

Appendix A

RF Test Data for BT V4.1(BDR/EDR) (Conducted Measurement)

Product Name: Bluetooth Headset

Trade Mark: MacaW

Test Model: TX80

FCC ID: 2AOYE-TX80

A.1 20 dB Bandwidth

Test Mode	Test Channel	EBW[MHz]	Limit[MHz]	Verdict
GFSK	2402	1.019	---	PASS
	2441	0.9704	---	PASS
	2480	0.9674	---	PASS
$\pi/4$ -DQPSK	2402	1.287	---	PASS
	2441	1.286	---	PASS
	2480	1.286	---	PASS
8-DPSK	2402	1.291	---	PASS
	2441	1.291	---	PASS
	2480	1.290	---	PASS

20 dB Bandwidth_GFSK_2402

Agilent Spectrum Analyzer - Occupied BW

Center Freq 2.40200000 GHz Center Freq: 2.402000000 GHz Radio Std: None
 Trig: Free Run Avg/Hold: 1/1
 #IFGain:Low #Atten: 30 dB Radio Device: BTS

Ref Offset 8.01 dB Mkr1 2.402164 GHz
 Ref 20.00 dBm 0.41348 dBm

Center 2.402 GHz Span 2 MHz
 #Res BW 30 kHz #VBW 100 kHz Sweep 2.133 ms

Occupied Bandwidth	Total Power	10.1 dBm
890.24 kHz		
Transmit Freq Error	OBW Power	99.00 %
4.789 kHz		
x dB Bandwidth	x dB	-20.00 dB
1.019 MHz		

CF Step 200.000 kHz
 Auto Man
 Freq Offset 0 Hz

MSG STATUS

20 dB Bandwidth_GFSK_2441

Agilent Spectrum Analyzer - Occupied BW

Center Freq 2.44100000 GHz Center Freq: 2.441000000 GHz Radio Std: None
 Trig: Free Run Avg/Hold: 1/1
 #IFGain:Low #Atten: 30 dB Radio Device: BTS

Ref Offset 8.01 dB Mkr1 2.441162 GHz
 Ref 20.00 dBm 0.51014 dBm

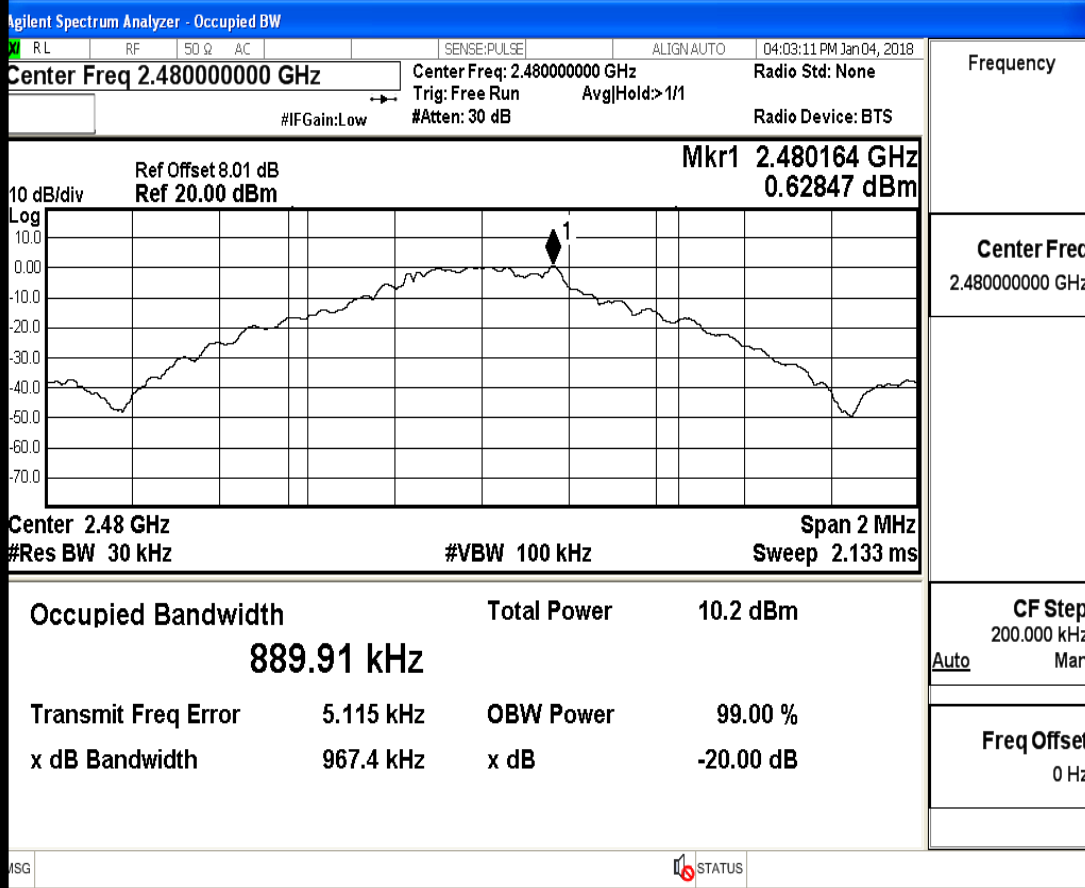
Center 2.441 GHz Span 2 MHz
 #Res BW 30 kHz #VBW 100 kHz Sweep 2.133 ms

Occupied Bandwidth	Total Power	10.2 dBm
888.81 kHz		
Transmit Freq Error	OBW Power	99.00 %
5.550 kHz		
x dB Bandwidth	x dB	-20.00 dB
970.4 kHz		

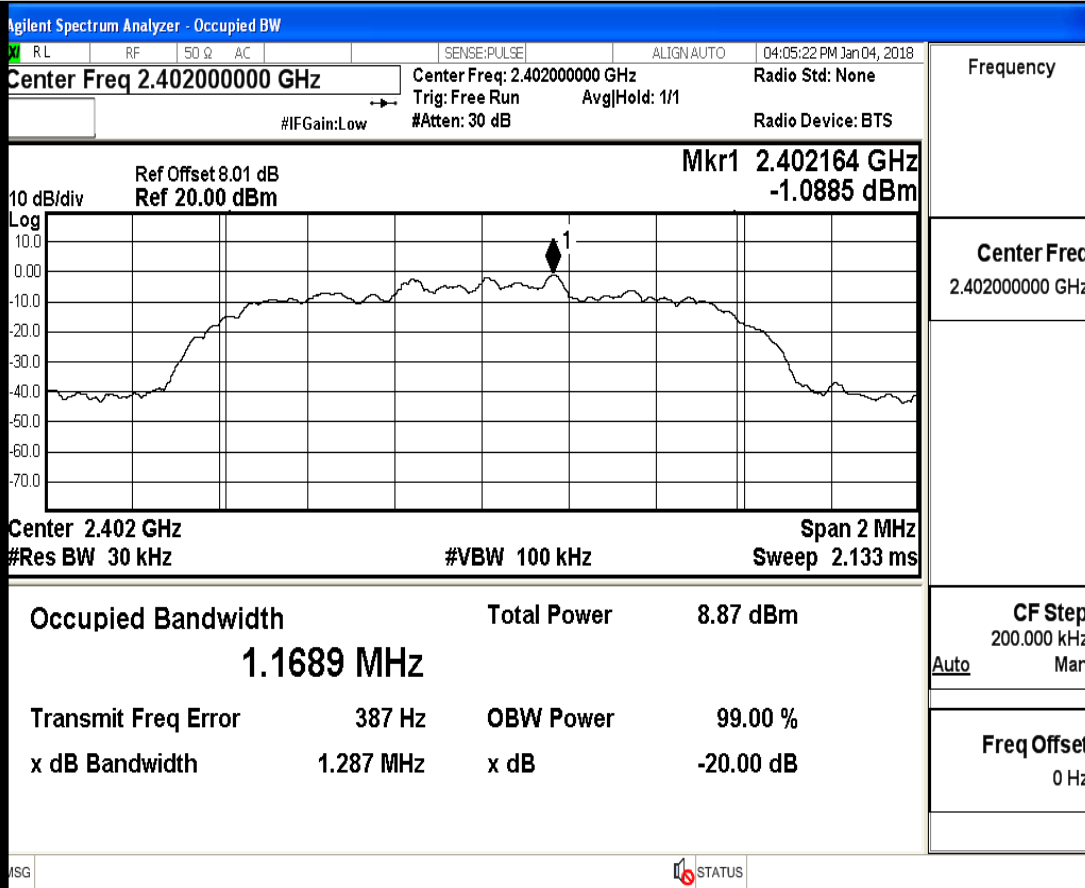
CF Step 200.000 kHz
 Auto Man
 Freq Offset 0 Hz

MSG STATUS

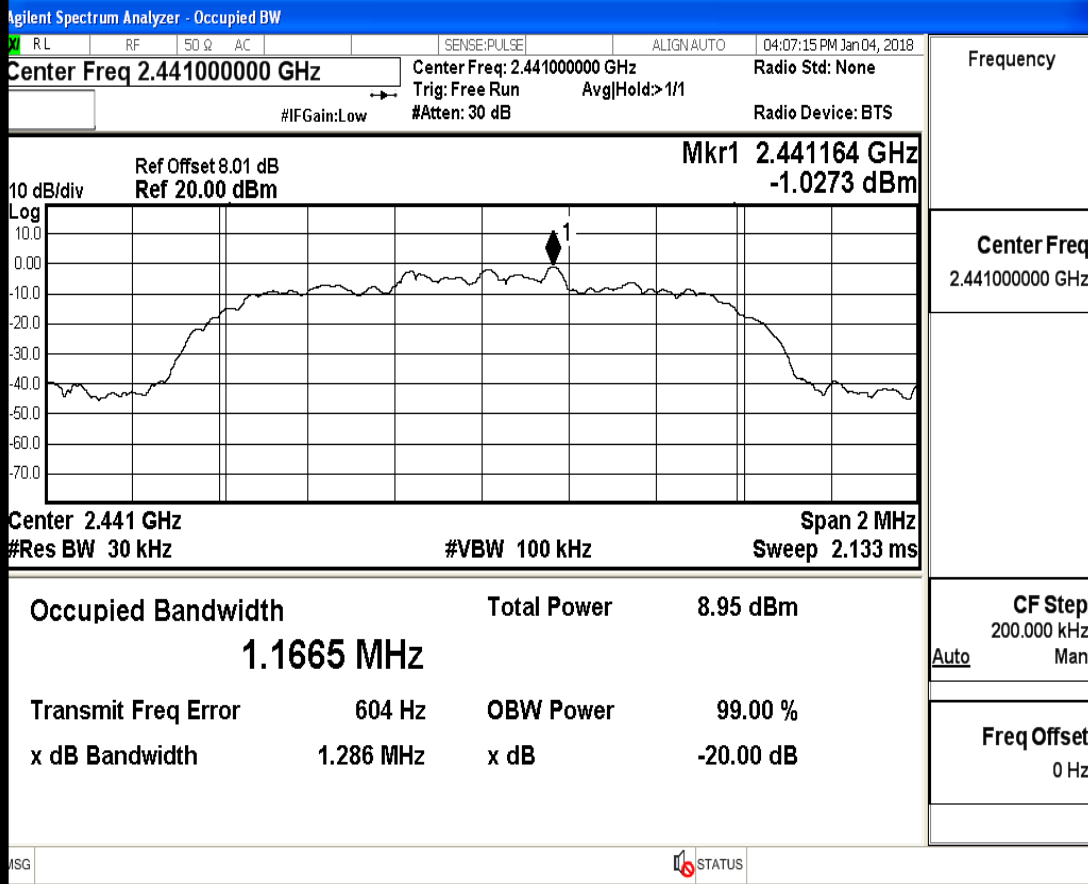
20 dB Bandwidth_GFSK_2480



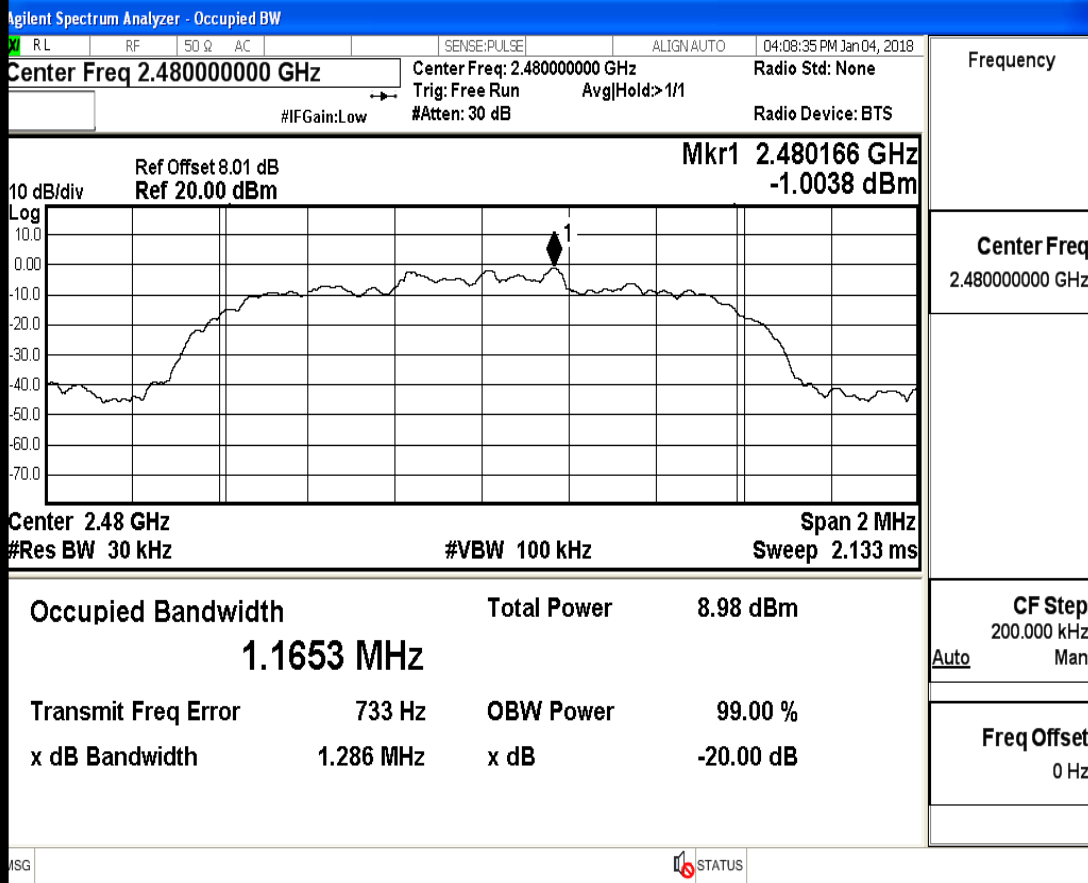
20 dB Bandwidth_π/4-DQPSK_2402



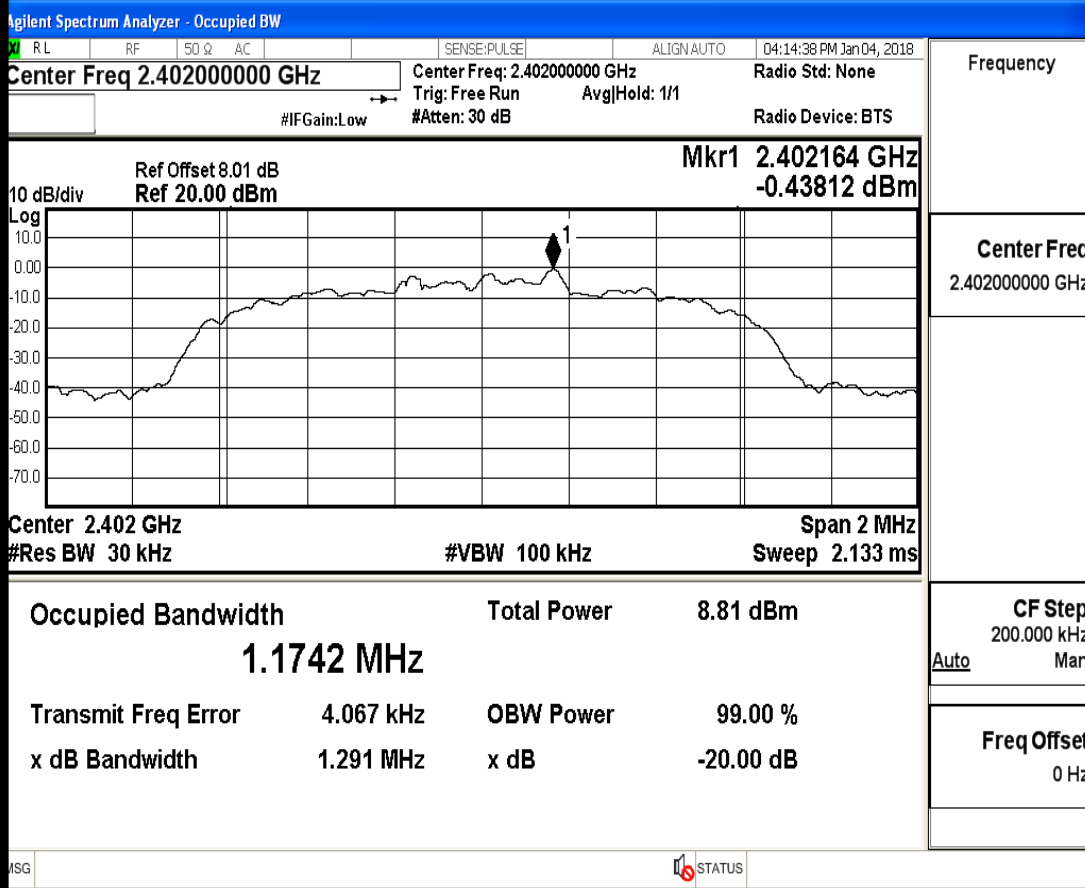
20 dB Bandwidth_π/4-DQPSK_2441



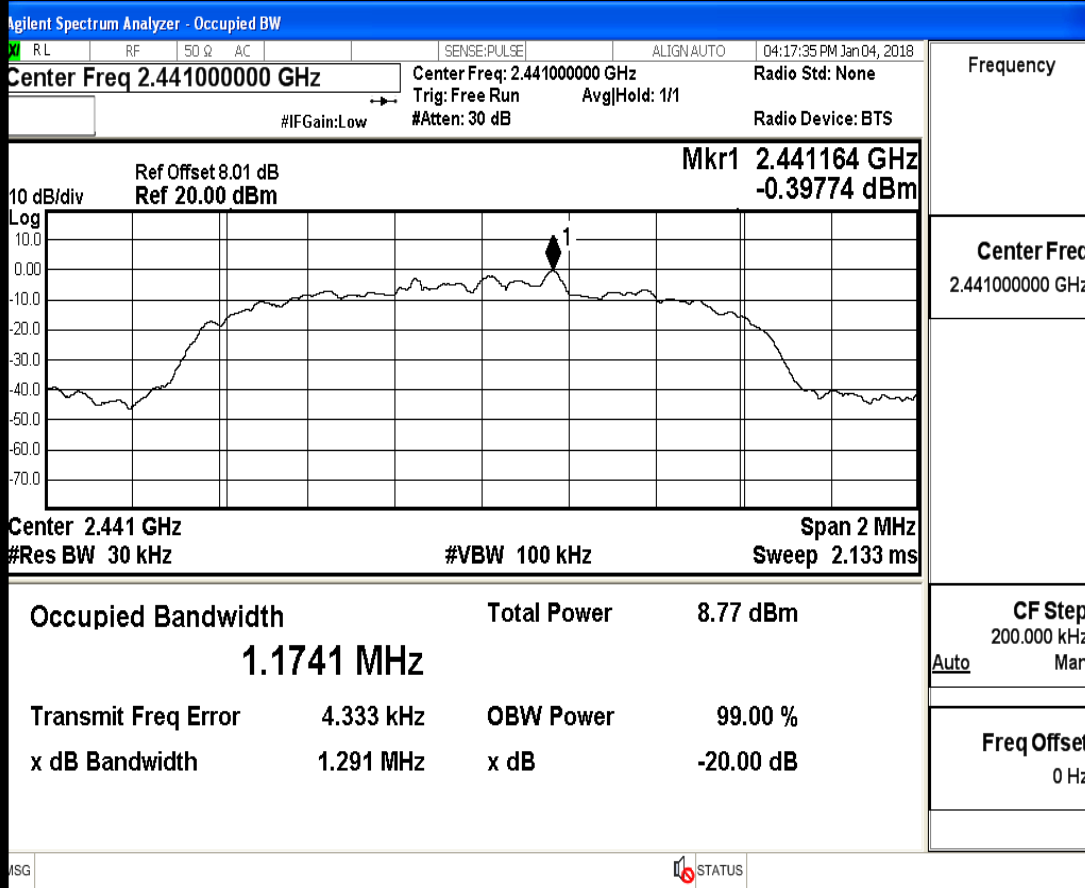
20 dB Bandwidth_π/4-DQPSK_2480



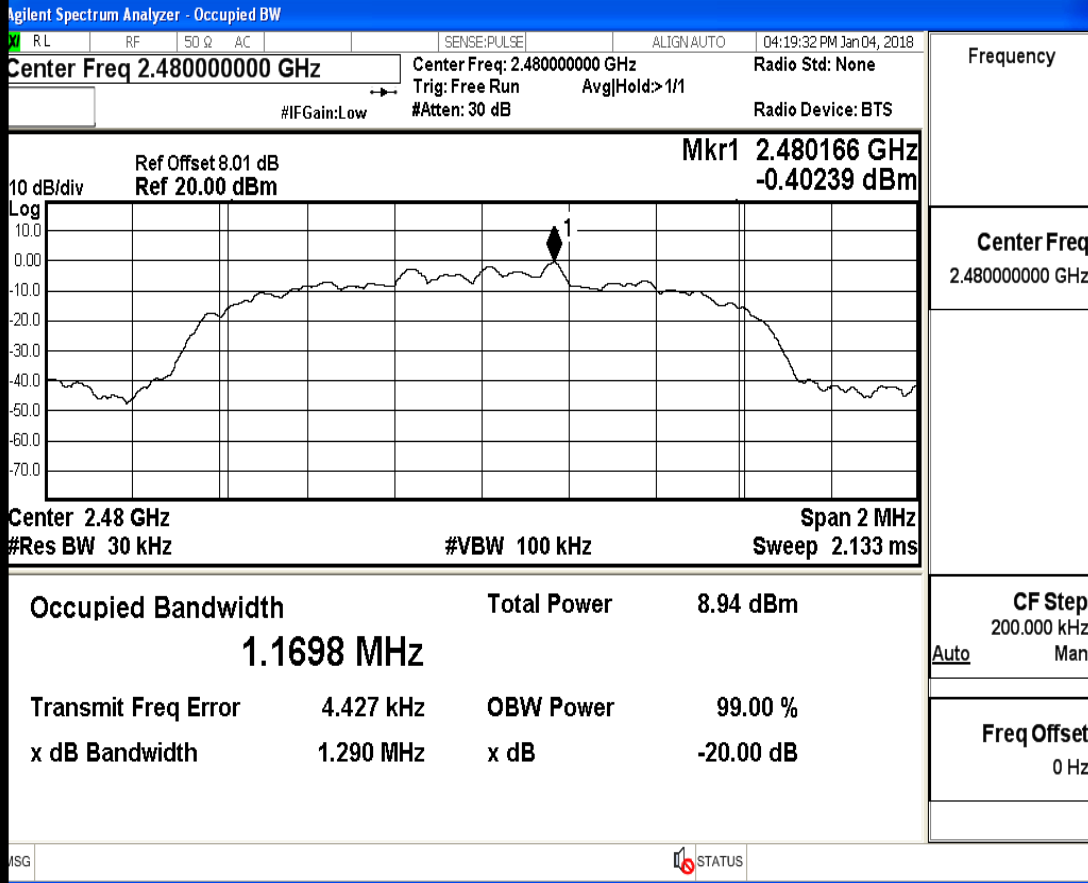
20 dB Bandwidth_8-DPSK_2402



20 dB Bandwidth_8-DPSK_2441



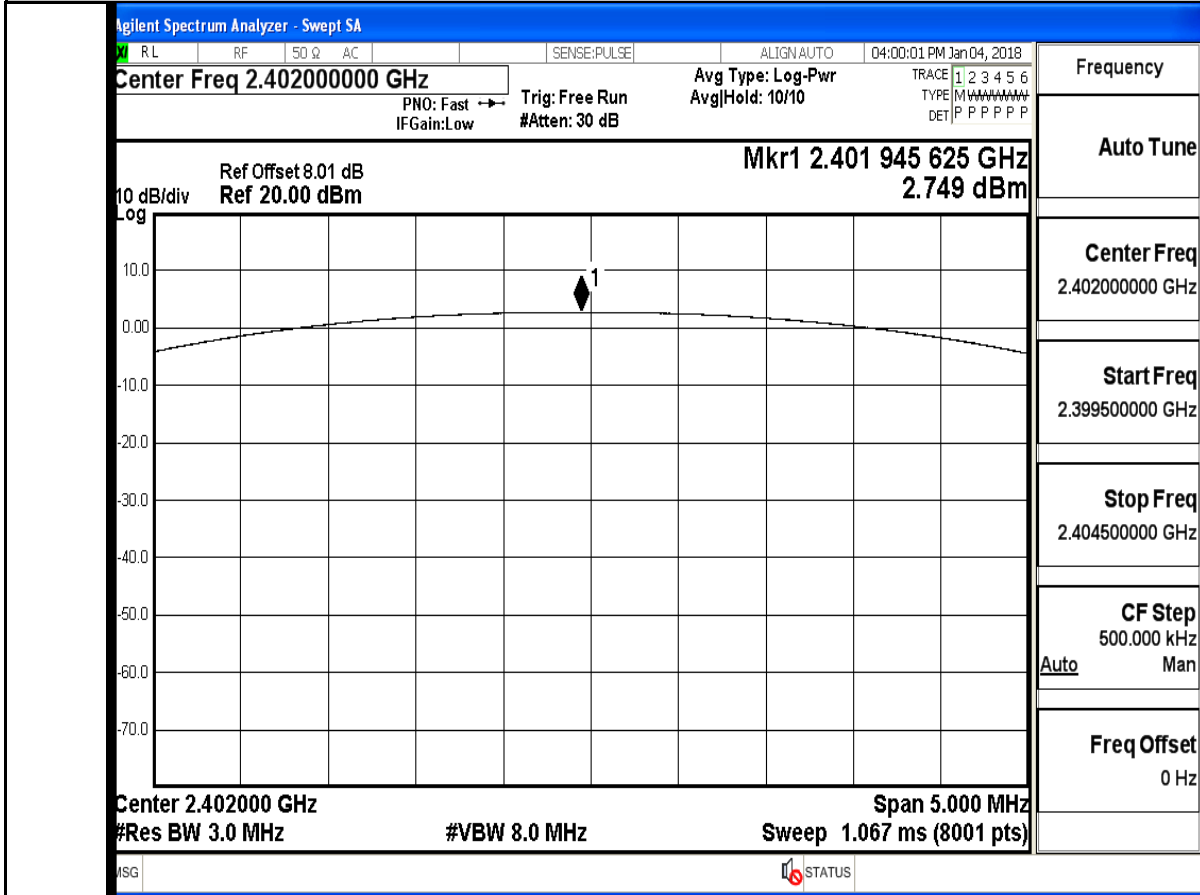
20 dB Bandwidth_8-DPSK_2480



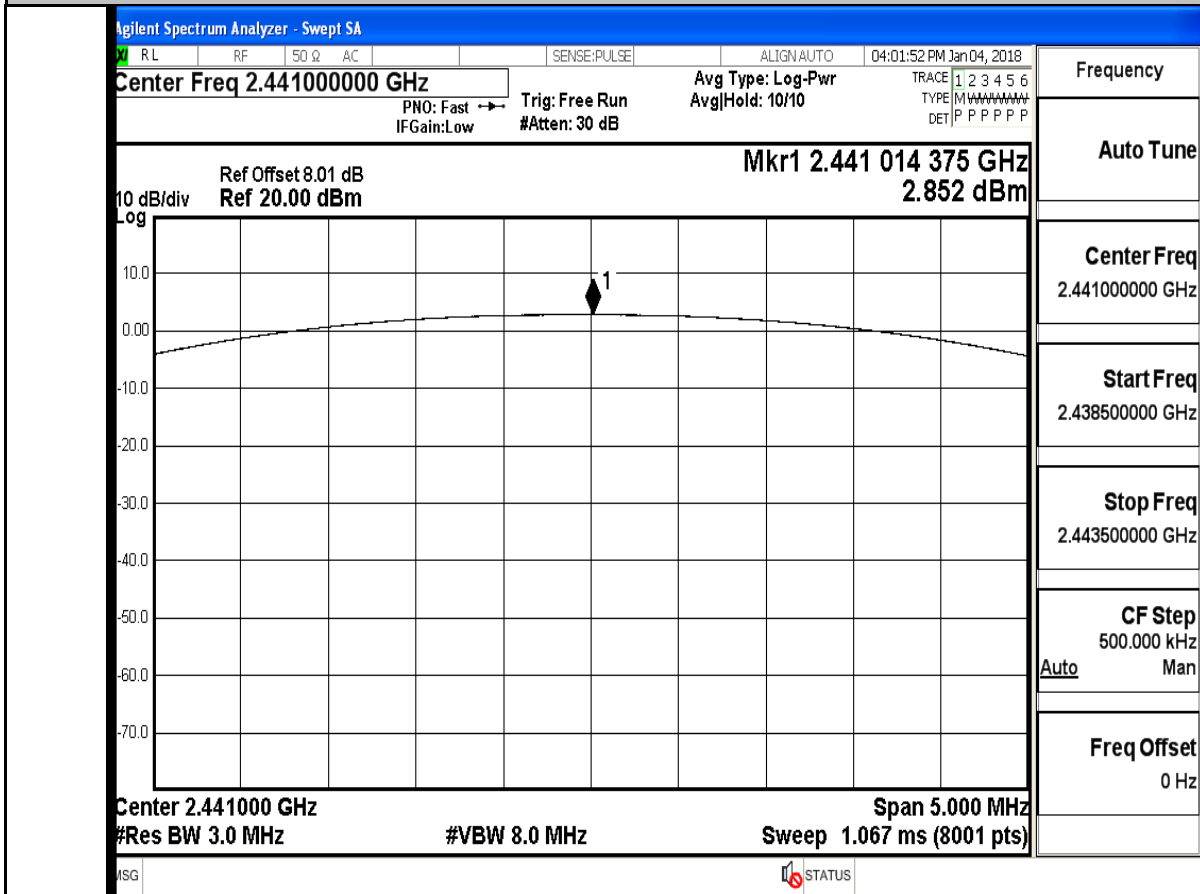
A.2 Conducted Peak Output Power

Test Mode	Test Channel	Power[dBm]	Limit[dBm]	Verdict
GFSK	2402	2.749	30	PASS
	2441	2.852	30	PASS
	2480	2.962	30	PASS
$\pi/4$ -DQPSK	2402	2.581	21	PASS
	2441	2.675	21	PASS
	2480	2.748	21	PASS
8-DPSK	2402	2.757	21	PASS
	2441	2.883	21	PASS
	2480	2.964	21	PASS

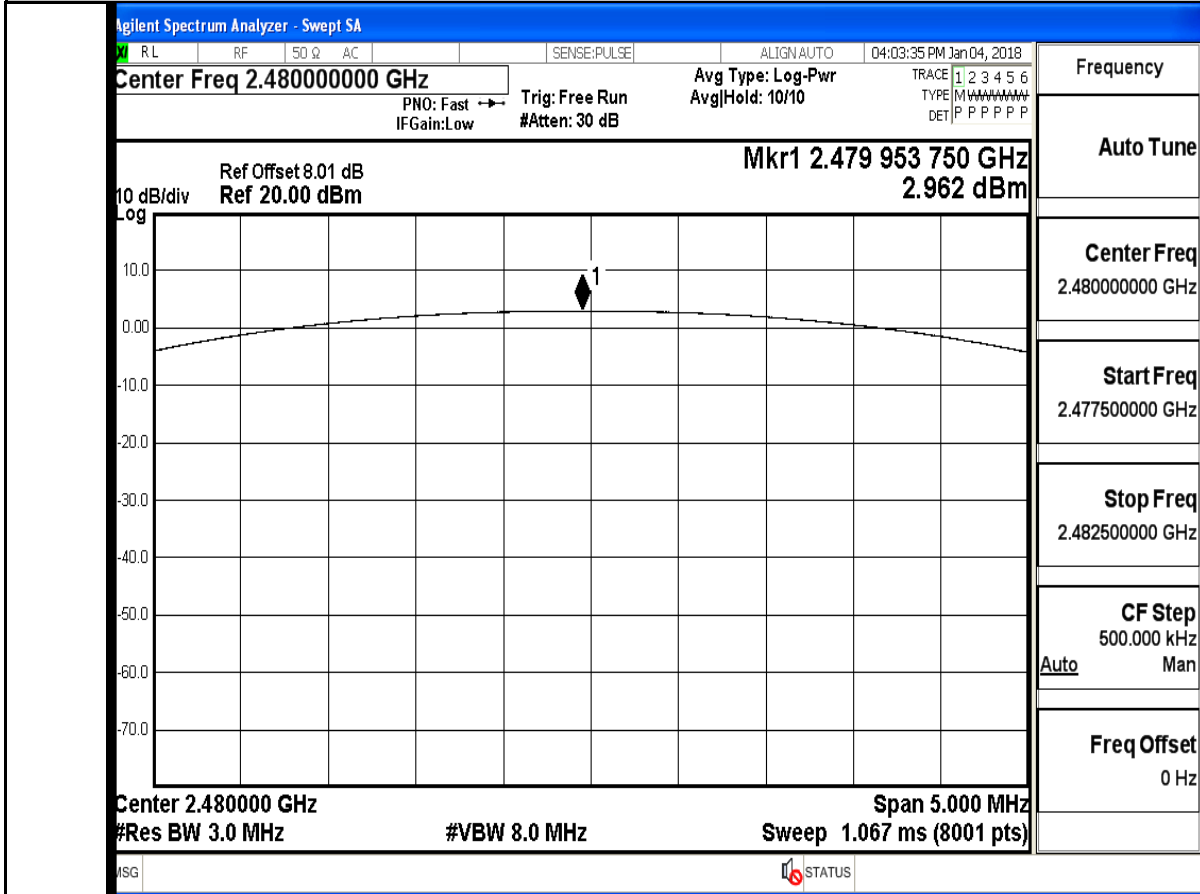
Conducted Peak Output Power_GFSK_2402



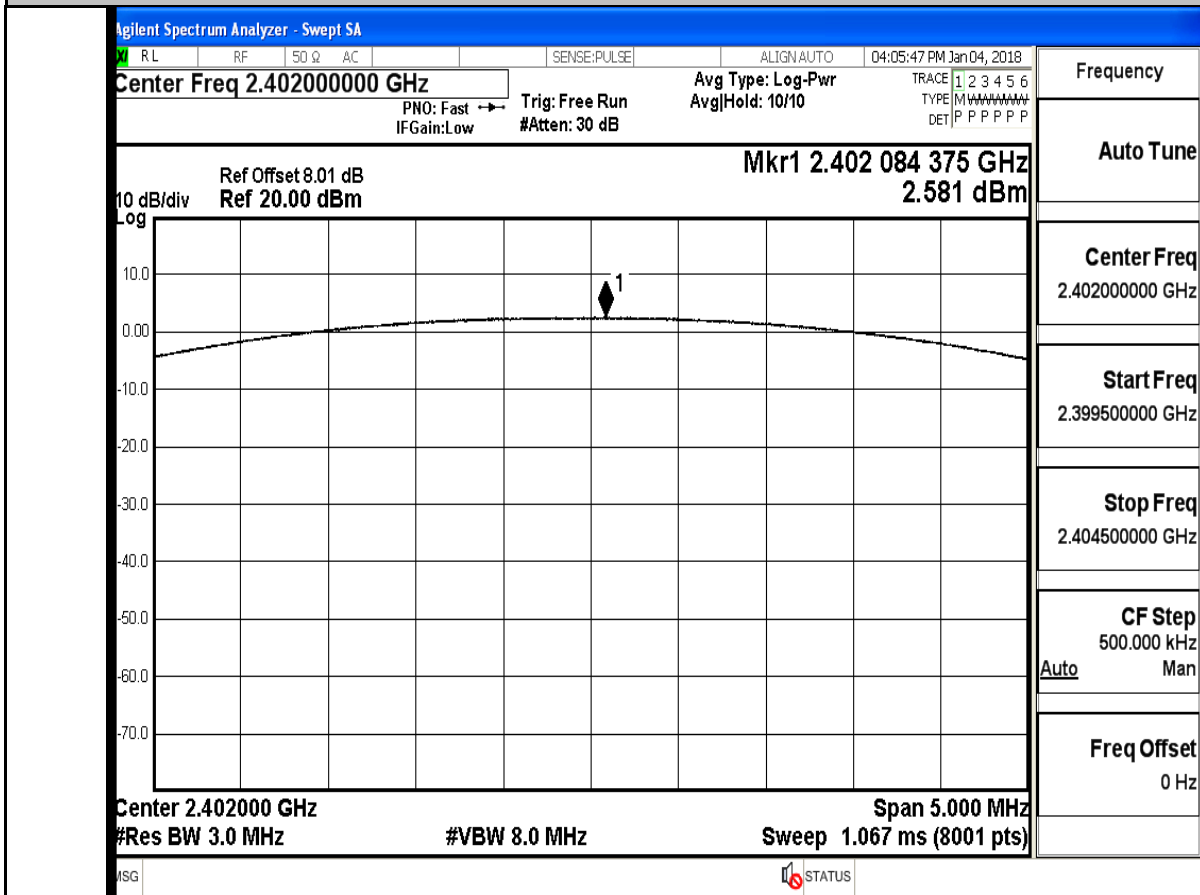
Conducted Peak Output Power_GFSK_2441



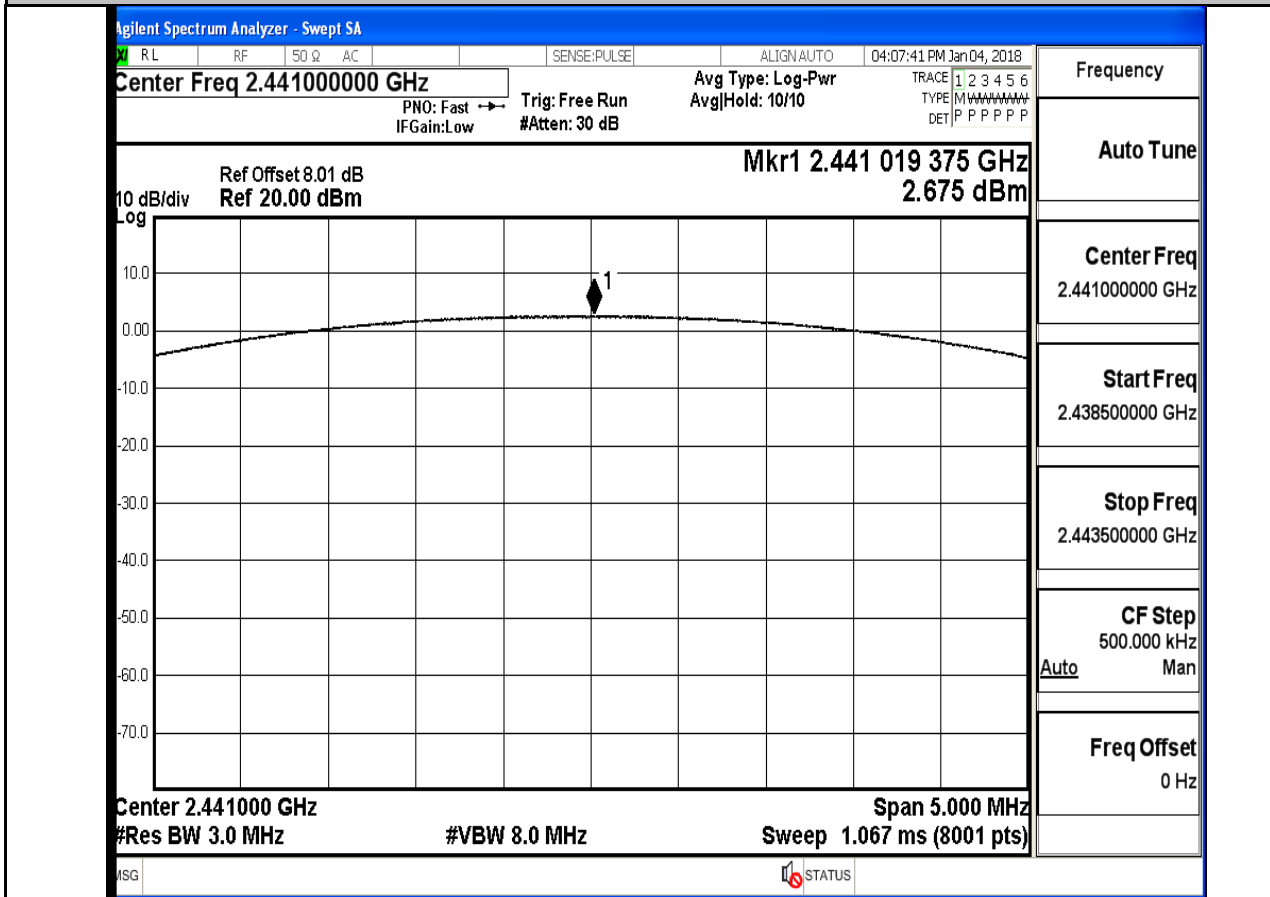
Conducted Peak Output Power_GFSK_2480



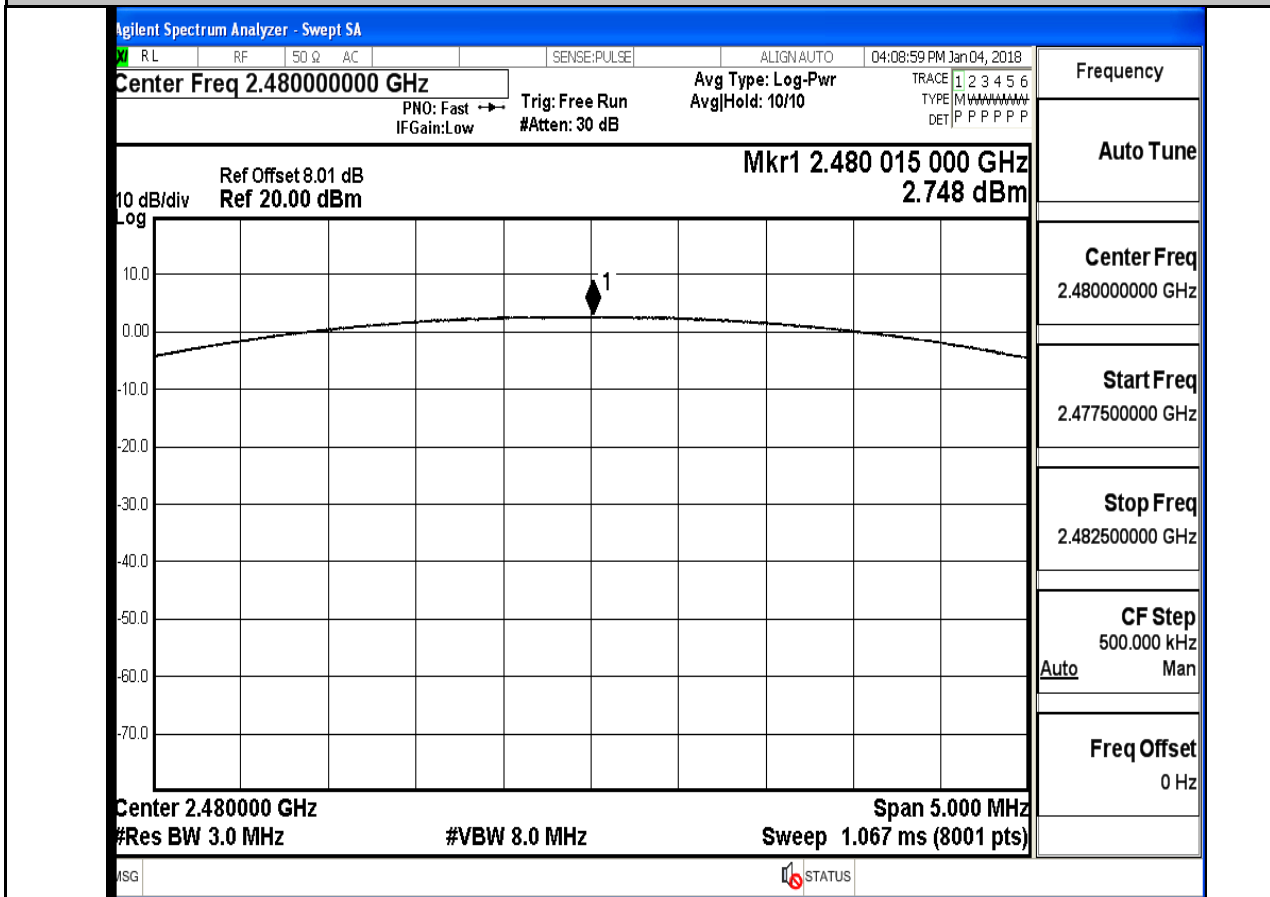
Conducted Peak Output Power_π/4-DQPSK_2402



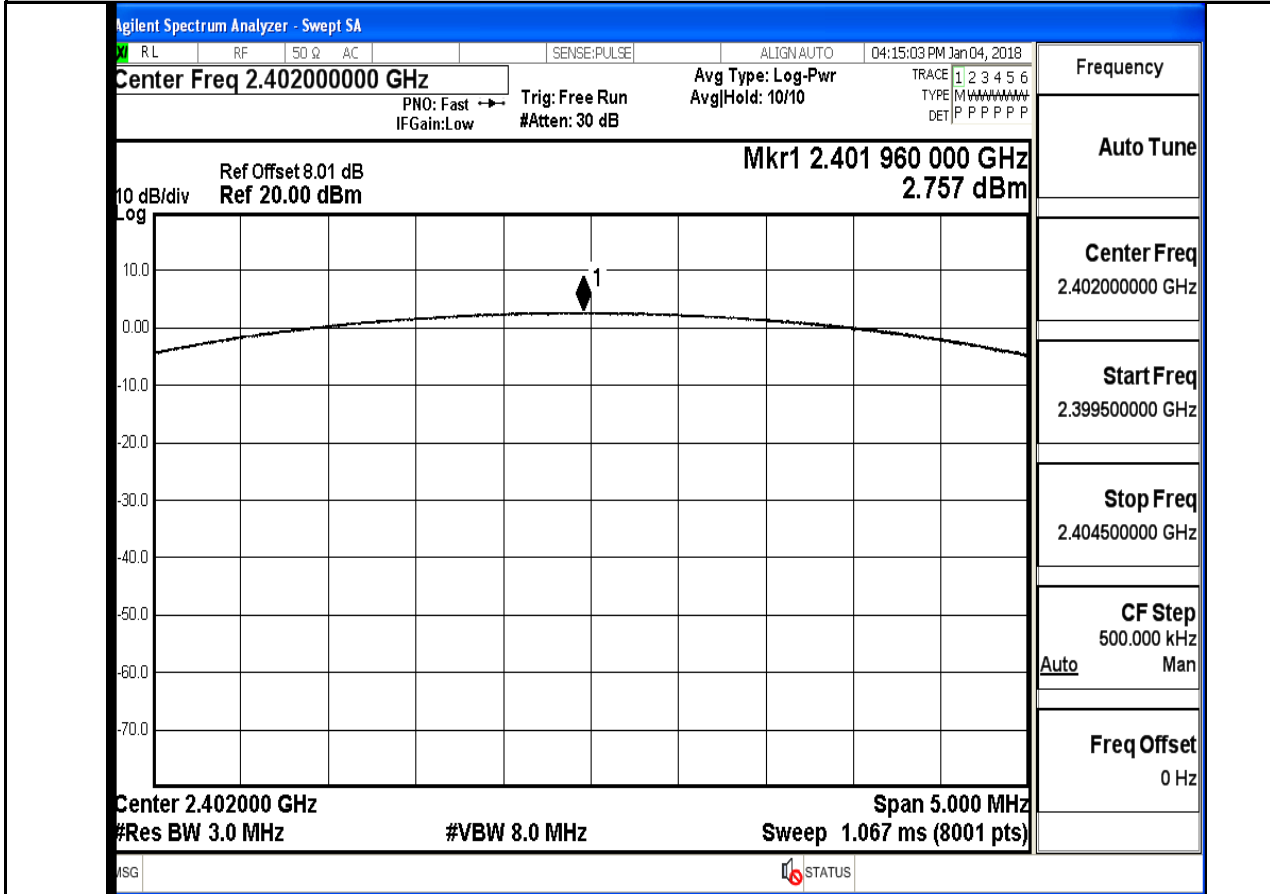
Conducted Peak Output Power $\pi/4$ -DQPSK_2441



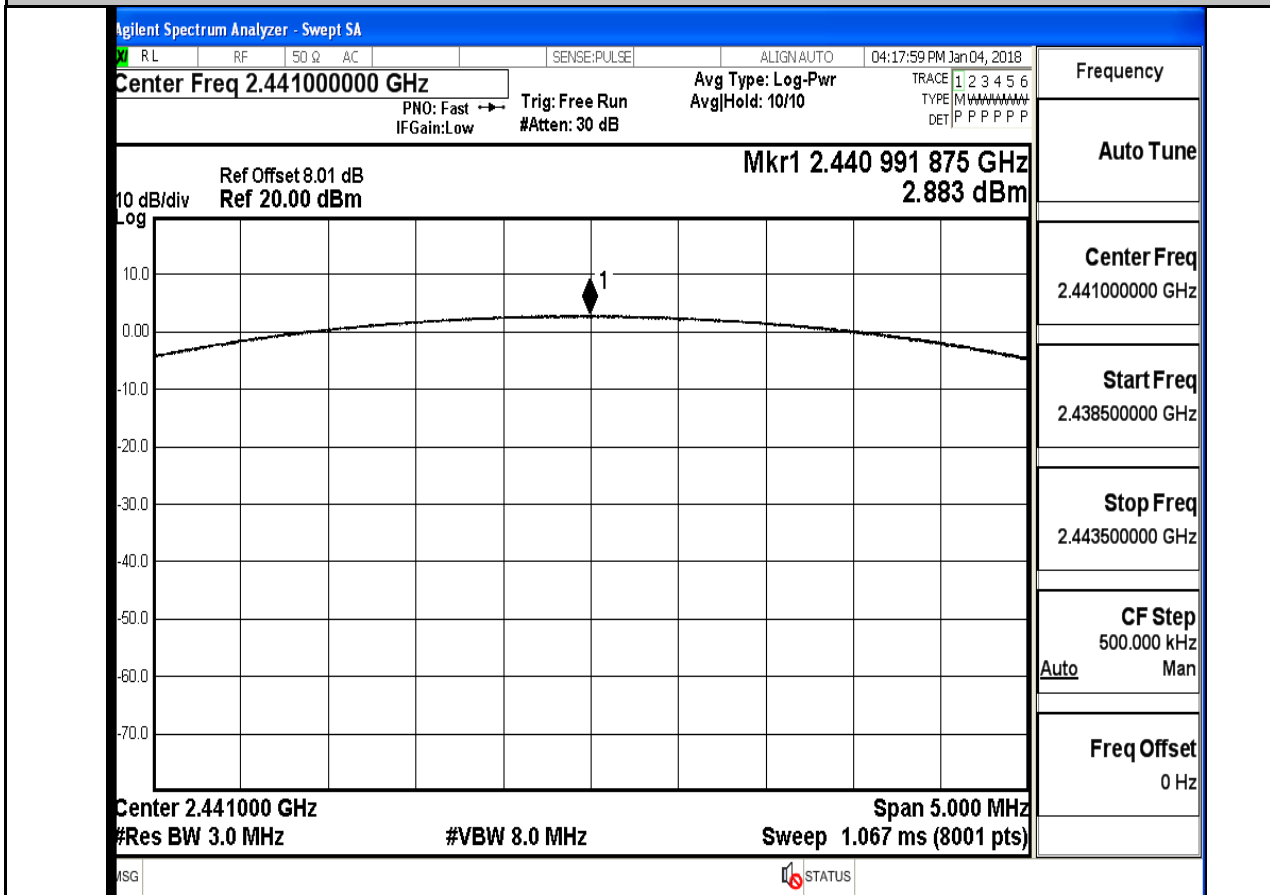
Conducted Peak Output Power $\pi/4$ -DQPSK_2480



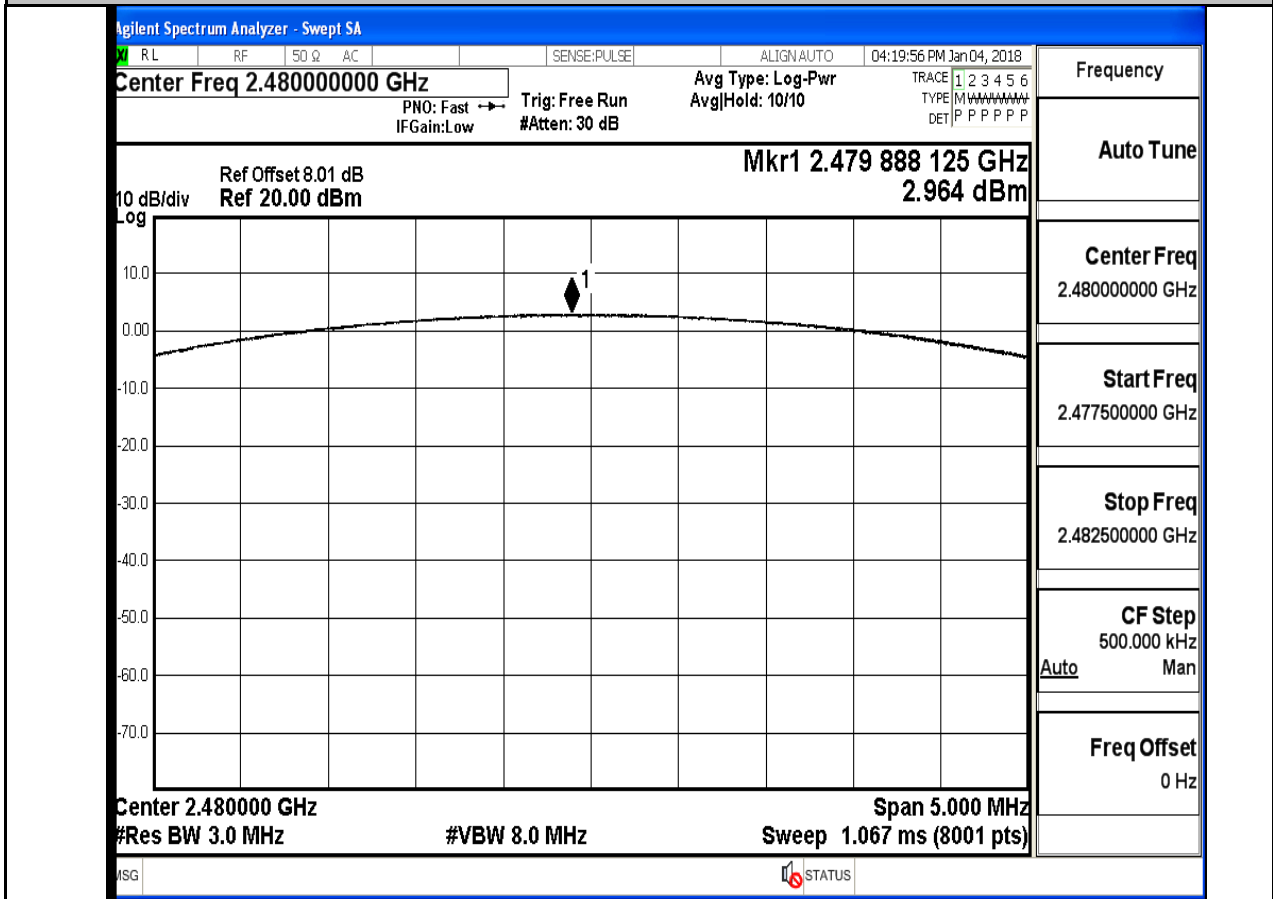
Conducted Peak Output Power_8-DPSK_2402



Conducted Peak Output Power_8-DPSK_2441



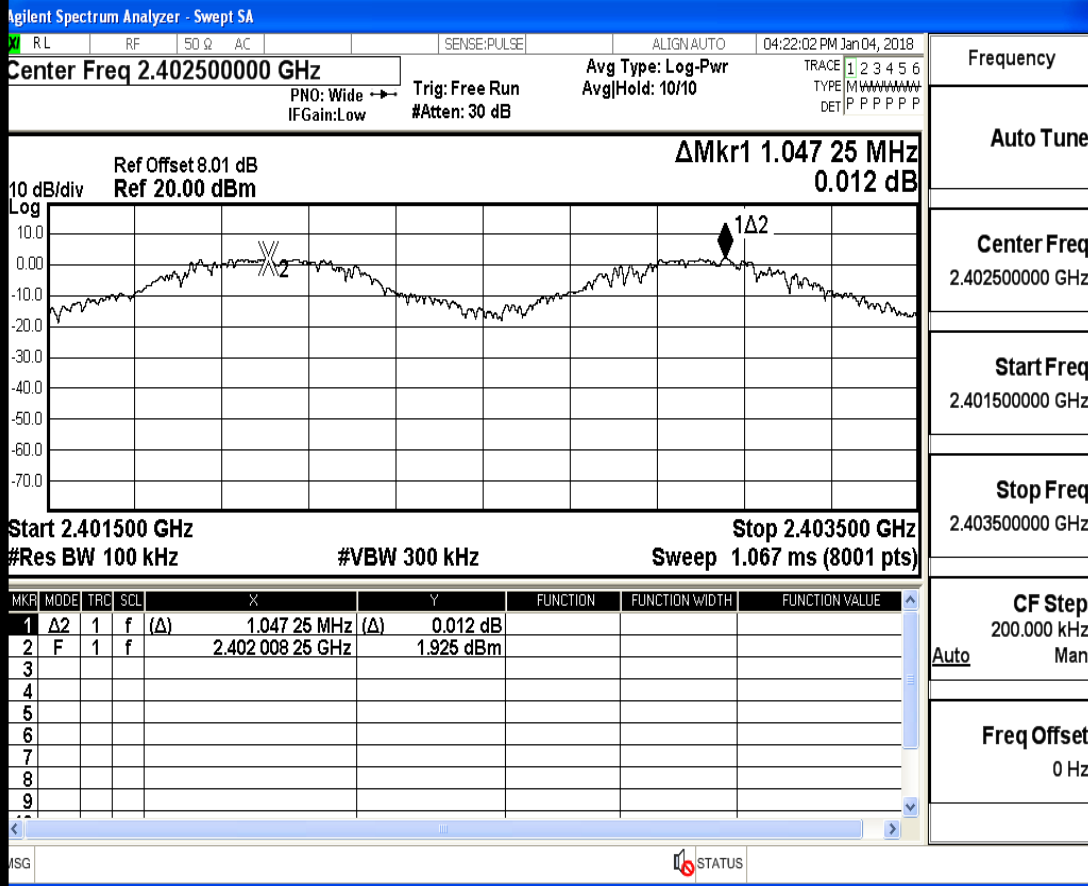
Conducted Peak Output Power_8-DPSK_2480



A.3 Carrier Frequency Separation

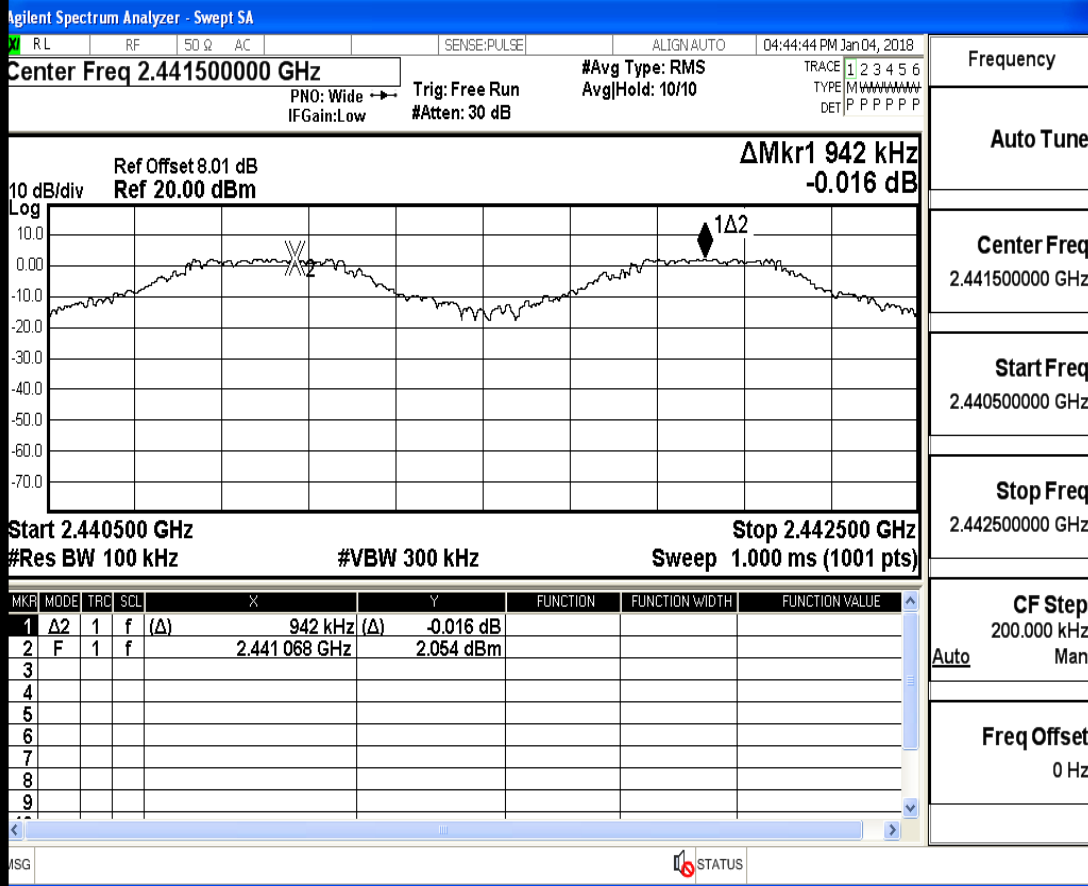
Test Mode	Test Channel	Result[MHz]	Limit[MHz]	Verdict
GFSK	2402	1.047	1.019	PASS
	2441	0.942	0.6469	PASS
	2480	1.094	0.9674	PASS
$\pi/4$ -DQPSK	2402	0.934	0.86	PASS
	2441	1.176	0.86	PASS
	2480	0.89	0.86	PASS
8-DPSK	2402	0.986	0.86	PASS
	2441	0.962	0.86	PASS
	2480	1.008	0.86	PASS

Carrier Frequency Separation_GFSK_2402



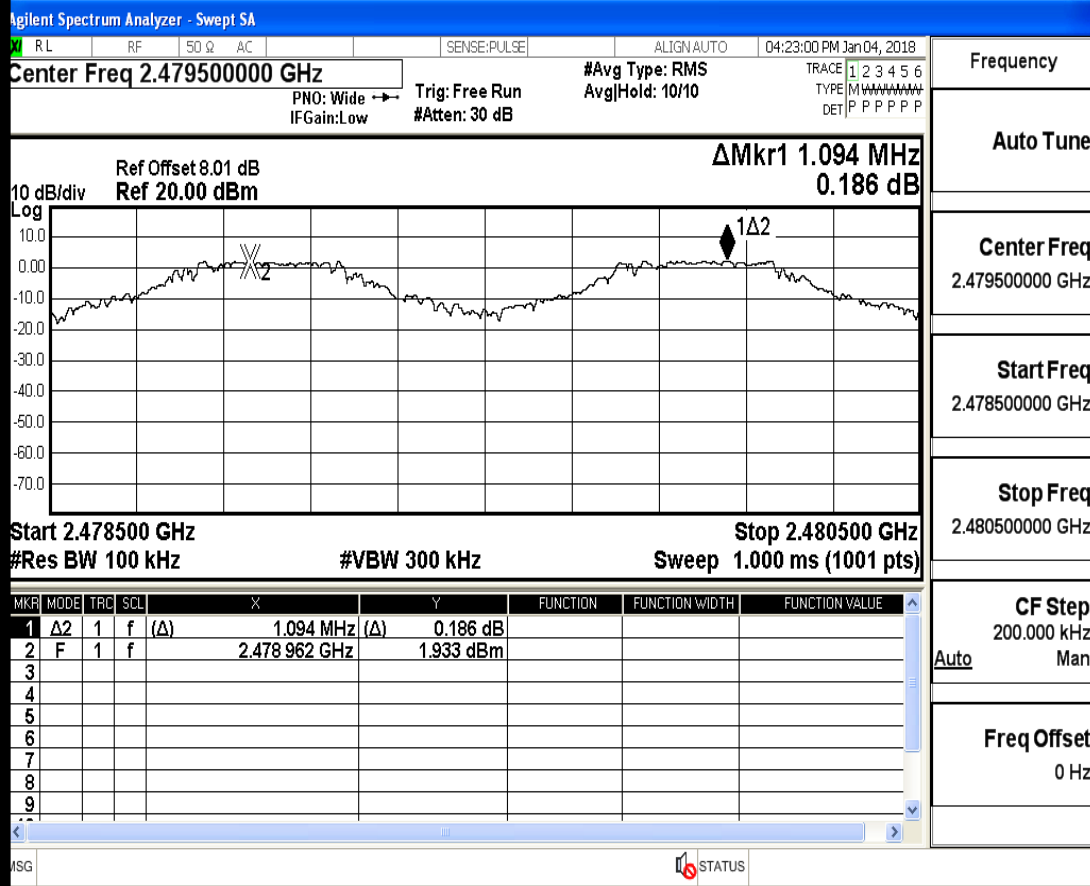
Frequency
Auto Tune
Center Freq 2.402500000 GHz
Start Freq 2.401500000 GHz
Stop Freq 2.403500000 GHz
CF Step 200.000 kHz Auto Man
Freq Offset 0 Hz

Carrier Frequency Separation_GFSK_2441

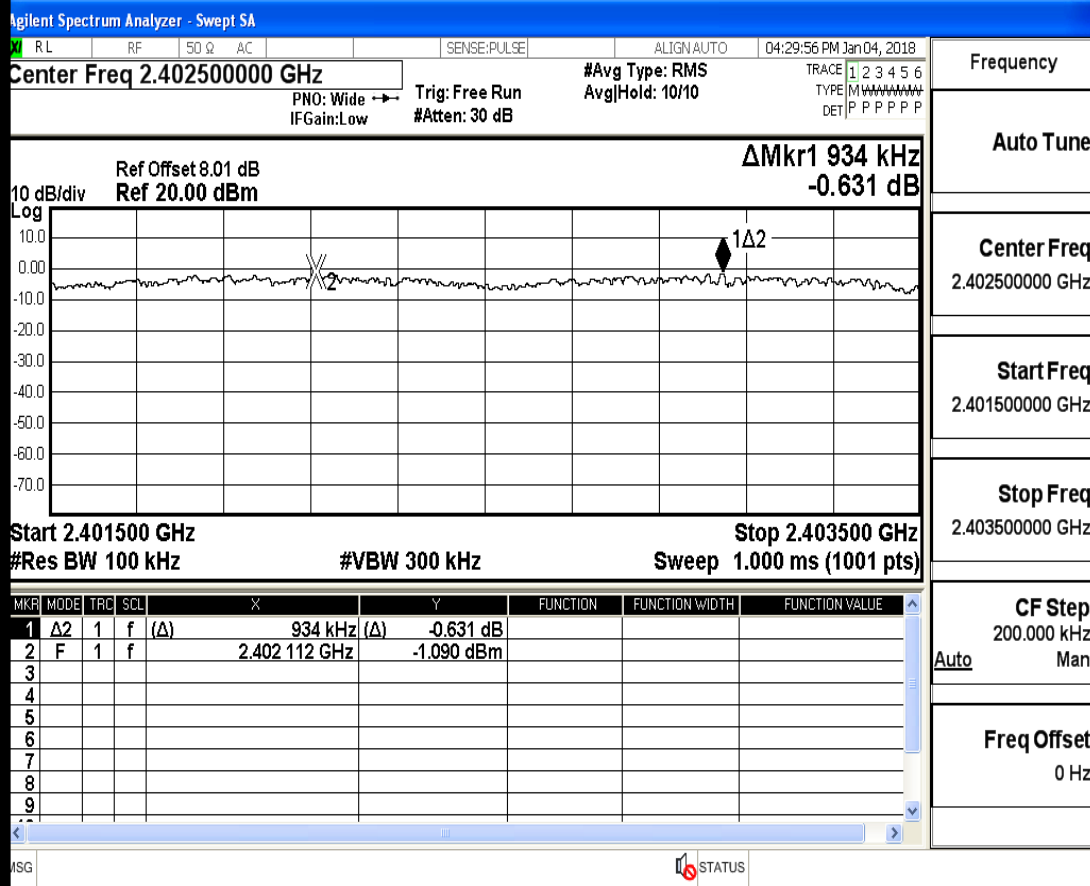


Frequency
Auto Tune
Center Freq 2.441500000 GHz
Start Freq 2.440500000 GHz
Stop Freq 2.442500000 GHz
CF Step 200.000 kHz Auto Man
Freq Offset 0 Hz

Carrier Frequency Separation_GFSK_2480



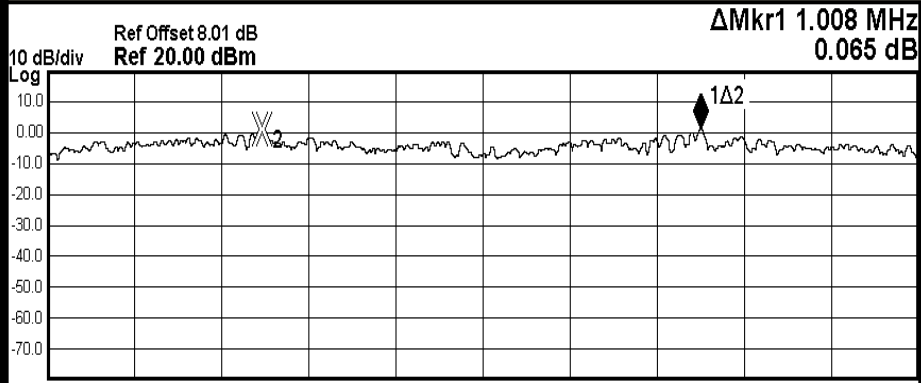
Carrier Frequency Separation_π/4-DQPSK_2402



Carrier Frequency Separation_8-DPSK_2480

Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC SENSE:PULSE ALIGN:AUTO 04:36:51 PM Jan04, 2018
Center Freq 2.479500000 GHz #Avg Type: RMS TRACE 1 2 3 4 5 6
 PNO: Wide → Trig: Free Run AvgJHold: 10/10 TYPE: M W W W W W W W
 IFGain: Low #Atten: 30 dB DET: P P P P P P



Start 2.478500 GHz Stop 2.480500 GHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 1.000 ms (1001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ 2	1	f	(Δ) 1.008 MHz	(Δ) 0.065 dB			
2	F	1	f	2.478 992 GHz	0.984 dBm			
3								
4								
5								
6								
7								
8								
9								

Frequency

Auto Tune

Center Freq
2.479500000 GHz

Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

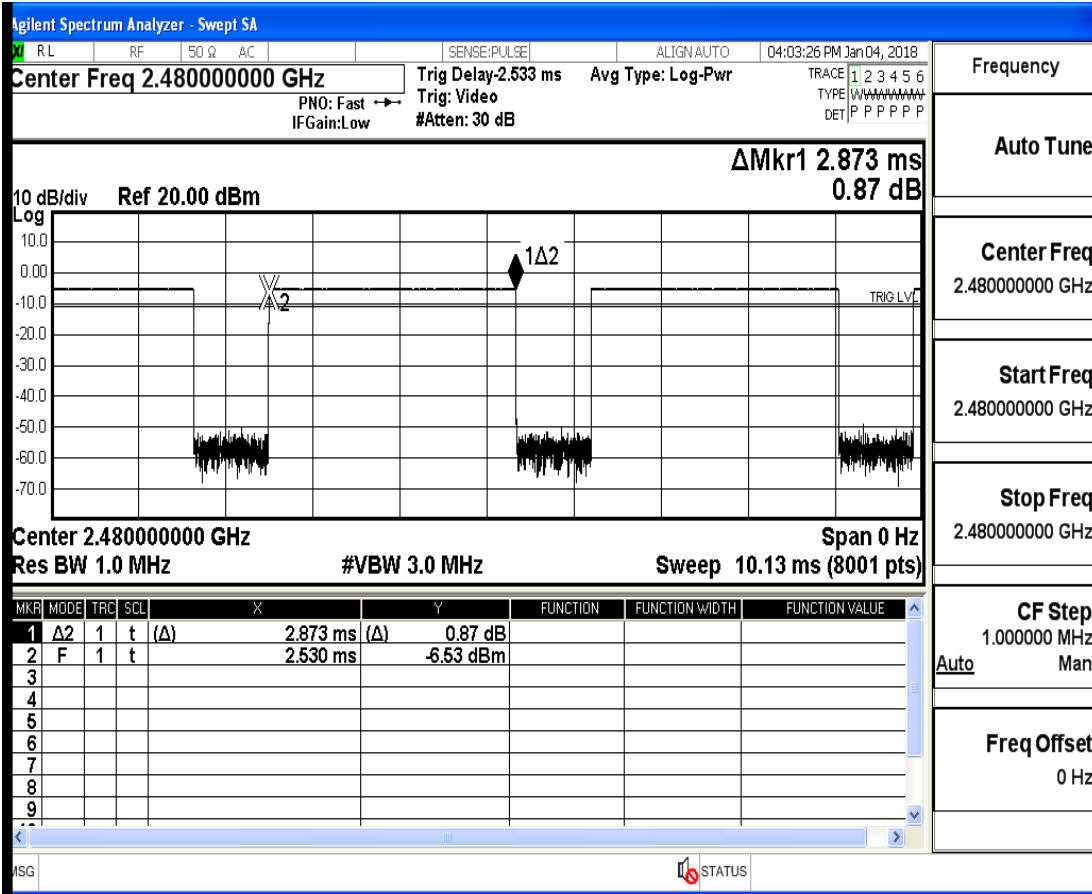
CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

A.4 Dwell Time

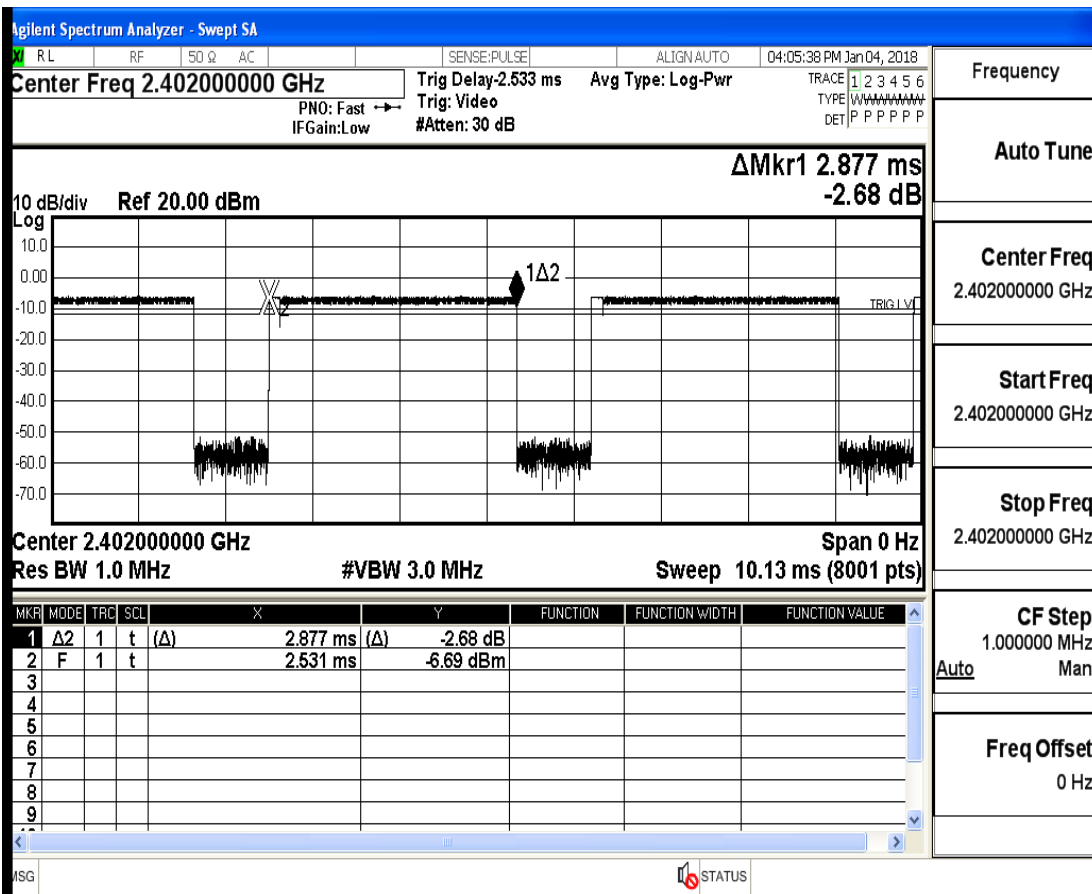
Test Mode	Test Channel	Burst Width[ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit[s]	Verdict
GFSK	2402	2.87	106.7	0.306	0.4	PASS
	2441	2.87	106.7	0.306	0.4	PASS
	2480	2.87	106.7	0.306	0.4	PASS
$\pi/4$ -DQPSK	2402	2.88	106.7	0.307	0.4	PASS
	2441	2.88	106.7	0.307	0.4	PASS
	2480	2.88	106.7	0.307	0.4	PASS
8-DPSK	2402	2.88	106.7	0.307	0.4	PASS
	2441	2.88	106.7	0.307	0.4	PASS
	2480	2.88	106.7	0.307	0.4	PASS

Dwell Time_GFSK_2480



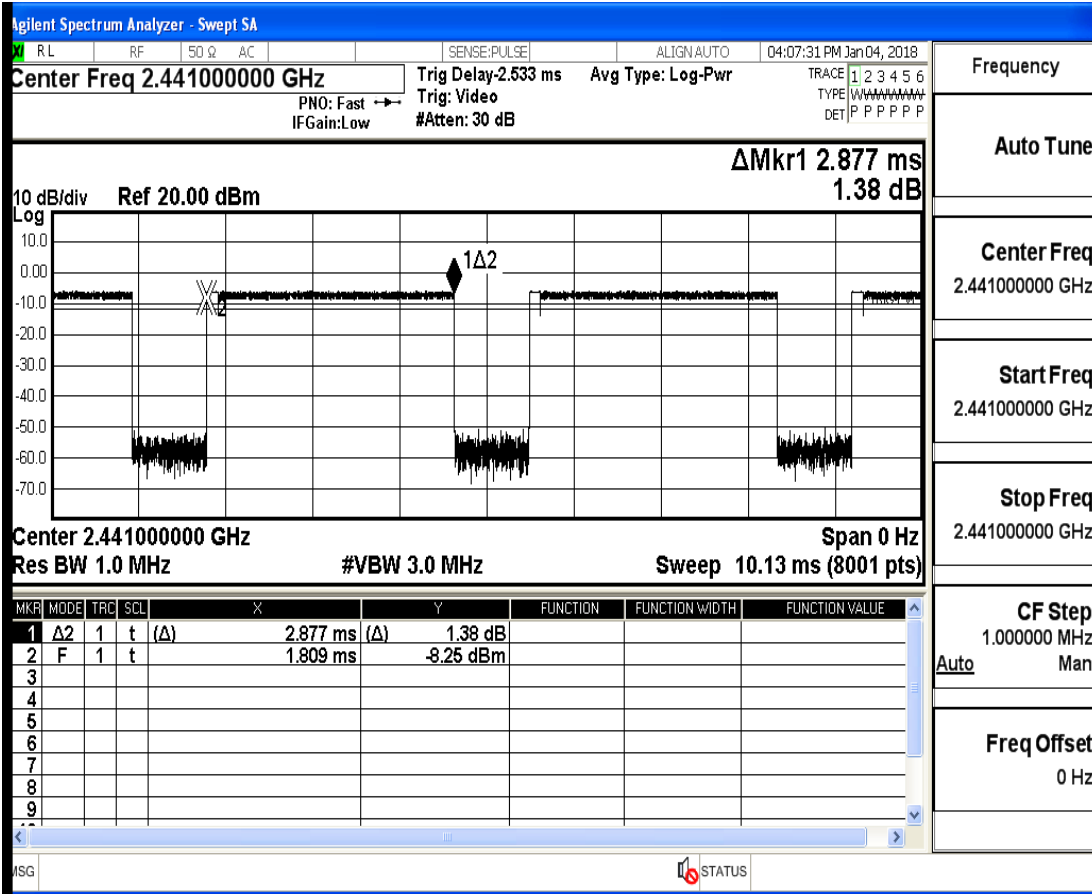
Frequency
Auto Tune
Center Freq 2.48000000 GHz
Start Freq 2.48000000 GHz
Stop Freq 2.48000000 GHz
CF Step 1.000000 MHz Auto Man
Freq Offset 0 Hz

Dwell Time_π/4-DQPSK_2402

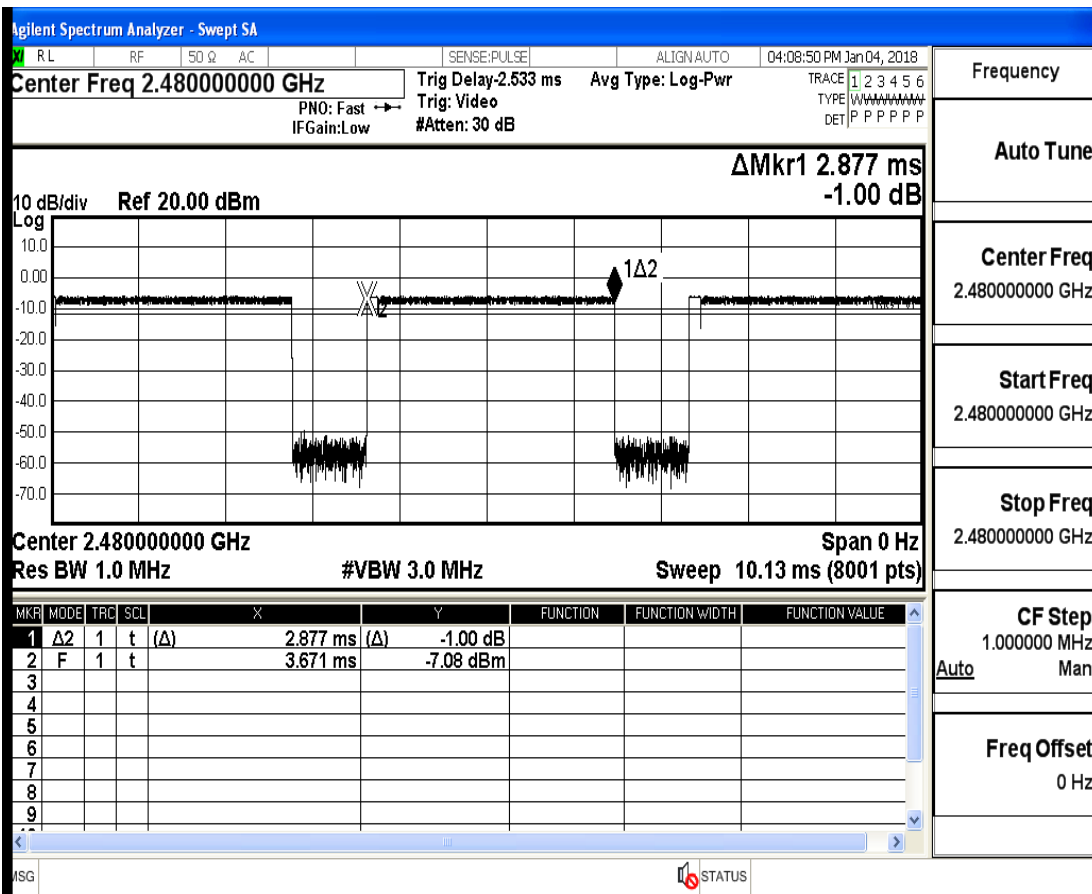


Frequency
Auto Tune
Center Freq 2.40200000 GHz
Start Freq 2.40200000 GHz
Stop Freq 2.40200000 GHz
CF Step 1.000000 MHz Auto Man
Freq Offset 0 Hz

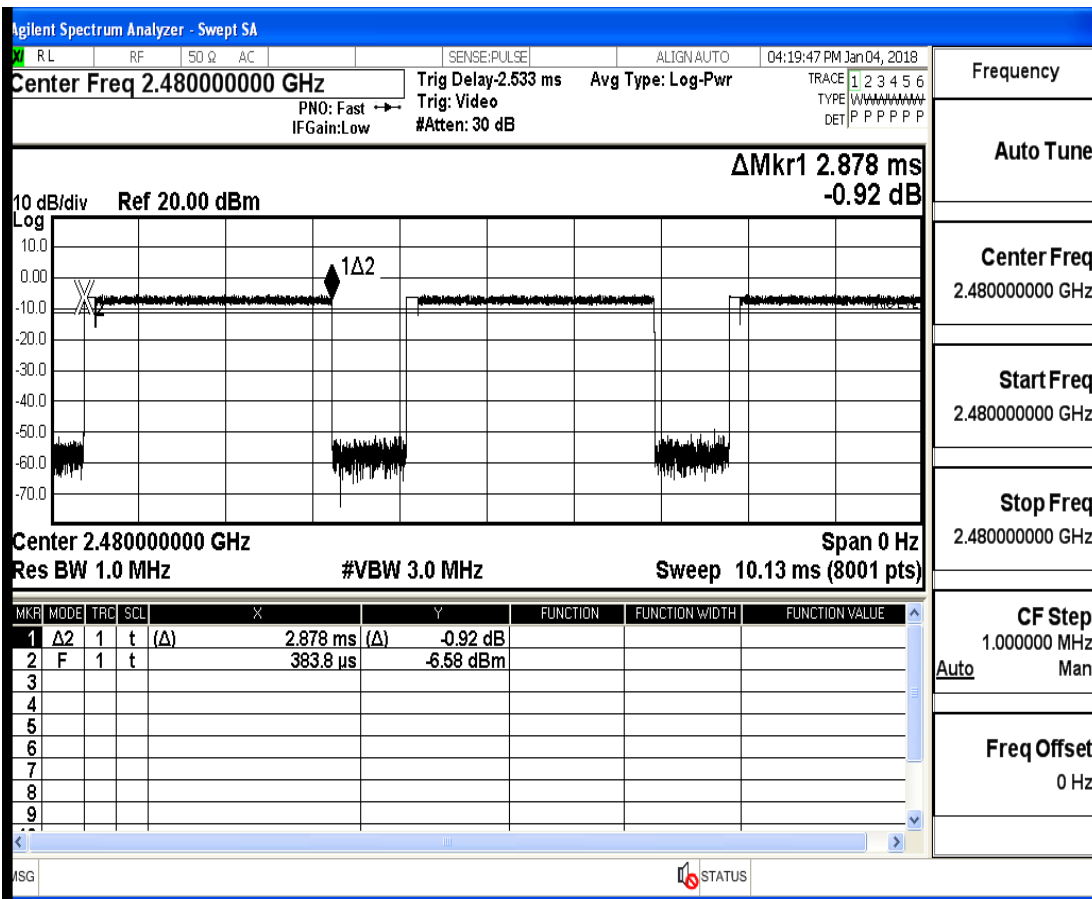
Dwell Time $\pi/4$ -DQPSK_2441



Dwell Time $\pi/4$ -DQPSK_2480



Dwell Time_8-DPSK_2480

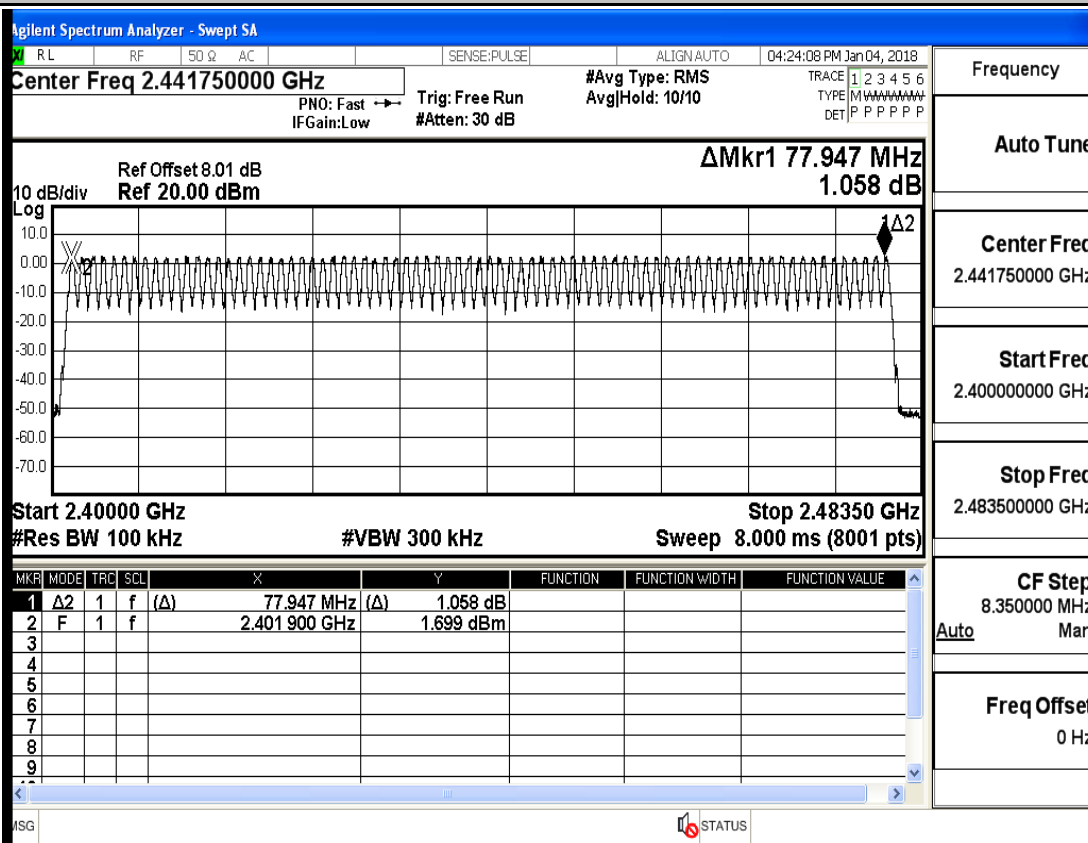


Frequency
Auto Tune
Center Freq 2.480000000 GHz
Start Freq 2.480000000 GHz
Stop Freq 2.480000000 GHz
CF Step 1.000000 MHz Auto Man
Freq Offset 0 Hz

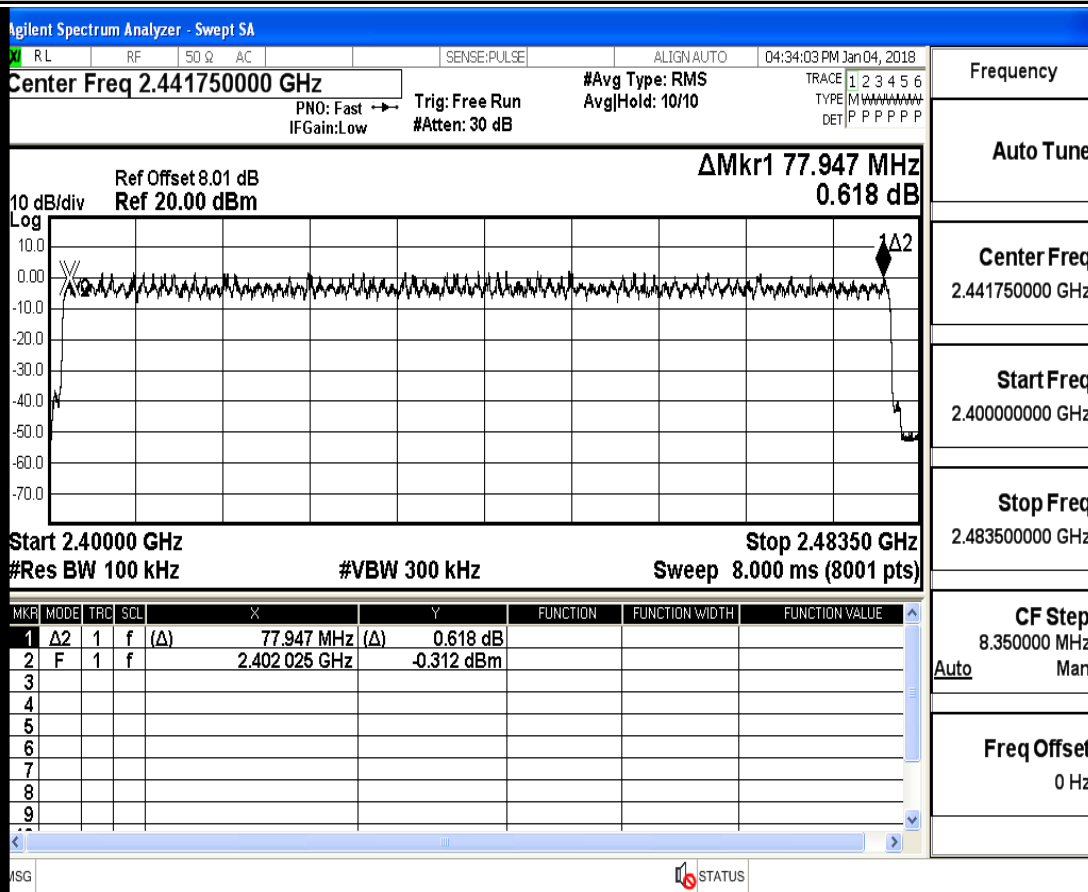
A.5 Hopping Channel Number

Test Mode	Test Channel	Number of Hopping Channel[N]	Limit[N]	Verdict
GFSK	2402	79	≥ 15	PASS
$\pi/4$ -DQPSK	2402	79	≥ 15	PASS
8-DPSK	2402	79	≥ 15	PASS

Hopping Channel Number_GFSK_2402



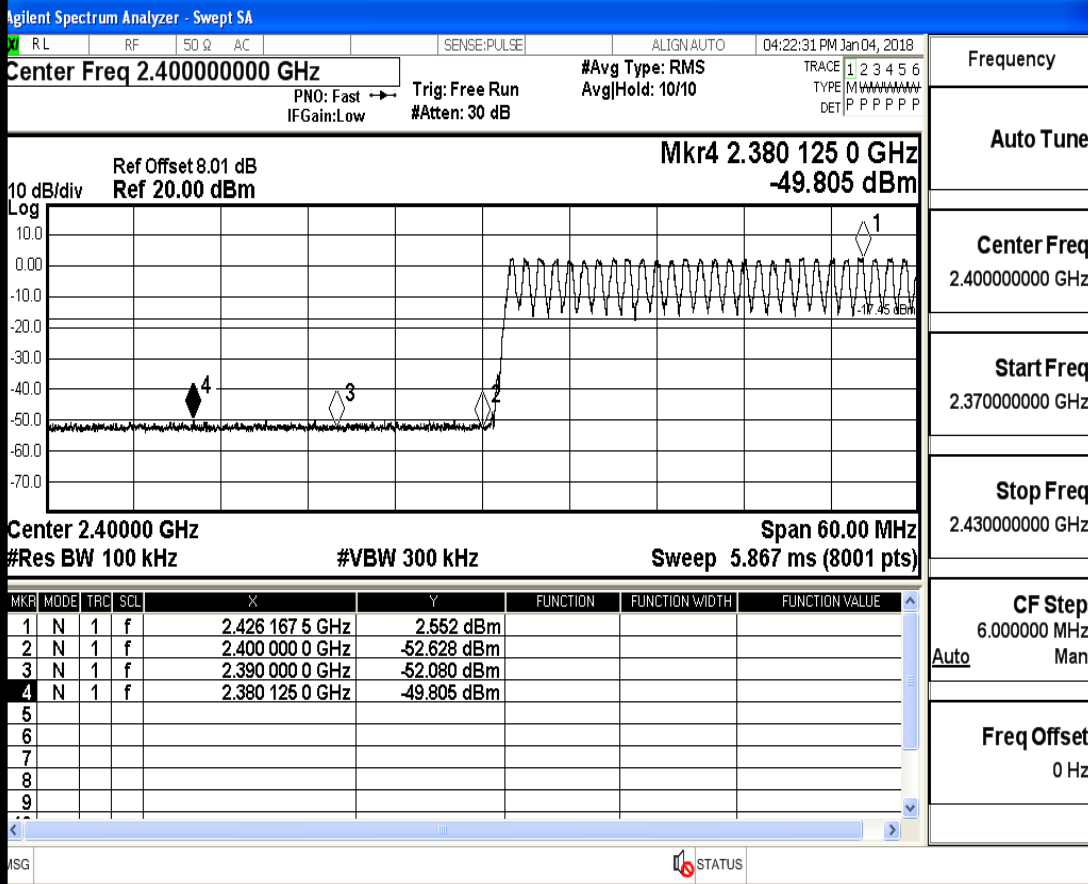
Hopping Channel Number_π/4-DQPSK_2402



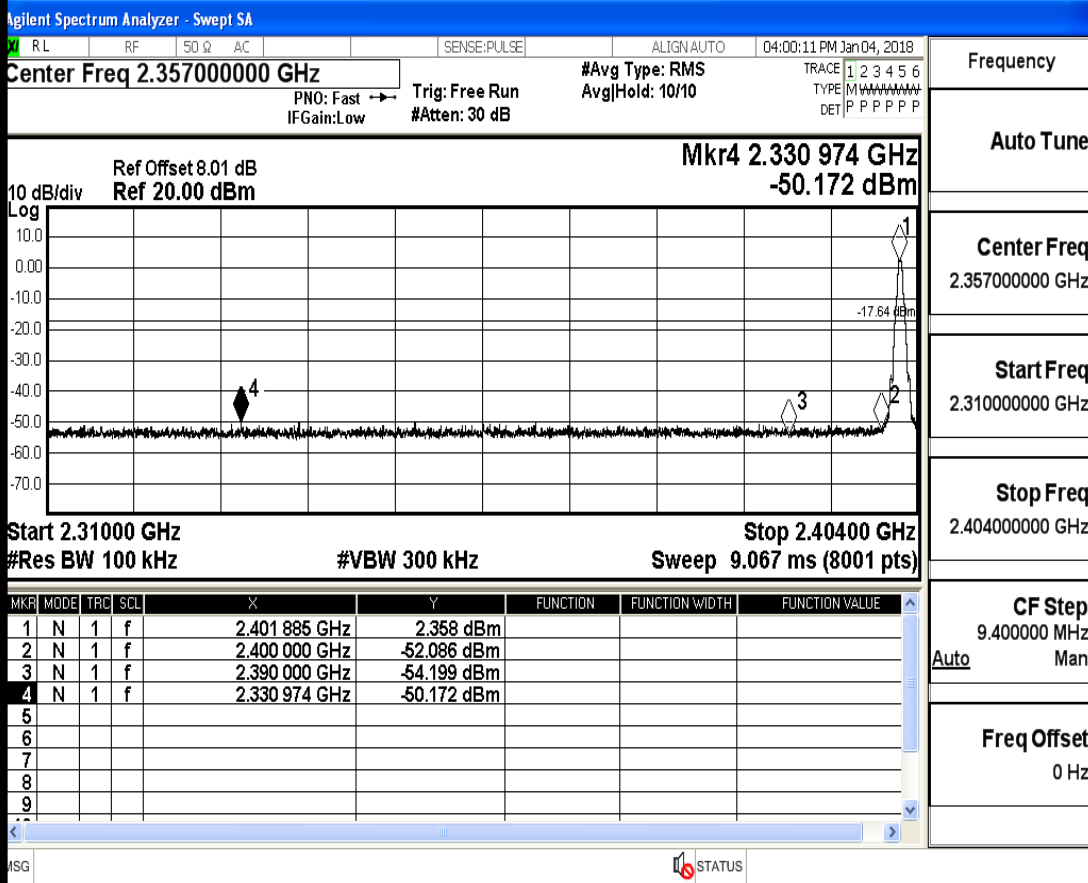
A.6 Band-edge for RF Conducted Emissions

Test Mode	Test Channel	Hopping	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit[dBm]	Verdict
GFSK	2402	On	2.552	-49.805	-17.45	PASS
	2402	Off	2.358	-50.172	-17.64	PASS
	2480	On	2.581	-50.121	-17.42	PASS
	2480	Off	2.772	-49.212	-17.23	PASS
$\pi/4$ -DQPSK	2402	On	1.743	-49.459	-18.26	PASS
	2402	Off	-1.503	-49.281	-21.5	PASS
	2480	On	1.860	-49.427	-18.14	PASS
	2480	Off	1.821	-49.810	-18.18	PASS
8-DPSK	2402	On	1.699	-49.143	-18.3	PASS
	2402	Off	1.197	-50.460	-18.8	PASS
	2480	On	1.806	-49.152	-18.19	PASS
	2480	Off	1.837	-50.116	-18.16	PASS

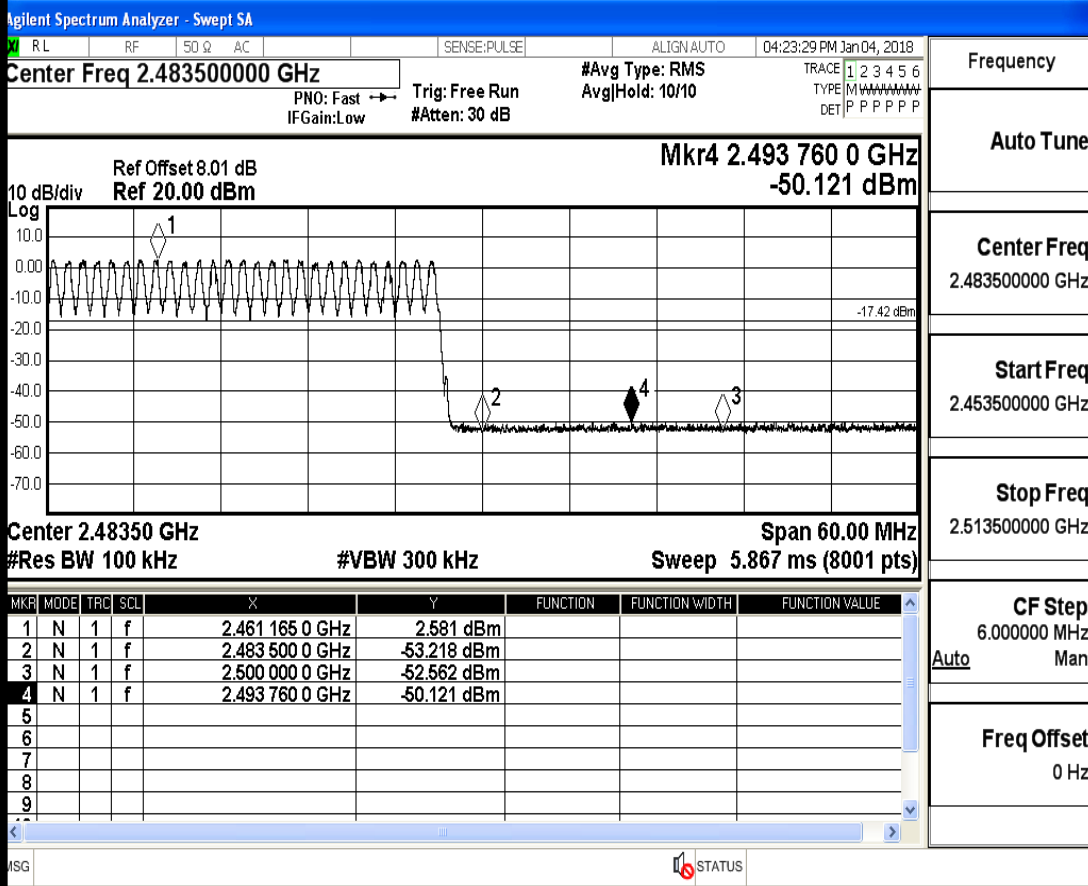
Band-edge for RF Conducted Emissions_GFSK_2402_Hopping On



Band-edge for RF Conducted Emissions_GFSK_2402_Hopping Off

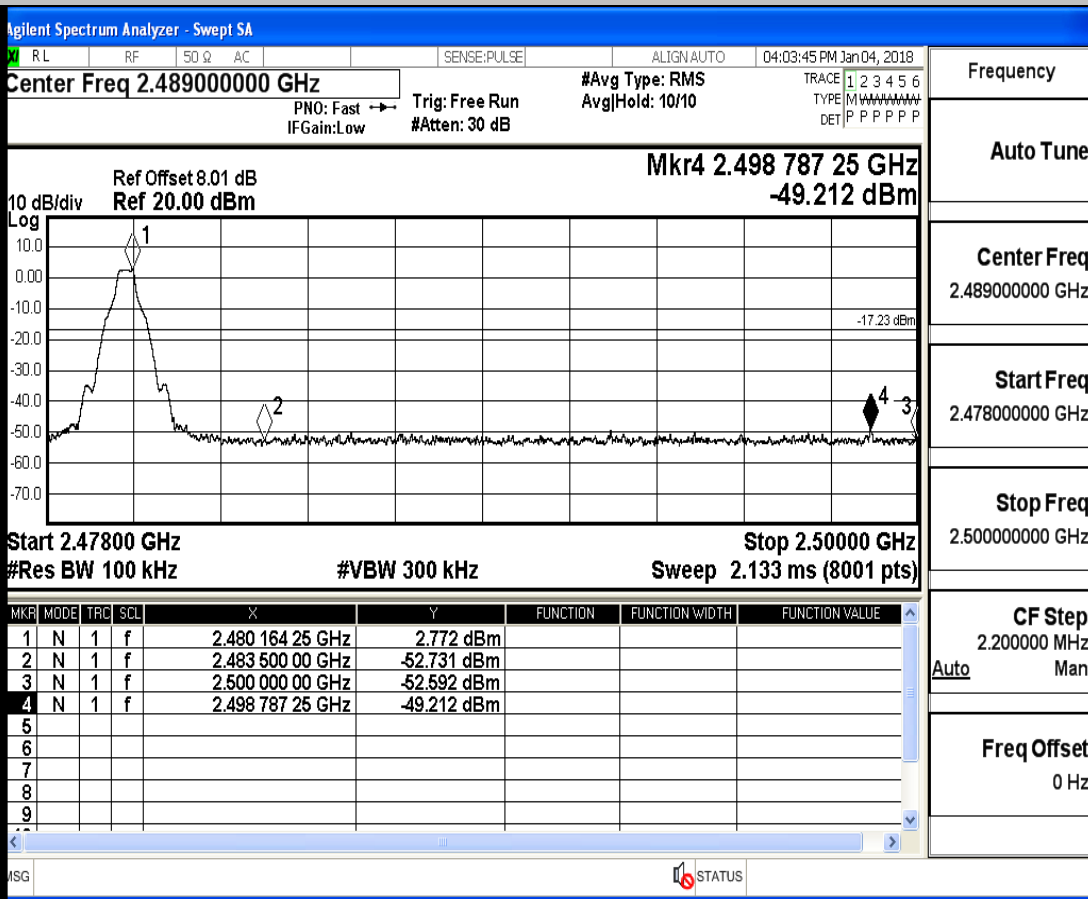


Band-edge for RF Conducted Emissions_GFSK_2480_Hopping On



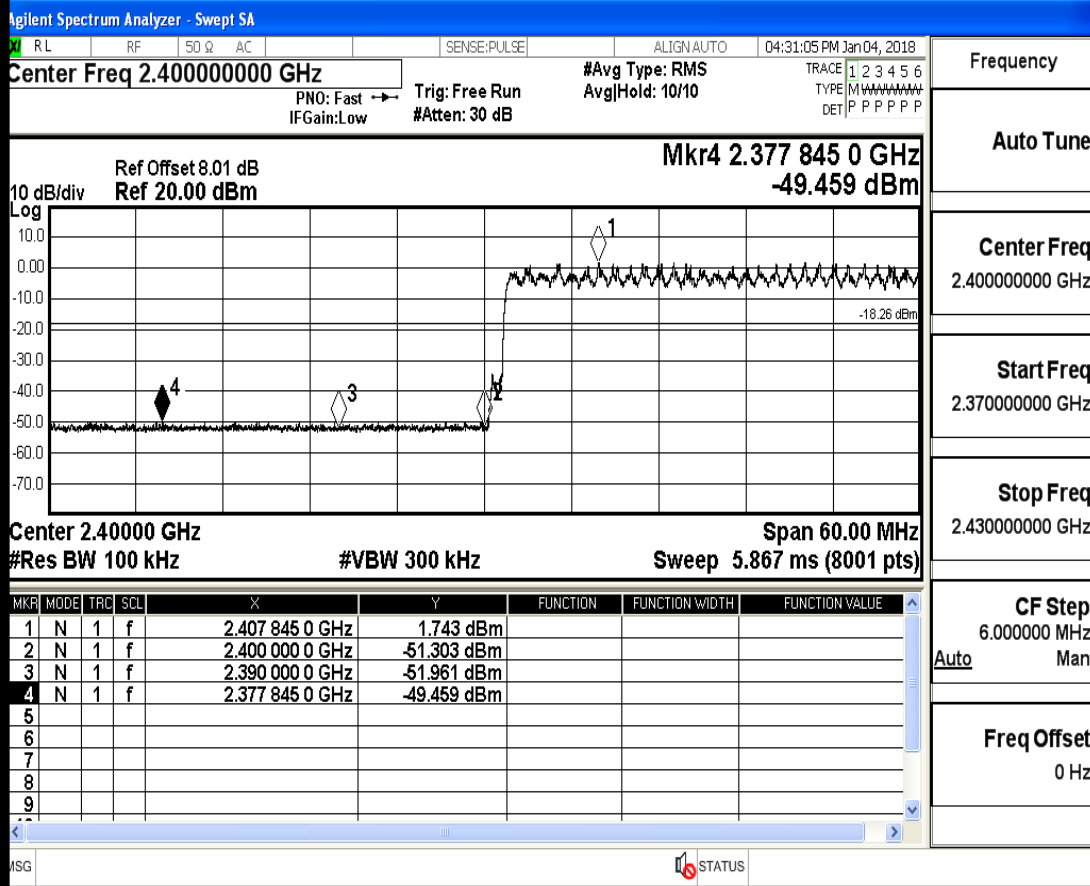
Frequency	
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.453500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Auto	Man
Freq Offset	0 Hz

Band-edge for RF Conducted Emissions_GFSK_2480_Hopping Off

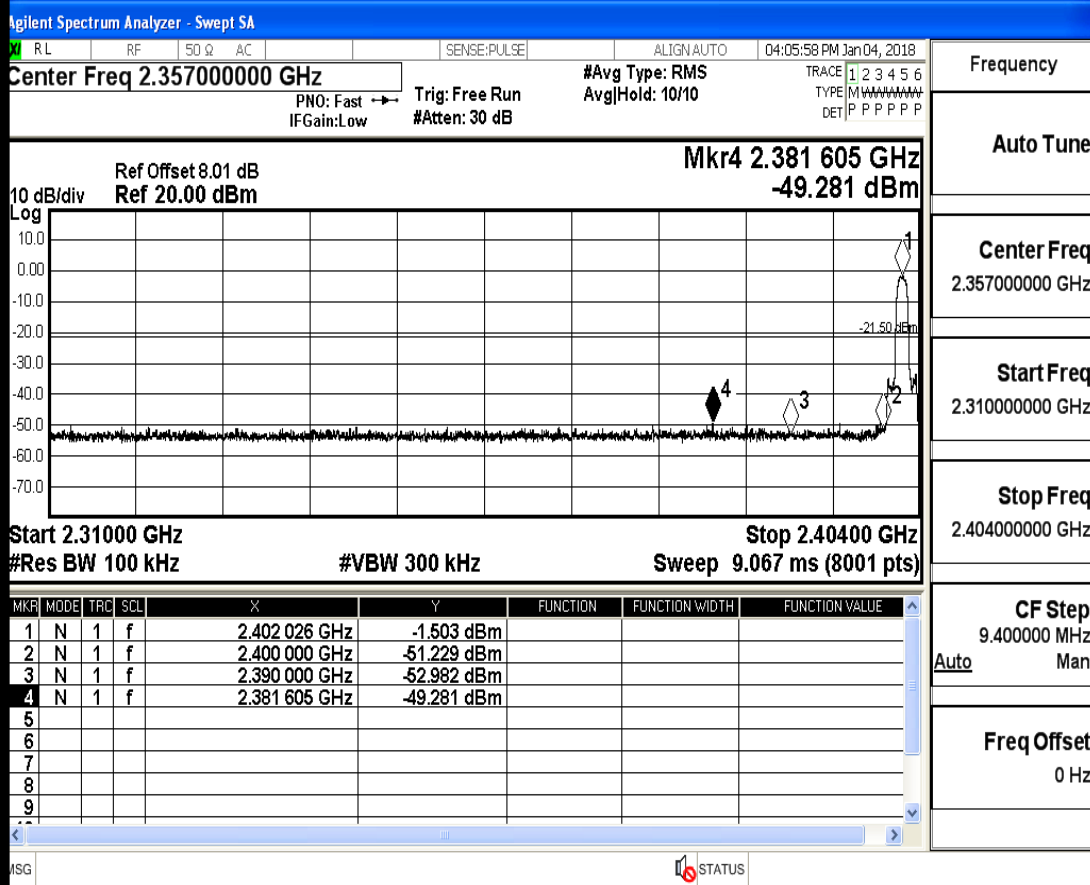


Frequency	
Auto Tune	
Center Freq	2.489000000 GHz
Start Freq	2.478000000 GHz
Stop Freq	2.500000000 GHz
CF Step	2.200000 MHz
Auto	Man
Freq Offset	0 Hz

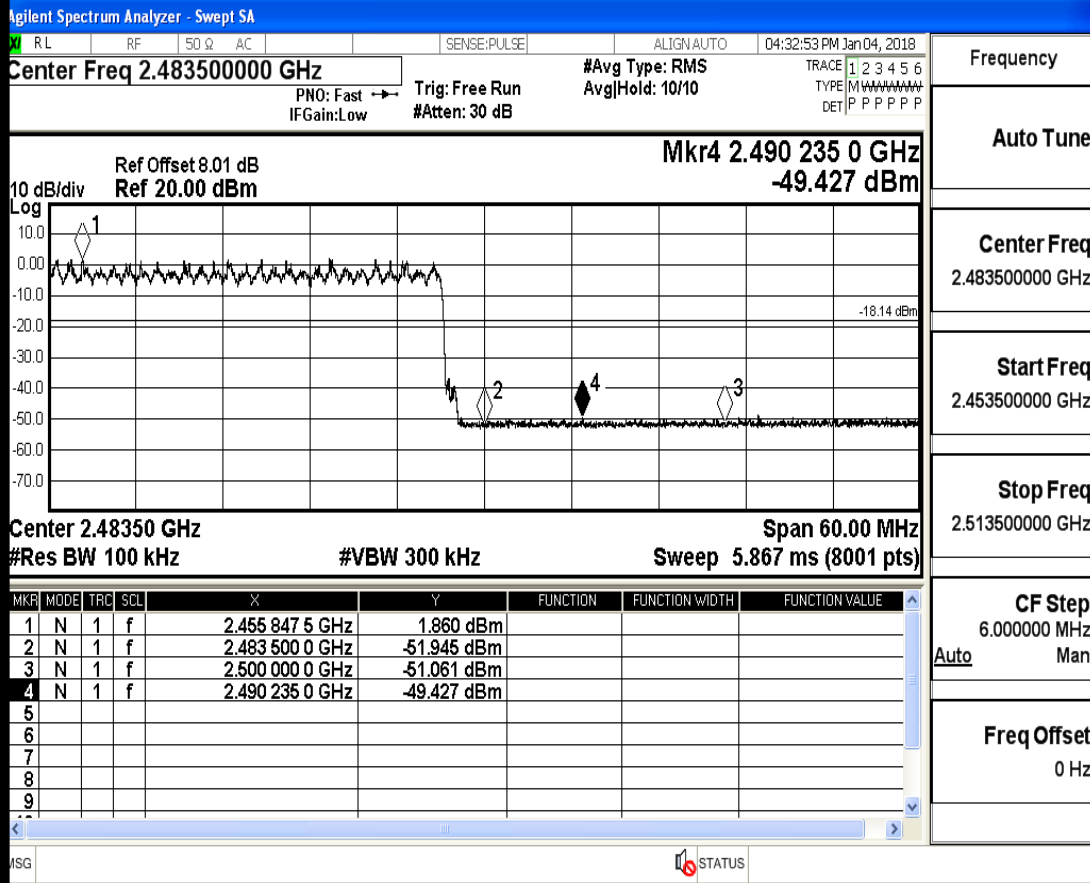
Band-edge for RF Conducted Emissions $\pi/4$ -DQPSK_2402_Hopping On



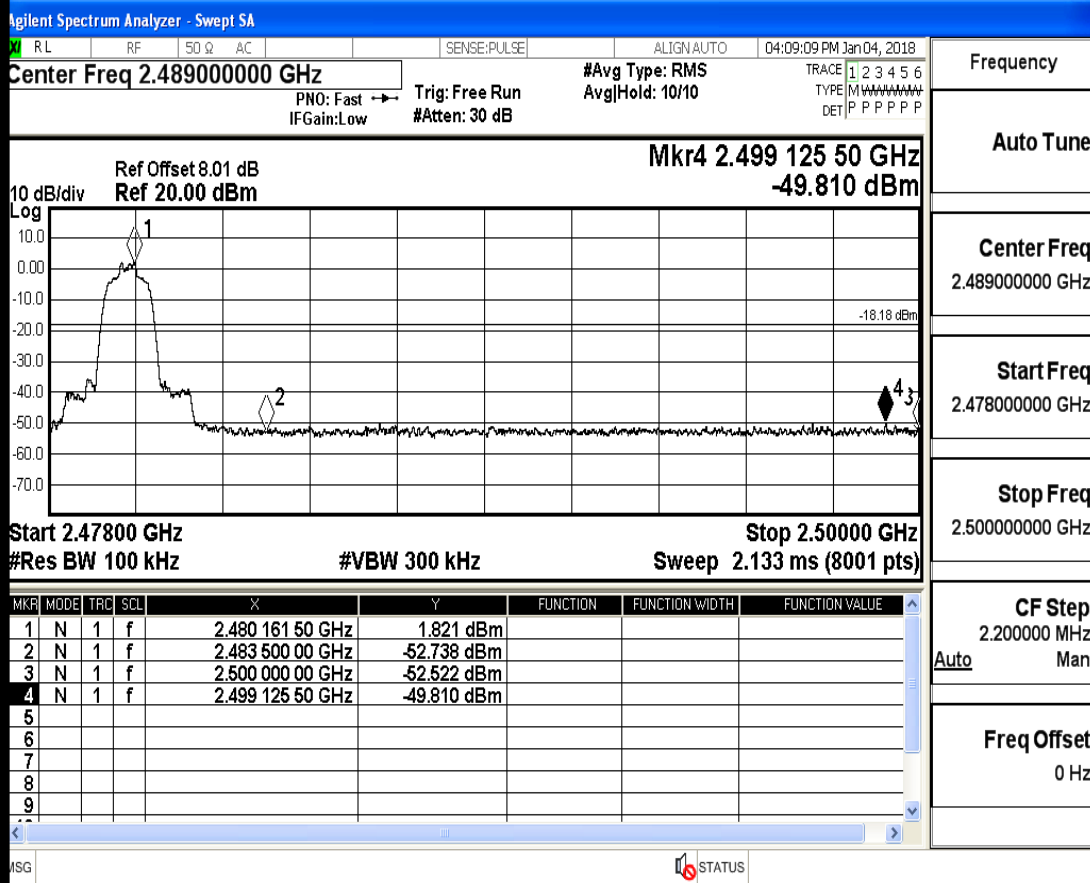
Band-edge for RF Conducted Emissions $\pi/4$ -DQPSK_2402_Hopping Off



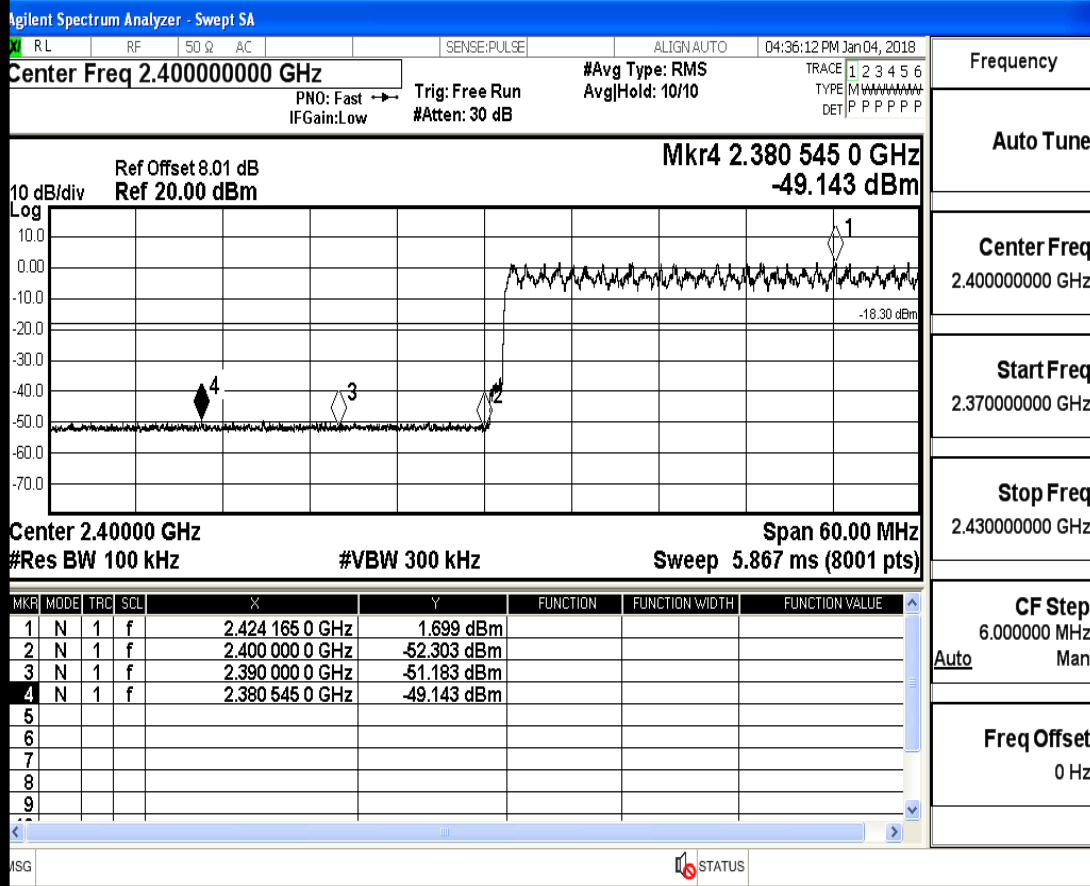
Band-edge for RF Conducted Emissions_π/4-DQPSK_2480_Hopping On



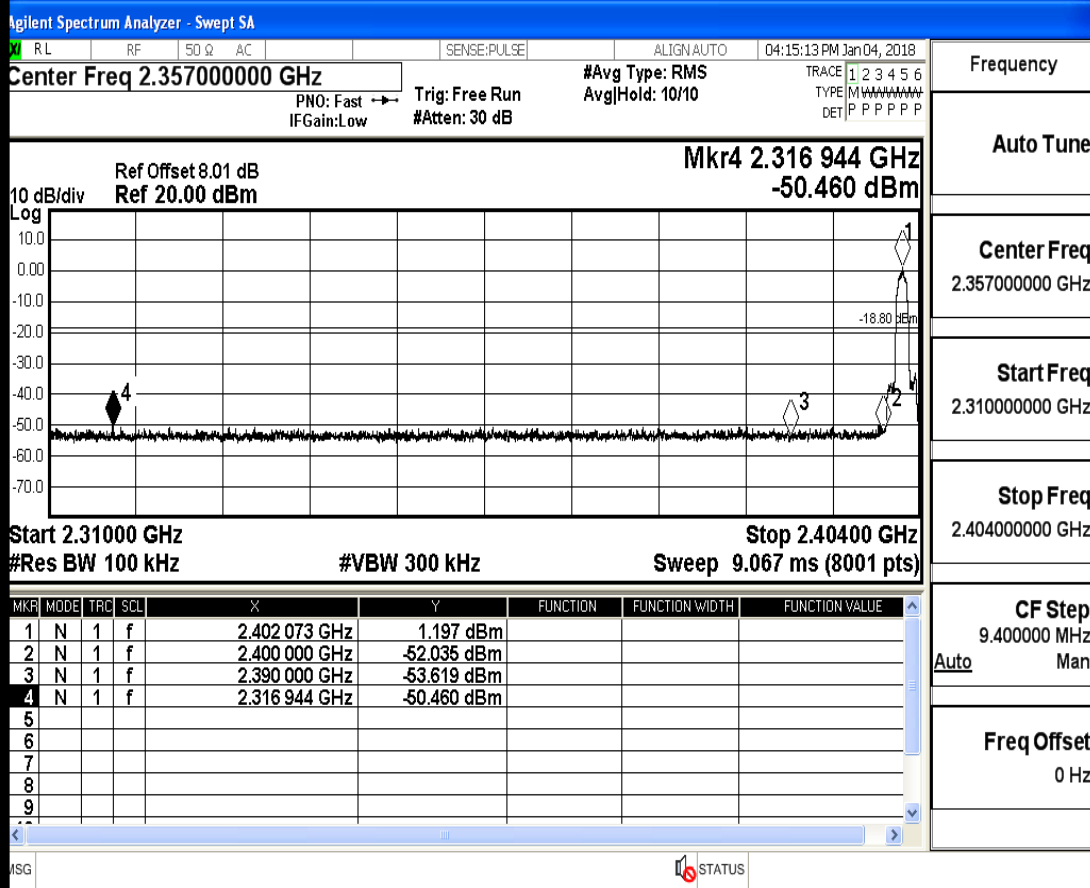
Band-edge for RF Conducted Emissions_π/4-DQPSK_2480_Hopping Off



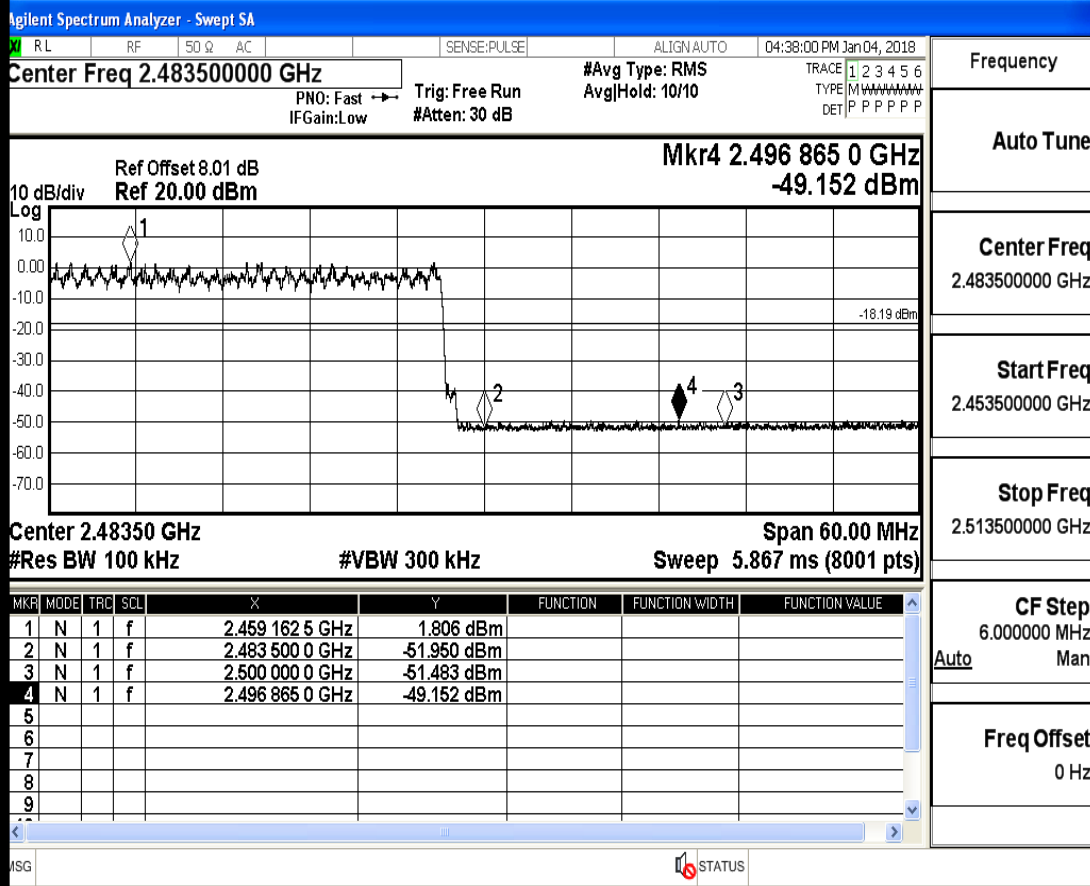
Band-edge for RF Conducted Emissions_8-DPSK_2402_Hopping On



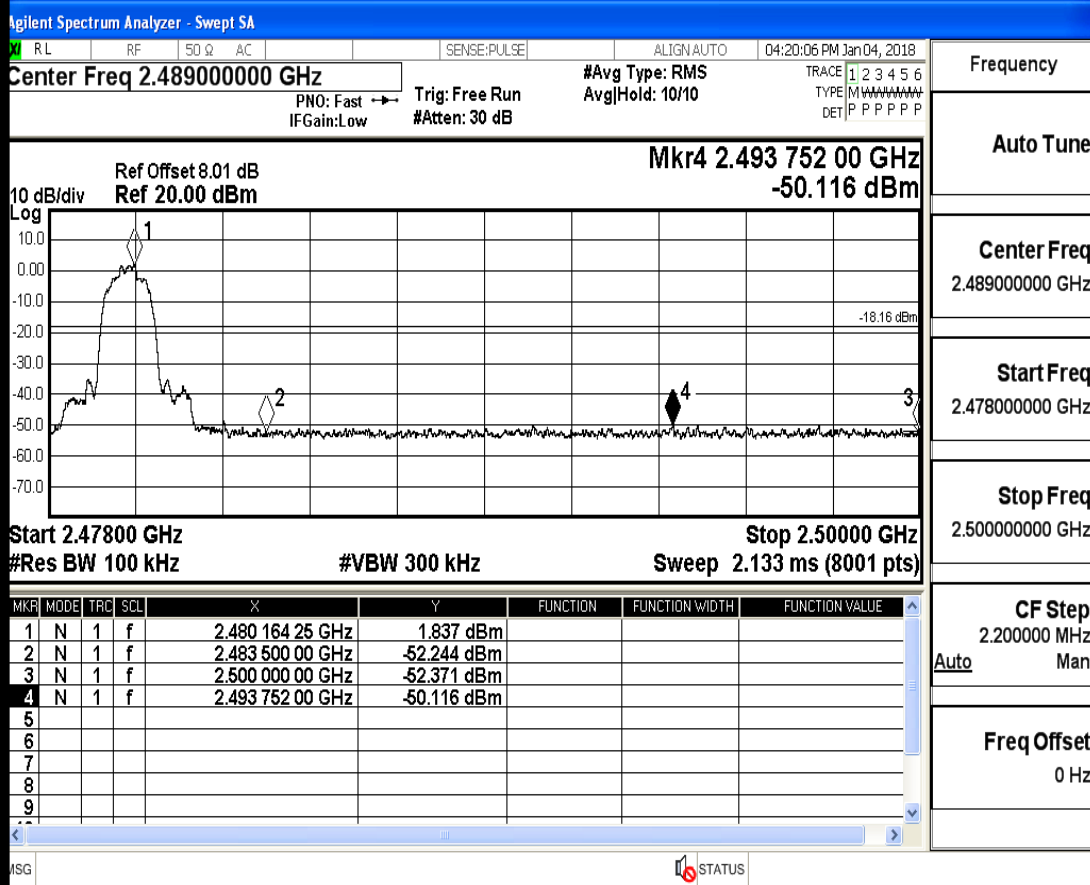
Band-edge for RF Conducted Emissions_8-DPSK_2402_Hopping Off



Band-edge for RF Conducted Emissions_8-DPSK_2480_Hopping On



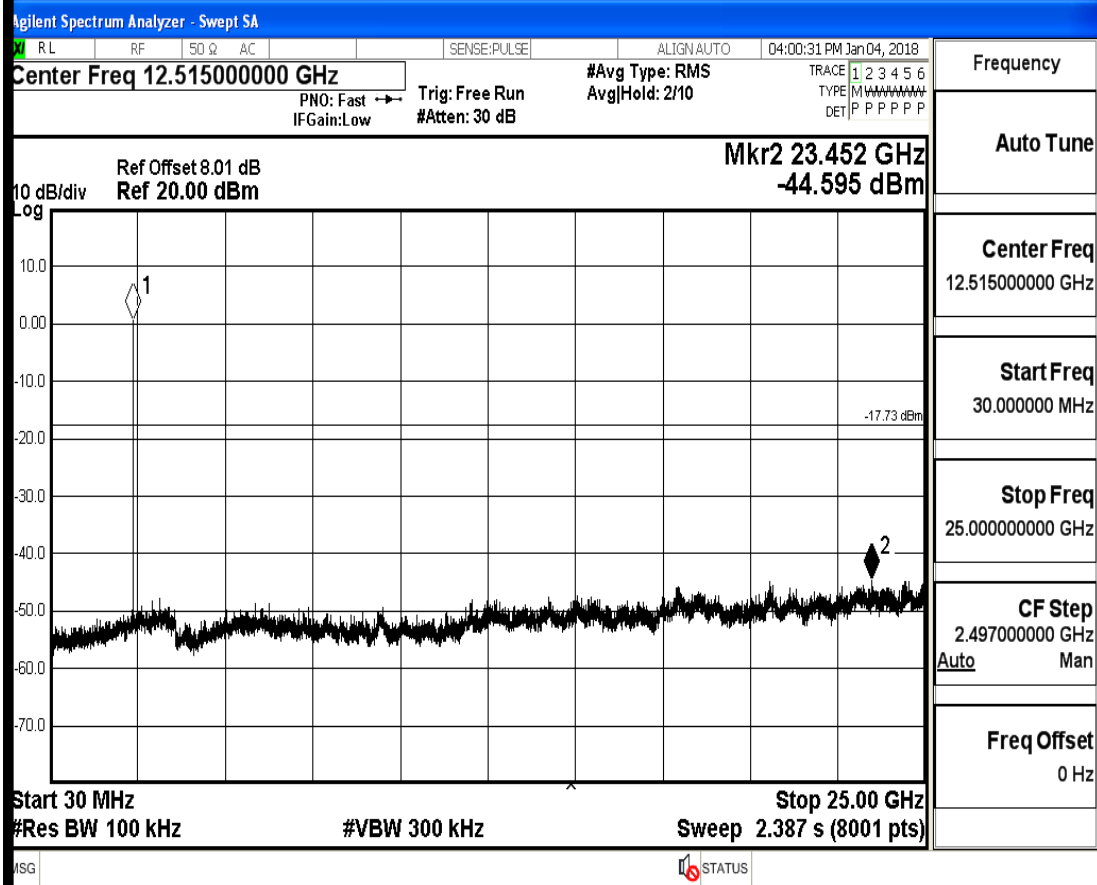
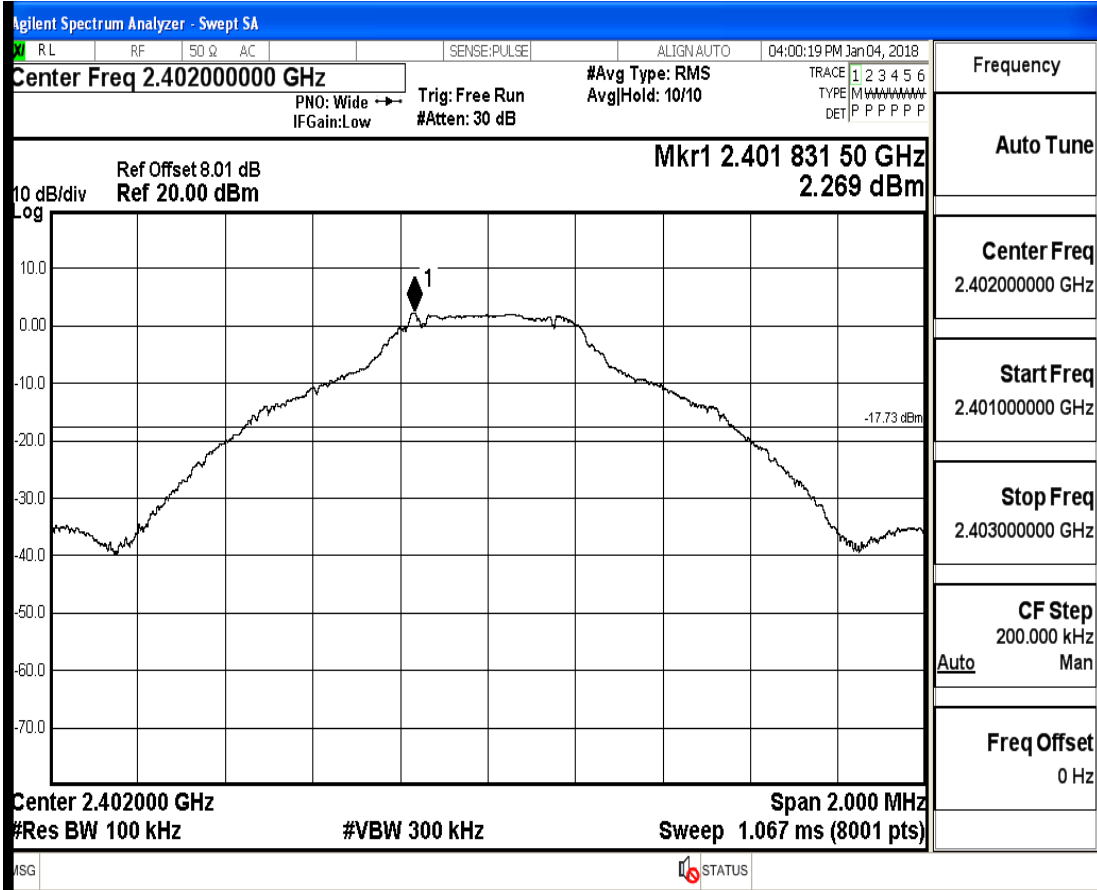
Band-edge for RF Conducted Emissions_8-DPSK_2480_Hopping Off



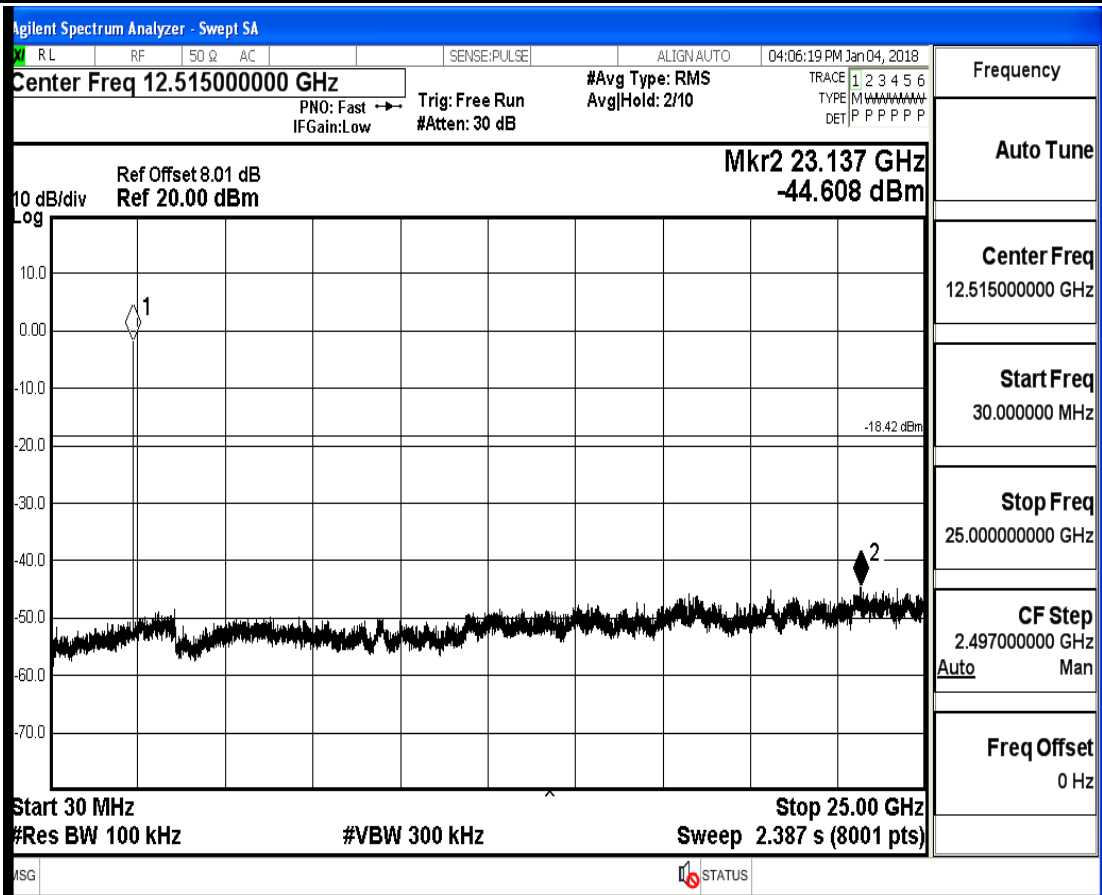
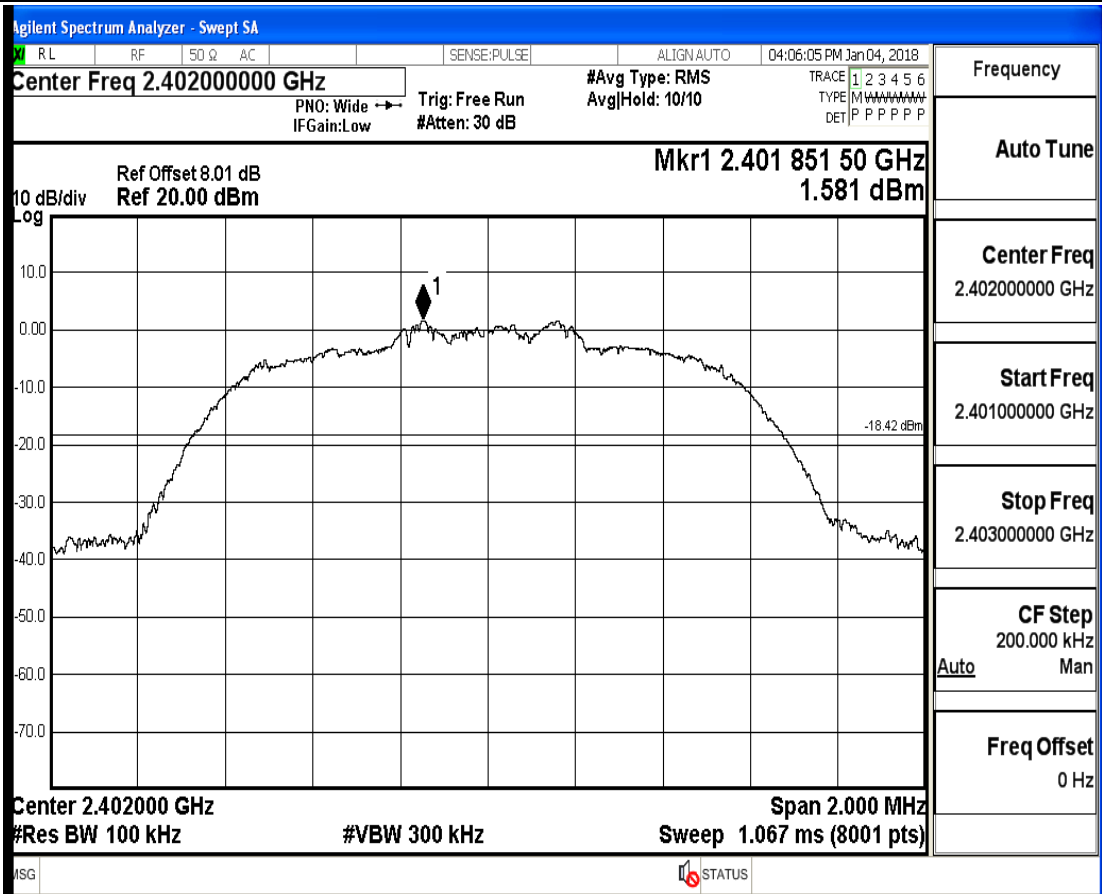
A.7 RF Conducted Spurious Emissions

Test Mode	Test Channel	StartFre [MHz]	StopFre [MHz]	RBW [kHz]	VBW [kHz]	Pref[dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	2402	30	25000	100	300	2.269	-44.595	<- 17.731	PASS
	2441	30	25000	100	300	2.241	-44.283	<- 17.759	PASS
	2480	30	25000	100	300	2.634	-44.757	<- 17.366	PASS
$\pi/4$ -DQPSK	2402	30	25000	100	300	1.581	-44.608	<- 18.419	PASS
	2441	30	25000	100	300	1.627	-44.533	<- 18.373	PASS
	2480	30	25000	100	300	1.72	-44.239	<-18.28	PASS
8-DPSK	2402	30	25000	100	300	1.483	-43.749	<- 18.517	PASS
	2441	30	25000	100	300	1.614	-44.671	<- 18.386	PASS
	2480	30	25000	100	300	1.639	-44.520	<- 18.361	PASS

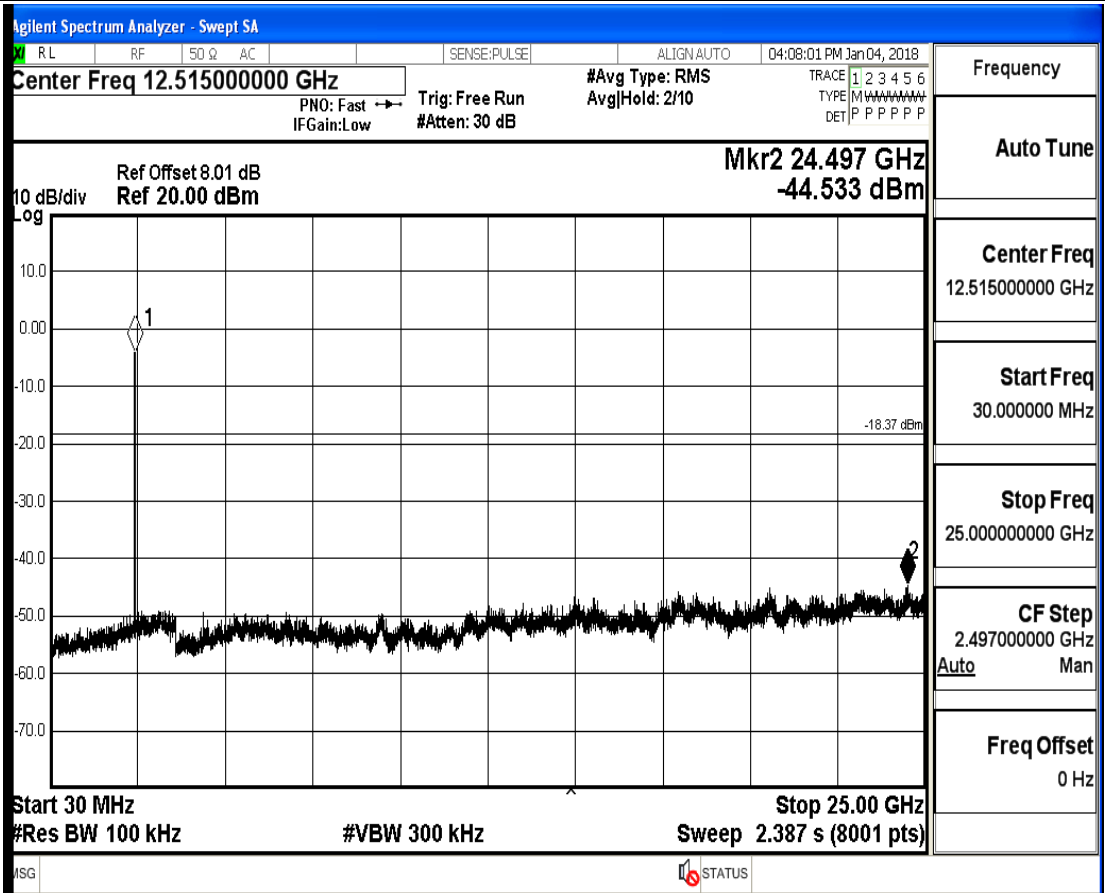
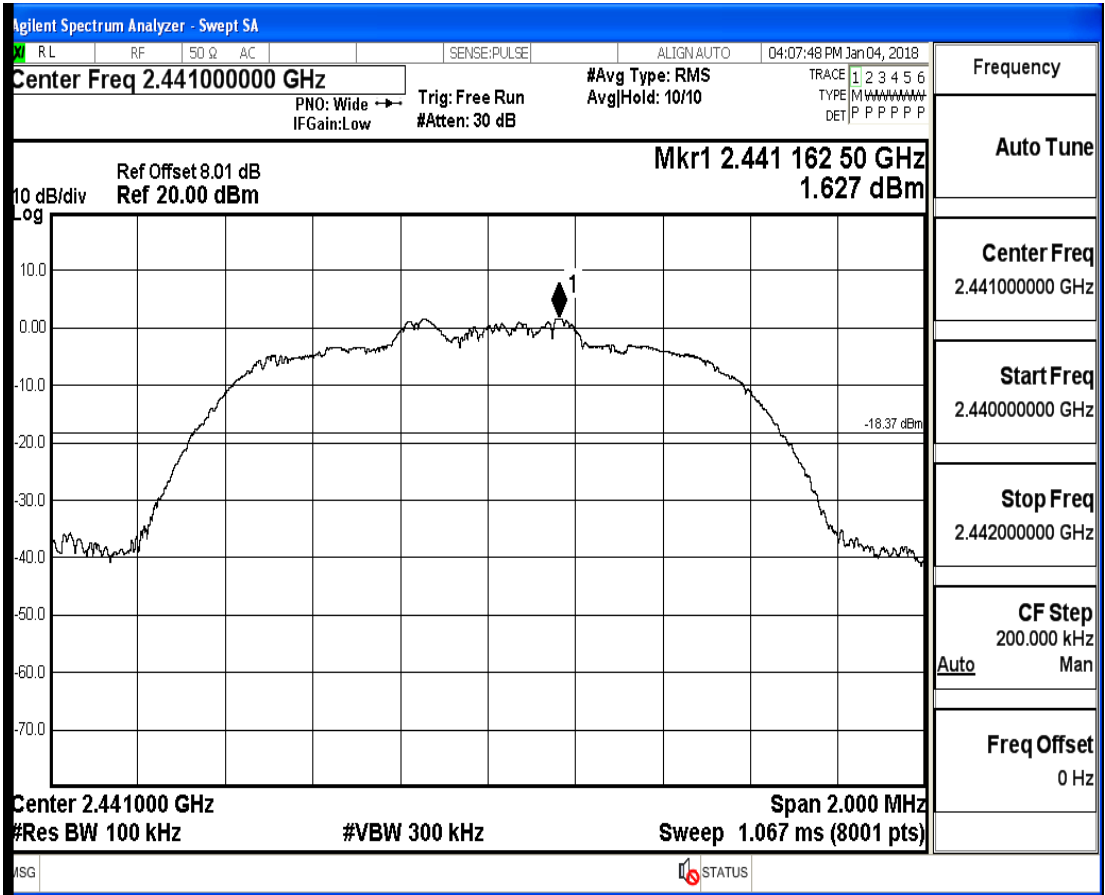
RF Conducted Spurious Emissions_GFSK_2402



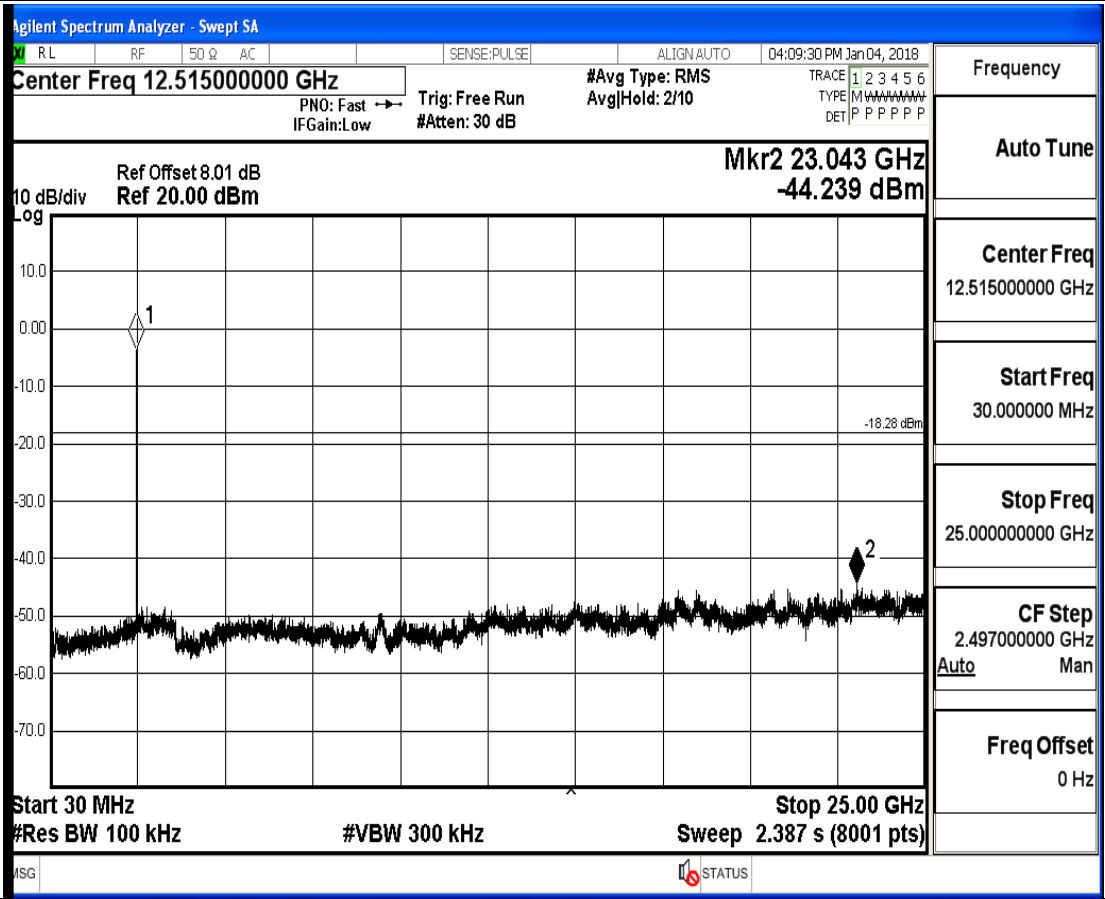
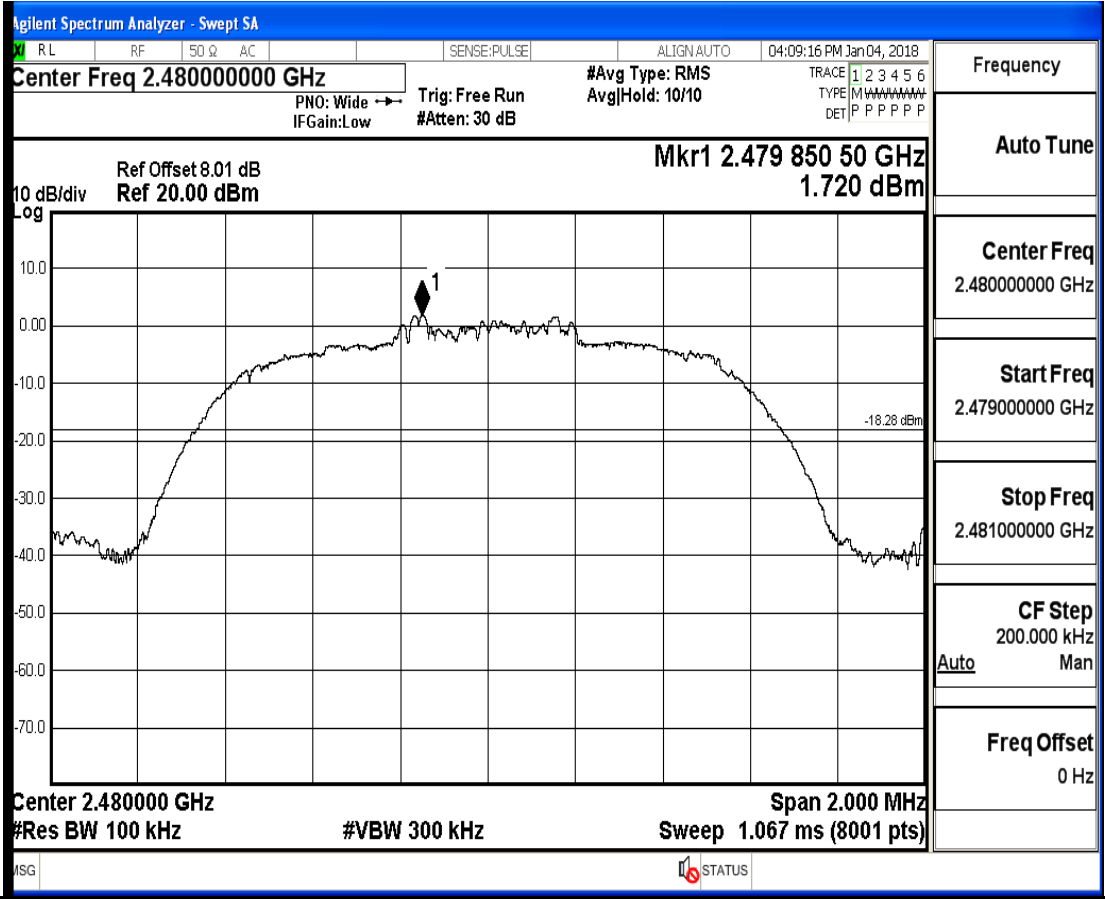
RF Conducted Spurious Emissions_π/4-DQPSK_2402



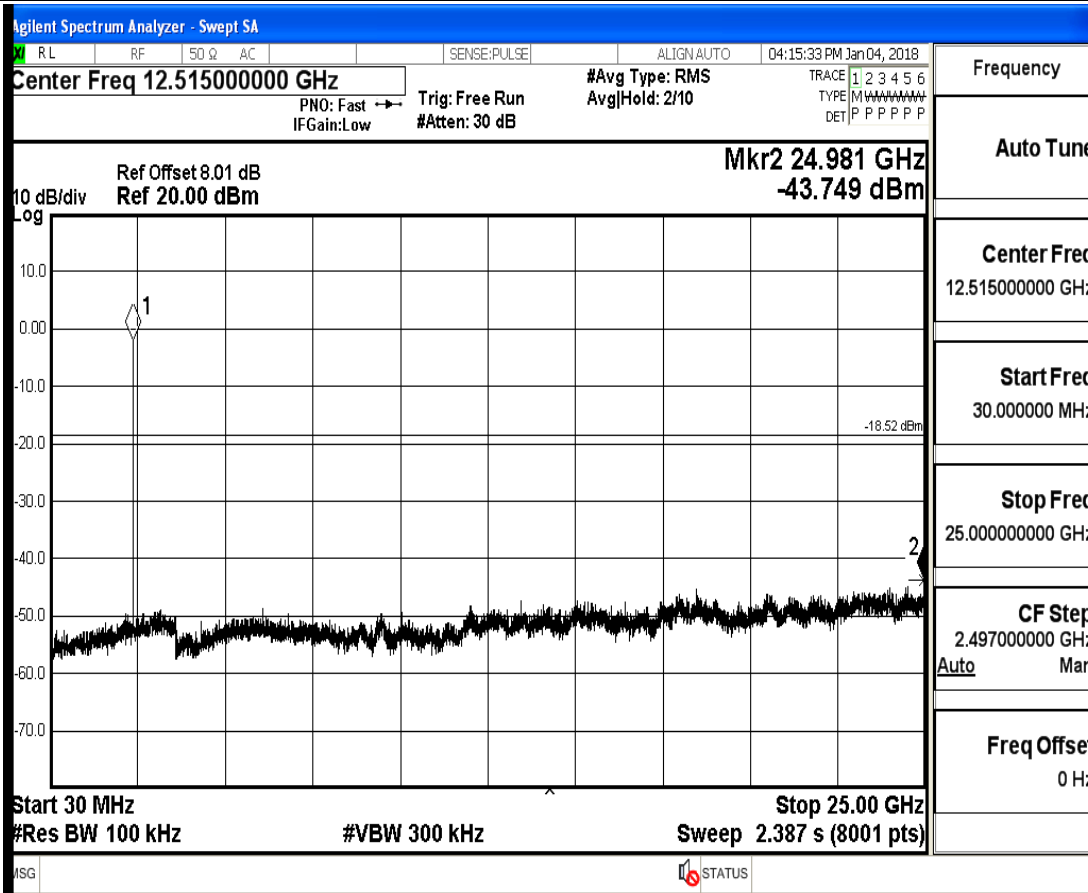
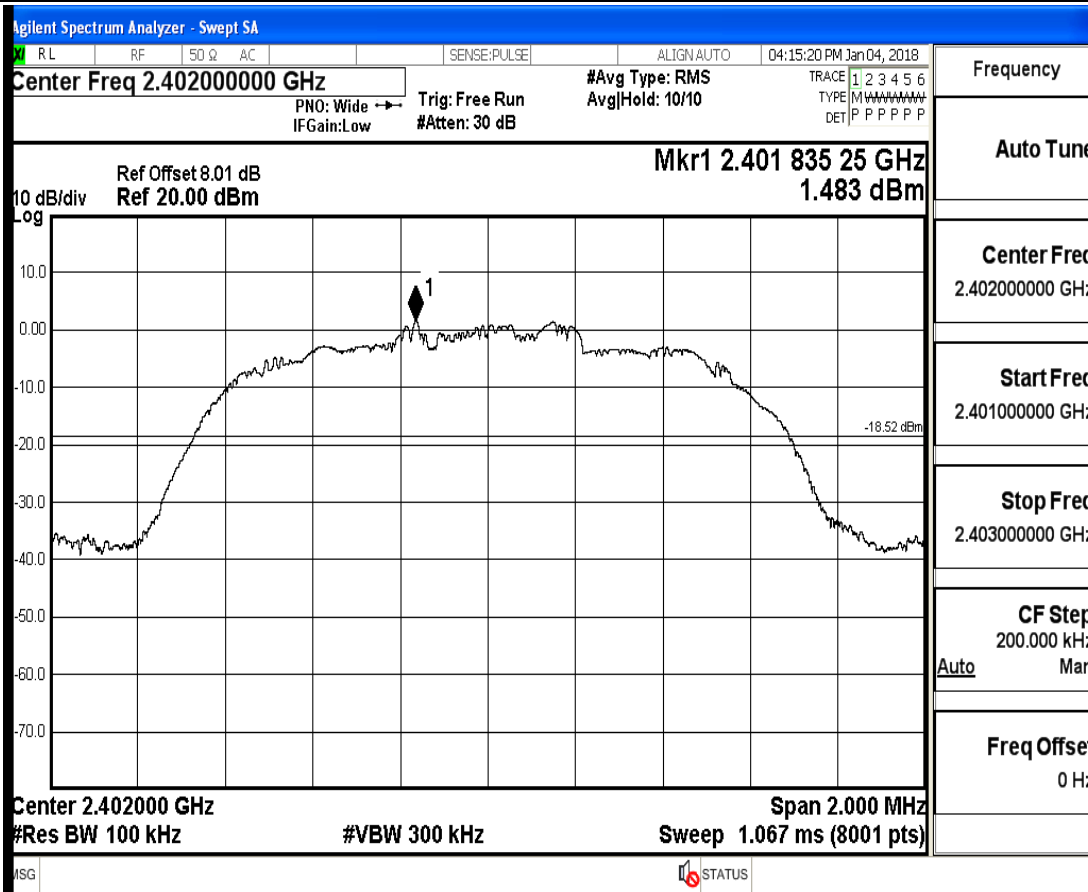
RF Conducted Spurious Emissions_π/4-DQPSK_2441



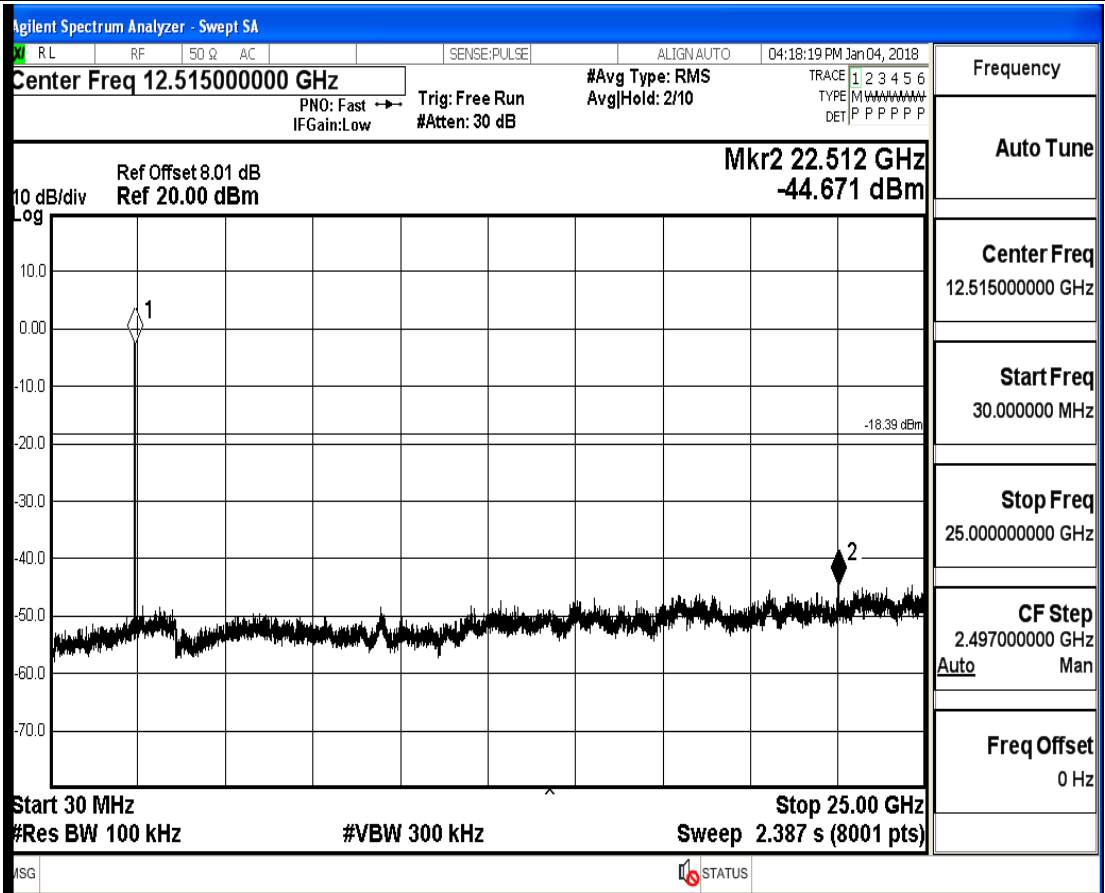
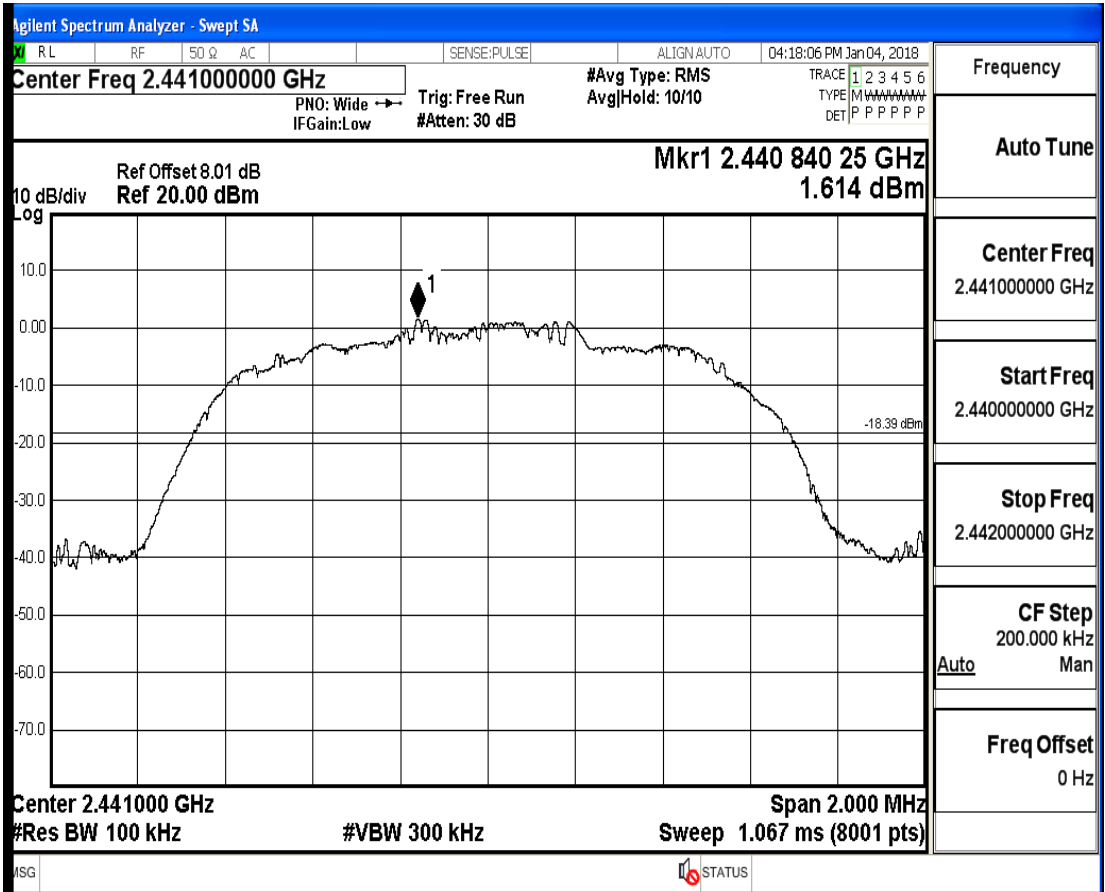
RF Conducted Spurious Emissions_π/4-DQPSK_2480



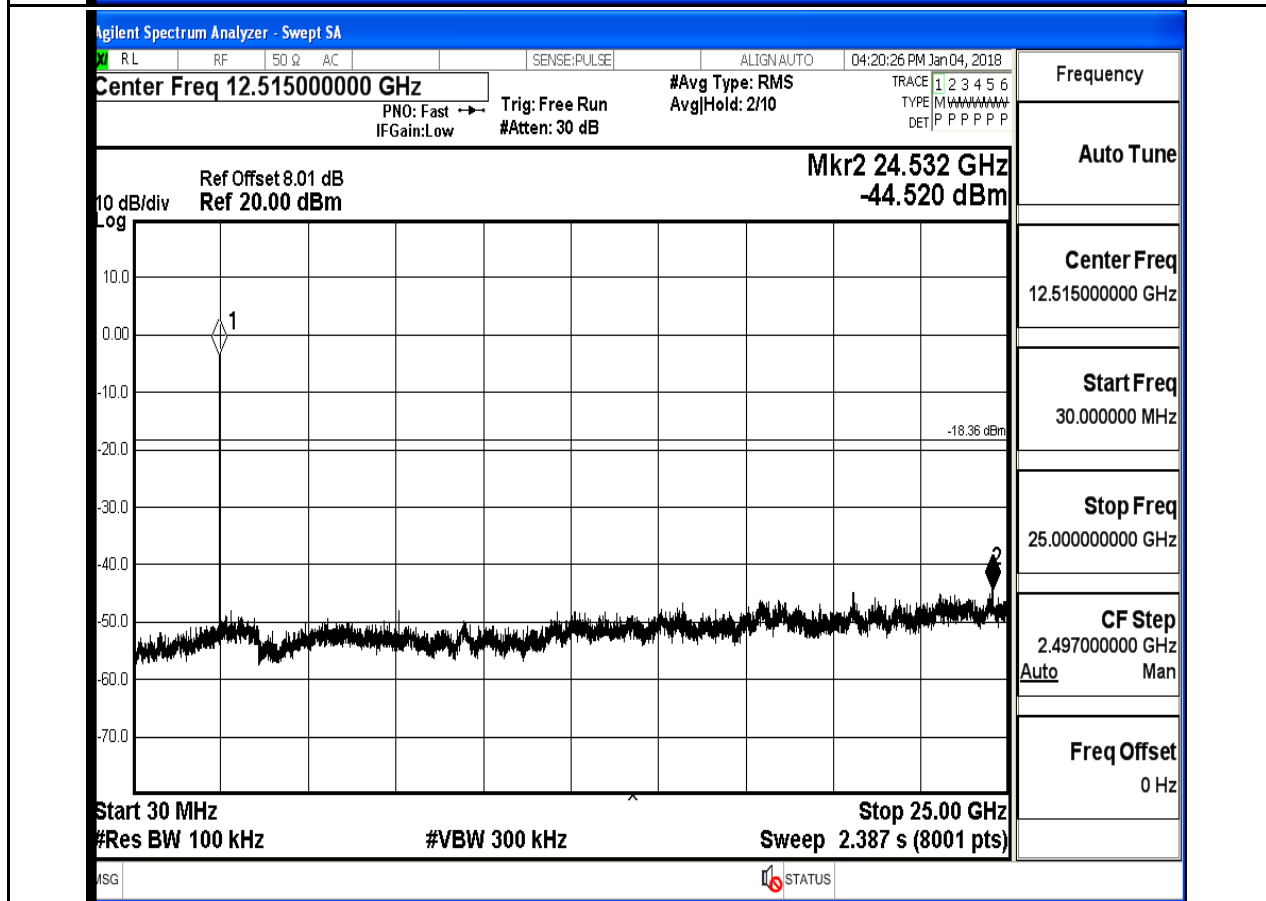
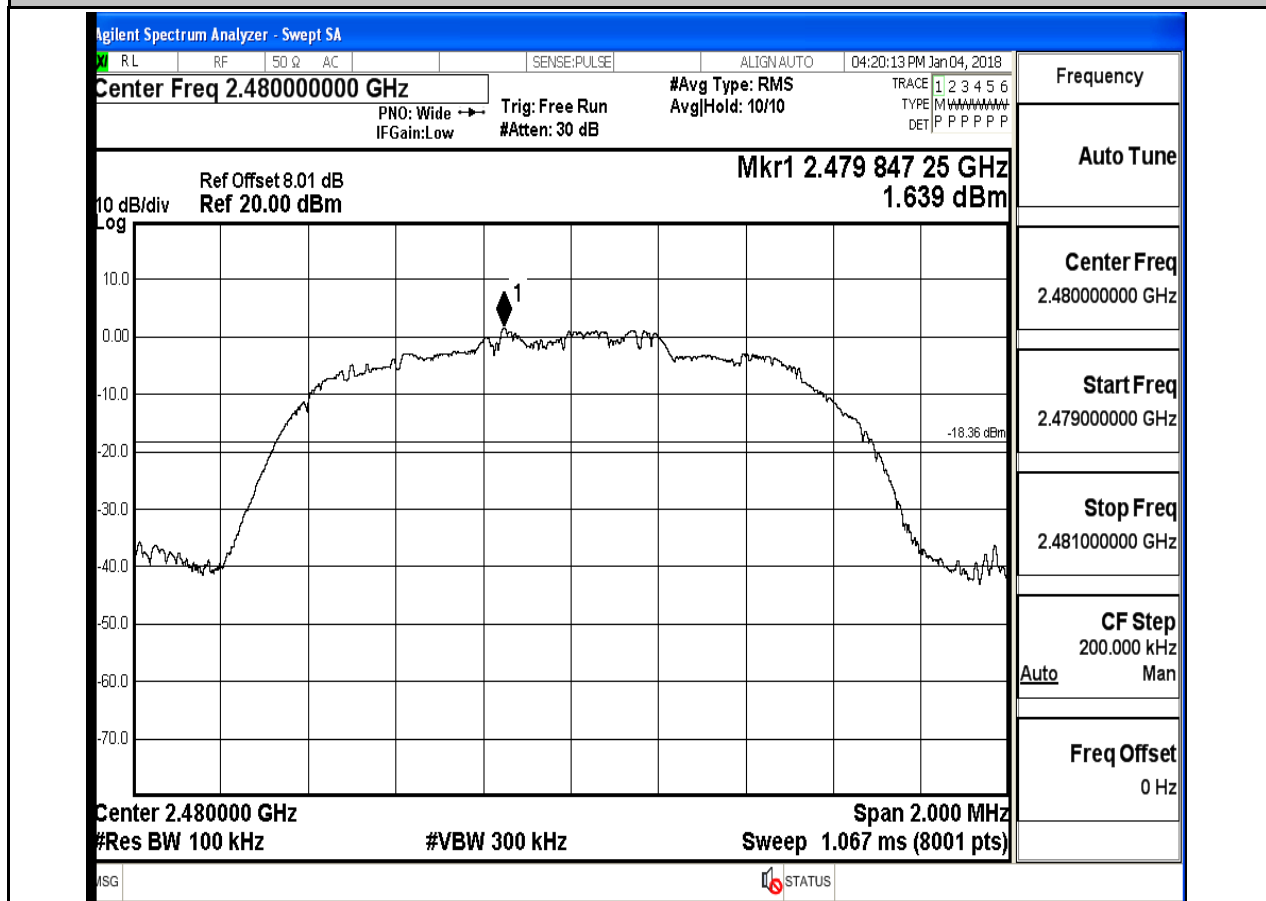
RF Conducted Spurious Emissions_8-DPSK_2402



RF Conducted Spurious Emissions_8-DPSK_2441



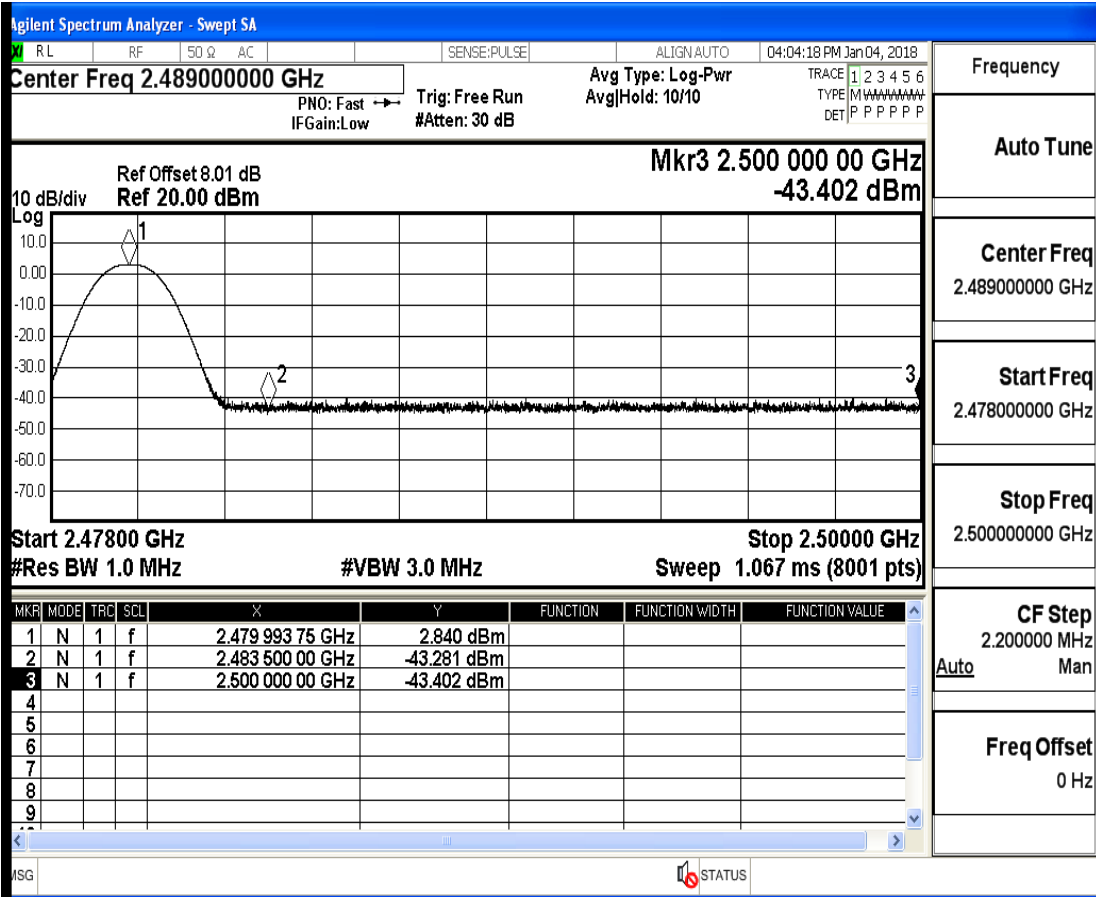
RF Conducted Spurious Emissions_8-DPSK_2480



A.8 Restrict-band band-edge measurements

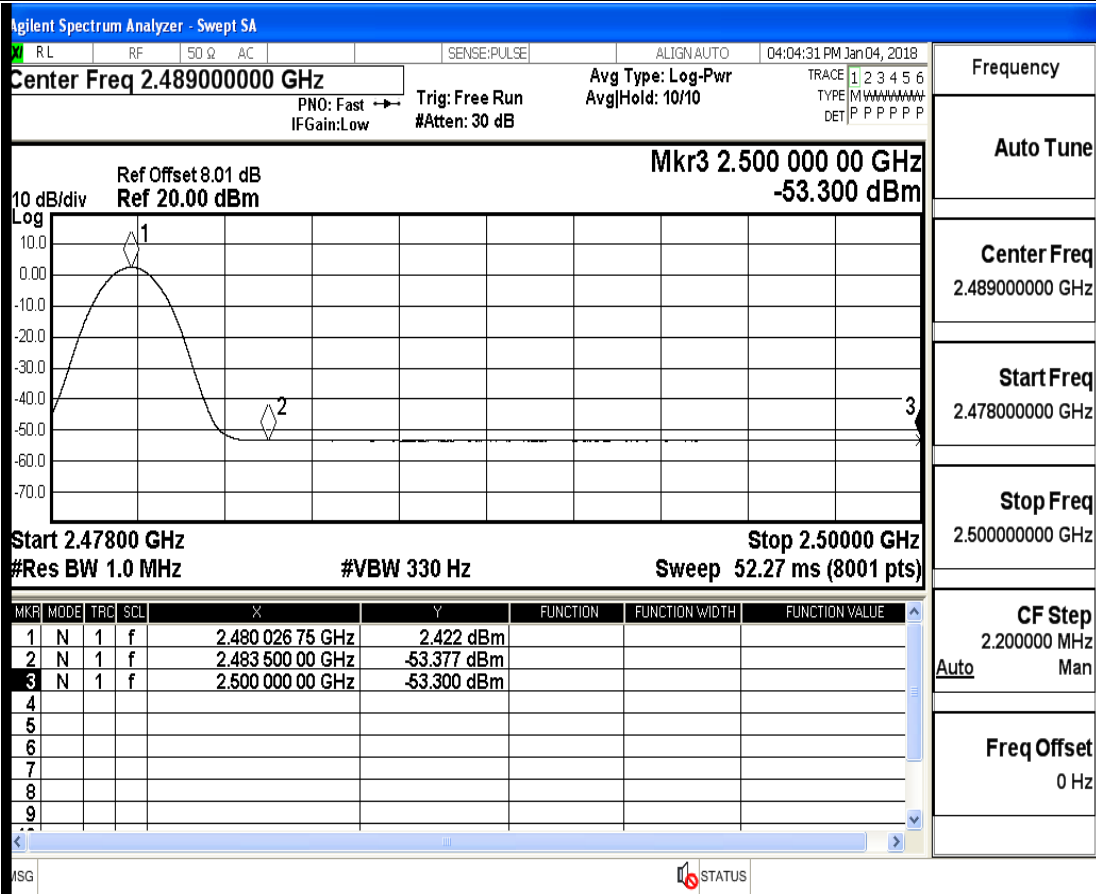
Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.81	1.5	0	54.45	PEAK	74	PASS
	Off	2310.0	-54.01	1.5	0	43.25	AV	54	PASS
	Off	2390.0	-44.01	1.5	0	53.25	PEAK	74	PASS
	Off	2390.0	-53.62	1.5	0	43.64	AV	54	PASS
	Off	2483.5	-43.28	1.5	0	53.98	PEAK	74	PASS
	Off	2483.5	-53.38	1.5	0	43.88	AV	54	PASS
	Off	2500.0	-43.40	1.5	0	53.86	PEAK	74	PASS
	Off	2500.0	-53.30	1.5	0	43.96	AV	54	PASS
$\pi/4$ -DQPSK	Off	2310.0	-43.64	1.5	0	53.62	PEAK	74	PASS
	Off	2310.0	-53.91	1.5	0	43.35	AV	54	PASS
	Off	2390.0	-42.80	1.5	0	54.46	PEAK	74	PASS
	Off	2390.0	-53.62	1.5	0	43.64	AV	54	PASS
	Off	2483.5	-43.73	1.5	0	53.52	PEAK	74	PASS
	Off	2483.5	-53.32	1.5	0	43.94	AV	54	PASS
	Off	2500.0	-41.11	1.5	0	56.14	PEAK	74	PASS
	Off	2500.0	-53.36	1.5	0	43.90	AV	54	PASS
8-DPSK	Off	2310.0	-44.29	1.5	0	52.97	PEAK	74	PASS
	Off	2310.0	-53.54	1.5	0	43.72	AV	54	PASS
	Off	2390.0	-43.98	1.5	0	53.28	PEAK	74	PASS
	Off	2390.0	-53.57	1.5	0	43.69	AV	54	PASS
	Off	2483.5	-43.56	1.5	0	53.70	PEAK	74	PASS
	Off	2483.5	-53.29	1.5	0	43.97	AV	54	PASS
	Off	2500.0	-42.14	1.5	0	55.11	PEAK	74	PASS
	Off	2500.0	-53.29	1.5	0	43.97	AV	54	PASS

Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK



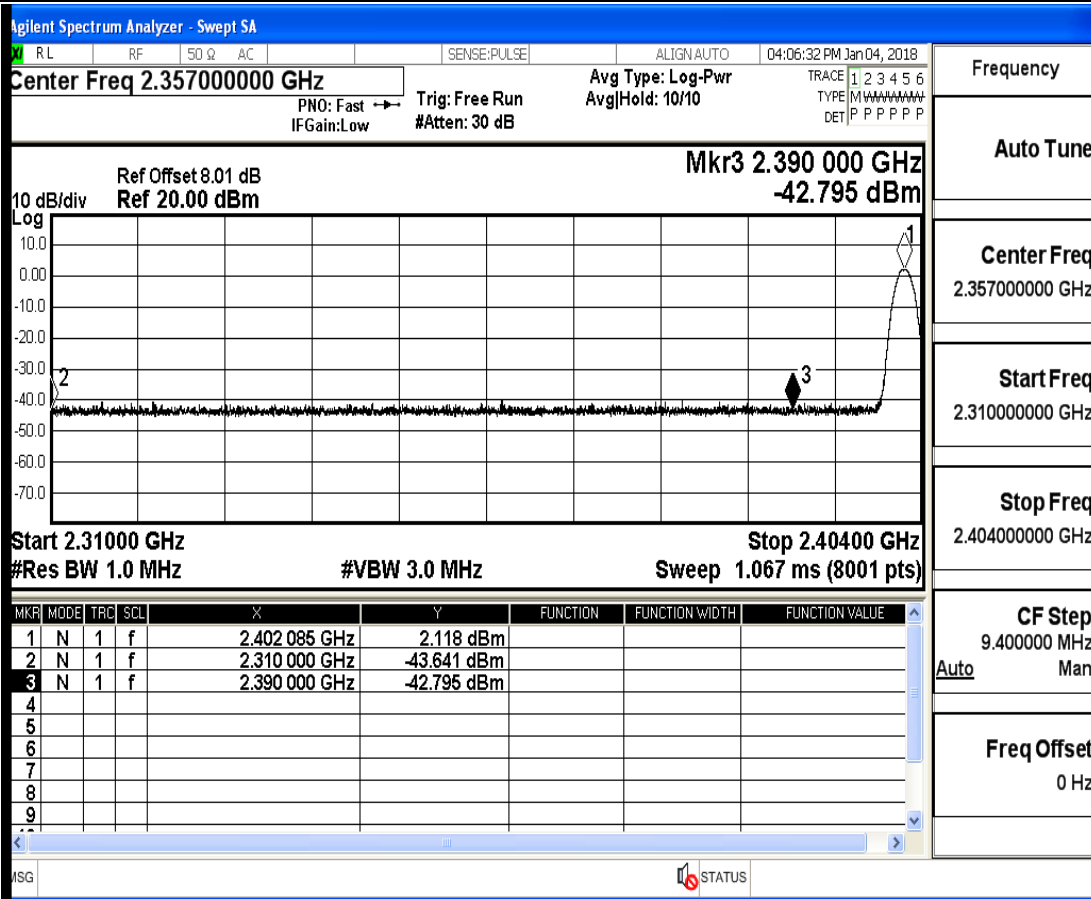
Frequency	
Auto Tune	
Center Freq	2.48900000 GHz
Start Freq	2.47800000 GHz
Stop Freq	2.50000000 GHz
CF Step	2.200000 MHz
	Auto Man
Freq Offset	0 Hz

Restrict-band band-edge measurements_Hopping Off_ GFSK_Average



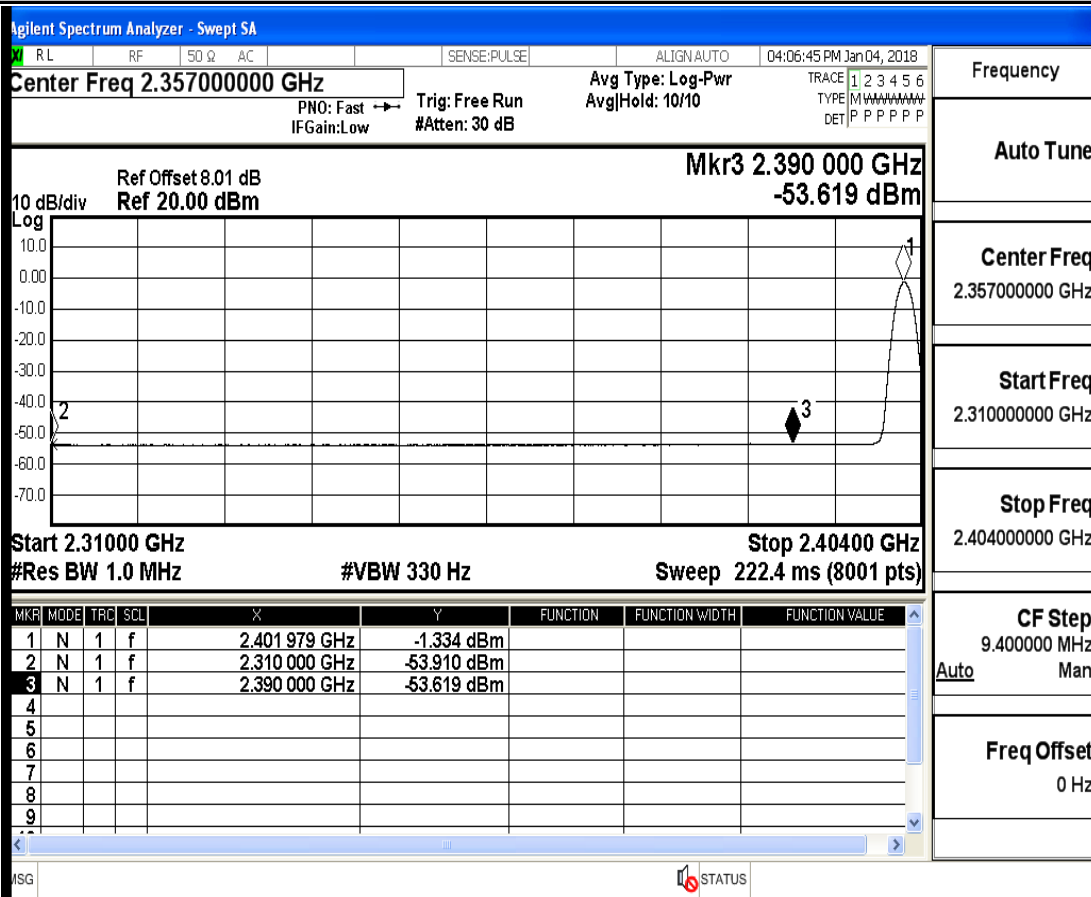
Frequency	
Auto Tune	
Center Freq	2.48900000 GHz
Start Freq	2.47800000 GHz
Stop Freq	2.50000000 GHz
CF Step	2.200000 MHz
	Auto Man
Freq Offset	0 Hz

Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK



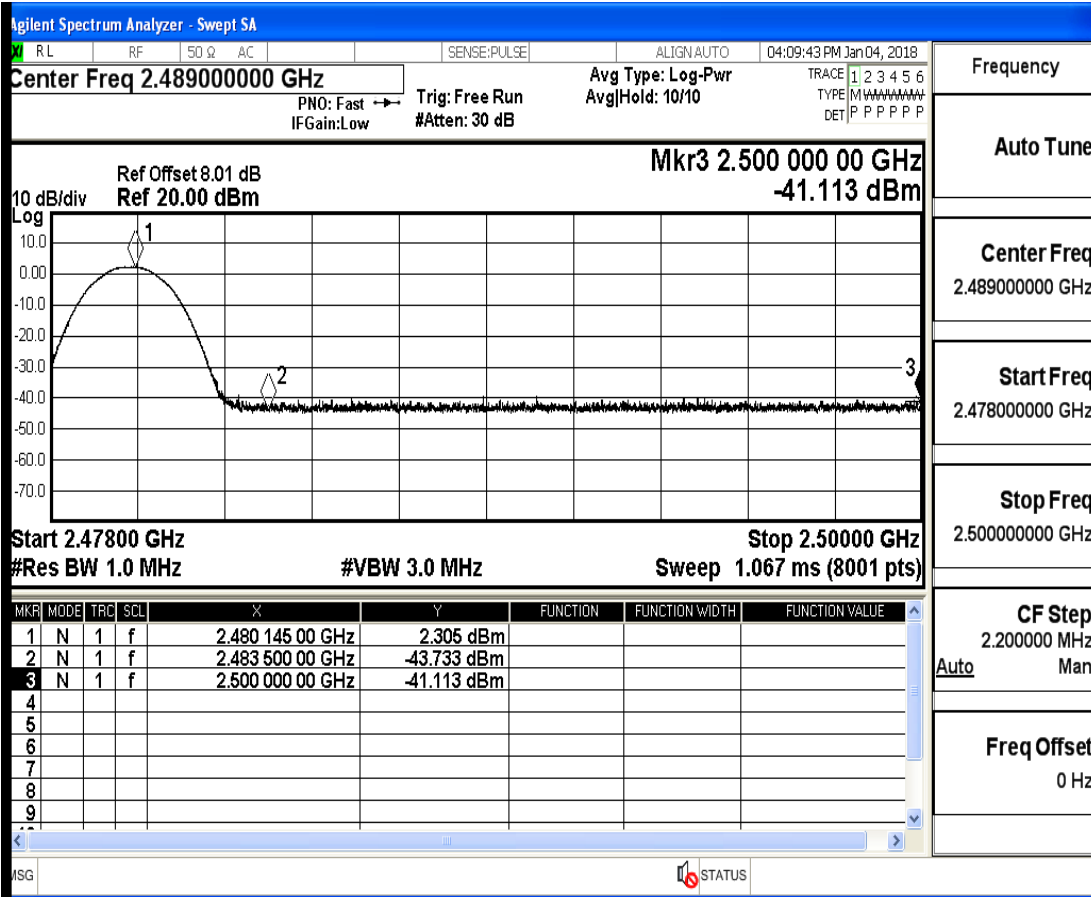
Frequency	
Auto Tune	
Center Freq	2.35700000 GHz
Start Freq	2.31000000 GHz
Stop Freq	2.40400000 GHz
CF Step	9.400000 MHz
Auto	Man
Freq Offset	0 Hz

Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average

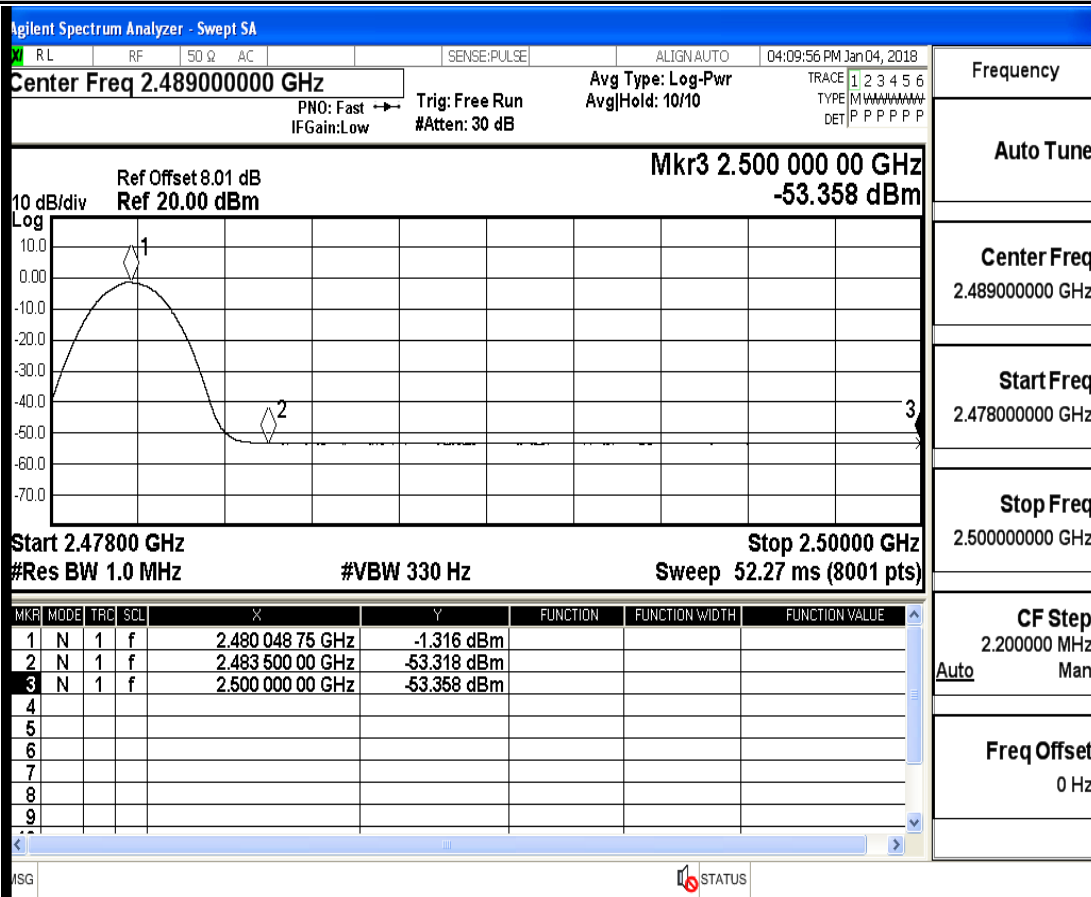


Frequency	
Auto Tune	
Center Freq	2.35700000 GHz
Start Freq	2.31000000 GHz
Stop Freq	2.40400000 GHz
CF Step	9.400000 MHz
Auto	Man
Freq Offset	0 Hz

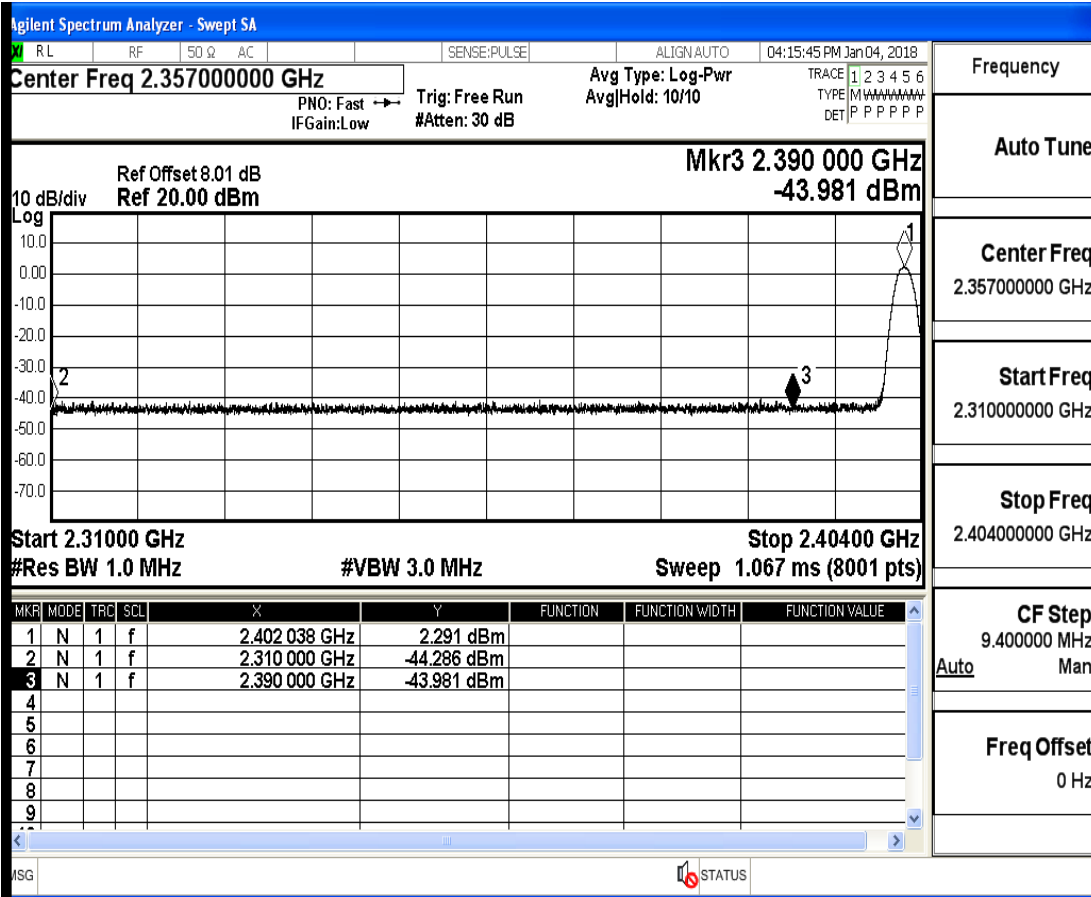
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK



Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average

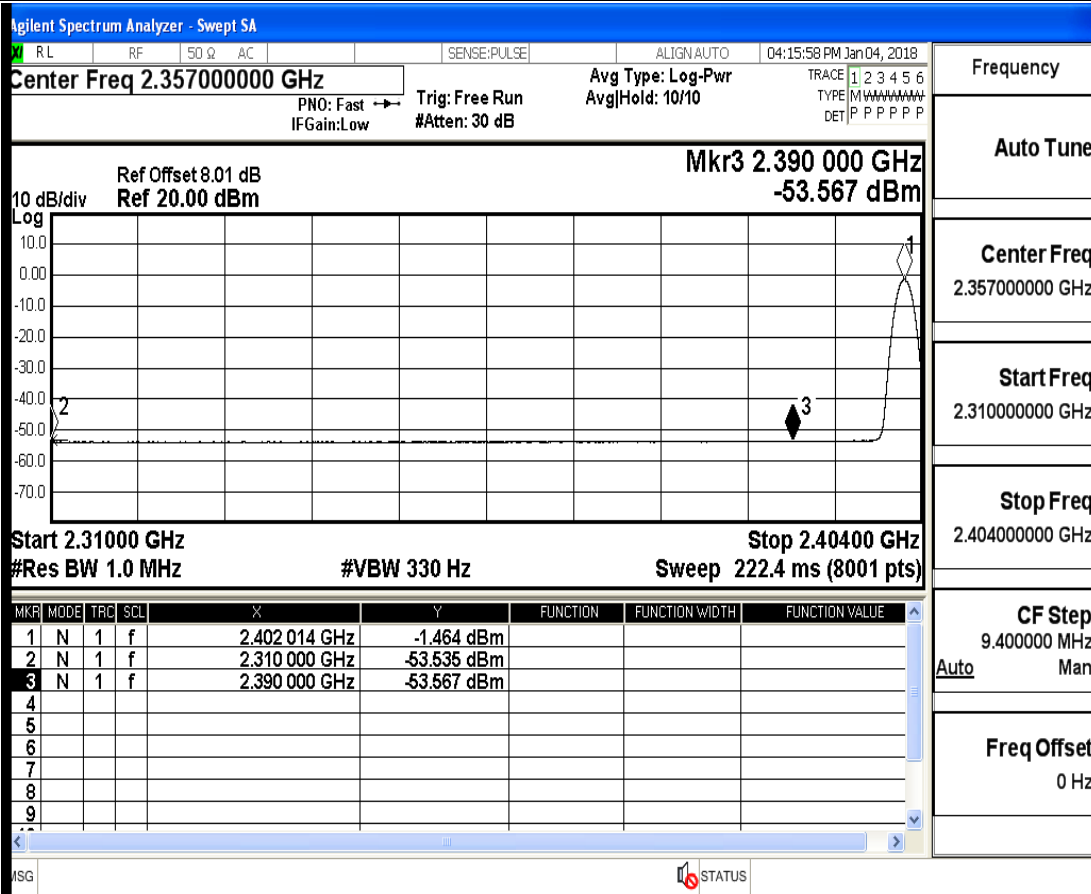


Restrict-band band-edge measurements_Hopping Off_8-DPSK_PEAK



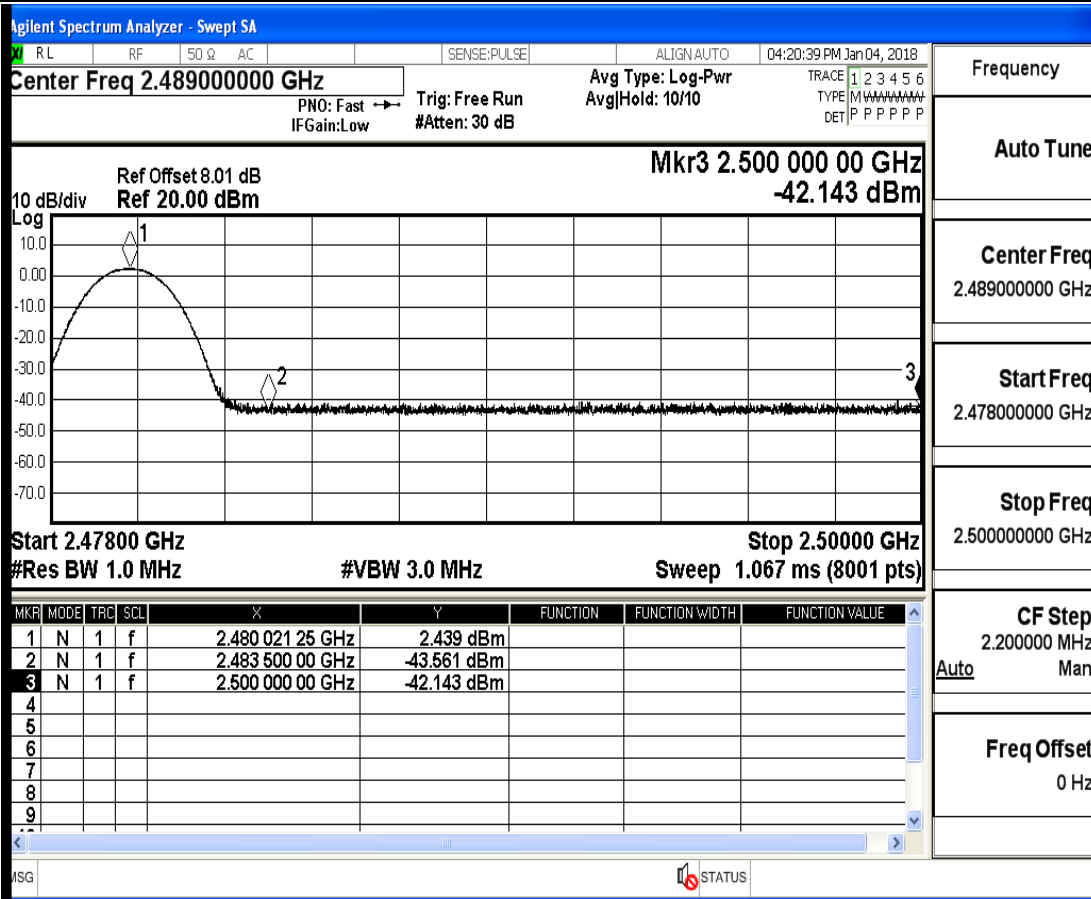
Frequency	
Auto Tune	
Center Freq	2.35700000 GHz
Start Freq	2.31000000 GHz
Stop Freq	2.40400000 GHz
CF Step	9.400000 MHz
Auto	Man
Freq Offset	0 Hz

Restrict-band band-edge measurements_Hopping Off_8-DPSK_Average



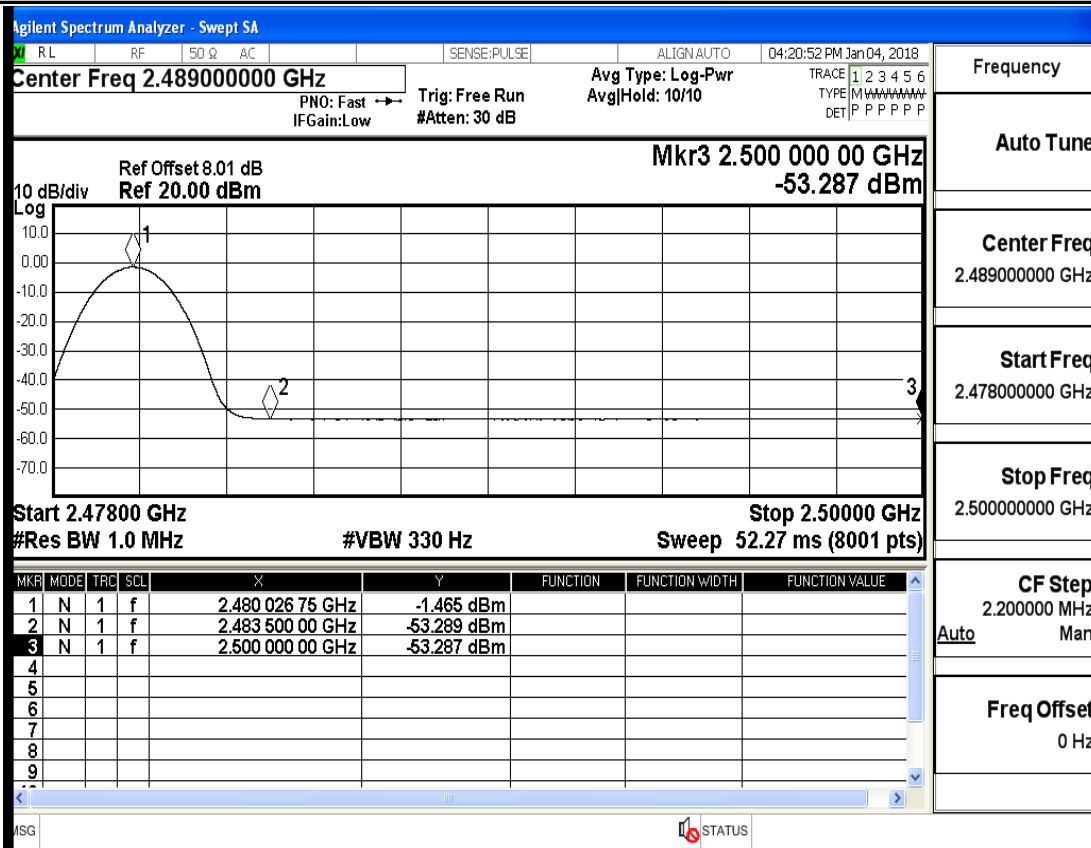
Frequency	
Auto Tune	
Center Freq	2.35700000 GHz
Start Freq	2.31000000 GHz
Stop Freq	2.40400000 GHz
CF Step	9.400000 MHz
Auto	Man
Freq Offset	0 Hz

Restrict-band band-edge measurements_Hopping Off_8-DPSK_PEAK



Frequency
Auto Tune
Center Freq 2.489000000 GHz
Start Freq 2.478000000 GHz
Stop Freq 2.500000000 GHz
CF Step 2.200000 MHz Auto Man
Freq Offset 0 Hz

Restrict-band band-edge measurements_Hopping Off_8-DPSK_Average



Frequency
Auto Tune
Center Freq 2.489000000 GHz
Start Freq 2.478000000 GHz
Stop Freq 2.500000000 GHz
CF Step 2.200000 MHz Auto Man
Freq Offset 0 Hz