



TEST REPORT

APPLICANT : Nubia Technology Co.,Ltd.
PRODUCT NAME : Nubia TWS Bluetooth Earbuds
MODEL NAME : BH4006
BRAND NAME : NUBIA
FCC ID : 2AHJO-BH4006
STANDARD(S) : 47 CFR Part 15 Subpart C
RECEIPT DATE : 2021-06-18
TEST DATE : 2021-06-25 to 2021-07-16
ISSUE DATE : 2021-07-23

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Change History		
Version	Date	Reason for change
1.0	2021-07-23	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Nubia Technology Co.,Ltd.
Applicant Address:	Room 1801, Building 2, Chongwen Park, Nanshan Zhiyuan, No.3370, Liuxian Rd, Nanshan District, Shenzhen City, Guangdong Province, P. R. China
Manufacturer:	Nubia Technology Co.,Ltd.
Manufacturer Address:	Room 1801, Building 2, Chongwen Park, Nanshan Zhiyuan, No.3370, Liuxian Rd, Nanshan District, Shenzhen City, Guangdong Province, P. R. China

1.2. Equipment Under Test (EUT) Description

Product Name:	Nubia TWS Bluetooth Earbuds	
Sample No.:	11#	
Hardware Version:	V5.1	
Software Version:	TT07B-0706	
Equipment Type:	Bluetooth classic	
Bluetooth Version:	5.1	
Modulation Type:	FHSS (GFSK(1Mbps), $\pi/4$ -DQPSK(EDR 2Mbps), 8-DPSK(EDR 3Mbps))	
Operating Frequency Range:	2402MHz–2480MHz	
Antenna Type:	FPC Antenna	
Antenna Gain:	Left: 1.80dBi; Right: 1.80dBi	
Accessory Information:	Battery (Earphone)	
	Brand Name:	N/A
	Model No.:	XD451011
	Serial No.:	N/A
	Capacity:	35mAh
	Rated Voltage:	3.7V
	Charge Limit:	4.2V
	Manufacturer:	DONGGUAN XINDIAN POWER SOURCE CO.,LTD



Accessory Information:	Battery (Charging Case)	
	Brand Name:	N/A
	Model No.:	902025
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	400mAh
	Rated Voltage:	3.7V
	Charge Limit:	4.2 V
	Manufacturer:	DONGGUAN XINDIAN POWER SOURCE CO.,LTD

Note 1: We use the dedicated software to control the EUT continuous transmission.

Note 2: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.



1.3. The Channel Number and Frequency

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

Note 1: The black bold channels were selected for test.



1.4. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Test Date	Test Engineer	Result	Method Determination /Remark
1	15.203	Antenna Requirement	N/A	N/A	PASS	No deviation
2	15.247(a) 15.247(h)	Hopping Mechanism	N/A	N/A	PASS	No deviation
3	15.247(a)	Number of Hopping Frequency	Jun 25, 2021	Meng Shurui	PASS	No deviation
4	ANSI C63.10	Duty Cycle	Jun 25, 2021	Meng Shurui	PASS	No deviation
5	15.247(b)	Maximum Peak Conducted Output Power	Jun 25, 2021	Meng Shurui	PASS	No deviation
6	15.247(b)	Maximum Average Conducted Output Power	Jun 25, 2021	Meng Shurui	PASS	No deviation
7	15.247(a)	20dB Bandwidth	Jun 25, 2021	Meng Shurui	PASS	No deviation
8	15.247(a)	Carrier Frequency Separation	Jun 25, 2021	Meng Shurui	PASS	No deviation
9	15.247(a)	Time of Occupancy (Dwell time)	Jun 25, 2021	Meng Shurui	PASS	No deviation
10	15.247(d)	Conducted Spurious Emission	Jun 25, 2021	Meng Shurui	PASS	No deviation
11	15.207	Conducted Emission	N/A	N/A	N/A ^{Note1}	N/A
12	15.247(d)	Restricted Frequency Bands	Jul 15, 2021	Gao Jianrou	PASS	No deviation
13	15.209, 15.247(d)	Radiated Emission	Jul 15, 2021	Gao Jianrou	PASS	No deviation



Note 1: Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

Note 2: The tests were performed according to the method of measurements prescribed in ANSI C63.10-2013, KDB558074 D01 v05r02 and DA 00-075.

Note 3: The path loss during the RF test is calibrated to correct the results by the offset setting in the test equipments. The Ref offset 1.5dB means the cable loss is 1.5dB.

Note 4: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.

Note 5: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.

1.5. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15-35
Relative Humidity (%):	30-60
Atmospheric Pressure (kPa):	86-106



2.47 CFR Part 15C Requirements

2.1. Antenna Requirement

2.1.1. Applicable Standard

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

2.1.2. Test Result: Compliant

Inside of the EUT has a FPC antenna coupled with the metal shrapnel. Please refer to the EUT internal photos.

2.2. Hopping Mechanism

2.2.1. Requirement

According to FCC §15.247(a)(1), a frequency hopping spread spectrum system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

According to FCC §15.247(h), the incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hop sets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

2.2.2. Result: Compliant

The hopping mechanism of the EUT is in compliance with the document "**Bluetooth core specification v5.1**".

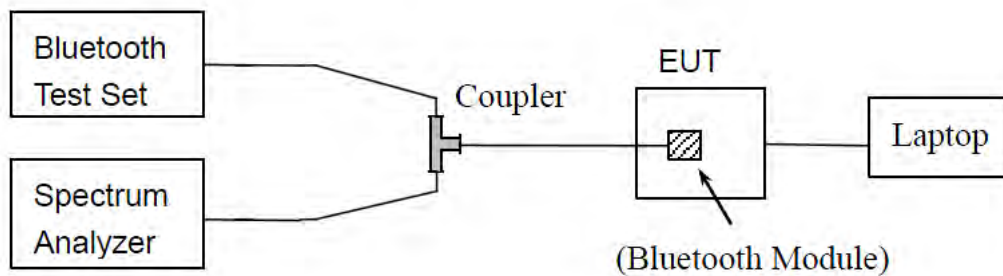
2.3. Number of Hopping Frequency

2.3.1. Requirement

According to FCC §15.247(a)(1)(iii), frequency hopping systems operating in the 2400MHz to 2483.5MHz bands shall use at least 15 hopping frequencies.

2.3.2. Test Description

Test Setup:



The Bluetooth Module of the EUT is coupled to the Spectrum Analyzer (SA) and the Bluetooth Test Set through the coupler; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

2.3.3. Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize



2.3.4. Test Result

Left:

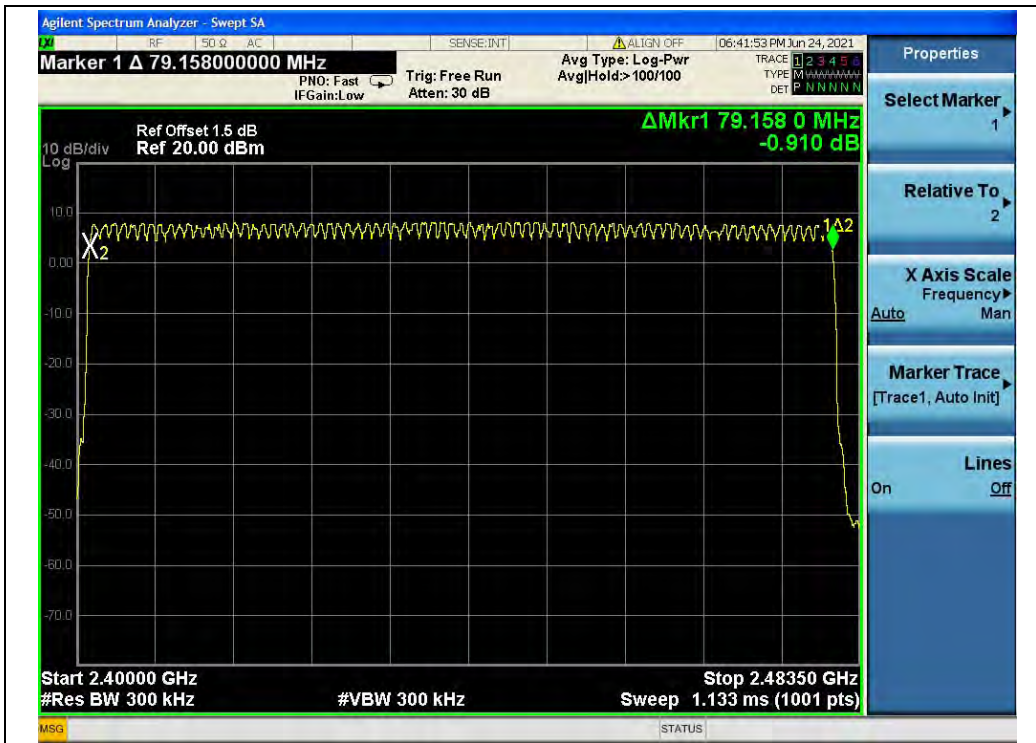
A. Test Verdict:

Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Verdict
GFSK	2400 - 2483.5	79	15	PASS
$\pi/4$ -DQPSK	2400 - 2483.5	79	15	PASS
8-DPSK	2400 - 2483.5	79	15	PASS

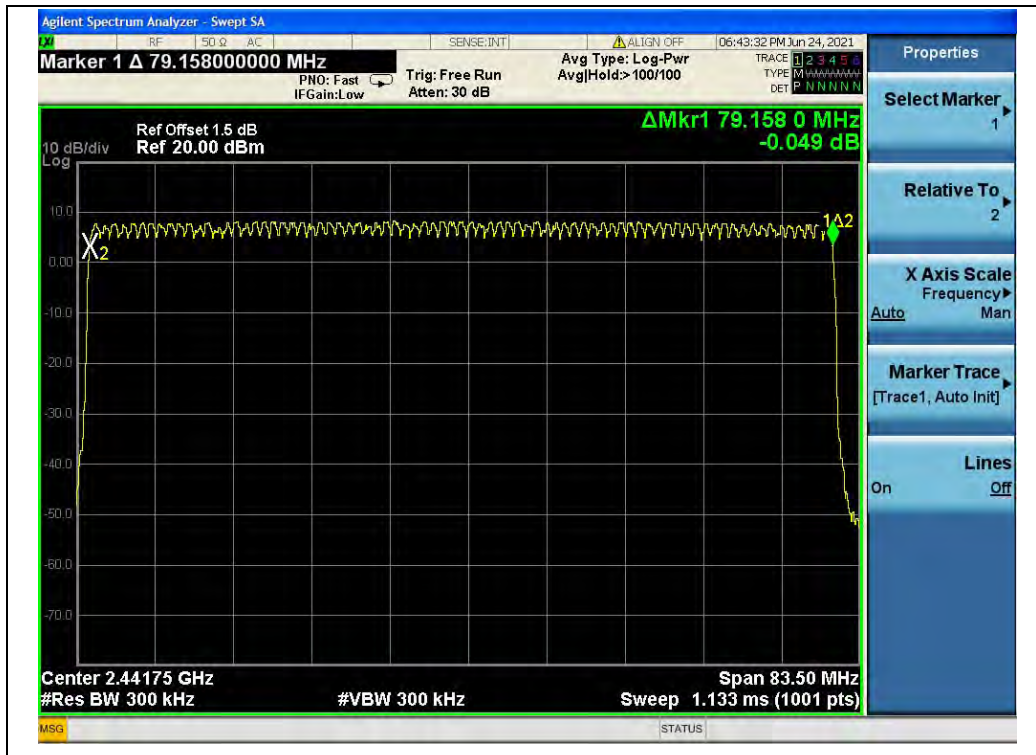
B. Test Plot:



(GFSK)



($\pi/4$ -DQPSK)



(8-DPSK)



Right:

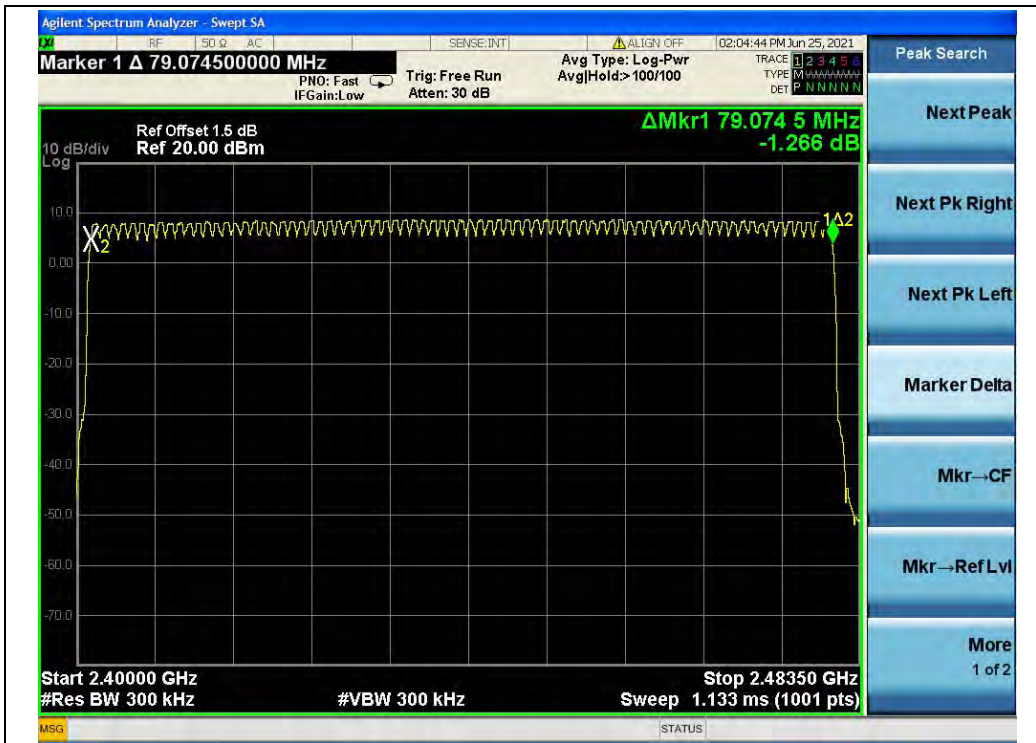
A. Test Verdict:

Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Verdict
GFSK	2400 - 2483.5	79	15	PASS
$\pi/4$ -DQPSK	2400 - 2483.5	79	15	PASS
8-DPSK	2400 - 2483.5	79	15	PASS

B. Test Plot:



(GFSK)



($\pi/4$ -DQPSK)



(8-DPSK)

2.4. Duty Cycle of Test Signal

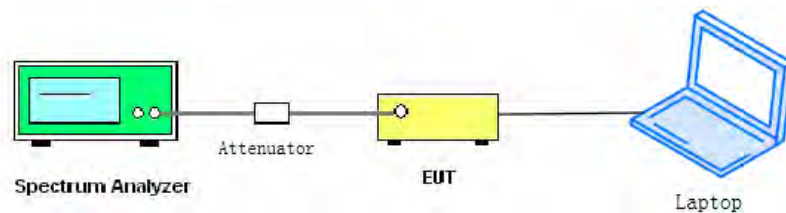
2.4.1. Requirement

Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%). When continuous operation cannot be realized, then the use of sweep triggering/signal gating techniques can be used to ensure that measurements are made only during transmissions at the maximum power control level. Such sweep triggering/signal gating techniques will require knowledge of the minimum transmission duration (T) over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. Sweep triggering/signal gating techniques can then be used if the measurement/sweep time of the analyzer can be set such that it does not exceed T at any time that data are being acquired (i.e., no transmitter OFF-time is to be considered).

When continuous transmission cannot be achieved and sweep triggering/signal gating cannot be implemented, alternative procedures are provided that can be used to measure the average power; however, they will require an additional measurement of the transmitter duty cycle (D). Within this sub clause, the duty cycle refers to the fraction of time over which the transmitter is ON and is transmitting at its maximum power control level. The duty cycle is considered to be constant if variations are less than $\pm 2\%$; otherwise, the duty cycle is considered to be nonconstant.

2.4.2. Test Description

Test Setup:



ANSI C63.10 2013 Clause 11.6 was used in order to prove compliance.



2.4.3. Test Result

Left:

Test Mode	Duty Cycle (%) (D)	Duty Factor (10*log[1/D])
GFSK	100.00	0.00
$\pi/4$ -DQPSK	100.00	0.00
8-DPSK	100.00	0.00

Right:

Test Mode	Duty Cycle (%) (D)	Duty Factor (10*log[1/D])
GFSK	100.00	0.00
$\pi/4$ -DQPSK	100.00	0.00
8-DPSK	100.00	0.00

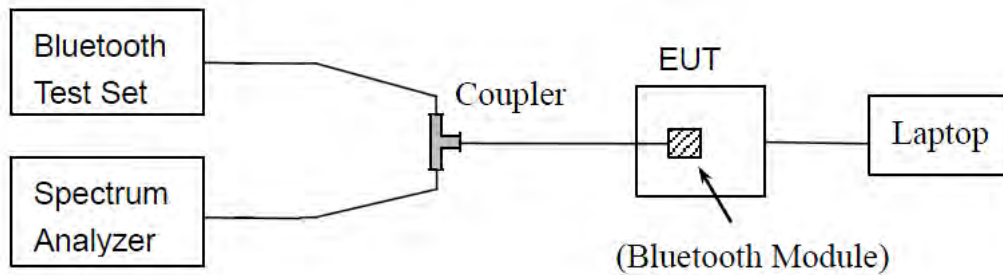
2.5. Maximum Peak Conducted Output Power

2.5.1. Requirement

According to FCC §15.247(b)(1), for frequency hopping systems that operates in the 2400MHz to 2483.5MHz band employing at least 75 hopping channels, the maximum peak output power of the intentional radiator shall not exceed 1Watt. For all other frequency hopping systems in the 2400MHz to 2483.5MHz band, it is 0.125Watts.

2.5.2. Test Description

Test Setup:



The Bluetooth Module of the EUT is coupled to the Spectrum Analyzer (SA) and the Bluetooth Test Set through the coupler; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.



2.5.3. Test Result

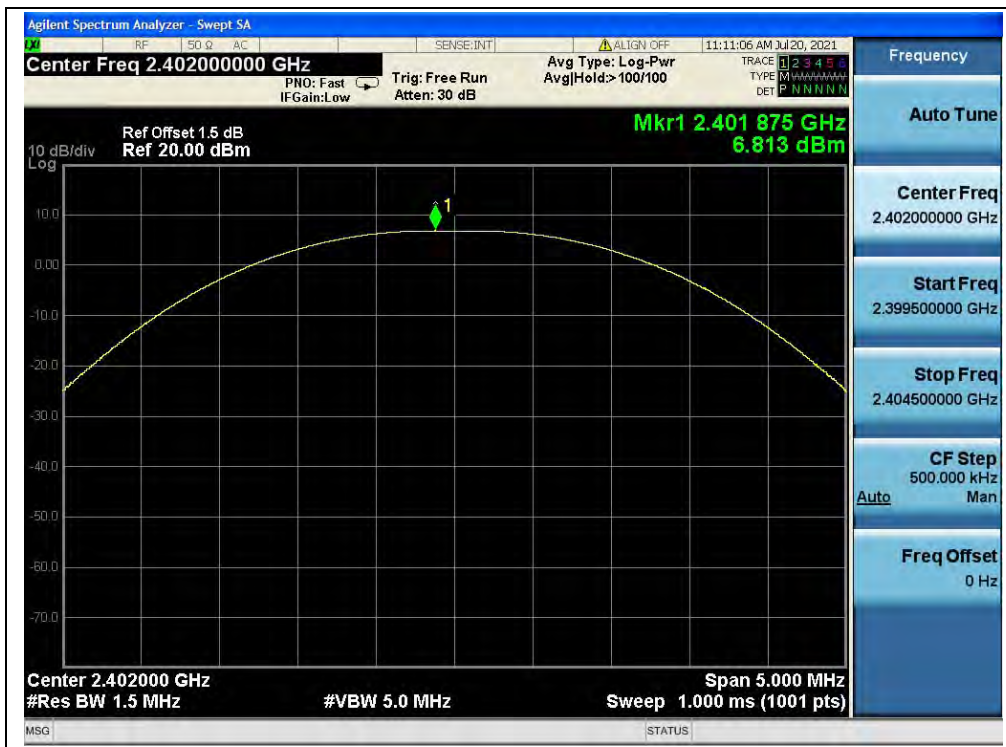
Left:

GFSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	6.81	0.005	20.96	0.125	PASS
39	2441	7.31	0.005			
78	2480	6.79	0.005			

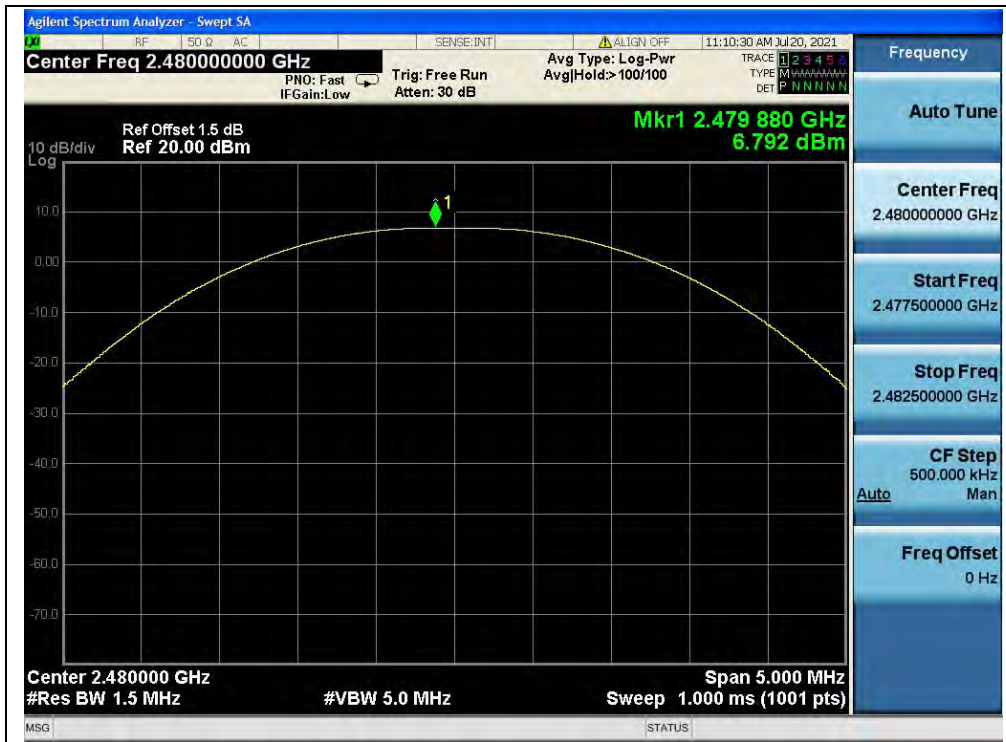
B. Test Plot:



(Channel 0, GFSK)



(Channel 39, GFSK)



(Channel 78, GFSK)

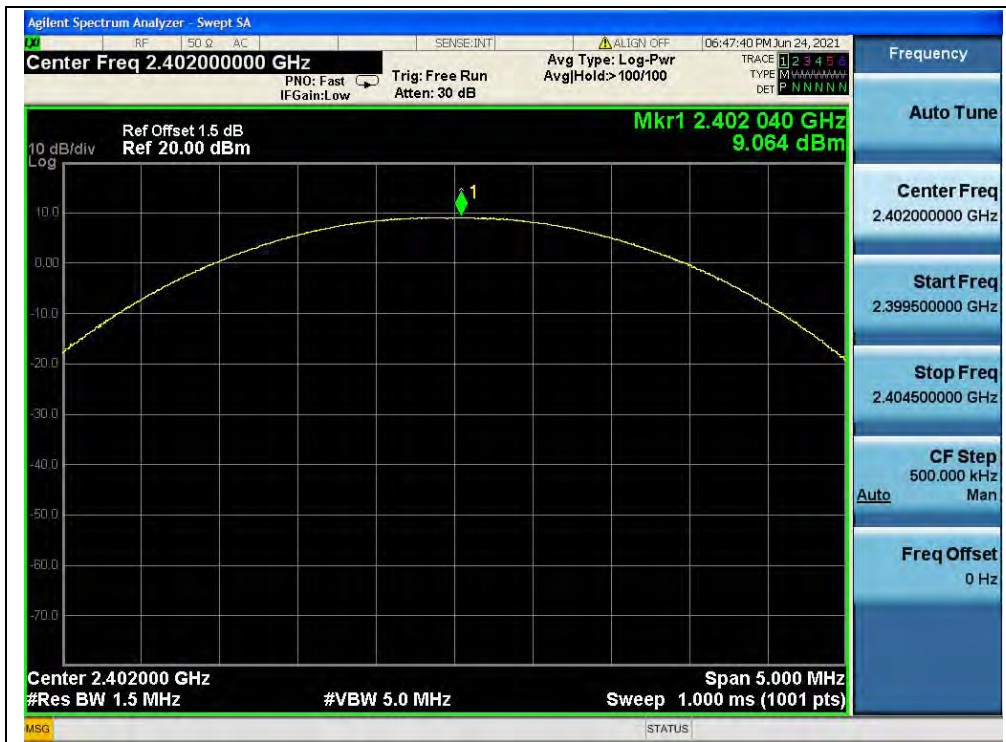


$\pi/4$ -DQPSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	9.06	0.008	20.96	0.125	PASS
39	2441	9.48	0.009			PASS
78	2480	8.95	0.008			PASS

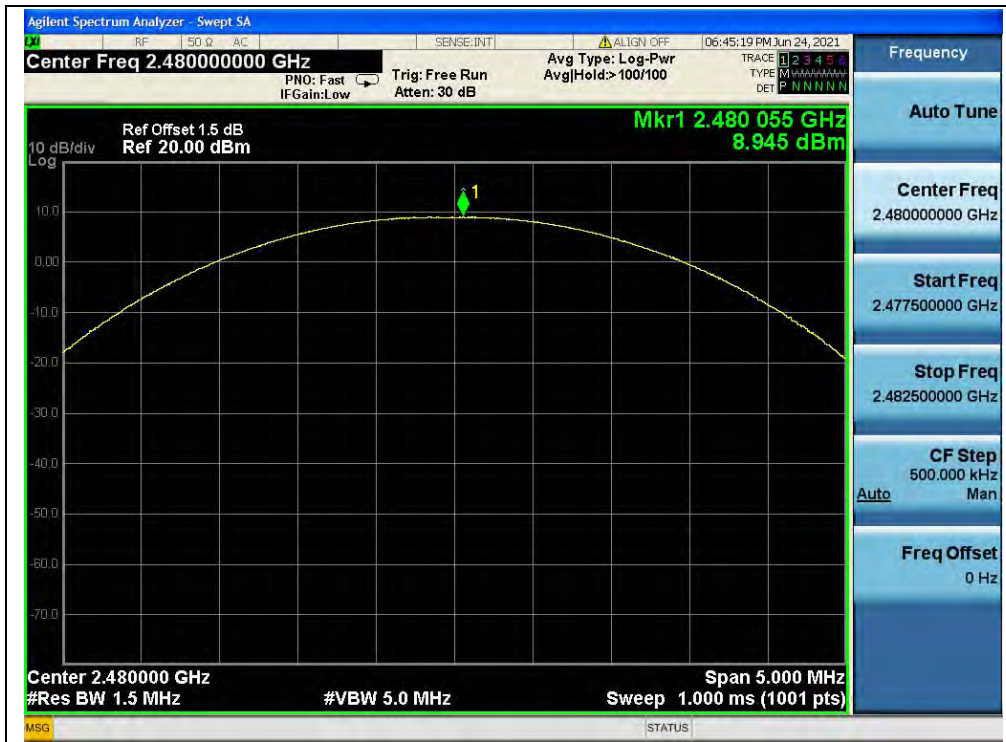
B. Test Plot:



(Channel 0, $\pi/4$ -DQPSK)



(Channel 39, $\pi/4$ -DQPSK)



(Channel 78, $\pi/4$ -DQPSK)

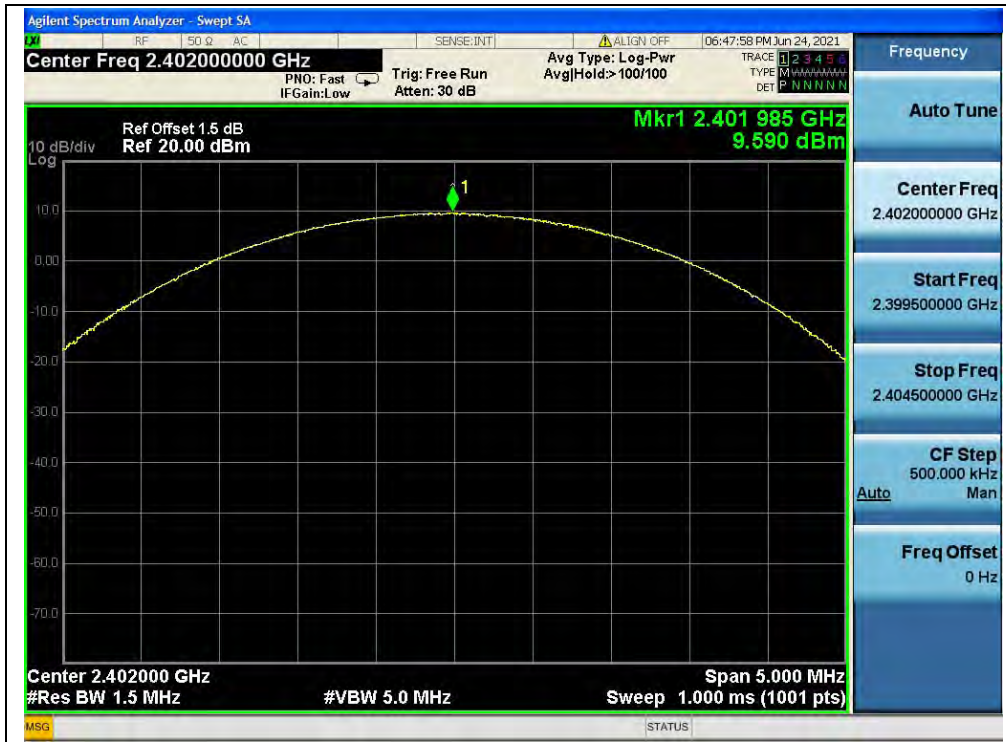


8-DPSK Mode

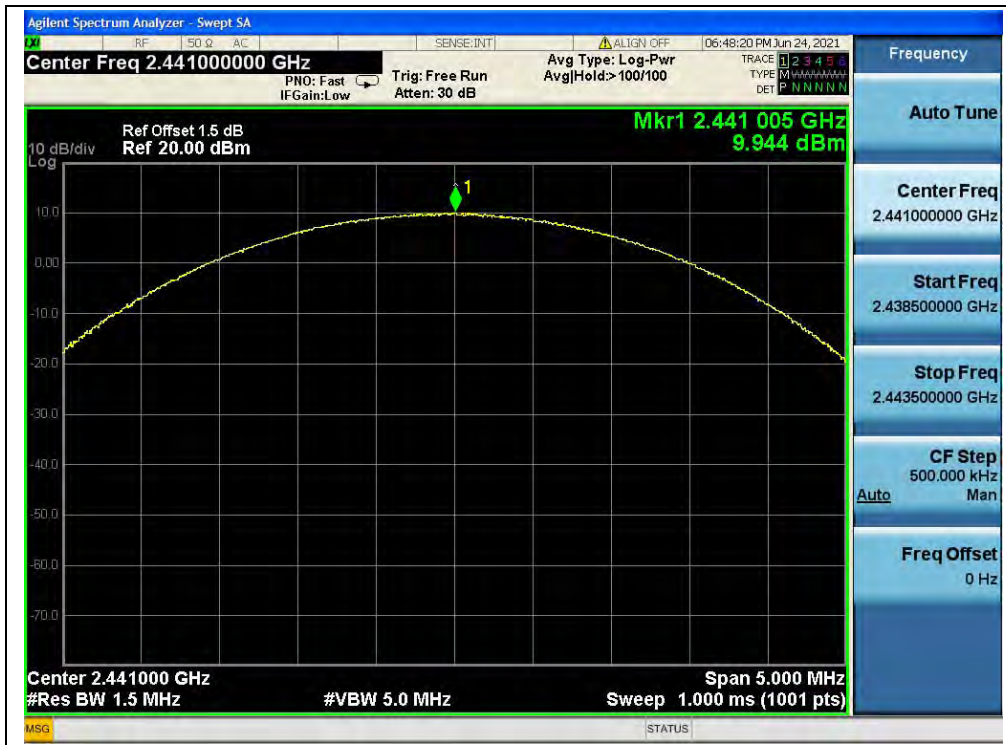
A. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	9.59	0.009	20.96	0.125	PASS
39	2441	9.94	0.010			PASS
78	2480	9.47	0.009			PASS

B. Test Plot:



(Channel 0, 8-DPSK)



(Channel 39, 8-DPSK)



(Channel 78, 8-DPSK)



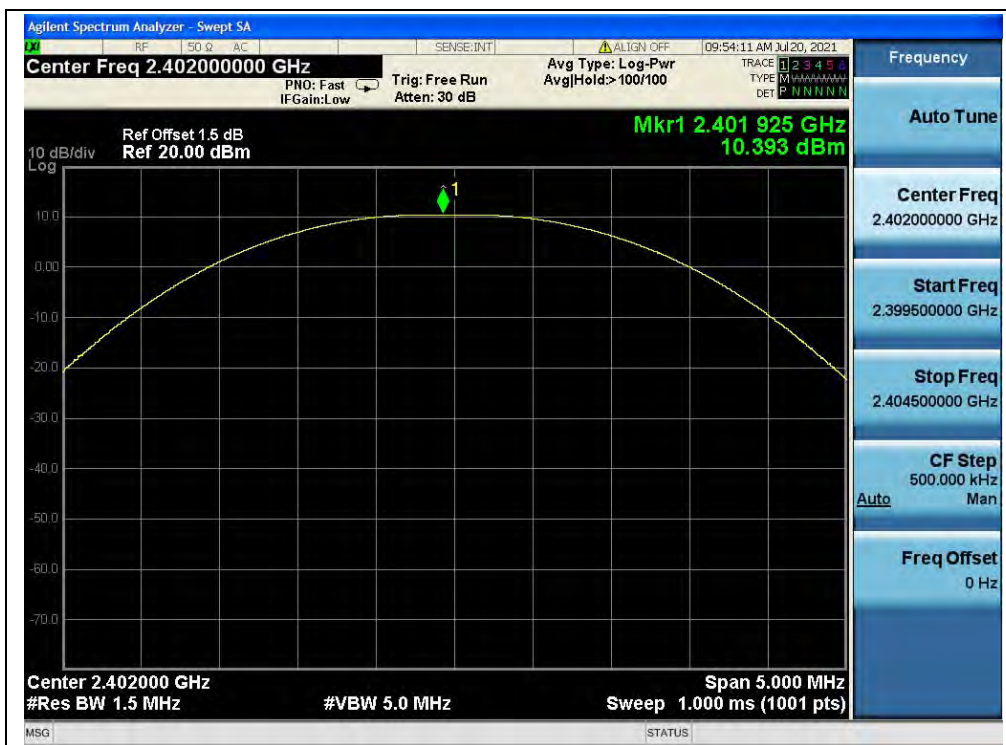
Right:

GFSK Mode

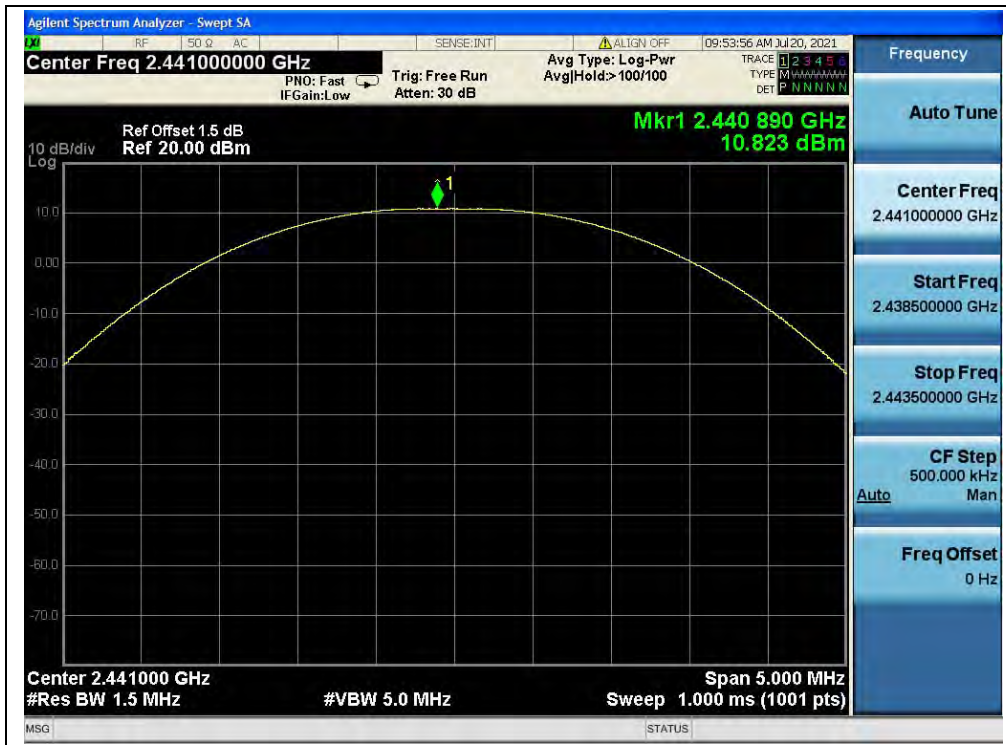
A. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	10.39	0.011	20.96	0.125	PASS
39	2441	10.82	0.012			PASS
78	2480	10.27	0.011			PASS

B. Test Plot:



(Channel 0, GFSK)



(Channel 39, GFSK)



(Channel 78, GFSK)



$\pi/4$ -DQPSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	9.15	0.008	20.96	0.125	PASS
39	2441	9.81	0.010			PASS
78	2480	9.55	0.009			PASS

B. Test Plot:



(Channel 0, $\pi/4$ -DQPSK)



(Channel 39, $\pi/4$ -DQPSK)



(Channel 78, $\pi/4$ -DQPSK)

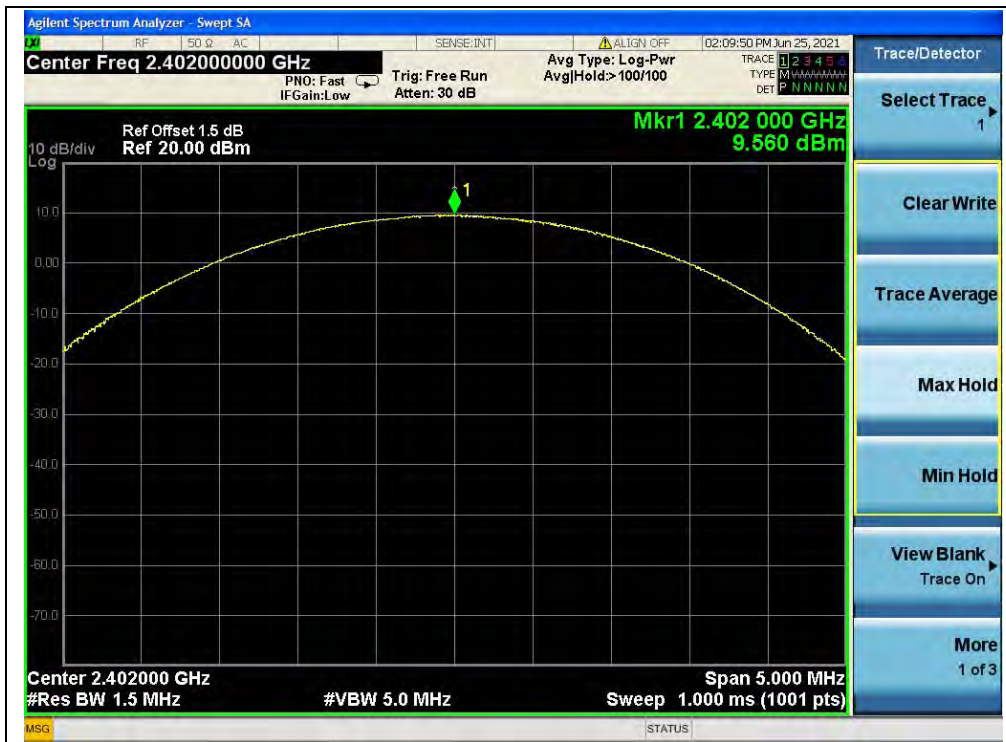


8-DPSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	9.56	0.009	20.96	0.125	PASS
39	2441	10.24	0.011			PASS
78	2480	9.97	0.010			PASS

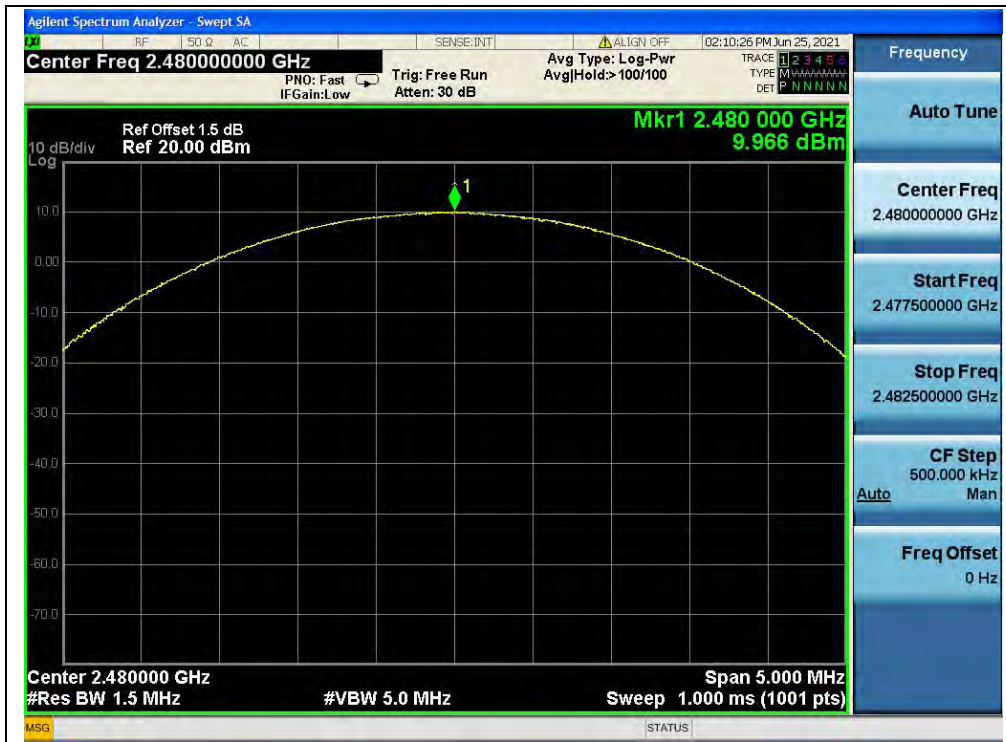
B. Test Plot:



(Channel 0, 8-DPSK)



(Channel 39, 8-DPSK)



(Channel 78, 8-DPSK)

2.6. Maximum Average Conducted Output Power

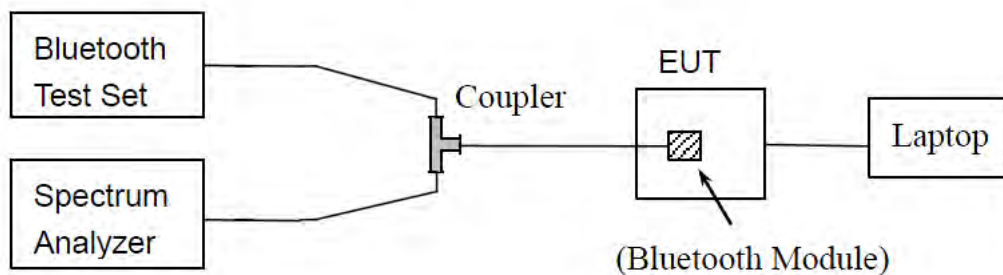
2.6.1. Requirement

According to FCC §15.247(b), for frequency hopping systems that operates in the 2400MHz to 2483.5MHz band employing at least 75 hopping channels, the maximum average output power of the intentional radiator shall not exceed 1Watt. For all other frequency hopping systems in the 2400MHz to 2483.5MHz band, it is 0.125Watts.

2.6.2. Test Description

The measured output power was calculated by the reading of the USB Wideband Power Sensor and calibration.

Test Setup:



The Bluetooth Module of the EUT is coupled to the Spectrum Analyzer (SA) and the Bluetooth Test Set through the coupler; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.



2.6.3. Test Result

Left:

GFSK Mode

Channel	Frequency (MHz)	Measured	Average Power			Limit		Verdict
			Duty	Duty Factor Calculated		dBm	W	
		Factor	dBm	W	dBm			
0	2402	6.48	0.00	6.48	0.004	20.96	0.125	PASS
39	2441	6.92		6.92	0.005			PASS
78	2480	6.49		6.49	0.004			PASS

$\pi/4$ -DQPSK Mode

Channel	Frequency (MHz)	Measured	Average Power			Limit		Verdict
			Duty	Duty Factor Calculated		dBm	W	
		Factor	dBm	W	dBm			
0	2402	6.18	0.00	6.18	0.004	20.96	0.125	PASS
39	2441	6.58		6.58	0.005			PASS
78	2480	6.03		6.03	0.004			PASS

8-DPSK Mode

Channel	Frequency (MHz)	Measured	Average Power			Limit		Verdict
			Duty	Duty Factor Calculated		dBm	W	
		Factor	dBm	W	dBm			
0	2402	6.16	0.00	6.16	0.004	20.96	0.125	PASS
39	2441	6.58		6.58	0.005			PASS
78	2480	6.01		6.01	0.004			PASS



Right:

GFSK Mode

Channel	Frequency (MHz)	Measured	Average Power			Limit		Verdict
			Duty Factor	Duty Factor Calculated		dBm	W	
		dBm		dBm	W			
0	2402	8.83	0.00	8.83	0.008	20.96	0.125	PASS
39	2441	9.28		9.28	0.008			PASS
78	2480	8.78		8.78	0.008			PASS

$\pi/4$ -DQPSK Mode

Channel	Frequency (MHz)	Measured	Average Power			Limit		Verdict
			Duty Factor	Duty Factor Calculated		dBm	W	
		dBm		dBm	W			
0	2402	6.21	0.00	6.21	0.004	20.96	0.125	PASS
39	2441	6.81		6.81	0.005			PASS
78	2480	6.54		6.54	0.005			PASS

8-DPSK Mode

Channel	Frequency (MHz)	Measured	Average Power			Limit		Verdict
			Duty Factor	Duty Factor Calculated		dBm	W	
		dBm		dBm	W			
0	2402	6.11	0.00	6.11	0.004	20.96	0.125	PASS
39	2441	6.76		6.76	0.005			PASS
78	2480	6.55		6.55	0.005			PASS

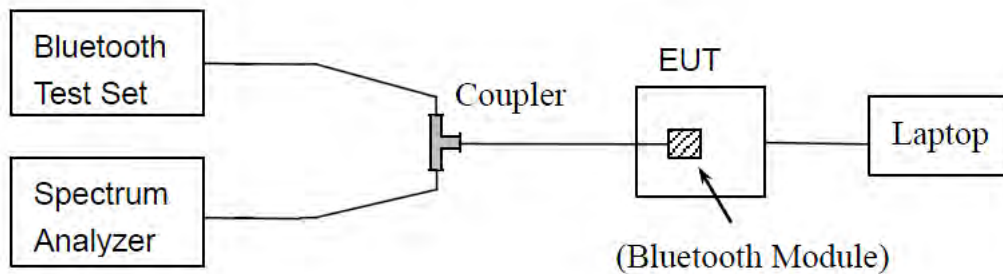
2.7. 20 dB Bandwidth

2.7.1. Definition

According to FCC §15.247(a)(1), the 20 dB bandwidth is known as the 99% emission bandwidth, or 20 dB bandwidth ($10 \cdot \log 1\% = 20$ dB) taking the total RF output power.

2.7.2. Test Description

Test Setup:



The Bluetooth Module of the EUT is coupled to the Spectrum Analyzer (SA) and the Bluetooth Test Set through the coupler; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

2.7.3. Test Procedure

Use the following spectrum analyzer settings:

Span = between 2 to 5 times the OBW, centered on the test channel

RBW= 1% to 5% of the OBW

VBW $\geq 3 \times$ RBW

Sweep = auto

Detector function = peak

Trace = max hold



2.7.4. Test Result

Left:

GFSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	Result
0	2402	1.026	PASS
39	2441	1.026	PASS
78	2480	0.963	PASS

B. Test Plot:



(Channel 0, GFSK)



(Channel 39, GFSK)



(Channel 78, GFSK)

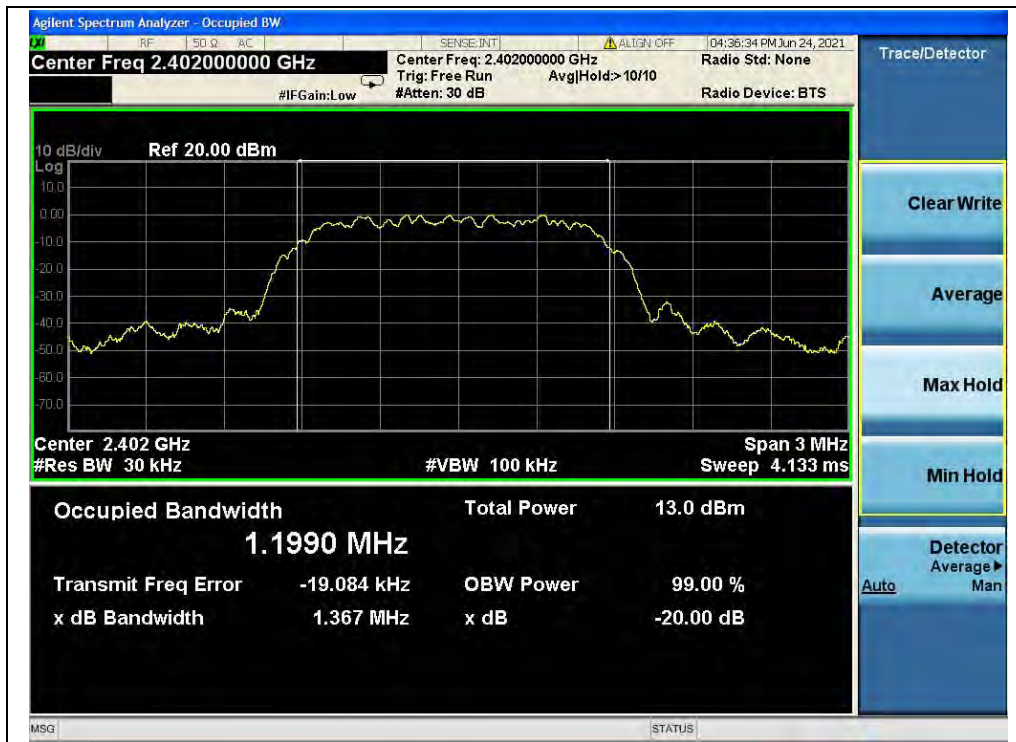


$\pi/4$ -DQPSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Result
0	2402	1.367	PASS
39	2441	1.367	PASS
78	2480	1.370	PASS

B. Test Plot:



(Channel 0, $\pi/4$ -DQPSK)



(Channel 39, $\pi/4$ -DQPSK)



(Channel 78, $\pi/4$ -DQPSK)

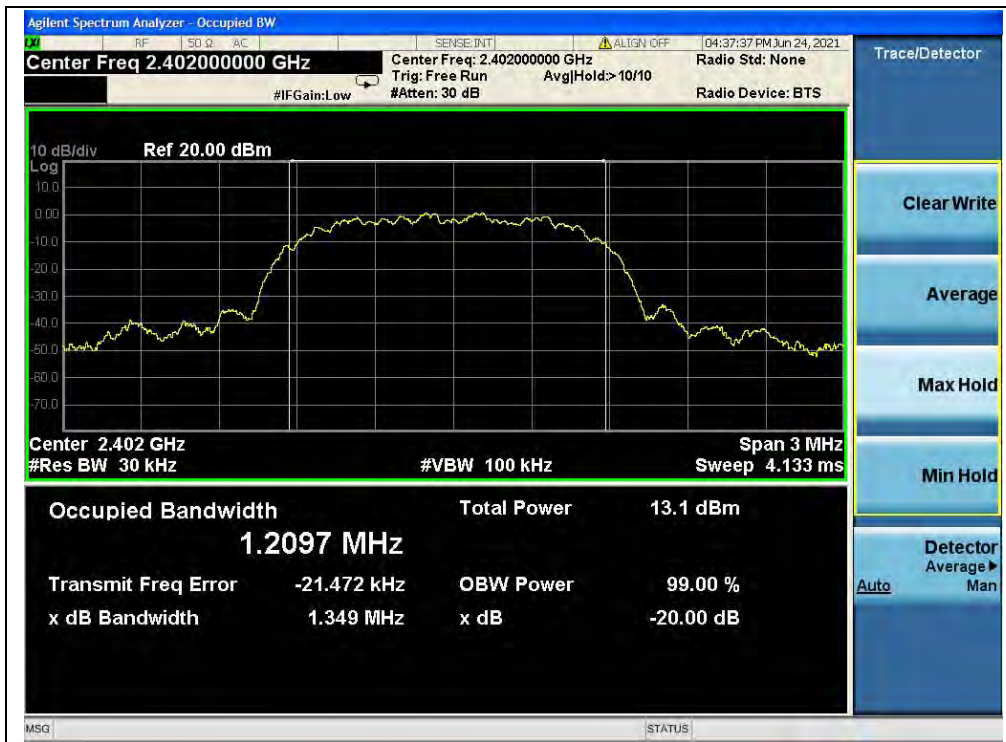


8-DPSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Result
0	2402	1.349	PASS
39	2441	1.349	PASS
78	2480	1.350	PASS

B. Test Plot:



(Channel 0, 8-DPSK)



(Channel 39, 8-DPSK)



(Channel 78, 8-DPSK)



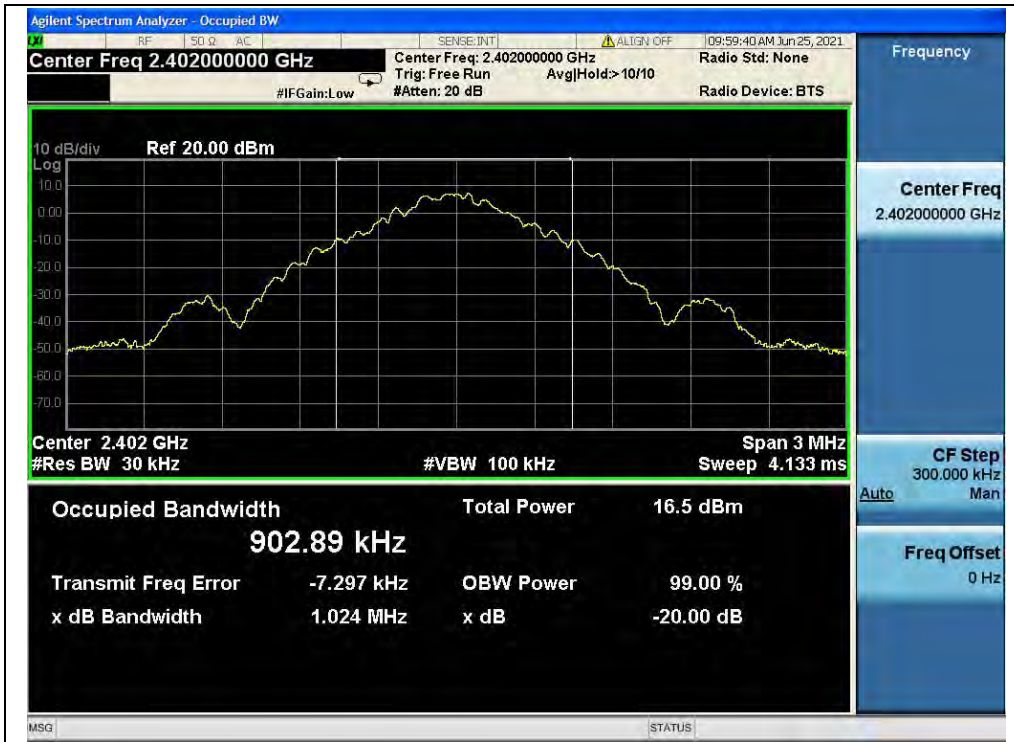
Right:

GFSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	Result
0	2402	1.024	PASS
39	2441	1.021	PASS
78	2480	1.020	PASS

B. Test Plot:



(Channel 0, GFSK)



(Channel 39, GFSK)



(Channel 78, GFSK)



$\pi/4$ -DQPSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Result
0	2402	1.369	PASS
39	2441	1.369	PASS
78	2480	1.370	PASS

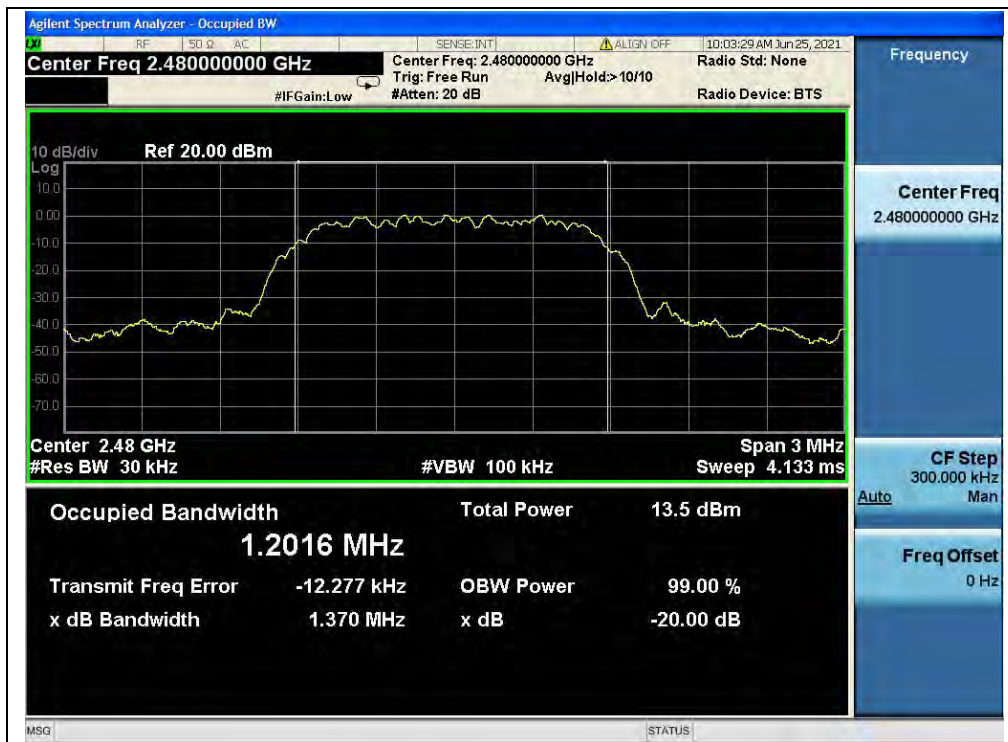
B. Test Plot:



(Channel 0, $\pi/4$ -DQPSK)



(Channel 39, $\pi/4$ -DQPSK)



(Channel 78, $\pi/4$ -DQPSK)



8-DPSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Result
0	2402	1.351	PASS
39	2441	1.350	PASS
78	2480	1.352	PASS

B. Test Plot:



(Channel 0, 8-DPSK)



(Channel 39, 8-DPSK)



(Channel 78, 8-DPSK)

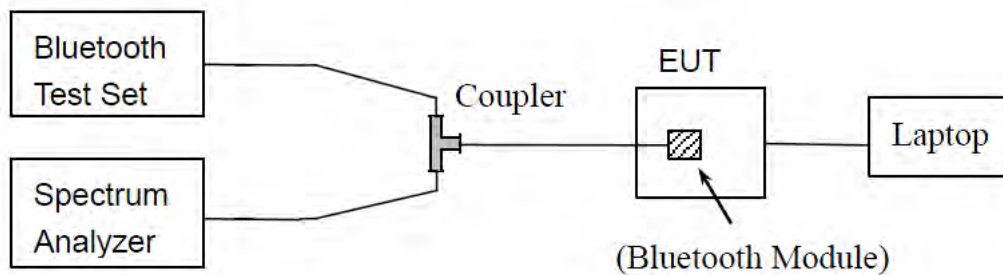
2.8. Carried Frequency Separation

2.8.1. Definition

According to FCC §15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

2.8.2. Test Description

Test Setup:



The Bluetooth Module of the EUT is coupled to the Spectrum Analyzer (SA) and the Bluetooth Test Set through the coupler; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

2.8.3. Test Procedure

The EUT must have its hopping function enabled. According to DA 00-705, use the following spectrum analyzer settings:

Span = wide enough to capture the peaks of two adjacent channels

Resolution (or IF) Bandwidth (RBW) \geq 1% of the span

Video (or Average) Bandwidth (VBW) \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.



2.8.4. Test Result

Left:

A. Test Verdict:

Test Mode	Measured Channel Numbers	Carried Frequency Separation (MHz)	20 dB Bandwidth (MHz)	Min. Limit	Verdict
GFSK	39 and 40	0.990	1.026	two-thirds of the 20dBbandwidth	PASS
$\pi/4$ -DQPSK	39 and 40	1.155	1.370		PASS
8-DPSK	39 and 40	1.026	1.350		PASS

B. Test Plot:



(GFSK)



($\pi/4$ -DQPSK)



(8-DPSK)



Right:

A. Test Verdict:

Test Mode	Measured Channel Numbers	Carried Frequency Separation (MHz)	20 dB Bandwidth (MHz)	Min. Limit	Verdict
GFSK	39 and 40	0.990	1.024	two-thirds of the 20dB bandwidth	PASS
$\pi/4$ -DQPSK	39 and 40	0.993	1.370		PASS
8-DPSK	39 and 40	1.158	1.352		PASS

B. Test Plot:



(GFSK)



($\pi/4$ -DQPSK)



(8-DPSK)

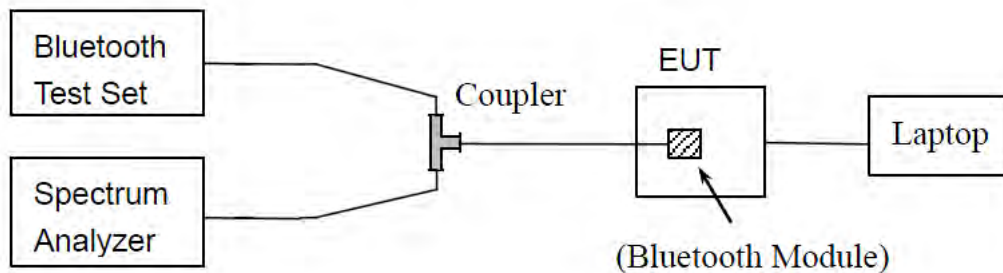
2.9. Time of Occupancy (Dwell time)

2.9.1. Requirement

According to FCC §15.247(a) (1) (iii), frequency hopping systems in the 2400 - 2483.5MHz band shall use at least 15 non-overlapping 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

2.9.2. Test Description

Test Setup:



The Bluetooth Module of the EUT is coupled to the Spectrum Analyzer (SA) and the Bluetooth Test Set through the coupler; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

2.9.3. Test Procedure

Normal Mode:

DH1: Dwell time equal to Pulse time (ms) * (1600 / 2 / 79) * 31.6 Millisecond
DH3: Dwell time equal to Pulse time (ms) * (1600 / 4 / 79) * 31.6 Millisecond
DH5: Dwell time equal to Pulse Time (ms) * (1600 / 6 / 79) * 31.6 Millisecond

AFH Mode:

DH1: Dwell time equal to Pulse time (ms) * (800 / 2 / 20) * (0.4 * 20) Millisecond
DH3: Dwell time equal to Pulse time (ms) * (800 / 4 / 20) * (0.4 * 20) Millisecond
DH5: Dwell time equal to Pulse Time (ms) * (800 / 6 / 20) * (0.4 * 20) Millisecond.



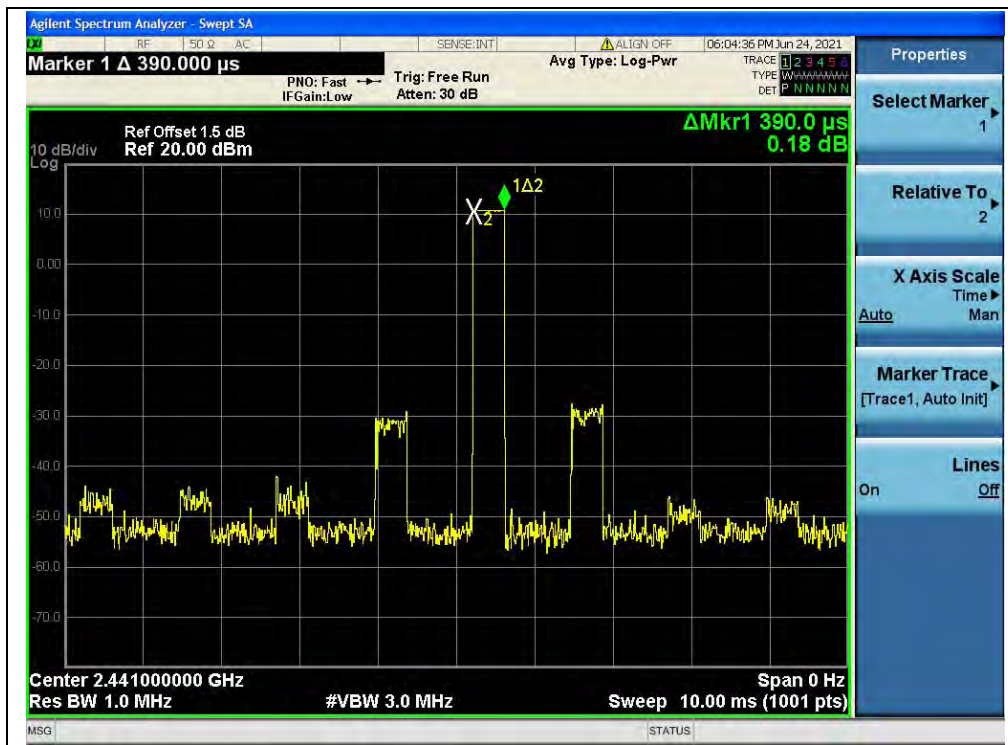
2.9.4. Test Result

Left:
GFSK Mode

A. Test Verdict:

DH Packet	Pulse Width (ms)	Dwell Time (ms)		Limit (sec)	Verdict
		Normal Mode	AFH Mode		
DH1	0.39	124.80	62.40	0.4	PASS
DH3	1.62	259.20	129.60		PASS
DH5	2.88	307.20	153.60		PASS

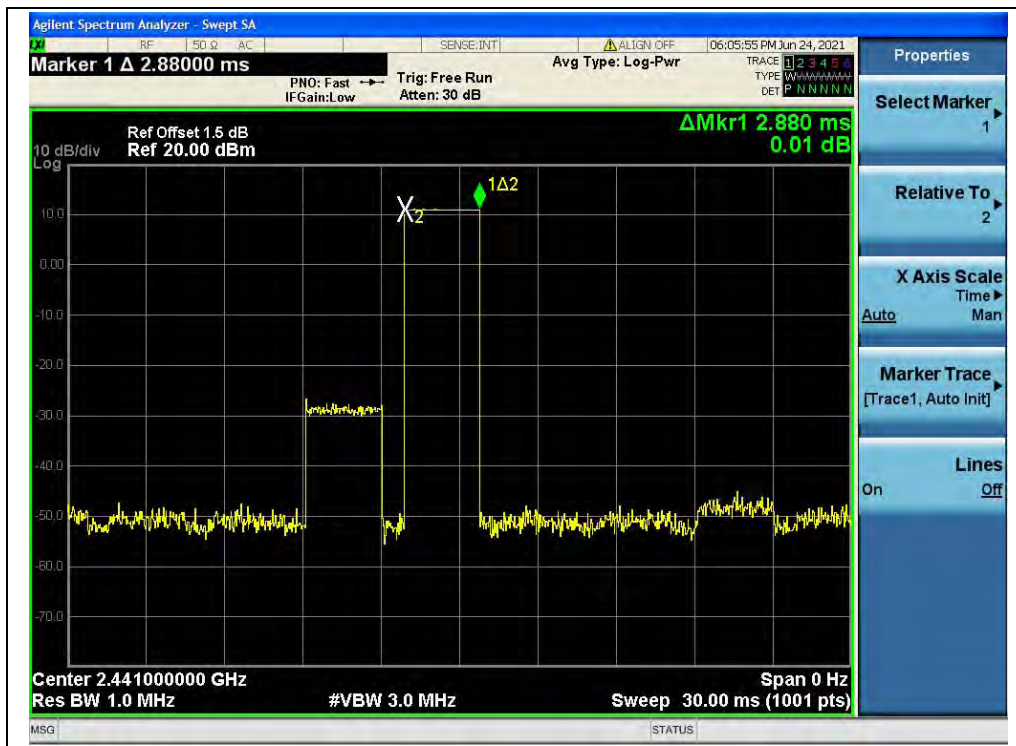
B. Test Plot:



(DH1, GFSK)



(DH3, GFSK)



(DH5, GFSK)

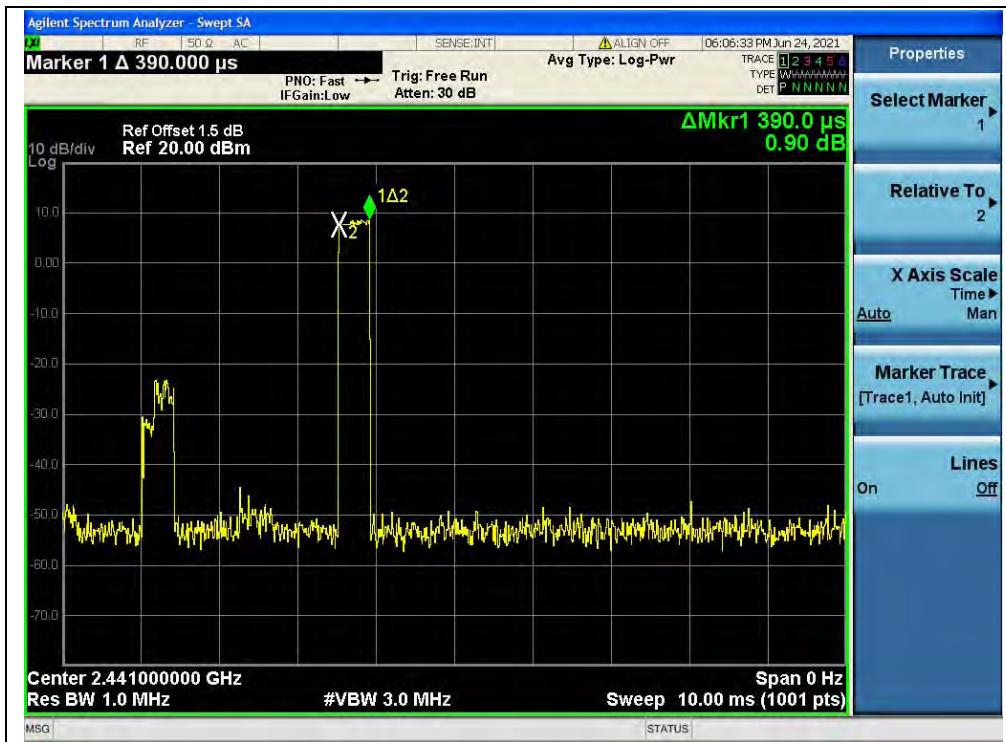


$\pi/4$ -DQPSK Mode

A. Test Verdict:

DH Packet	Pulse Width (ms)	Dwell Time (ms)		Limit (sec)	Verdict
		Normal Mode	AFH Mode		
DH1	0.39	124.80	62.40	0.4	PASS
DH3	1.66	265.60	132.80		PASS
DH5	2.91	310.40	155.20		PASS

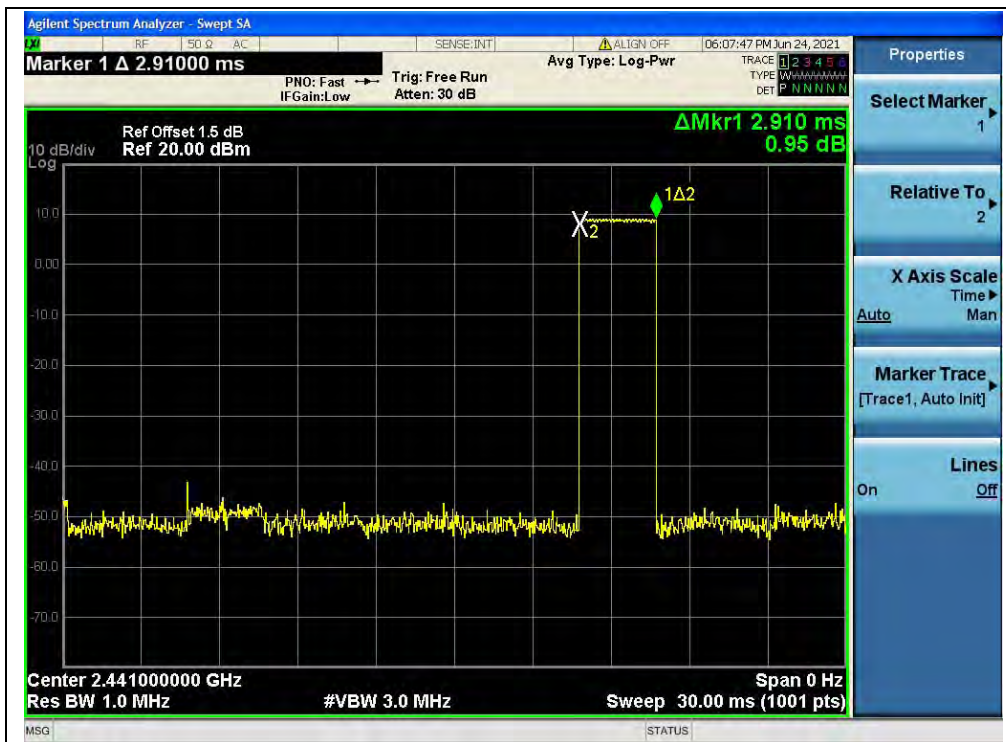
B. Test Plot:



(DH1, $\pi/4$ -DQPSK)



(DH3, $\pi/4$ -DQPSK)



(DH5, $\pi/4$ -DQPSK)

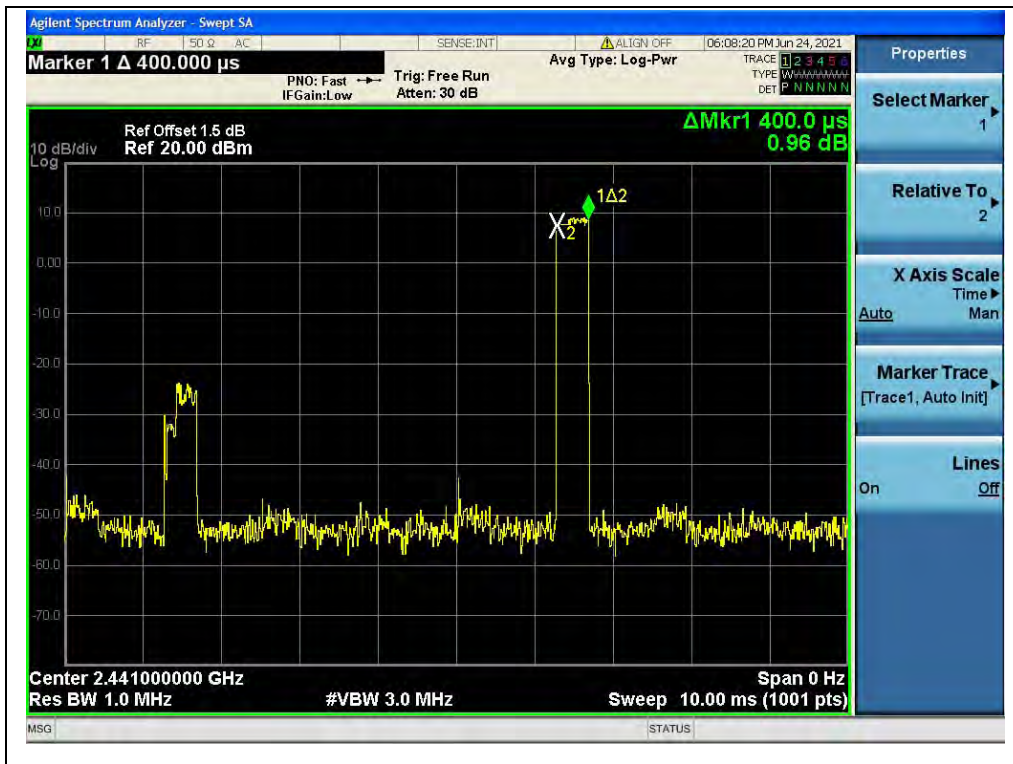


8-DPSK mode

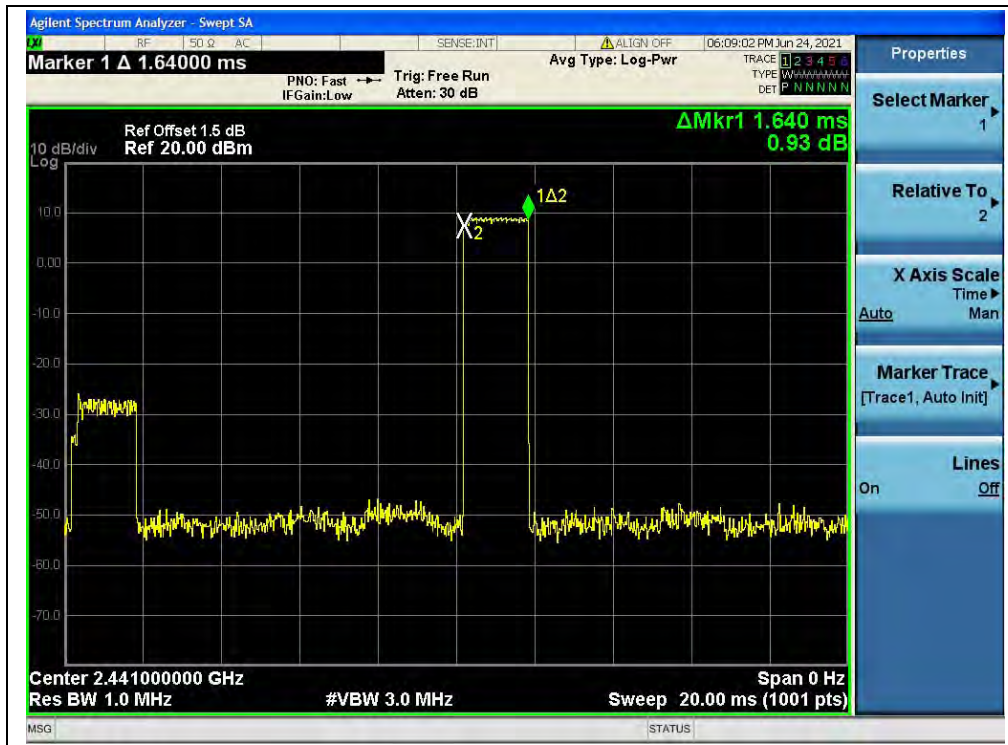
A. Test Verdict:

DH Packet	Pulse Width (ms)	Dwell Time (ms)		Limit (sec)	Verdict
		Normal Mode	AFH Mode		
DH1	0.40	128.00	64.00	0.4	PASS
DH3	1.64	262.40	131.20		PASS
DH5	2.88	307.20	153.60		PASS

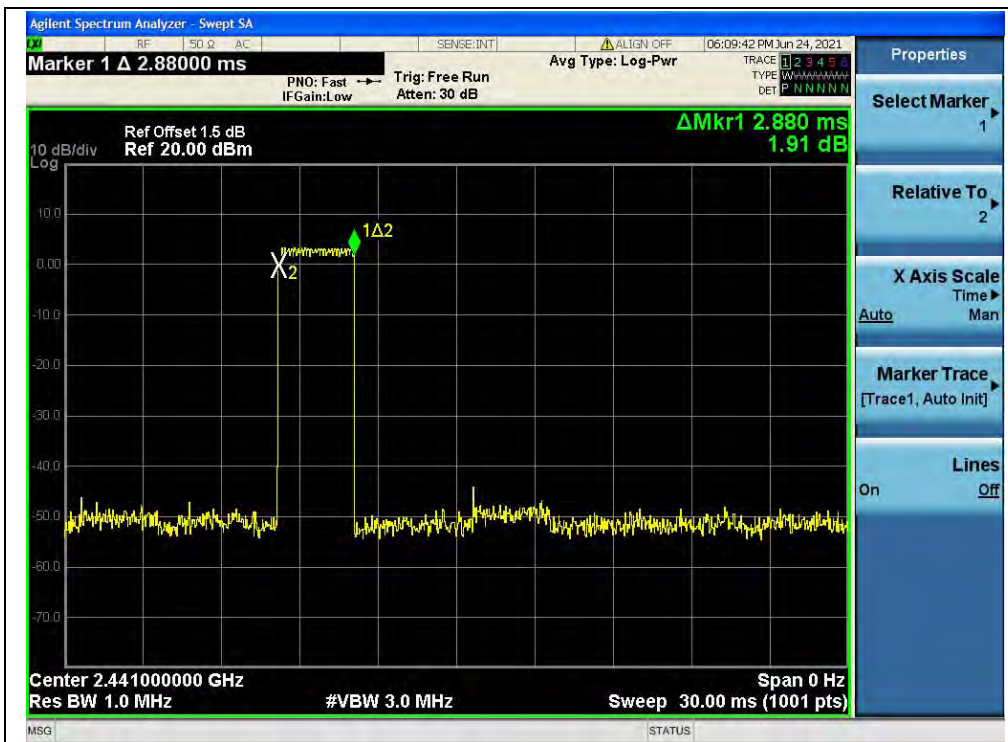
B. Test Plot:



(DH1, 8-DPSK)



(DH3, 8-DPSK)



(DH5, 8-DPSK)

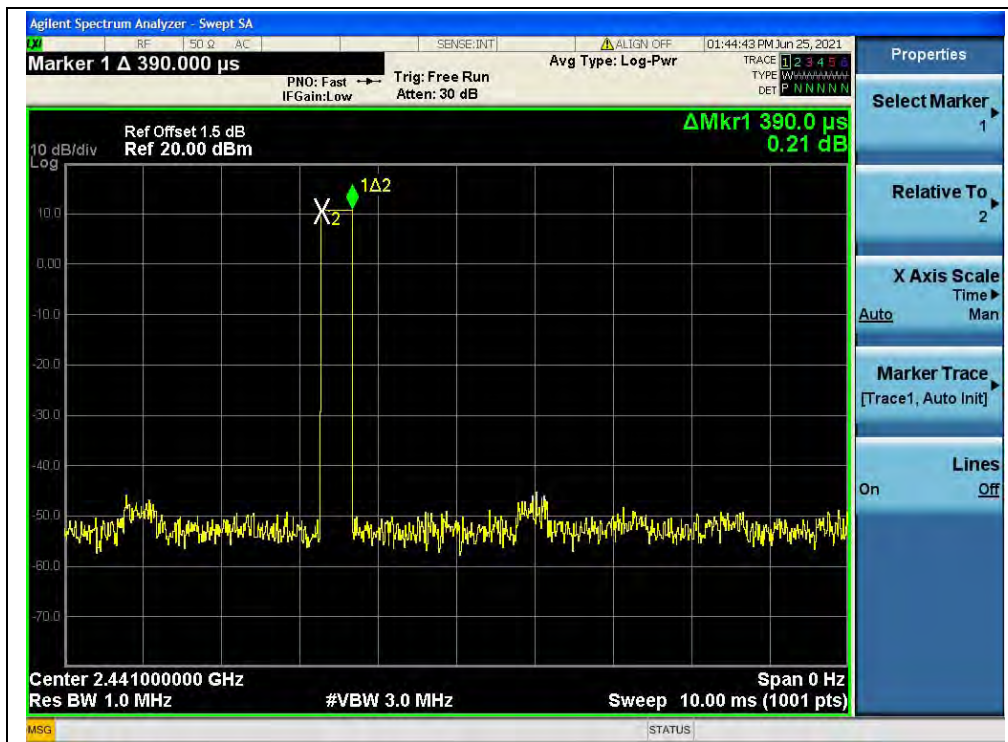


Right:
GFSK Mode

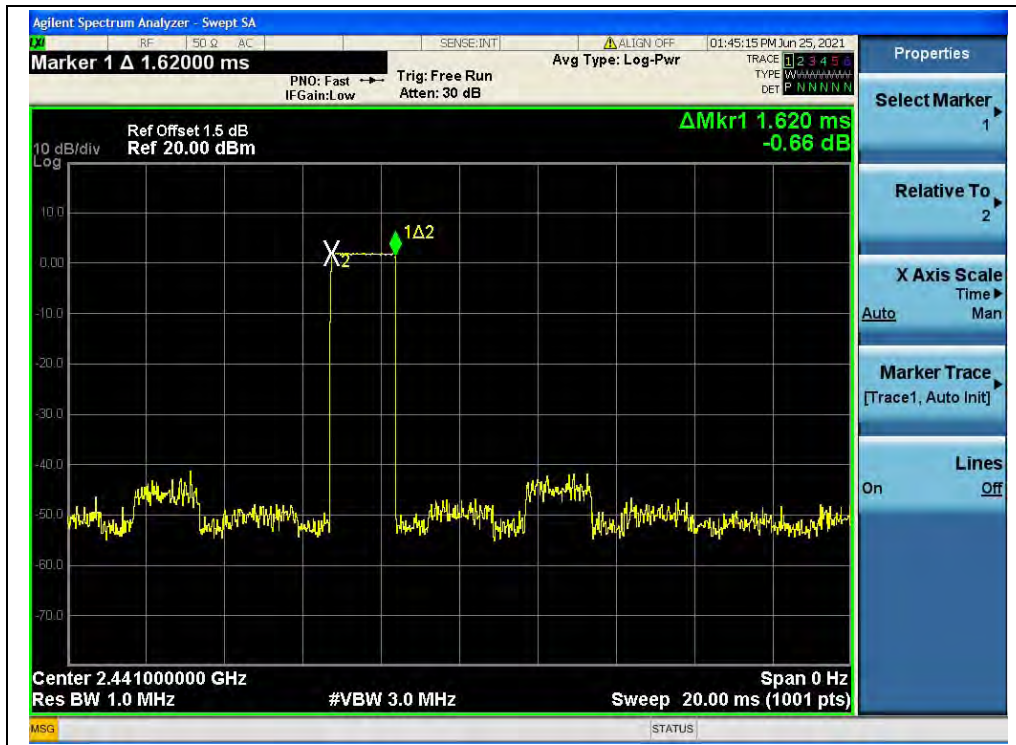
A. Test Verdict:

DH Packet	Pulse Width (ms)	Dwell Time (ms)		Limit (sec)	Verdict
		Normal Mode	AFH Mode		
DH1	0.39	124.80	62.40	0.4	PASS
DH3	1.62	259.20	129.60		PASS
DH5	2.85	304.00	152.00		PASS

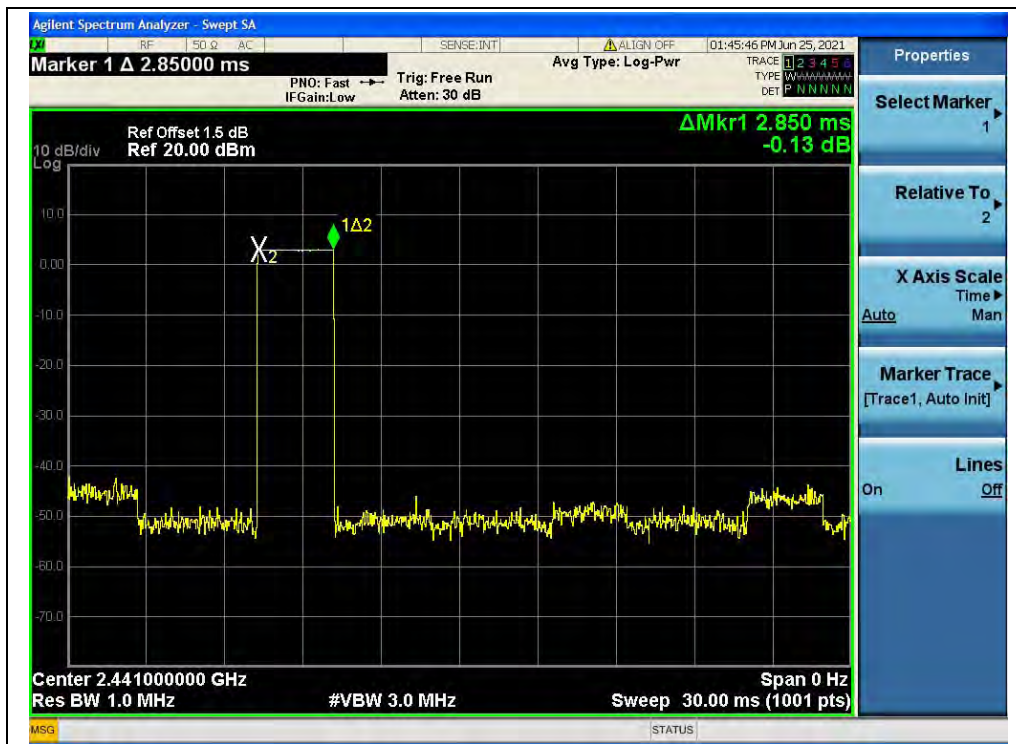
B. Test Plot:



(DH1, GFSK)



(DH3, GFSK)



(DH5, GFSK)



$\pi/4$ -DQPSK Mode

C. Test Verdict:

DH Packet	Pulse Width (ms)	Dwell Time (ms)		Limit (sec)	Verdict
		Normal Mode	AFH Mode		
DH1	0.39	124.80	62.40	0.4	PASS
DH3	1.64	262.40	131.20		PASS
DH5	2.88	307.20	153.60		PASS

D. Test Plot:



(DH1, $\pi/4$ -DQPSK)



(DH3, $\pi/4$ -DQPSK)



(DH5, $\pi/4$ -DQPSK)

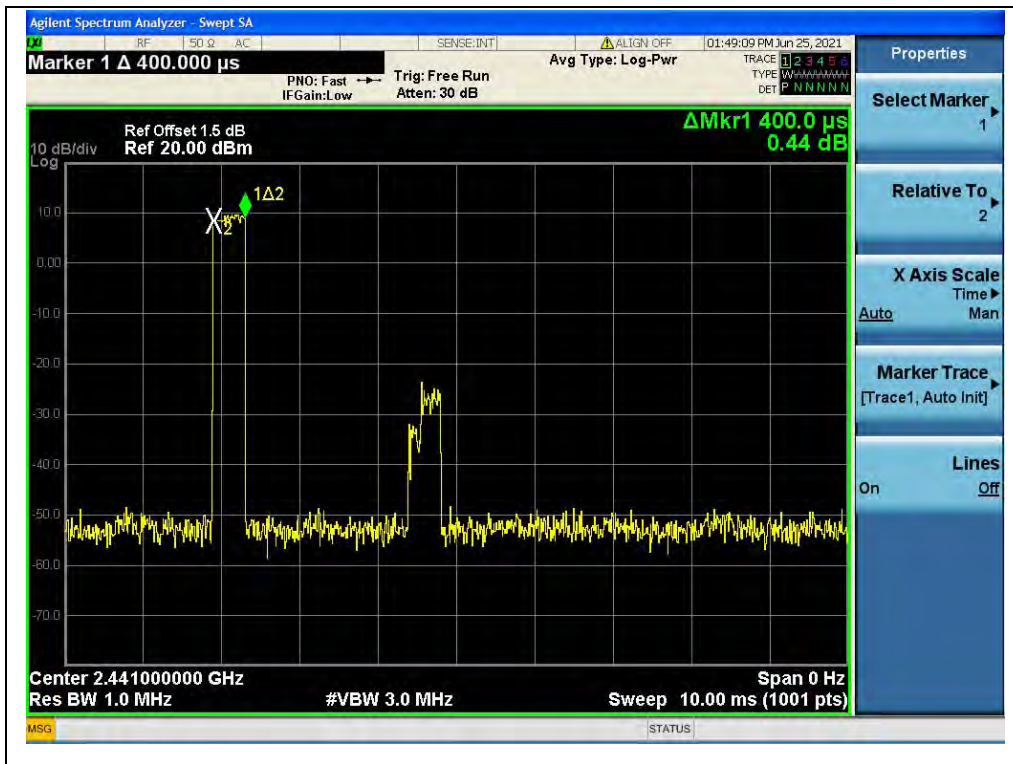


8-DPSK mode

E. Test Verdict:

DH Packet	Pulse Width (ms)	Dwell Time (ms)		Limit (sec)	Verdict
		Normal Mode	AFH Mode		
DH1	0.40	128.00	64.00	0.4	PASS
DH3	1.66	265.60	132.80		PASS
DH5	2.88	307.20	153.60		PASS

F. Test Plot:



(DH1, 8-DPSK)



(DH3, 8-DPSK)



(DH5, 8-DPSK)

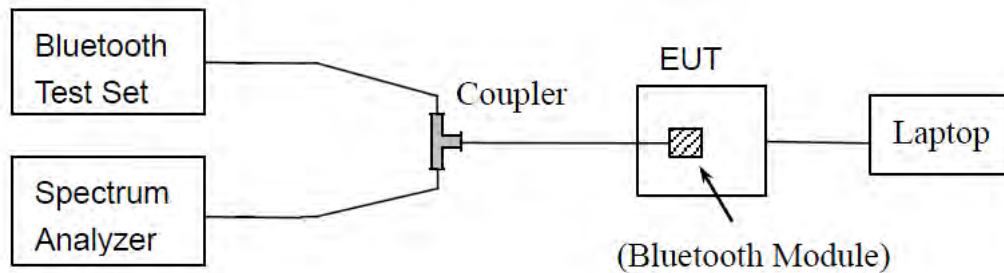
2.10. Conducted Spurious Emissions

2.10.1. Requirement

According to FCC §15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

2.10.2. Test Description

Test Setup:



The Bluetooth Module of the EUT is coupled to the Spectrum Analyzer (SA) and the Bluetooth Test Set through the coupler; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

2.10.3. Test Procedure

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

RBW = 100 kHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize.



2.10.4. Test Result

Left:
GFSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
0	2402	-35.83	10.00	-10.00	PASS
39	2441	-39.62	9.57	-10.43	PASS
78	2480	-41.25	9.85	-10.15	PASS

B. Test Plot:



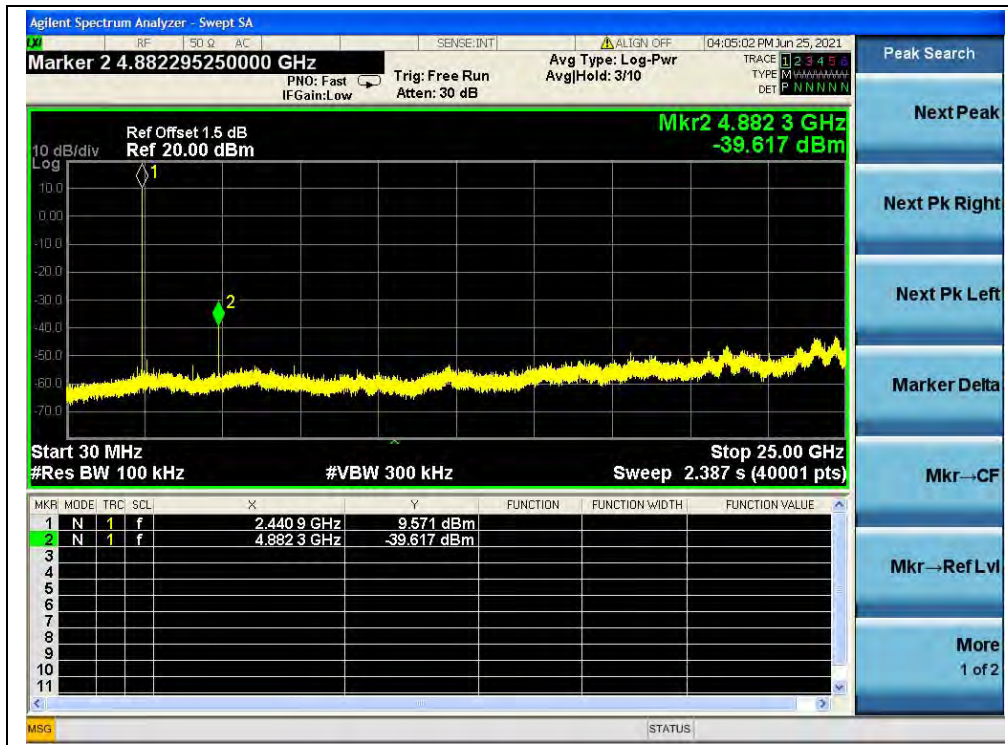
(30MHz to 25GHz, Channel 0, GFSK)



(Band edge, Channel 0, GFSK)



(Band edge with hopping on, Channel 0, GFSK)



(30MHz to 25GHz, Channel 39, GFSK)



(30MHz to 25GHz, Channel 78, GFSK)



(Band edge, Channel 78, GFSK)



(Band edge with hopping on, Channel 78, GFSK)

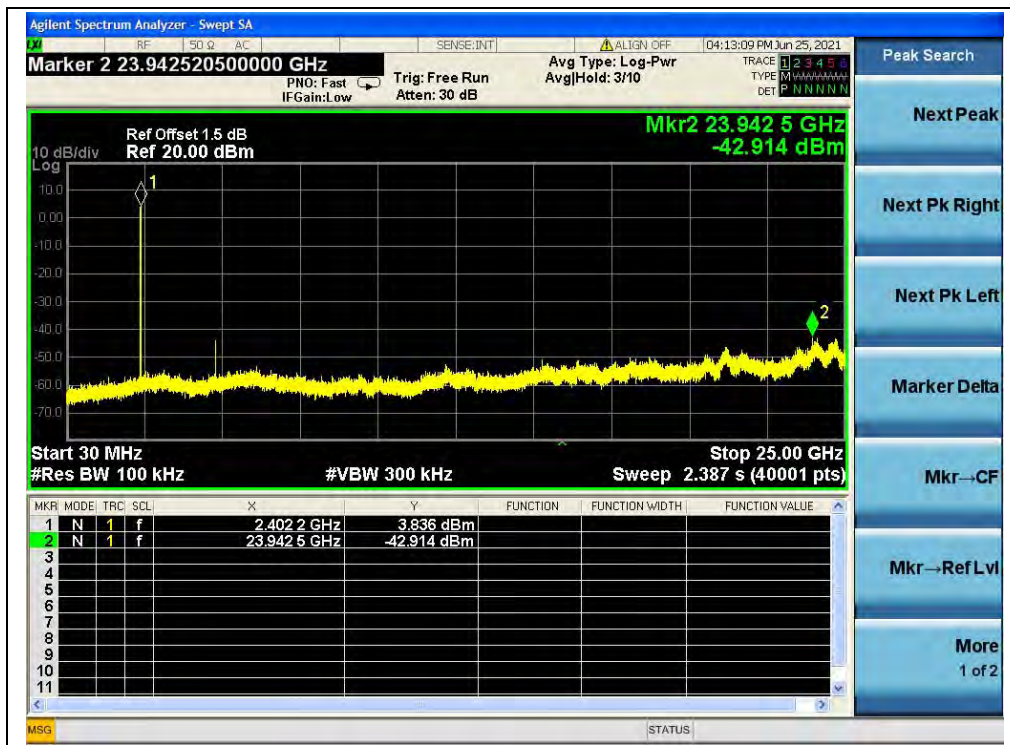


$\pi/4$ -DQPSK Mode

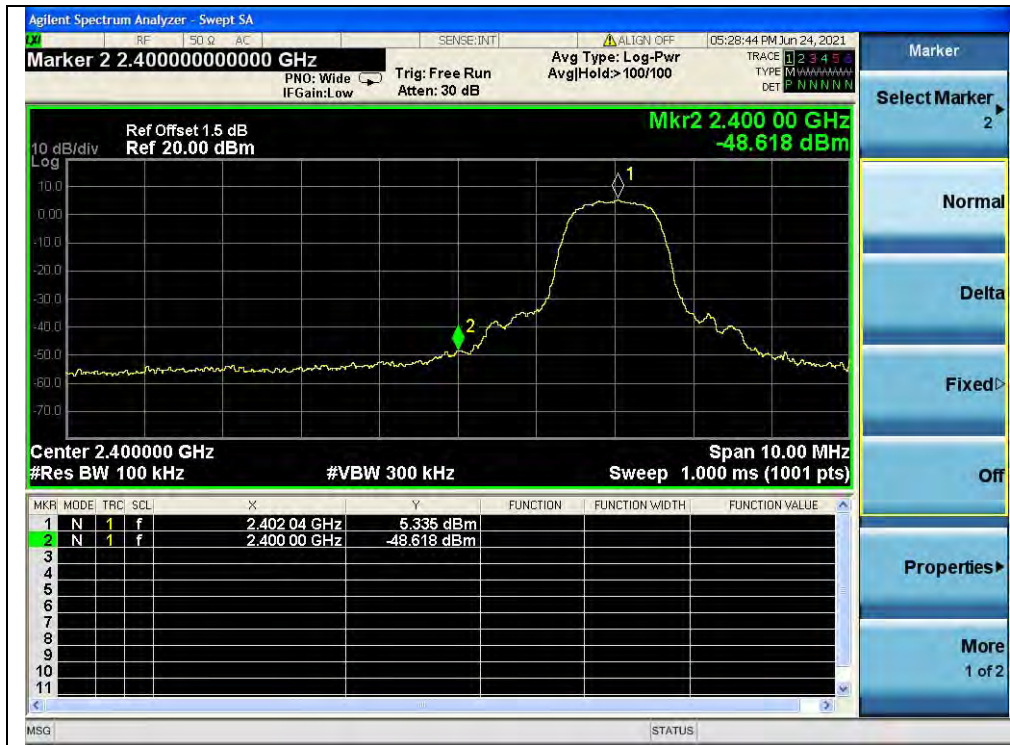
A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
0	2402	-42.91	3.84	-16.16	PASS
39	2441	-43.18	5.42	-14.58	PASS
78	2480	-42.97	1.58	-18.42	PASS

B. Test Plot:



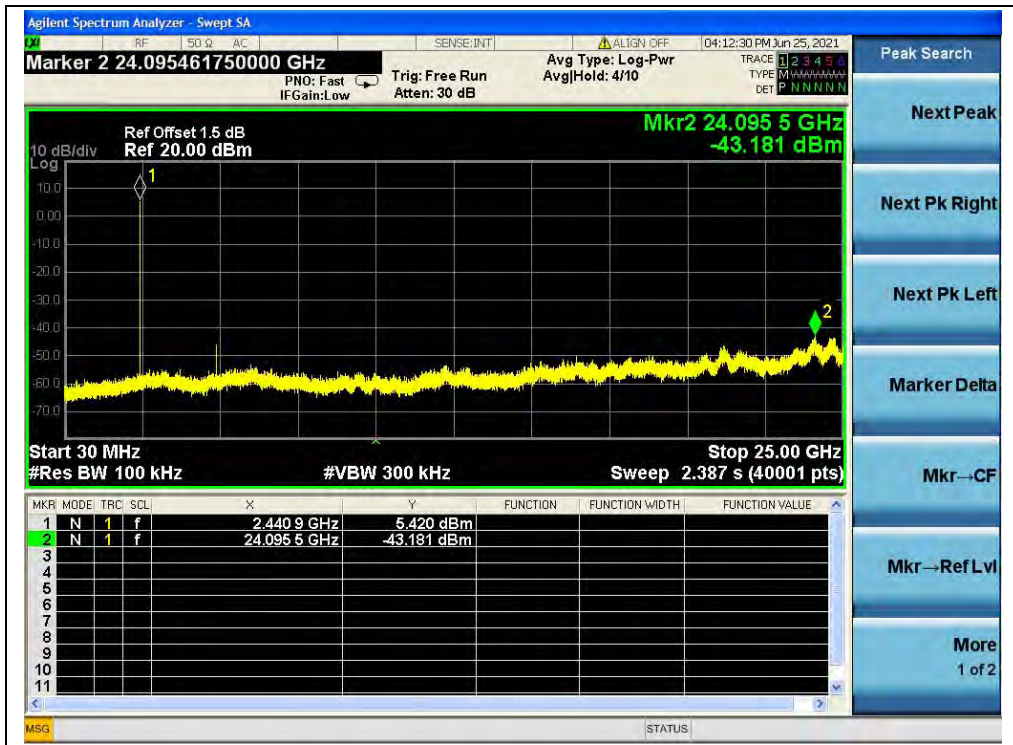
(30MHz to 25GHz, Channel 0, $\pi/4$ -DQPSK)



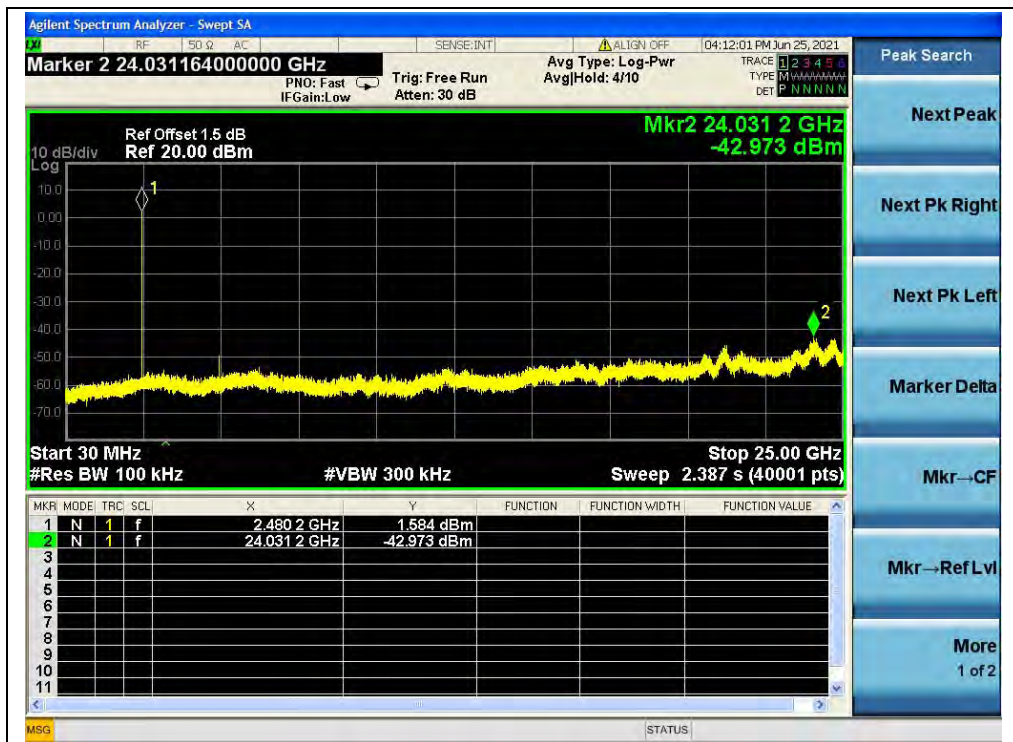
(Band edge, Channel 0, $\pi/4$ -DQPSK)



(Band edge with hopping on, Channel 0, $\pi/4$ -DQPSK)



(30MHz to 25GHz, Channel 39, $\pi/4$ -DQPSK)



(30MHz to 25GHz, Channel 78, $\pi/4$ -DQPSK)