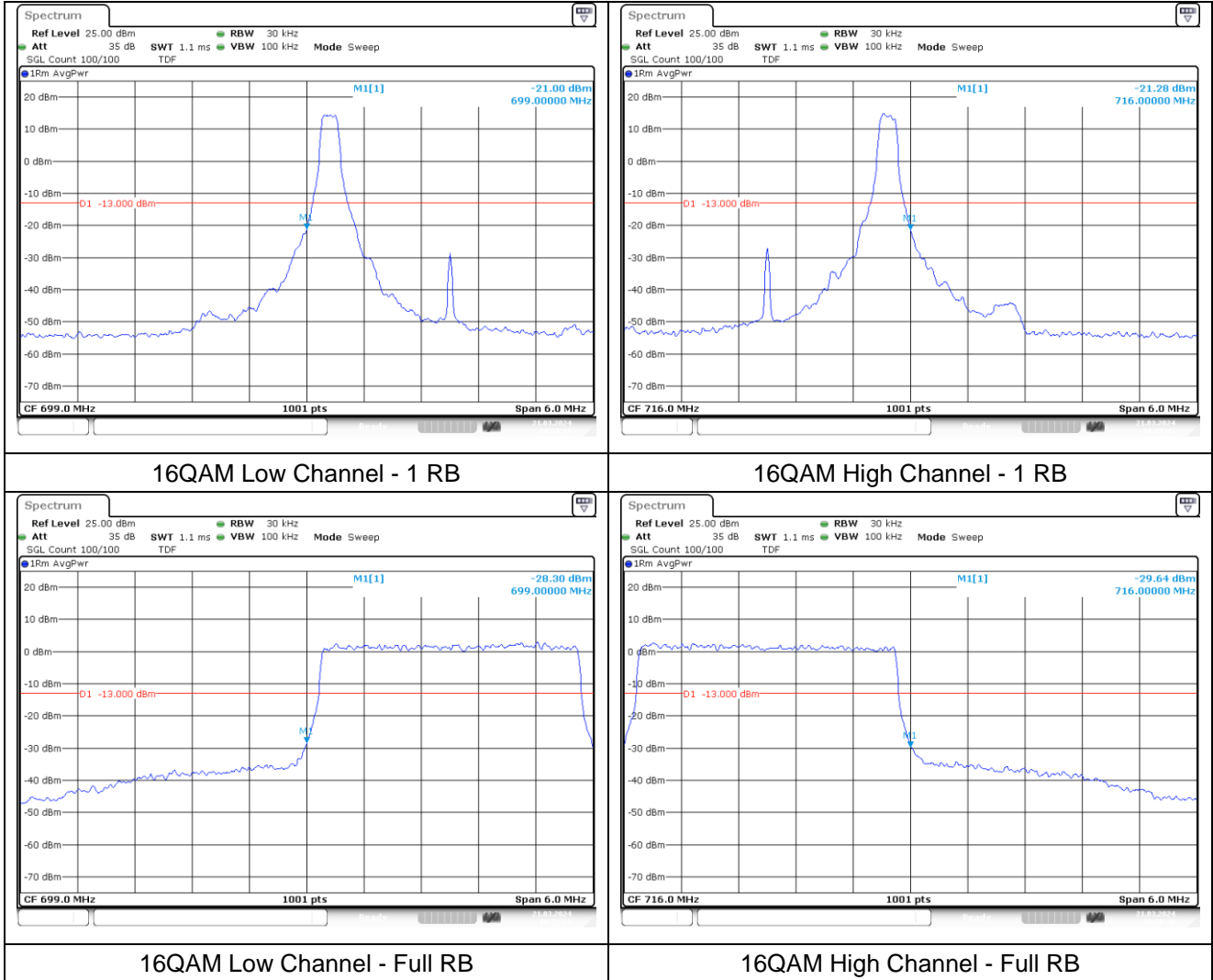
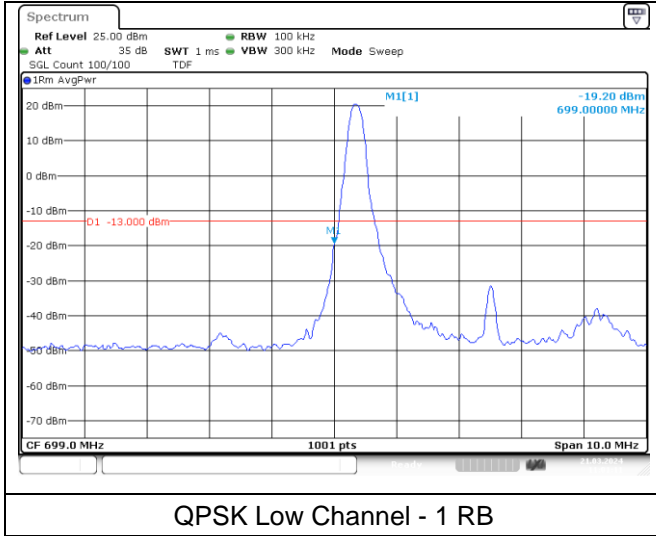


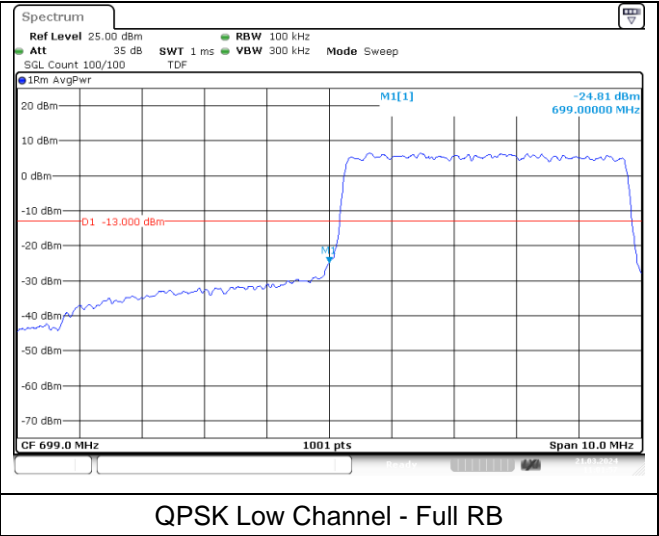
LTE band 12 (3 MHz)



**LTE band 12 (5 MHz)**

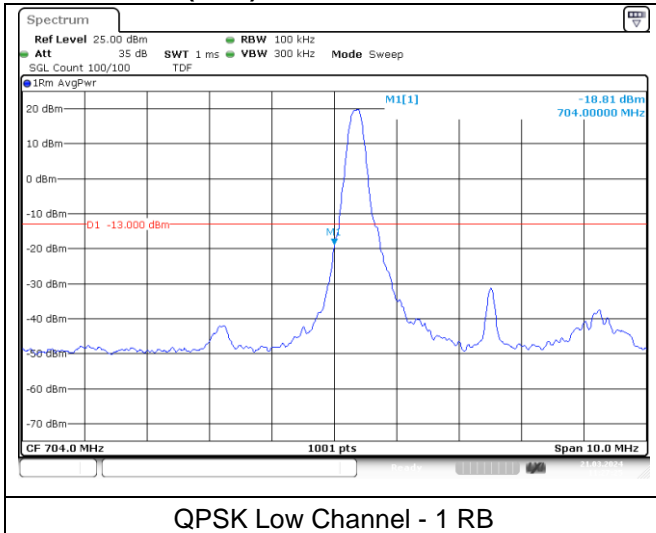


QPSK Low Channel - 1 RB

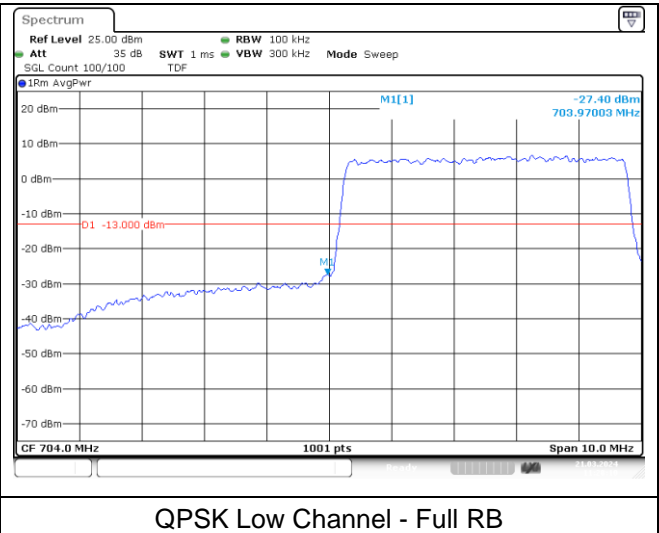


QPSK Low Channel - Full RB

**LTE band 17 (5 MHz)**

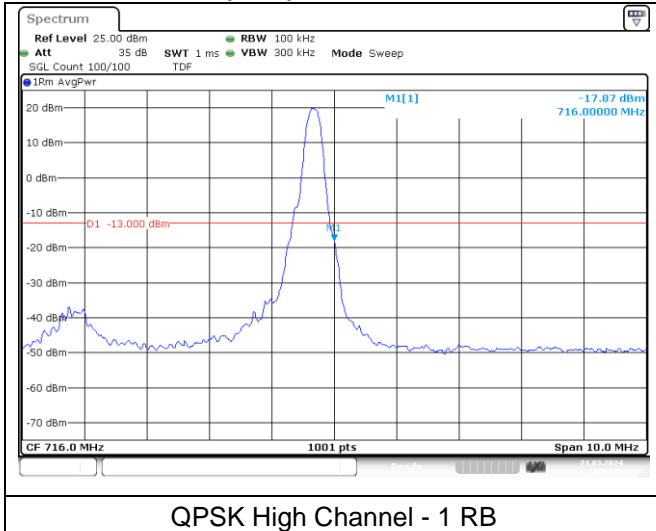


QPSK Low Channel - 1 RB

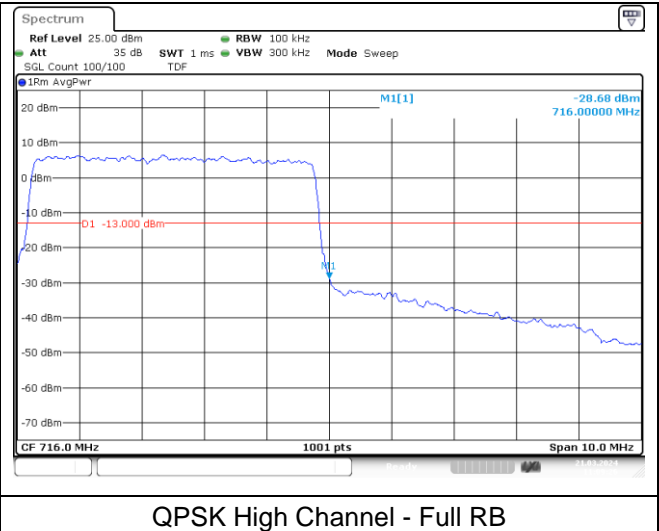


QPSK Low Channel - Full RB

**LTE band 12/17 (5 MHz)**

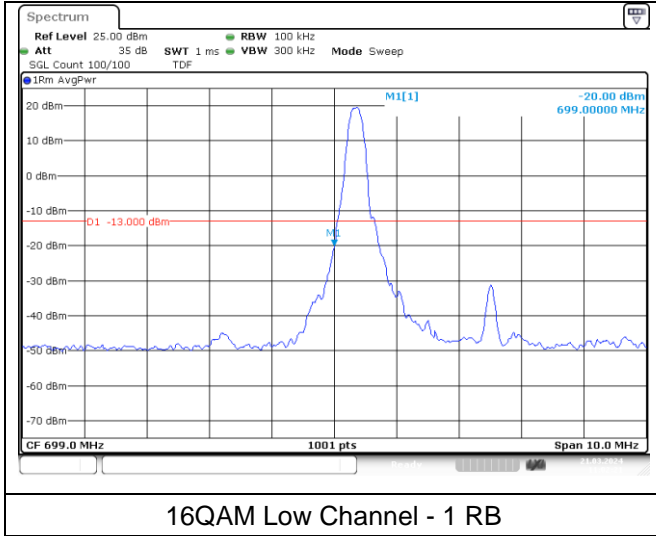


QPSK High Channel - 1 RB

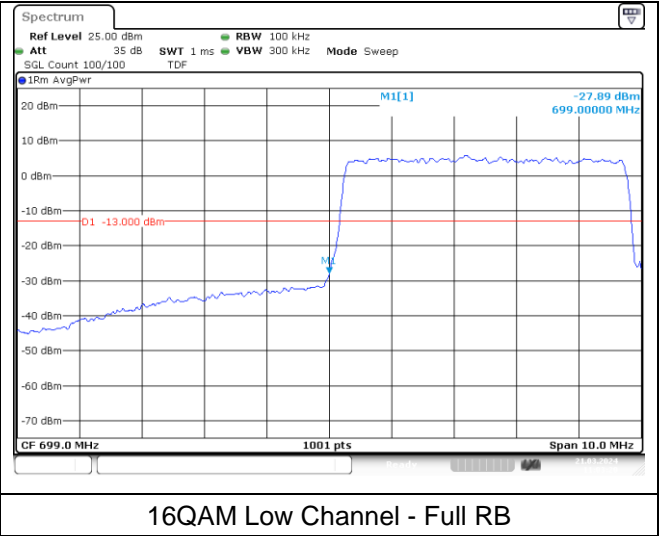


QPSK High Channel - Full RB

**LTE band 12 (5 MHz)**

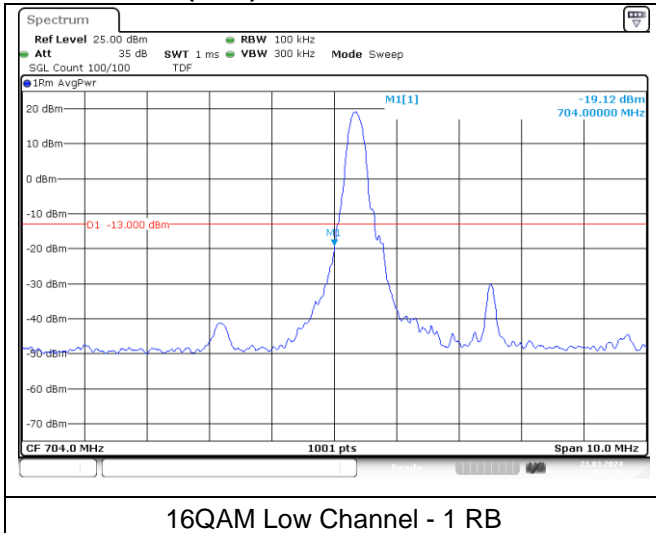


16QAM Low Channel - 1 RB

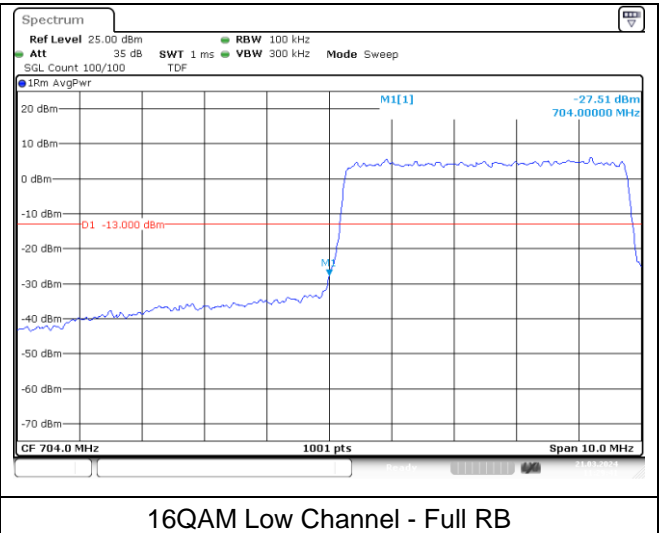


16QAM Low Channel - Full RB

**LTE band 17 (5 MHz)**

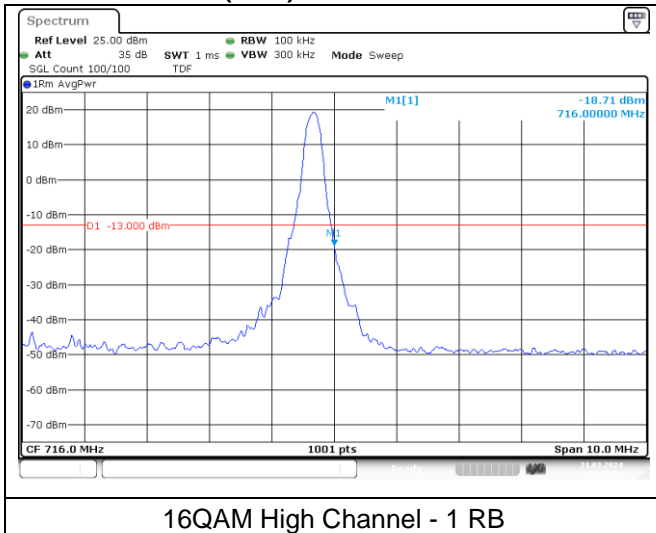


16QAM Low Channel - 1 RB

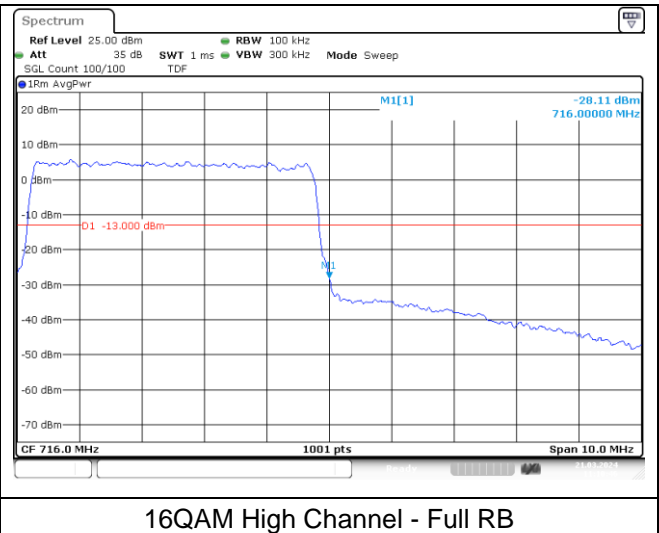


16QAM Low Channel - Full RB

**LTE band 12/17 (5 MHz)**

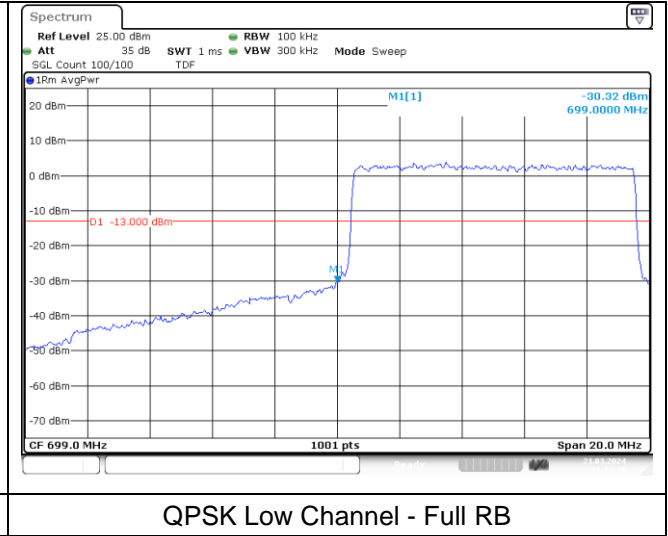
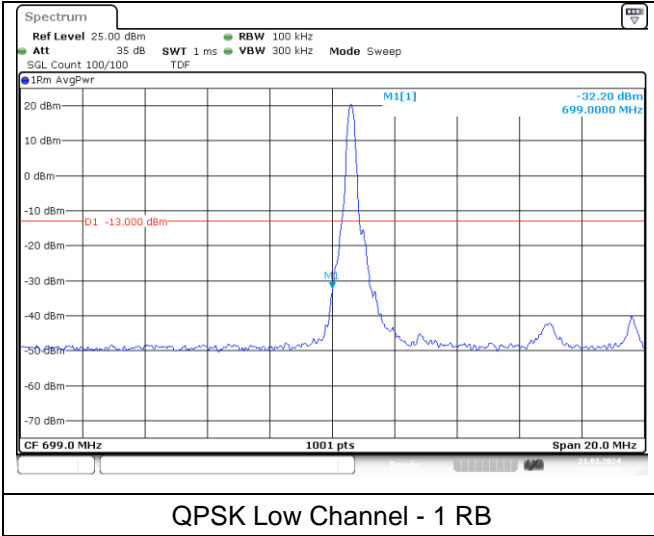


16QAM High Channel - 1 RB

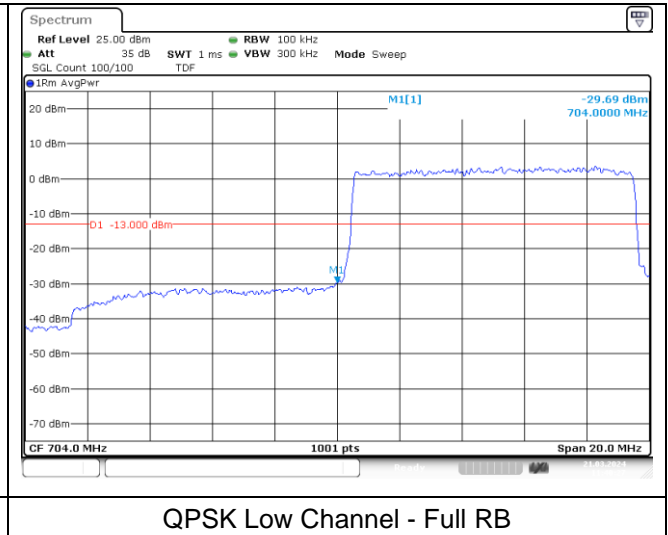
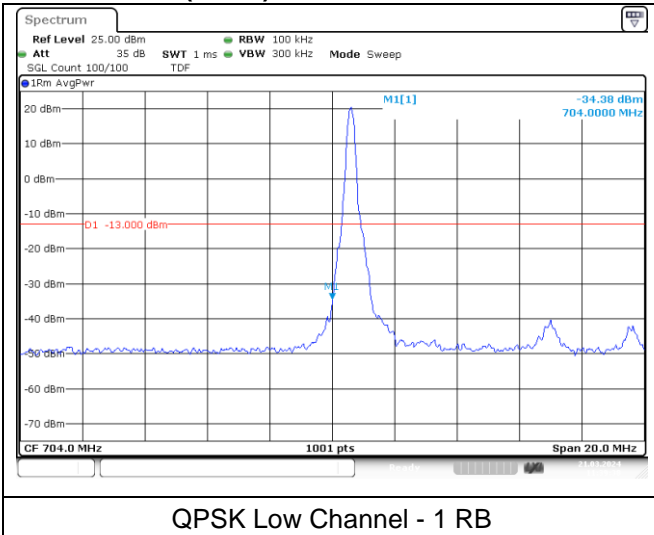


16QAM High Channel - Full RB

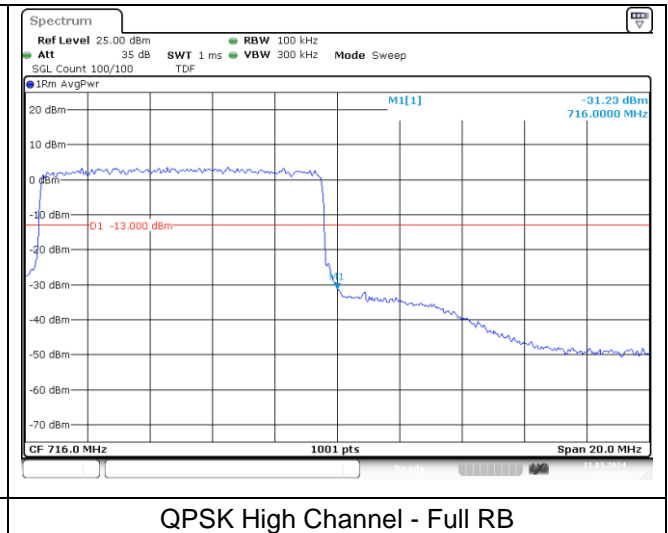
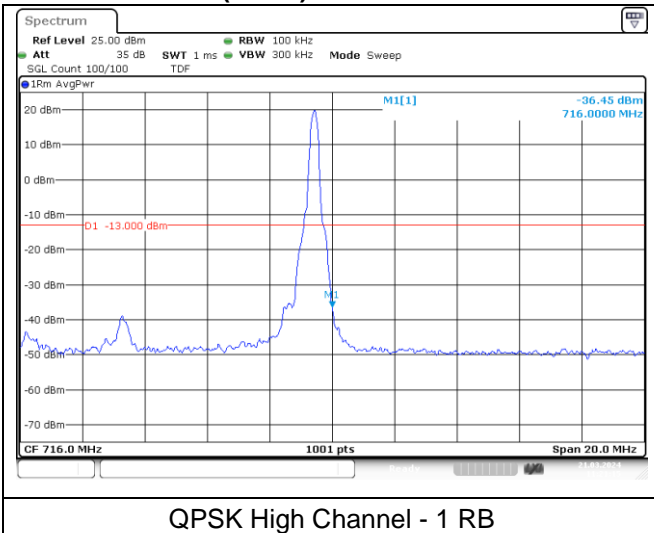
**LTE band 12 (10 MHz)**



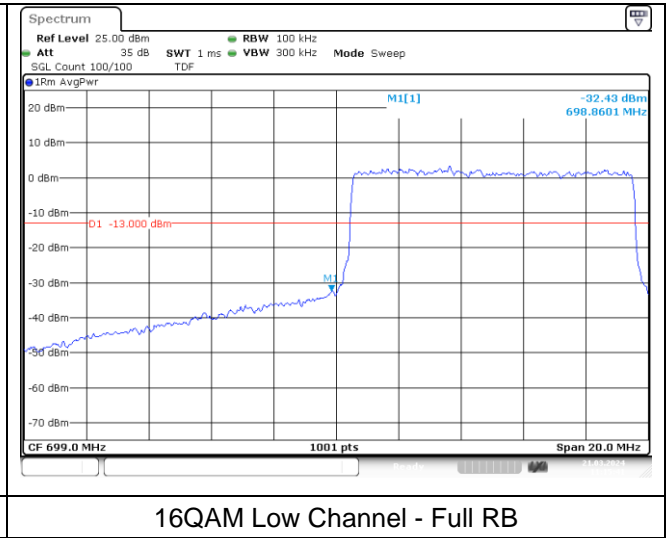
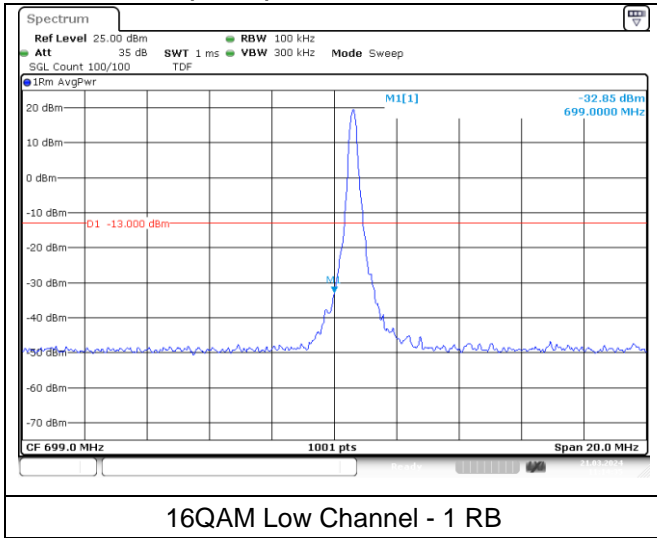
**LTE band 17 (10 MHz)**



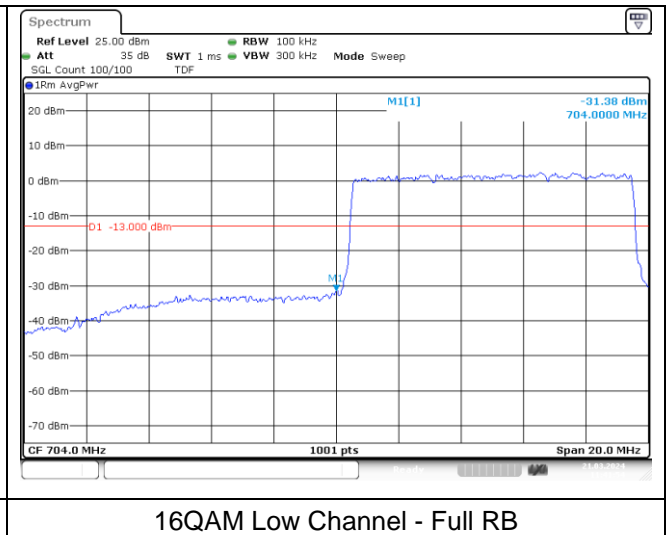
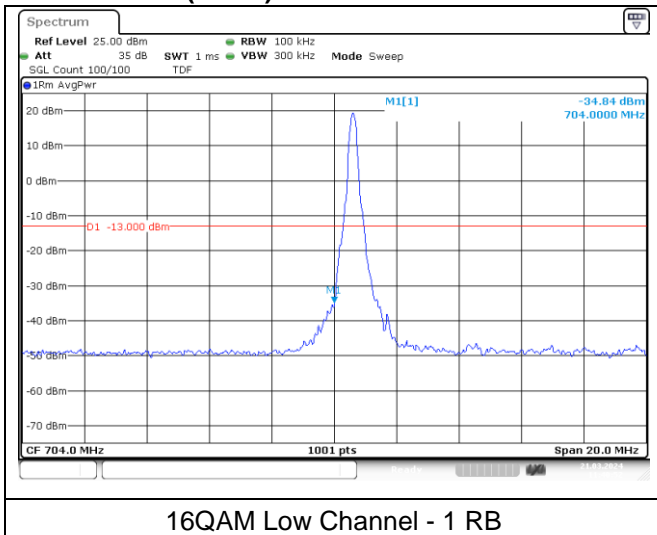
**LTE band 12/17 (10 MHz)**



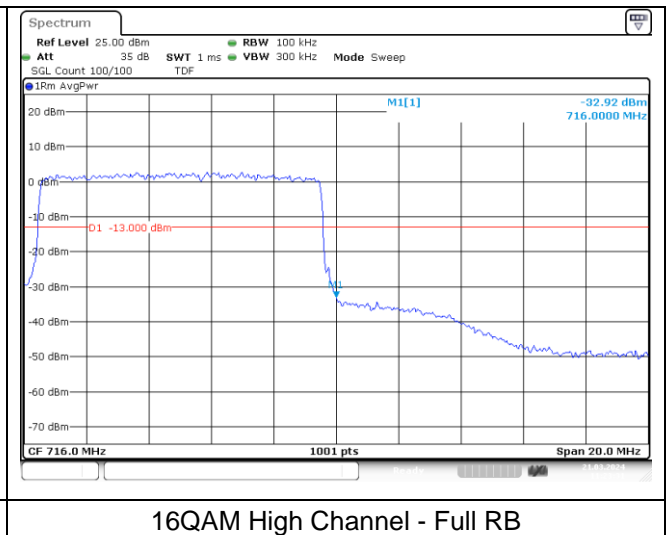
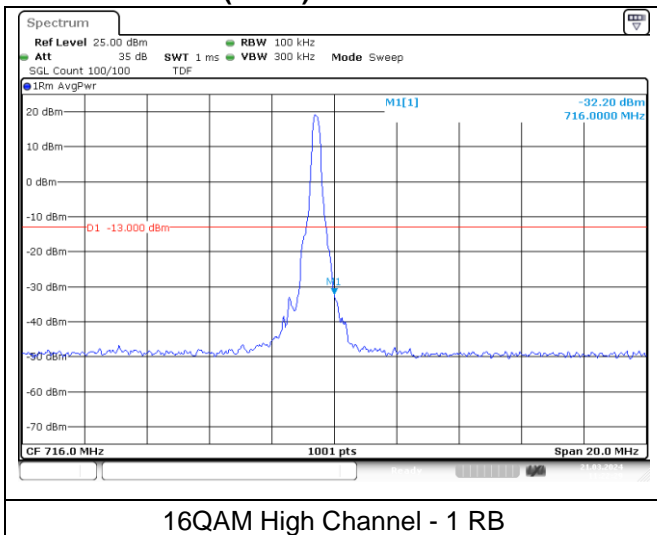
**LTE band 12 (10 MHz)**



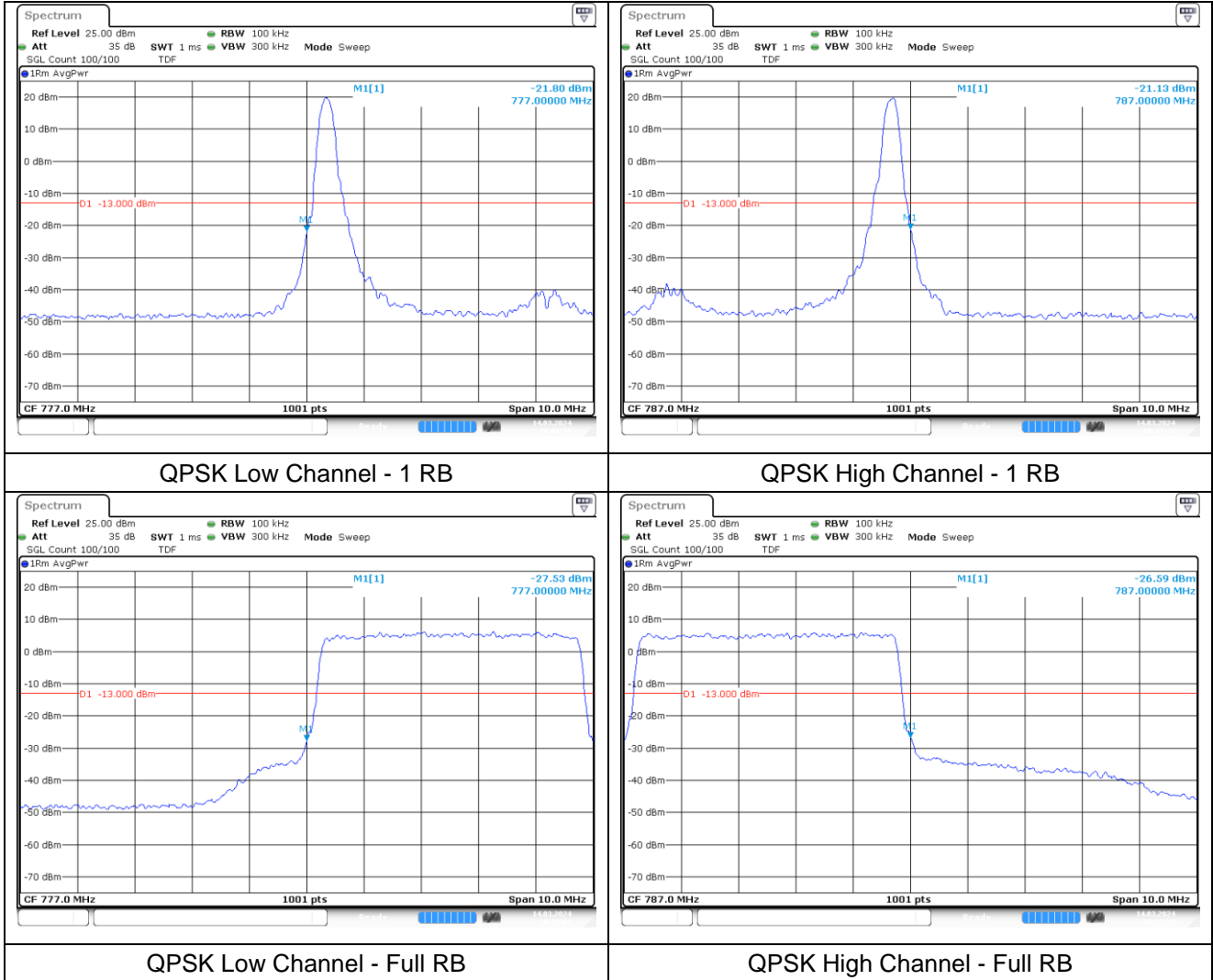
**LTE band 17 (10 MHz)**



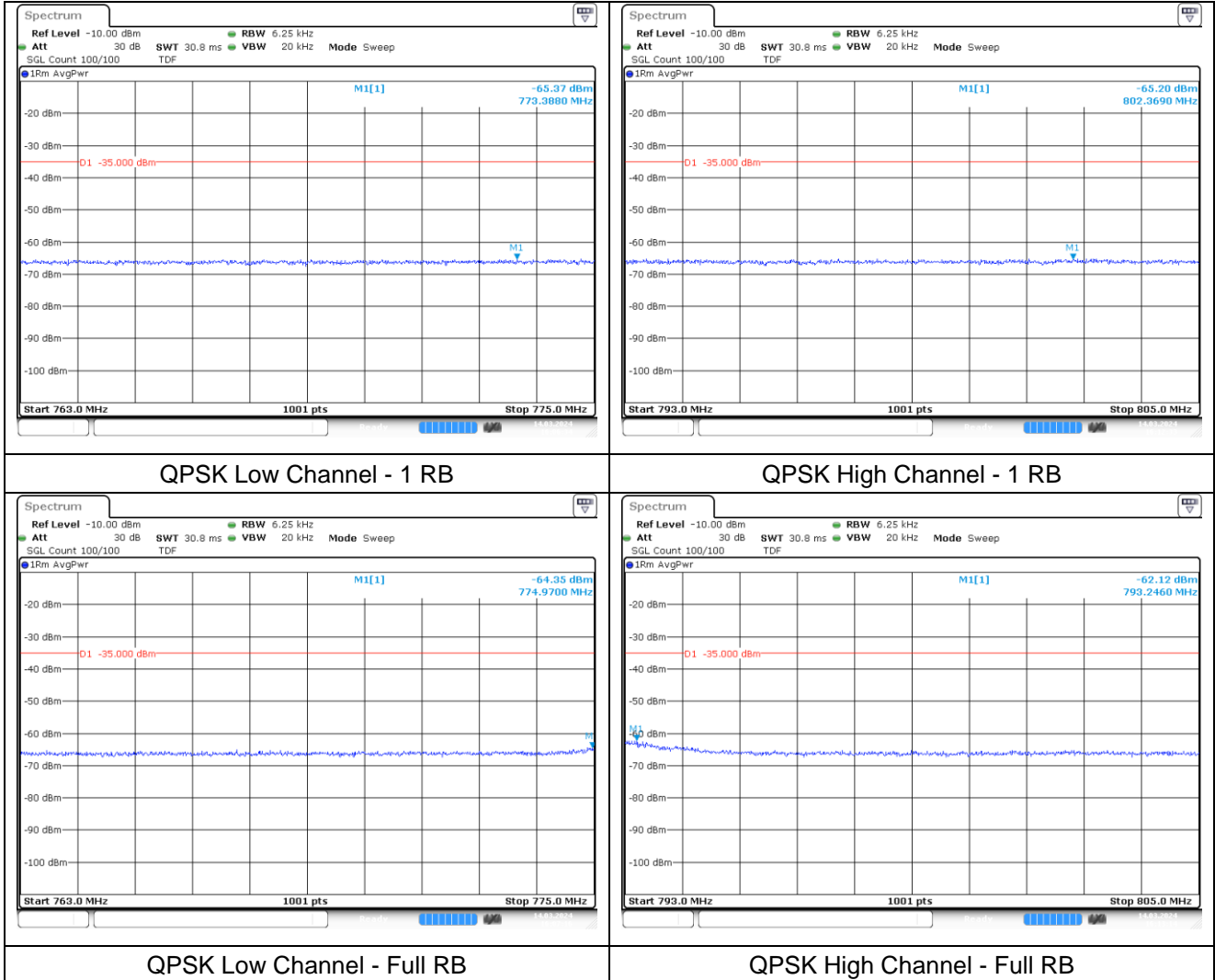
**LTE band 12/17 (10 MHz)**



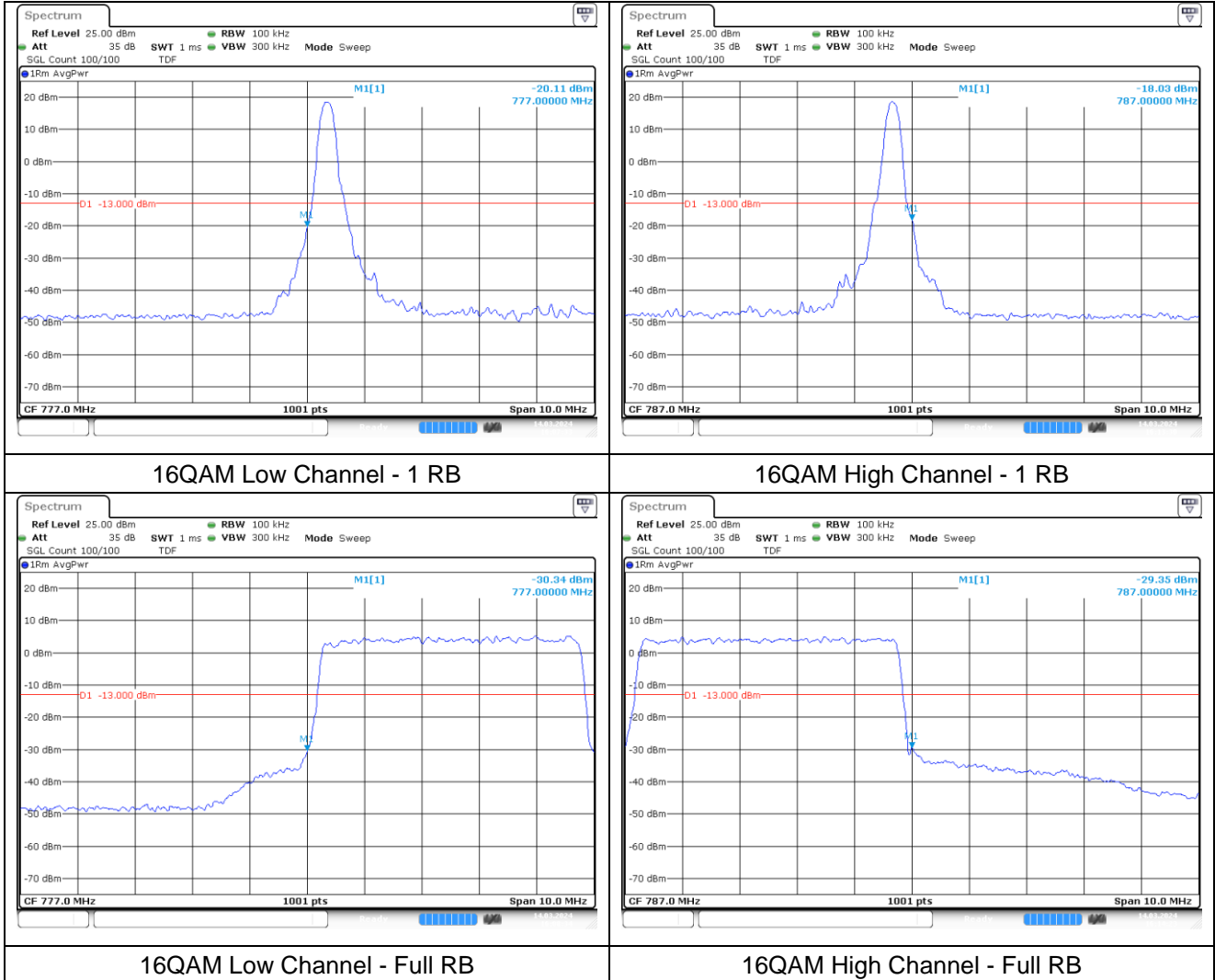
**LTE band 13 (5 MHz)**



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

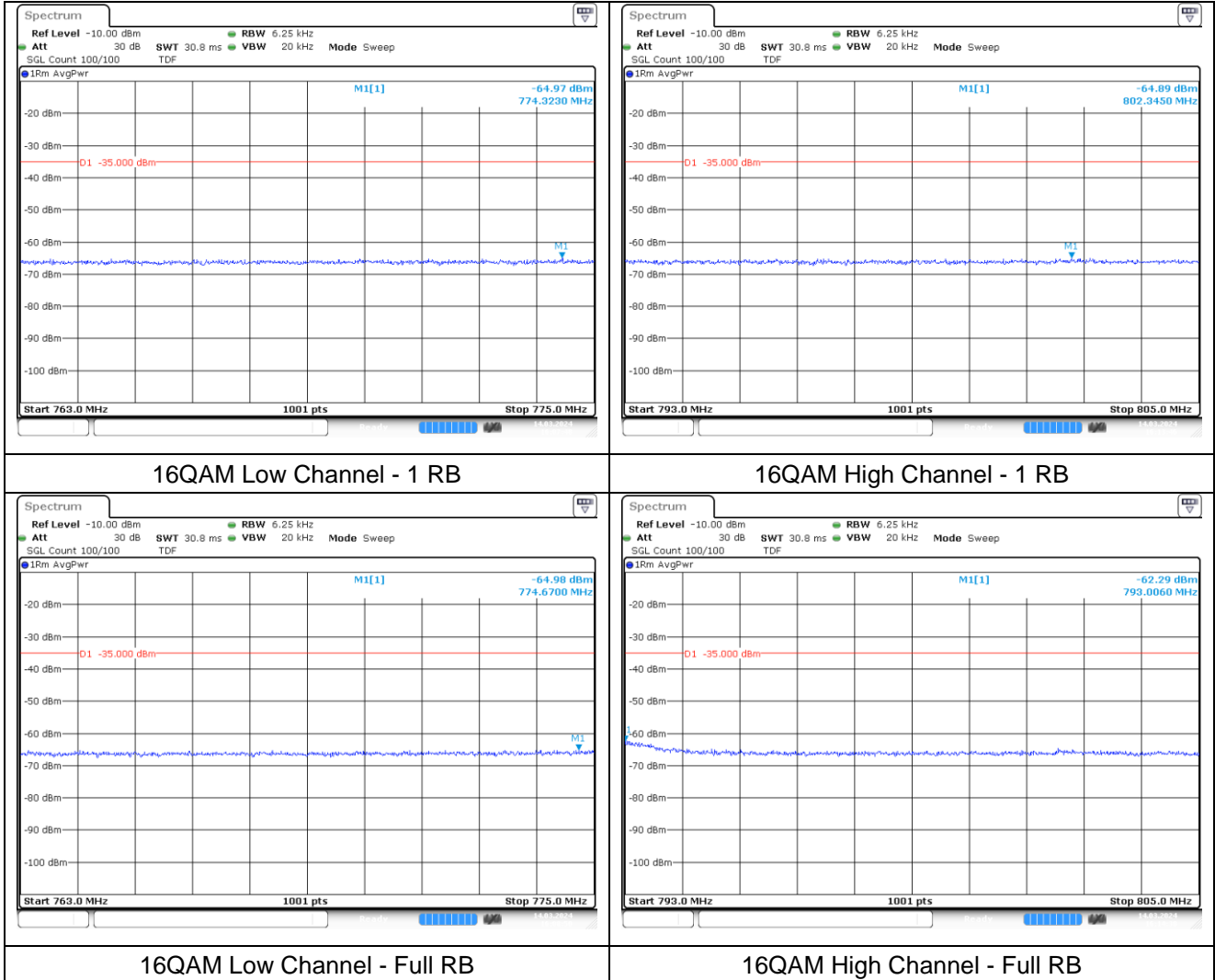


**LTE band 13 (5 MHz)**

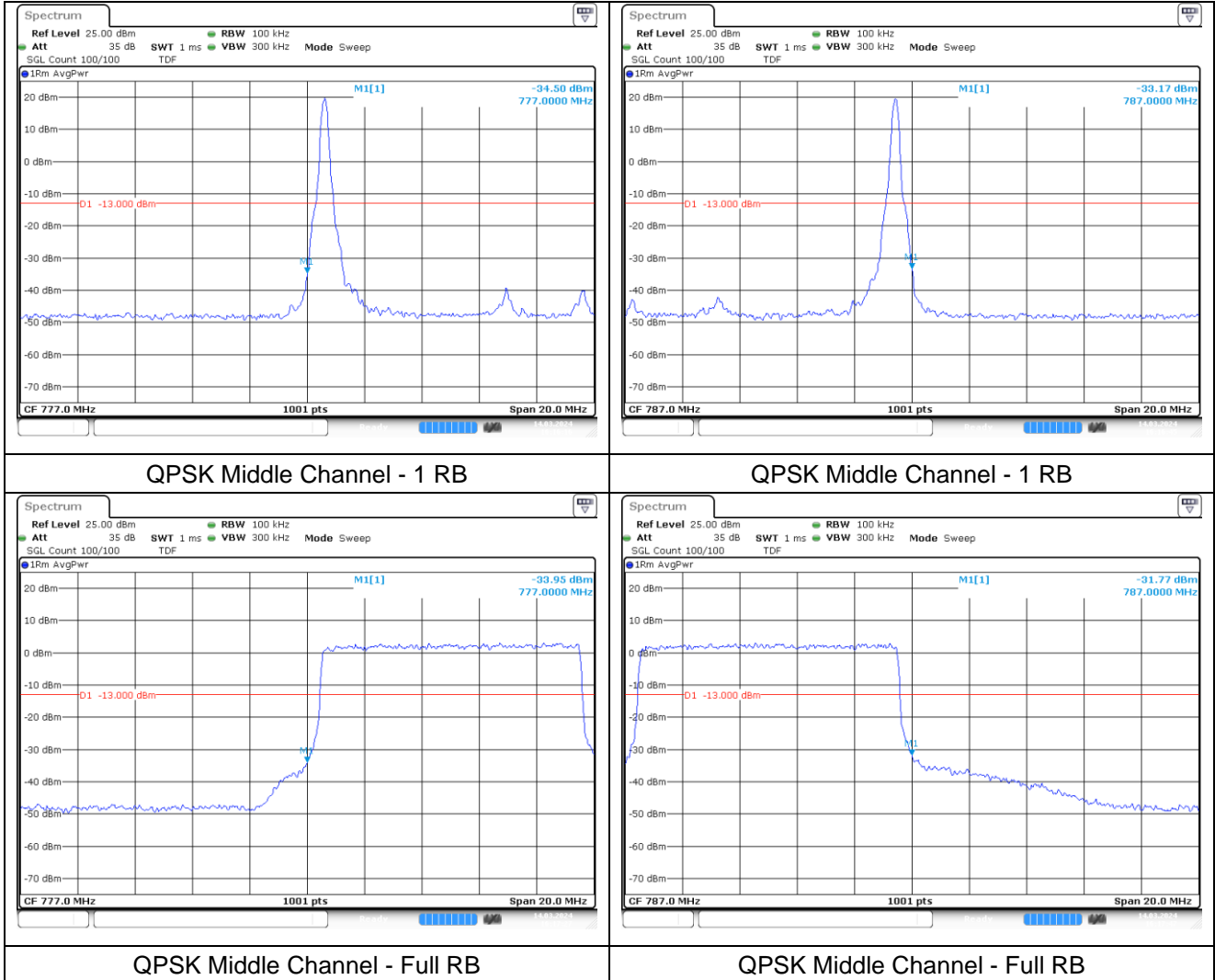




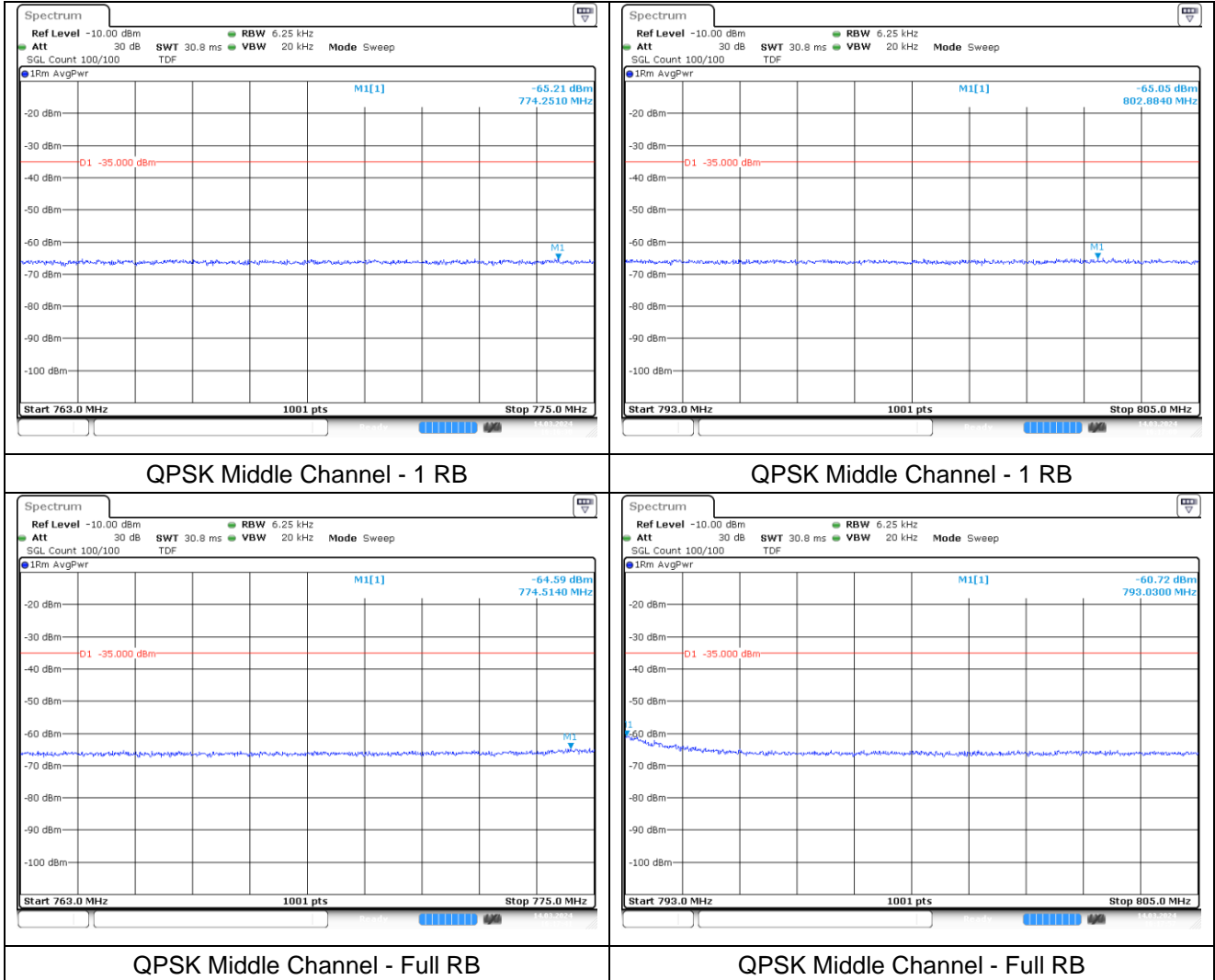
**LTE band 13 (5 MHz) Extended Band edge**



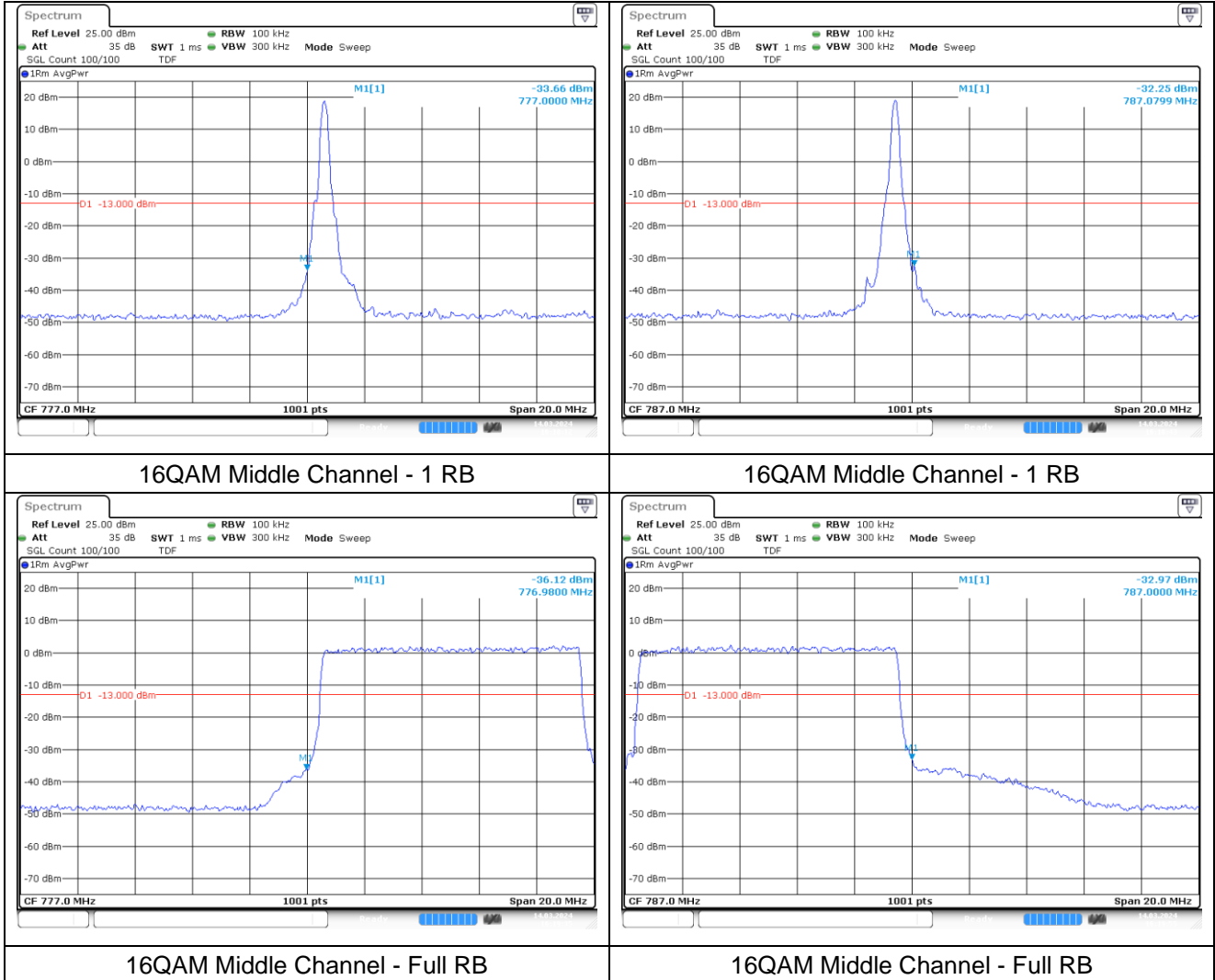
**LTE band 13 (10 MHz)**



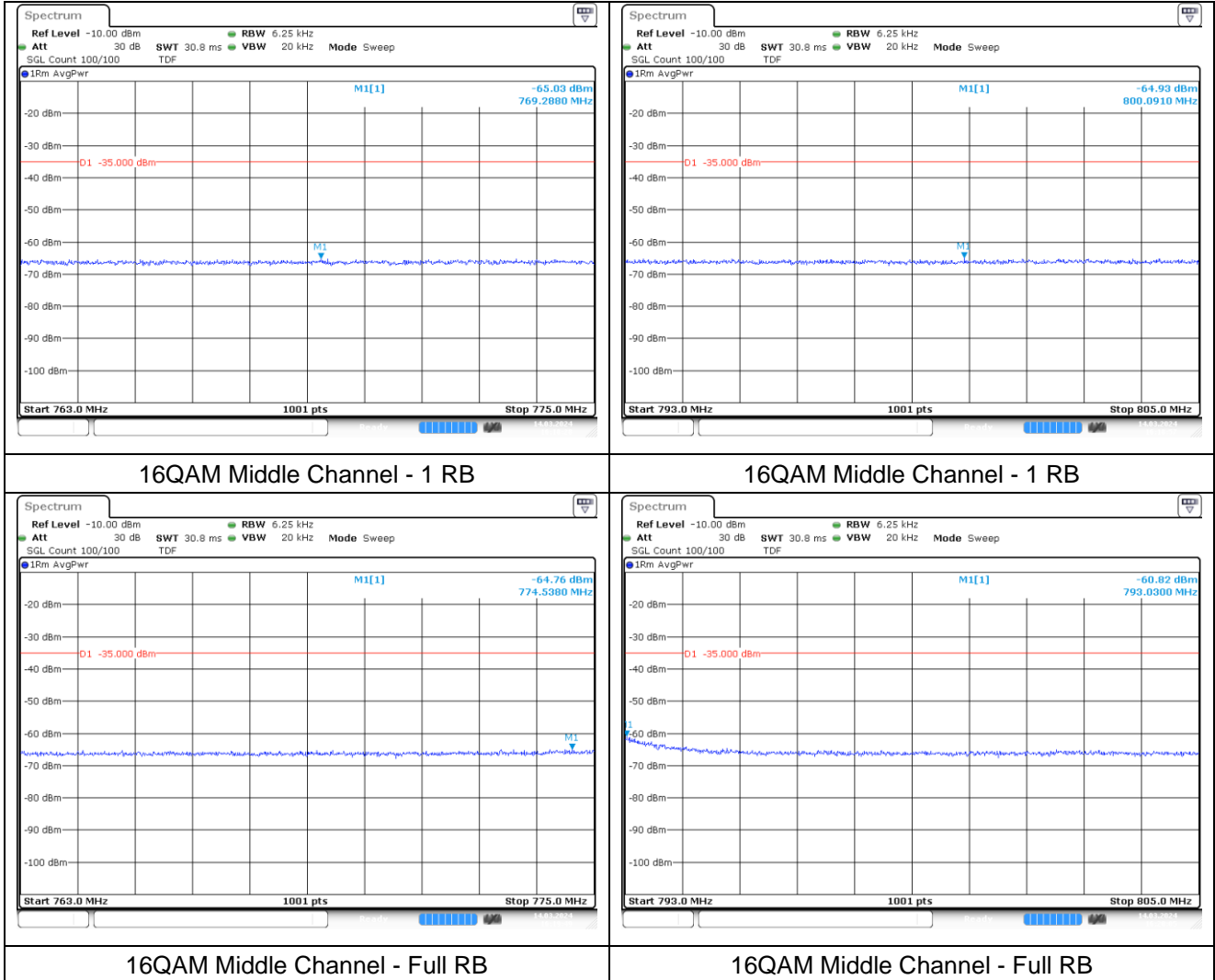
**LTE band 13 (10 MHz) Extended Band edge**



**LTE band 13 (10 MHz)**



**LTE band 13 (10 MHz)\_Extended Band edge**



## 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.

#### 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 6

6.3, the carrier frequency shall not depart from the reference frequency, in excess of ±2.5 ppm for mobile stations and ±1.0 ppm for base stations.

- RSS-139 Issue 4

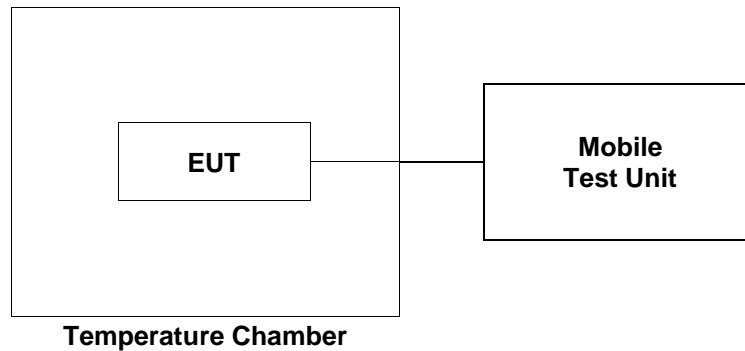
5.4, the frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block or frequency block group when tested to the temperature and supply voltage variations specified in RSS-Gen.

- 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 ± 2 %

#### LTE band 2 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	4.00	8.70	0.011 49
40		8.30	0.011 28
30		8.00	0.011 12
20(Ref.)		-12.90	-
10		-10.80	0.001 12
0		8.50	0.011 38
-10		8.90	0.011 60
-20		10.30	0.012 34
-30		11.40	0.012 93
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.40 (85%)	7.10	0.010 64
	4.60 (115%)	7.30	0.010 74



**LTE band 66/4 at middle channel**

Reference Frequency: 1 745.0 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	4.00	-10.80	-0.000 29
40		9.40	0.011 29
30		9.00	0.011 06
20(Ref.)		-10.30	-
10		-8.50	0.001 03
0		11.40	0.012 44
-10		9.60	0.011 40
-20		9.50	0.011 35
-30		8.80	0.010 95
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.40 (85%)	8.70	0.010 89
	4.60 (115%)	6.90	0.009 86

**LTE band 5 at middle channel**

Reference Frequency: 836.5 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	4.00	-6.70	-0.0027 5
40		5.60	0.0119 5
30		-6.20	-0.002 15
20(Ref.)		-4.40	-
10		5.60	0.011 95
0		7.40	0.014 11
-10		6.30	0.012 79
-20		7.10	0.013 75
-30		7.20	0.013 87
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.40 (85%)	6.70	0.013 27
	4.60 (115%)	5.20	0.011 48

**LTE band 7 at middle channel**

Reference Frequency: 2 535.0 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	4.00	-18.20	-0.001 78
40		-14.20	-0.000 20
30		12.90	0.010 49
20(Ref.)		-13.70	-
10		13.50	0.010 73
0		-14.70	-0.000 39
-10		-14.20	-0.000 20
-20		14.40	0.011 08
-30		10.40	0.009 51
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.40 (85%)	8.60	0.008 80
	4.60 (115%)	12.20	0.010 22

**LTE band 12/17 at middle channel**

Reference Frequency: 707.5 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	4.00	5.80	0.016 96
40		4.10	0.014 56
30		6.50	0.017 95
20(Ref.)		-6.20	-
10		3.60	0.013 85
0		-4.80	0.001 98
-10		6.60	0.018 09
-20		5.40	0.016 40
-30		4.20	0.014 70
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.40 (85%)	4.40	0.014 98
	4.60 (115%)	6.40	0.017 81

**LTE band 13 at middle channel**

Reference Frequency: 782 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	4.00	6.70	0.002 69
40		-3.80	-0.010 74
30		-5.60	-0.013 04
20(Ref.)		4.60	-
10		6.10	0.001 92
0		7.90	0.004 22
-10		6.70	0.002 69
-20		-2.60	-0.009 21
-30		-3.80	-0.010 74
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.40 (85%)	-4.30	-0.011 38
	4.60 (115%)	-4.40	-0.011 51

**- End of the Test Report -**