



Appendix A

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

Product Name: TWS headphones

Trade Mark: N/A

Test Model: FE30

Environmental Conditions

Temperature:	25.0℃
Relative Humidity:	52.5%
ATM Pressure:	101Kpa
Test Engineer:	Simba Huang
Supervised by:	Seal Chen



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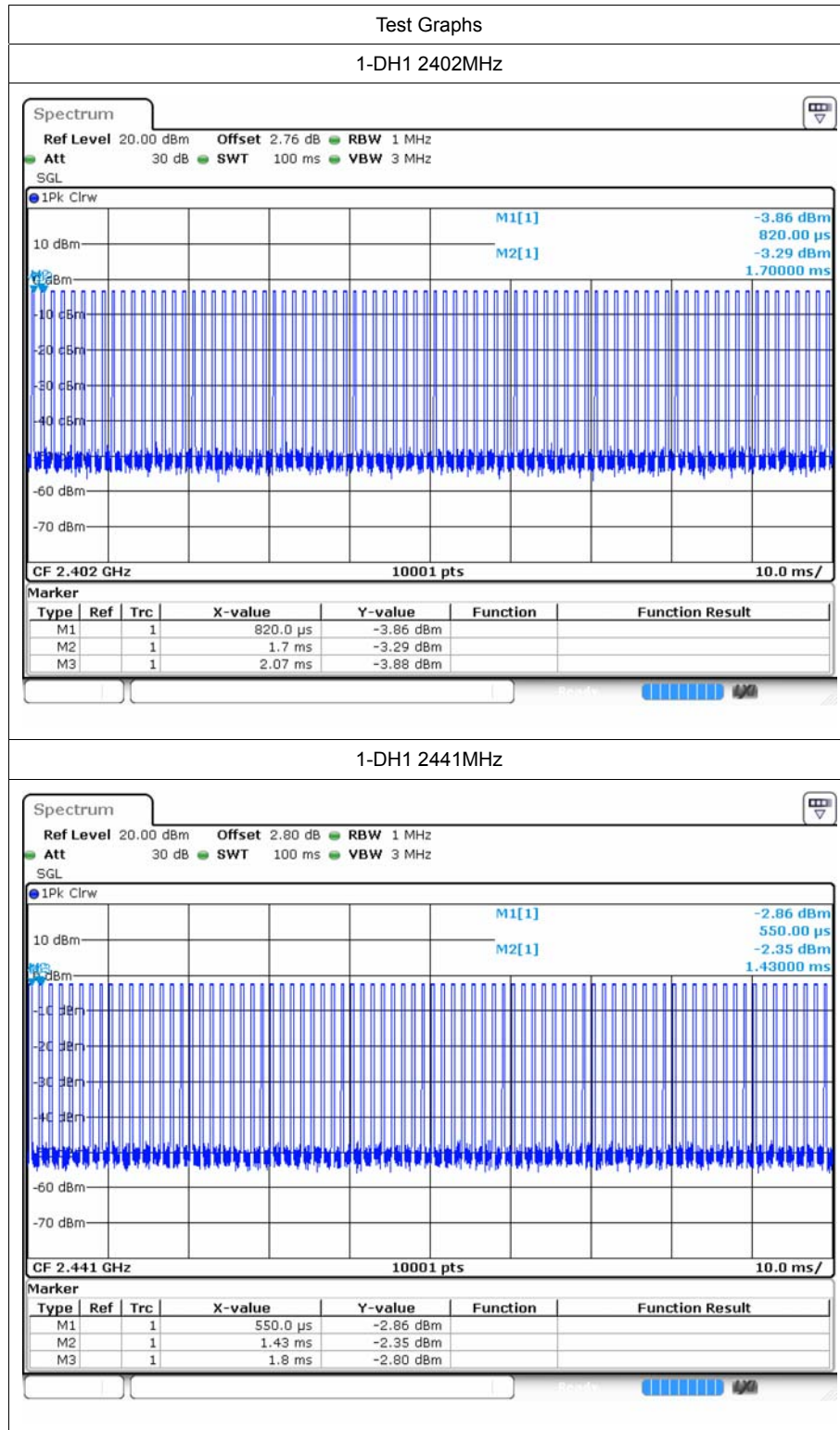
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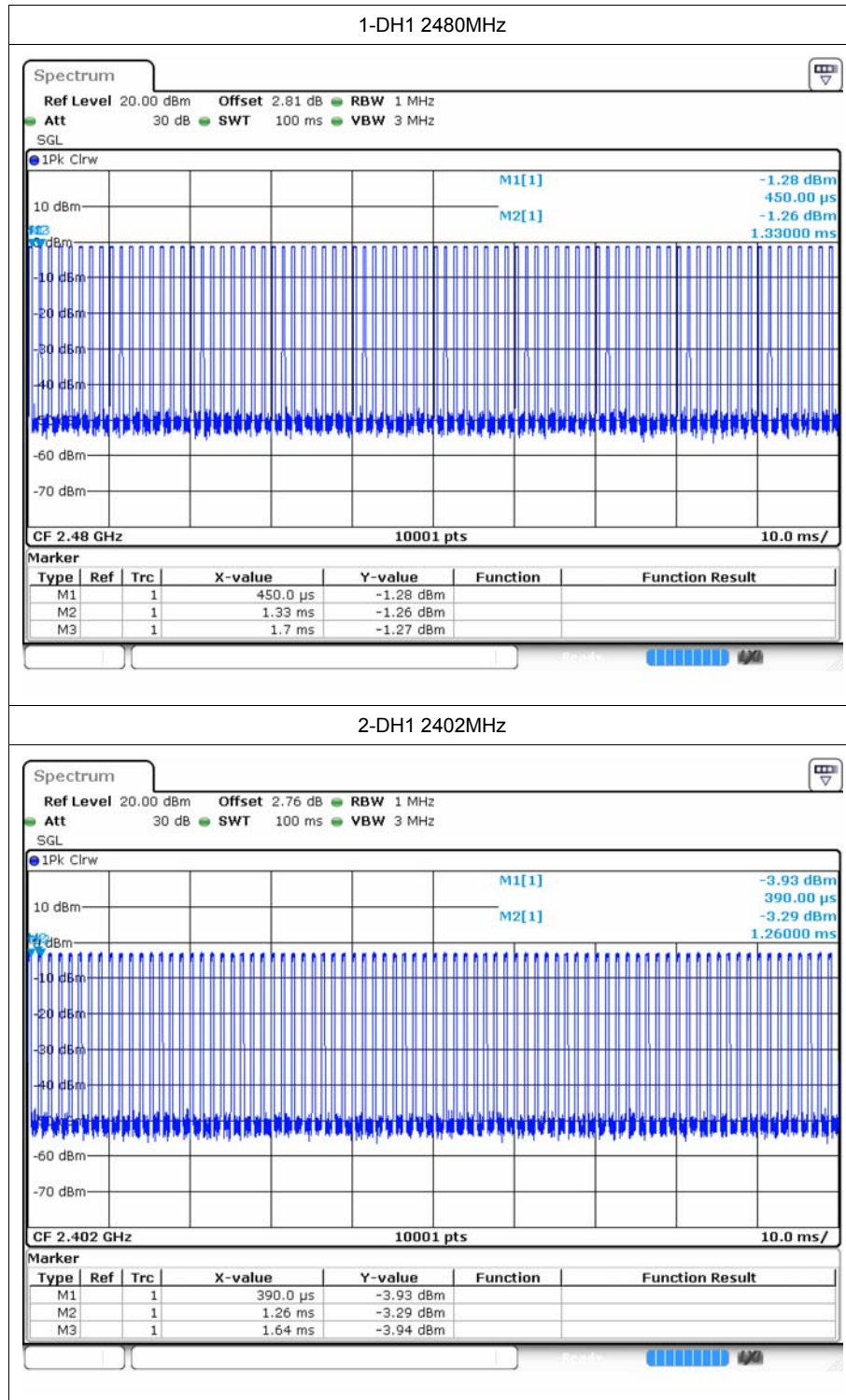
1 Duty Cycle

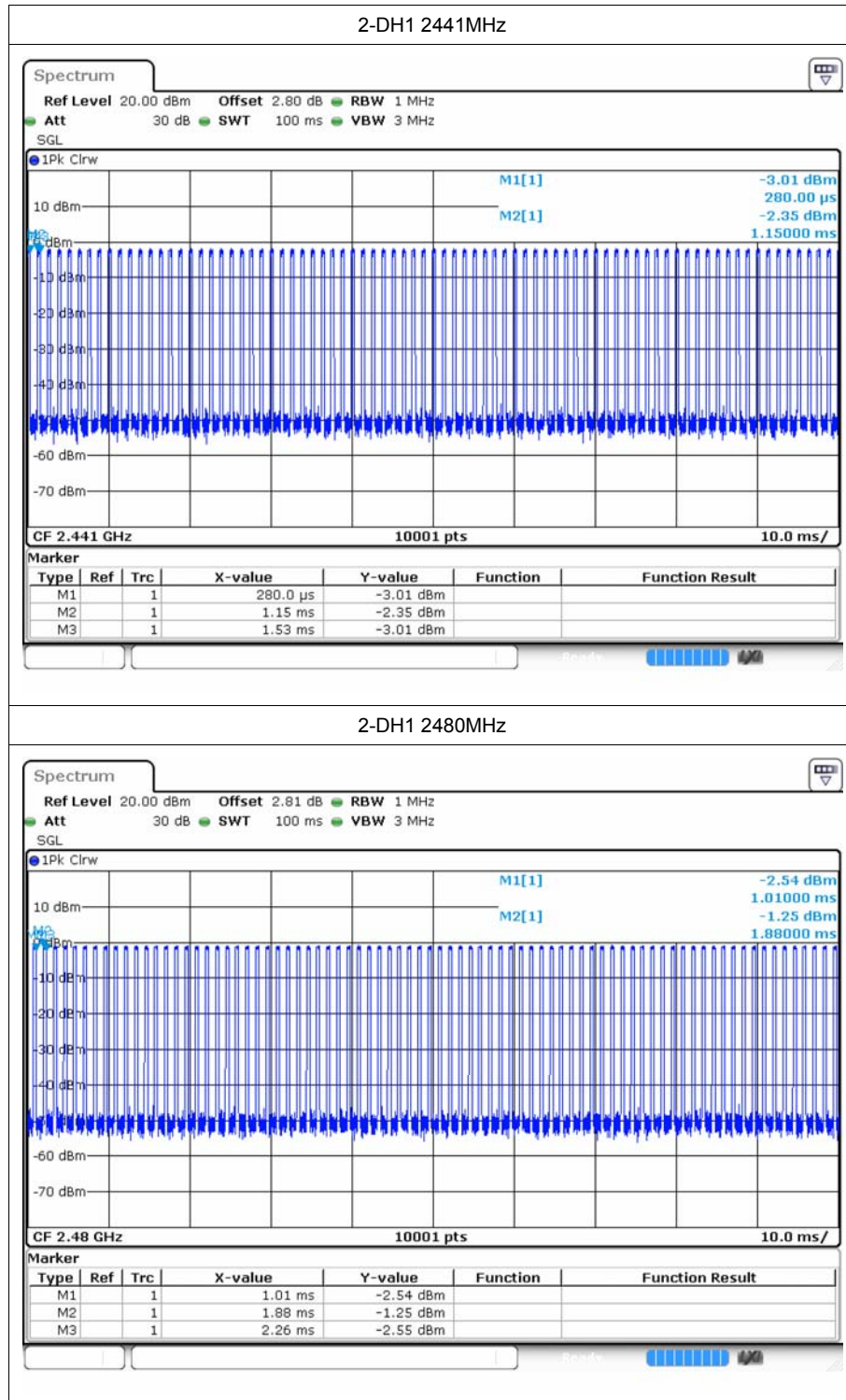
1.1 Test Result

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

1.2 Test Graphs





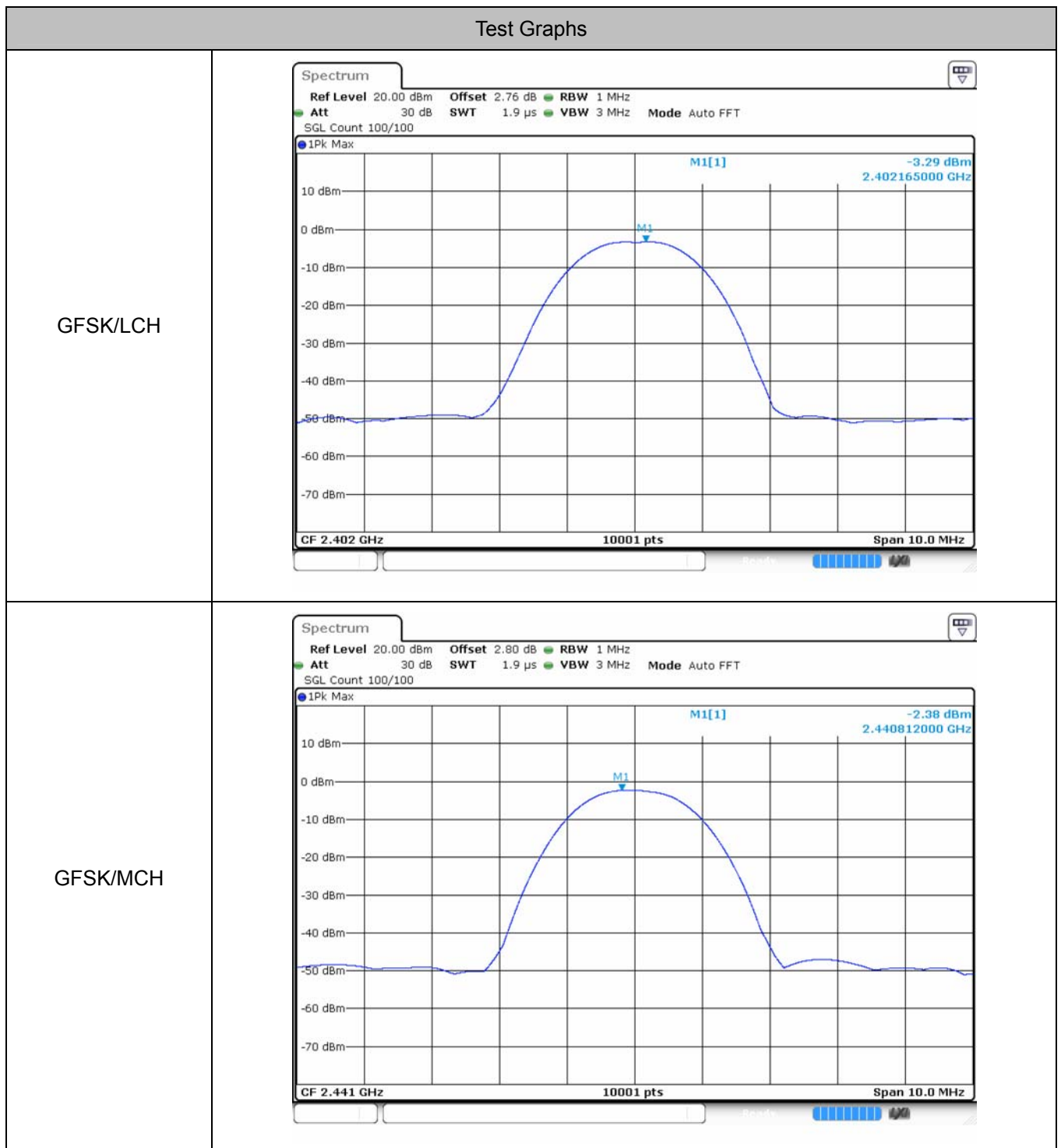


2 Maximum Conducted Peak Output Power

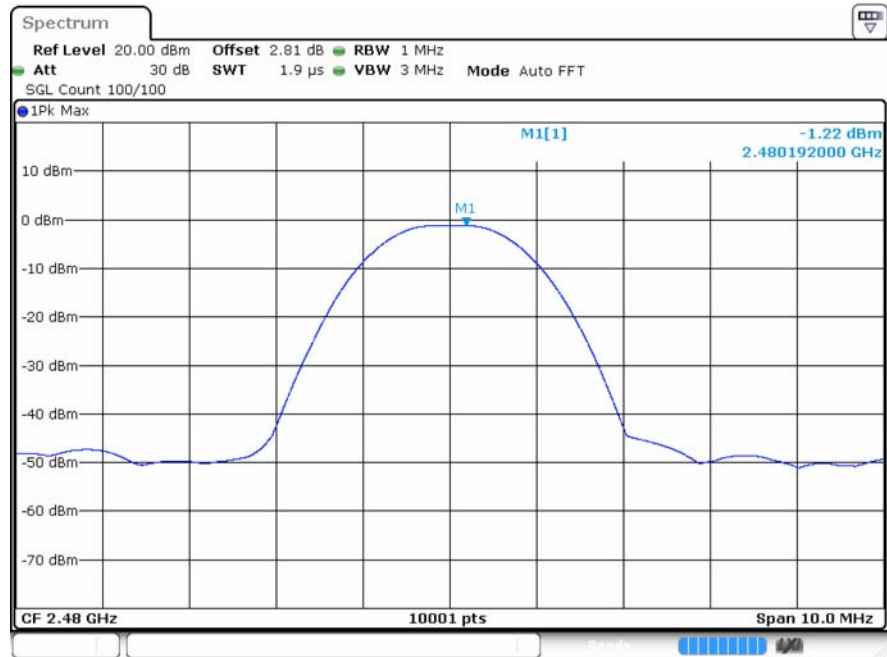
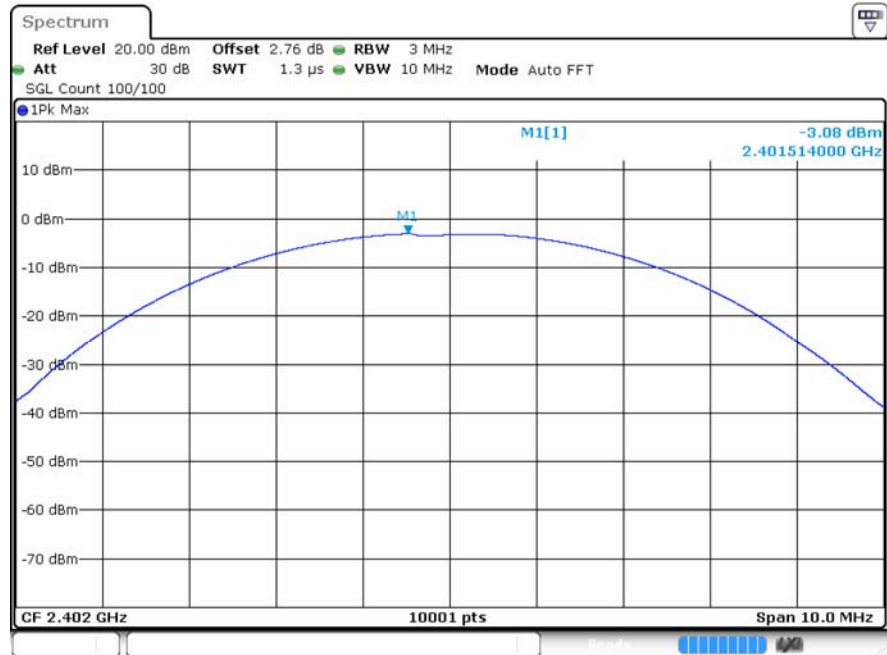
2.1 Test Result

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-3.29	21	Pass
	MCH	-2.38	21	Pass
	HCH	-1.22	21	Pass
$\pi/4$ DQPSK	LCH	-3.08	21	Pass
	MCH	-2.22	21	Pass
	HCH	-1.05	21	Pass

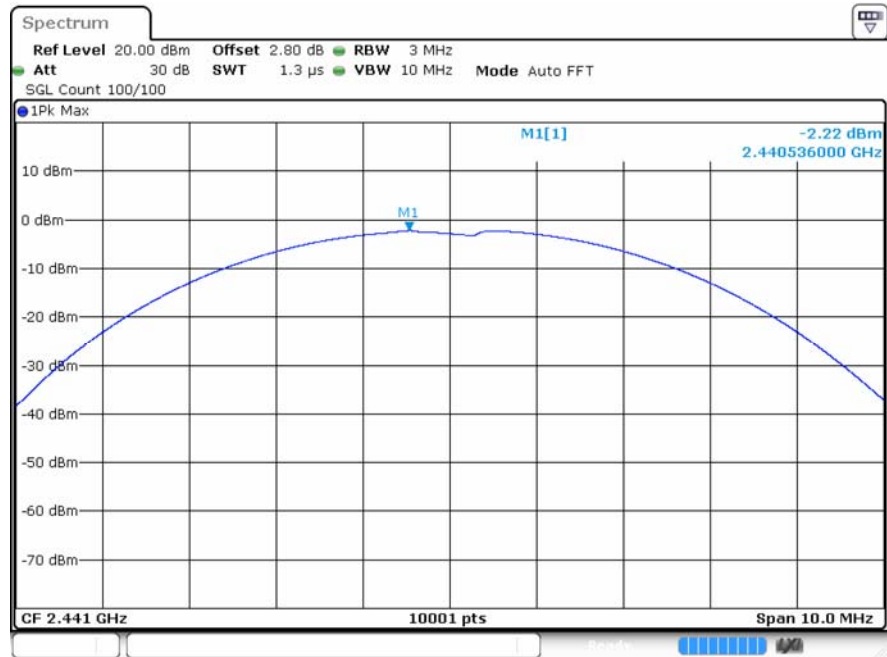
2.2 Test Graphs



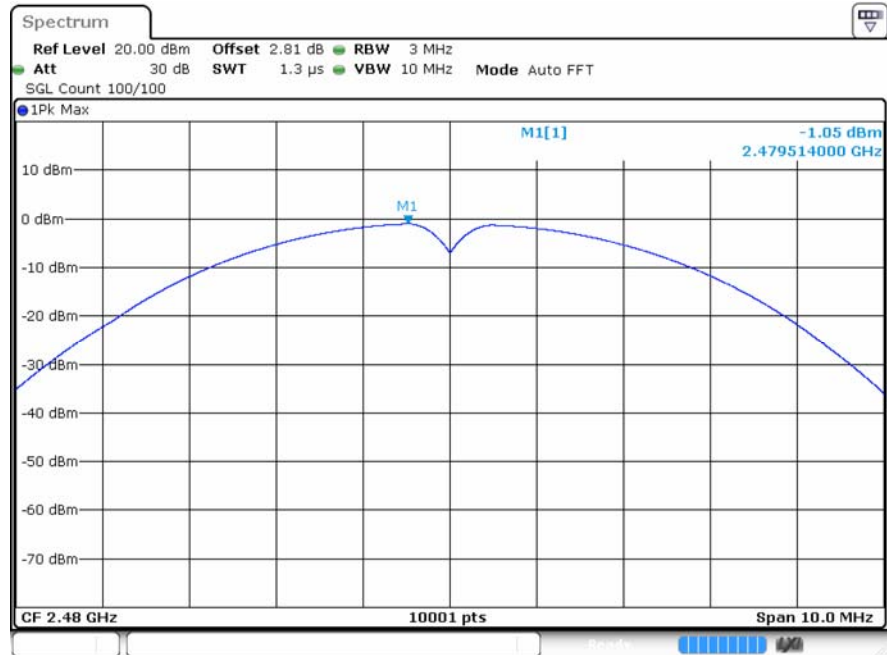
GFSK/HCH


 $\pi/4$ DQPSK/LCH


$\pi/4$ DQPSK/MCH



$\pi/4$ DQPSK/HCH

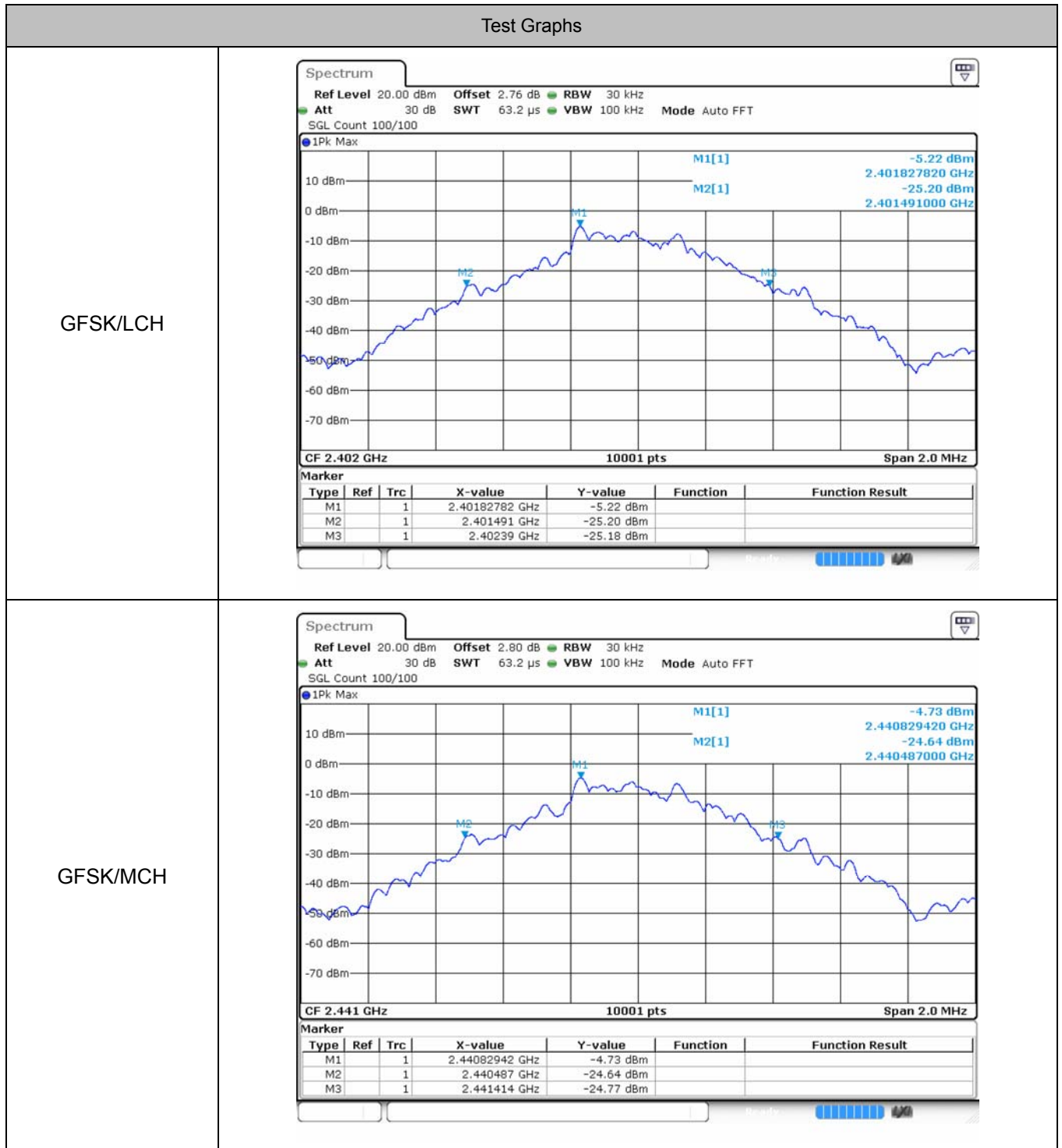


3 20dB Bandwidth

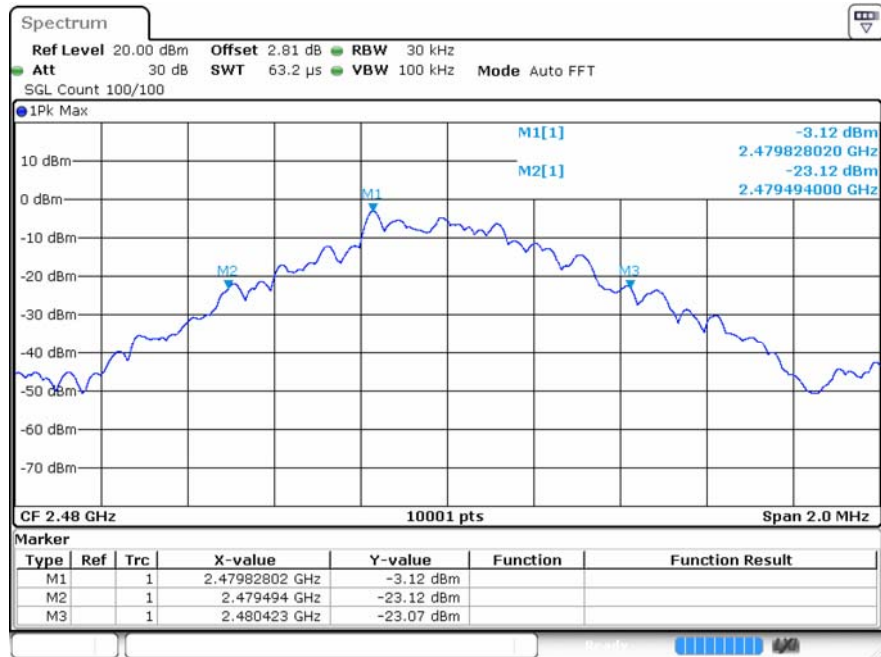
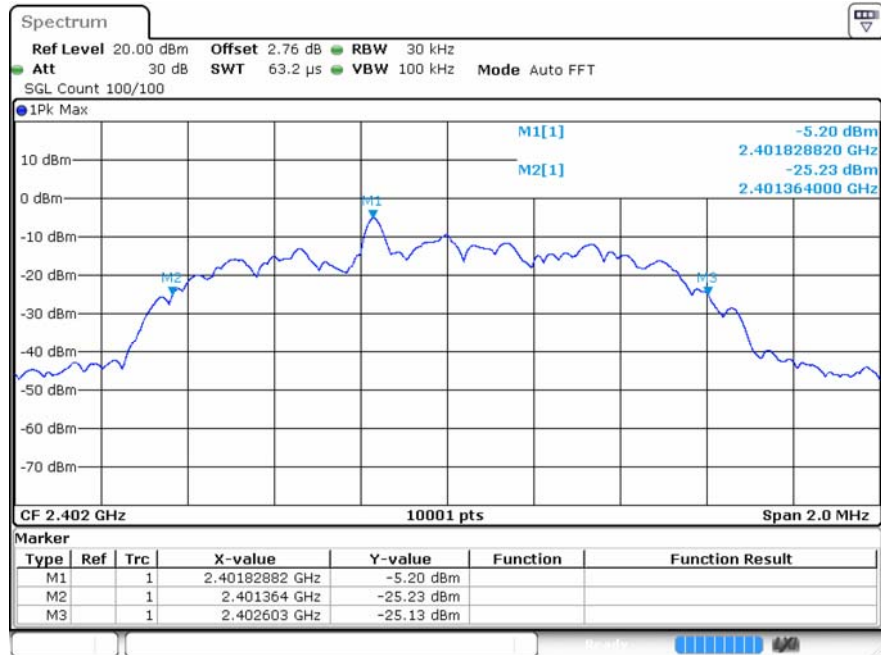
3.1 Test Result

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.899	Not Specified	Pass
	MCH	0.927	Not Specified	Pass
	HCH	0.929	Not Specified	Pass
$\pi/4$ DQPSK	LCH	1.239	Not Specified	Pass
	MCH	1.247	Not Specified	Pass
	HCH	1.237	Not Specified	Pass

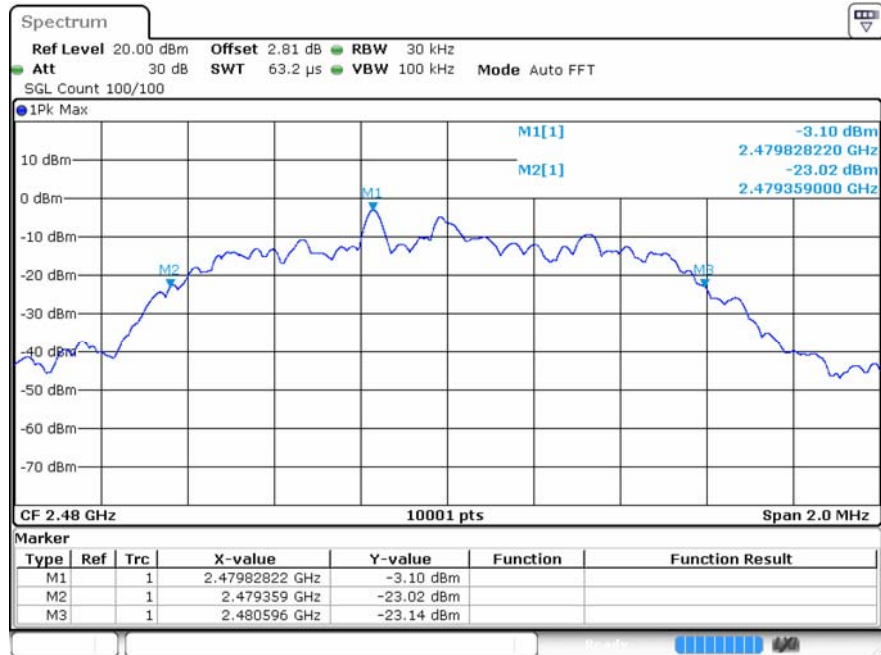
3.2 Test Graphs



GFSK/HCH


 $\pi/4$ DQPSK/LCH


$\pi/4$ DQPSK/MCH

 $\pi/4$ DQPSK/HCH


4 Carrier Frequency Separation

4.1 Test Result

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	MCH	1	0.618	Pass
$\pi/4$ DQPSK	MCH	0.886	0.831	Pass

4.2 Test Graphs

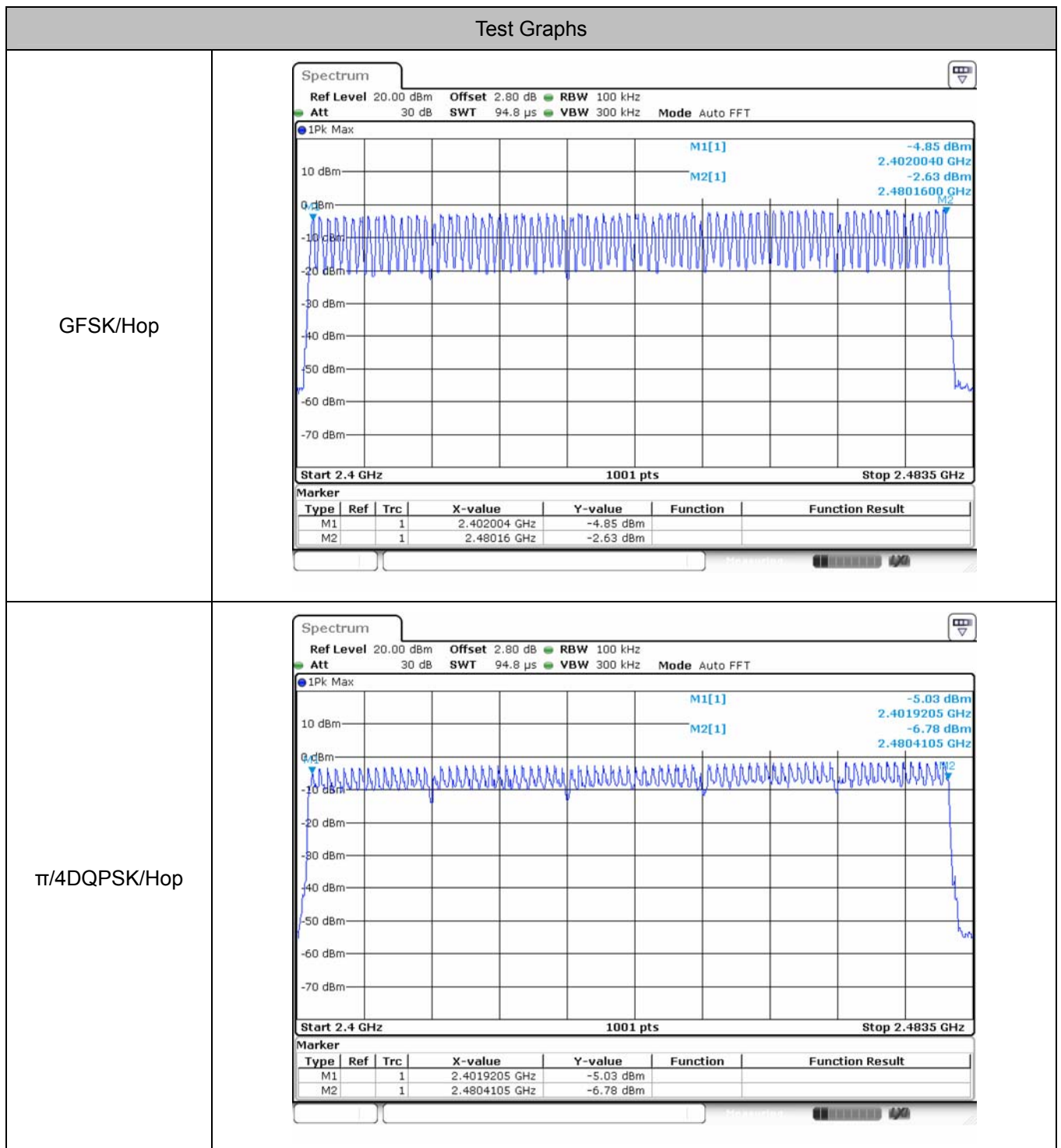


5 Hopping Channel Number

5.1 Test Result

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

5.2 Test Graphs



6 Dwell Time

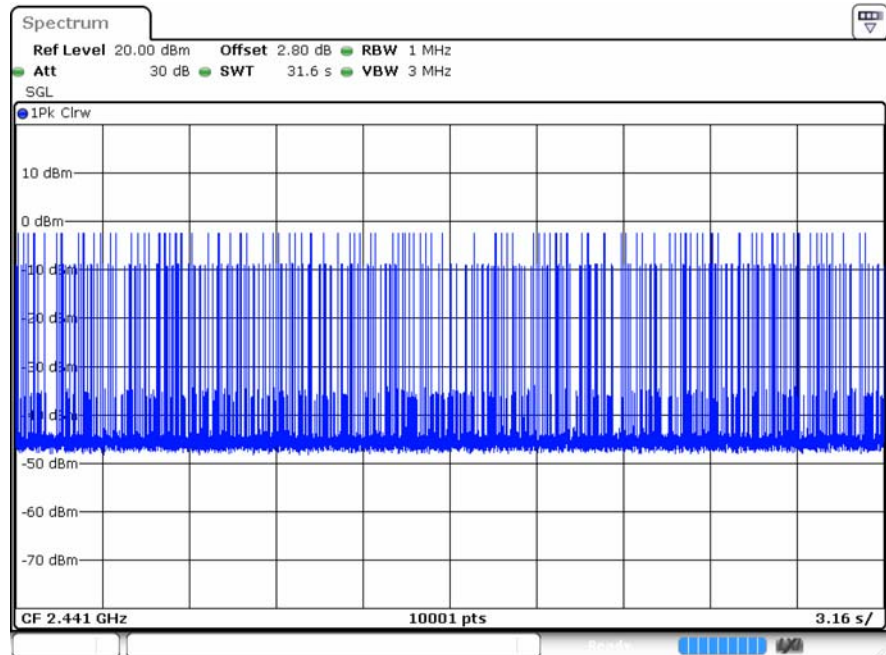
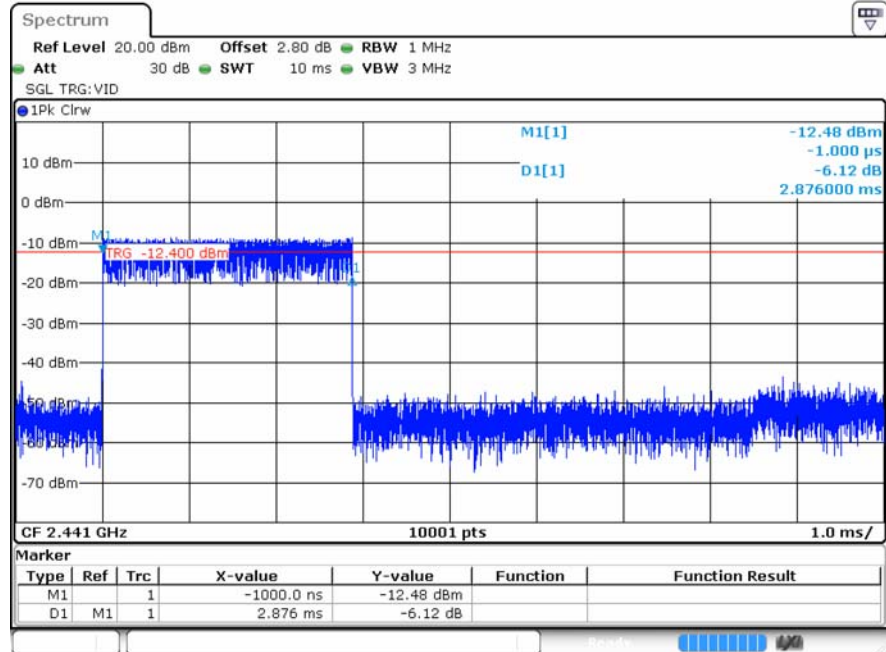
6.1 Test Result

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[ms]	Limit [s]	Verdict
GFSK	DH5	MCH	2.876	115	330.74	0.4	Pass
$\pi/4$ DQPSK	2DH5	MCH	2.881	113	325.553	0.4	Pass

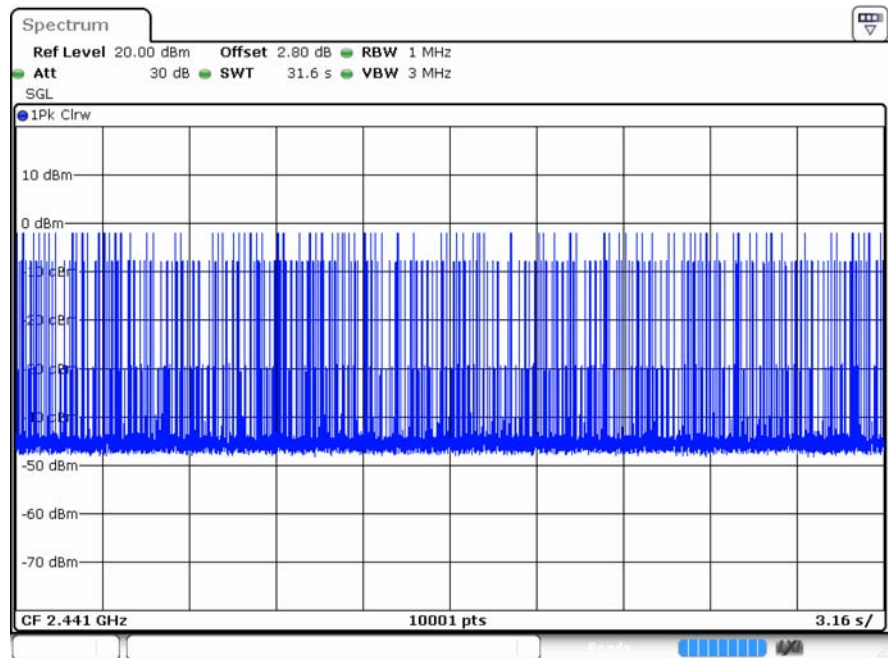
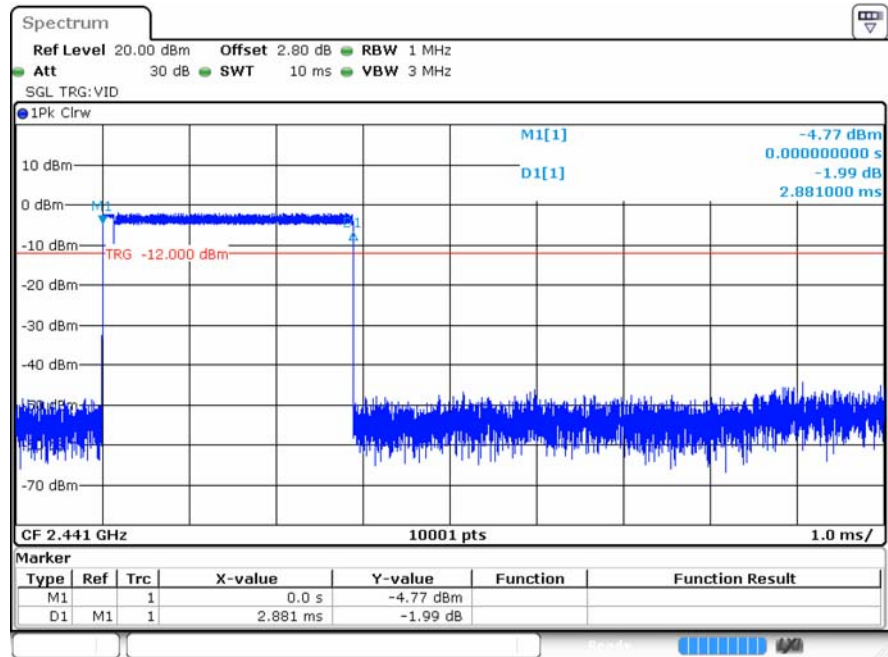
6.2 Test Graphs

Test Graphs

GFSK_DH5/MCH



$\pi/4$ DQPSK
_2DH5/MCH

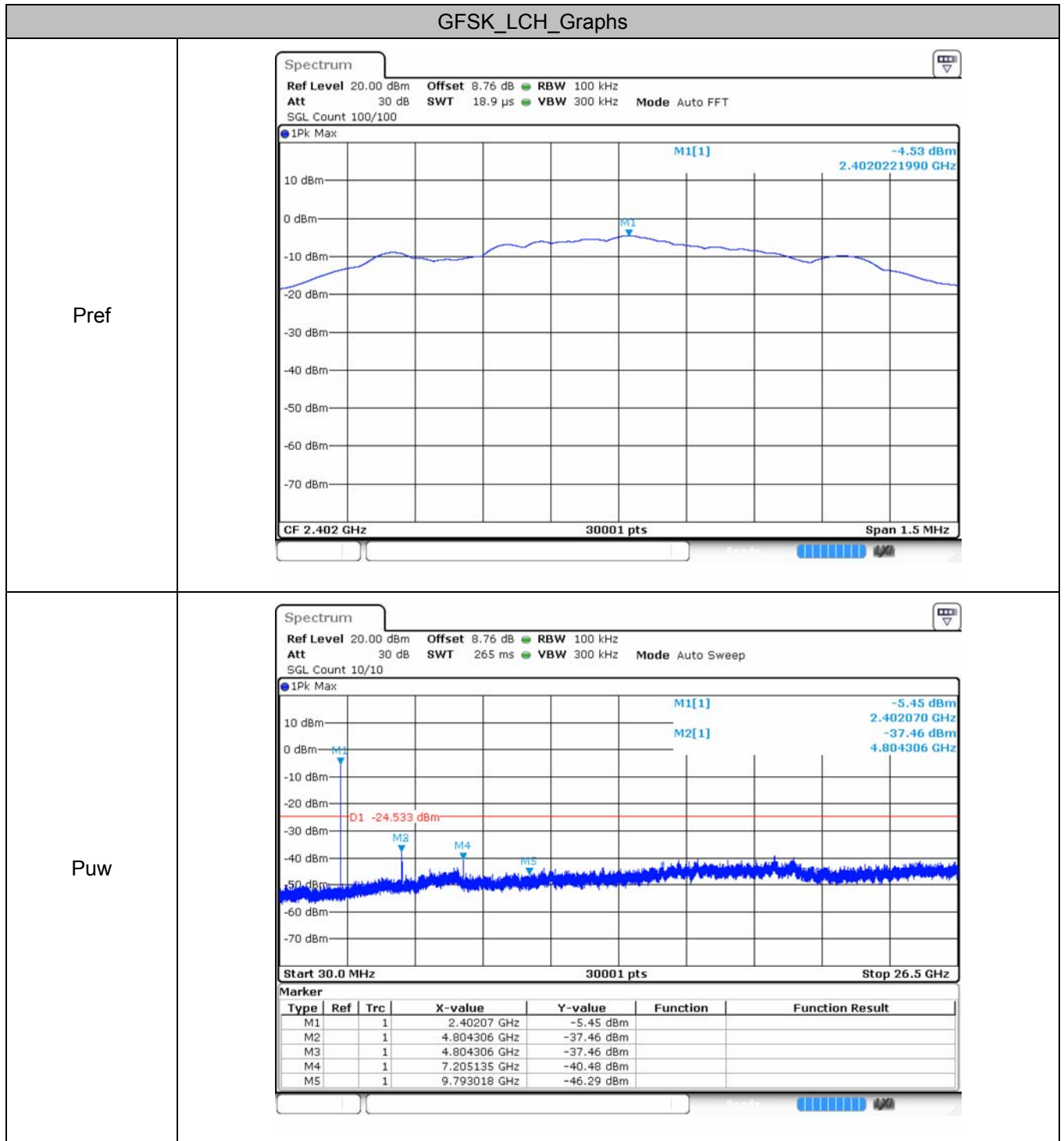


7 RF Conducted Spurious Emissions

7.1 Test Result

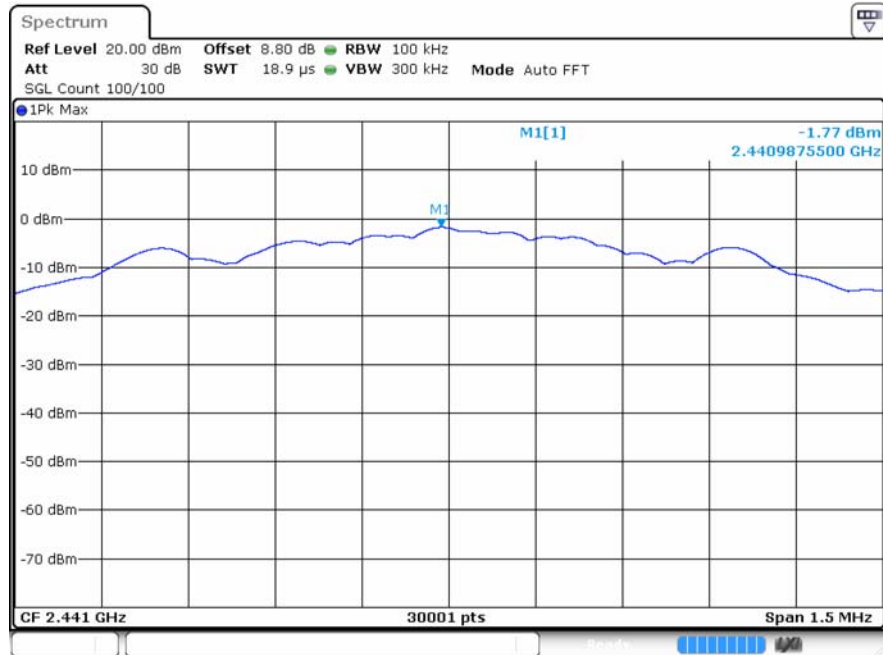
Mode	Channel	Max. Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	-32.92	-20	Pass
	MCH	-32.31	-20	Pass
	HCH	-35.55	-20	Pass
$\pi/4$ DQPSK	LCH	-31.83	-20	Pass
	MCH	-36.88	-20	Pass
	HCH	-35.9	-20	Pass

7.2 Test Graphs

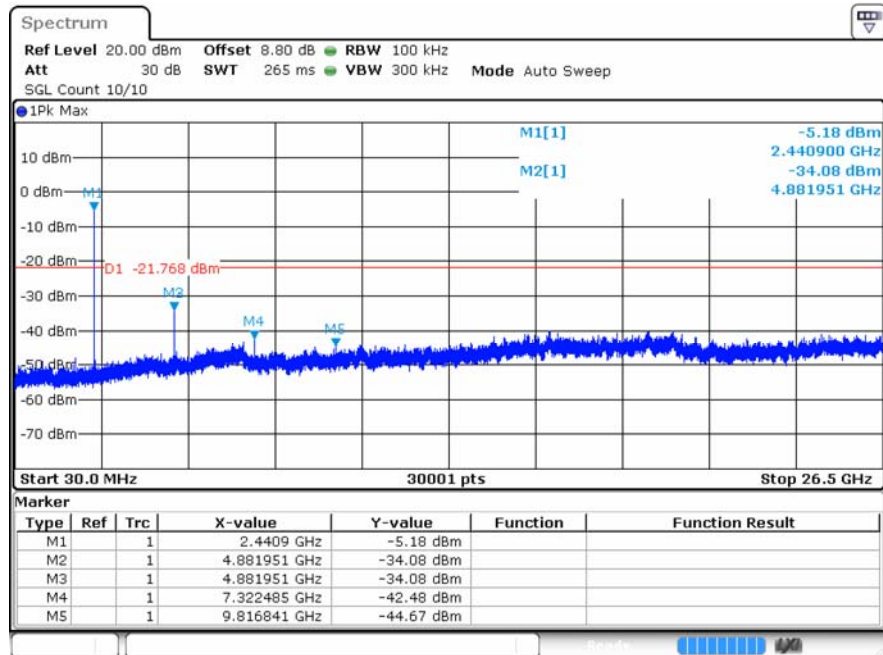


GFSK_MCH_Graphs

Pref

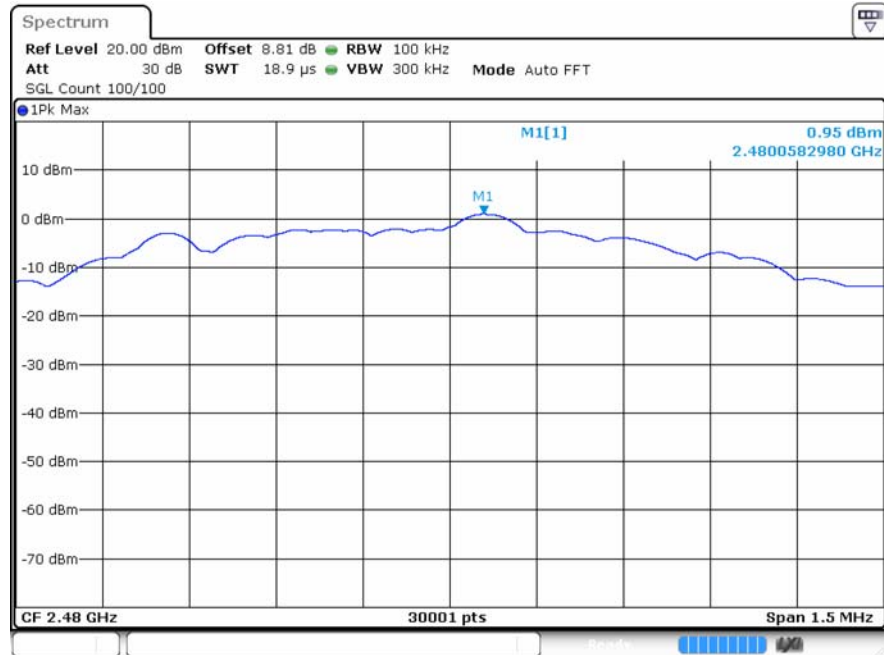


Puw

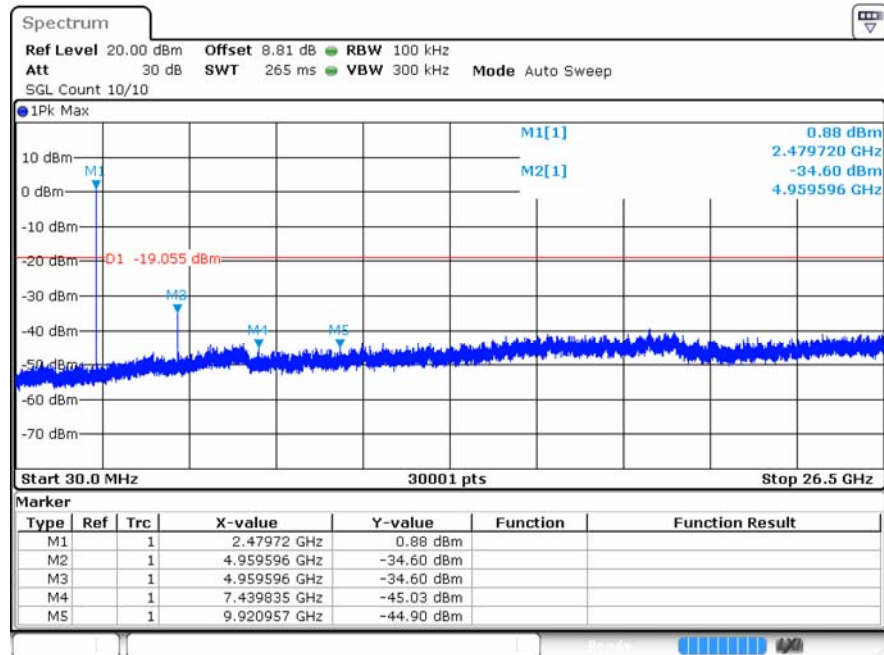


GFSK_HCH_Graphs

Pref

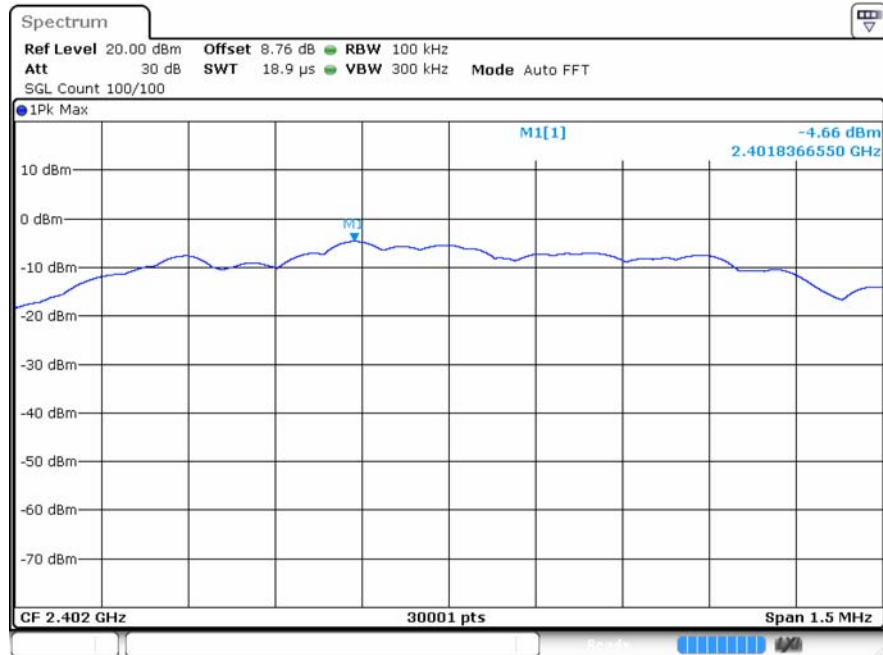


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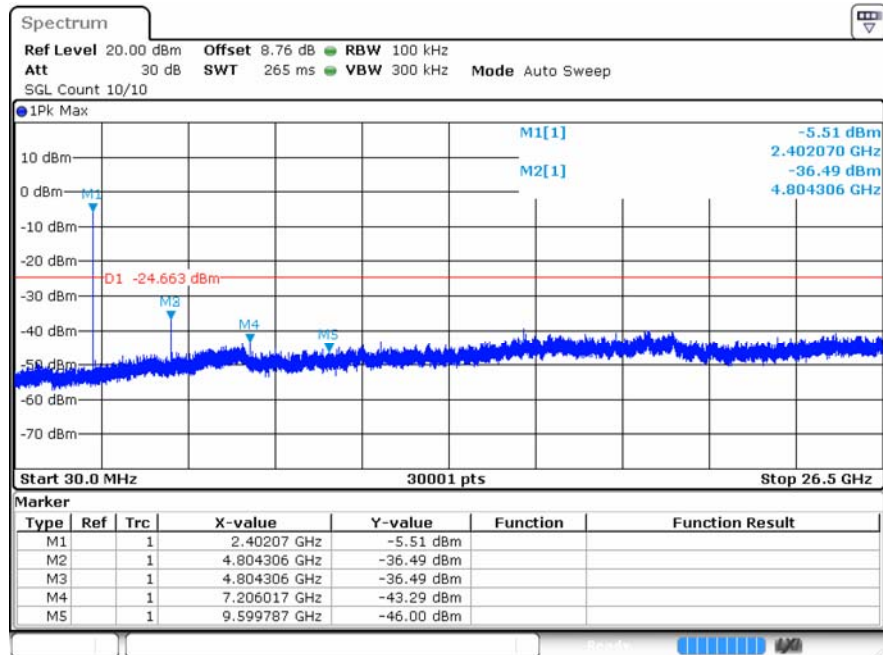


$\pi/4$ DQPSK_LCH_Graphs

Pref

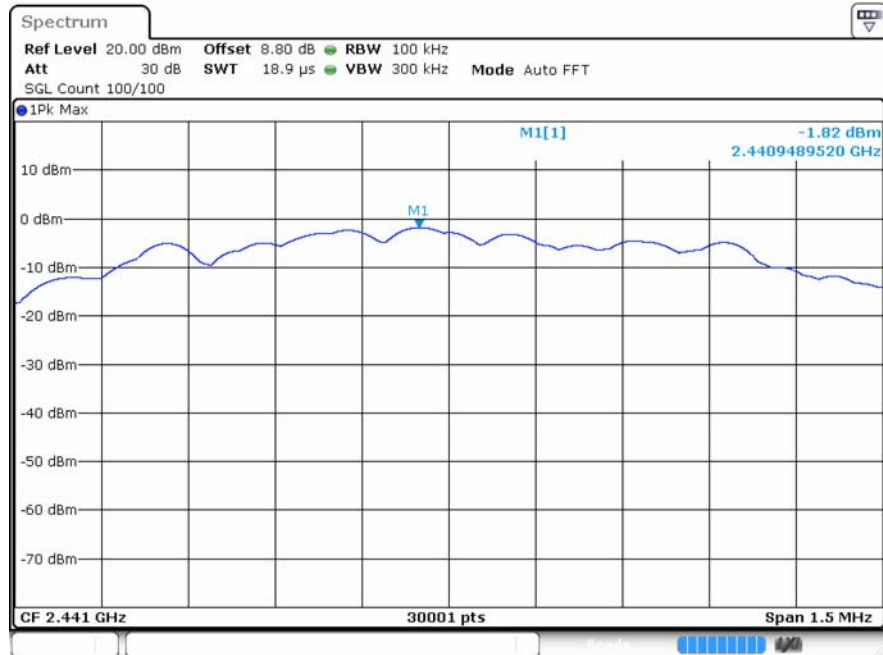


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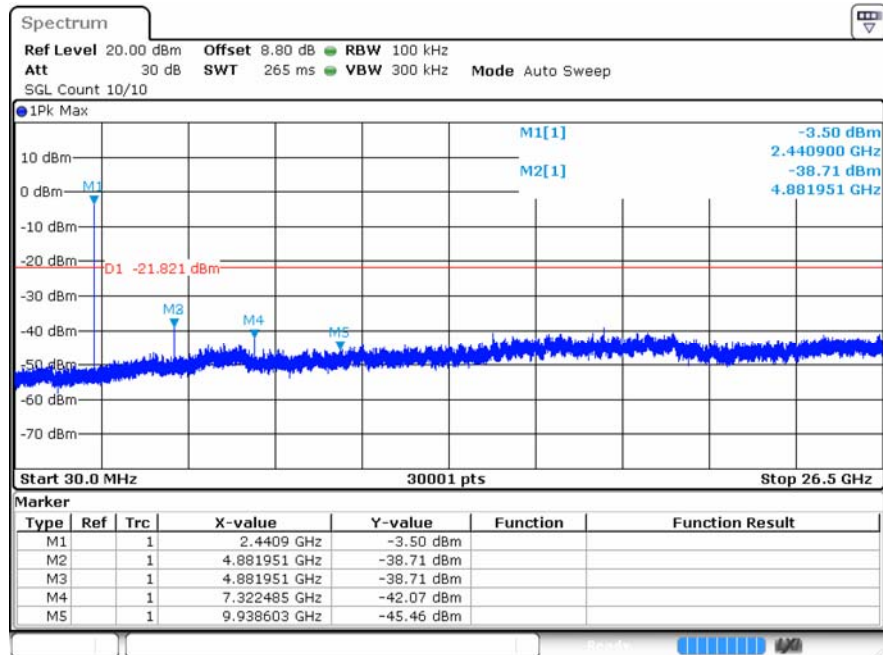


$\pi/4$ DQPSK_MCH_Graphs

Pref

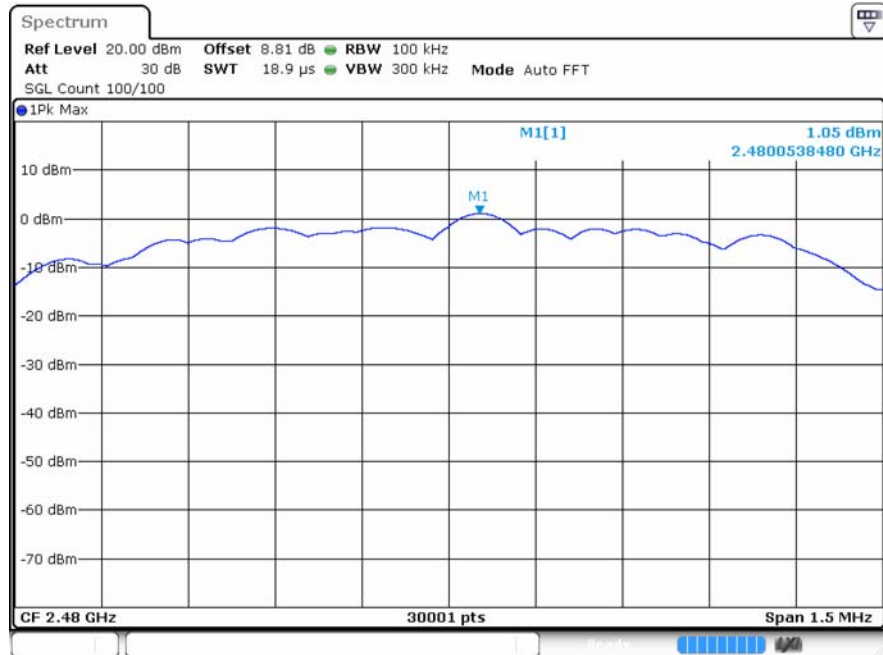


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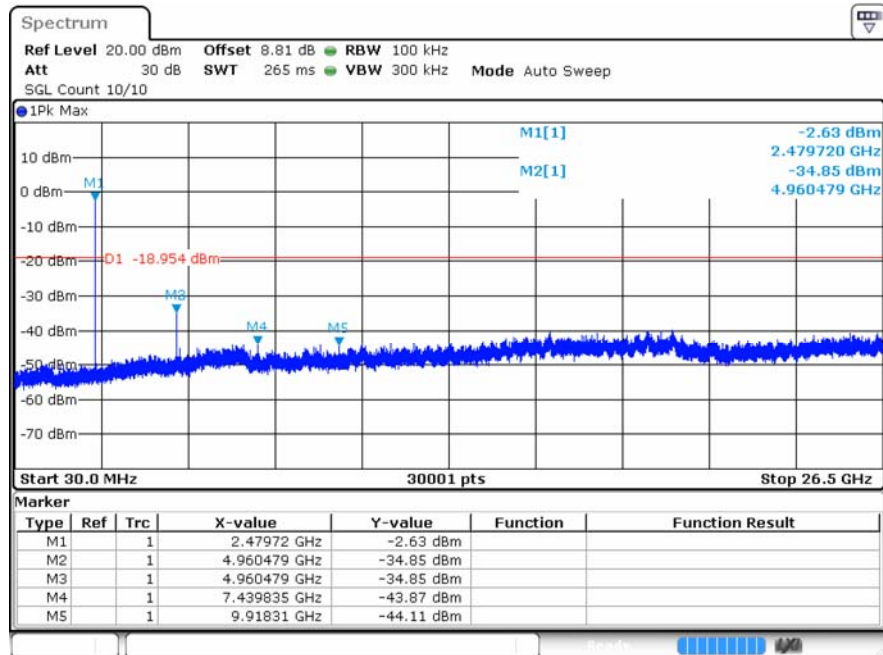


$\pi/4$ DQPSK_HCH_Graphs

Pref



Puw

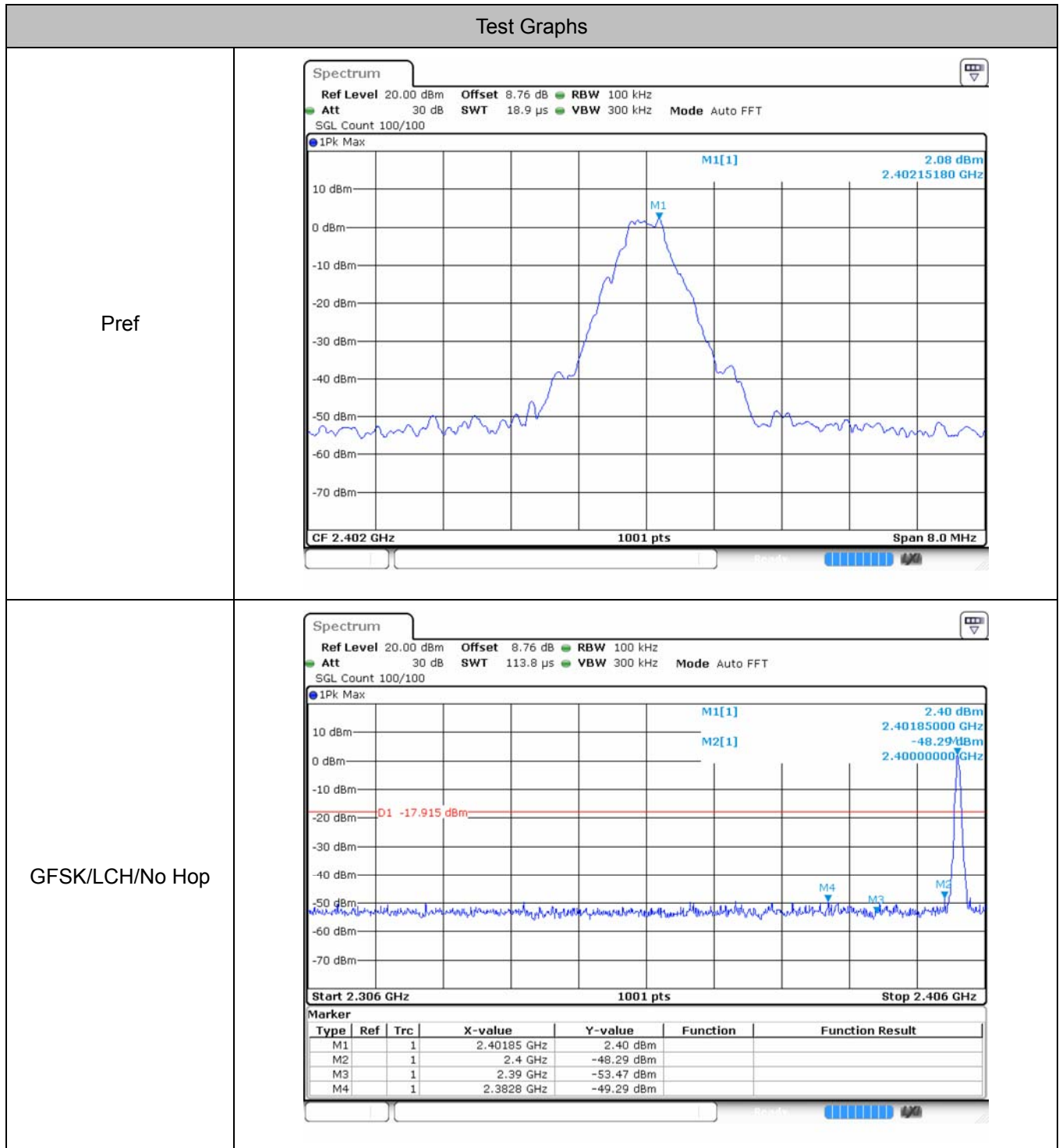


8 Band-edge for RF Conducted Emissions

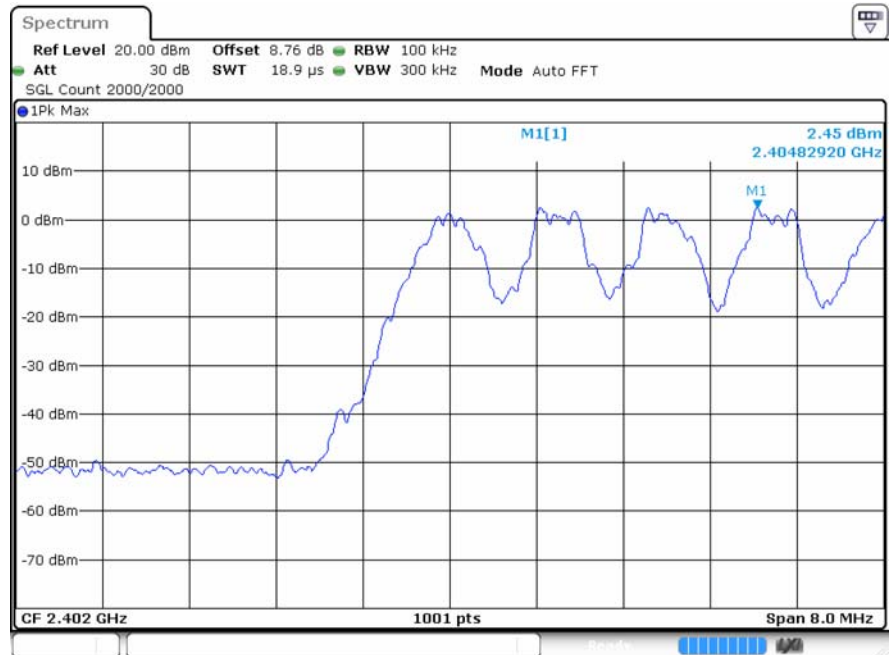
8.1 Test Result

Mode	Channel	Carrier Frequency [MHz]	Frequency Hopping	Max Spurious Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	2402	Off	-51.36	-20	Pass
			On	-50.4	-20	Pass
	HCH	2480	Off	-52.21	-20	Pass
			On	-51.48	-20	Pass
$\pi/4$ DQPSK	LCH	2402	Off	-51.1	-20	Pass
			On	-51.17	-20	Pass
	HCH	2480	Off	-52.69	-20	Pass
			On	-51.28	-20	Pass

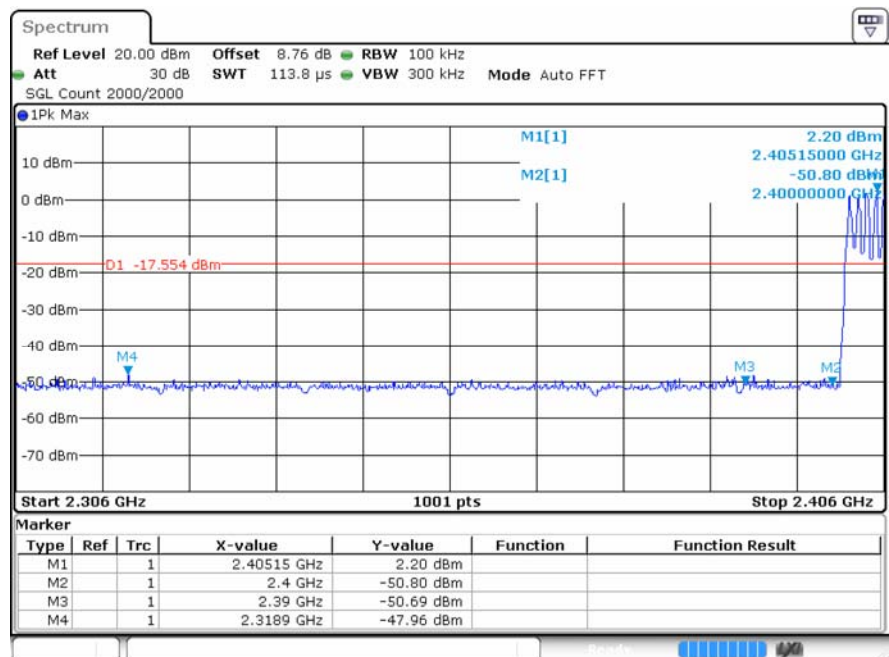
8.2 Test Graphs



Ref



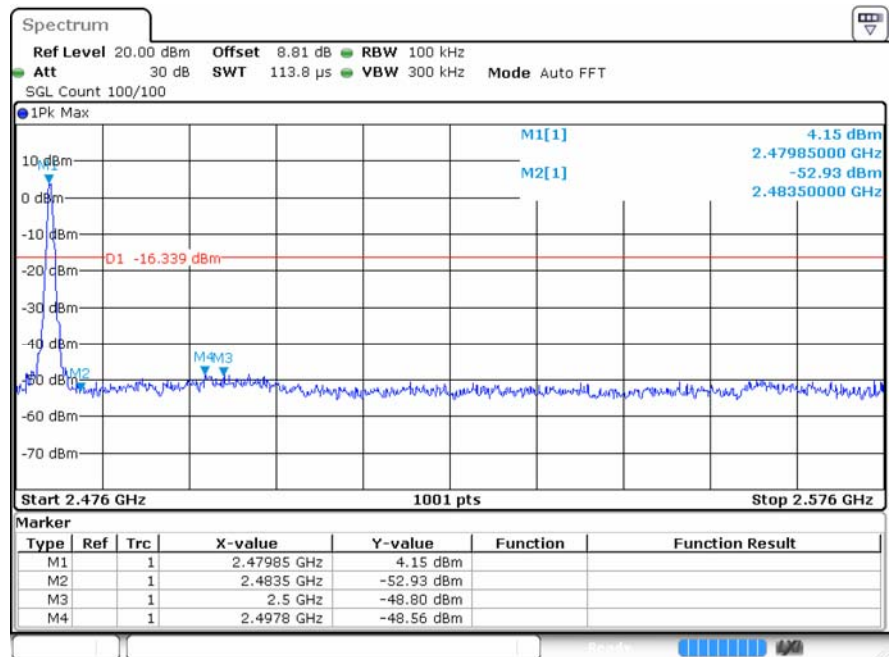
GFSK/LCH/Hop



Ref



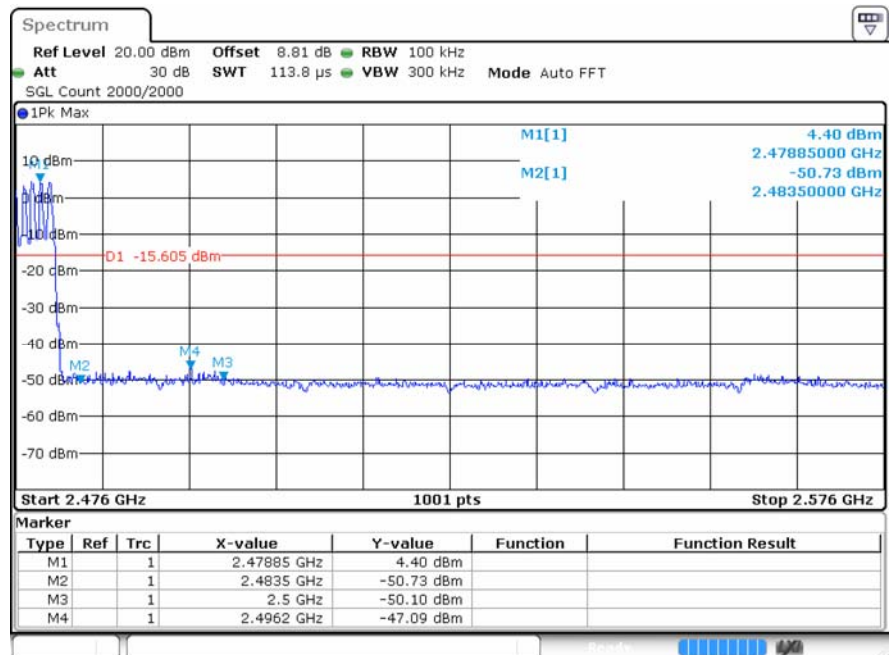
GFSK/HCH/No Hop



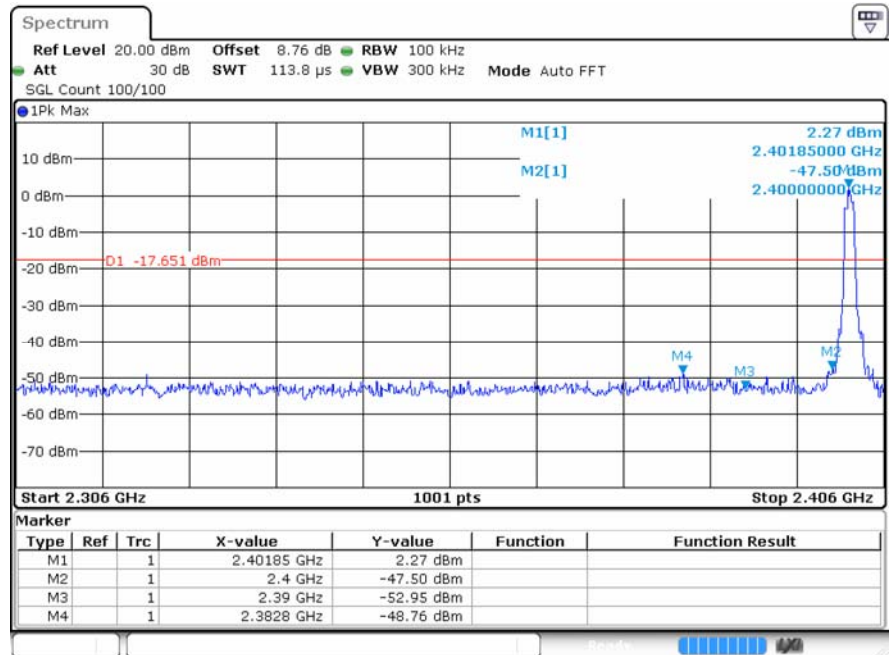
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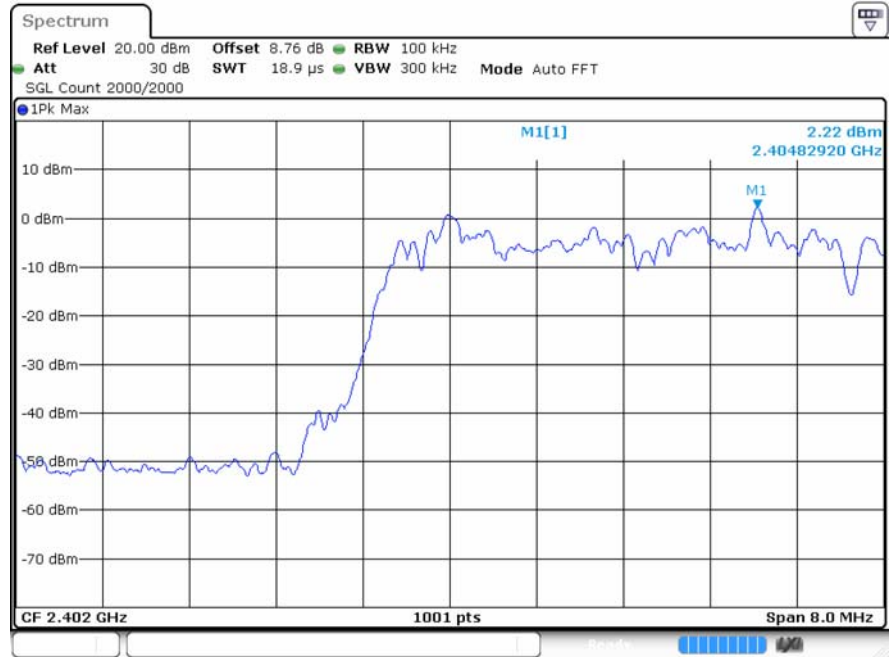
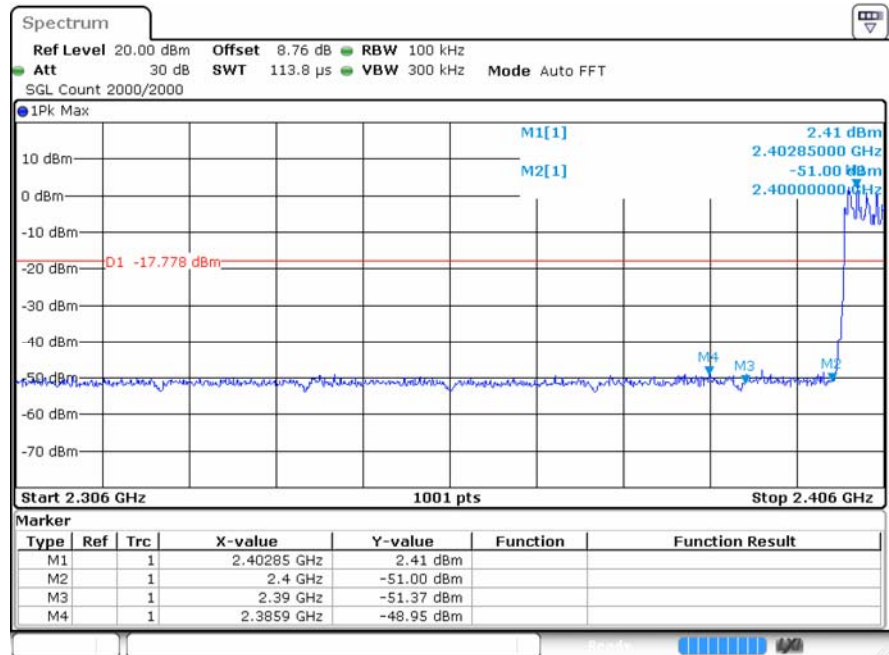
GFSK/HCH/Hop



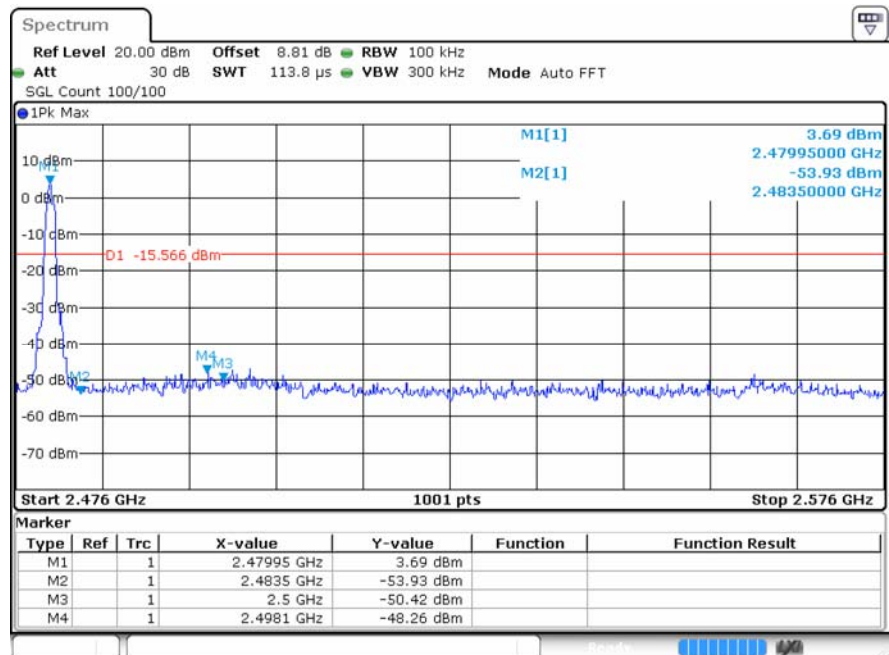
Ref


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


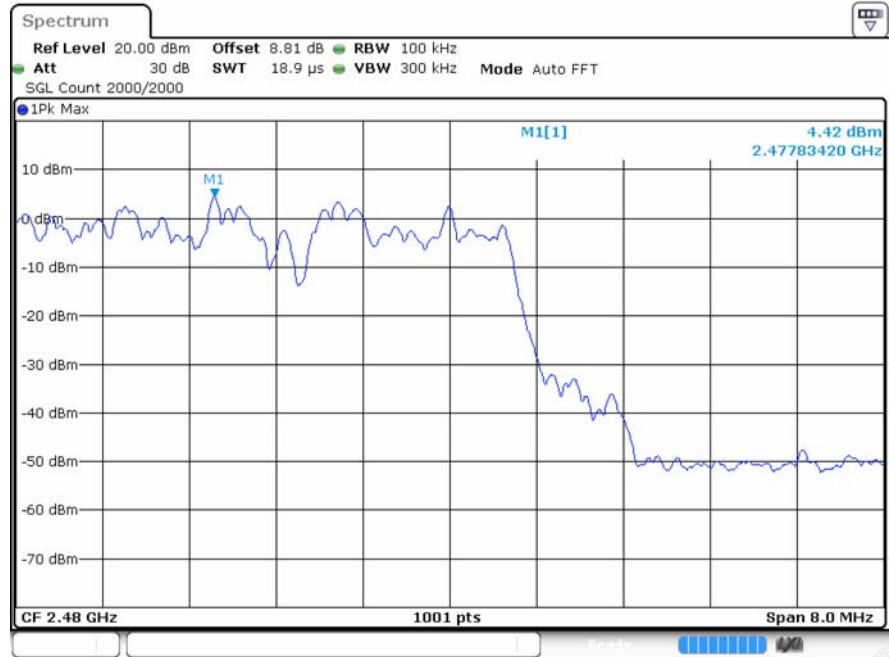
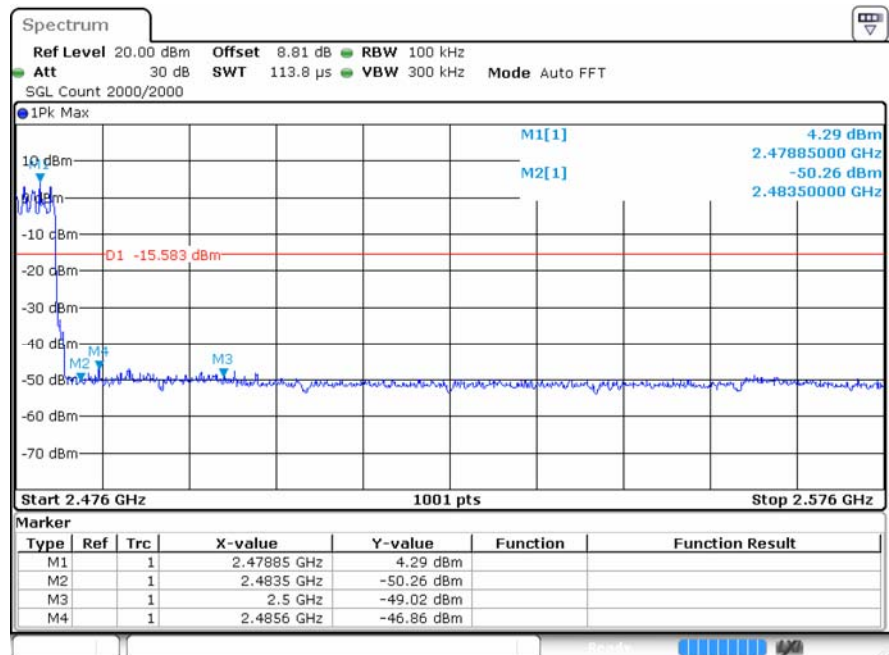
Ref


 $\pi/4$ DQPSK/LCH/Hop


Ref


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


Ref


 $\pi/4$ DQPSK/HCH/Hop


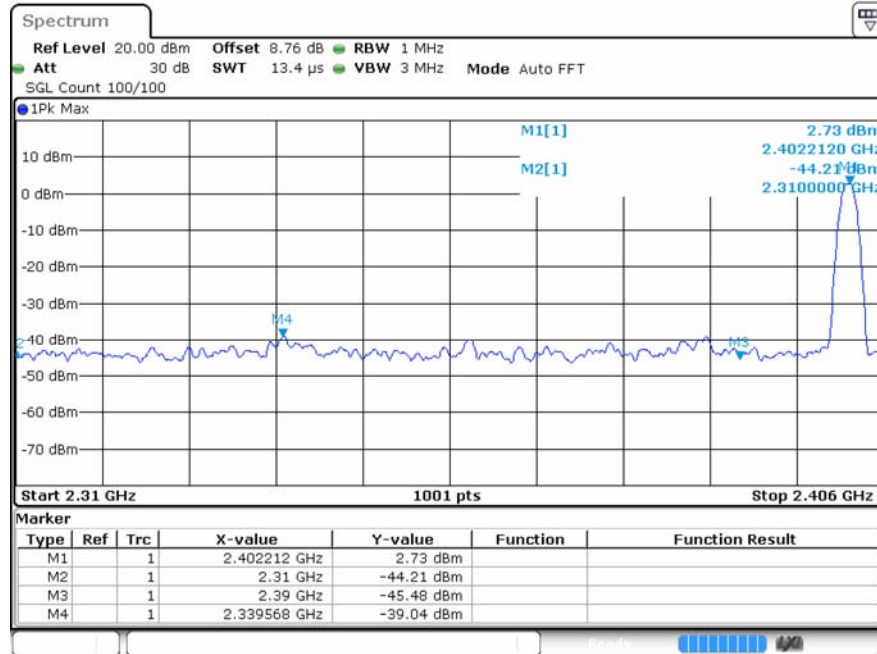
9 Restrict-band band-edge measurements

9.1 Test Result

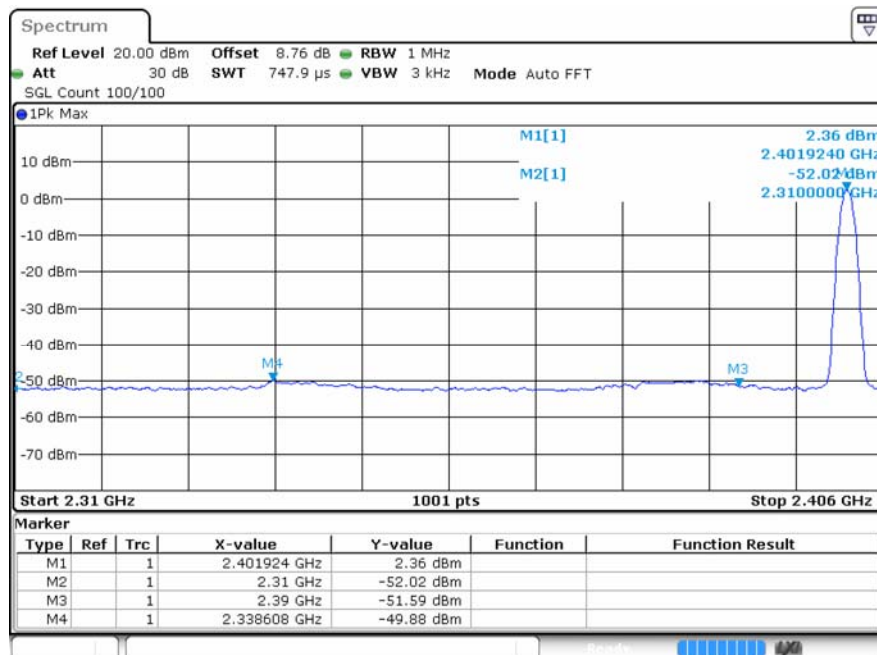
Test Mode	Hopping	Freq.	Power [dBm]	Gain	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.2	6	57.06	PEAK	74	Pass
	Off	2310.0	-52.01	6	49.25	AV	54	Pass
	Off	2339.568	-39.03	6	62.23	PEAK	74	Pass
	Off	2338.608	-49.88	6	51.38	AV	54	Pass
	Off	2390.0	-45.47	6	55.79	PEAK	74	Pass
	Off	2390.0	-51.59	6	49.67	AV	54	Pass
	Off	2483.5	-41.01	6	60.25	PEAK	74	Pass
	Off	2483.5	-51.47	6	49.79	AV	54	Pass
	Off	2495.008	-39.7	6	61.56	PEAK	74	Pass
	Off	2500	-48.39	6	52.87	AV	54	Pass
	Off	2500.0	-40.76	6	60.5	PEAK	74	Pass
	Off	2500.0	-48.39	6	52.87	AV	54	Pass
$\pi/4$ DQPSK	Off	2310.0	-43.67	6	57.59	PEAK	74	Pass
	Off	2310.0	-52.12	6	49.14	AV	54	Pass
	Off	2380.368	-40.38	6	60.88	PEAK	74	Pass
	Off	2382.864	-49.41	6	51.85	AV	54	Pass
	Off	2390.0	-42.62	6	58.64	PEAK	74	Pass
	Off	2390.0	-50.48	6	50.78	AV	54	Pass
	Off	2483.5	-45.67	6	55.59	PEAK	74	Pass
	Off	2483.5	-51.32	6	49.94	AV	54	Pass
	Off	2498.752	-39.61	6	61.65	PEAK	74	Pass
	Off	2499.976	-48.35	6	52.91	AV	54	Pass
	Off	2500.0	-40.85	6	60.41	PEAK	74	Pass
	Off	2500.0	-48.35	6	52.91	AV	54	Pass

9.2 Test Graphs

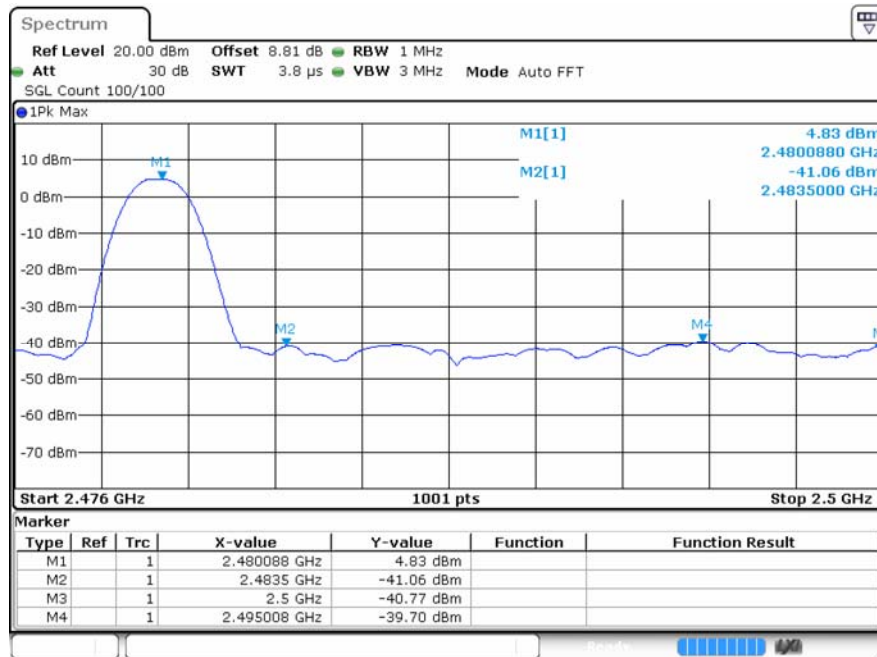
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



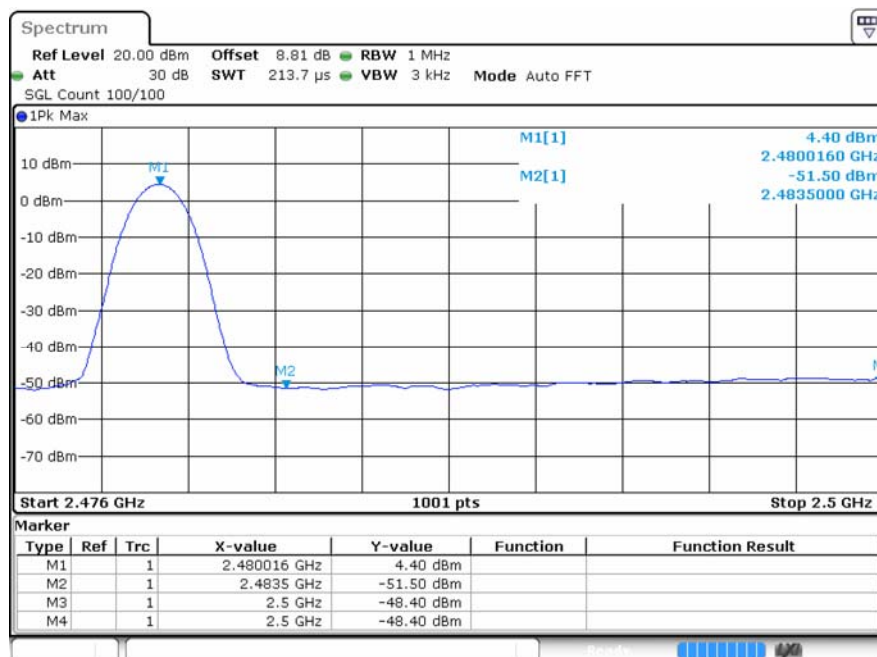
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



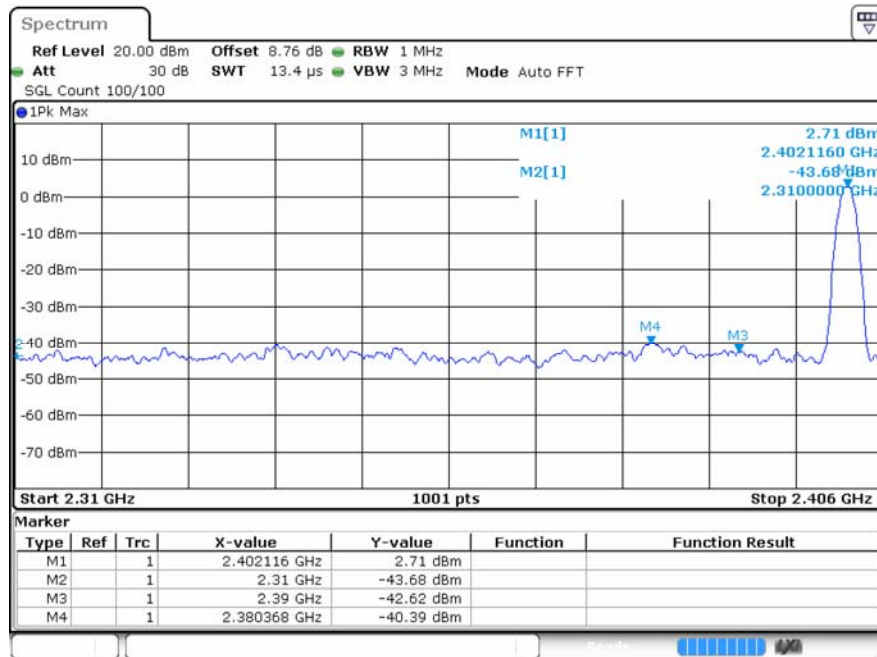
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



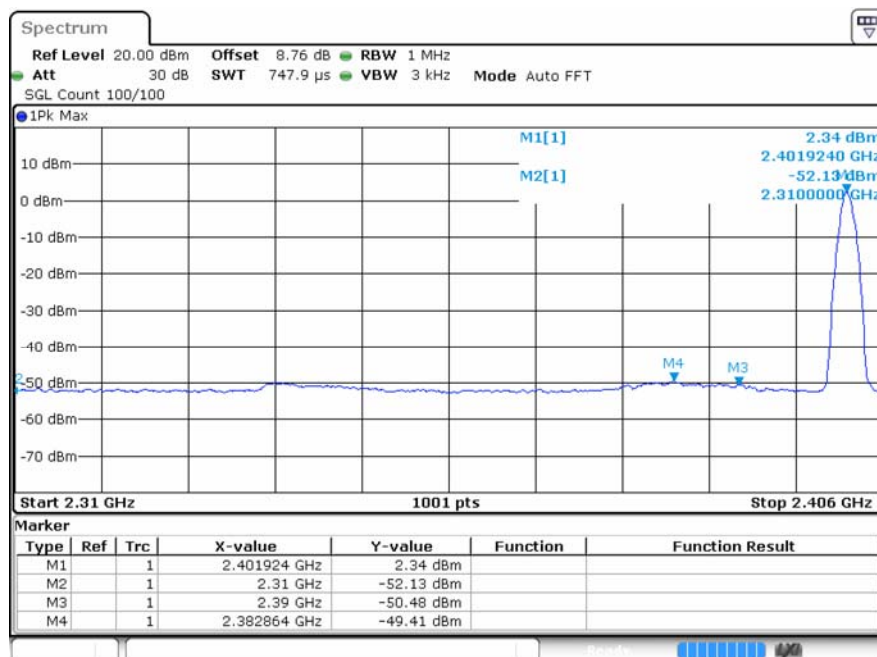
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



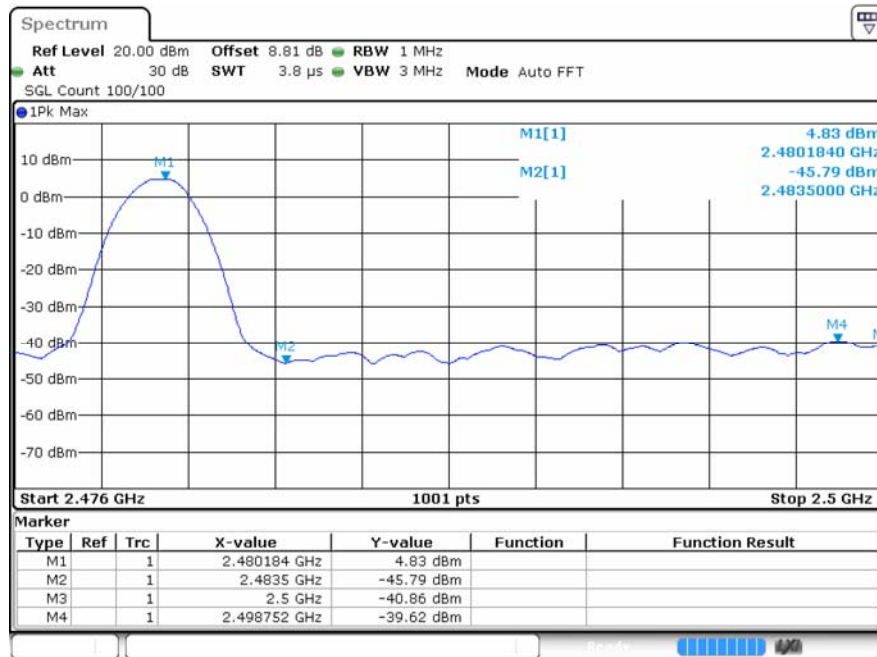
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



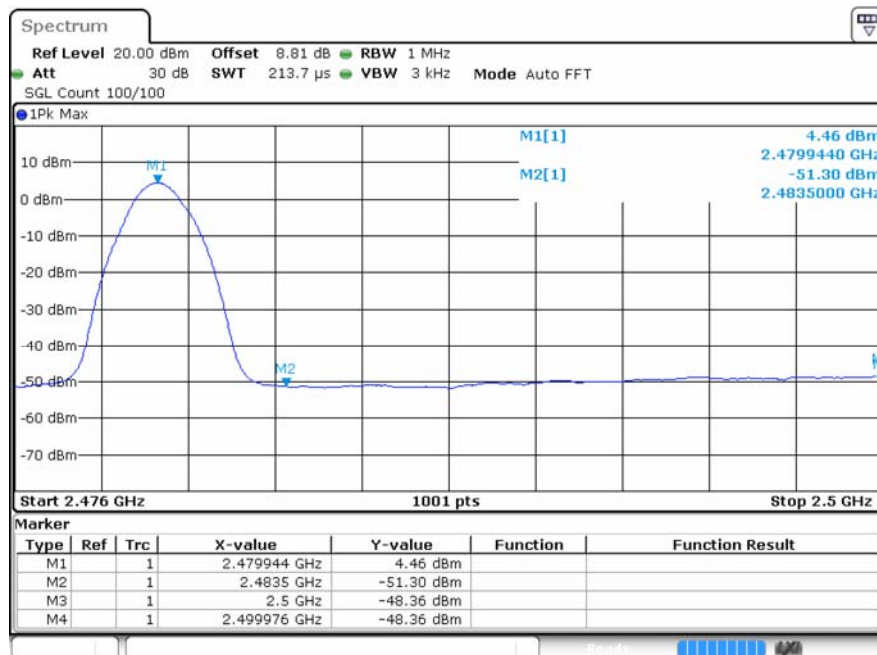
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



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)



---The End---