

Appendix A

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

Product Name: Sleep speaker

Trade Mark: N/A

Test Model: SM01

Environmental Conditions

Temperature:	24.3℃
Relative Humidity:	51.4%
ATM Pressure:	101Kpa
Test Engineer:	Emiya lin
Supervised by:	Simba Haung



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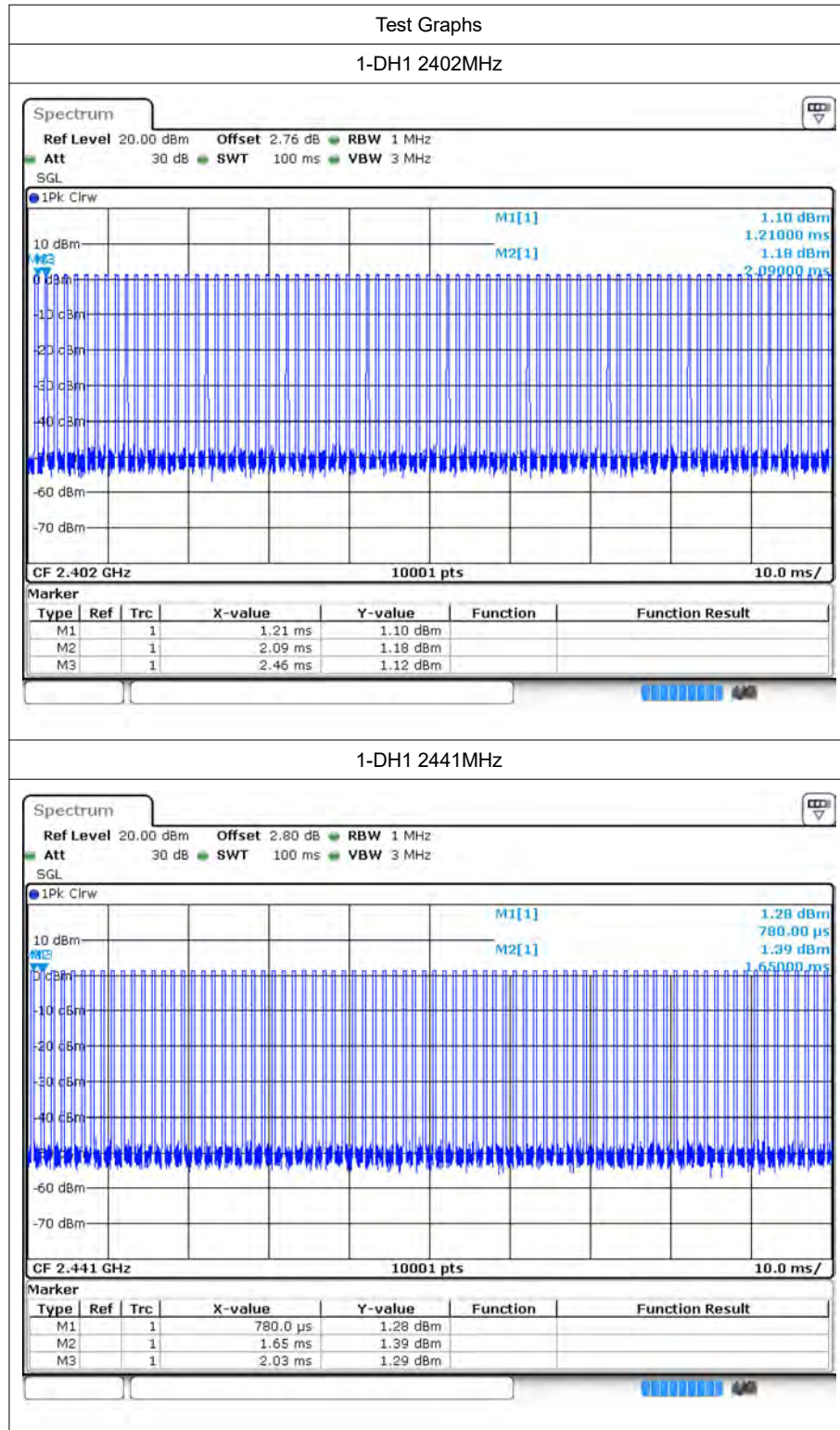
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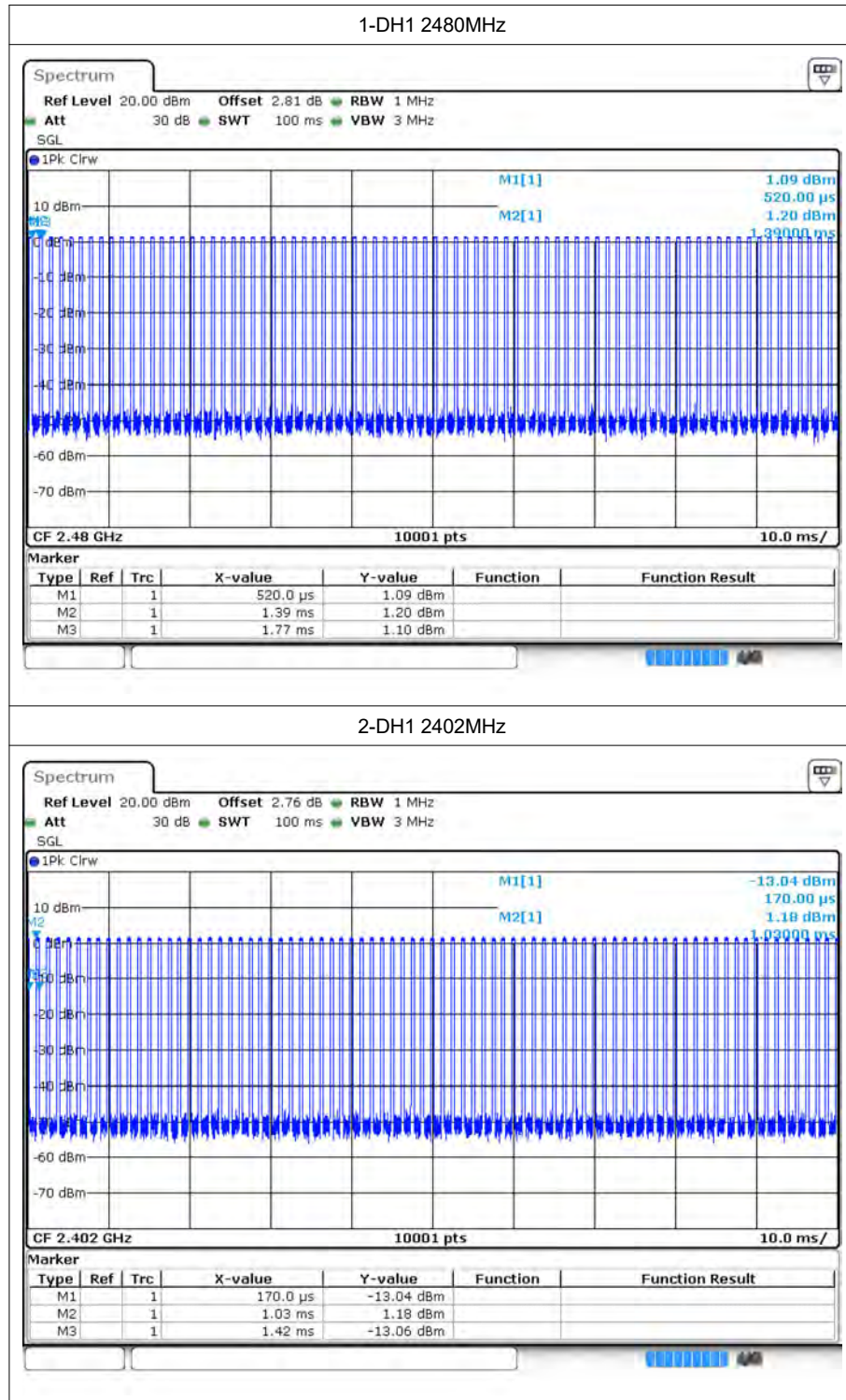
1 Duty Cycle

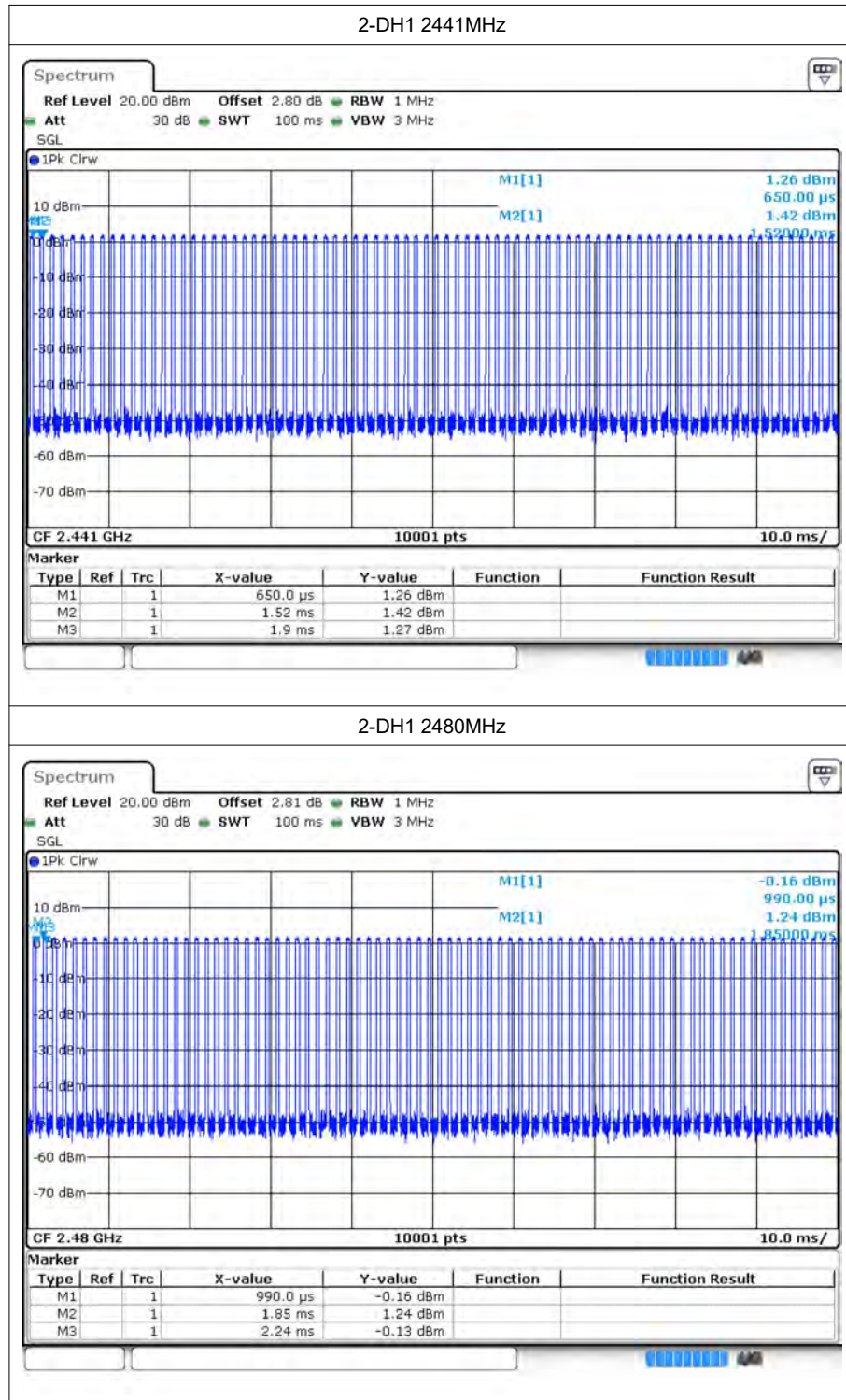
1.1 Test Result

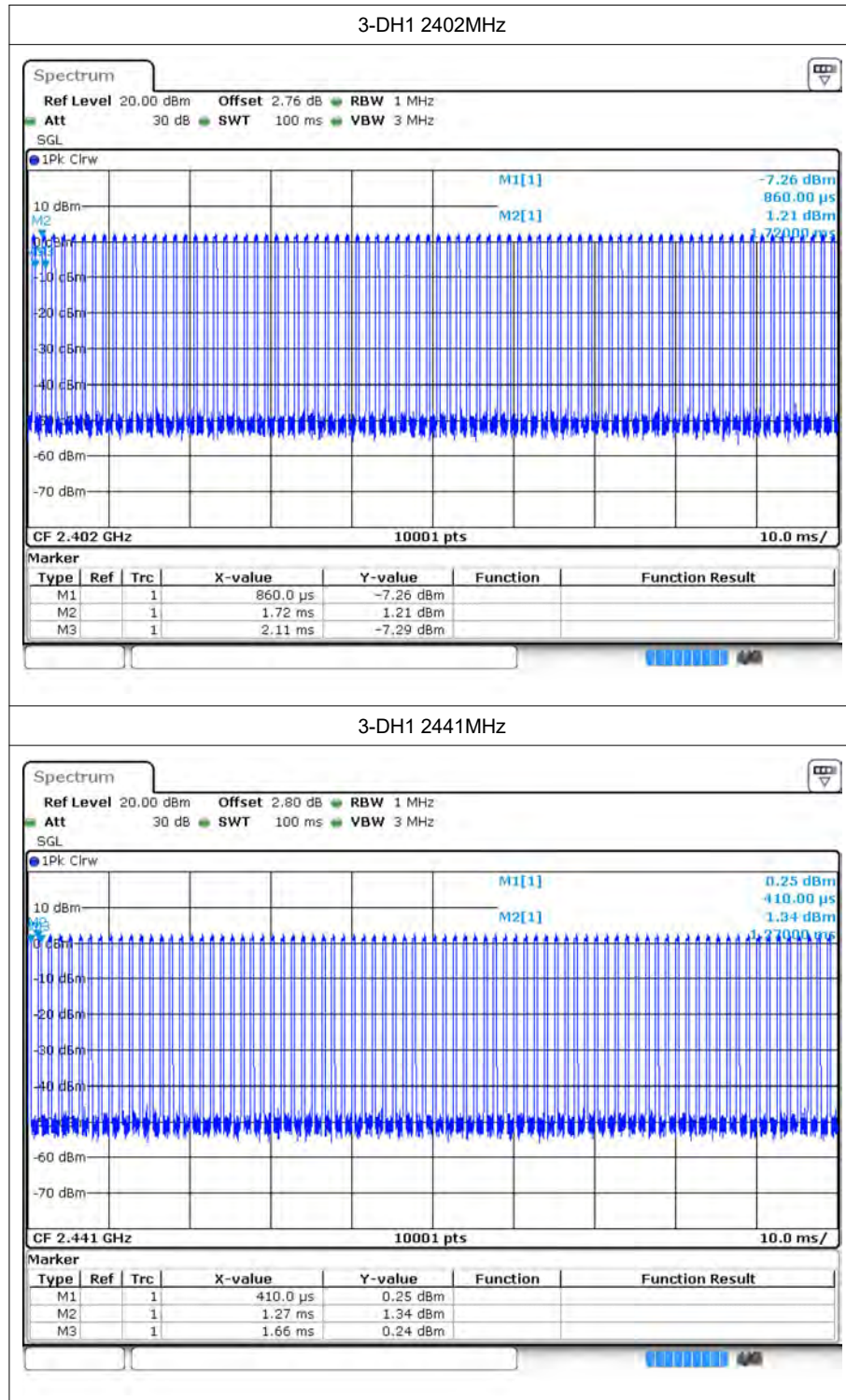
Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor	1/T (kHz)
1-DH1	2402	30.6	5.14	2.7
1-DH1	2441	31.2	5.06	2.63
1-DH1	2480	31.2	5.06	2.63
2-DH1	2402	32.01	4.95	2.56
2-DH1	2441	31.2	5.06	2.63
2-DH1	2480	32	4.95	2.56
3-DH1	2402	32	4.95	2.56
3-DH1	2441	32	4.95	2.56
3-DH1	2480	32.01	4.95	2.56

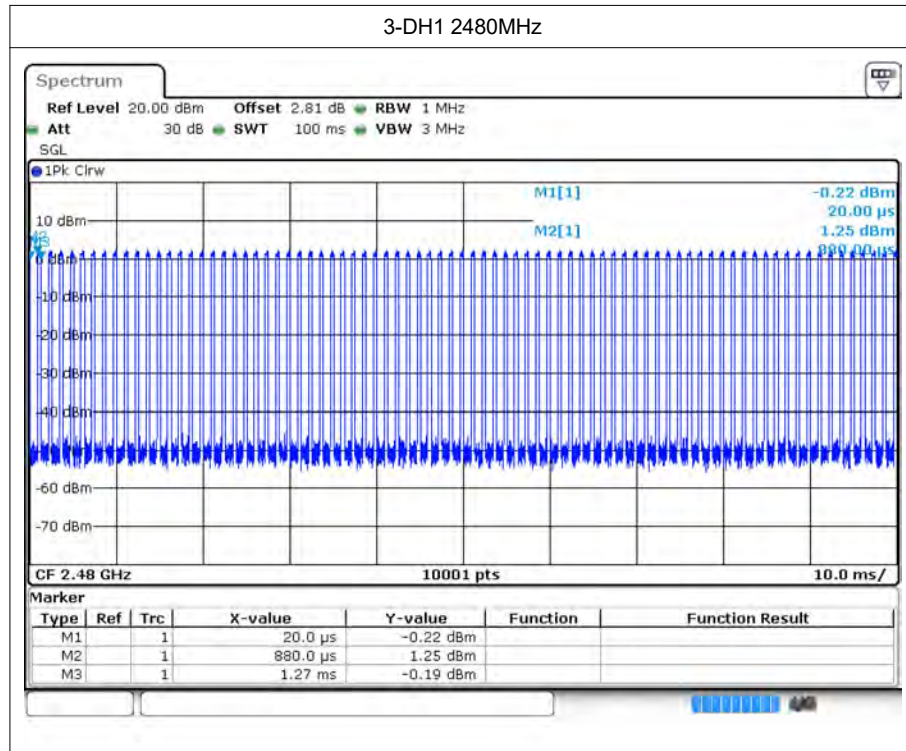
1.2 Test Graphs









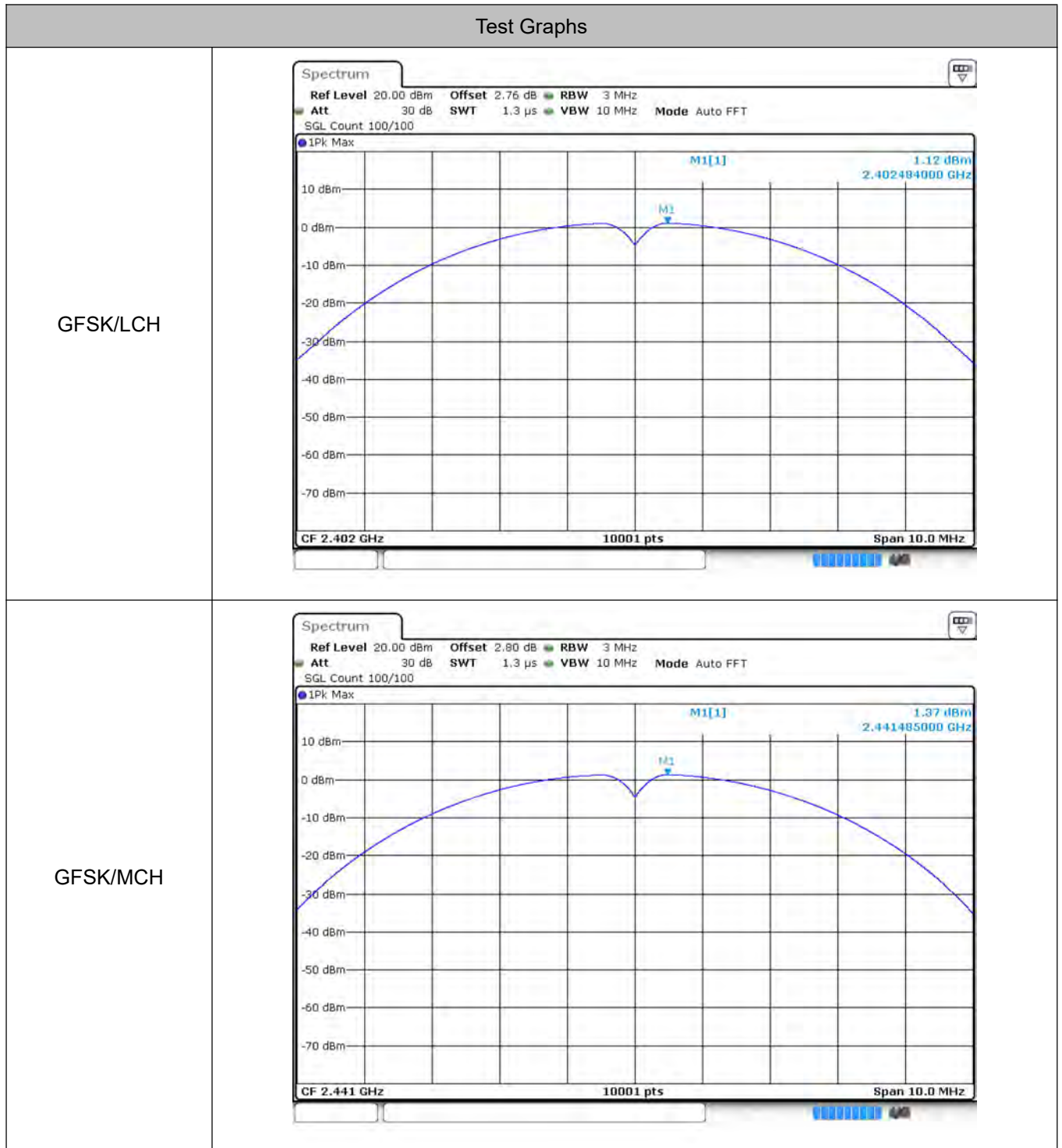


2 Maximum Conducted Peak Output Power

2.1 Test Result

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.12	21	Pass
	MCH	1.37	21	Pass
	HCH	1.09	21	Pass
$\pi/4$ DQPSK	LCH	1.44	21	Pass
	MCH	1.84	21	Pass
	HCH	1.5	21	Pass
8DPSK	LCH	1.81	21	Pass
	MCH	1.8	21	Pass
	HCH	1.89	21	Pass

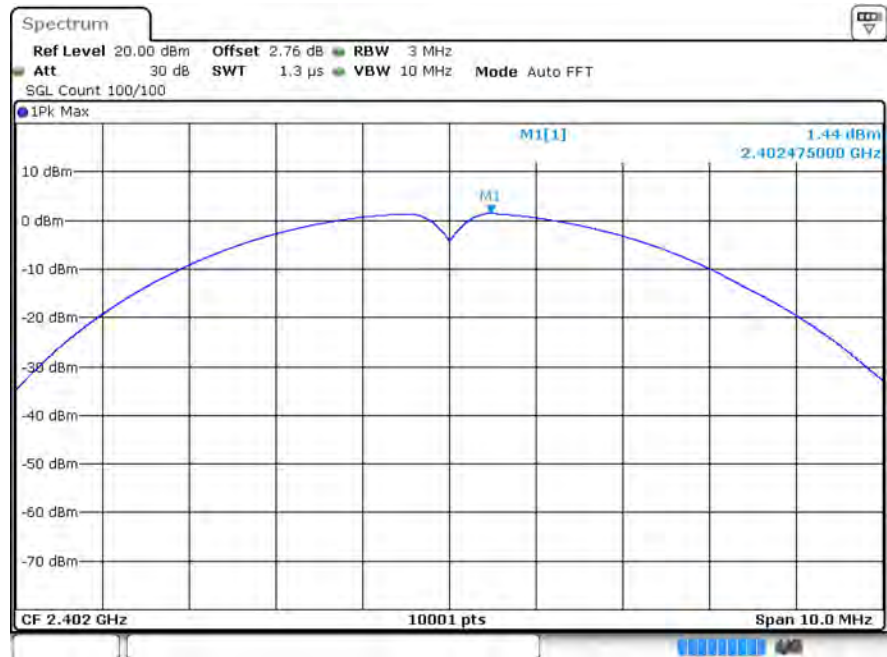
2.2 Test Graphs



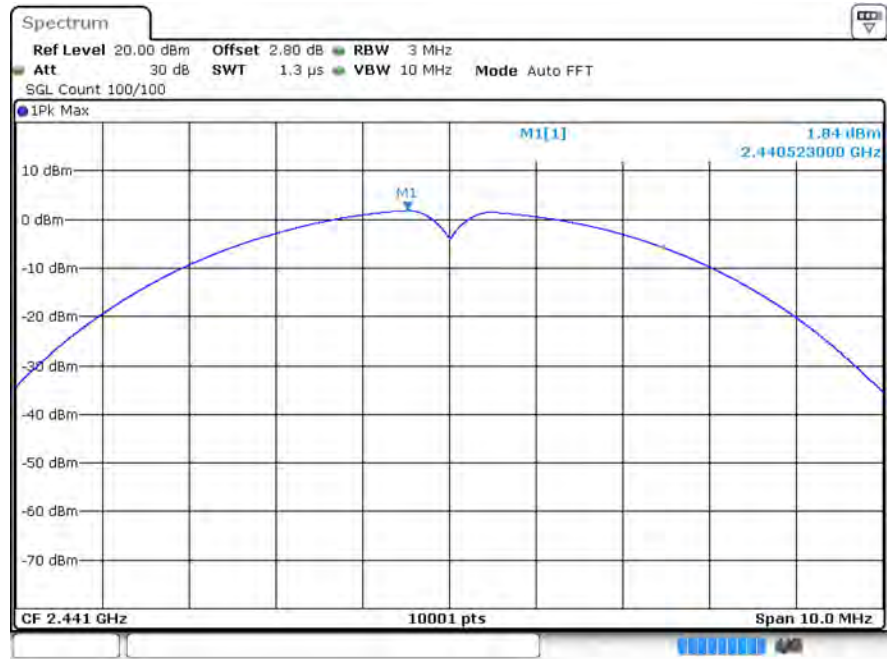
GFSK/HCH



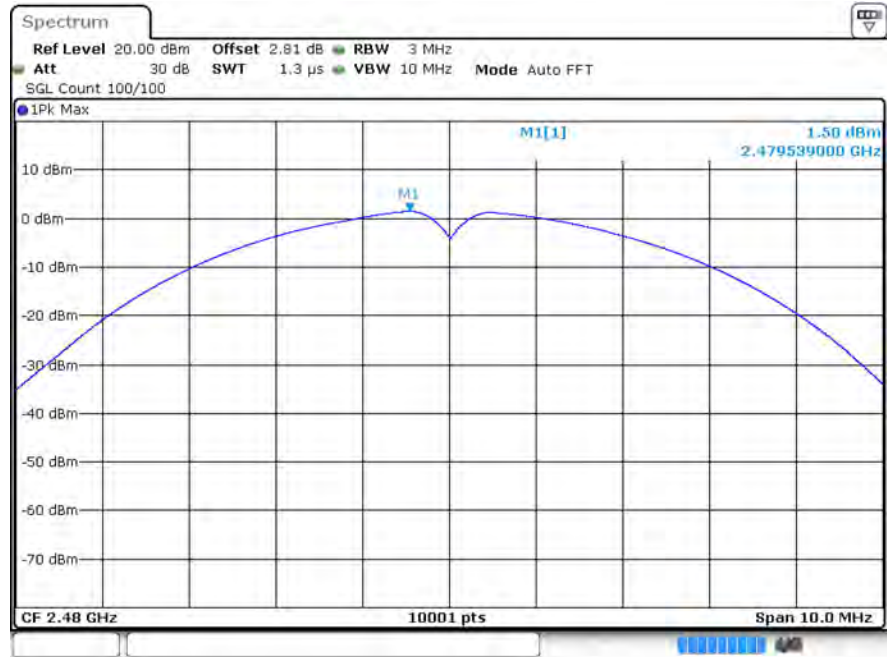
$\pi/4$ DQPSK/LCH



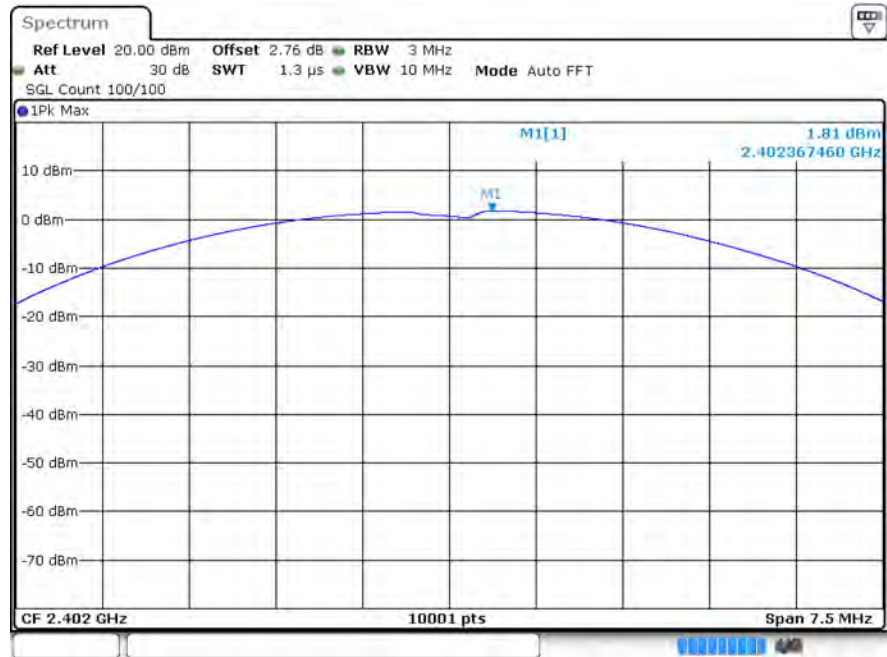
$\pi/4$ DQPSK/MCH



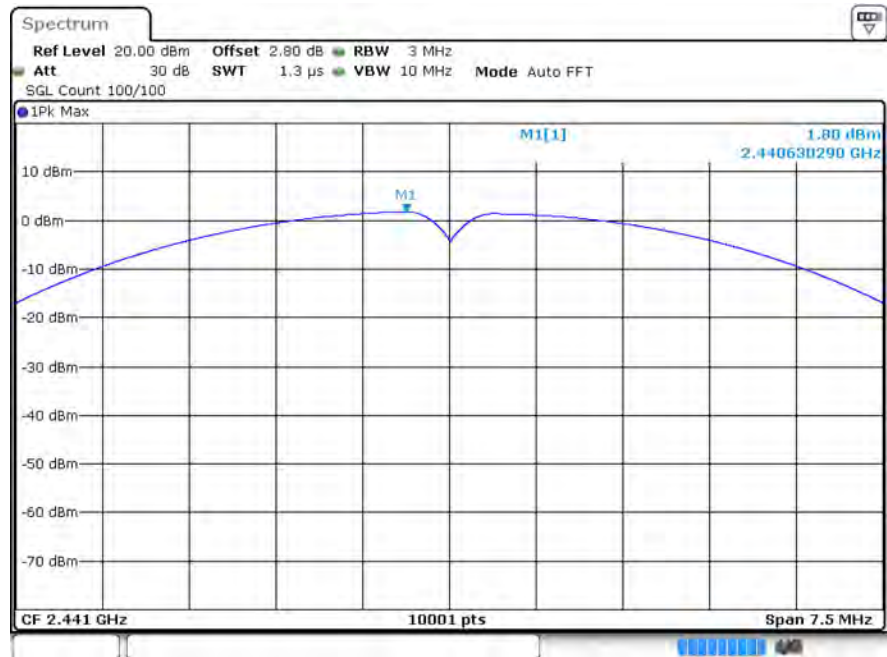
$\pi/4$ DQPSK/HCH



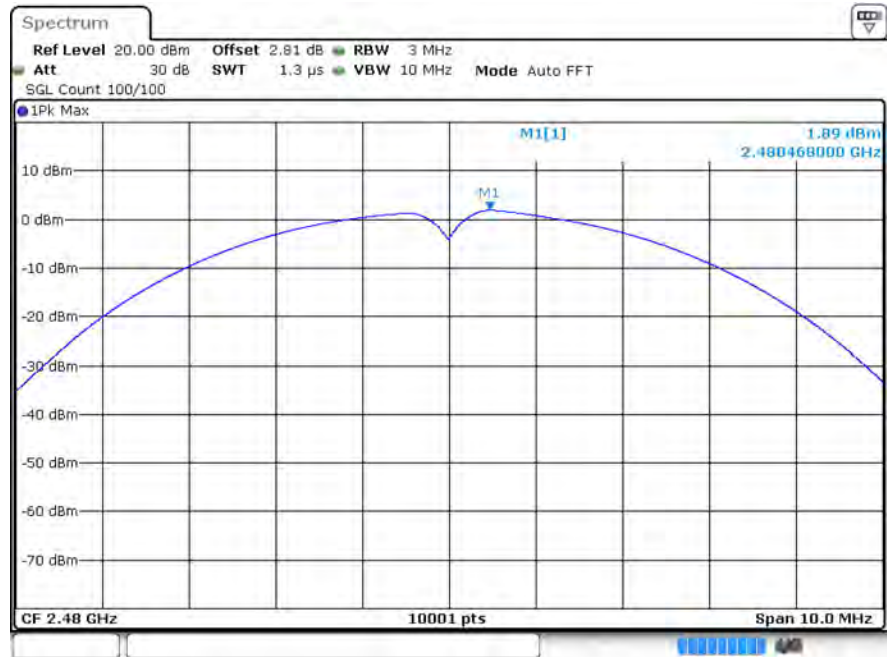
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

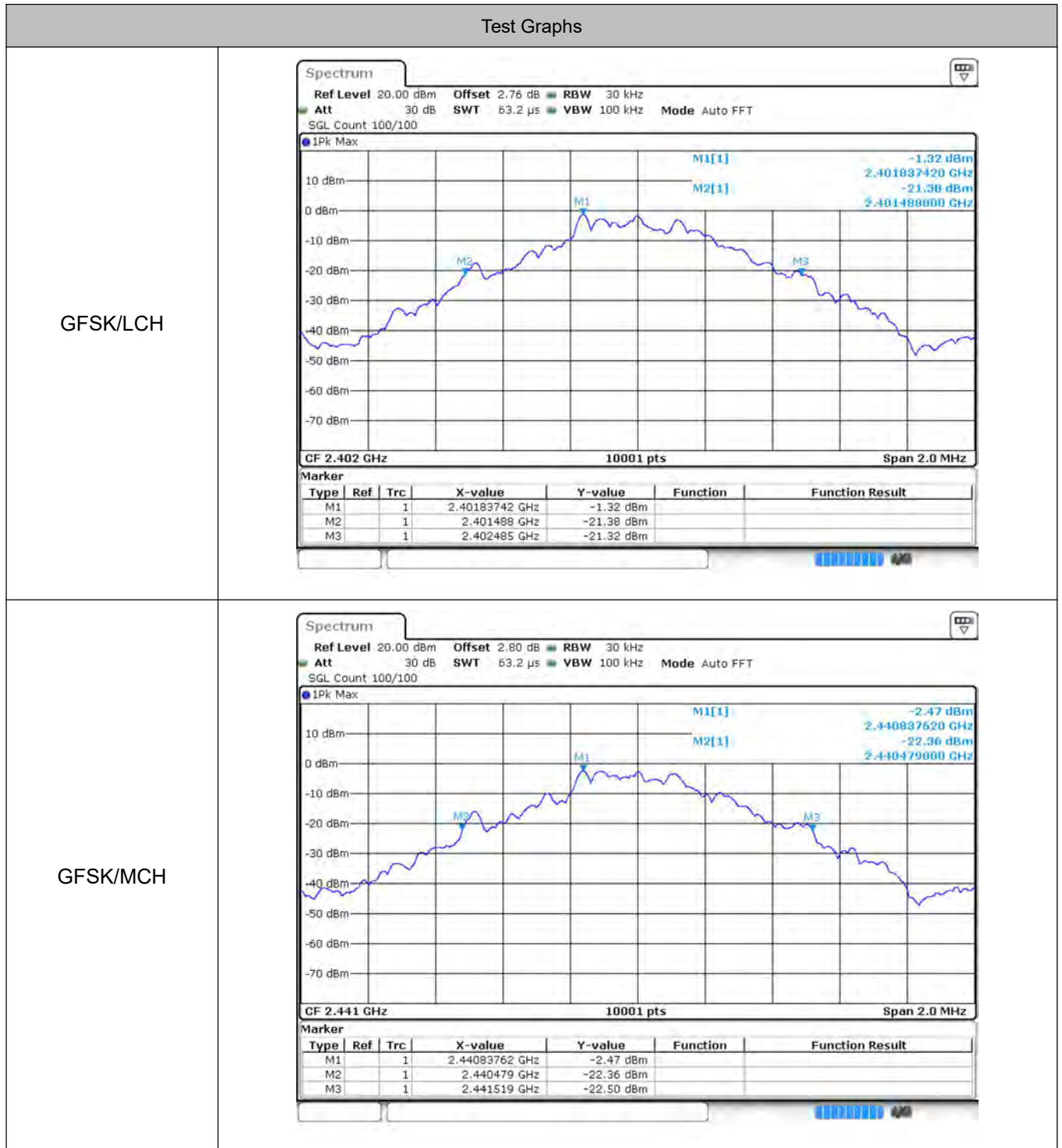


3 20dB Bandwidth

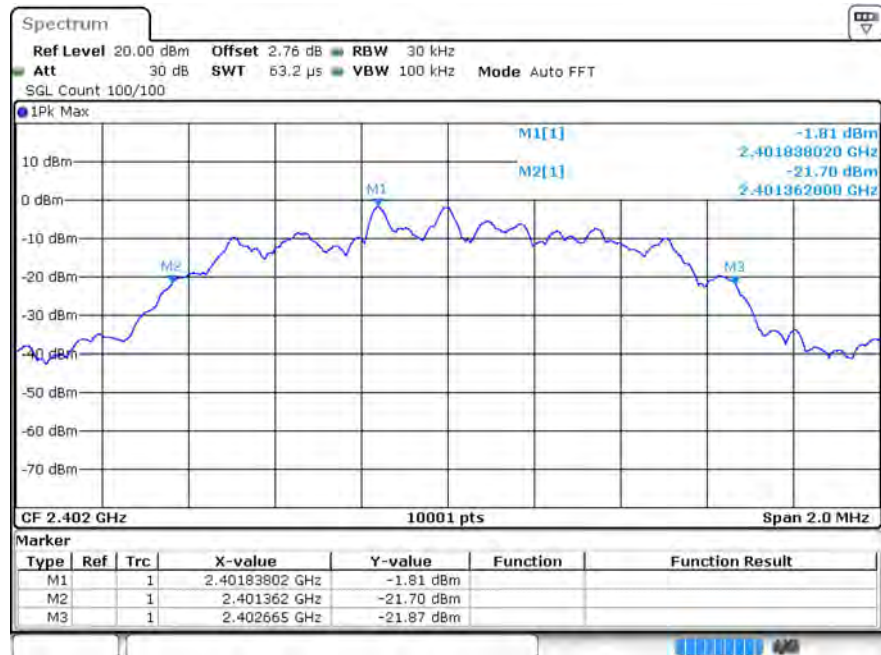
3.1 Test Result

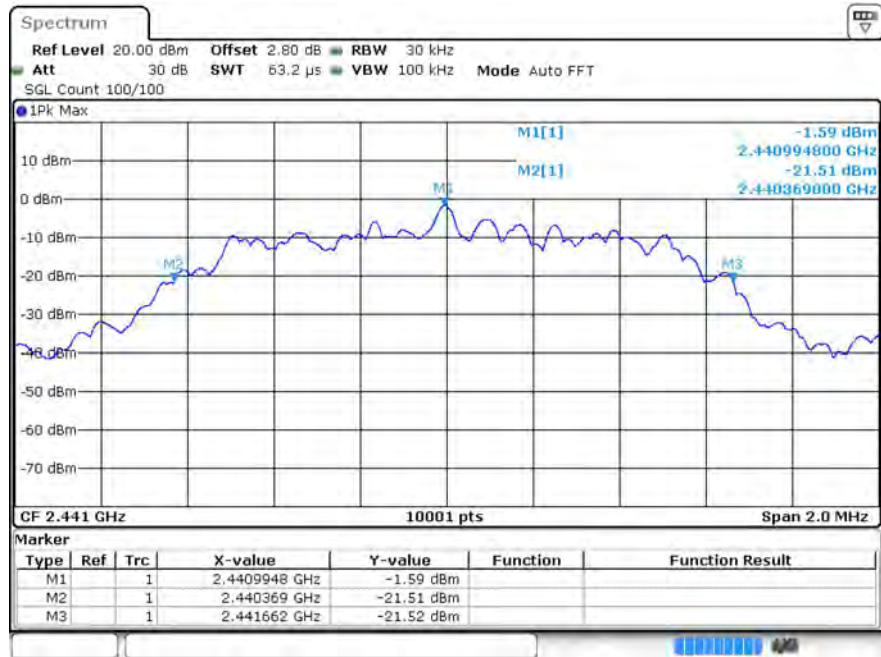
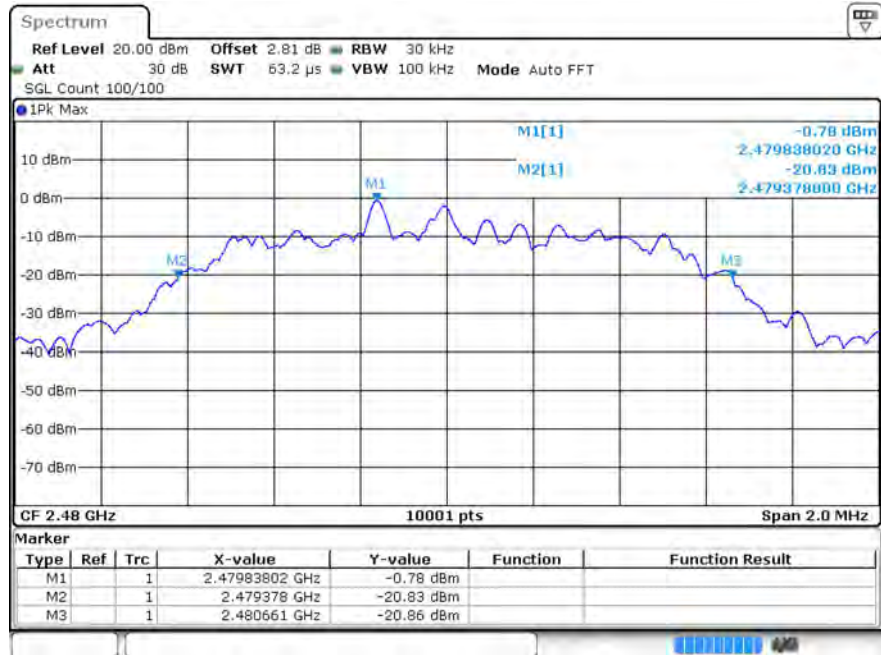
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.997	Not Specified	Pass
	MCH	1.04	Not Specified	Pass
	HCH	1.033	Not Specified	Pass
$\pi/4$ DQPSK	LCH	1.303	Not Specified	Pass
	MCH	1.293	Not Specified	Pass
	HCH	1.282	Not Specified	Pass
8DPSK	LCH	1.258	Not Specified	Pass
	MCH	1.272	Not Specified	Pass
	HCH	1.272	Not Specified	Pass

3.2 Test Graphs

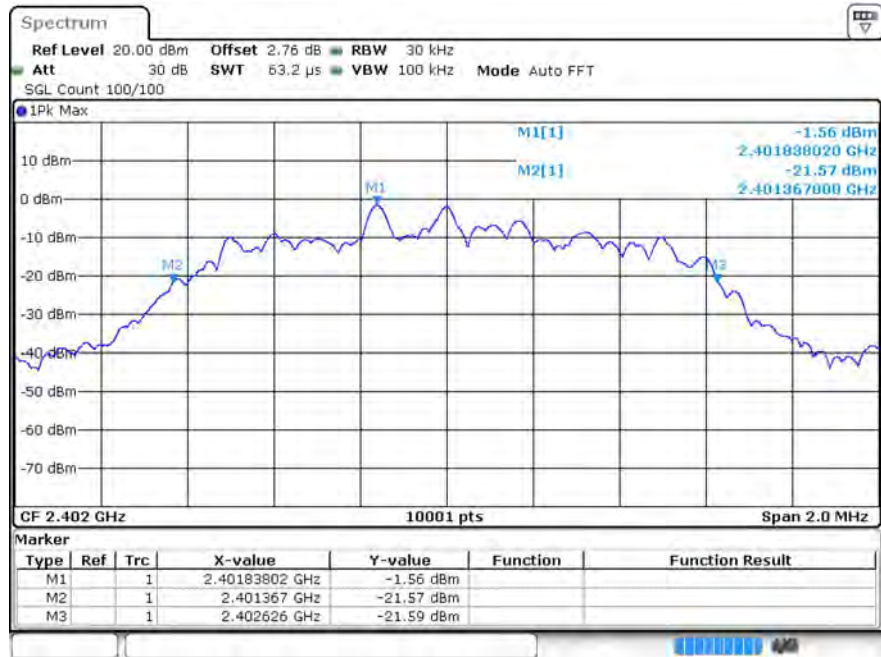


GFSK/HCH

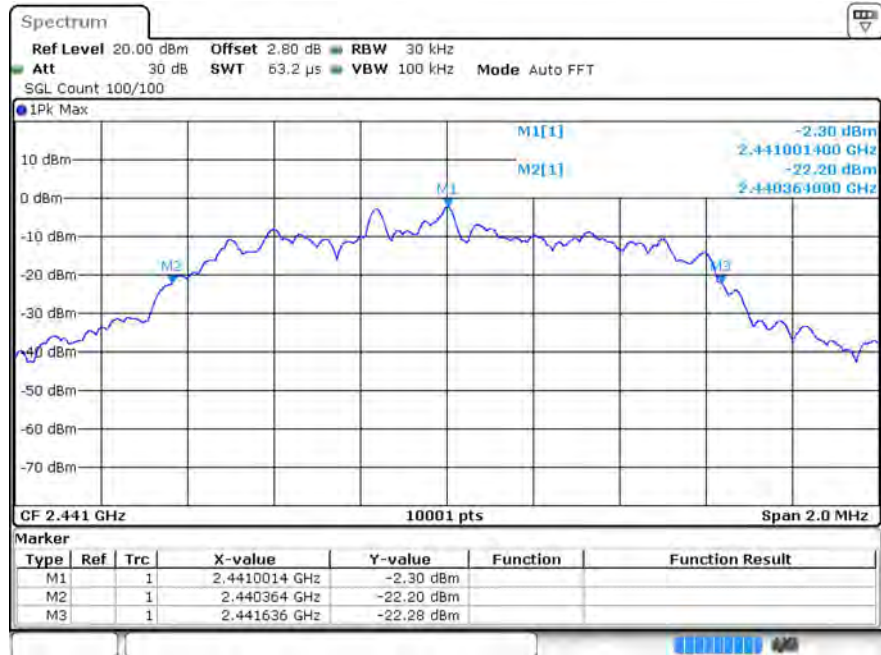

 $\pi/4$ DQPSK/LCH


$\pi/4$ DQPSK/MCH

 $\pi/4$ DQPSK/HCH


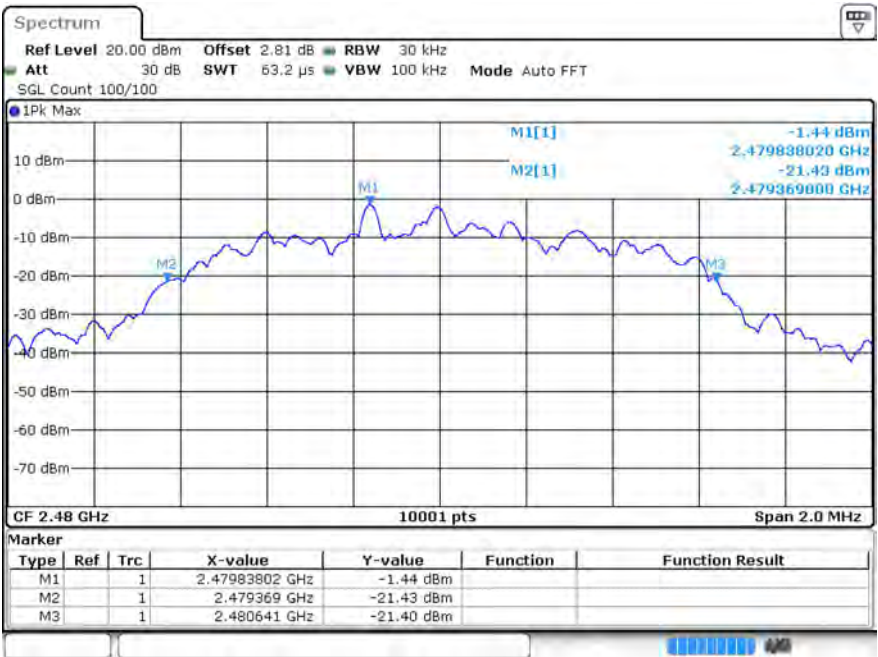
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

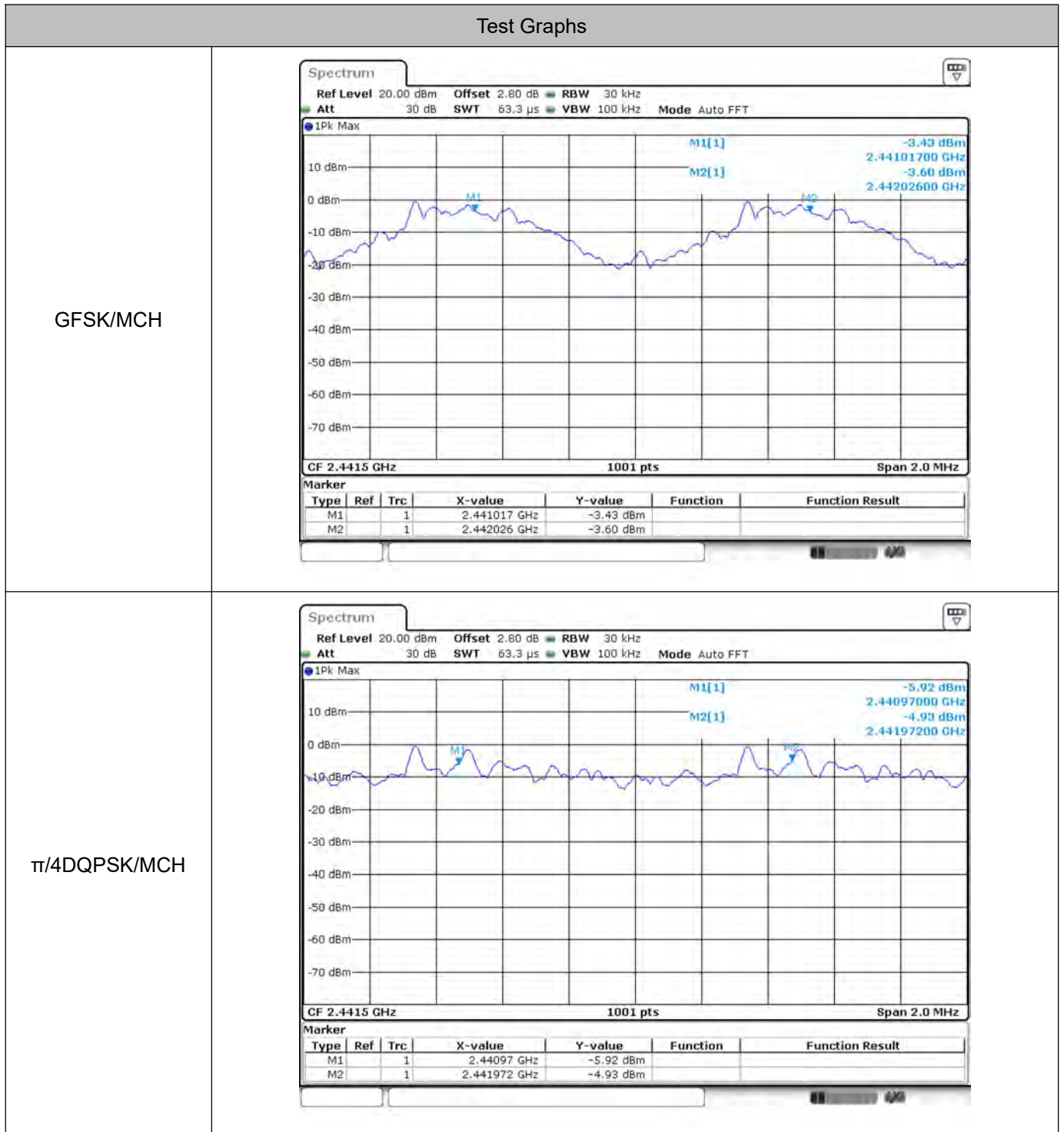


4 Carrier Frequency Separation

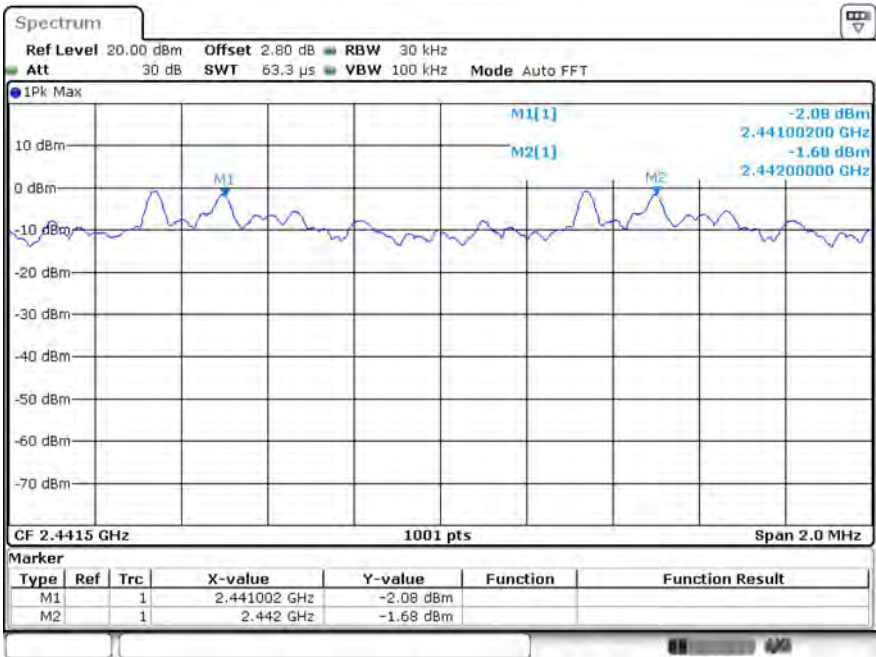
4.1 Test Result

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	MCH	1.009	0.693	Pass
$\pi/4$ DQPSK	MCH	1.002	0.862	Pass
8DPSK	MCH	0.998	0.848	Pass

4.2 Test Graphs



8DPSK/MCH

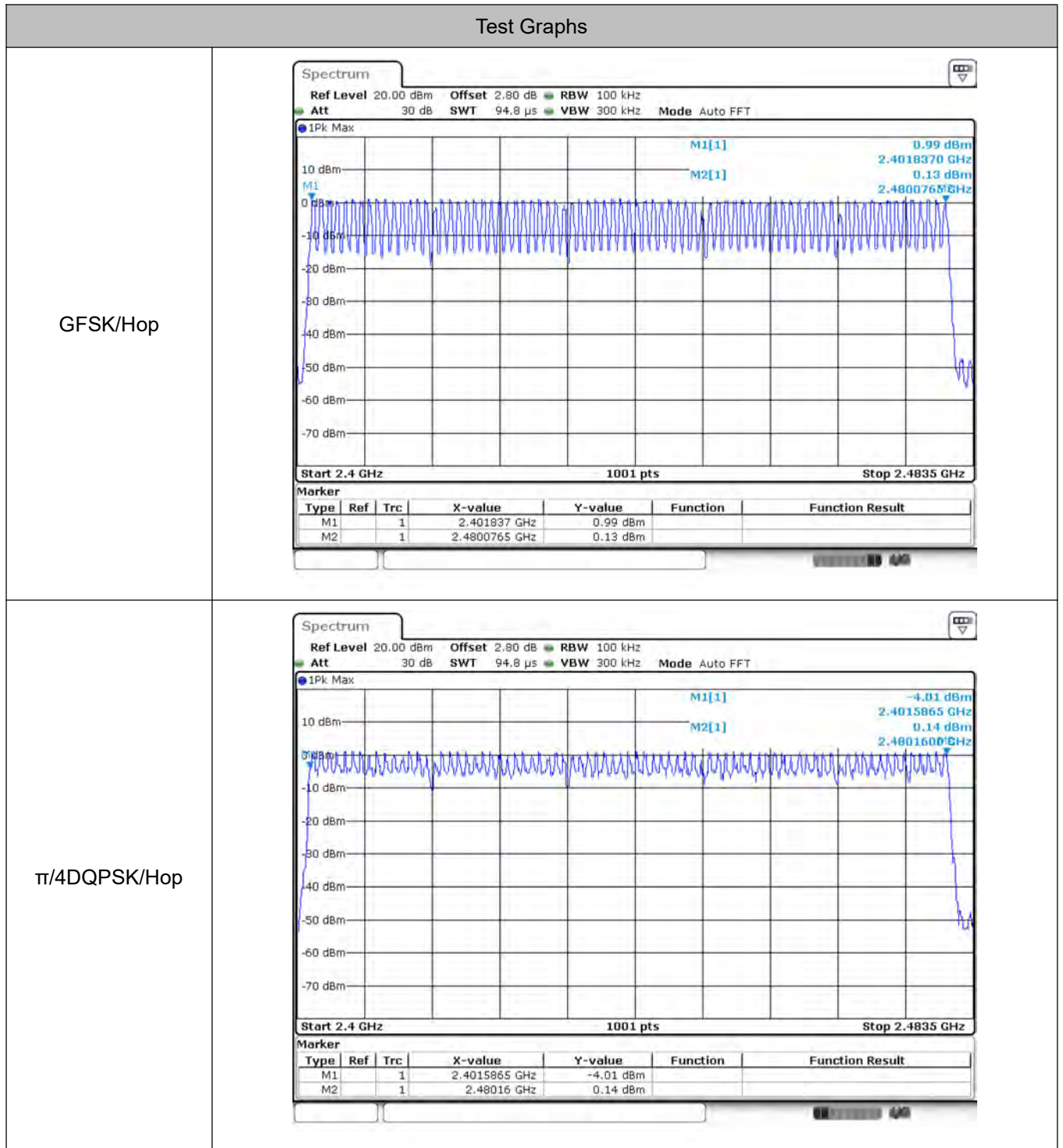


5 Hopping Channel Number

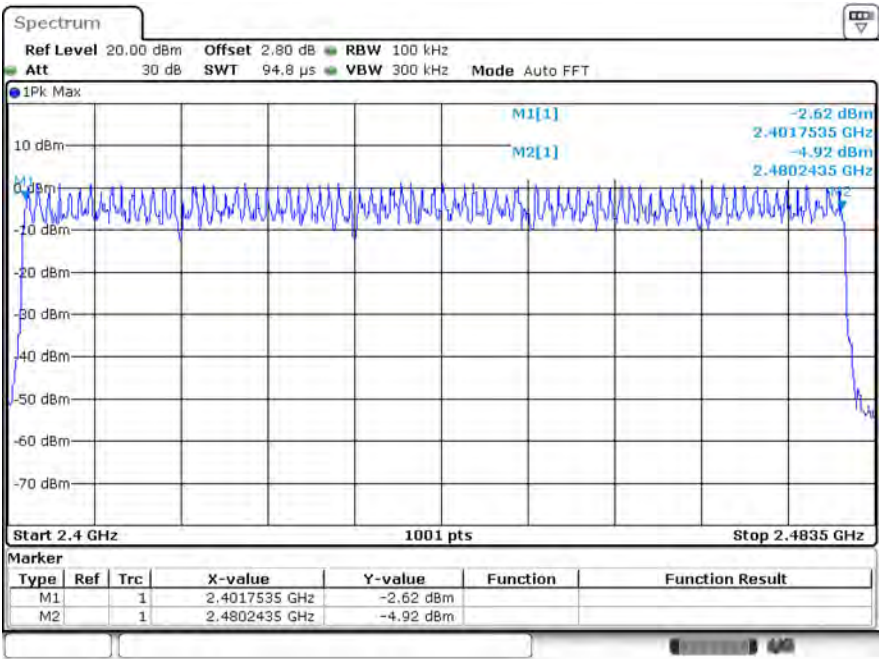
5.1 Test Result

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

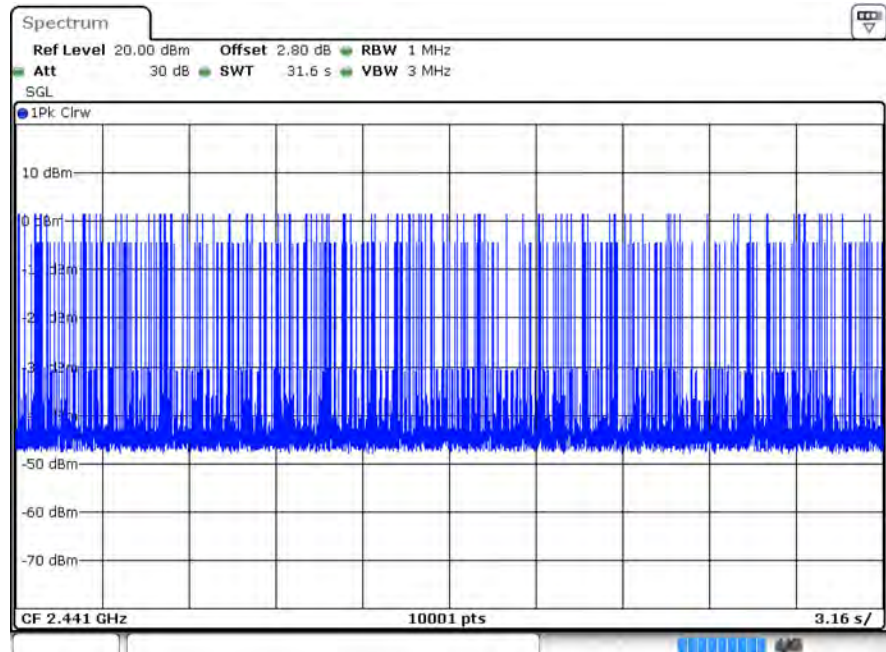
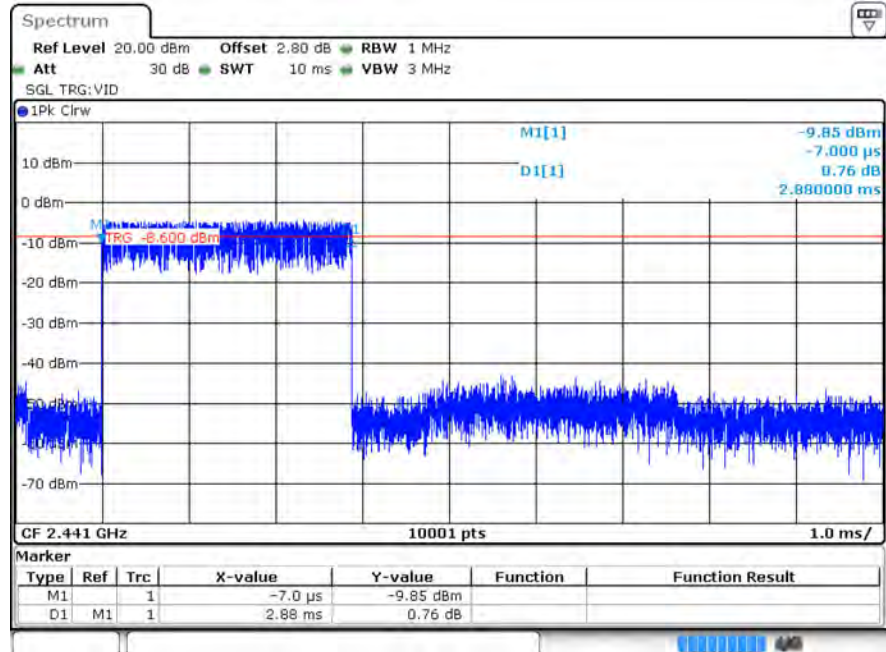
6.1 Test Result

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[ms]	Limit [s]	Verdict
GFSK	DH5	MCH	2.88	113	325.44	0.4	Pass
$\pi/4$ DQPSK	2DH5	MCH	2.883	106	305.598	0.4	Pass
8DPSK	3DH5	MCH	2.888	110	317.68	0.4	Pass

6.2 Test Graphs

Test Graphs

GFSK_DH5/MCH



Spectrum

Ref Level 20.00 dBm Offset 2.80 dB RBW 1 MHz

Att 30 dB SWT 31.6 s VBW 3 MHz

SGL

1Pk Clrw

10 dBm

0 dBm

-10 dBm

-20 dBm

-30 dBm

-40 dBm

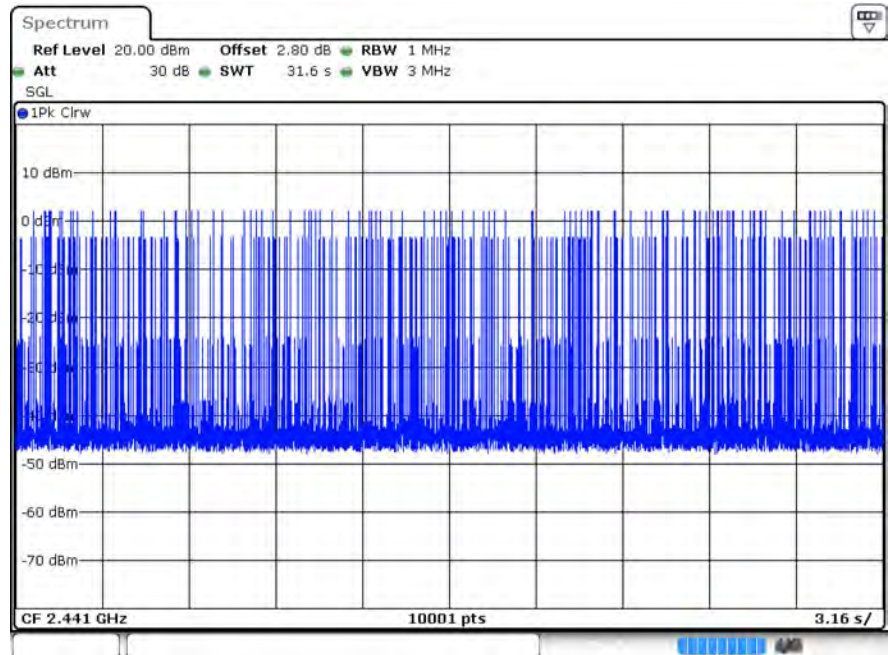
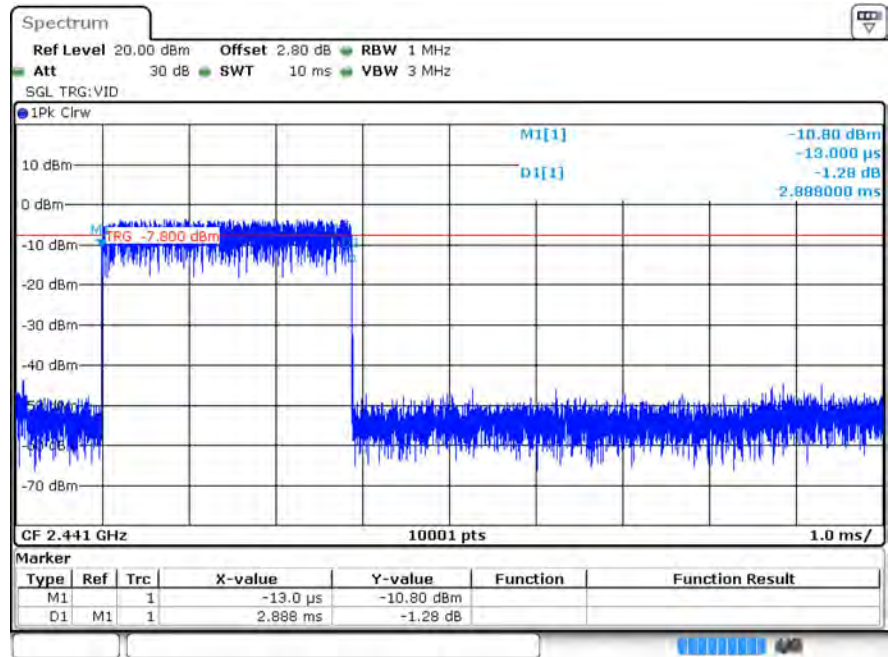
-50 dBm

-60 dBm

-70 dBm

CF 2.441 GHz 10001 pts 3.16 s/

8DPSK_3DH5/MCH



7 RF Conducted Spurious Emissions

7.1 Test Result

Mode	Channel	Max. Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	-42.33	-20	Pass
	MCH	-37.62	-20	Pass
	HCH	-41.57	-20	Pass
$\pi/4$ DQPSK	LCH	-39.36	-20	Pass
	MCH	-41.66	-20	Pass
	HCH	-41.45	-20	Pass
8DPSK	LCH	-42.55	-20	Pass
	MCH	-42.55	-20	Pass
	HCH	-42.13	-20	Pass

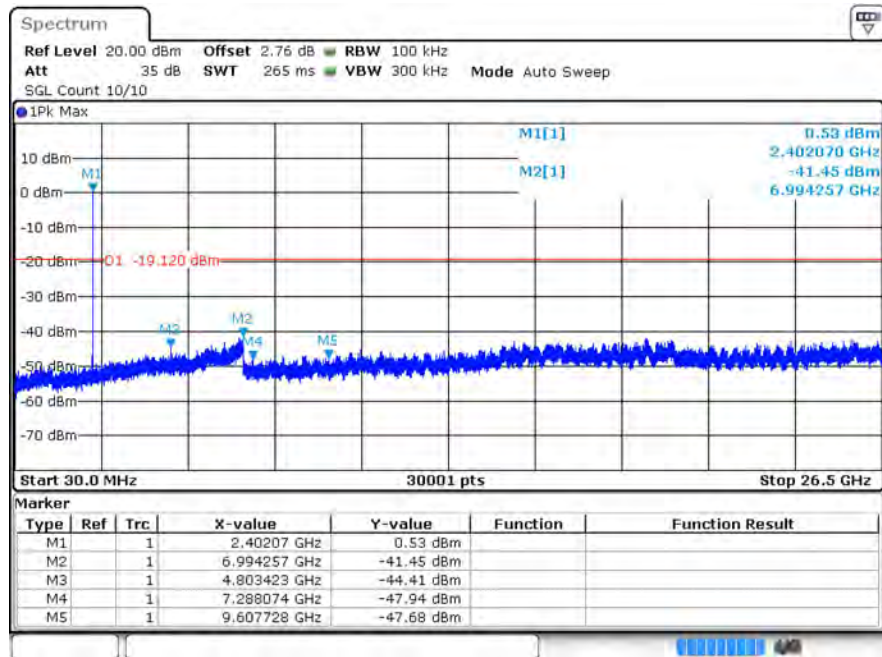
7.2 Test Graphs

GFSK_LCH_Graphs

Pref



Puw

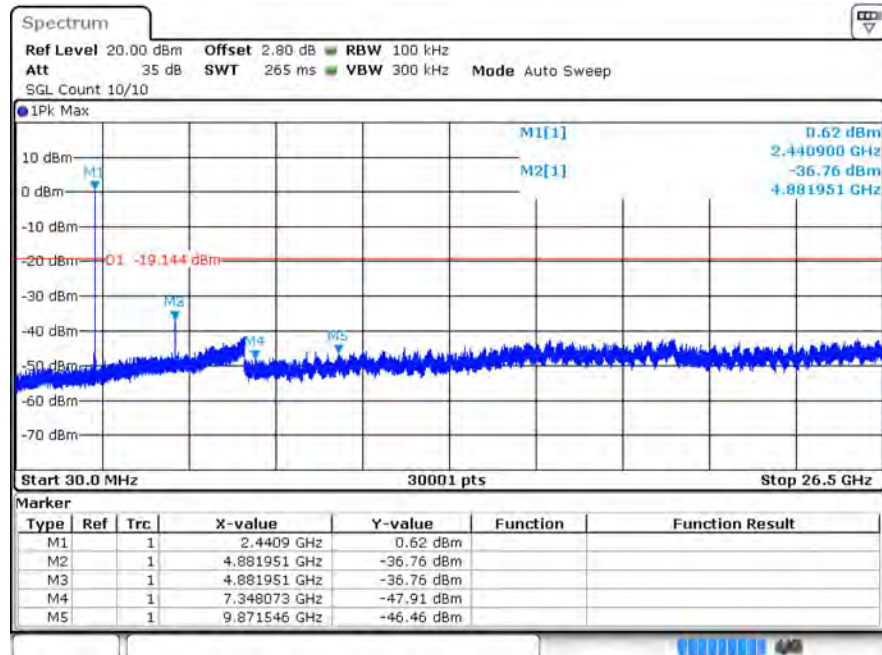


GFSK_MCH_Graphs

Pref



Puw

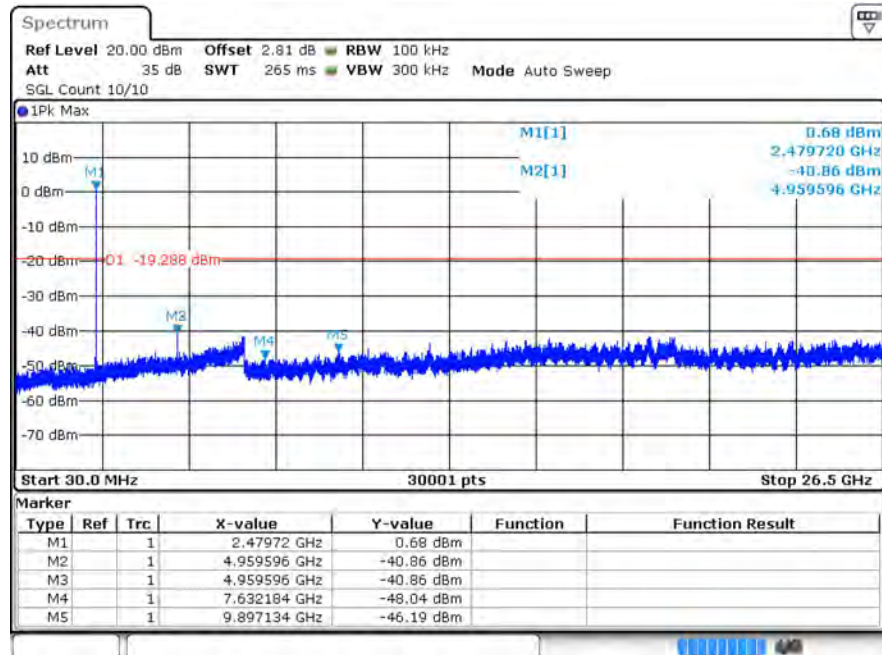


GFSK_HCH_Graphs

Pref



Puw

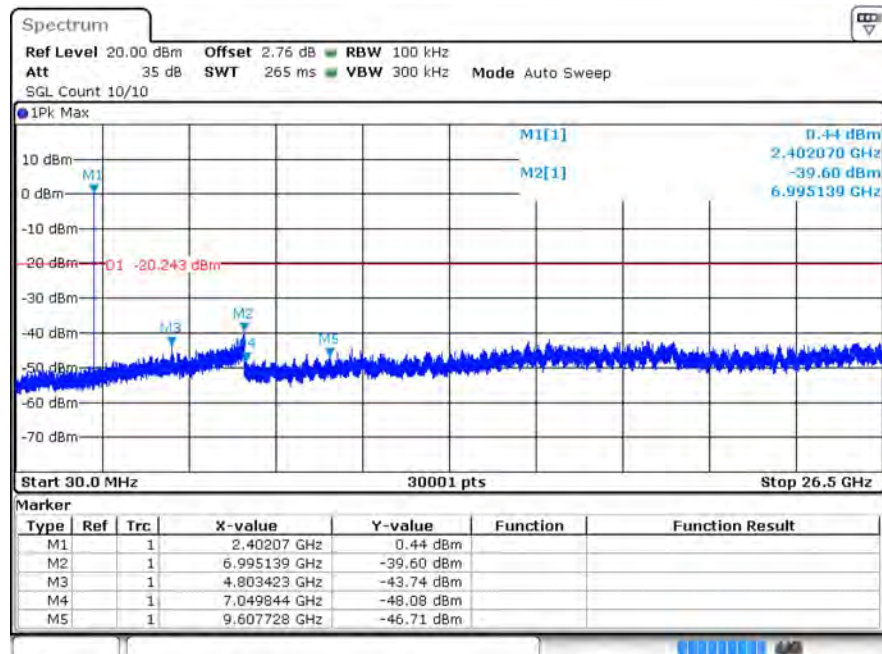


$\pi/4$ DQPSK_LCH_Graphs

Pref



Puw

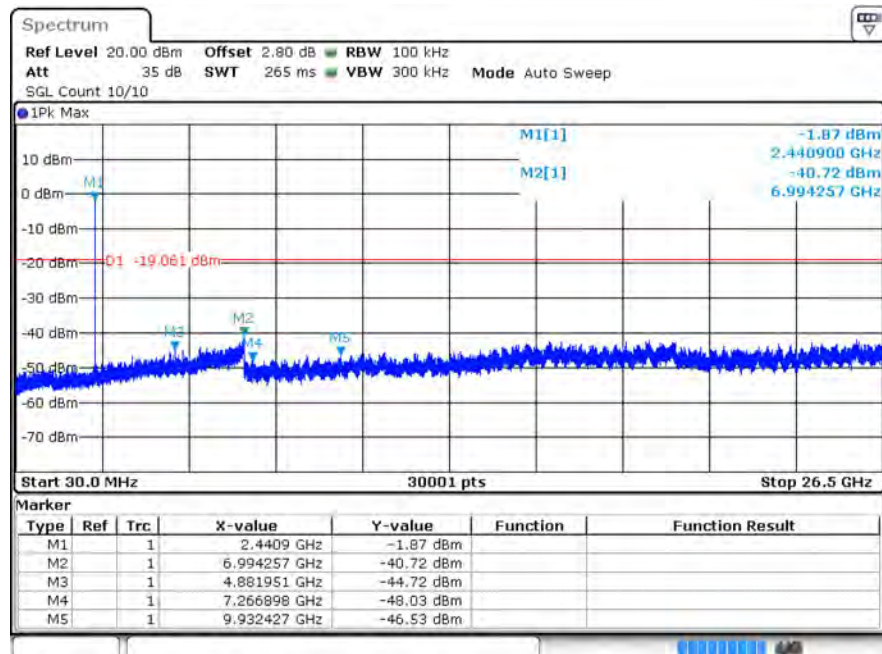


$\pi/4$ DQPSK_MCH_Graphs

Pref



Puw

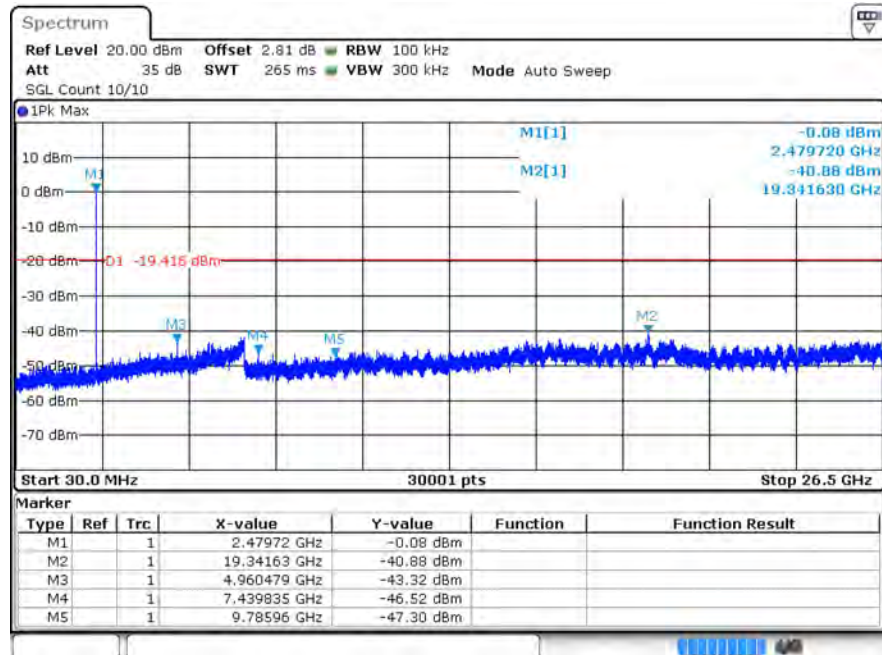


$\pi/4$ DQPSK_HCH_Graphs

Pref



Puw

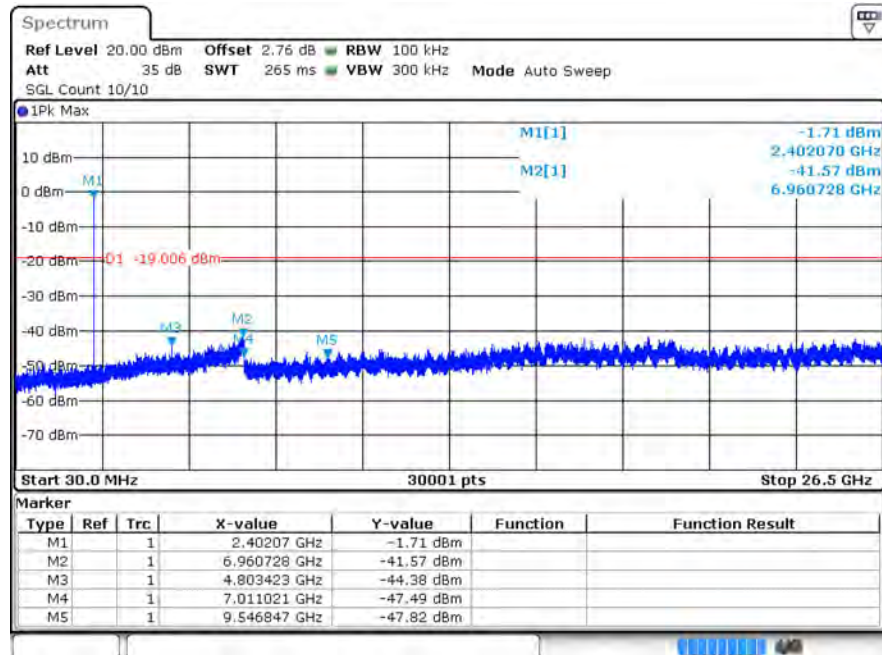


8DPSK_LCH_Graphs

Pref



Puw

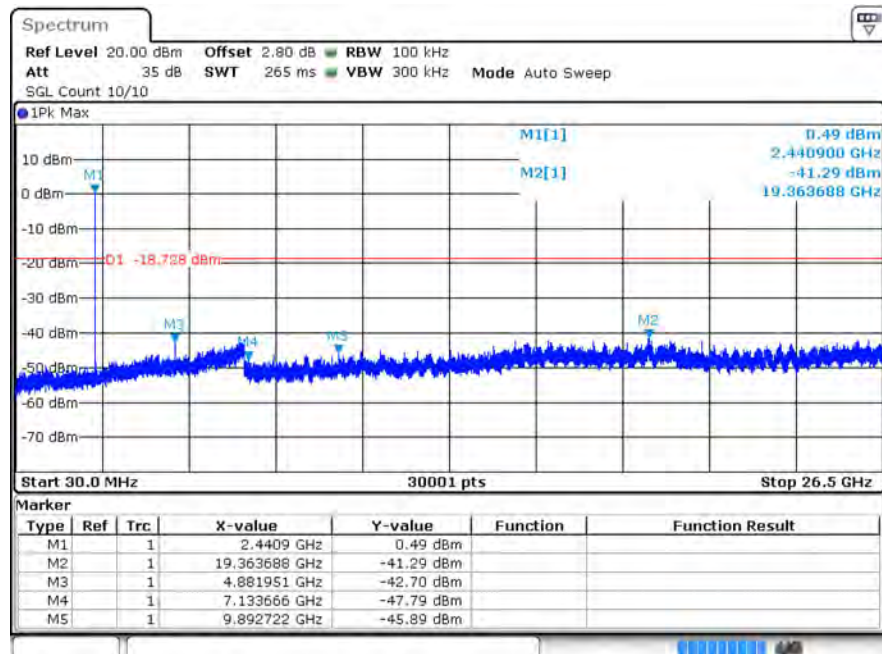


8DPSK_MCH_Graphs

Pref

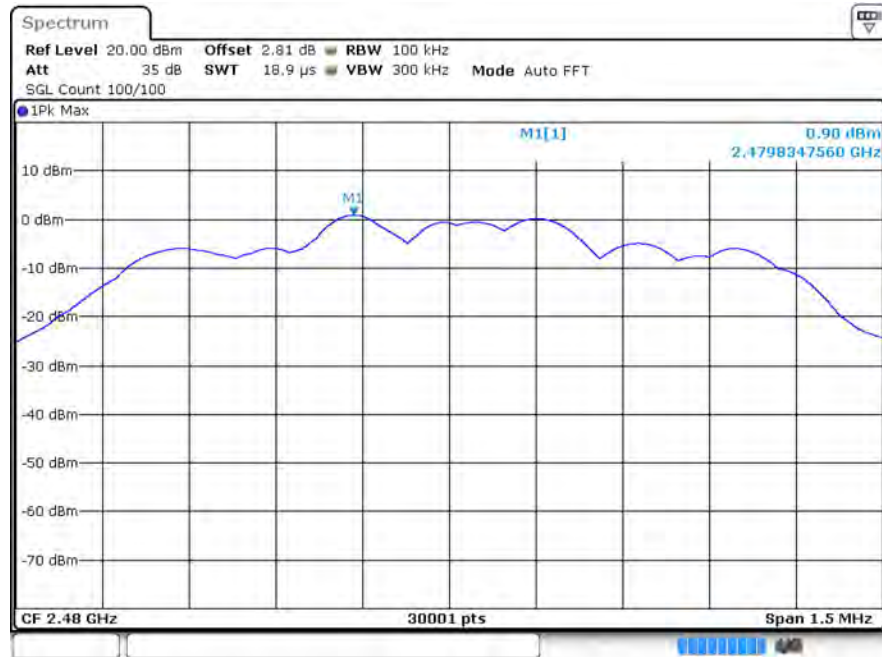


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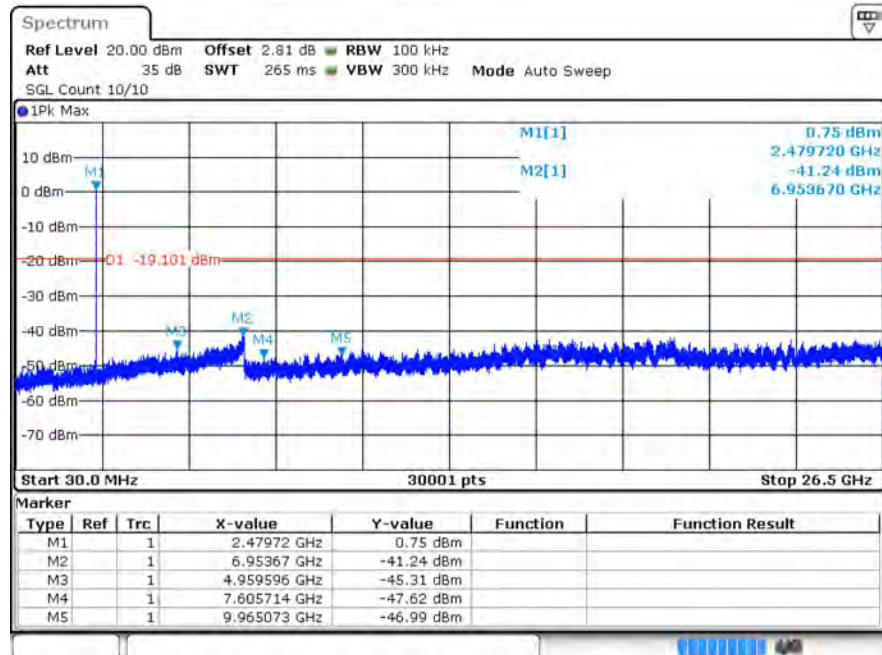


8DPSK_HCH_Graphs

Pref



Puw

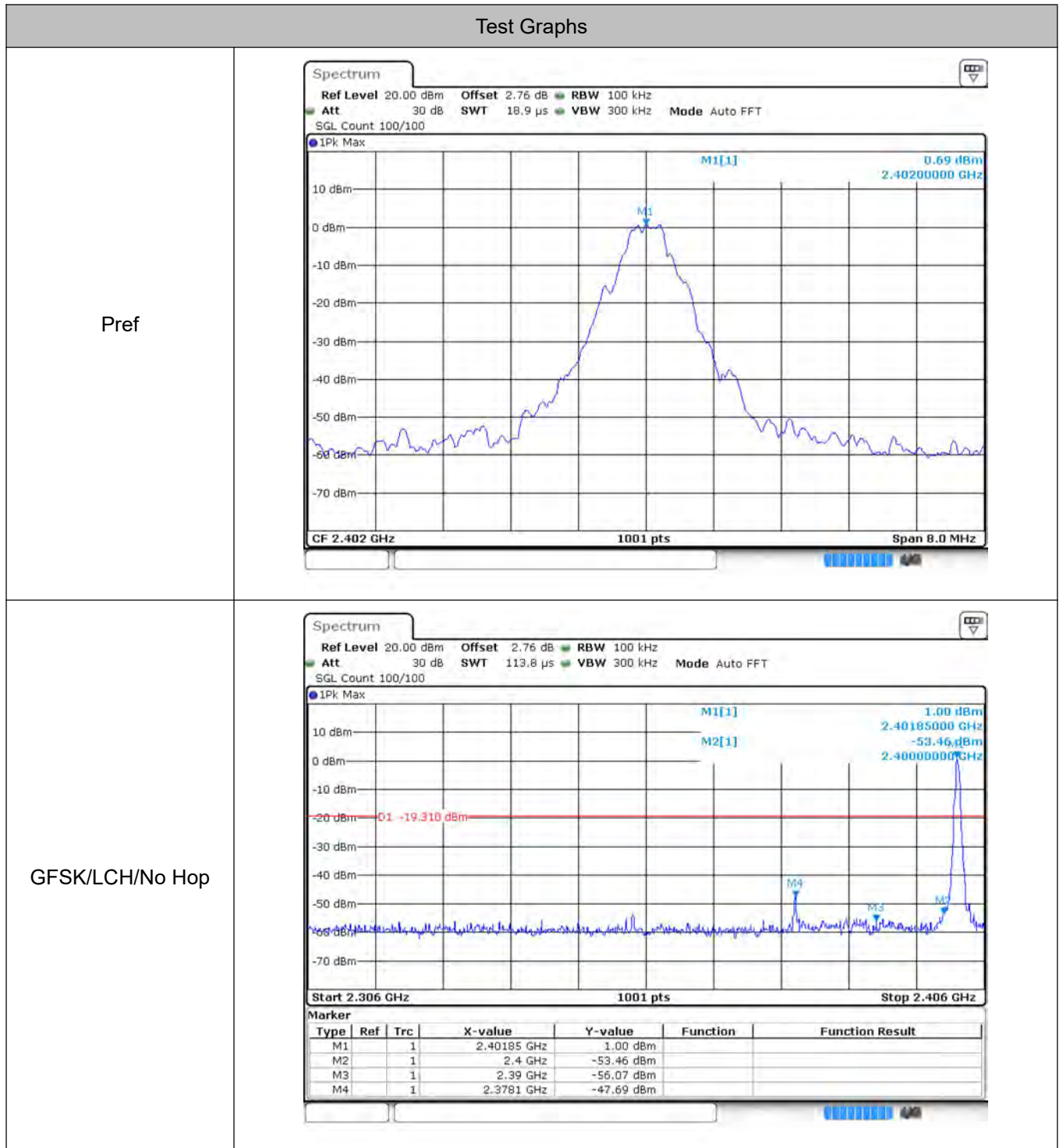


8 Band-edge for RF Conducted Emissions

8.1 Test Result

Mode	Channel	Carrier Frequency [MHz]	Frequency Hopping	Max Spurious Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	2402	Off	-48.37	-20	Pass
			On	-48.18	-20	Pass
	HCH	2480	Off	-55.42	-20	Pass
			On	-48.46	-20	Pass
$\pi/4$ DQPSK	LCH	2402	Off	-48.59	-20	Pass
			On	-48.18	-20	Pass
	HCH	2480	Off	-53.97	-20	Pass
			On	-48.39	-20	Pass
8DPSK	LCH	2402	Off	-49.14	-20	Pass
			On	-48.33	-20	Pass
	HCH	2480	Off	-54.96	-20	Pass
			On	-47.76	-20	Pass

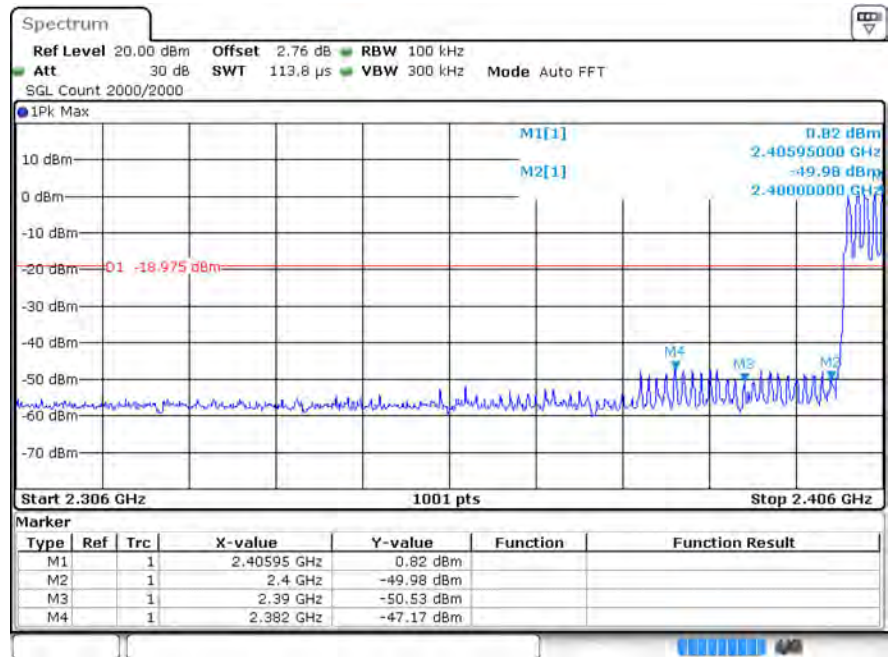
8.2 Test Graphs



Ref



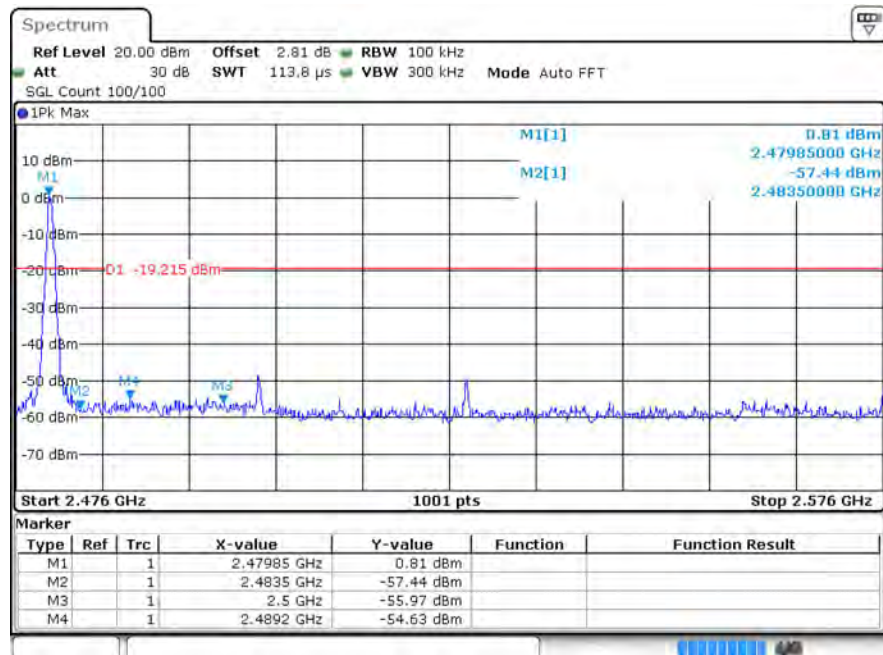
GFSK/LCH/Hop



Ref



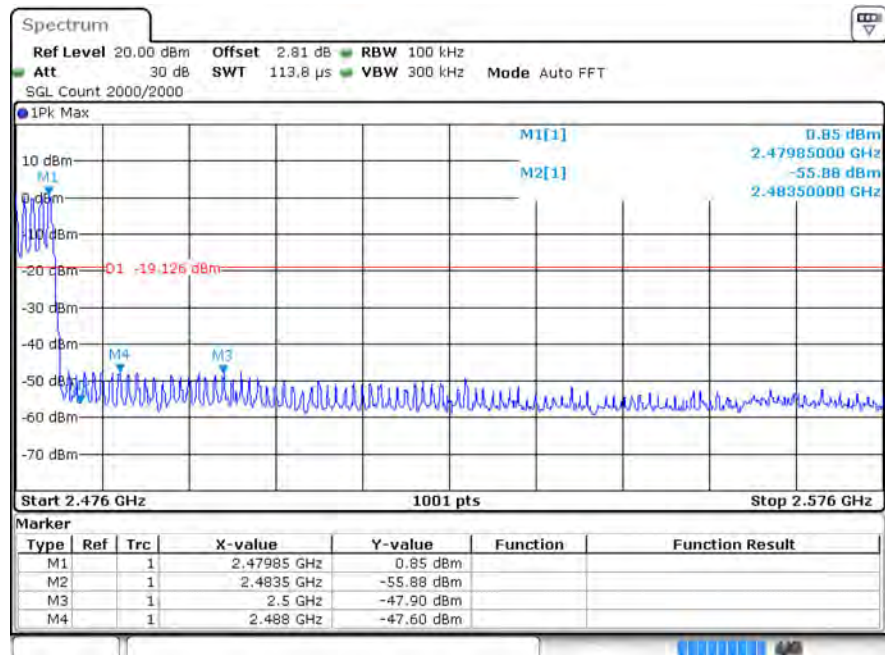
GFSK/HCH/No Hop



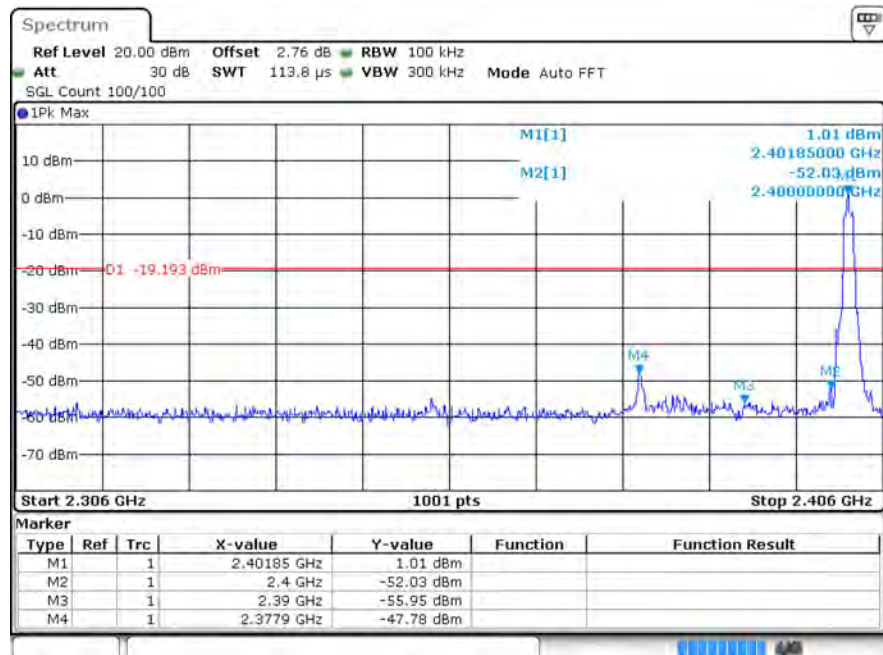
Ref.



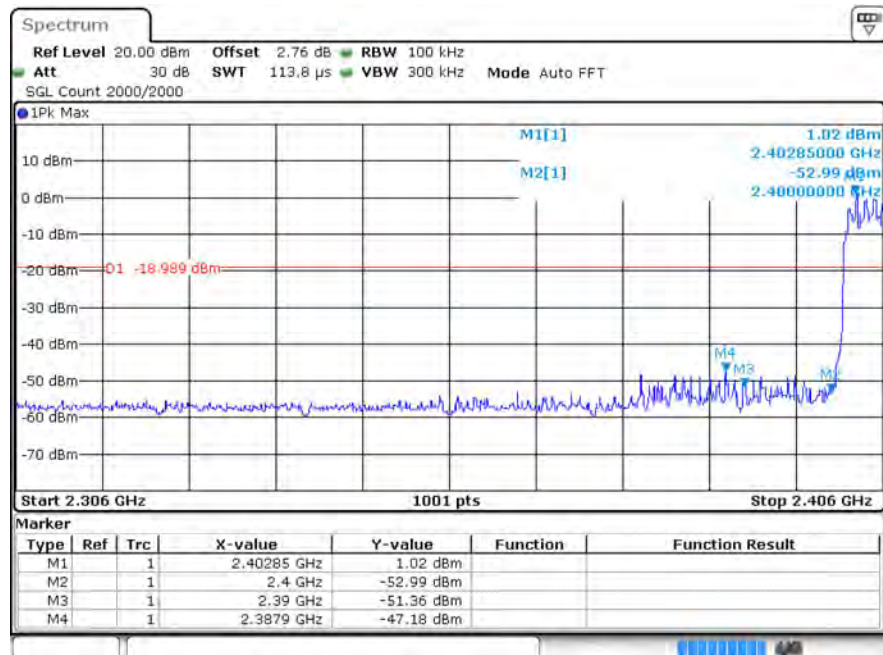
GFSK/HCH/Hop



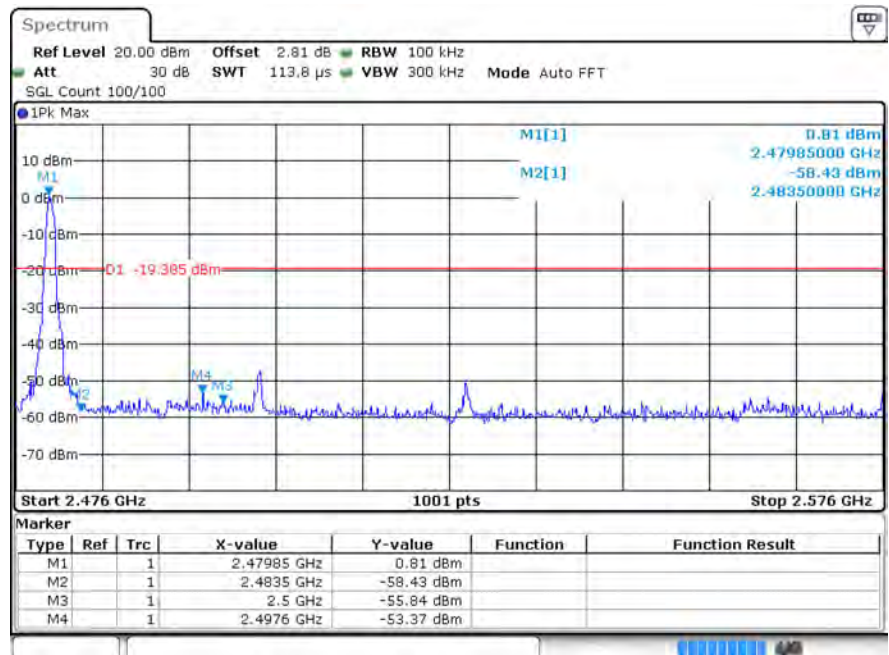
Ref


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


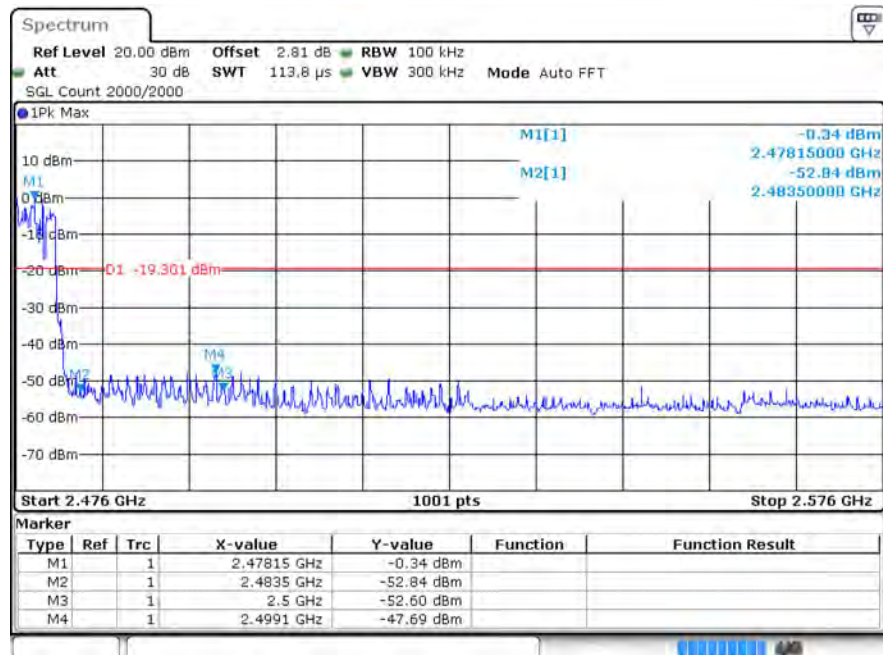
Ref


 $\pi/4$ DQPSK/LCH/Hop


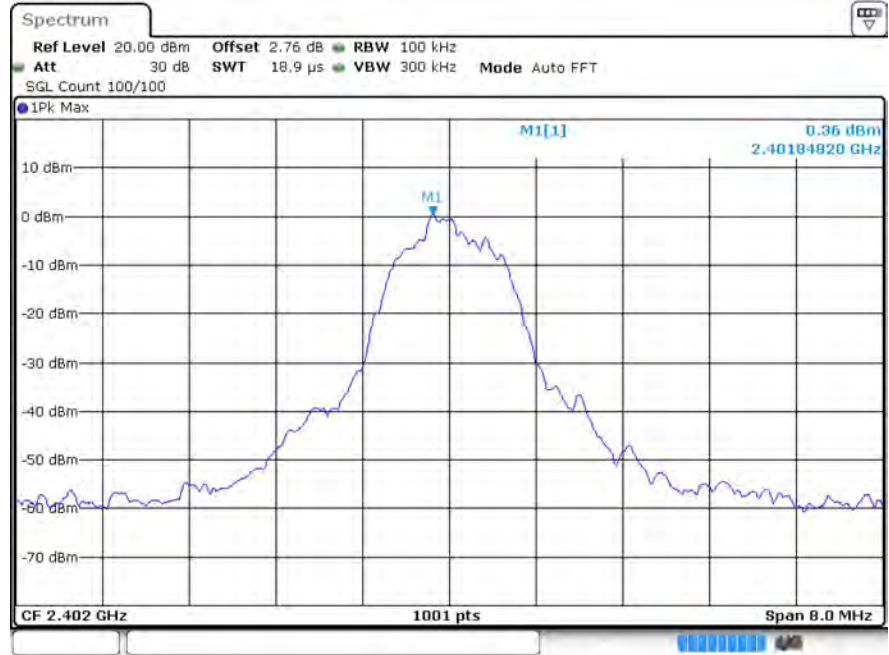
Ref


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


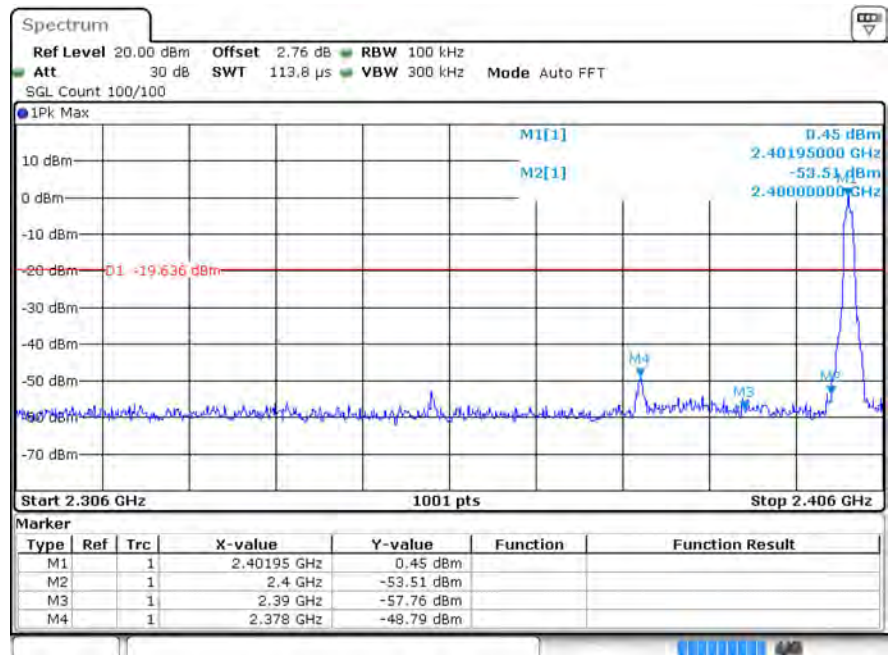
Ref


 $\pi/4$ DQPSK/HCH/Hop


Ref



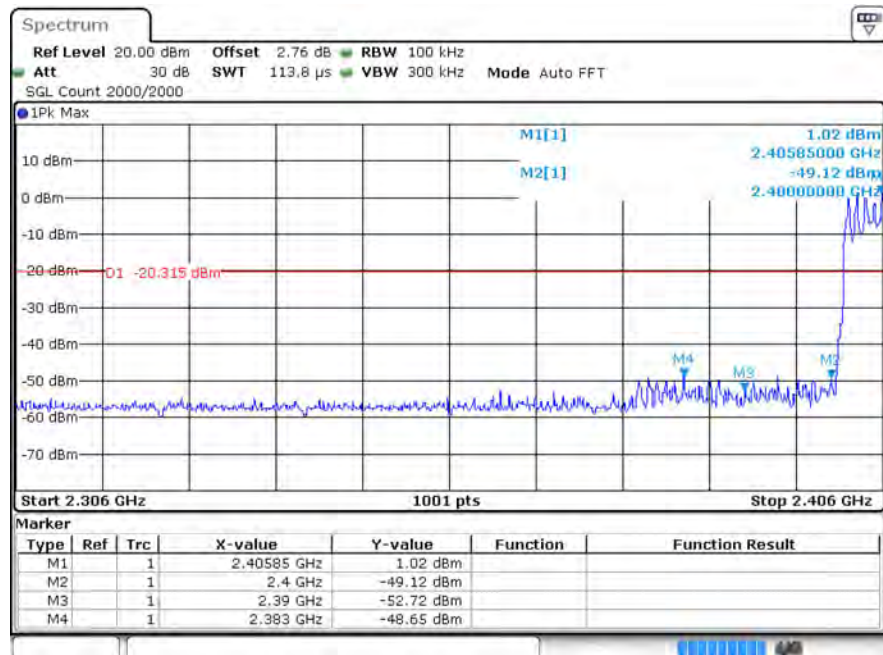
8DPSK/LCH/No Hop



Ref



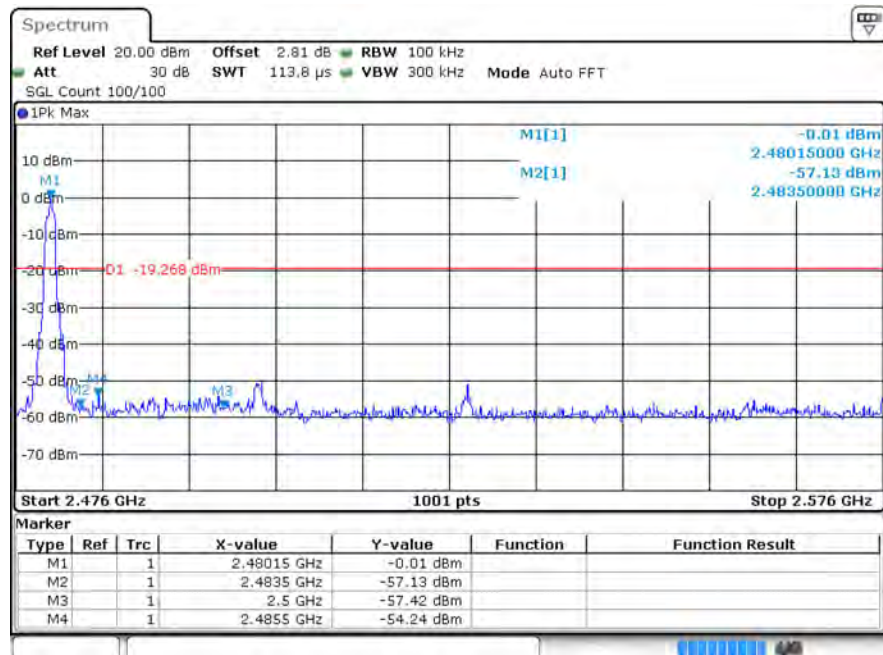
8DPSK/LCH/Hop



Ref



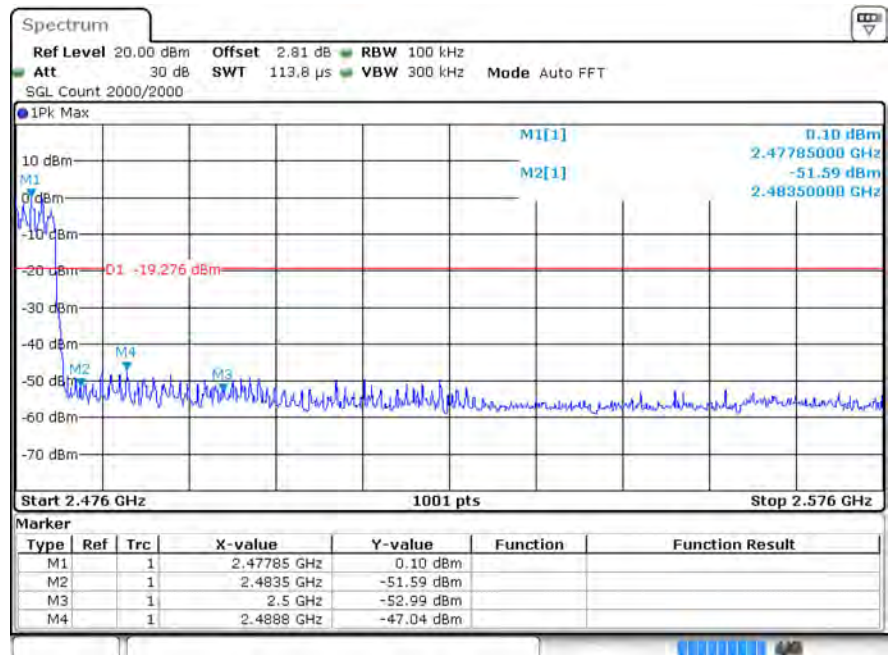
8DPSK/HCH/No Hop



Ref



8DPSK/HCH/Hop



9 Restrict-band band-edge measurements

9.1 Test Result

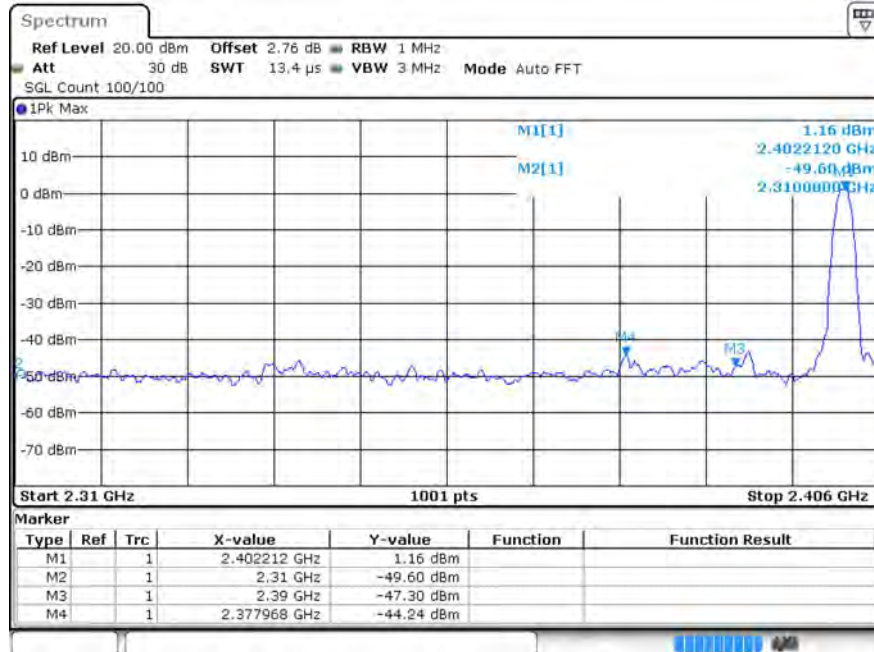
Test Mode	Hopping	Freq.	Power [dBm]	Gain	Duty Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-49.6	2	-	47.66	PEAK	74	Pass
	Off	2310.0	-56.65	2	5.14	45.75	AV	54	Pass
	Off	2377.968	-44.24	2	-	53.02	PEAK	74	Pass
	Off	2378.064	-50.76	2	5.14	51.64	AV	54	Pass
	Off	2390.0	-47.3	2	-	49.96	PEAK	74	Pass
	Off	2390.0	-57.03	2	5.14	45.37	AV	54	Pass
	Off	2483.5	-45.07	2	-	52.19	PEAK	74	Pass
	Off	2483.5	-55.27	2	5.06	47.05	AV	54	Pass
	Off	2499.52	-43.64	2	-	53.62	PEAK	74	Pass
	Off	2485.936	-54.94	2	5.06	47.38	AV	54	Pass
	Off	2500.0	-44.99	2	-	52.27	PEAK	74	Pass
	Off	2500.0	-56.05	2	5.06	46.27	AV	54	Pass
$\pi/4$ DQPSK	Off	2310.0	-50.42	2	-	46.84	PEAK	74	Pass
	Off	2310.0	-56.36	2	4.95	45.85	AV	54	Pass
	Off	2377.776	-44.68	2	-	52.58	PEAK	74	Pass
	Off	2377.872	-52.71	2	4.95	49.5	AV	54	Pass
	Off	2390.0	-48	2	-	49.26	PEAK	74	Pass
	Off	2390.0	-55.66	2	4.95	46.55	AV	54	Pass
	Off	2483.5	-48.8	2	-	48.46	PEAK	74	Pass
	Off	2483.5	-55.88	2	4.95	46.33	AV	54	Pass
	Off	2491.696	-46.09	2	-	51.17	PEAK	74	Pass
	Off	2496.112	-54.14	2	4.95	48.07	AV	54	Pass
	Off	2500.0	-48.05	2	-	49.21	PEAK	74	Pass
	Off	2500.0	-55.04	2	4.95	47.17	AV	54	Pass
8DPSK	Off	2310.0	-50.34	2	-	46.92	PEAK	74	Pass
	Off	2310.0	-56.68	2	4.95	45.53	AV	54	Pass
	Off	2377.584	-44.58	2	-	52.68	PEAK	74	Pass
	Off	2378.256	-53.73	2	4.95	48.48	AV	54	Pass



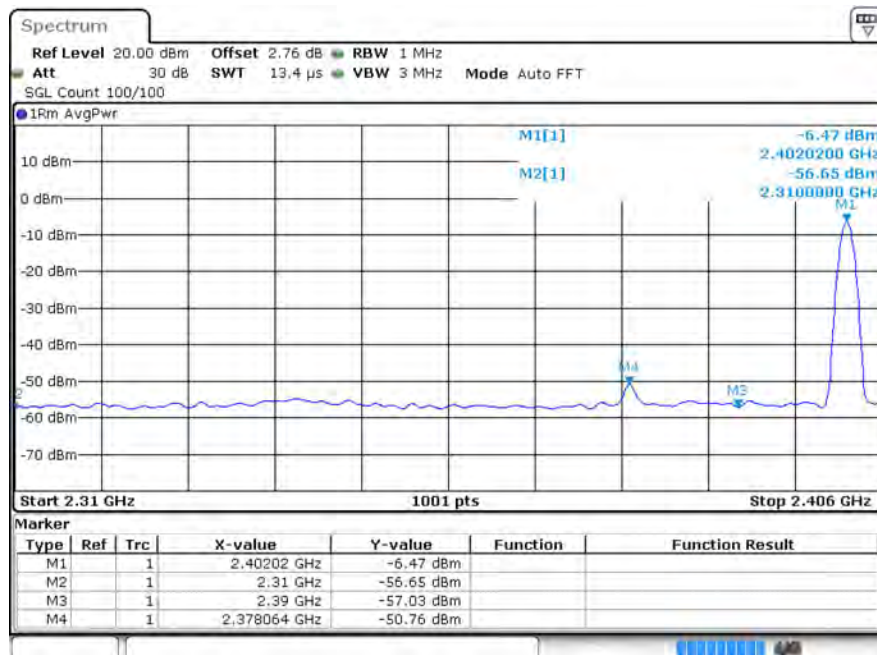
Off	2390.0	-48.27	2	-	48.99	PEAK	74	Pass
Off	2390.0	-56.9	2	4.95	45.31	AV	54	Pass
Off	2483.5	-48.87	2	-	48.39	PEAK	74	Pass
Off	2483.5	-55.78	2	4.95	46.43	AV	54	Pass
Off	2494.072	-45.06	2	-	52.2	PEAK	74	Pass
Off	2487.208	-54.64	2	4.95	47.57	AV	54	Pass
Off	2500.0	-49.92	2	-	47.34	PEAK	74	Pass
Off	2500.0	-55.65	2	4.95	46.56	AV	54	Pass

9.2 Test Graphs

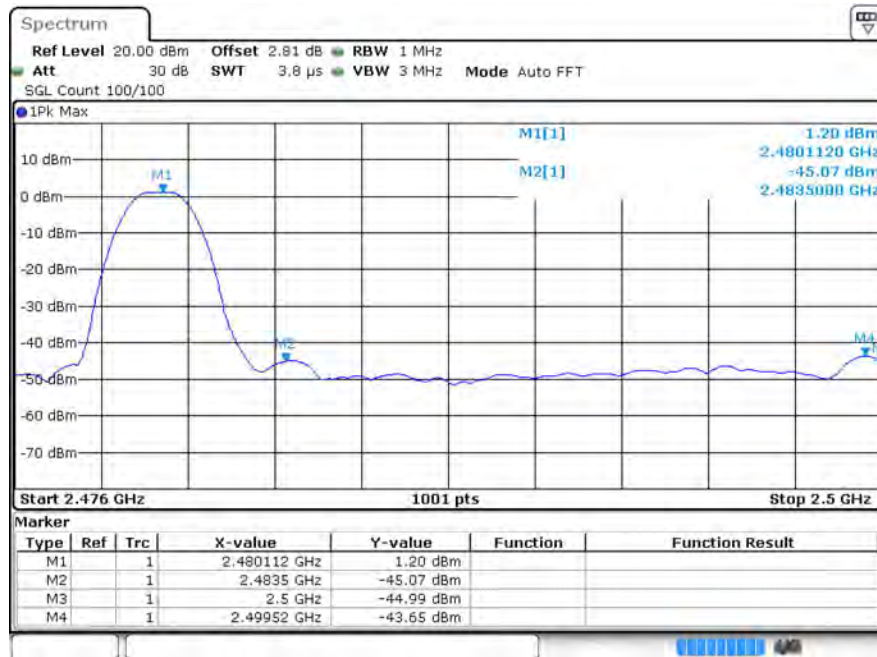
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



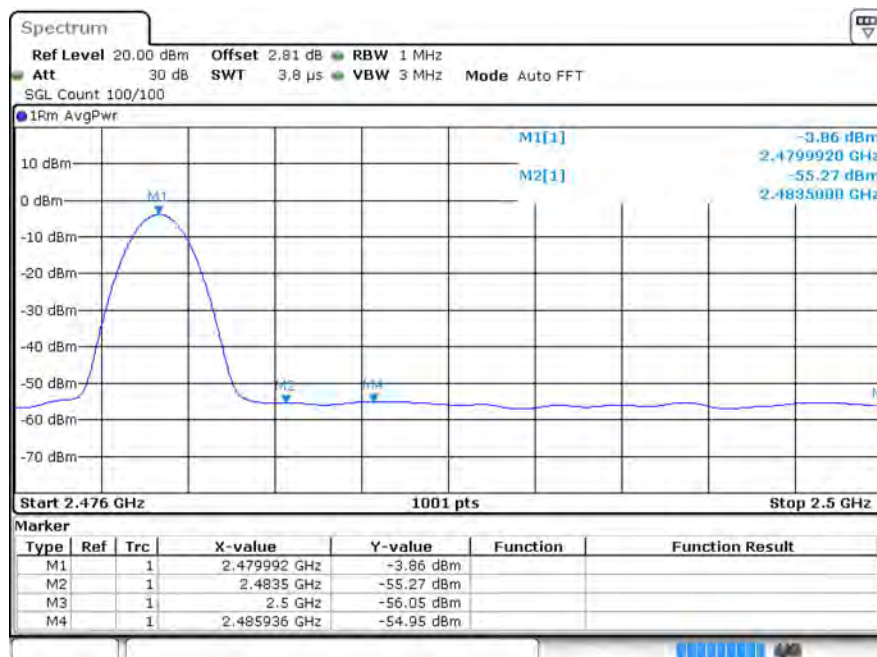
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



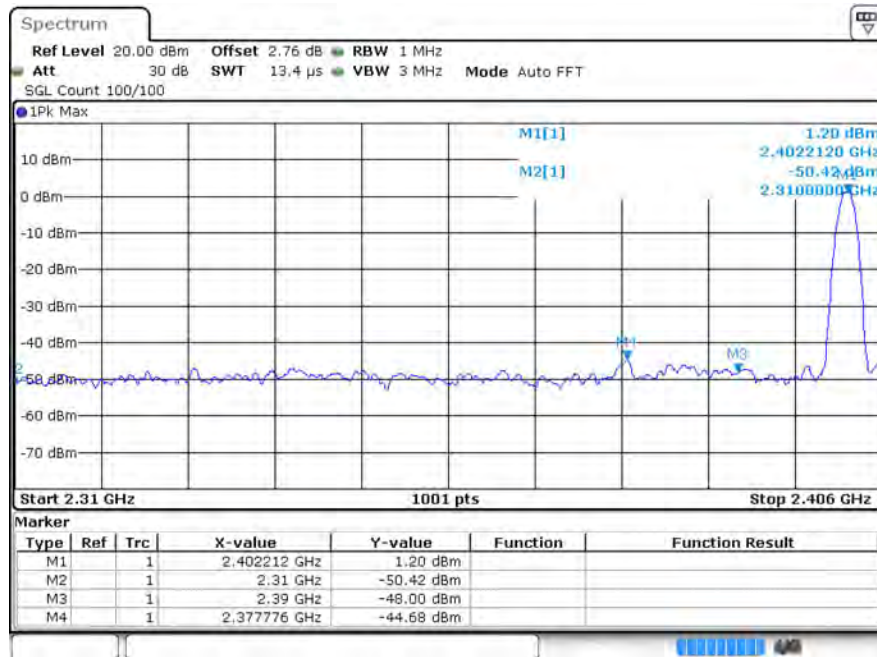
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



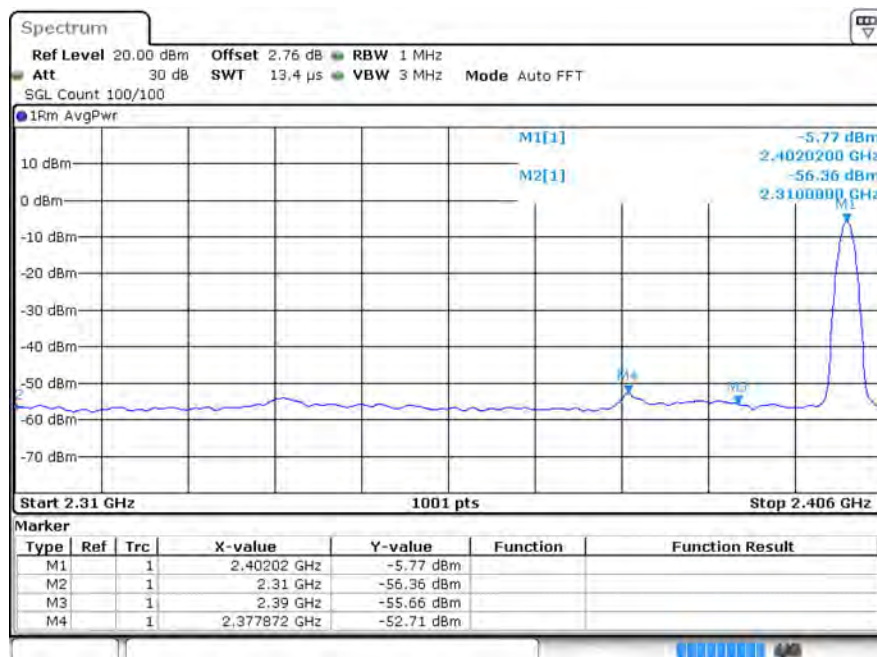
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



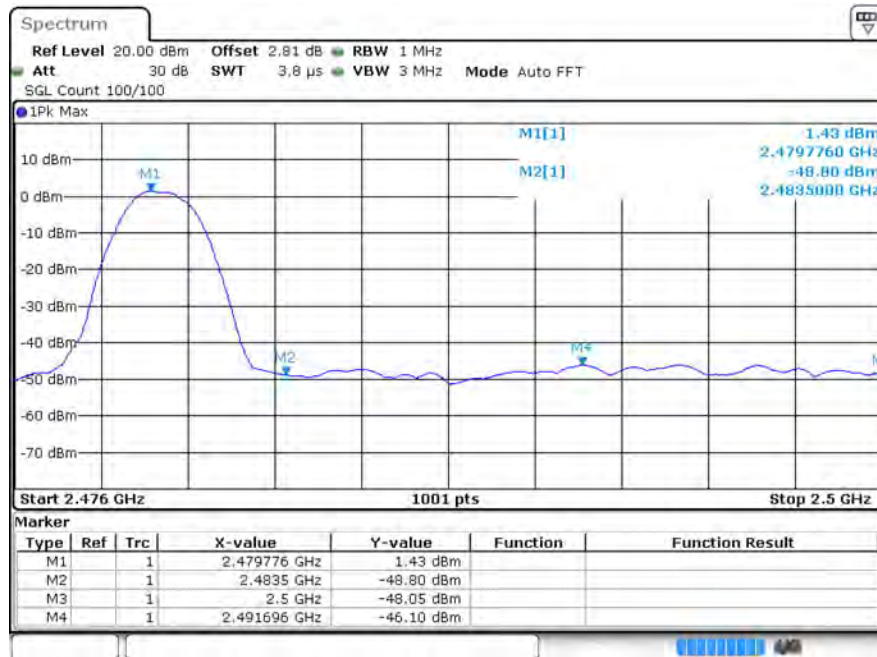
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



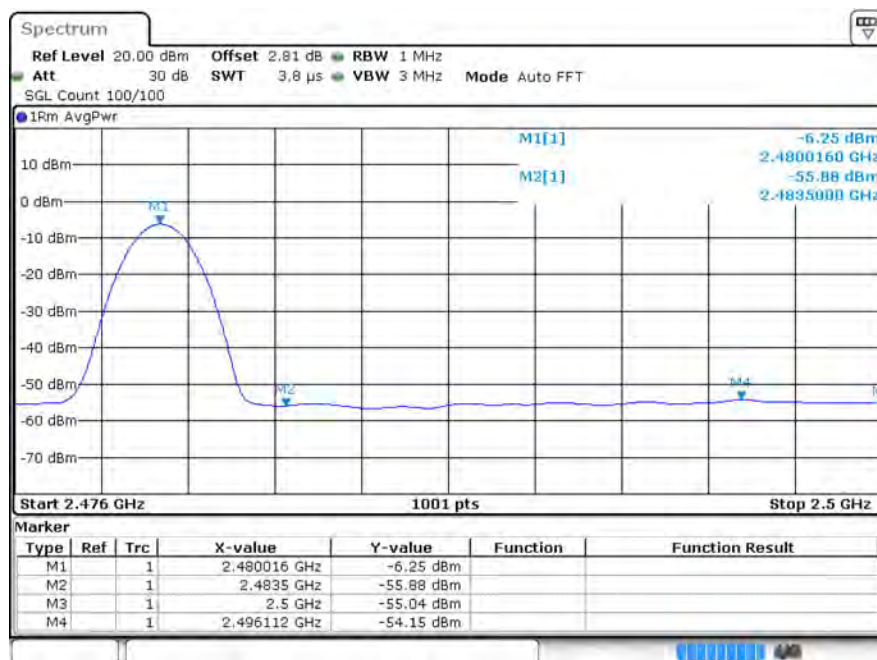
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



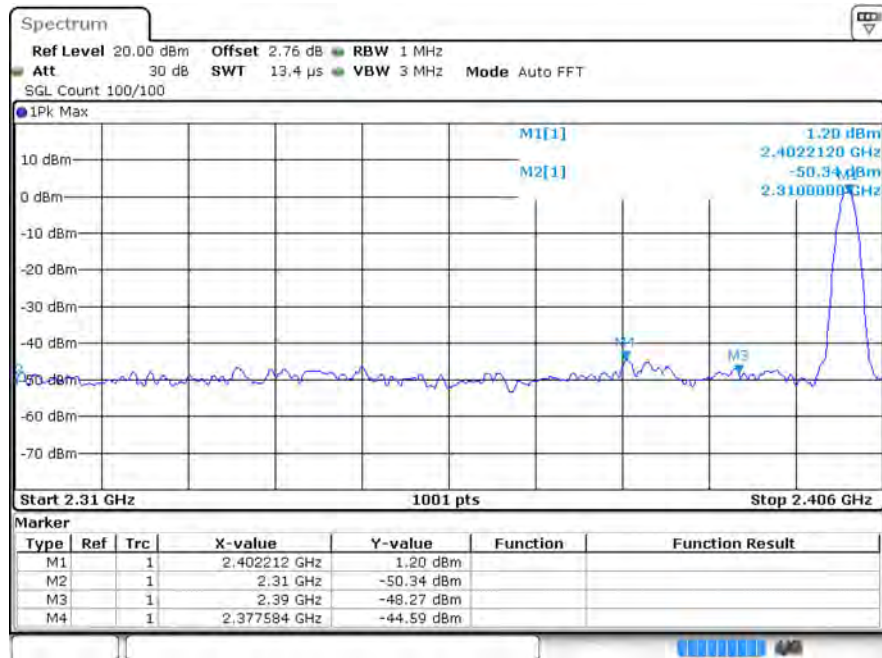
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



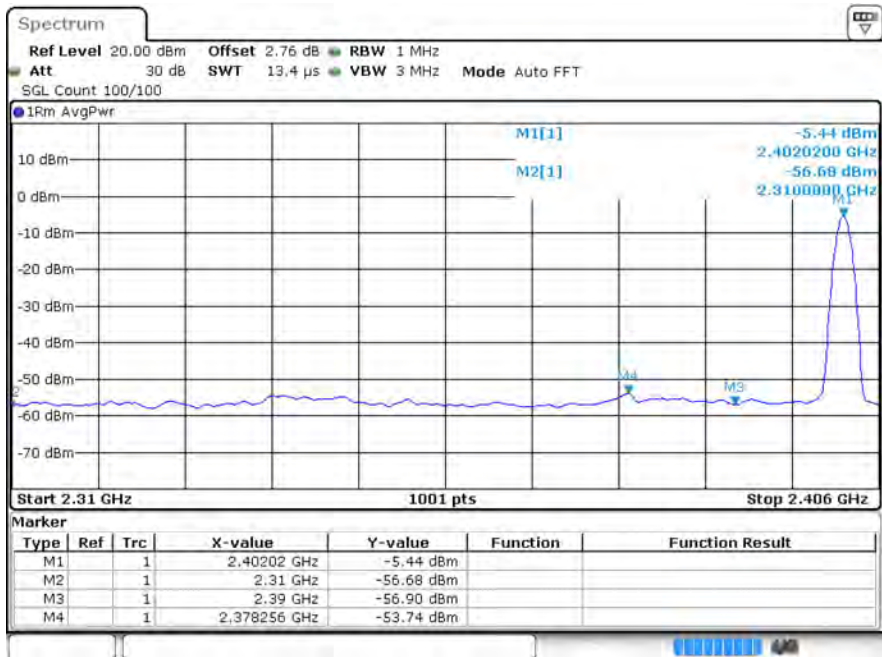
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



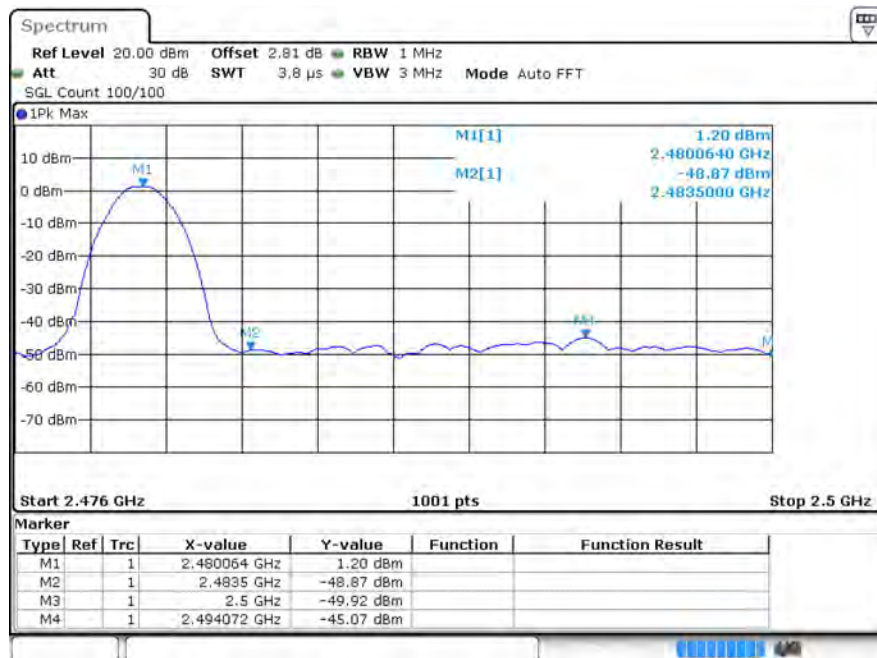
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



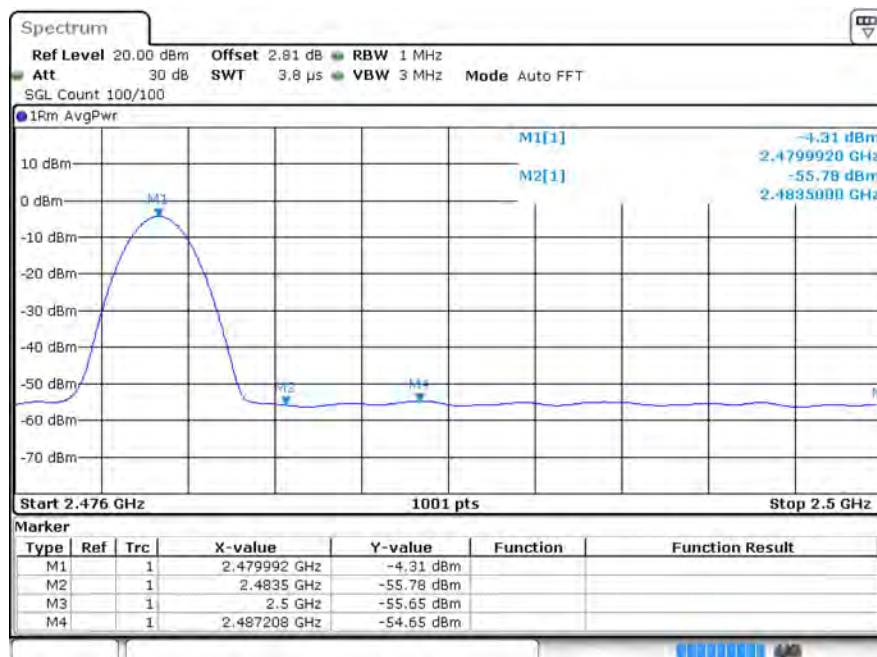
Restrict-band band-edge measurements_Hopping Off_8DPSK_Average (Low Channel)



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



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



---The End---