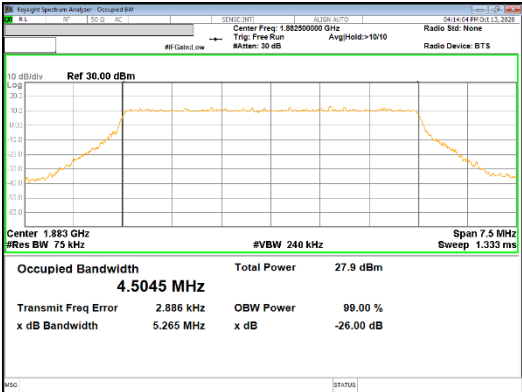
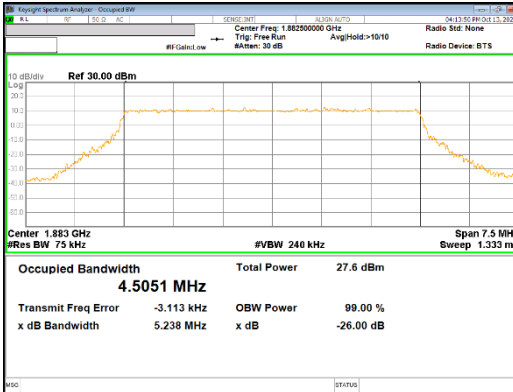
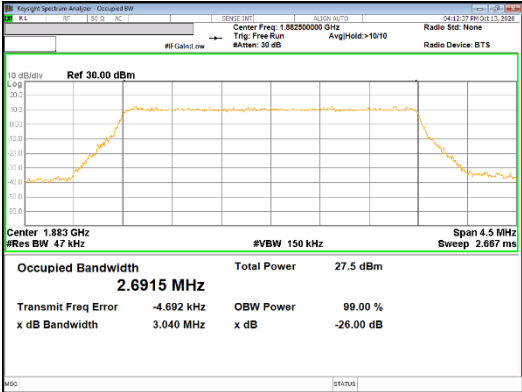
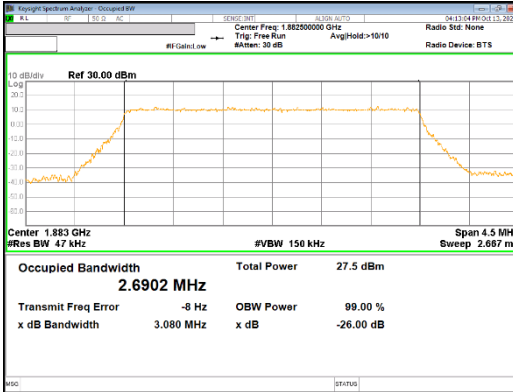
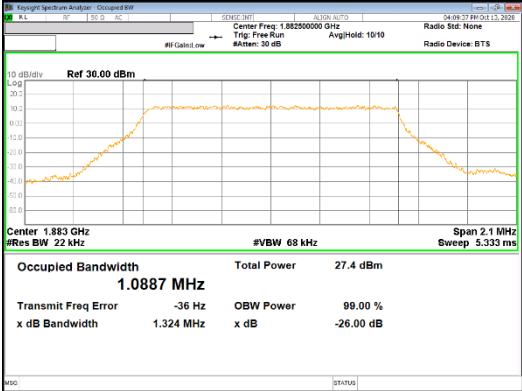
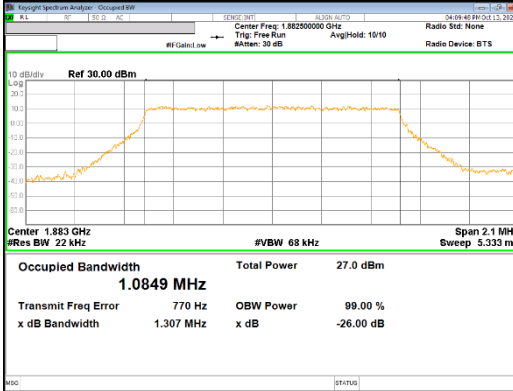
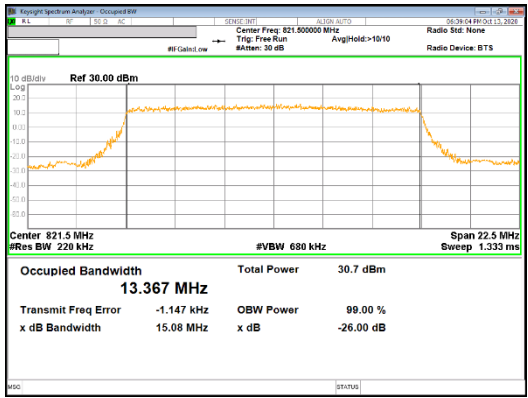
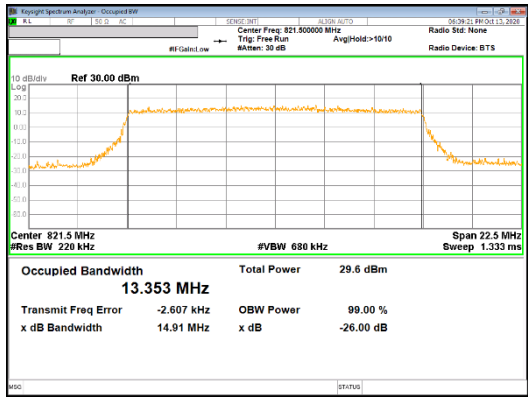
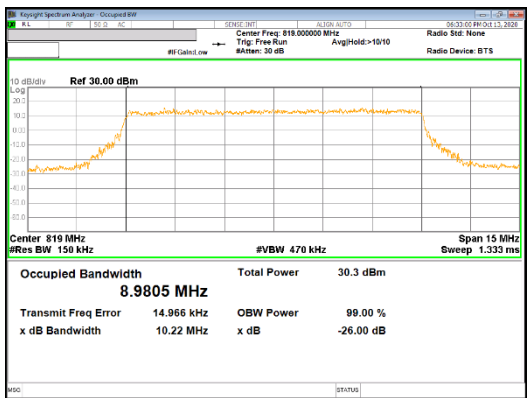
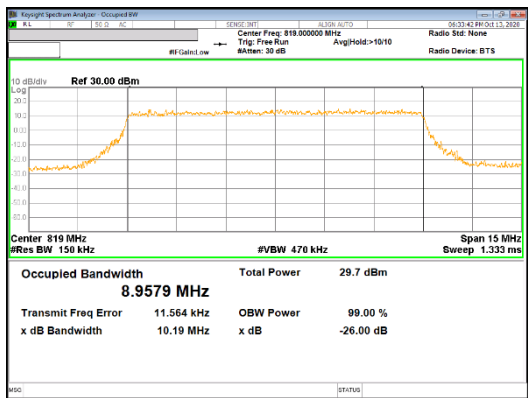
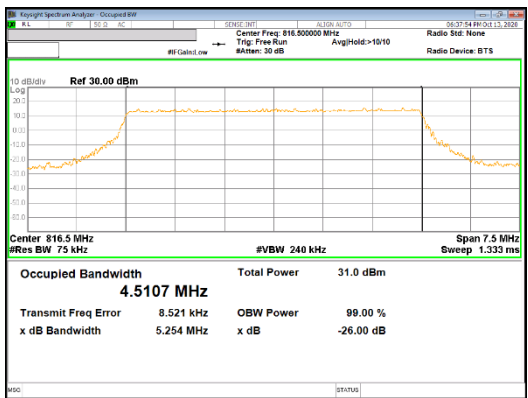
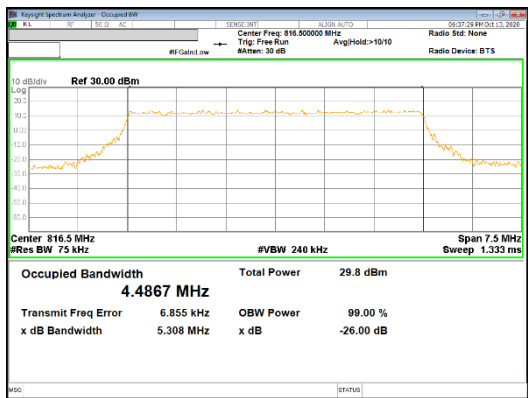
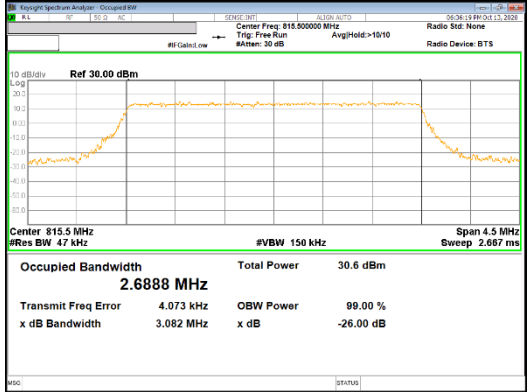
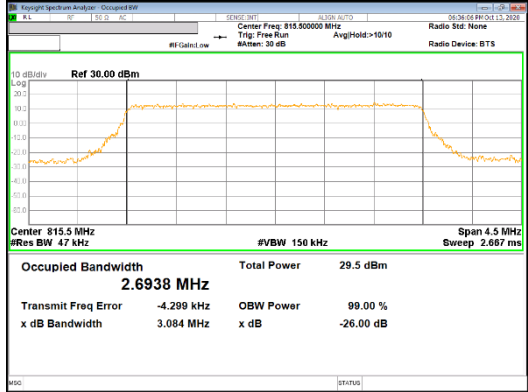
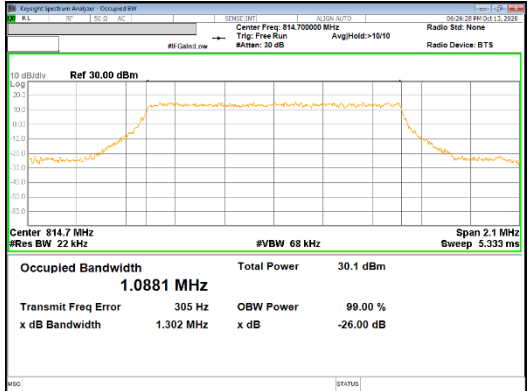
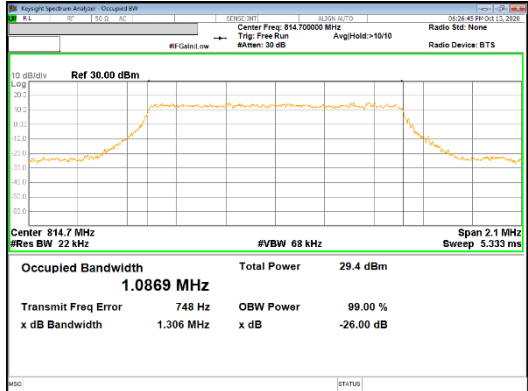


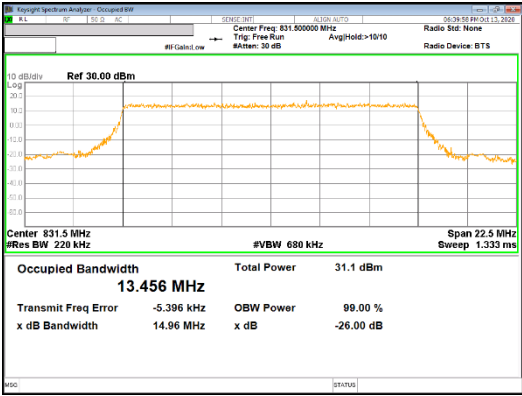
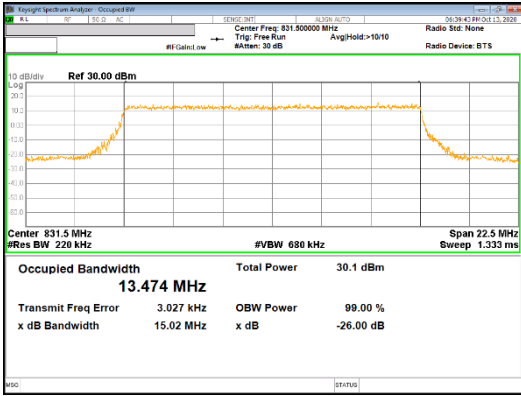
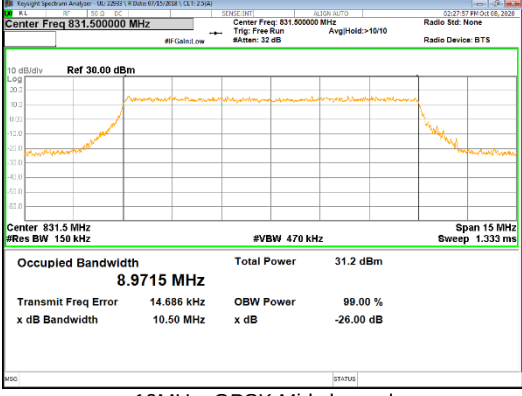
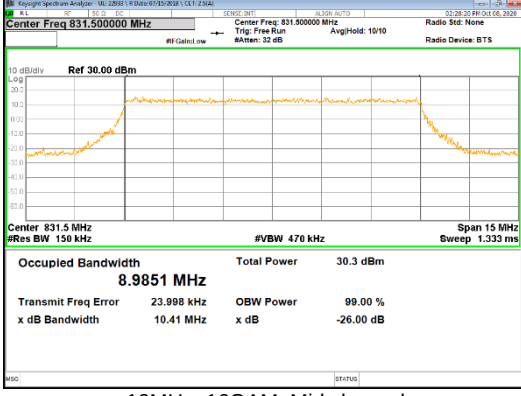
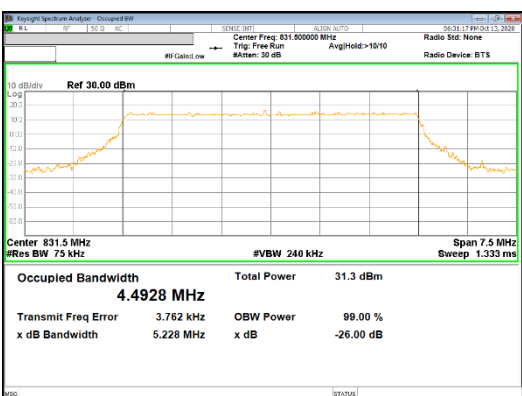
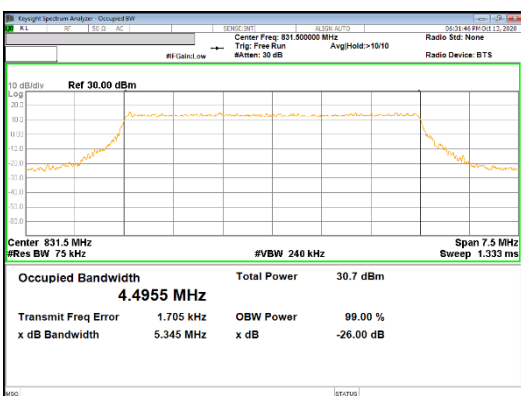
Band 25 5MHz	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel
Band 25 3MHz	 3MHz QPSK Mid channel	 3MHz 16QAM Mid channel
Band 25 1.4MHz	 1.4MHz QPSK Mid channel	 1.4MHz 16QAM Mid channel

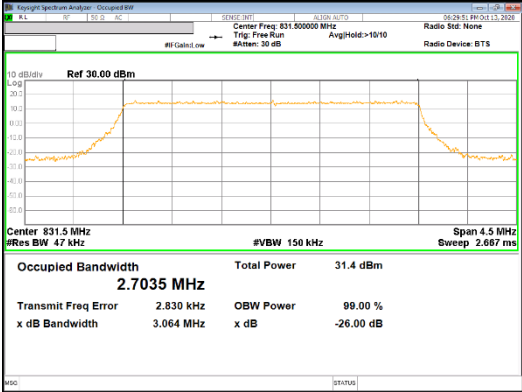
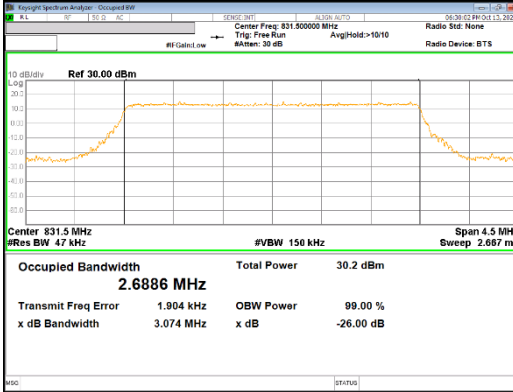
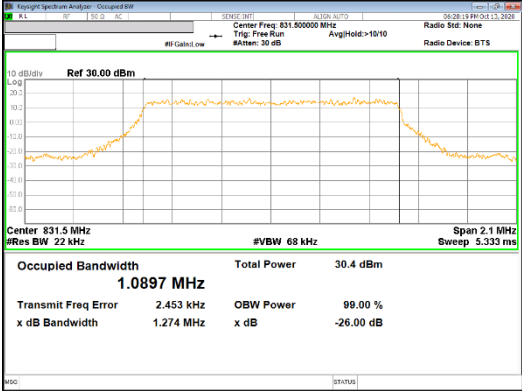
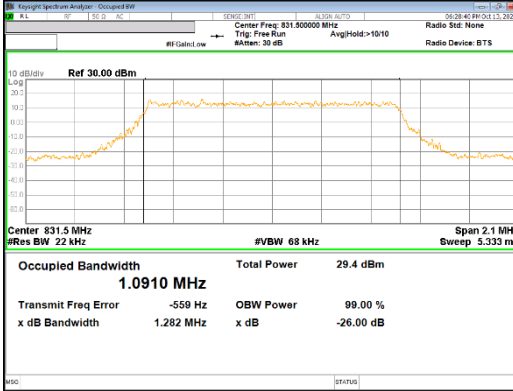
LTE Band 26 (Part90)

Band 26 15MHz	 15MHz QPSK Mid channel	 15MHz 16QAM Mid channel
Band 26 10MHz	 10MHz QPSK Mid channel	 10MHz 16QAM Mid channel
Band 26 5MHz	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel

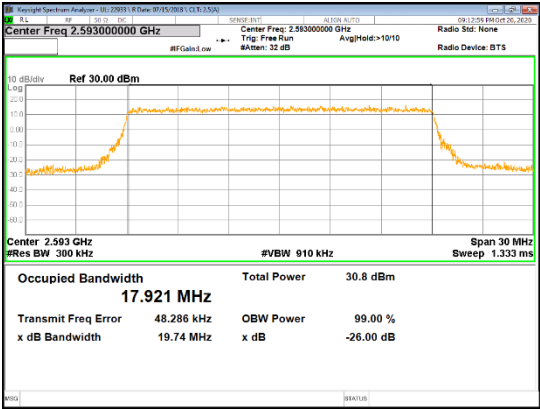
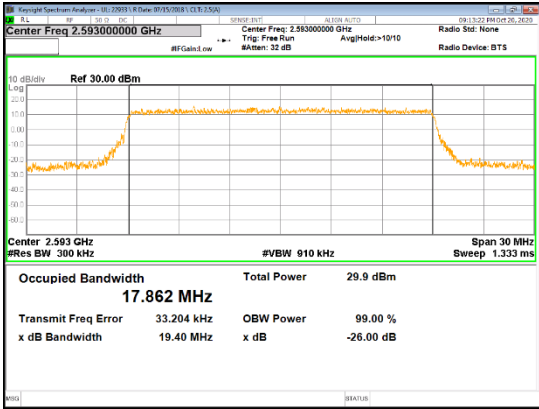
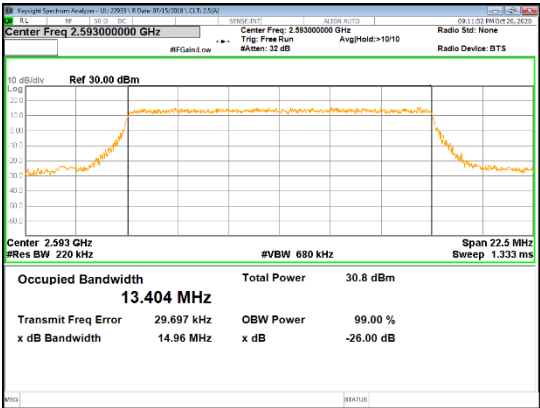
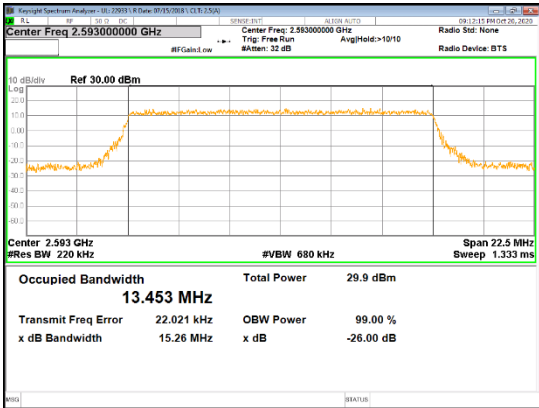
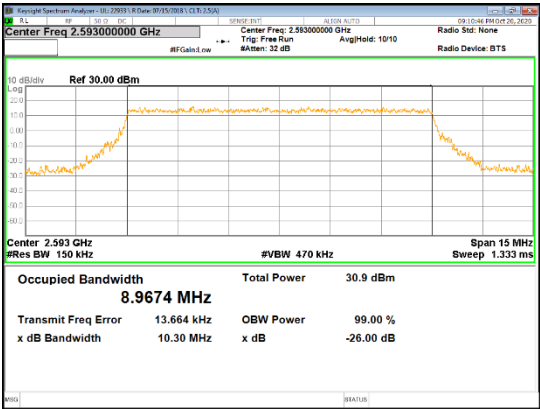
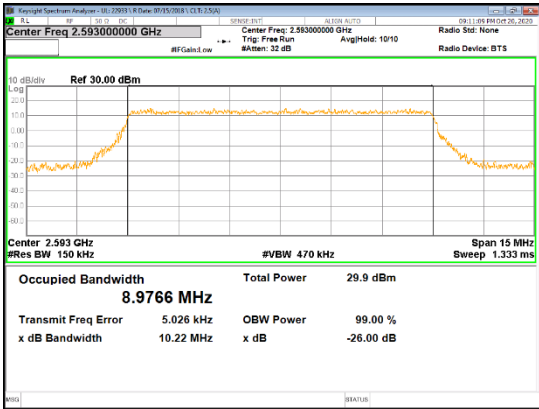
Band 26 3MHz	 3MHz QPSK Mid channel	 3MHz 16QAM Mid channel
Band 26 1.4MHz	 1.4MHz QPSK Mid channel	 1.4MHz 16QAM Mid channel

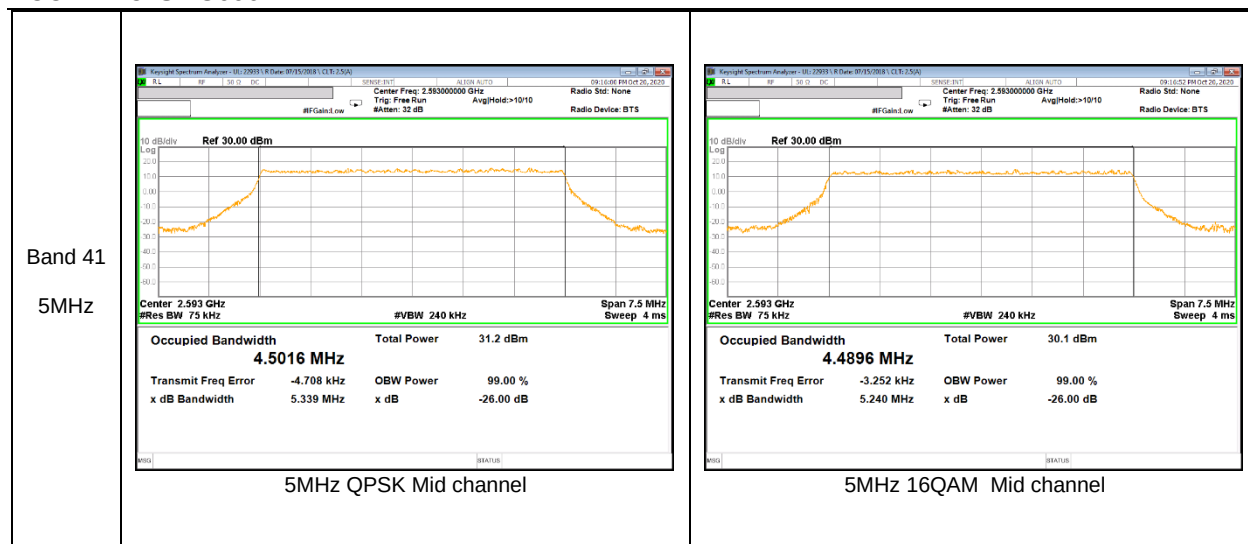
LTE Band 26 (Part22)

Band 26 15MHz	 15MHz QPSK Mid channel	 15MHz 16QAM Mid channel
Band 26 10MHz	 10MHz QPSK Mid channel	 10MHz 16QAM Mid channel
Band 26 5MHz	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel

Band 26 3MHz	 3MHz QPSK Mid channel	 3MHz 16QAM Mid channel
Band 26 1.4MHz	 1.4MHz QPSK Mid channel	 1.4MHz 16QAM Mid channel

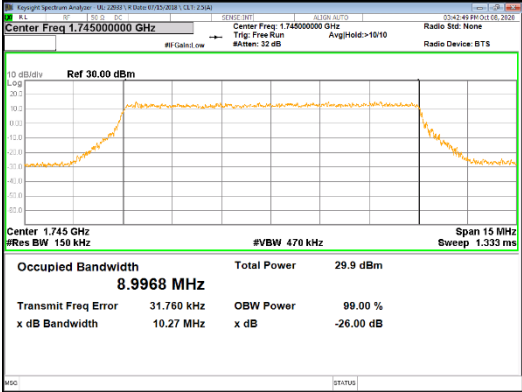
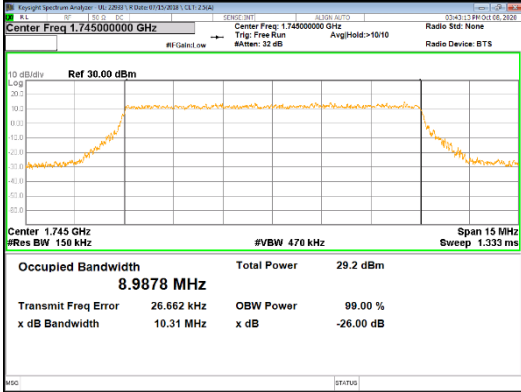
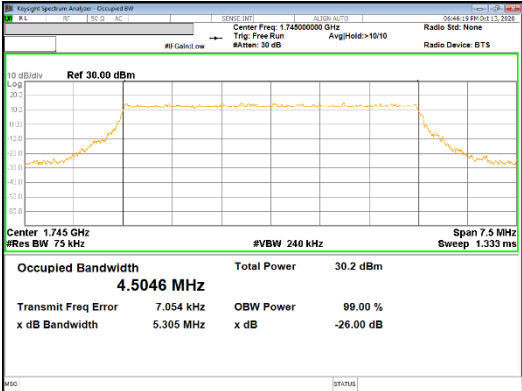
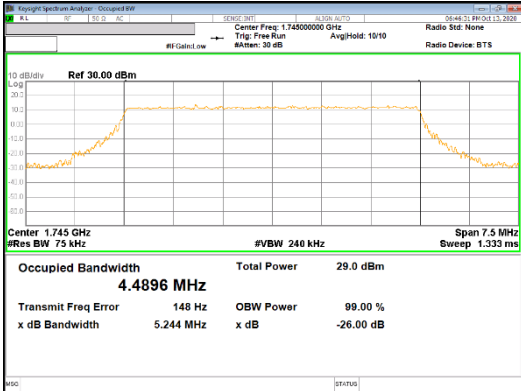
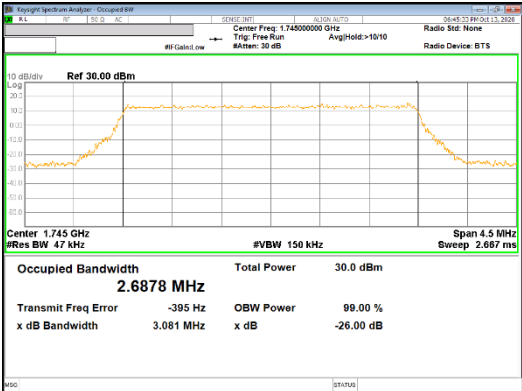
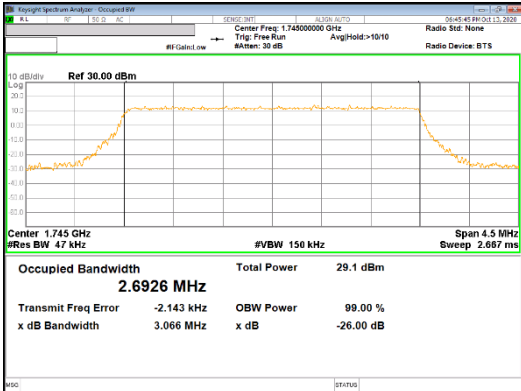
LTE Band 41(PC2)

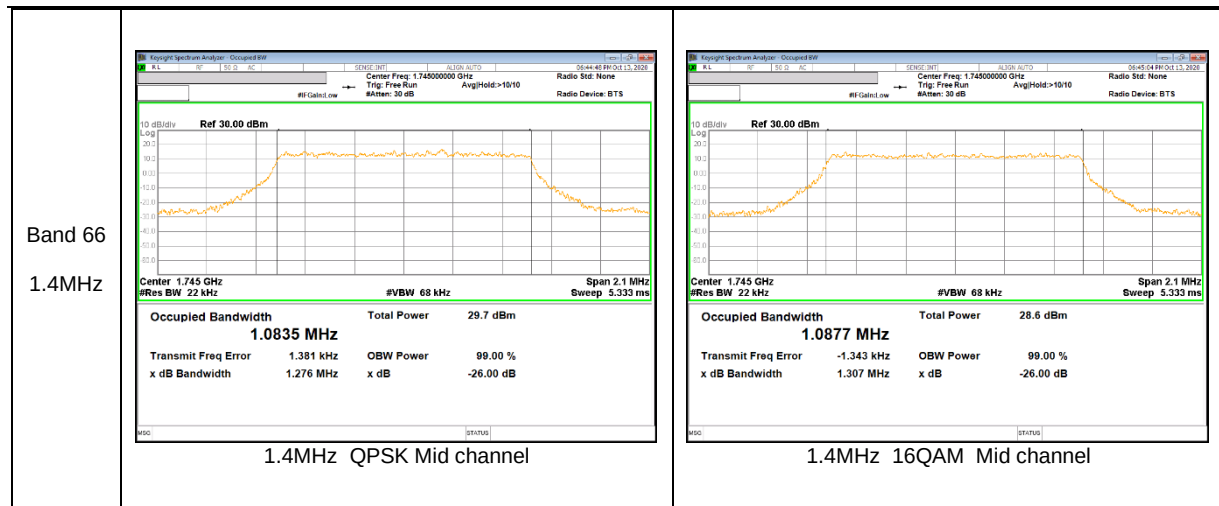
Band 41 20MHz	 Center Freq 2.593000000 GHz #Res BW 300 kHz #VBW 910 kHz Sweep 1.333 ms Occupied Bandwidth 17.921 MHz Total Power 30.8 dBm Transmit Freq Error 48.286 kHz x dB Bandwidth 19.74 MHz OBW Power 99.00 % x dB -26.00 dB 20MHz QPSK Mid channel	 Center Freq 2.593000000 GHz #Res BW 300 kHz #VBW 910 kHz Sweep 1.333 ms Occupied Bandwidth 17.862 MHz Total Power 29.9 dBm Transmit Freq Error 33.204 kHz x dB Bandwidth 19.40 MHz OBW Power 99.00 % x dB -26.00 dB 20MHz 16QAM Mid channel
Band 41 15MHz	 Center Freq 2.593000000 GHz #Res BW 220 kHz #VBW 680 kHz Sweep 1.333 ms Occupied Bandwidth 13.404 MHz Total Power 30.8 dBm Transmit Freq Error 29.697 kHz x dB Bandwidth 14.96 MHz OBW Power 99.00 % x dB -26.00 dB 15MHz QPSK Mid channel	 Center Freq 2.593000000 GHz #Res BW 220 kHz #VBW 680 kHz Sweep 1.333 ms Occupied Bandwidth 13.453 MHz Total Power 29.9 dBm Transmit Freq Error 22.021 kHz x dB Bandwidth 15.26 MHz OBW Power 99.00 % x dB -26.00 dB 15MHz 16QAM Mid channel
Band 41 10MHz	 Center Freq 2.593000000 GHz #Res BW 150 kHz #VBW 470 kHz Sweep 1.333 ms Occupied Bandwidth 8.9674 MHz Total Power 30.9 dBm Transmit Freq Error 13.664 kHz x dB Bandwidth 10.30 MHz OBW Power 99.00 % x dB -26.00 dB 10MHz QPSK Mid channel	 Center Freq 2.593000000 GHz #Res BW 150 kHz #VBW 470 kHz Sweep 1.333 ms Occupied Bandwidth 8.9766 MHz Total Power 29.9 dBm Transmit Freq Error 5.026 kHz x dB Bandwidth 10.22 MHz OBW Power 99.00 % x dB -26.00 dB 10MHz 16QAM Mid channel



LTE Band 66



Band 66 10MHz	 10MHz QPSK Mid channel	 10MHz 16QAM Mid channel
Band 66 5MHz	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel
Band 66 3MHz	 3MHz QPSK Mid channel	 3MHz 16QAM Mid channel



LTE Band 2

LTE Band 2(Frequency range: 1850-1910 MHz) is covered by LTE Band 25 (Frequency range: 1850-1915 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band41(PC3)

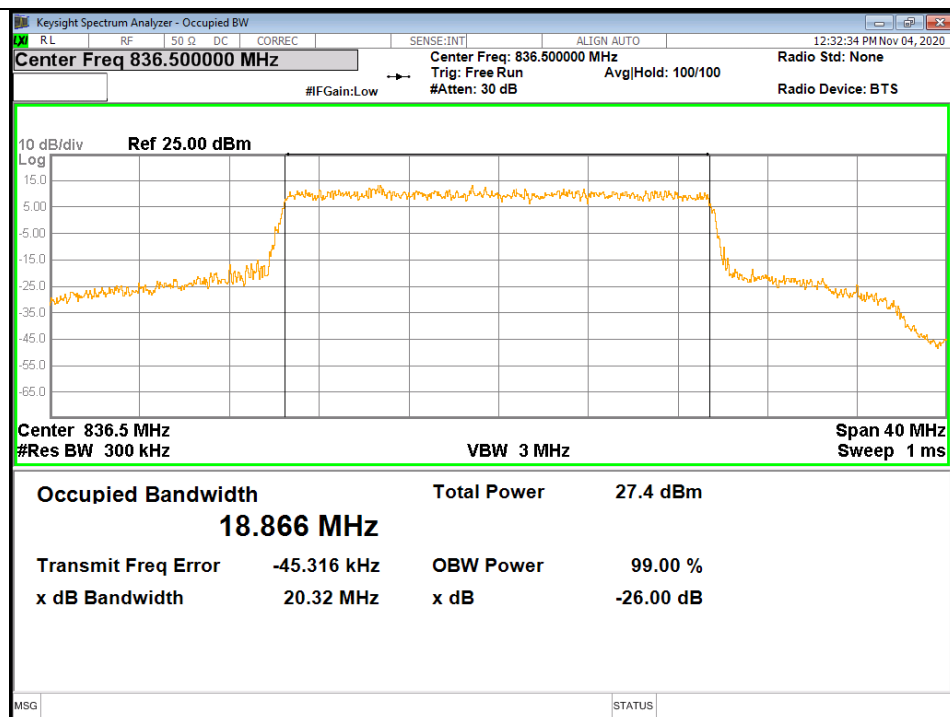
LTE Band 41(PC3, Frequency range : 2496-2690 MHz) is covered by LTE Band 41(PC2) (Frequency range: 2496-2690 MHz) due to same frequency range, same channel bandwidth and maximum tune-up limit is higher than LTE Band41(PC3).

NR Band n5

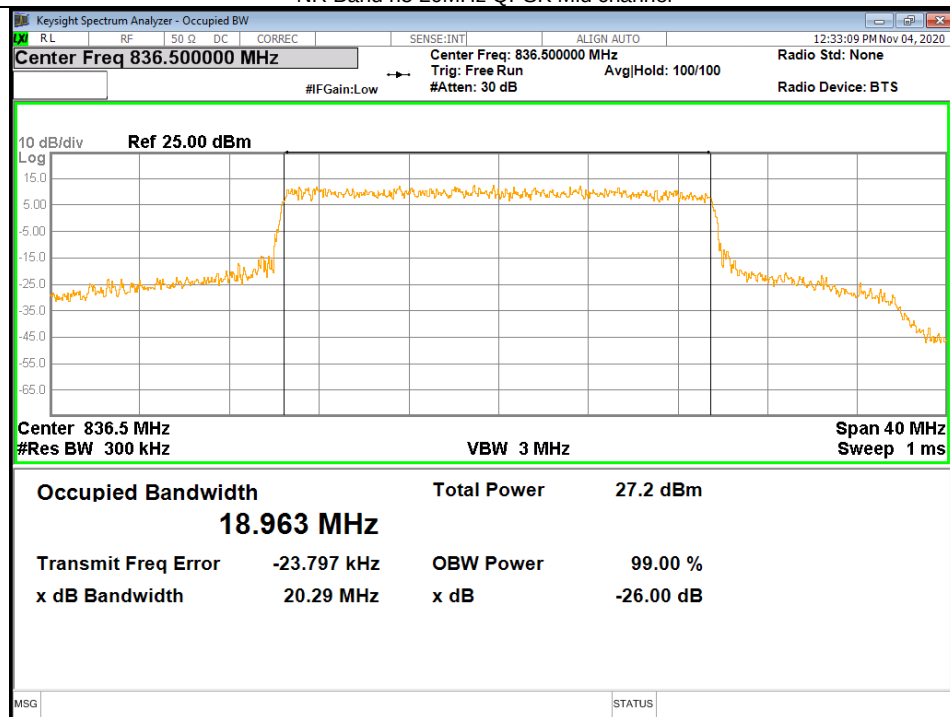
NR Band n5

20 MHz

CP-OFDM

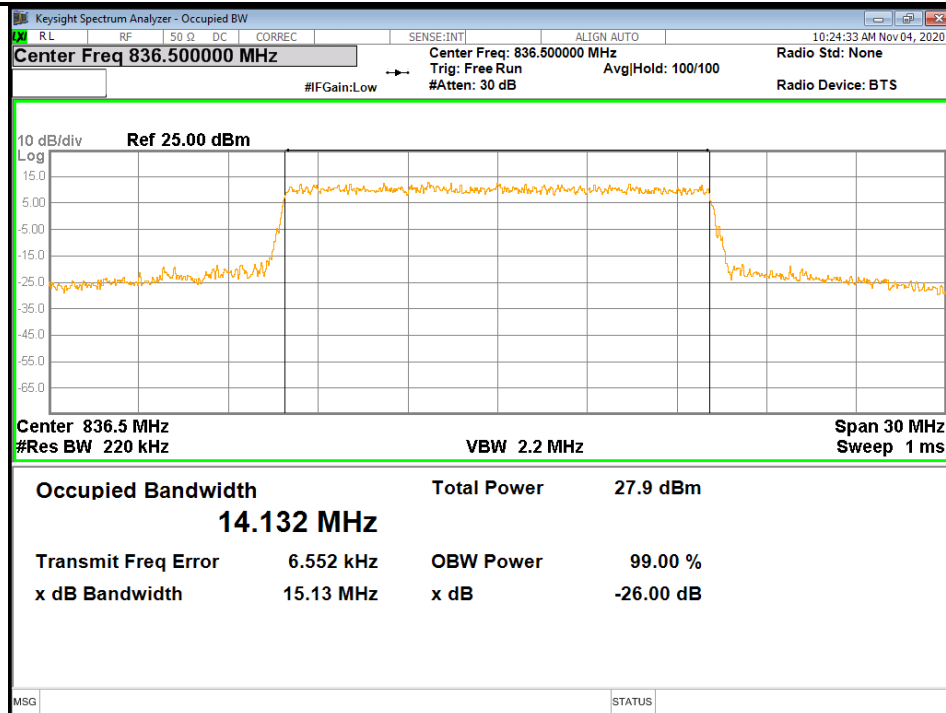


NR Band n5 20MHz QPSK Mid channel

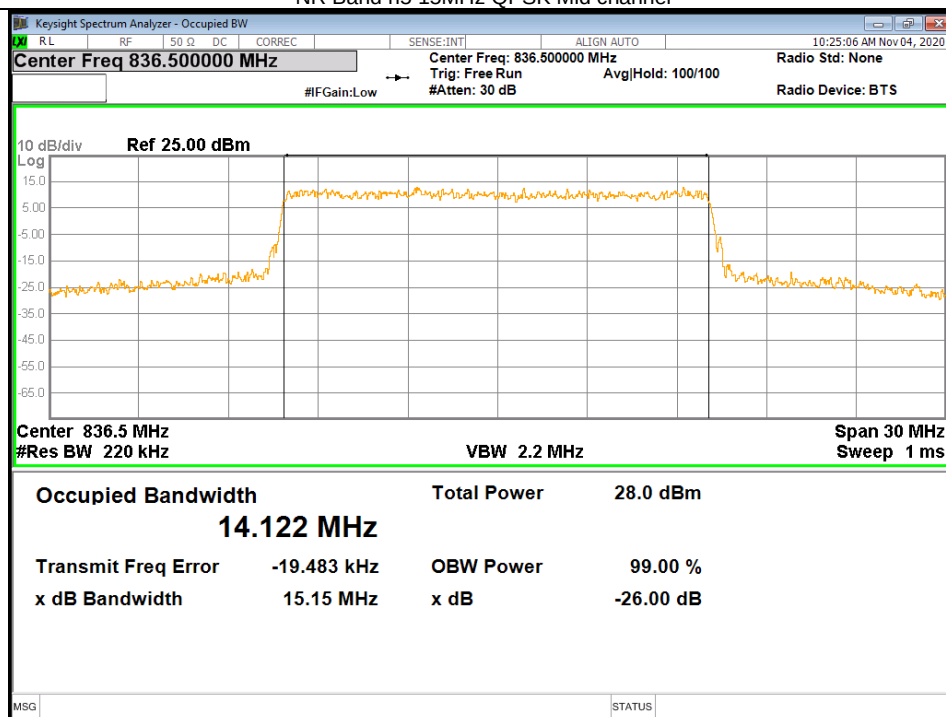


NR Band n5 20MHz 16QAM Mid channel

NR Band n5
15 MHz
CP-OFDM

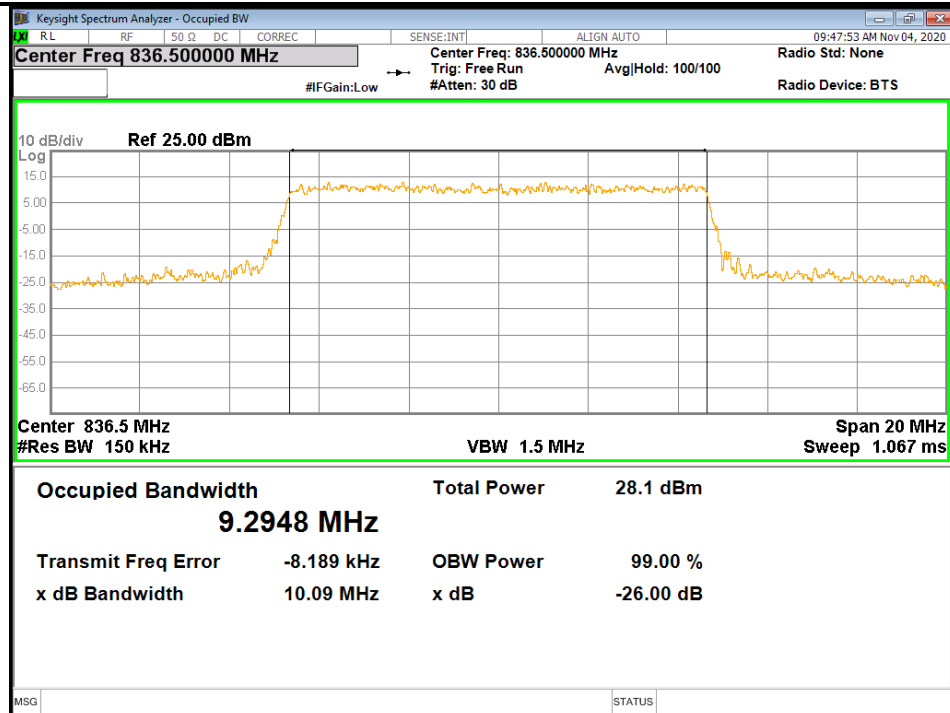


NR Band n5 15MHz QPSK Mid channel

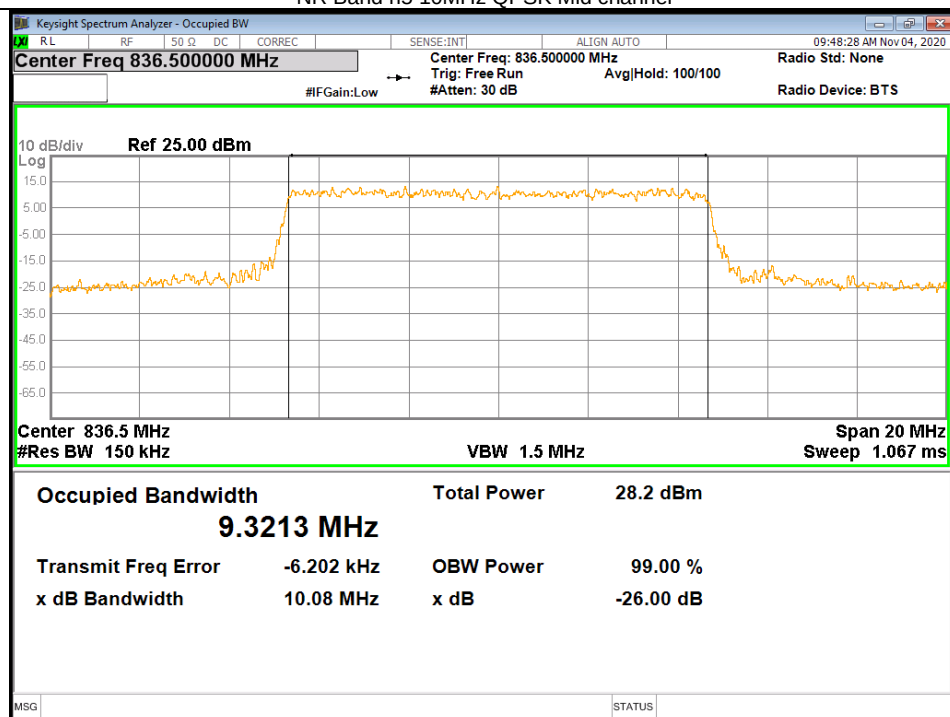


NR Band n5 15MHz 16QAM Mid channel

NR Band n5
10 MHz
CP-OFDM

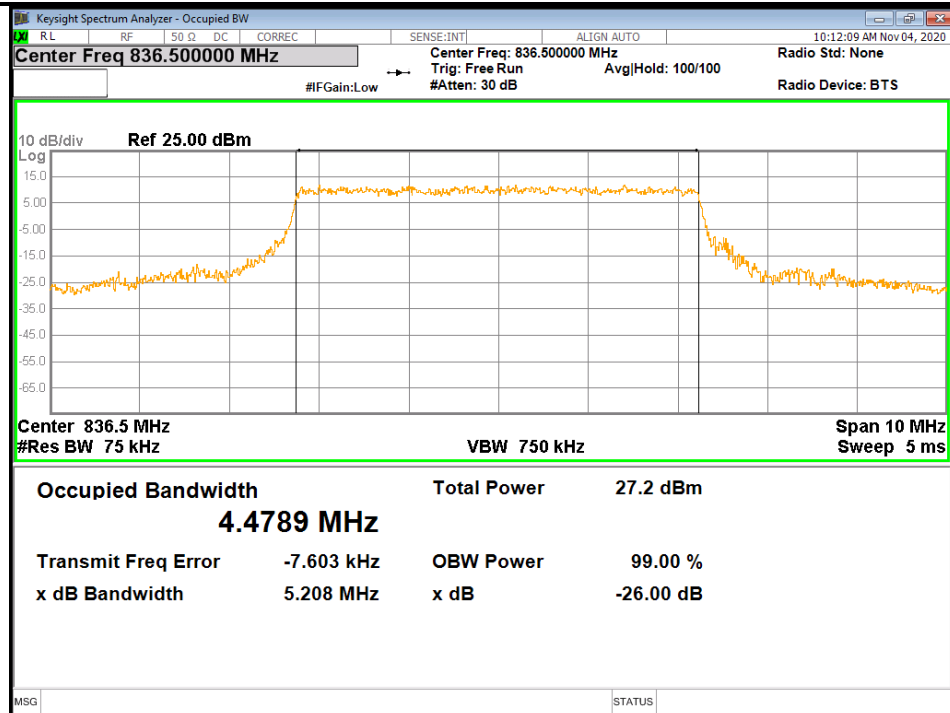


NR Band n5 10MHz QPSK Mid channel

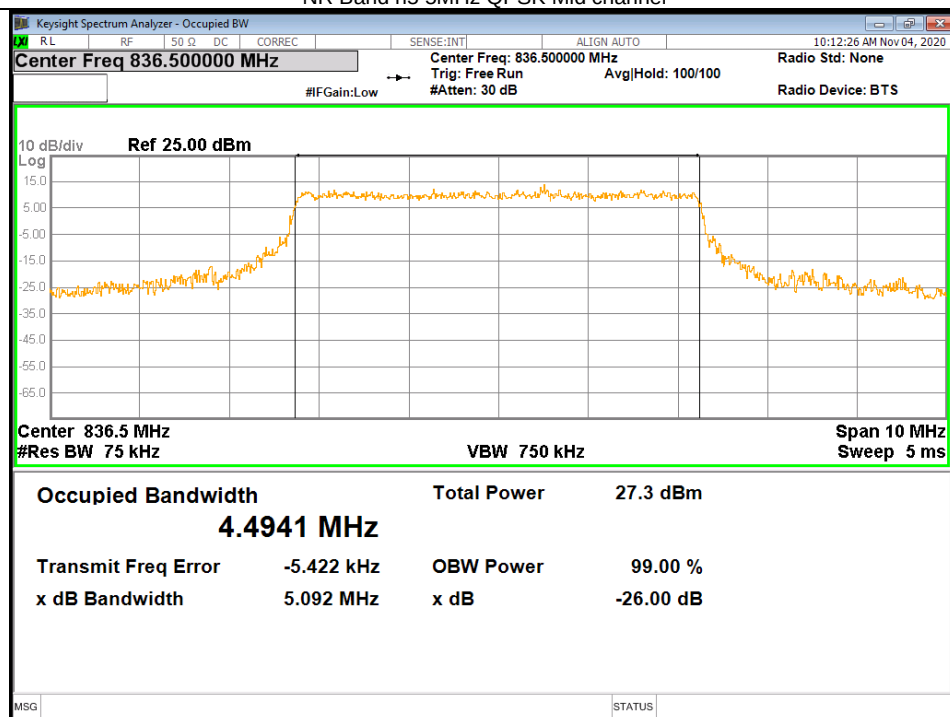


NR Band n5 10MHz 16QAM Mid channel

NR Band n5
5 MHz
CP-OFDM



NR Band n5 5MHz QPSK Mid channel



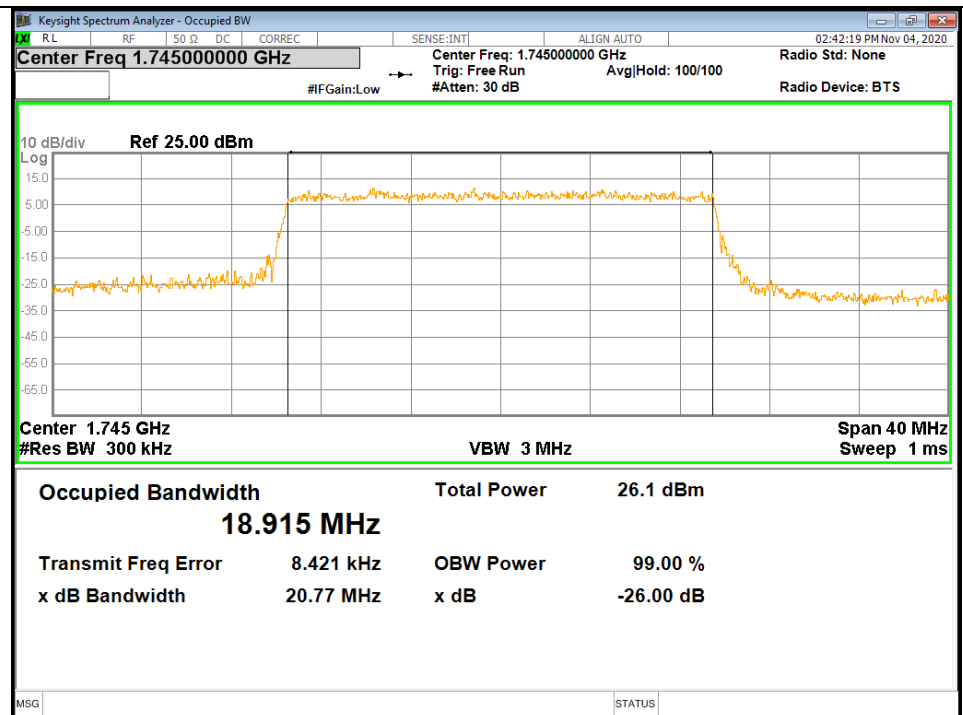
NR Band n5 5MHz 16QAM Mid channel

NR Band n66

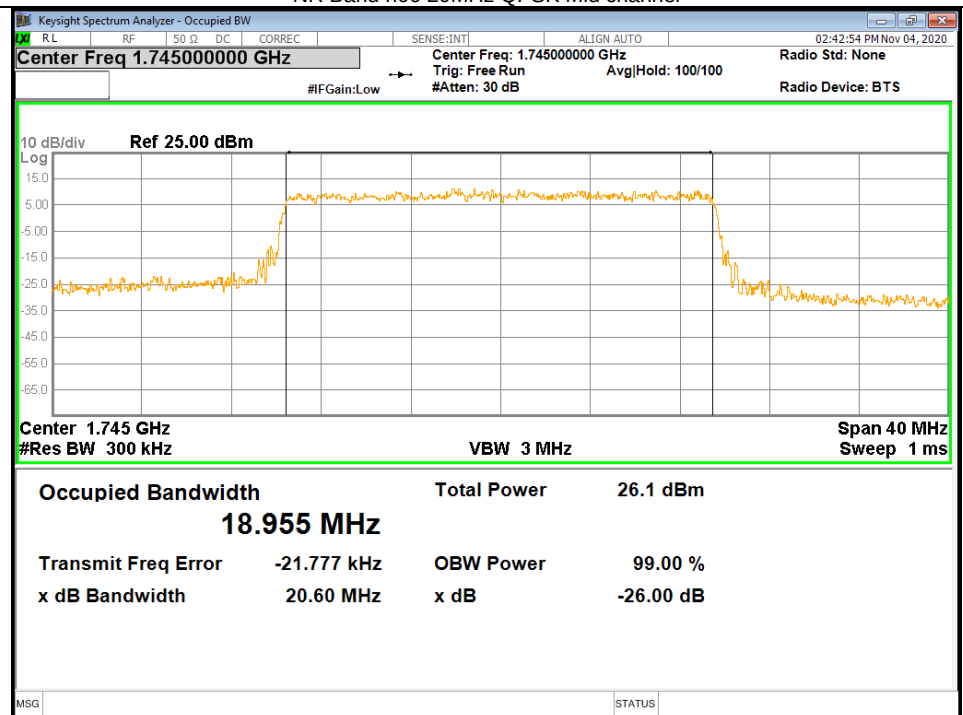
NR Band n66

20 MHz

CP-OFDM

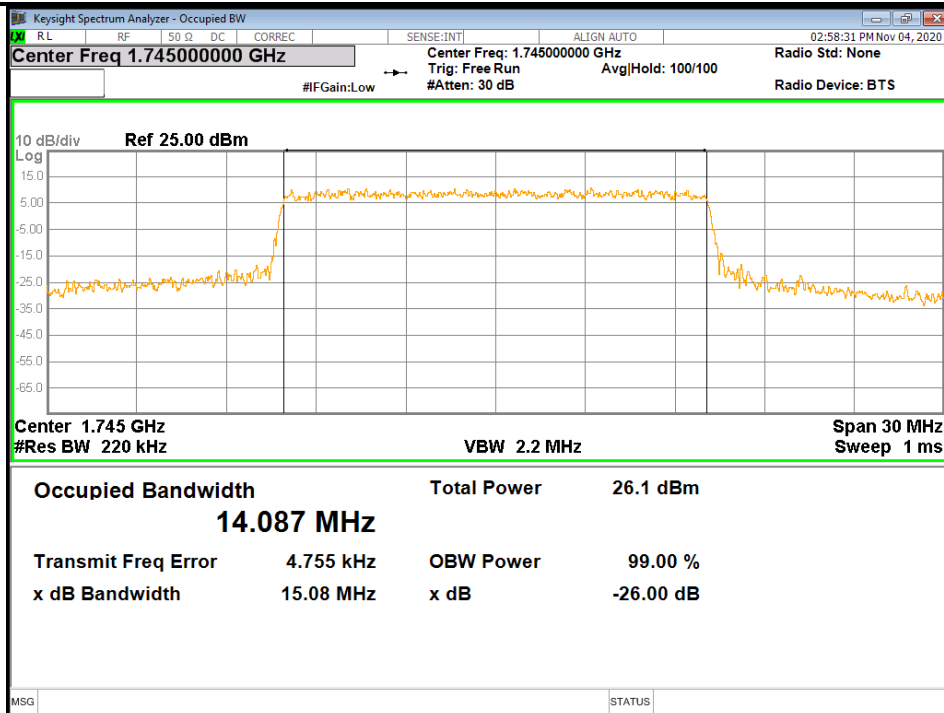


NR Band n66 20MHz QPSK Mid channel

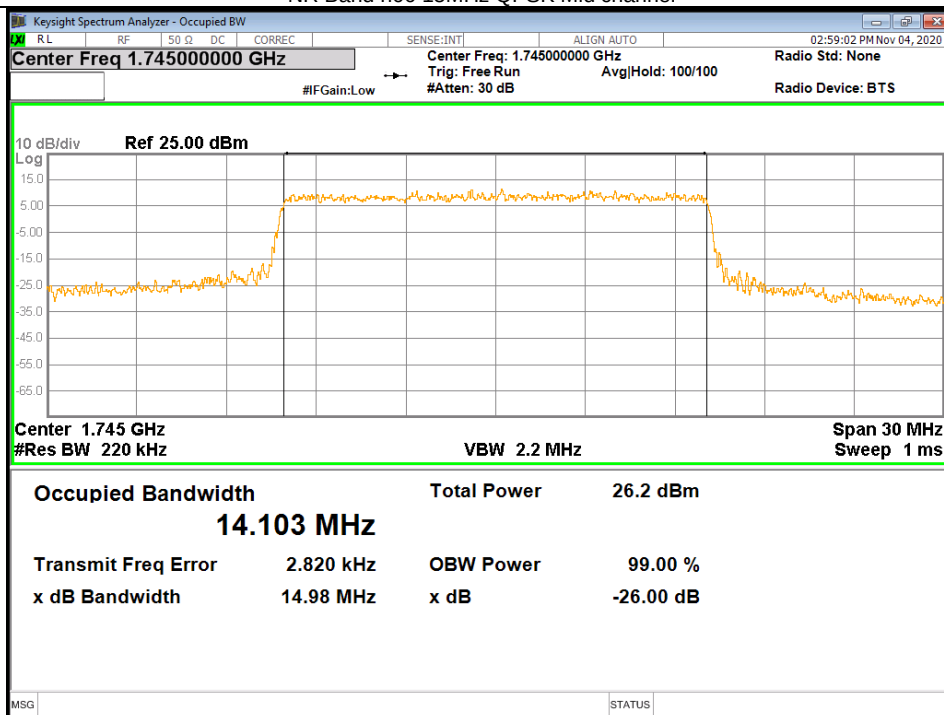


NR Band n66 20MHz 16QAM Mid channel

NR Band n66
15 MHz
CP-OFDM



NR Band n66 15MHz QPSK Mid channel

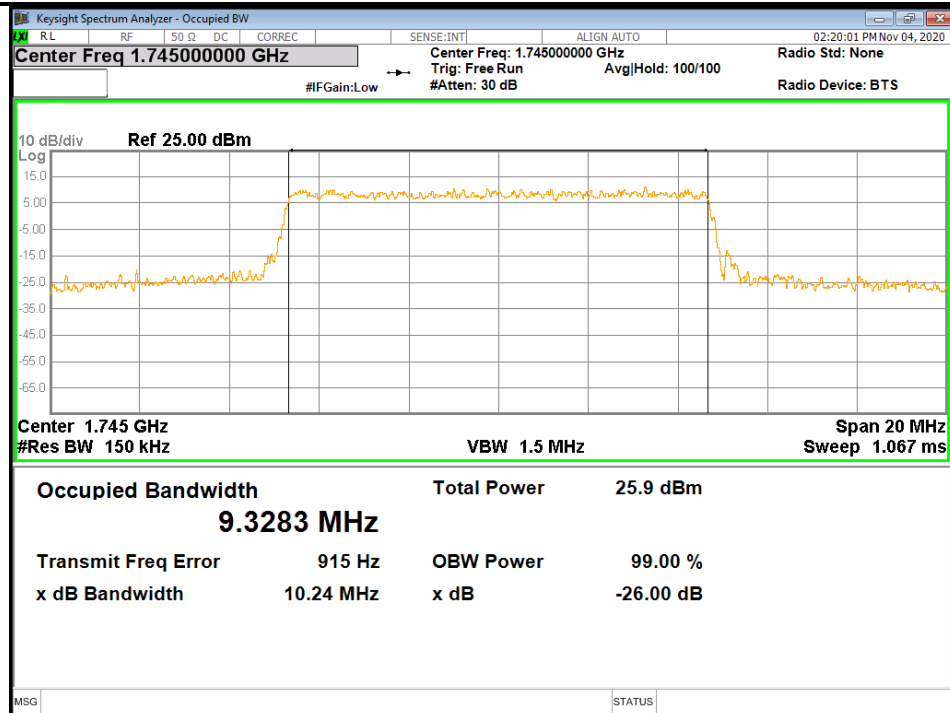


NR Band n66 15MHz 16QAM Mid channel

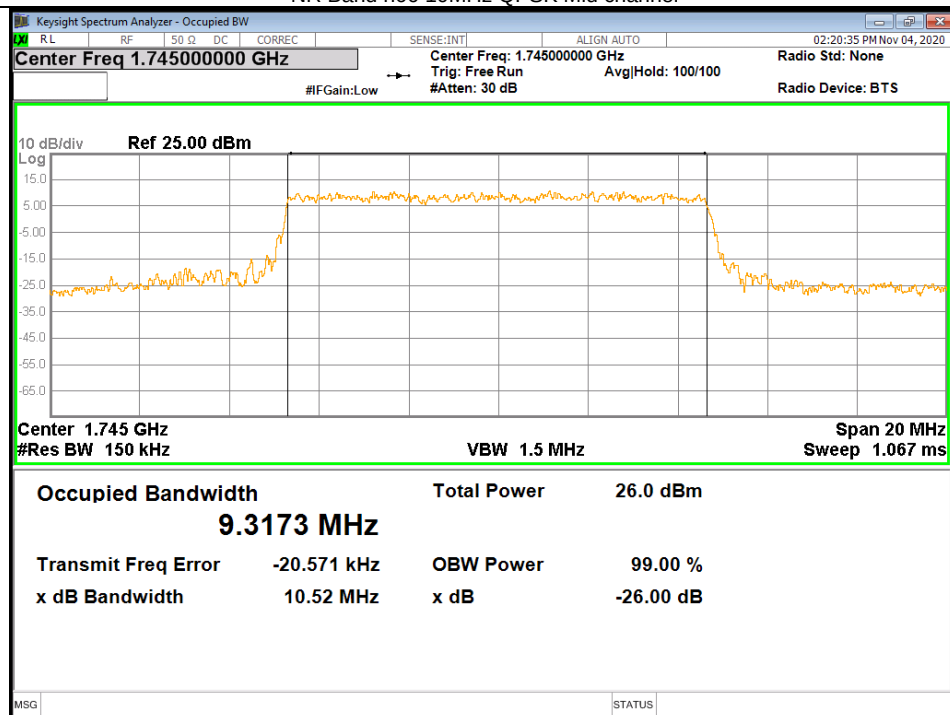
NR Band n66

10 MHz

CP-OFDM



NR Band n66 10MHz QPSK Mid channel

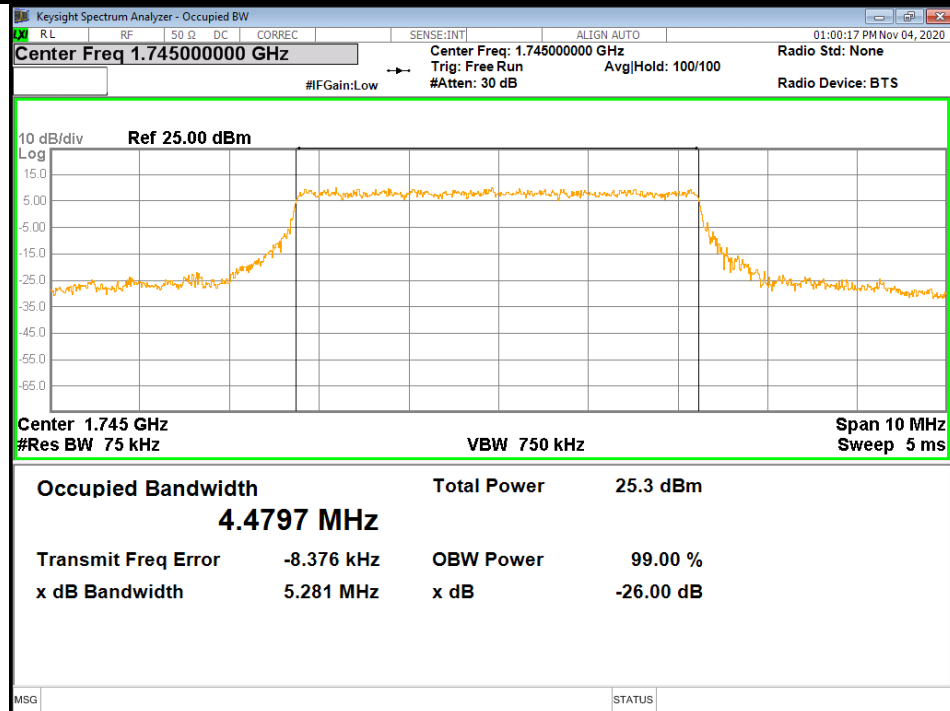


NR Band n66 10MHz 16QAM Mid channel

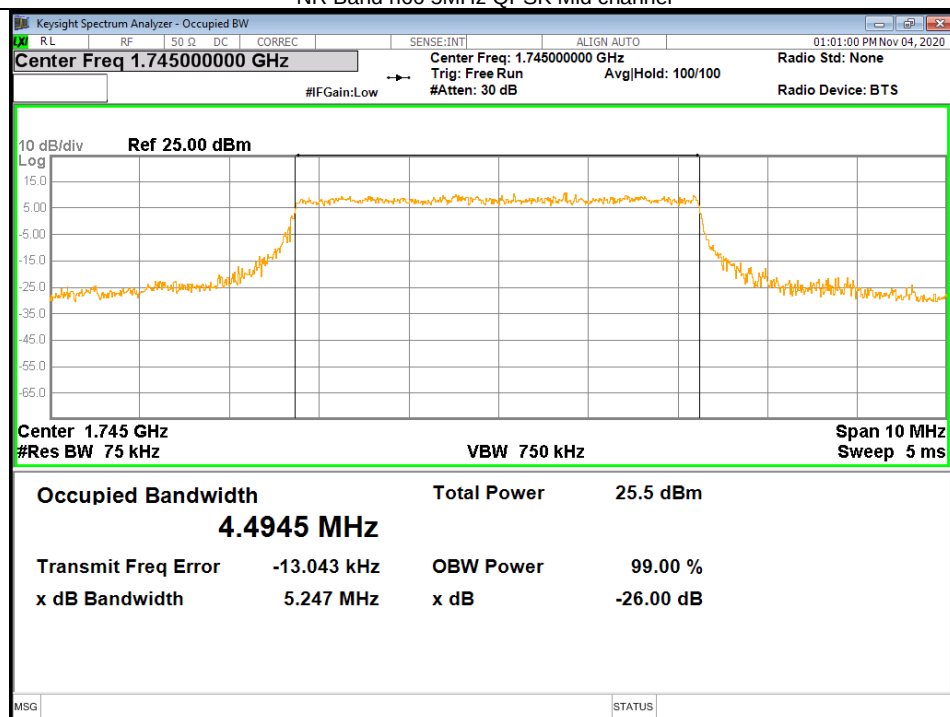
NR Band n66

5 MHz

CP-OFDM



NR Band n66 5MHz QPSK Mid channel



NR Band n66 5MHz 16QAM Mid channel

9.2. BAND EDGE EMISSIONS

RULE PART(S)

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

LIMITS

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.

Part 27.53:

(c) For operations in the 746-758 MHz band and 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 793-806 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

(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 than $43 + 10 \log (P)$ 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.

Part 90.691:

(a) Out-of-band emission requirement shall apply only to the "outer" channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(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 $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ 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.

(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 $43 + 10 \log_{10}(P)$ 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.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

The transmitter output was connected to a CMW500 Test 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.

GSM

- a) Set the RBW = 1 ~ 5% of OBW(GSM850 – 8.2KHz, GSM1900 – 9.1KHz)
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 1.5 times the OBW;
- d) Sweep time = 1S ;
- e) Detector = RMS;
- f) Ensure that the number of measurement points $\geq 2 \times$ Span/RBW;
- g) Trace mode = Average(100);
- h) Add duty cycle correction factor (9dB)

WCDMA/LTE/5G NR

- a) Set the RBW = 1 ~ 1.5 % of OBW(Typically limited to a minimum RBW of 1% of the OBW)
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 1.5 times the OBW;
- d) Sweep time $\geq$ Auto;
- e) Detector = RMS;
- f) Ensure that the number of measurement points $\geq 2 \times$ Span/RBW;
- g) Trace mode = Average (100);

NOTE1: For frequency range of 763-775 MHz and 793-806 MHz.(LTE Band 13)

- a) Set the RBW = 6.2kHz
- b) Set VBW $\geq 3 \times$ RBW;
- c) Sweep time = 1 second ;
- d) Detector = RMS;
- e) Ensure that the number of measurement points $\geq 2 \times$ Span/RBW;
- f) Trace mode = Average;

NOTE2

Note that the spurious emissions outside of the channel include narrowband signals. These signals are all below the -13dBm / -25dBm limits. Although the measurement bandwidth is less than the reference bandwidth of 1MHz no additional correction is applied as ANSI C63.26 section 4.2.3 only requires the correction to be applied when the OBW of the emission being measured is wider than the measurement bandwidth (Where the OBW of the signal under measurement is less than the RBW of the measuring instrument, no bandwidth correction or integration will be required.) Plots for low and high channels show the level of the emission measured with the reduced bandwidth and the level of the same emission measured using the integration method over the 1MHz reference bandwidth are very close, indicating the emissions are narrowband.

NOTE3

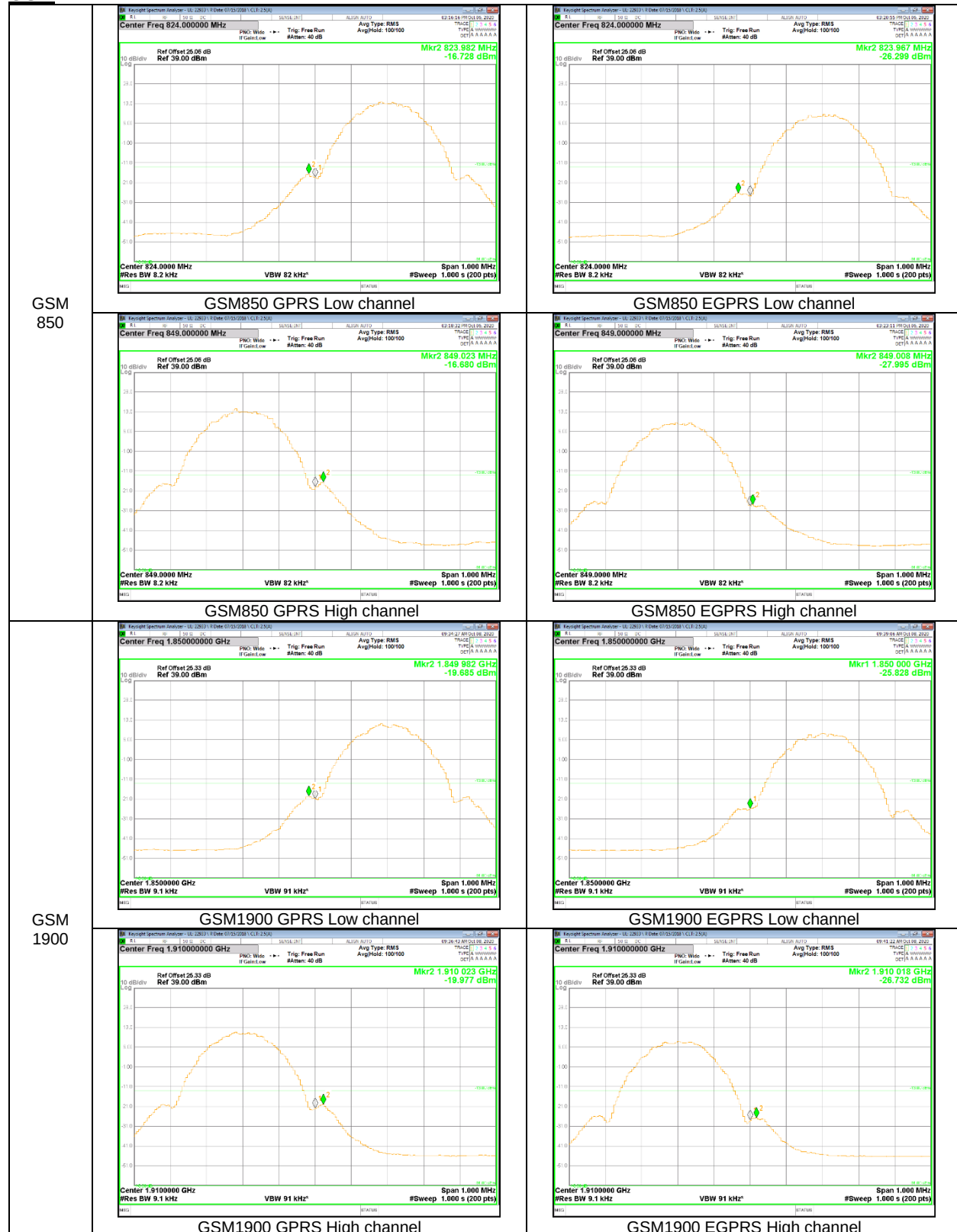
5G NR: All Waveforms (CP-OFDM vs DFT-s OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

RESULTS

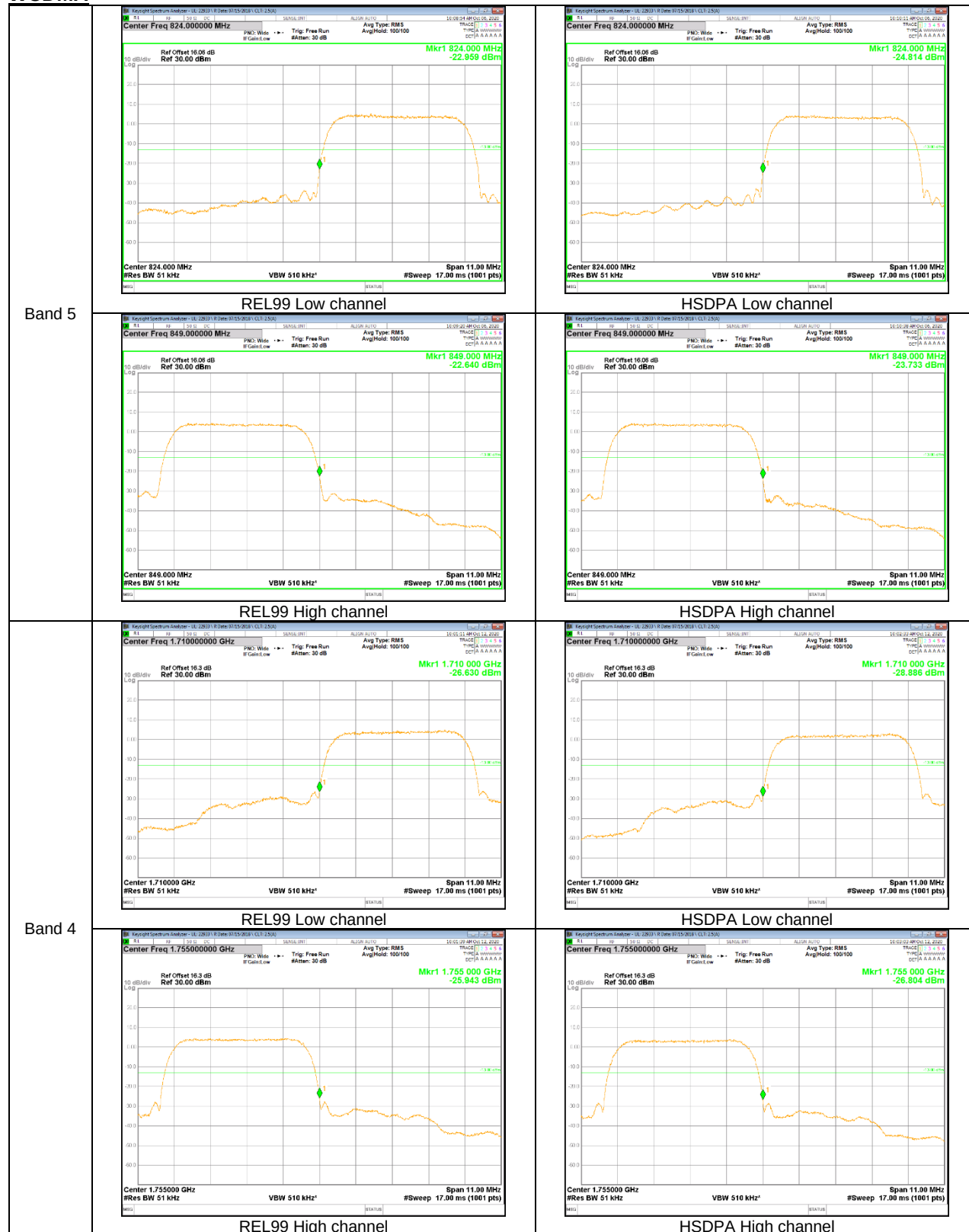
See the following pages.

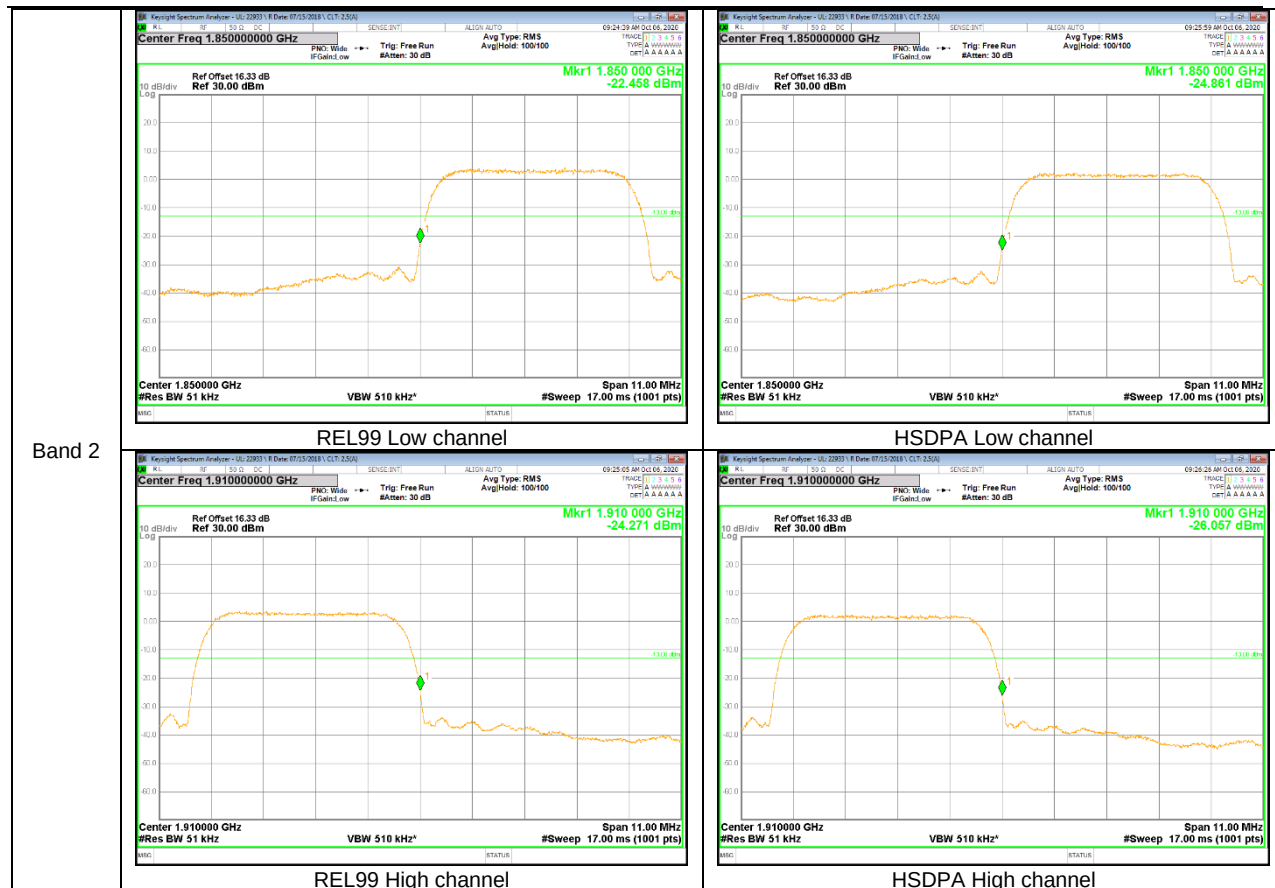
9.2.1. BAND EDGE RESULT

GSM

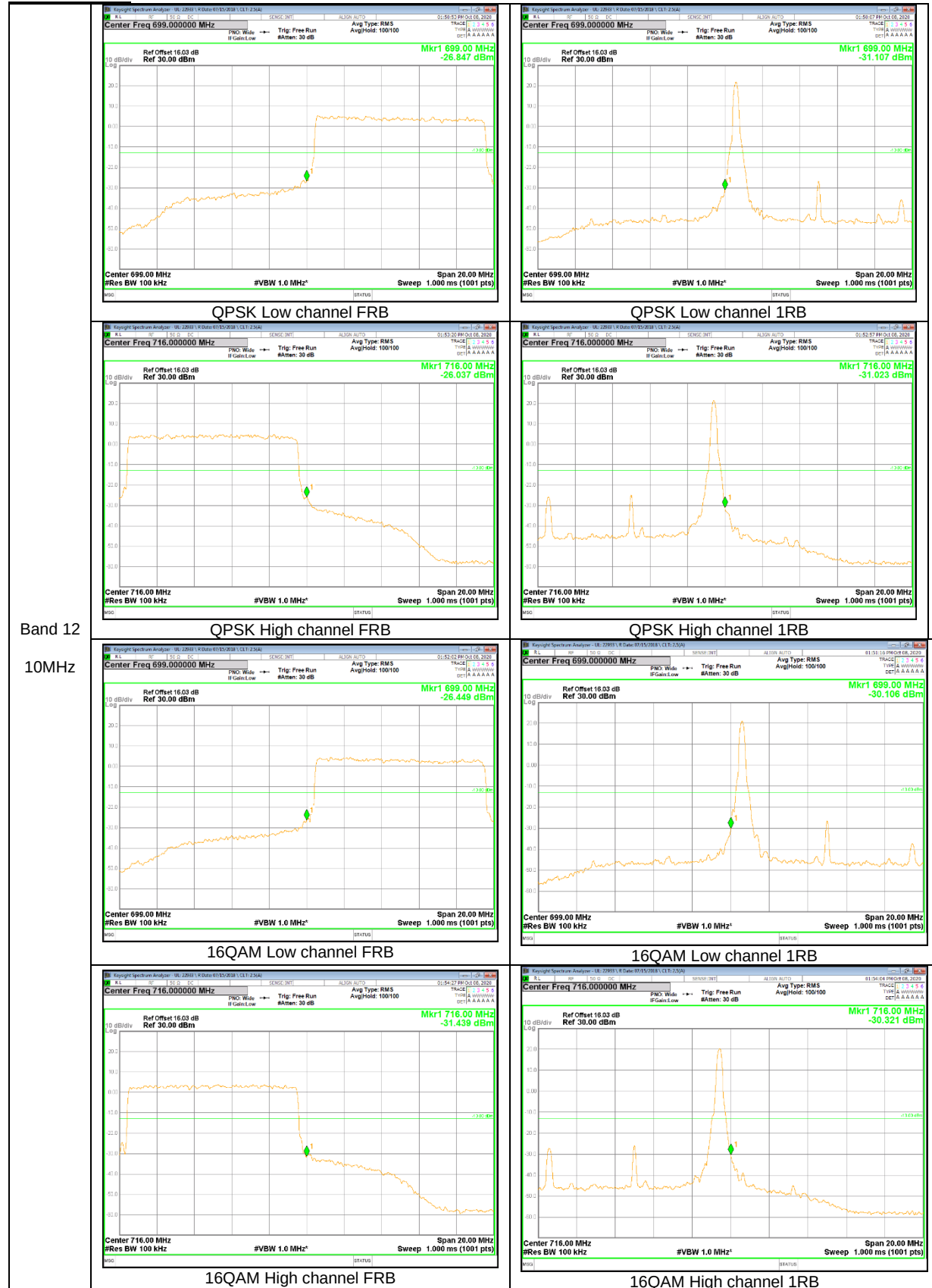


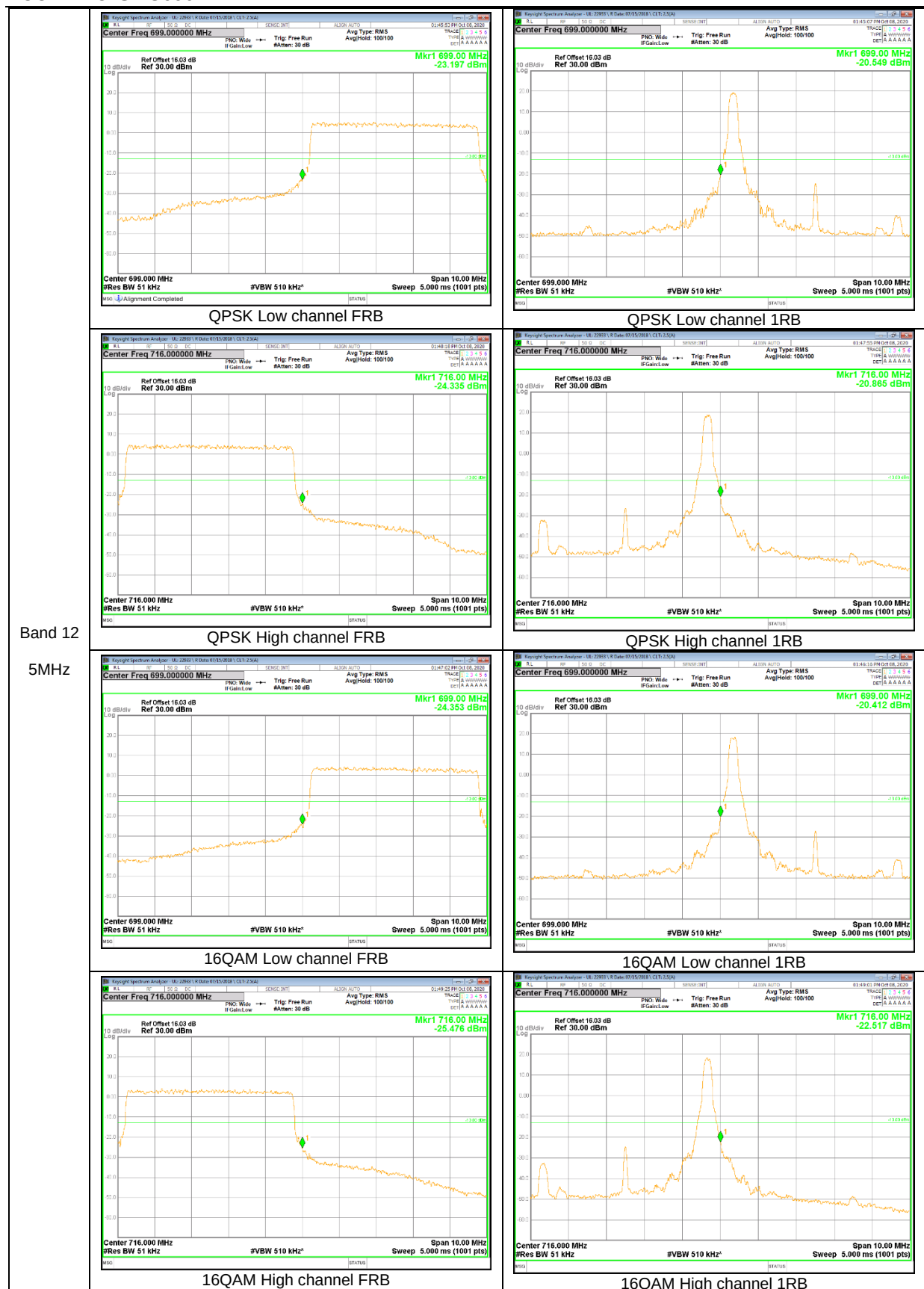
WCDMA

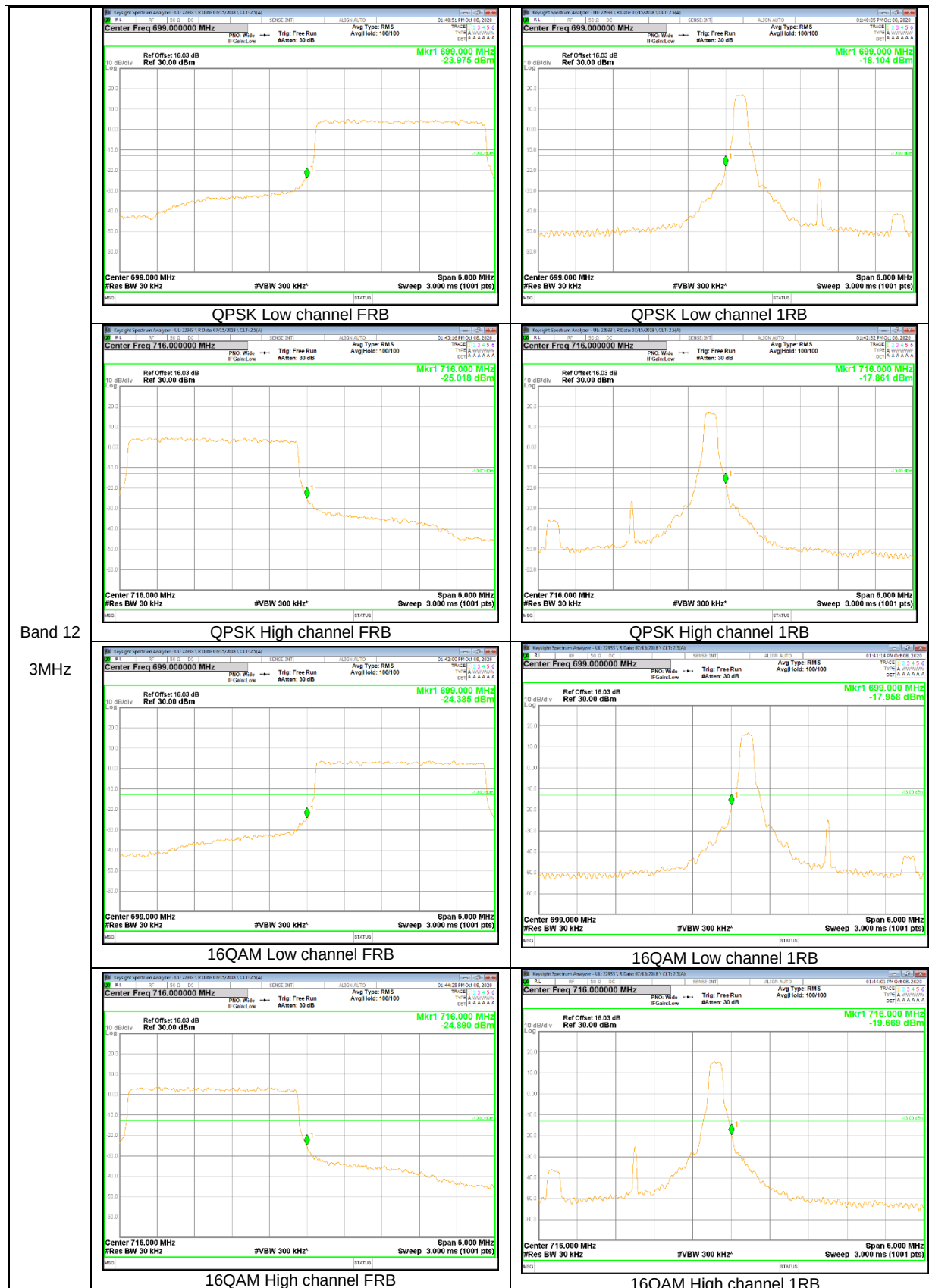


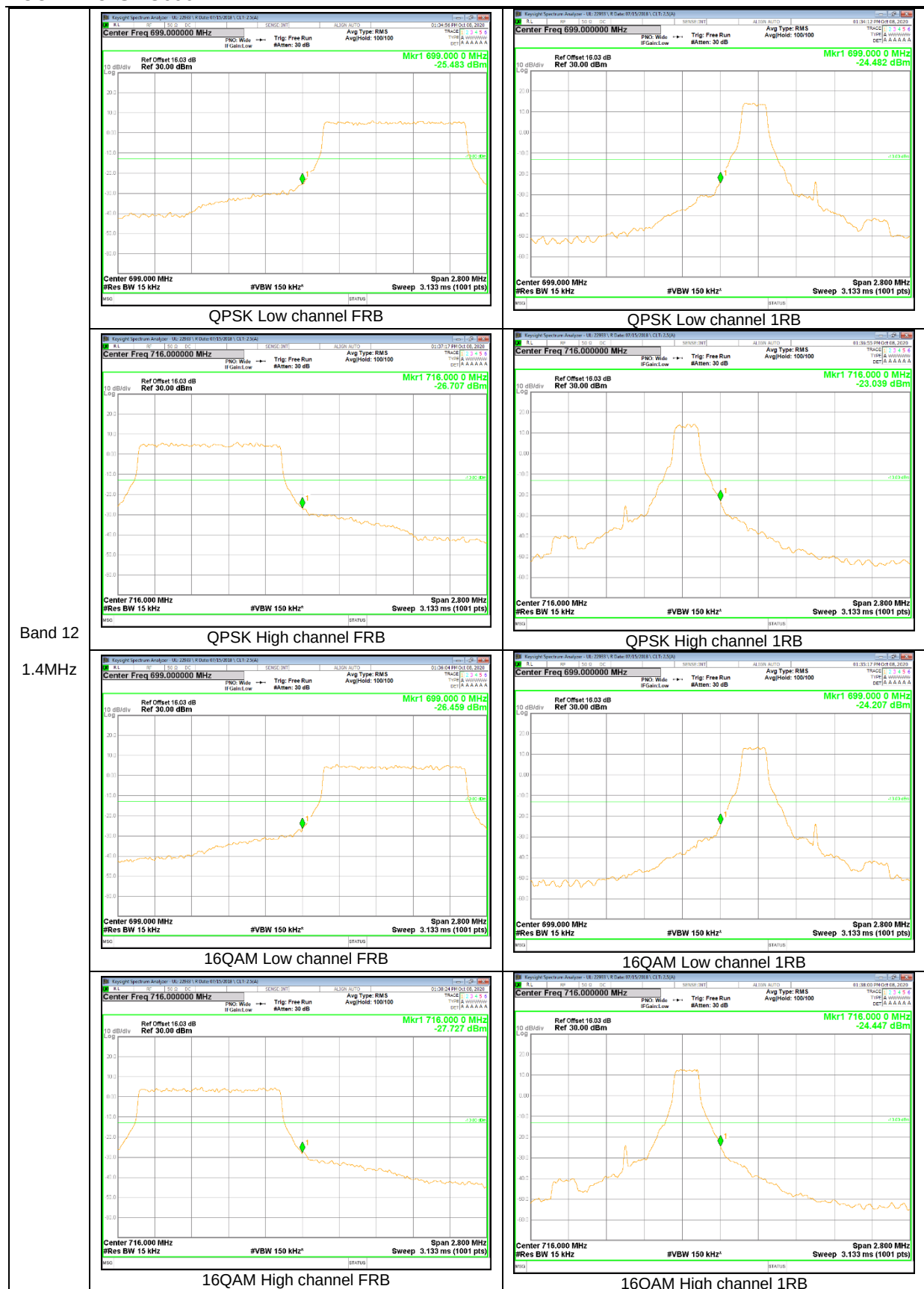


LTE Band 12









LTE Band 13

