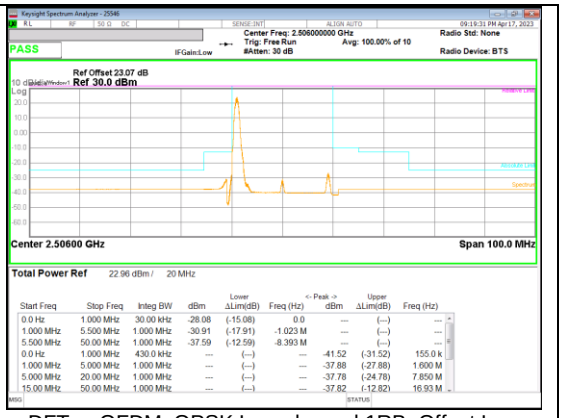
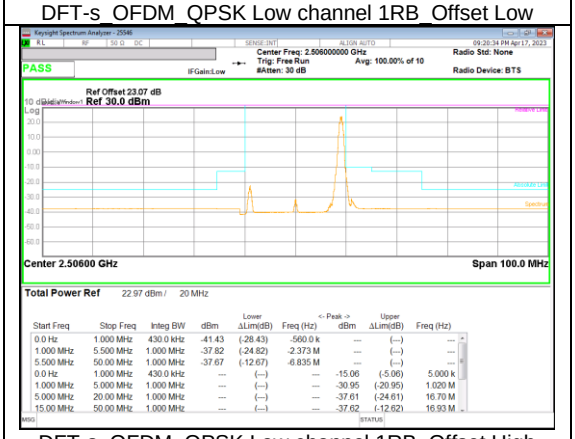
20MHz

QPSK

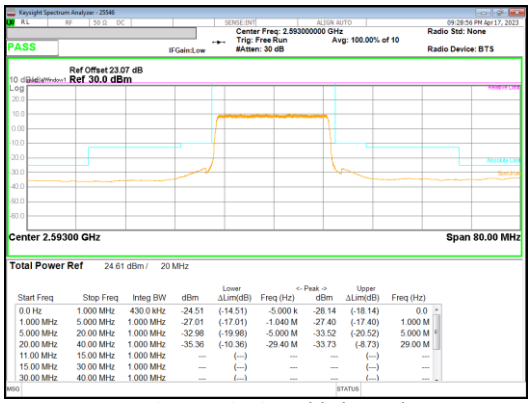
DFT-s_OFDM_QPSK Low channel FRB



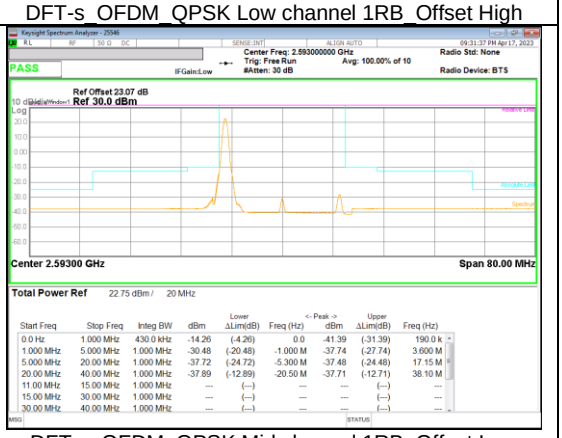
DFT-s_OFDM_QPSK Low channel 1RB_Offset Low



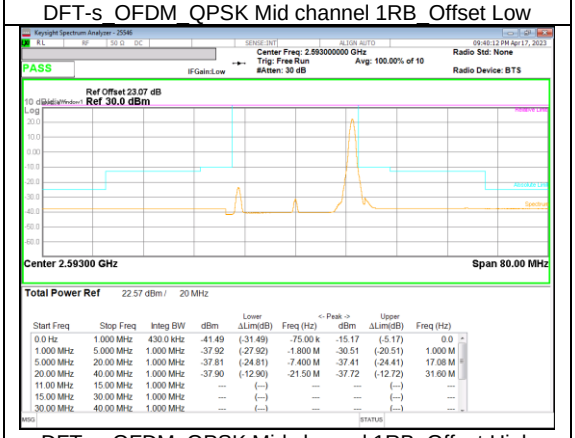
DFT-s_OFDM_QPSK Low channel 1RB_Offset High



DFT-s_OFDM_QPSK Mid channel FRB



DFT-s_OFDM_QPSK Mid channel 1RB_Offset Low



DFT-s_OFDM_QPSK Mid channel 1RB_Offset High

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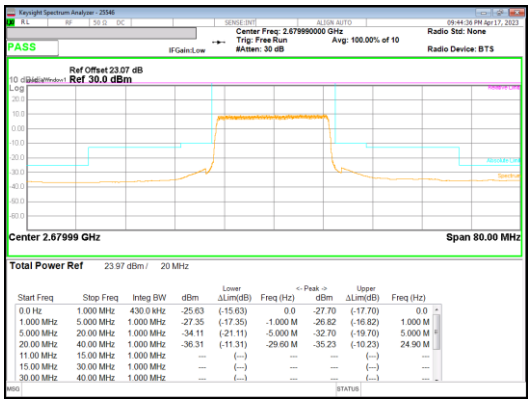
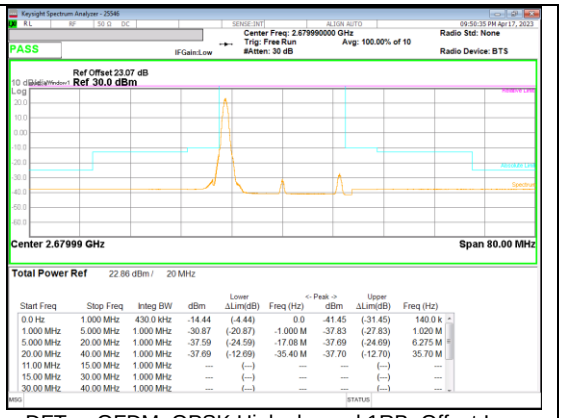
20MHz

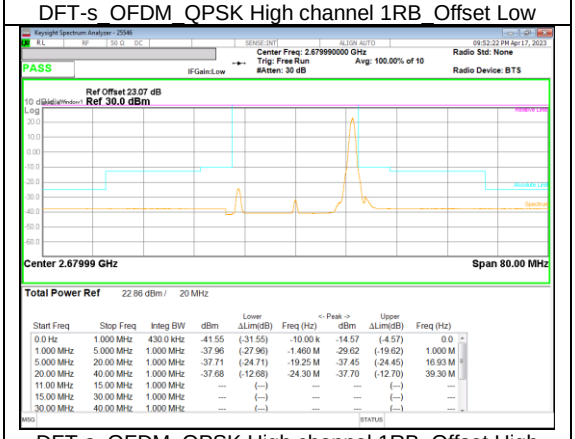
QPSK



DFT-s_OFDM_QPSK High channel FRB



DFT-s_OFDM_QPSK High channel 1RB_Offset Low

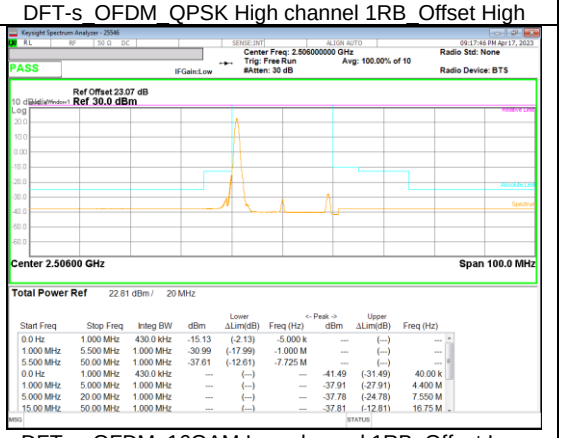


DFT-s_OFDM_QPSK High channel 1RB_Offset High

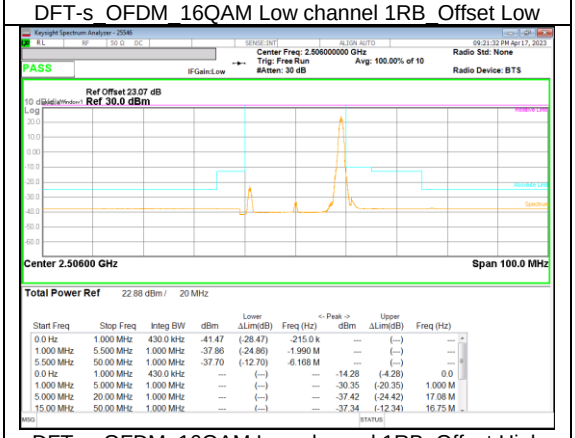
20MHz

16QAM

DFT-s_OFDM_16QAM Low channel FRB



DFT-s_OFDM_16QAM Low channel 1RB_Offset Low



DFT-s_OFDM_16QAM Low channel 1RB_Offset High

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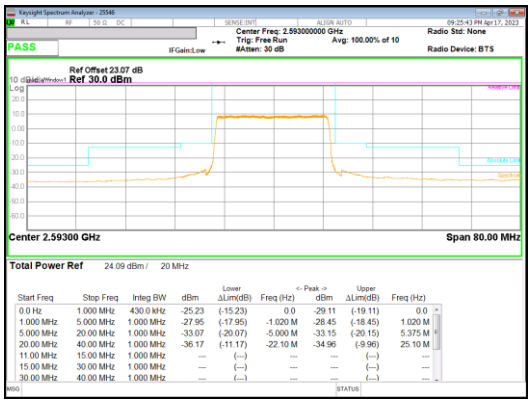
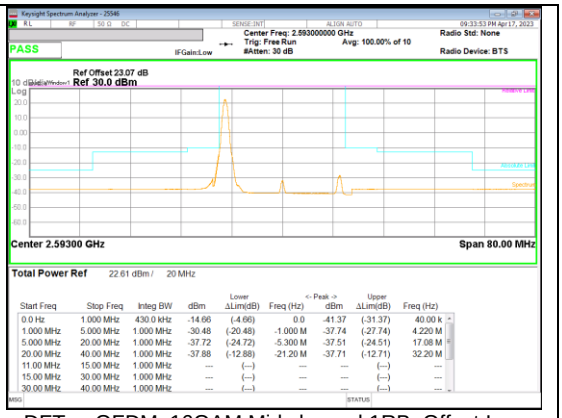
20MHz

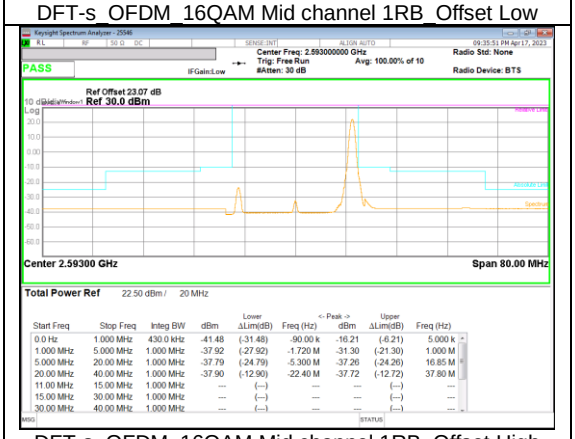
16QAM



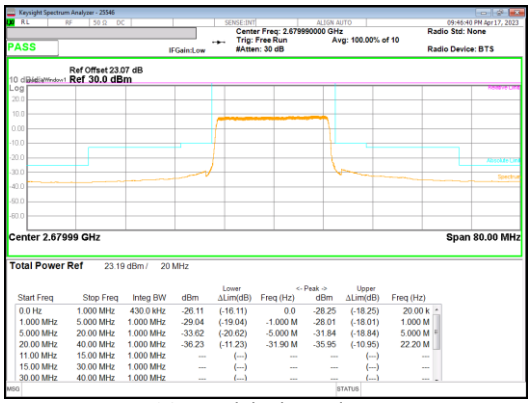
DFT-s_OFDM_16QAM Mid channel FRB



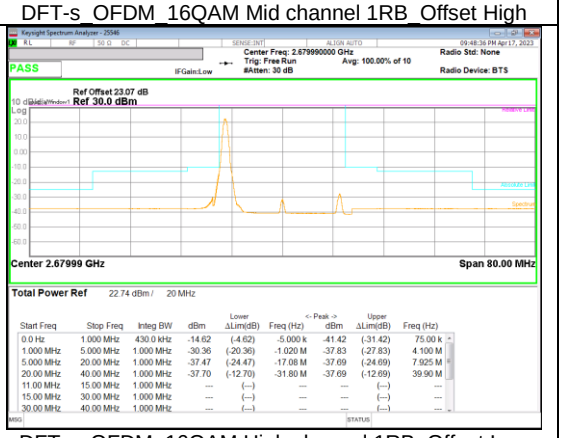
DFT-s_OFDM_16QAM Mid channel 1RB_Offset Low



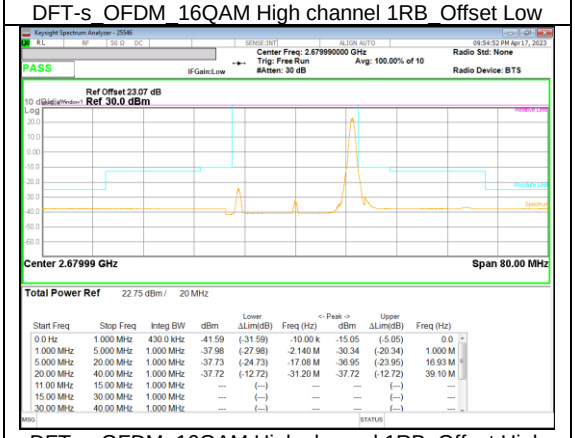
DFT-s_OFDM_16QAM Mid channel 1RB_Offset High



16QAM High channel FRB



DFT-s_OFDM_16QAM High channel 1RB_Offset Low



DFT-s_OFDM_16QAM High channel 1RB_Offset High

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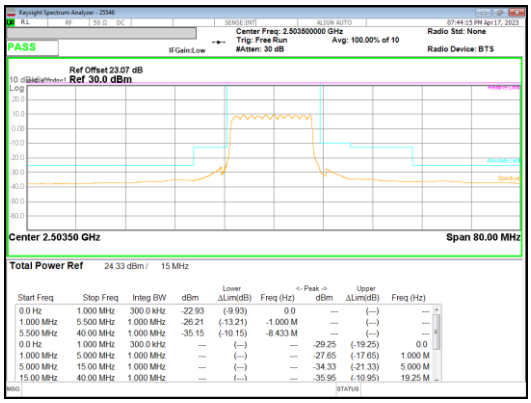
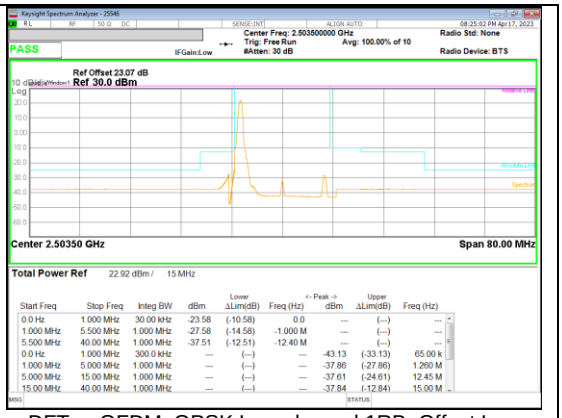
15MHz

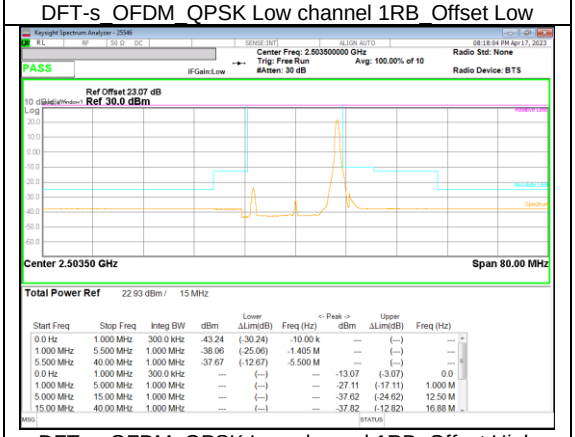
QPSK



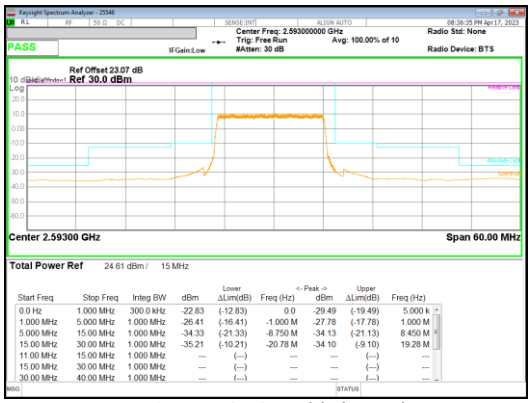
DFT-s_OFDM_QPSK Low channel FRB



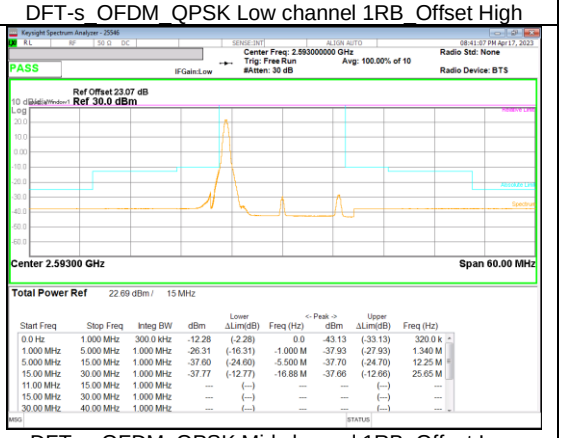
DFT-s_OFDM_QPSK Low channel 1RB_Offset Low



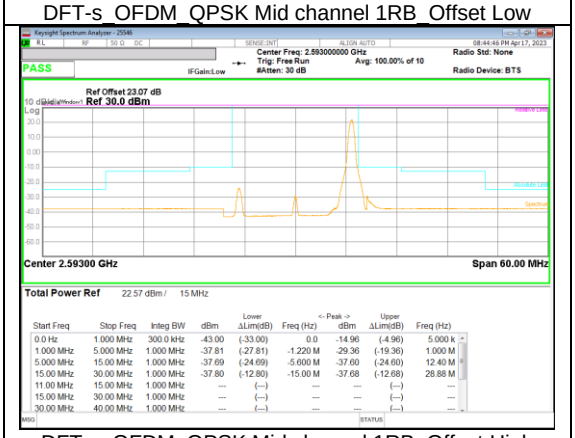
DFT-s_OFDM_QPSK Low channel 1RB_Offset High



DFT-s_OFDM_QPSK Mid channel FRB



DFT-s_OFDM_QPSK Mid channel 1RB_Offset Low



DFT-s_OFDM_QPSK Mid channel 1RB_Offset High

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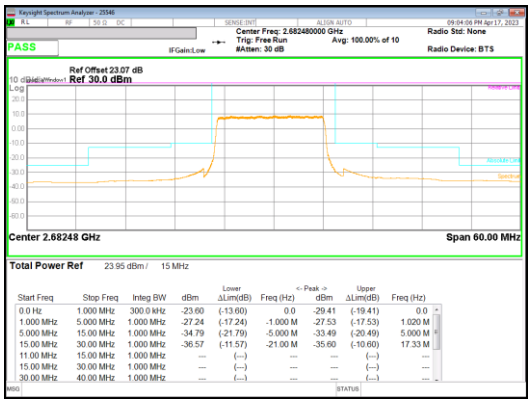
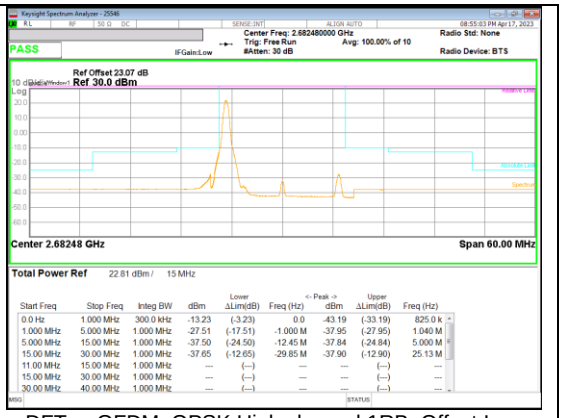
15MHz

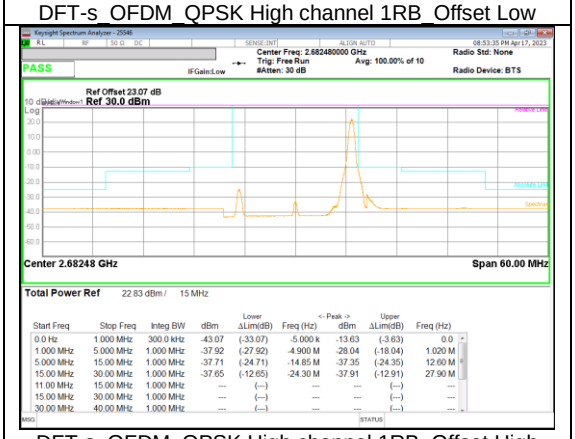
QPSK



DFT-s_OFDM_QPSK High channel FRB



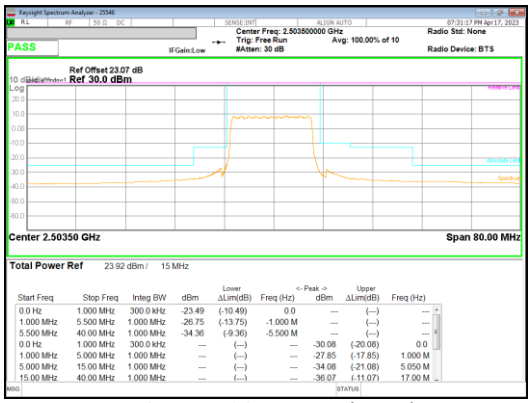
DFT-s_OFDM_QPSK High channel 1RB_Offset Low



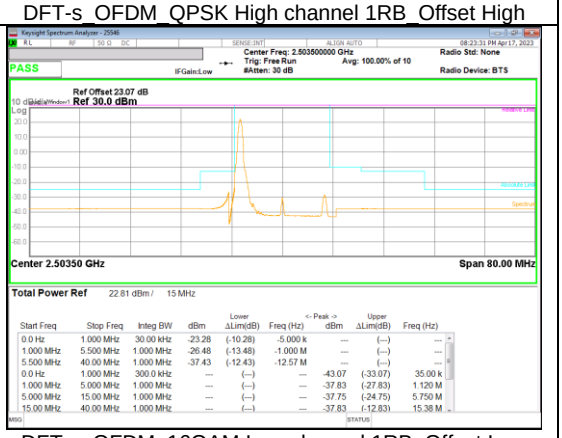
DFT-s_OFDM_QPSK High channel 1RB_Offset High

15MHz

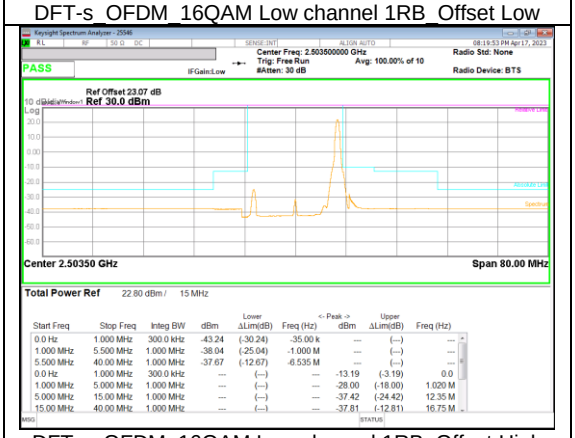
16QAM



DFT-s_OFDM_16QAM Low channel FRB



DFT-s_OFDM_16QAM Low channel 1RB_Offset Low



DFT-s_OFDM_16QAM Low channel 1RB_Offset High

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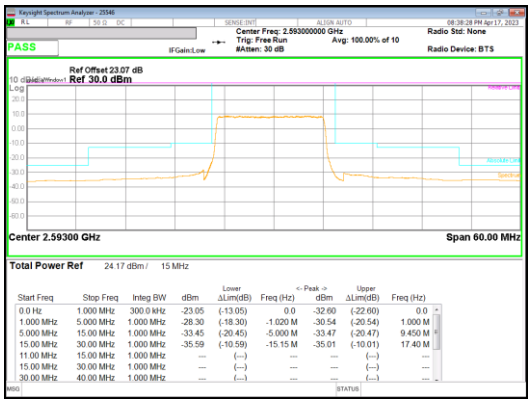
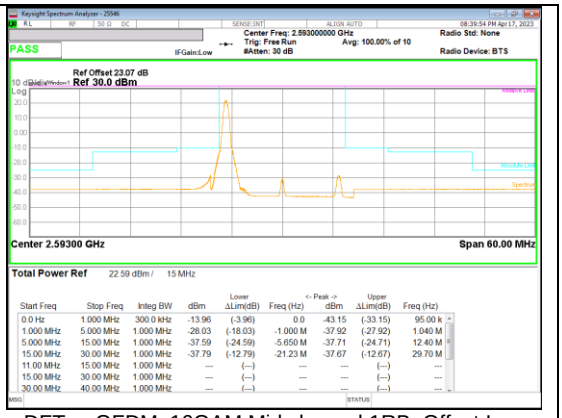
15MHz

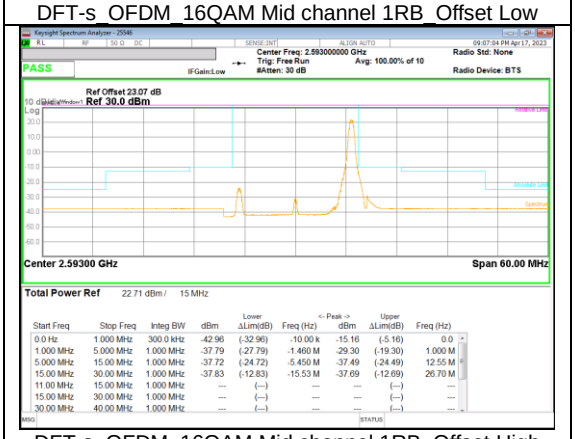
16QAM



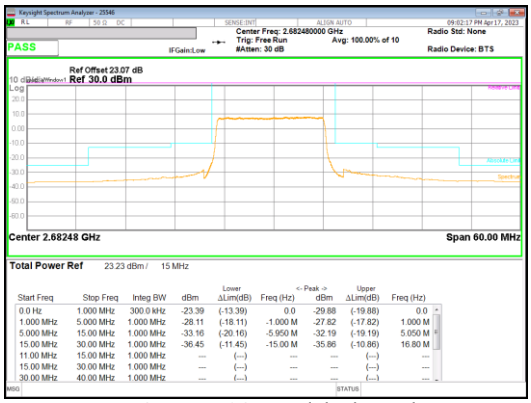
DFT-s_OFDM_16QAM Mid channel FRB



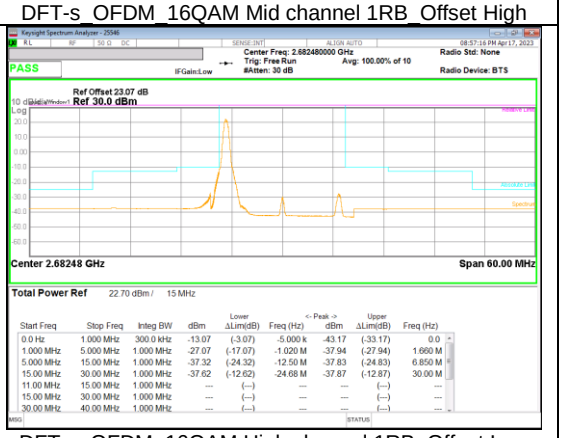
DFT-s_OFDM_16QAM Mid channel 1RB_Offset Low



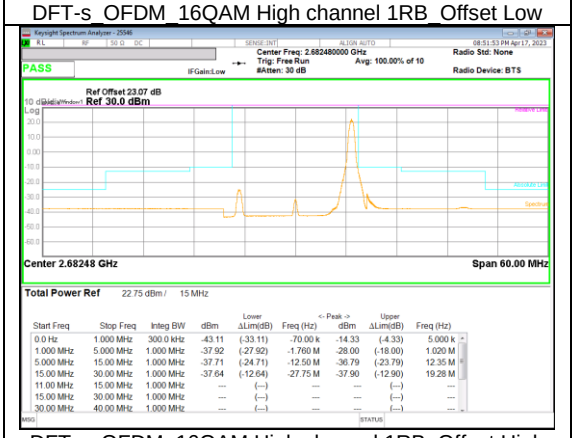
DFT-s_OFDM_16QAM Mid channel 1RB_Offset High



DFT-s_OFDM_16QAM High channel FRB



DFT-s_OFDM_16QAM High channel 1RB_Offset Low



DFT-s_OFDM_16QAM High channel 1RB_Offset High

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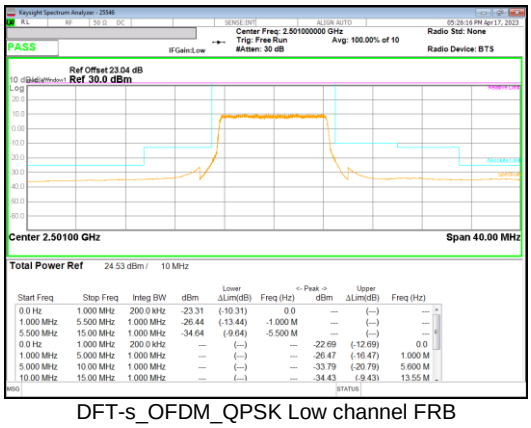
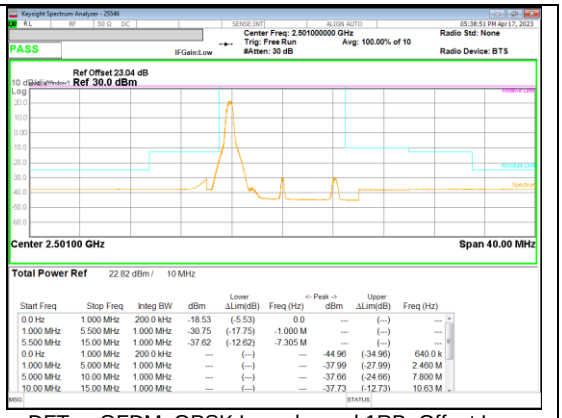
10MHz

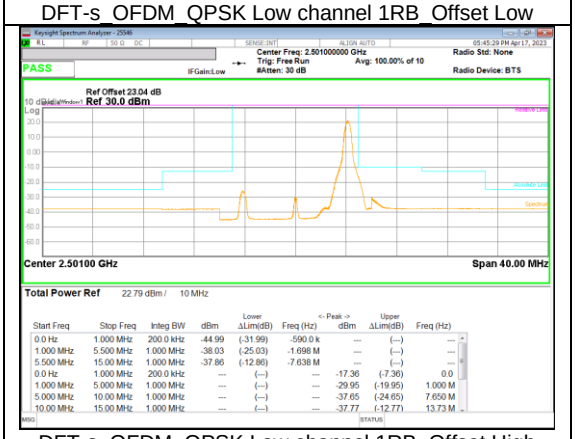
QPSK



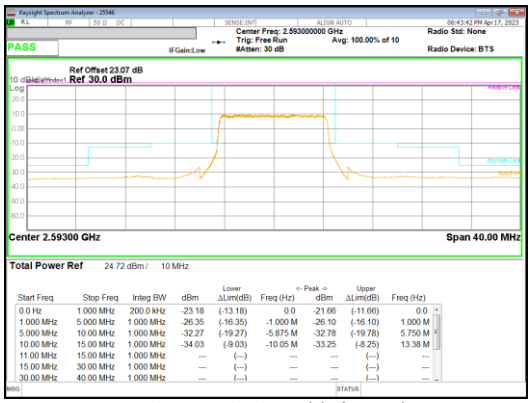
DFT-s_OFDM_QPSK Low channel FRB



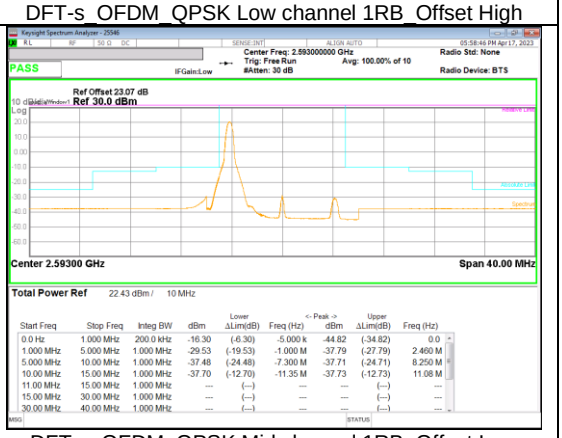
DFT-s_OFDM_QPSK Low channel 1RB_Offset Low



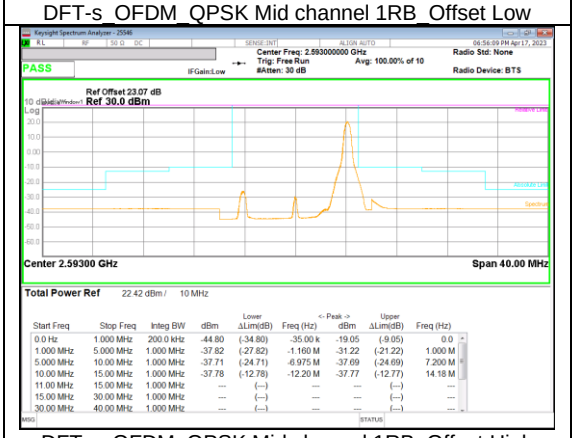
DFT-s_OFDM_QPSK Low channel 1RB_Offset High



DFT-s_OFDM_QPSK Mid channel FRB



DFT-s_OFDM_QPSK Mid channel 1RB_Offset Low



DFT-s_OFDM_QPSK Mid channel 1RB_Offset High

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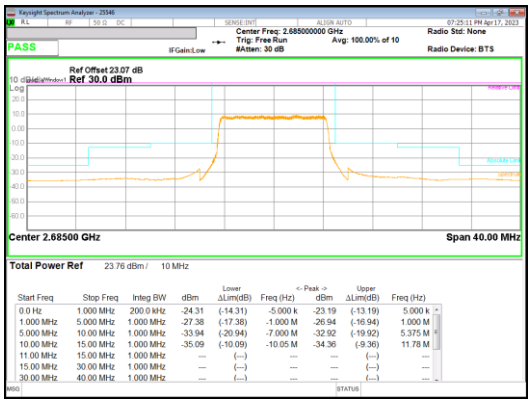
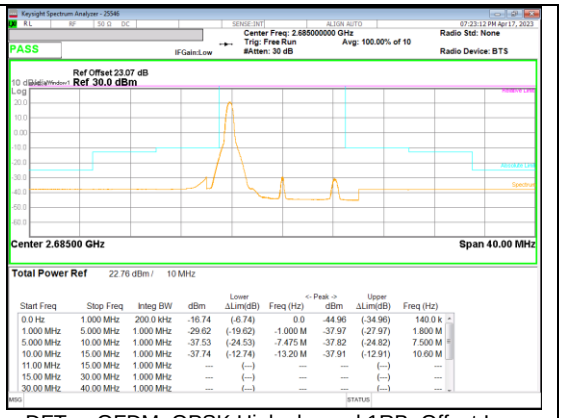
10MHz

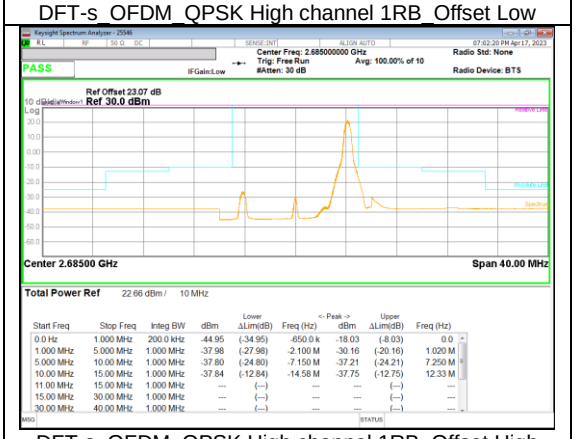
QPSK



DFT-s_OFDM_QPSK High channel FRB



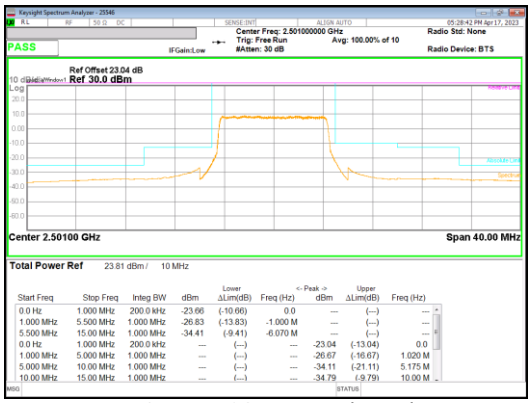
DFT-s_OFDM_QPSK High channel 1RB_Offset Low



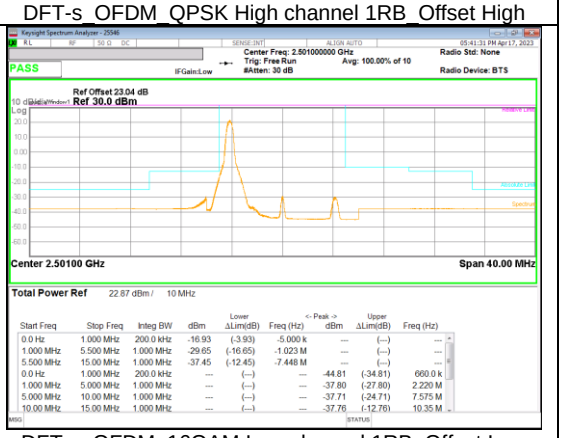
DFT-s_OFDM_QPSK High channel 1RB_Offset High

10MHz

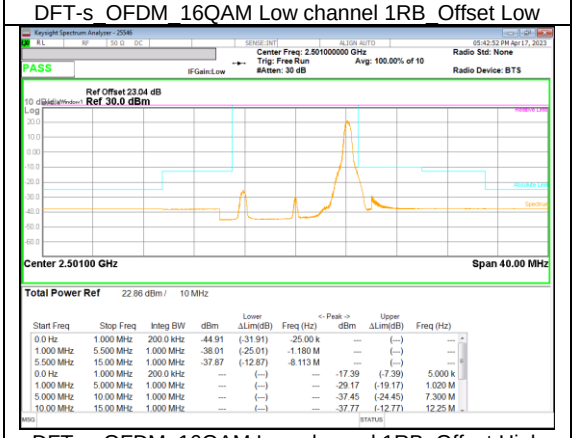
16QAM



DFT-s_OFDM_16QAM Low channel FRB



DFT-s_OFDM_16QAM Low channel 1RB_Offset Low



DFT-s_OFDM_16QAM Low channel 1RB_Offset High

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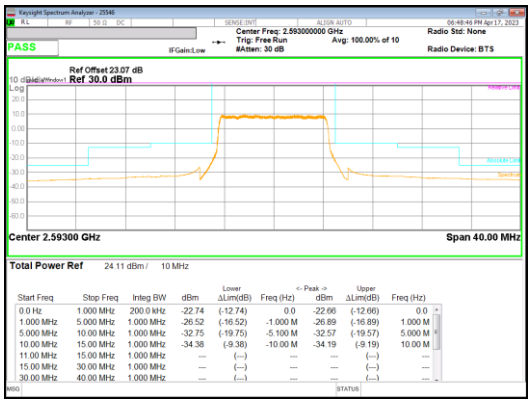
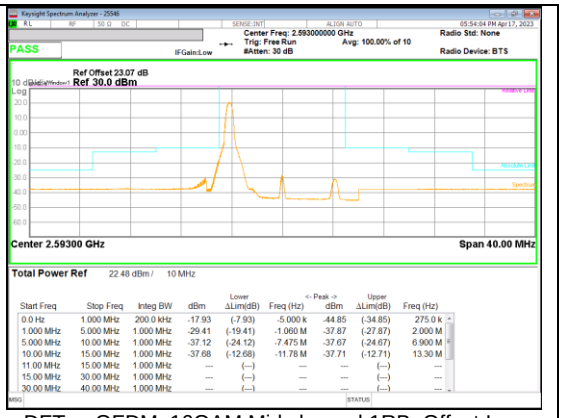
10MHz

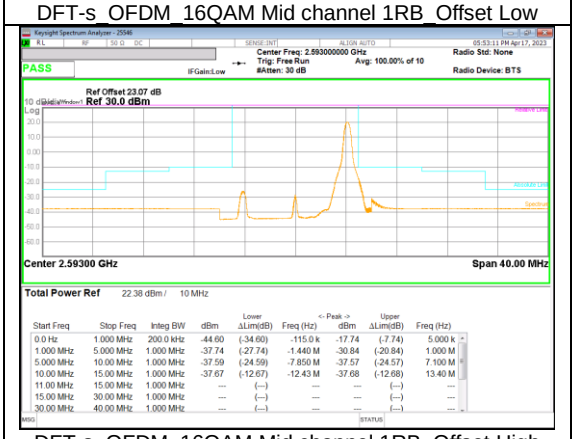
16QAM



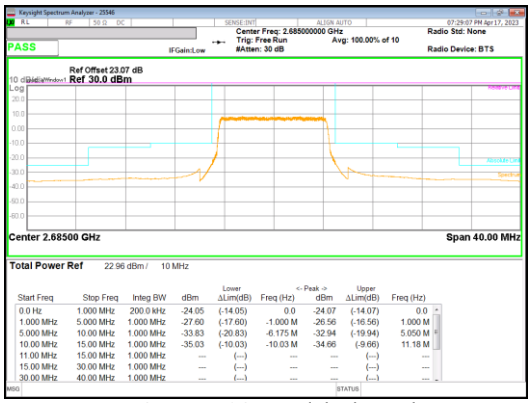
DFT-s_OFDM_16QAM Mid channel FRB



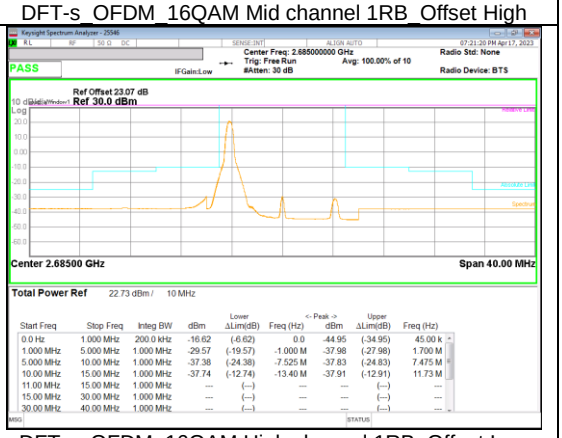
DFT-s_OFDM_16QAM Mid channel 1RB_Offset Low



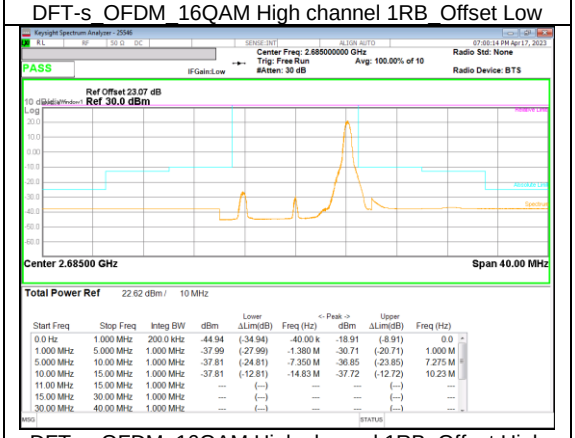
DFT-s_OFDM_16QAM Mid channel 1RB_Offset High



DFT-s_OFDM_16QAM High channel FRB



DFT-s_OFDM_16QAM High channel 1RB_Offset Low



DFT-s_OFDM_16QAM High channel 1RB_Offset High

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8.5. CONDUCTED SPURIOUS EMISSIONS

RULE PART(S)

FCC: §27.53

LIMITS

Part 27.53:
(c)(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB.

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.

(h) The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$ (P) dB.

(m) (4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

(l)(2) For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz. Compliance with this paragraph (l)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(n)(2) For mobile operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz. Compliance with this paragraph (n)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed, but limited to a maximum of 200 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01
The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold Mode using a peak detector to ensure that the worst-case emissions were caught.

a) Set the RBW = 100 kHz for emission below 1 GHz and 1 MHz for emissions above 1 GHz
(Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)
b) Set VBW ≥ 3 × RBW;
c) Set span ≥ 1.5 times the OBW;
d) Sweep time = auto couple;
e) Detector = rms;
f) Ensure that the number of measurement points = Max (40001);
g) Trace Mode = average(WCDMA, LTE FDD, 5G NR FDD),
Max hold(LTE TDD, 5G NR TDD);

NOTE1

5G NR: All Waveforms (CP-OFDM vs DFT-s_OFDM) and modulations (π/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All Modes of operation were investigated and the worst case configuration results are reported in this section.

NOTE2

Please refer to section 5.4 for bandwidth and RB setting about LTE, 5G NR bands.

RESULTS

See the following pages.

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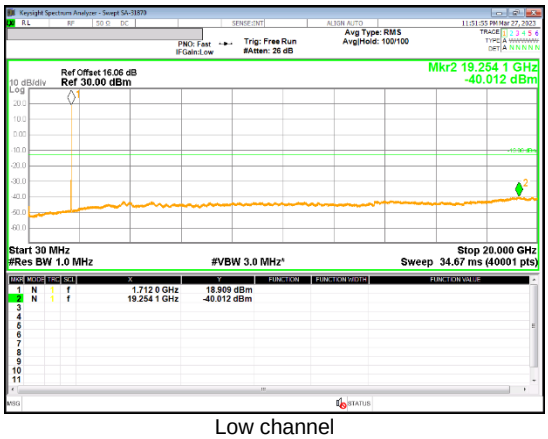
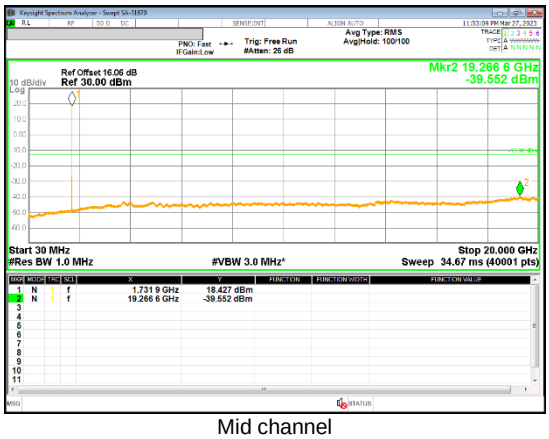
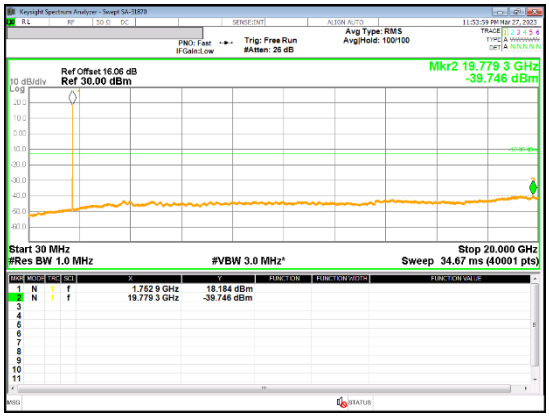
8.5.1. OUT OF BAND EMISSIONS RESULT

WCDMA Band 4

REL99	 Low channel	 Mid channel
	 High channel	

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LTE Band 7 (ANT B)

20 MHz QPSK	 Low channel	 Mid channel
	 High channel	

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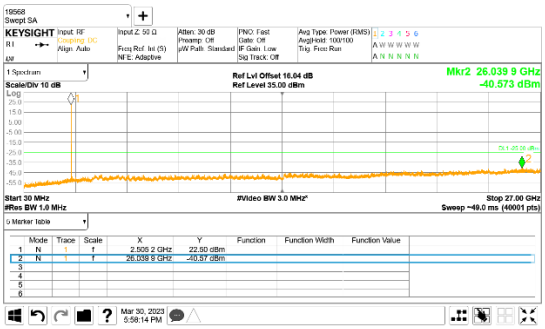
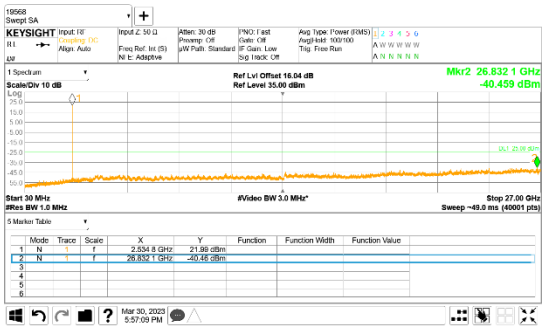
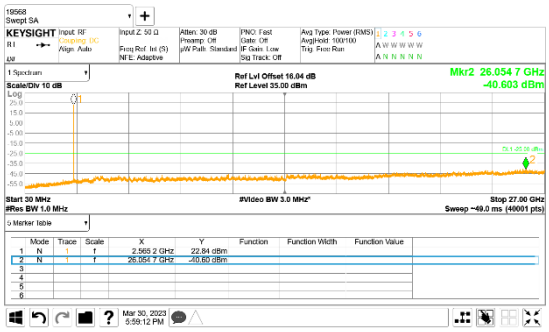
LTE Band 7 (ANT F)

10 MHz QPSK	 Low channel	 Mid channel
	 High channel	

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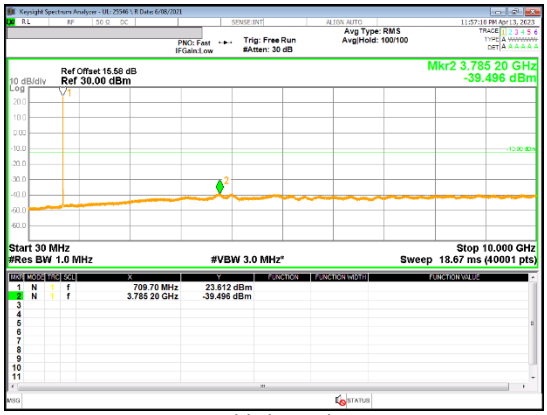
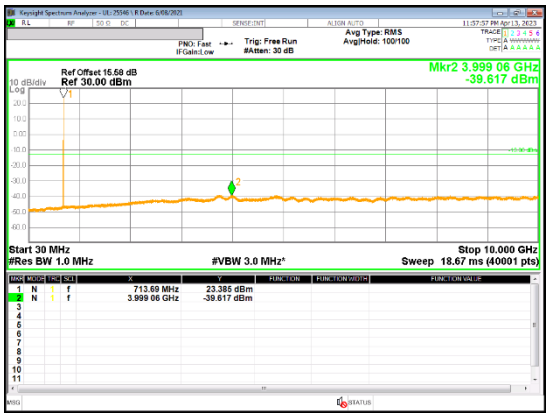
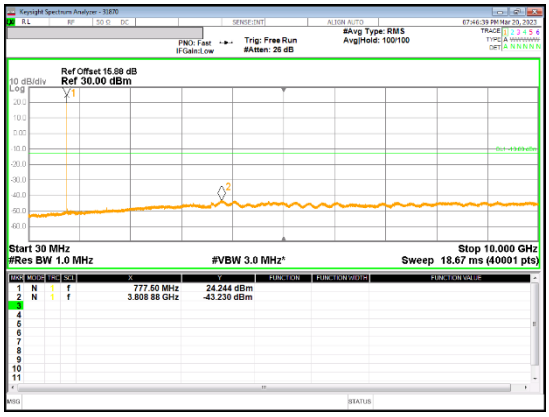
LTE Band 12

5 MHz QPSK	 Low channel	 Mid channel
	 High channel	

LTE Band 13

10 MHz QPSK	 Mid channel

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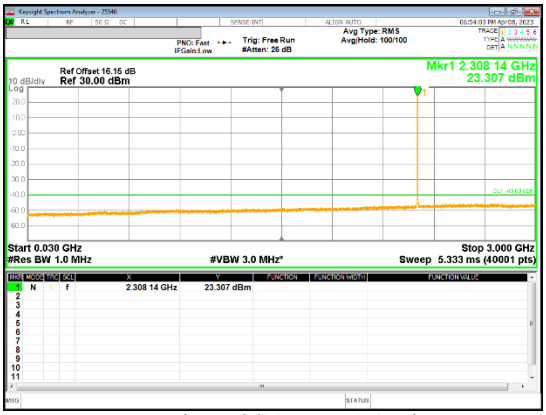
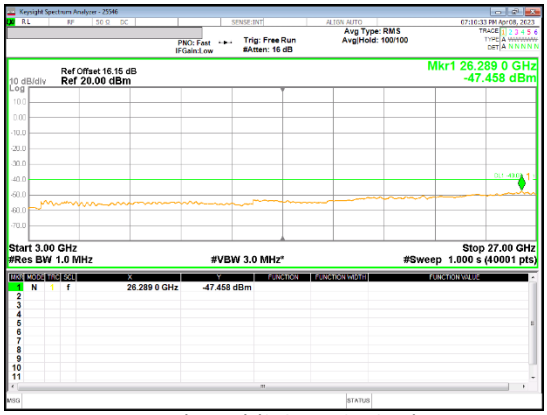
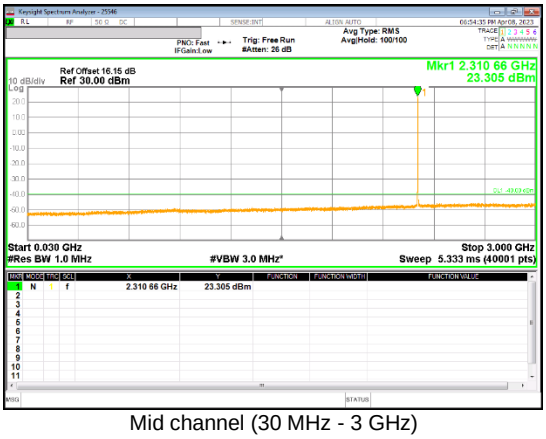
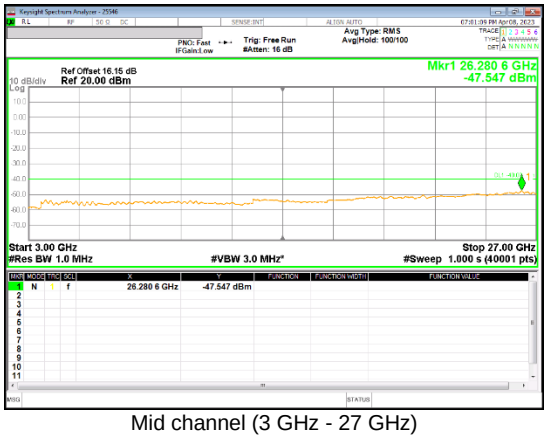
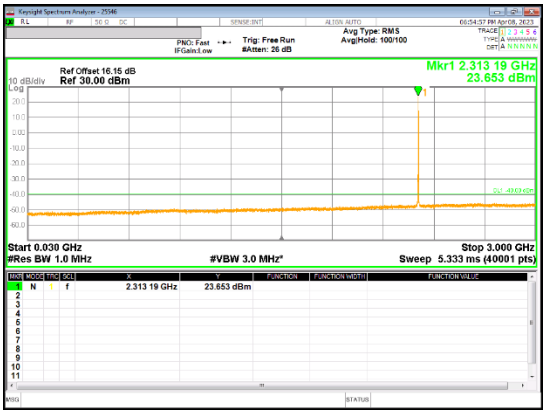
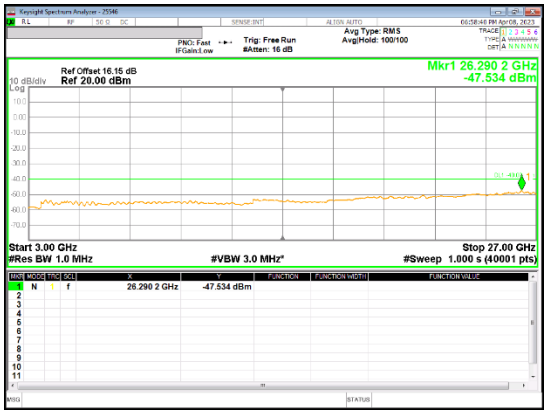
LTE Band 30 (ANT B)

5 MHz QPSK	 Low channel (30 MHz - 3 GHz)	 Low channel (3 GHz - 27 GHz)
	 Mid channel (30 MHz - 3 GHz)	 Mid channel (3 GHz - 27 GHz)
	 High channel (30 MHz - 3 GHz)	 High channel (3 GHz - 27 GHz)

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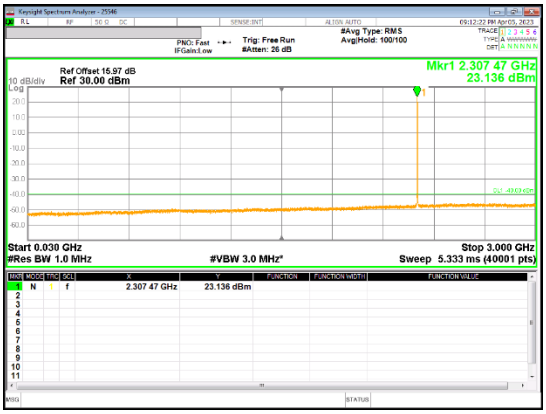
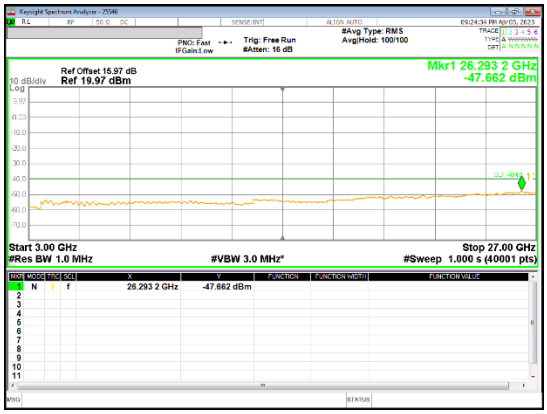
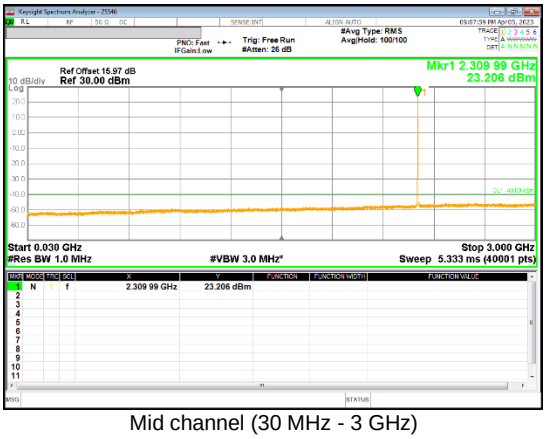
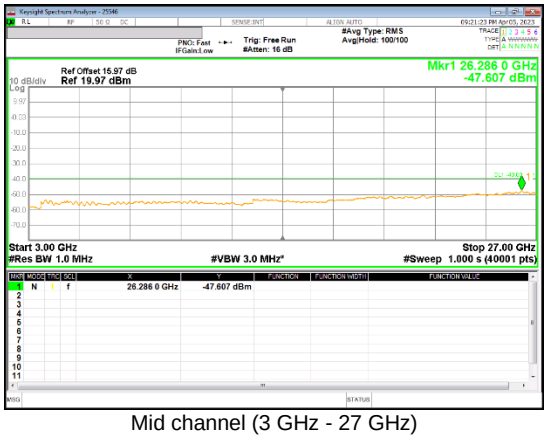
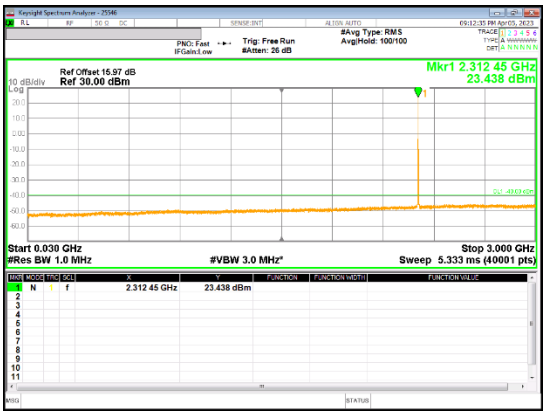
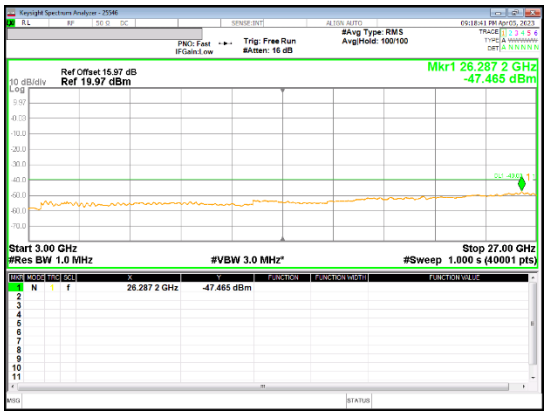
LTE Band 30 (ANT F)

5 MHz QPSK	 Low channel (30 MHz - 3 GHz)	 Low channel (3 GHz - 27 GHz)
	 Mid channel (30 MHz - 3 GHz)	 Mid channel (3 GHz - 27 GHz)
	 High channel (30 MHz - 3 GHz)	 High channel (3 GHz - 27 GHz)

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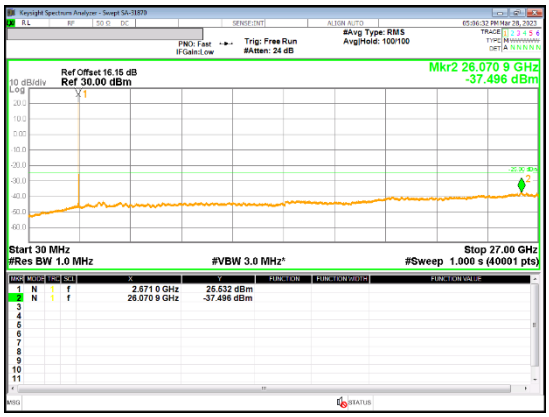
LTE Band 41(PC2) (ANT B)

20 MHz QPSK	 Low channel	 Mid channel
	 High channel	

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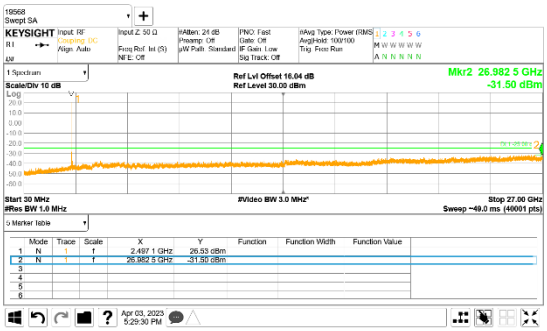
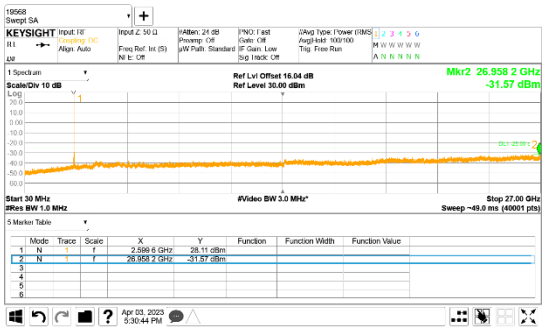
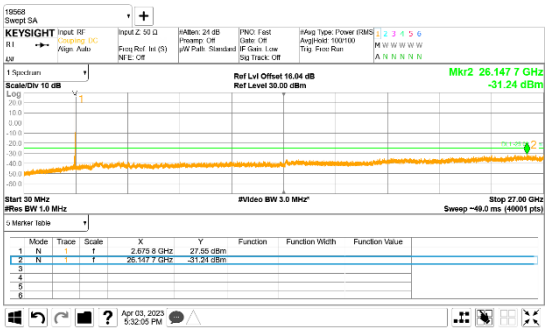
LTE Band 41(PC2) (ANT F)

15 MHz QPSK	 Low channel	 Mid channel
	 High channel	

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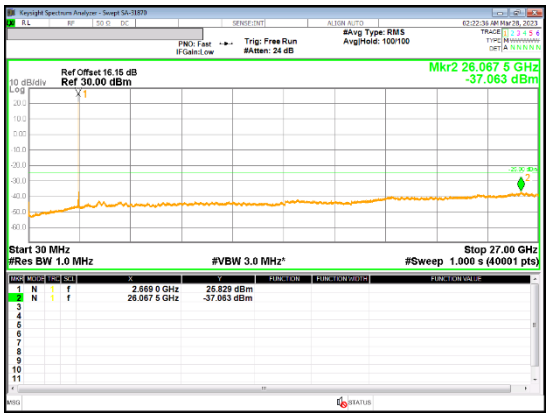
LTE Band 41C (UL CA) (ANT B)

20+20 MHz QPSK	 Low channel	 Mid channel
	 High channel	

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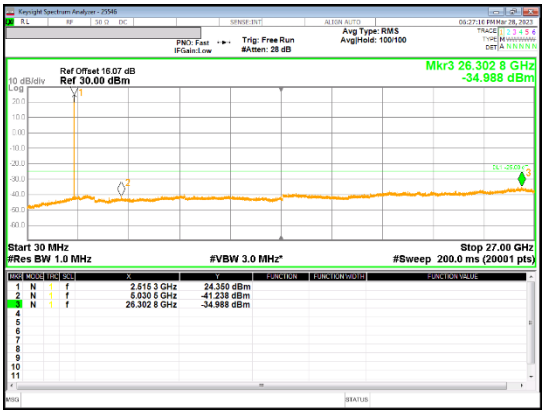
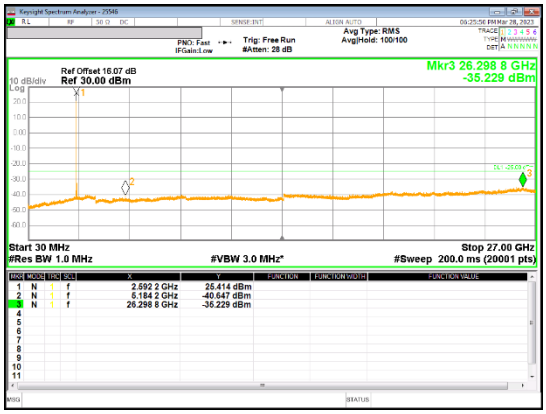
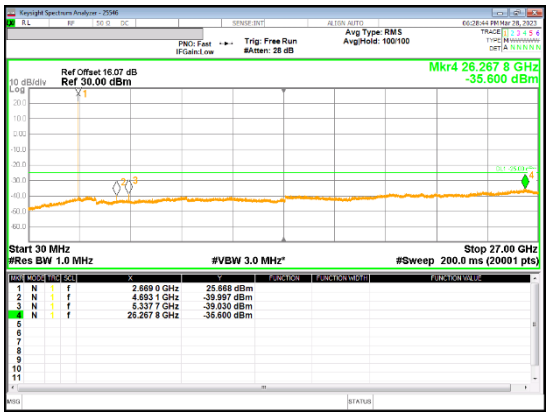
LTE Band 41C (UL CA) (ANT F)

20+20 MHz QPSK	 Low channel	 Mid channel
	 High channel	

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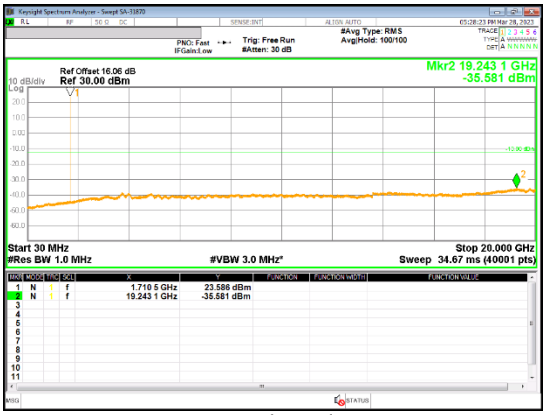
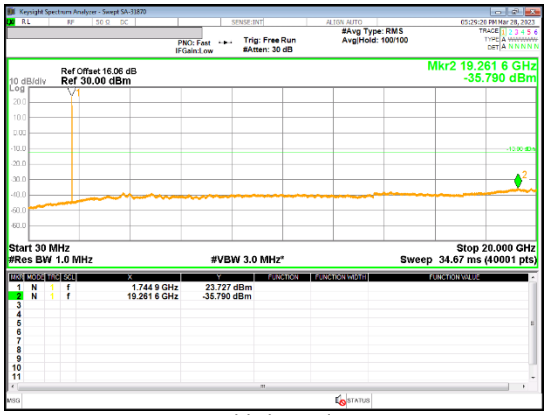
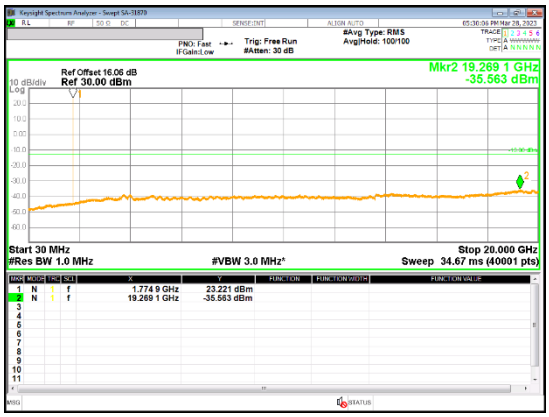
LTE Band 66 (ANT B)

10 MHz QPSK	 Low channel	 Mid channel
	 High channel	

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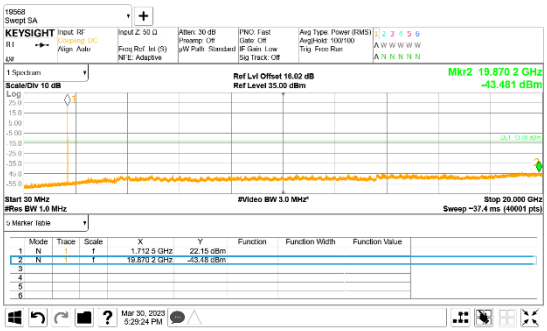
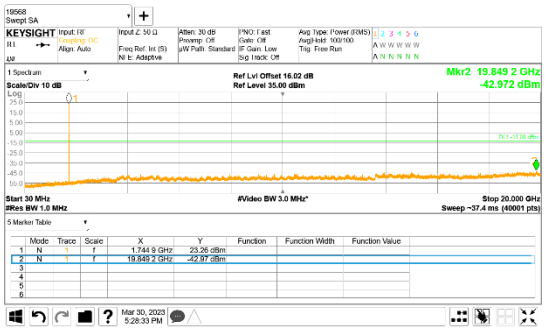
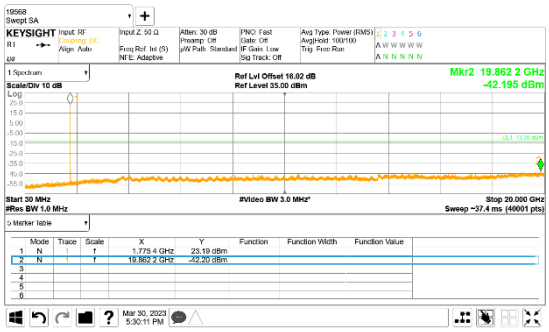
LTE Band 66 (ANT F)

5 MHz QPSK	 Low channel	 Mid channel
	 High channel	

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