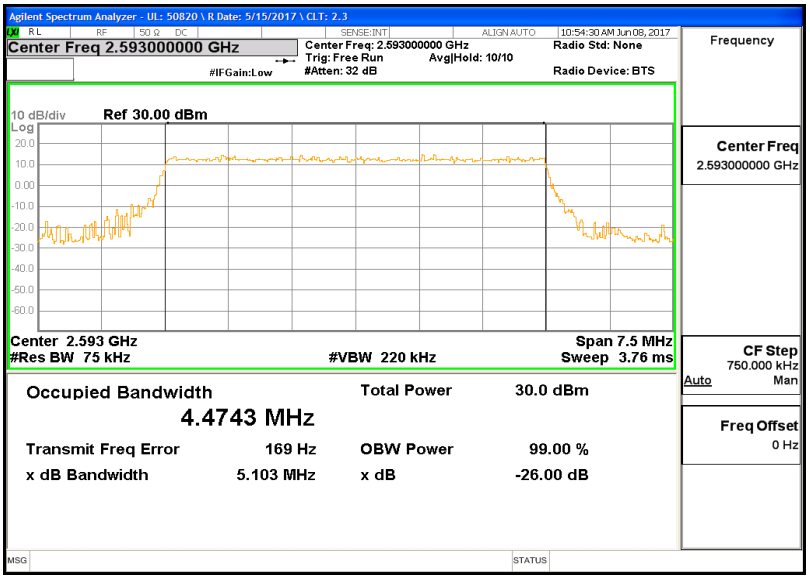
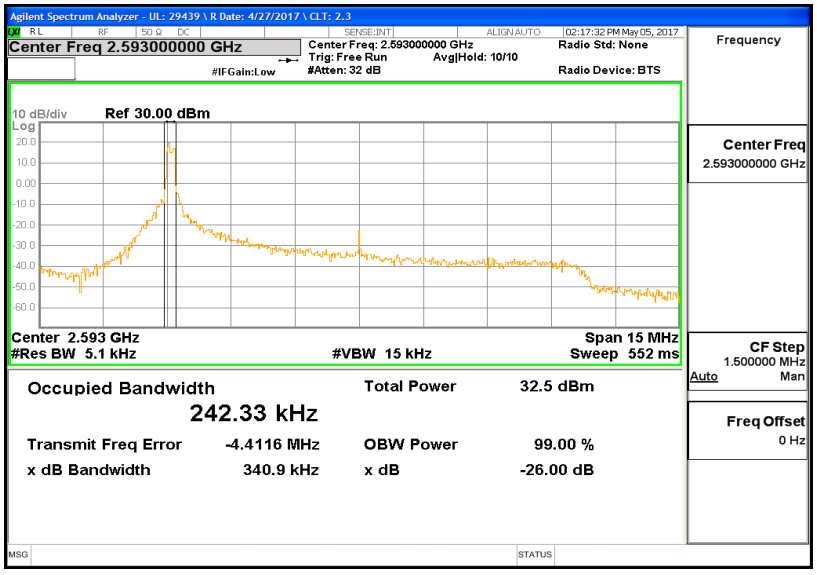
64QAM, (5.0 MHz BAND WIDTH)

MID CH, RB25-0



QPSK, (10.0 MHz BAND WIDTH)

MID CH, RB1-0



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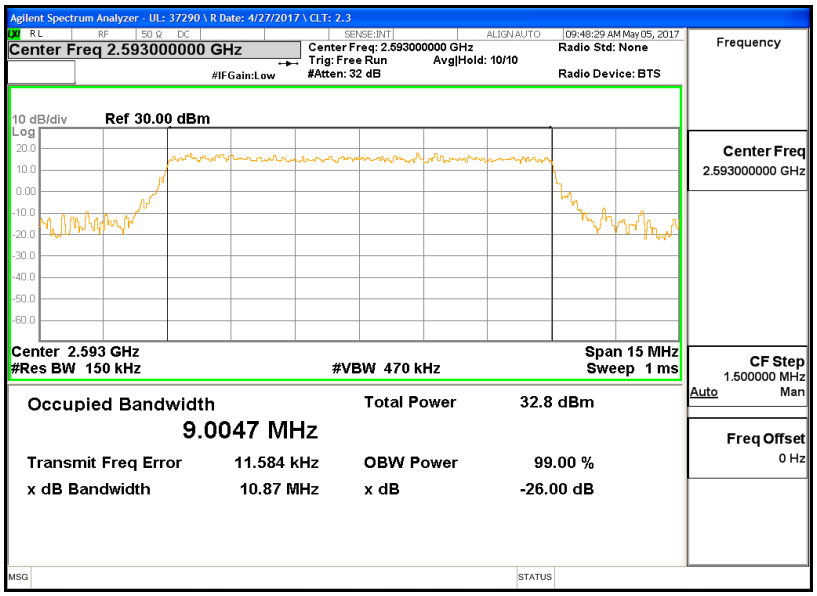
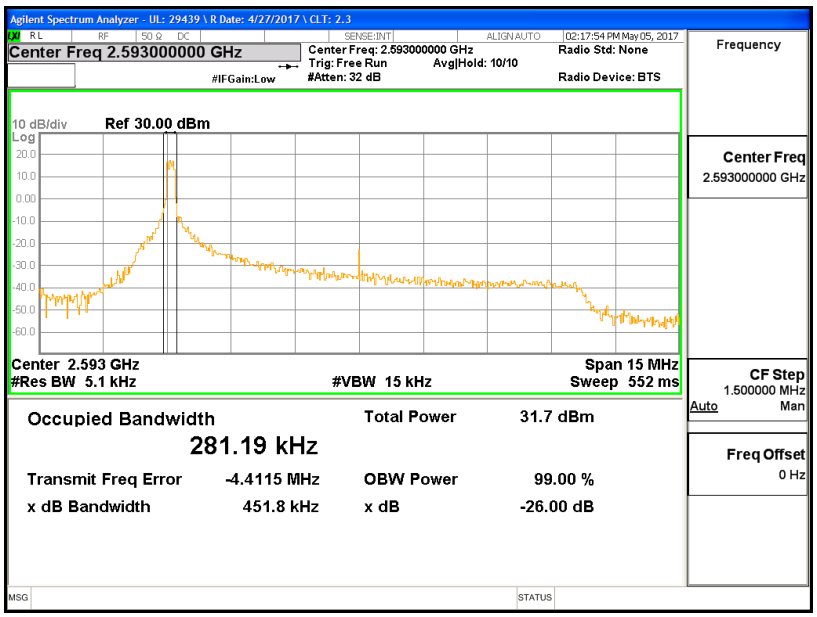
MID CH, RB50-0



16QAM, (10.0 MHz BAND WIDTH)

MID CH, RB1-0



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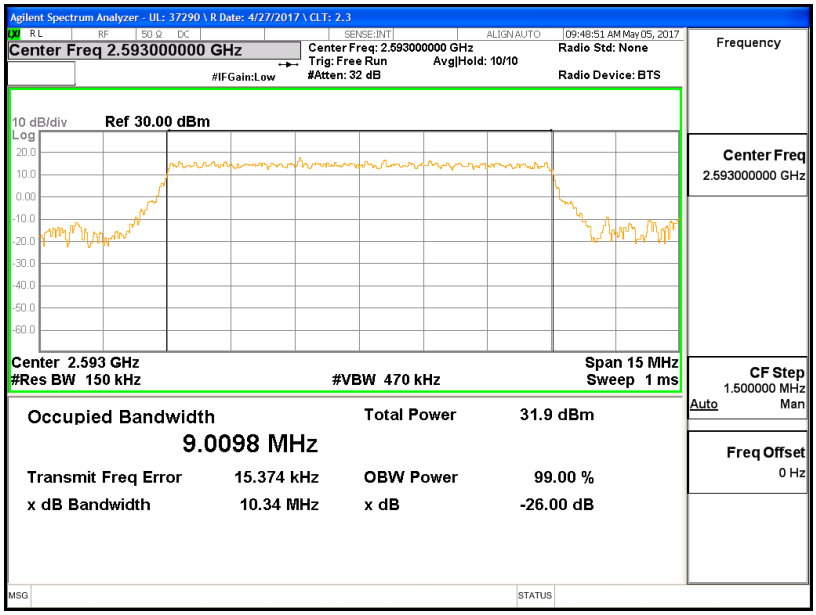
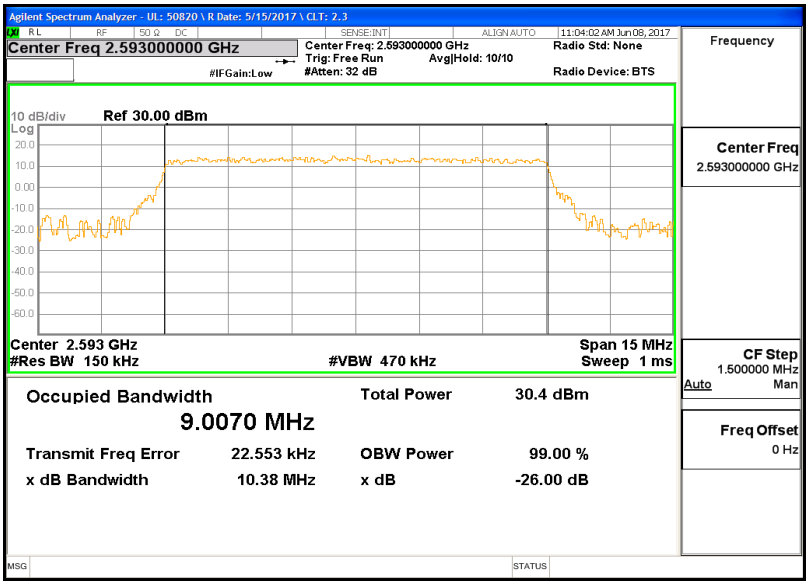
MID CH, RB50-0



64QAM, (10.0 MHz BAND WIDTH)

MID CH, RB50-0



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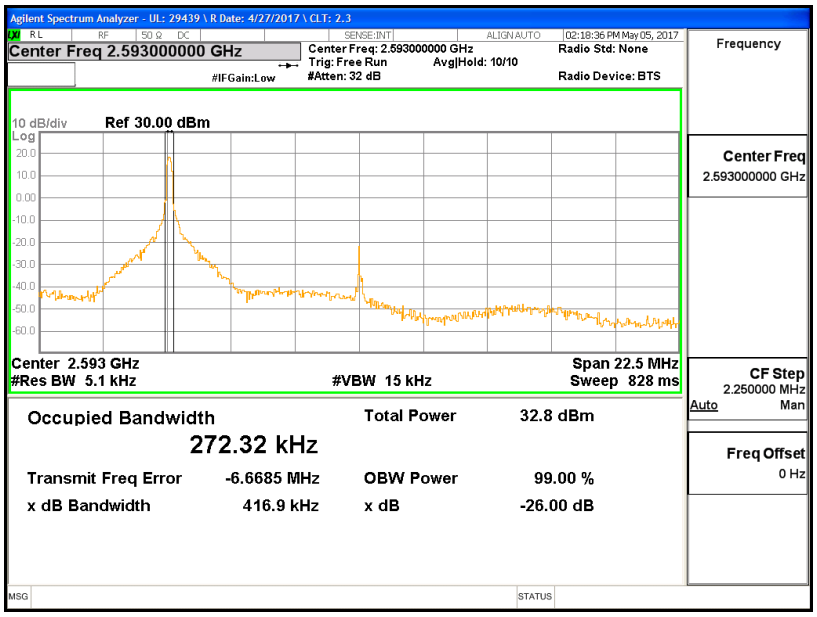
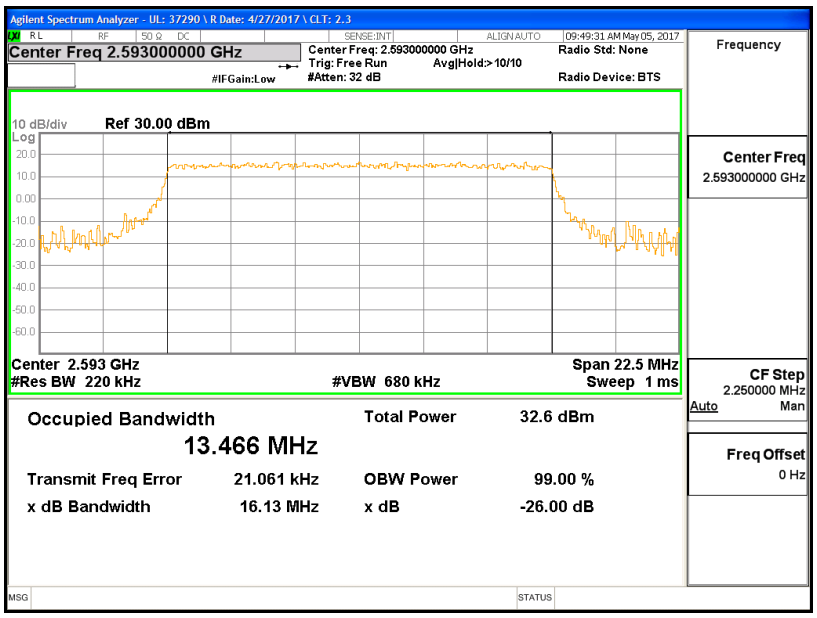
QPSK, (15.0 MHz BAND WIDTH)

MID CH, RB1-0



MID CH, RB75-0



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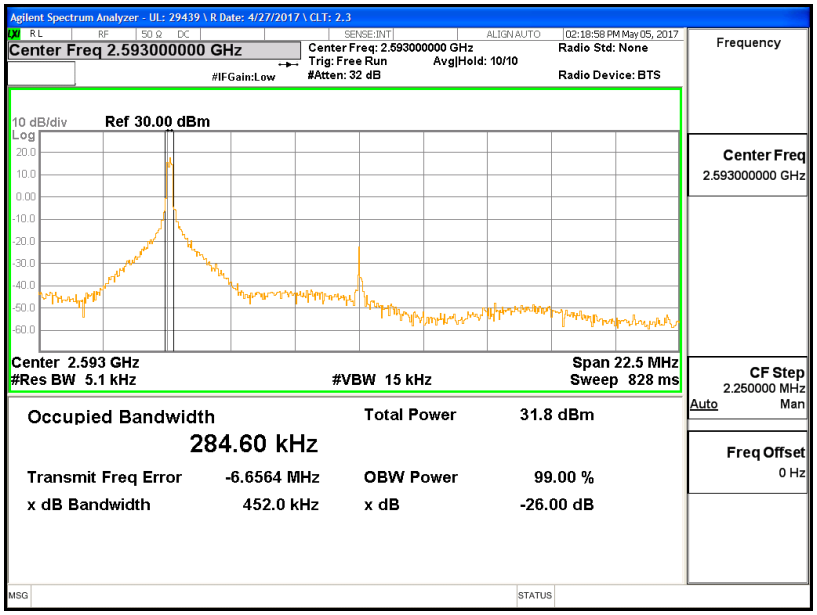
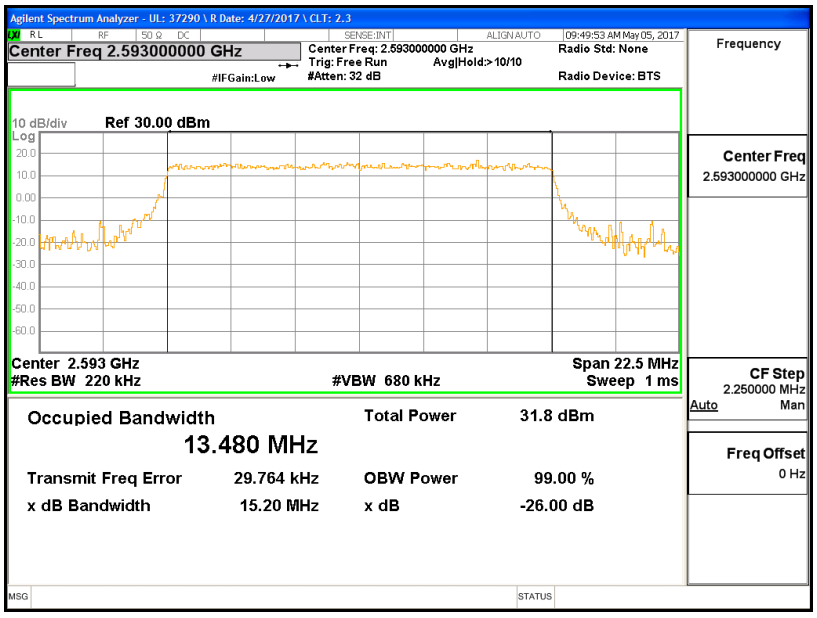
16QAM, (15.0 MHz BAND WIDTH)

MID CH, RB1-0



MID CH, RB75-0



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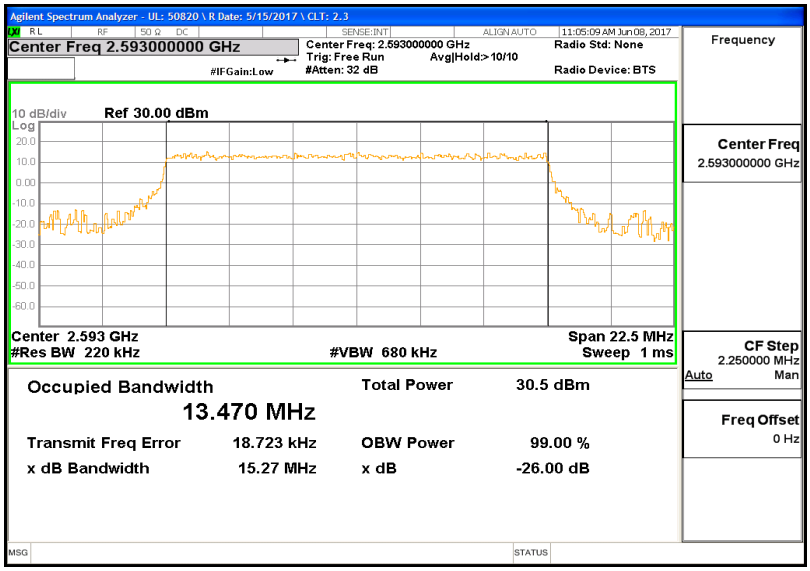
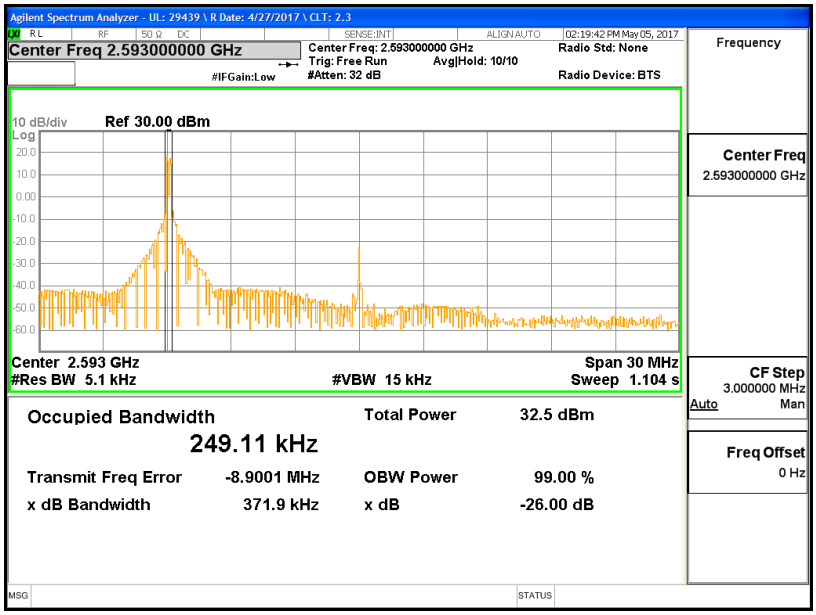
64QAM, (15.0 MHz BAND WIDTH)

MID CH, RB75-0



QPSK, (20.0 MHz BAND WIDTH)

MID CH, RB1-0



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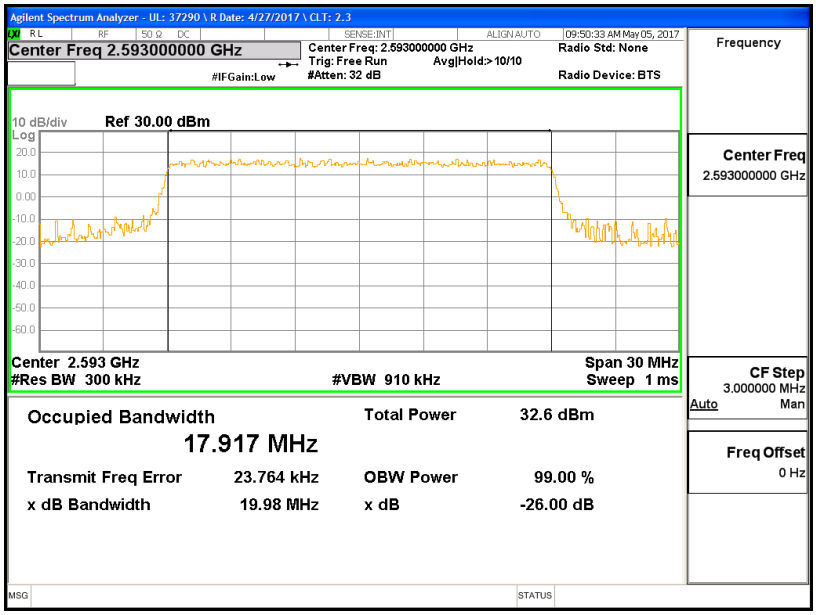
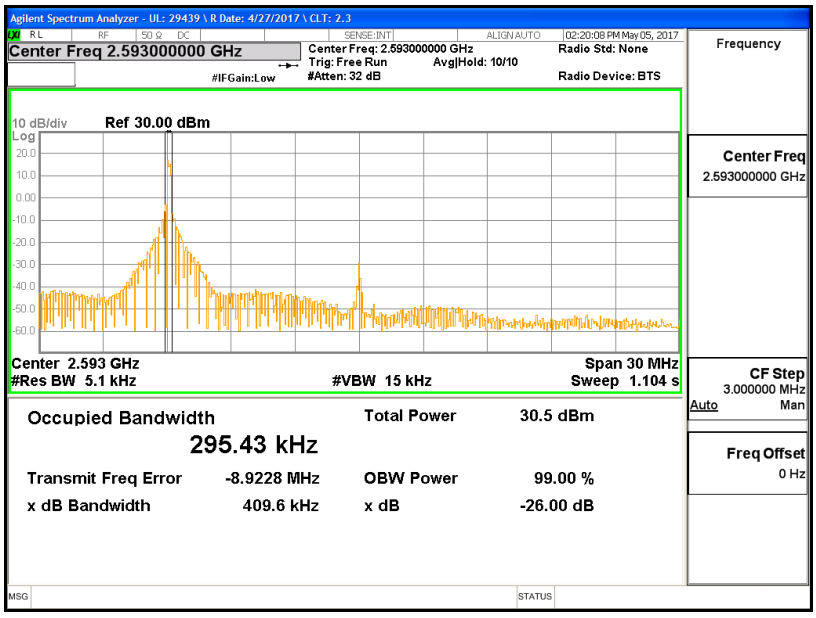
MID CH, RB100-0



16QAM, (20.0 MHz BAND WIDTH)

MID CH, RB1-0



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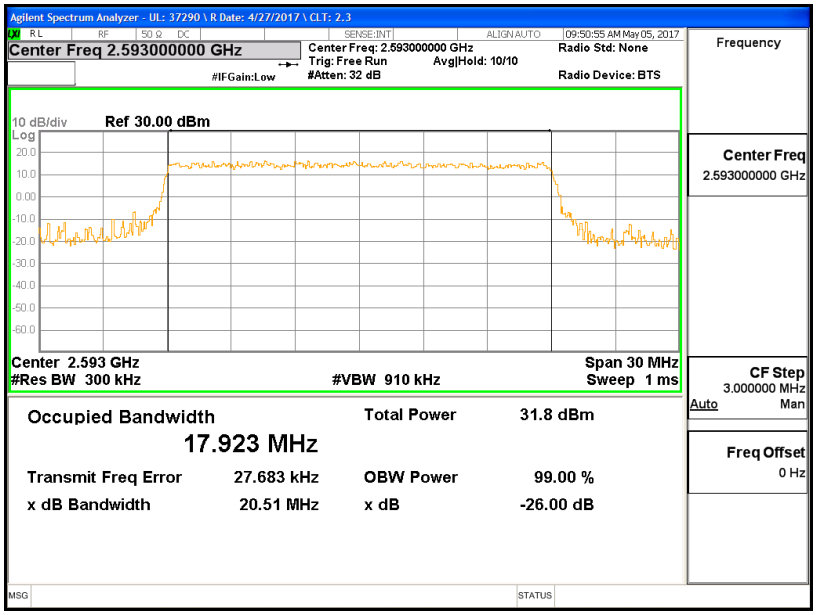
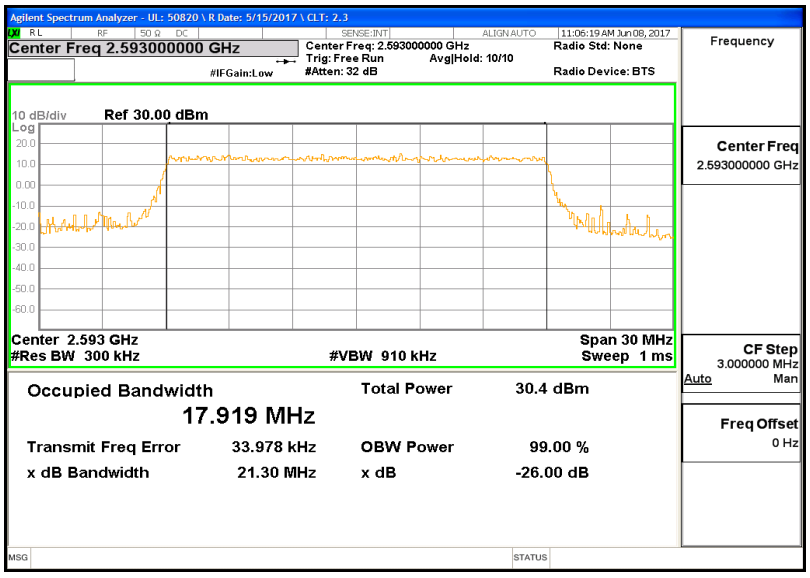
MID CH, RB100-0



64QAM, (20.0 MHz BAND WIDTH)

MID CH, RB100-0



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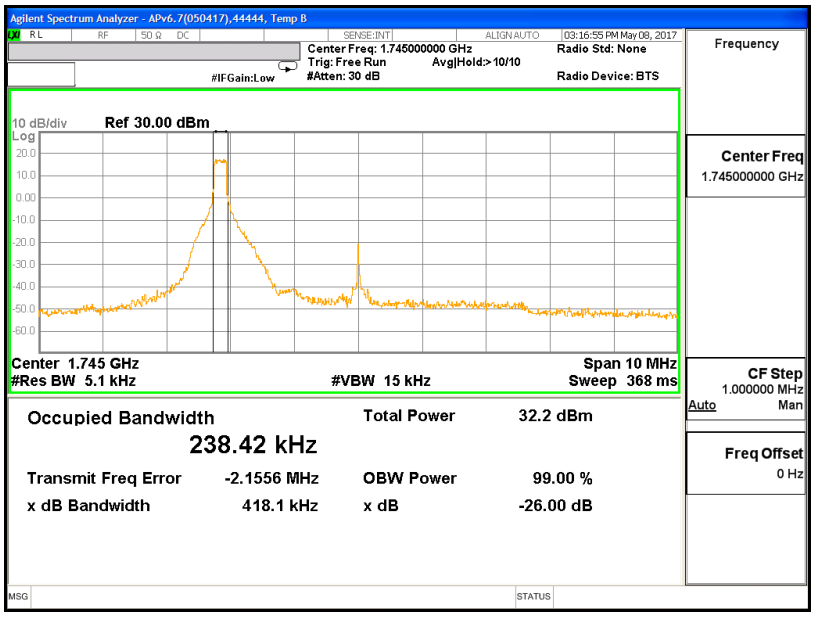
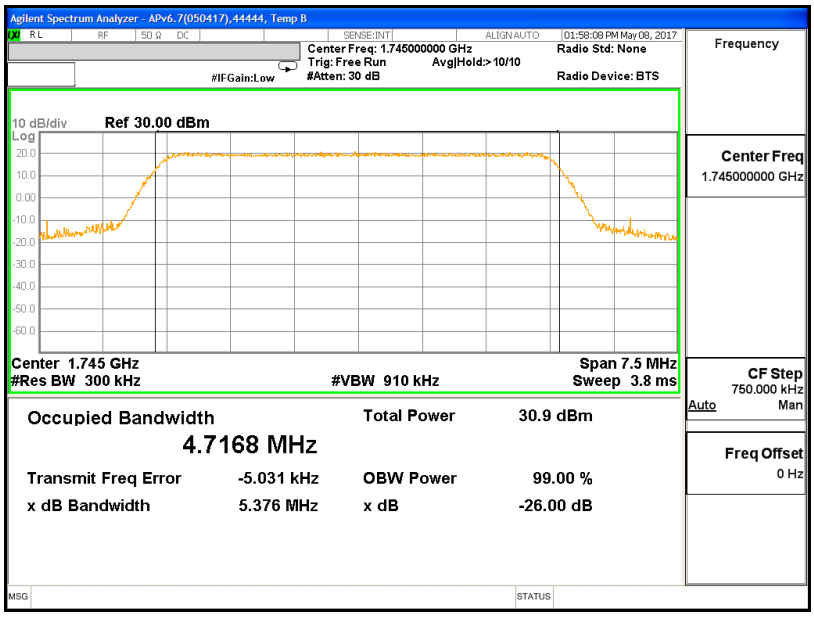
8.1.12. LTE BAND 66

QPSK, (5.0 MHz BAND WIDTH)

MID CH, RB1-0



MID CH, RB25-0



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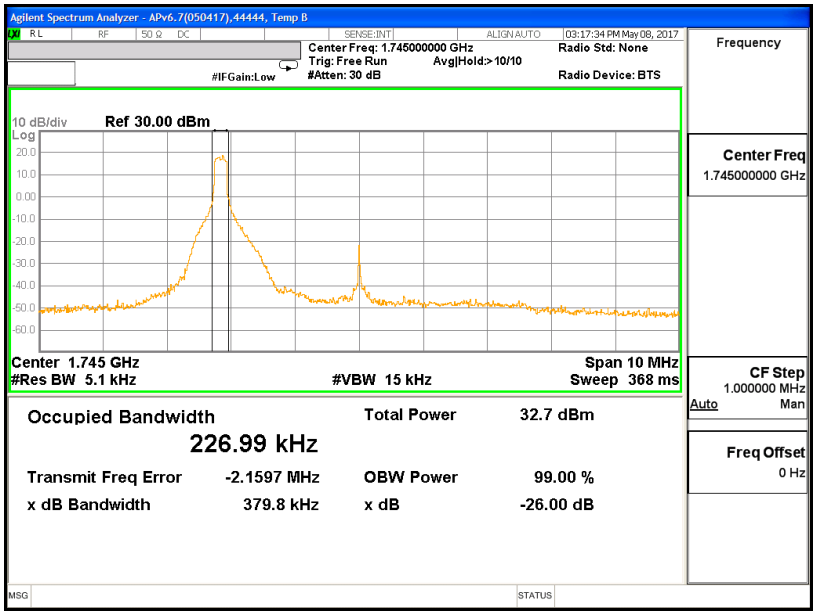
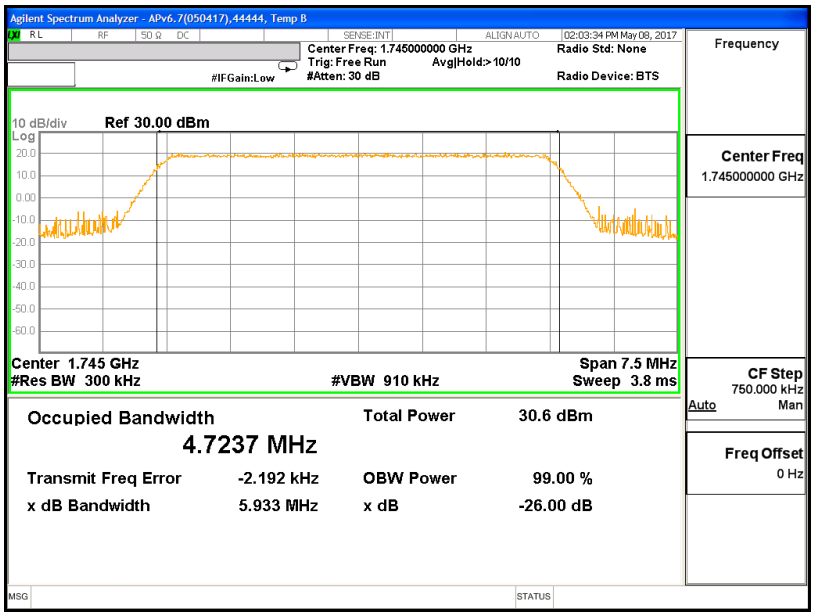
16QAM, (5.0 MHz BAND WIDTH)

MID CH, RB1-0



MID CH, RB25-0



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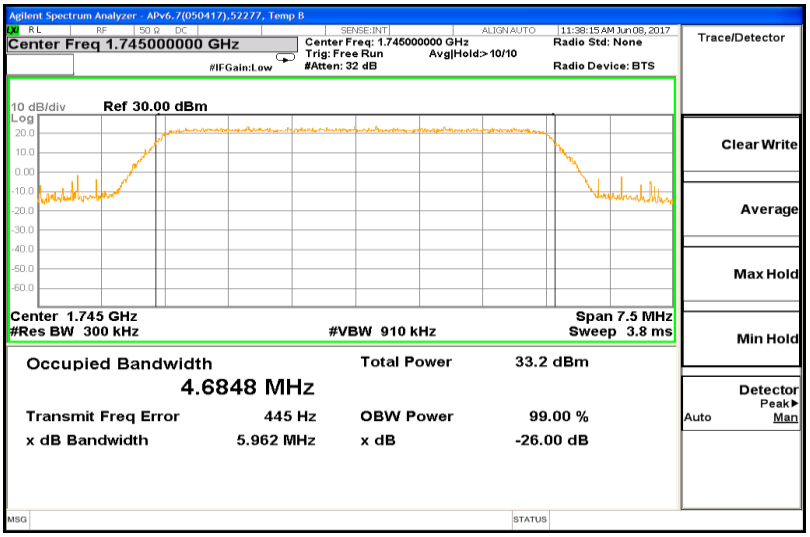
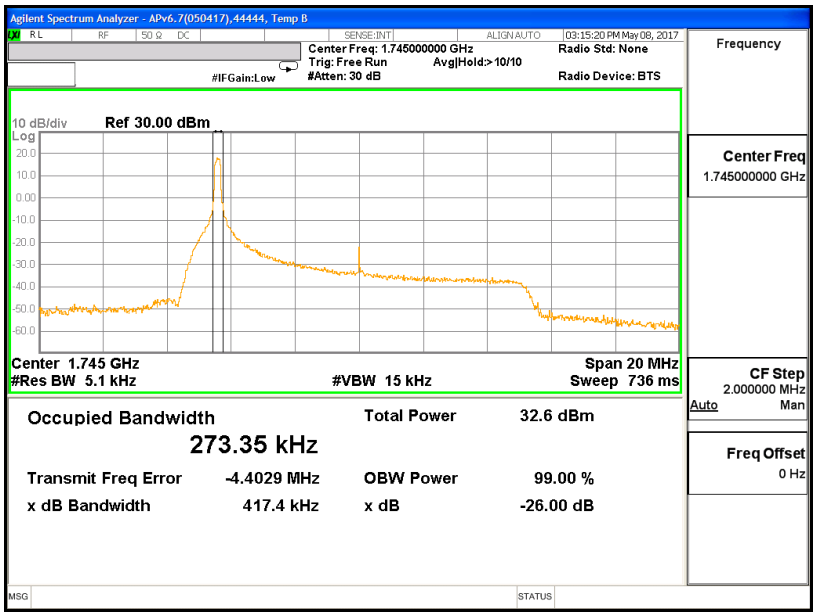
64QAM, (5.0 MHz BAND WIDTH)

MID CH, RB25-0



QPSK, (10.0 MHz BAND WIDTH)

MID CH, RB1-0



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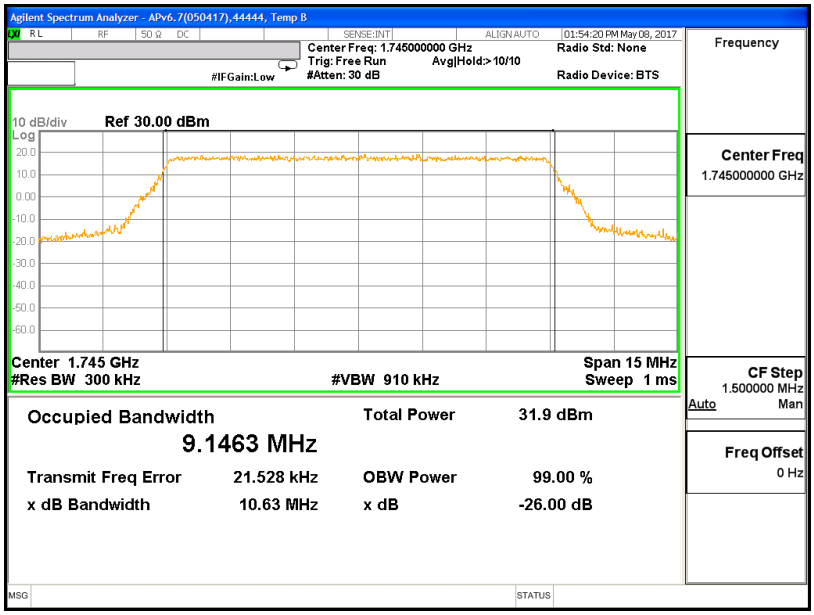
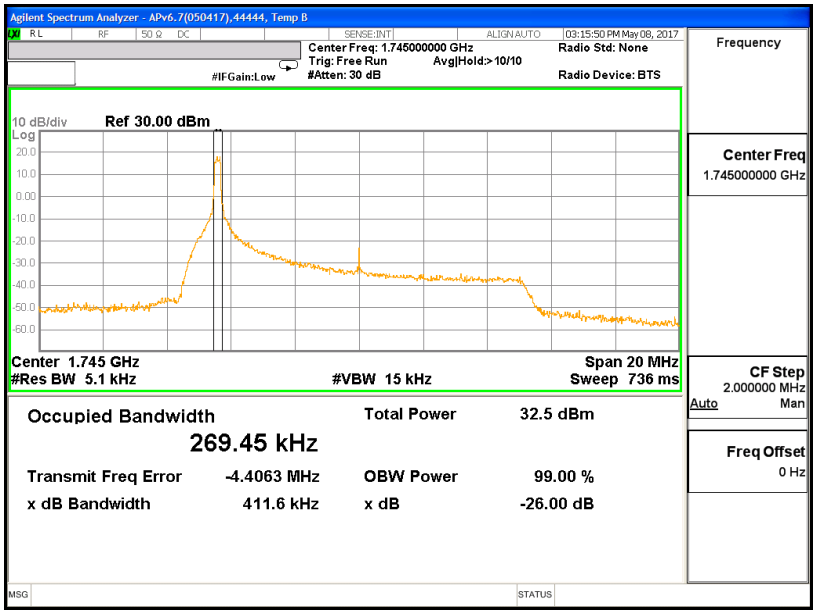
MID CH, RB50-0



16QAM, (10.0 MHz BAND WIDTH)

MID CH, RB1-0



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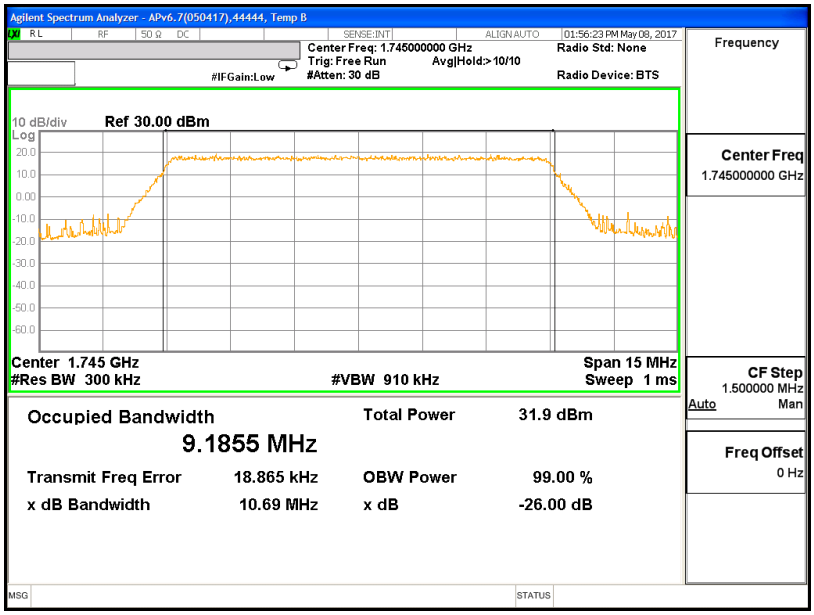
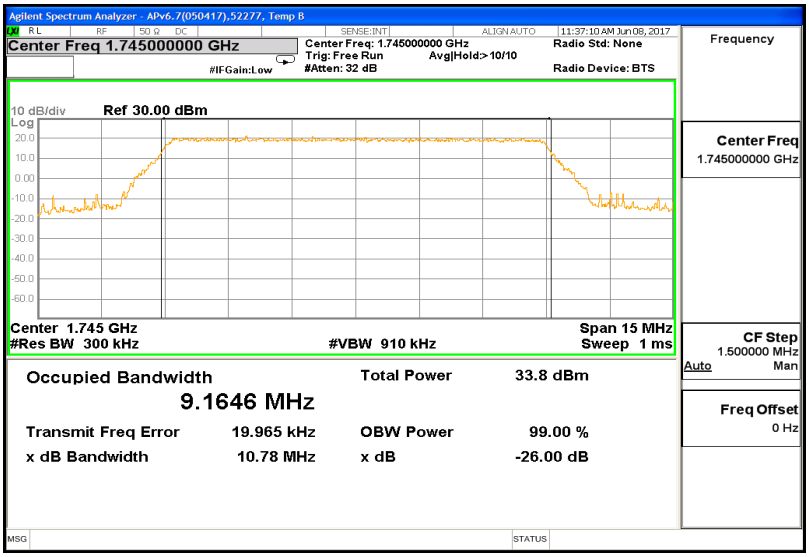
MID CH, RB50-0



64QAM, (10.0 MHz BAND WIDTH)

MID CH, RB50-0



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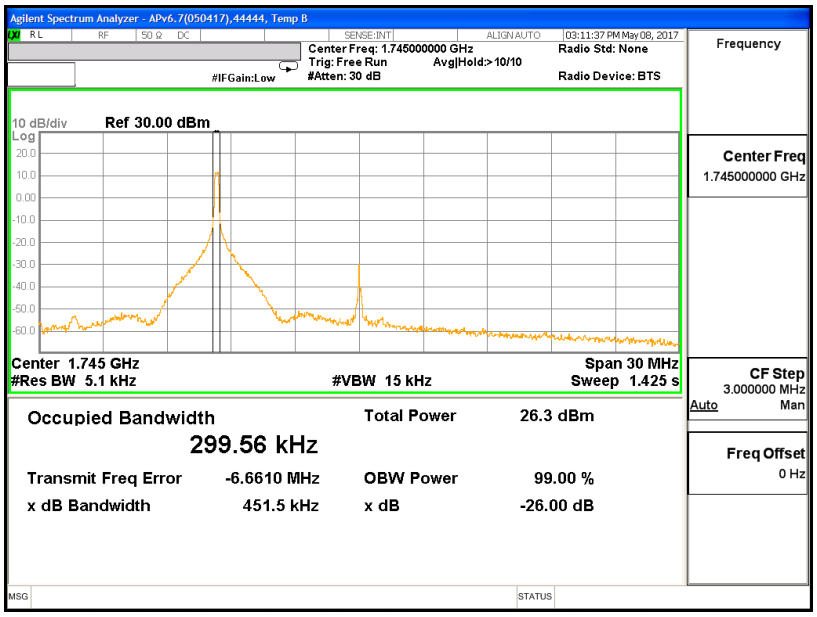
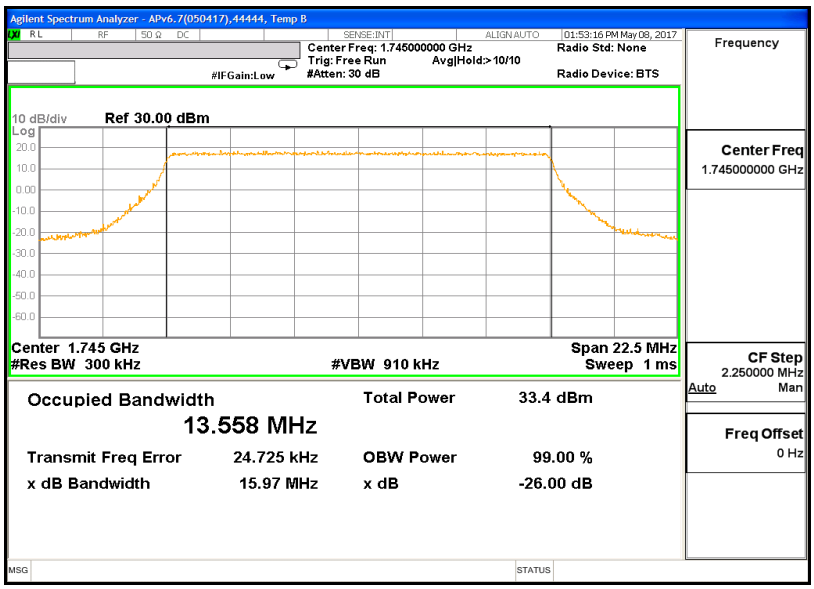
QPSK, (15.0 MHz BAND WIDTH)

MID CH, RB1-0



MID CH, RB75-0



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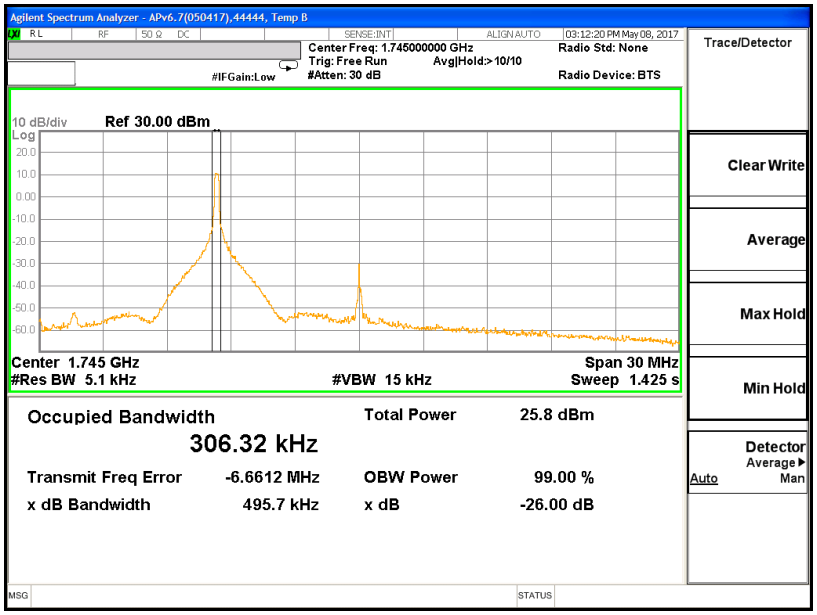
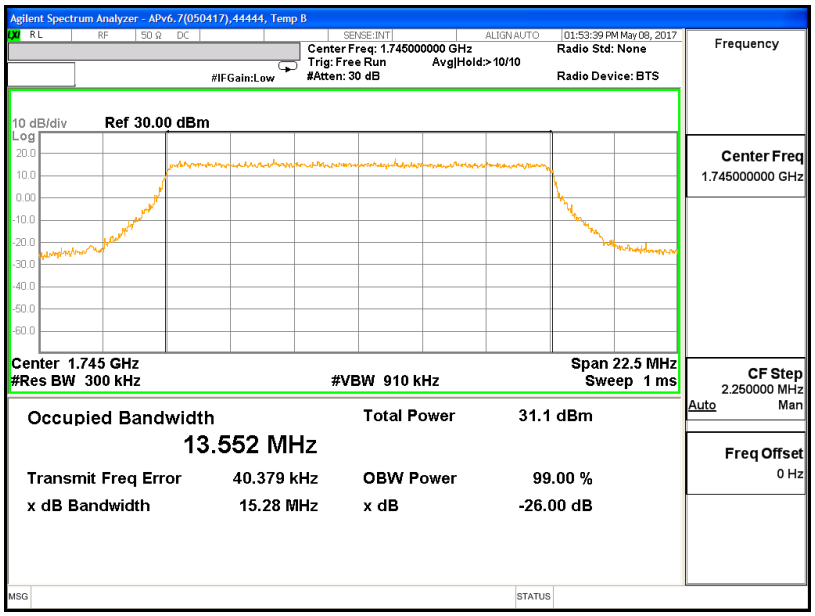
16QAM, (15.0 MHz BAND WIDTH)

MID CH, RB1-0



MID CH, RB75-0



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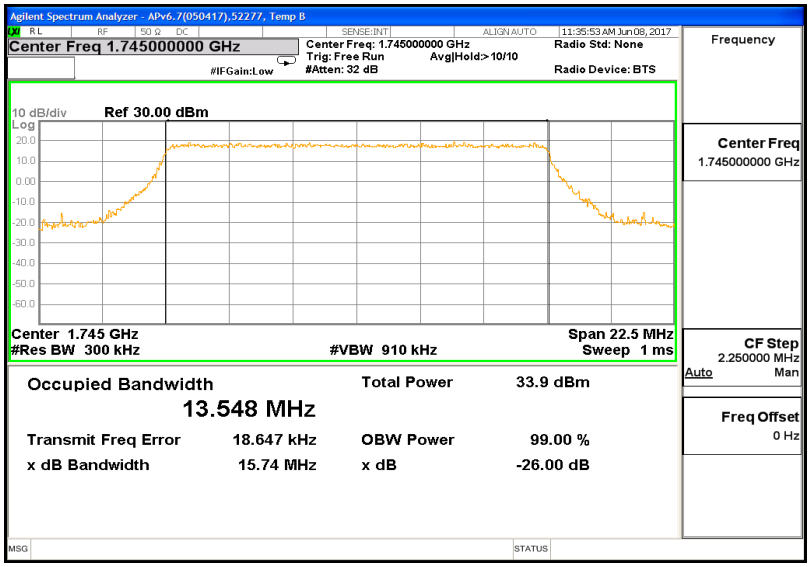
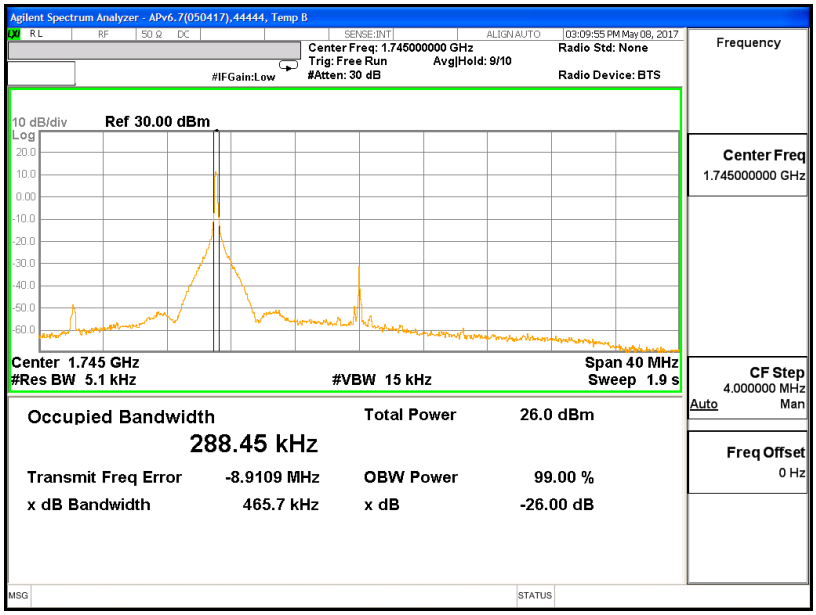
64QAM, (15.0 MHz BAND WIDTH)

MID CH, RB75-0



QPSK, (20.0 MHz BAND WIDTH)

MID CH, RB1-0



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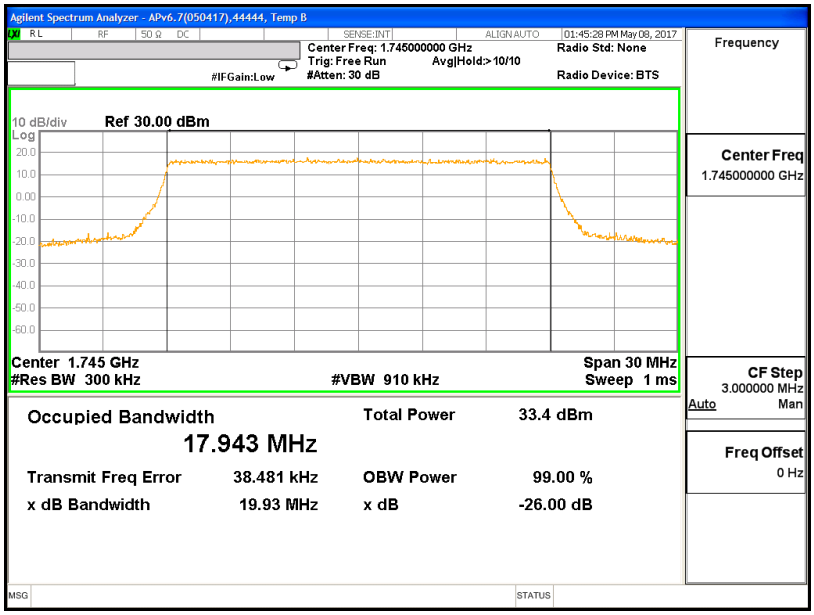
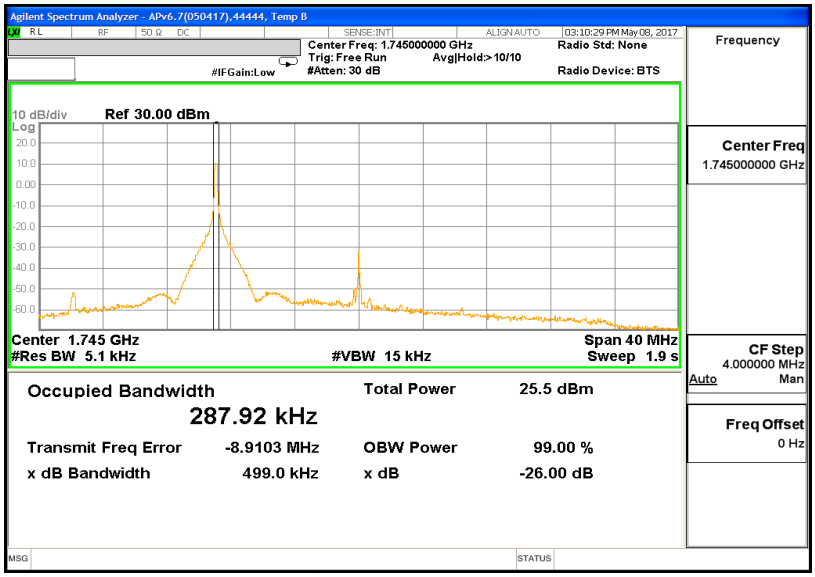
MID CH, RB100-0



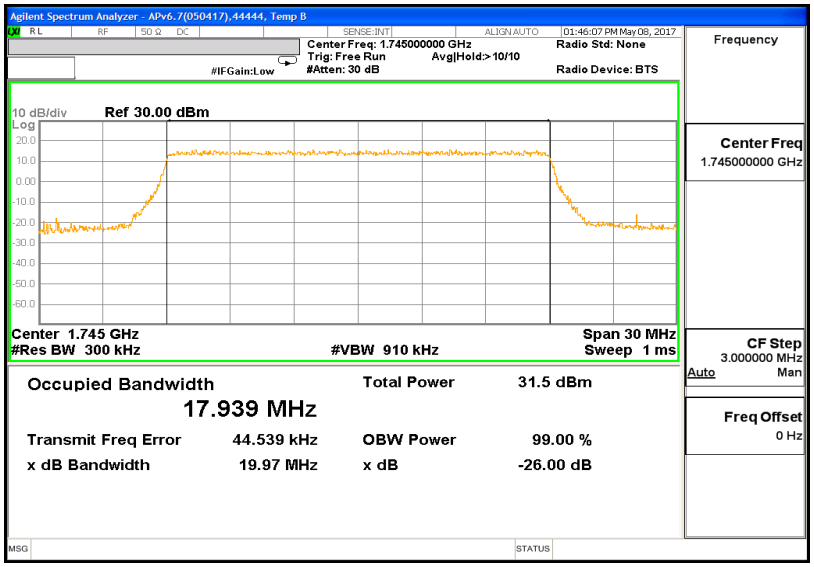
16QAM, (20.0 MHz BAND WIDTH)

MID CH, RB1-0



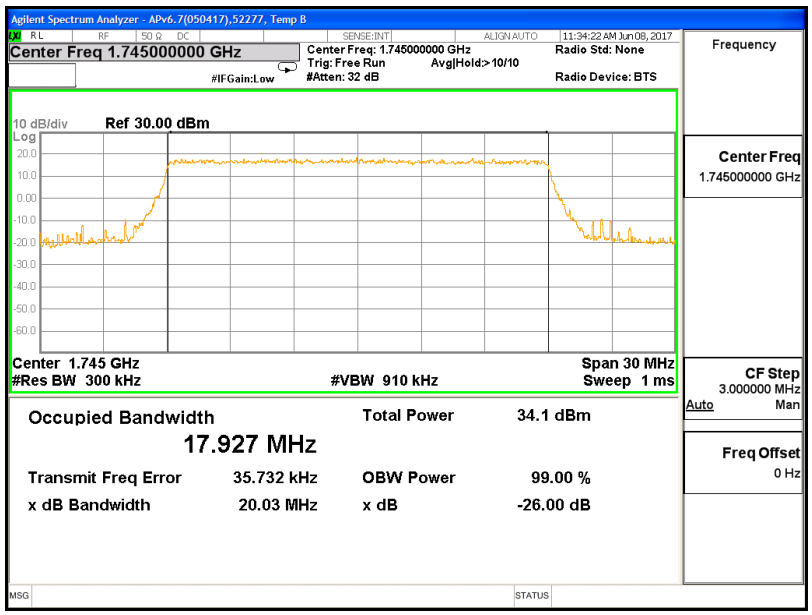
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

MID CH, RB100-0



64QAM, (20.0 MHz BAND WIDTH)

MID CH, RB100-0



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8.2. BANDEDGE AND EMISSION MASK

RULE PART(S)

FCC: §2.1051, §22.359, §22.917, §24.238, §27.53, §90.691

LIMITS

FCC: §22.359, §22.917, §24.238, §27.53
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

FCC: §90.210, and §90.691 (LTE BAND 26)
(a)(1)For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10 (f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.
(a)(2)For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

FCC: §27.53
(c) For operations in the 776-788 MHz band, the power of any emission outside the 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, in accordance with the following:

(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;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

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FCC: §27.53 (LTE BAND 41)
(m)(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). 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. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

(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.Show citation box.

TEST PROCEDURE

The transmitter output was connected to a CMW500Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

1. Set the spectrum analyzer span to include the block edge frequency.
2. Set a marker to point the corresponding band edge frequency in each test case.
3. Set display line at -13 dBm
4. Set resolution bandwidth to at least 1% of emission bandwidth.

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MODES TESTED

- LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 17
- LTE Band 25
- LTE Band 26
- LTE Band 30
- LTE Band 41
- LTE Band 66

RESULTS

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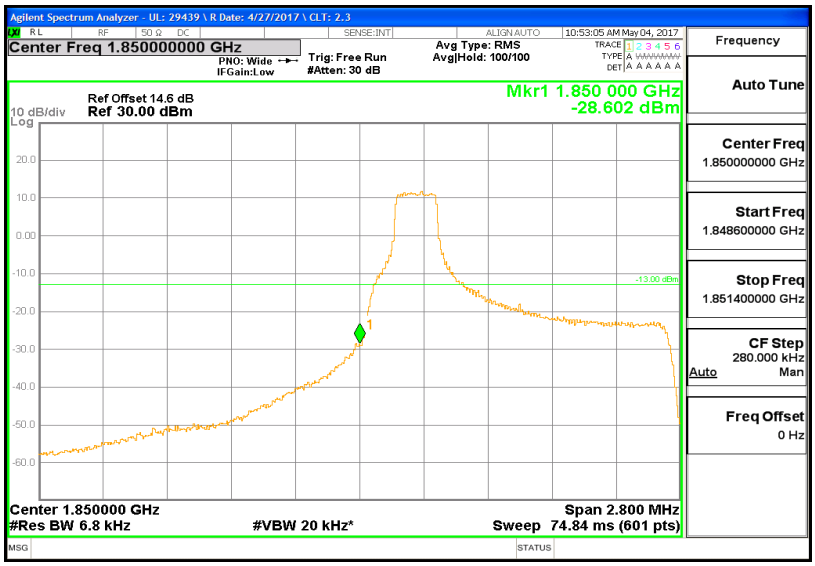
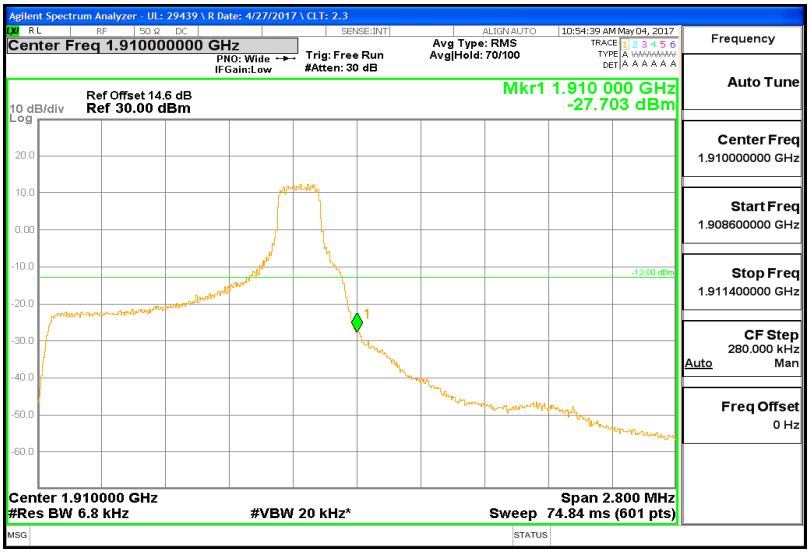
8.2.1. LTE BAND 2 BANDEDGE

QPSK, (1.4 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-5



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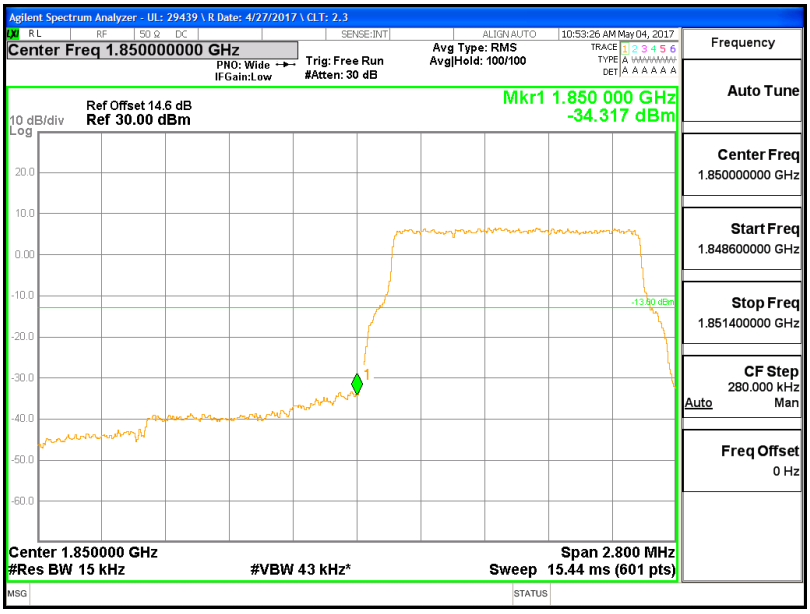
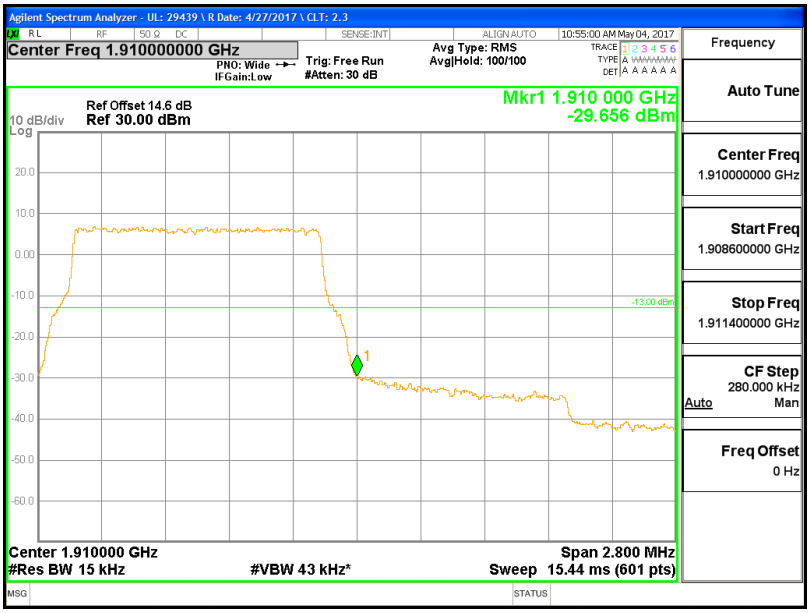
LOW CH, RB6-0



HIGH CH, RB6-0



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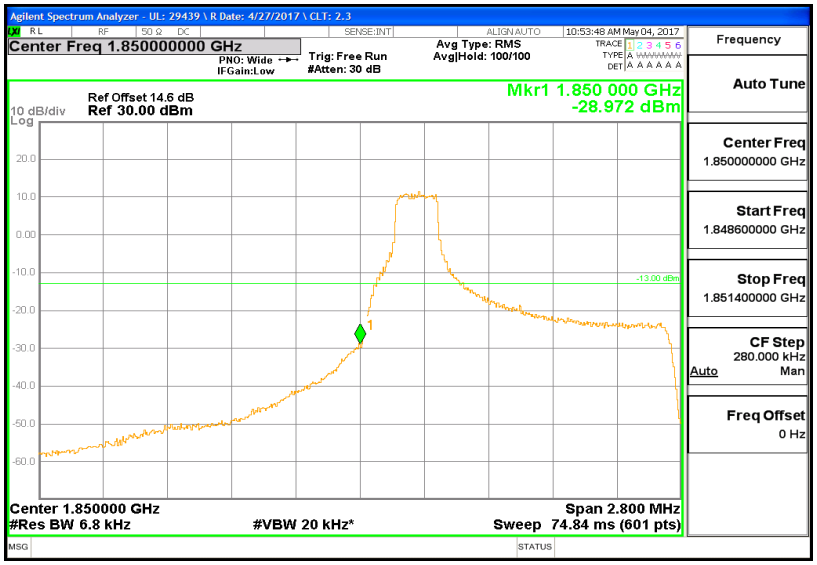
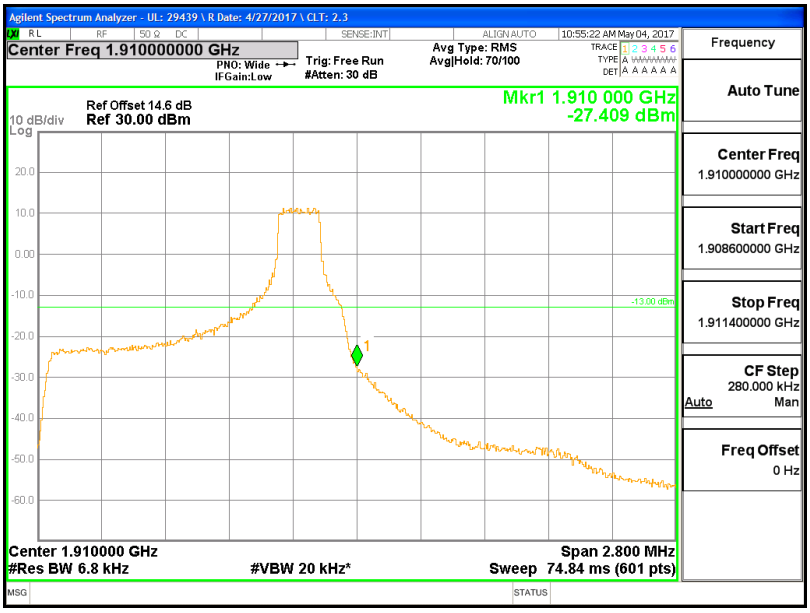
16QAM, (1.4 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-5



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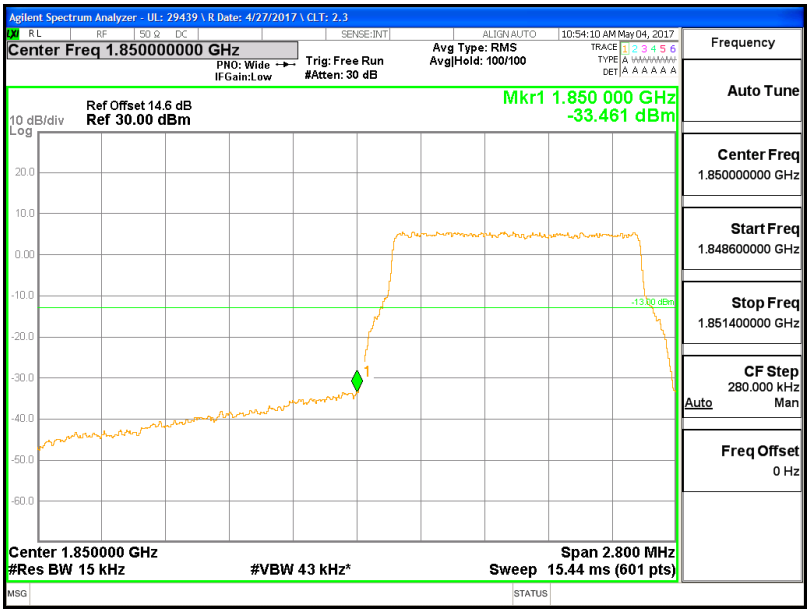
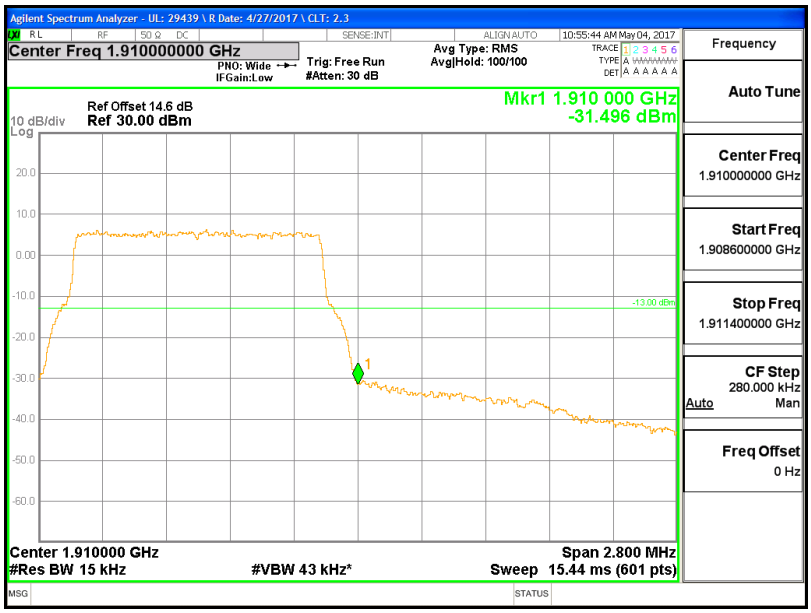
LOW CH, RB6-0



HIGH CH, RB6-0



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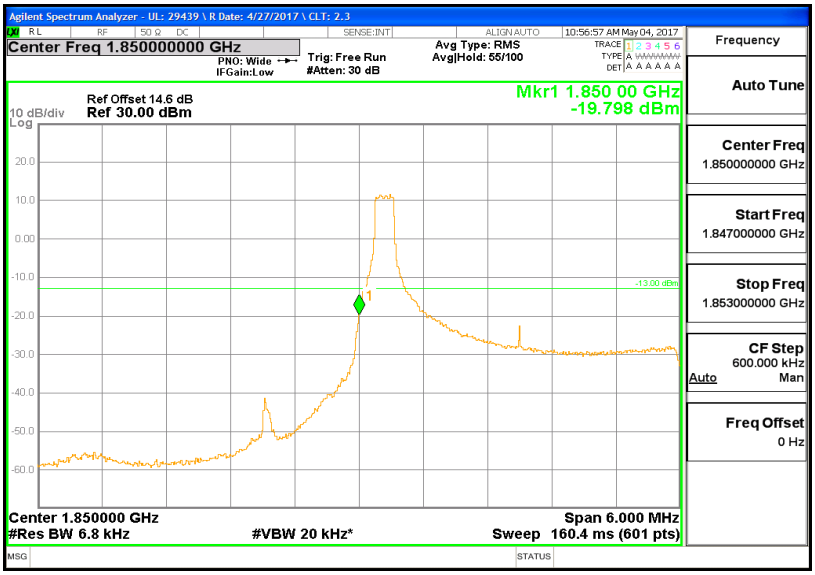
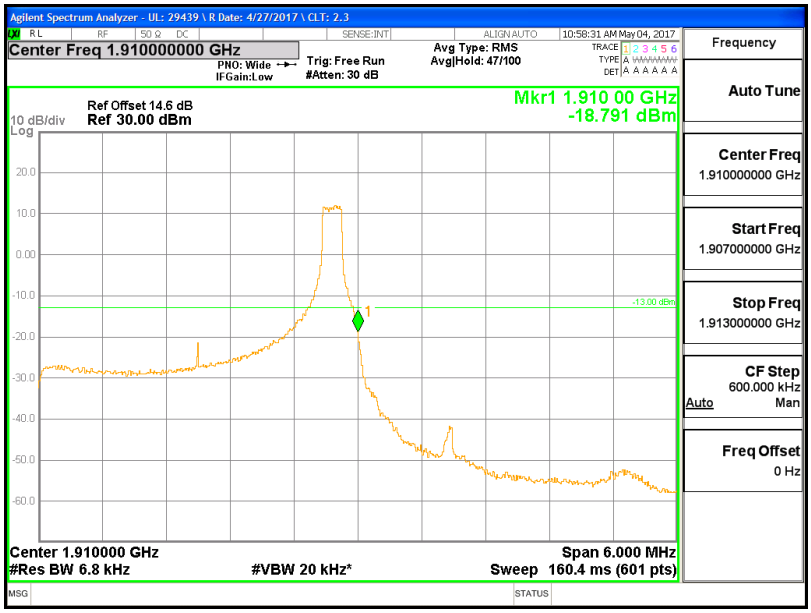
QPSK, (3.0 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-14



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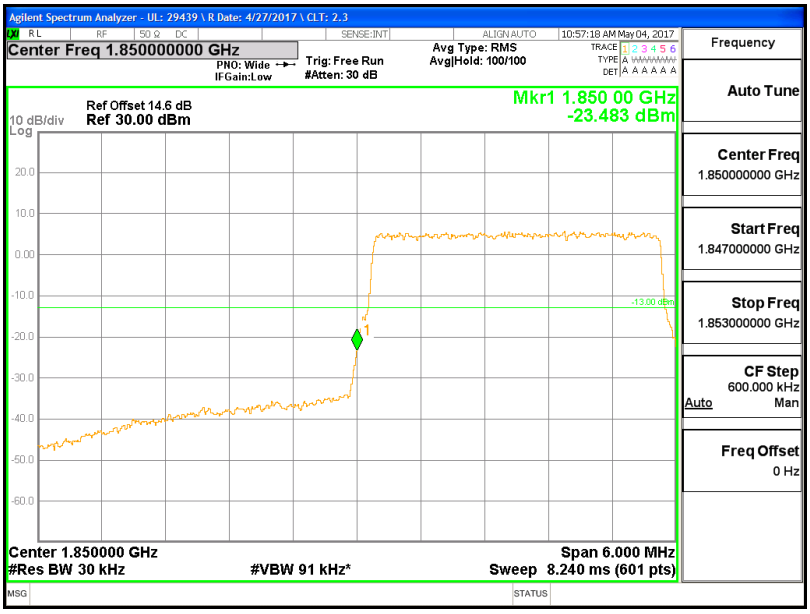
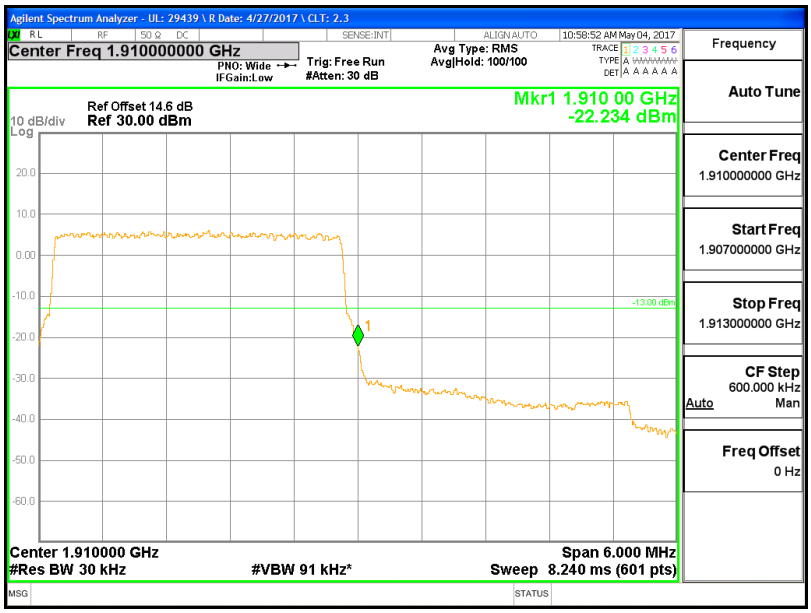
LOW CH, RB15-0



HIGH CH, RB15-0



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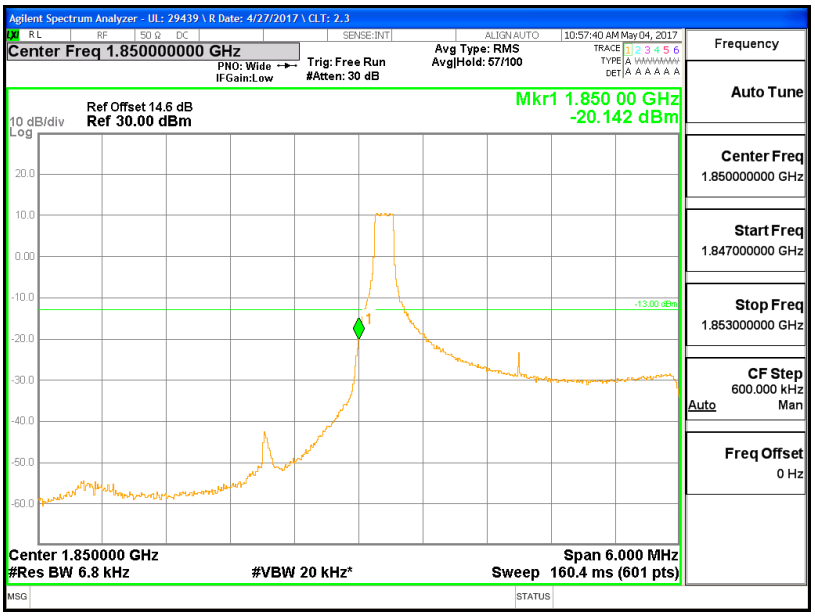
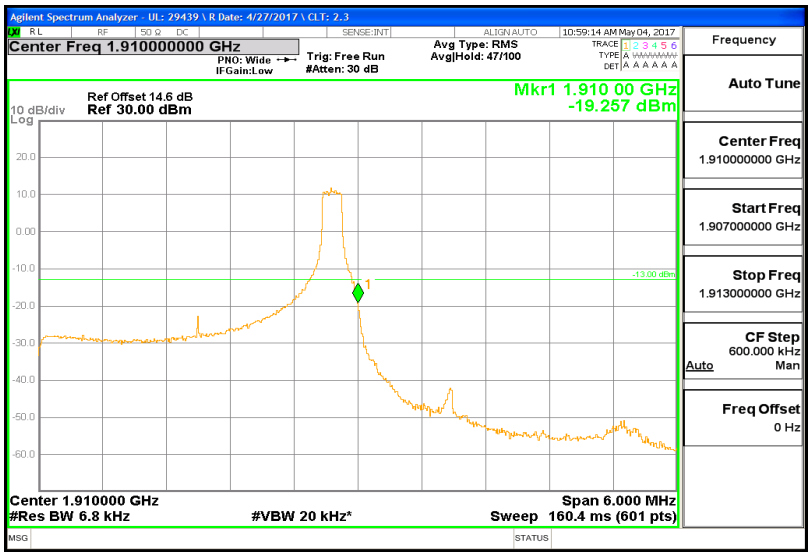
16QAM, (3.0 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-14



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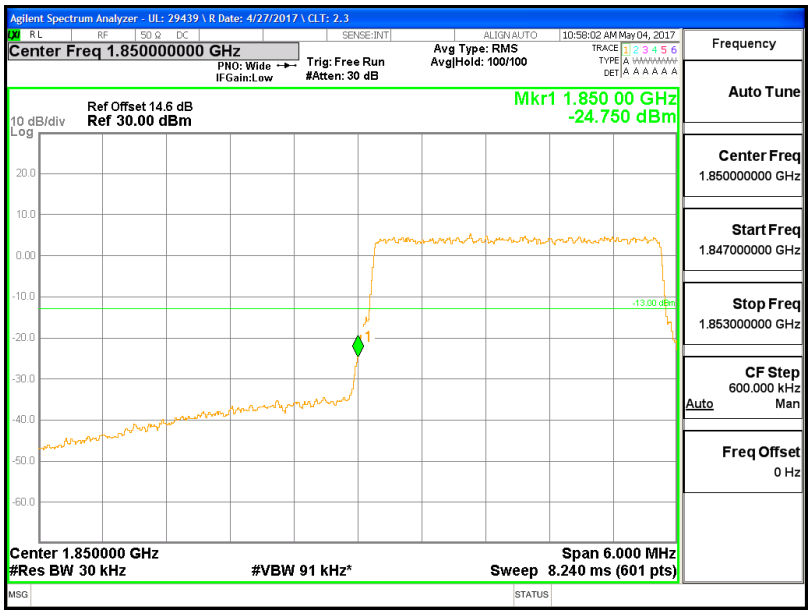
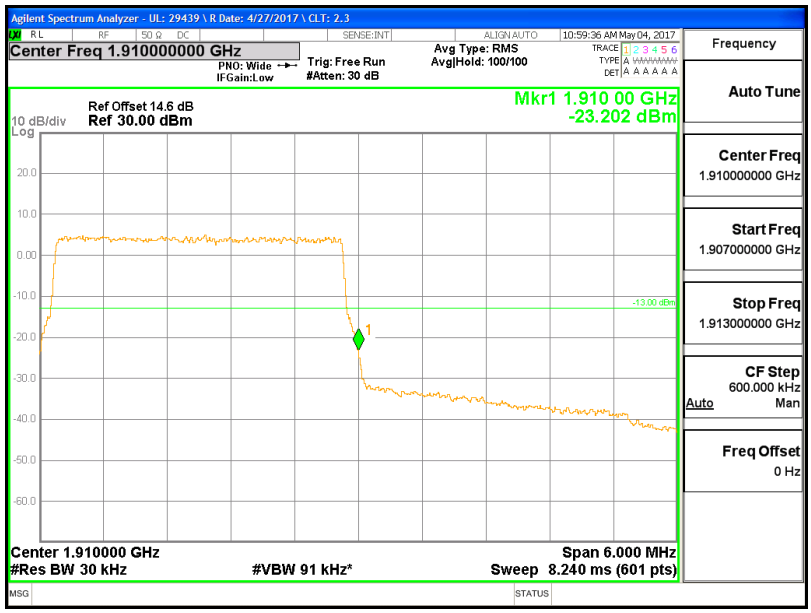
LOW CH, RB15-0



HIGH CH, RB15-0



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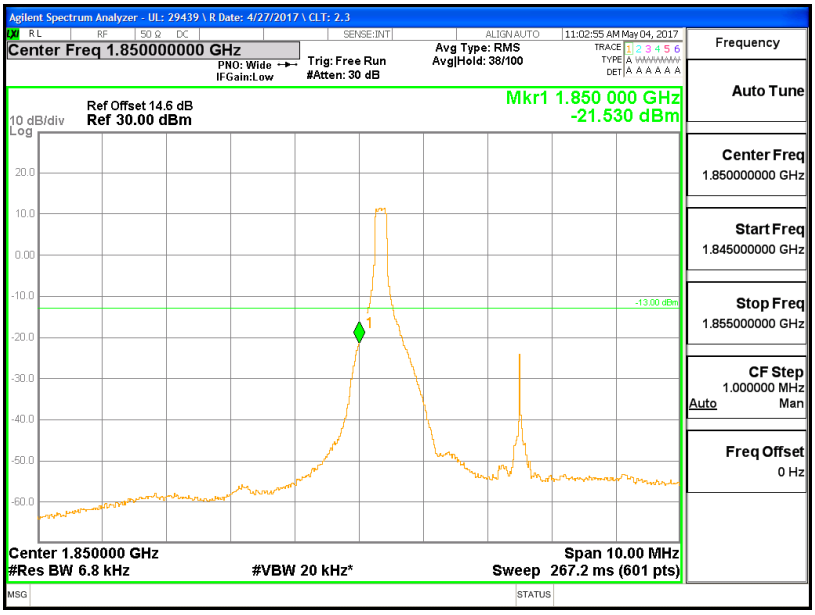
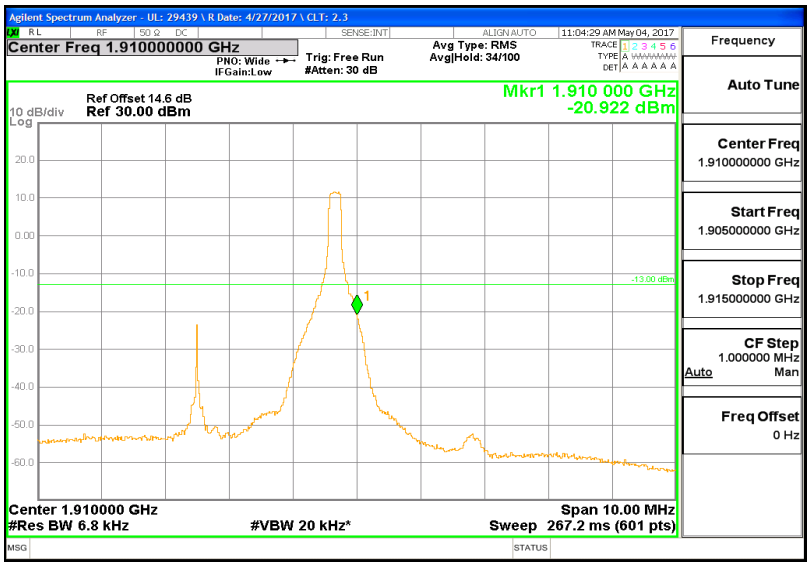
QPSK, (5.0 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-24



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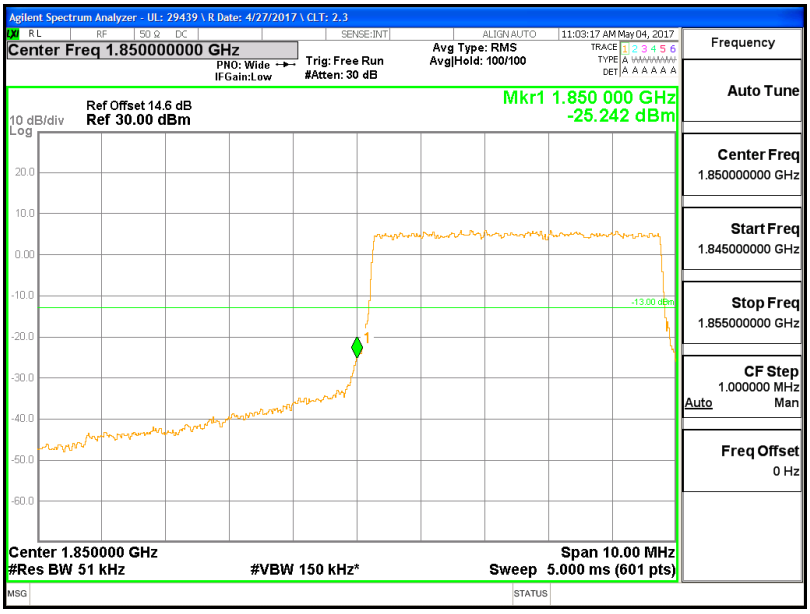
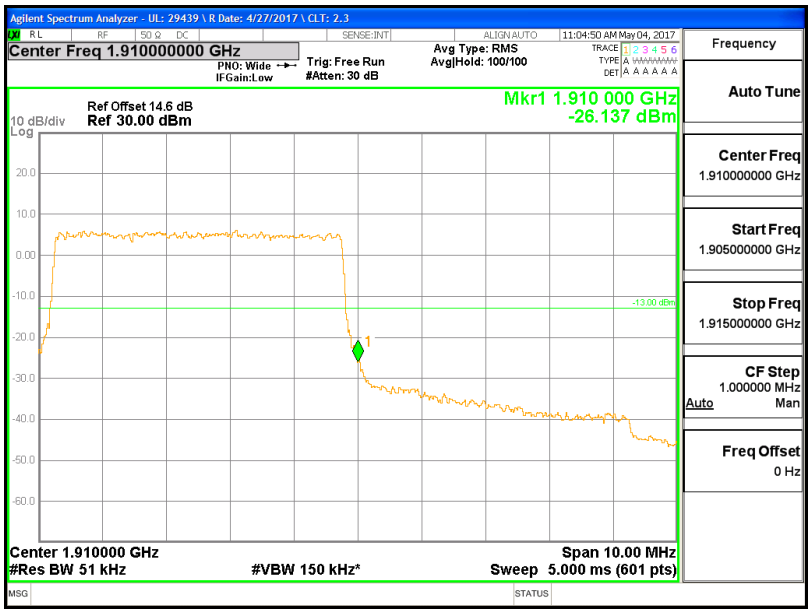
LOW CH, RB25-0



HIGH CH, RB25-0



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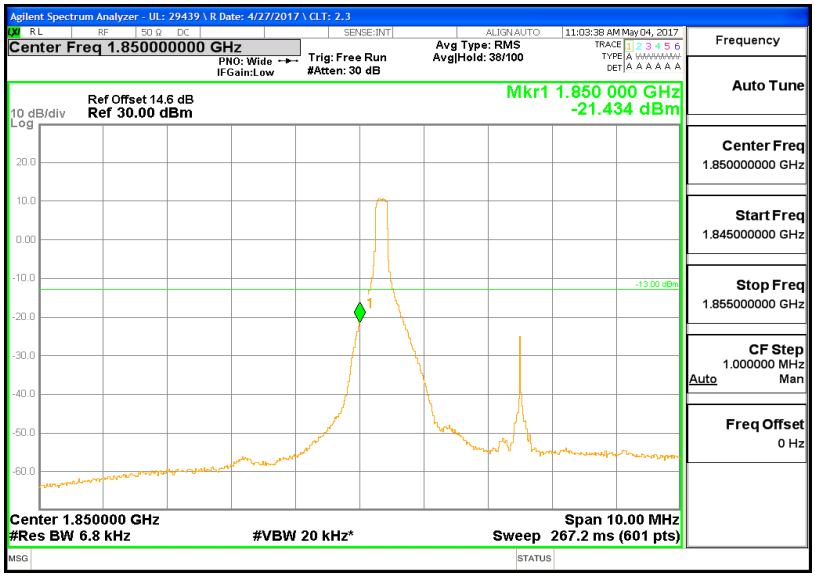
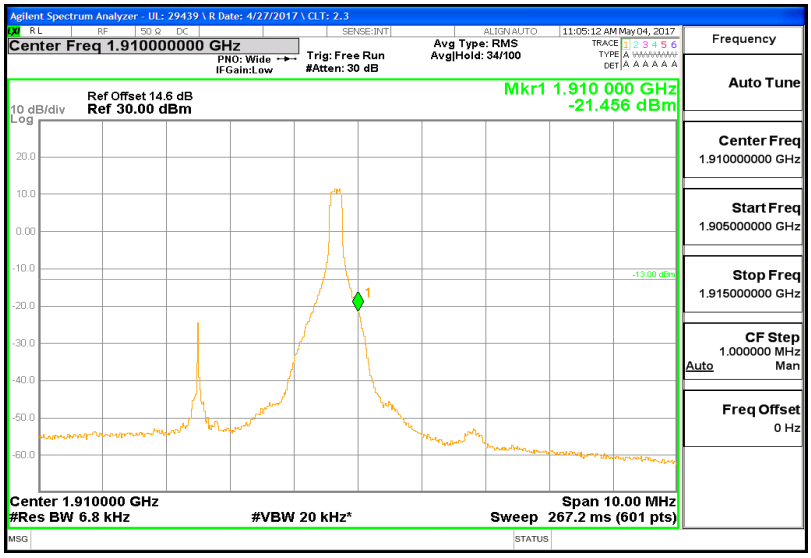
16QAM, (5.0 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-24



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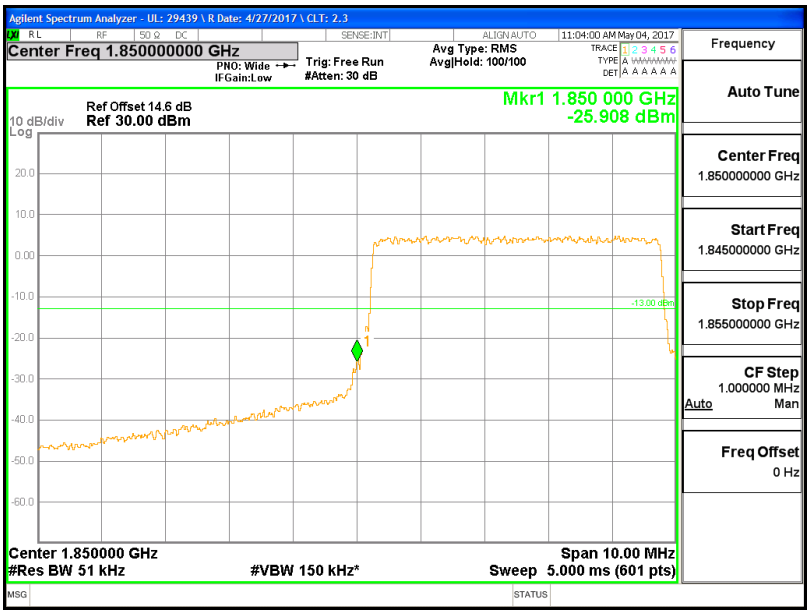
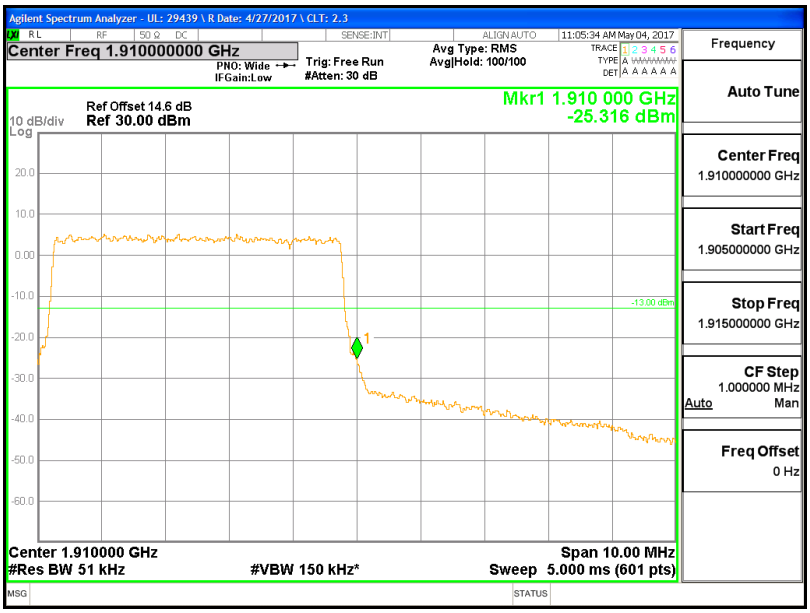
LOW CH, RB25-0



HIGH CH, RB25-0



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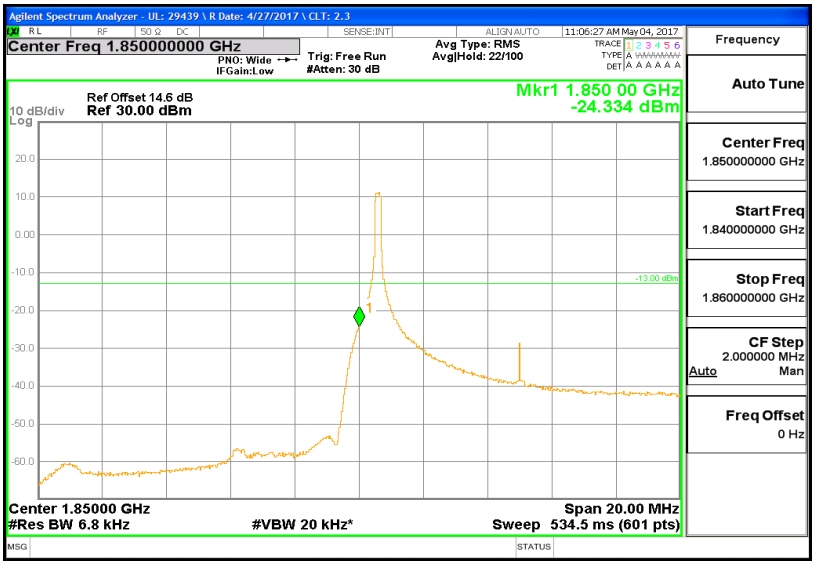
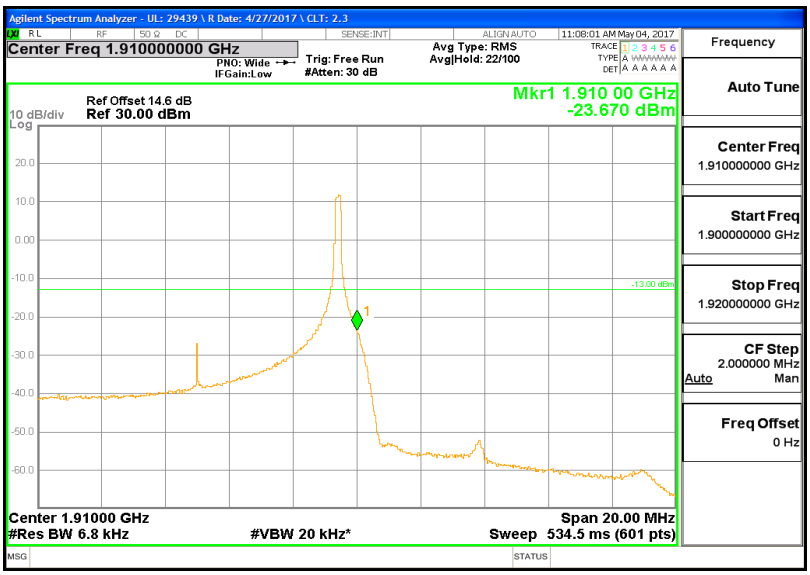
QPSK, (10.0 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-24



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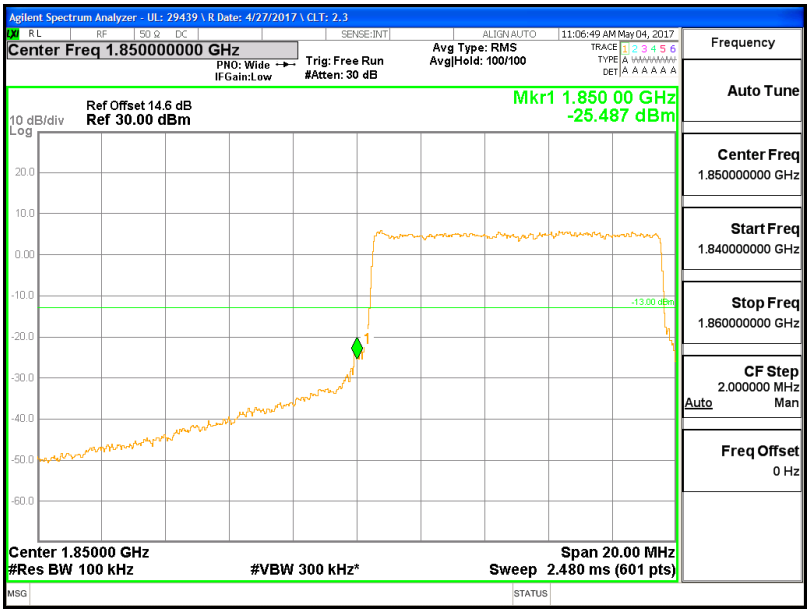
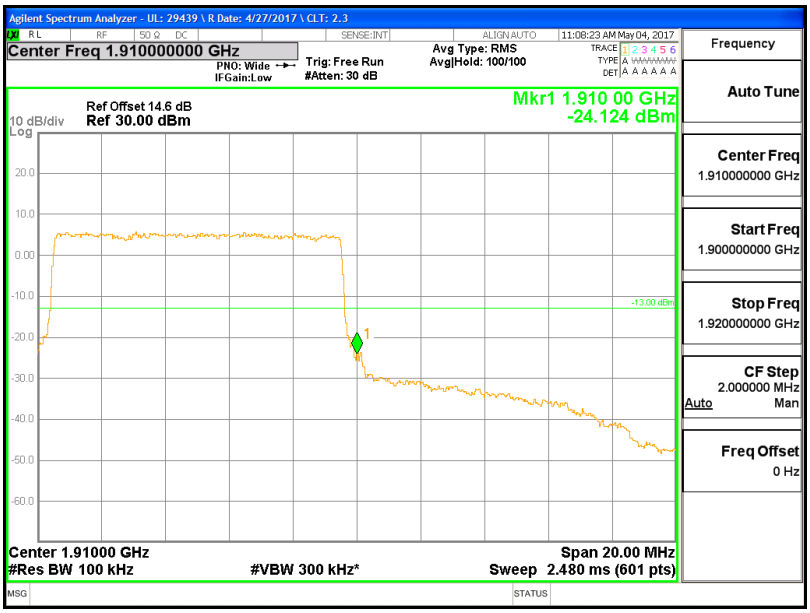
LOW CH, RB50-0



HIGH CH, RB50-0



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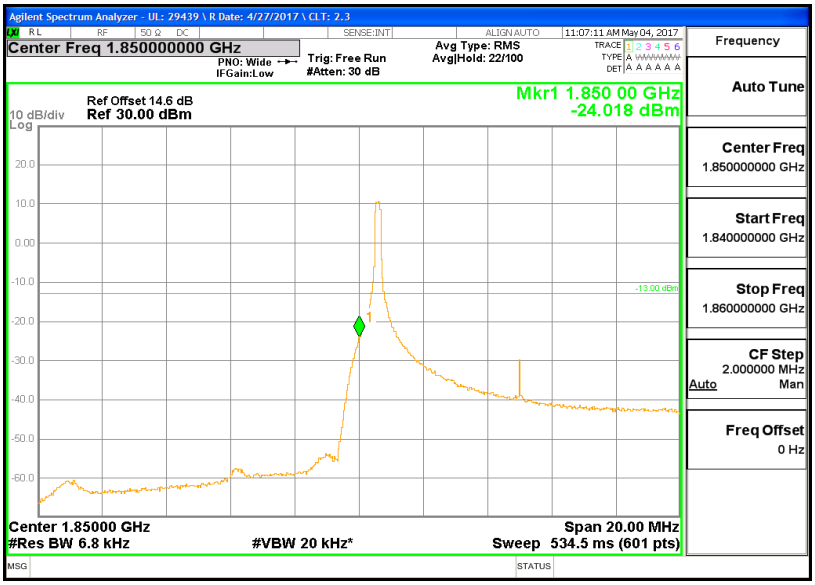
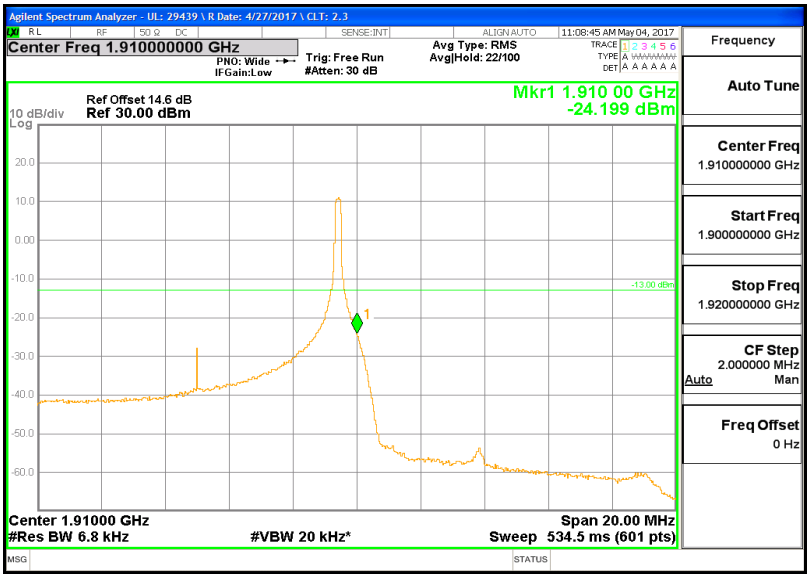
16QAM, (10.0 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-24



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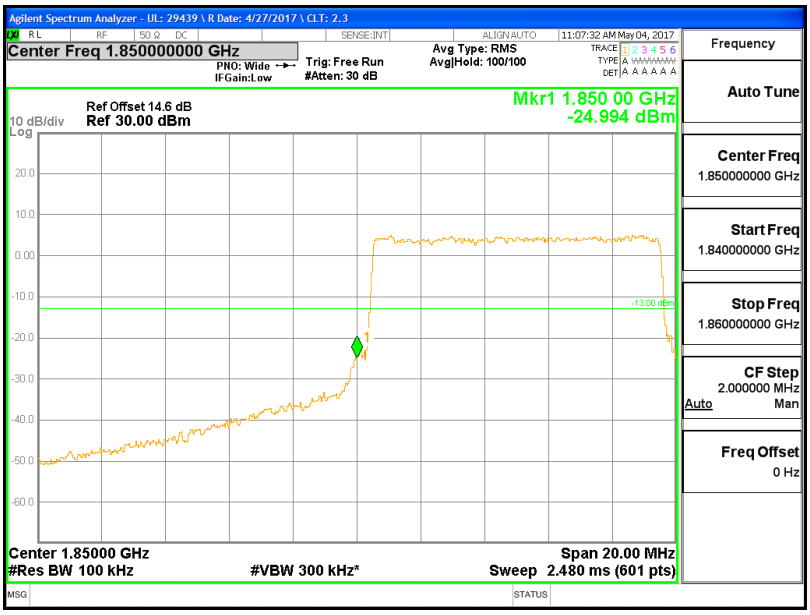
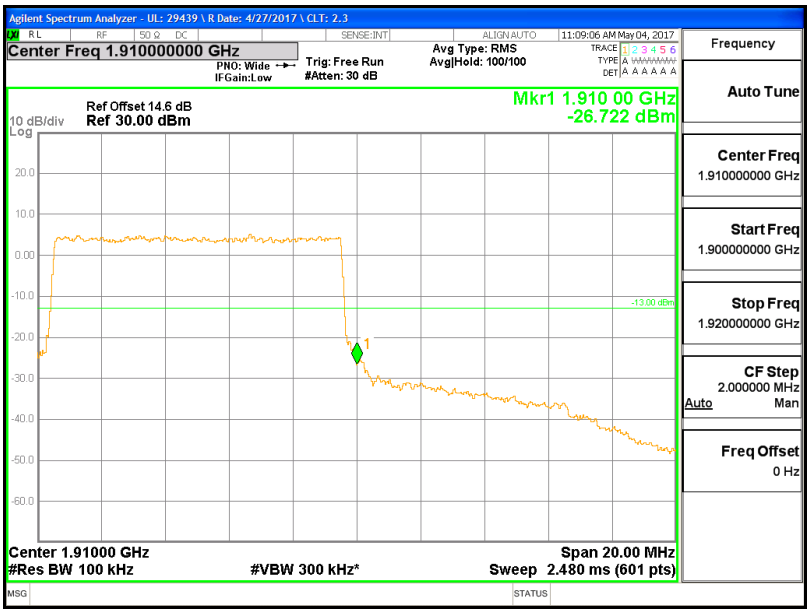
LOW CH, RB50-0



HIGH CH, RB50-0



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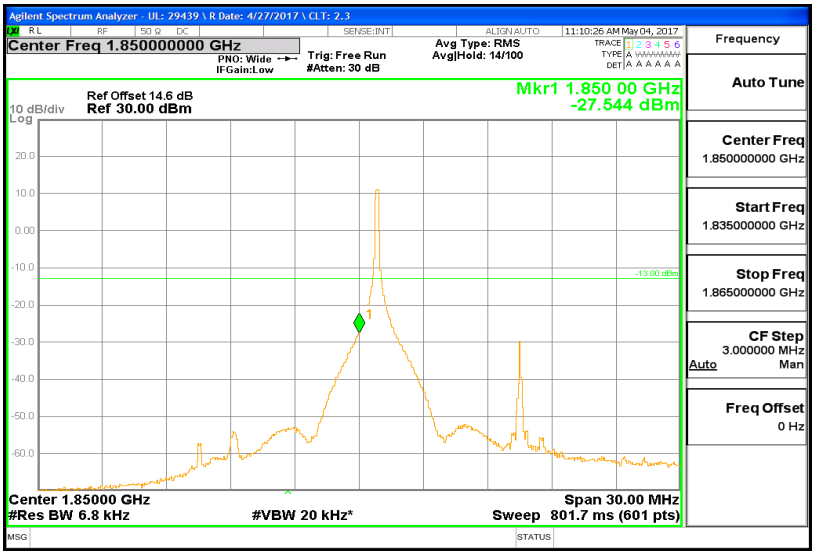
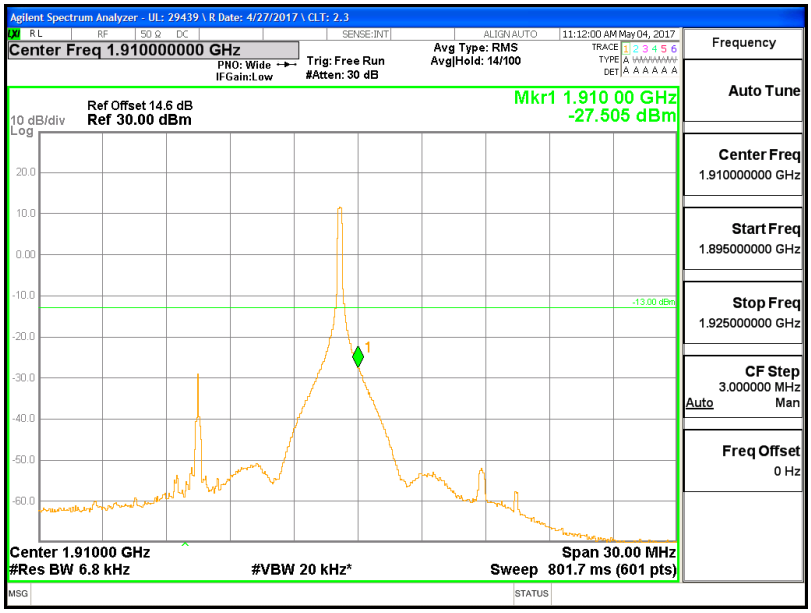
QPSK, (15.0 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-74



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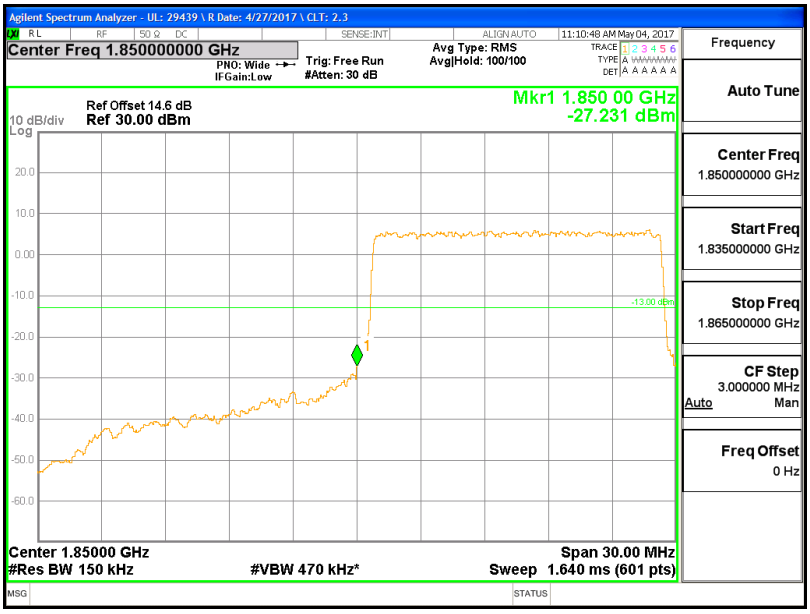
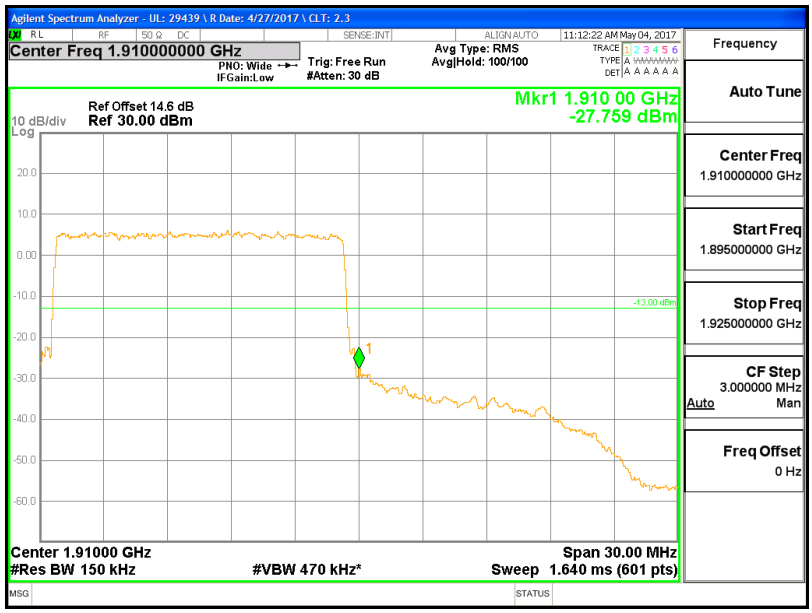
LOW CH, RB75-0



HIGH CH, RB75-0



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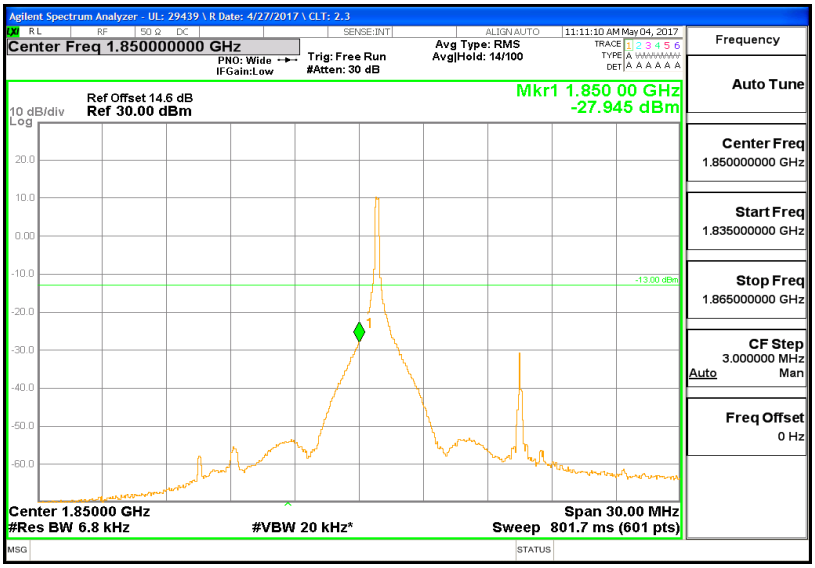
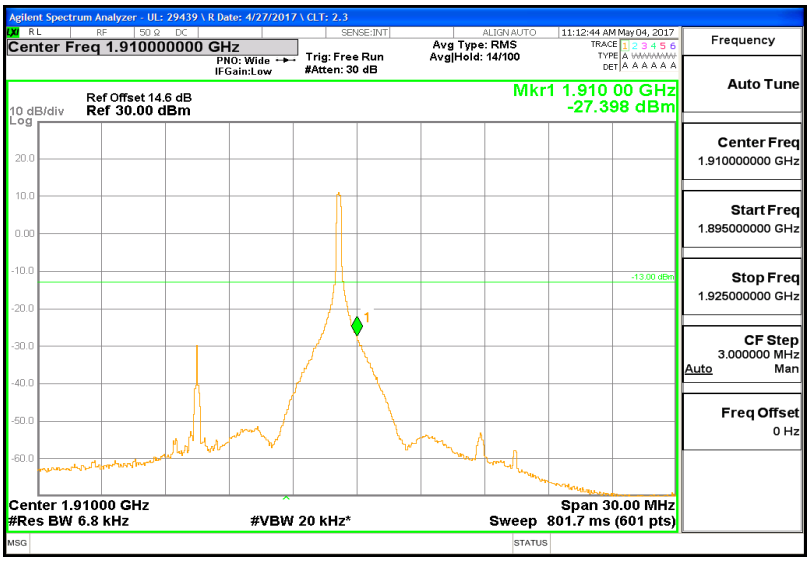
16QAM, (15.0 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-74



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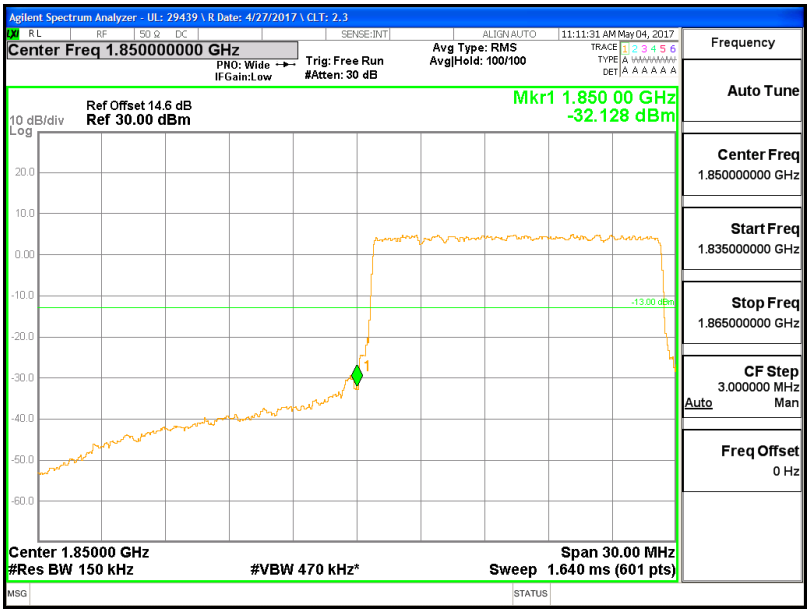
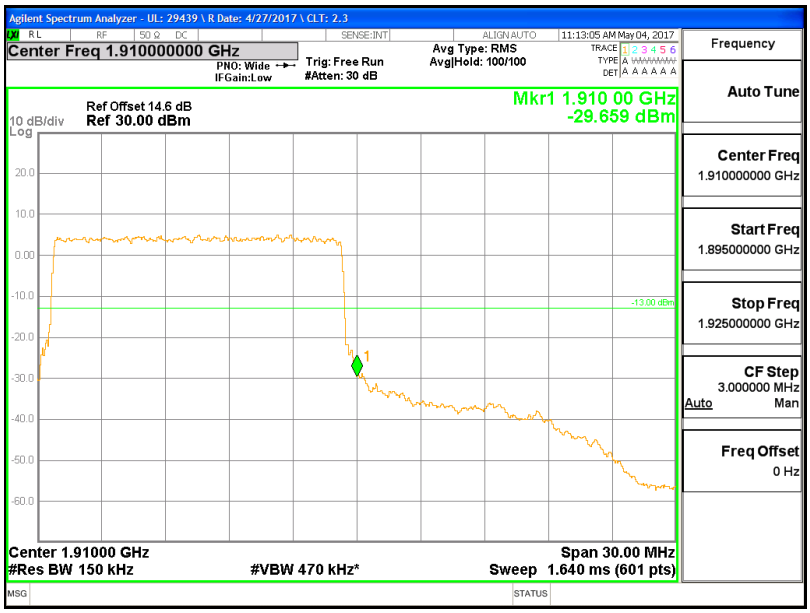
LOW CH, RB75-0



HIGH CH, RB75-0



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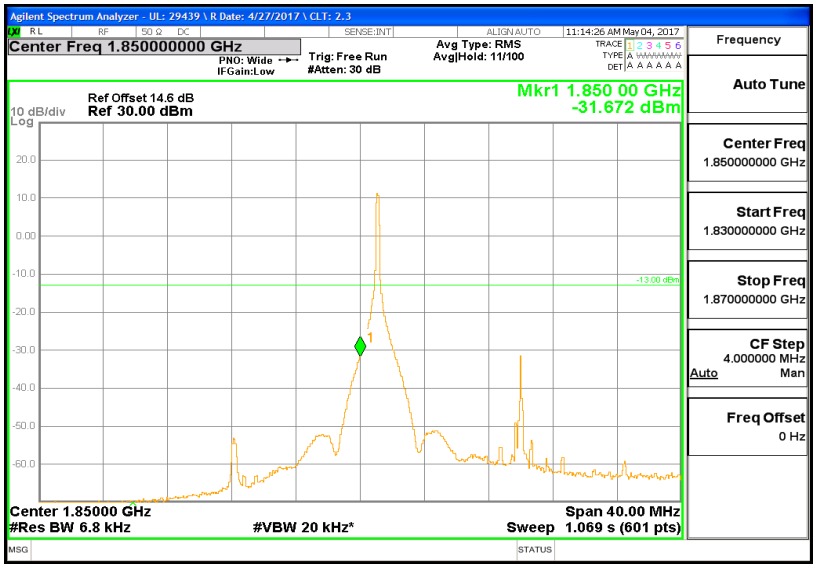
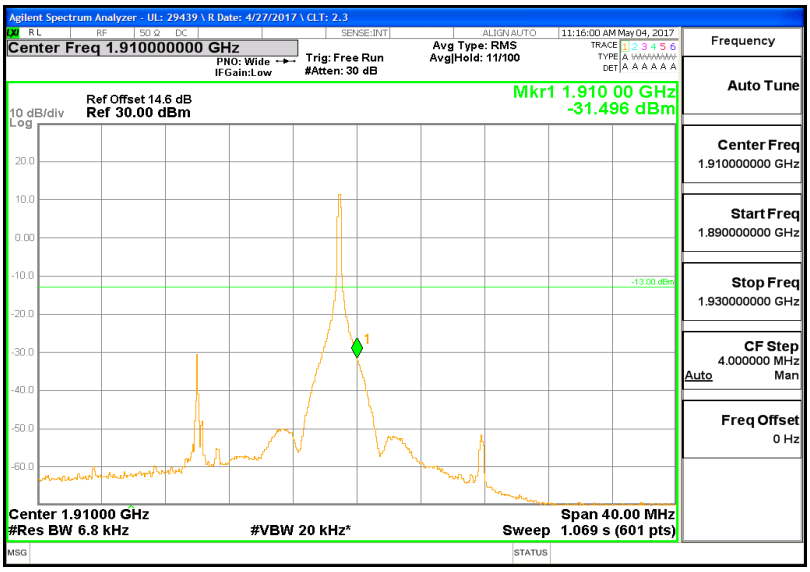
QPSK, (20.0 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-99



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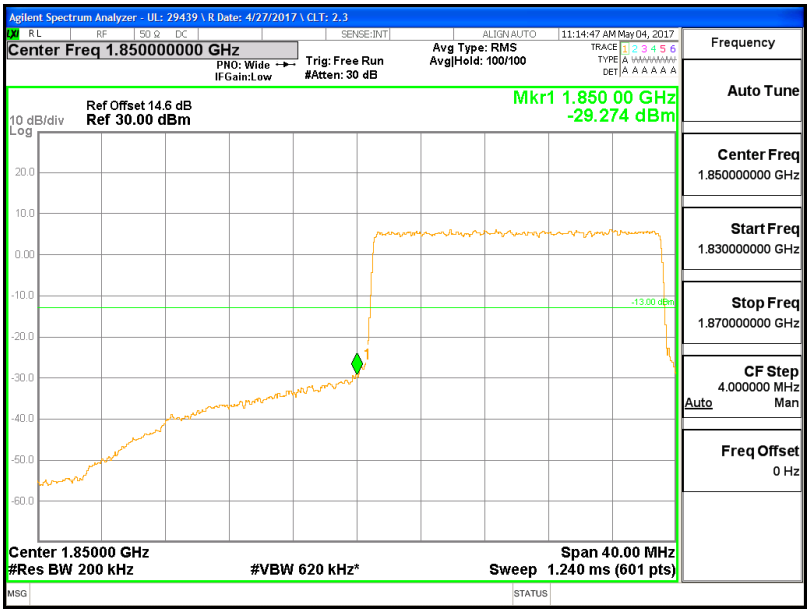
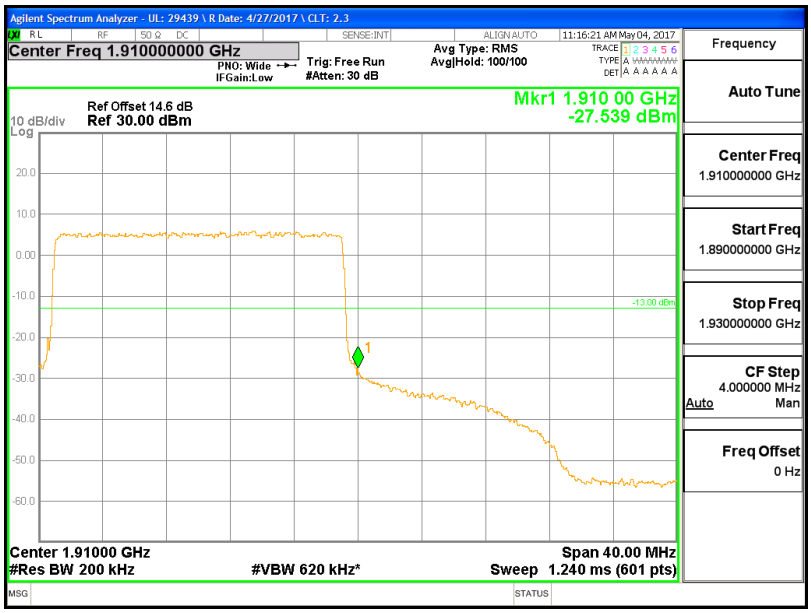
LOW CH, RB100-0



HIGH CH, RB100-0



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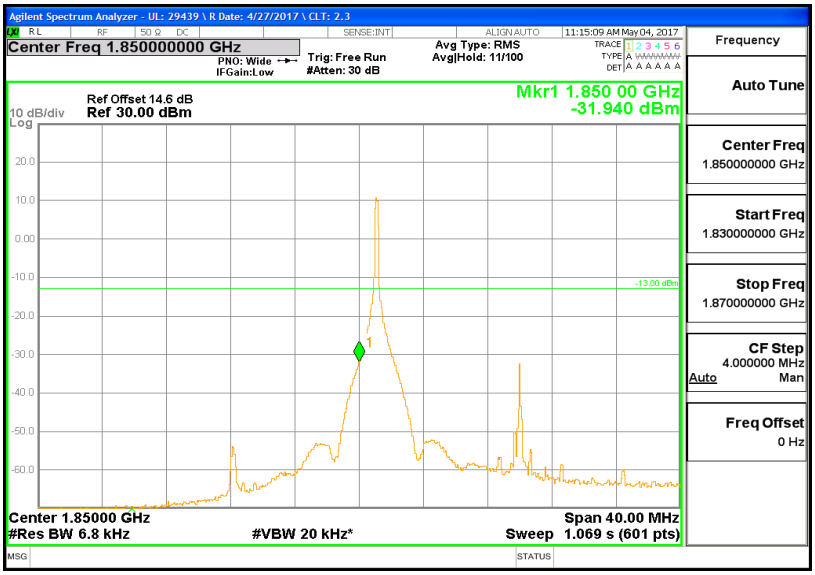
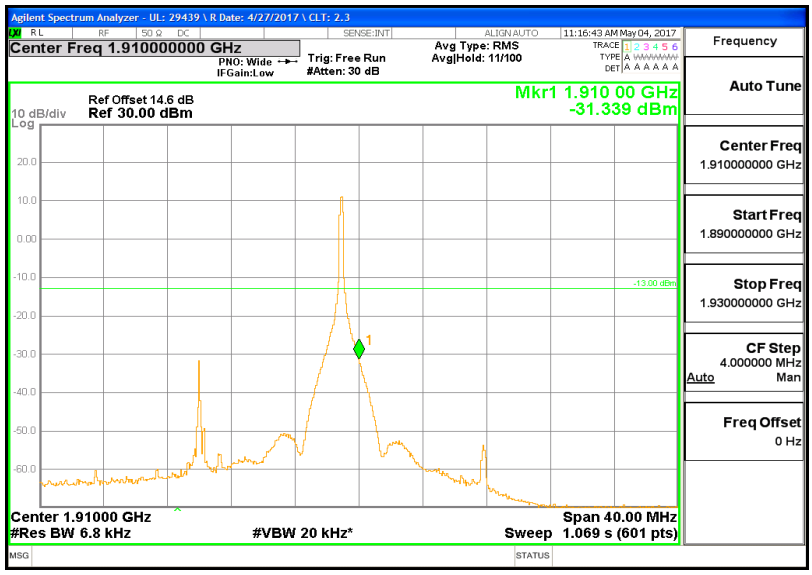
16QAM, (20.0 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-99



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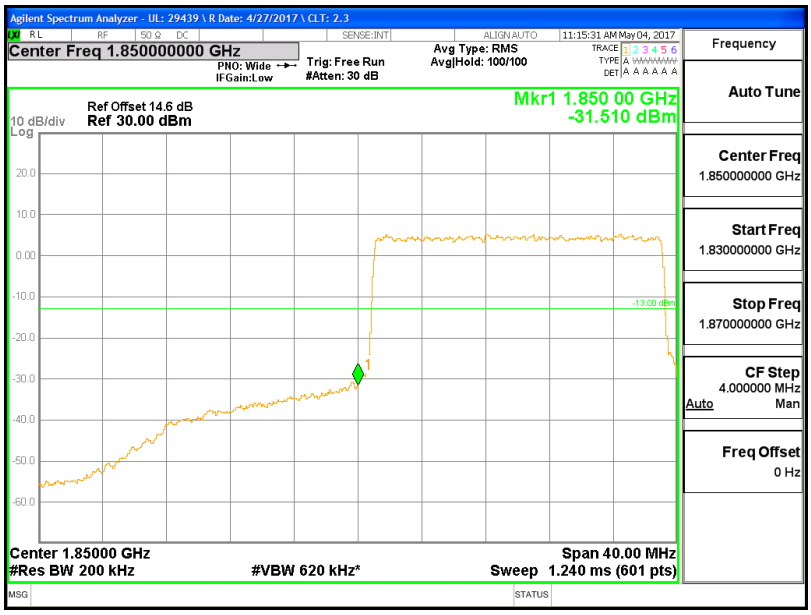
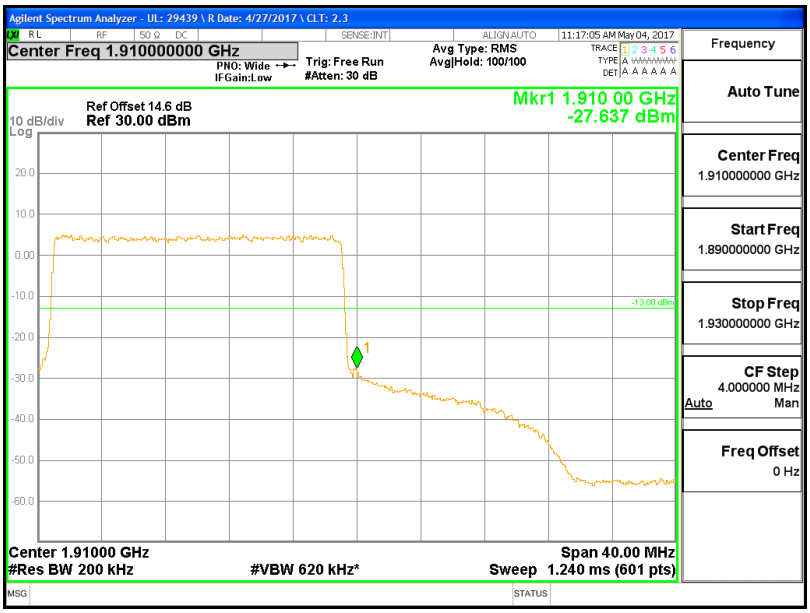
LOW CH, RB100-0



HIGH CH, RB100-0



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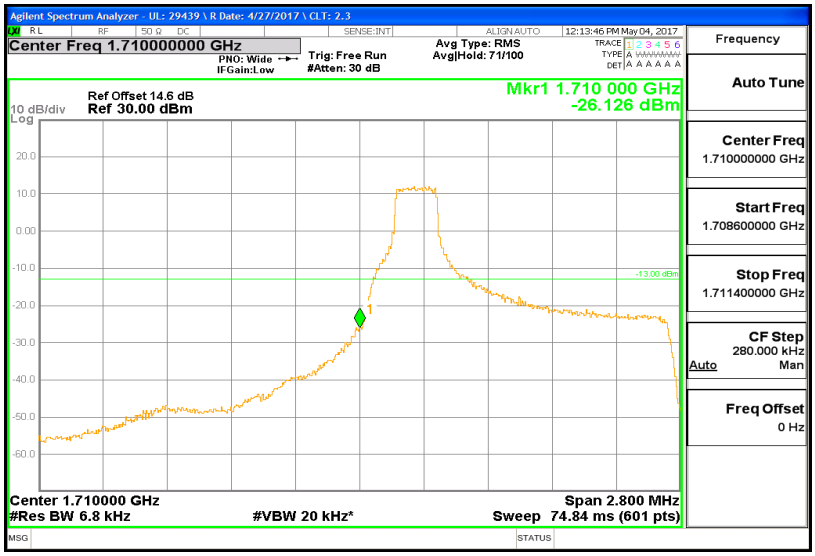
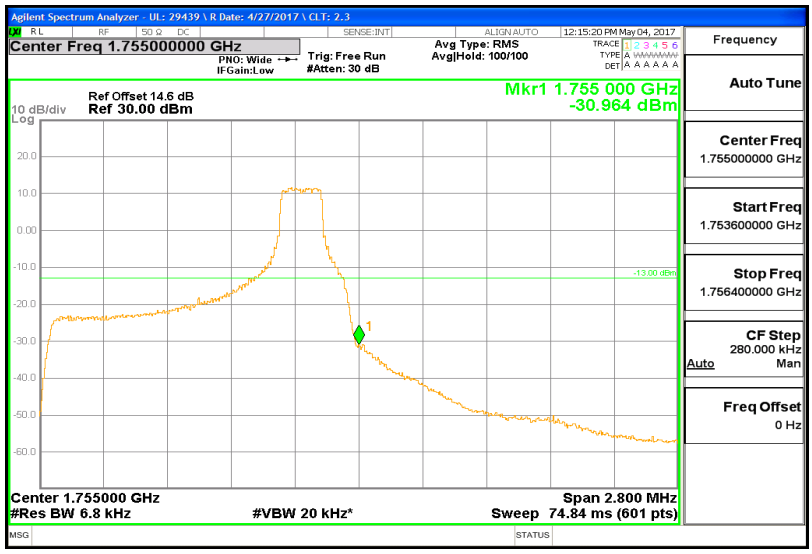
8.2.2. LTE BAND 4 BANDEDGE

QPSK, (1.4 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-5



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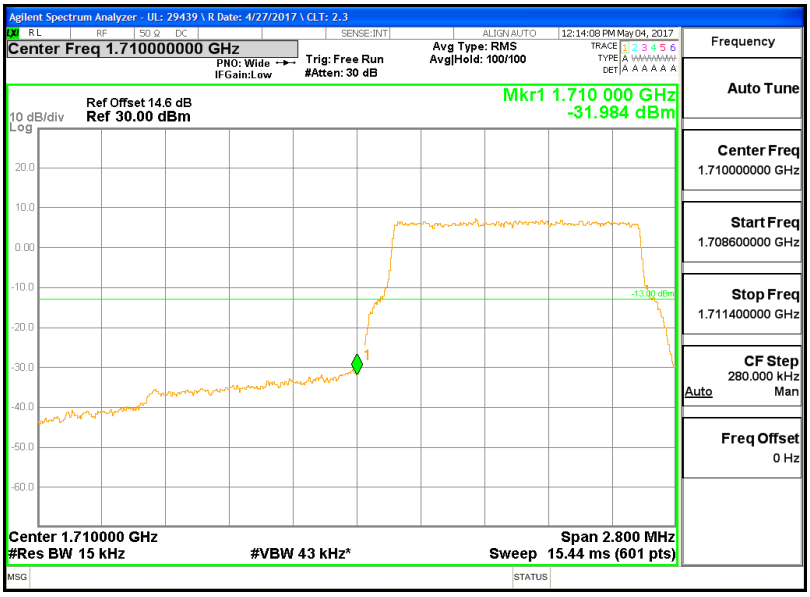
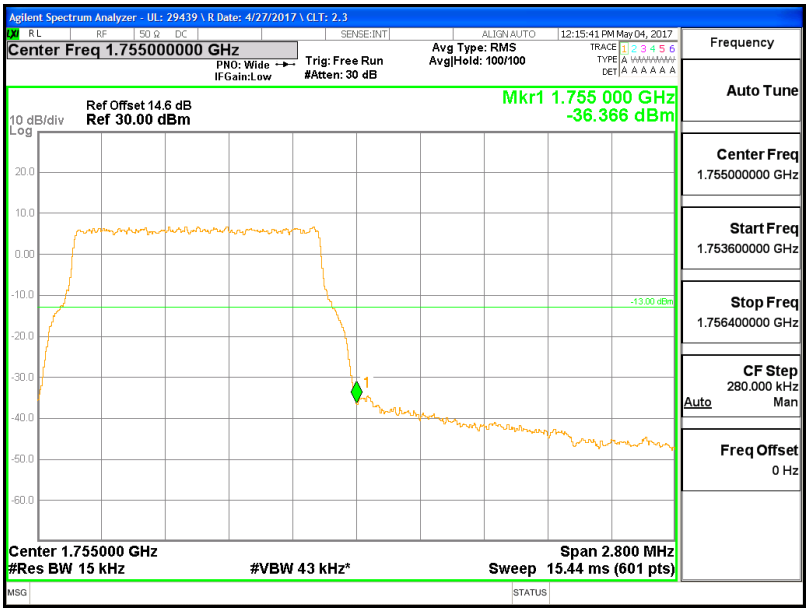
LOW CH, RB6-0



HIGH CH, RB6-0



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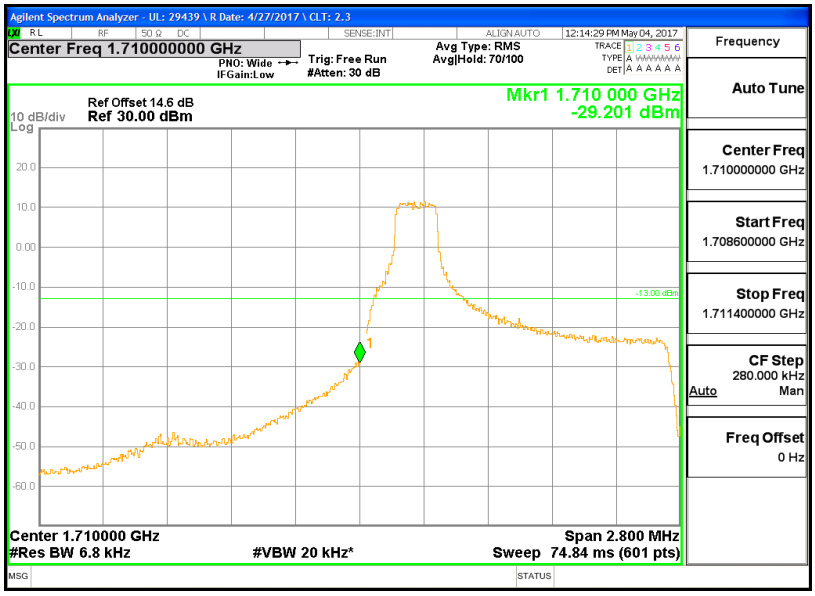
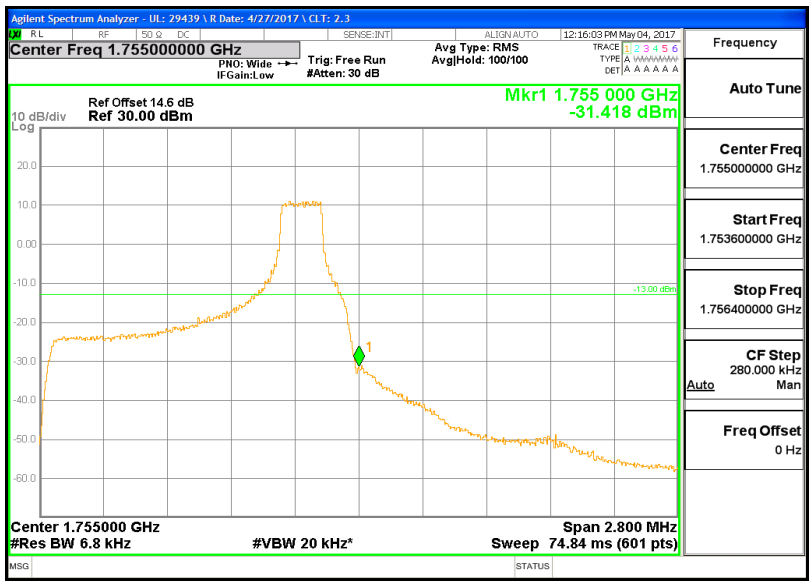
16QAM, (1.4 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-5



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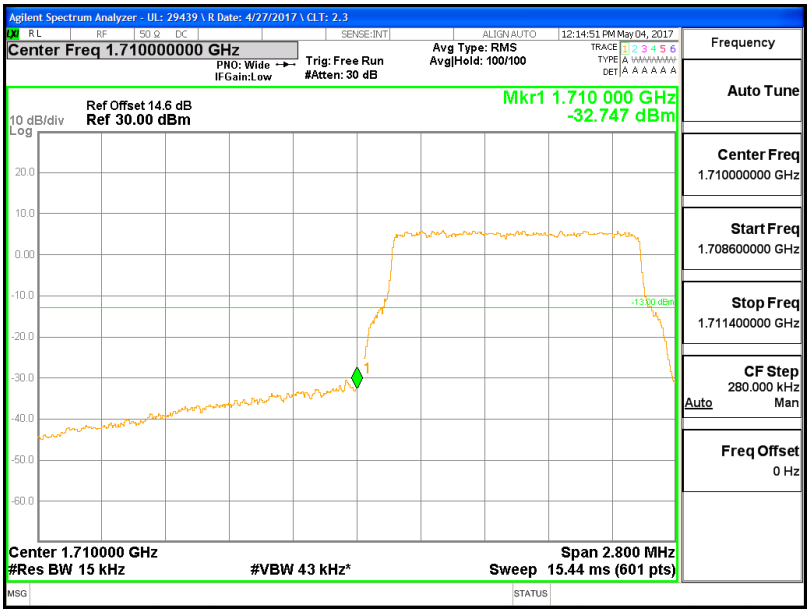
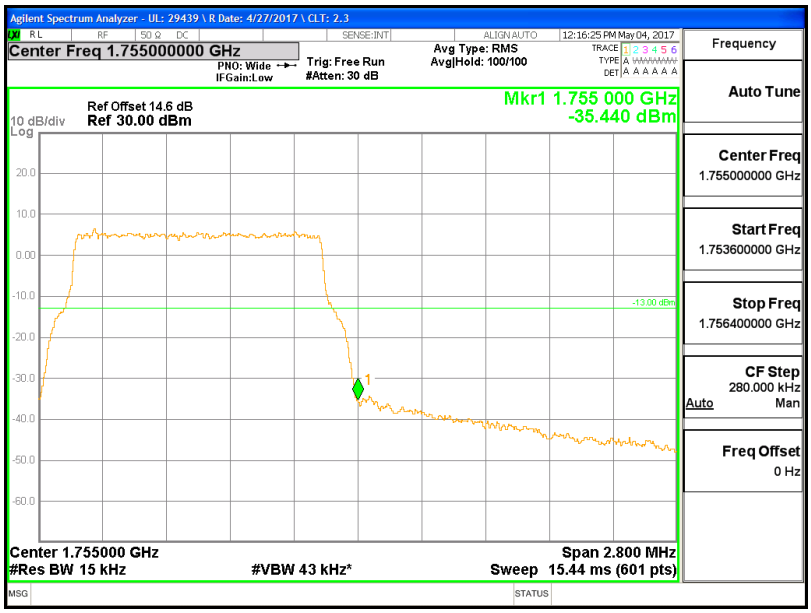
LOW CH, RB6-0



HIGH CH, RB6-0



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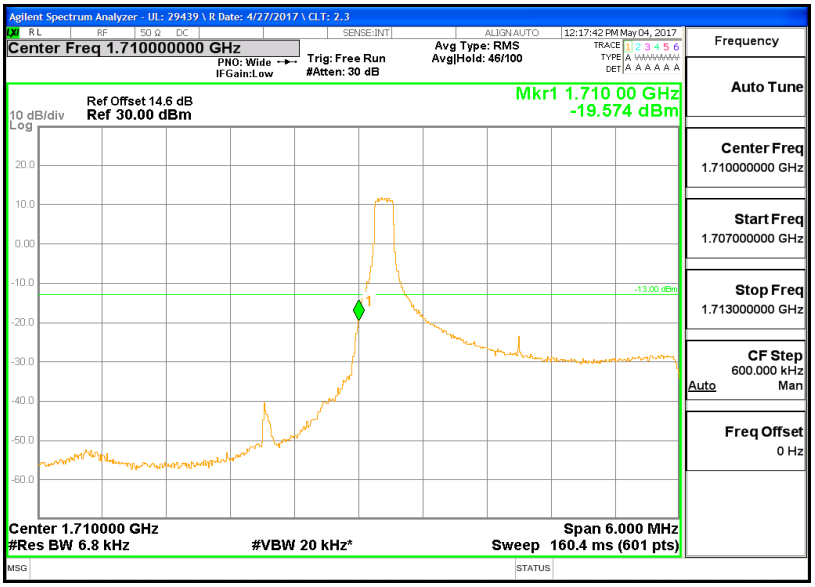
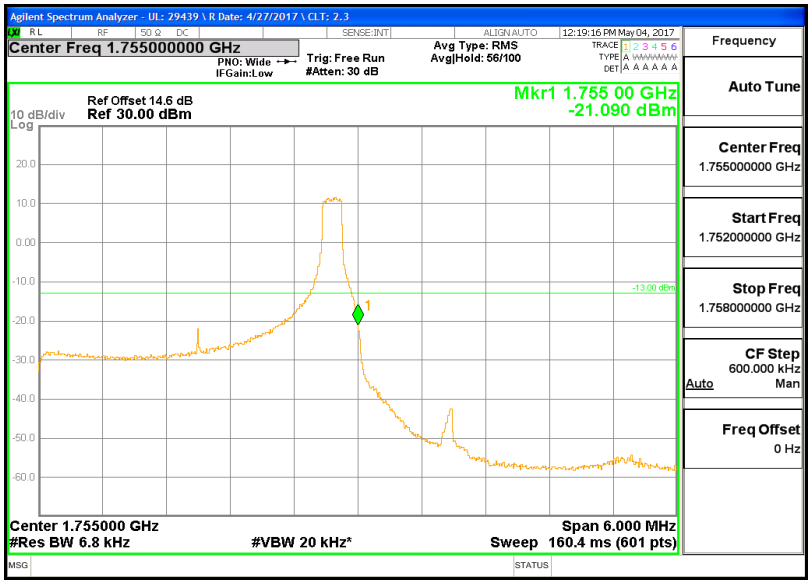
QPSK, (3.0 MHz BAND WIDTH)

LOW CH, RB1-0



HIGH CH, RB1-14



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