

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

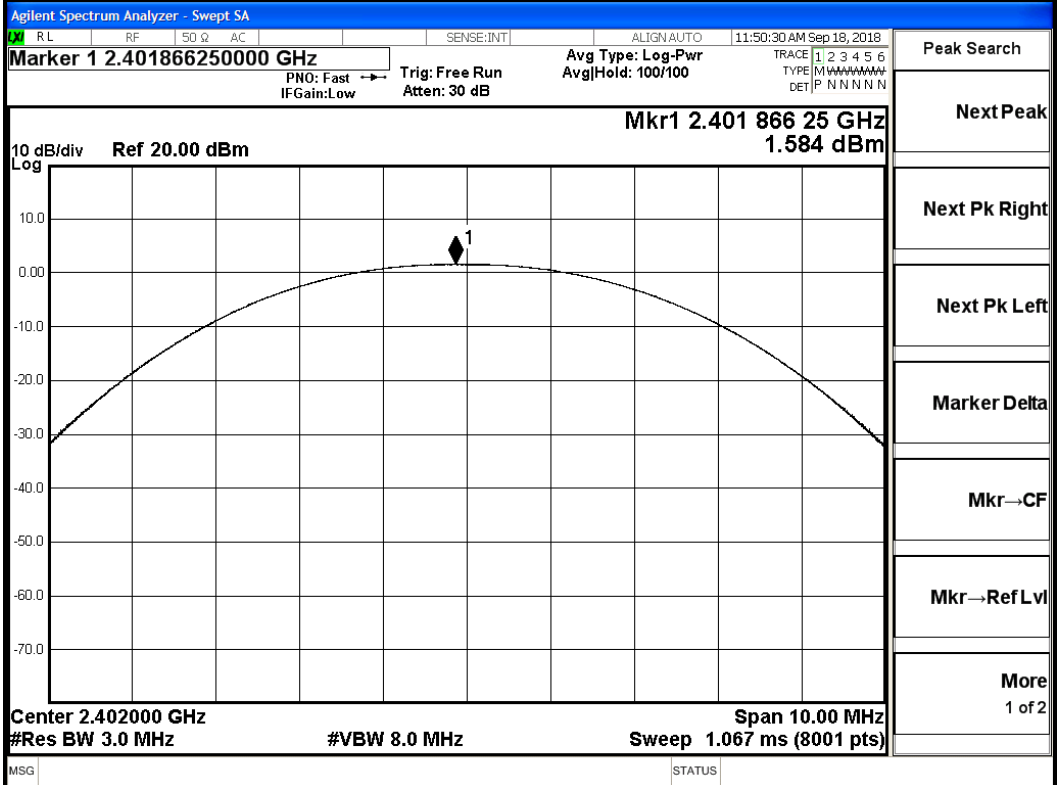
Temperature:	23.5 ° C
Relative Humidity:	66%
ATM Pressure:	100.0 kPa
Test Engineer:	AKING JIN
Supervised by:	JAYDEN ZHUO

A.1 Maximum Conducted Peak Output Power

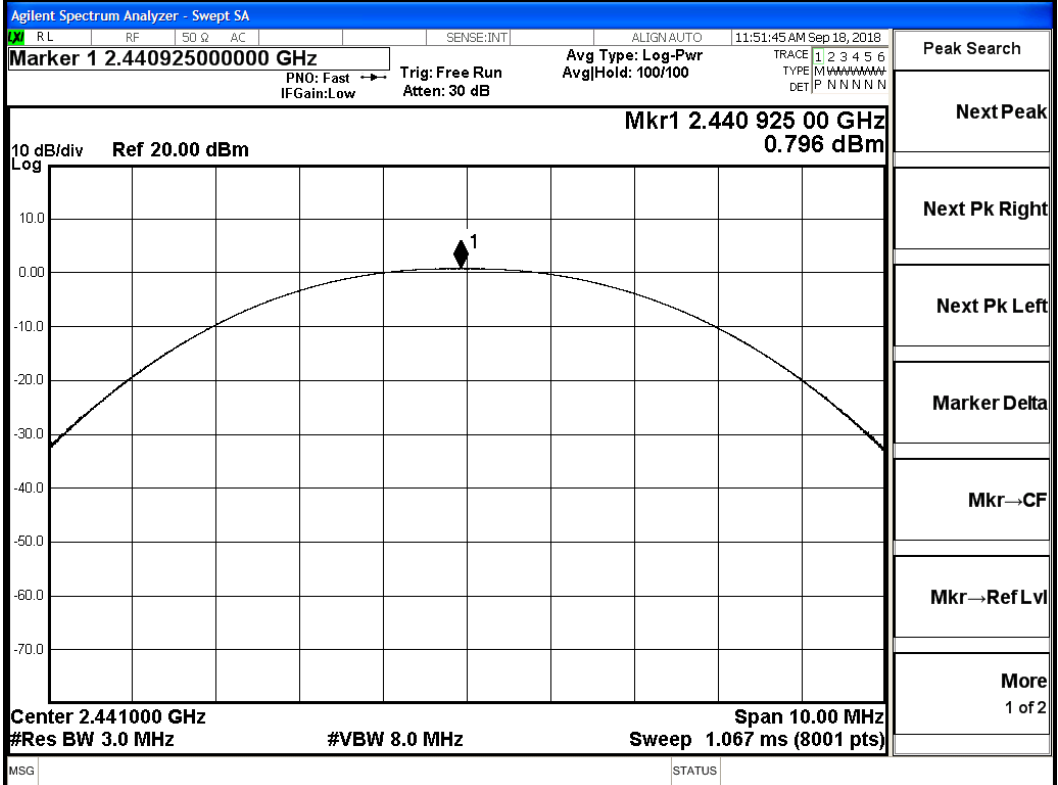
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.584	21	PASS
	MCH	0.796	21	PASS
	HCH	-0.840	21	PASS
$\pi/4$ DQPSK	LCH	0.663	21	PASS
	MCH	0.104	21	PASS
	HCH	-1.410	21	PASS
8DPSK	LCH	1.047	21	PASS
	MCH	0.624	21	PASS
	HCH	-0.836	21	PASS

Test Graphs

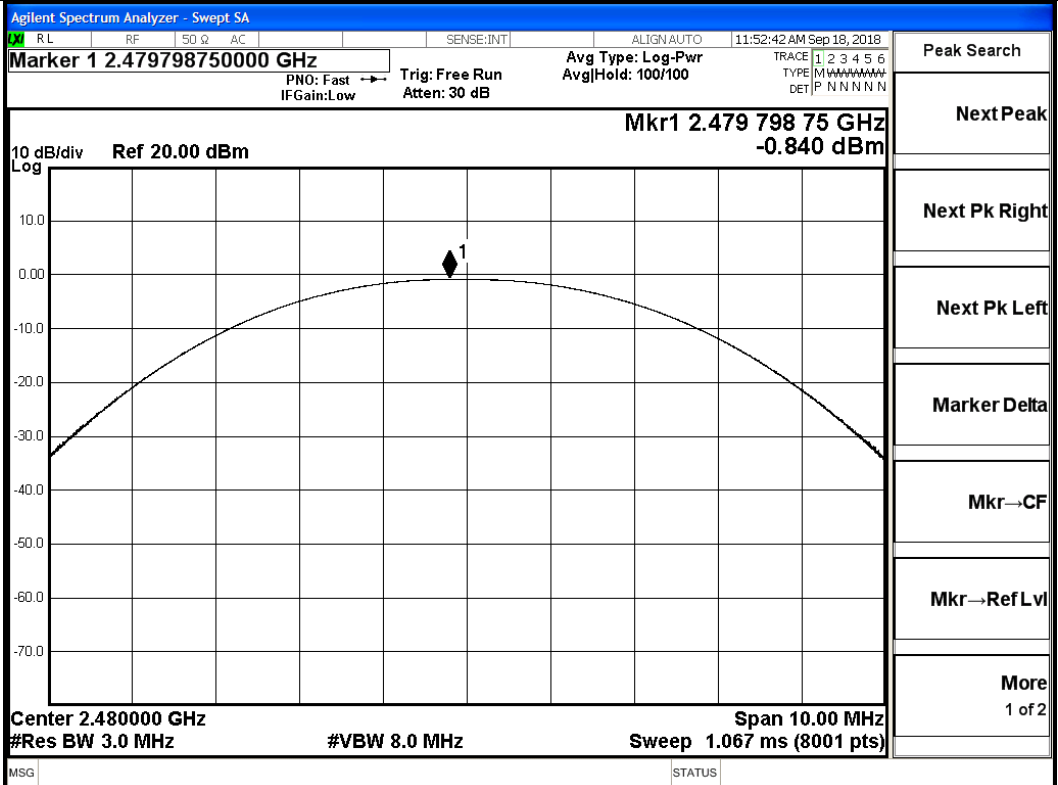
GFSK/LCH



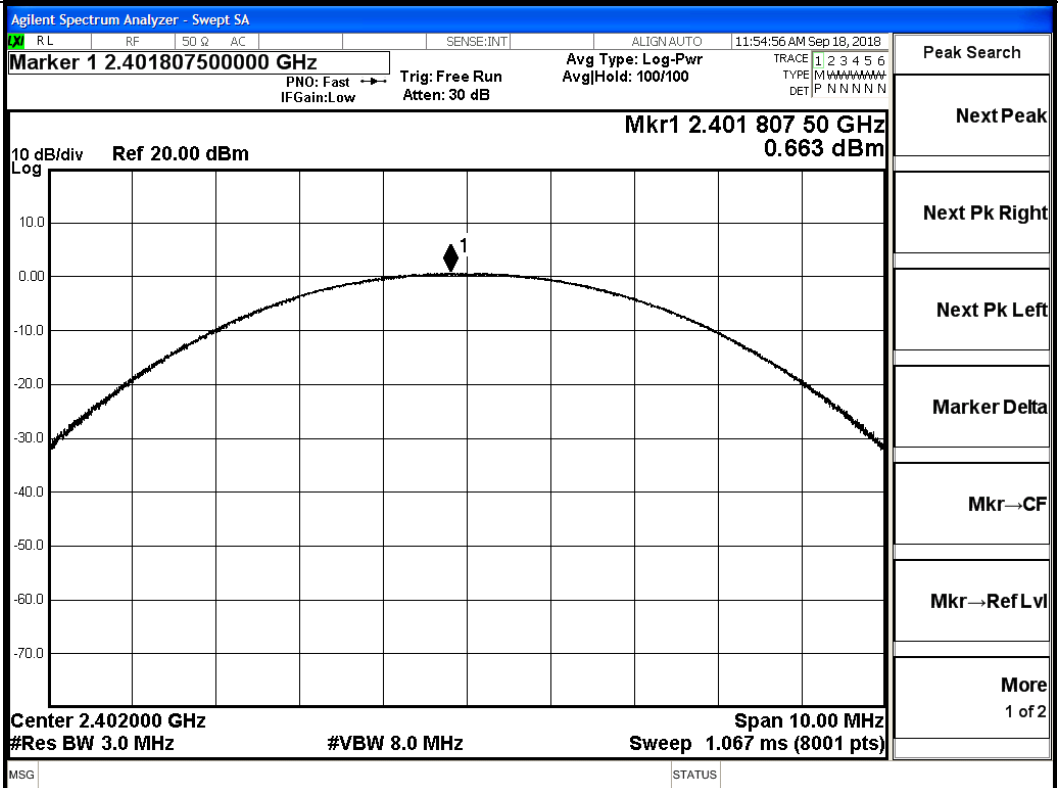
GFSK/MCH



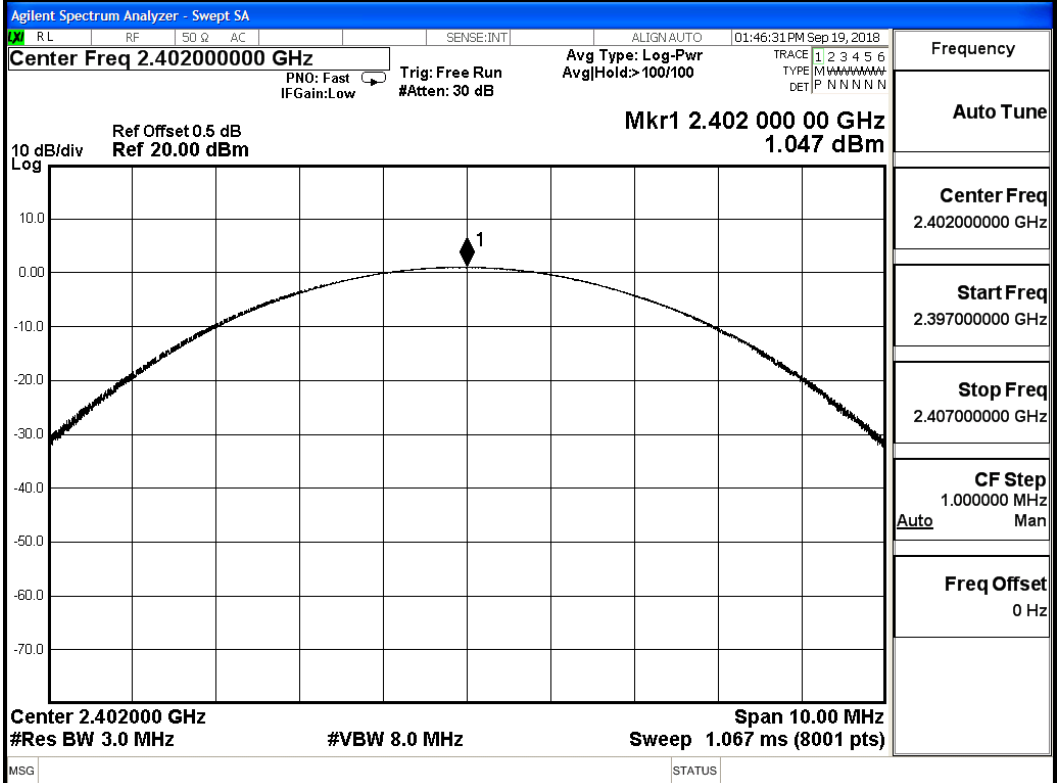
GFSK/HCH



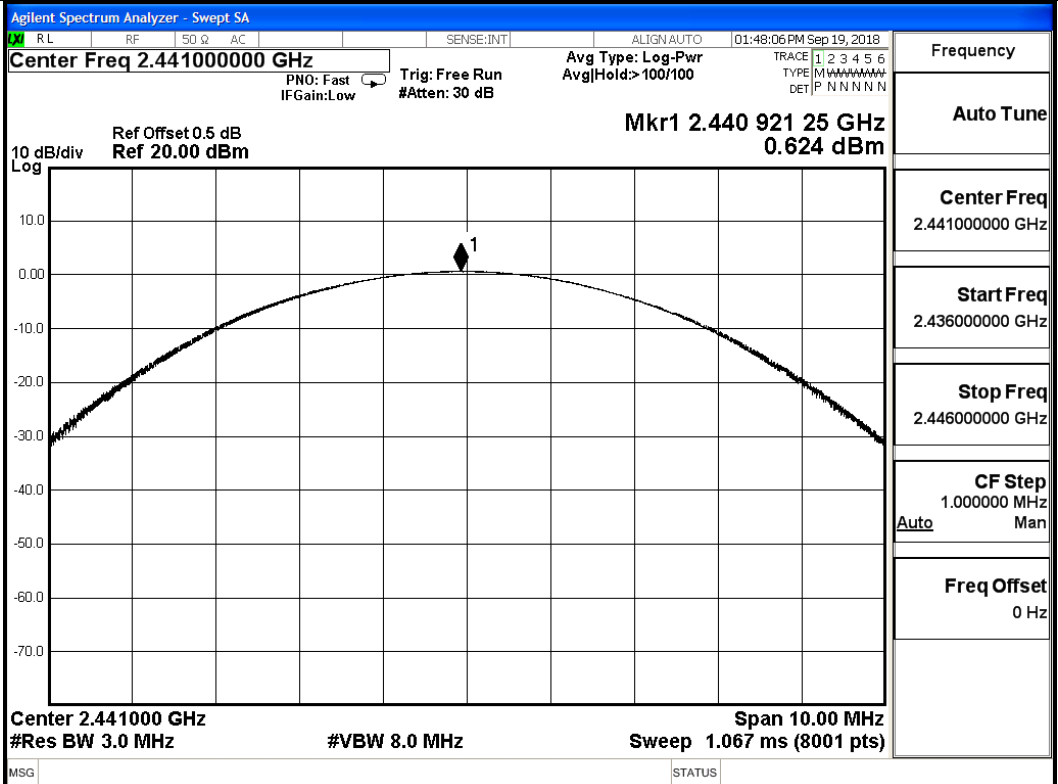
$\pi/4$ DQPSK/LCH

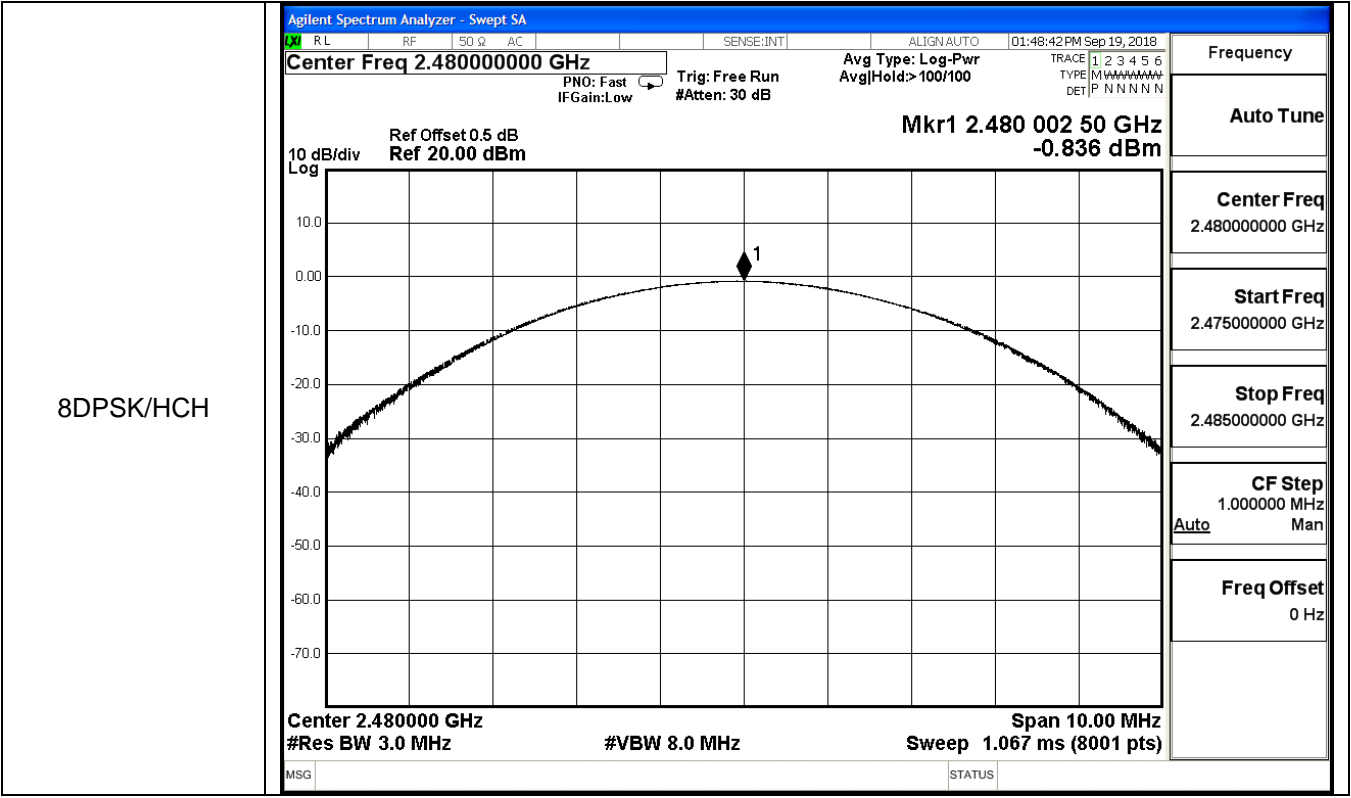


8DPSK/LCH



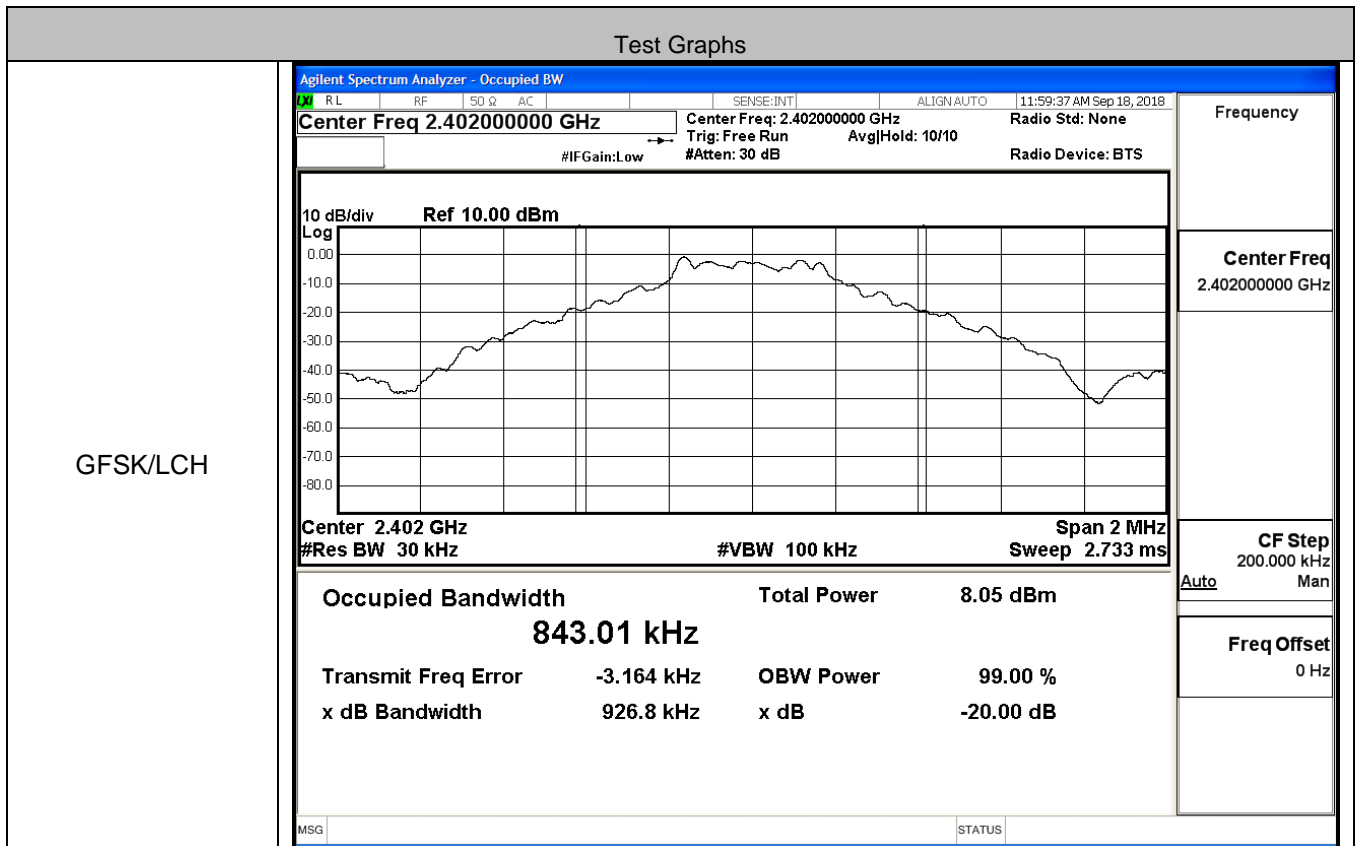
8DPSK/MCH





A.2 99% and 20dB Bandwidth

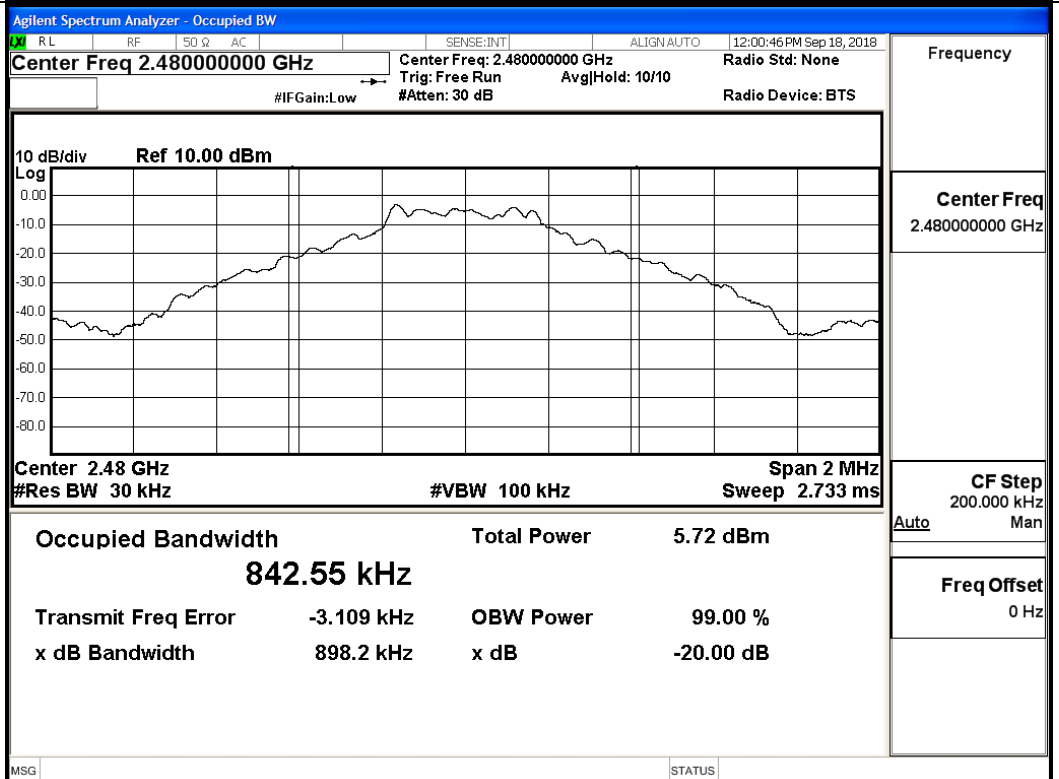
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.84301	0.9268	Not Specified	PASS
	MCH	0.84151	0.9266	Not Specified	PASS
	HCH	0.84255	0.8982	Not Specified	PASS
π/4DQPSK	LCH	1.1560	1.253	Not Specified	PASS
	MCH	1.1584	1.253	Not Specified	PASS
	HCH	1.1626	1.252	Not Specified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



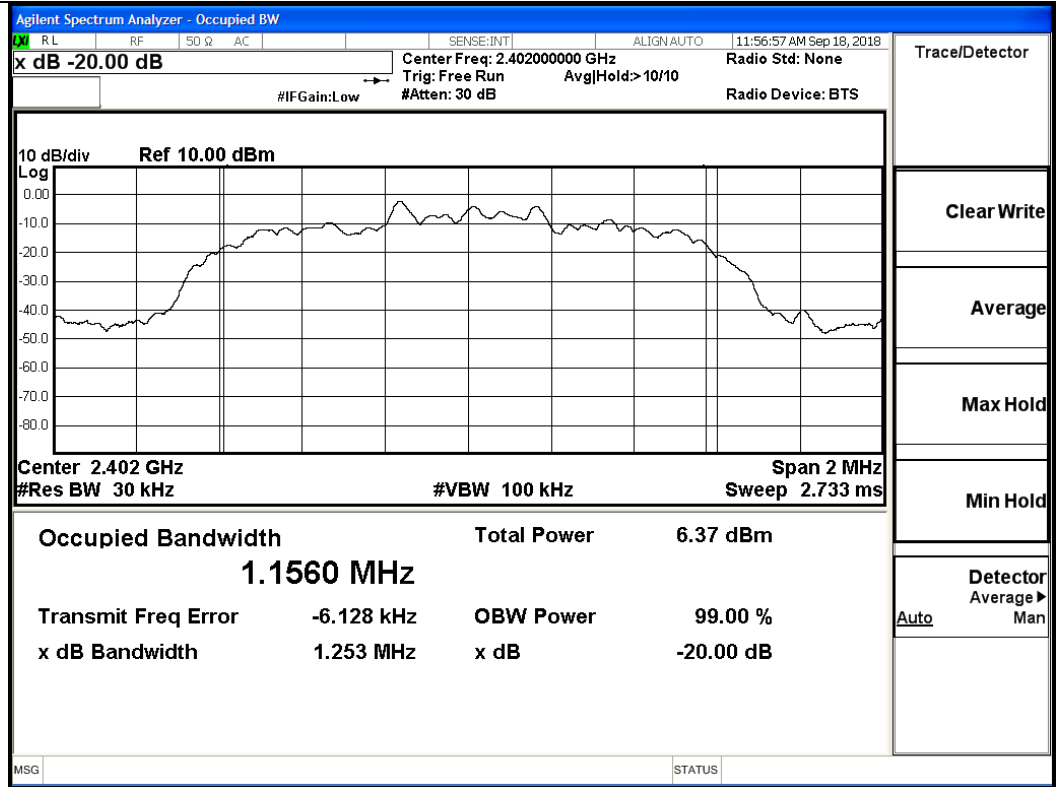
GFSK/MCH



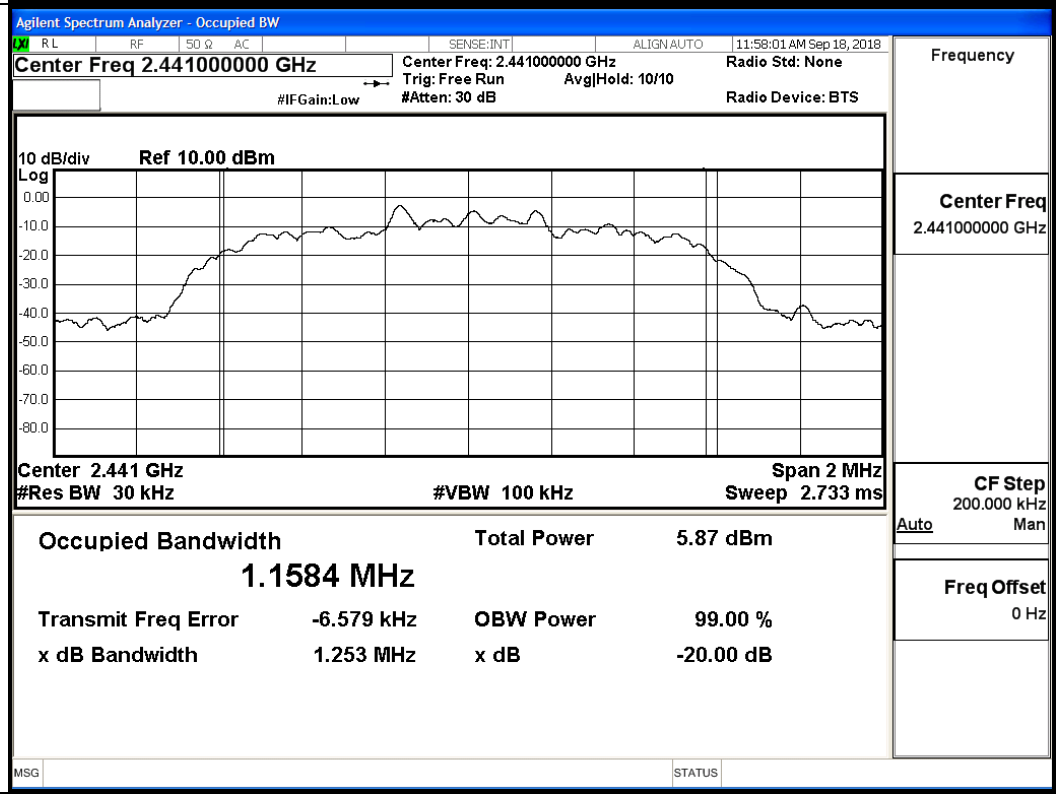
GFSK/HCH



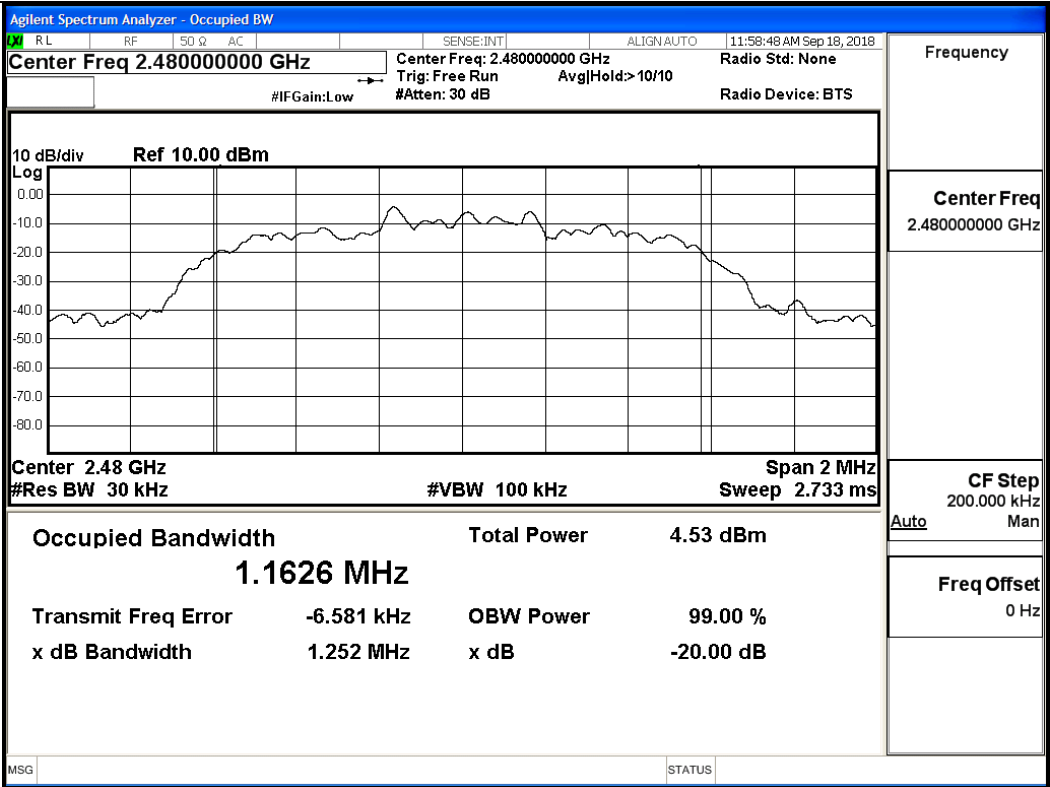
$\pi/4$ DQPSK/LCH



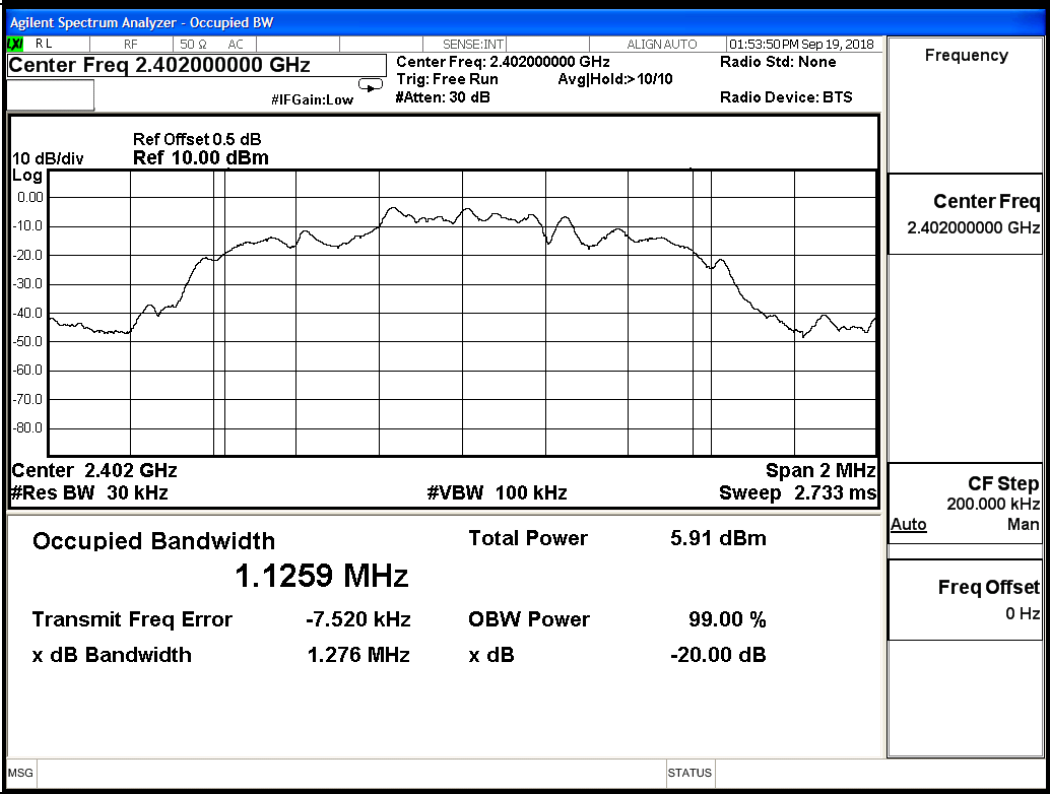
$\pi/4$ DQPSK/MCH



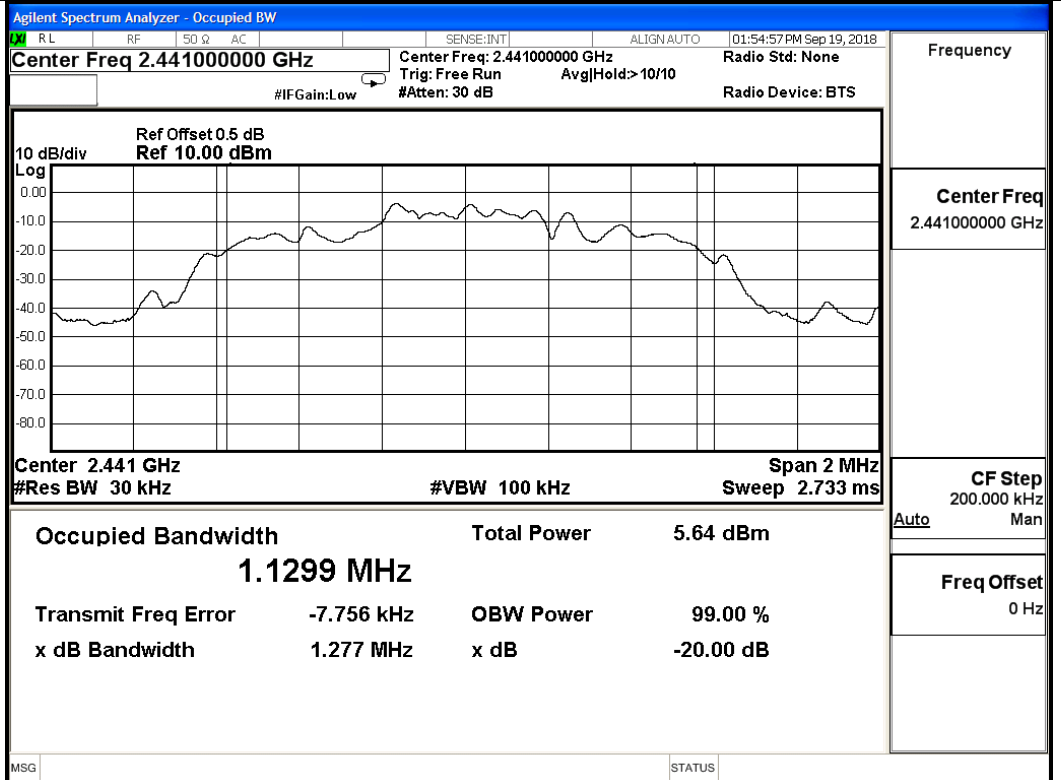
π/4DQPSK/HCH



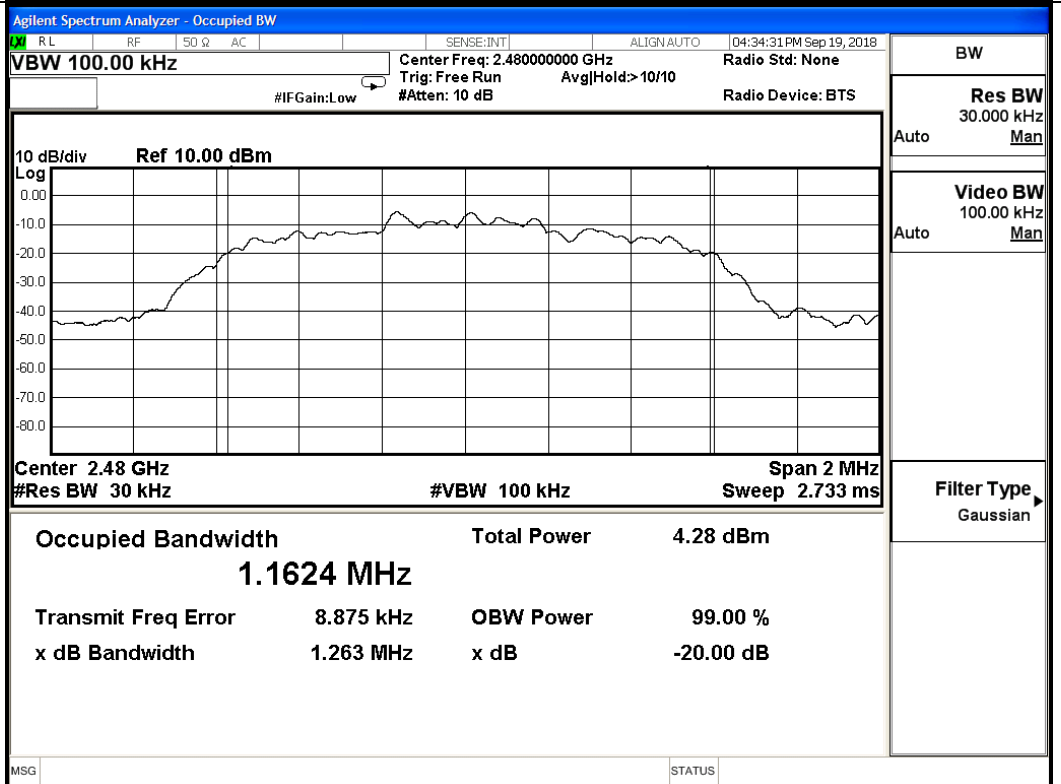
8DPSK/LCH



8DPSK/MCH



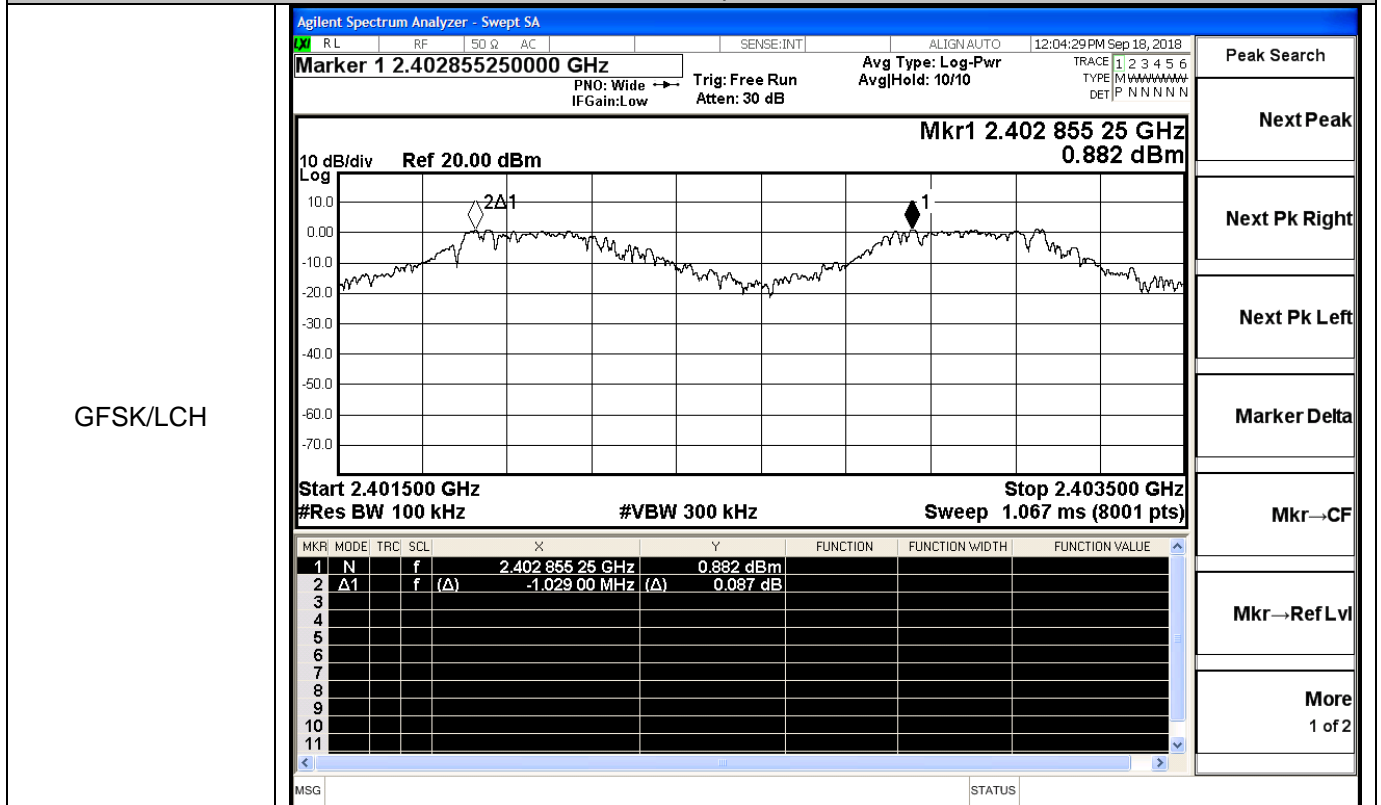
8DPSK/HCH



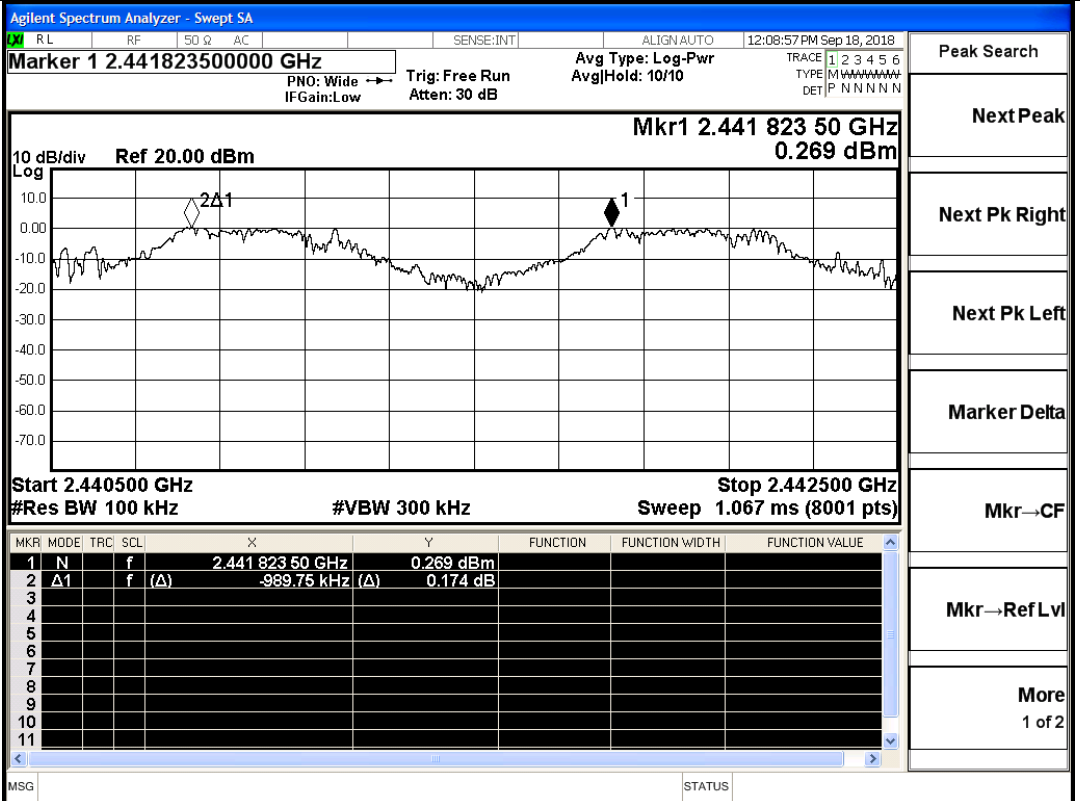
A.3 Carrier Frequency Separation

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

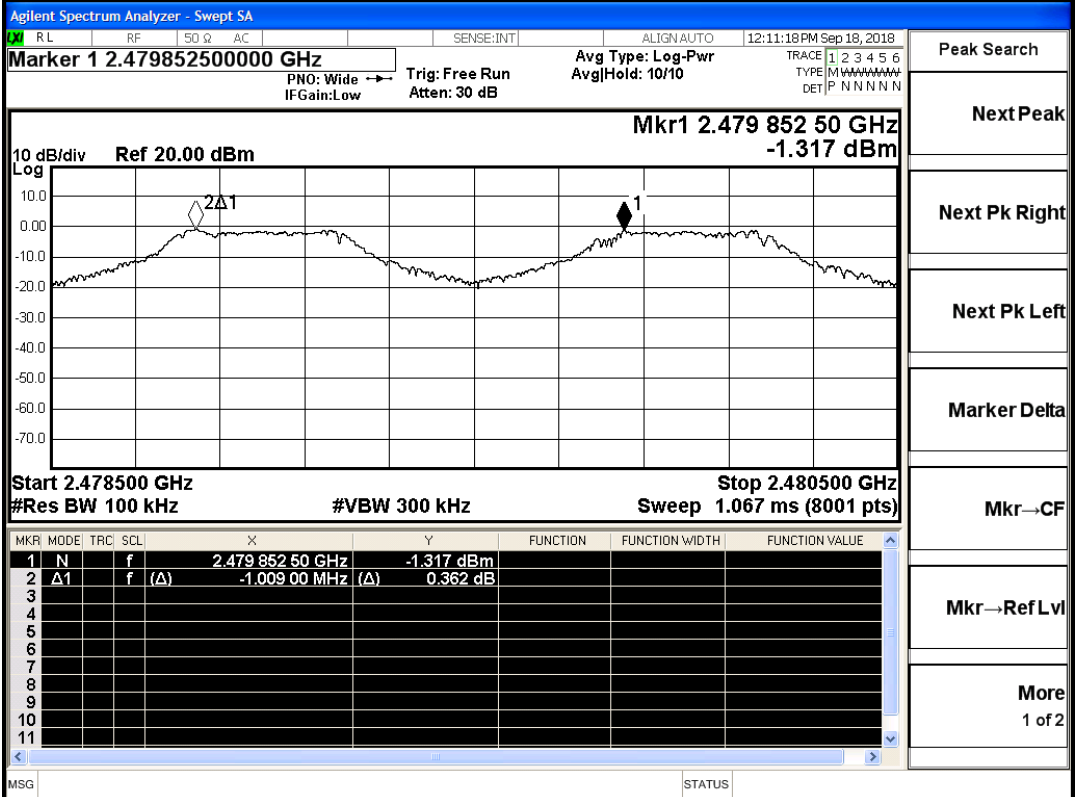
Test Graphs



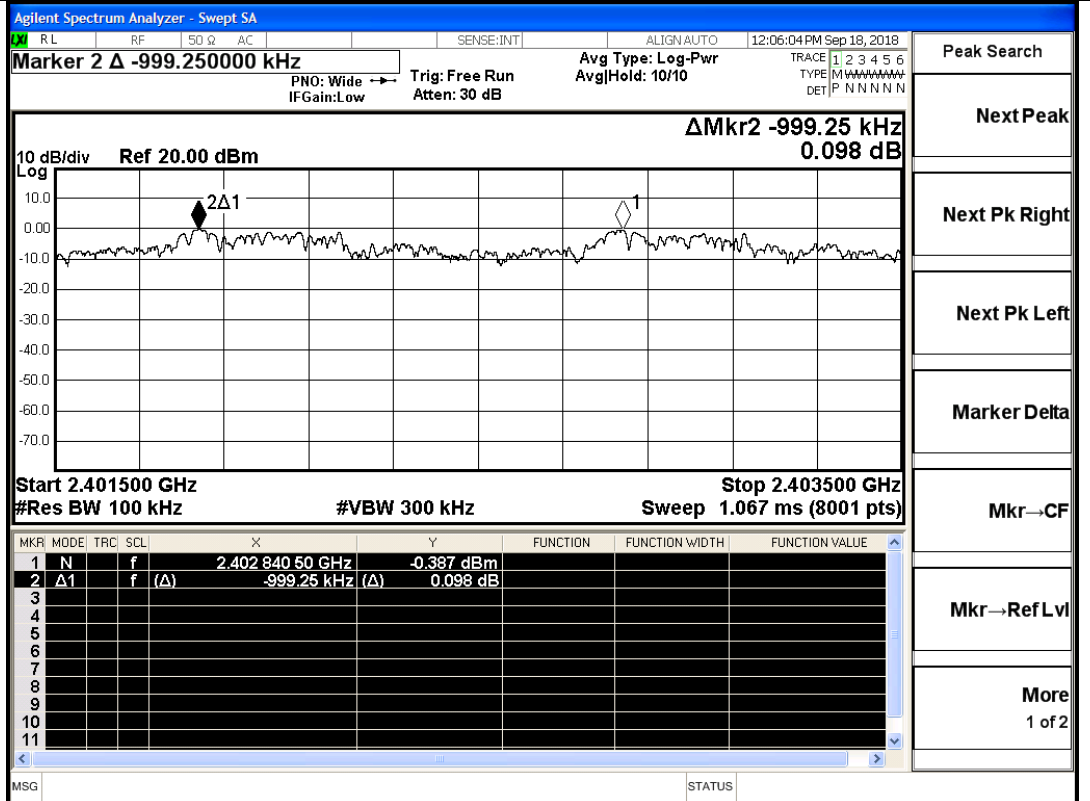
GFSK/MCH



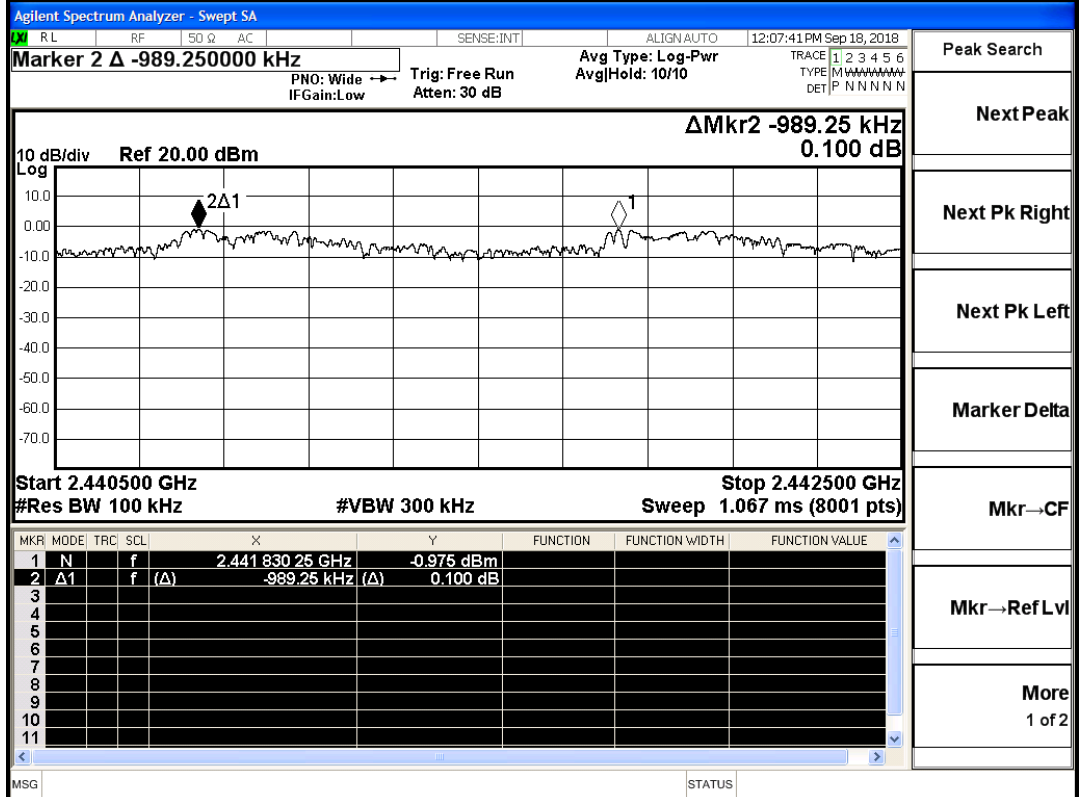
GFSK/HCH



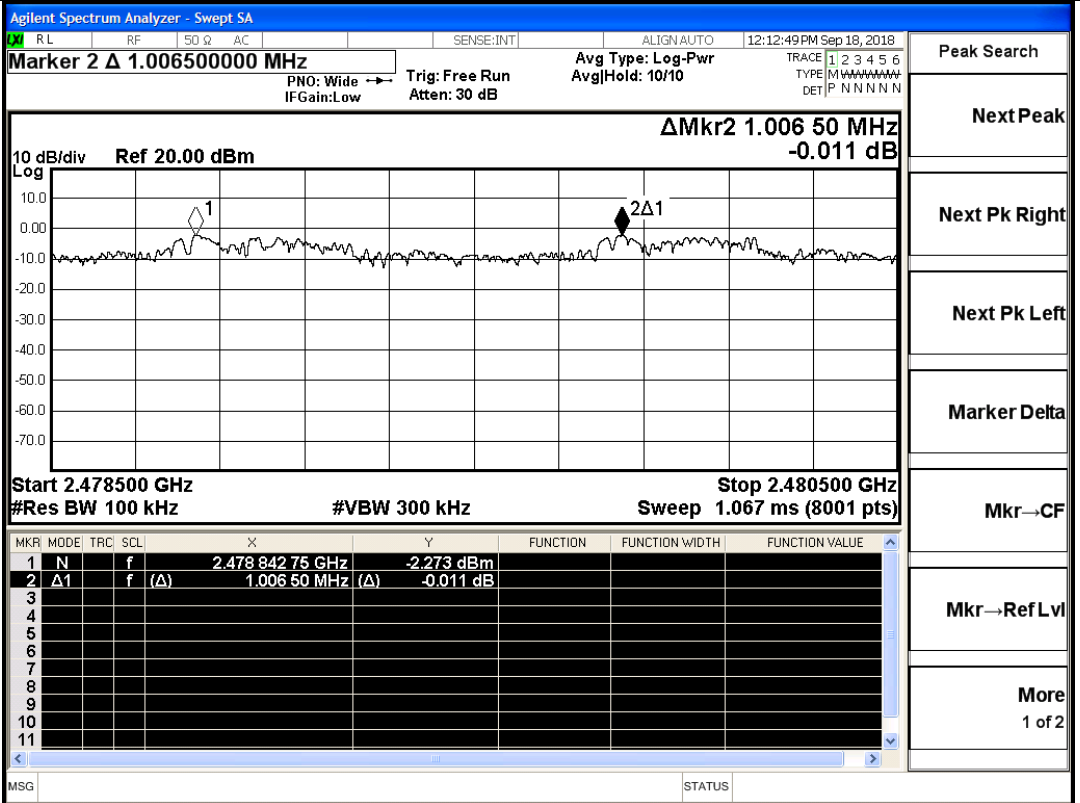
$\pi/4$ DQPSK/LCH



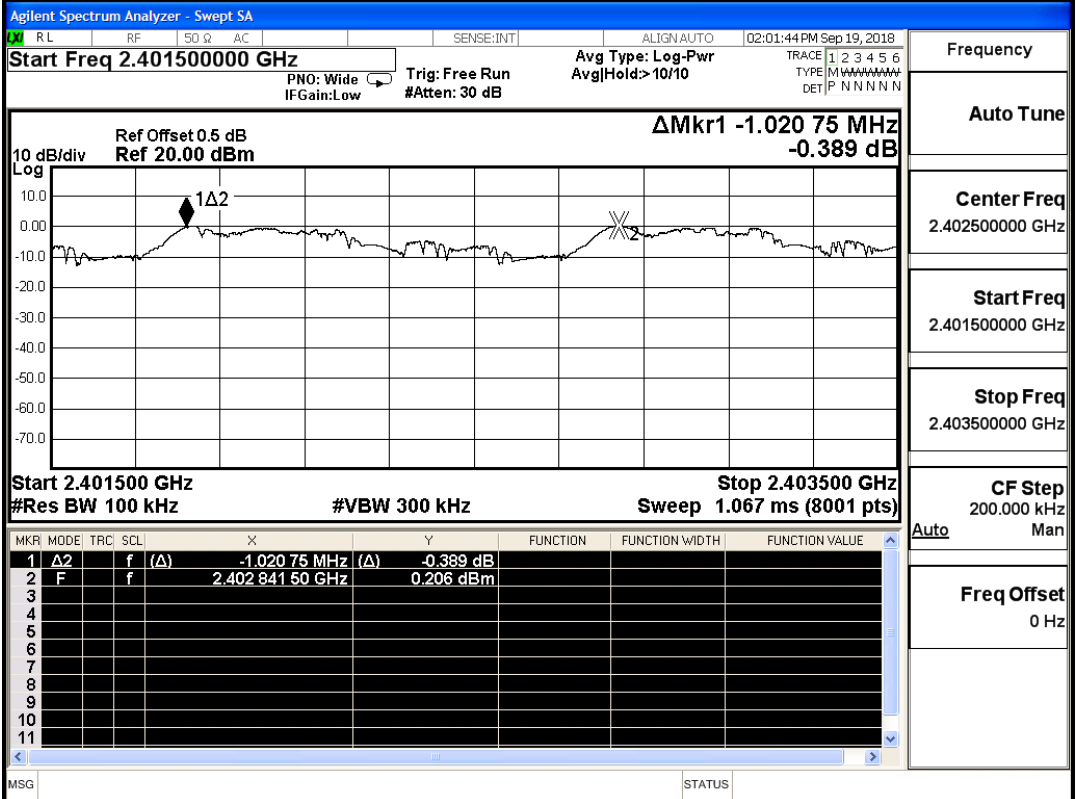
$\pi/4$ DQPSK/MCH



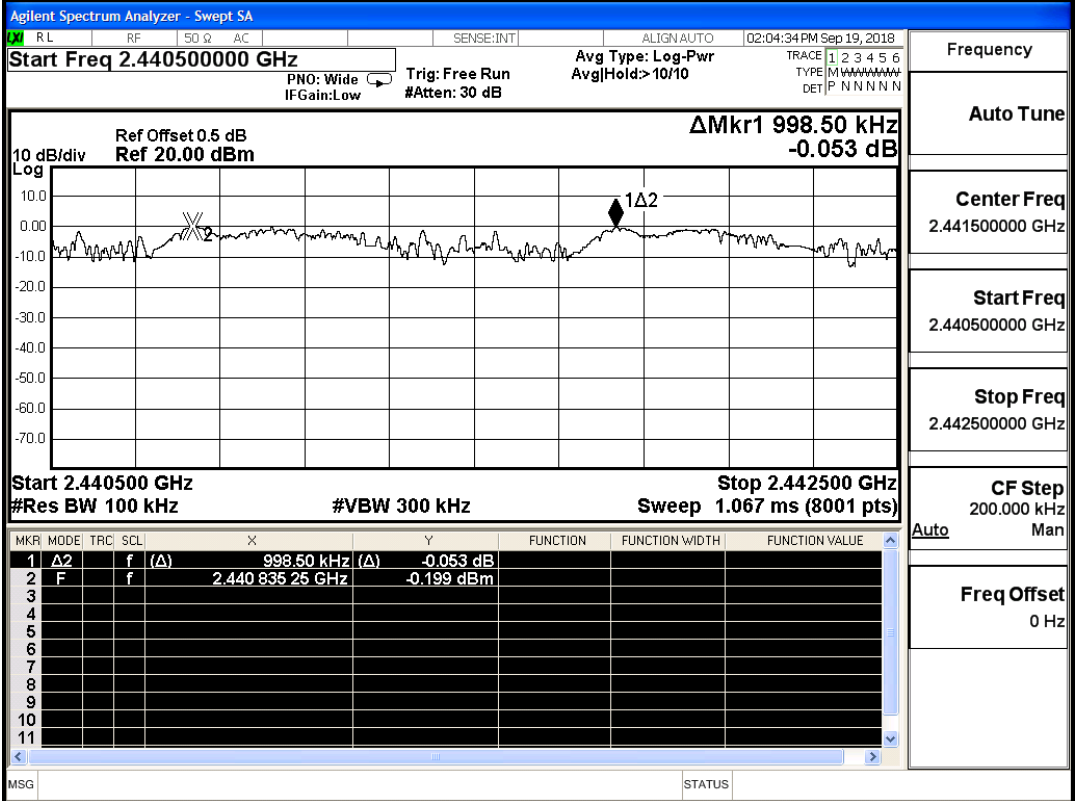
π/4DQPSK/HCH



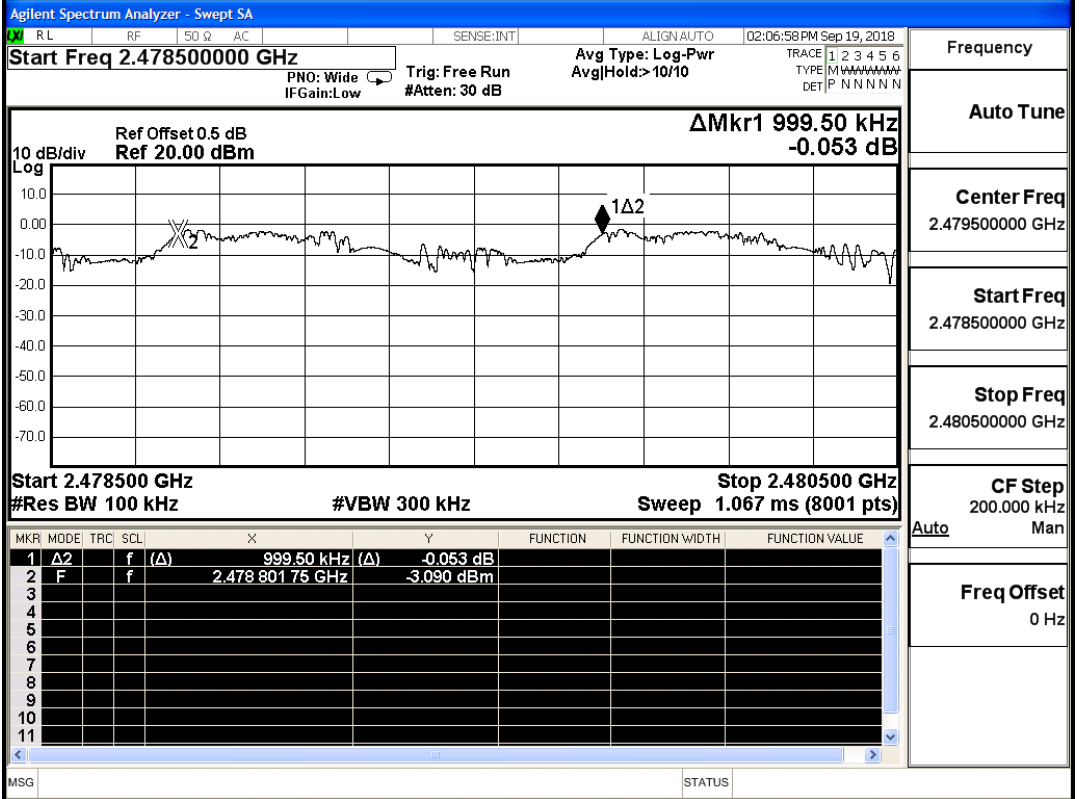
8DPSK/LCH



8DPSK/MCH

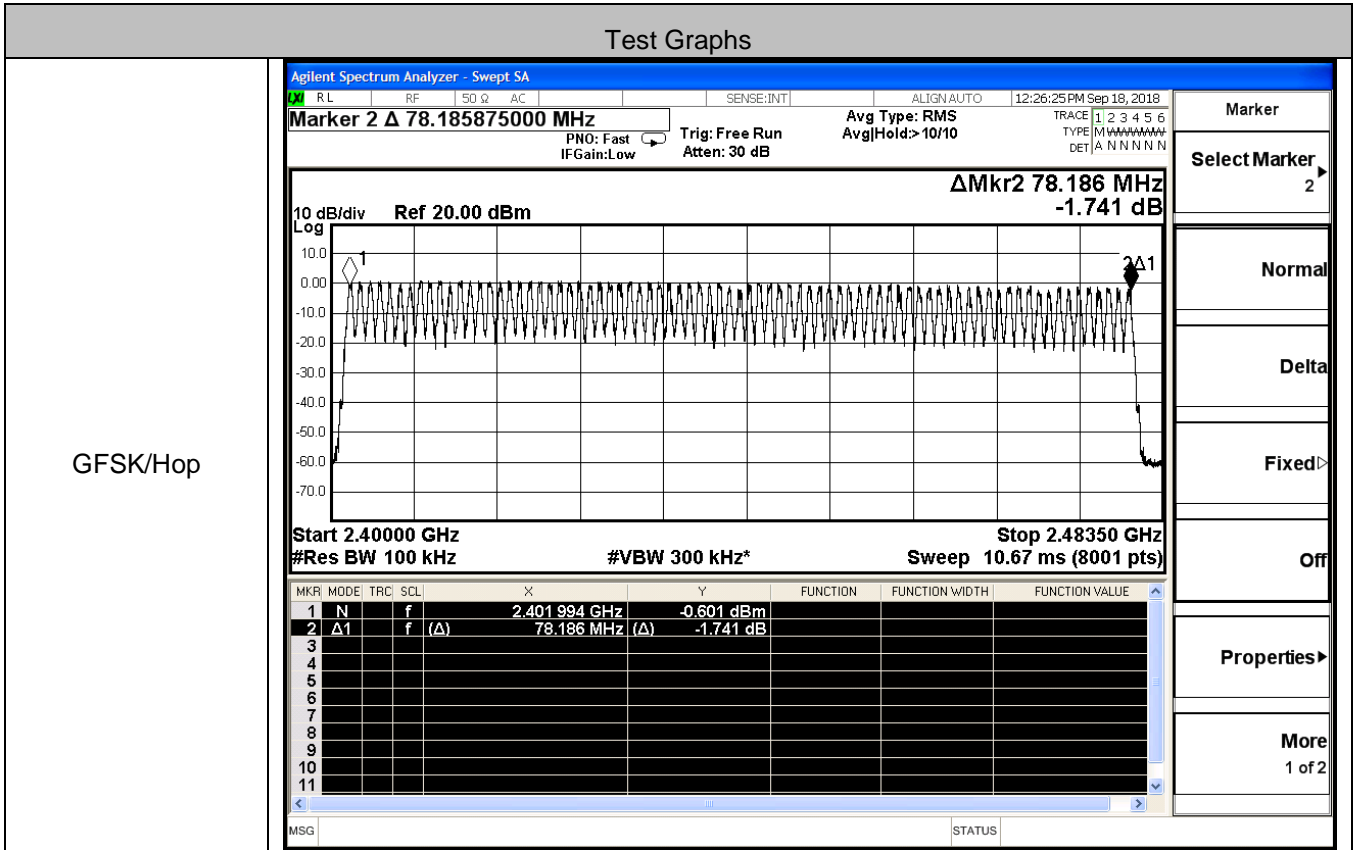


8DPSK/HCH

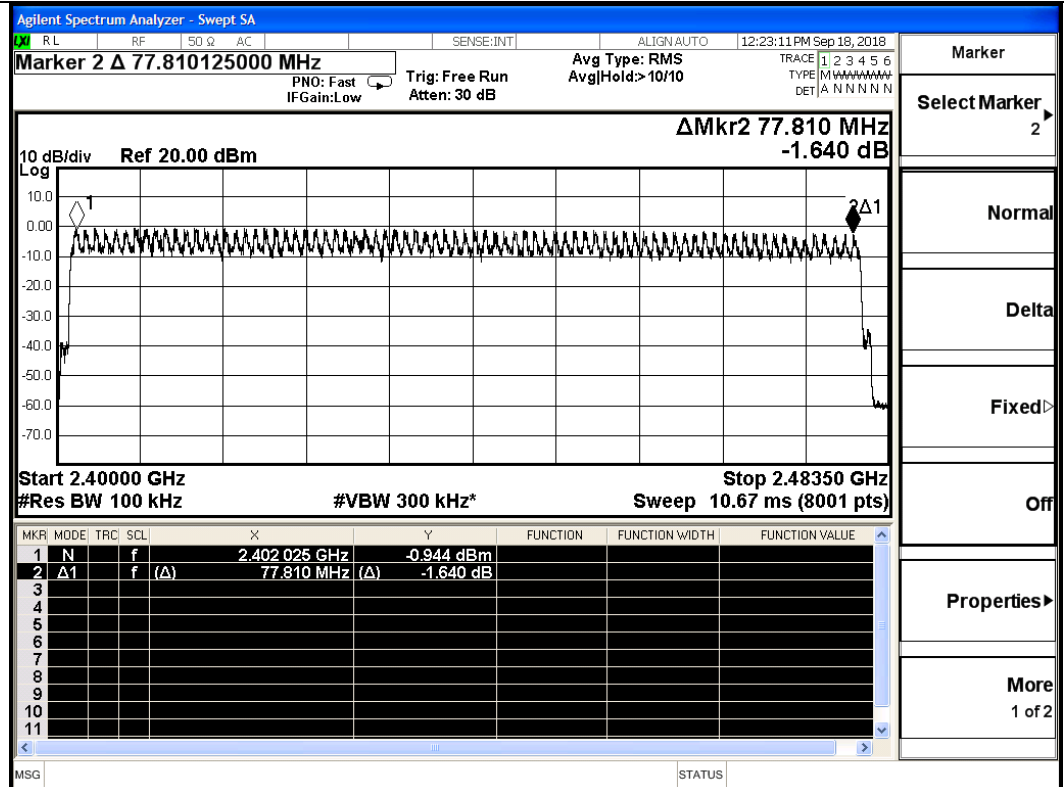


A.4 Hopping Channel Number

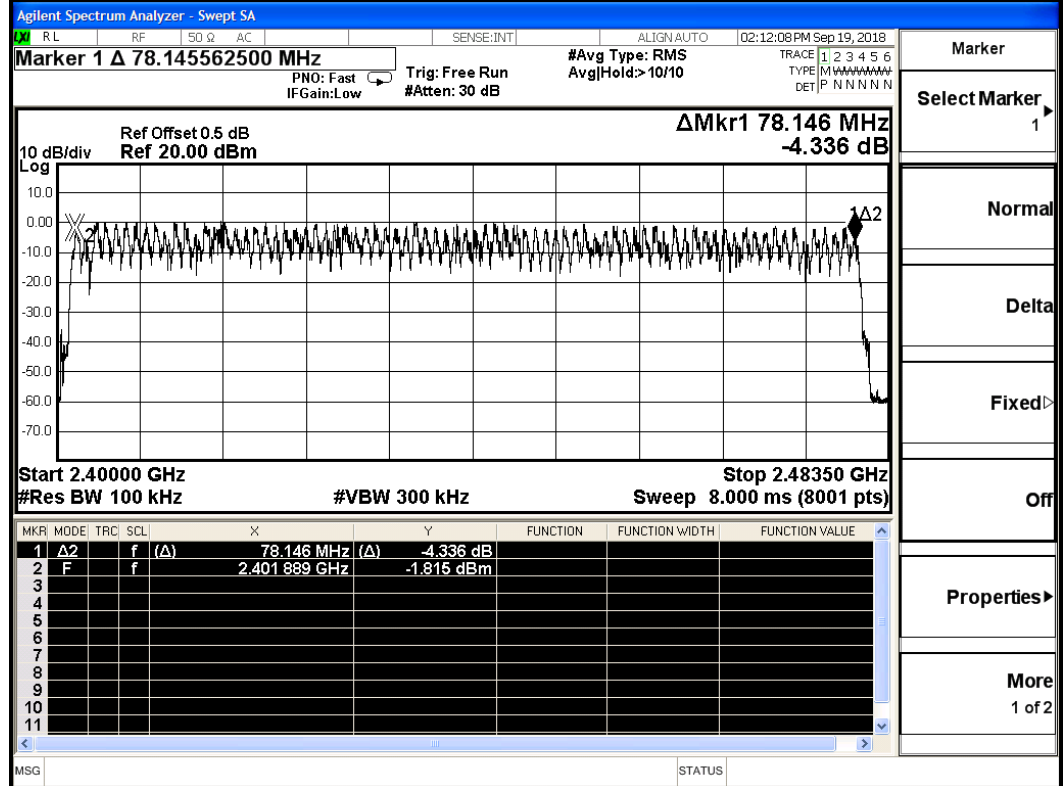
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS



$\pi/4$ DQPSK/Hop

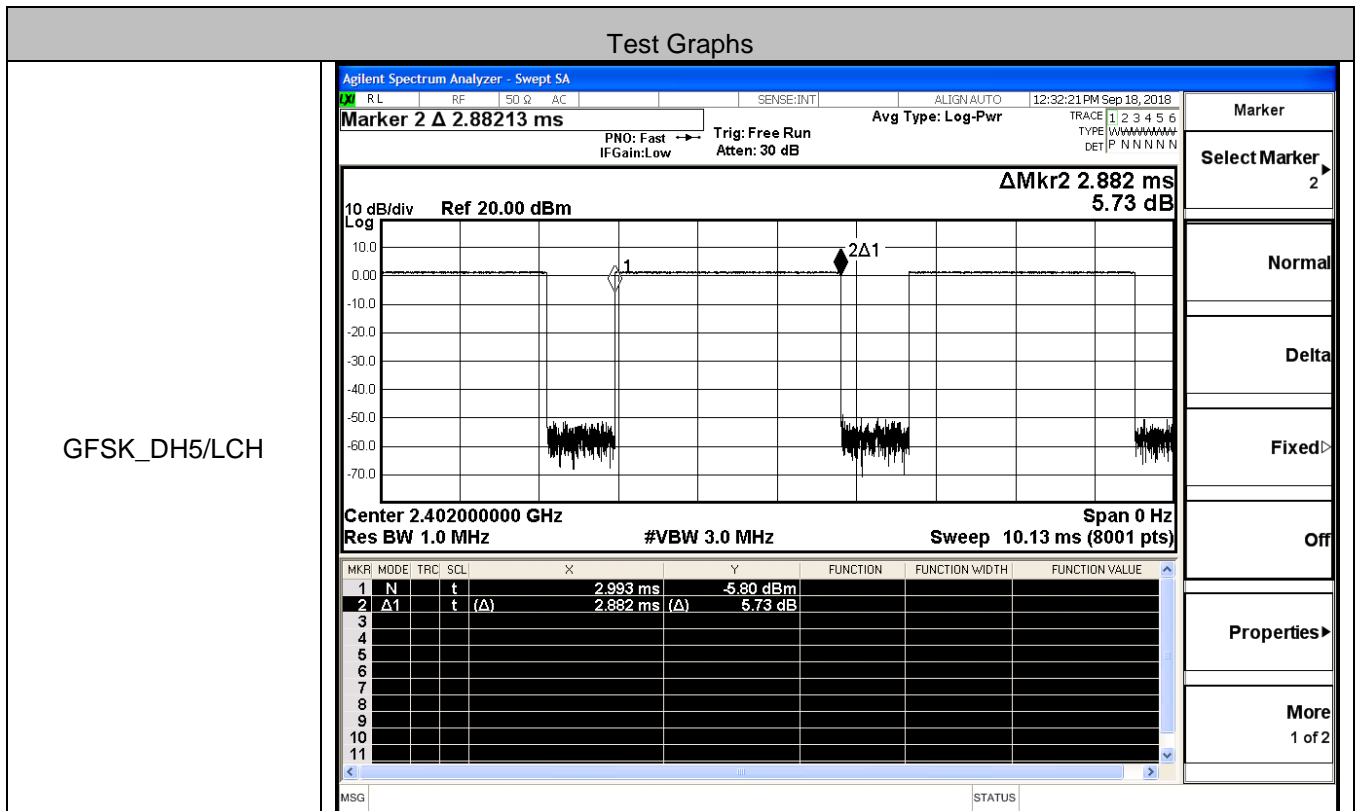


8DPSK/Hop

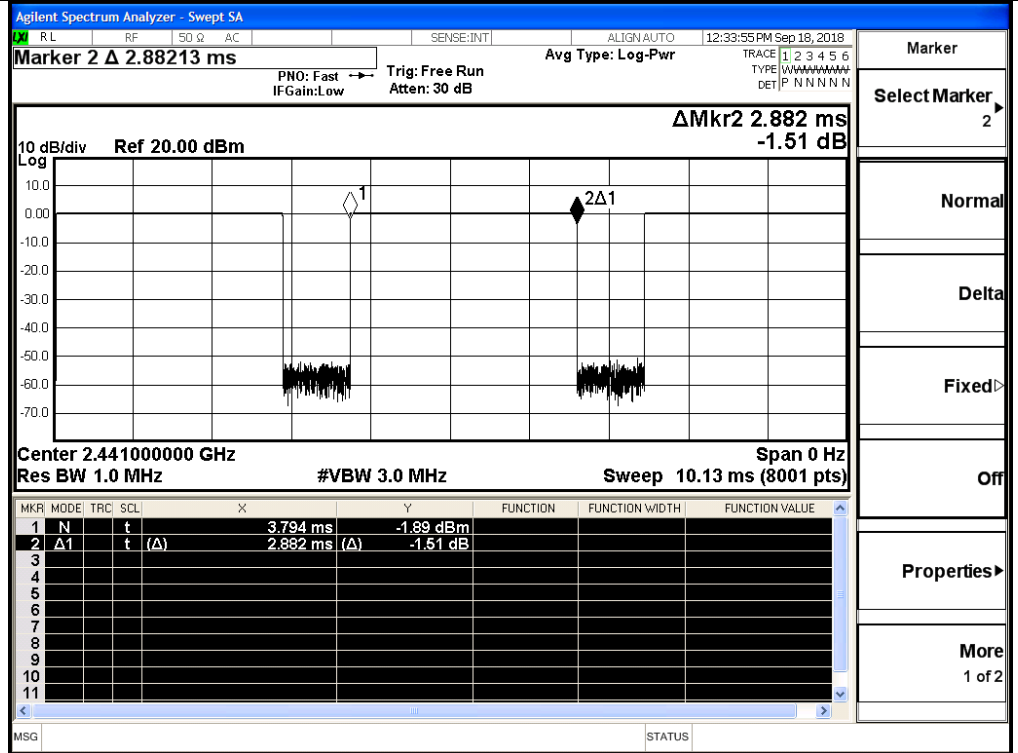


A.5 Dwell Time

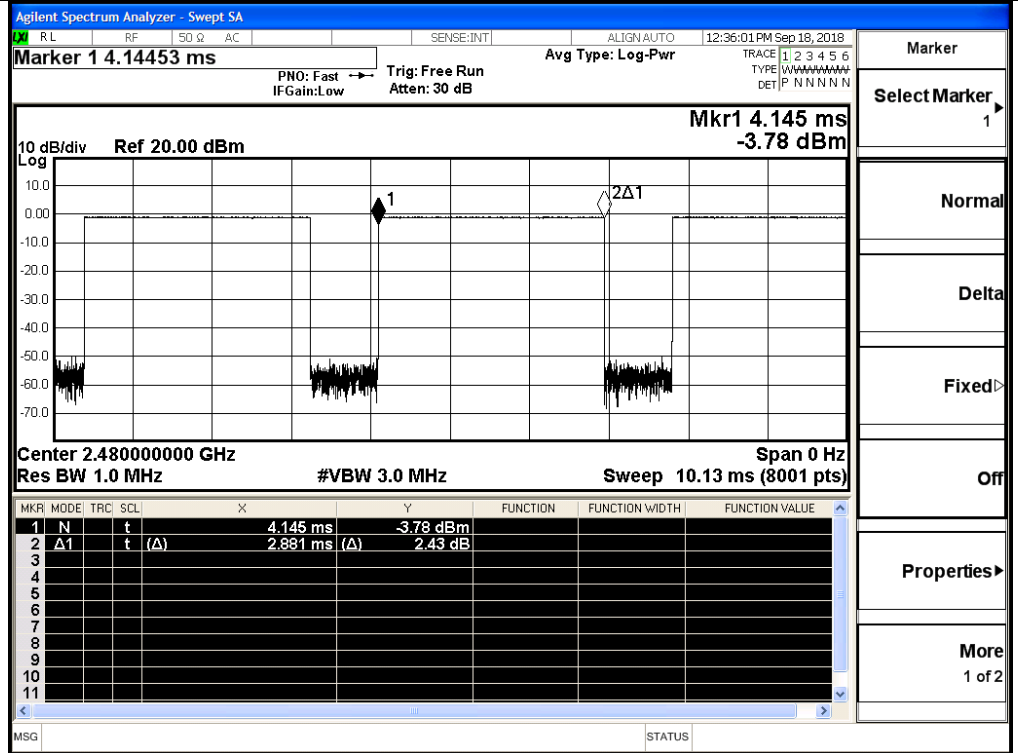
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.89	106.7	0.308	0.4	PASS
	2DH5	MCH	2.89	106.7	0.308	0.4	PASS
	2DH5	HCH	2.89	106.7	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



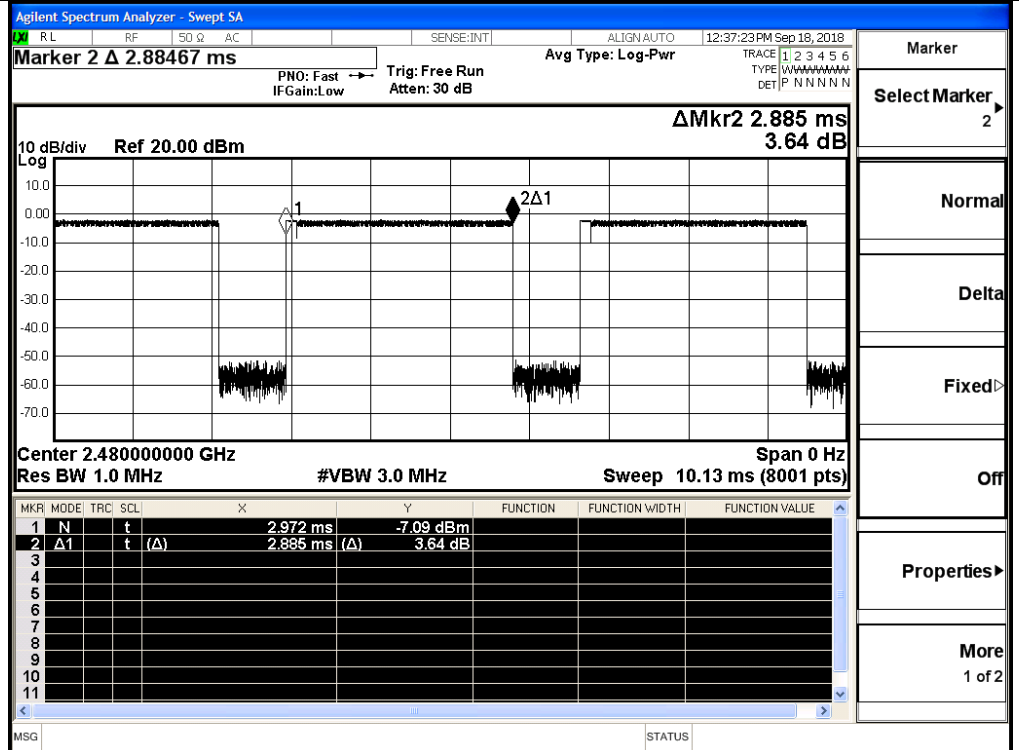
GFSK_DH5/MCH



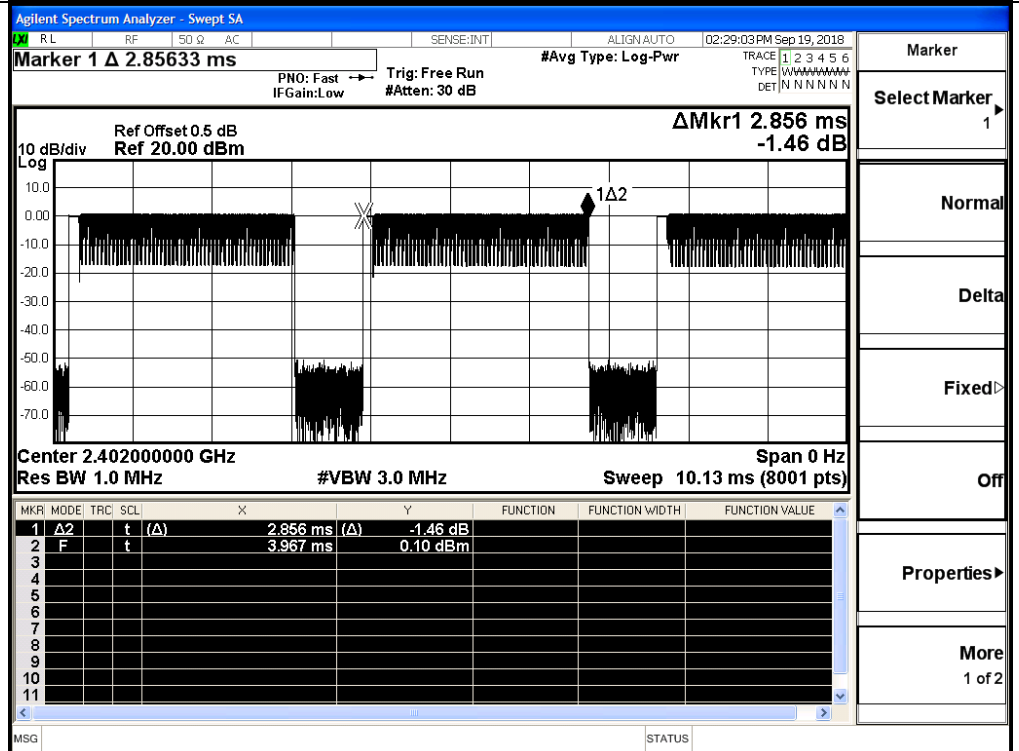
GFSK_DH5/HCH



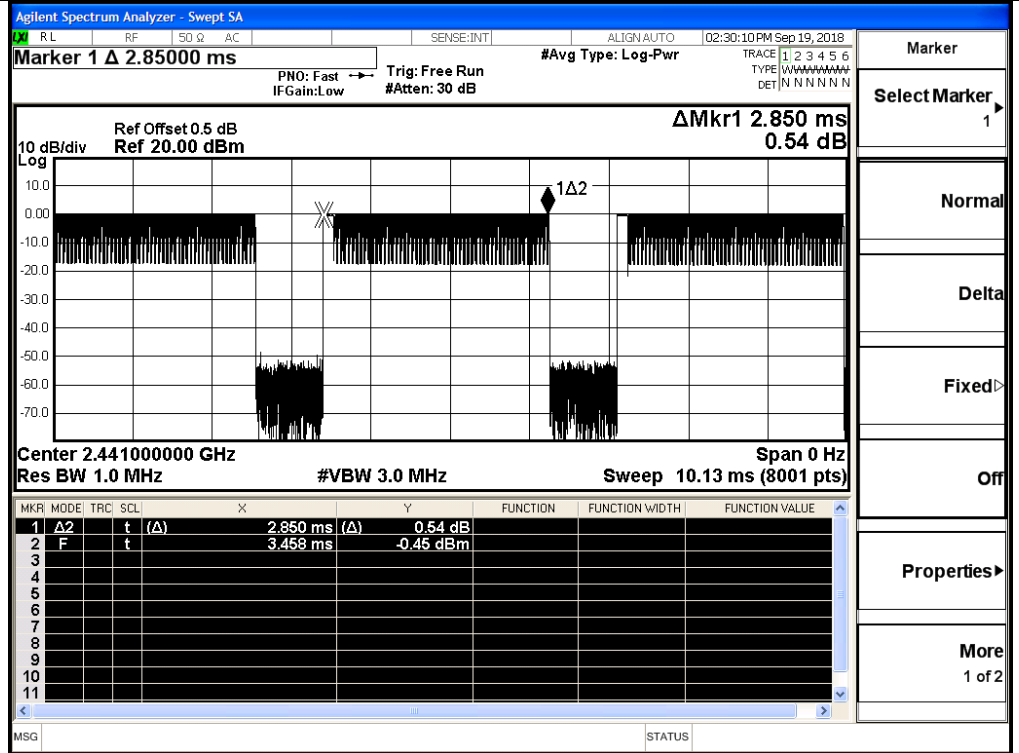
$\pi/4$ DQPSK
_2DH5/HCH



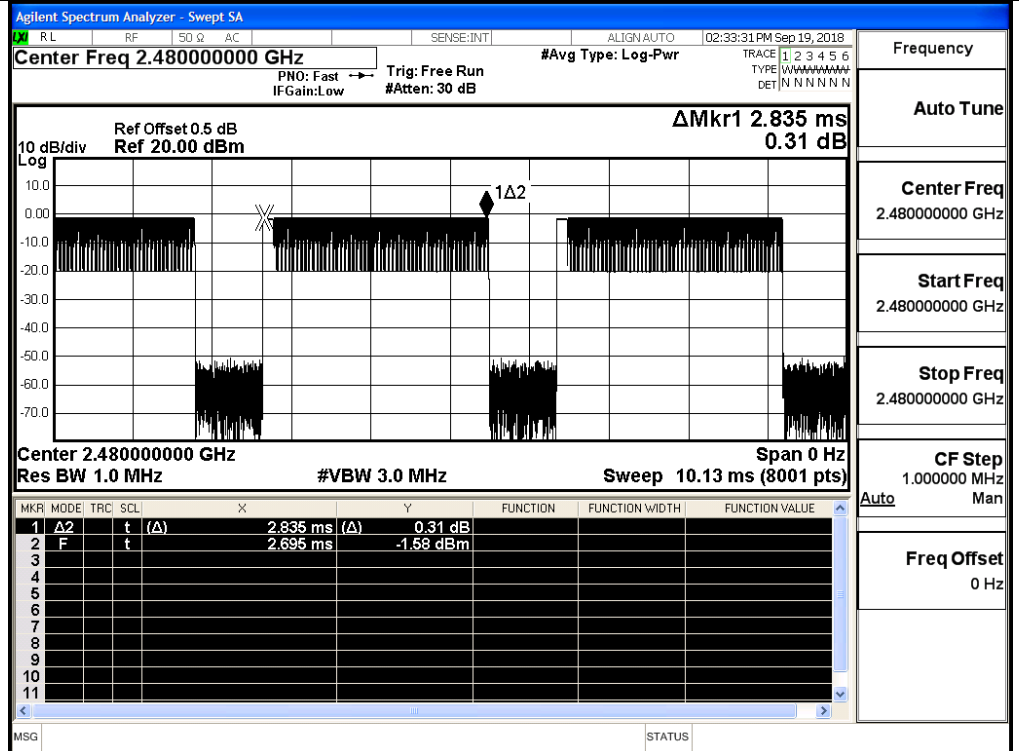
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

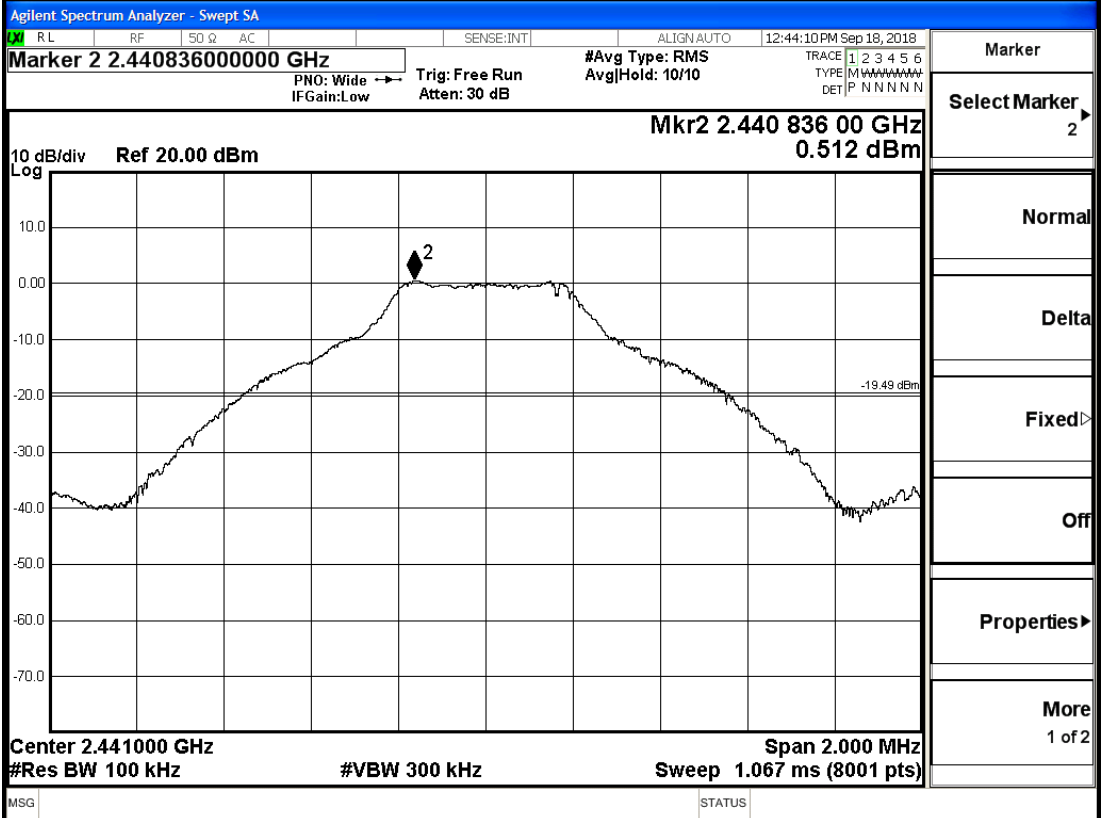


A.6 RF Conducted Spurious Emissions

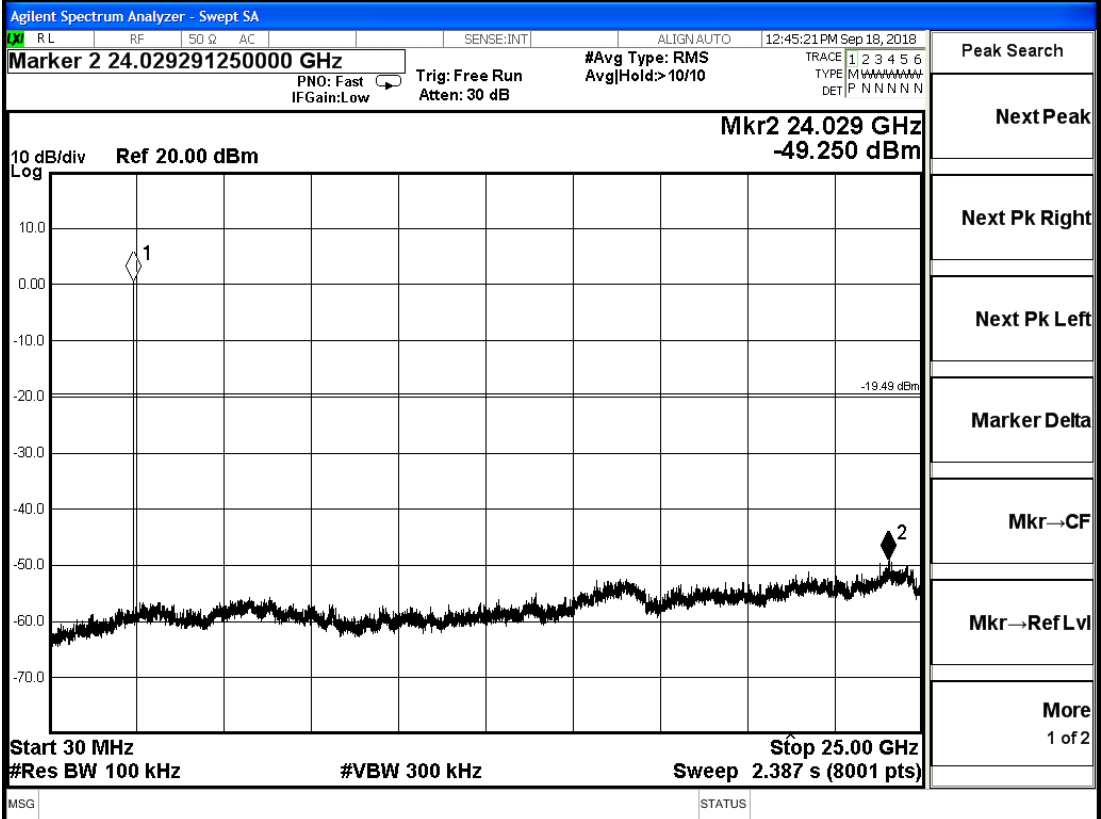
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.252	-49.967	-18.75	PASS
	MCH	0.512	-49.250	-19.49	PASS
	HCH	-1.209	-50.009	-21.21	PASS
$\pi/4$ DQPSK	LCH	-0.316	-49.984	-20.32	PASS
	MCH	-0.786	-50.189	-20.79	PASS
	HCH	-2.198	-49.625	-22.20	PASS
8DPSK	LCH	-0.159	-49.620	-20.16	PASS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

GFSK_MCH_Graphs

Pref

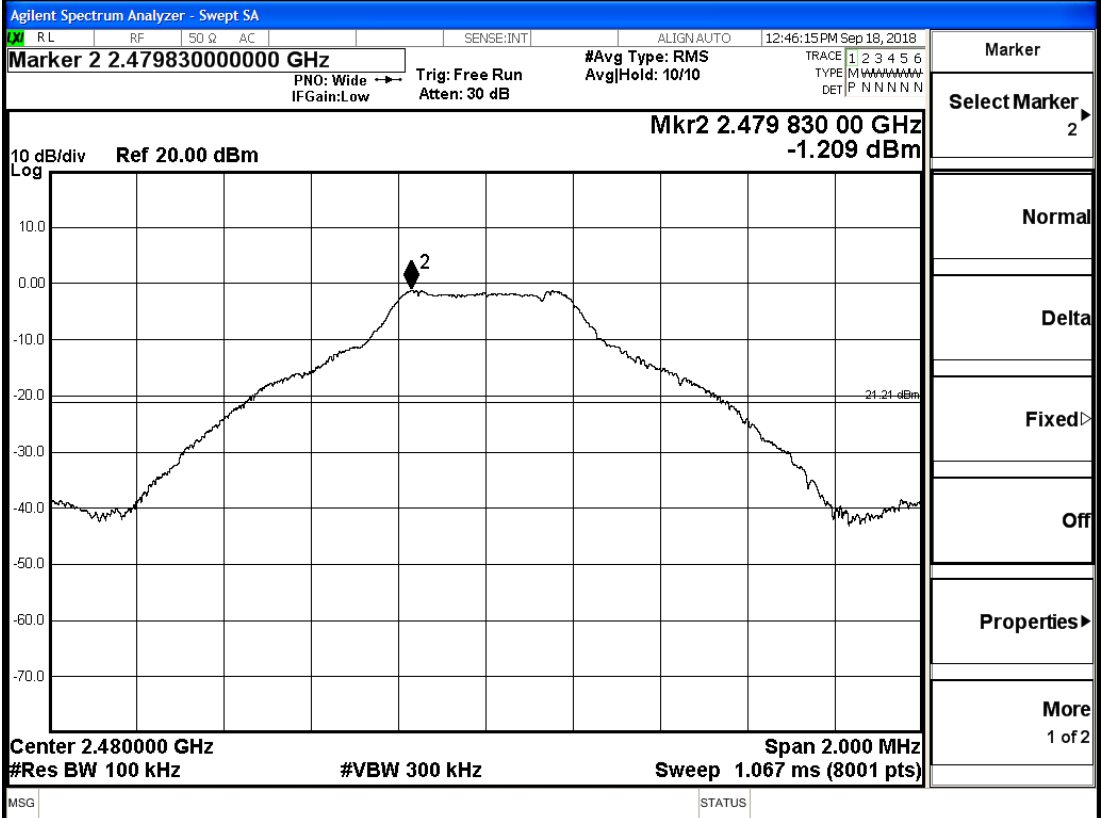


Puw



GFSK_HCH_Graphs

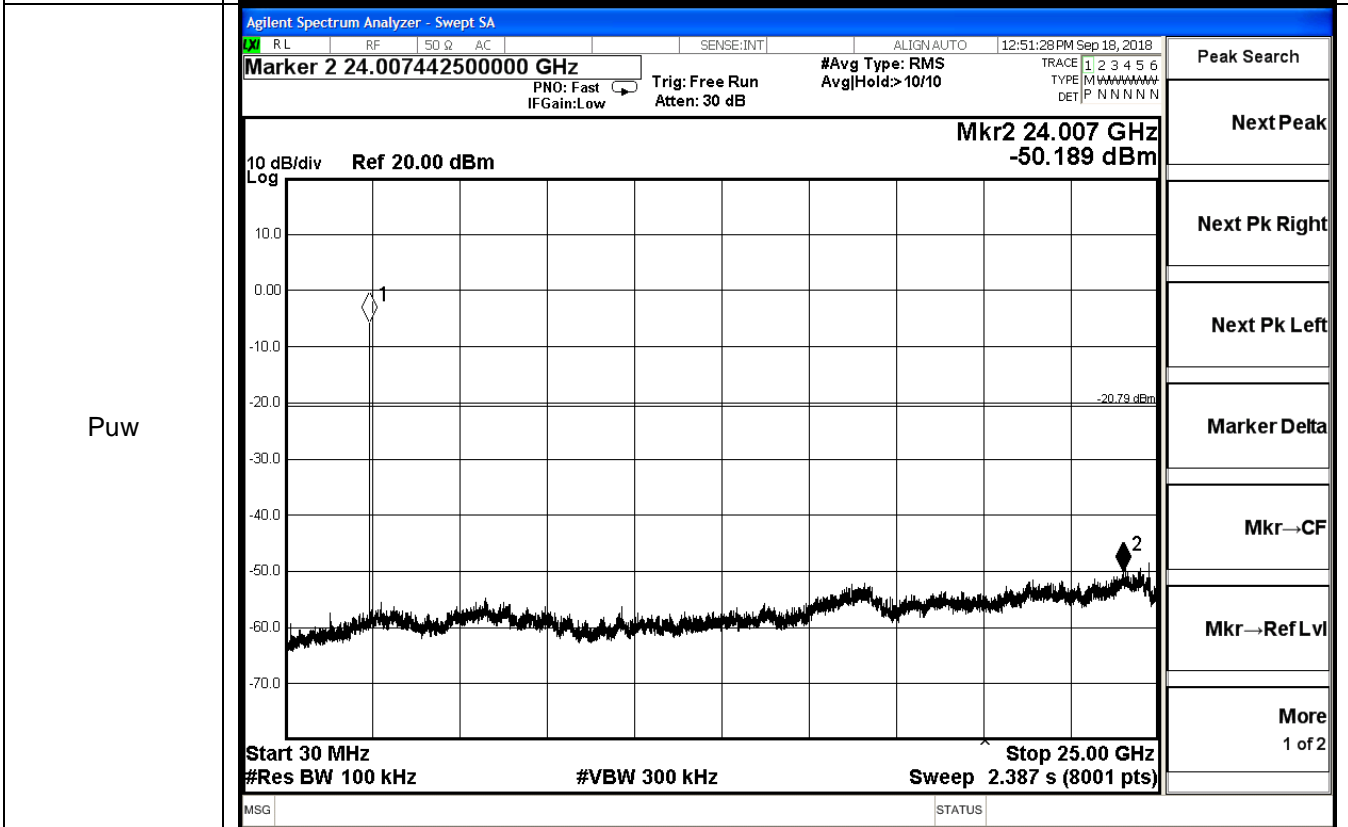
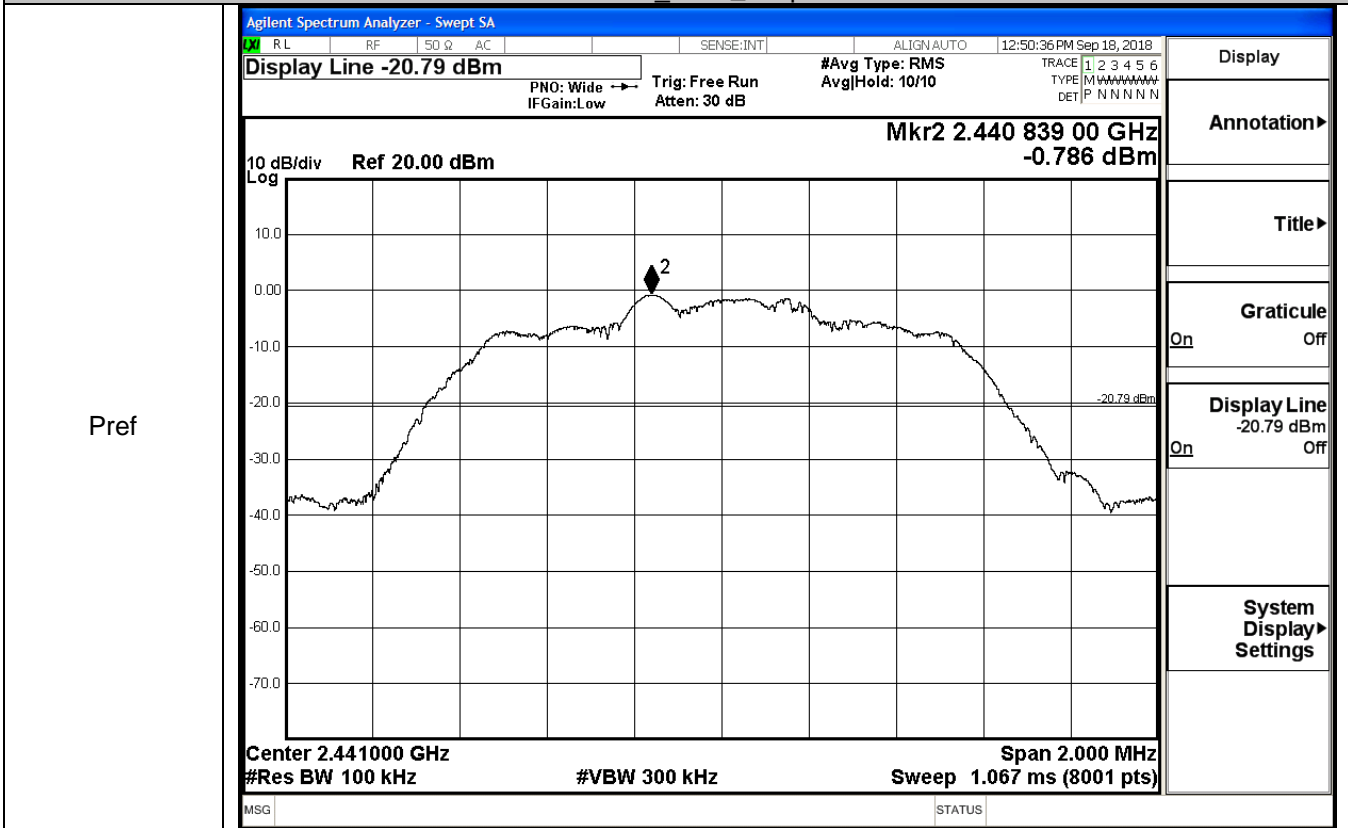
Pref



Puw

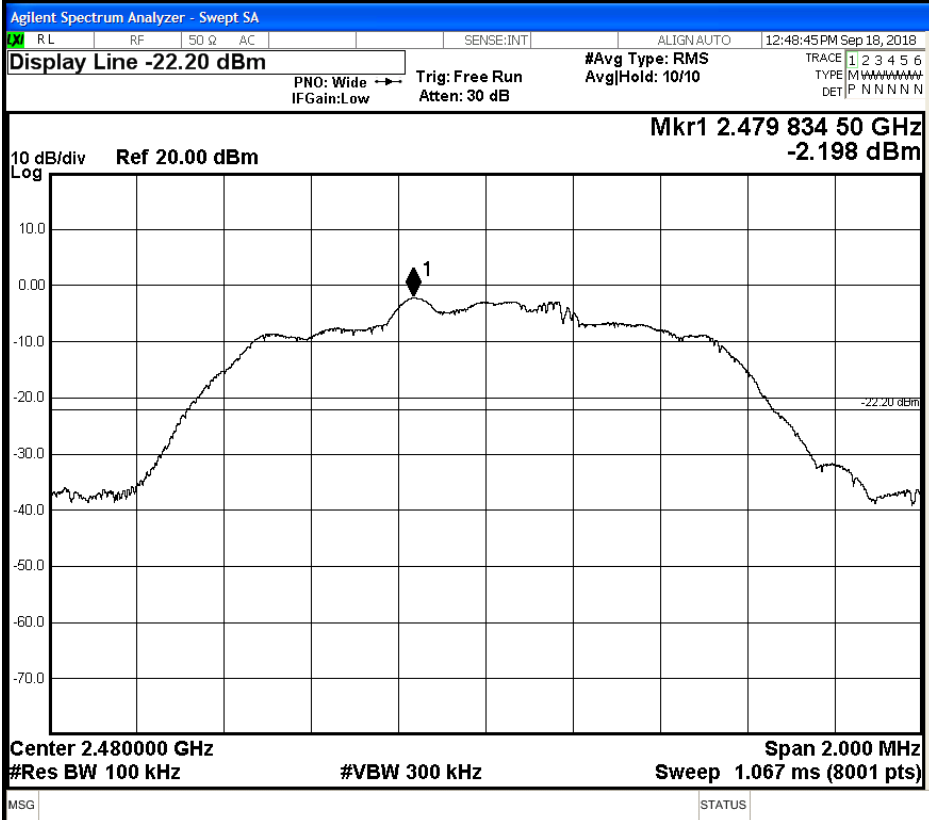


$\pi/4$ DQPSK_MCH_Graphs



$\pi/4$ DQPSK_HCH_Graphs

Pref



Display

Annotation ▶

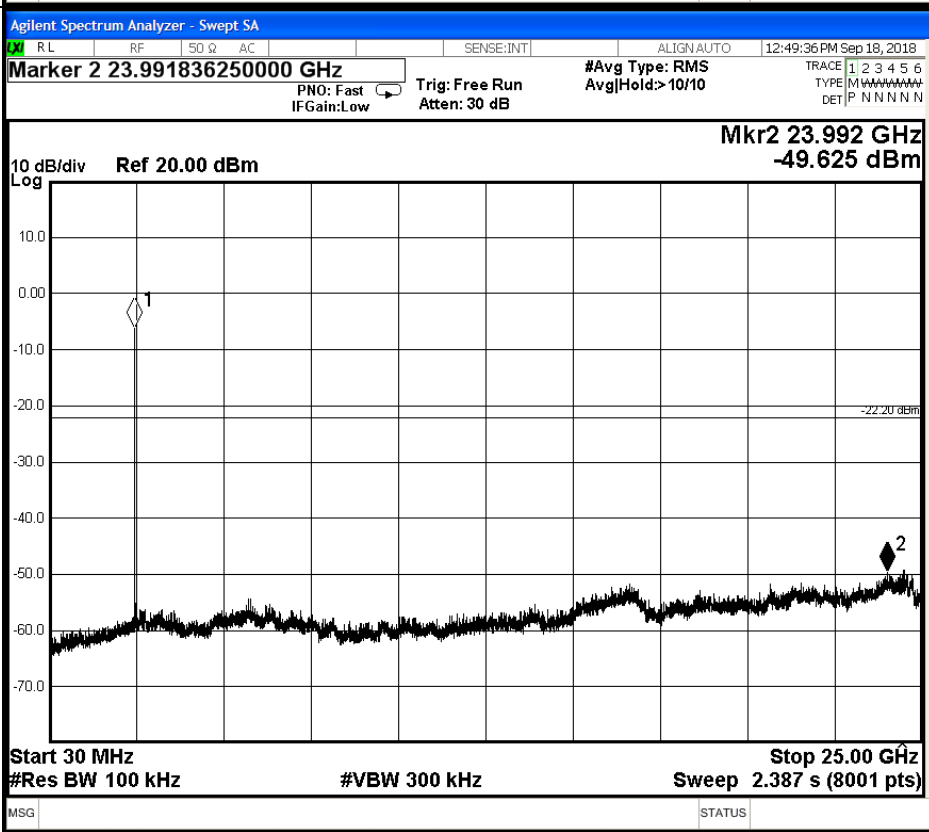
Title ▶

Graticule
On Off

Display Line
-22.20 dBm
On Off

System
Display ▶
Settings

Puw



Peak Search

Next Peak

Next Pk Right

Next Pk Left

Marker Delta

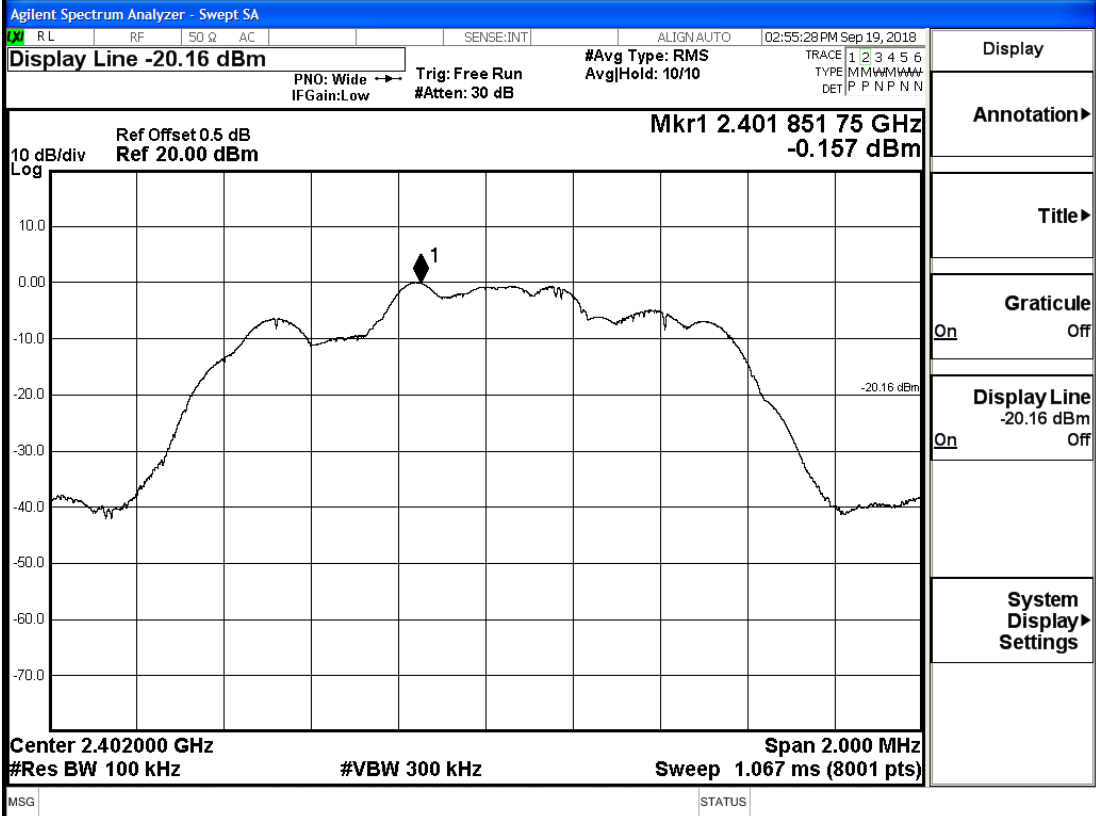
Mkr → CF

Mkr → Ref Lvl

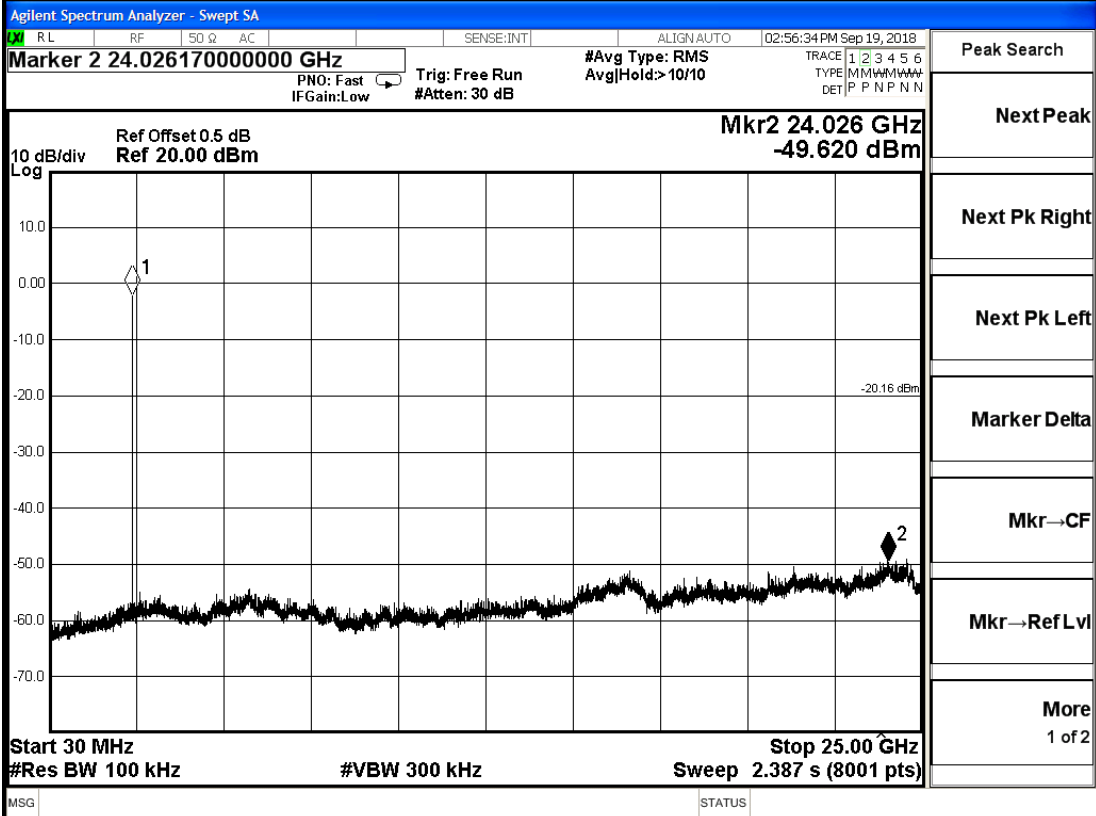
More
1 of 2

8DPSK_LCH_Graphs

Pref

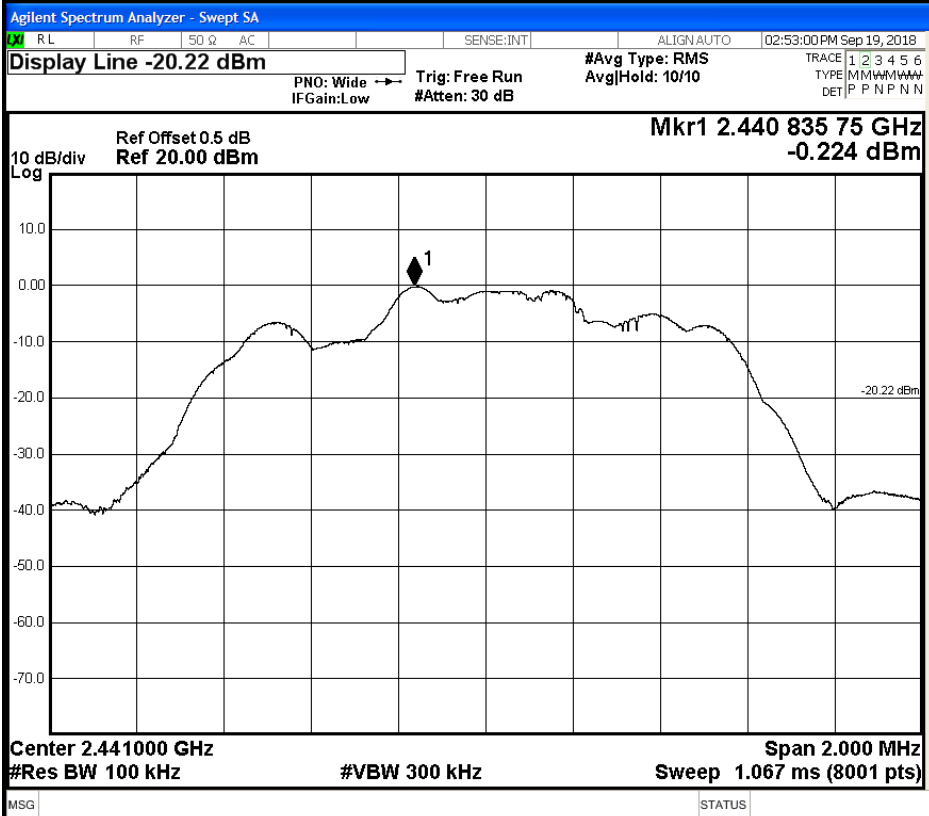


Puw



8DPSK_MCH_Graphs

Pref



Display

Annotation ▶

Title ▶

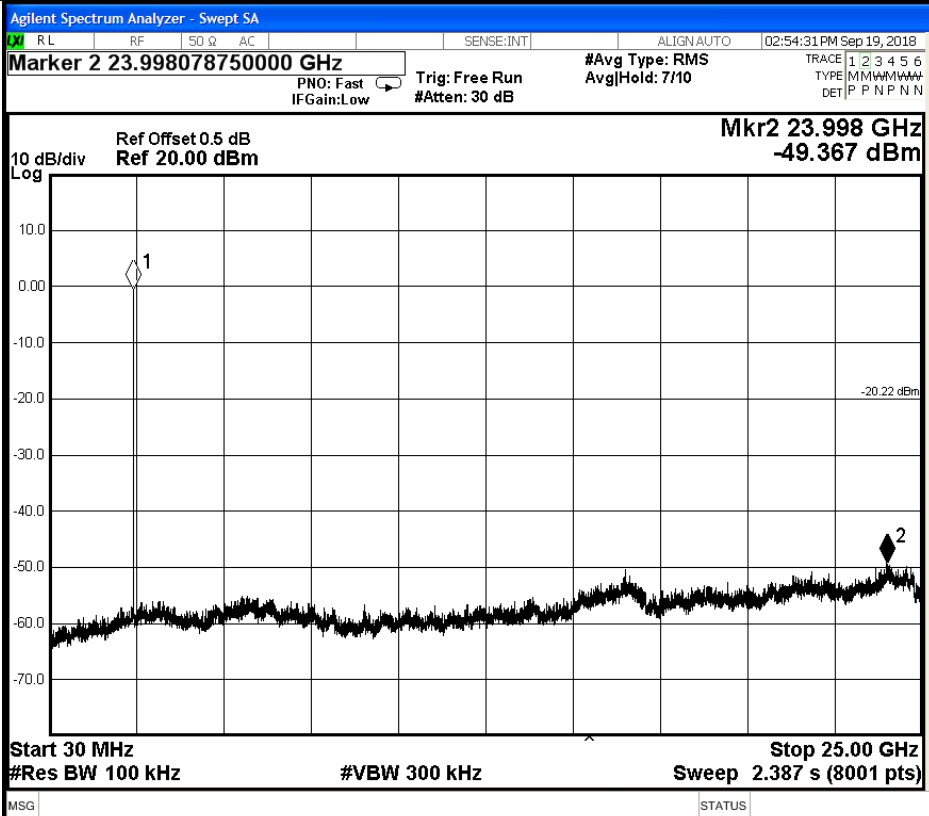
Graticule
On Off

Display Line
-20.22 dBm Off

System Display ▶
Settings

MSG STATUS

Puw



Peak Search

Next Peak

Next Pk Right

Next Pk Left

Marker Delta

Mkr→CF

Mkr→Ref Lvl

More
1 of 2

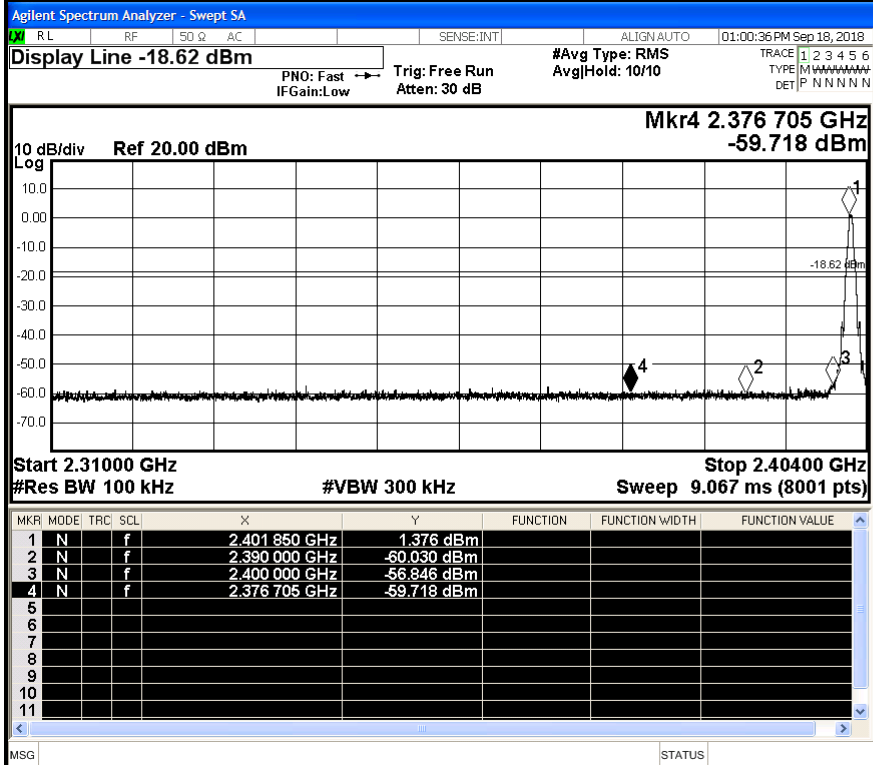
MSG STATUS

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
$\pi/4$ DQPSK	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



Display

Annotation ▶

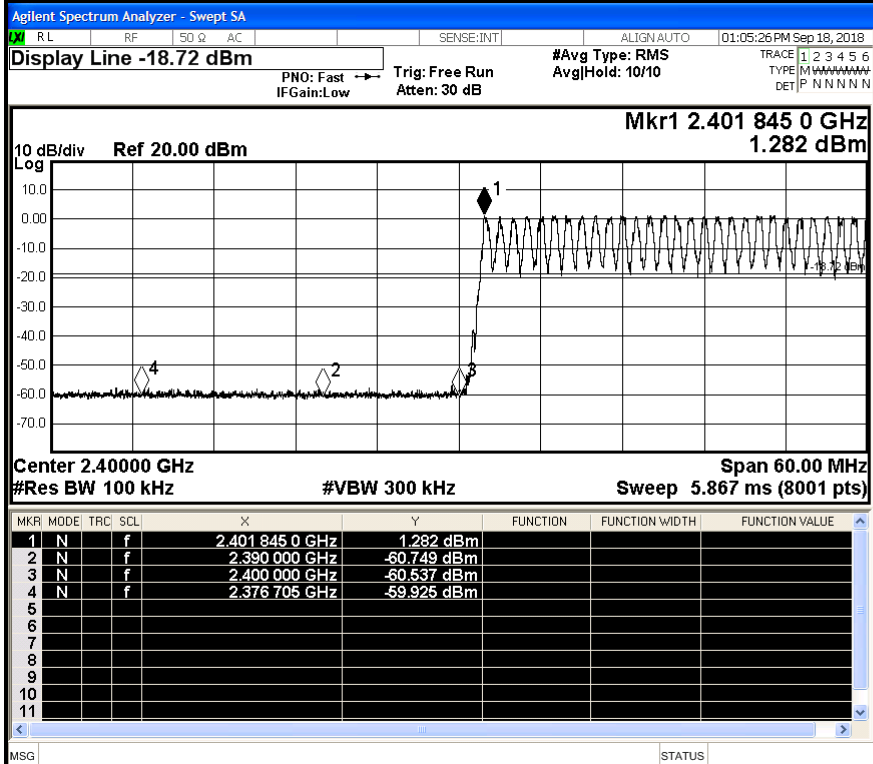
Title ▶

Graticule
On Off

Display Line
On Off
-18.62 dBm

System
Display
Settings ▶

GFSK/LCH/Hop



Display

Annotation ▶

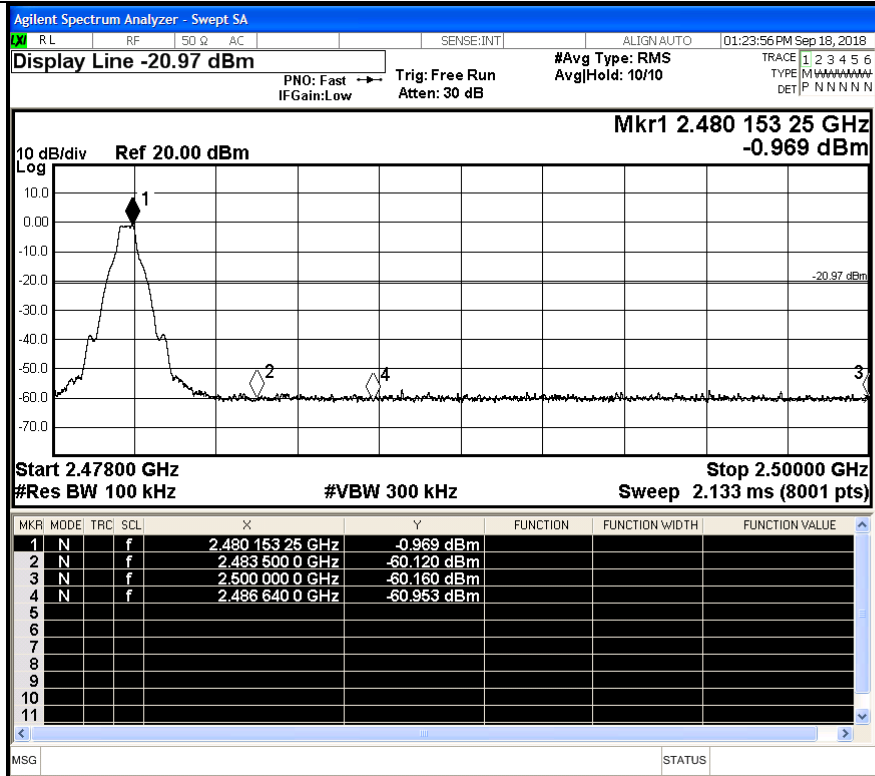
Title ▶

Graticule
On Off

Display Line
On Off
-18.72 dBm

System
Display
Settings ▶

GFSK/HCH/No Hop



Display

Annotation ▶

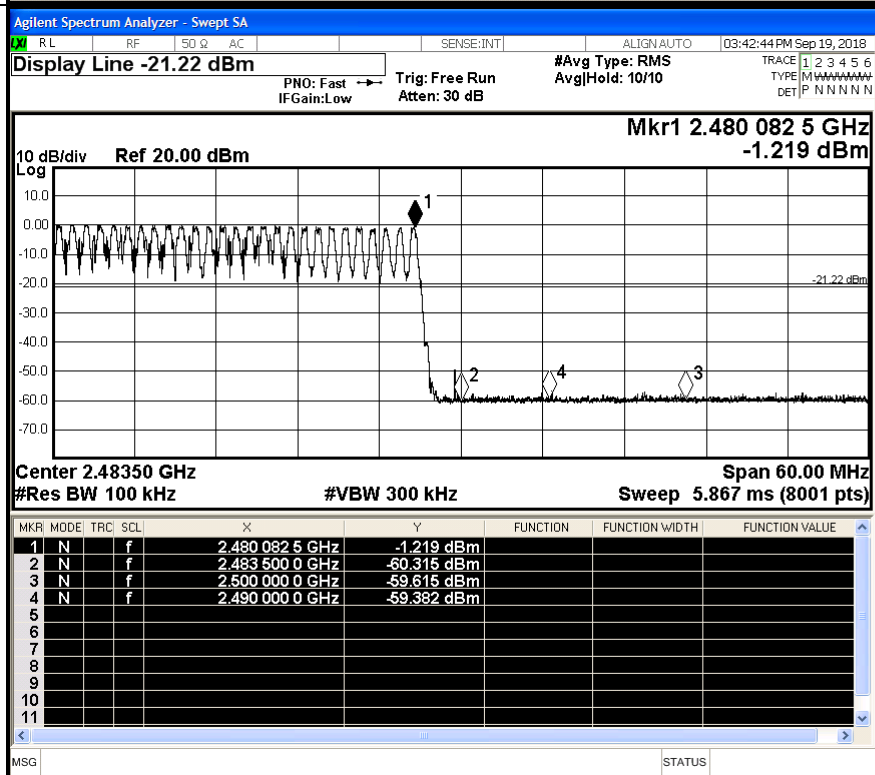
Title ▶

Graticule
On Off

Display Line
-20.97 dBm
On Off

System Display
Settings ▶

GFSK/HCH/Hop



Display

Annotation ▶

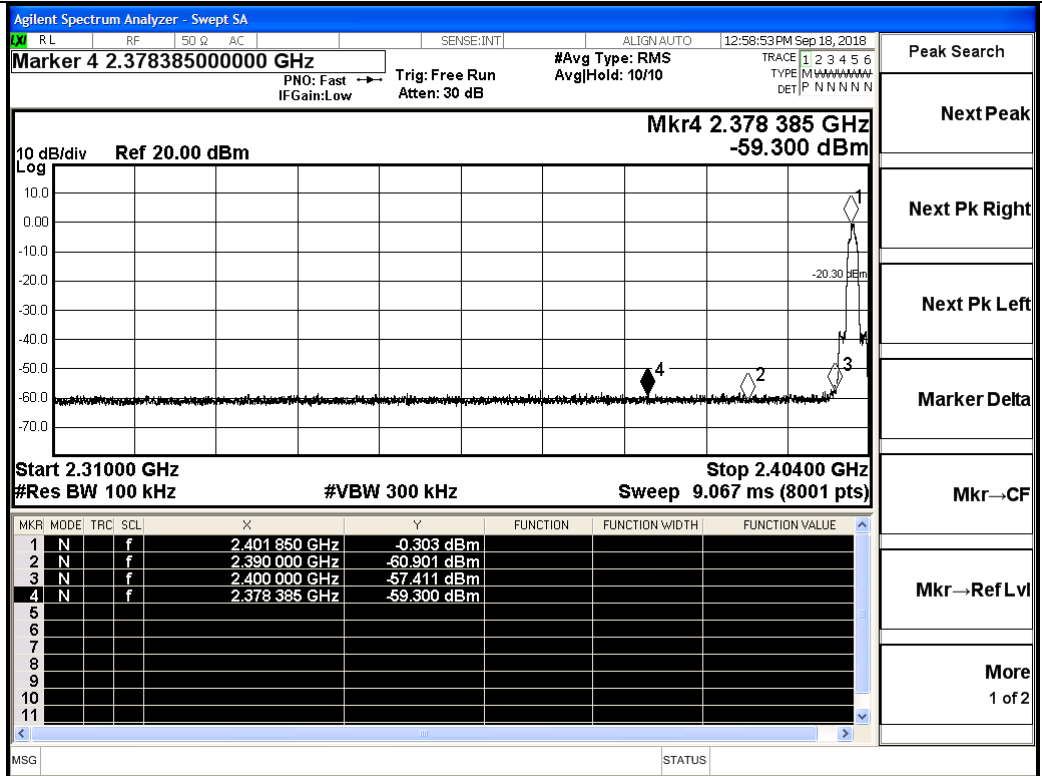
Title ▶

Graticule
On Off

Display Line
-21.22 dBm
On Off

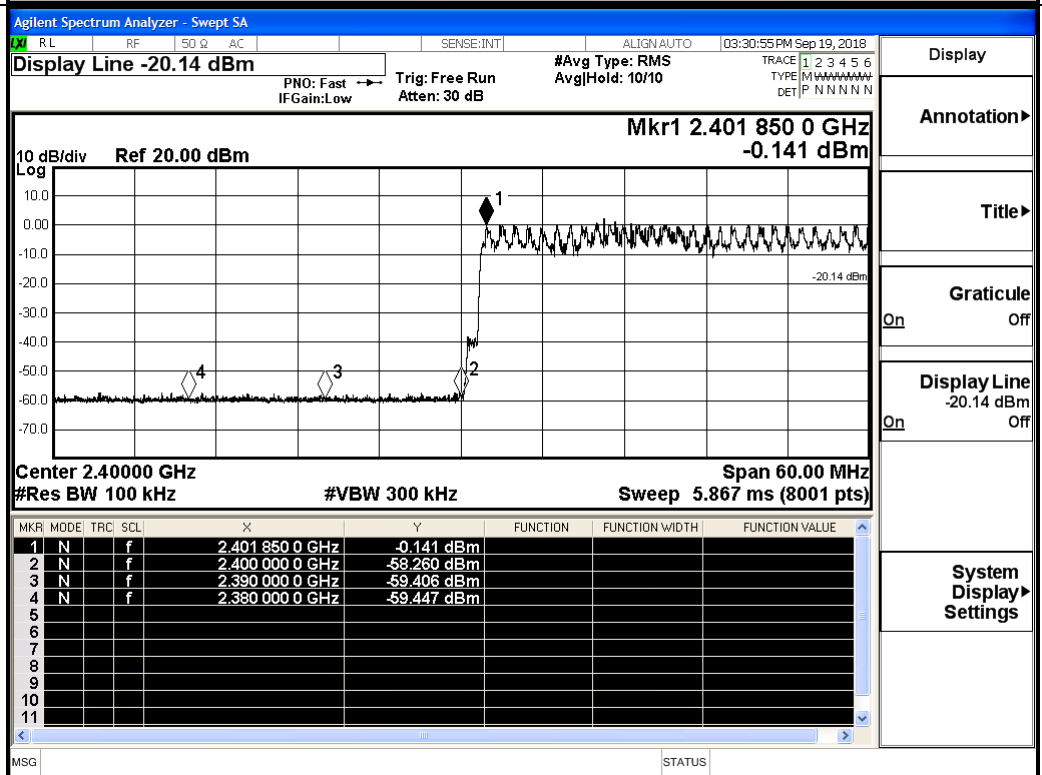
System Display
Settings ▶

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



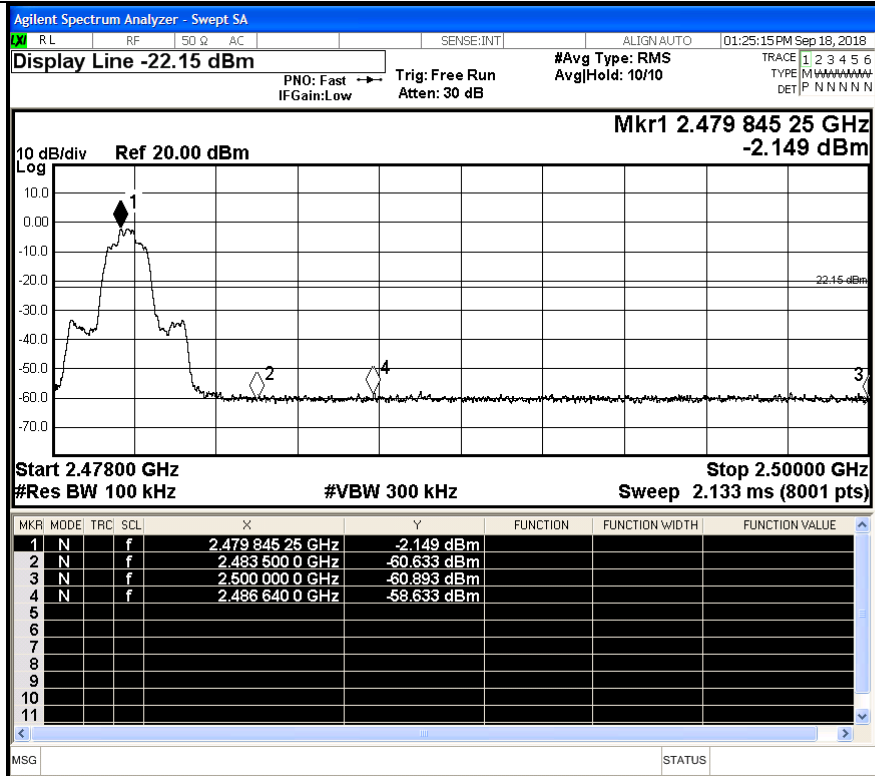
- Peak Search
- Next Peak
- Next Pk Right
- Next Pk Left
- Marker Delta
- Mkr→CF
- Mkr→Ref Lvl
- More
1 of 2

$\pi/4$ DQPSK/LCH/Hop



- Display
- Annotation▶
- Title▶
- Graticule
On Off
- Display Line
On Off
- System
Display▶
Settings

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



Display

Annotation ▶

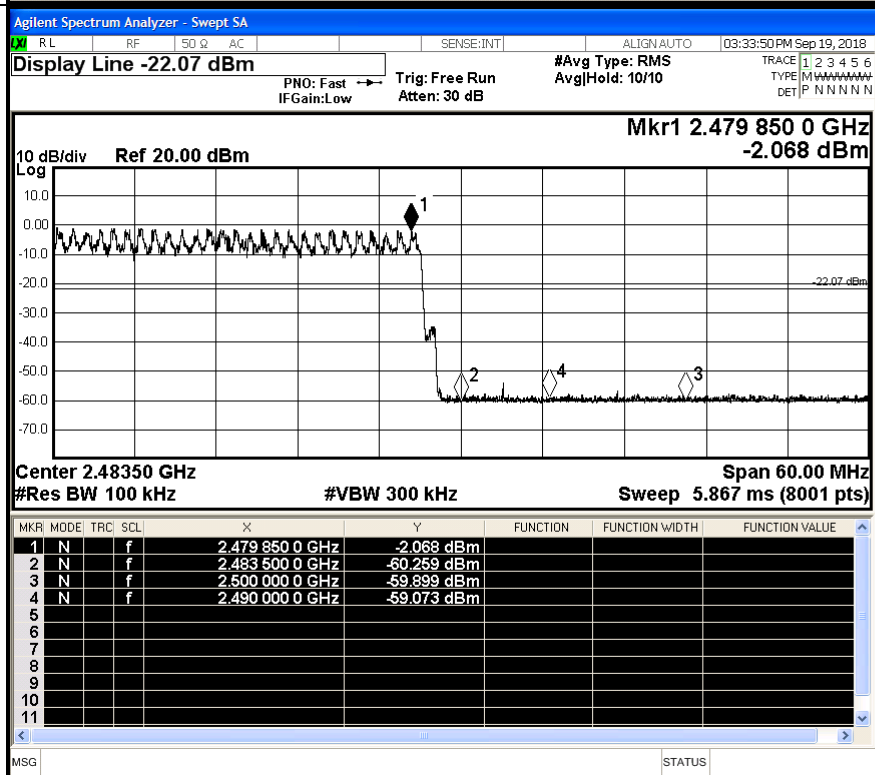
Title ▶

Graticule
On Off

Display Line
-22.15 dBm
On Off

System Display Settings ▶

$\pi/4$ DQPSK/HCH/Hop



Display

Annotation ▶

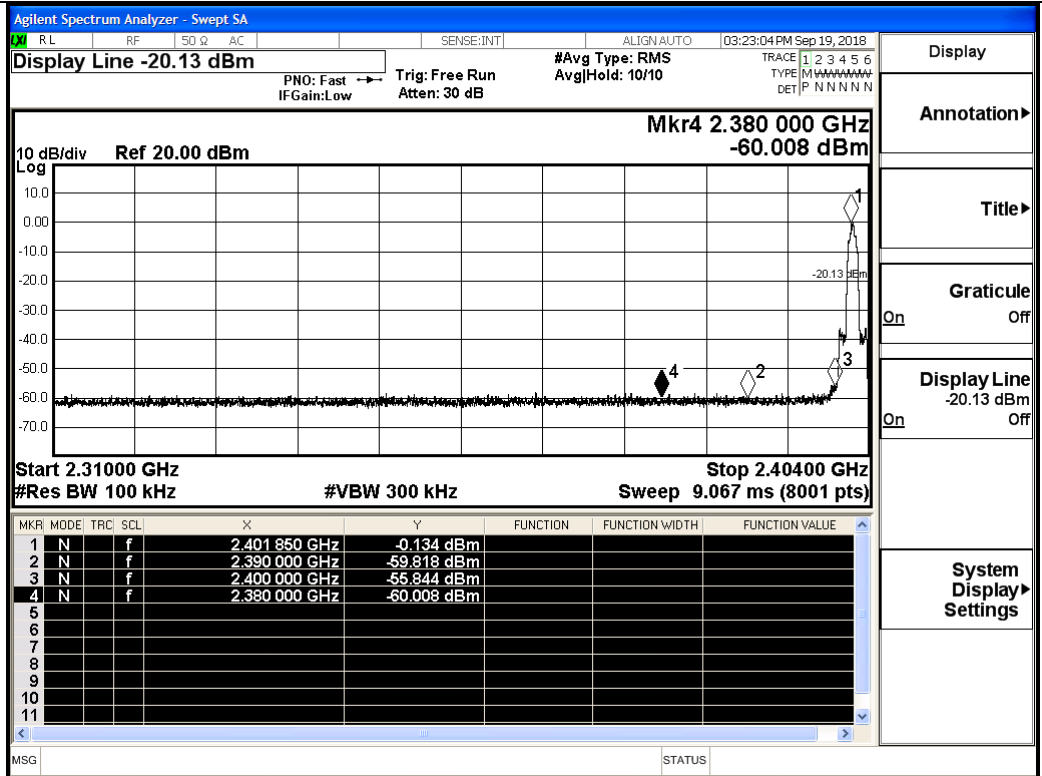
Title ▶

Graticule
On Off

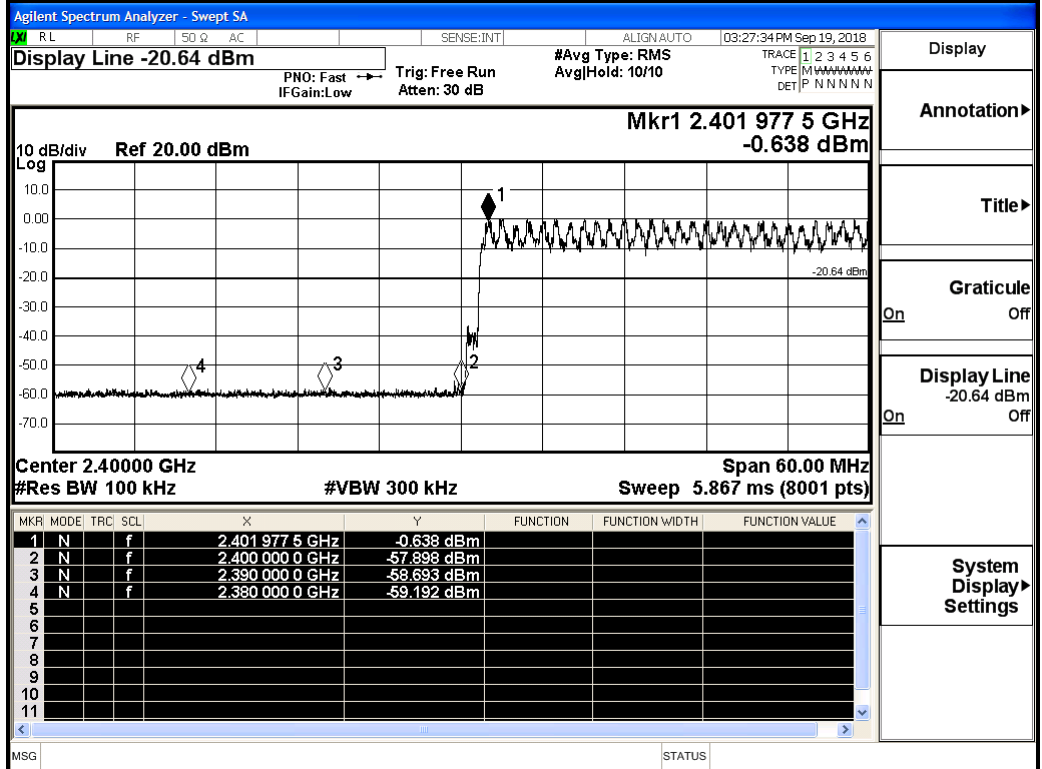
Display Line
-22.07 dBm
On Off

System Display Settings ▶

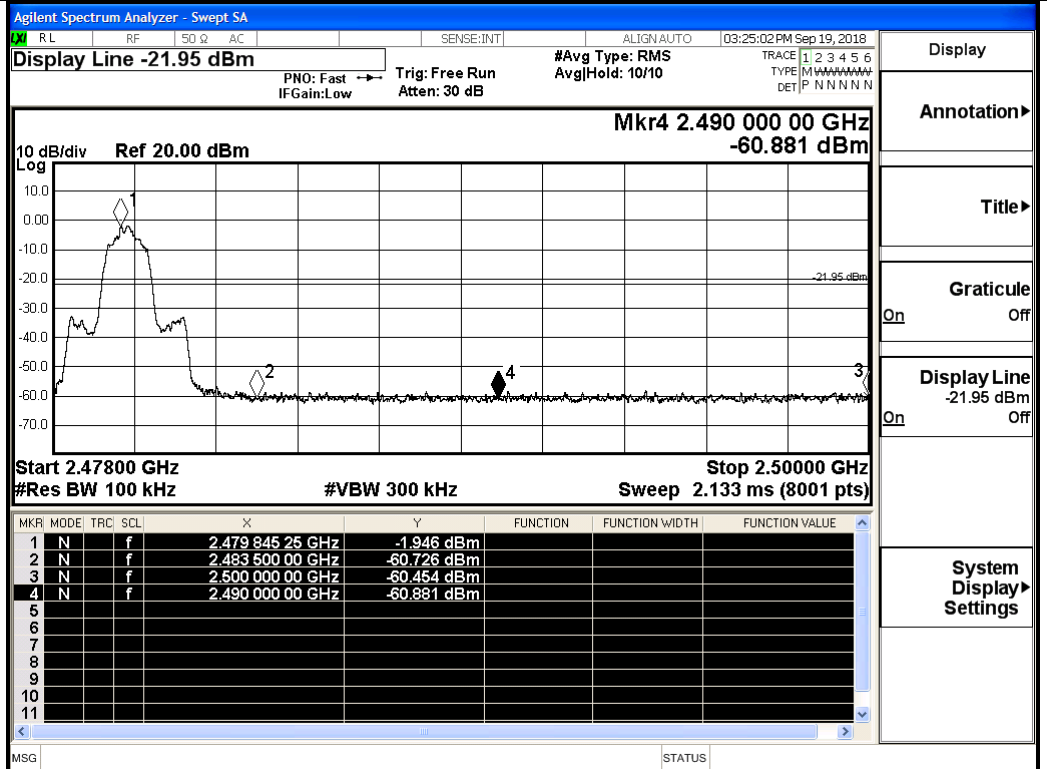
8DPSK/LCH/No Hop



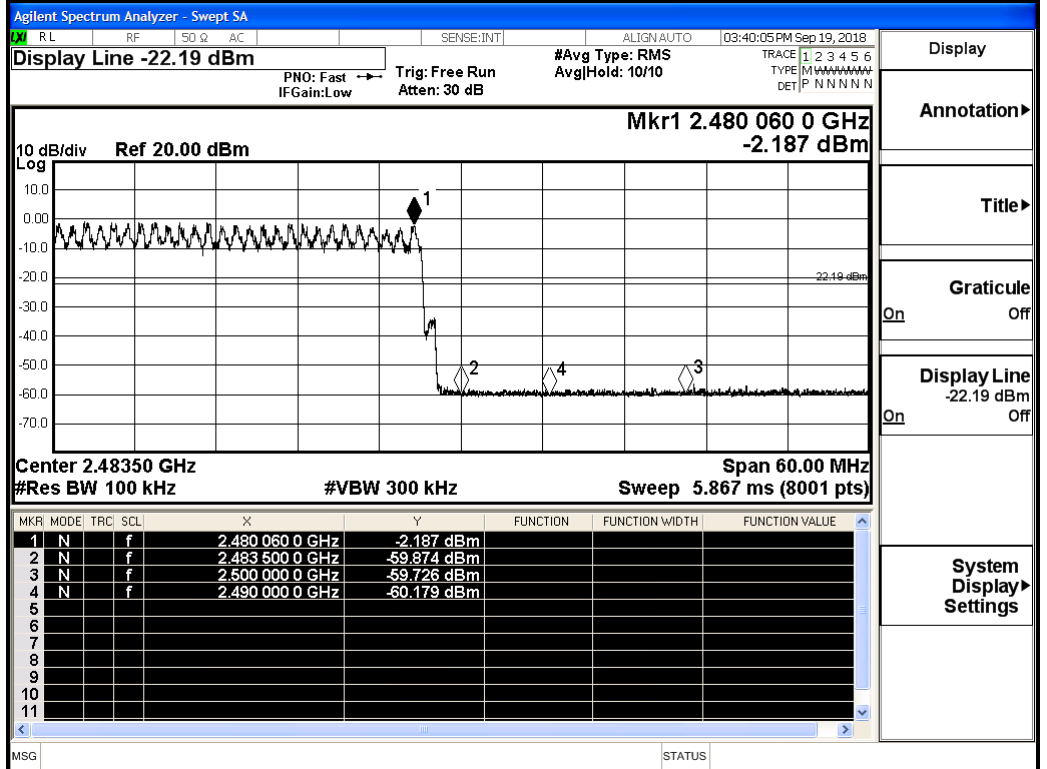
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



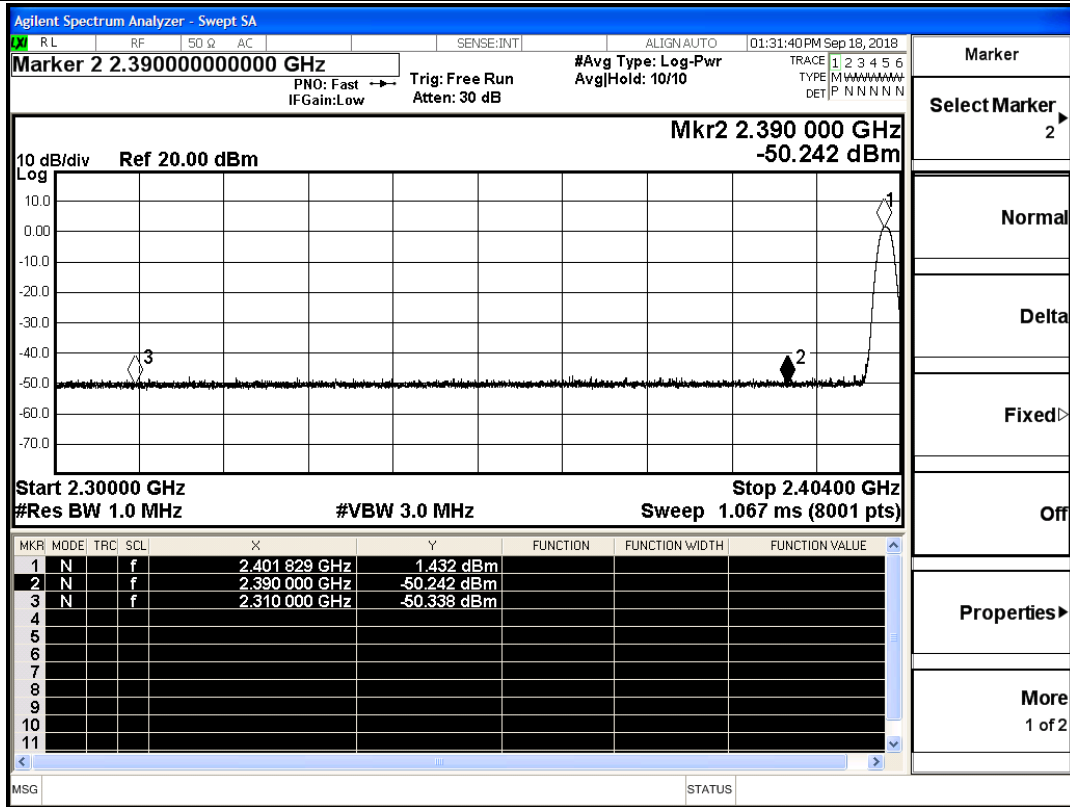
8DPSK/HCH/Hop



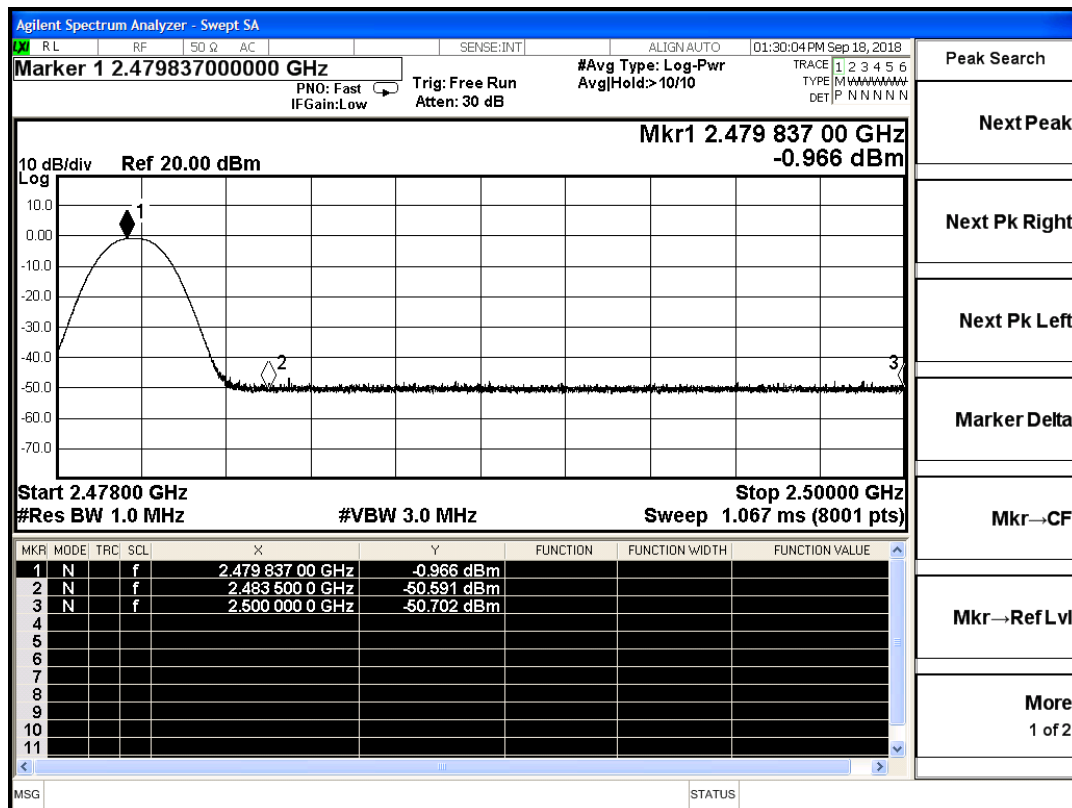
A.8 Restrict-band band-edge measurements

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
$\pi/4$ DQPSK	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

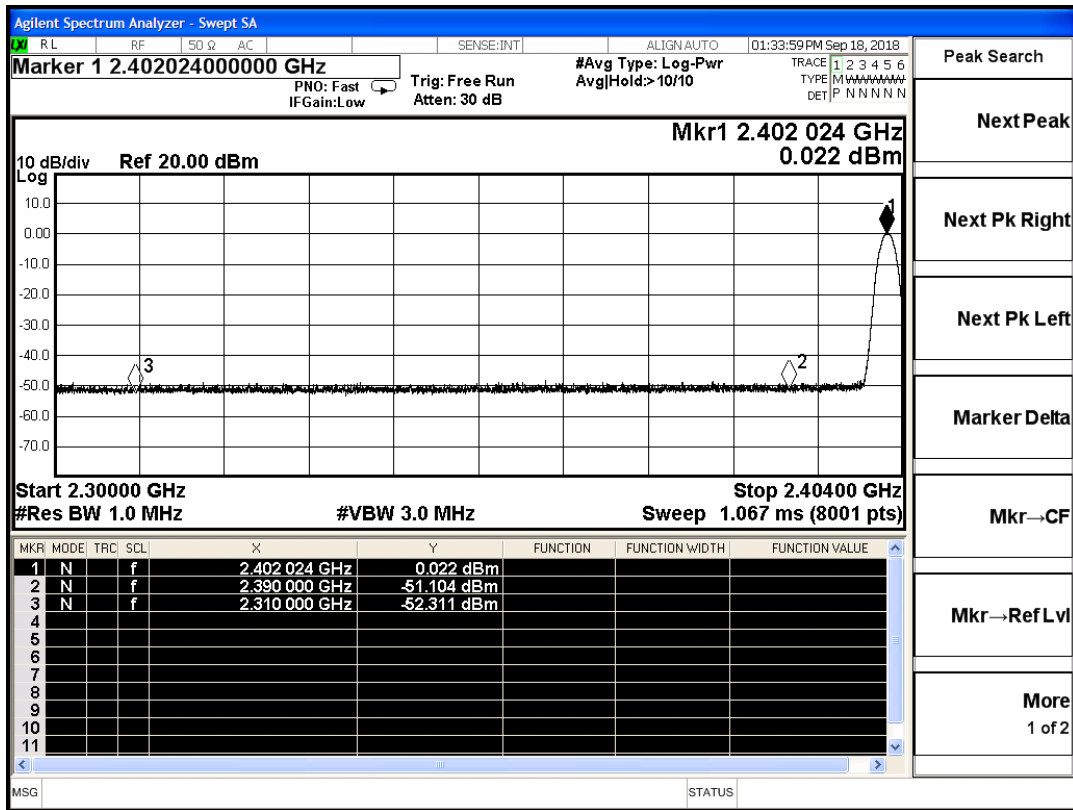
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



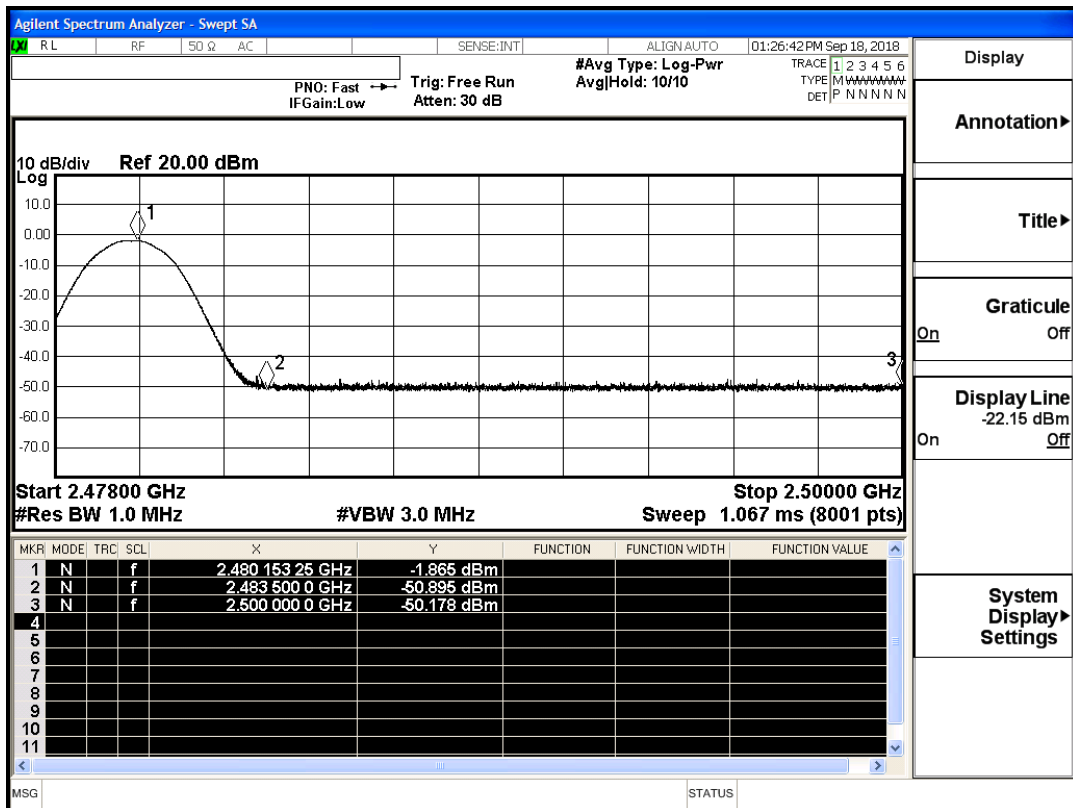
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



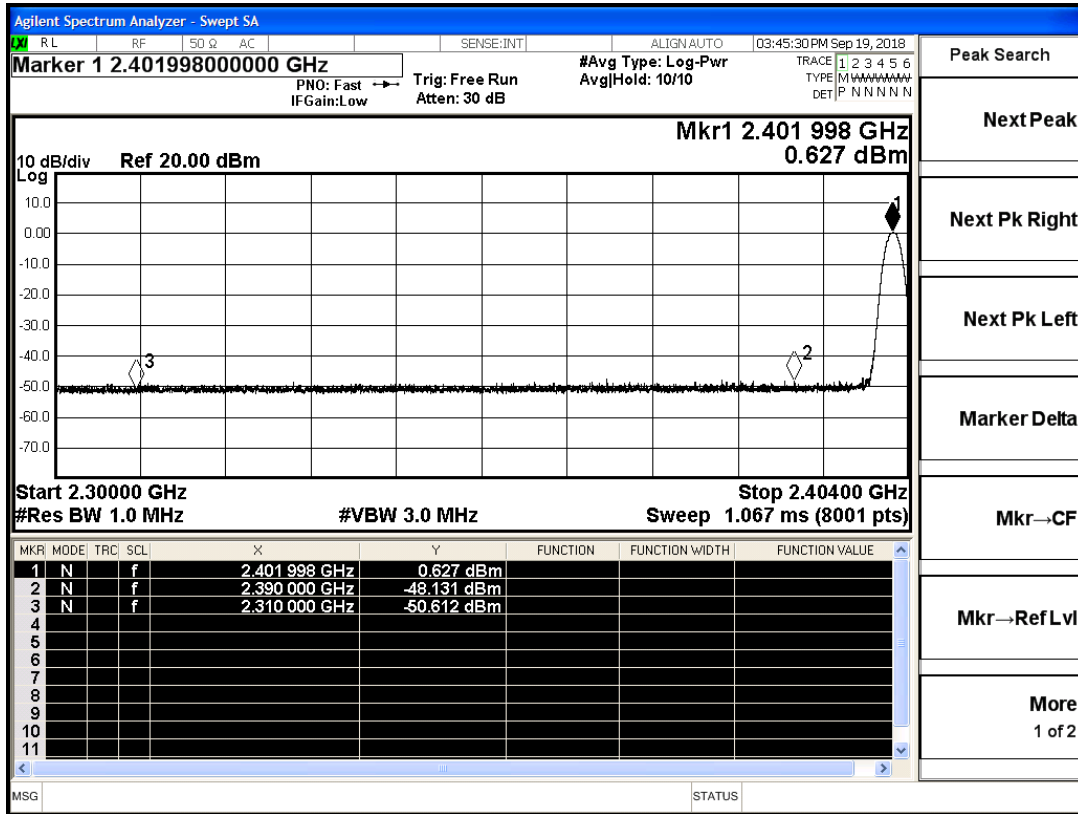
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



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



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



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

