Appendix A

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

Product Name: Emax Pro BT Comms

Trade Mark: Caldwell

Test Model: 1136235

Environmental Conditions

Temperature:	25.6℃
Relative Humidity:	52.3%
ATM Pressure:	101Kpa
Test Engineer:	Simba Huang
Supervised by:	Seal Chen

Contents

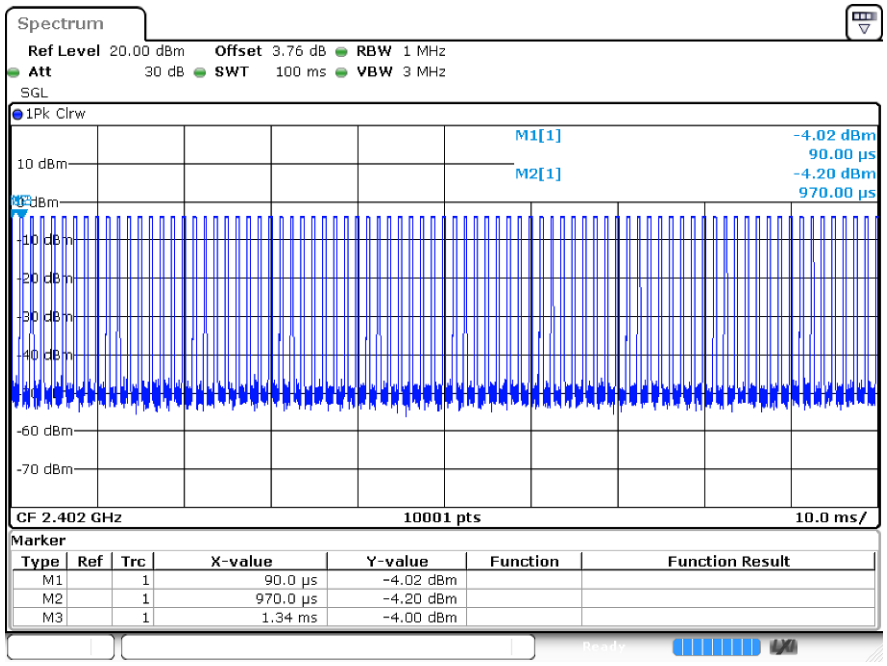
1 Duty Cycle

1.1 Test Result

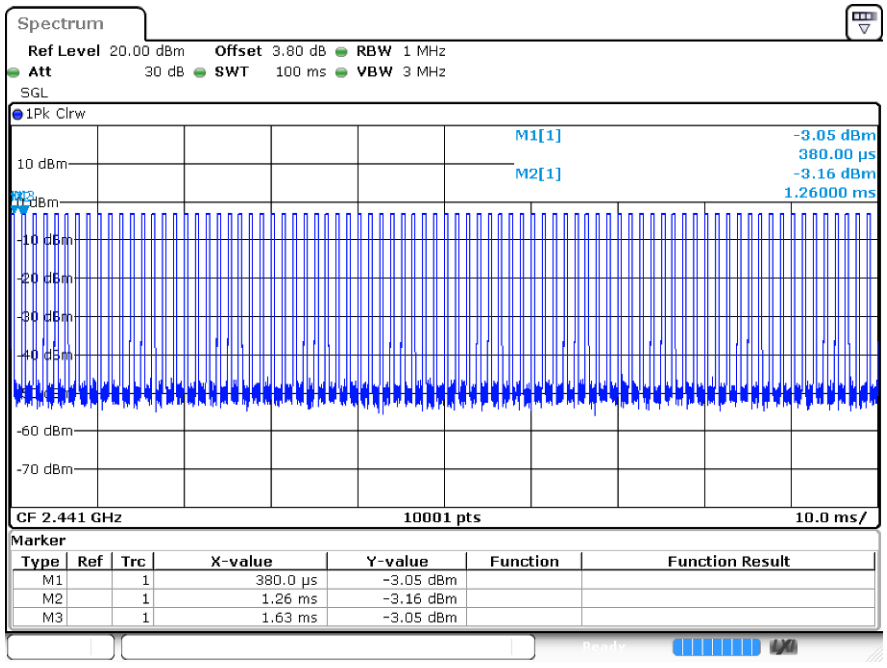
Mode	Frequency (MHz)	Duty Cycle (%)	1/T (kHz)
1-DH1	2402	30.67	2.7
1-DH1	2441	30.4	2.7
1-DH1	2480	31.2	2.63
2-DH1	2402	31.93	2.56
2-DH1	2441	31.45	2.63
2-DH1	2480	31.21	2.63

1.2 Test Graphs

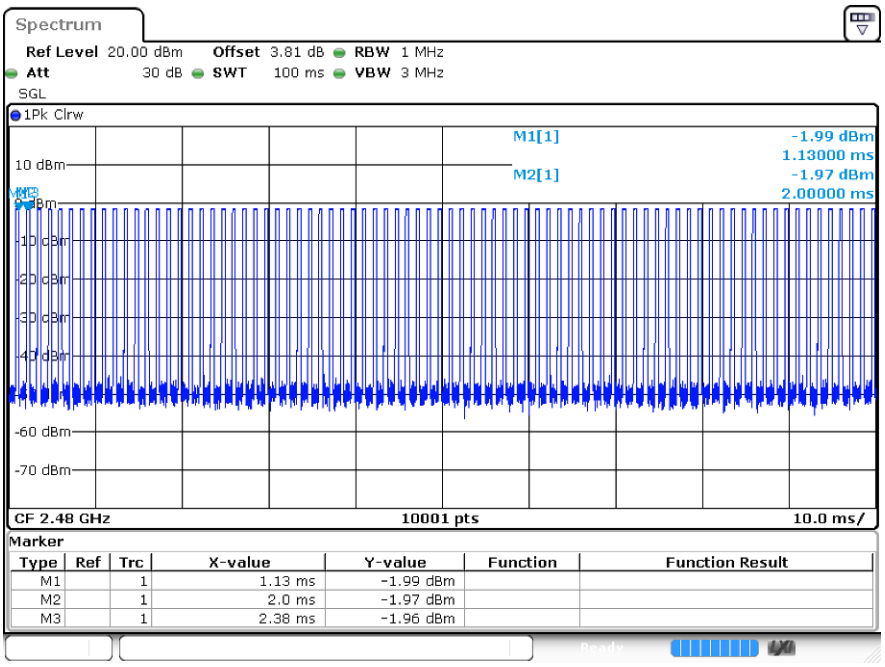
Test Graphs
1-DH1 2402MHz



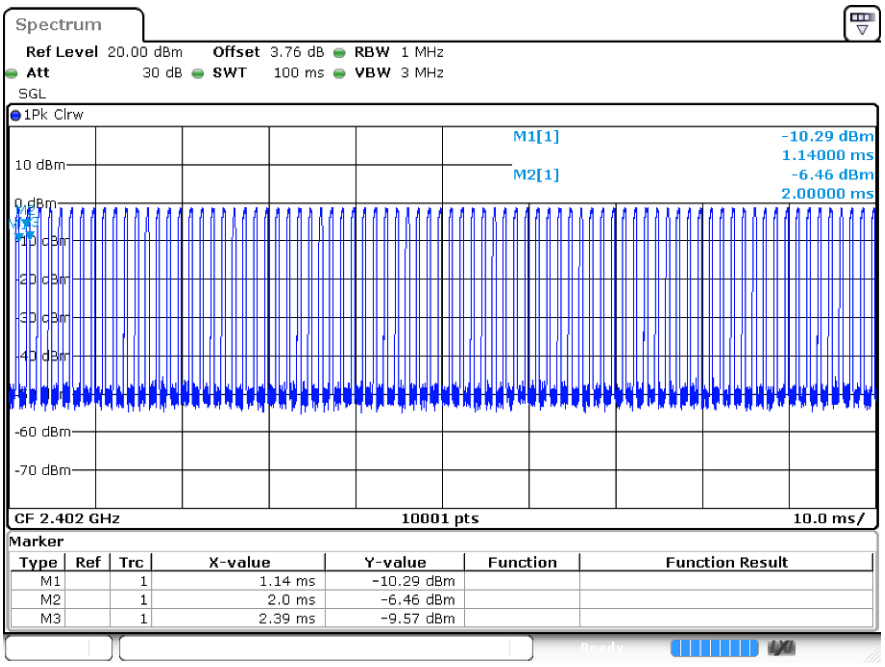
1-DH1 2441MHz



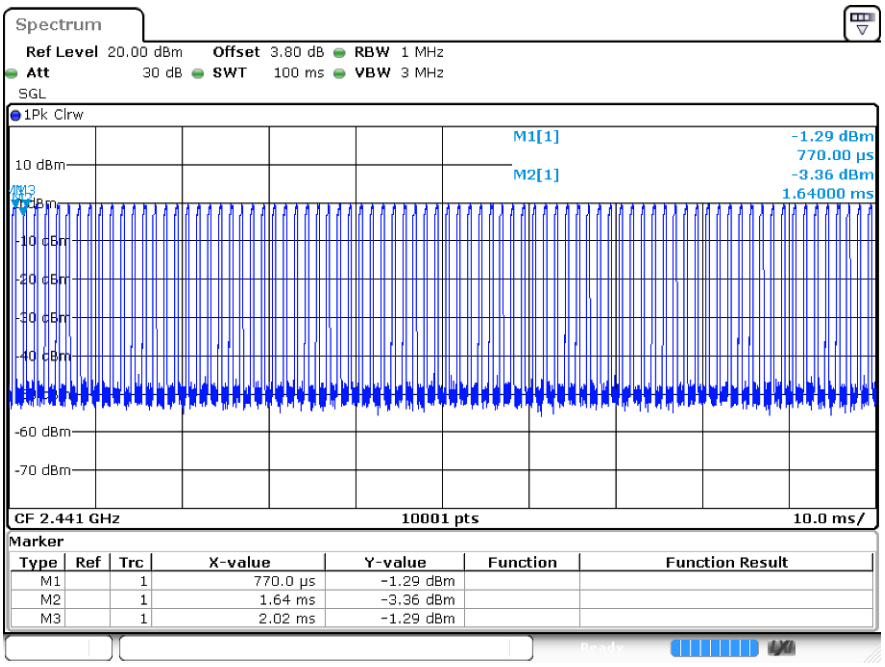
1-DH1 2480MHz



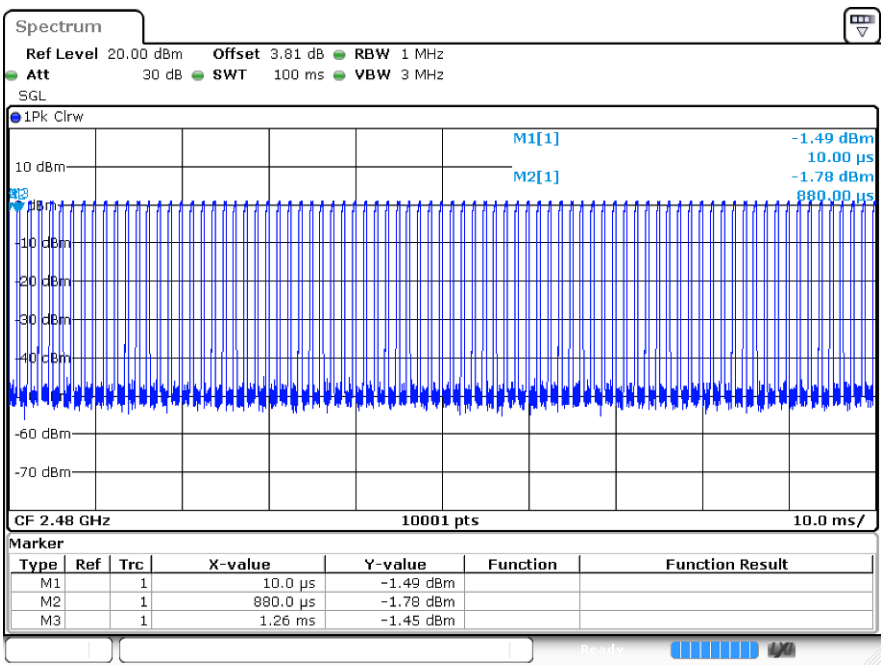
2-DH1 2402MHz



2-DH1 2441MHz



2-DH1 2480MHz

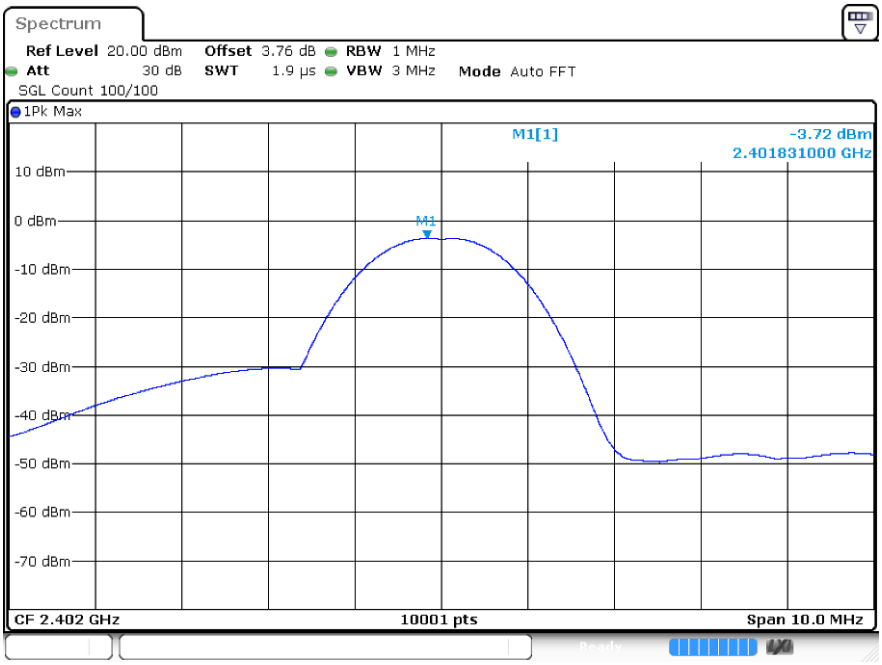
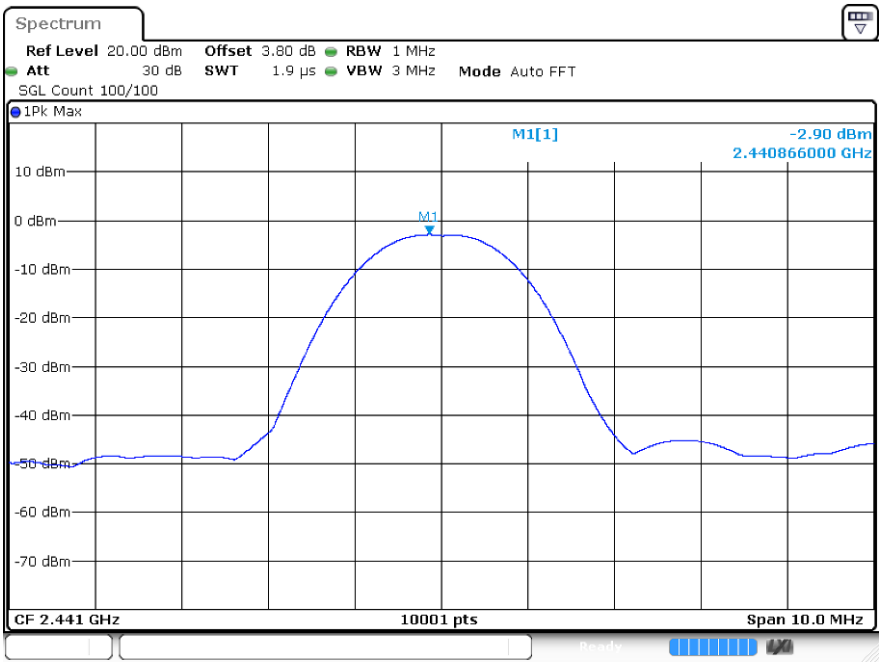


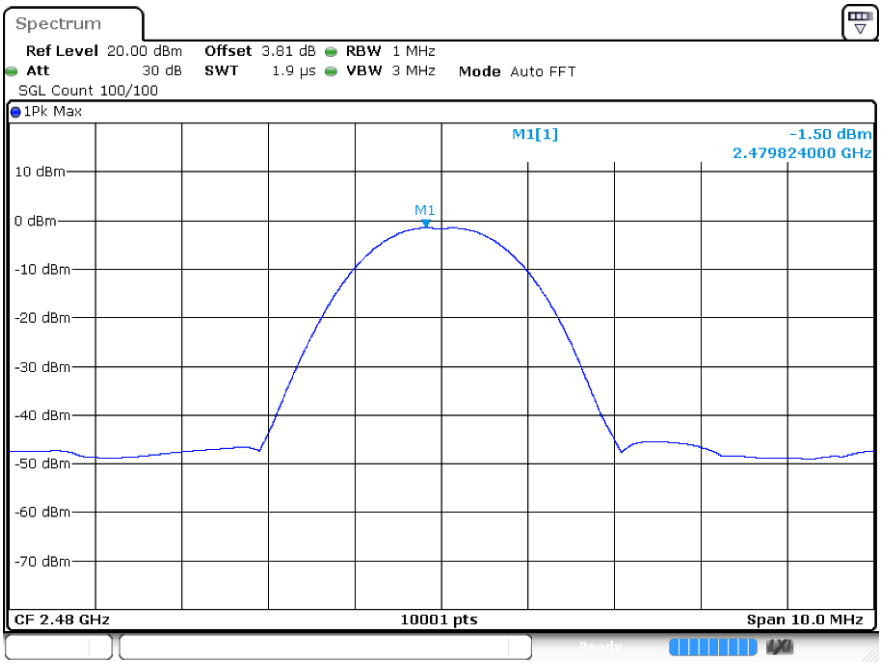
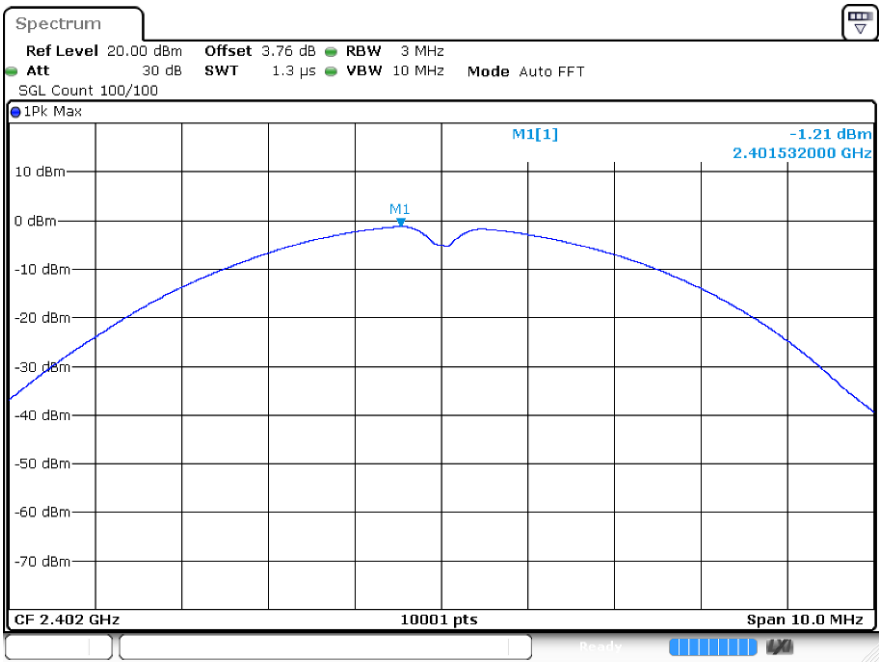
2 Maximum Conducted Peak Output Power

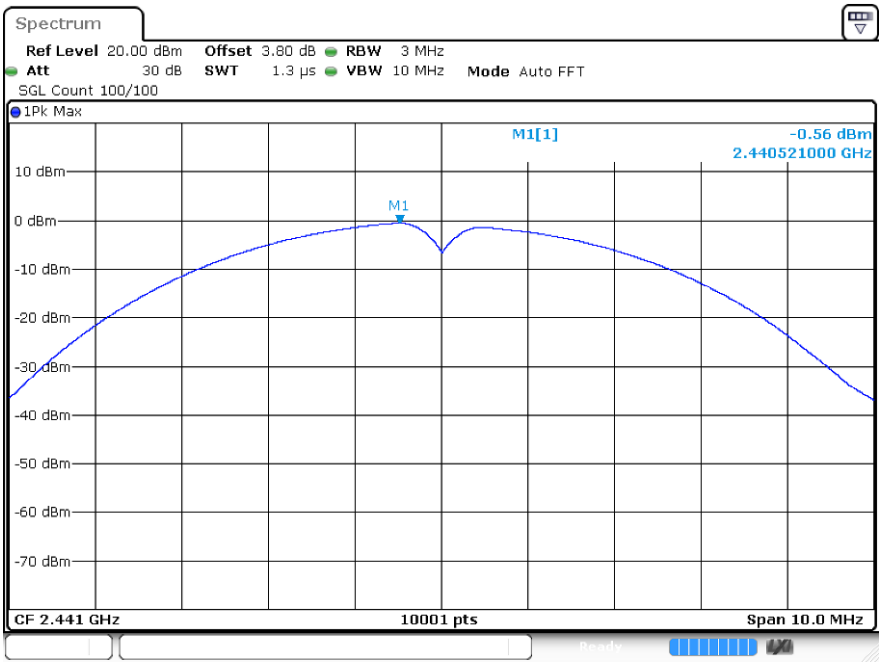
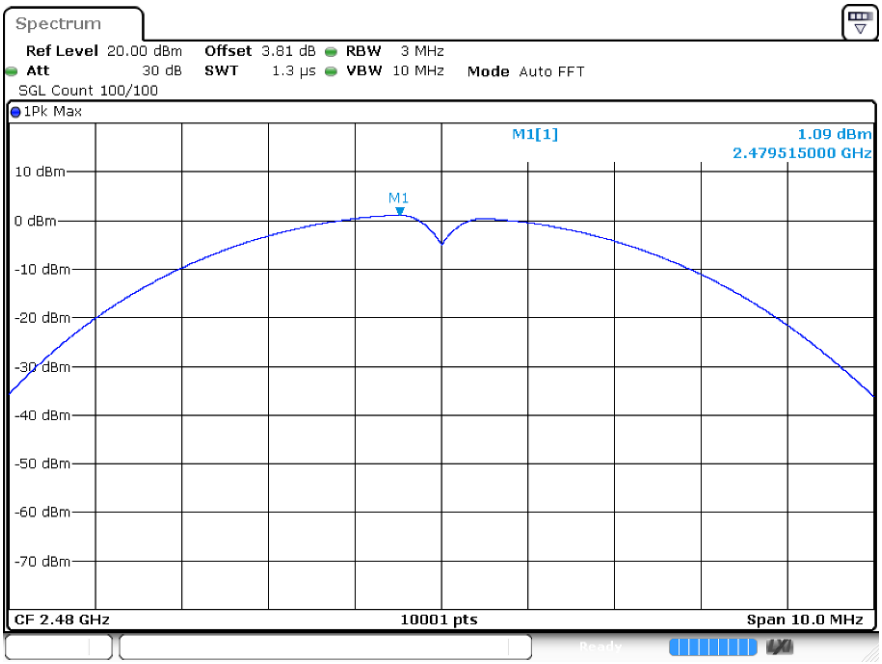
2.1 Test Result

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-3.72	21	Pass
	MCH	-2.9	21	Pass
	HCH	-1.5	21	Pass
π/4DQPSK	LCH	-1.21	21	Pass
	MCH	-0.56	21	Pass
	HCH	1.09	21	Pass

2.2 Test Graphs

Test Graphs	
GFSK/LCH	
GFSK/MCH	

GFSK/HCH	
π/4DQPSK/LCH	

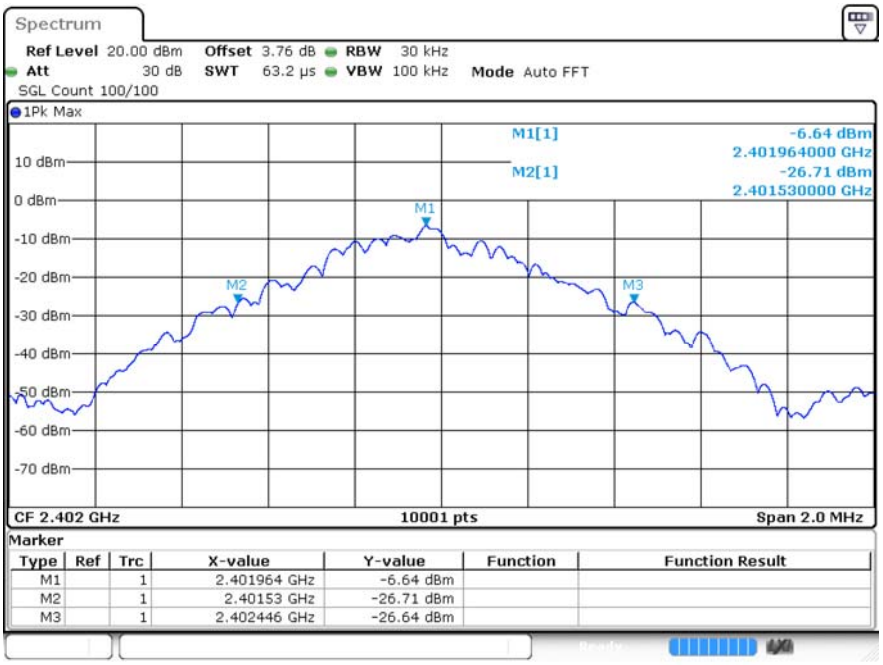
π/4DQPSK/MCH	
π/4DQPSK/HCH	

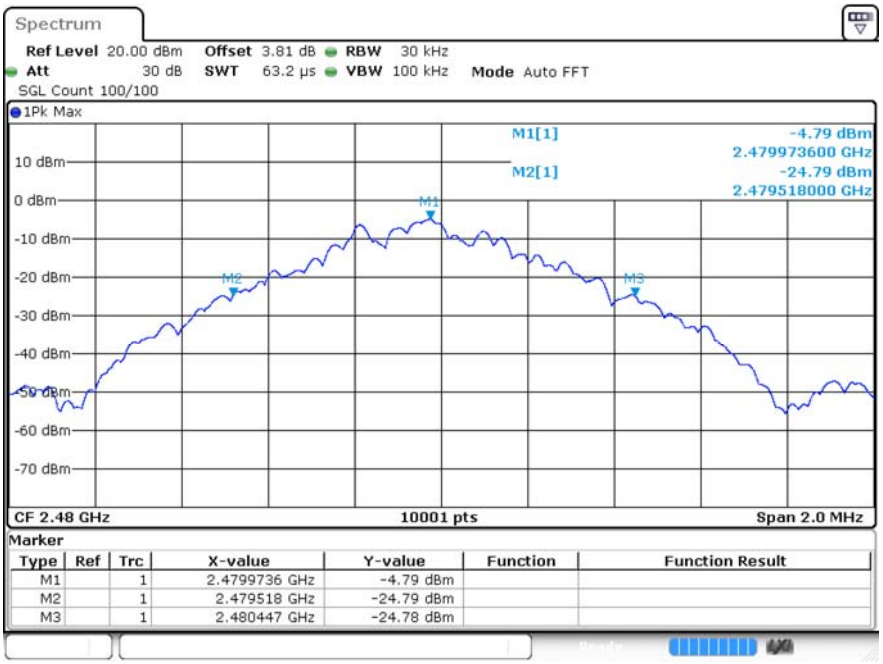
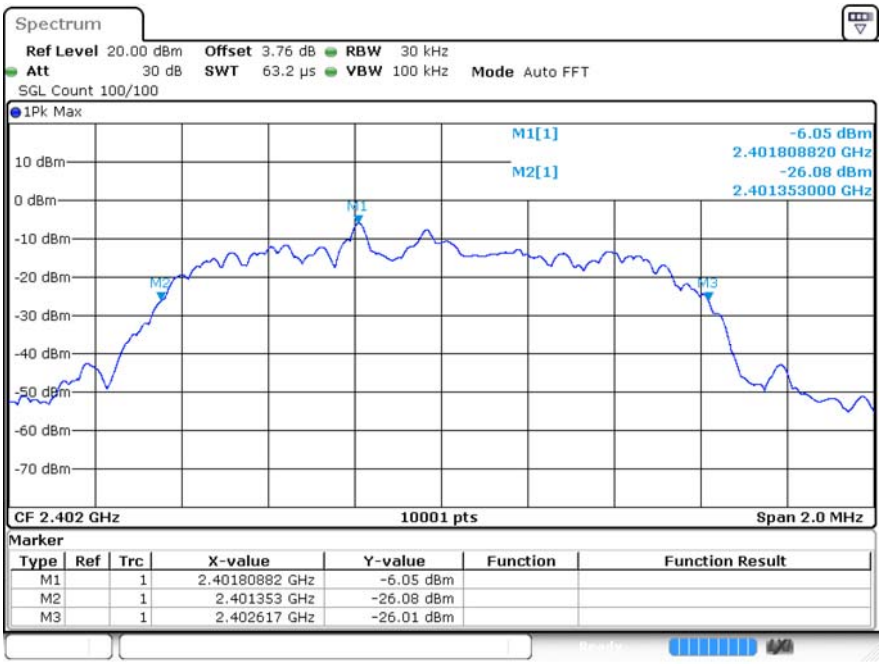
3 20dB Bandwidth

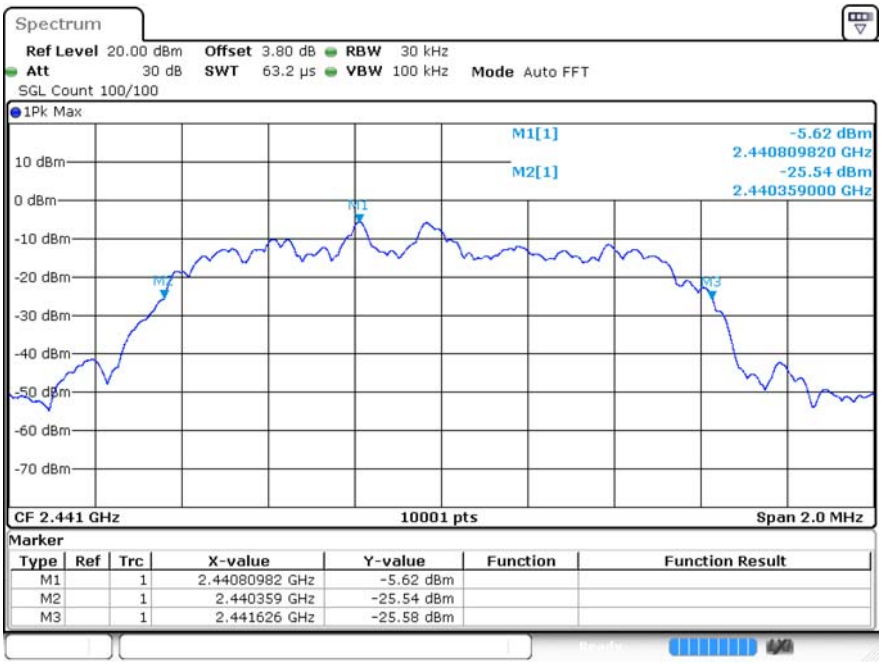
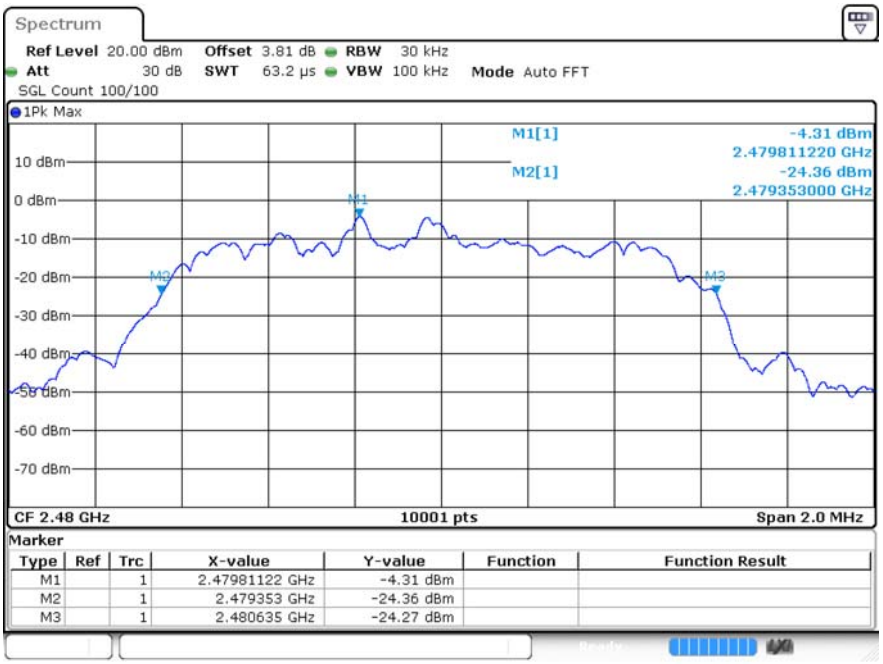
3.1 Test Result

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.916	Not Specified	Pass
	MCH	0.861	Not Specified	Pass
	HCH	0.929	Not Specified	Pass
π/4DQPSK	LCH	1.264	Not Specified	Pass
	MCH	1.267	Not Specified	Pass
	HCH	1.282	Not Specified	Pass

3.2 Test Graphs

Test Graphs	
GFSK/LCH	
GFSK/MCH	

GFSK/HCH	
π/4DQPSK/LCH	

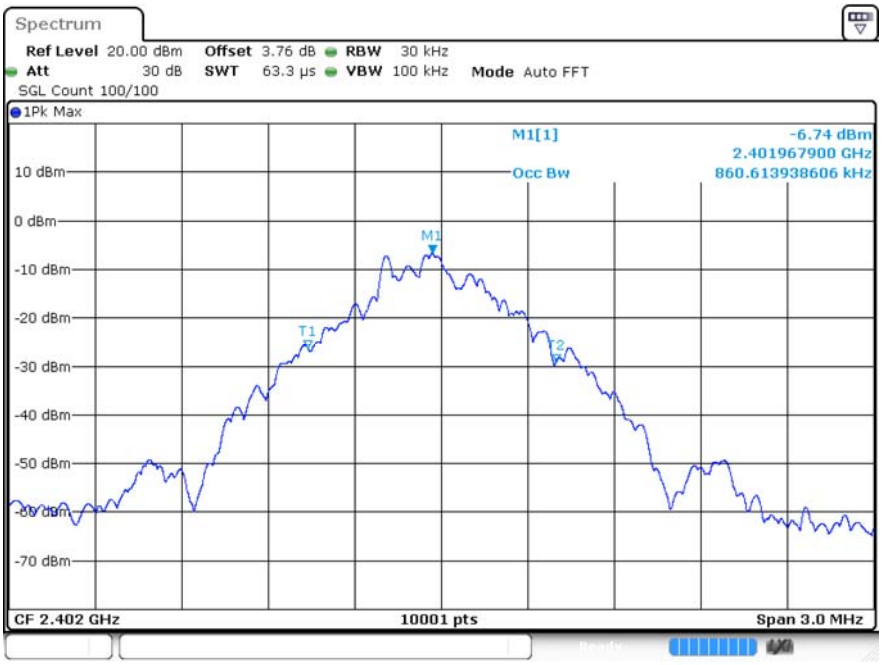
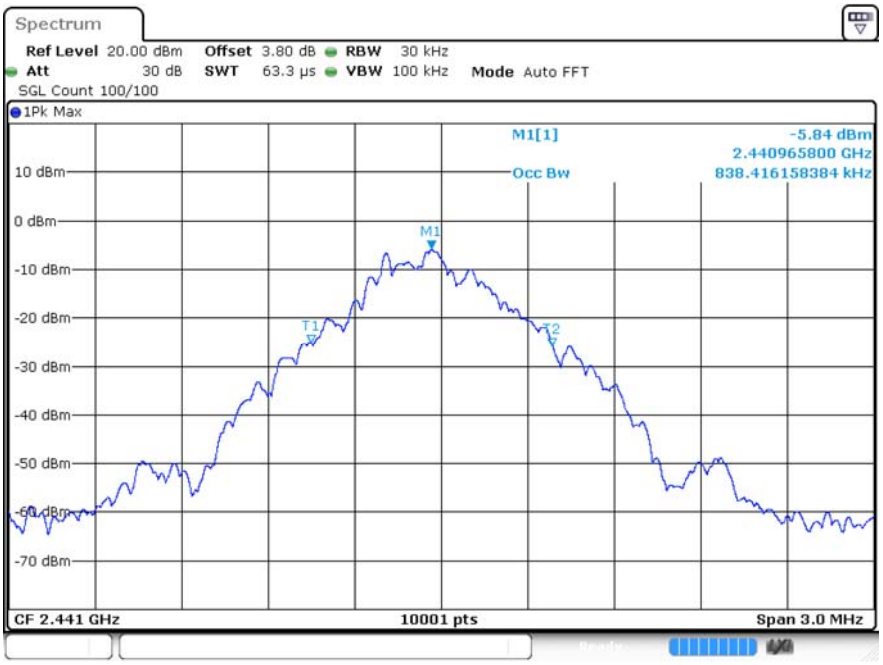
π/4DQPSK/MCH	
π/4DQPSK/HCH	

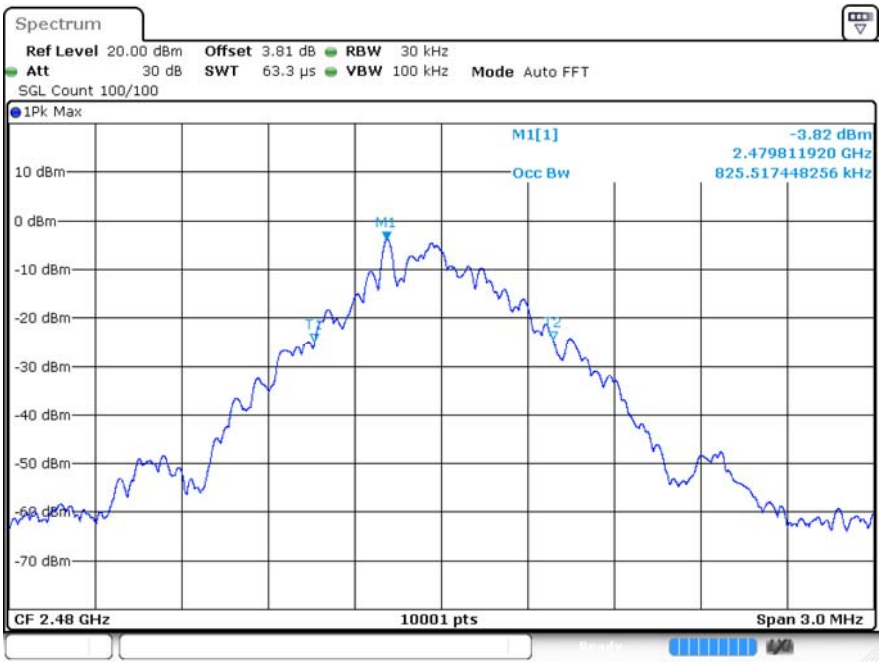
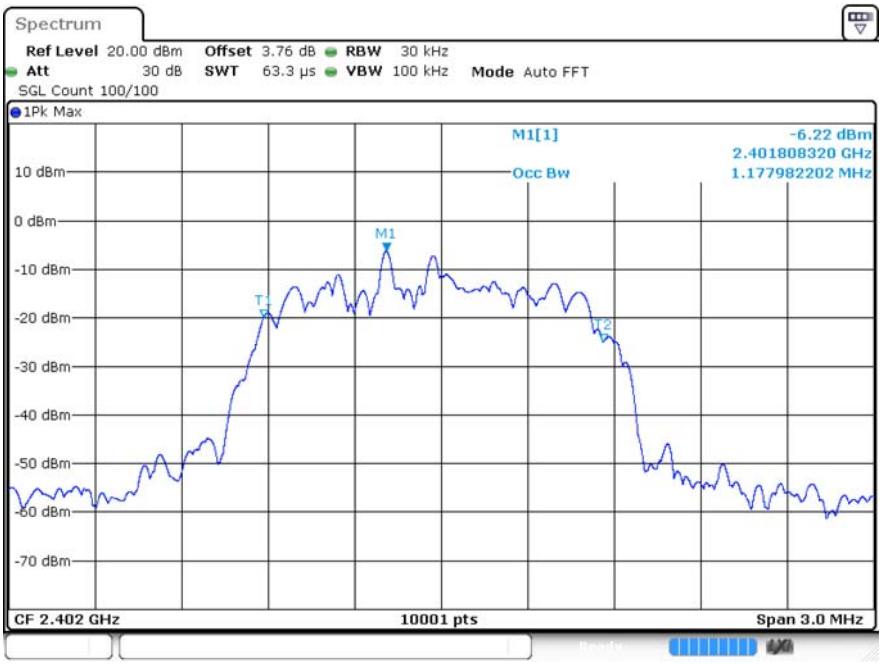
4 Occupied Bandwidth

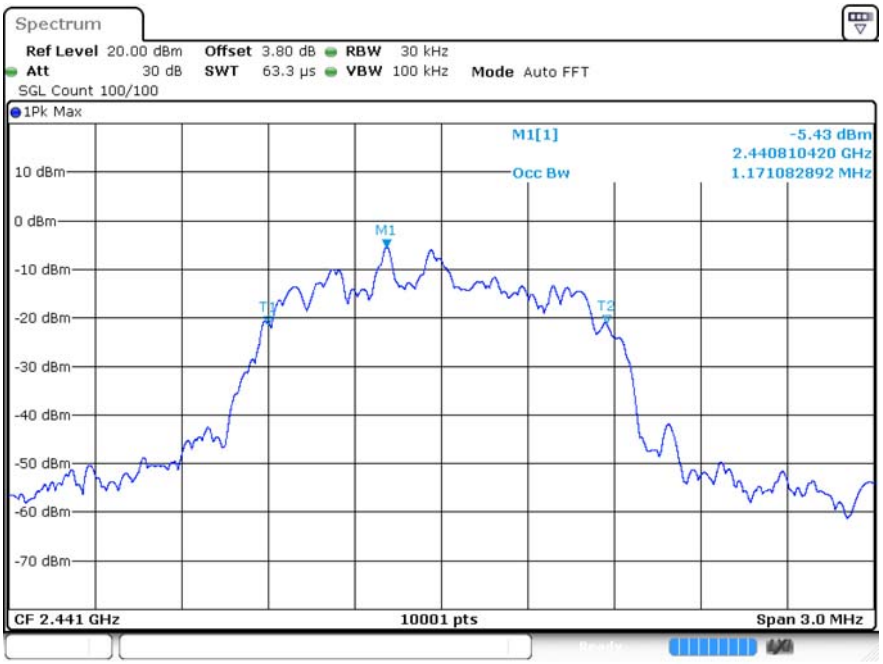
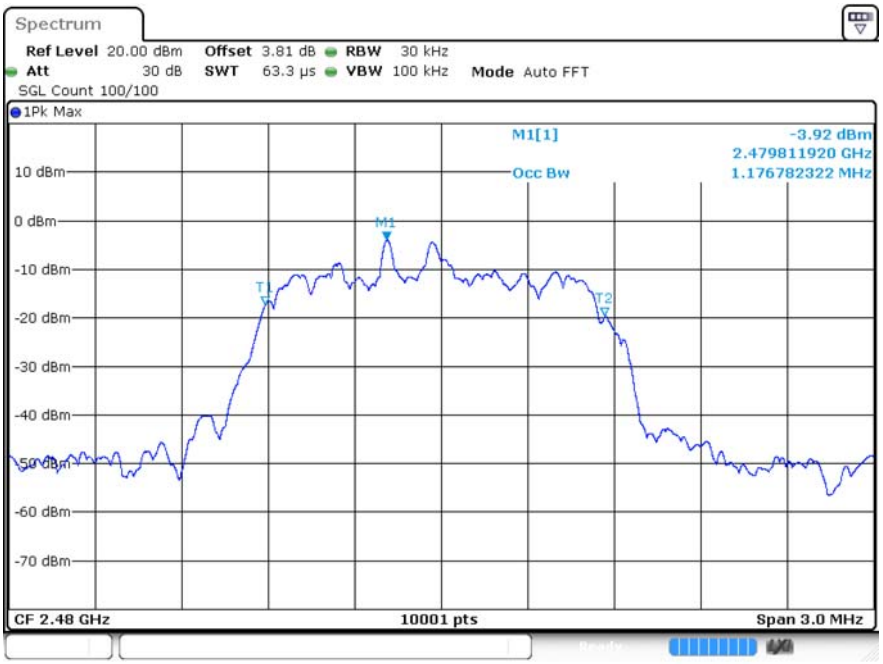
4.1 Test Result

Mode	Channel.	99% Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.861	Not Specified	PASS
	MCH	0.838	Not Specified	PASS
	HCH	0.826	Not Specified	PASS
π/4DQPSK	LCH	1.178	Not Specified	PASS
	MCH	1.171	Not Specified	PASS
	HCH	1.177	Not Specified	PASS

4.2 Test Graphs

Test Graphs	
GFSK/LCH	
GFSK/MCH	

GFSK/HCH	
π/4DQPSK/LCH	

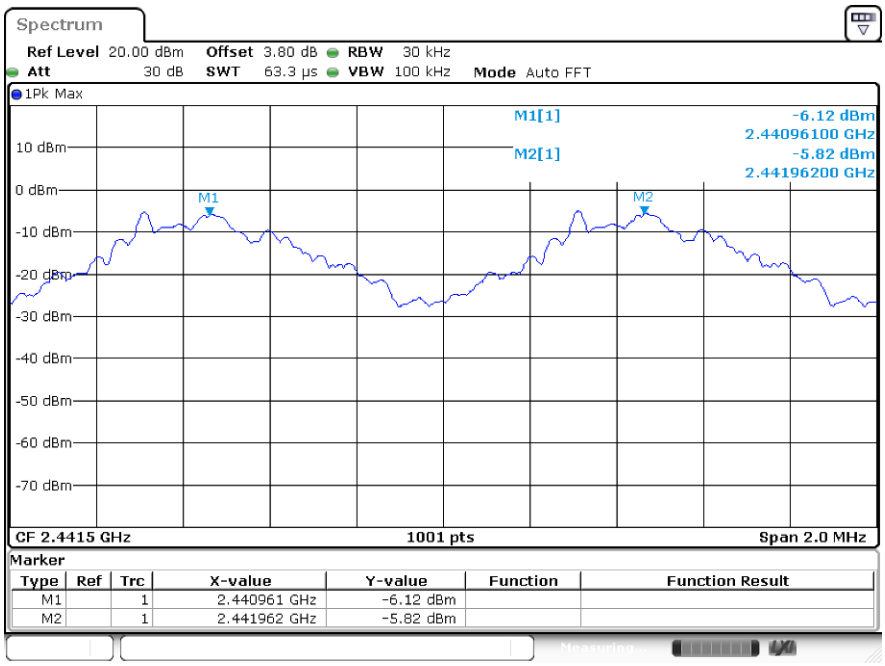
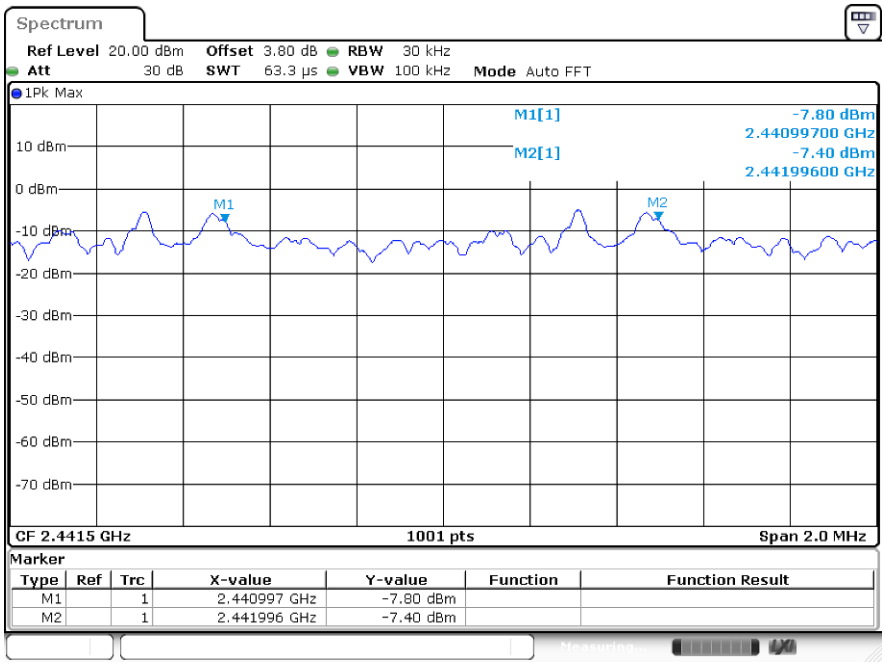
π/4DQPSK/MCH	
π/4DQPSK/HCH	

5 Carrier Frequency Separation

5.1 Test Result

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	MCH	1.001	0.574	Pass
π/4DQPSK	MCH	0.999	0.845	Pass

5.2 Test Graphs

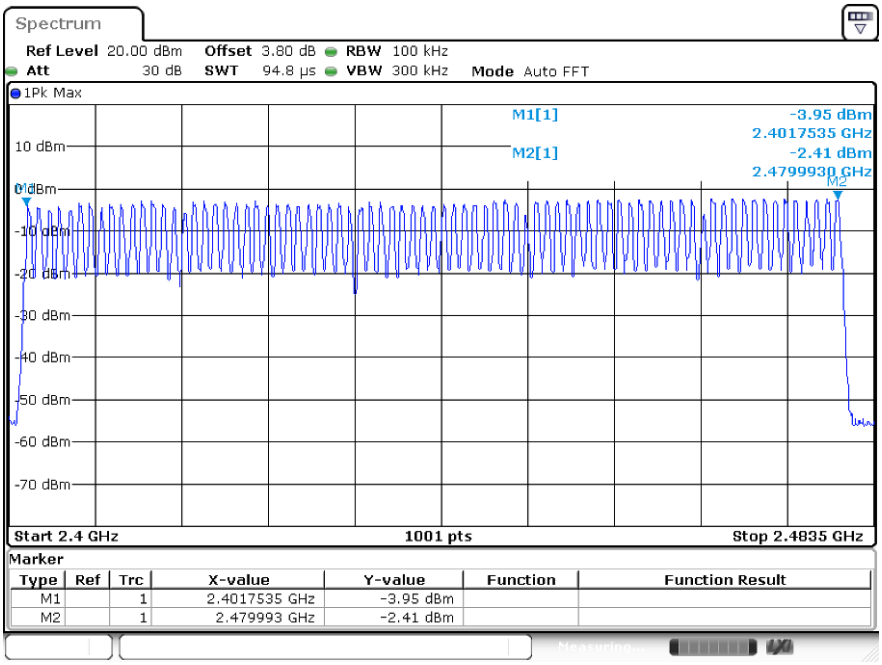
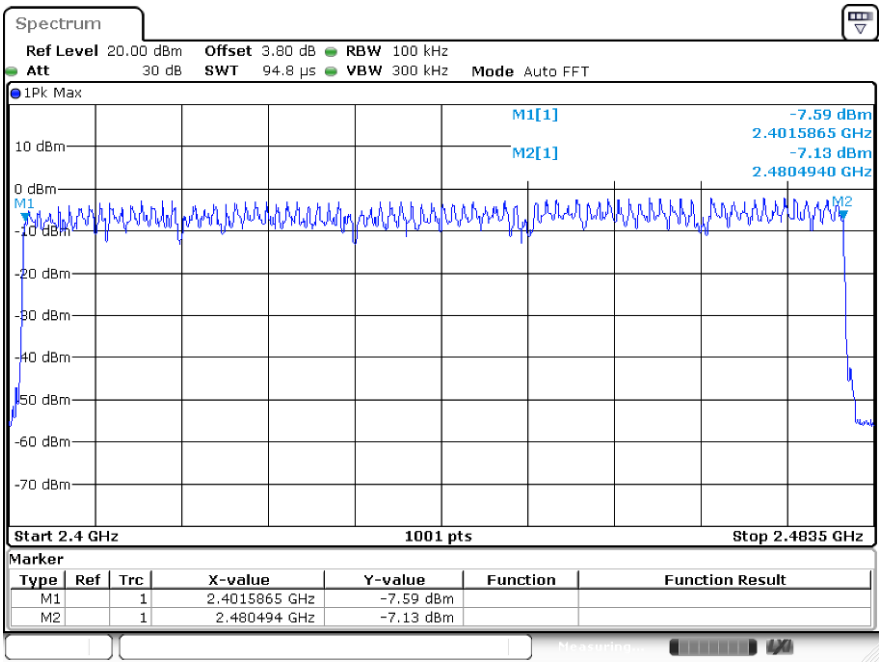
Test Graphs	
GFSK/MCH	
π/4DQPSK/MCH	

6 Hopping Channel Number

6.1 Test Result

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

6.2 Test Graphs

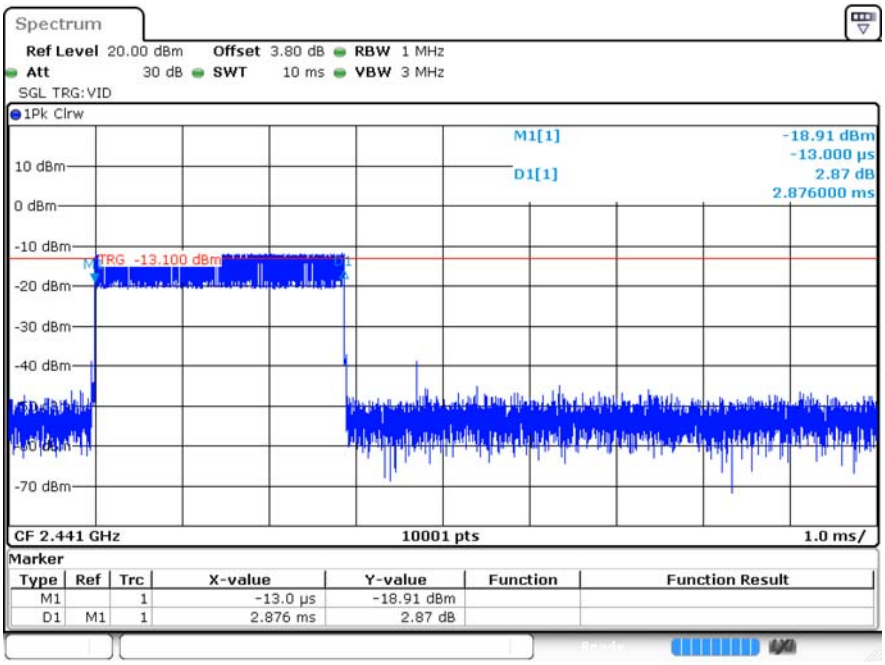
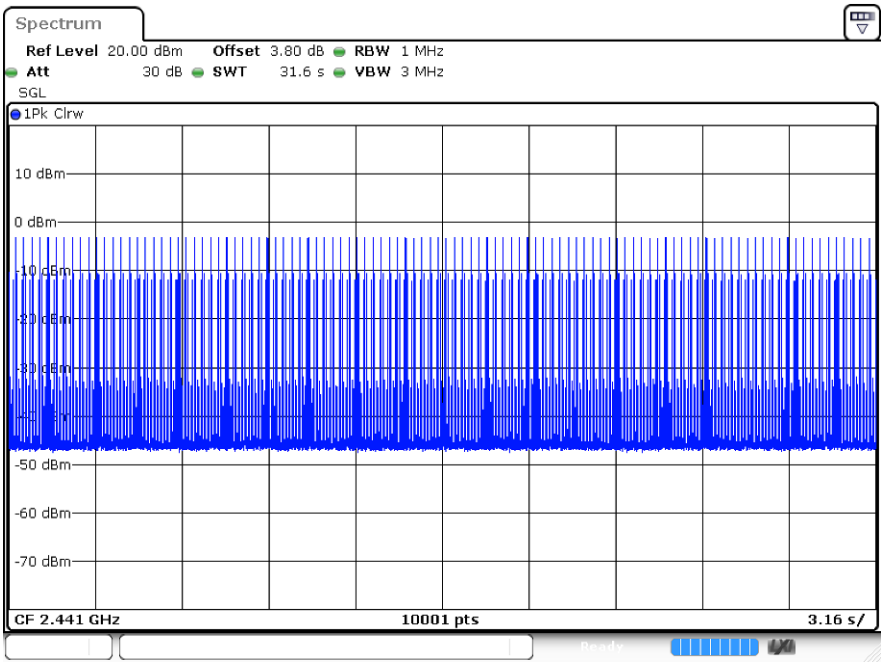
Test Graphs	
GFSK/Hop	
π/4DQPSK/Hop	

7 Dwell Time

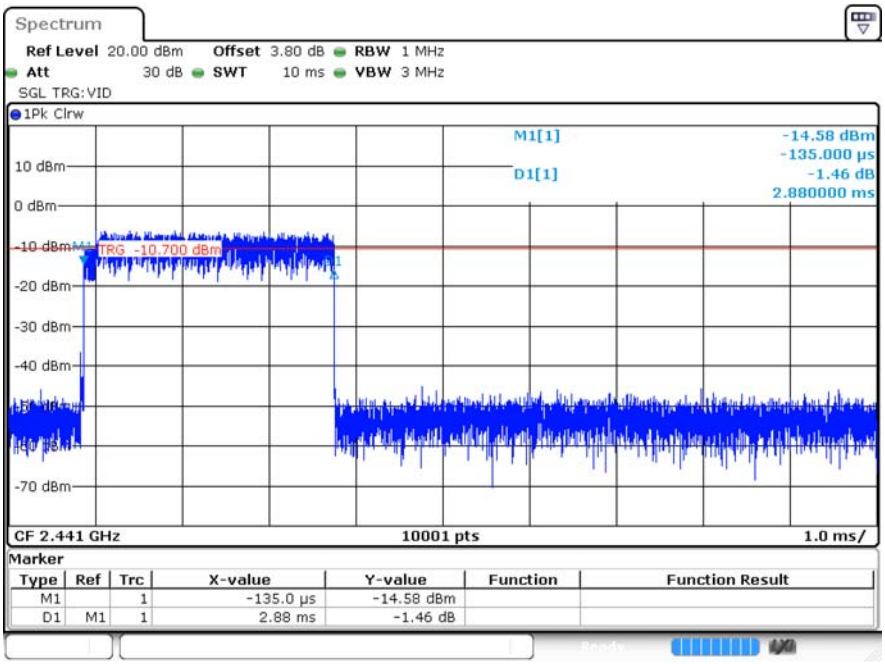
7.1 Test Result

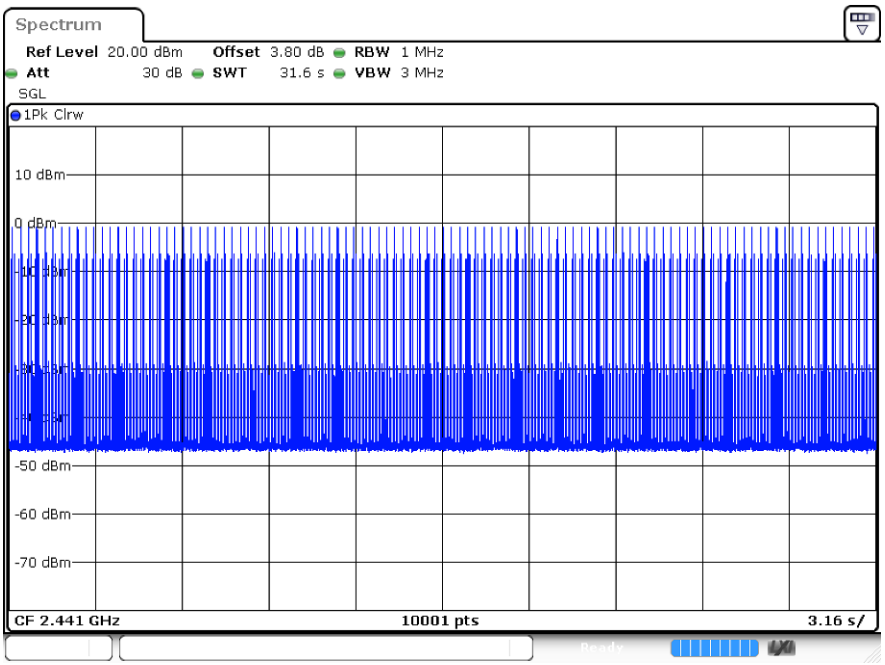
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[ms]	Limit [s]	Verdict
GFSK	DH5	MCH	2.876	106	304.856	0.4	Pass
π/4DQPSK	2DH5	MCH	2.88	107	308.16	0.4	Pass

7.2 Test Graphs

Test Graphs	
GFSK_DH5/MCH	 

π/4DQPSK
_2DH5/MCH



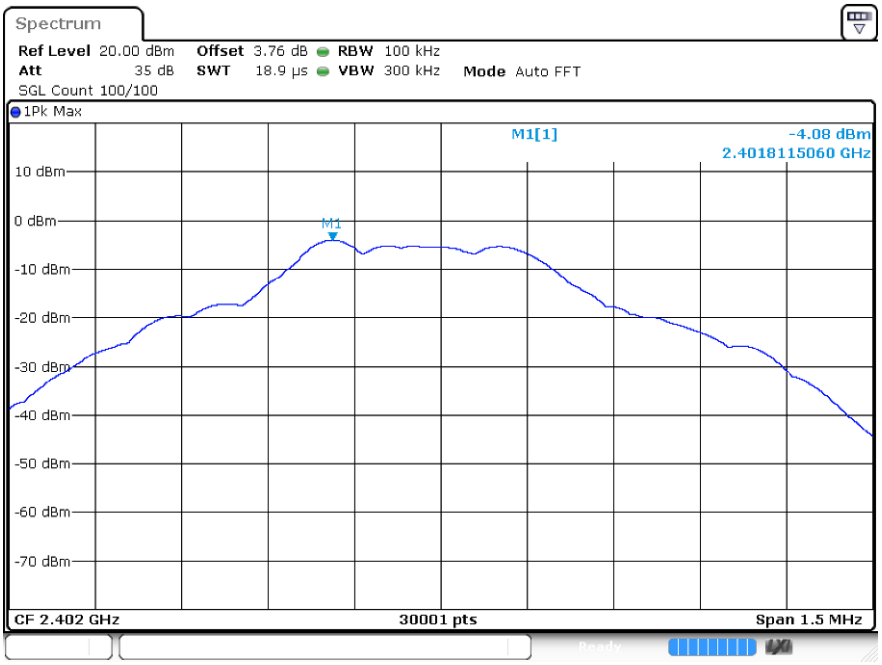
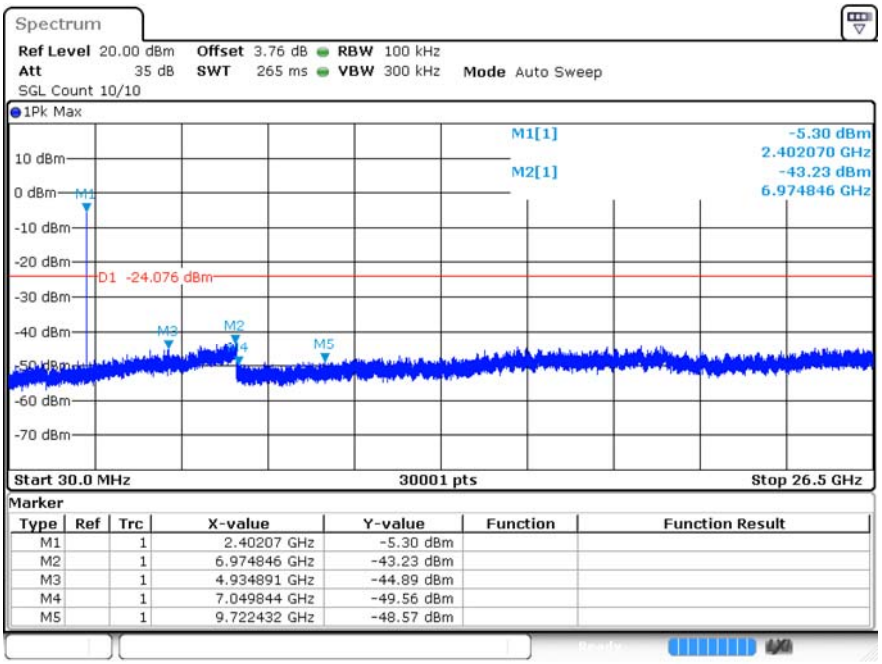


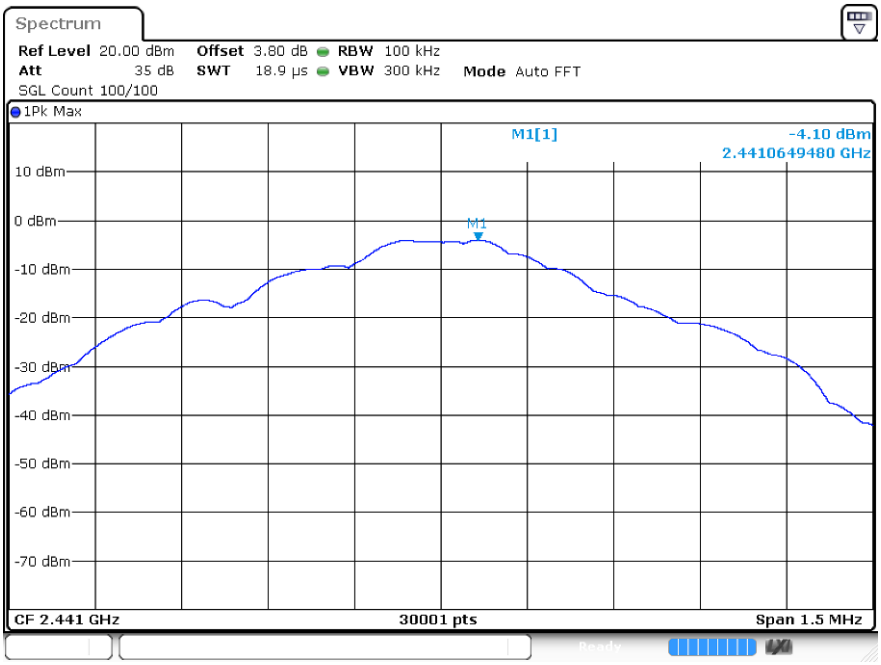
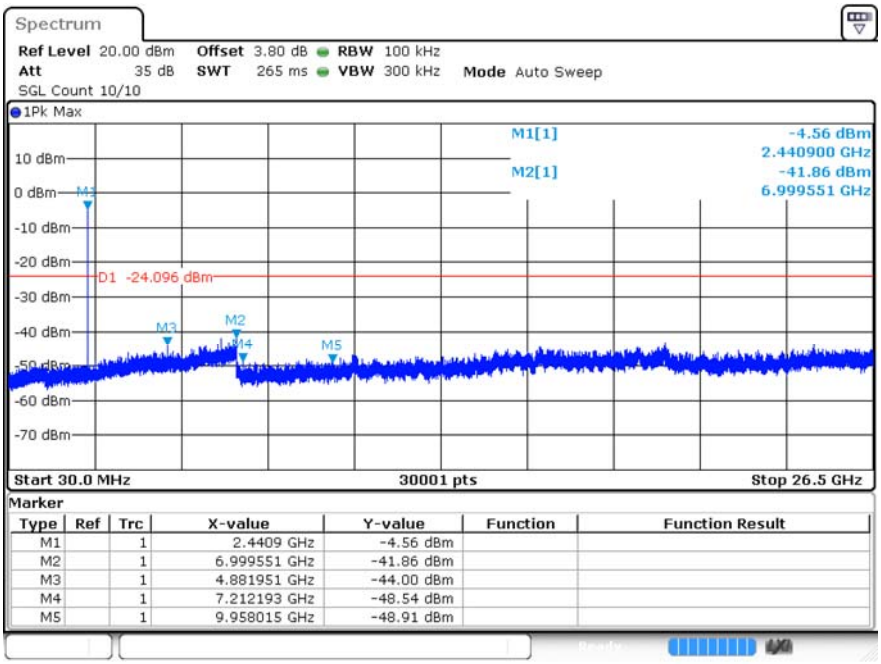
8 RF Conducted Spurious Emissions

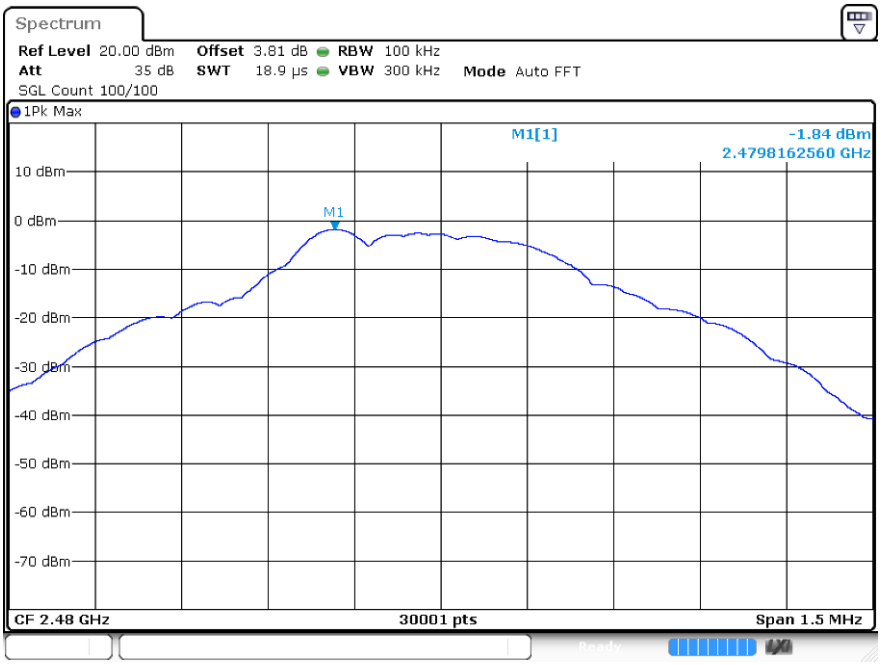
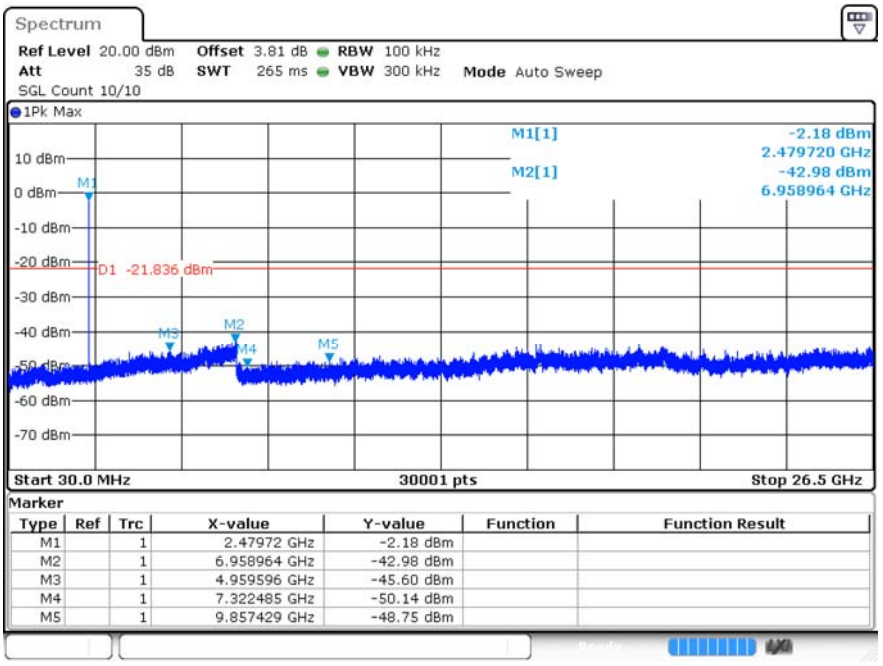
8.1 Test Result

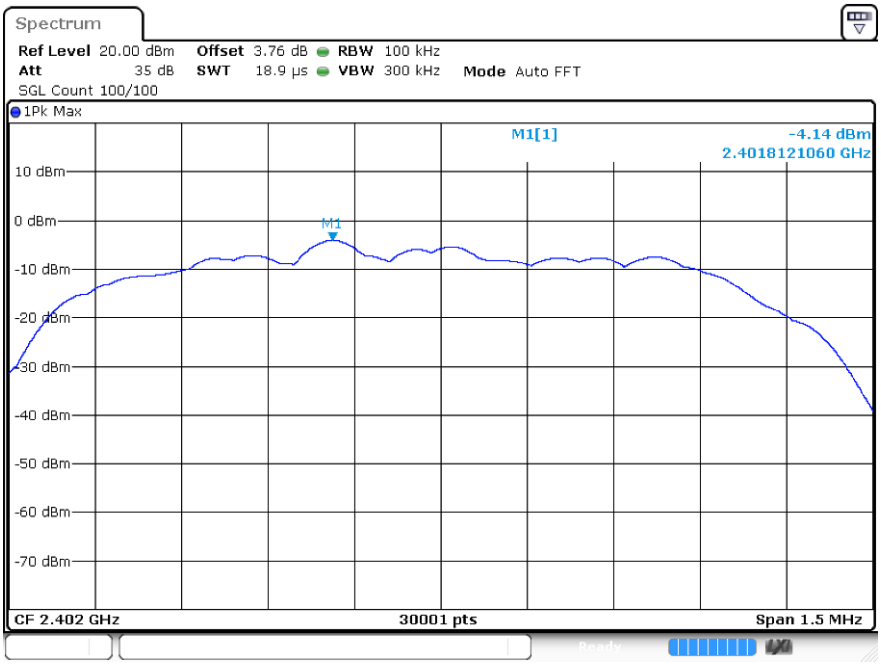
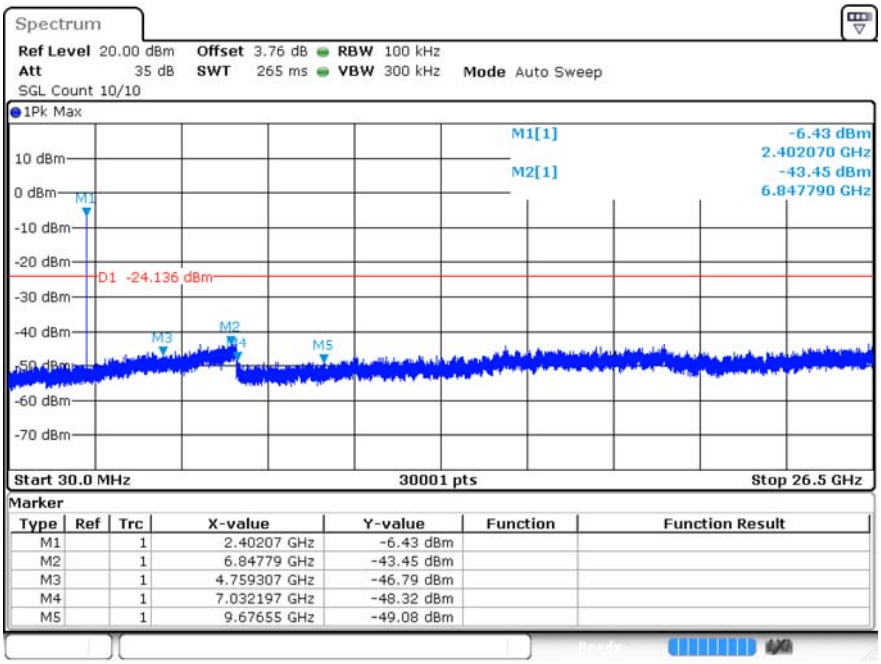
Mode	Channel	Max. Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	-39.15	-20	Pass
	MCH	-37.75	-20	Pass
	HCH	-41.14	-20	Pass
π/4DQPSK	LCH	-39.31	-20	Pass
	MCH	-39.89	-20	Pass
	HCH	-39.85	-20	Pass

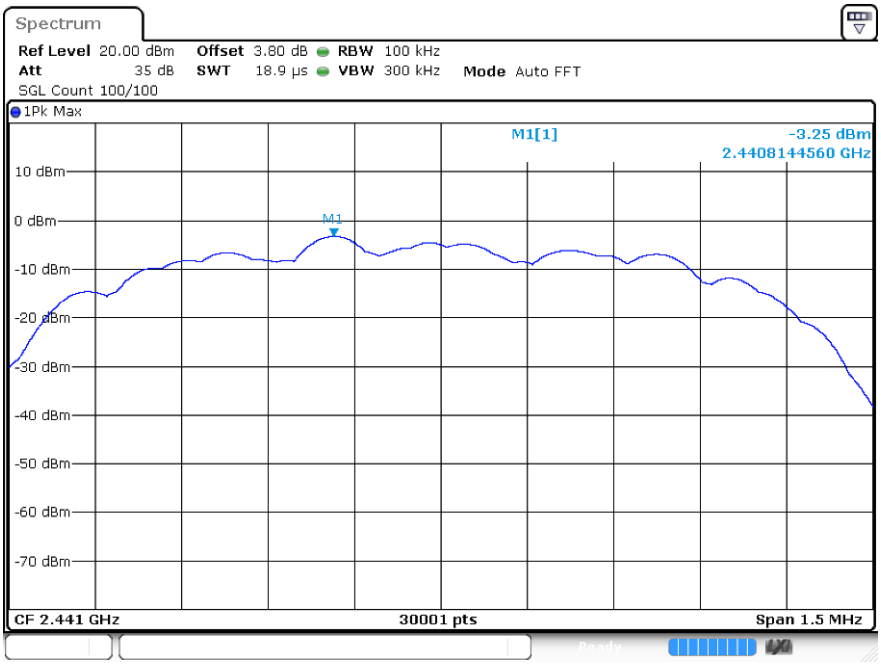
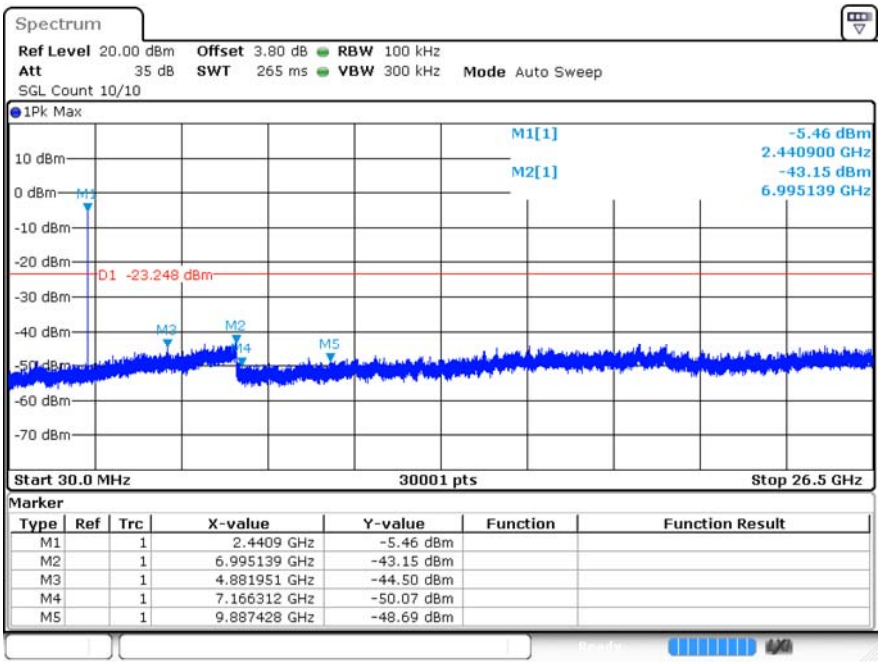
8.2 Test Graphs

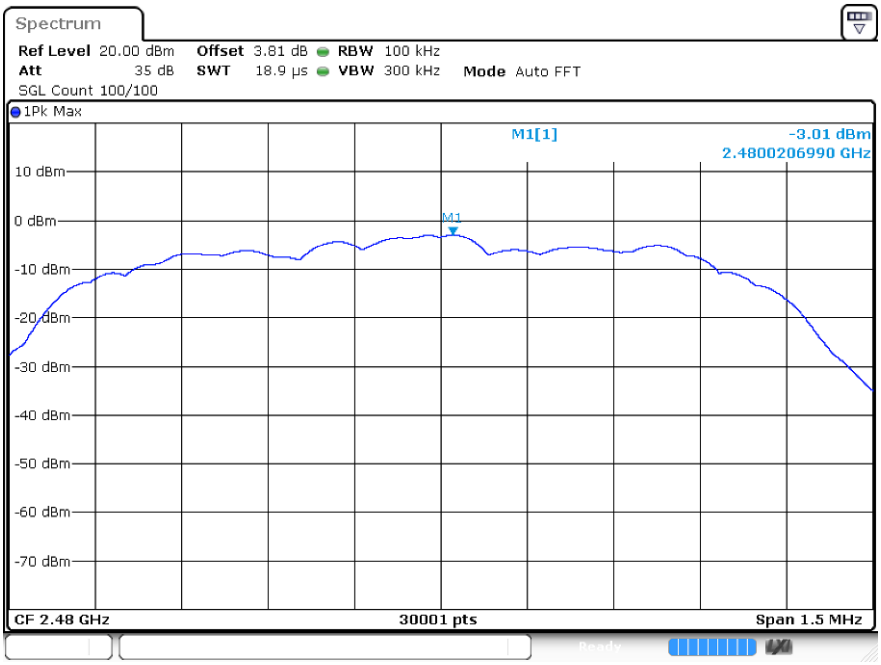
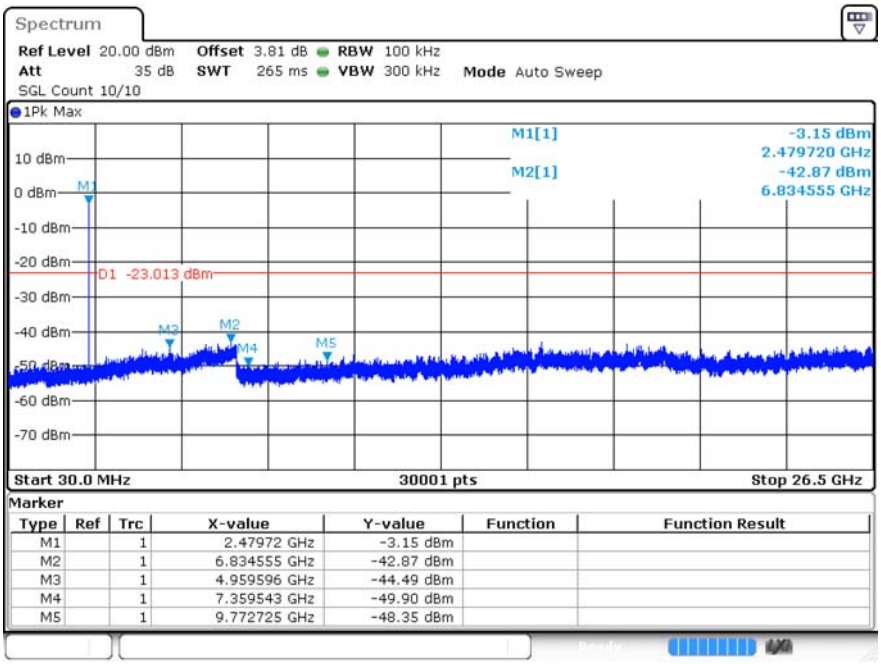
GFSK_LCH_Graphs	
Pref	
Puw	

GFSK_MCH_Graphs	
Pref	
Puw	

GFSK_HCH_Graphs	
Pref	
Puw	

π/4DQPSK_LCH_Graphs	
Pref	
Puw	

π/4DQPSK_MCH_Graphs	
Pref	
Puw	

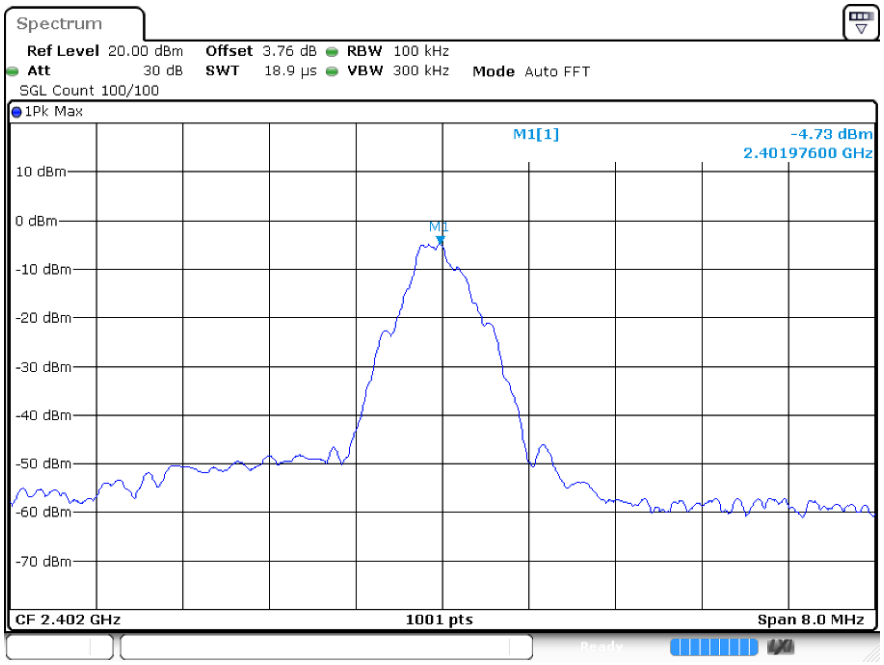
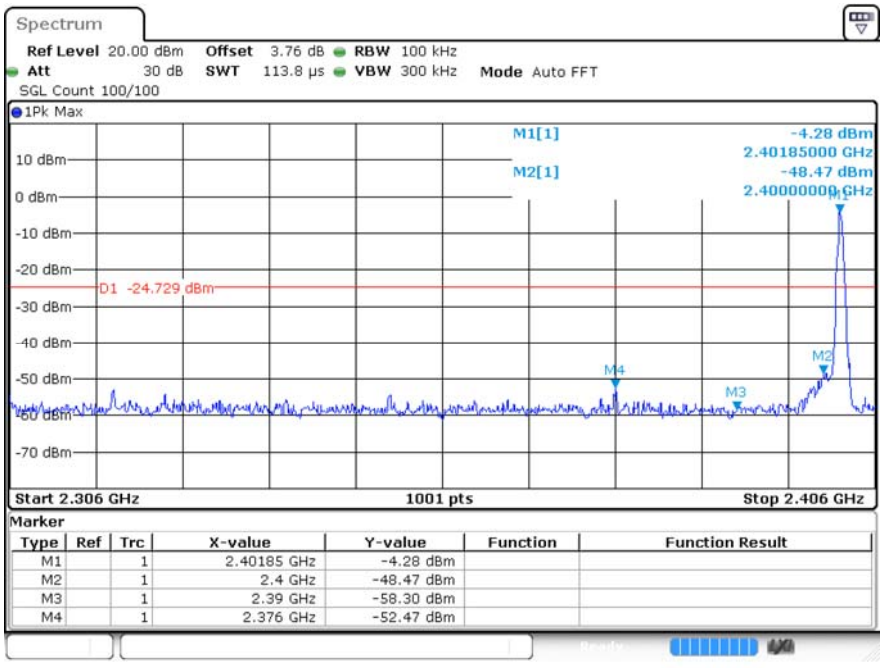
π/4DQPSK_HCH_Graphs	
Pref	
Puw	

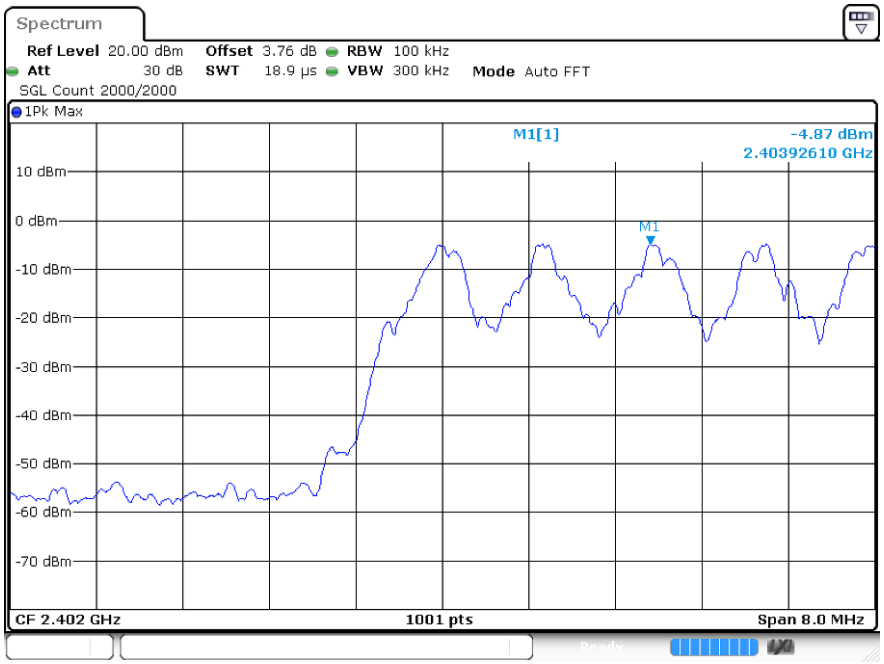
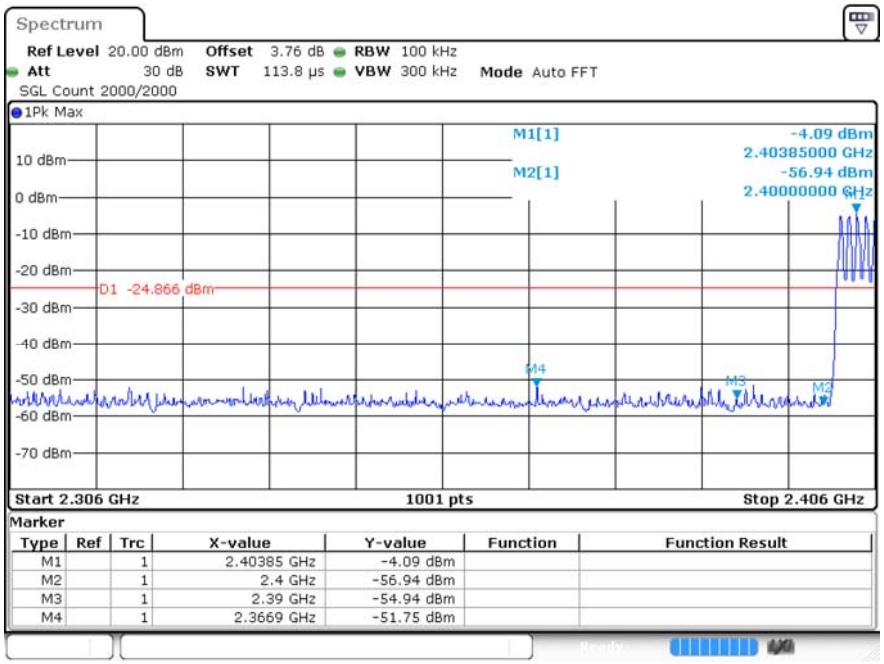
9 Band-edge for RF Conducted Emissions

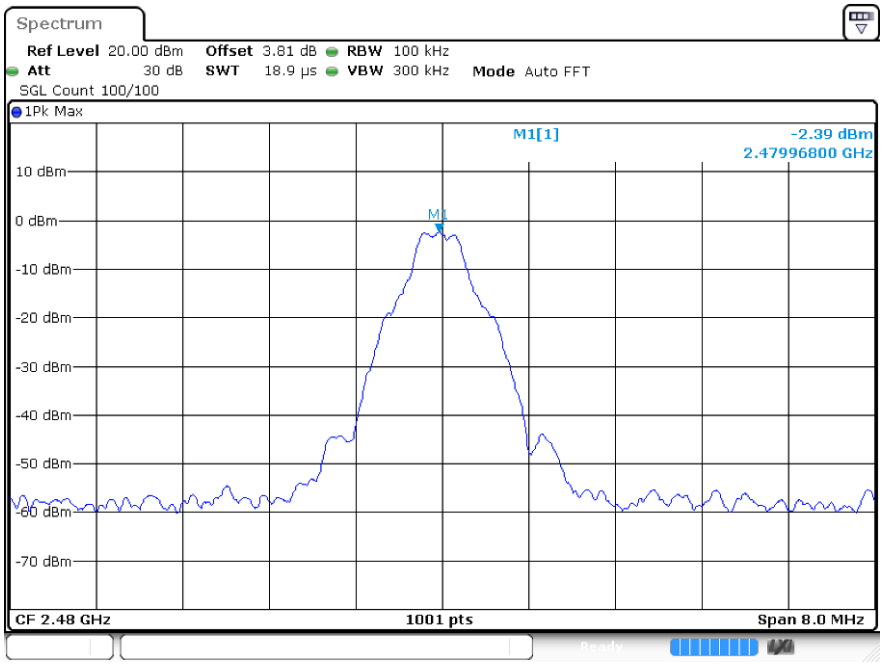
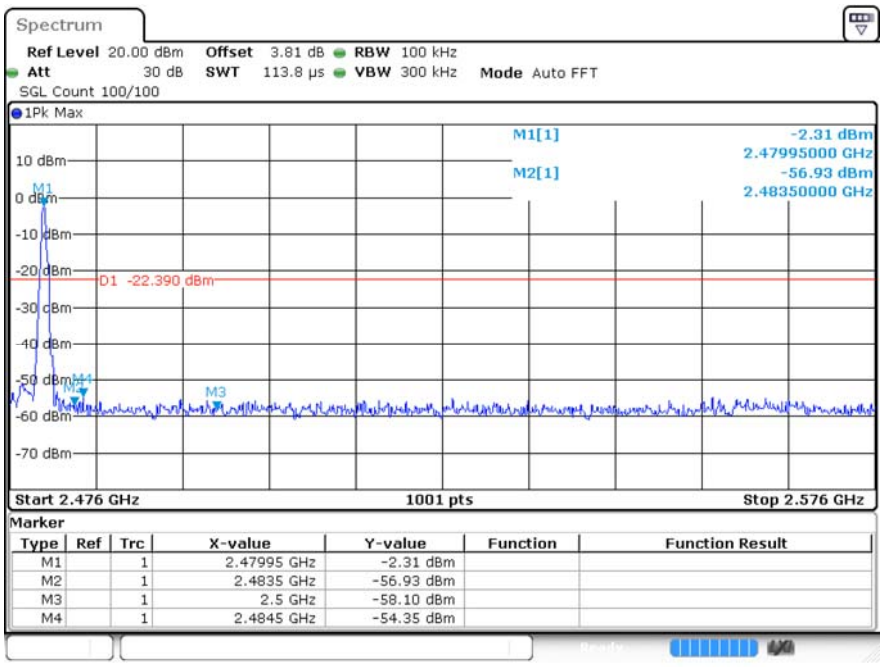
9.1 Test Result

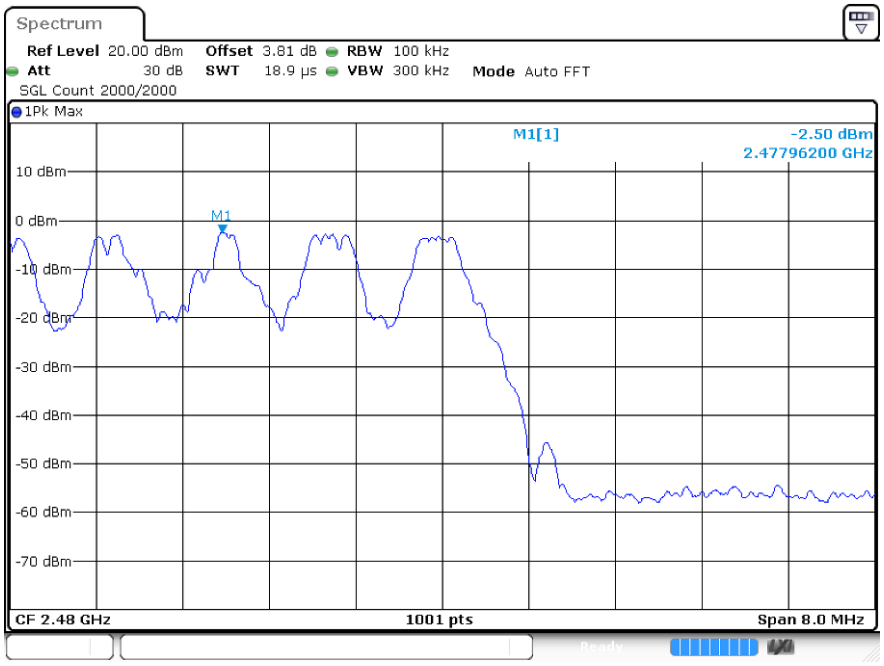
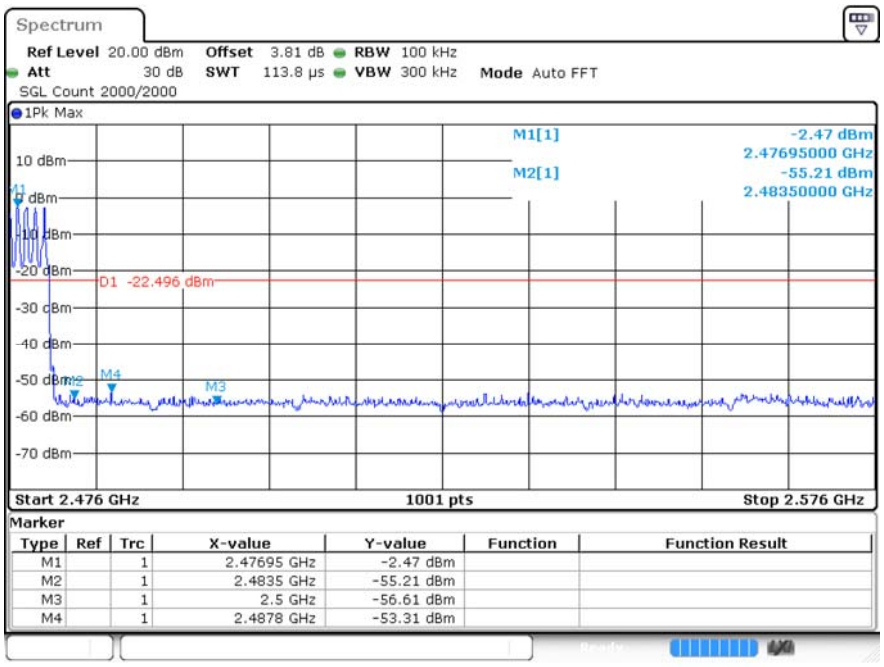
Mode	Channel	Carrier Frequency [MHz]	Frequency Hopping	Max Spurious Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	2402	Off	-47.73	-20	Pass
			On	-46.88	-20	Pass
	HCH	2480	Off	-51.96	-20	Pass
			On	-50.8	-20	Pass
π/4DQPSK	LCH	2402	Off	-48.8	-20	Pass
			On	-47.77	-20	Pass
	HCH	2480	Off	-53.84	-20	Pass
			On	-50.27	-20	Pass

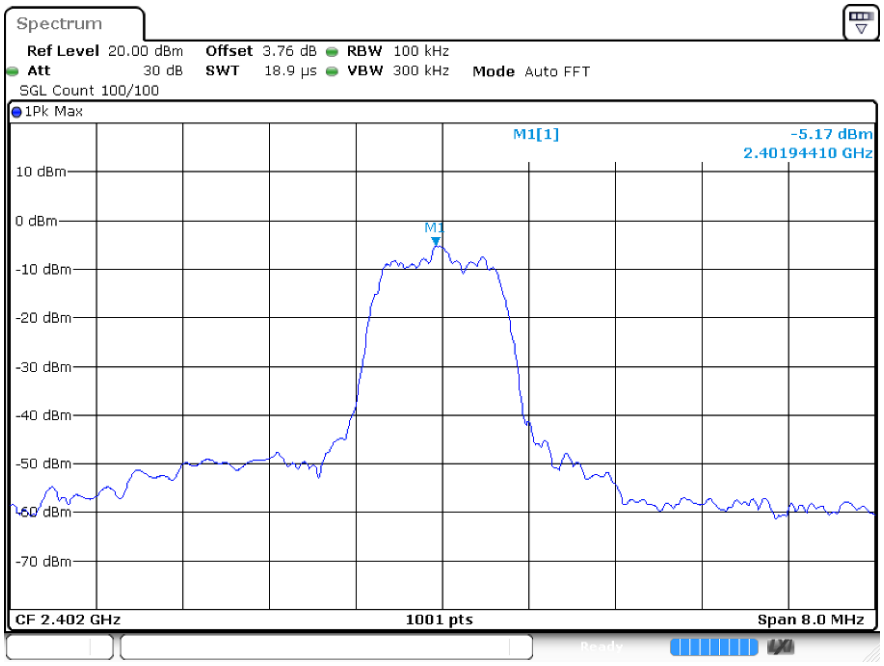
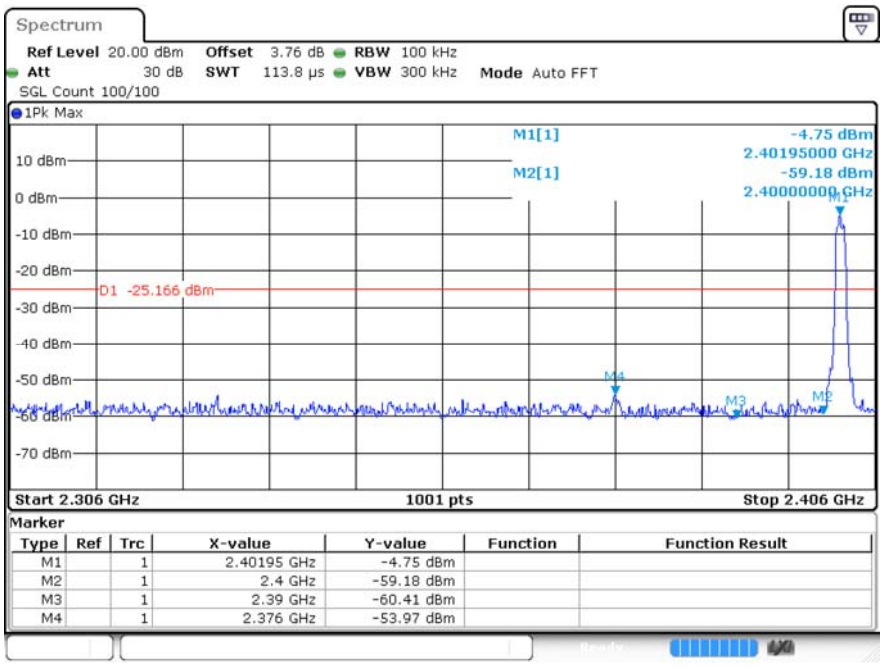
9.2 Test Graphs

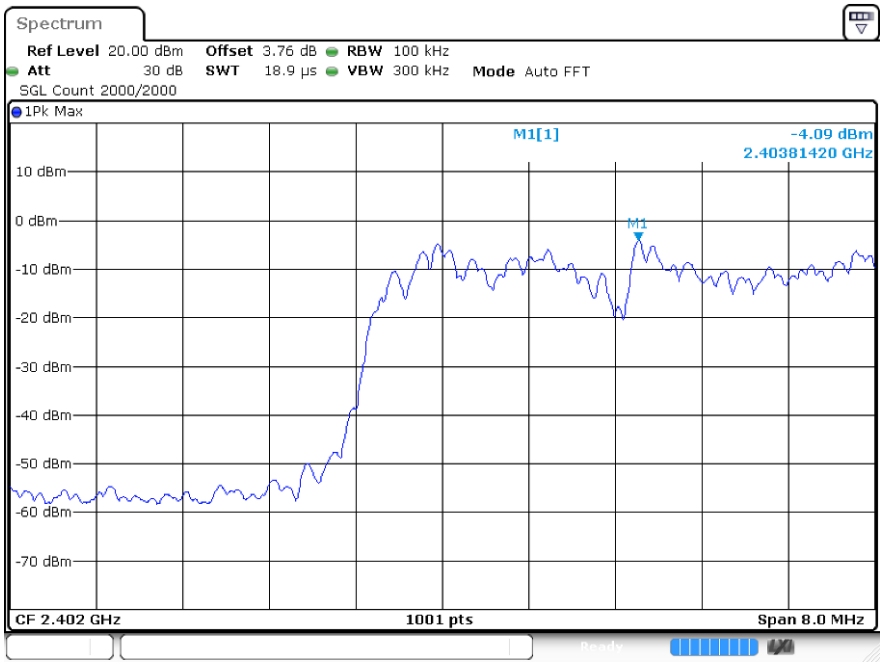
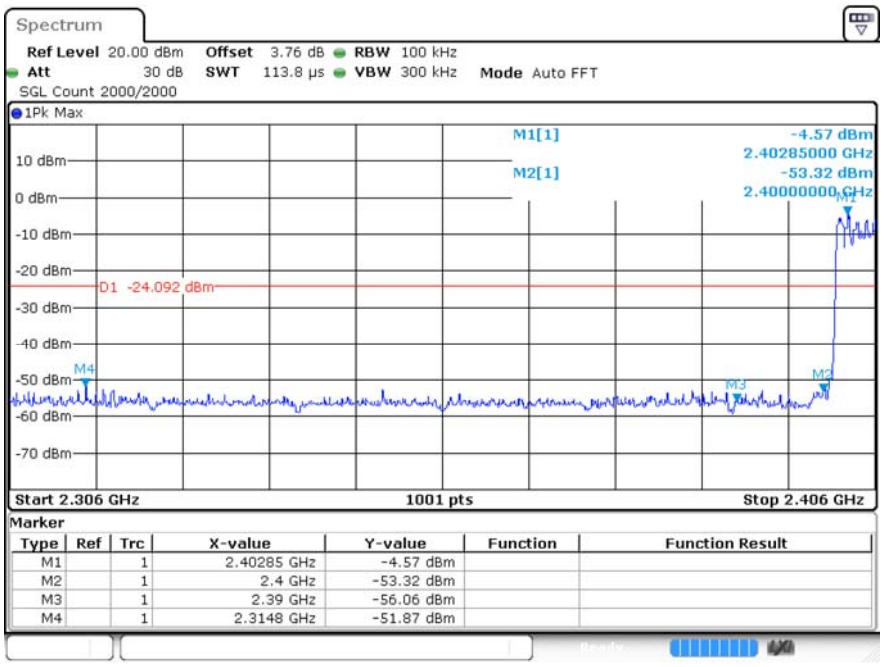
Test Graphs	
Pref	
GFSK/LCH/No Hop	

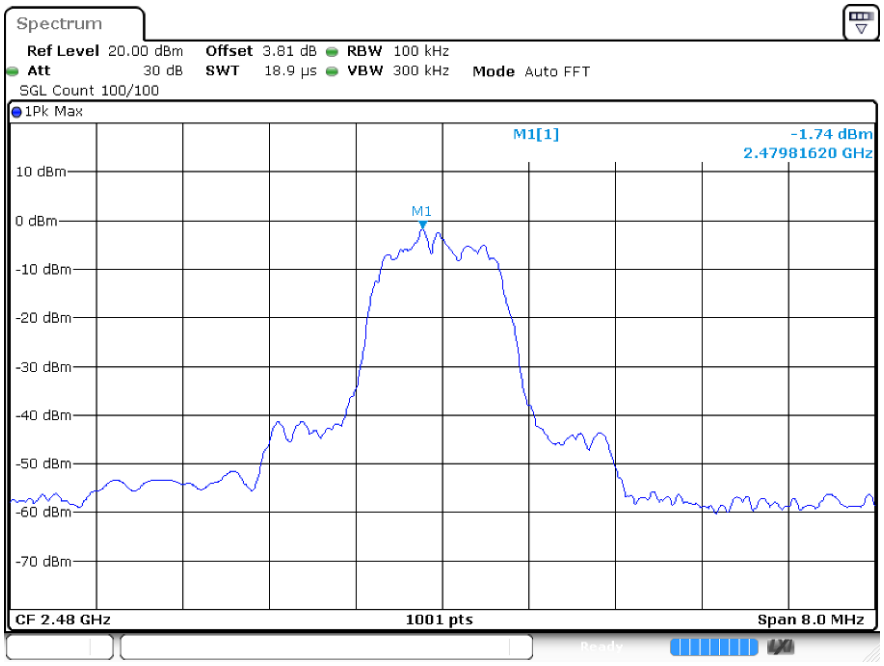
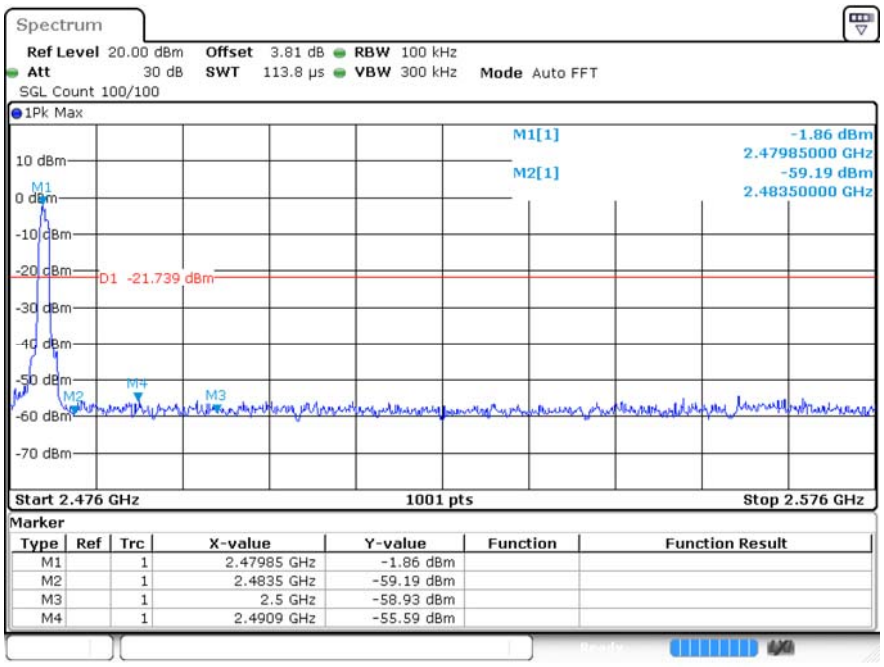
Ref	
GFSK/LCH/Hop	

Ref	
GFSK/HCH/No Hop	

Ref.	
GFSK/HCH/Hop	

Ref	
π/4DQPSK/LCH/No Hop	

Ref	
π/4DQPSK/LCH/Hop	 Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.40285 GHz -4.57 dBm M2 1 2.4 GHz -53.32 dBm M3 1 2.39 GHz -56.06 dBm M4 1 2.3148 GHz -51.87 dBm

Ref	
π/4DQPSK/HCH/No Hop	

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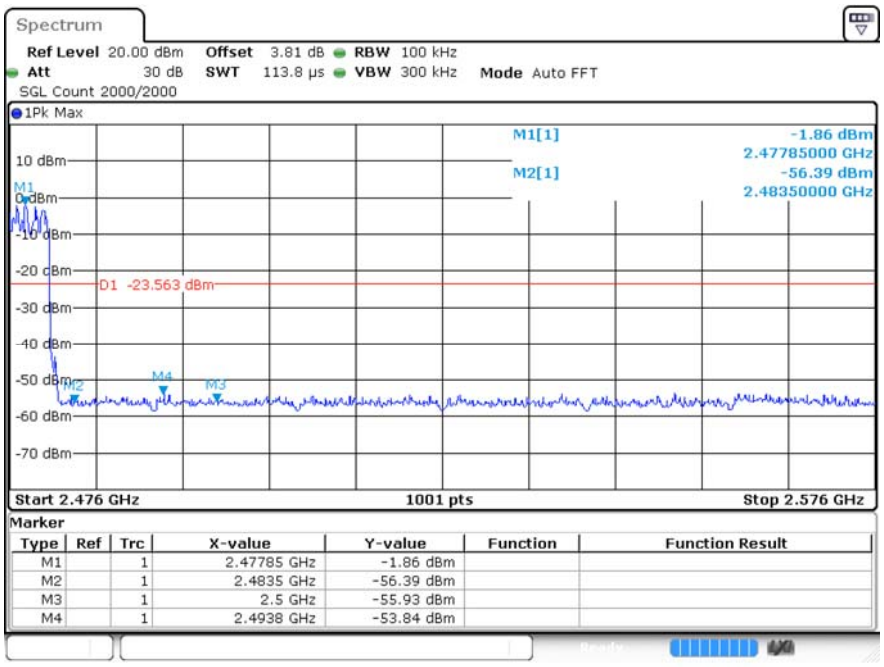
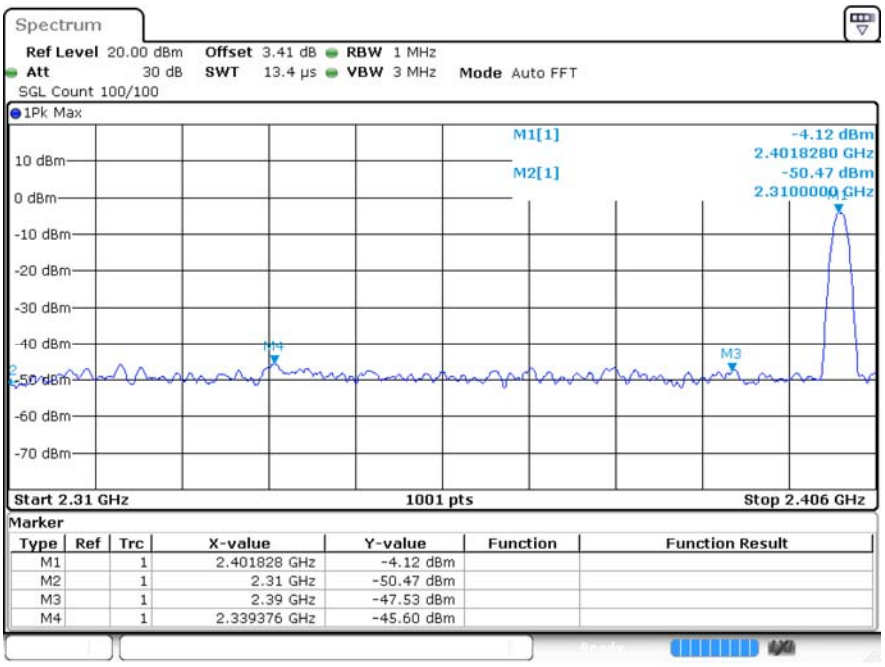
π/4DQPSK/HCH/Hop	 Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.47785 GHz -1.86 dBm M2 1 2.4835 GHz -56.39 dBm M3 1 2.5 GHz -55.93 dBm M4 1 2.4938 GHz -53.84 dBm

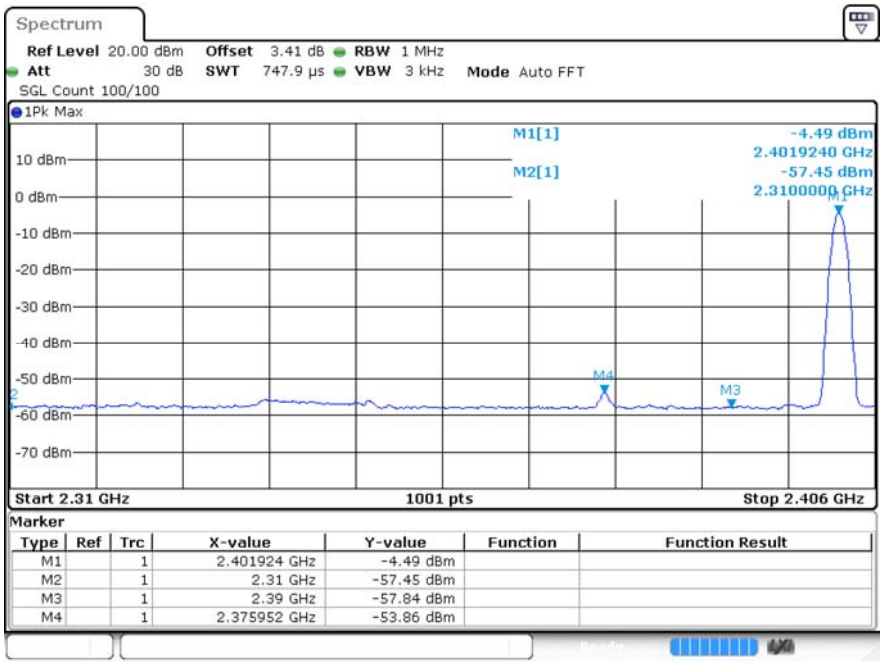
10 Restrict-band band-edge measurements

10.1 Test Result

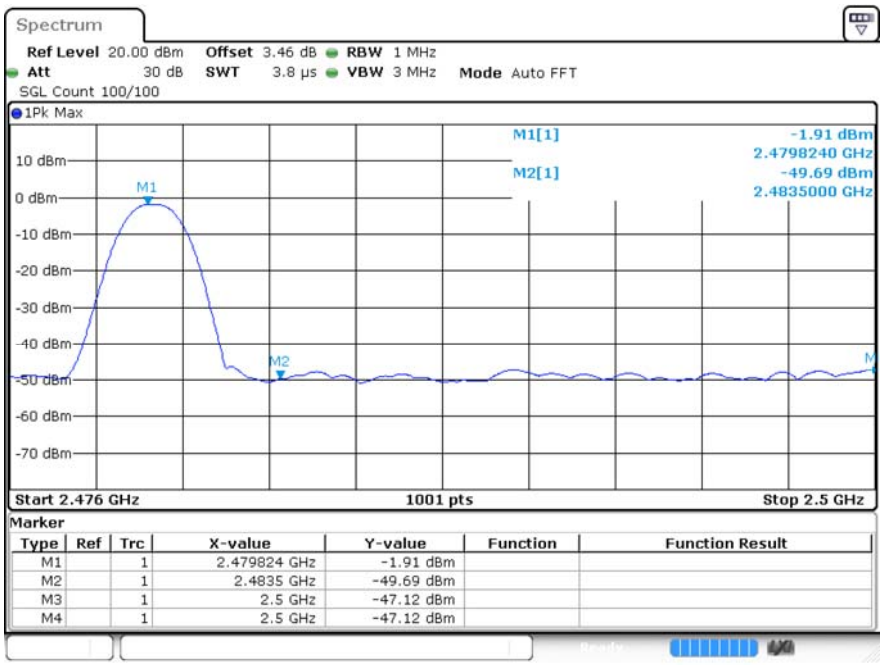
Test Mode	Hopping	Freq.	Power [dBm]	Gain	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-50.46	2	46.8	PEAK	74	Pass
	Off	2310.0	-57.44	2	39.82	AV	54	Pass
	Off	2339.376	-45.59	2	51.67	PEAK	74	Pass
	Off	2375.952	-53.86	2	43.4	AV	54	Pass
	Off	2390.0	-47.53	2	49.73	PEAK	74	Pass
	Off	2390.0	-57.83	2	39.43	AV	54	Pass
	Off	2483.5	-49.64	2	47.62	PEAK	74	Pass
	Off	2483.5	-56.97	2	40.29	AV	54	Pass
	Off	2500	-47.12	2	50.14	PEAK	74	Pass
	Off	2484.592	-55.53	2	41.73	AV	54	Pass
	Off	2500.0	-47.12	2	50.14	PEAK	74	Pass
	Off	2500.0	-57.37	2	39.89	AV	54	Pass
π/4DQPSK	Off	2310.0	-49.33	2	47.93	PEAK	74	Pass
	Off	2310.0	-57.42	2	39.84	AV	54	Pass
	Off	2376.624	-46.05	2	51.21	PEAK	74	Pass
	Off	2375.856	-53.9	2	43.36	AV	54	Pass
	Off	2390.0	-49.28	2	47.98	PEAK	74	Pass
	Off	2390.0	-57.83	2	39.43	AV	54	Pass
	Off	2483.5	-48.3	2	48.96	PEAK	74	Pass
	Off	2483.5	-57.32	2	39.94	AV	54	Pass
	Off	2499.208	-46.48	2	50.78	PEAK	74	Pass
	Off	2484.592	-56.06	2	41.2	AV	54	Pass
	Off	2500.0	-48.58	2	48.68	PEAK	74	Pass
	Off	2500.0	-57.12	2	40.14	AV	54	Pass

10.2 Test Graphs

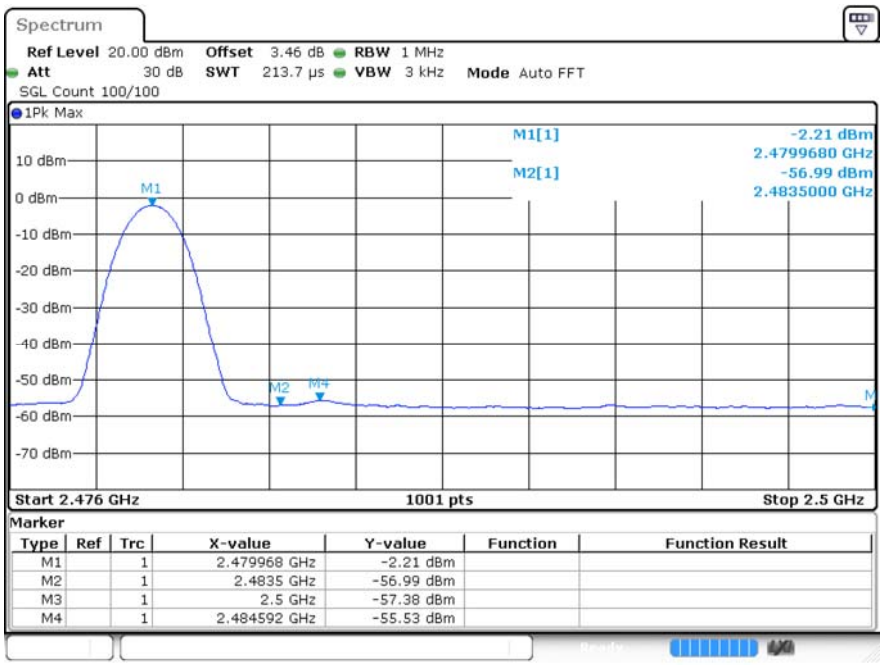
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)

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



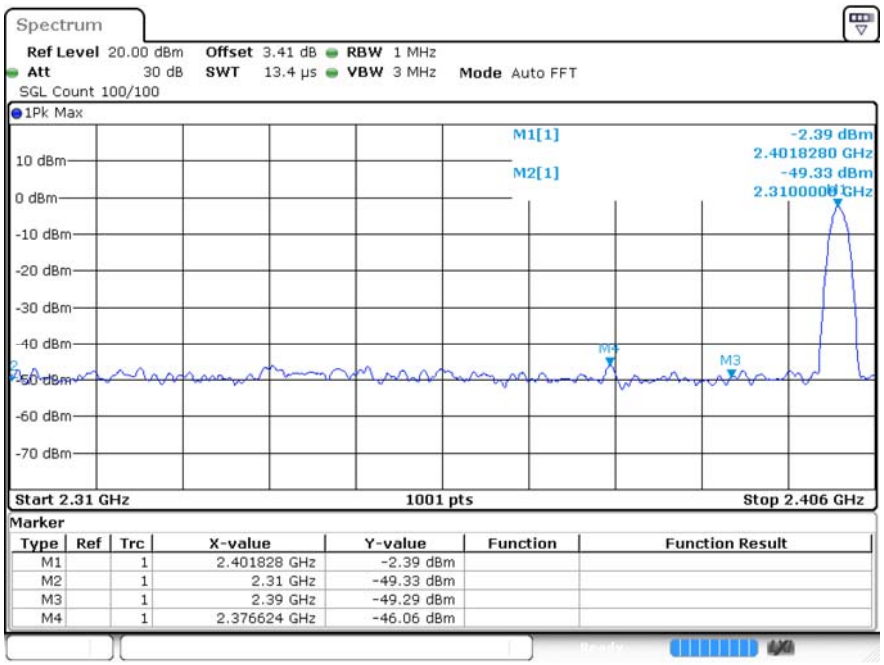
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



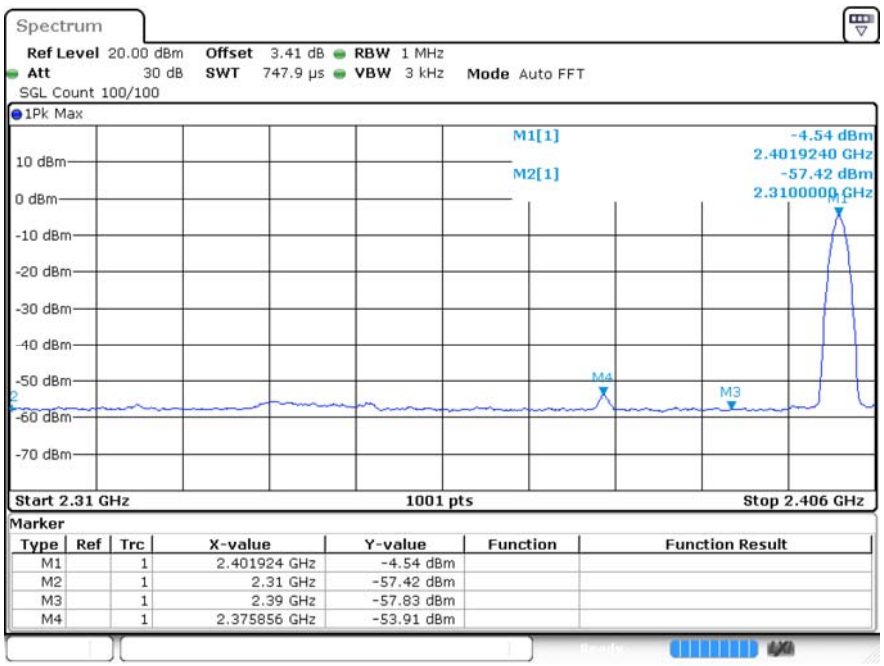
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



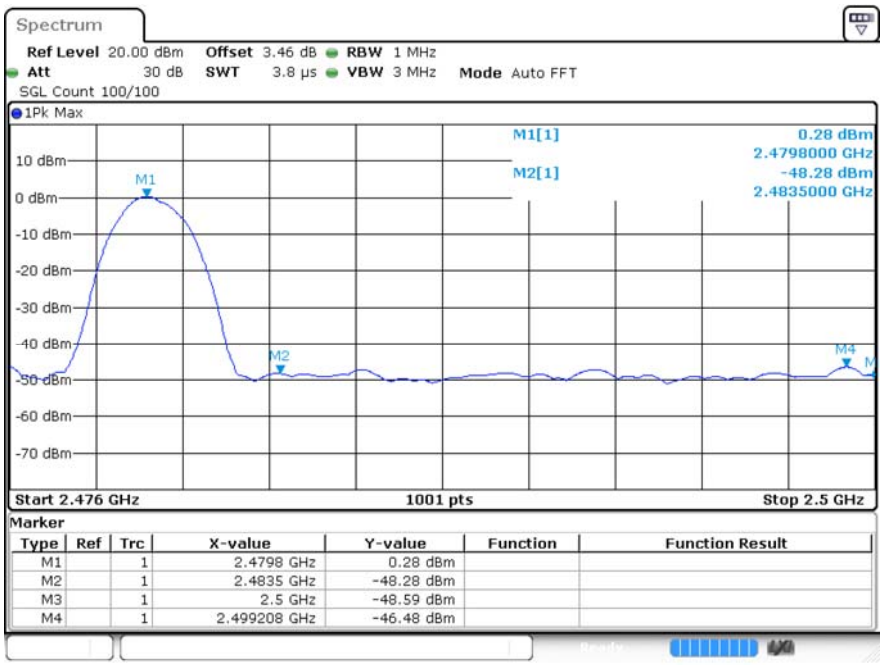
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



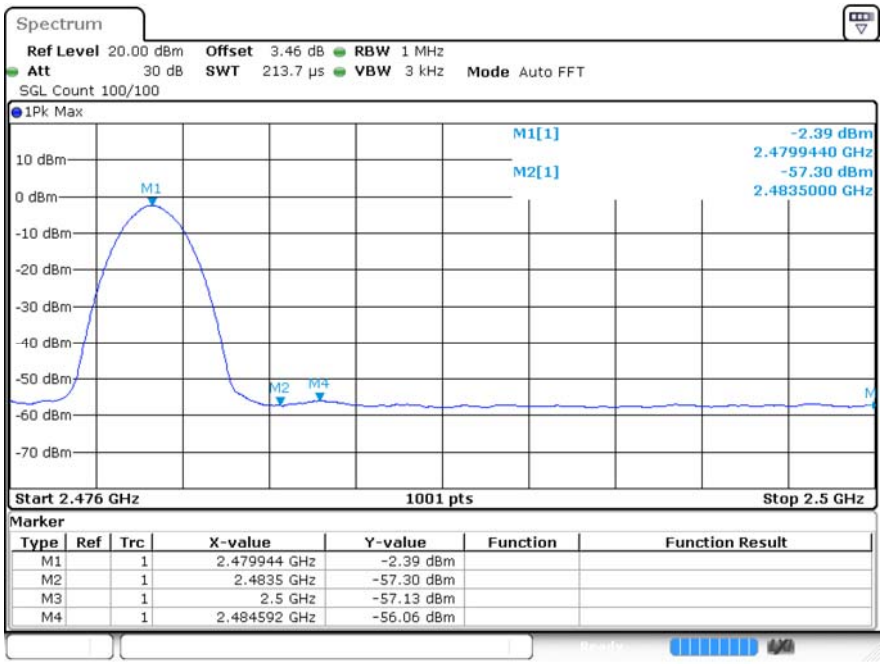
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



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)



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