



Appendix A

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

Product Name: HELMET WIRELESS EARPHONE

Trade Mark: N/A

Test Model: Q68-Max

Environmental Conditions

Temperature:	24.4℃
Relative Humidity:	52.3%
ATM Pressure:	101Kpa
Test Engineer:	Emiya lin
Supervised by:	Simba Haung



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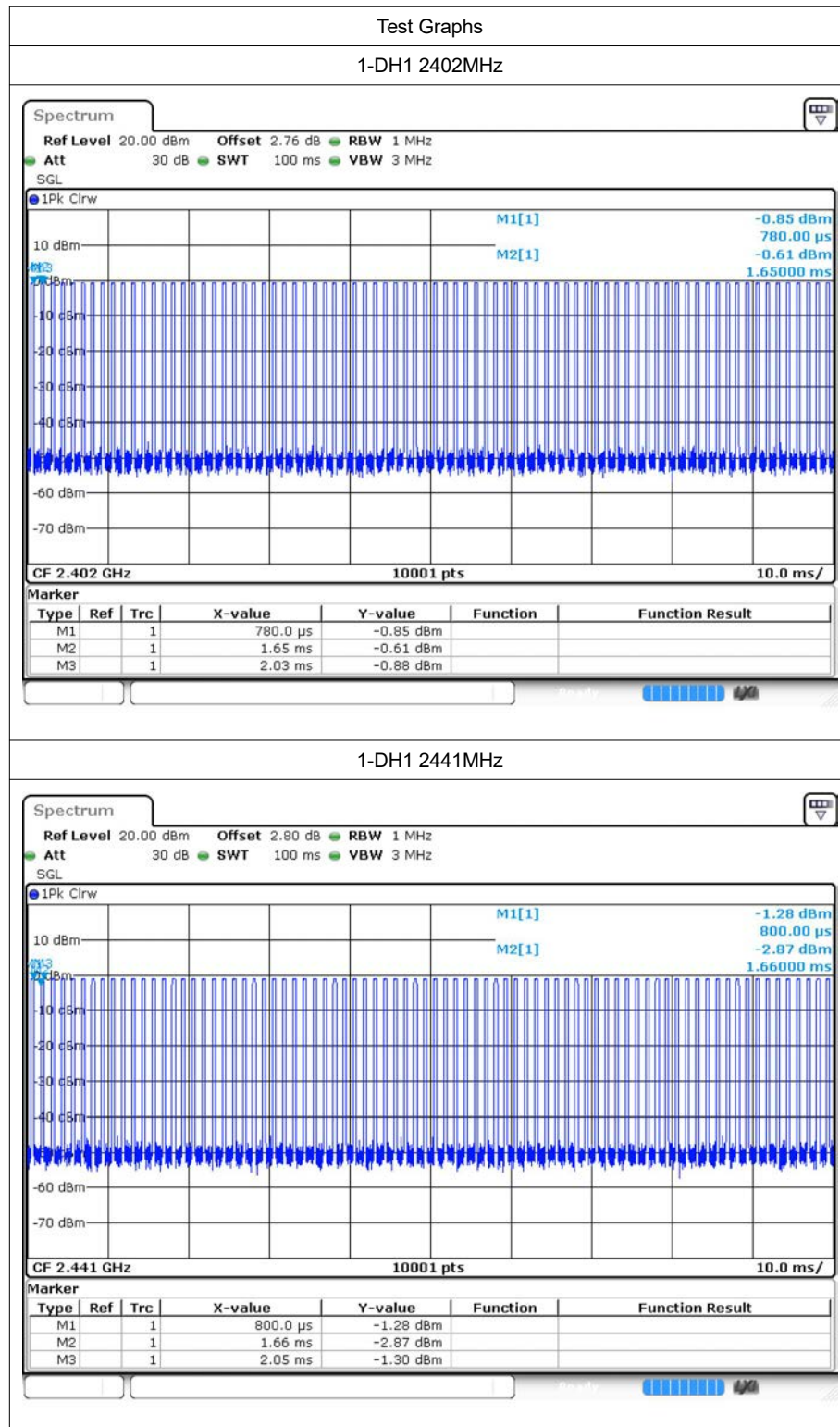
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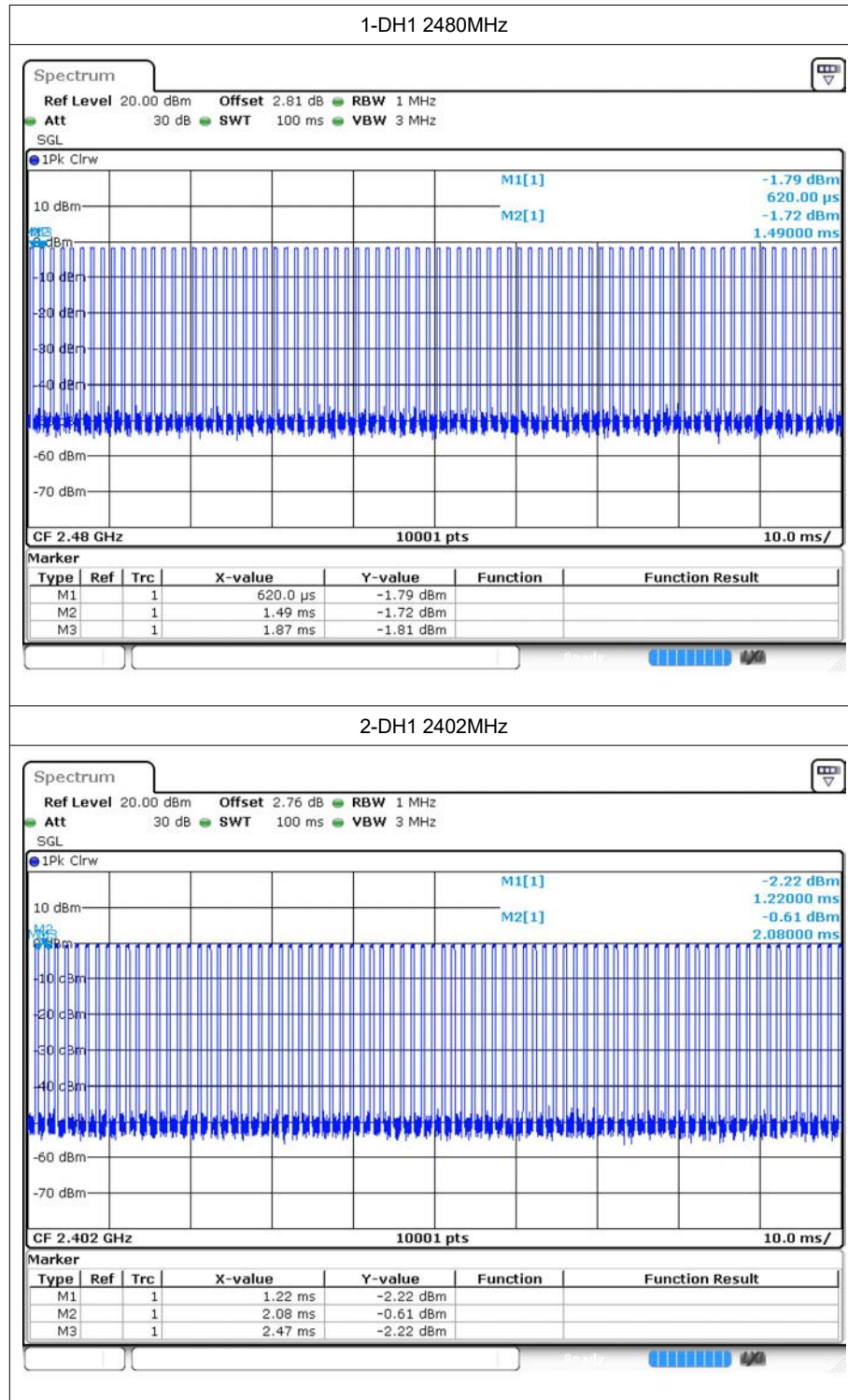
1 Duty Cycle

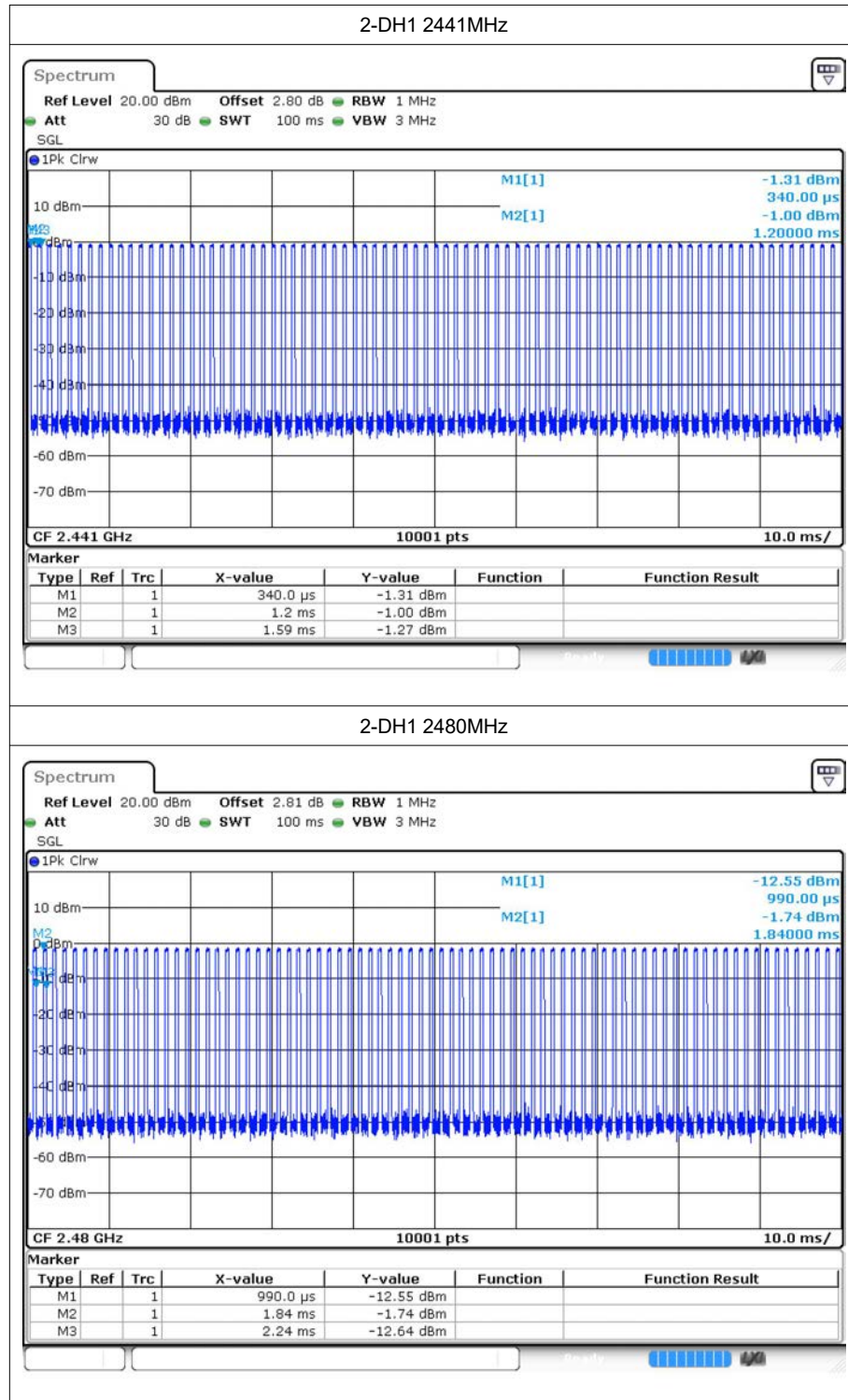
1.1 Test Result

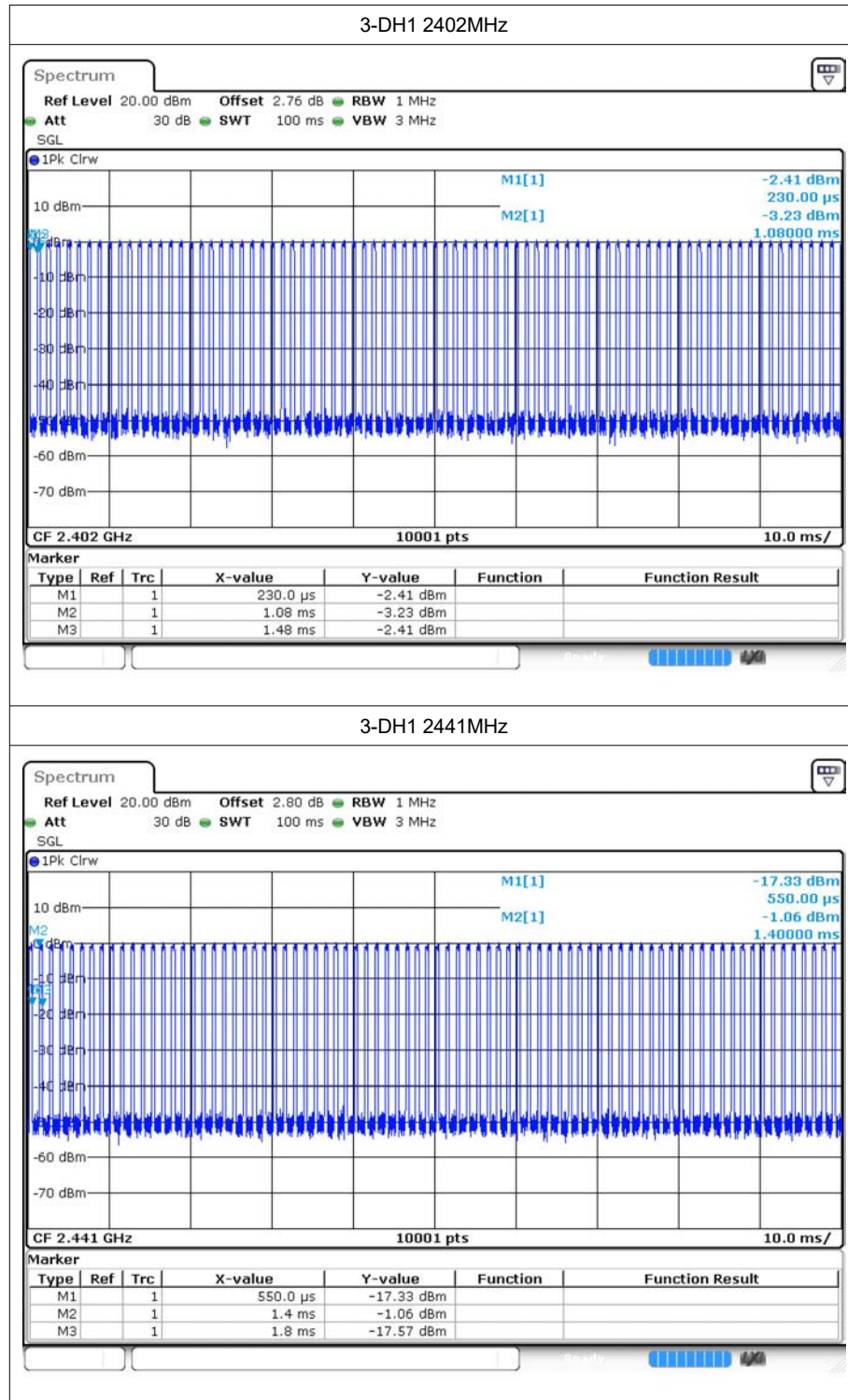
Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor	1/T (kHz)
1-DH1	2402	31.2	5.06	2.63
1-DH1	2441	32	4.95	2.56
1-DH1	2480	31.2	5.06	2.63
2-DH1	2402	32	4.95	2.56
2-DH1	2441	32.01	4.95	2.56
2-DH1	2480	32.8	4.84	2.5
3-DH1	2402	32.81	4.84	2.5
3-DH1	2441	32.68	4.86	2.5
3-DH1	2480	32	4.95	2.56

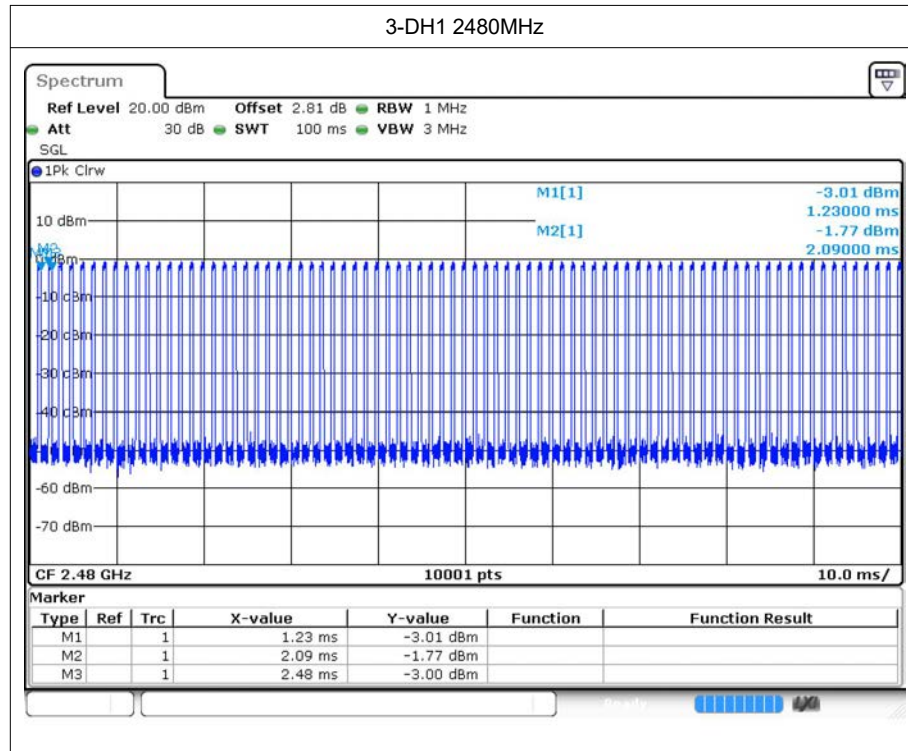
1.2 Test Graphs









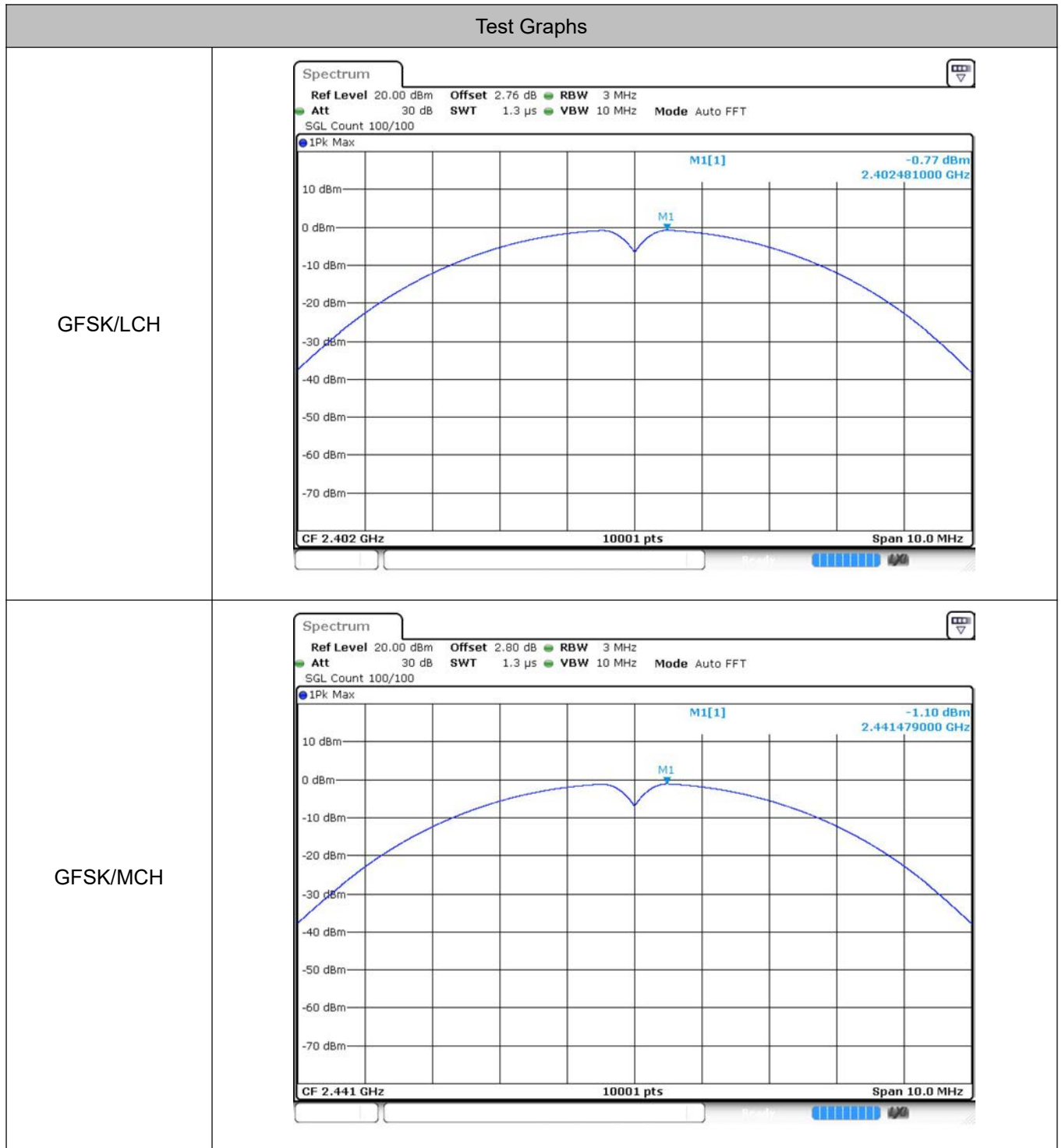


2 Maximum Conducted Peak Output Power

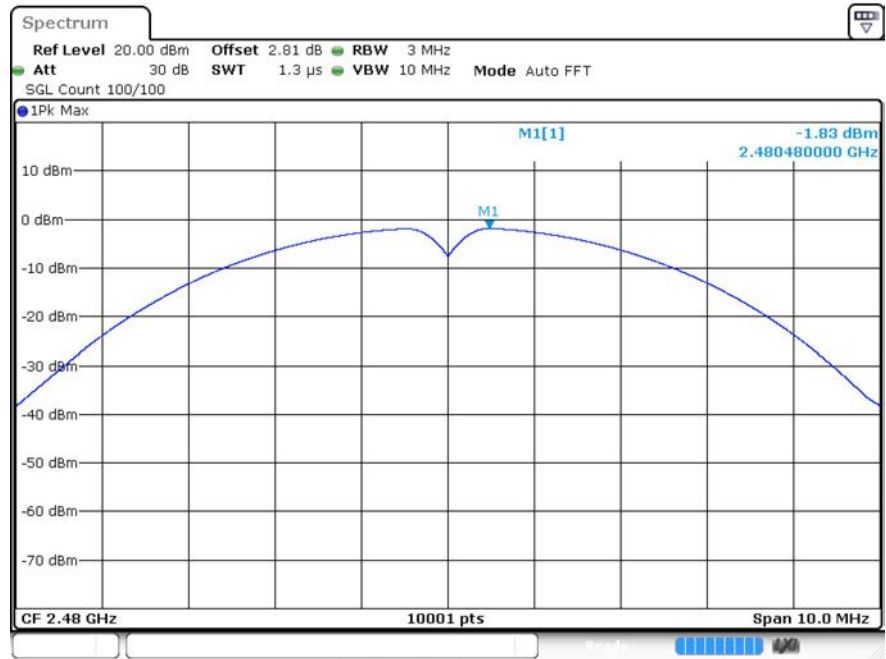
2.1 Test Result

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.77	21	Pass
	MCH	-1.1	21	Pass
	HCH	-1.83	21	Pass
$\pi/4$ DQPSK	LCH	-0.17	21	Pass
	MCH	-0.78	21	Pass
	HCH	-1.28	21	Pass
8DPSK	LCH	0.23	21	Pass
	MCH	0.11	21	Pass
	HCH	-1.22	21	Pass

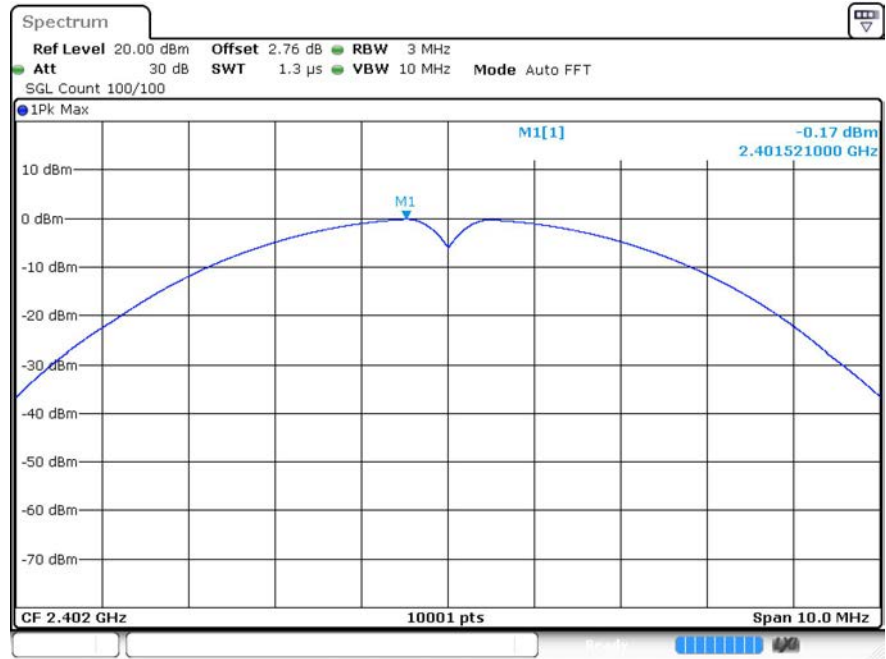
2.2 Test Graphs



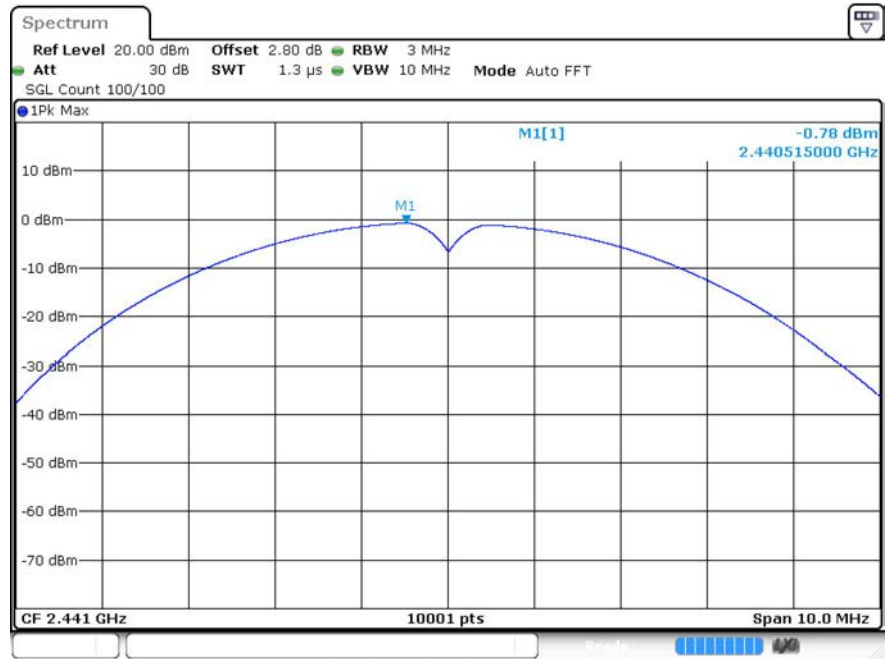
GFSK/HCH



$\pi/4$ DQPSK/LCH



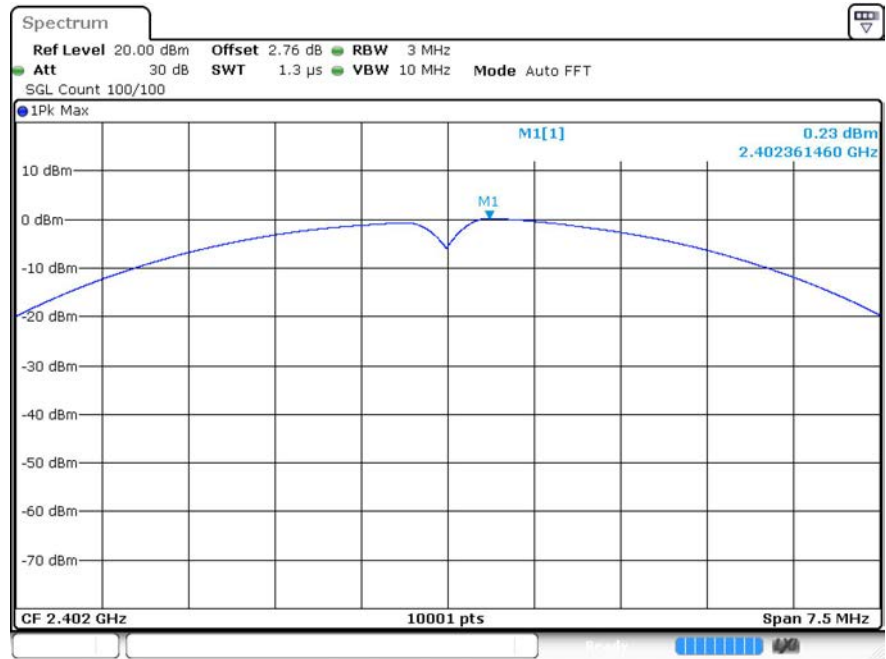
$\pi/4$ DQPSK/MCH



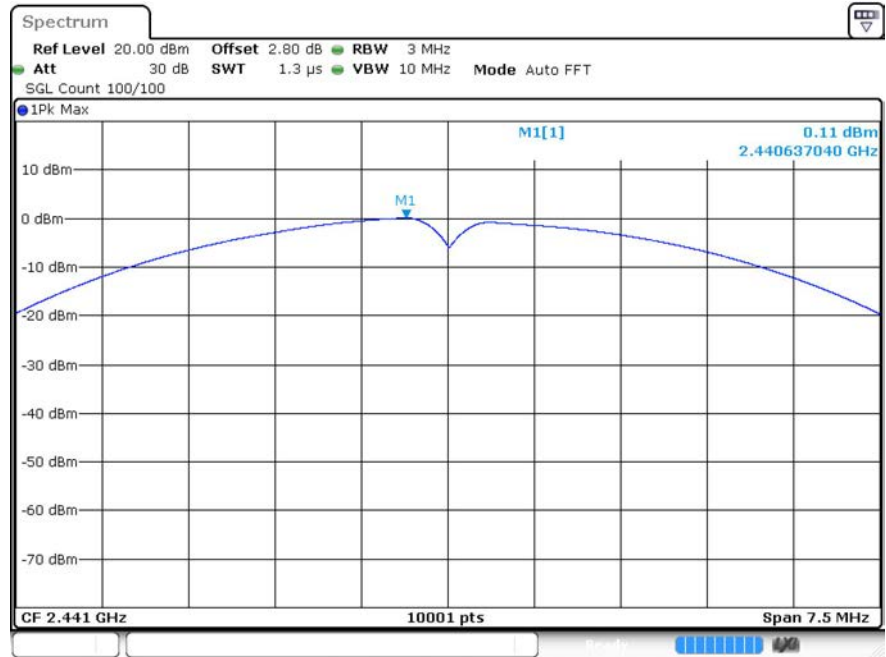
$\pi/4$ DQPSK/HCH



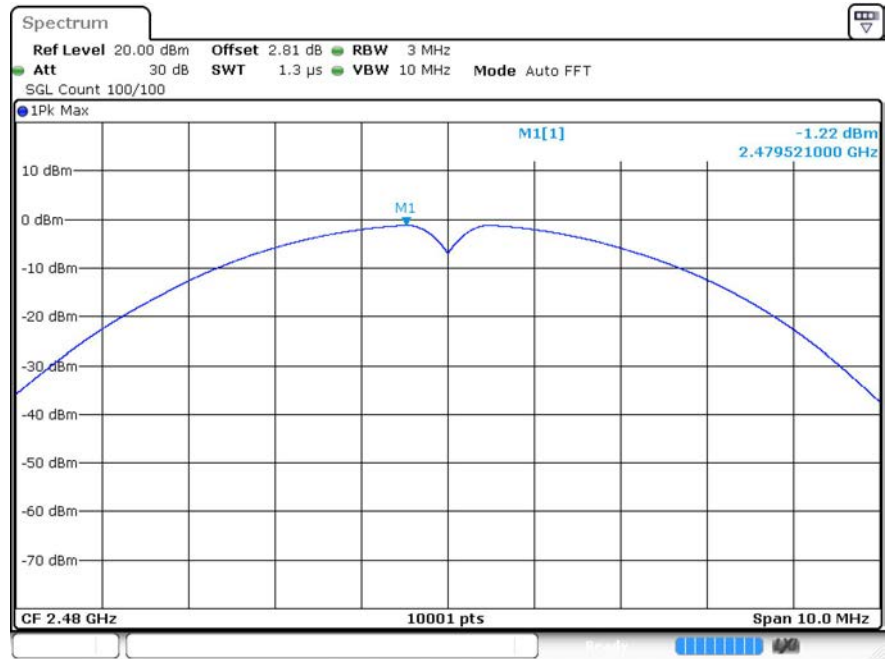
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

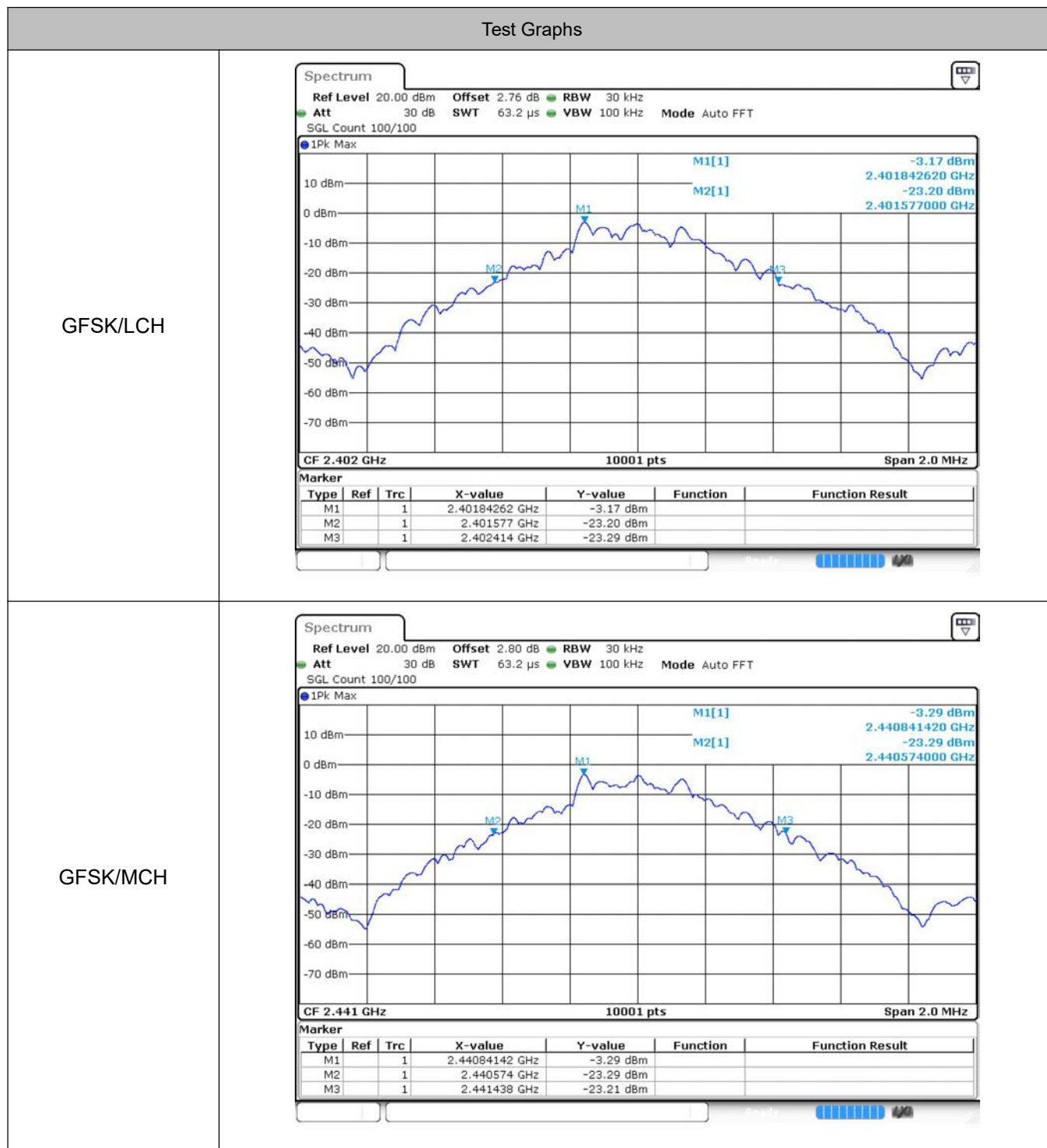


3 20dB Bandwidth

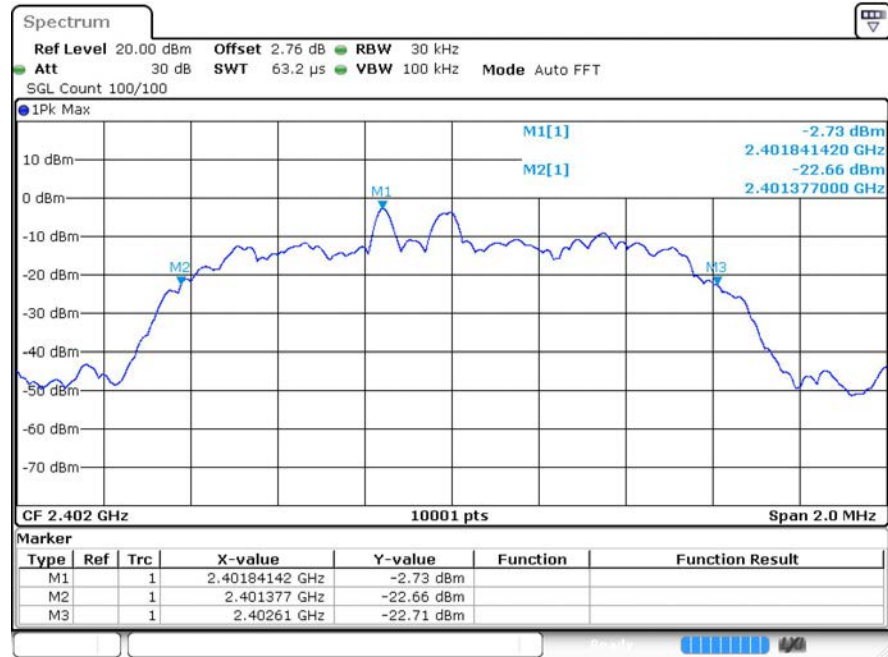
3.1 Test Result

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.836	Not Specified	Pass
	MCH	0.864	Not Specified	Pass
	HCH	0.877	Not Specified	Pass
$\pi/4$ DQPSK	LCH	1.234	Not Specified	Pass
	MCH	1.211	Not Specified	Pass
	HCH	1.24	Not Specified	Pass
8DPSK	LCH	1.214	Not Specified	Pass
	MCH	1.204	Not Specified	Pass
	HCH	1.215	Not Specified	Pass

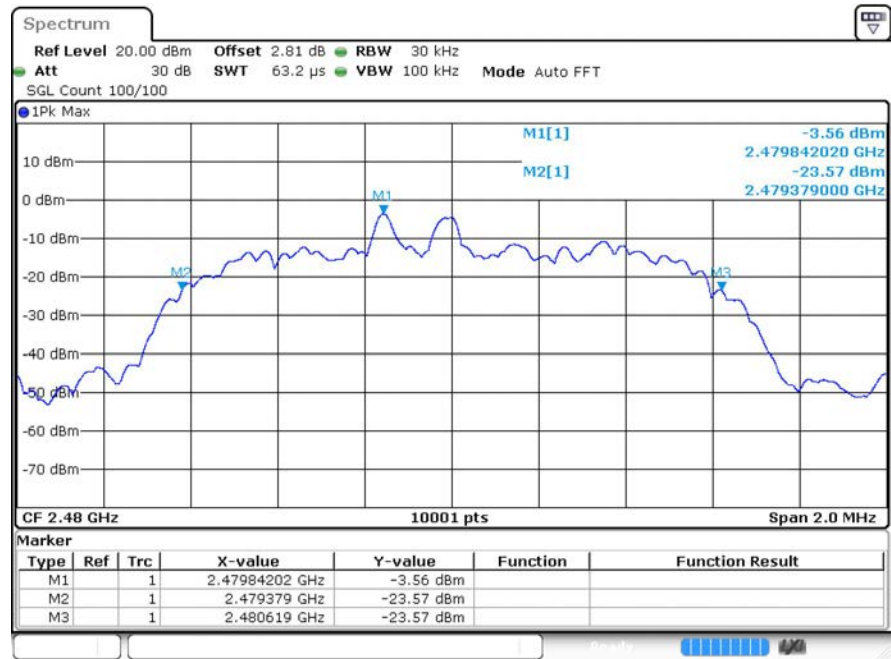
3.2 Test Graphs



GFSK/HCH


 $\pi/4$ DQPSK/LCH


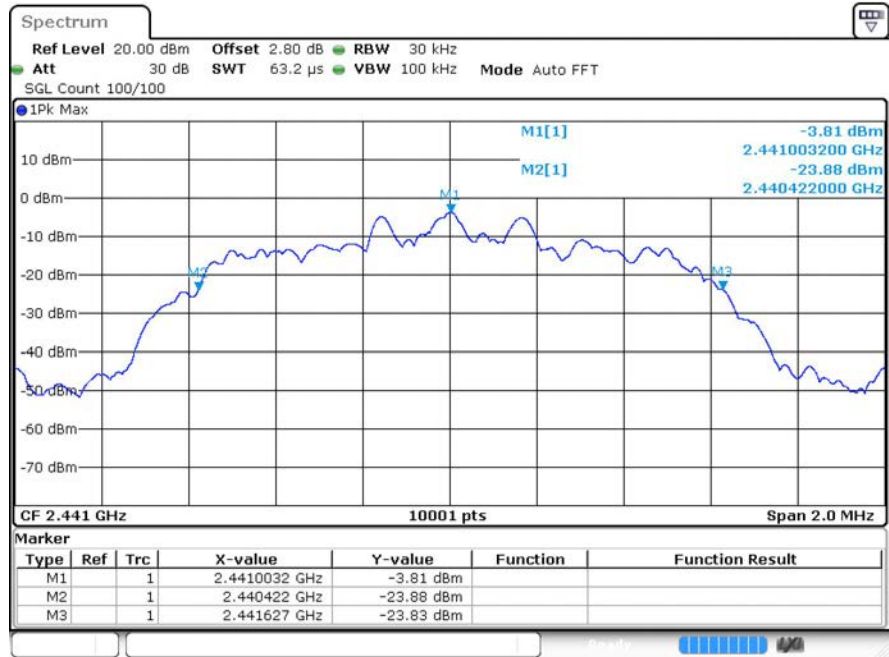
$\pi/4$ DQPSK/MCH

 $\pi/4$ DQPSK/HCH


8DPSK/LCH

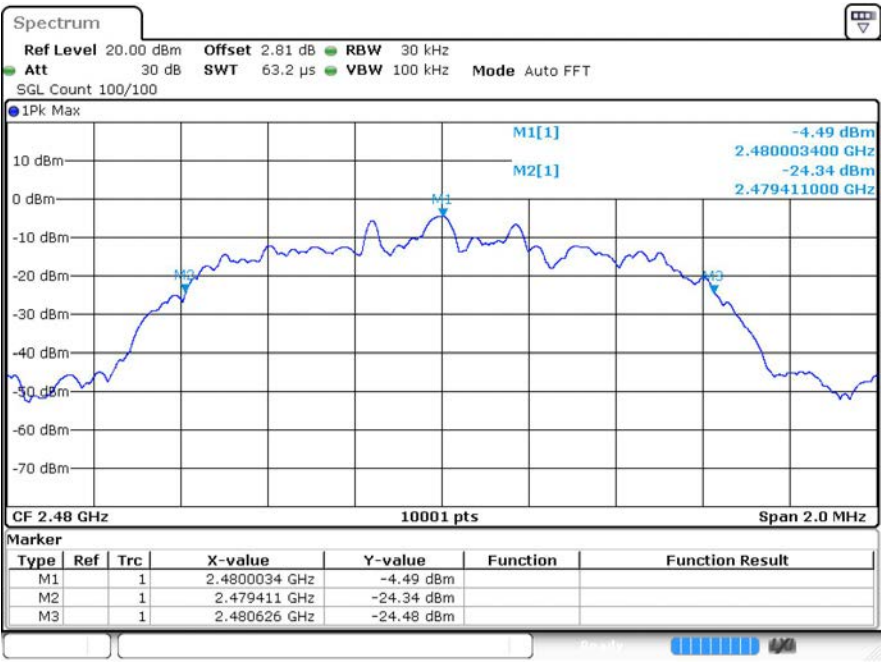


8DPSK/MCH





8DPSK/HCH



4 Carrier Frequency Separation

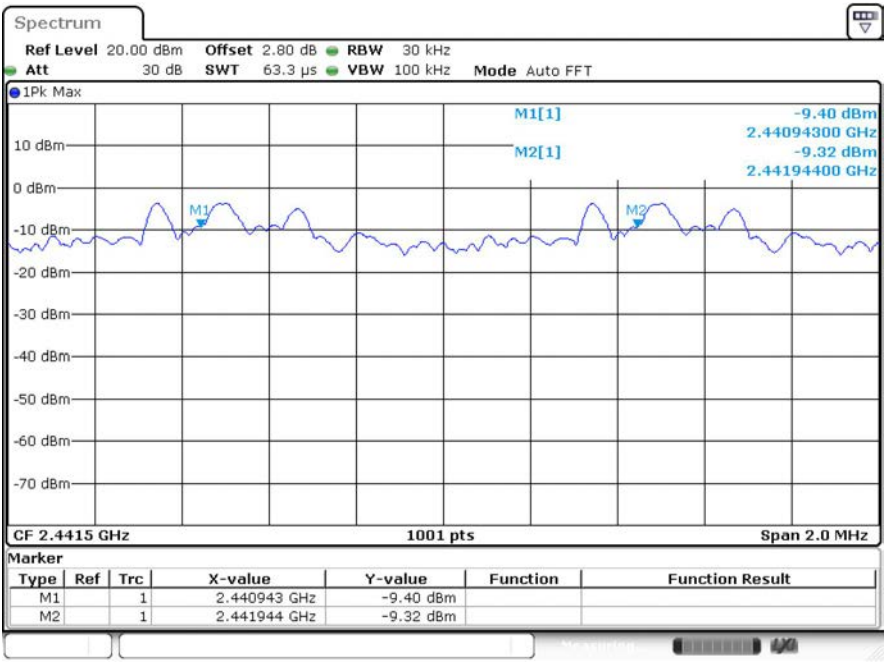
4.1 Test Result

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	MCH	1.008	0.576	Pass
$\pi/4$ DQPSK	MCH	1	0.807	Pass
8DPSK	MCH	1.001	0.803	Pass

4.2 Test Graphs



8DPSK/MCH

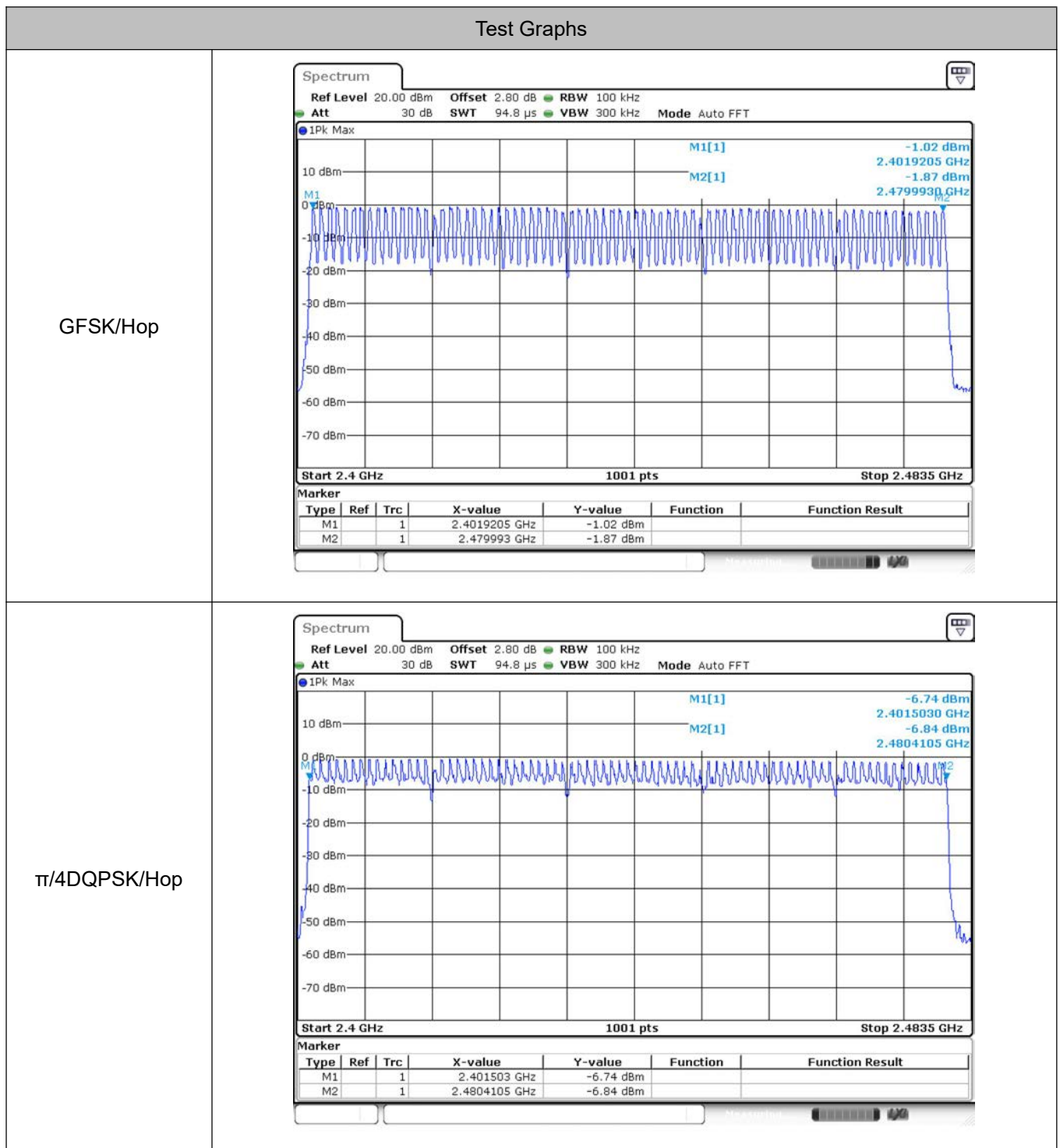


5 Hopping Channel Number

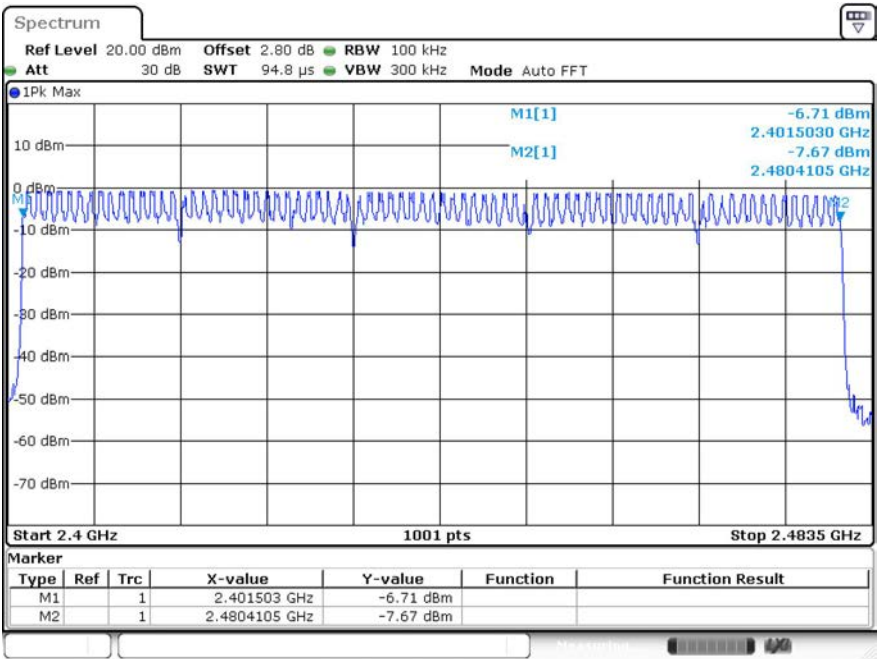
5.1 Test Result

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

5.2 Test Graphs



8DPSK/Hop

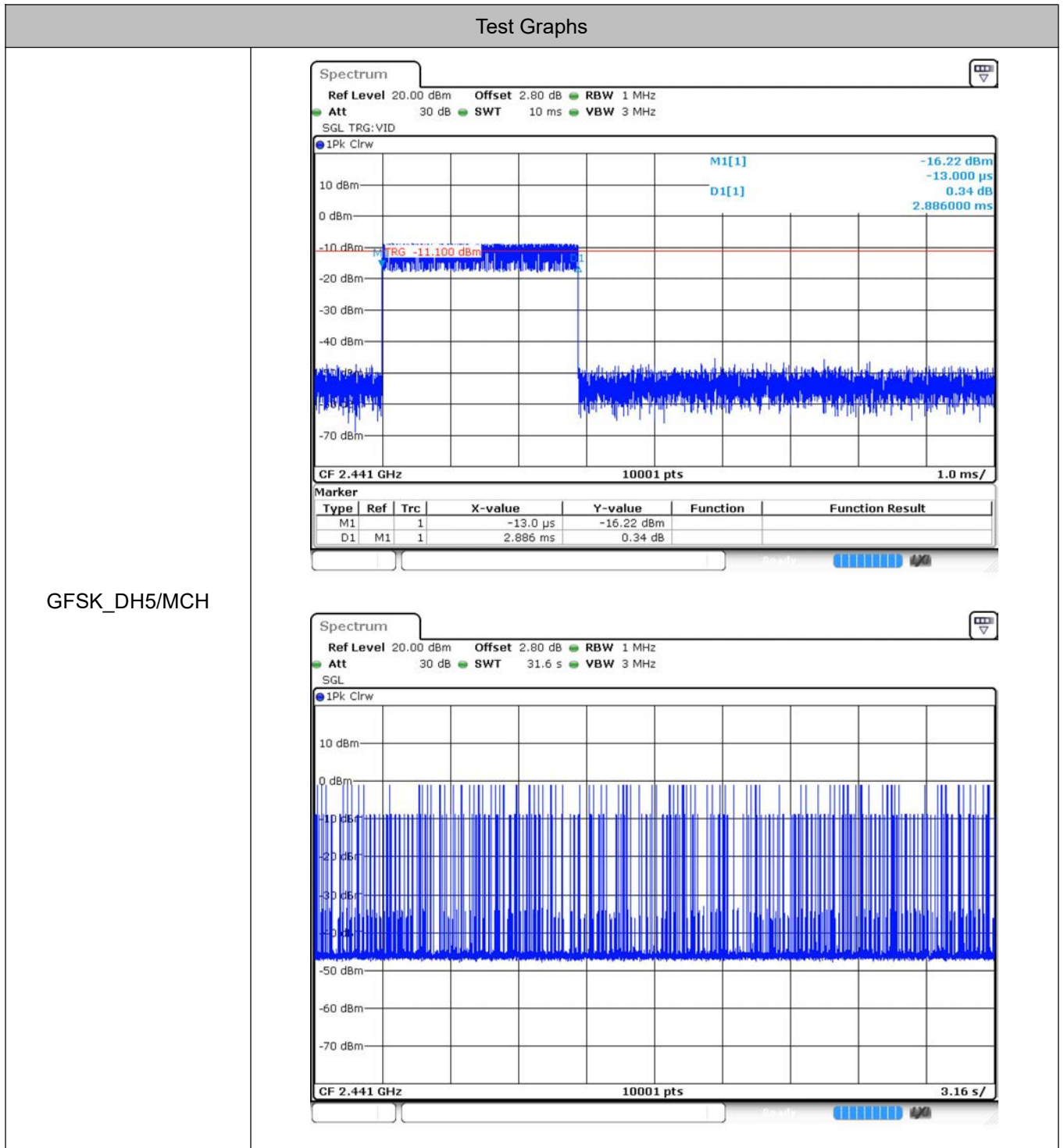


6 Dwell Time

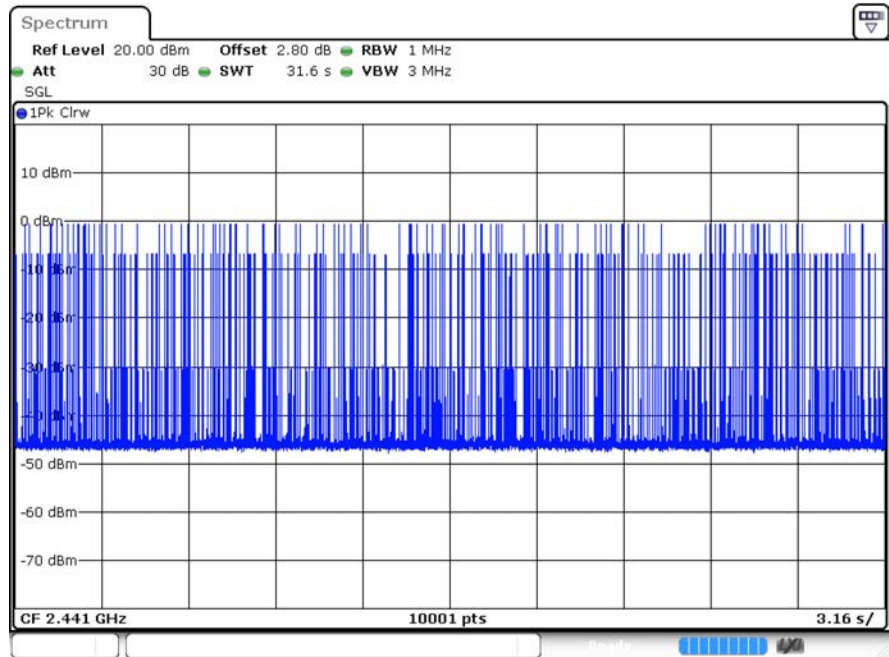
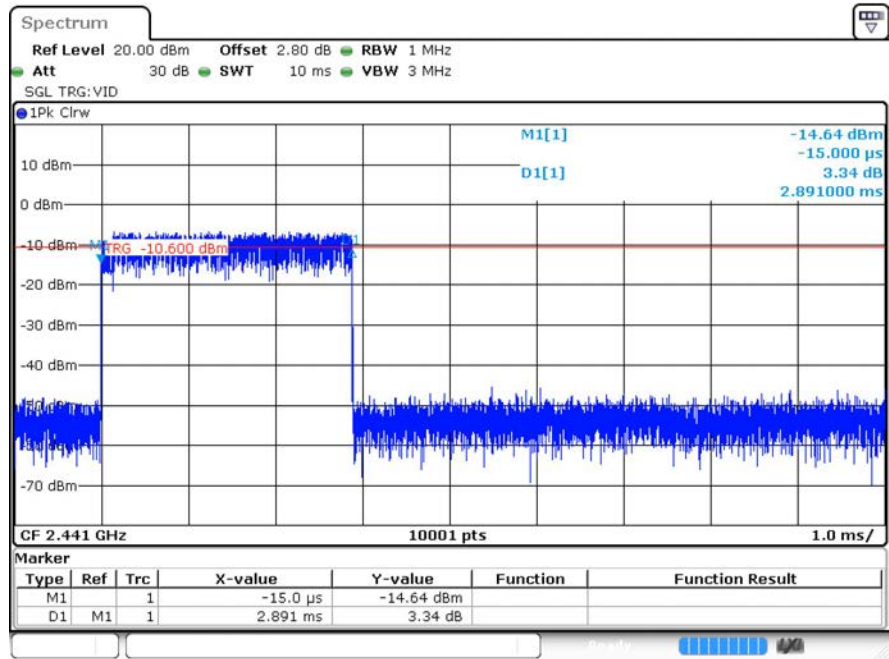
6.1 Test Result

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[ms]	Limit [s]	Verdict
GFSK	DH5	MCH	2.886	105	303.03	0.4	Pass
$\pi/4$ DQPSK	2DH5	MCH	2.891	114	329.574	0.4	Pass
8DPSK	3DH5	MCH	2.893	105	303.765	0.4	Pass

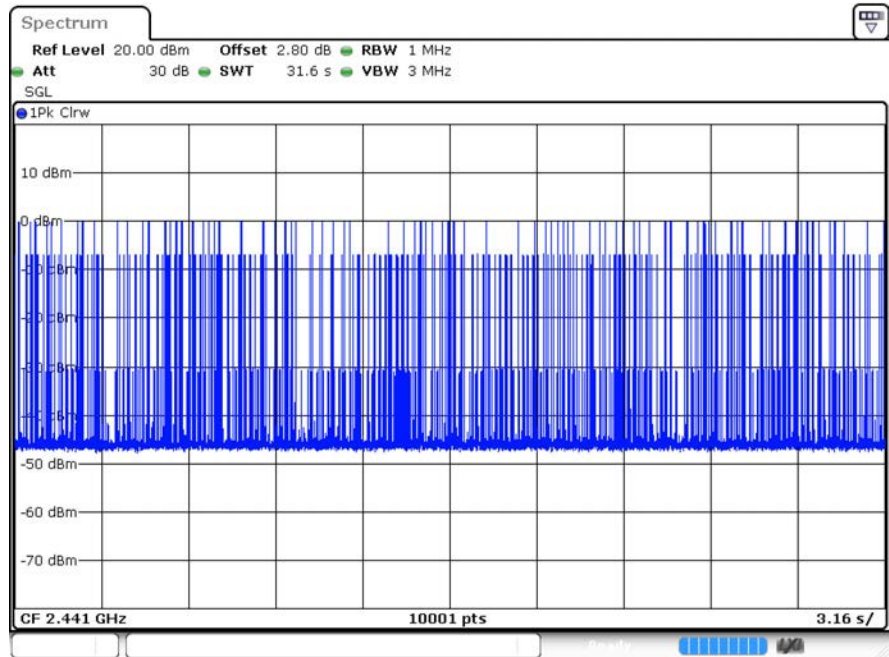
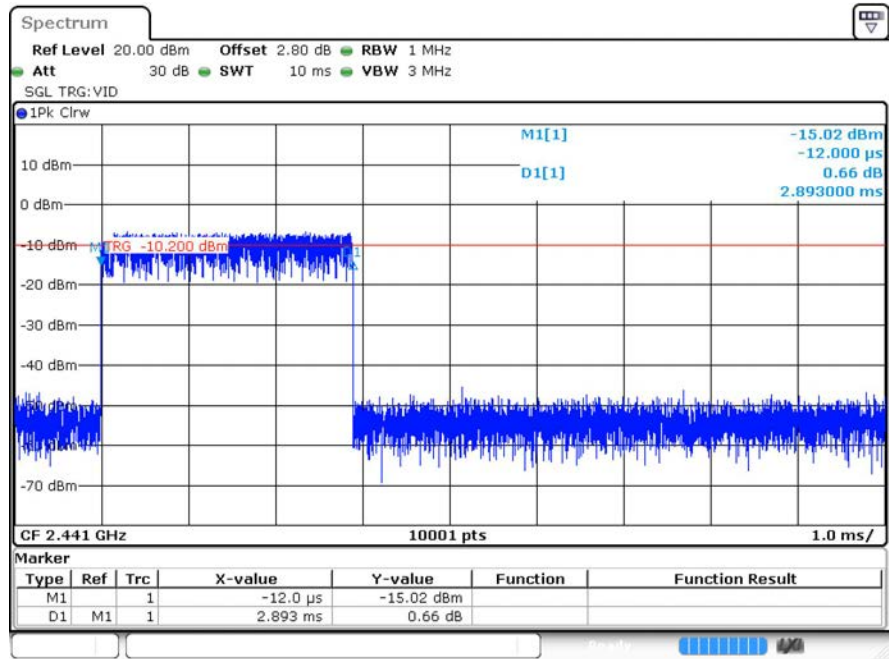
6.2 Test Graphs



$\pi/4$ DQPSK
_2DH5/MCH



8DPSK_3DH5/MCH



7 RF Conducted Spurious Emissions

7.1 Test Result

Mode	Channel	Max. Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	-35.15	-20	Pass
	MCH	-32.2	-20	Pass
	HCH	-32.79	-20	Pass
$\pi/4$ DQPSK	LCH	-35.14	-20	Pass
	MCH	-32.17	-20	Pass
	HCH	-32.71	-20	Pass
8DPSK	LCH	-34.51	-20	Pass
	MCH	-32.15	-20	Pass
	HCH	-31.65	-20	Pass

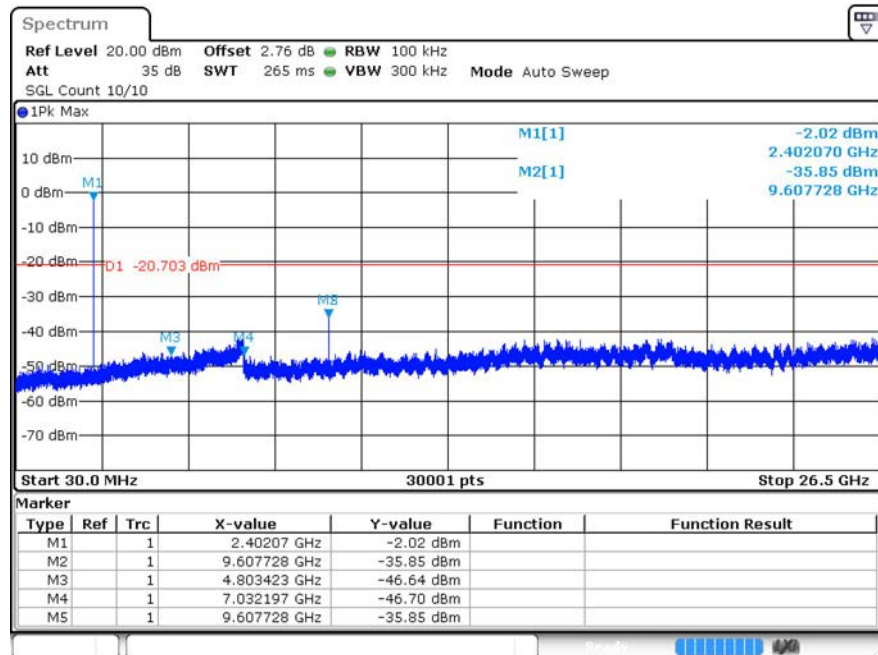
7.2 Test Graphs

GFSK_LCH_Graphs

Pref

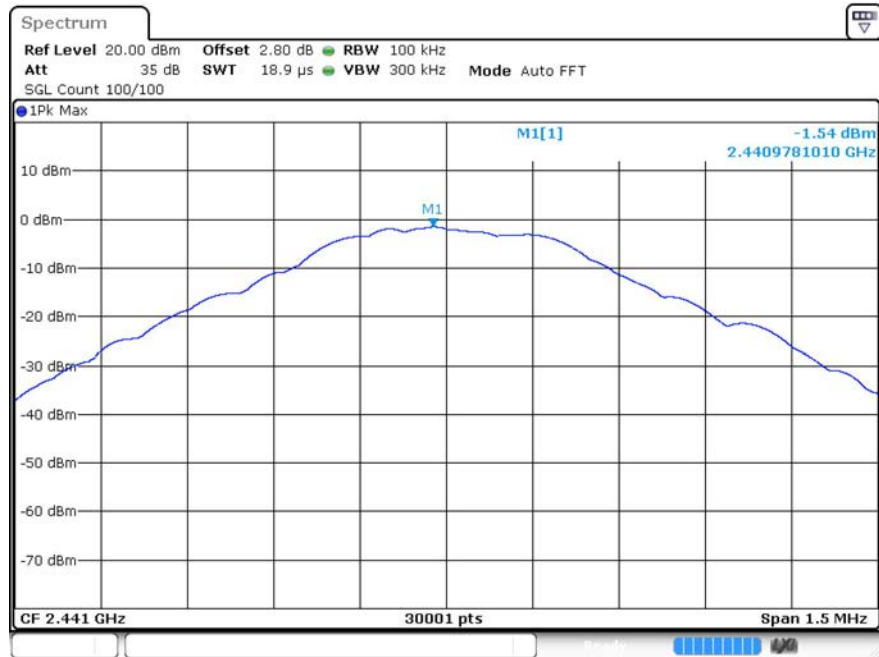


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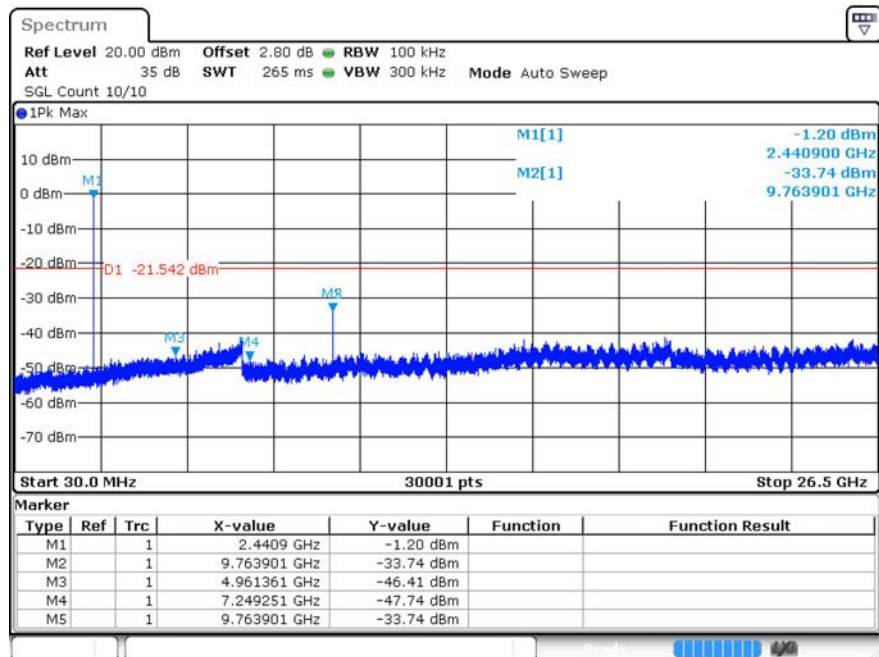


GFSK_MCH_Graphs

Pref

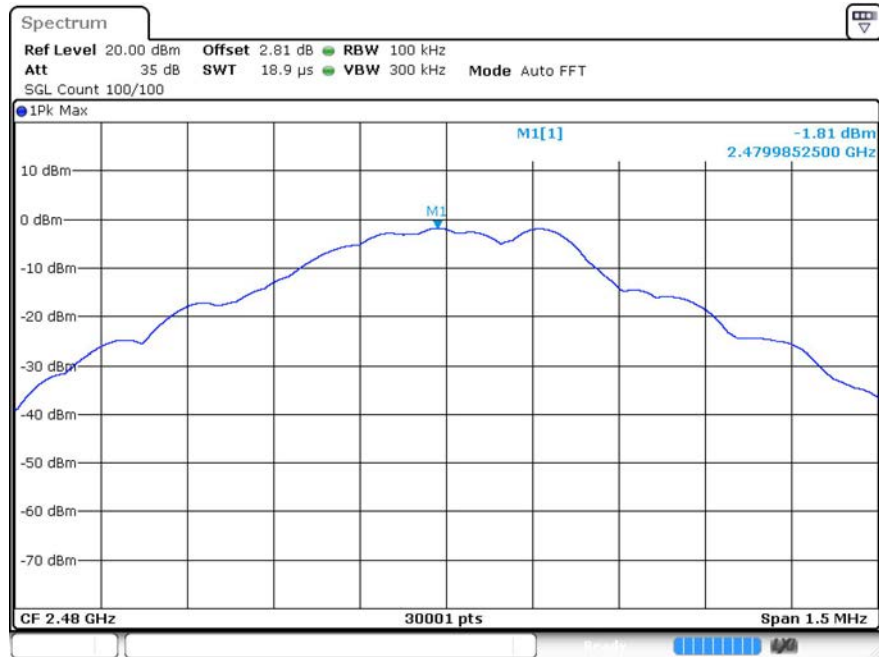


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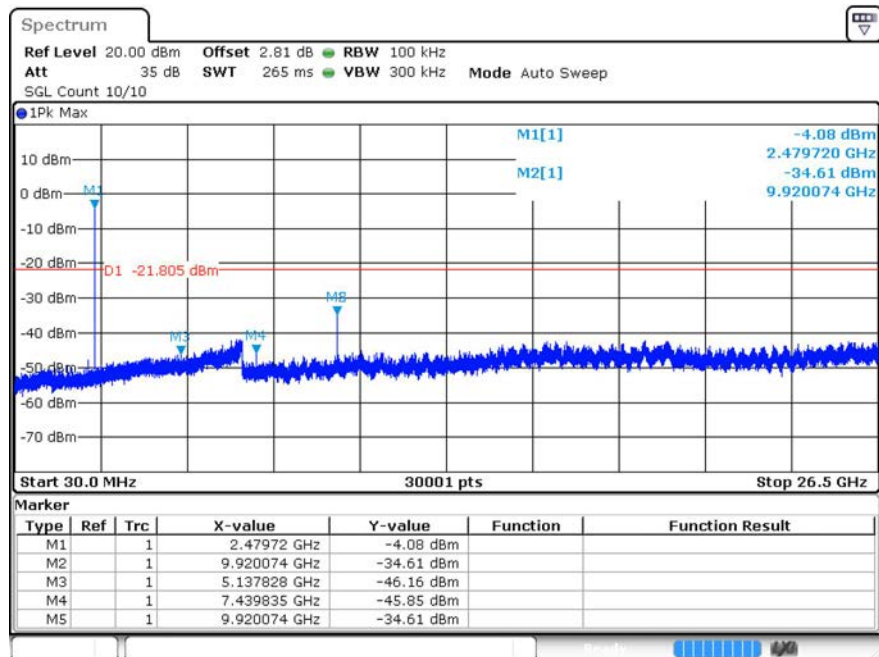


GFSK_HCH_Graphs

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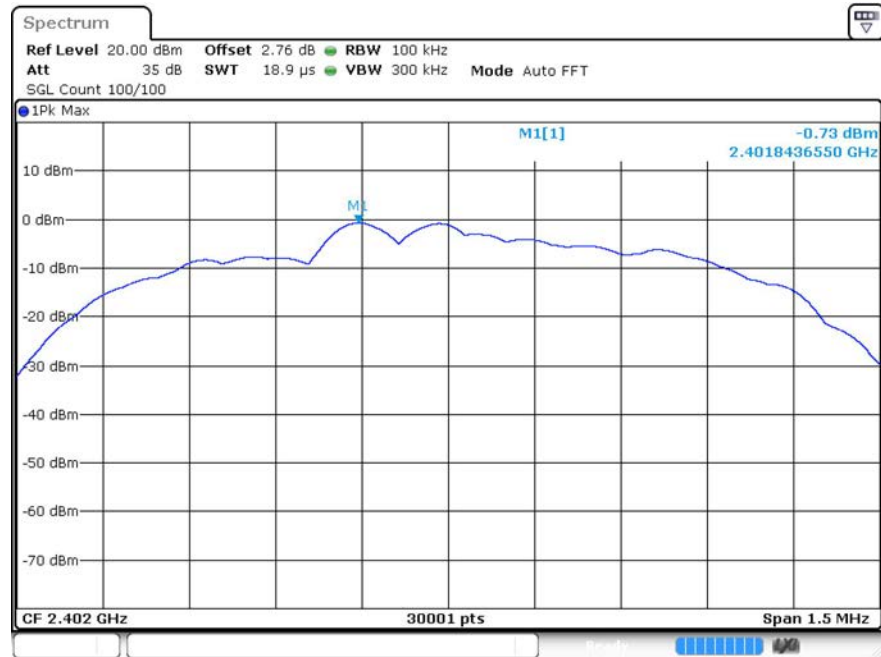


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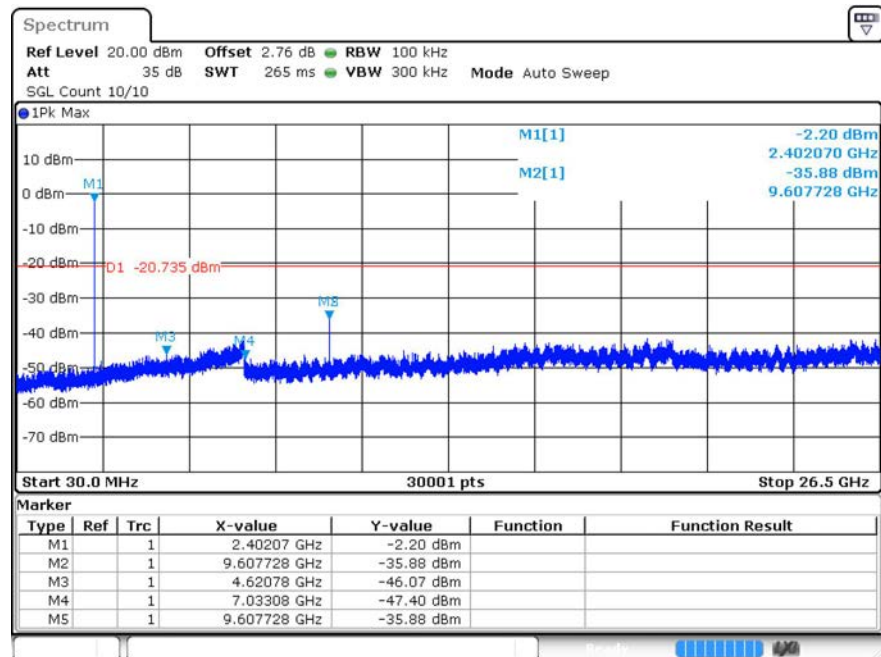


$\pi/4$ DQPSK_LCH_Graphs

Pref

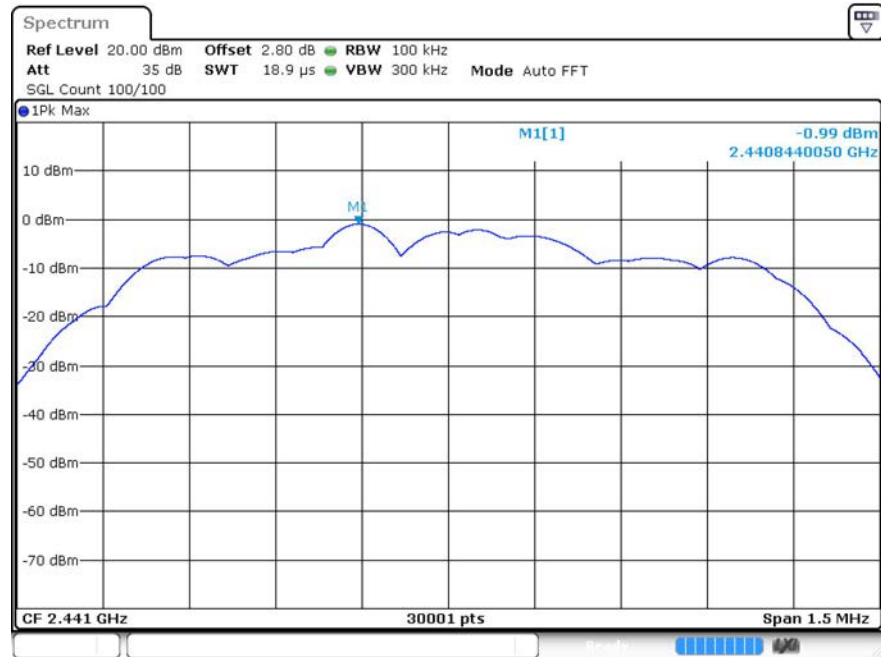


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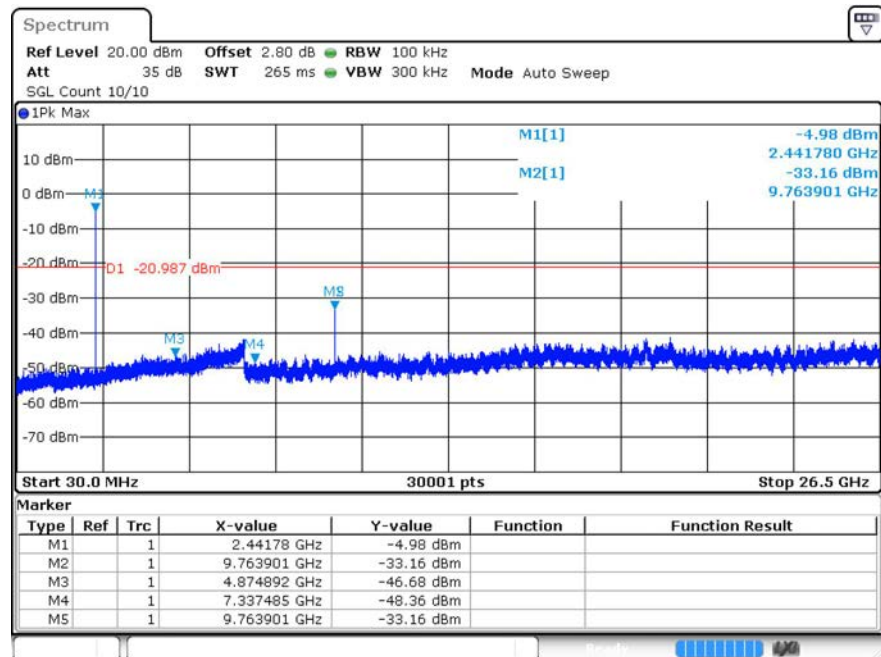


π /4DQPSK_MCH_Graphs

Pref

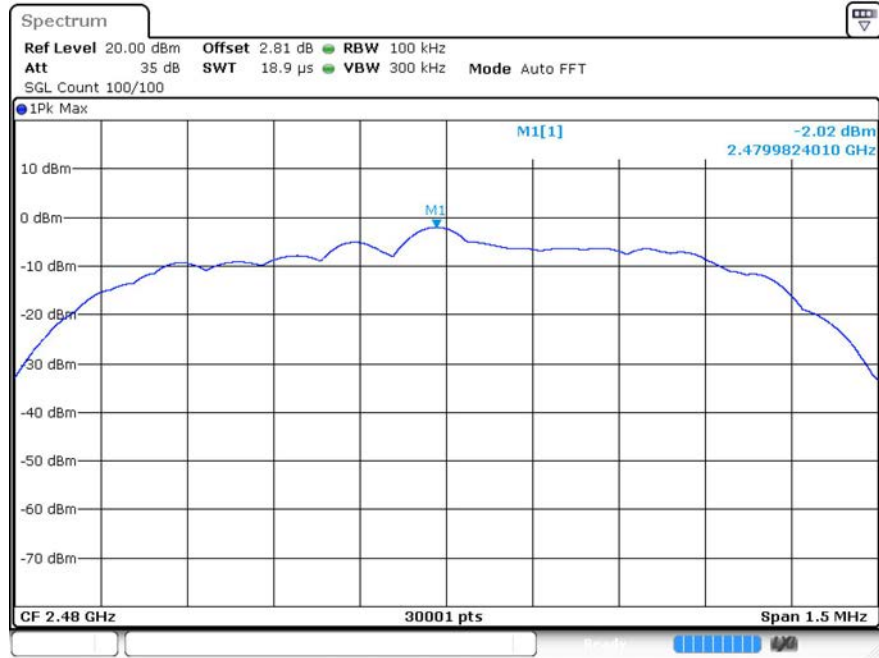


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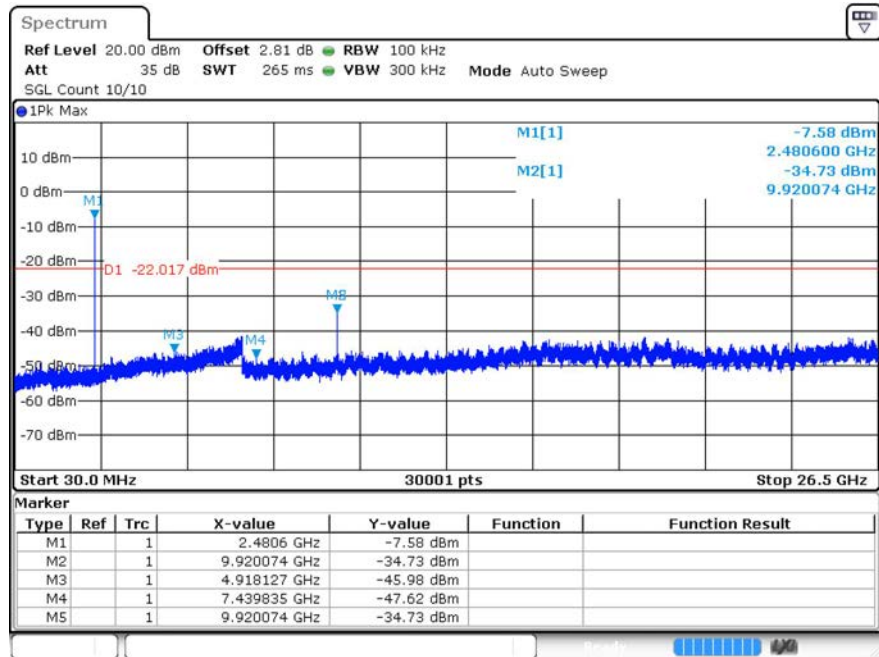


$\pi/4$ DQPSK_HCH_Graphs

Pref

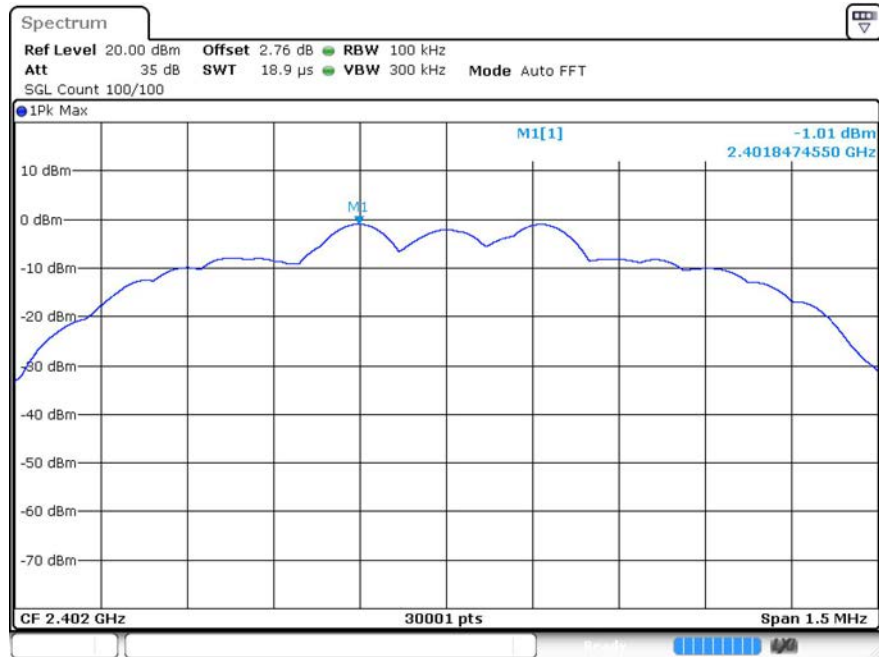


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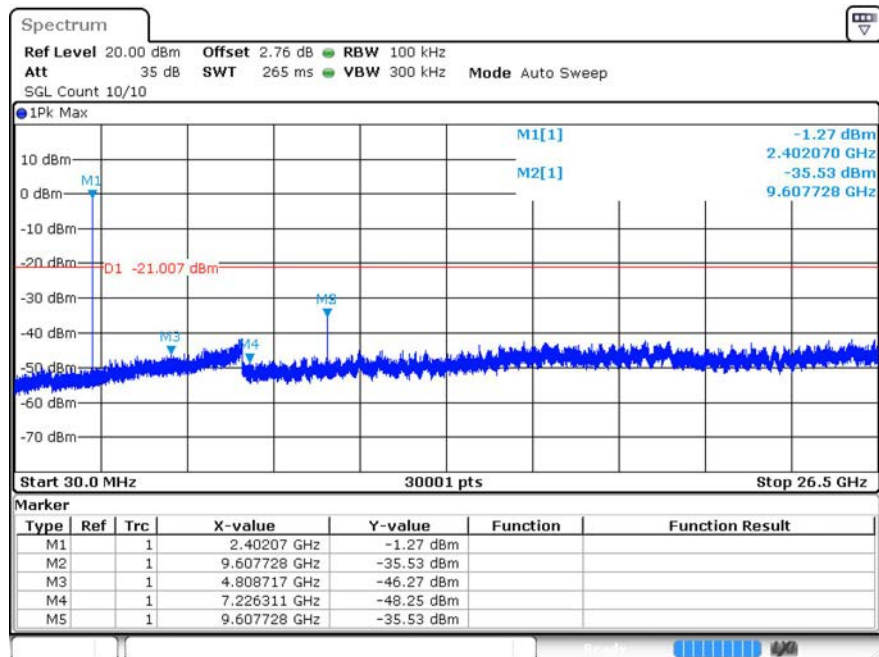


8DPSK_LCH_Graphs

Pref

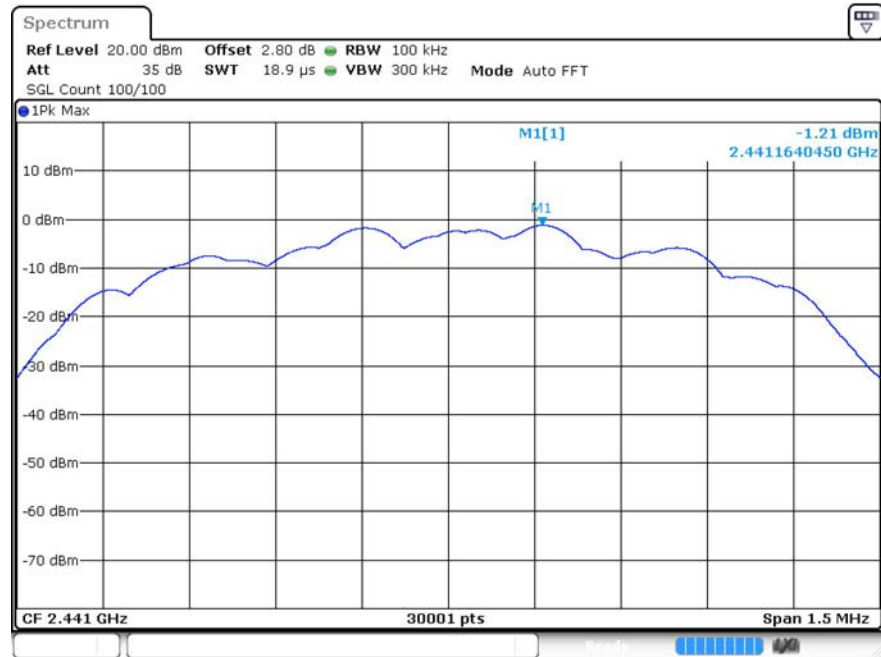


Puw

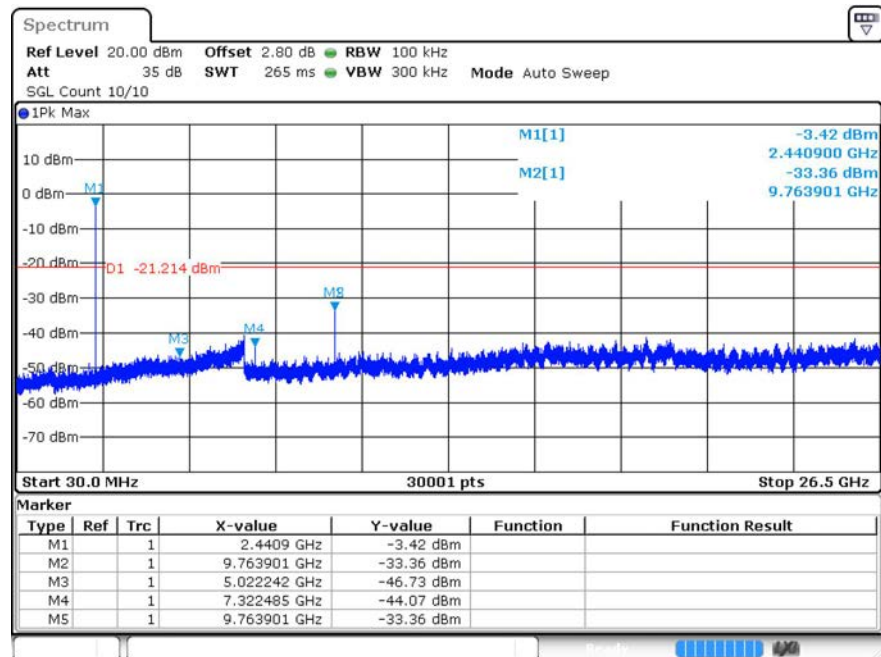


8DPSK_MCH_Graphs

Pref

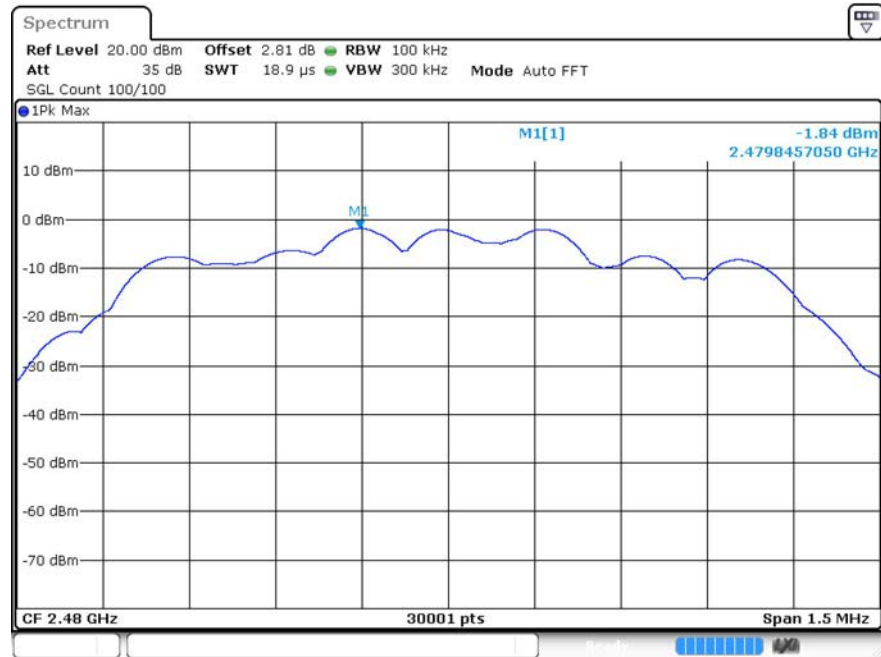


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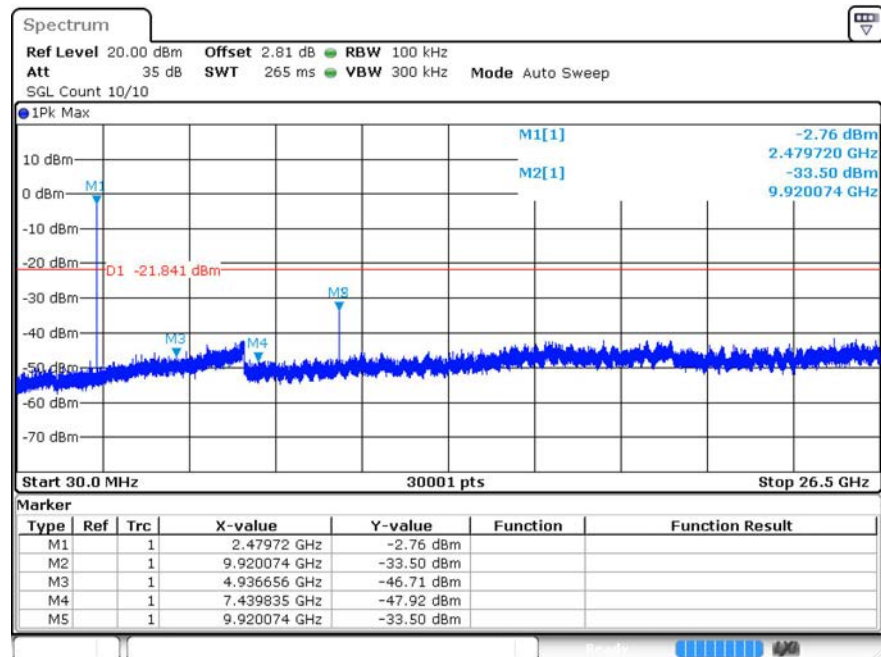


8DPSK_HCH_Graphs

Pref



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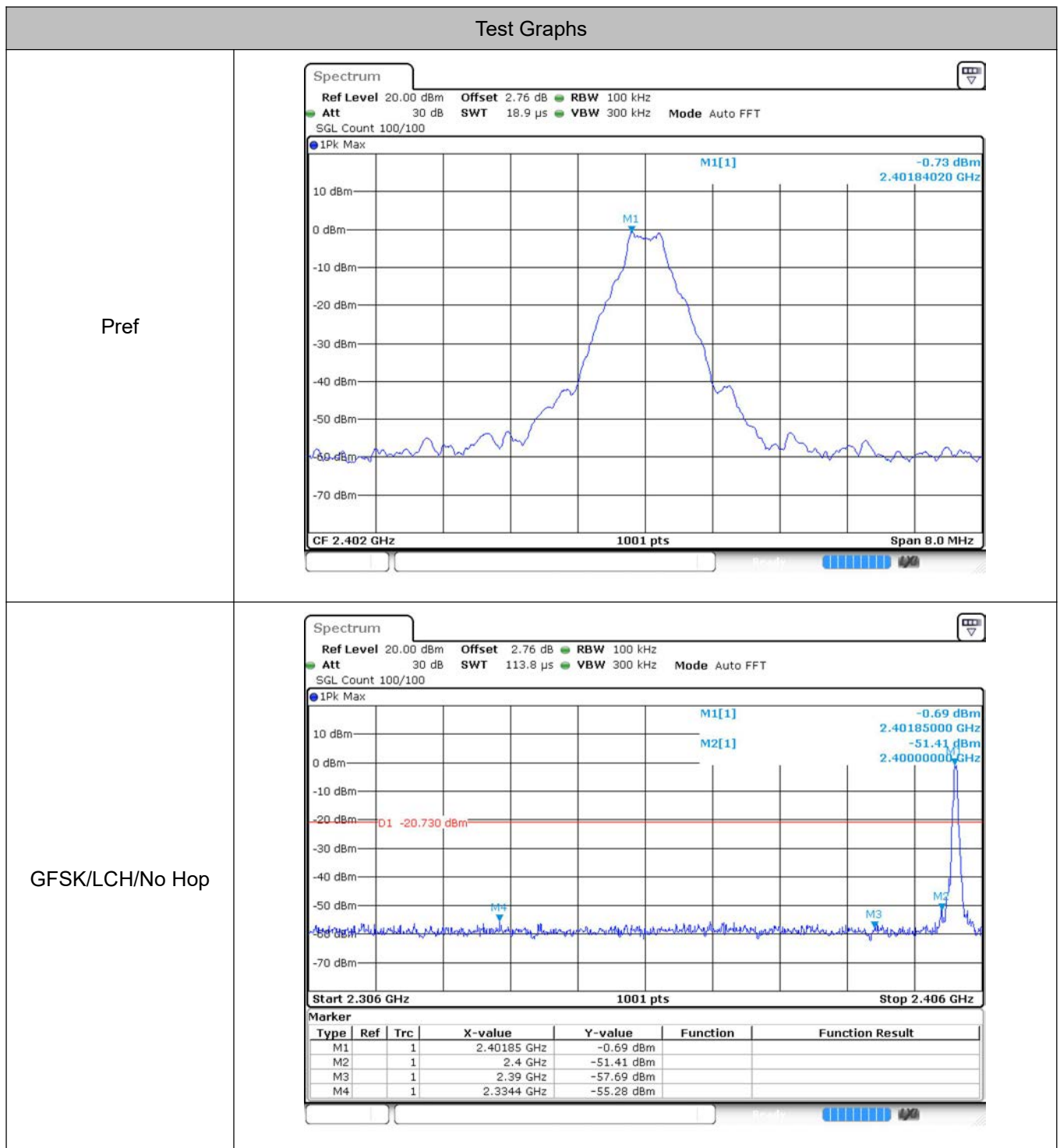


8 Band-edge for RF Conducted Emissions

8.1 Test Result

Mode	Channel	Carrier Frequency [MHz]	Frequency Hopping	Max Spurious Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	2402	Off	-54.54	-20	Pass
			On	-52.62	-20	Pass
	HCH	2480	Off	-53.81	-20	Pass
			On	-53.02	-20	Pass
$\pi/4$ DQPSK	LCH	2402	Off	-55.1	-20	Pass
			On	-53.83	-20	Pass
	HCH	2480	Off	-53.6	-20	Pass
			On	-53.37	-20	Pass
8DPSK	LCH	2402	Off	-54.8	-20	Pass
			On	-53.83	-20	Pass
	HCH	2480	Off	-54.46	-20	Pass
			On	-53.43	-20	Pass

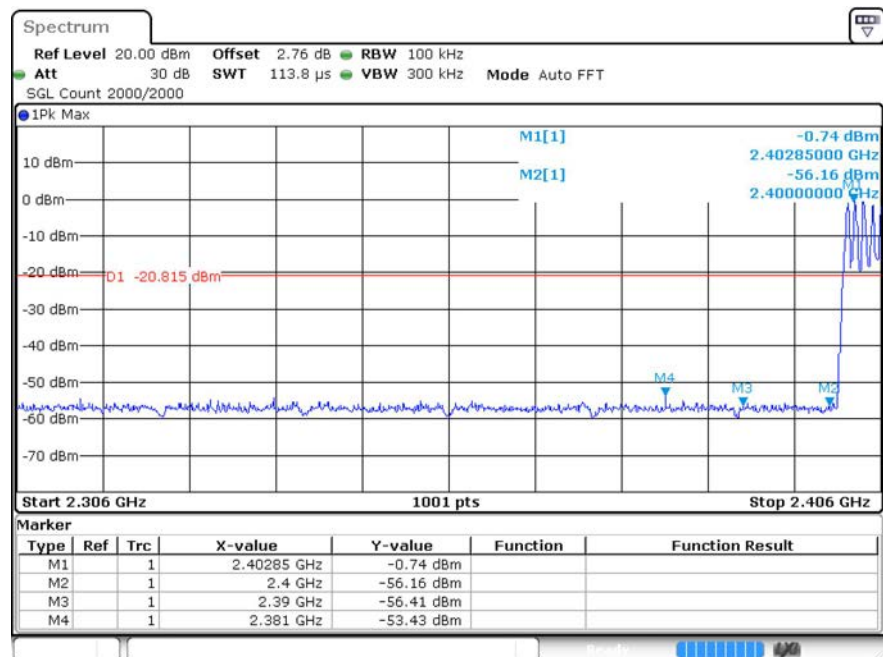
8.2 Test Graphs



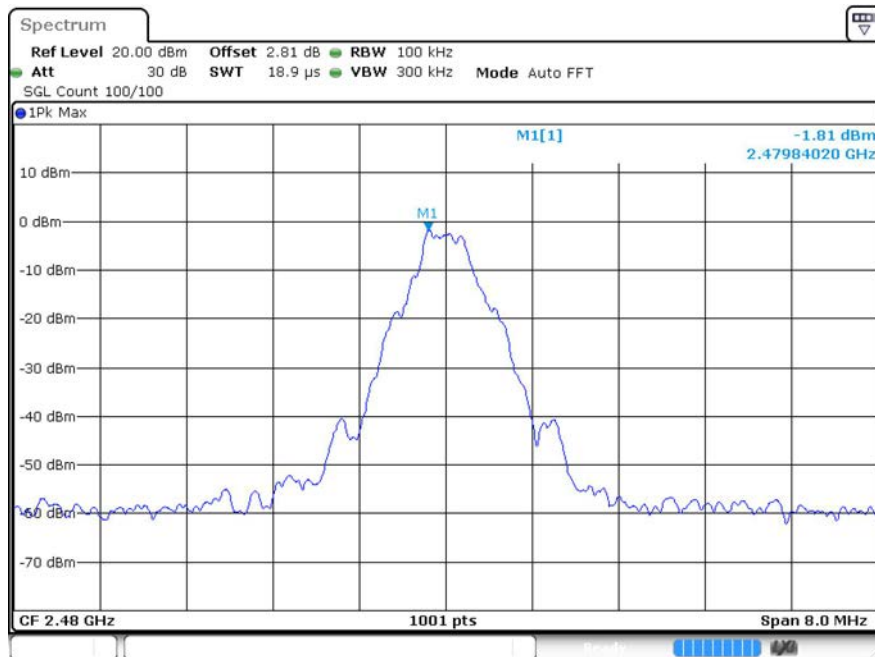
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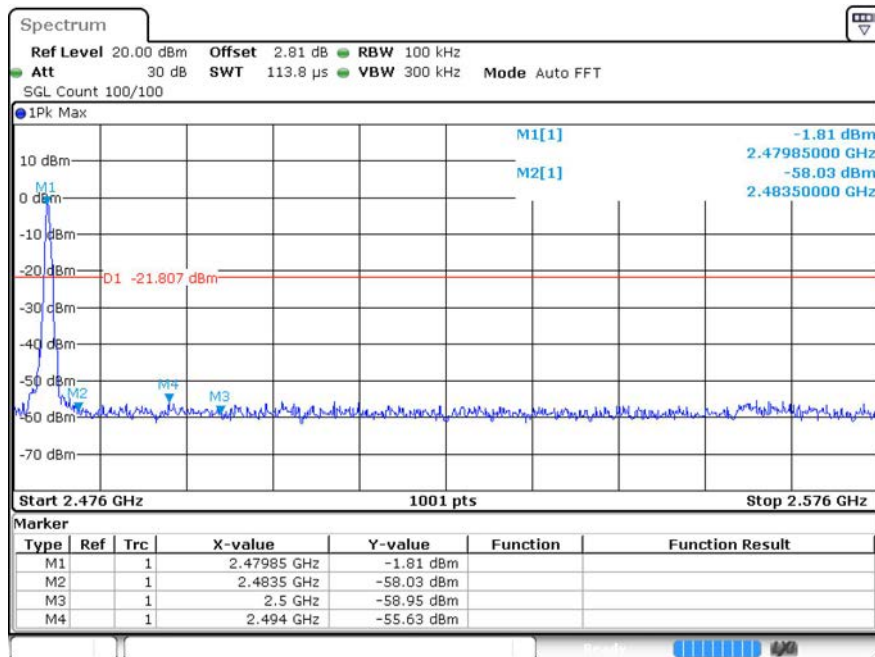
GFSK/LCH/Hop



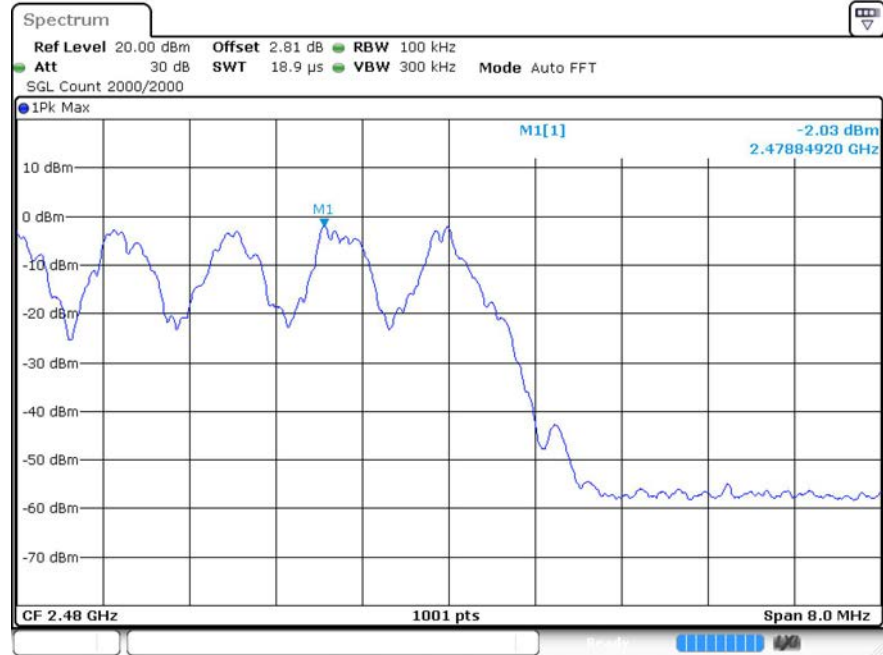
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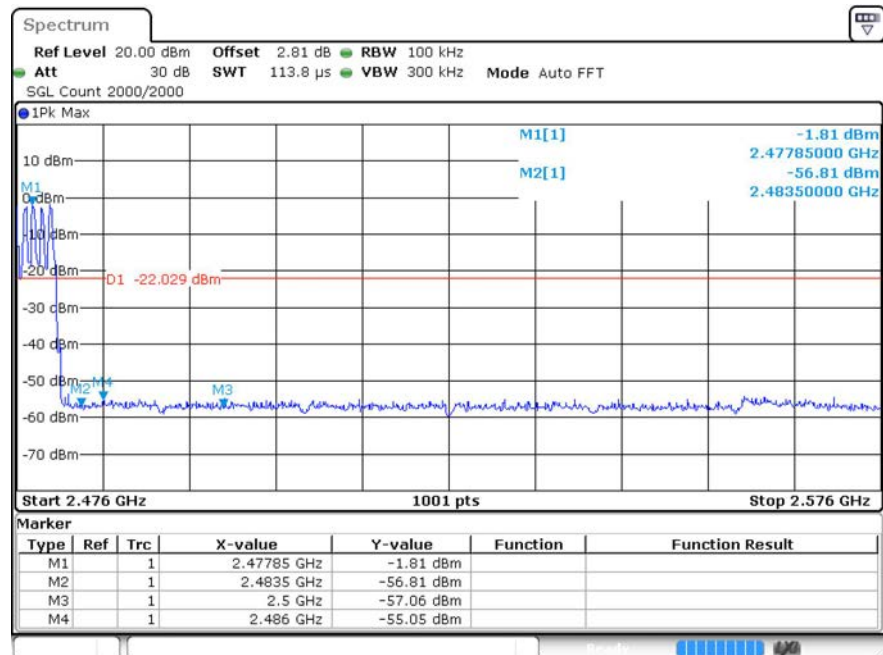
GFSK/HCH/No Hop



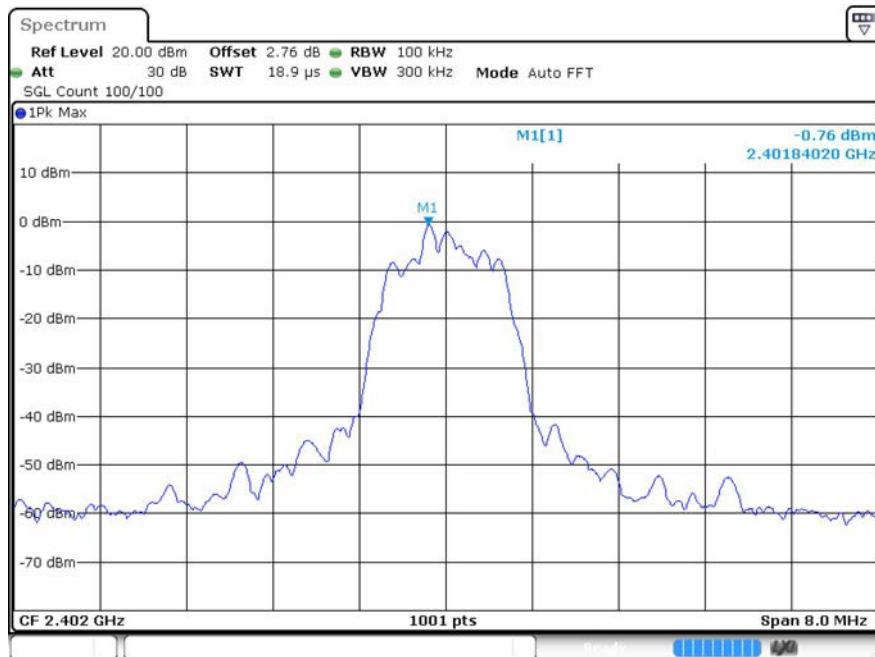
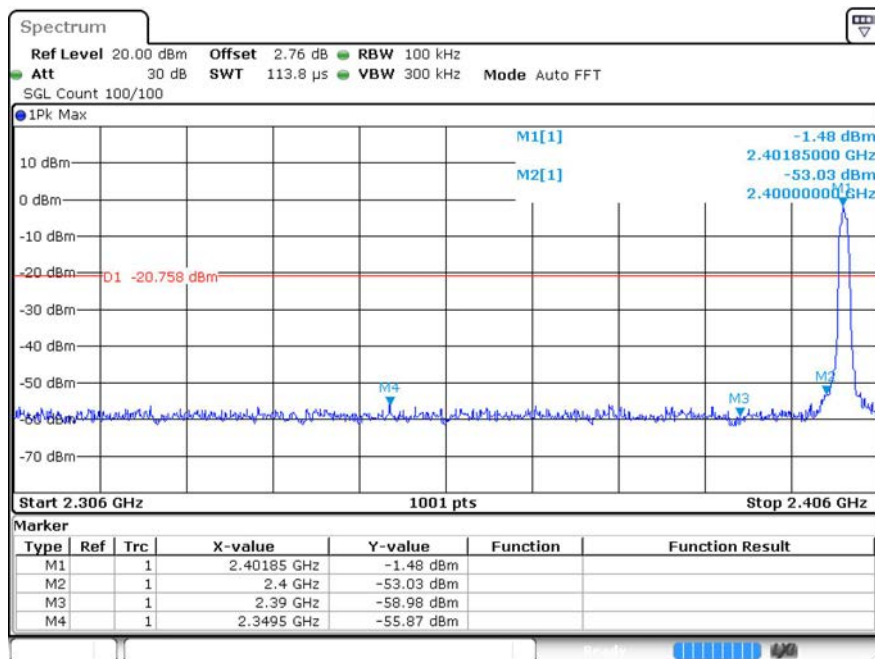
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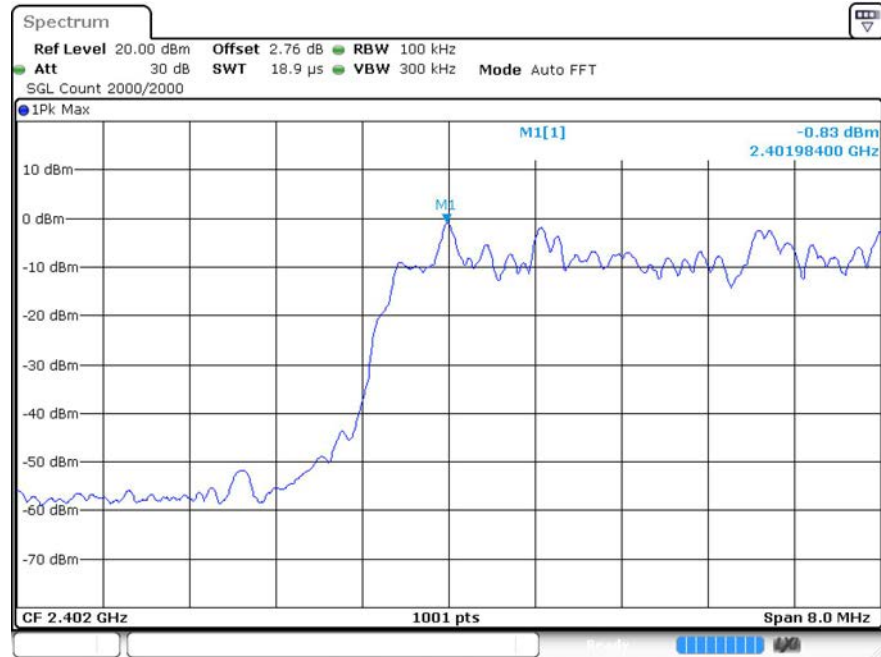
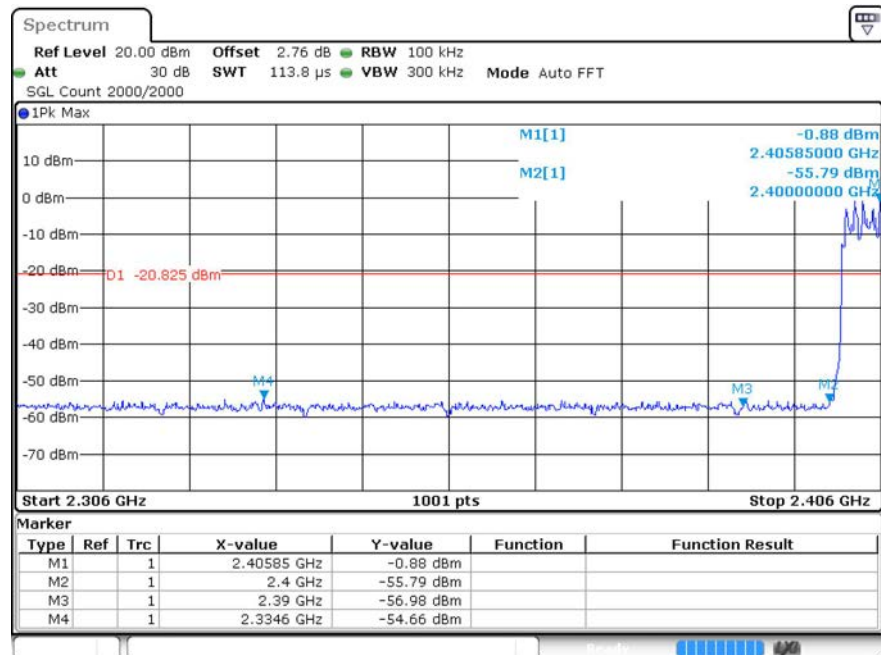
GFSK/HCH/Hop



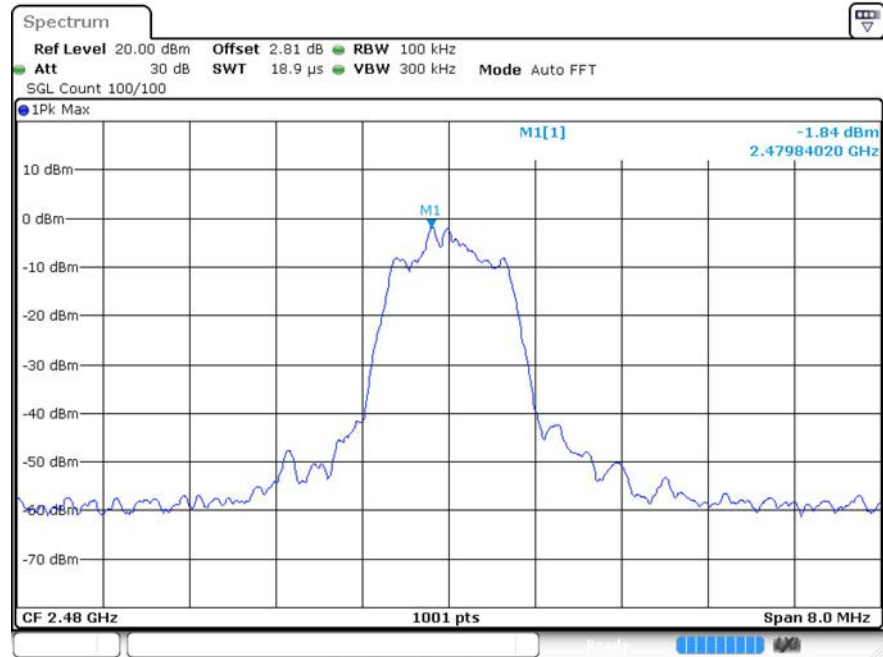
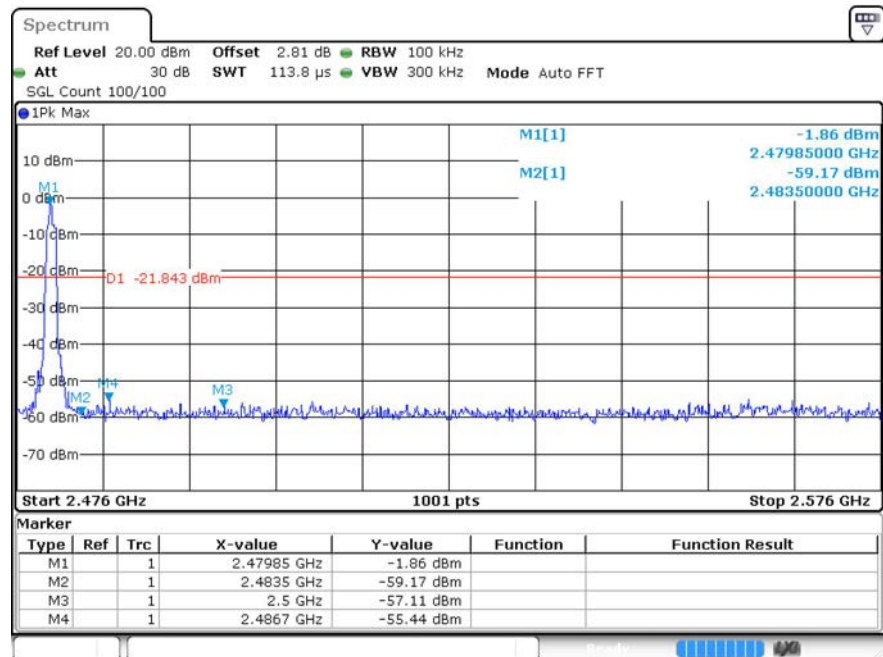
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 $\pi/4$ DQPSK/LCH/No Hop


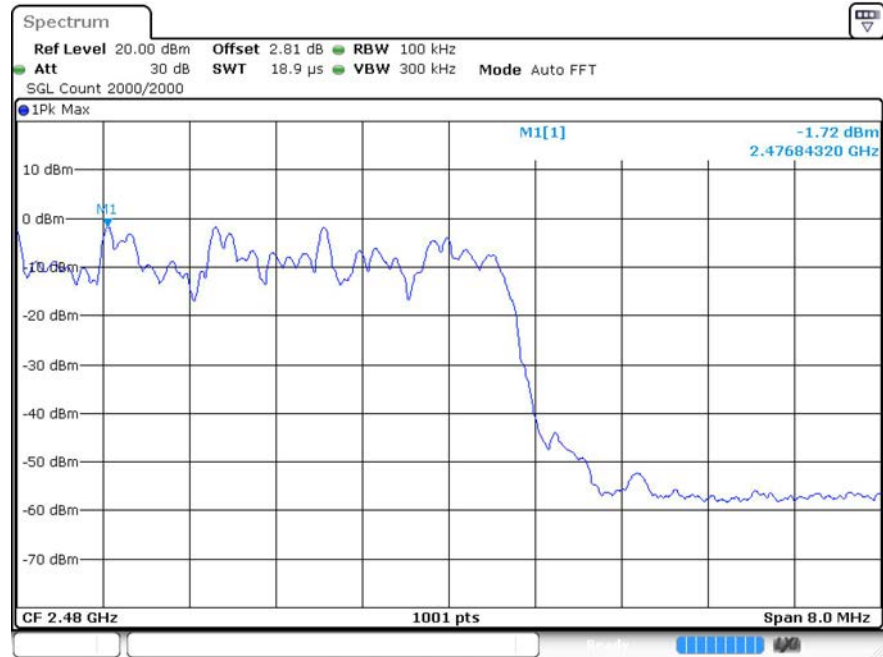
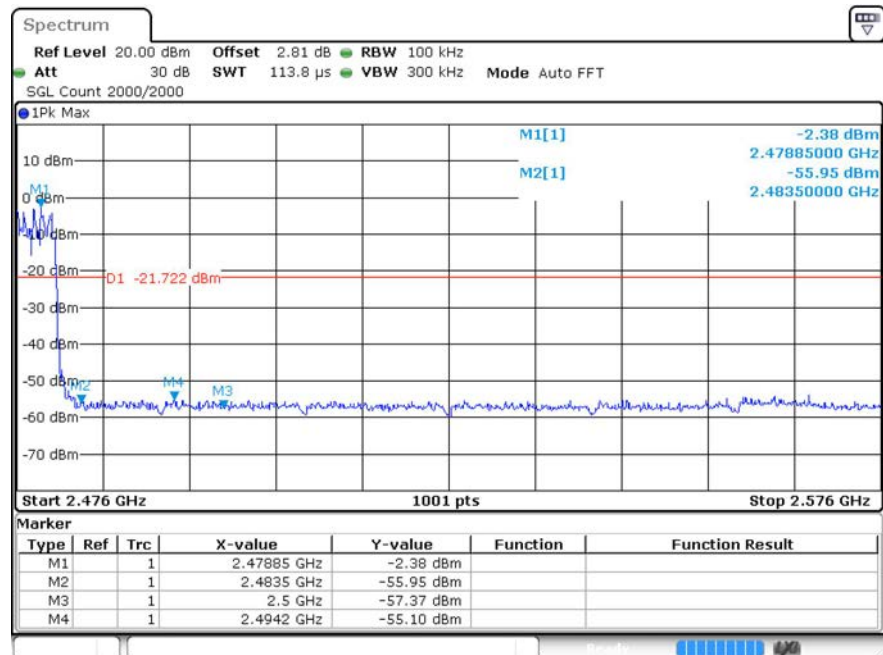
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 $\pi/4$ DQPSK/LCH/Hop


Ref


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


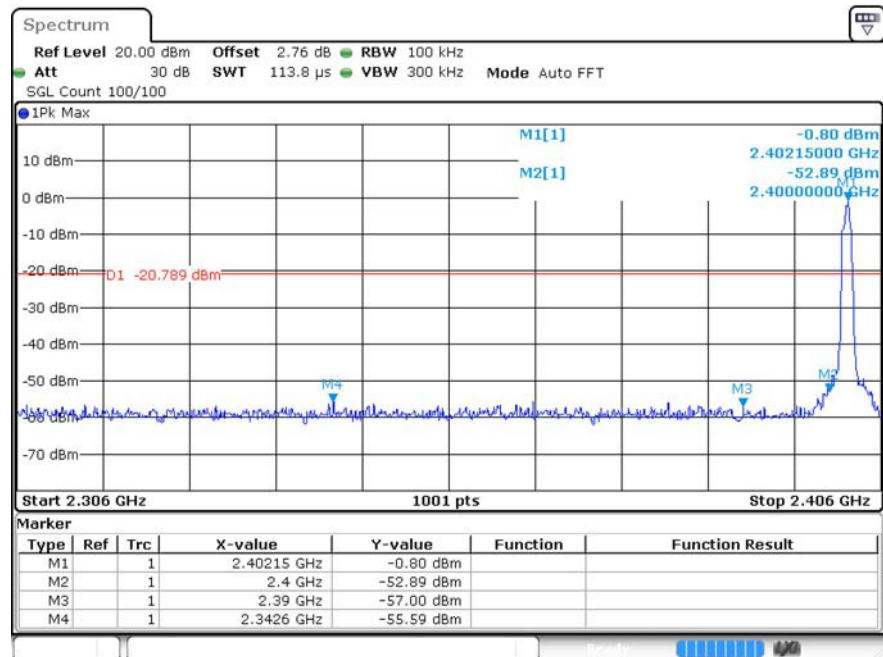
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 $\pi/4$ DQPSK/HCH/Hop


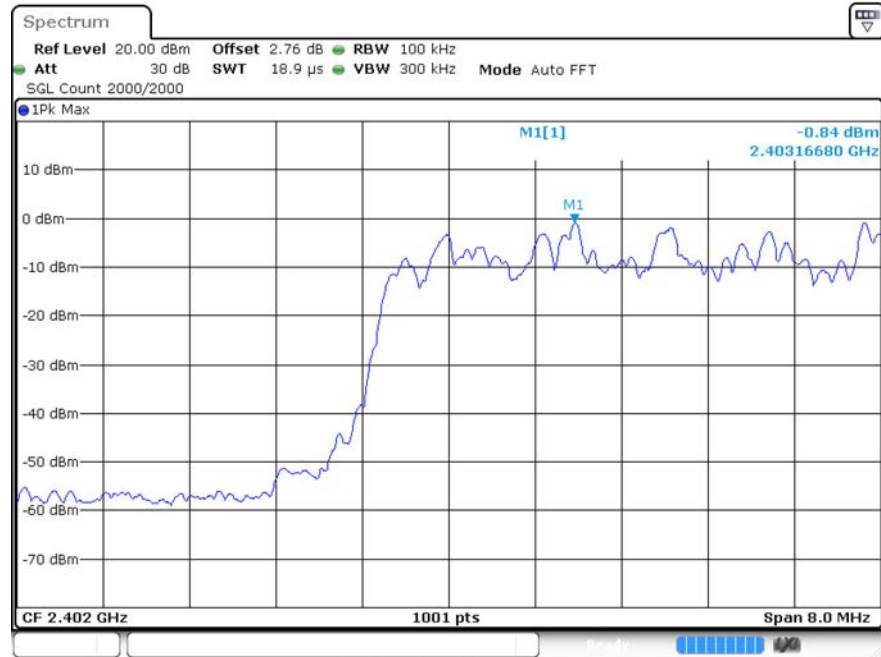
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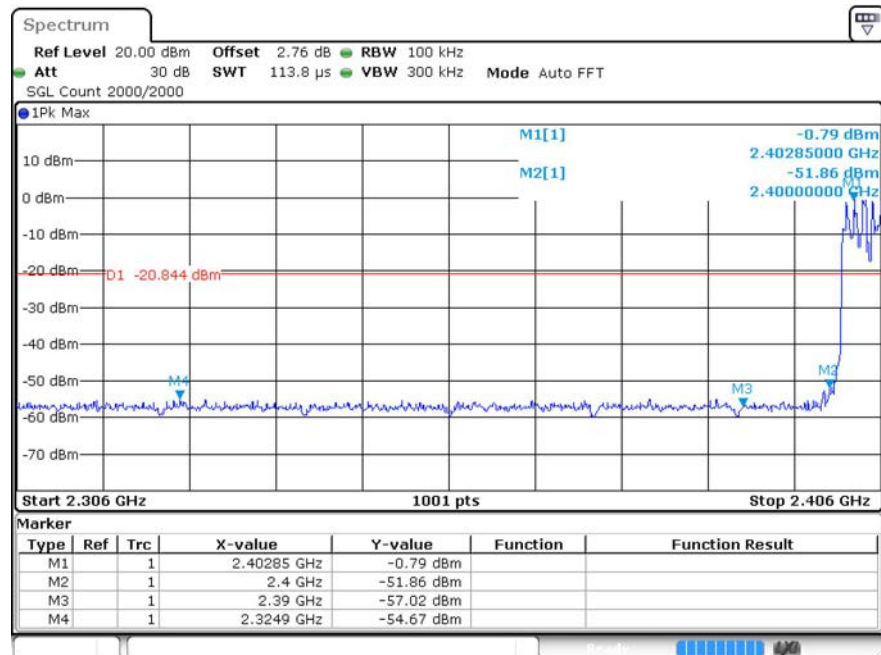
8DPSK/LCH/No Hop



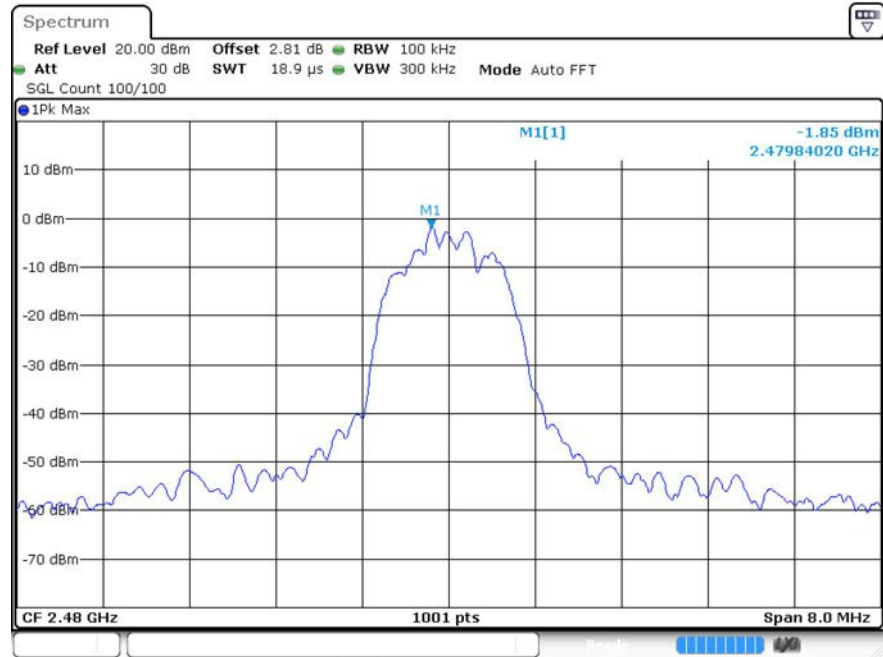
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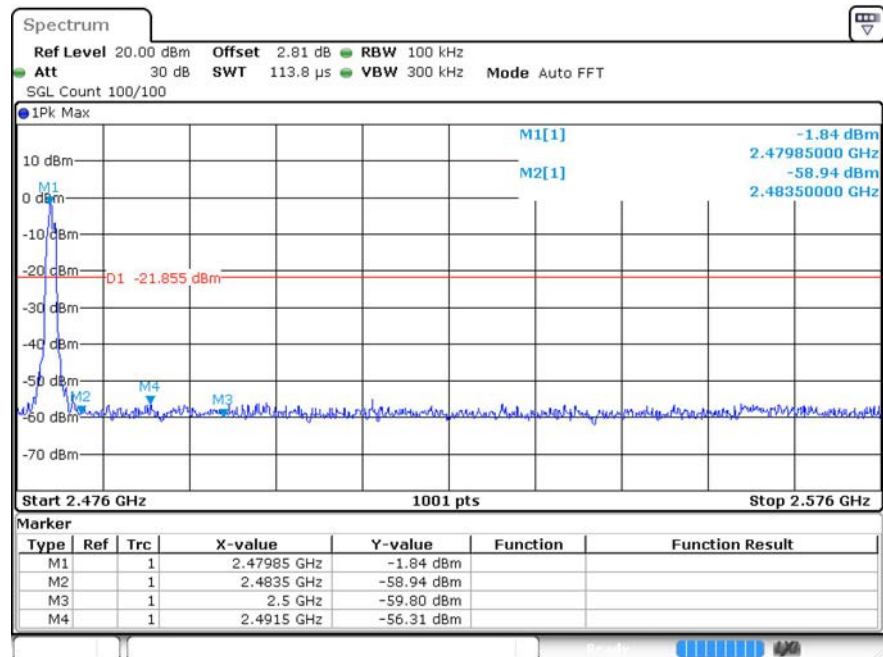
8DPSK/LCH/Hop



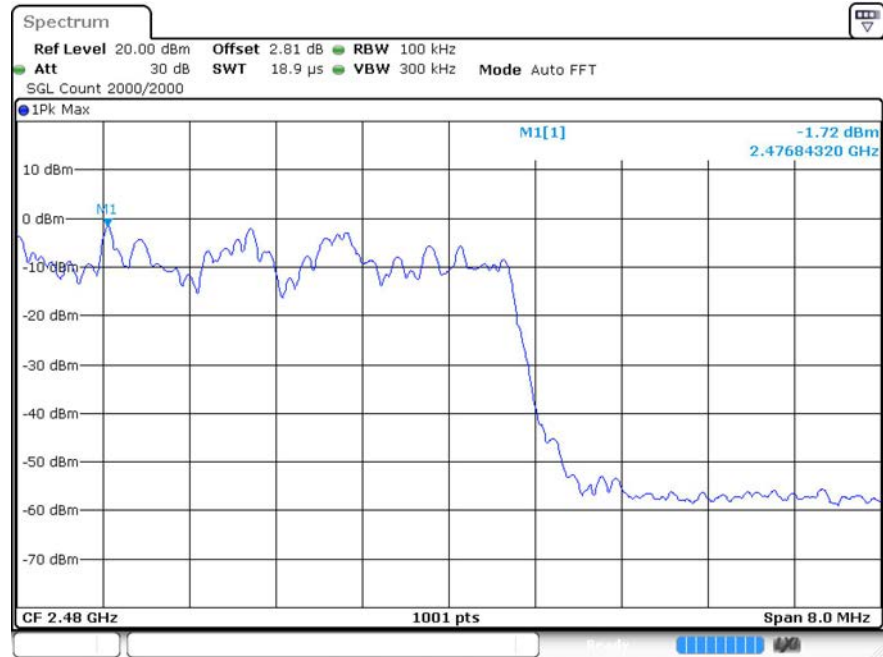
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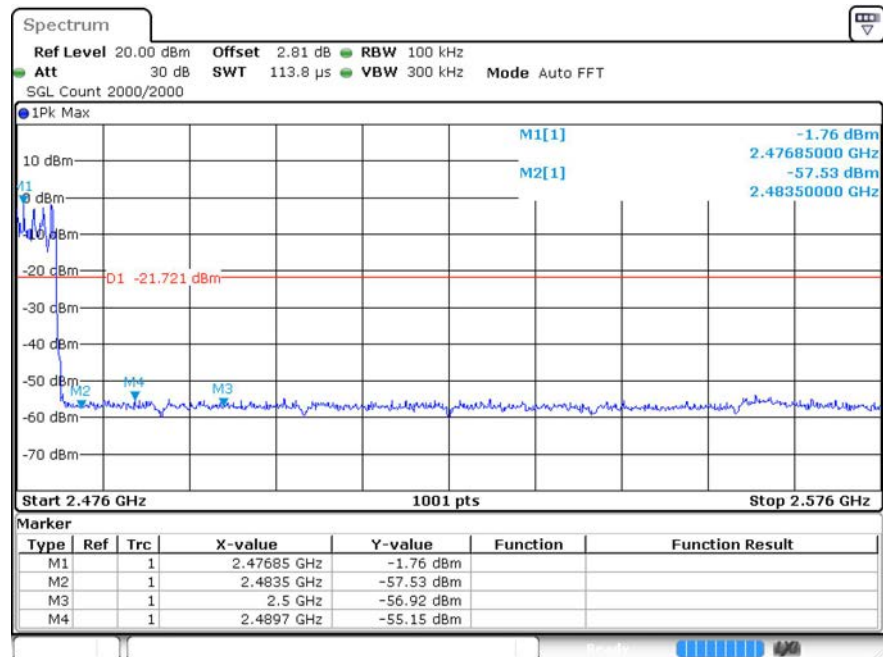
8DPSK/HCH/No Hop



Ref



8DPSK/HCH/Hop



9 Restrict-band band-edge measurements

9.1 Test Result

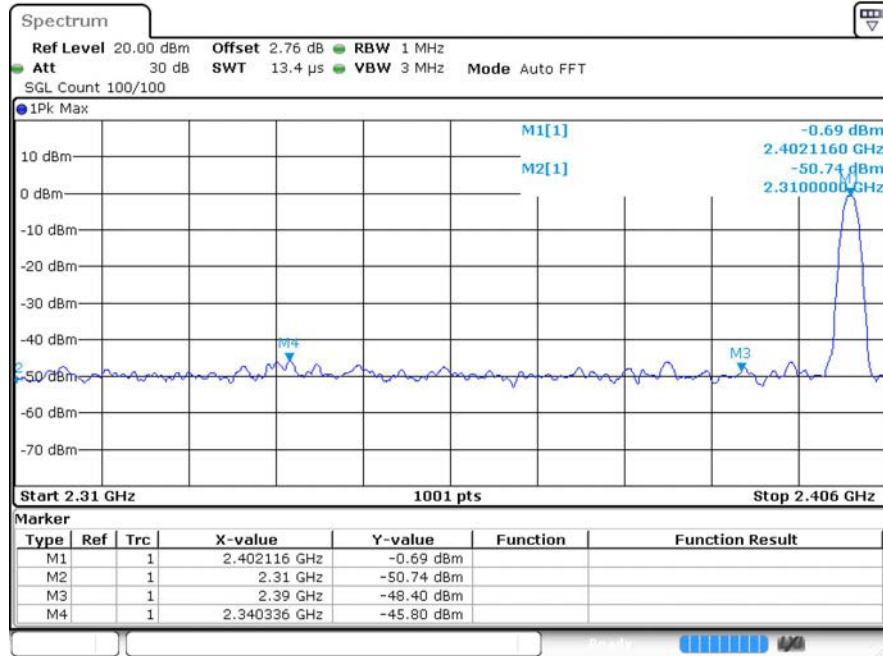
Test Mode	Hopping	Freq.	Power [dBm]	Gain	Duty Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-50.74	3.54	-	48.06	PEAK	74	Pass
	Off	2310.0	-56.18	3.54	5.06	47.68	AV	54	Pass
	Off	2340.336	-45.8	3.54	-	53	PEAK	74	Pass
	Off	2338.992	-54.08	3.54	5.06	49.78	AV	54	Pass
	Off	2390.0	-48.4	3.54	-	50.4	PEAK	74	Pass
	Off	2390.0	-56.87	3.54	5.06	46.99	AV	54	Pass
	Off	2483.5	-50.91	3.54	-	47.89	PEAK	74	Pass
	Off	2483.5	-56.46	3.54	5.06	47.4	AV	54	Pass
	Off	2496.256	-47.06	3.54	-	51.74	PEAK	74	Pass
	Off	2498.272	-55.73	3.54	5.06	48.13	AV	54	Pass
	Off	2500.0	-49.18	3.54	-	49.62	PEAK	74	Pass
	Off	2500.0	-56.01	3.54	5.06	47.85	AV	54	Pass
$\pi/4$ DQPSK	Off	2310.0	-50.59	3.54	-	48.21	PEAK	74	Pass
	Off	2310.0	-56.7	3.54	4.95	47.05	AV	54	Pass
	Off	2381.04	-45.51	3.54	-	53.29	PEAK	74	Pass
	Off	2338.608	-54.51	3.54	4.95	49.24	AV	54	Pass
	Off	2390.0	-49.87	3.54	-	48.93	PEAK	74	Pass
	Off	2390.0	-56.4	3.54	4.95	47.35	AV	54	Pass
	Off	2483.5	-49.21	3.54	-	49.59	PEAK	74	Pass
	Off	2483.5	-56.91	3.54	4.84	46.73	AV	54	Pass
	Off	2499.568	-47.2	3.54	-	51.6	PEAK	74	Pass
	Off	2490.976	-55.61	3.54	4.84	48.03	AV	54	Pass
	Off	2500.0	-48.24	3.54	-	50.56	PEAK	74	Pass
	Off	2500.0	-56.26	3.54	4.84	47.38	AV	54	Pass
8DPSK	Off	2310.0	-50.18	3.54	-	48.62	PEAK	74	Pass
	Off	2310.0	-56.68	3.54	4.84	46.96	AV	54	Pass
	Off	2343.984	-45.53	3.54	-	53.27	PEAK	74	Pass
	Off	2341.68	-54.29	3.54	4.84	49.35	AV	54	Pass



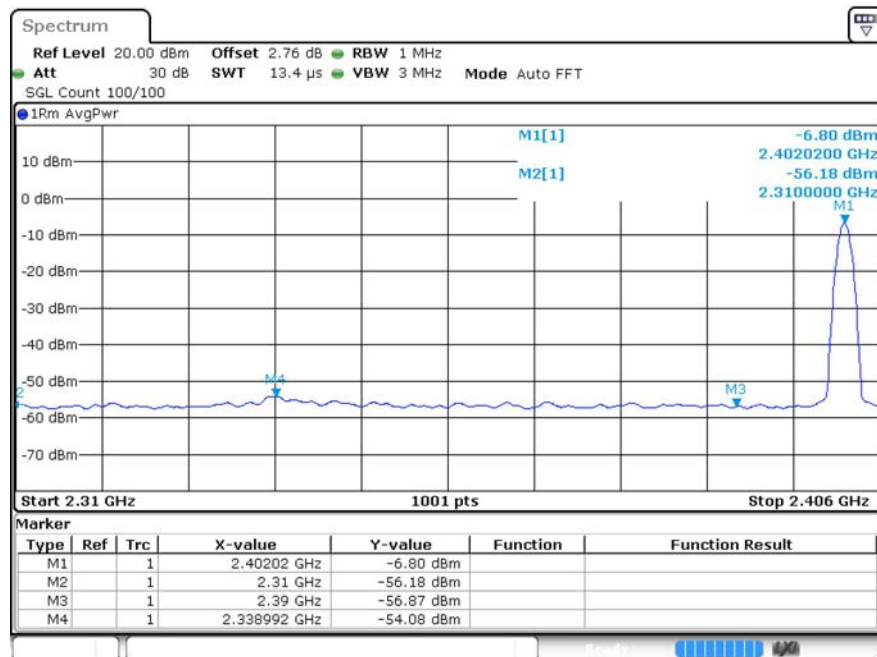
Off	2390.0	-50.25	3.54	-	48.55	PEAK	74	Pass
Off	2390.0	-57.43	3.54	4.84	46.21	AV	54	Pass
Off	2483.5	-46.37	3.54	-	52.43	PEAK	74	Pass
Off	2483.5	-57.24	3.54	4.95	46.51	AV	54	Pass
Off	2483.512	-46.44	3.54	-	52.36	PEAK	74	Pass
Off	2499.112	-55.51	3.54	4.95	48.24	AV	54	Pass
Off	2500.0	-49.73	3.54	-	49.07	PEAK	74	Pass
Off	2500.0	-56.15	3.54	4.95	47.6	AV	54	Pass

9.2 Test Graphs

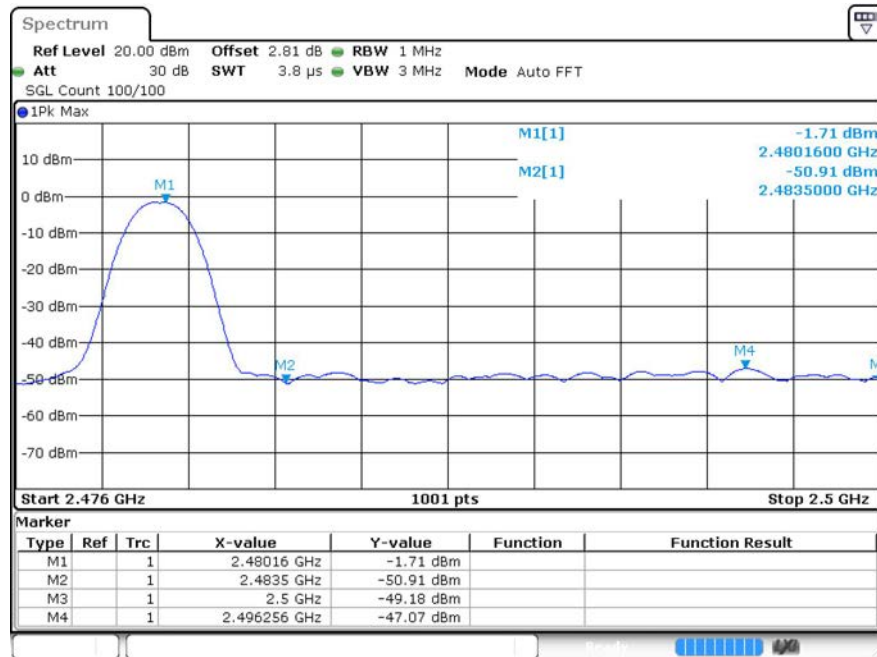
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



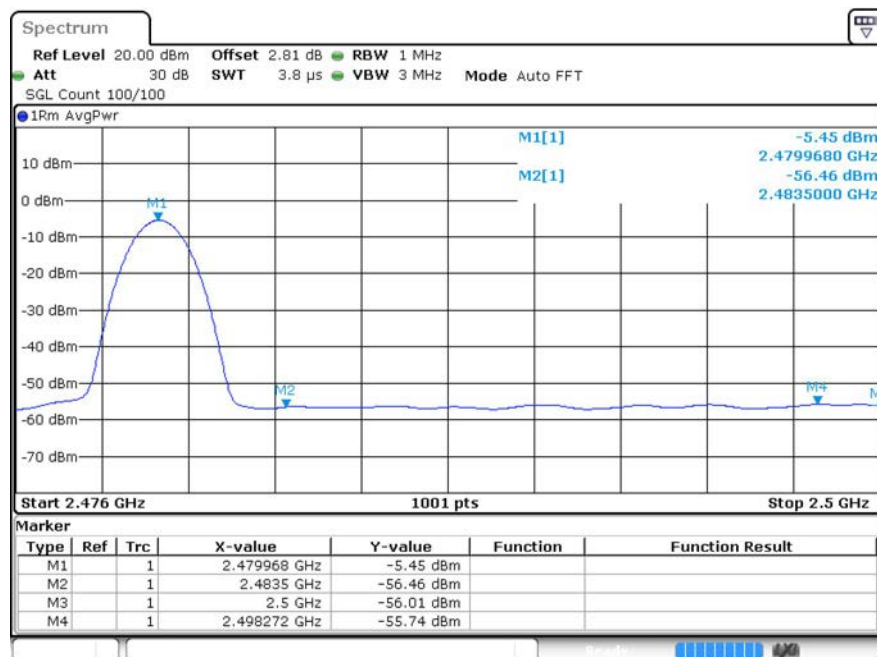
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



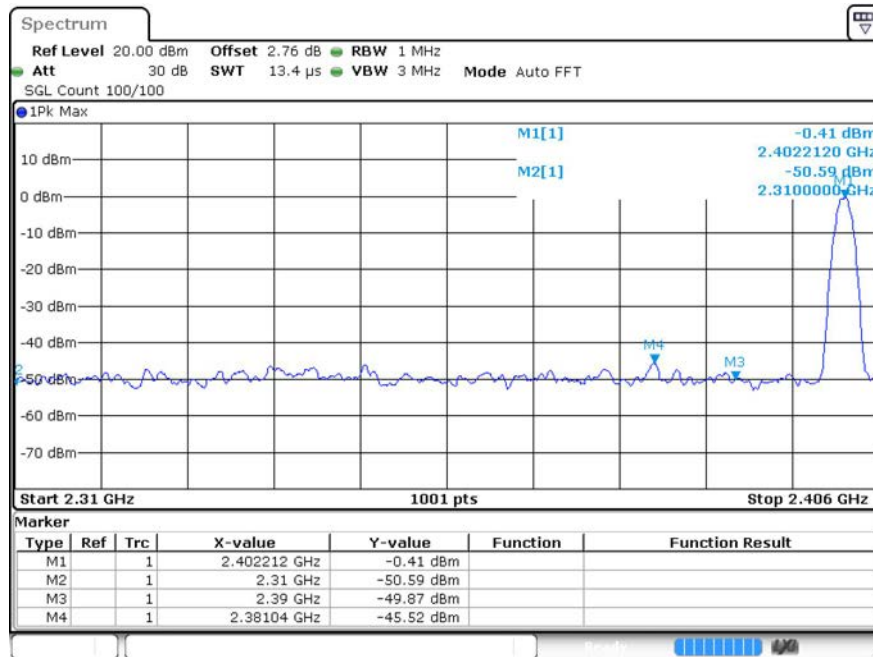
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



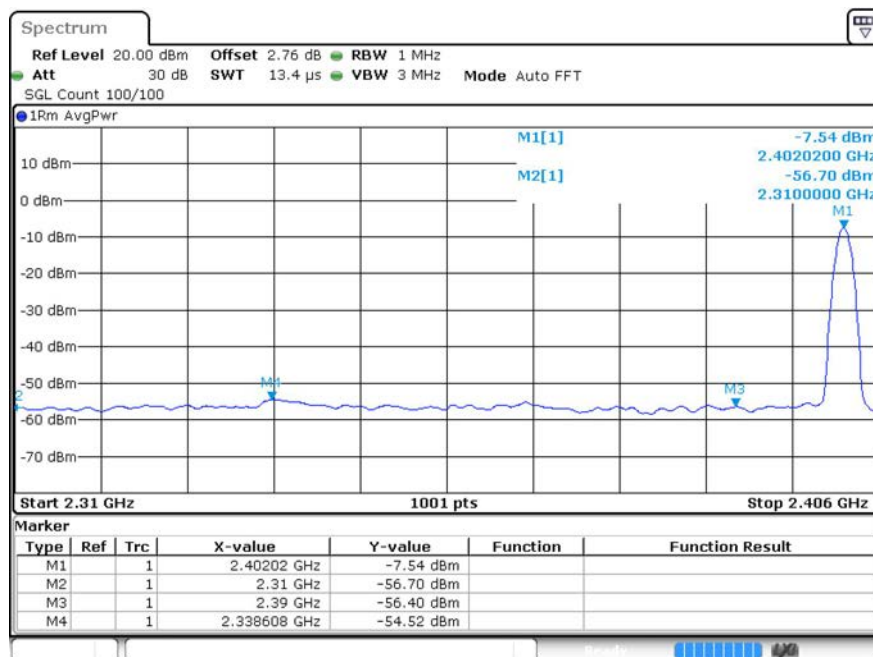
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



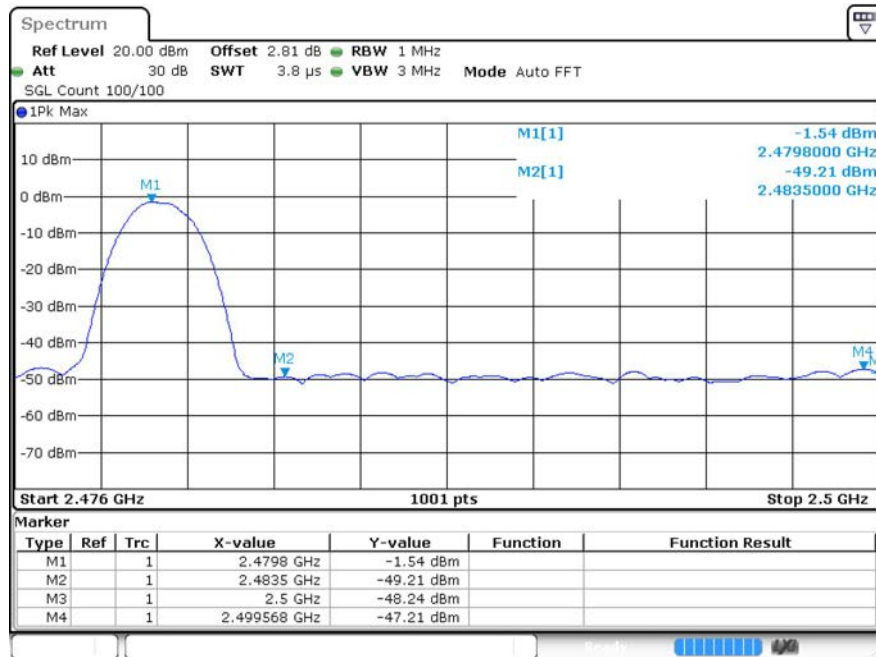
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



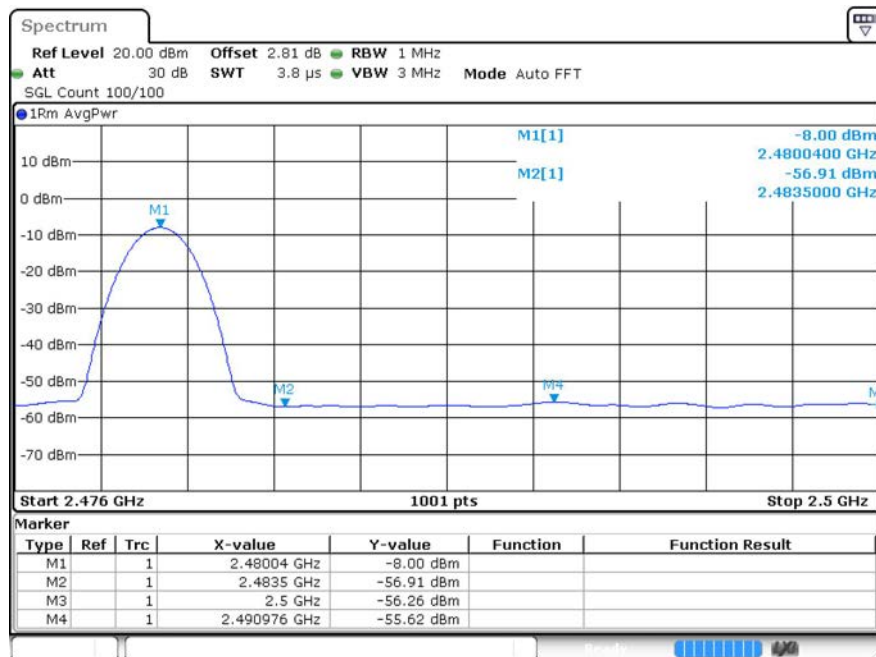
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



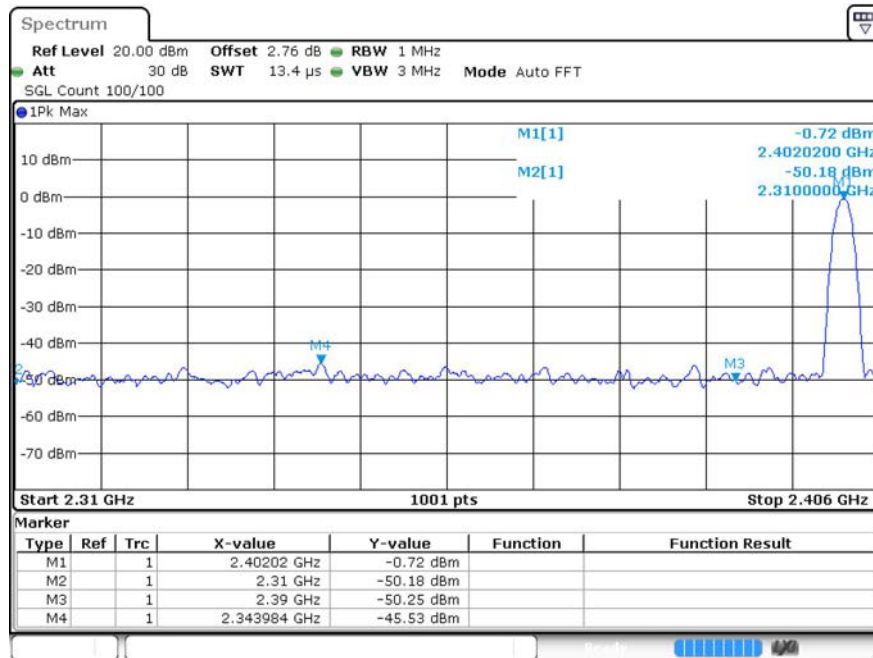
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



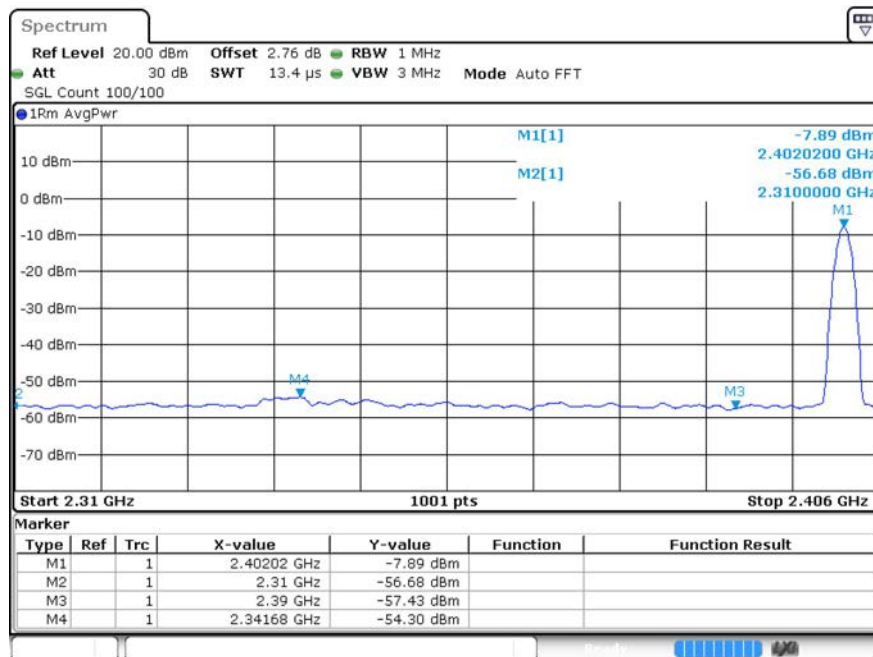
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



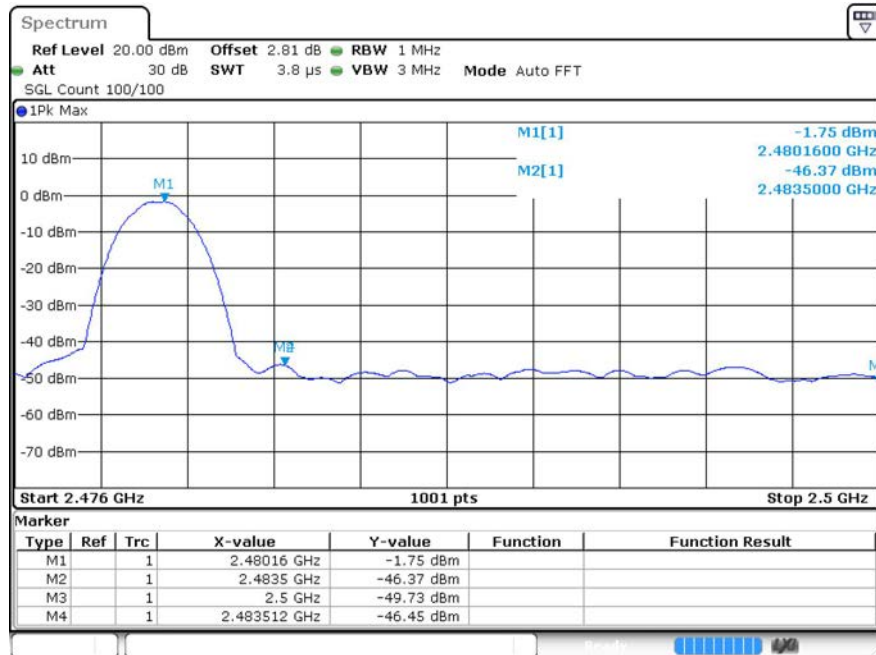
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



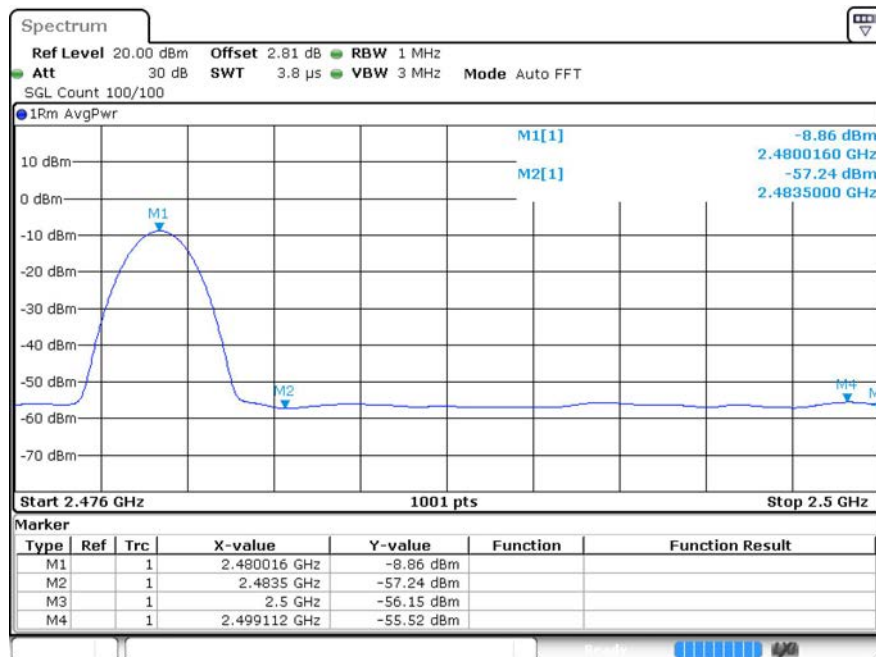
Restrict-band band-edge measurements_Hopping Off_8DPSK_Average (Low Channel)



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



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



---The End---