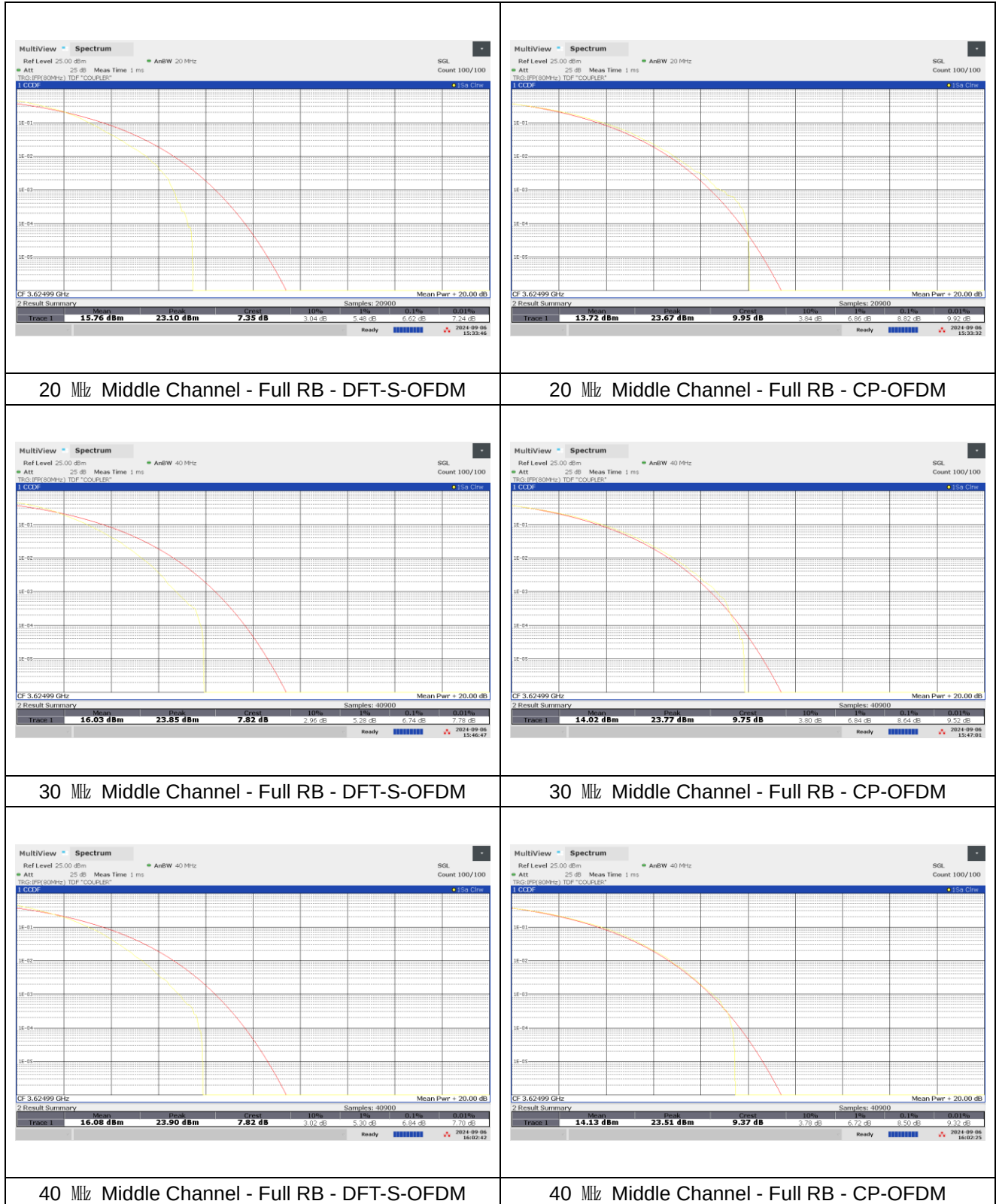


NR band 48



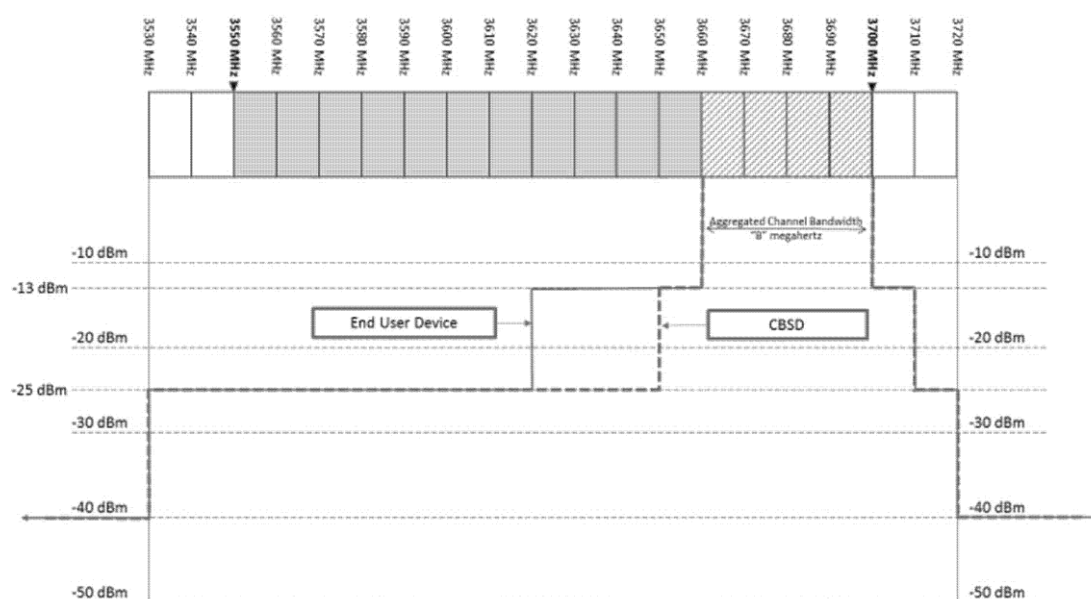
6. Spurious Emissions at Antenna Terminal

6.1. Limit

- §96.41(e), 3.5GHz Emissions and Interference Limits

(1) General protection levels.

Figure 1 to paragraph (e) – Protection levels



(i) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed -13 dB m/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed -25 dB m/MHz. The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.

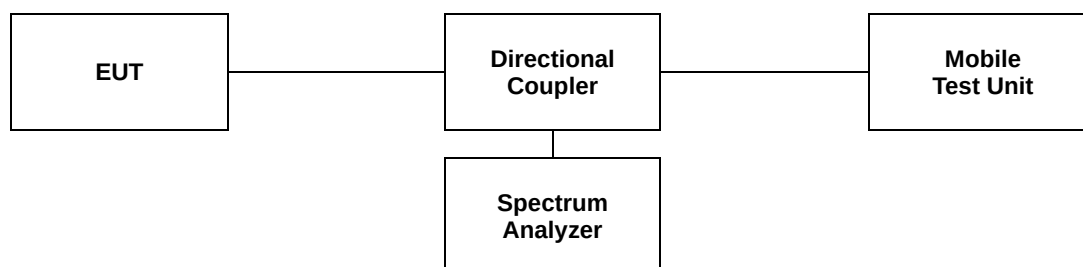
(ii) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dB m/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed -25 dB m/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

(2) **Additional protection levels.** Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3 540 MHz or above 3 710 MHz shall not exceed -25 dB m/MHz, and the conducted power of emissions below 3 530 MHz or above 3 720 MHz shall not exceed -40 dB m/MHz.

6.2. Test Procedure

The test follows section 5.7 of ANSI C63.26-2015.

1. Start frequency was set to 9 kHz and stop frequency was set to at least 10* the fundamental frequency.
2. Detector = RMS.
3. Trace mode = Max hold.
4. Sweep time = Auto couple.
5. The trace was allowed to stabilize.
6. Please see notes below for RBW and VBW settings.
7. For plots showing conducted spurious emissions from 9 kHz to 40 GHz, all path loss of wide frequency range was investigated and compensated to spectrum analyzer as TDF function.



Note;

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and frequencies greater than 1 GHz. 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. The emission bandwidth is defined as the width of the signal between two point, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

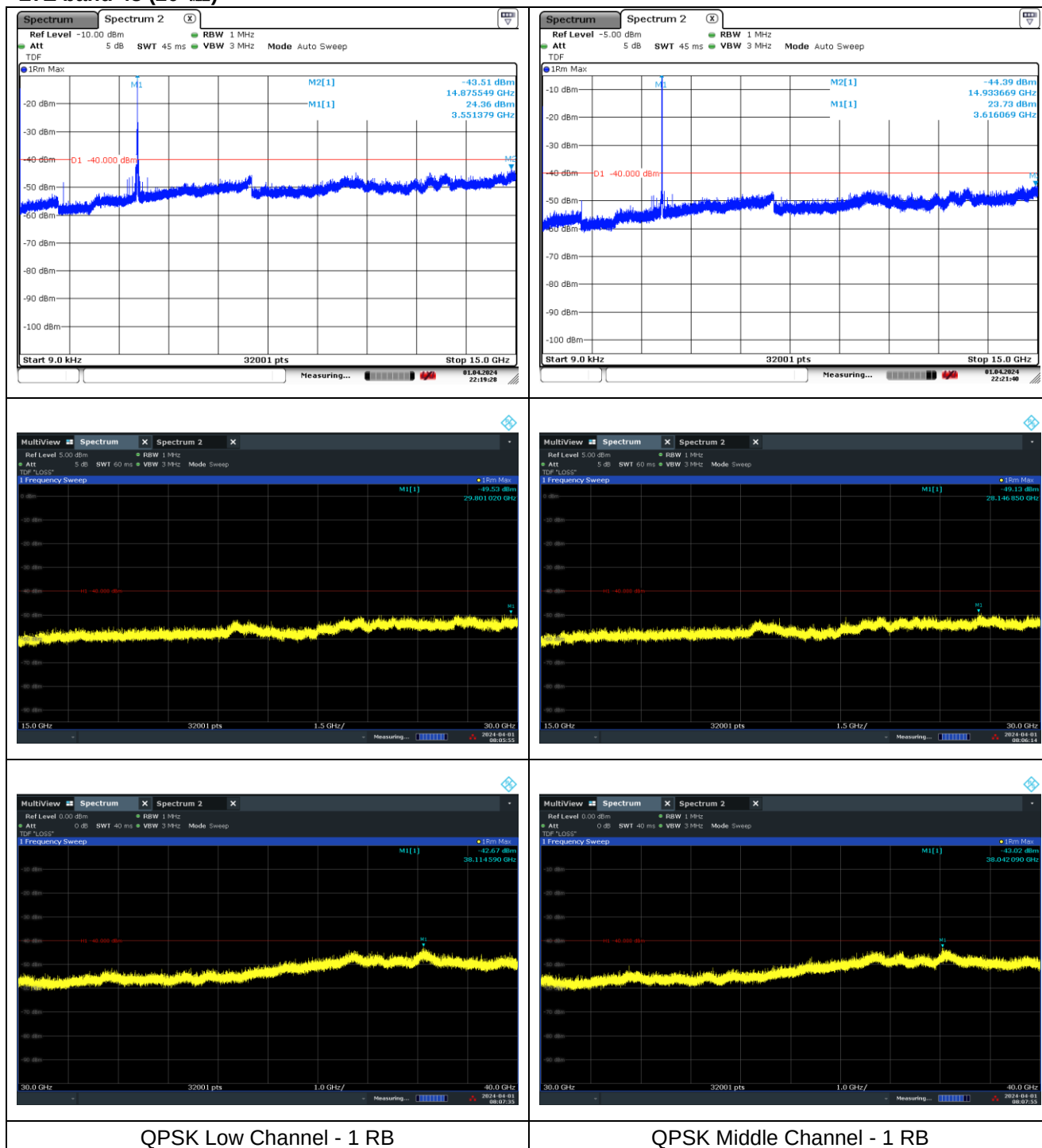
6.3. Test Results

Ambient temperature : $(23 \pm 1) ^\circ\text{C}$
Relative humidity : 47 % R.H.

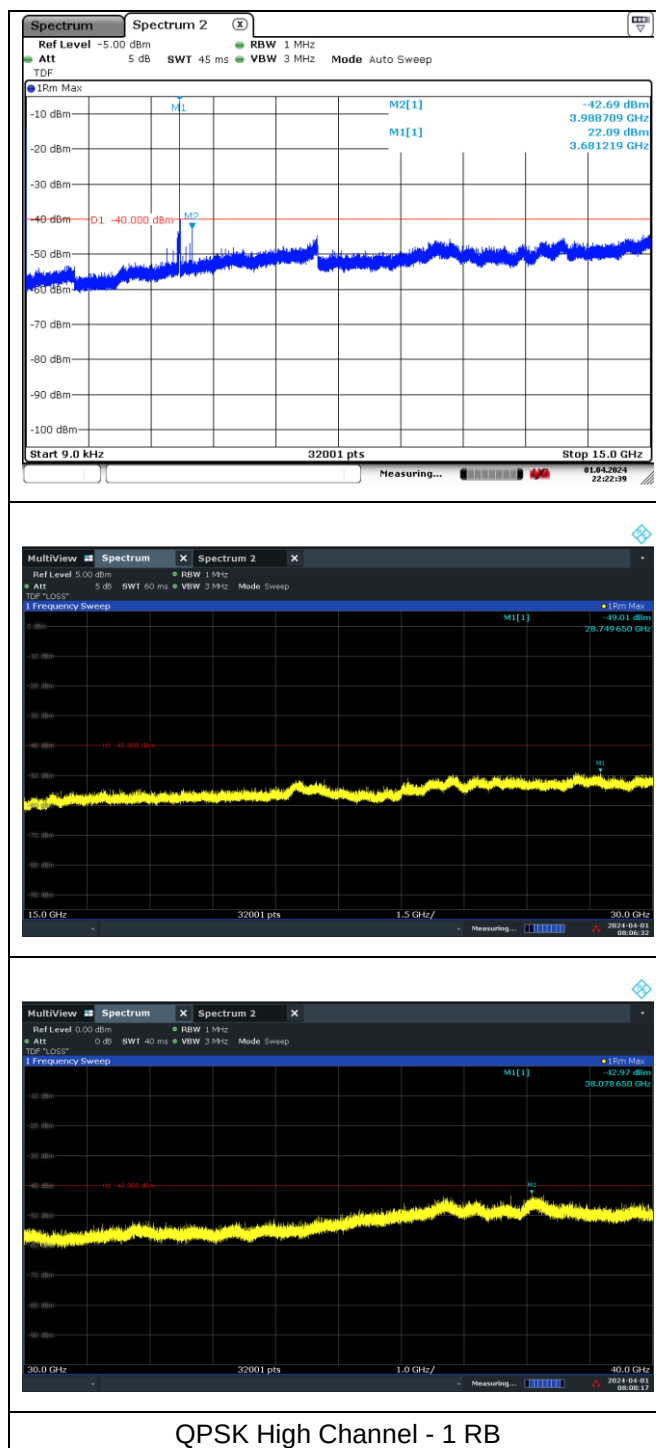
- Test plots

Ant. 2

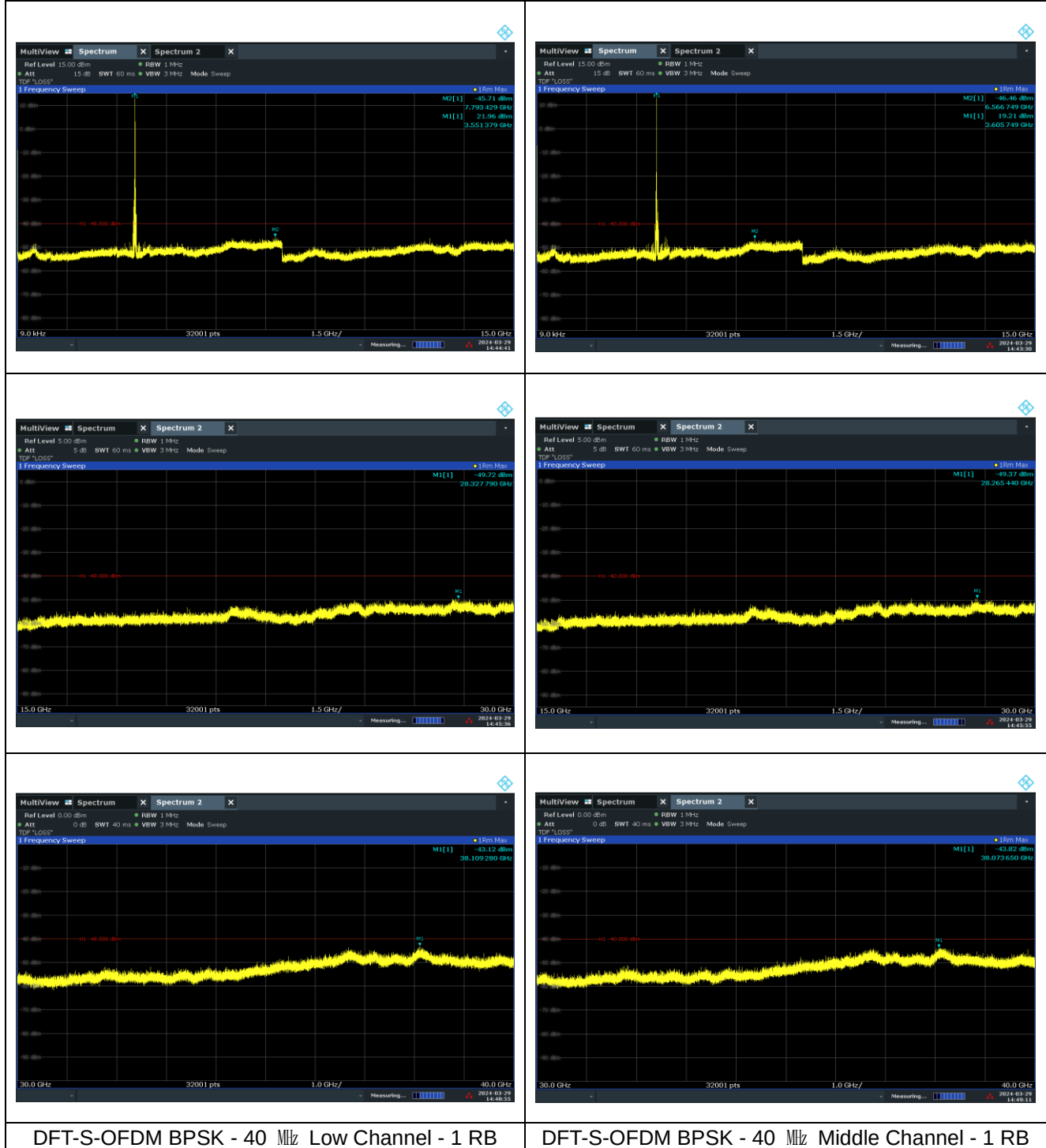
LTE band 48 (20 MHz)



LTE band 48 (20 MHz)



NR band 48

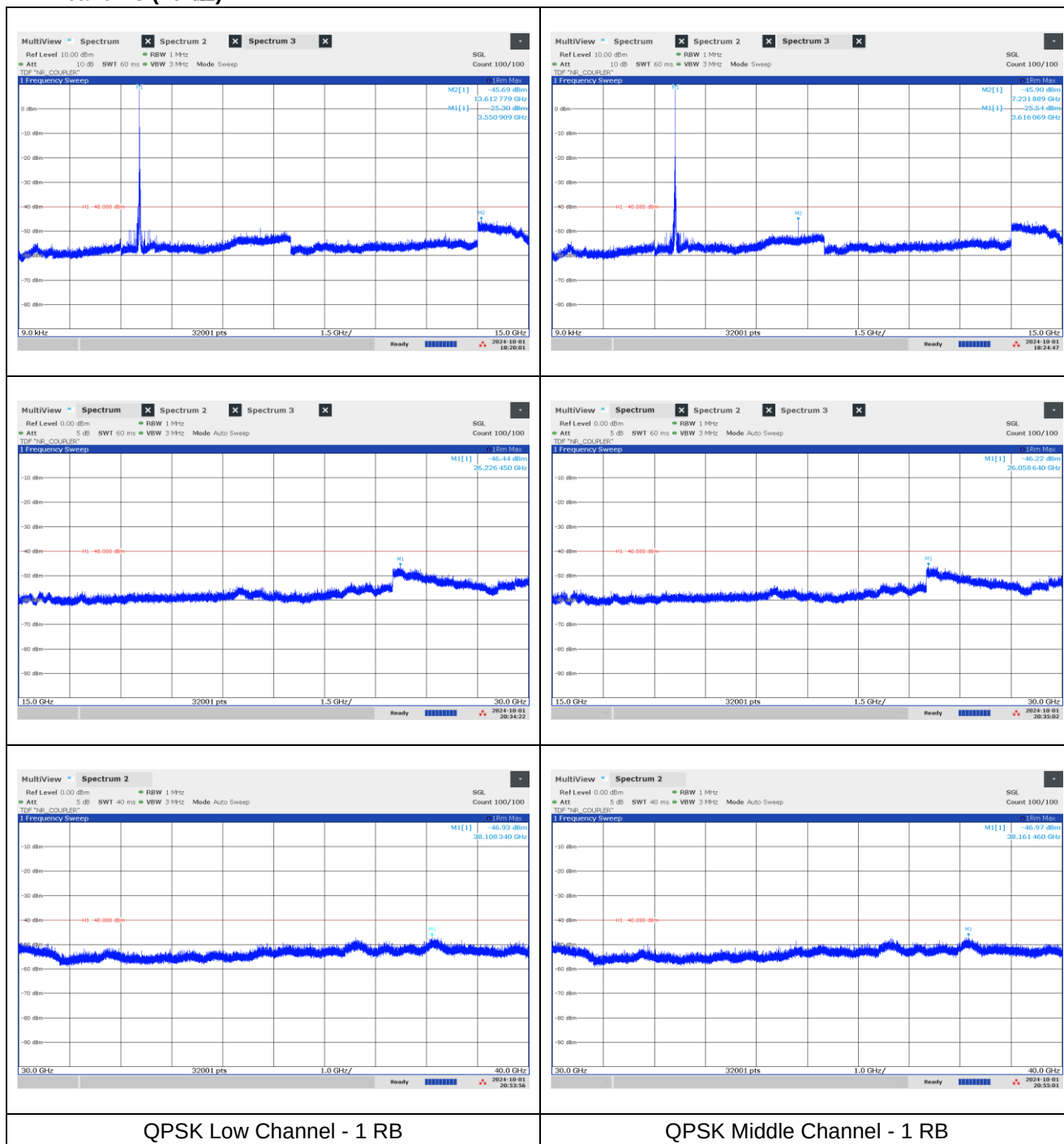


NR band 48

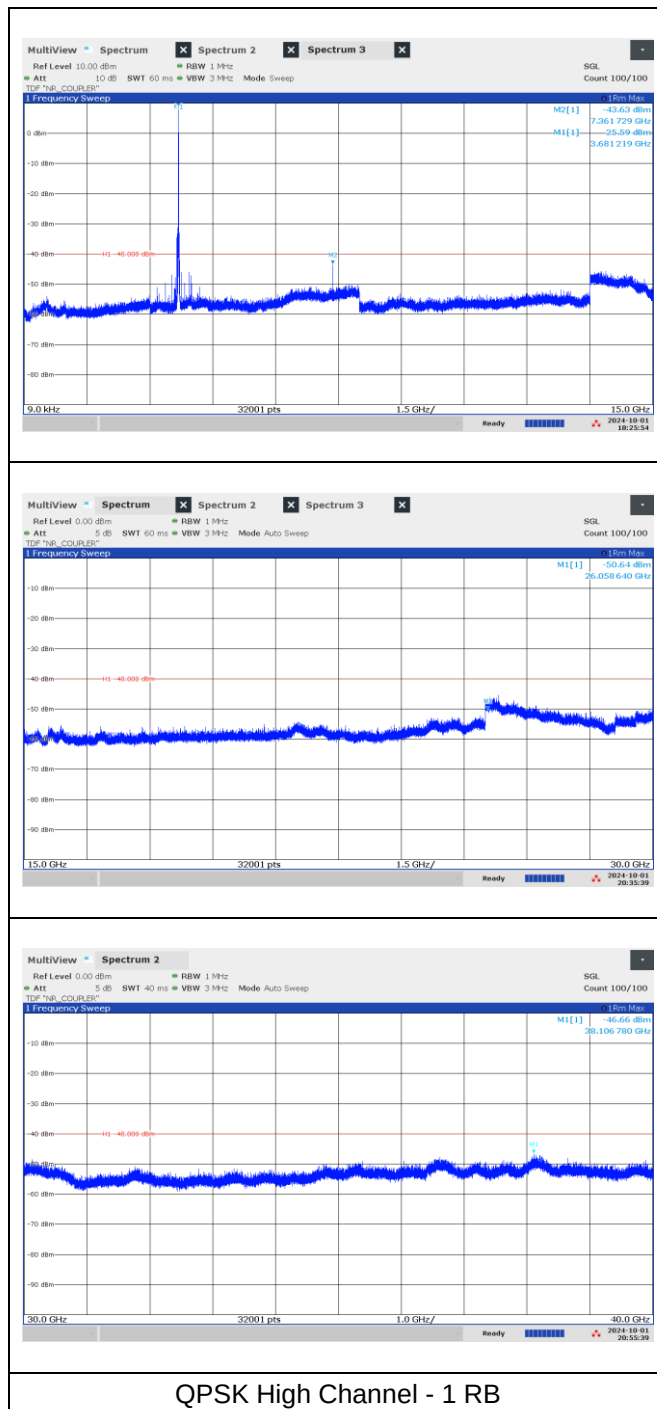


Switching

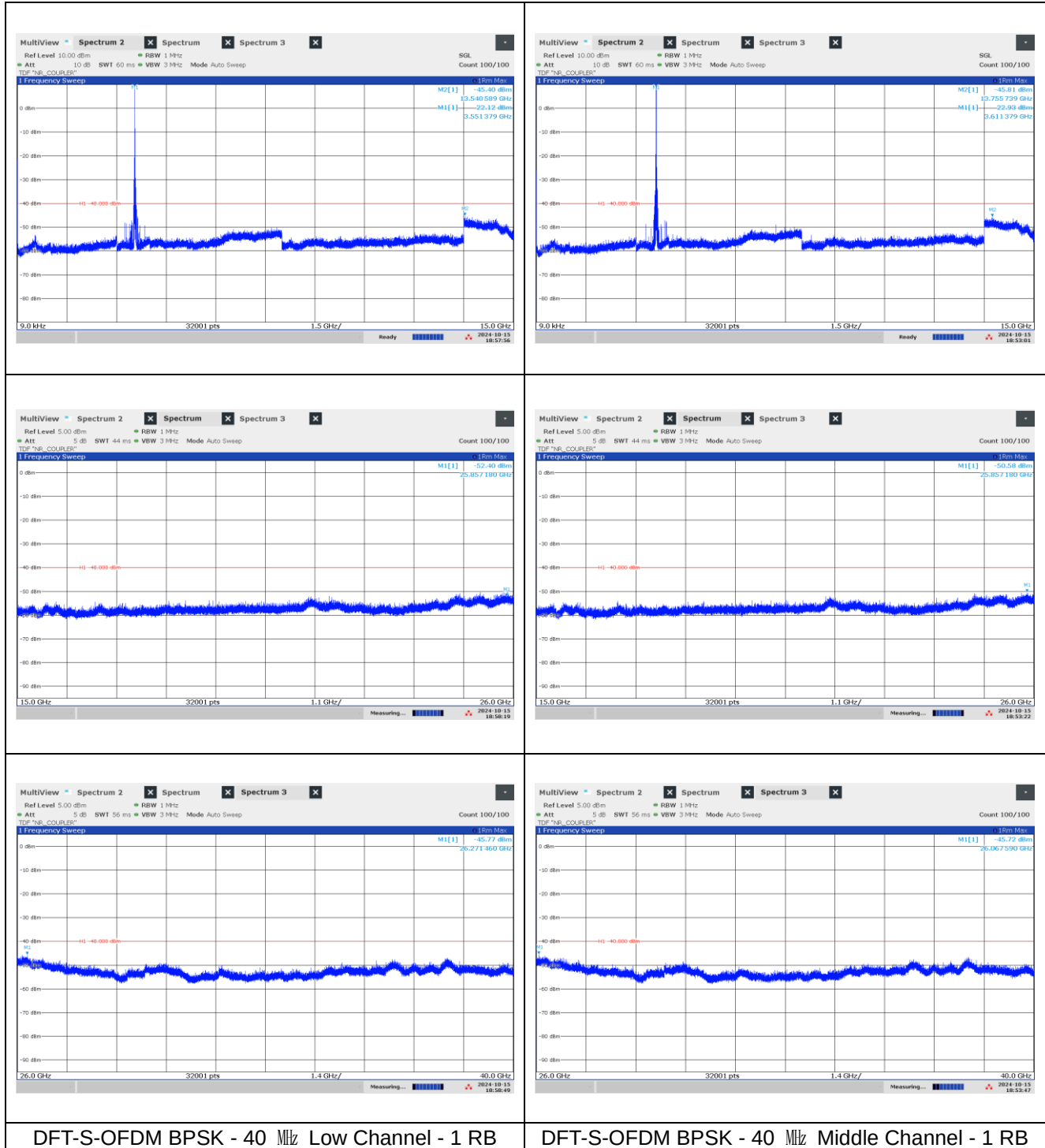
LTE band 48 (20 MHz)



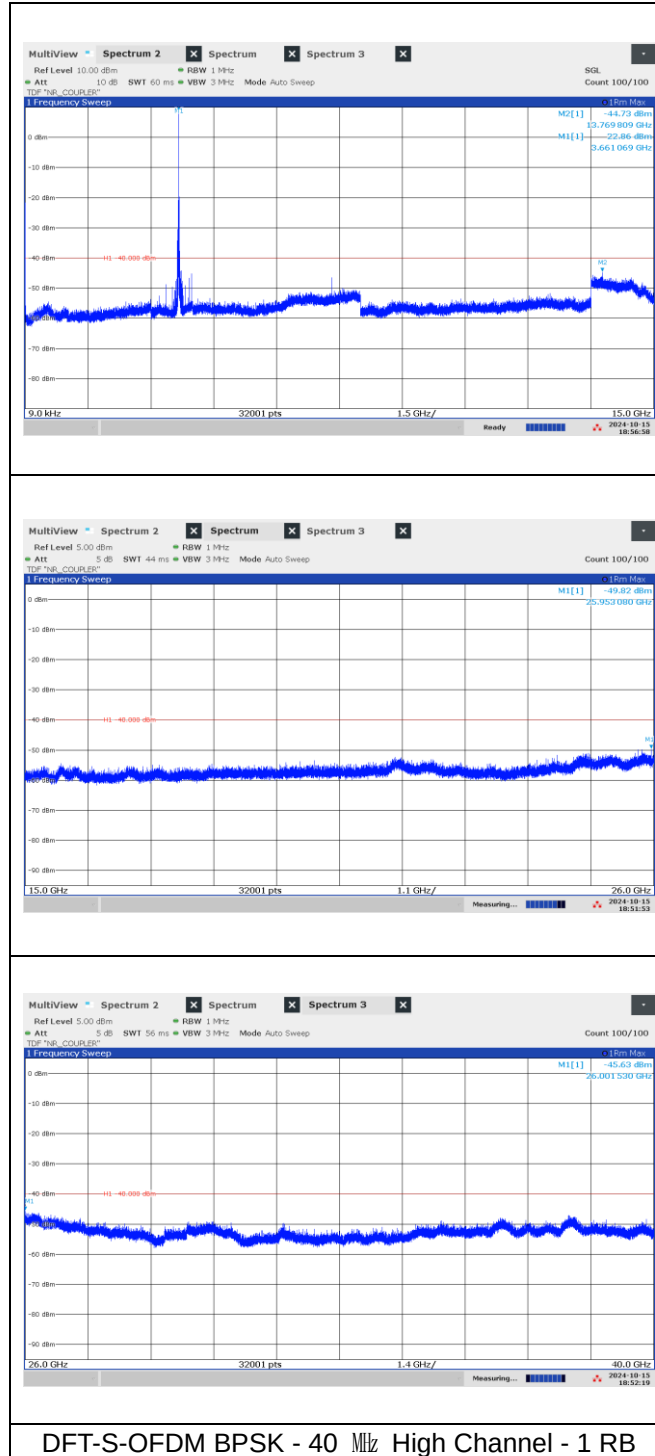
LTE band 48 (20 MHz)



NR band 48



NR band 48



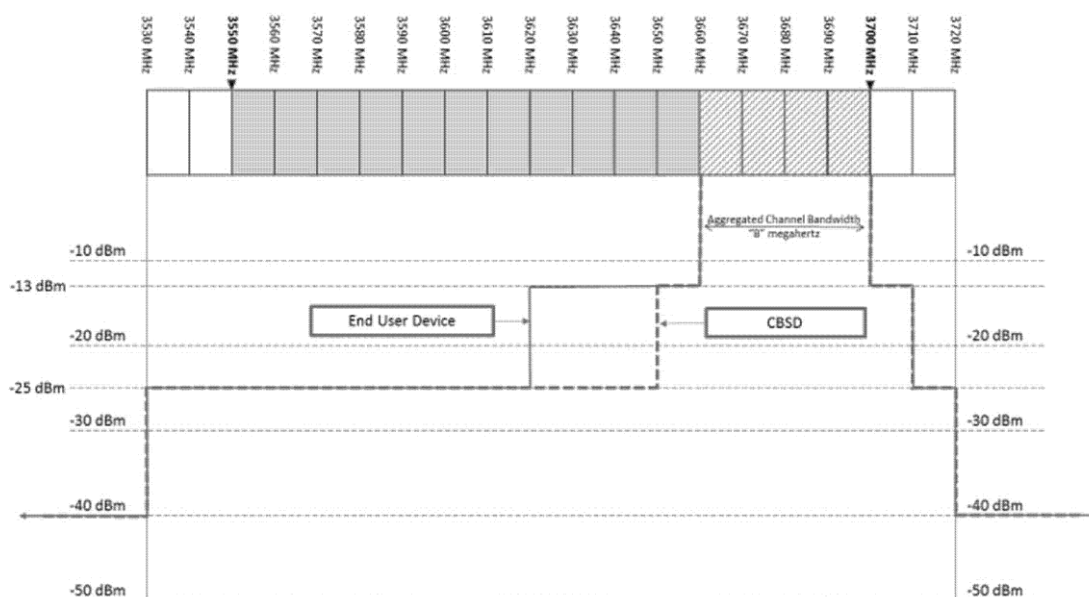
7. Band Edge and Adjacent Channel Leakage Ratio

7.1. Limit

- §96.41(e), 3.5GHz Emissions and Interference Limits

(1) General protection levels.

Figure 1 to paragraph (e) – Protection levels



(i) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed -13 dB m/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed -25 dB m/MHz. The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.

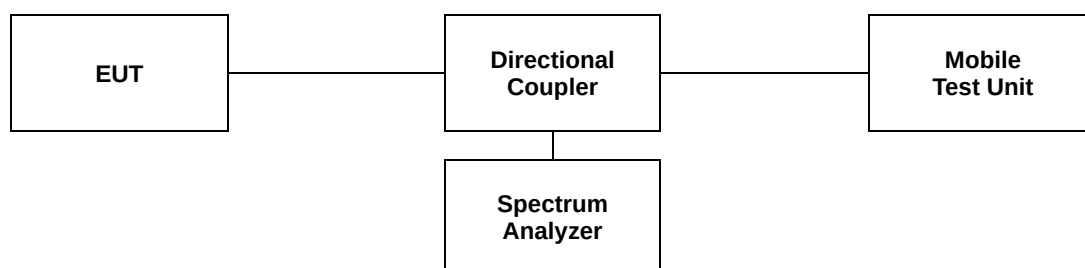
(ii) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dB m/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed -25 dB m/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

(2) **Additional protection levels.** Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3 540 MHz or above 3 710 MHz shall not exceed -25 dB m/MHz, and the conducted power of emissions below 3 530 MHz or above 3 720 MHz shall not exceed -40 dB m/MHz.

7.2. Test Procedure

The test follows section 5.7 of ANSI C63.26-2015.

- a. Span was set large enough so as to capture all out of band emissions near the band edge.
- b. RBW $\geq 1\%$ of OBW
- c. VBW $\geq 3 \times$ RBW.
- d. Detector = RMS.
- e. Trace mode = Average.
- f. Sweep time = Auto.
- g. The trace was allowed to stabilize.
- h. All path loss of frequency range was investigated and compensated to spectrum analyzer as TDF function.



7.3. Test Results

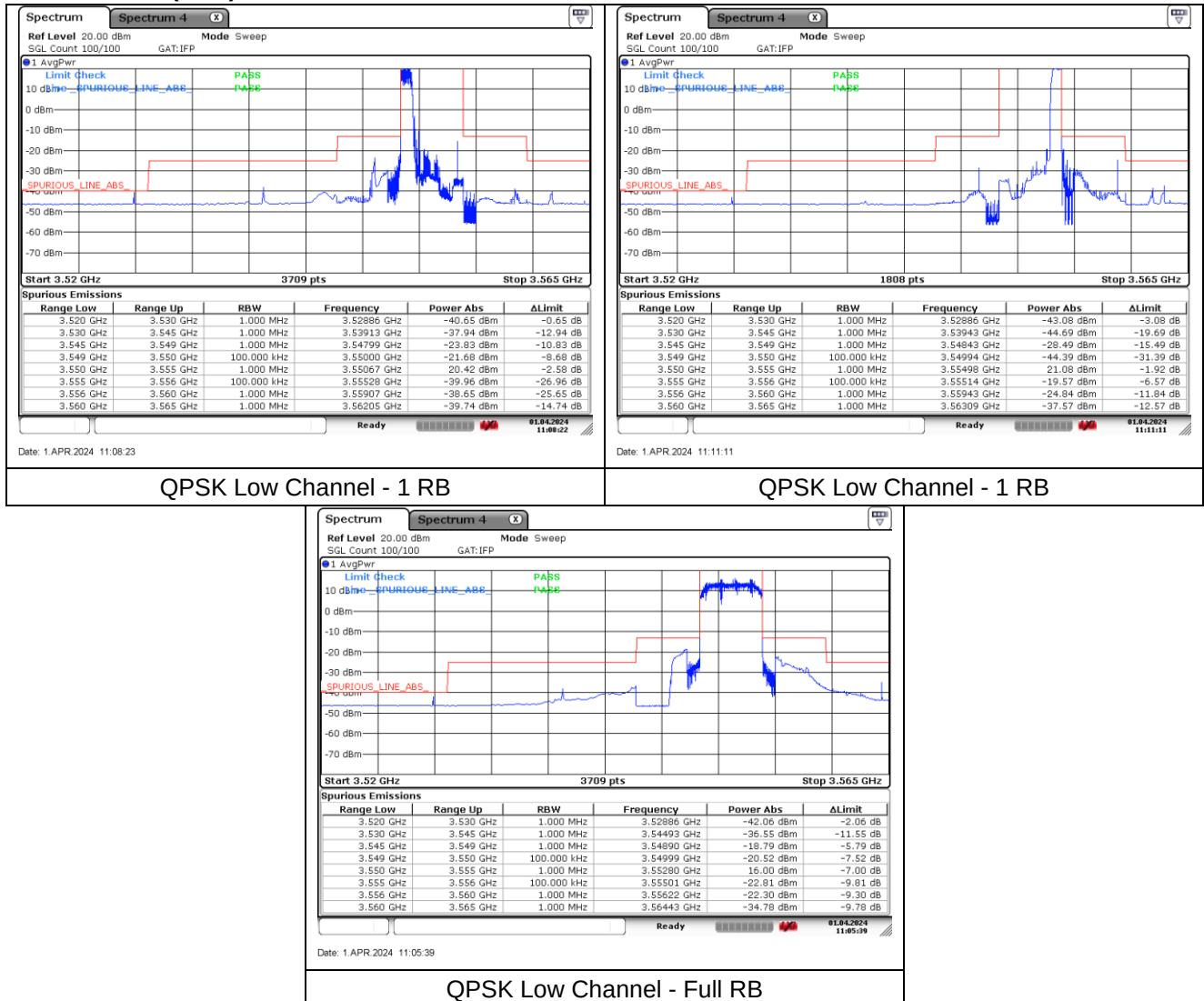
Ambient temperature : (23 ± 1) °C
 Relative humidity : 47 % R.H.

- Test plots

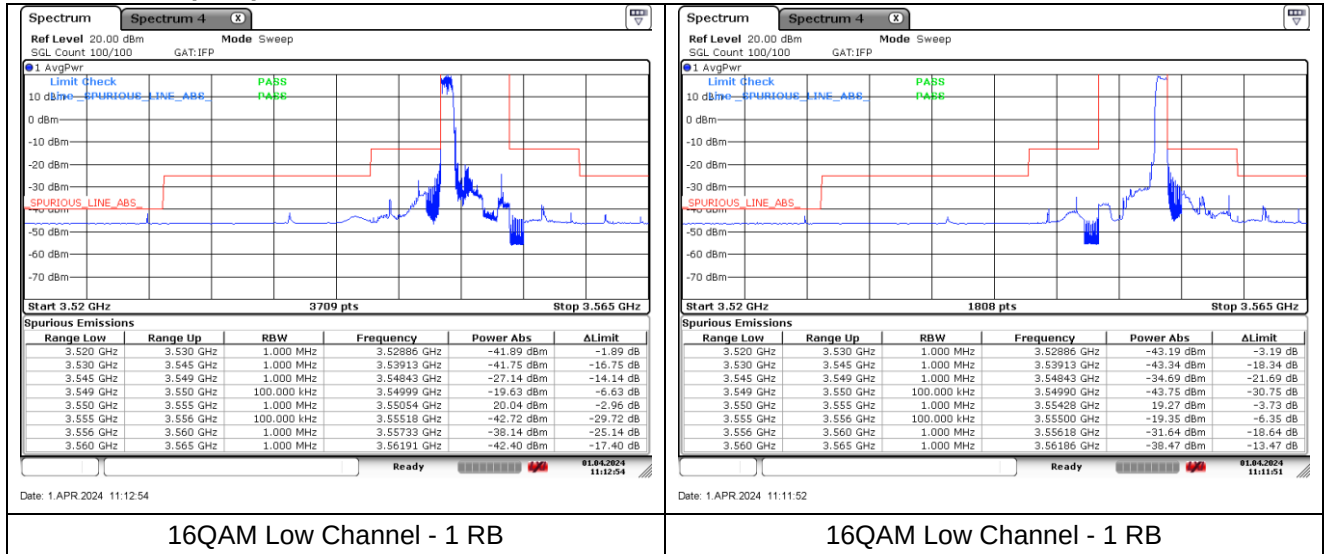
Ant. 2

Band edge

LTE band 48 (5 MHz)

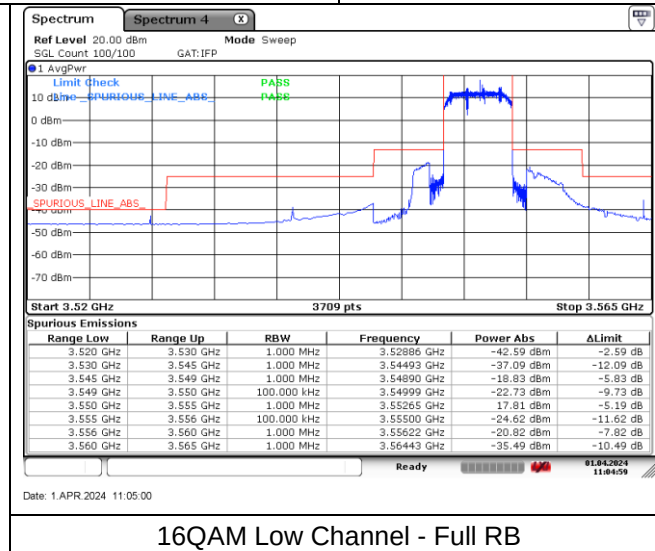


LTE band 48 (5 MHz)



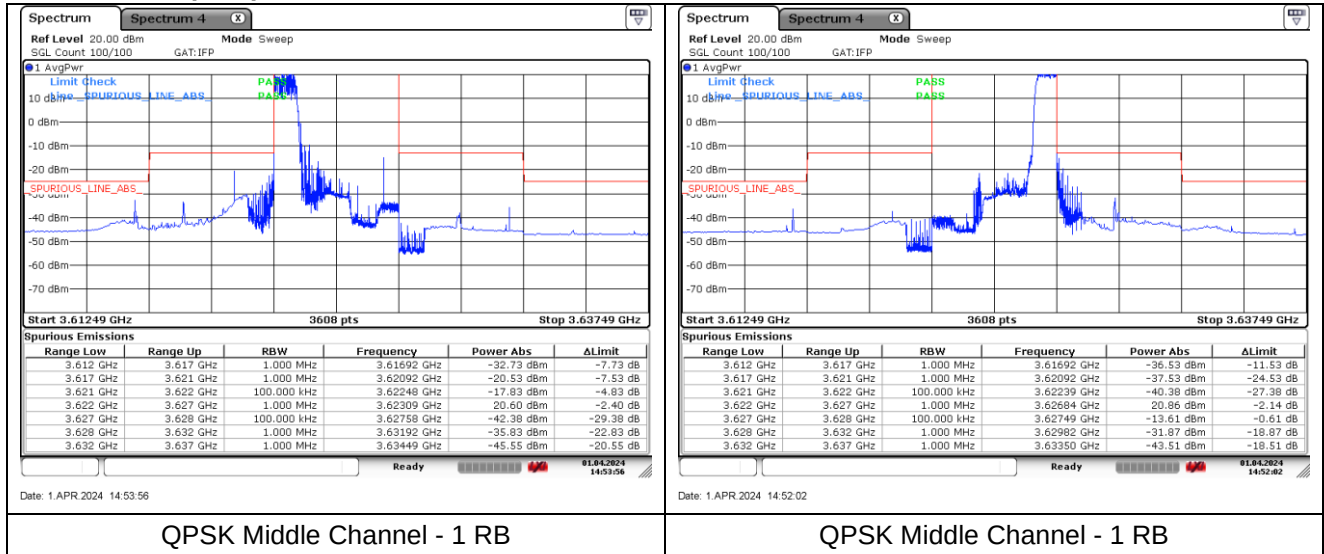
16QAM Low Channel - 1 RB

16QAM Low Channel - 1 RB



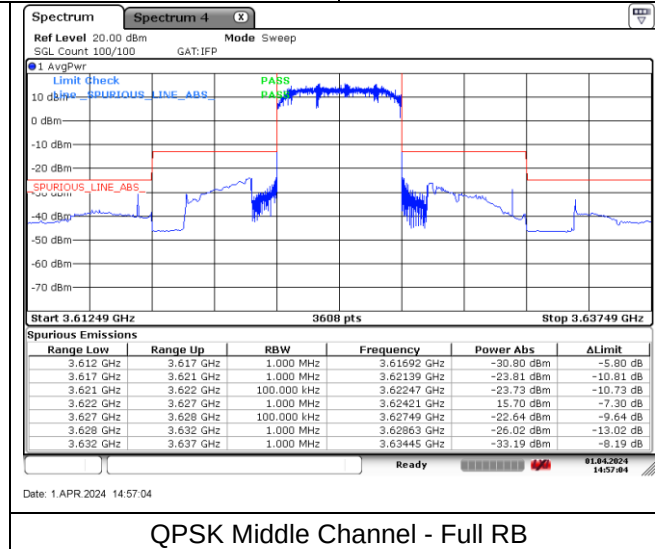
16QAM Low Channel - Full RB

LTE band 48 (5 MHz)



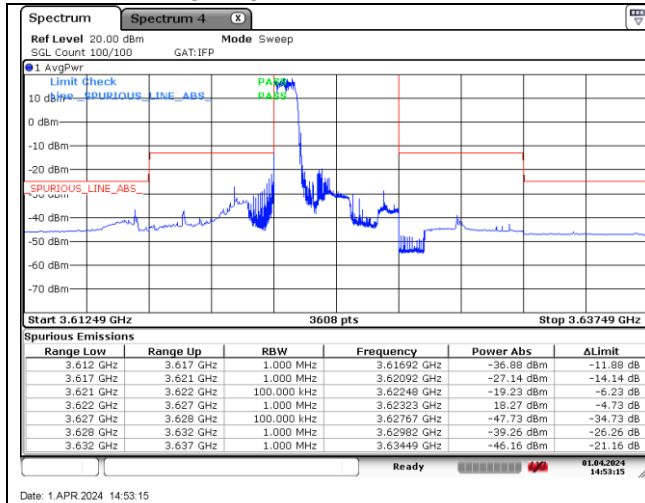
QPSK Middle Channel - 1 RB

QPSK Middle Channel - 1 RB

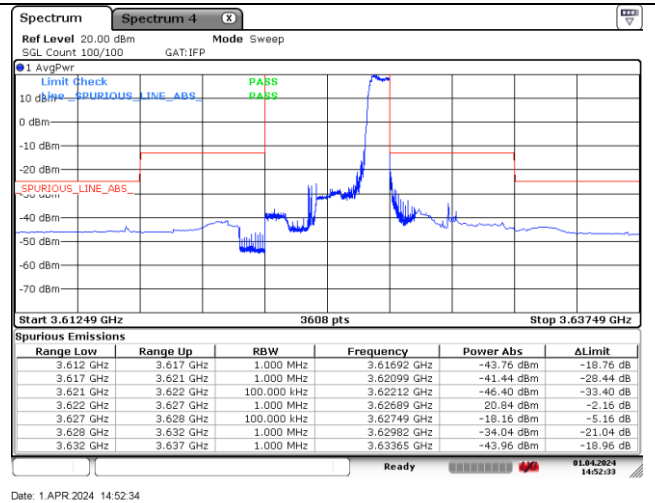


QPSK Middle Channel - Full RB

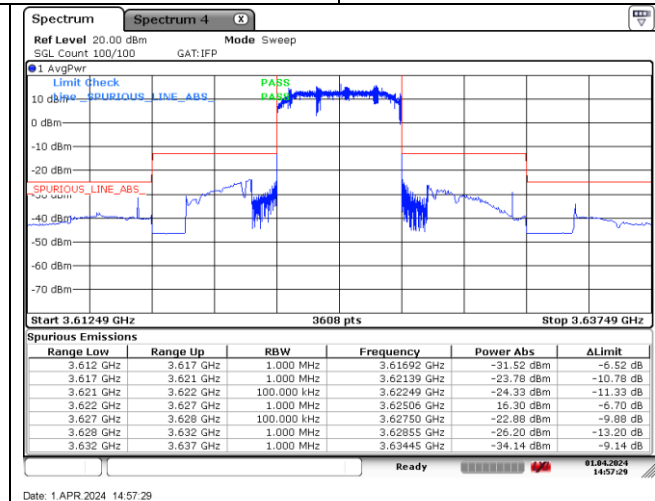
LTE band 48 (5 MHz)



16QAM Middle Channel - 1 RB

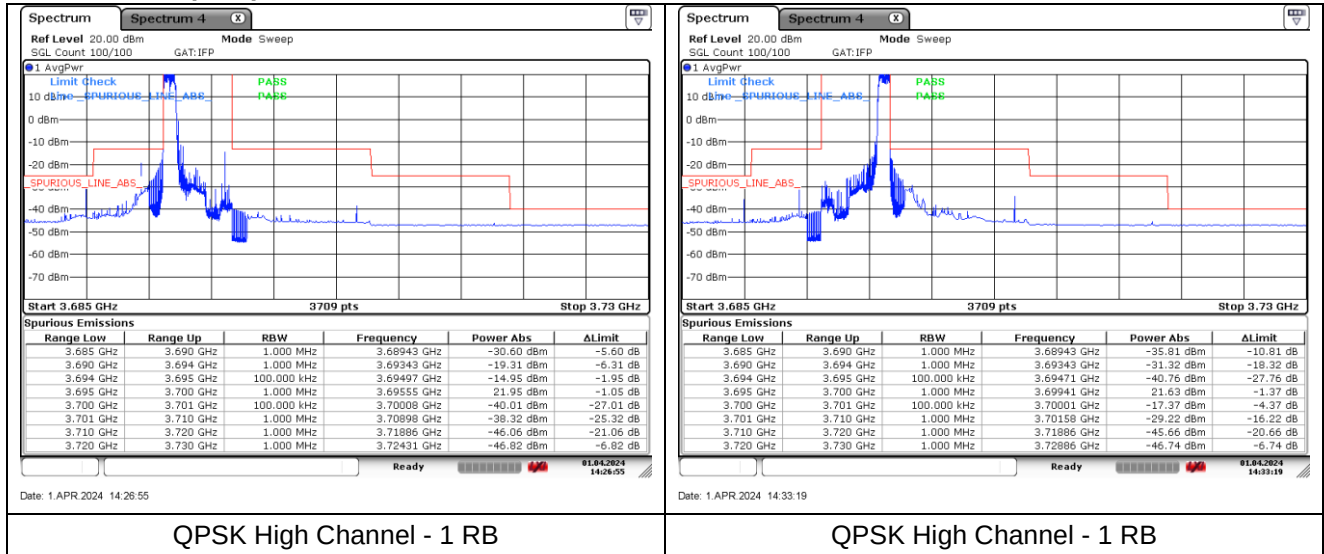


16QAM Middle Channel - 1 RB



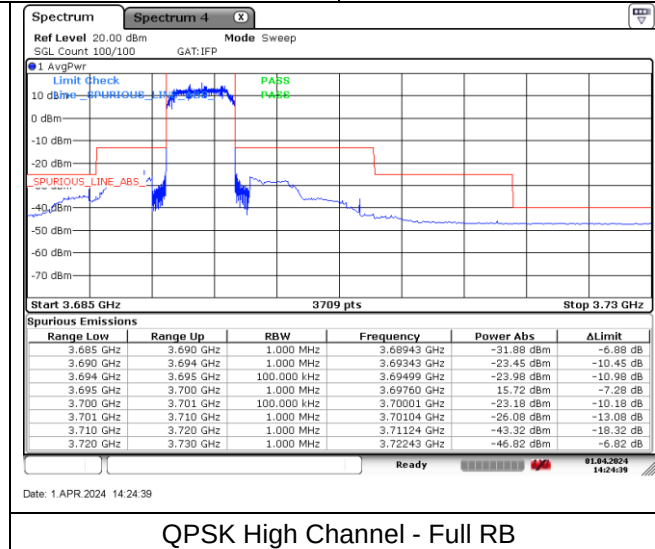
16QAM Middle Channel - Full RB

LTE band 48 (5 MHz)



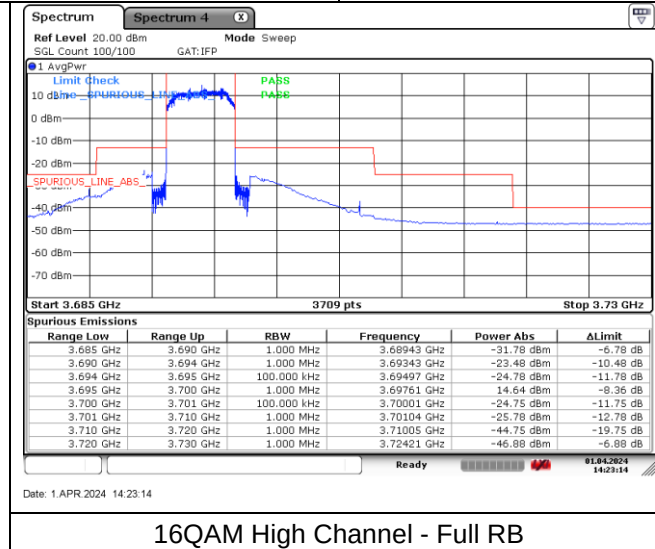
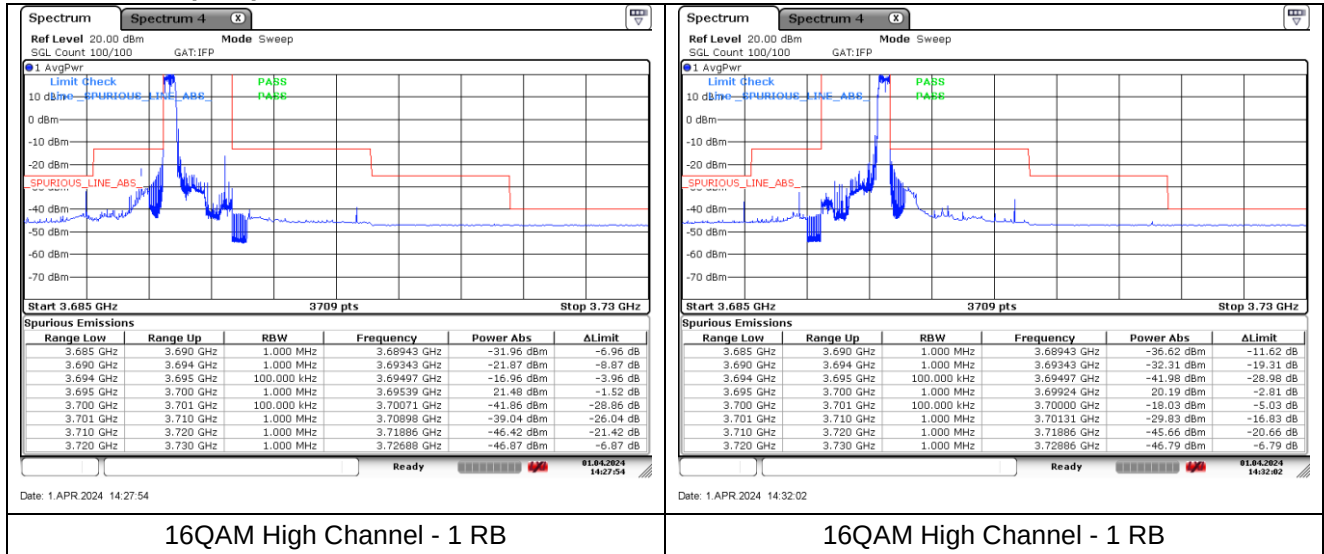
QPSK High Channel - 1 RB

QPSK High Channel - 1 RB

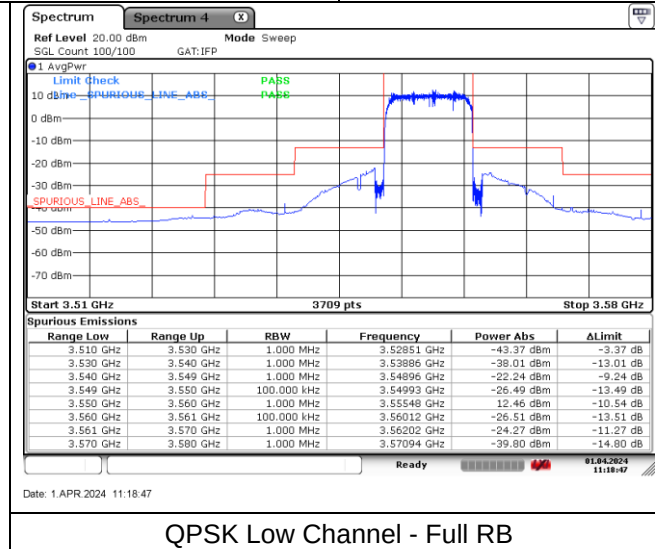
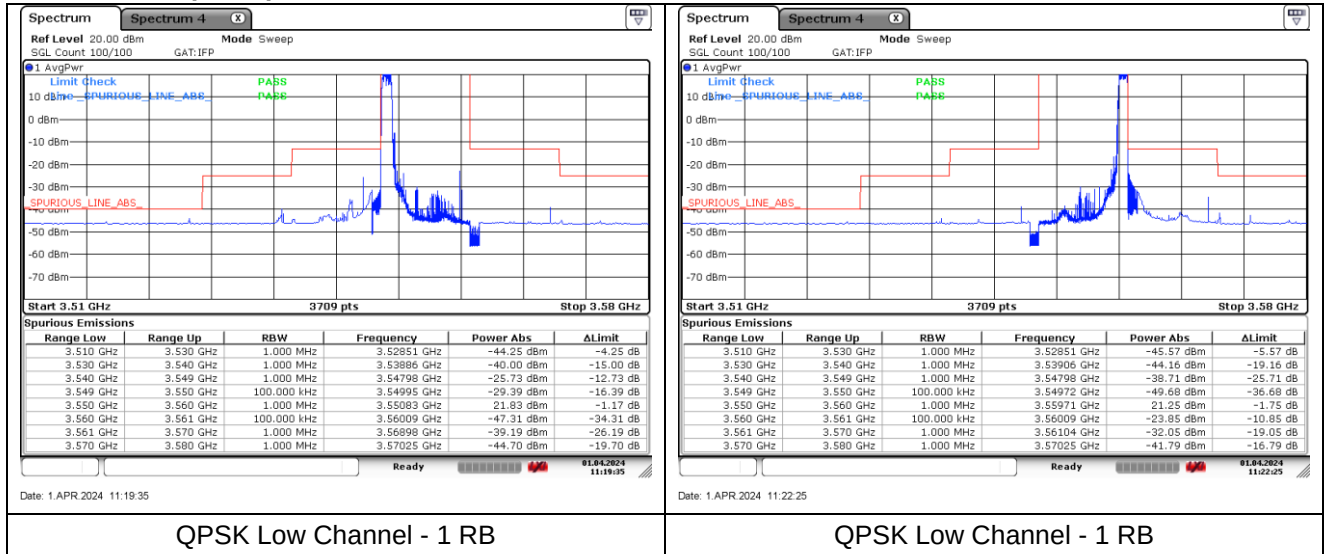


QPSK High Channel - Full RB

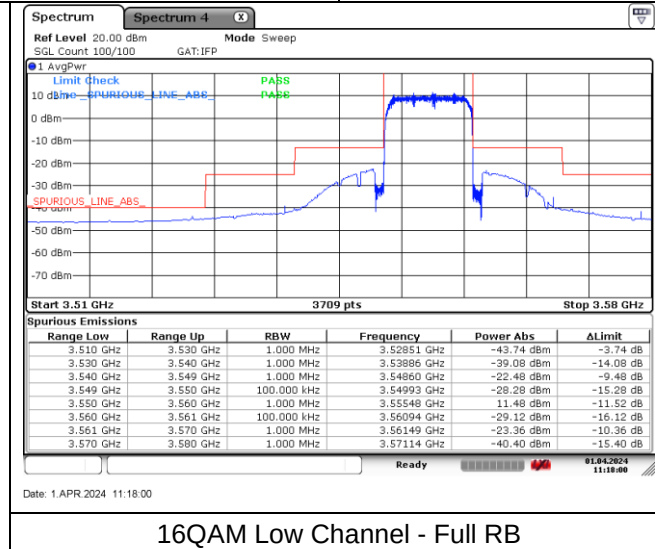
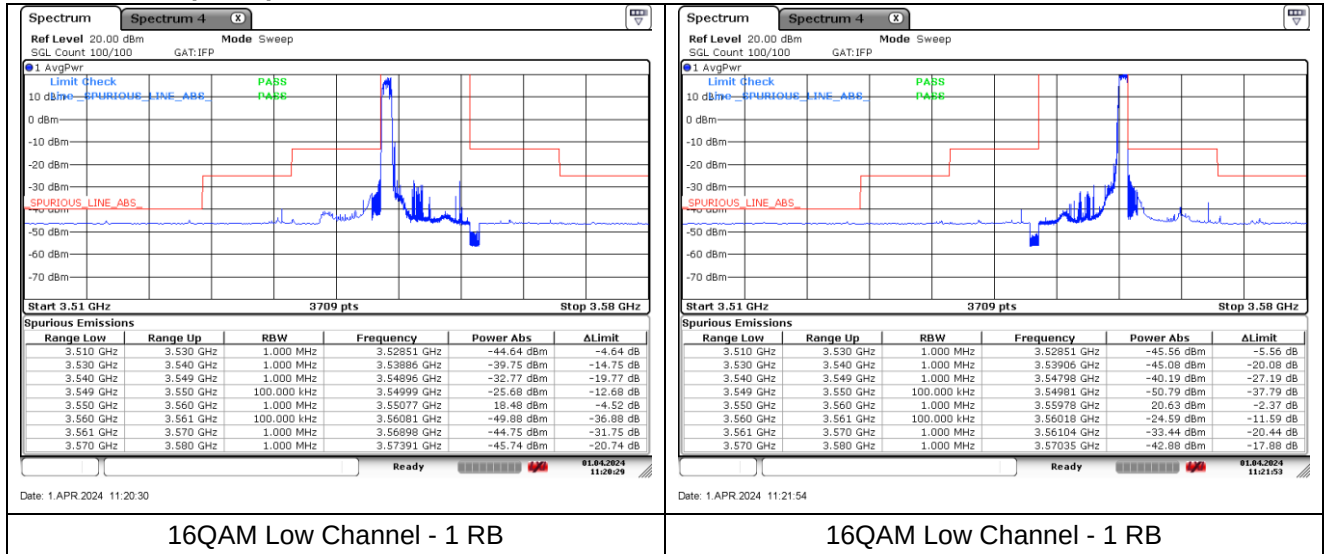
LTE band 48 (5 MHz)



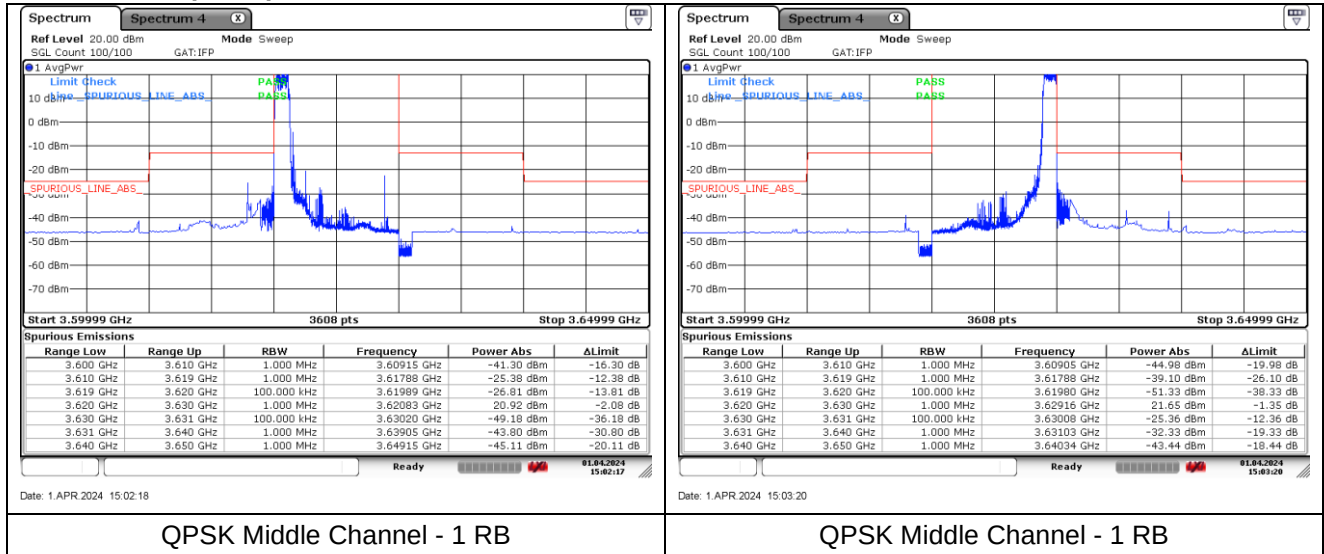
LTE band 48 (10 MHz)



LTE band 48 (10 MHz)

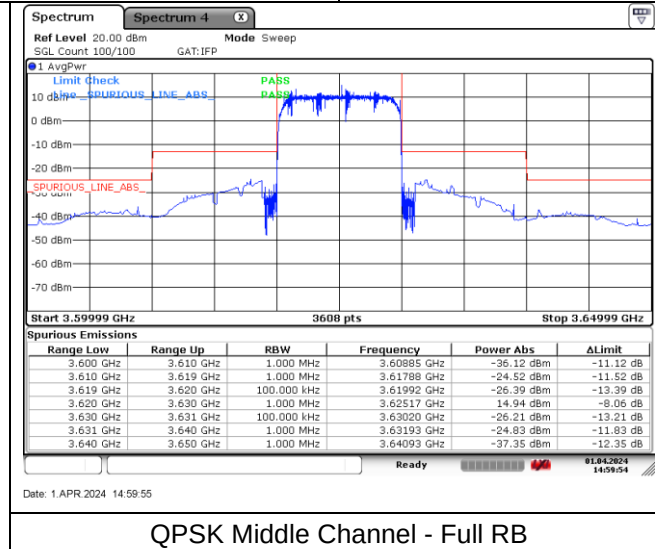


LTE band 48 (10 MHz)



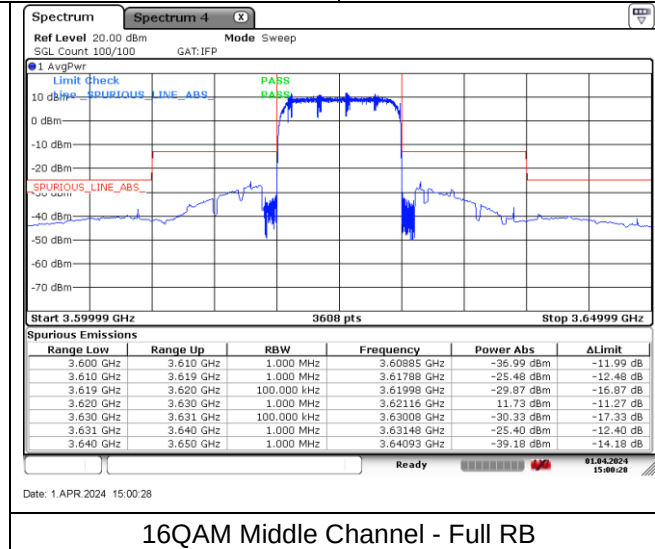
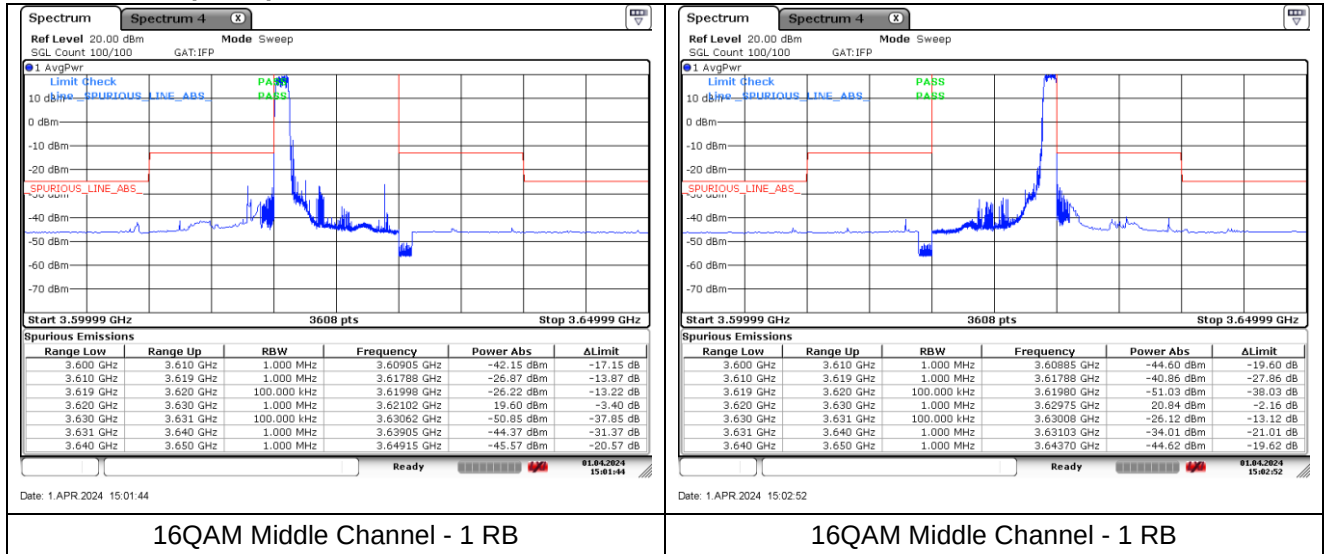
QPSK Middle Channel - 1 RB

QPSK Middle Channel - 1 RB

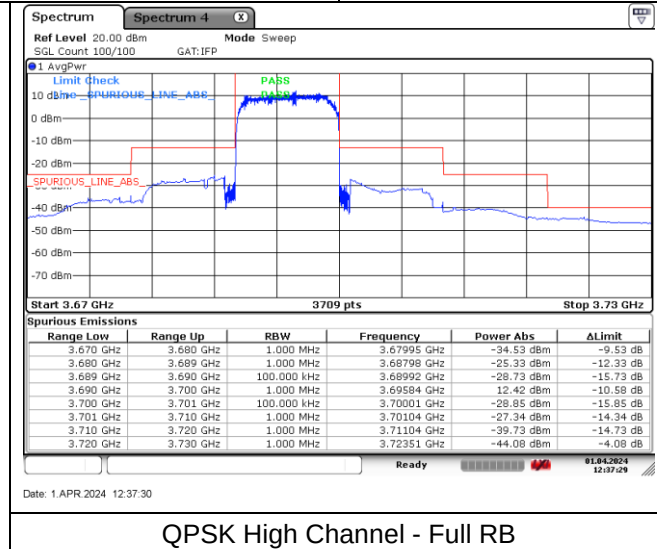
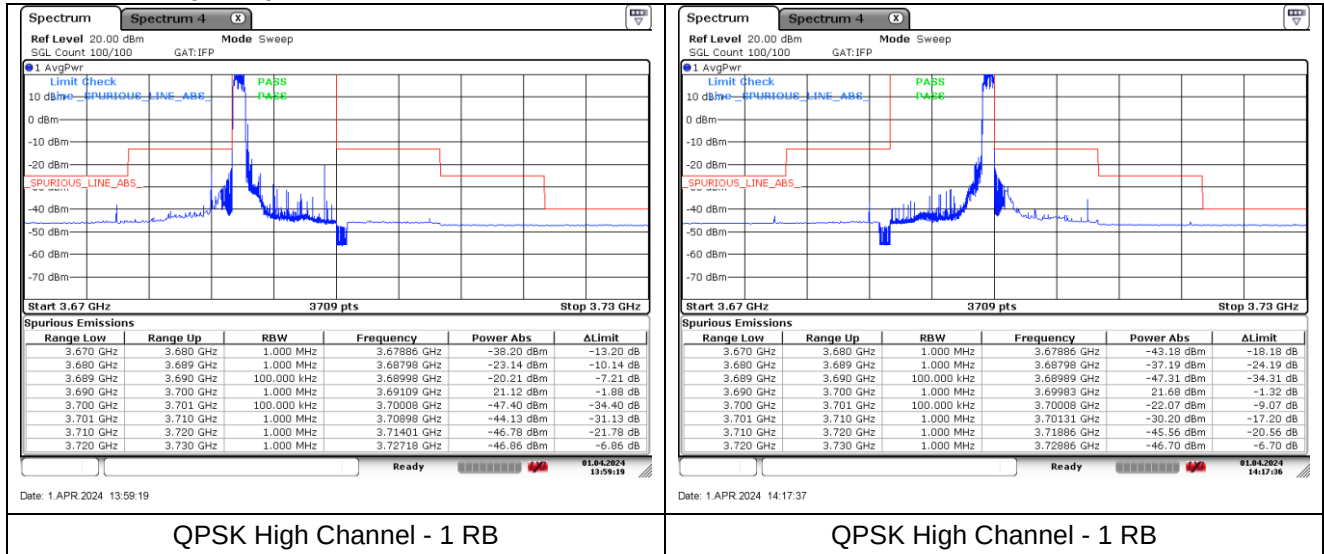


QPSK Middle Channel - Full RB

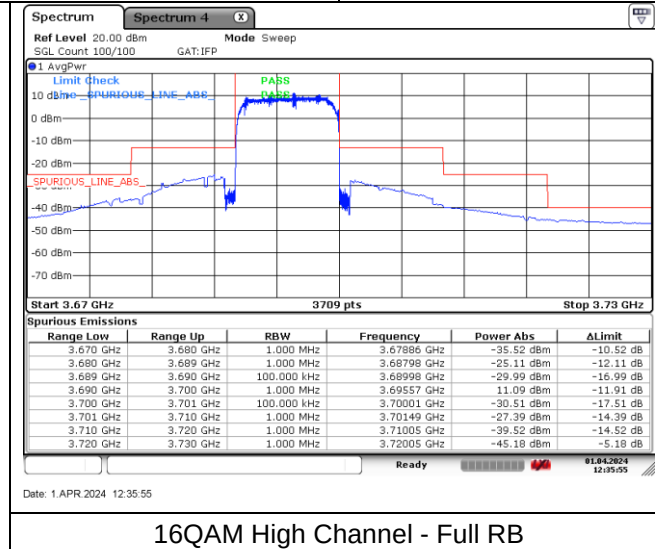
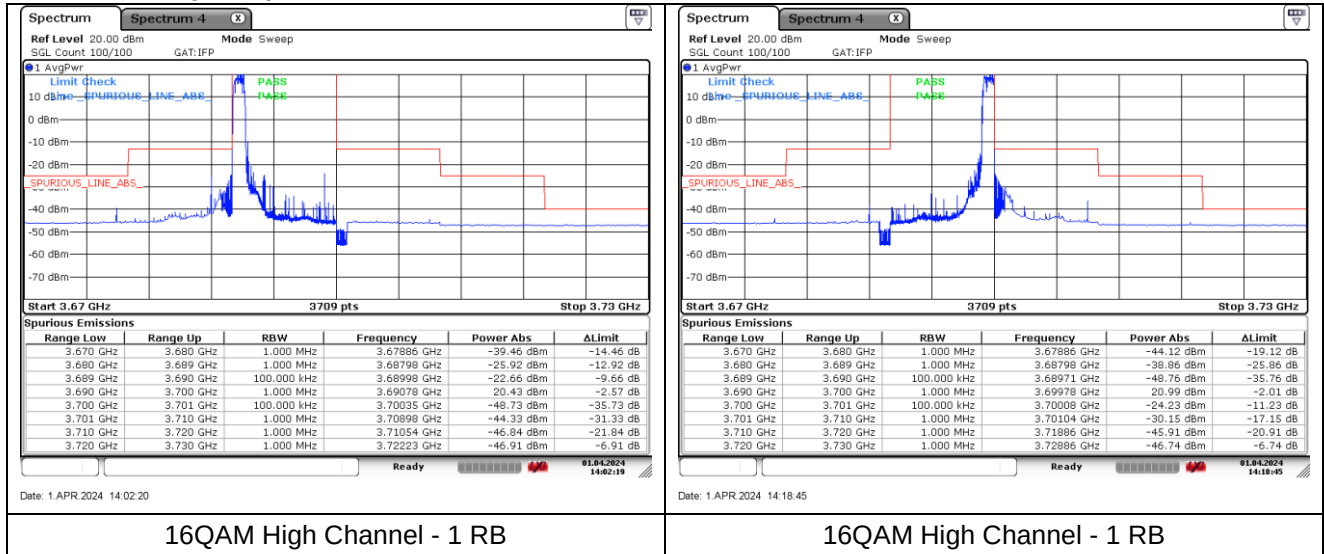
LTE band 48 (10 MHz)



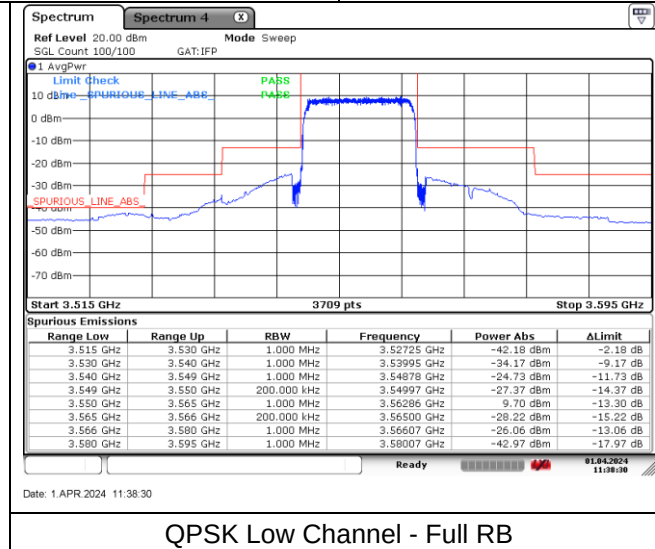
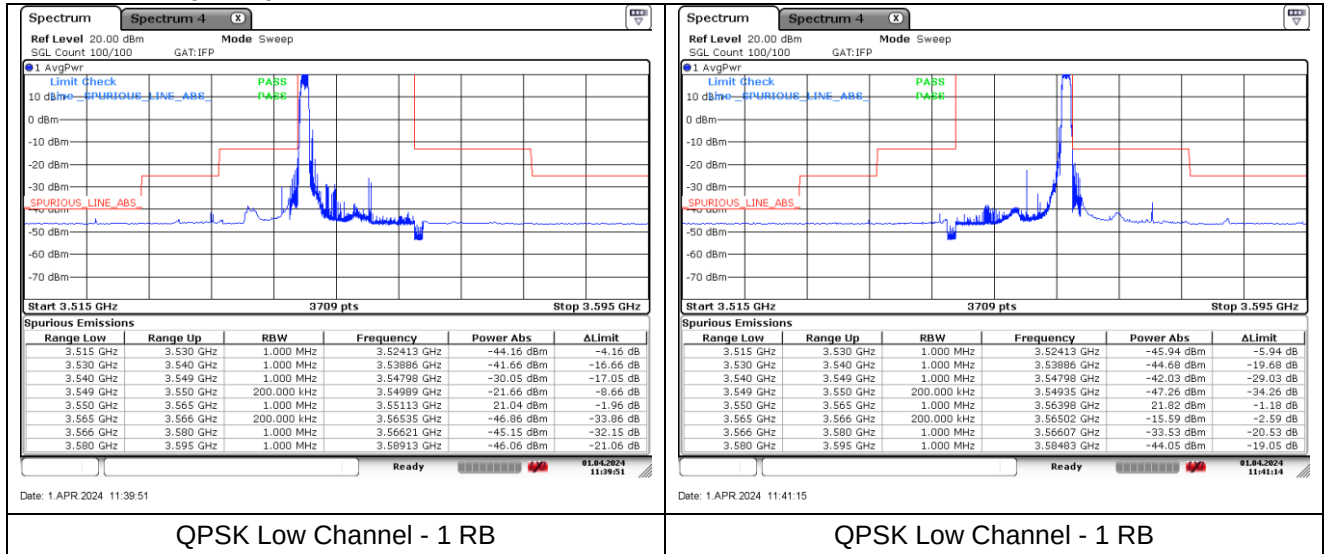
LTE band 48 (10 MHz)



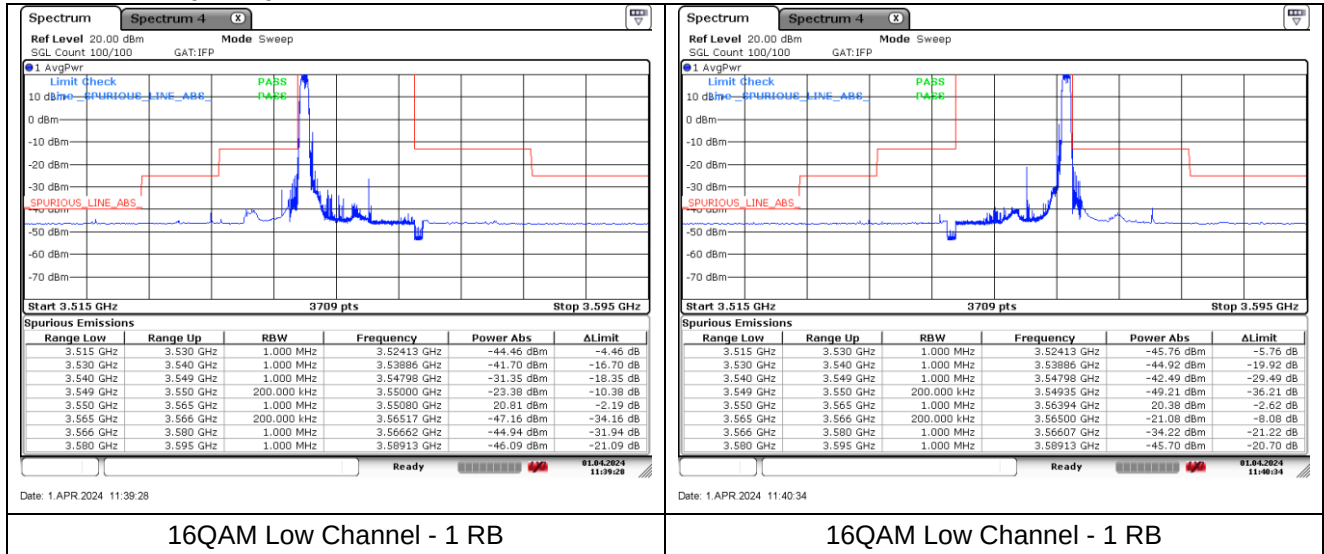
LTE band 48 (10 MHz)



LTE band 48 (15 MHz)

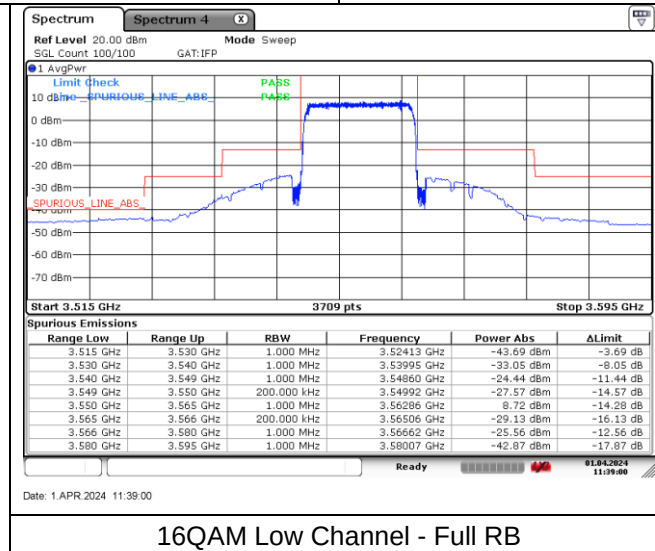


LTE band 48 (15 MHz)



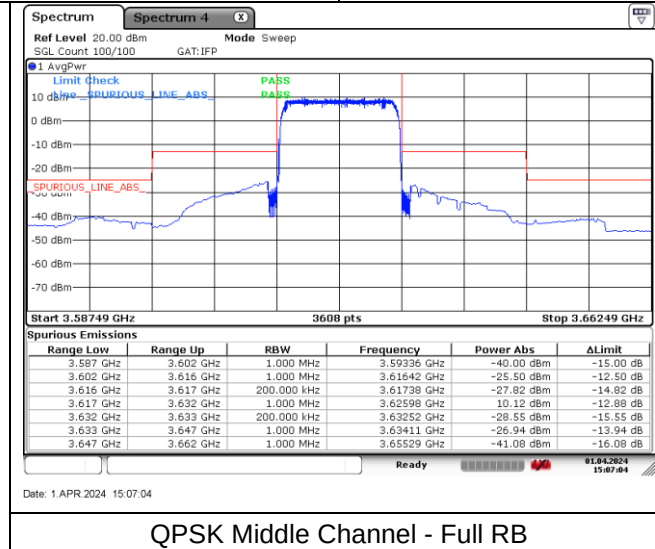
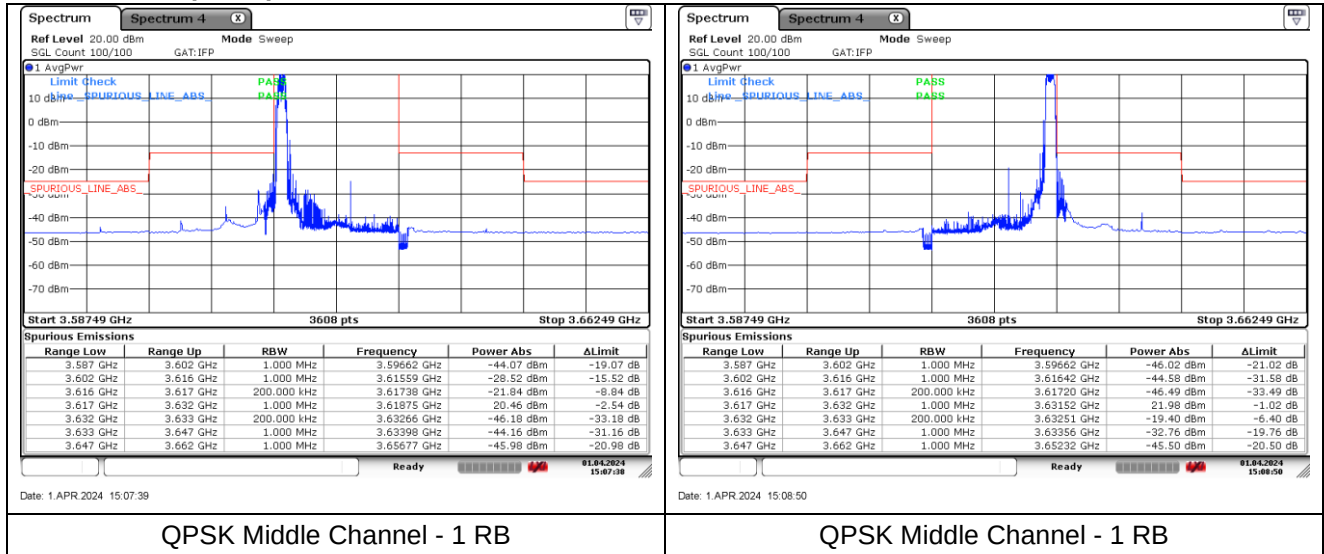
16QAM Low Channel - 1 RB

16QAM Low Channel - 1 RB

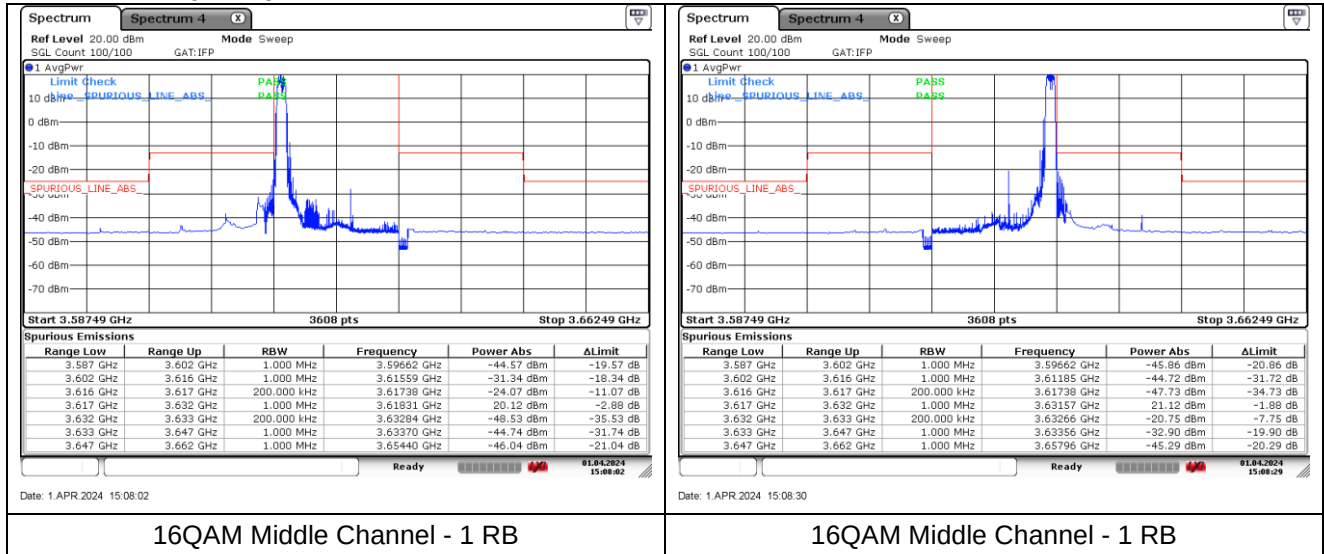


16QAM Low Channel - Full RB

LTE band 48 (15 MHz)

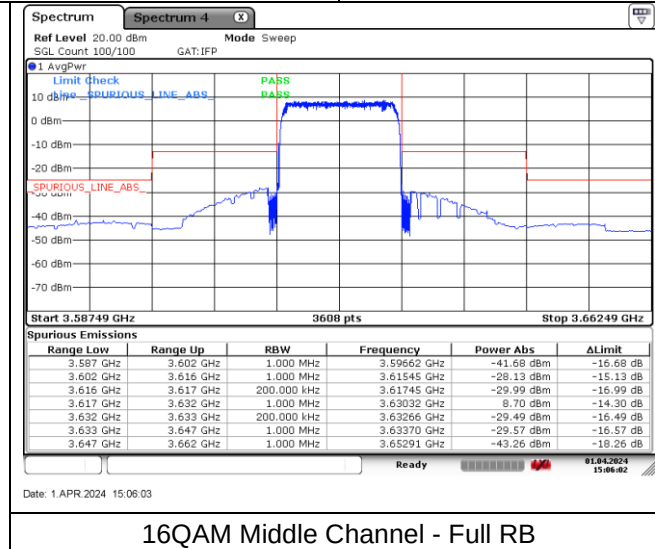


LTE band 48 (15 MHz)



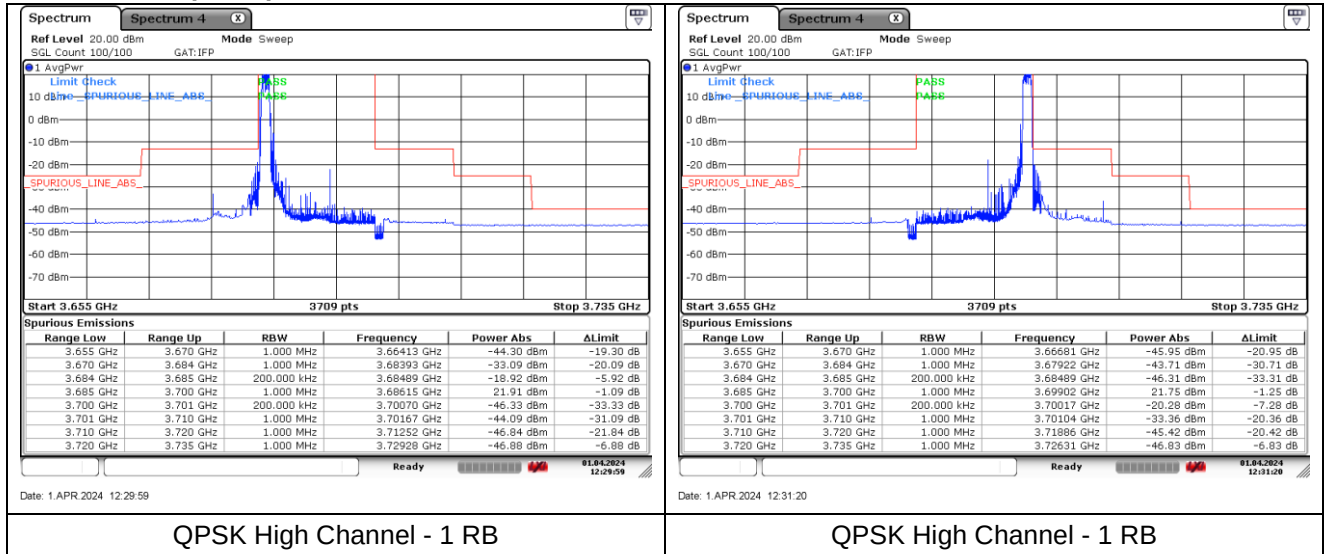
16QAM Middle Channel - 1 RB

16QAM Middle Channel - 1 RB



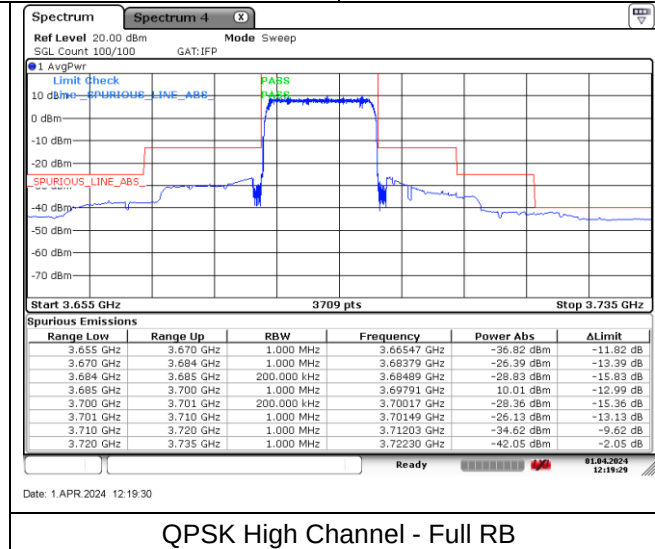
16QAM Middle Channel - Full RB

LTE band 48 (15 MHz)



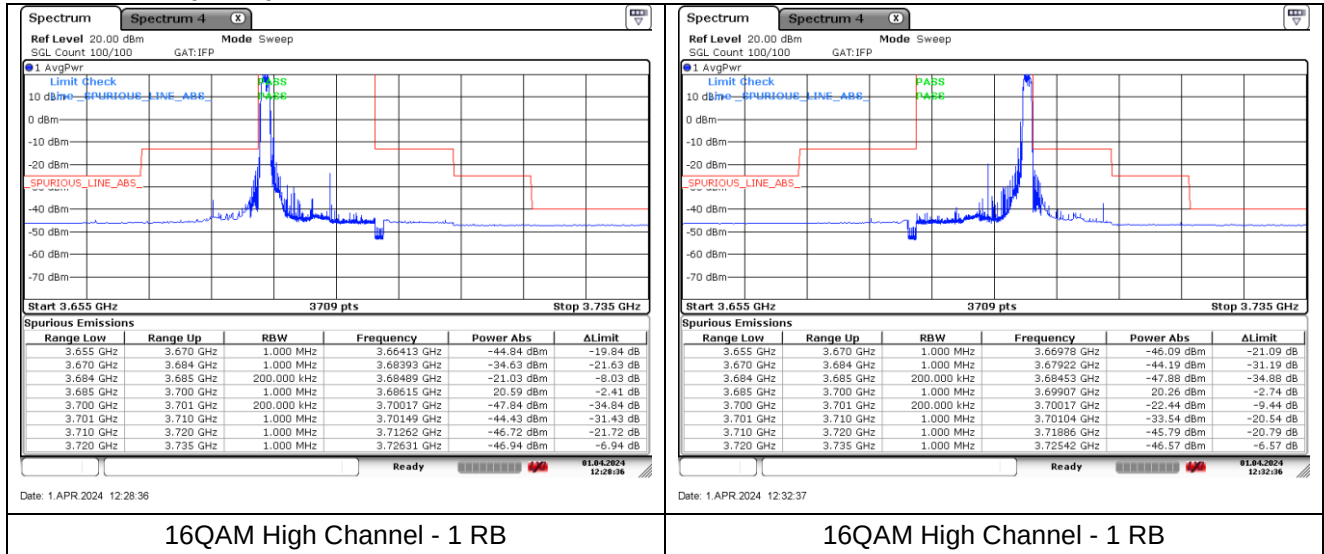
QPSK High Channel - 1 RB

QPSK High Channel - 1 RB



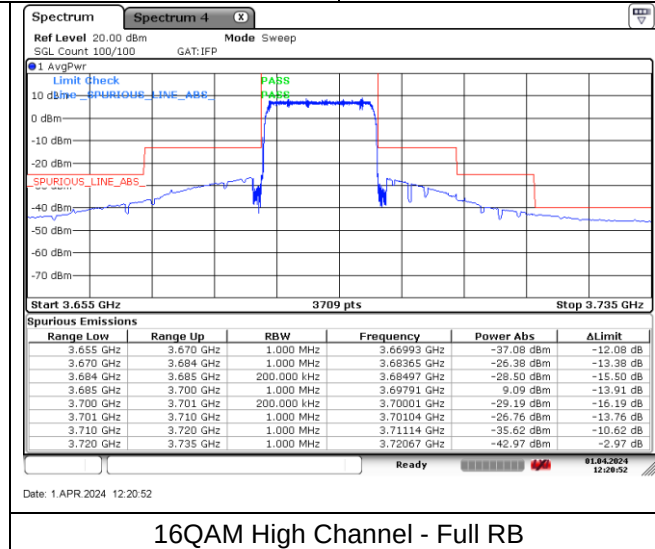
QPSK High Channel - Full RB

LTE band 48 (15 MHz)



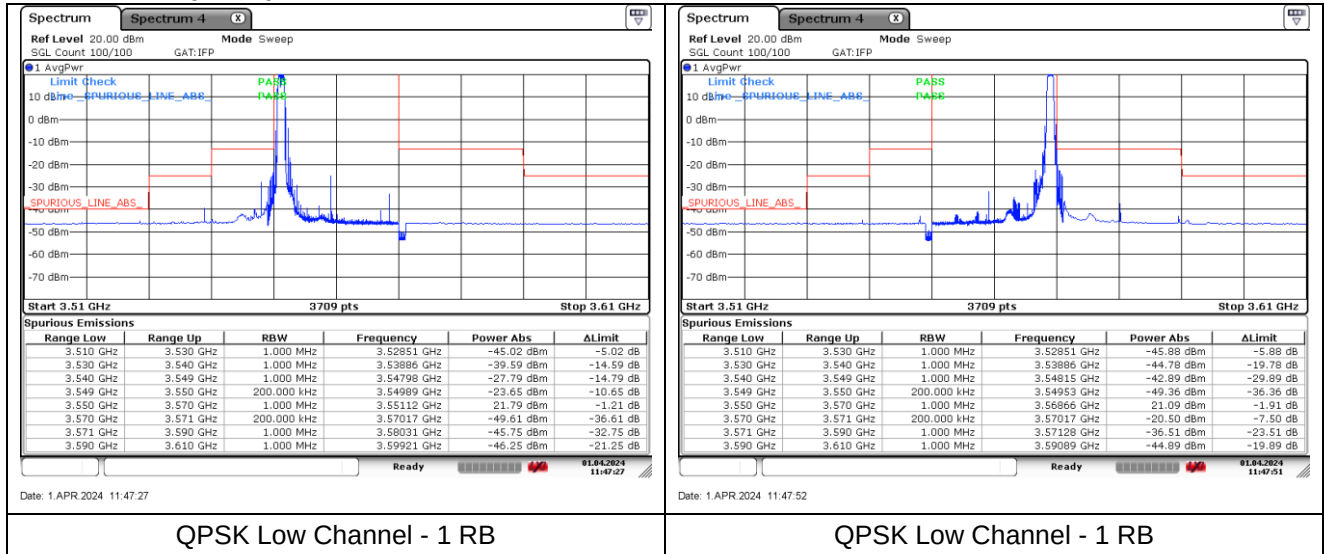
16QAM High Channel - 1 RB

16QAM High Channel - 1 RB



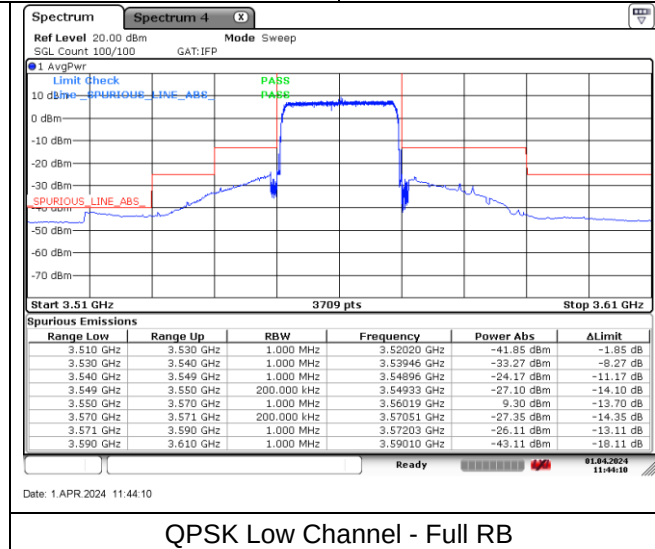
16QAM High Channel - Full RB

LTE band 48 (20 MHz)



QPSK Low Channel - 1 RB

QPSK Low Channel - 1 RB



QPSK Low Channel - Full RB