



Appendix A

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

Product Name: AUTOMOTIVE DIAGNOSIS SYSTEM

Trade Mark: AUTEL

Test Model: MaxiCheck MX900-BT

Environmental Conditions

Temperature:	25.2℃
Relative Humidity:	52.4%
ATM Pressure:	101Kpa
Test Engineer:	Simba Huang
Supervised by:	Seal Chen

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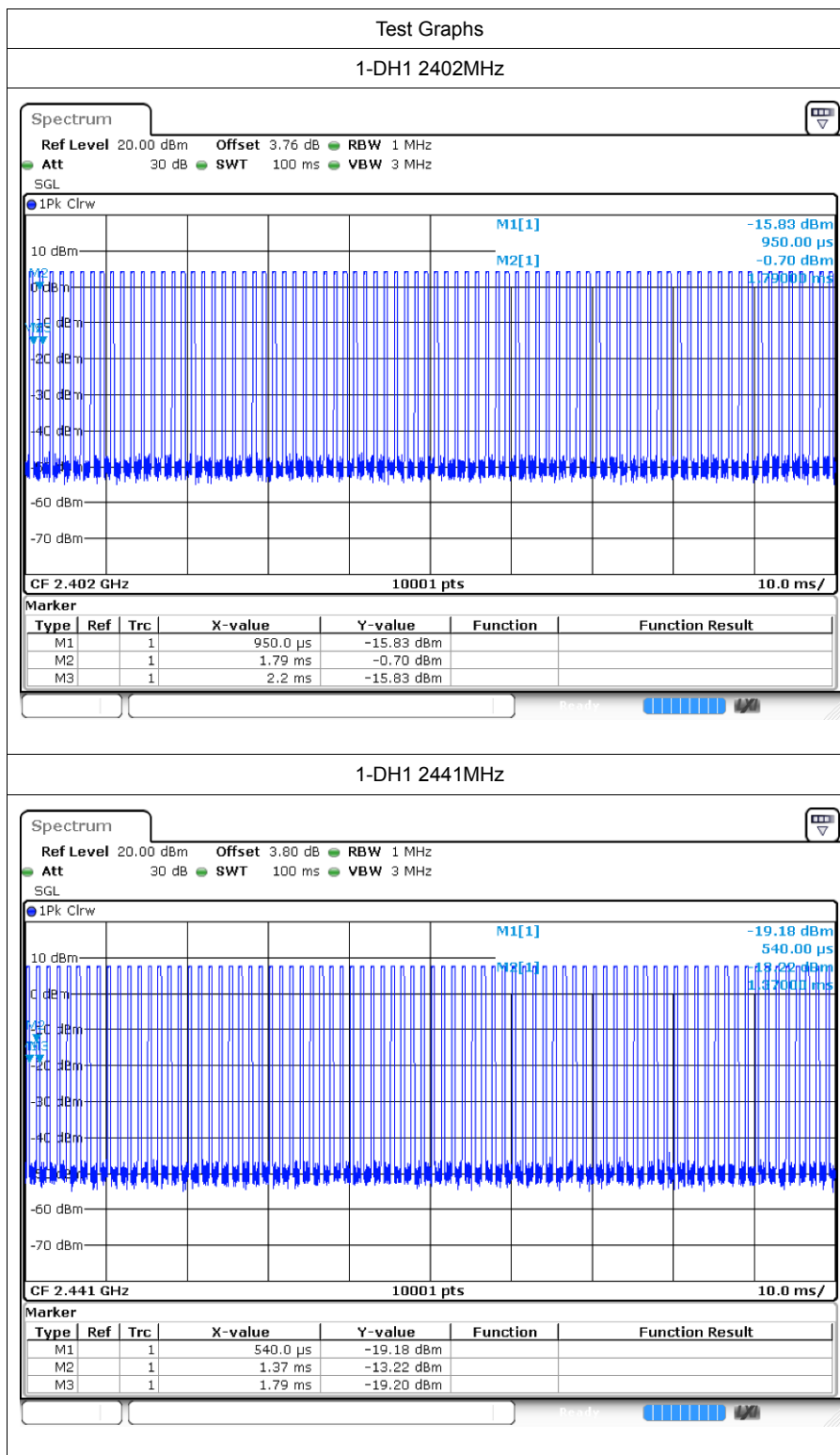
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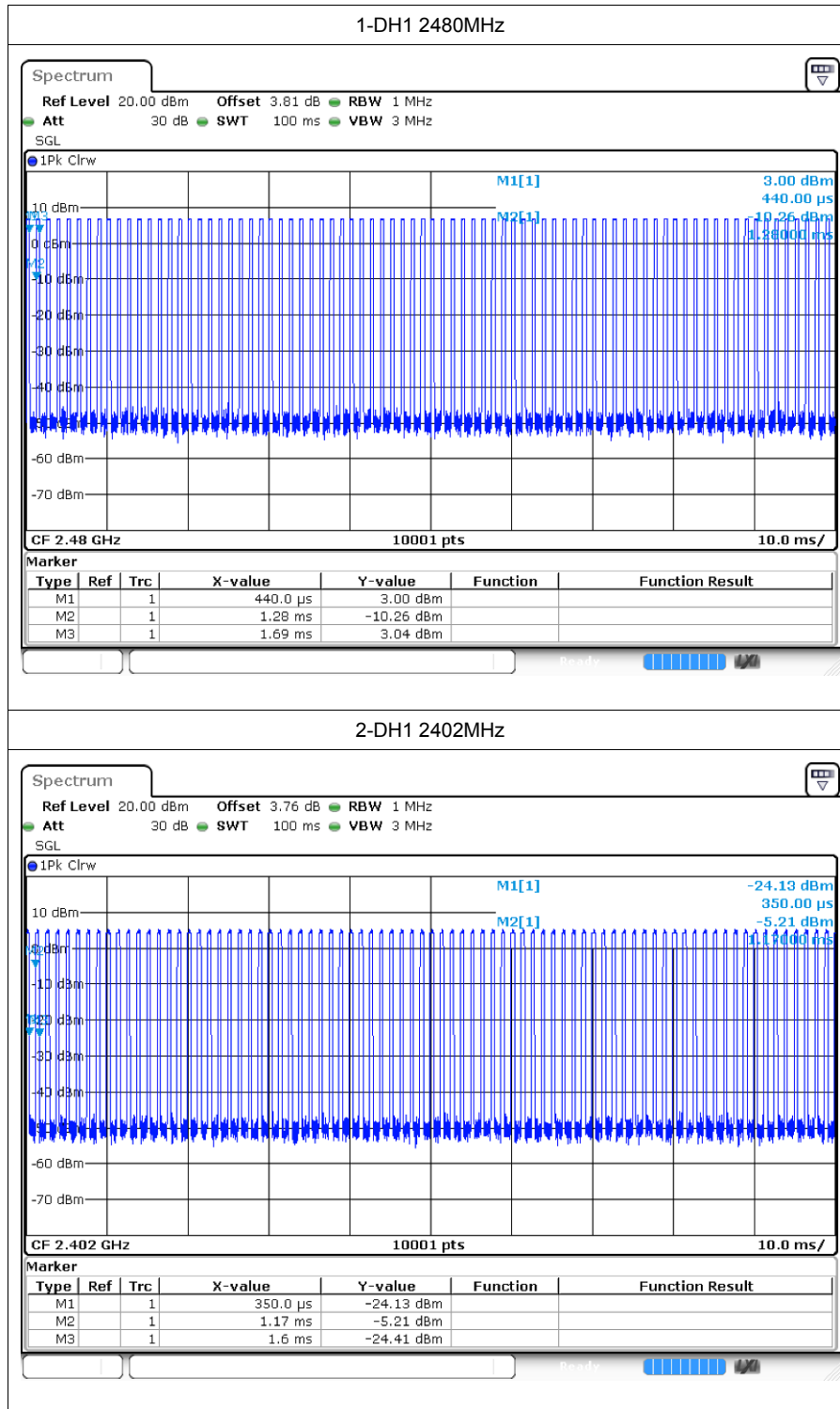
1 Duty Cycle

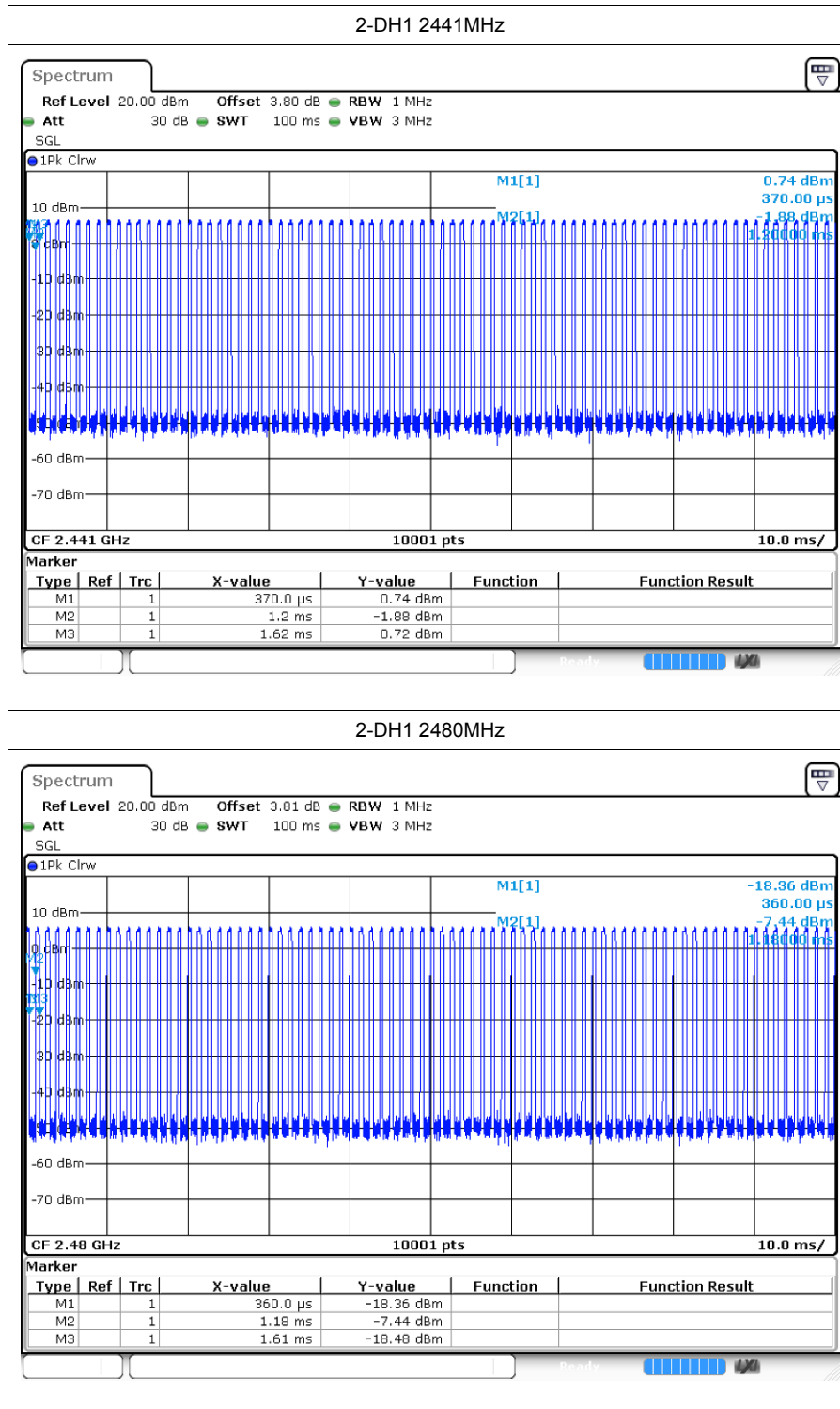
1.1 Test Result

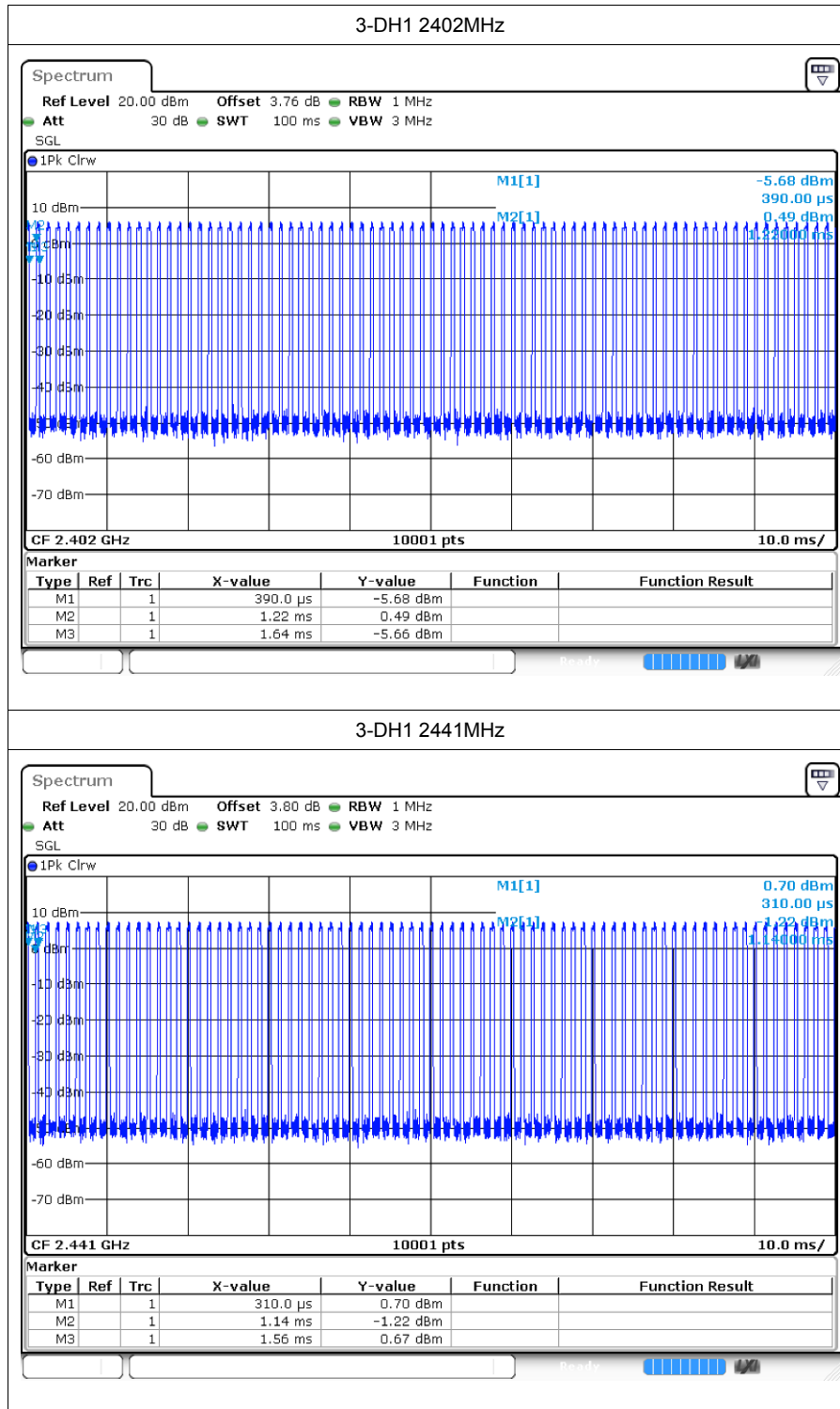
Mode	Frequency (MHz)	Duty Cycle (%)	1/T (kHz)
1-DH1	2402	33.6	2.44
1-DH1	2441	34.4	2.38
1-DH1	2480	33.6	2.44
2-DH1	2402	35.21	2.33
2-DH1	2441	34.41	2.38
2-DH1	2480	35.21	2.33
3-DH1	2402	34.41	2.38
3-DH1	2441	34.41	2.38
3-DH1	2480	35.21	2.33

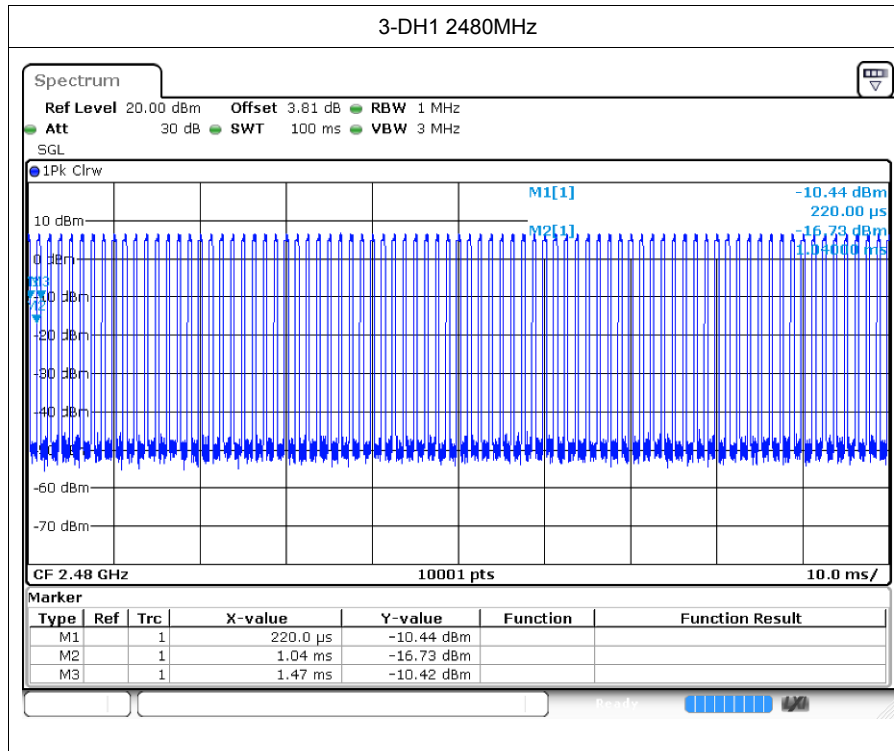
1.2 Test Graphs









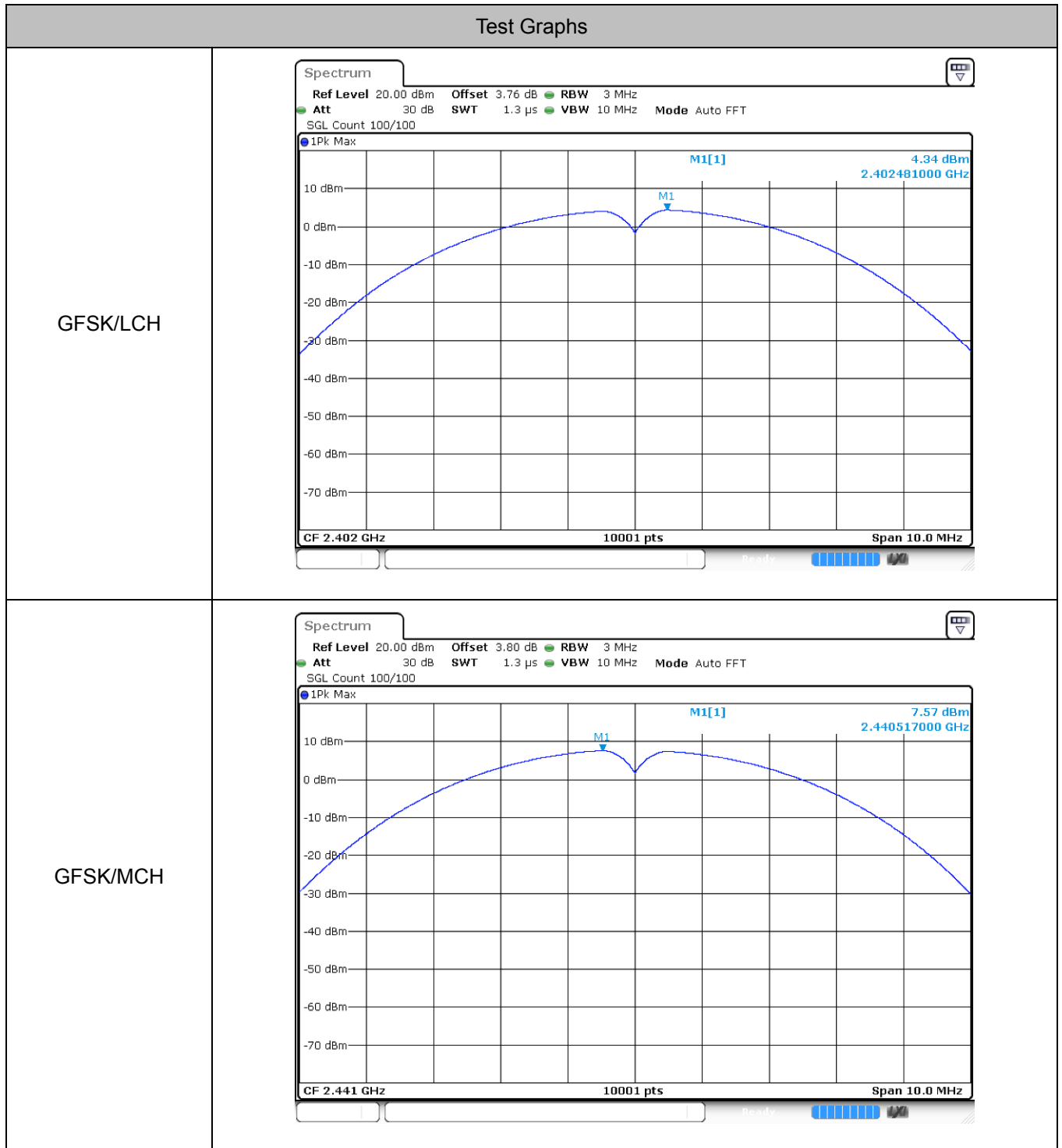


2 Maximum Conducted Peak Output Power

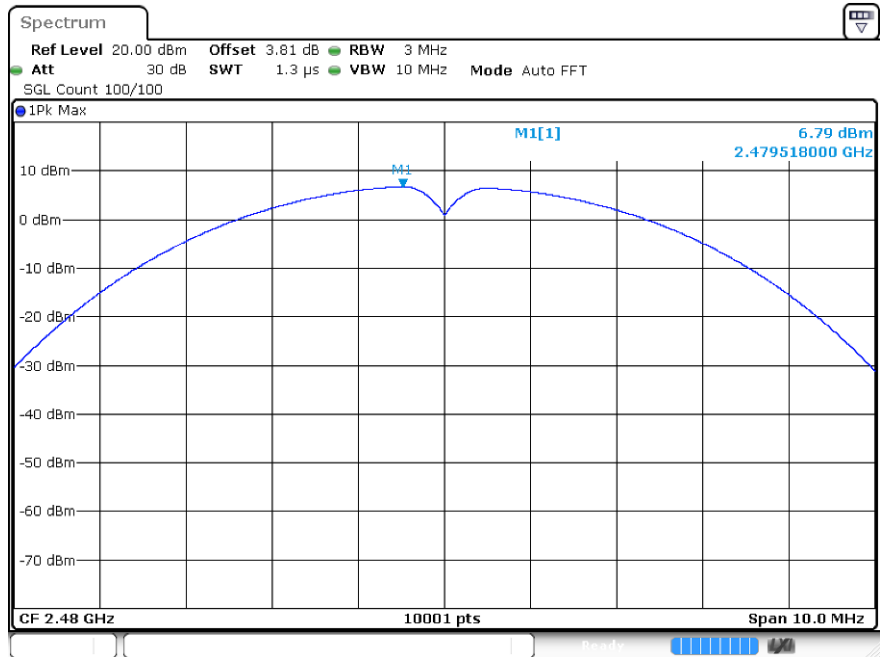
2.1 Test Result

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.34	21	Pass
	MCH	7.57	21	Pass
	HCH	6.79	21	Pass
$\pi/4$ DQPSK	LCH	5.43	21	Pass
	MCH	6.74	21	Pass
	HCH	5.49	21	Pass
8DPSK	LCH	4.88	21	Pass
	MCH	7.52	21	Pass
	HCH	6.33	21	Pass

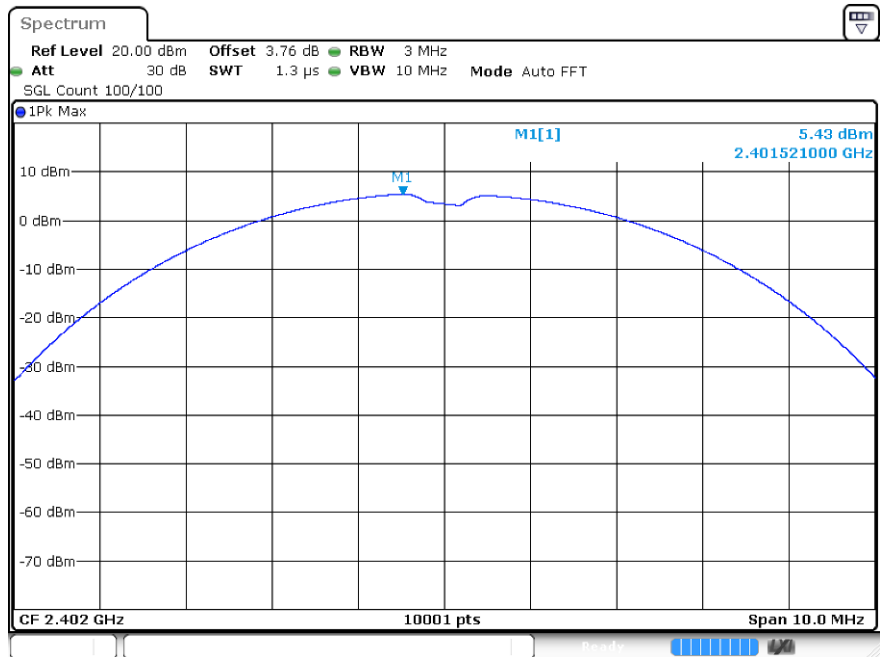
2.2 Test Graphs



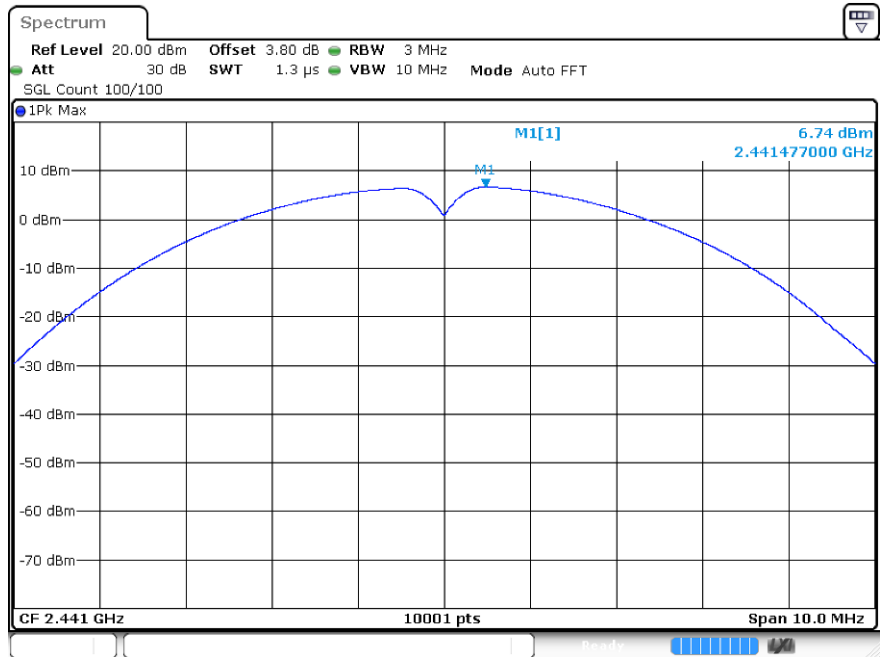
GFSK/HCH



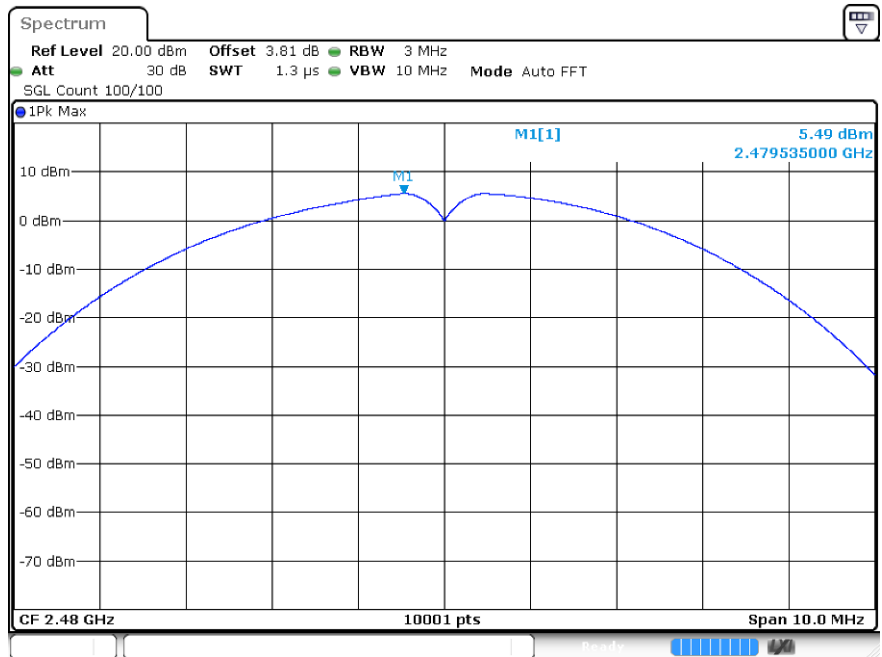
$\pi/4$ DQPSK/LCH



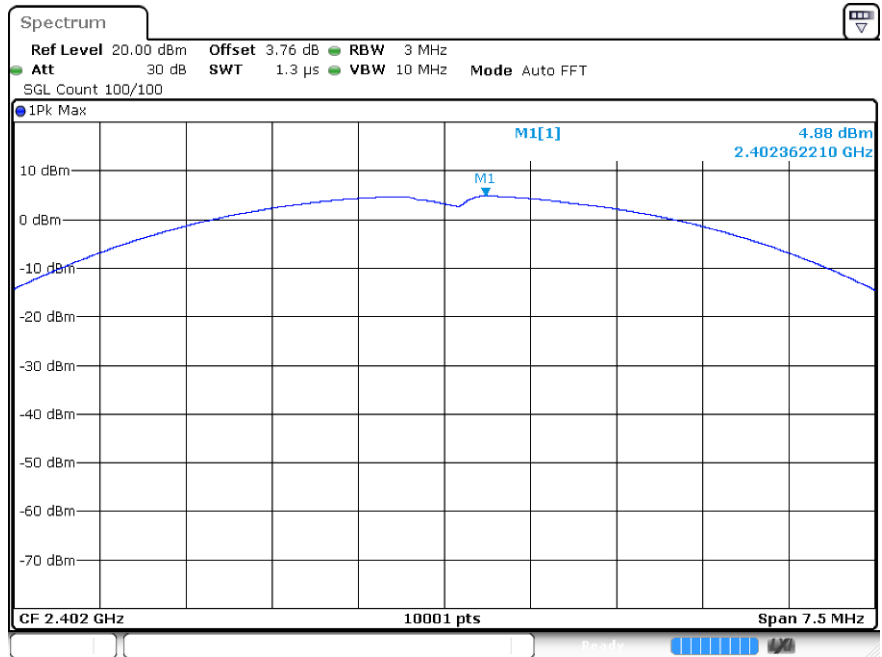
$\pi/4$ DQPSK/MCH



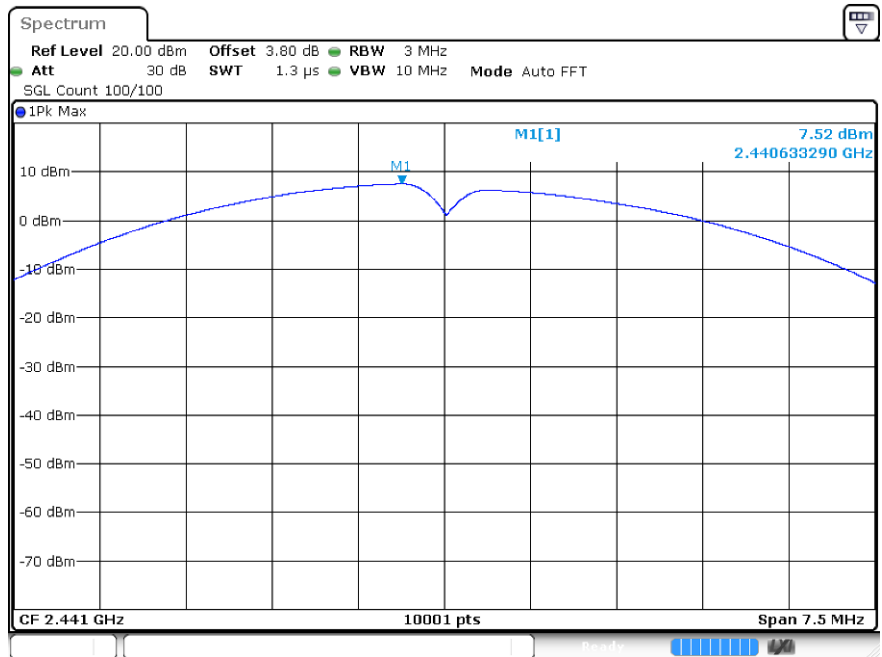
$\pi/4$ DQPSK/HCH



8DPSK/LCH

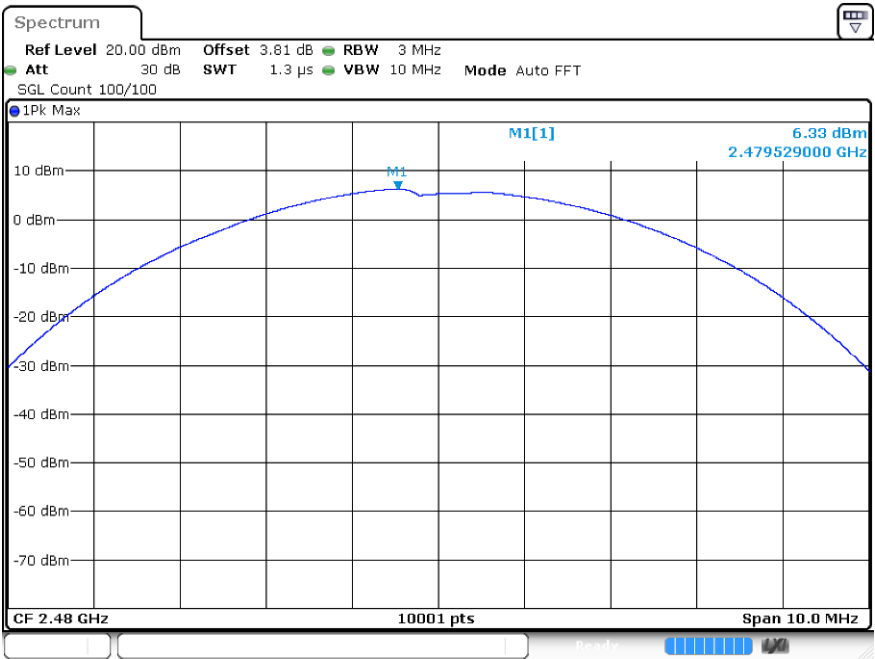


8DPSK/MCH





8DPSK/HCH

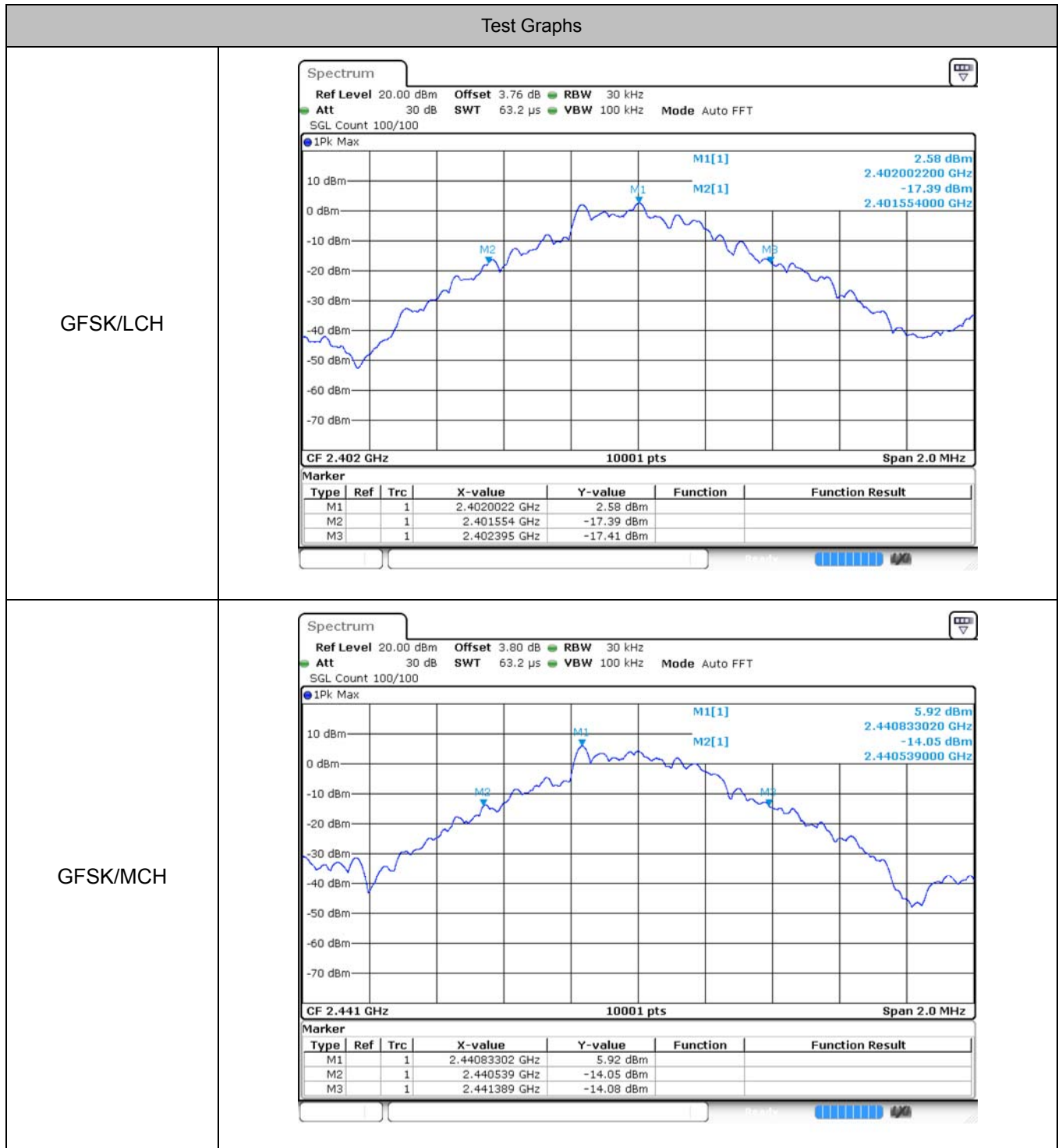


3 20dB Bandwidth

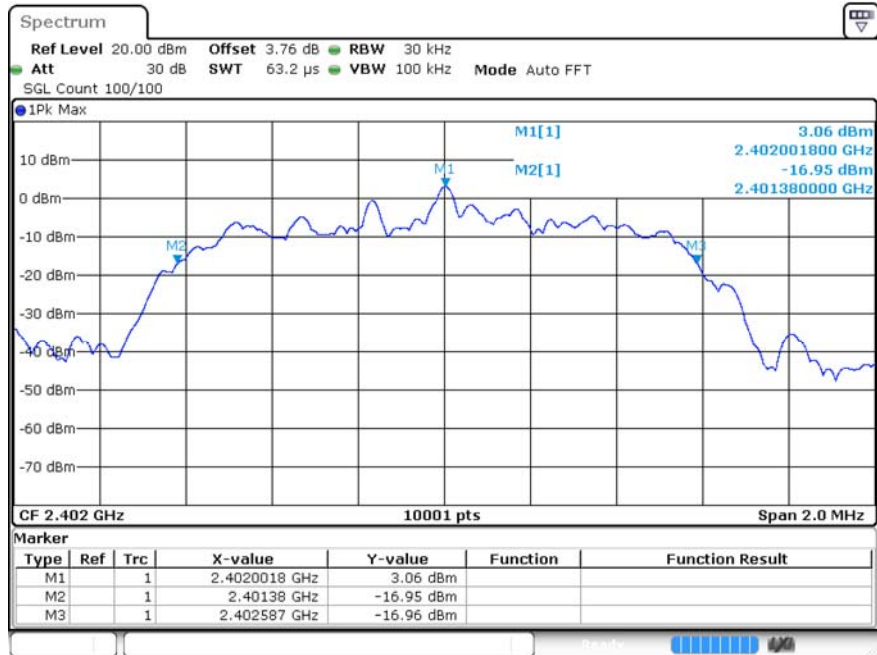
3.1 Test Result

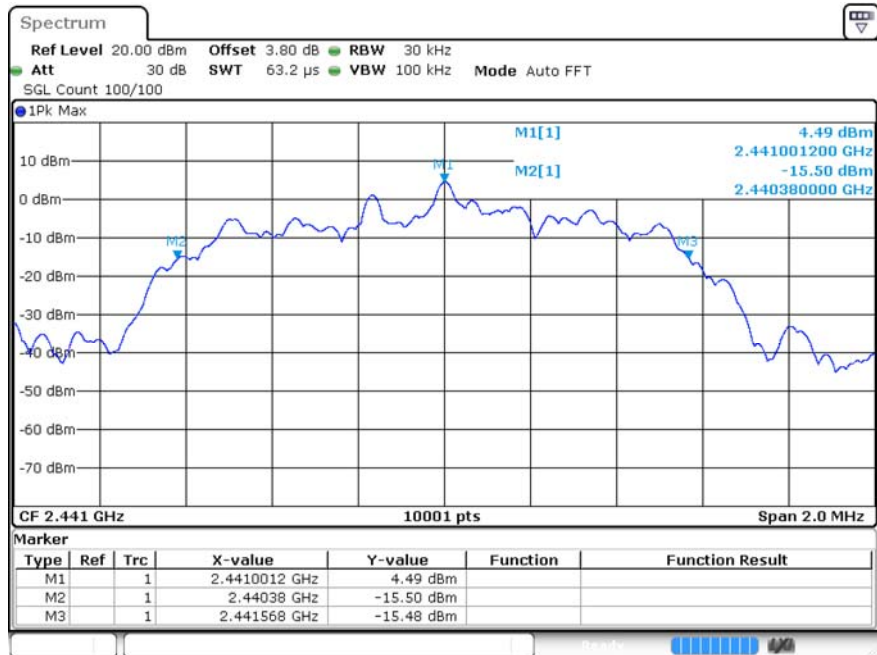
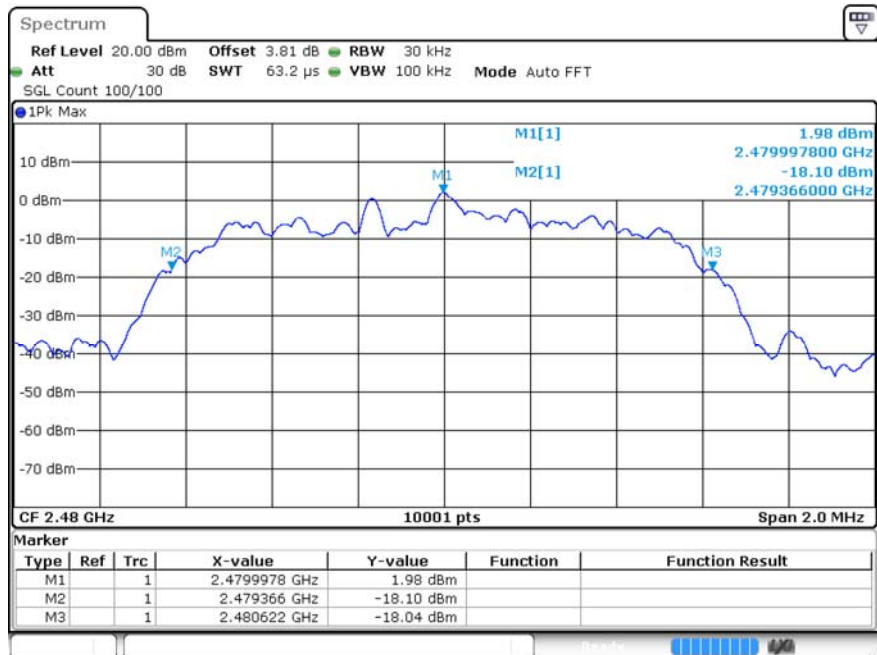
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.842	Not Specified	Pass
	MCH	0.85	Not Specified	Pass
	HCH	0.844	Not Specified	Pass
$\pi/4$ DQPSK	LCH	1.207	Not Specified	Pass
	MCH	1.188	Not Specified	Pass
	HCH	1.256	Not Specified	Pass
8DPSK	LCH	1.198	Not Specified	Pass
	MCH	1.208	Not Specified	Pass
	HCH	1.236	Not Specified	Pass

3.2 Test Graphs

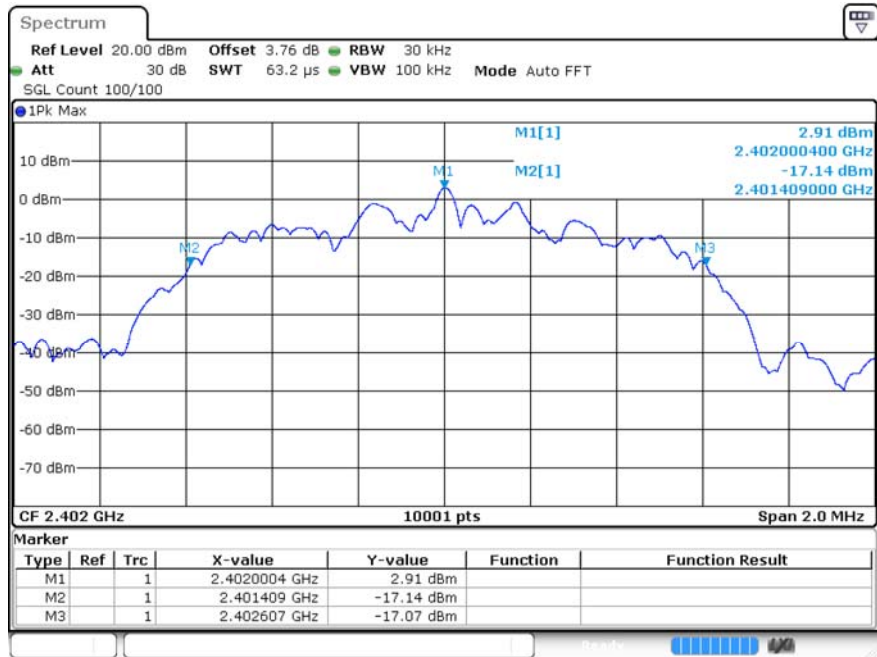


GFSK/HCH

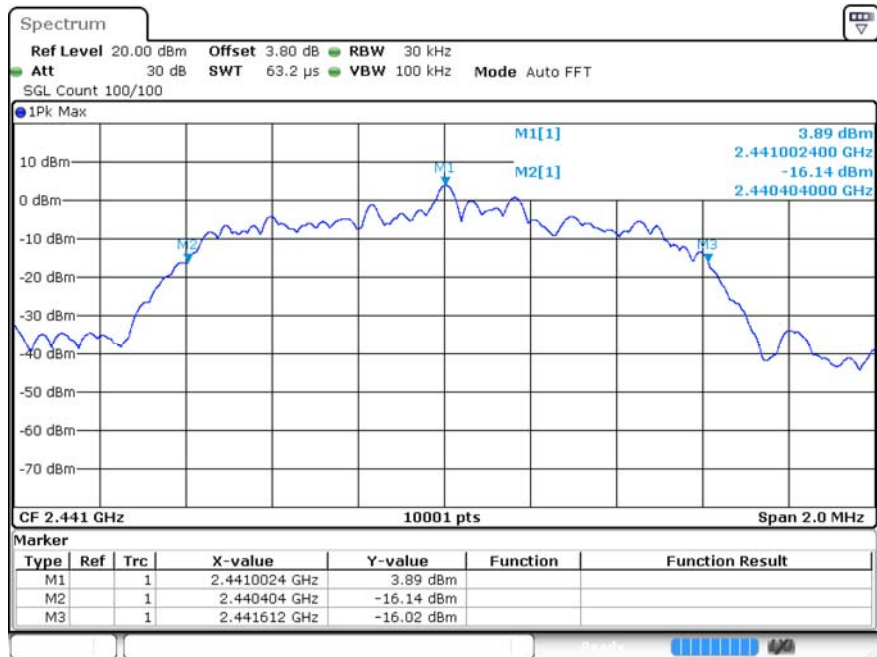

 $\pi/4$ DQPSK/LCH


$\pi/4$ DQPSK/MCH

 $\pi/4$ DQPSK/HCH


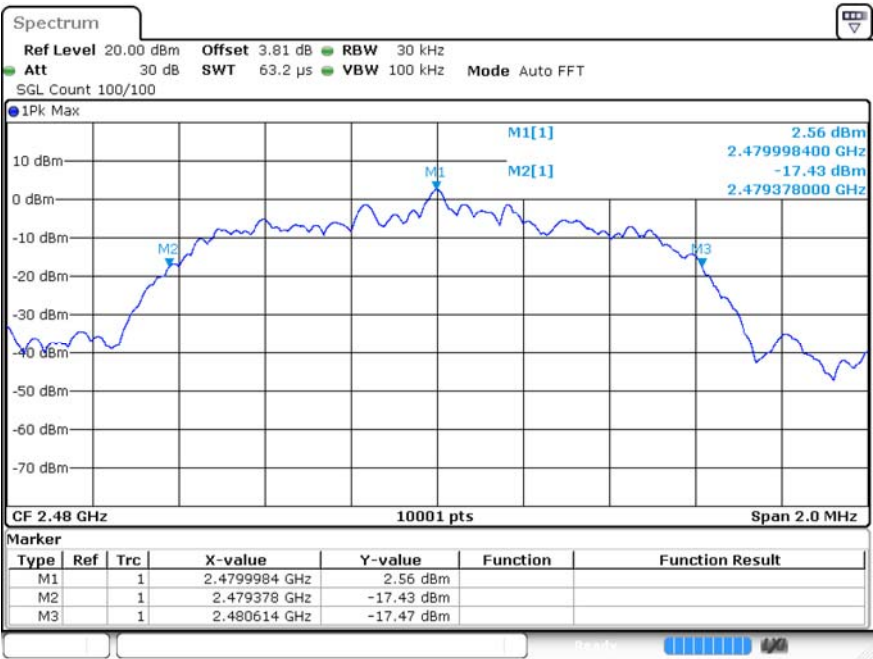
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH



4 Carrier Frequency Separation

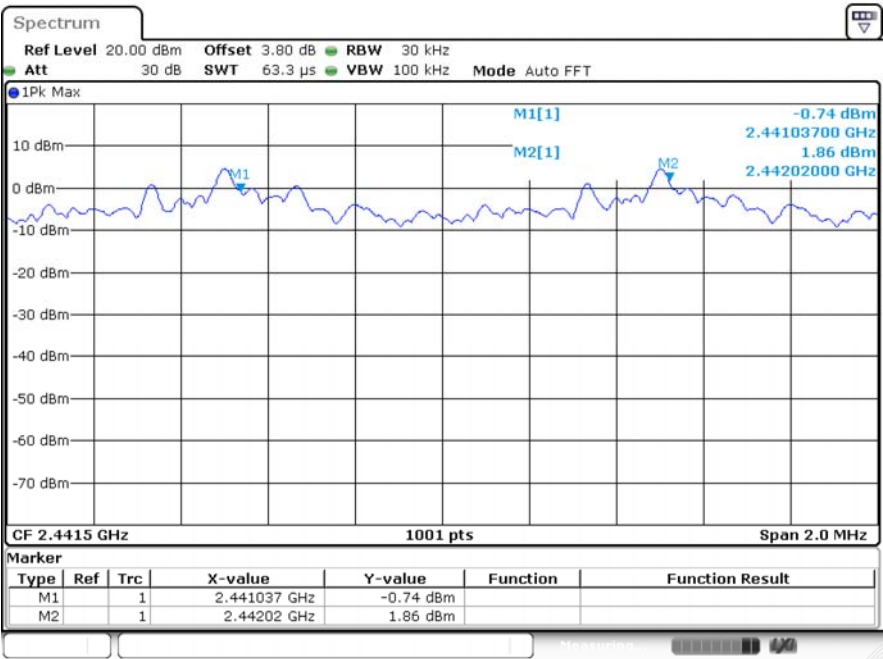
4.1 Test Result

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	MCH	1.003	0.567	Pass
$\pi/4$ DQPSK	MCH	0.987	0.792	Pass
8DPSK	MCH	0.983	0.805	Pass

4.2 Test Graphs



8DPSK/MCH

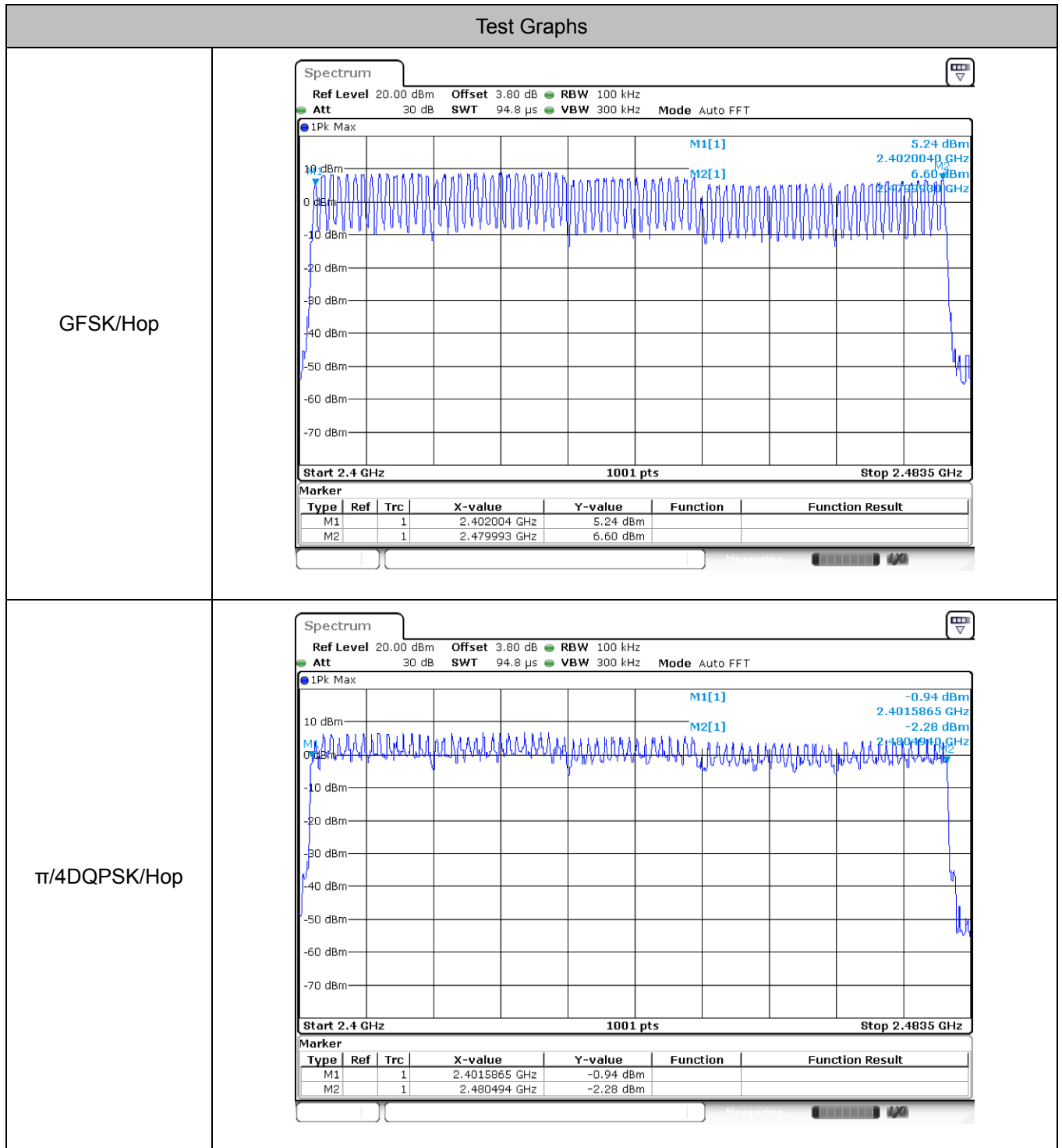


5 Hopping Channel Number

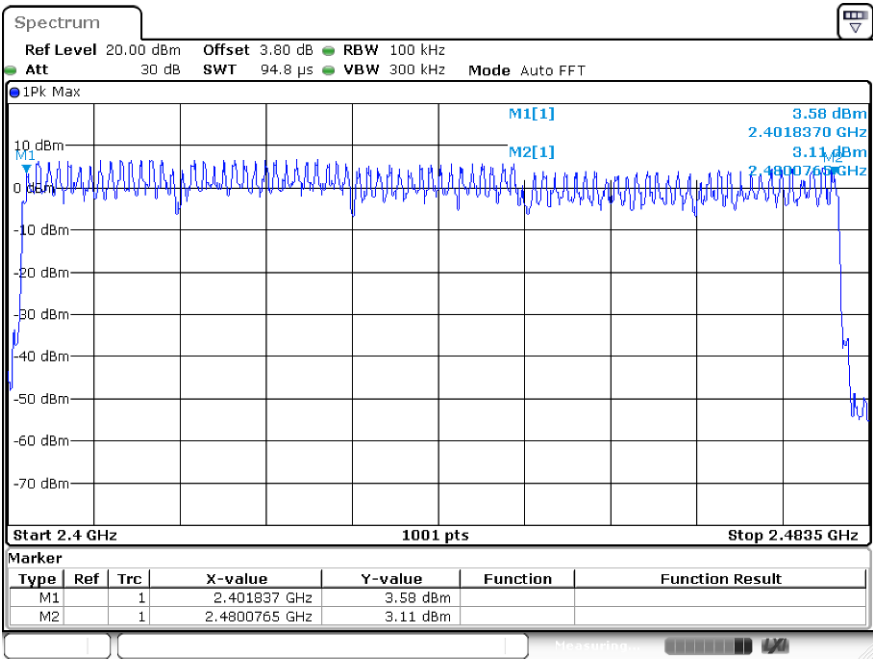
5.1 Test Result

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

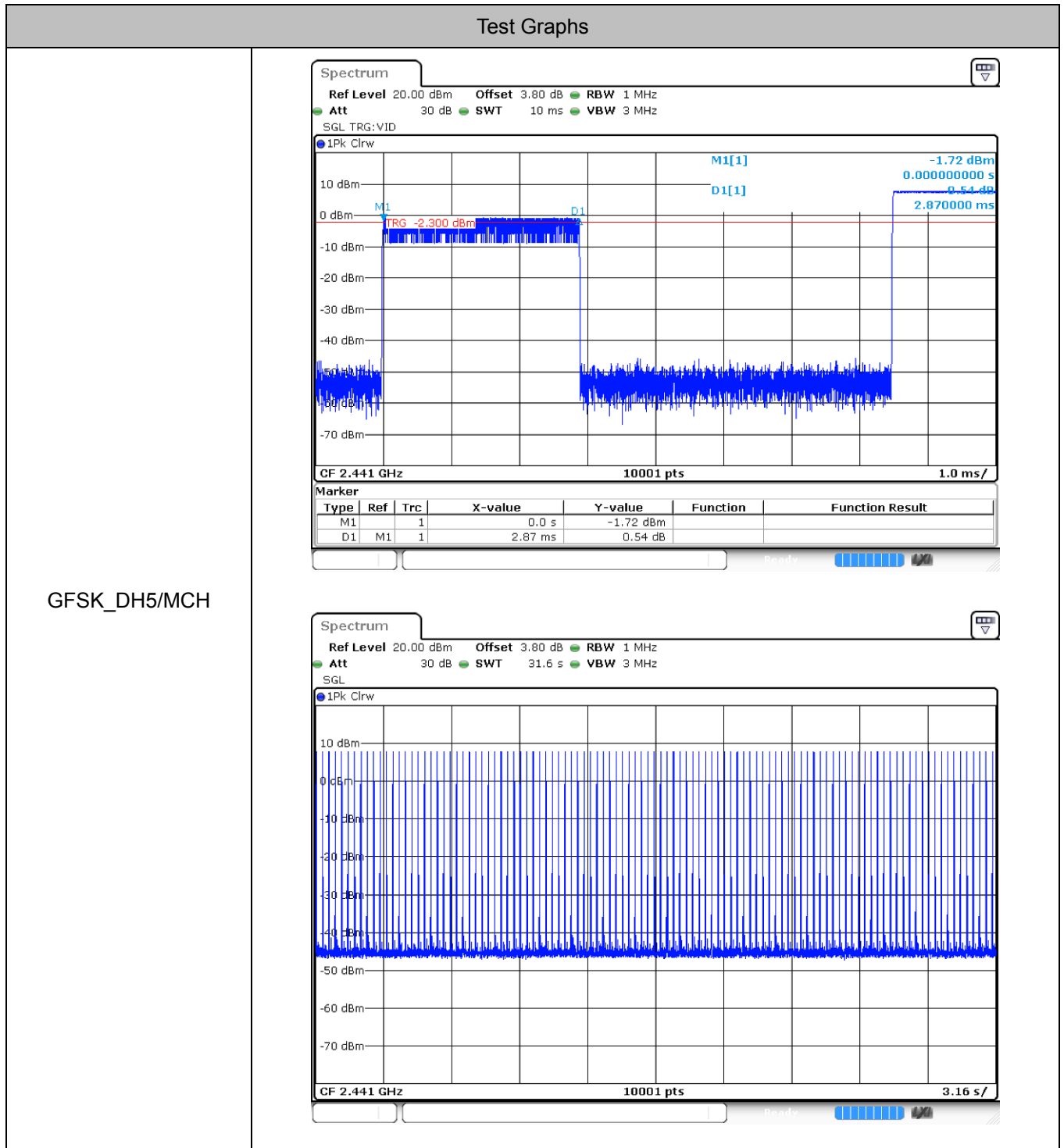


6 Dwell Time

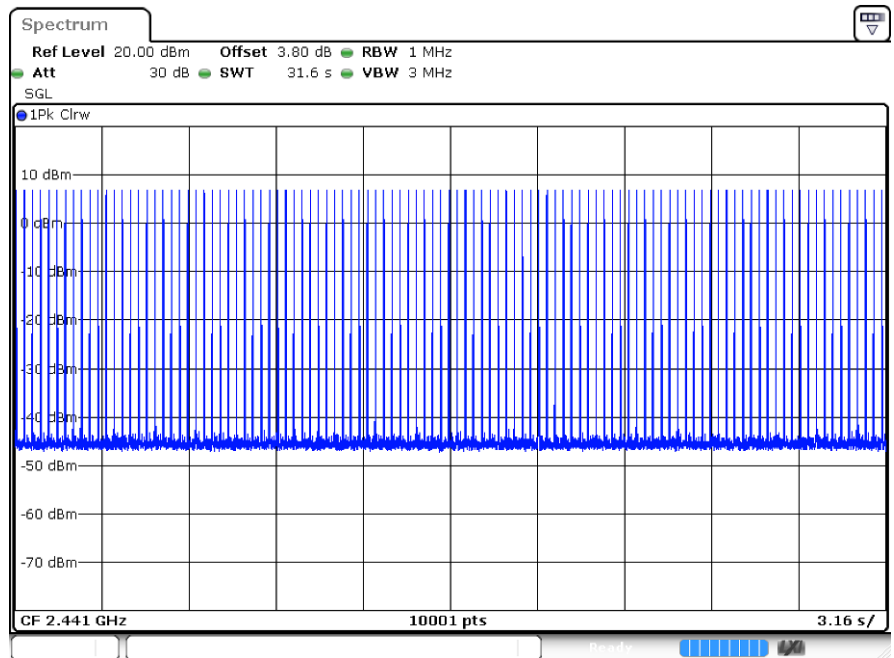
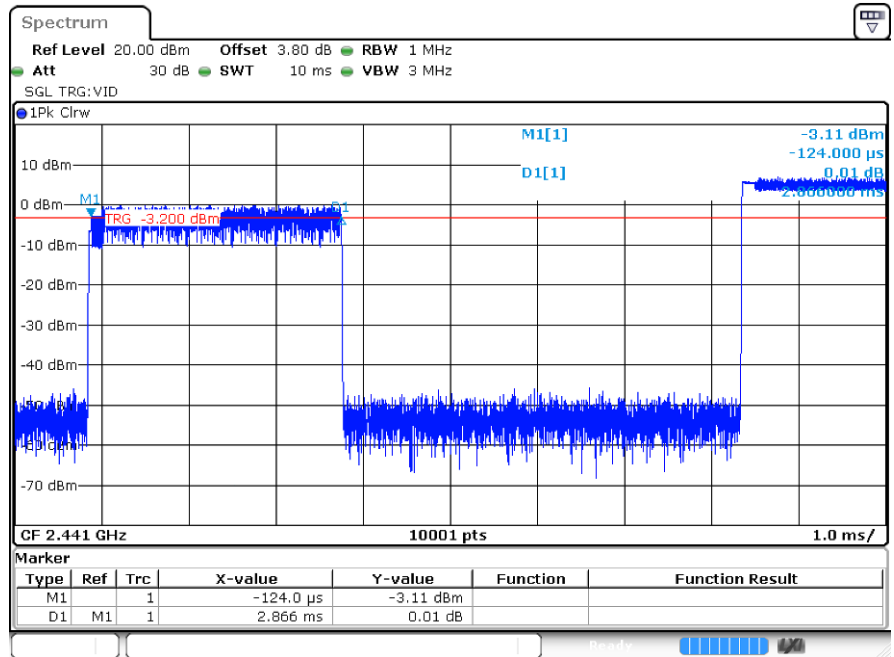
6.1 Test Result

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[ms]	Limit [s]	Verdict
GFSK	DH5	MCH	2.87	107	307.09	0.4	Pass
$\pi/4$ DQPSK	2DH5	MCH	2.866	107	306.662	0.4	Pass
8DPSK	3DH5	MCH	2.74	106	290.44	0.4	Pass

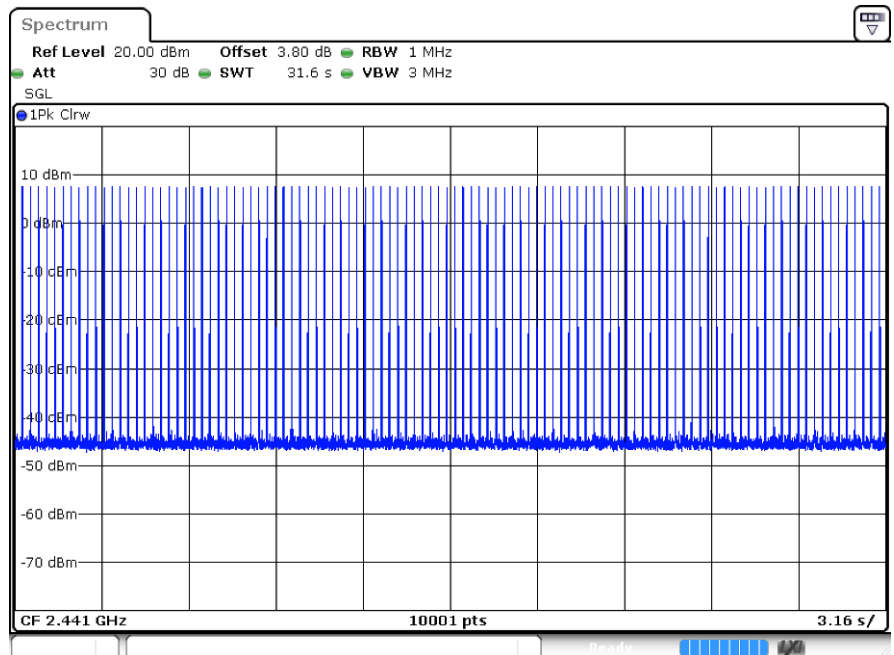
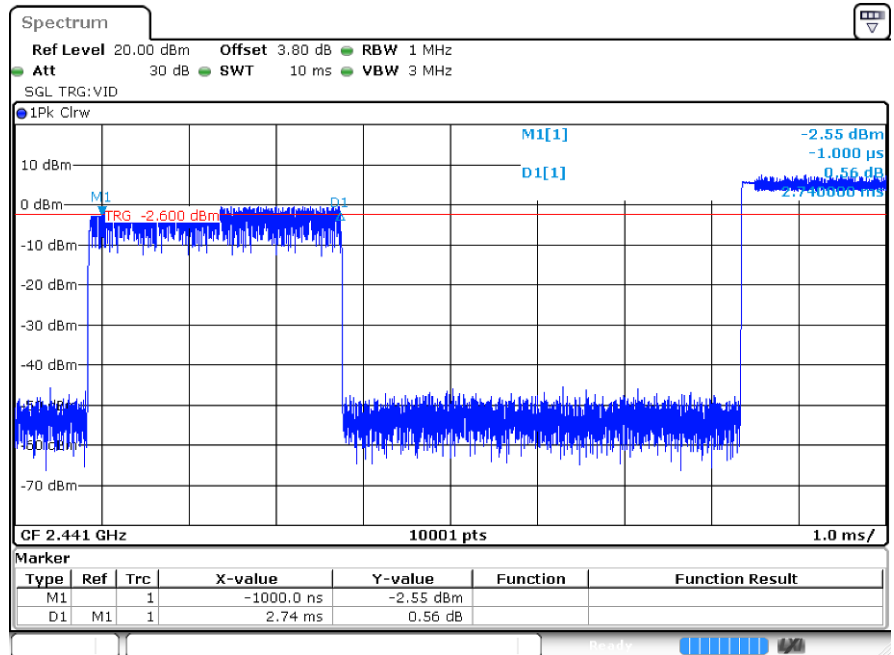
6.2 Test Graphs



$\pi/4$ DQPSK
_2DH5/MCH



8DPSK_3DH5/MCH

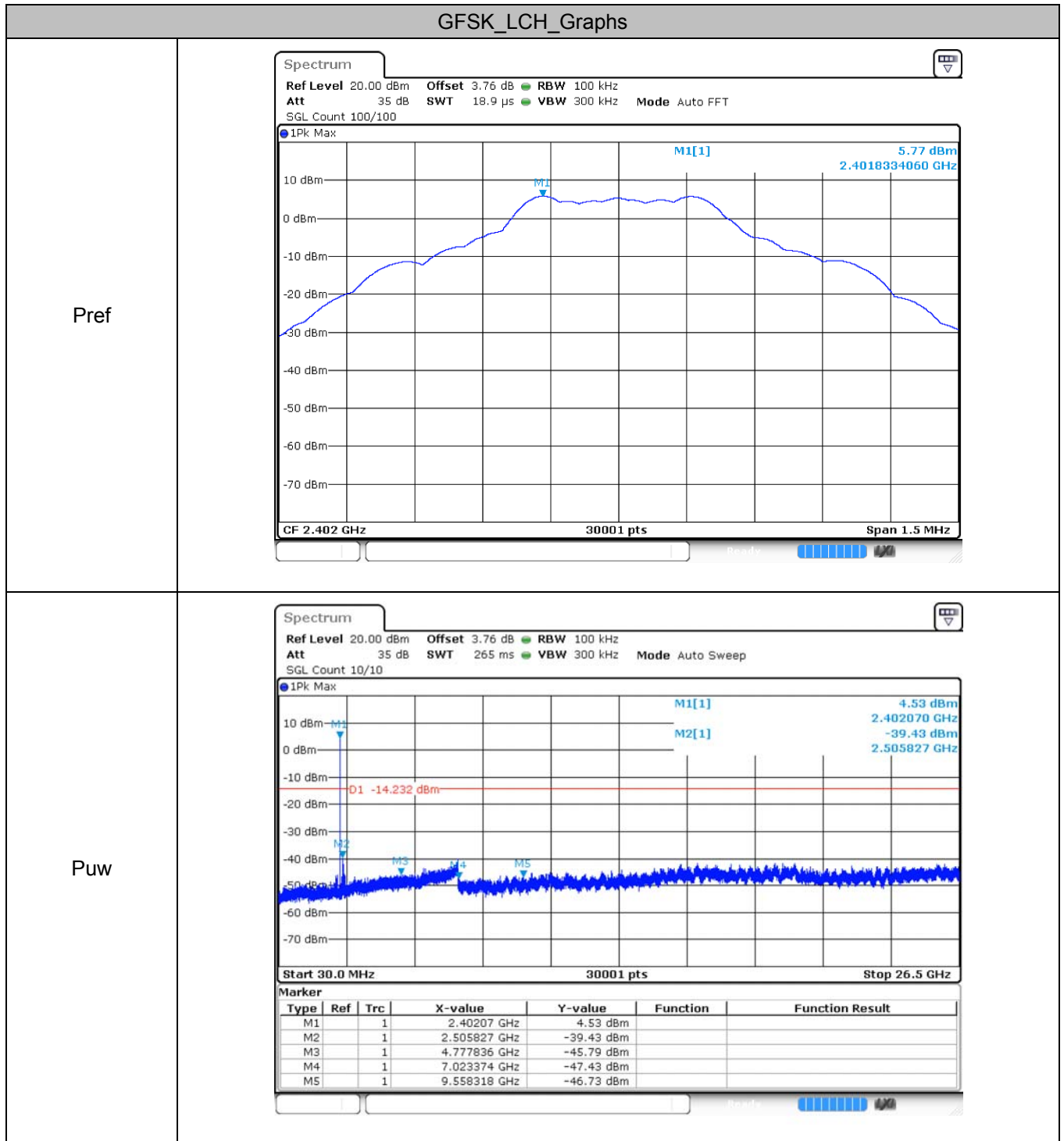


7 RF Conducted Spurious Emissions

7.1 Test Result

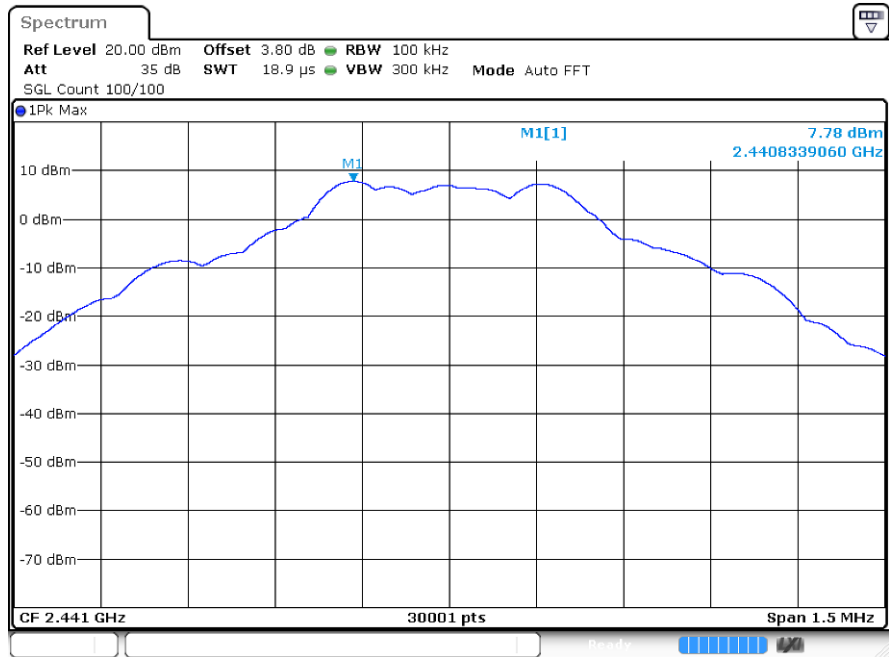
Mode	Channel	Max. Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	-45.19	-20	Pass
	MCH	-45.81	-20	Pass
	HCH	-45.17	-20	Pass
$\pi/4$ DQPSK	LCH	-44.17	-20	Pass
	MCH	-46.8	-20	Pass
	HCH	-45.03	-20	Pass
8DPSK	LCH	-43.69	-20	Pass
	MCH	-45.86	-20	Pass
	HCH	-45.36	-20	Pass

7.2 Test Graphs

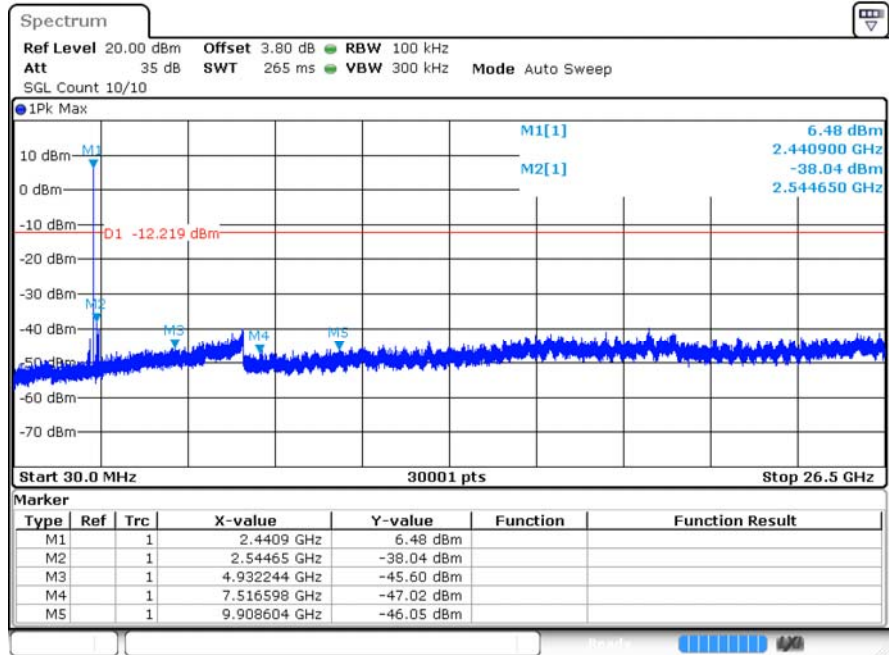


GFSK_MCH_Graphs

Pref

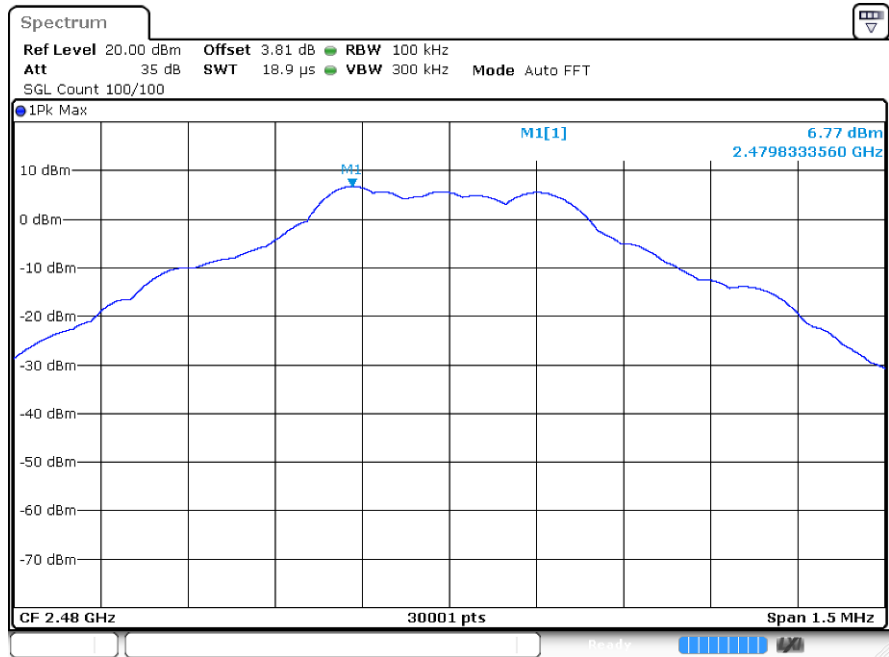


Puw

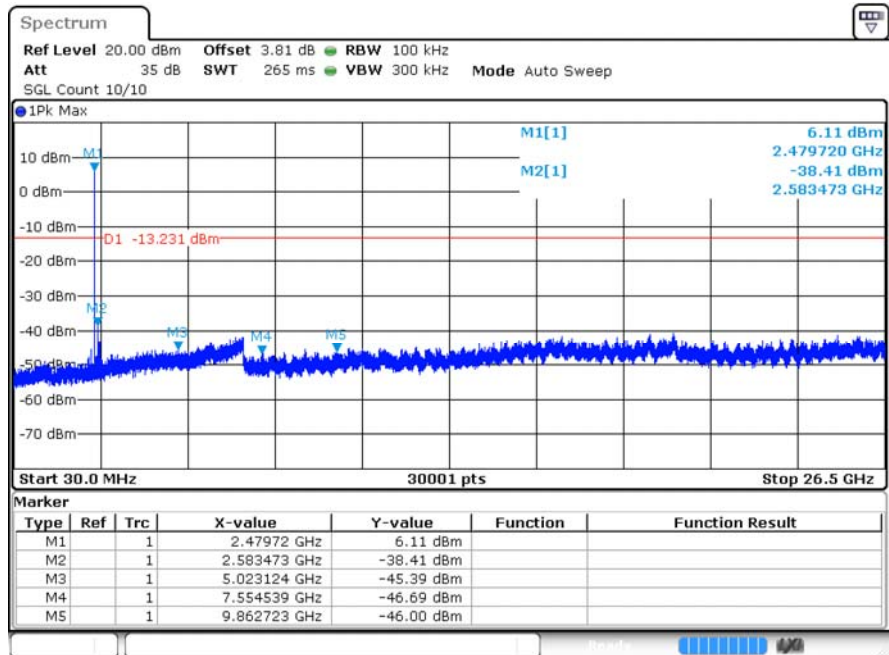


GFSK_HCH_Graphs

Pref

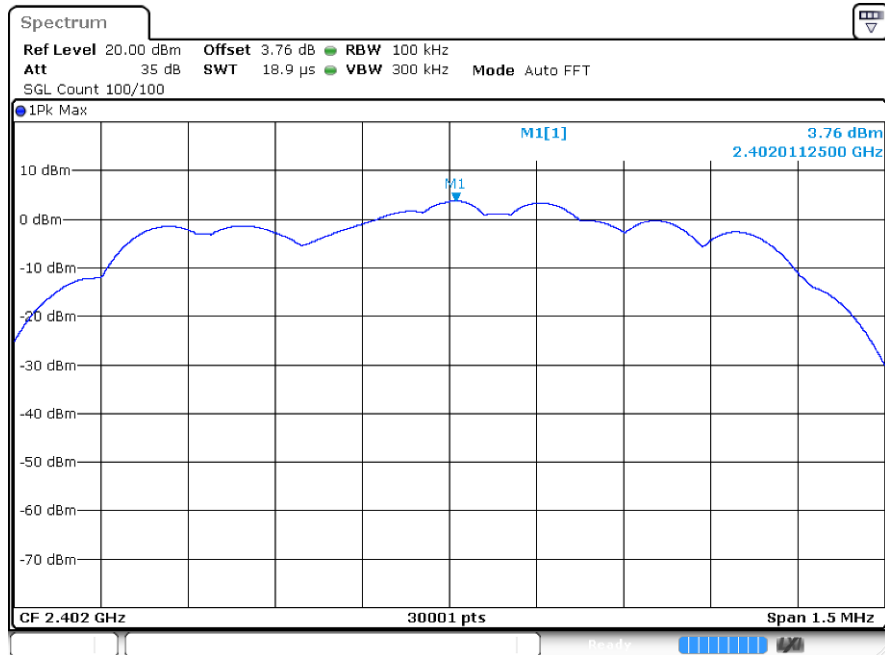


Puw

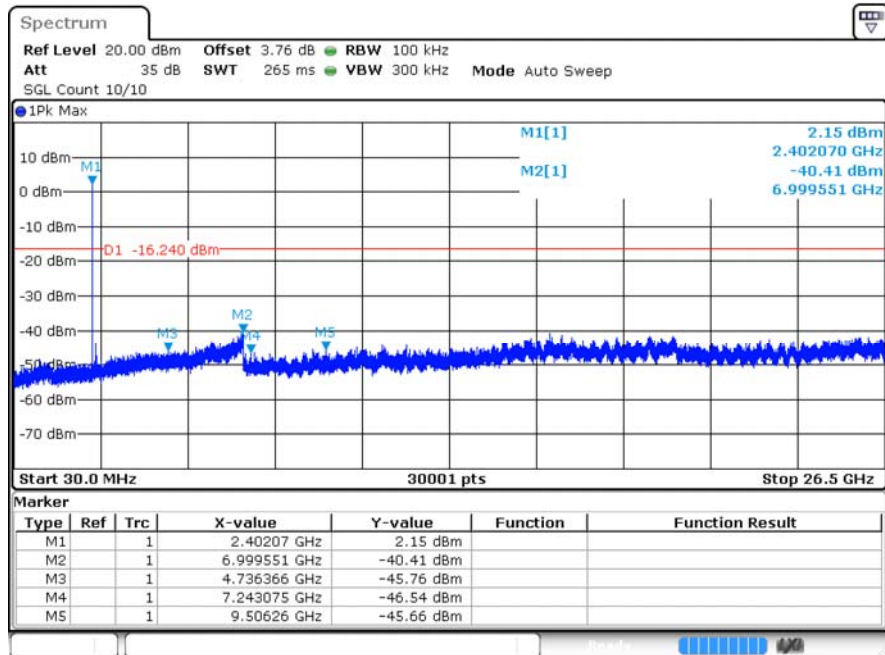


$\pi/4$ DQPSK_LCH_Graphs

Pref

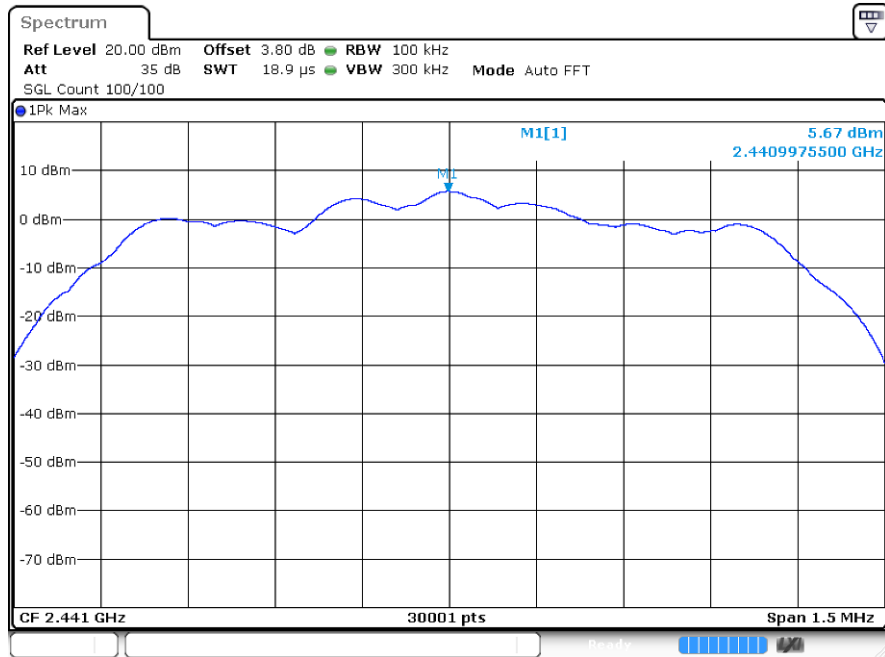


Puw

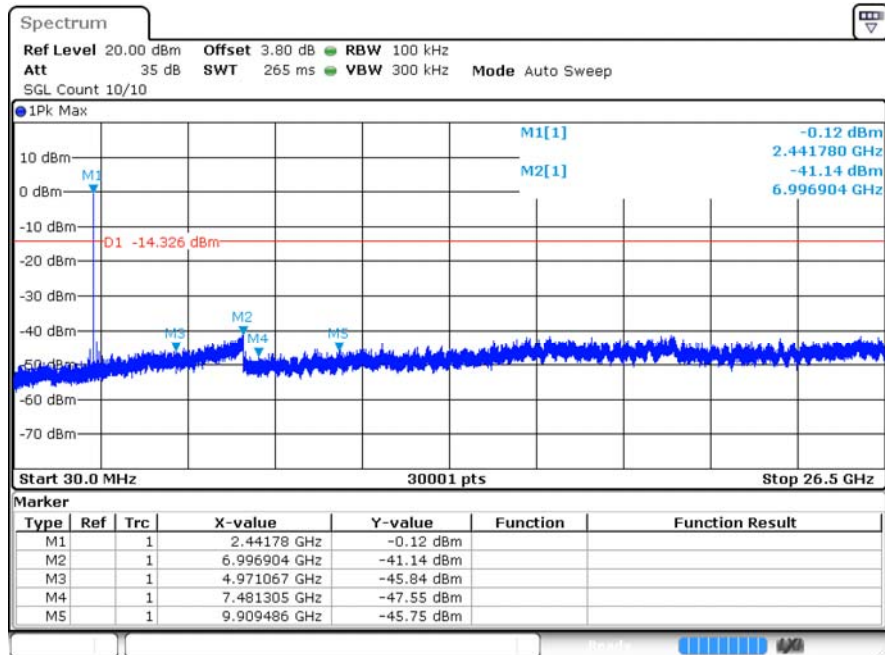


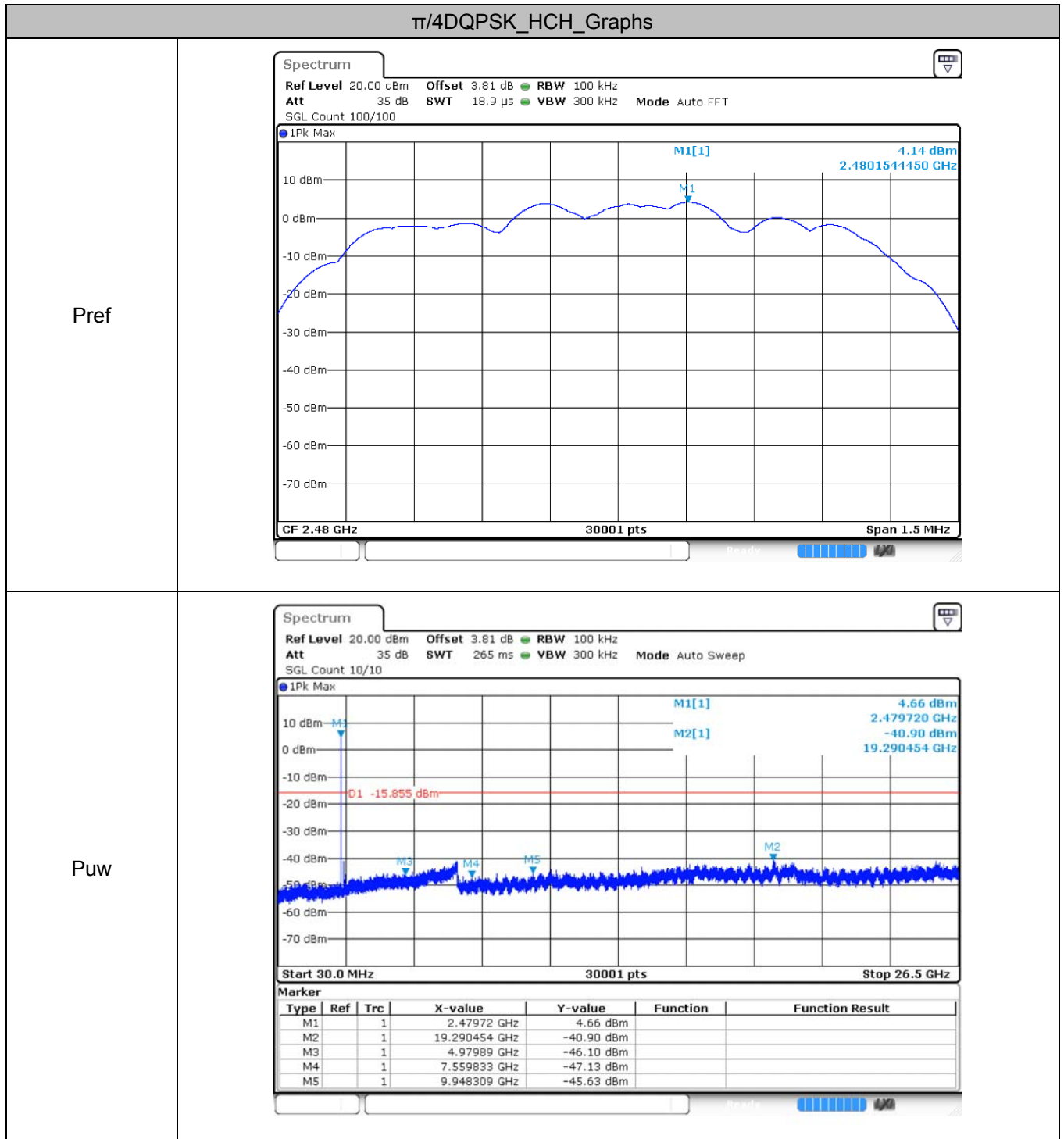
$\pi/4$ DQPSK_MCH_Graphs

Pref



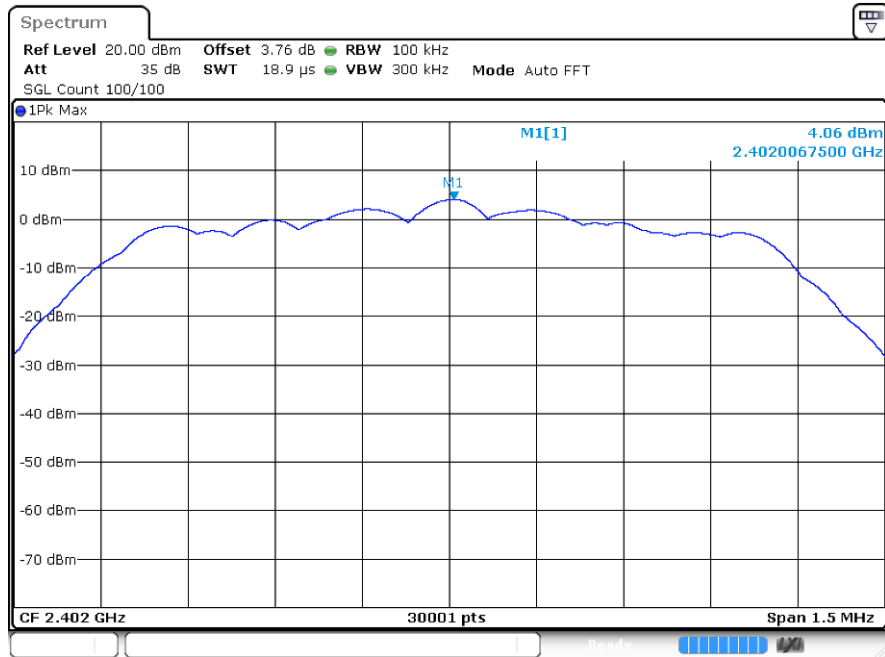
Puw



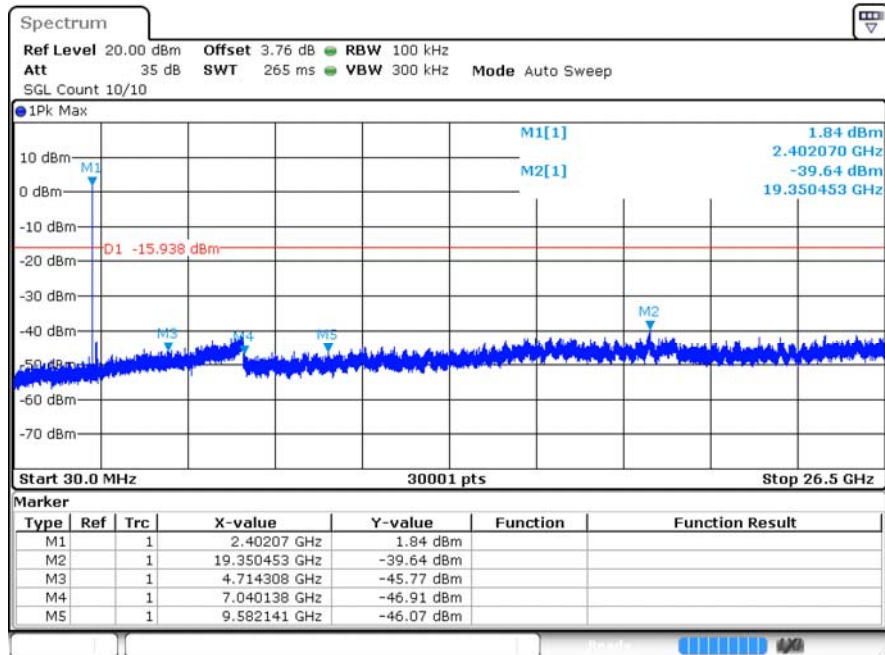


8DPSK_LCH_Graphs

Pref

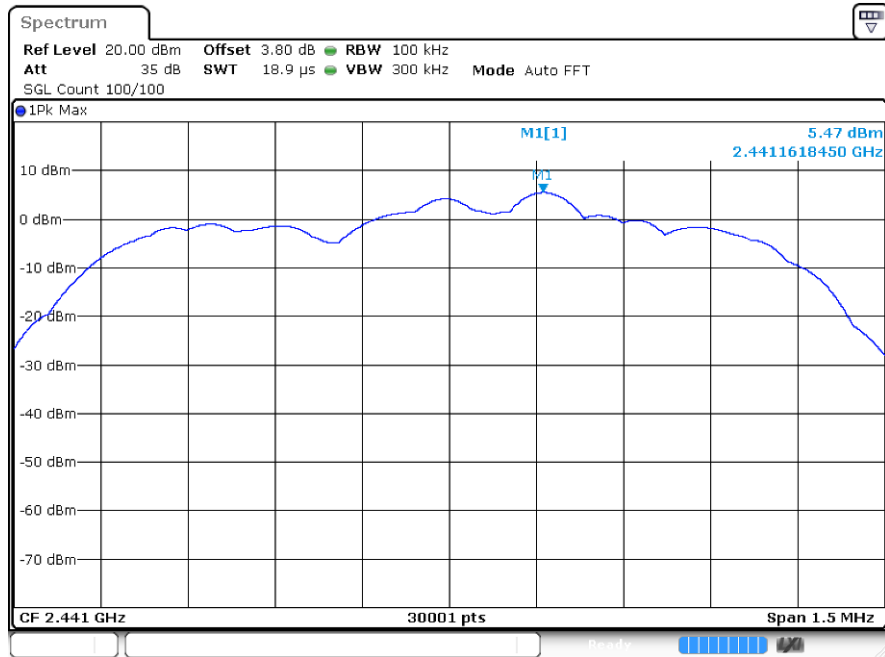


Puw

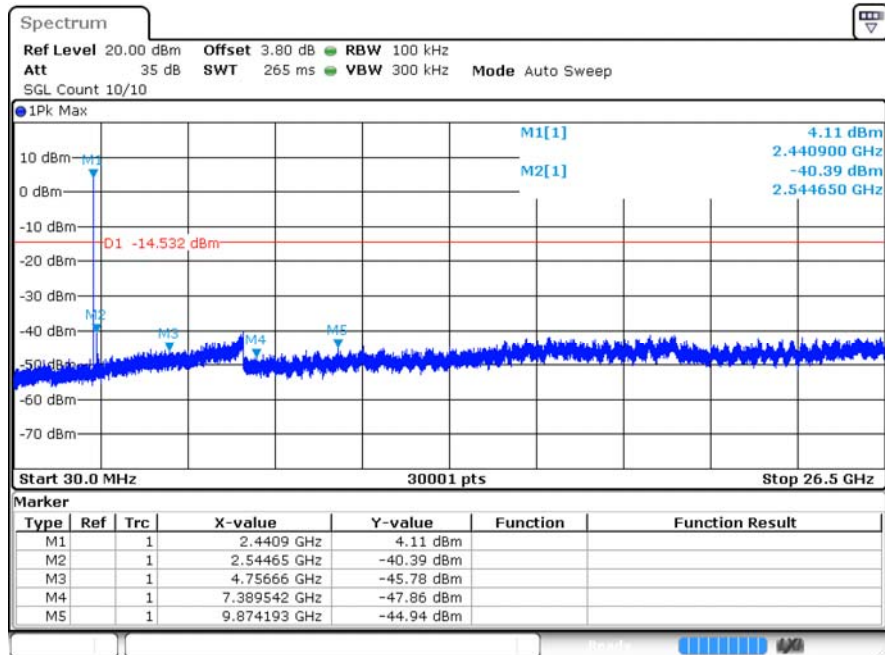


8DPSK_MCH_Graphs

Pref

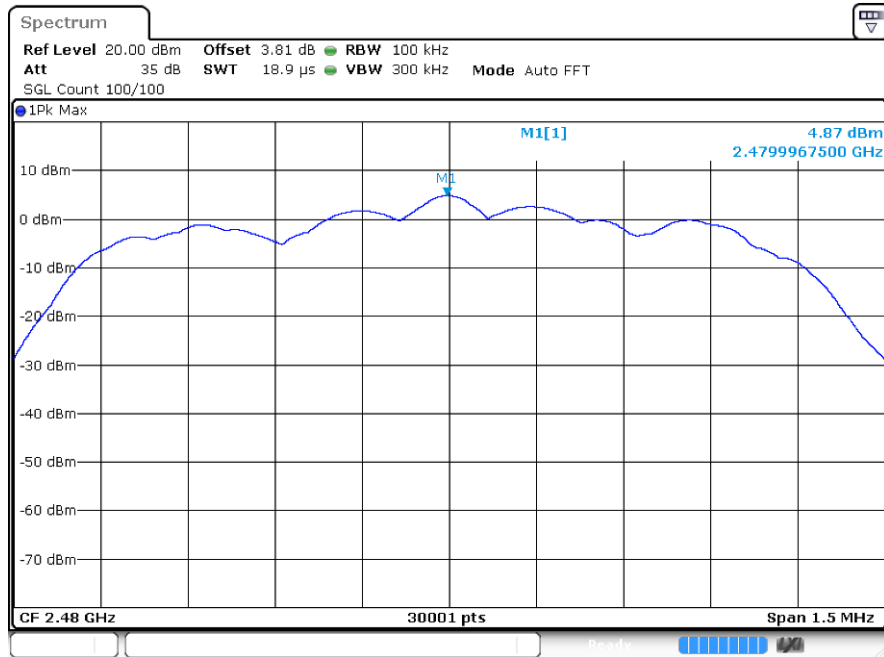


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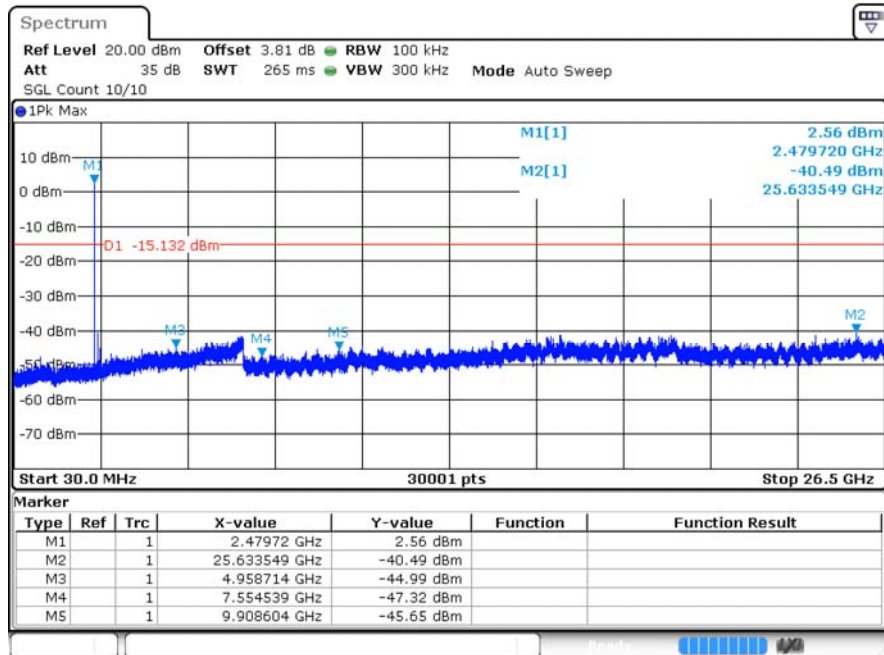


8DPSK_HCH_Graphs

Pref



Puw

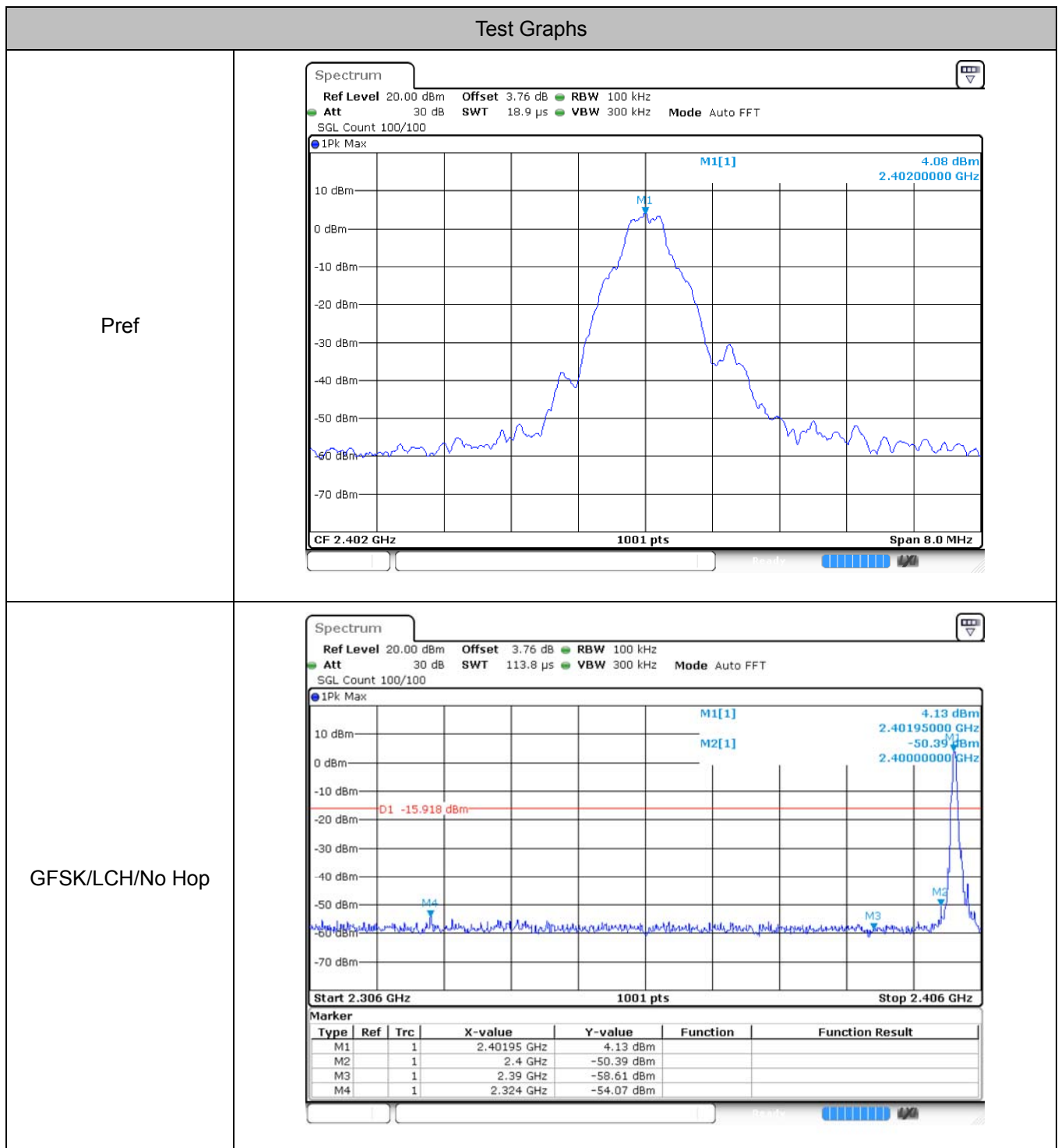


8 Band-edge for RF Conducted Emissions

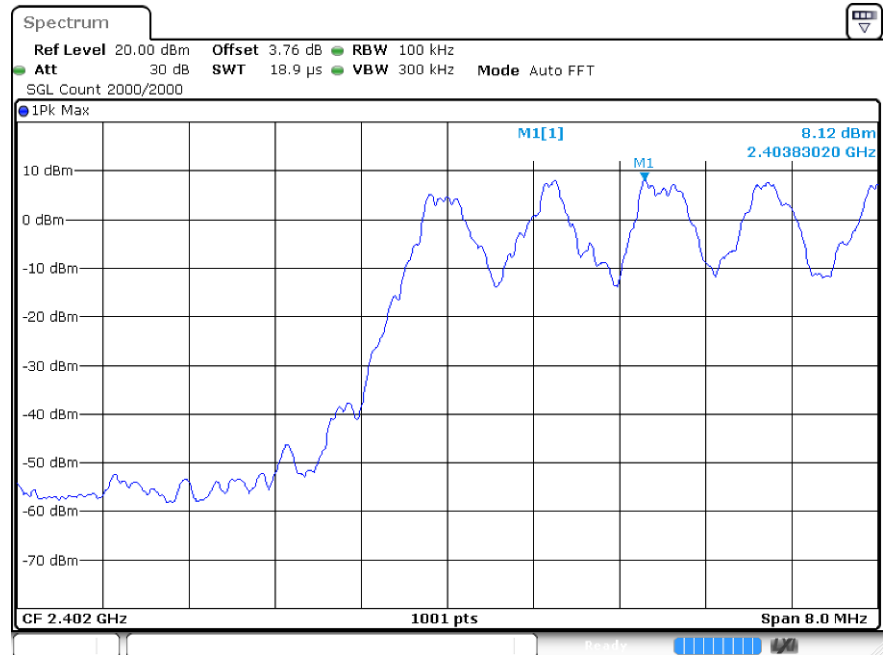
8.1 Test Result

Mode	Channel	Carrier Frequency [MHz]	Frequency Hopping	Max Spurious Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	2402	Off	-58.14	-20	Pass
			On	-49.24	-20	Pass
	HCH	2480	Off	-62.4	-20	Pass
			On	-52.61	-20	Pass
$\pi/4$ DQPSK	LCH	2402	Off	-58.75	-20	Pass
			On	-50.84	-20	Pass
	HCH	2480	Off	-59.41	-20	Pass
			On	-52.13	-20	Pass
8DPSK	LCH	2402	Off	-58.99	-20	Pass
			On	-48.84	-20	Pass
	HCH	2480	Off	-58.87	-20	Pass
			On	-52.46	-20	Pass

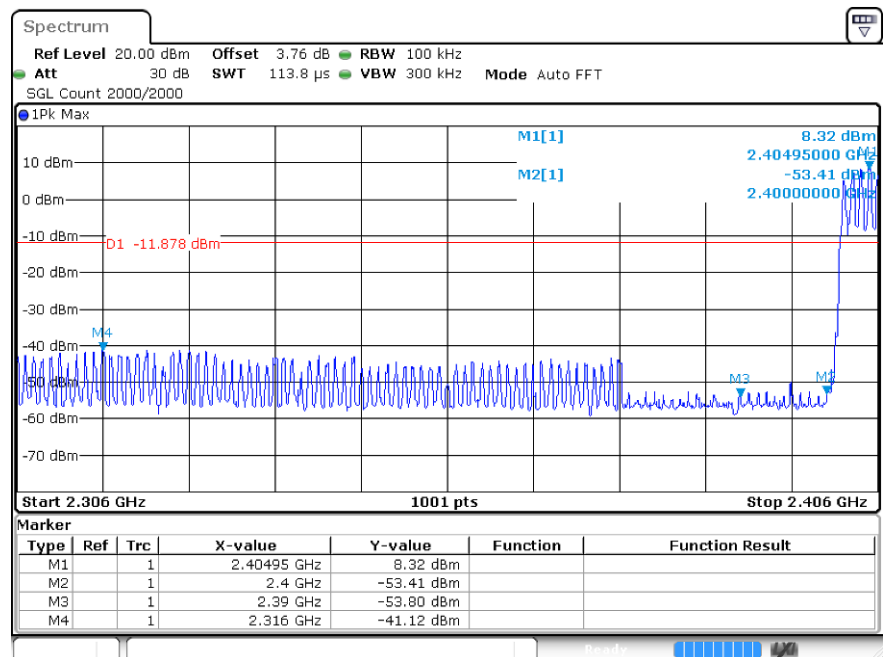
8.2 Test Graphs



Ref



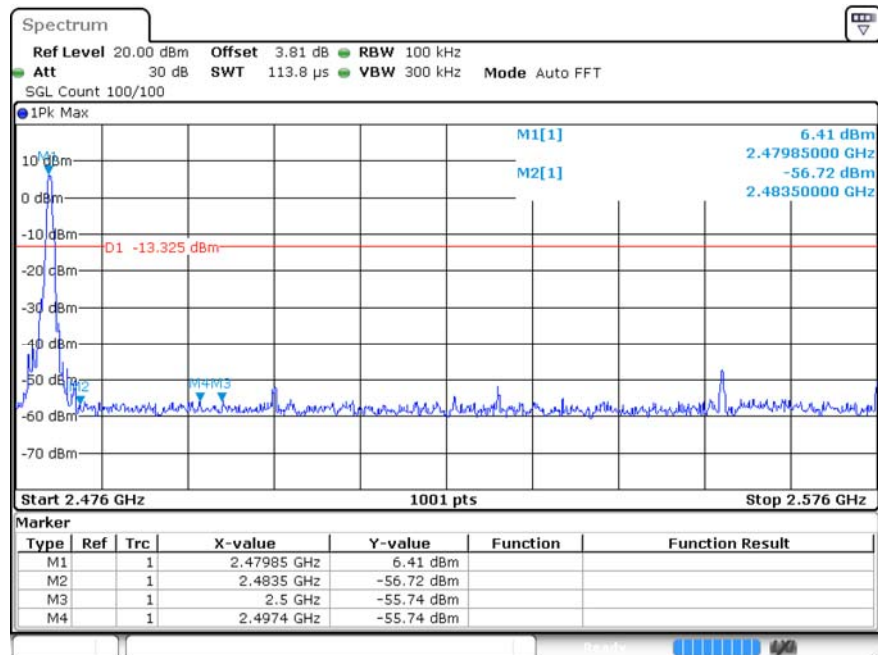
GFSK/LCH/Hop



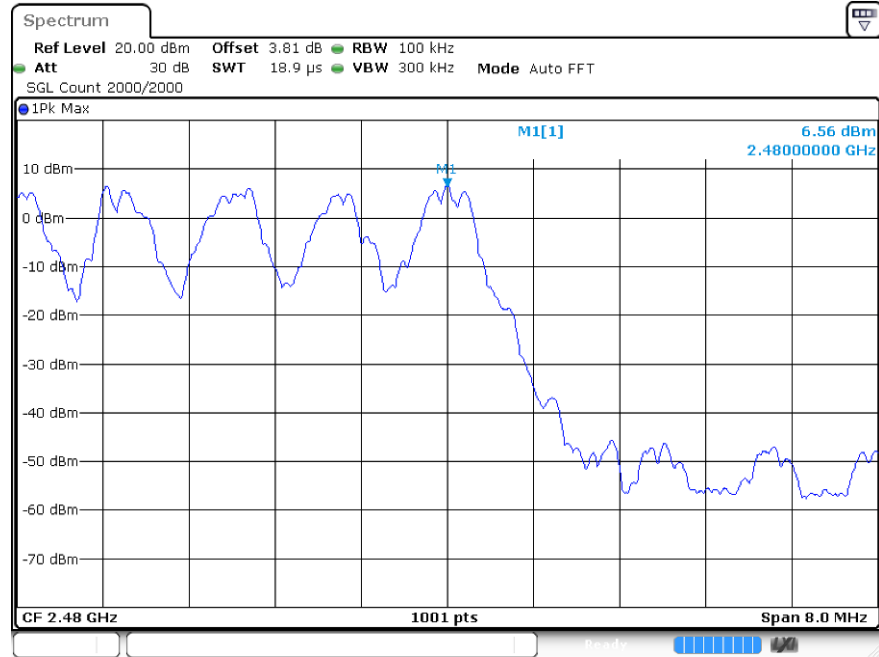
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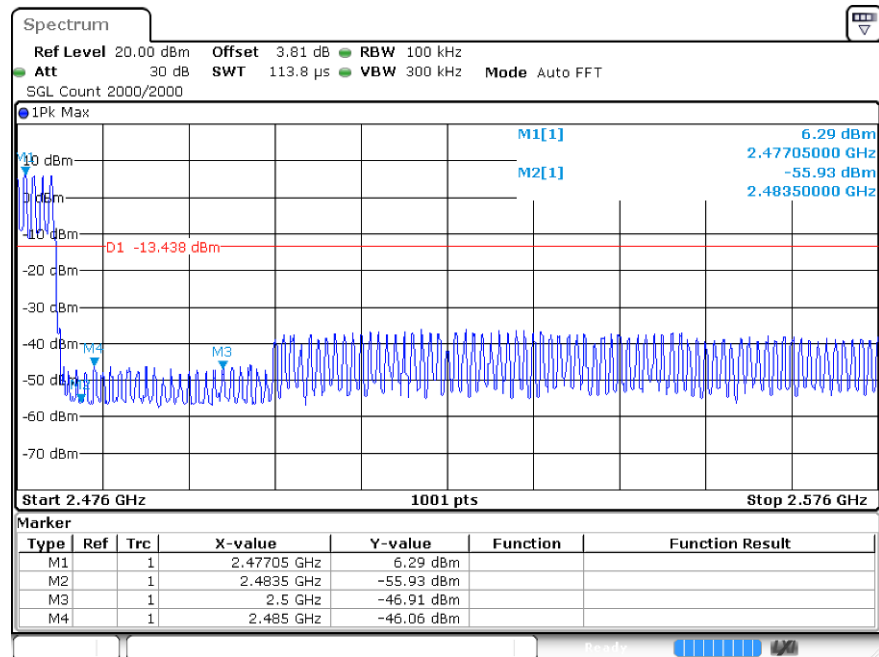
GFSK/HCH/No Hop



Ref.



GFSK/HCH/Hop



Spectrum

Ref Level 20.00 dBm Offset 3.76 dB RBW 100 kHz
Att 30 dB SWT 18.9 μ s VBW 300 kHz Mode Auto FFT
SGL Count 100/100

1Pk Max

M1[1] 3.94 dBm
2.40200800 GHz

10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm

CF 2.402 GHz 1001 pts Span 8.0 MHz

Spectrum

Ref Level 20.00 dBm Offset 3.76 dB RBW 100 kHz
 Att 30 dB SWT 113.8 μ s VBW 300 kHz Mode Auto FFT
 SGL Count 100/100

● 1Pk Max

10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm

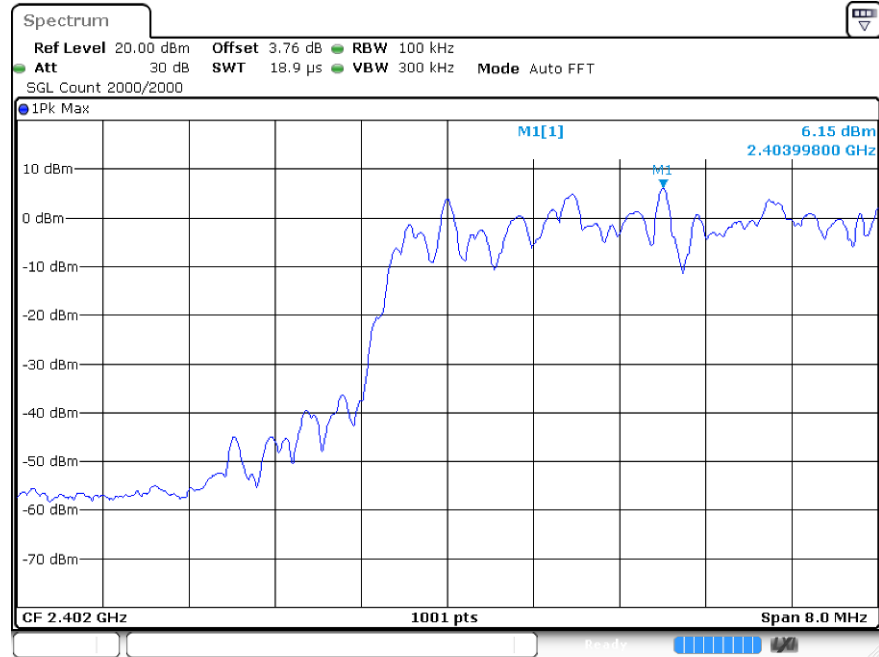
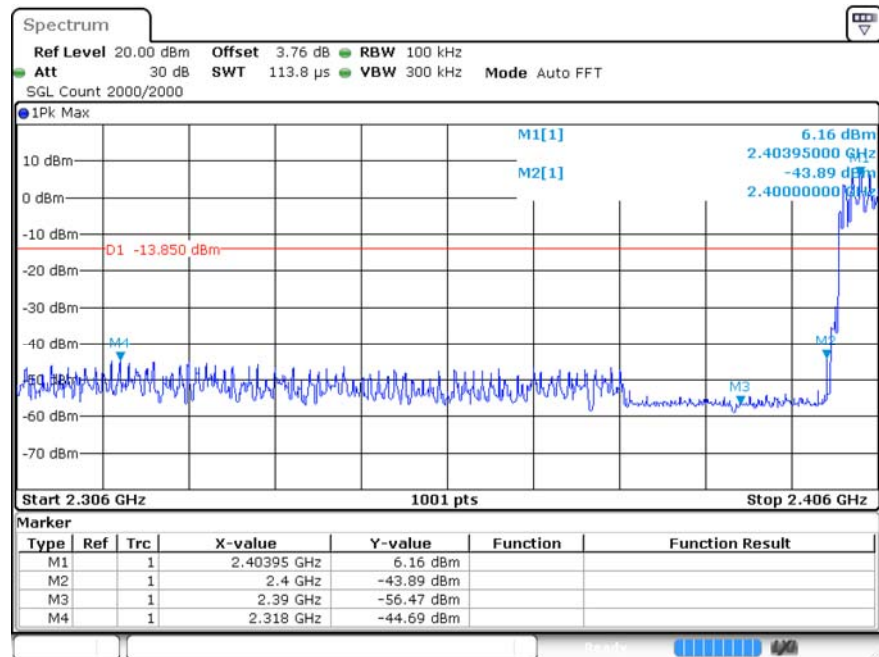
M1[1] 3.98 dBm 2.4025000 GHz
 M2[1] -47.91 dBm 2.4000000 GHz

D1 -16.057 dBm

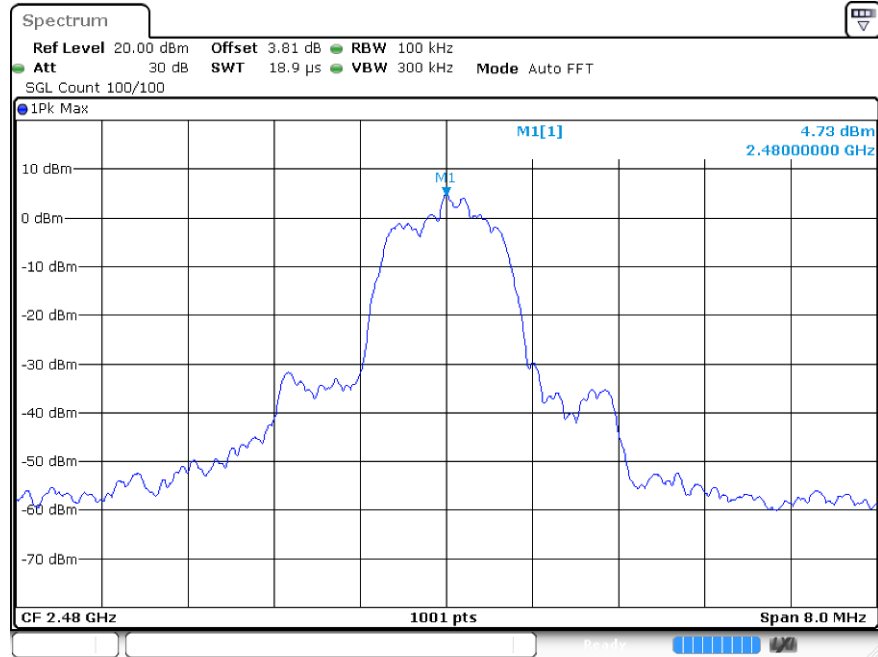
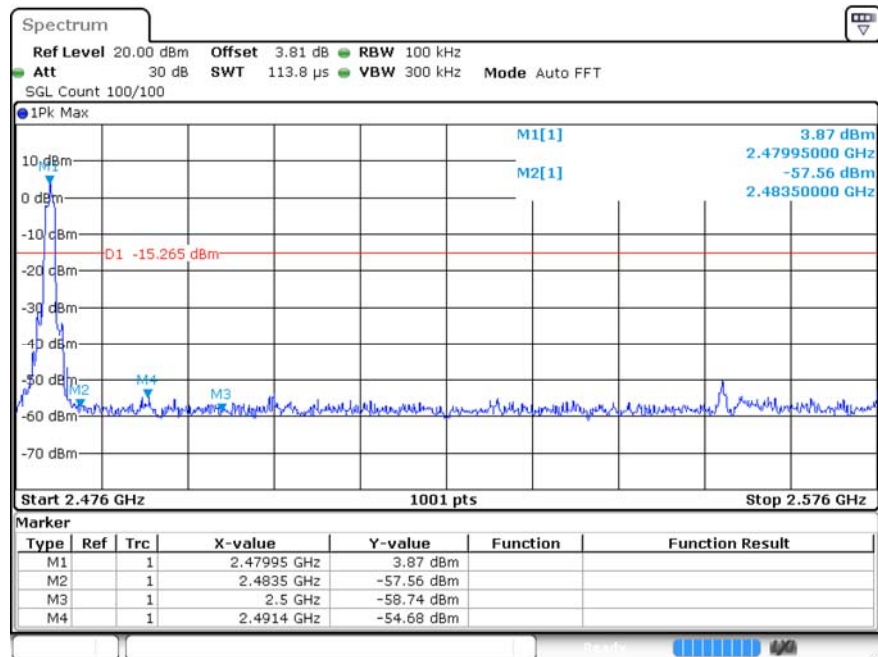
Start 2.306 GHz 1001 pts Stop 2.406 GHz

Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1	1		1	2.4025 GHz	3.98 dBm		
M2	1		1	2.4 GHz	-47.91 dBm		
M3	1		1	2.39 GHz	-56.55 dBm		
M4	1		1	2.3168 GHz	-54.81 dBm		

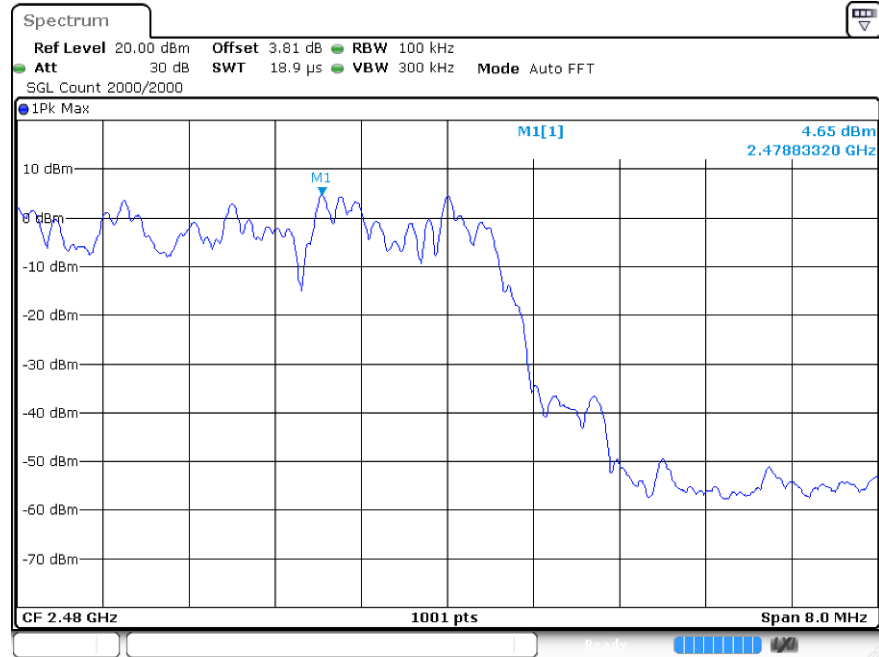
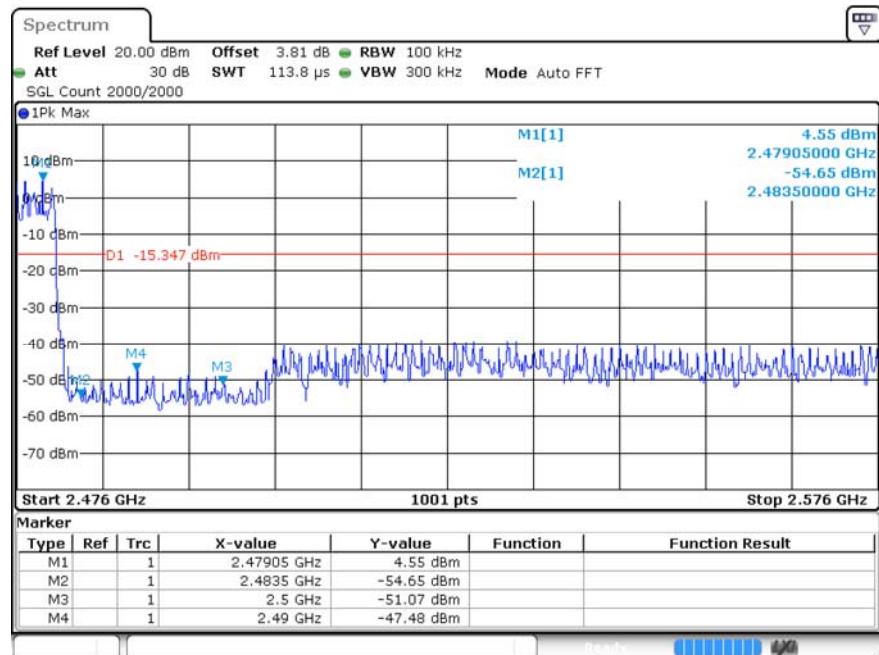
Ref


 $\pi/4$ DQPSK/LCH/Hop


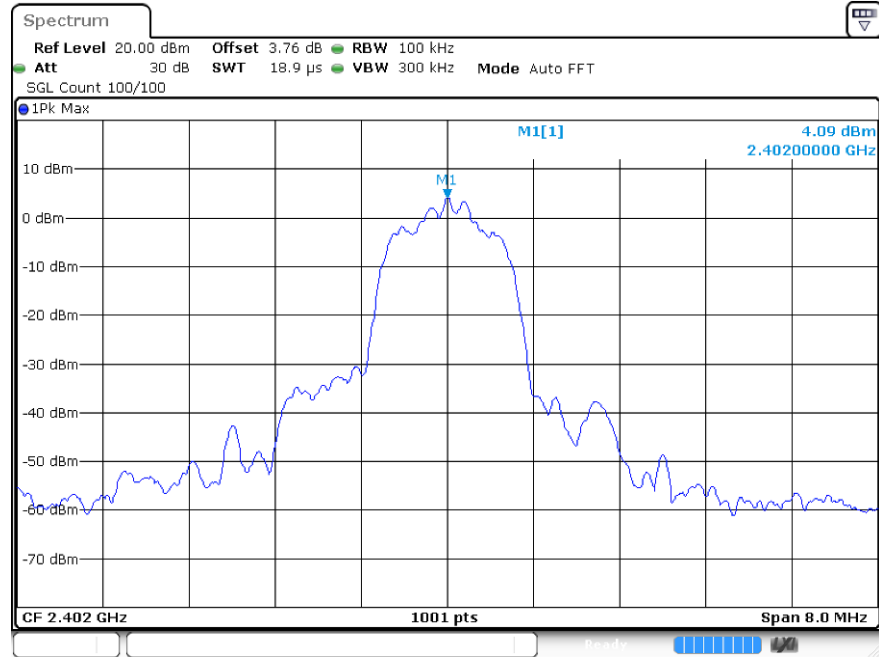
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 $\pi/4$ DQPSK/HCH/No Hop


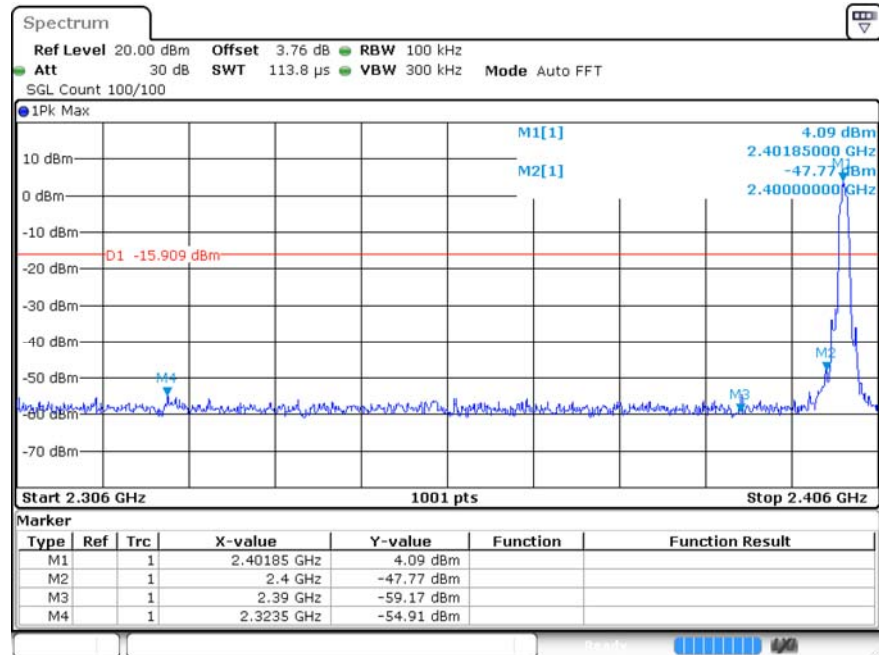
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 $\pi/4$ DQPSK/HCH/Hop


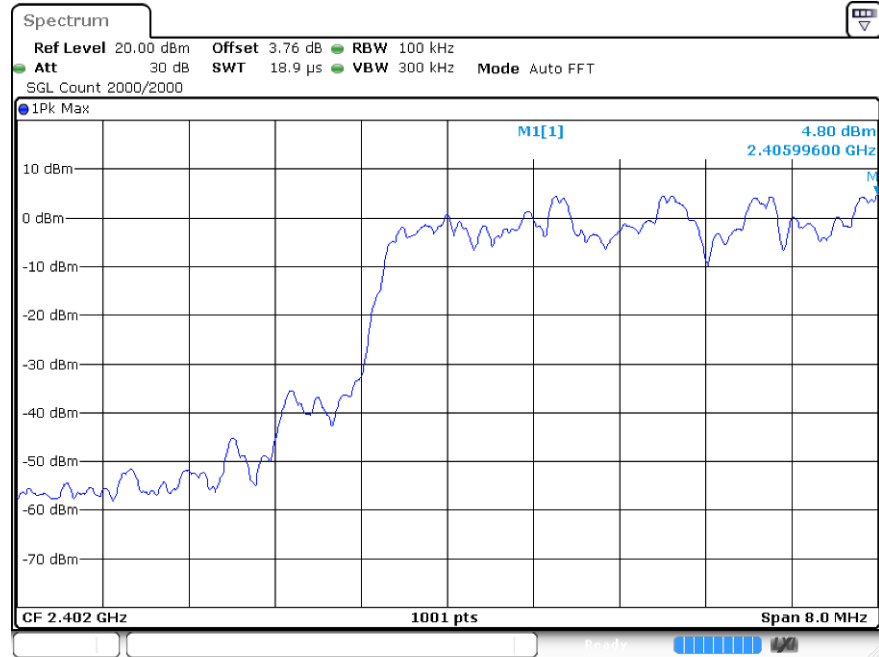
Ref



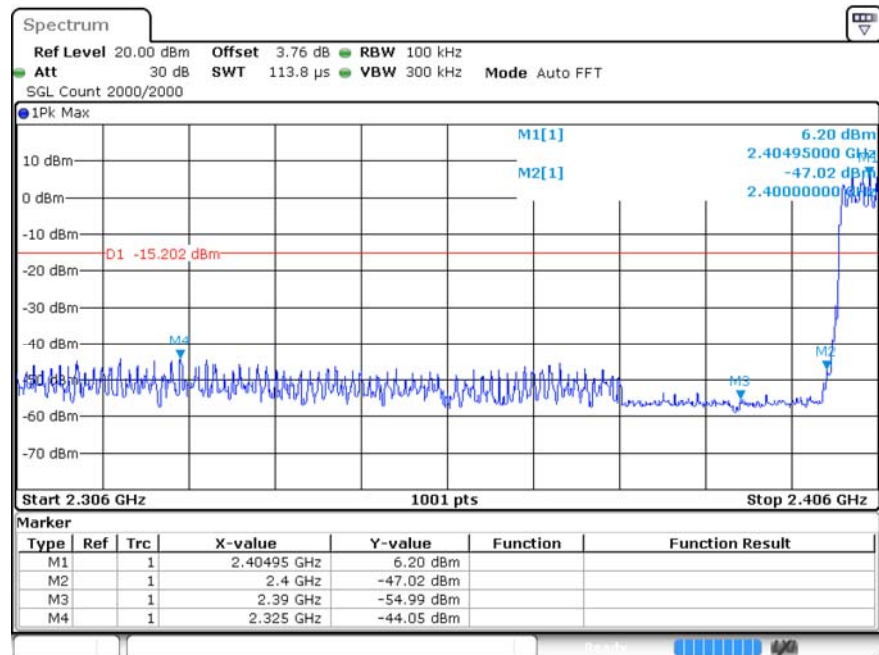
8DPSK/LCH/No Hop



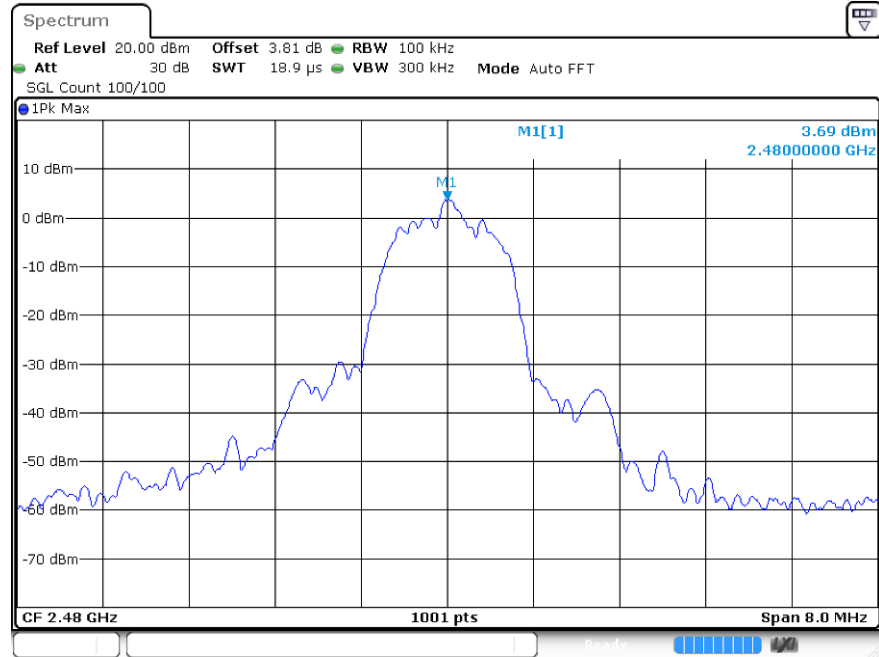
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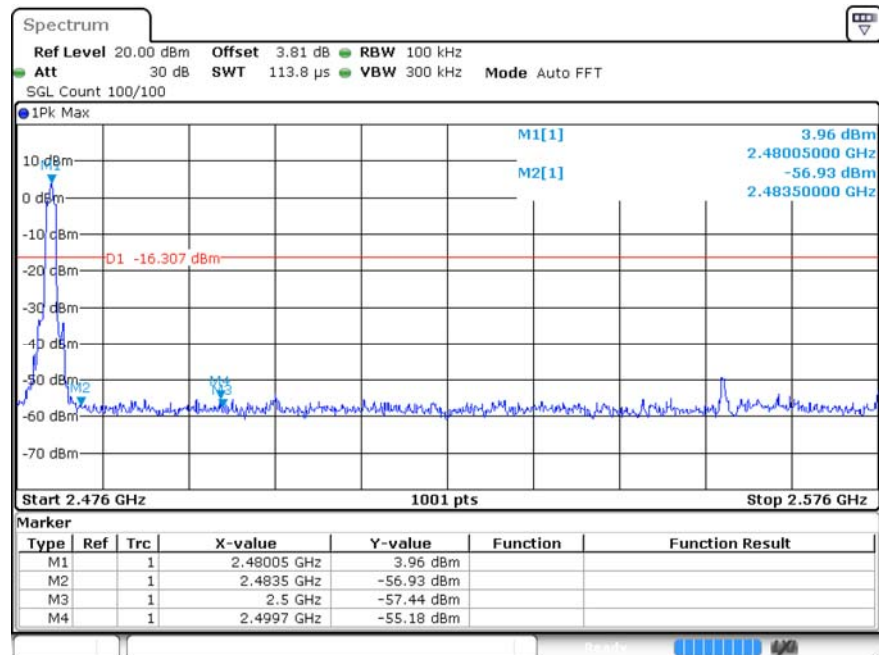
8DPSK/LCH/Hop



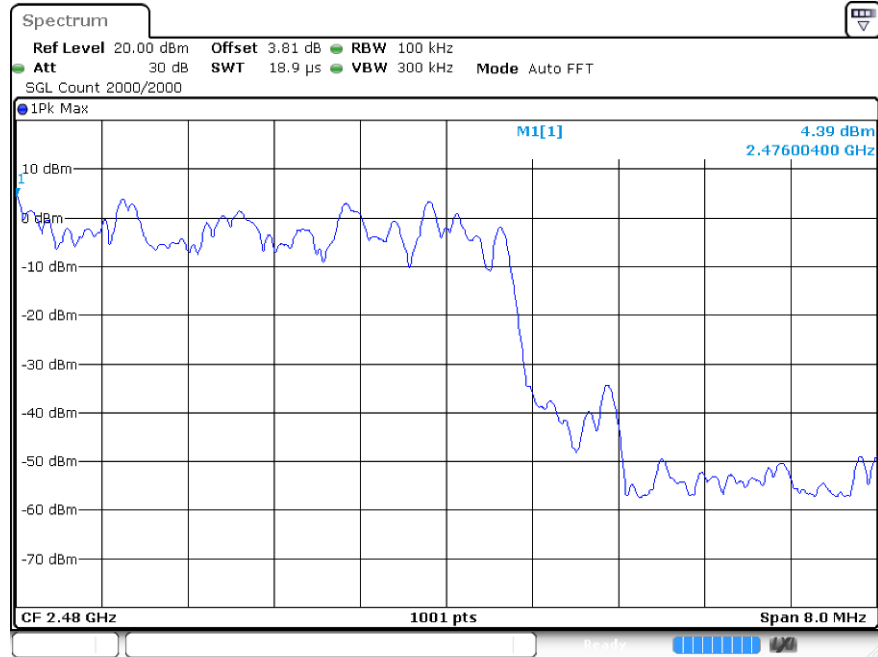
Ref



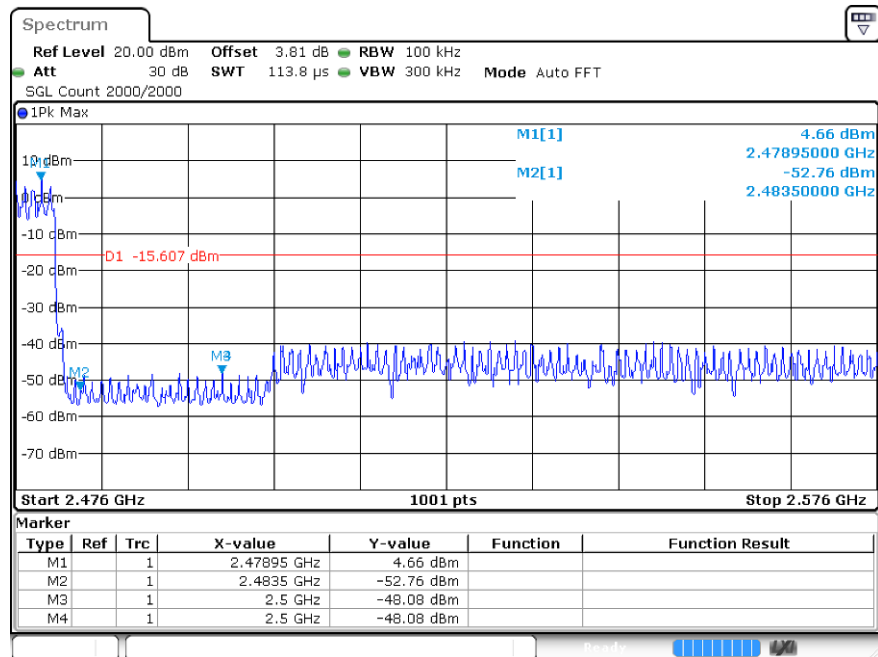
8DPSK/HCH/No Hop



Ref



8DPSK/HCH/Hop



9 Restrict-band band-edge measurements

9.1 Test Result

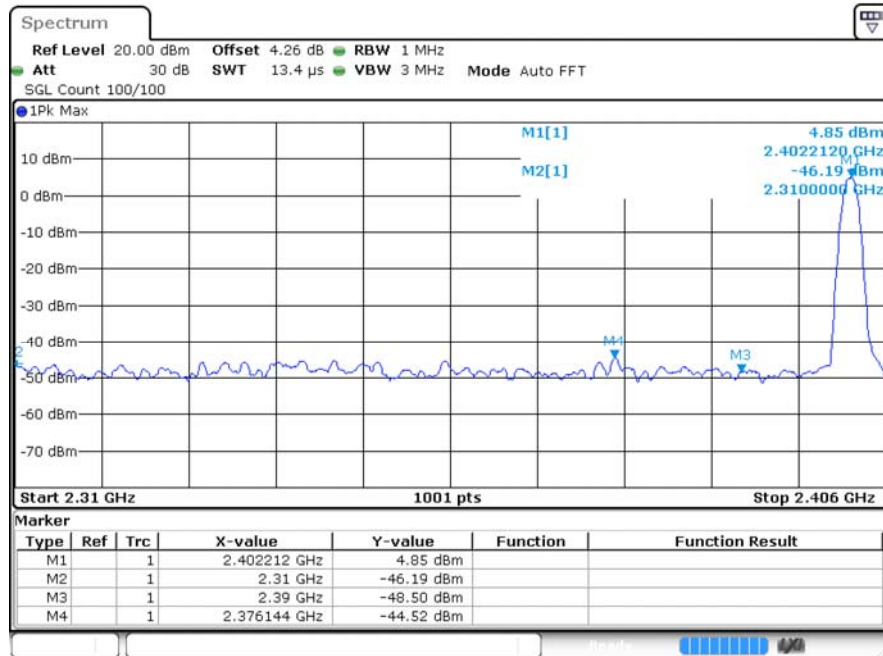
Test Mode	Hopping	Freq.	Power [dBm]	Gain	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-46.18	2	51.08	PEAK	74	Pass
	Off	2310.0	-56.71	2	40.55	AV	54	Pass
	Off	2376.144	-44.51	2	52.75	PEAK	74	Pass
	Off	2324.208	-54.77	2	42.49	AV	54	Pass
	Off	2390.0	-48.5	2	48.76	PEAK	74	Pass
	Off	2390.0	-56.88	2	40.38	AV	54	Pass
	Off	2483.5	-46.45	2	50.81	PEAK	74	Pass
	Off	2483.5	-54.7	2	42.56	AV	54	Pass
	Off	2492.176	-45.59	2	51.67	PEAK	74	Pass
	Off	2483.512	-54.7	2	42.56	AV	54	Pass
	Off	2500.0	-48.13	2	49.13	PEAK	74	Pass
	Off	2500.0	-55.25	2	42.01	AV	54	Pass
$\pi/4$ DQPSK	Off	2310.0	-48.11	2	49.15	PEAK	74	Pass
	Off	2310.0	-56.49	2	40.77	AV	54	Pass
	Off	2340.912	-44.9	2	52.36	PEAK	74	Pass
	Off	2338.8	-54.55	2	42.71	AV	54	Pass
	Off	2390.0	-49.94	2	47.32	PEAK	74	Pass
	Off	2390.0	-56.81	2	40.45	AV	54	Pass
	Off	2483.5	-47.38	2	49.88	PEAK	74	Pass
	Off	2483.5	-55.64	2	41.62	AV	54	Pass
	Off	2494.552	-45.77	2	51.49	PEAK	74	Pass
	Off	2484.328	-55.63	2	41.63	AV	54	Pass
	Off	2500.0	-47.76	2	49.5	PEAK	74	Pass
	Off	2500.0	-55.98	2	41.28	AV	54	Pass
8DPSK	Off	2310.0	-48.58	2	48.68	PEAK	74	Pass
	Off	2310.0	-56.31	2	40.95	AV	54	Pass
	Off	2338.224	-45.12	2	52.14	PEAK	74	Pass
	Off	2341.008	-54.46	2	42.8	AV	54	Pass



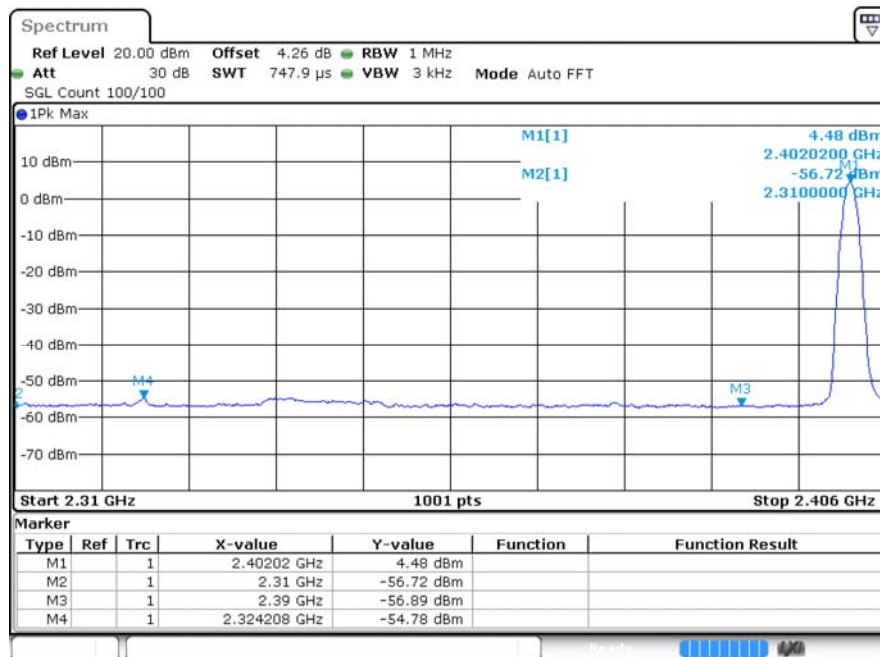
	Off	2390.0	-48.98	2	48.28	PEAK	74	Pass
	Off	2390.0	-56.93	2	40.33	AV	54	Pass
	Off	2483.5	-47.98	2	49.28	PEAK	74	Pass
	Off	2483.5	-55.71	2	41.55	AV	54	Pass
	Off	2487.424	-45.96	2	51.3	PEAK	74	Pass
	Off	2483.608	-55.57	2	41.69	AV	54	Pass
	Off	2500.0	-48.57	2	48.69	PEAK	74	Pass
	Off	2500.0	-56.21	2	41.05	AV	54	Pass

9.2 Test Graphs

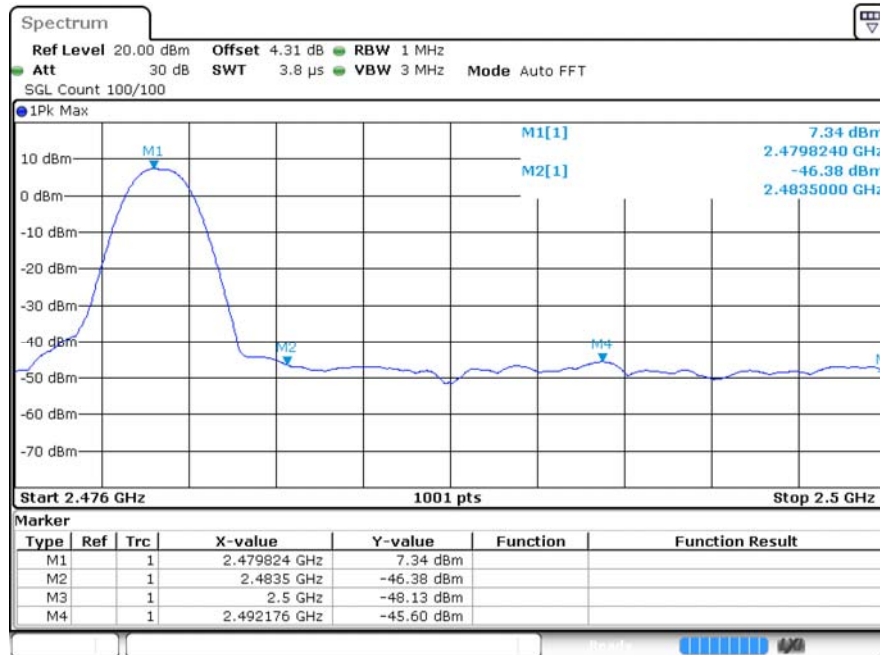
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



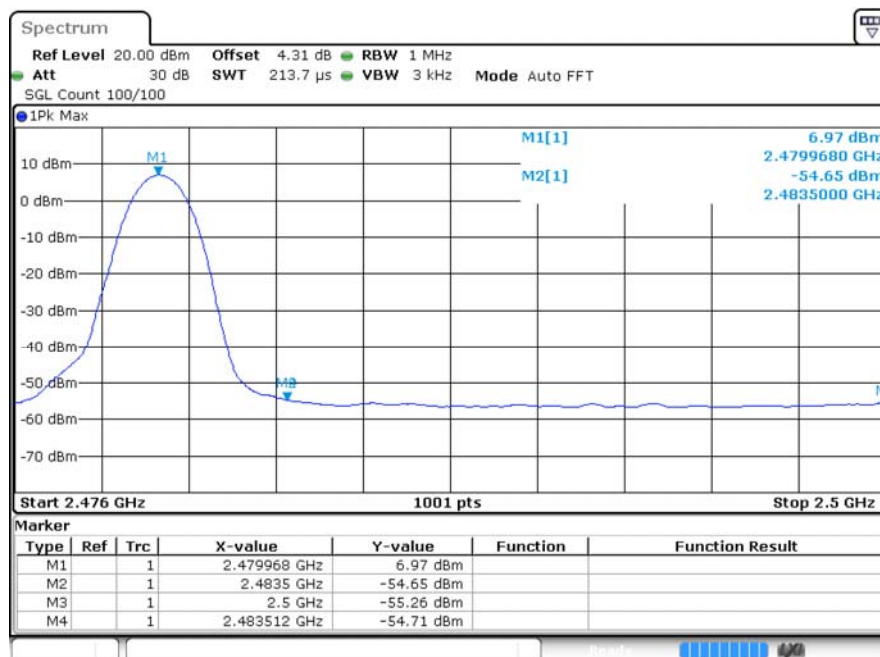
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



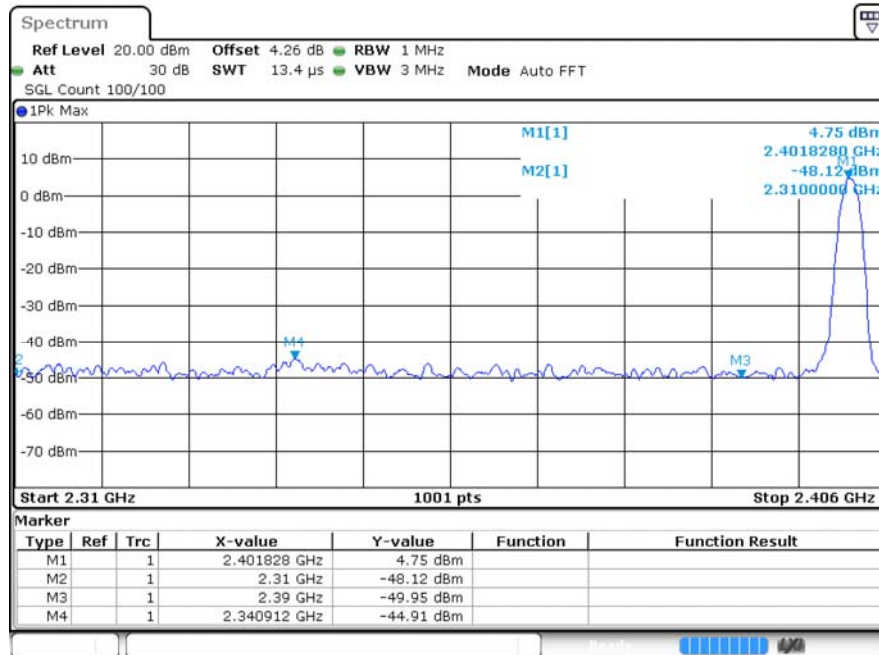
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



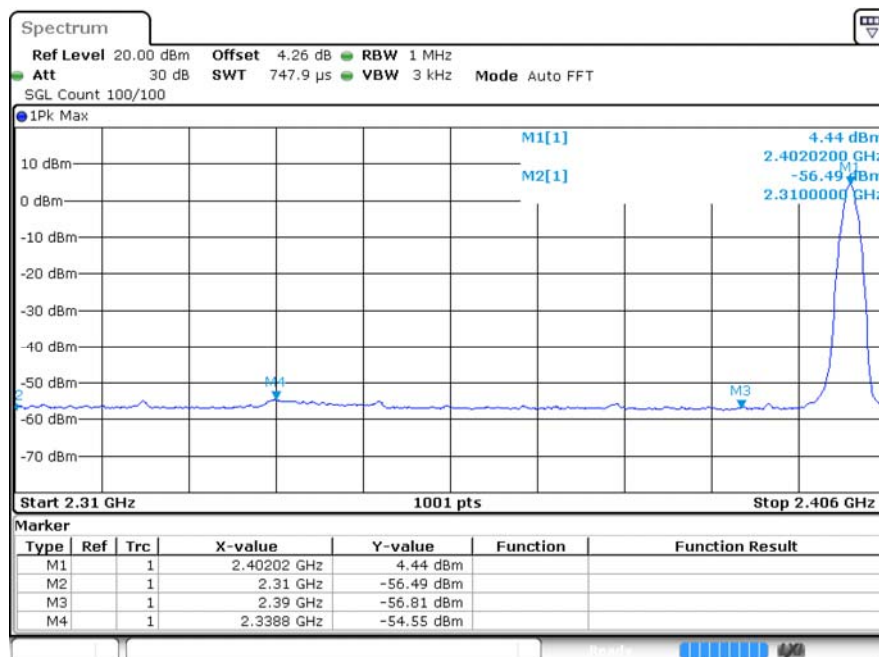
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



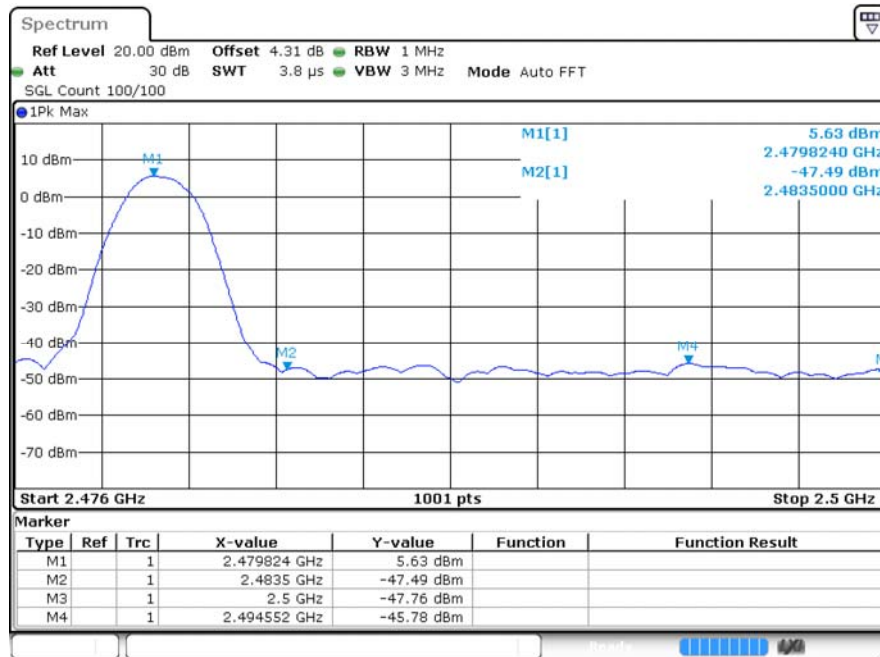
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



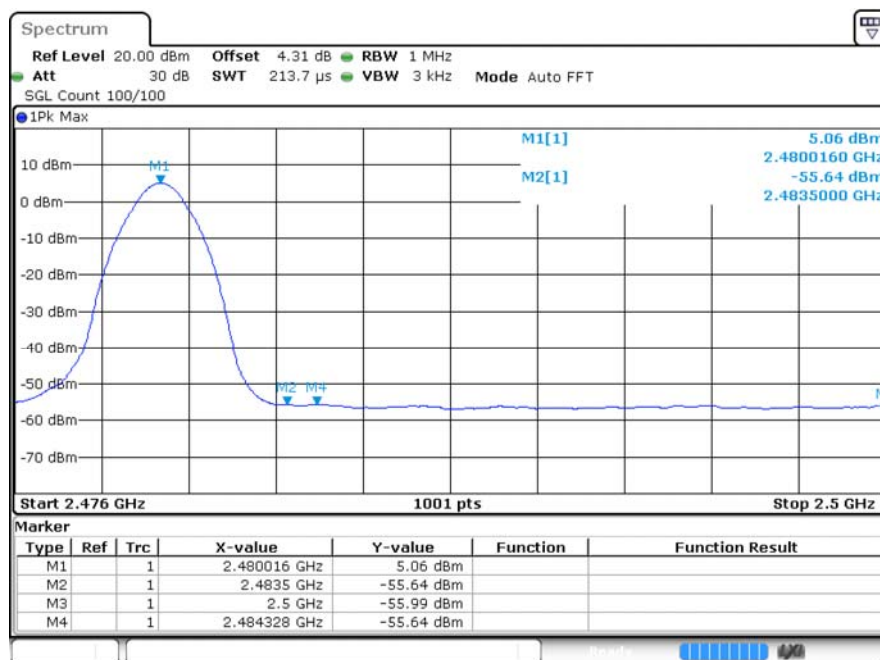
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



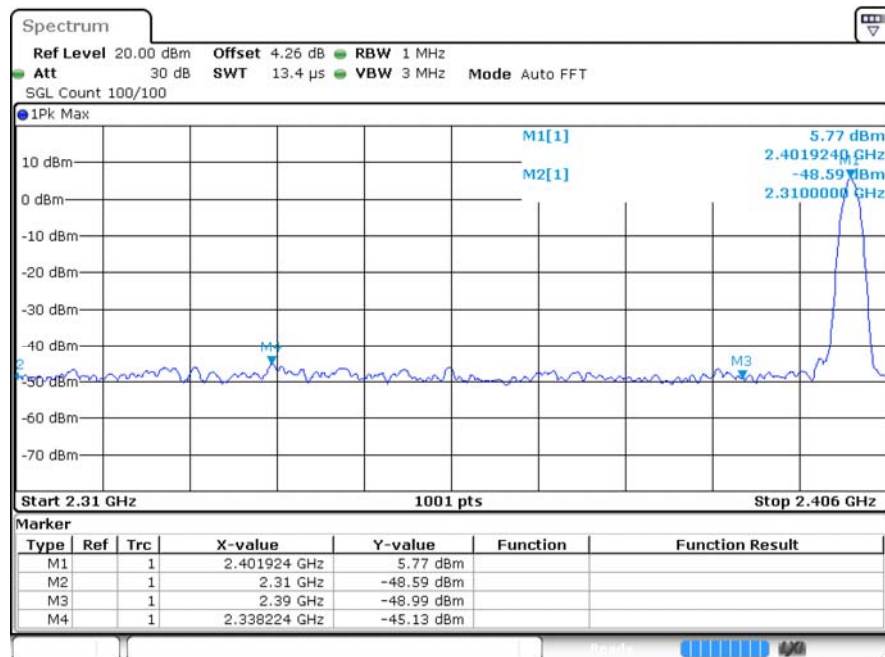
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



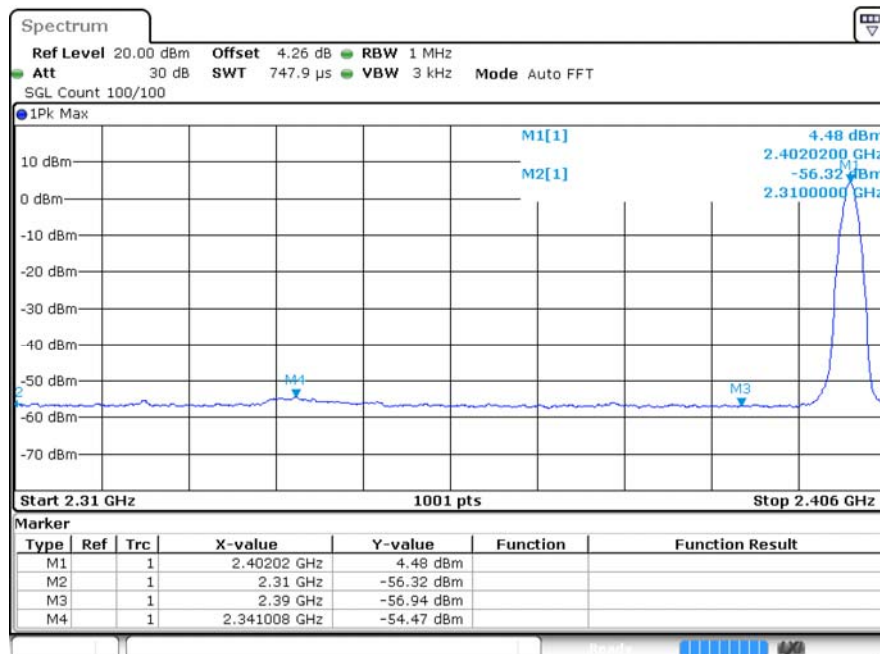
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



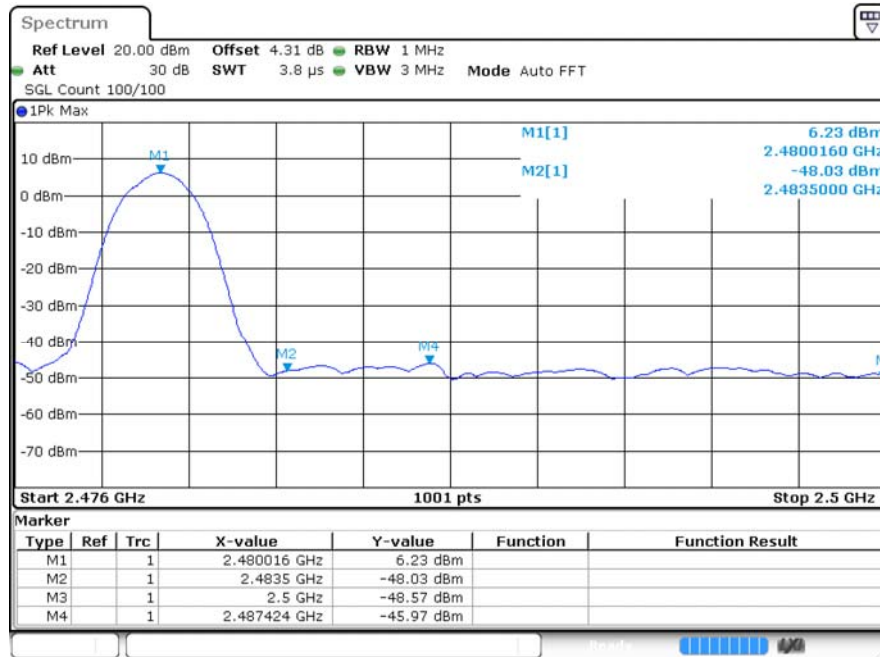
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



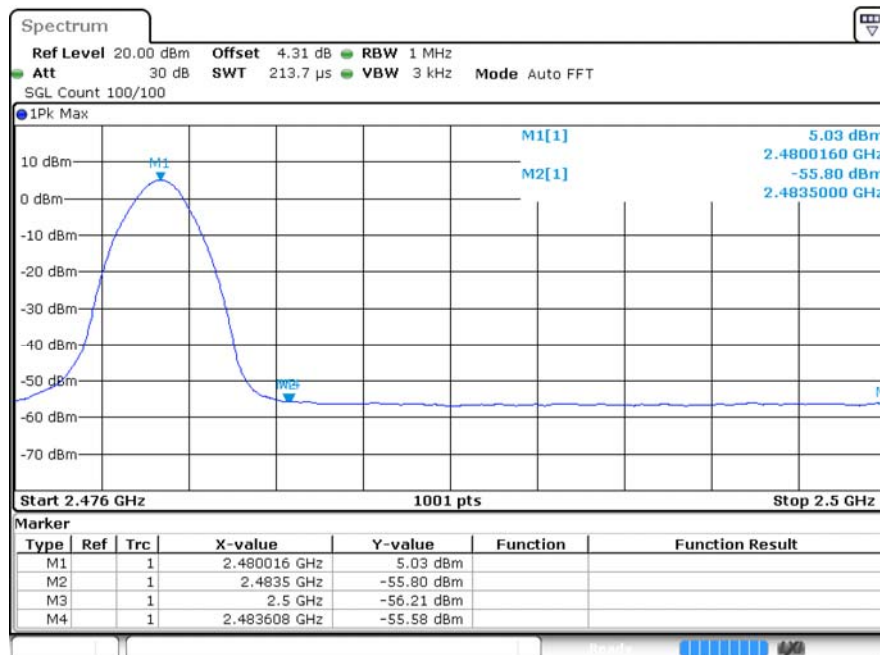
Restrict-band band-edge measurements_Hopping Off_8DPSK_Average (Low Channel)



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



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



---The End---