Appendix A

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

Product Name: Karaoke Machine

Trade Mark: N/A

Test Model: K12

Environmental Conditions

Temperature:	24.5℃
Relative Humidity:	52.5%
ATM Pressure:	101Kpa
Test Engineer:	Emiya lin
Supervised by:	Simba Haung

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1 Duty Cycle

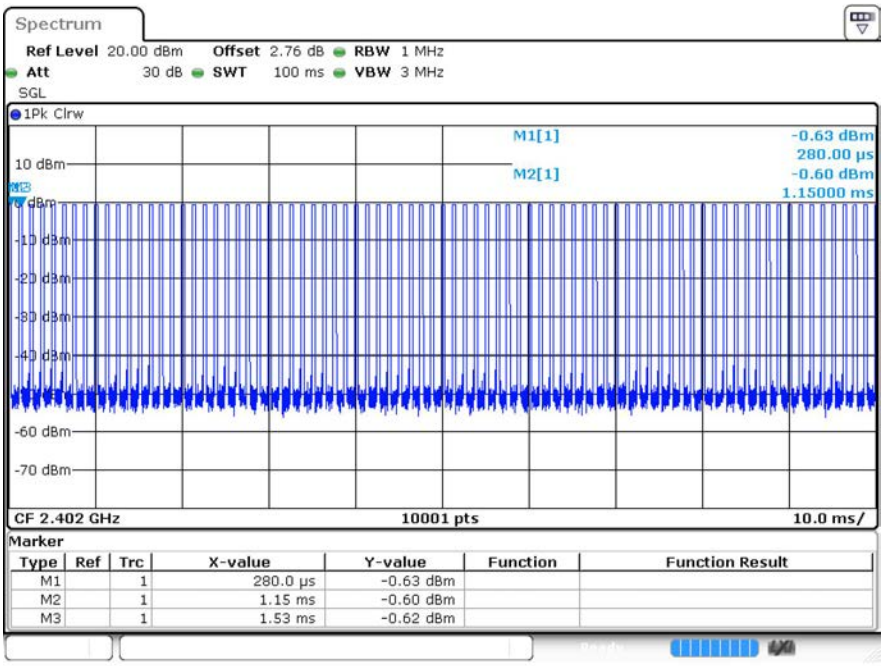
1.1 Test Result

Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor	1/T (kHz)
1-DH1	2402	31.54	5.01	2.63
1-DH1	2441	31.2	5.06	2.63
1-DH1	2480	31.71	4.99	2.56
2-DH1	2402	32	4.95	2.56
2-DH1	2441	32	4.95	2.56
2-DH1	2480	31.91	4.96	2.56
3-DH1	2402	32	4.95	2.56
3-DH1	2441	32	4.95	2.56
3-DH1	2480	32.01	4.95	2.56

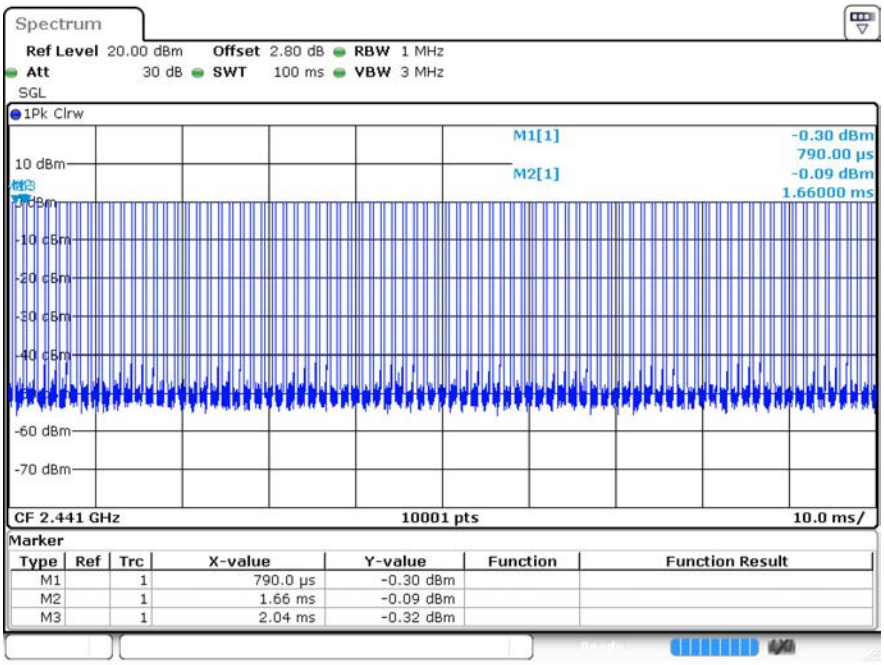
1.2 Test Graphs

Test Graphs

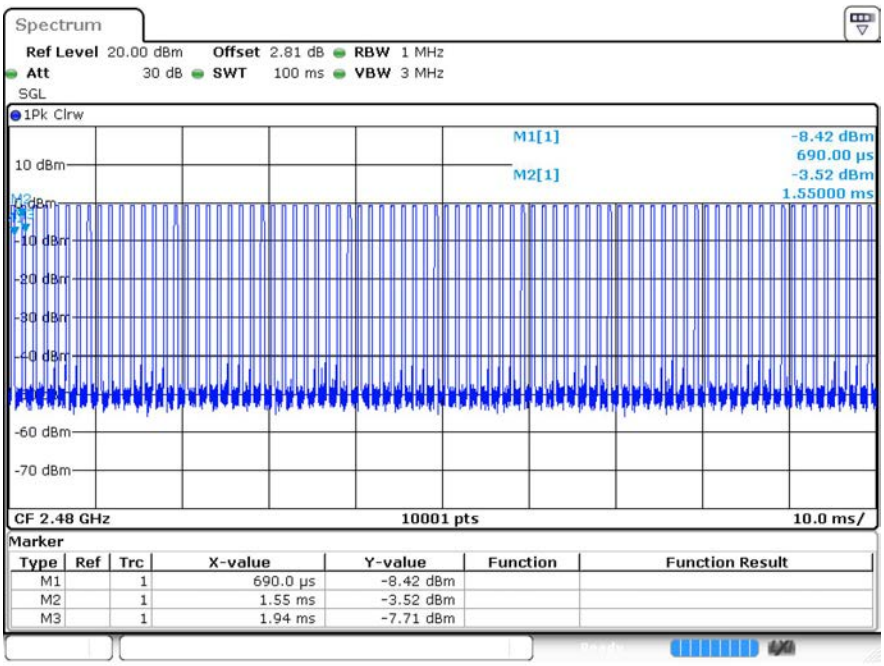
1-DH1 2402MHz



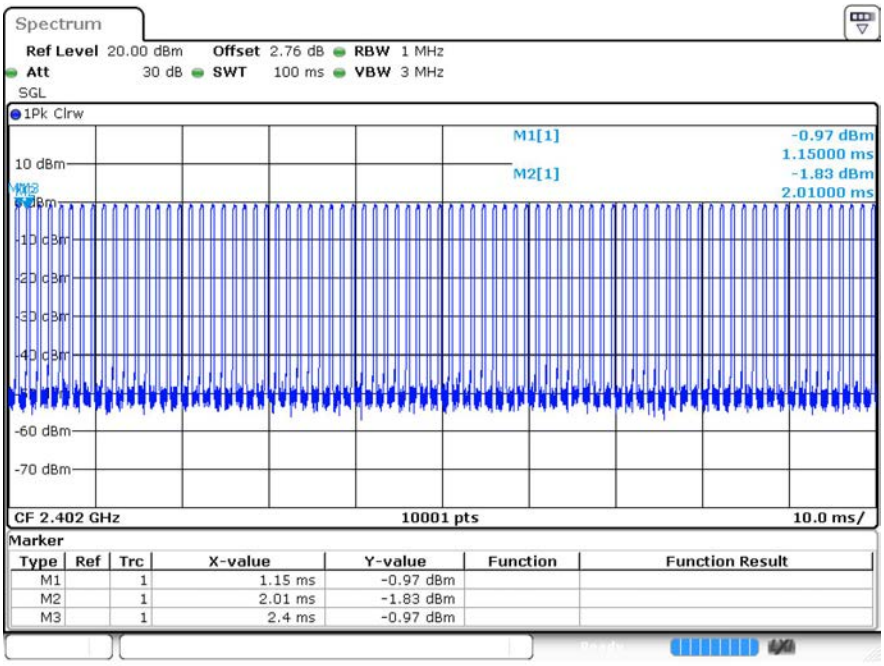
1-DH1 2441MHz



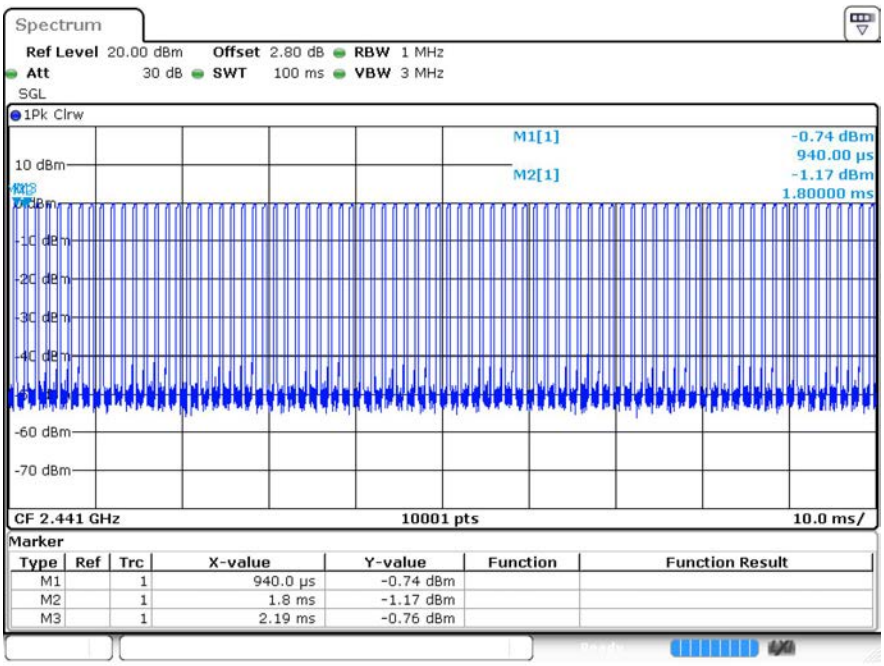
1-DH1 2480MHz



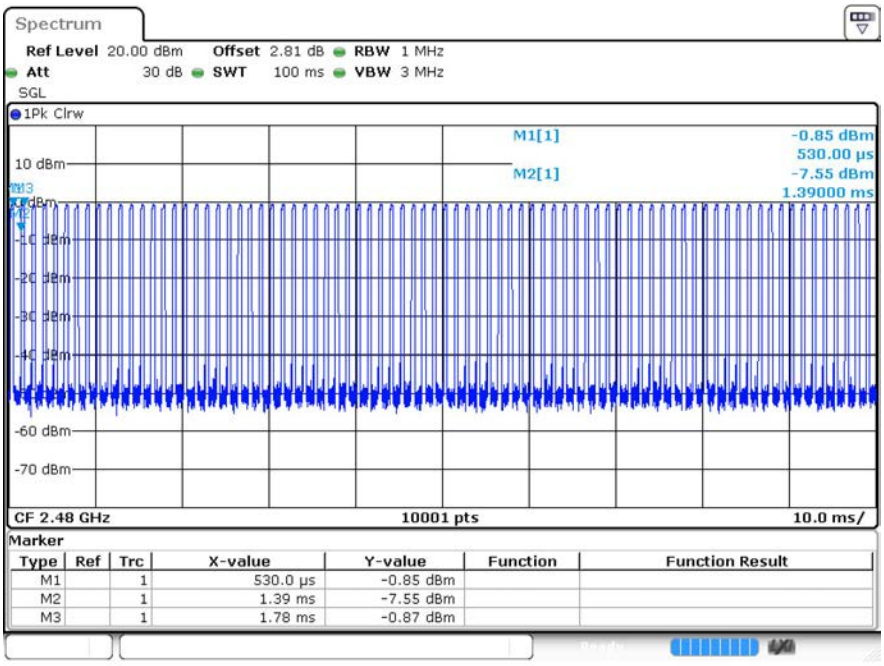
2-DH1 2402MHz



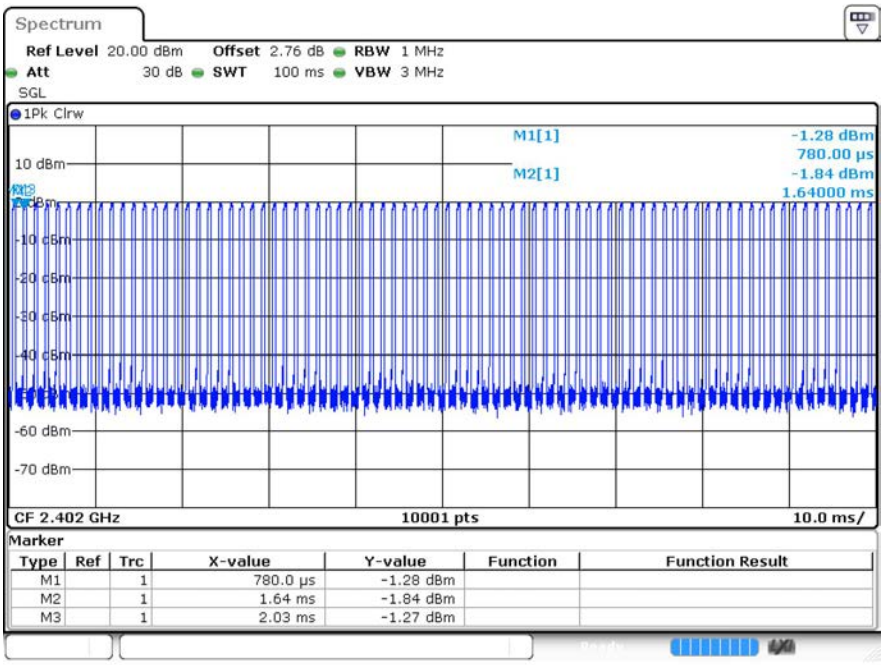
2-DH1 2441MHz



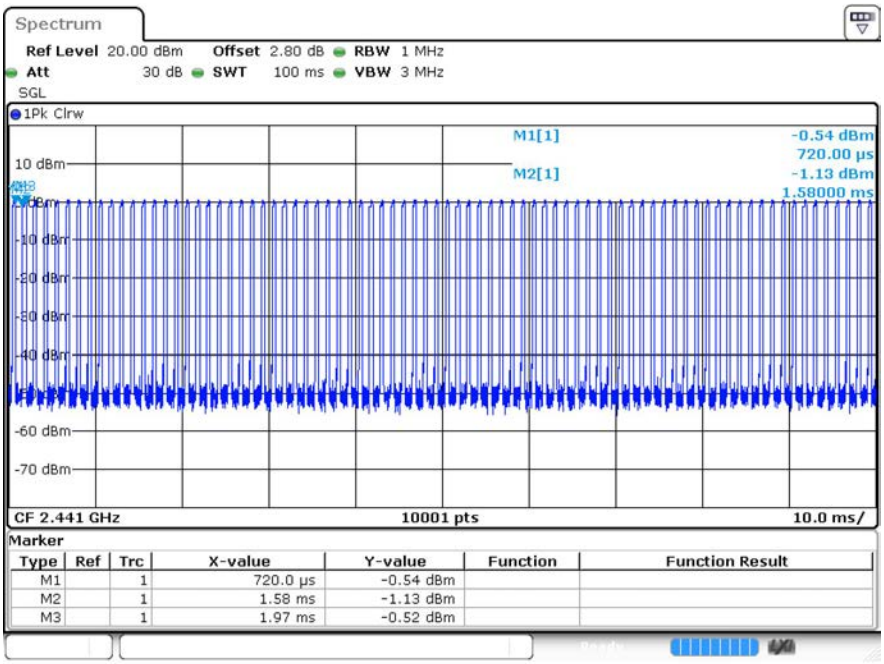
2-DH1 2480MHz



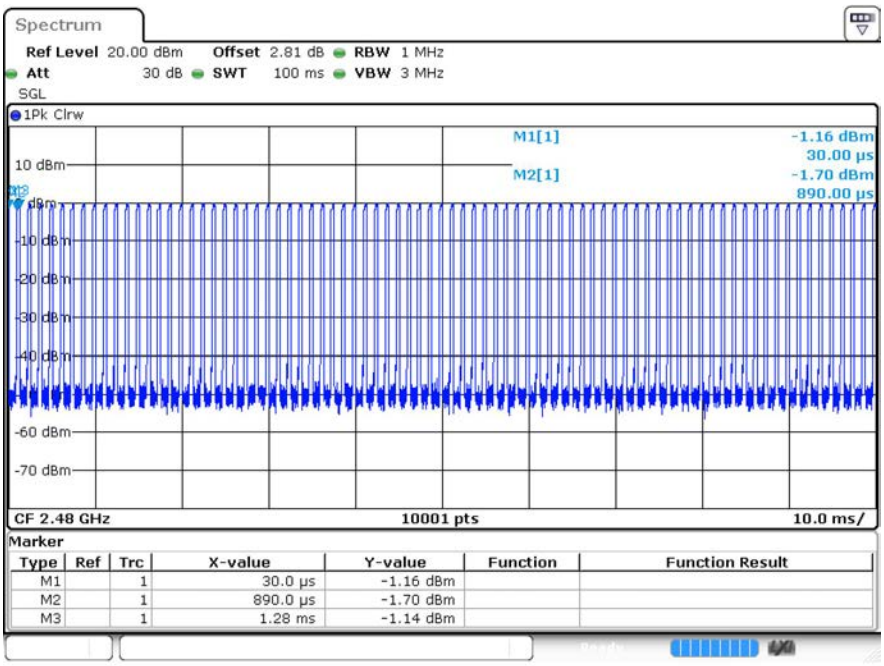
3-DH1 2402MHz



3-DH1 2441MHz



3-DH1 2480MHz

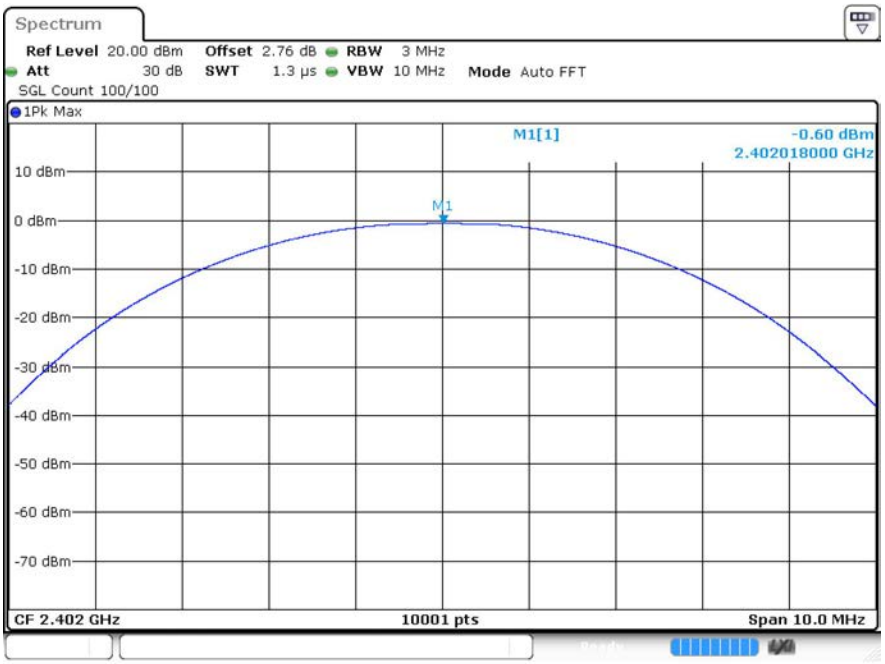
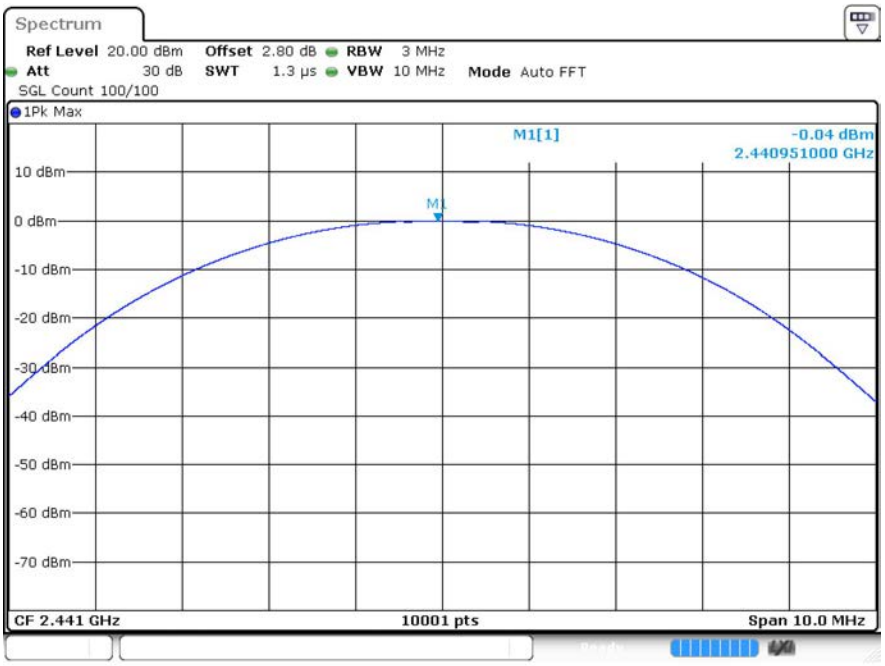


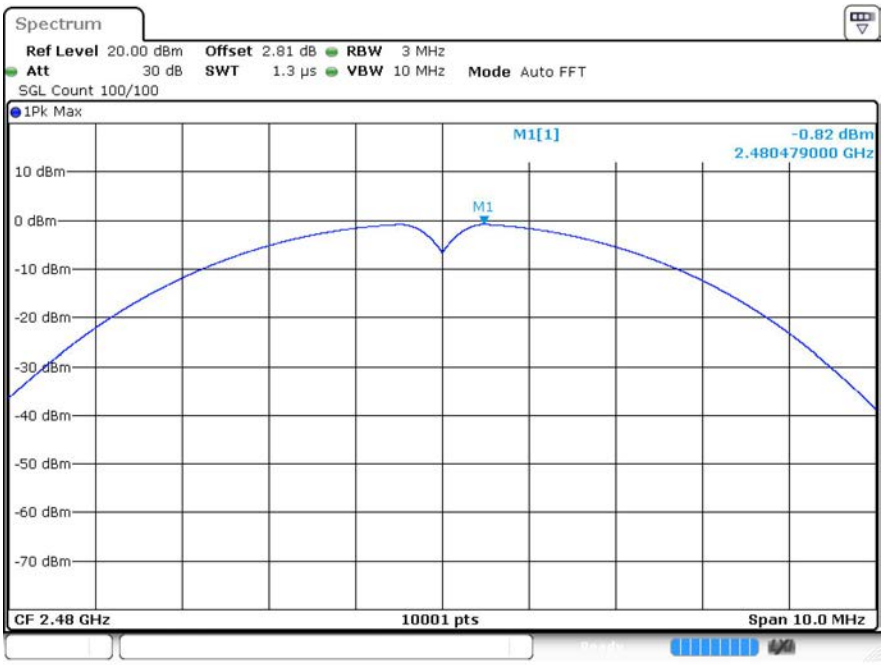
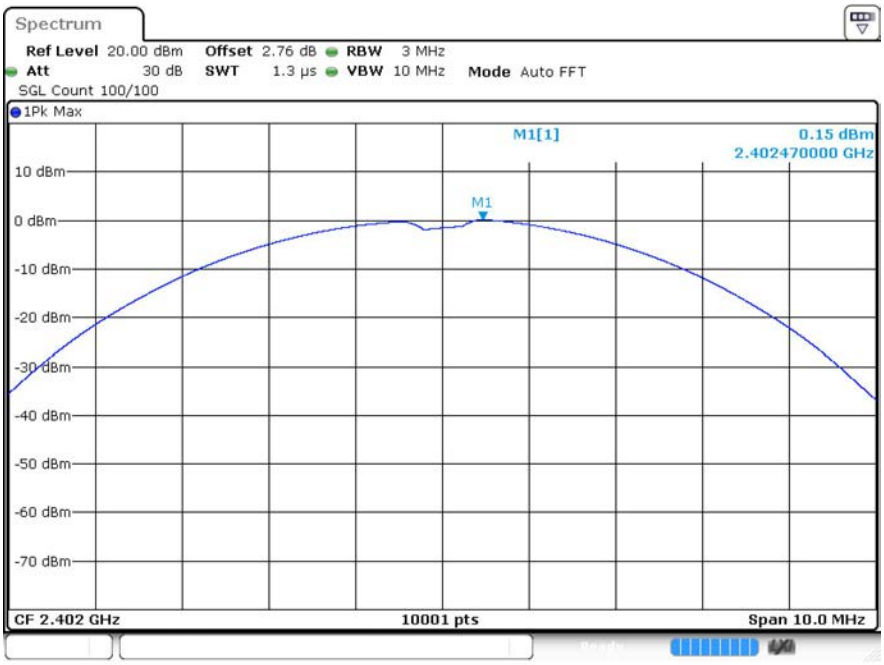
2 Maximum Conducted Peak Output Power

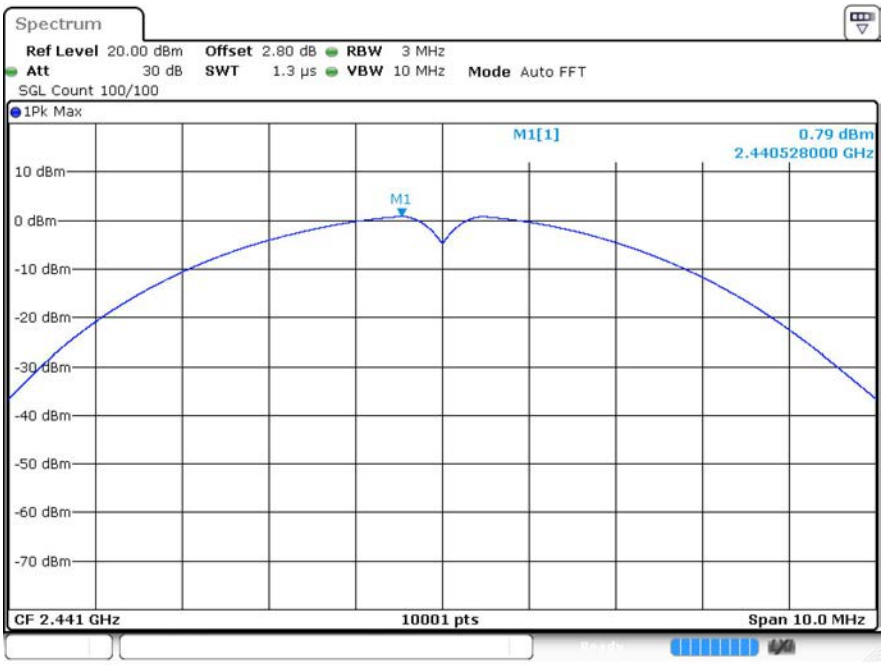
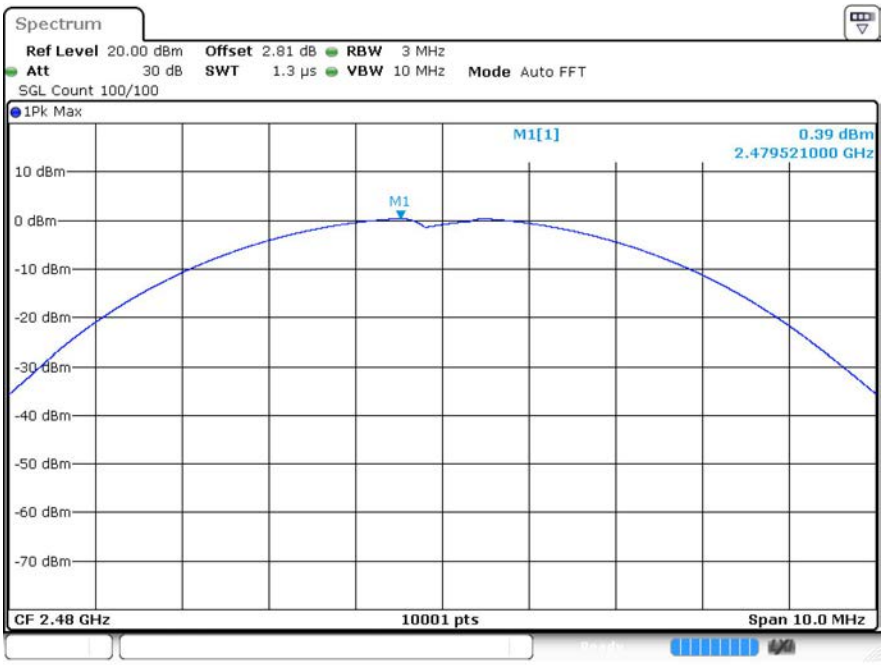
2.1 Test Result

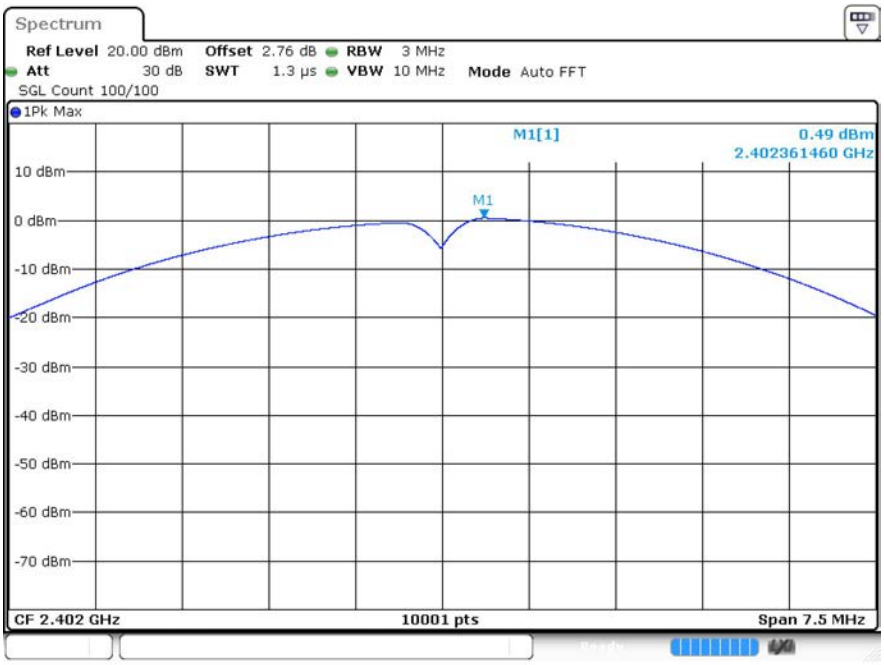
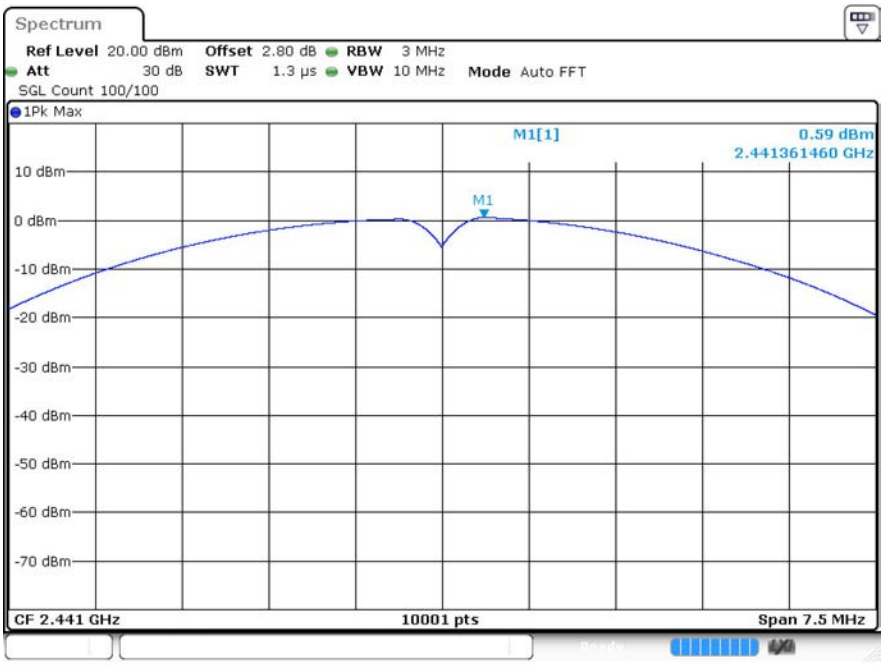
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.6	21	Pass
	MCH	-0.04	21	Pass
	HCH	-0.82	21	Pass
π/4DQPSK	LCH	0.15	21	Pass
	MCH	0.79	21	Pass
	HCH	0.39	21	Pass
8DPSK	LCH	0.49	21	Pass
	MCH	0.59	21	Pass
	HCH	0.27	21	Pass

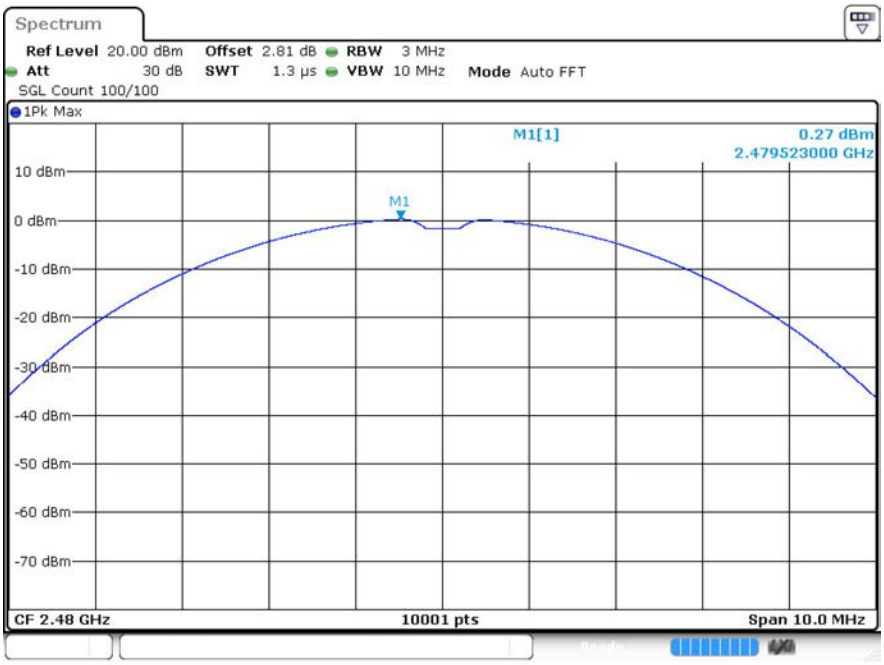
2.2 Test Graphs

Test Graphs	
GFSK/LCH	
GFSK/MCH	

GFSK/HCH	
π/4DQPSK/LCH	

π/4DQPSK/MCH	
π/4DQPSK/HCH	

8DPSK/LCH	
8DPSK/MCH	

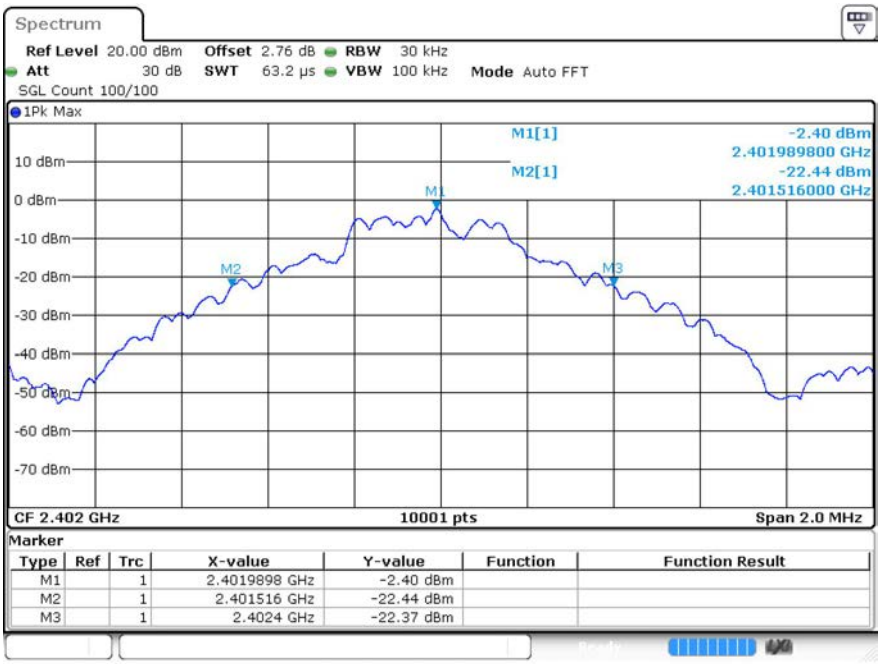
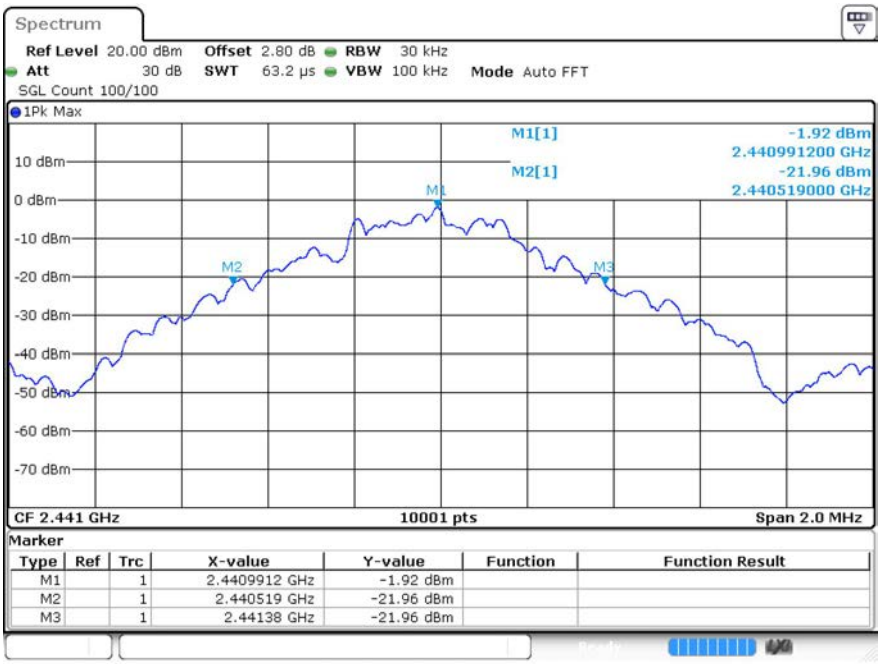
8DPSK/HCH	 Spectrum Ref Level 20.00 dBm Offset 2.81 dB RBW 3 MHz Att 30 dB SWT 1.3 µs VBW 10 MHz Mode Auto FFT SGL Count 100/100 1Pk Max M1[1] 0.27 dBm 2.479523000 GHz M1 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.48 GHz 10001 pts Span 10.0 MHz

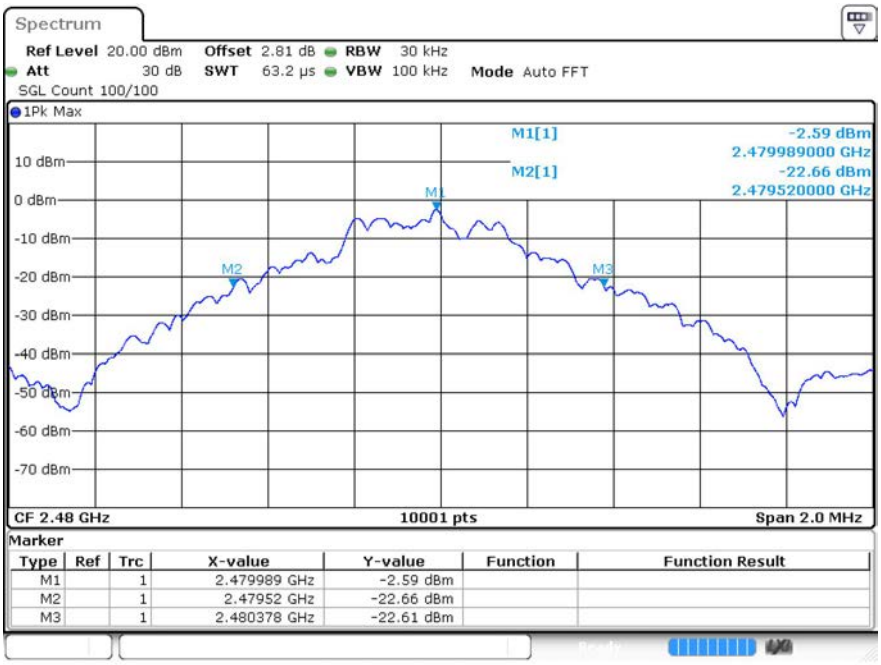
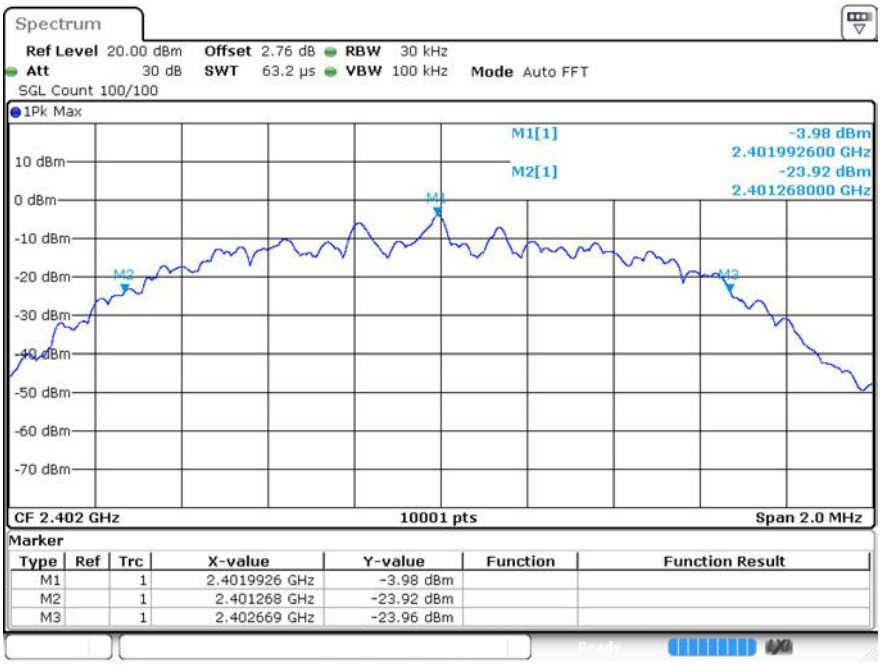
3 20dB Bandwidth

3.1 Test Result

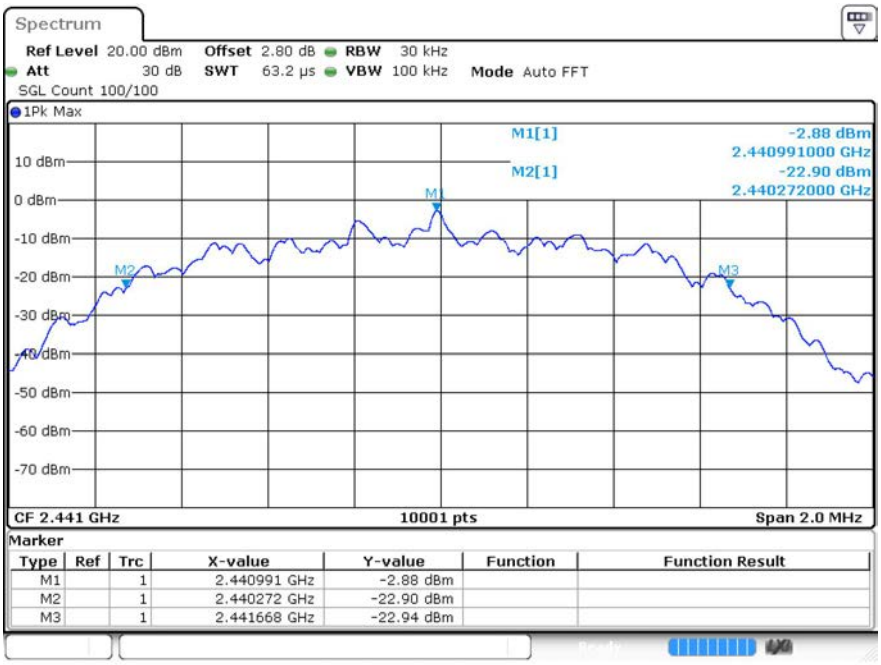
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.884	Not Specified	Pass
	MCH	0.86	Not Specified	Pass
	HCH	0.857	Not Specified	Pass
π/4DQPSK	LCH	1.401	Not Specified	Pass
	MCH	1.395	Not Specified	Pass
	HCH	1.392	Not Specified	Pass
8DPSK	LCH	1.438	Not Specified	Pass
	MCH	1.439	Not Specified	Pass
	HCH	1.423	Not Specified	Pass

3.2 Test Graphs

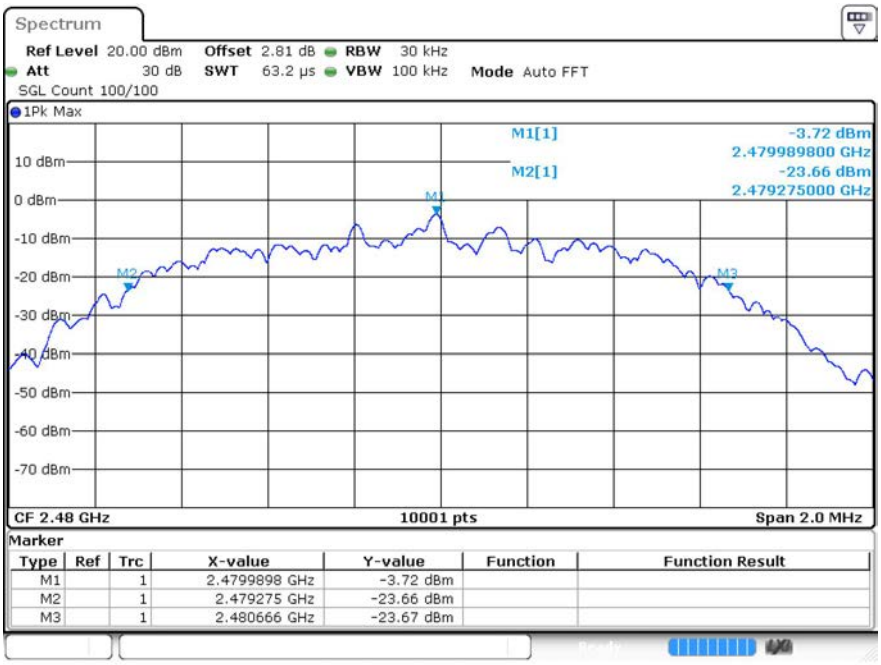
Test Graphs	
GFSK/LCH	
GFSK/MCH	

GFSK/HCH	
π/4DQPSK/LCH	

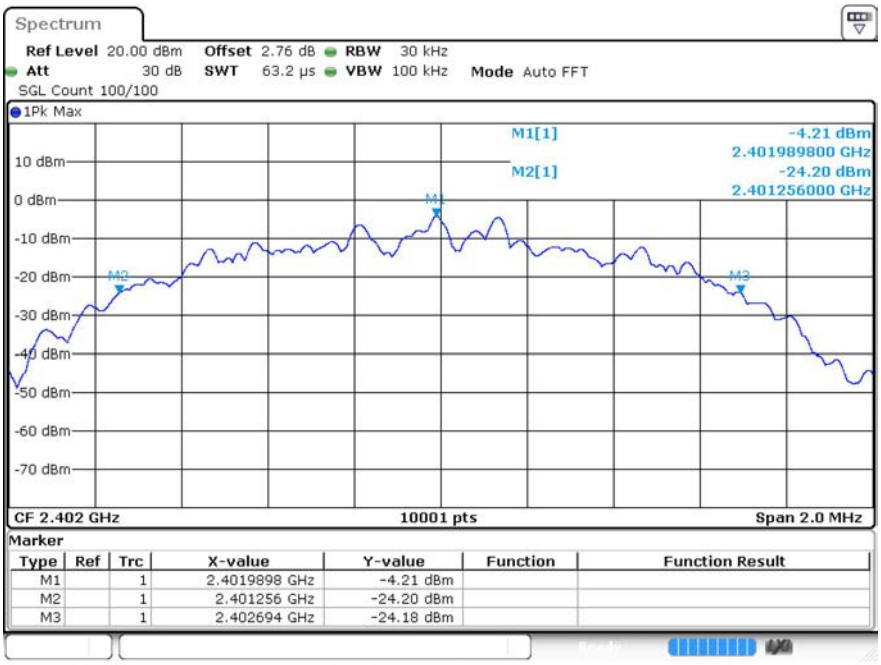
π/4DQPSK/MCH



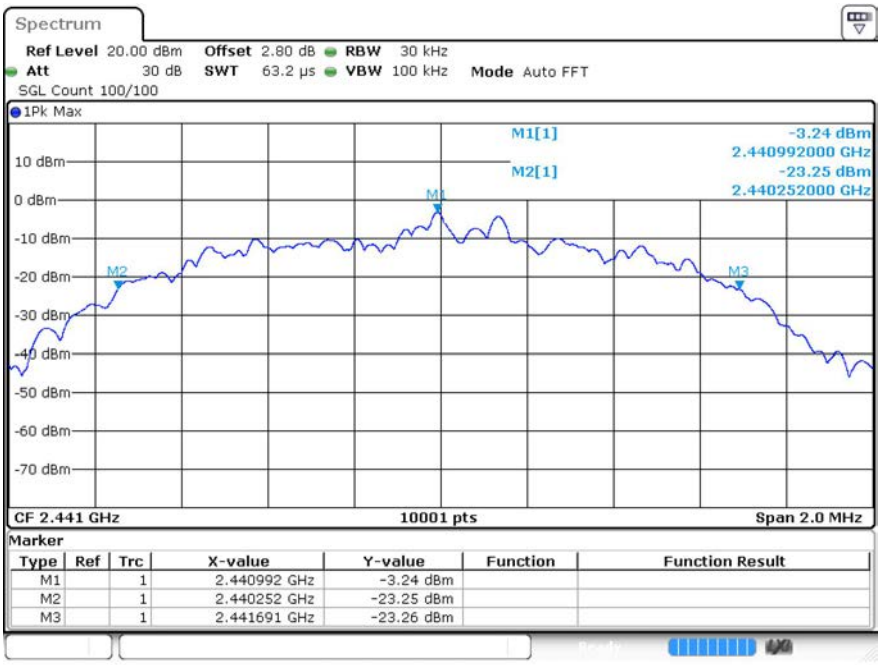
π/4DQPSK/HCH

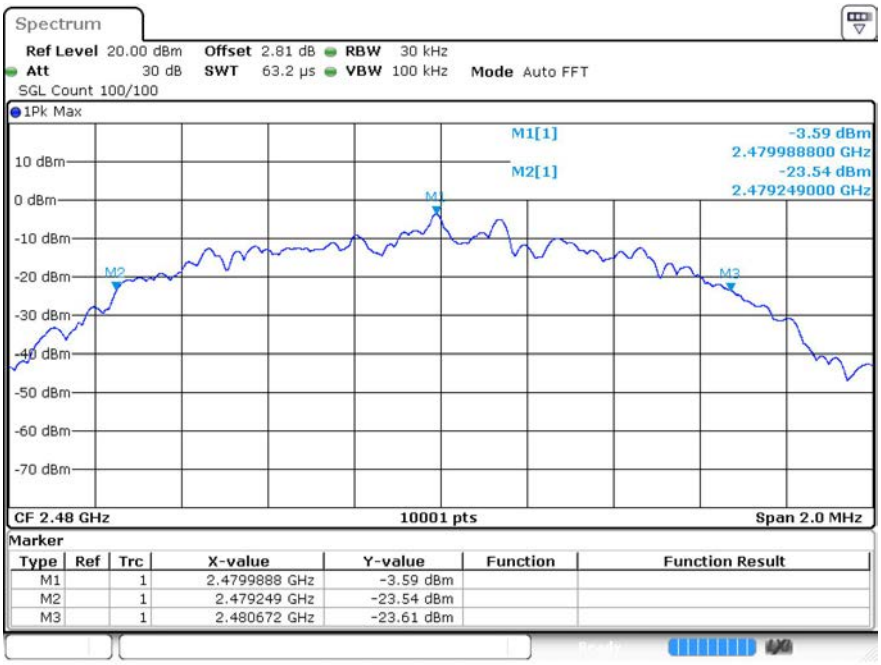


8DPSK/LCH



8DPSK/MCH



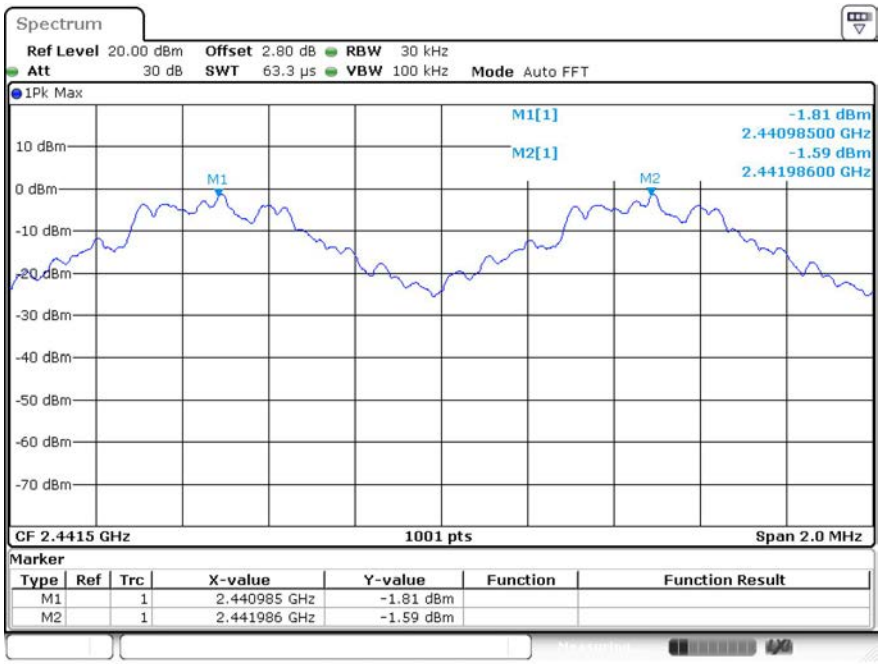
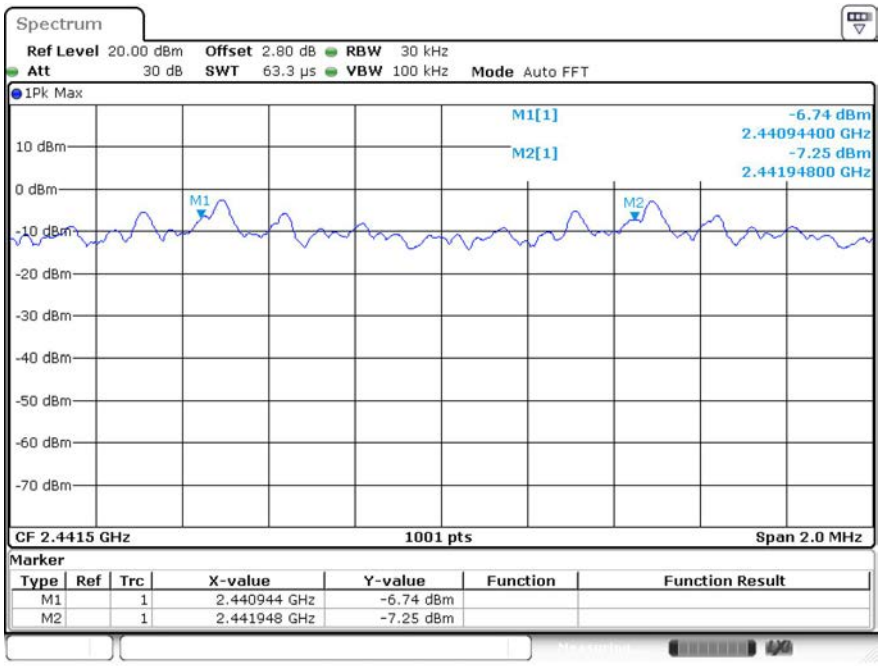
8DPSK/HCH	 Spectrum Ref Level 20.00 dBm Offset 2.81 dB RBW 30 kHz Att 30 dB SWT 63.2 µs VBW 100 kHz Mode Auto FFT SGL Count 100/100 1Pk Max M1[1] -3.59 dBm 2.479988800 GHz M2[1] -23.54 dBm 2.479249000 GHz 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.48 GHz 10001 pts Span 2.0 MHz Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.4799888 GHz -3.59 dBm M2 1 2.479249 GHz -23.54 dBm M3 1 2.480672 GHz -23.61 dBm

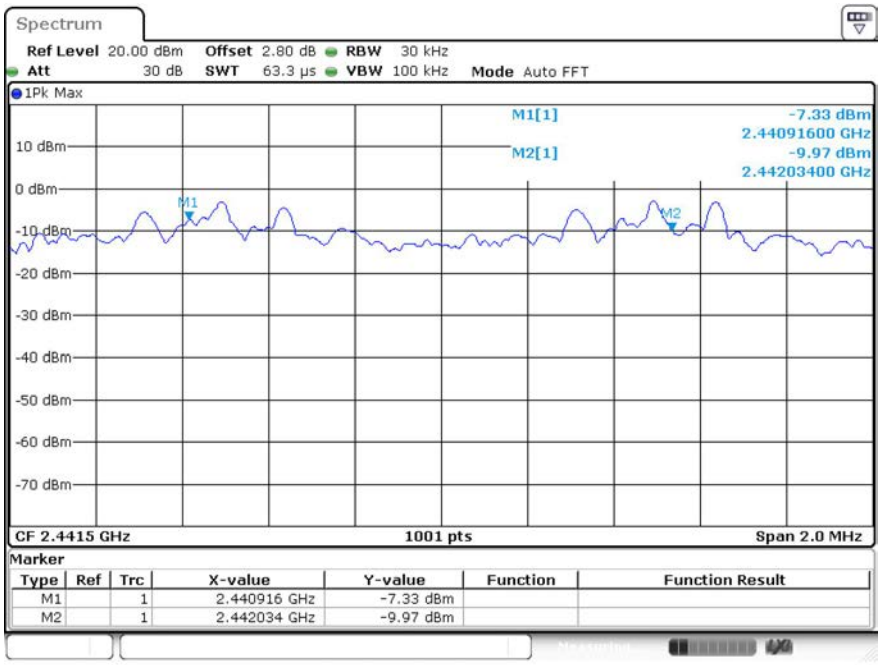
4 Carrier Frequency Separation

4.1 Test Result

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	MCH	1.001	0.573	Pass
π/4DQPSK	MCH	1.004	0.93	Pass
8DPSK	MCH	1.118	0.959	Pass

4.2 Test Graphs

Test Graphs	
GFSK/MCH	
π/4DQPSK/MCH	

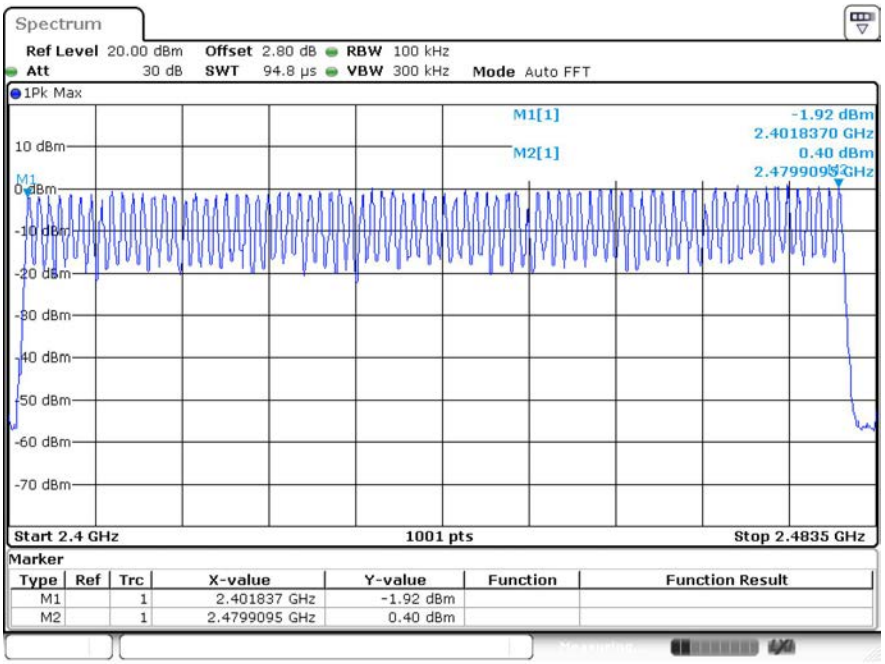
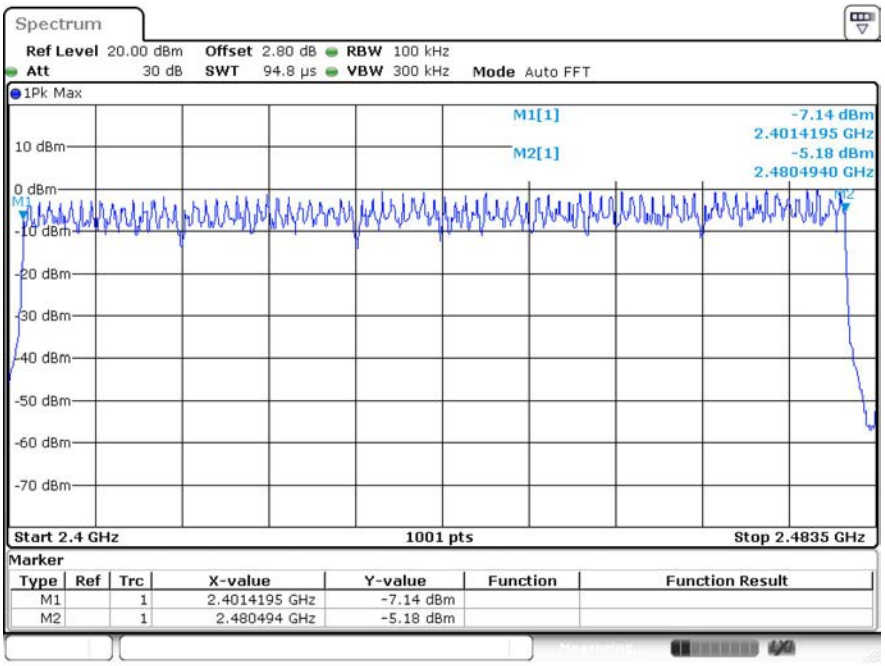
8DPSK/MCH	 Spectrum Ref Level 20.00 dBm Offset 2.80 dB RBW 30 kHz Att 30 dB SWT 63.3 µs VBW 100 kHz Mode Auto FFT 1Pk Max M1[1] -7.33 dBm 2.44091600 GHz M2[1] -9.97 dBm 2.44203400 GHz 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.4415 GHz 1001 pts Span 2.0 MHz Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.440916 GHz -7.33 dBm M2 1 2.442034 GHz -9.97 dBm

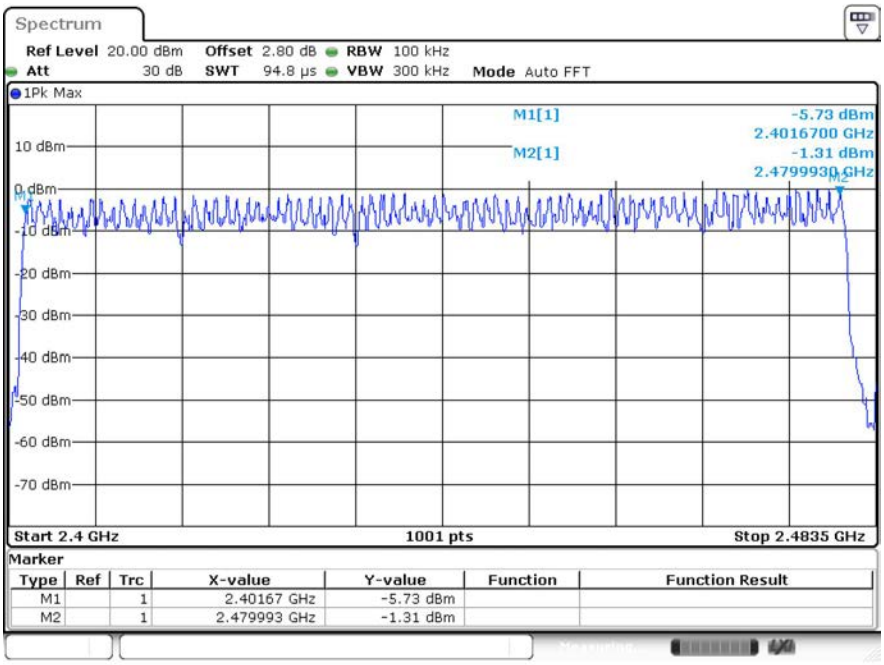
5 Hopping Channel Number

5.1 Test Result

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

5.2 Test Graphs

Test Graphs	
GFSK/Hop	
π/4DQPSK/Hop	

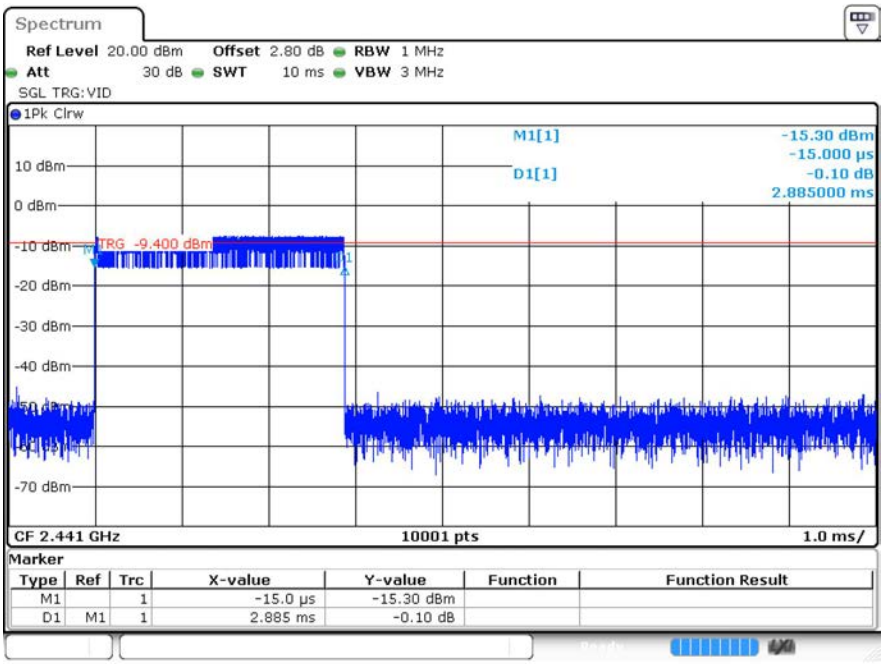
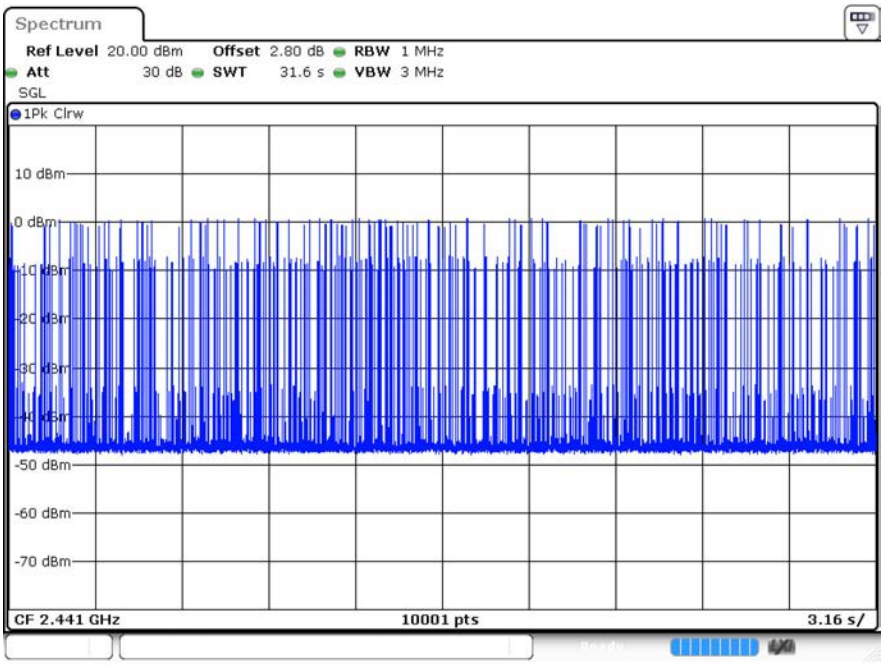
8DPSK/Hop	 Spectrum Ref Level 20.00 dBm Offset 2.80 dB RBW 100 kHz Att 30 dB SWT 94.8 µs VBW 300 kHz Mode Auto FFT 1Pk Max M1[1] -5.73 dBm 2.4016700 GHz M2[1] -1.31 dBm 2.4799930 GHz 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm Start 2.4 GHz 1001 pts Stop 2.4835 GHz Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.40167 GHz -5.73 dBm M2 1 2.479993 GHz -1.31 dBm

6 Dwell Time

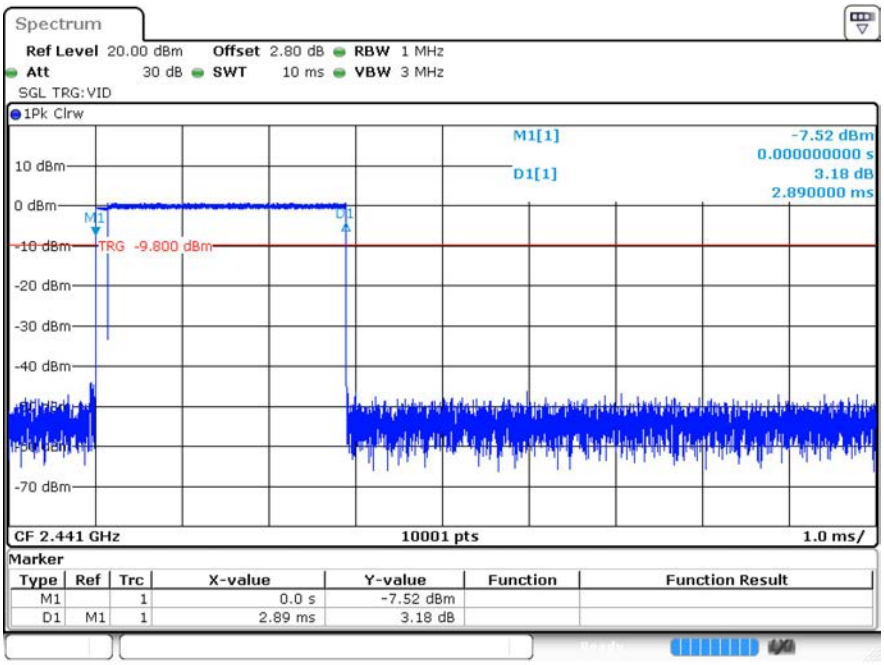
6.1 Test Result

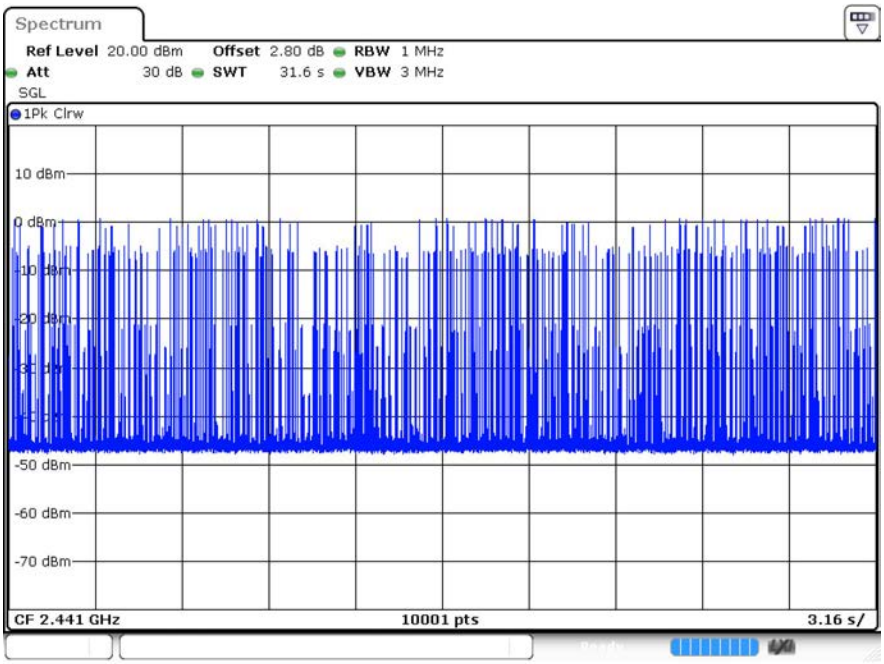
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[ms]	Limit [s]	Verdict
GFSK	DH5	MCH	2.885	114	328.89	0.4	Pass
π/4DQPSK	2DH5	MCH	2.89	101	291.89	0.4	Pass
8DPSK	3DH5	MCH	2.891	100	289.1	0.4	Pass

6.2 Test Graphs

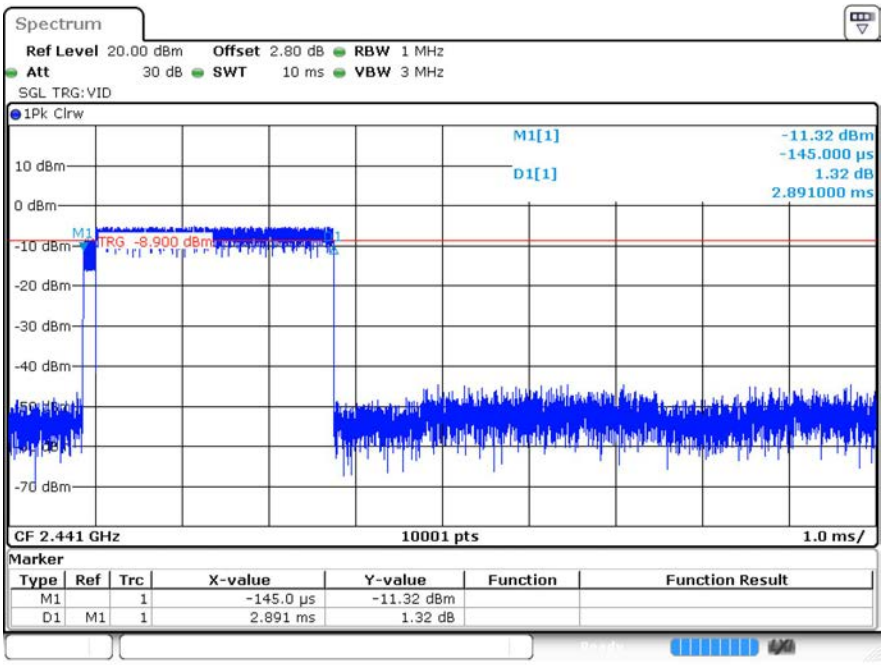
Test Graphs	
GFSK_DH5/MCH	 

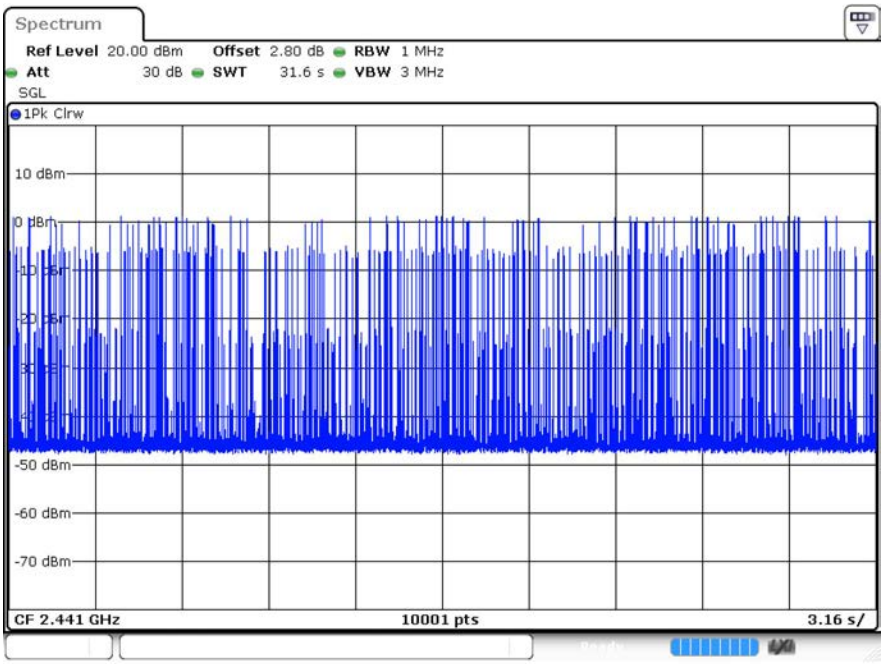
π/4DQPSK
_2DH5/MCH





8DPSK _3DH5/MCH



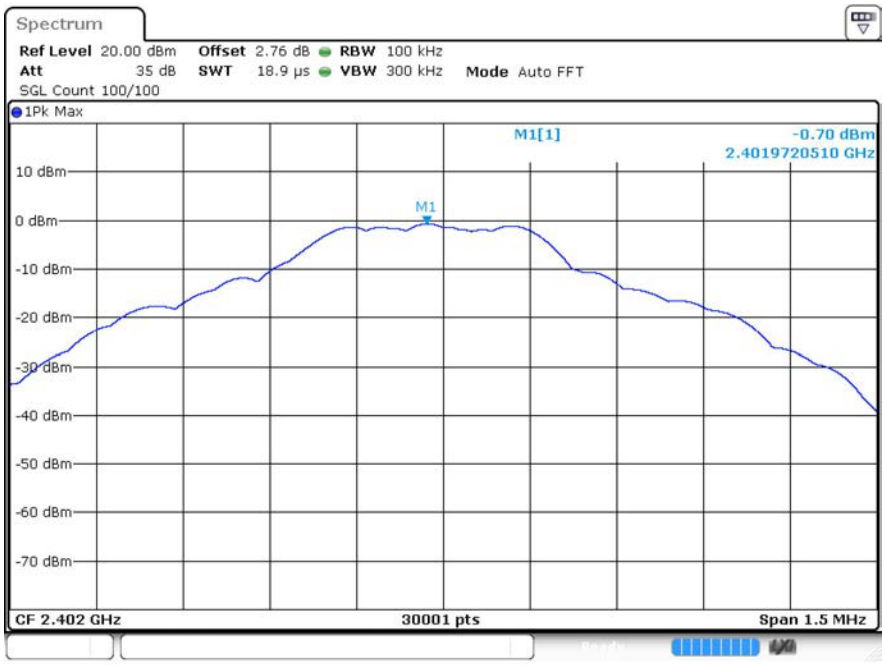
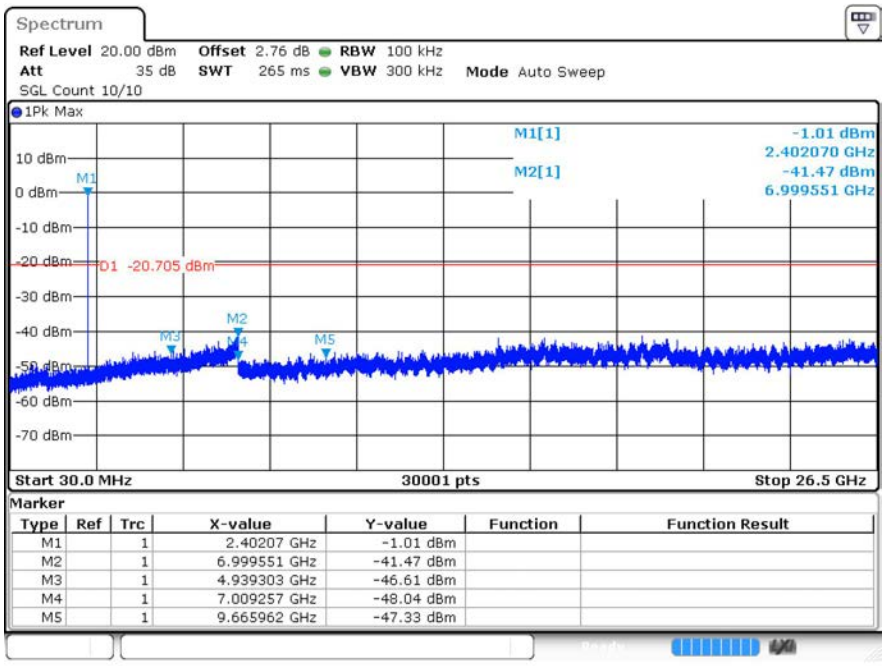


7 RF Conducted Spurious Emissions

7.1 Test Result

Mode	Channel	Max. Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	-40.77	-20	Pass
	MCH	-40.44	-20	Pass
	HCH	-40.76	-20	Pass
π/4DQPSK	LCH	-39.13	-20	Pass
	MCH	-40.06	-20	Pass
	HCH	-38.98	-20	Pass
8DPSK	LCH	-39.73	-20	Pass
	MCH	-40.31	-20	Pass
	HCH	-39.94	-20	Pass

7.2 Test Graphs

GFSK_LCH_Graphs	
Pref	
Puw	

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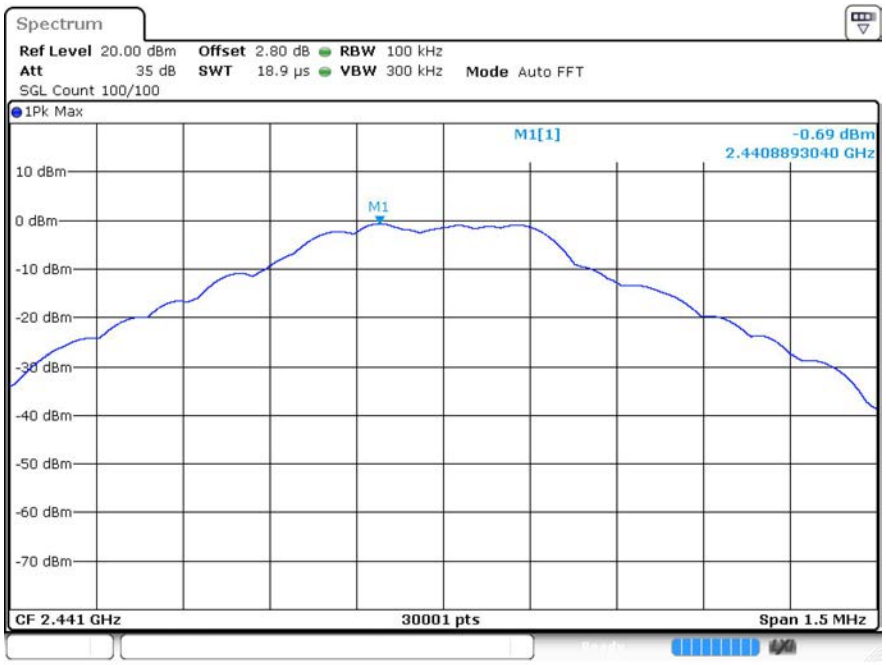
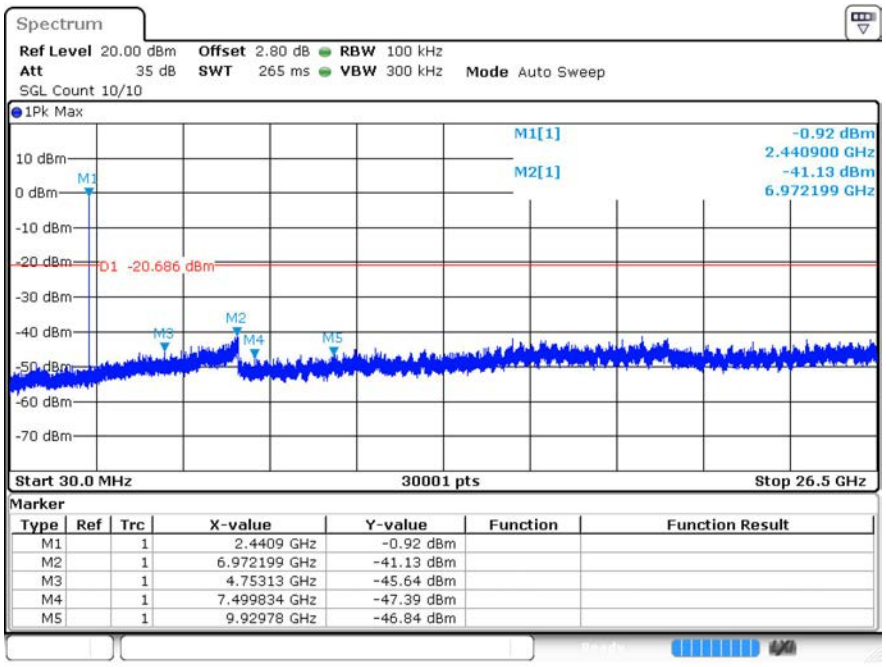
Pref	
Puw	

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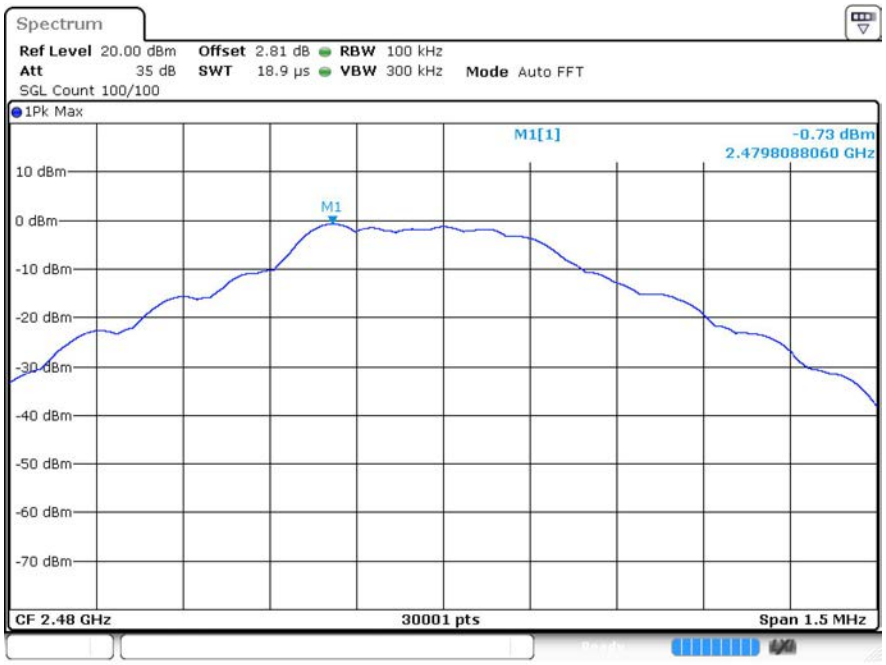
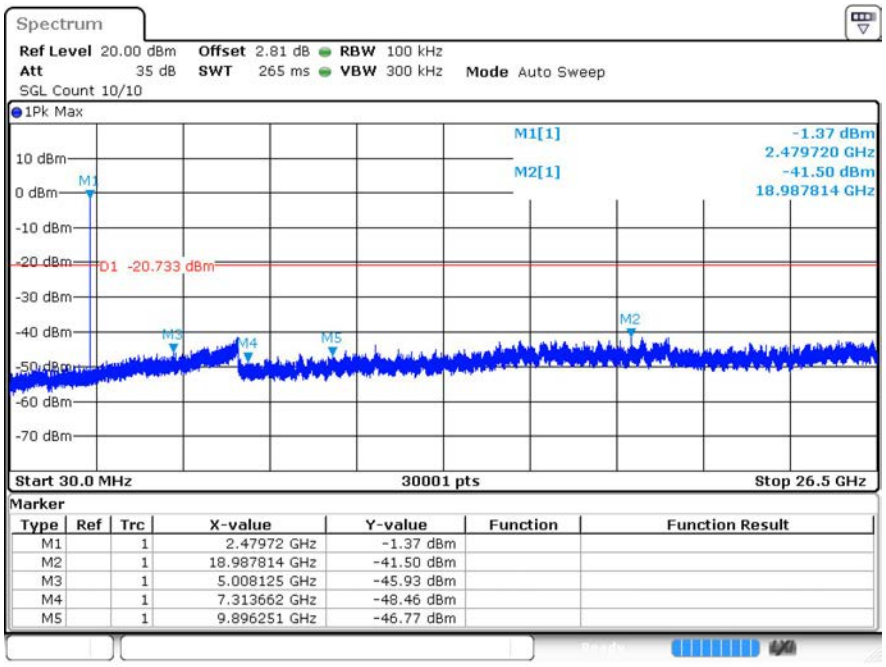
Pref	
Puw	

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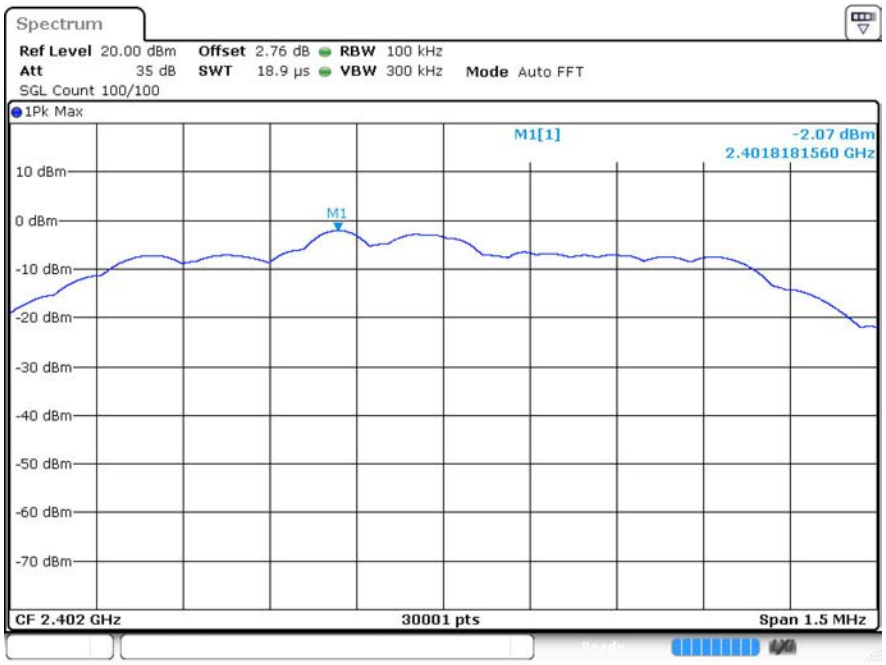
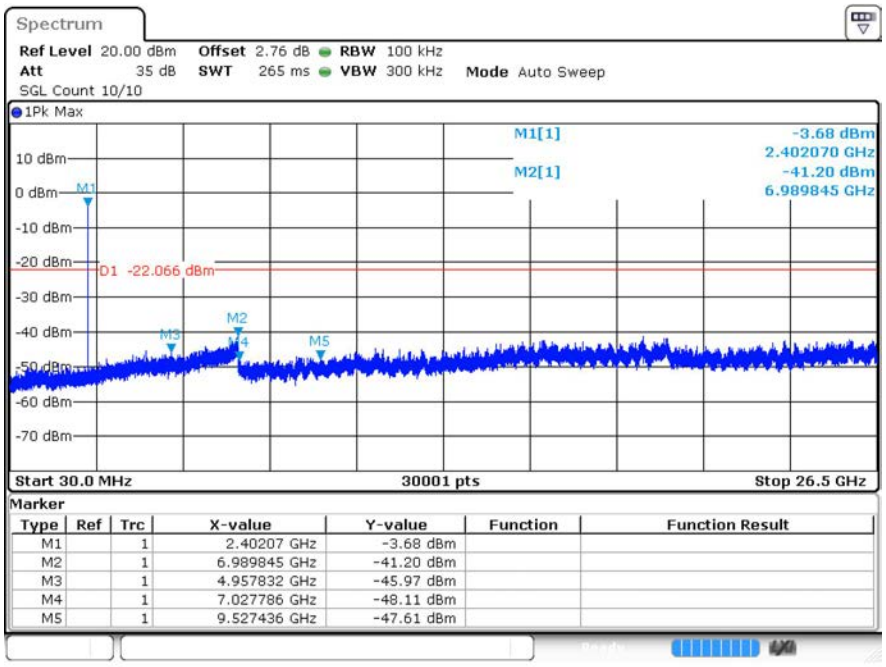
Pref	
Puw	

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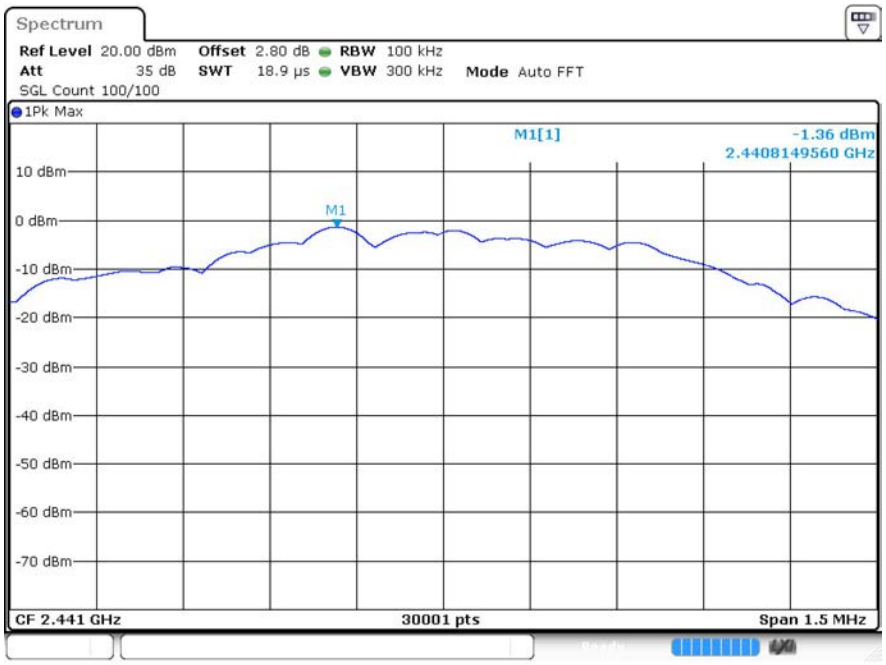
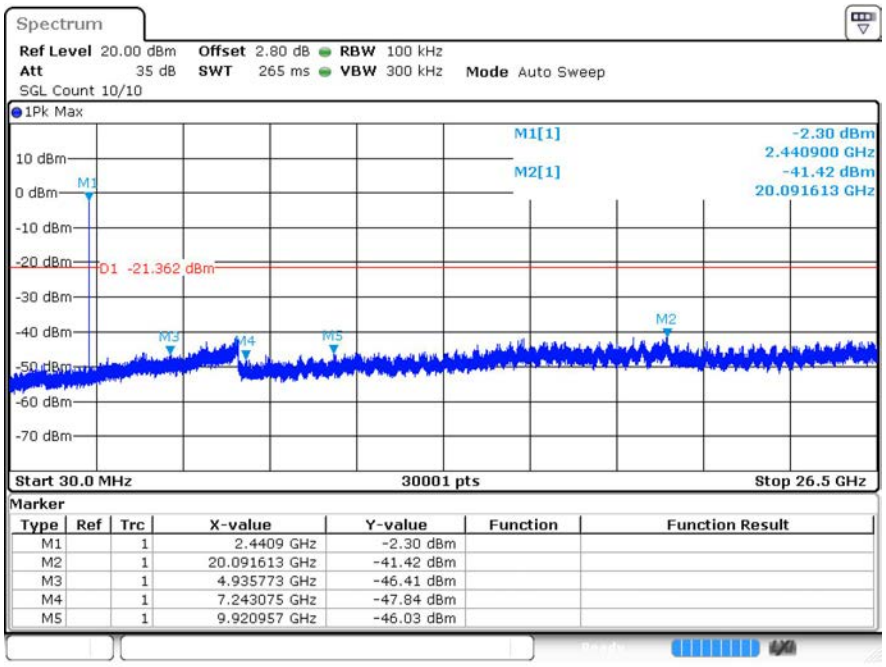
Pref	
Puw	

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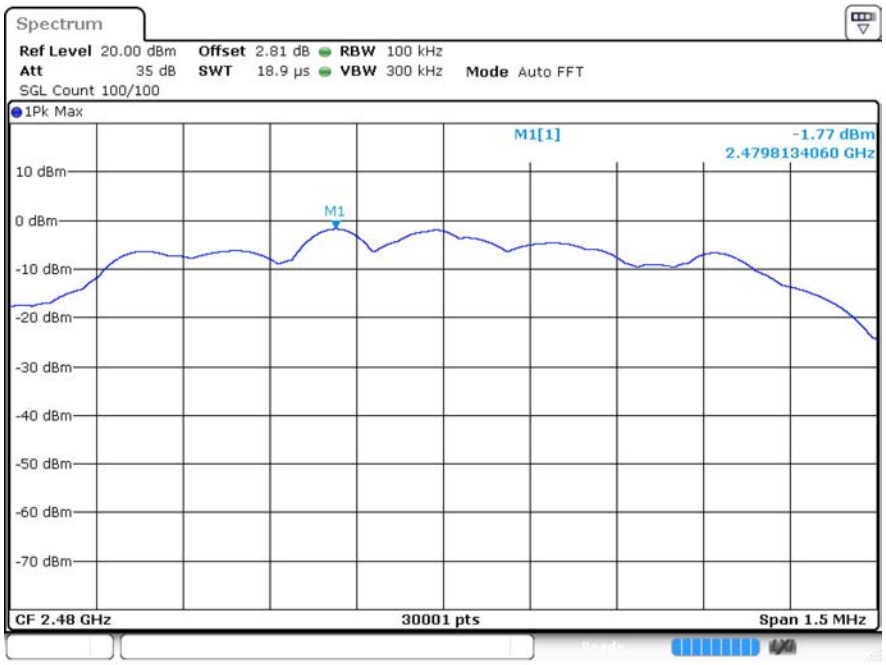
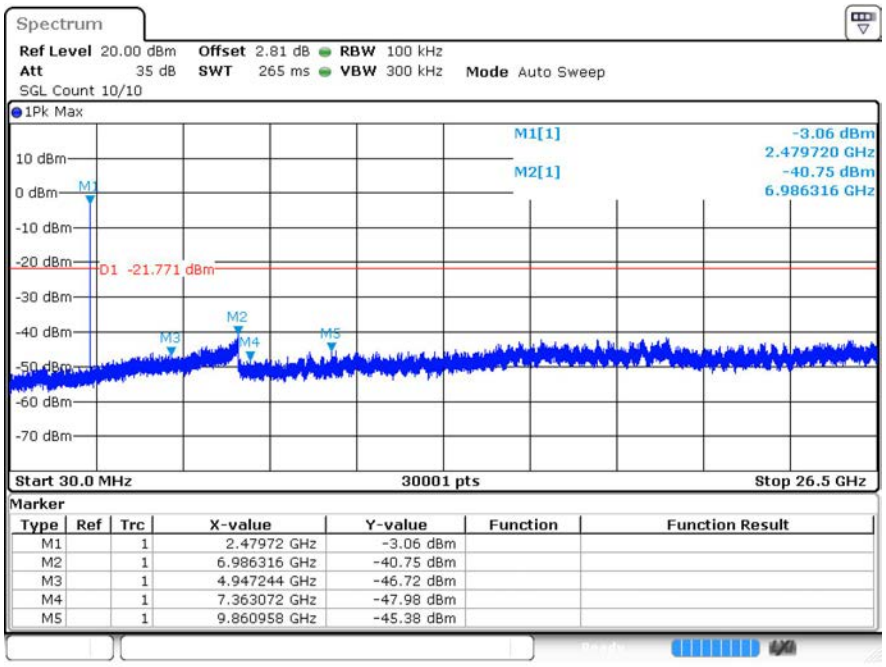
Pref	
Puw	

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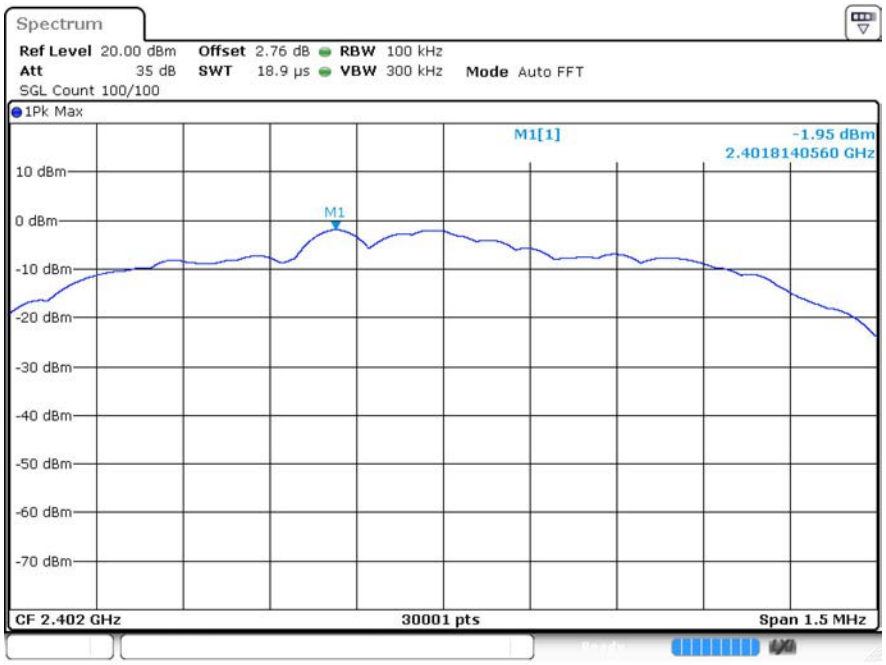
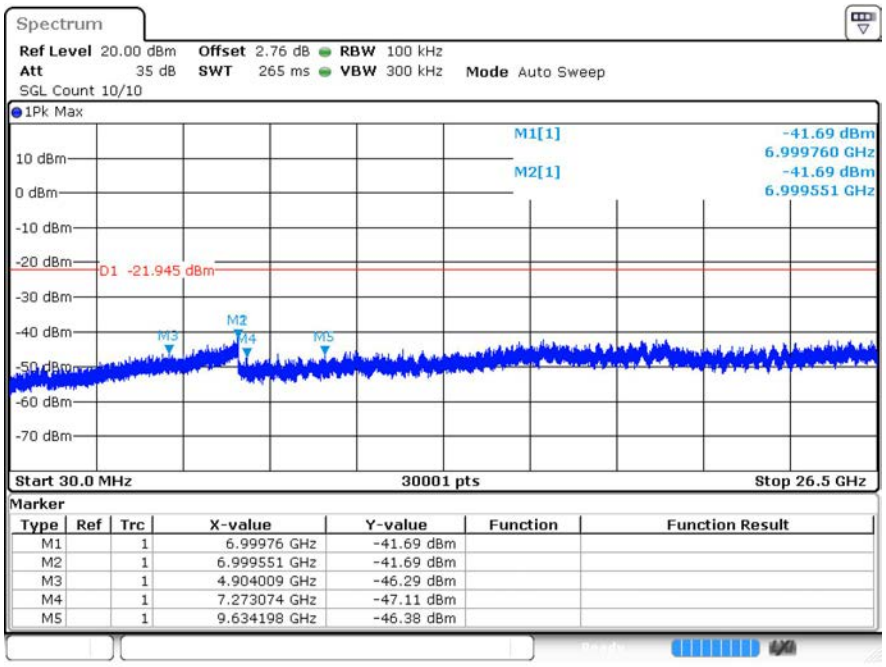
Pref	
Puw	

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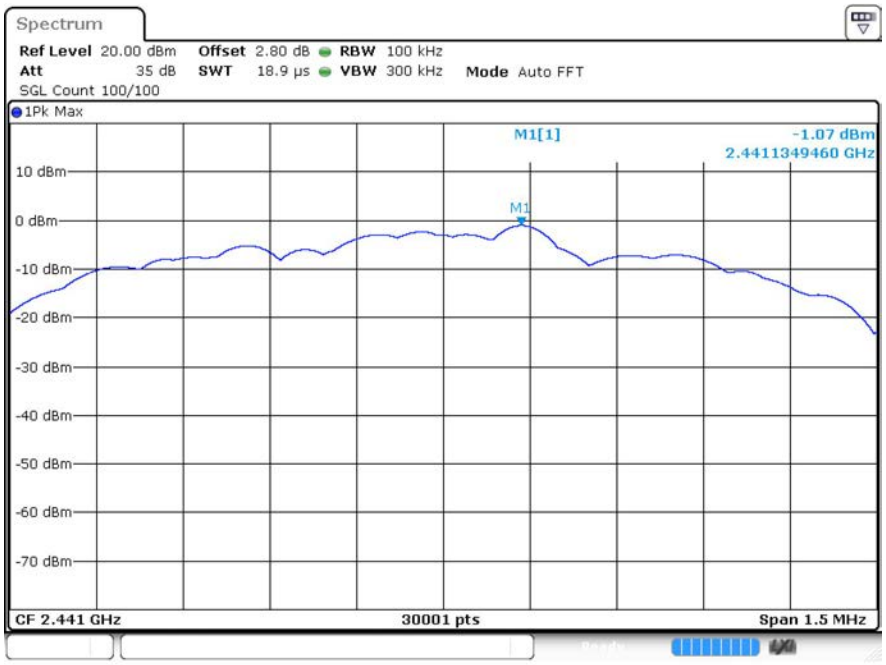
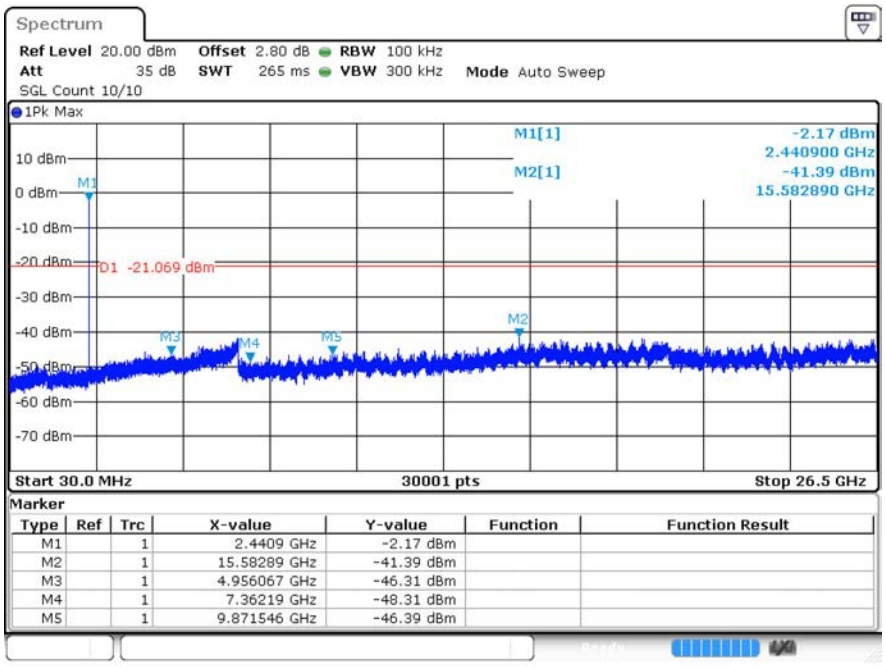
Pref	
Puw	

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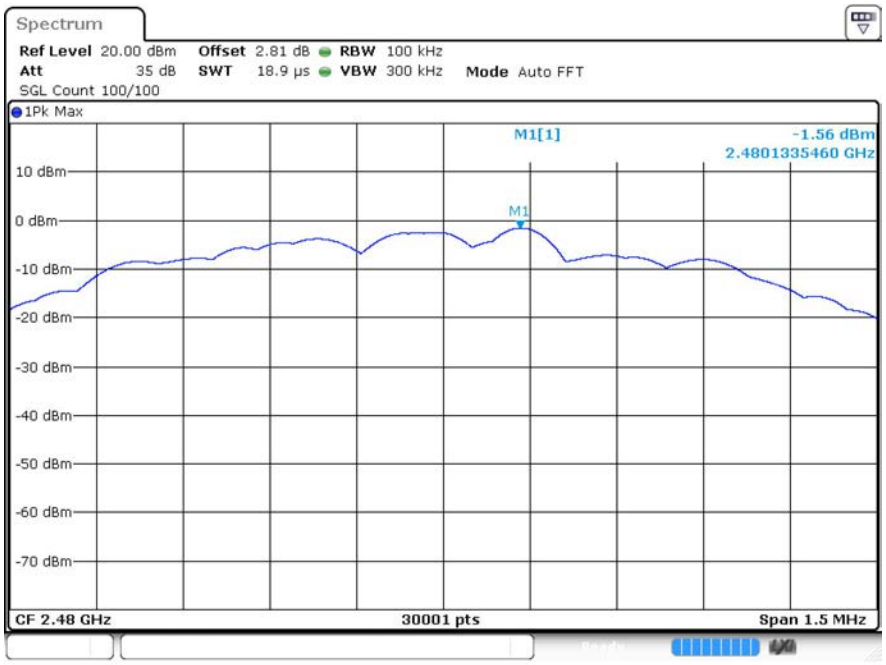
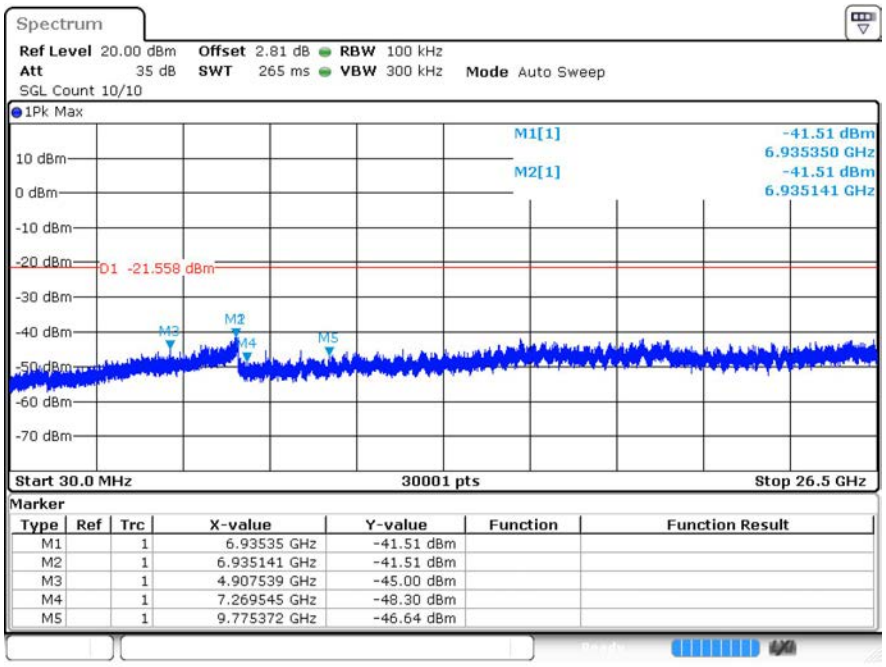
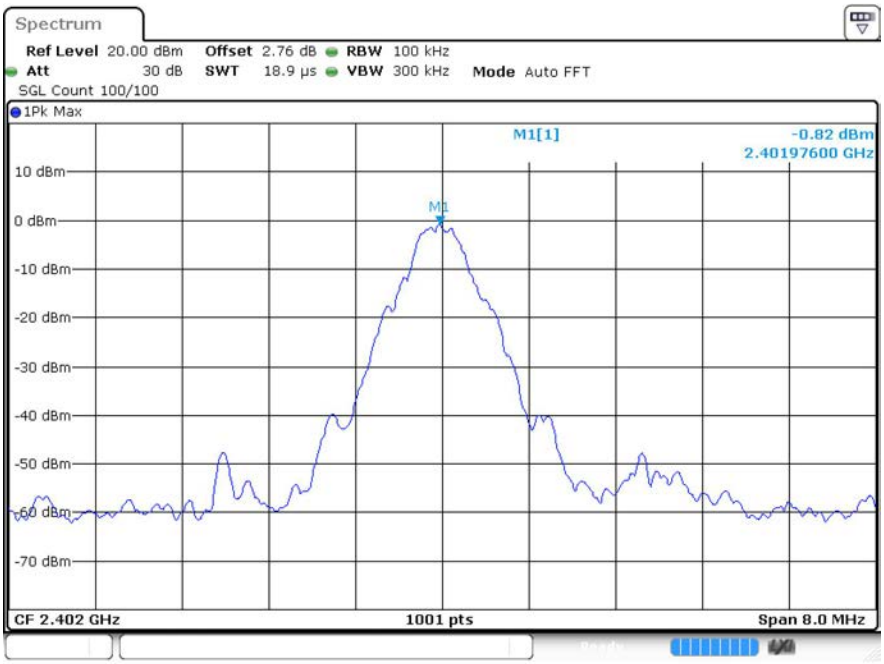
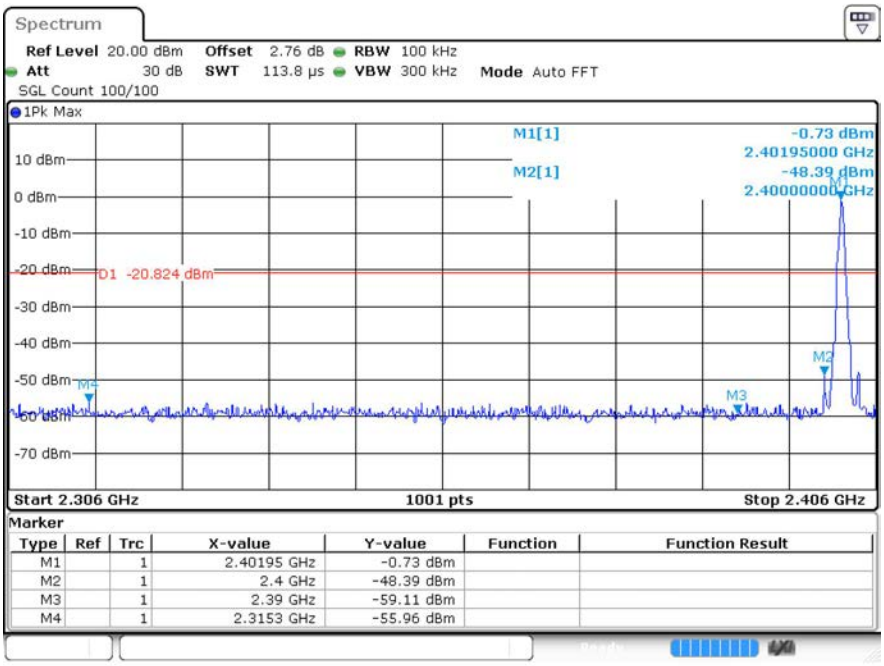
Pref	
Puw	

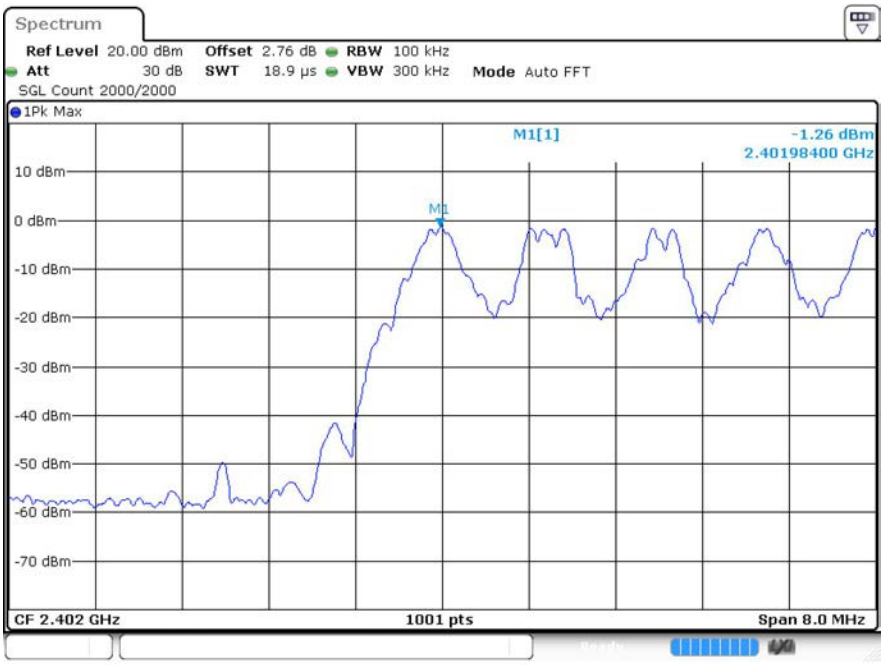
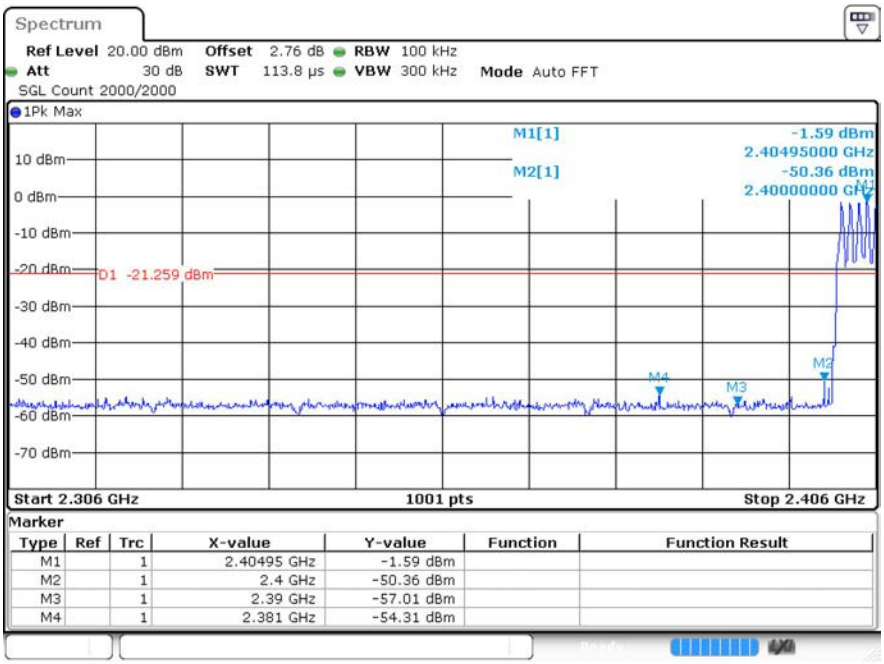
8 Band-edge for RF Conducted Emissions

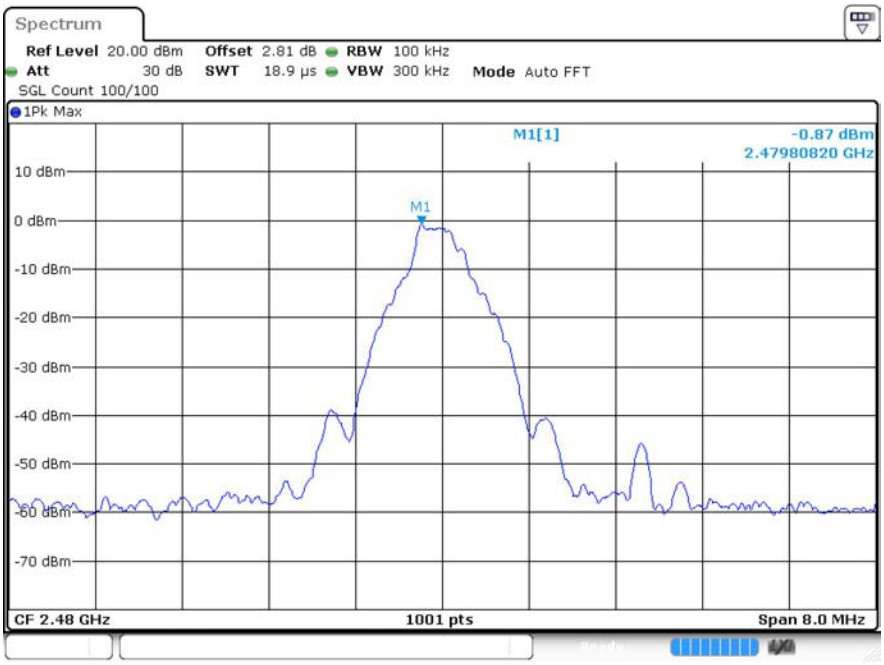
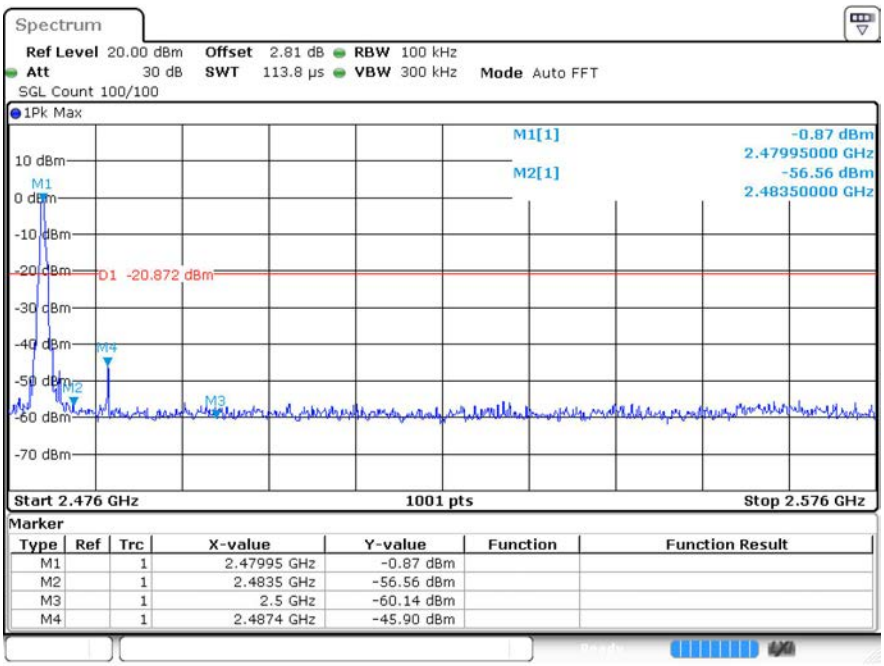
8.1 Test Result

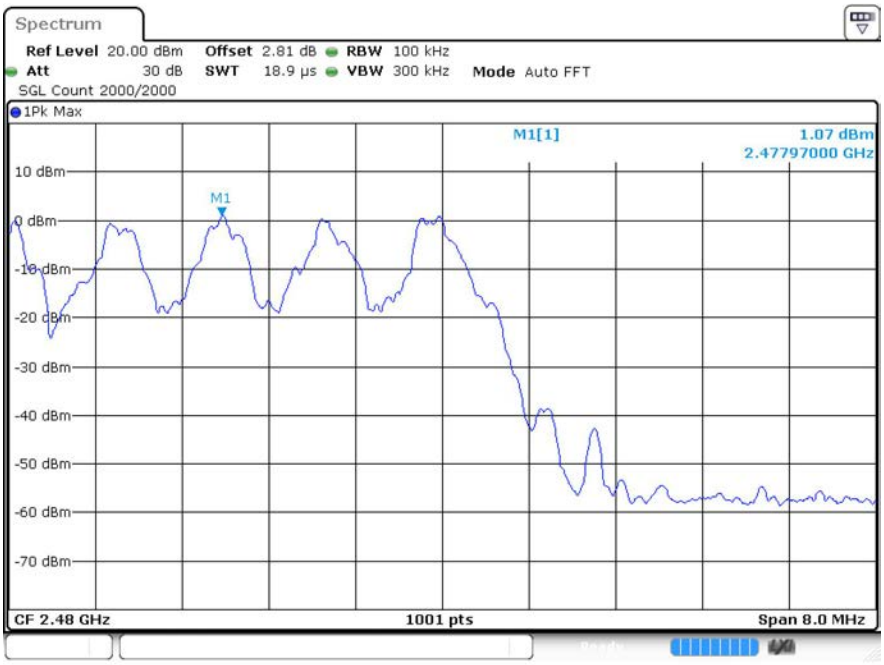
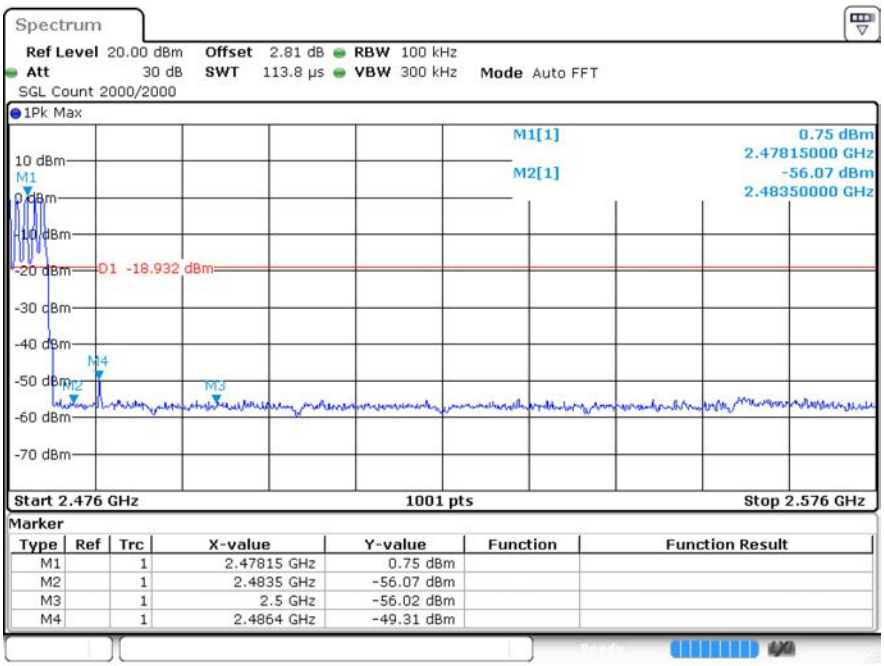
Mode	Channel	Carrier Frequency [MHz]	Frequency Hopping	Max Spurious Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	2402	Off	-55.13	-20	Pass
			On	-53.04	-20	Pass
	HCH	2480	Off	-45.03	-20	Pass
			On	-50.38	-20	Pass
π/4DQPSK	LCH	2402	Off	-53.77	-20	Pass
			On	-52.52	-20	Pass
	HCH	2480	Off	-46.99	-20	Pass
			On	-47.01	-20	Pass
8DPSK	LCH	2402	Off	-53.16	-20	Pass
			On	-51.91	-20	Pass
	HCH	2480	Off	-43.75	-20	Pass
			On	-54.24	-20	Pass

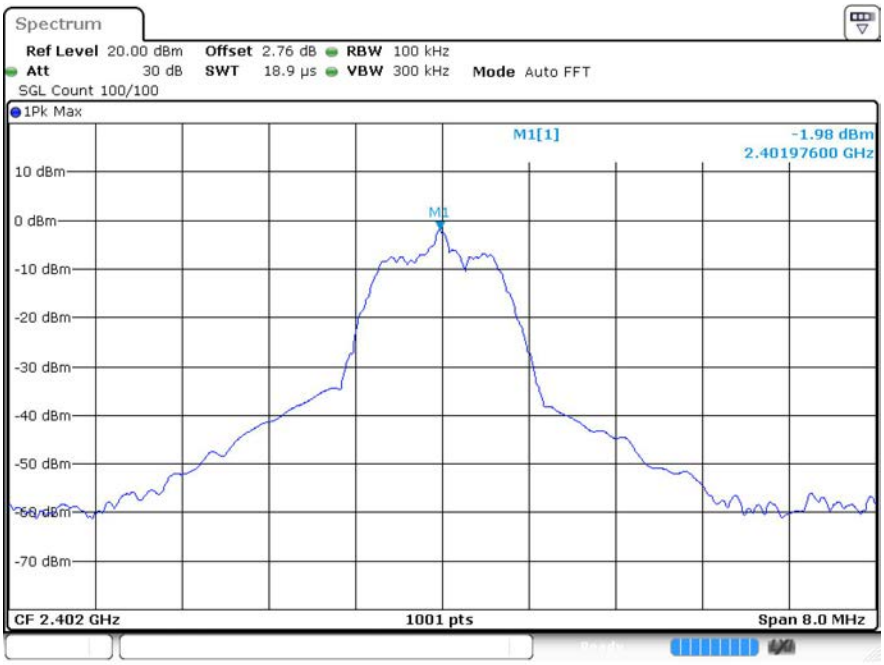
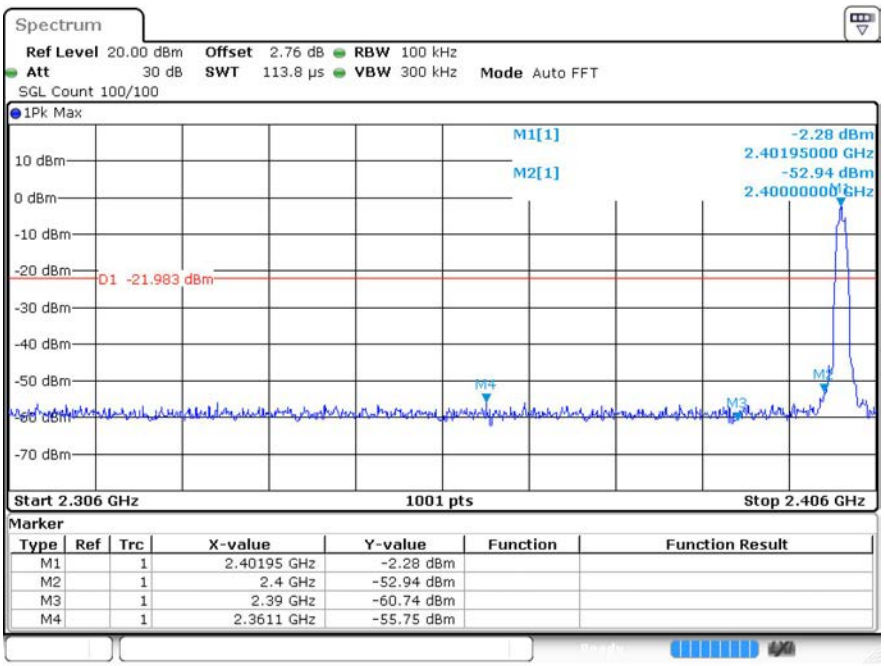
8.2 Test Graphs

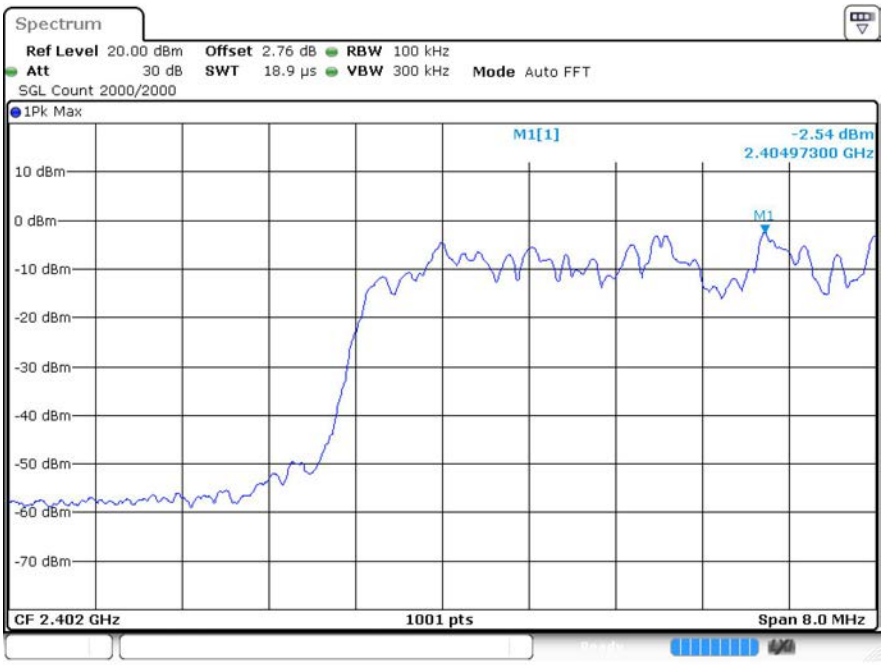
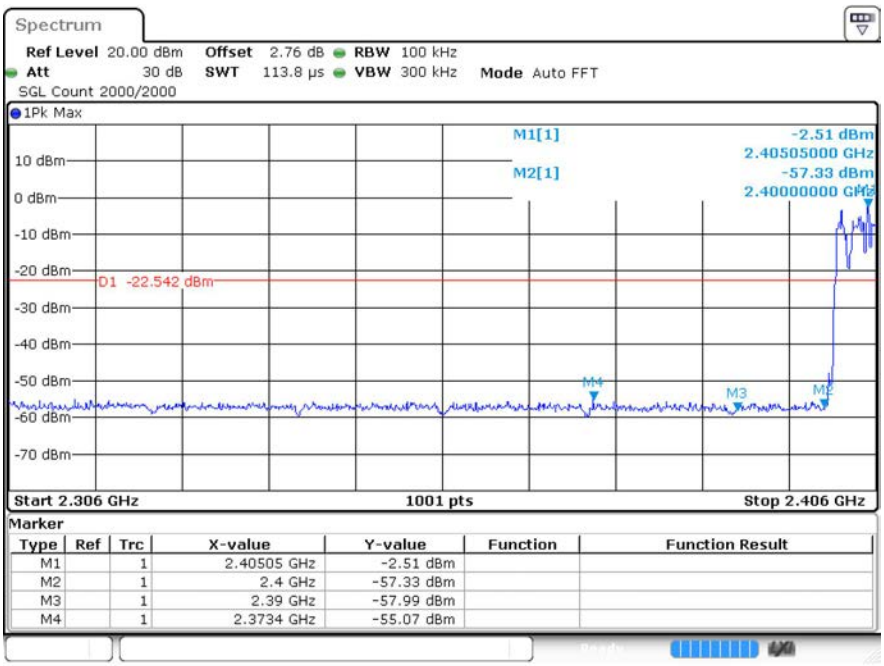
Test Graphs	
Pref	
GFSK/LCH/No Hop	

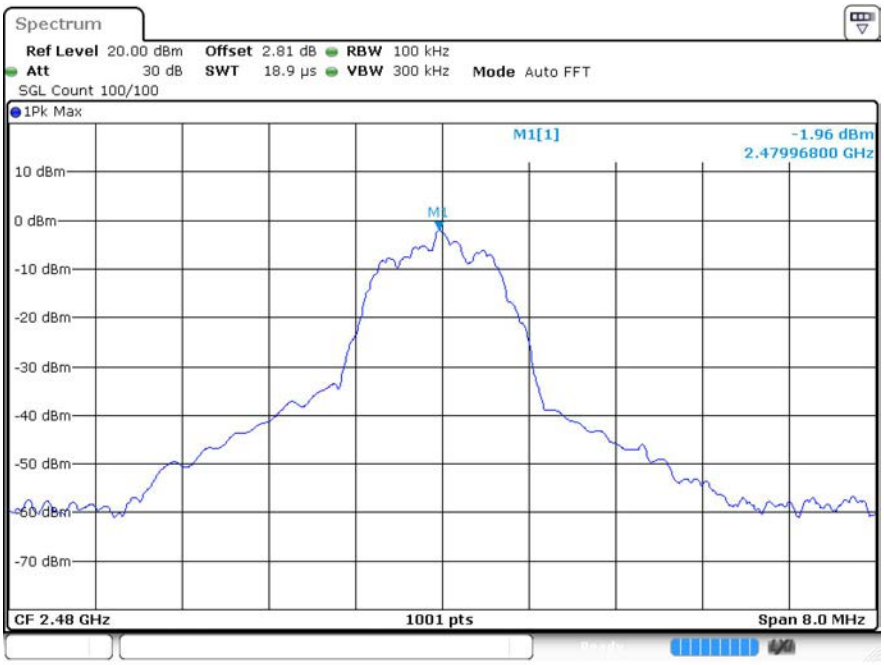
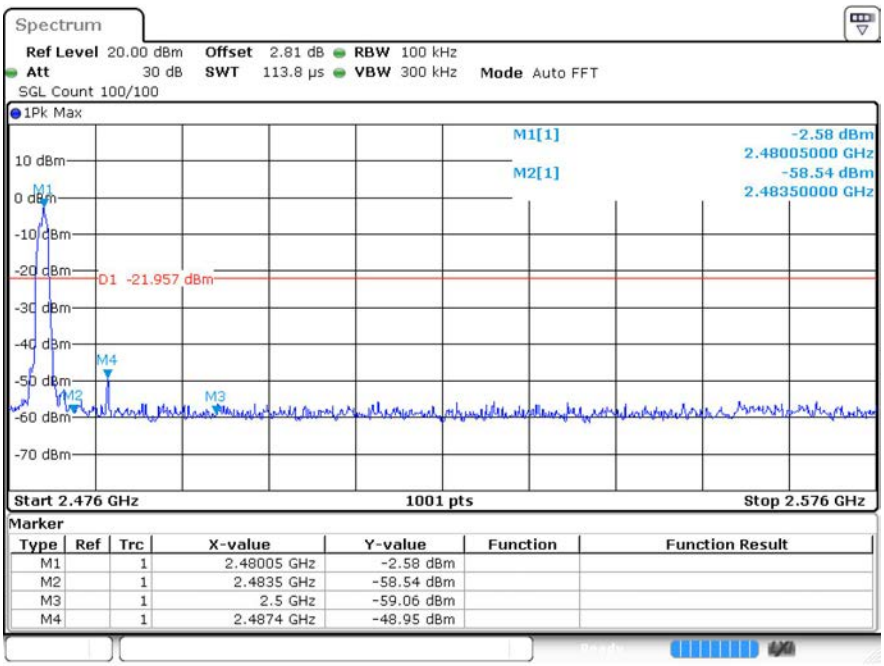
Ref	
GFSK/LCH/Hop	

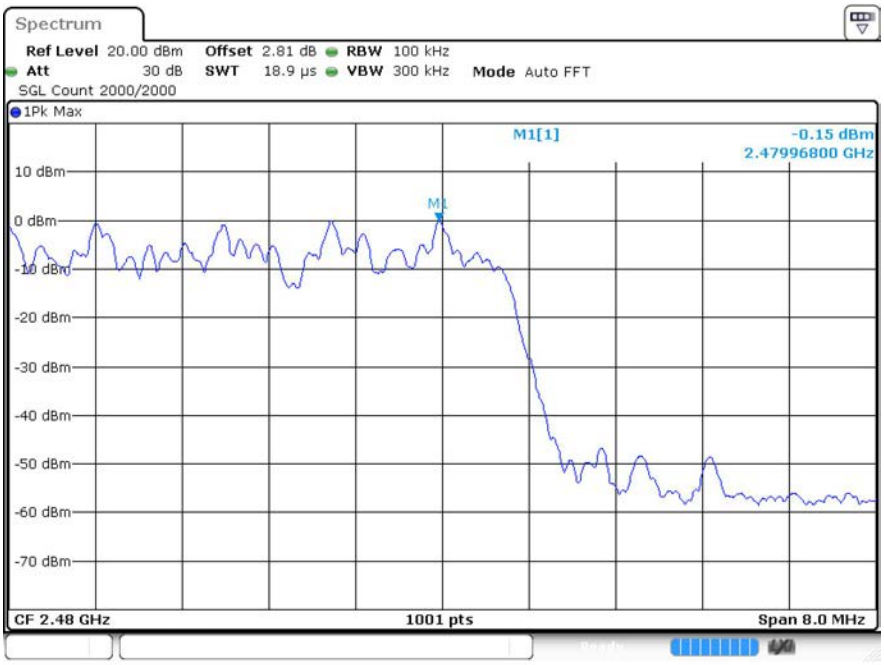
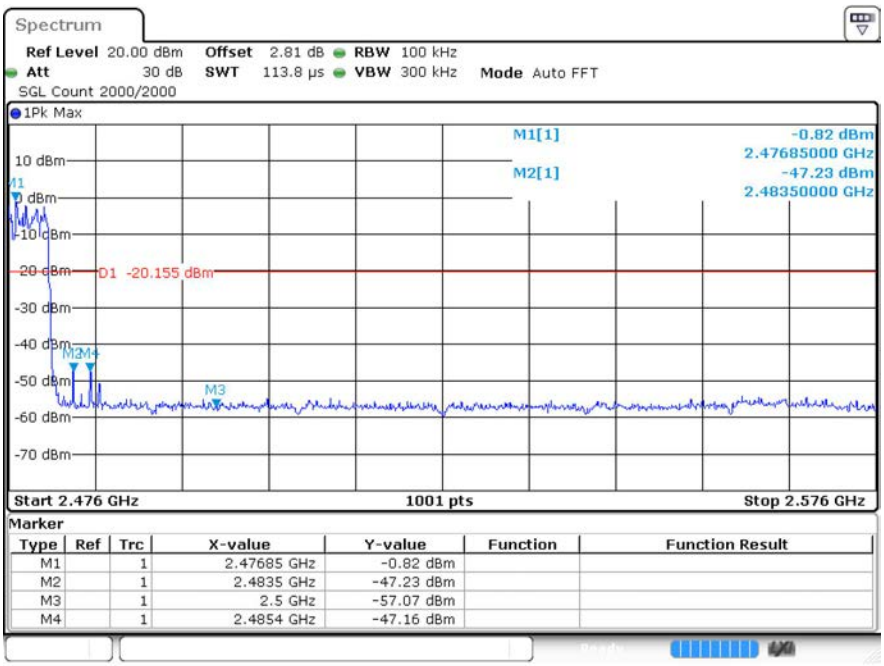
Ref	
GFSK/HCH/No Hop	

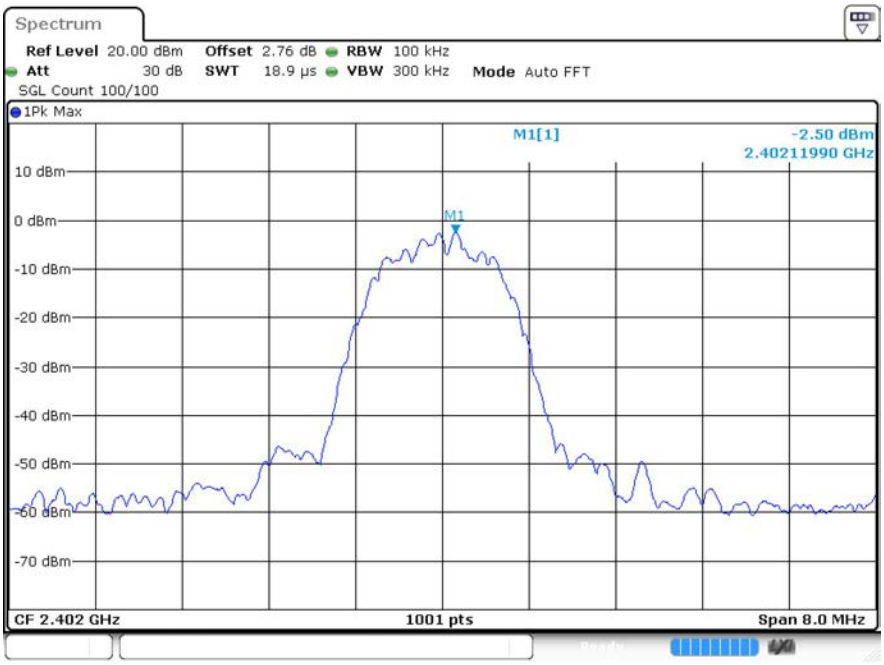
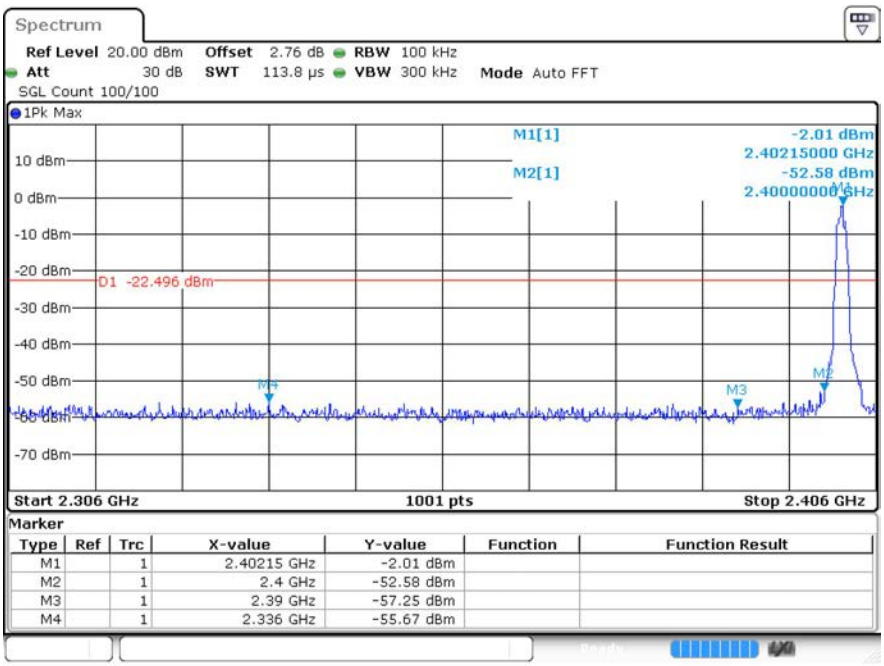
Ref.	
GFSK/HCH/Hop	

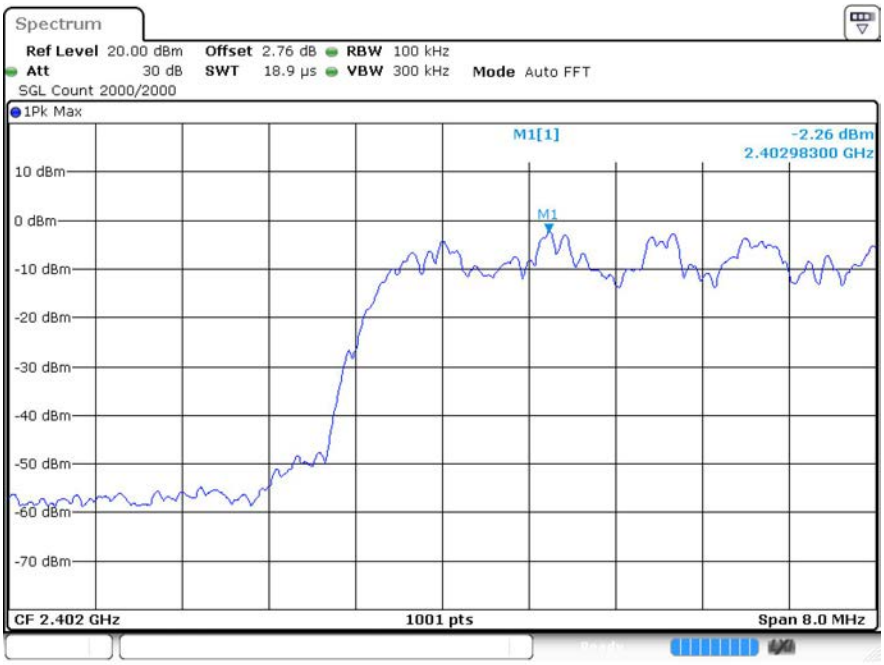
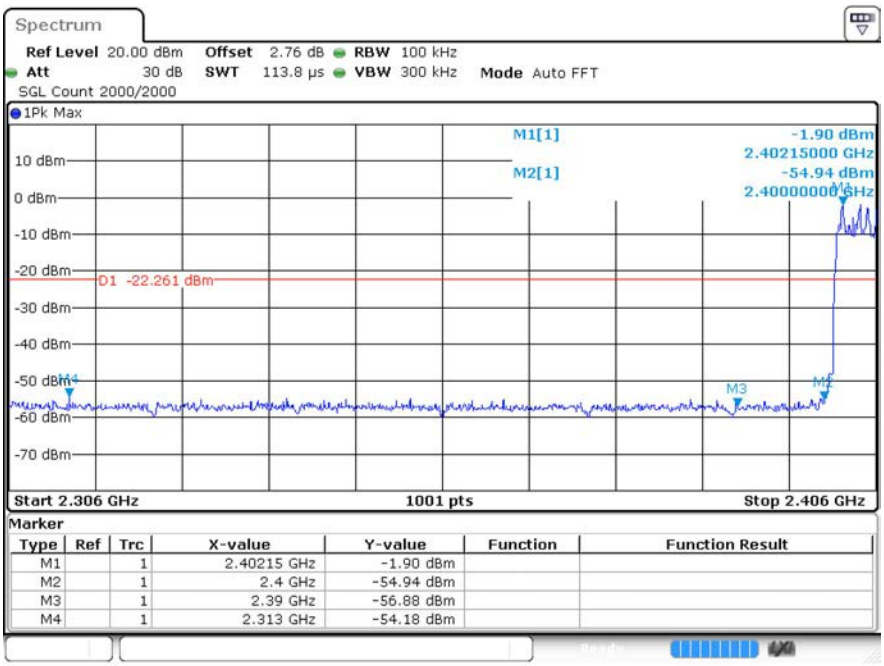
Ref	
π/4DQPSK/LCH/No Hop	

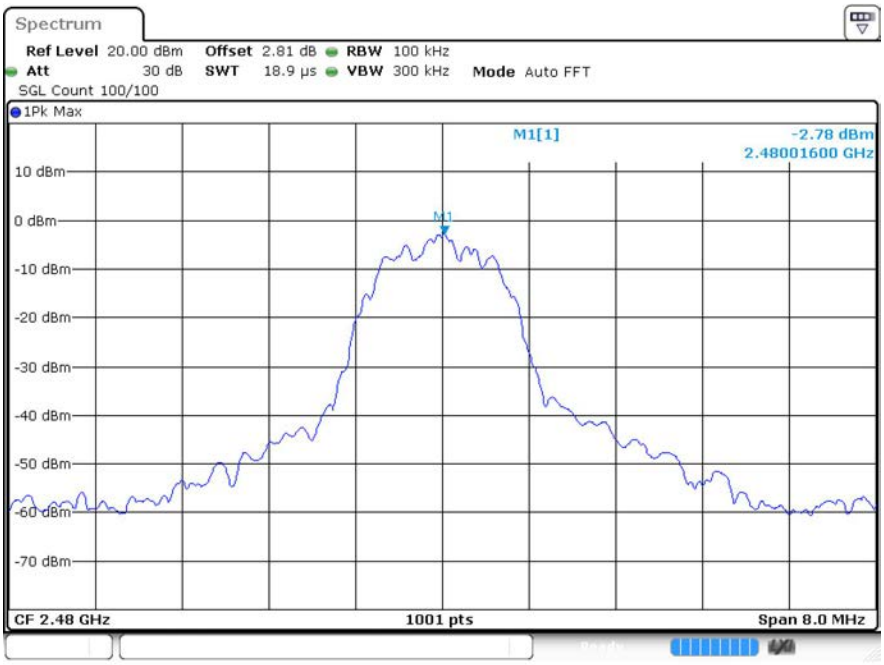
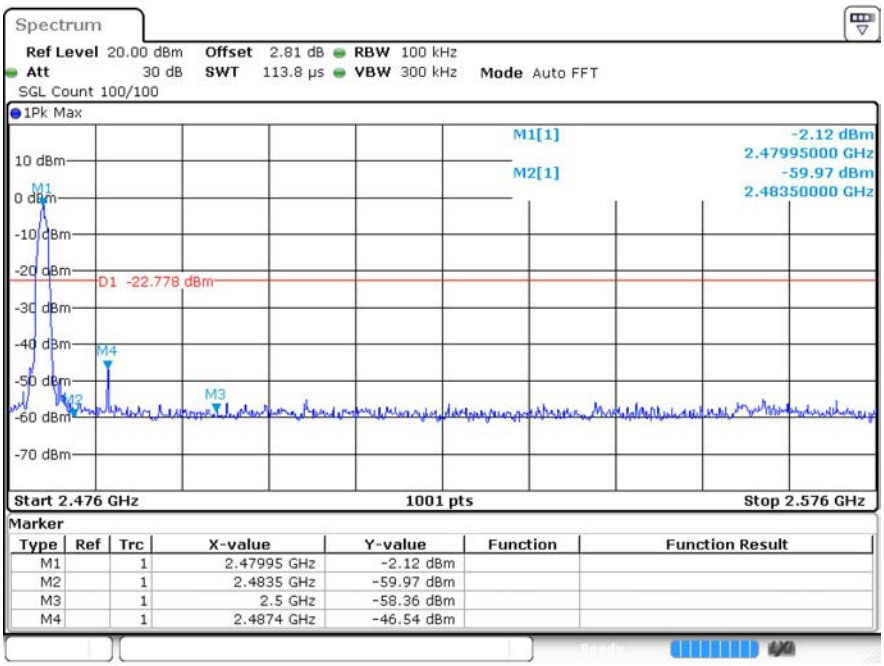
Ref	
π/4DQPSK/LCH/Hop	

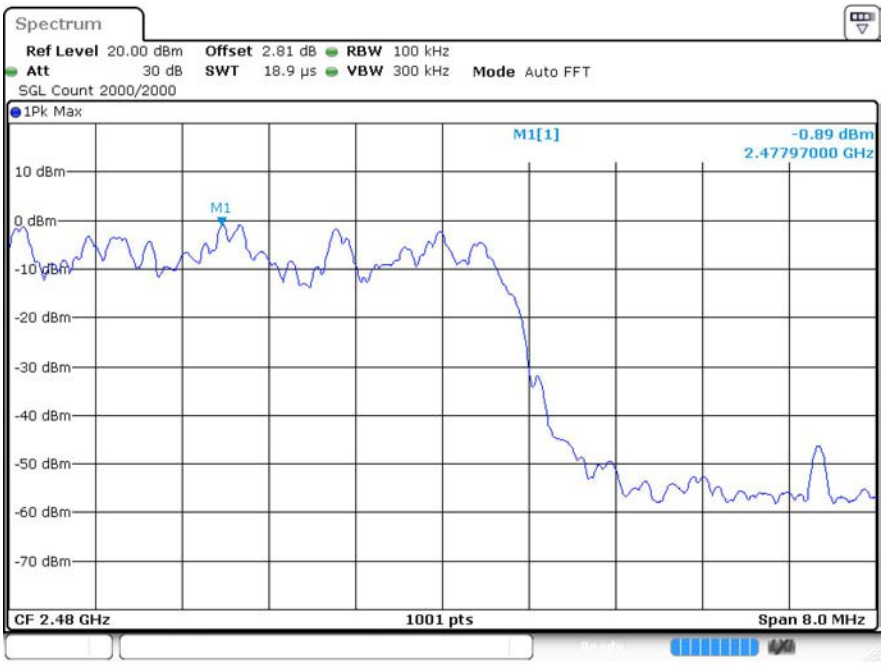
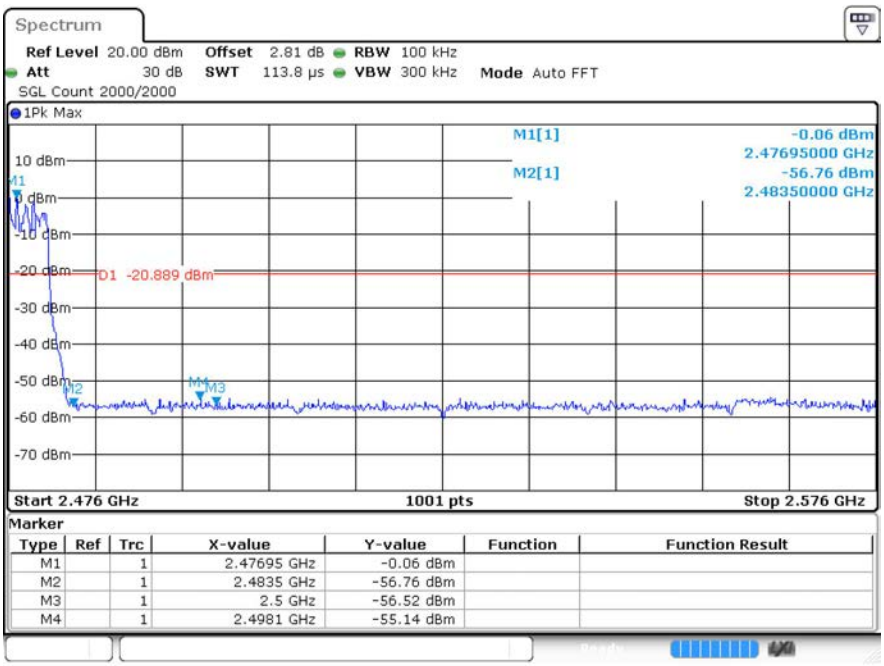
Ref	
π/4DQPSK/HCH/No Hop	

Ref	
π/4DQPSK/HCH/Hop	

Ref	
8DPSK/LCH/No Hop	

Ref	
8DPSK/LCH/Hop	

Ref	
8DPSK/HCH/No Hop	

Ref	
8DPSK/HCH/Hop	

9 Restrict-band band-edge measurements

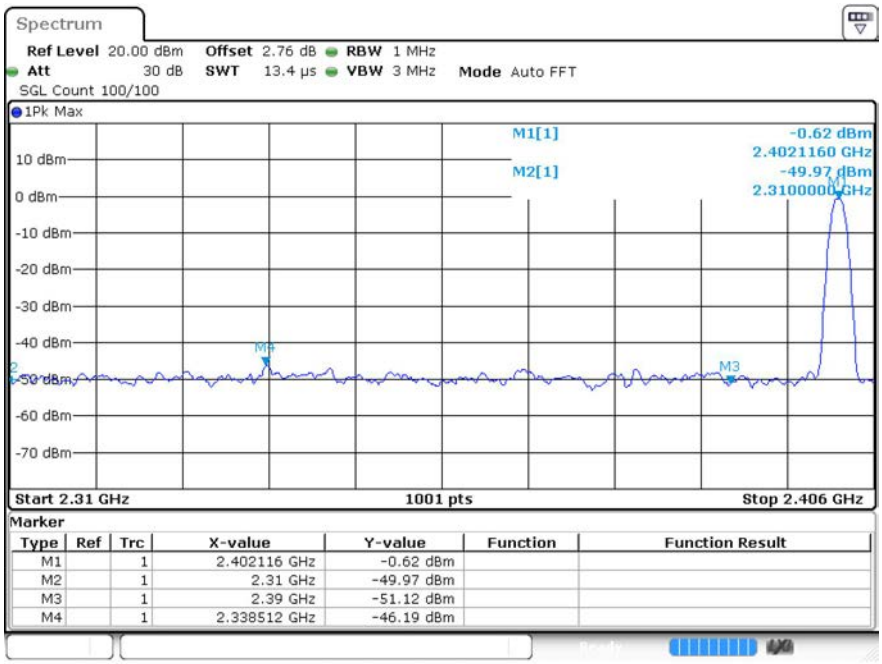
9.1 Test Result

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Duty Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-49.97	2	-	47.29	PEAK	74	Pass
	Off	2310.0	-56	2	5.01	46.27	AV	54	Pass
	Off	2338.512	-46.18	2	-	51.08	PEAK	74	Pass
	Off	2340.24	-54.13	2	5.01	48.14	AV	54	Pass
	Off	2390.0	-51.12	2	-	46.14	PEAK	74	Pass
	Off	2390.0	-57.12	2	5.01	45.15	AV	54	Pass
	Off	2483.5	-49.7	2	-	47.56	PEAK	74	Pass
	Off	2483.5	-56.73	2	4.99	45.52	AV	54	Pass
	Off	2485.888	-47.76	2	-	49.5	PEAK	74	Pass
	Off	2487.472	-54.84	2	4.99	47.41	AV	54	Pass
	Off	2500.0	-50.42	2	-	46.84	PEAK	74	Pass
	Off	2500.0	-56.9	2	4.99	45.35	AV	54	Pass
π/4DQPSK	Off	2310.0	-49.62	2	-	47.64	PEAK	74	Pass
	Off	2310.0	-56.73	2	4.95	45.48	AV	54	Pass
	Off	2343.024	-46.62	2	-	50.64	PEAK	74	Pass
	Off	2337.936	-54.52	2	4.95	47.69	AV	54	Pass
	Off	2390.0	-49.93	2	-	47.33	PEAK	74	Pass
	Off	2390.0	-57.36	2	4.95	44.85	AV	54	Pass
	Off	2483.5	-48.49	2	-	48.77	PEAK	74	Pass
	Off	2483.5	-55.6	2	4.96	46.62	AV	54	Pass
	Off	2487.424	-44.24	2	-	53.02	PEAK	74	Pass
	Off	2484.304	-55.42	2	4.96	46.8	AV	54	Pass
	Off	2500.0	-47.62	2	-	49.64	PEAK	74	Pass
	Off	2500.0	-56.36	2	4.96	45.86	AV	54	Pass
8DPSK	Off	2310.0	-50.04	2	-	47.22	PEAK	74	Pass
	Off	2310.0	-56.29	2	4.95	45.92	AV	54	Pass
	Off	2339.184	-45.2	2	-	52.06	PEAK	74	Pass
	Off	2342.544	-54.39	2	4.95	47.82	AV	54	Pass

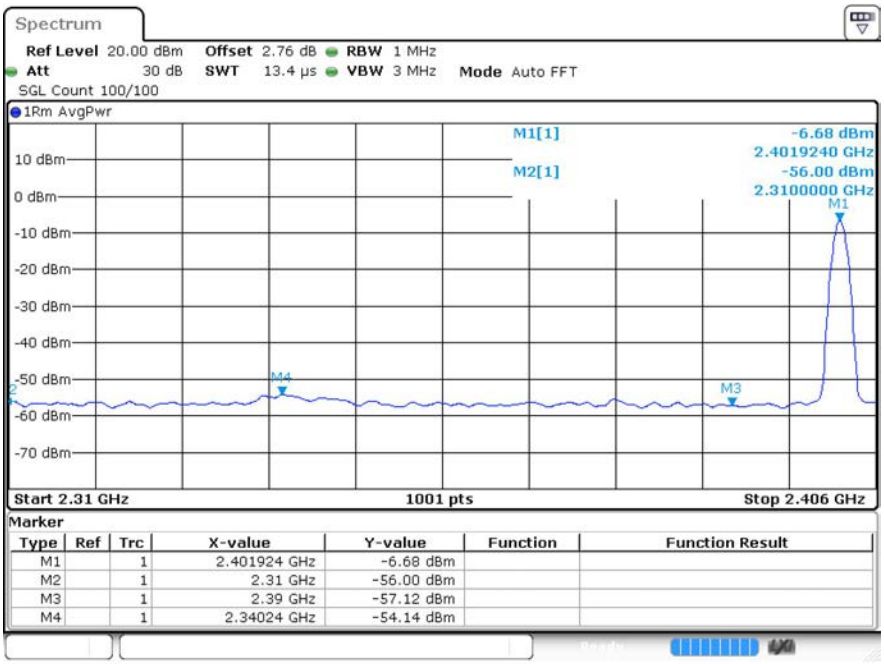
	Off	2390.0	-49.89	2	-	47.37	PEAK	74	Pass
	Off	2390.0	-56.49	2	4.95	45.72	AV	54	Pass
	Off	2483.5	-45.75	2	-	51.51	PEAK	74	Pass
	Off	2483.5	-55.63	2	4.95	46.58	AV	54	Pass
	Off	2487.352	-43.5	2	-	53.76	PEAK	74	Pass
	Off	2490.424	-55.44	2	4.95	46.77	AV	54	Pass
	Off	2500.0	-50.35	2	-	46.91	PEAK	74	Pass
	Off	2500.0	-56.84	2	4.95	45.37	AV	54	Pass

9.2 Test Graphs

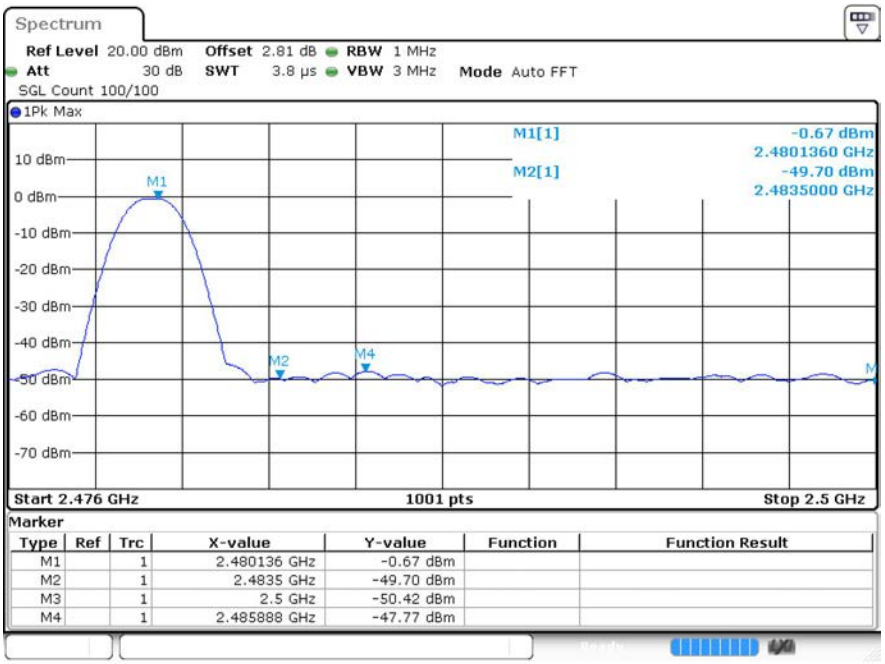
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



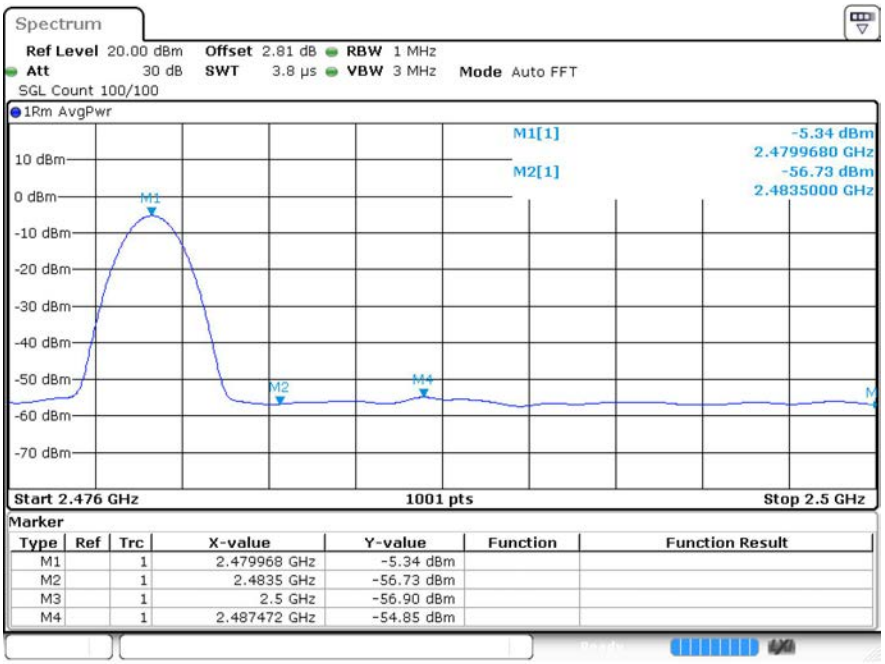
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



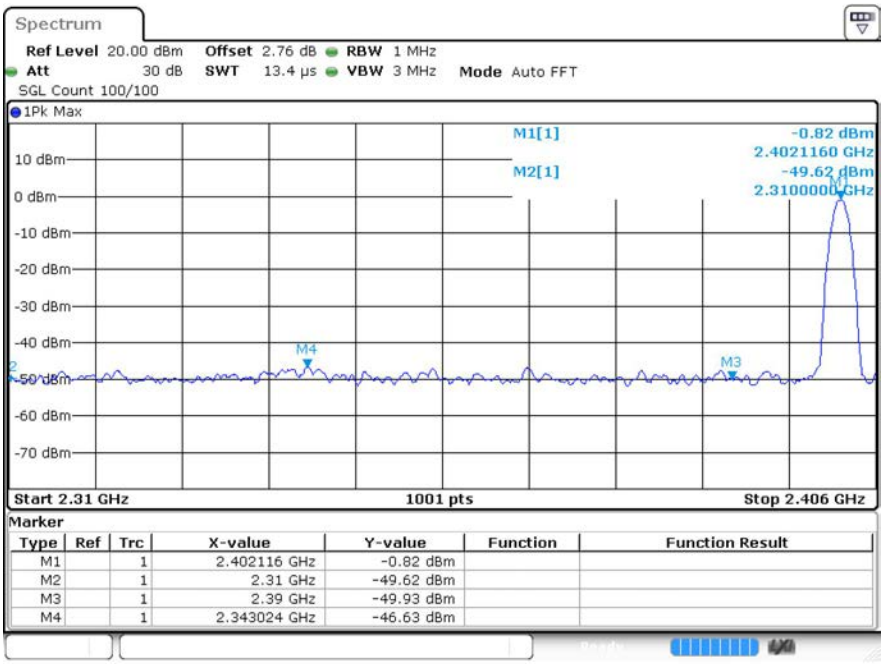
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



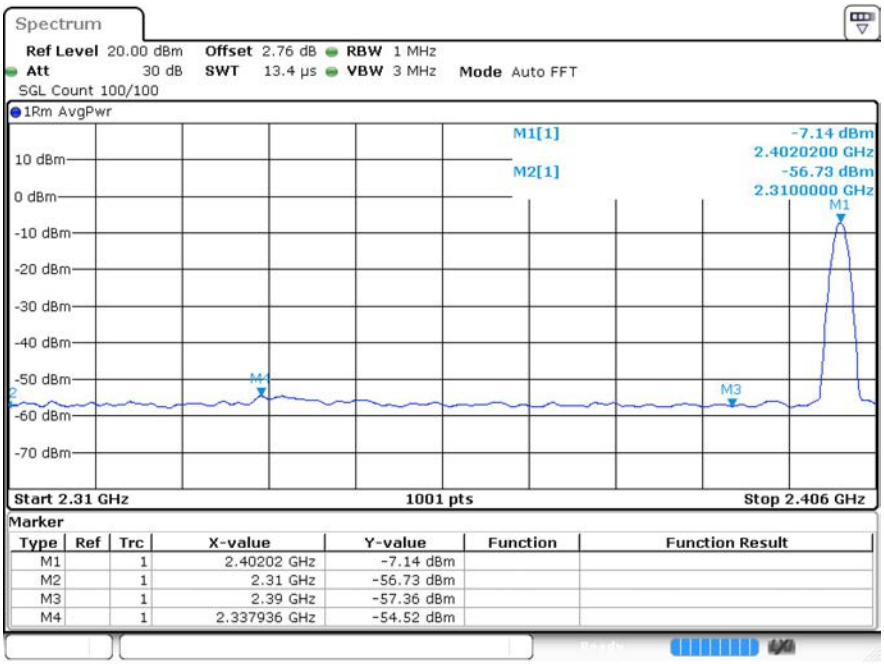
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



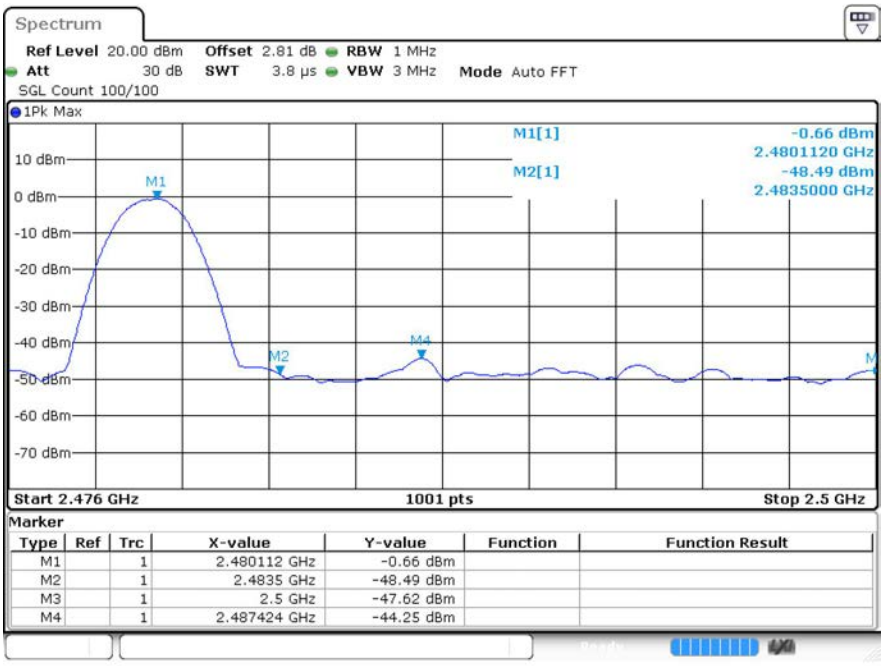
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



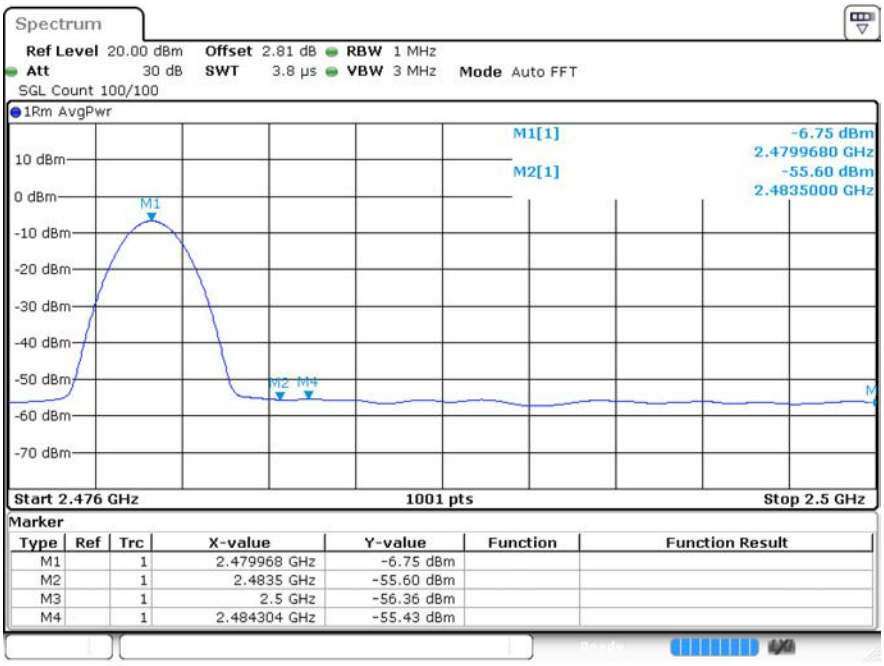
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



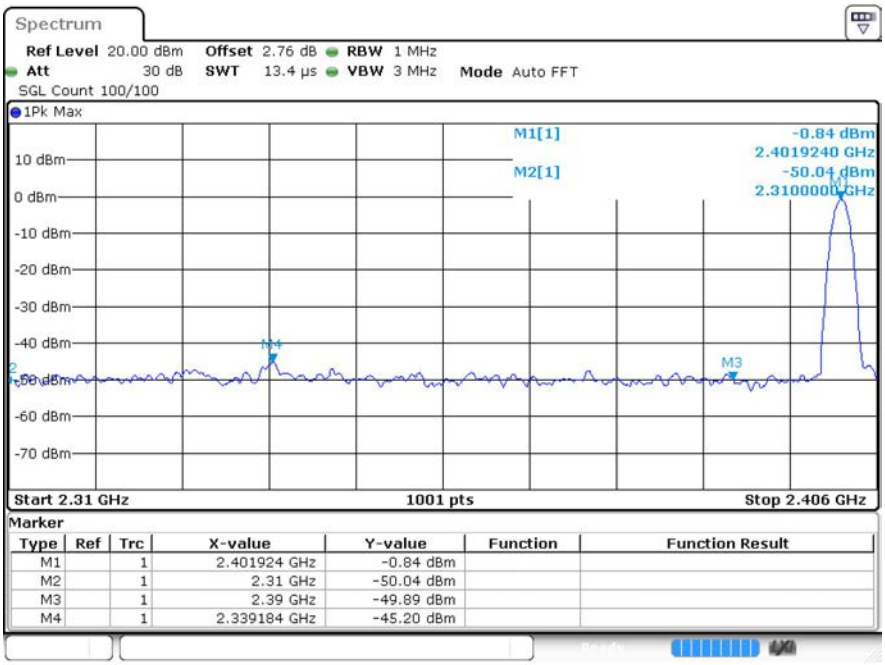
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



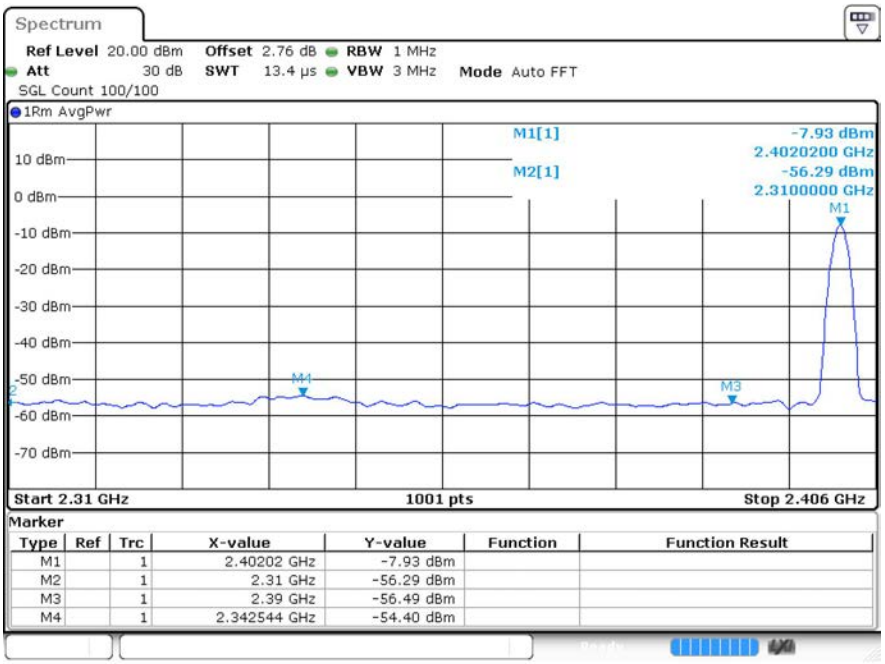
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



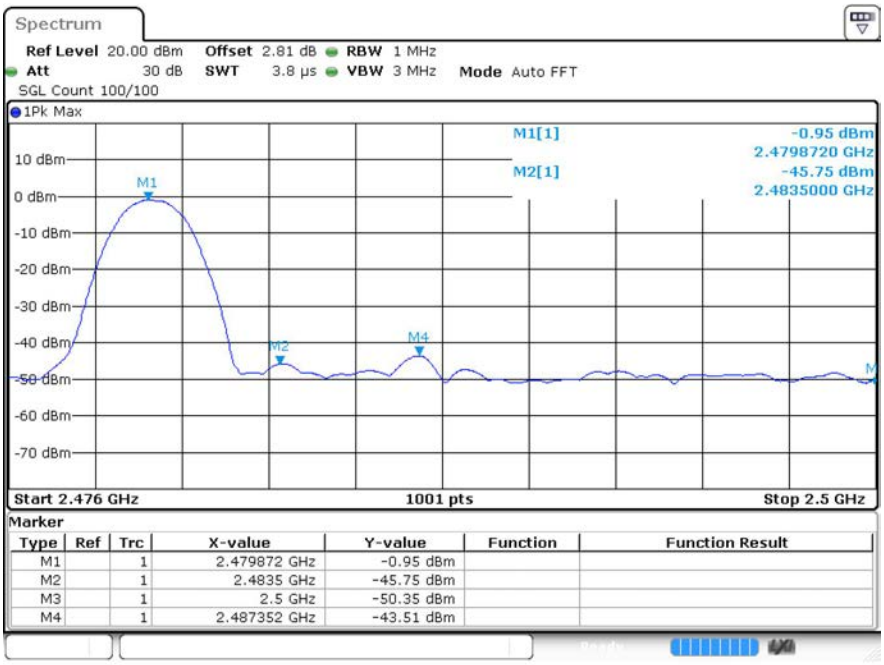
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



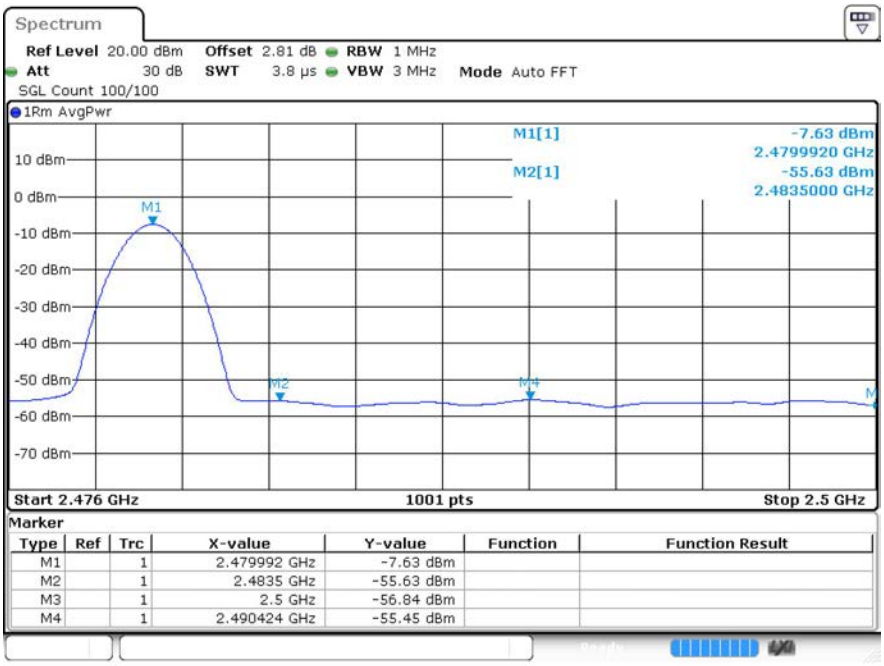
Restrict-band band-edge measurements_Hopping Off_8DPSK_Average (Low Channel)



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



Restrict-band band-edge measurements_Hopping Off_8DPSK_Average (High Channel)



---The End---