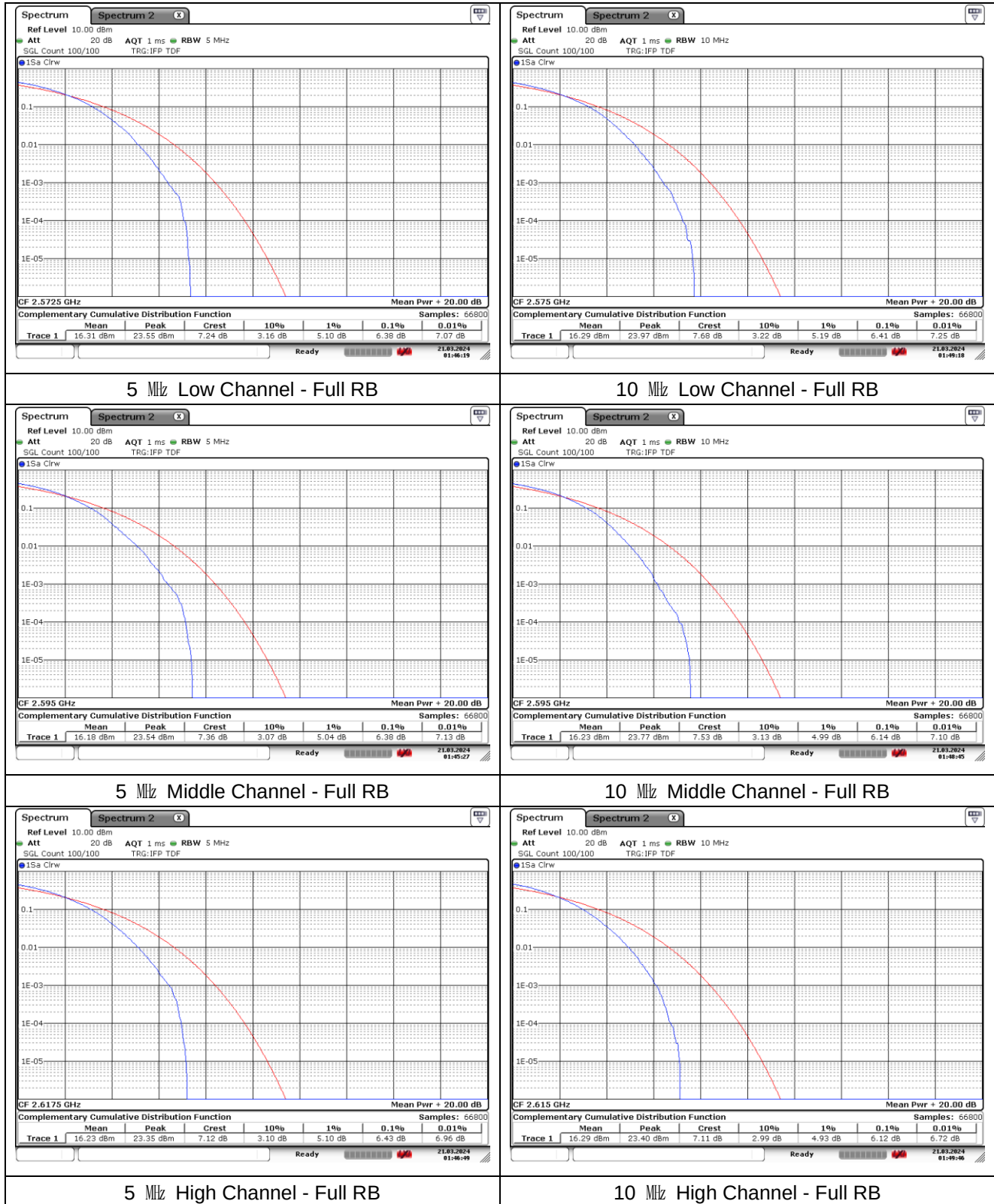
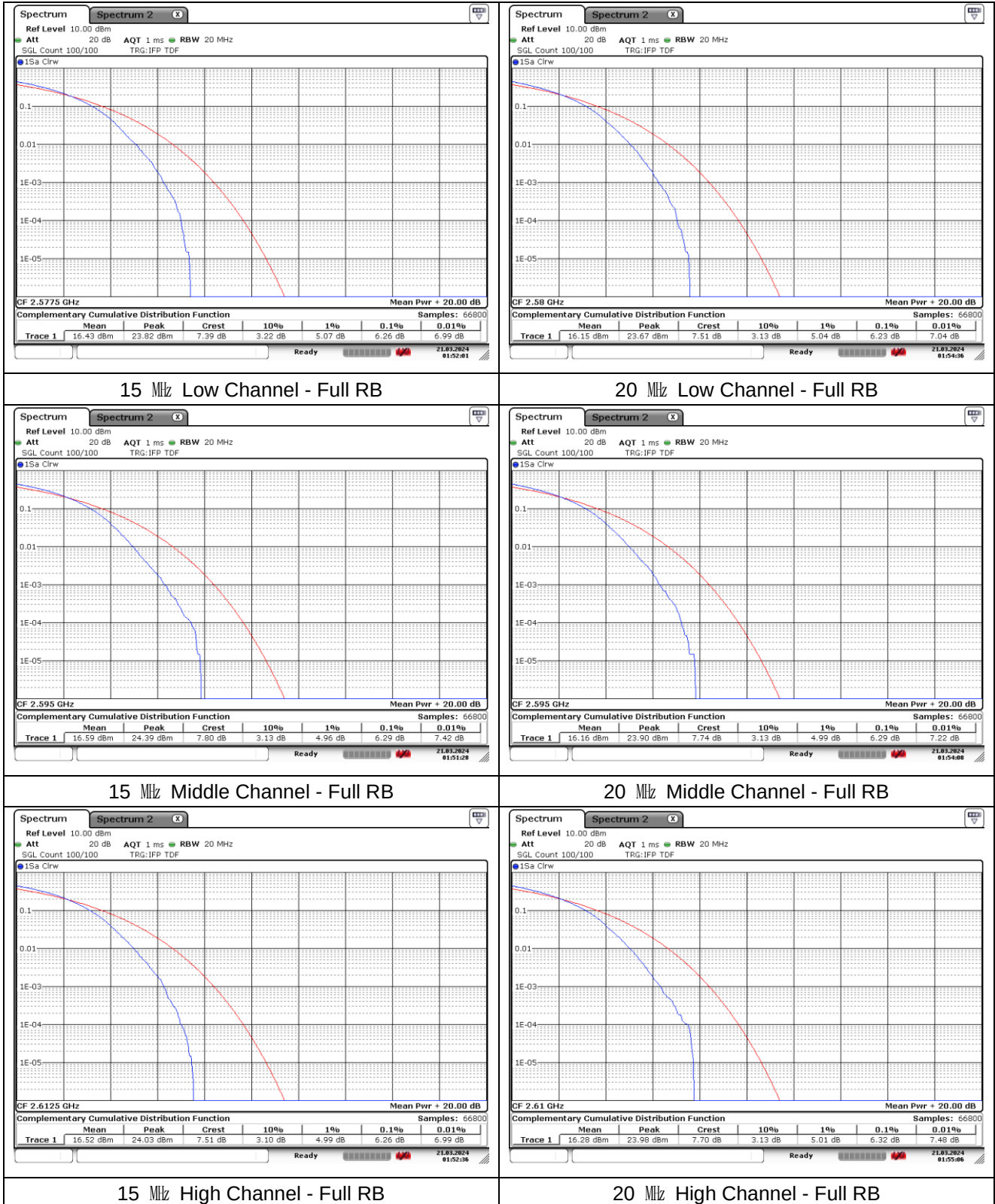


## - Switching

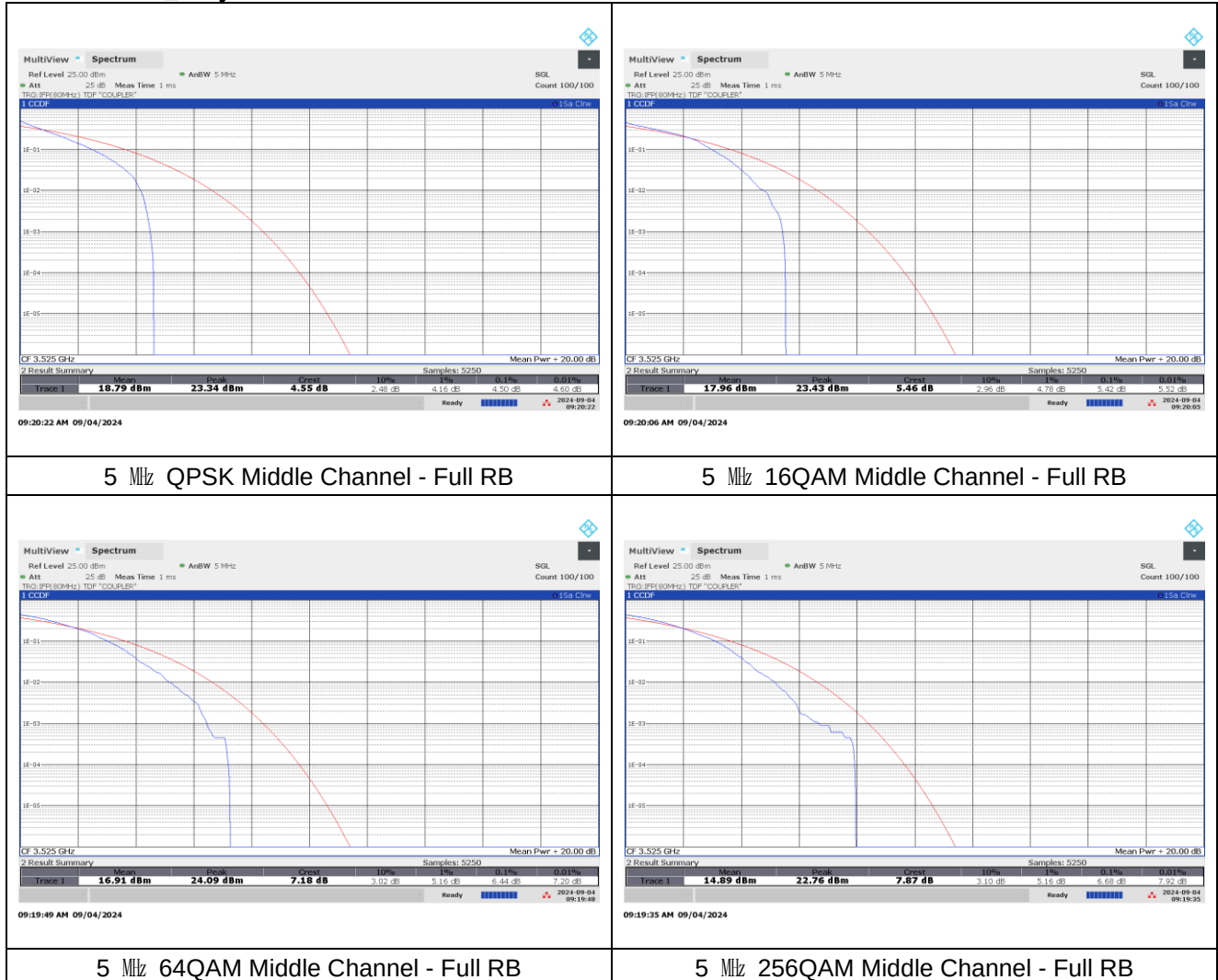
### LTE band 38



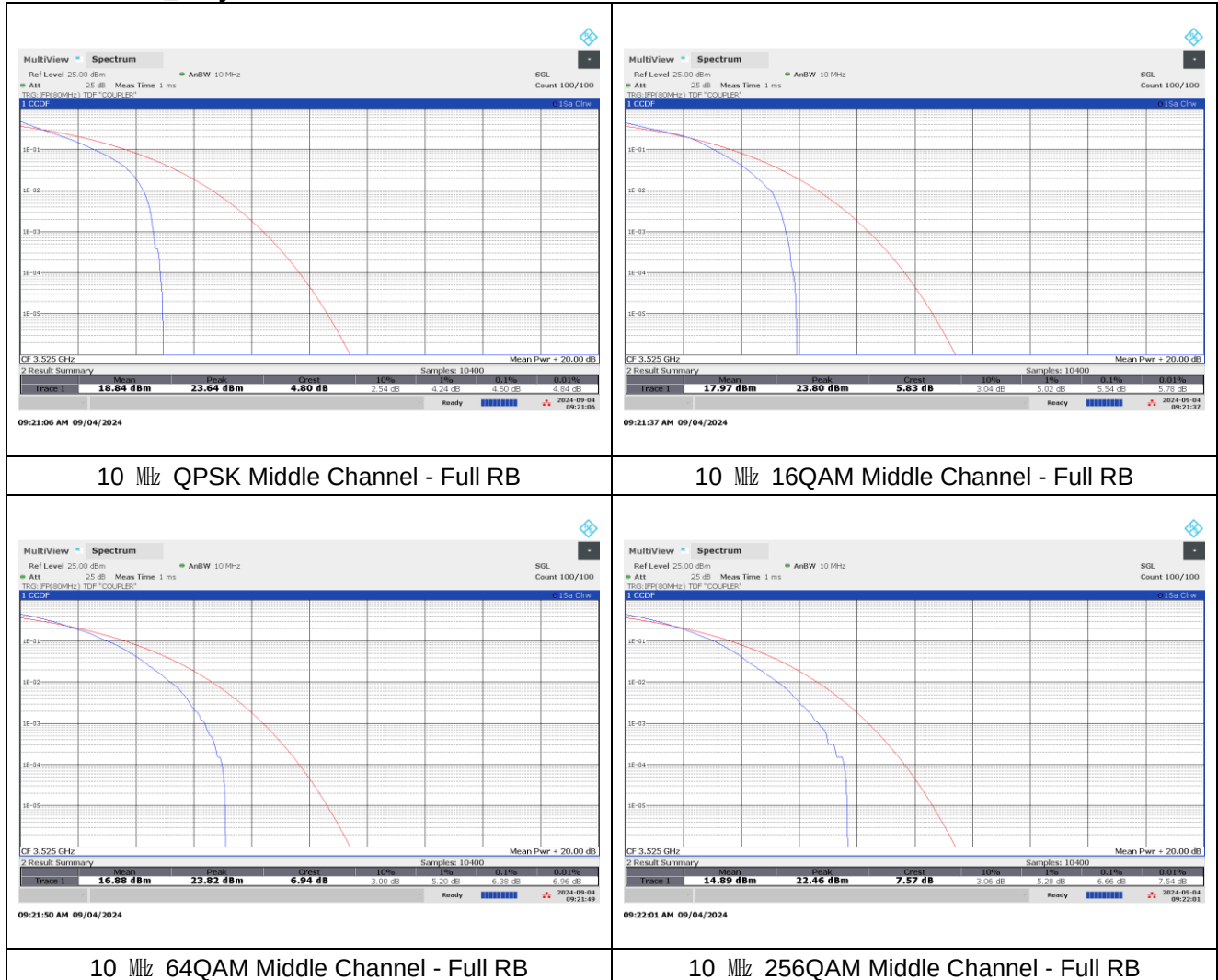
## LTE band 38



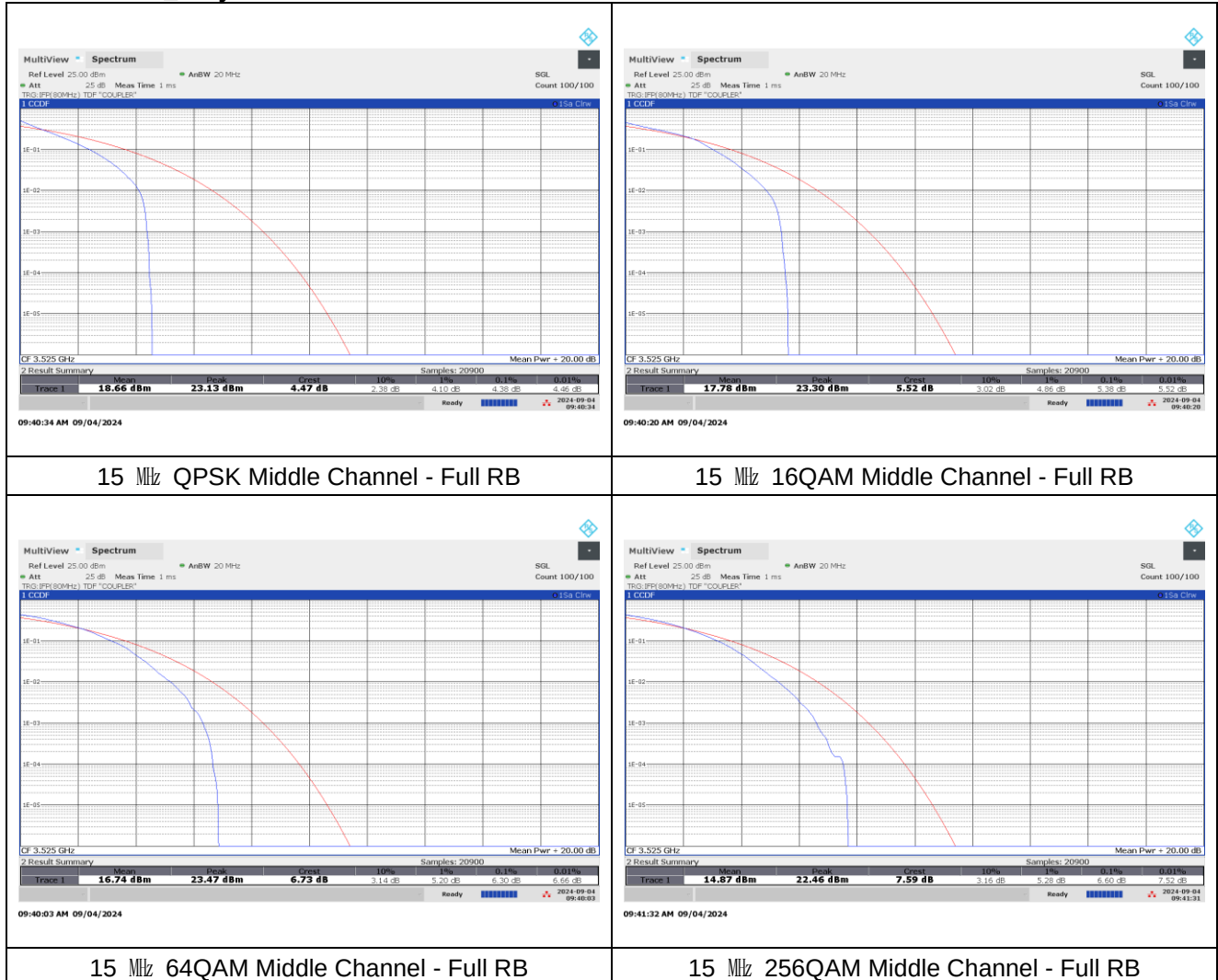
## LTE band 42\_Only IC



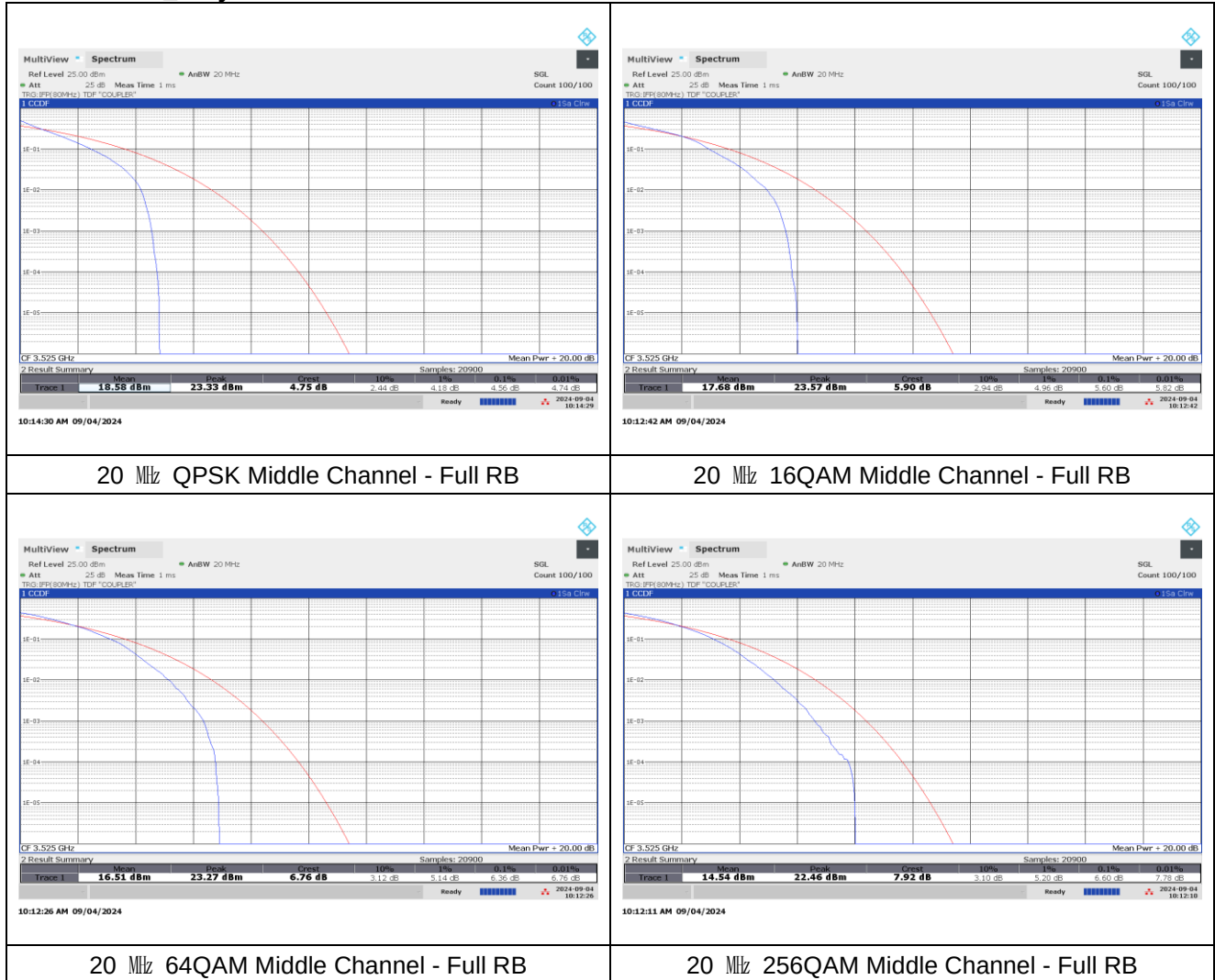
## LTE band 42\_Only IC



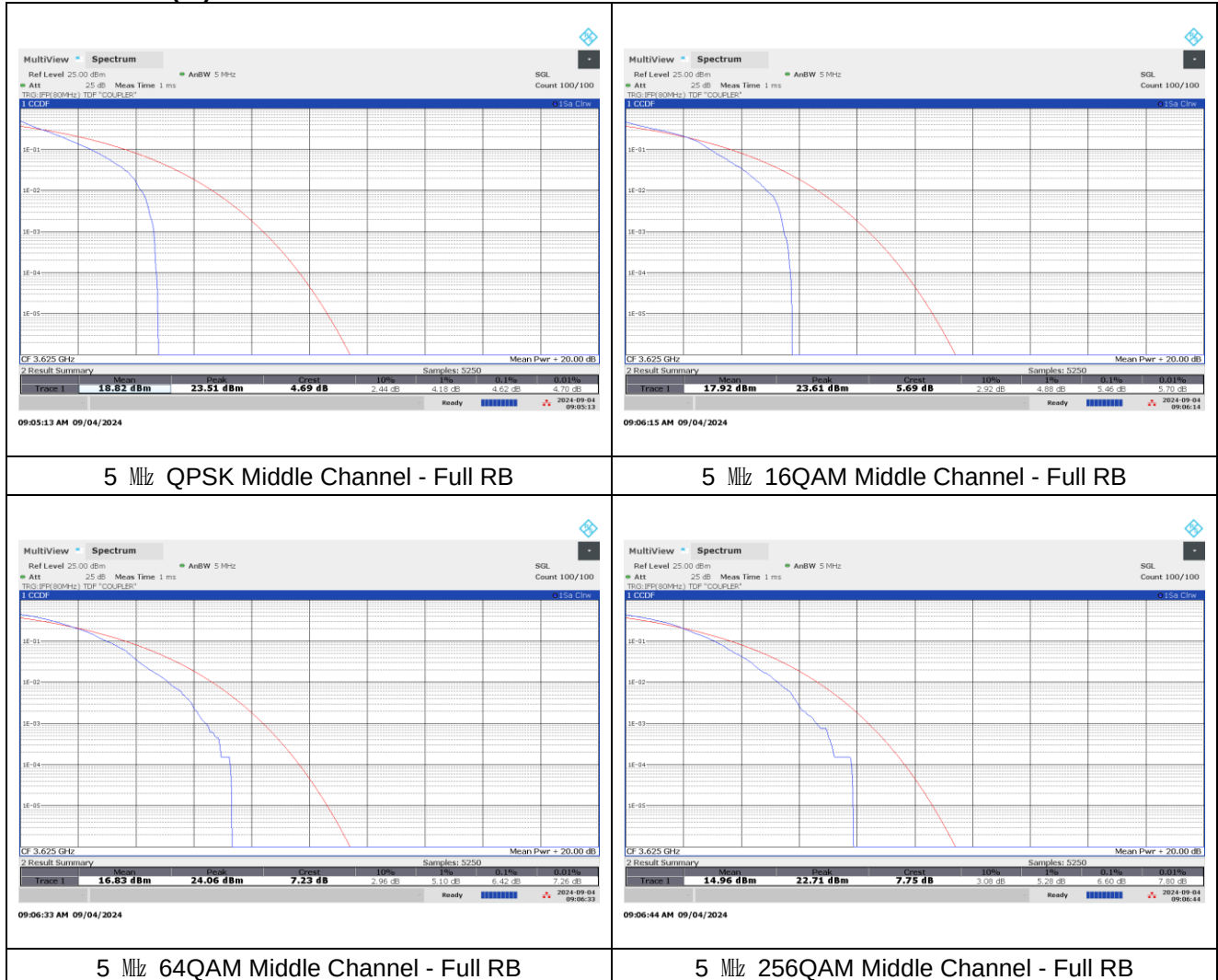
## LTE band 42\_Only IC



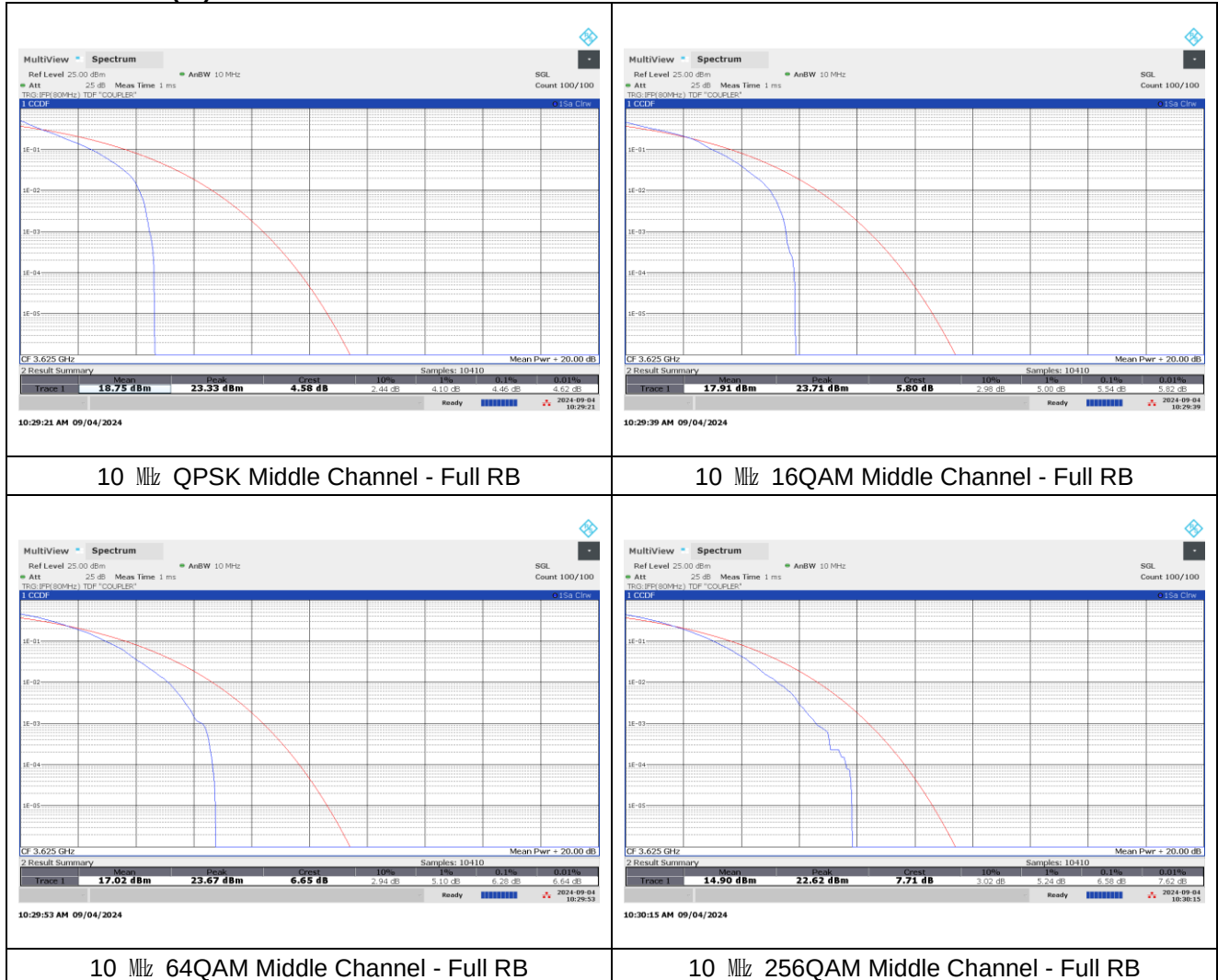
## LTE band 42\_Only IC



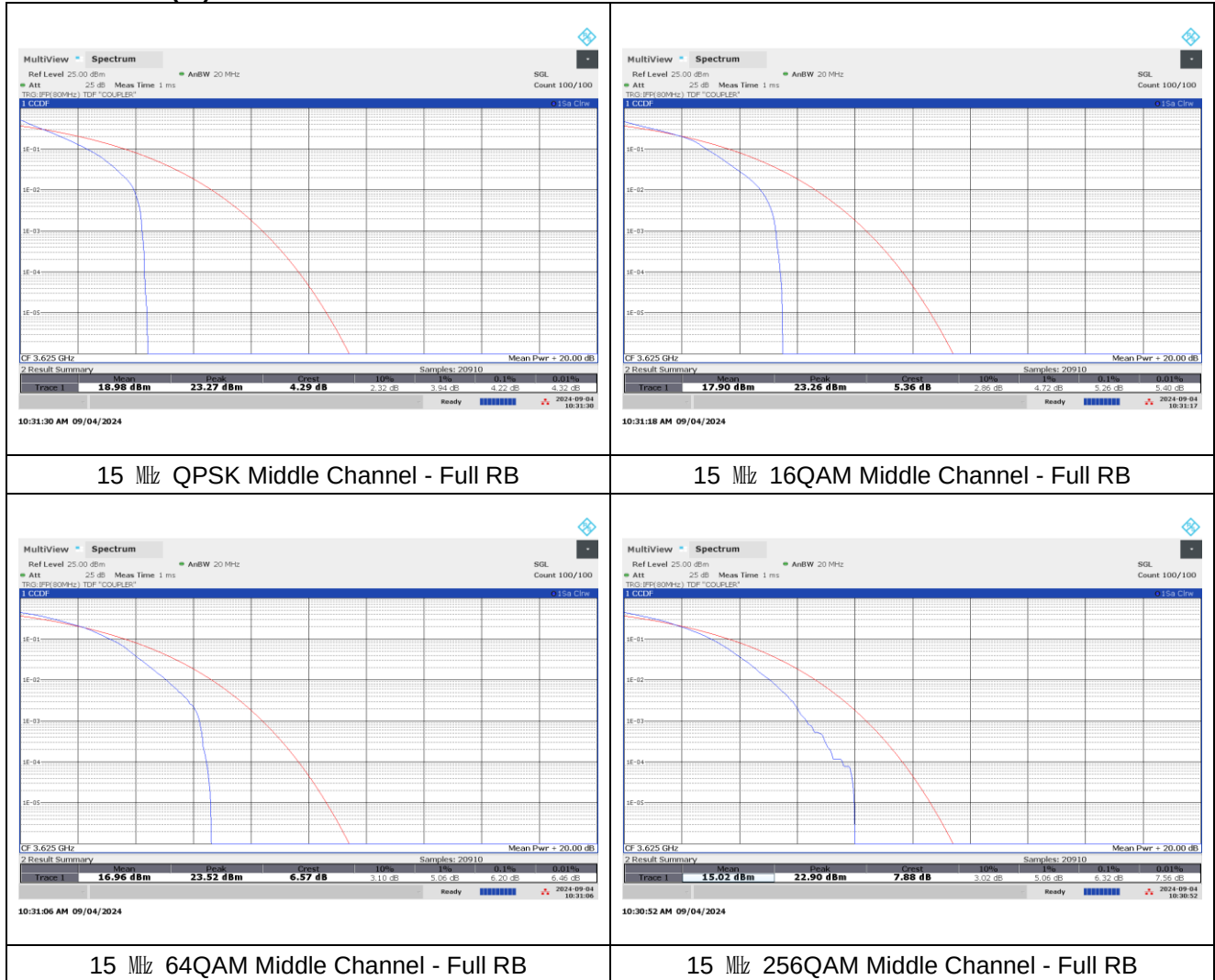
## LTE band 48 (IC)



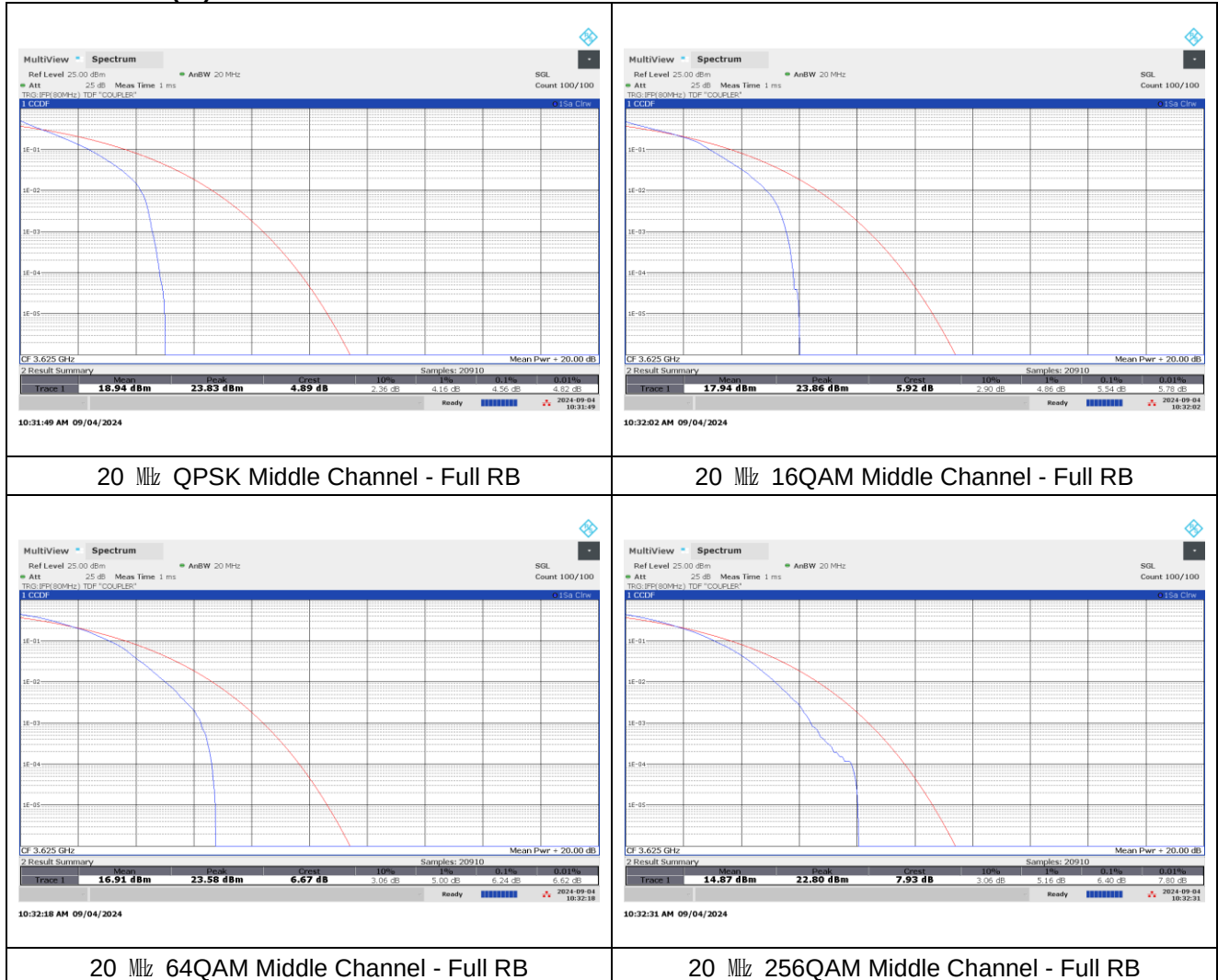
### LTE band 48 (IC)



## LTE band 48 (IC)



## LTE band 48 (IC)



## 6. Spurious Emissions at Antenna Terminal

### 6.1. Limit

#### FCC

- §27.53(m)(4), for mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log_{10} (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log_{10} (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log_{10} (P)$  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  $43 + 10 \log_{10} (P)$  dB on all frequencies between 2 490.5 MHz and 2 496 MHz and  $55 + 10 \log_{10} (P)$  dB at or below 2 490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2 495 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.

#### IC

- RSS-192 Issue 5

5.6, unwanted emissions shall be measured in terms of average values when the transmitter is operating at the manufacturer's rated power and modulated as specified in RSS-Gen.

Equipment shall meet the unwanted emission limits, specified below, outside each frequency block group.

For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end and one located as close as possible to the high end of the equipment's operating frequency range.

If the transmitter is designed for multi-carrier operation, the tests shall be carried out using both the maximum and minimum number of carriers intended for the equipment.

5.6.3, subscriber equipment shall have the TRP or conducted power (per antenna), where applicable, of unwanted emission not exceeding the following:

a. the limits in table 6

b. a limit of -30 dBm/MHz in the frequency range greater than (B+5) MHz from the edge of the frequency band

Table 6: Unwanted emission limits for subscriber equipment

| Frequency block group (B)         | Offset frequency from the edge of the frequency block group (MHz) |             |             |             |
|-----------------------------------|-------------------------------------------------------------------|-------------|-------------|-------------|
|                                   | 0-1                                                               | 1-5         | 5-B         | >B          |
| 10 MHz, 20 MHz, 30 MHz and 40 MHz | -13 dBm/1% of B                                                   | -10 dBm/MHz | -13 dBm/MHz | -25 dBm/MHz |
| > 40 MHz                          | -13 dBm/400 kHz                                                   | -10 dBm/MHz | -13 dBm/MHz | -25 dBm/MHz |

- RSS-199 Issue 4

5.6, unwanted emissions shall be measured in terms of average values when the transmitter is operating at the manufacturer's rated power and modulated as specified in RSS-Gen.

Equipment shall meet the unwanted emission limits, specified below, outside each frequency block group. For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end and one located as close as possible to the high end of the equipment's operating frequency range.

For the unwanted emission limits, in the 1 MHz band immediately outside and adjacent to the frequency block group, the power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth for fixed stations, base stations, and fixed subscriber equipment, and 2 % for subscriber equipment other than fixed subscriber equipment. Beyond this 1 MHz band, a resolution bandwidth of 1 MHz shall be used. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1 % or 2 % of the occupied bandwidth, as applicable.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors), where applicable, of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in the tables below.

**Table 4: Unwanted emission limits for fixed station, base station and fixed subscriber equipment**

| Offset from the edge of the frequency block or frequency block group (MHz) | Unwanted emission limit |
|----------------------------------------------------------------------------|-------------------------|
| ≤1                                                                         | -13 dB m/(1% of OB*)    |
| >1                                                                         | -13 dB m/MHz            |

\* OB is the occupied bandwidth

**Table 5: Unwanted emission limits for subscriber equipment other than fixed subscriber equipment**

| Offset from the edge of the frequency block or frequency block group (MHz) | Unwanted emission limit |
|----------------------------------------------------------------------------|-------------------------|
| 0-1                                                                        | -10 dB m/(2% of OB*)    |
| 1-5                                                                        | -10 dB m/MHz            |
| 5-X**                                                                      | -13 dB m/MHz            |
| ≥X                                                                         | -25 dB m/MHz            |

\* OB is the occupied bandwidth

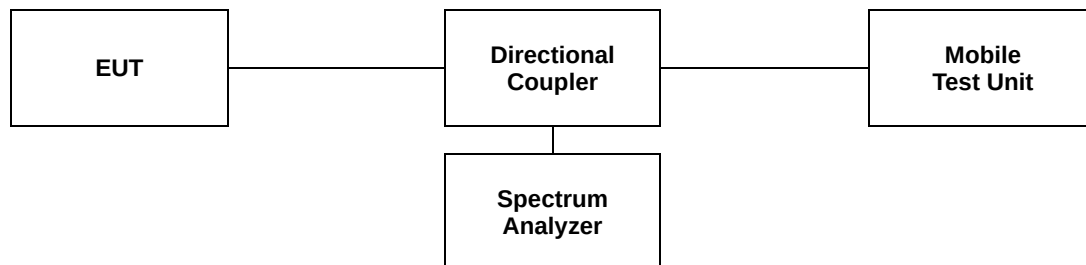
\*\* X is 6 MHz or the equipment occupied bandwidth, whichever is greater

In addition to complying with the limits in table 5, subscriber equipment other than fixed subscriber equipment shall not exceed -13 dB m/MHz on all frequencies between 2 490.5 MHz and 2 496 MHz, and -25 dB m/MHz at or below 2 490.5 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.

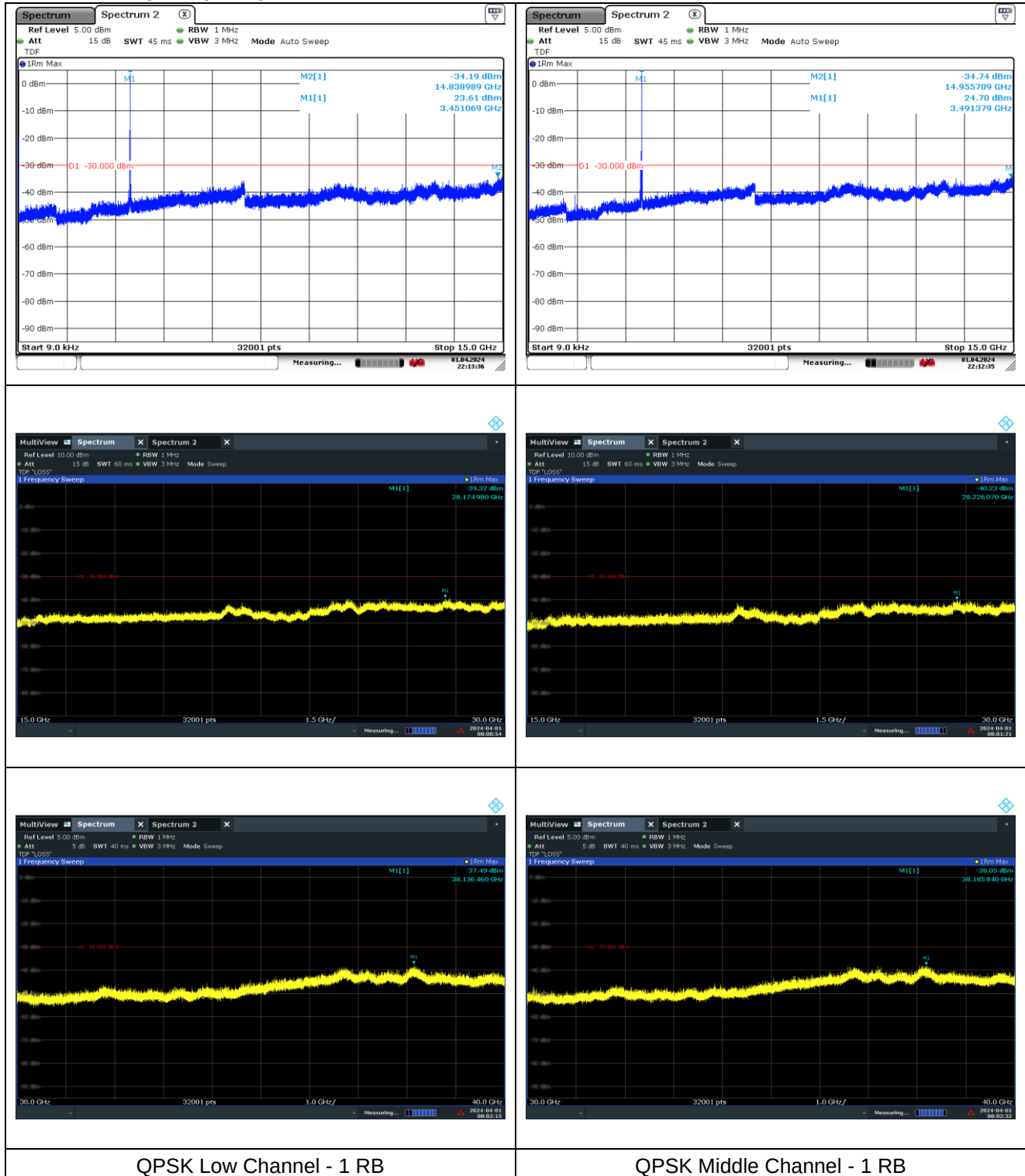
### 6.3. Test Results

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

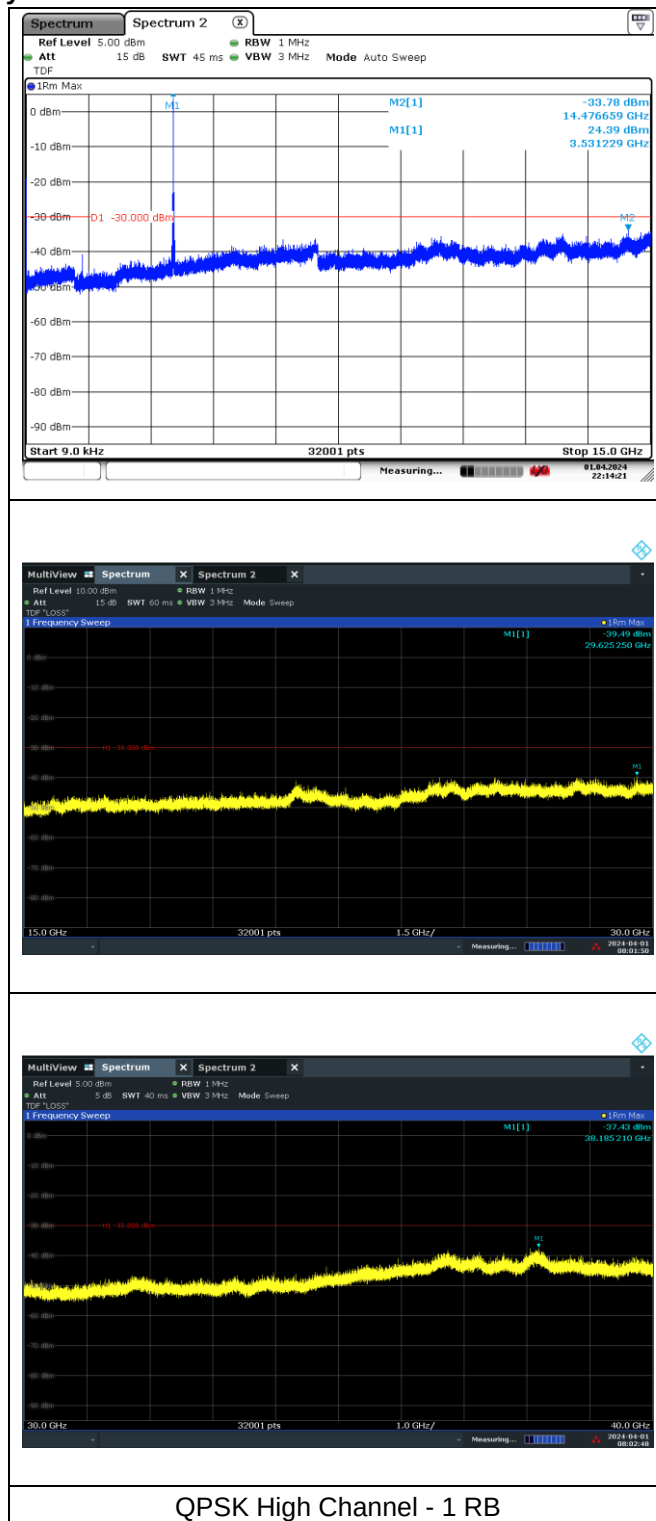
#### - Test plots

#### - Ant. 2

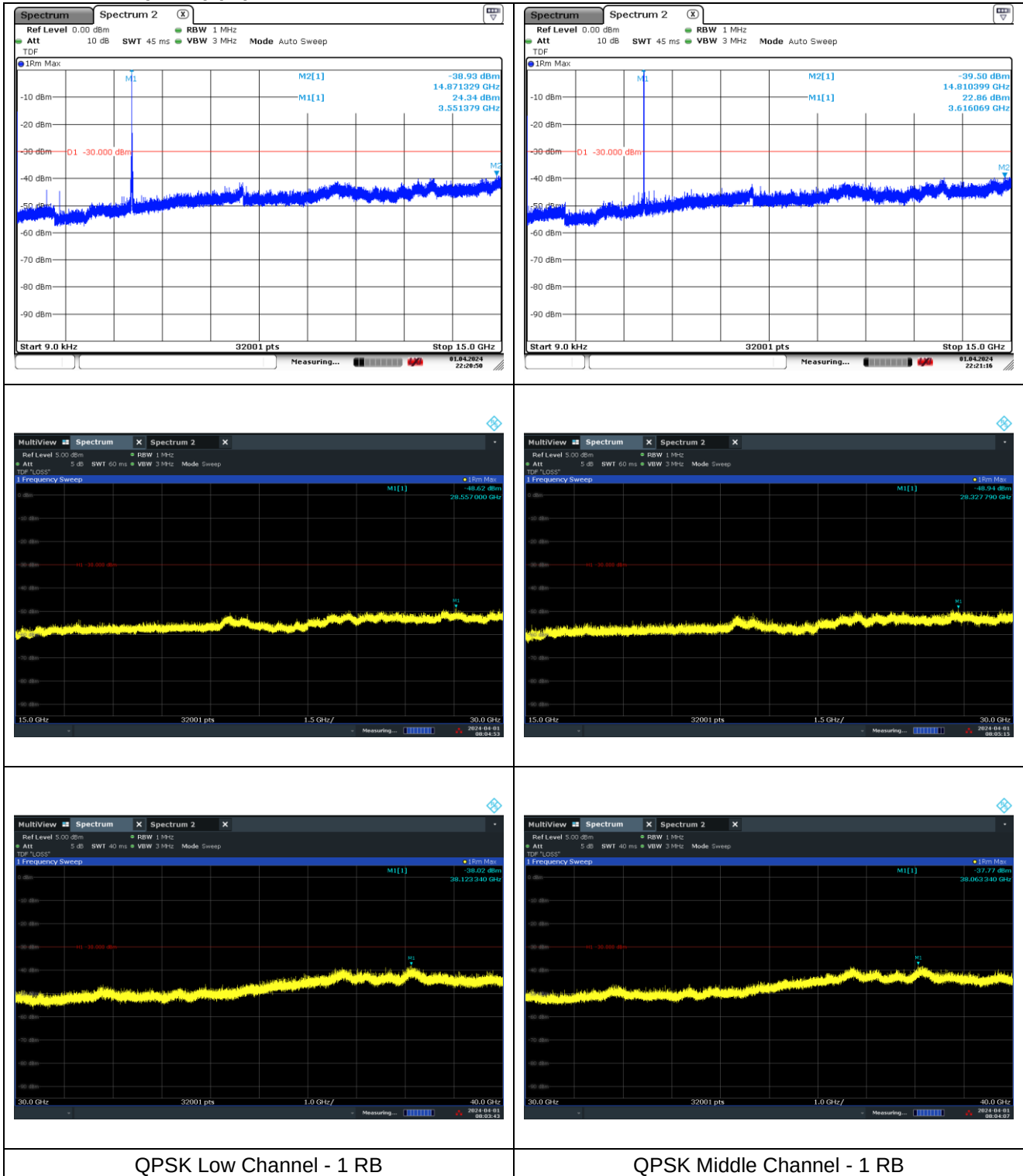
#### LTE band 42 (20 MHz) Only IC



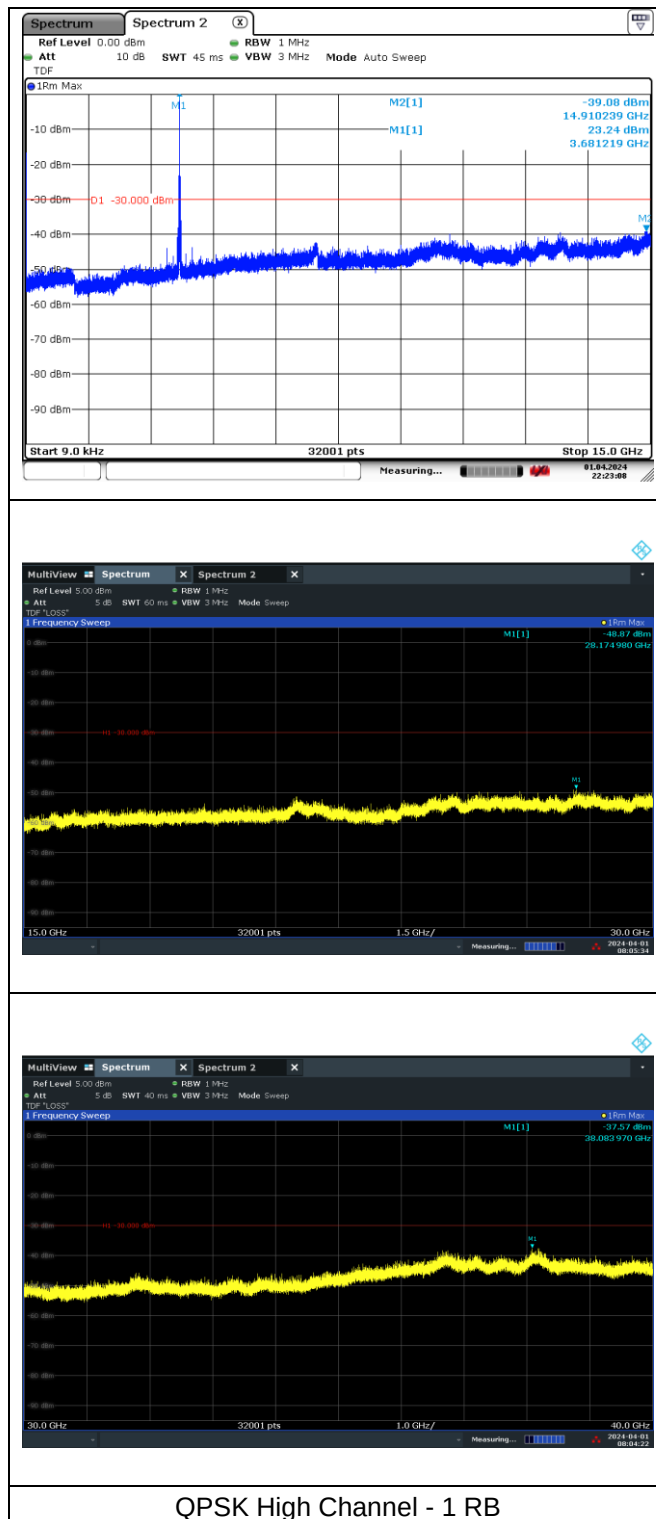
## LTE band 42 (20 MHz)\_Only IC



## LTE band 48 (20 MHz) (IC)

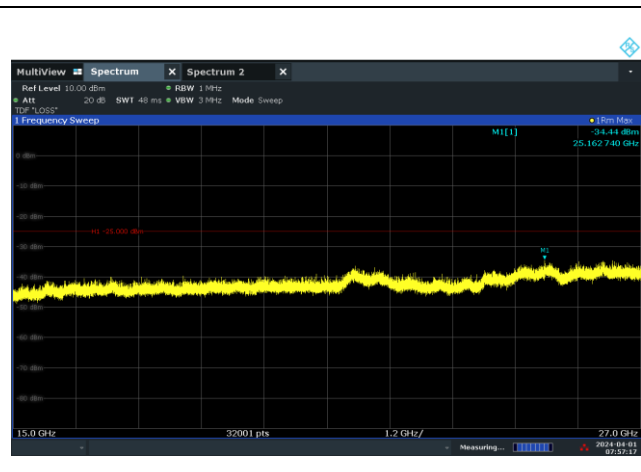
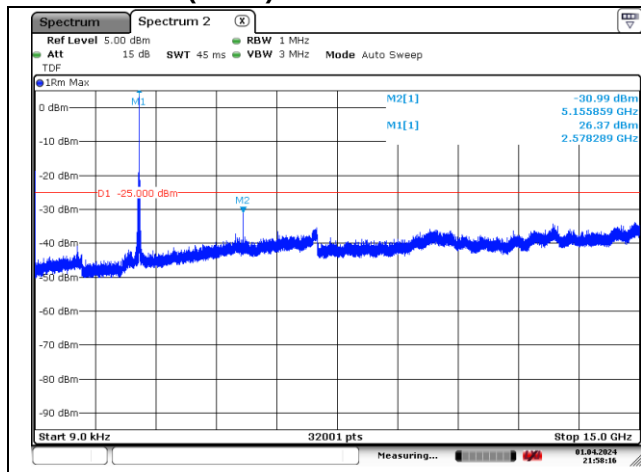


## LTE band 48 (20 MHz) (IC)

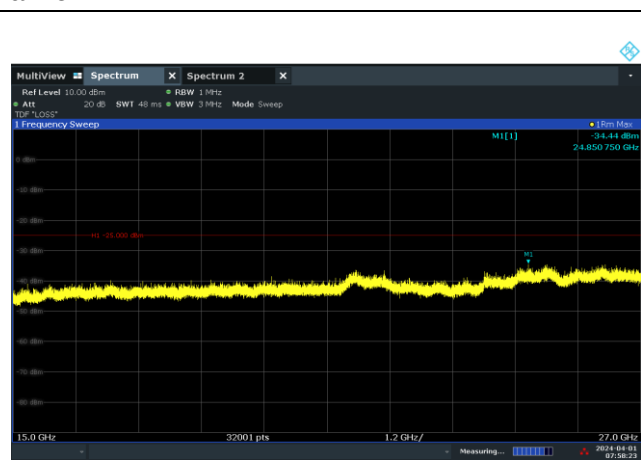
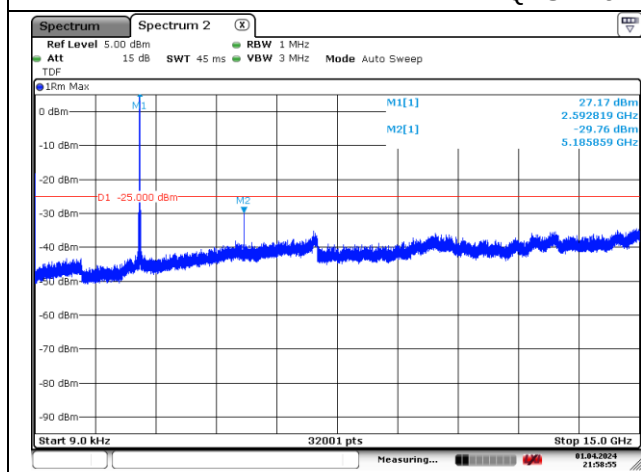


## - Switching

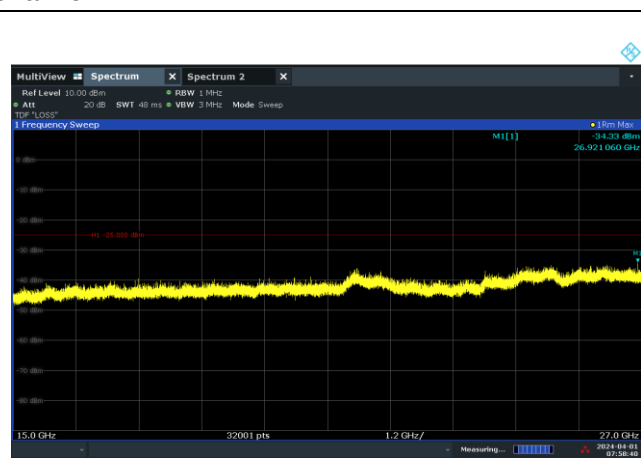
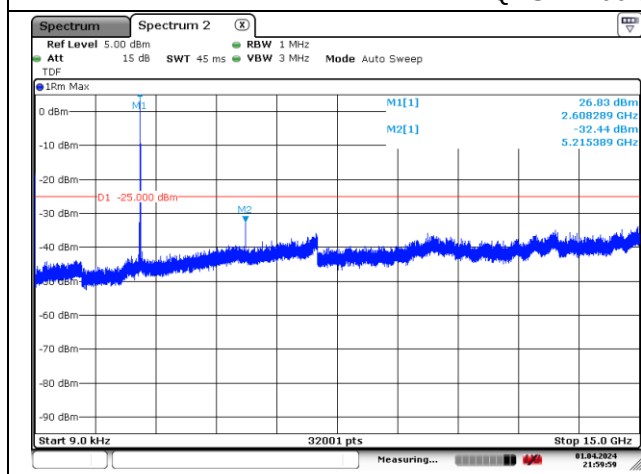
### LTE band 38 (20 MHz)



### QPSK Low Channel - 1 RB

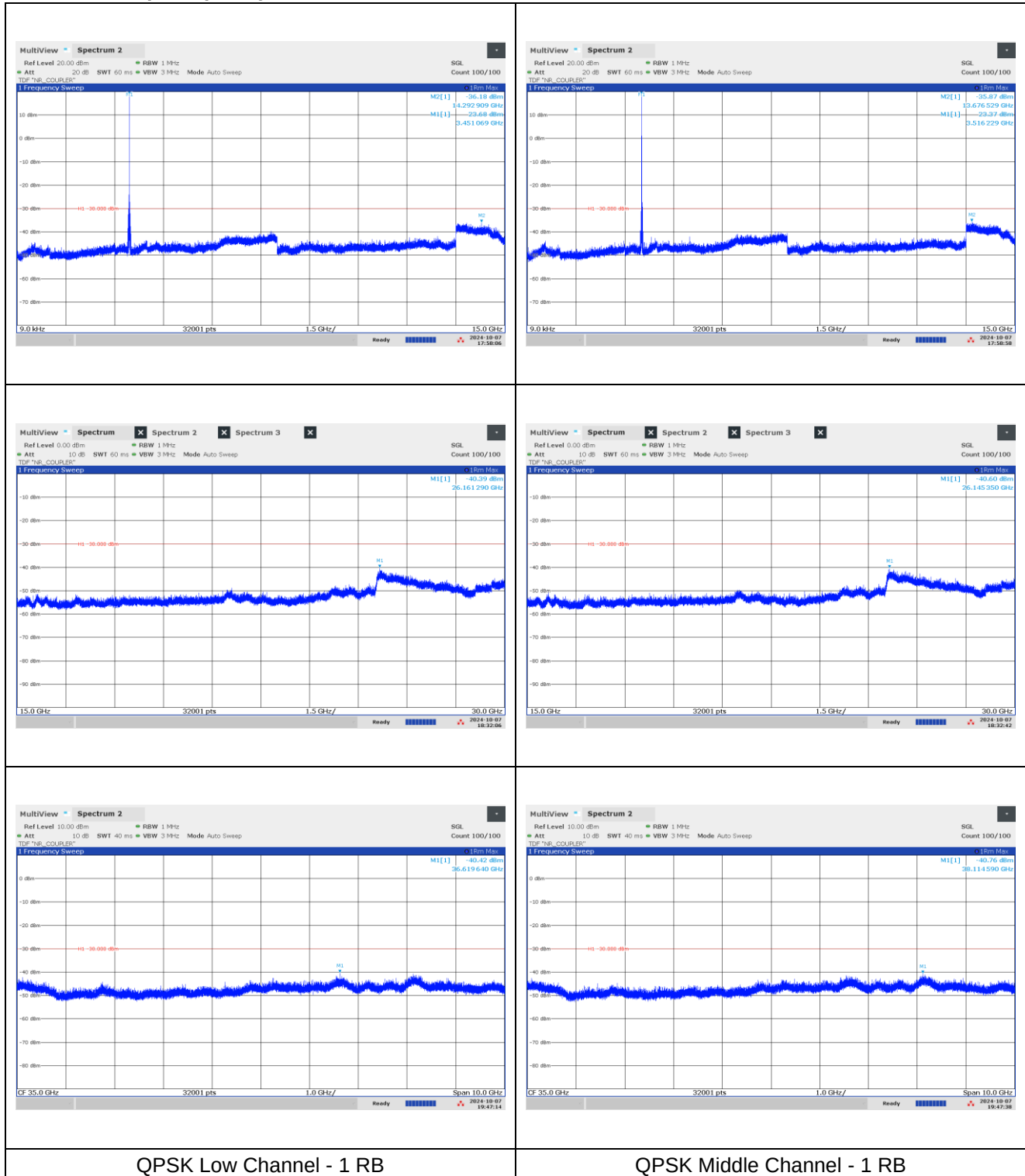


### QPSK Middle Channel - 1 RB



### QPSK High Channel - 1 RB

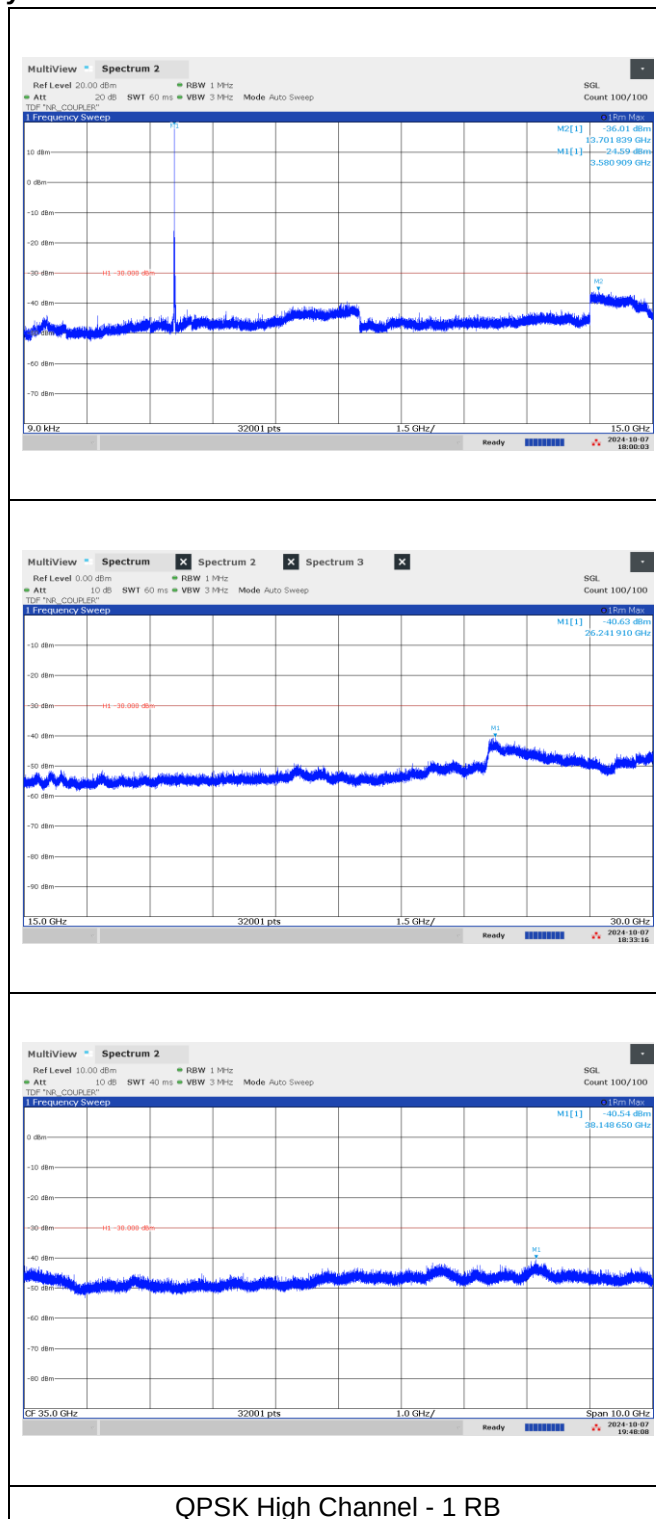
### LTE band 42 (20 MHz) Only IC



QPSK Low Channel - 1 RB

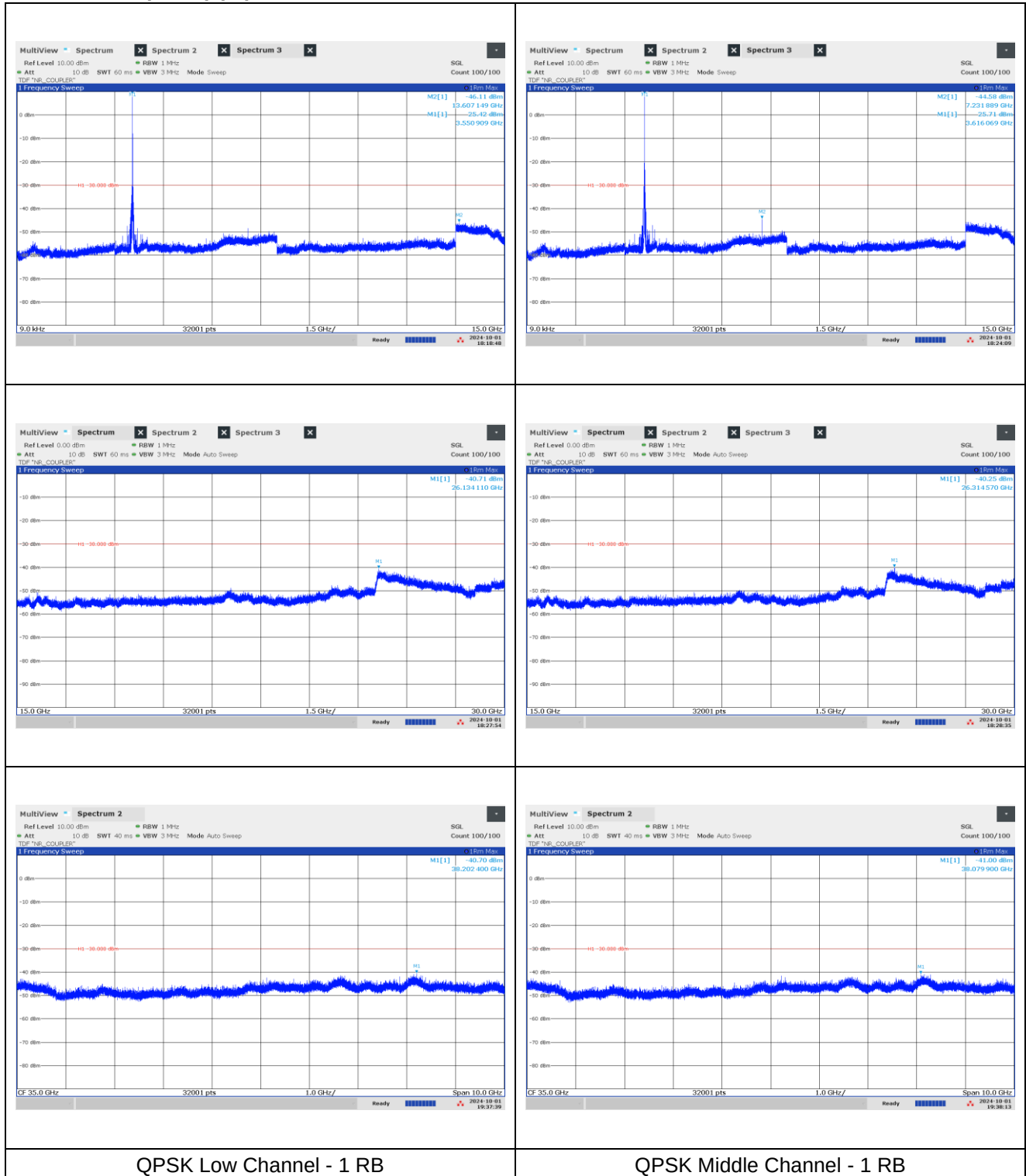
QPSK Middle Channel - 1 RB

# LTE band 42 (20 MHz)\_Only IC

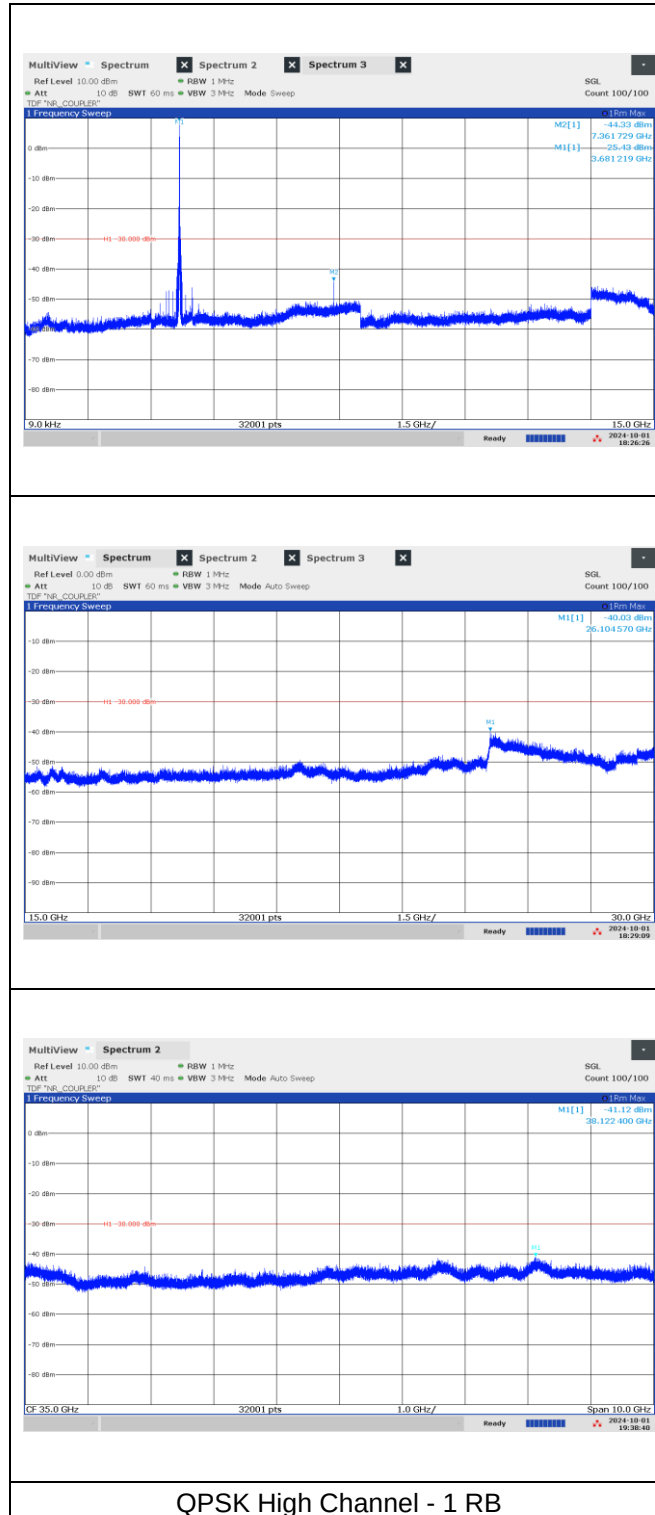


QPSK High Channel - 1 RB

LTE band 48 (20 MHz) (IC)



LTE band 48 (20 MHz) (IC)



## 7. Band Edge and Emission Mask

### 7.1. Limit

#### FCC

- §27.53(m)(4), for mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log_{10} (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log_{10} (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log_{10} (P)$  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  $43 + 10 \log_{10} (P)$  dB on all frequencies between 2 490.5 MHz and 2 496 MHz and  $55 + 10 \log_{10} (P)$  dB at or below 2 490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2 495 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.

#### IC

- RSS-192 Issue 5

5.6, unwanted emissions shall be measured in terms of average values when the transmitter is operating at the manufacturer's rated power and modulated as specified in RSS-Gen.

Equipment shall meet the unwanted emission limits, specified below, outside each frequency block group. For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end and one located as close as possible to the high end of the equipment's operating frequency range.

If the transmitter is designed for multi-carrier operation, the tests shall be carried out using both the maximum and minimum number of carriers intended for the equipment.

5.6.3, subscriber equipment shall have the TRP or conducted power (per antenna), where applicable, of unwanted emission not exceeding the following:

- a. the limits in table 6
- b. a limit of -30 dBm/MHz in the frequency range greater than  $(B+5)$  MHz from the edge of the frequency band

Table 6: Unwanted emission limits for subscriber equipment

| Frequency block group (B)         | Offset frequency from the edge of the frequency block group (MHz) |             |             |             |
|-----------------------------------|-------------------------------------------------------------------|-------------|-------------|-------------|
|                                   | 0-1                                                               | 1-5         | 5-B         | >B          |
| 10 MHz, 20 MHz, 30 MHz and 40 MHz | -13 dBm/1% of B                                                   | -10 dBm/MHz | -13 dBm/MHz | -25 dBm/MHz |
| > 40 MHz                          | -13 dBm/400 kHz                                                   | -10 dBm/MHz | -13 dBm/MHz | -25 dBm/MHz |

- RSS-199 Issue 4

5.6, unwanted emissions shall be measured in terms of average values when the transmitter is operating at the manufacturer's rated power and modulated as specified in RSS-Gen.

Equipment shall meet the unwanted emission limits, specified below, outside each frequency block group. For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end and one located as close as possible to the high end of the equipment's operating frequency range.

For the unwanted emission limits, in the 1 MHz band immediately outside and adjacent to the frequency block group, the power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth for fixed stations, base stations, and fixed subscriber equipment, and 2 % for subscriber equipment other than fixed subscriber equipment. Beyond this 1 MHz band, a resolution bandwidth of 1 MHz shall be used. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1 % or 2 % of the occupied bandwidth, as applicable.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors), where applicable, of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in the tables below.

**Table 4: Unwanted emission limits for fixed station, base station and fixed subscriber equipment**

| Offset from the edge of the frequency block or frequency block group (MHz) | Unwanted emission limit |
|----------------------------------------------------------------------------|-------------------------|
| ≤1                                                                         | -13 dB m/(1% of OB*)    |
| >1                                                                         | -13 dB m/MHz            |

\* OB is the occupied bandwidth

**Table 5: Unwanted emission limits for subscriber equipment other than fixed subscriber equipment**

| Offset from the edge of the frequency block or frequency block group (MHz) | Unwanted emission limit |
|----------------------------------------------------------------------------|-------------------------|
| 0-1                                                                        | -10 dB m/(2% of OB*)    |
| 1-5                                                                        | -10 dB m/MHz            |
| 5-X**                                                                      | -13 dB m/MHz            |
| ≥X                                                                         | -25 dB m/MHz            |

\* OB is the occupied bandwidth

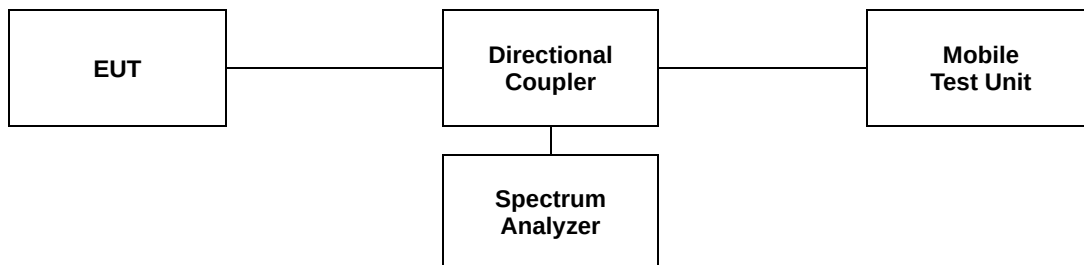
\*\* X is 6 MHz or the equipment occupied bandwidth, whichever is greater

In addition to complying with the limits in table 5, subscriber equipment other than fixed subscriber equipment shall not exceed -13 dB m/MHz on all frequencies between 2 490.5 MHz and 2 496 MHz, and -25 dB m/MHz at or below 2 490.5 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.



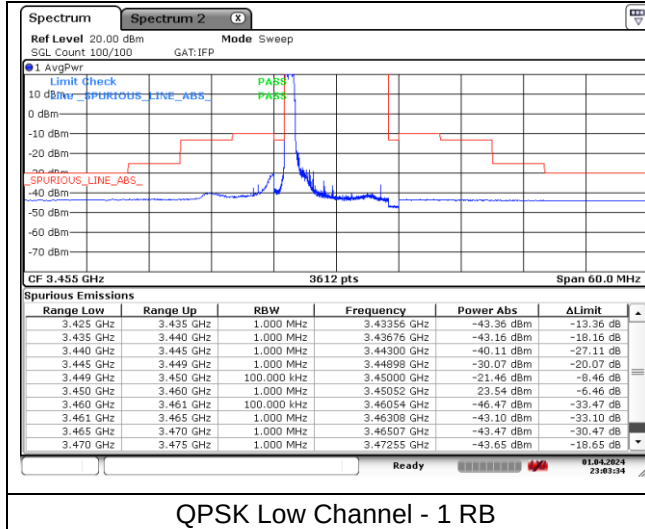
### 7.3. Test Results

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

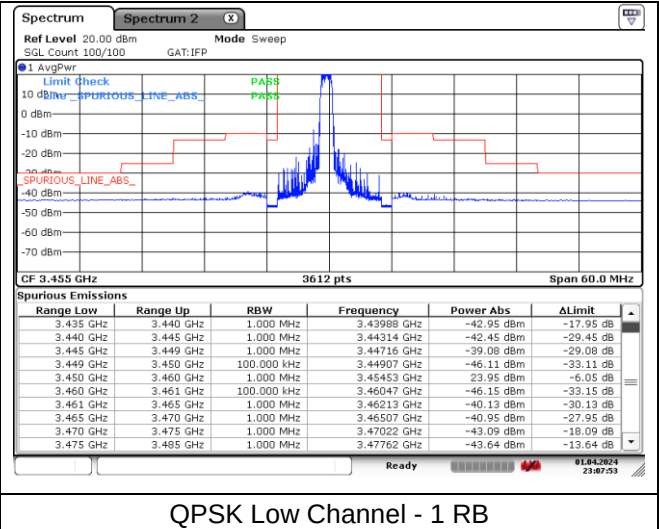
#### - Test plots

#### - Ant. 2

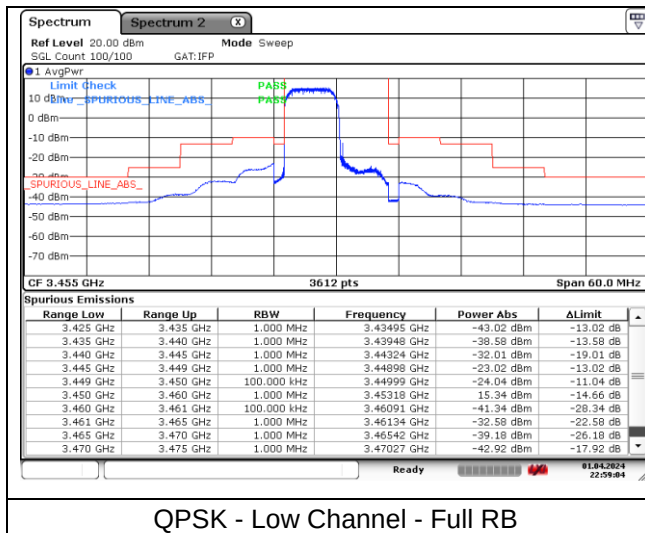
#### LTE band 42 (5 MHz) Only IC



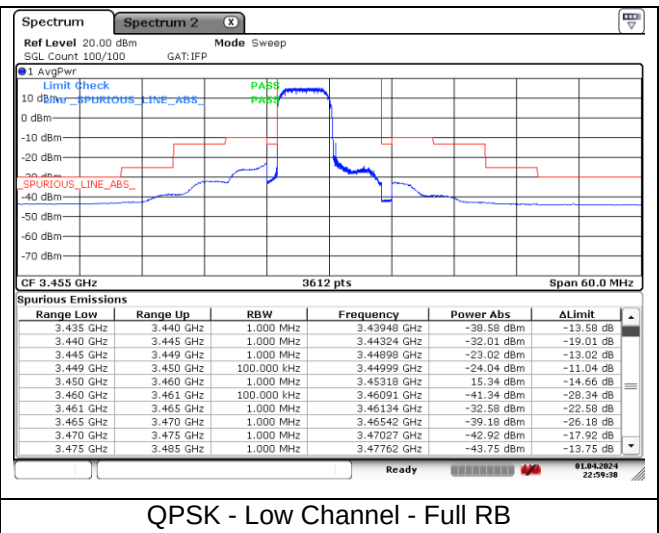
QPSK Low Channel - 1 RB



QPSK Low Channel - 1 RB

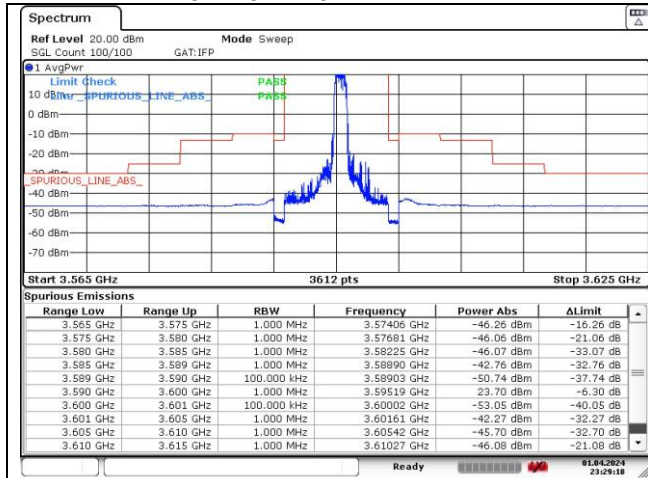


QPSK - Low Channel - Full RB

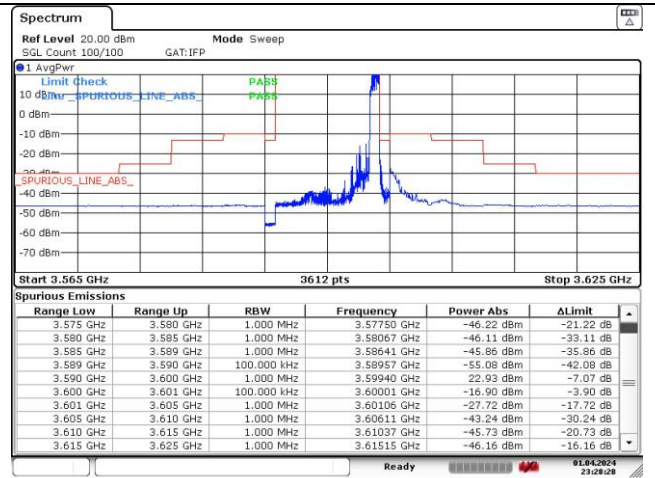


QPSK - Low Channel - Full RB

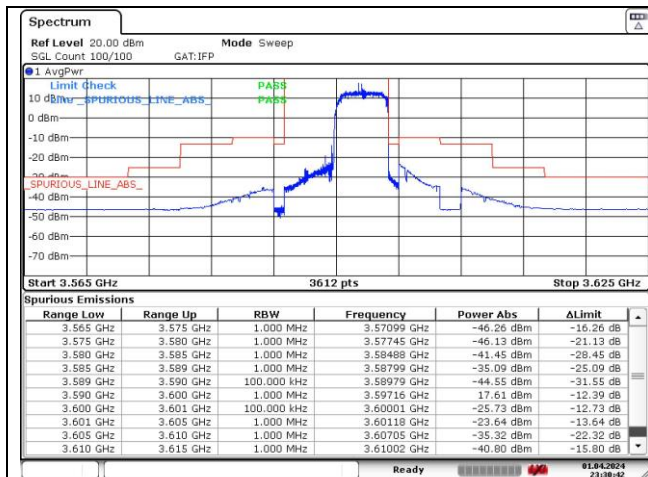
**LTE band 42 (5 MHz) Only IC**



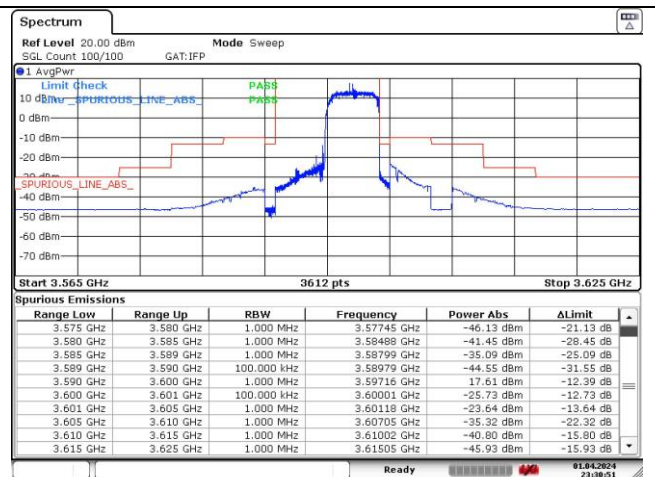
**QPSK High Channel - 1 RB**



**QPSK High Channel - 1 RB**

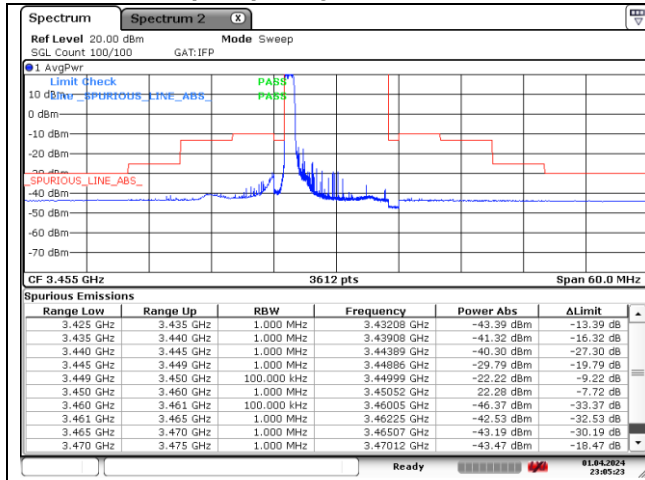


**QPSK High Channel - Full RB**

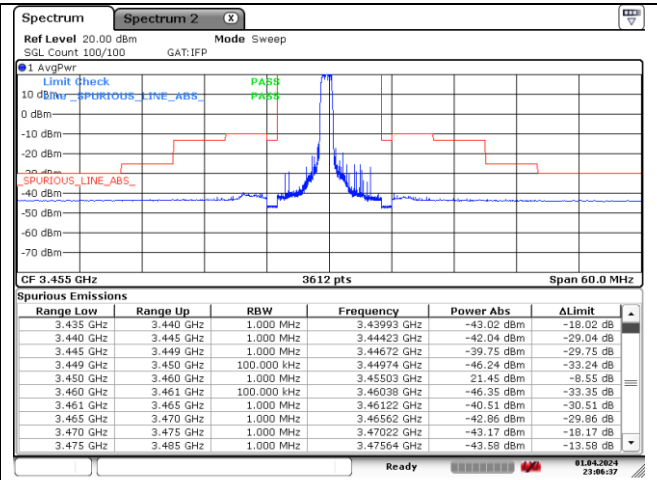


**QPSK High Channel - Full RB**

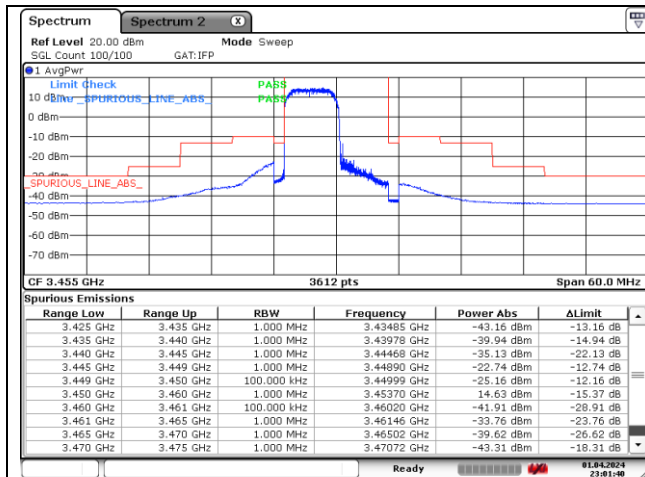
## LTE band 42 (5 MHz) Only IC



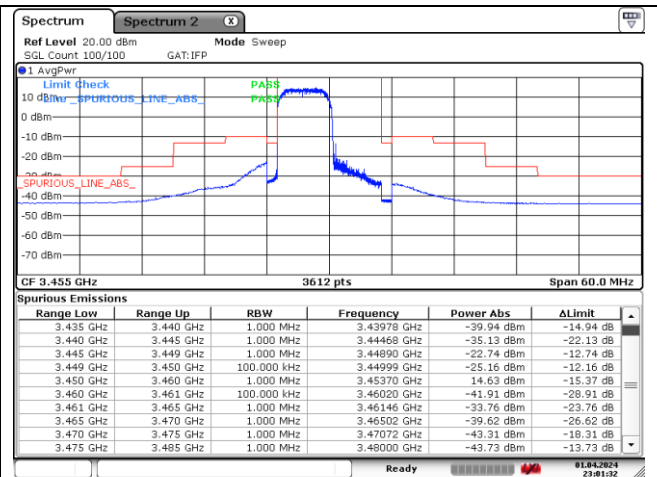
16QAM Low Channel - 1 RB



16QAM Low Channel - 1 RB

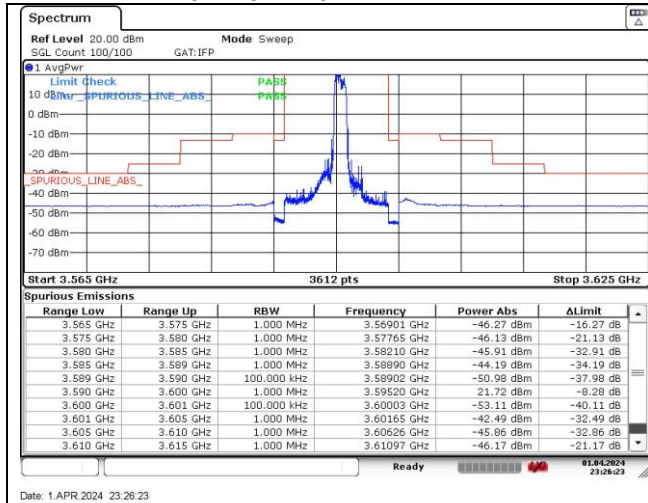


16QAM Low Channel - Full RB

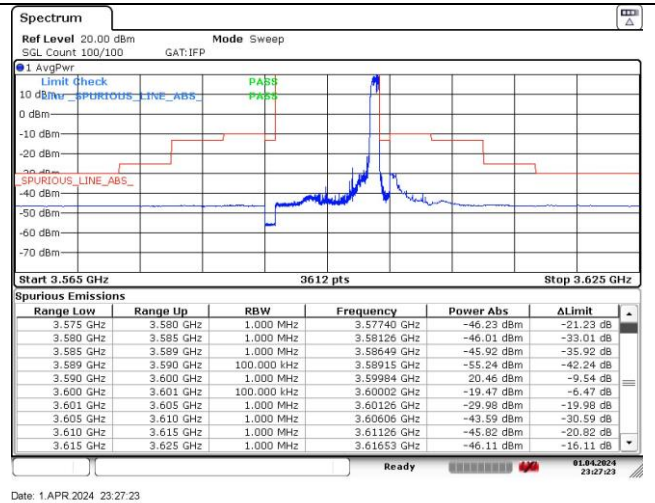


16QAM Low Channel - Full RB

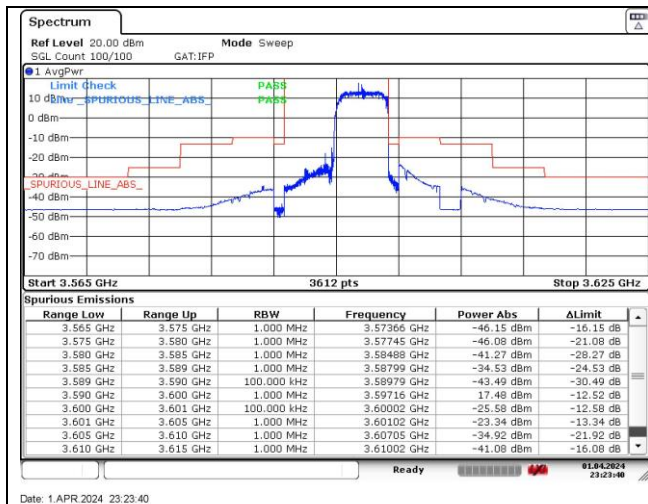
**LTE band 42 (5 MHz) Only IC**



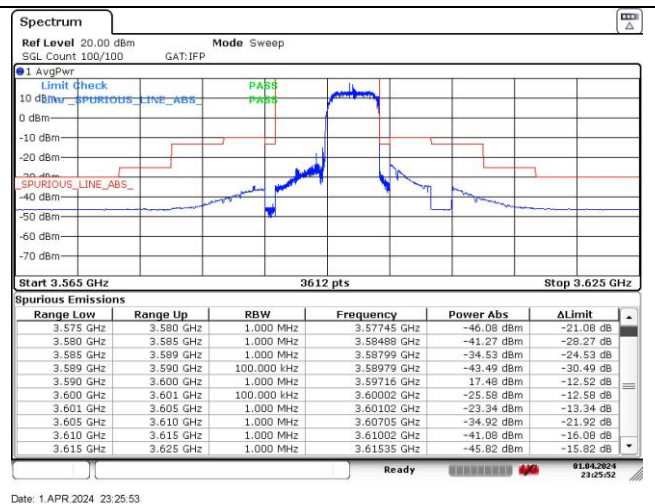
16QAM High Channel - 1 RB



16QAM High Channel - 1 RB



16QAM High Channel - Full RB



16QAM High Channel - Full RB