Appendix A

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

Product Name: Portable bluetooth speaker

Trade Mark: N/A

Test Model: ZQS1315

Environmental Conditions

Temperature:	25.7℃
Relative Humidity:	52.4%
ATM Pressure:	101Kpa
Test Engineer:	Simba Huang
Supervised by:	Seal Chen

Contents

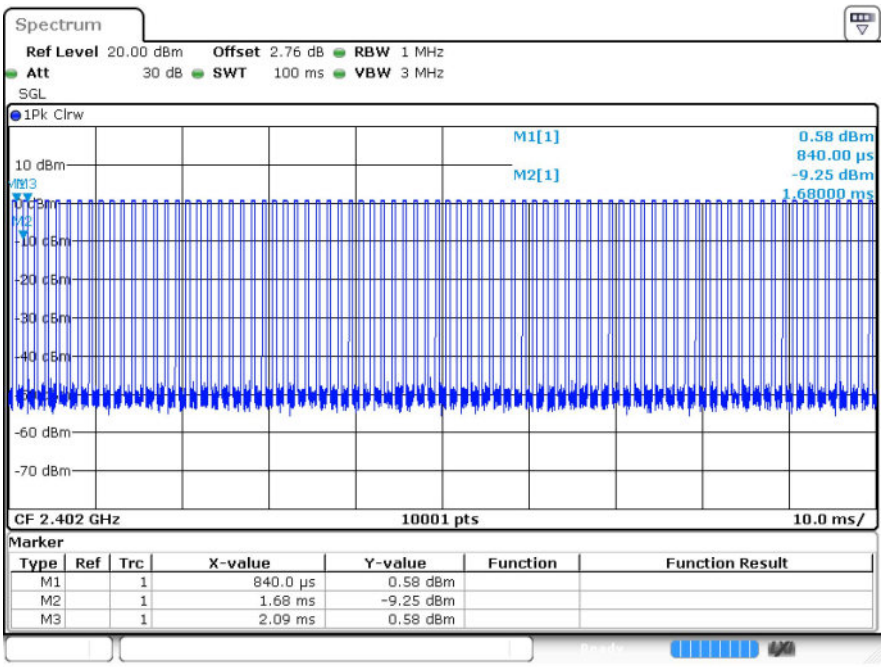
1 Duty Cycle

1.1 Test Result

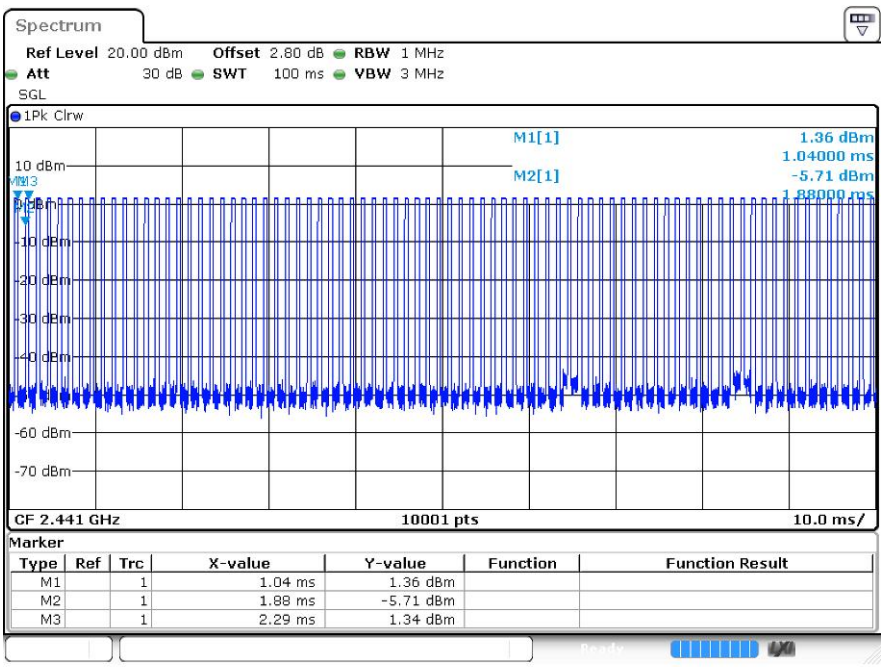
Mode	Frequency (MHz)	Duty Cycle (%)	1/T (kHz)
1-DH1	2402	33.6	2.44
1-DH1	2441	33.6	2.44
1-DH1	2480	33.61	2.44
2-DH1	2402	34.4	2.38
2-DH1	2441	34.4	2.38
2-DH1	2480	34.66	2.33
3-DH1	2402	35.21	2.33
3-DH1	2441	34.41	2.38
3-DH1	2480	35.12	2.38

1.2 Test Graphs

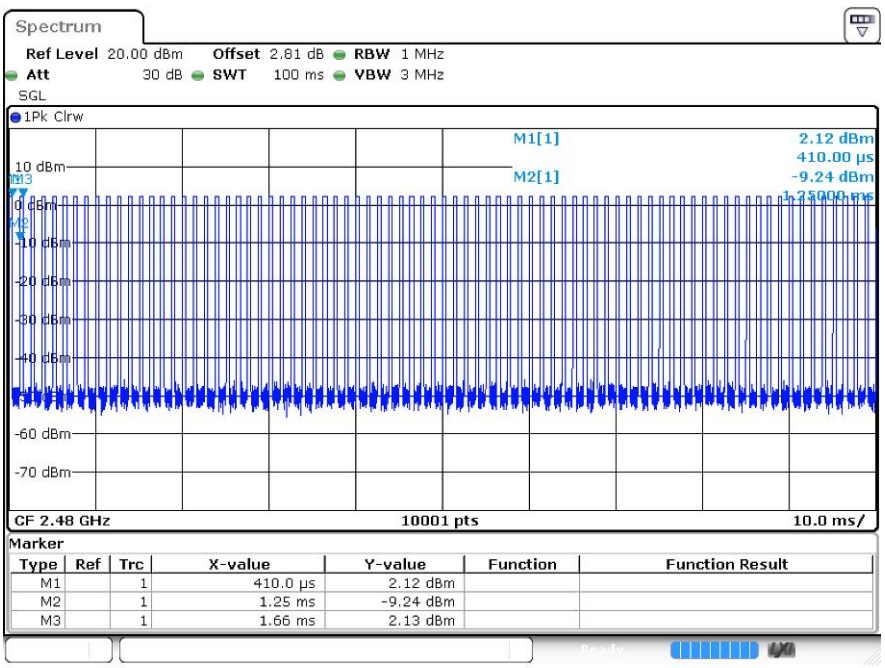
Test Graphs
1-DH1 2402MHz



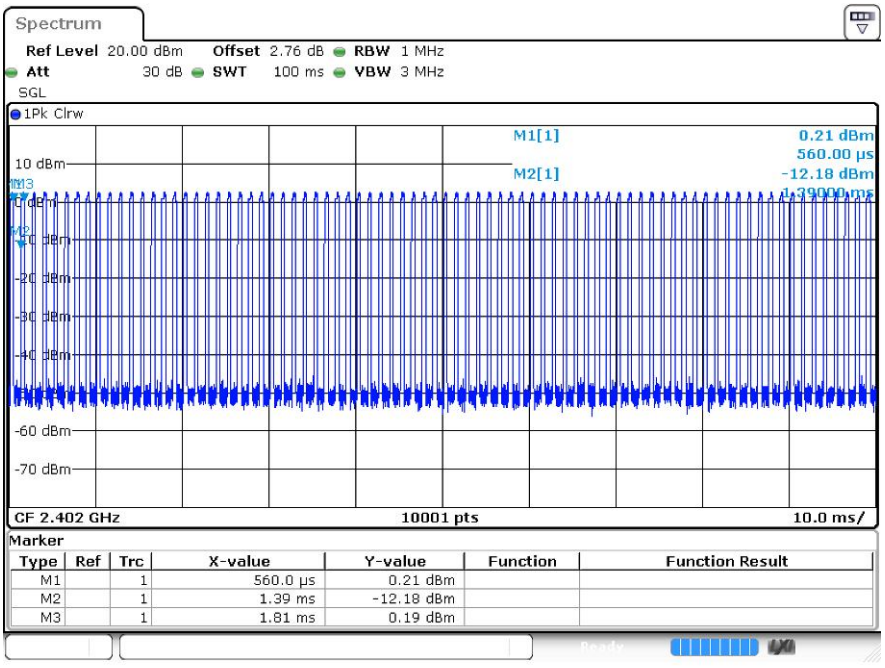
1-DH1 2441MHz



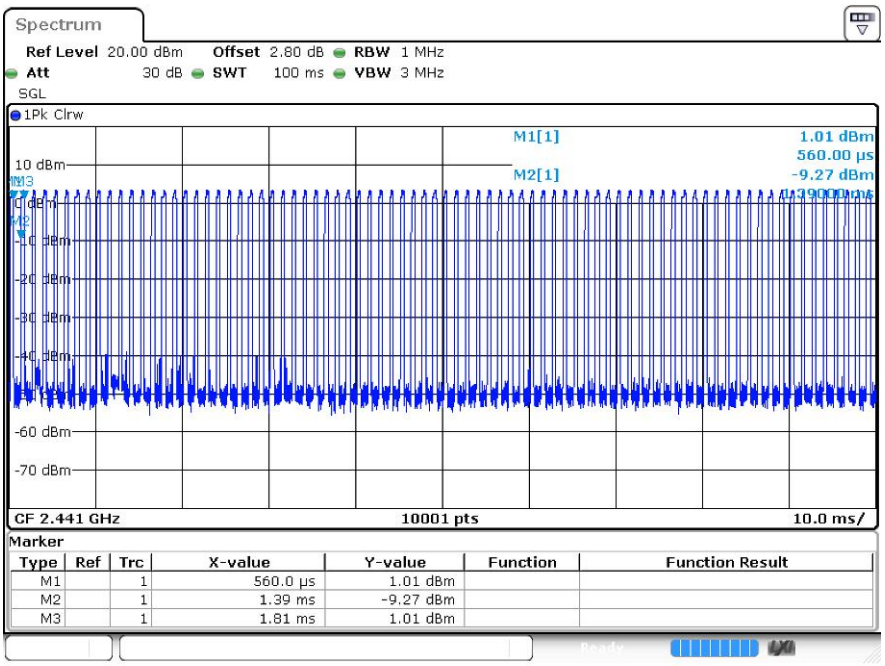
1-DH1 2480MHz



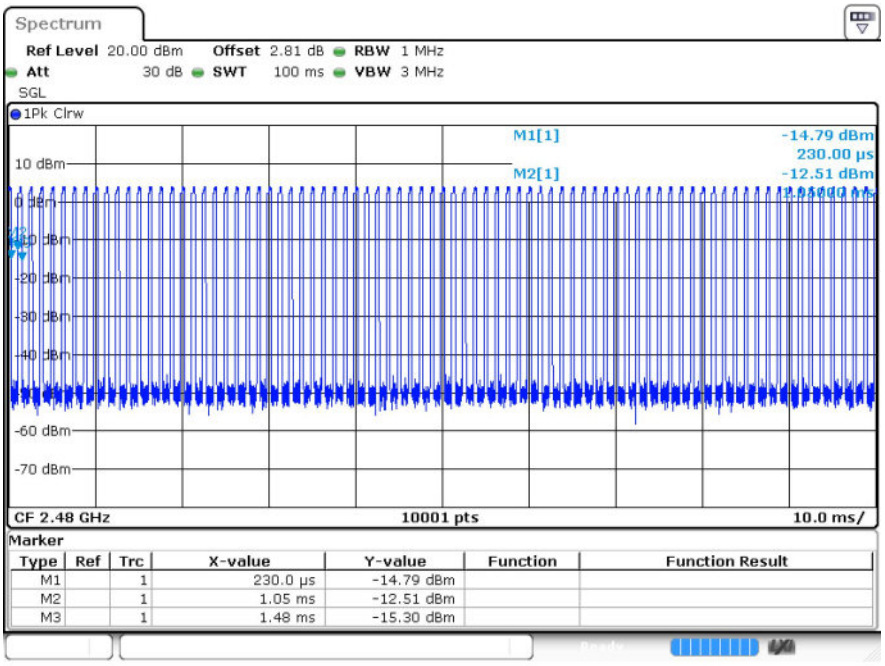
2-DH1 2402MHz



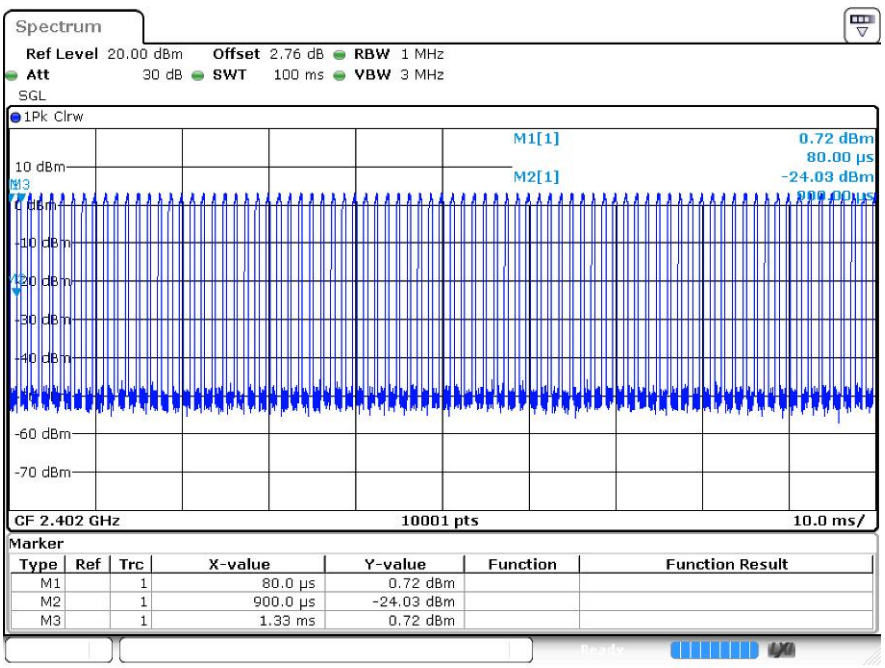
2-DH1 2441MHz



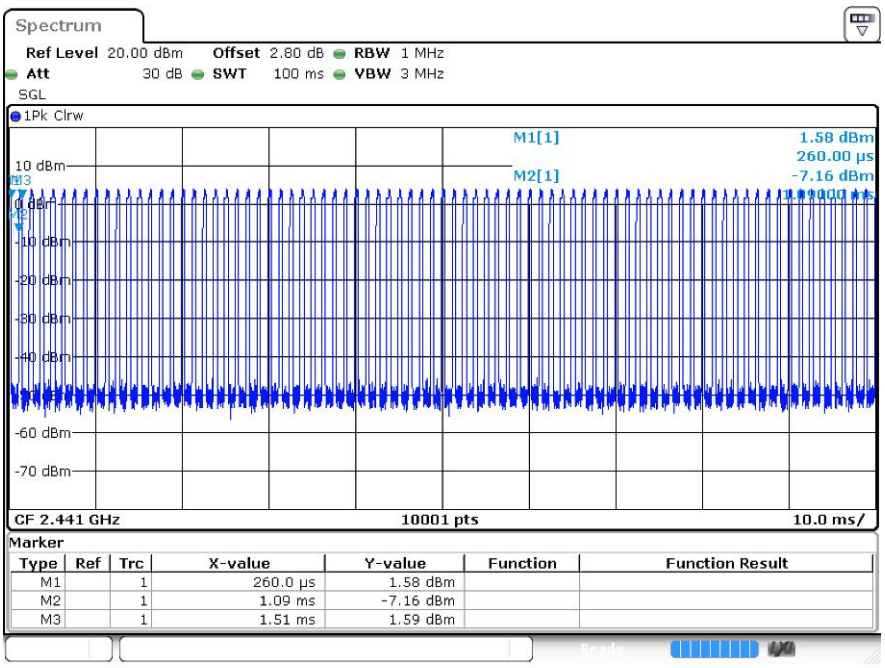
2-DH1 2480MHz



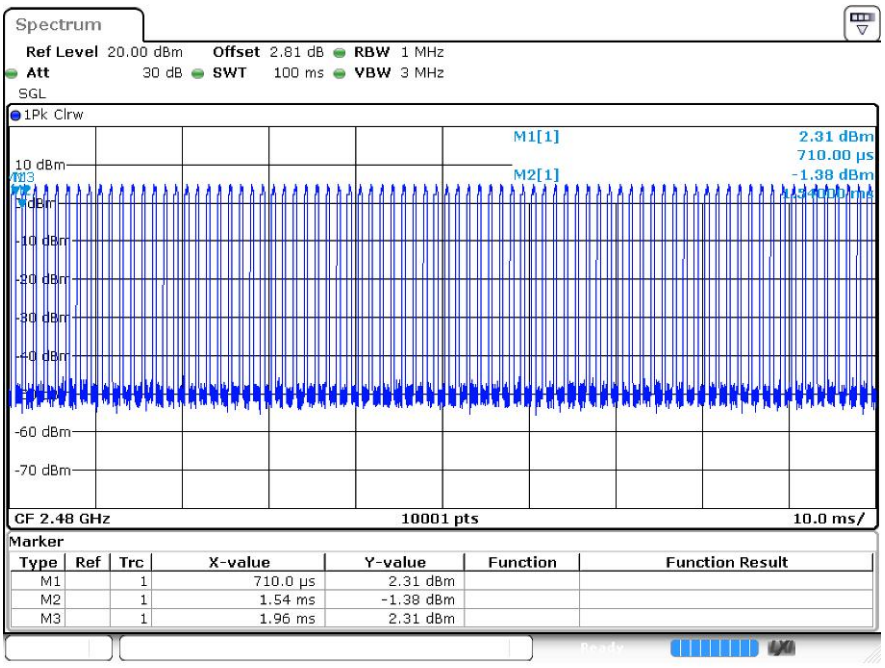
3-DH1 2402MHz



3-DH1 2441MHz



3-DH1 2480MHz

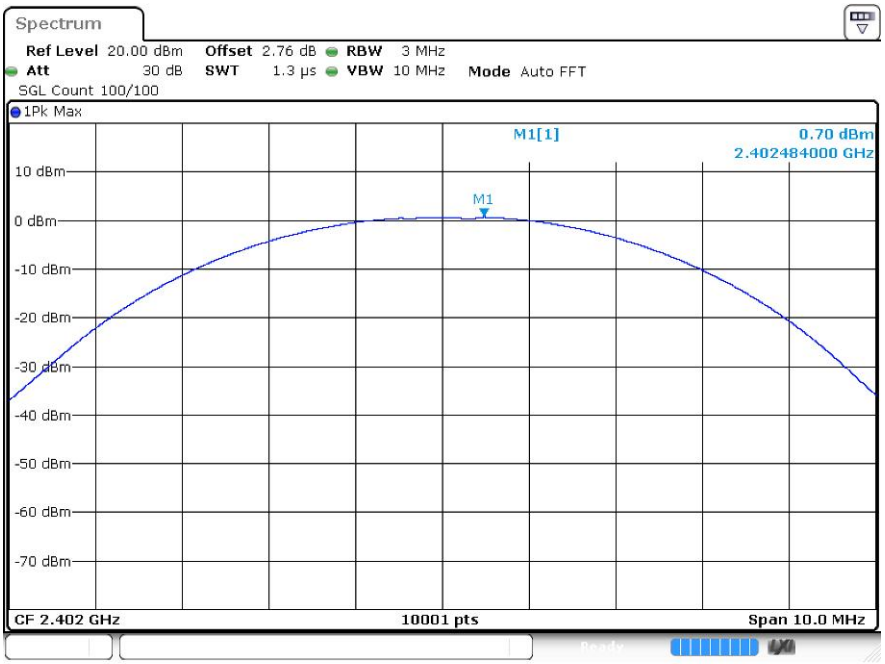
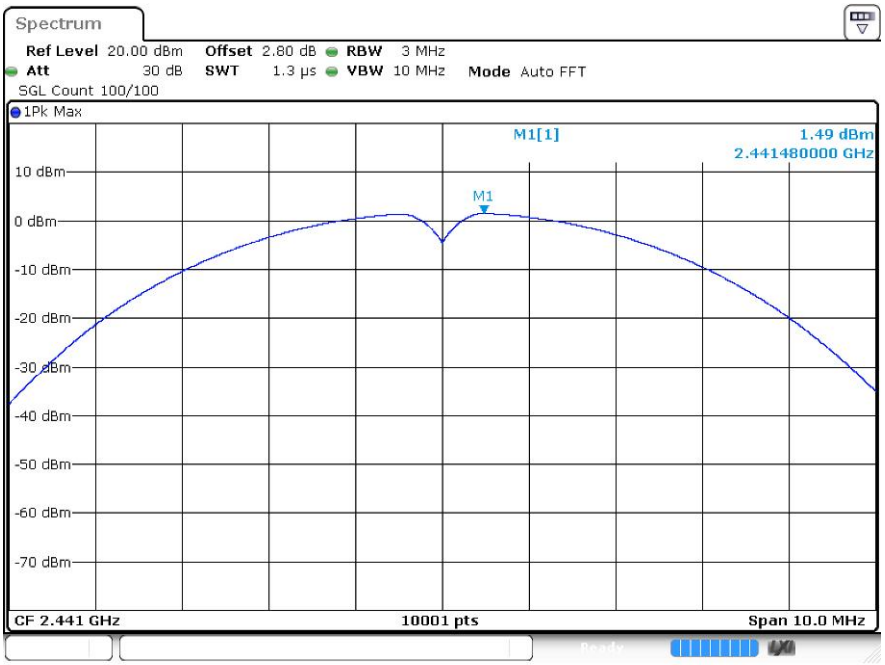


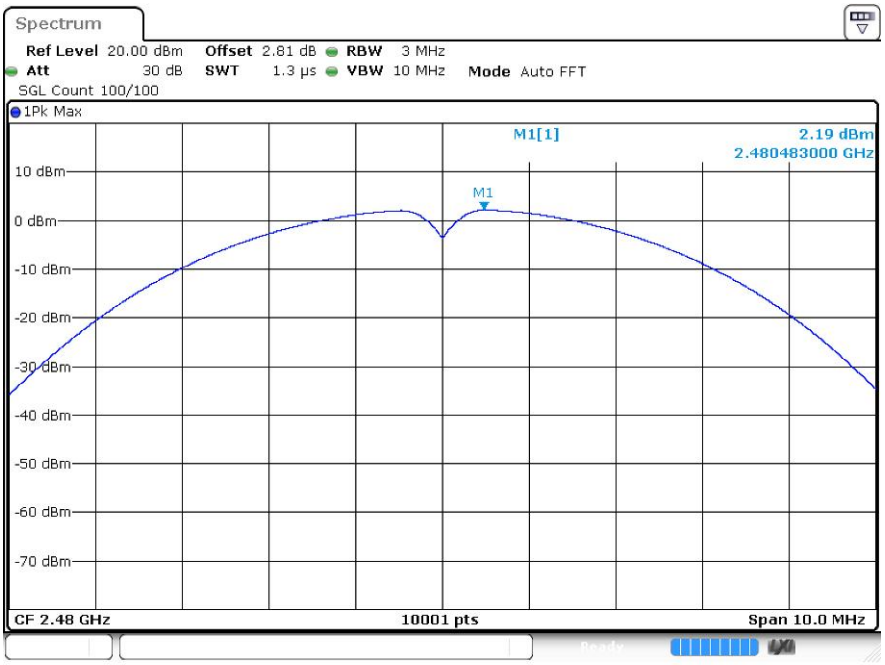
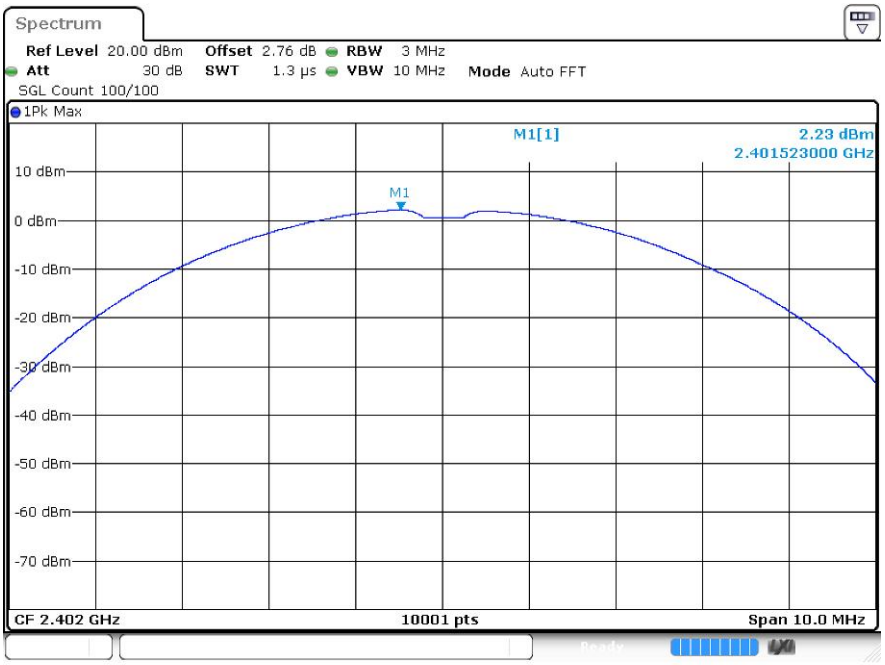
2 Maximum Conducted Peak Output Power

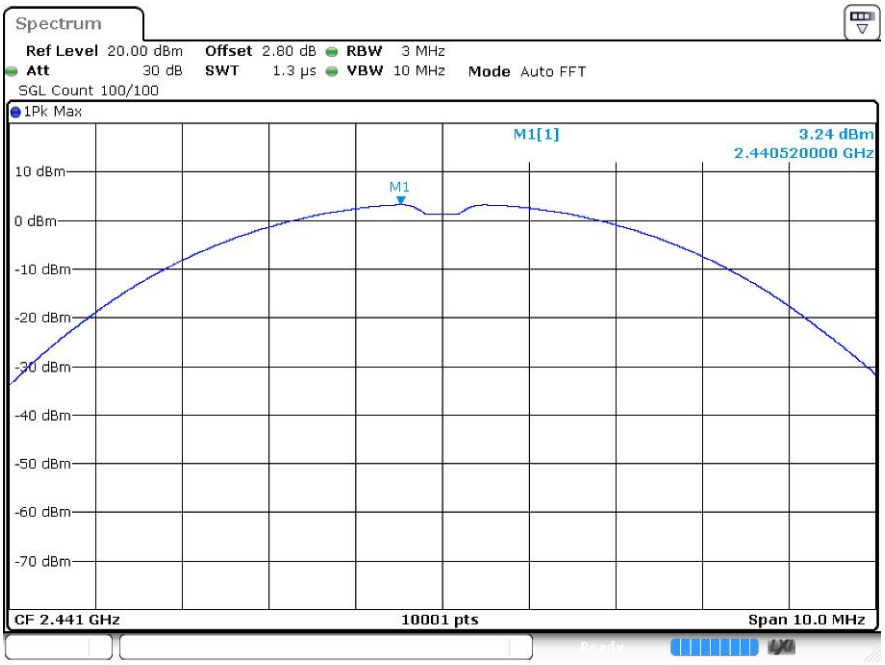
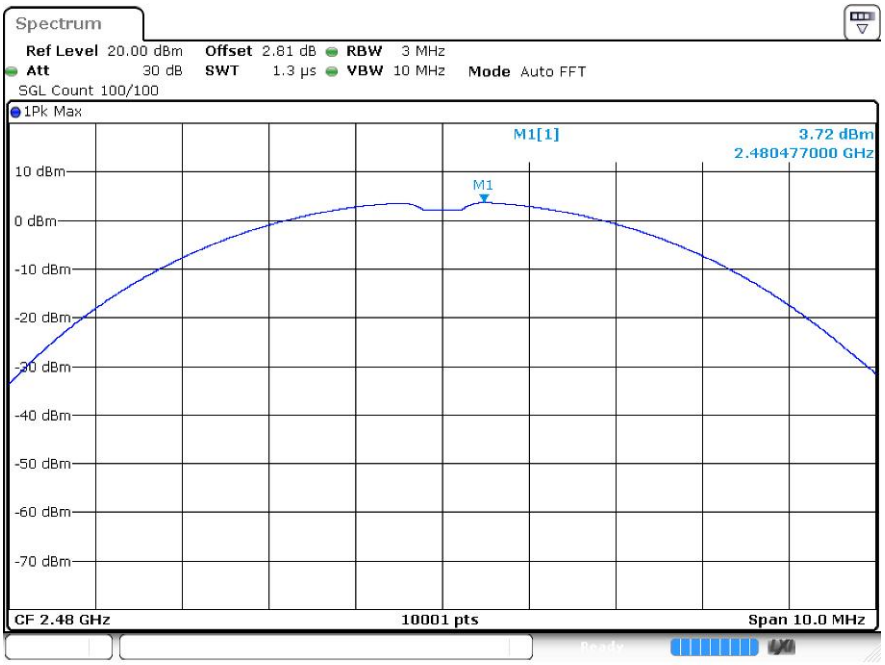
2.1 Test Result

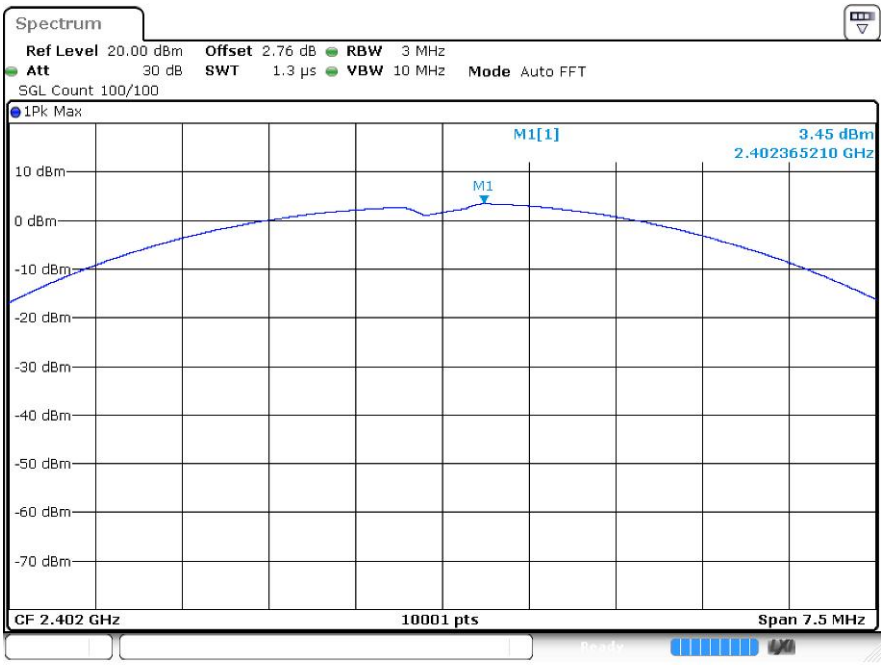
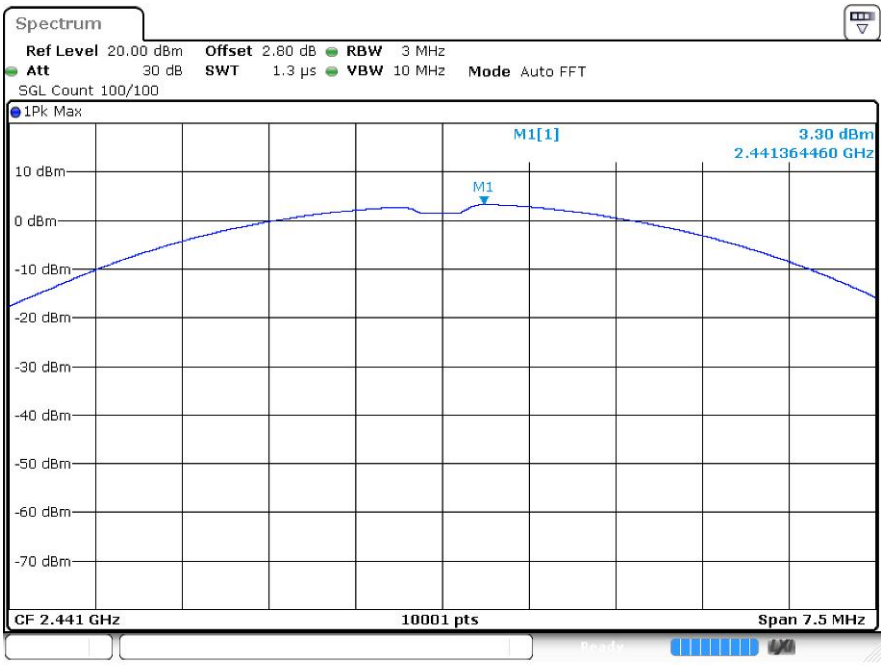
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.7	21	Pass
	MCH	1.49	21	Pass
	HCH	2.19	21	Pass
π/4DQPSK	LCH	2.23	21	Pass
	MCH	3.24	21	Pass
	HCH	3.72	21	Pass
8DPSK	LCH	3.45	21	Pass
	MCH	3.3	21	Pass
	HCH	3.55	21	Pass

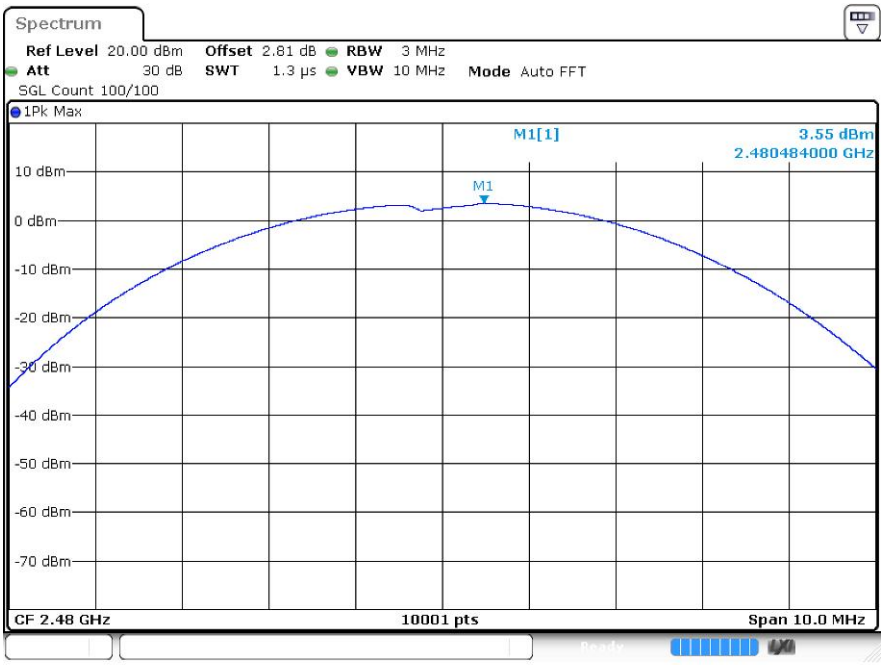
2.2 Test Graphs

Test Graphs	
GFSK/LCH	
GFSK/MCH	

GFSK/HCH	
π/4DQPSK/LCH	

π/4DQPSK/MCH	
π/4DQPSK/HCH	

8DPSK/LCH	
8DPSK/MCH	

8DPSK/HCH	

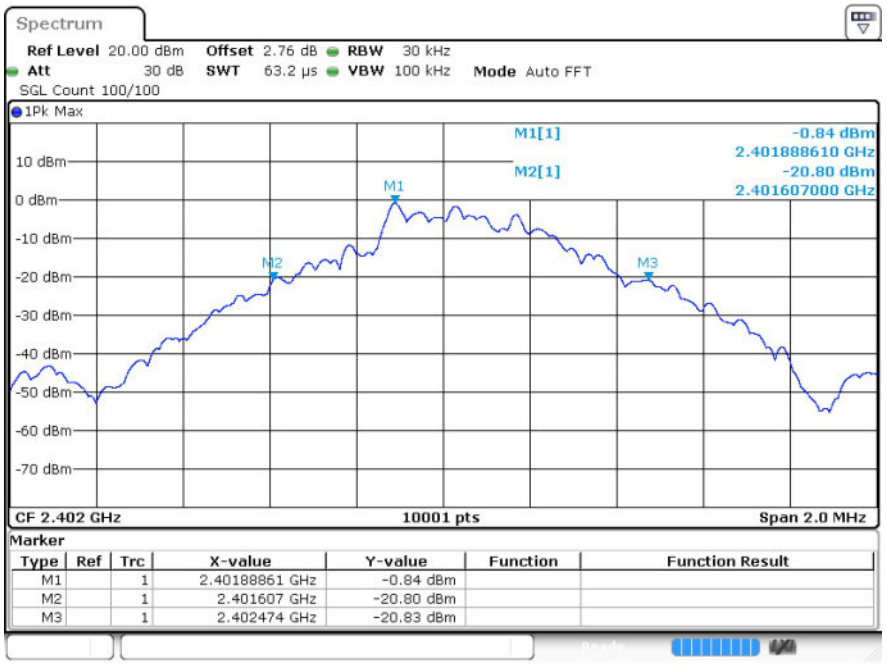
Spectrum
Ref Level 20.00 dBm Offset 2.81 dB RBW 3 MHz
Att 30 dB SWT 1.3 µs VBW 10 MHz Mode Auto FFT
SGL Count 100/100
1Pk Max
M1[1] 3.55 dBm
2.480484000 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.48 GHz
10001 pts
Span 10.0 MHz

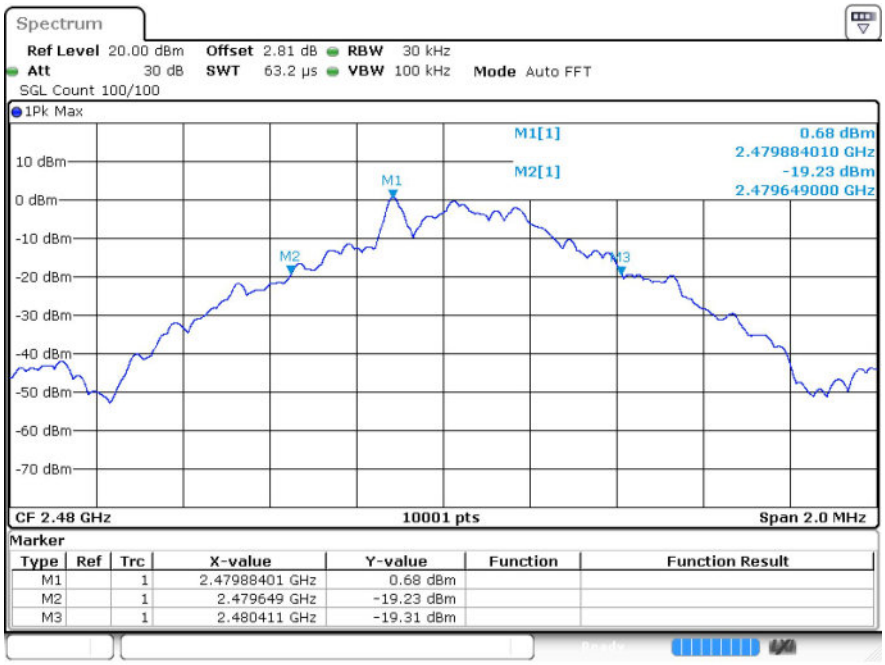
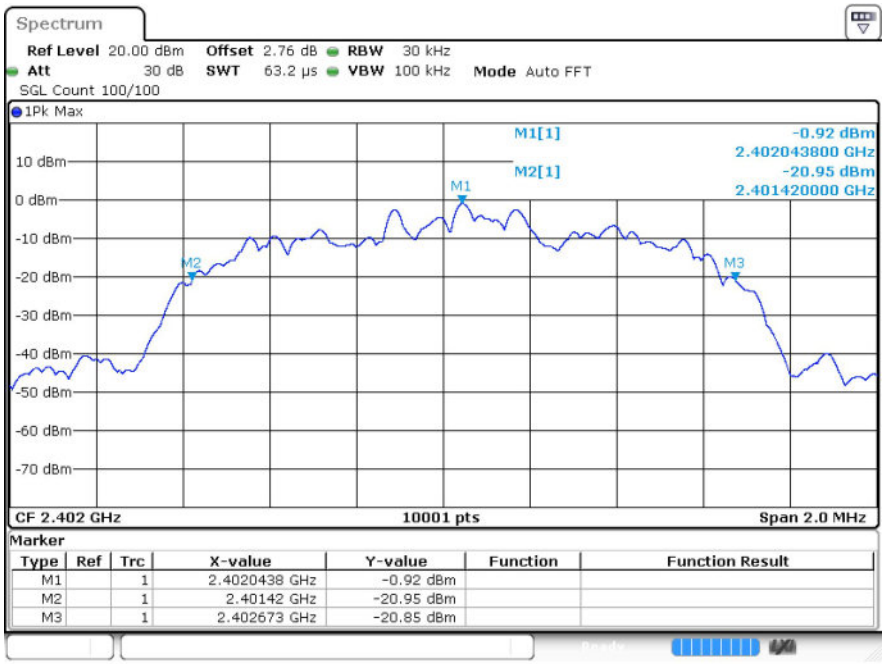
3 20dB Bandwidth

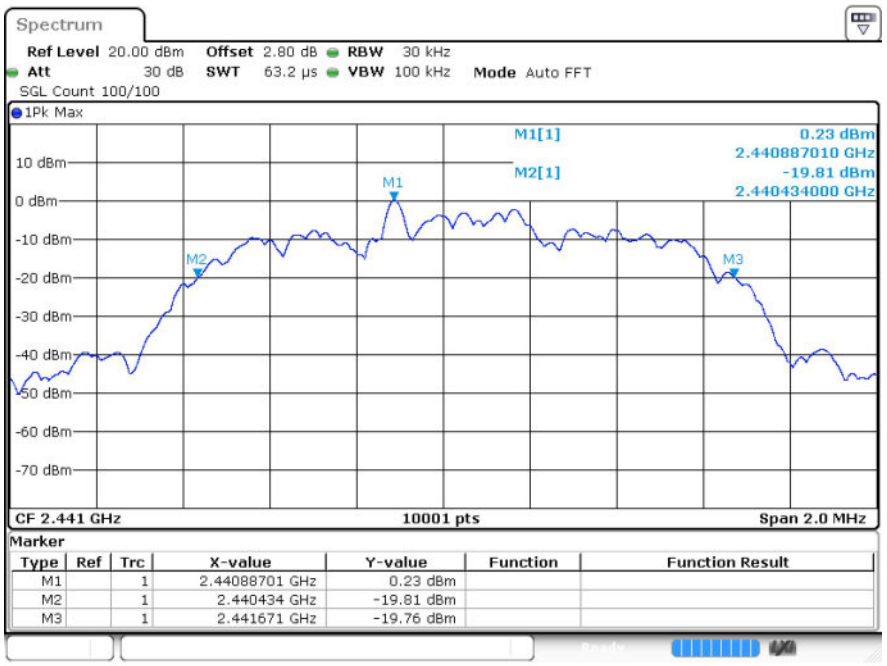
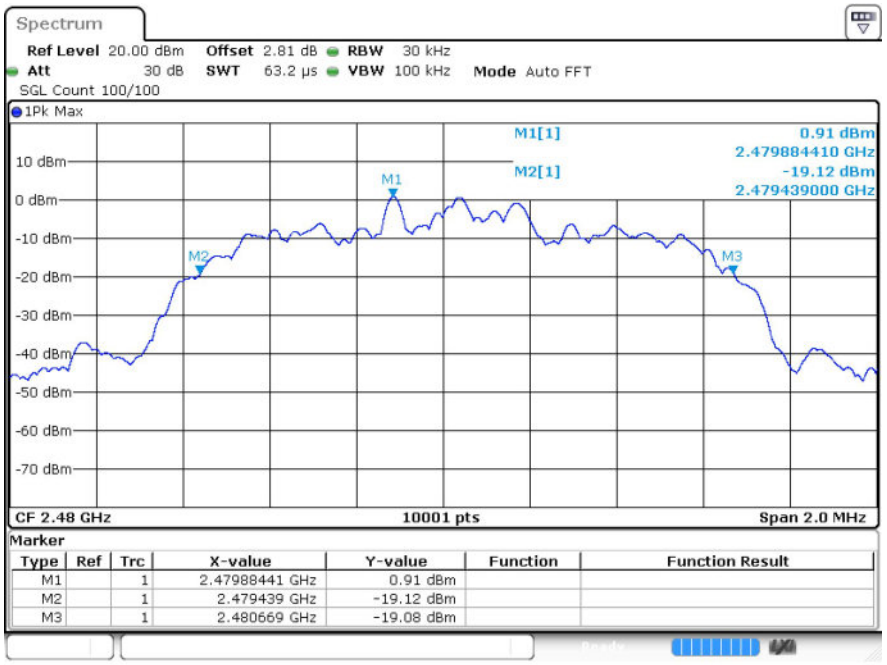
3.1 Test Result

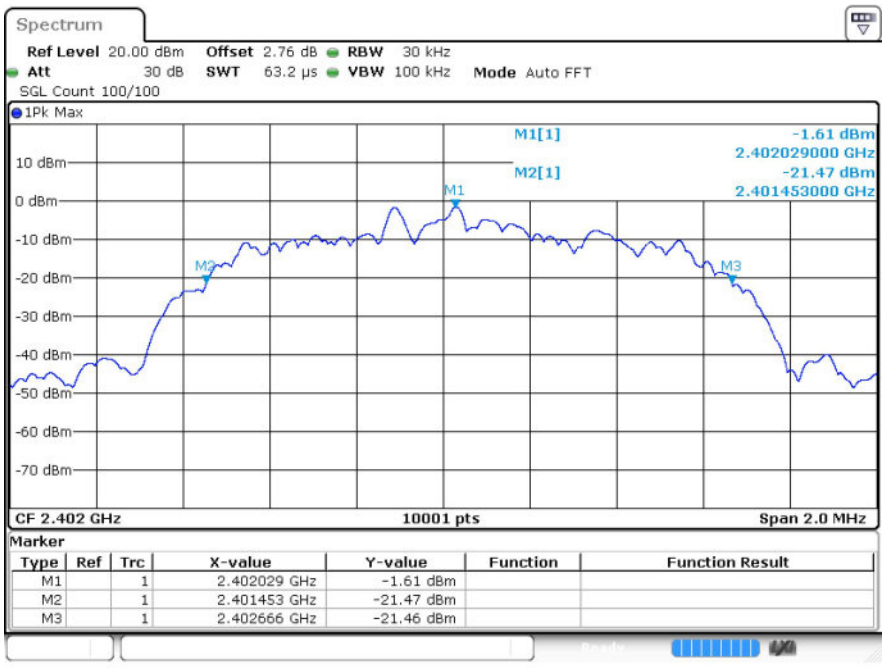
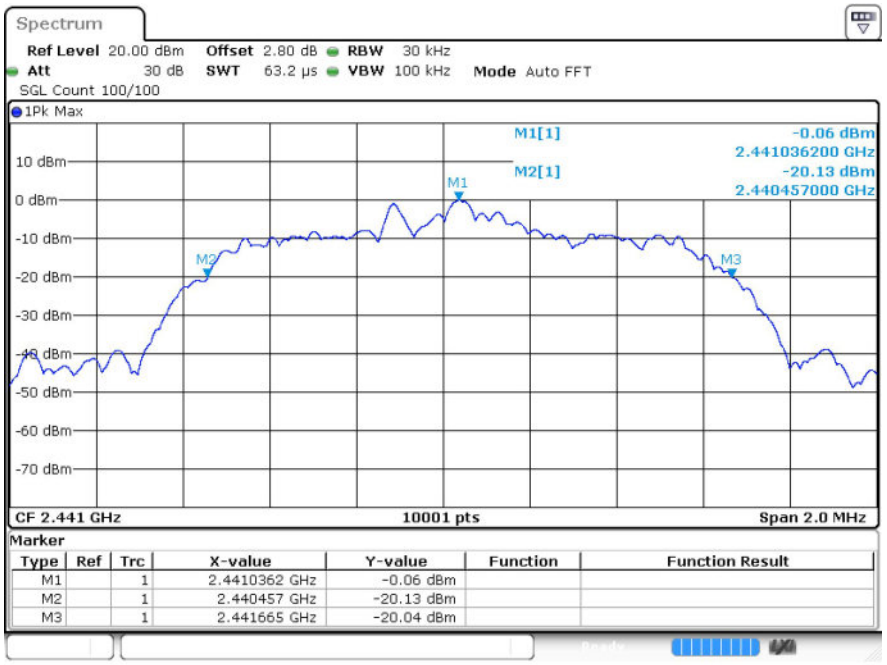
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.868	Not Specified	Pass
	MCH	0.831	Not Specified	Pass
	HCH	0.762	Not Specified	Pass
π/4DQPSK	LCH	1.253	Not Specified	Pass
	MCH	1.237	Not Specified	Pass
	HCH	1.23	Not Specified	Pass
8DPSK	LCH	1.214	Not Specified	Pass
	MCH	1.208	Not Specified	Pass
	HCH	1.217	Not Specified	Pass

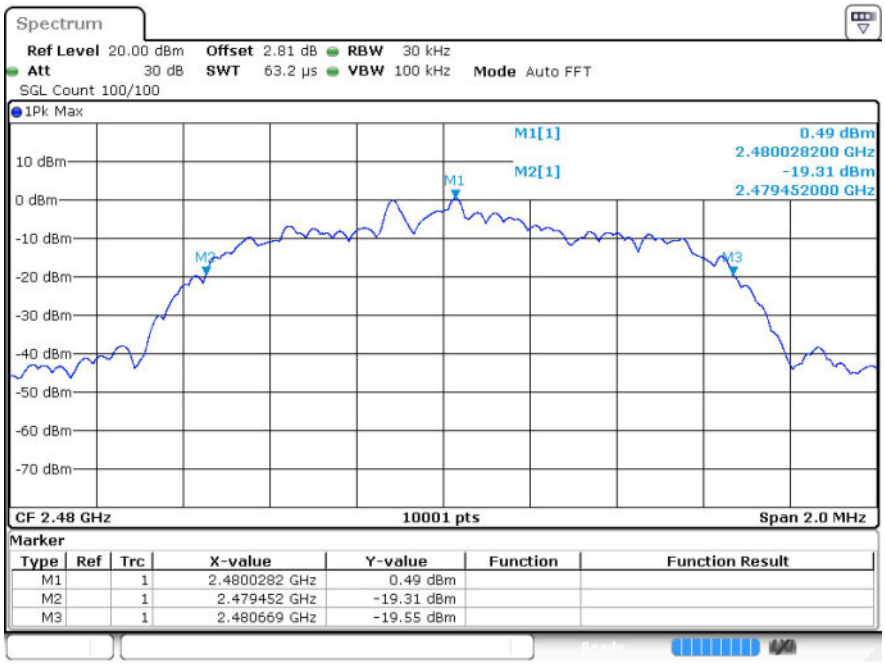
3.2 Test Graphs

Test Graphs	
GFSK/LCH	
GFSK/MCH	

GFSK/HCH	
π/4DQPSK/LCH	

π/4DQPSK/MCH	
π/4DQPSK/HCH	

8DPSK/LCH	
8DPSK/MCH	

8DPSK/HCH	

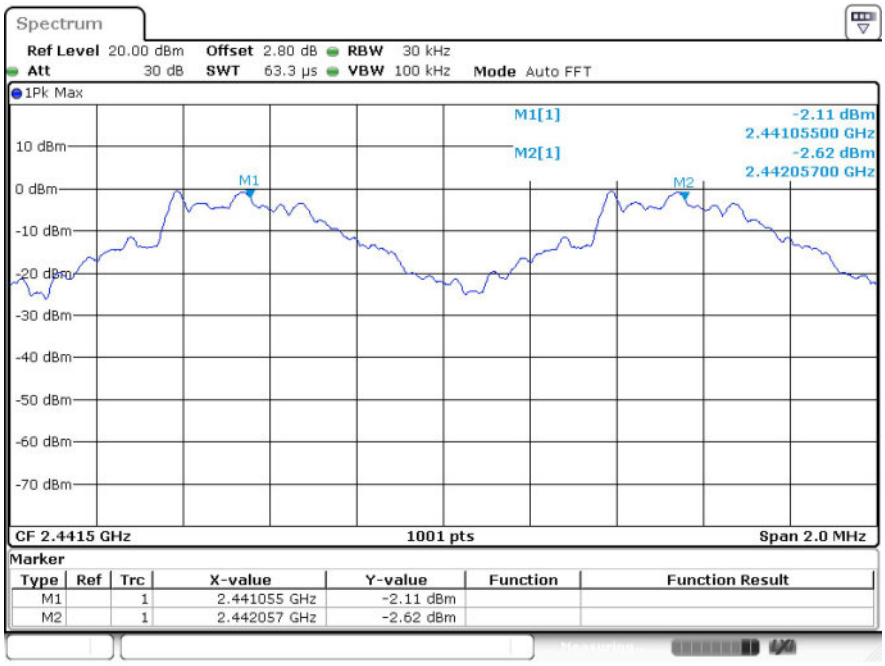
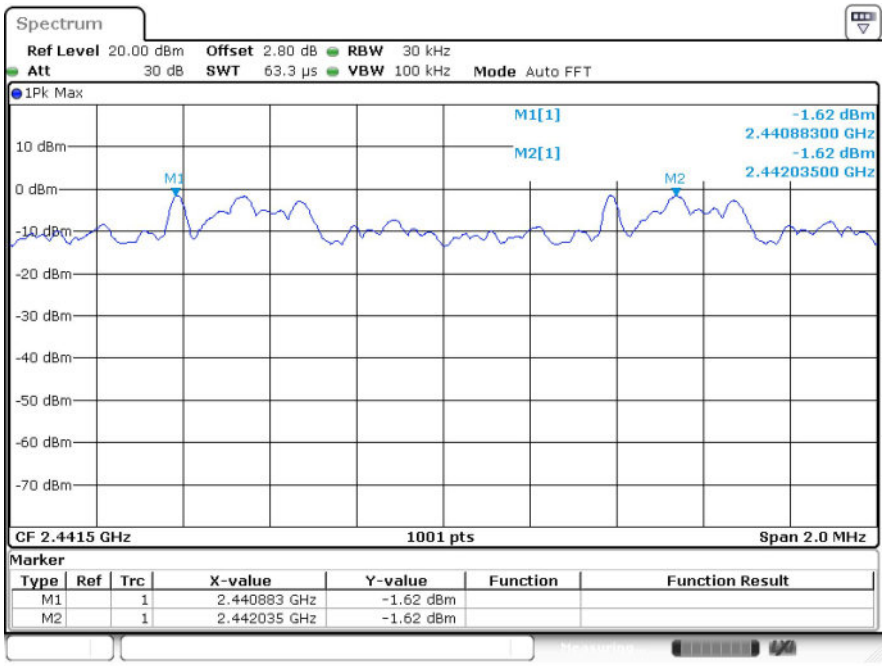
Spectrum
Ref Level 20.00 dBm Offset 2.81 dB RBW 30 kHz
Att 30 dB SWT 63.2 µs VBW 100 kHz Mode Auto FFT
SGL Count 100/100
1Pk Max
M1[1] 0.49 dBm
2.480028200 GHz
M2[1] -19.31 dBm
2.479452000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.48 GHz
10001 pts
Span 2.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.4800282 GHz 0.49 dBm
M2 1 2.479452 GHz -19.31 dBm
M3 1 2.480669 GHz -19.55 dBm

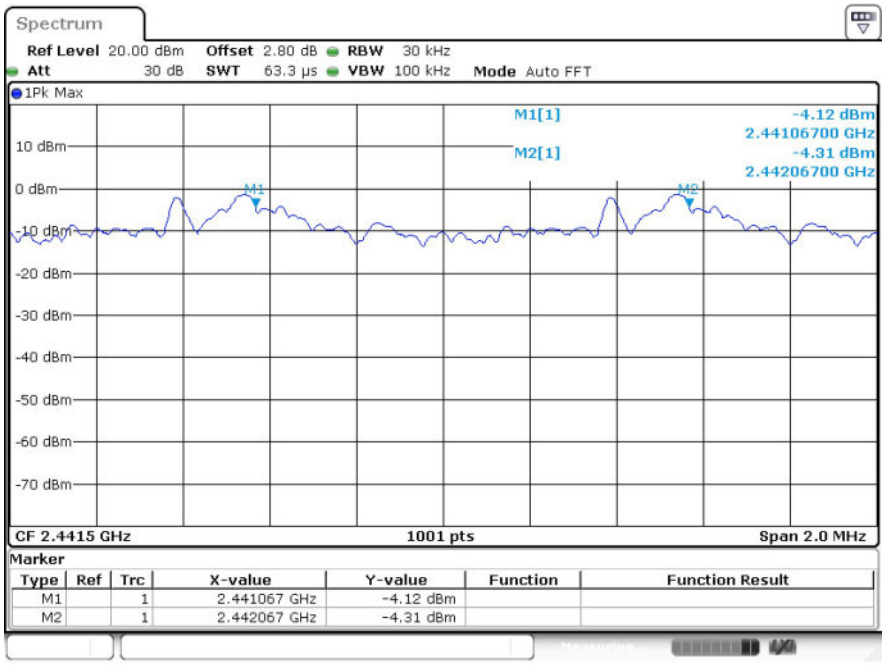
4 Carrier Frequency Separation

4.1 Test Result

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	MCH	1.002	0.554	Pass
π/4DQPSK	MCH	1.152	0.825	Pass
8DPSK	MCH	1	0.805	Pass

4.2 Test Graphs

Test Graphs	
GFSK/MCH	
π/4DQPSK/MCH	

8DPSK/MCH	

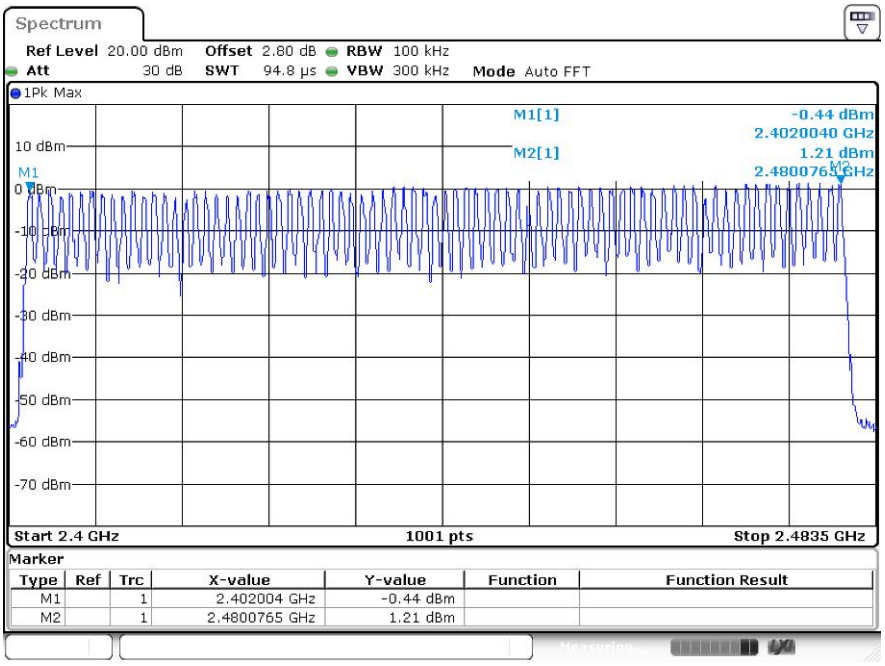
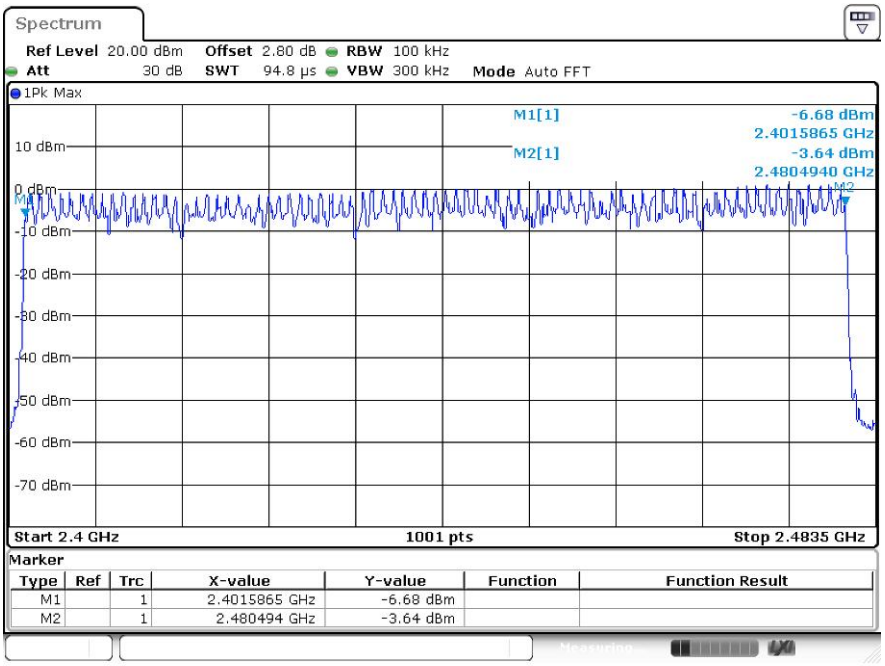
Spectrum
Ref Level 20.00 dBm Offset 2.80 dB RBW 30 kHz
Att 30 dB SWT 63.3 µs VBW 100 kHz Mode Auto FFT
1Pk Max
M1[1] -4.12 dBm
2.44106700 GHz
M2[1] -4.31 dBm
2.44206700 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.4415 GHz
1001 pts
Span 2.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.441067 GHz -4.12 dBm
M2 1 2.442067 GHz -4.31 dBm

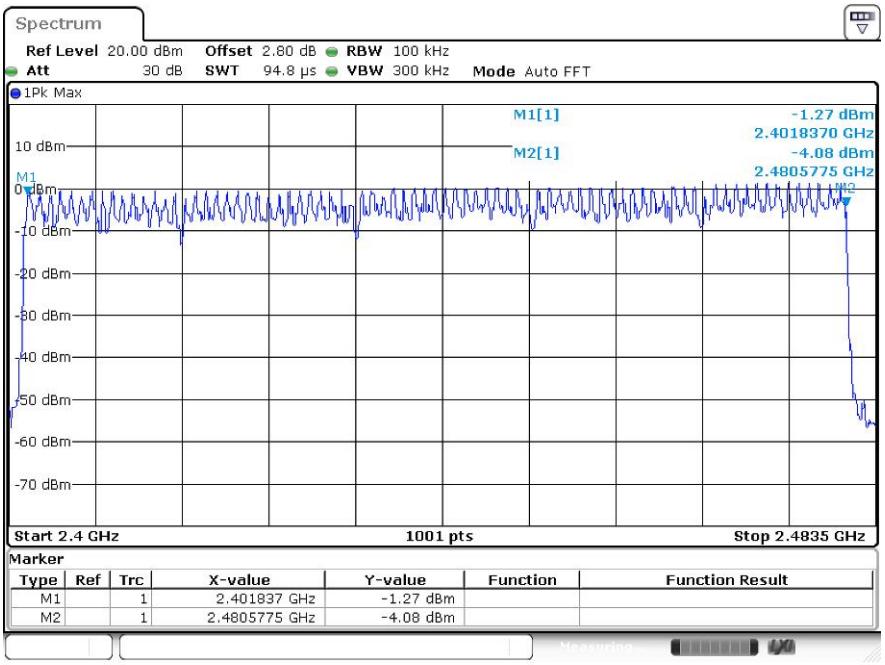
5 Hopping Channel Number

5.1 Test Result

Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
π/4DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

5.2 Test Graphs

Test Graphs	
GFSK/Hop	
π/4DQPSK/Hop	

8DPSK/Hop	

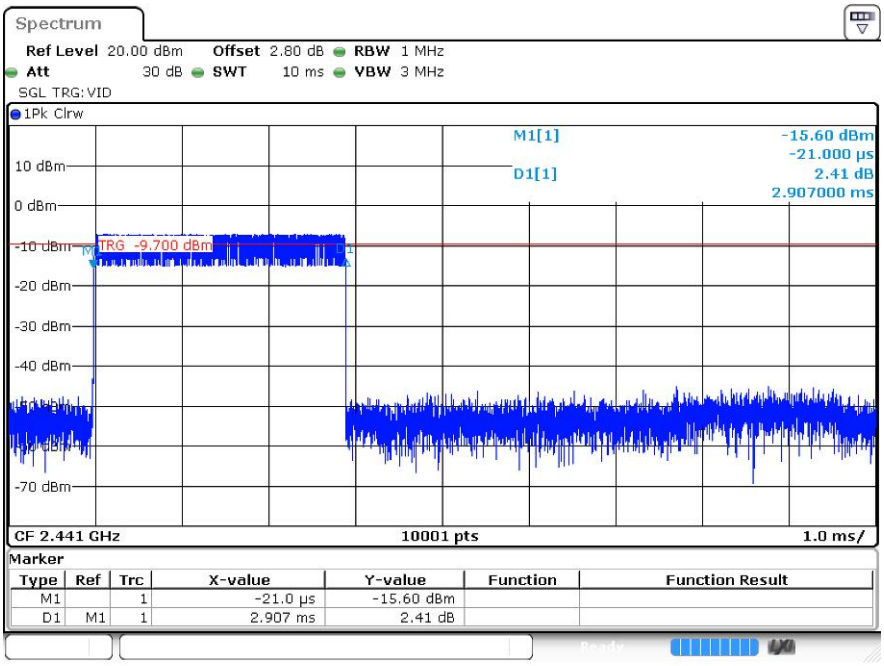
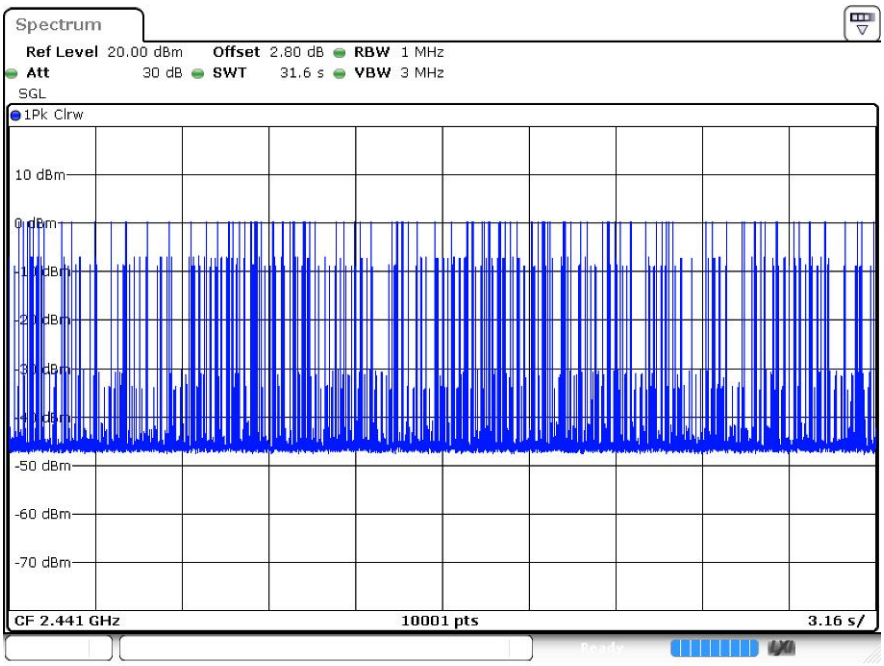
Spectrum
Ref Level 20.00 dBm Offset 2.80 dB RBW 100 kHz
Att 30 dB SWT 94.8 µs VBW 300 kHz Mode Auto FFT
1Pk Max
M1[1] -1.27 dBm
2.4018370 GHz
M2[1] -4.08 dBm
2.4805775 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
Start 2.4 GHz
1001 pts
Stop 2.4835 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.401837 GHz -1.27 dBm
M2 1 2.4805775 GHz -4.08 dBm

6 Dwell Time

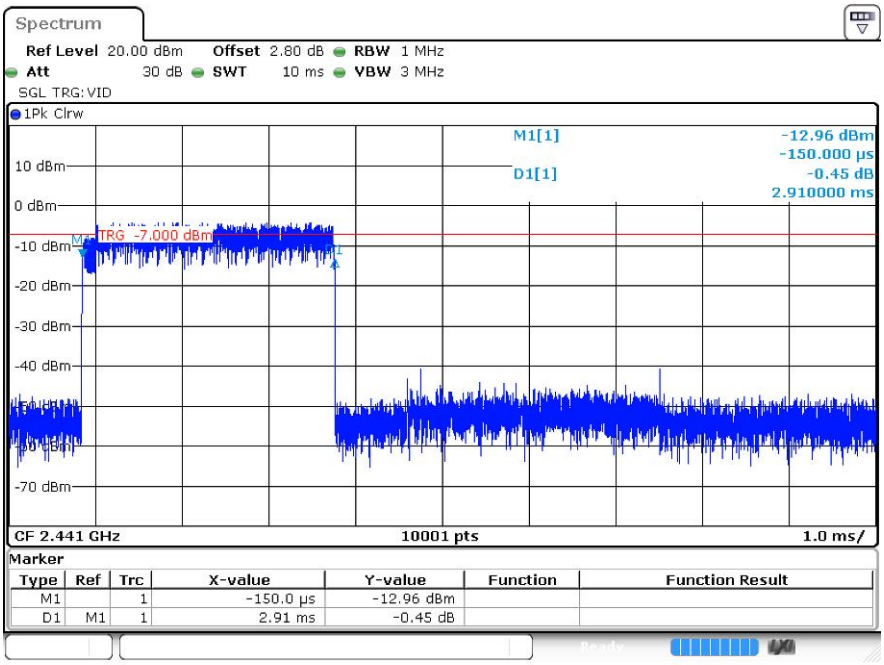
6.1 Test Result

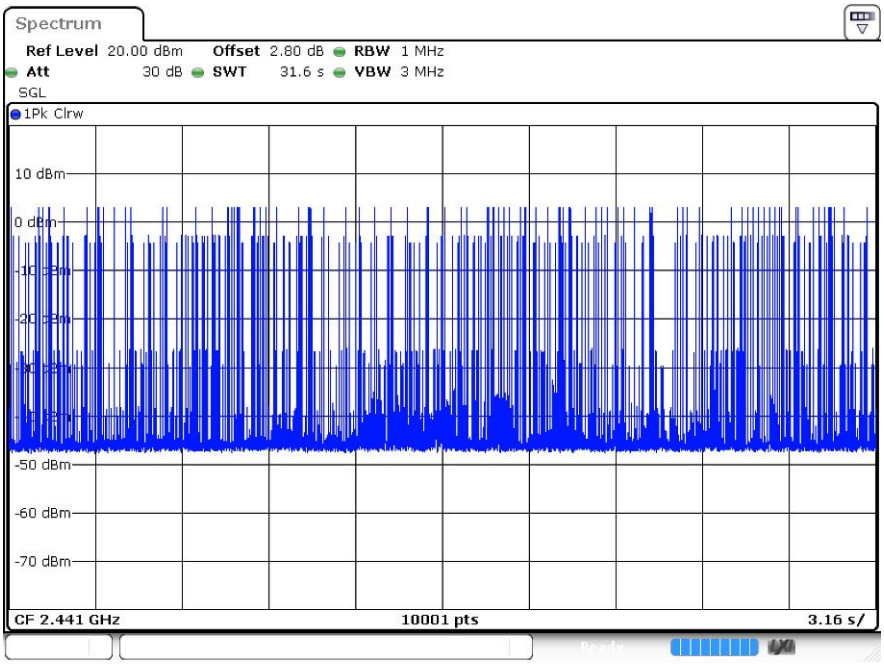
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[ms]	Limit [s]	Verdict
GFSK	DH5	MCH	2.907	107	311.049	0.4	Pass
π/4DQPSK	2DH5	MCH	2.91	93	270.63	0.4	Pass
8DPSK	3DH5	MCH	2.917	104	303.368	0.4	Pass

6.2 Test Graphs

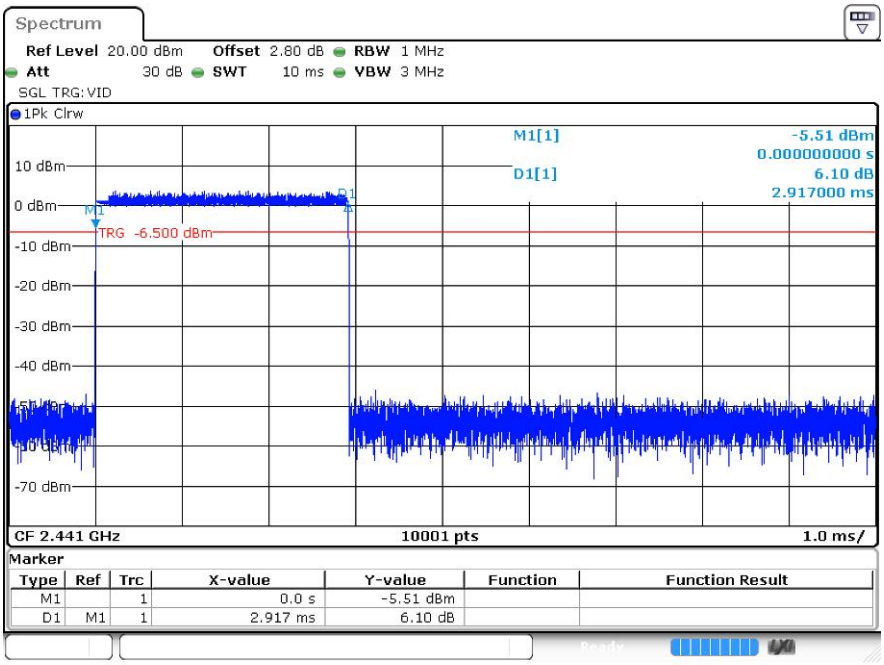
Test Graphs	
GFSK_DH5/MCH	 

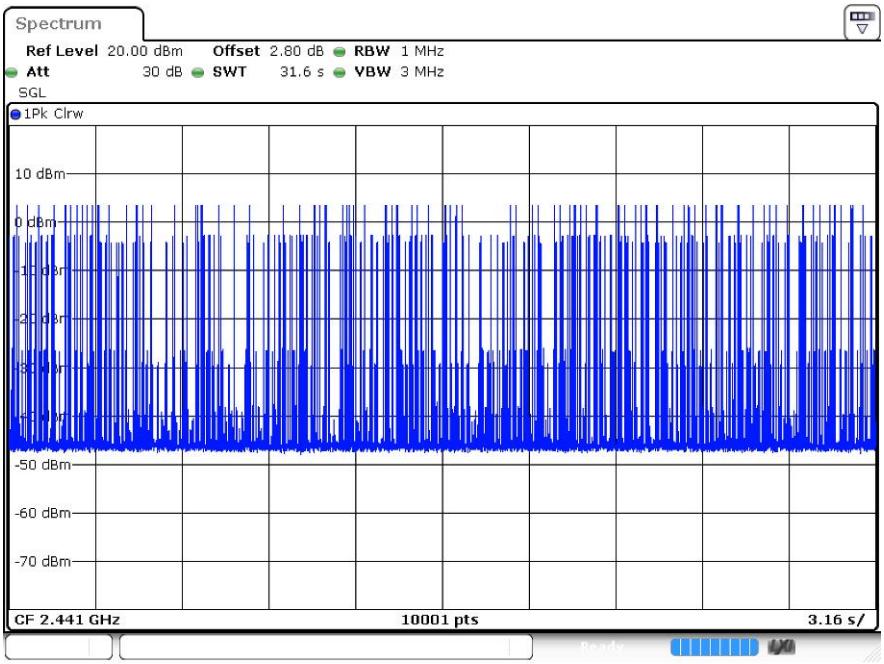
π/4DQPSK
_2DH5/MCH





8DPSK _3DH5/MCH



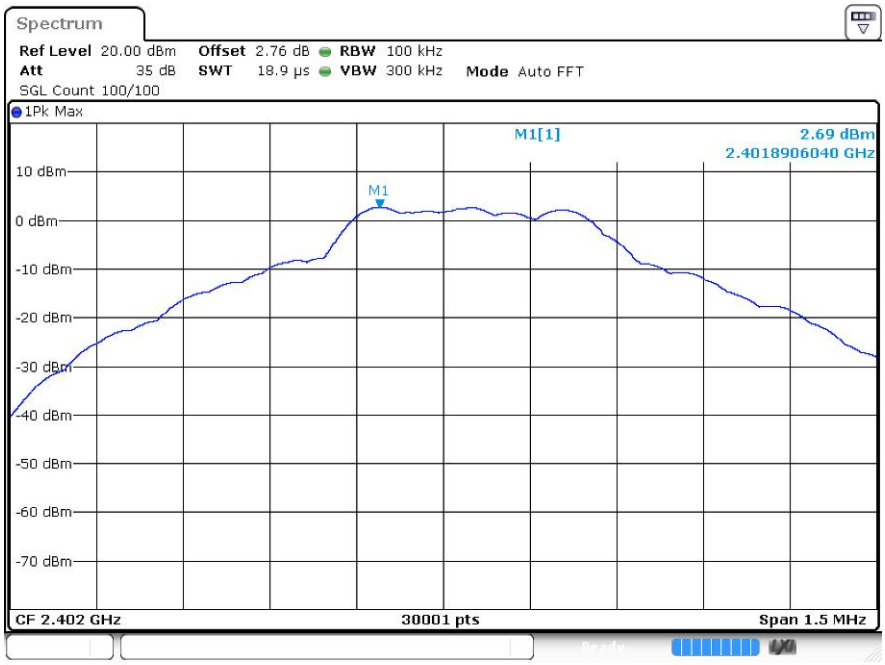
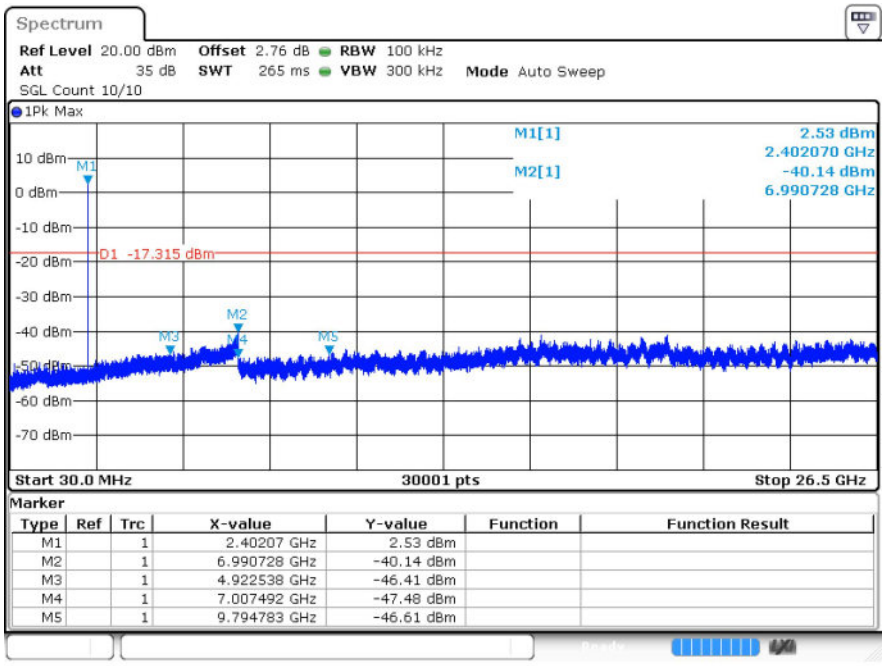


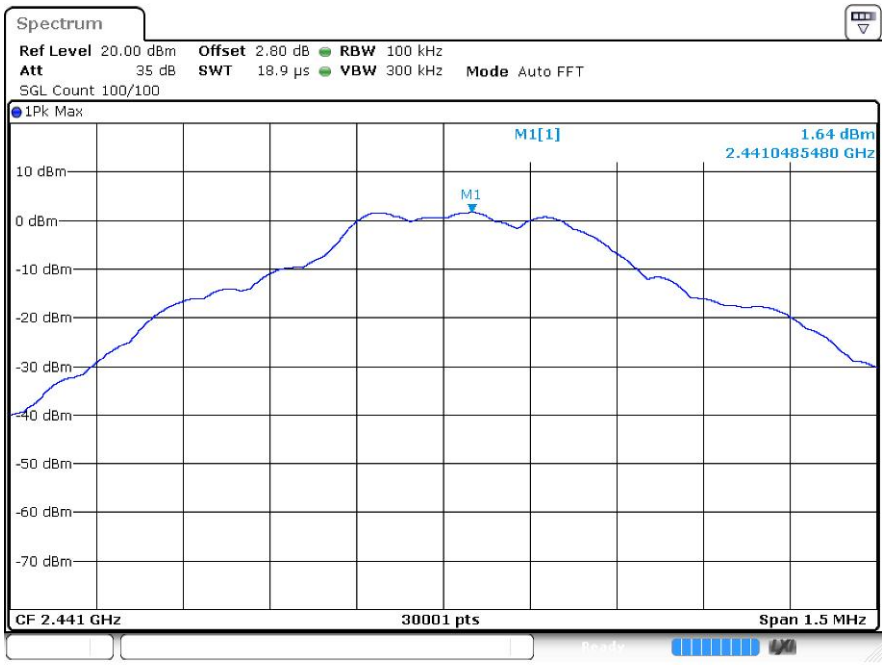
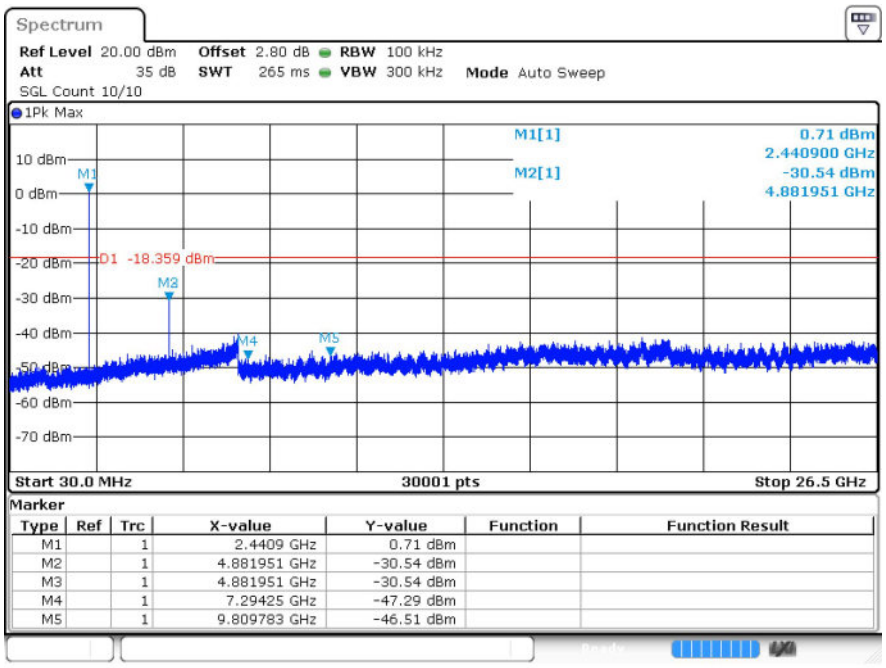
7 RF Conducted Spurious Emissions

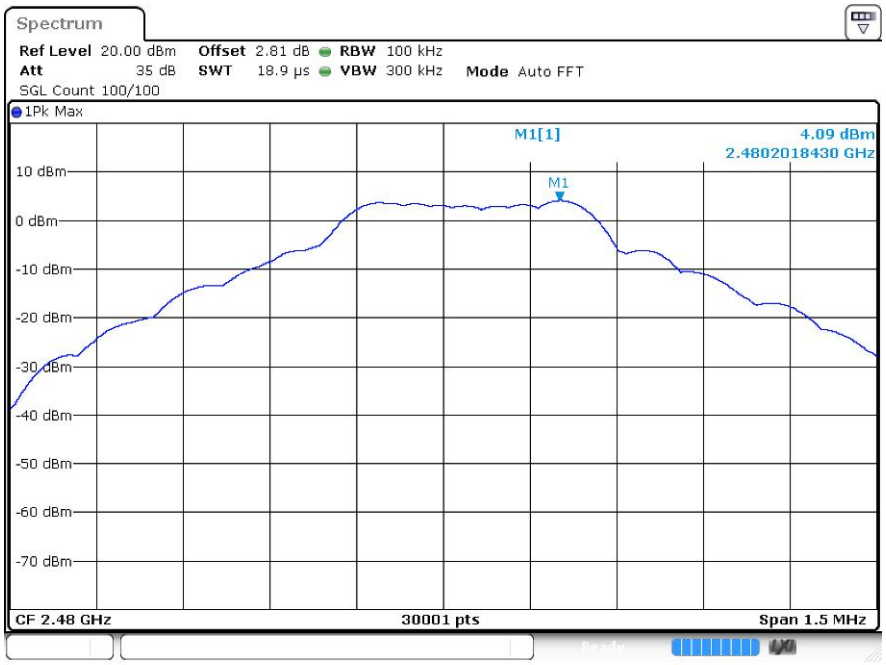
7.1 Test Result

Mode	Channel	Max. Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	-42.83	-20	Pass
	MCH	-32.17	-20	Pass
	HCH	-27.95	-20	Pass
π/4DQPSK	LCH	-33.61	-20	Pass
	MCH	-34.12	-20	Pass
	HCH	-31.58	-20	Pass
8DPSK	LCH	-29.17	-20	Pass
	MCH	-31.21	-20	Pass
	HCH	-29.64	-20	Pass

7.2 Test Graphs

GFSK_LCH_Graphs	
Pref	
Puw	

GFSK_MCH_Graphs	
Pref	
Puw	

GFSK_HCH_Graphs	
Pref	
Puw