

5.7 DWELL TIME

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.247(a)(1)
RSS-247 Issue 2, Section 5.1(d)

Test Method: ANSI C63.10-2013 Section 7.8.4

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.

Test Procedure: Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
Use the following spectrum analyzer settings:

- a) Span = zero span, centered on a hopping channel
- b) RBW shall be \leq channel spacing and where possible RBW should be set $\gg 1 / T$, where T is the expected dwell time per channel.
- c) Sweep = As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
- d) Detector function = peak
- e) Trace = max hold
- f) Use the marker-delta function to determine the dwell time

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.5.3 for details.

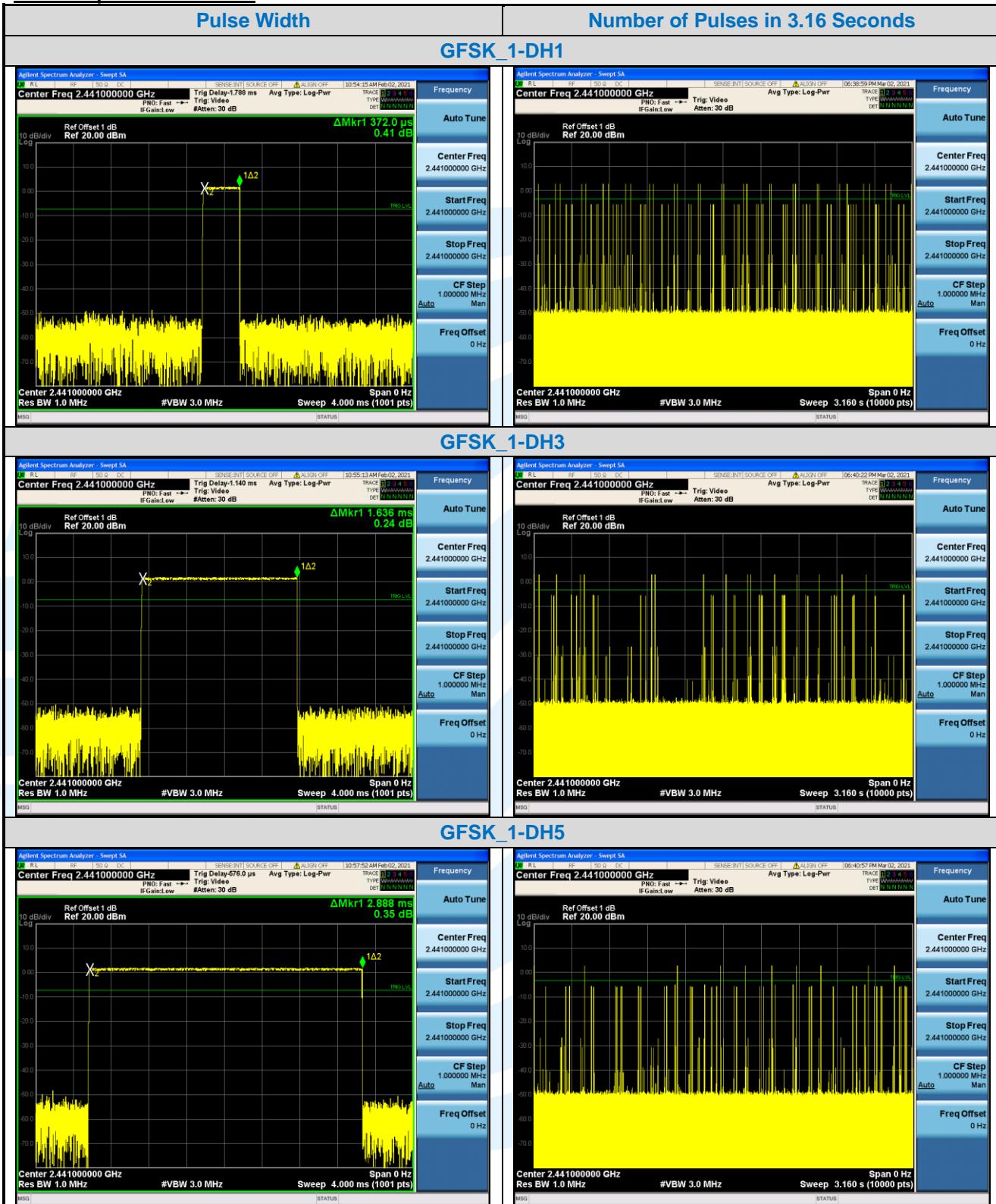
Instruments Used: Refer to section 3 for details

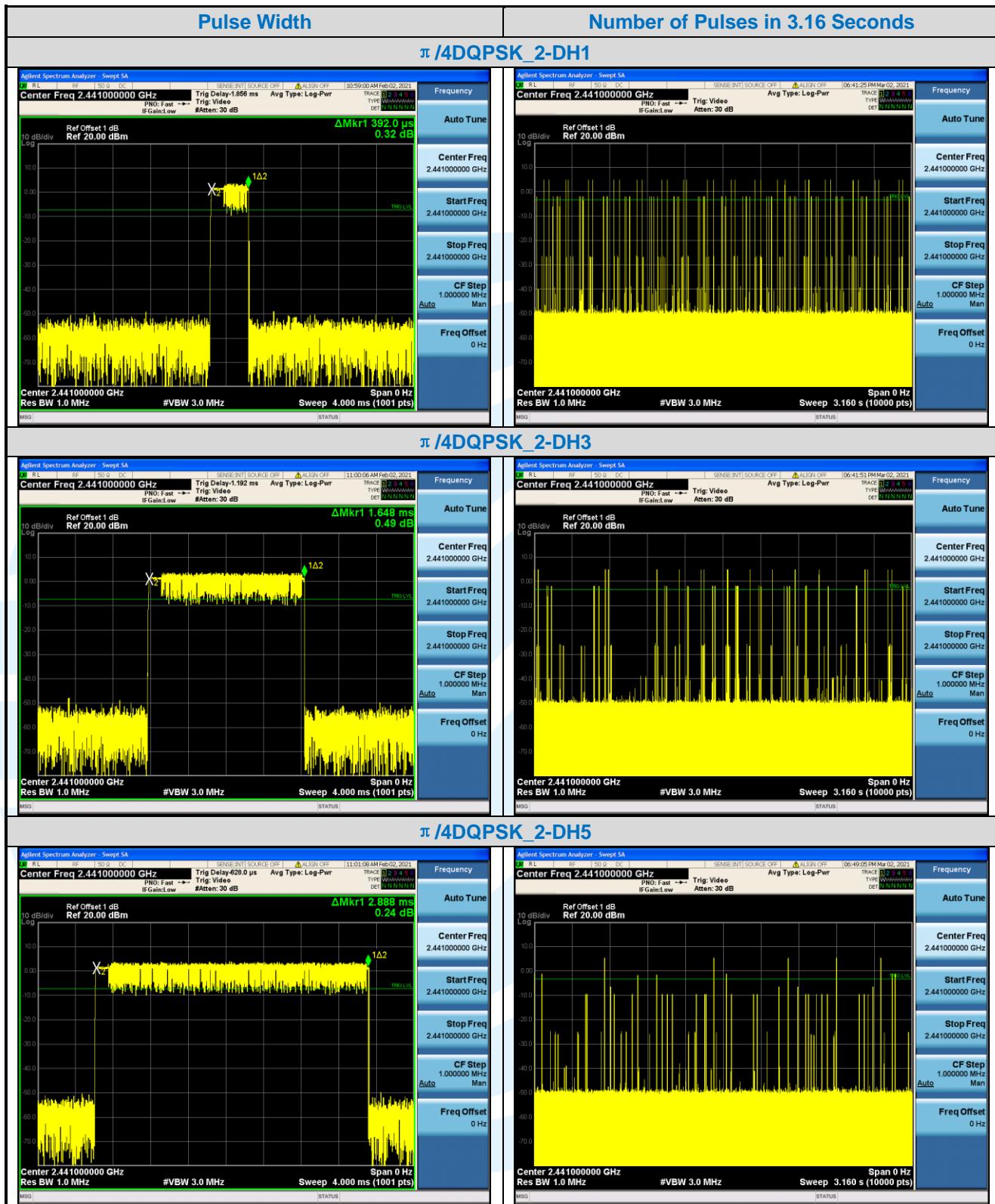
Test Results: Pass

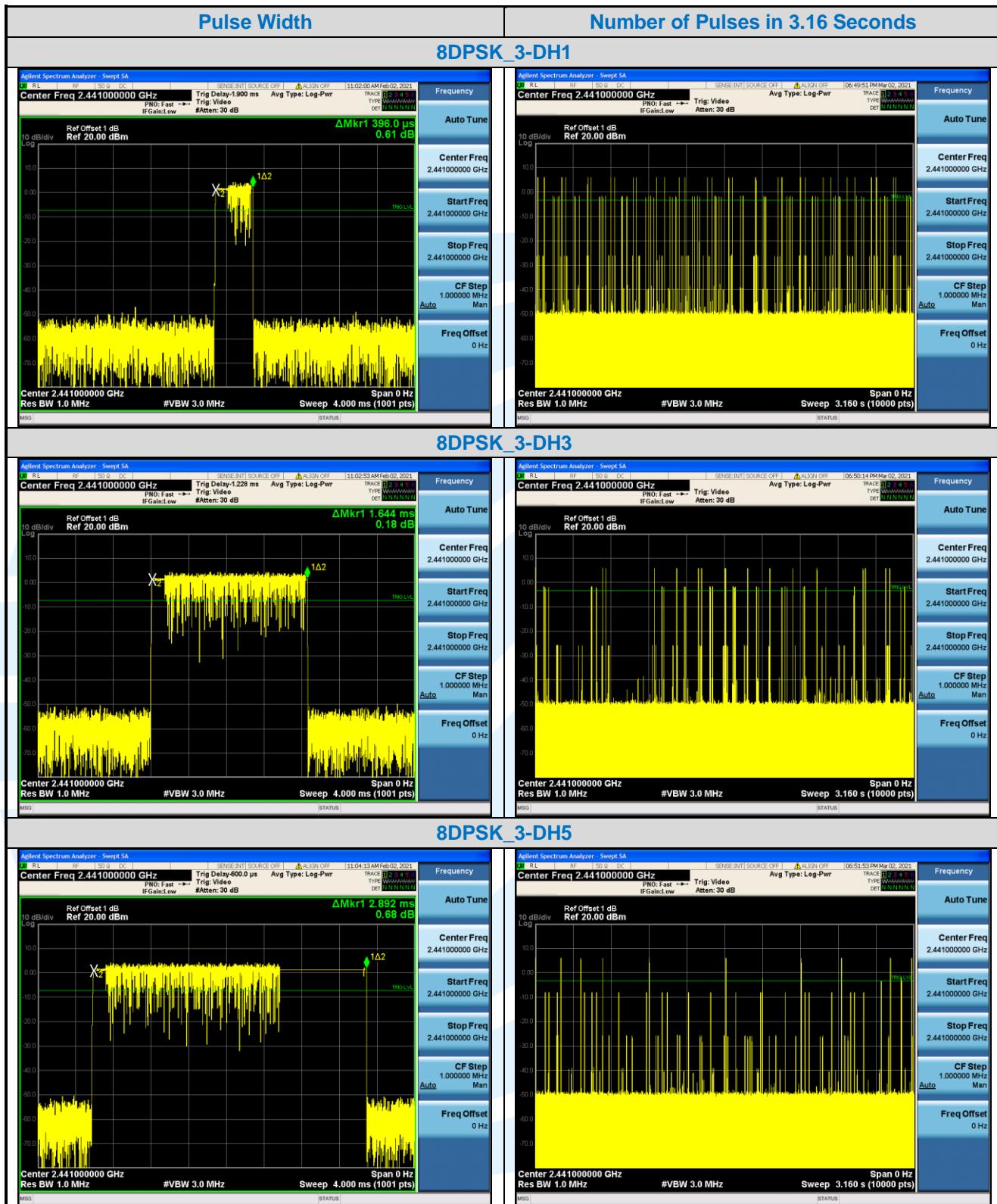
Left Earbud

Type of Modulation	Test Frequency	Packet	Pulse Width	Number of Pulses in 3.16 seconds	Dwell Time	Limit
			ms		ms	ms
GFSK	2441MHz	1-DH1	0.372	31.000	115.32	< 400
		1-DH3	1.636	17.000	278.12	< 400
		1-DH5	2.888	11.000	317.68	< 400
$\pi/4$ DQPSK	2441MHz	2-DH1	0.392	36.000	141.12	< 400
		2-DH3	1.648	20.000	329.60	< 400
		2-DH5	2.888	11.000	317.68	< 400
8DPSK	2441MHz	3-DH1	0.396	41.000	162.36	< 400
		3-DH3	1.644	18.000	295.92	< 400
		3-DH5	2.892	11.000	318.12	< 400

The test plots as follows:



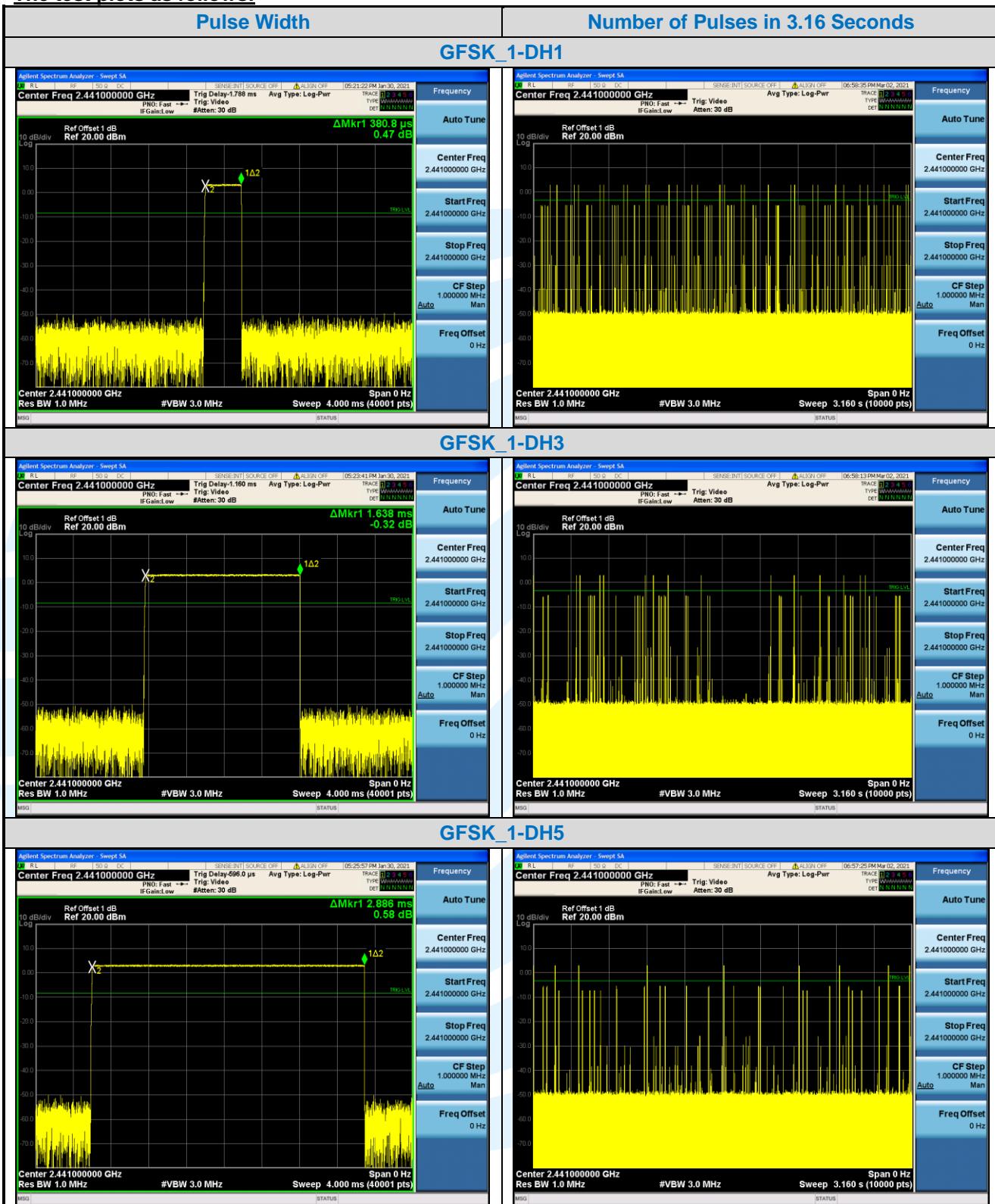


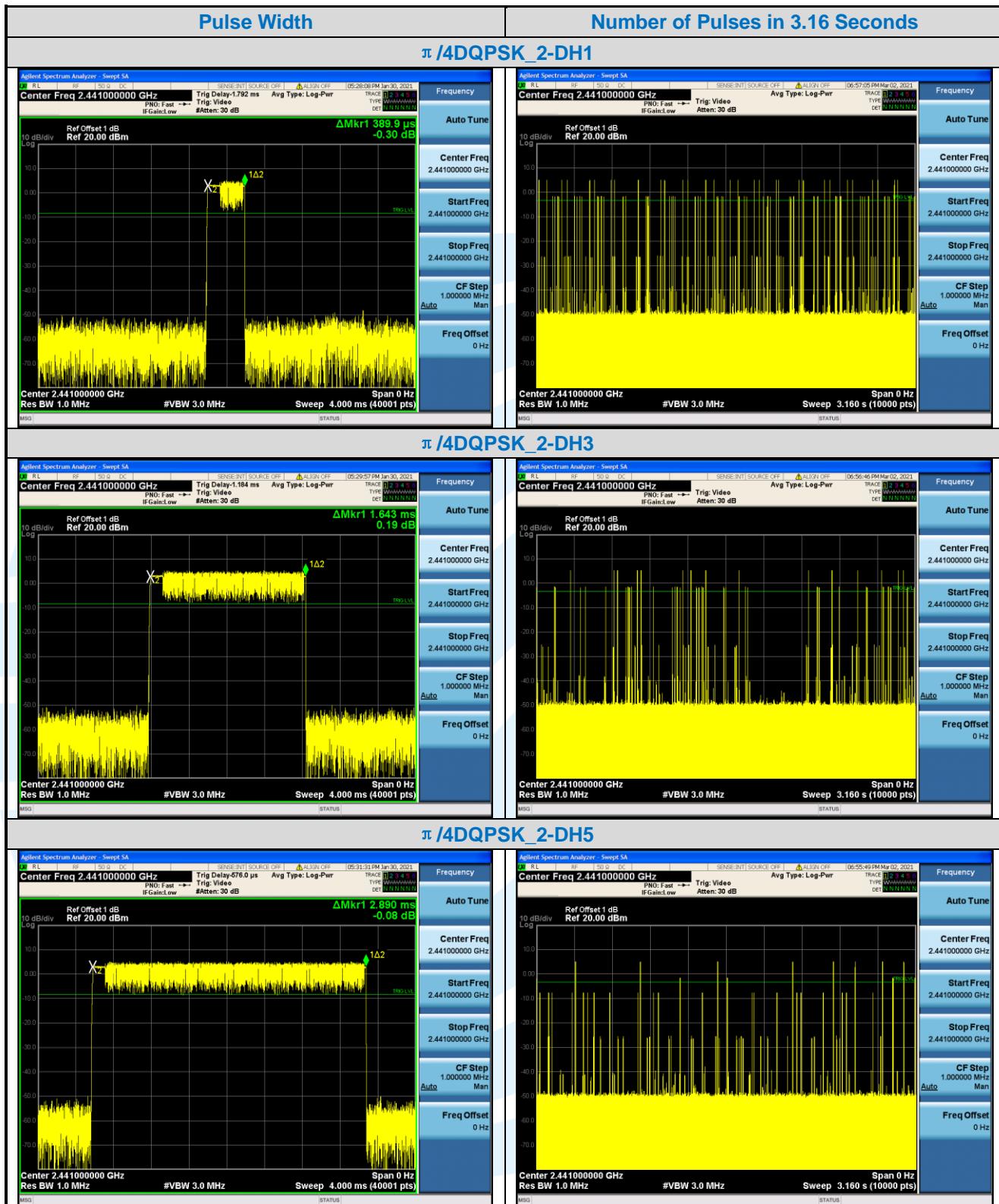


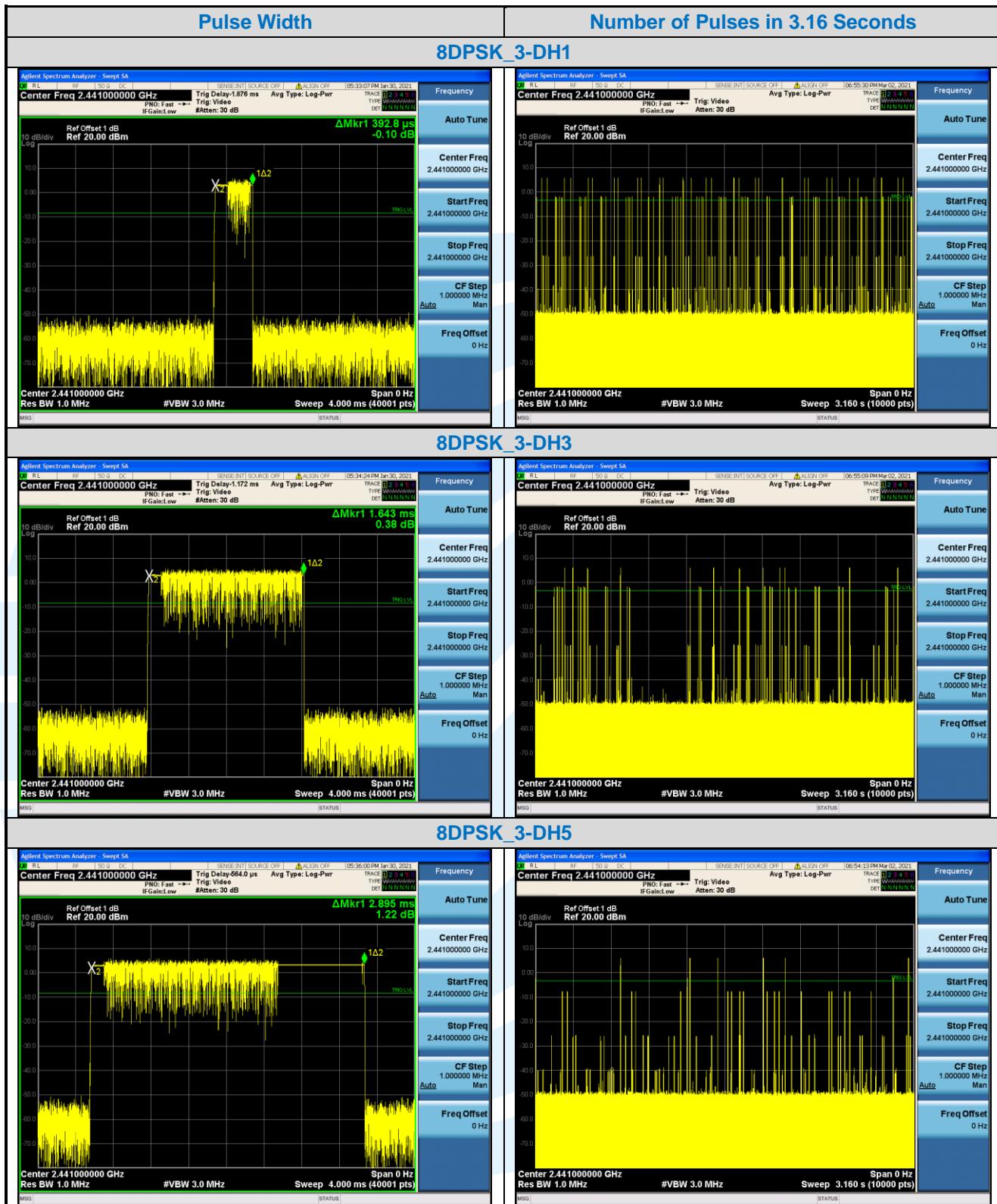
Right Earbud

Type of Modulation	Test Frequency	Packet	Pulse Width	Number of Pulses in 3.16 seconds	Dwell Time	Limit
			ms		ms	ms
GFSK	2441MHz	1-DH1	0.381	31.000	118.05	< 400
		1-DH3	1.638	14.000	229.32	< 400
		1-DH5	2.886	8.000	230.88	< 400
$\pi/4$ DQPSK	2441MHz	2-DH1	0.390	32.000	124.77	< 400
		2-DH3	1.643	21.000	345.03	< 400
		2-DH5	2.890	12.000	346.80	< 400
8DPSK	2441MHz	3-DH1	0.393	30.000	117.84	< 400
		3-DH3	1.643	12.000	197.16	< 400
		3-DH5	2.895	7.000	202.65	< 400

The test plots as follows:







5.8 CONDUCTED OUT OF BAND EMISSION

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.247(d)
RSS-247 Issue 2, Section 5.5

Test Method: ANSI C63.10-2013 Section 6.10.4 & Section 7.8.8

Limit: In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

Test Procedure: Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Use the following spectrum analyzer settings:

Step 1:Measurement Procedure REF

- a) Set instrument center frequency to 2400 MHz or 2483.5 MHz.
- b) Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products that fall outside of the authorized band of operation.
- c) Set the RBW = 100 kHz.
- d) Set the VBW $\geq 3 \times$ RBW.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Sweep points $\geq 2 \times$ Span/RBW
- h) Trace mode = max hold.
- i) Allow the trace to stabilize.
- j) Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Enable the marker-delta function, and then use the marker-to-peak function to move the marker to the peak of the in-band emission.

Step 2:Measurement Procedure OOB

- a) Set RBW = 100 kHz.
- b) Set VBW ≥ 300 kHz.
- c) Detector = peak.
- d) Sweep = auto couple.
- e) Trace Mode = max hold.
- f) Allow trace to fully stabilize.
- g) Use the peak marker function to determine the maximum amplitude level.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

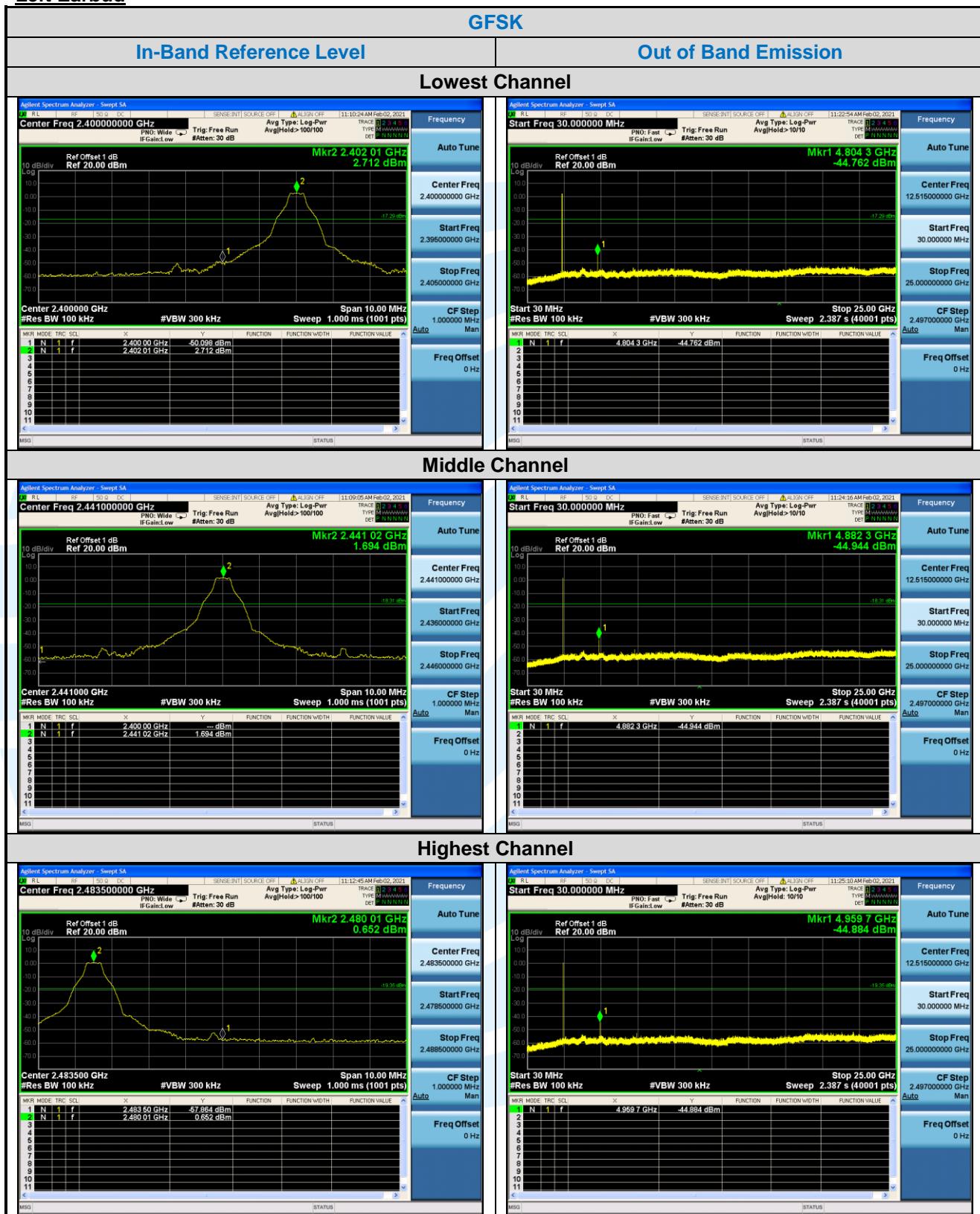
Test Mode: Hopping Frequencies Transmitter mode

Test Results: Pass

Test Data:

The test plots as follows:

Left Earbud



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