

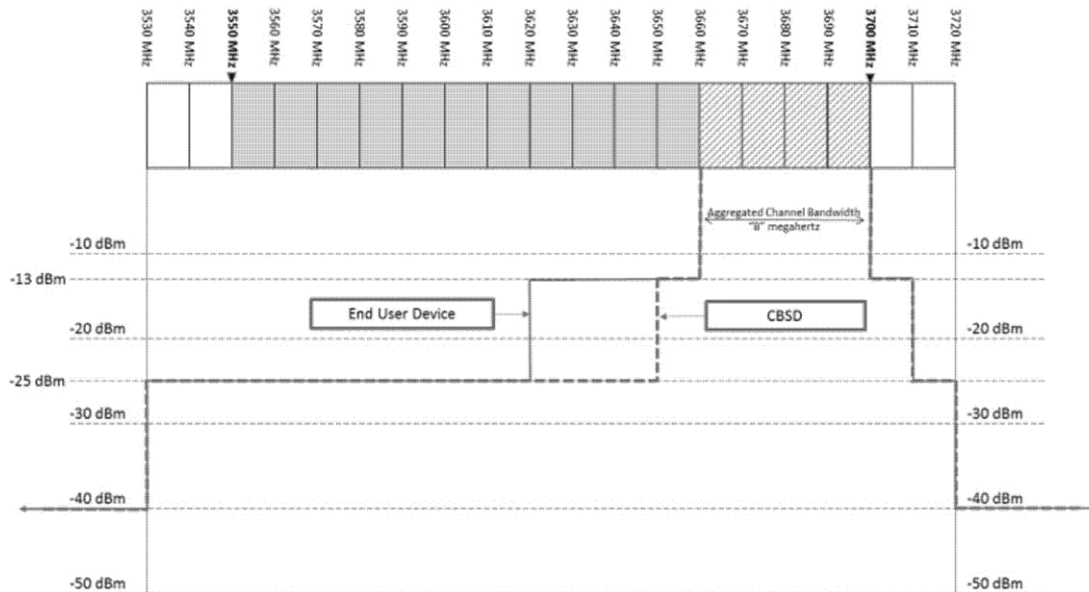
## 7. Band Edge and Adjacent Channel Leakage Ratio

### 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  $-13 \text{ dB m/MHz}$  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  $-25 \text{ dB m/MHz}$ . 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.

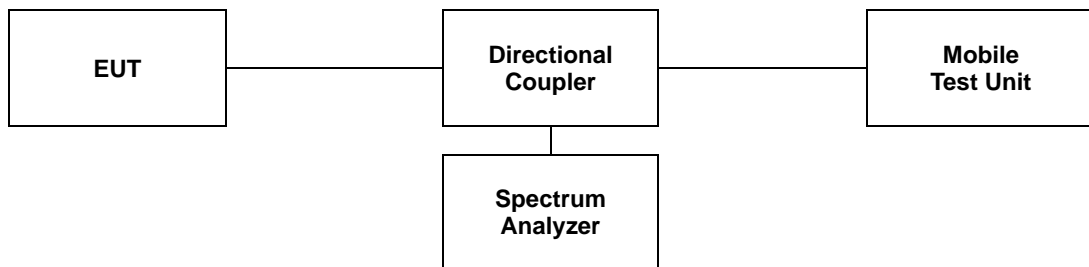
(ii) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed  $-13 \text{ dB m/MHz}$  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  $-25 \text{ dB m/MHz}$ . 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  $-25 \text{ dB m/MHz}$ , and the conducted power of emissions below 3 530 MHz or above 3 720 MHz shall not exceed  $-40 \text{ dB m/MHz}$ .

## 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.



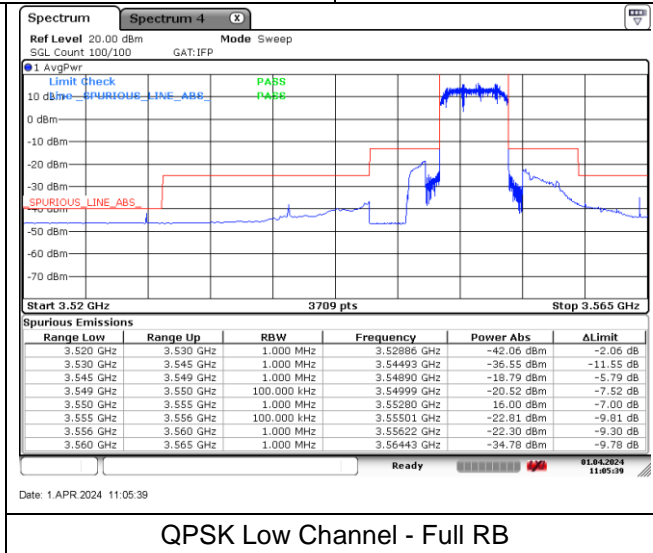
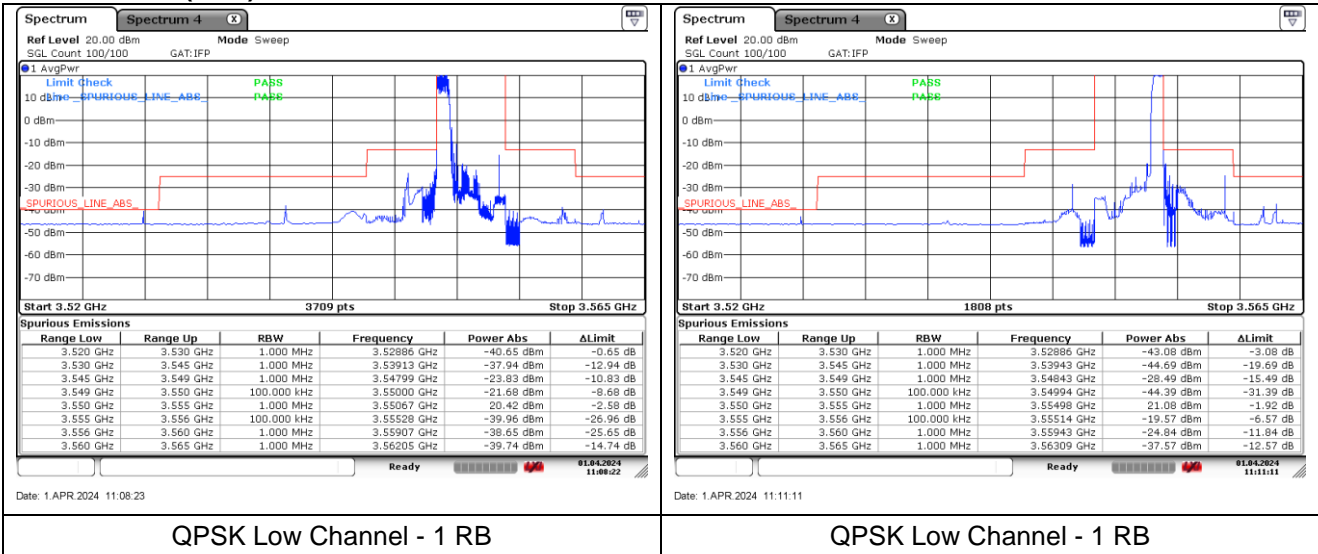
### 7.3. Test Results

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

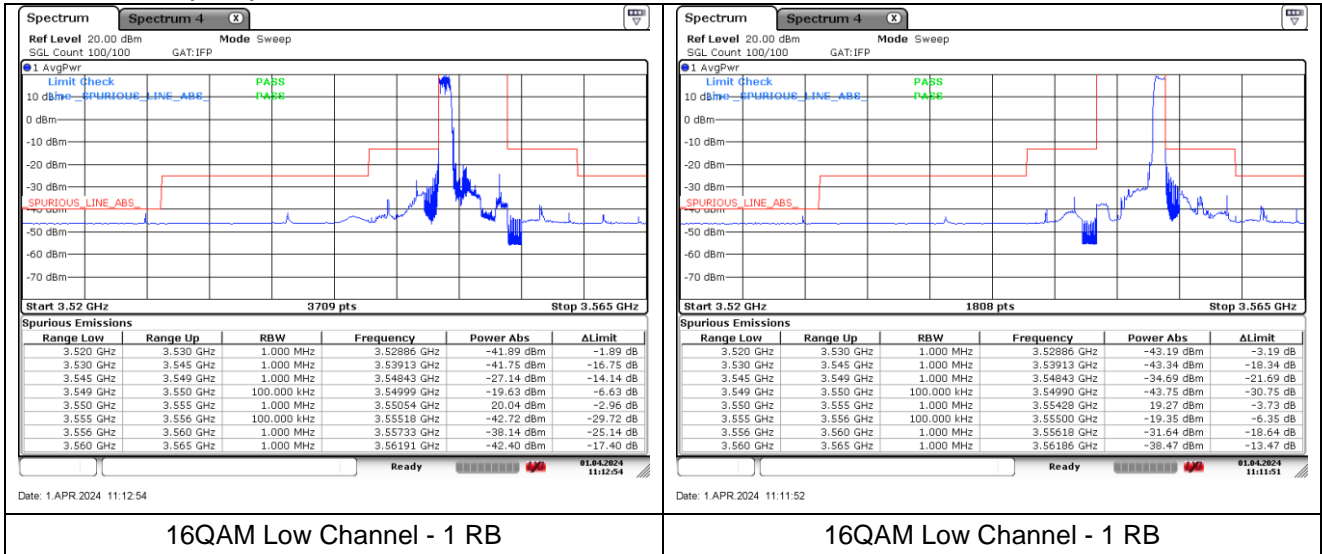
#### - Test plots

#### Band edge

#### LTE band 48 (5 MHz)

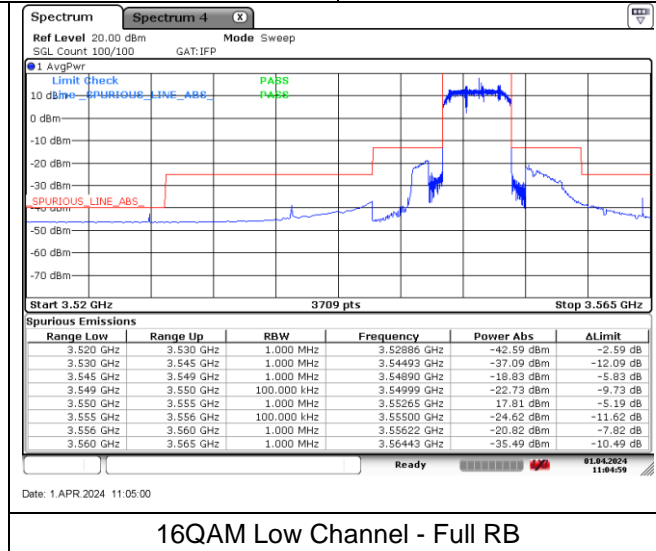


**LTE band 48 (5 MHz)**



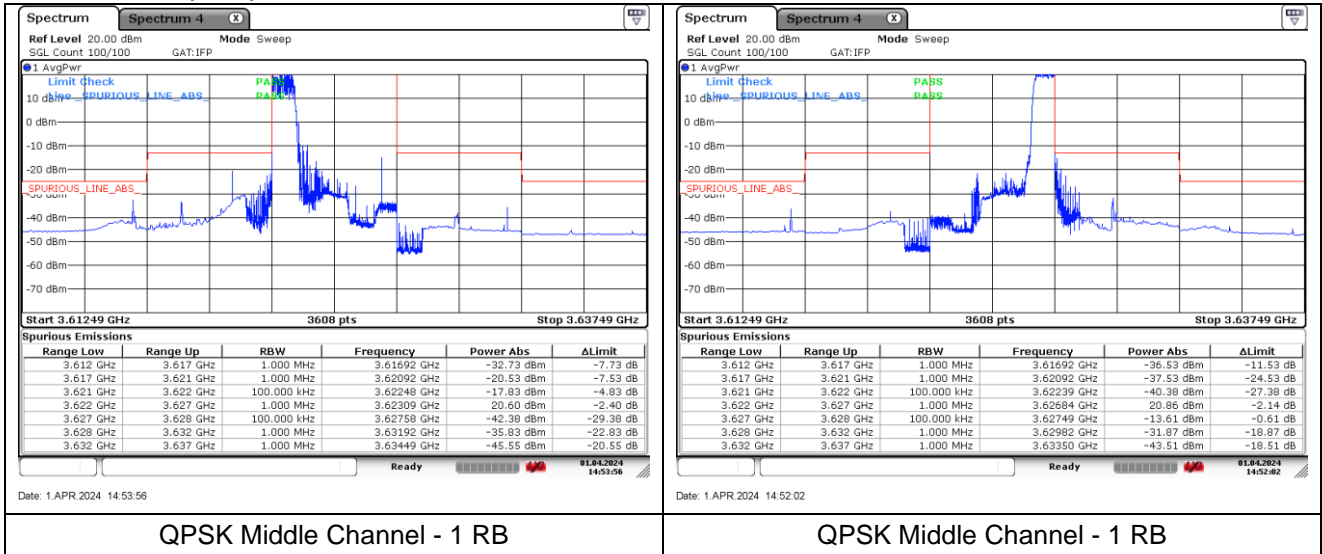
16QAM Low Channel - 1 RB

16QAM Low Channel - 1 RB



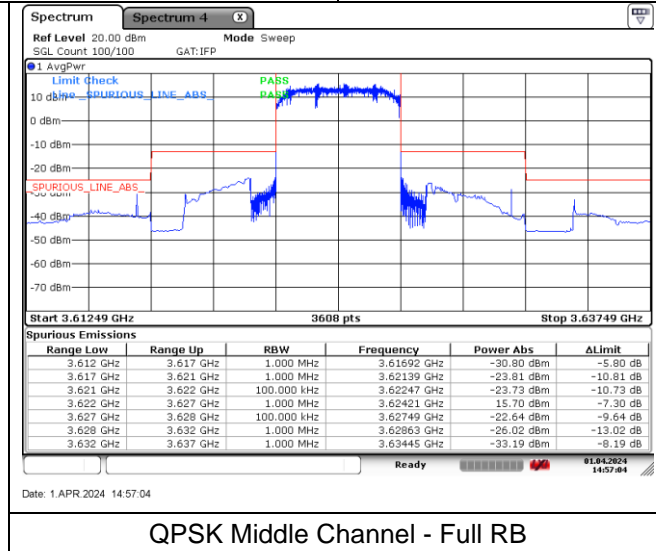
16QAM Low Channel - Full RB

**LTE band 48 (5 MHz)**



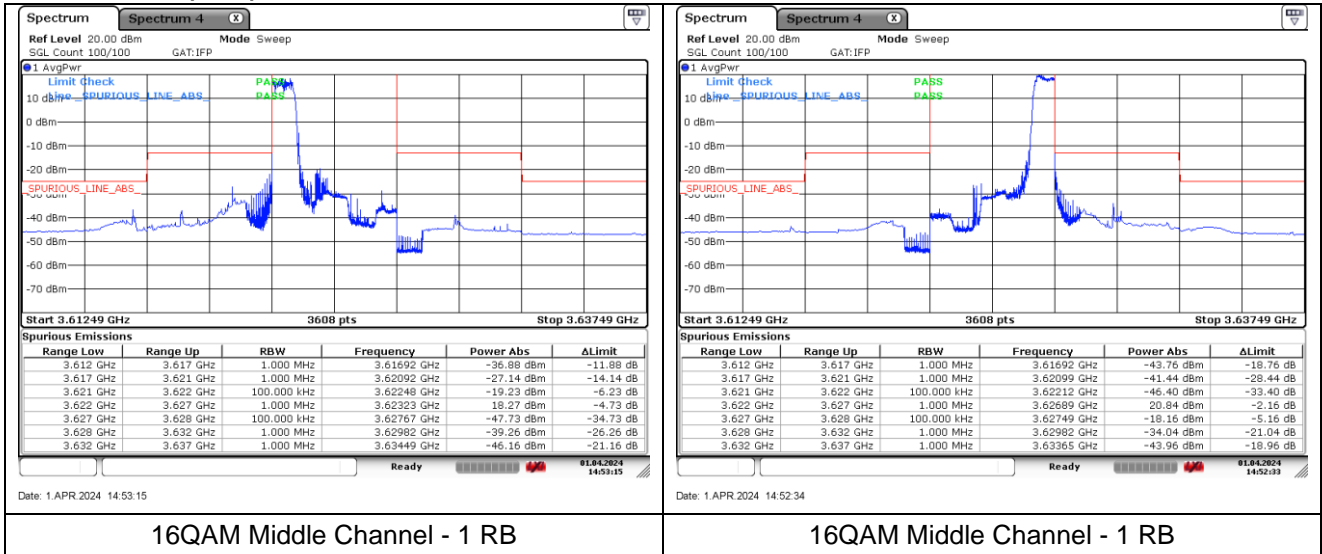
QPSK Middle Channel - 1 RB

QPSK Middle Channel - 1 RB



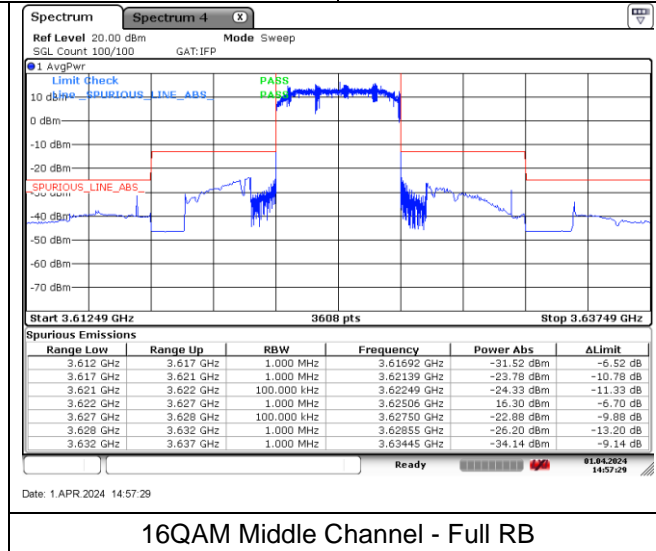
QPSK Middle Channel - Full RB

**LTE band 48 (5 MHz)**



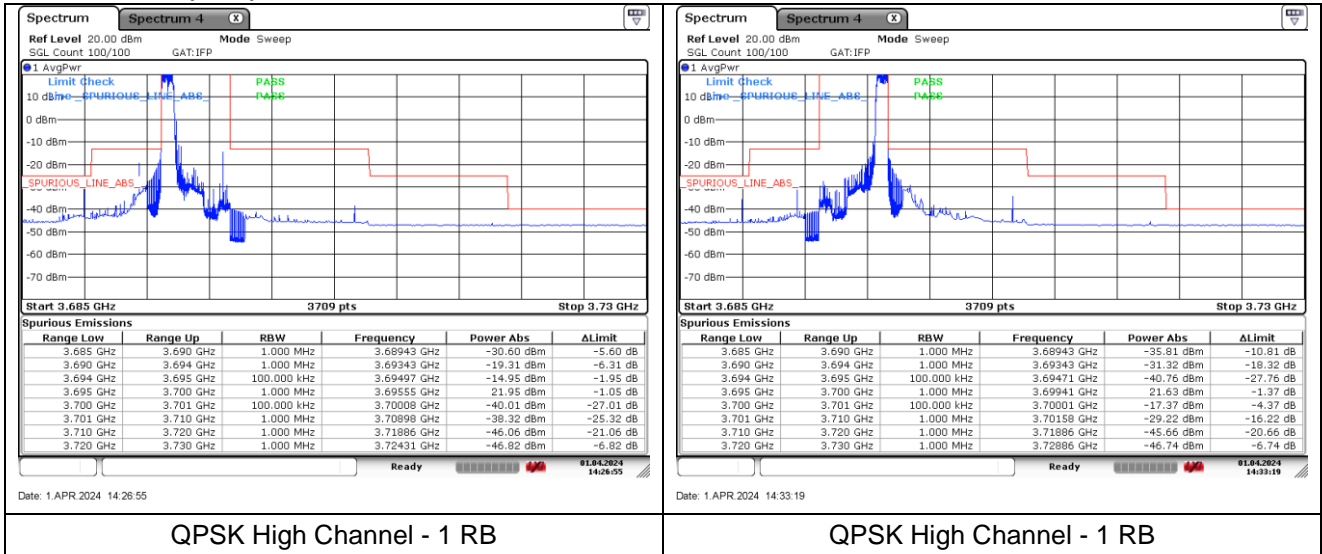
16QAM Middle Channel - 1 RB

16QAM Middle Channel - 1 RB



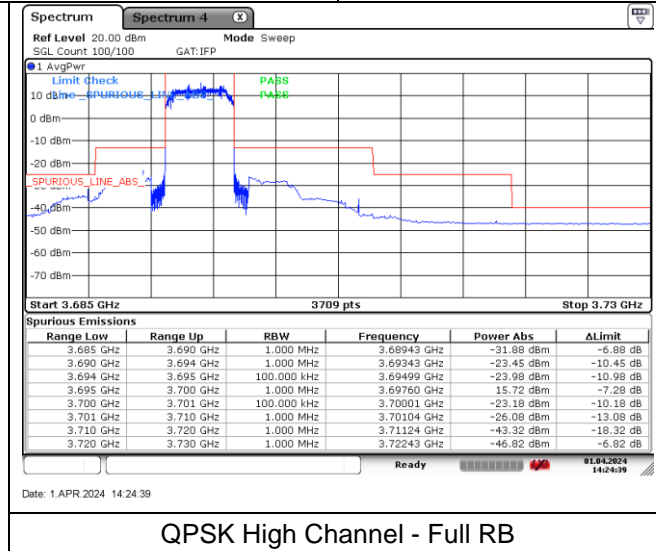
16QAM Middle Channel - Full RB

**LTE band 48 (5 MHz)**



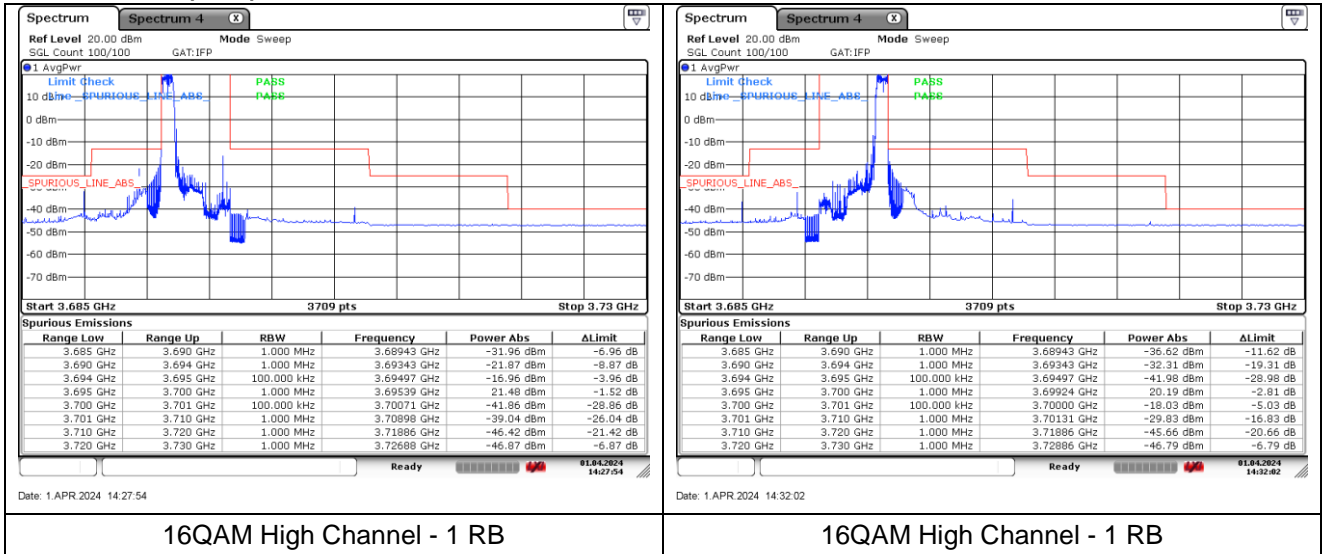
QPSK High Channel - 1 RB

QPSK High Channel - 1 RB



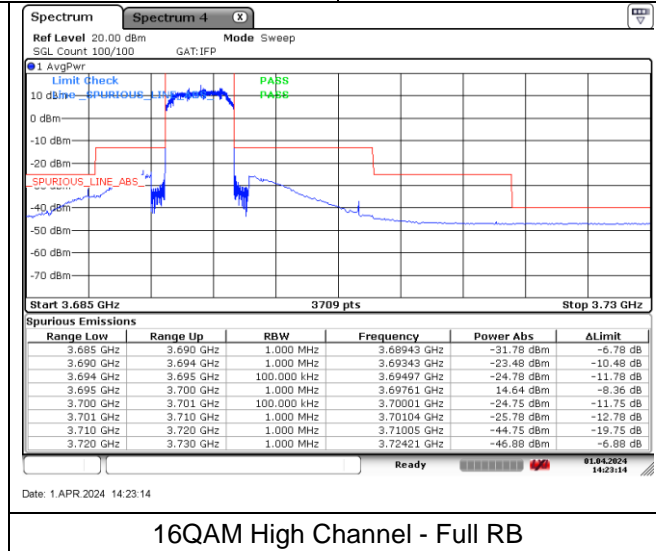
QPSK High Channel - Full RB

**LTE band 48 (5 MHz)**



16QAM High Channel - 1 RB

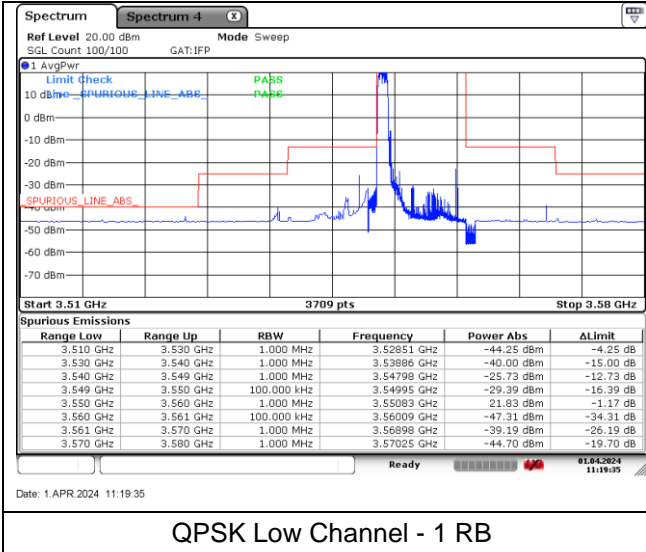
16QAM High Channel - 1 RB



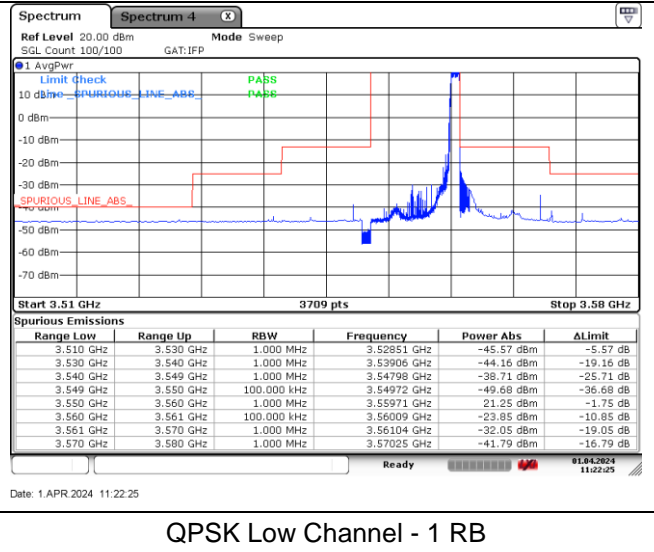
16QAM High Channel - Full RB



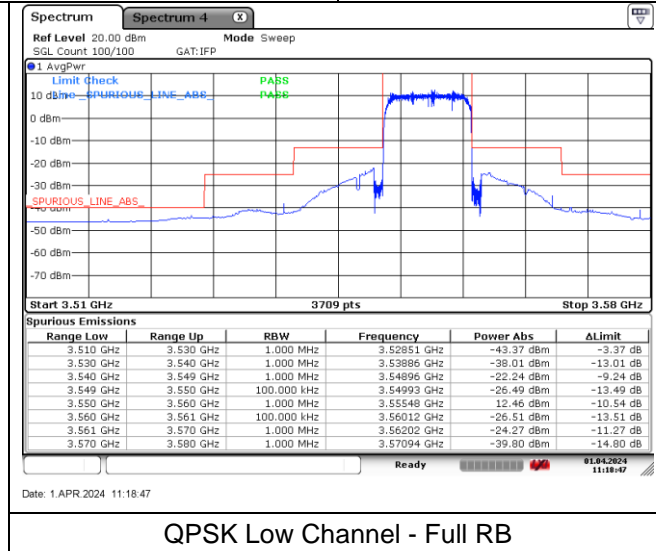
**LTE band 48 (10 MHz)**



QPSK Low Channel - 1 RB

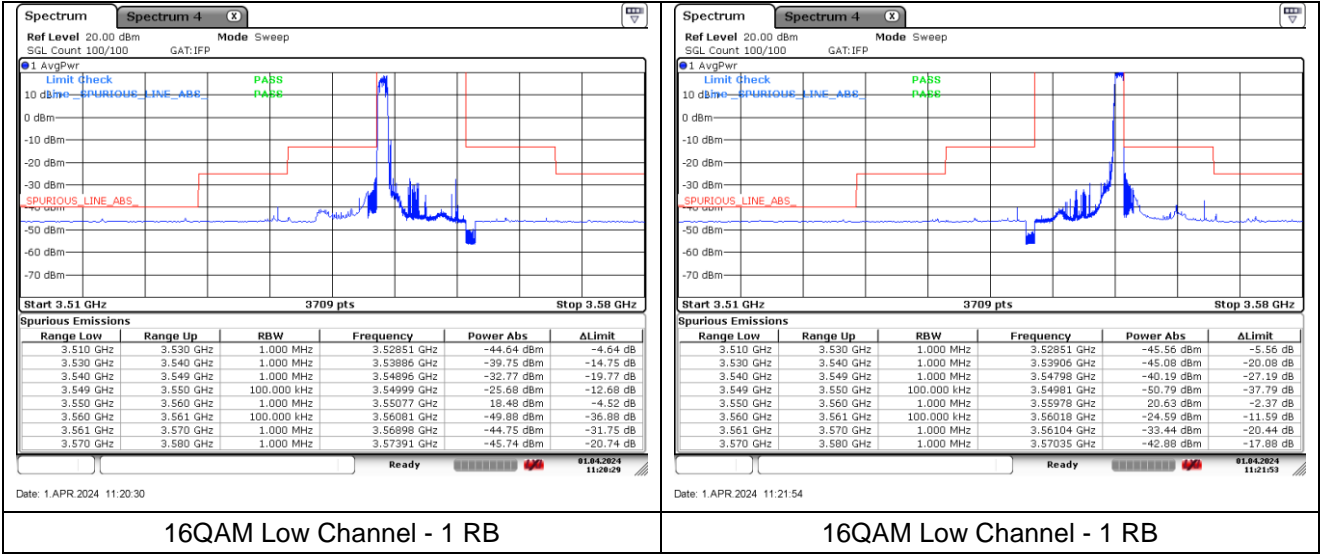


QPSK Low Channel - 1 RB



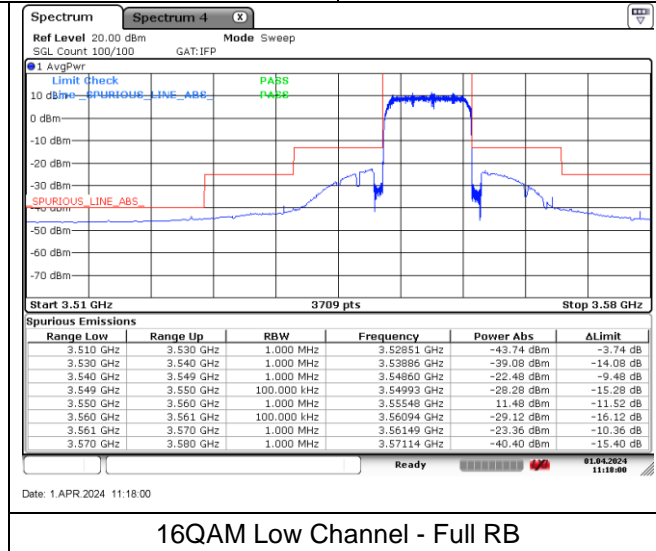
QPSK Low Channel - Full RB

**LTE band 48 (10 MHz)**



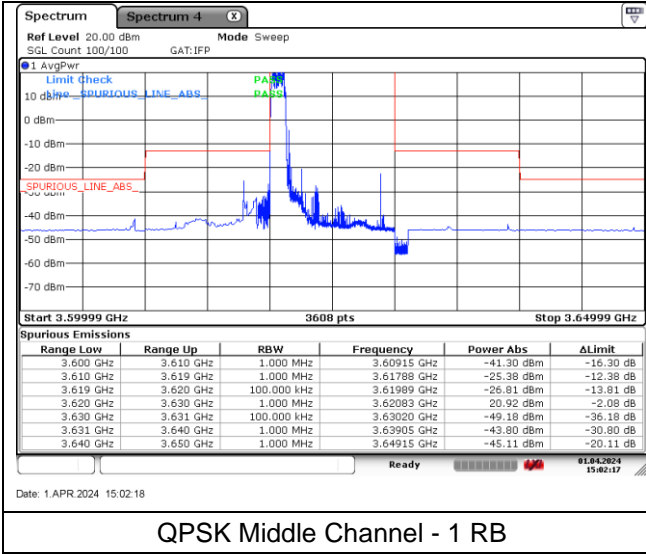
16QAM Low Channel - 1 RB

16QAM Low Channel - 1 RB

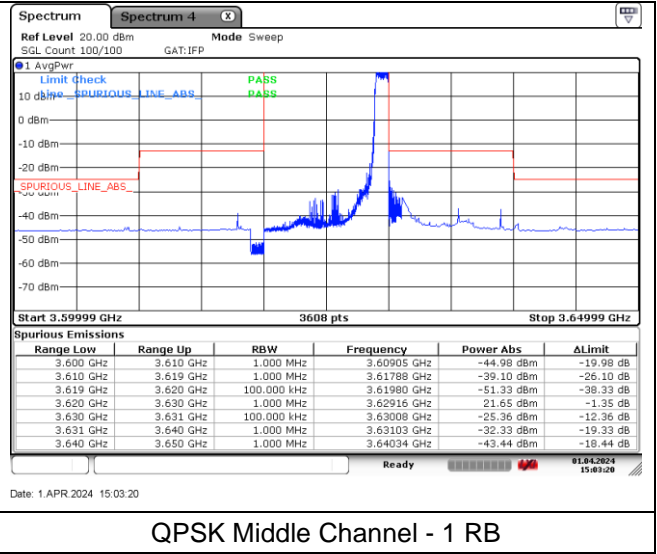


16QAM Low Channel - Full RB

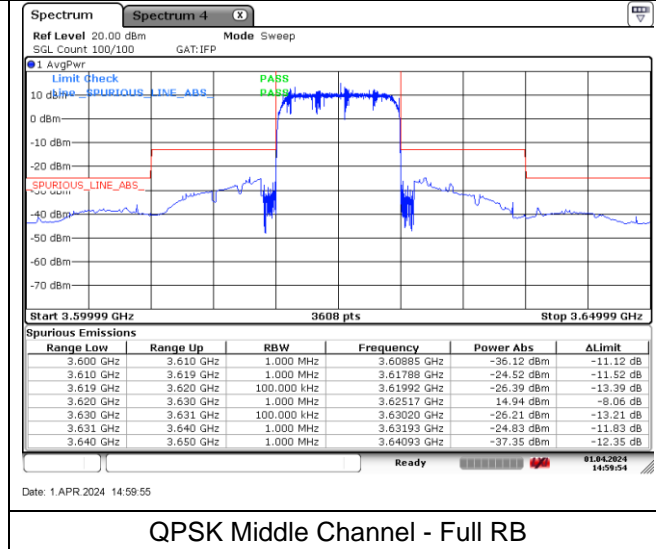
**LTE band 48 (10 MHz)**



QPSK Middle Channel - 1 RB

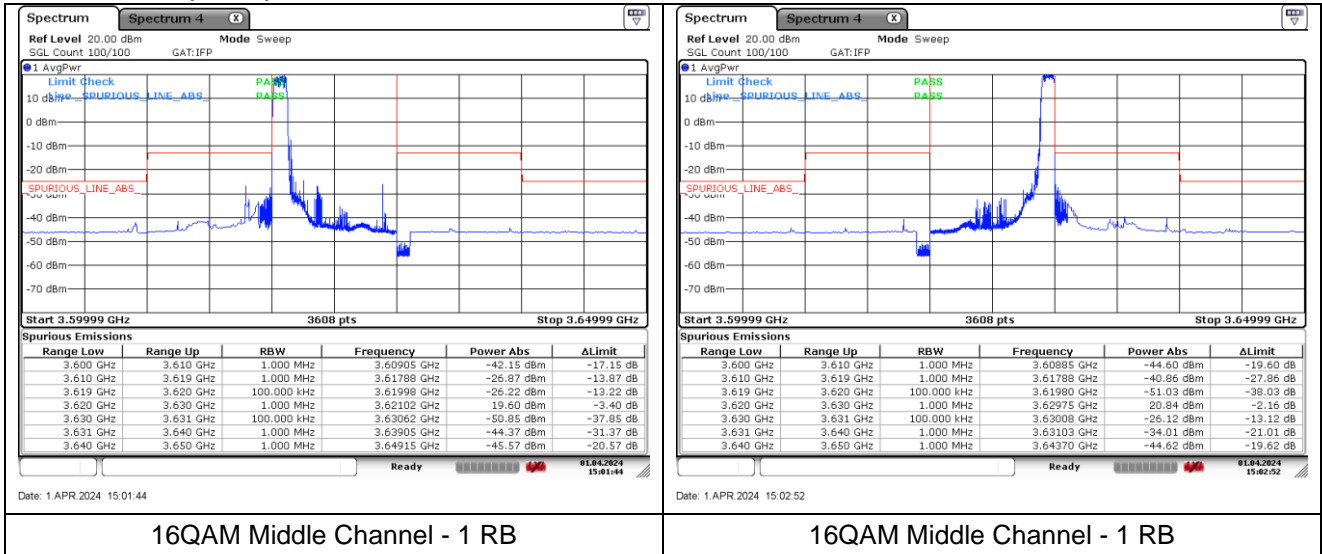


QPSK Middle Channel - 1 RB



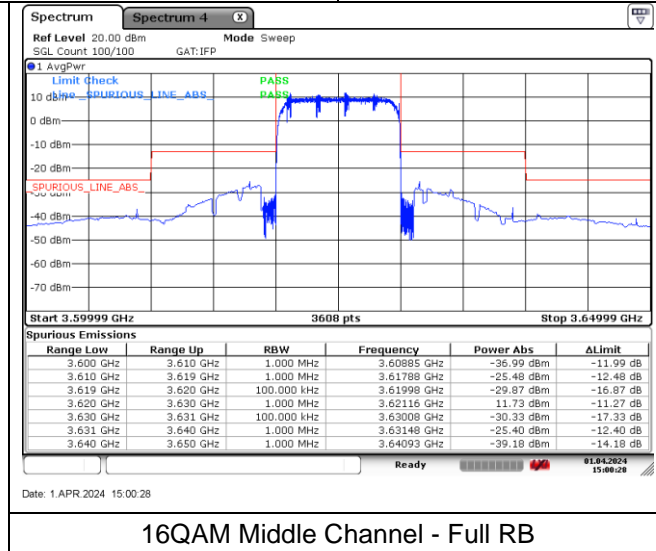
QPSK Middle Channel - Full RB

**LTE band 48 (10 MHz)**



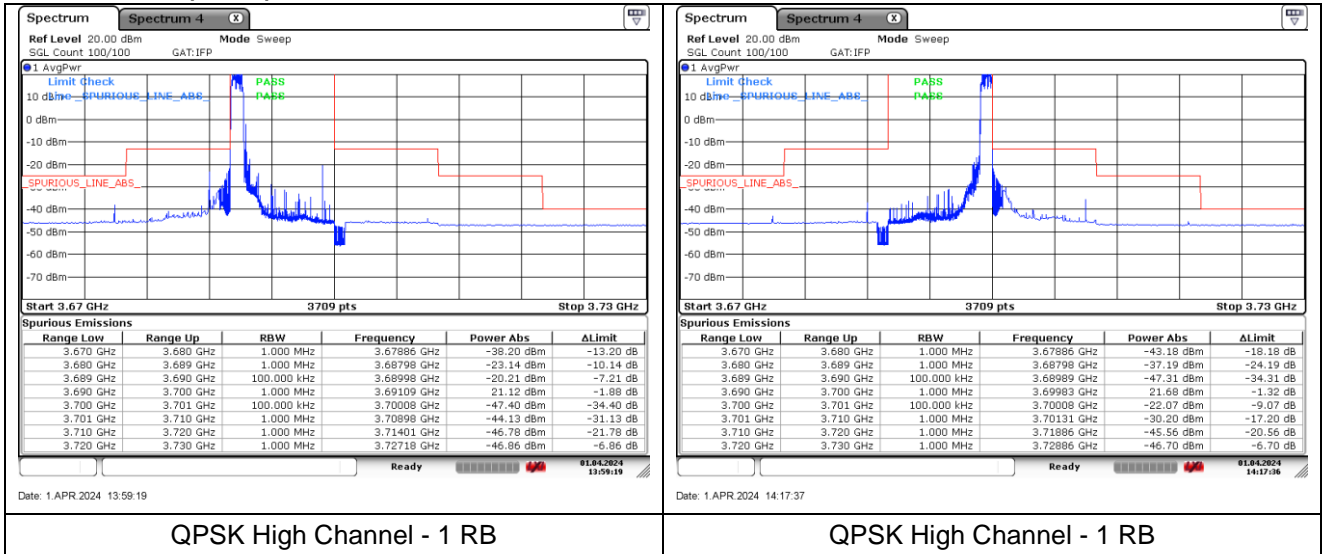
16QAM Middle Channel - 1 RB

16QAM Middle Channel - 1 RB



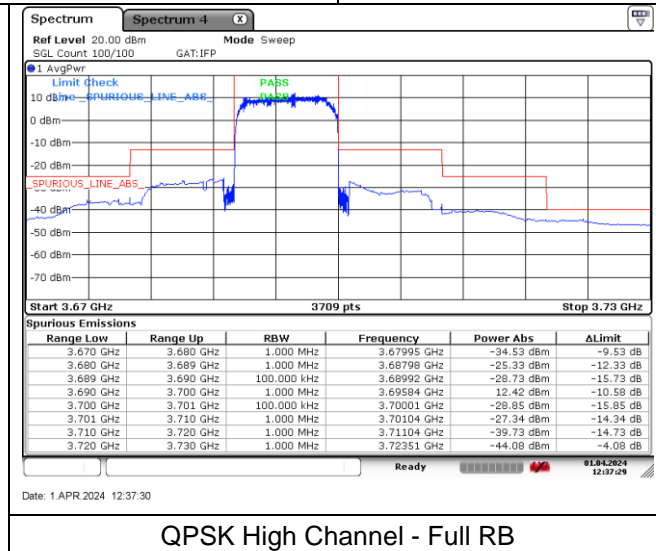
16QAM Middle Channel - Full RB

**LTE band 48 (10 MHz)**



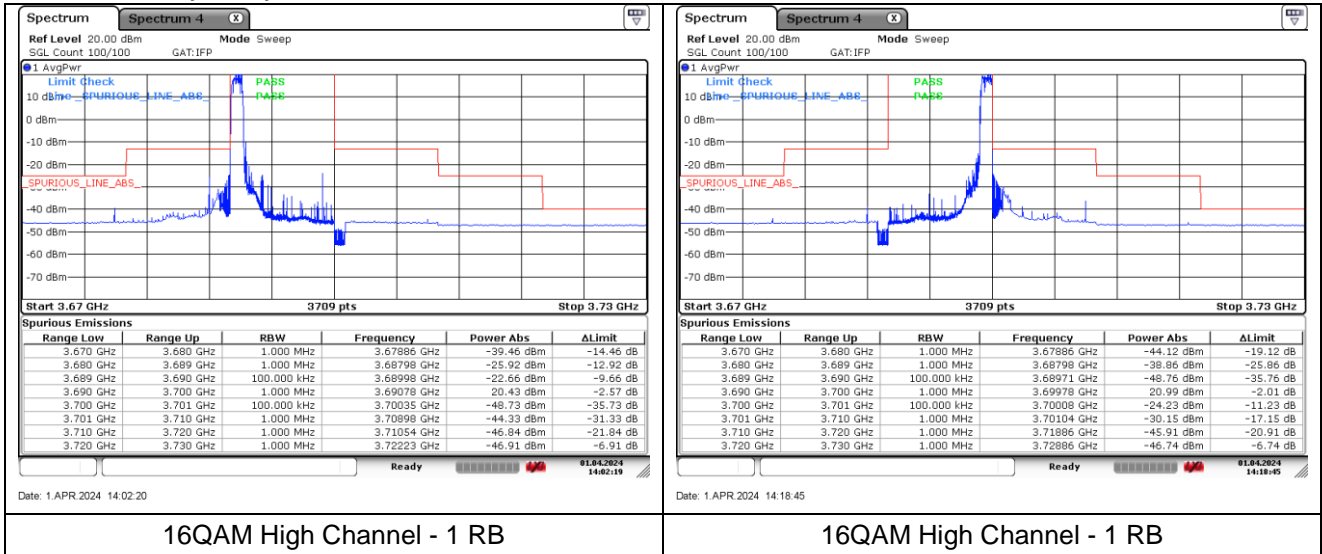
QPSK High Channel - 1 RB

QPSK High Channel - 1 RB



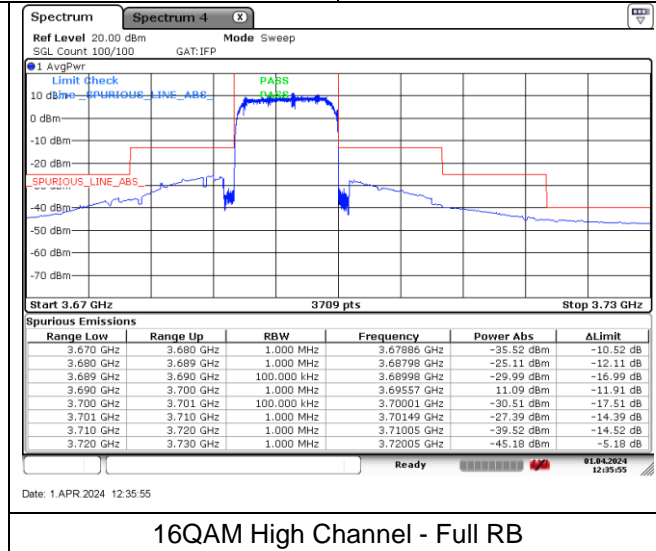
QPSK High Channel - Full RB

**LTE band 48 (10 MHz)**



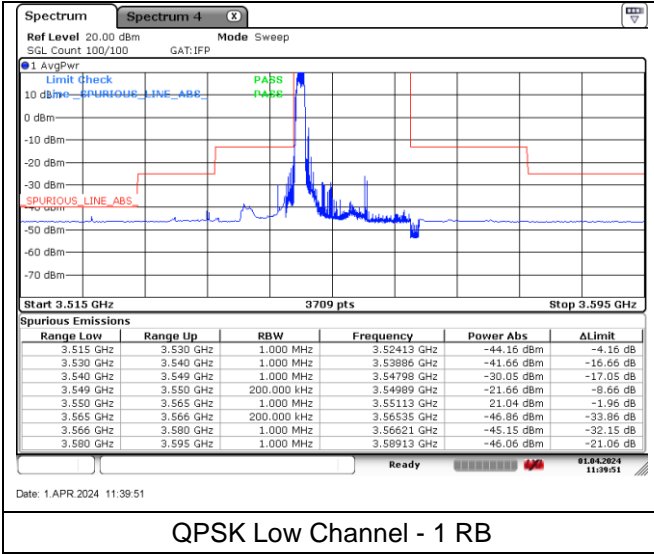
16QAM High Channel - 1 RB

16QAM High Channel - 1 RB

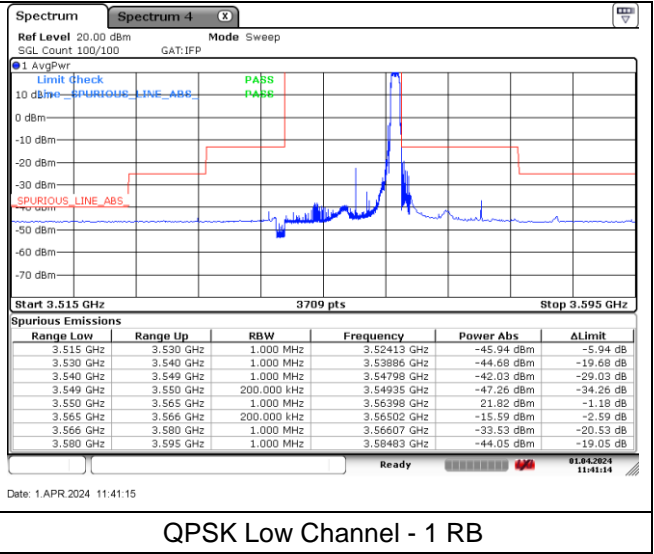


16QAM High Channel - Full RB

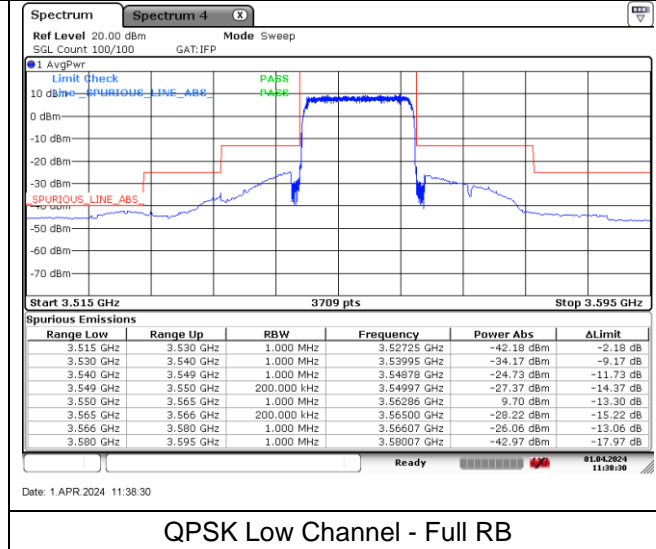
**LTE band 48 (15 MHz)**



**QPSK Low Channel - 1 RB**

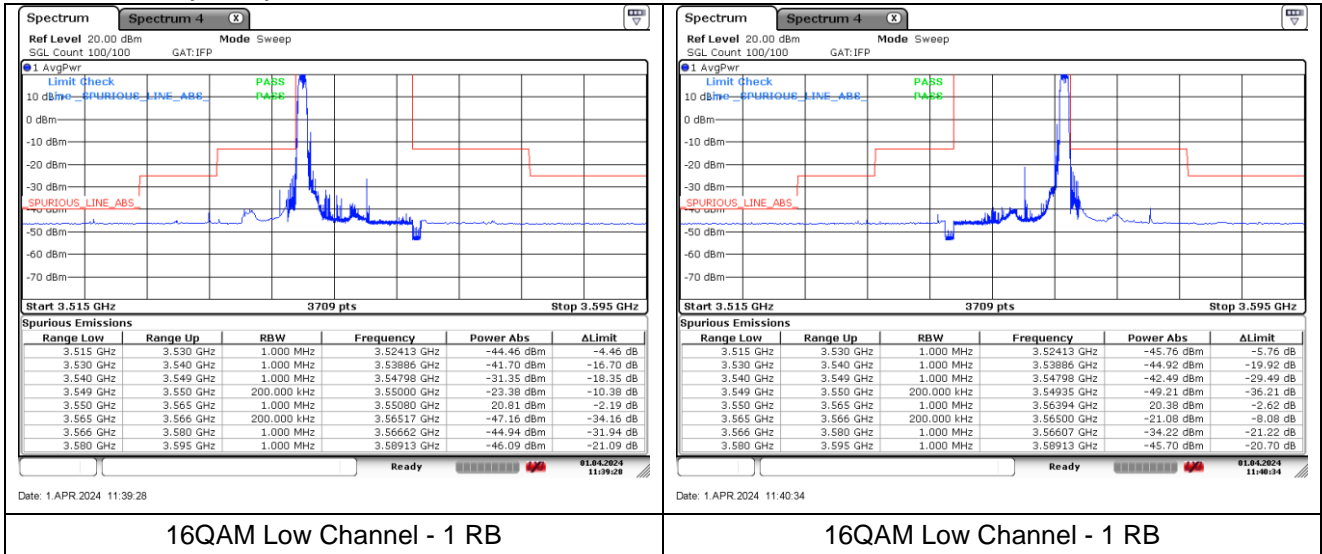


**QPSK Low Channel - 1 RB**



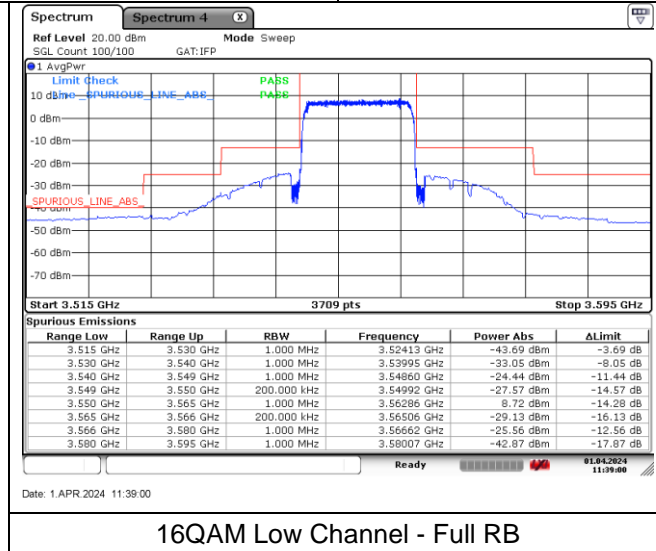
**QPSK Low Channel - Full RB**

**LTE band 48 (15 MHz)**



16QAM Low Channel - 1 RB

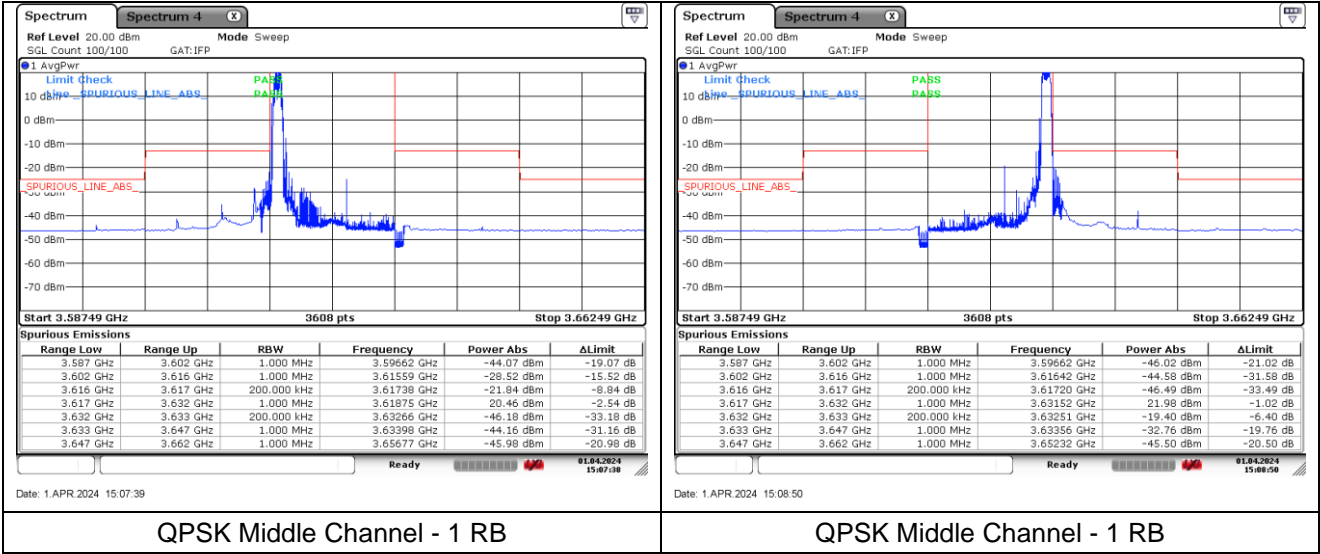
16QAM Low Channel - 1 RB



16QAM Low Channel - Full RB

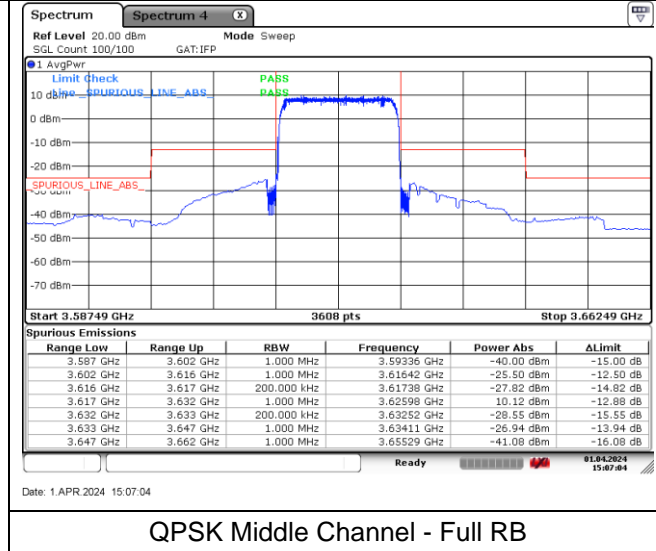


**LTE band 48 (15 MHz)**



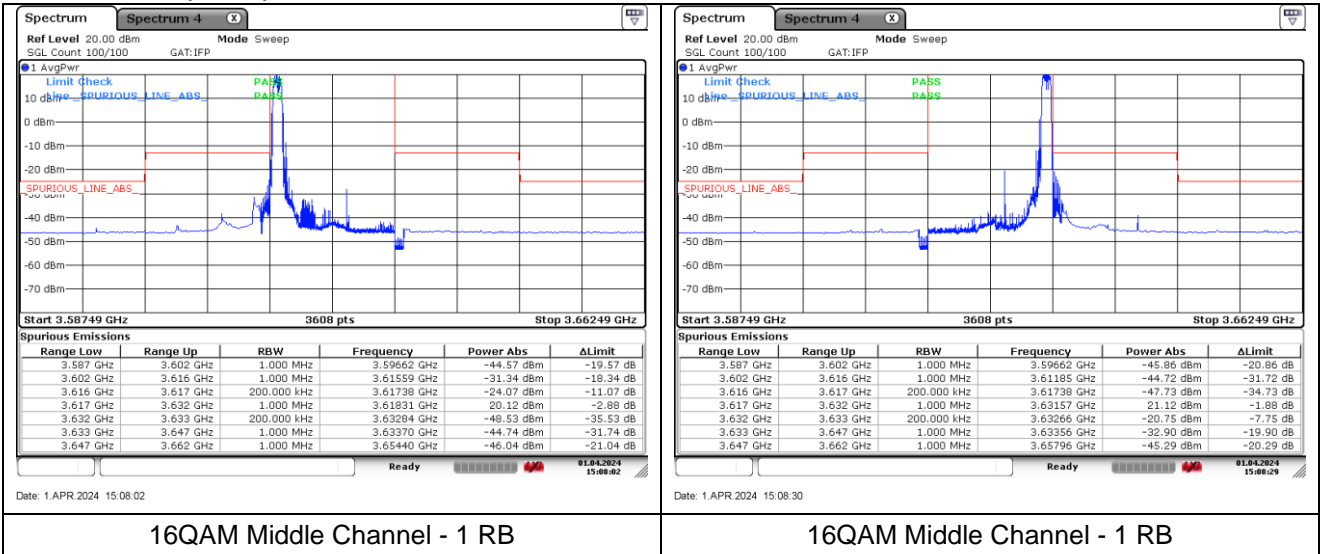
QPSK Middle Channel - 1 RB

QPSK Middle Channel - 1 RB



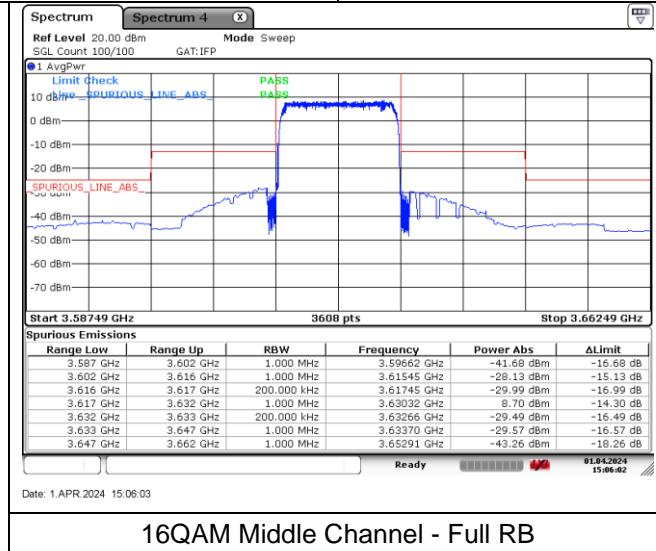
QPSK Middle Channel - Full RB

**LTE band 48 (15 MHz)**



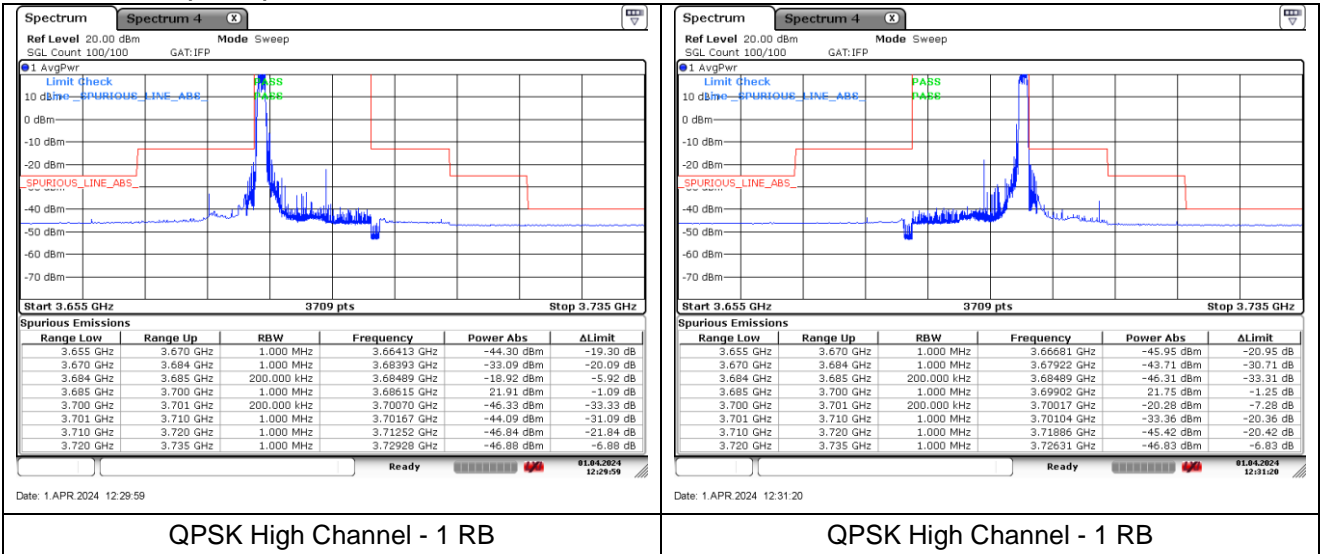
16QAM Middle Channel - 1 RB

16QAM Middle Channel - 1 RB



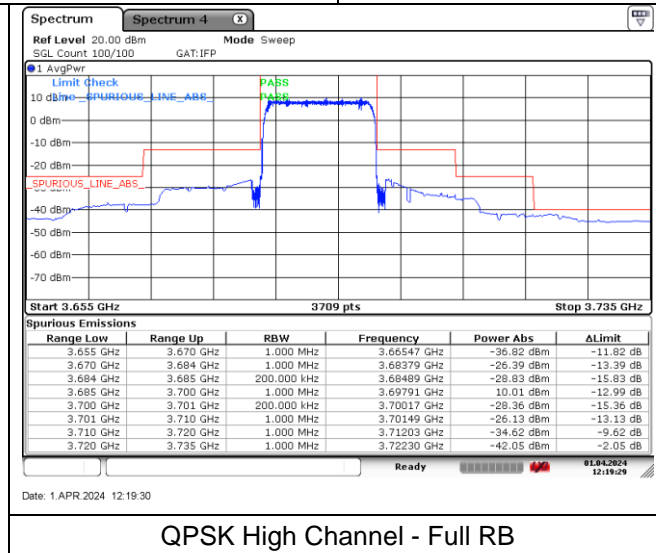
16QAM Middle Channel - Full RB

**LTE band 48 (15 MHz)**



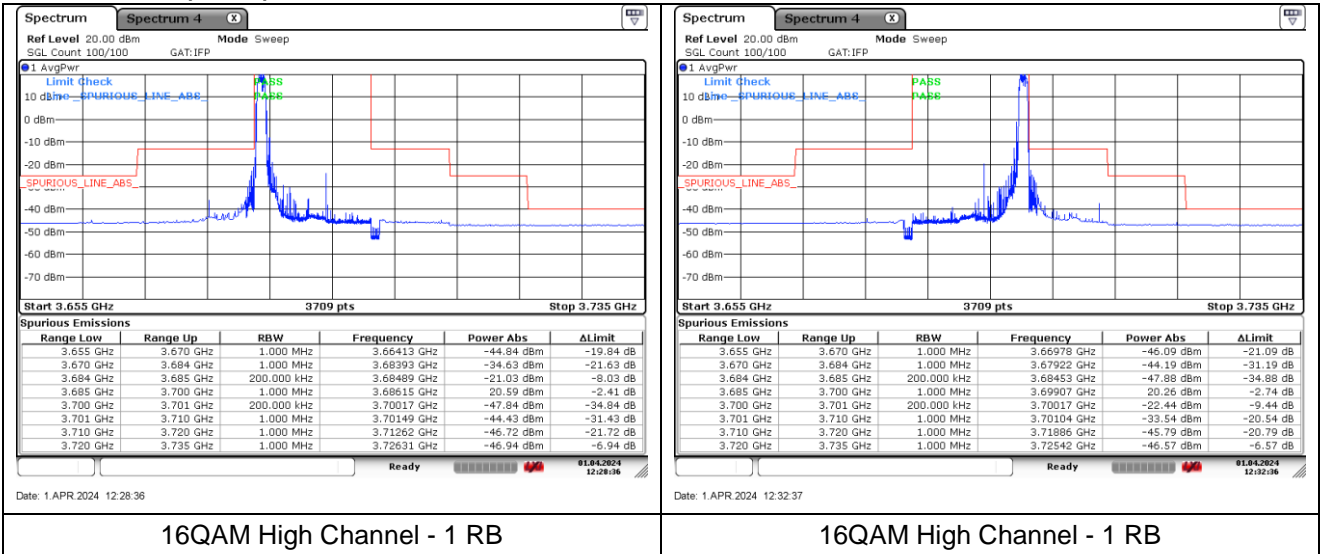
QPSK High Channel - 1 RB

QPSK High Channel - 1 RB



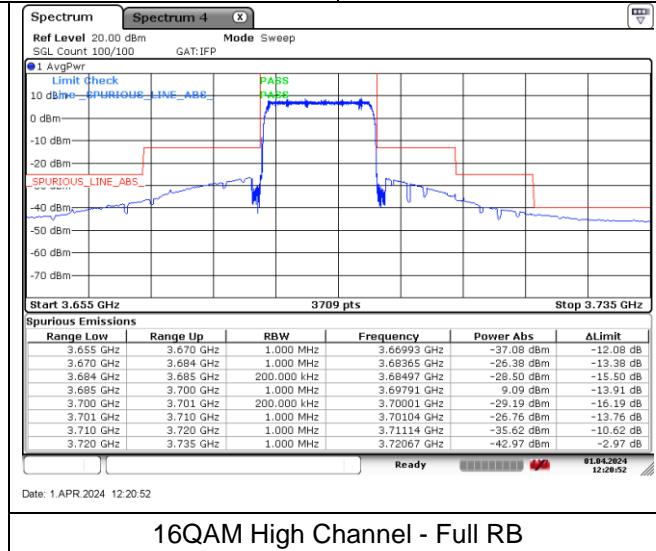
QPSK High Channel - Full RB

**LTE band 48 (15 MHz)**



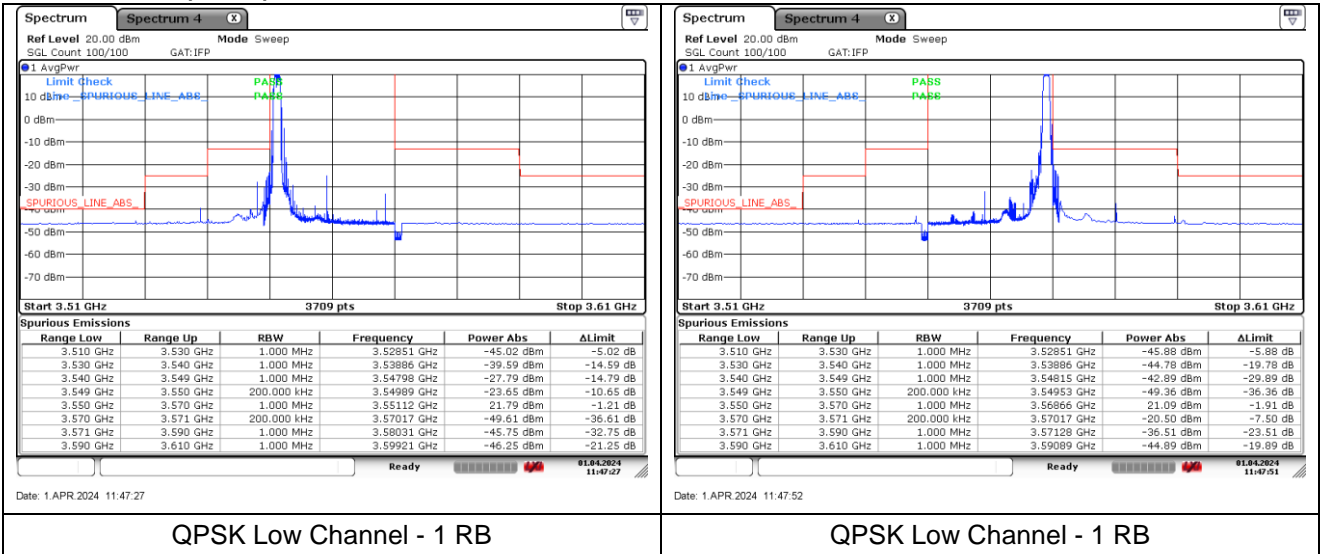
16QAM High Channel - 1 RB

16QAM High Channel - 1 RB



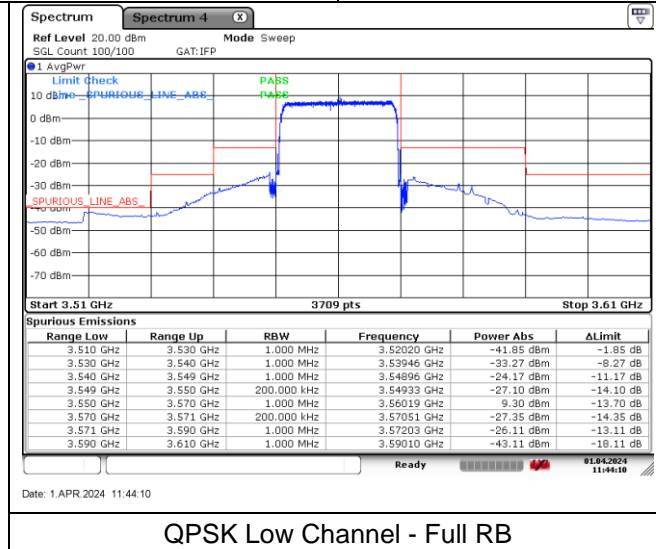
16QAM High Channel - Full RB

**LTE band 48 (20 MHz)**



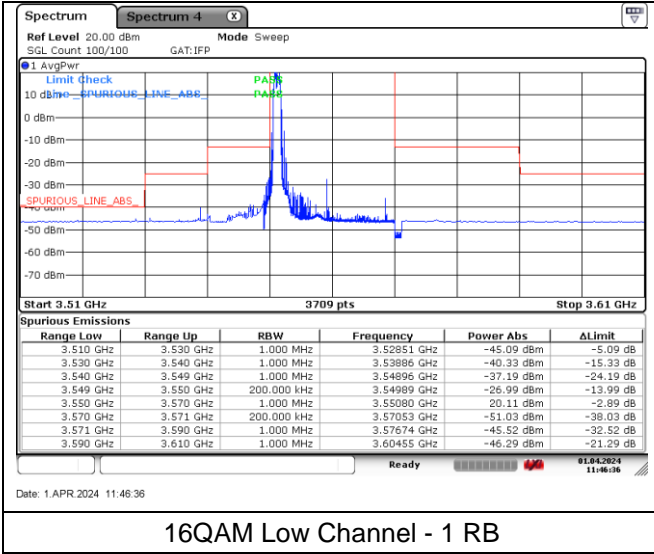
QPSK Low Channel - 1 RB

QPSK Low Channel - 1 RB

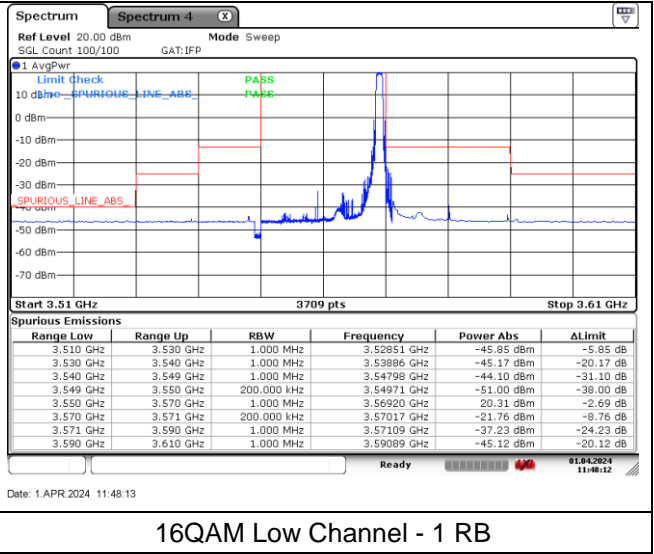


QPSK Low Channel - Full RB

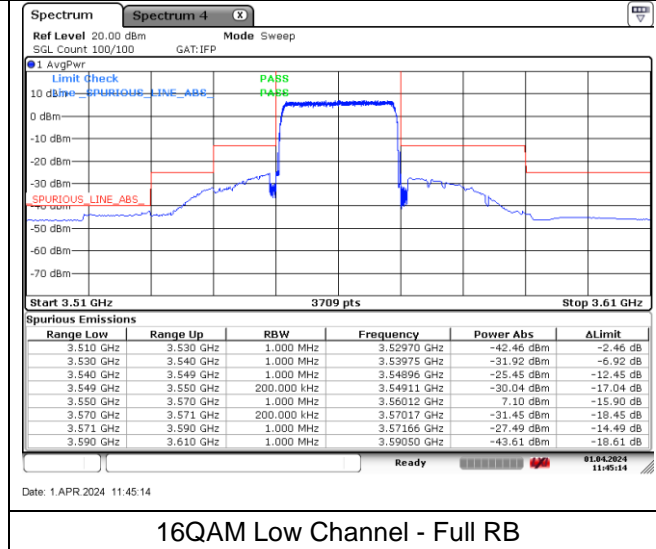
**LTE band 48 (20 MHz)**



16QAM Low Channel - 1 RB

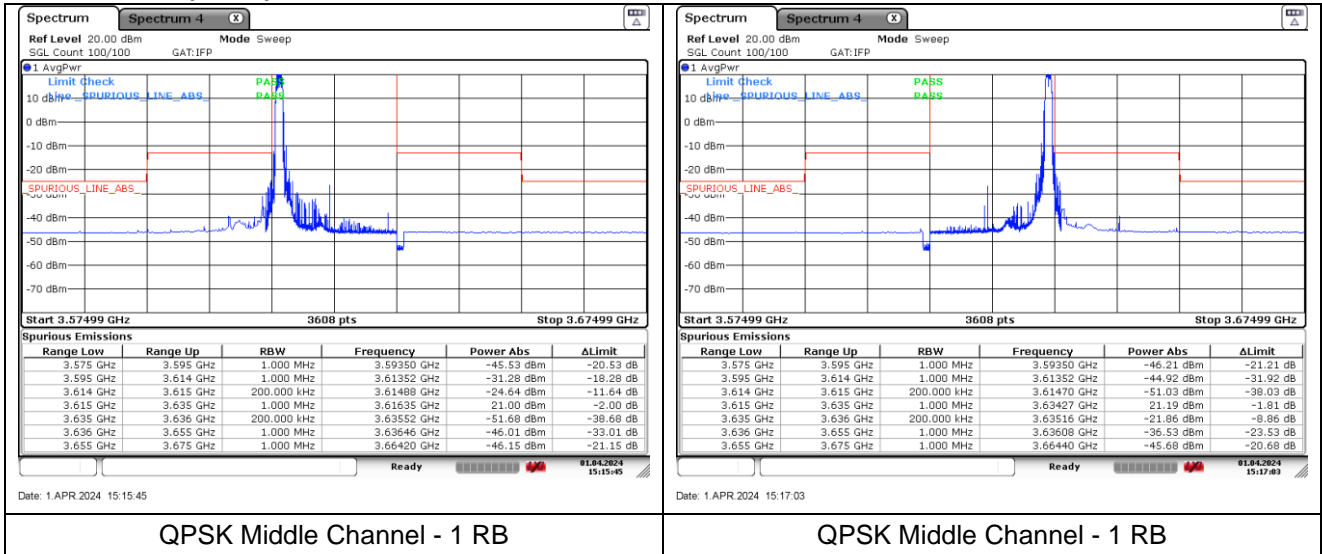


16QAM Low Channel - 1 RB



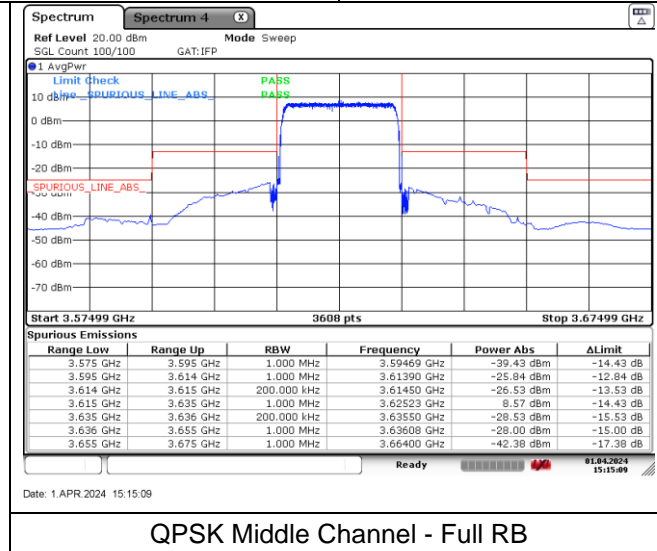
16QAM Low Channel - Full RB

**LTE band 48 (20 MHz)**



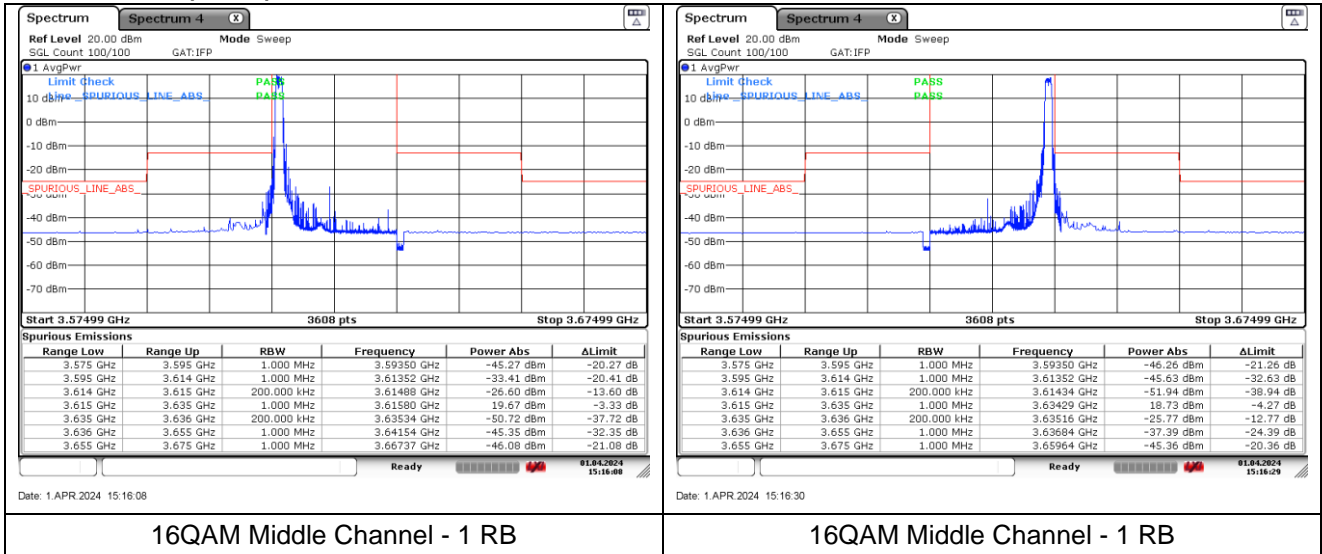
QPSK Middle Channel - 1 RB

QPSK Middle Channel - 1 RB



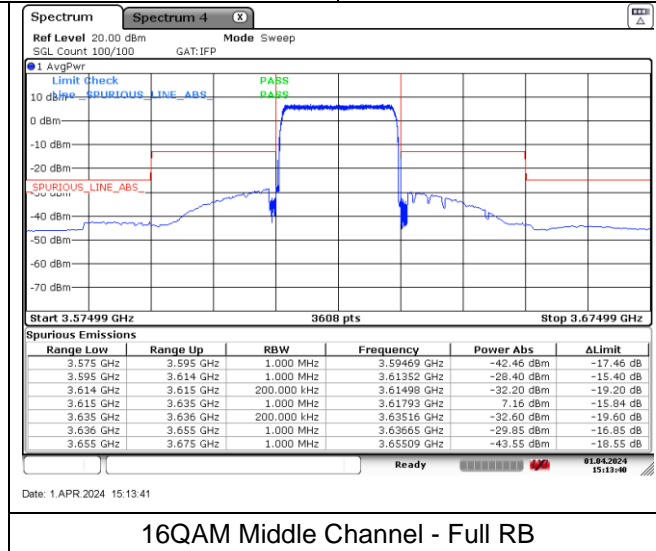
QPSK Middle Channel - Full RB

**LTE band 48 (20 MHz)**



16QAM Middle Channel - 1 RB

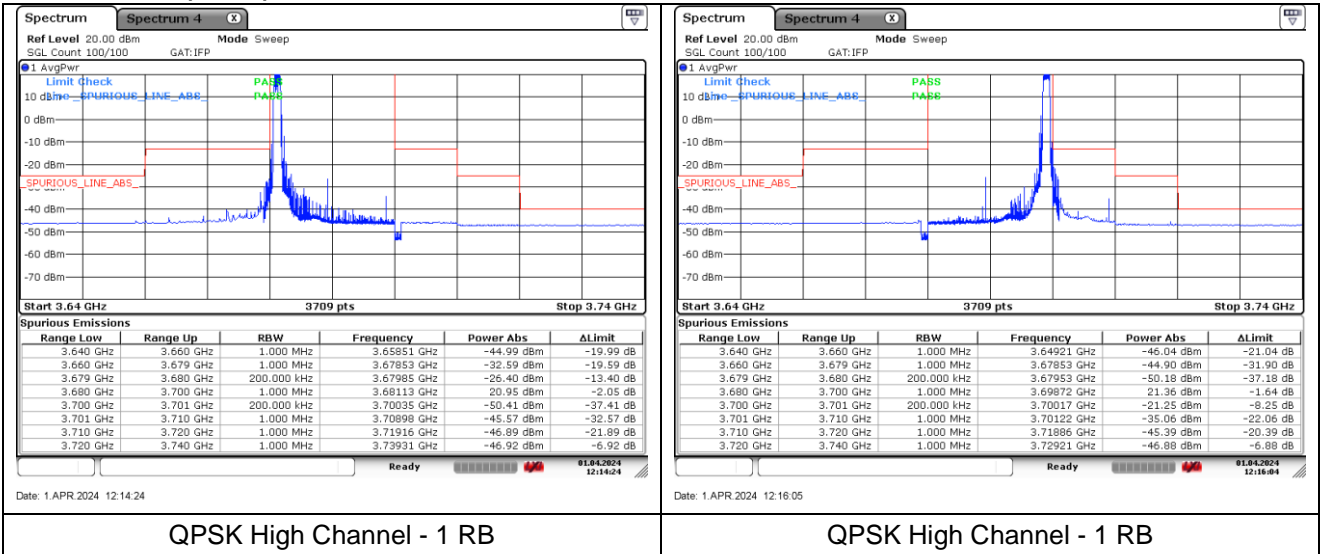
16QAM Middle Channel - 1 RB



16QAM Middle Channel - Full RB

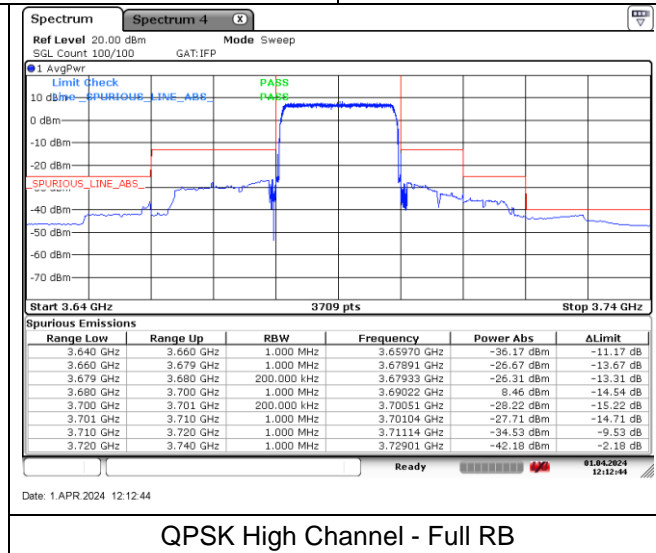


**LTE band 48 (20 MHz)**



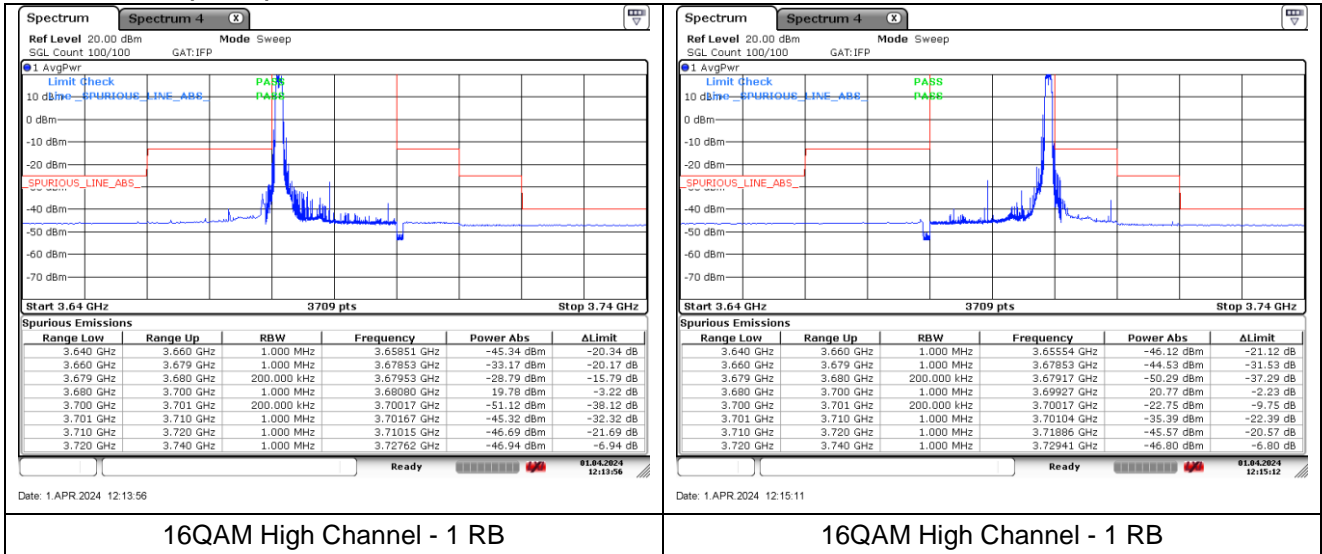
QPSK High Channel - 1 RB

QPSK High Channel - 1 RB



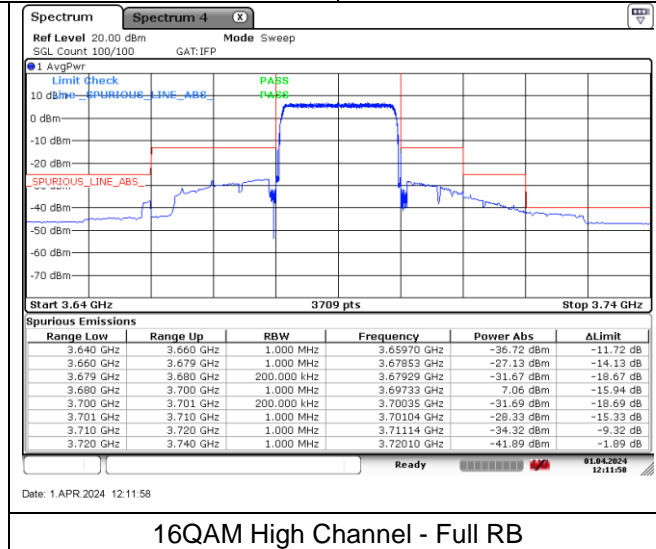
QPSK High Channel - Full RB

**LTE band 48 (20 MHz)**



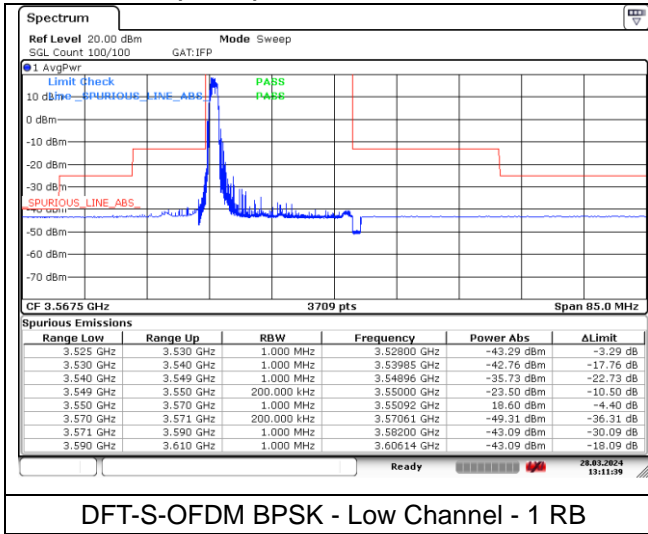
16QAM High Channel - 1 RB

16QAM High Channel - 1 RB

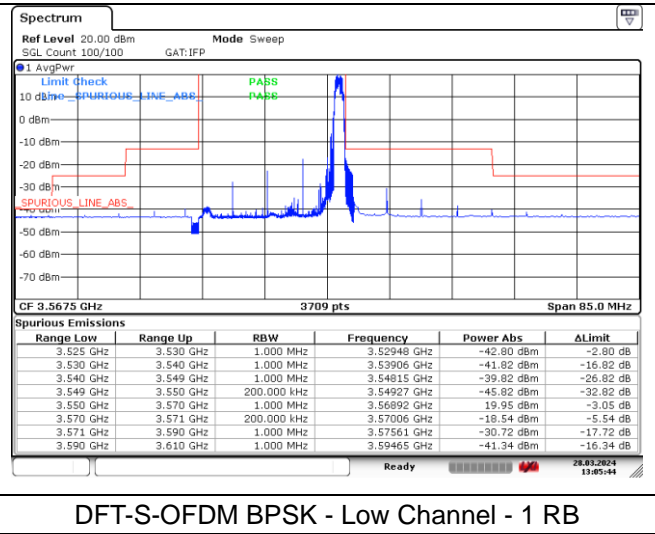


16QAM High Channel - Full RB

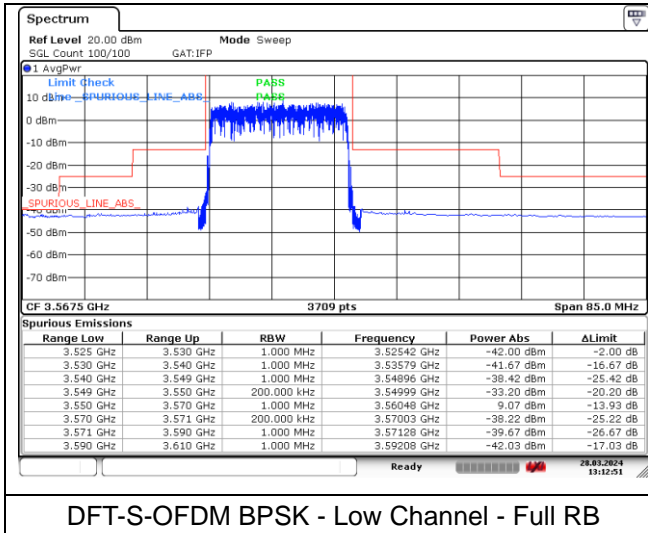
**NR band 48 (20 MHz)**



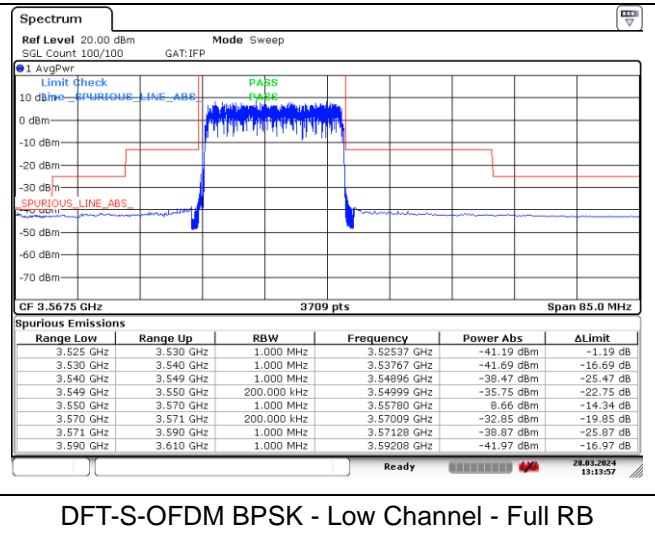
DFT-S-OFDM BPSK - Low Channel - 1 RB



DFT-S-OFDM BPSK - Low Channel - 1 RB

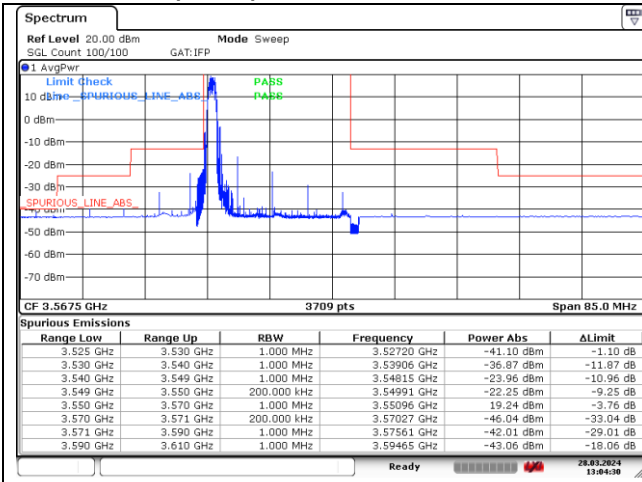


DFT-S-OFDM BPSK - Low Channel - Full RB

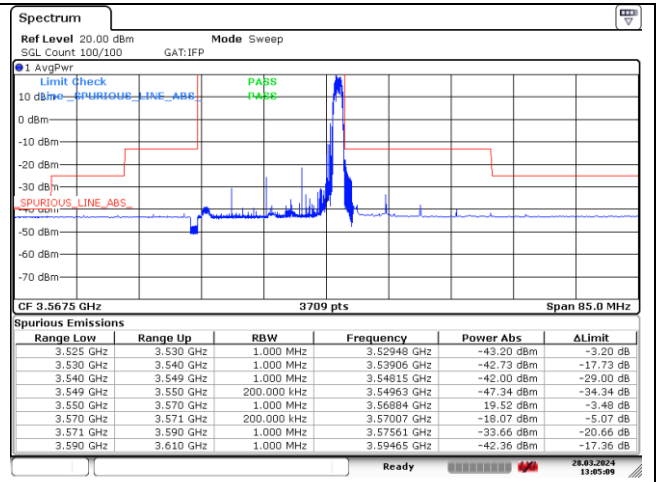


DFT-S-OFDM BPSK - Low Channel - Full RB

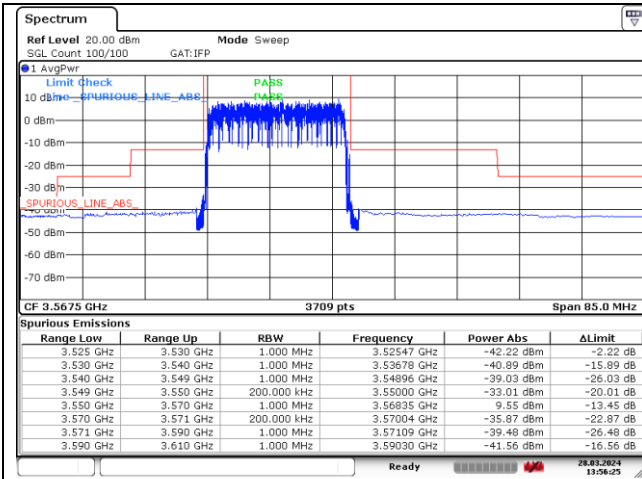
**NR band 48 (20 MHz)**



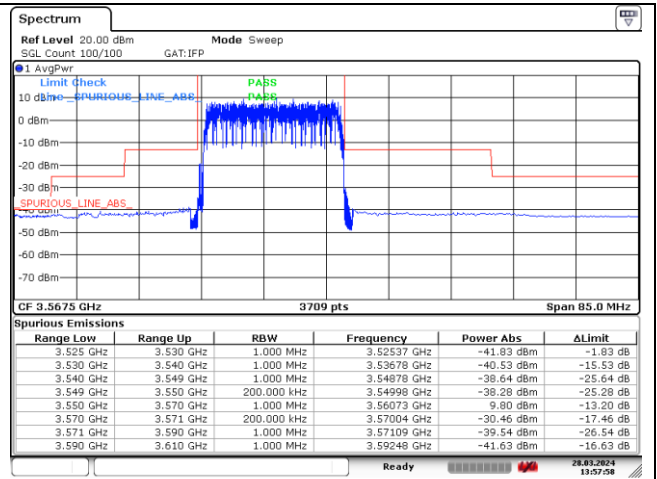
DFT-S-OFDM 16QAM - Low Channel - 1 RB



DFT-S-OFDM 16QAM - Low Channel - 1 RB

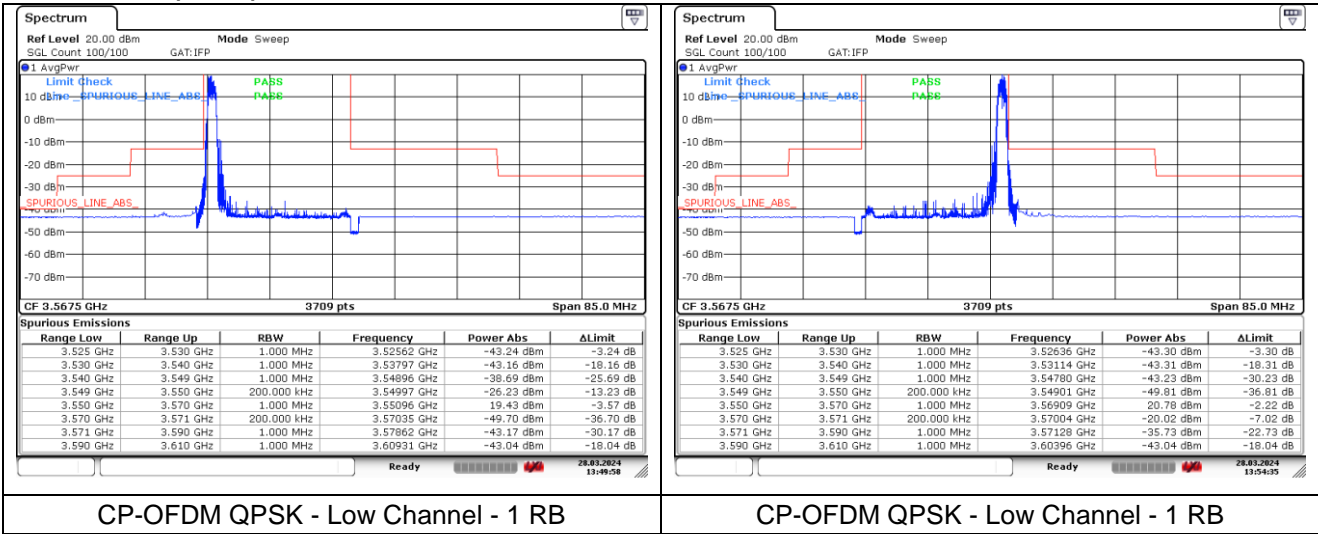


DFT-S-OFDM 16QAM - Low Channel - Full RB



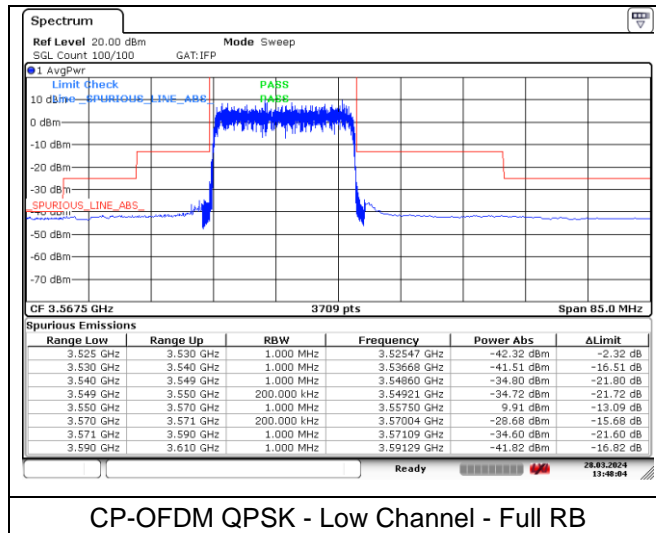
DFT-S-OFDM 16QAM - Low Channel - Full RB

**NR band 48 (20 MHz)**



CP-OFDM QPSK - Low Channel - 1 RB

CP-OFDM QPSK - Low Channel - 1 RB



CP-OFDM QPSK - Low Channel - Full RB