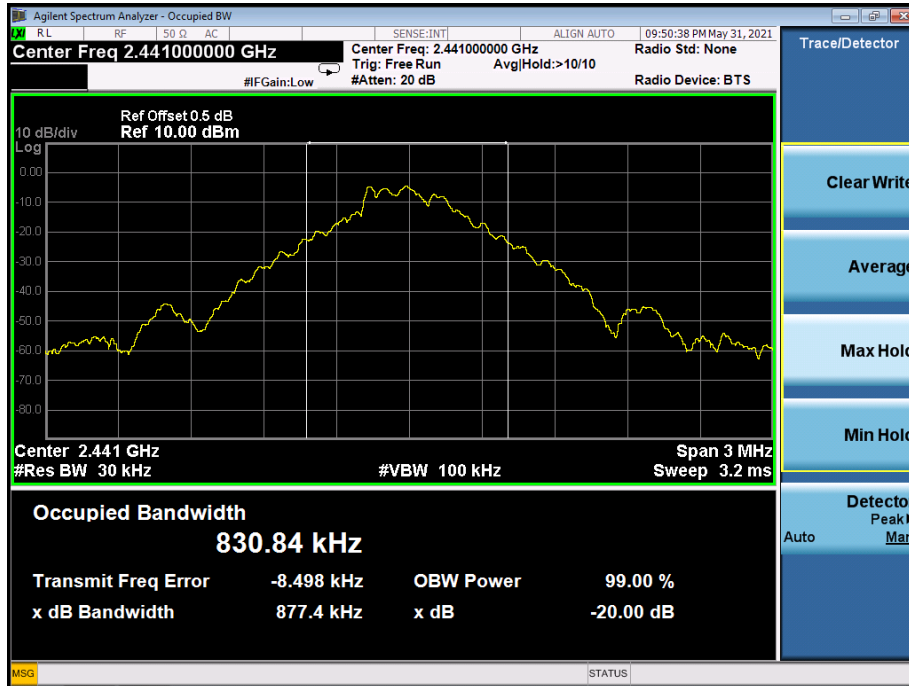
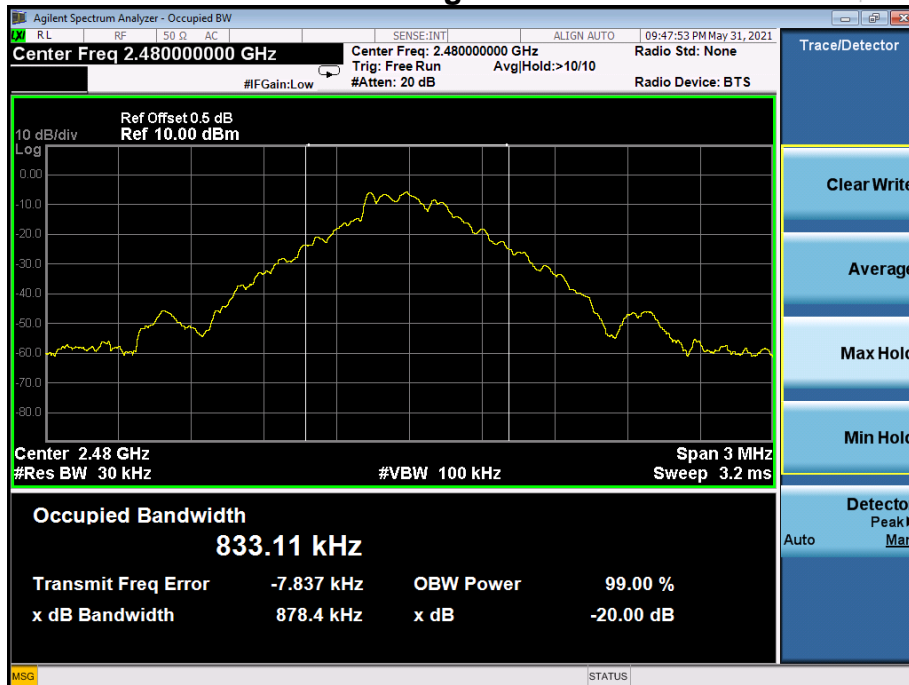


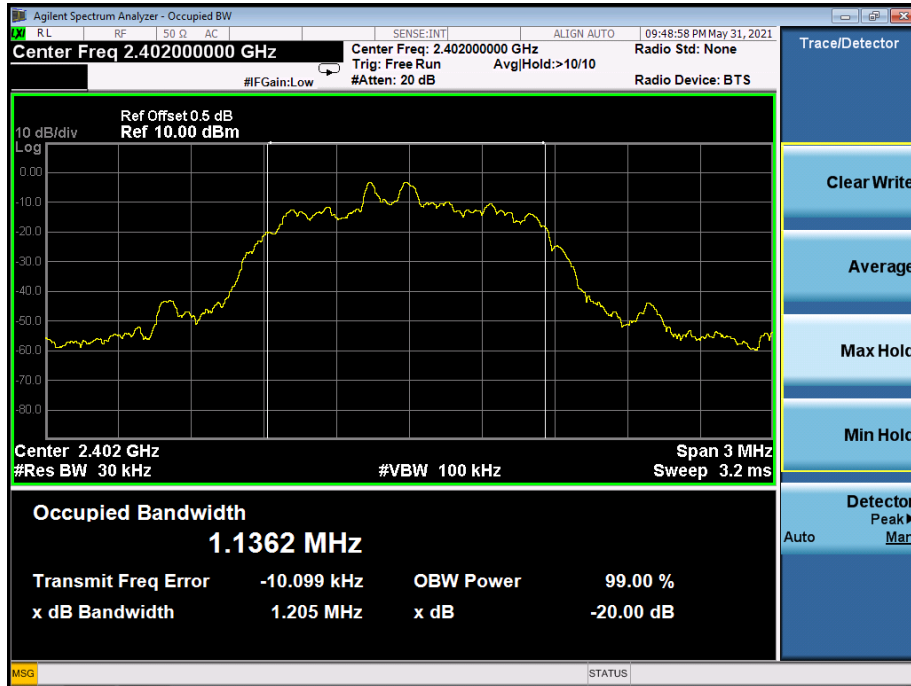
GFSK Middle Channel



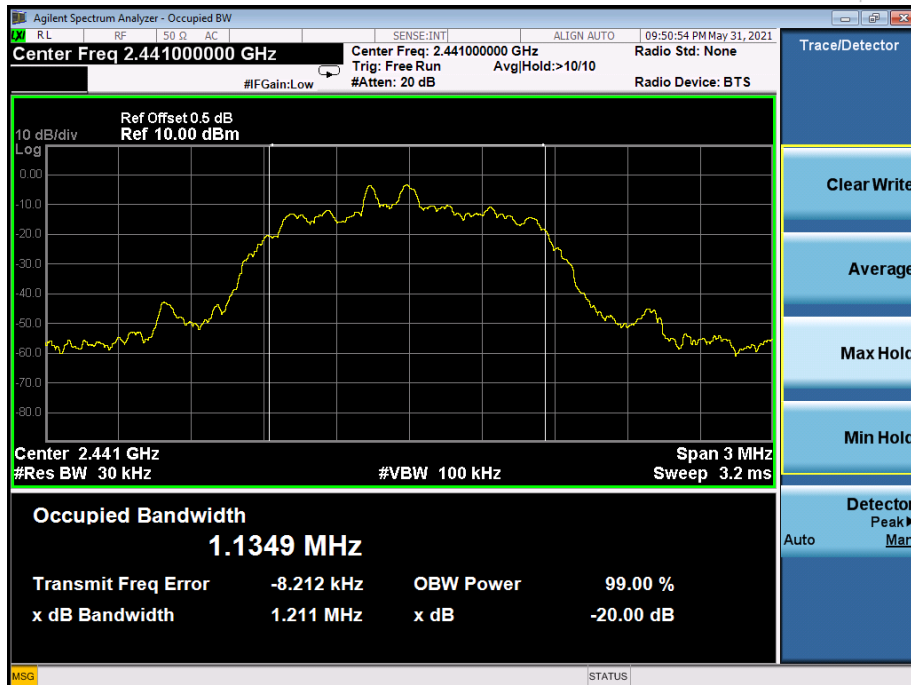
GFSK High Channel



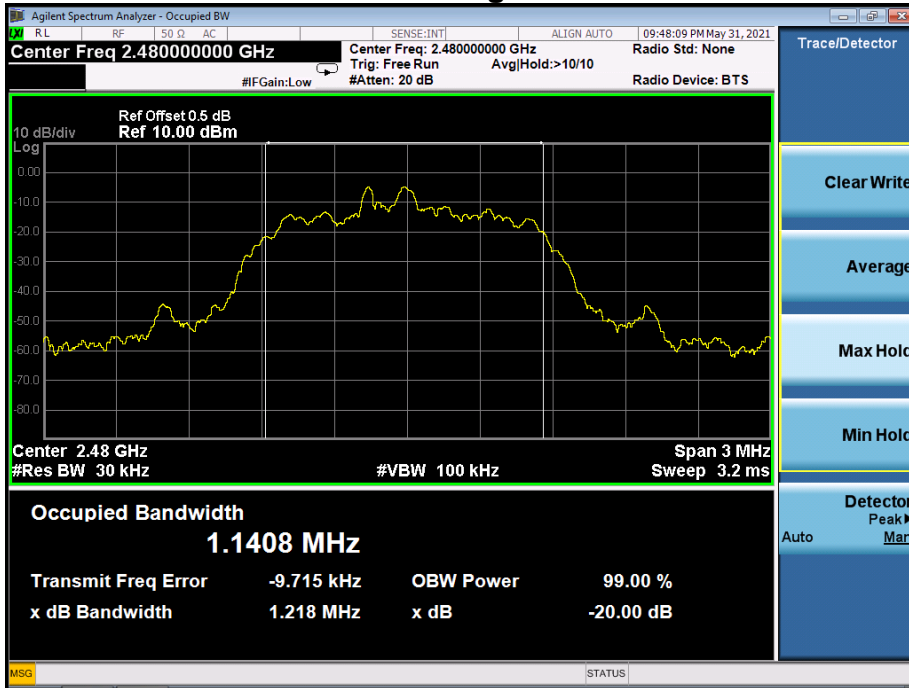
Pi/4 DQPSK Low Channel



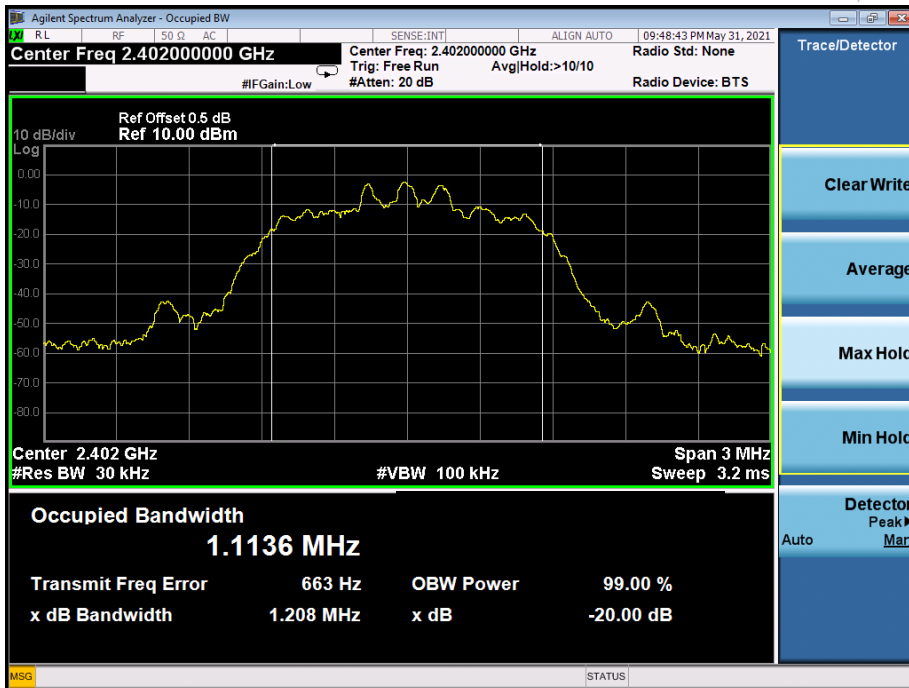
Pi/4 DQPSK Middle Channel



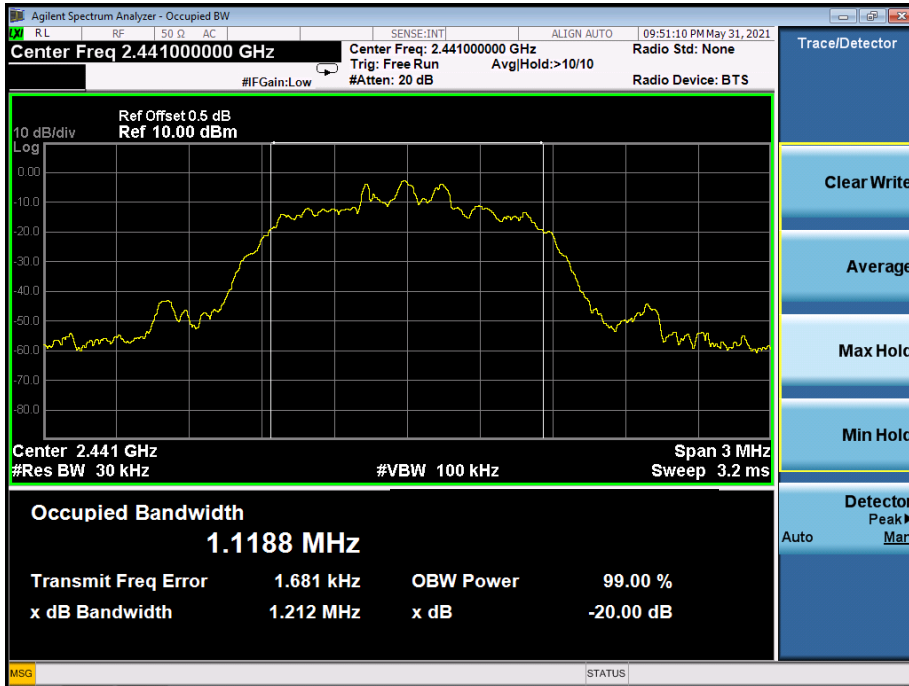
Pi/4 DQPSK High Channel



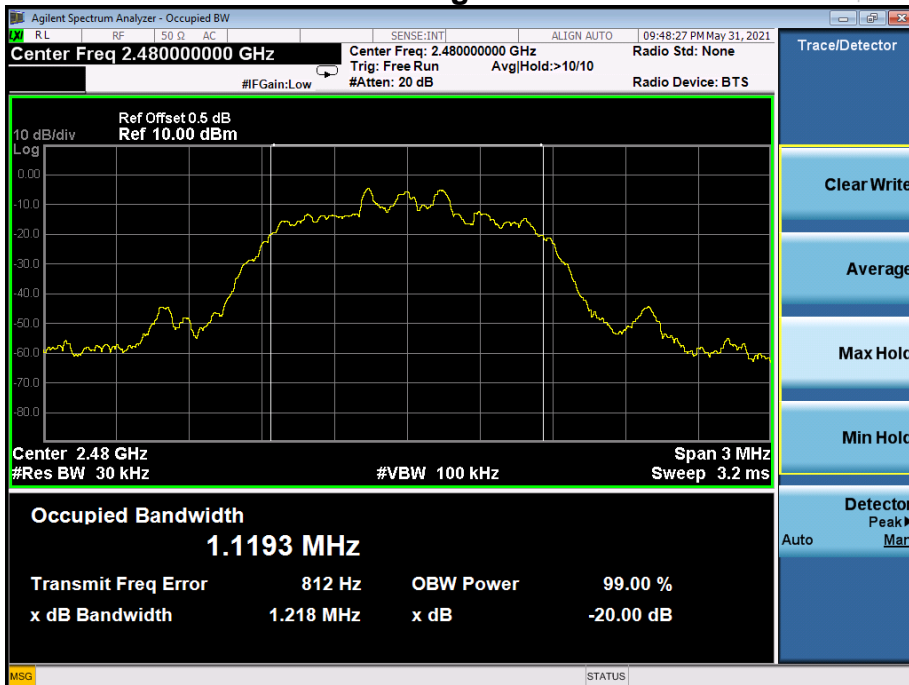
8DPSK Low Channel



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

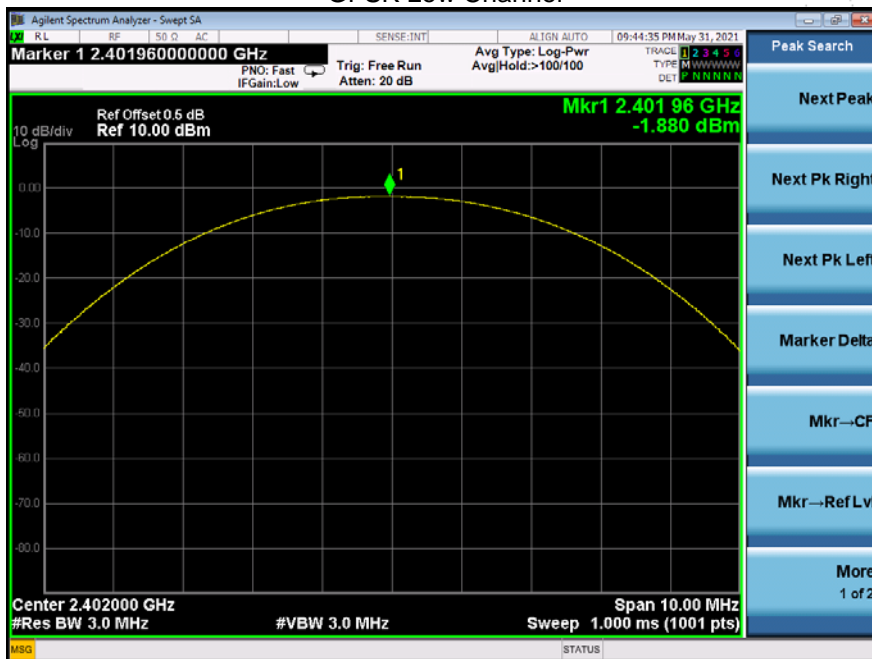
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3MHz. VBW = 3MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

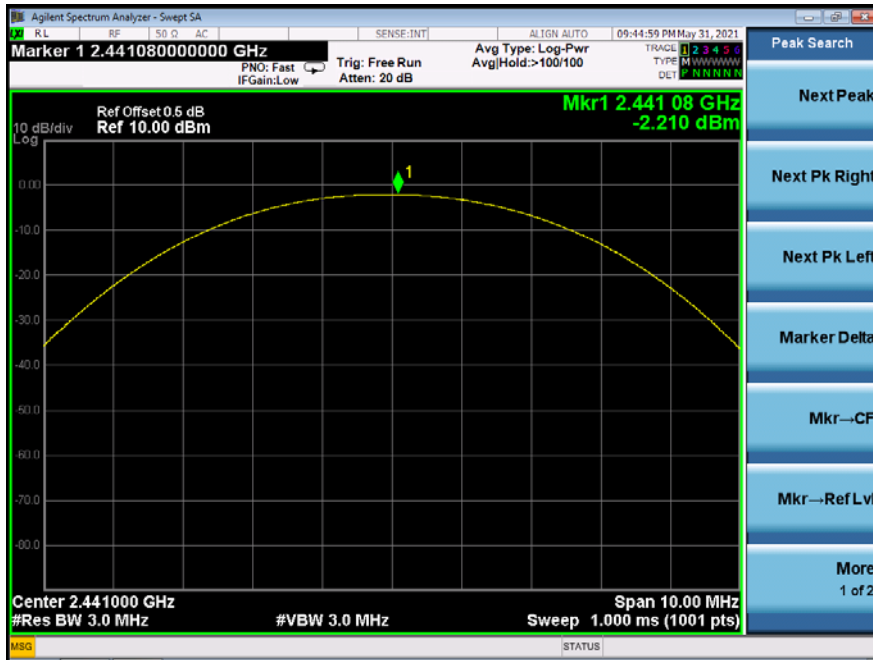
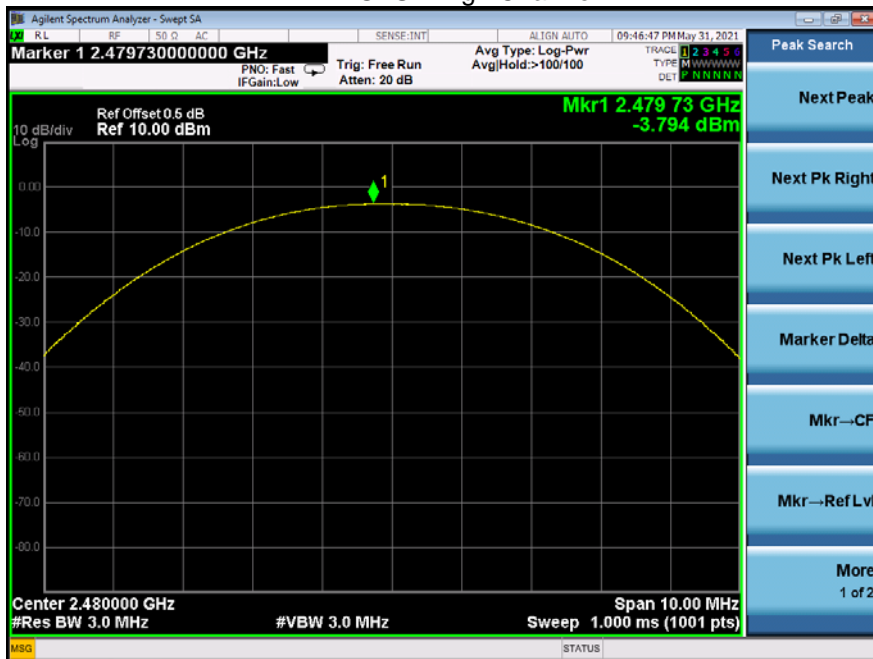
11.4 Test Result

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

Modulation	Test Channel	Output Power (dBm)	Limit (dBm)
GFSK	Low	-1.880	21
GFSK	Middle	-2.210	21
GFSK	High	-3.794	21
Pi/4 DQPSK	Low	-0.875	21
Pi/4 DQPSK	Middle	-1.166	21
Pi/4 DQPSK	High	-2.785	21
8DPSK	Low	0.152	21
8DPSK	Middle	-0.140	21
8DPSK	High	-1.495	21

Test plots
GFSK Low Channel

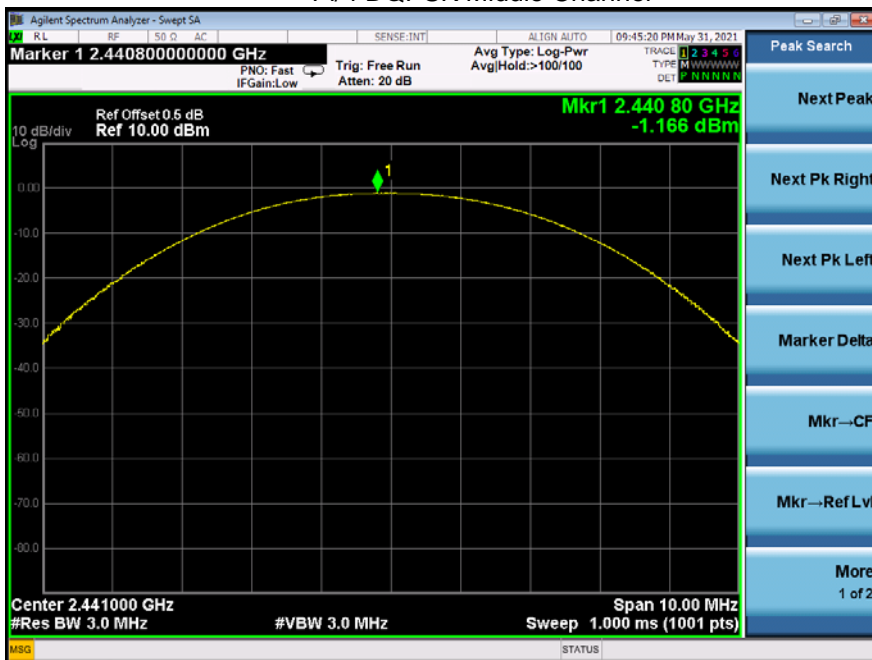


GFSK Middle Channel

GFSK High Channel


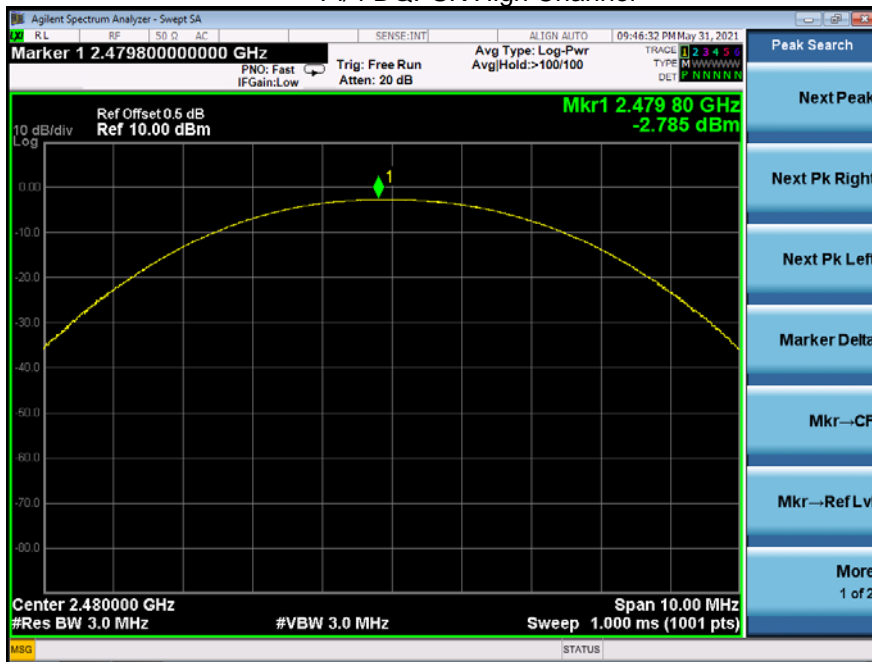
Pi/4 DQPSK Low Channel



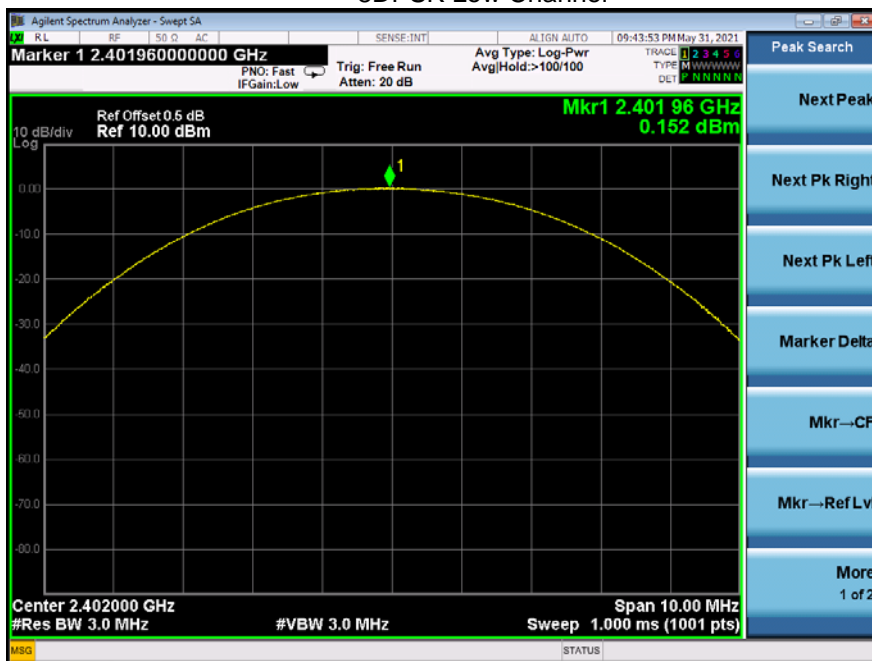
Pi/4 DQPSK Middle Channel

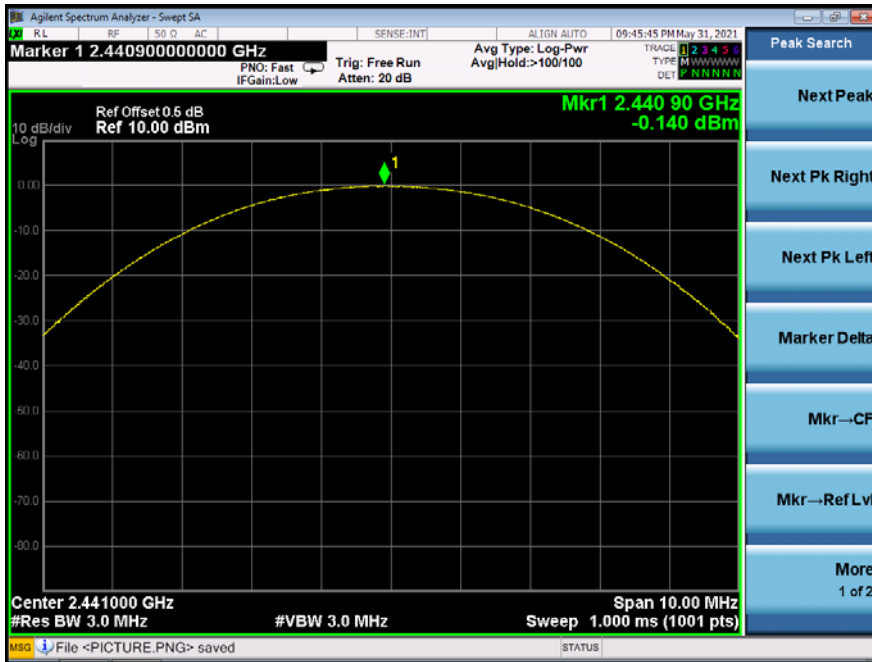
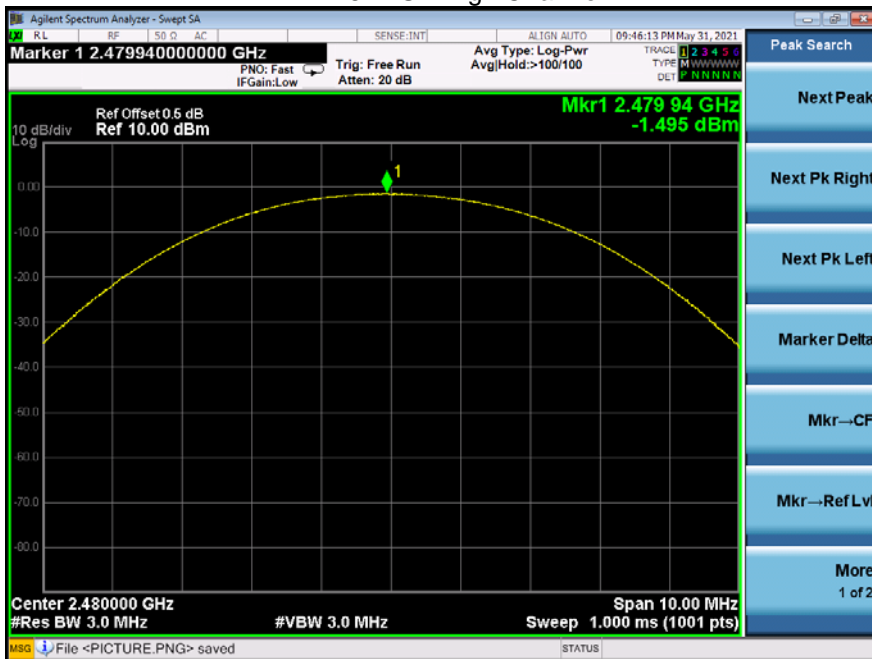


Pi/4 DQPSK High Channel



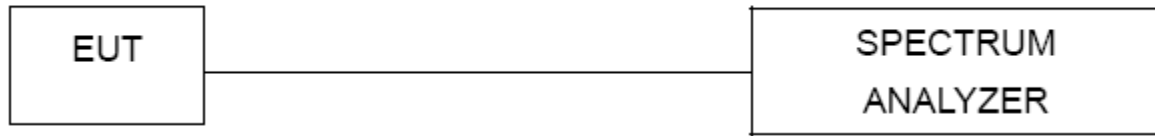
8DPSK Low Channel



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	1.008	0.602	PASS
GFSK	Middle	1.002	0.585	PASS
GFSK	High	1.000	0.585	PASS
Pi/4 DQPSK	Low	1.000	0.803	PASS
Pi/4 DQPSK	Middle	1.004	0.807	PASS
Pi/4 DQPSK	High	0.998	0.812	PASS
8DPSK	Low	1.000	0.805	PASS
8DPSK	Middle	1.002	0.808	PASS
8DPSK	High	1.000	0.812	PASS

Test plots GFSK Low Channel



GFSK Middle Channel



GFSK High Channel



Pi/4 DQPSK Low Channel



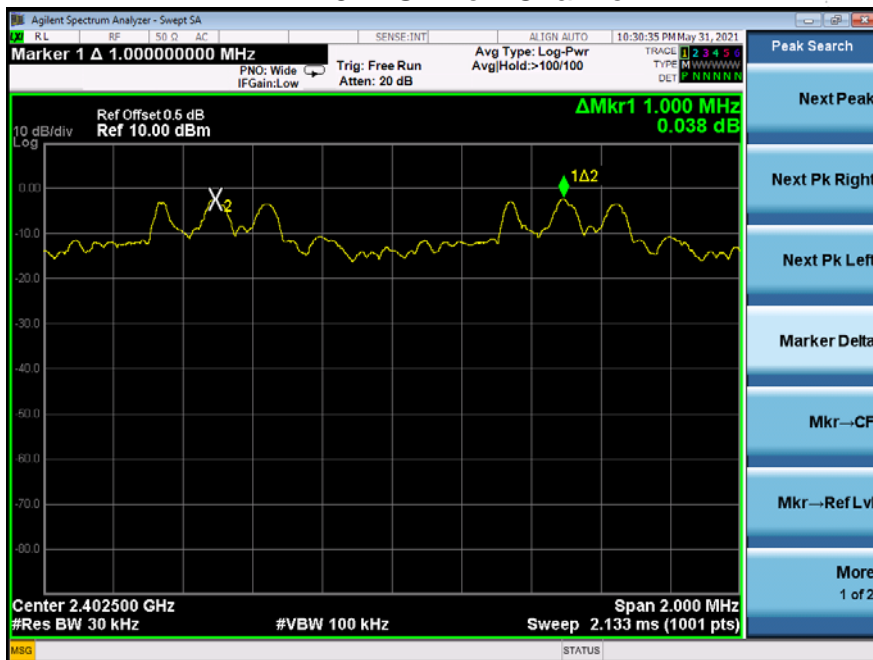
Pi/4 DQPSK Middle Channel



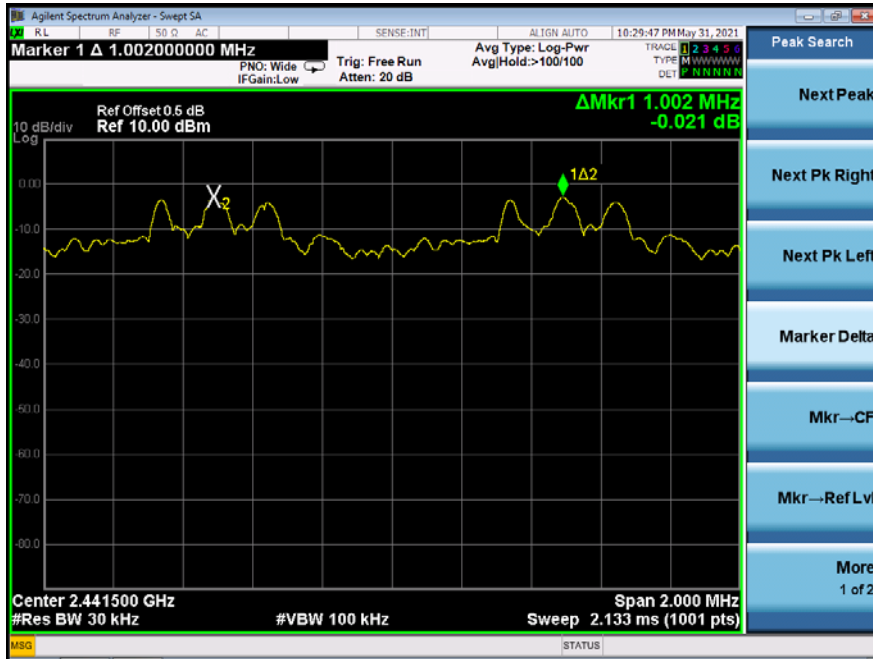
Pi/4 DQPSK High Channel



8DPSK Low Channel



8DPSK Middle Channel



8DPSK High Channel



13. NUMBER OF HOPPING FREQUENCY

13.1 Block Diagram Of Test Setup



13.2 Limit

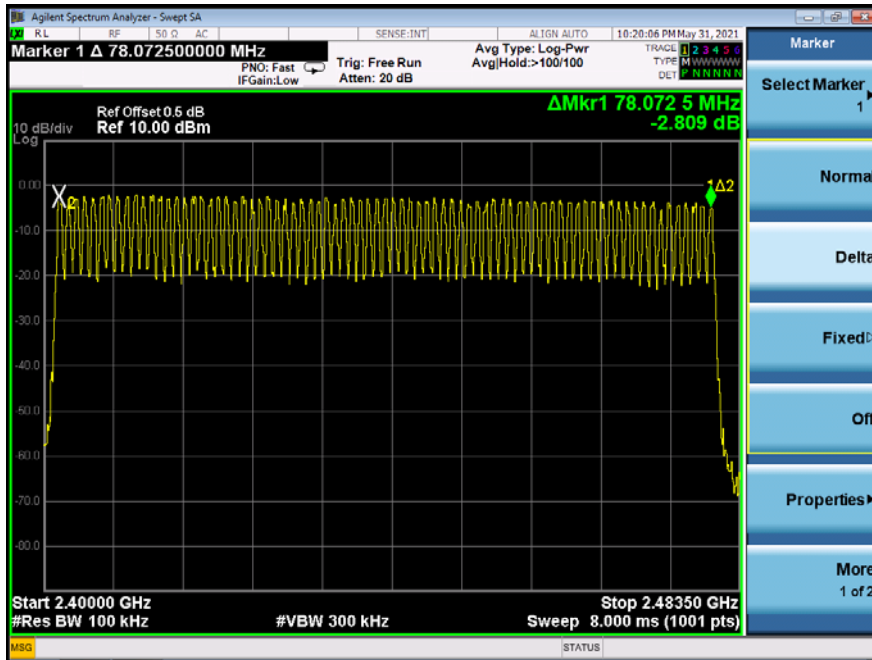
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

13.3 Test procedure

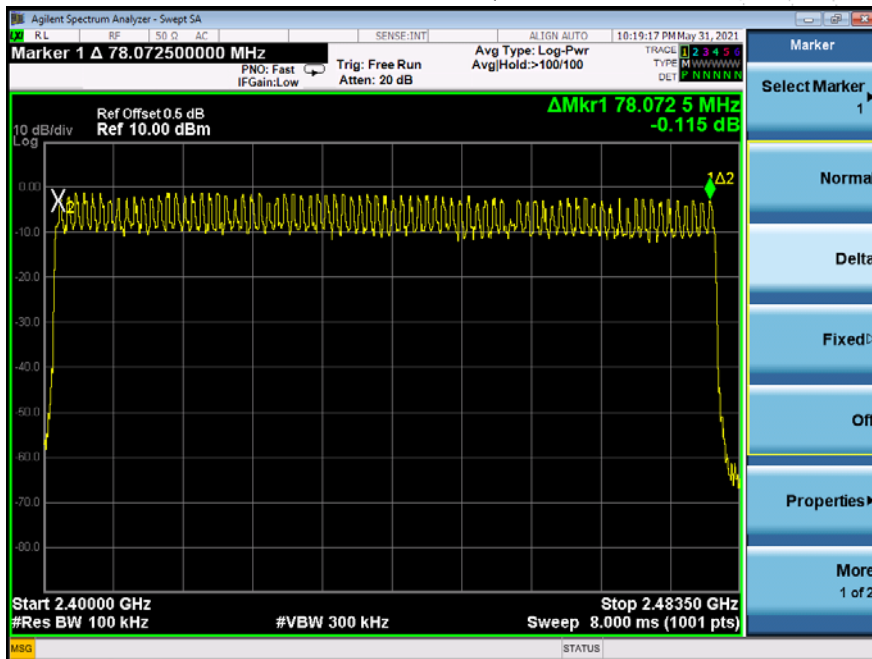
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to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

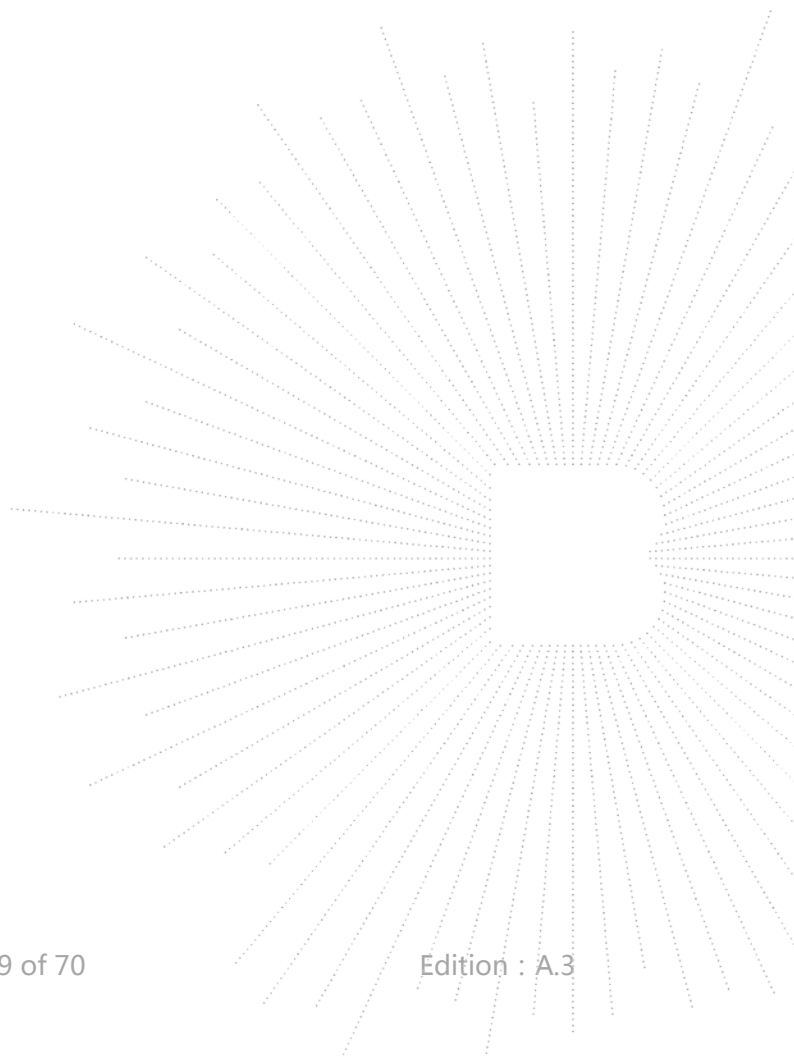
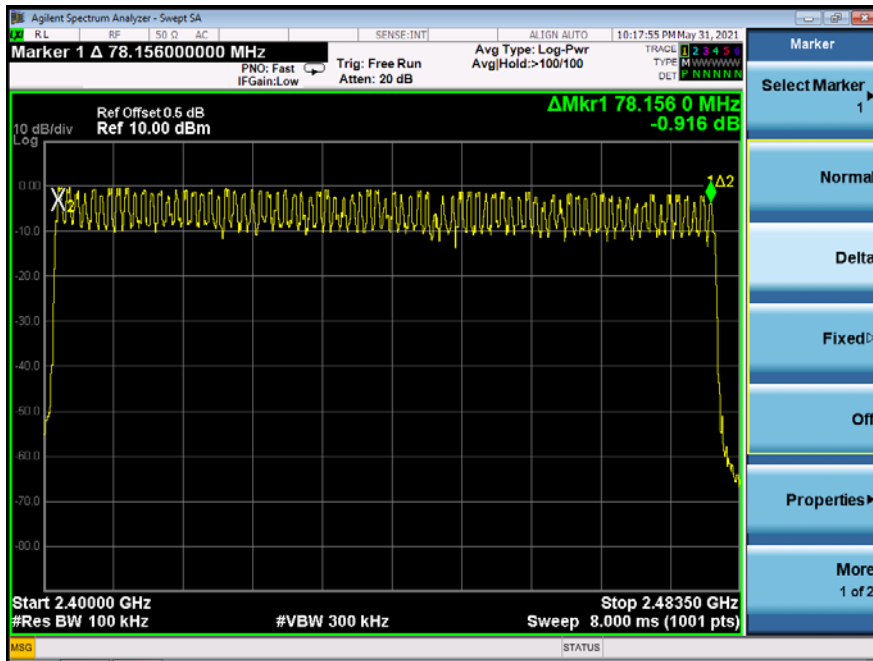
Test Plots: 79 Channels in total GFSK



Pi/4 DQPSK

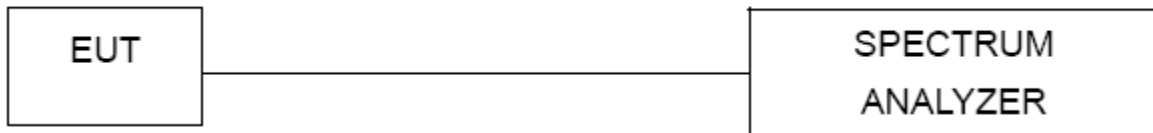


8DPSK



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

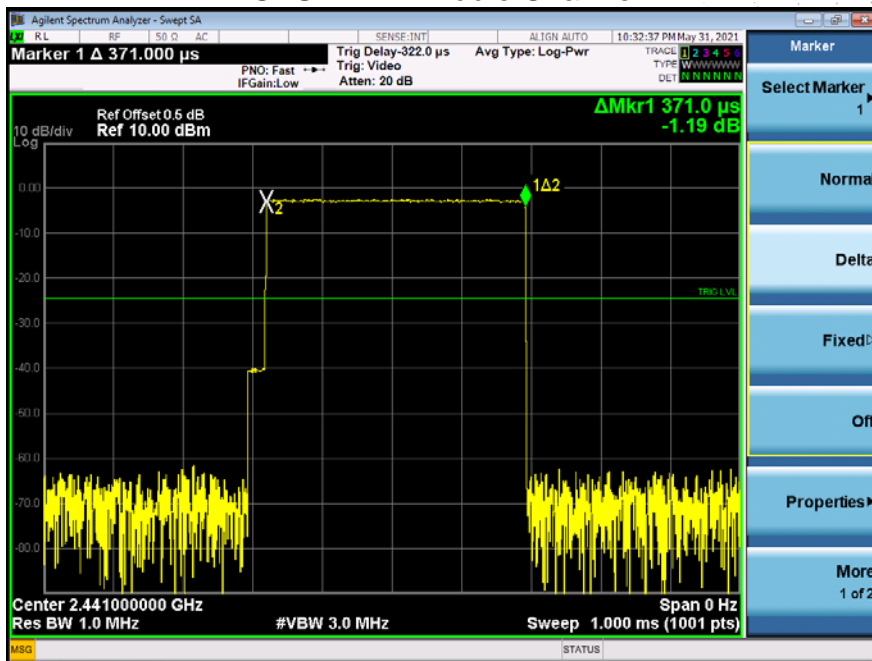
DH3: $1600/79/4 * 0.4 * 79 * (\text{MkrDelta}) / 1000$

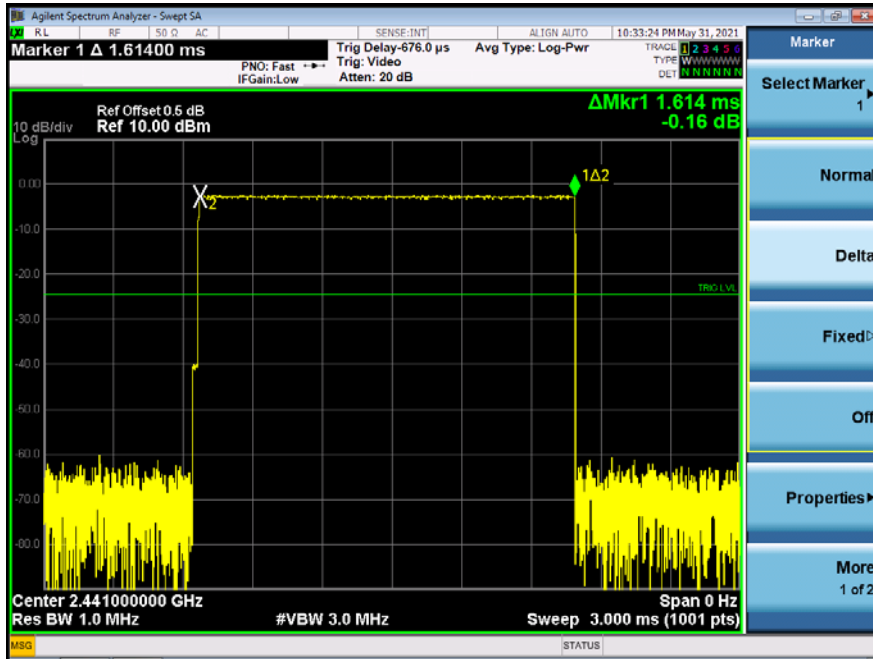
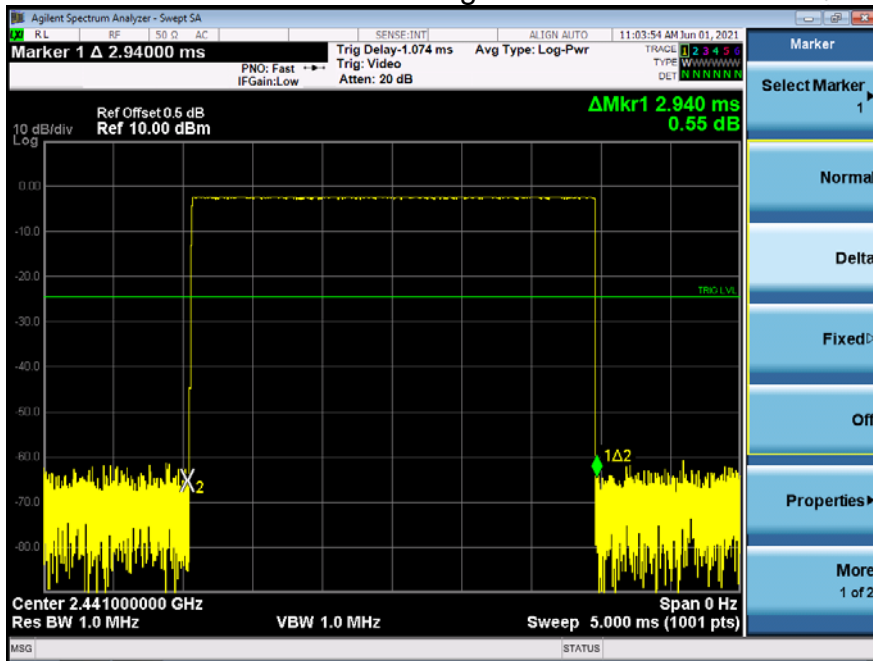
DH1: $1600/79/2 * 0.4 * 79 * (\text{MkrDelta}) / 1000$

Remark: Mkr Delta is once pulse time.

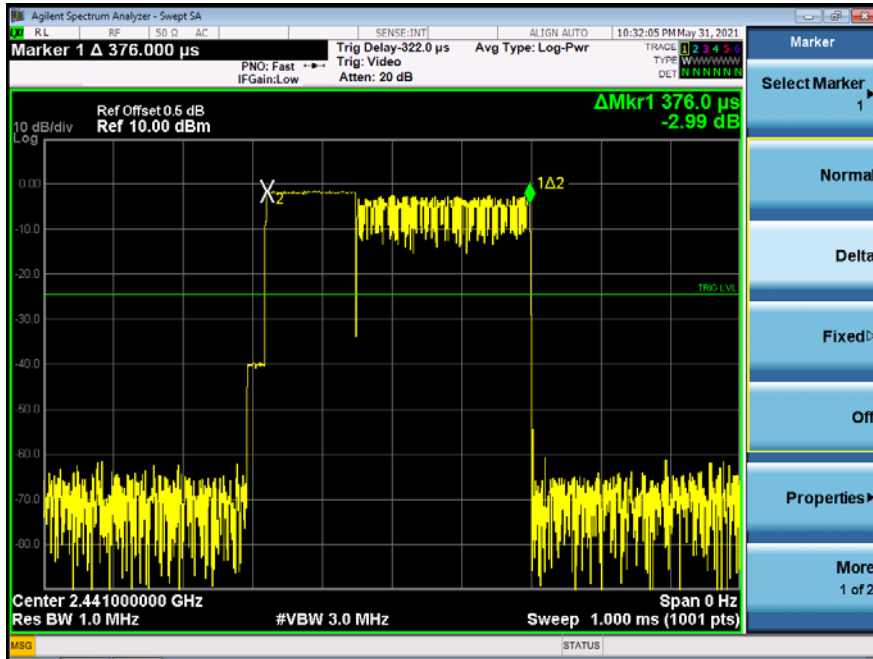
Modulation	Channel Data	Packet	pulse time(ms)	Dwell Time(s)	Limits(s)
GFSK	Middle	DH1	0.371	0.119	0.4
		DH3	1.614	0.258	0.4
		DH5	2.940	0.314	0.4
Pi/4DQPSK	Middle	2DH1	0.376	0.120	0.4
		2DH3	1.626	0.260	0.4
		2DH5	2.940	0.314	0.4
8DPSK	Middle	3DH1	0.378	0.121	0.4
		3DH3	1.614	0.258	0.4
		3DH5	2.940	0.314	0.4

Test Plots
GFSK DH1 Middle Channel

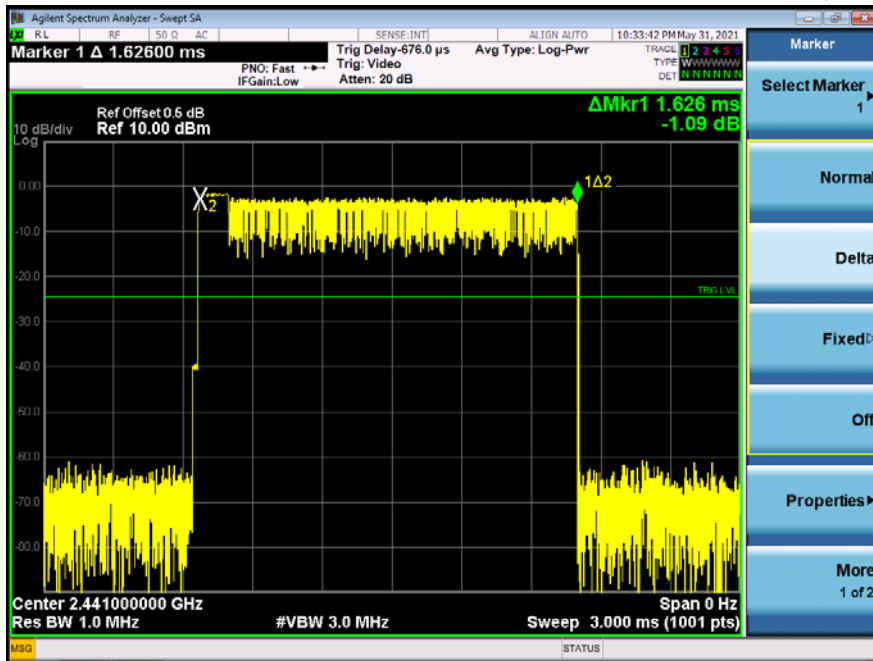


GFSK DH3 Middle Channel

GFSK DH5 High Middle Channel


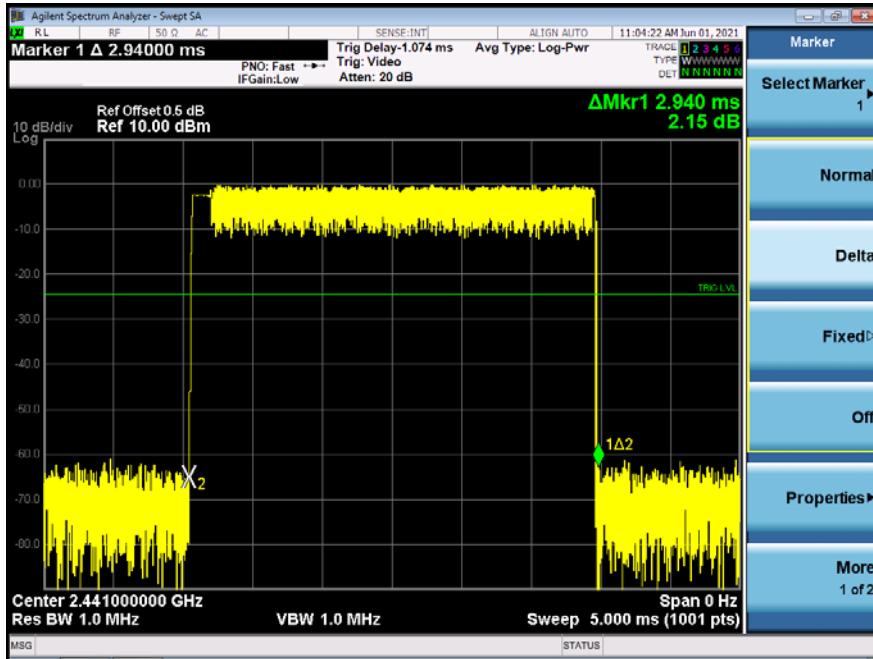
Pi/4DQPSK DH1 Middle Channel



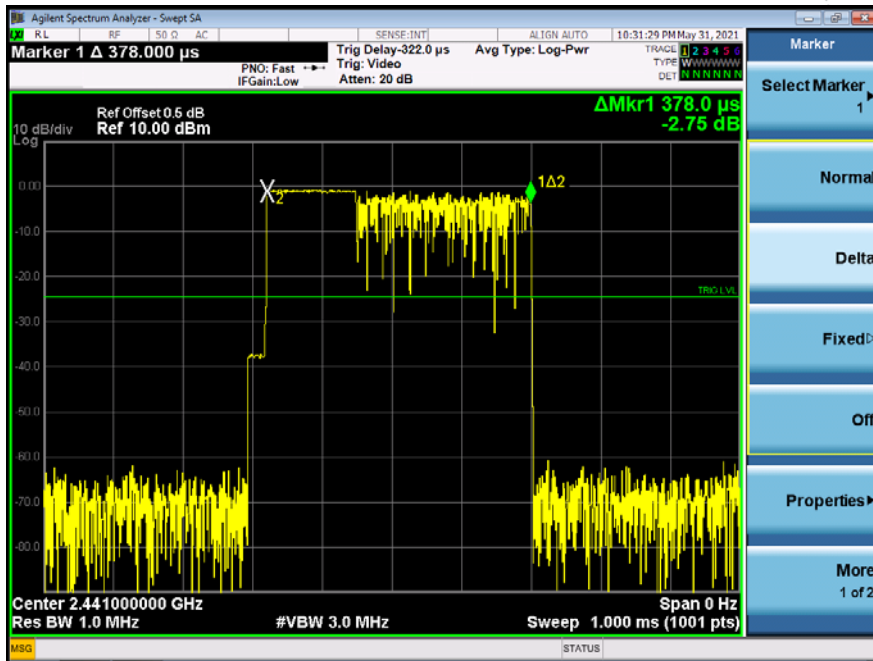
Pi/4DQPSK DH3 Middle Channel



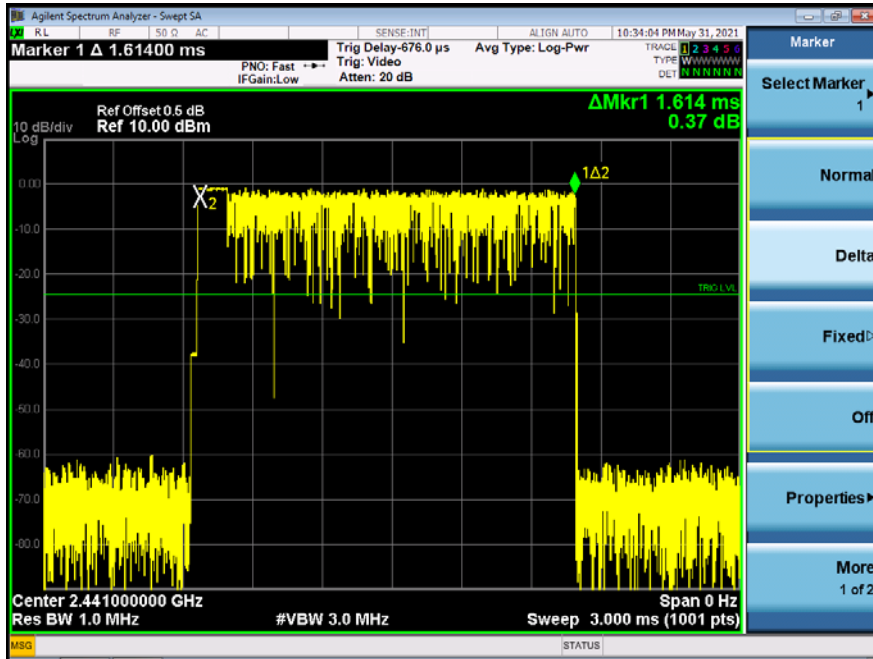
Pi/4DQPSK DH5 Middle Channel



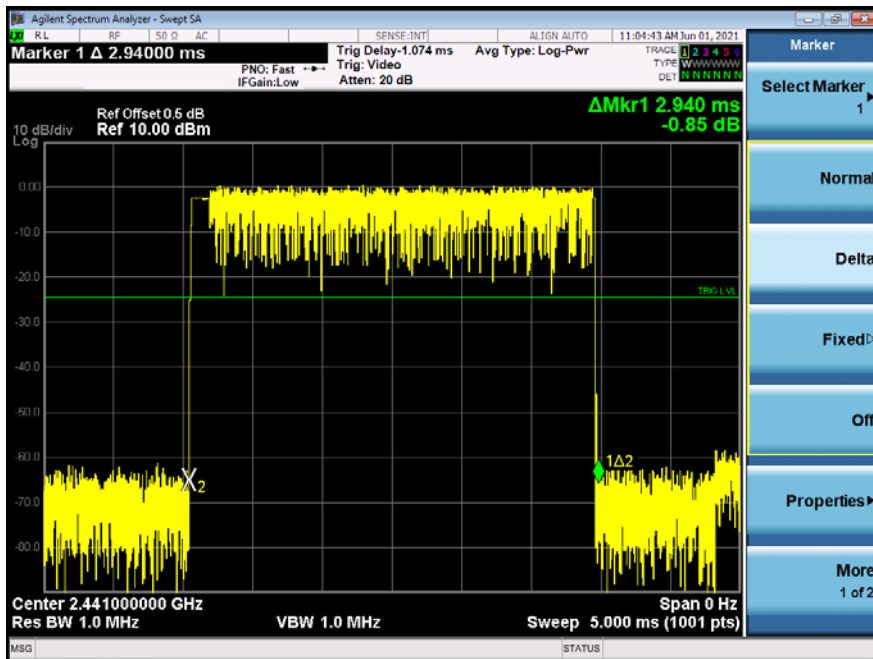
8DPSK DH1 Middle Channel



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.

