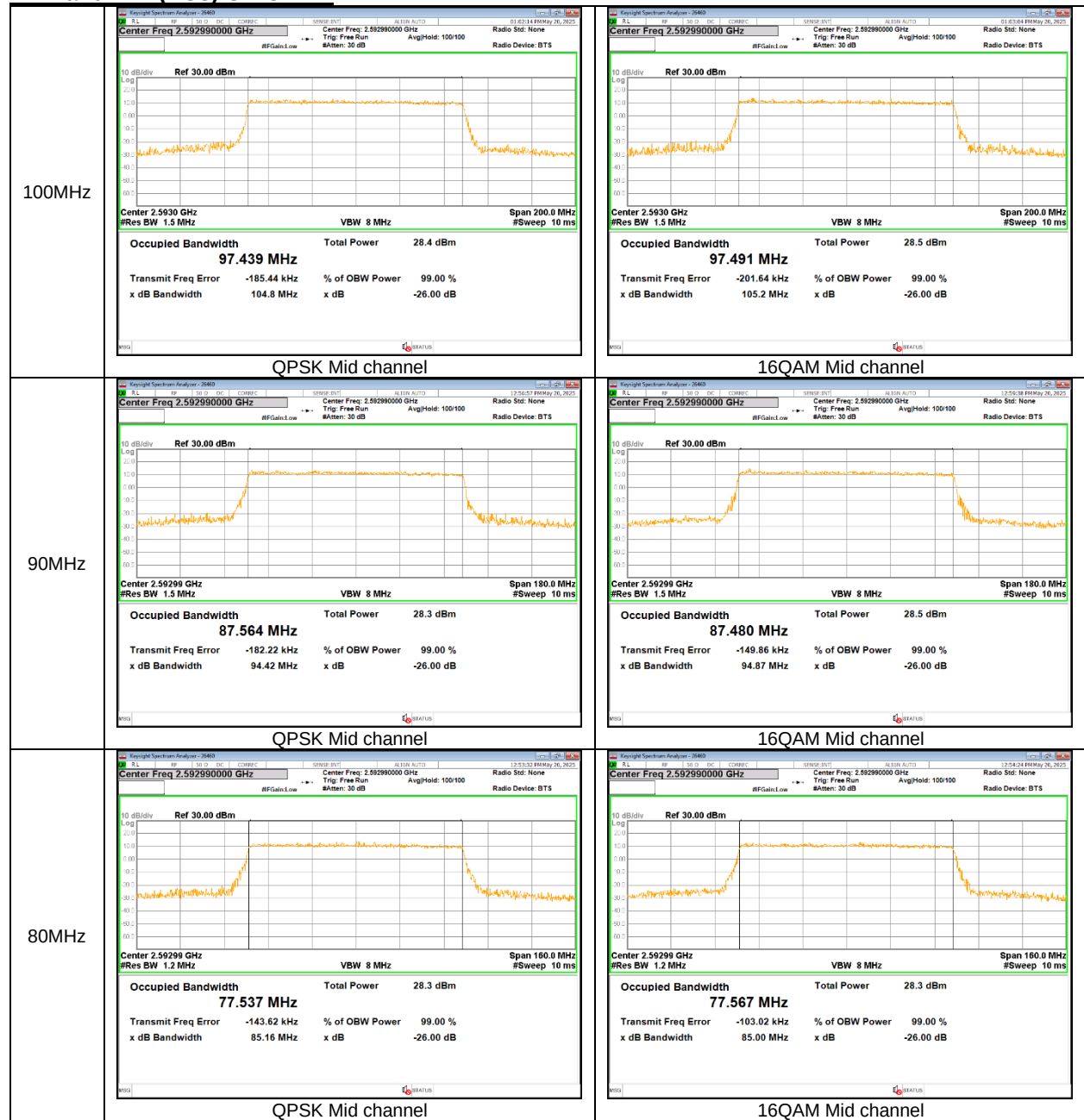
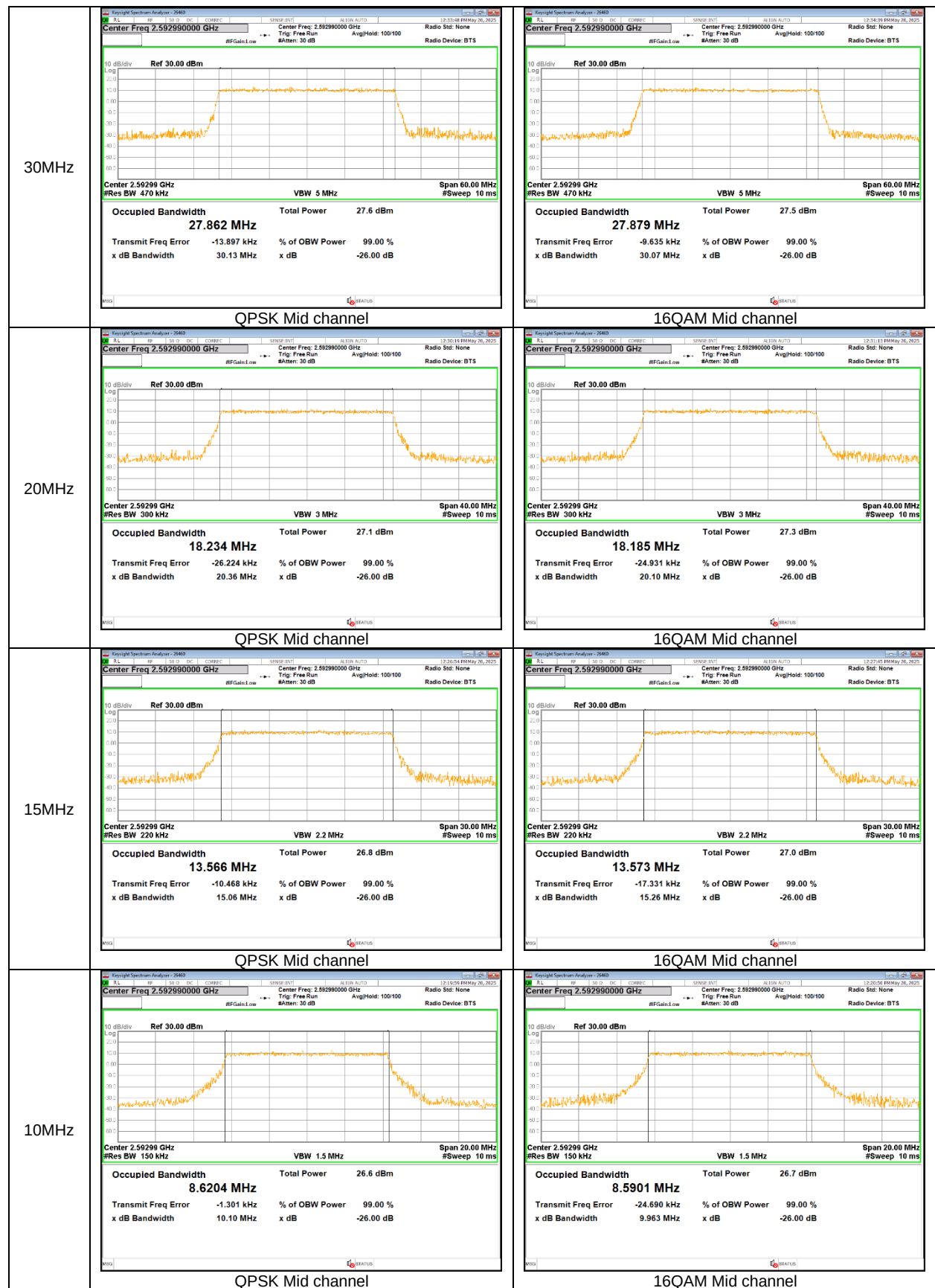




NR Band n41 (PC3) CP-OFDM







NR Band n66 CP-OFDM





## 8.4. BAND EDGE EMISSIONS

### RULE PART(S)

FCC: §27.53

### LIMITS

§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 793-805 MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations;

(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.

## **WCDMA/LTE/5G NR**

- a) Set the RBW = 1 - 1.5 % of OBW(Typically limited to a minimum RBW of 1% of the OBW) within 100 kHz from the edge of the authorized frequency block/band.  
Set the RBW = 100 kHz (Below 1GHz Bands: 100 kHz from the edge of the authorized frequency block/band)  
Set the RBW = 1 - 1.5 % of OBW(Typically limited to a minimum RBW of 1% of the OBW) within 1 MHz from the edge of the authorized frequency block/band.  
Set the RBW = 1 MHz (Above 1GHz Bands: 1 MHz from the edge of the authorized frequency block/band)
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Set span  $\geq 1.5$  times the OBW;
- d) Sweep time = auto couple or Set  $\geq [10 \times (\text{number of points in sweep}) \times (\text{transmission period})]$  for single sweep (automation-compatible) measurement. Transmission period is the on and off time of the transmitter.
- e) Detector = RMS;
- f) Ensure that the number of measurement points  $\geq 2 \times \text{span/RBW}$ ;
- g) Trace Mode = Average;

### NOTE1

For frequency range of 763-775 MHz and 793-805 MHz. (LTE Band 13)

- Set the RBW = 6.25 kHz (The minimum RBW setting value for the Spectrum analyzer is 6.8 kHz)
- Set VBW  $\geq 3 \times$  RBW;
- Sweep time = 1 second ;
- Detector = RMS;
- Ensure that the number of measurement points  $\geq 2 \times$  span/RBW;
- Trace Mode = Average;

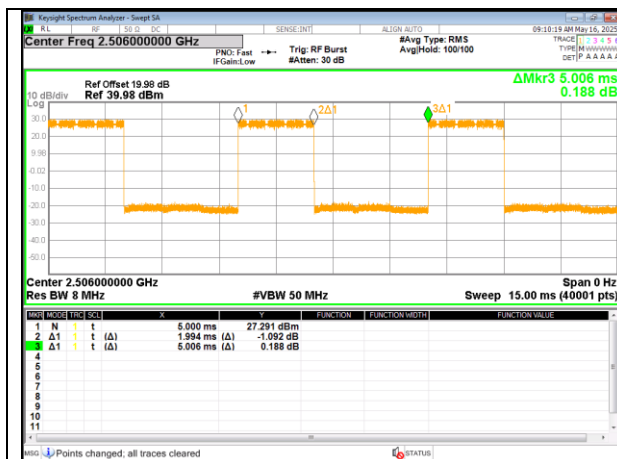
### NOTE2

Note that the spurious emissions outside of the channel include narrowband signals. These signals are all below the -13dBm / -25dBm / -40dBm 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.

### 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.

### NOTE4



For LTE Band 41

DCF: 4 dB=10log(2/5)

Measure offset (Gate trigger off):  
The reference offset for RF path loss, 15.98 dB. Additionally, there is DCF of 4dB. The EMISSION MASK RESULT in section 8.4.2 apply **19.98 dB** to the reference offset.

### NOTE5

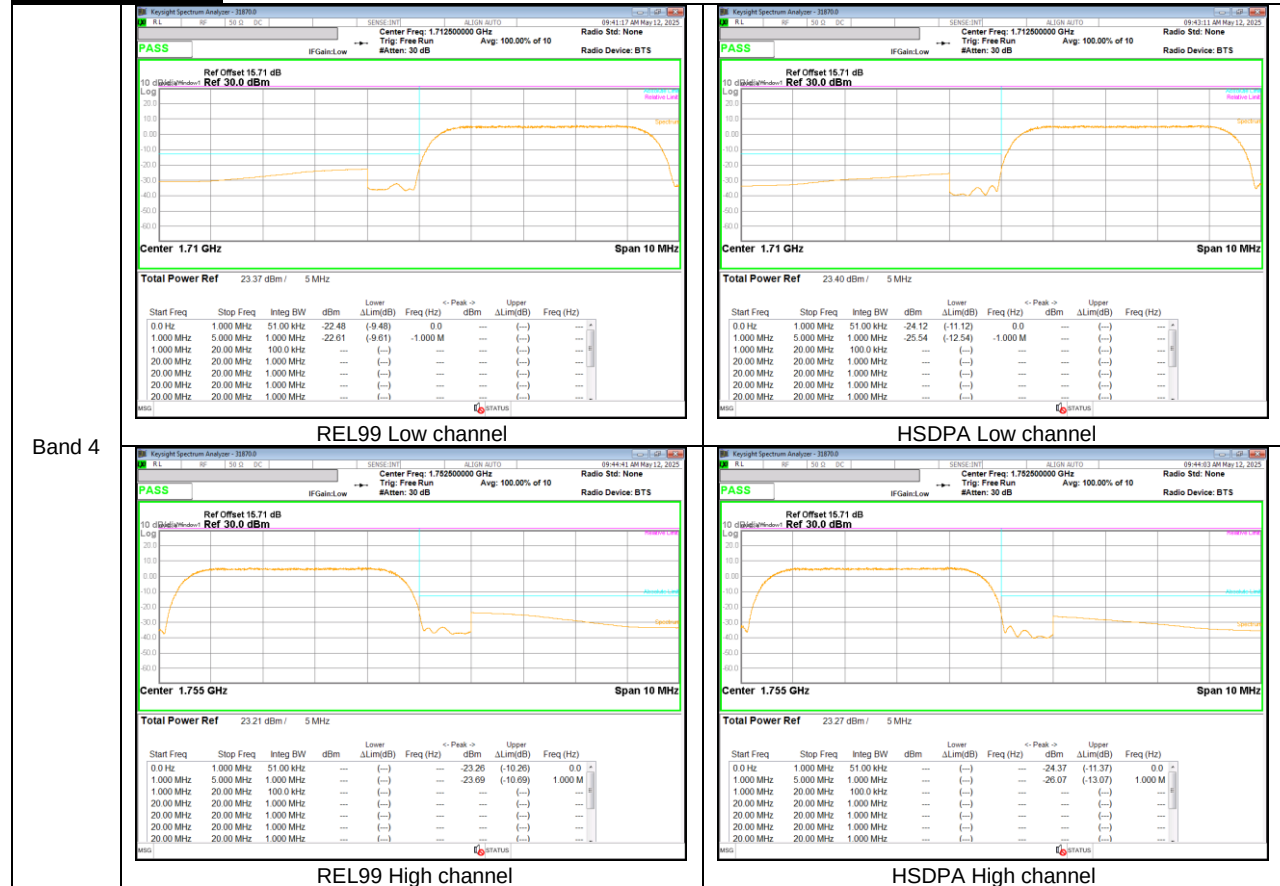
Emission Mask: All 1RB Positions (Edge RB, Outer RB, Inner RB) and modulations (QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

### RESULTS

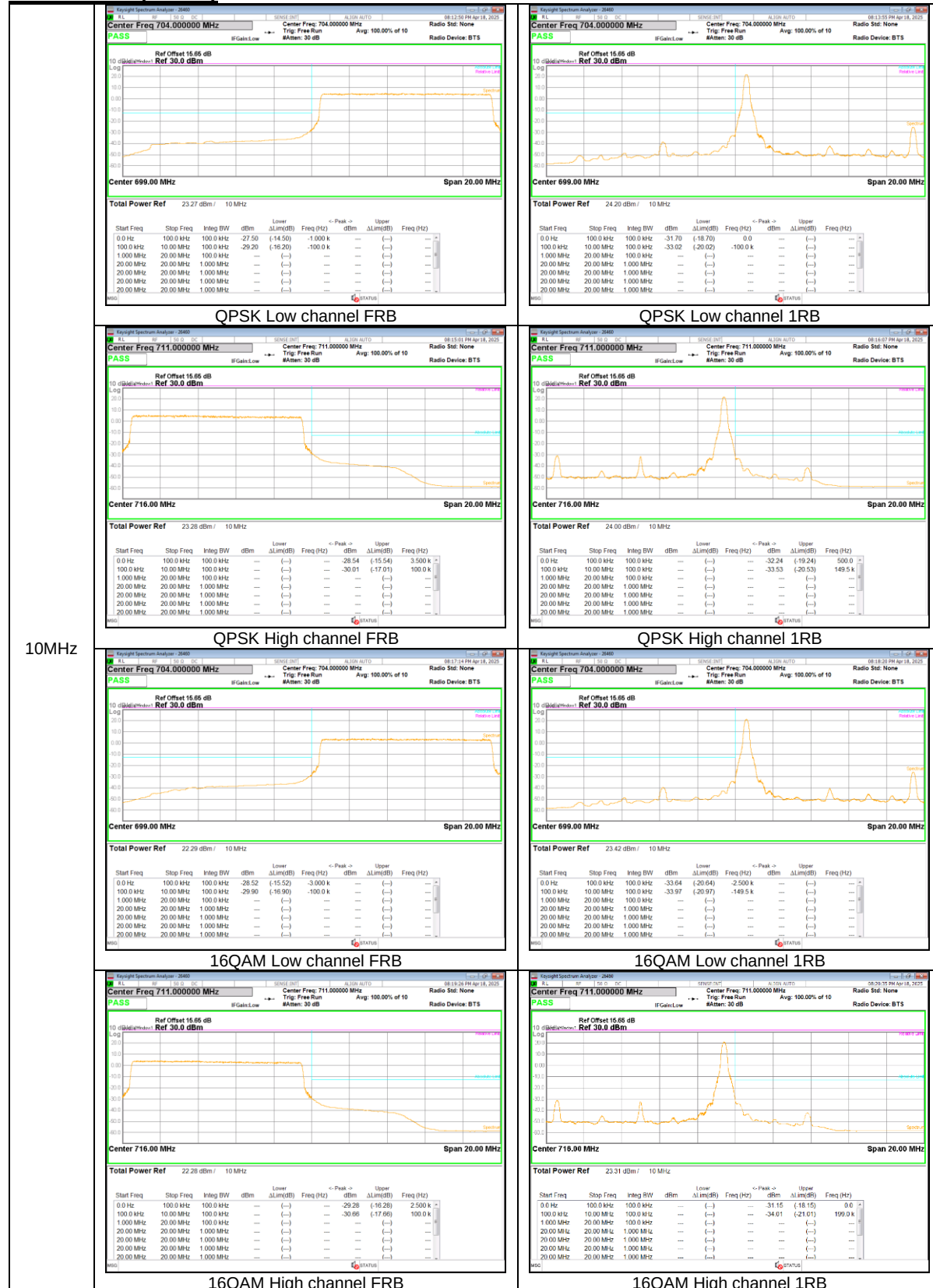
See the following pages.

## 8.4.1. BAND EDGE RESULT

### WCDMA (ANT A)



LTE Band 12 (ANT A)









LTE Band 13 (ANT A)

