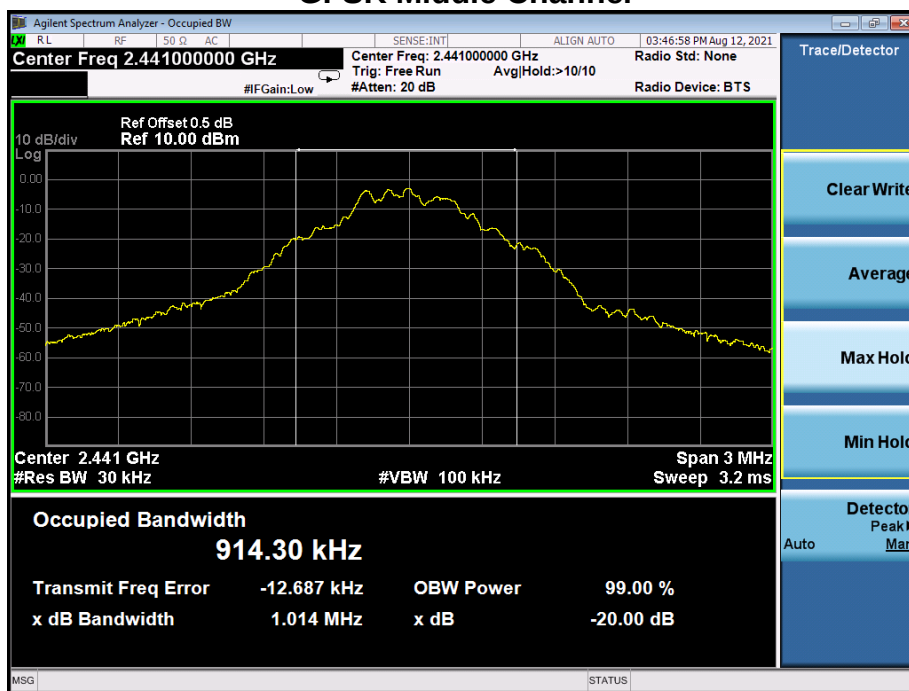
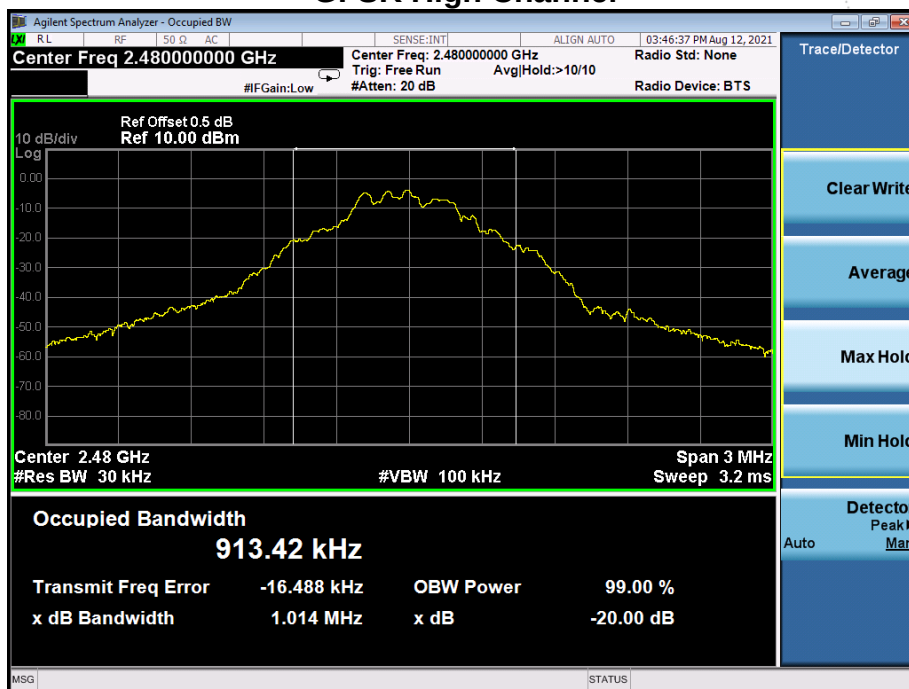


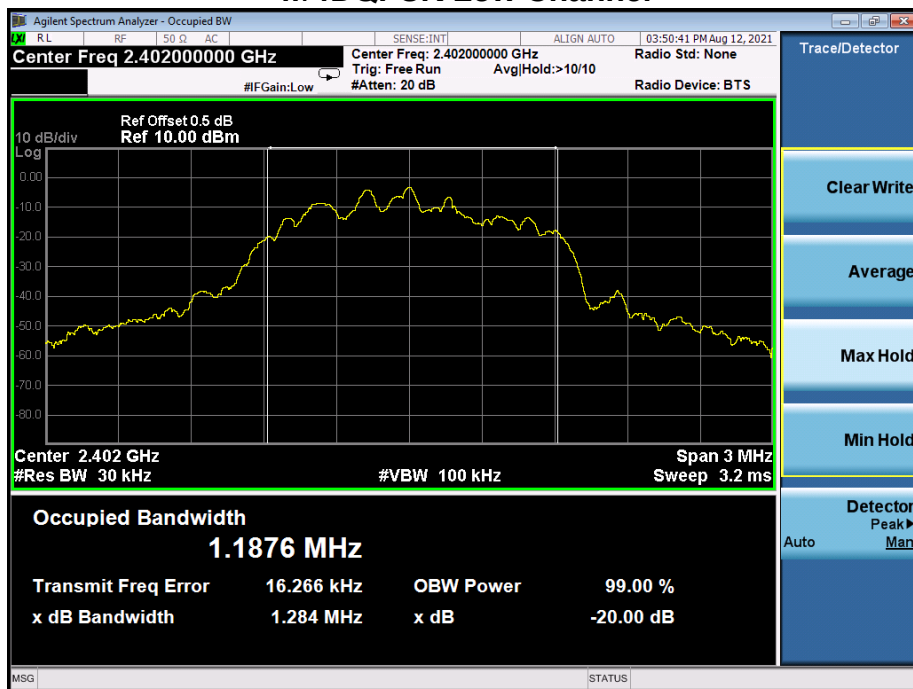
GFSK Middle Channel



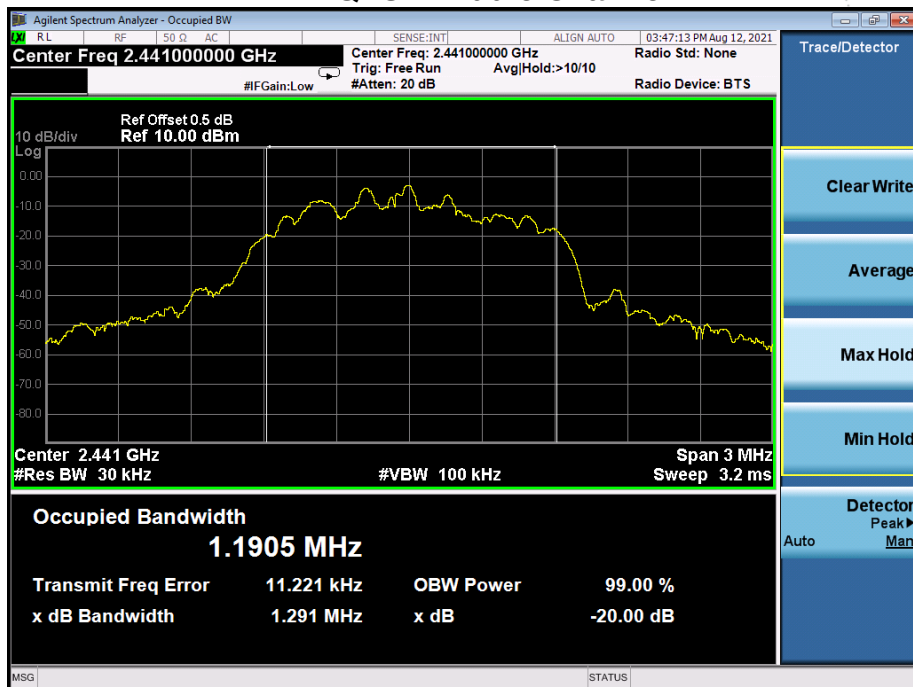
GFSK High Channel



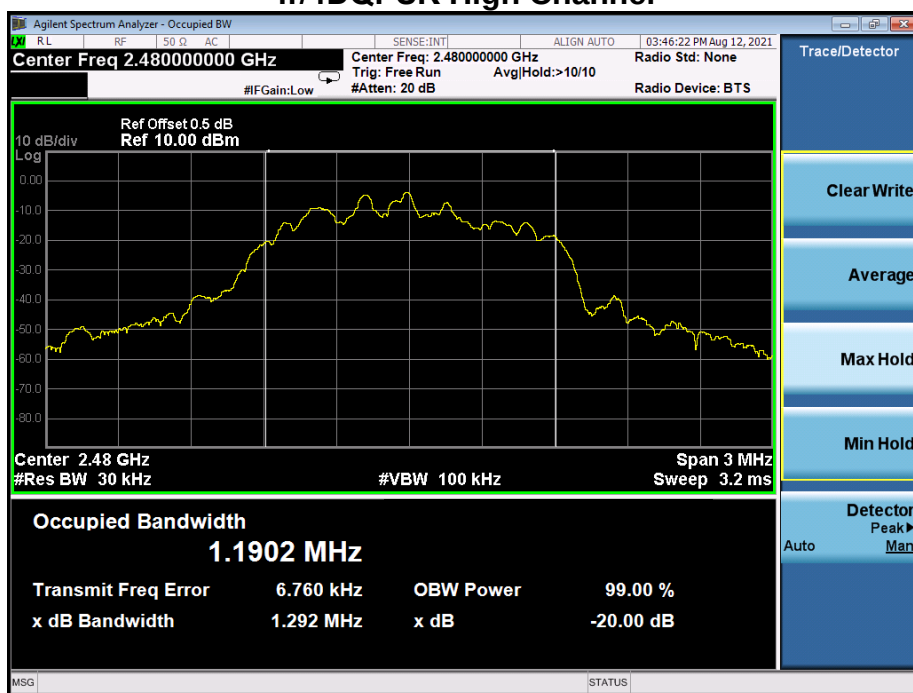
$\pi/4$ DQPSK Low Channel



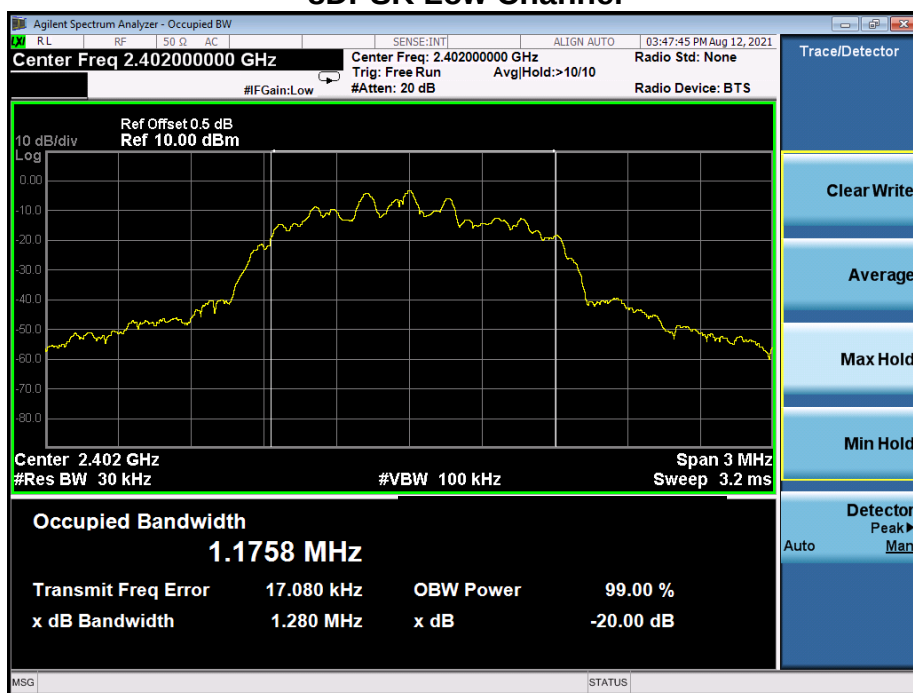
$\pi/4$ DQPSK Middle Channel



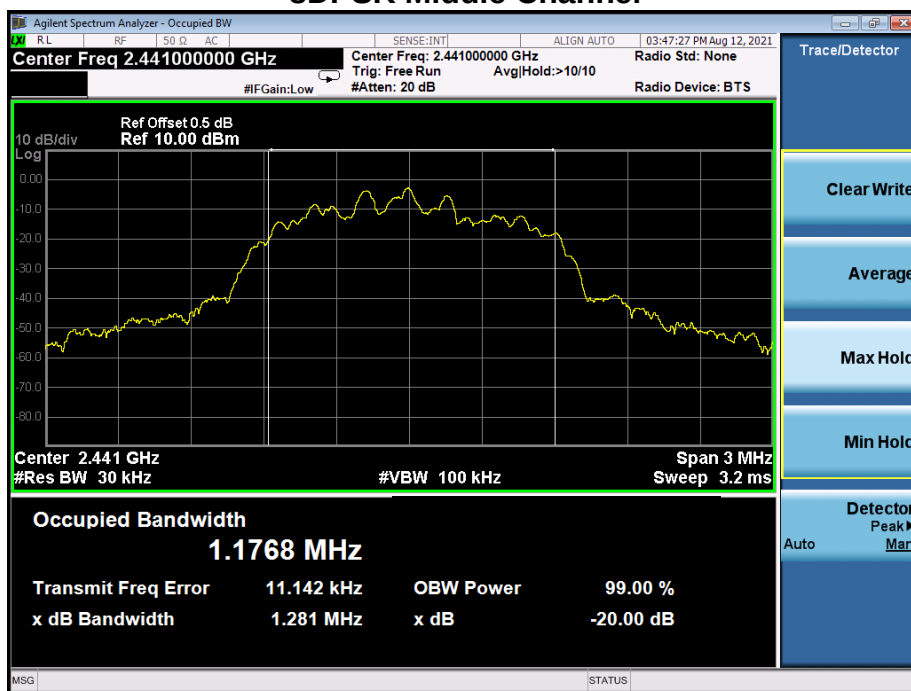
$\pi/4$ DQPSK High Channel



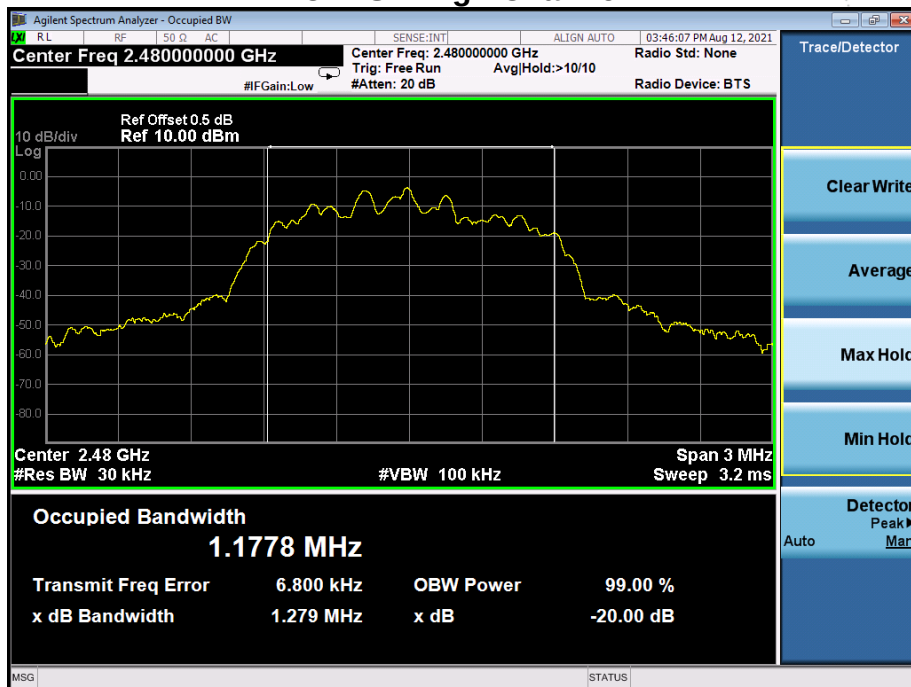
8DPSK Low Channel



8DPSK Middle Channel



8DPSK High Channel



11. MAXIMUM PEAK OUTPUT POWER

11.1 Block Diagram Of Test Setup



11.2 Limit

FCC Part15 (15.247), Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(1)	Peak Output Power	0.125 watt or 21dBm	2400-2483.5	PASS

11.3 Test procedure

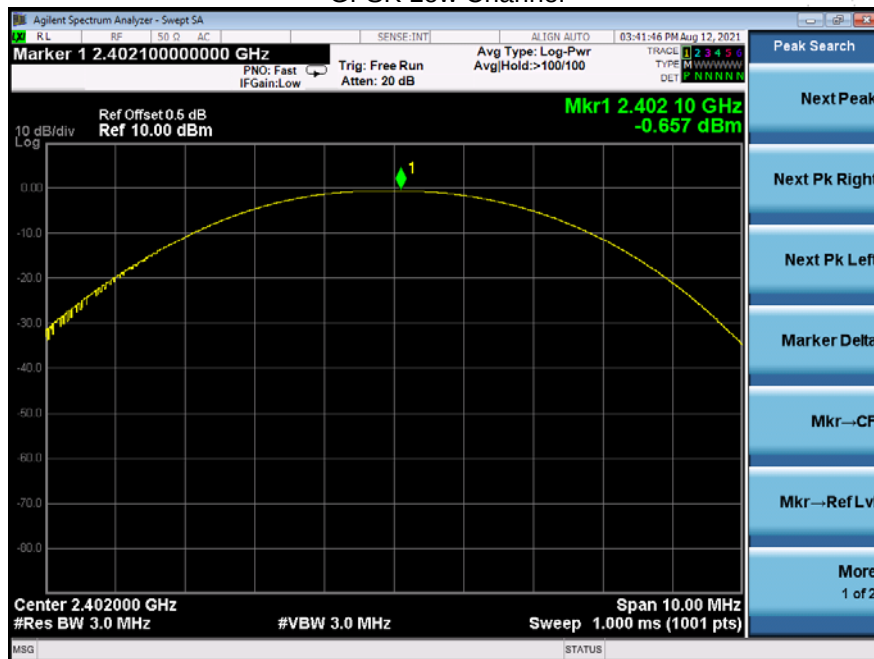
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3MHz. VBW = 3MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

11.4 Test Result

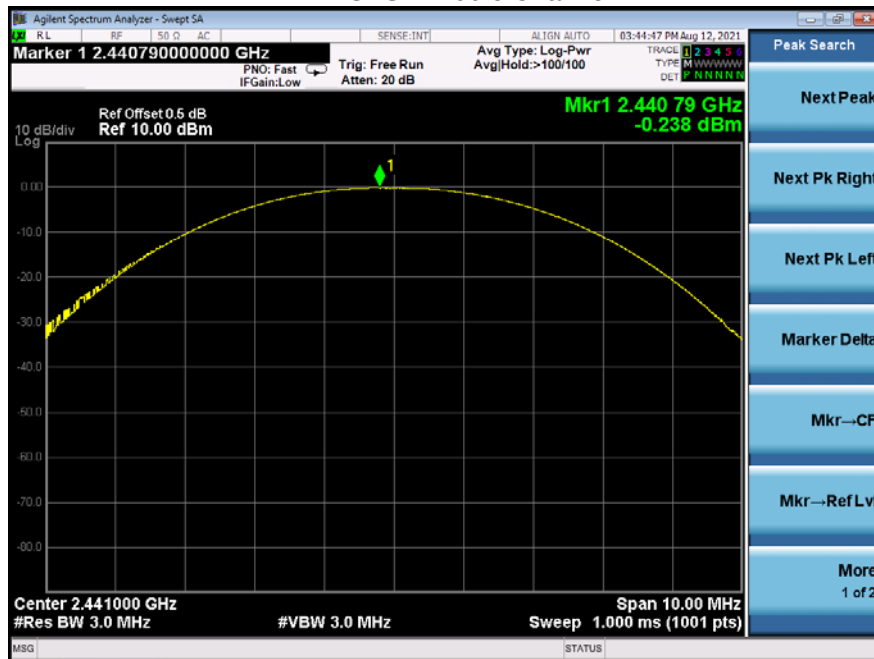
Temperature :	26°C	Relative Humidity :	54%
Test Voltage :	AC 120V/60Hz	Remark:	N/A

Modulation	Test Channel	Output Power (dBm)	Limit (dBm)
GFSK	Low	-0.657	21
GFSK	Middle	-0.238	21
GFSK	High	-1.170	21
$\pi/4$ DQPSK	Low	-0.684	21
$\pi/4$ DQPSK	Middle	-0.252	21
$\pi/4$ DQPSK	High	-1.172	21
8DPSK	Low	-0.670	21
8DPSK	Middle	-0.243	21
8DPSK	High	-1.147	21

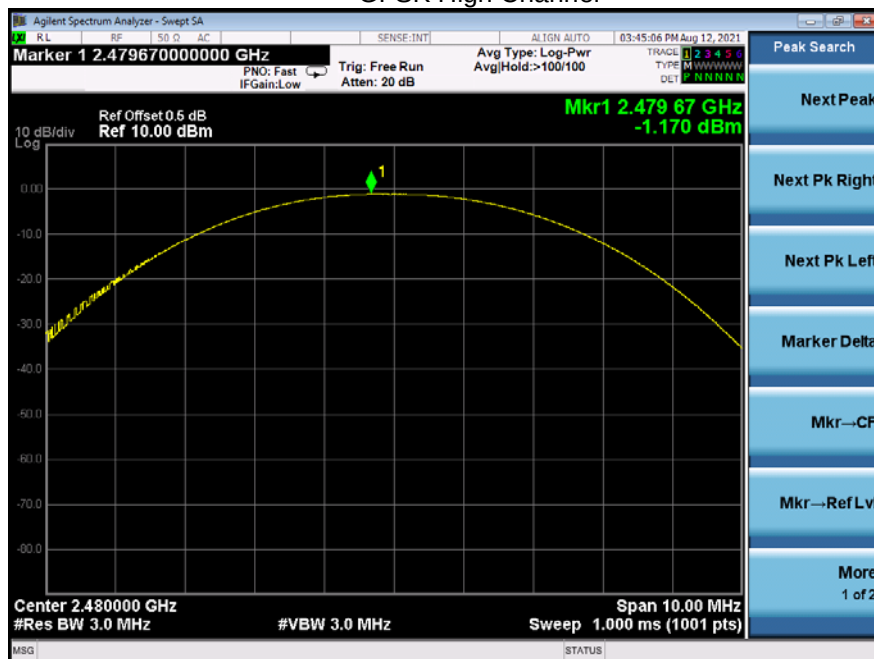
Test plots
GFSK Low Channel

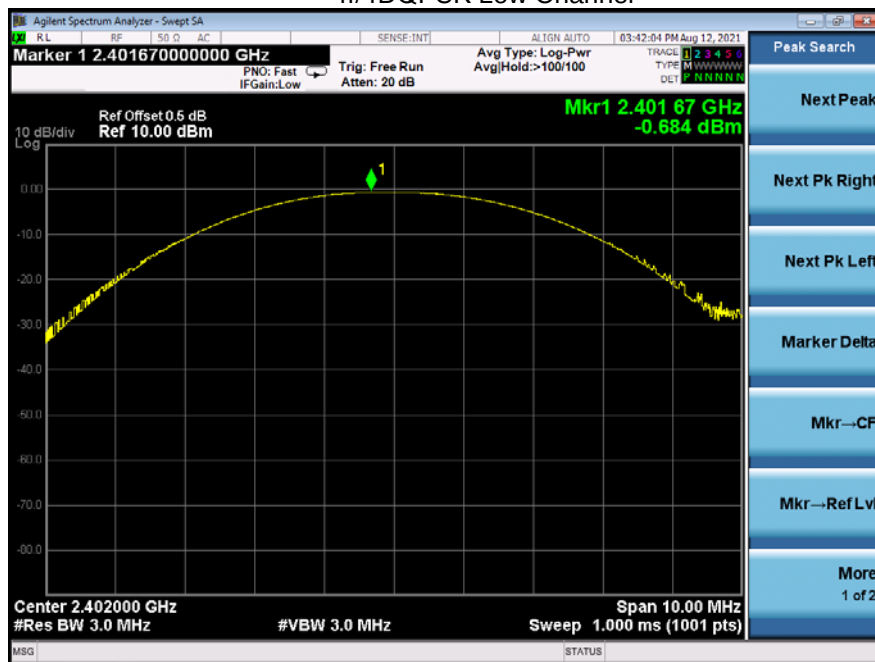
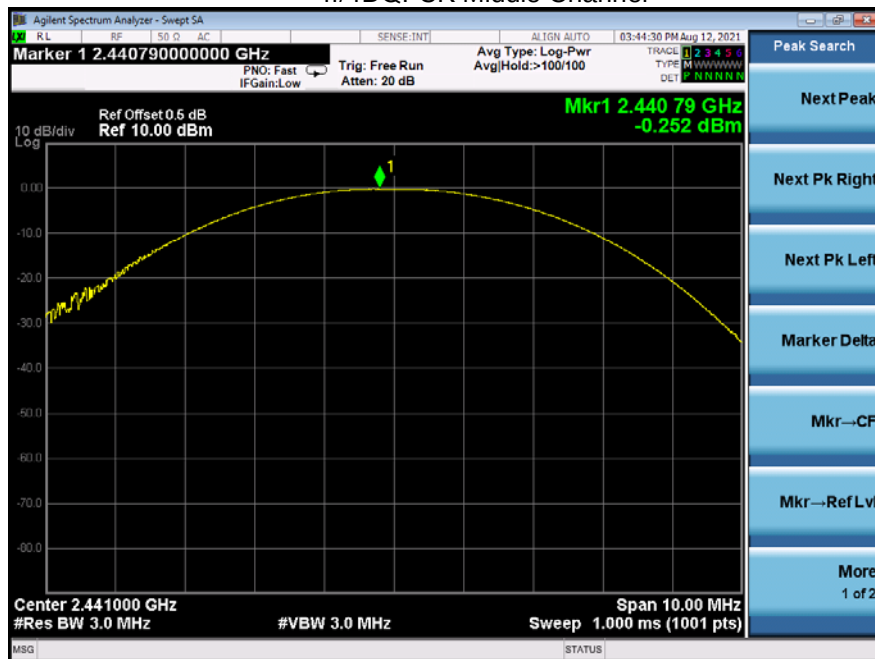


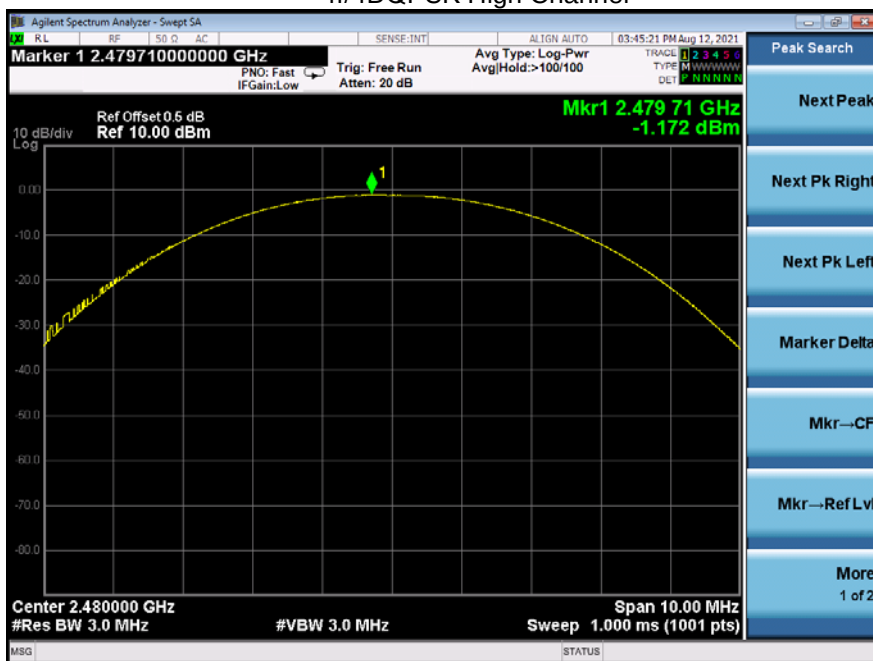
GFSK Middle Channel



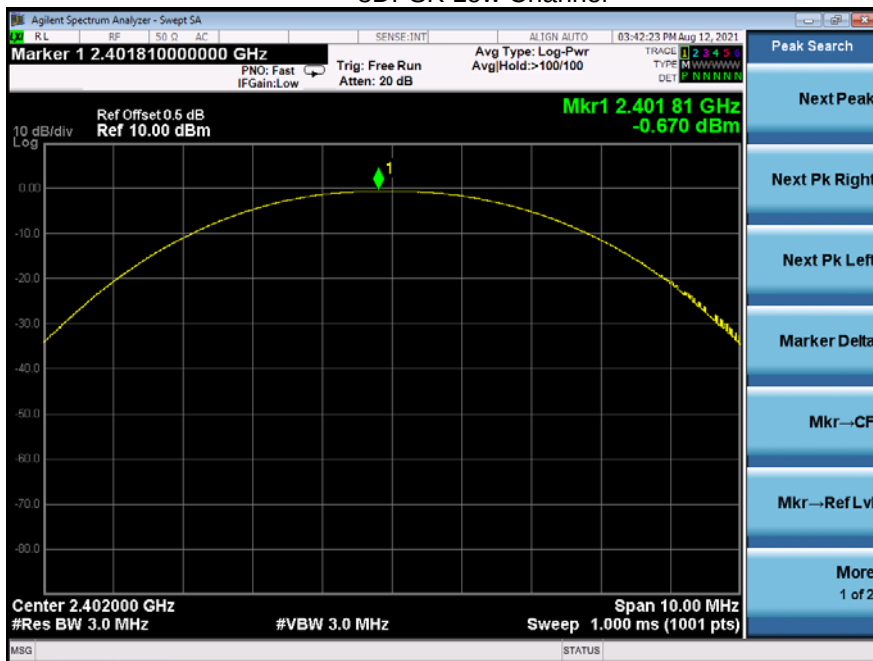
GFSK High Channel



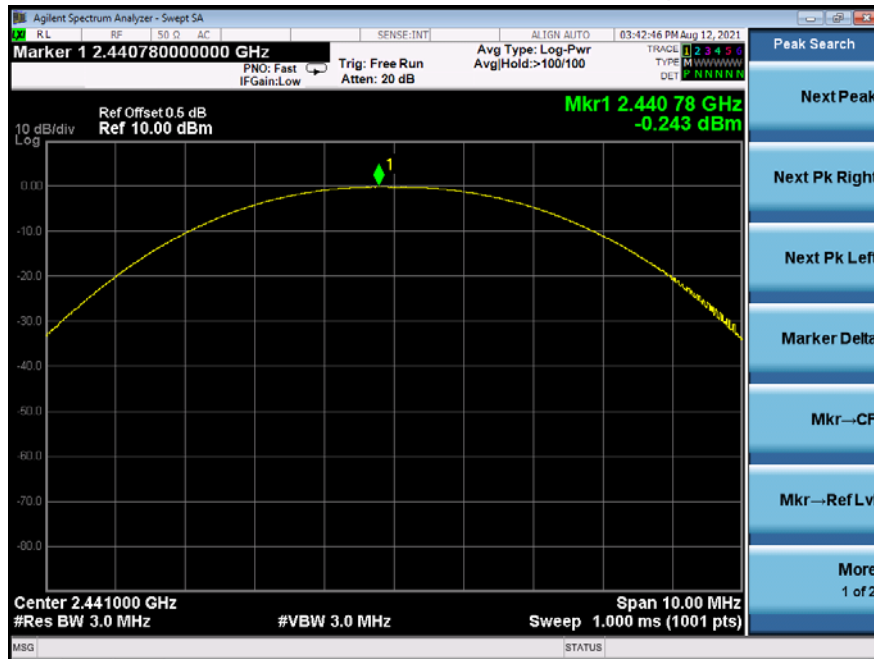
$\pi/4$ DQPSK Low Channel

 $\pi/4$ DQPSK Middle Channel


$\pi/4$ DQPSK High Channel


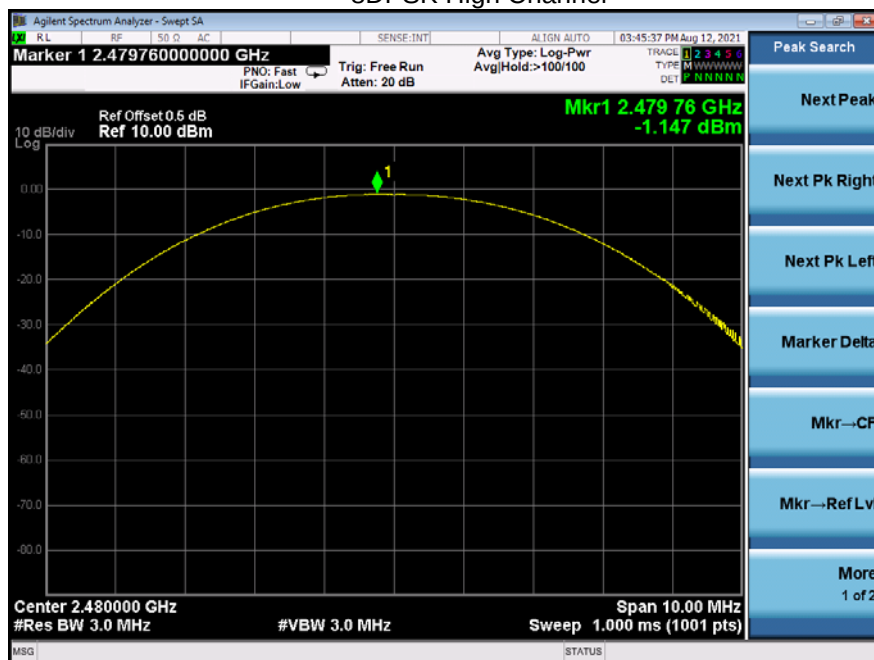
8DPSK Low Channel



8DPSK Middle Channel



8DPSK High Channel



12. HOPPING CHANNEL SEPARATION

12.1 Block Diagram Of Test Setup



12.2 Limit

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 2400-2483.5 MHz 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.

12.3 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 = 2.0MHz. 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.

12.4 Test Result

Modulation	Test Channel	Separation (MHz)	Limit(MHz)	Result
GFSK	Low	0.028	0.674	PASS
GFSK	Middle	0.014	0.676	PASS
GFSK	High	-0.100	0.676	PASS
$\pi/4$ DQPSK	Low	0.081	0.856	PASS
$\pi/4$ DQPSK	Middle	-0.105	0.861	PASS
$\pi/4$ DQPSK	High	-0.048	0.861	PASS
8DPSK	Low	-0.114	0.853	PASS
8DPSK	Middle	-0.723	0.854	PASS
8DPSK	High	0.080	0.853	PASS

Test plots GFSK Low Channel



GFSK Middle Channel



GFSK High Channel



$\pi/4$ DQPSK Low Channel



$\pi/4$ DQPSK Middle Channel



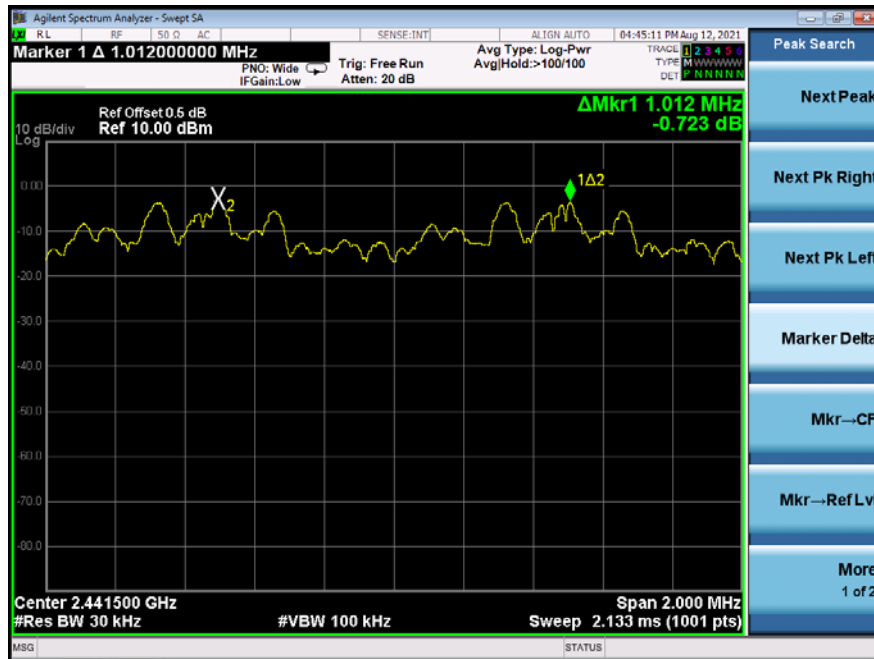
$\pi/4$ DQPSK High Channel



8DPSK Low Channel



8DPSK Middle Channel



8DPSK High Channel



13. NUMBER OF HOPPING FREQUENCY

13.1 Block Diagram Of Test Setup



13.2 Limit

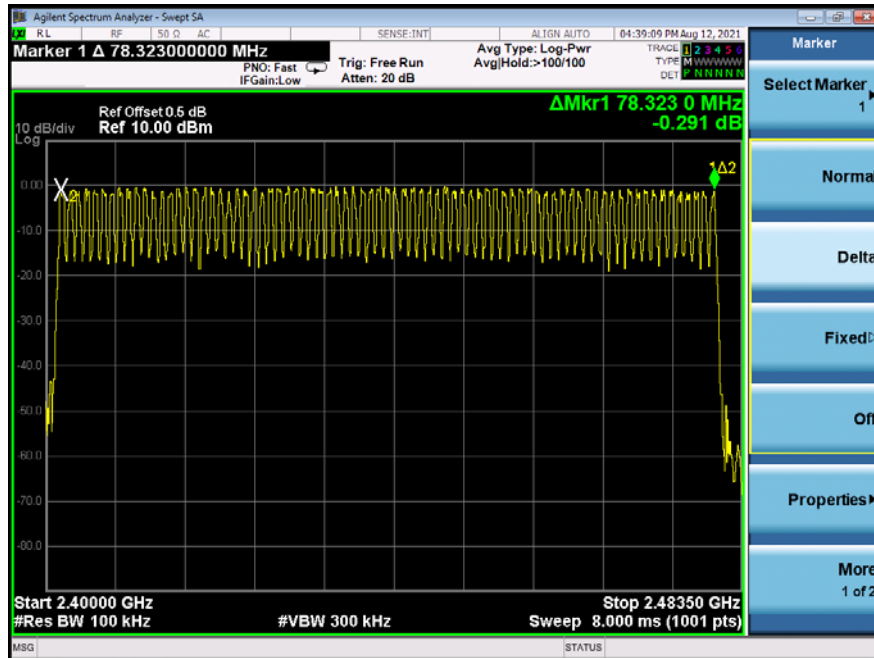
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

13.3 Test procedure

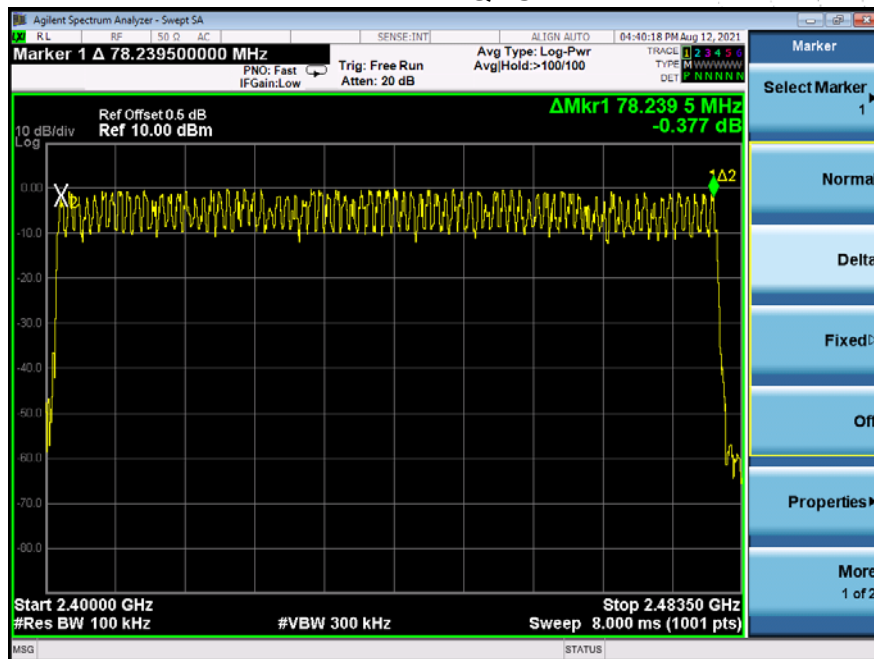
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to 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 = 2.4835GHz. Sweep=auto;

13.4 Test Result

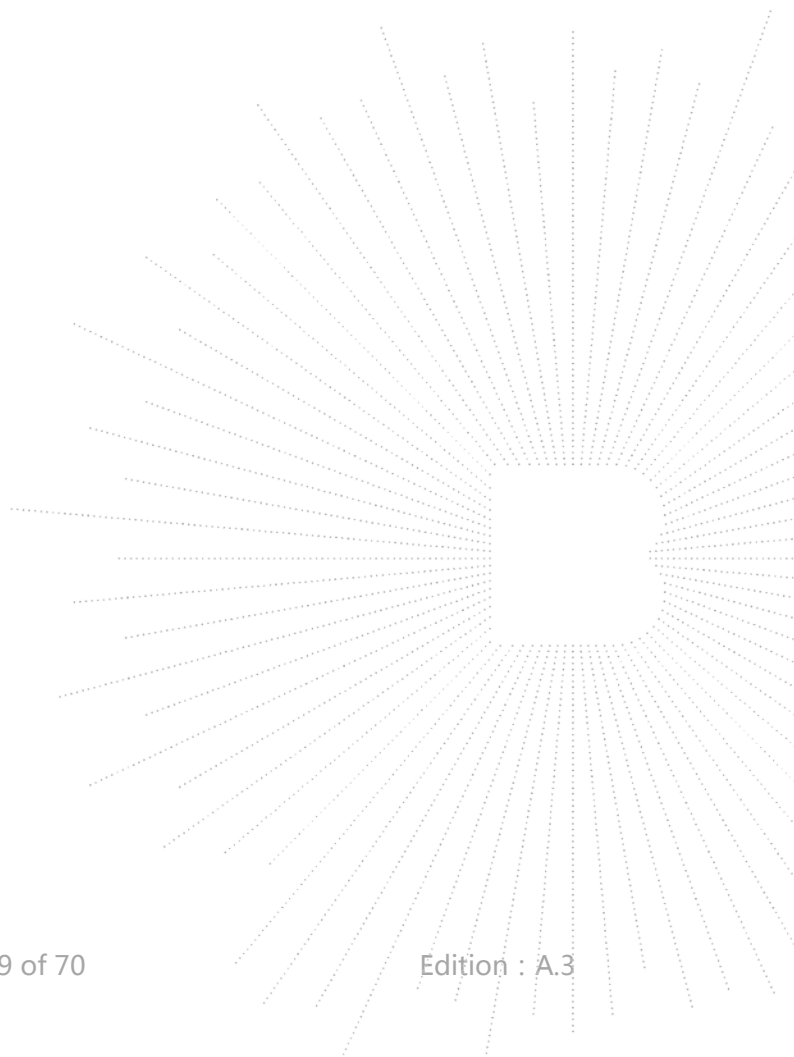
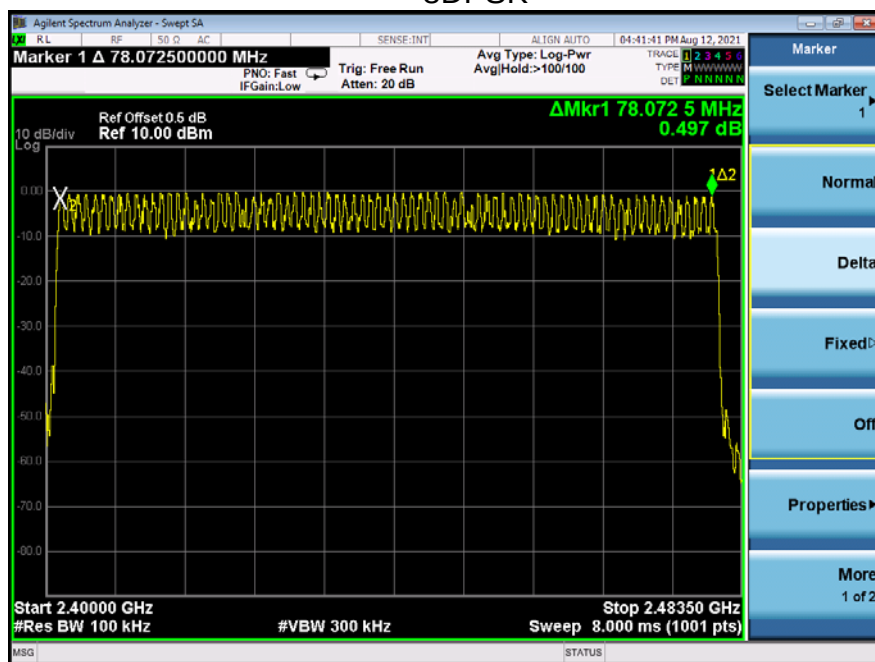
Test Plots: 79 Channels in total GFSK



$\pi/4$ DQPSK



8DPSK



14. DWELL TIME

14.1 Block Diagram Of Test Setup



14.2 Limit

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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

14.3 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.
4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

14.4 Test Result

DH5 Packet permit maximum 1600 / 79 / 6 hops per second in each channel (5 time slots RX, 1 time slot TX).

DH3 Packet permit maximum 1600 / 79 / 4 hops per second in each channel (3 time slots RX, 1 time slot TX).

DH1 Packet permit maximum 1600 / 79 / 2 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the Dwell Time can be calculated as follows:

DH5: $1600/79/6 \times 0.4 \times 79 \times (\text{MkrDelta})/1000$

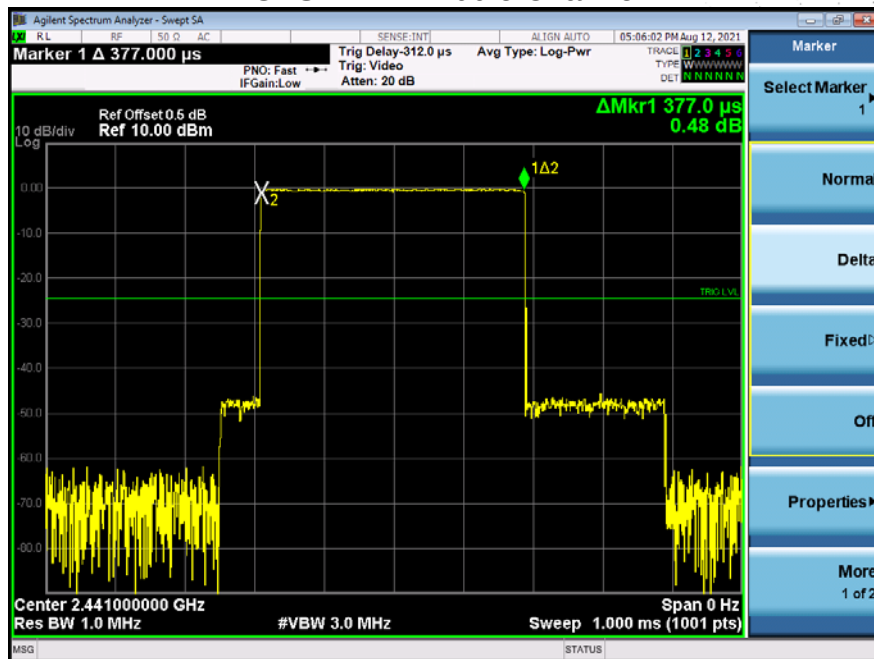
DH3: $1600/79/4 \times 0.4 \times 79 \times (\text{MkrDelta})/1000$

DH1: $1600/79/2 \times 0.4 \times 79 \times (\text{MkrDelta})/1000$

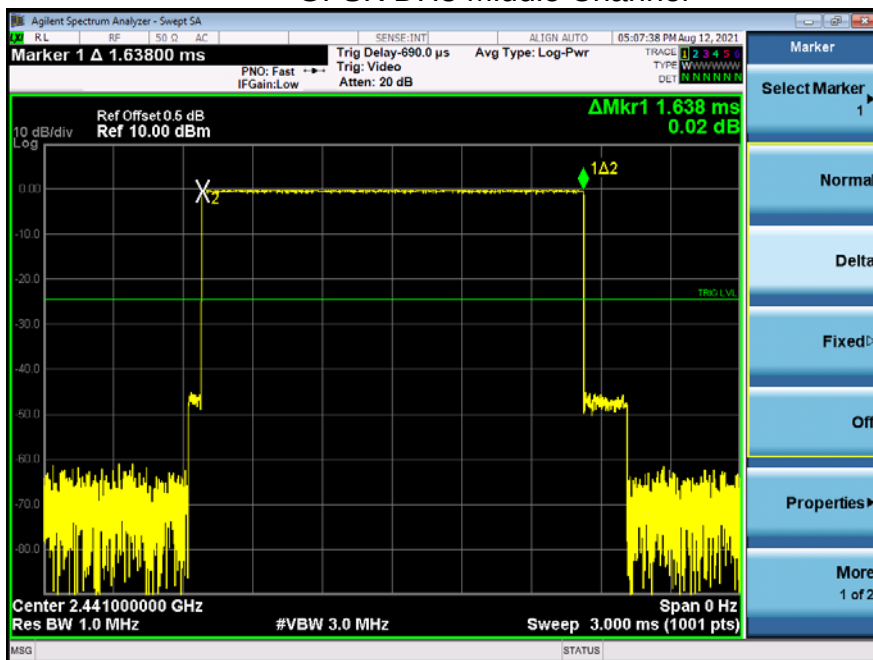
Remark: Mkr Delta is once pulse time.

Modulation	Channel Data	Packet	pulse time(ms)	Dwell Time(s)	Limits(s)
GFSK	Middle	DH1	0.377	0.121	0.4
		DH3	1.638	0.262	0.4
		DH5	2.890	0.308	0.4
$\pi/4$ DQPSK	Middle	2DH1	0.386	0.124	0.4
		2DH3	1.638	0.262	0.4
		2DH5	2.880	0.307	0.4
8DPSK	Middle	3DH1	0.386	0.124	0.4
		3DH3	1.638	0.262	0.4
		3DH5	2.880	0.307	0.4

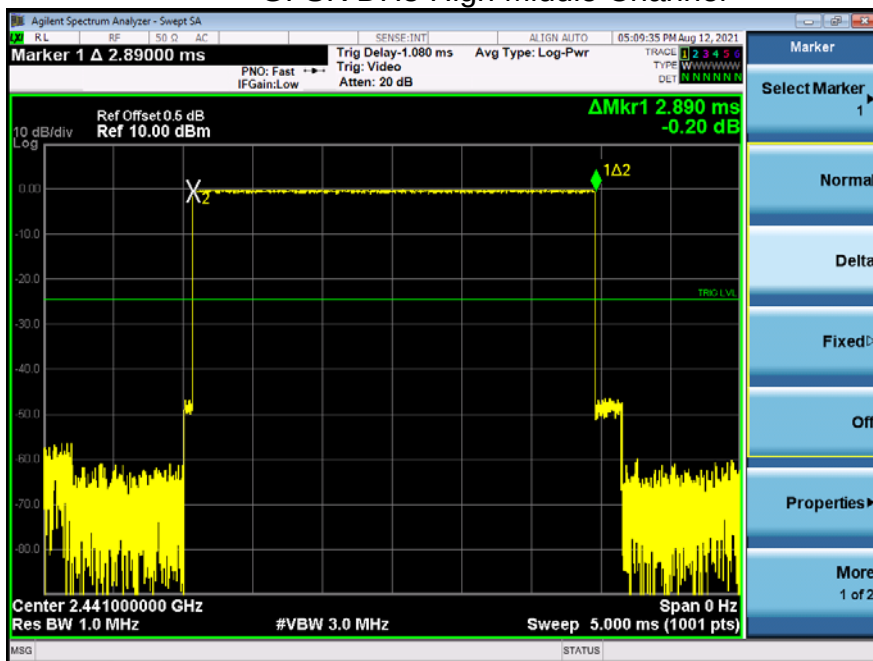
Test Plots
GFSK DH1 Middle Channel



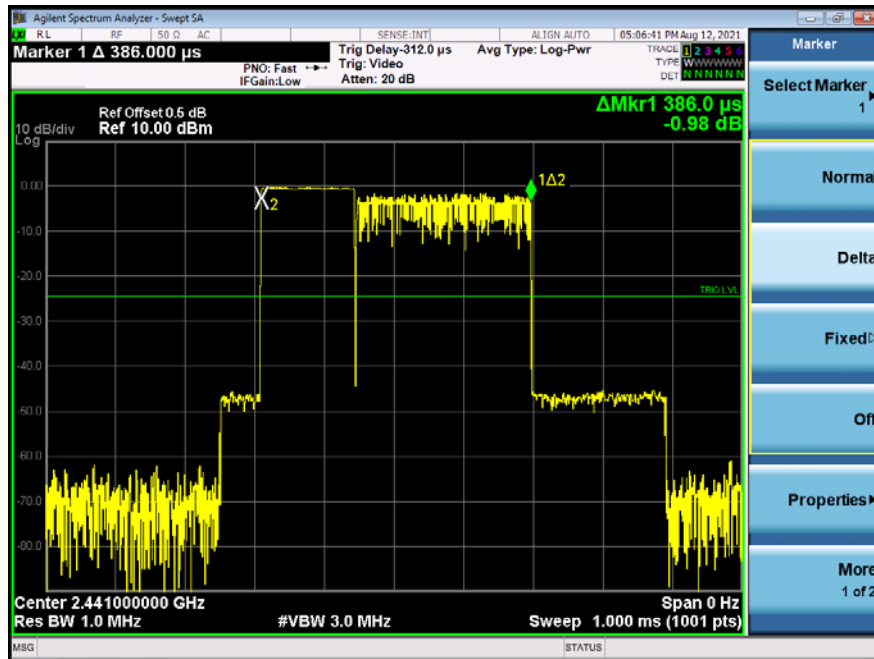
GFSK DH3 Middle Channel



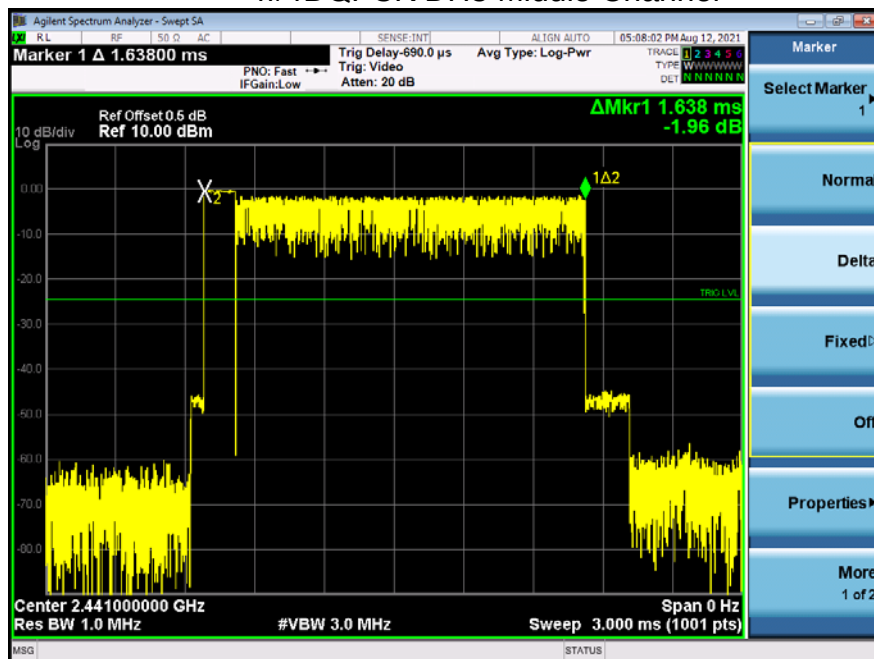
GFSK DH5 High Middle Channel



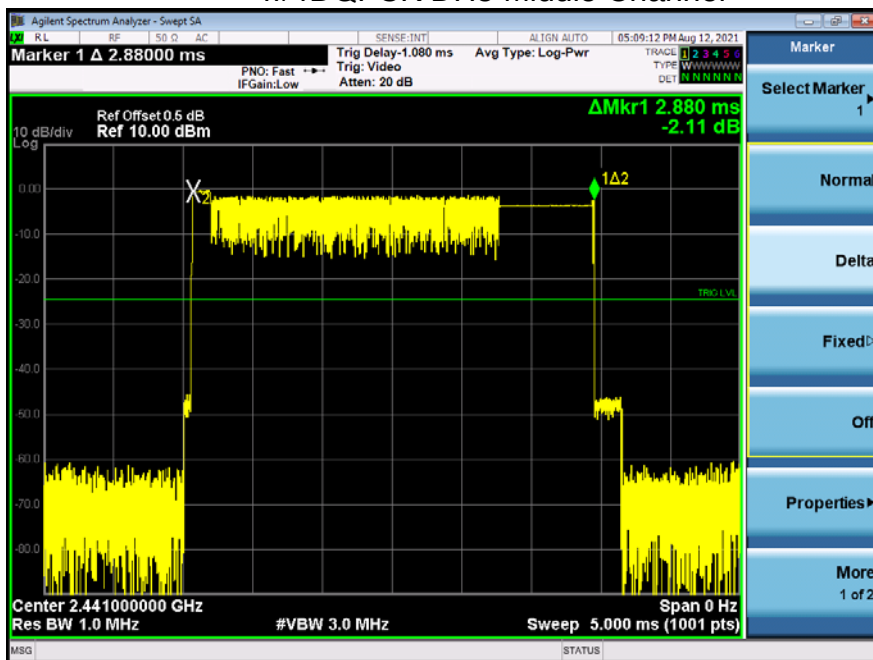
$\pi/4$ DQPSK DH1 Middle Channel



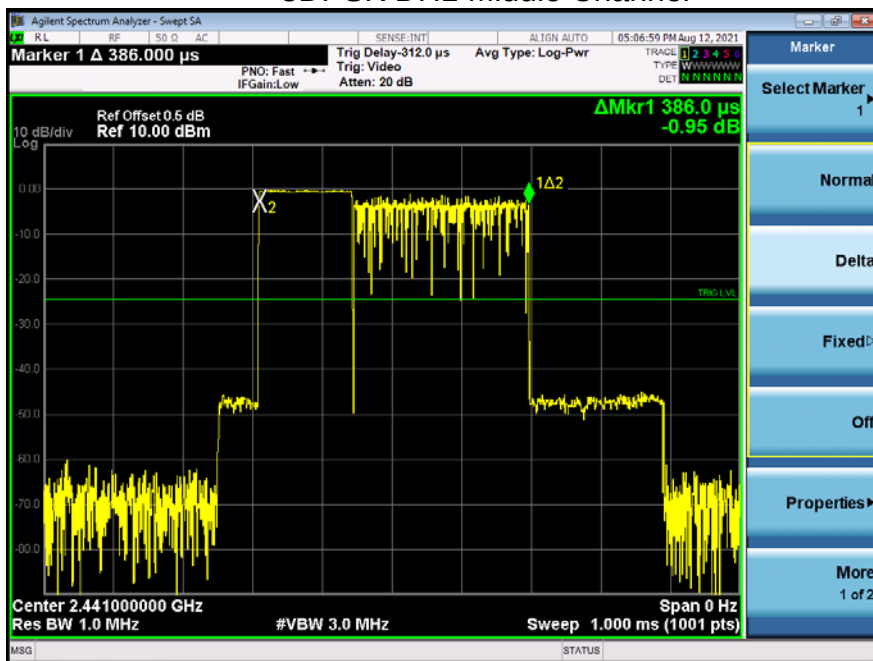
$\pi/4$ DQPSK DH3 Middle Channel



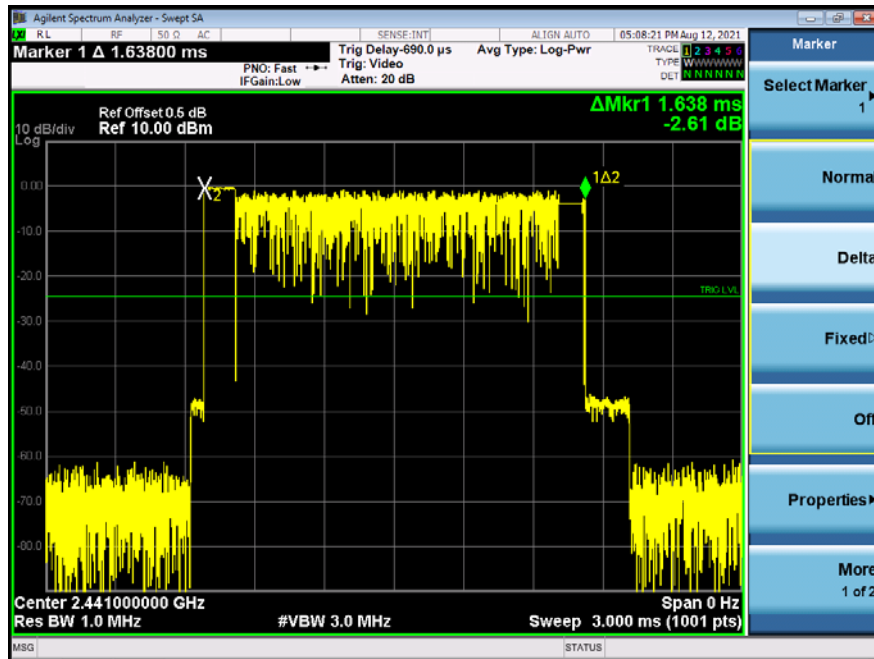
$\pi/4$ DQPSK DH5 Middle Channel



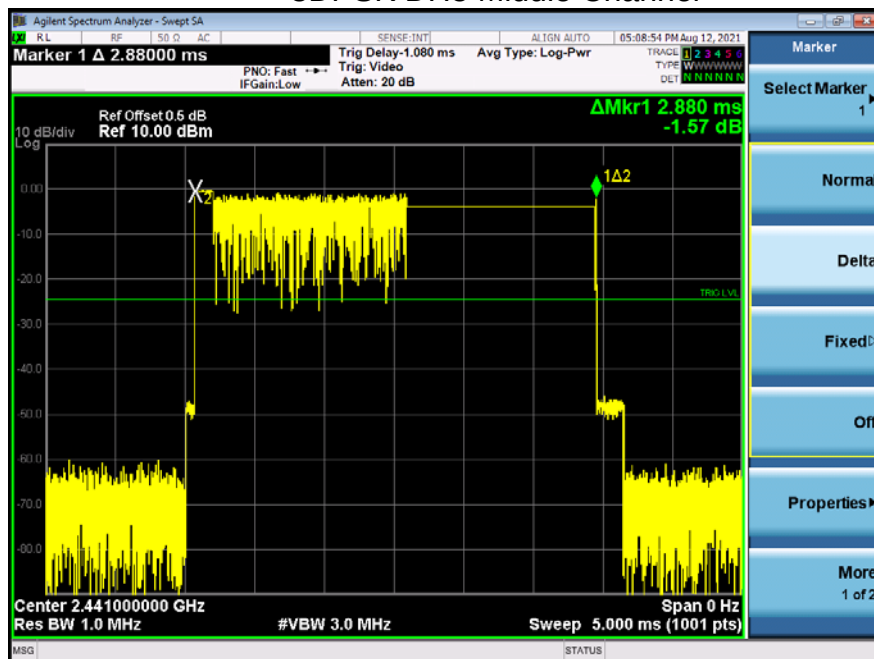
8DPSK DH1 Middle Channel



8DPSK DH3 Middle Channel



8DPSK DH5 Middle Channel



15. ANTENNA REQUIREMENT

15.1 Limit

15.203 requirement: For intentional device, according to 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.

15.2 Test Result

The EUT antenna is PCB antenna, fulfill the requirement of this section.

