



Appendix A

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

Product Name: Wireless Earphones

Trade Mark: N/A

Test Model: M2404

Environmental Conditions

Temperature:	24.7℃
Relative Humidity:	52.5%
ATM Pressure:	101Kpa
Test Engineer:	Emiya lin
Supervised by:	Simba Haung

Contents

Page

COVER PAGE

1 Duty Cycle	3
1.1 Test Result	3
1.2 Test Graphs	4
2 Maximum Conducted Peak Output Power	7
2.1 Test Result(Left earphone)	7
2.2 Test Result(Right earphone)	7
2.3 Test Graphs(Left earphone)	8
2.4 Test Graphs(Right earphone)	11
3 20dB Bandwidth	14
3.1 Test Result	14
3.2 Test Graphs	15
4 Carrier Frequency Separation	18
4.1 Test Result	18
4.2 Test Graphs	19
5 Hopping Channel Number	20
5.1 Test Result	20
5.2 Test Graphs	21
6 Dwell Time	22
6.1 Test Result	22
6.2 Test Graphs	23
7 RF Conducted Spurious Emissions	25
7.1 Test Result	25
7.2 Test Graphs	26
8 Band-edge for RF Conducted Emissions	32
8.1 Test Result	32
8.2 Test Graphs	33
9 Restrict-band band-edge measurements	41
9.1 Test Result	41
9.2 Test Graphs	42

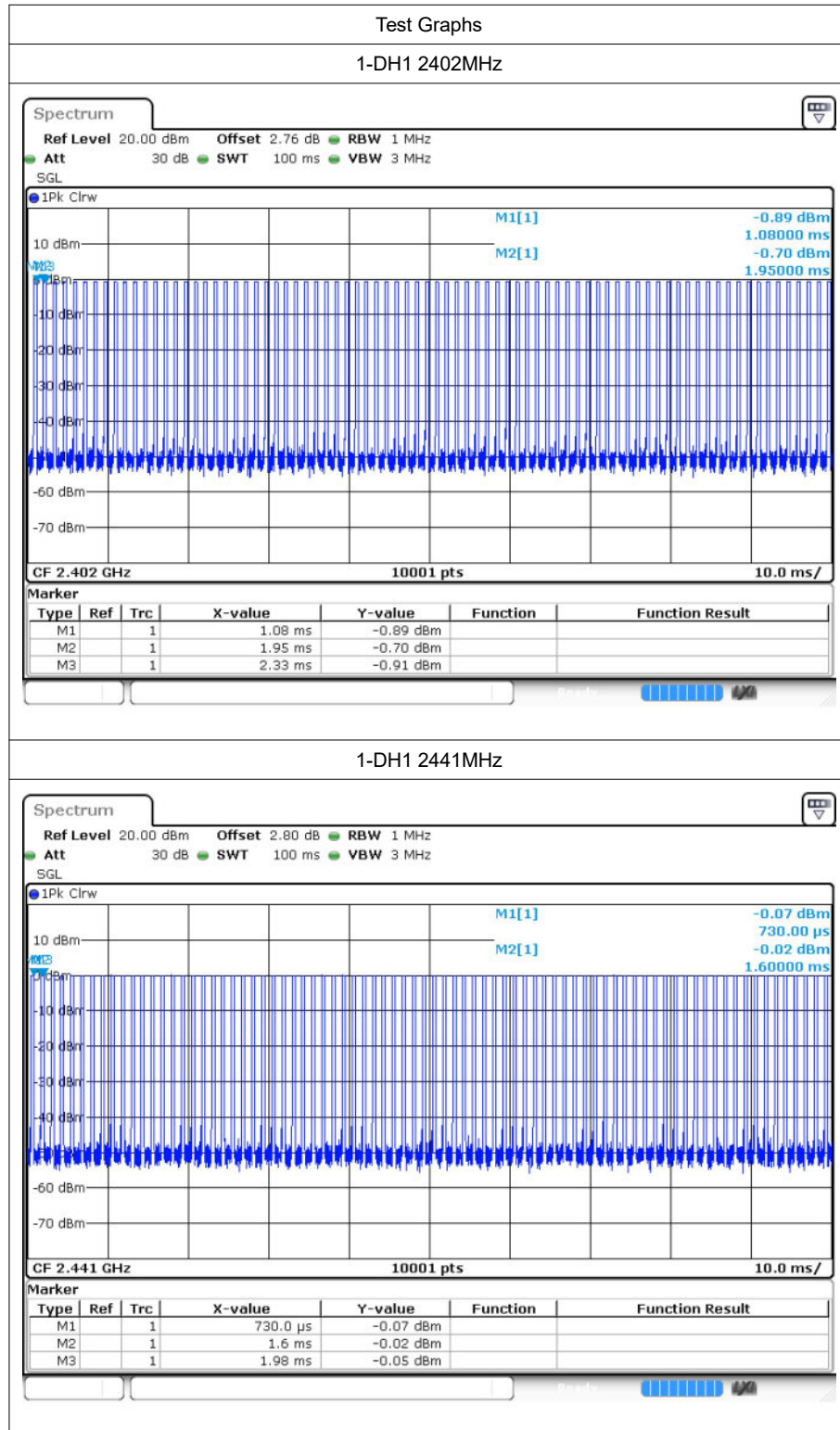
1 Duty Cycle

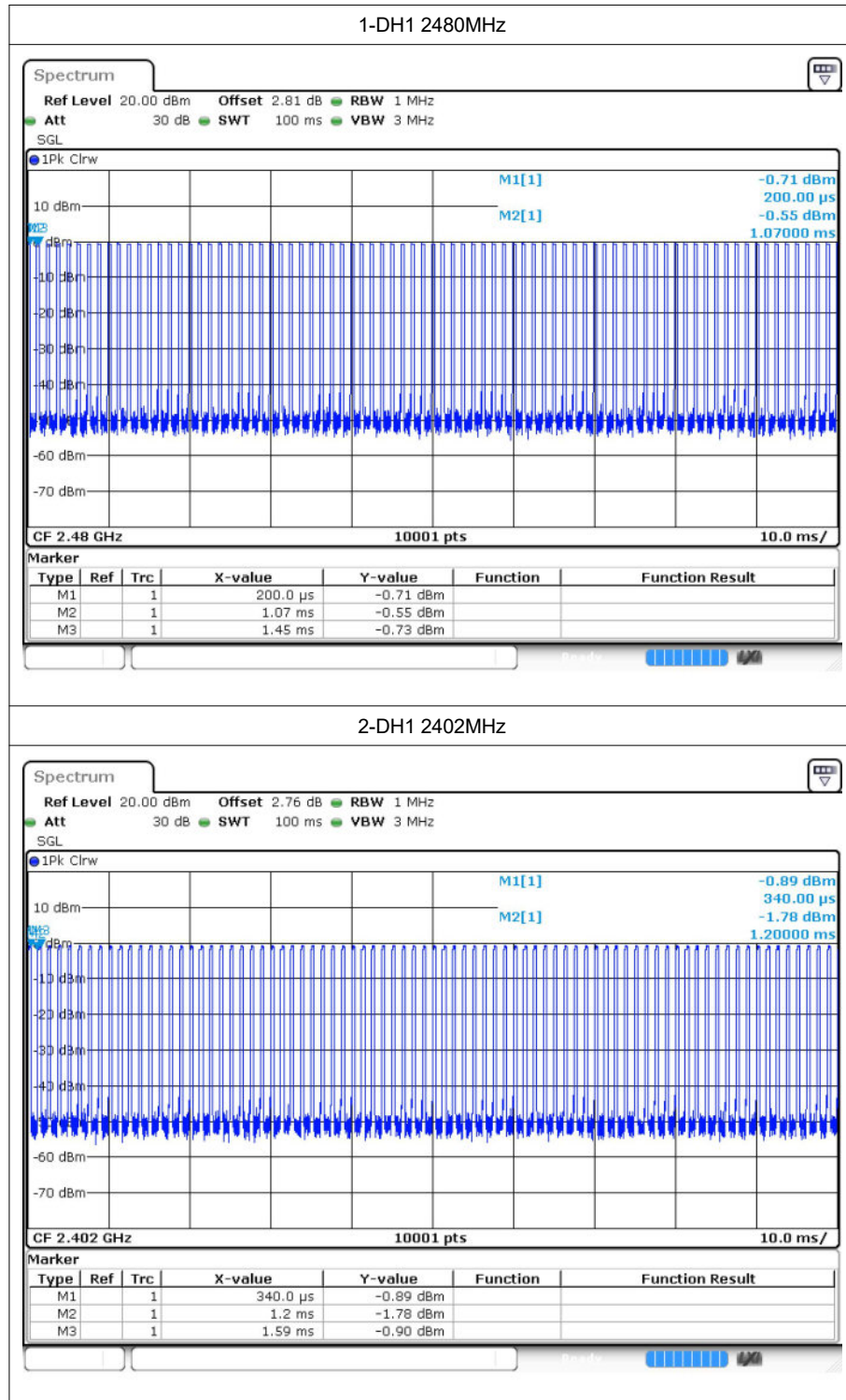
1.1 Test Result

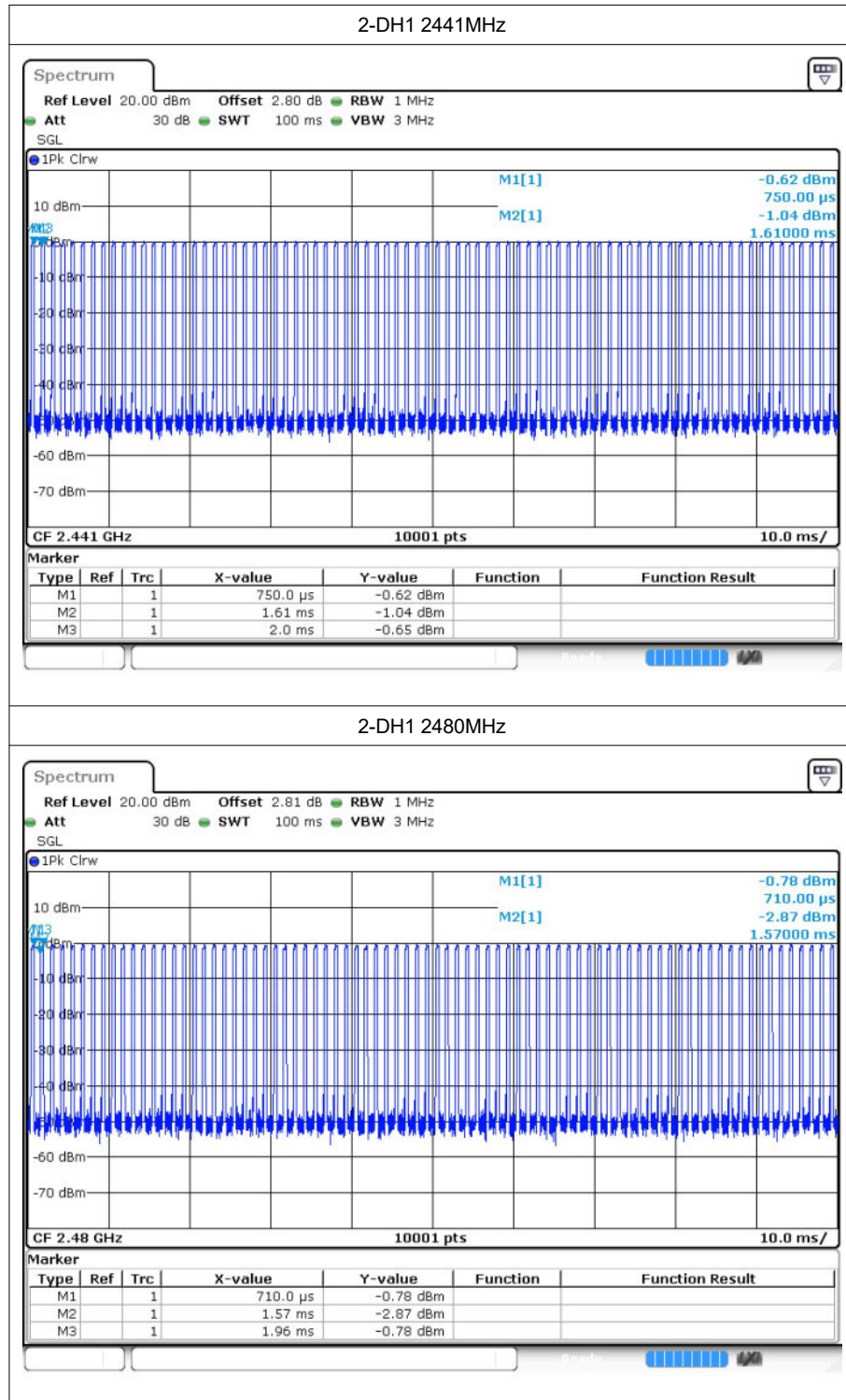
Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor	1/T (kHz)
1-DH1	2402	31.2	5.06	2.63
1-DH1	2441	31.21	5.06	2.63
1-DH1	2480	31.21	5.06	2.63
2-DH1	2402	32.01	4.95	2.56
2-DH1	2441	32	4.95	2.56
2-DH1	2480	31.9	4.96	2.56

Note: Left and right ear have been tested and the only shows the worst case mode.

1.2 Test Graphs







2 Maximum Conducted Peak Output Power

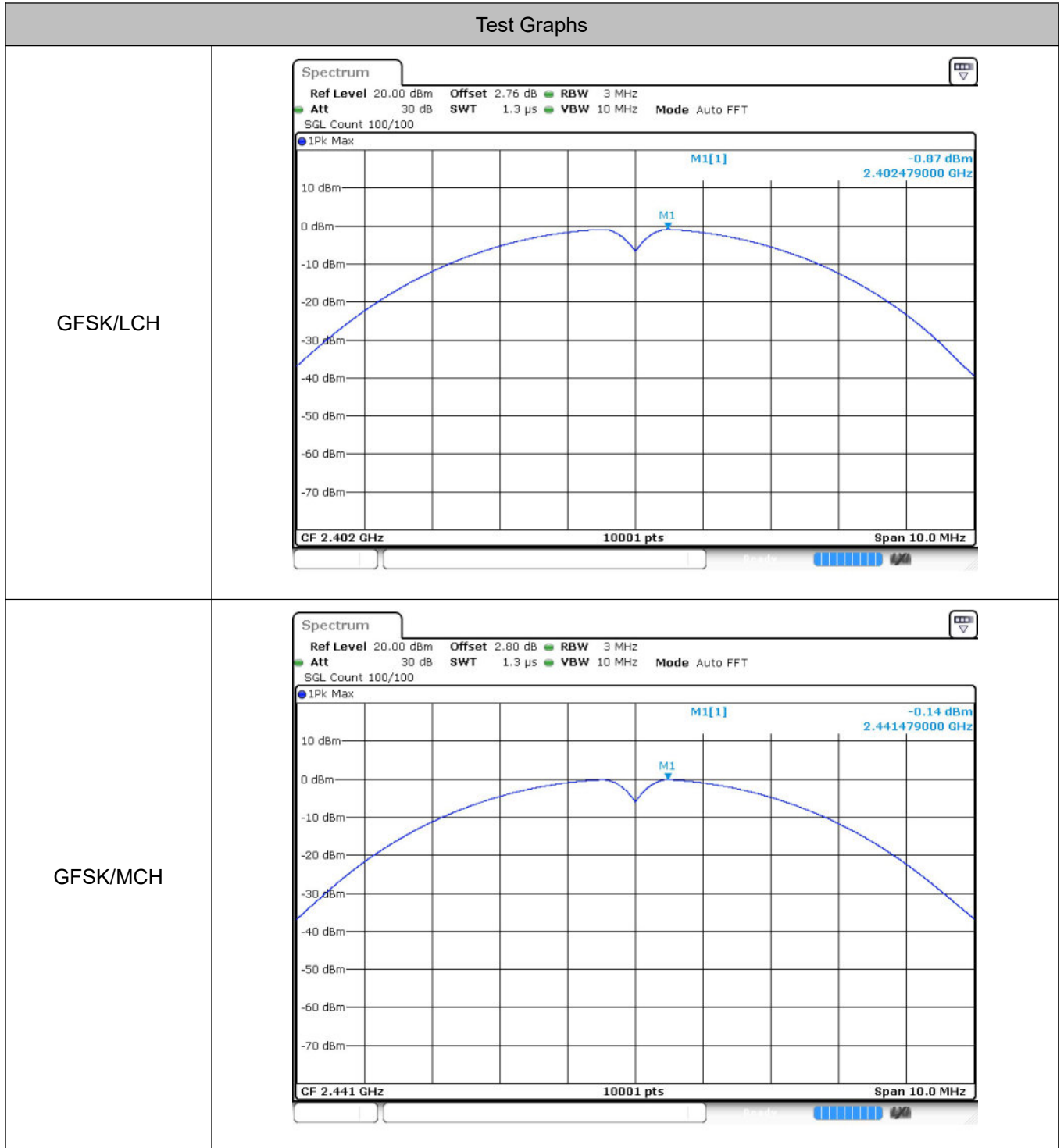
2.1 Test Result(Left earphone)

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.87	21	Pass
	MCH	-0.14	21	Pass
	HCH	-0.72	21	Pass
$\pi/4$ DQPSK	LCH	0.19	21	Pass
	MCH	0.71	21	Pass
	HCH	0.31	21	Pass

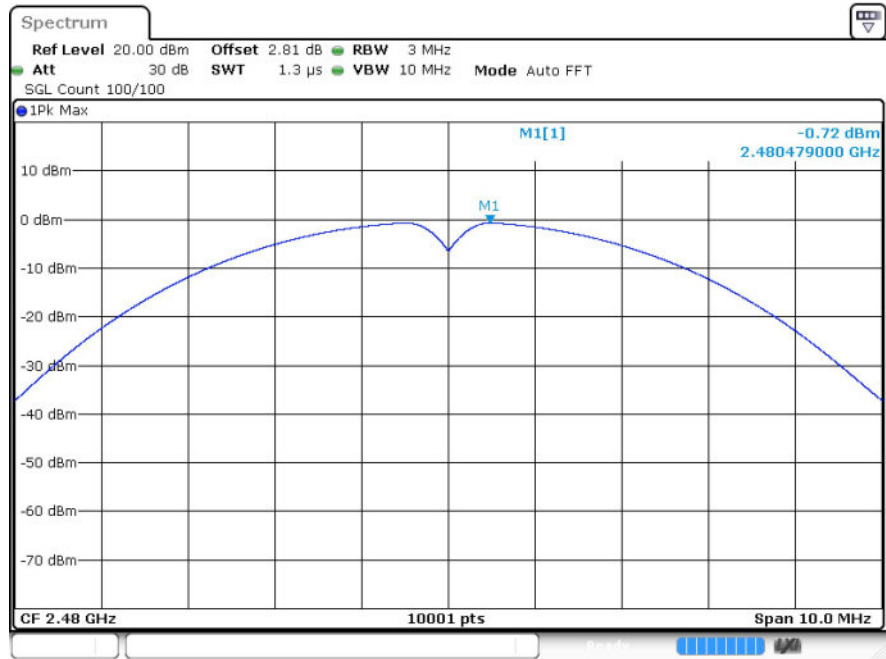
2.2 Test Result(Right earphone)

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.4	21	Pass
	MCH	-0.81	21	Pass
	HCH	-1.31	21	Pass
$\pi/4$ DQPSK	LCH	-0.25	21	Pass
	MCH	0.2	21	Pass
	HCH	-0.18	21	Pass

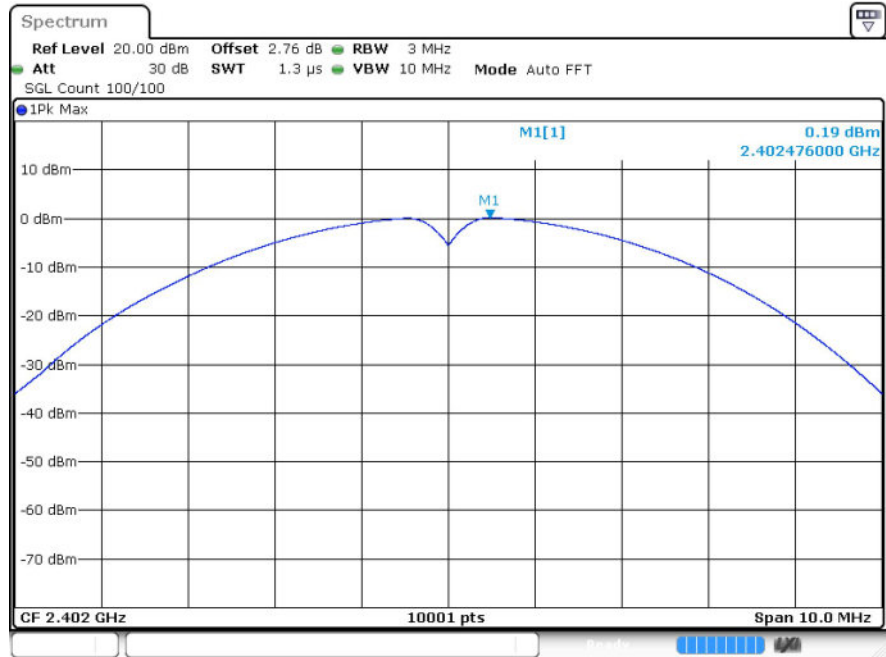
2.3 Test Graphs(Left earphone)



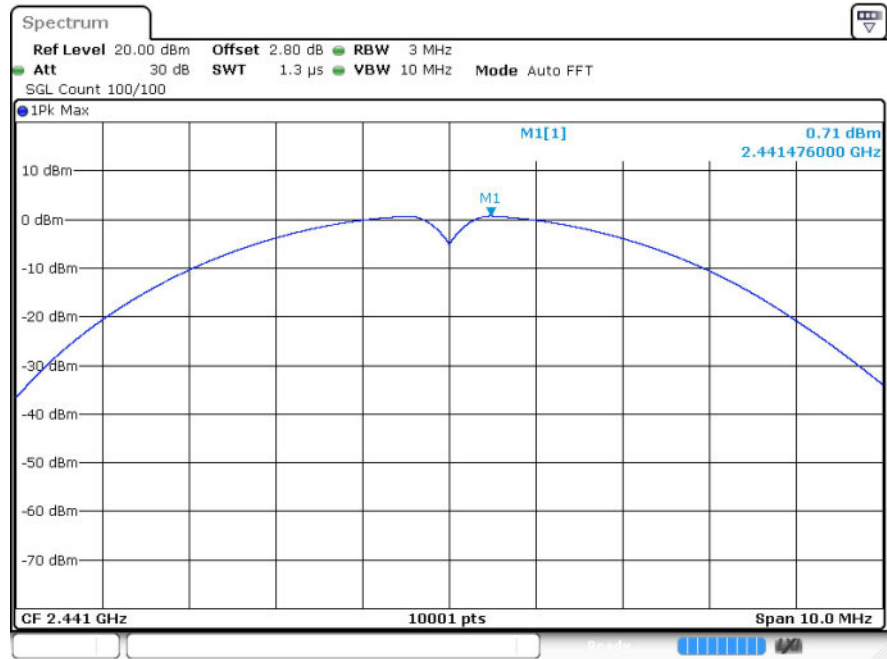
GFSK/HCH



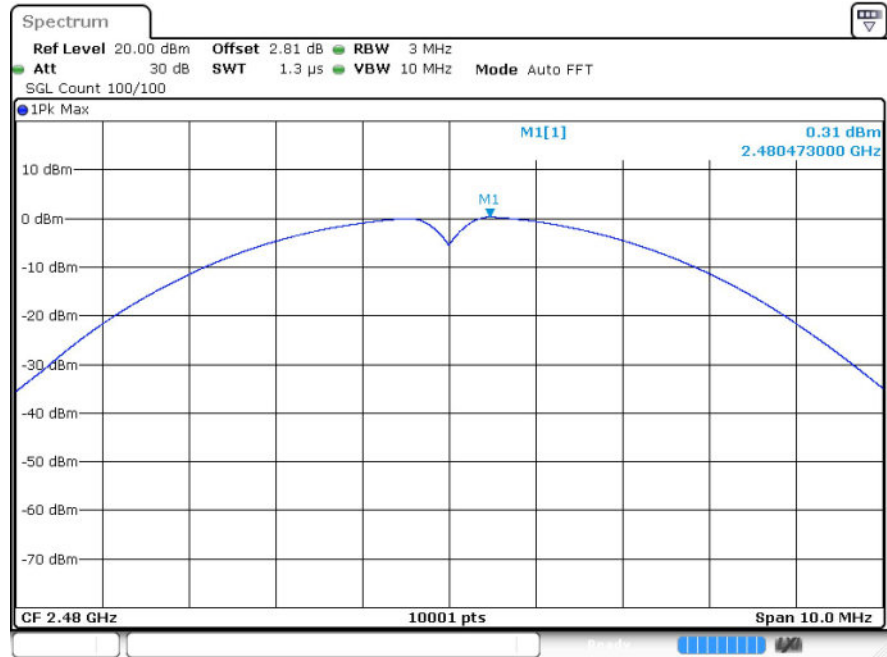
$\pi/4$ DQPSK/LCH



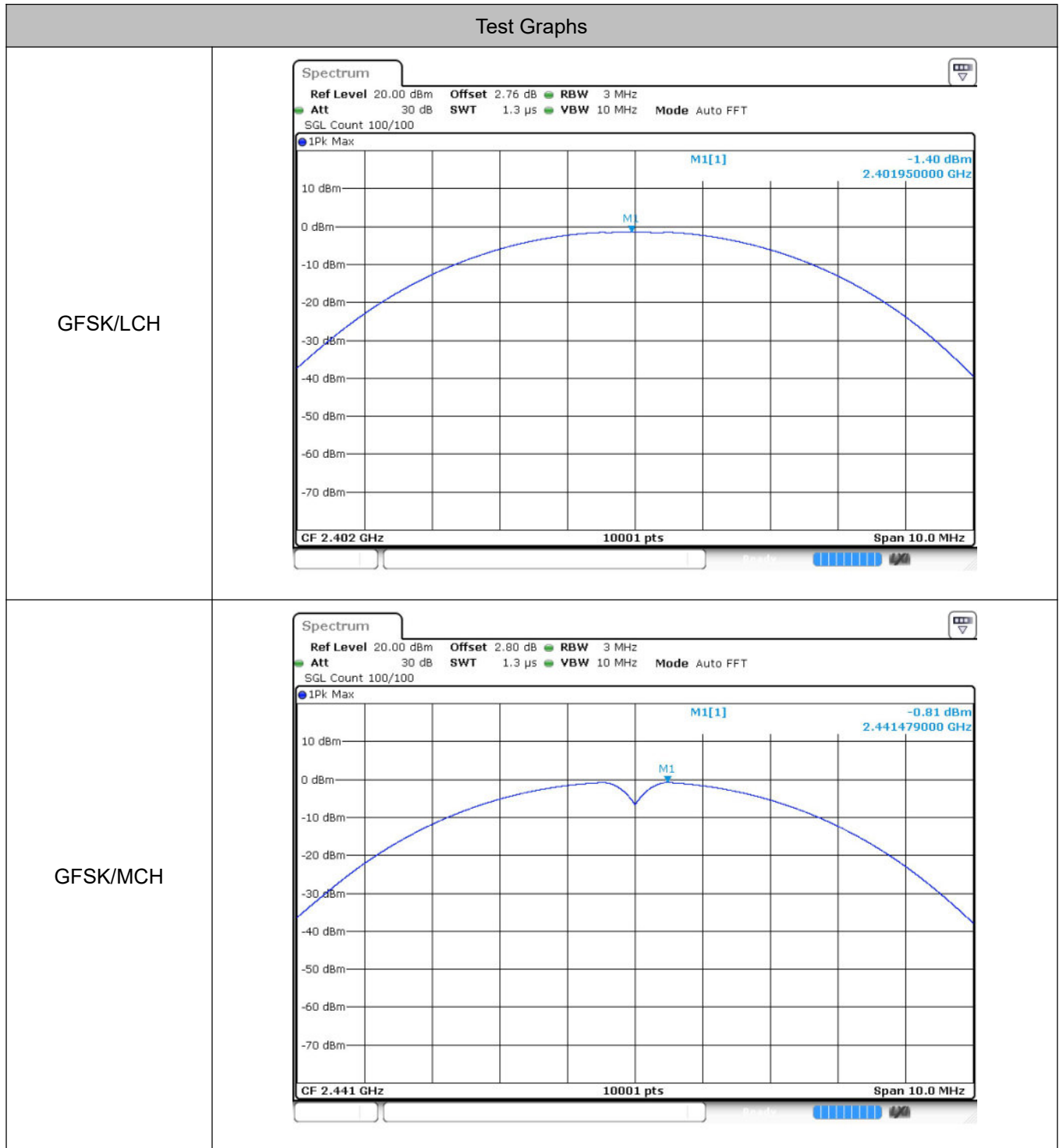
$\pi/4$ DQPSK/MCH



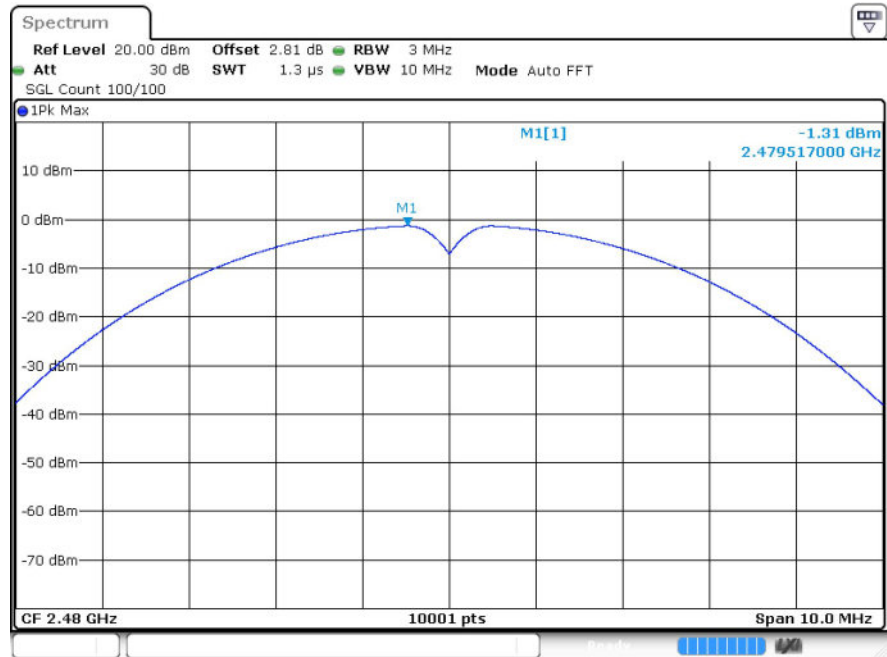
$\pi/4$ DQPSK/HCH



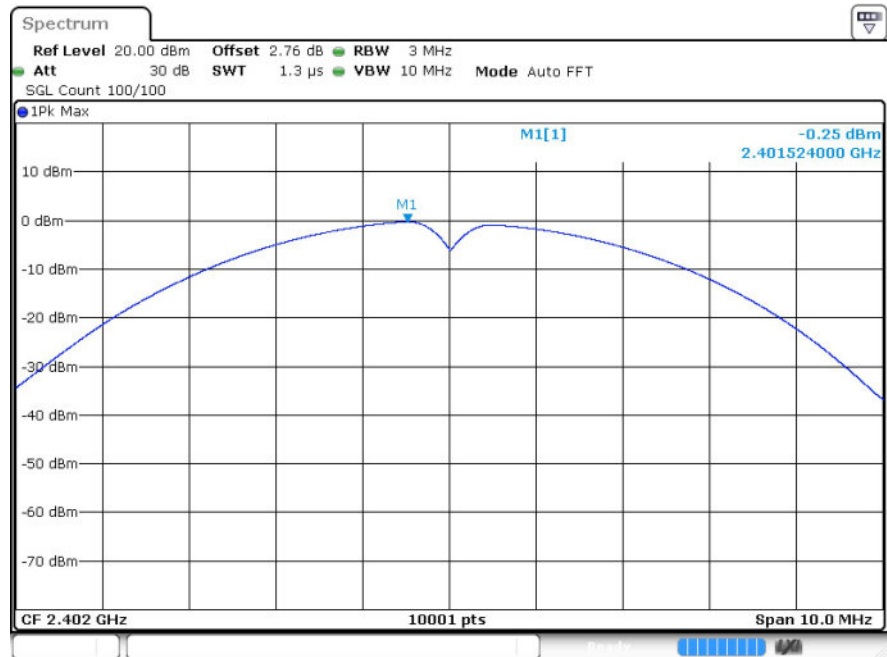
2.4 Test Graphs(Right earphone)



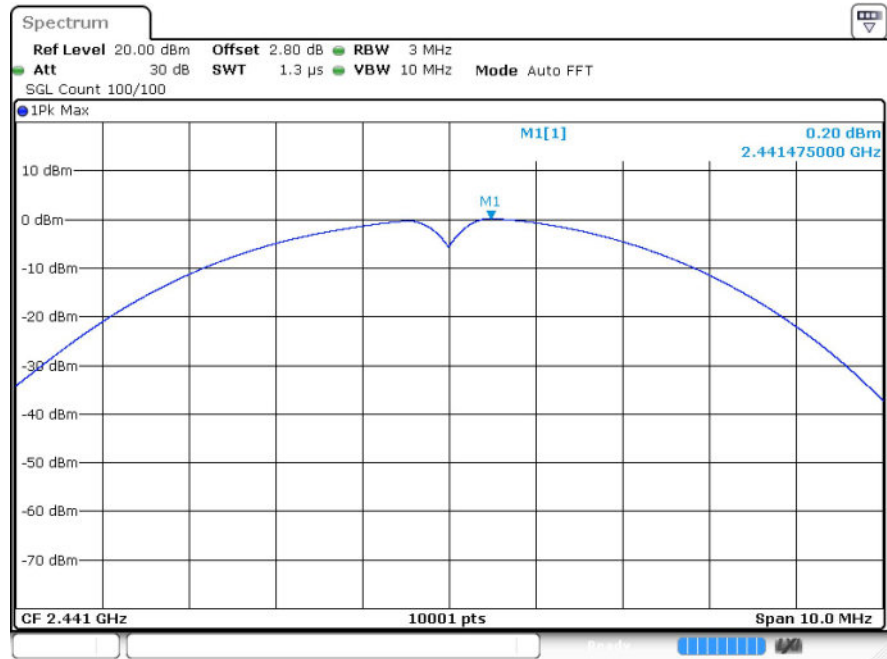
GFSK/HCH



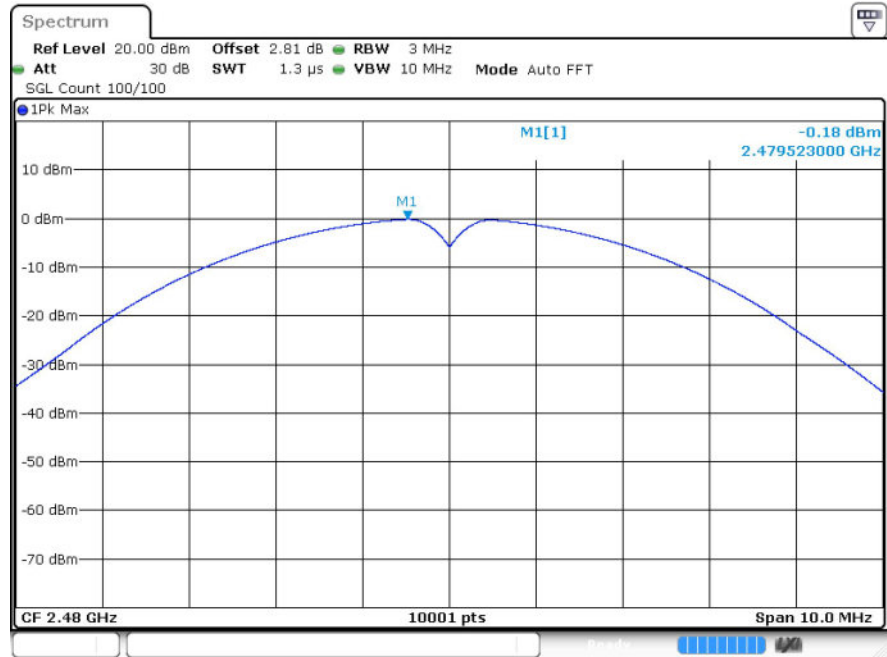
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH



$\pi/4$ DQPSK/HCH



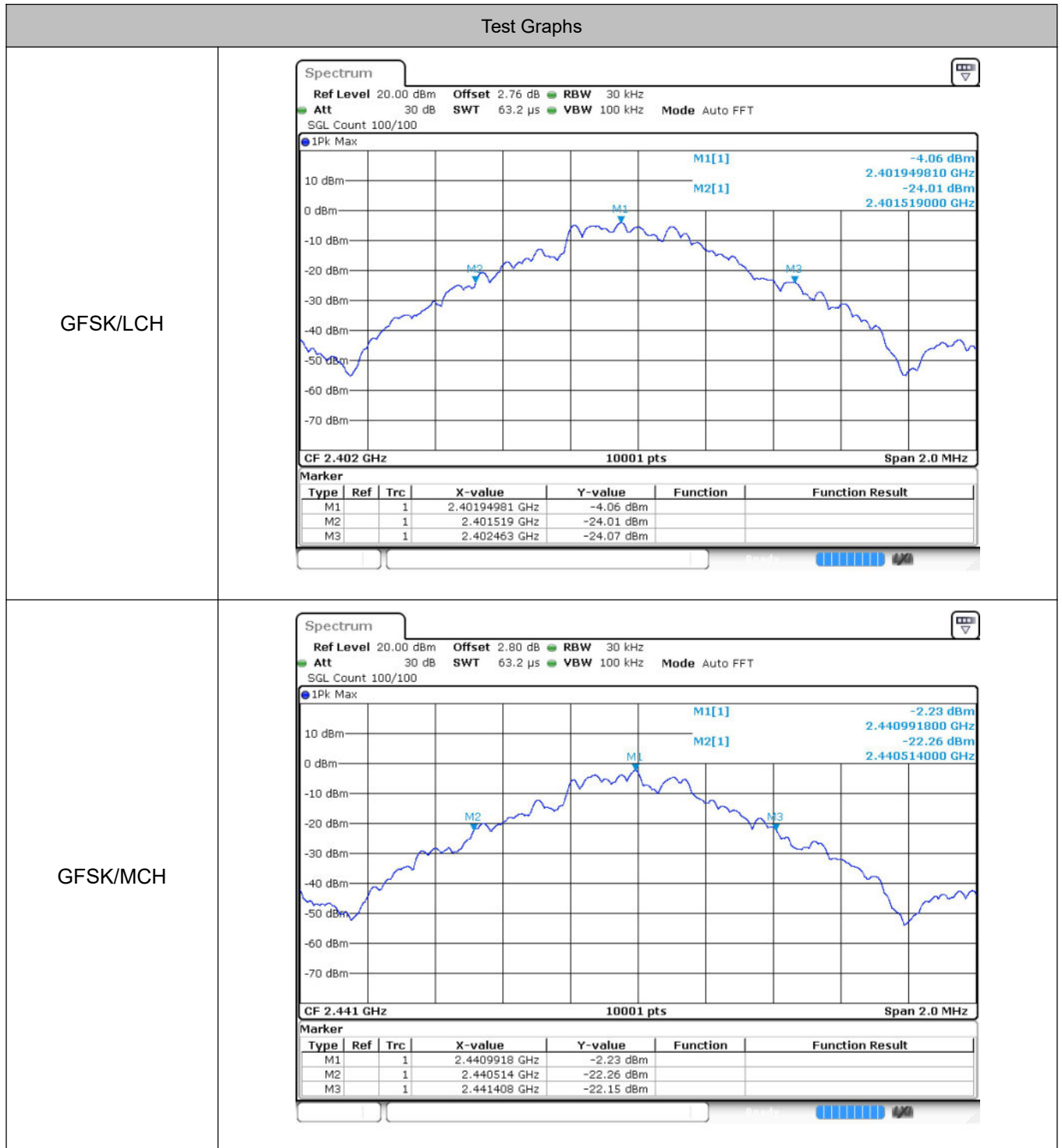
3 20dB Bandwidth

3.1 Test Result

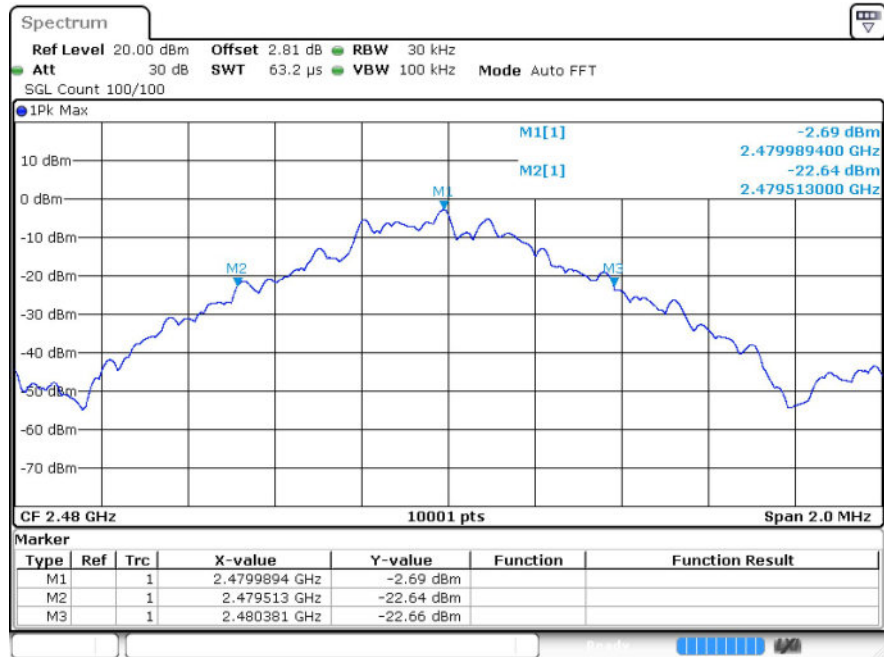
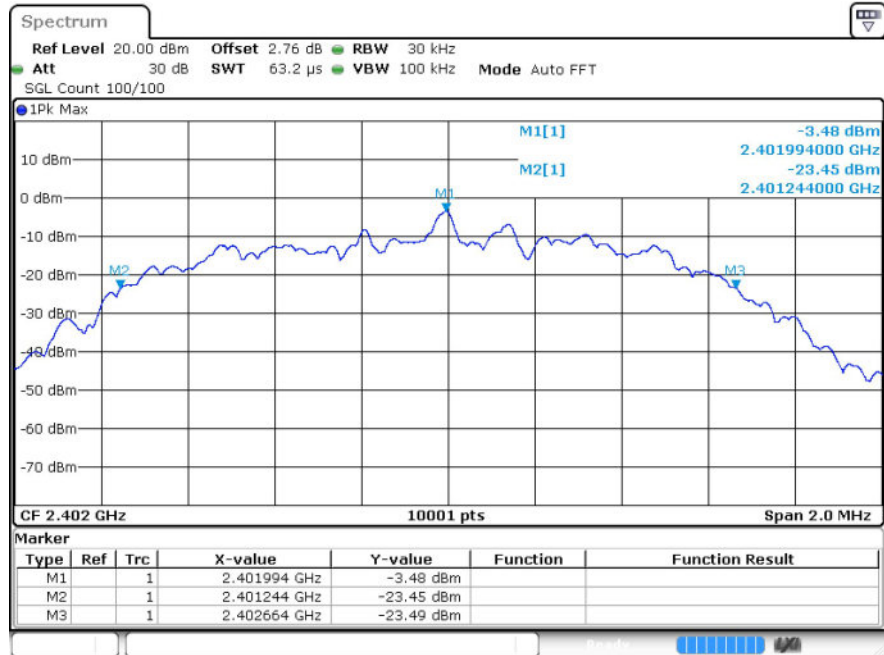
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.944	Not Specified	Pass
	MCH	0.894	Not Specified	Pass
	HCH	0.868	Not Specified	Pass
$\pi/4$ DQPSK	LCH	1.42	Not Specified	Pass
	MCH	1.422	Not Specified	Pass
	HCH	1.421	Not Specified	Pass

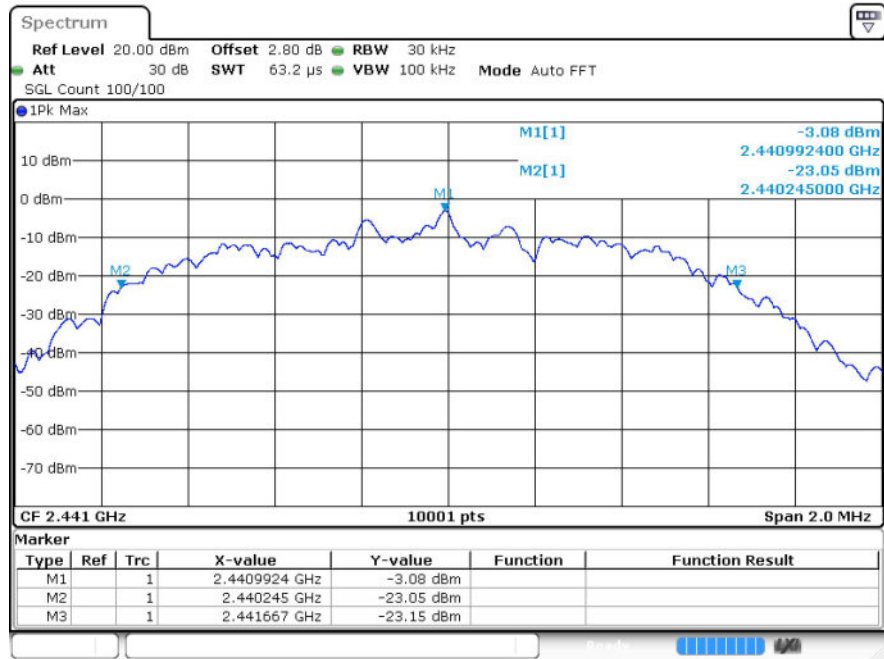
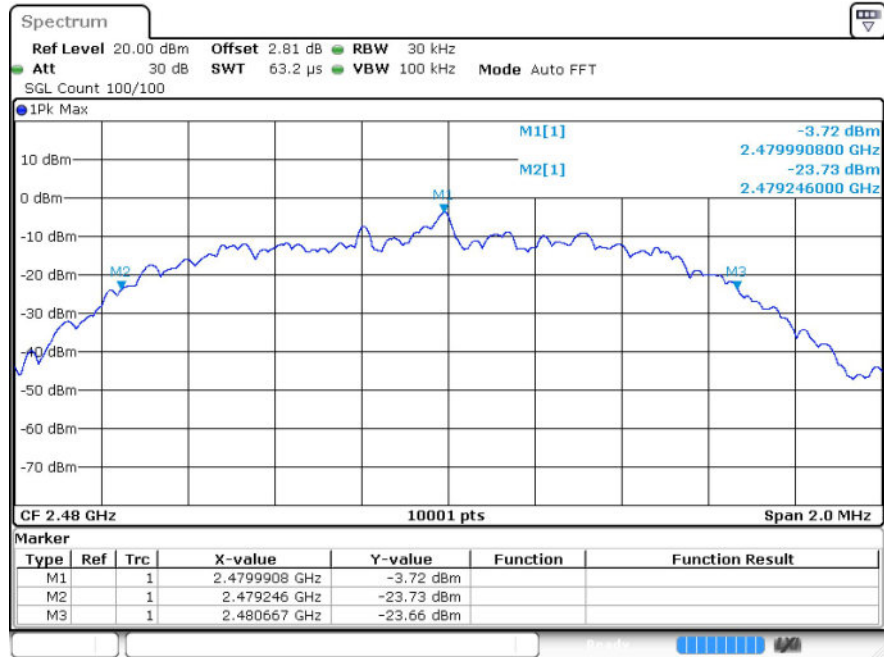
Note: Left and right ear have been tested and the only shows the worst case mode.

3.2 Test Graphs



GFSK/HCH


 $\pi/4$ DQPSK/LCH


$\pi/4$ DQPSK/MCH

 $\pi/4$ DQPSK/HCH


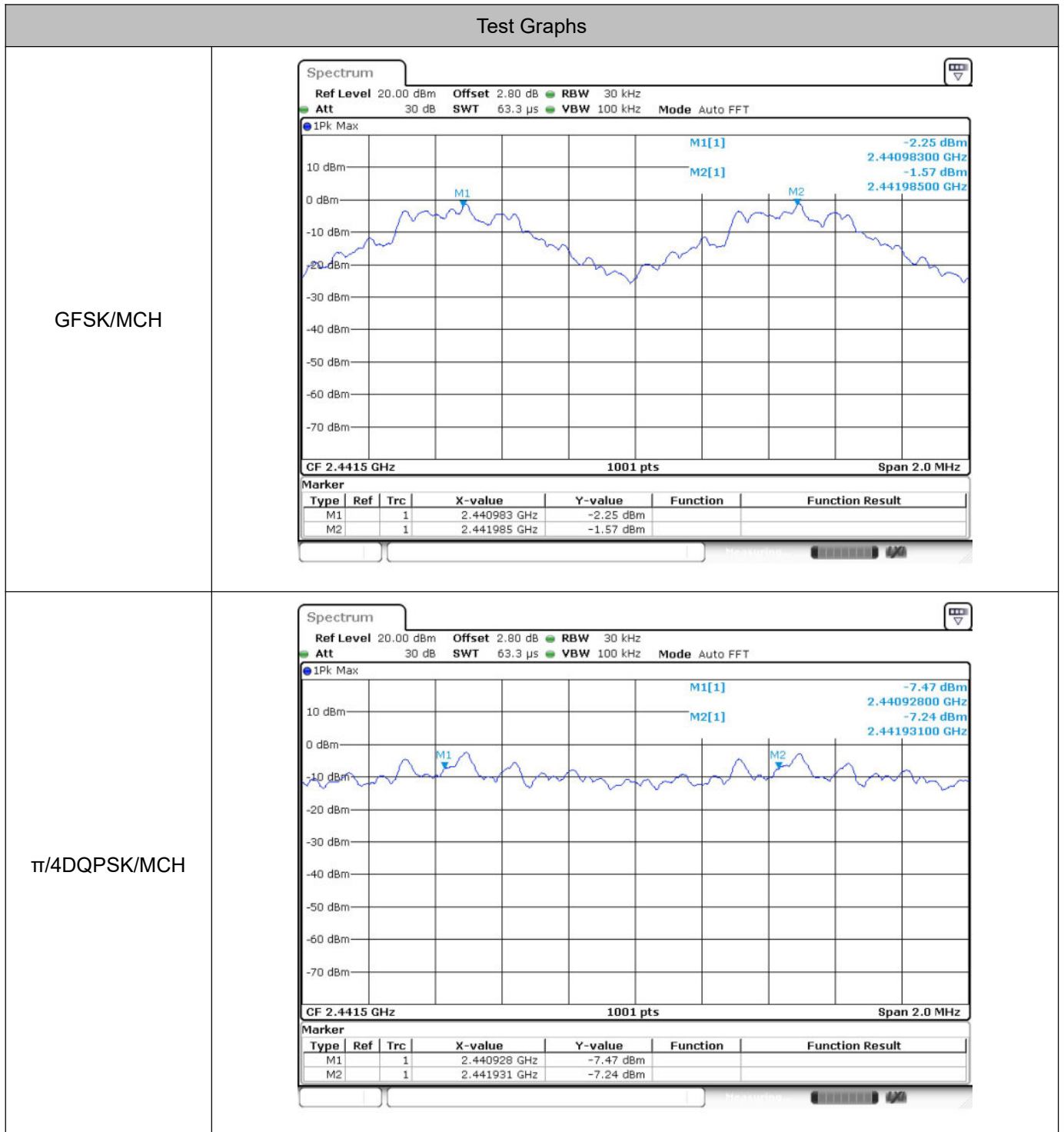
4 Carrier Frequency Separation

4.1 Test Result

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	MCH	1.002	0.596	Pass
$\pi/4$ DQPSK	MCH	1.003	0.948	Pass

Note: Left and right ear have been tested and the only shows the worst case mode.

4.2 Test Graphs



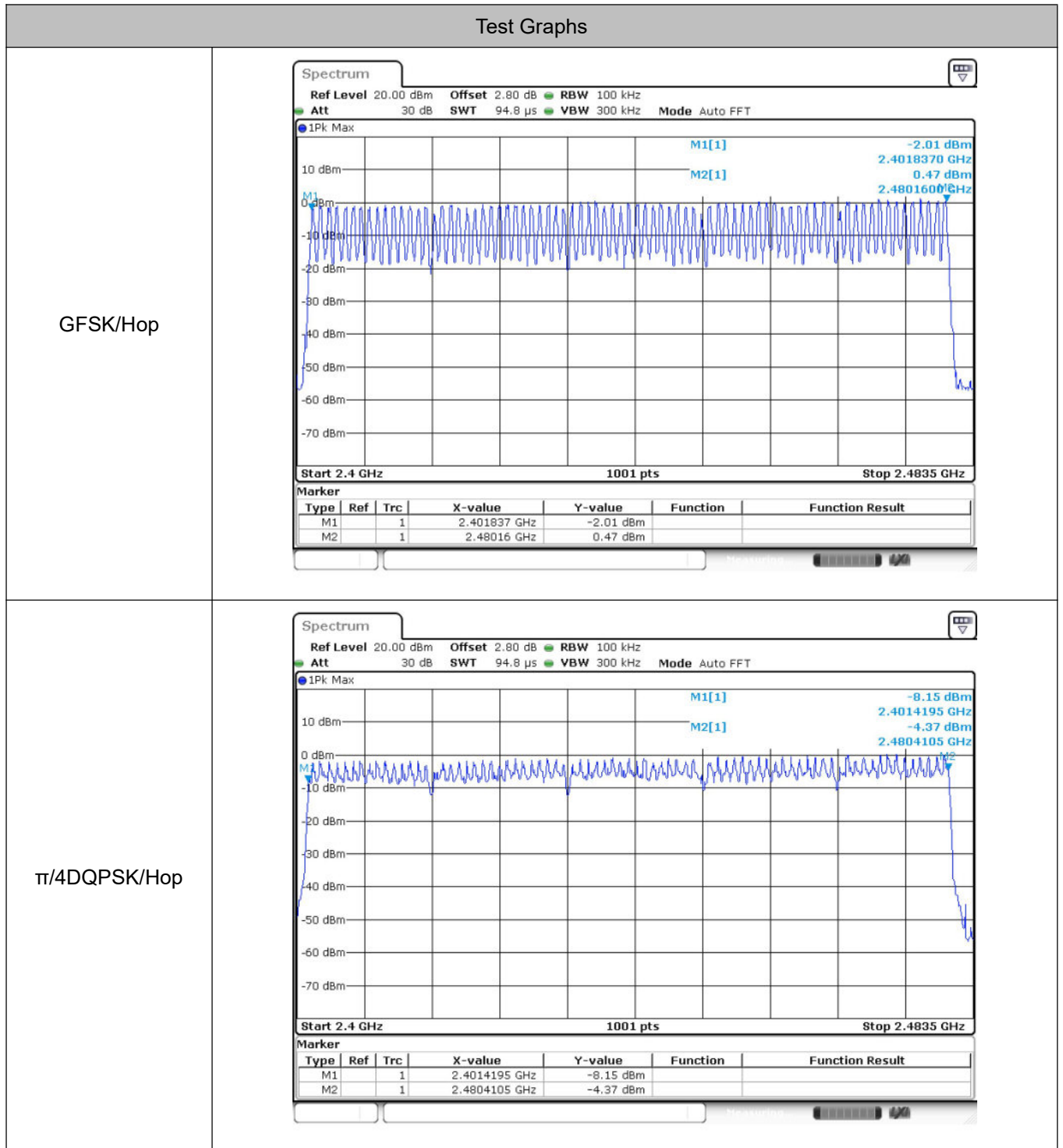
5 Hopping Channel Number

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

Note: Left and right ear have been tested and the only shows the worst case mode.

5.2 Test Graphs





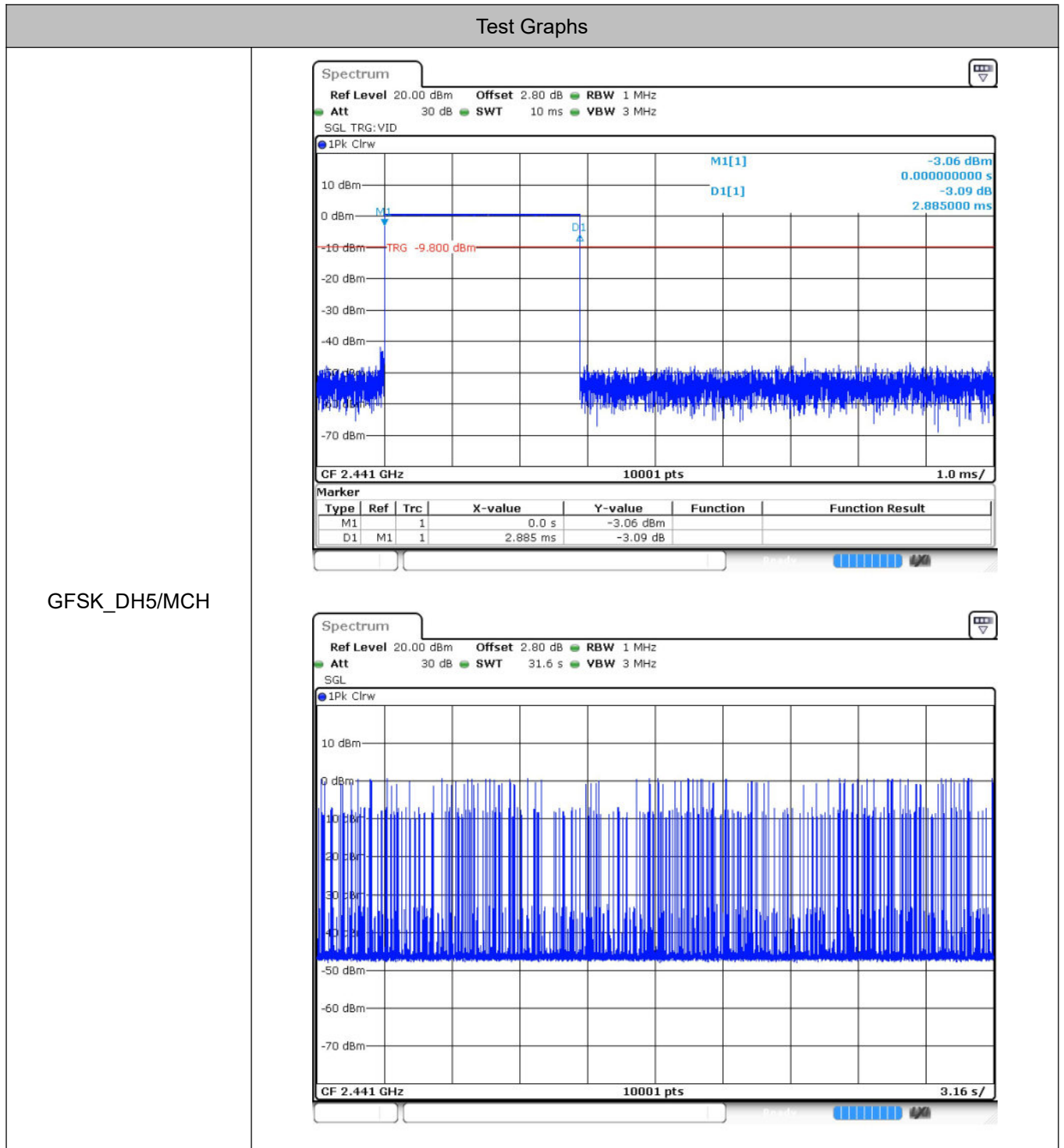
6 Dwell Time

6.1 Test Result

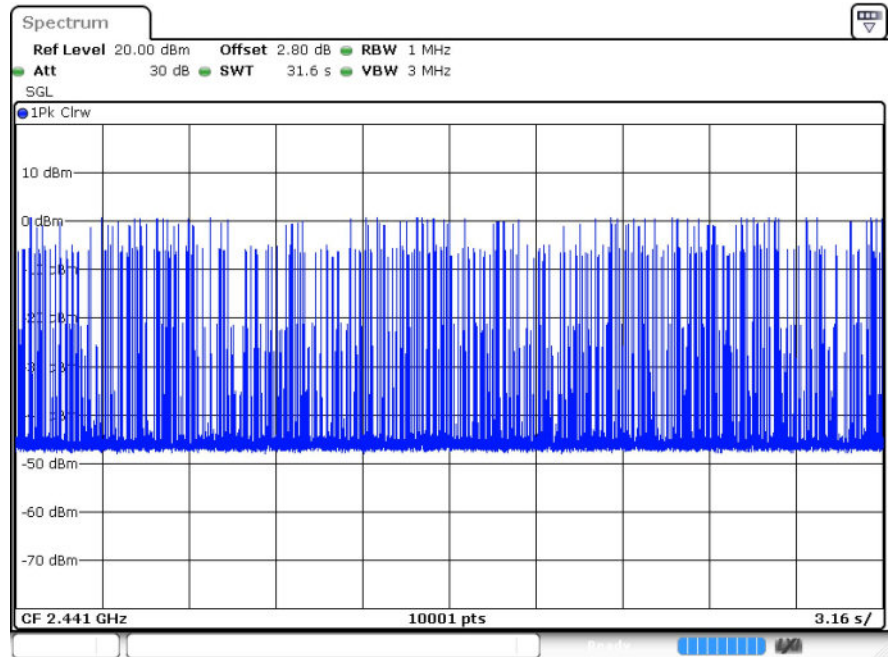
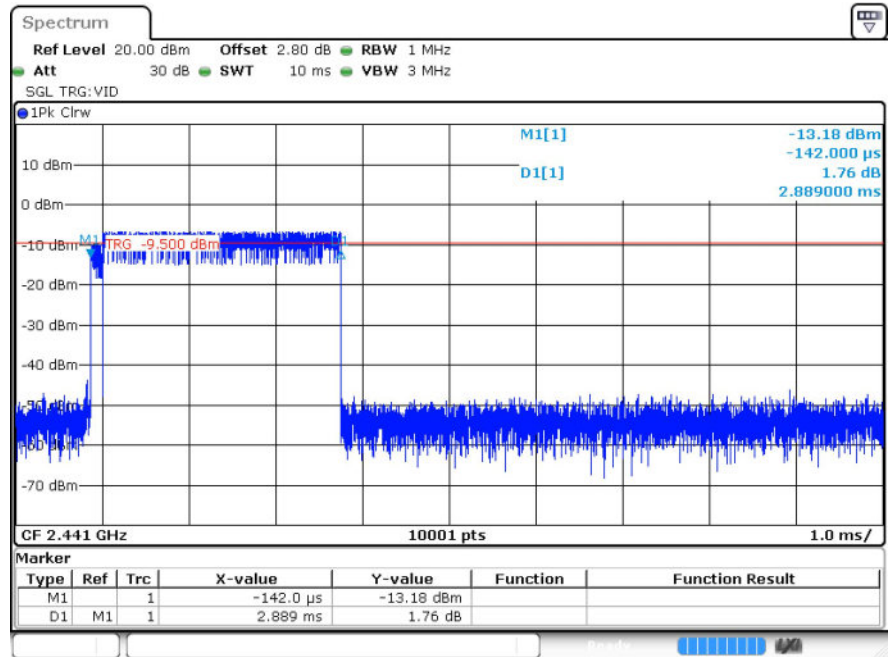
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[ms]	Limit [s]	Verdict
GFSK	DH5	MCH	2.885	102	294.27	0.4	Pass
$\pi/4$ DQPSK	2DH5	MCH	2.889	102	294.678	0.4	Pass

Note: Left and right ear have been tested and the only shows the worst case mode.

6.2 Test Graphs



$\pi/4$ DQPSK
_2DH5/MCH



7 RF Conducted Spurious Emissions

7.1 Test Result

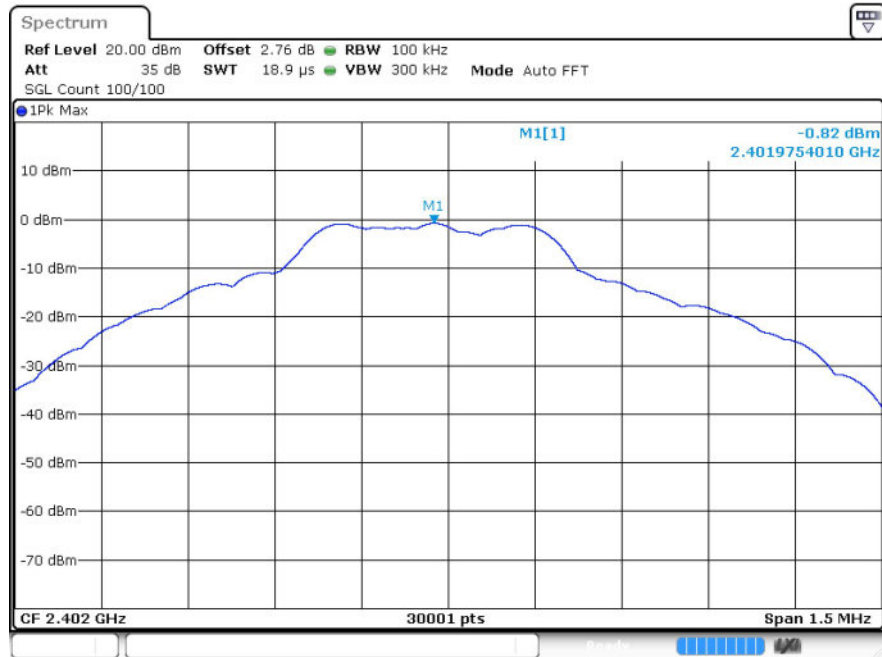
Mode	Channel	Max. Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	-40.6	-20	Pass
	MCH	-41.79	-20	Pass
	HCH	-40.37	-20	Pass
π /4DQPSK	LCH	-39.36	-20	Pass
	MCH	-40.54	-20	Pass
	HCH	-39.21	-20	Pass

Note: Left and right ear have been tested and the only shows the worst case mode.

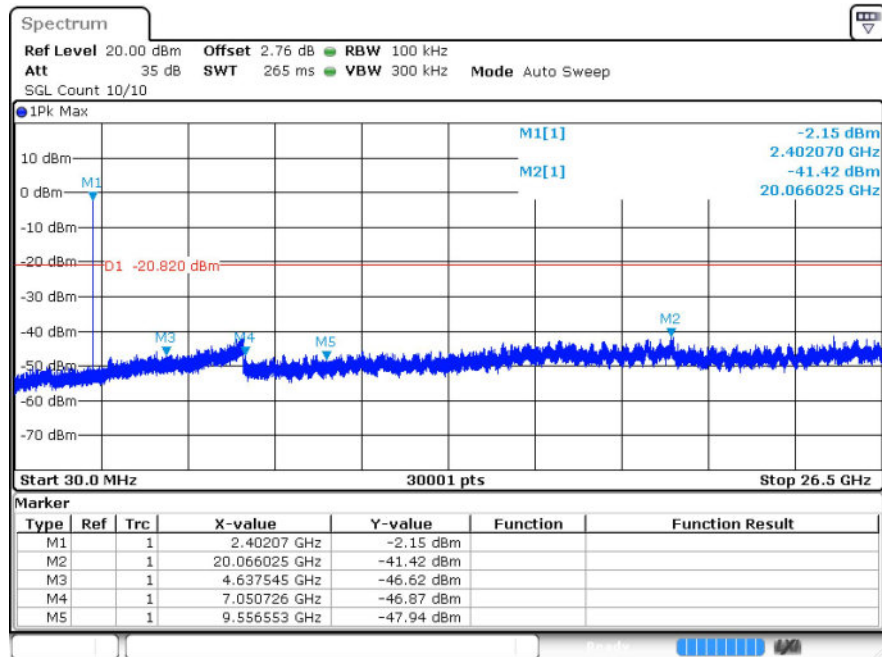
7.2 Test Graphs

GFSK_LCH_Graphs

Pref

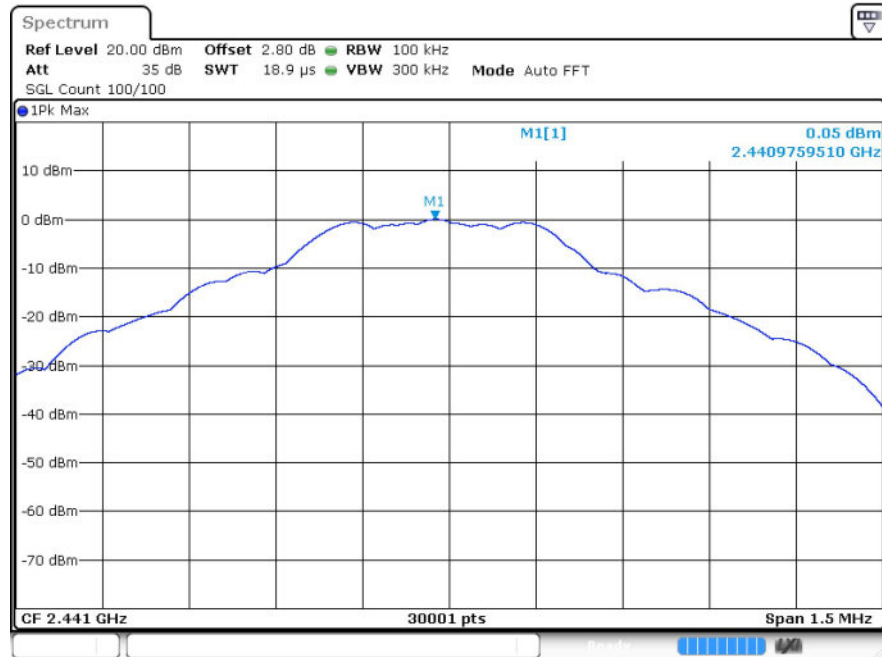


Puw

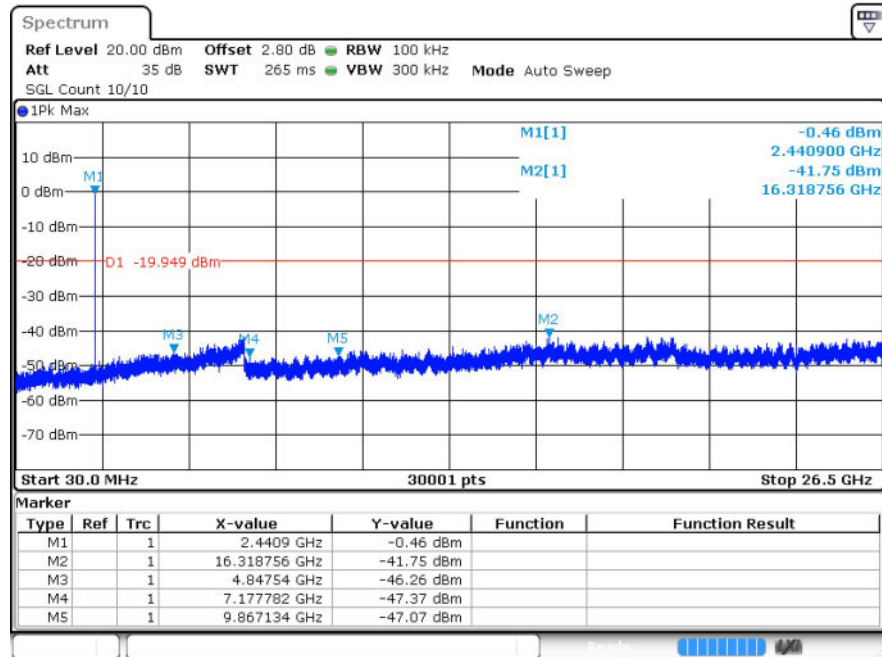


GFSK_MCH_Graphs

Pref

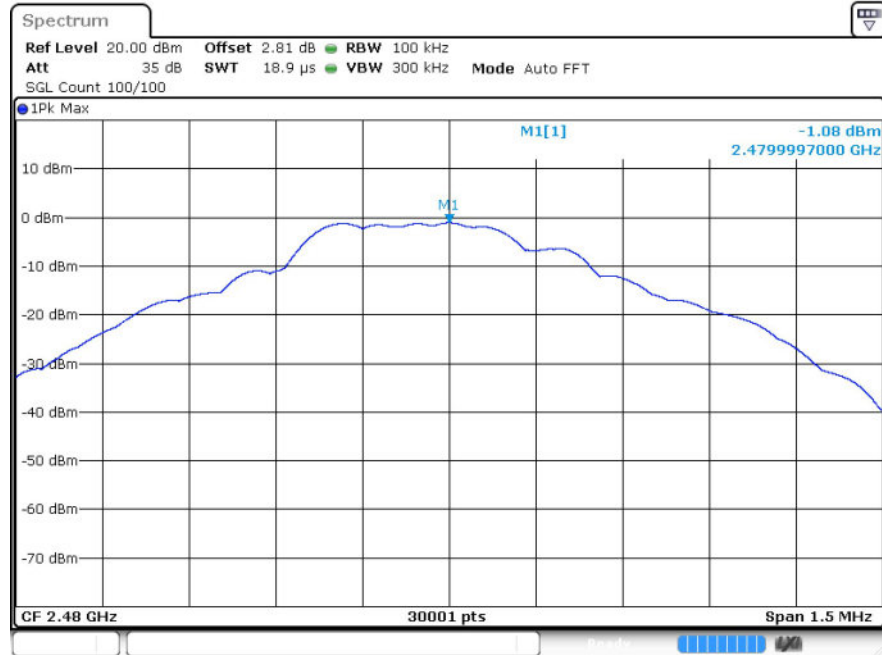


Puw

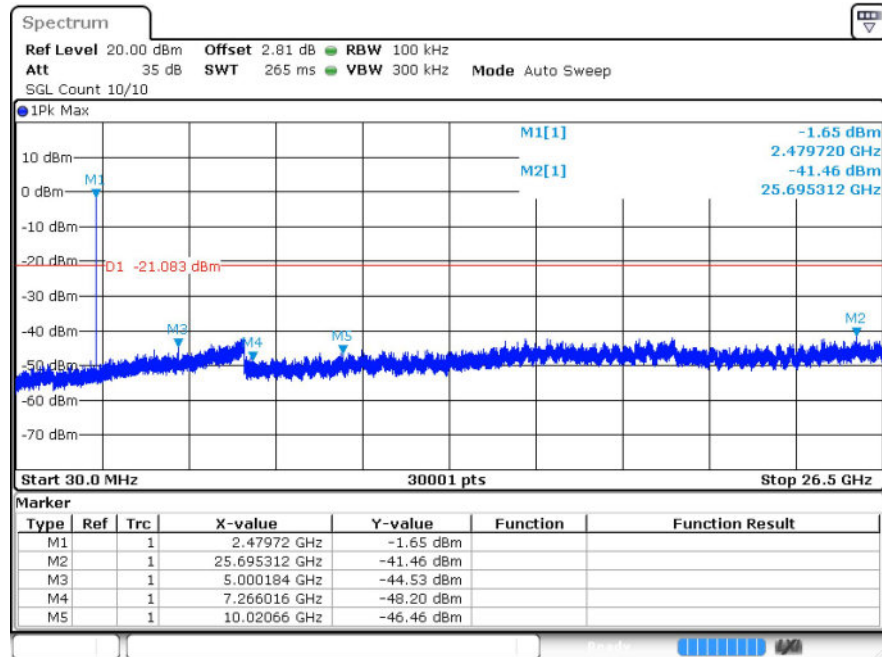


GFSK_HCH_Graphs

Pref

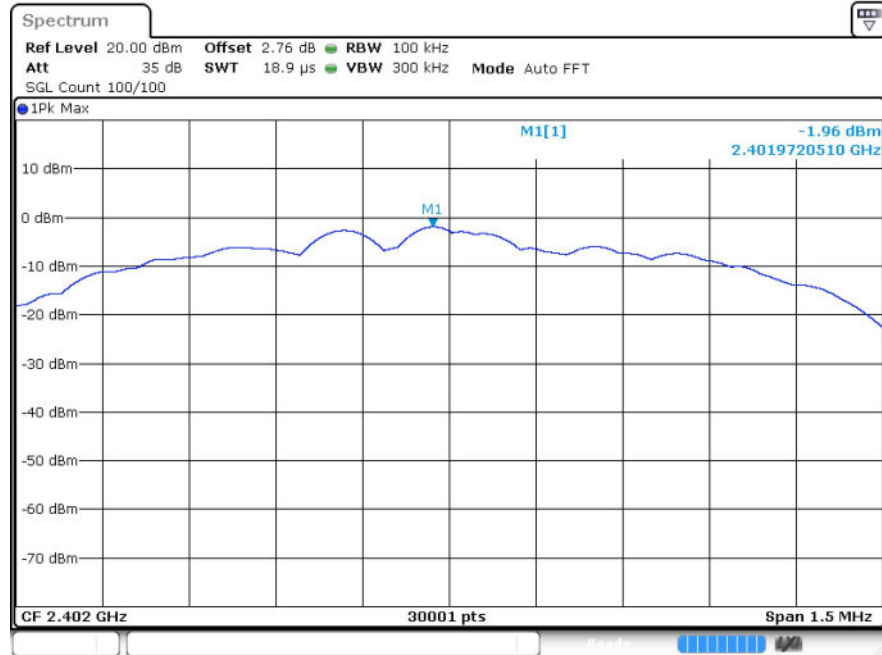


Puw

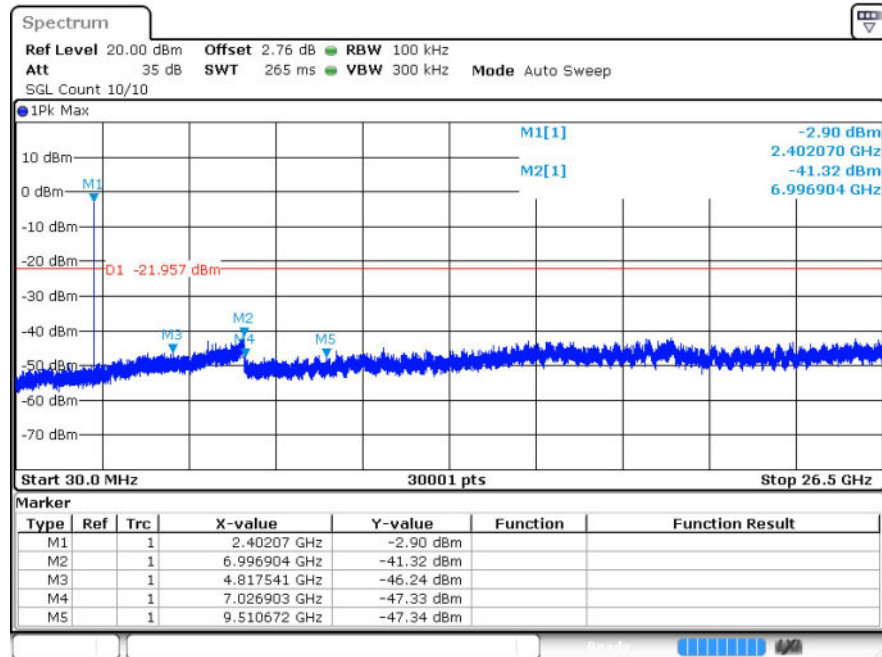


$\pi/4$ DQPSK_LCH_Graphs

Pref

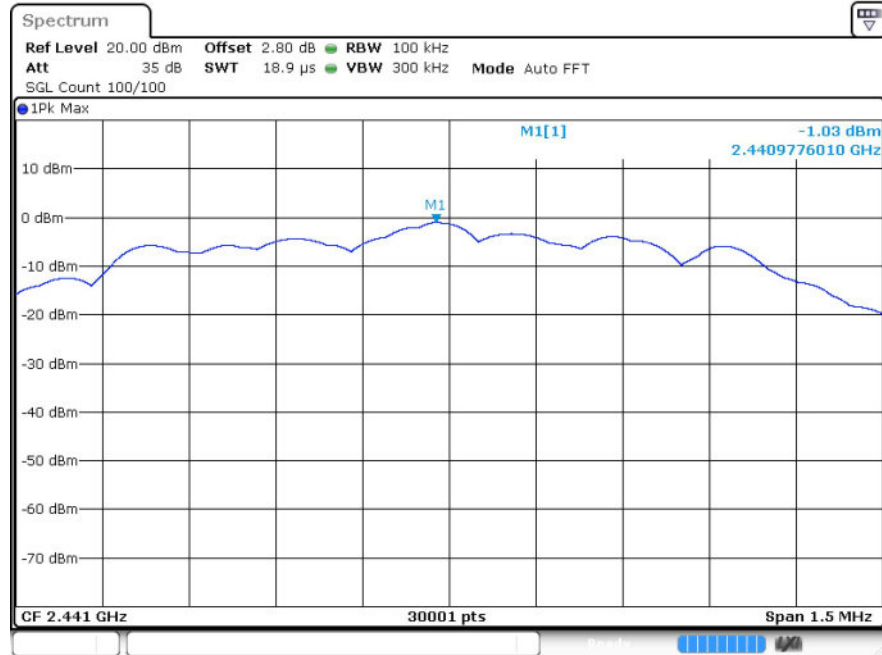


Puw

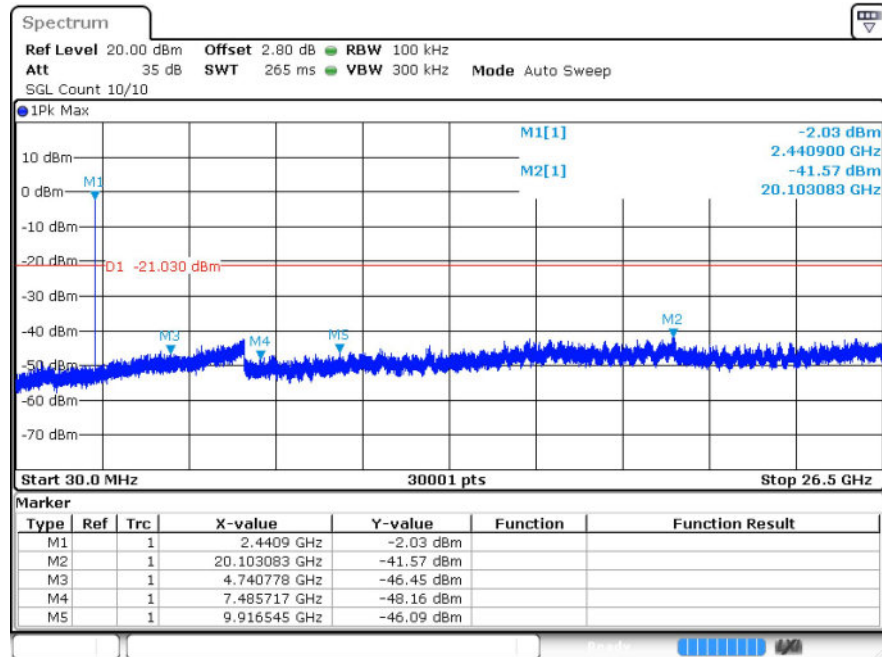


π /4DQPSK_MCH_Graphs

Pref

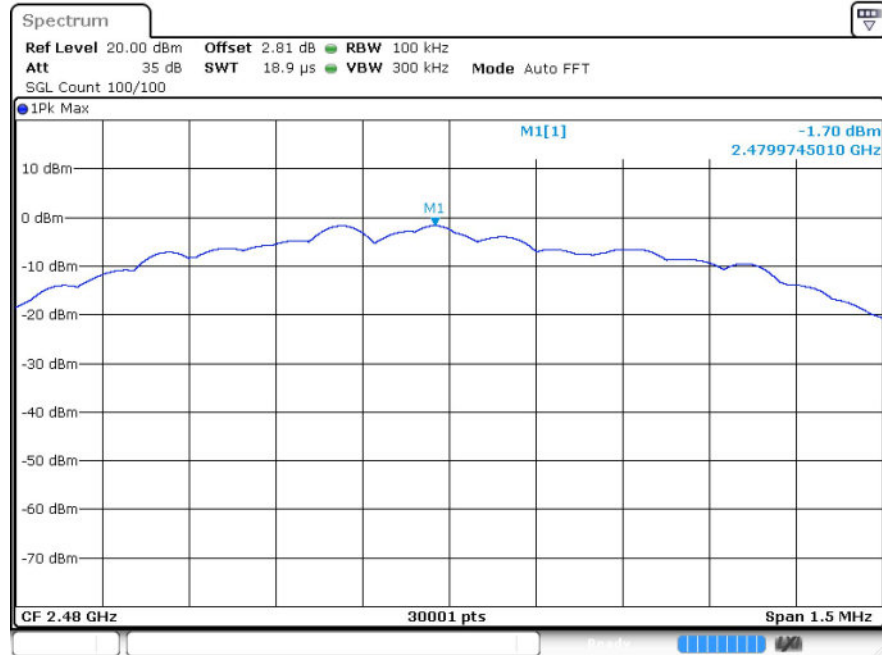


Puw

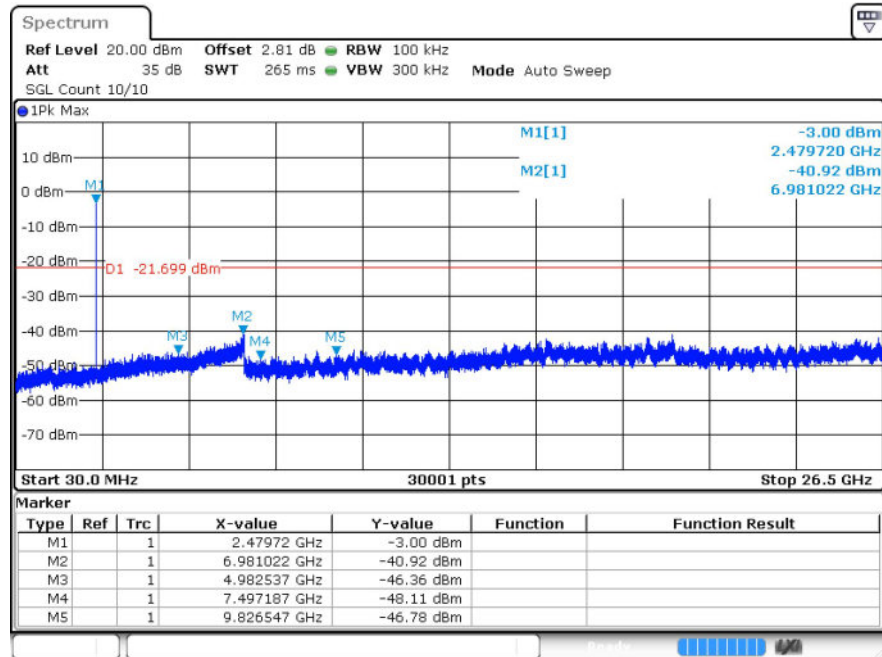


$\pi/4$ DQPSK_HCH_Graphs

Pref



Puw



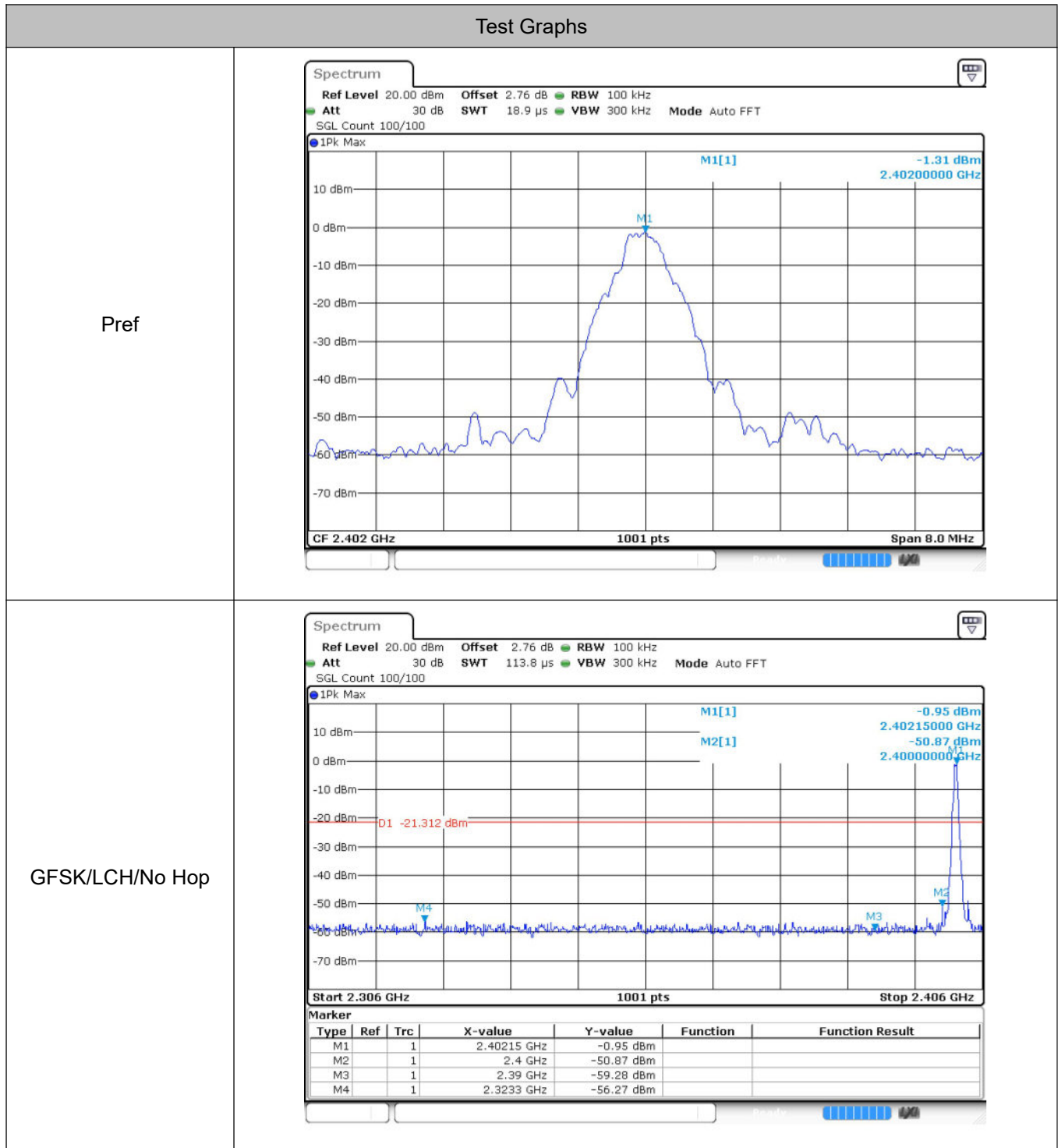
8 Band-edge for RF Conducted Emissions

8.1 Test Result

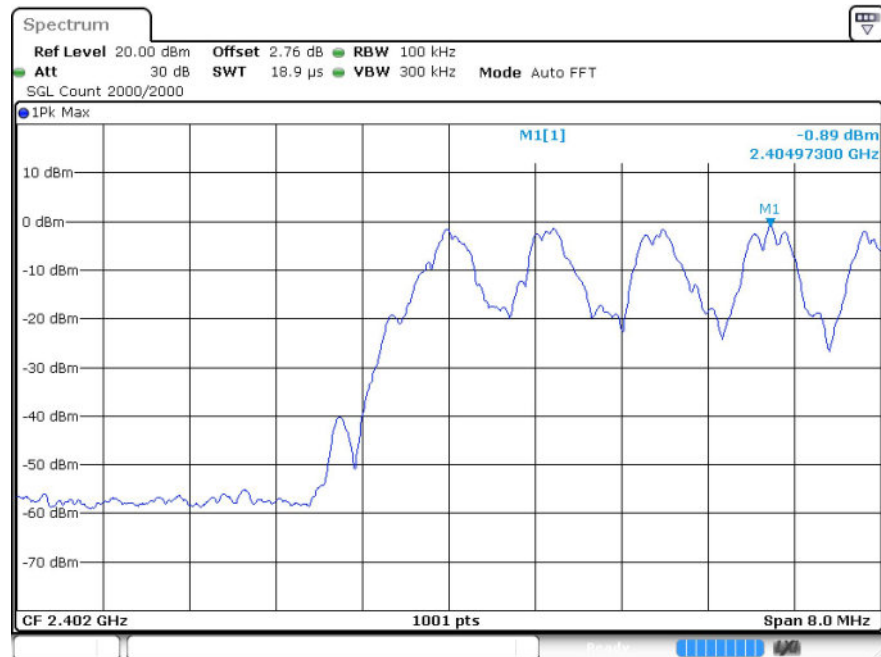
Mode	Channel	Carrier Frequency [MHz]	Frequency Hopping	Max Spurious Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	2402	Off	-54.96	-20	Pass
			On	-53.03	-20	Pass
	HCH	2480	Off	-46.72	-20	Pass
			On	-50.07	-20	Pass
$\pi/4$ DQPSK	LCH	2402	Off	-54.2	-20	Pass
			On	-53.26	-20	Pass
	HCH	2480	Off	-46.98	-20	Pass
			On	-47.64	-20	Pass

Note: Left and right ear have been tested and the only shows the worst case mode.

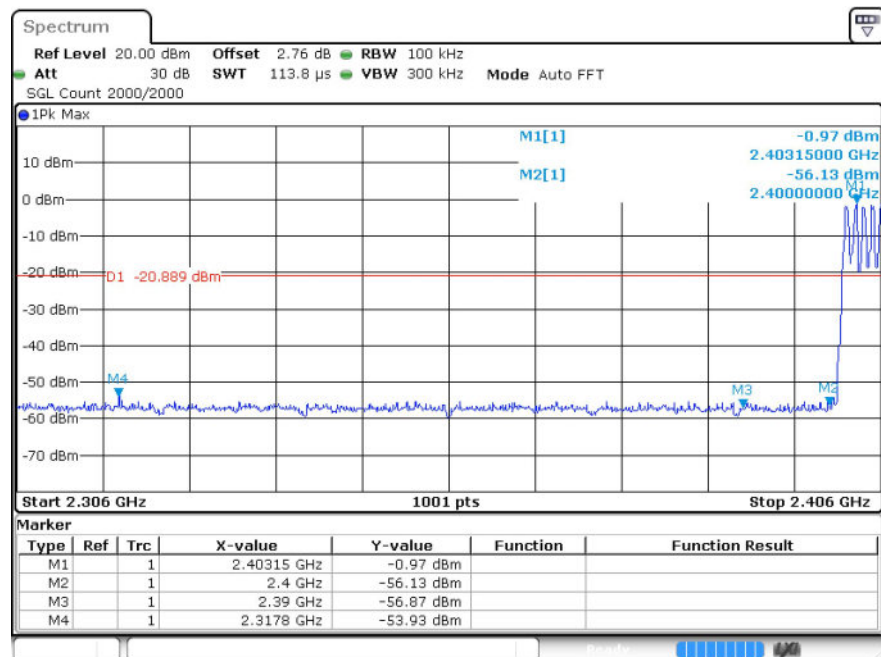
8.2 Test Graphs



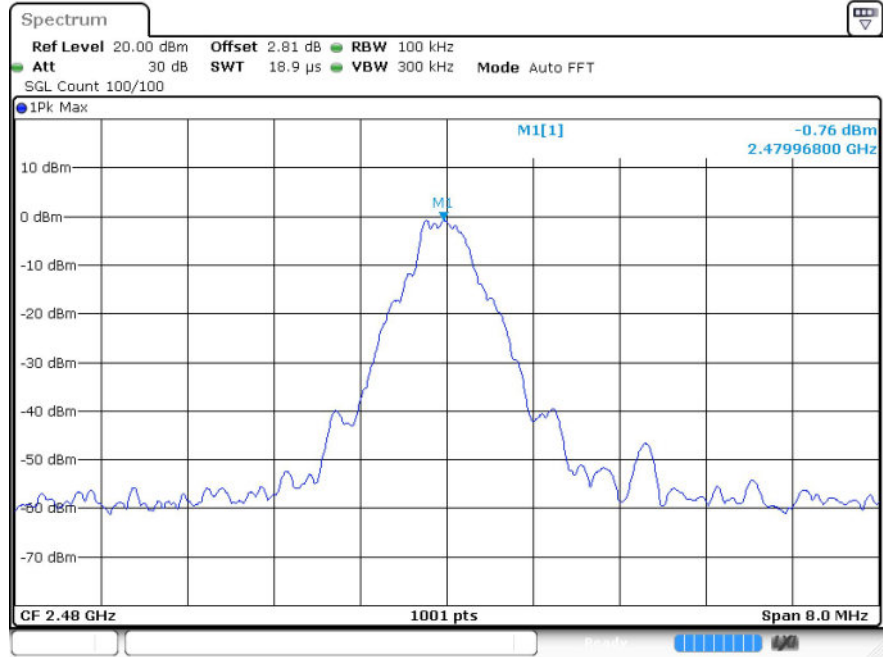
Ref



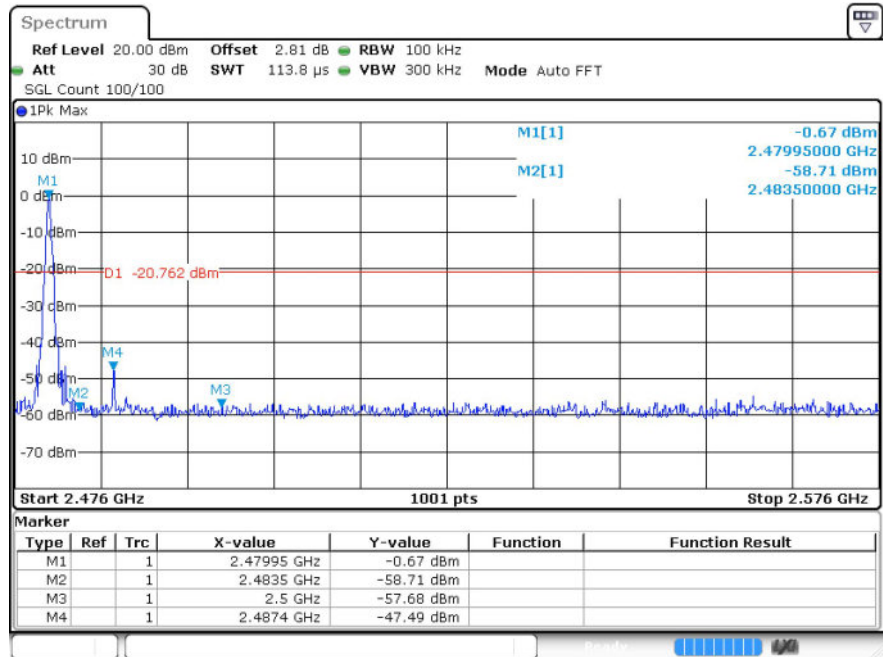
GFSK/LCH/Hop



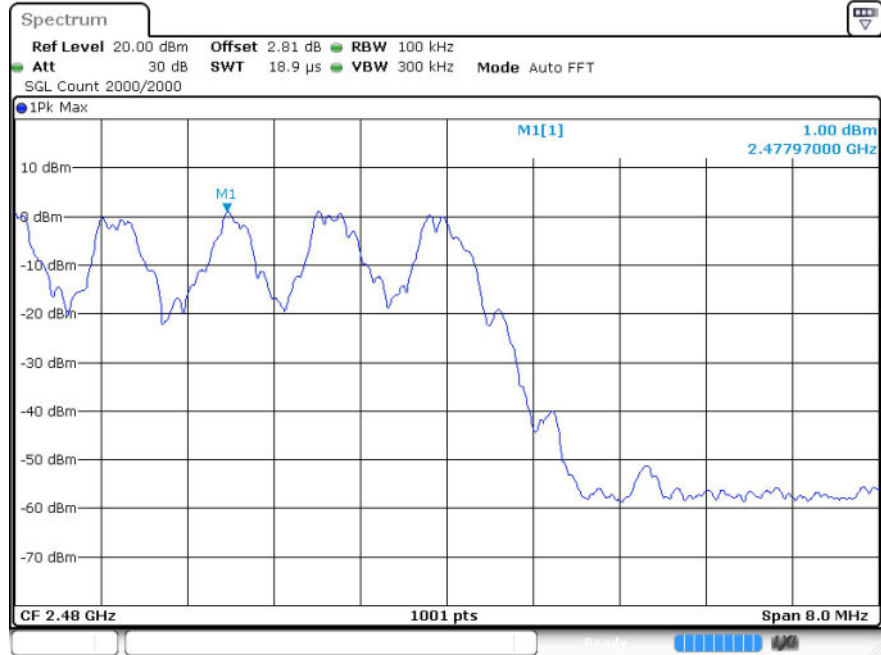
Ref



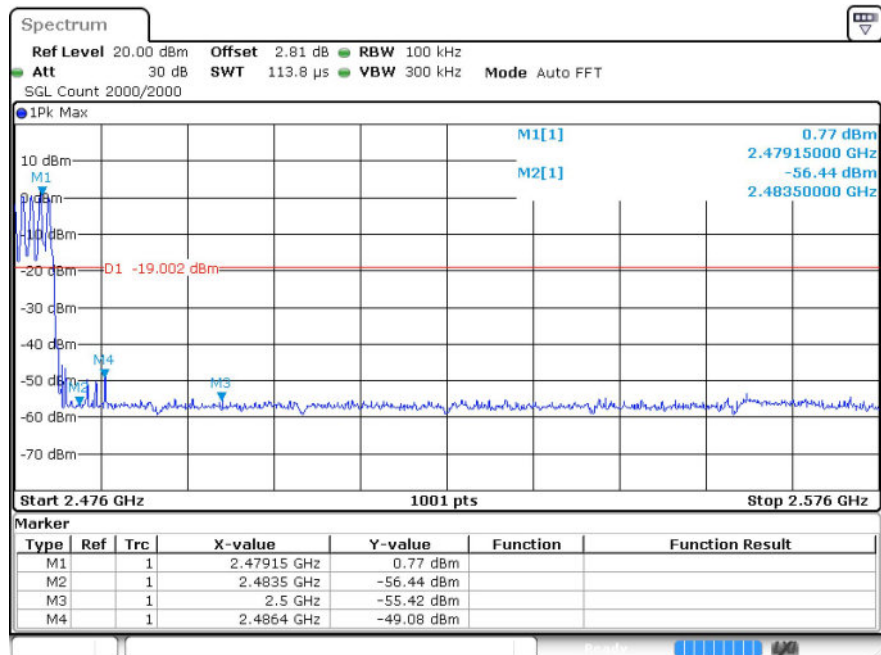
GFSK/HCH/No Hop



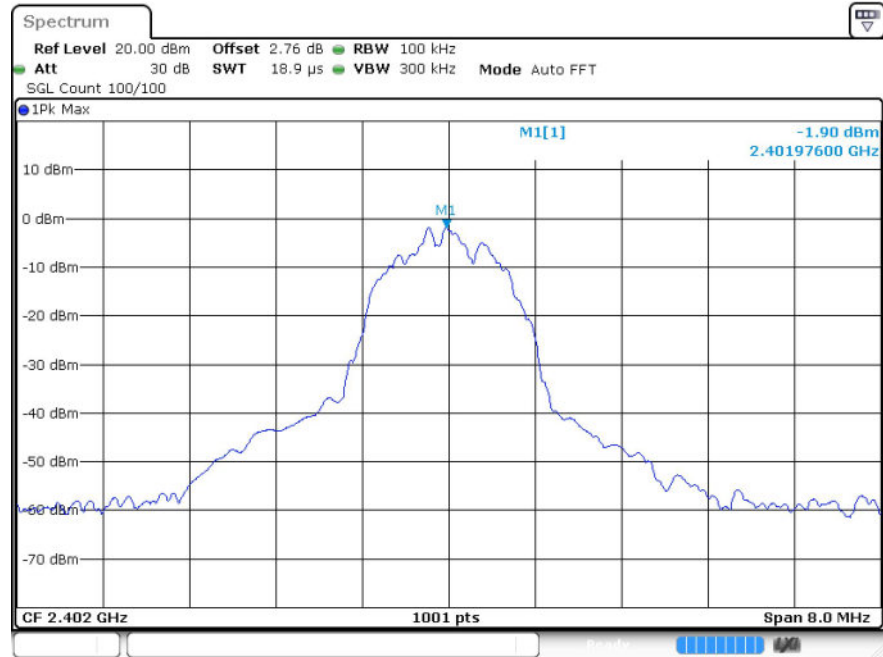
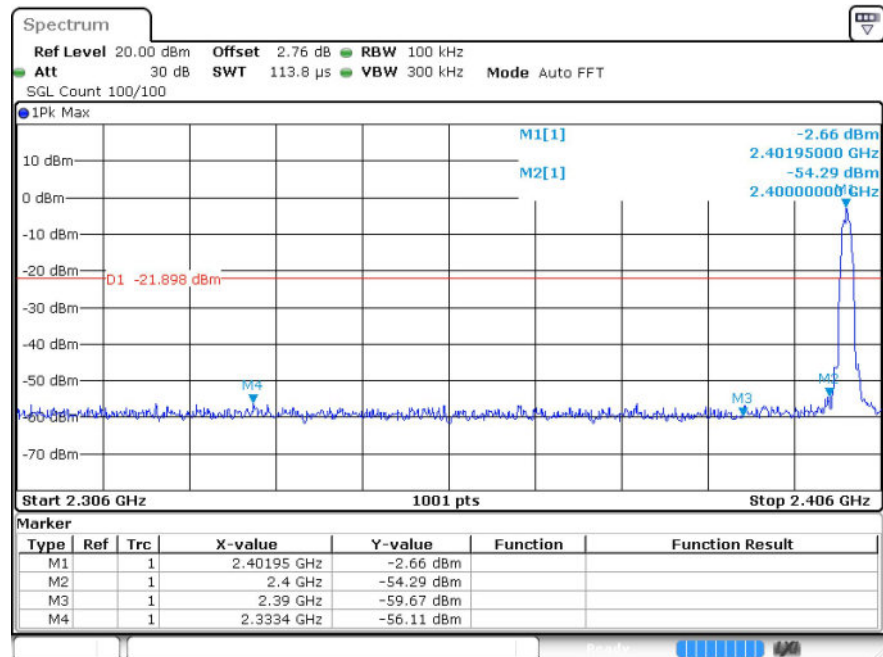
Ref.



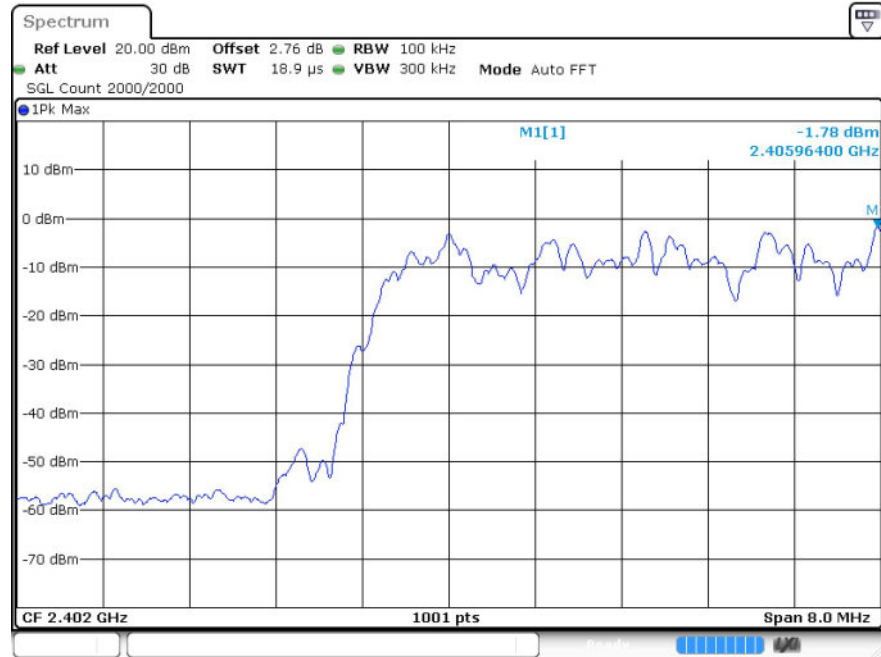
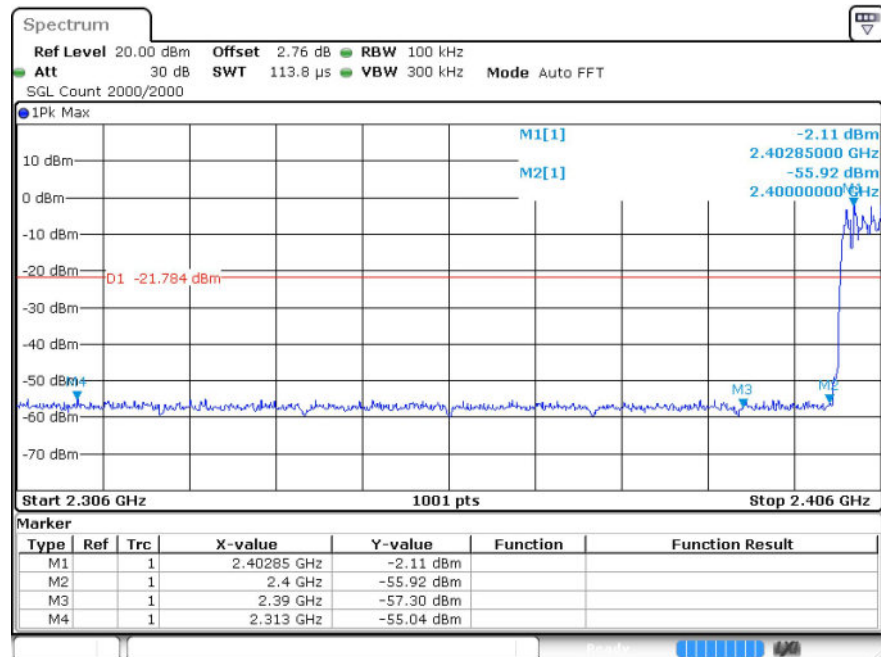
GFSK/HCH/Hop



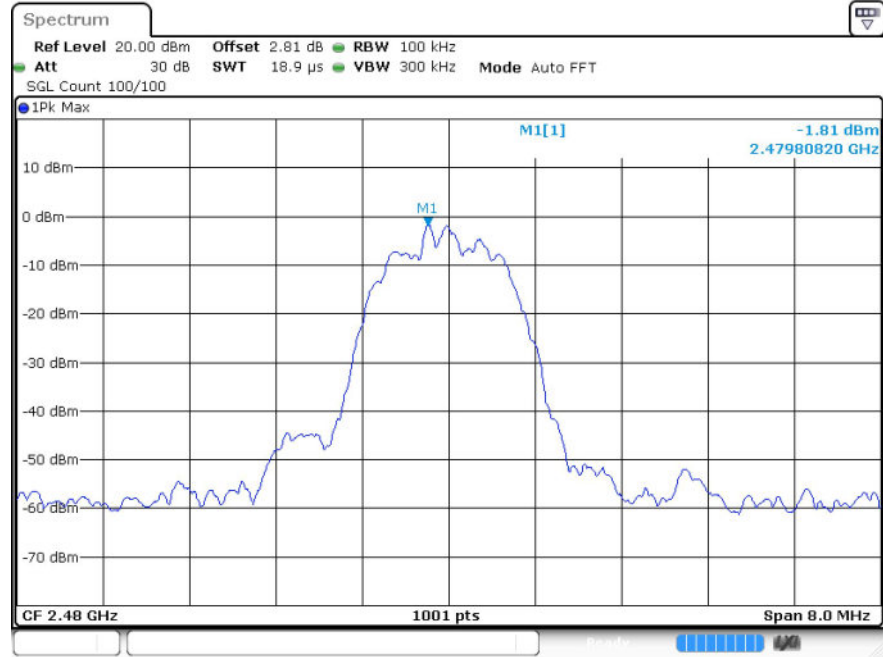
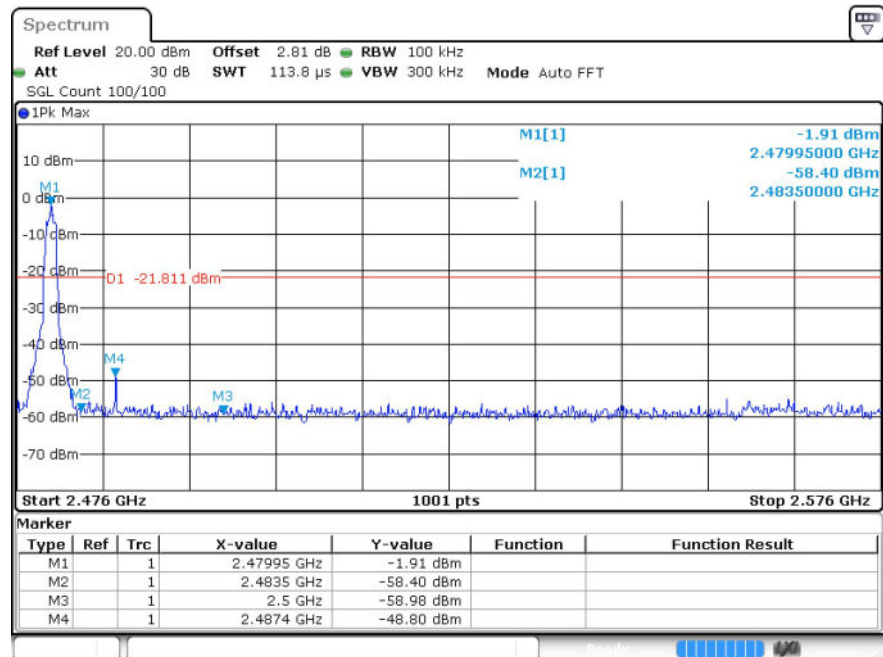
Ref


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


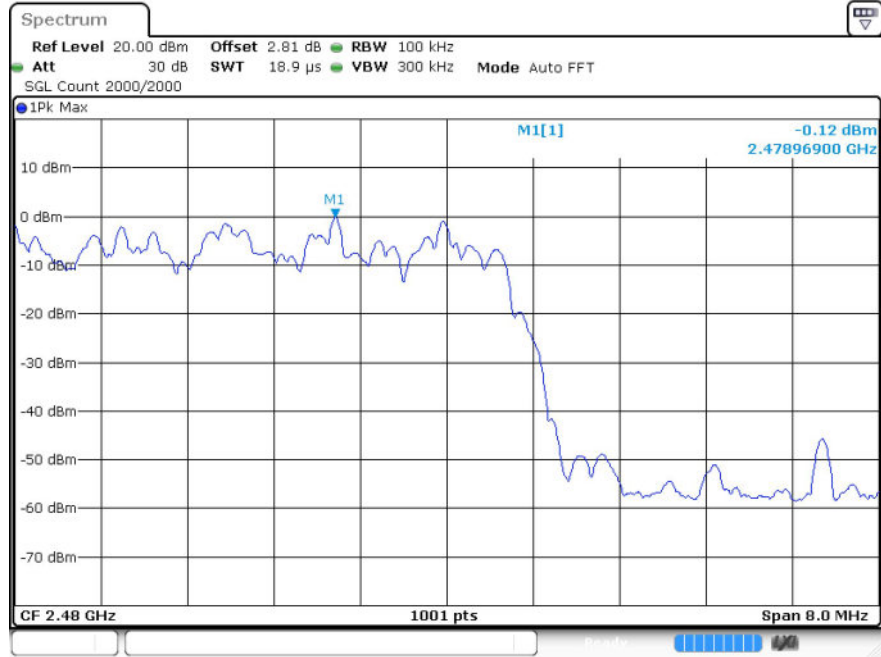
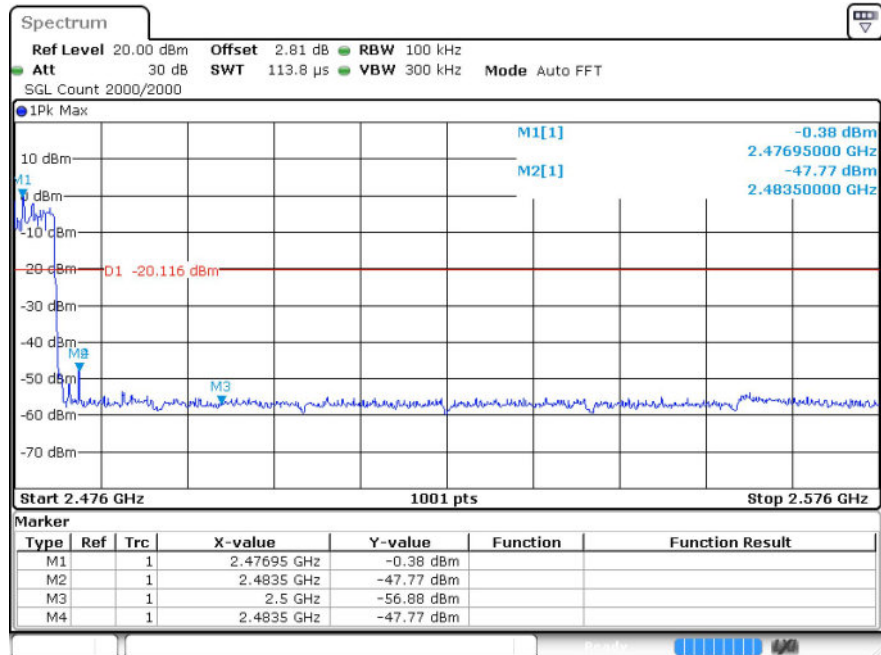
Ref


 $\pi/4$ DQPSK/LCH/Hop


Ref


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


Ref


 $\pi/4$ DQPSK/HCH/Hop


9 Restrict-band band-edge measurements

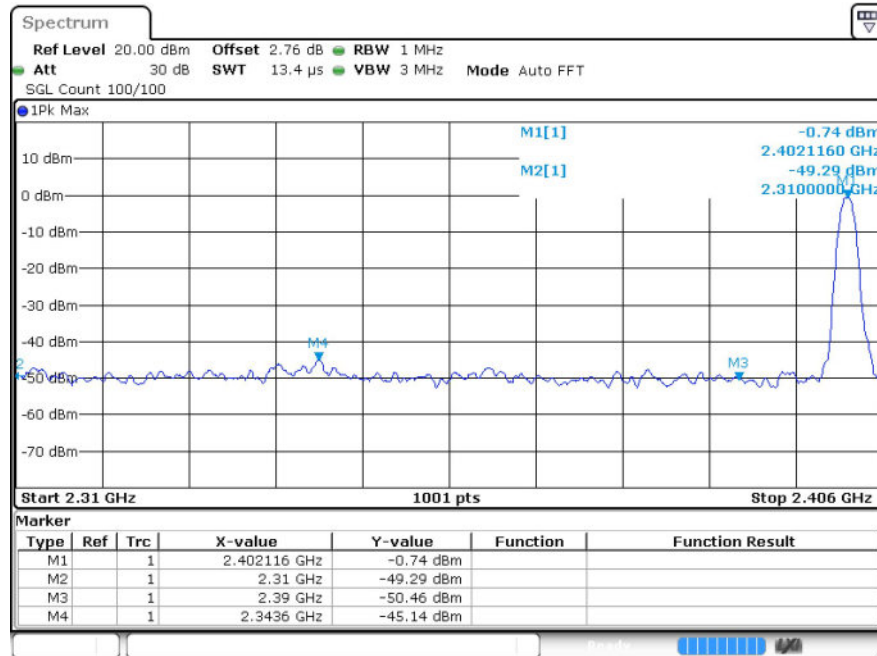
9.1 Test Result

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Duty Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-49.29	2.36	-	48.33	PEAK	74	Pass
	Off	2310.0	-56.54	2.36	5.06	46.14	AV	54	Pass
	Off	2343.6	-45.13	2.36	-	52.49	PEAK	74	Pass
	Off	2341.584	-54.26	2.36	5.06	48.42	AV	54	Pass
	Off	2390.0	-50.46	2.36	-	47.16	PEAK	74	Pass
	Off	2390.0	-56.49	2.36	5.06	46.19	AV	54	Pass
	Off	2483.5	-47.81	2.36	-	49.81	PEAK	74	Pass
	Off	2483.5	-56.04	2.36	5.06	46.64	AV	54	Pass
	Off	2487.448	-45.67	2.36	-	51.95	PEAK	74	Pass
	Off	2497.984	-55.8	2.36	5.06	46.88	AV	54	Pass
	Off	2500.0	-50.91	2.36	-	46.71	PEAK	74	Pass
	Off	2500.0	-56.77	2.36	5.06	45.91	AV	54	Pass
$\pi/4$ DQPSK	Off	2310.0	-47.67	2.36	-	49.95	PEAK	74	Pass
	Off	2310.0	-55.43	2.36	4.95	47.14	AV	54	Pass
	Off	2338.416	-44.54	2.36	-	53.08	PEAK	74	Pass
	Off	2341.68	-53.96	2.36	4.95	48.61	AV	54	Pass
	Off	2390.0	-49.81	2.36	-	47.81	PEAK	74	Pass
	Off	2390.0	-56.33	2.36	4.95	46.24	AV	54	Pass
	Off	2483.5	-48.66	2.36	-	48.96	PEAK	74	Pass
	Off	2483.5	-55.93	2.36	4.96	46.65	AV	54	Pass
	Off	2487.472	-45.6	2.36	-	52.02	PEAK	74	Pass
	Off	2487.112	-55.22	2.36	4.96	47.36	AV	54	Pass
	Off	2500.0	-49.37	2.36	-	48.25	PEAK	74	Pass
	Off	2500.0	-56.54	2.36	4.96	46.04	AV	54	Pass

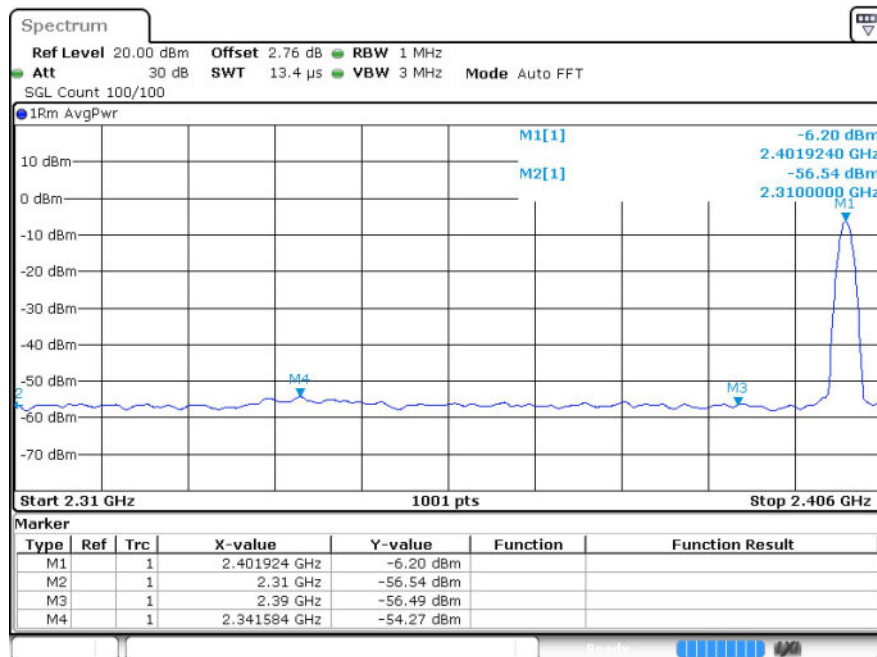
Note: Left and right ear have been tested and the only shows the worst case mode.

9.2 Test Graphs

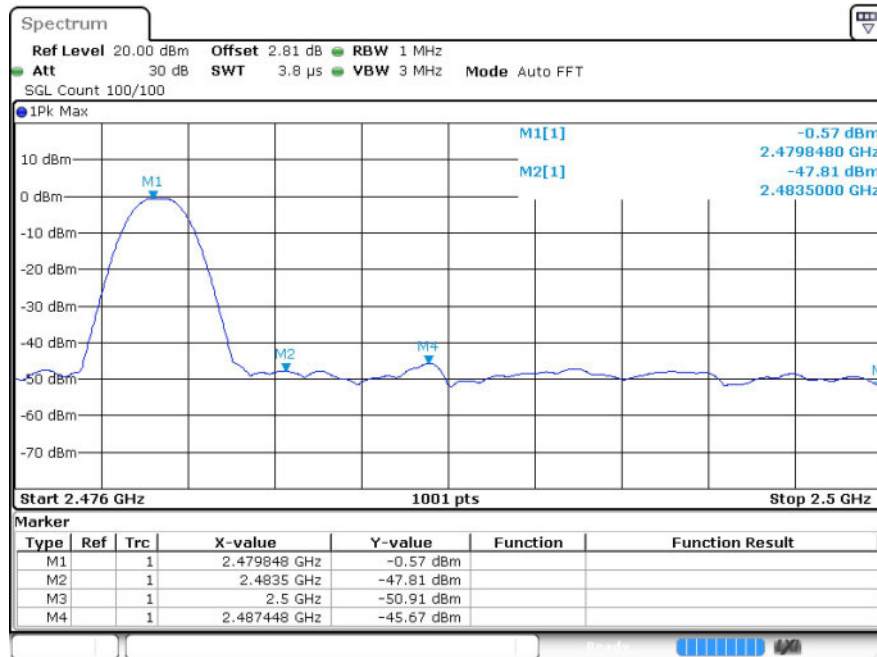
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



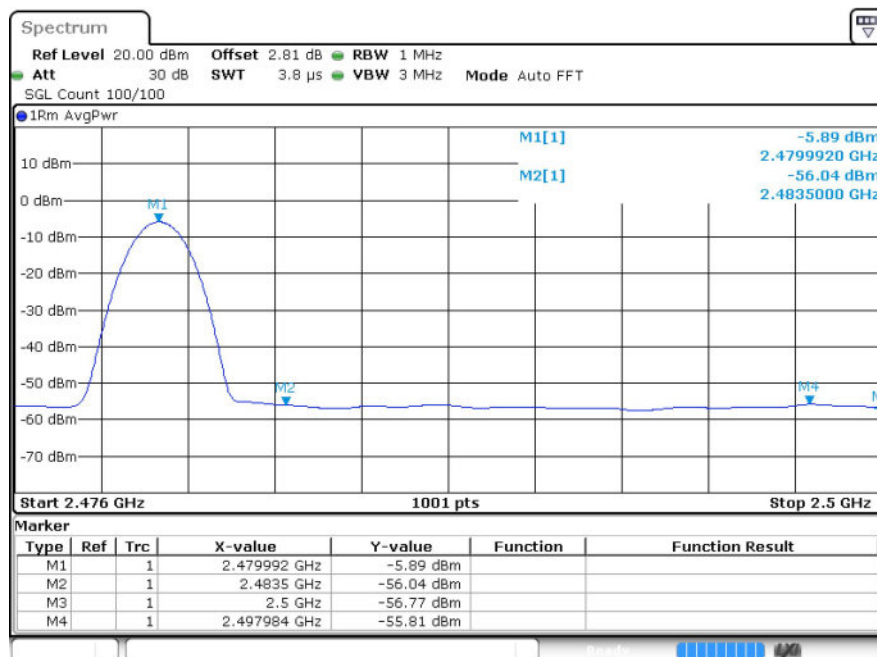
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



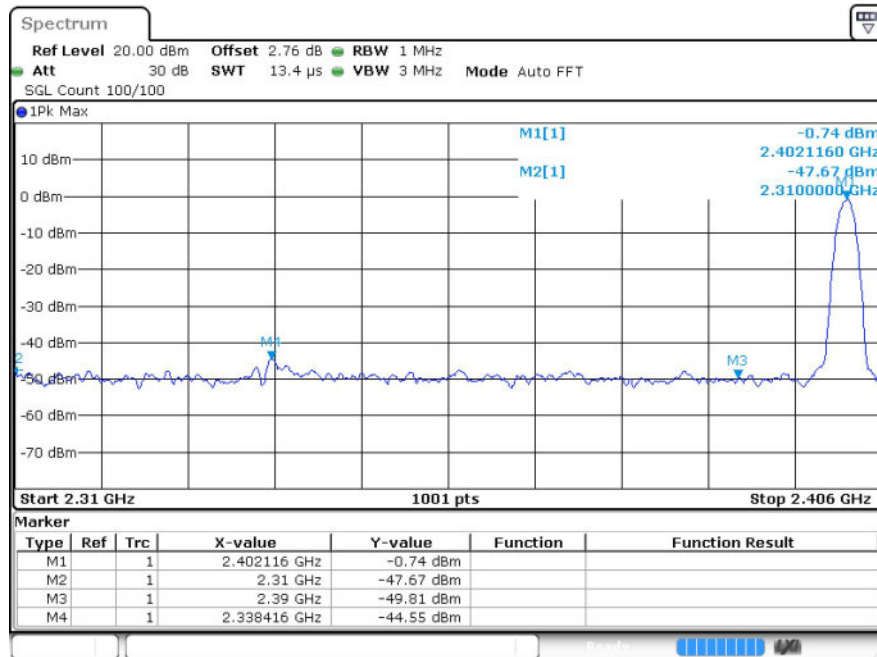
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



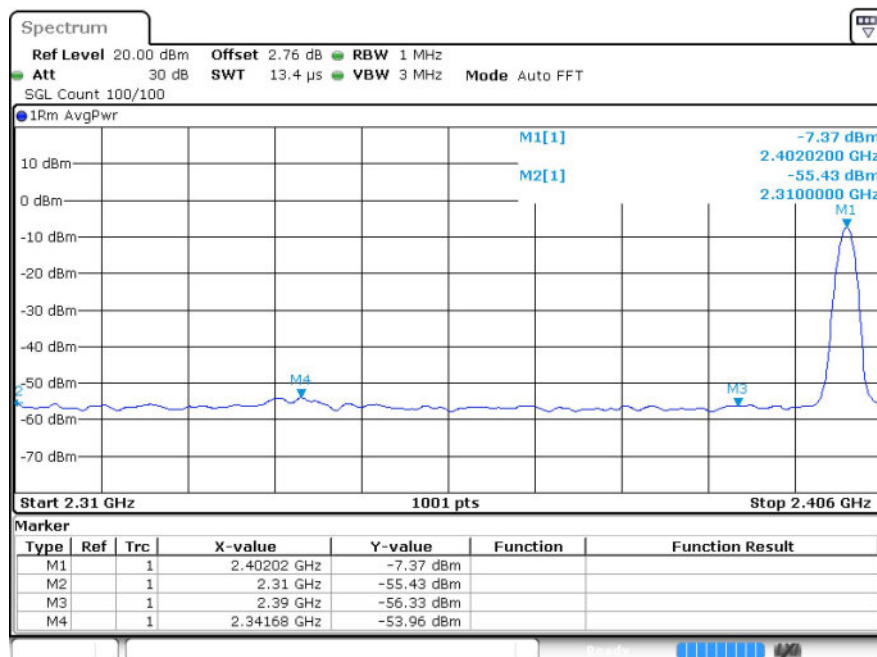
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



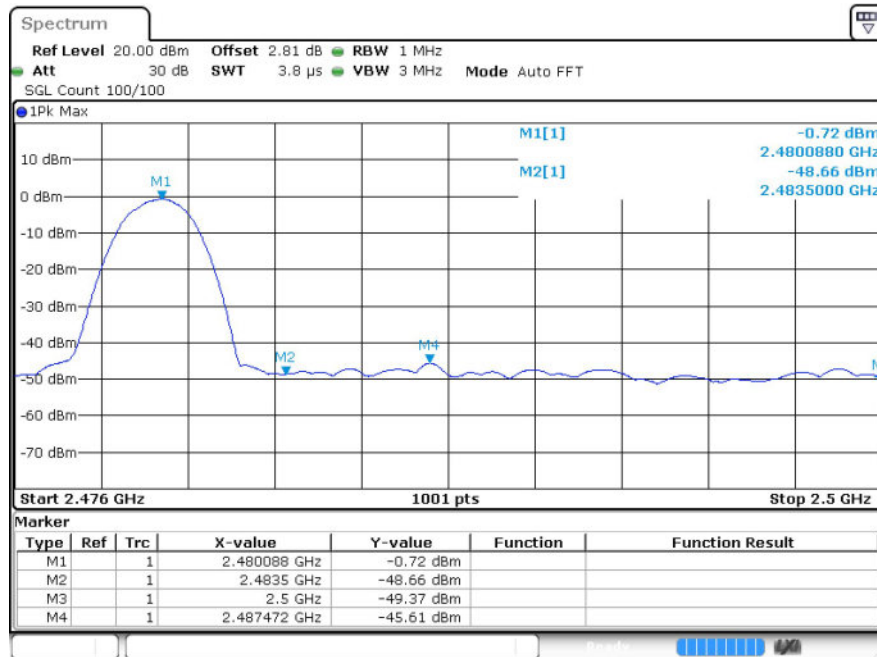
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



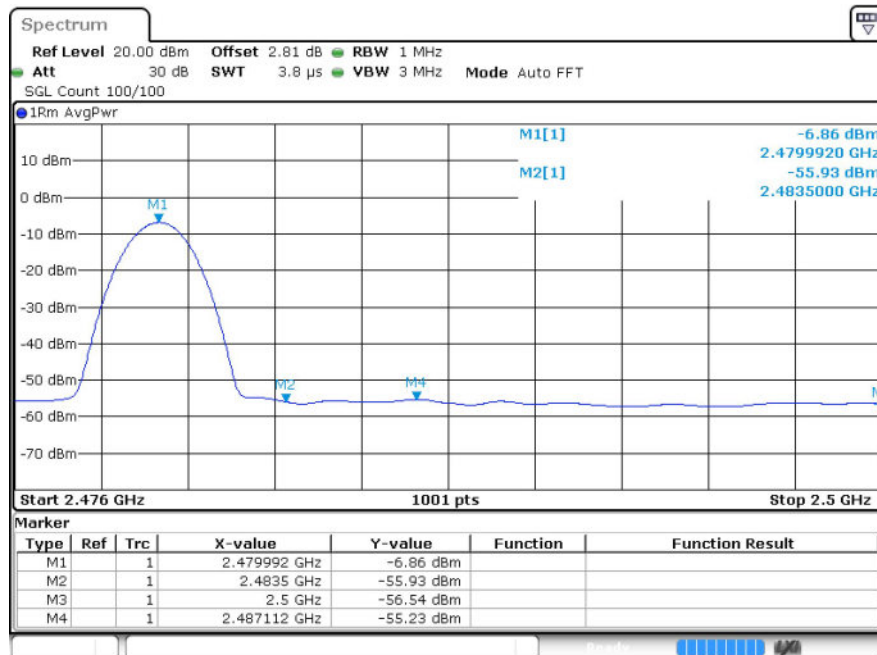
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



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---