

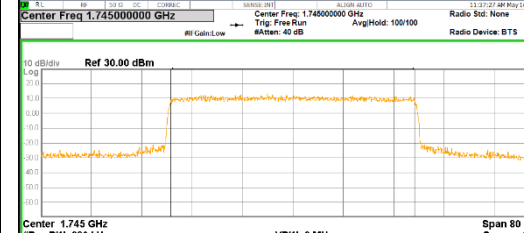
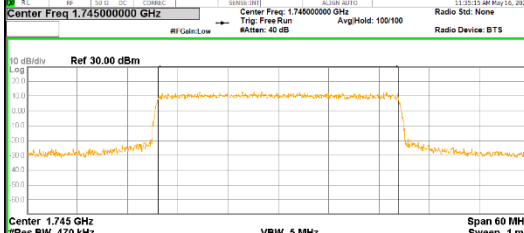
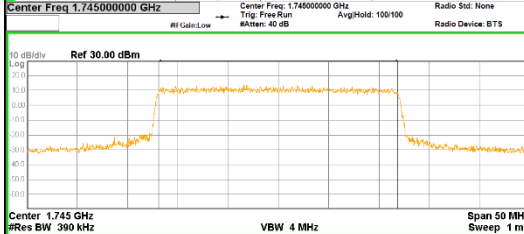
NR Band n41 CP-OFDM







NR Band n66 CP-OFDM

40MHz	 <p>Center Freq 1.745000000 GHz #Ref 30.00 dBm #Gain: Low #Att: 40 dB #Avg: 100/100 Radio Std: None Radio Device: BTS</p> <p>Center 1.745 GHz #Res BW 620 kHz #VBW 6 MHz Span 80 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 38.572 MHz Total Power 27.6 dBm Transmit Freq Error -16.749 kHz OBW Power 99.00 % x dB Bandwidth 40.25 MHz x dB -26.00 dB</p> <p>QPSK Mid channel</p>	 <p>Center Freq 1.745000000 GHz #Ref 30.00 dBm #Gain: Low #Att: 40 dB #Avg: 100/100 Radio Std: None Radio Device: BTS</p> <p>Center 1.745 GHz #Res BW 620 kHz #VBW 6 MHz Span 80 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 38.592 MHz Total Power 27.4 dBm Transmit Freq Error 17.134 kHz OBW Power 99.00 % x dB Bandwidth 40.26 MHz x dB -26.00 dB</p> <p>16QAM Mid channel</p>
35MHz	 <p>Center Freq 1.745000000 GHz #Ref 30.00 dBm #Gain: Low #Att: 40 dB #Avg: 100/100 Radio Std: None Radio Device: BTS</p> <p>Center 1.745 GHz #Res BW 510 kHz #VBW 4 MHz Span 70 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 33.593 MHz Total Power 27.6 dBm Transmit Freq Error 31.742 kHz OBW Power 99.00 % x dB Bandwidth 35.05 MHz x dB -26.00 dB</p> <p>QPSK Mid channel</p>	 <p>Center Freq 1.745000000 GHz #Ref 30.00 dBm #Gain: Low #Att: 40 dB #Avg: 100/100 Radio Std: None Radio Device: BTS</p> <p>Center 1.745 GHz #Res BW 510 kHz #VBW 4 MHz Span 70 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 33.569 MHz Total Power 27.6 dBm Transmit Freq Error -72.586 kHz OBW Power 99.00 % x dB Bandwidth 35.01 MHz x dB -26.00 dB</p> <p>16QAM Mid channel</p>
30MHz	 <p>Center Freq 1.745000000 GHz #Ref 30.00 dBm #Gain: Low #Att: 40 dB #Avg: 100/100 Radio Std: None Radio Device: BTS</p> <p>Center 1.745 GHz #Res BW 470 kHz #VBW 5 MHz Span 60 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 28.577 MHz Total Power 27.6 dBm Transmit Freq Error -7.367 kHz OBW Power 99.00 % x dB Bandwidth 30.10 MHz x dB -26.00 dB</p> <p>QPSK Mid channel</p>	 <p>Center Freq 1.745000000 GHz #Ref 30.00 dBm #Gain: Low #Att: 40 dB #Avg: 100/100 Radio Std: None Radio Device: BTS</p> <p>Center 1.745 GHz #Res BW 470 kHz #VBW 5 MHz Span 60 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 28.632 MHz Total Power 27.6 dBm Transmit Freq Error -31.358 kHz OBW Power 99.00 % x dB Bandwidth 29.84 MHz x dB -26.00 dB</p> <p>16QAM Mid channel</p>
25MHz	 <p>Center Freq 1.745000000 GHz #Ref 30.00 dBm #Gain: Low #Att: 40 dB #Avg: 100/100 Radio Std: None Radio Device: BTS</p> <p>Center 1.745 GHz #Res BW 390 kHz #VBW 4 MHz Span 50 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 23.751 MHz Total Power 27.8 dBm Transmit Freq Error -19.884 kHz OBW Power 99.00 % x dB Bandwidth 24.97 MHz x dB -26.00 dB</p> <p>QPSK Mid channel</p>	 <p>Center Freq 1.745000000 GHz #Ref 30.00 dBm #Gain: Low #Att: 40 dB #Avg: 100/100 Radio Std: None Radio Device: BTS</p> <p>Center 1.745 GHz #Res BW 390 kHz #VBW 4 MHz Span 50 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 23.774 MHz Total Power 27.7 dBm Transmit Freq Error -13.984 kHz OBW Power 99.00 % x dB Bandwidth 25.00 MHz x dB -26.00 dB</p> <p>16QAM Mid channel</p>



8.4. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §27.53

LIMITS

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. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(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.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

The transmitter output was connected to either CMW500 Test Set or E7515B 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.

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 = 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, 769-775 MHz and 799-805 MHz.(LTE Band 13)

- a) Set the RBW = 6.2 kHz
- 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 addental 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.

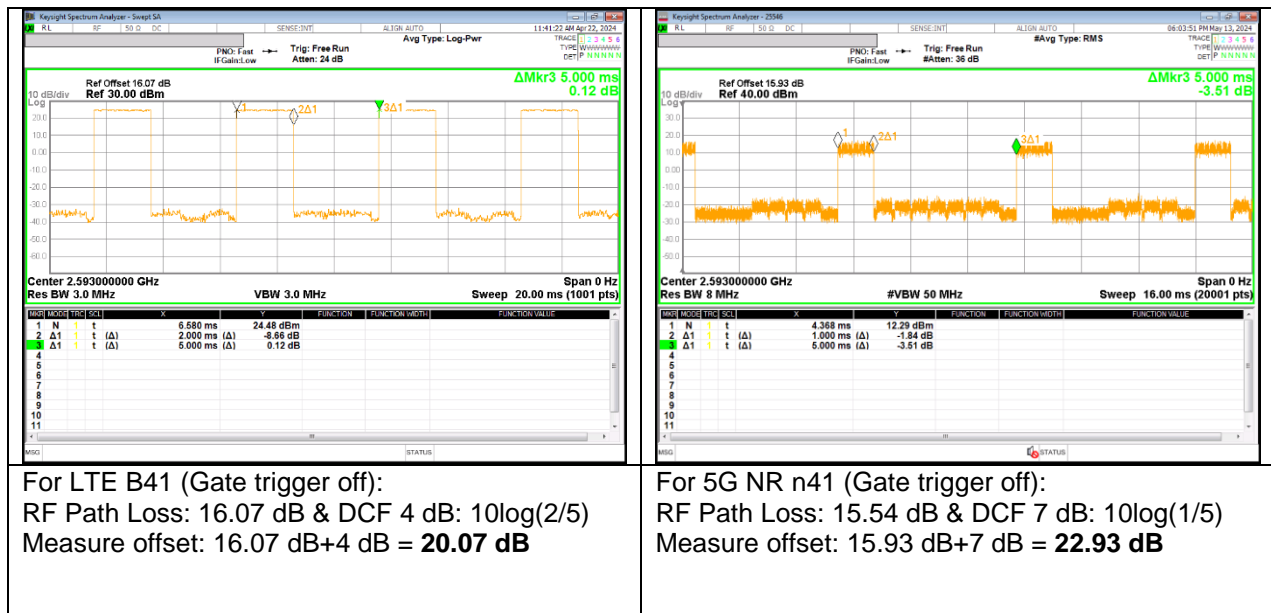
NOTE3

For Band-Edge extended:

CH BW (MHz)	RB Used (kHz)	CF for emissions more than 100kHz	CF for emissions more than 1MHz
1.4	15	+8.2 dB	+18.2 dB
3	30	+5.2 dB	+15.2 dB
5	51	+2.9 dB	+12.9 dB
10	100	N/A	+10.0 dB
15	150	N/A	+8.2 dB
20	200	N/A	+7.0 dB
25	250	N/A	+6.0 dB
30	300	N/A	+5.2 dB
35	350	N/A	+4.6 dB
40	400	N/A	+4.0 dB

For the band edge value measured in [RB Used], even if [CF for emissions reference bandwidth 100kHz/1MHz] is applied, it is below -13dBm.

NOTE4



NOTE5

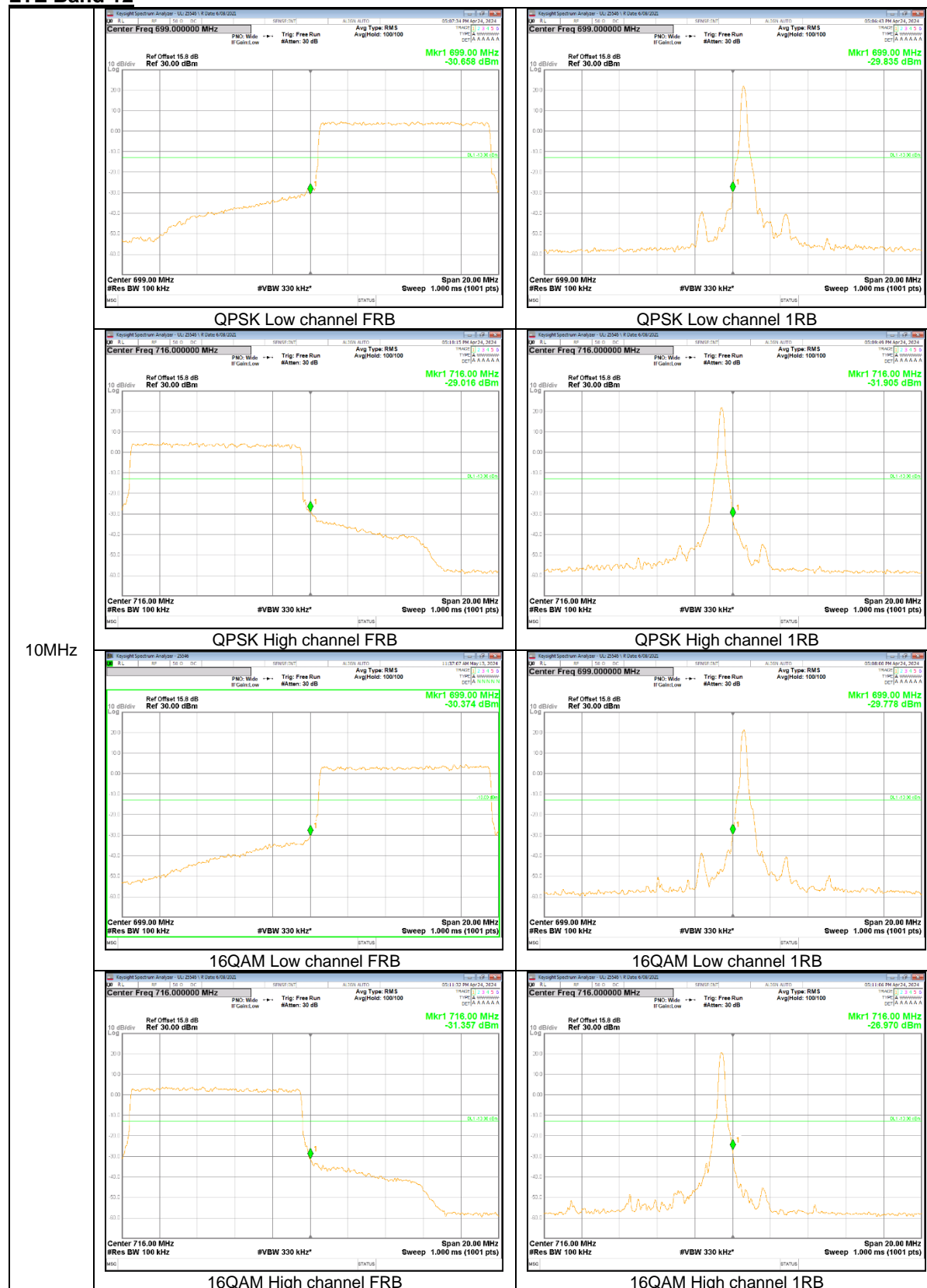
LTE: It was tested at 1RB QPSK as worst case (the highest output power and density).
5G NR: All Waveforms (CP-OFDM vs DFT-s_OFDM) and modulations ($\pi/2$ BPSK, QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All Modes of operation were investigated and the worst case configuration results are reported in this section.

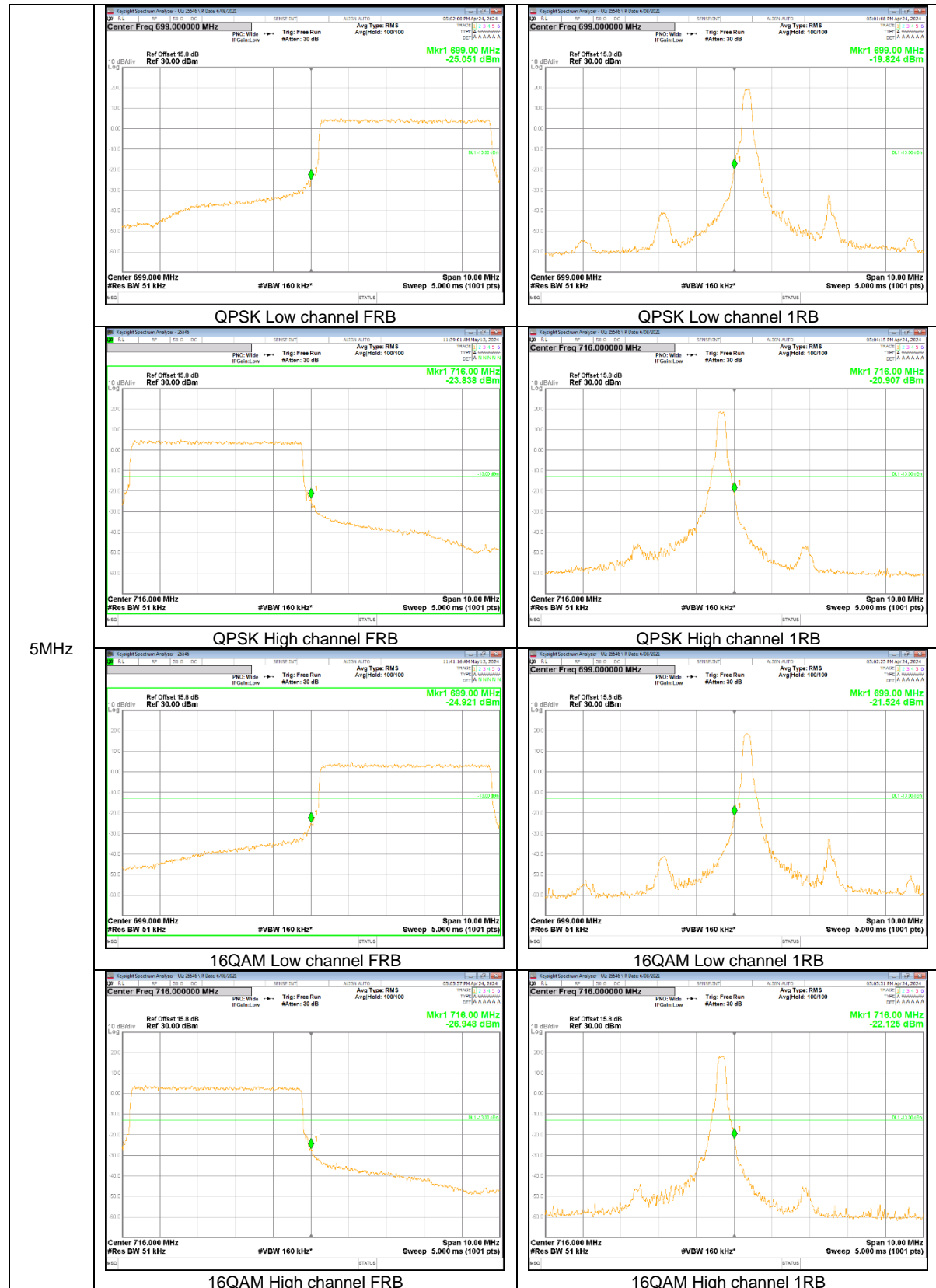
RESULTS

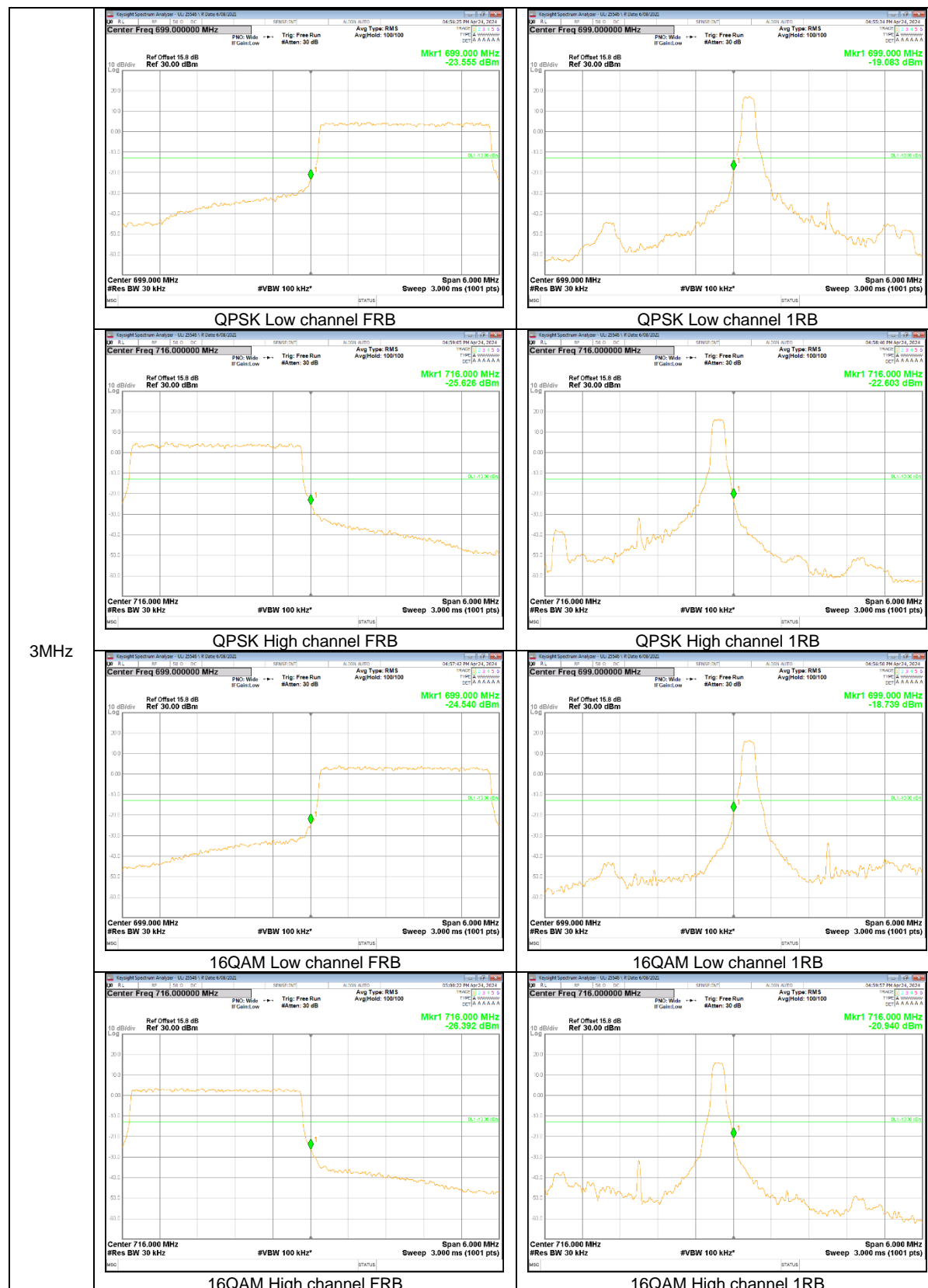
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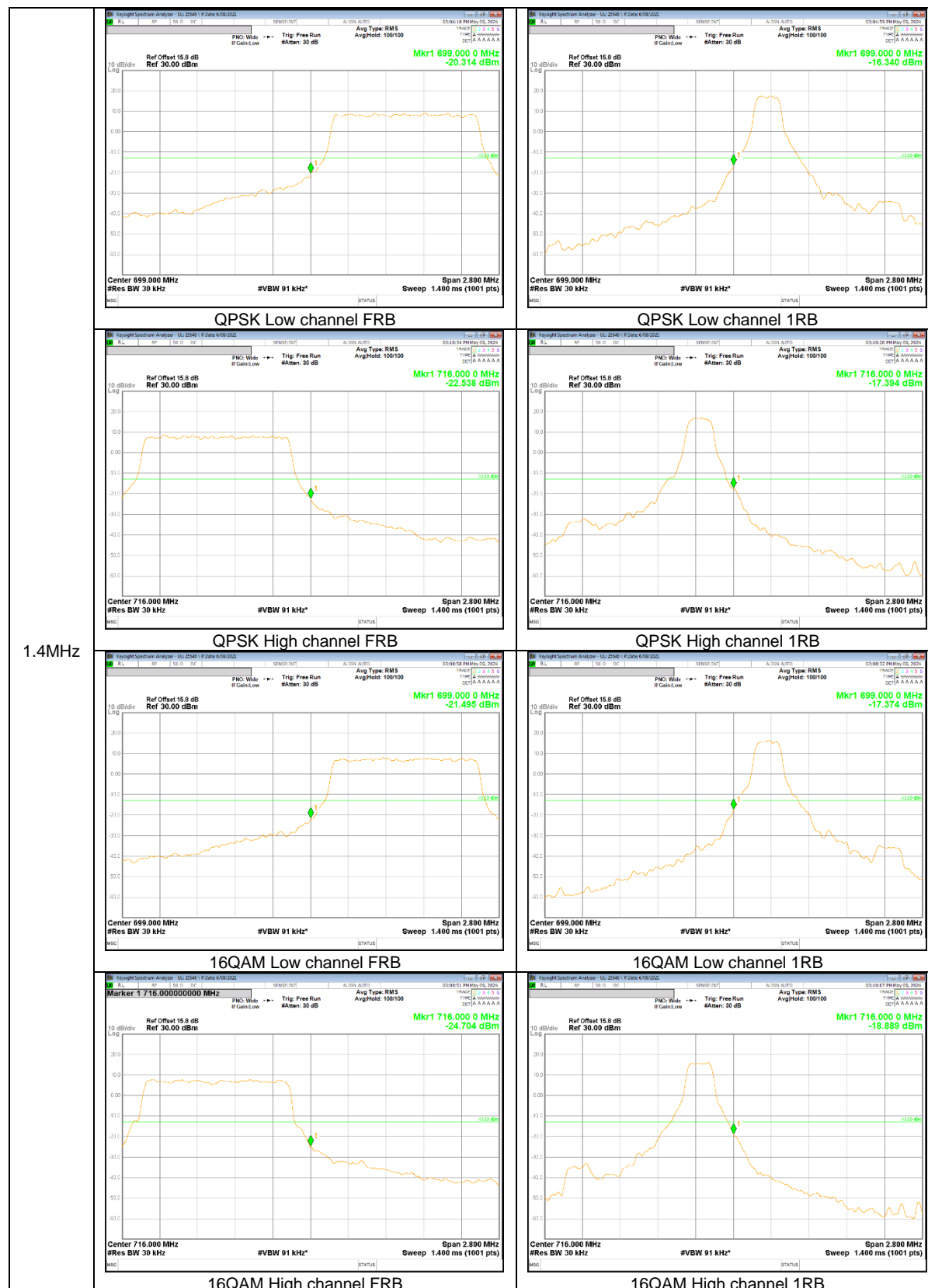
8.4.1. BAND EDGE RESULT

LTE Band 12

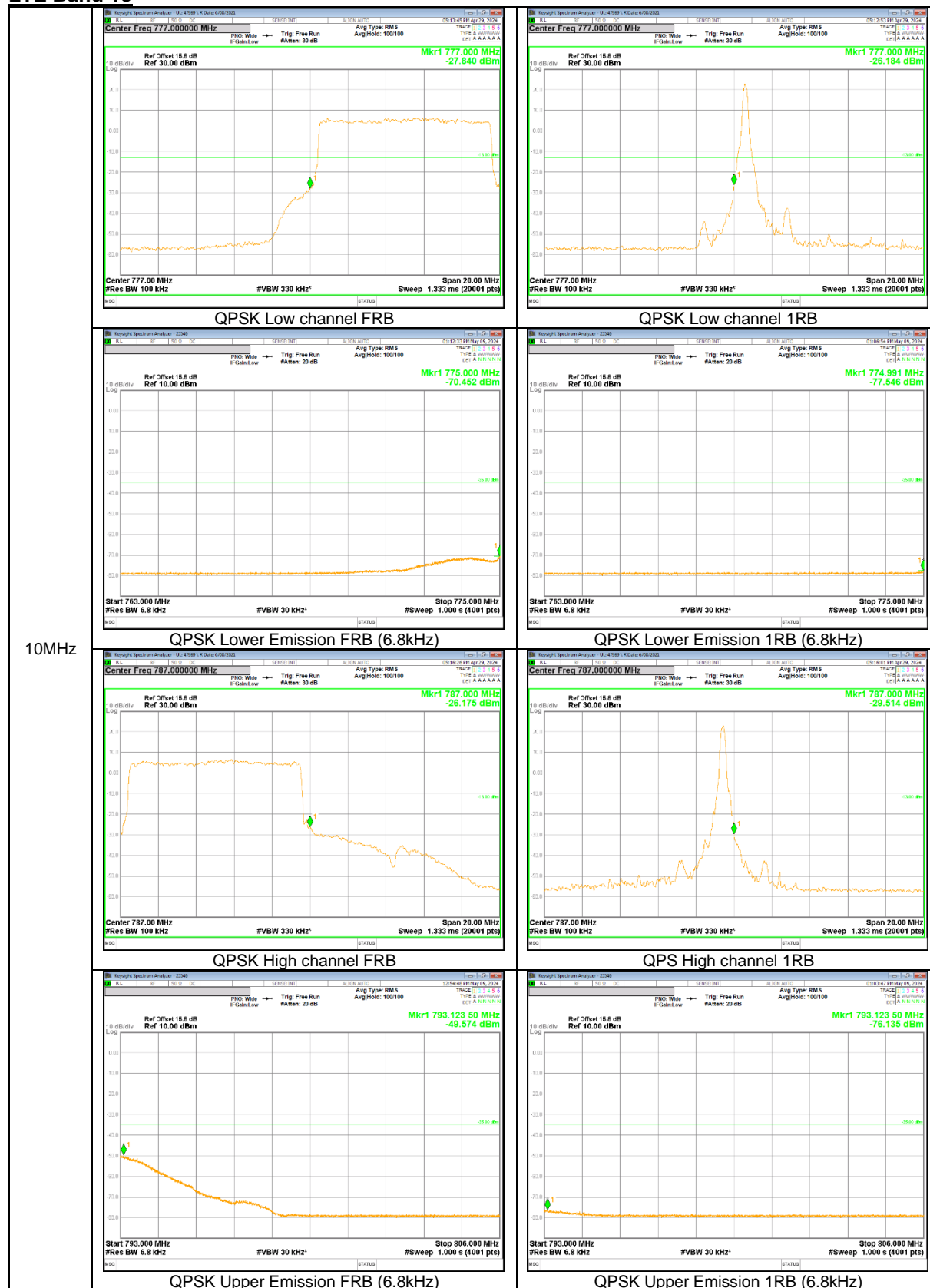




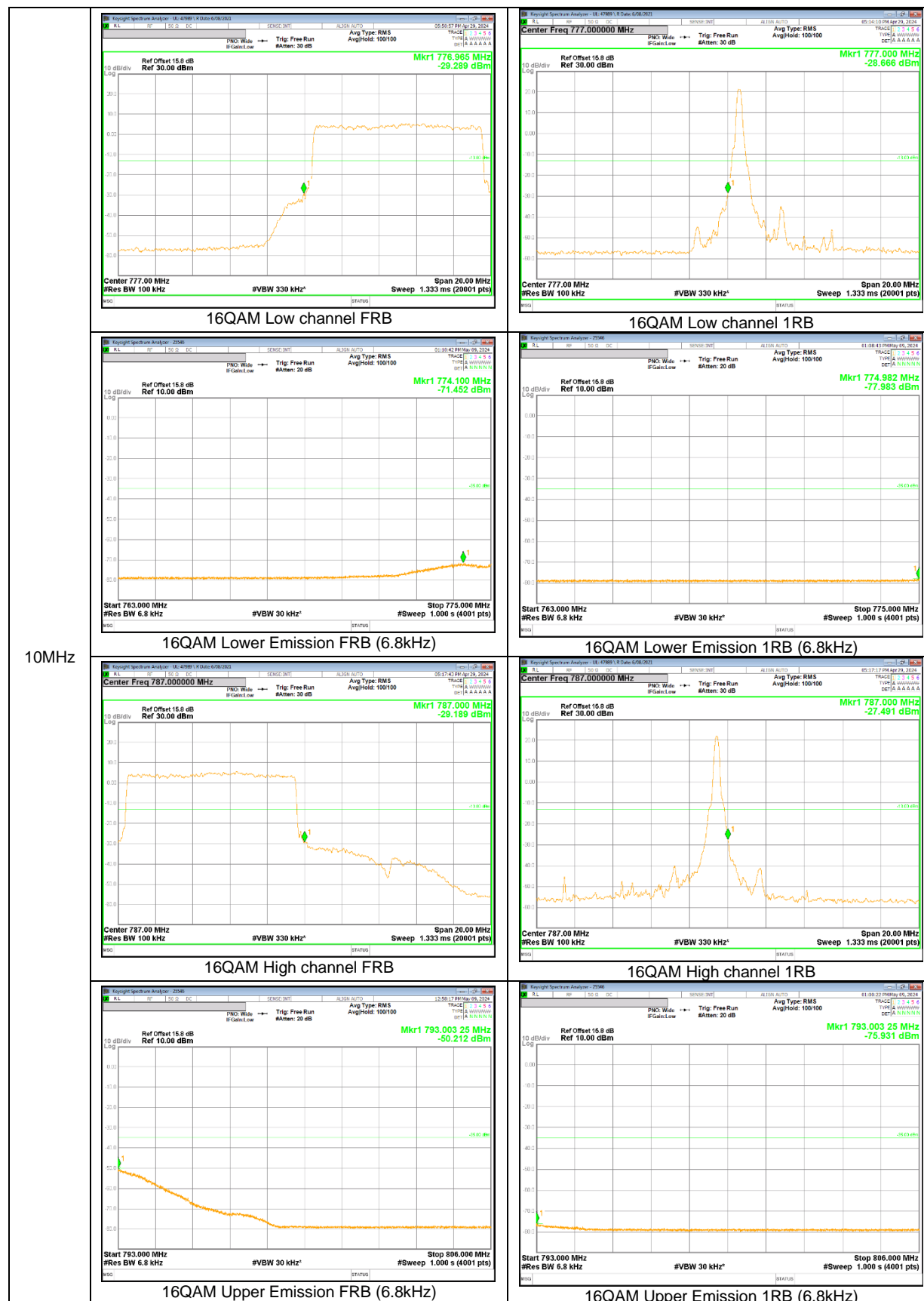


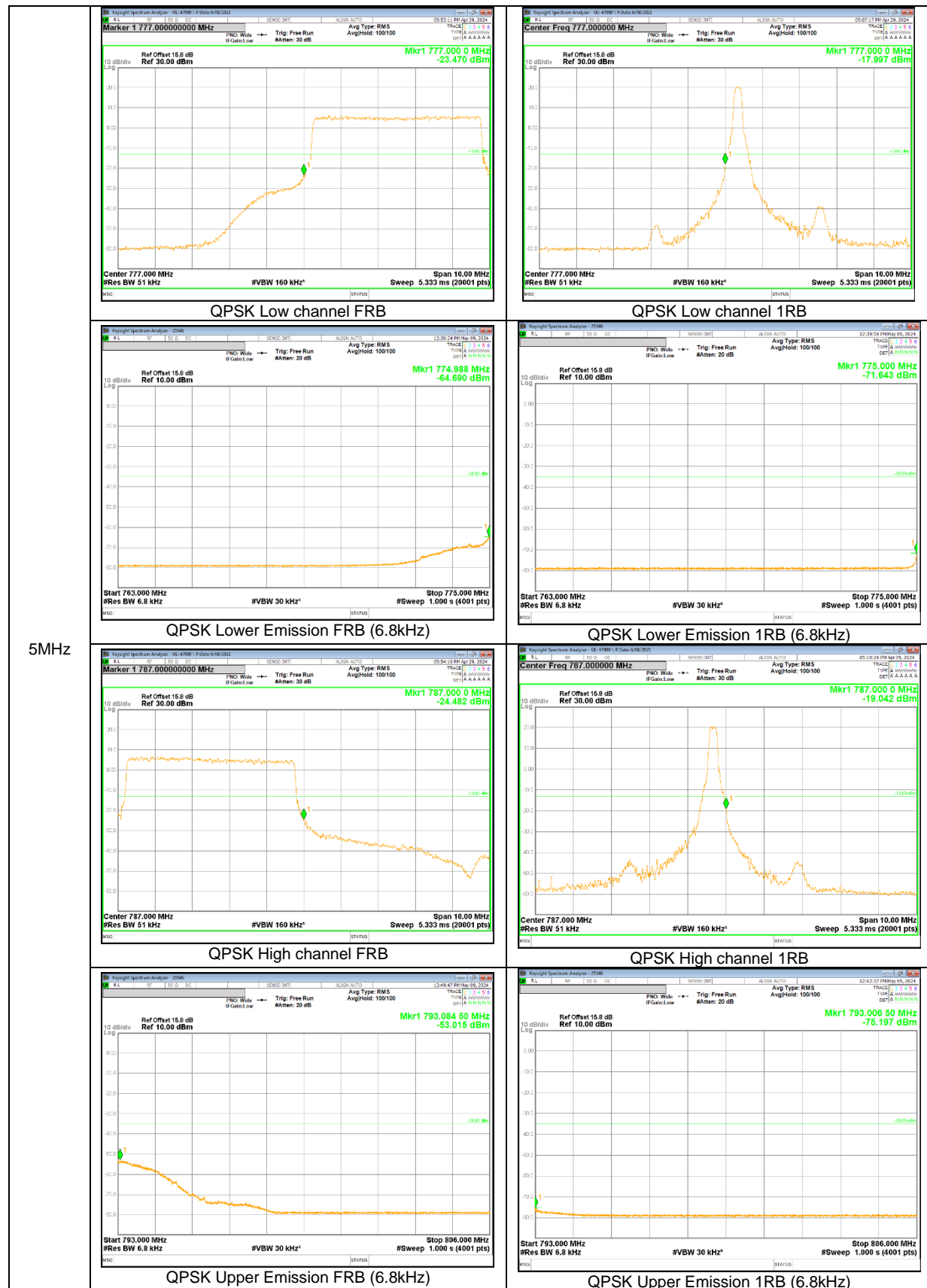


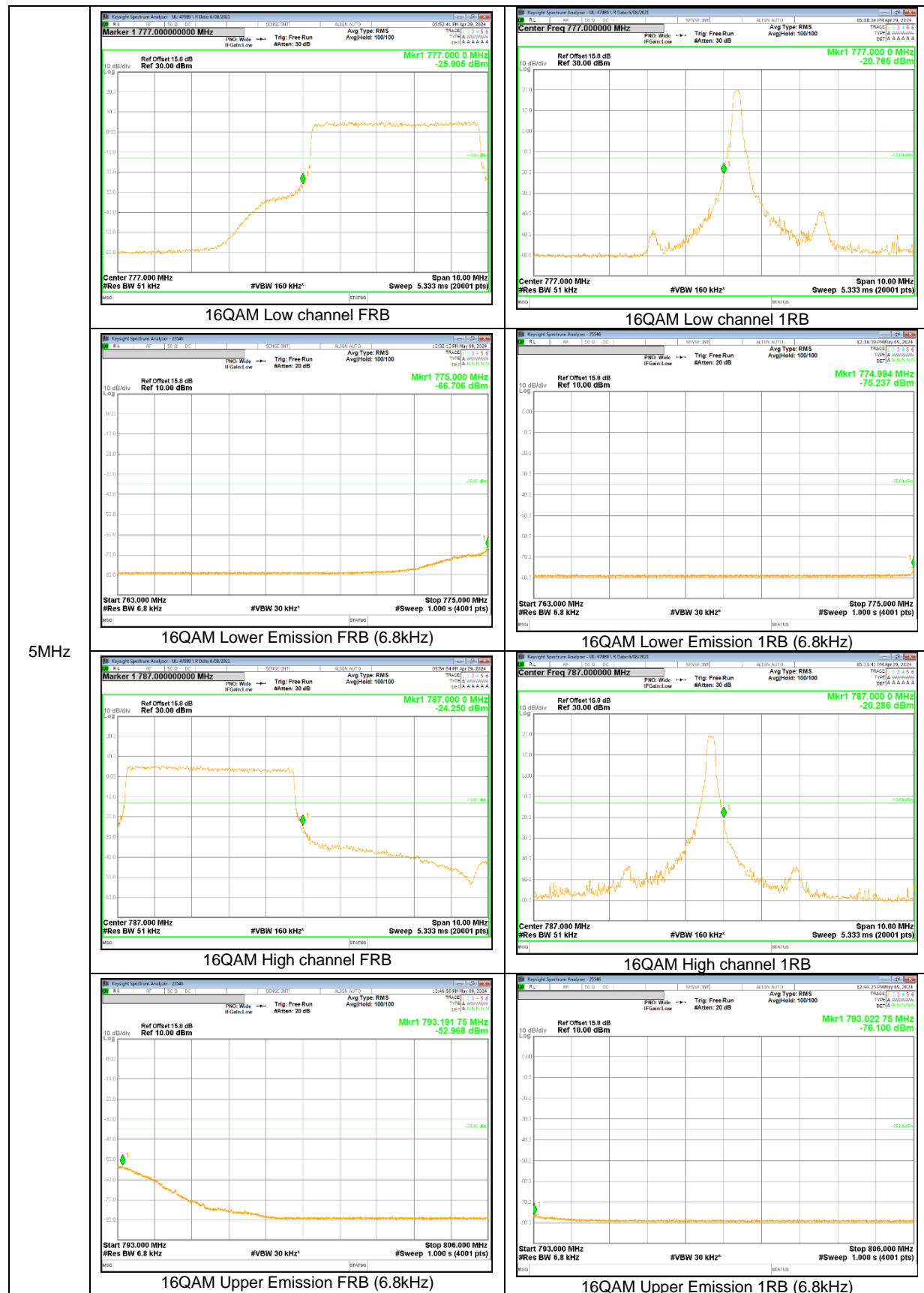
LTE Band 13



10MHz







LTE Band 66

