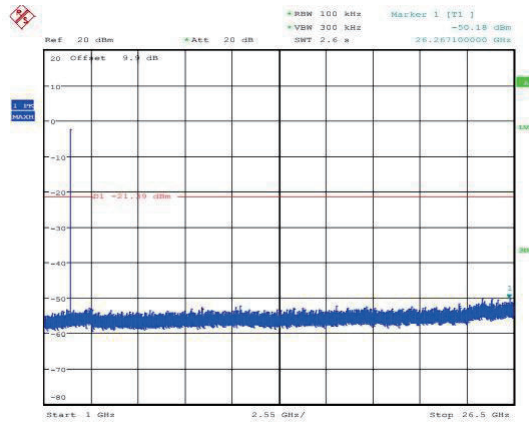
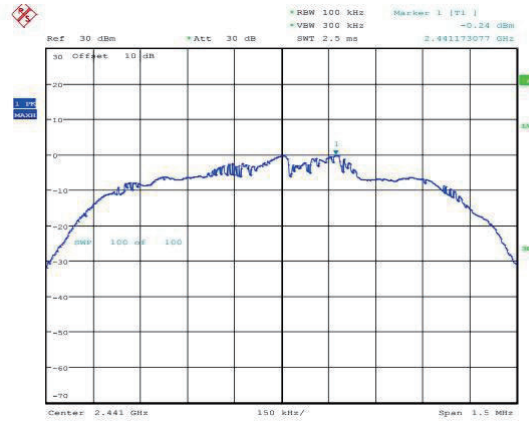




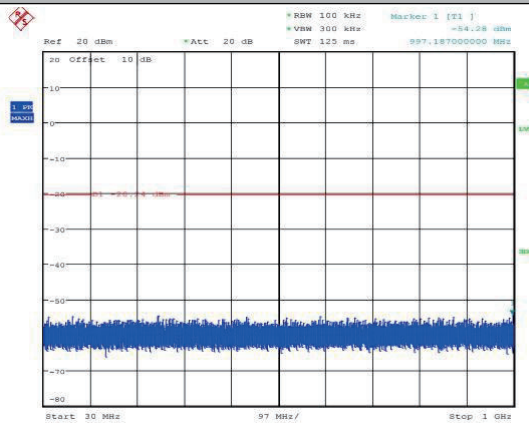
8DPSK_2402_1000~26500



8DPSK_2441

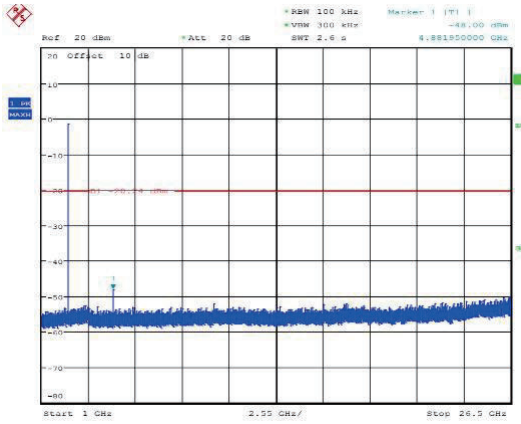


8DPSK_2441_30~1000

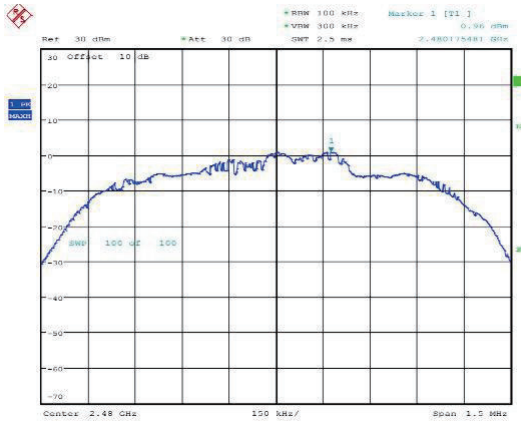




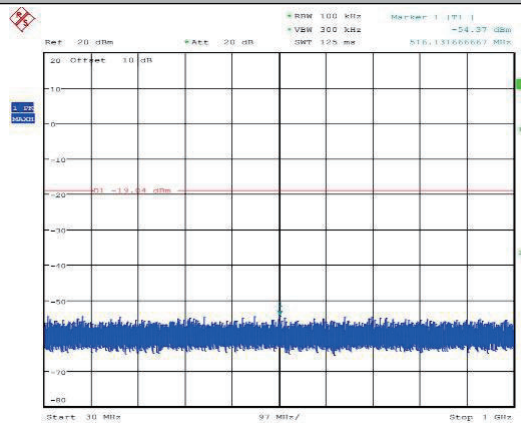
8DPSK_2441_1000~26500



8DPSK_2480

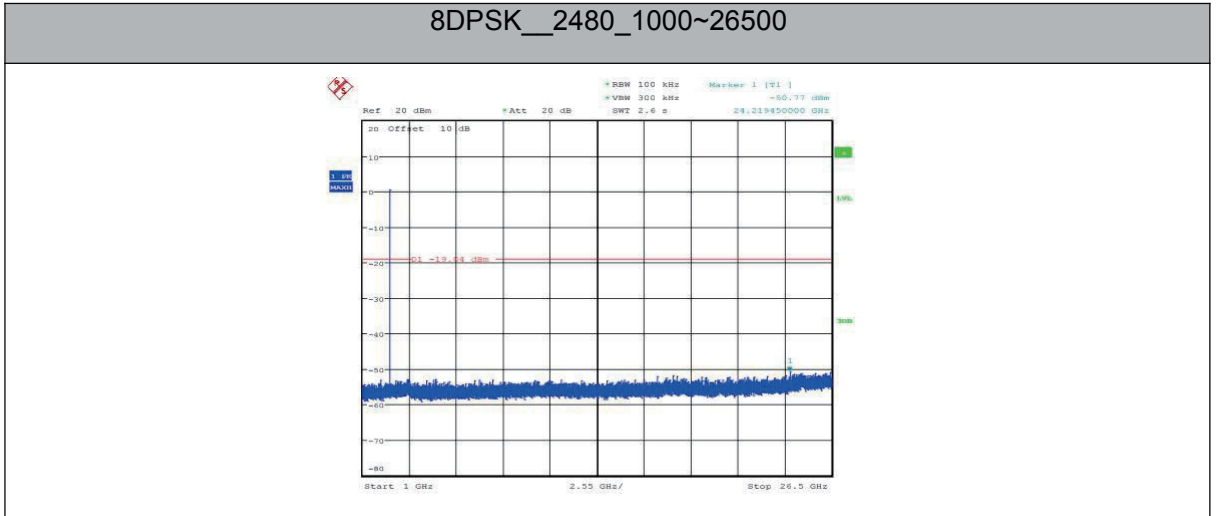


8DPSK_2480_30~1000





8DPSK_2480_1000~26500





9 20 dB Bandwidth & 99% Bandwidth Measurement

Test Requirement : FCC CFR47 Part 15 Section 15.247; RSS-247 Issue 2

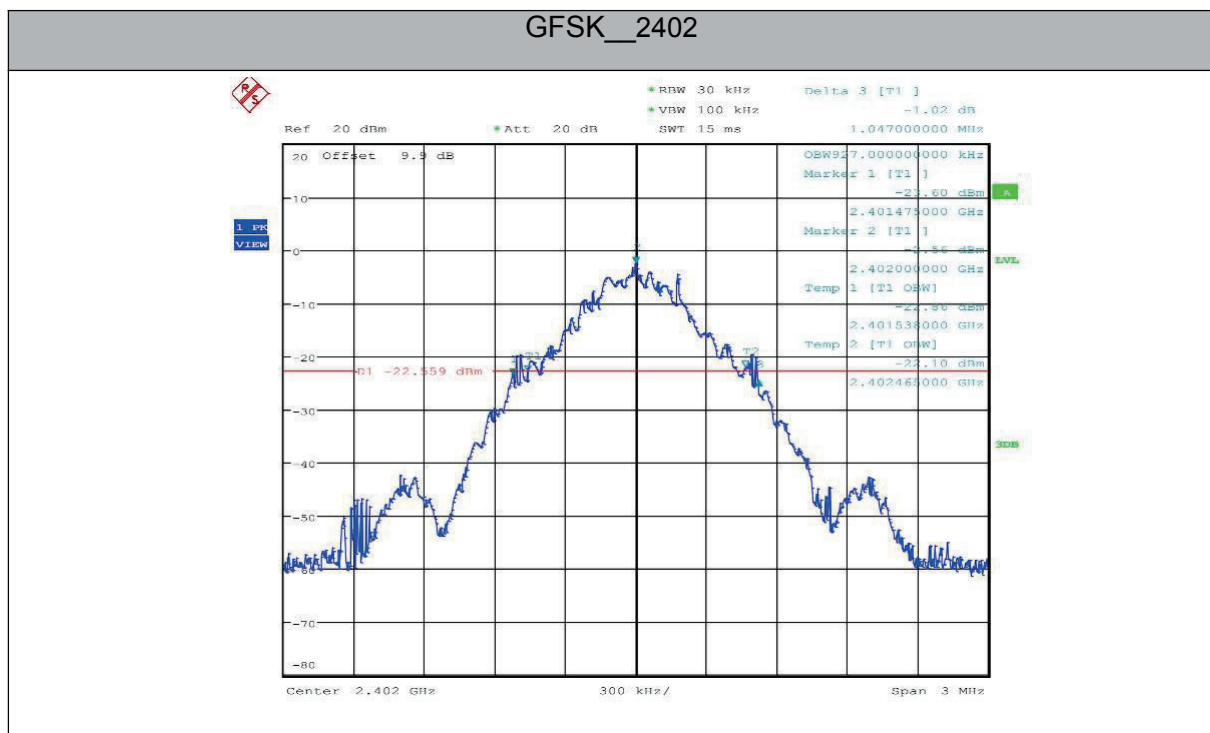
Test Method : ANSI C63.10:2013

9.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW =100kHz, VBW = 100kHz

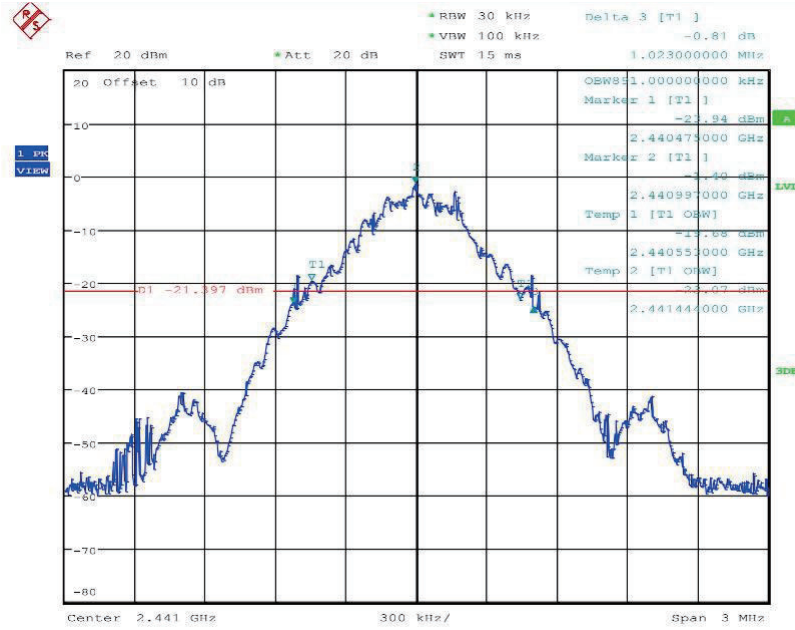
9.2 Test Result

Mode	Freq. (MHz)	20 dB bandwidth Result (MHz)	99% bandwidth Result (MHz)	Conclusion
GFSK	2402	1.047	0.927	PASS
	2441	1.023	0.891	PASS
	2480	1.050	0.930	PASS
8DPSK	2402	1.203	1.146	PASS
	2441	1.239	1.152	PASS
	2480	1.206	1.140	PASS

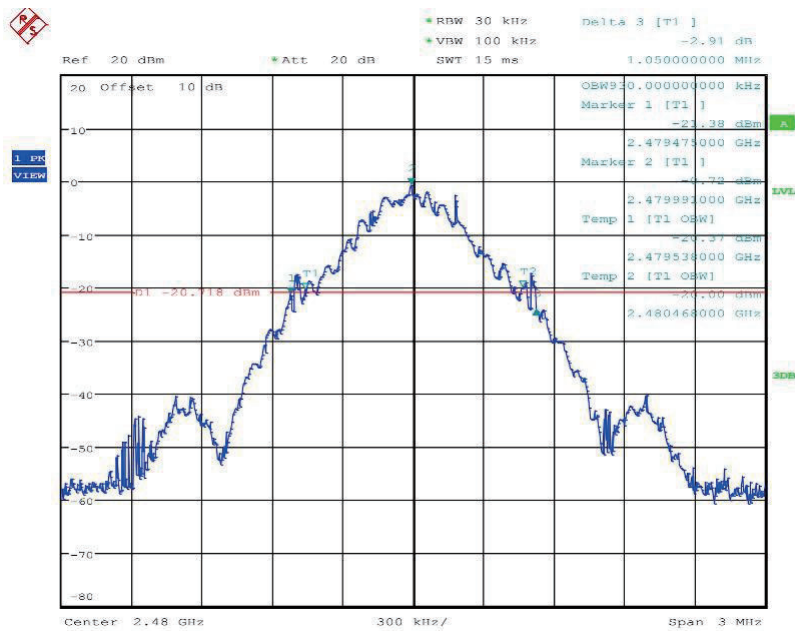




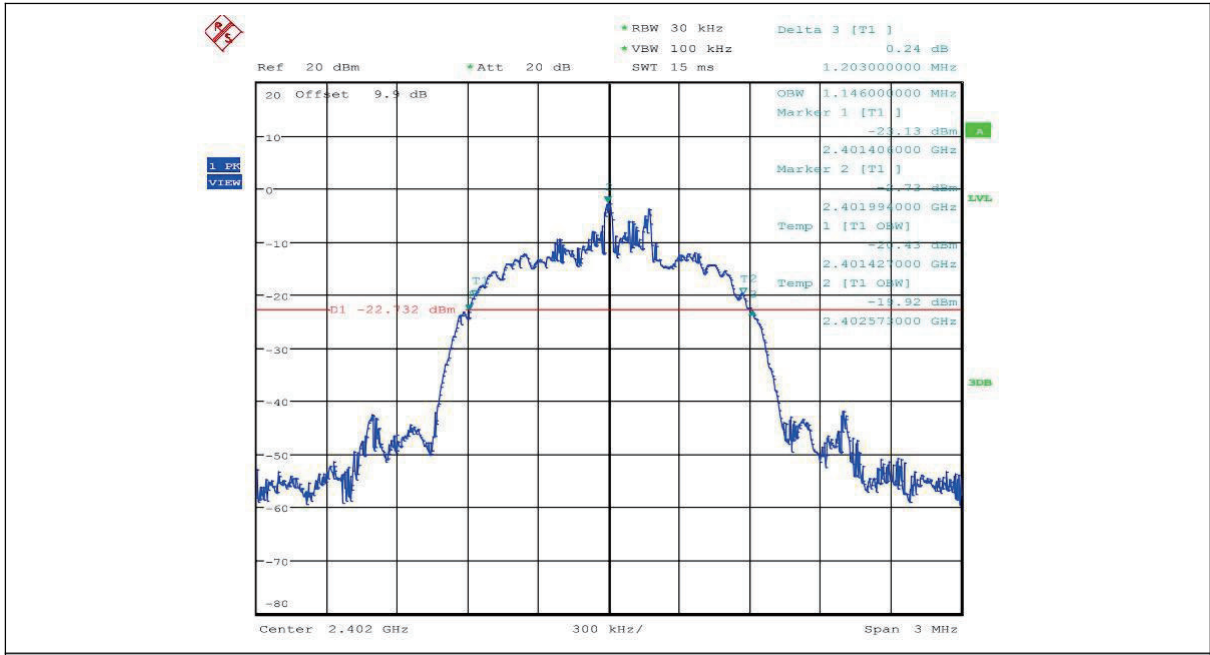
GFSK_2441



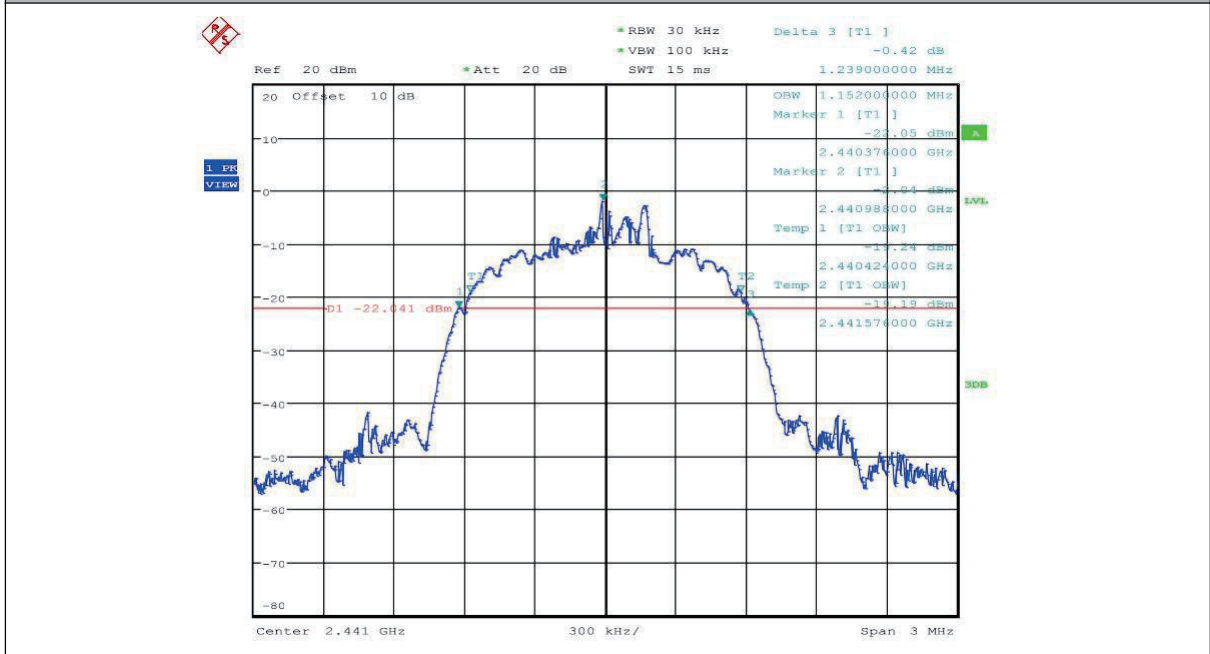
GFSK_2480



8DPSK_2402

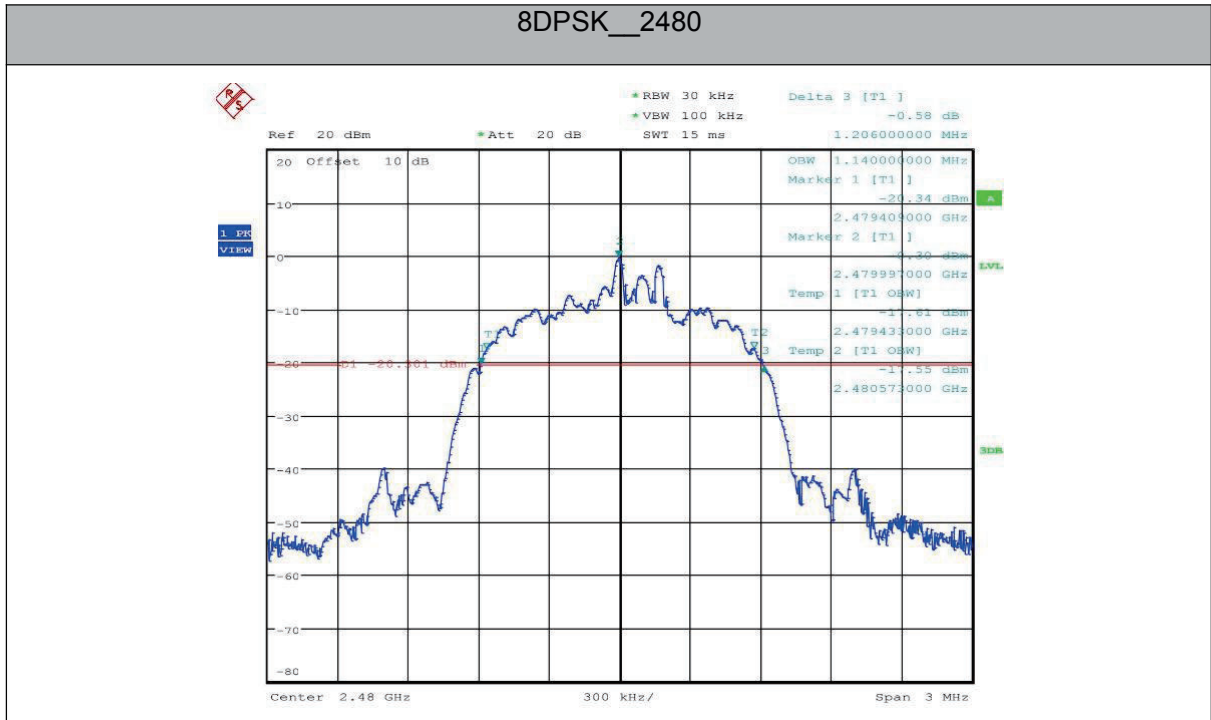


8DPSK_2441





8DPSK_2480





10 Maximum Peak Output Power

Test Requirement : FCC CFR47 Part 15 Section 15.247; RSS-247 Issue 2

Test Method : ANSI C63.10:2013

Test Limit : Regulation 15.247 (b)(1), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt (30dBm). For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

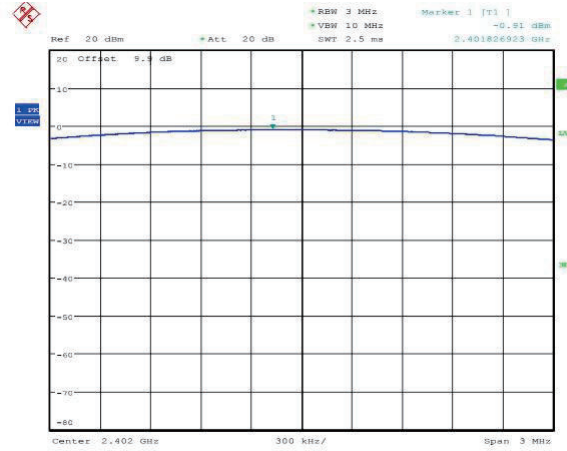
Refer to the result “Number of Hopping Frequency” of this document. The 0.125watts (20.97 dBm) limit applies.

10.1 Test Procedure

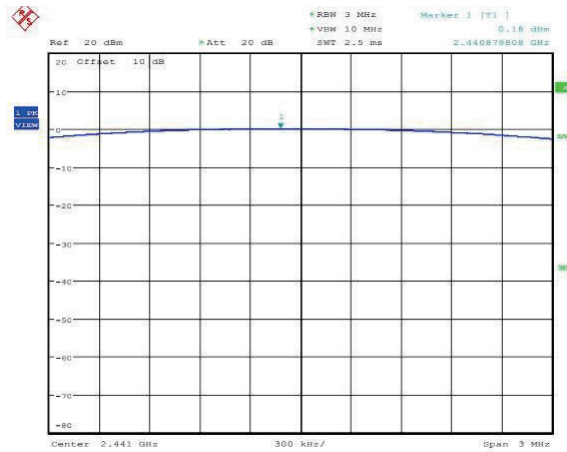
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyser: RBW = 3.0 MHz. VBW =10 MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

10.2 Test Result

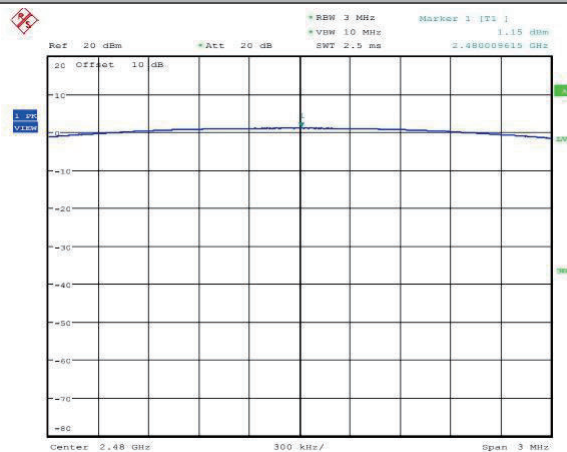
Mode	Freq. (MHz)	Result (dBm)	Limit (dBm)	Conclusion
GFSK	2402	-0.91	21	PASS
	2441	0.18	21	PASS
	2480	1.15	21	PASS
$\pi/4$ -DQPSK	2402	-0.98	21	PASS
	2441	0.13	21	PASS
	2480	1.20	21	PASS
8DPSK	2402	-0.92	21	PASS
	2441	0.13	21	PASS
	2480	1.28	21	PASS



GFSK_2441

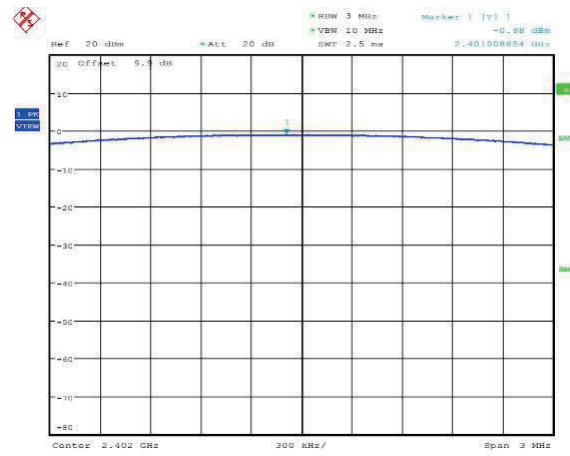


GFSK_2480

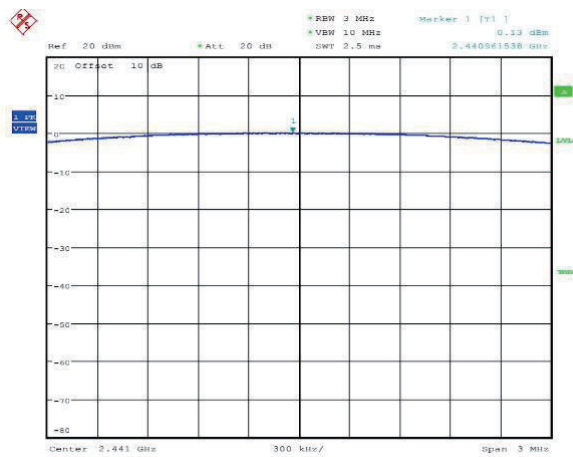




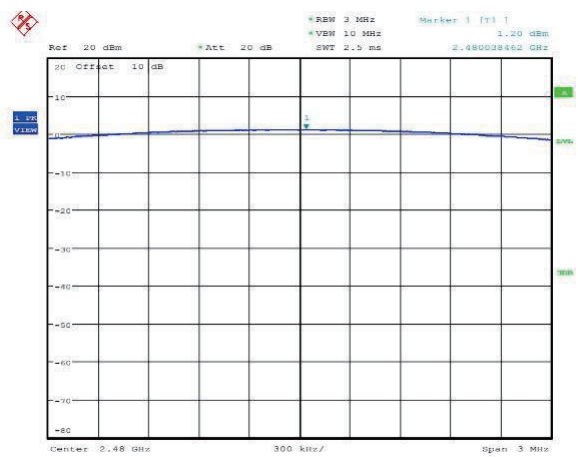
$\pi/4$ -DQPSK_2402



$\pi/4$ -DQPSK_2441

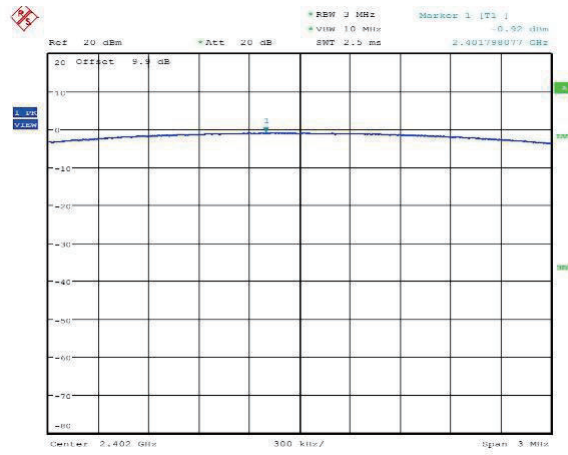


$\pi/4$ -DQPSK_2480

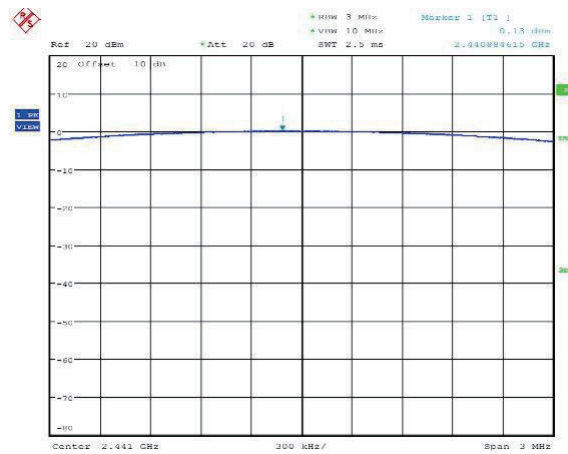




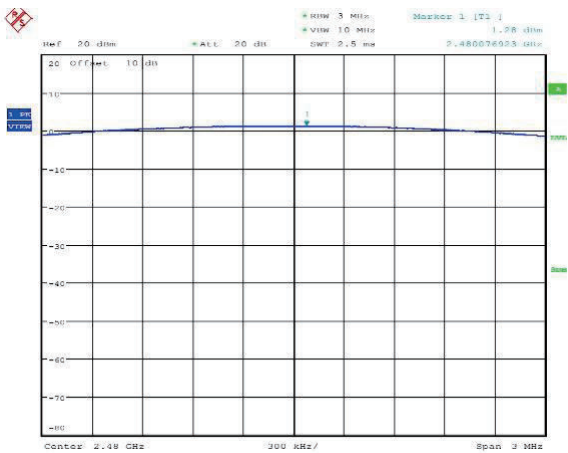
8DPSK_2402



8DPSK_2441



8DPSK_2480





11 Hopping Channel Separation

Test Requirement	: FCC CFR47 Part 15 Section 15.247; RSS-247 Issue 2
Test Method	: ANSI C63.10:2013
Test Limit	: Regulation 15.247(a)(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 0.125W.
Test Mode	: Hopping

11.1 Test Procedure

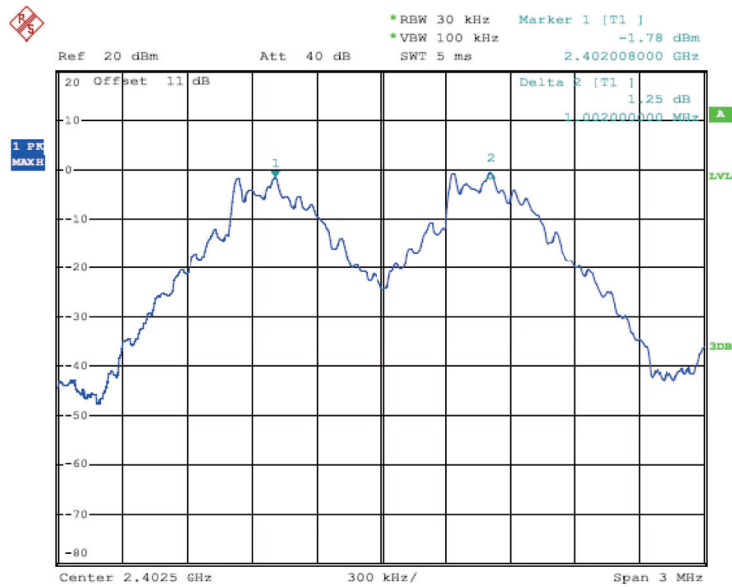
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 30KHz. VBW = 100KHz, Span = 3.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

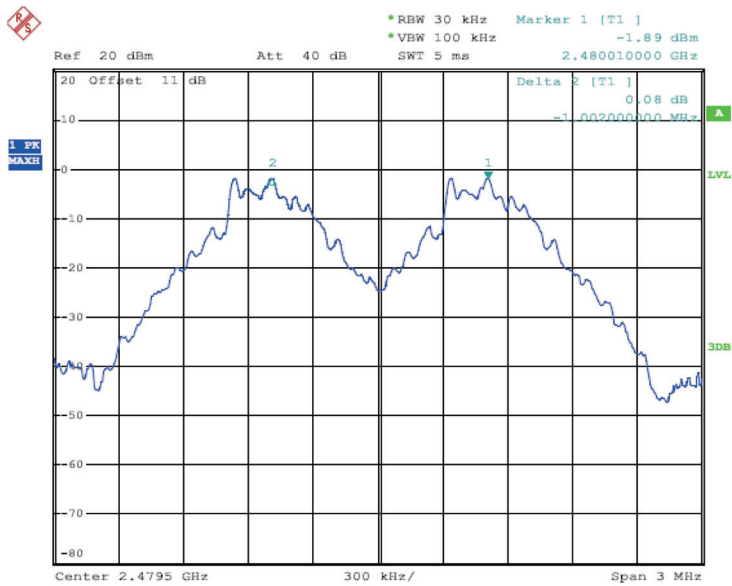
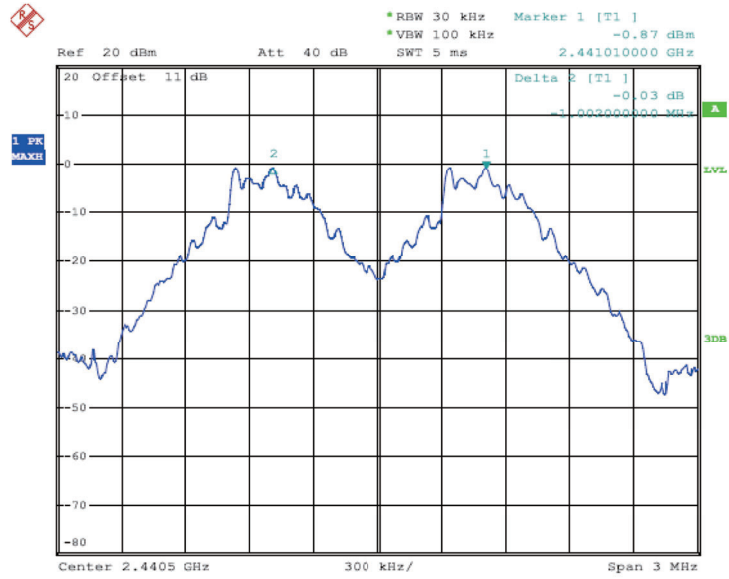


11.2 Test Result

Test Mode:	CH00 / CH39 / CH78 (GFSK(1Mbps) Mode)
------------	---------------------------------------

Channel number	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
00	2402	1002	>732
38	2440	1002	>736
78	2480	1002	>736

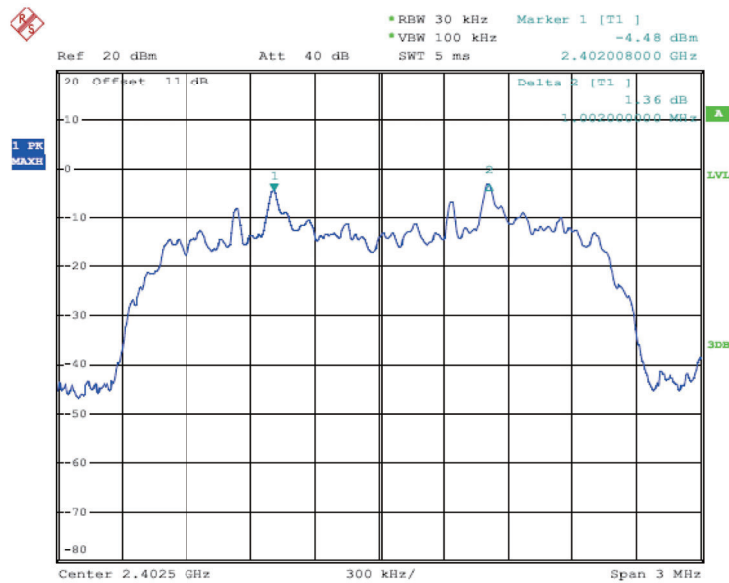


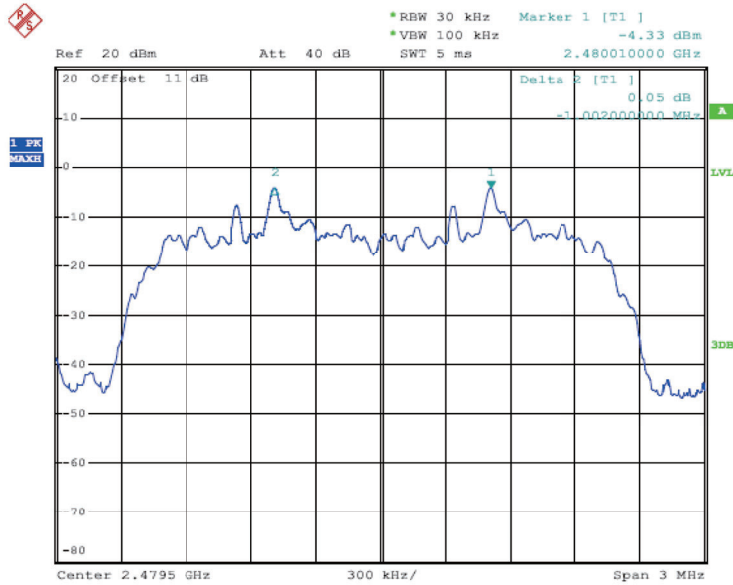
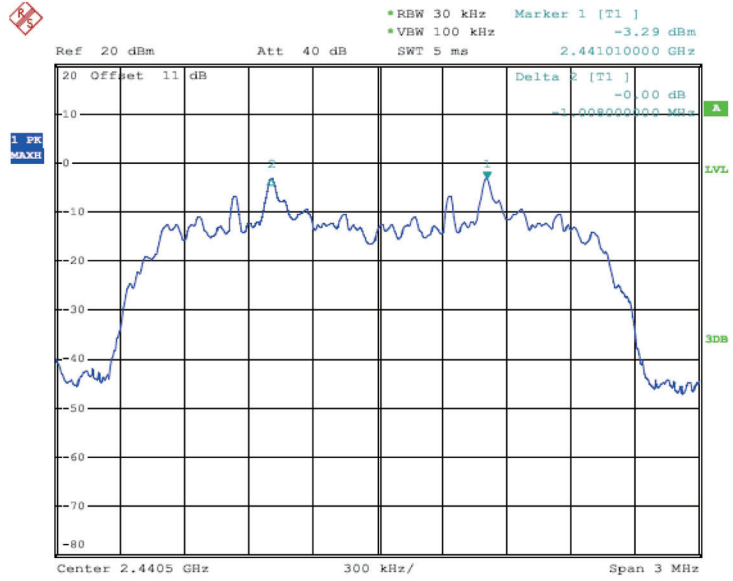




Test Mode:	CH00 / CH39 / CH78 ($\pi/4$ -DQPSK(2Mbps) Mode)
------------	--

Channel number	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
00	2402	1002	>912
39	2441	1008	>904
78	2480	1002	>908

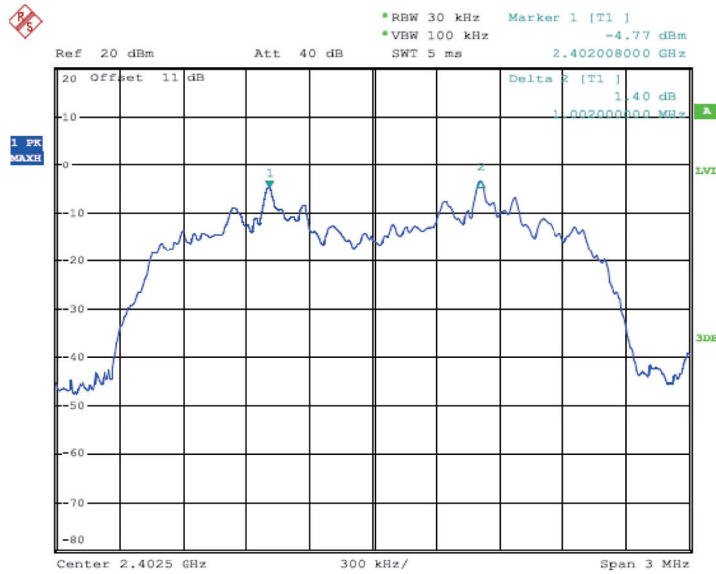


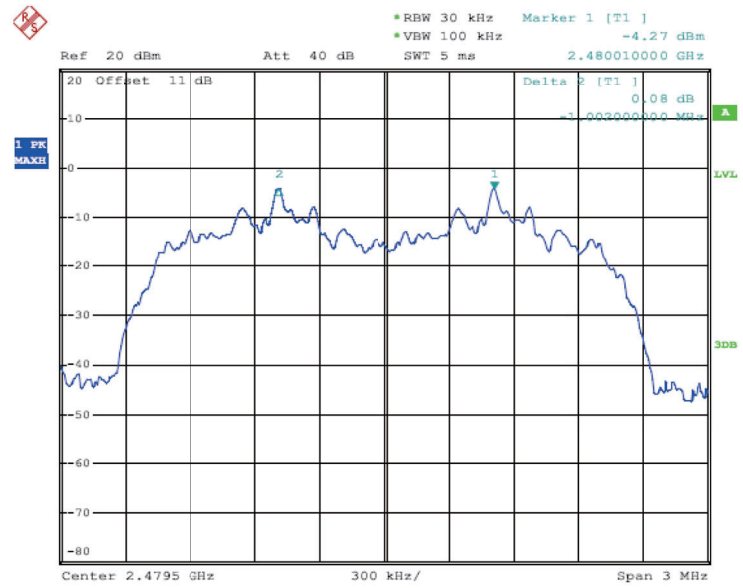
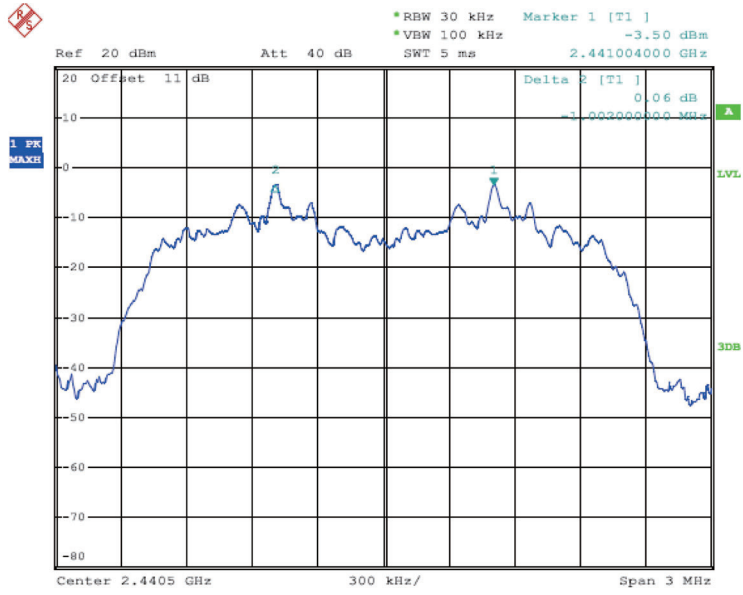




Test Mode:	CH00 / CH39 / CH78 (8DPSK(3Mbps)Mode)
------------	---------------------------------------

Channel number	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
00	2402	1002	>900
39	2441	1002	>896
78	2480	1002	>900







12 Number of Hopping Frequency

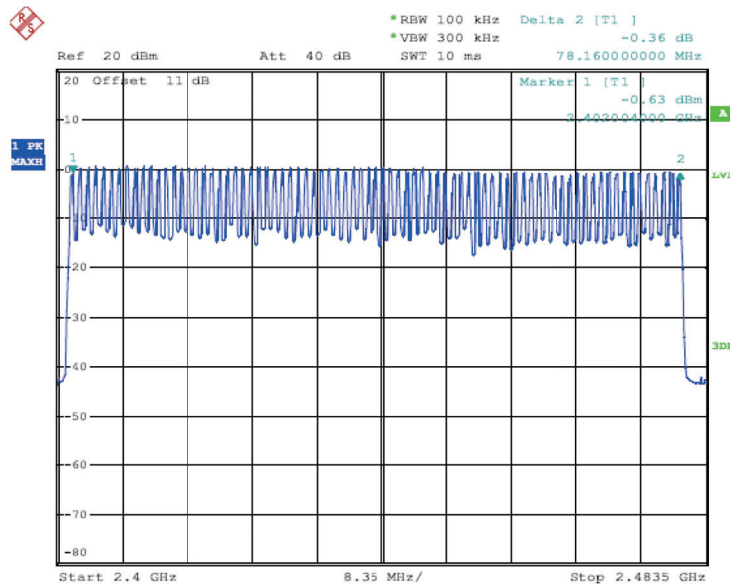
Test Requirement : FCC CFR47 Part 15 Section 15.247; RSS-247 Issue 2
 Test Method : ANSI C63.10:2013
 Test Limit : Regulation 15.247 (a)(1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.
 Test Mode : Hopping(GFSK)

12.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100KHz. VBW = 300KHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.
4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.483GHz. Sweep=auto;

12.2 Test Result

Channel Number	Limit
79	≥15





13 Dwell Time

- Test Requirement : FCC CFR47 Part 15 Section 15.247; RSS-247 Issue 2
- Test Method : ANSI C63.10:2013
- Test Limit : Regulation 15.247(a)(1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.
- Test Mode : The GFSK & 8DPSK was recorded.

13.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set spectrum analyzer span = 0. Centred on a hopping channel;
3. Set RBW = 1MHz and VBW = 3MHz.Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3 and DH1 packet transmitting.Set RBW = 0.5MHz and VBW = 3MHz.Sweep = 31.6s
4. Set RBW = 0.5MHz and VBW = 3MHz,the test period: T= 0.4 Second/Channel x 79 Channel = 31.6s;Measure the hopping number and on time of each pulse with spectrum analyzer in zero span set, and calculate dwell time with formula Dwell time = total hops *pulse's on time.

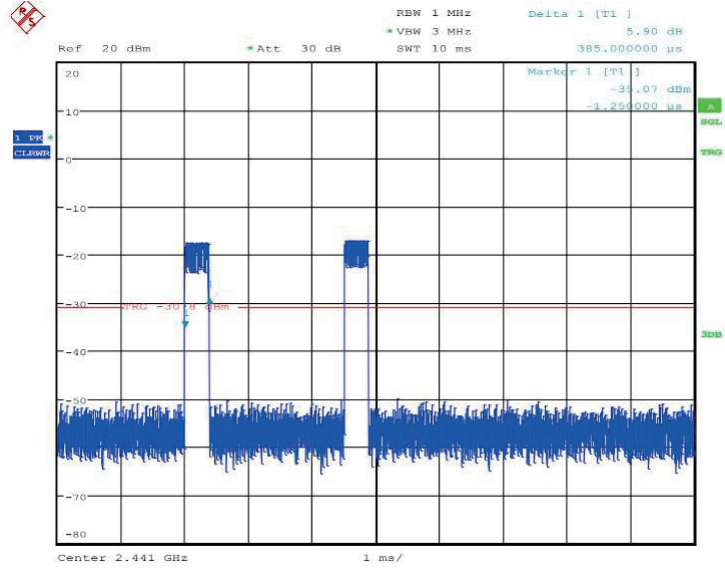
13.2 Test Result

Mode	Dwell time (s)	Pulse' s on time (ms)	Total hops	Limit	Conclusion
DH1	0.058	0.39	151	<400ms	PASS
DH3	0.182	1.64	111	<400ms	PASS
DH5	0.274	2.89	95	<400ms	PASS
3DH1	0.059	0.40	150	<400ms	PASS
3DH3	0.181	1.65	110	<400ms	PASS
3DH5	0.203	2.90	70	<400ms	PASS

Note: Dwell time = total hops *pulse' s on time.



GFSK_HOP_DH1



GFSK_HOP_DH1

