

## Appendix A

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

**Product Name: Sync Pro**

**Trade Mark: SOUL**

**Test Model: SS55**

#### Environmental Conditions

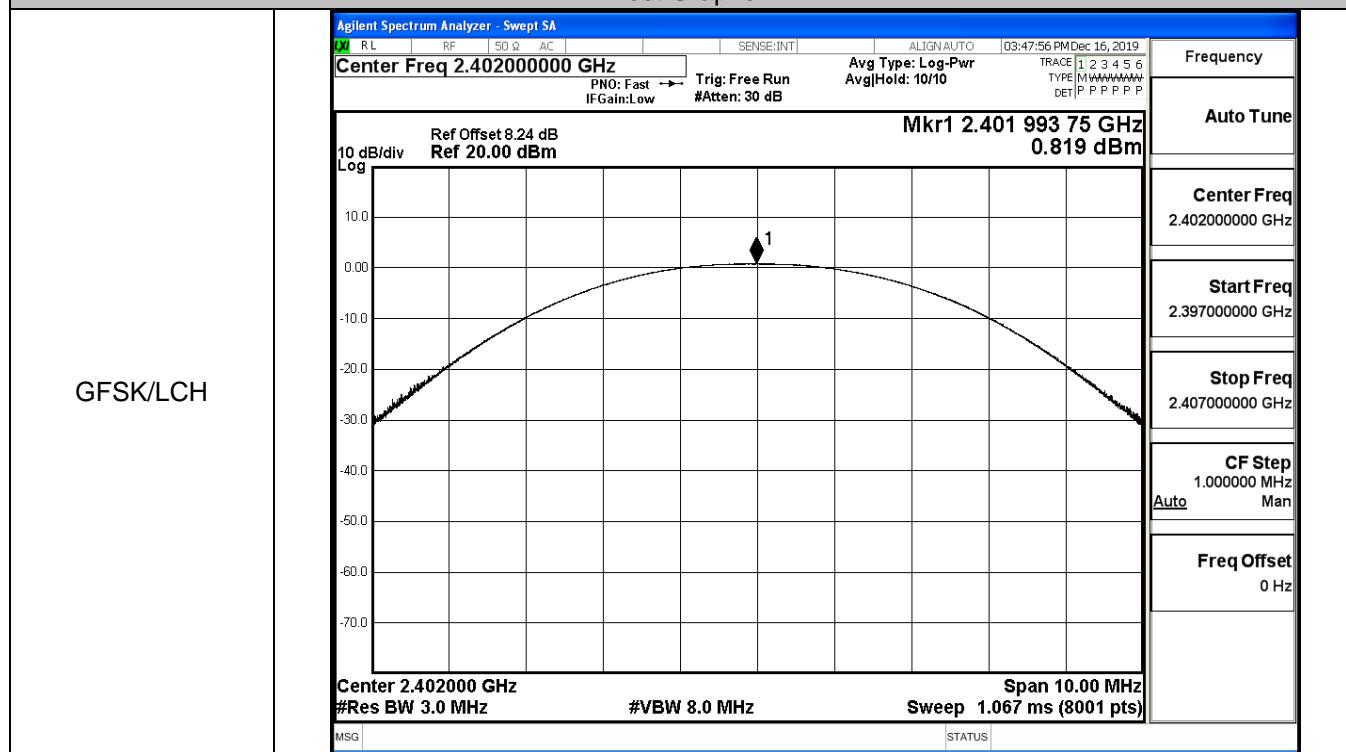
Temperature:	23.2 ° C
Relative Humidity:	53.8%
ATM Pressure:	100.0 kPa
Test Engineer:	Alisa Huang
Supervised by:	Wang Chuang

## A.1 Maximum Conducted Peak Output Power

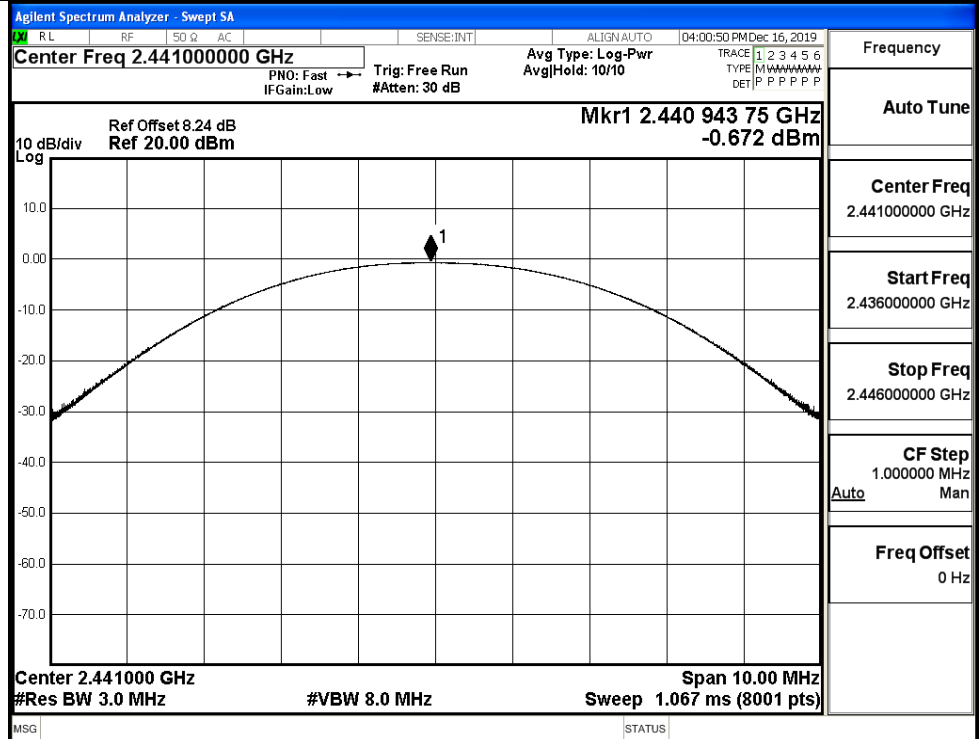
Left Ear

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.819	21	PASS
	MCH	-0.672	21	PASS
	HCH	-2.274	21	PASS
$\pi/4$ DQPSK	LCH	0.319	21	PASS
	MCH	1.602	21	PASS
	HCH	-0.124	21	PASS
8DPSK	LCH	0.764	21	PASS
	MCH	2.102	21	PASS
	HCH	0.401	21	PASS

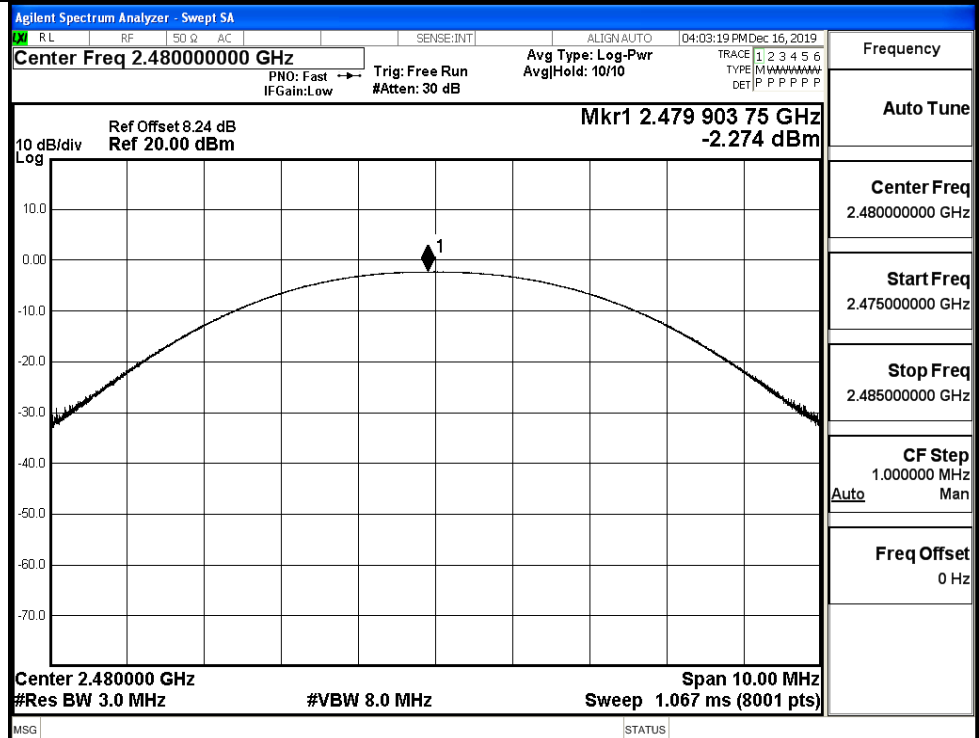
Test Graphs

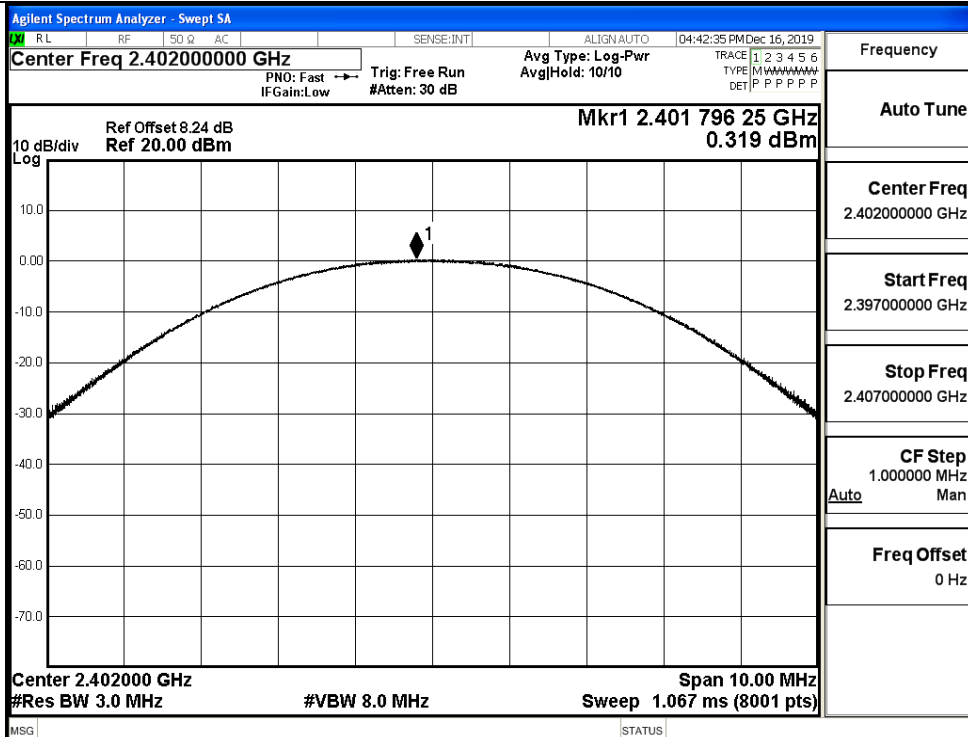
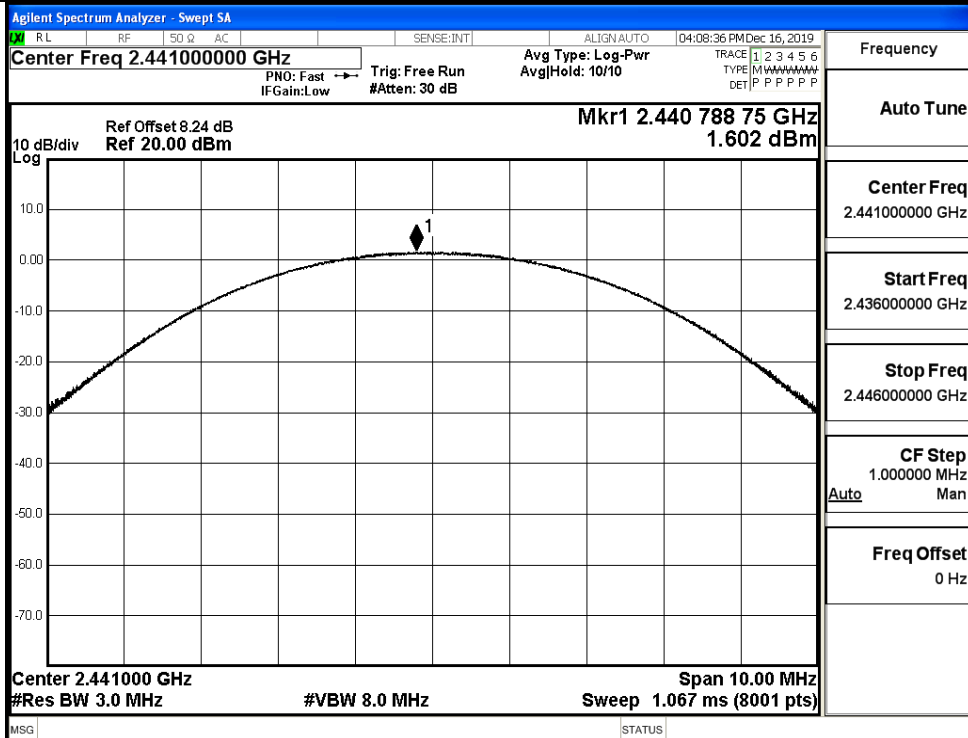


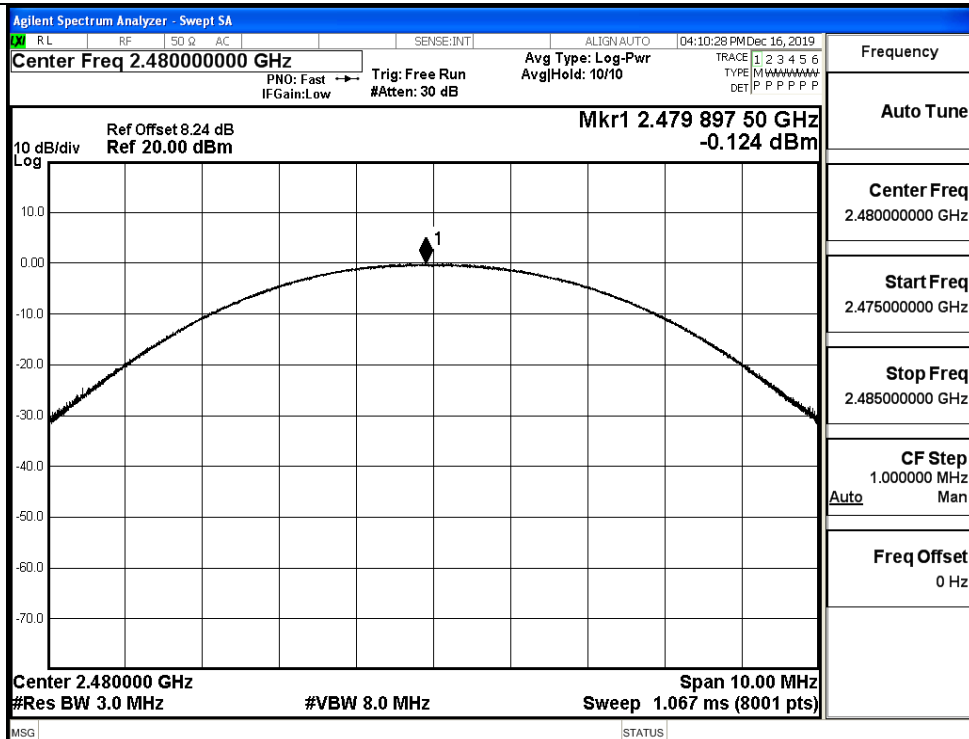
GFSK/MCH



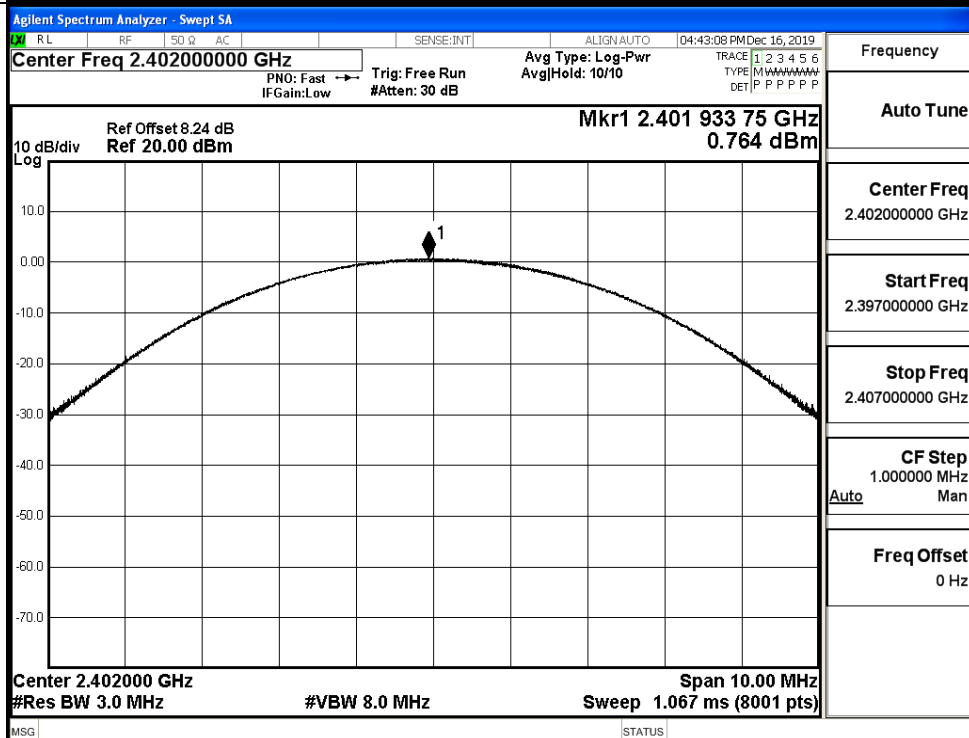
GFSK/HCH



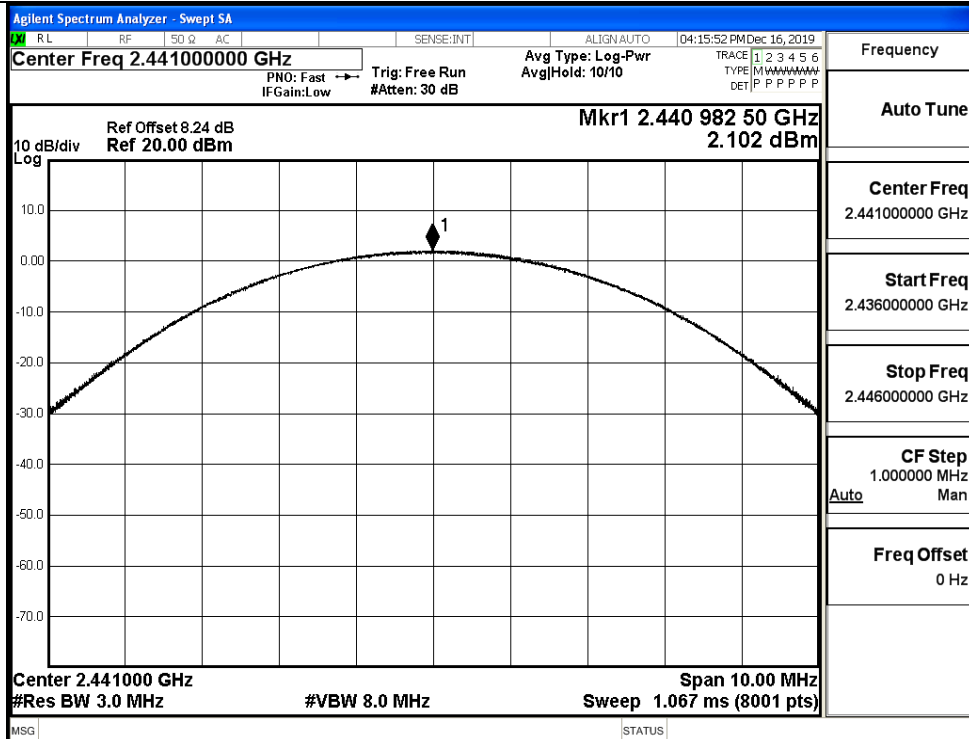
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

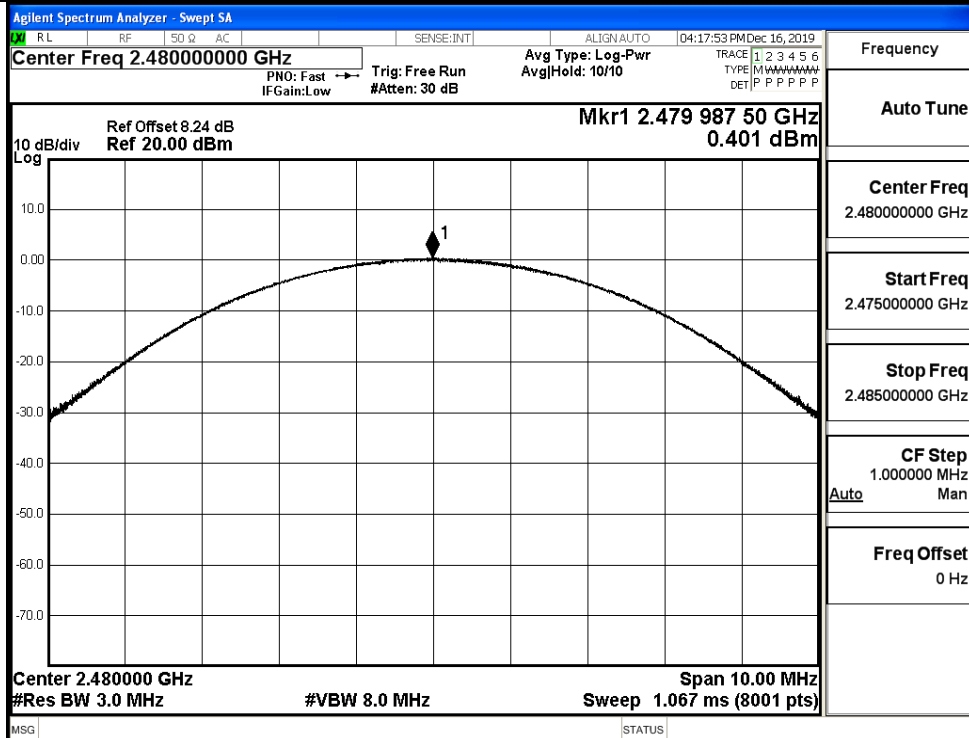
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

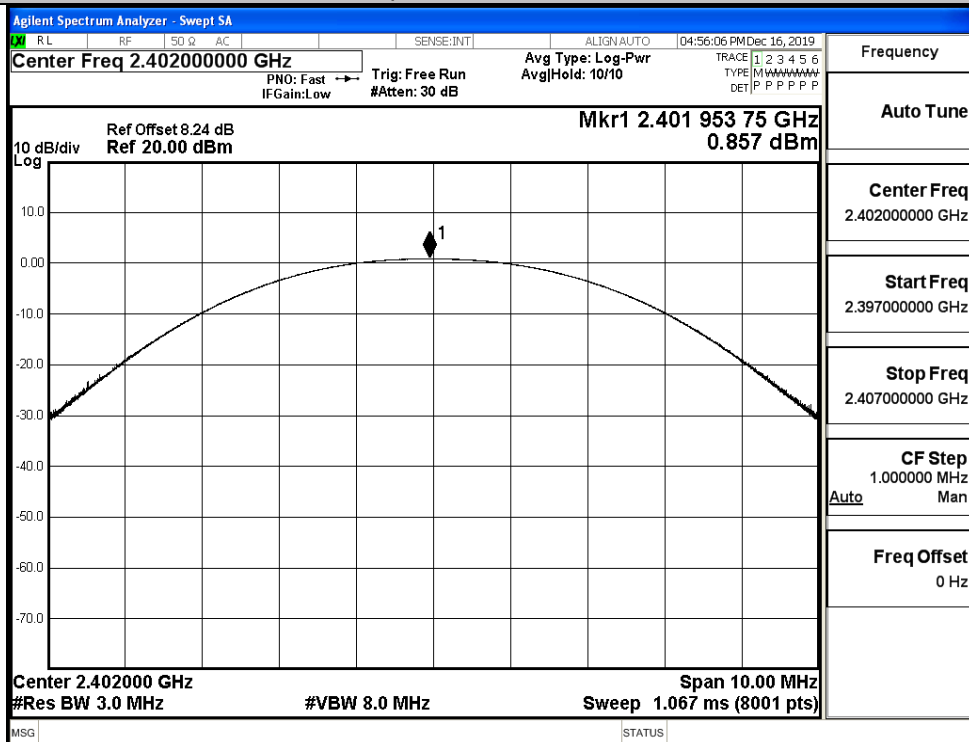


Right Ear

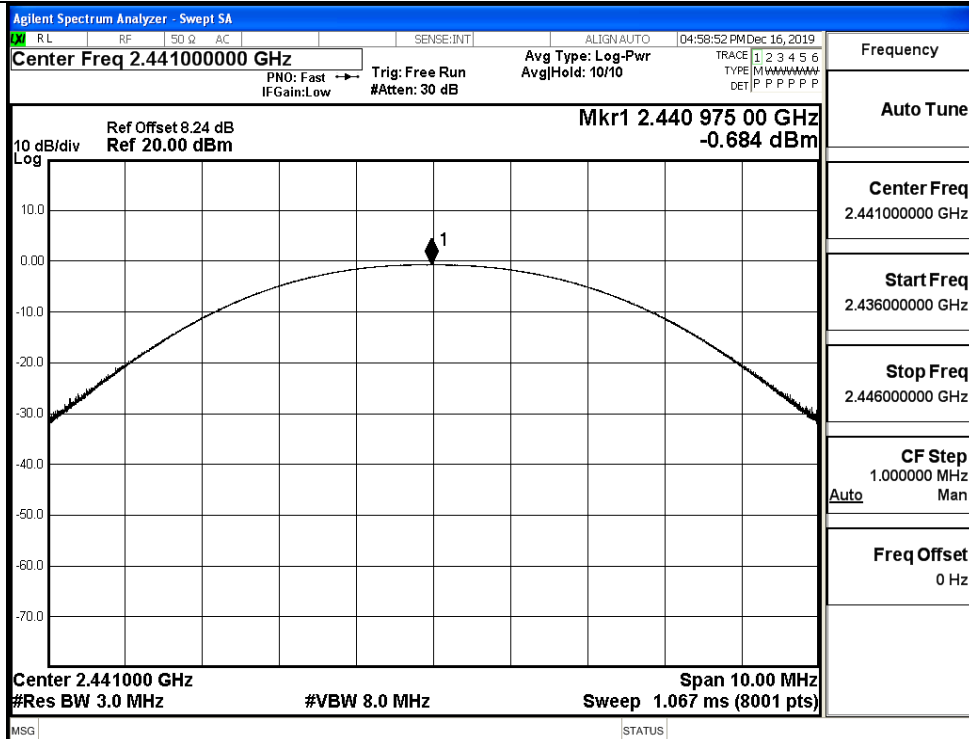
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.857	30	PASS
	MCH	-0.684	30	PASS
	HCH	-2.268	30	PASS
$\pi/4$ DQPSK	LCH	0.404	21	PASS
	MCH	1.592	21	PASS
	HCH	-0.075	21	PASS
8DPSK	LCH	0.807	21	PASS
	MCH	2.147	21	PASS
	HCH	0.444	21	PASS

## Test Graphs

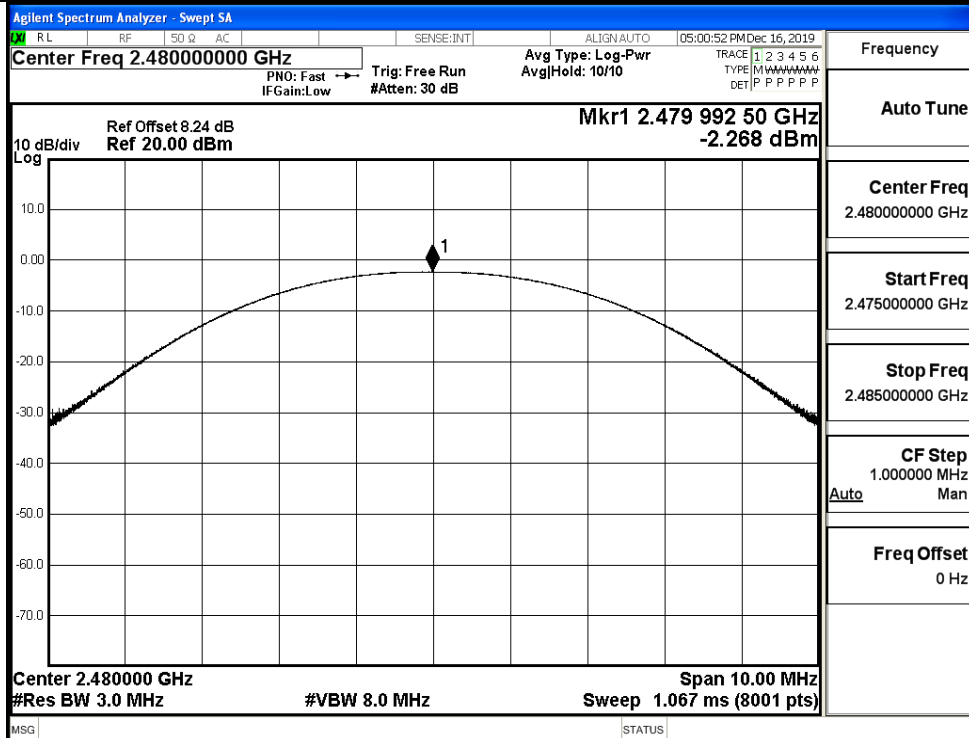
GFSK/LCH



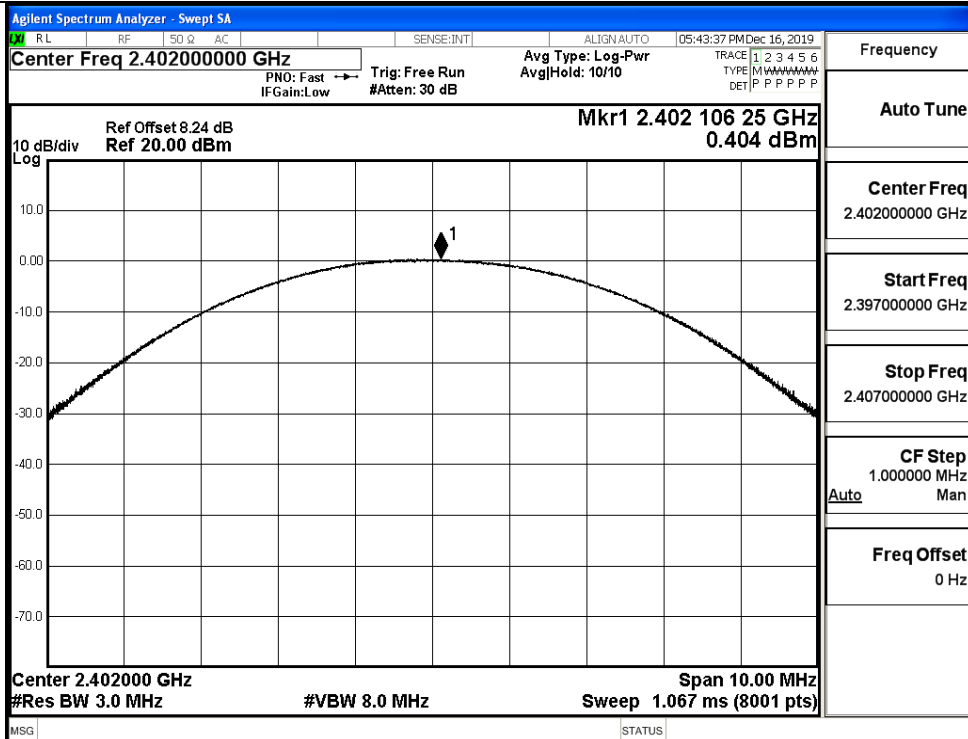
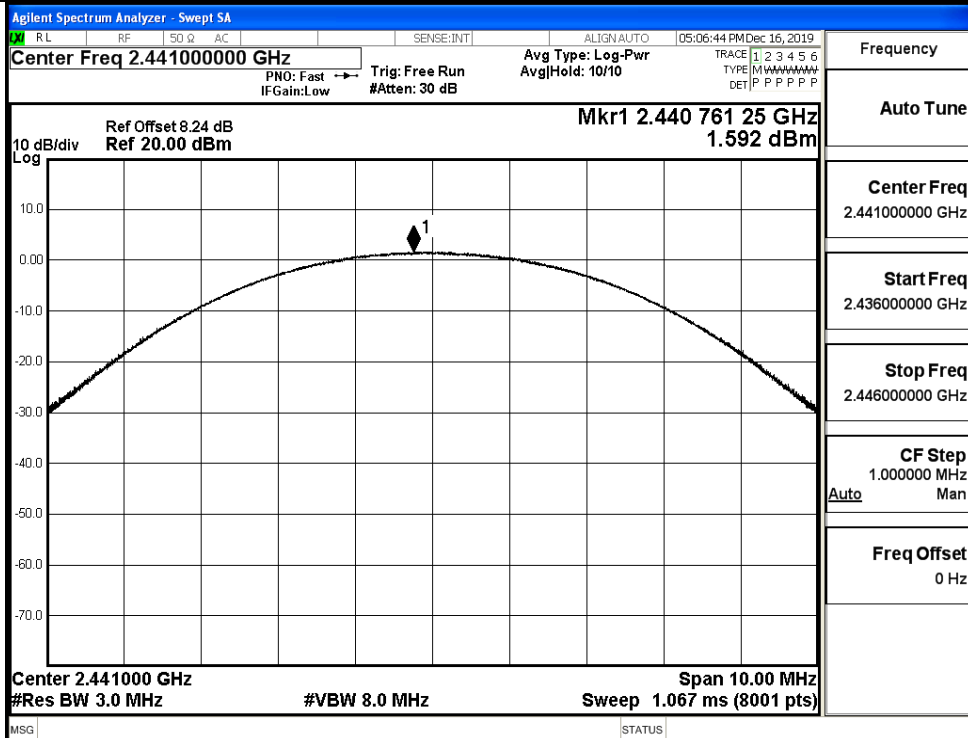
GFSK/MCH

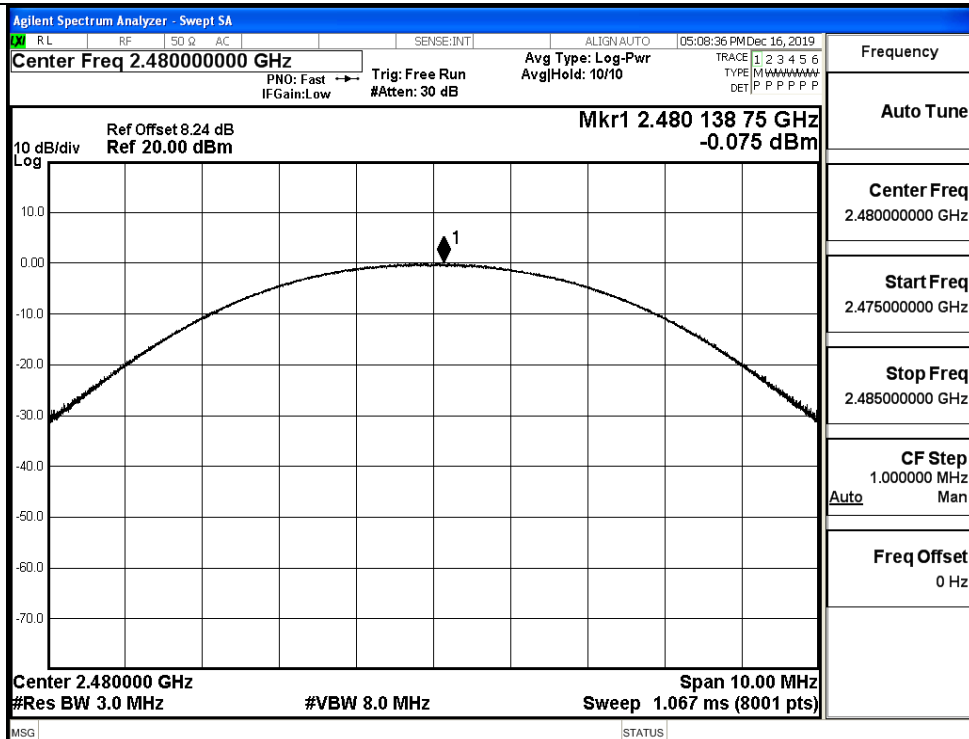


GFSK/HCH

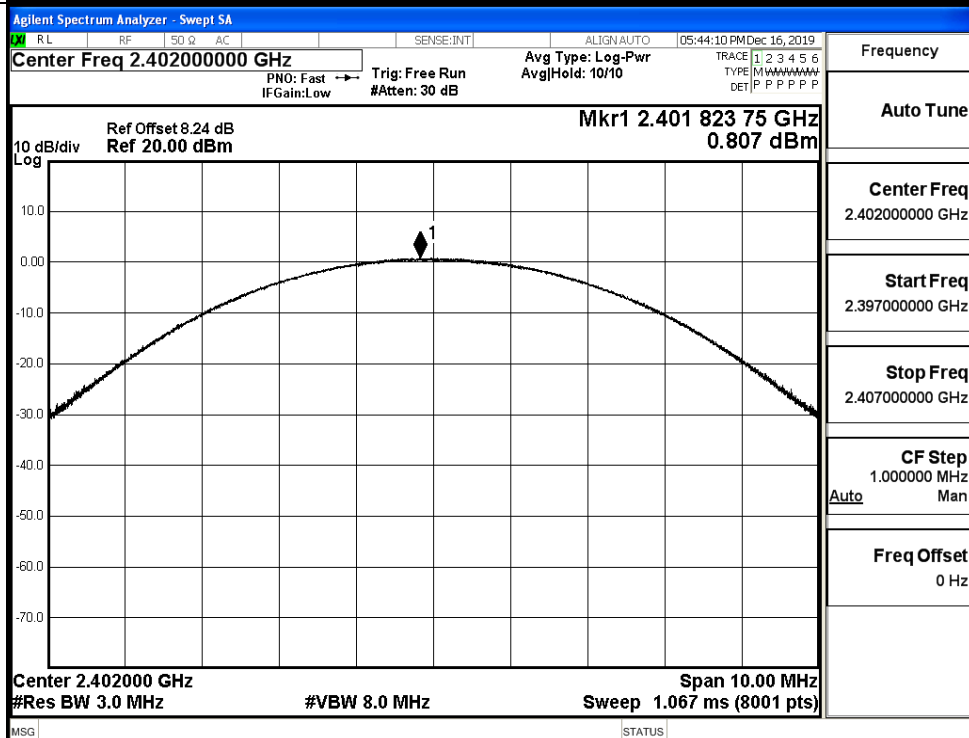




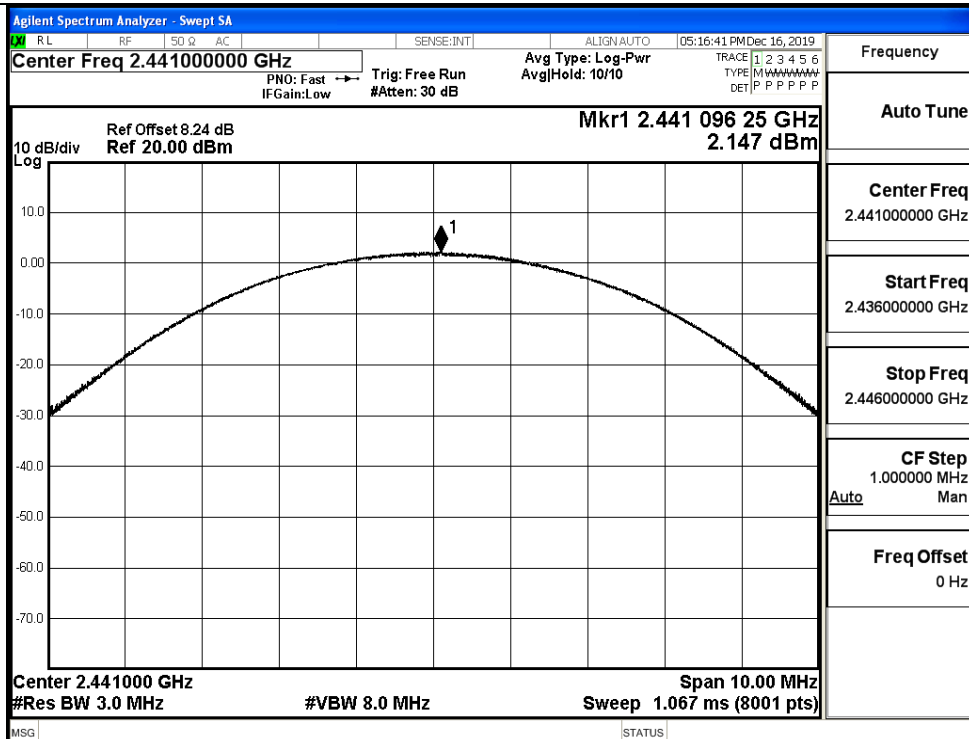
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

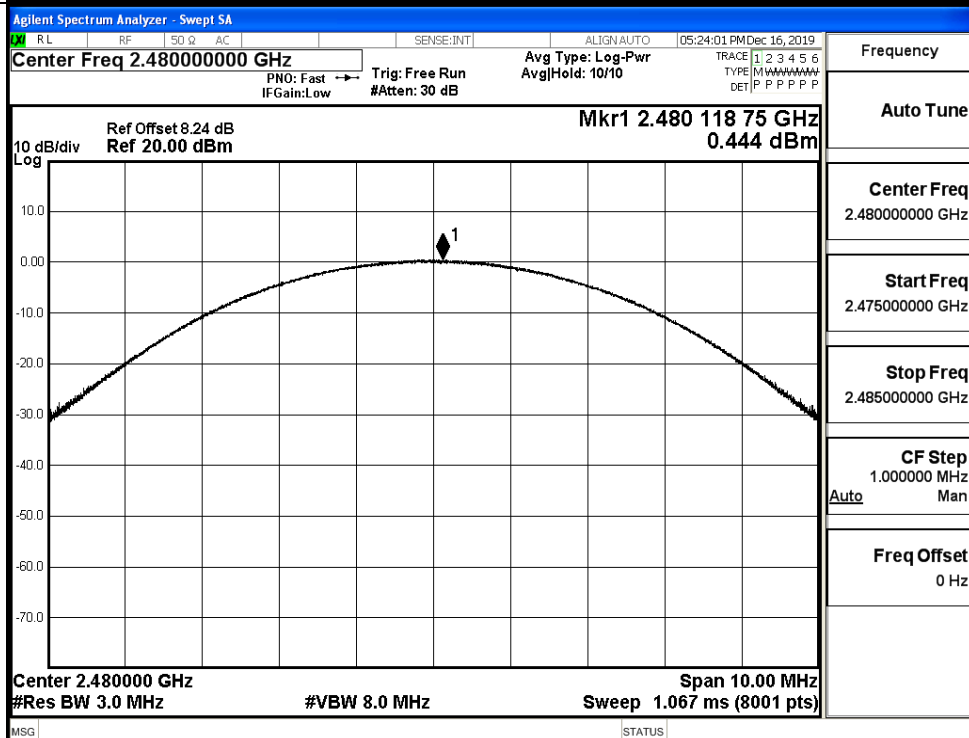
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

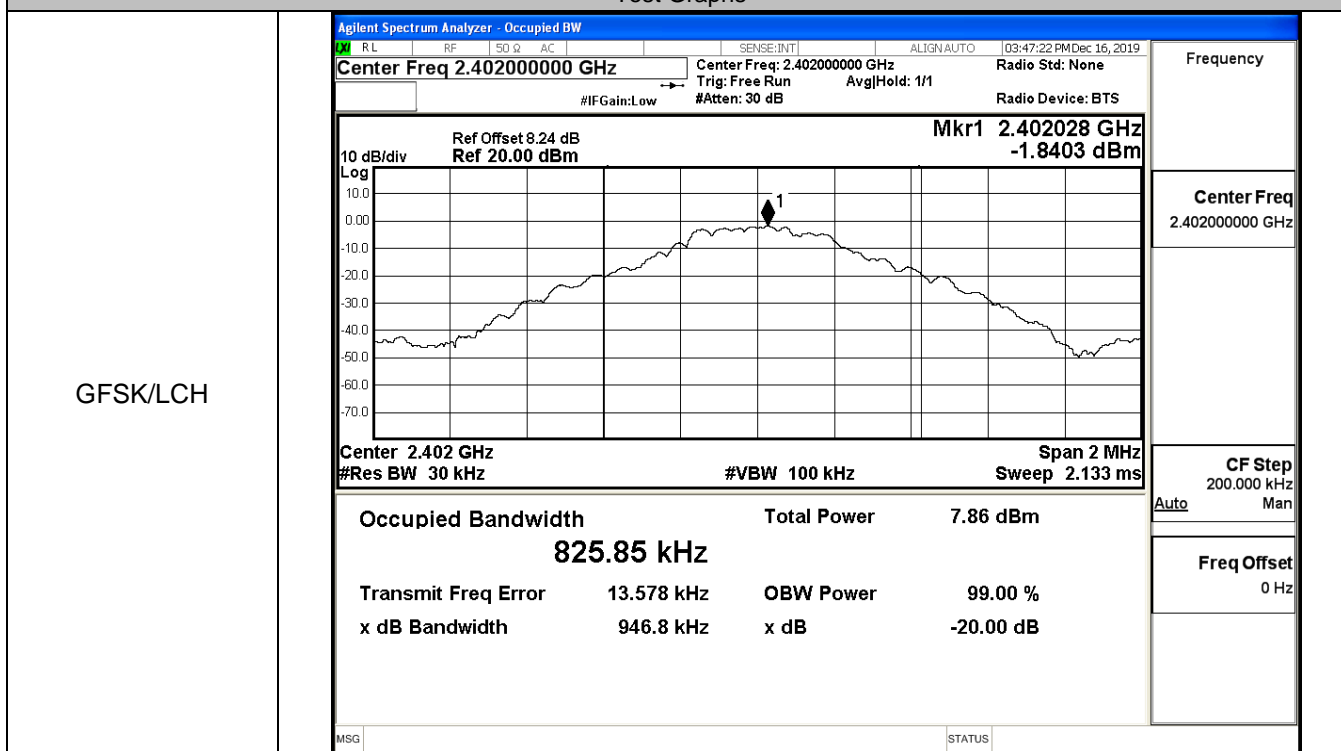


## A.2 20dB Bandwidth

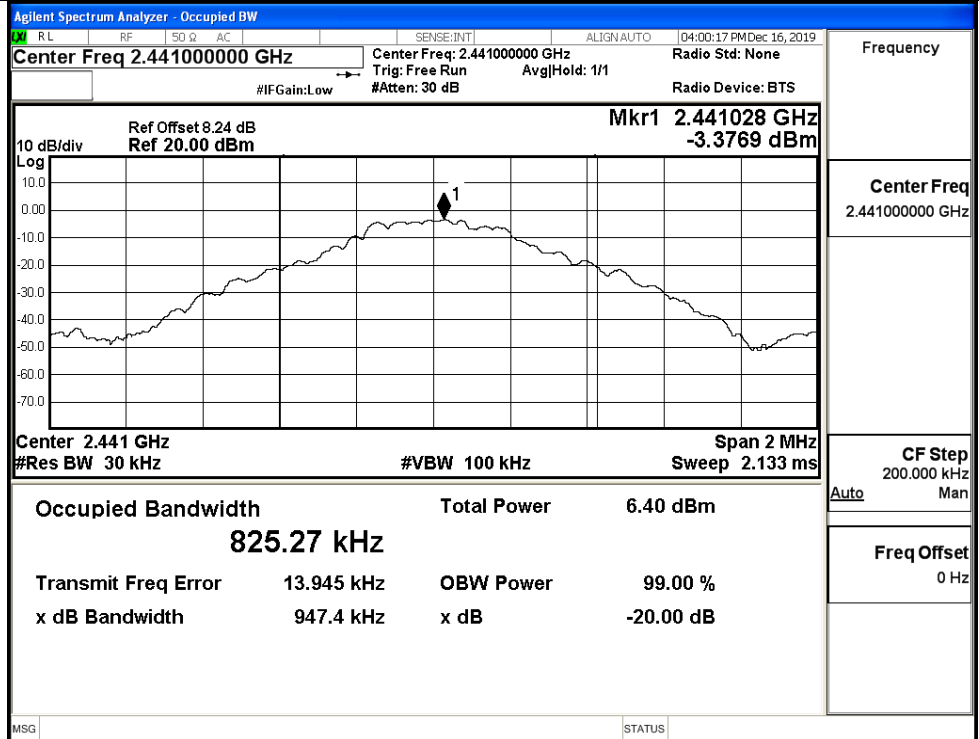
Left Ear

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9468	Not Specified	PASS
	MCH	0.9474	Not Specified	PASS
	HCH	0.9480	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.323	Not Specified	PASS
	MCH	1.323	Not Specified	PASS
	HCH	1.324	Not Specified	PASS
8DPSK	LCH	1.287	Not Specified	PASS
	MCH	1.289	Not Specified	PASS
	HCH	1.291	Not Specified	PASS

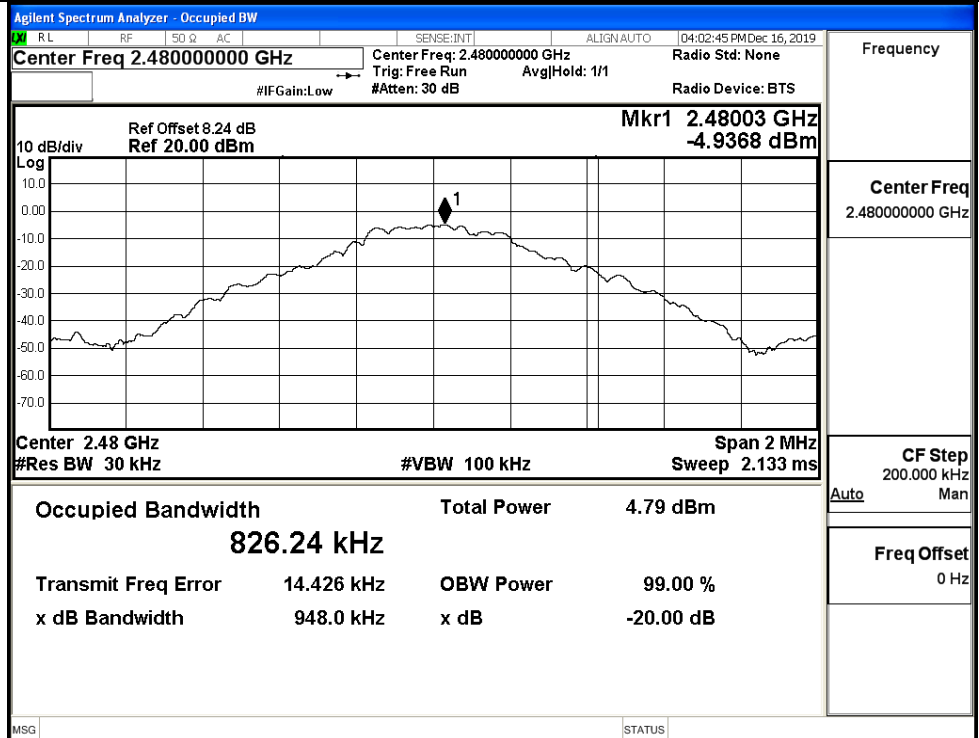
Test Graphs

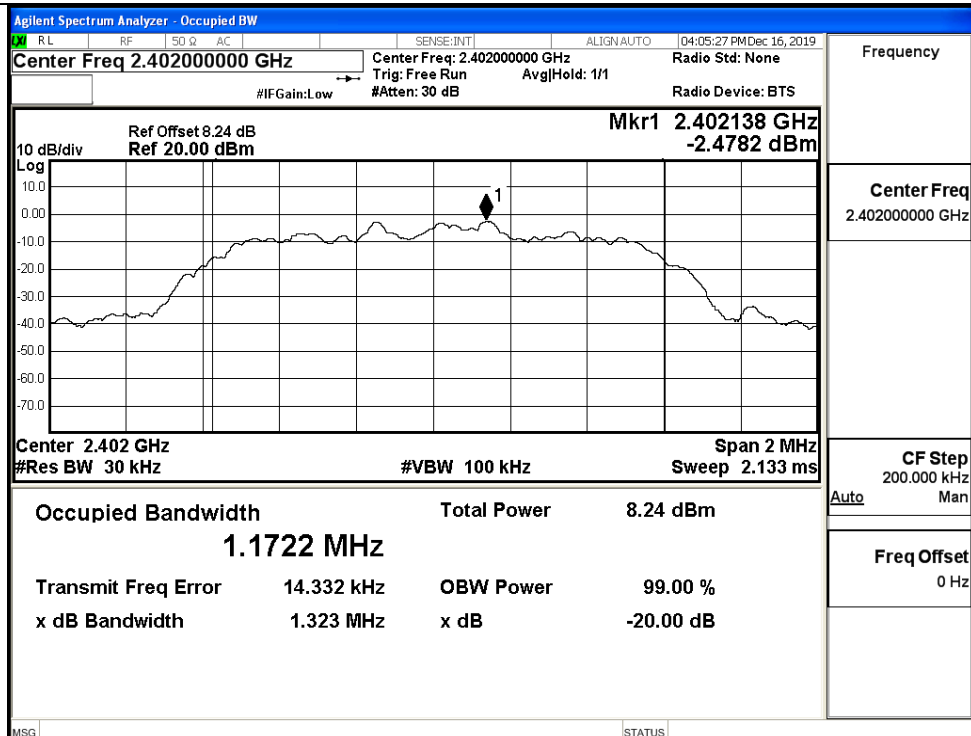
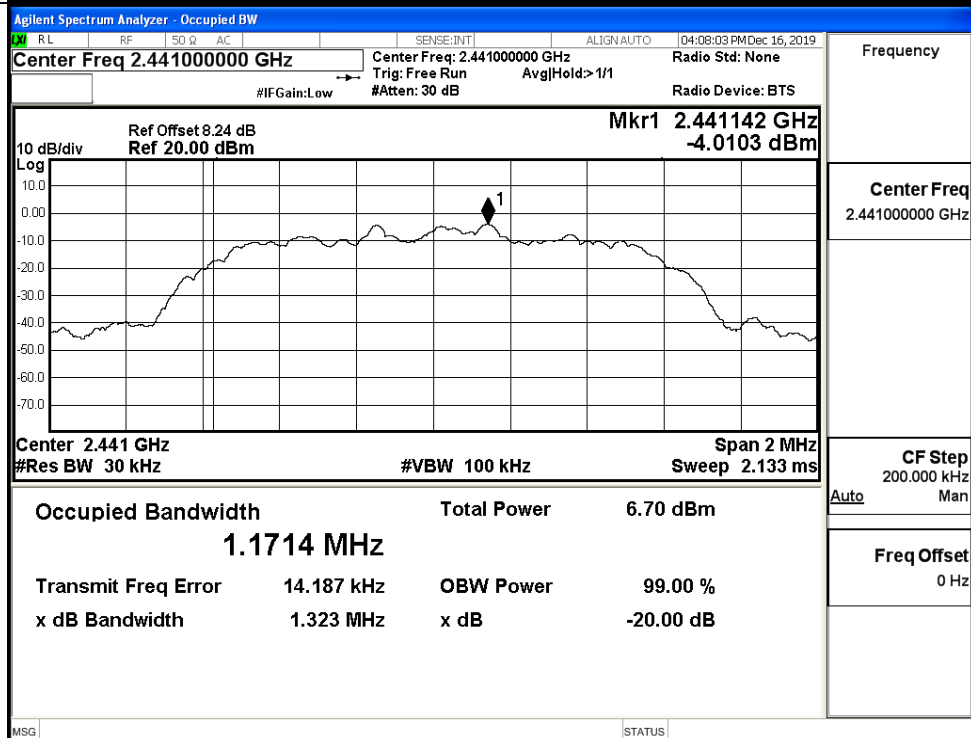


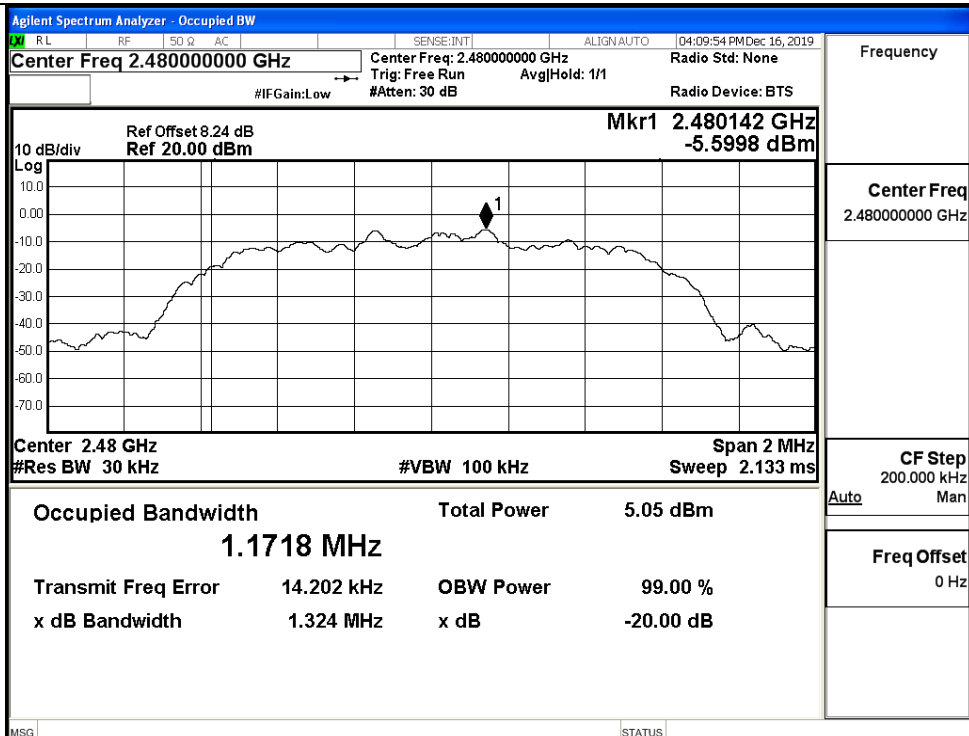
GFSK/MCH



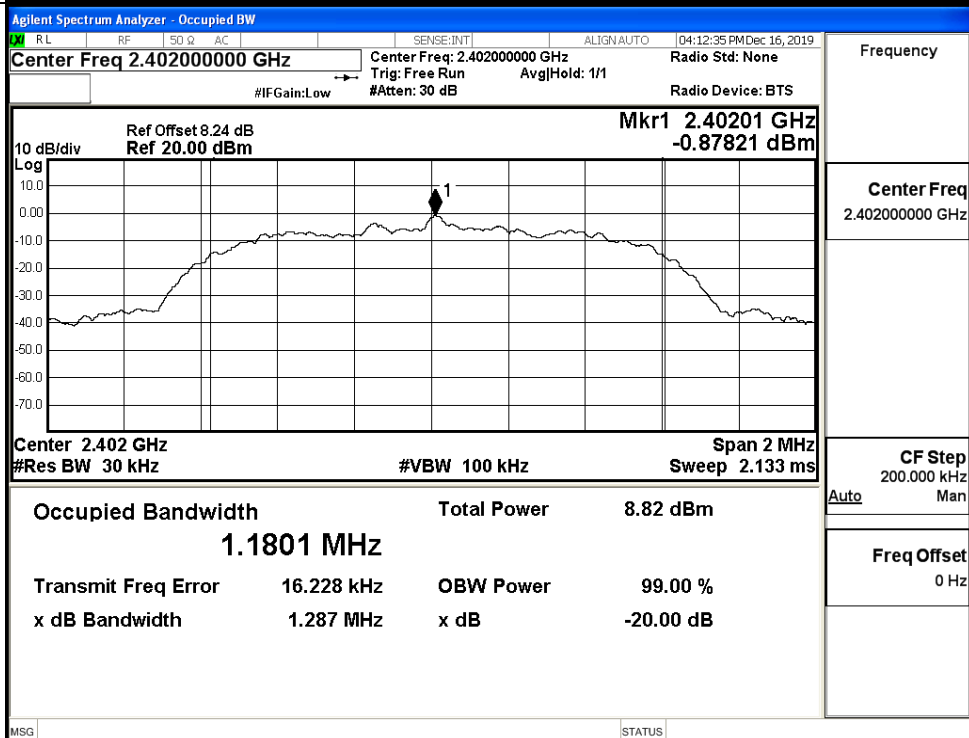
GFSK/HCH



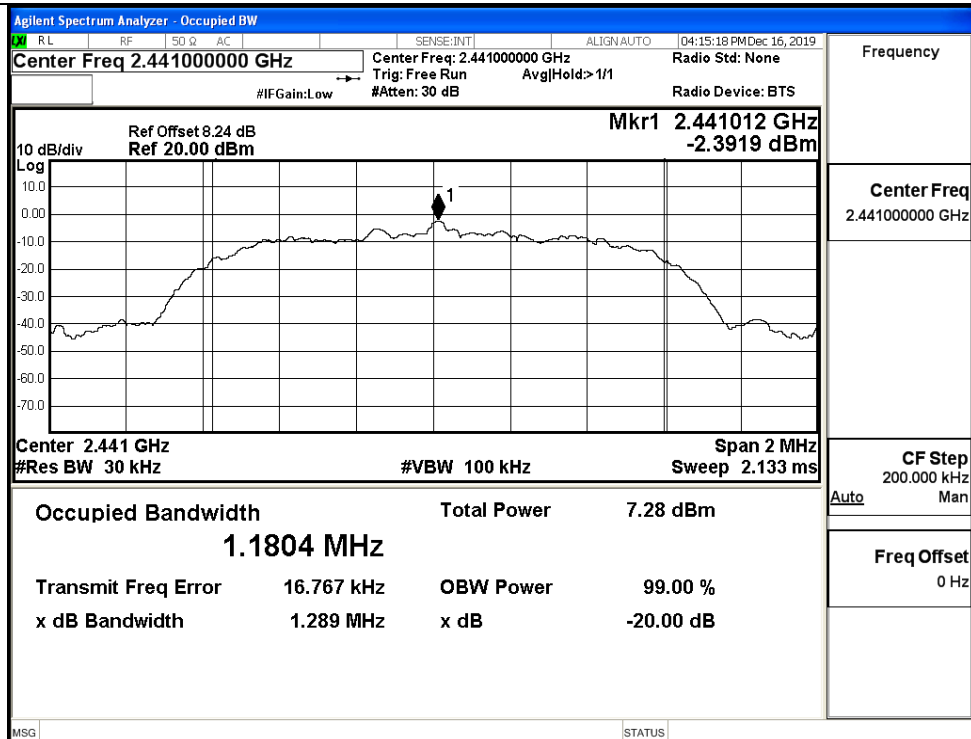
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

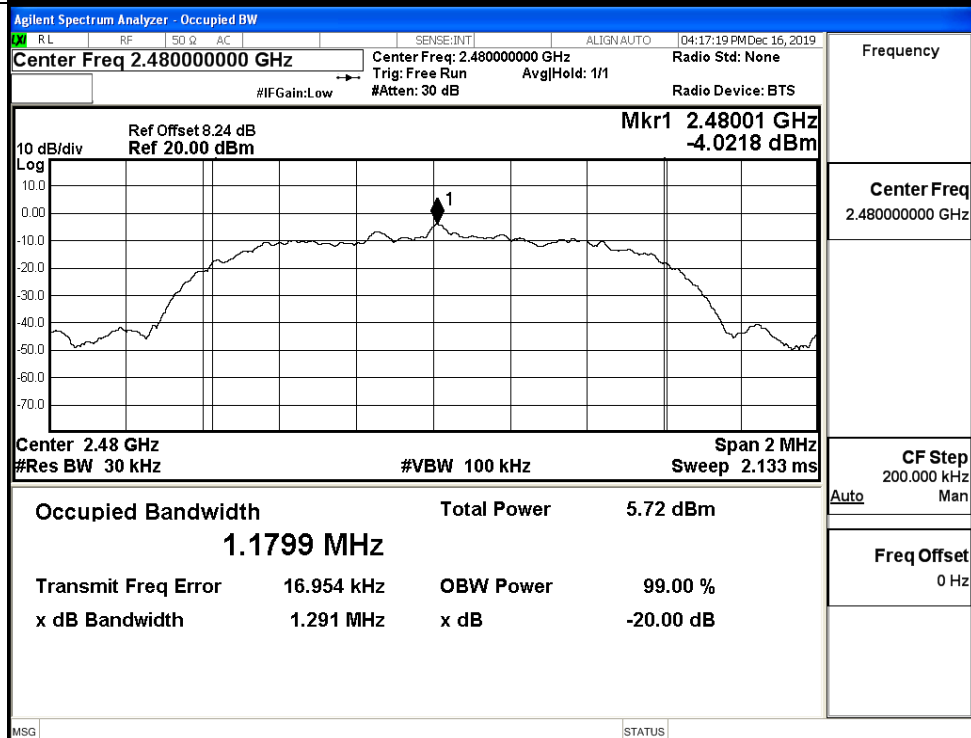
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH



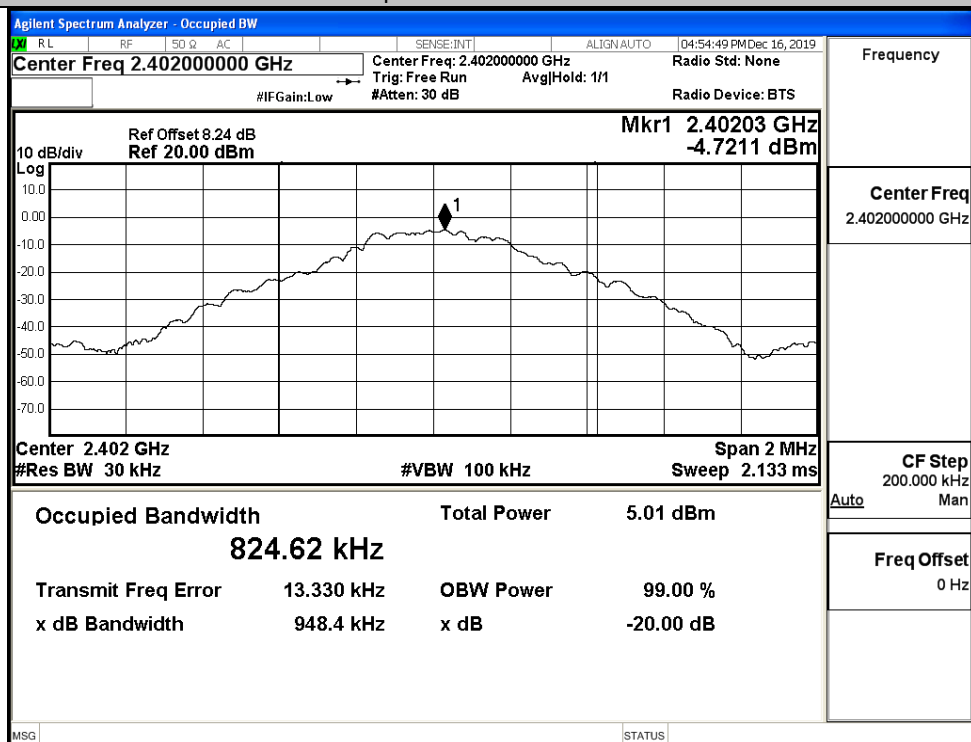


## Right Ear

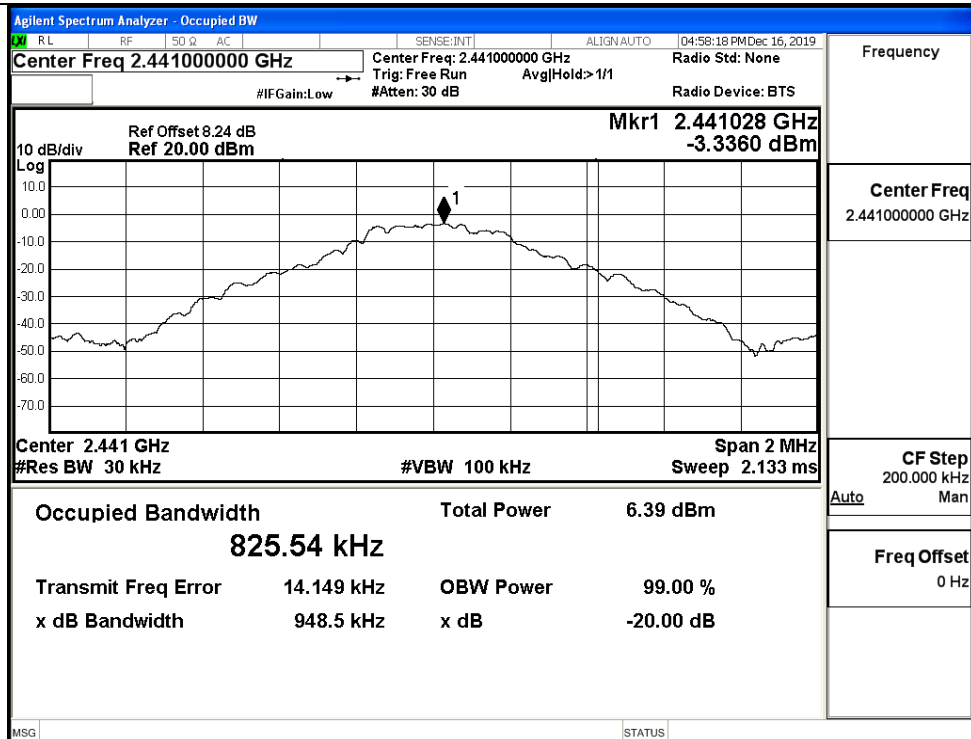
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9484	Not Specified	PASS
	MCH	0.9485	Not Specified	PASS
	HCH	0.9487	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.322	Not Specified	PASS
	MCH	1.325	Not Specified	PASS
	HCH	1.322	Not Specified	PASS
8DPSK	LCH	1.286	Not Specified	PASS
	MCH	1.288	Not Specified	PASS
	HCH	1.300	Not Specified	PASS

## Test Graphs

GFSK/LCH



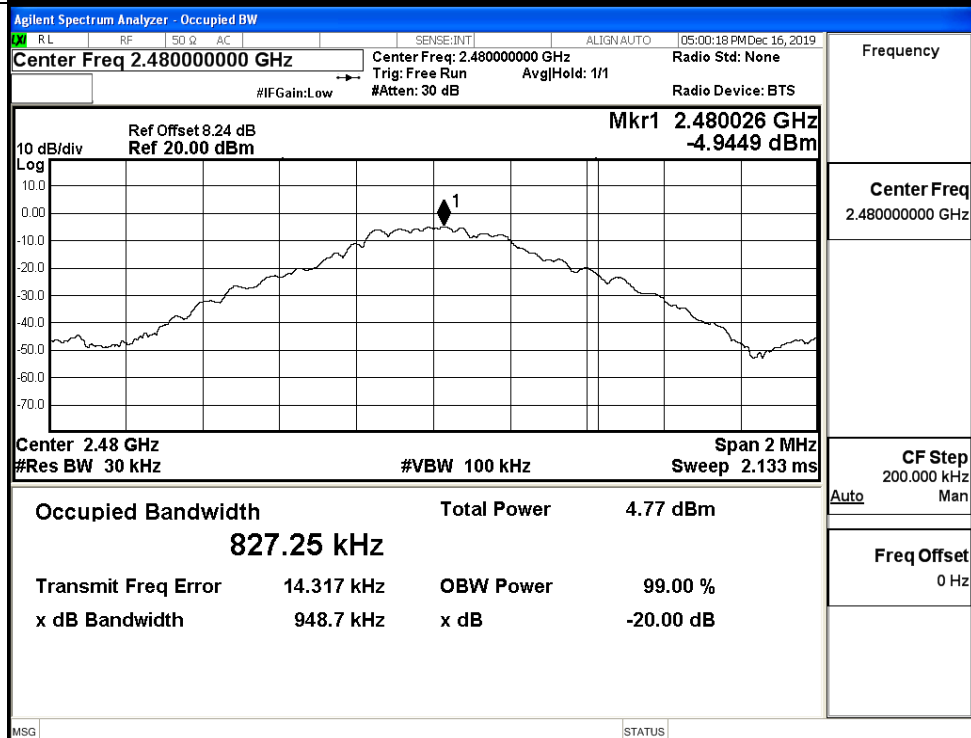
GFSK/MCH



Frequency

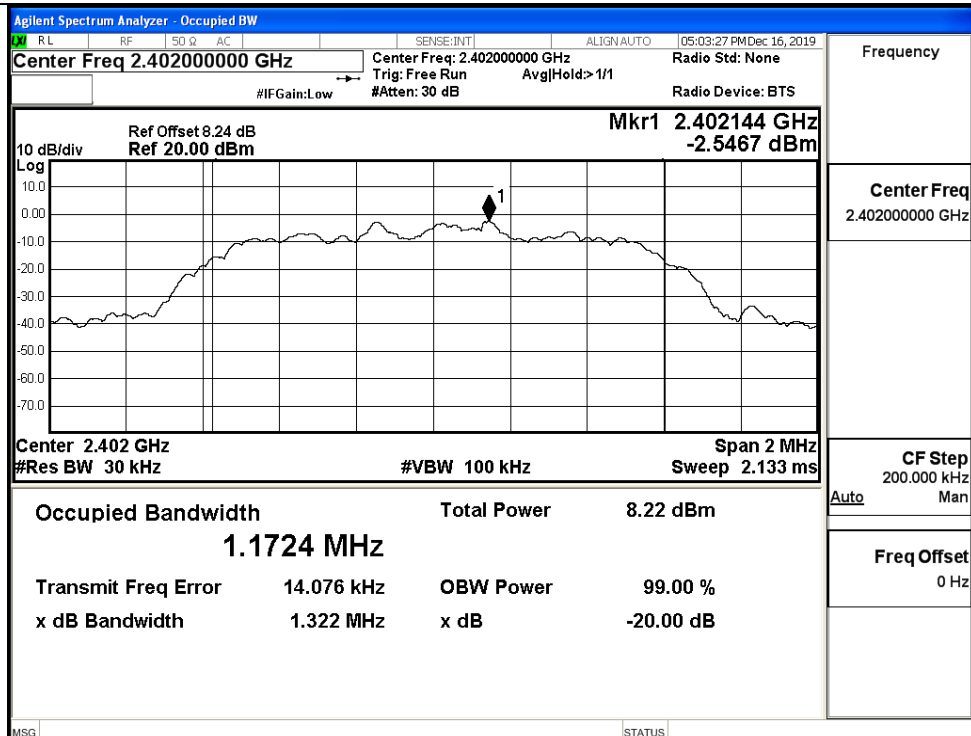
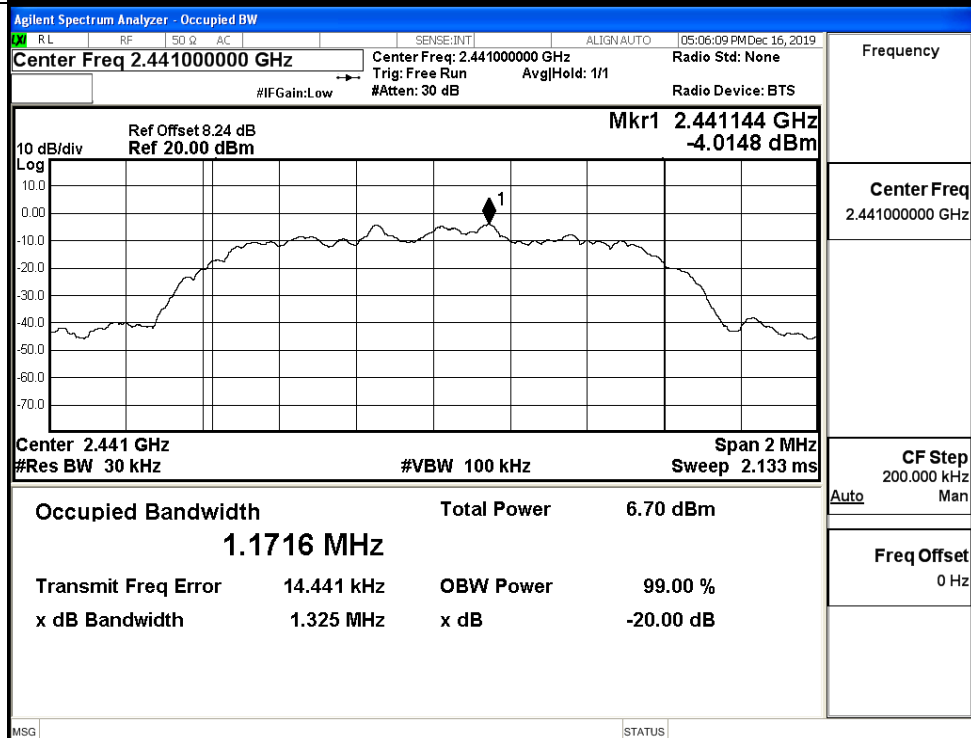
Center Freq  
2.441000000 GHzCF Step  
200.000 kHz  
Auto ManFreq Offset  
0 Hz

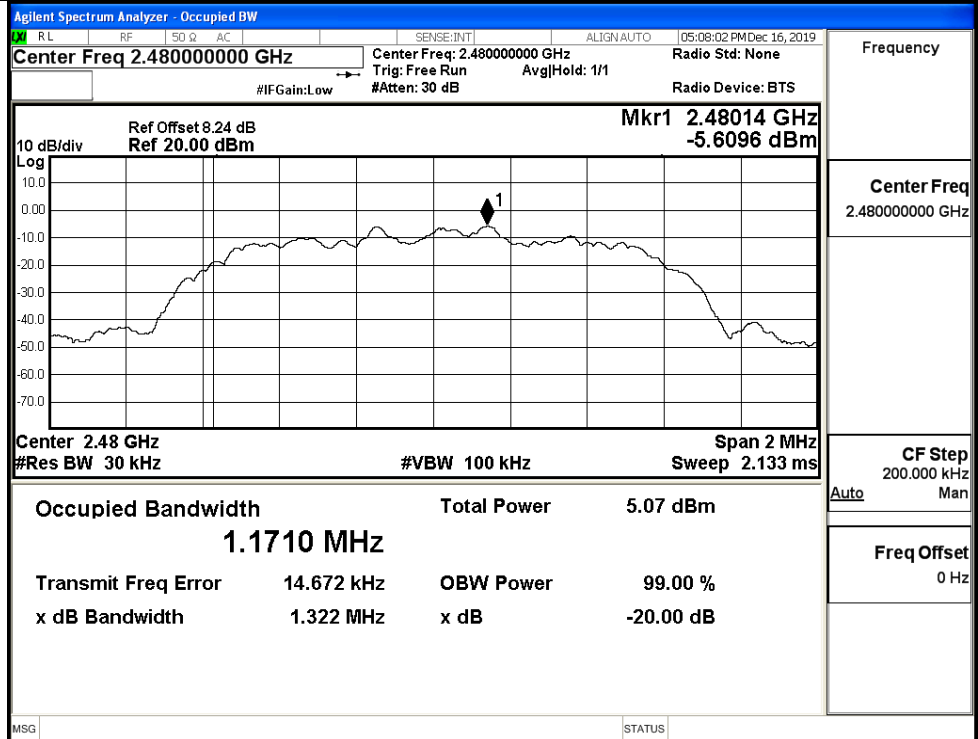
GFSK/HCH



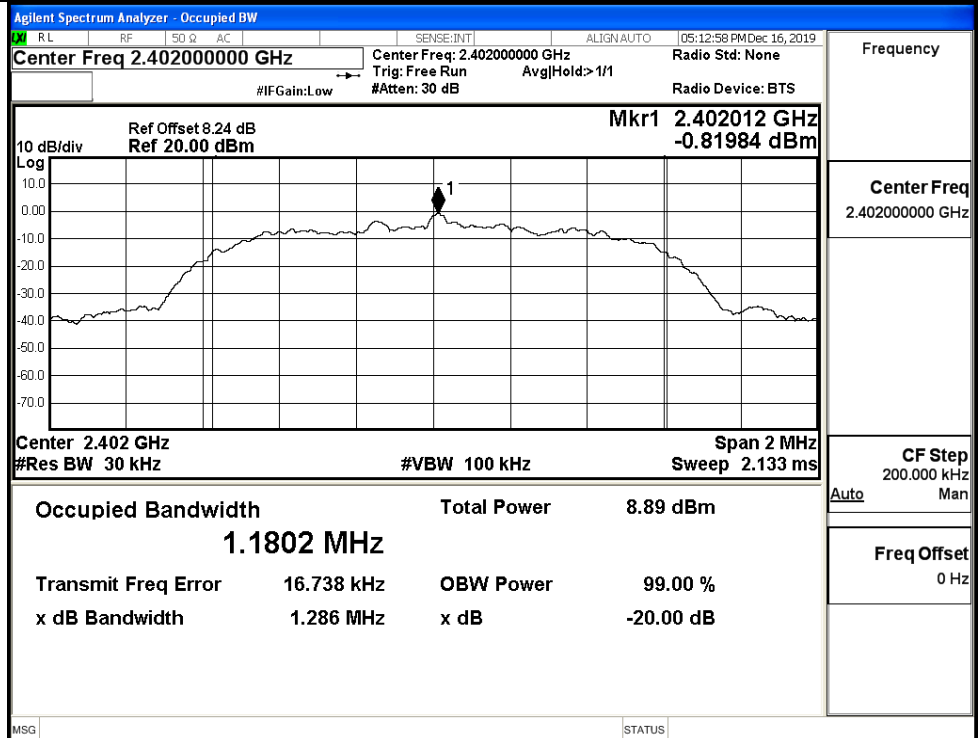
Frequency

Center Freq  
2.480000000 GHzCF Step  
200.000 kHz  
Auto ManFreq Offset  
0 Hz

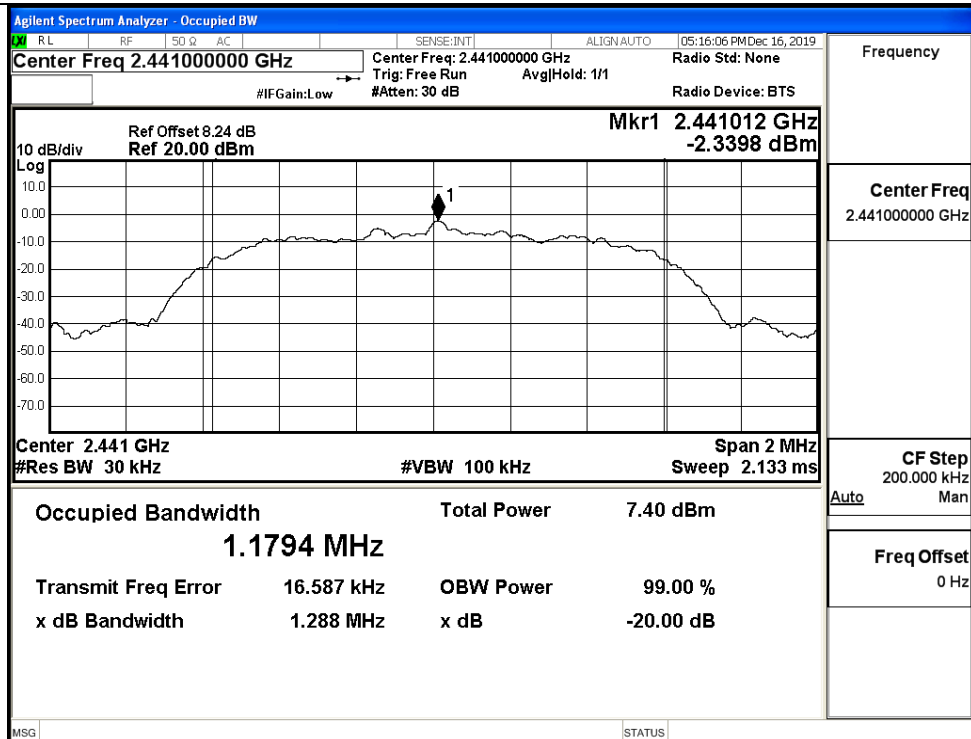
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

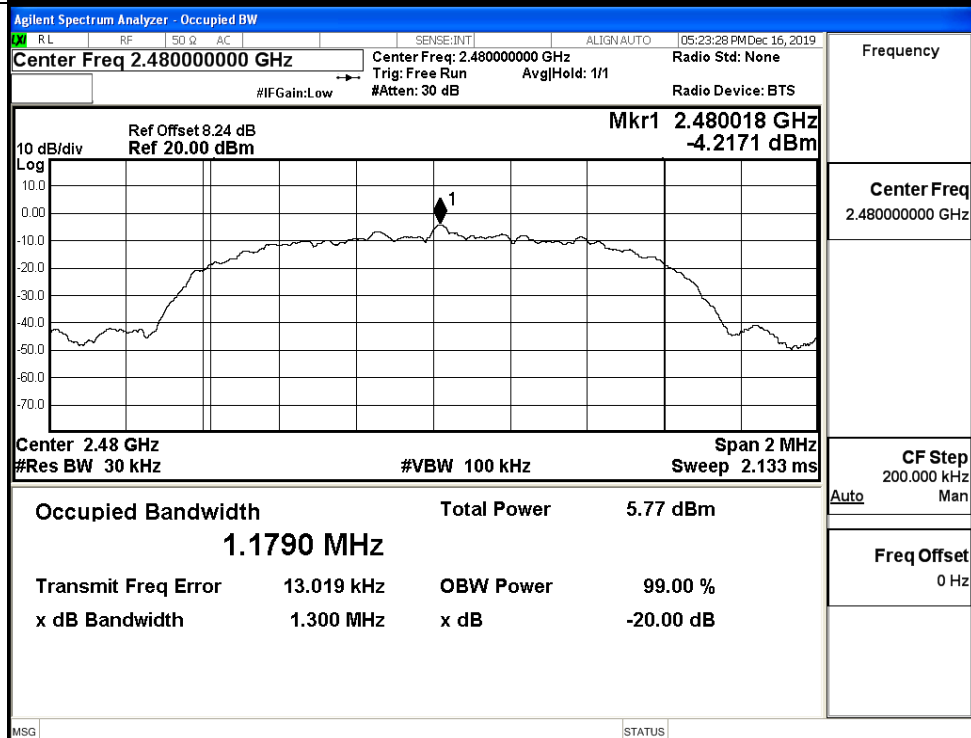
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH



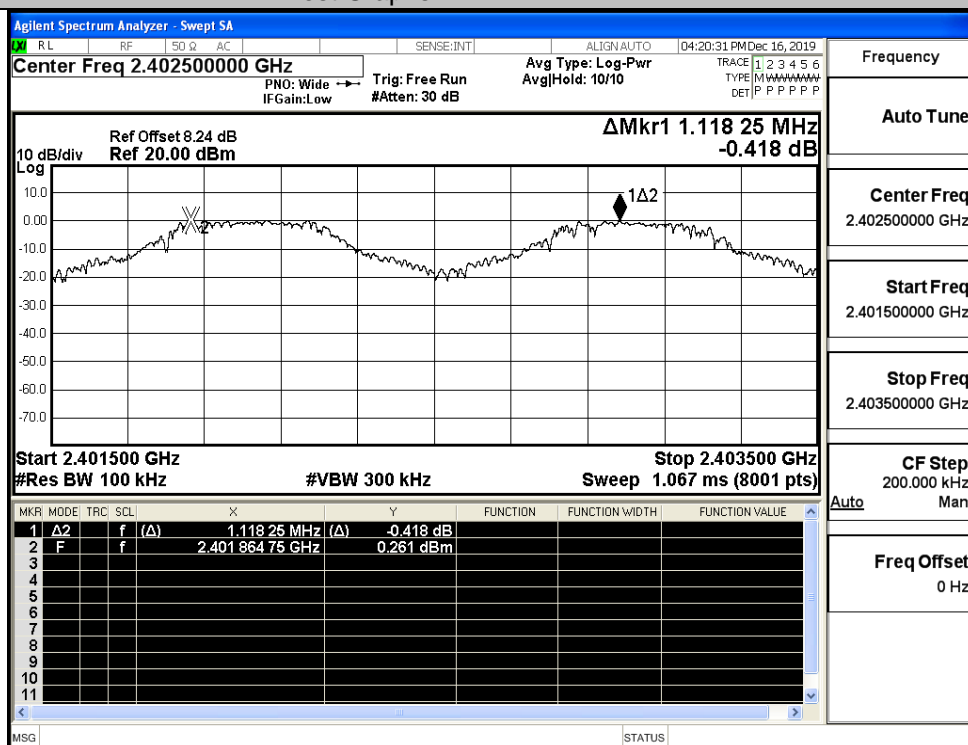
### A.3 Carrier Frequency Separation

Left Ear

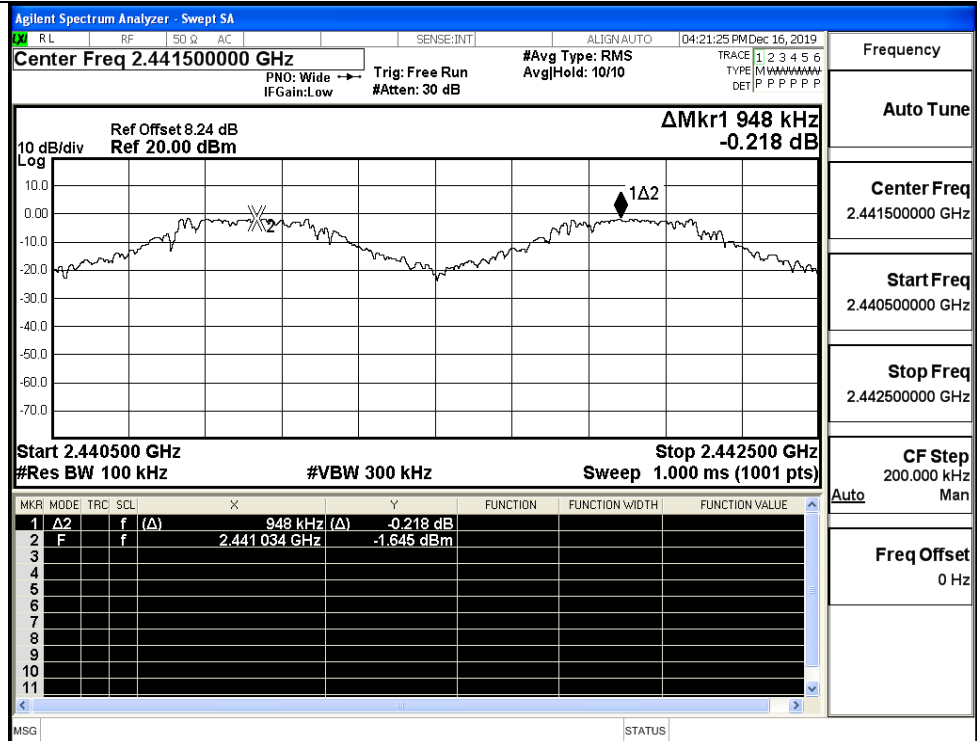
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.118	0.632	PASS
	MCH	0.948	0.632	PASS
	HCH	1.010	0.632	PASS
$\pi/4$ DQPSK	LCH	1.000	0.883	PASS
	MCH	0.986	0.883	PASS
	HCH	1.028	0.883	PASS
8DPSK	LCH	1.014	0.861	PASS
	MCH	1.134	0.861	PASS
	HCH	1.074	0.861	PASS

#### Test Graphs

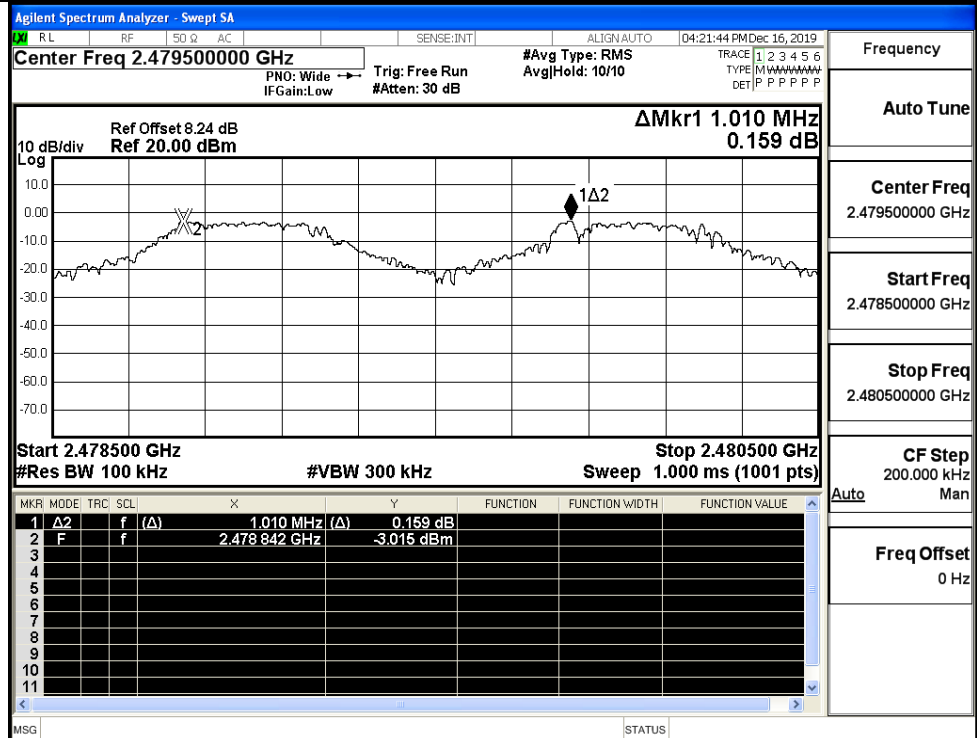
GFSK/LCH

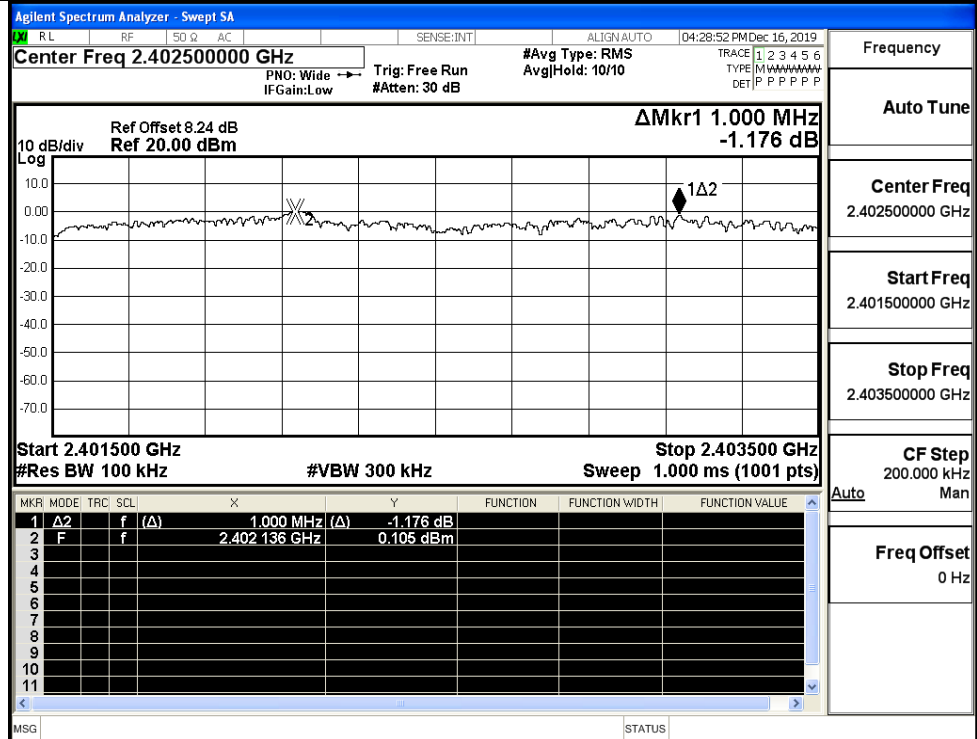
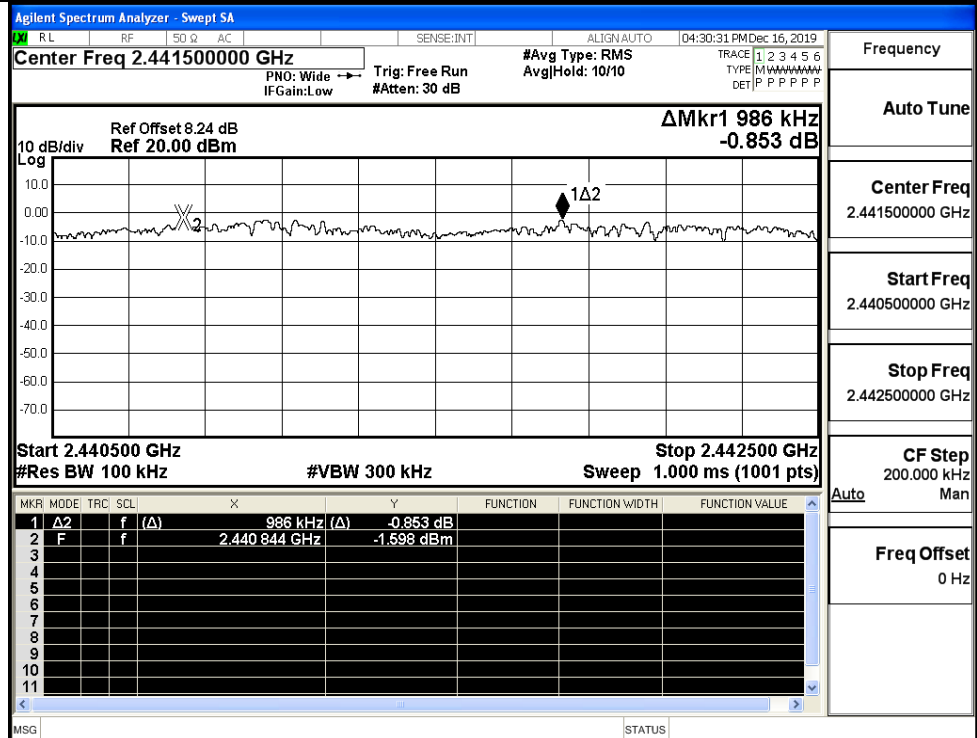


GFSK/MCH

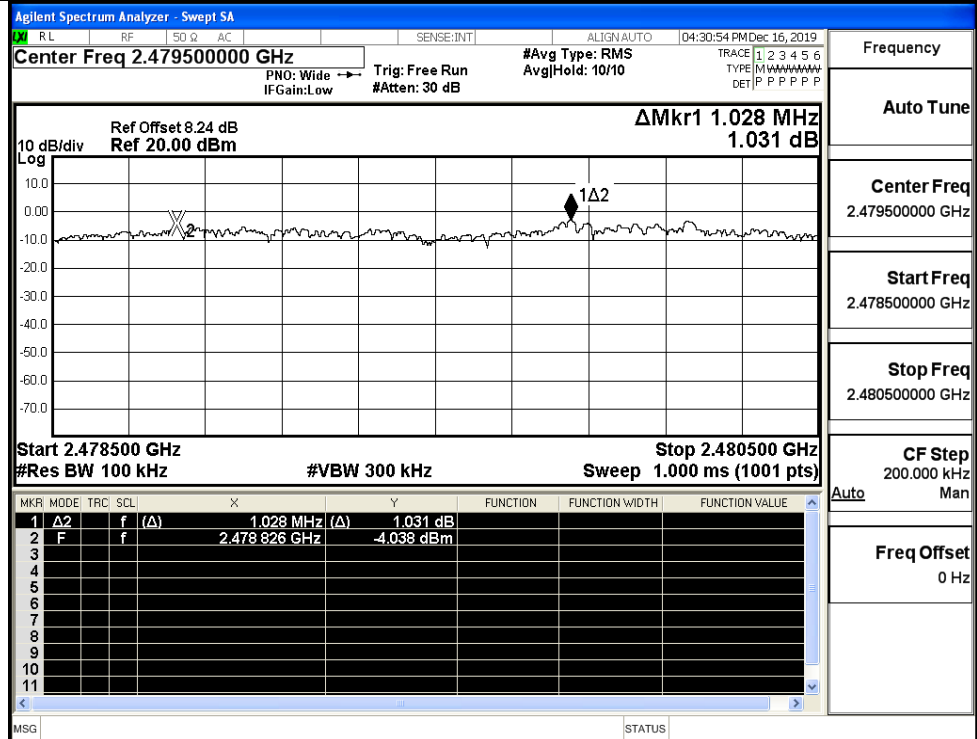


GFSK/HCH

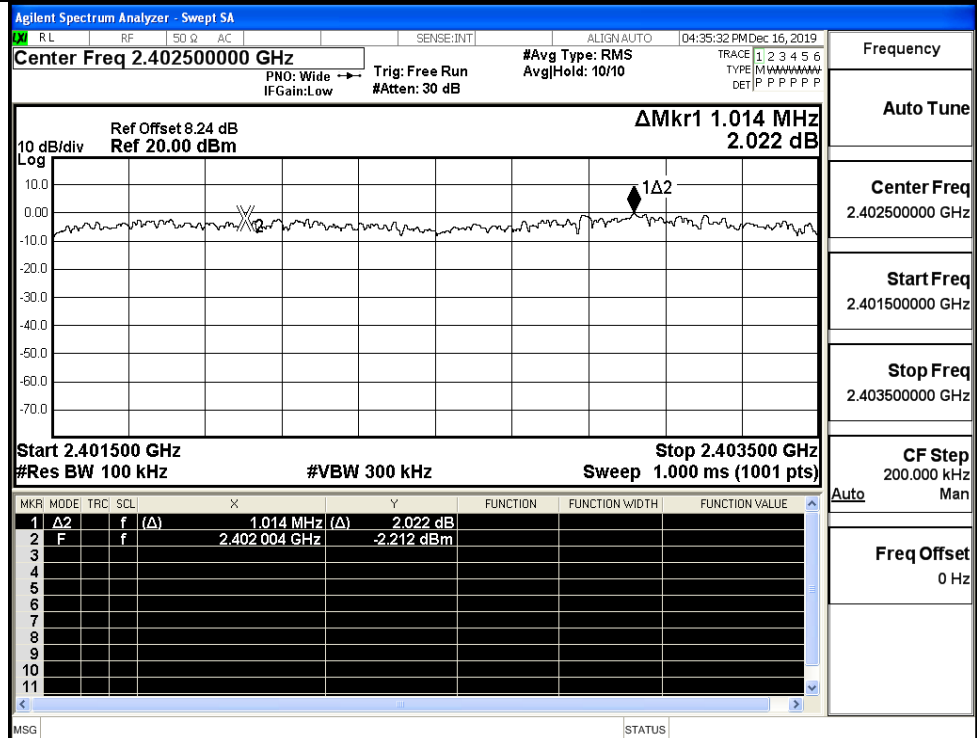


$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

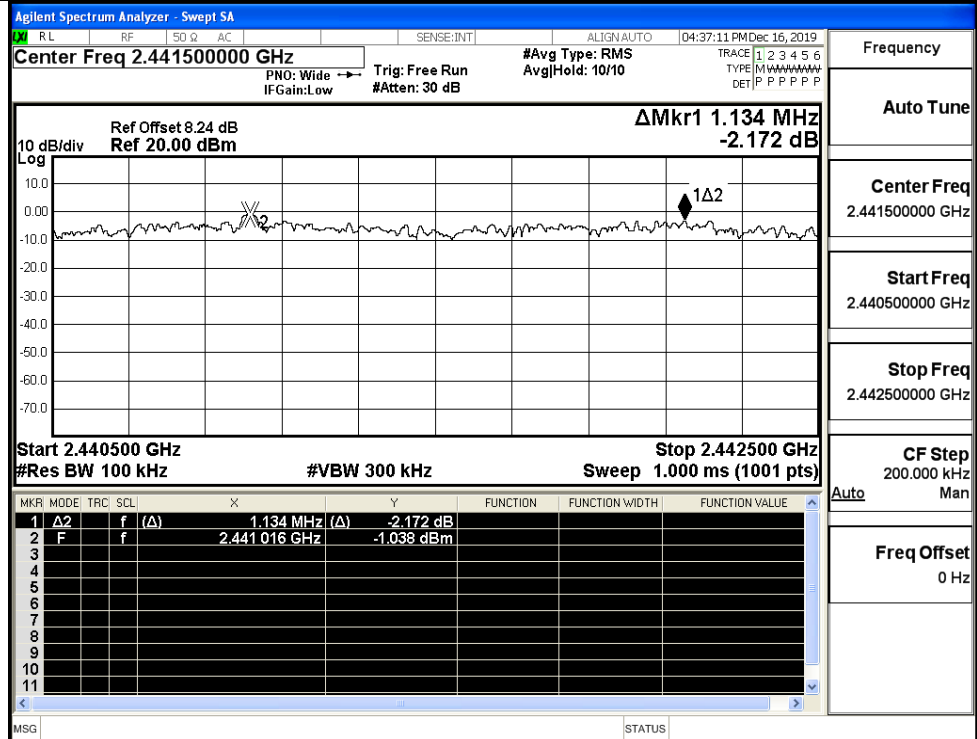


$\pi/4$ DQPSK/HCH

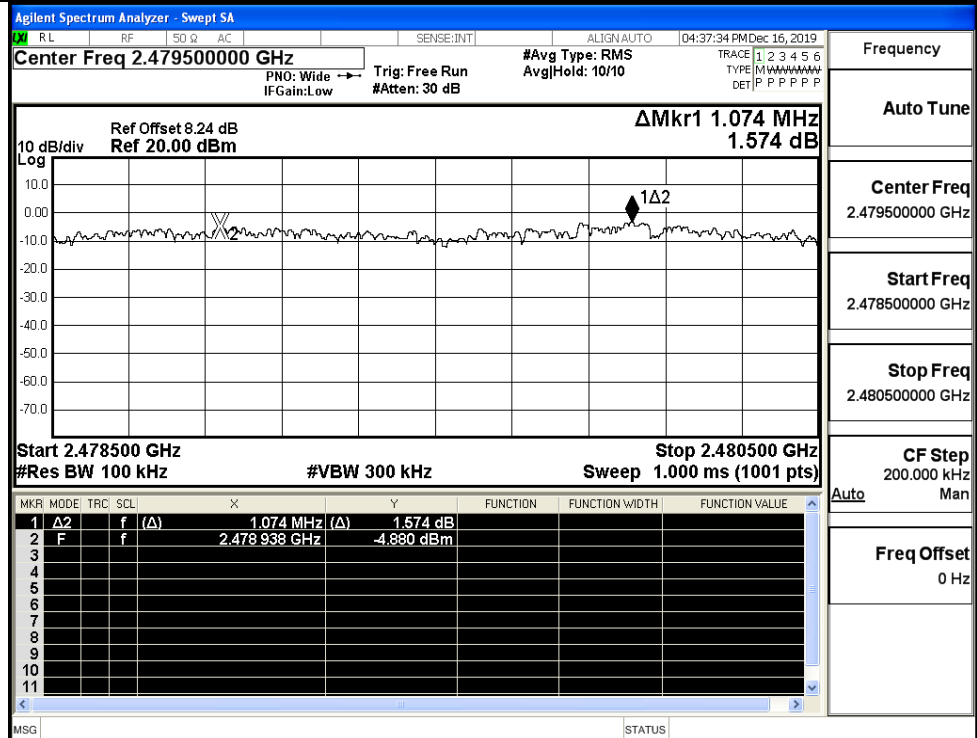
8DPSK/LCH



8DPSK/MCH



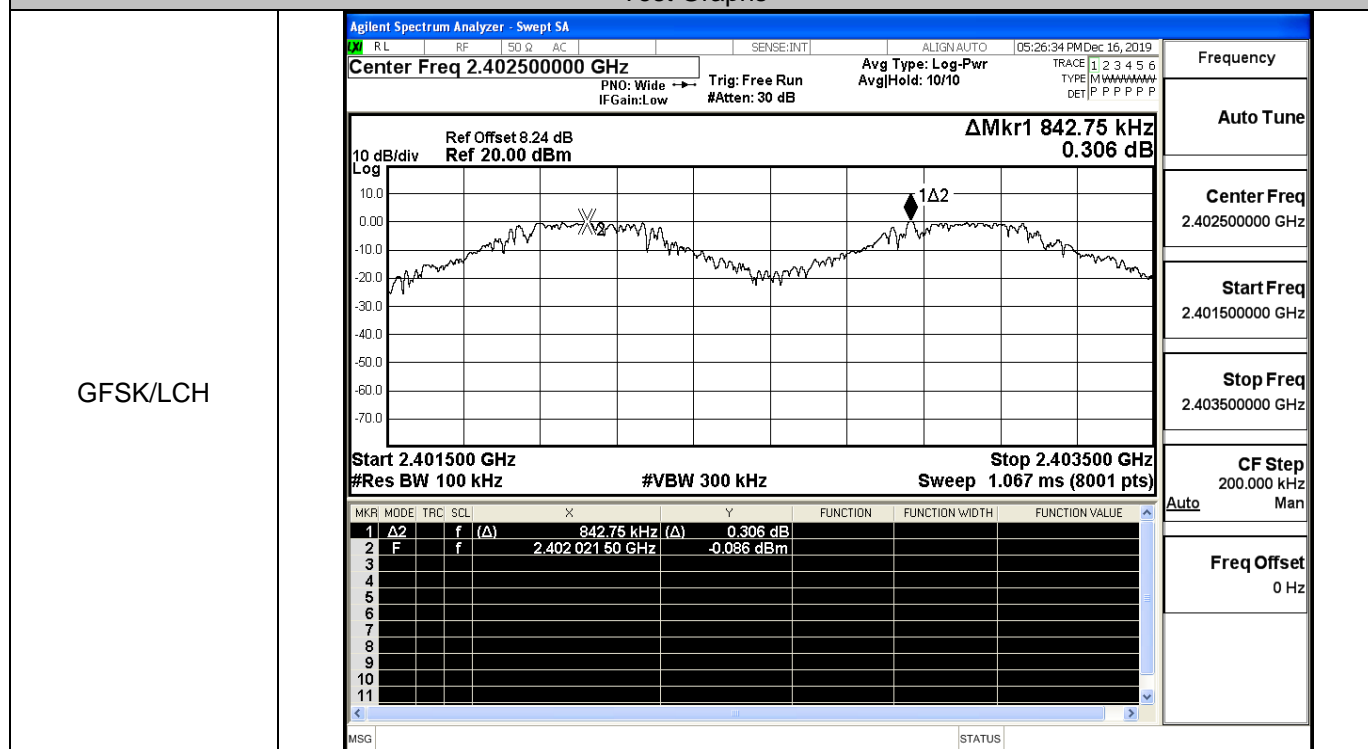
8DPSK/HCH



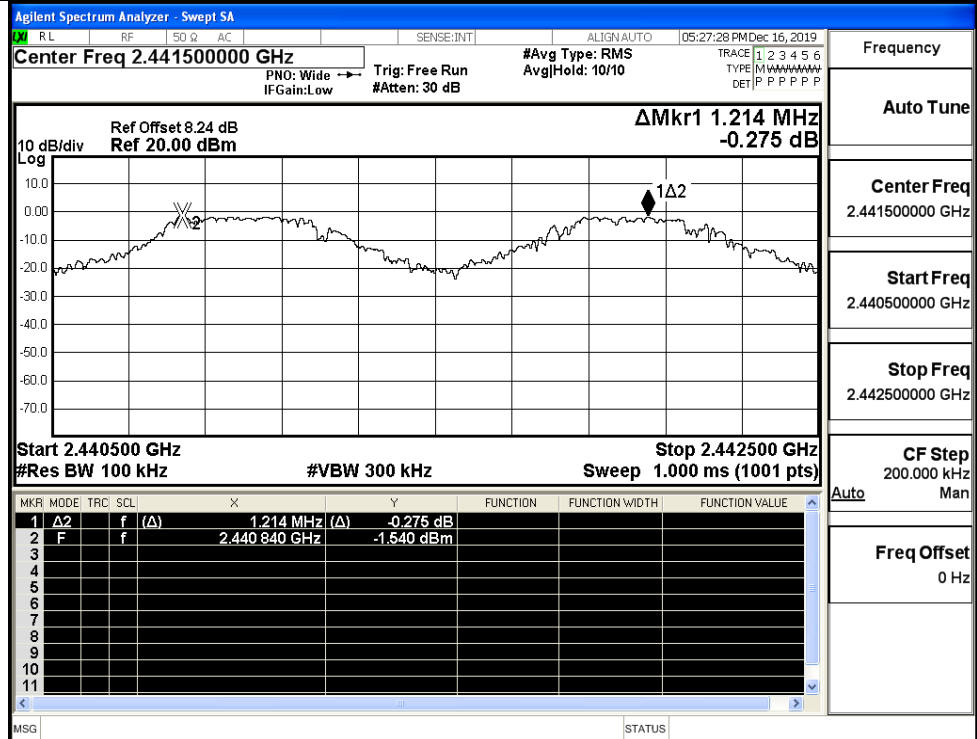
## Right Ear

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.843	0.632	PASS
	MCH	1.214	0.632	PASS
	HCH	0.992	0.632	PASS
$\pi/4$ DQPSK	LCH	0.988	0.883	PASS
	MCH	0.968	0.883	PASS
	HCH	1.120	0.883	PASS
8DPSK	LCH	0.942	0.867	PASS
	MCH	1.012	0.867	PASS
	HCH	1.162	0.867	PASS

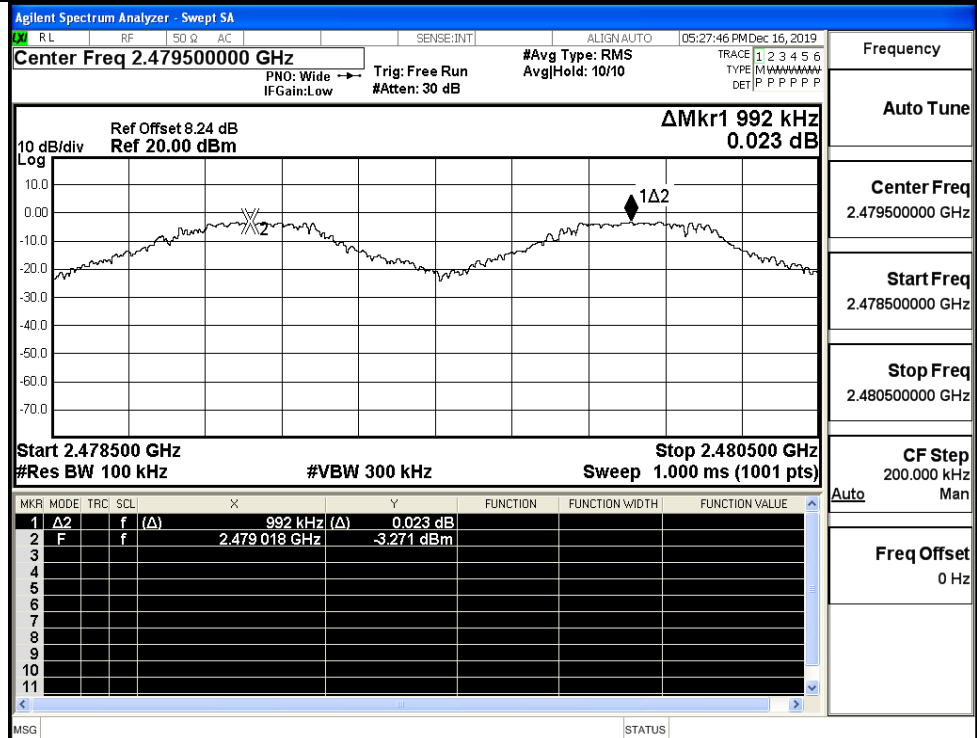
## Test Graphs

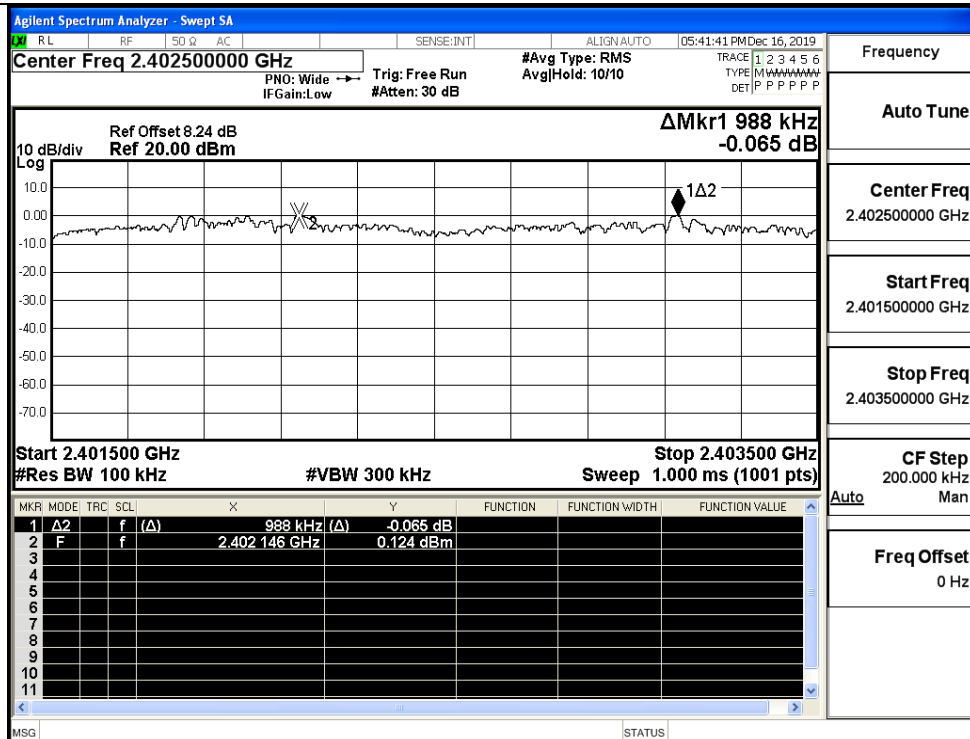
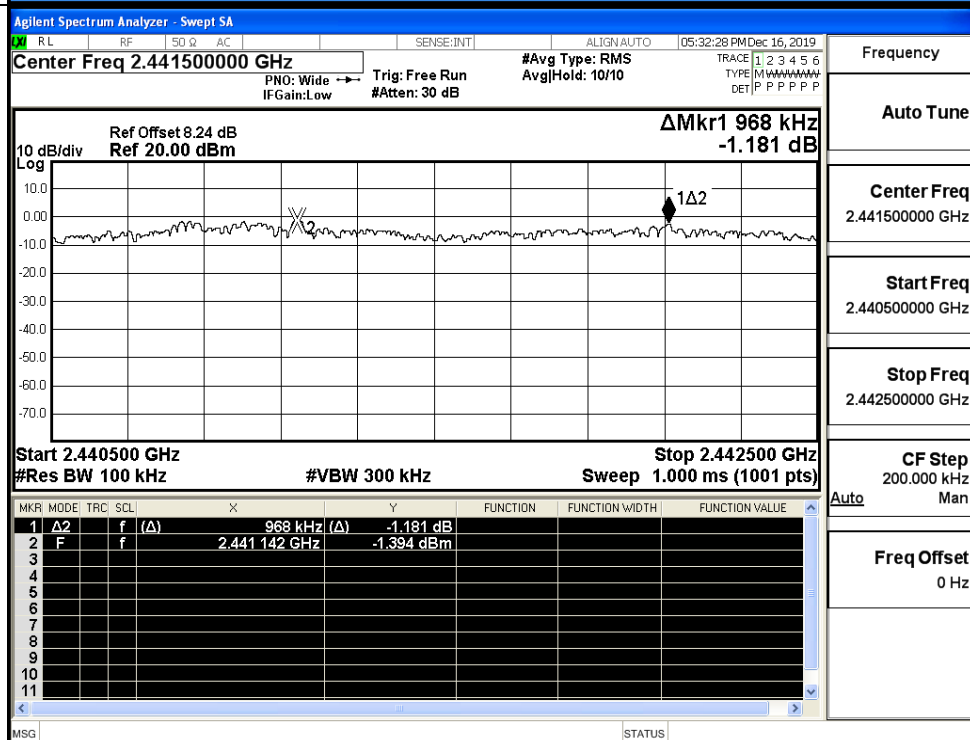


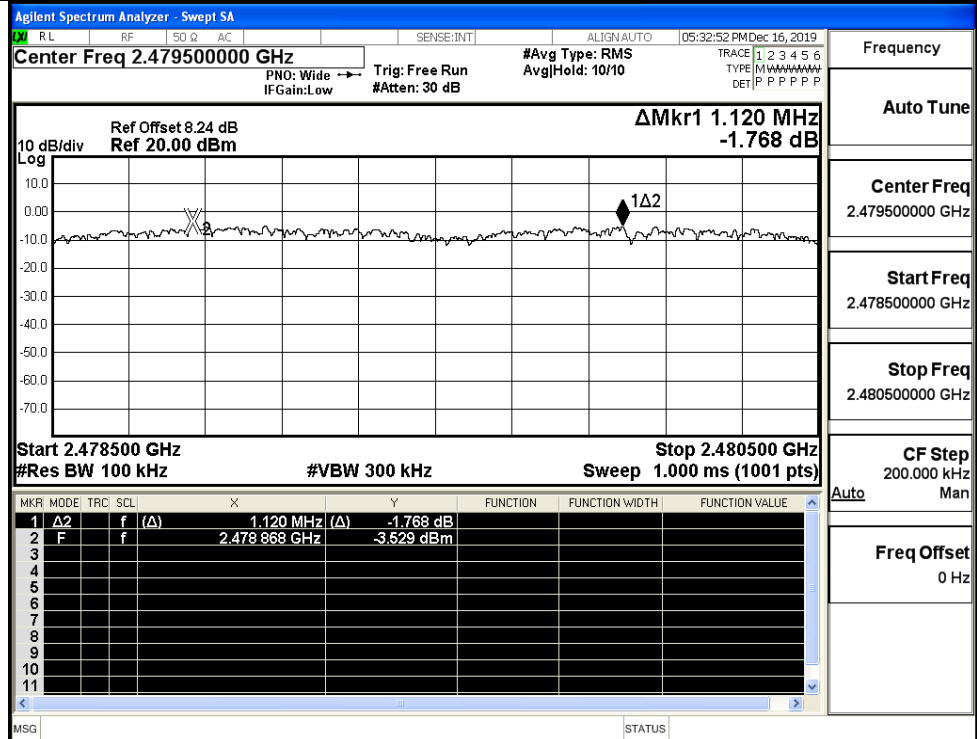
GFSK/MCH



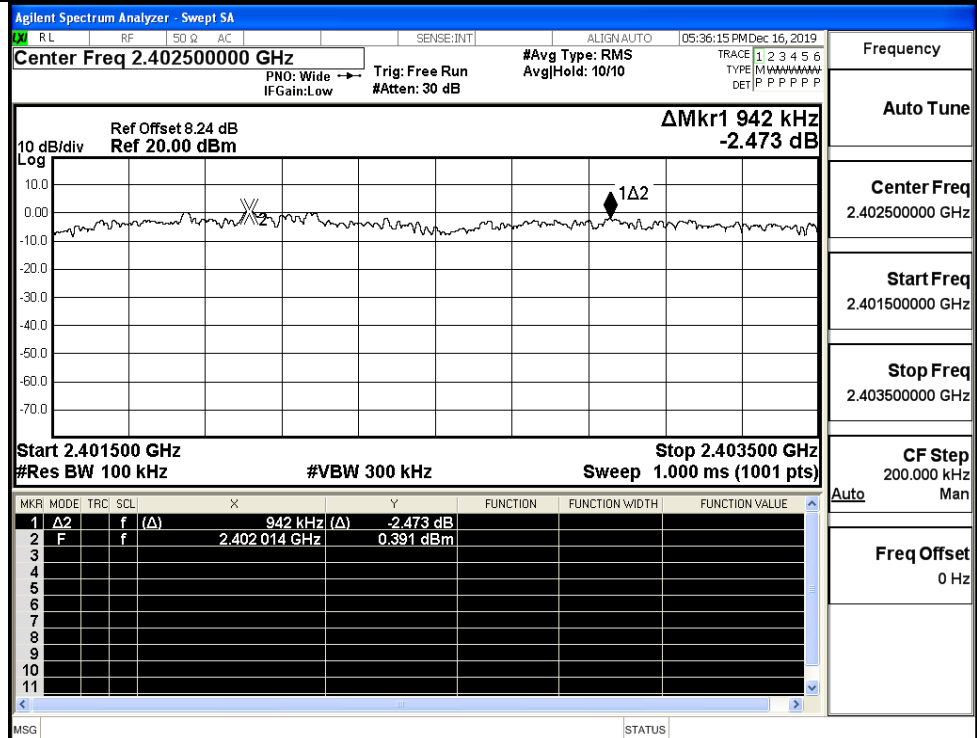
GFSK/HCH



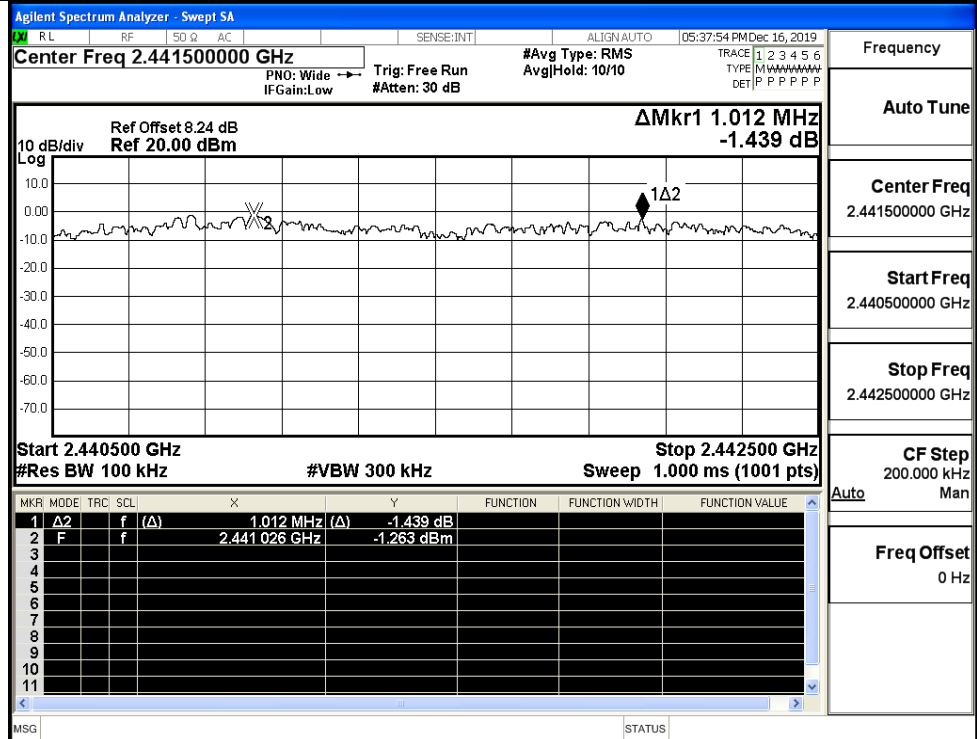
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

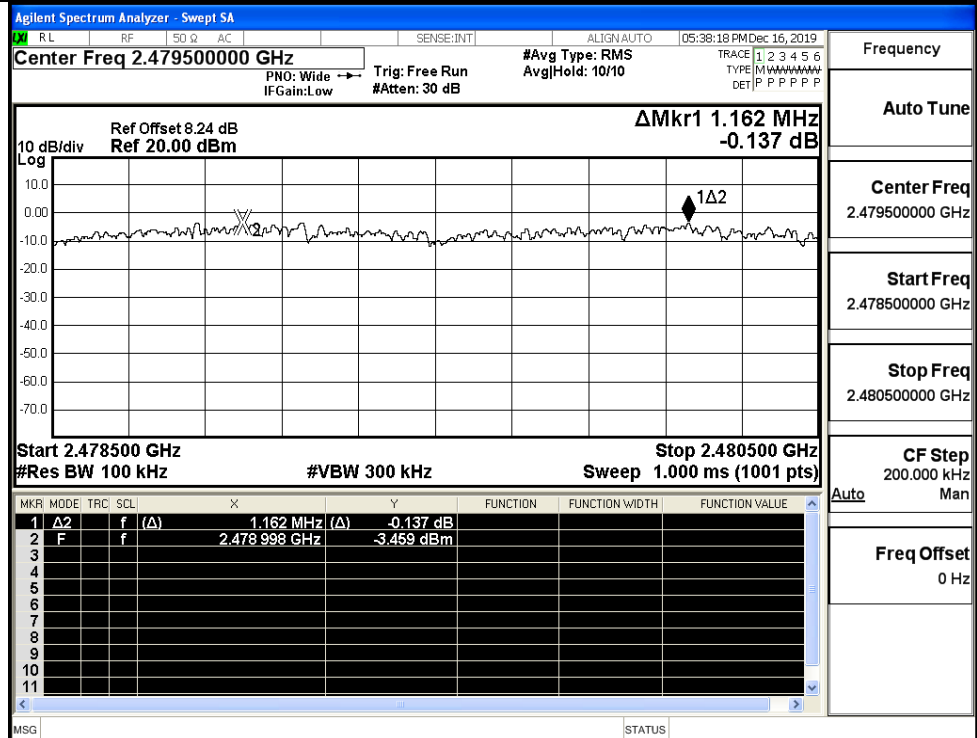
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH



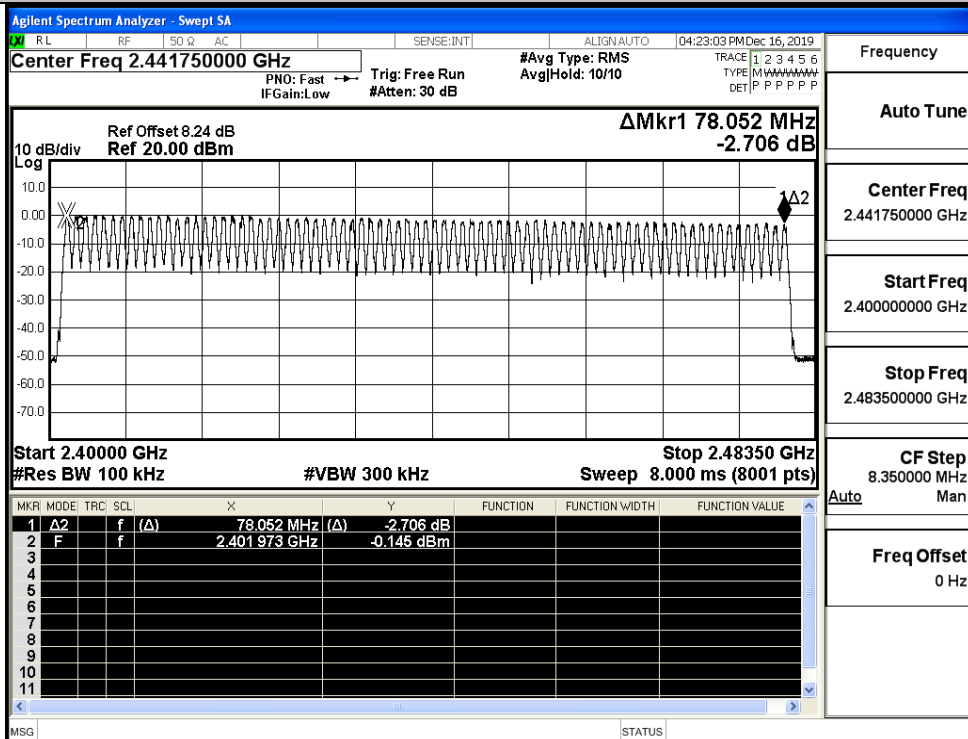
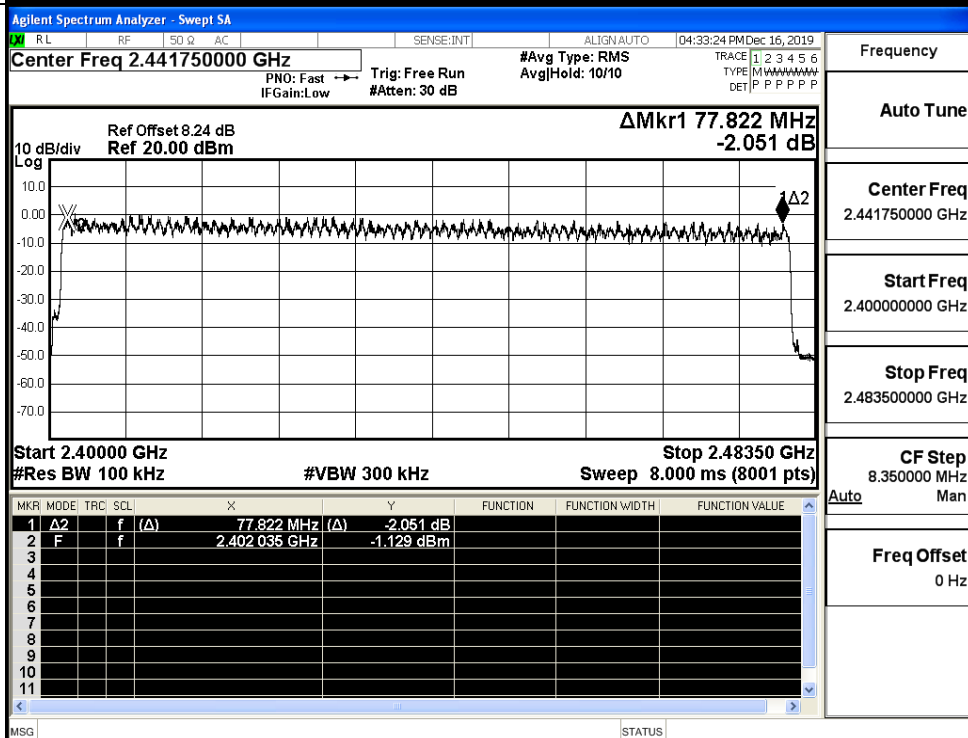
## A.4 Hopping Channel Number

Left Ear

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

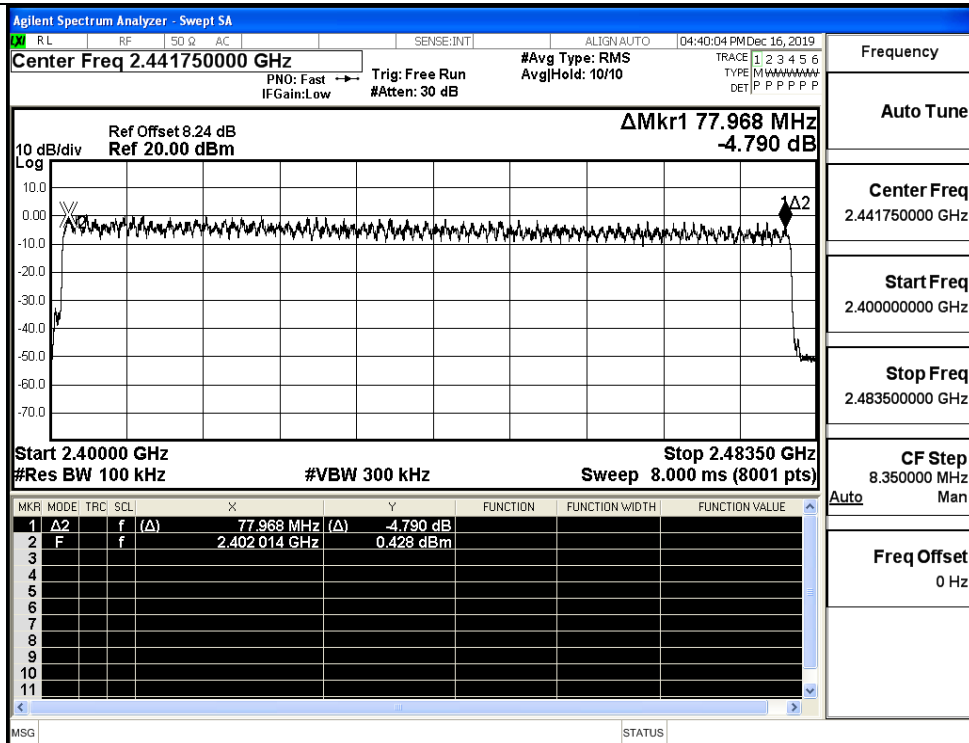
### Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop



8DPSK/Hop

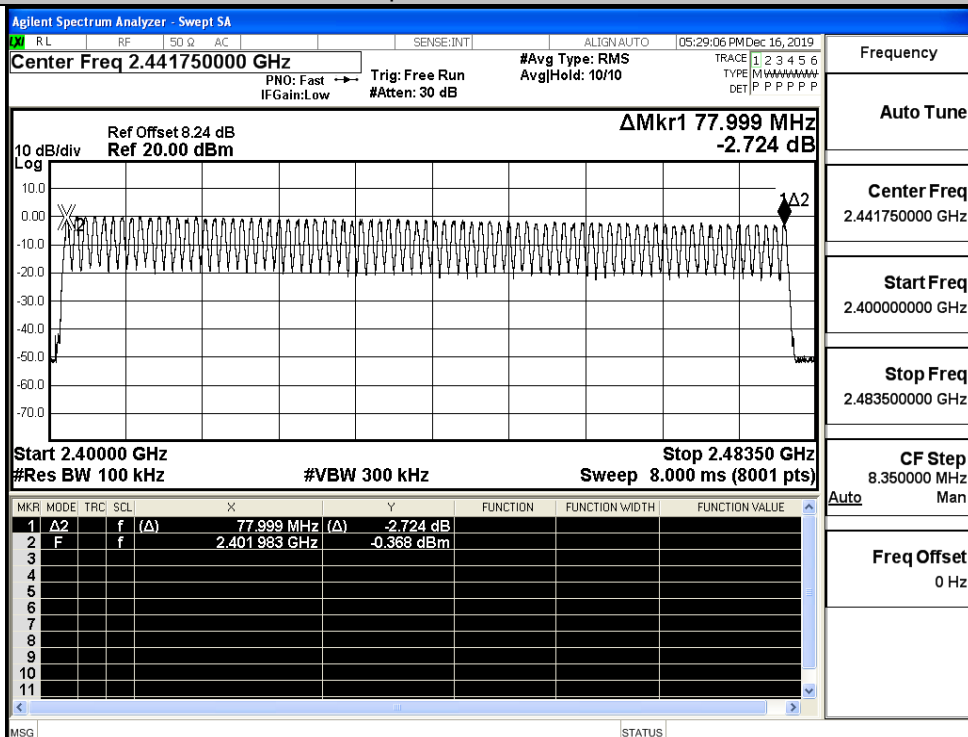
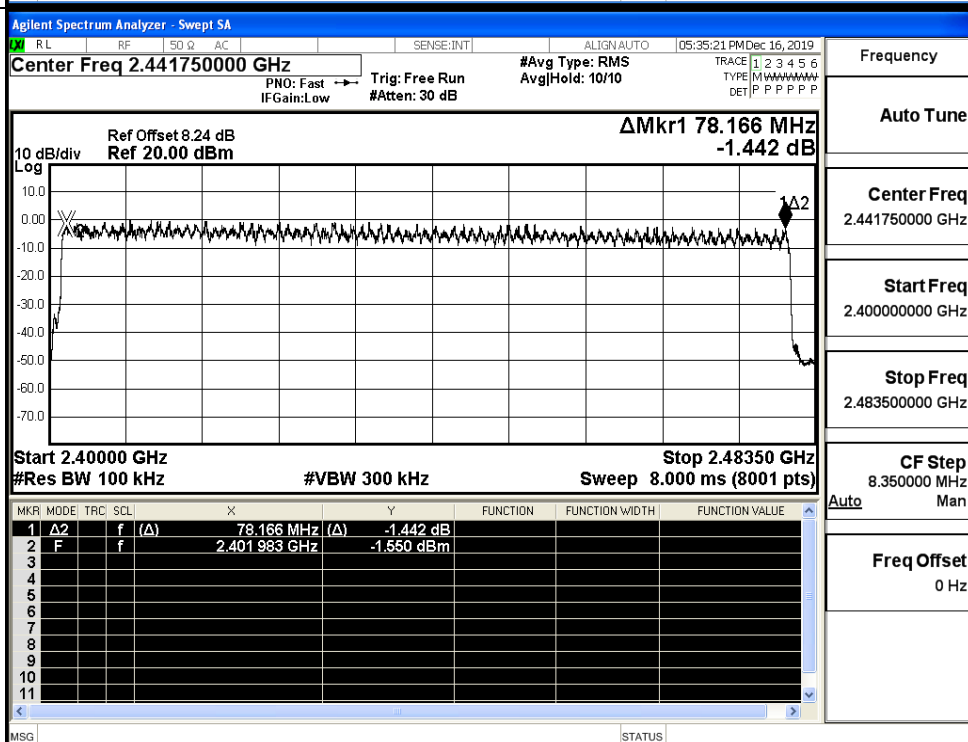


Right Ear

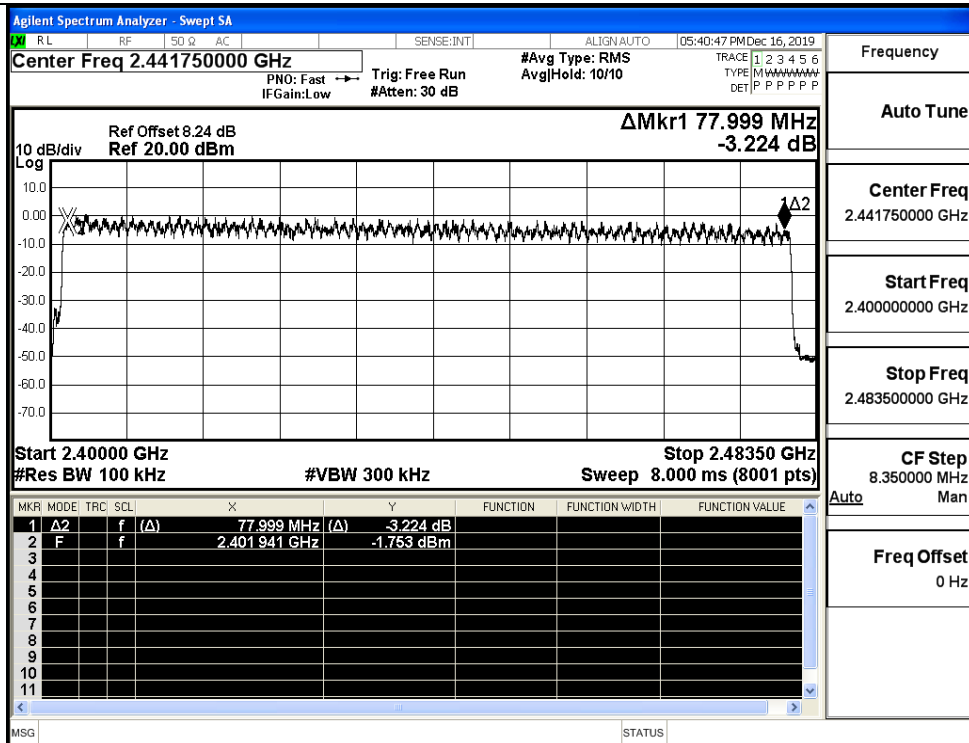
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

## Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop



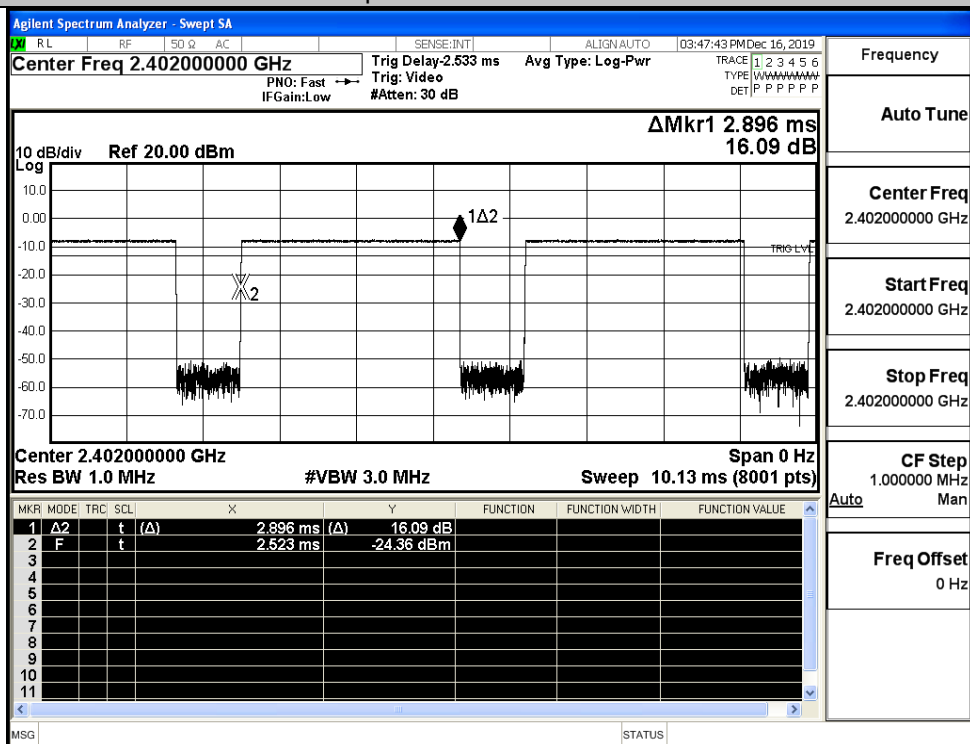
## A.5 Dwell Time

Left Ear

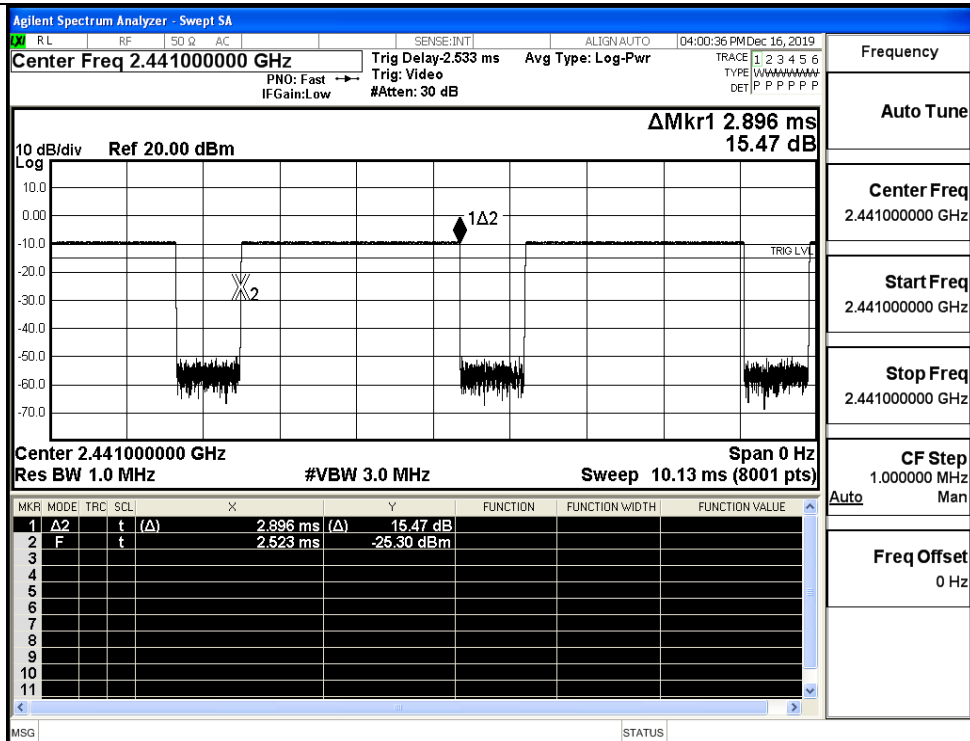
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.9	106.7	0.309	0.4	PASS
	DH5	MCH	2.9	106.7	0.309	0.4	PASS
	DH5	HCH	2.9	106.7	0.309	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.9	106.7	0.309	0.4	PASS
	2DH5	MCH	2.9	106.7	0.309	0.4	PASS
	2DH5	HCH	2.9	106.7	0.309	0.4	PASS
8DPSK	3DH5	LCH	2.9	106.7	0.309	0.4	PASS
	3DH5	MCH	2.9	106.7	0.309	0.4	PASS
	3DH5	HCH	2.9	106.7	0.309	0.4	PASS

Test Graphs

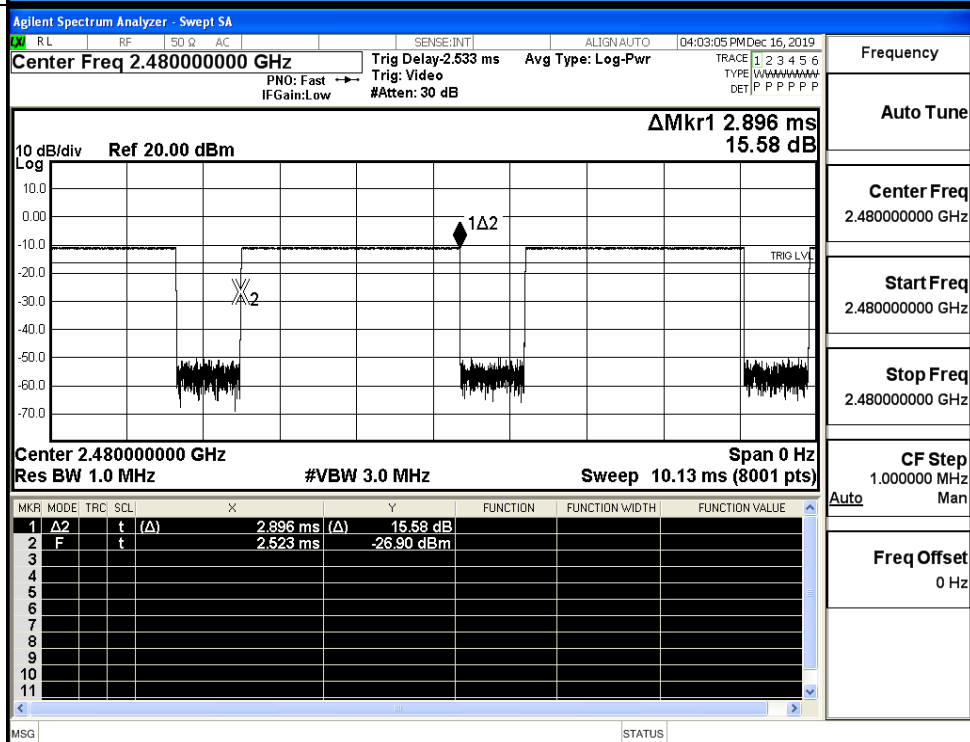
GFSK\_DH5/LCH



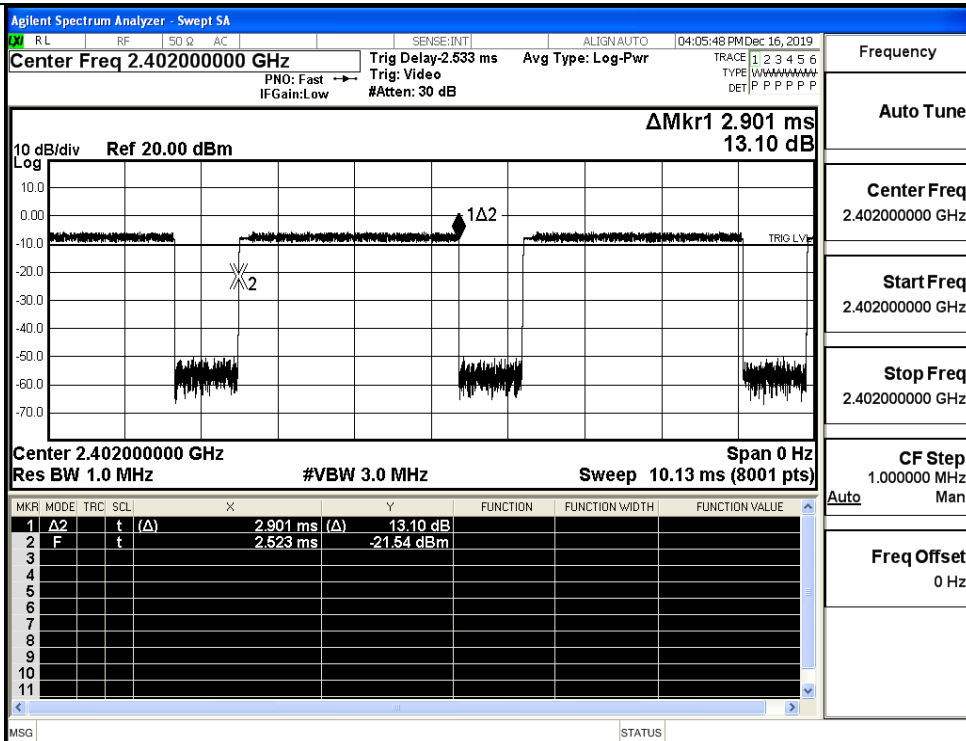
GFSK\_DH5/MCH



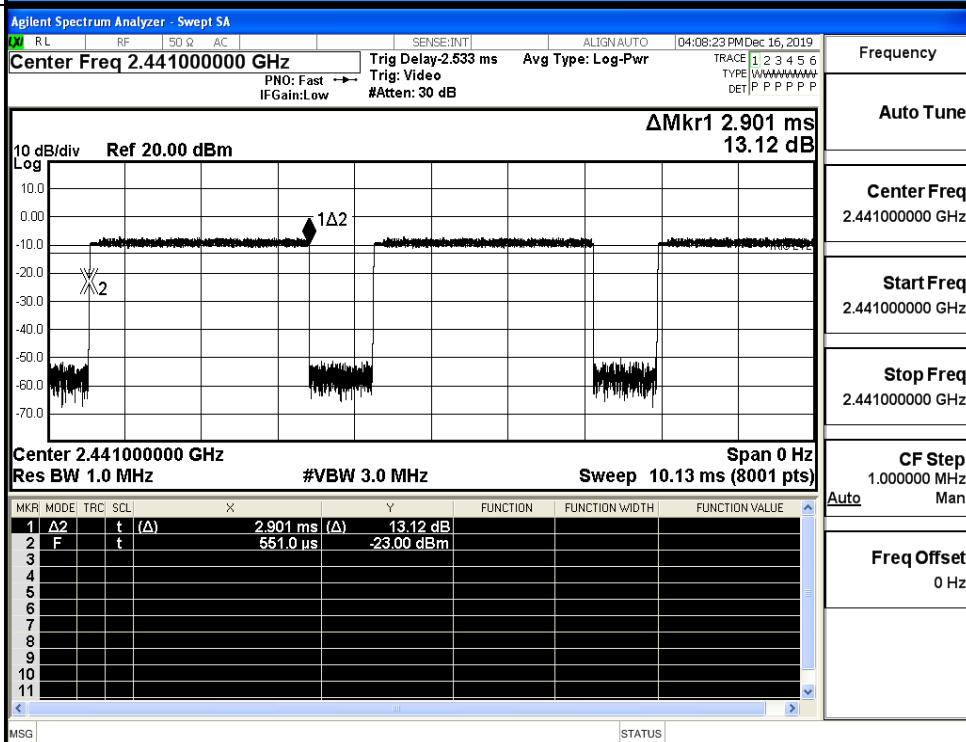
GFSK\_DH5/HCH



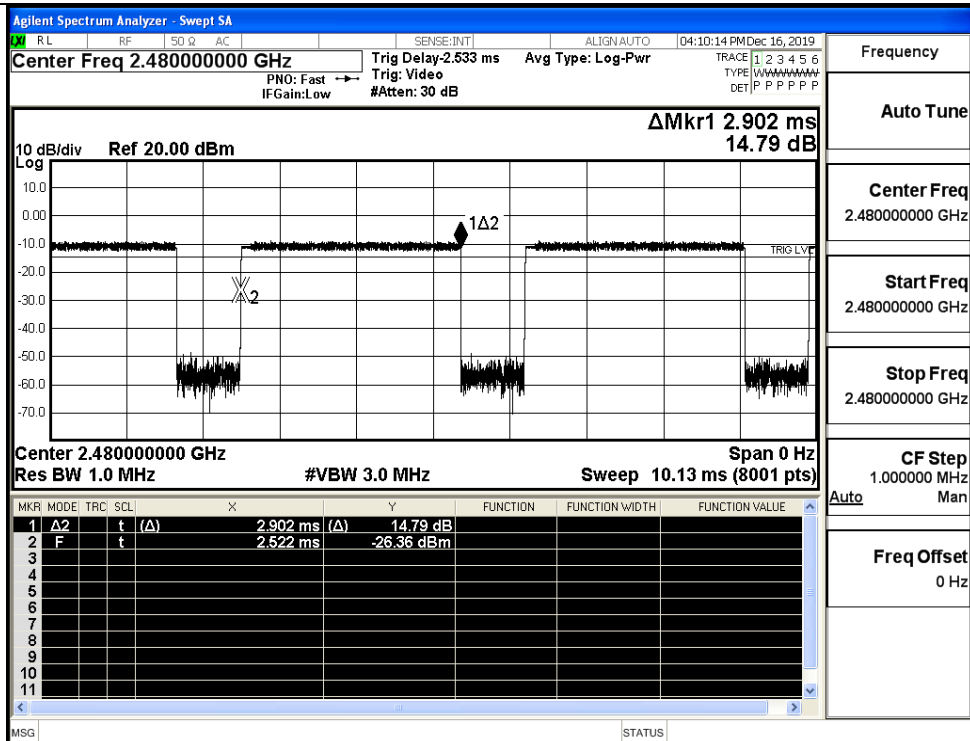
$\pi/4$ DQPSK  
\_2DH5/LCH



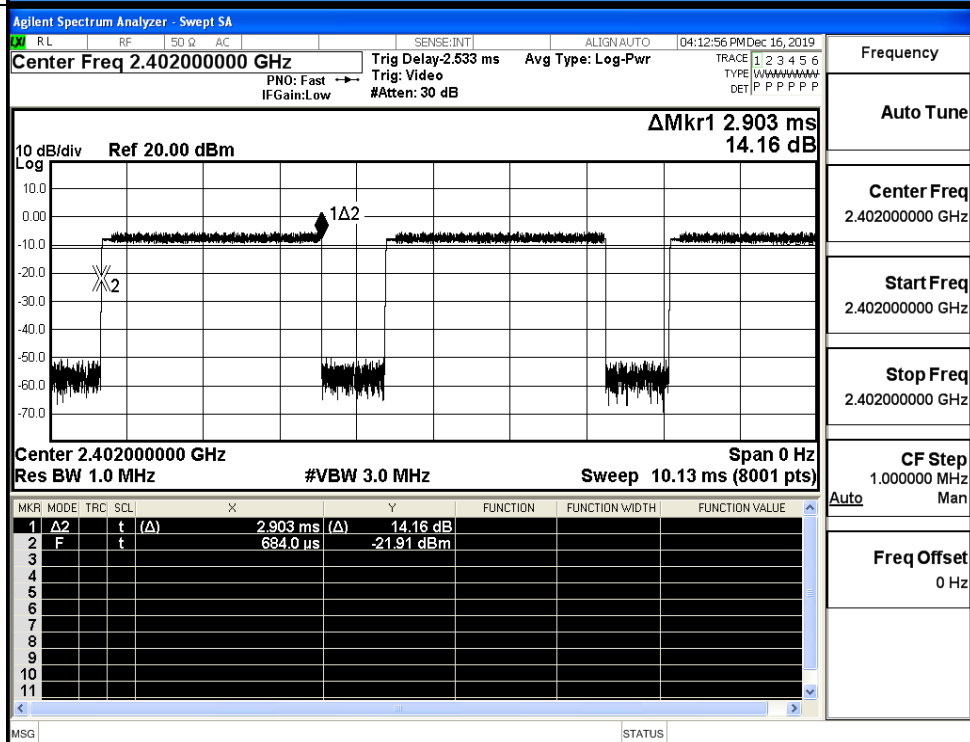
$\pi/4$ DQPSK  
\_2DH5/MCH



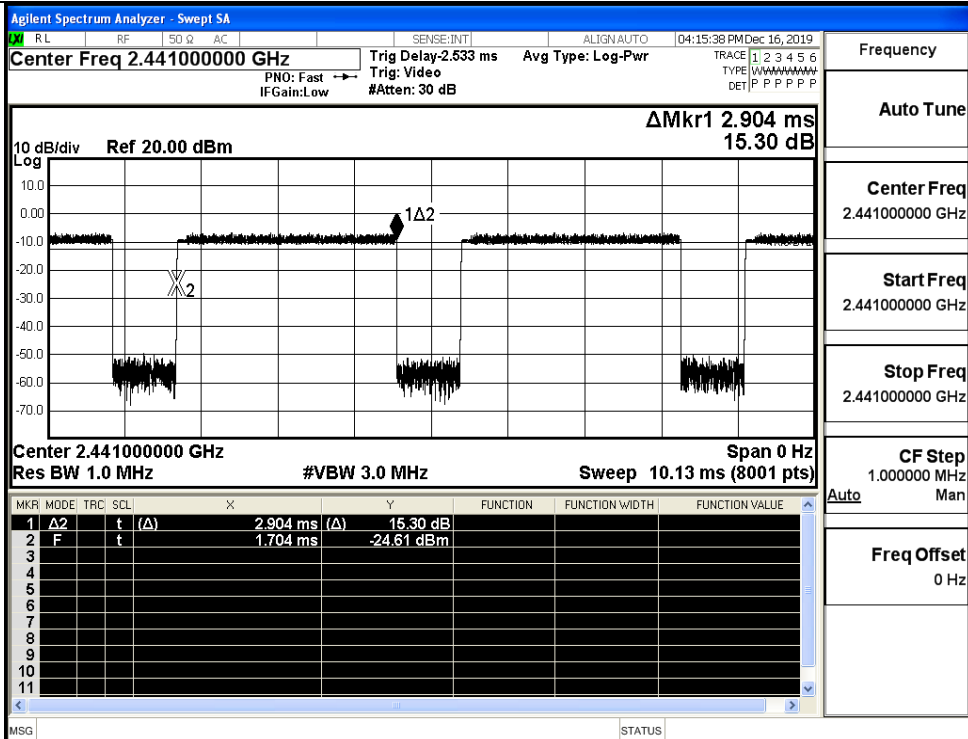
$\pi/4$ DQPSK  
\_2DH5/HCH



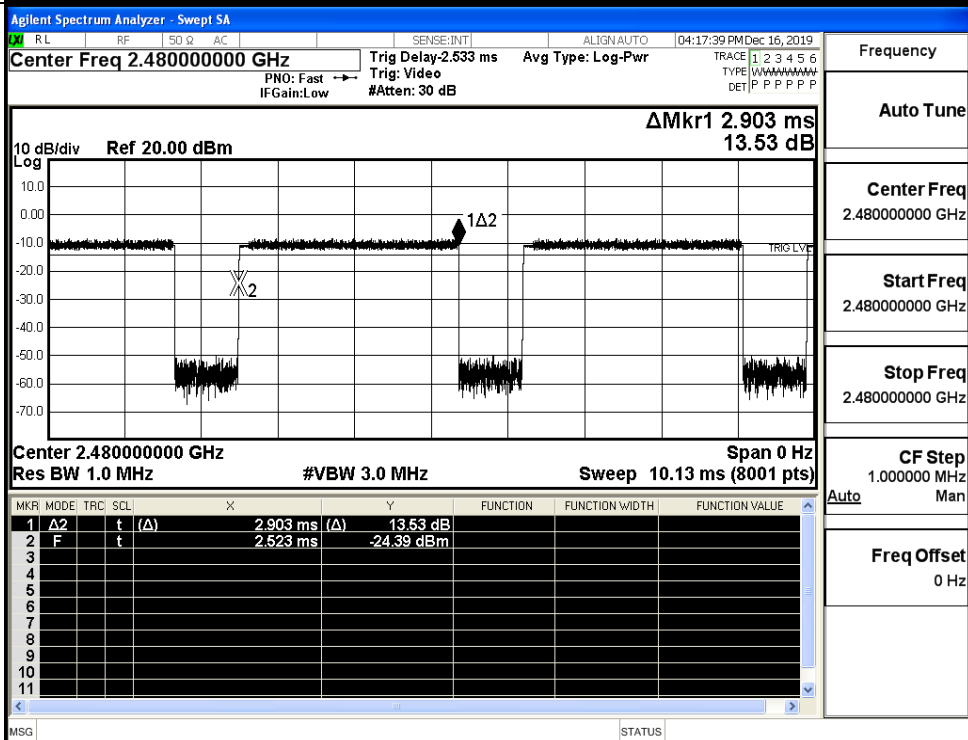
8DPSK \_3DH5/LCH



8DPSK\_3DH5/MCH



8DPSK\_3DH5/HCH



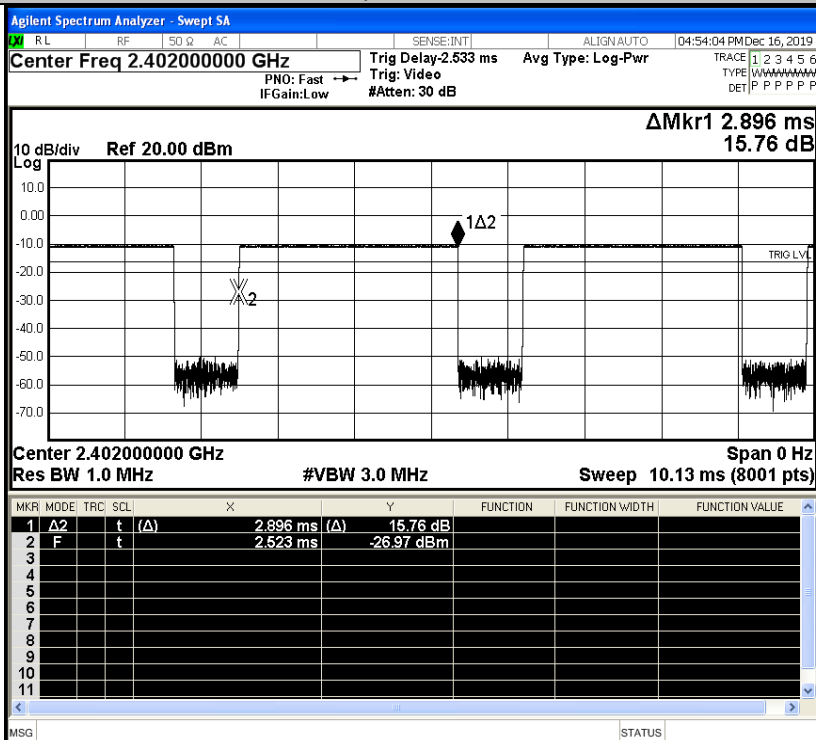


## Right Ear

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.9	106.7	0.309	0.4	PASS
	DH5	MCH	2.9	106.7	0.309	0.4	PASS
	DH5	HCH	2.9	106.7	0.309	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.9	106.7	0.309	0.4	PASS
	2DH5	MCH	2.9	106.7	0.309	0.4	PASS
	2DH5	HCH	2.9	106.7	0.309	0.4	PASS
8DPSK	3DH5	LCH	2.9	106.7	0.309	0.4	PASS
	3DH5	MCH	2.9	106.7	0.309	0.4	PASS
	3DH5	HCH	2.9	106.7	0.309	0.4	PASS

## Test Graphs

GFSK\_DH5/LCH



Frequency

Auto Tune

Center Freq

2.402000000 GHz

Start Freq

2.402000000 GHz

Stop Freq

2.402000000 GHz

CF Step

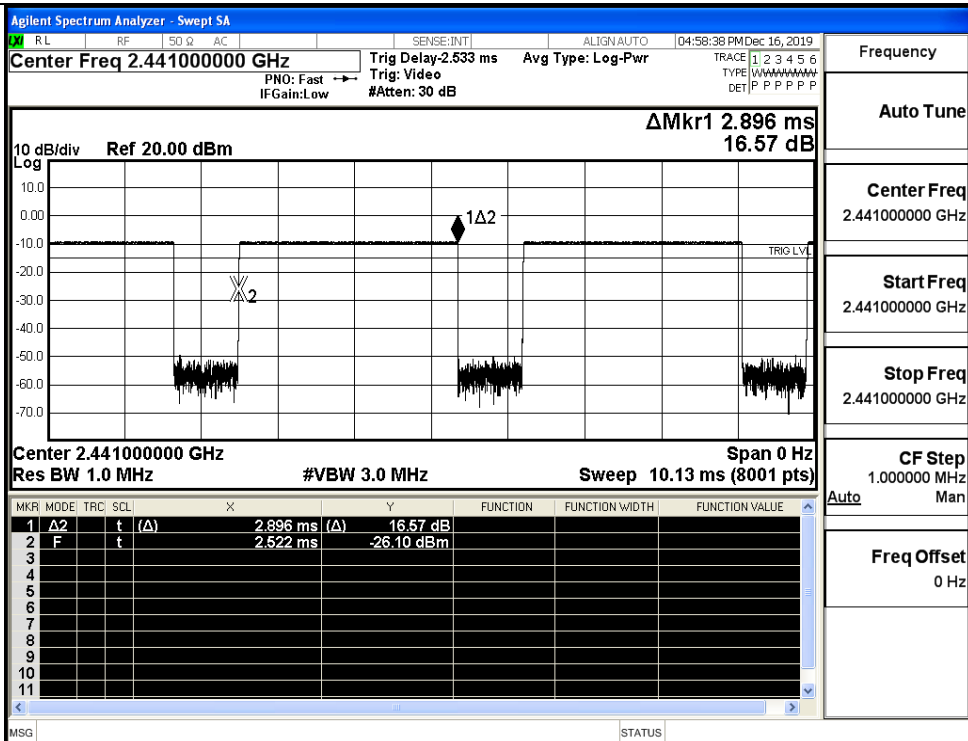
1.000000 MHz

Auto Man

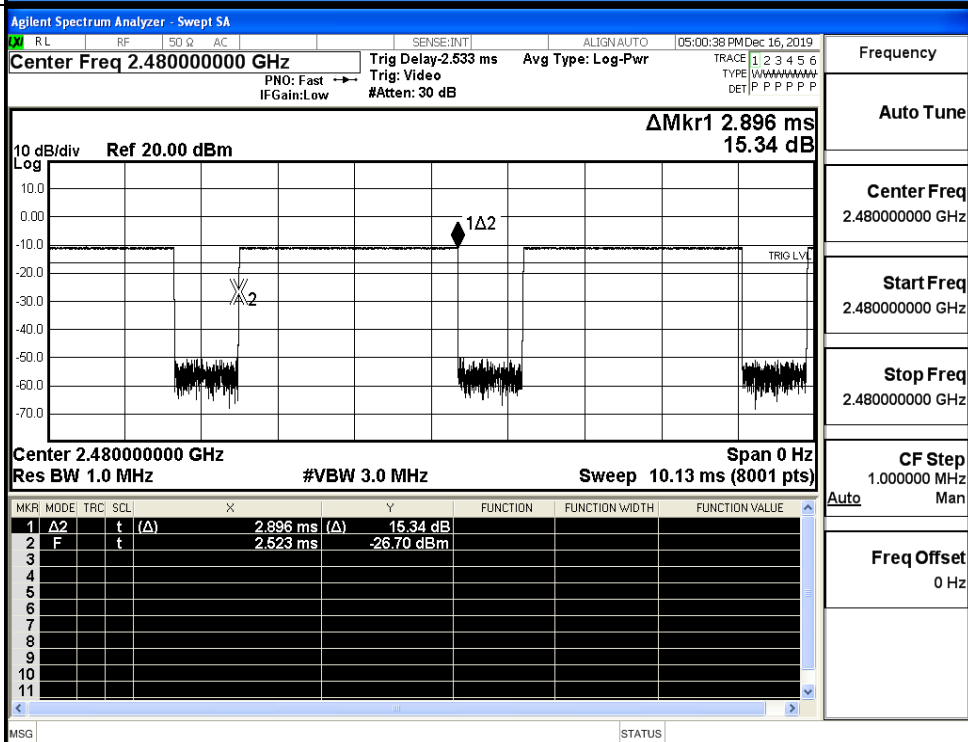
Freq Offset

0 Hz

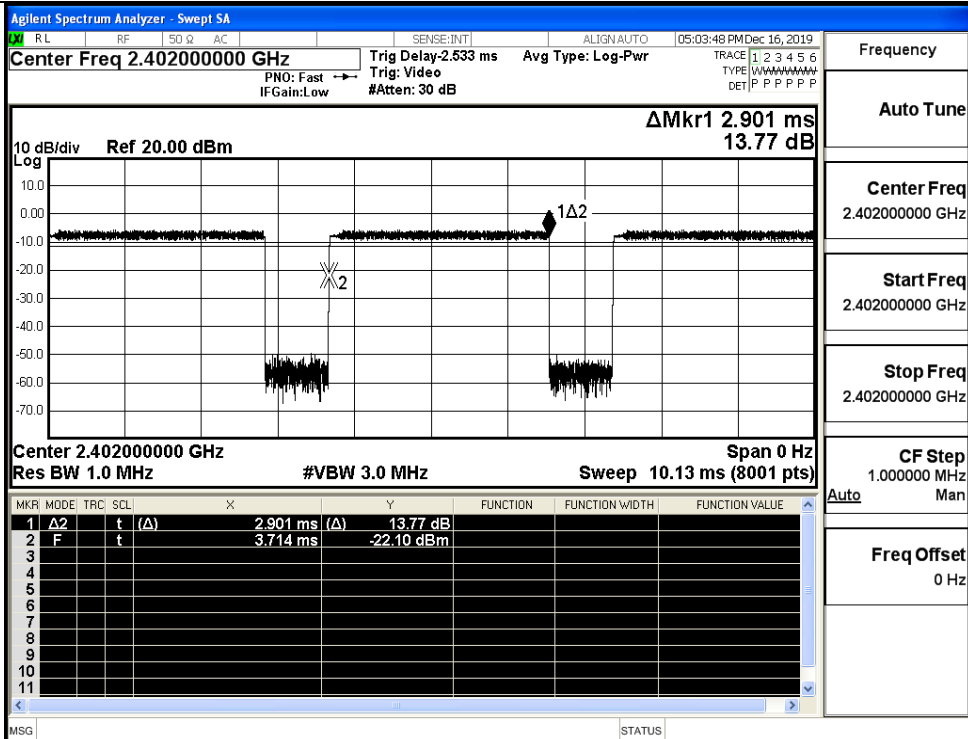
GFSK\_DH5/MCH



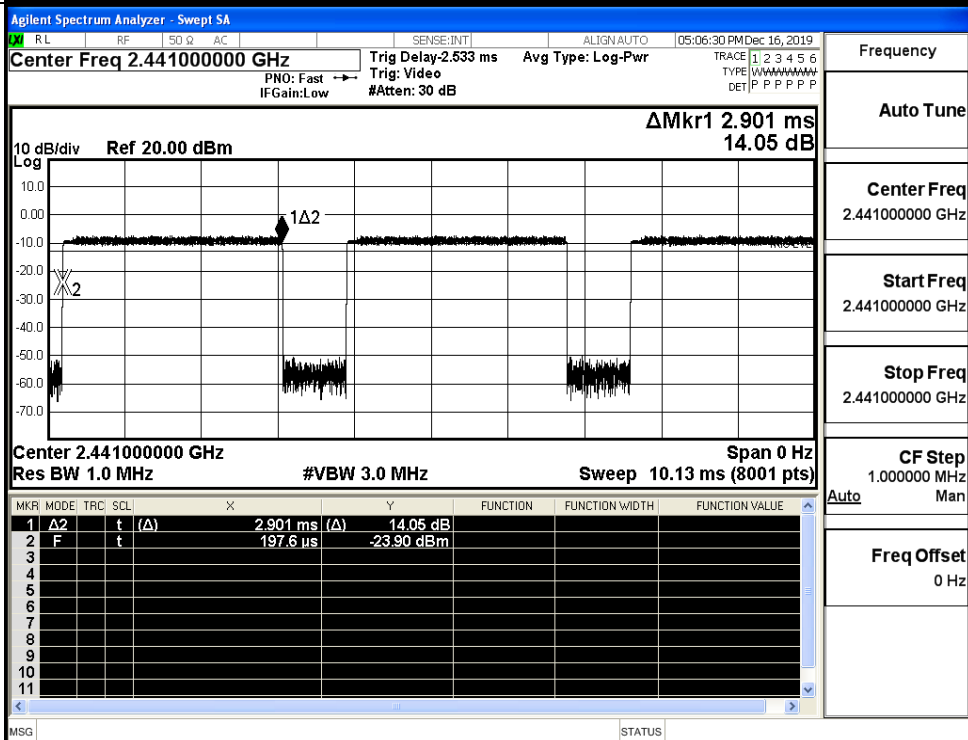
GFSK\_DH5/HCH



$\pi/4$ DQPSK  
\_2DH5/LCH



$\pi/4$ DQPSK  
\_2DH5/MCH



Agilent Spectrum Analyzer - Swept SA

RL RF 50  $\Omega$  AC

SENSE:INT

ALIGN:AUTO

05:08:22 PM Dec 16, 2019

Center Freq 2.48000000 GHz

Trig Delay: 2.533 ms

Avg Type: Log-Pwr

Trace 1 2 3 4 5 6

TYPE P P P P P P

DET P P P P P P

PNO: Fast  $\rightarrow$

IF Gain: Low

#Atten: 30 dB

Frequency

Auto Tune

Center Freq 2.48000000 GHz

Start Freq 2.48000000 GHz

Stop Freq 2.48000000 GHz

CF Step 1.000000 MHz

Auto Man

Freq Offset 0 Hz

10 dB/div

Ref 20.00 dBm

$\Delta$ Mkr1 2.901 ms

14.10 dB

Log

10.0

0.00

-10.0

-20.0

-30.0

-40.0

-50.0

-60.0

-70.0

Center 2.48000000 GHz

Res BW 1.0 MHz

#VBW 3.0 MHz

Sweep 10.13 ms (8001 pts)

Span 0 Hz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	$\Delta$ 2	t	( $\Delta$ )	2.901 ms	( $\Delta$ ) 14.10 dB			
2	F	t		1.511 ms	-25.52 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG

STATUS

Agilent Spectrum Analyzer - Swept SA

RL RF 50  $\Omega$  AC SENSE:INT ALIGN:AUTO 05:13:19 PM Dec 16, 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 P DET P P P P P P P

10 dB/div Ref 20.00 dBm  $\Delta$ Mkr1 2.903 ms 13.80 dB

Center Freq 2.402000000 GHz Start Freq 2.402000000 GHz Stop Freq 2.402000000 GHz

Res BW 1.0 MHz #VBW 3.0 MHz Span 0 Hz CF Step 1.000000 MHz

Sweep 10.13 ms (8001 pts)

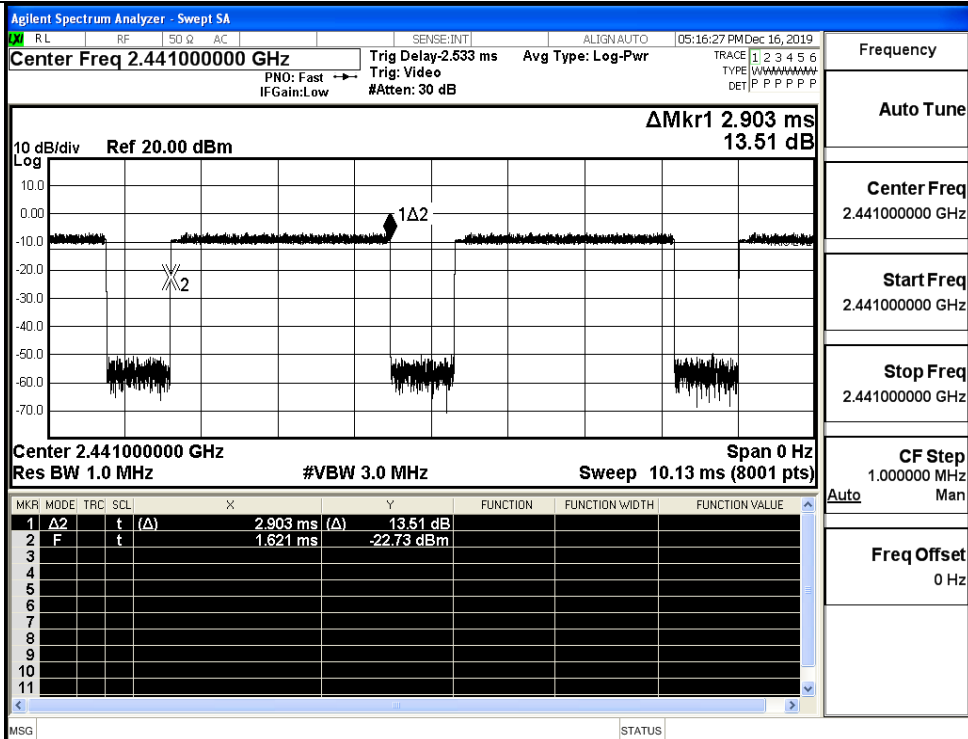
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	$\Delta$ 2	t	( $\Delta$ )	2.903 ms	( $\Delta$ ) 13.80 dB			
2	F	t		644.7 $\mu$ s	-21.45 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG STATUS

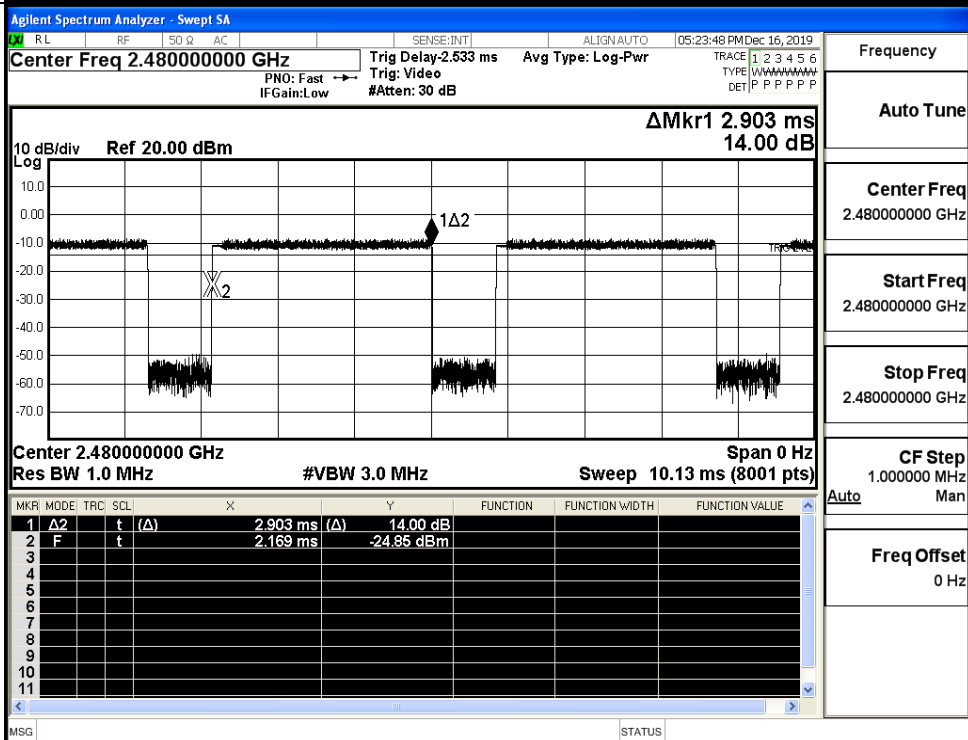
Auto Man

Freq Offset 0 Hz

8DPSK\_3DH5/MCH



8DPSK\_3DH5/HCH

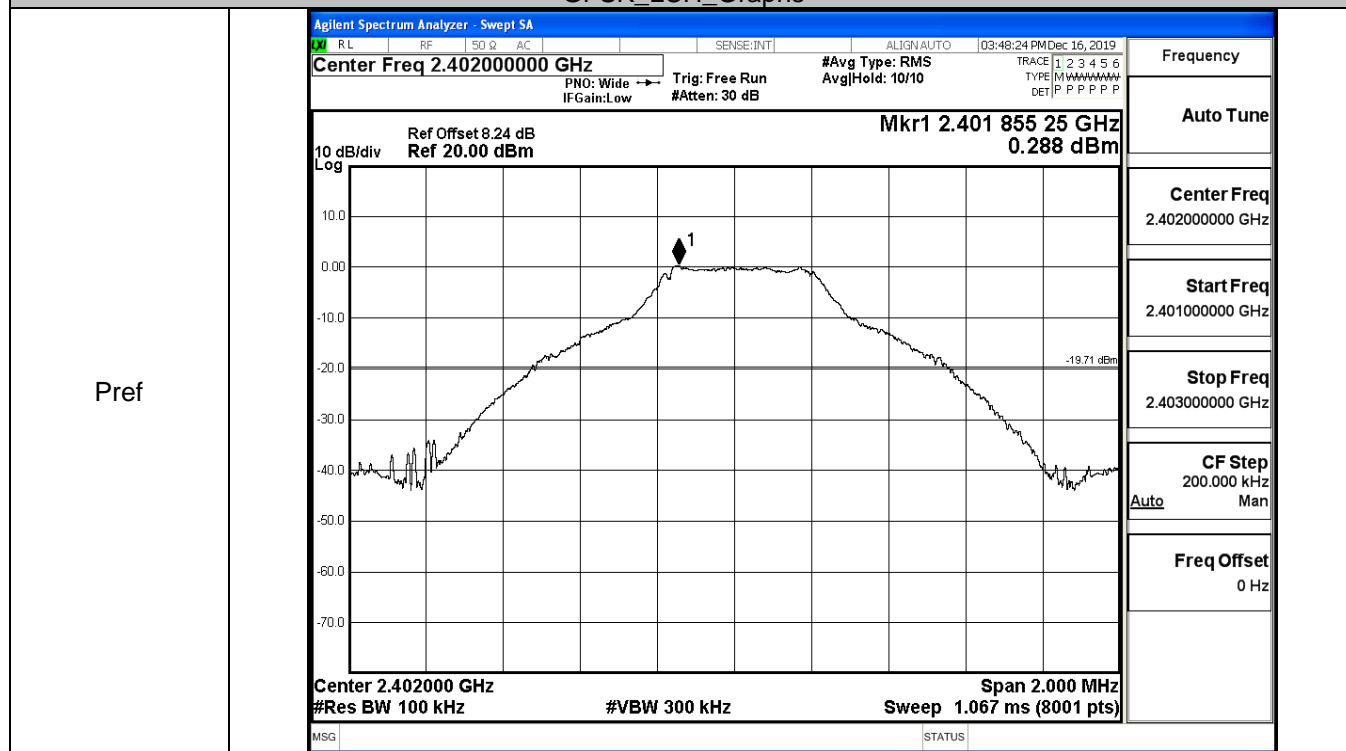


## A.6 RF Conducted Spurious Emissions

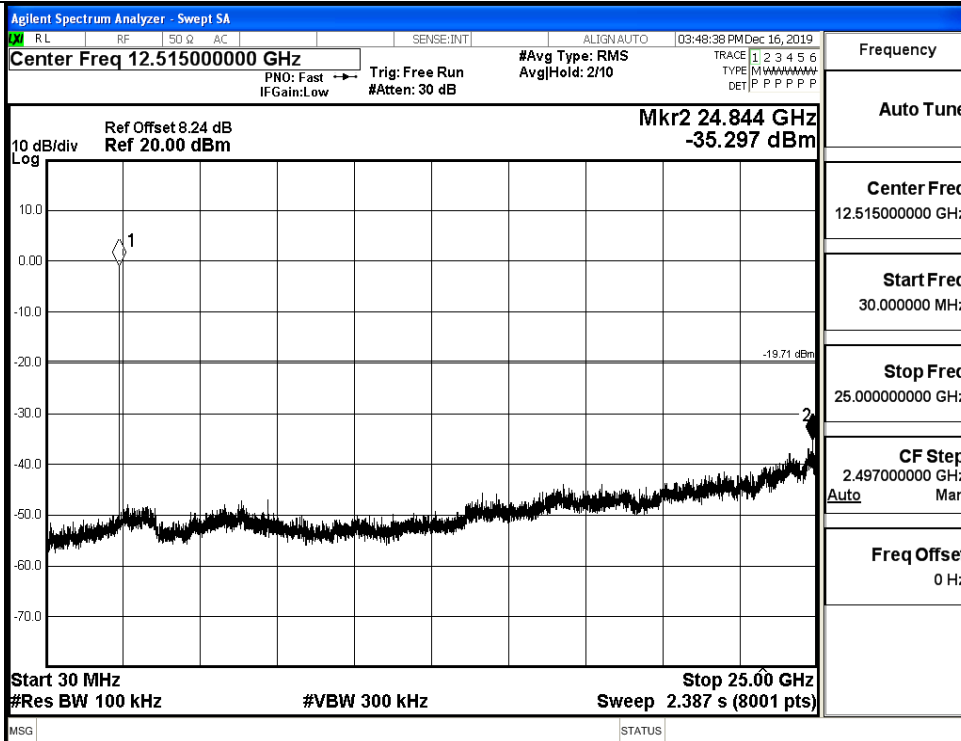
Left Ear

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.288	-35.297	-19.712	PASS
	MCH	-1.212	-37.678	-21.212	PASS
	HCH	-3.083	-37.132	-23.083	PASS
$\pi/4$ DQPSK	LCH	0.148	-36.730	-19.852	PASS
	MCH	-1.403	-36.745	-21.403	PASS
	HCH	-3.183	-37.532	-23.183	PASS
8DPSK	LCH	0.471	-37.192	-19.529	PASS
	MCH	-1.373	-36.873	-21.373	PASS
	HCH	-2.636	-37.615	-22.636	PASS

GFSK\_LCH\_Graphs

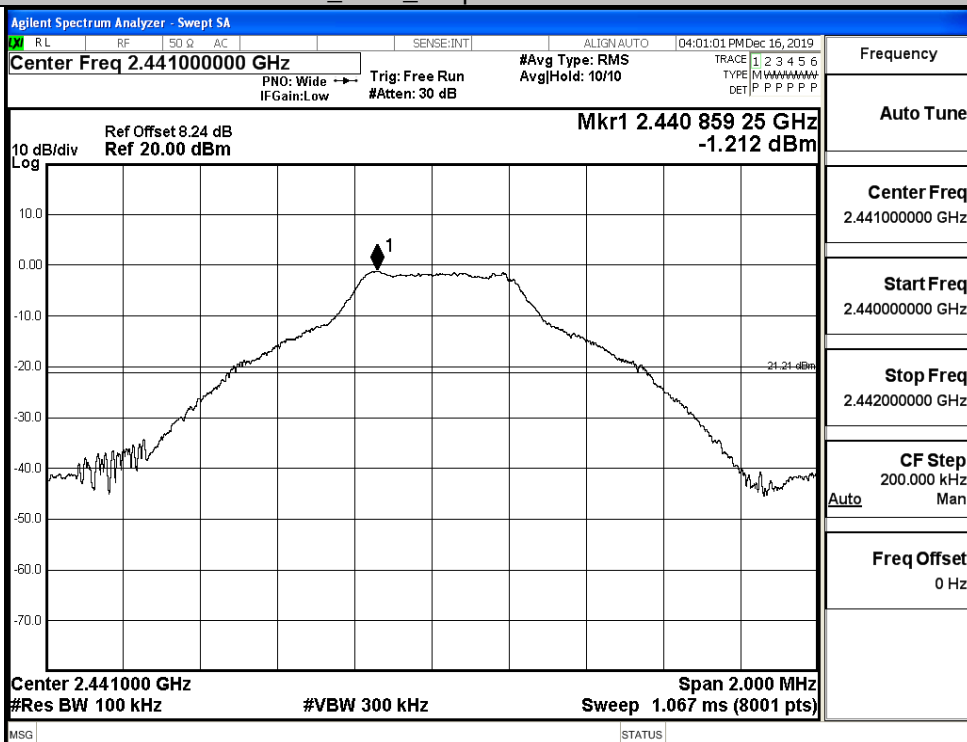


Puw



## GFSK\_MCH\_Graphs

Pref



Puw

