Appendix A

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

Product Name: True wireless stereo earphones

Trade Mark: N/A

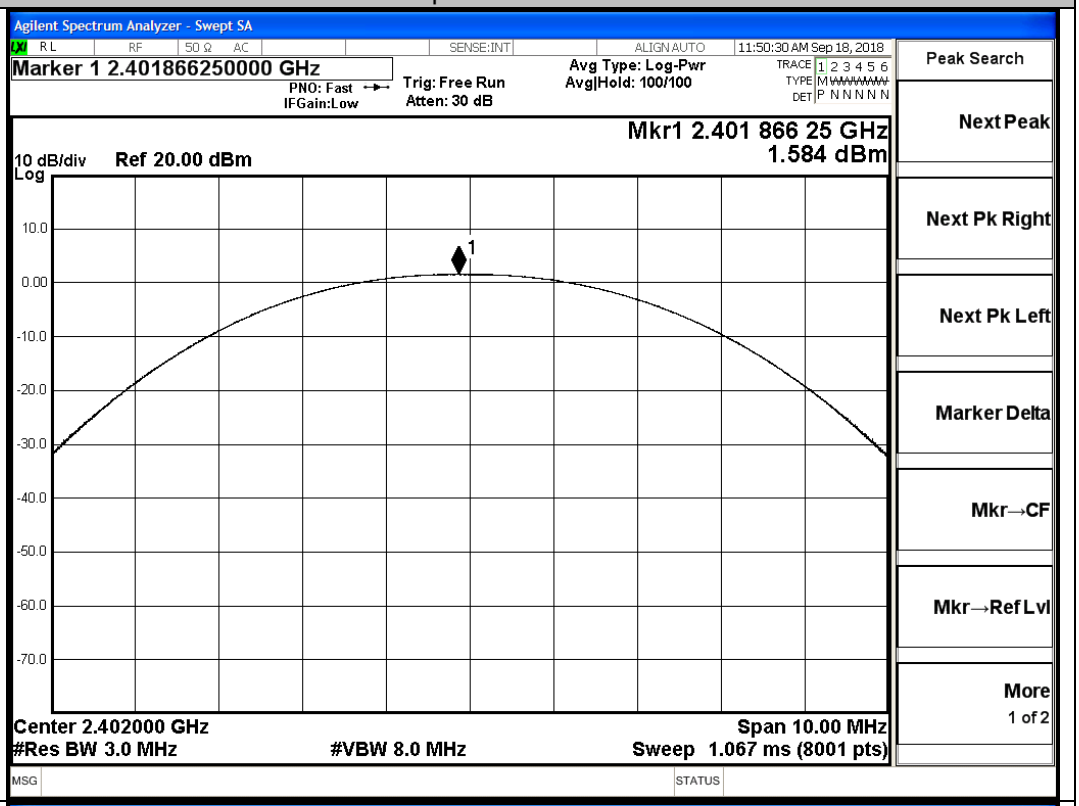
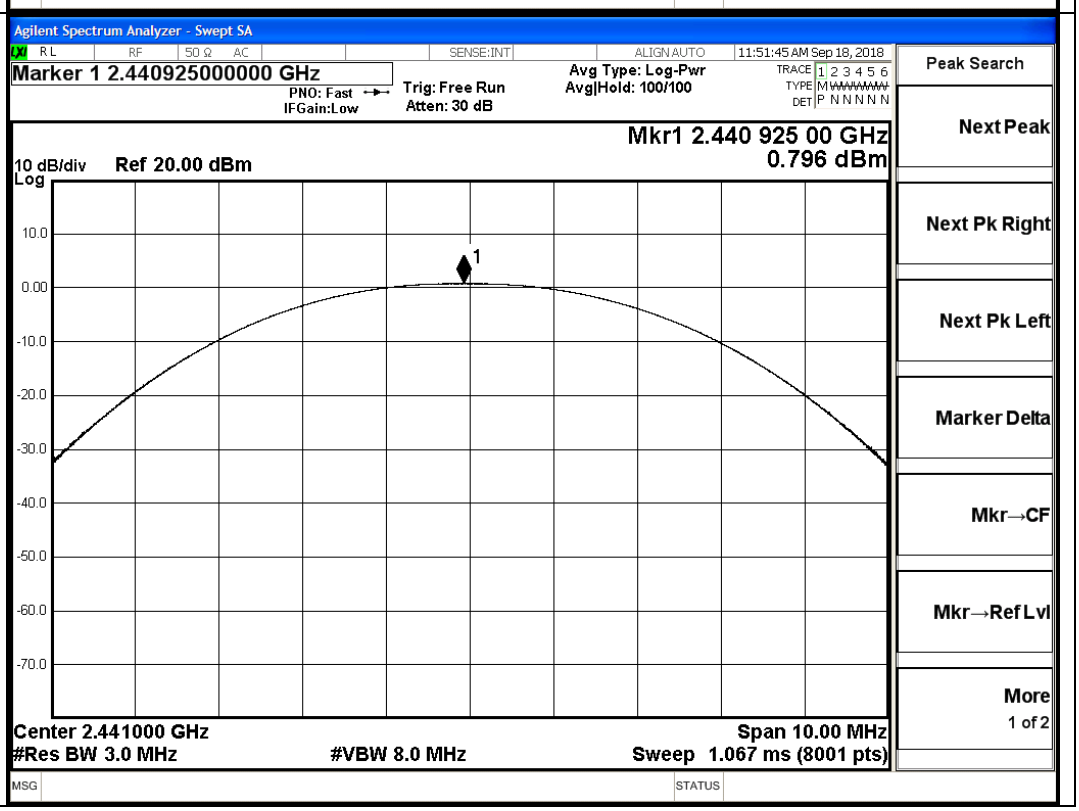
Test Model: TWS-G3

Environmental Conditions

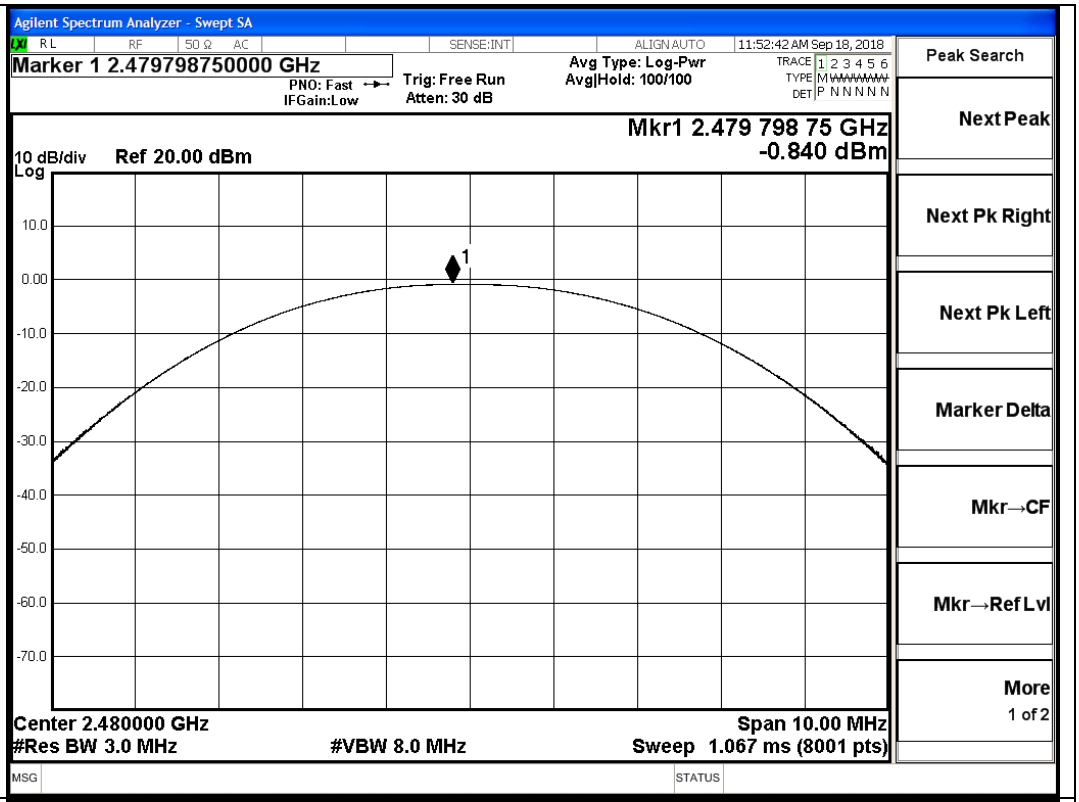
Temperature:	23.5 ° C
Relative Humidity:	66%
ATM Pressure:	100.0 kPa
Test Engineer:	AKING JIN
Supervised by:	JAYDEN ZHUO

A.1 Maximum Conducted Peak Output Power

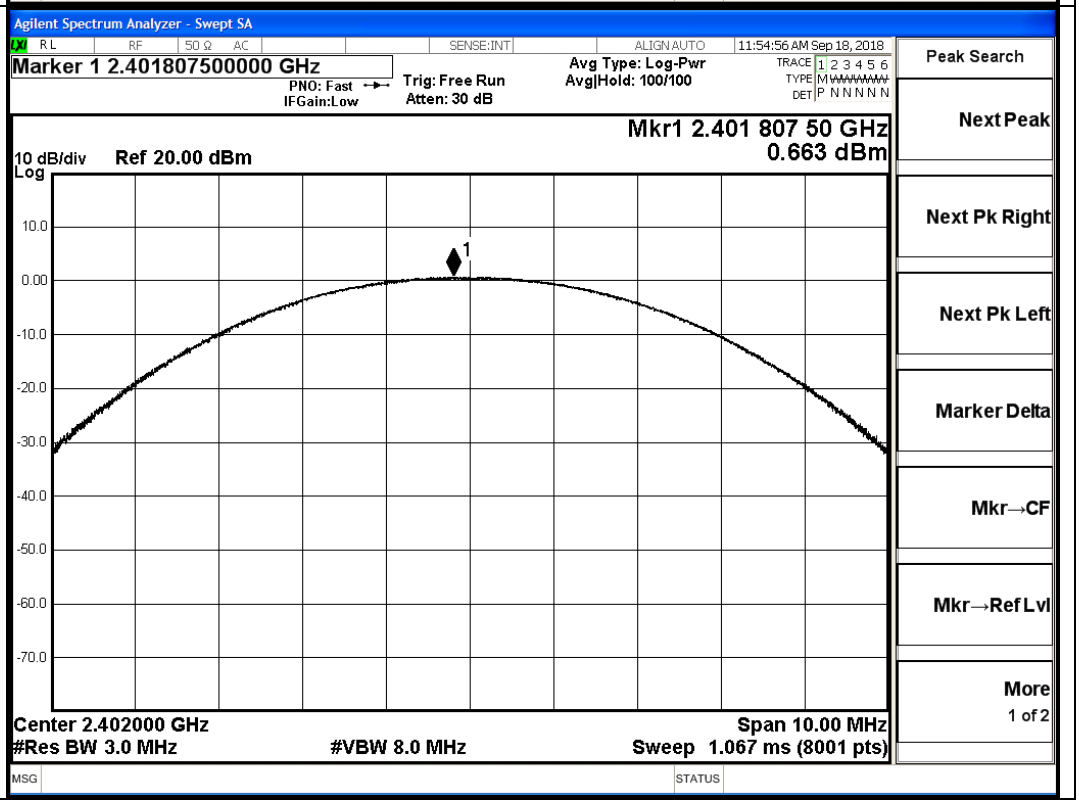
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.584	21	PASS
	MCH	0.796	21	PASS
	HCH	-0.840	21	PASS
π/4DQPSK	LCH	0.663	21	PASS
	MCH	0.104	21	PASS
	HCH	-1.410	21	PASS
8DPSK	LCH	1.047	21	PASS
	MCH	0.624	21	PASS
	HCH	-0.836	21	PASS

Test Graphs	
GFSK/LCH	
GFSK/MCH	

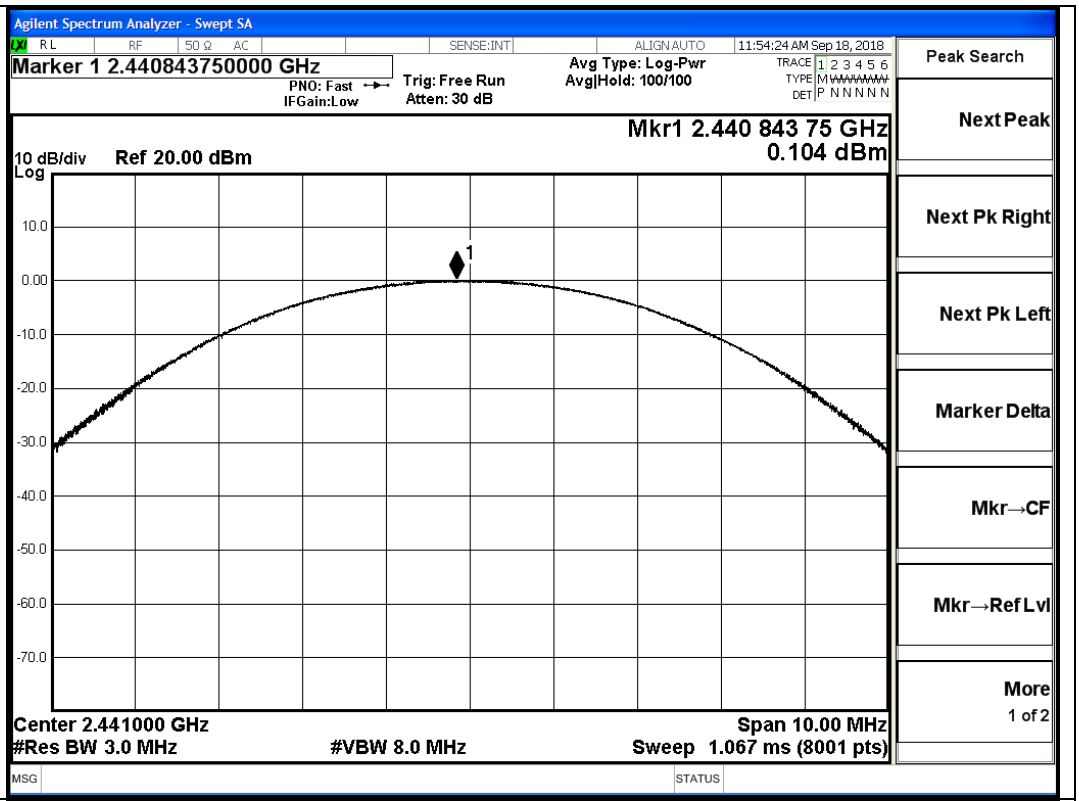
GFSK/HCH



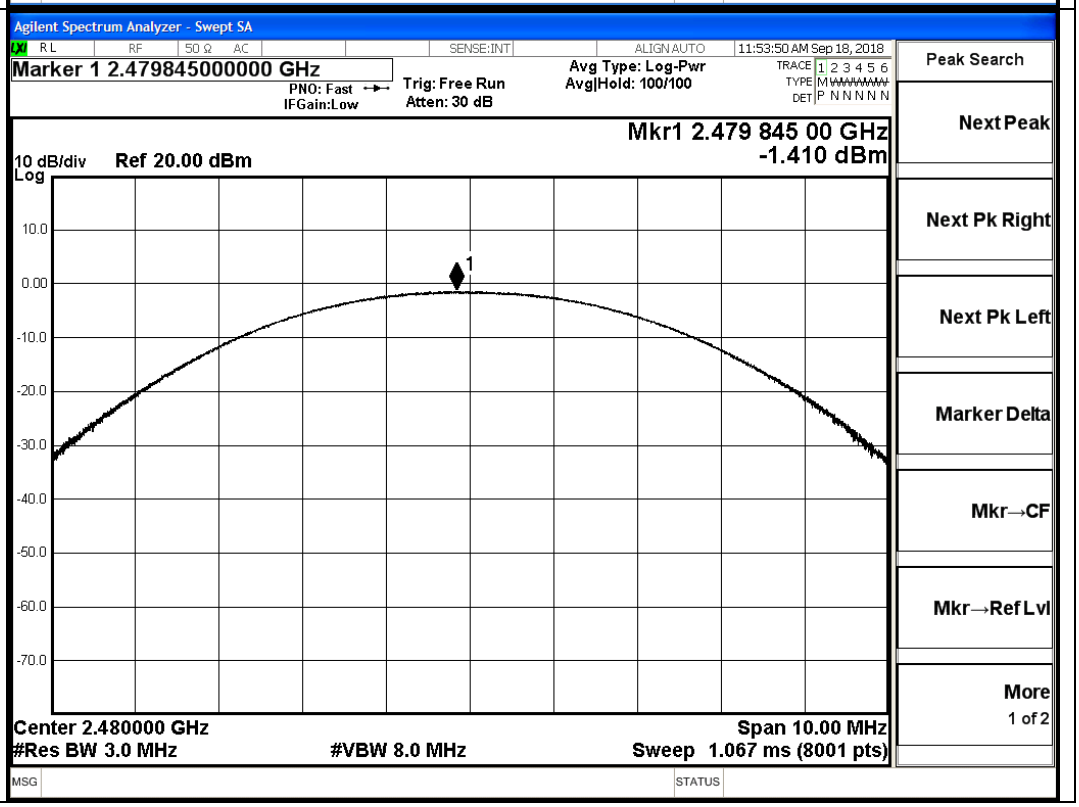
π/4DQPSK/LCH



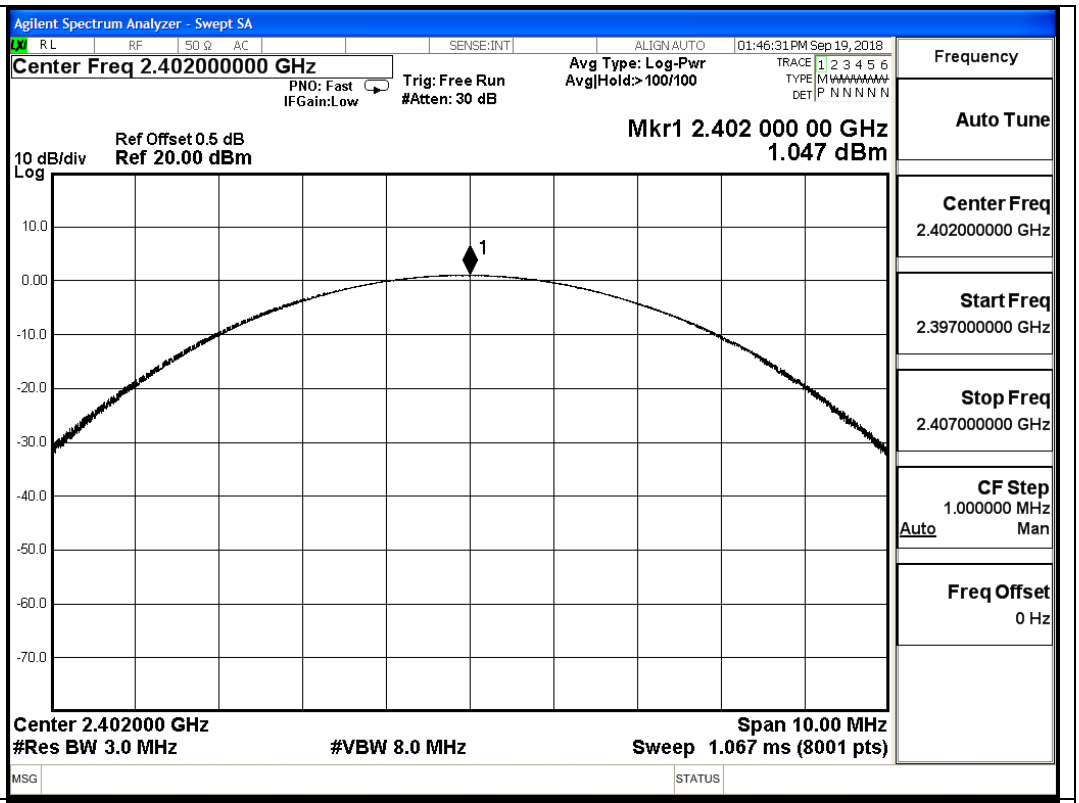
π/4DQPSK/MCH



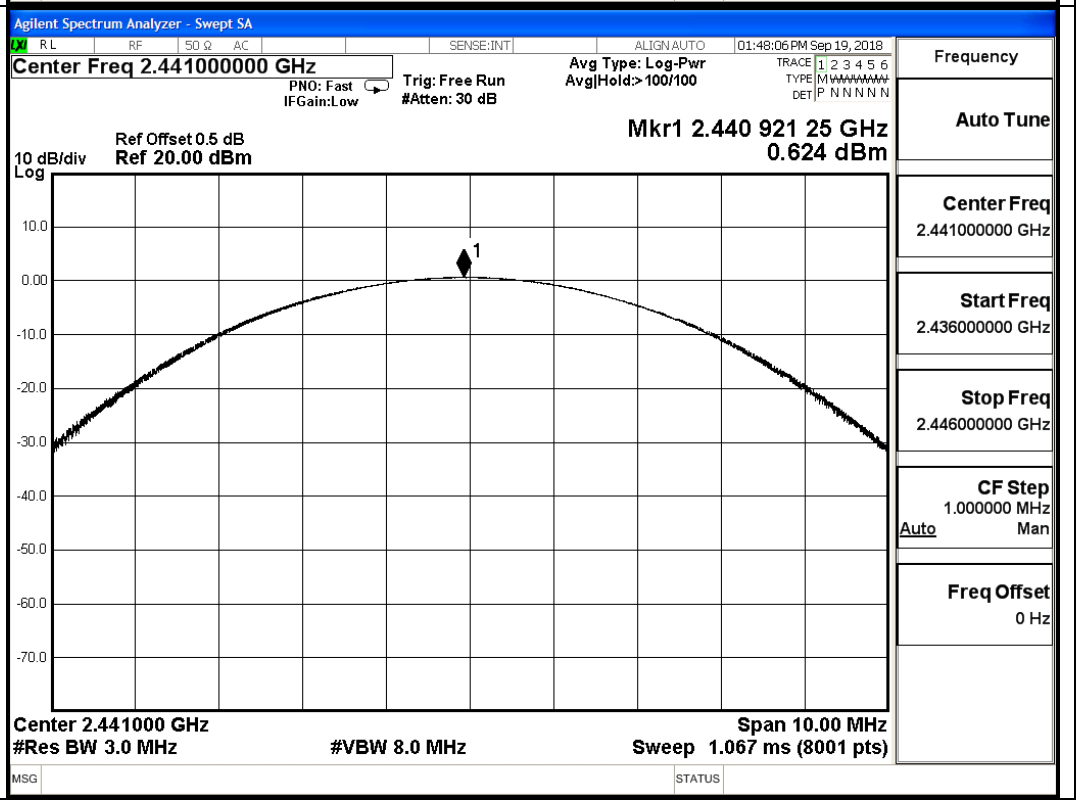
π/4DQPSK/HCH

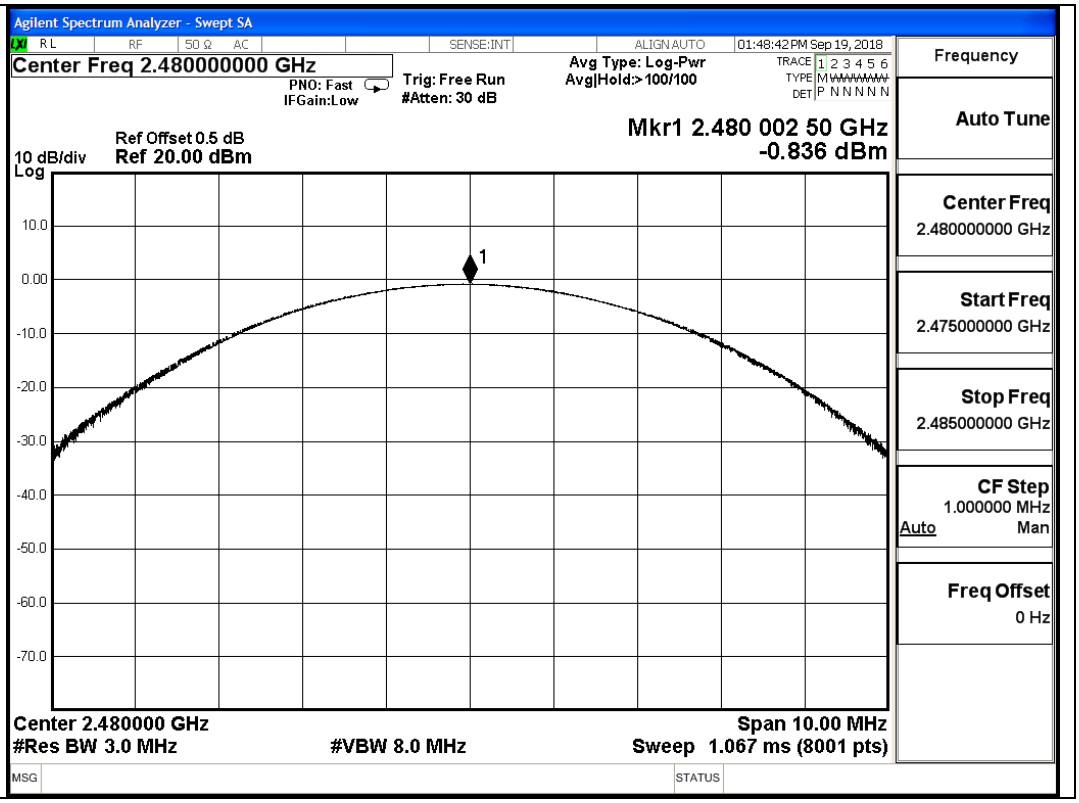


8DPSK/LCH



8DPSK/MCH

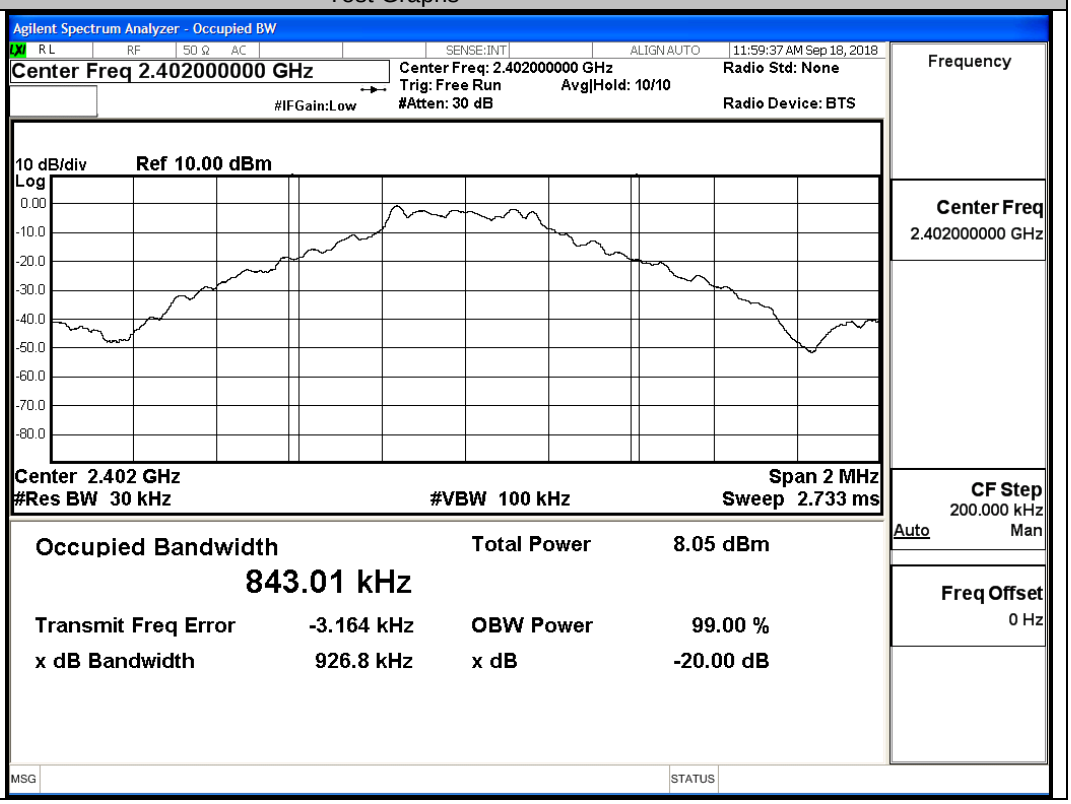


8DPSK/HCH	

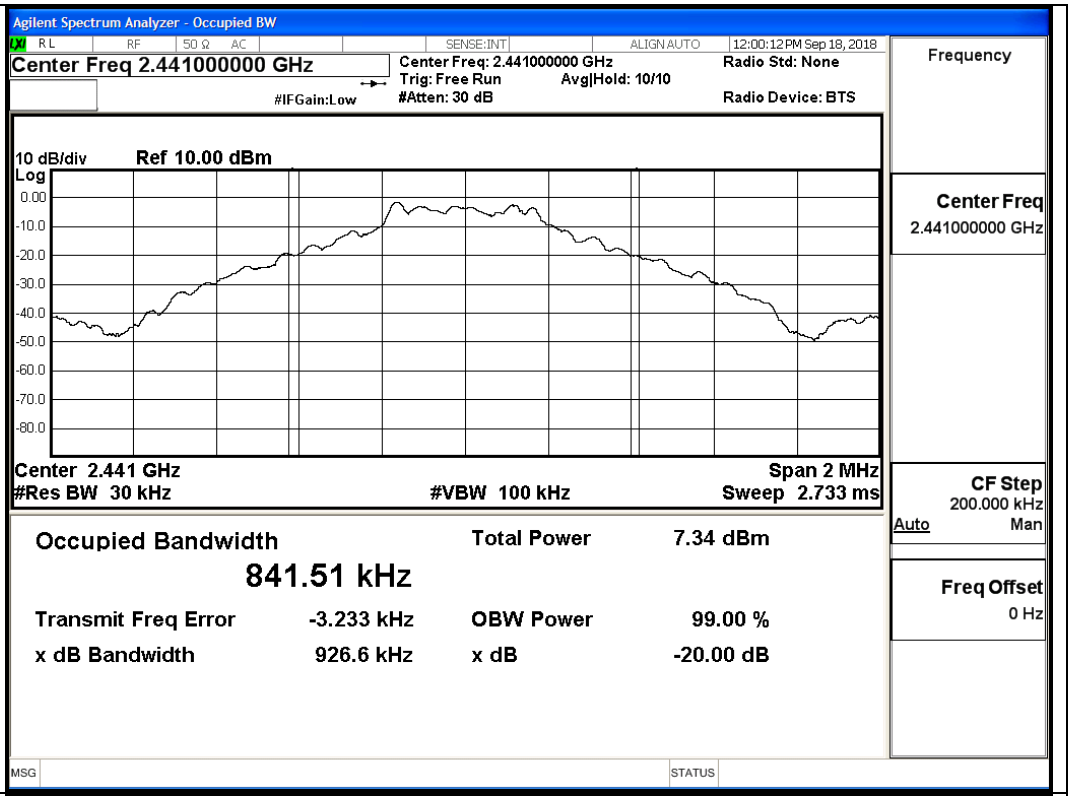
Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
01:48:42 PM Sep 19, 2018
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 2.480 002 50 GHz
-0.836 dBm
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
Center 2.480000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
Span 10.00 MHz
Sweep 1.067 ms (8001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.475000000 GHz
Stop Freq
2.485000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

A.2 99% and 20dB Bandwidth

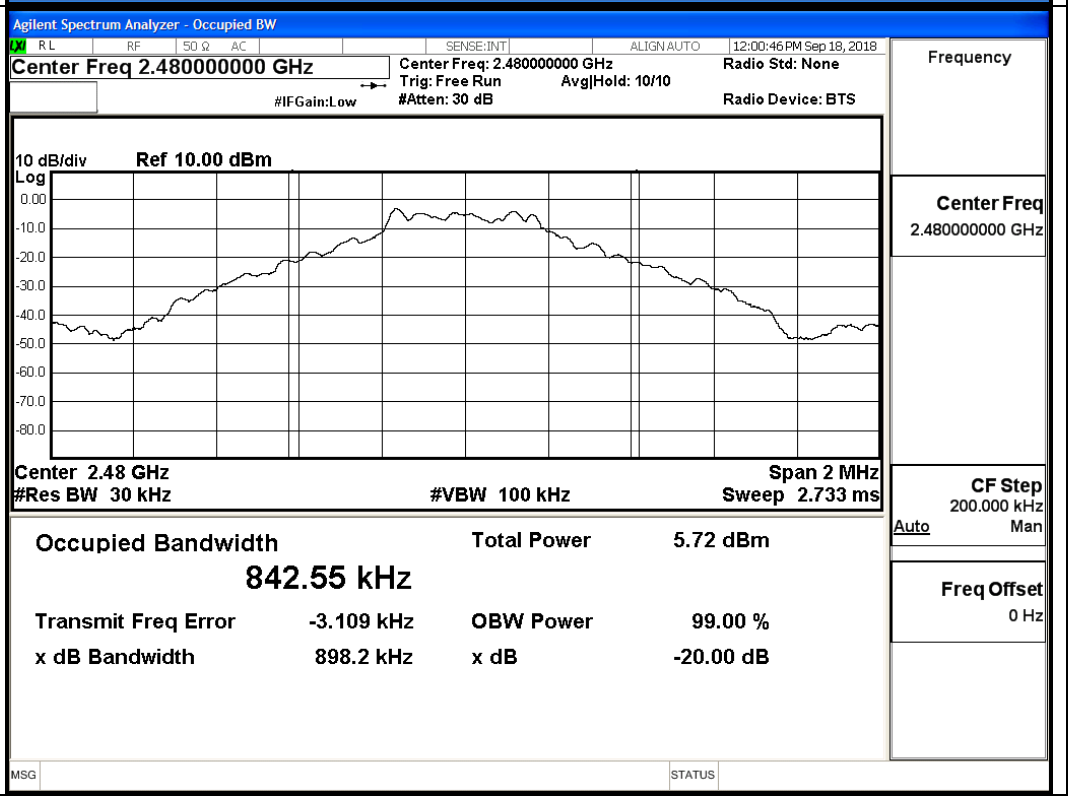
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.84301	0.9268	Not Specified	PASS
	MCH	0.84151	0.9266	Not Specified	PASS
	HCH	0.84255	0.8982	Not Specified	PASS
π/4DQPSK	LCH	1.1560	1.253	Not Specified	PASS
	MCH	1.1584	1.253	Not Specified	PASS
	HCH	1.1626	1.252	Not Specified	PASS
8DPSK	LCH	1.1259	1.276	Not Specified	PASS
	MCH	1.1299	1.277	Not Specified	PASS
	HCH	1.1624	1.263	Not Specified	PASS

Test Graphs	
GFSK/LCH	

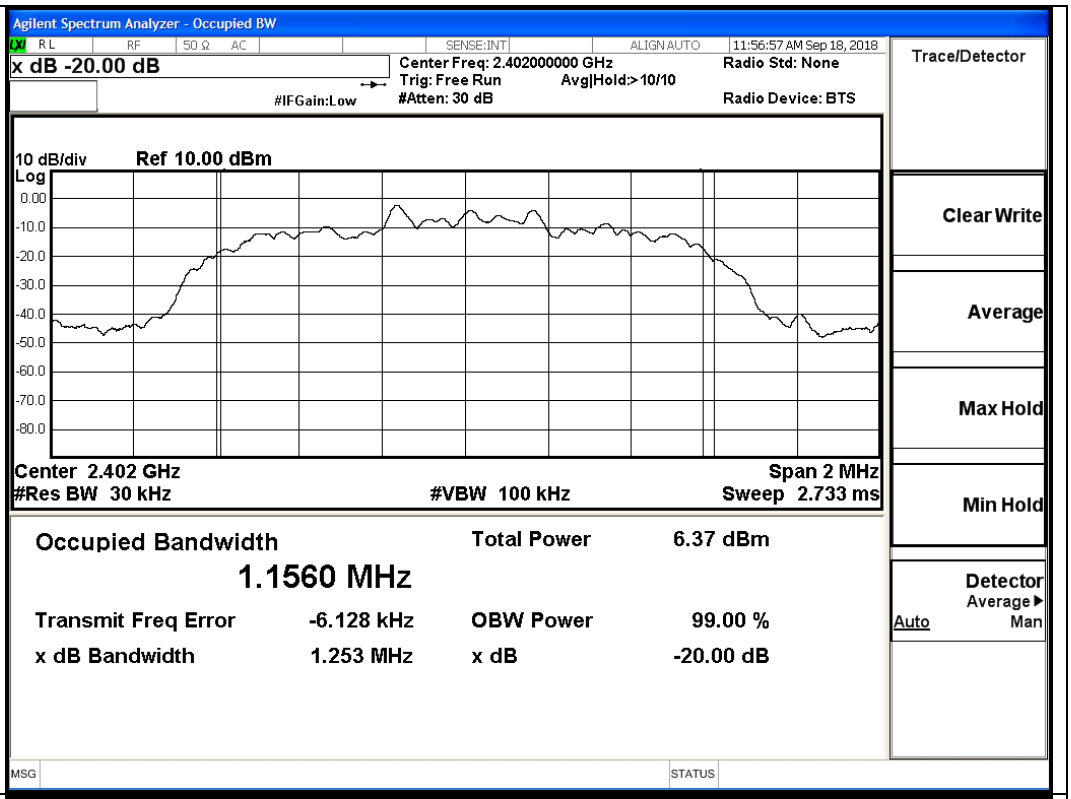
GFSK/MCH



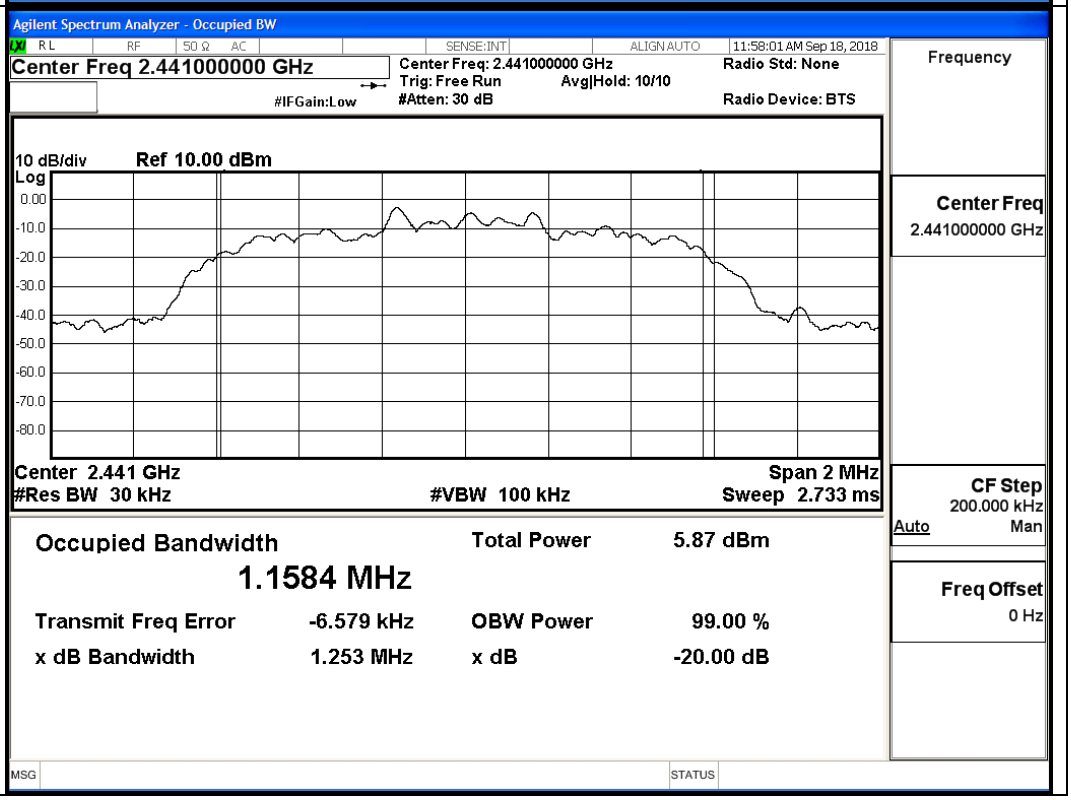
GFSK/HCH



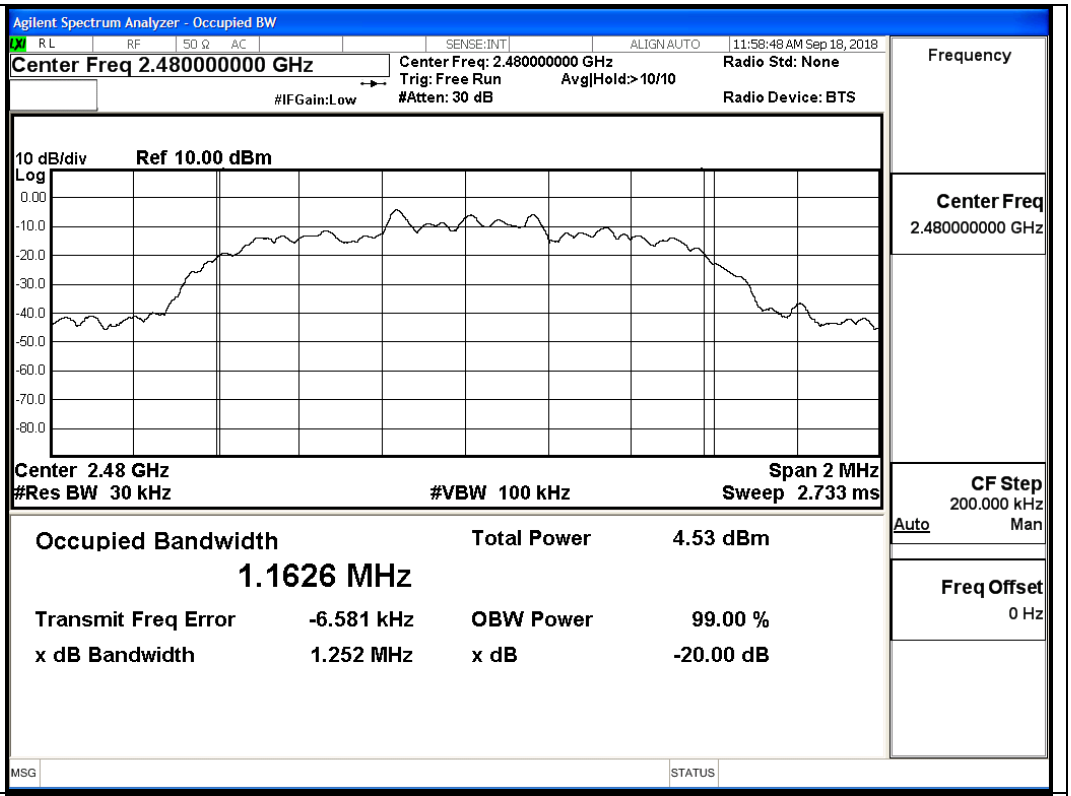
π/4DQPSK/LCH



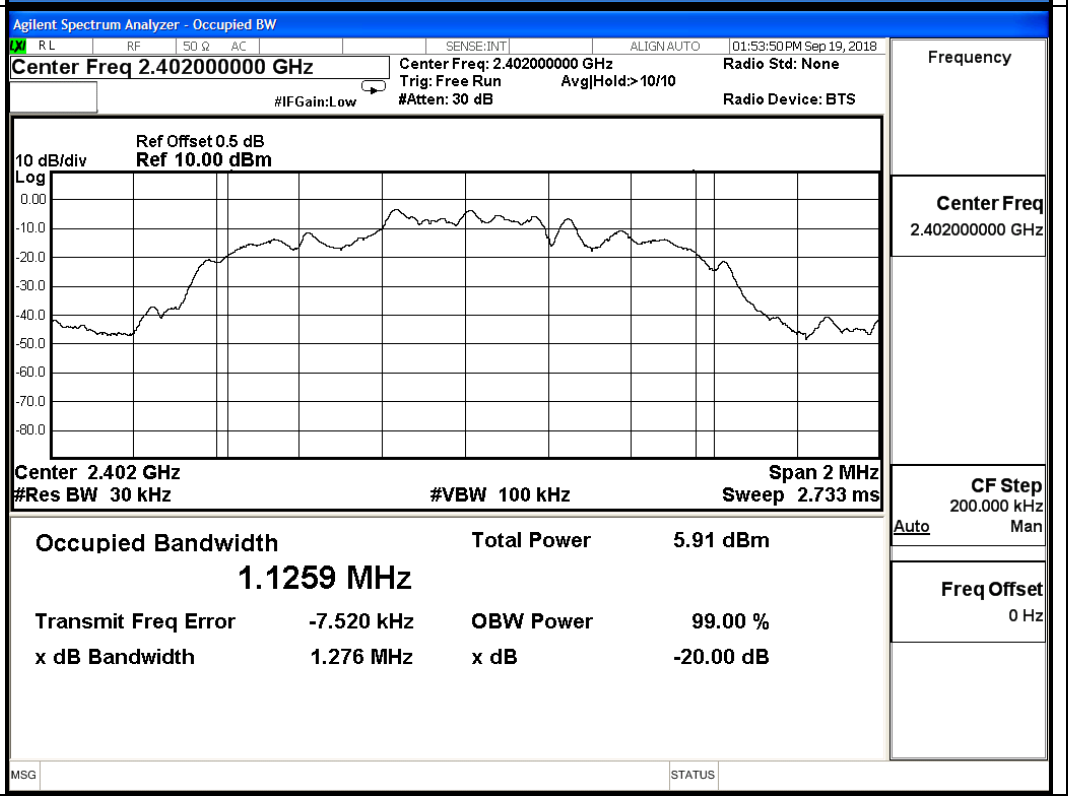
π/4DQPSK/MCH



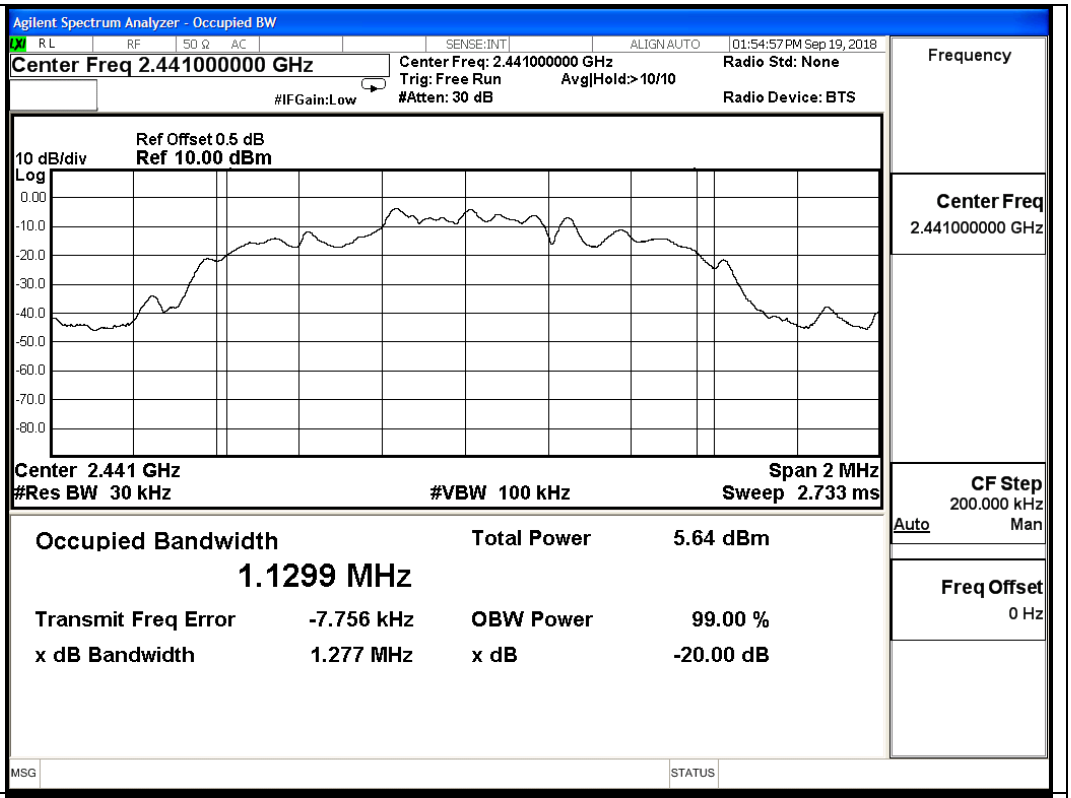
π/4DQPSK/HCH



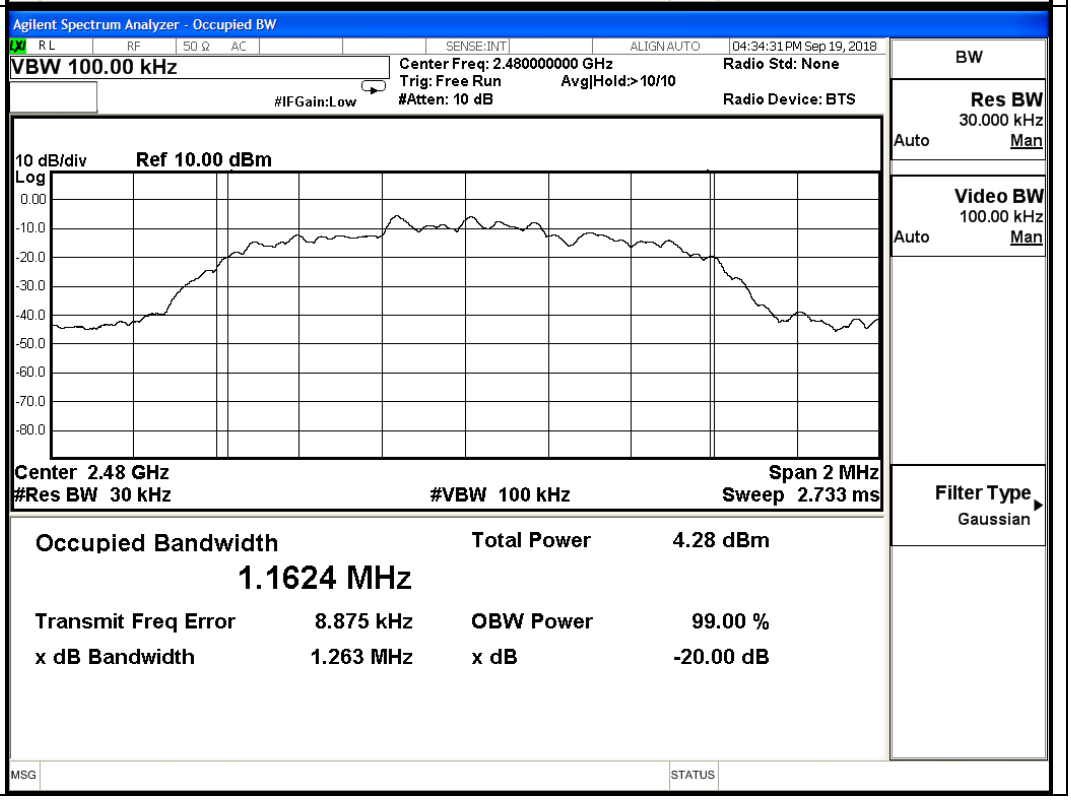
8DPSK/LCH



8DPSK/MCH

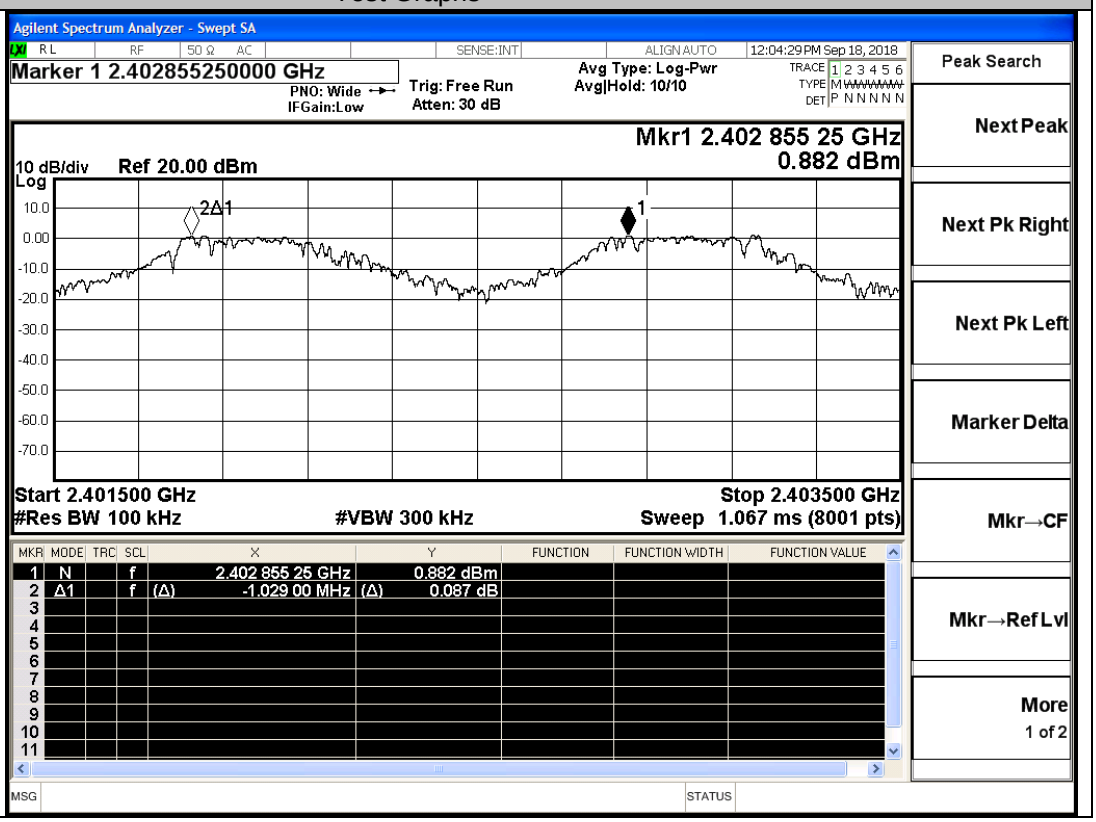


8DPSK/HCH

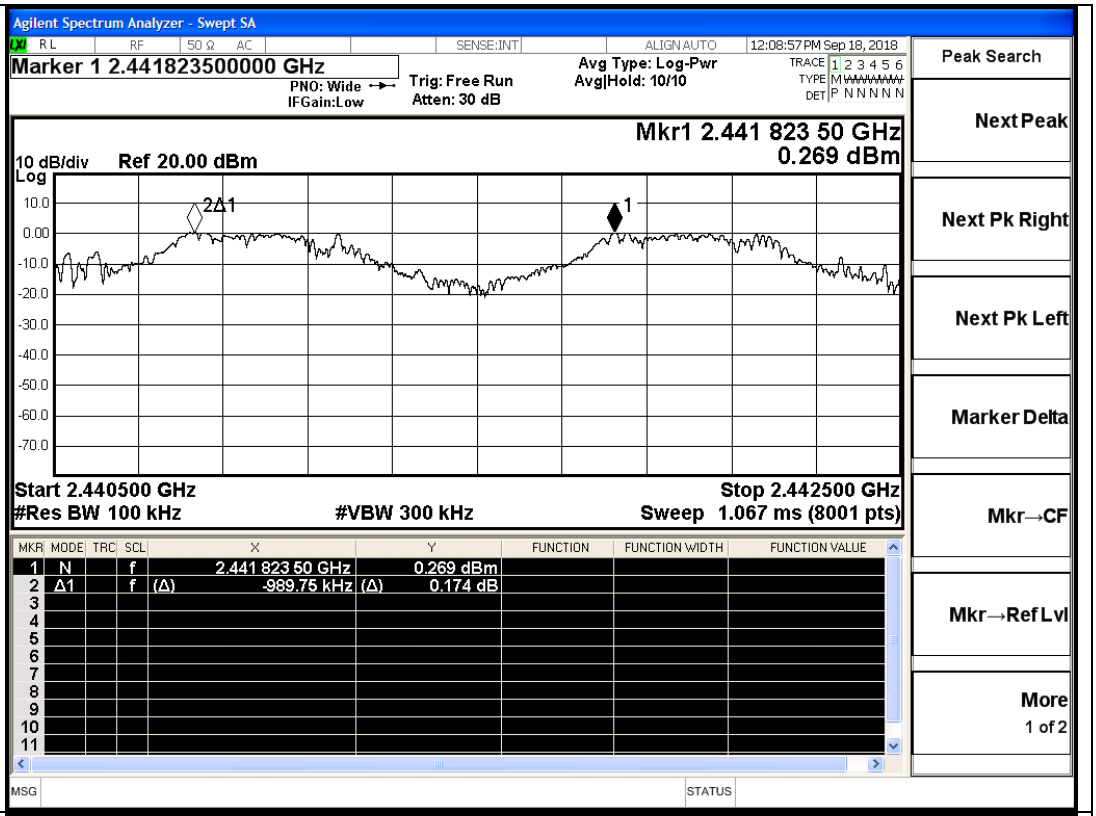


A.3 Carrier Frequency Separation

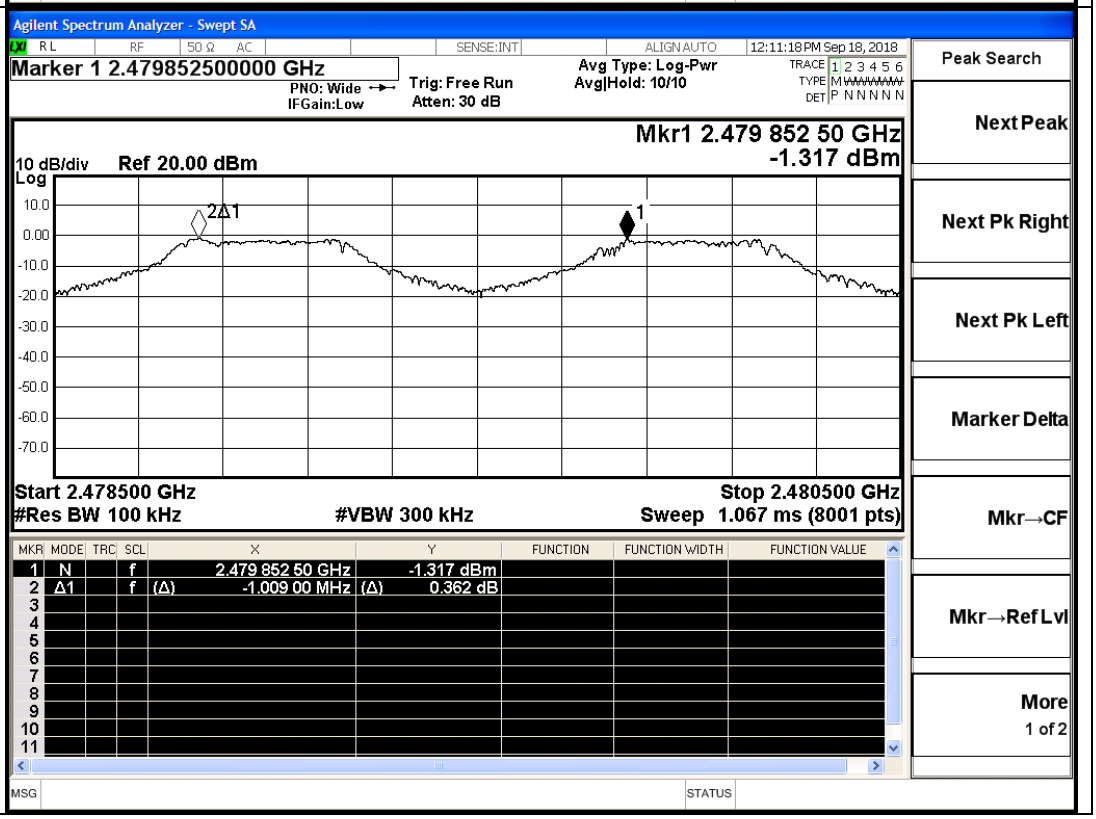
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz] 2/3*20dB Bandwidth	Verdict
GFSK	LCH	1.029	0.618	PASS
	MCH	0.990	0.618	PASS
	HCH	1.009	0.618	PASS
π/4DQPSK	LCH	0.999	0.835	PASS
	MCH	0.989	0.835	PASS
	HCH	1.007	0.835	PASS
8DPSK	LCH	1.021	0.851	PASS
	MCH	0.999	0.851	PASS
	HCH	1.000	0.851	PASS

Test Graphs	
GFSK/LCH	

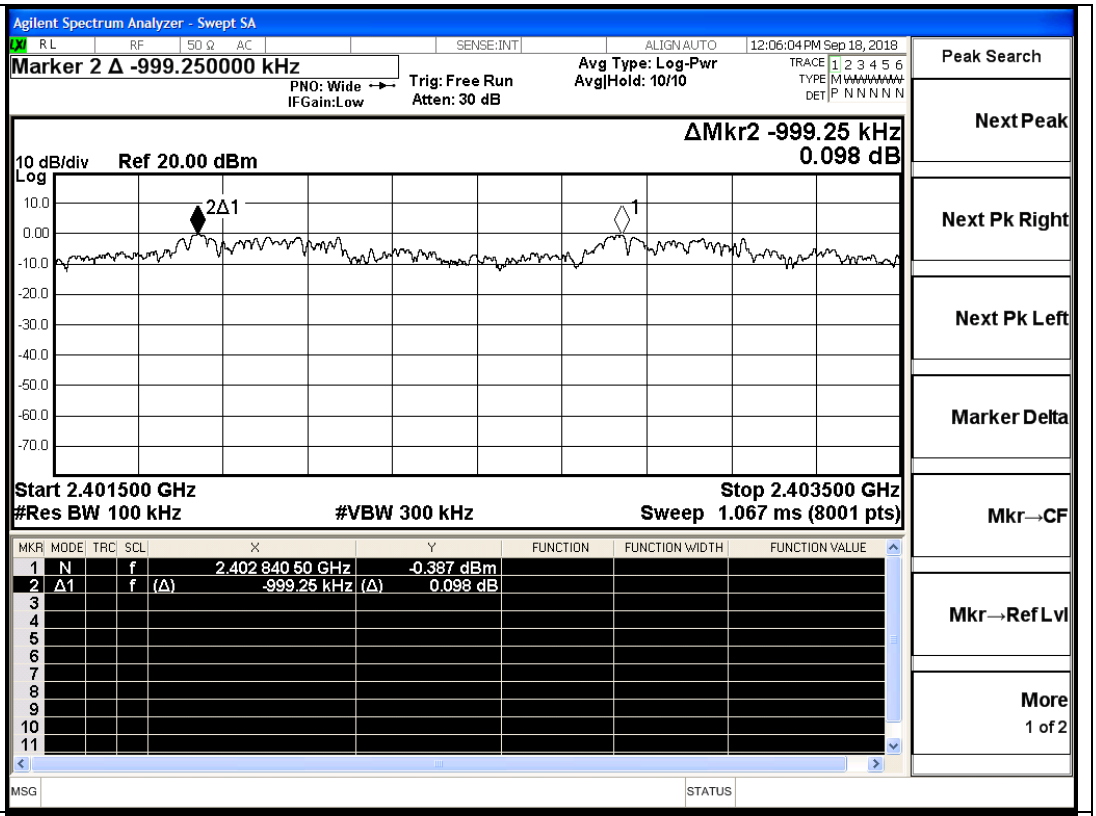
GFSK/MCH



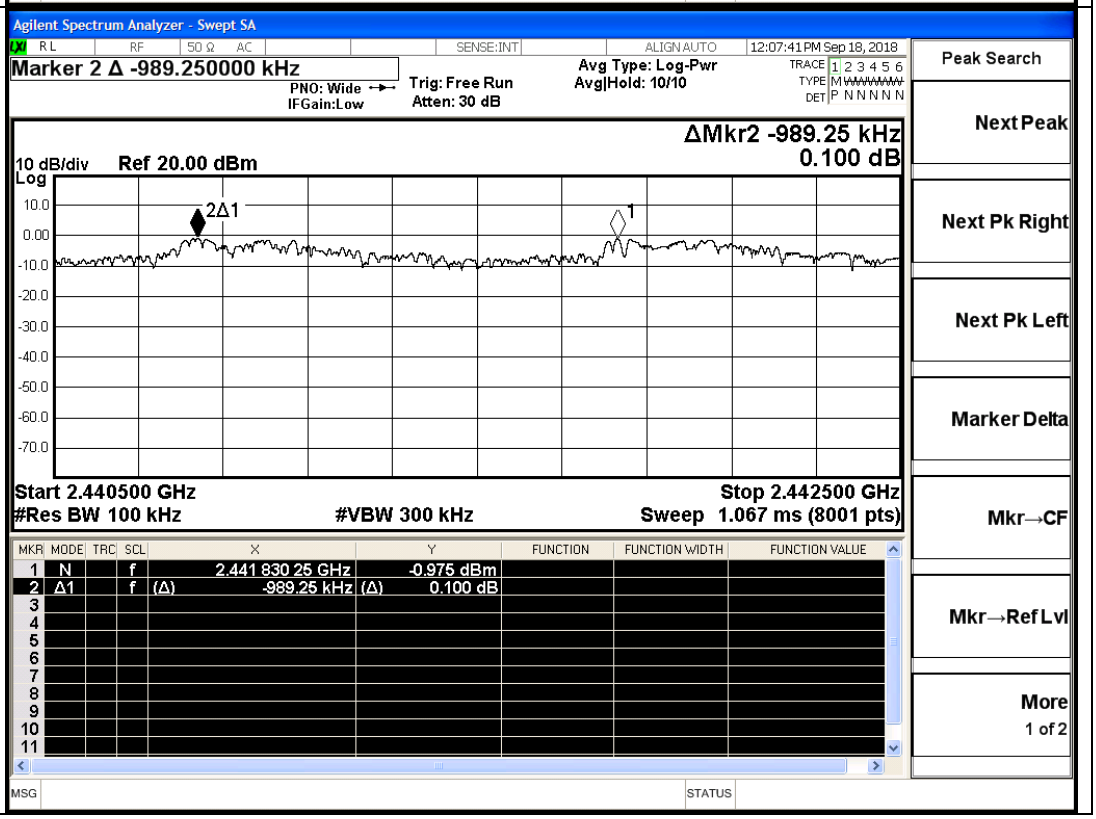
GFSK/HCH



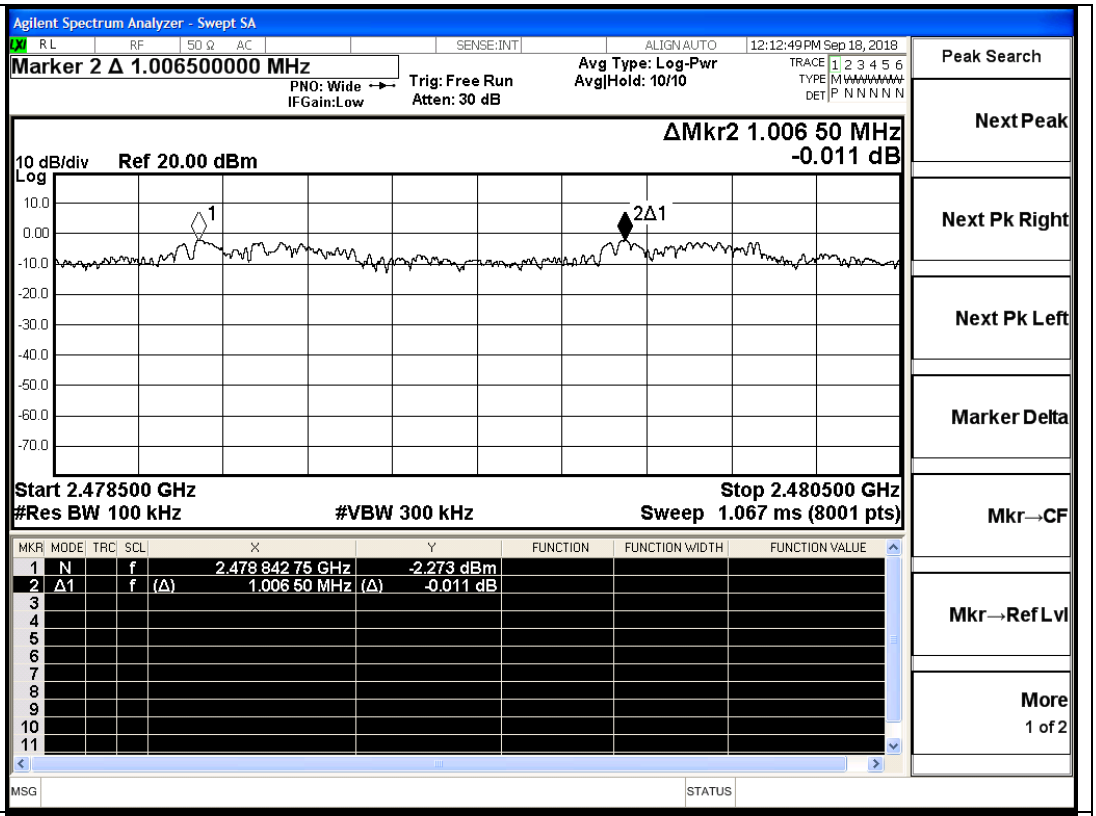
π/4DQPSK/LCH



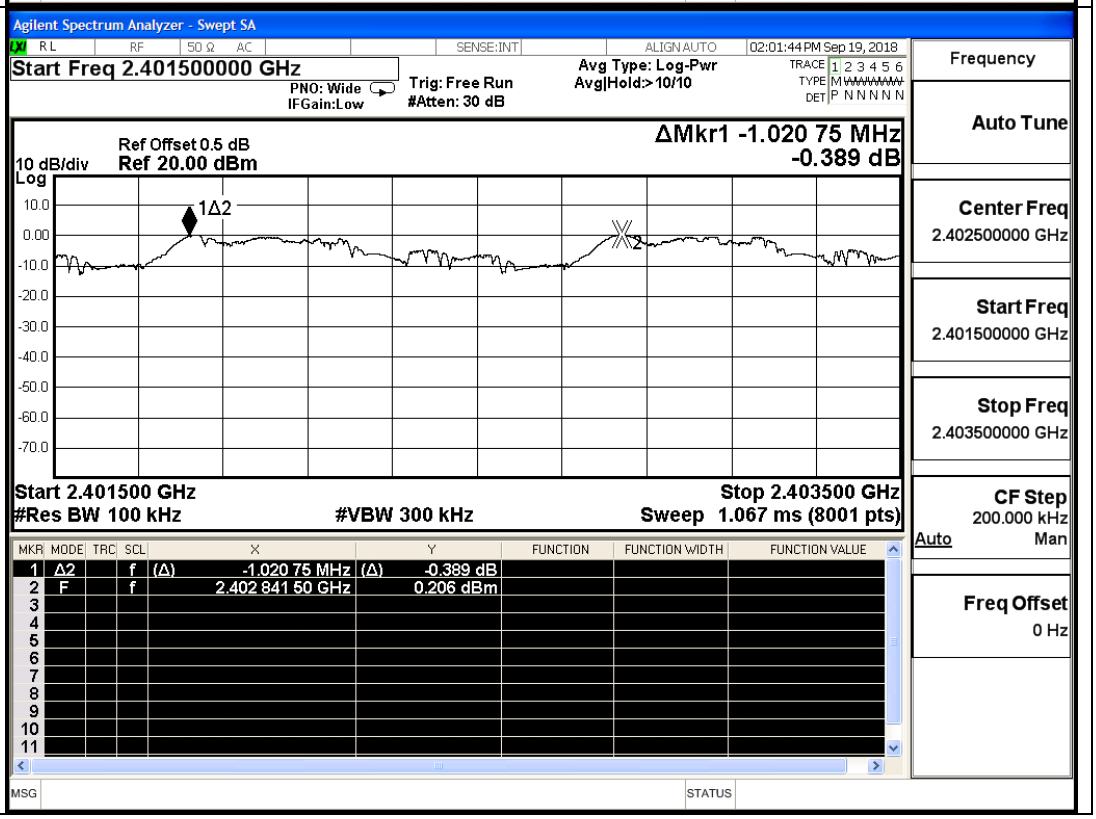
π/4DQPSK/MCH



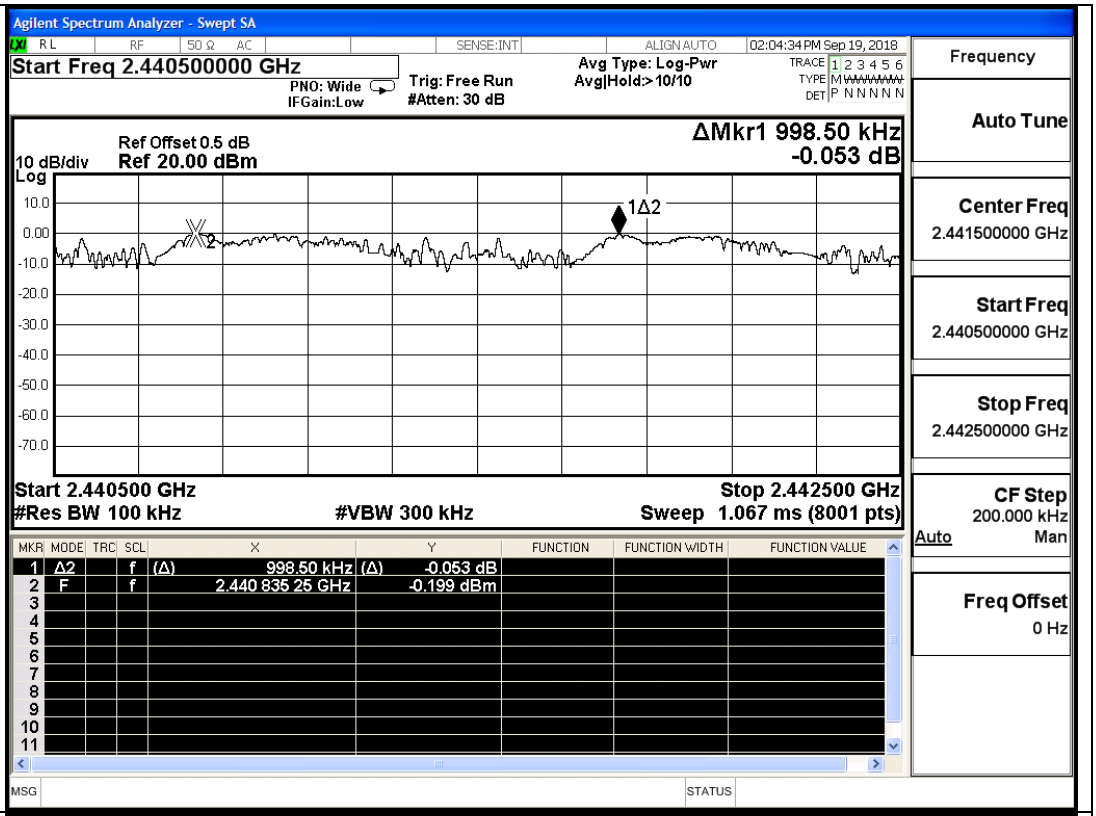
π/4DQPSK/HCH



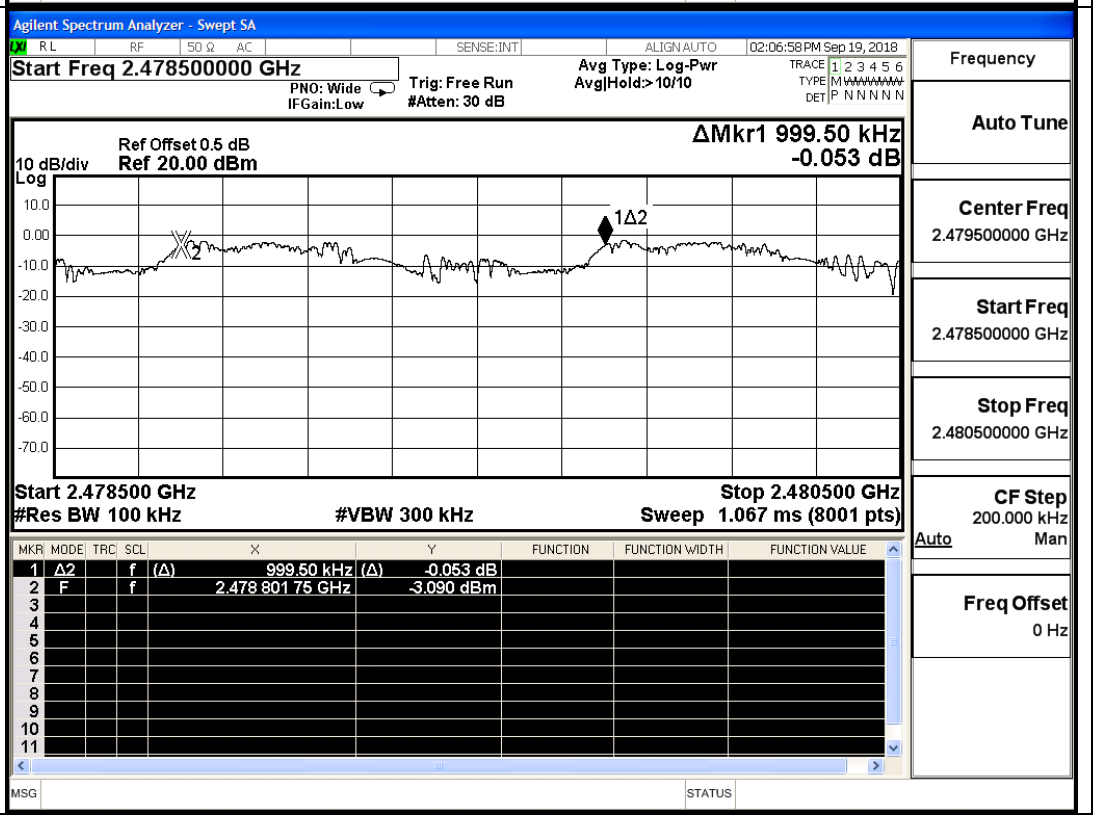
8DPSK/LCH



8DPSK/MCH

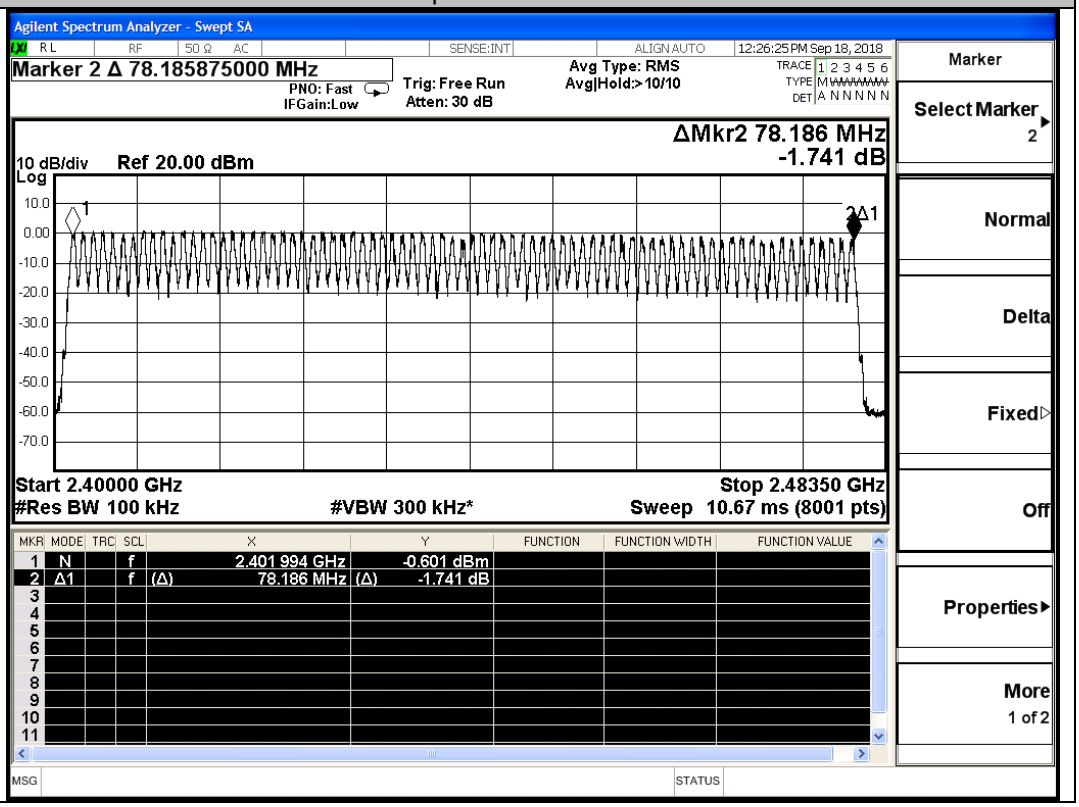


8DPSK/HCH

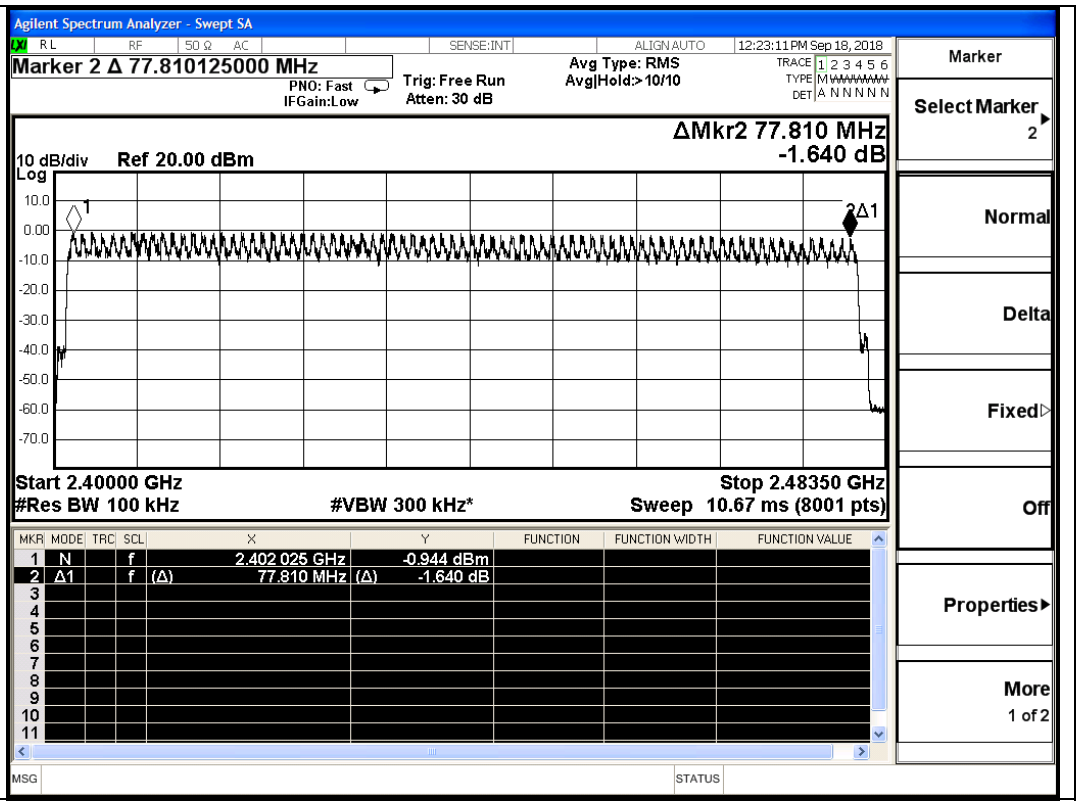


A.4 Hopping Channel Number

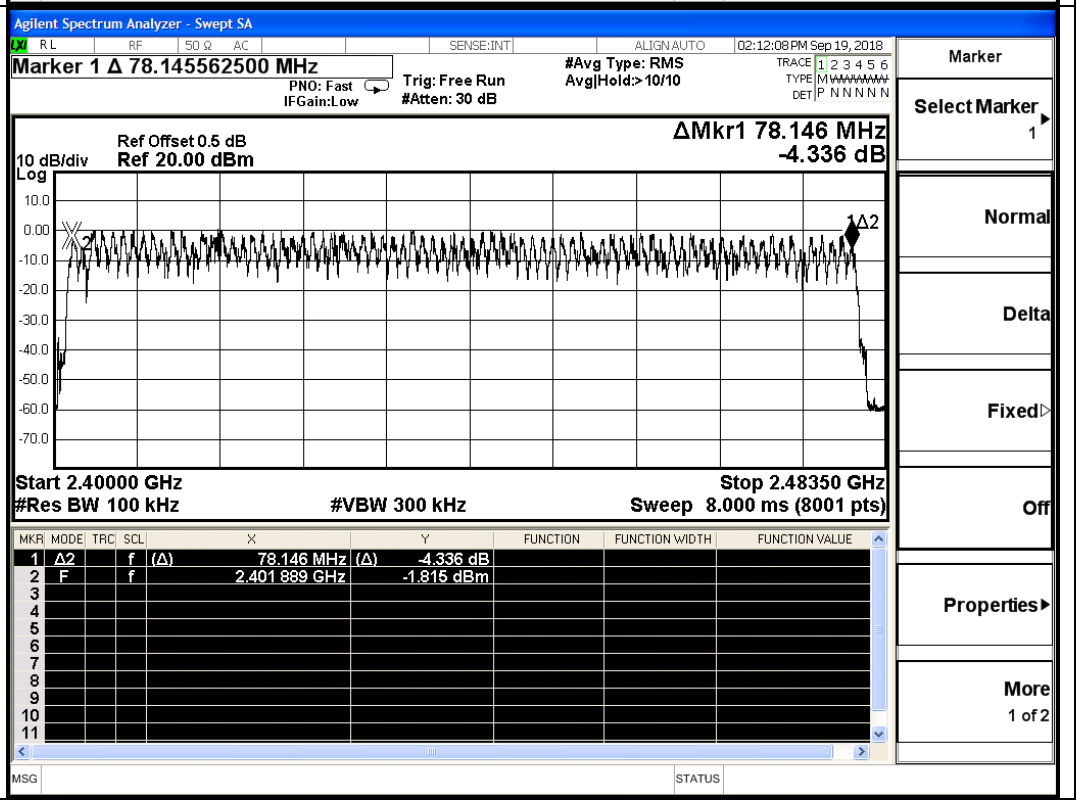
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
π/4DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graphs	
GFSK/Hop	

π/4DQPSK/Hop

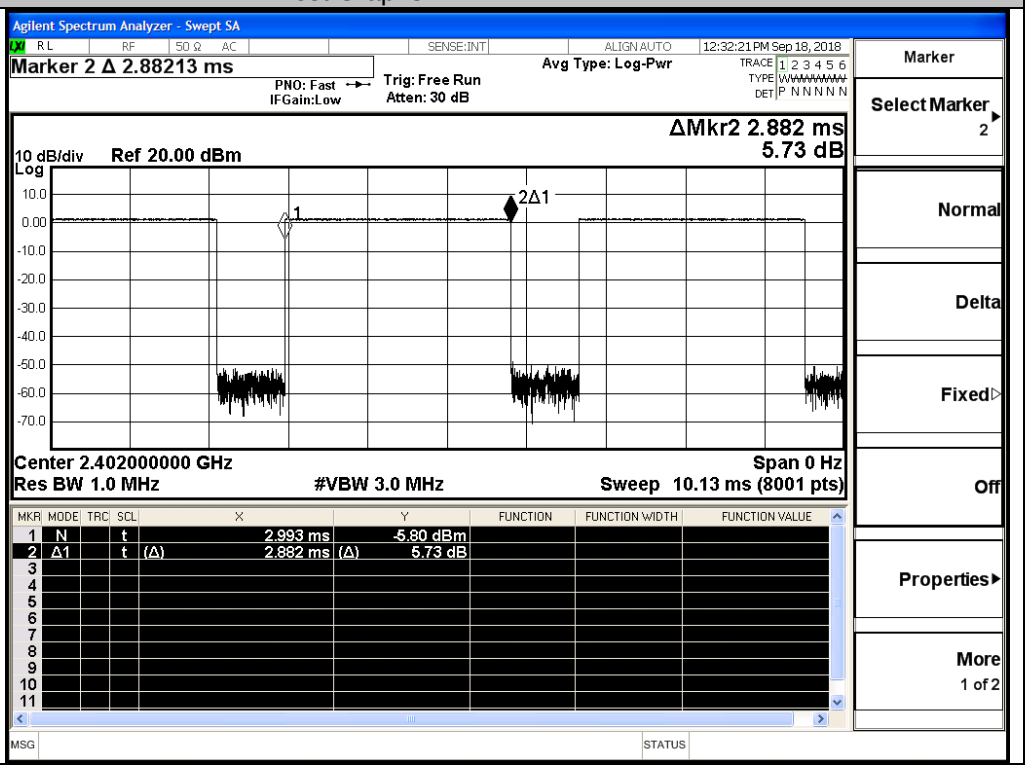


8DPSK/Hop

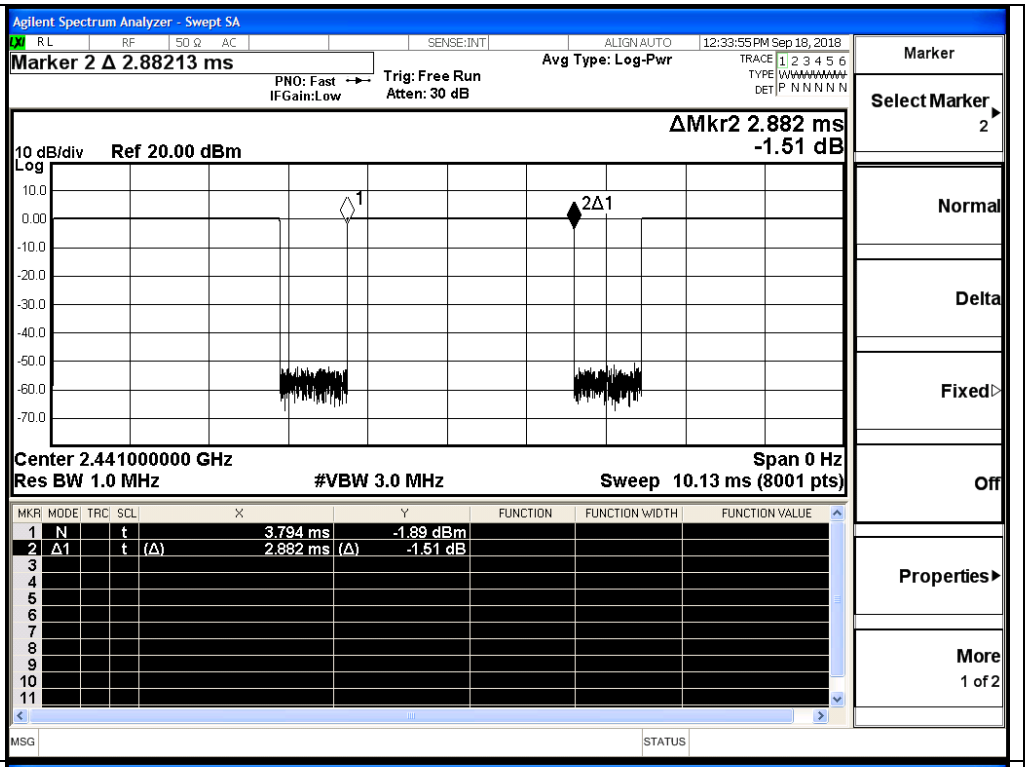


A.5 Dwell Time

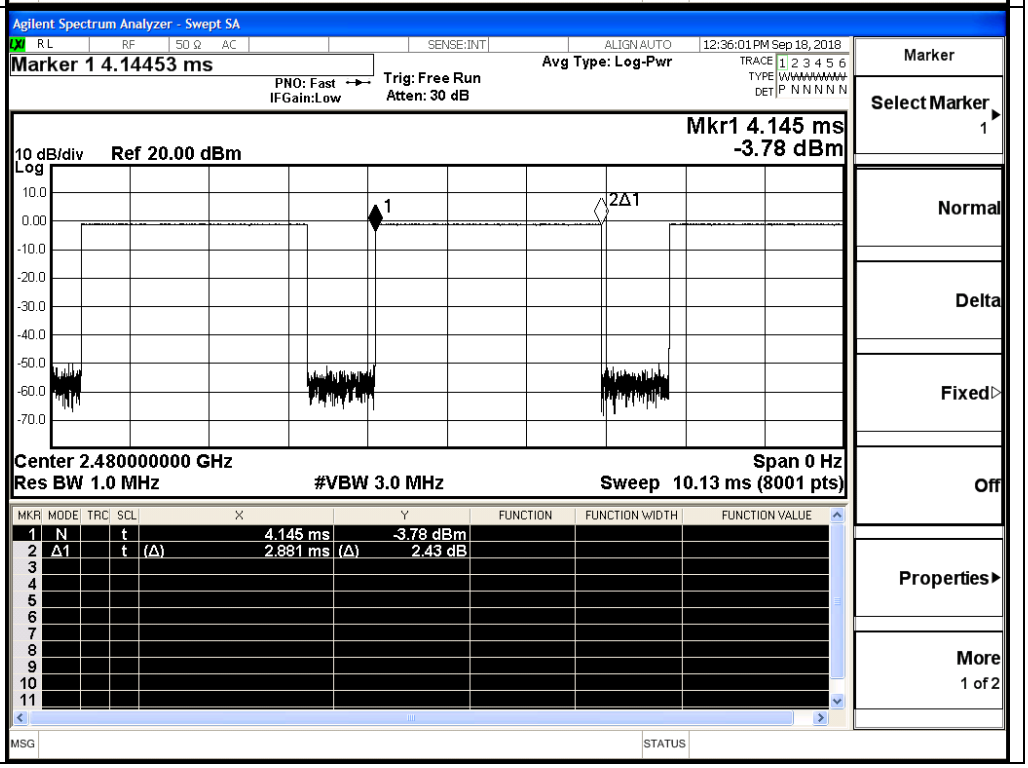
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.89	106.7	0.308	0.4	PASS
	2DH5	MCH	2.89	106.7	0.308	0.4	PASS
	2DH5	HCH	2.89	106.7	0.308	0.4	PASS
8DPSK	3DH5	LCH	2.86	106.7	0.305	0.4	PASS
	3DH5	MCH	2.85	106.7	0.304	0.4	PASS
	3DH5	HCH	2.84	106.7	0.303	0.4	PASS

Test Graphs	
GFSK_DH5/LCH	

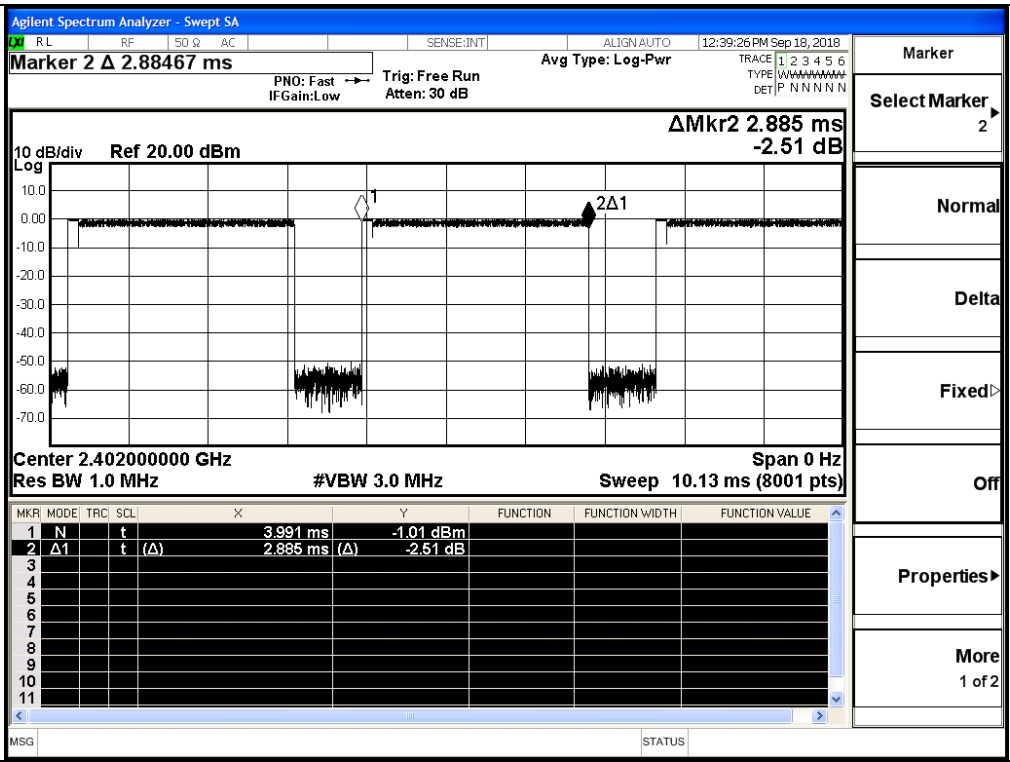
GFSK_DH5/MCH



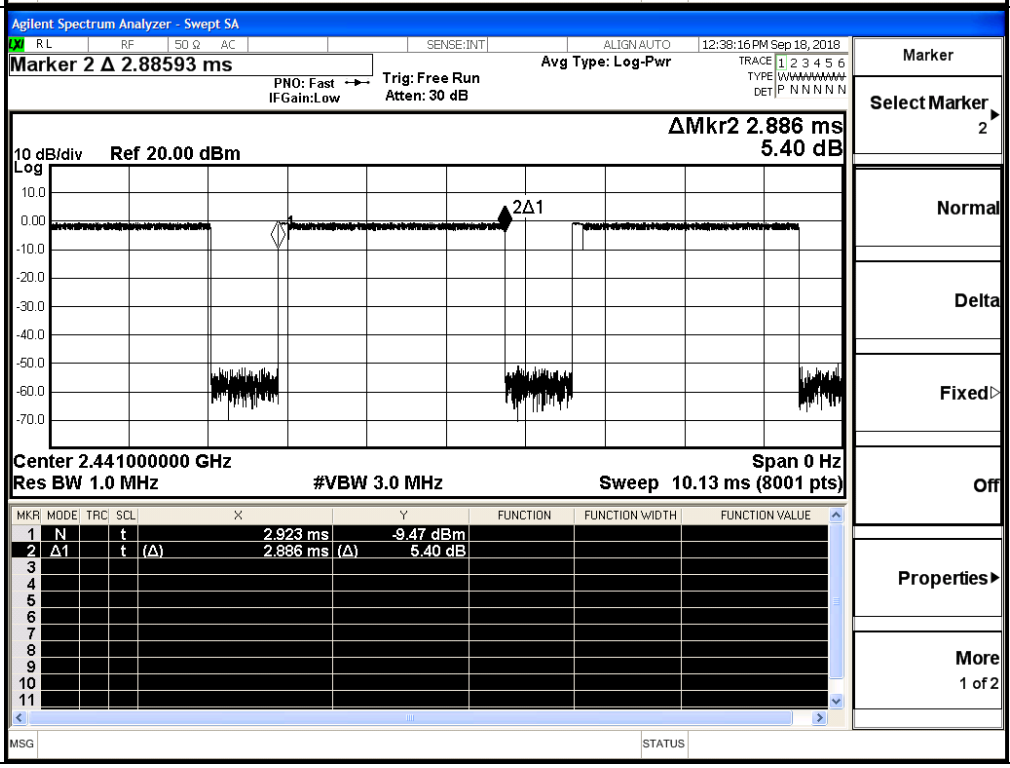
GFSK_DH5/HCH



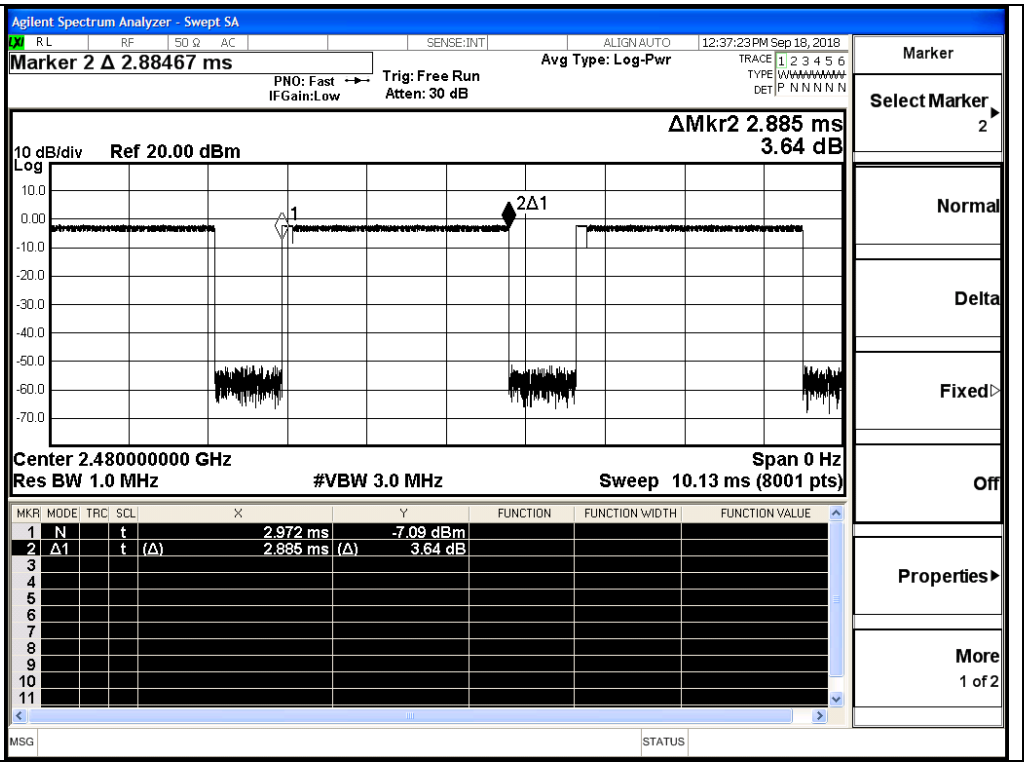
π/4DQPSK
_2DH5/LCH



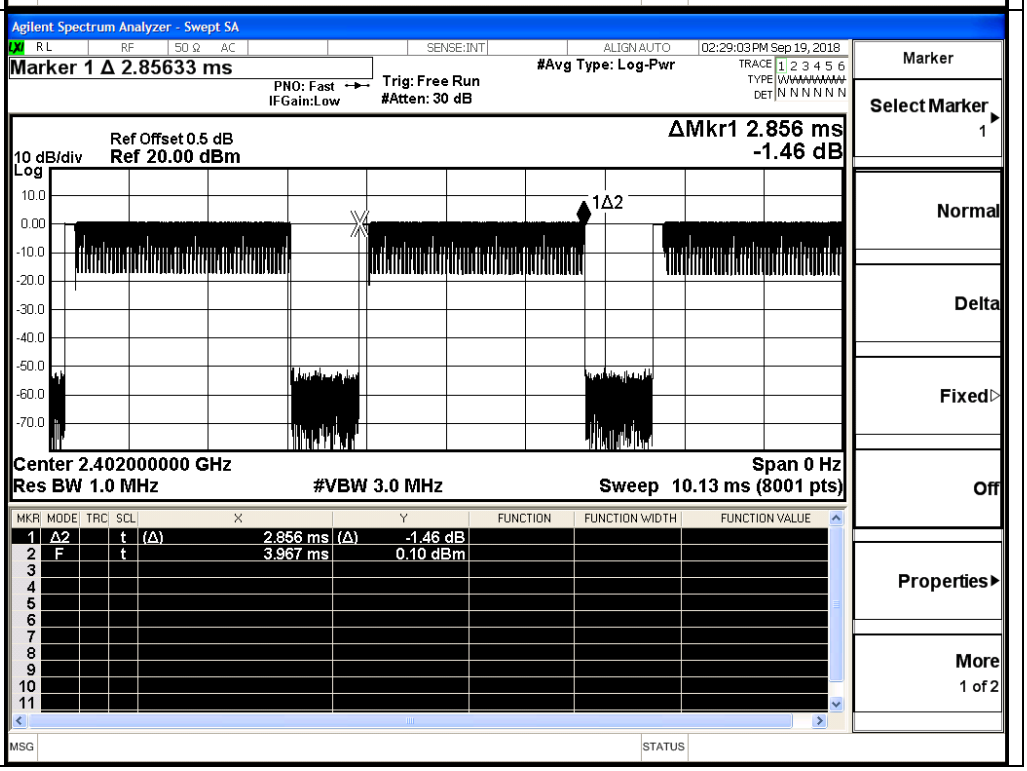
π/4DQPSK
_2DH5/MCH



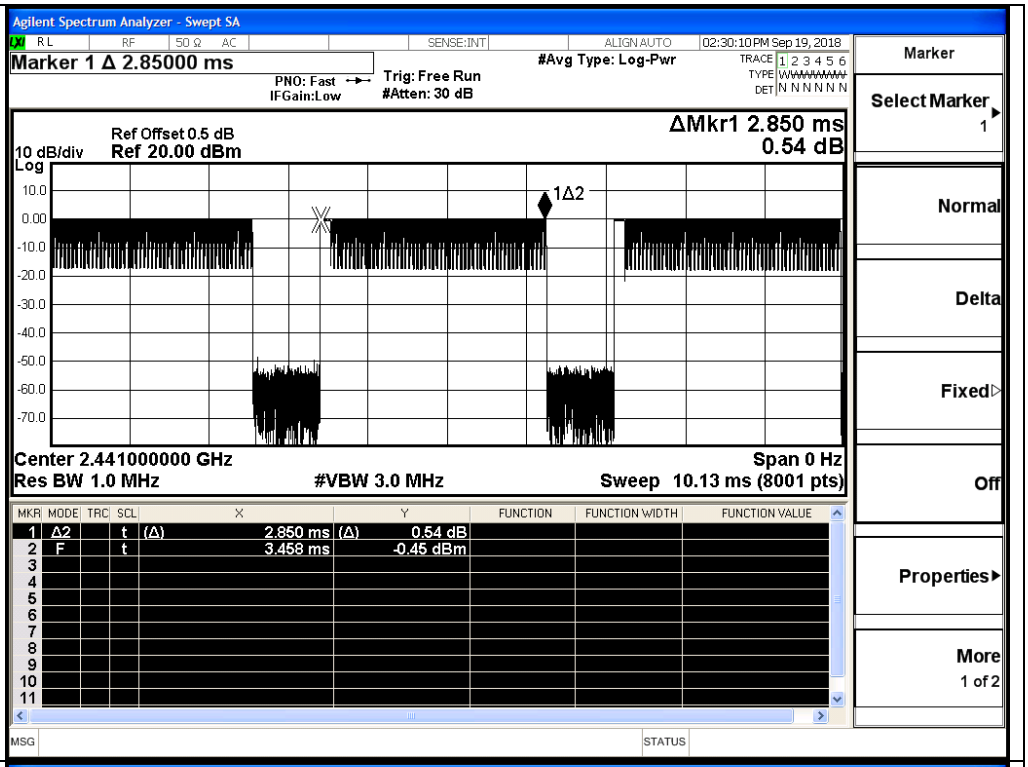
π/4DQPSK _2DH5/HCH



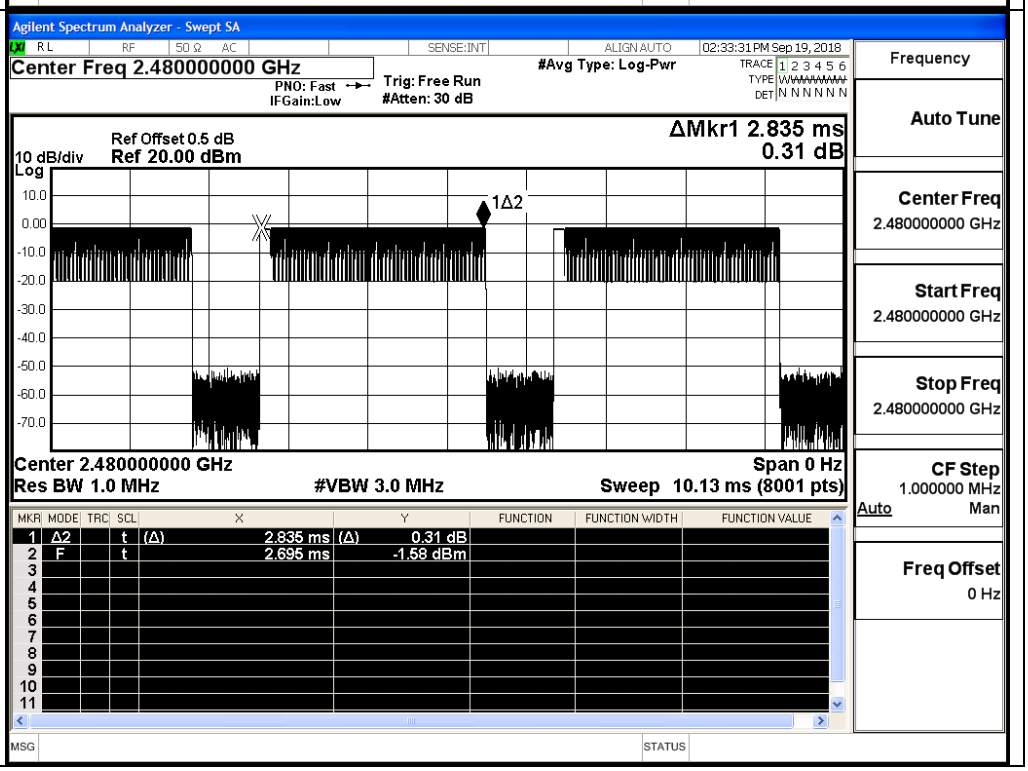
8DPSK _3DH5/LCH



8DPSK _3DH5/MCH

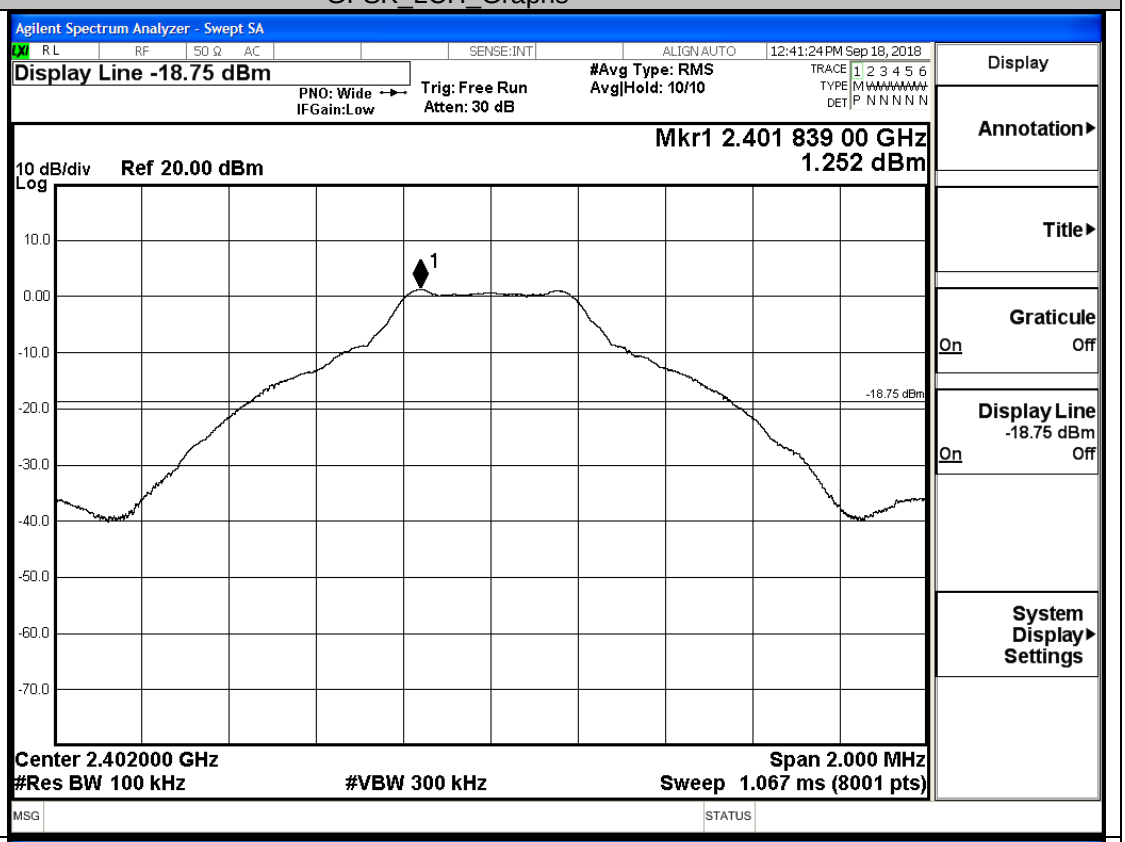
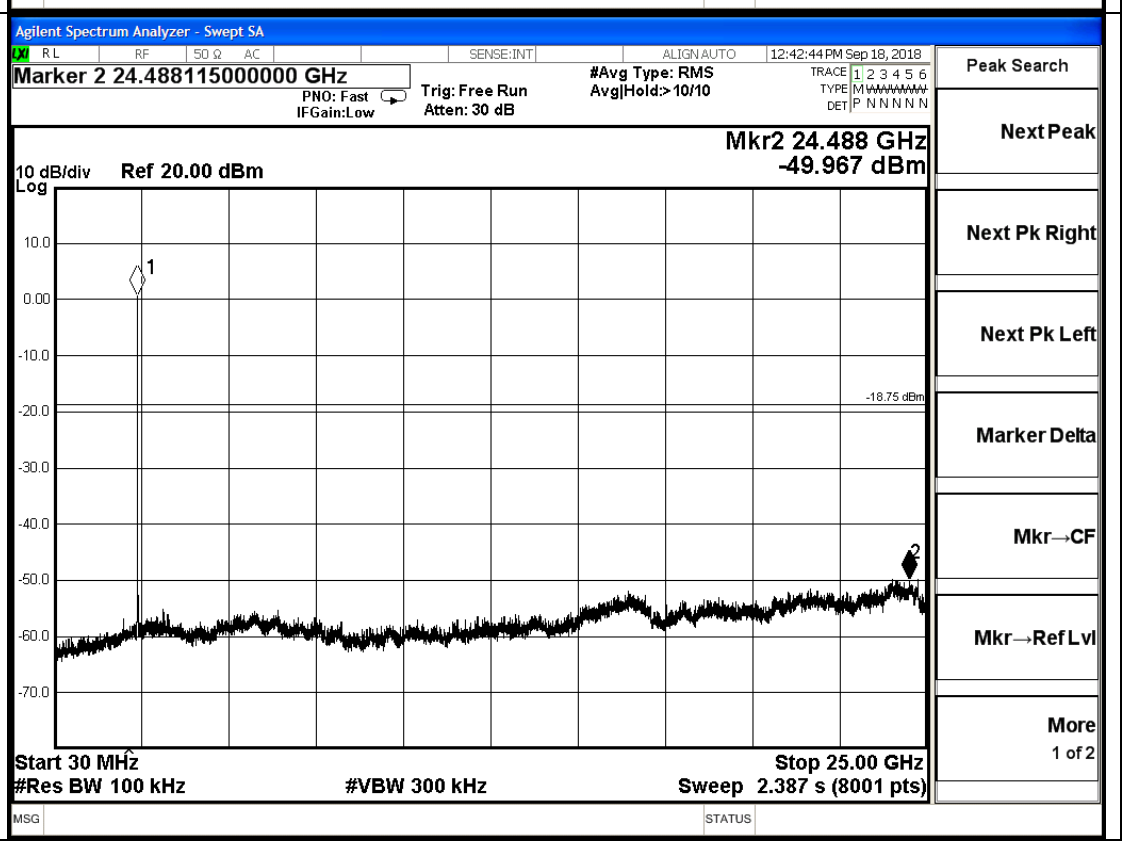


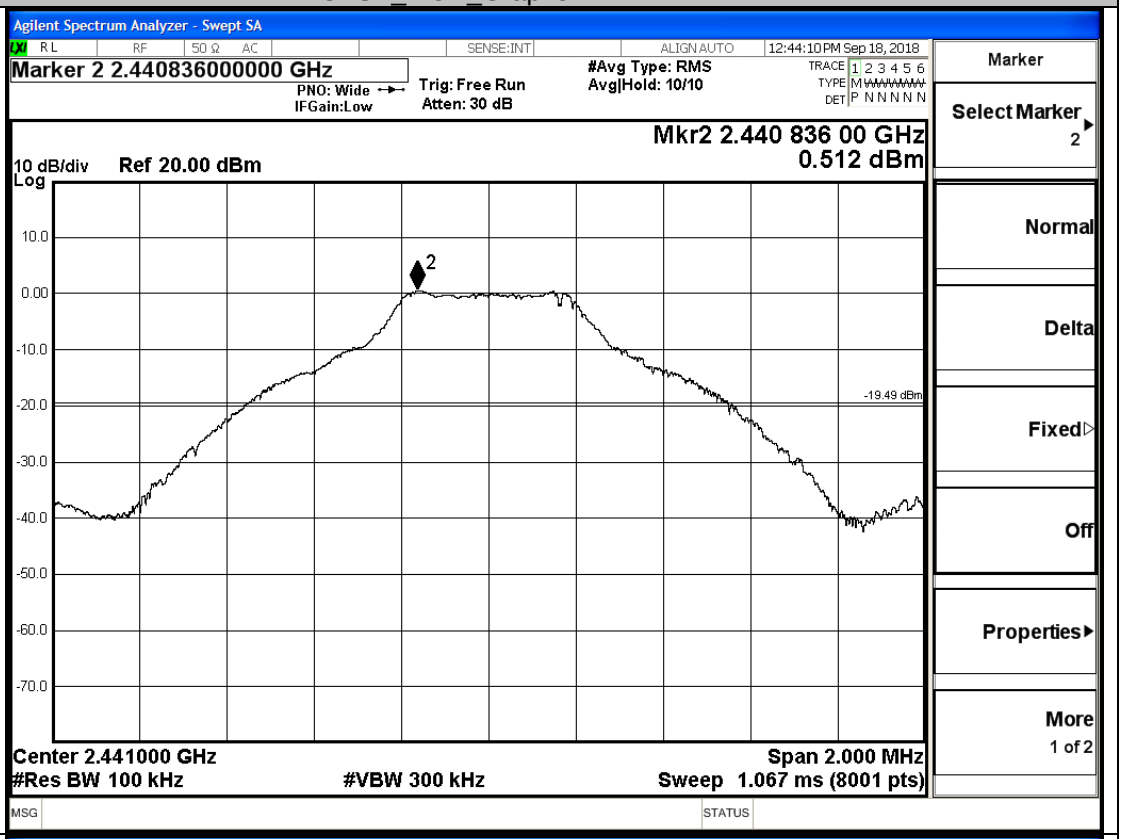
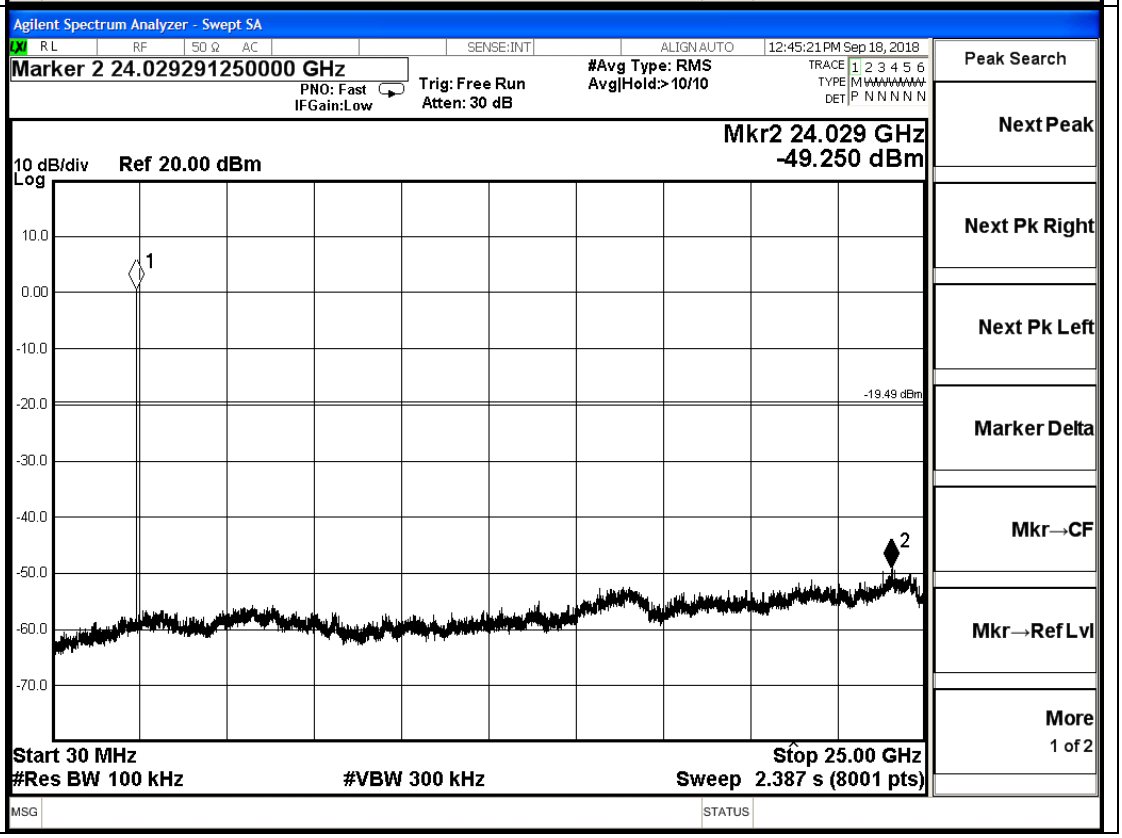
8DPSK _3DH5/HCH



A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.252	-49.967	-18.75	PASS
	MCH	0.512	-49.250	-19.49	PASS
	HCH	-1.209	-50.009	-21.21	PASS
π/4DQPSK	LCH	-0.316	-49.984	-20.32	PASS
	MCH	-0.786	-50.189	-20.79	PASS
	HCH	-2.198	-49.625	-22.20	PASS
8DPSK	LCH	-0.159	-49.620	-20.16	PASS
	MCH	-0.224	-49.367	-20.22	PASS
	HCH	-1.891	-49.296	-21.89	PASS

GFSK_LCH_Graphs	
Pref	
Puw	

GFSK_MCH_Graphs	
Pref	
Puw	

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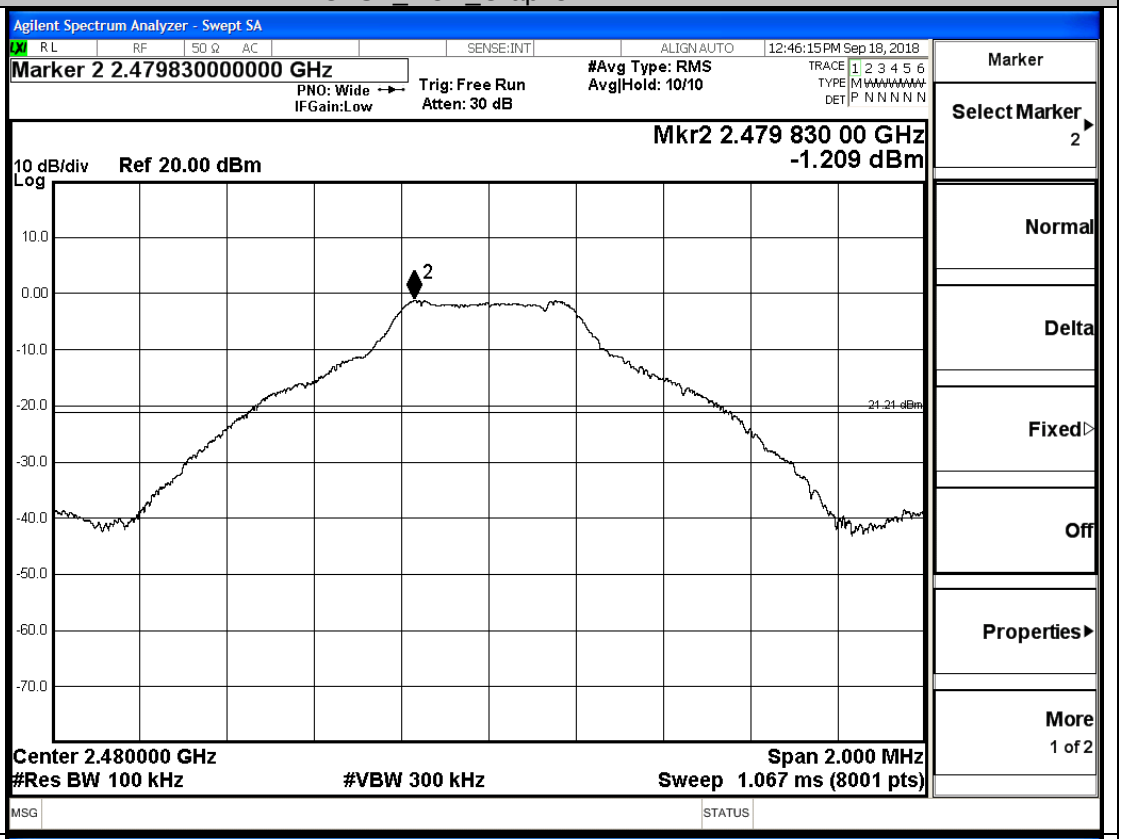
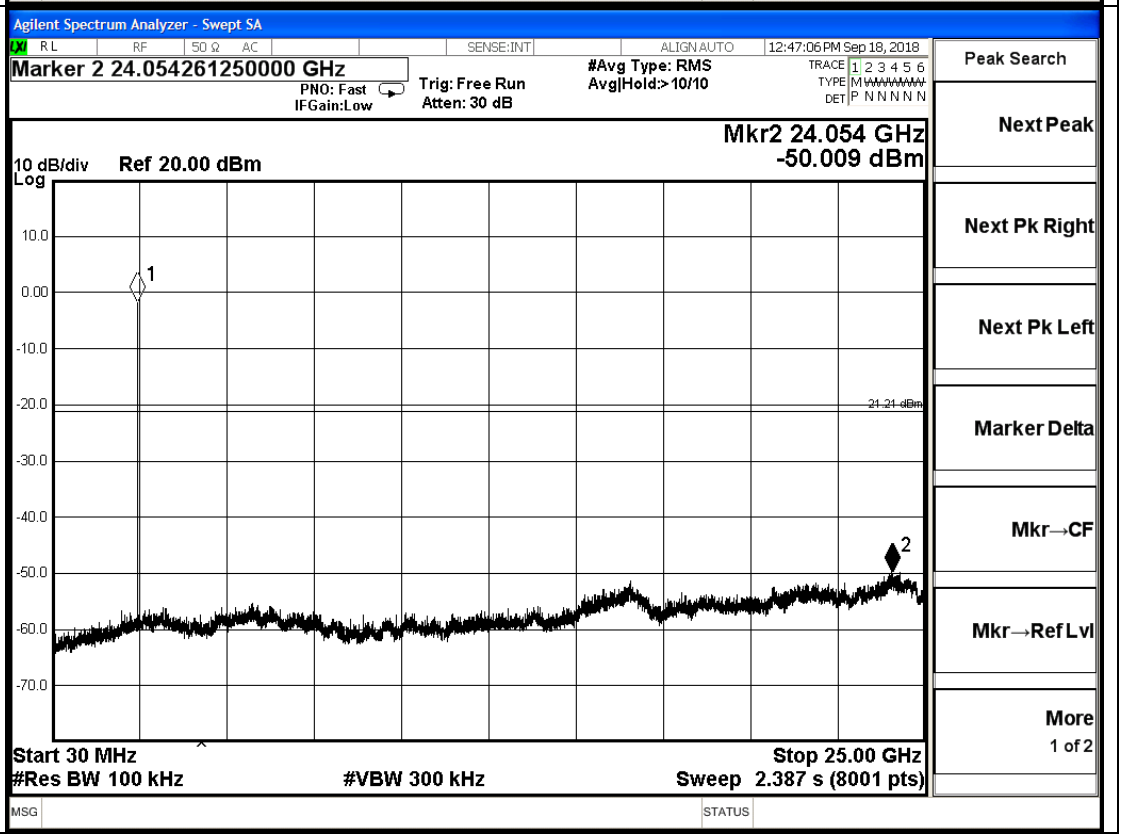
Pref	
Puw	

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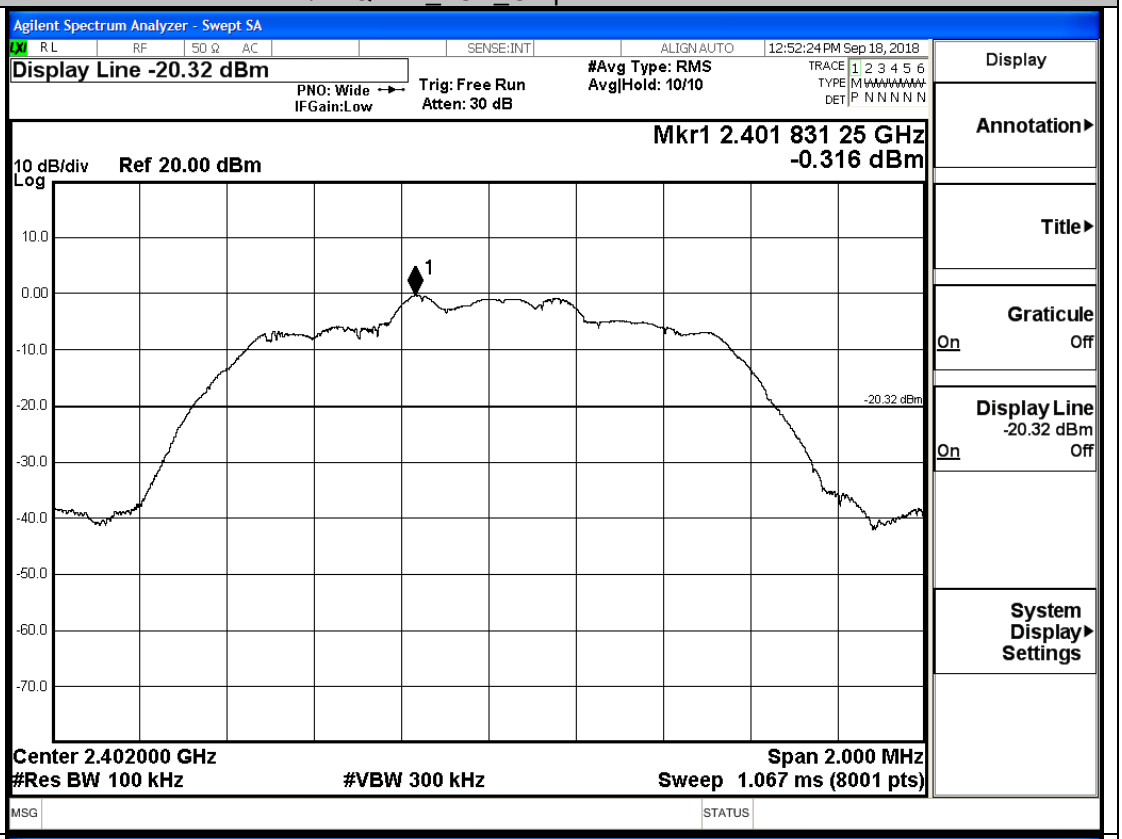
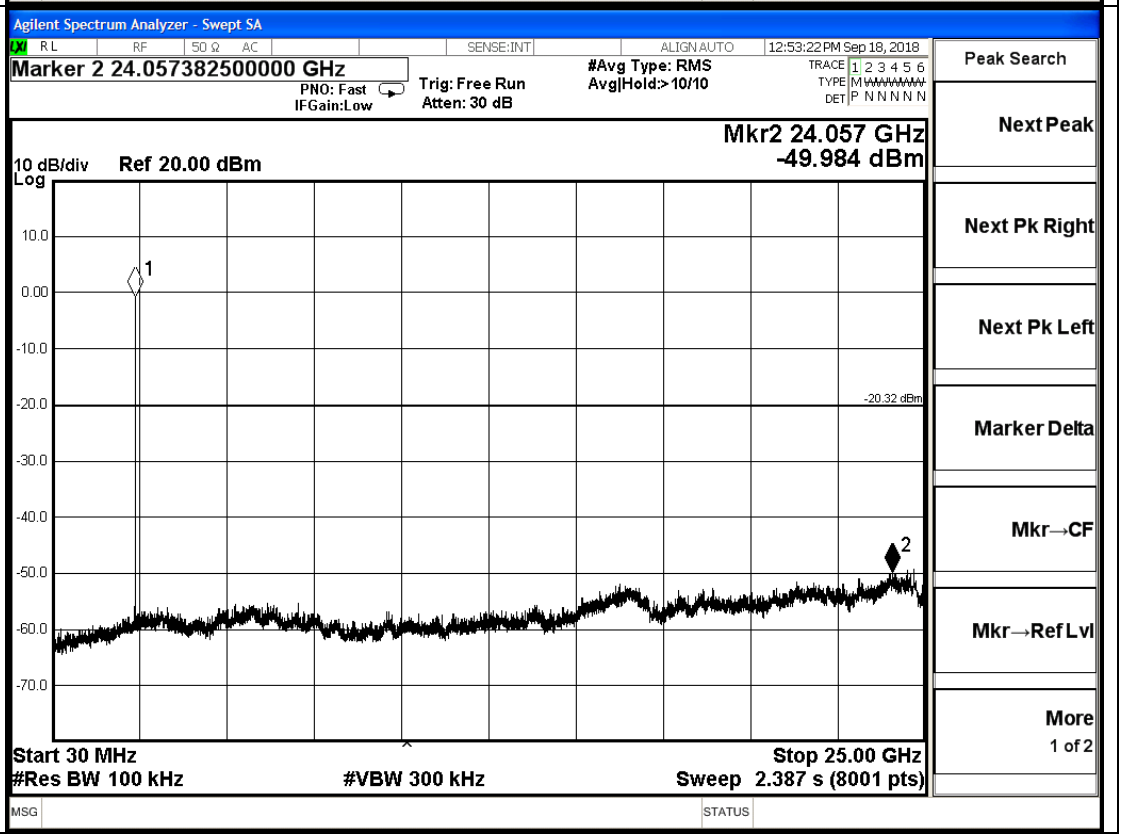
Pref	
Puw	

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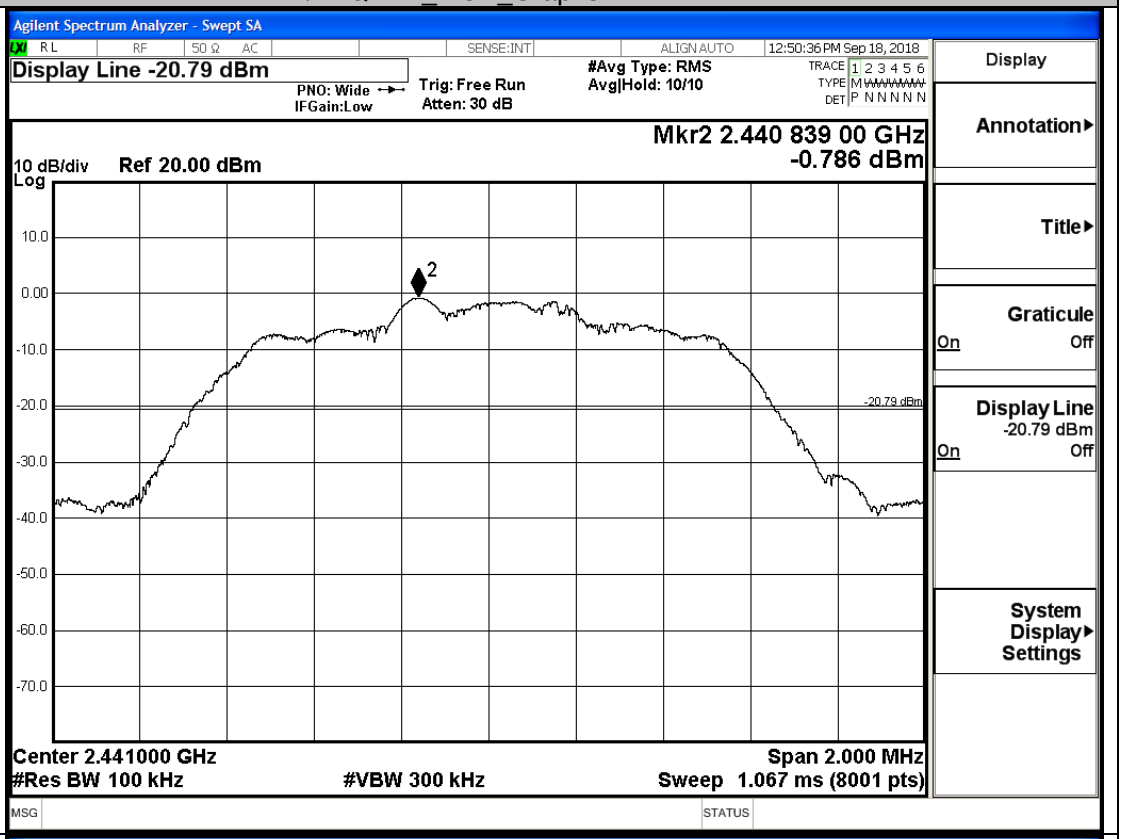
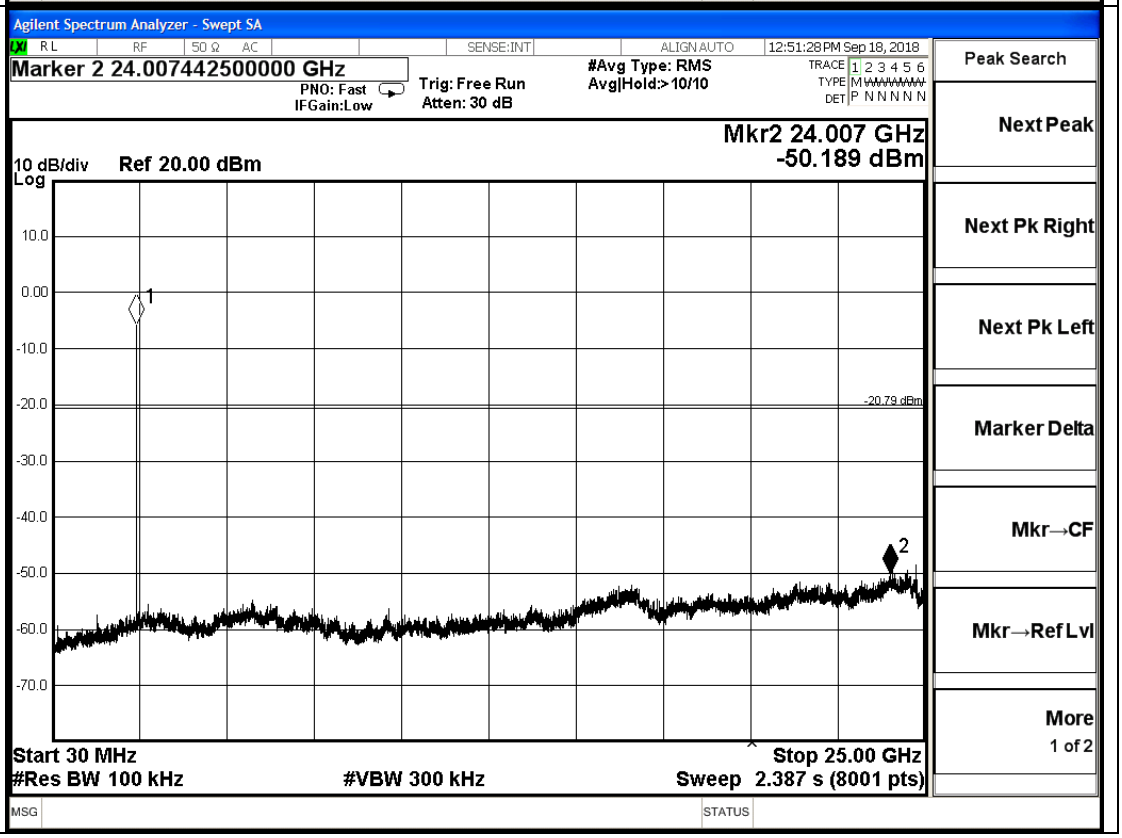
Pref	
Puw	

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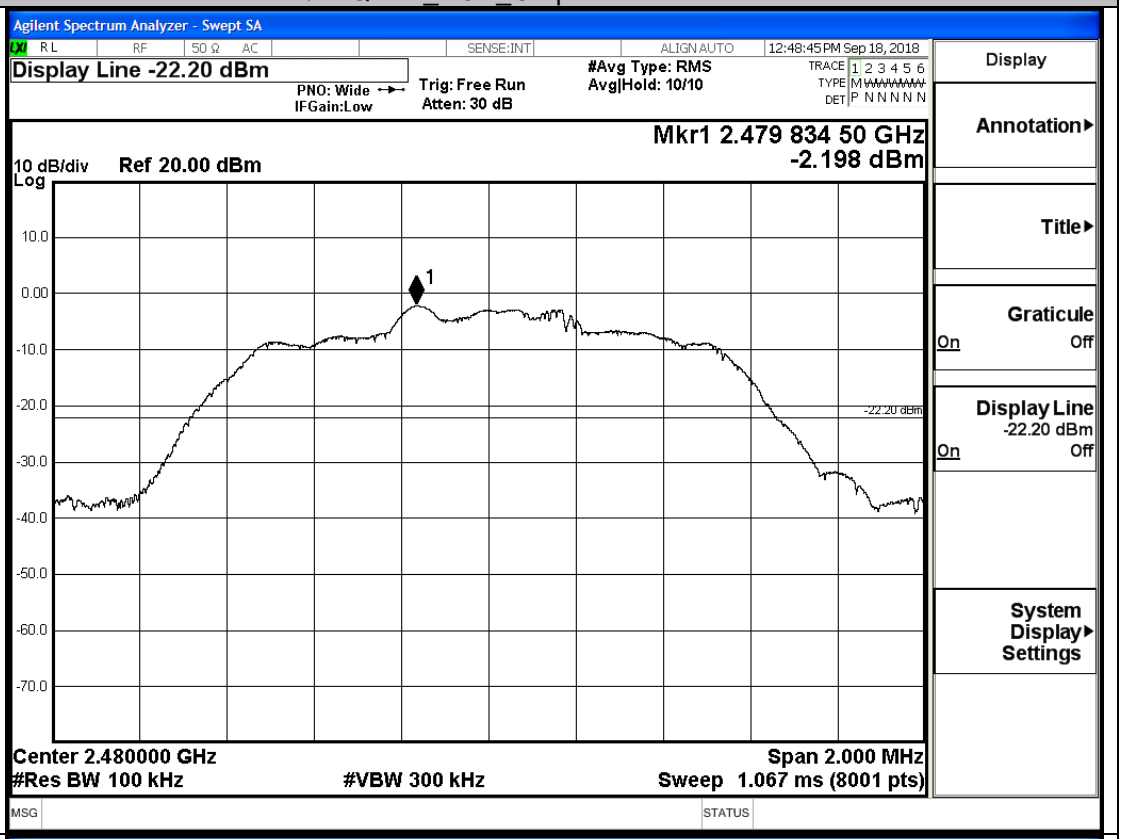
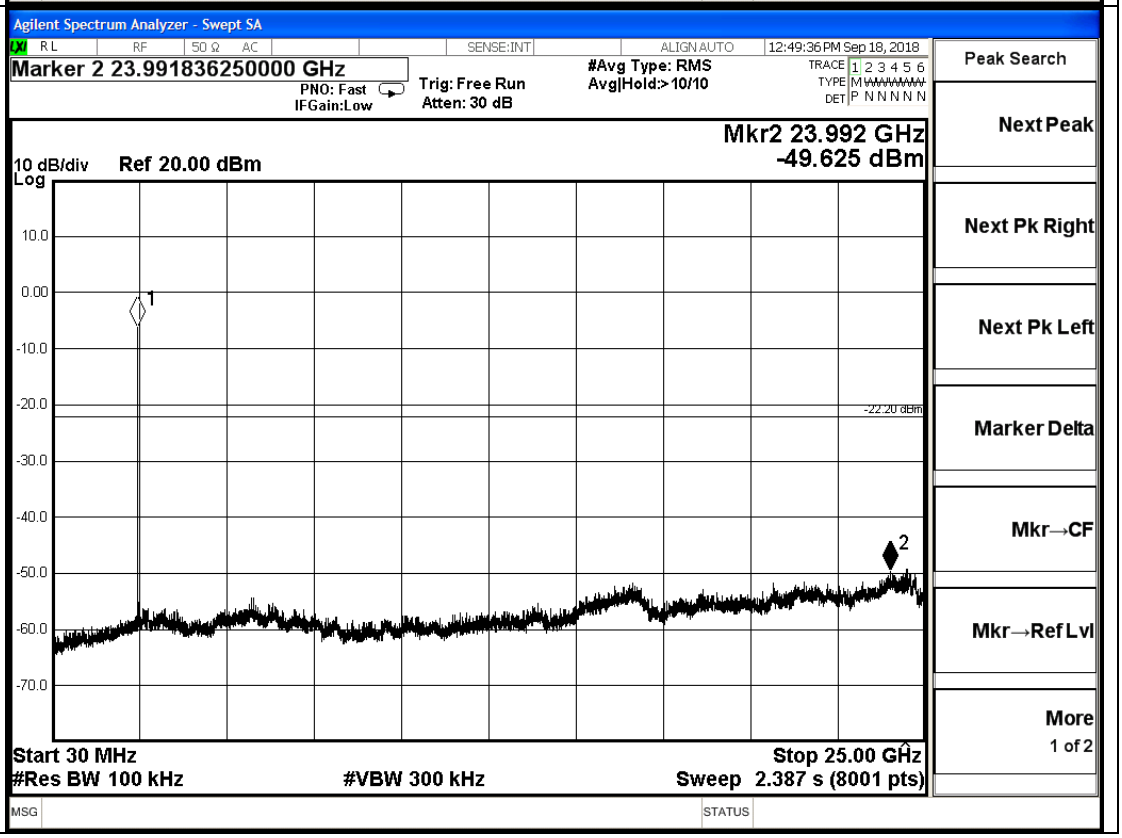
Pref	
Puw	

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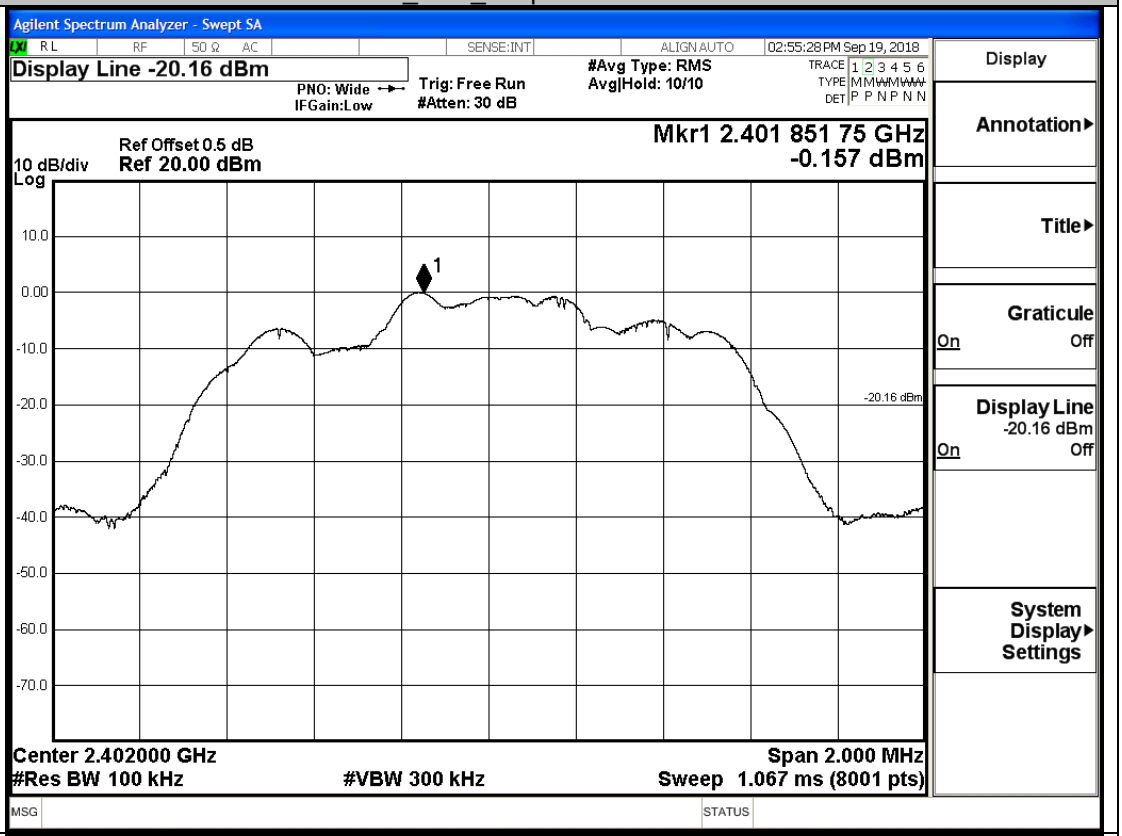
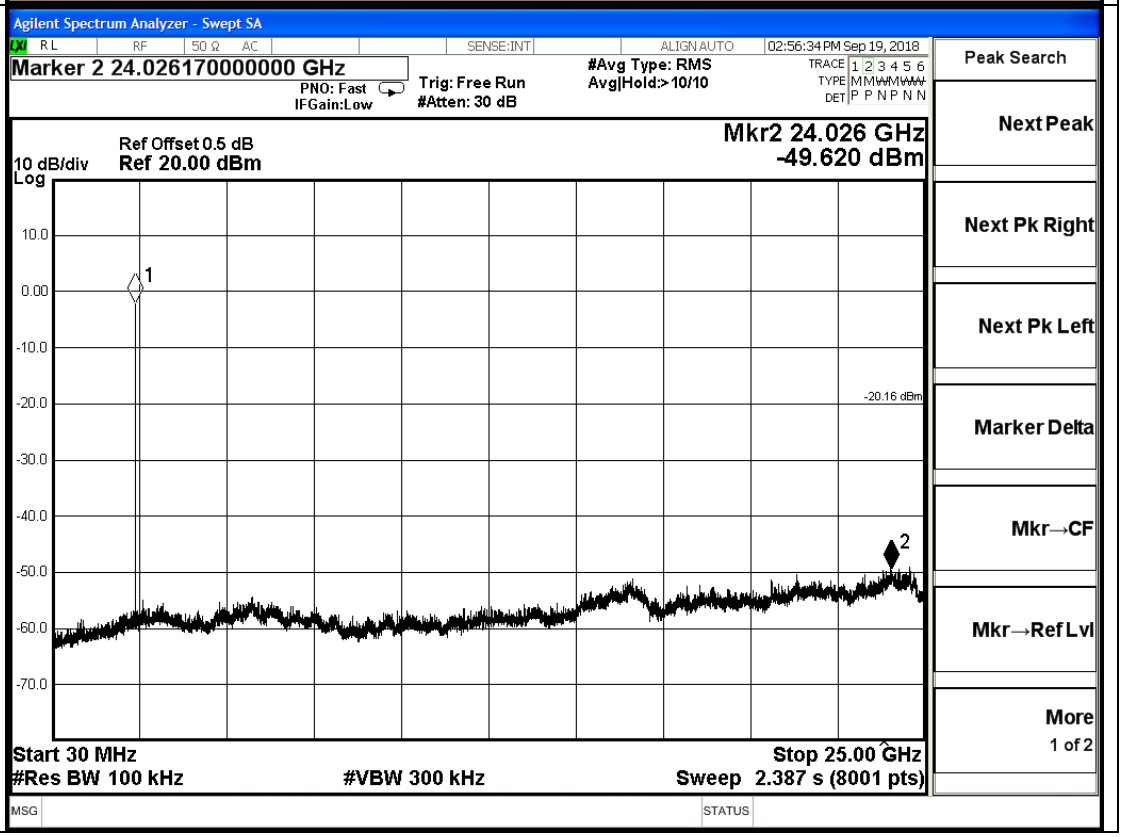
Pref	
Puw	

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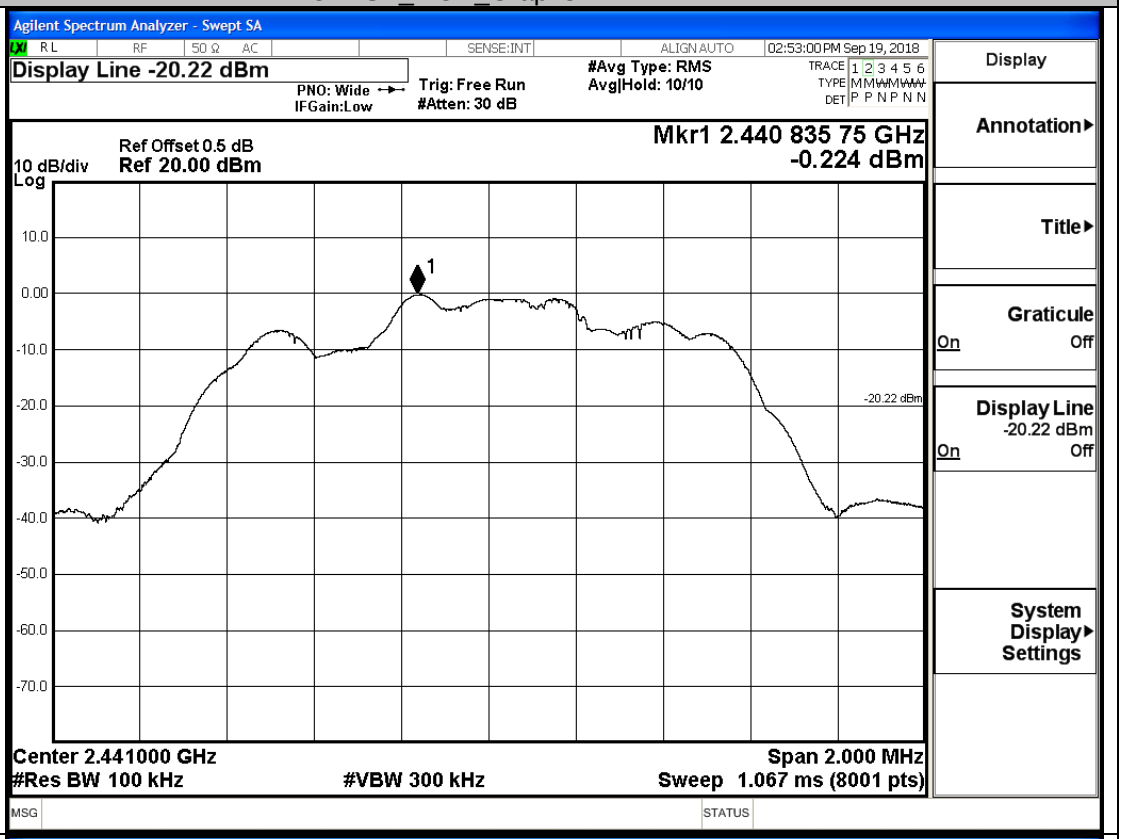
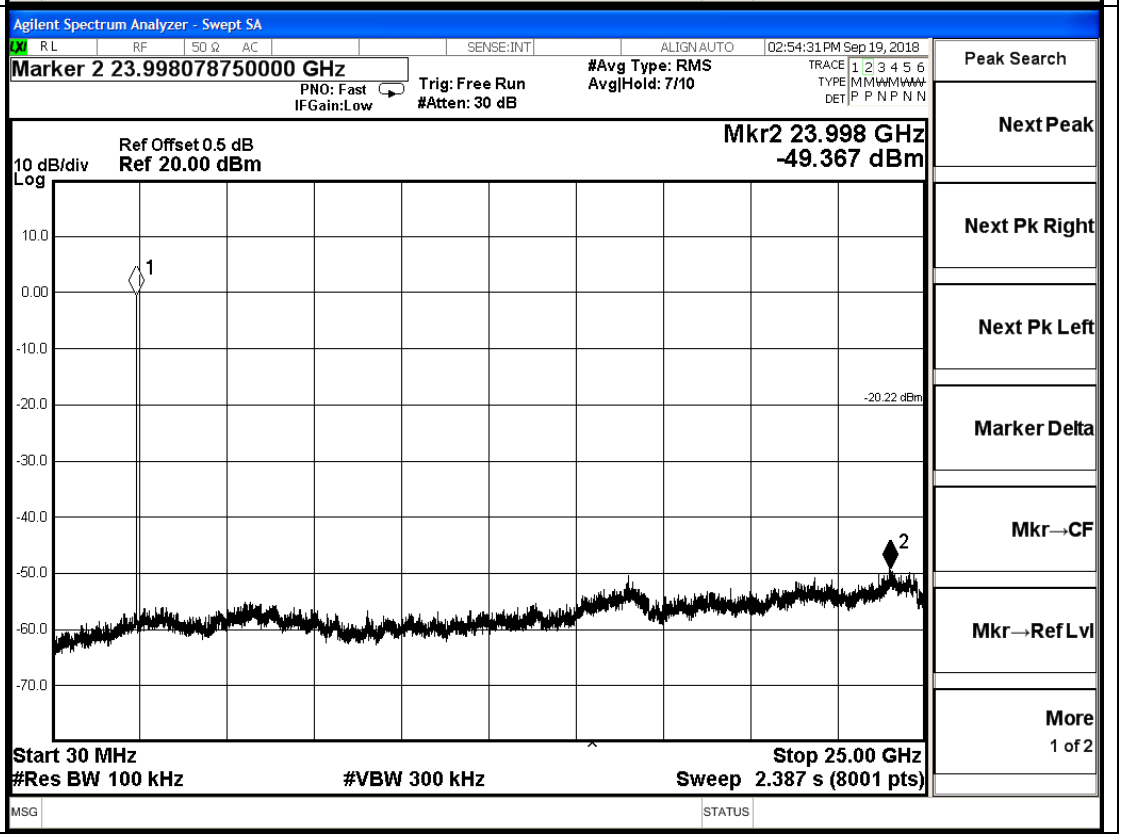
Pref	
Puw	

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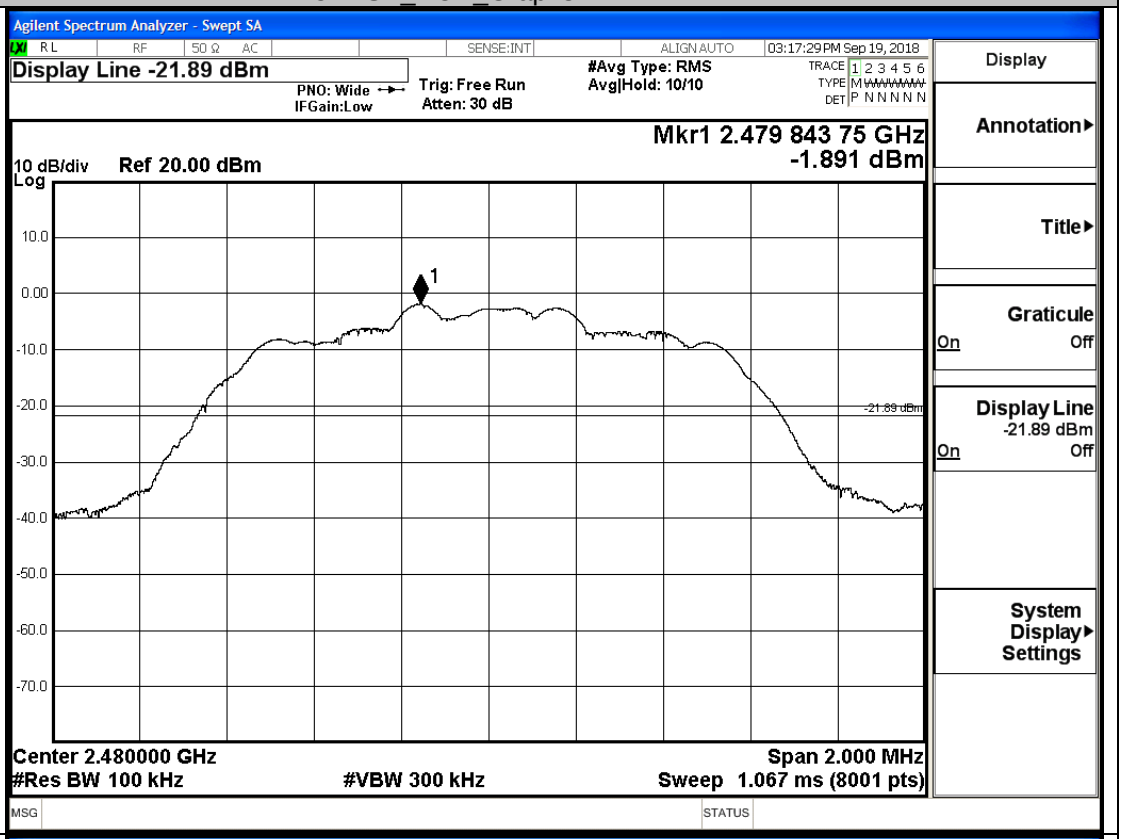
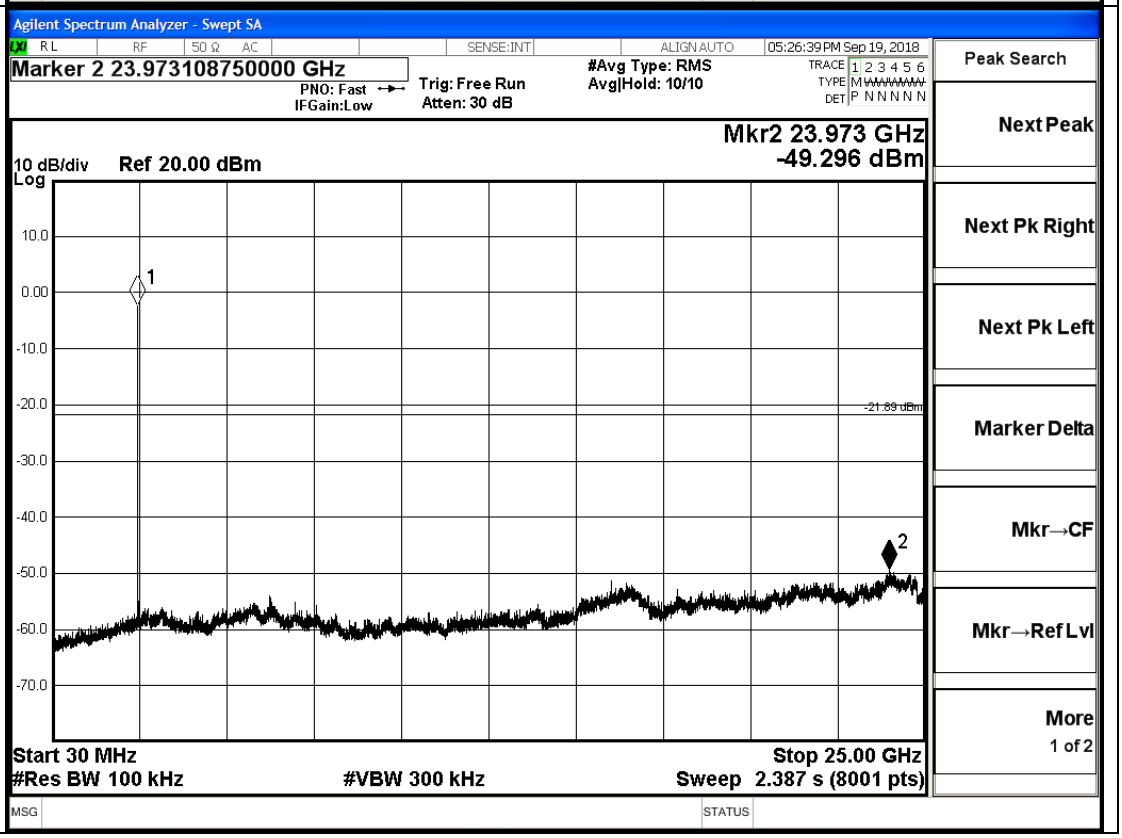
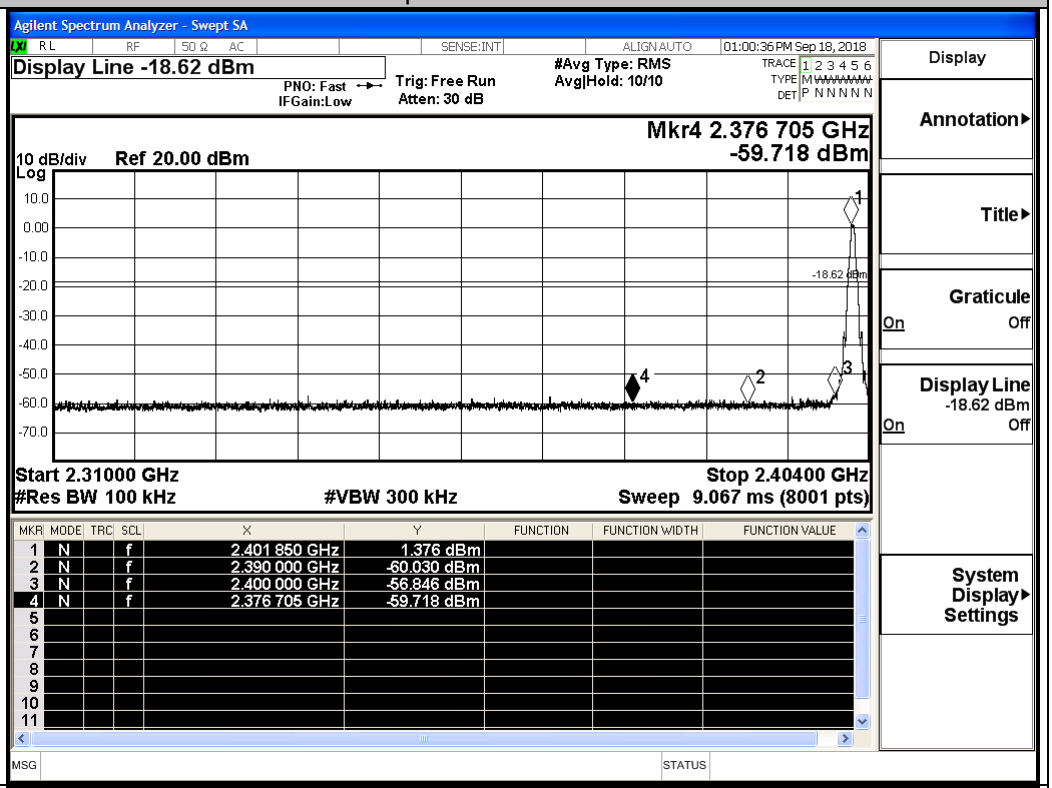
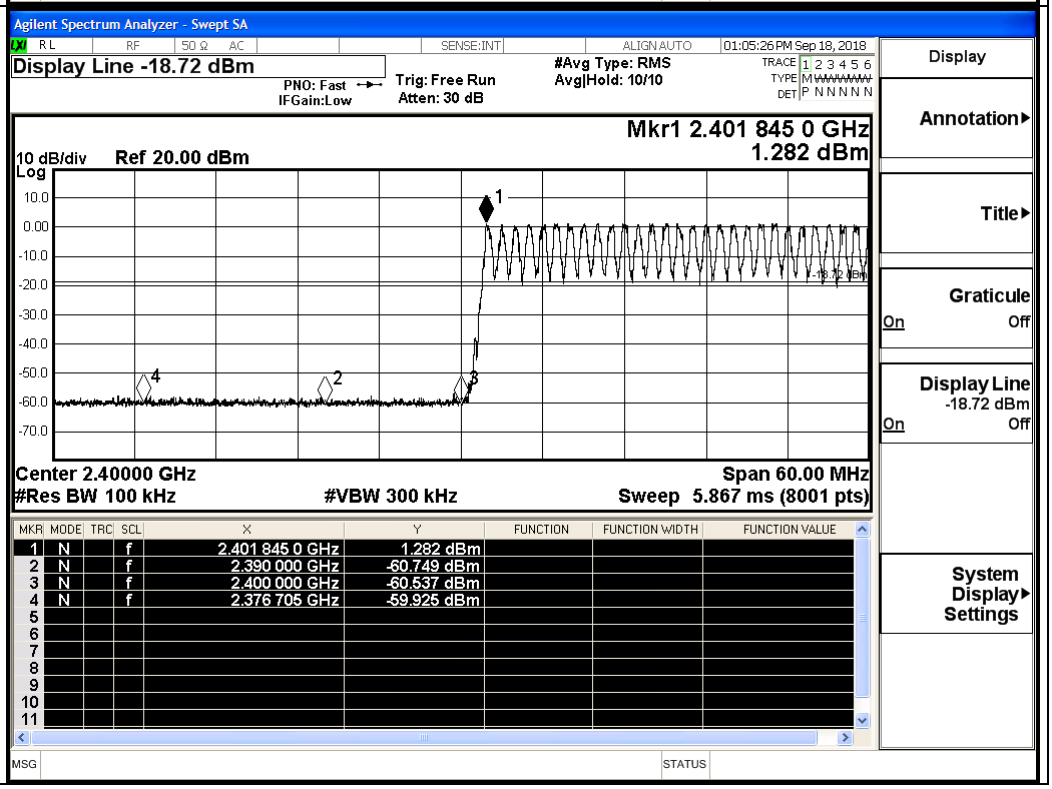
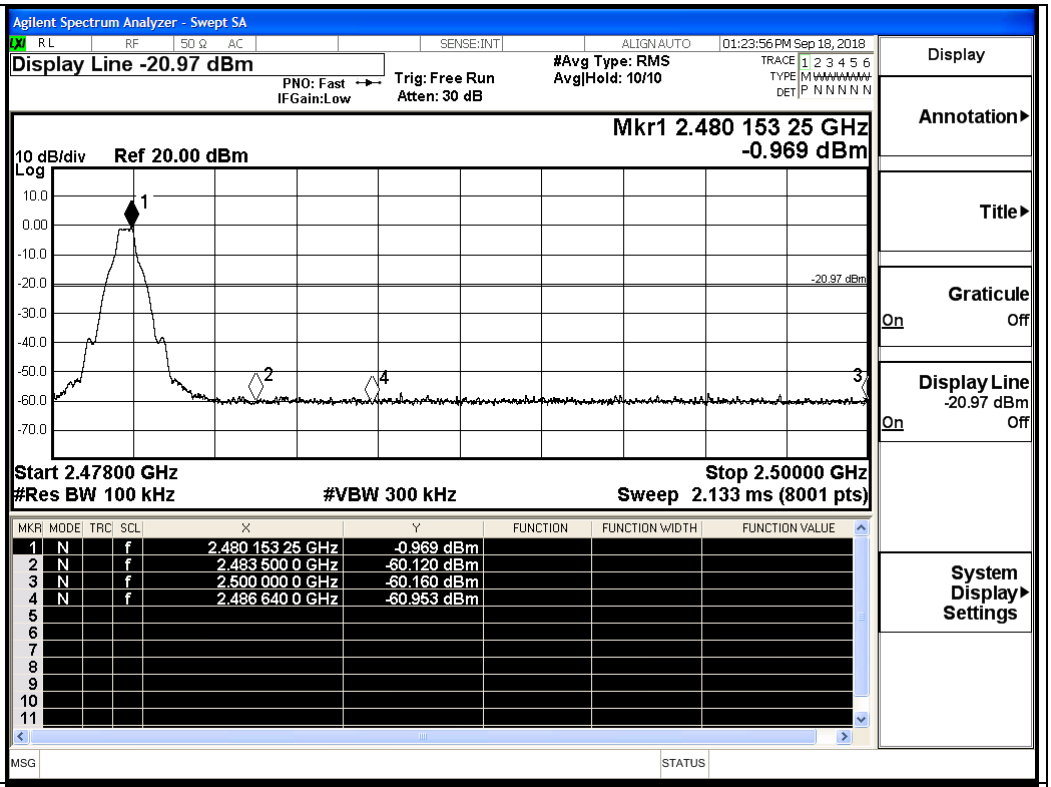
Pref	
Puw	

A.7 Band-edge for RF Conducted Emissions

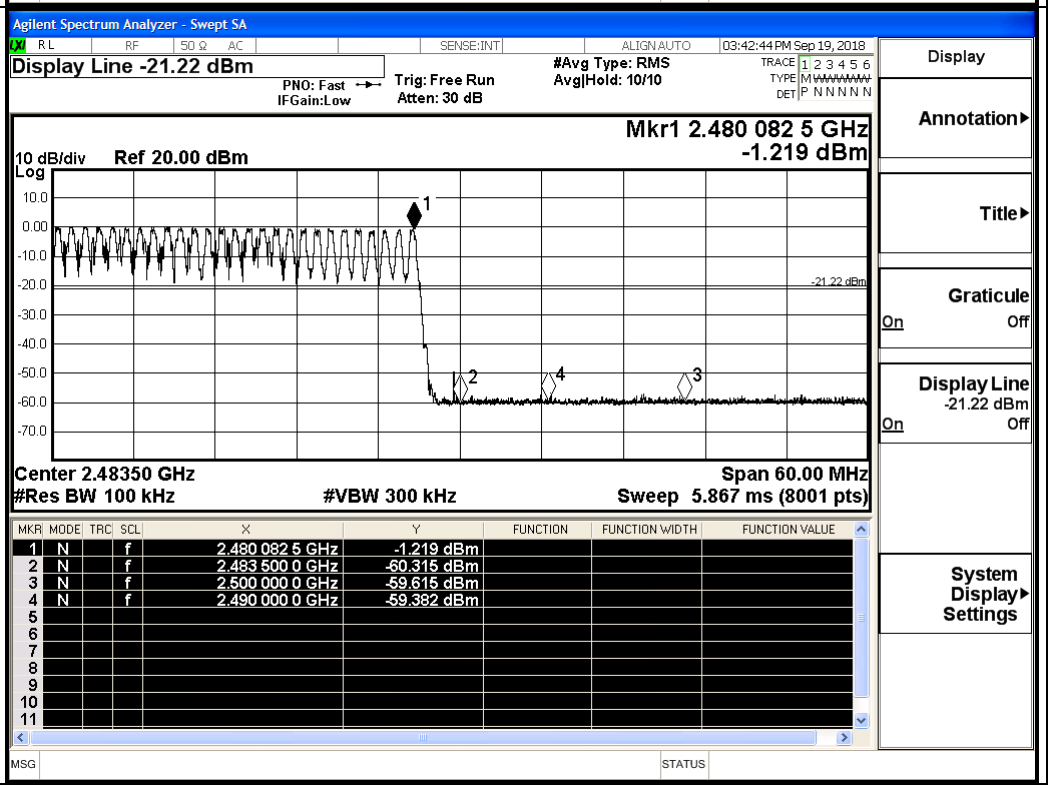
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	1.376	Off	-59.718	-18.62	PASS
			1.282	On	-59.925	-18.72	PASS
	HCH	2480	-0.969	Off	-60.953	-20.97	PASS
			-1.219	On	-59.382	-21.22	PASS
π/4DQPSK	LCH	2402	-0.303	Off	-59.300	-20.30	PASS
			-0.141	On	-59.447	-20.14	PASS
	HCH	2480	-2.149	Off	-58.633	-22.15	PASS
			-2.068	On	-59.073	-22.07	PASS
8DPSK	LCH	2402	-0.134	Off	-60.008	-20.13	PASS
			-0.638	On	-59.192	-20.64	PASS
	HCH	2480	-1.946	Off	-60.881	-21.95	PASS
			-2.187	On	-60.179	-22.19	PASS

Test Graphs	
GFSK/LCH/No Hop	
GFSK/LCH/Hop	

GFSK/HCH/No Hop



GFSK/HCH/Hop



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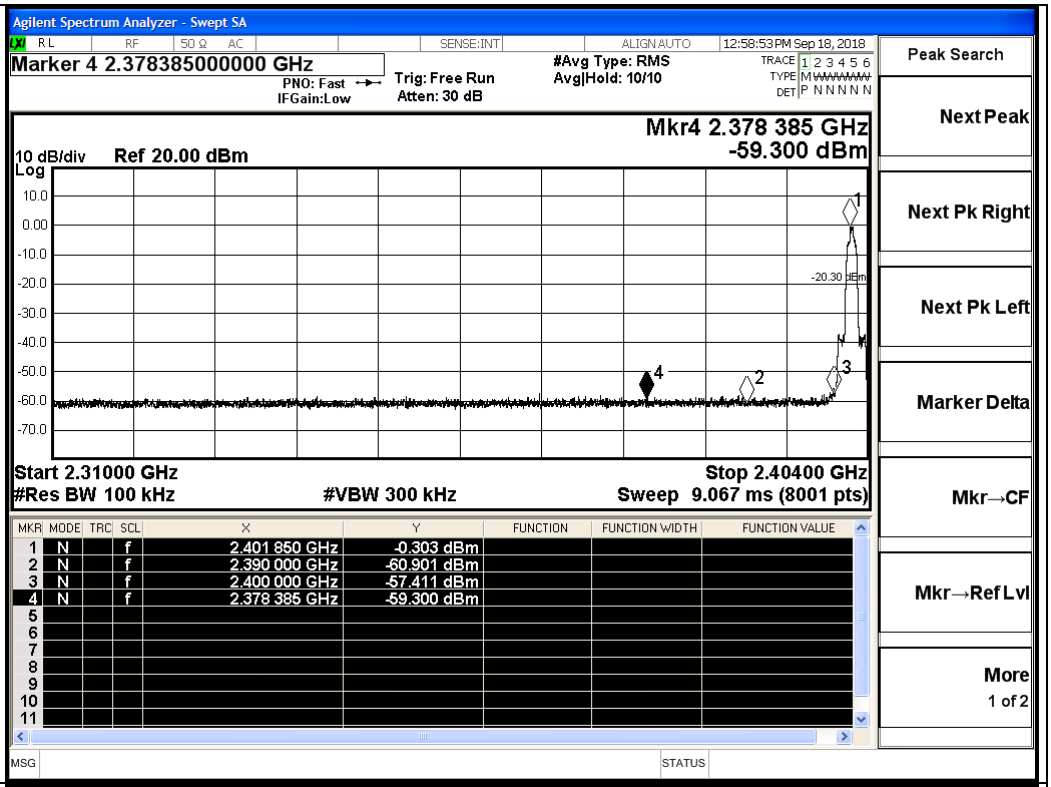

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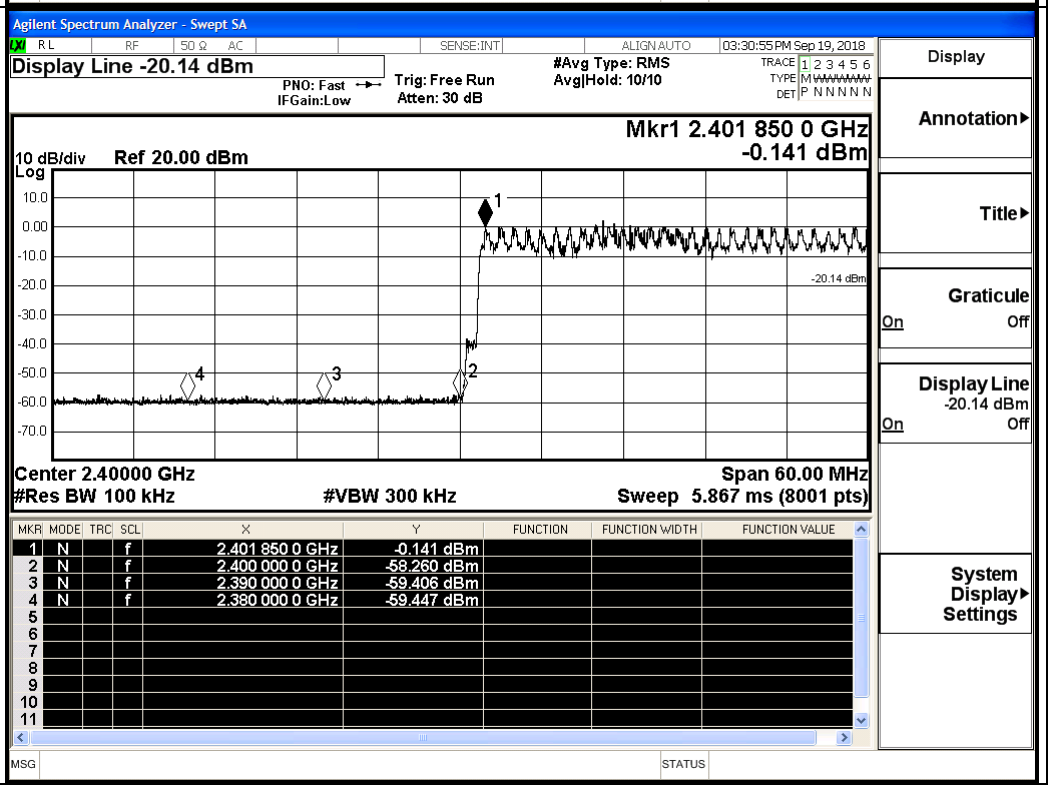

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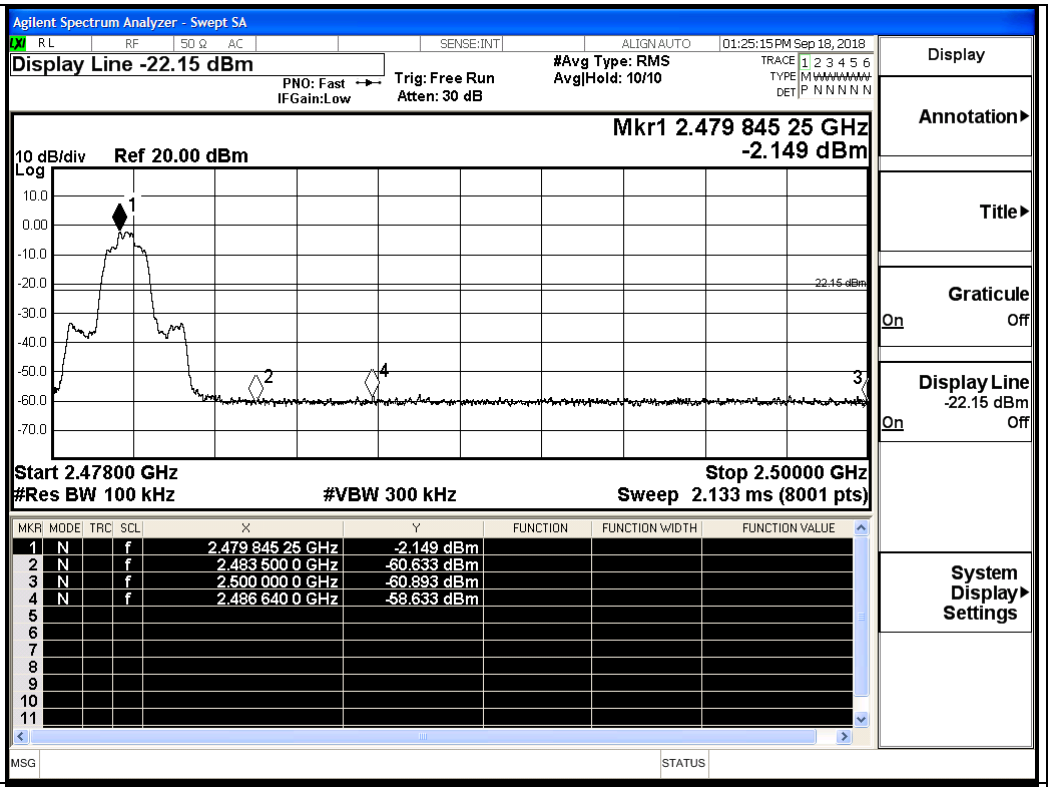

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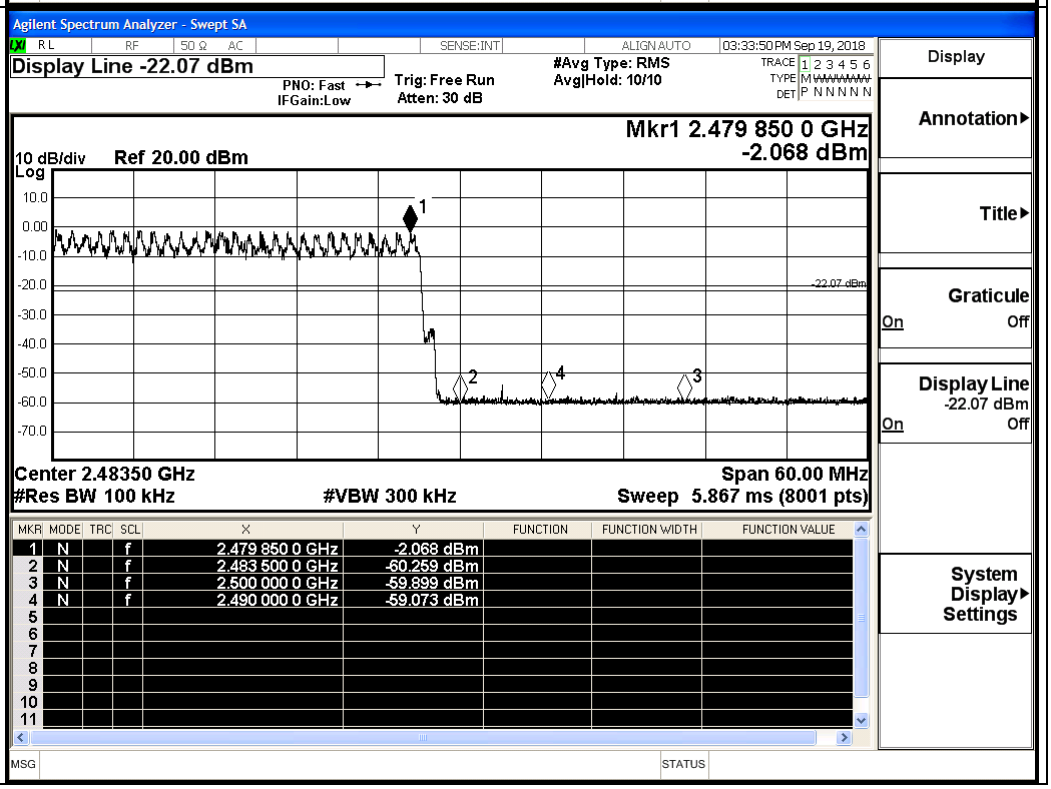
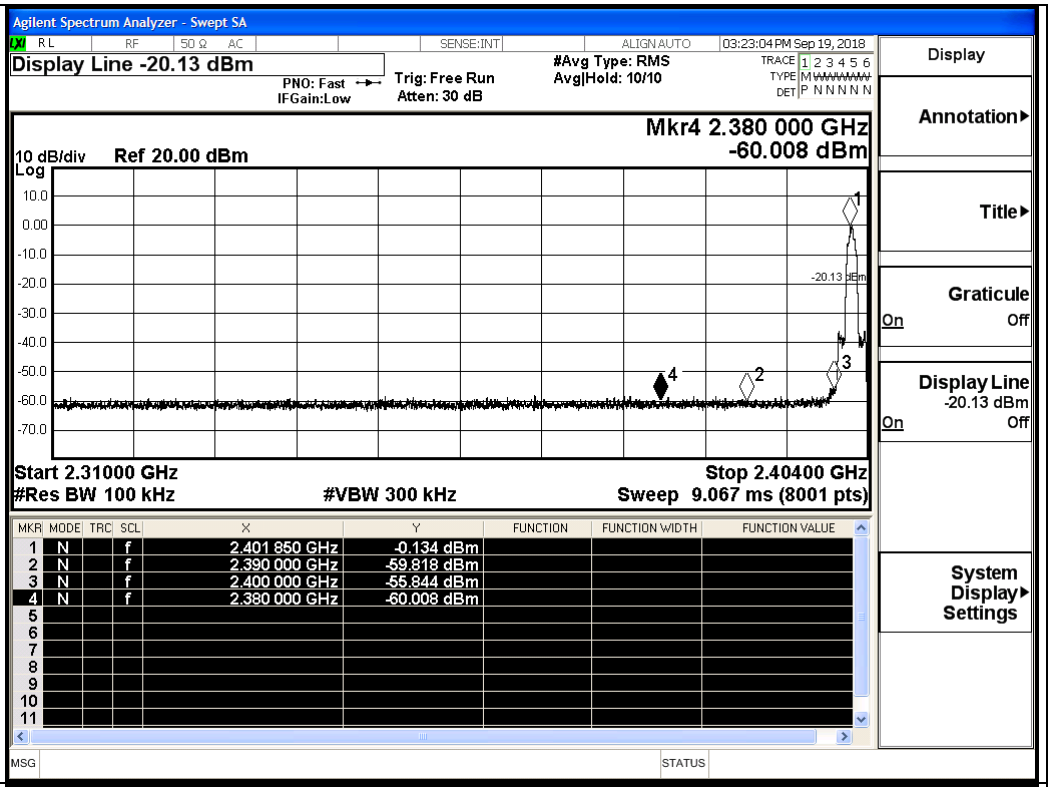
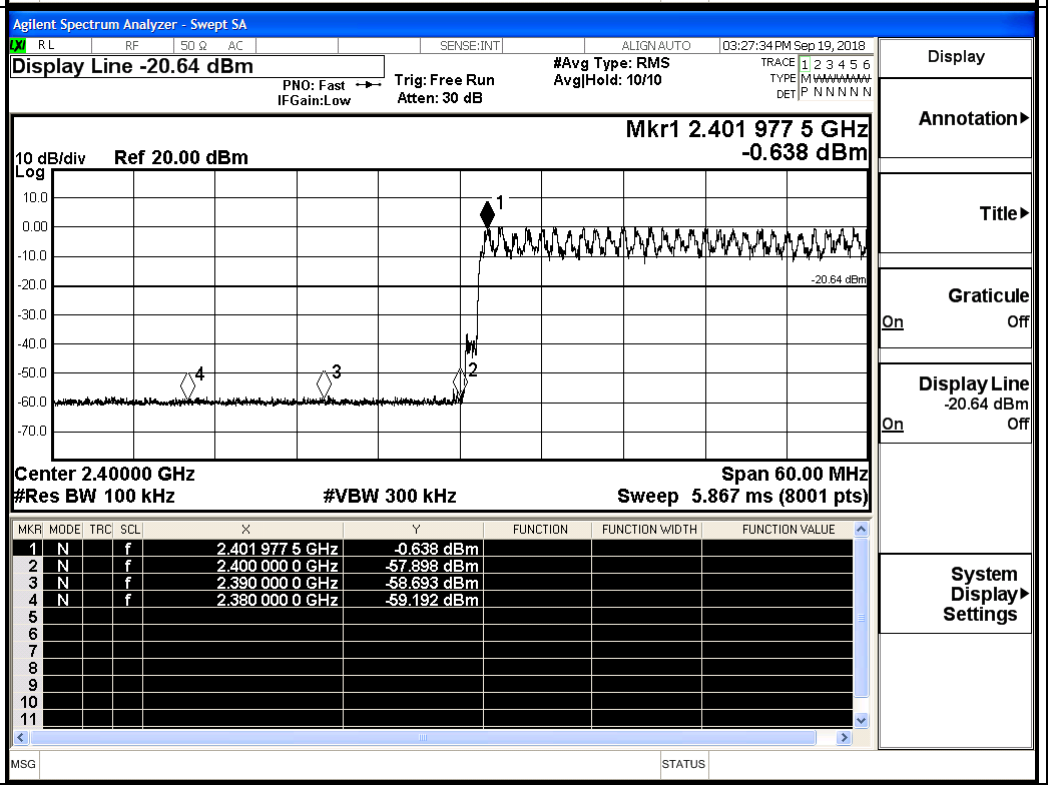


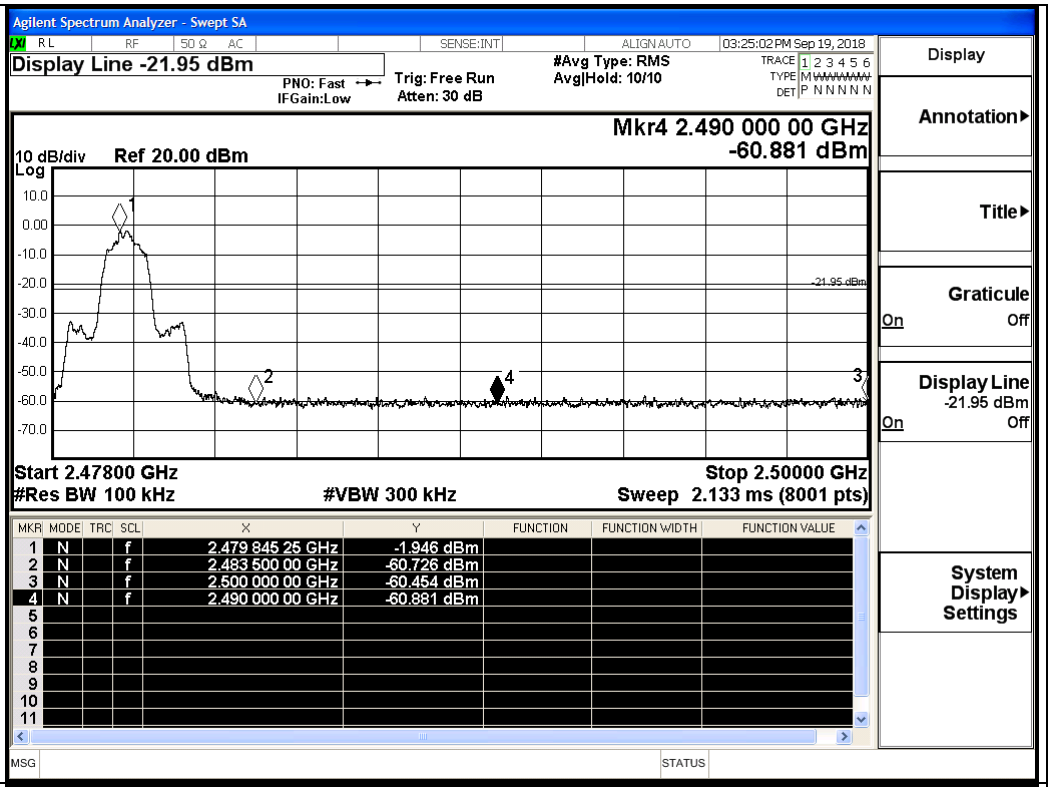
8DPSK/LCH/No Hop



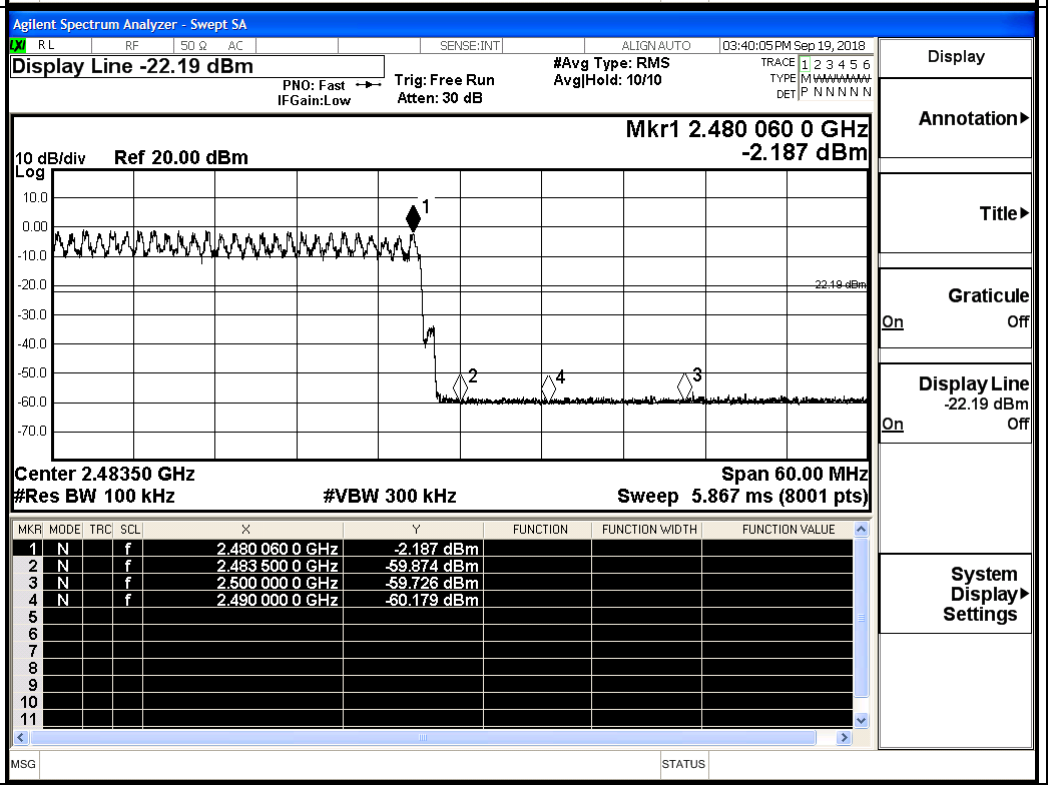
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



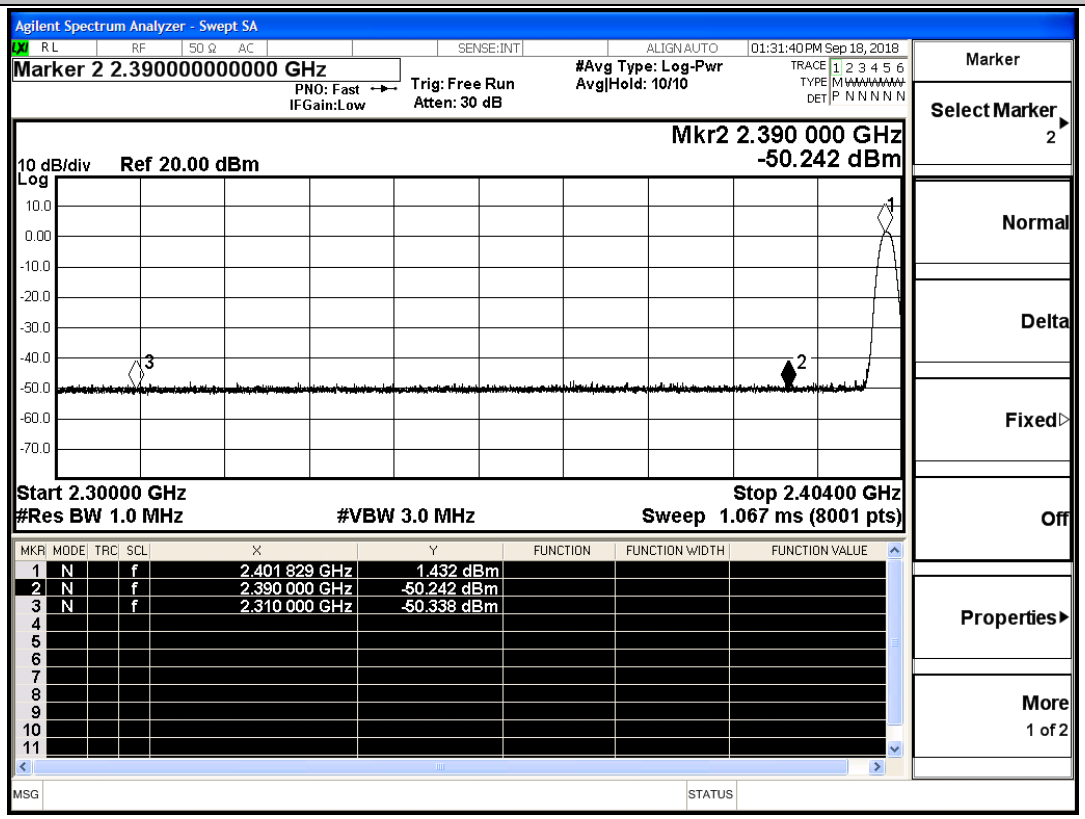
8DPSK/HCH/Hop



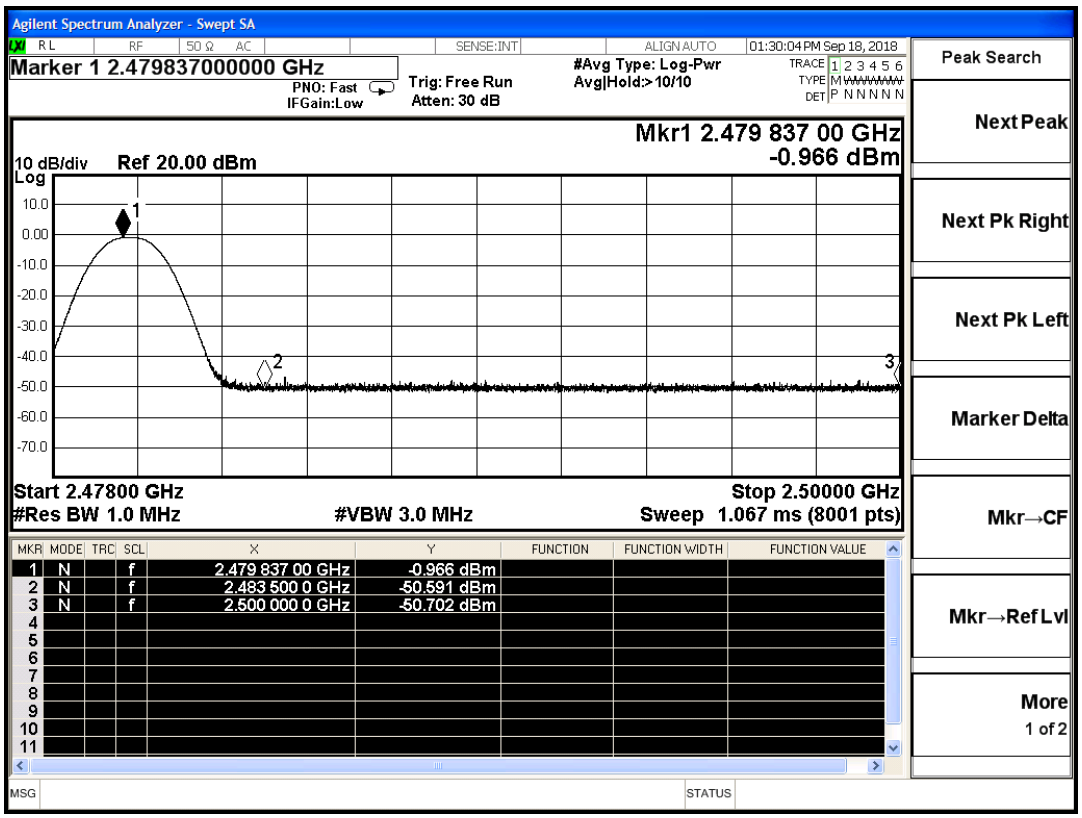
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-50.242	2.000	0	46.986	PEAK	54	PASS
	Off	2390.0	-50.338	2.000	0	46.890	PEAK	54	PASS
	Off	2483.5	-50.591	2.000	0	46.637	PEAK	54	PASS
	Off	2500.0	-50.702	2.000	0	46.526	PEAK	54	PASS
π/4DQPSK	Off	2310.0	-51.104	2.000	0	46.124	PEAK	54	PASS
	Off	2390.0	-52.311	2.000	0	44.917	PEAK	54	PASS
	Off	2483.5	-50.895	2.000	0	46.333	PEAK	54	PASS
	Off	2500.0	-50.178	2.000	0	47.050	PEAK	54	PASS
8DPSK	Off	2310.0	-48.131	2.000	0	49.097	PEAK	54	PASS
	Off	2390.0	-50.612	2.000	0	46.616	PEAK	54	PASS
	Off	2483.5	-48.348	2.000	0	48.880	PEAK	54	PASS
	Off	2500.0	-50.902	2.000	0	46.326	PEAK	54	PASS

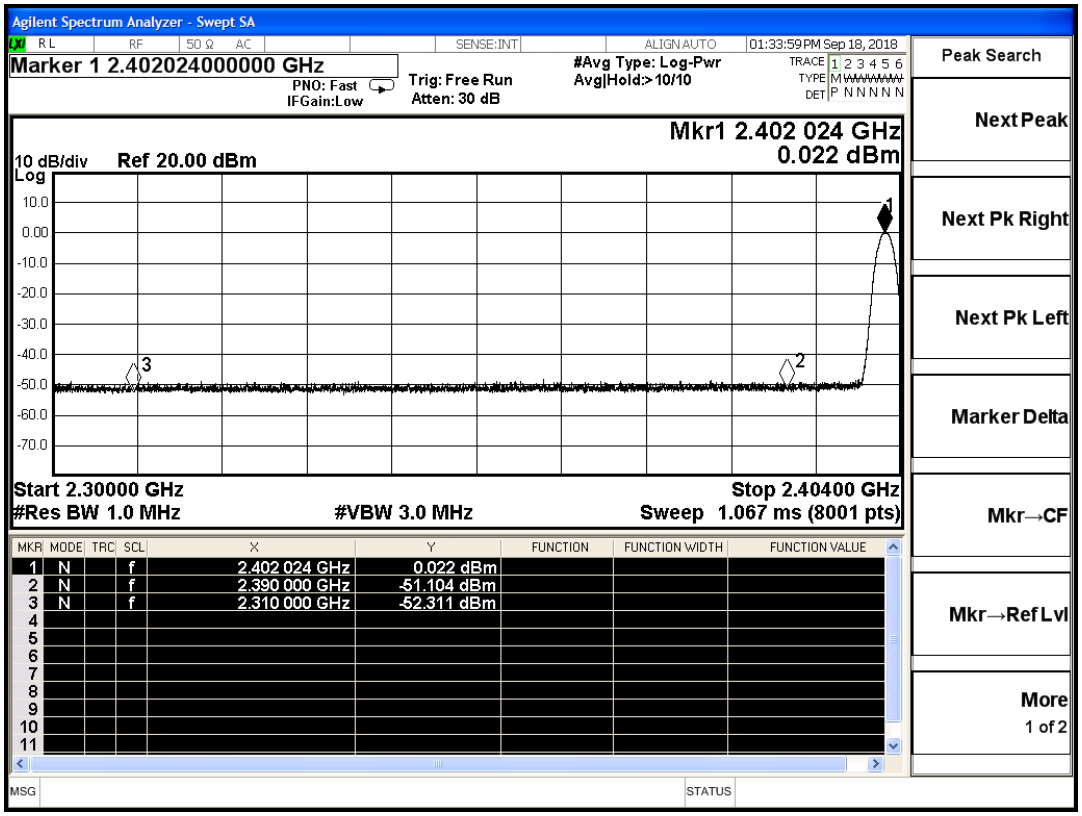
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



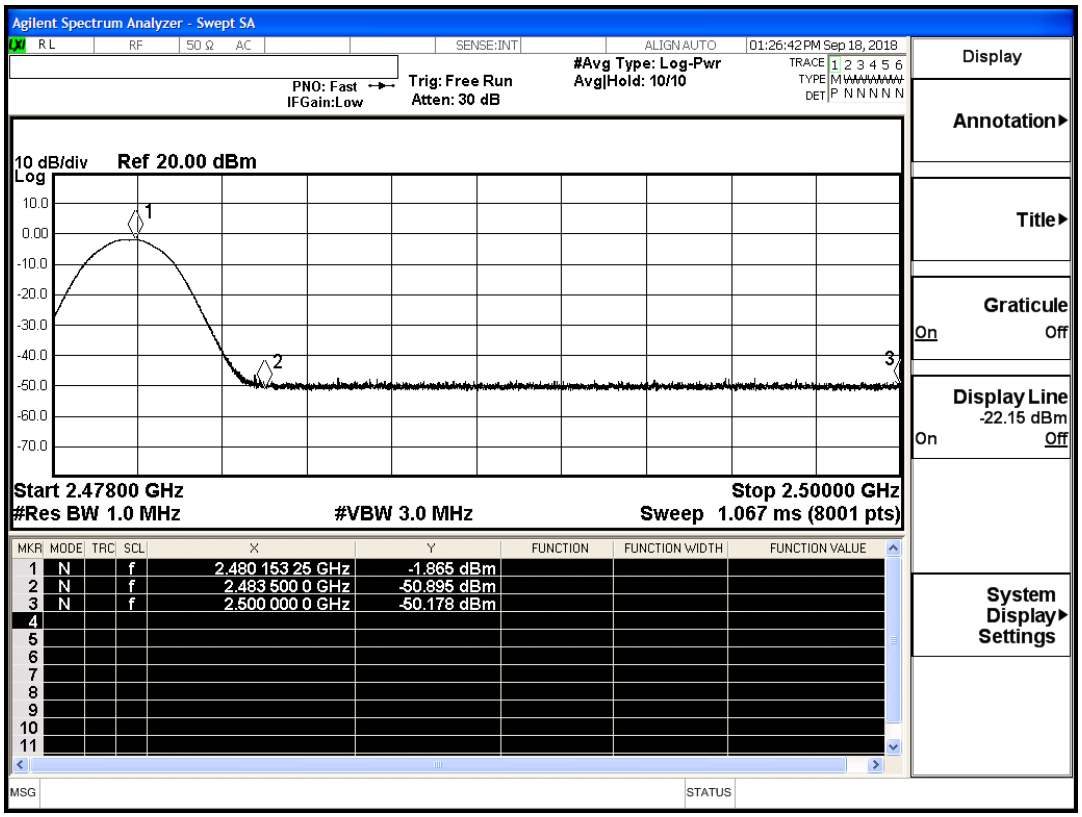
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



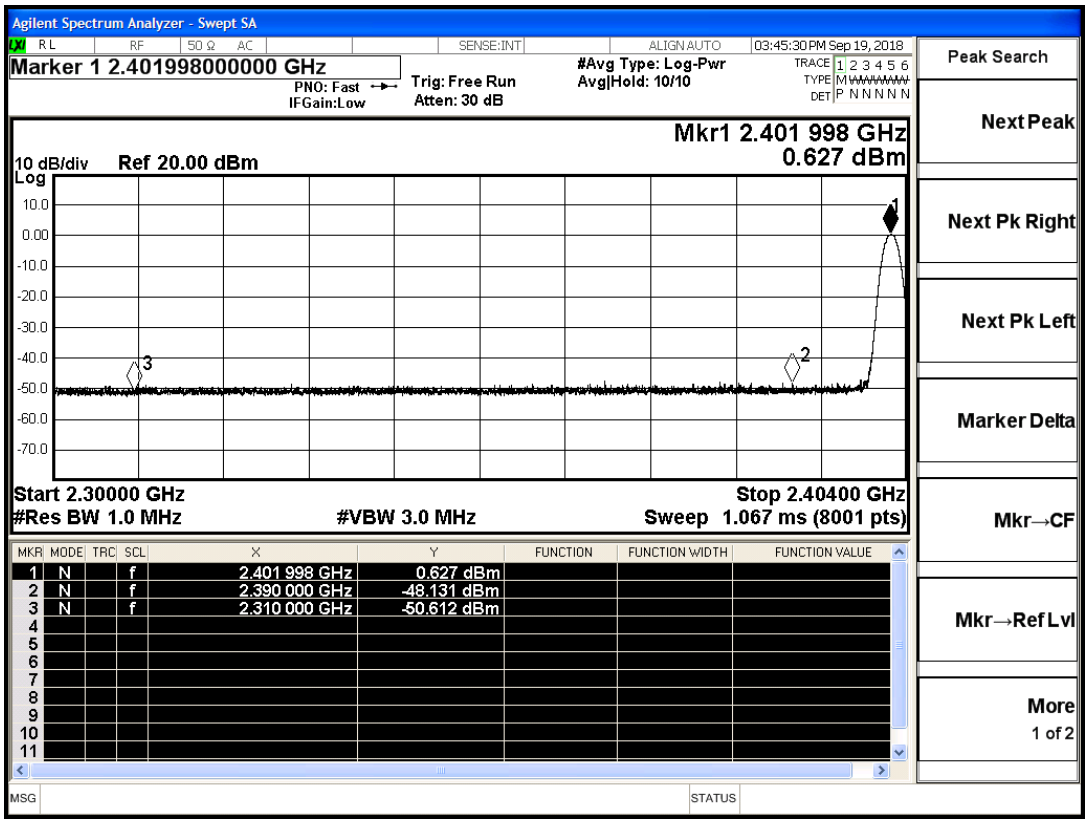
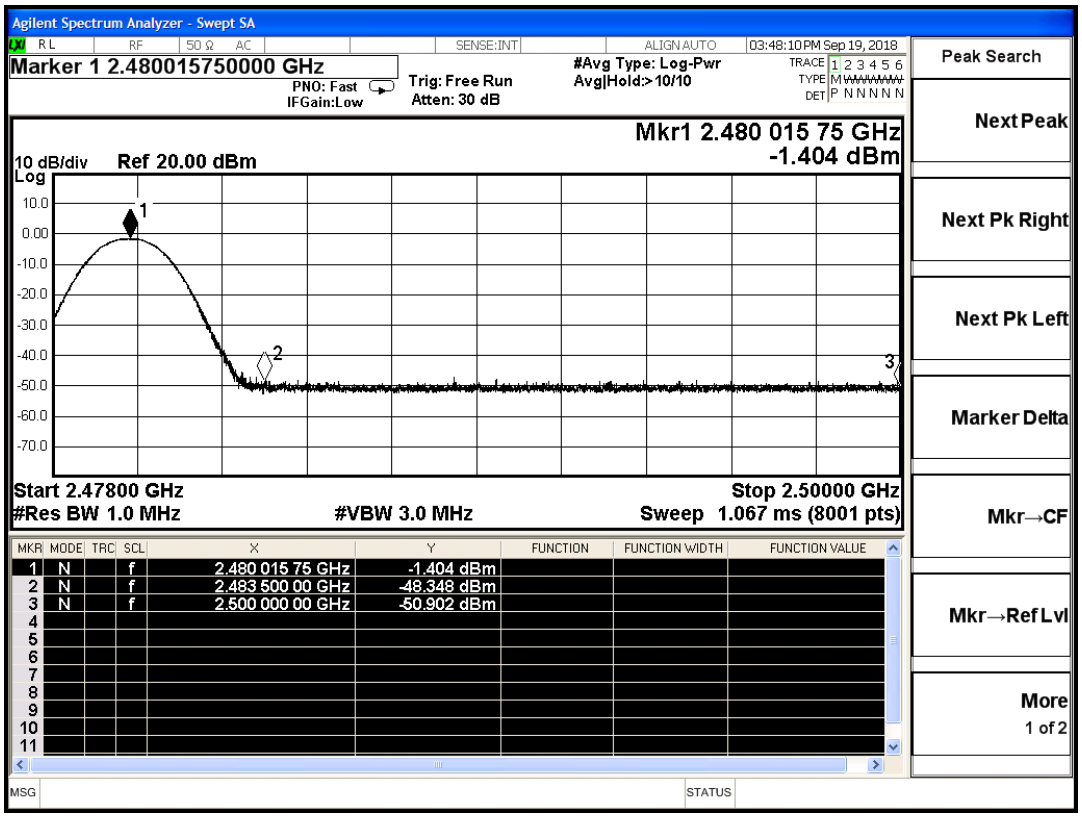
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)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