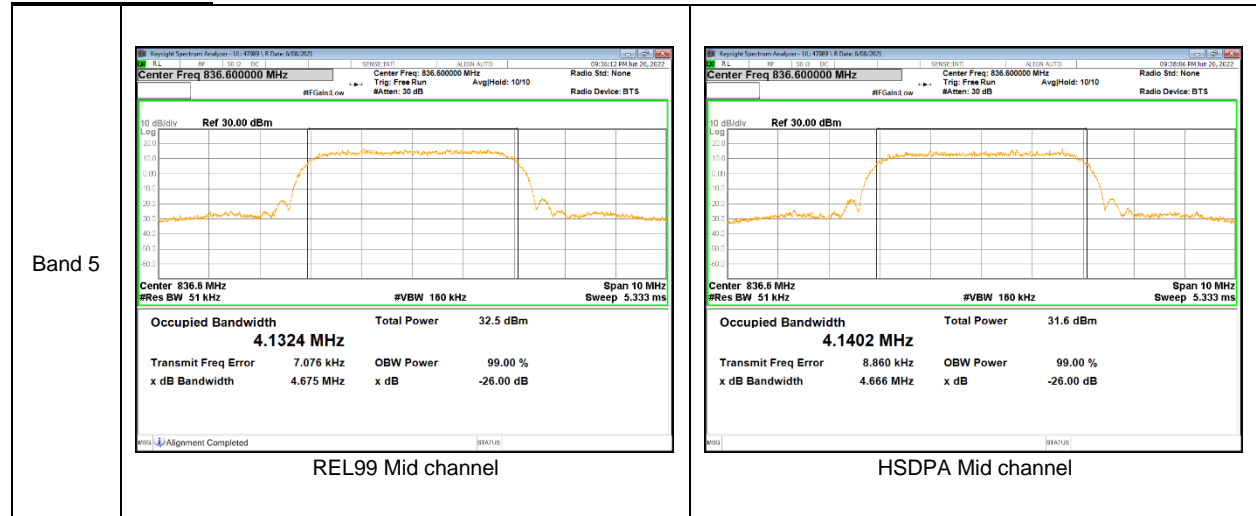
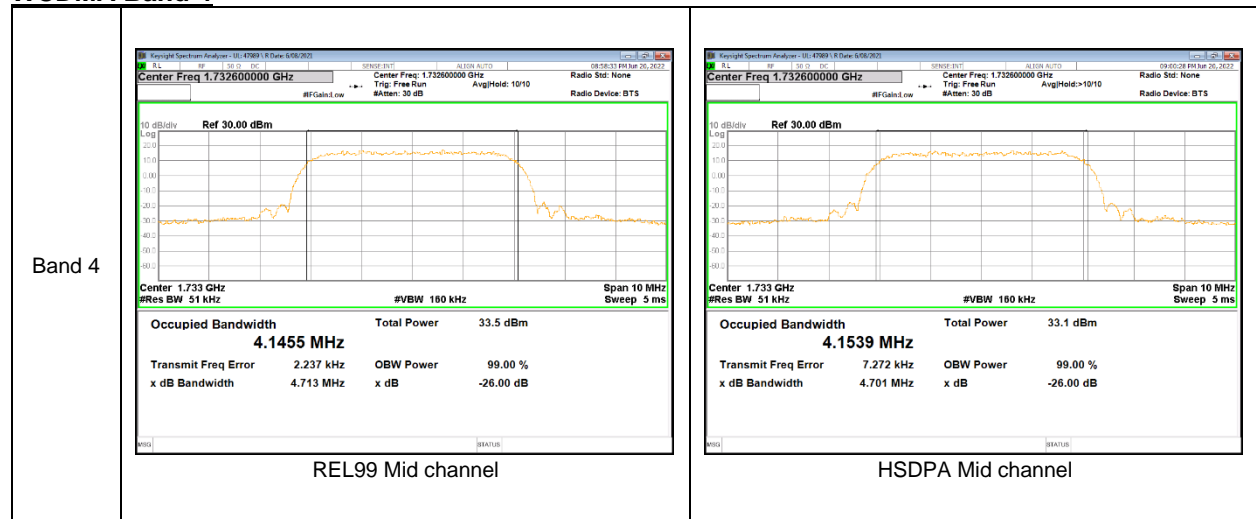


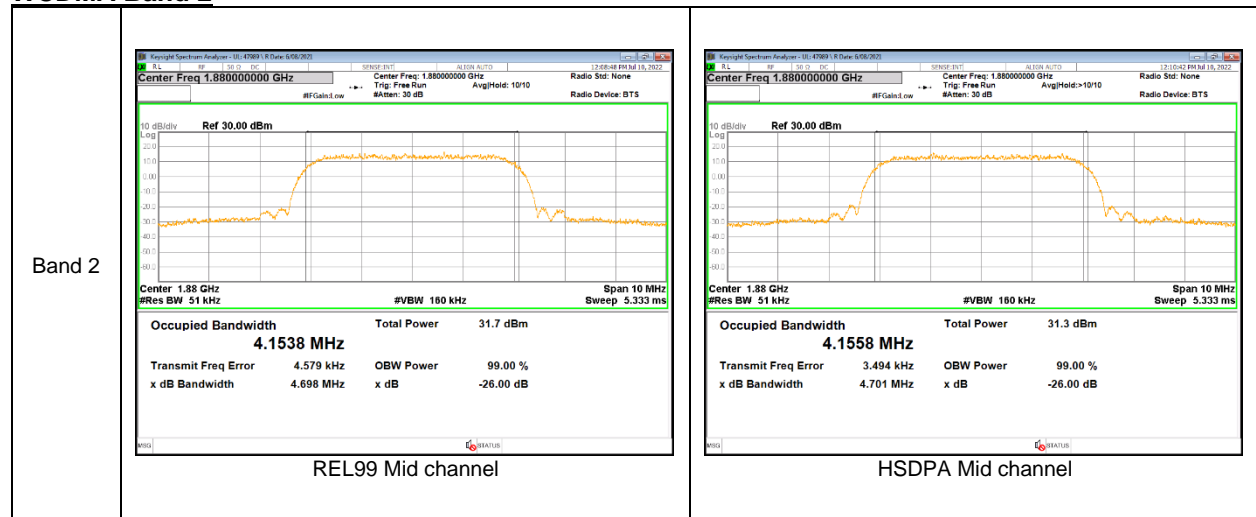
WCDMA Band 5



WCDMA Band 4



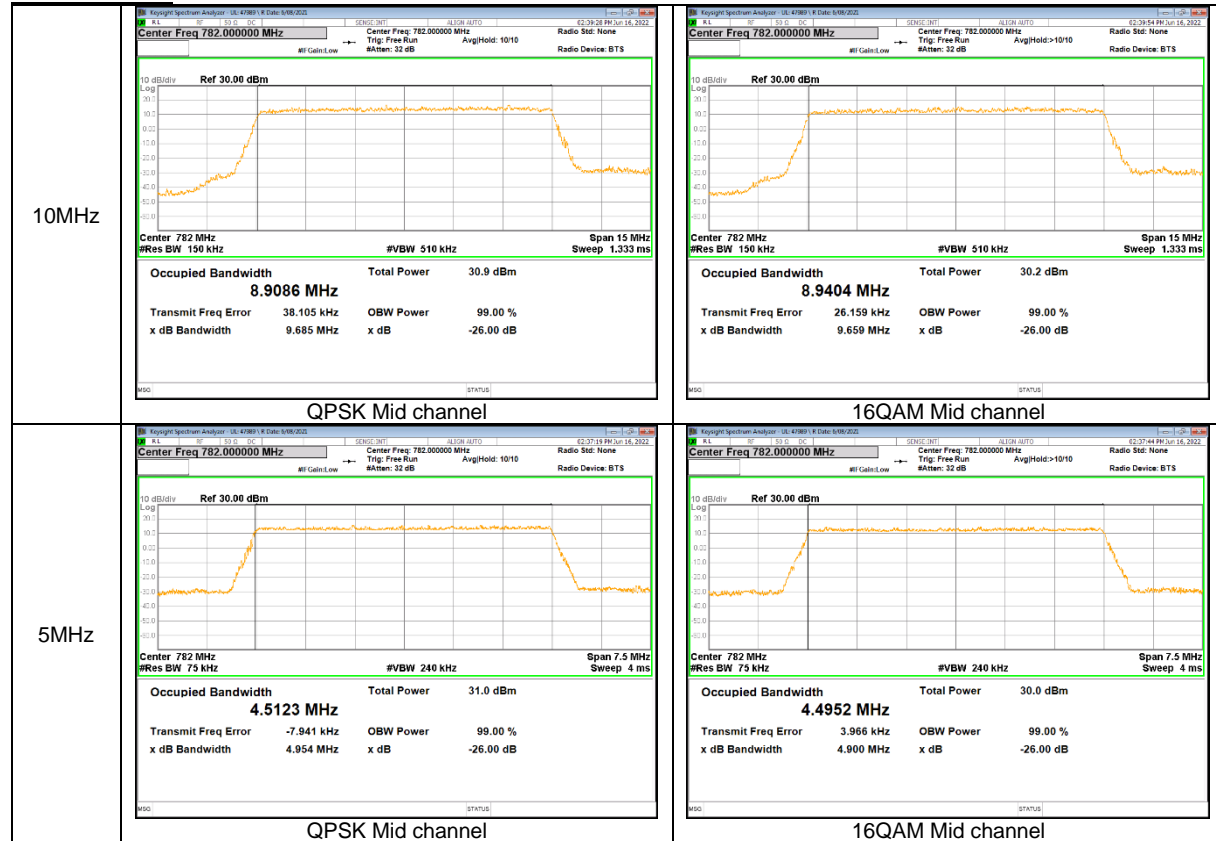
WCDMA Band 2



LTE Band 12

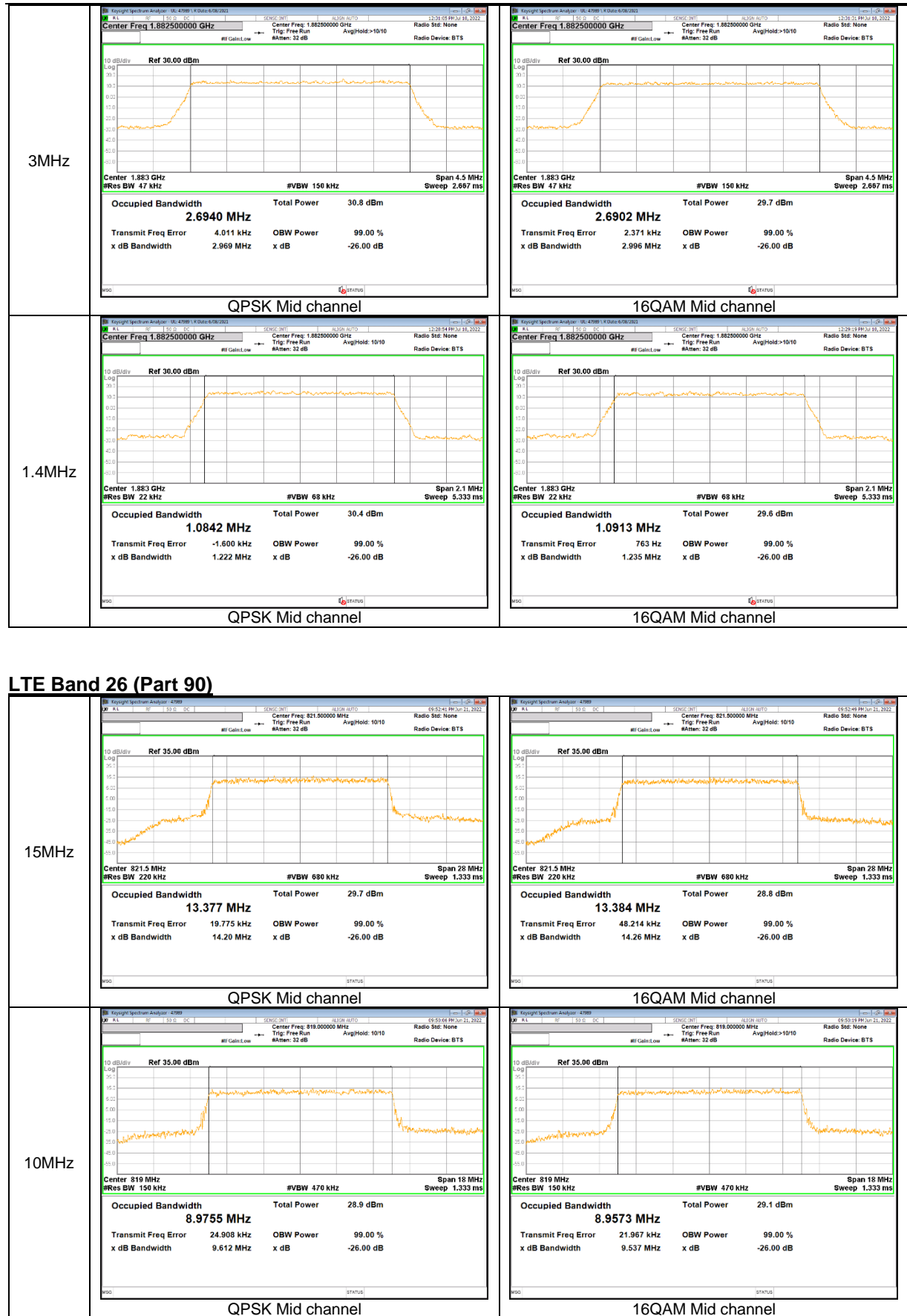


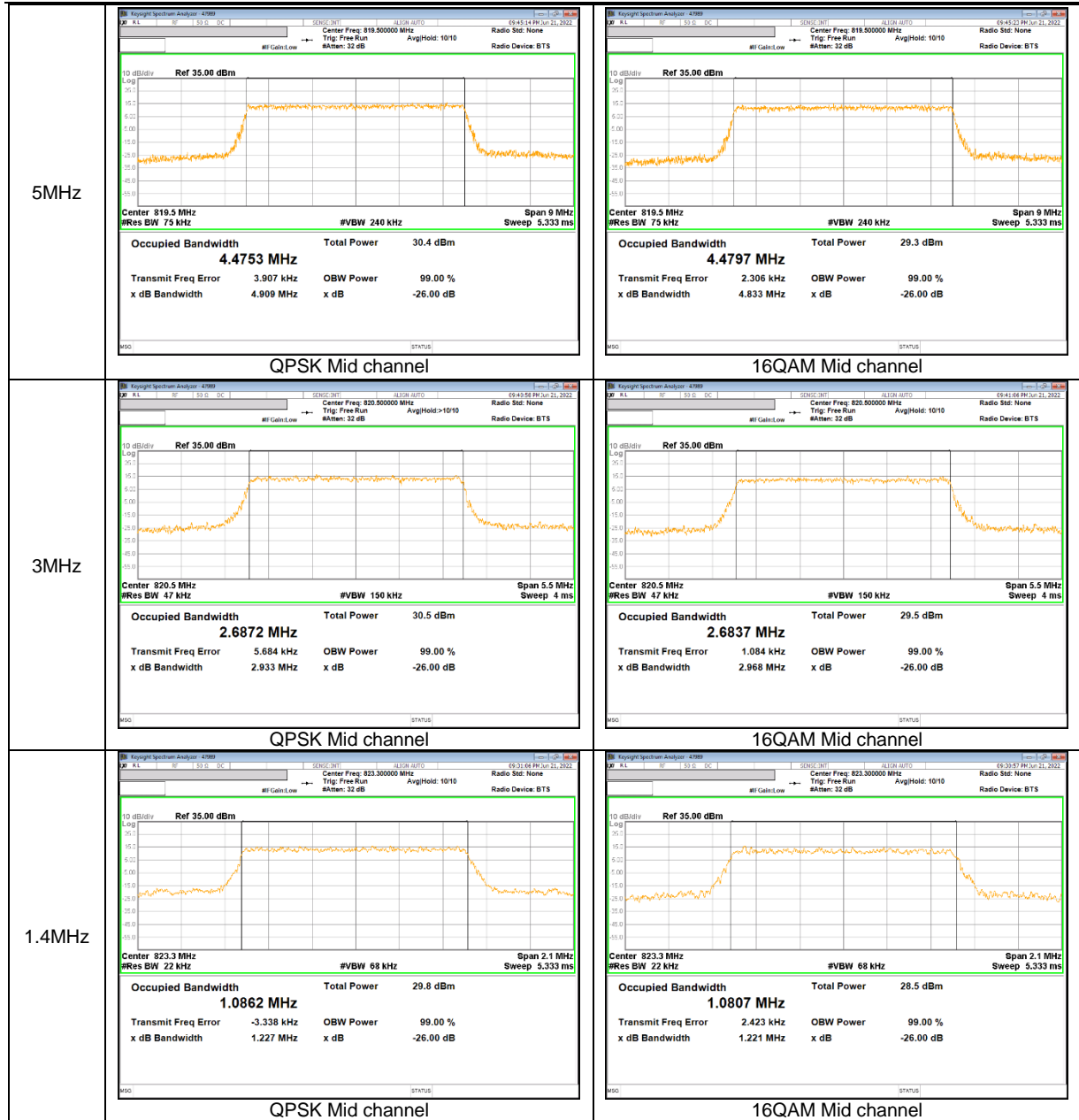
LTE Band 13



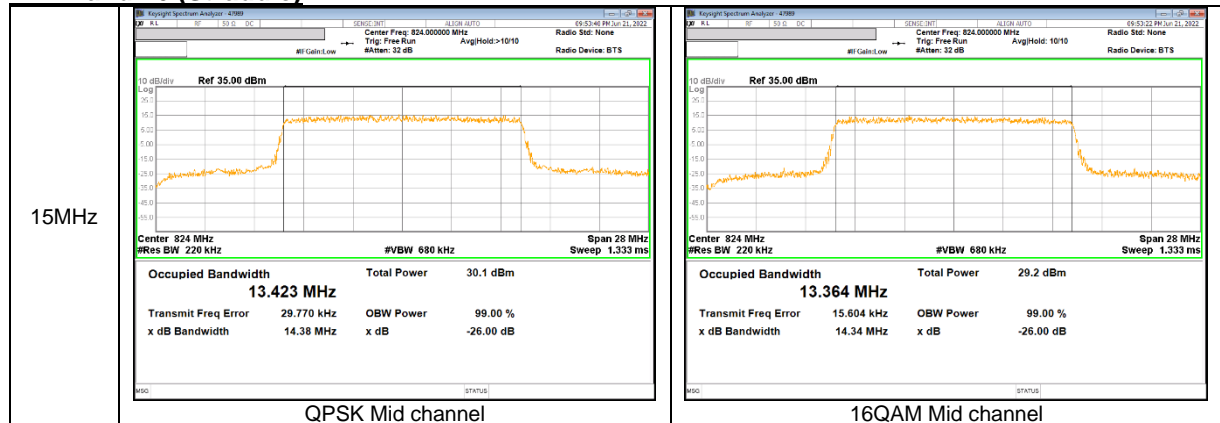
LTE Band 25





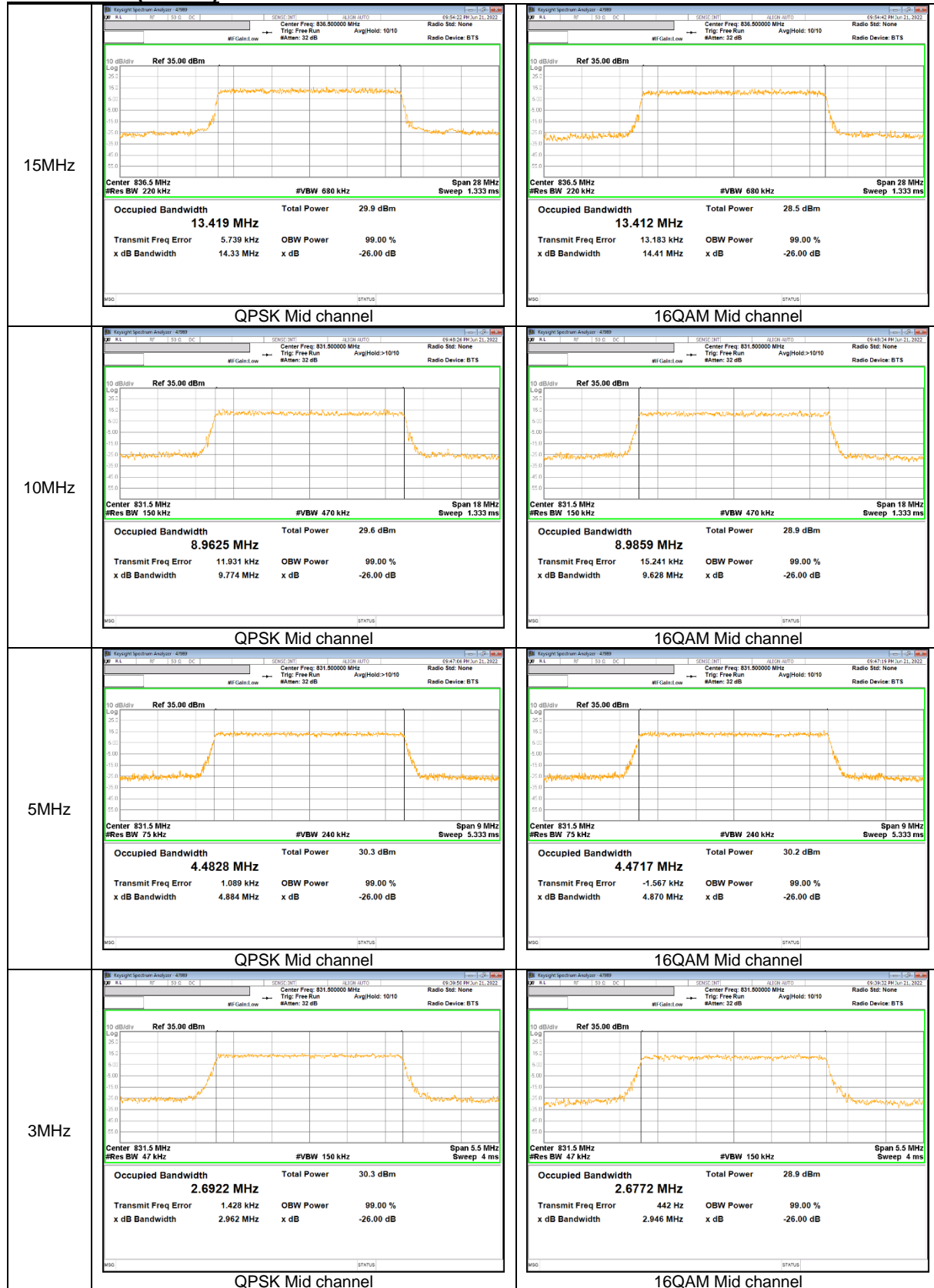


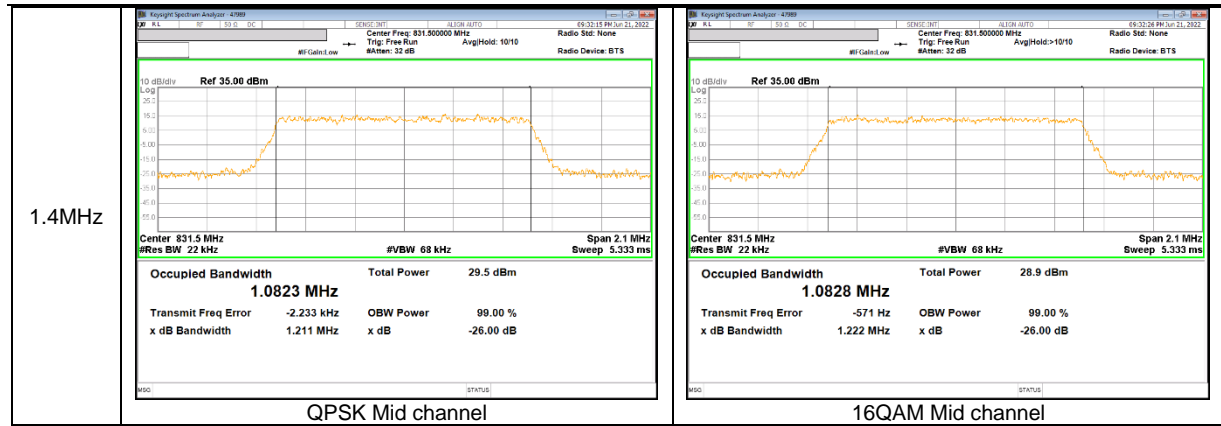
LTE Band 26 (Straddle)





LTE Band 26 (Part 22)





LTE Band 41



LTE Band 66





NR Band n5 CP-OFDM



NR Band n66 CP-OFDM

<p>20MHz</p>	<p>Center Freq 1.745000000 GHz Res BW 300 kHz VBW 3 MHz Span 40 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 18.941 MHz Total Power 27.5 dBm Transmit Freq Error 48.980 kHz OBW Power 99.00 % x dB Bandwidth 19.82 MHz x dB -26.00 dB</p> <p>QPSK Mid channel</p>	<p>Center Freq 1.745000000 GHz Res BW 300 kHz VBW 3 MHz Span 40 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 18.955 MHz Total Power 27.4 dBm Transmit Freq Error 53.514 kHz OBW Power 99.00 % x dB Bandwidth 19.86 MHz x dB -26.00 dB</p> <p>16QAM Mid channel</p>
<p>15MHz</p>	<p>Center Freq 1.745000000 GHz Res BW 220 kHz VBW 2.2 MHz Span 30 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 14.139 MHz Total Power 27.4 dBm Transmit Freq Error 26.867 kHz OBW Power 99.00 % x dB Bandwidth 14.79 MHz x dB -26.00 dB</p> <p>QPSK Mid channel</p>	<p>Center Freq 1.745000000 GHz Res BW 220 kHz VBW 2.2 MHz Span 30 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 14.131 MHz Total Power 27.5 dBm Transmit Freq Error 23.701 kHz OBW Power 99.00 % x dB Bandwidth 14.88 MHz x dB -26.00 dB</p> <p>16QAM Mid channel</p>
<p>10MHz</p>	<p>Center Freq 1.745000000 GHz Res BW 150 kHz VBW 1.5 MHz Span 20 MHz Sweep 1.087 ms</p> <p>Occupied Bandwidth 9.2774 MHz Total Power 27.7 dBm Transmit Freq Error 16.701 kHz OBW Power 99.00 % x dB Bandwidth 9.883 MHz x dB -26.00 dB</p> <p>QPSK Mid channel</p>	<p>Center Freq 1.745000000 GHz Res BW 150 kHz VBW 1.5 MHz Span 20 MHz Sweep 1.087 ms</p> <p>Occupied Bandwidth 9.3195 MHz Total Power 27.8 dBm Transmit Freq Error 19.206 kHz OBW Power 99.00 % x dB Bandwidth 9.903 MHz x dB -26.00 dB</p> <p>16QAM Mid channel</p>
<p>5MHz</p>	<p>Center Freq 1.745000000 GHz Res BW 75 kHz VBW 750 kHz Span 10 MHz Sweep 5 ms</p> <p>Occupied Bandwidth 4.4785 MHz Total Power 26.8 dBm Transmit Freq Error -5.225 kHz OBW Power 99.00 % x dB Bandwidth 4.857 MHz x dB -26.00 dB</p> <p>QPSK Mid channel</p>	<p>Center Freq 1.745000000 GHz Res BW 75 kHz VBW 750 kHz Span 10 MHz Sweep 5 ms</p> <p>Occupied Bandwidth 4.4762 MHz Total Power 27.0 dBm Transmit Freq Error -3.946 kHz OBW Power 99.00 % x dB Bandwidth 4.900 MHz x dB -26.00 dB</p> <p>16QAM Mid channel</p>

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:

(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 both CMW500 Test Set and E7515B Test Set 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 = Auto;
- e) Detector = RMS;
- f) Ensure that the number of measurement points $\geq 2 \times$ Span/RBW;
- g) Trace mode = Average (100);

NOTE1

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 addtional 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.

NOTE2

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

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

NOTE3

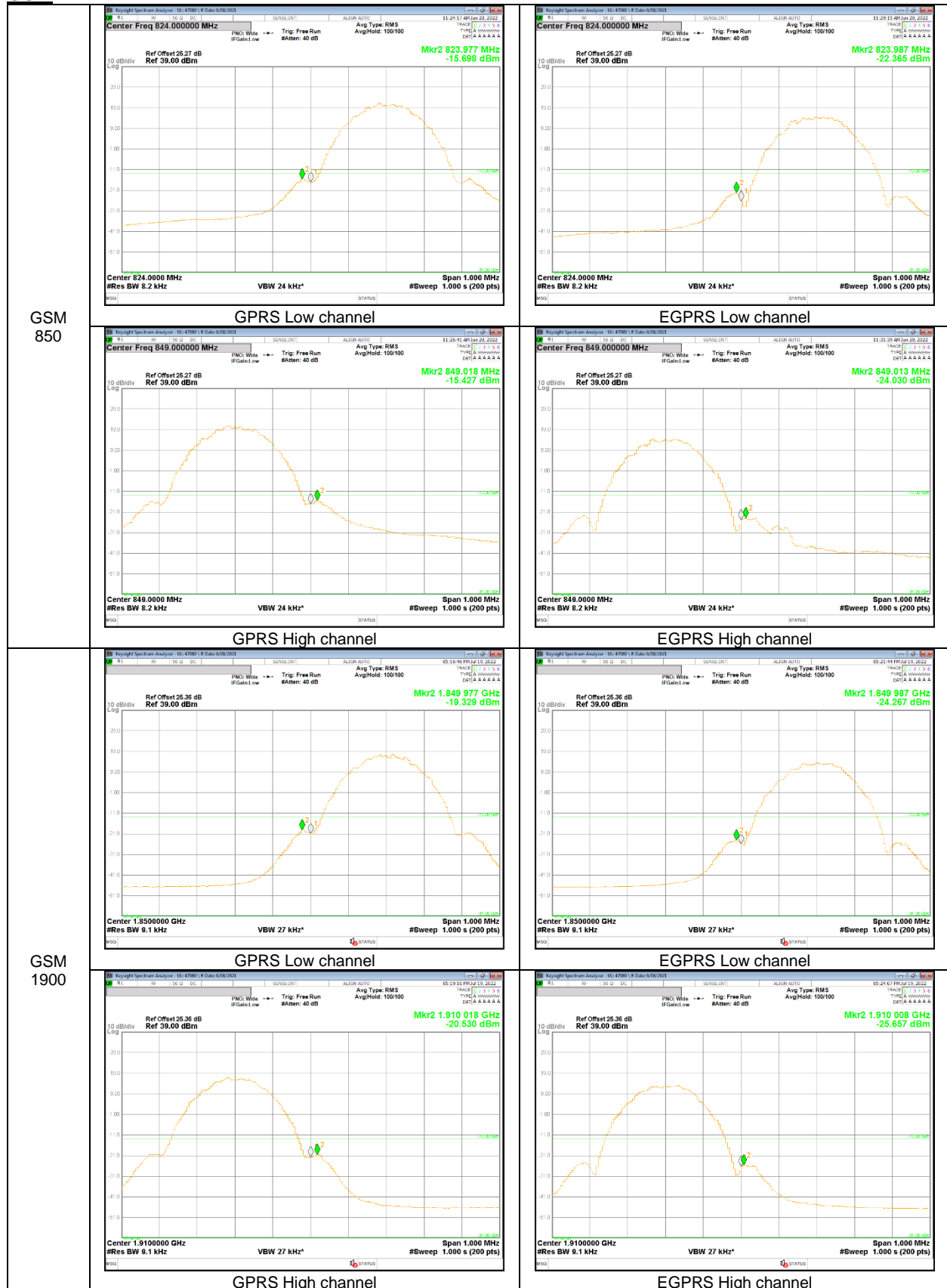
5G NR: All Waveforms (CP-OFDM vs DFT-s OFDM) and modulations ($\pi/2$ BPSK, QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

RESULTS

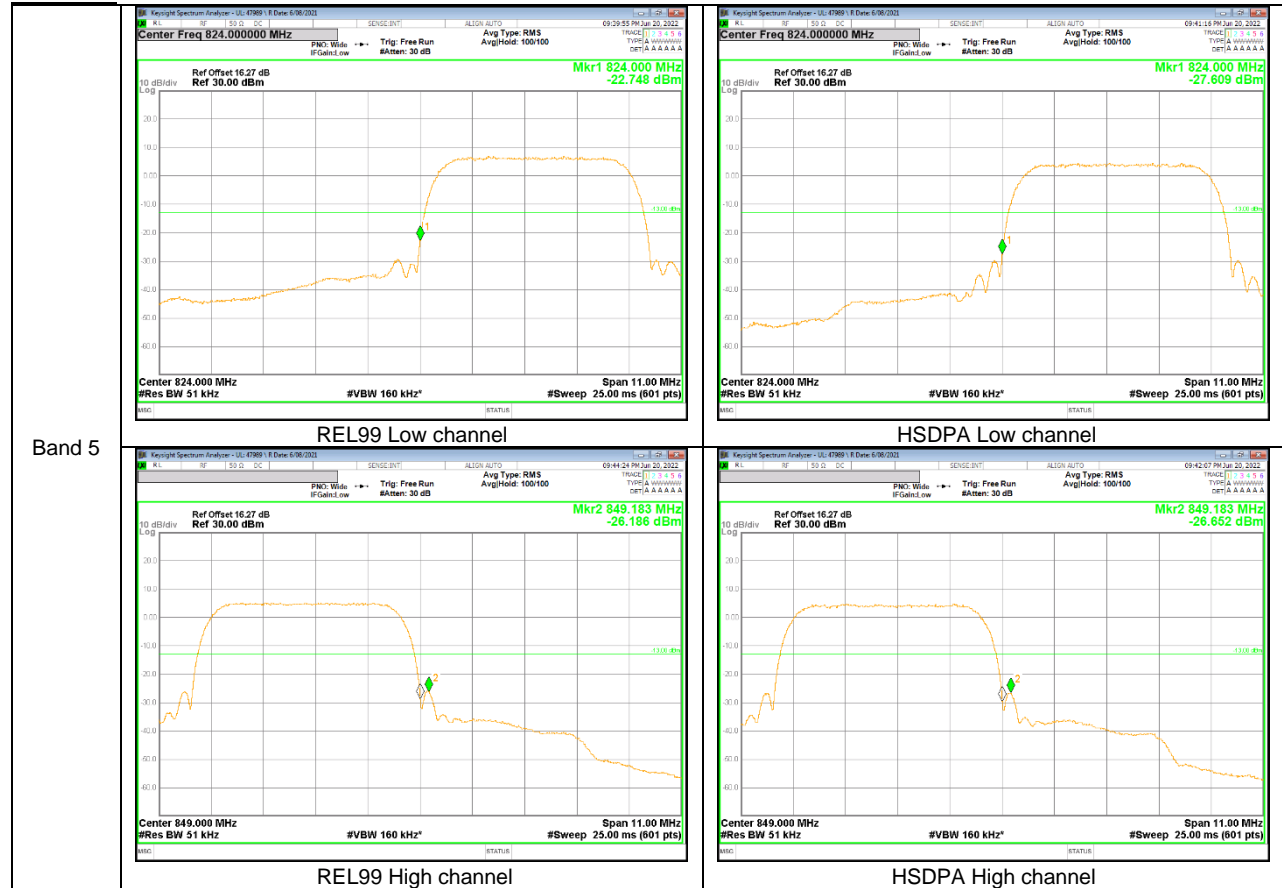
See the following pages.

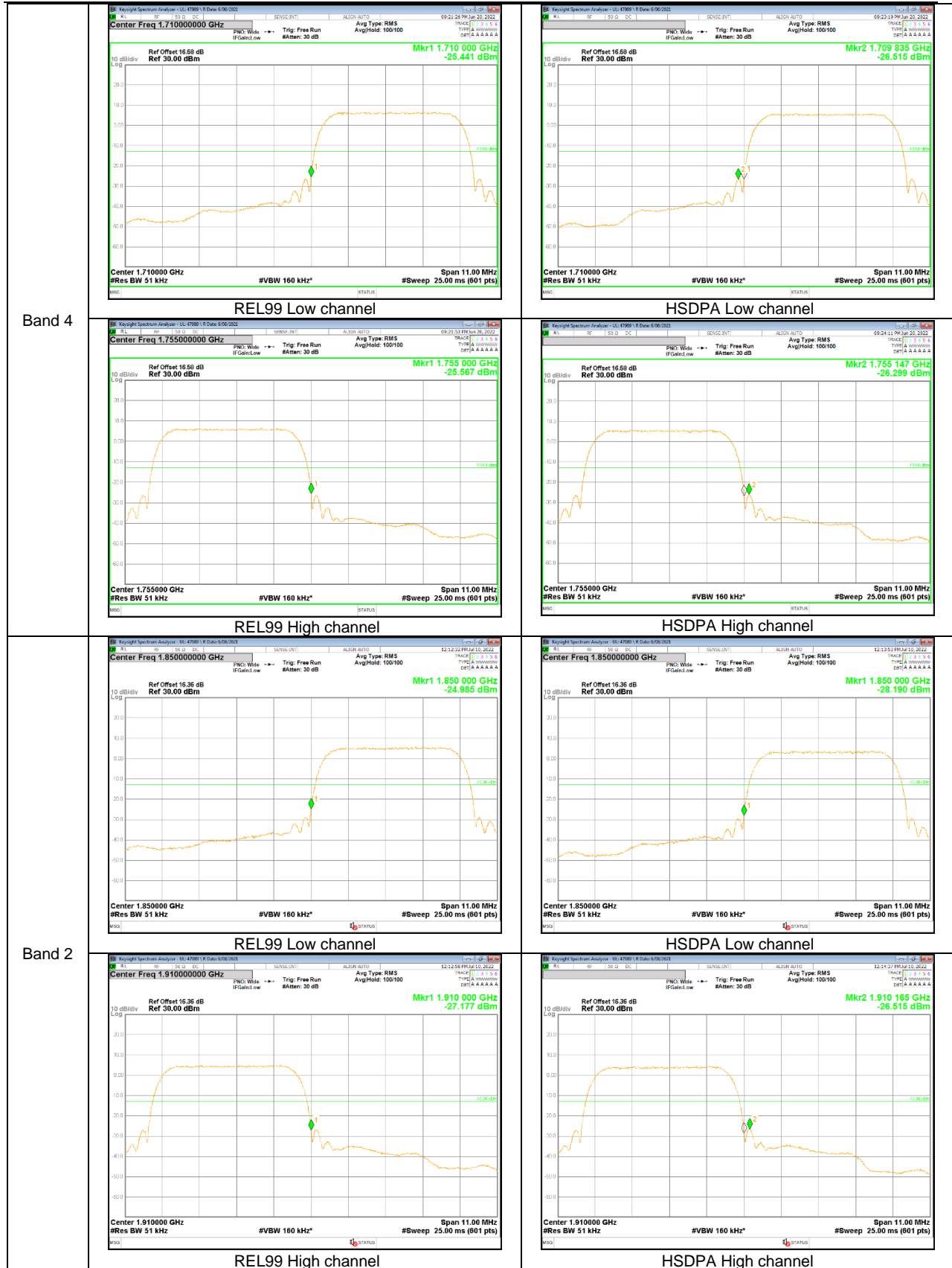
9.2.1. BAND EDGE RESULT

GSM



WCDMA





Band 4

Band 2