Appendix A

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

Product Name: TWS Clear Case Earbud XT-87

Trade Mark: N/A

Test Model: HM-AU-BE-232

Environmental Conditions

Temperature:	25.4℃
Relative Humidity:	52.3%
ATM Pressure:	101Kpa
Test Engineer:	Simba Huang
Supervised by:	Seal Chen

Contents

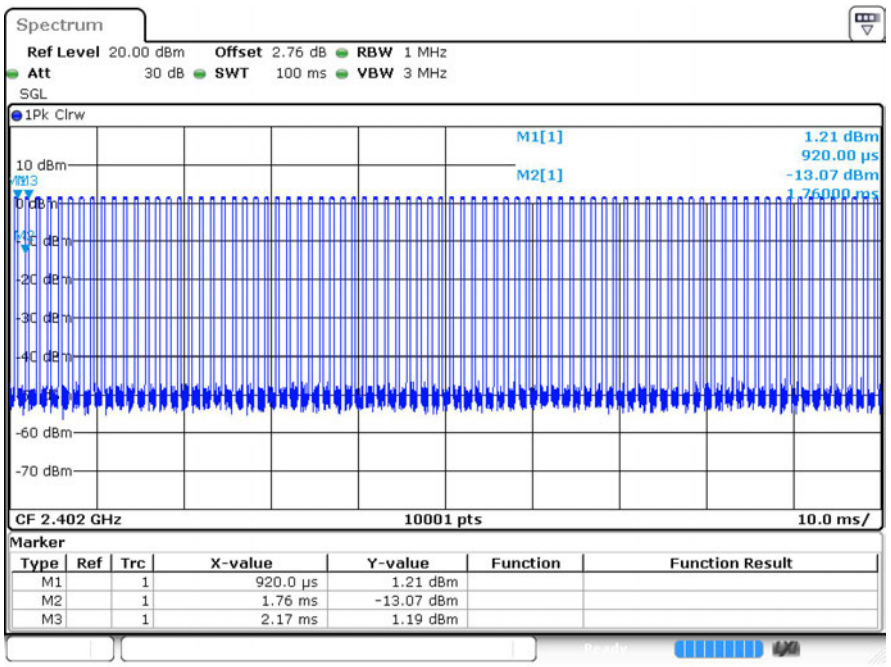
1 Duty Cycle

1.1 Test Result

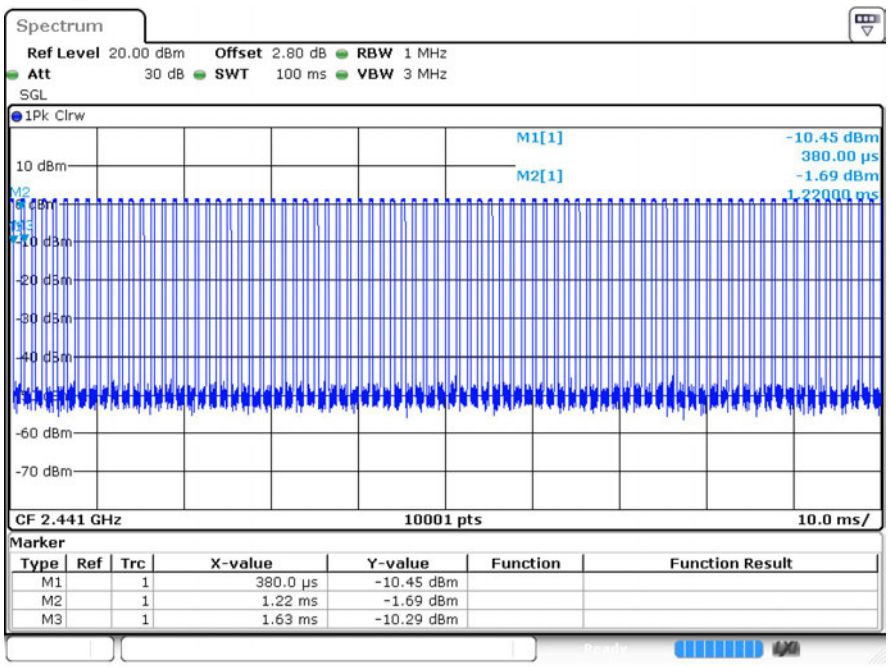
Mode	Frequency (MHz)	Duty Cycle (%)	1/T (kHz)
1-DH1	2402	33.6	2.44
1-DH1	2441	33.61	2.44
1-DH1	2480	33.61	2.44
2-DH1	2402	34.15	2.44
2-DH1	2441	34.41	2.38
2-DH1	2480	34.4	2.38
3-DH1	2402	34.41	2.38
3-DH1	2441	34.4	2.38
3-DH1	2480	34.4	2.38

1.2 Test Graphs

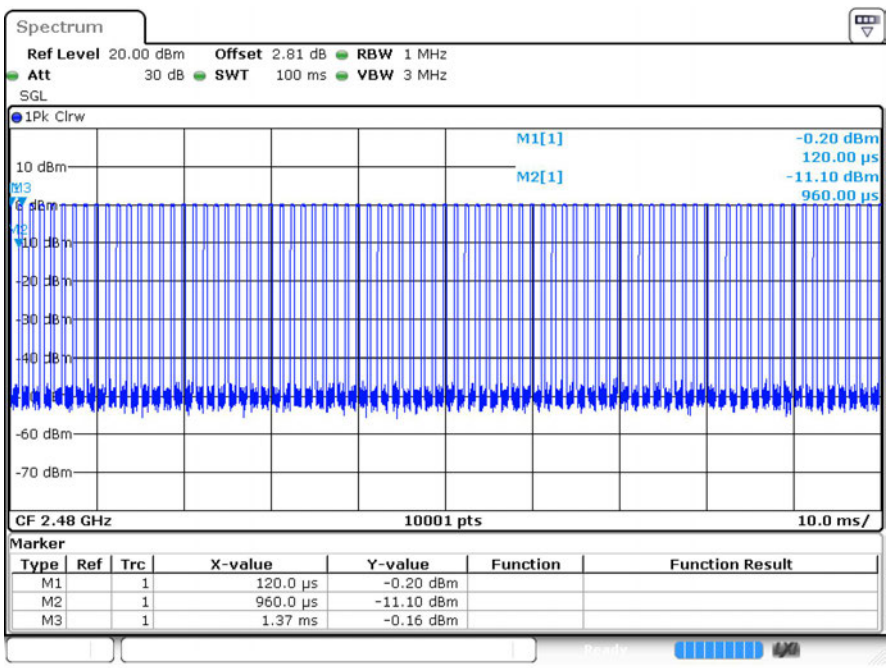
Test Graphs
1-DH1 2402MHz



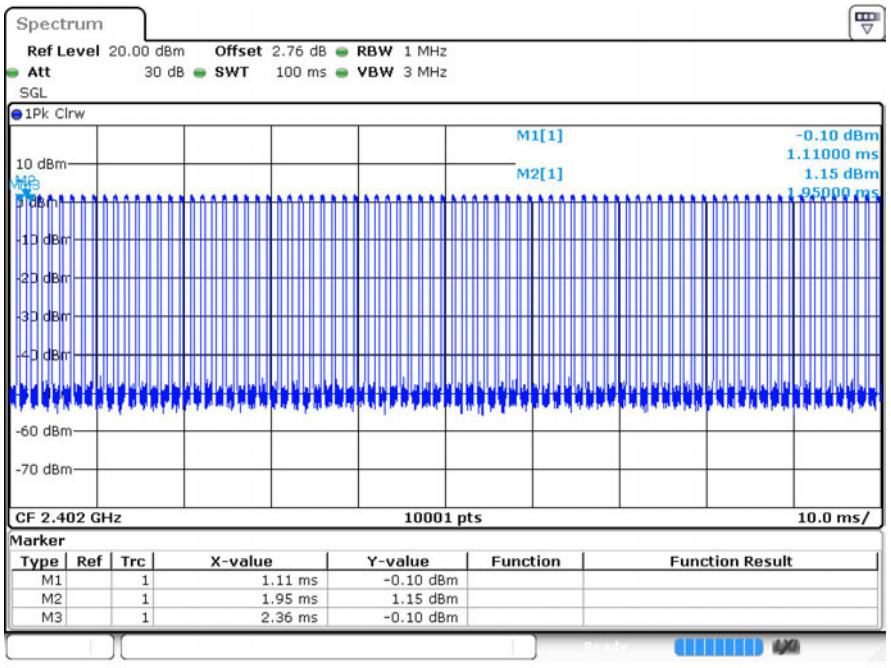
1-DH1 2441MHz



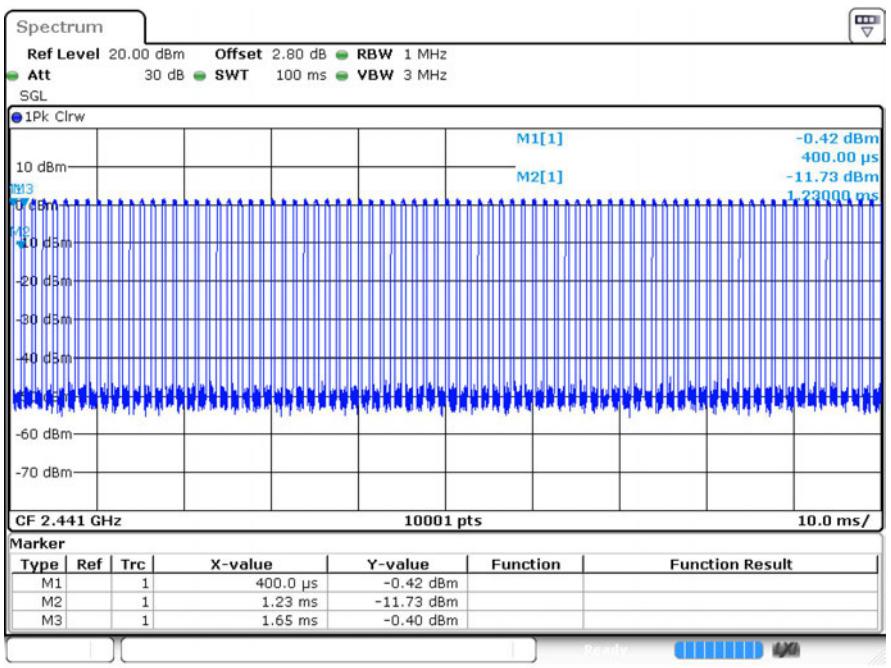
1-DH1 2480MHz



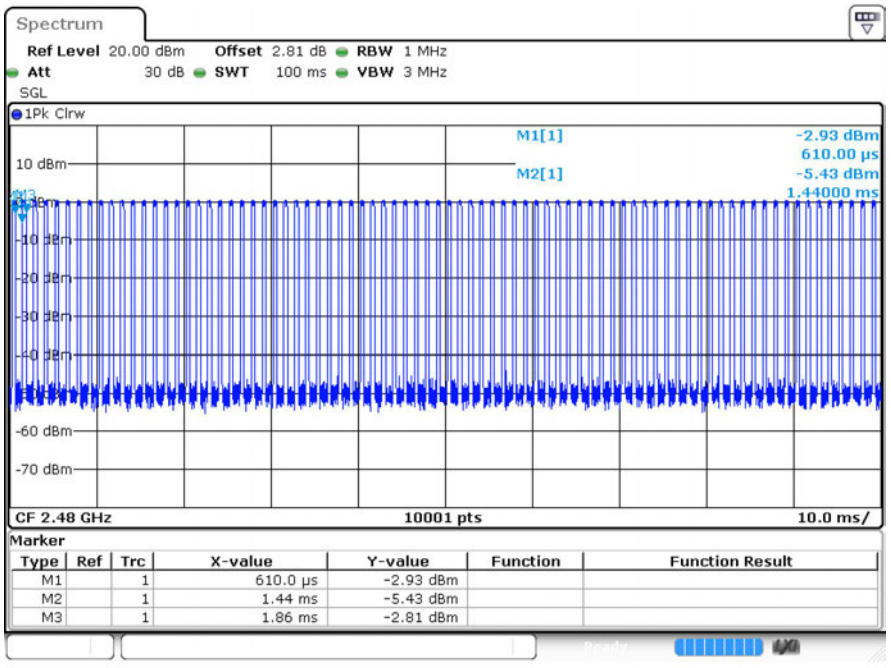
2-DH1 2402MHz



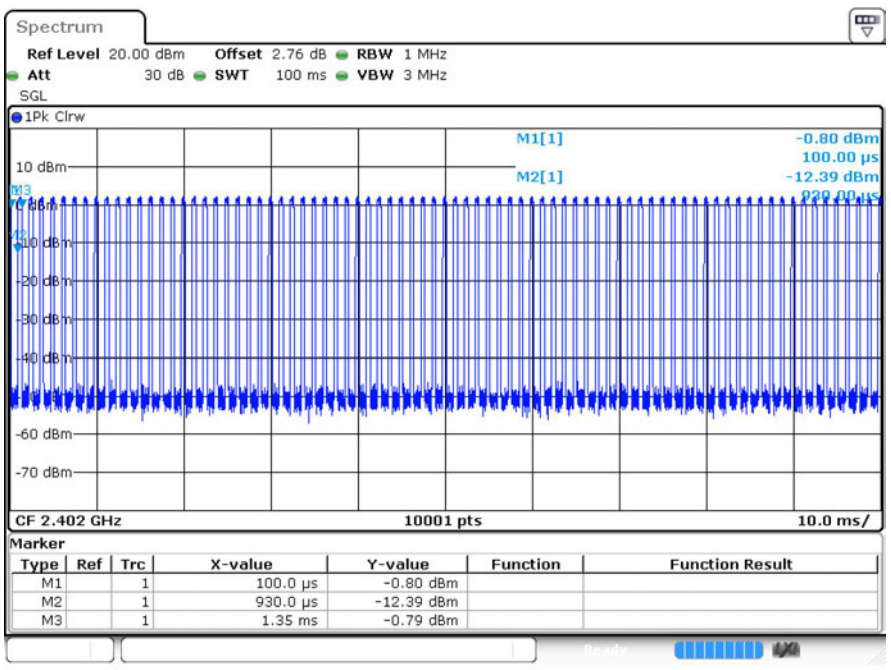
2-DH1 2441MHz



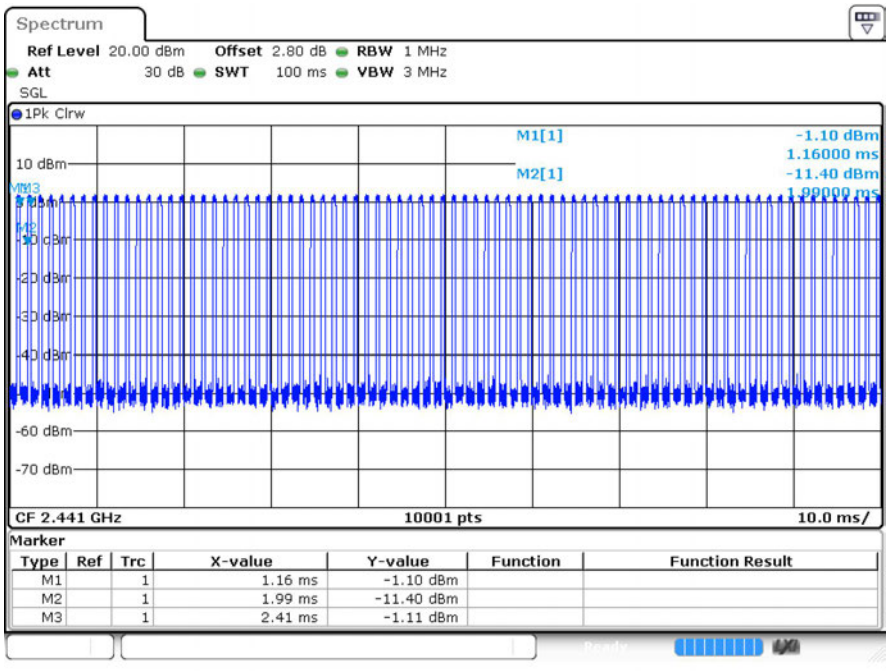
2-DH1 2480MHz



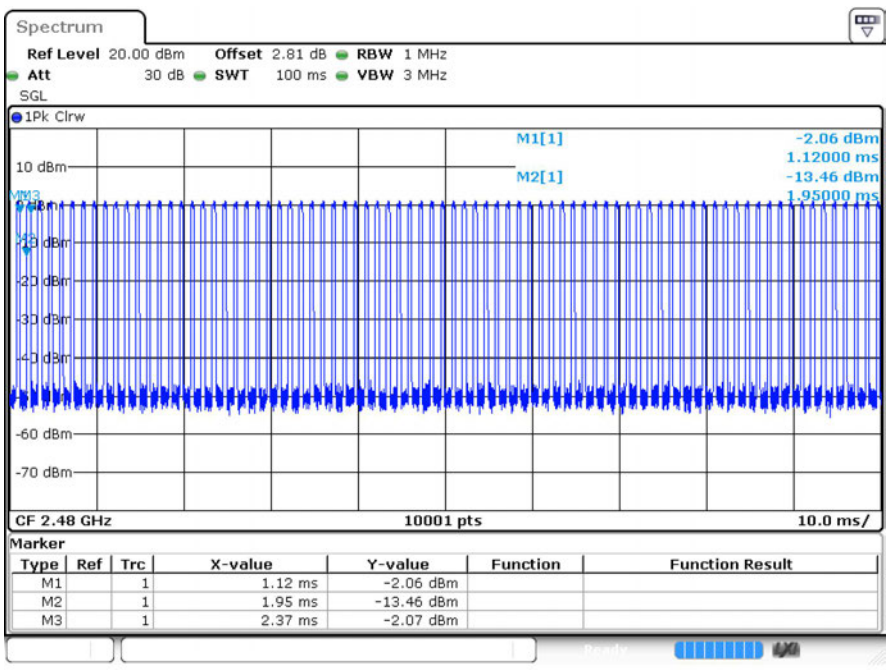
3-DH1 2402MHz



3-DH1 2441MHz



3-DH1 2480MHz

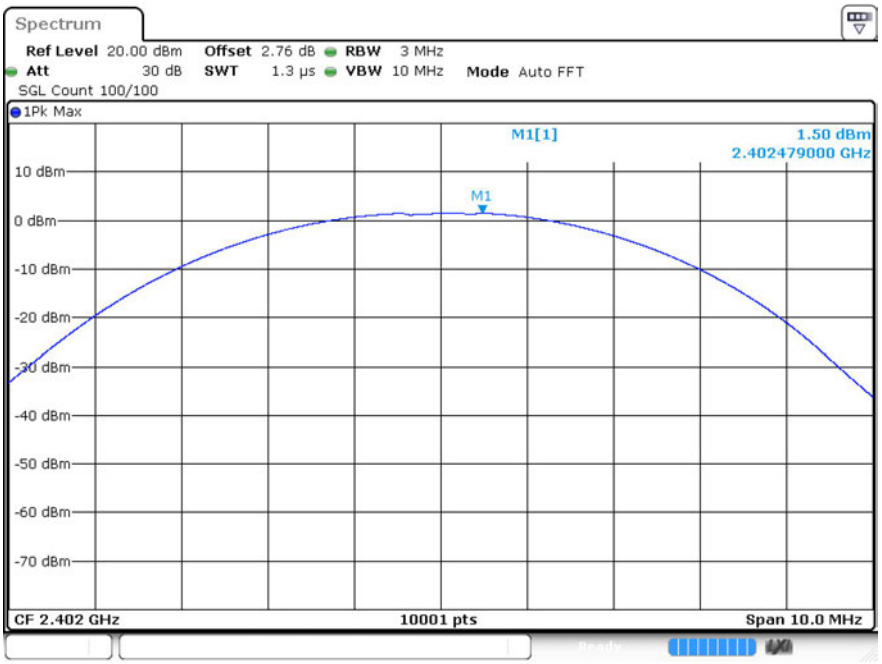
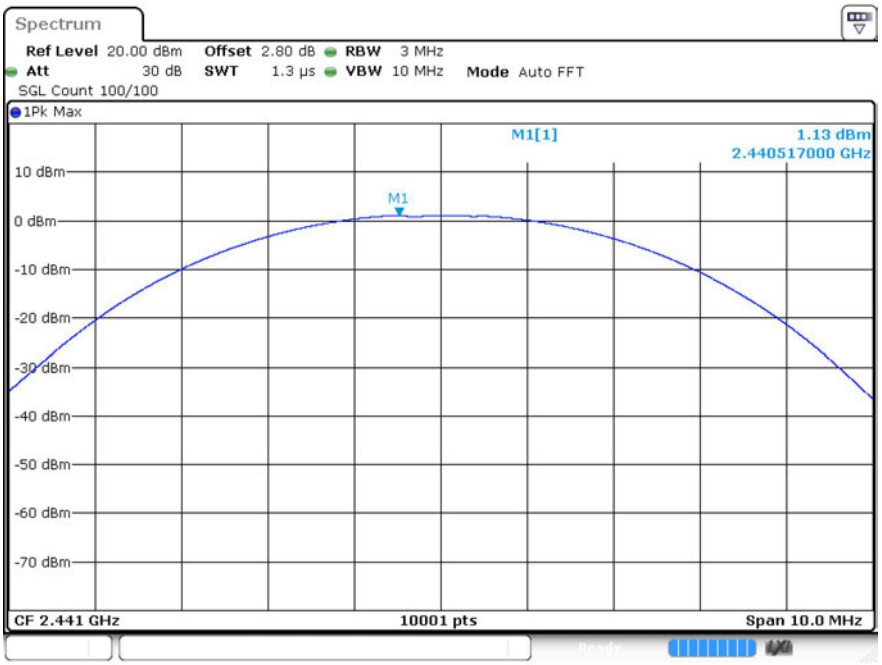


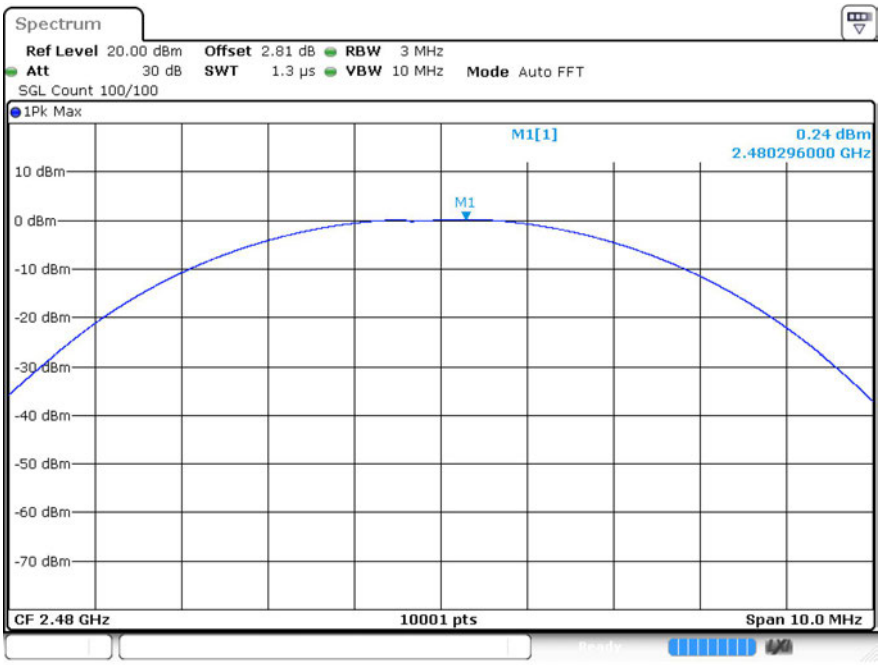
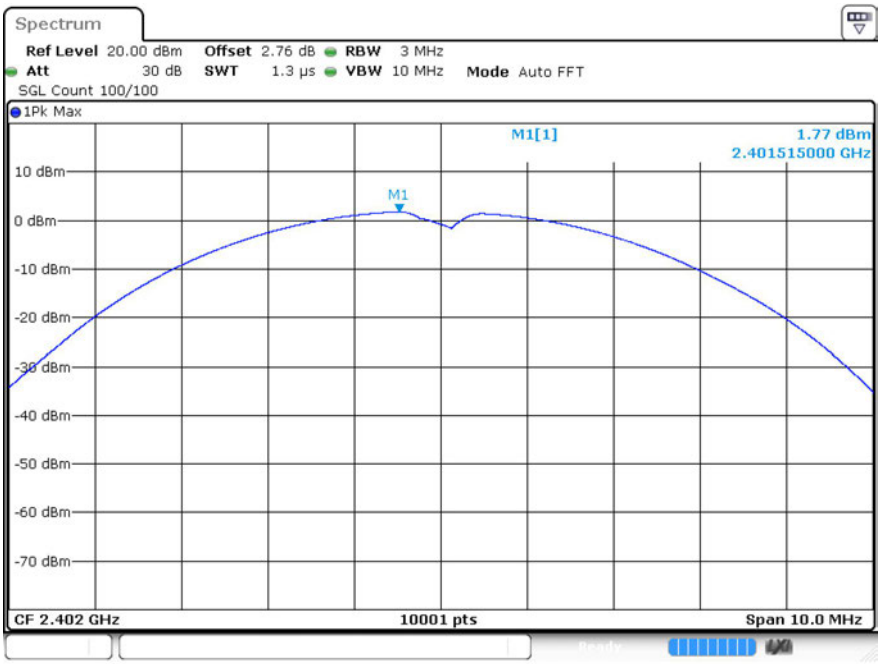
2 Maximum Conducted Peak Output Power

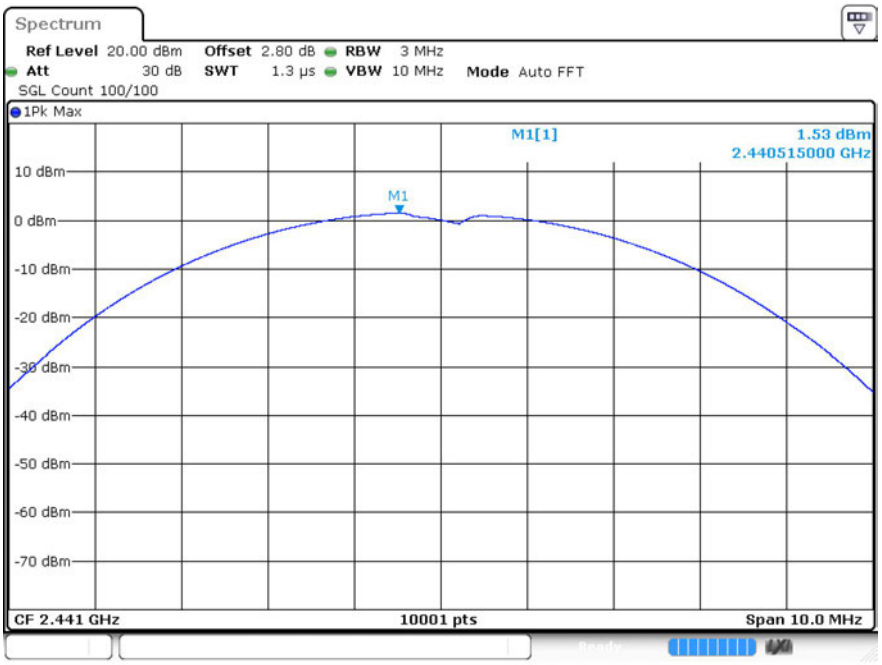
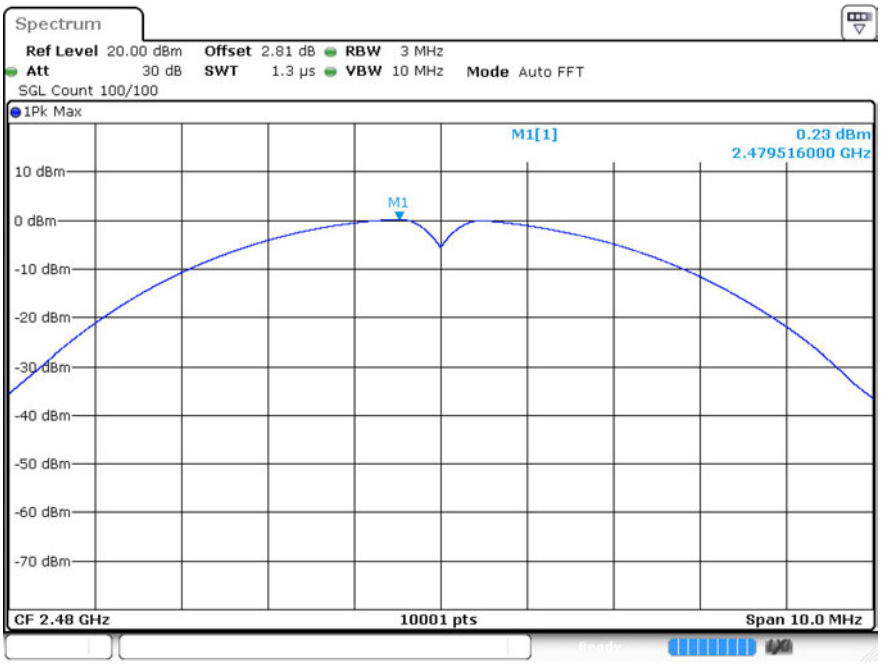
2.1 Test Result

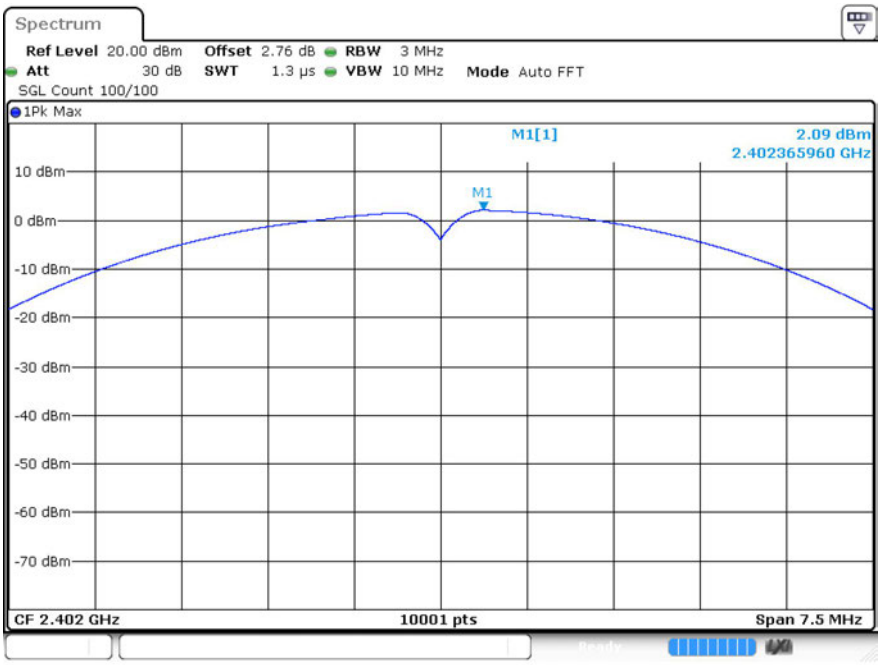
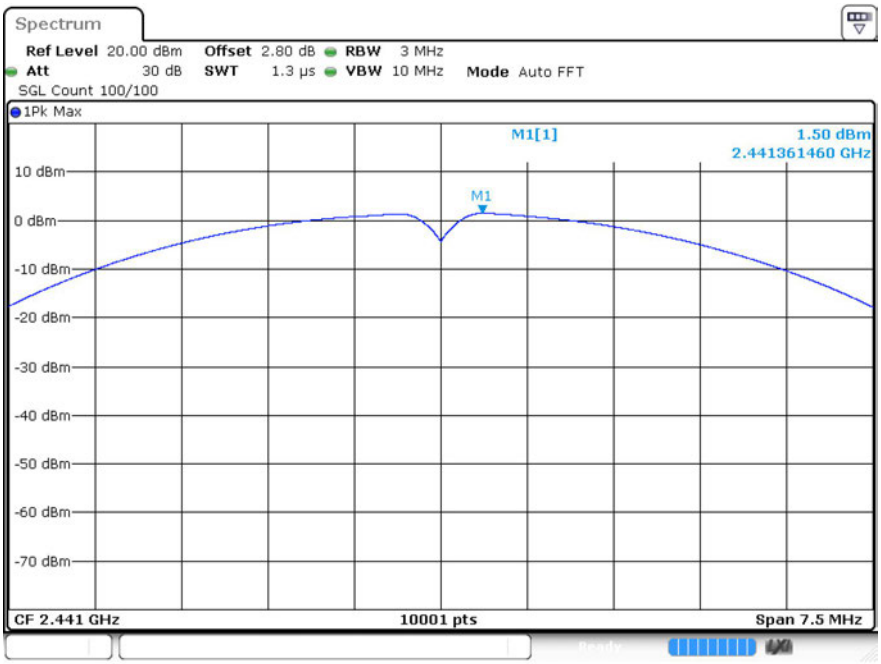
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.5	21	Pass
	MCH	1.13	21	Pass
	HCH	0.24	21	Pass
π/4DQPSK	LCH	1.77	21	Pass
	MCH	1.53	21	Pass
	HCH	0.23	21	Pass
8DPSK	LCH	2.09	21	Pass
	MCH	1.5	21	Pass
	HCH	0.33	21	Pass

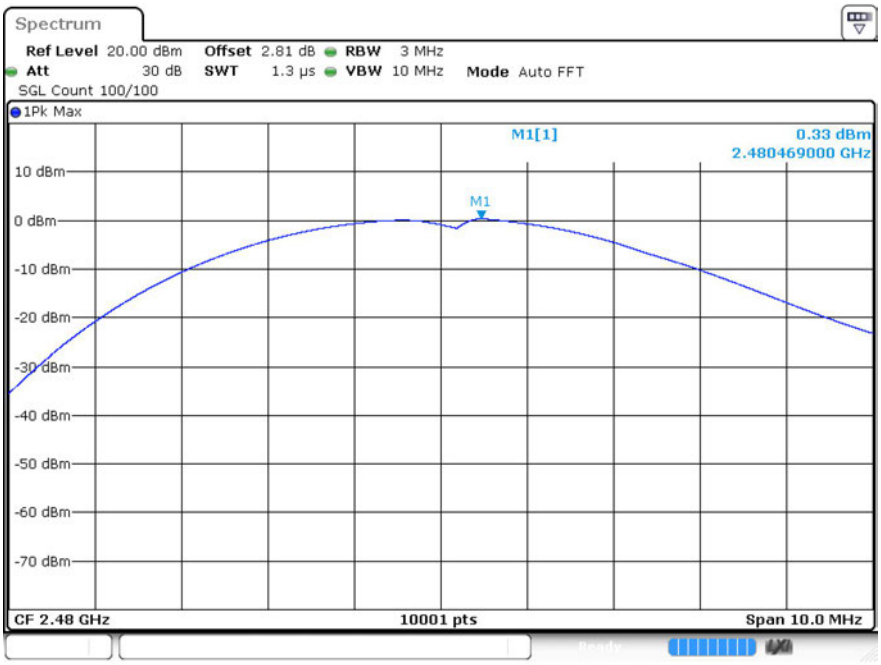
2.2 Test Graphs

Test Graphs	
GFSK/LCH	
GFSK/MCH	

GFSK/HCH	
π/4DQPSK/LCH	

π/4DQPSK/MCH	
π/4DQPSK/HCH	

8DPSK/LCH	
8DPSK/MCH	

8DPSK/HCH	

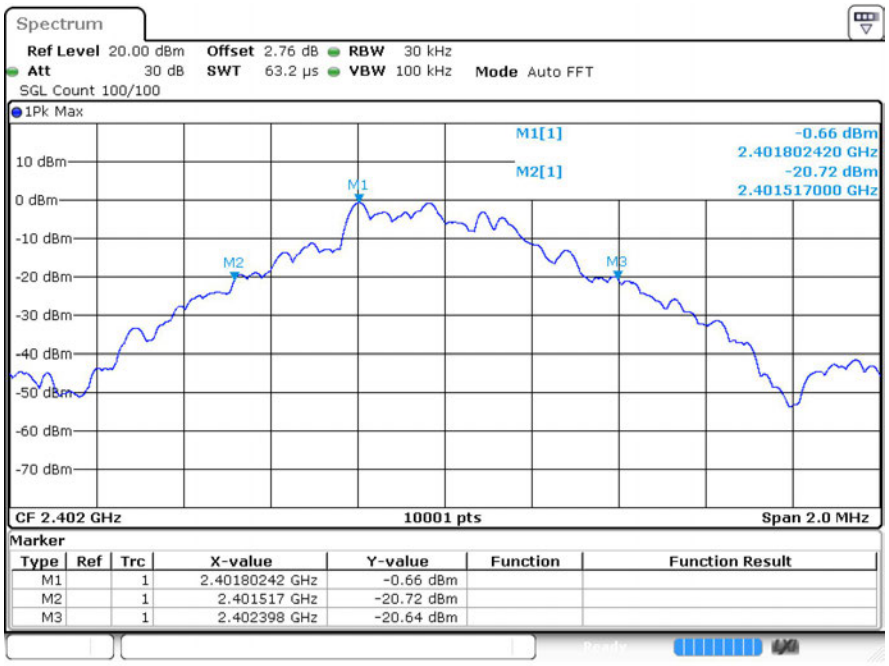
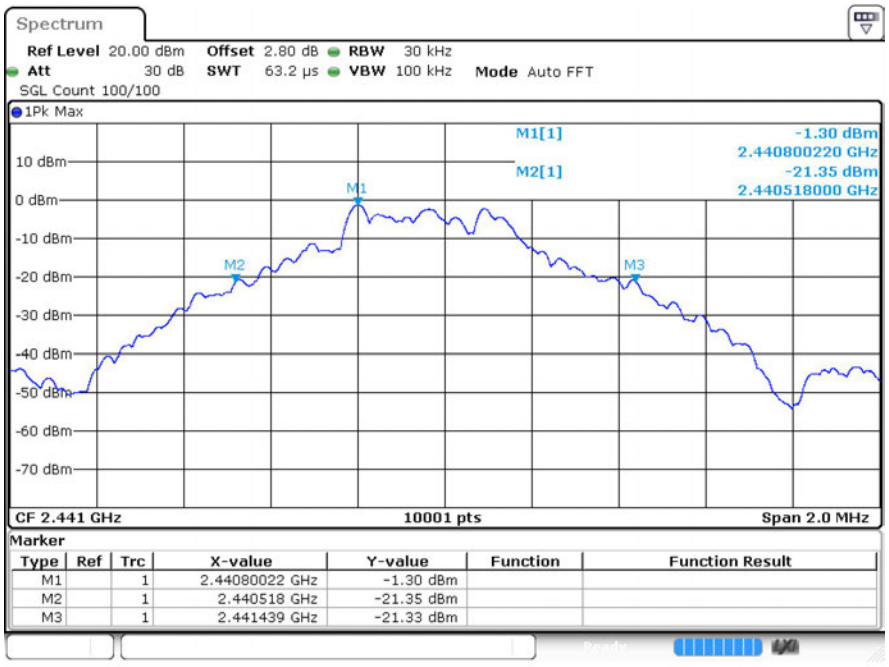
Spectrum
Ref Level 20.00 dBm Offset 2.81 dB RBW 3 MHz
Att 30 dB SWT 1.3 µs VBW 10 MHz Mode Auto FFT
SGL Count 100/100
1Pk Max
M1[1]
0.33 dBm
2.480469000 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.48 GHz
10001 pts
Span 10.0 MHz

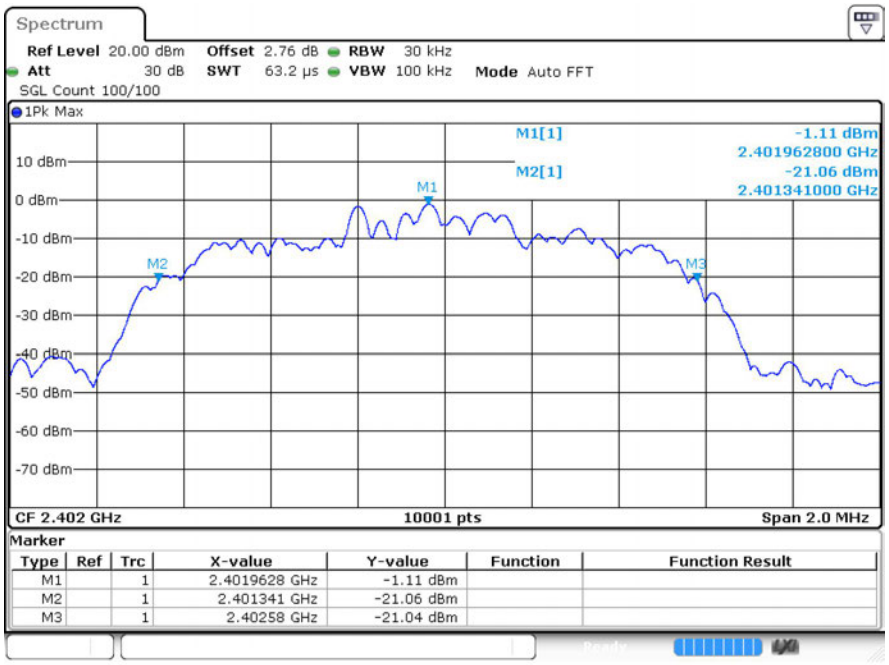
3 20dB Bandwidth

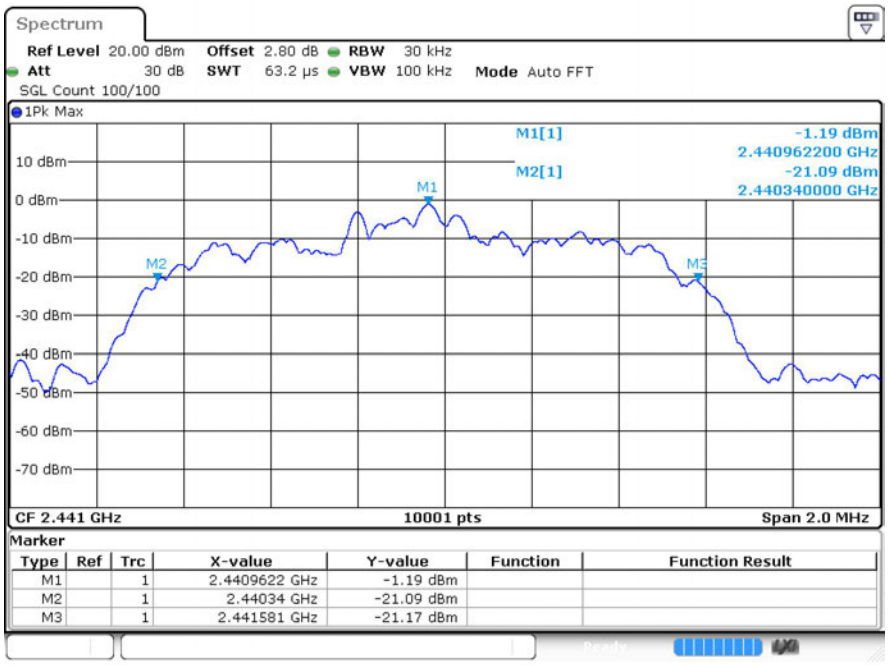
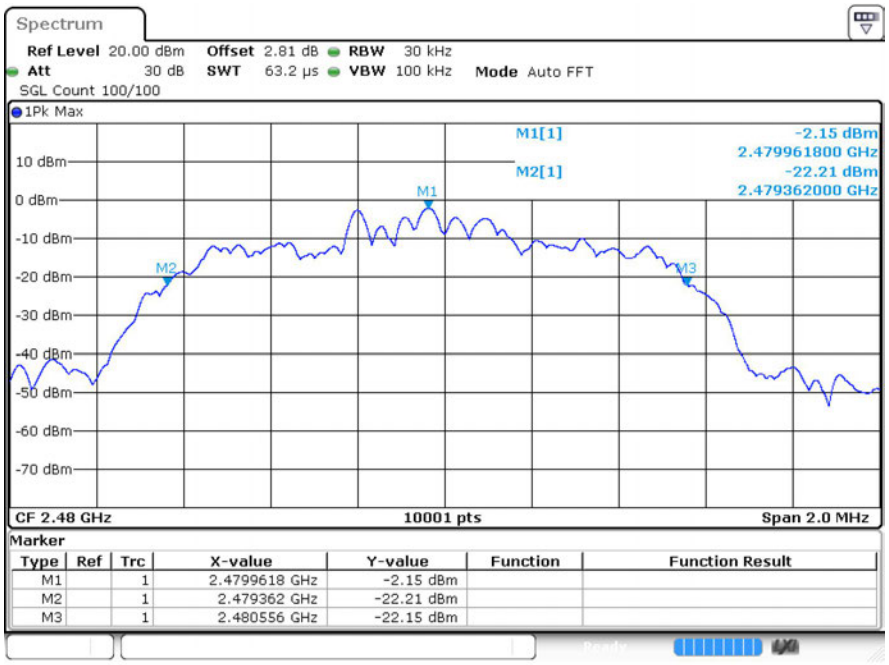
3.1 Test Result

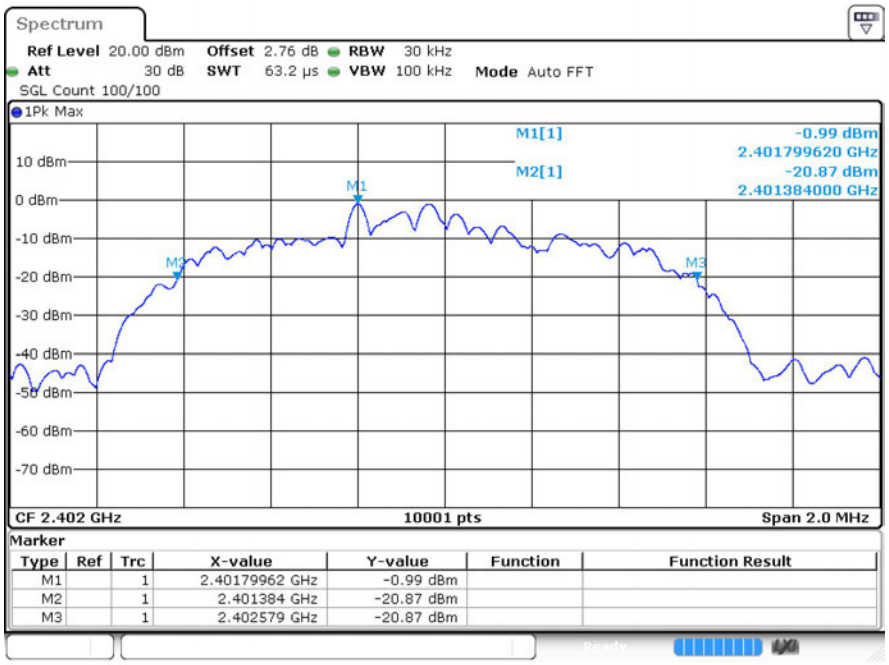
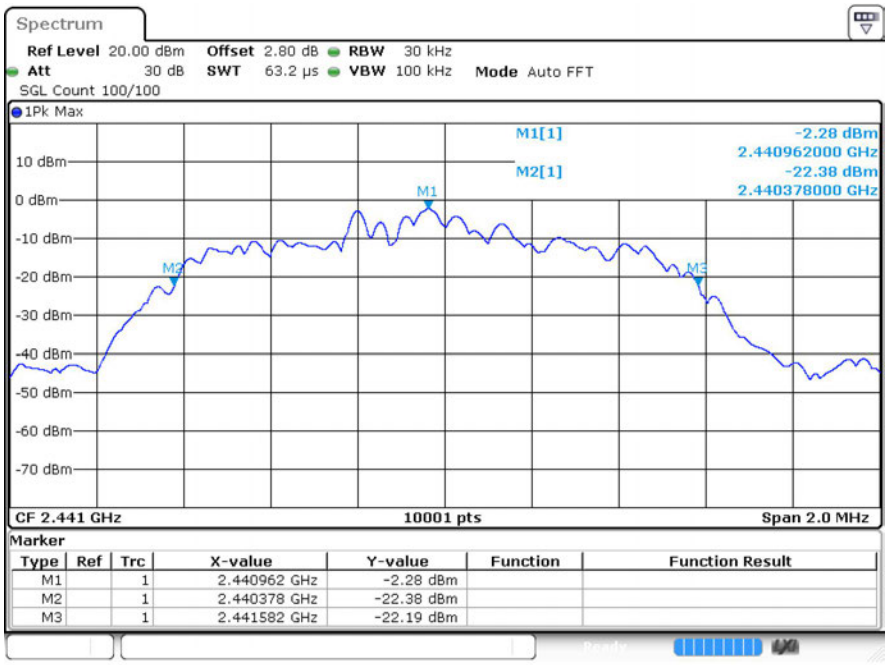
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.881	Not Specified	Pass
	MCH	0.92	Not Specified	Pass
	HCH	0.89	Not Specified	Pass
π/4DQPSK	LCH	1.24	Not Specified	Pass
	MCH	1.242	Not Specified	Pass
	HCH	1.194	Not Specified	Pass
8DPSK	LCH	1.196	Not Specified	Pass
	MCH	1.204	Not Specified	Pass
	HCH	1.196	Not Specified	Pass

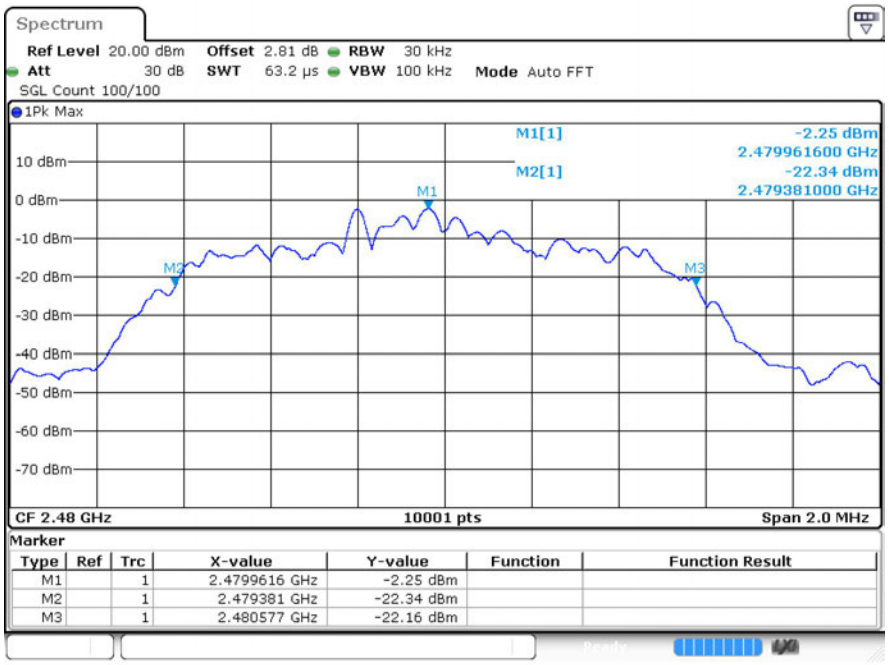
3.2 Test Graphs

Test Graphs	
GFSK/LCH	
GFSK/MCH	

GFSK/HCH	
π/4DQPSK/LCH	

π/4DQPSK/MCH	
π/4DQPSK/HCH	

8DPSK/LCH	
8DPSK/MCH	

8DPSK/HCH	

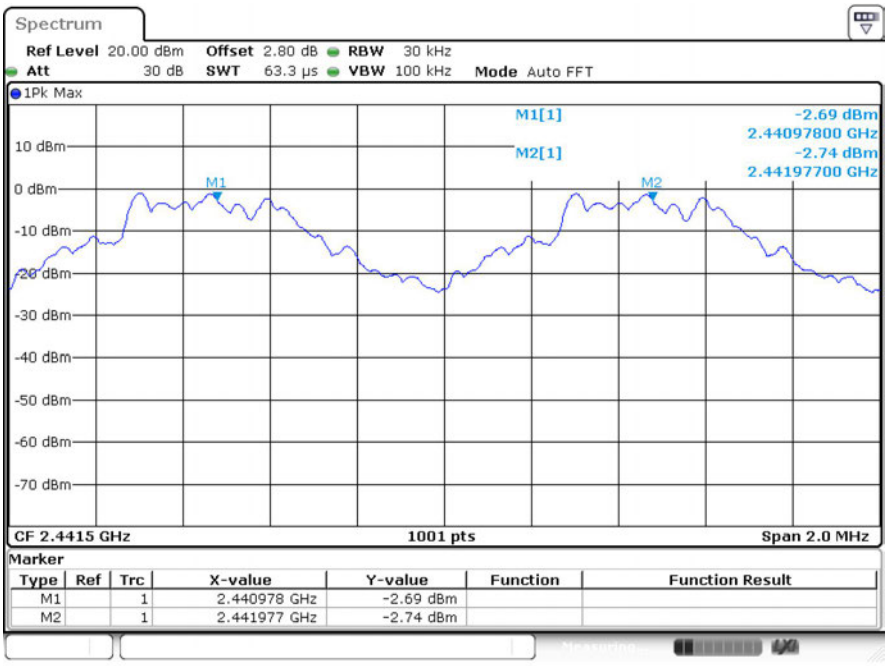
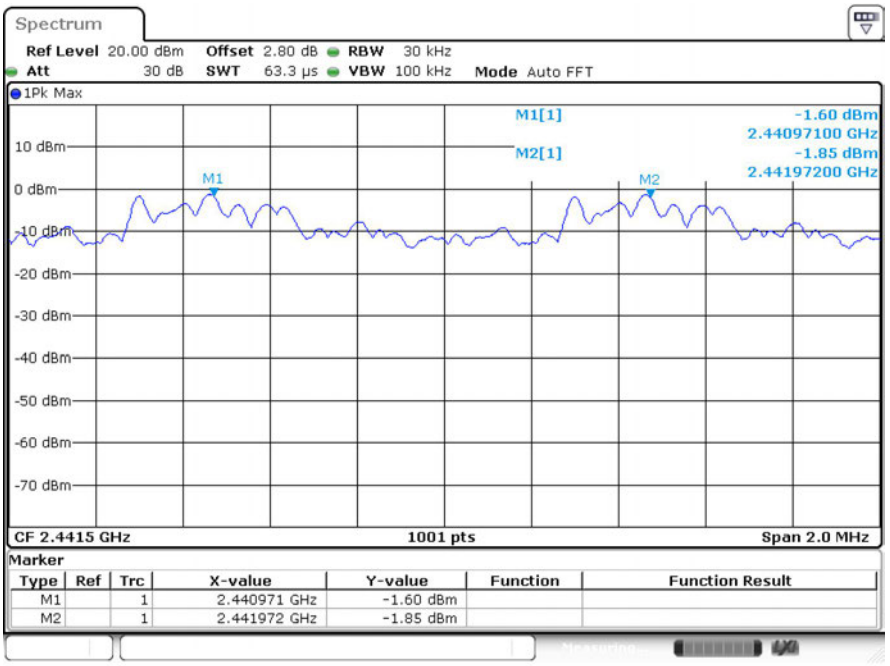
Spectrum
Ref Level 20.00 dBm Offset 2.81 dB RBW 30 kHz
Att 30 dB SWT 63.2 µs VBW 100 kHz Mode Auto FFT
SGL Count 100/100
1Pk Max
M1[1] -2.25 dBm
2.479961600 GHz
M2[1] -22.34 dBm
2.479381000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.48 GHz
10001 pts
Span 2.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.4799616 GHz -2.25 dBm
M2 1 2.479381 GHz -22.34 dBm
M3 1 2.480577 GHz -22.16 dBm

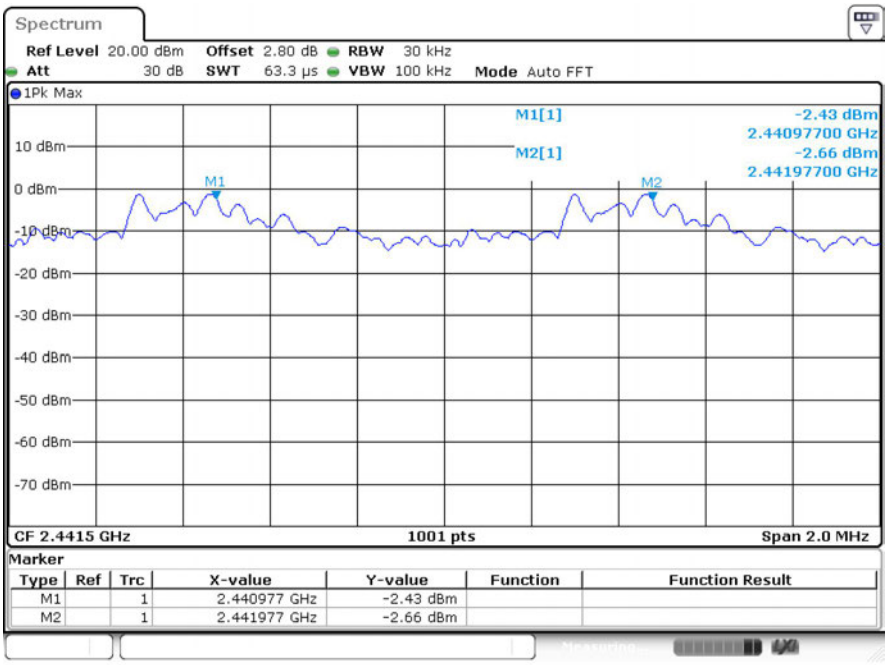
4 Carrier Frequency Separation

4.1 Test Result

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	MCH	0.999	0.613	Pass
π/4DQPSK	MCH	1.001	0.828	Pass
8DPSK	MCH	1	0.803	Pass

4.2 Test Graphs

Test Graphs	
GFSK/MCH	
π/4DQPSK/MCH	

8DPSK/MCH	

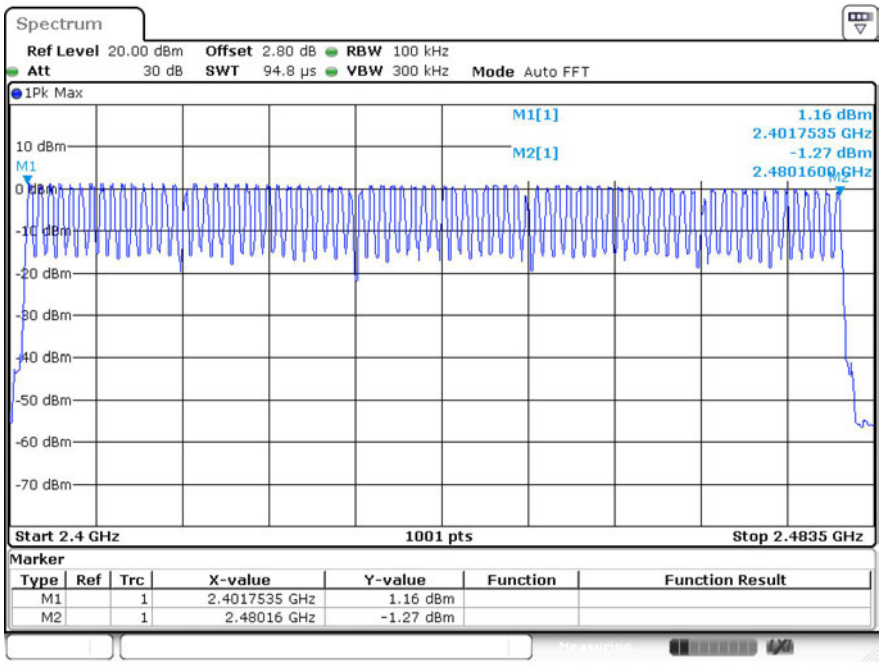
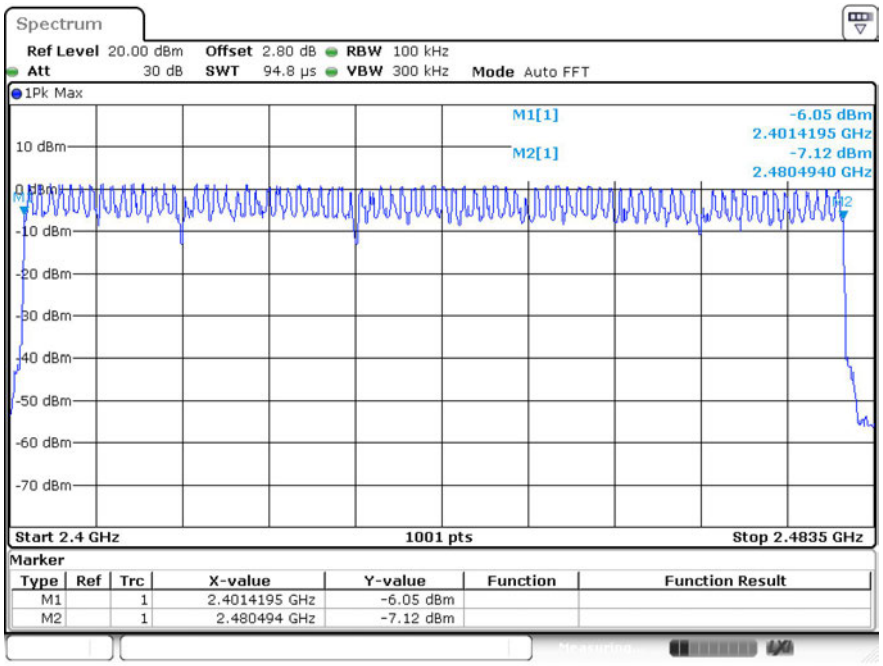
Spectrum
Ref Level 20.00 dBm Offset 2.80 dB RBW 30 kHz
Att 30 dB SWT 63.3 µs VBW 100 kHz Mode Auto FFT
1Pk Max
M1[1] -2.43 dBm
2.44097700 GHz
M2[1] -2.66 dBm
2.44197700 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
M2
CF 2.4415 GHz
1001 pts
Span 2.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.440977 GHz -2.43 dBm
M2 1 2.441977 GHz -2.66 dBm

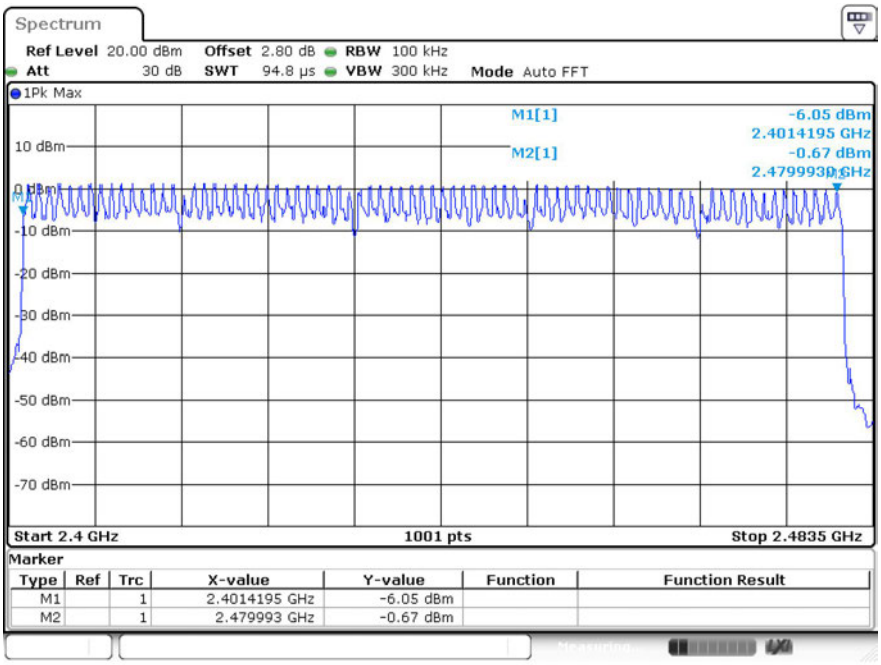
5 Hopping Channel Number

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	

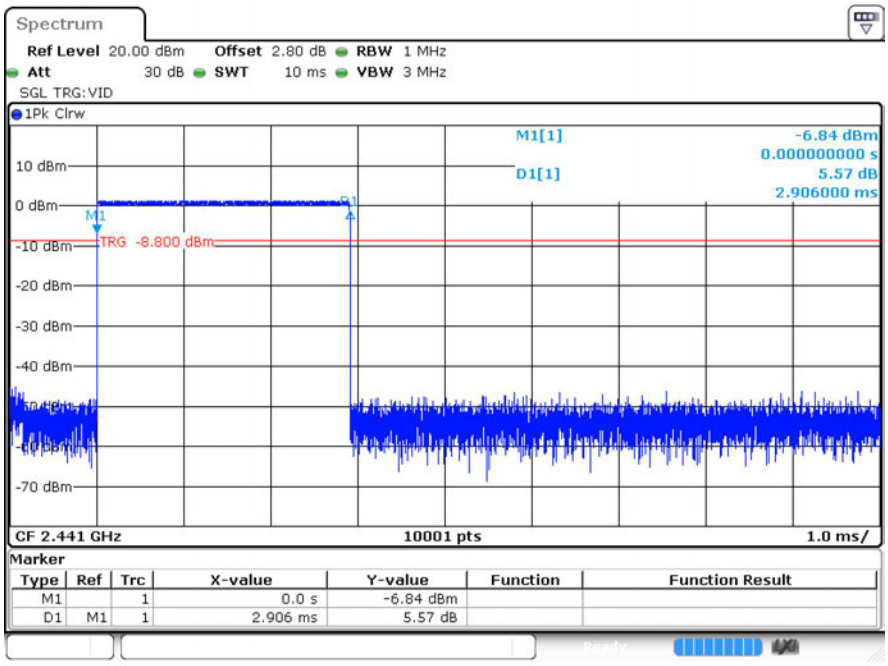
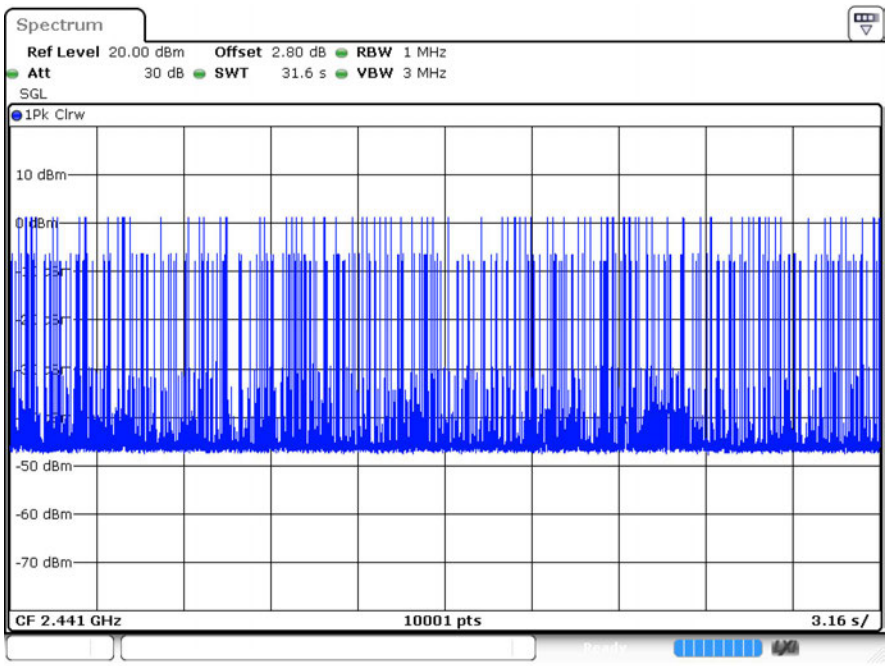
Spectrum
Ref Level 20.00 dBm Offset 2.80 dB RBW 100 kHz
Att 30 dB SWT 94.8 µs VBW 300 kHz Mode Auto FFT
1Pk Max
M1[1] -6.05 dBm
2.4014195 GHz
M2[1] -0.67 dBm
2.479993 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
Start 2.4 GHz
1001 pts
Stop 2.4835 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.4014195 GHz -6.05 dBm
M2 1 2.479993 GHz -0.67 dBm

6 Dwell Time

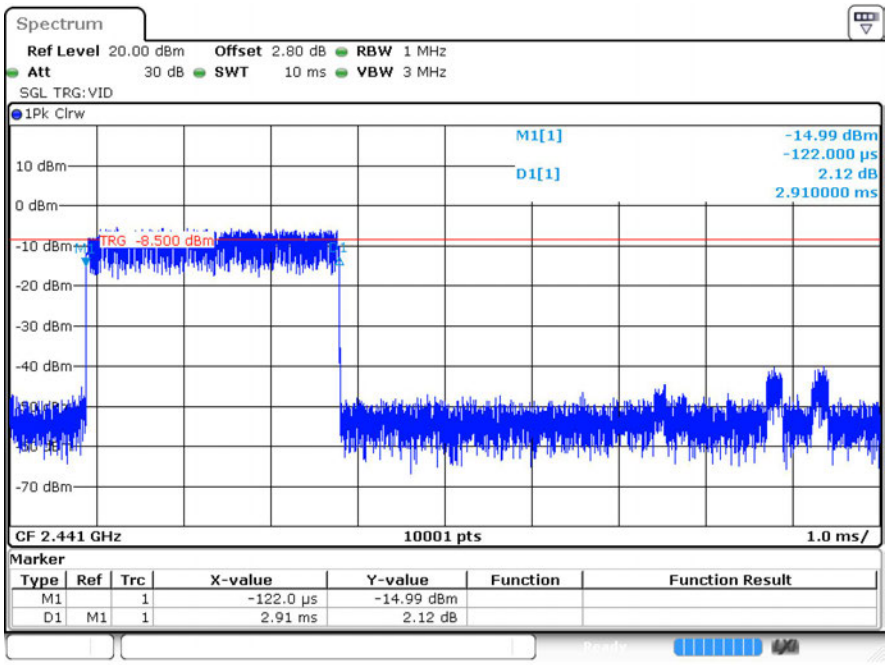
6.1 Test Result

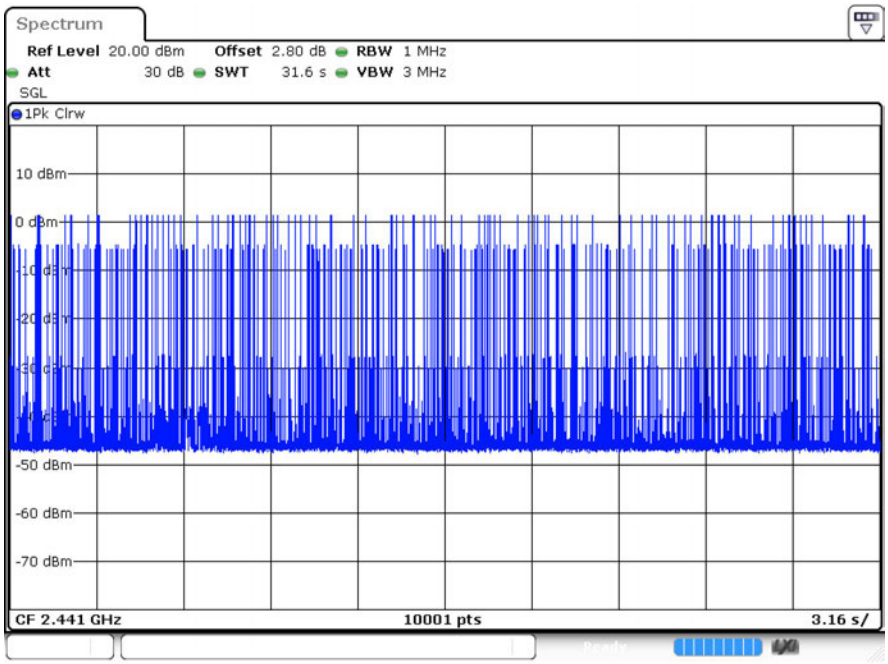
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[ms]	Limit [s]	Verdict
GFSK	DH5	MCH	2.906	98	284.788	0.4	Pass
π/4DQPSK	2DH5	MCH	2.91	102	296.82	0.4	Pass
8DPSK	3DH5	MCH	2.912	118	343.616	0.4	Pass

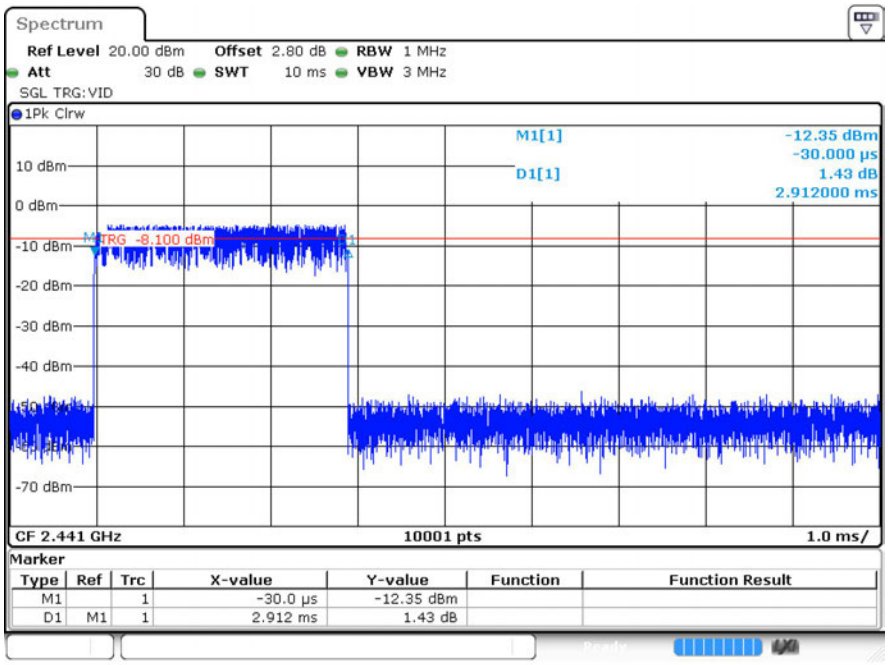
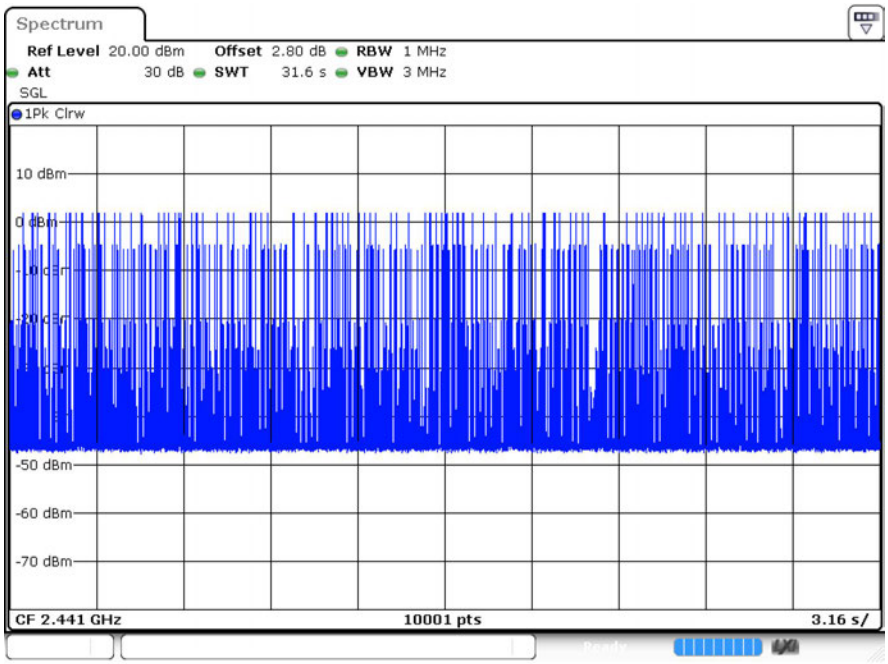
6.2 Test Graphs

Test Graphs	
GFSK_DH5/MCH	 

π/4DQPSK
_2DH5/MCH





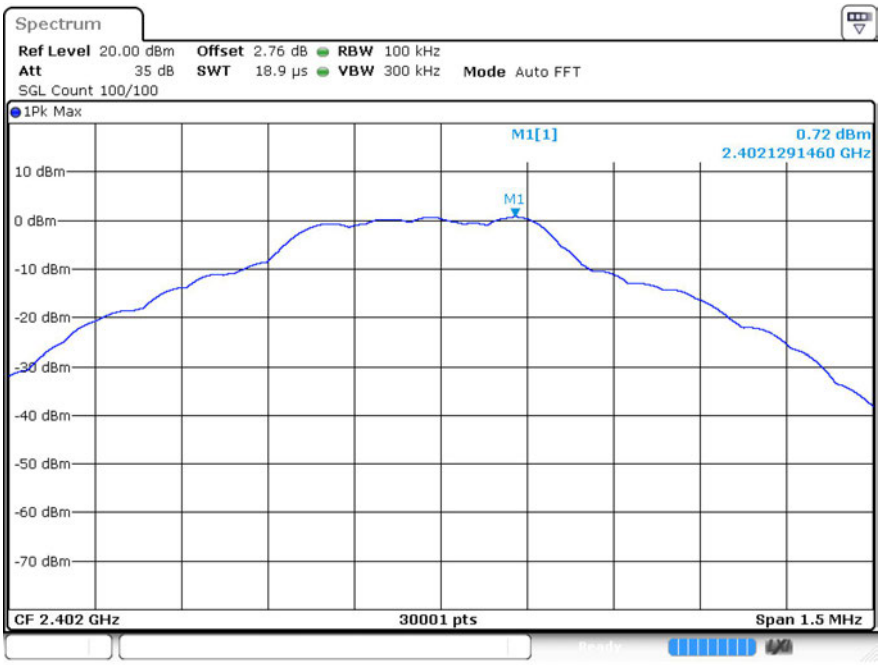
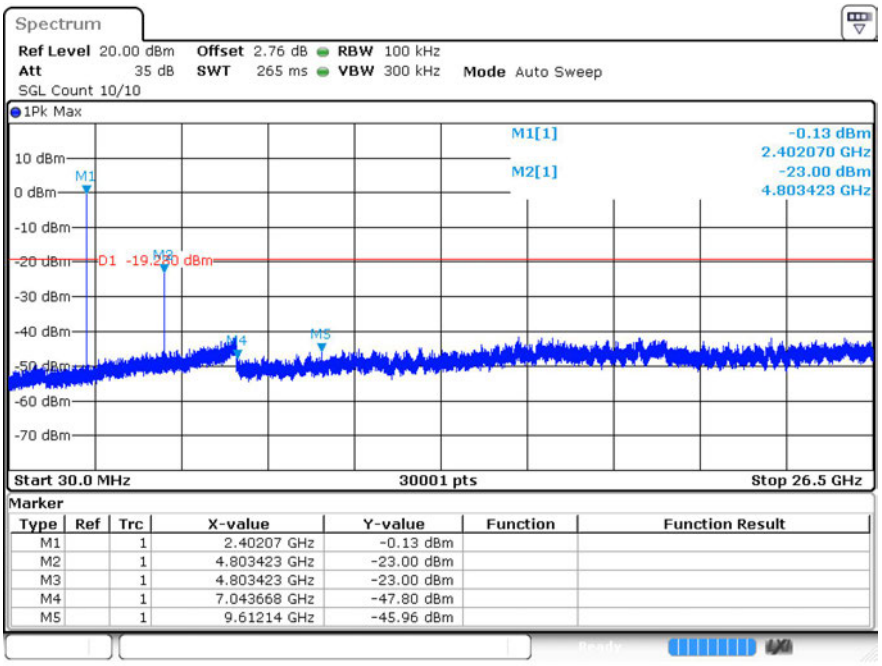
8DPSK _3DH5/MCH	 

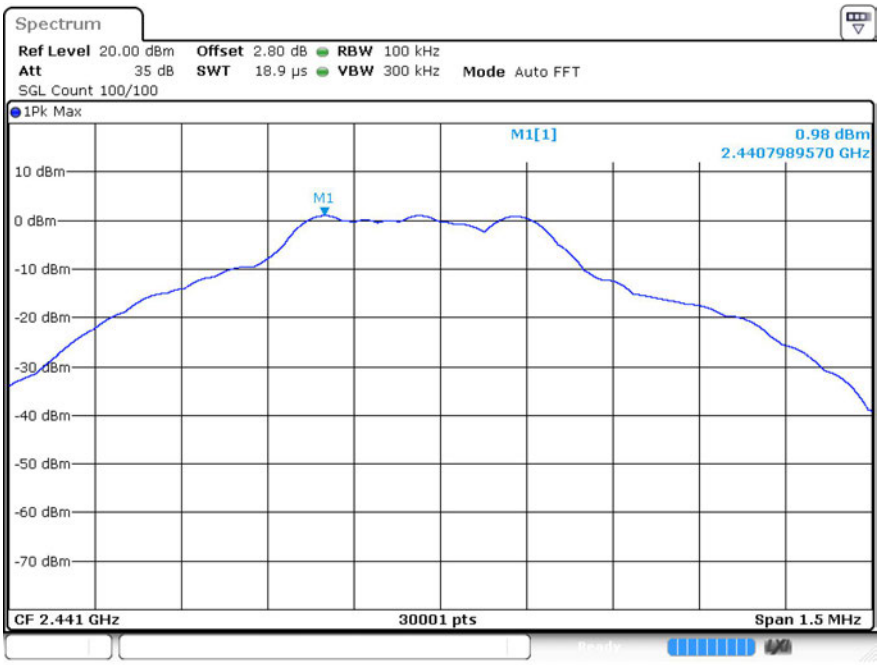
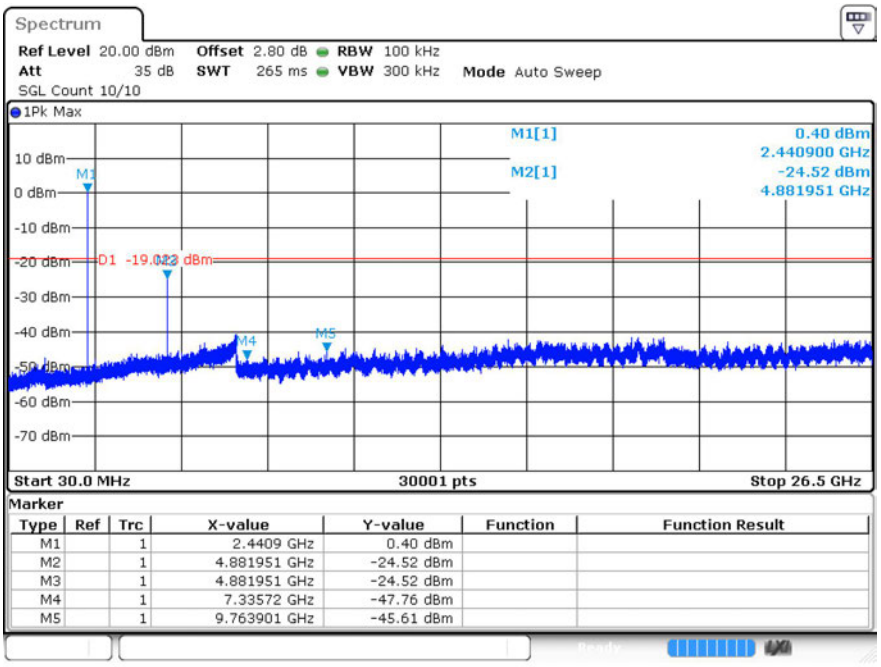
7 RF Conducted Spurious Emissions

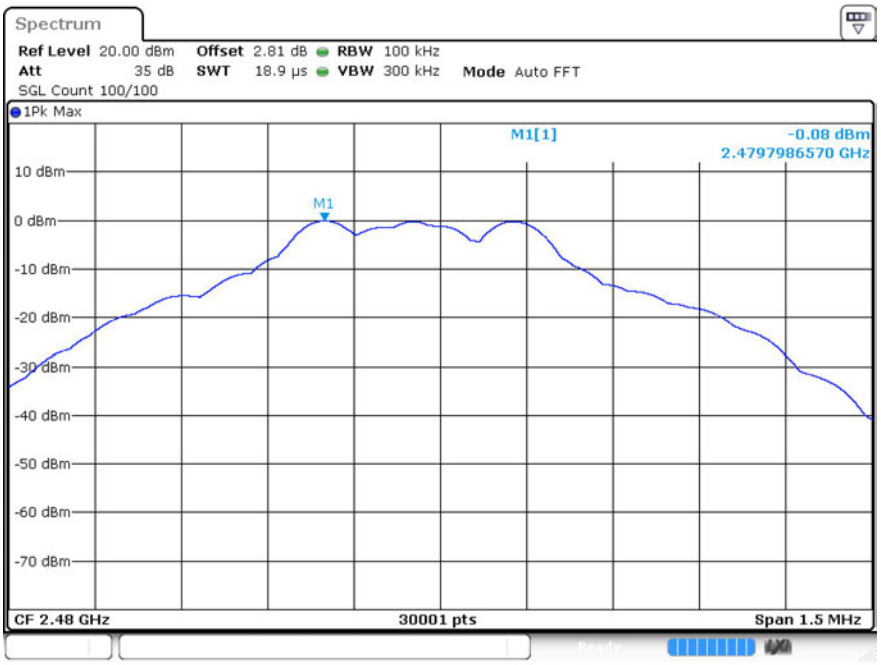
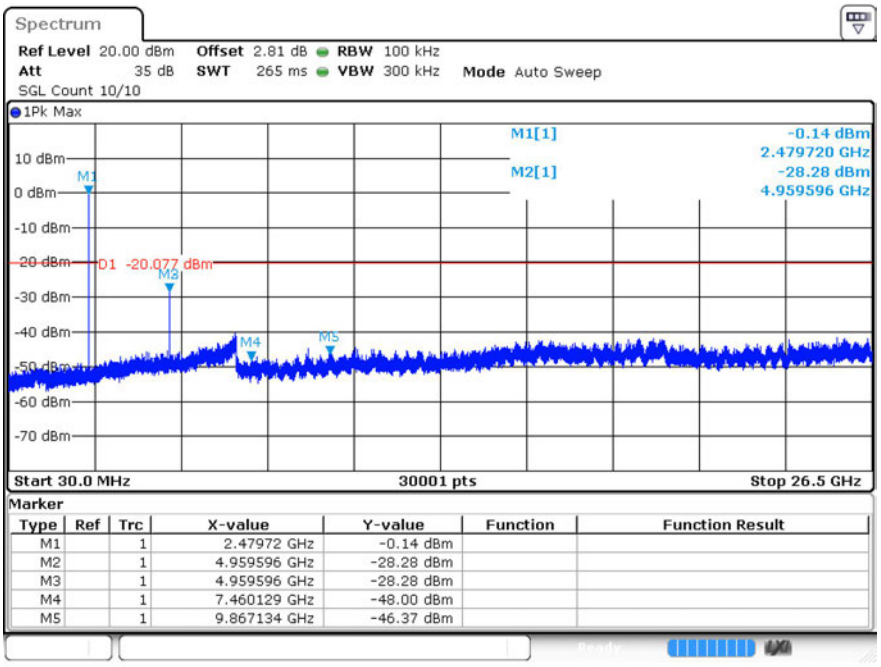
7.1 Test Result

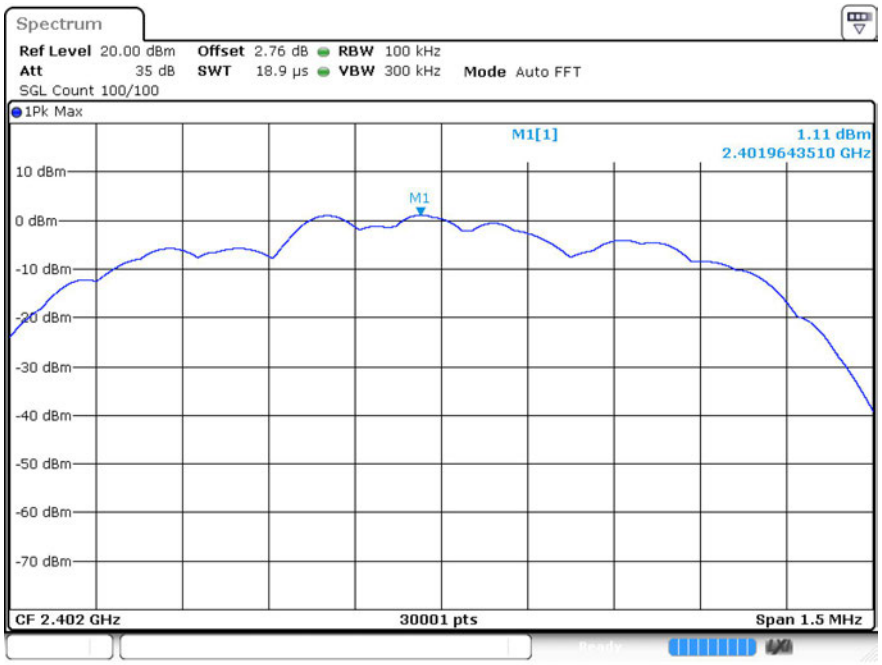
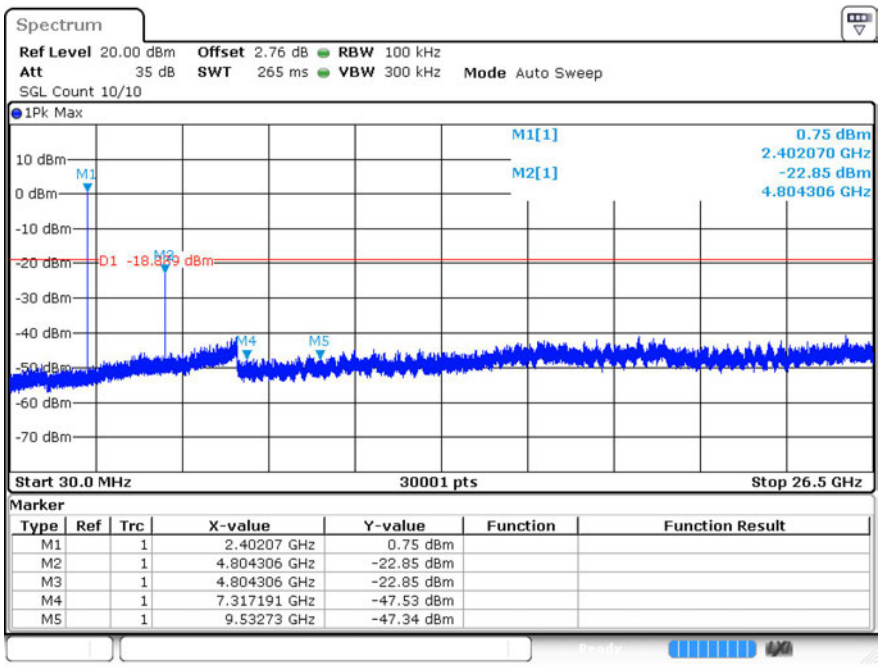
Mode	Channel	Max. Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	-23.72	-20	Pass
	MCH	-25.5	-20	Pass
	HCH	-28.19	-20	Pass
π/4DQPSK	LCH	-23.96	-20	Pass
	MCH	-24.93	-20	Pass
	HCH	-25.39	-20	Pass
8DPSK	LCH	-24.48	-20	Pass
	MCH	-29.68	-20	Pass
	HCH	-29.07	-20	Pass

7.2 Test Graphs

GFSK_LCH_Graphs	
Pref	
Puw	

GFSK_MCH_Graphs	
Pref	
Puw	

GFSK_HCH_Graphs	
Pref	
Puw	

π/4DQPSK_LCH_Graphs	
Pref	
Puw	

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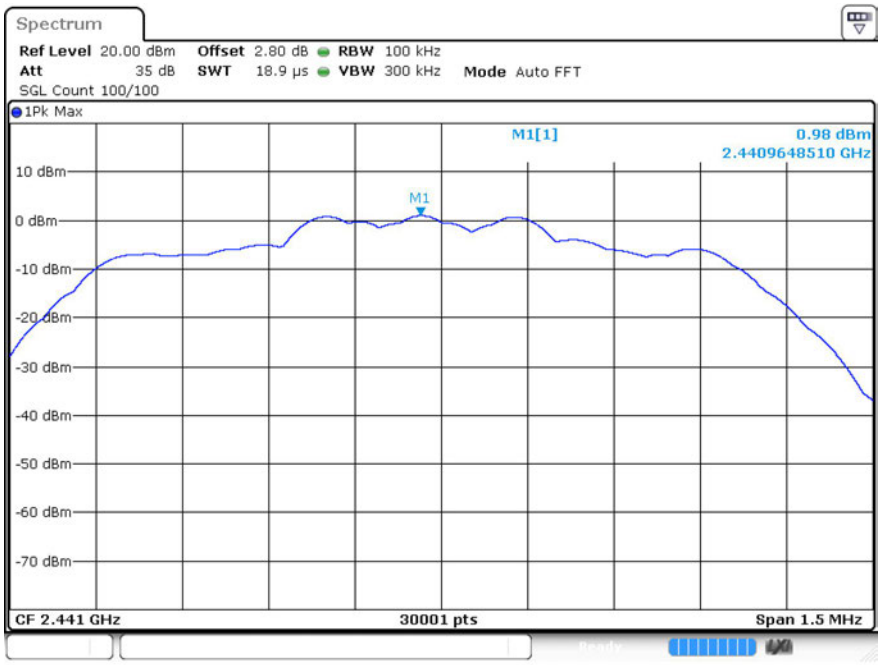
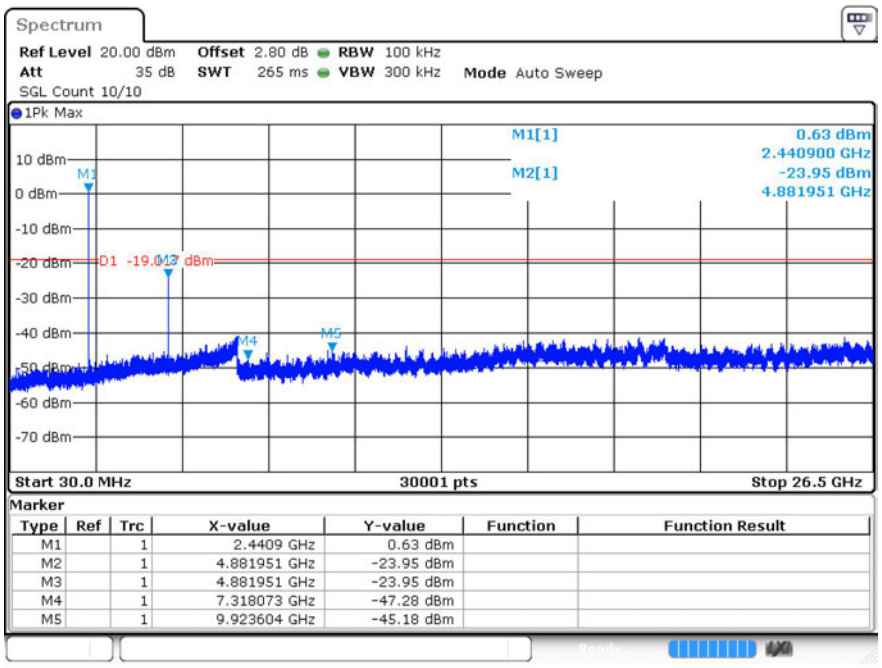
Pref	
Puw	

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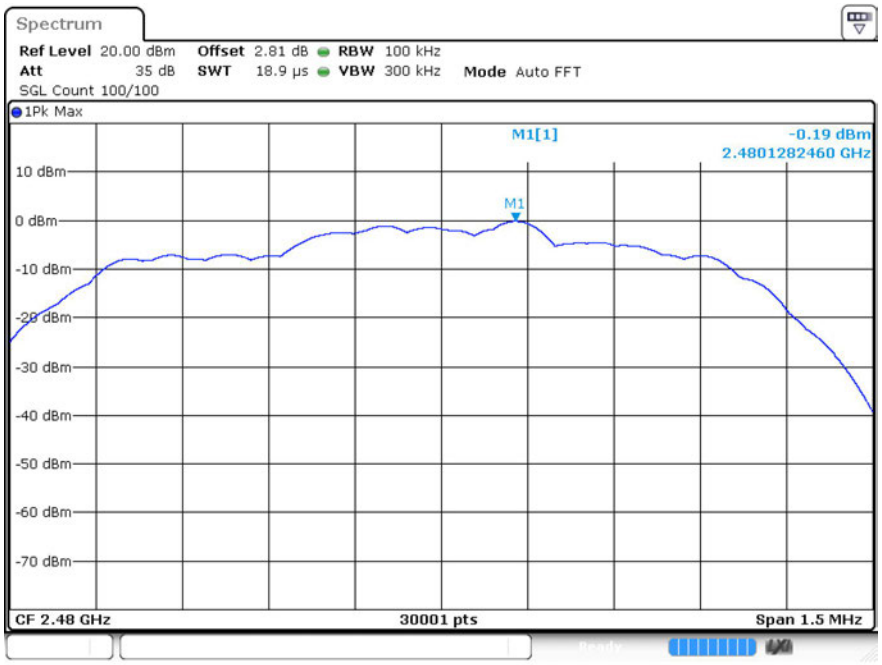
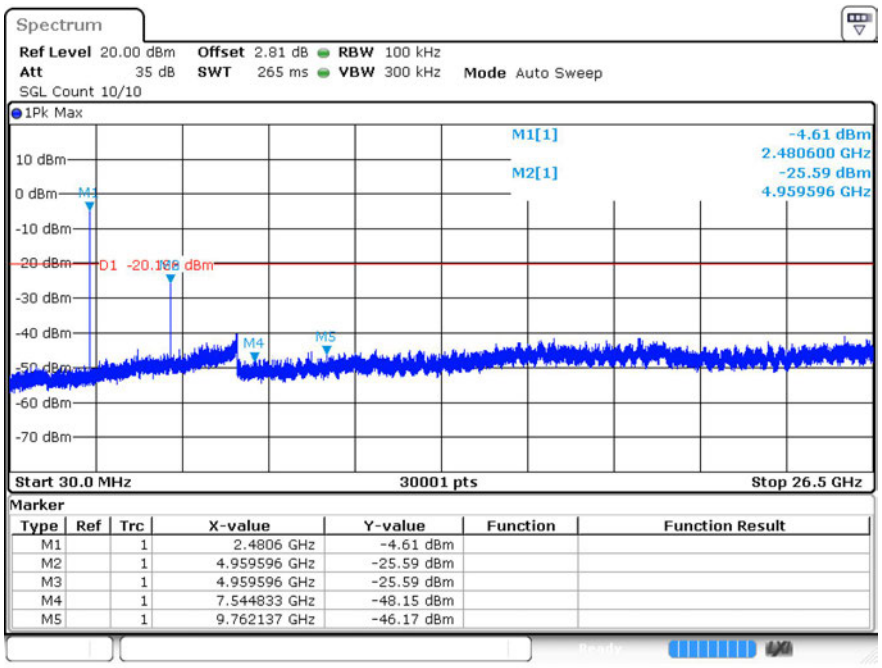
Pref	
Puw	

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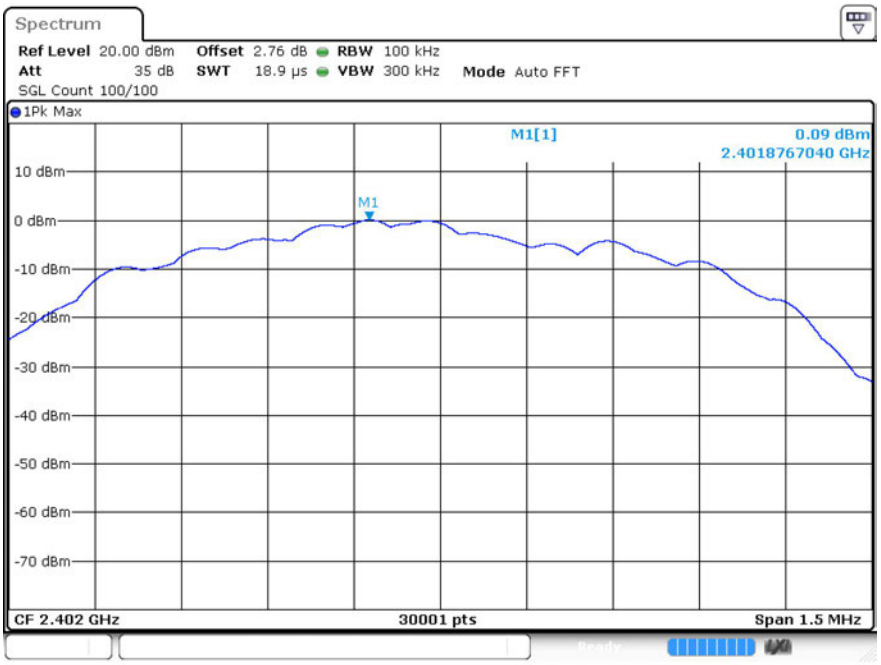
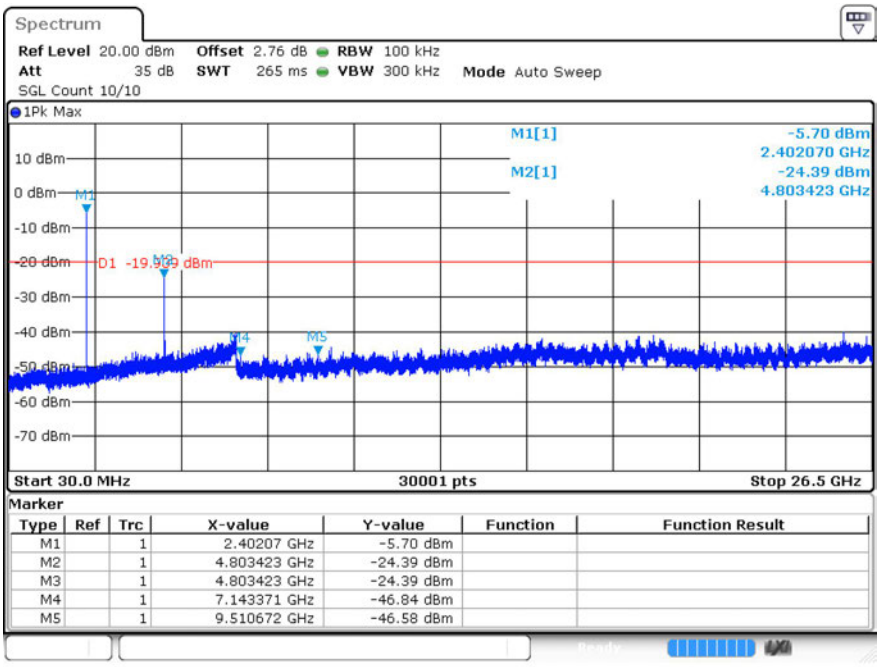
Pref	
Puw	

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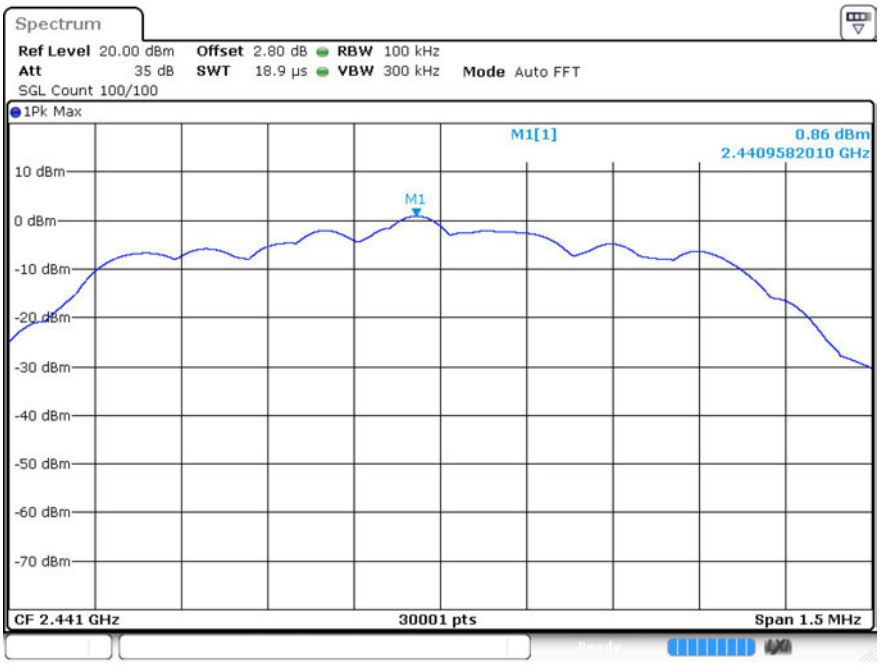
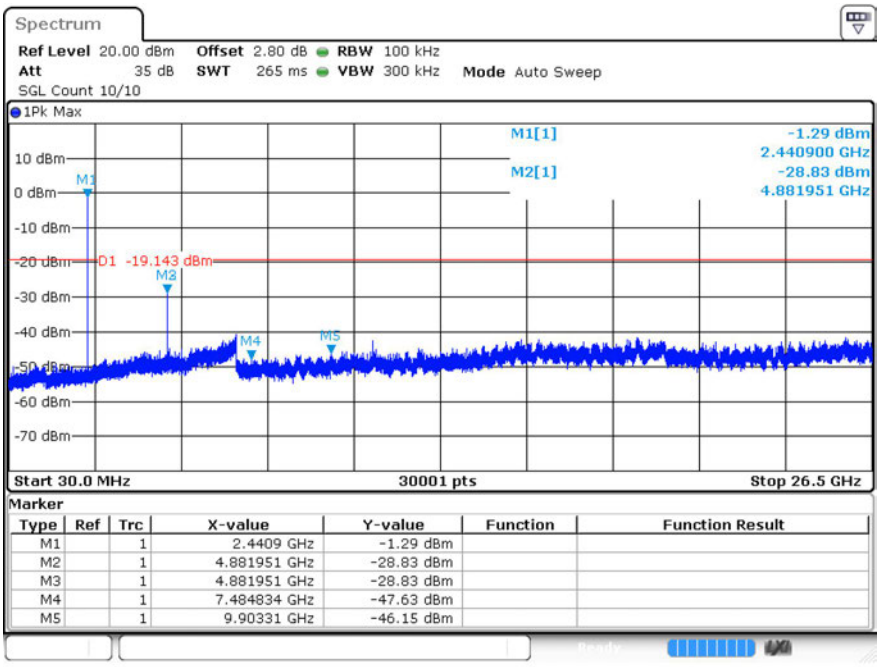
Pref	
Puw	

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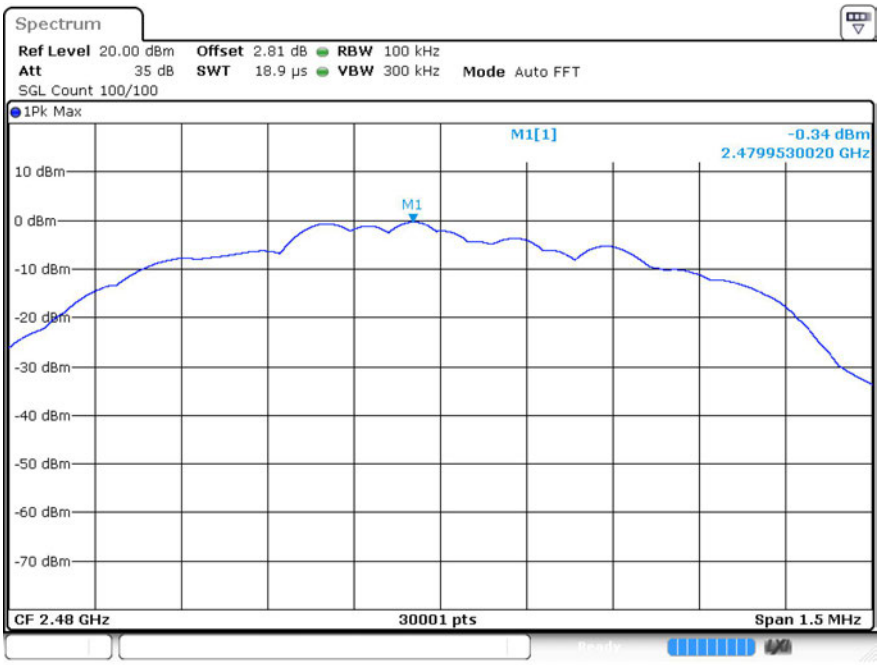
Pref	
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