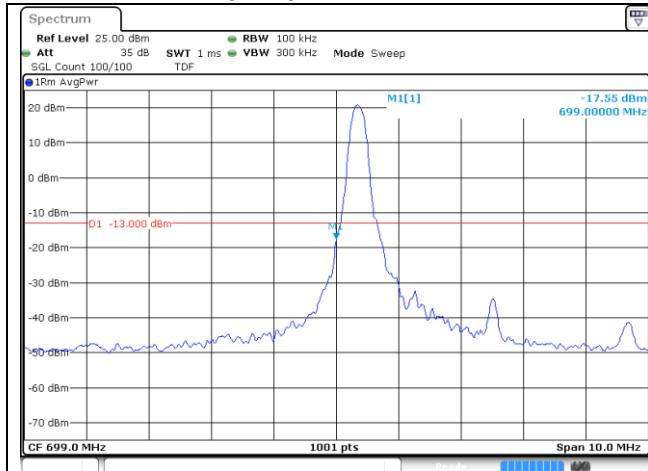
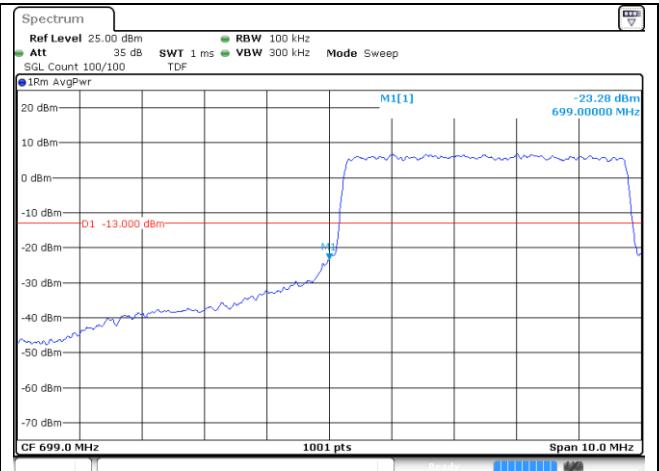


## LTE band 12/17 (5 MHz)

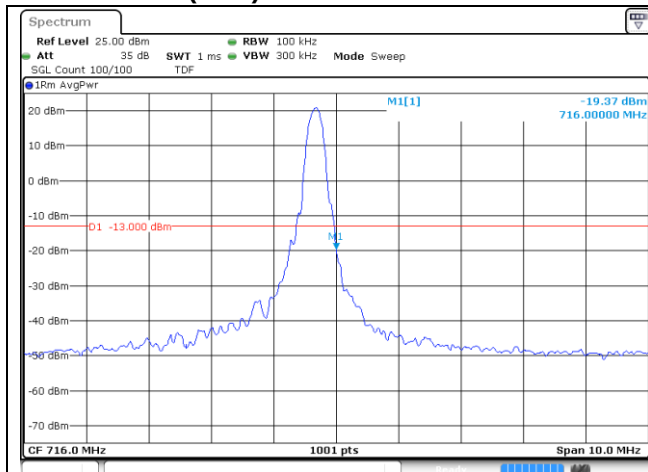


QPSK Low Channel - 1 RB

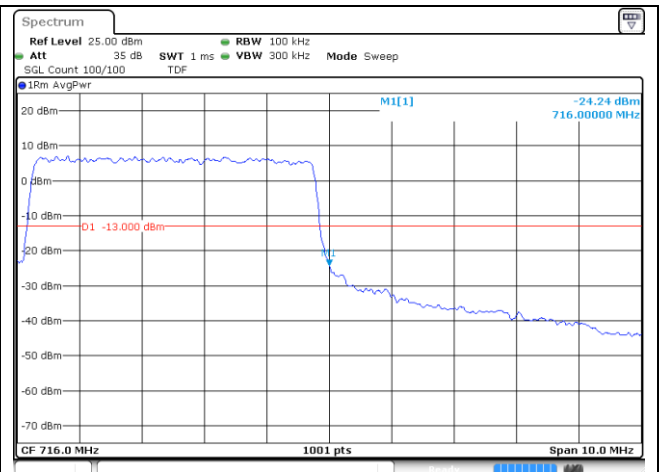


QPSK Low Channel - Full RB

## LTE band 12 (5 MHz)

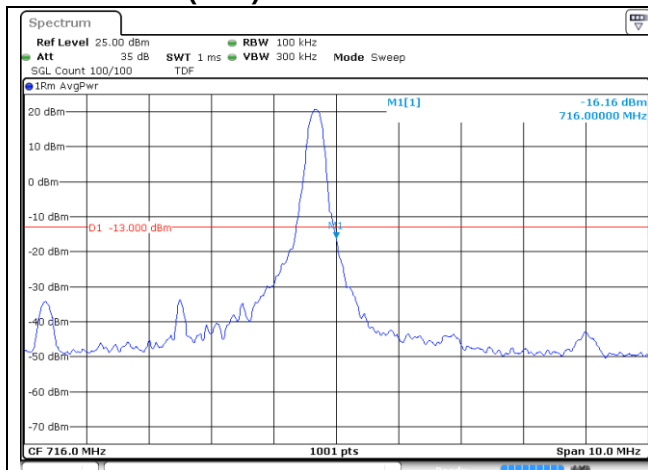


QPSK High Channel - 1 RB

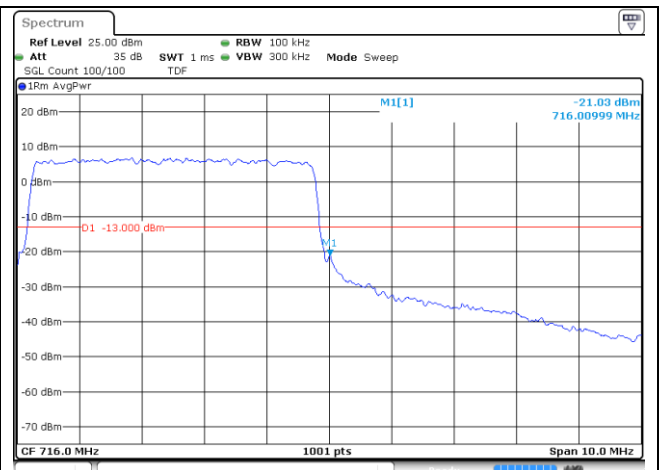


QPSK High Channel - Full RB

## LTE band 17 (5 MHz)

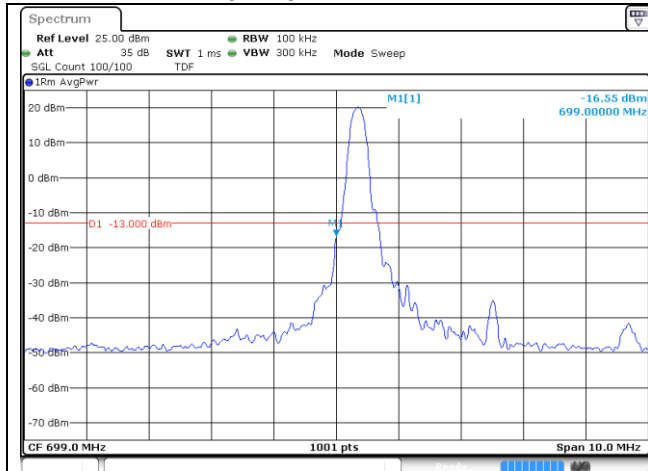


QPSK High Channel - 1 RB

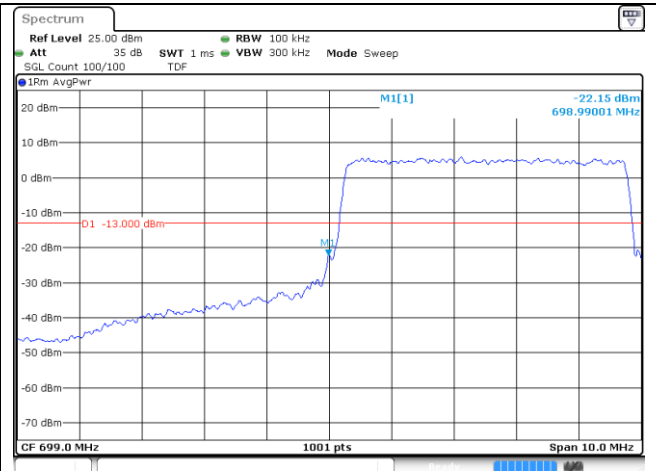


QPSK High Channel - Full RB

## LTE band 12/17 (5 MHz)

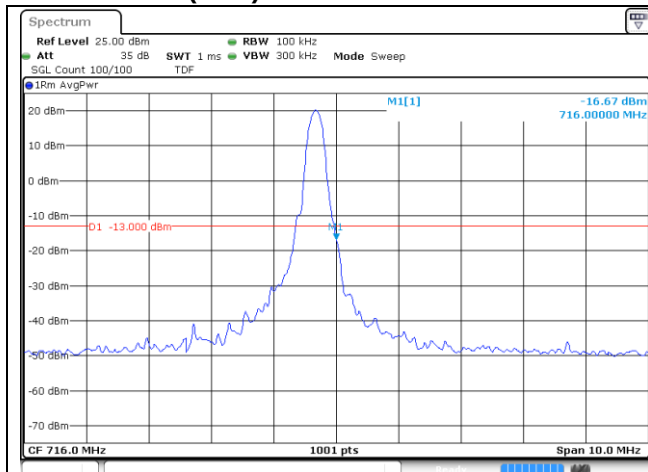


16QAM Low Channel - 1 RB

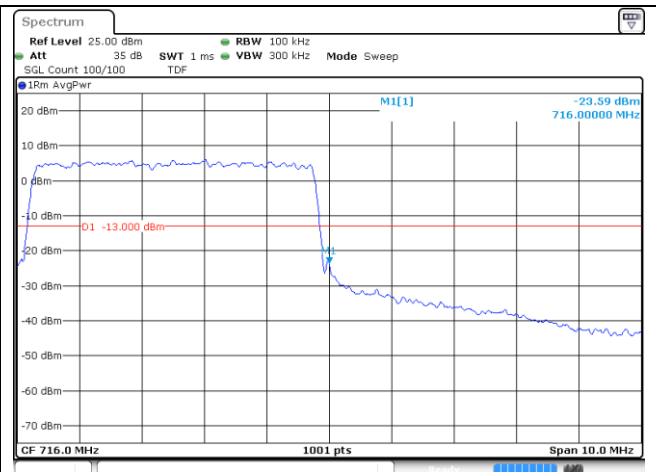


16QAM Low Channel - Full RB

## LTE band 12 (5 MHz)

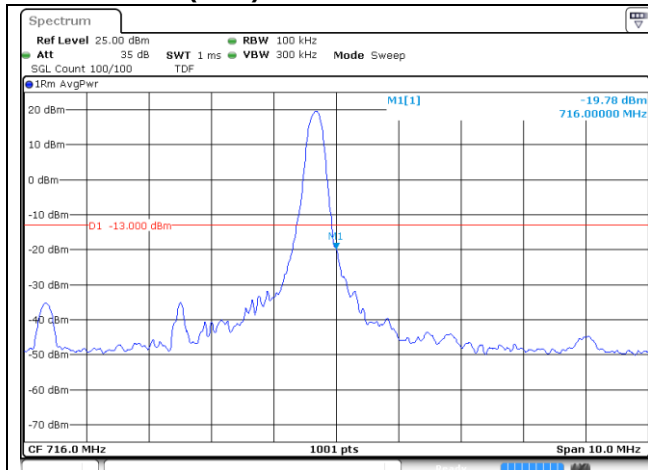


16QAM High Channel - 1 RB

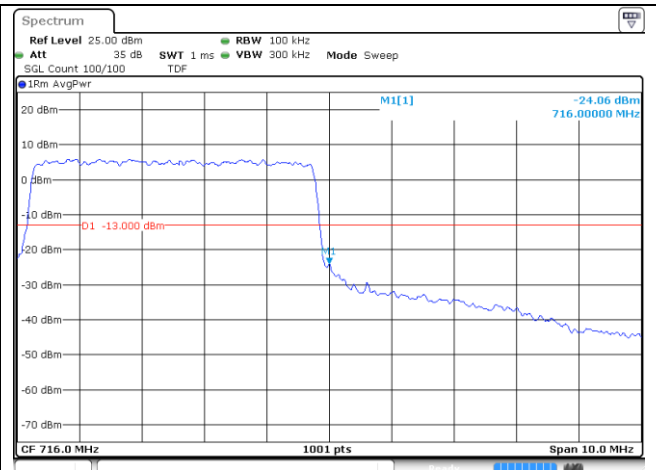


16QAM High Channel - Full RB

## LTE band 17 (5 MHz)

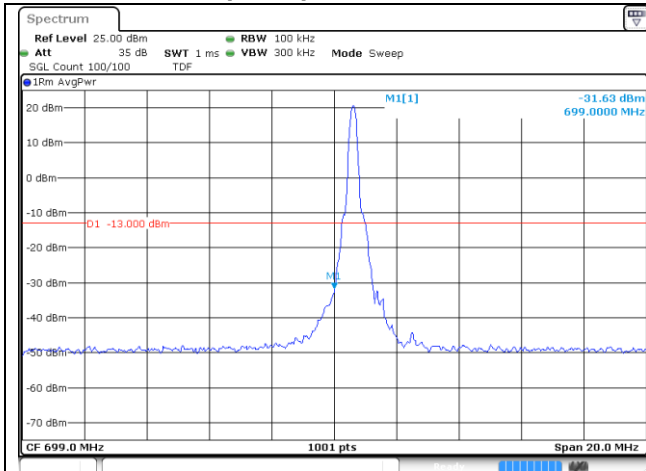


16QAM High Channel - 1 RB

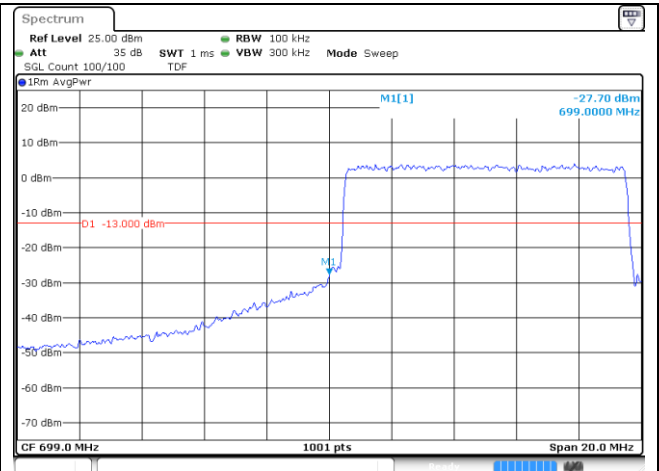


16QAM High Channel - Full RB

## LTE band 12/17 (10 MHz)

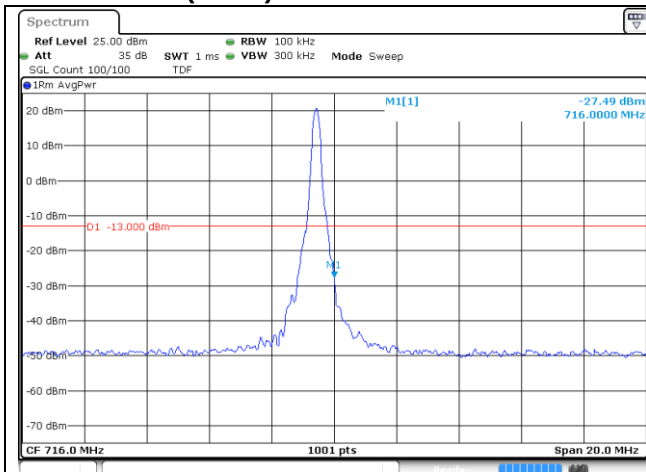


QPSK Low Channel - 1 RB

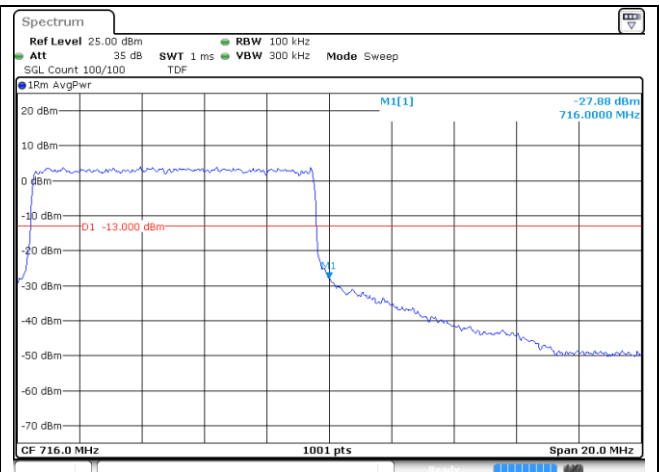


QPSK Low Channel - Full RB

## LTE band 12 (10 MHz)

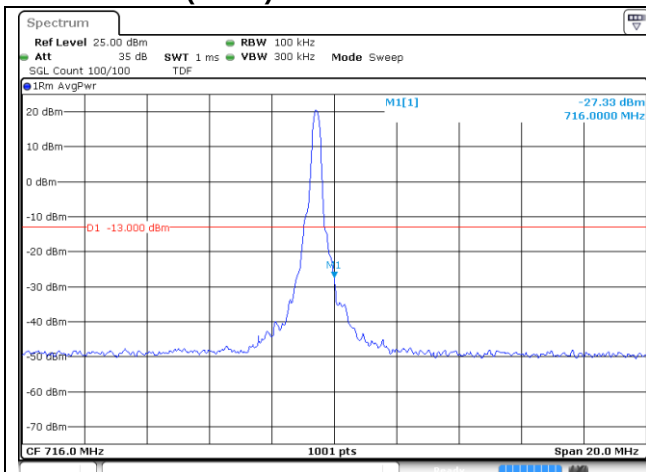


QPSK High Channel - 1 RB

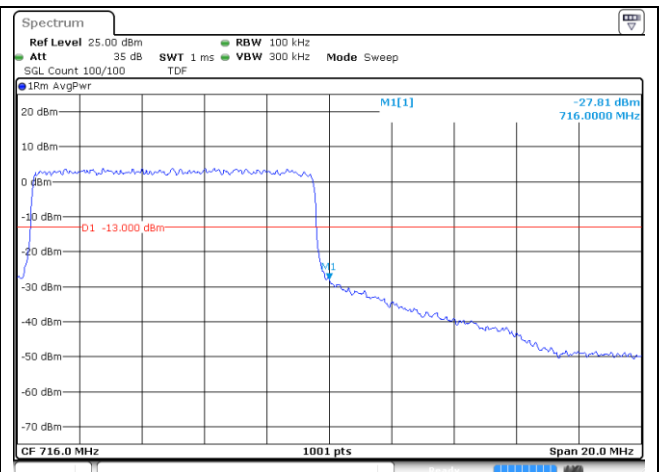


QPSK High Channel - Full RB

## LTE band 17 (10 MHz)

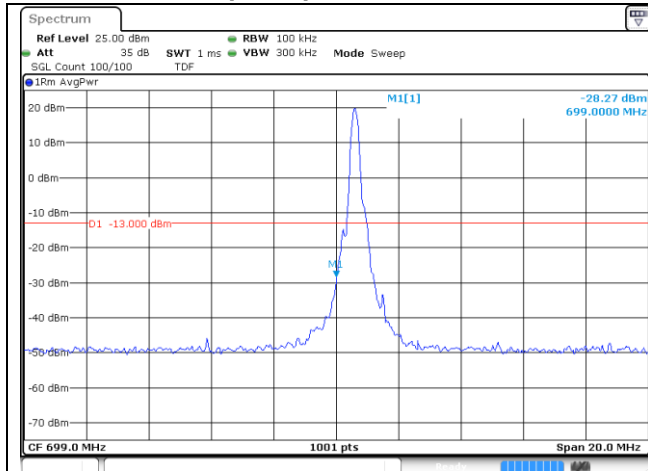


QPSK High Channel - 1 RB

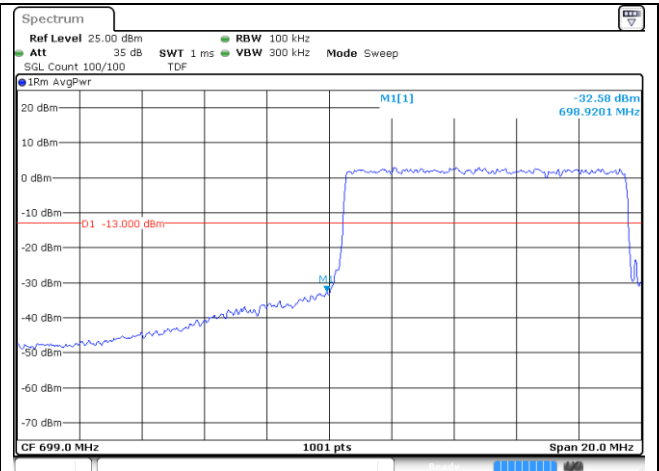


QPSK High Channel - Full RB

## LTE band 12/17 (10 MHz)

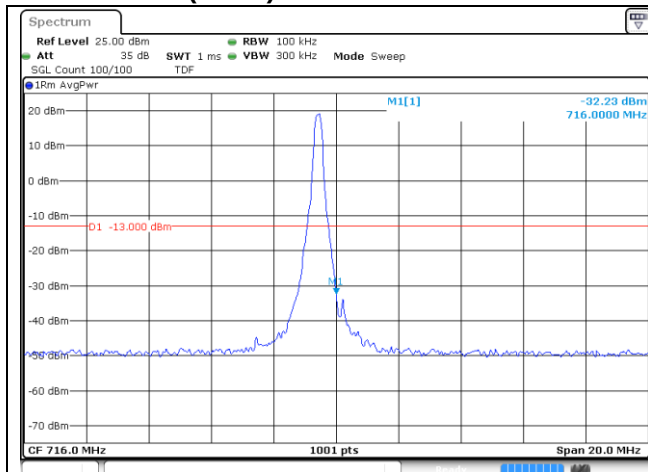


16QAM Low Channel - 1 RB

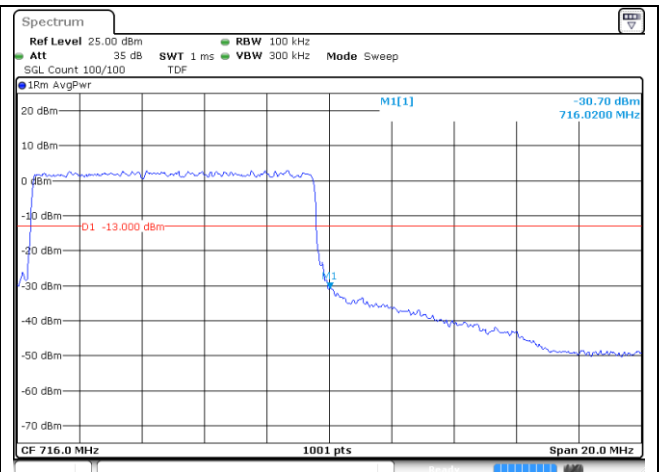


16QAM Low Channel - Full RB

## LTE band 12 (10 MHz)

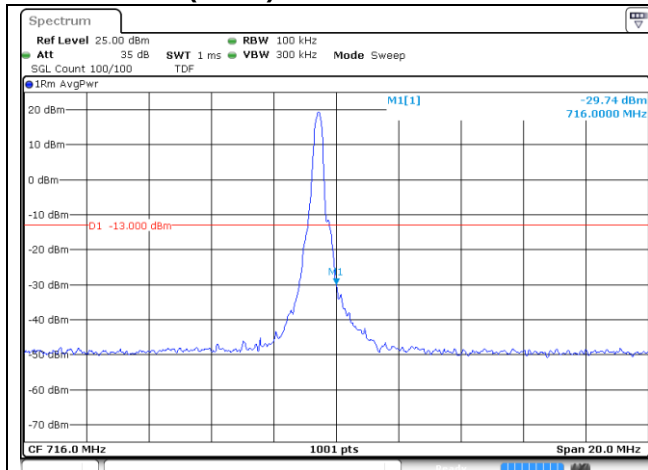


16QAM High Channel - 1 RB

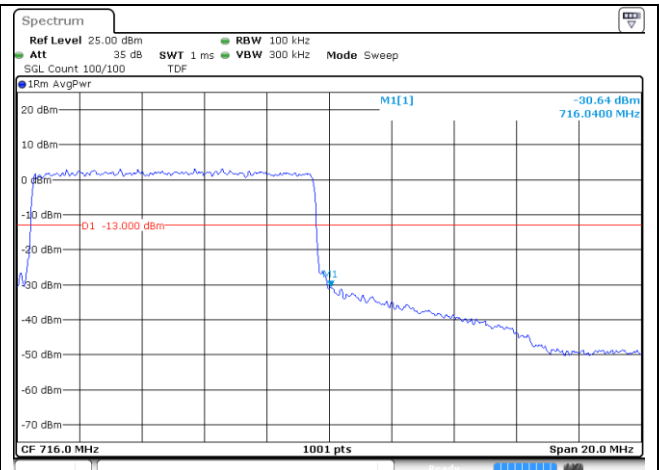


16QAM High Channel - Full RB

## LTE band 17 (10 MHz)

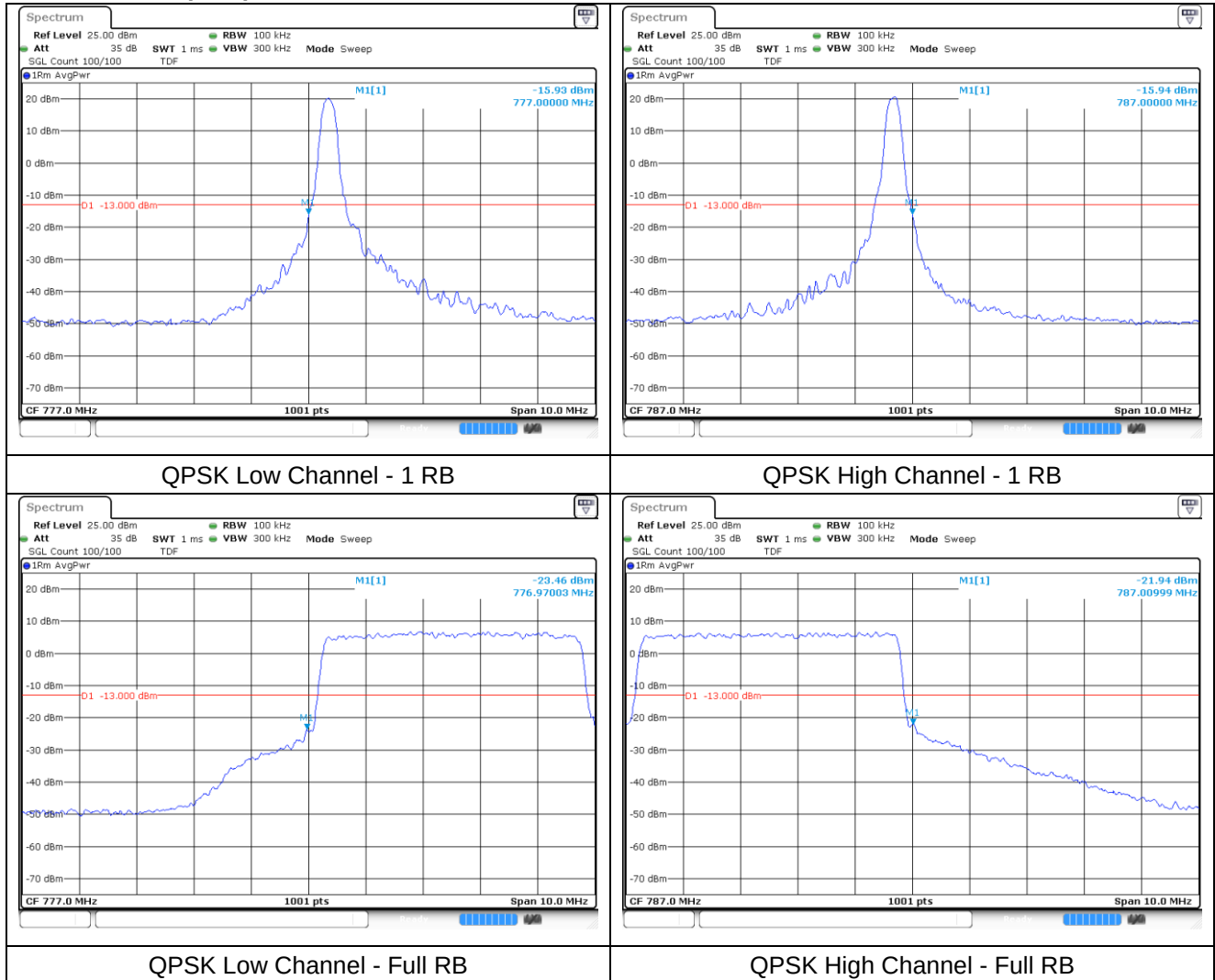


16QAM High Channel - 1 RB

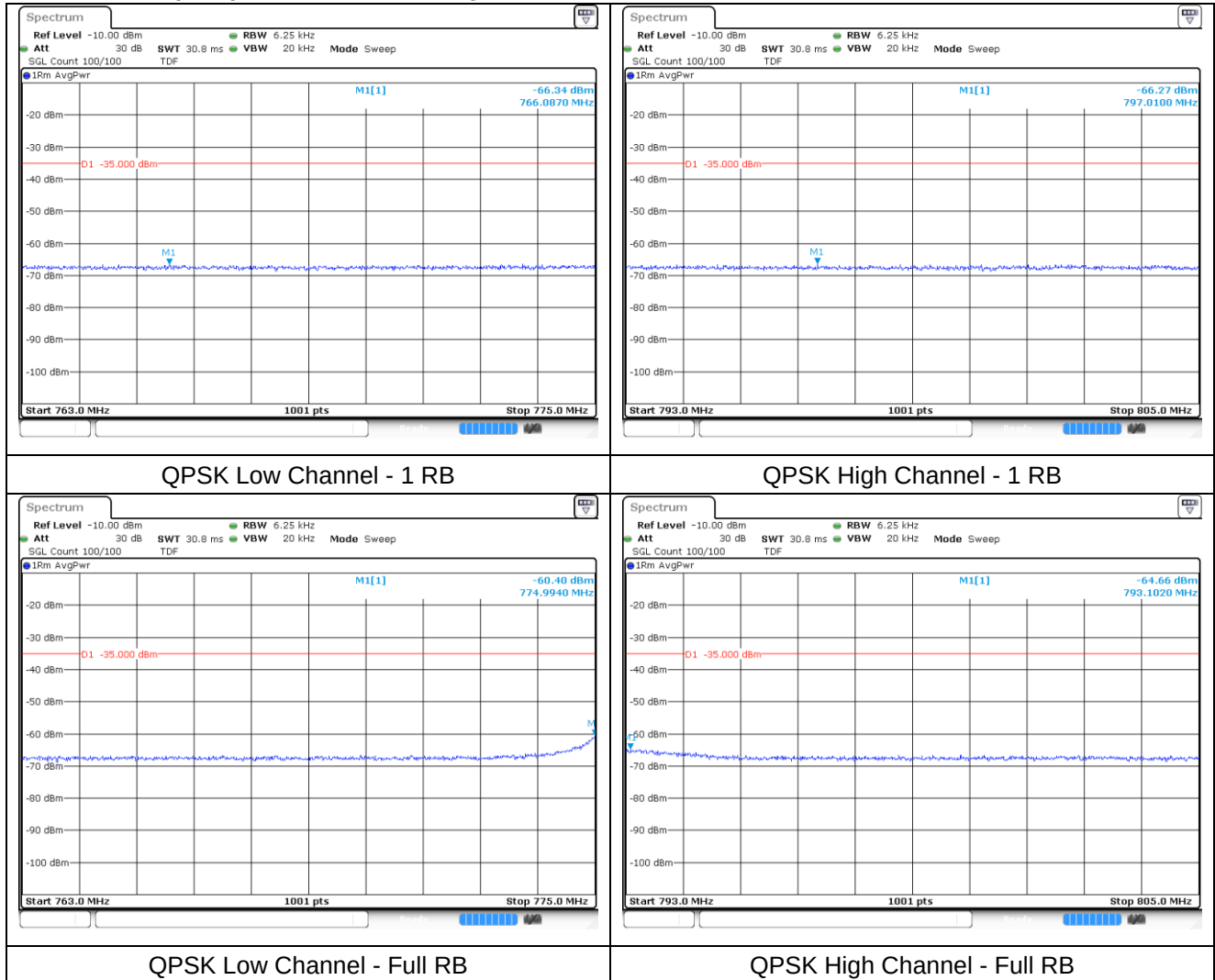


16QAM High Channel - Full RB

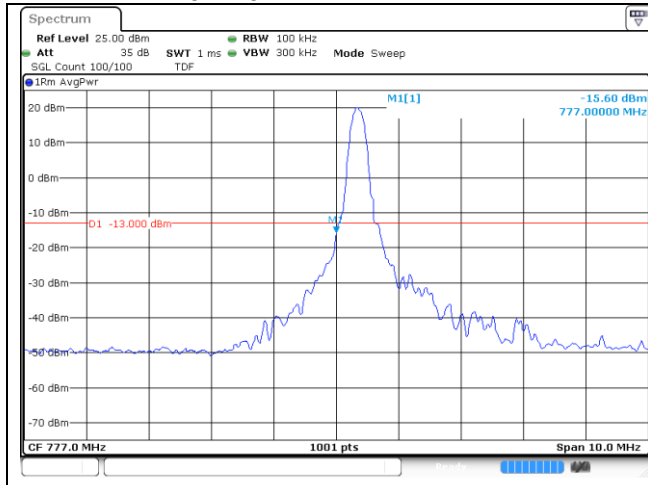
## LTE band 13 (5 MHz)



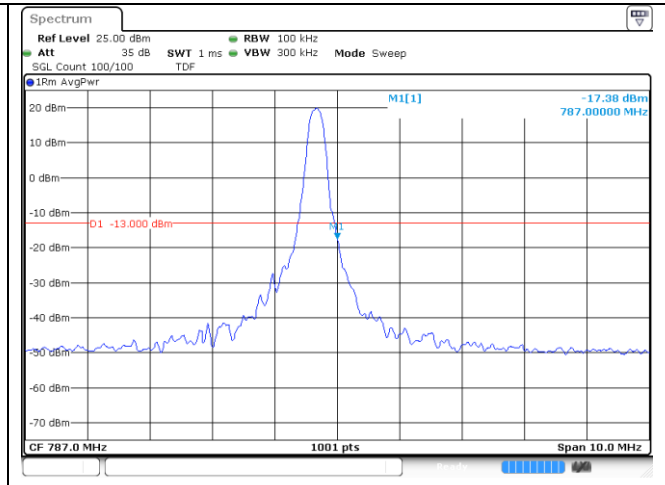
## LTE band 13 (5 MHz) Extended Band edge



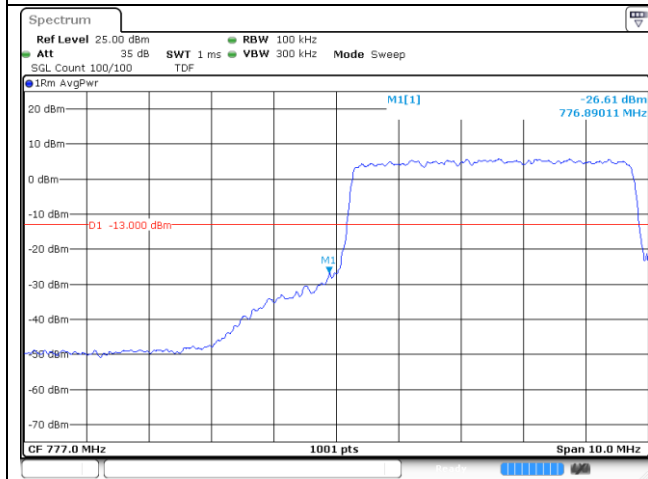
## LTE band 13 (5 MHz)



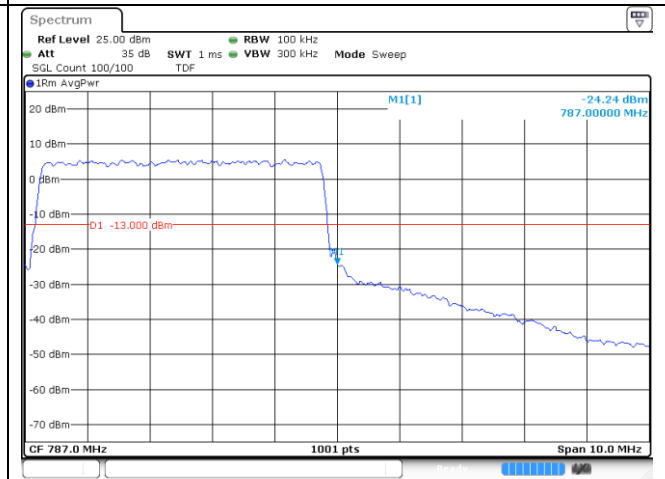
16QAM Low Channel - 1 RB



16QAM High Channel - 1 RB

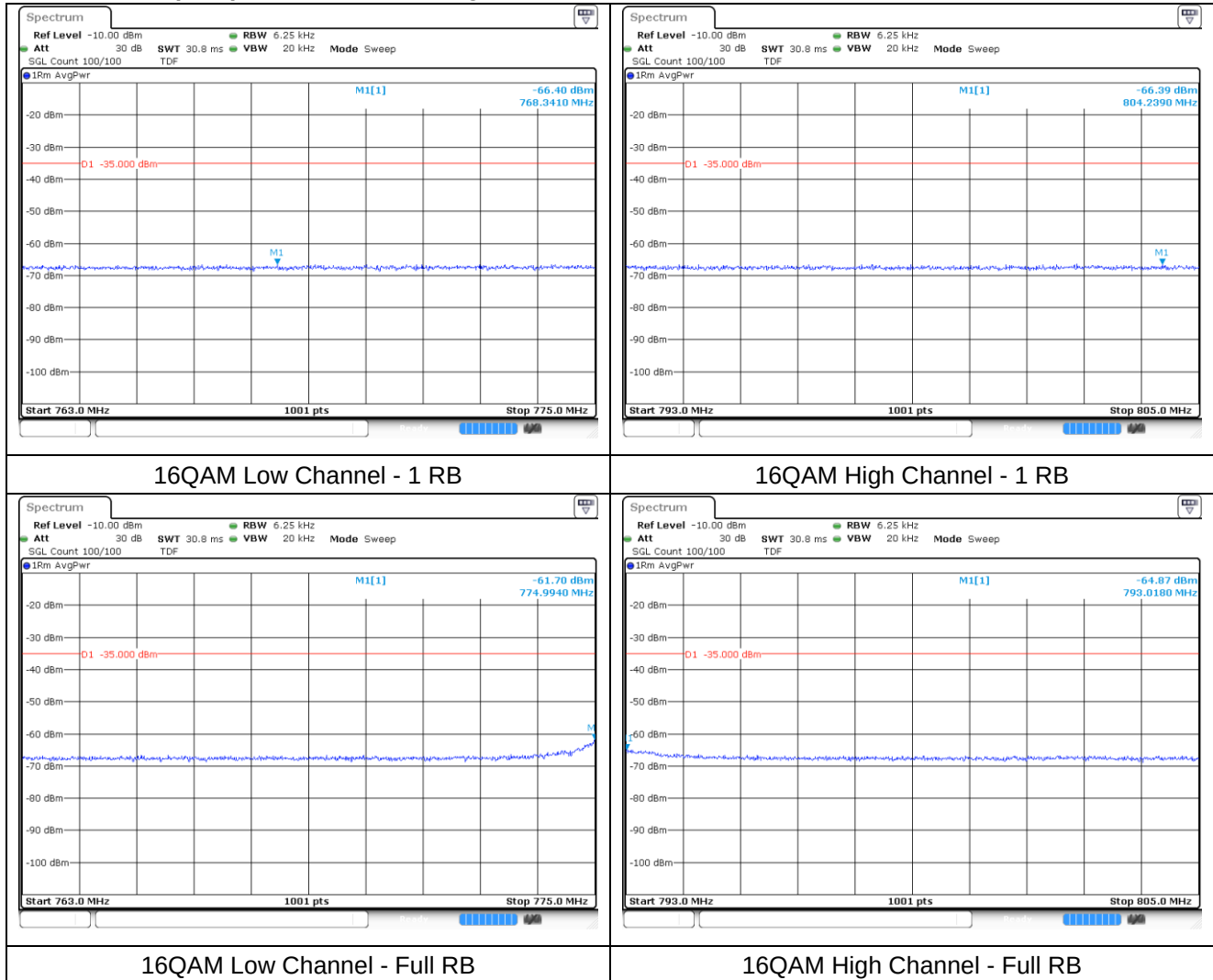


16QAM Low Channel - Full RB

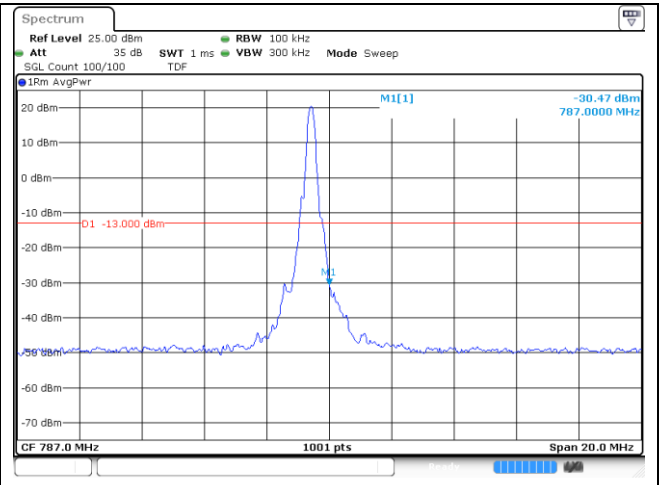
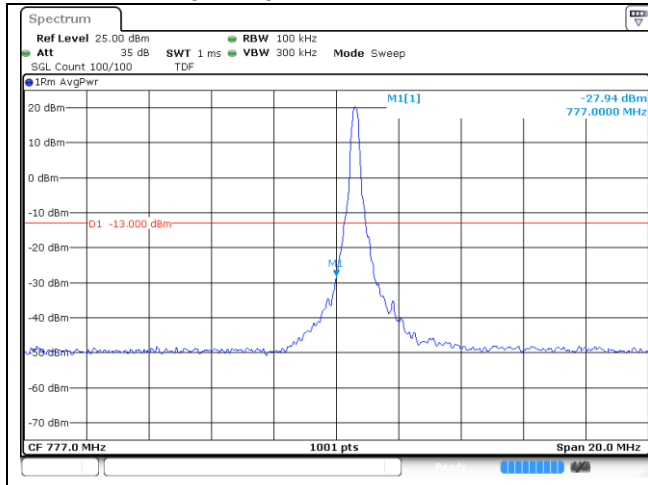


16QAM High Channel - Full RB

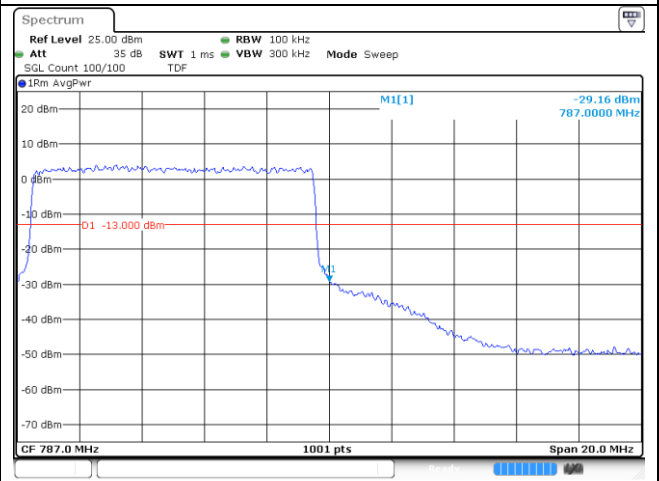
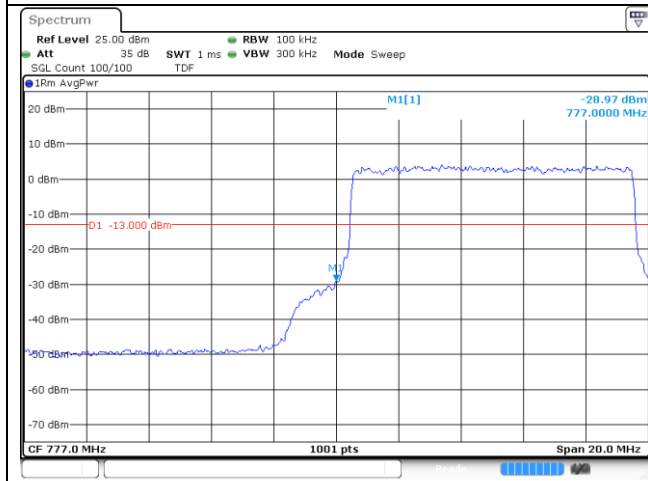
## LTE band 13 (5 MHz) Extended Band edge



## LTE band 13 (10 MHz)



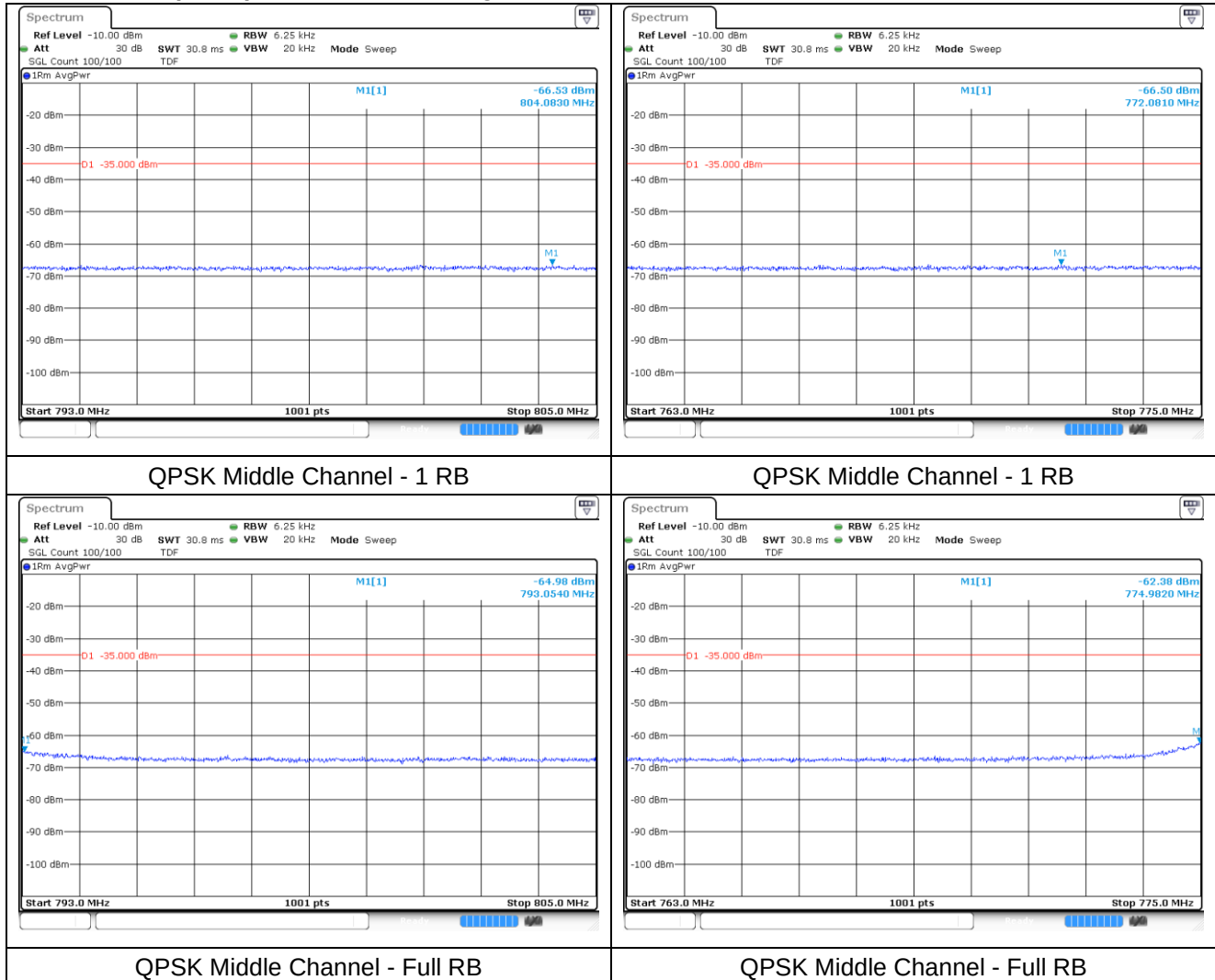
## QPSK Middle Channel - 1 RB



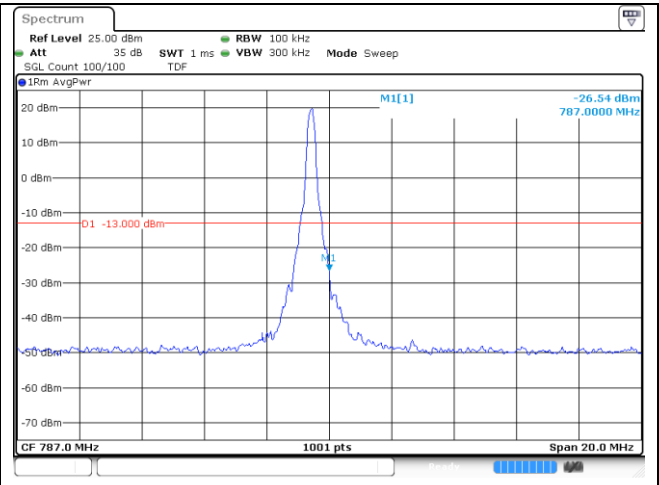
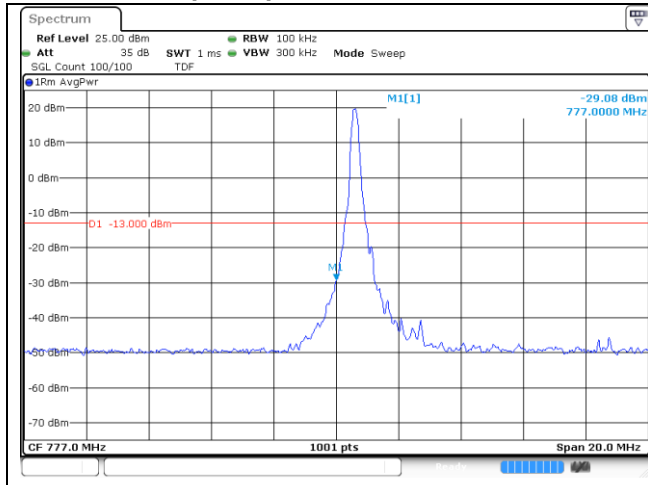
## QPSK Middle Channel - Full RB

## QPSK Middle Channel - Full RB

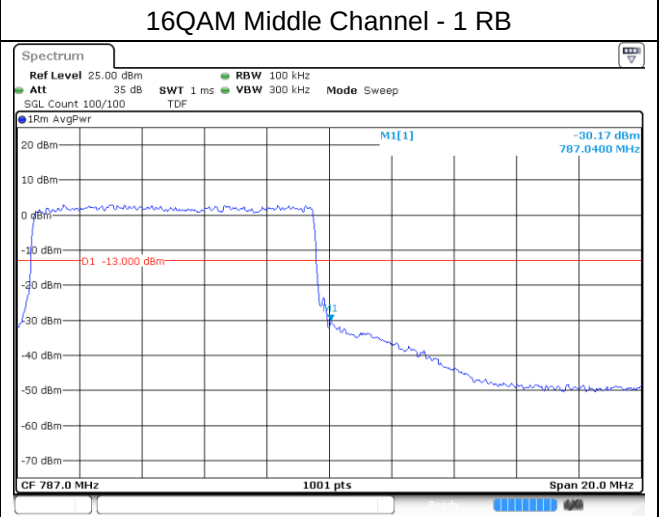
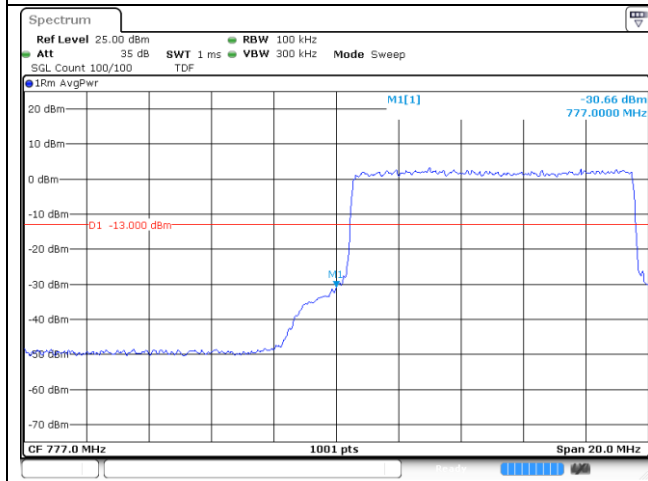
## LTE band 13 (10 MHz) Extended Band edge



## LTE band 13 (10 MHz)



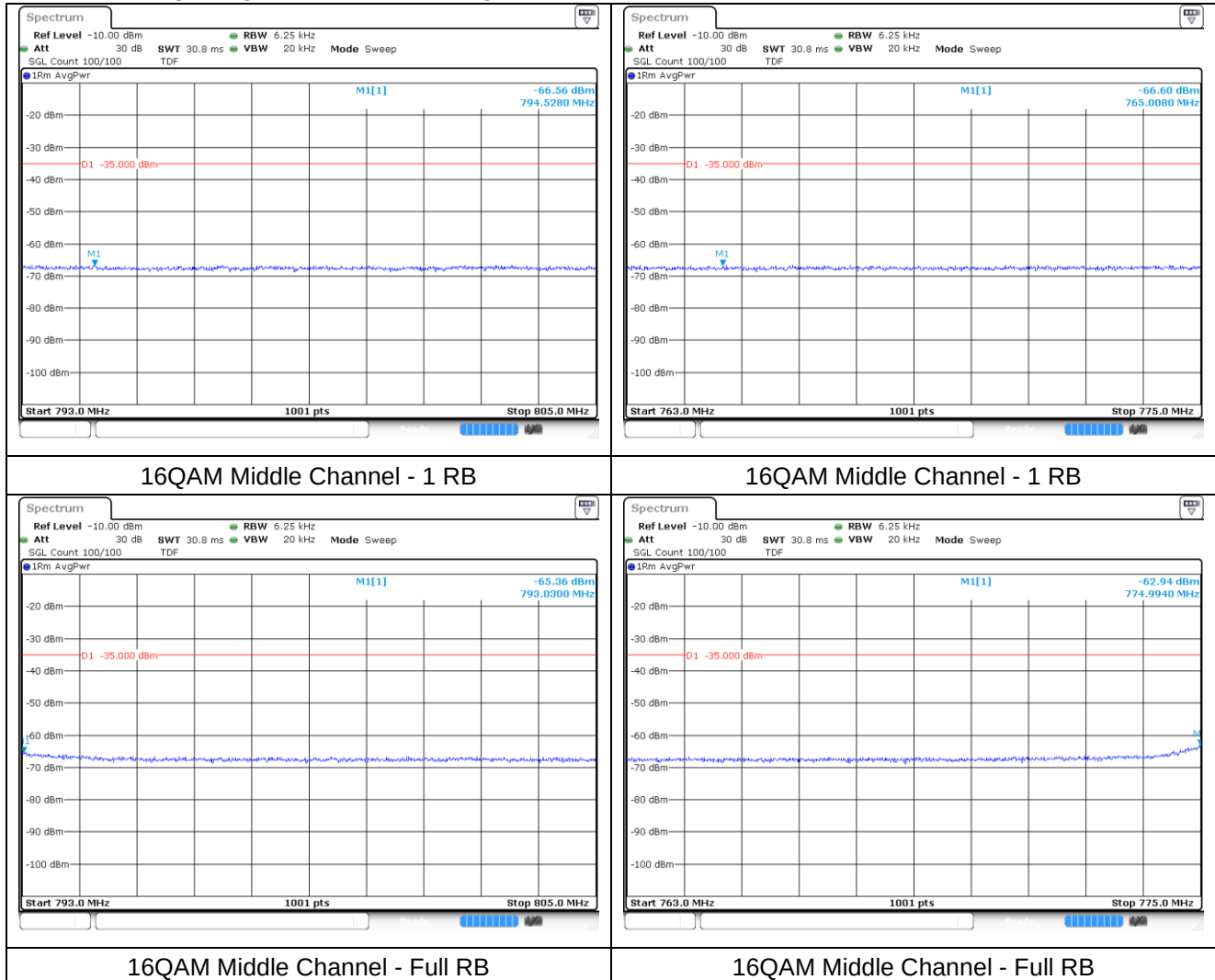
## 16QAM Middle Channel - 1 RB



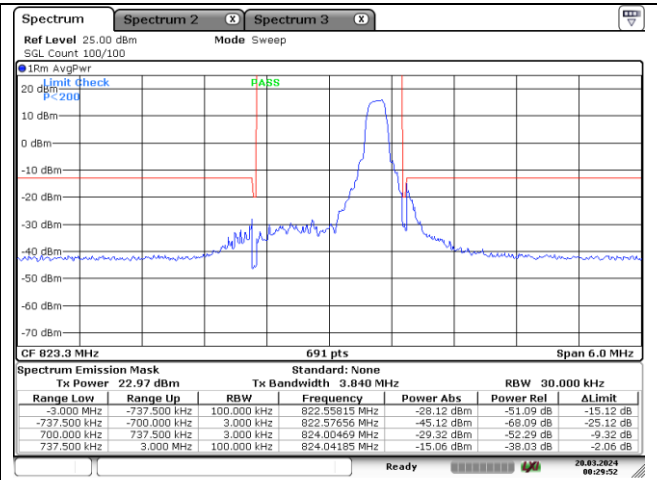
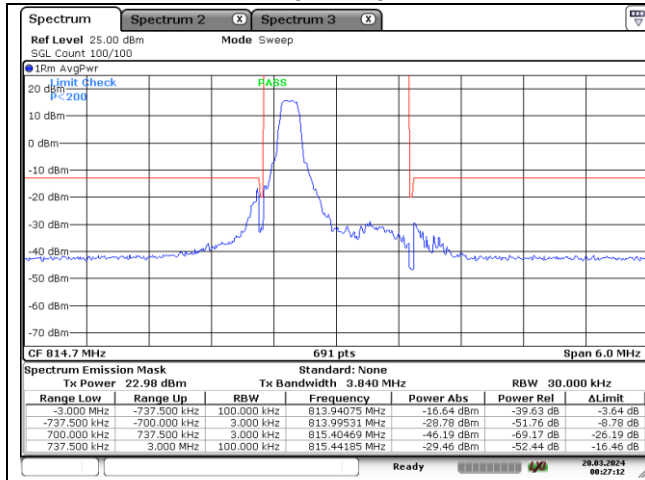
## 16QAM Middle Channel - Full RB

## 16QAM Middle Channel - Full RB

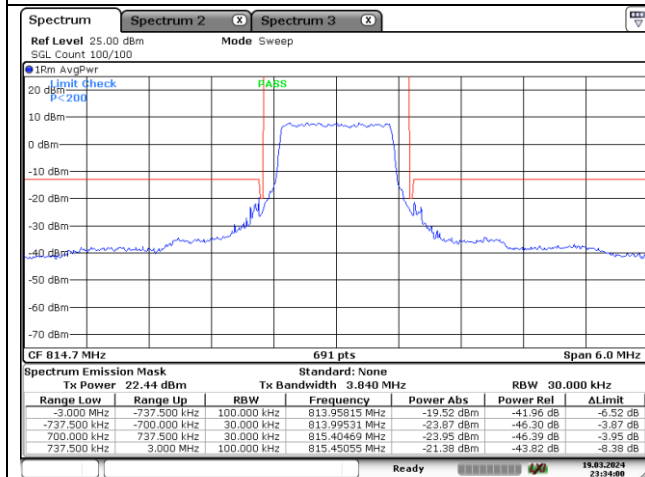
## LTE band 13 (10 MHz) Extended Band edge



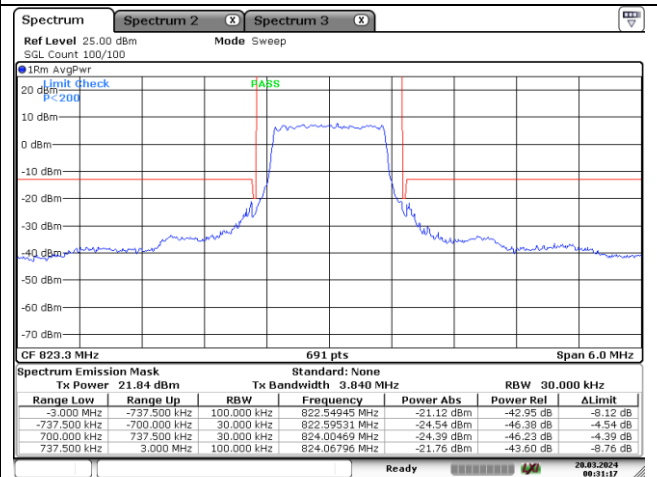
## LTE band 26 Part 90 (1.4 MHz)



## QPSK Low Channel - 1 RB



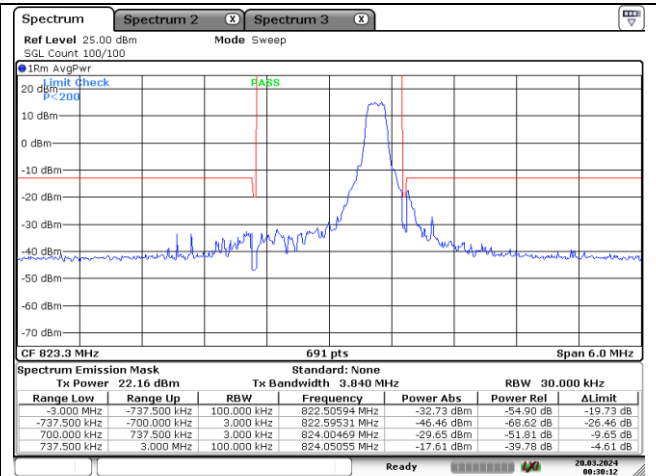
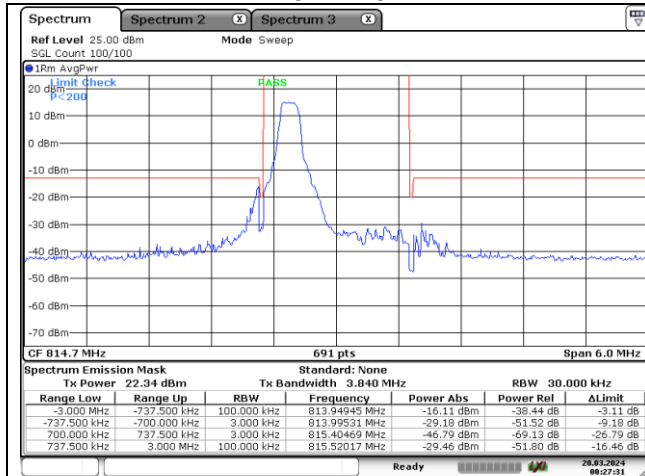
## QPSK High Channel - 1 RB



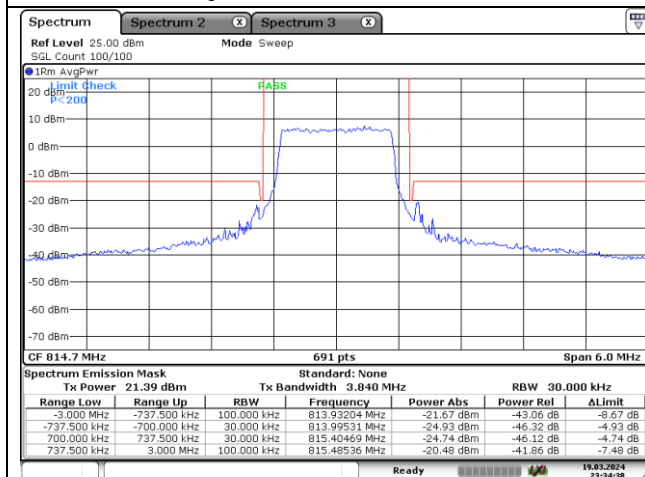
## QPSK Low Channel - Full RB

## QPSK High Channel - Full RB

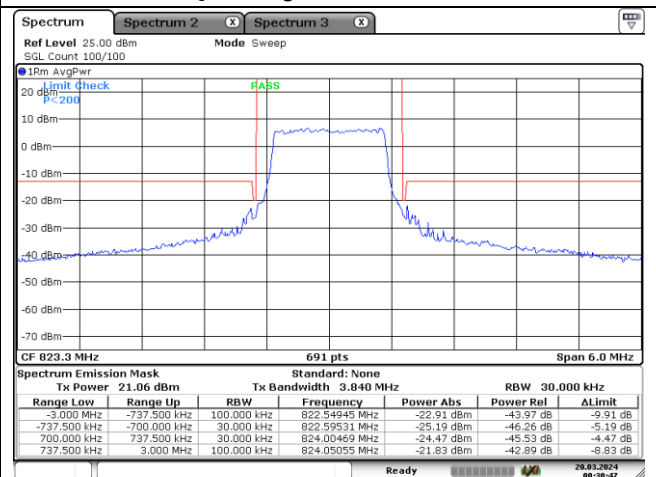
## LTE band 26 Part 90 (1.4 MHz)



## 16QAM Low Channel - 1 RB



## 16QAM High Channel - 1 RB



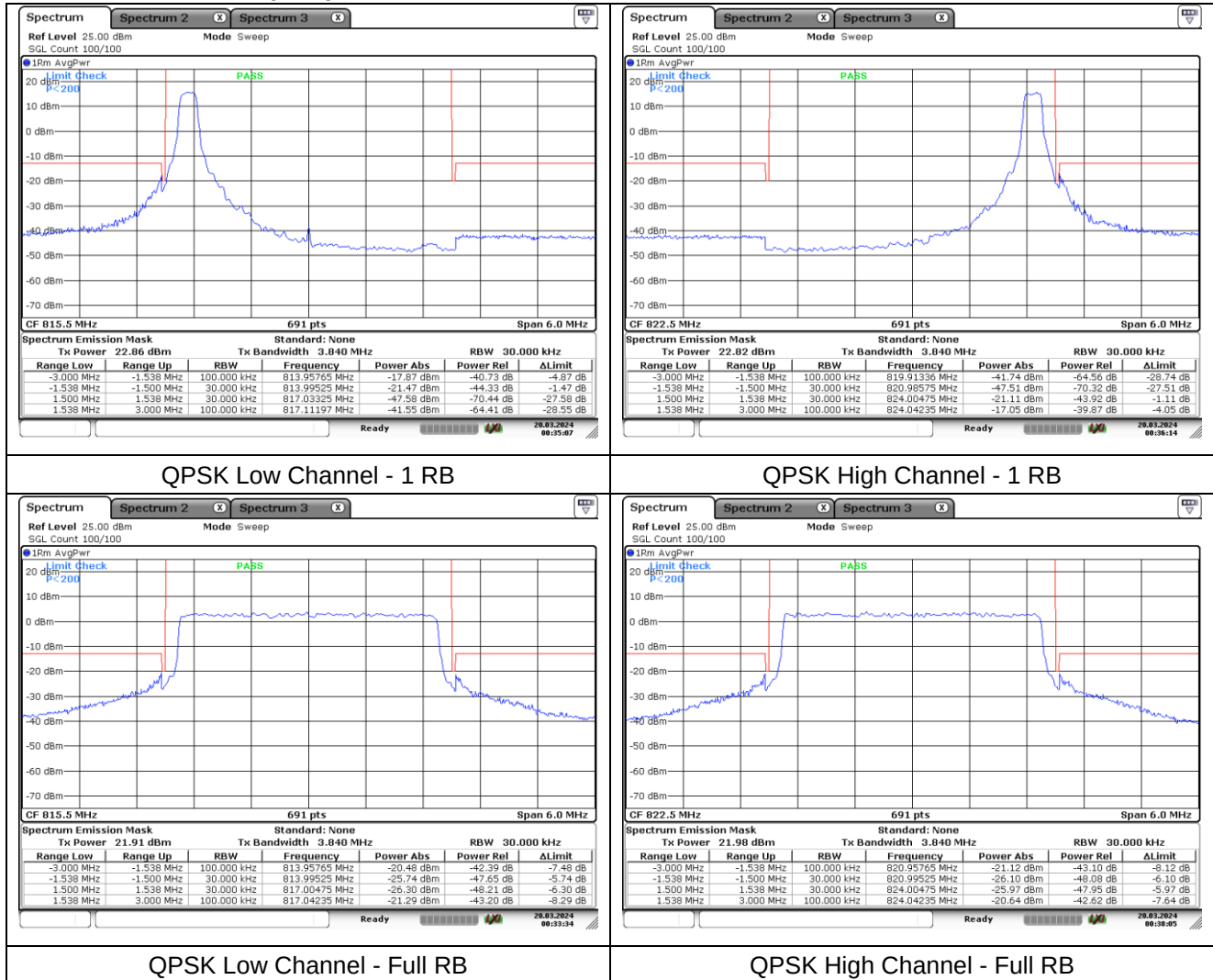
## 16QAM Low Channel - Full RB



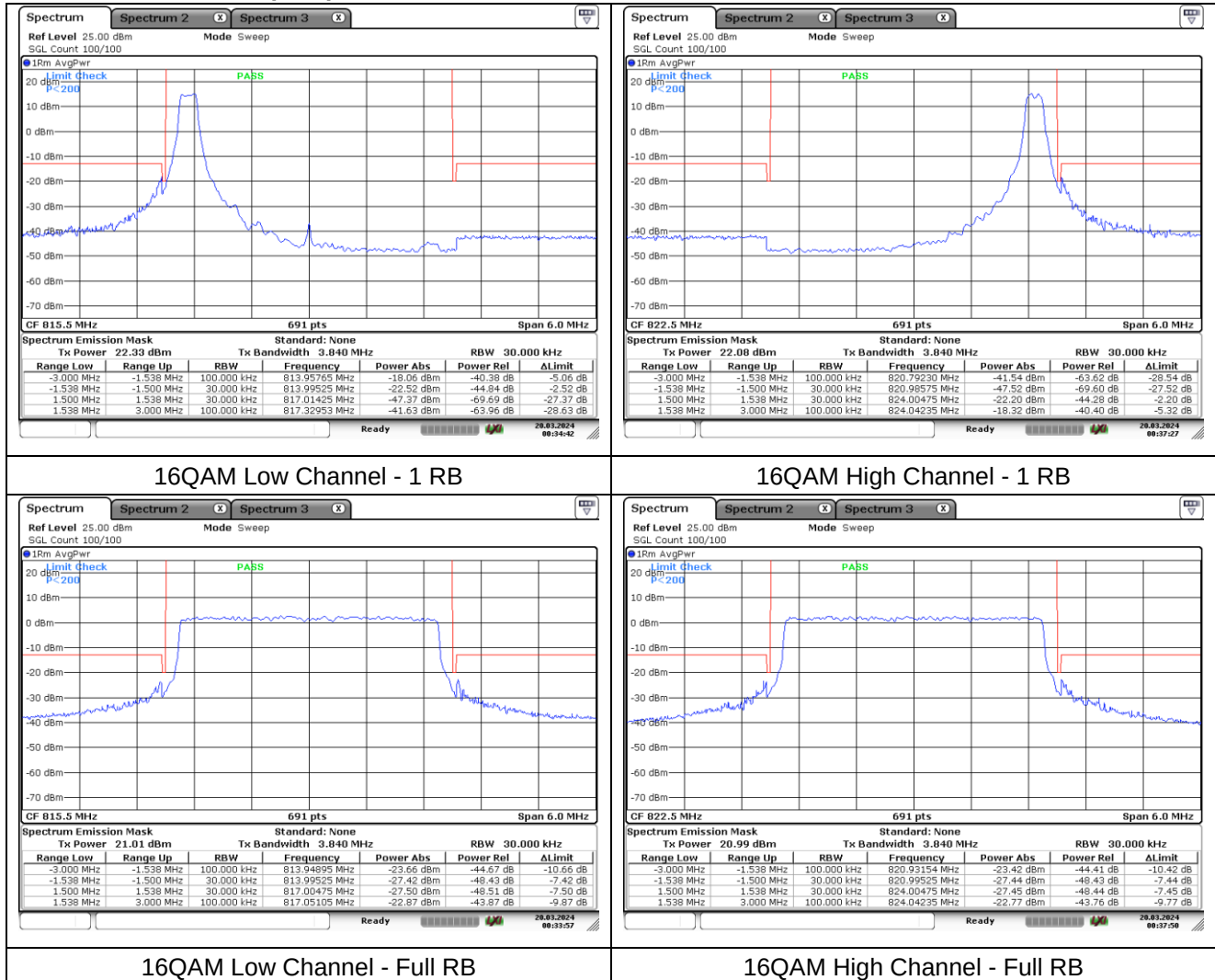
## 16QAM High Channel - Full RB



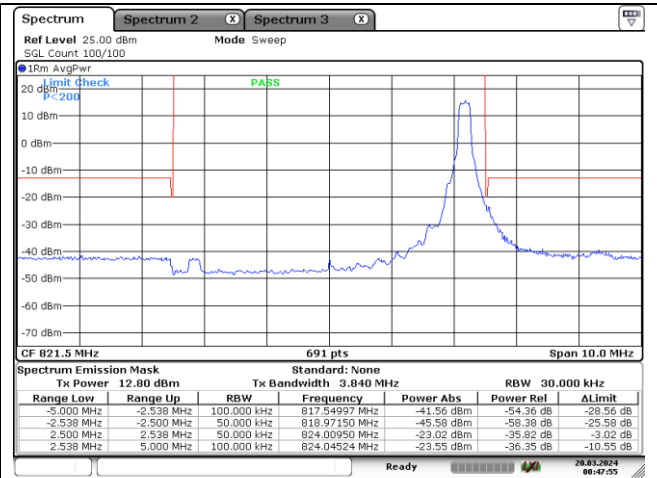
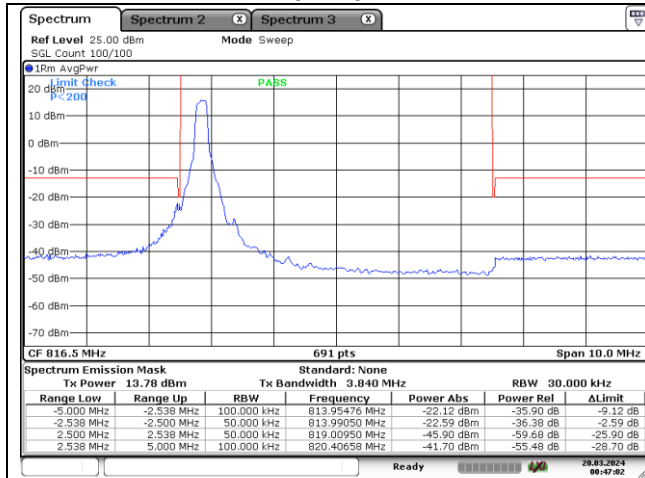
## LTE band 26 Part 90 (3 MHz)



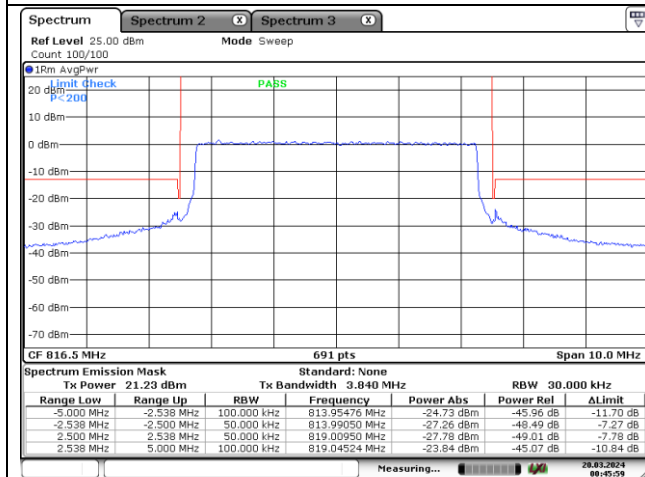
## LTE band 26 Part 90 (3 MHz)



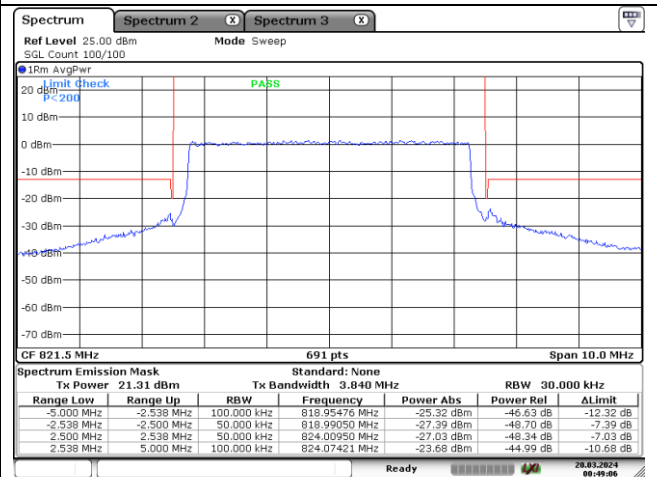
## LTE band 26 Part 90 (5 MHz)



## QPSK Low Channel - 1 RB



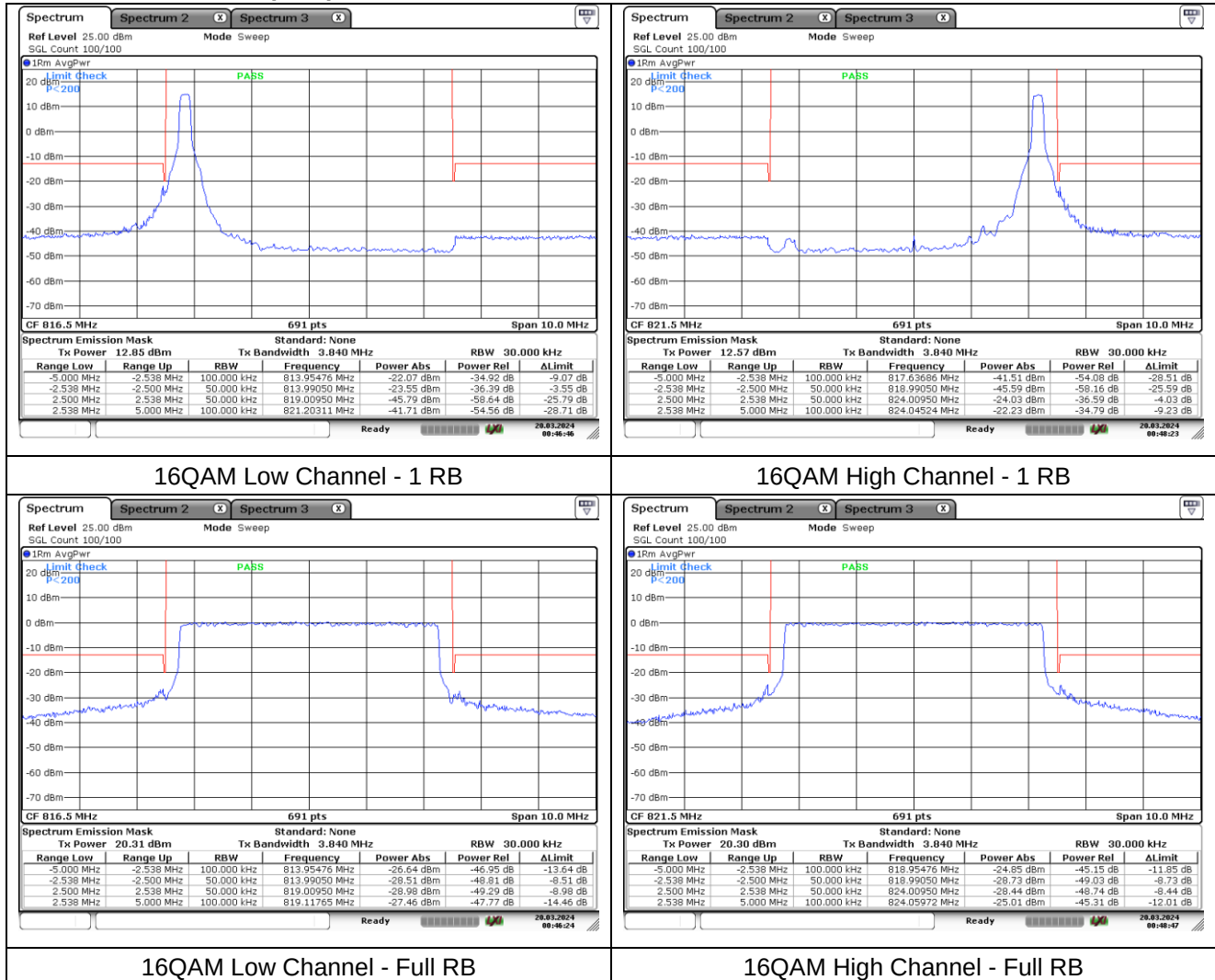
## QPSK High Channel - 1 RB



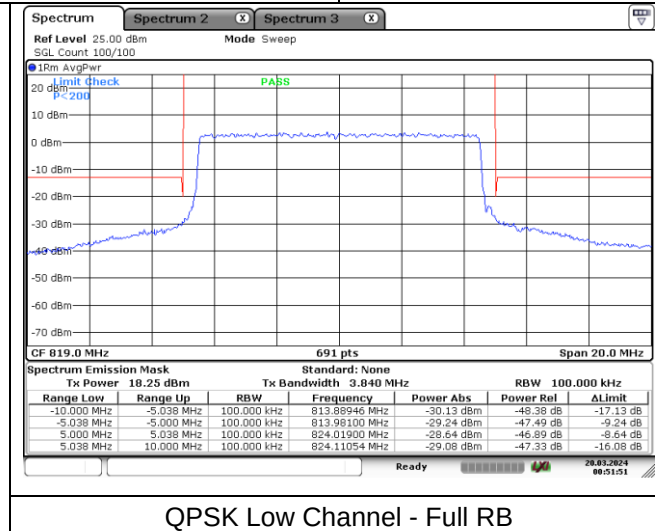
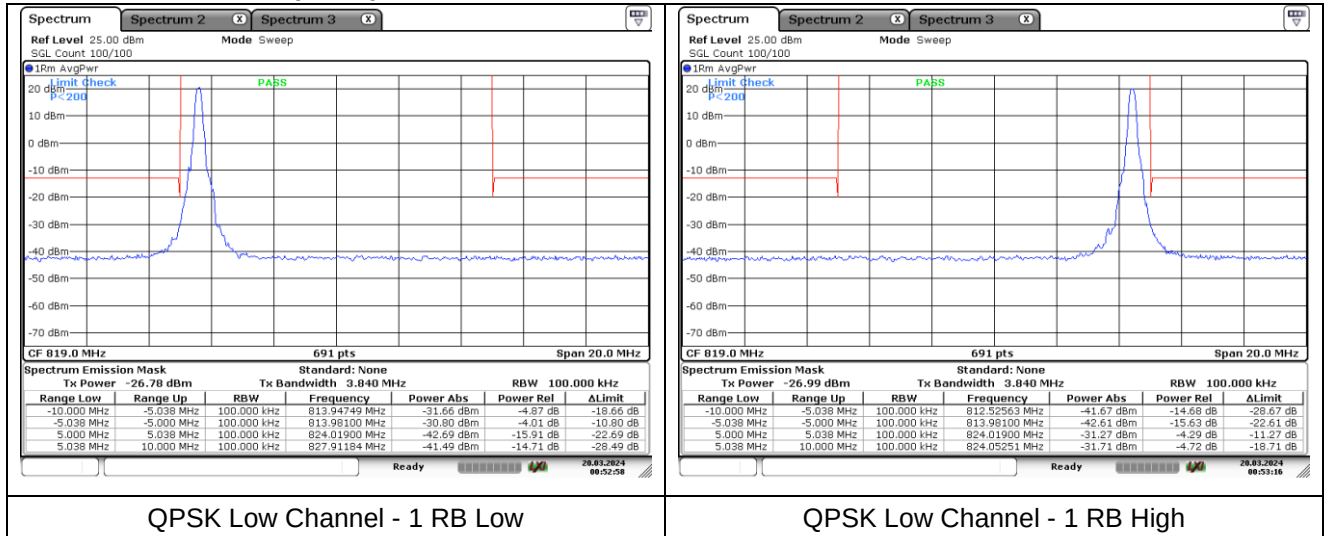
## QPSK Low Channel - Full RB

## QPSK High Channel - Full RB

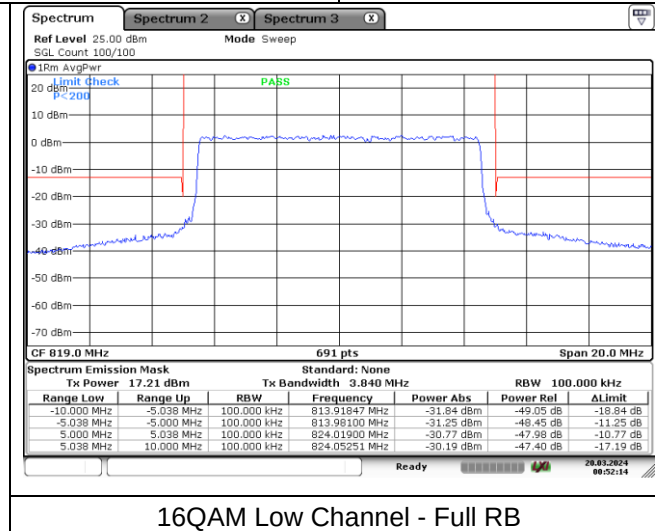
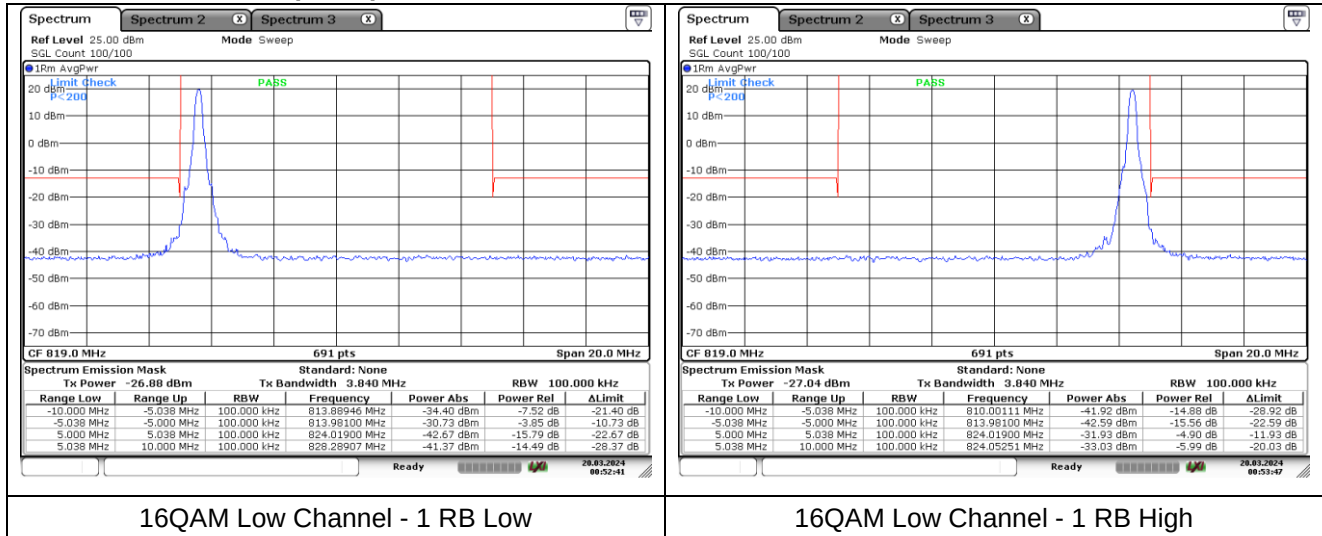
## LTE band 26 Part 90 (5 MHz)



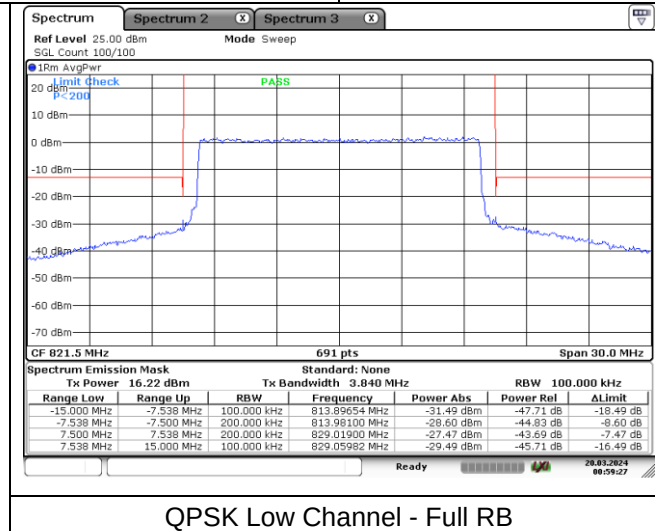
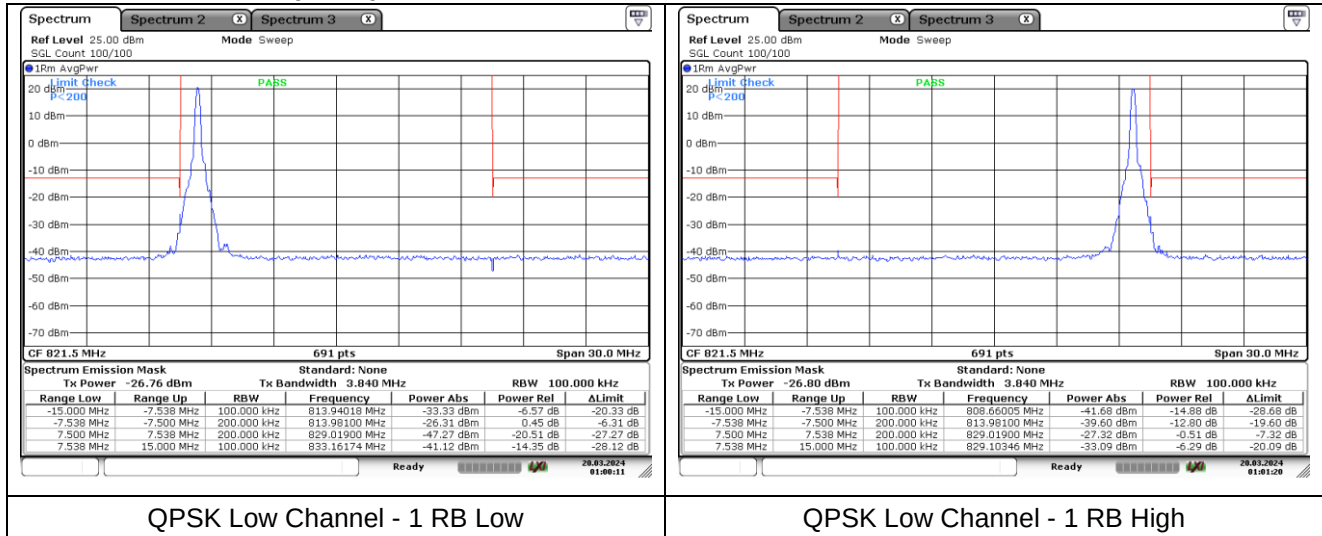
## LTE band 26 Part 90 (10 MHz)



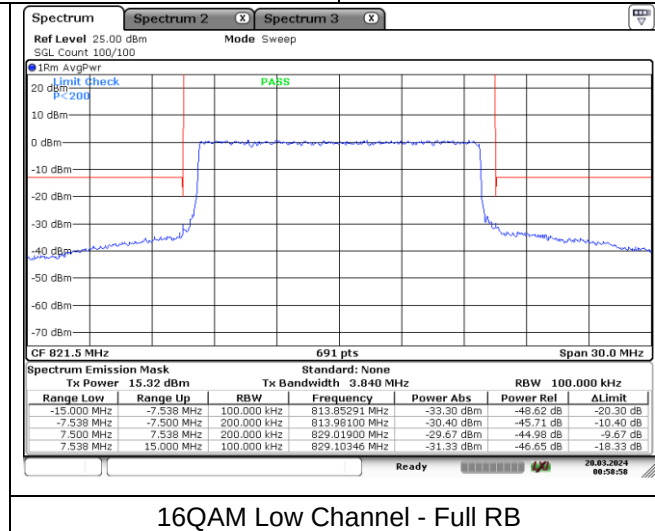
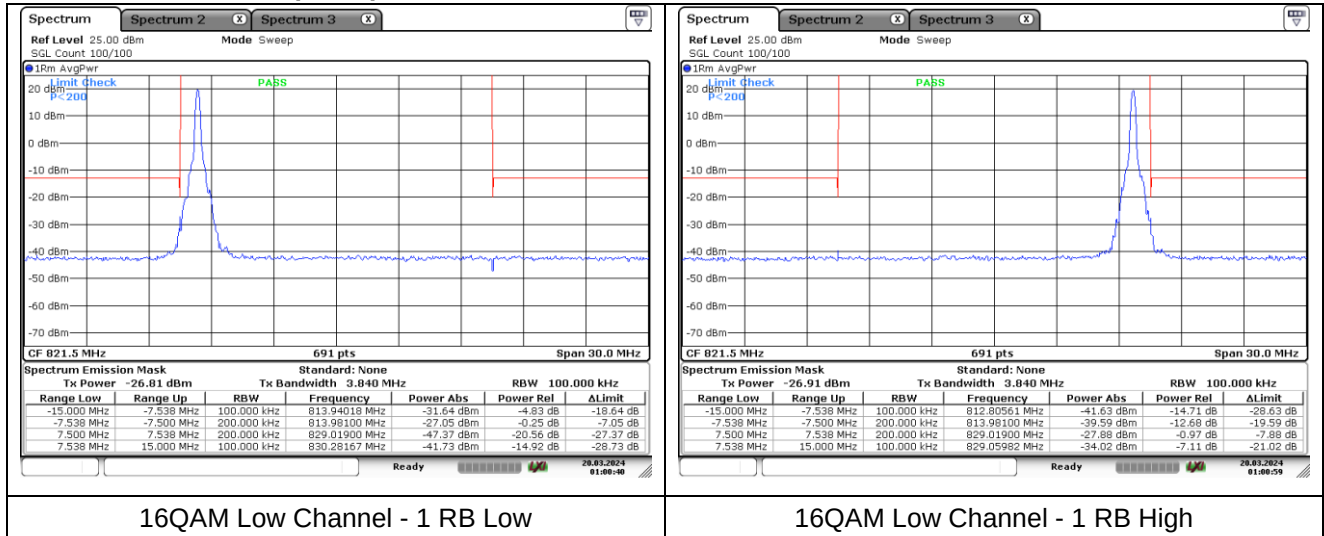
## LTE band 26 Part 90 (10 MHz)



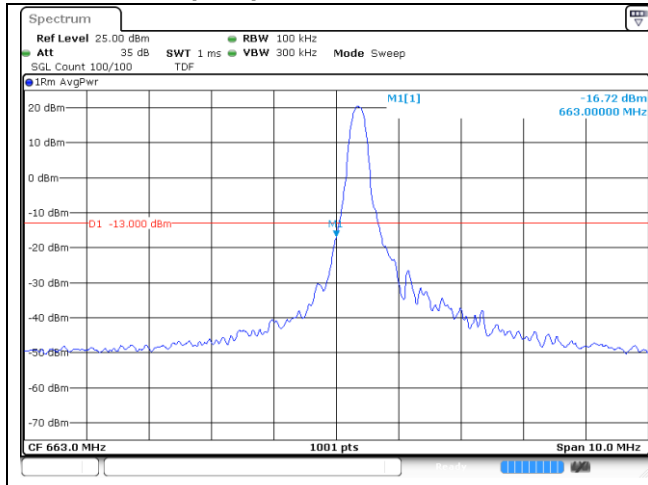
## LTE band 26 Part 90 (15 MHz)



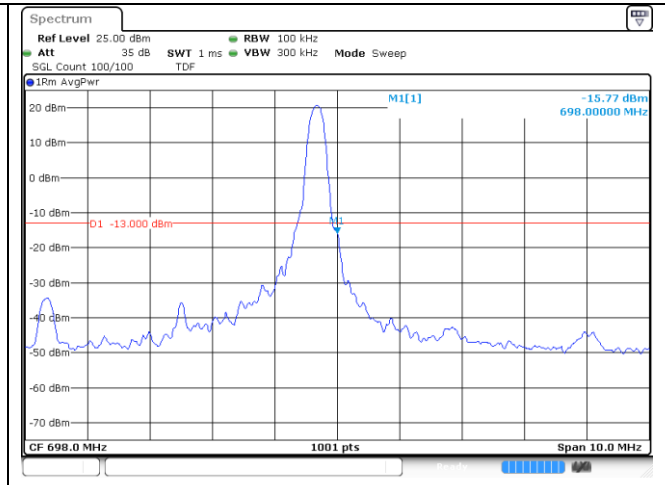
## LTE band 26 Part 90 (15 MHz)



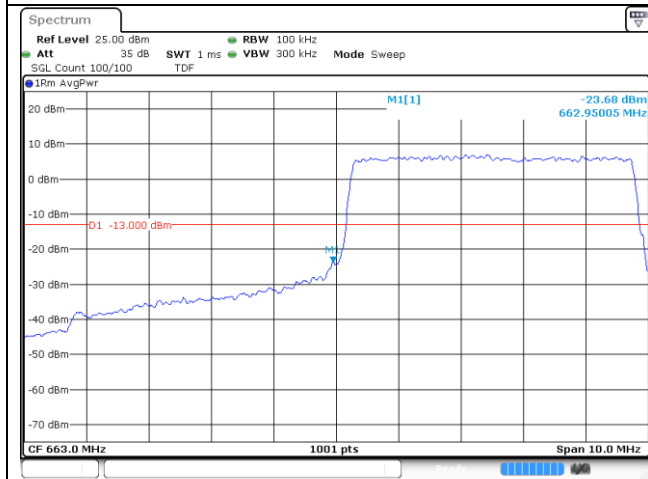
## LTE band 71 (5 MHz)



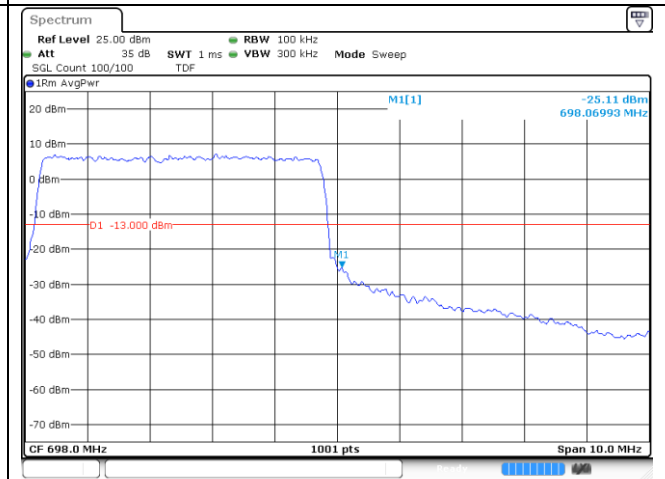
QPSK Low Channel - 1 RB



QPSK High Channel - 1 RB

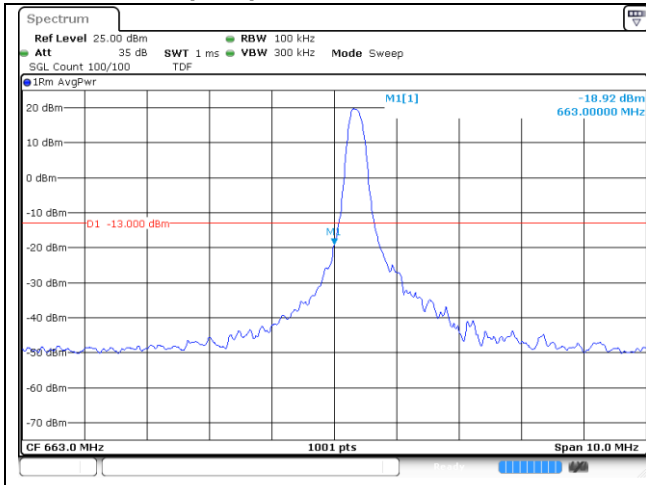


QPSK Low Channel - Full RB

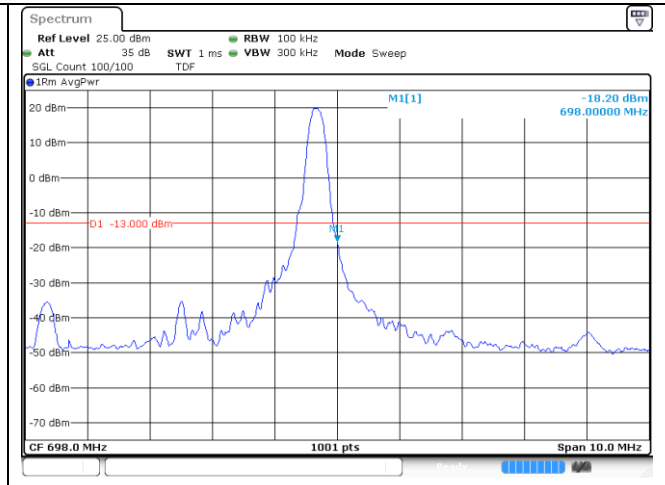


QPSK High Channel - Full RB

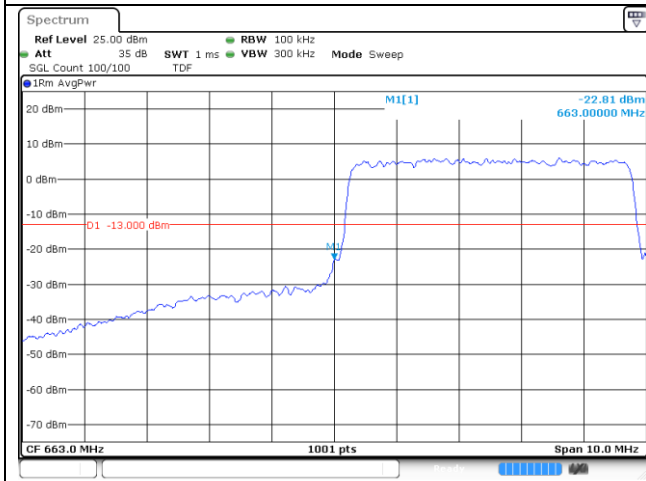
## LTE band 71 (5 MHz)



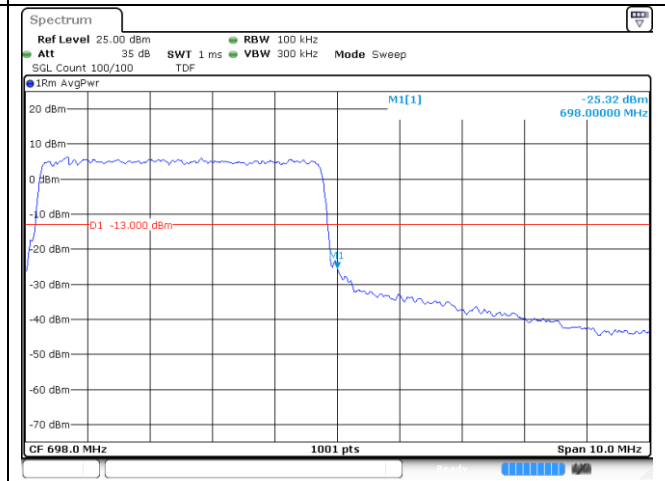
16QAM Low Channel - 1 RB



16QAM High Channel - 1 RB

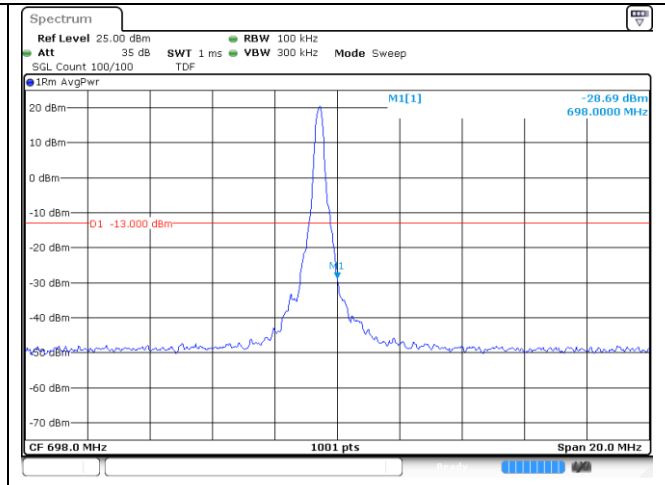
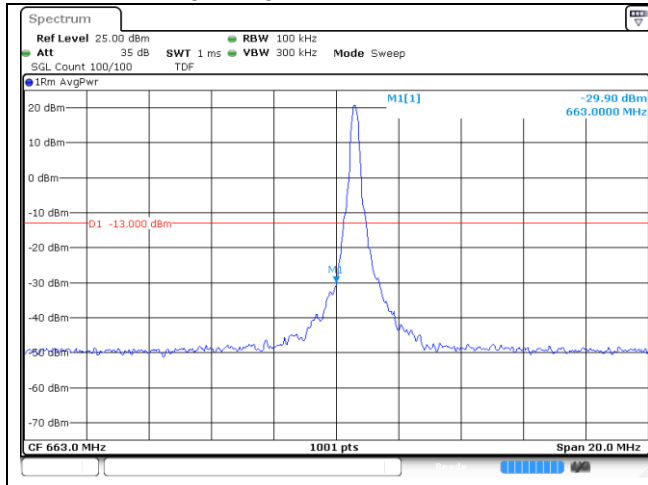


16QAM Low Channel - Full RB

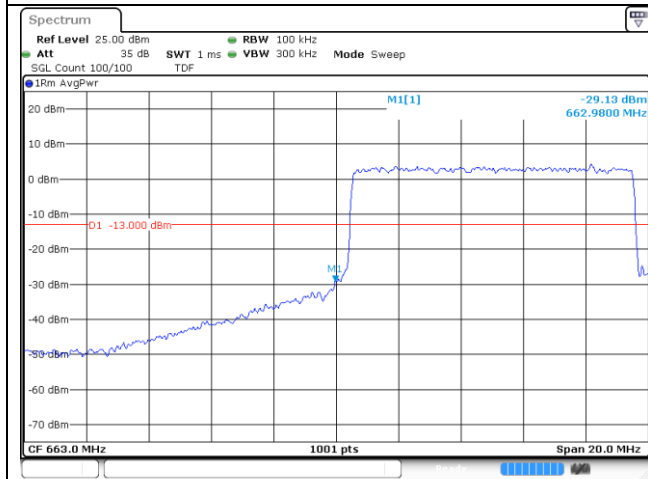


16QAM High Channel - Full RB

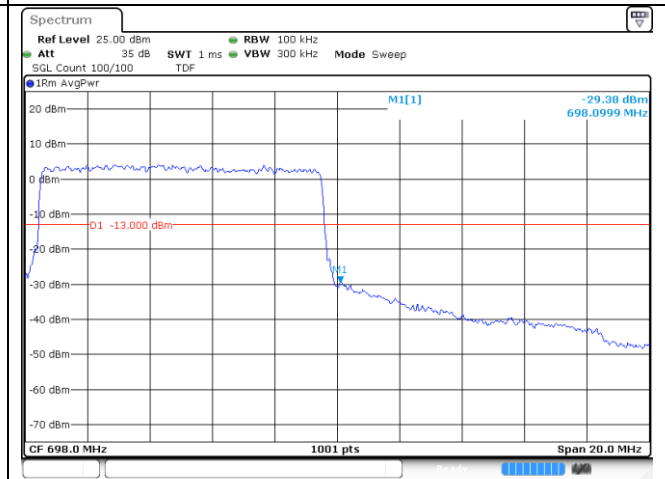
## LTE band 71 (10 MHz)



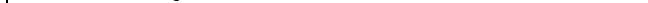
## QPSK Low Channel - 1 RB



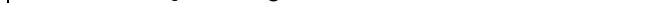
## QPSK High Channel - 1 RB



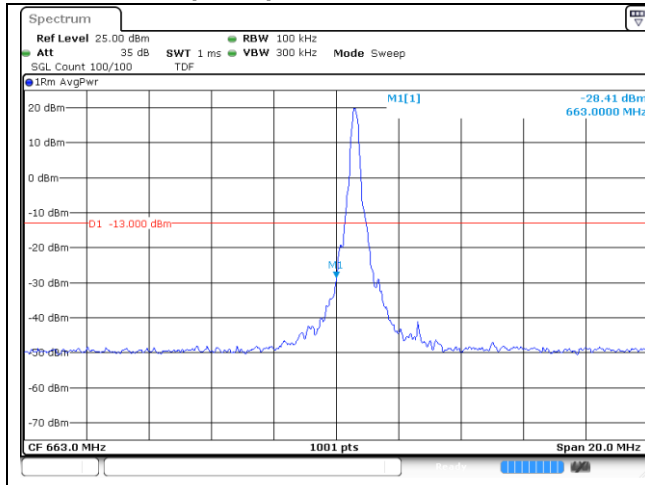
## QPSK Low Channel - Full RB



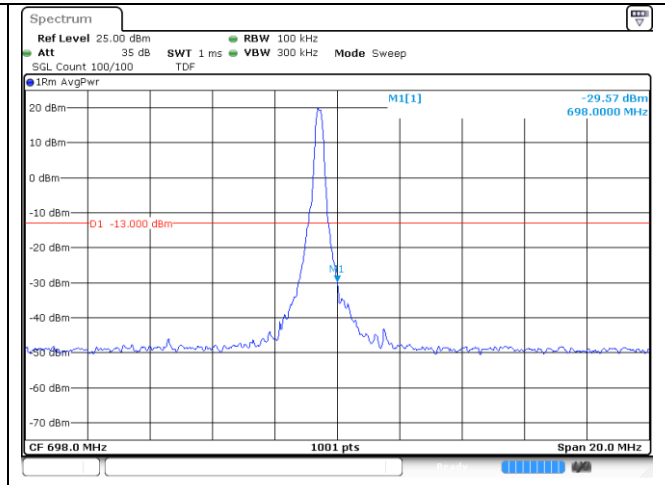
## QPSK High Channel - Full RB



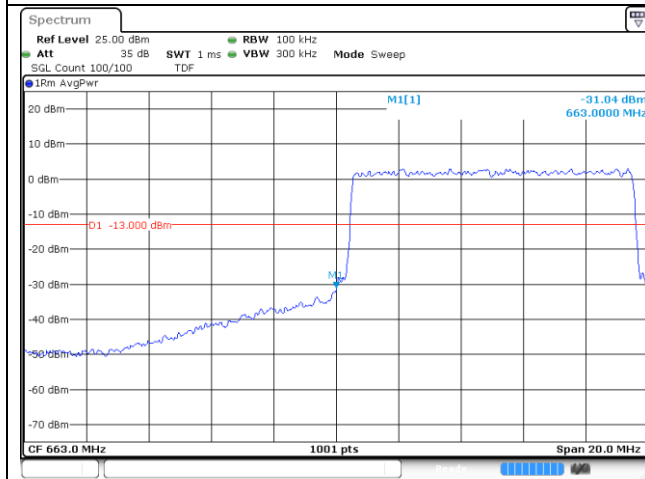
## LTE band 71 (10 MHz)



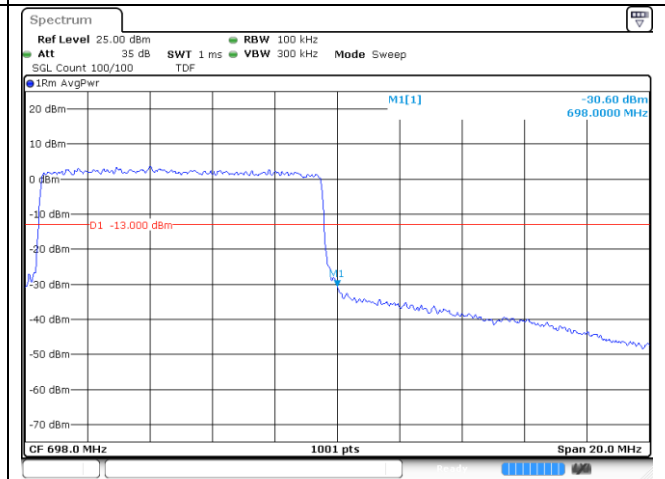
16QAM Low Channel - 1 RB



16QAM High Channel - 1 RB

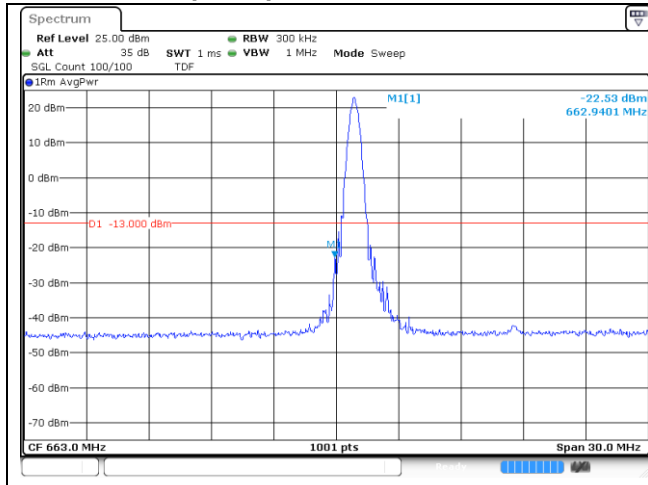


16QAM Low Channel - Full RB

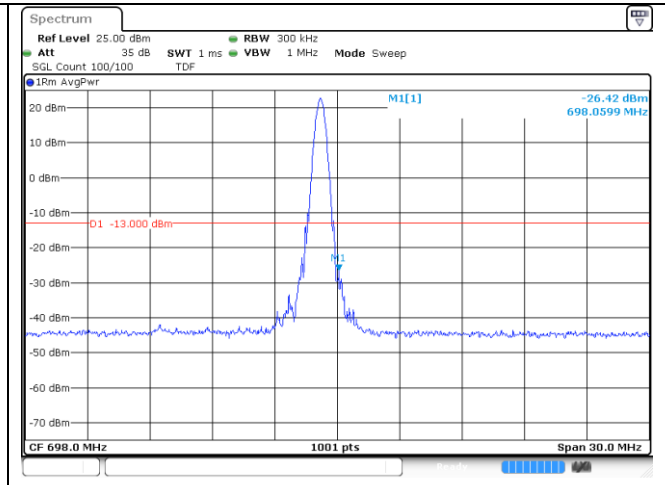


16QAM High Channel - Full RB

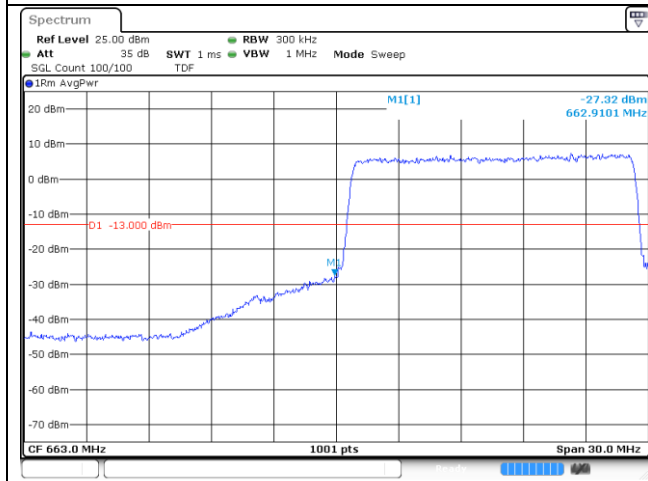
## LTE band 71 (15 MHz)



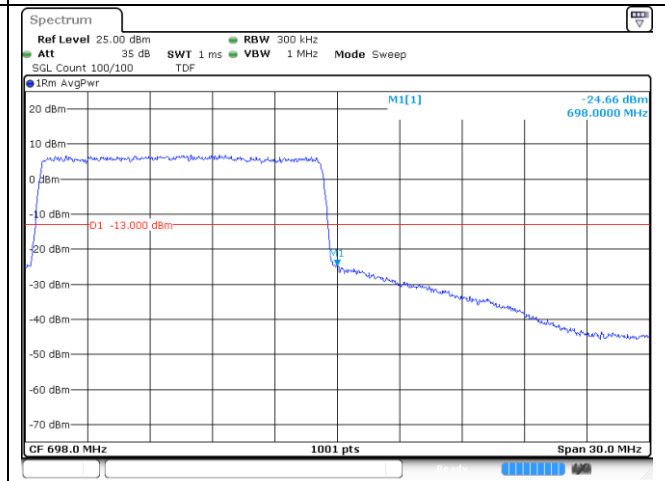
QPSK Low Channel - 1 RB



QPSK High Channel - 1 RB

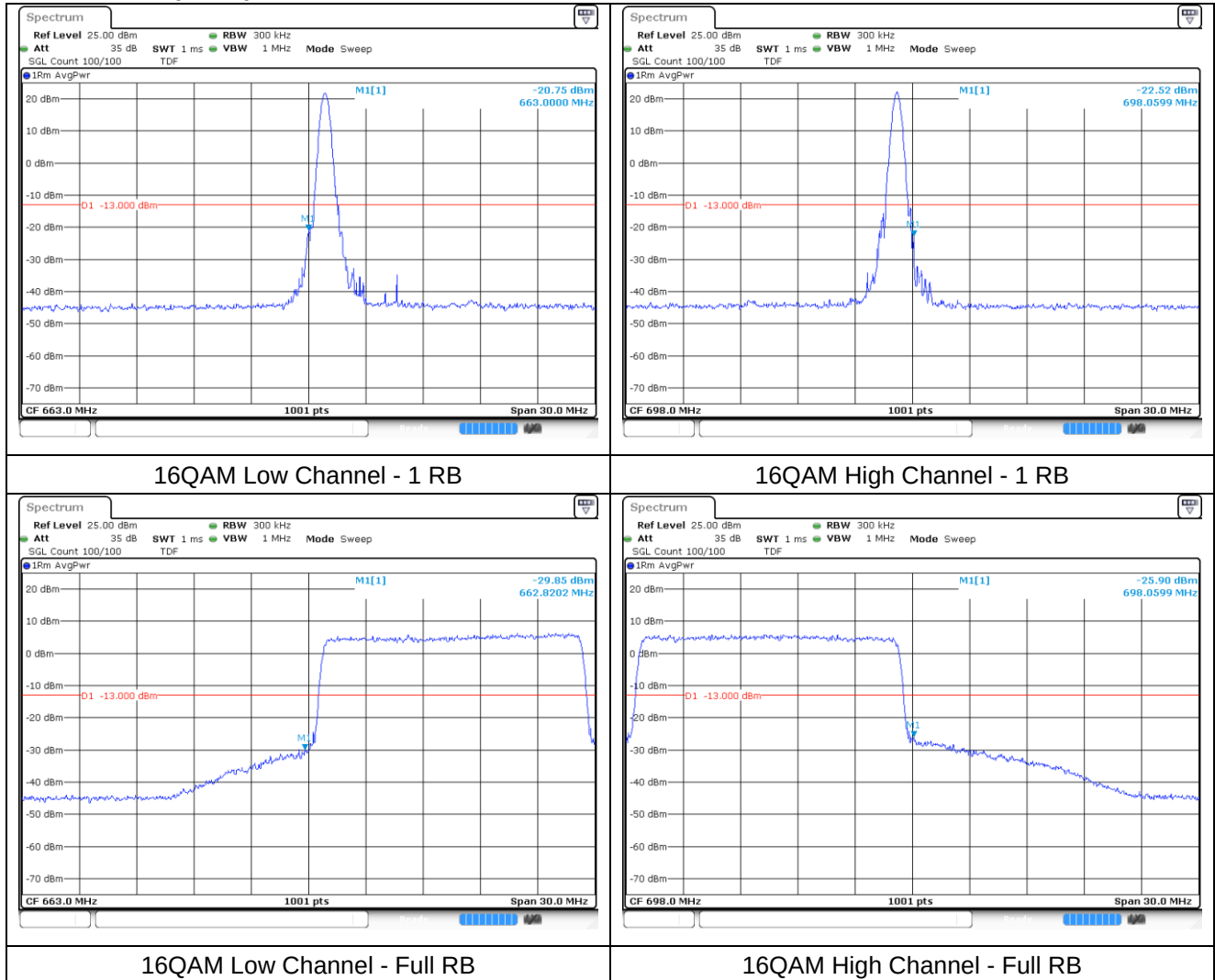


QPSK Low Channel - Full RB

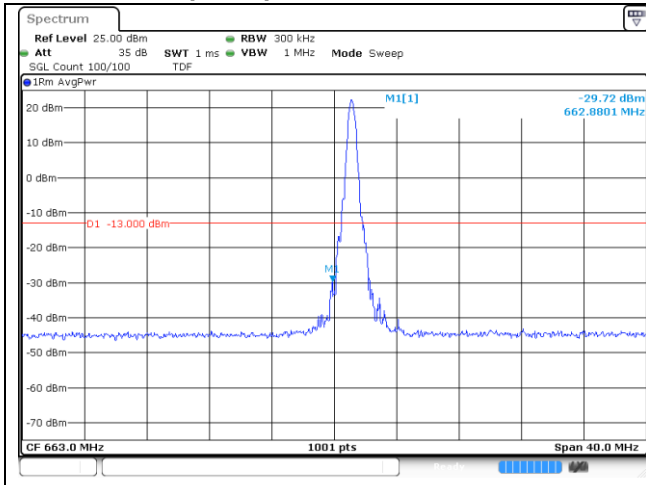


QPSK High Channel - Full RB

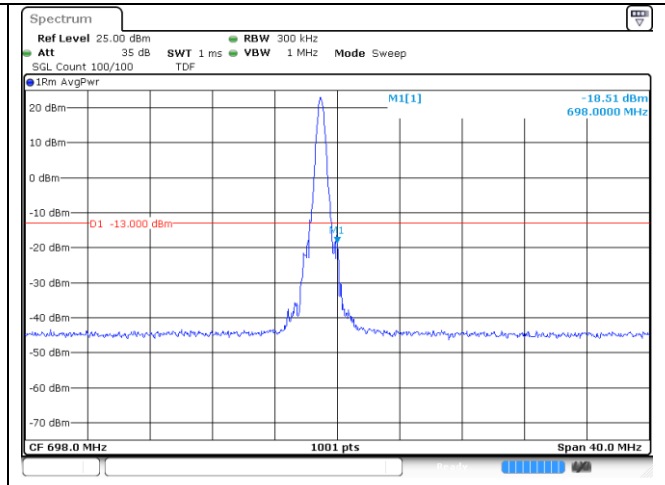
## LTE band 71 (15 MHz)



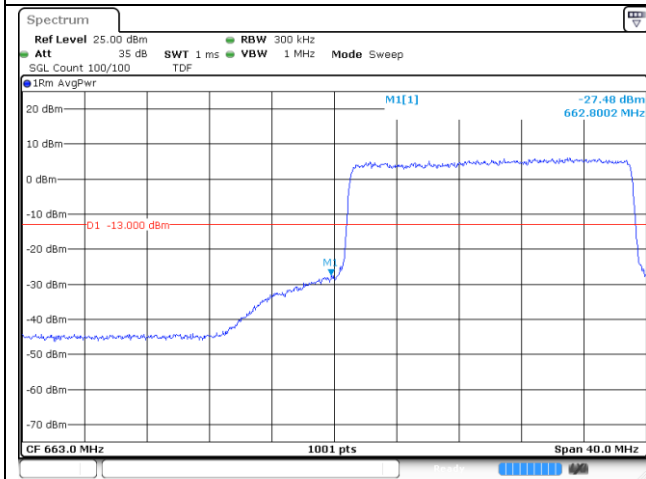
## LTE band 71 (20 MHz)



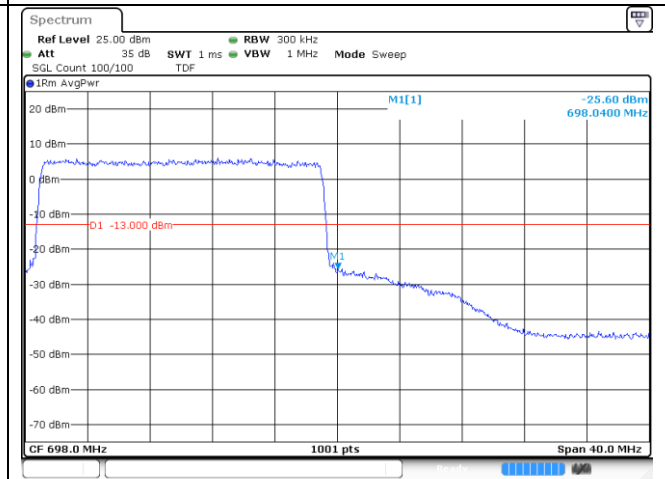
QPSK Low Channel - 1 RB



QPSK High Channel - 1 RB

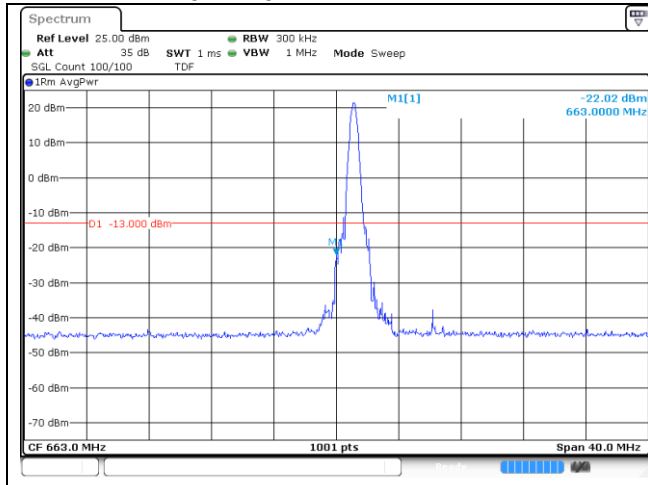


QPSK Low Channel - Full RB

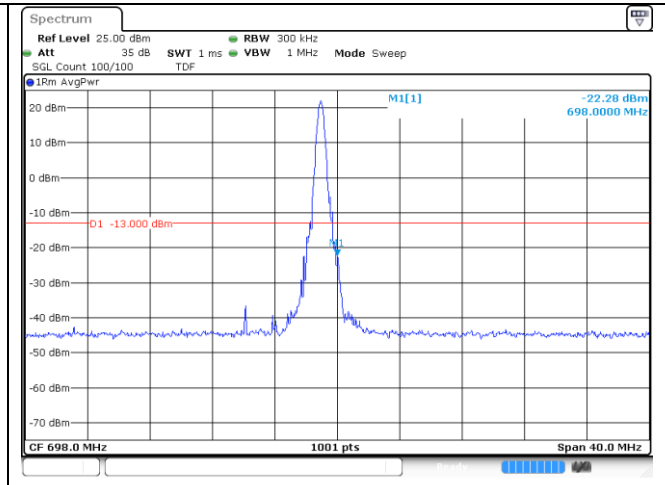


QPSK High Channel - Full RB

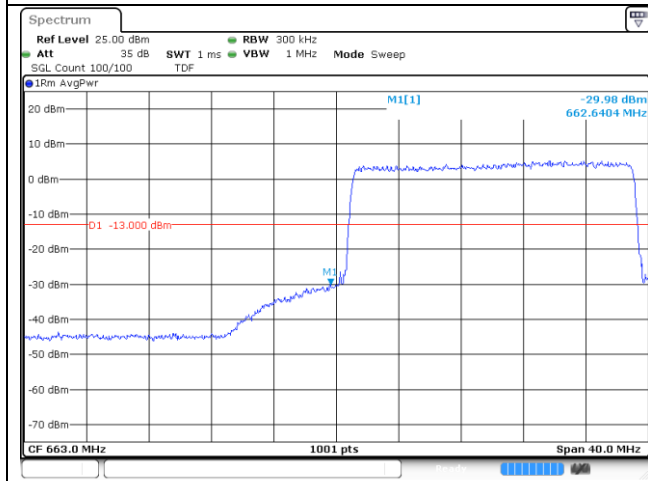
## LTE band 71 (20 MHz)



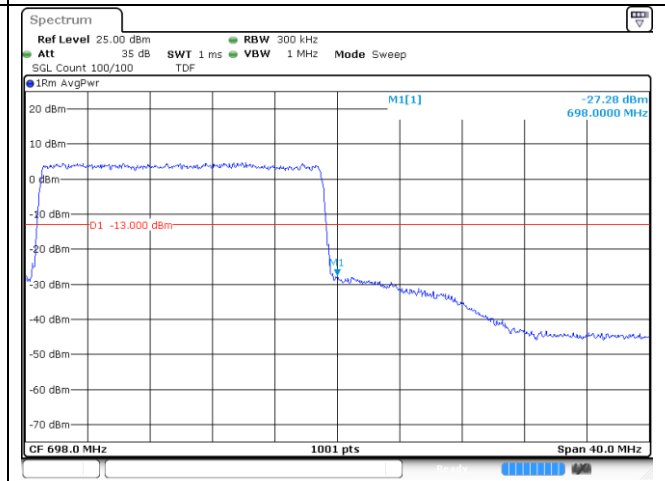
16QAM Low Channel - 1 RB



16QAM High Channel - 1 RB



16QAM Low Channel - Full RB



16QAM High Channel - Full RB

## 8. Frequency Stability

### 8.1. Limit

#### FCC

- § 2.1055 (a), § 2.1055 (d) & following:

- §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table of this section.

For Mobile devices operating in the 824 to 849 MHz band at a power level less than or equal to 3 Watts, the limit specified in Table C-1 is +/- 2.5 ppm.

- §24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

- §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

- §90.213, transmitters used in the services governed by this part must have a minimum frequency stability as specified in the following table.

For Mobile devices operating in the 809 to 824 MHz band at a power level 2 Watts or less, the limit specified in Table is +/- 2.5 ppm.

#### IC

- RSS-Gen Issue 5

6.11, for licensed devices, the following measurement conditions apply:

a. at the temperatures of -30°C (-22°F), +20°C (+68°F) and +50°C (+122°F), and at the manufacturer's rated supply voltage

- RSS-130 Issue 2

4.5, the transmitter frequency stability limit shall be determined as follows:

For equipment that is capable of transmitting numerous channels simultaneously for different applications (e.g. LTE and narrowband – internet of things (IoT)), the occupied bandwidth shall be the bandwidth representing the sum of the occupied bandwidths of these channels.

The frequency stability shall be sufficient to ensure that the occupied bandwidth remains within each frequency block range when tested at the temperature and supply voltage variations specified in RSS-Gen.

- RSS-132 Issue 4

5.3, the frequency stability shall be sufficient to ensure that the occupied bandwidth stays within each of the sub-bands when tested at the temperature and supply voltage variations specified in RSS-Gen.

- RSS-133 Issue 7

5.4, the frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block or frequency block group when tested to the temperature and supply voltage variations specified in RSS-Gen.

- RSS-139 Issue 4

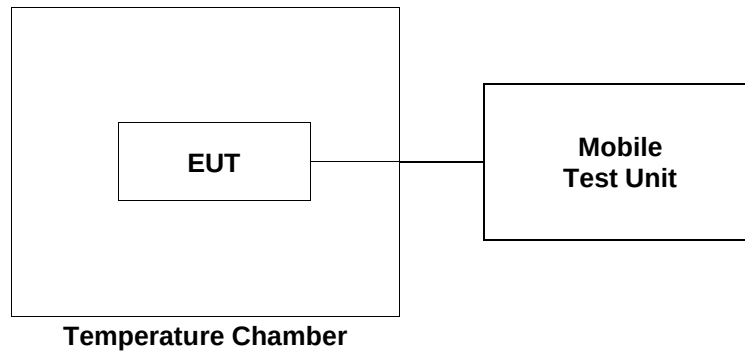
5.4, the frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block or frequency block group when tested to the temperature and supply voltage variations specified in RSS-Gen.

- RSS-199 Issue 4

5.4, the frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block or frequency block group when tested to the temperature and supply voltage variations specified in RSS-Gen.

## 8.2. Test Procedure

1. Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Mobile Test Unit via feed-through attenuators.
2. The EUT was placed inside the temperature chamber.
3. After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from Mobile Test Unit.



### 8.3. Test Results

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

#### WCDMA II mode at middle channel

| Reference Frequency: 1 880.0 MHz        |                    |                                    |           |
|-----------------------------------------|--------------------|------------------------------------|-----------|
| Frequency Stability versus Temperature  |                    |                                    |           |
| Environment Temperature (°C)            | Power Supplied (V) | Frequency Measure with Time Elapse |           |
|                                         |                    | Frequency Error (Hz)               | ppm       |
| 50                                      | 4.10               | -9.00                              | -0.004 84 |
| 40                                      |                    | 6.00                               | 0.003 14  |
| 30                                      |                    | -3.80                              | -0.002 07 |
| 20(Ref.)                                |                    | 0.10                               | -         |
| 10                                      |                    | -3.10                              | -0.001 70 |
| 0                                       |                    | 13.20                              | 0.006 97  |
| -10                                     |                    | -4.20                              | -0.002 29 |
| -20                                     |                    | 16.50                              | 0.008 72  |
| -30                                     |                    | 18.10                              | 0.009 57  |
| Frequency Stability versus Power Supply |                    |                                    |           |
| Environment Temperature (°C)            | Power Supplied (V) | Frequency Measure with Time Elapse |           |
|                                         |                    | Frequency Error (Hz)               | ppm       |
| 20                                      | 3.49 (85%)         | 5.70                               | 0.002 98  |
|                                         | 4.72 (115%)        | 2.30                               | 0.001 17  |

**WCDMA V mode at middle channel**

| Reference Frequency: 836.6 MHz          |                    |                                    |           |
|-----------------------------------------|--------------------|------------------------------------|-----------|
| Frequency Stability versus Temperature  |                    |                                    |           |
| Environment Temperature (°C)            | Power Supplied (V) | Frequency Measure with Time Elapse |           |
|                                         |                    | Frequency Error (Hz)               | ppm       |
| 50                                      | 4.10               | 6.00                               | 0.010 88  |
| 40                                      |                    | 13.30                              | 0.019 60  |
| 30                                      |                    | 4.90                               | 0.009 56  |
| 20(Ref.)                                |                    | -3.10                              | -         |
| 10                                      |                    | 1.10                               | 0.005 02  |
| 0                                       |                    | 8.60                               | 0.013 99  |
| -10                                     |                    | 11.40                              | 0.017 33  |
| -20                                     |                    | 7.60                               | 0.012 79  |
| -30                                     |                    | 13.60                              | 0.019 96  |
| Frequency Stability versus Power Supply |                    |                                    |           |
| Environment Temperature (°C)            | Power Supplied (V) | Frequency Measure with Time Elapse |           |
|                                         |                    | Frequency Error (Hz)               | ppm       |
| 20                                      | 3.49 (85%)         | 9.60                               | 0.015 18  |
|                                         | 4.72 (115%)        | -5.80                              | -0.003 23 |

**LTE band 25/2 at middle channel**

| Reference Frequency: 1 882.5 MHz        |                    |                                    |           |
|-----------------------------------------|--------------------|------------------------------------|-----------|
| Frequency Stability versus Temperature  |                    |                                    |           |
| Environment Temperature (°C)            | Power Supplied (V) | Frequency Measure with Time Elapse |           |
|                                         |                    | Frequency Error (Hz)               | ppm       |
| 50                                      | 4.10               | -11.90                             | -0.005 58 |
| 40                                      |                    | -6.00                              | -0.002 44 |
| 30                                      |                    | -6.20                              | -0.002 55 |
| 20(Ref.)                                |                    | -1.40                              | -         |
| 10                                      |                    | 10.70                              | 0.006 43  |
| 0                                       |                    | 7.30                               | 0.004 62  |
| -10                                     |                    | 4.00                               | 0.002 87  |
| -20                                     |                    | 11.10                              | 0.006 64  |
| -30                                     |                    | -1.10                              | 0.000 16  |
| Frequency Stability versus Power Supply |                    |                                    |           |
| Environment Temperature (°C)            | Power Supplied (V) | Frequency Measure with Time Elapse |           |
|                                         |                    | Frequency Error (Hz)               | ppm       |
| 20                                      | 3.49 (85%)         | -9.20                              | -0.004 14 |
|                                         | 4.72 (115%)        | 1.70                               | 0.001 65  |