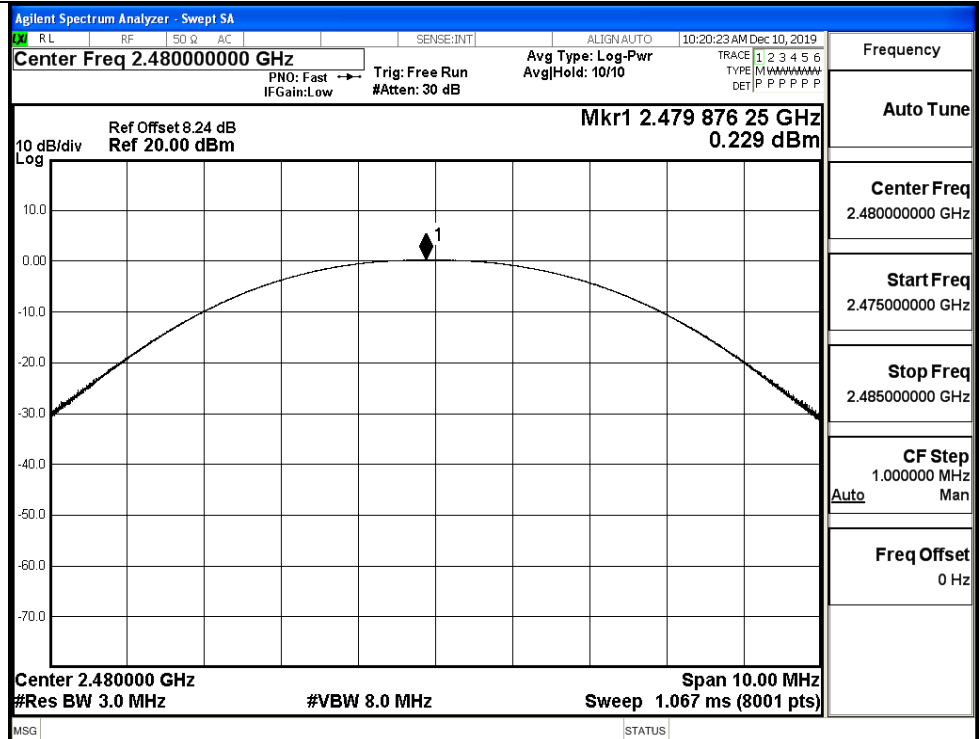
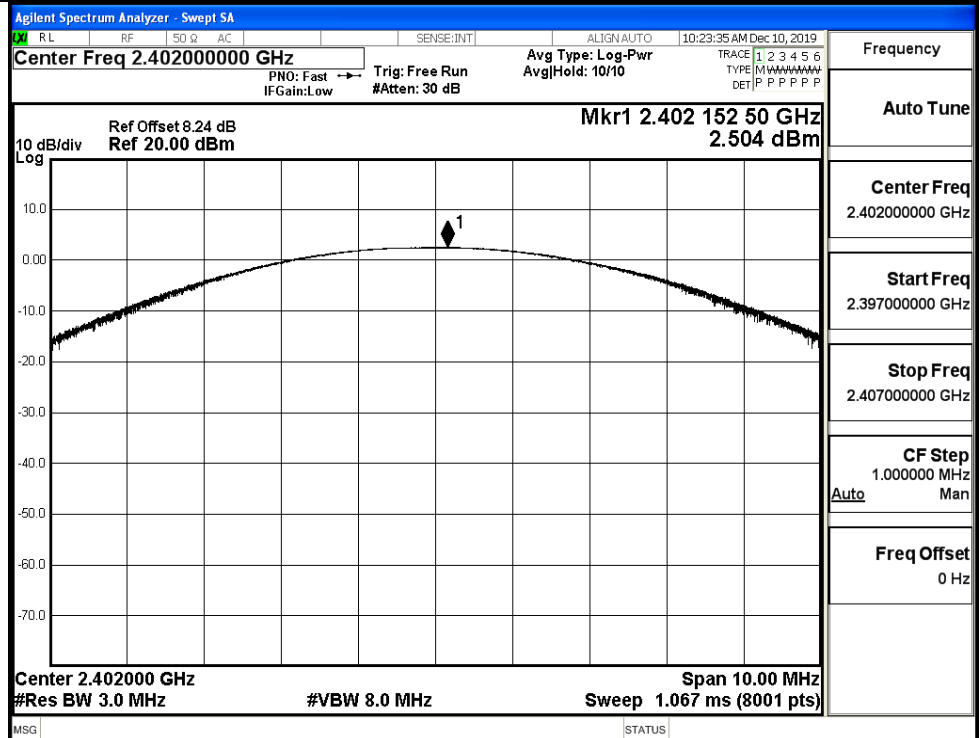
GFSK/LCH

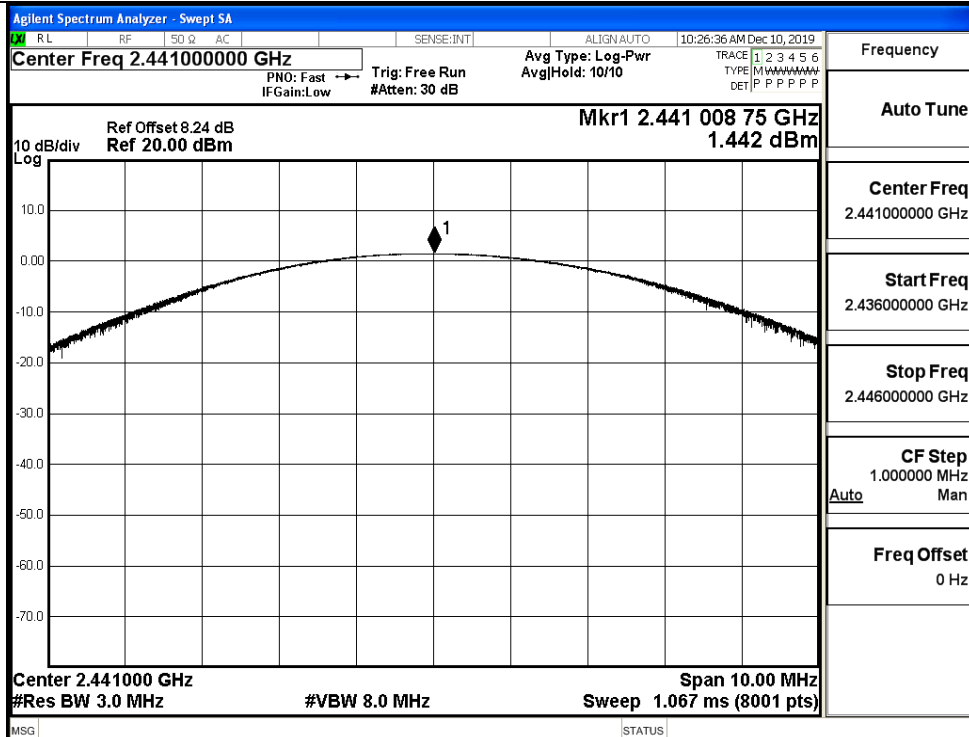
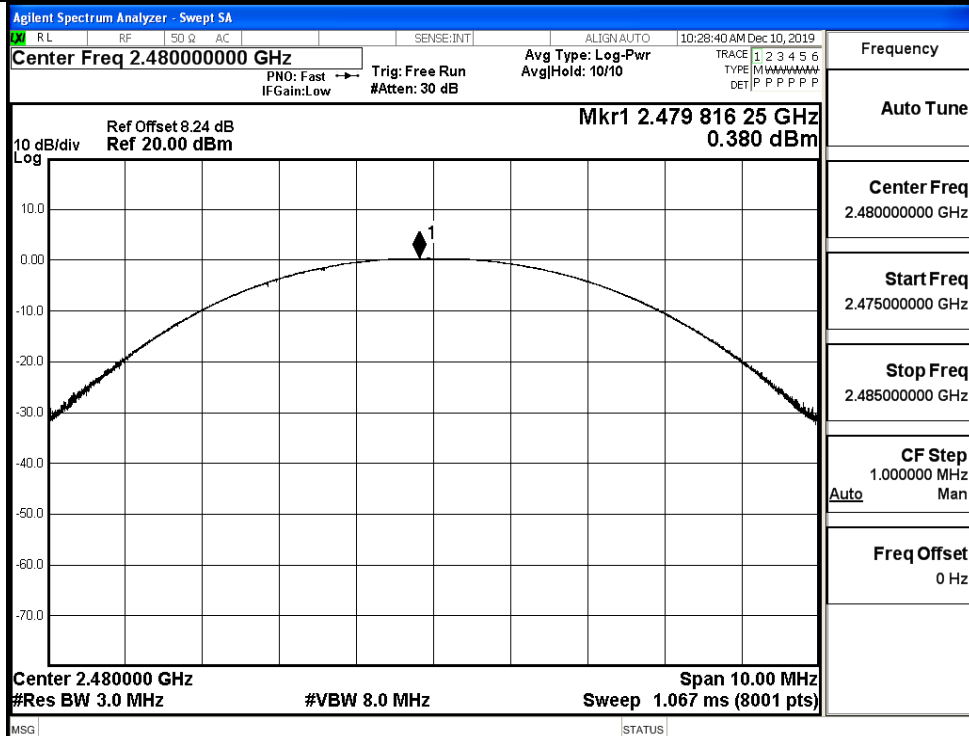


GFSK/MCH

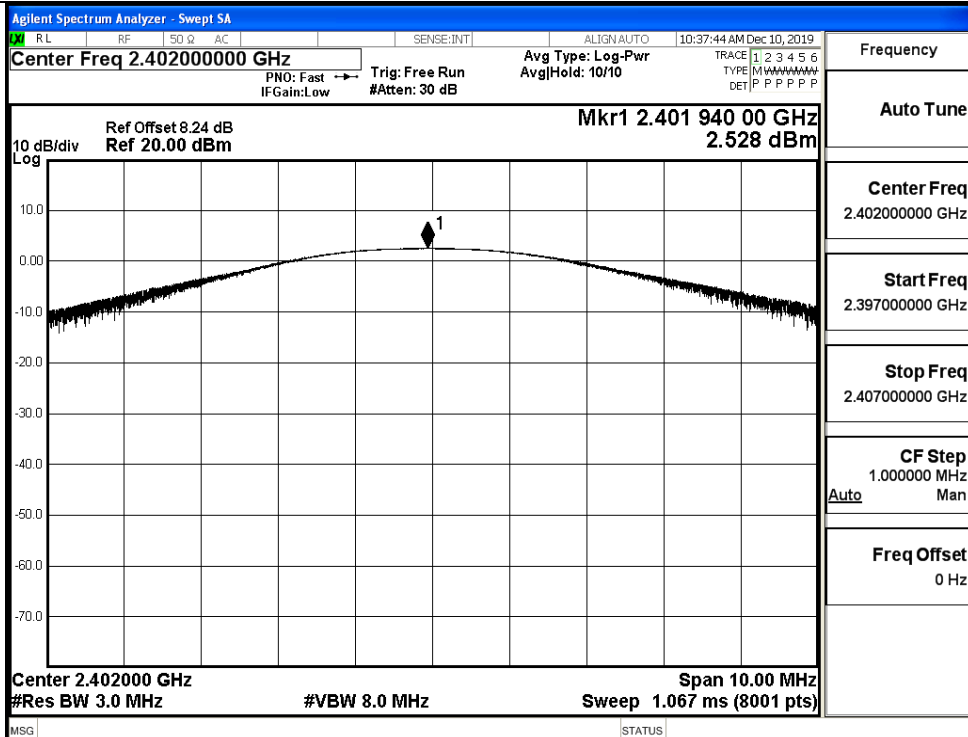


GFSK/HCH

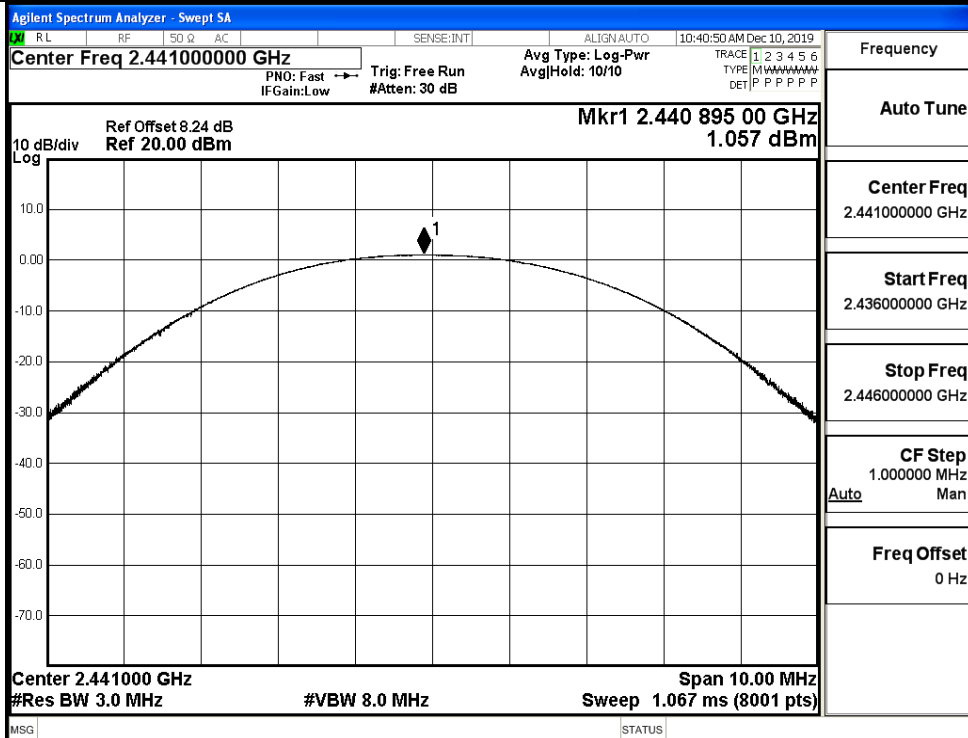
 $\pi/4$ DQPSK/LCH

$\pi/4$ DQPSK/MCH $\pi/4$ DQPSK/HCH

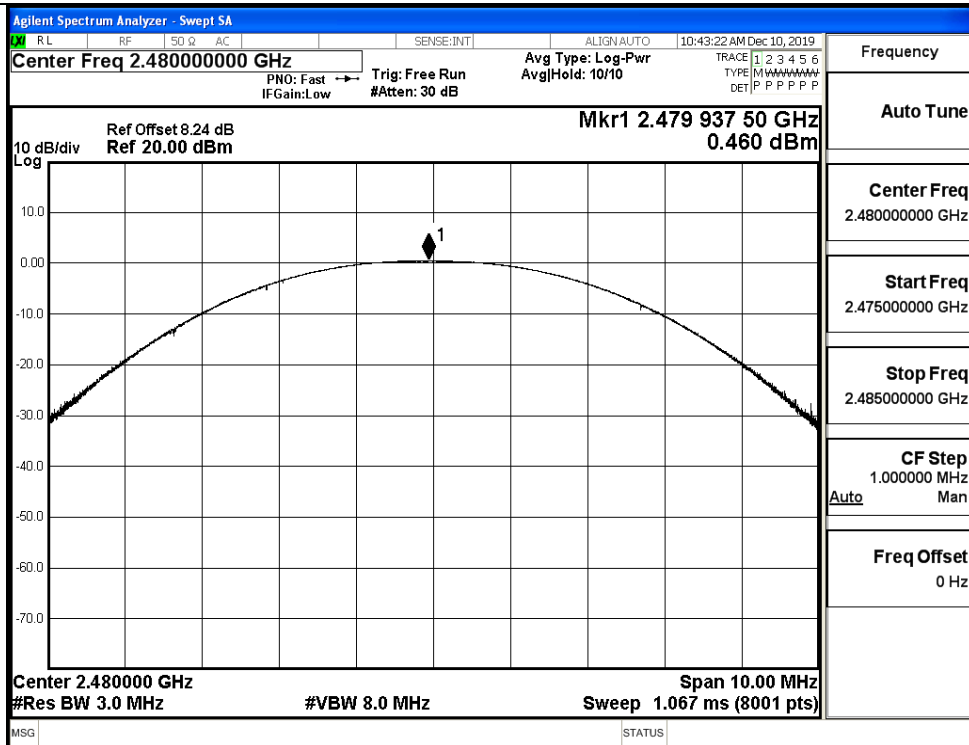
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

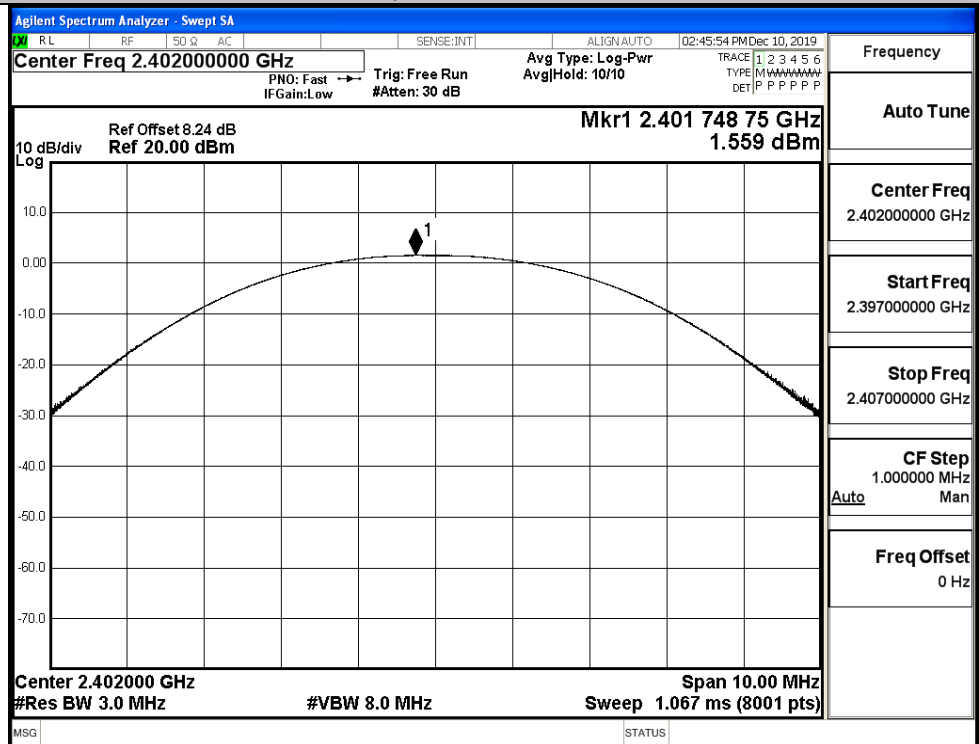


Right Ear

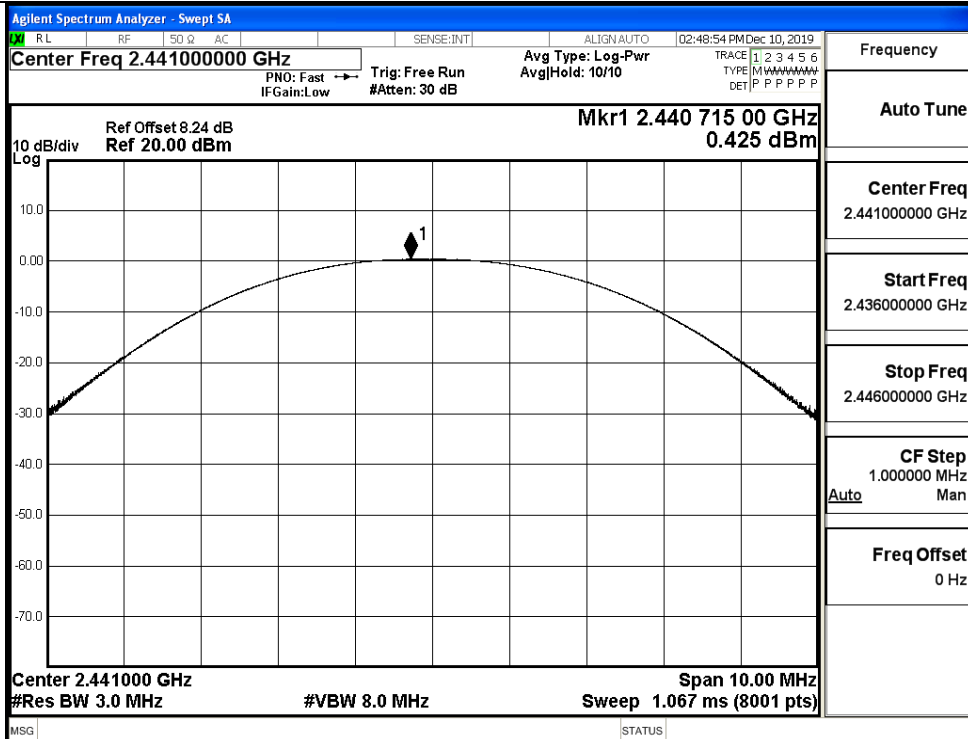
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.559	30	PASS
	MCH	0.425	30	PASS
	HCH	-0.385	30	PASS
$\pi/4$ DQPSK	LCH	1.945	21	PASS
	MCH	0.323	21	PASS
	HCH	-0.390	21	PASS
8DPSK	LCH	2.043	21	PASS
	MCH	0.361	21	PASS
	HCH	-0.391	21	PASS

Test Graphs

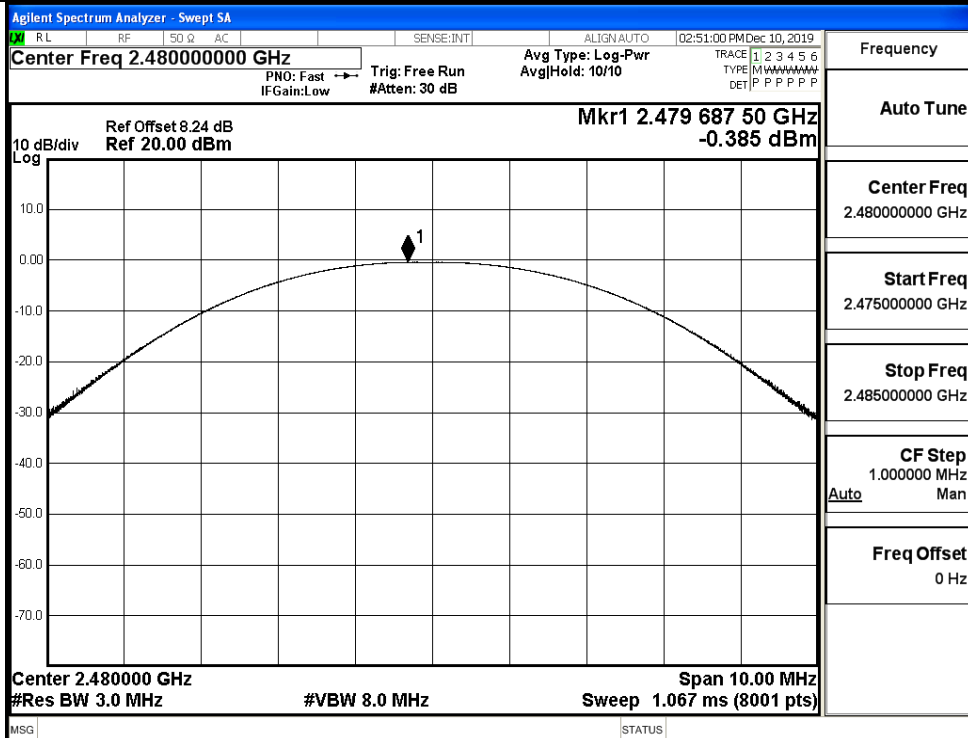
GFSK/LCH

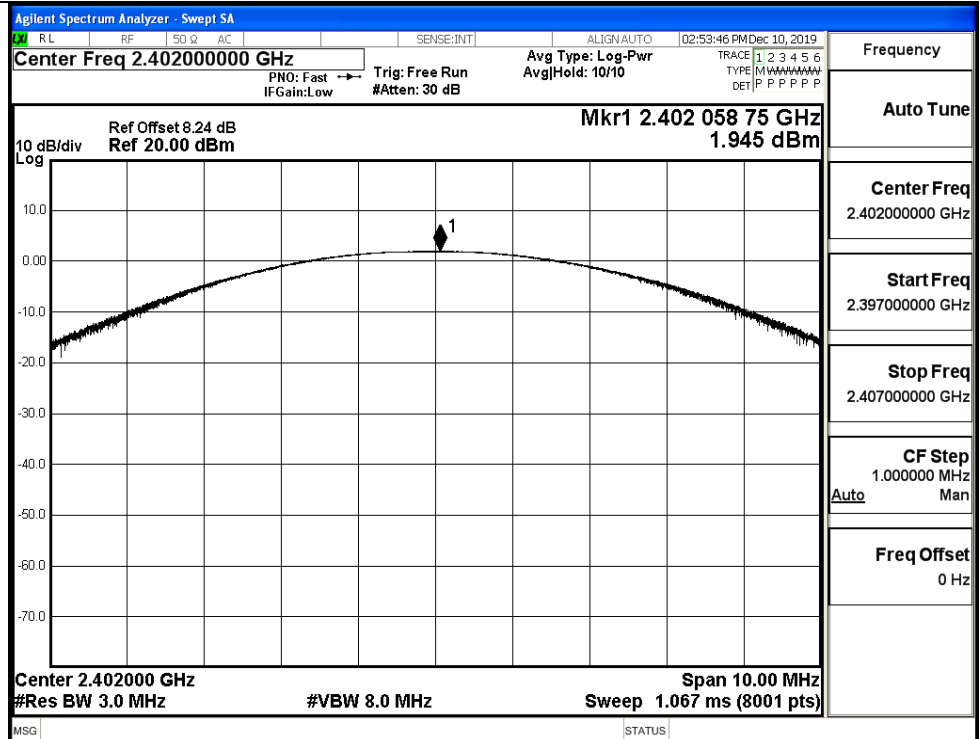
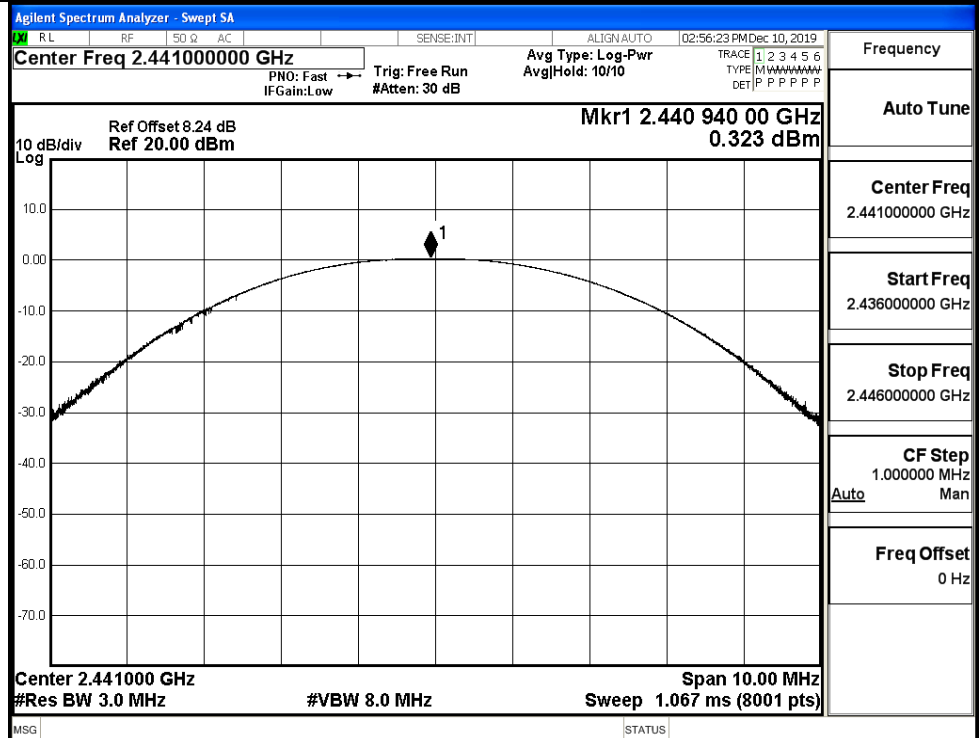


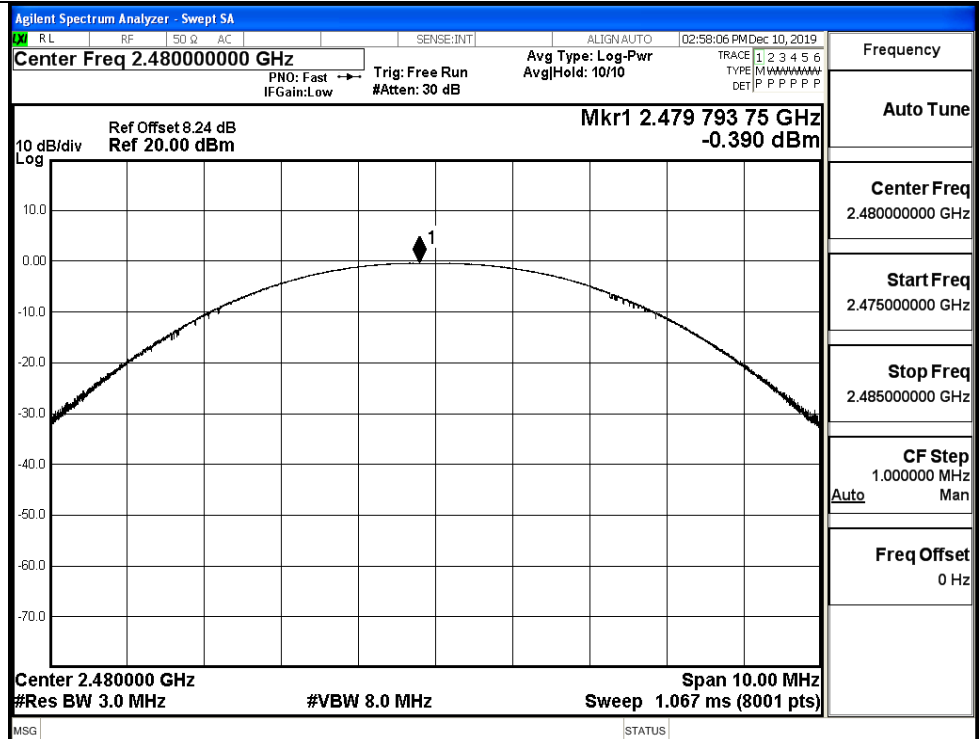
GFSK/MCH



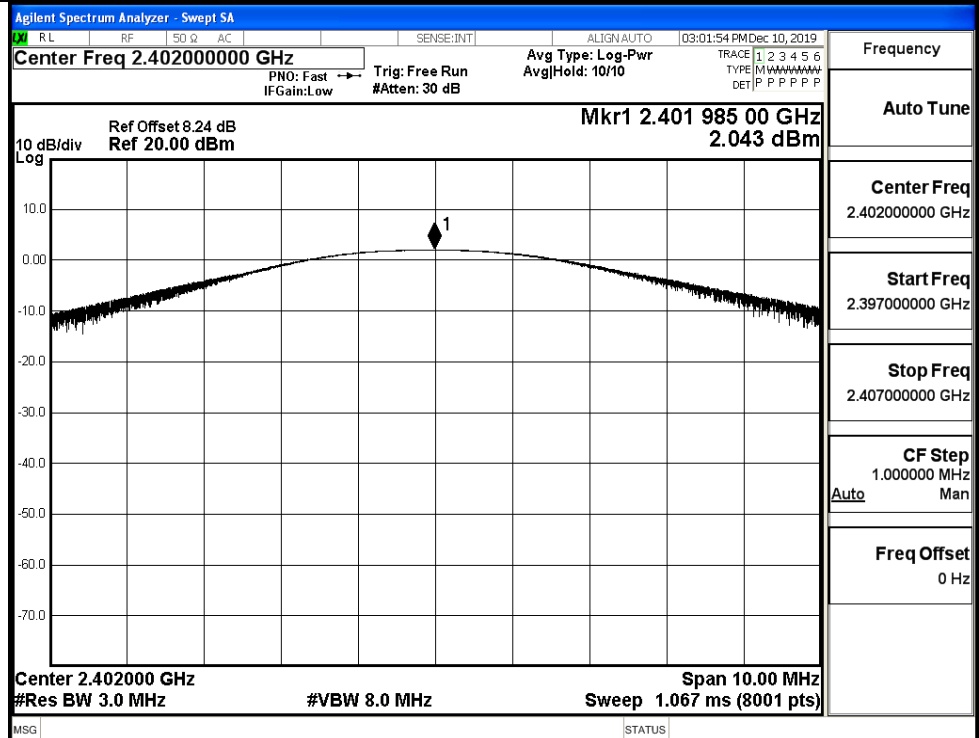
GFSK/HCH



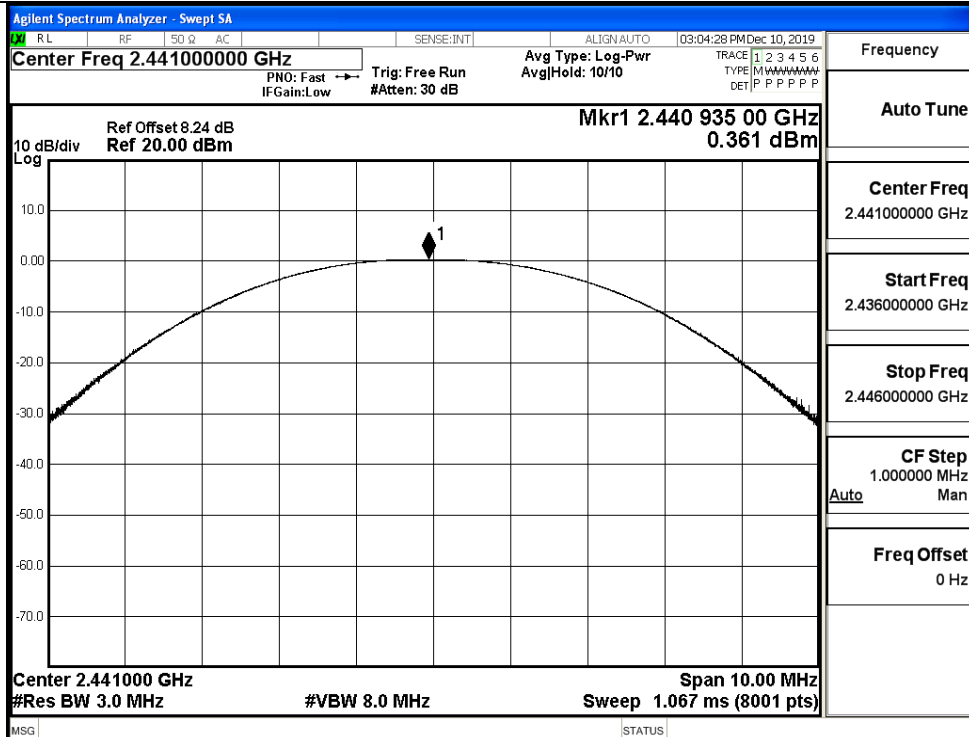
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

π /4DQPSK/HCH

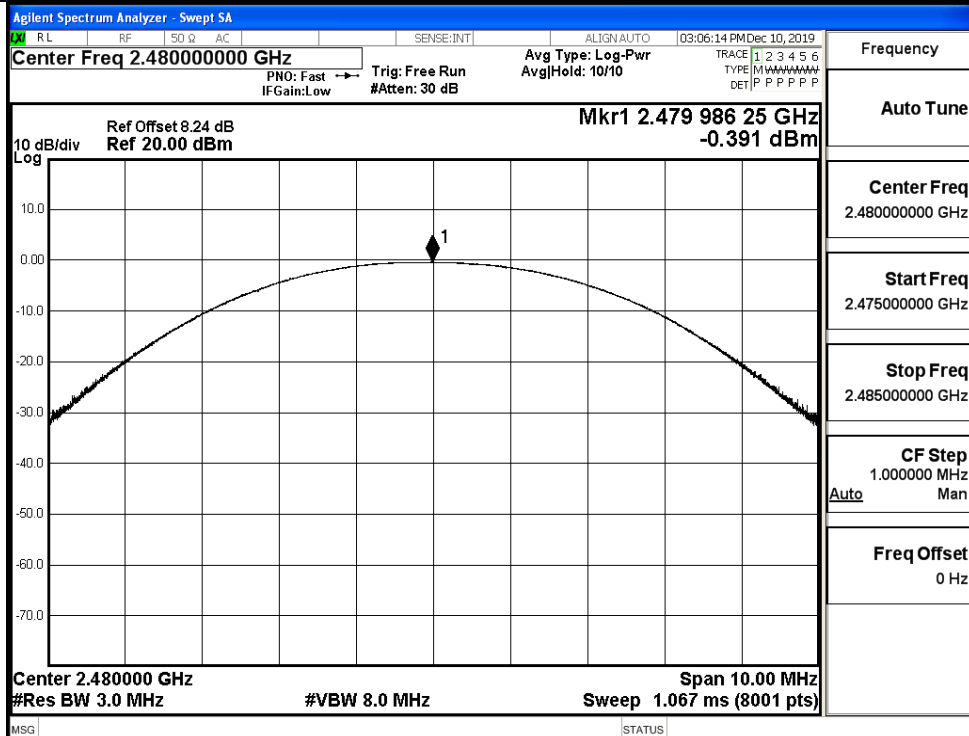
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

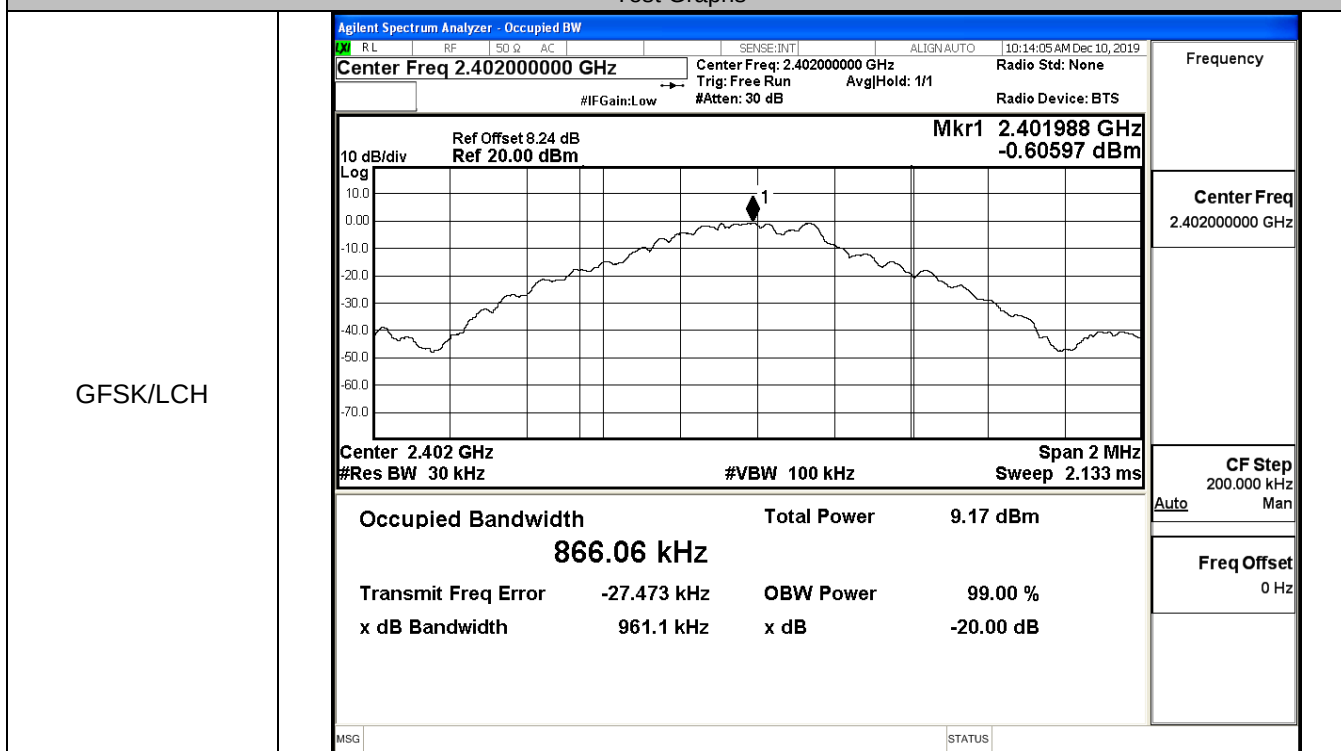


A.2 20dB Bandwidth

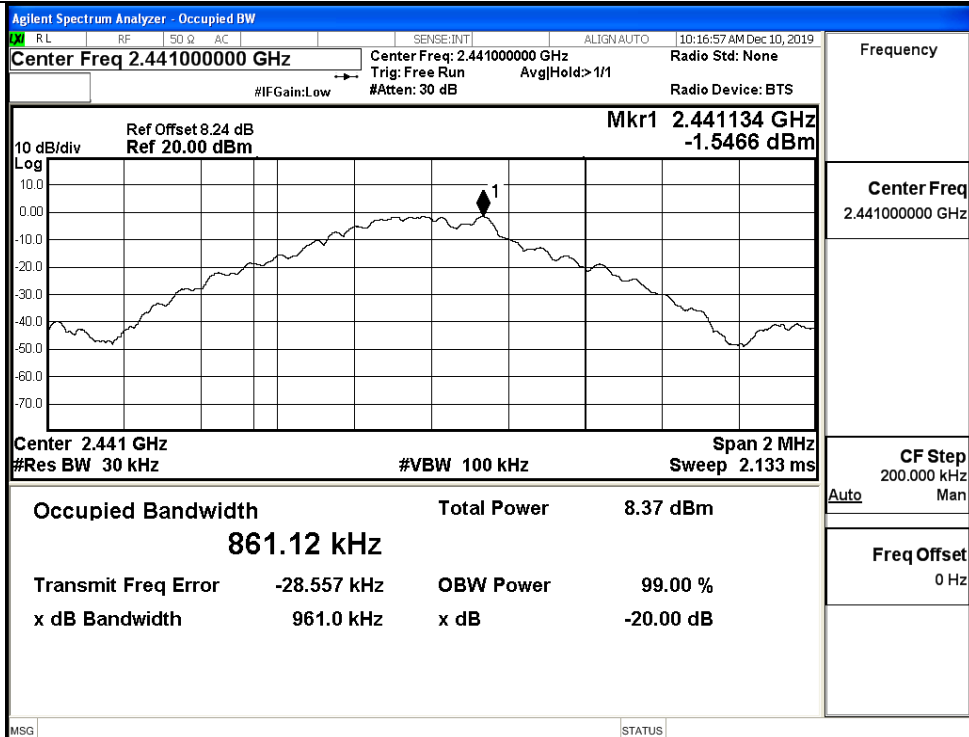
Left Ear

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9611	Not Specified	PASS
	MCH	0.9610	Not Specified	PASS
	HCH	0.9591	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.345	Not Specified	PASS
	MCH	1.346	Not Specified	PASS
	HCH	0.6883	Not Specified	PASS
8DPSK	LCH	1.316	Not Specified	PASS
	MCH	0.6970	Not Specified	PASS
	HCH	0.6926	Not Specified	PASS

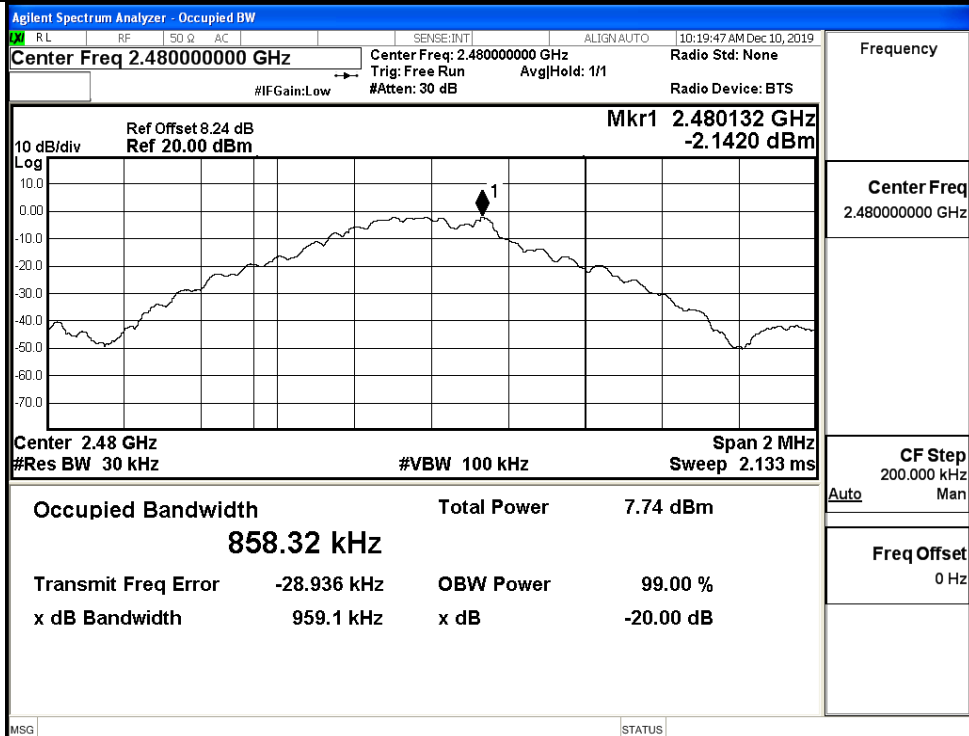
Test Graphs

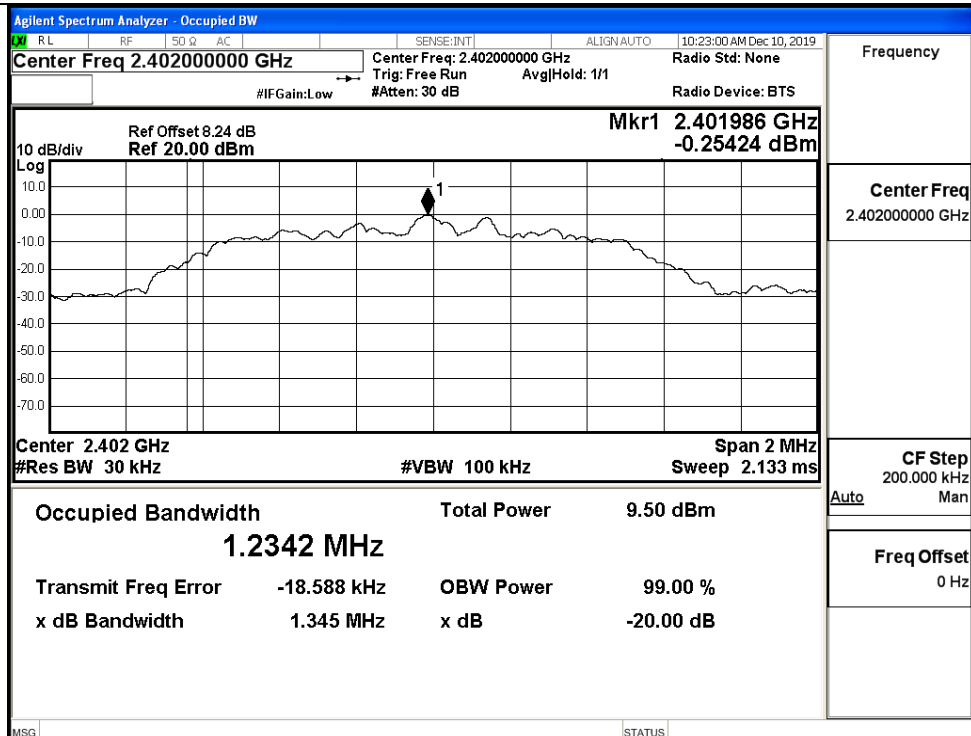
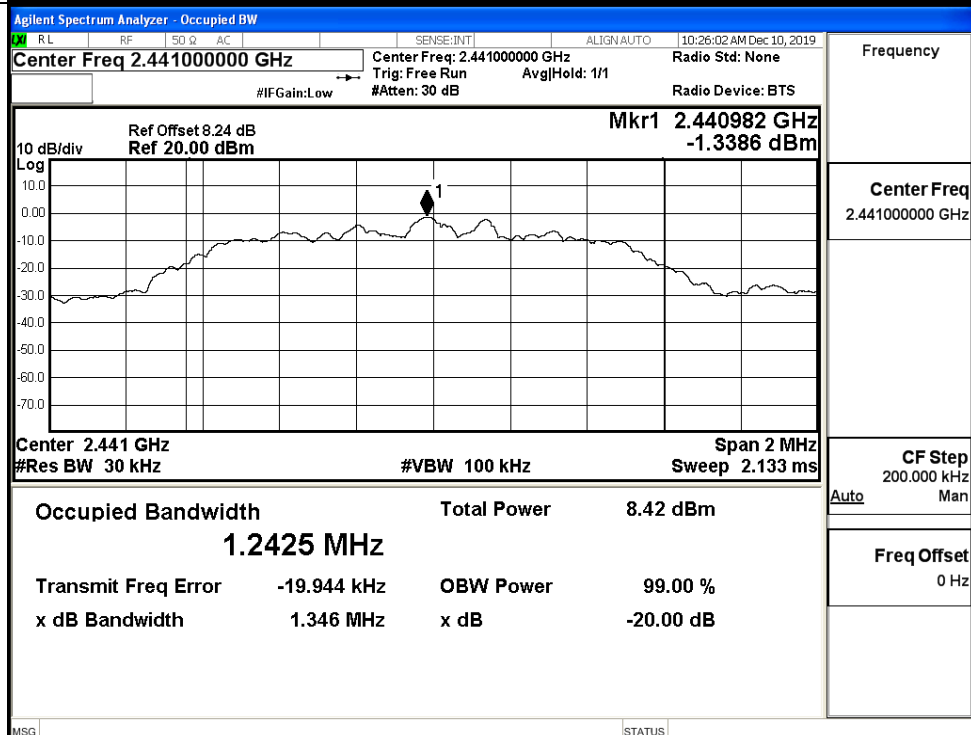


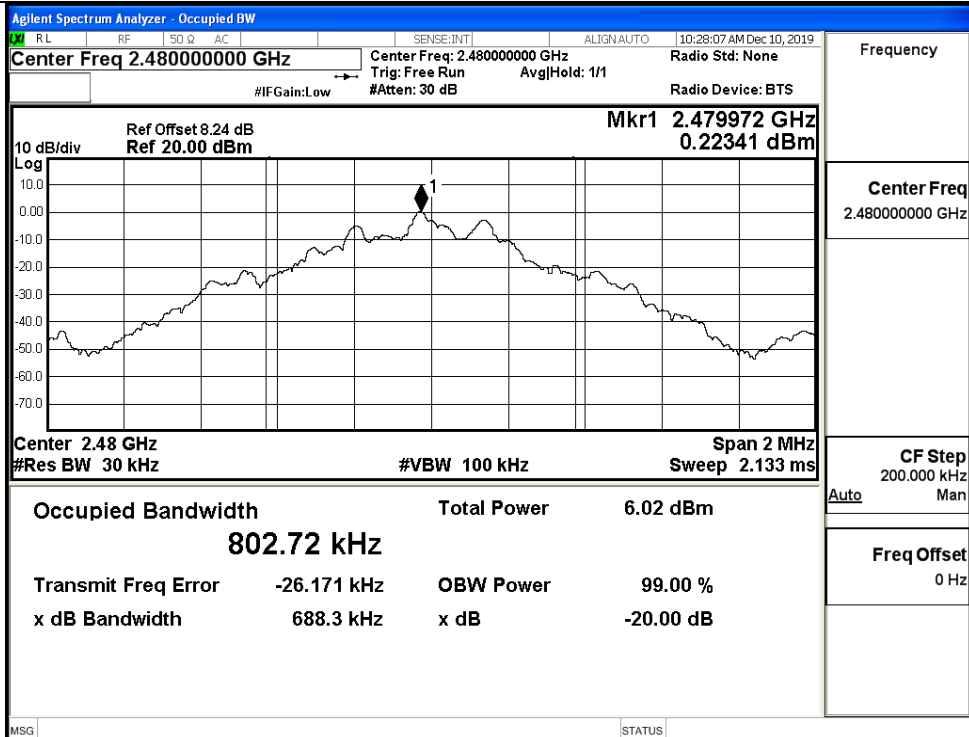
GFSK/MCH



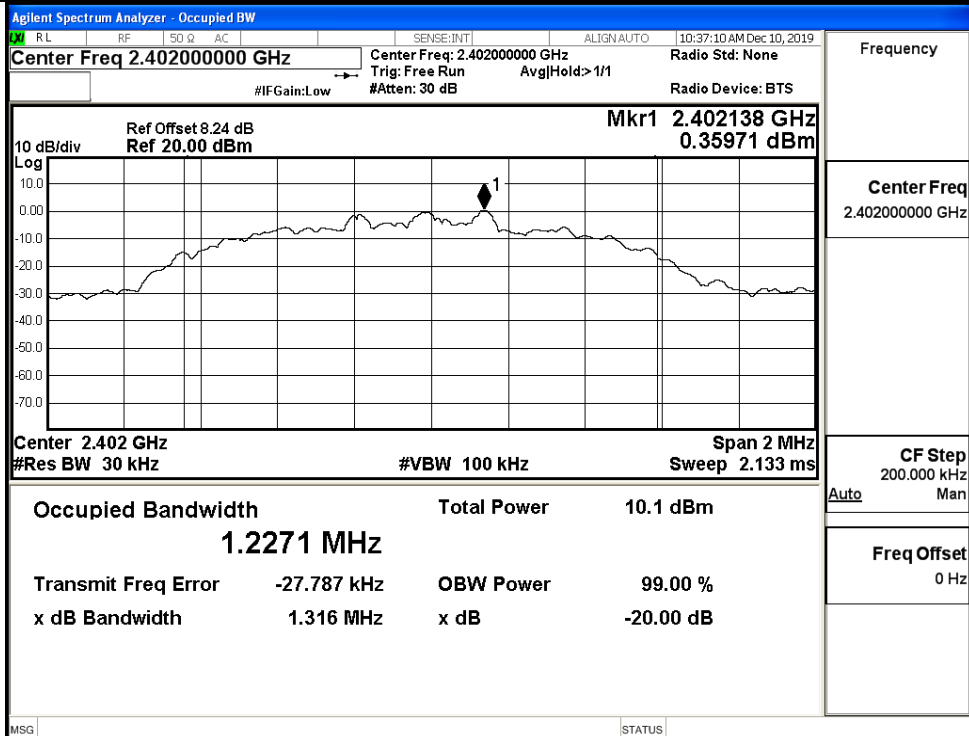
GFSK/HCH



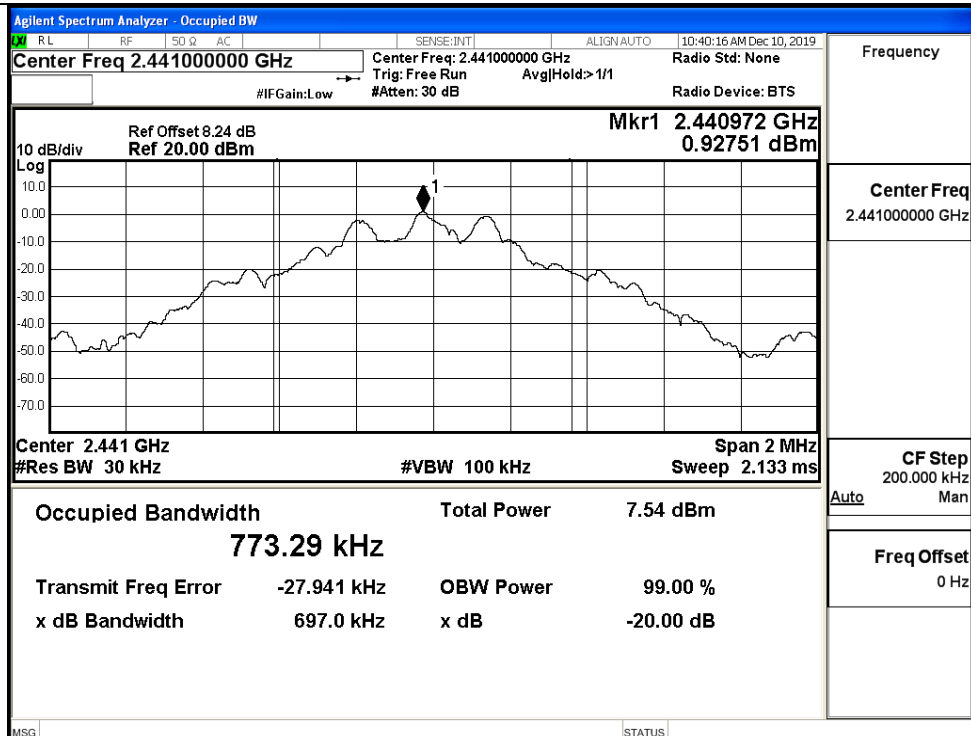
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

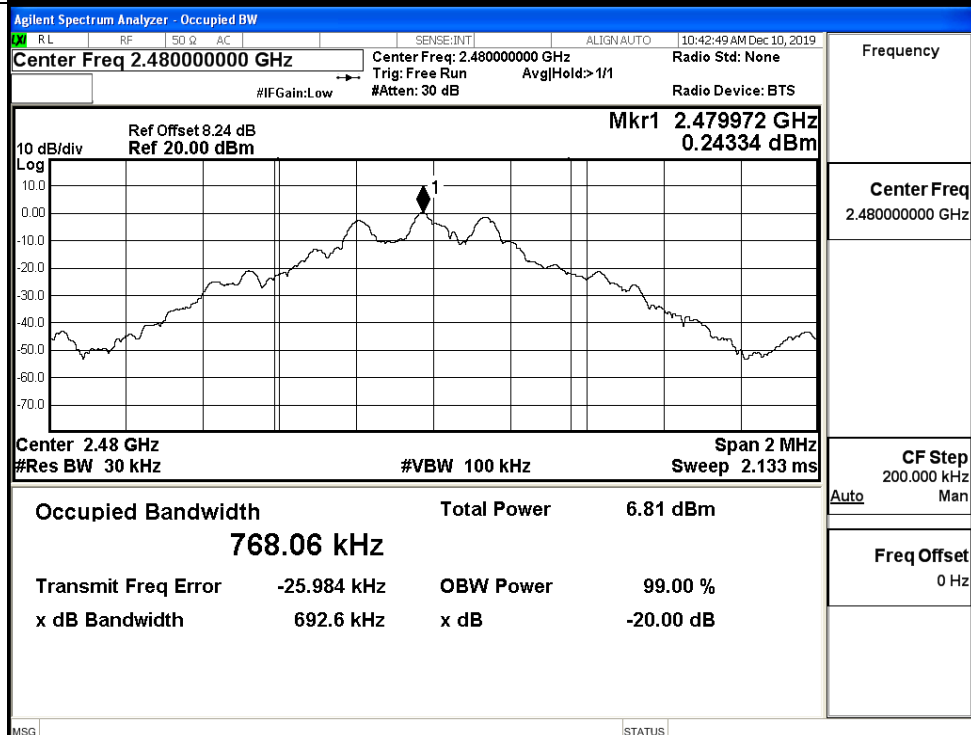
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

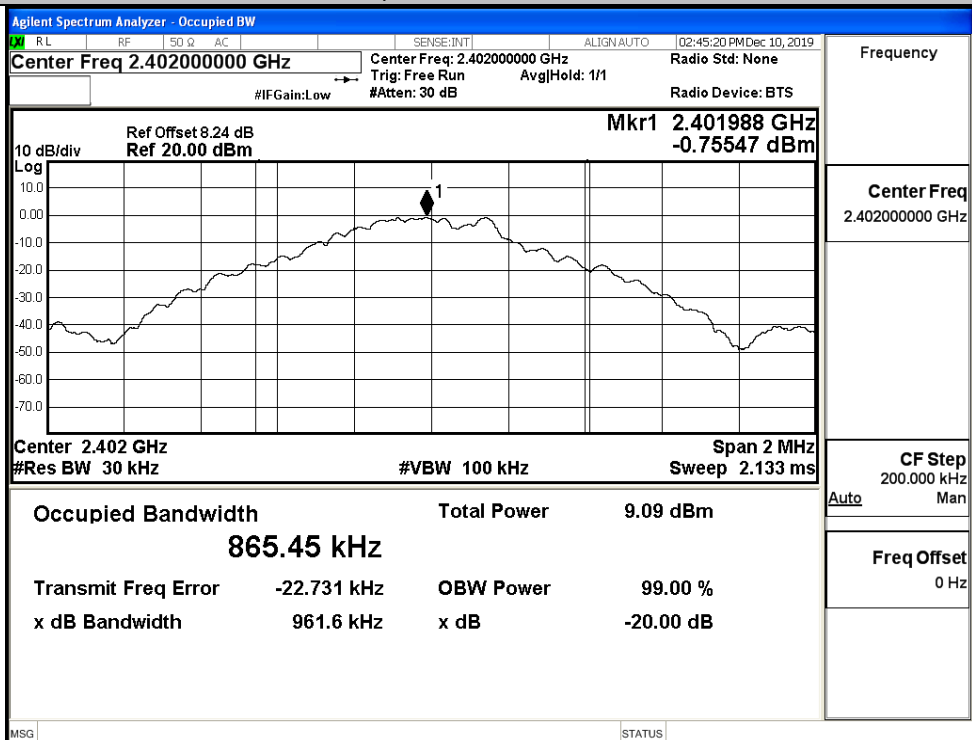


Right Ear

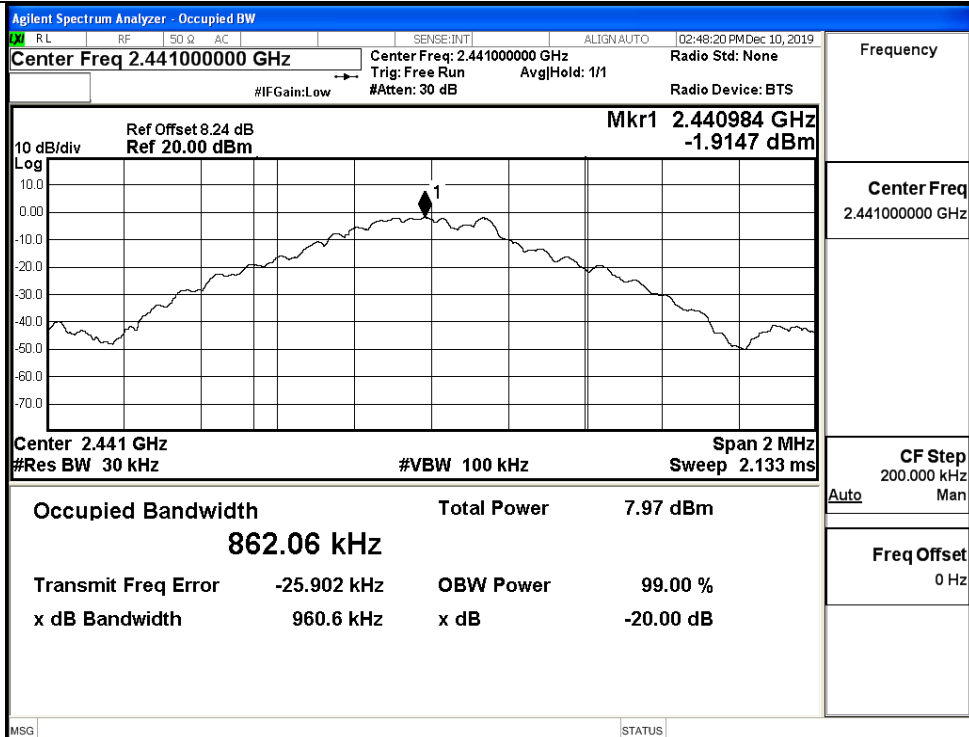
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9616	Not Specified	PASS
	MCH	0.9606	Not Specified	PASS
	HCH	0.9605	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.351	Not Specified	PASS
	MCH	0.6983	Not Specified	PASS
	HCH	0.6944	Not Specified	PASS
8DPSK	LCH	1.315	Not Specified	PASS
	MCH	0.6943	Not Specified	PASS
	HCH	0.6914	Not Specified	PASS

Test Graphs

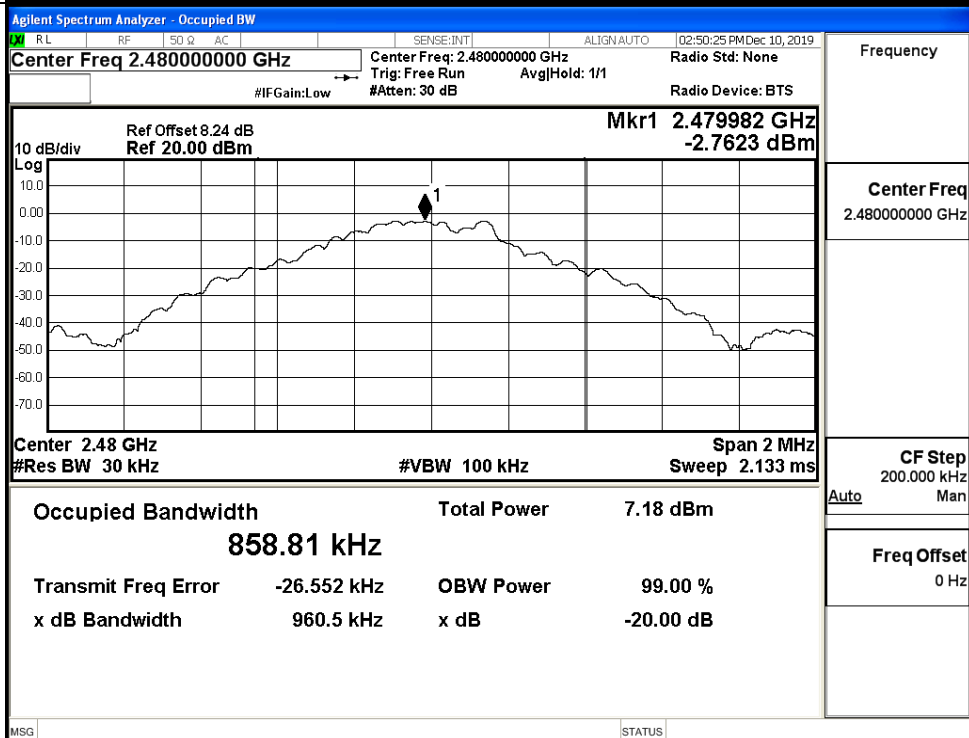
GFSK/LCH

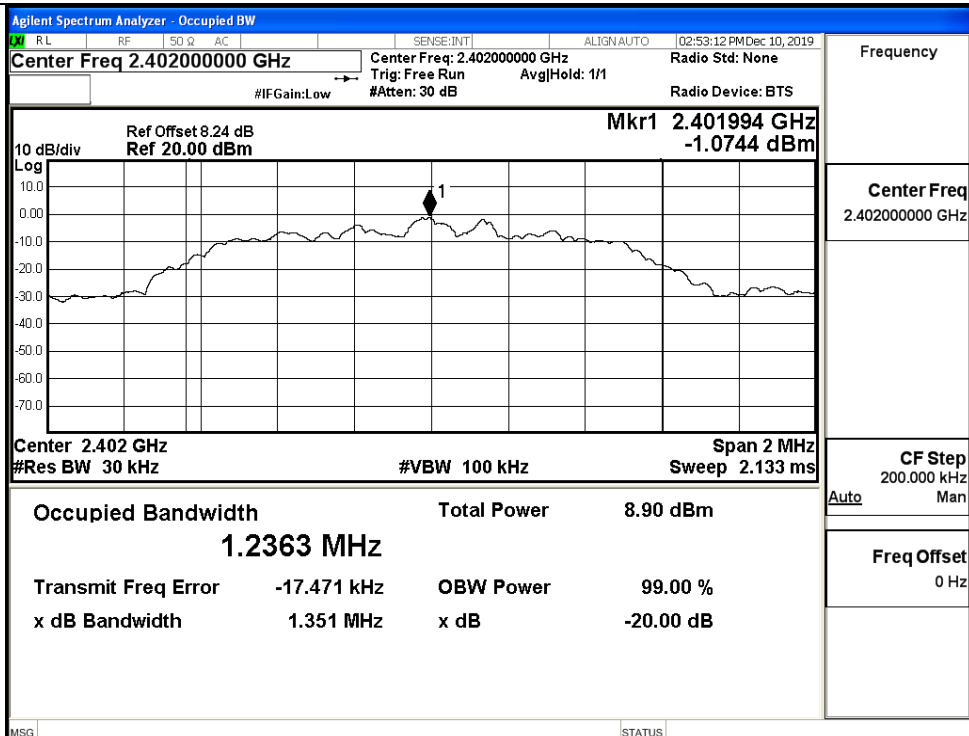
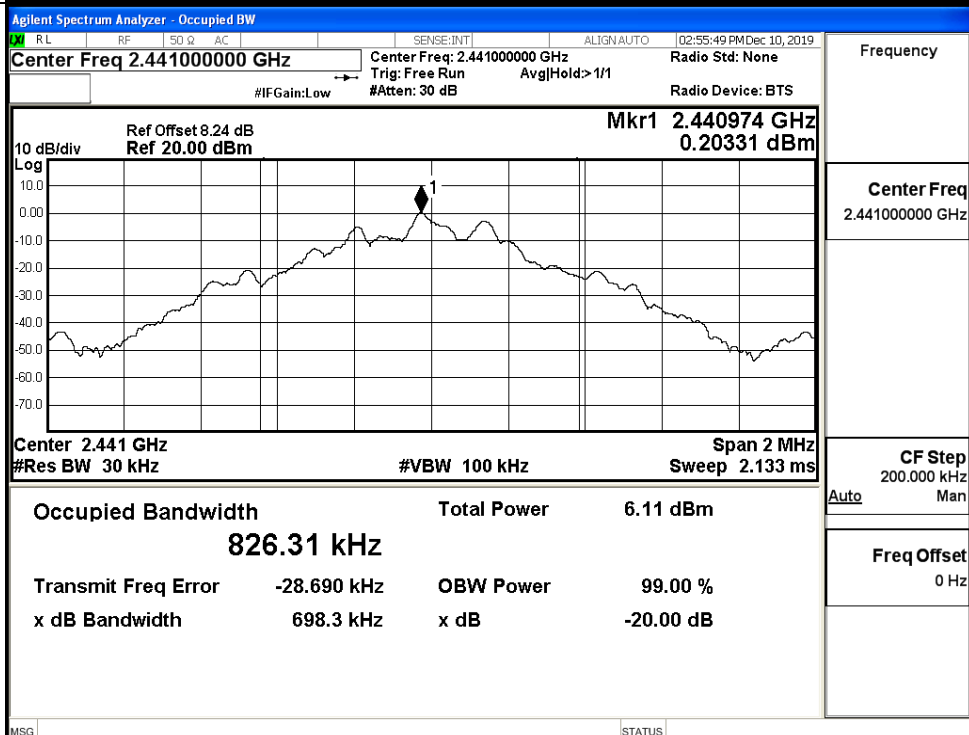


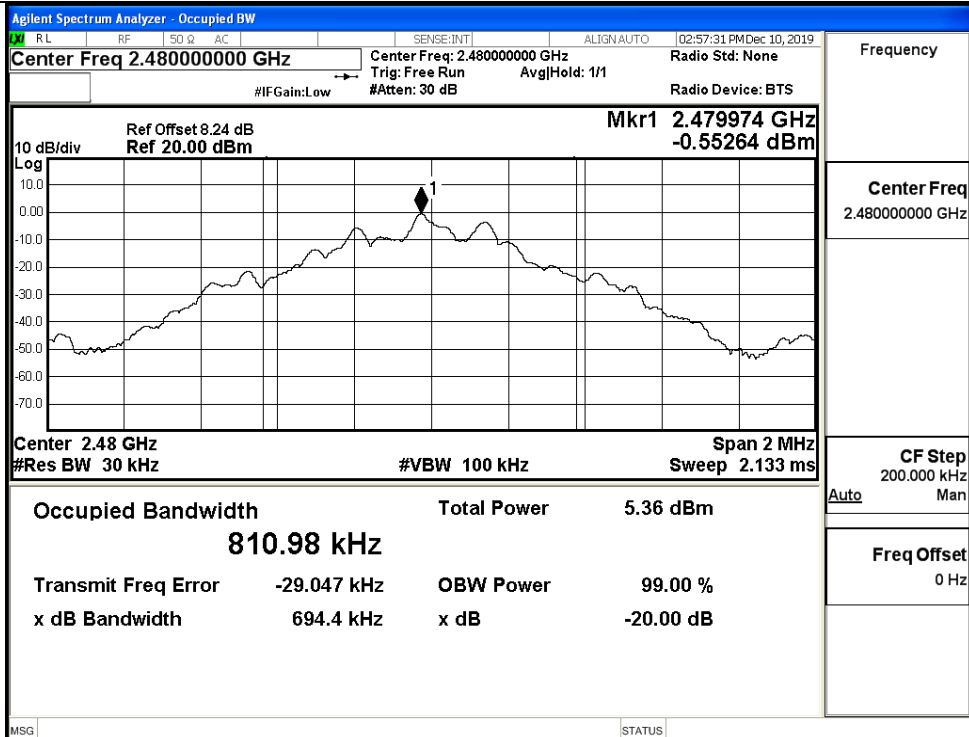
GFSK/MCH



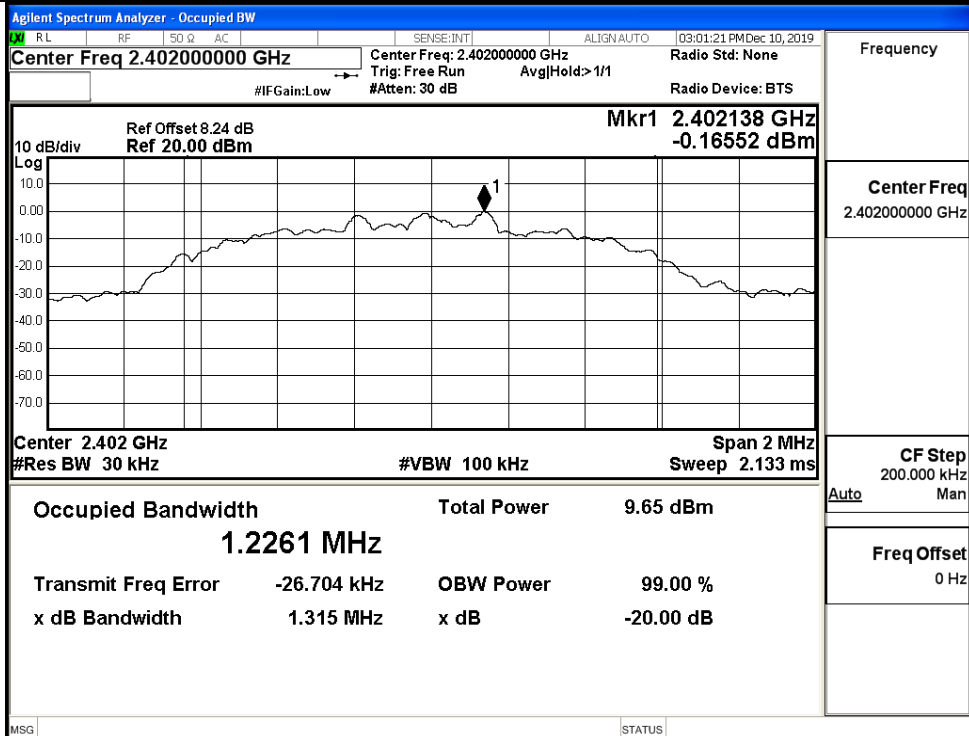
GFSK/HCH



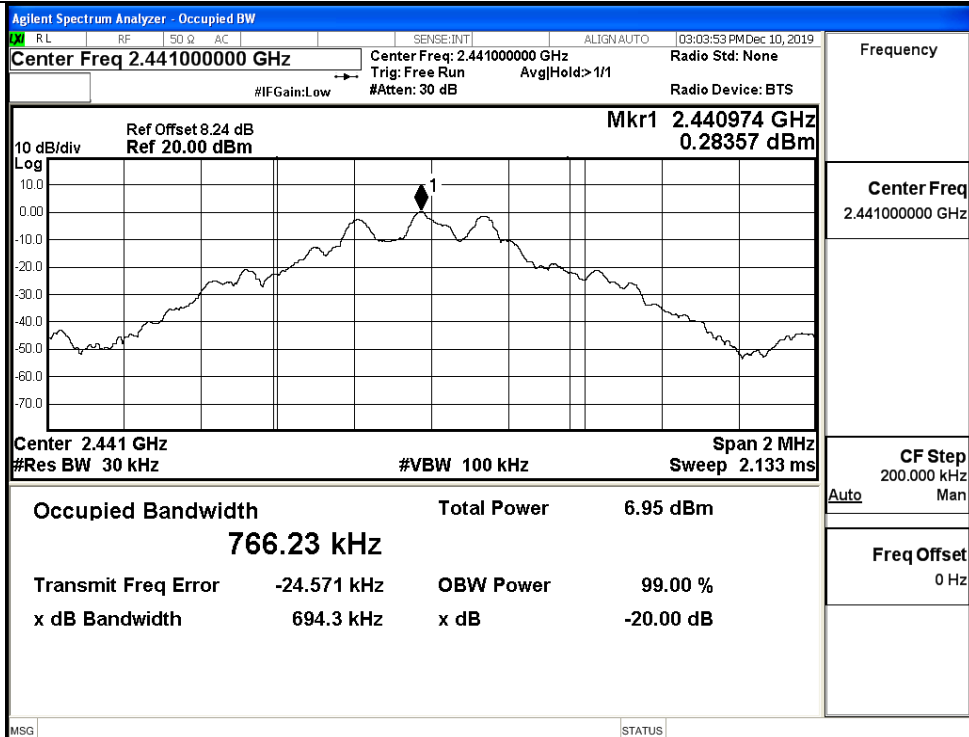
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

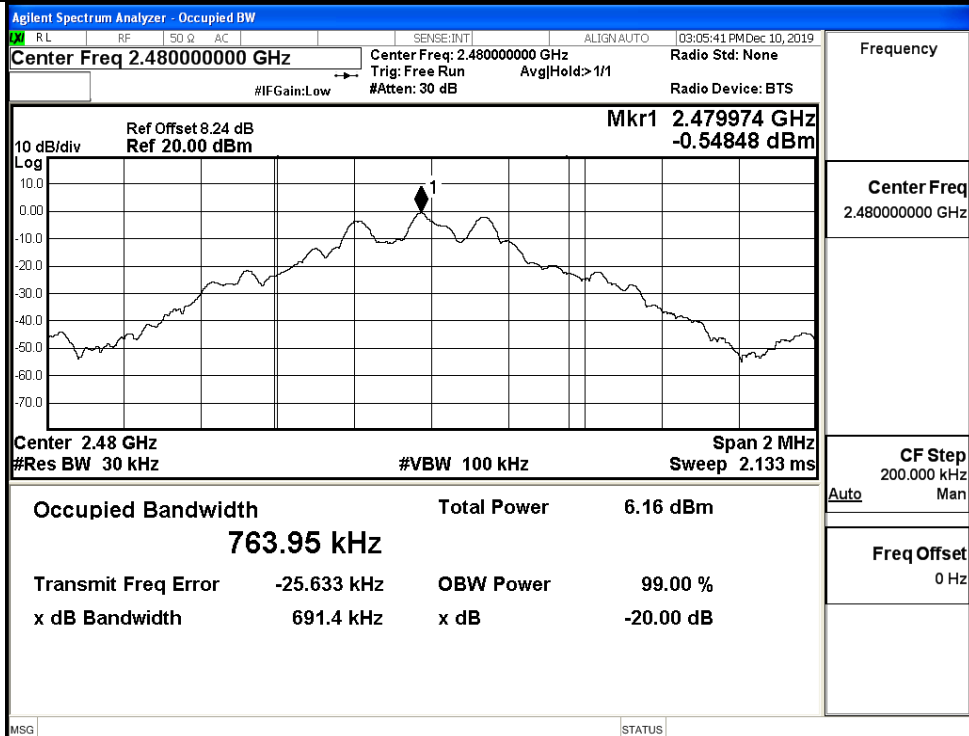
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH



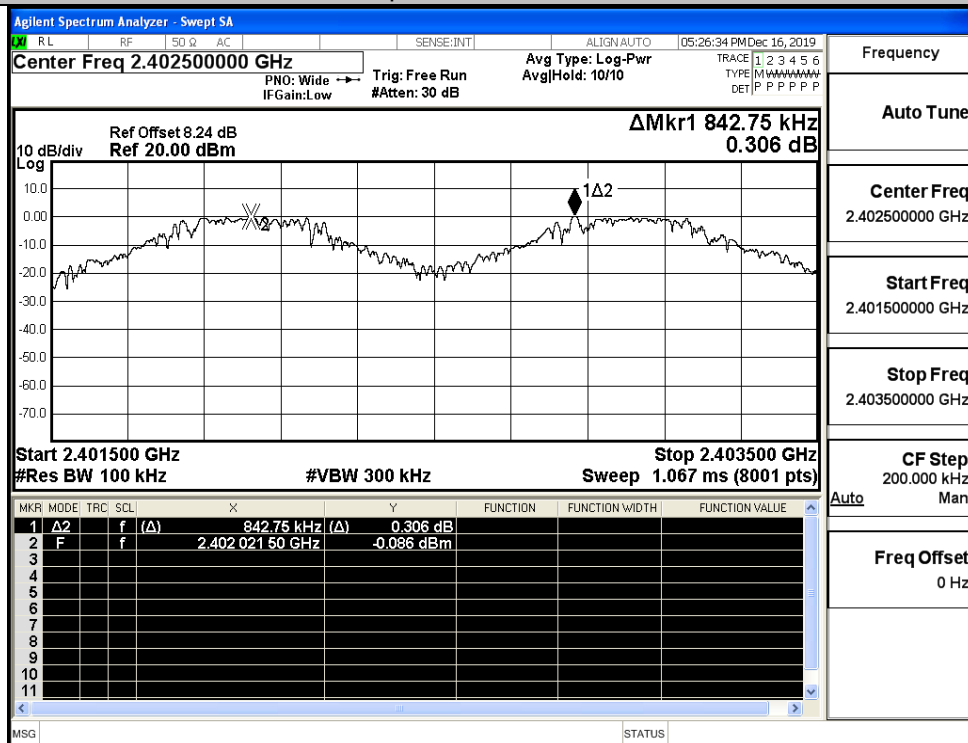
A.3 Carrier Frequency Separation

Left Ear

Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.843	0.641	PASS
	MCH	0.982	0.641	PASS
	HCH	1.132	0.641	PASS
$\pi/4$ DQPSK	LCH	1.076	0.897	PASS
	MCH	1.026	0.897	PASS
	HCH	0.986	0.897	PASS
8DPSK	LCH	1.190	0.877	PASS
	MCH	1.036	0.877	PASS
	HCH	1.212	0.877	PASS

Test Graphs

GFSK/LCH



Frequency

Auto Tune

Center Freq

2.402500000 GHz

Start Freq

2.401500000 GHz

Stop Freq

2.403500000 GHz

CF Step

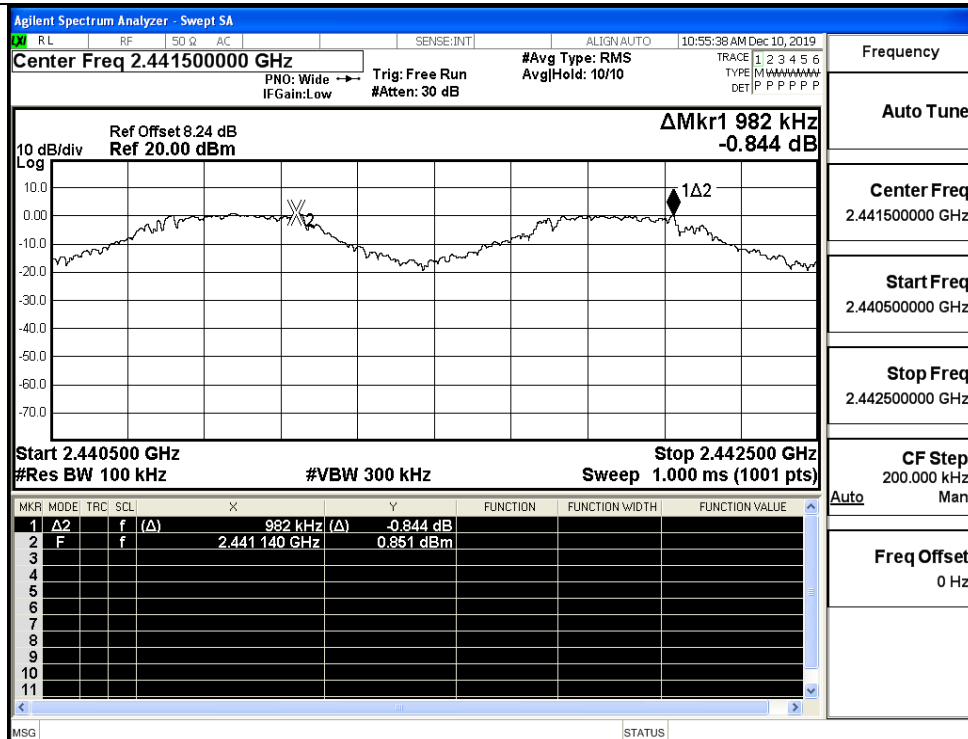
200.000 kHz

Man

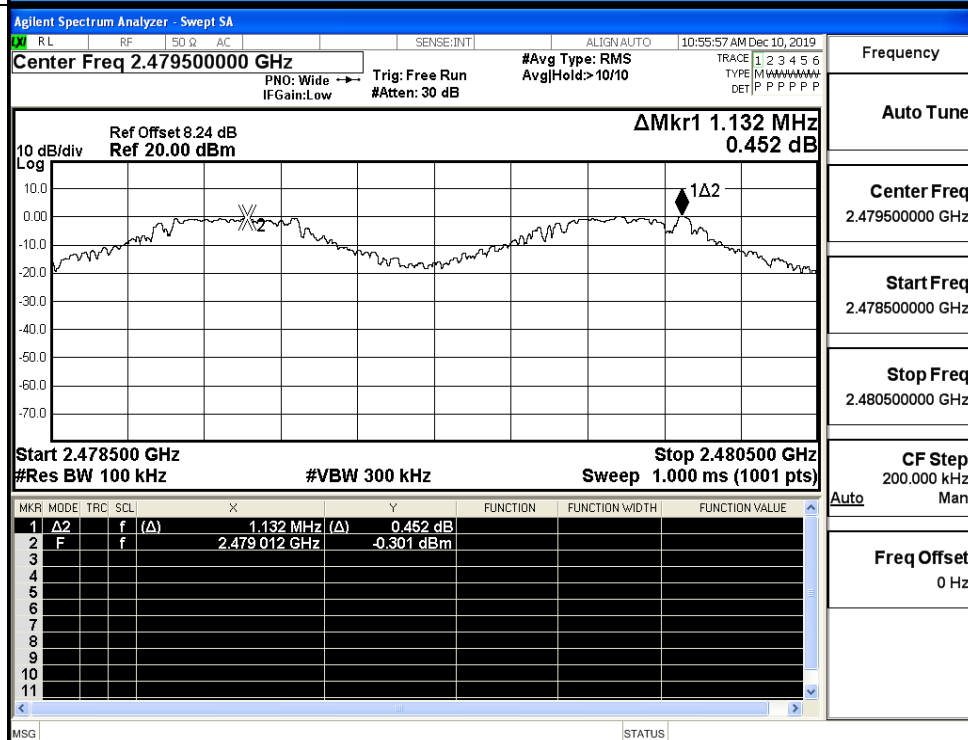
Freq Offset

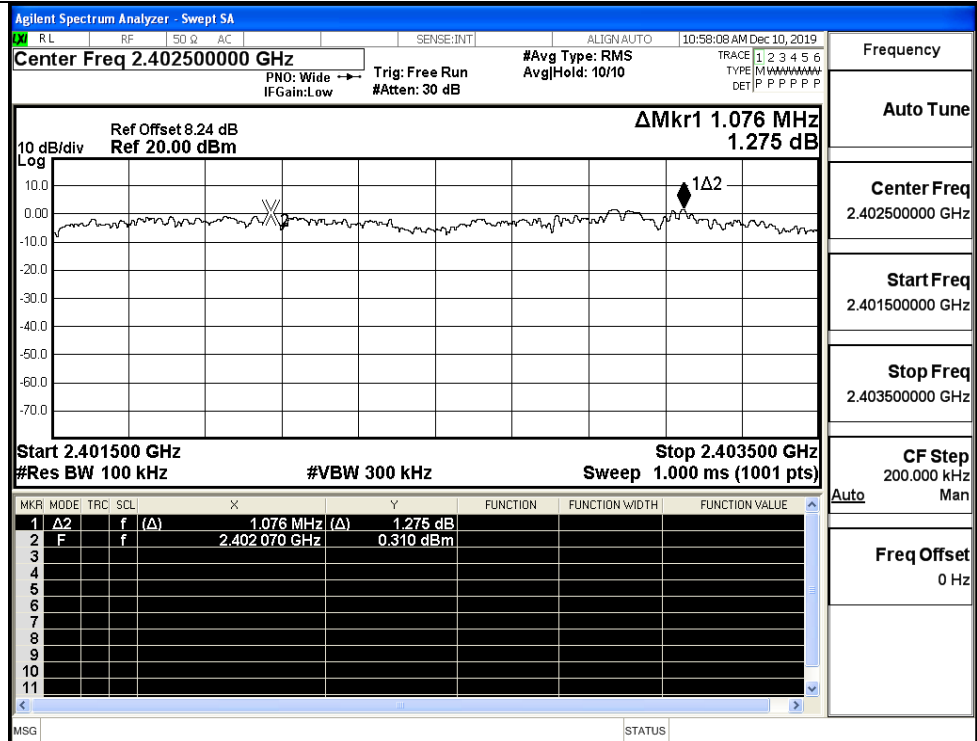
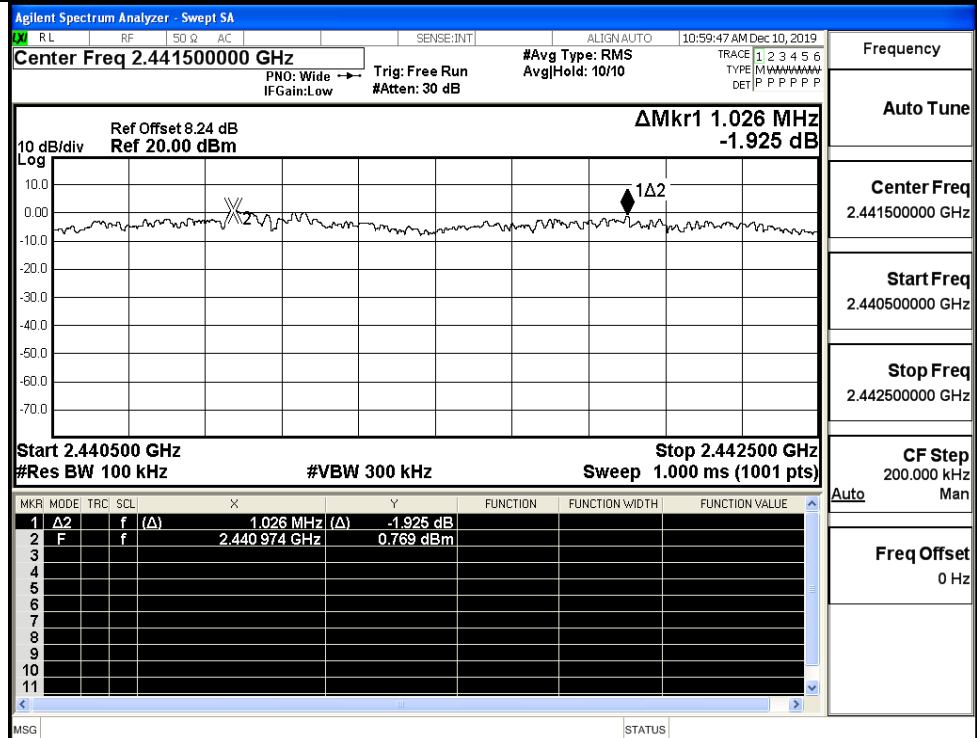
0 Hz

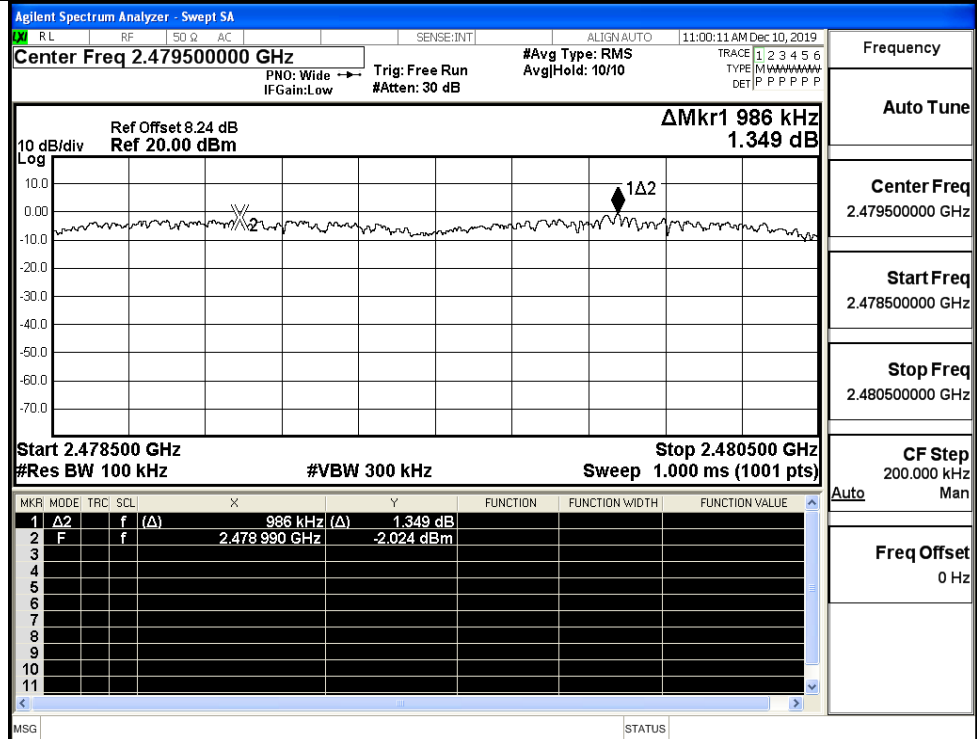
GFSK/MCH



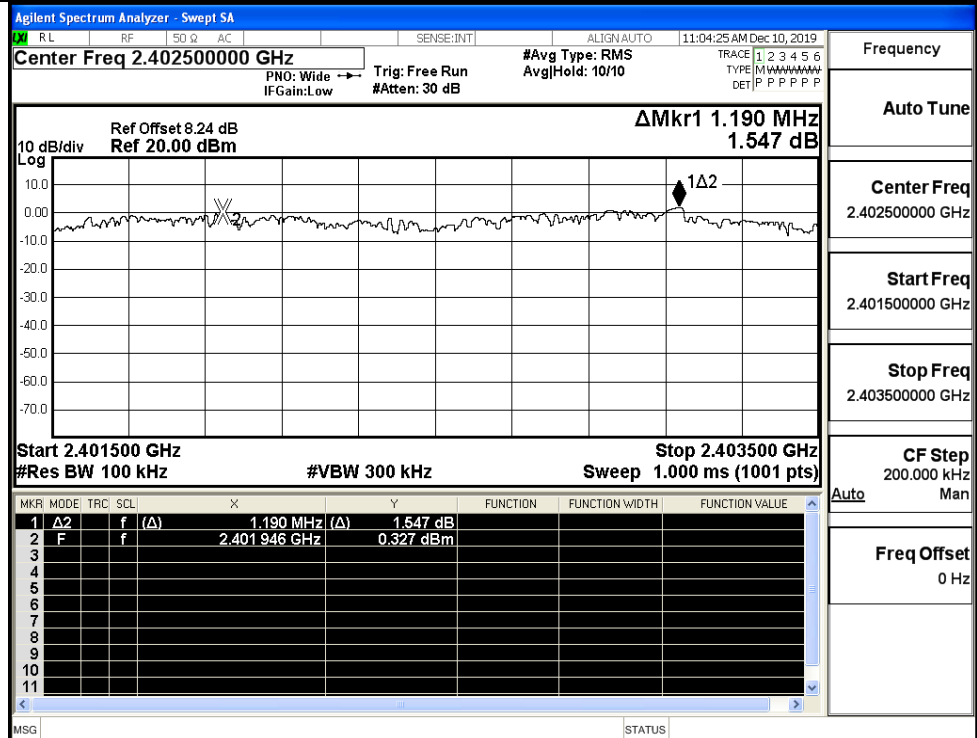
GFSK/HCH



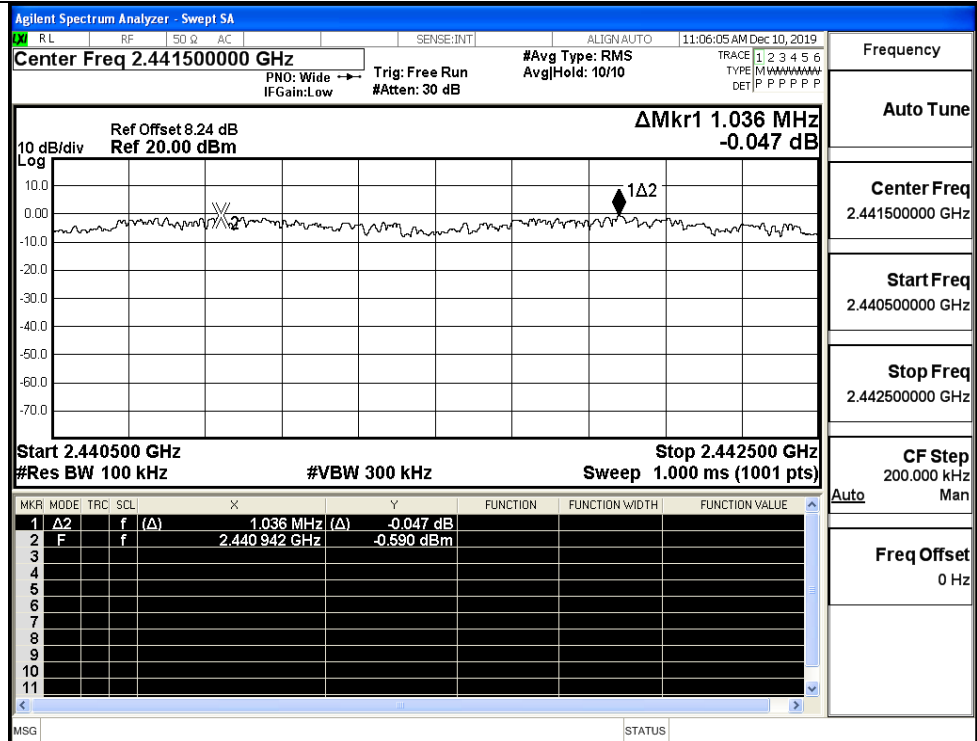
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

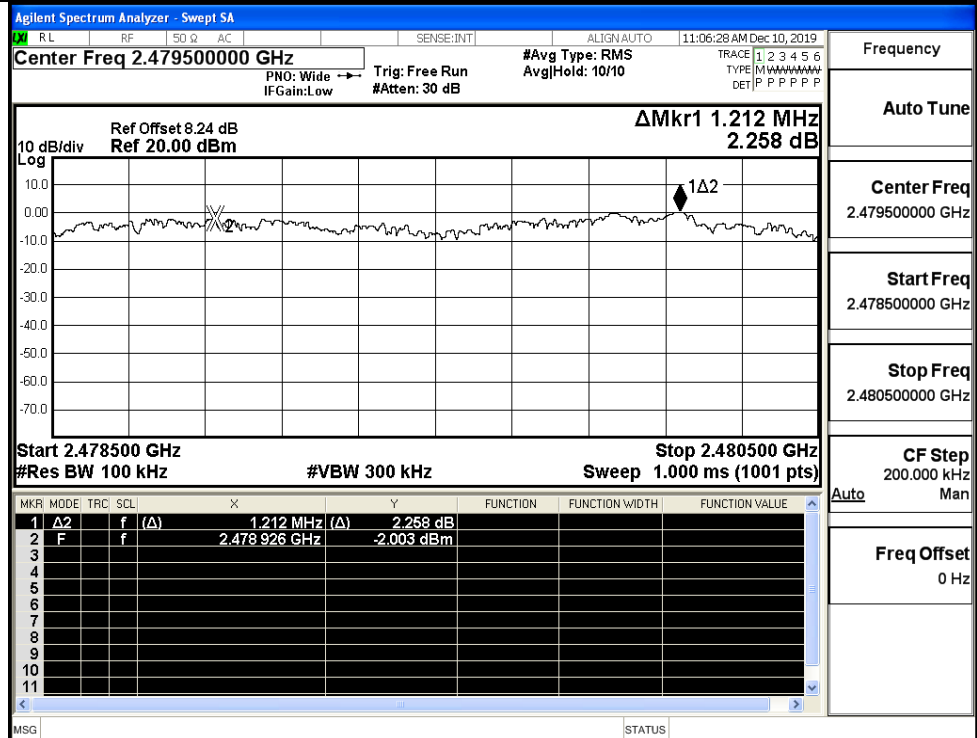
8DPSK/LCH



8DPSK/MCH



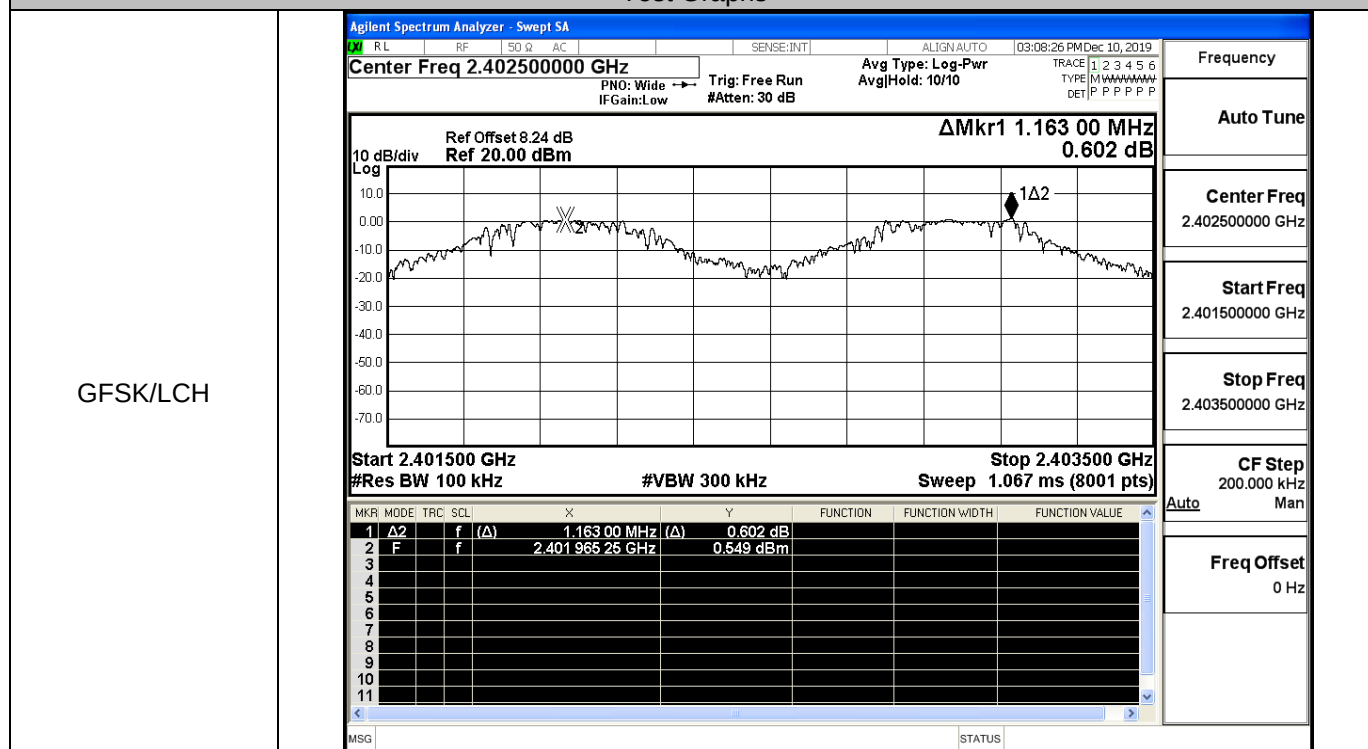
8DPSK/HCH



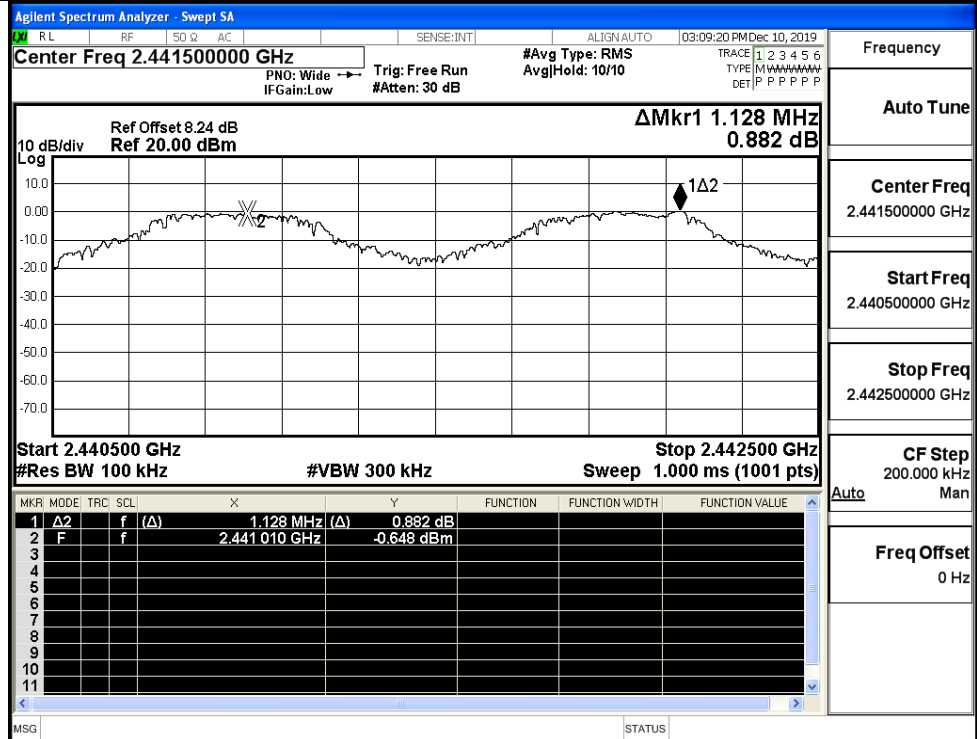
Right Ear

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.163	0.641	PASS
	MCH	1.128	0.641	PASS
	HCH	0.860	0.641	PASS
π /4DQPSK	LCH	0.974	0.901	PASS
	MCH	1.098	0.901	PASS
	HCH	0.994	0.901	PASS
8DPSK	LCH	1.068	0.877	PASS
	MCH	0.918	0.877	PASS
	HCH	1.168	0.877	PASS

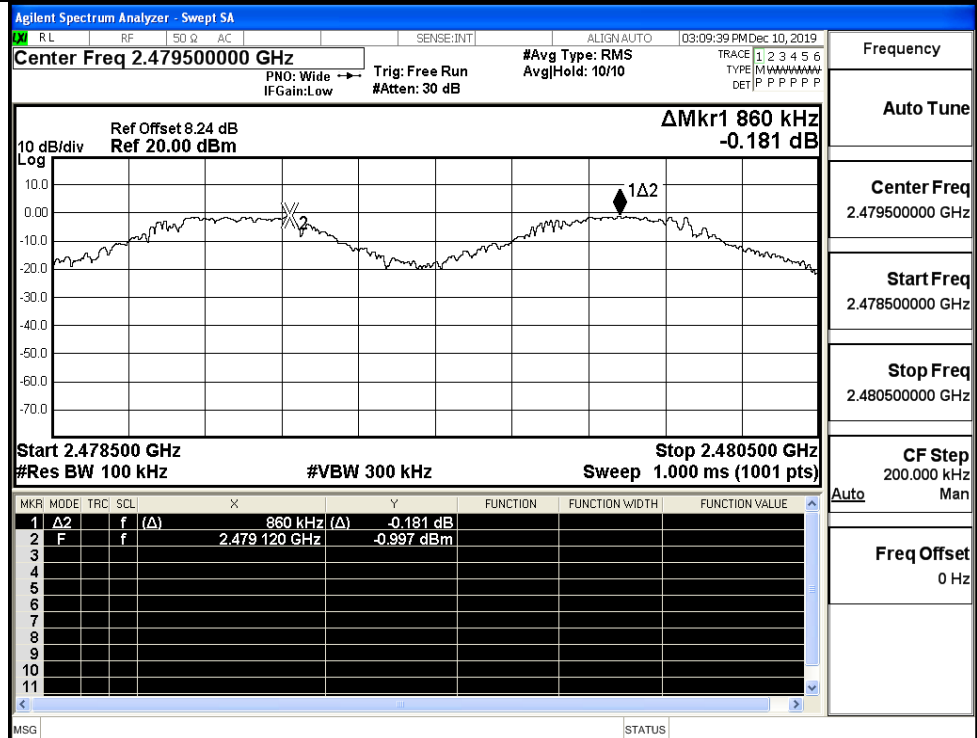
Test Graphs

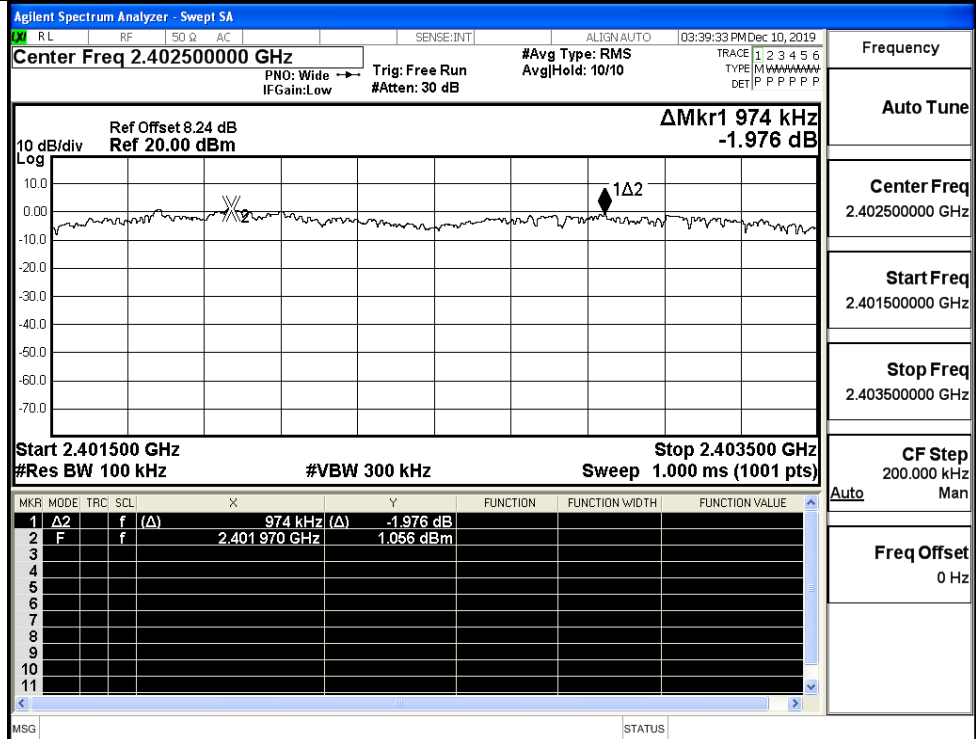
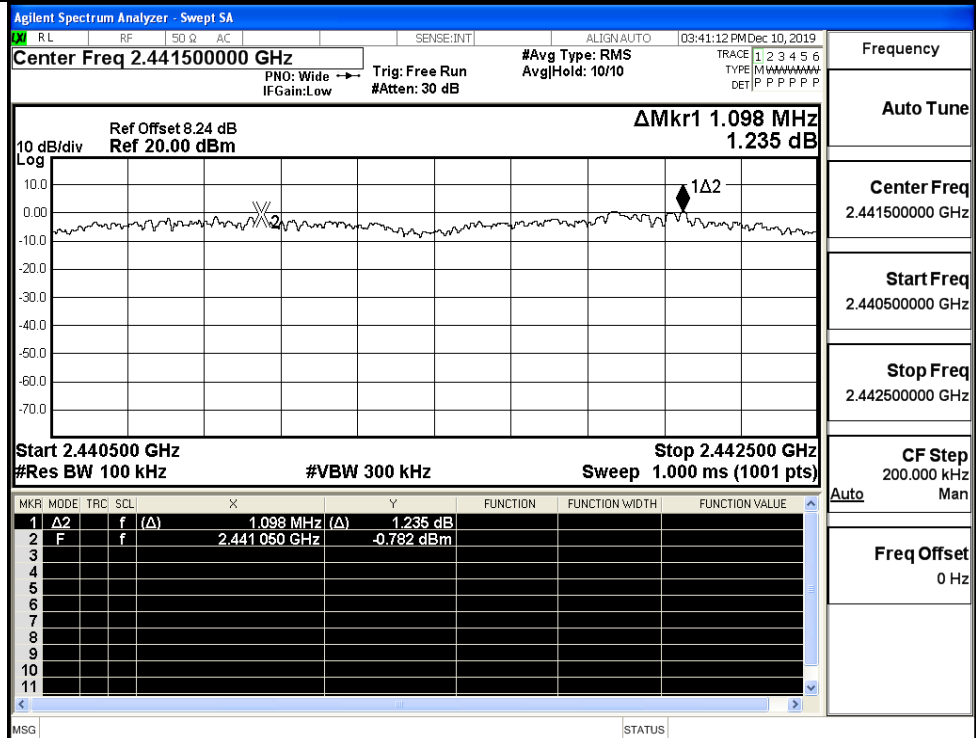


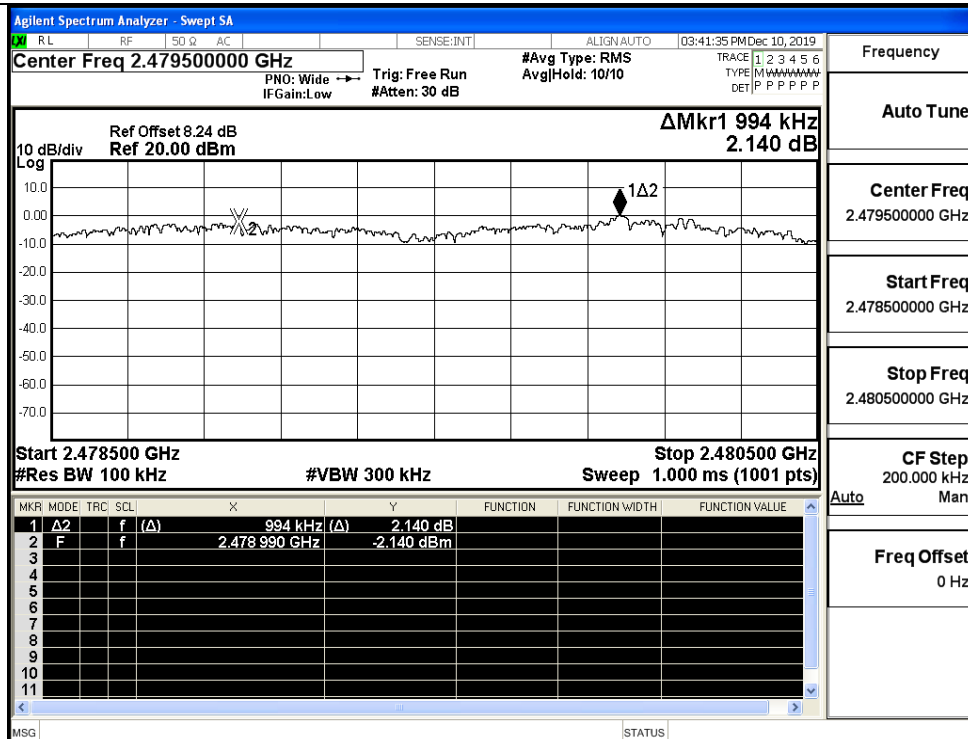
GFSK/MCH



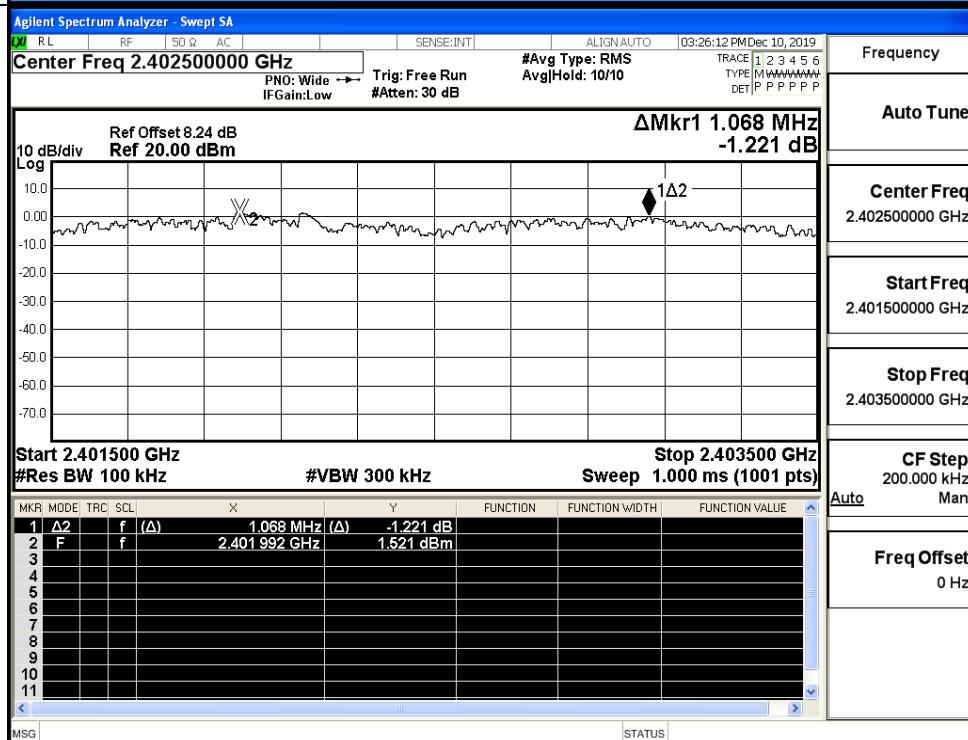
GFSK/HCH



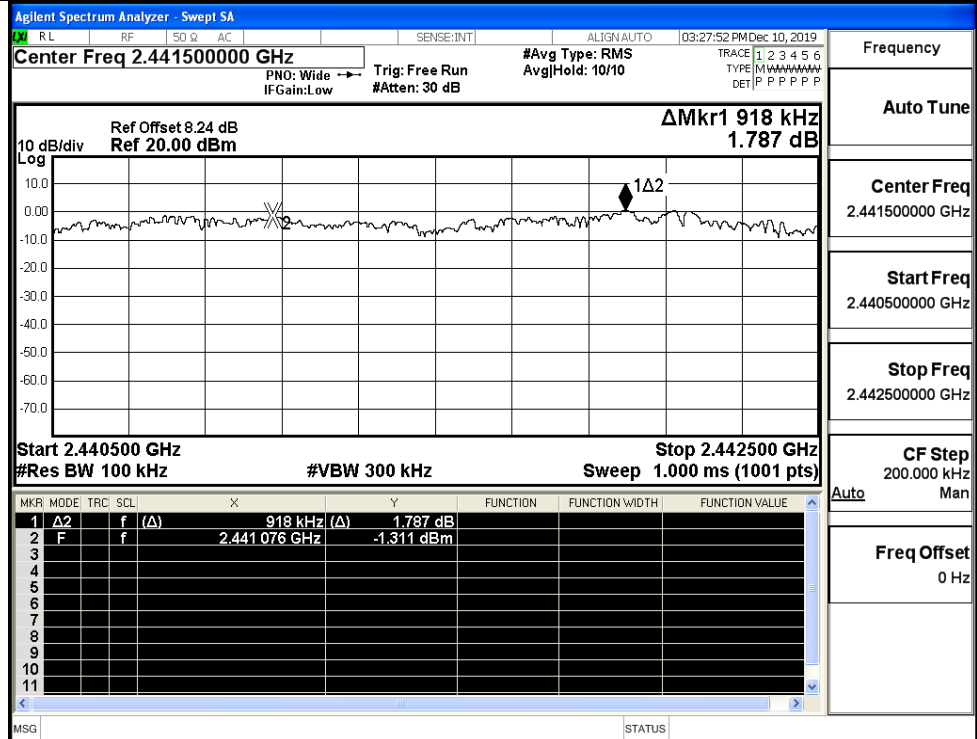
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

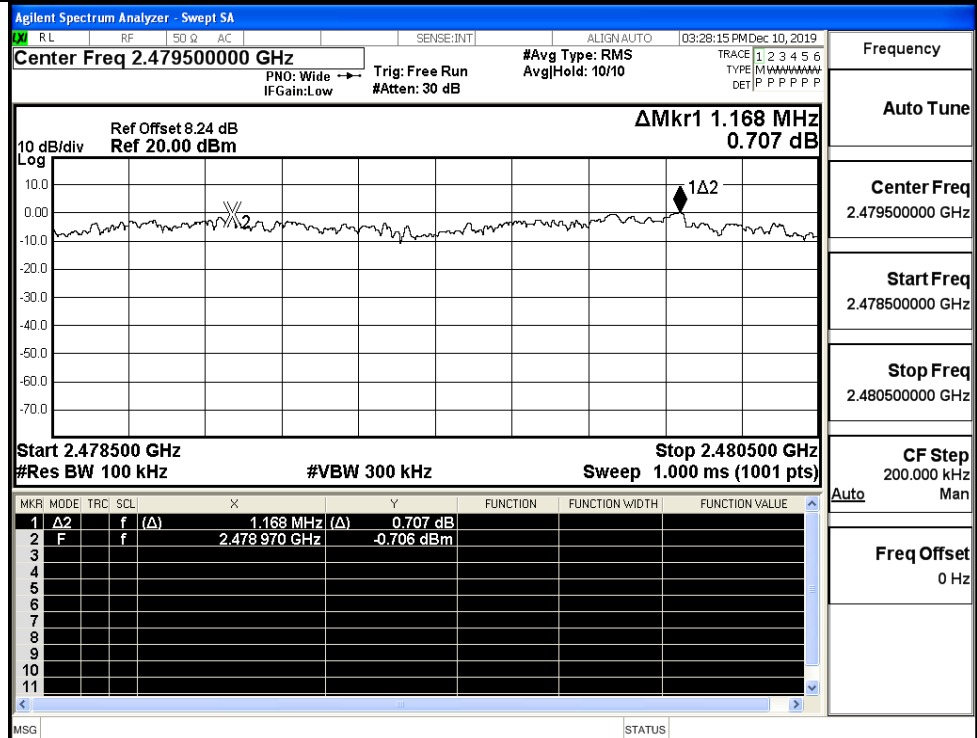
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH



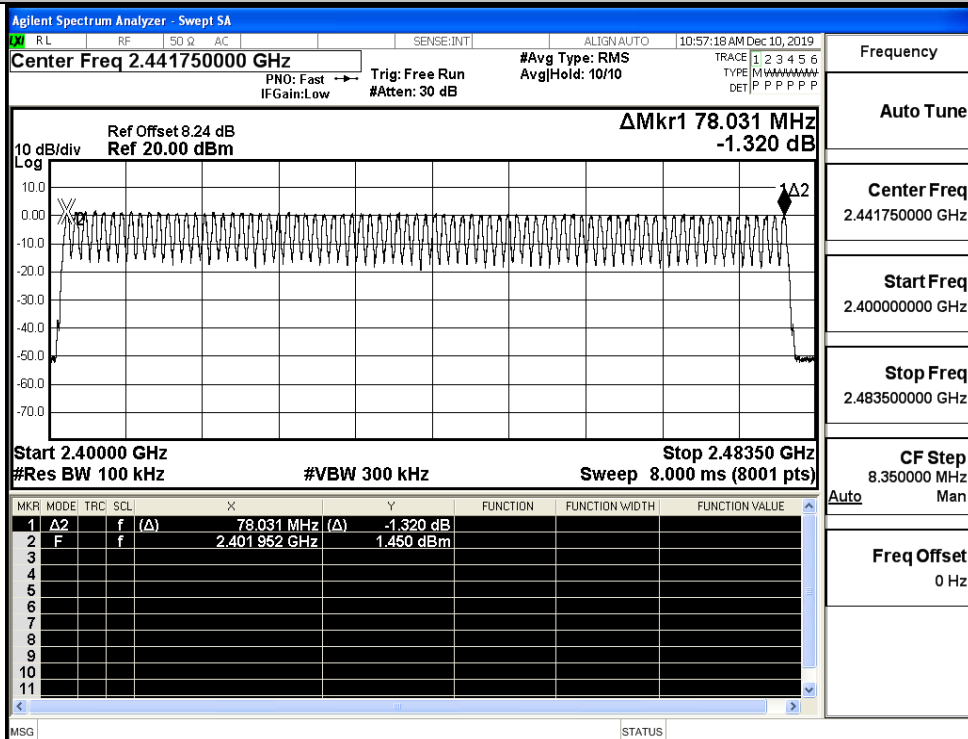
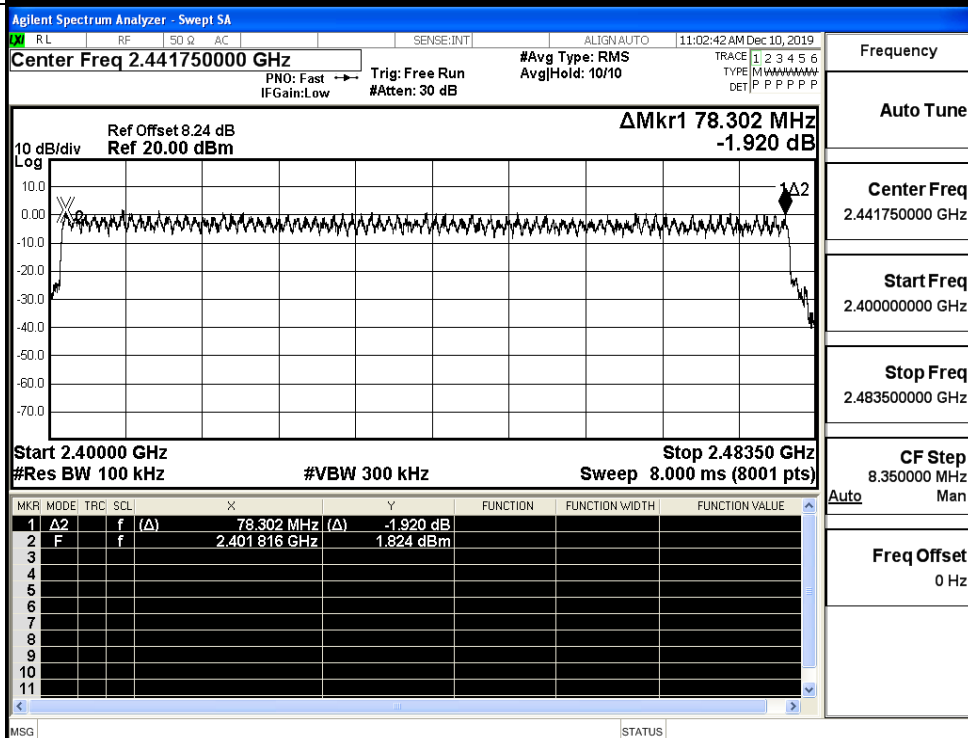
A.4 Hopping Channel Number

Left Ear

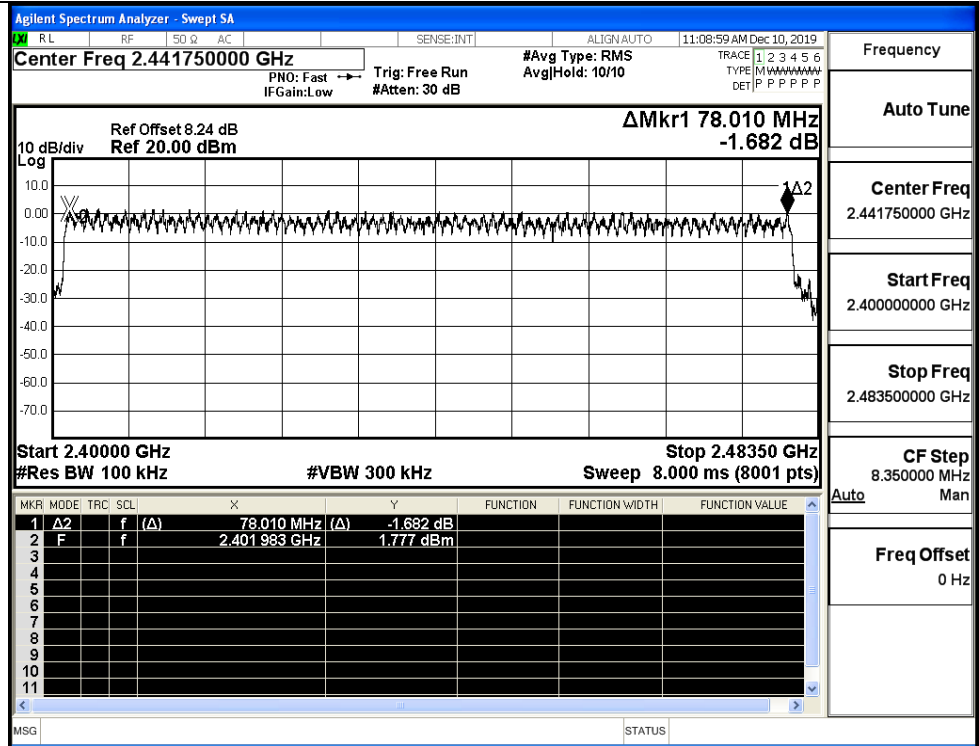
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

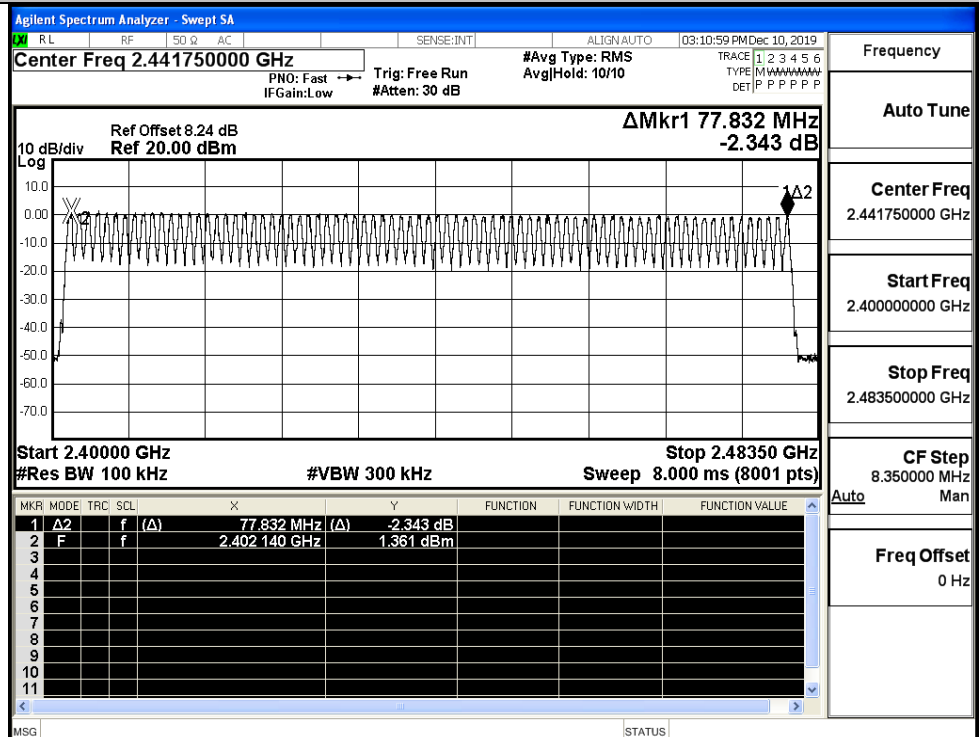


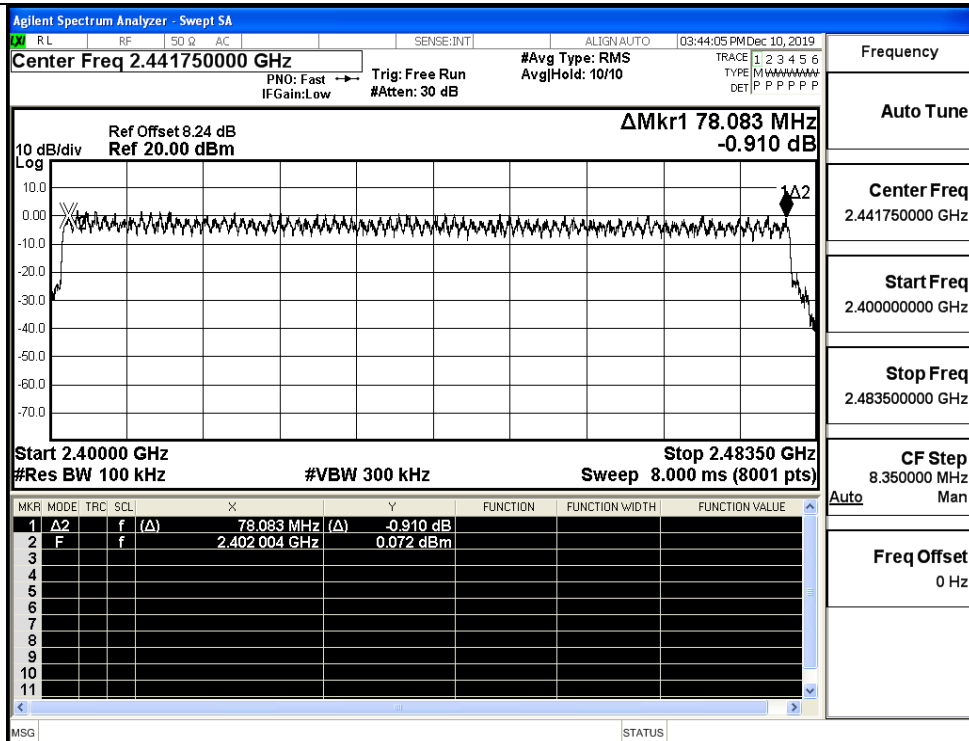
Right Ear

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

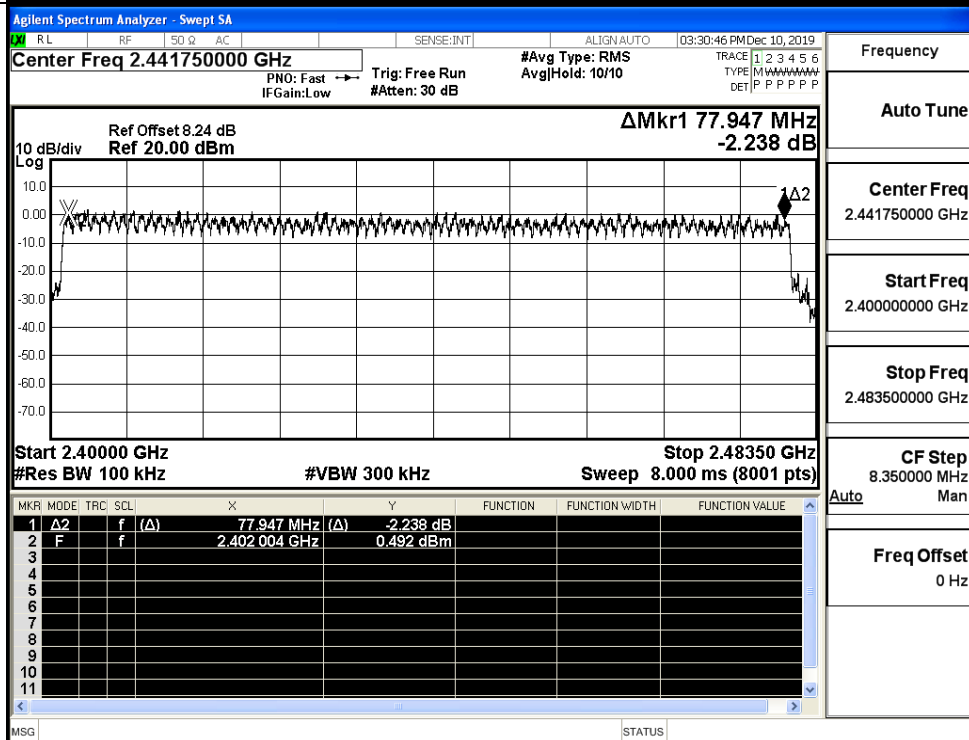
Test Graphs

GFSK/Hop



$\pi/4$ DQPSK/Hop

8DPSK/Hop



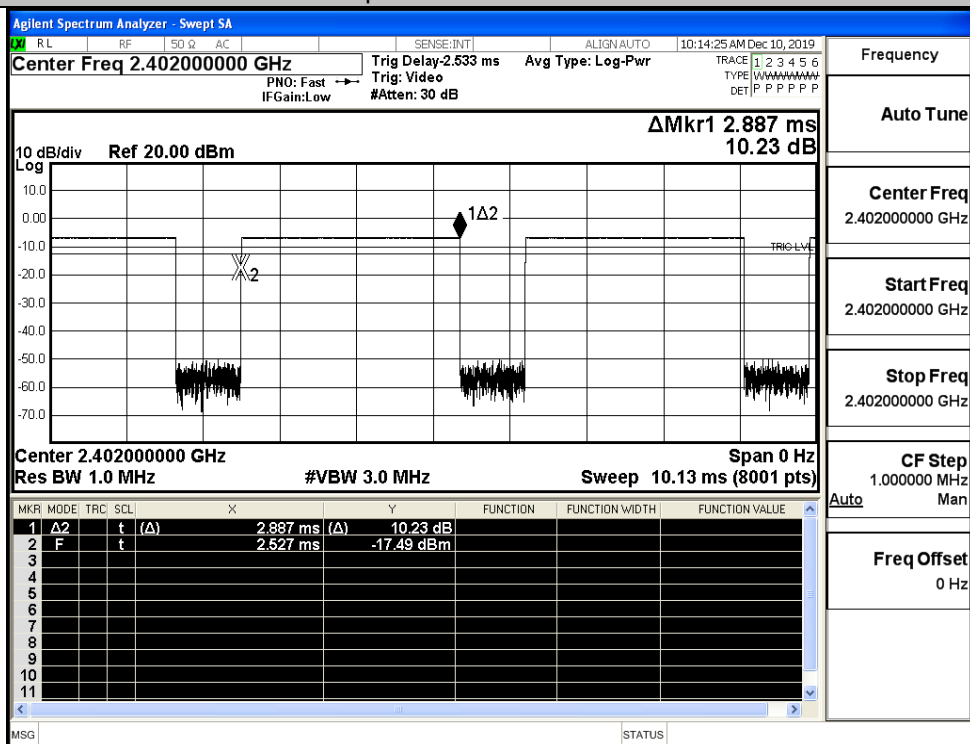
A.5 Dwell Time

Left Ear

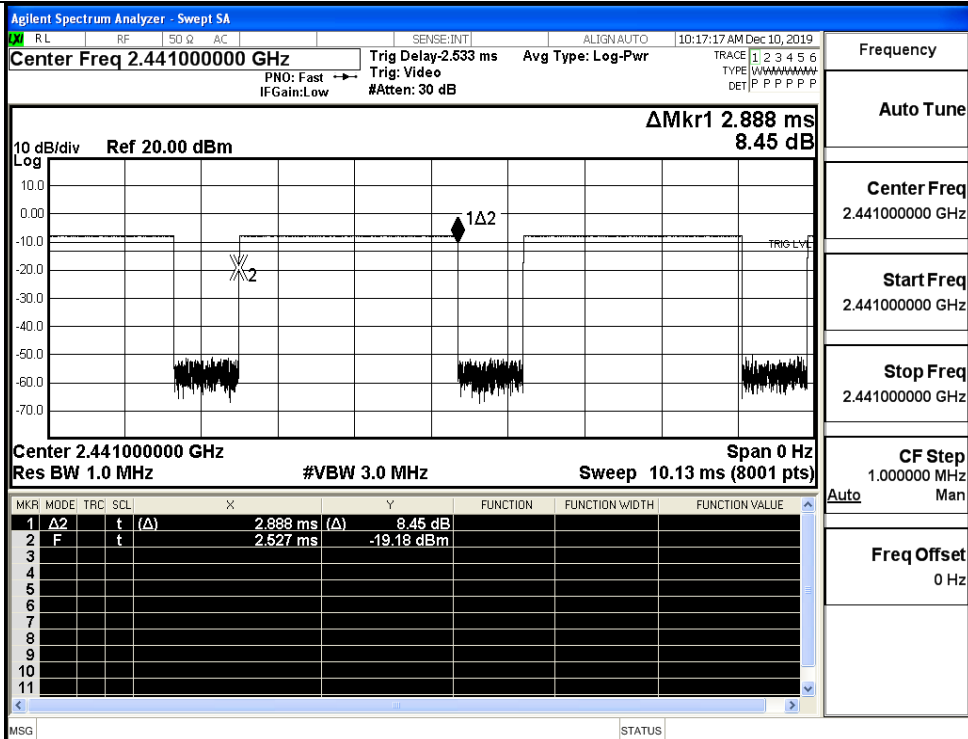
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.89	106.7	0.308	0.4	PASS
	DH5	MCH	2.89	106.7	0.308	0.4	PASS
	DH5	HCH	2.89	106.7	0.308	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.89	106.7	0.308	0.4	PASS
	2DH5	MCH	2.89	106.7	0.308	0.4	PASS
	2DH5	HCH	2.89	106.7	0.307	0.4	PASS
8DPSK	3DH5	LCH	2.89	106.7	0.308	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

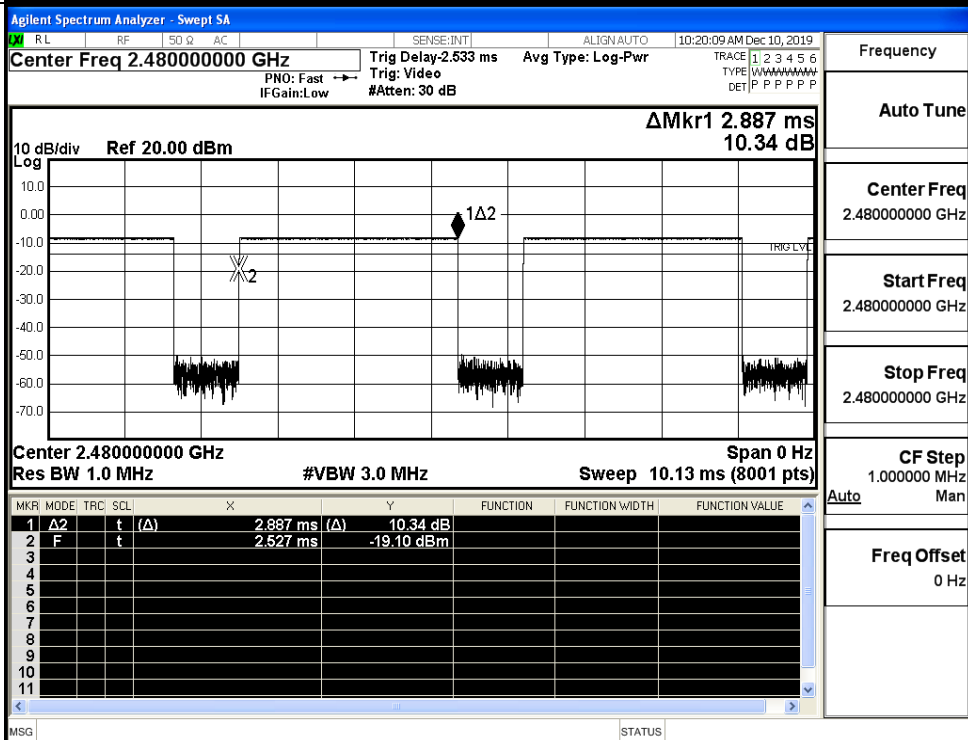
GFSK_DH5/LCH



GFSK_DH5/MCH



GFSK_DH5/HCH



Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC SENSE:INT ALIGN:AUTO 10:23:21 AM Dec 10, 2019

Center Freq 2.402000000 GHz Trig Delay: 2.533 ms Avg Type: Log-Pwr
PNO: Fast IF Gain: Low Trig: Video #Atten: 30 dB TRACE 1 2 3 4 5 6 TYPE: P P P P P P DET: P P P P P P

Auto Tune

Frequency

Center Freq
2.402000000 GHz

Start Freq
2.402000000 GHz

Stop Freq
2.402000000 GHz

CF Step
1.000000 MHz

Freq Offset
0 Hz

Ref 20.00 dBm **ΔMkr1 2.893 ms**
Log **8.69 dB**

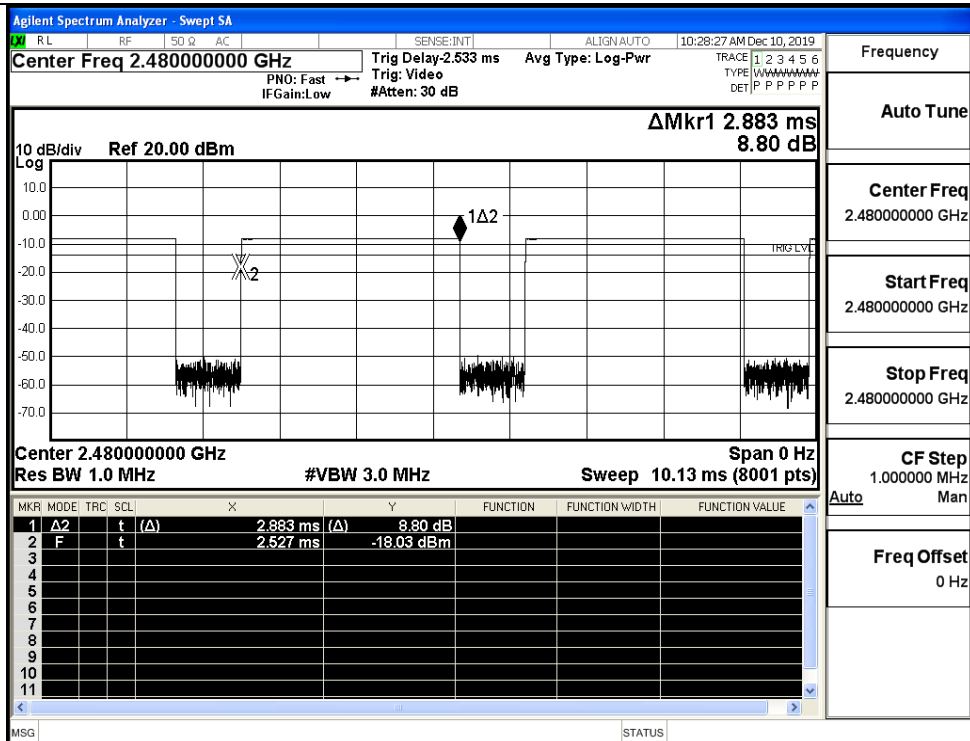
Center 2.402000000 GHz **Span 0 Hz**
Res BW 1.0 MHz **#VBW 3.0 MHz** **Sweep 10.13 ms (8001 pts)**

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ2	t	(Δ)	2.893 ms	(Δ) 8.69 dB			
2	F	t		2.528 ms	-15.24 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

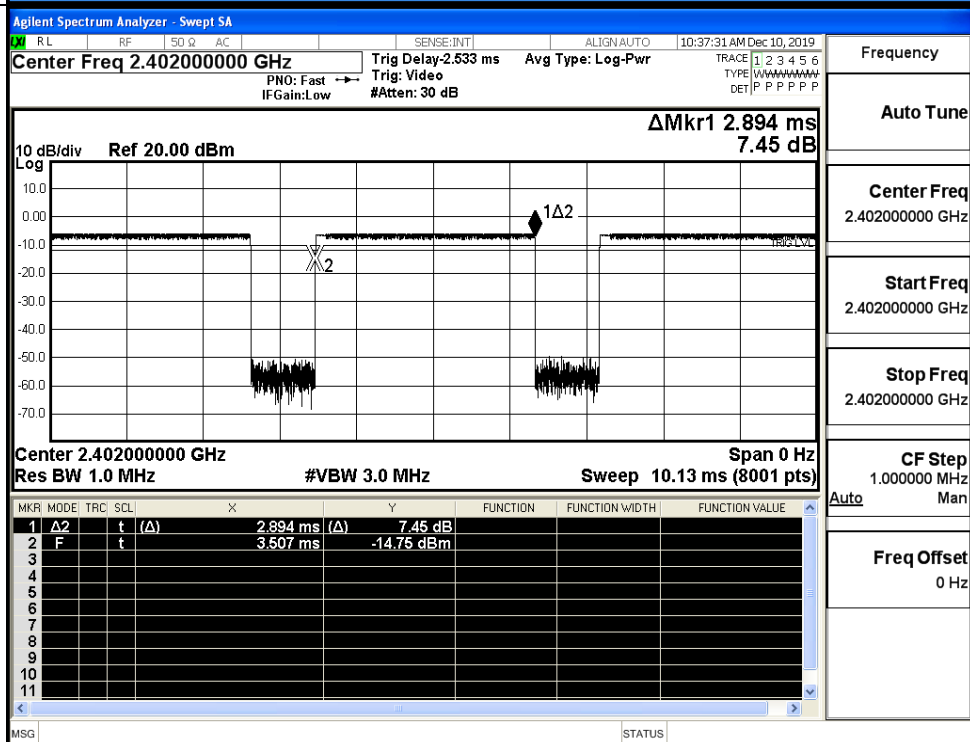
MSG **STATUS**

[illegible]

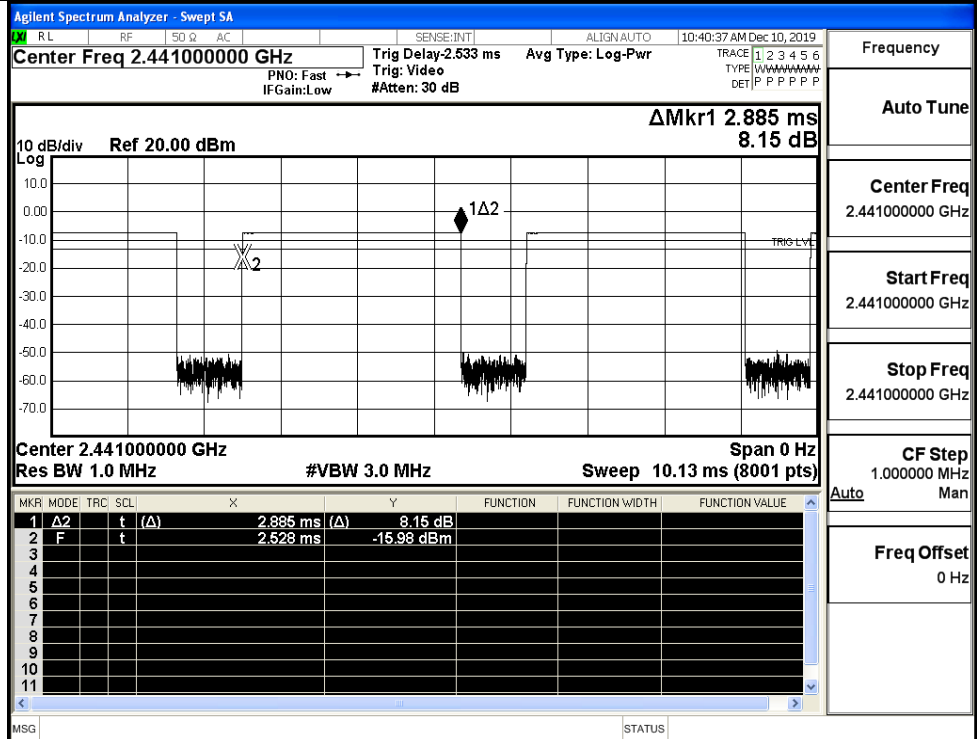
$\pi/4$ DQPSK
_2DH5/HCH



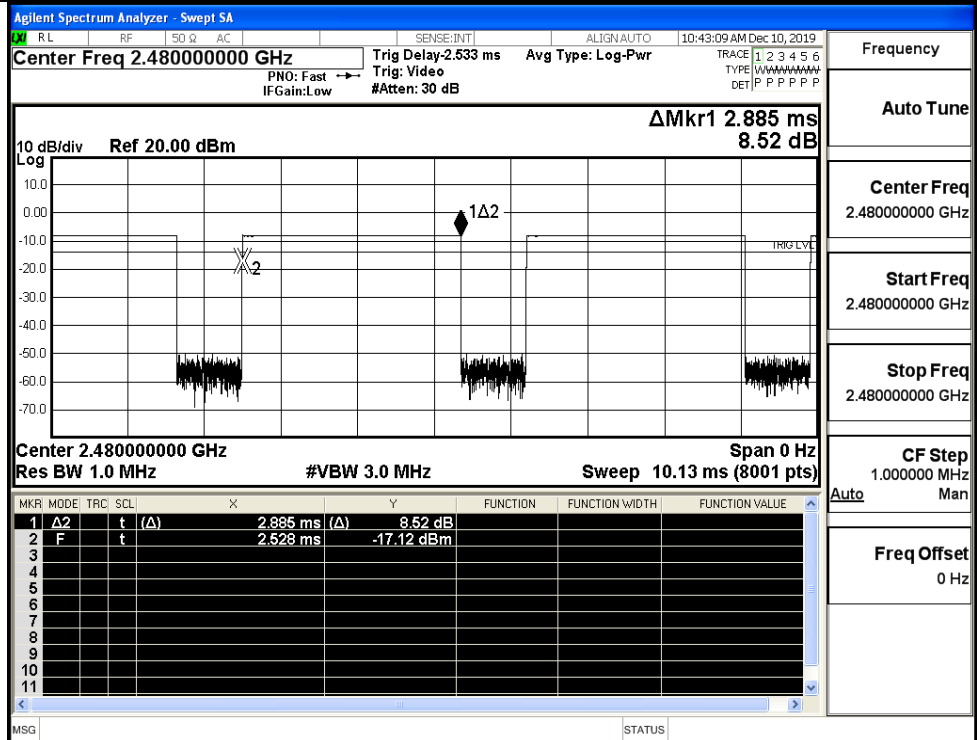
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

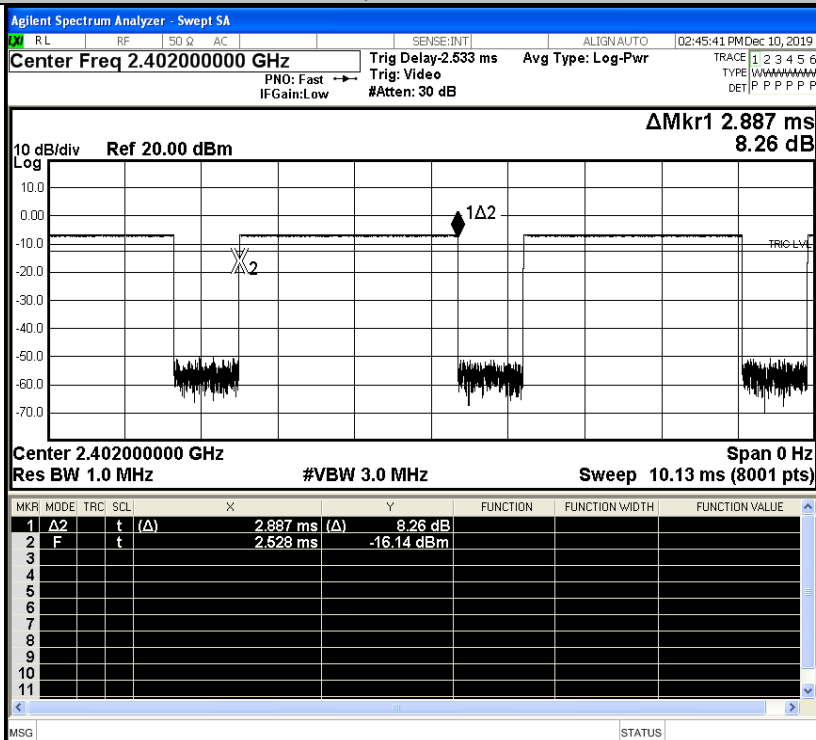


Right Ear

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	0.307	0.4	PASS
	2DH5	HCH	2.89	106.7	0.307	0.4	PASS
8DPSK	3DH5	LCH	2.89	106.7	0.308	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

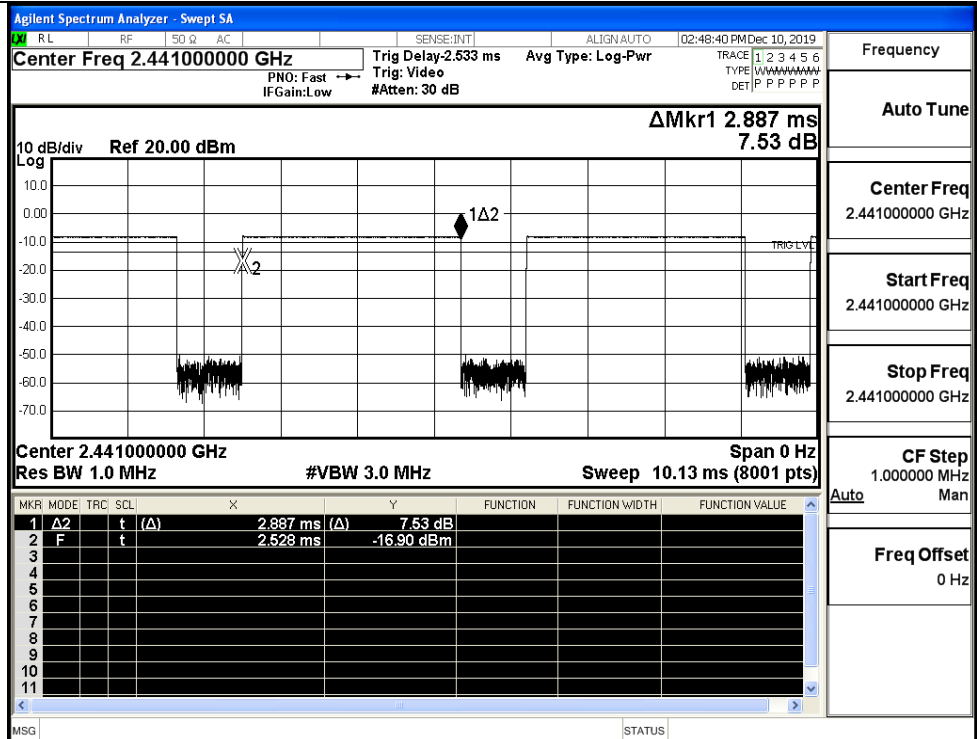


Frequency

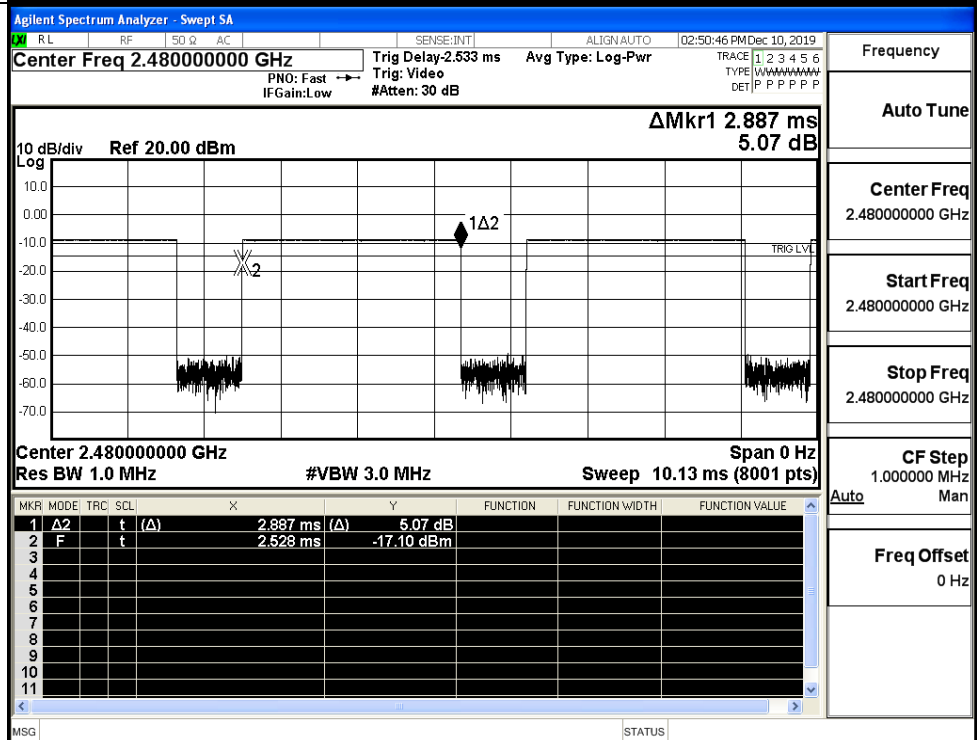
Auto Tune

Center Freq
2.402000000 GHzStart Freq
2.402000000 GHzStop Freq
2.402000000 GHzCF Step
1.000000 MHz
Auto ManFreq Offset
0 Hz

GFSK_DH5/MCH



GFSK_DH5/HCH



Agilent Spectrum Analyzer - Swept SA

RL RF 50 Q AC SENSE:INT ALIGN:AUTO 02:53:32 PM Dec 10, 2019

Center Freq 2.402000000 GHz Trig Delay: 2.533 ms Avg Type: Log-Pwr PNO: Fast Trig: Video TYPE: W P P P P P P IF Gain: Low #Atten: 30 dB DET: P P P P P P P

10 dB/div Ref 20.00 dBm Δ Mkr1 2.893 ms 7.56 dB

Center 2.402000000 GHz Span 0 Hz
Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.13 ms (8001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ 2	t	(Δ)	2.893 ms	(Δ) 7.56 dB			
2	F	t		1.539 ms	-15.06 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

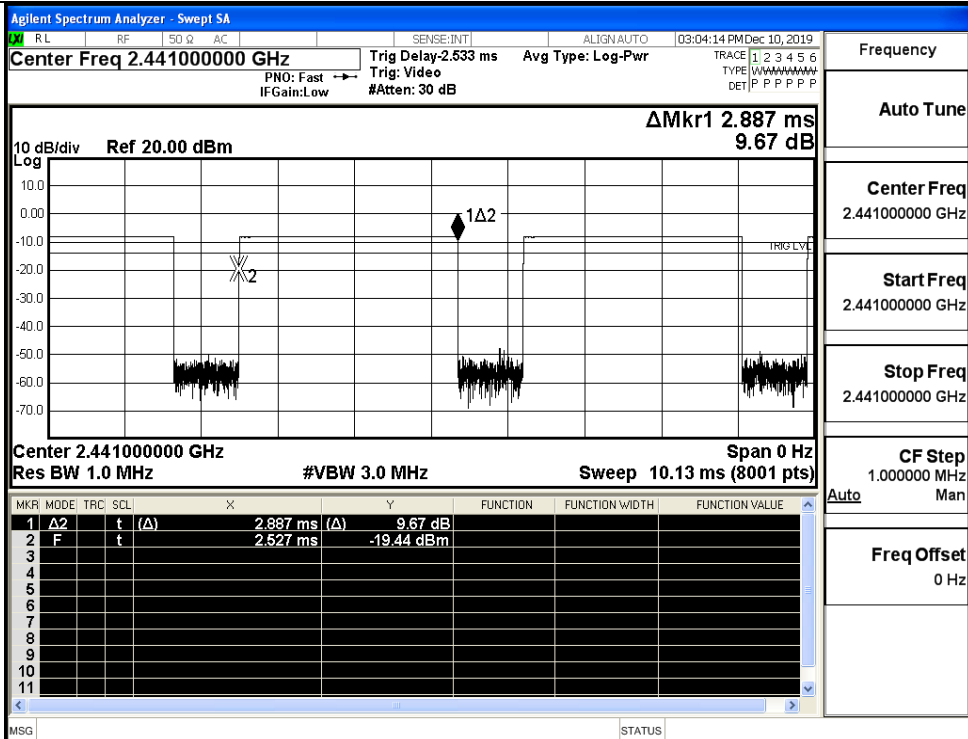
MSG STATUS

Frequency Auto Tune Center Freq 2.402000000 GHz Start Freq 2.402000000 GHz Stop Freq 2.402000000 GHz CF Step 1.000000 MHz Man Freq Offset 0 Hz

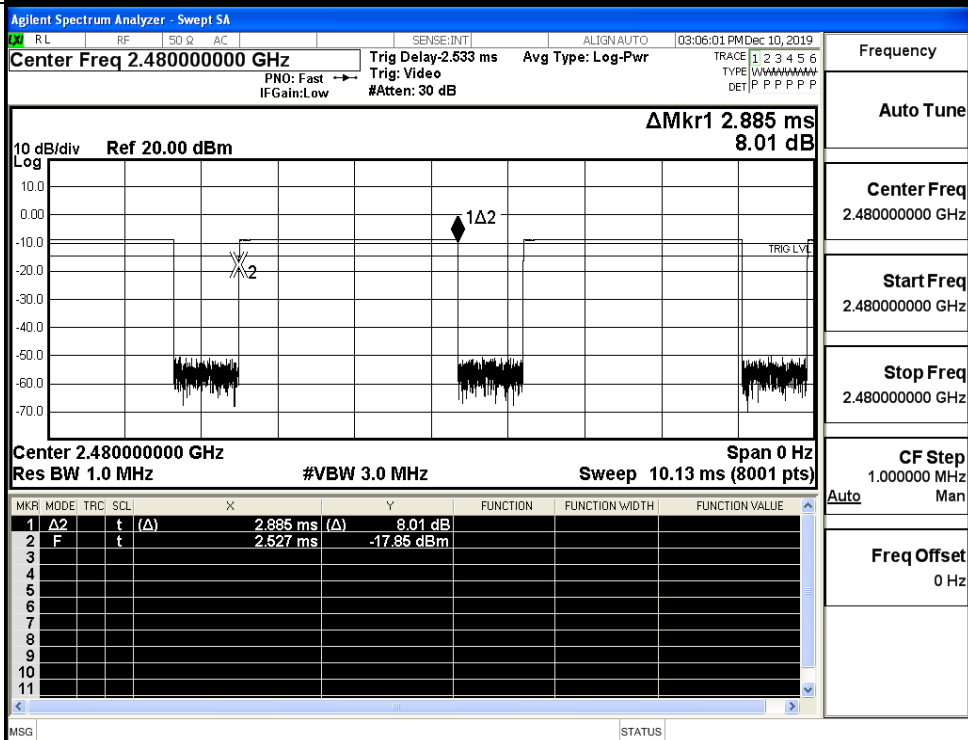
[illegible]

[illegible][illegible]

8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

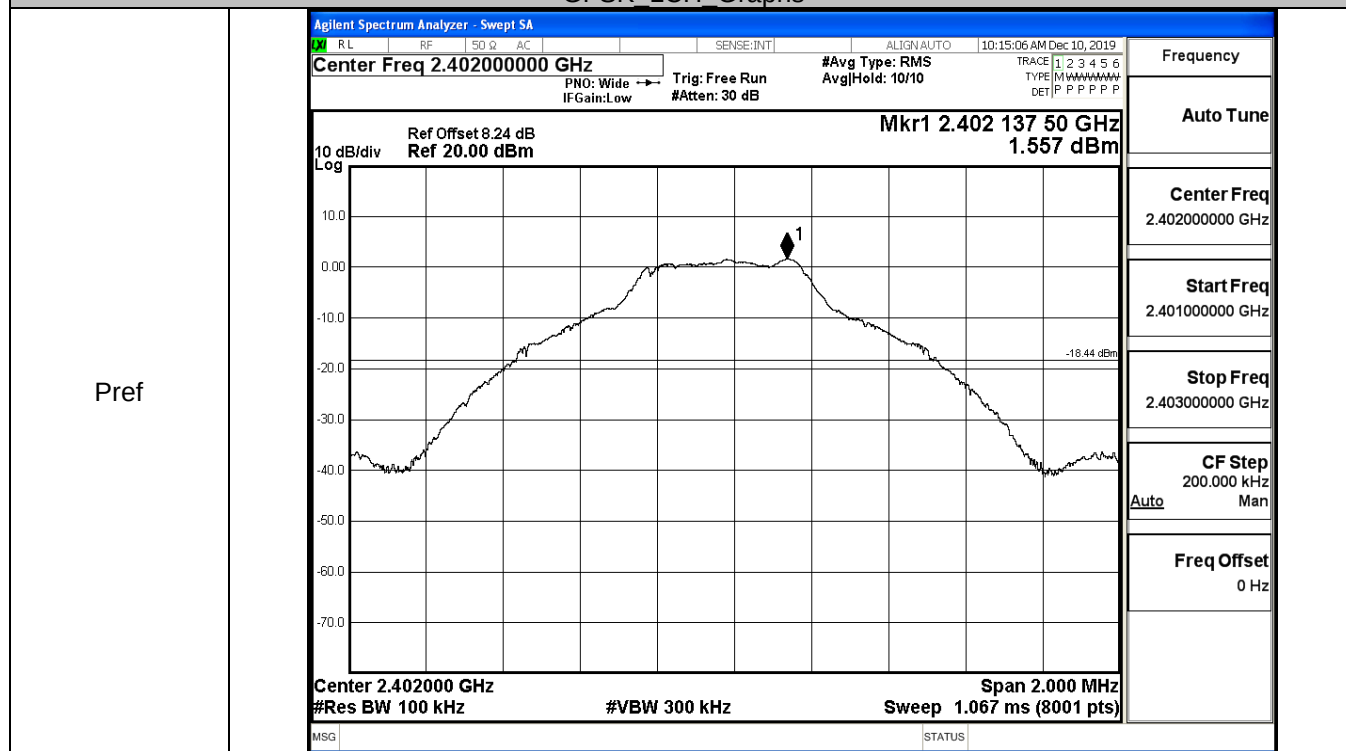


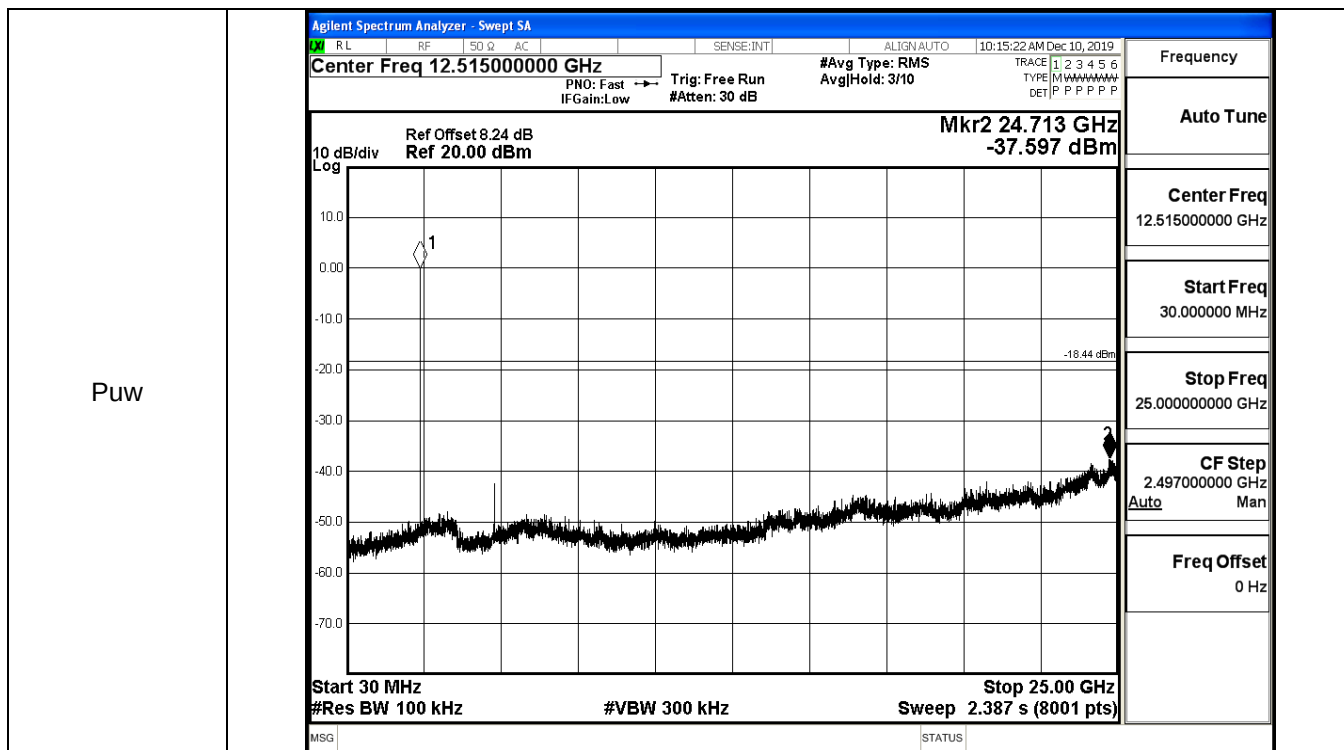
A.6 RF Conducted Spurious Emissions

Left Ear

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.557	-37.597	-18.443	PASS
	MCH	0.432	-37.802	-19.568	PASS
	HCH	0.072	-36.246	-19.928	PASS
$\pi/4$ DQPSK	LCH	1.844	-37.522	-18.156	PASS
	MCH	0.673	-36.719	-19.327	PASS
	HCH	0.182	-38.027	-19.818	PASS
8DPSK	LCH	1.955	-37.085	-18.045	PASS
	MCH	0.903	-37.648	-19.097	PASS
	HCH	0.292	-36.909	-19.708	PASS

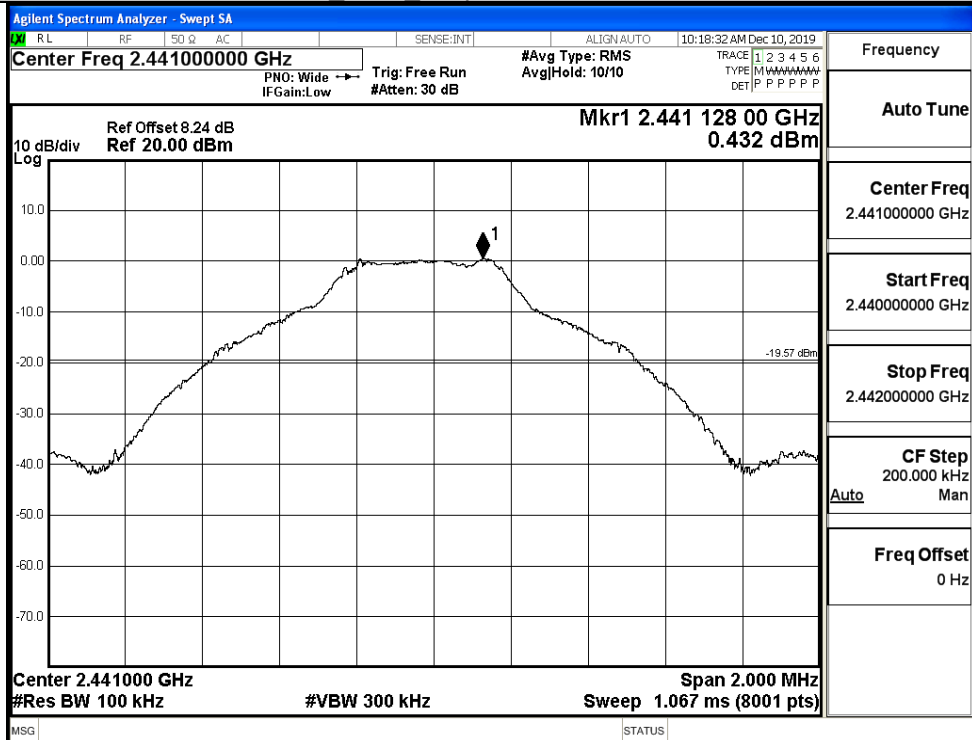
GFSK LCH Graphs



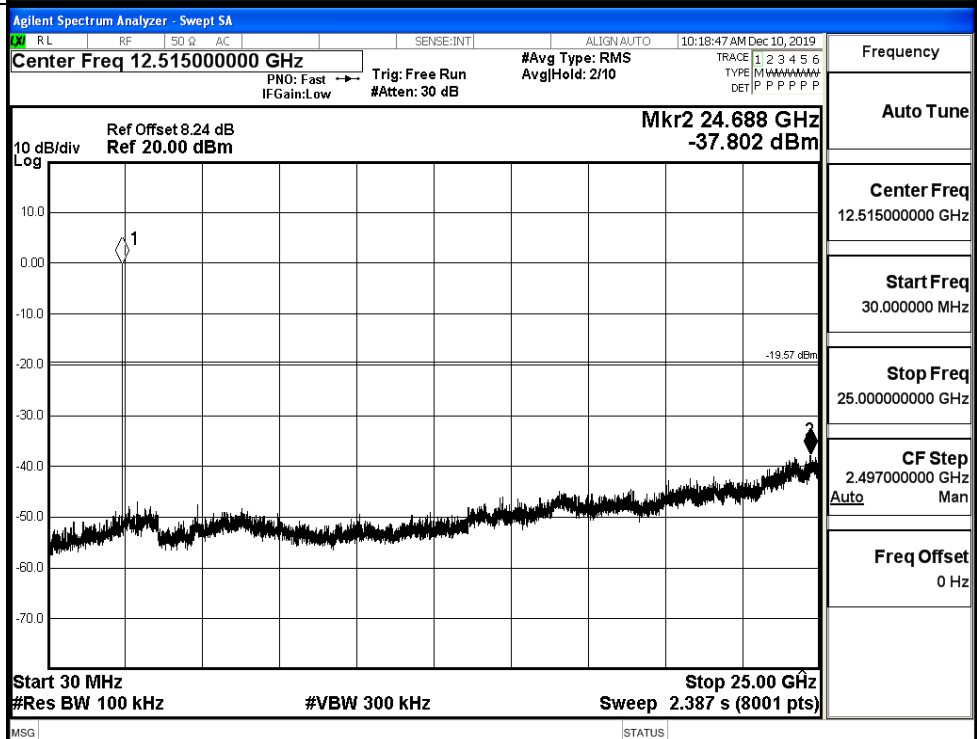


GFSK_MCH_Graphs

Pref

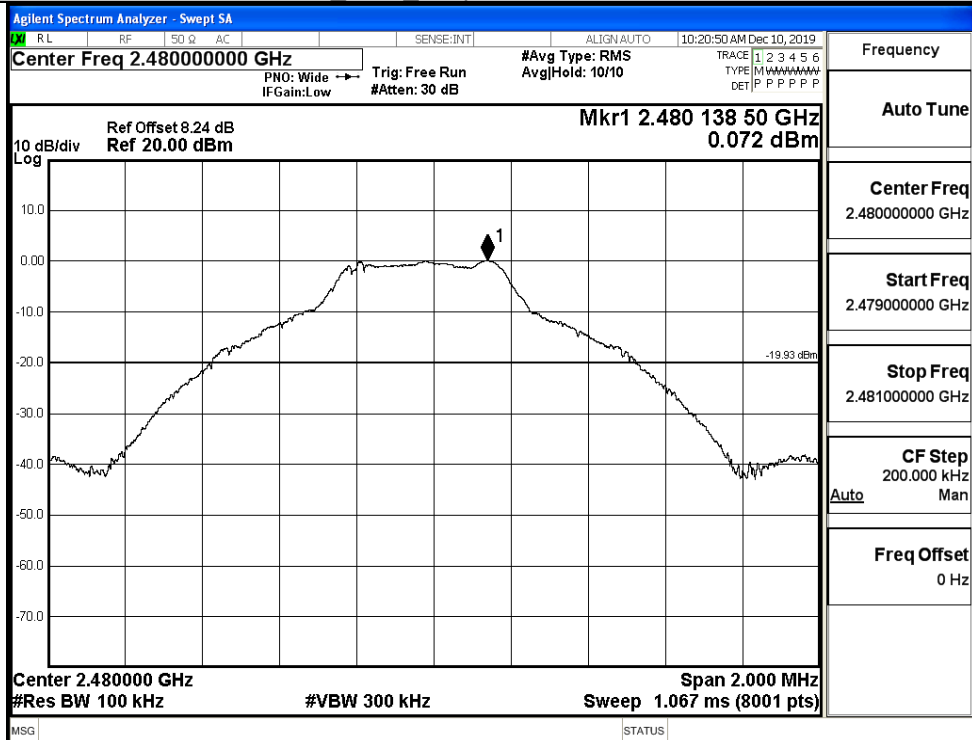


Puw

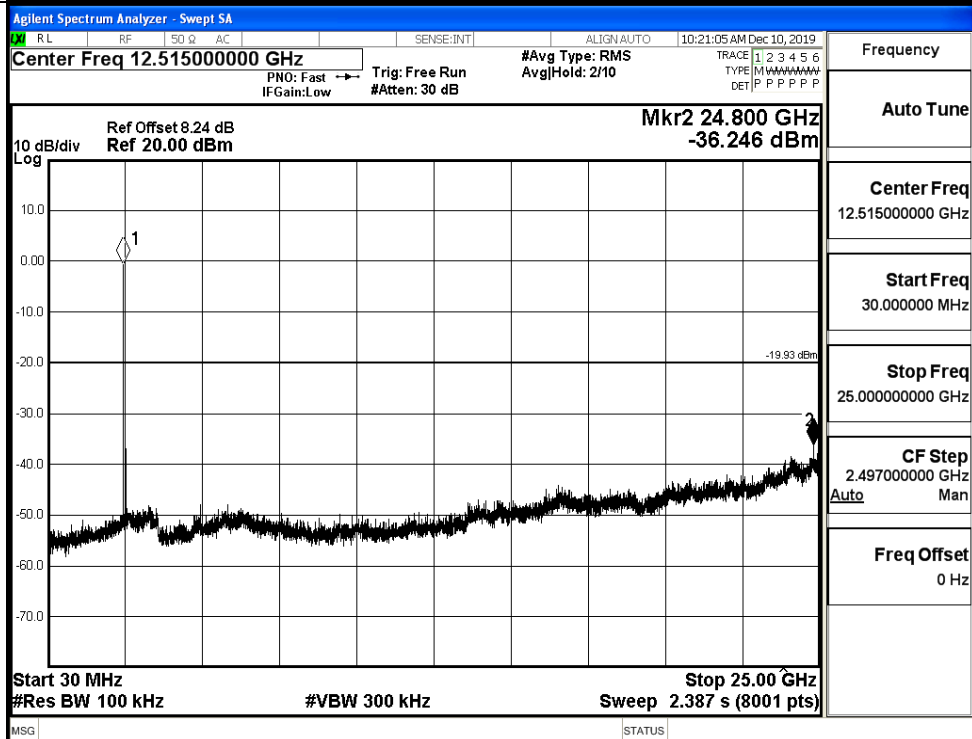


GFSK HCH Graphs

Pref

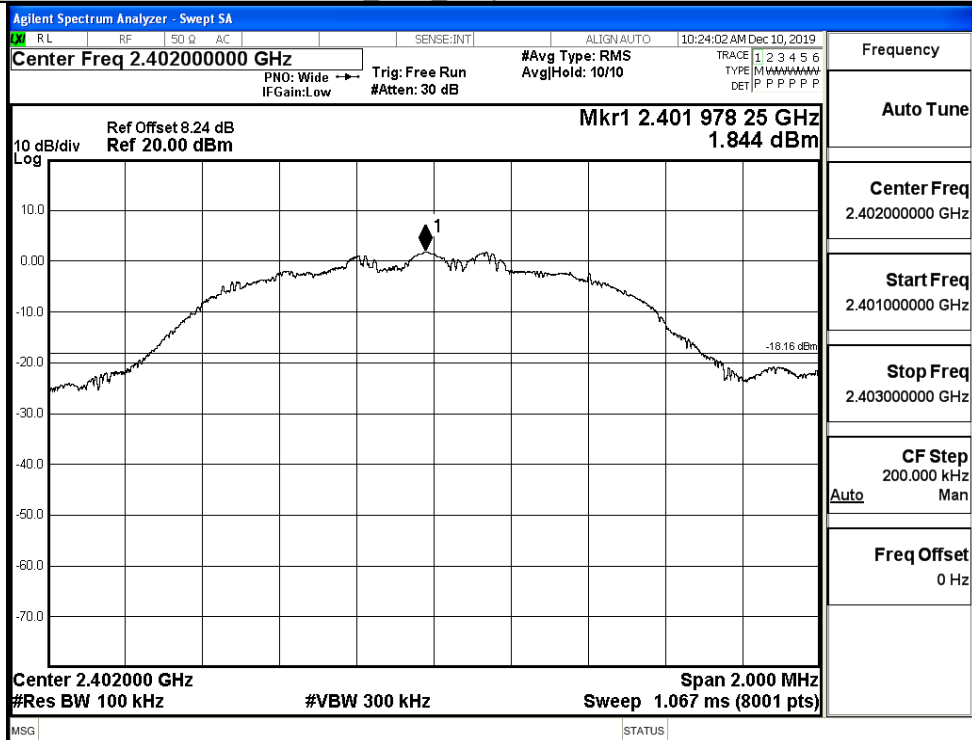


Puw

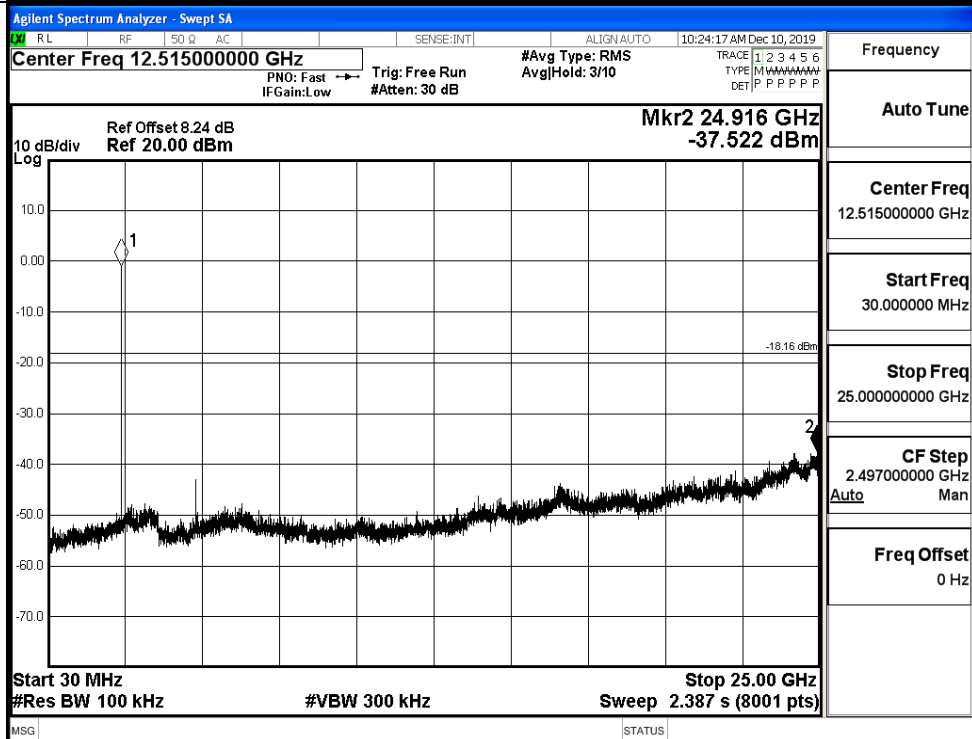


$\pi/4$ DQPSK_LCH_Graphs

Pref

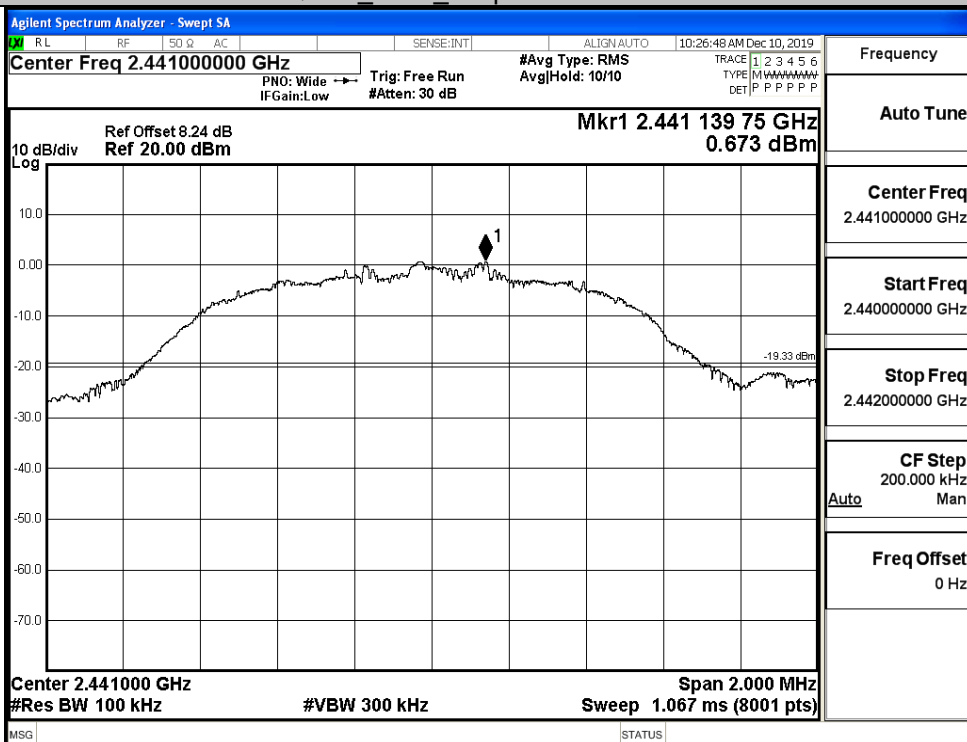


Puw



π /4DQPSK_MCH_Graphs

Pref



Puw

