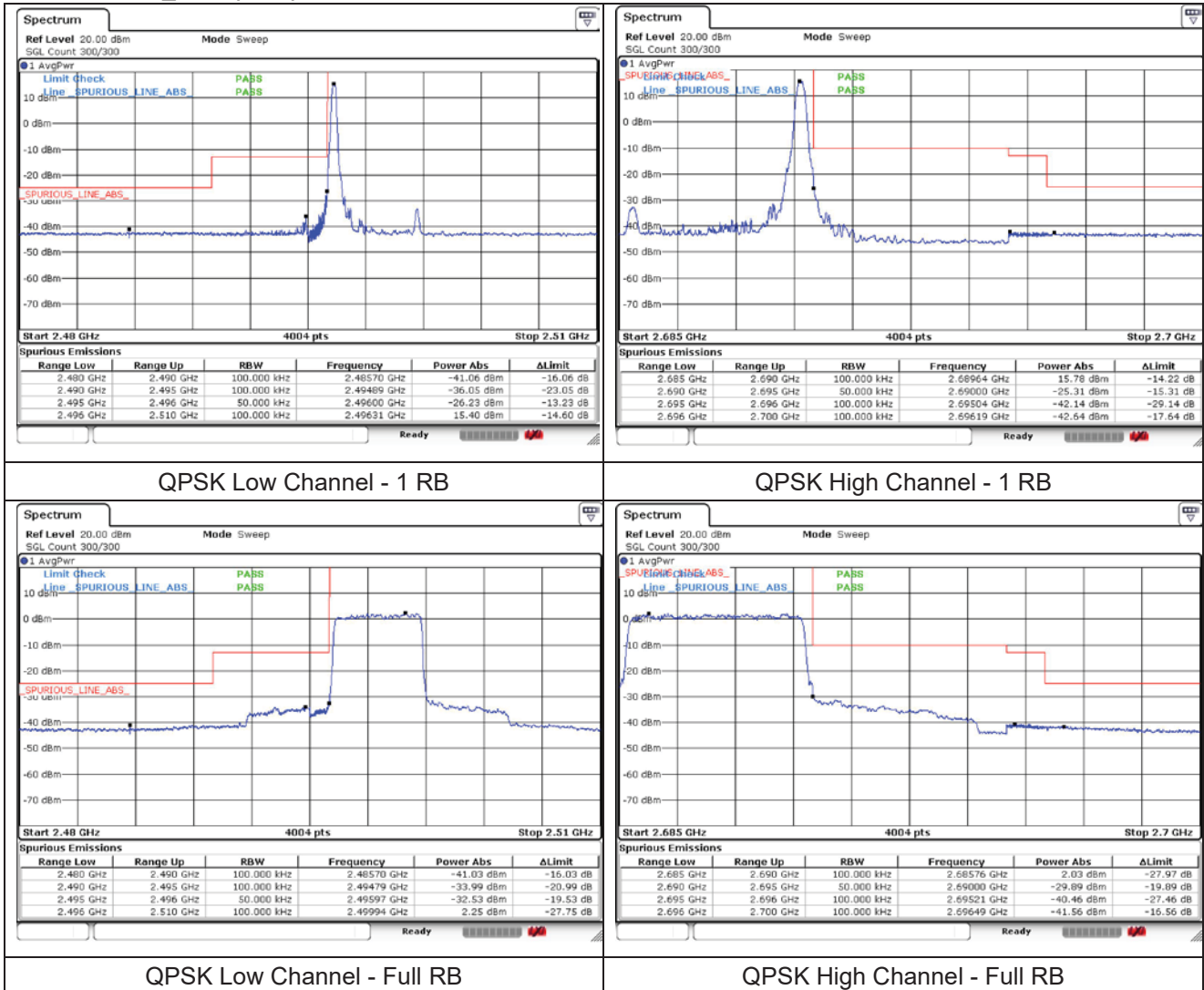
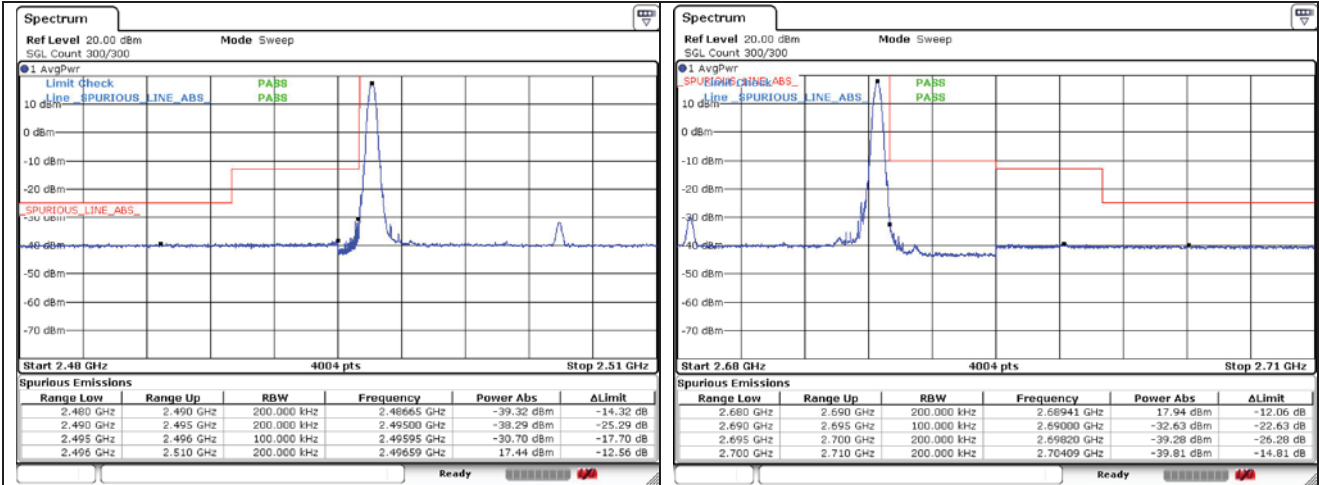


LTE band 41_FCC (5 MHz)

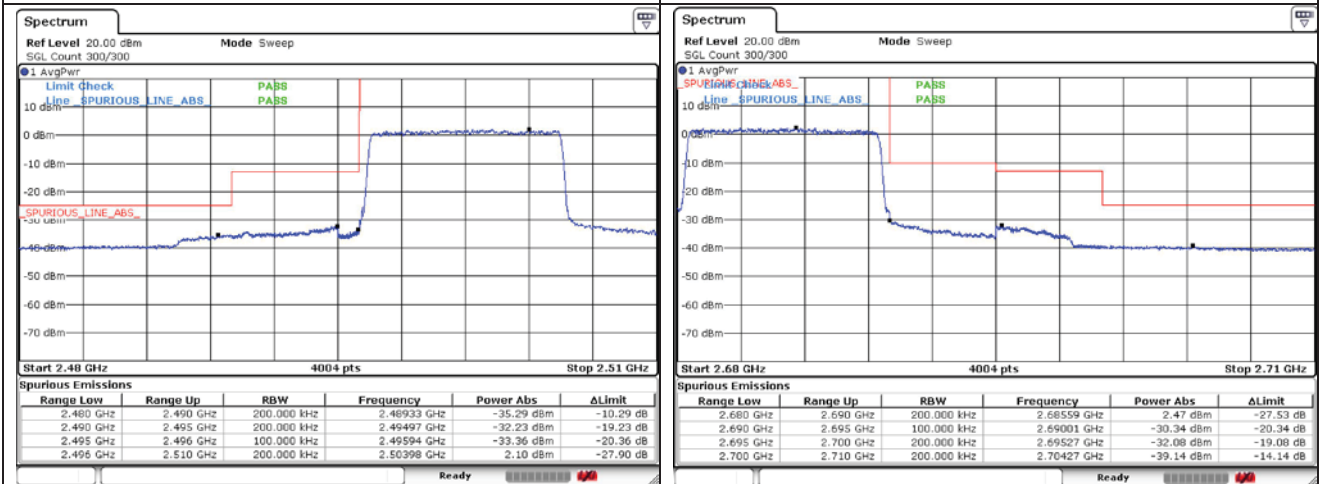


LTE band 41_FCC (10 MHz)



QPSK Low Channel - 1 RB

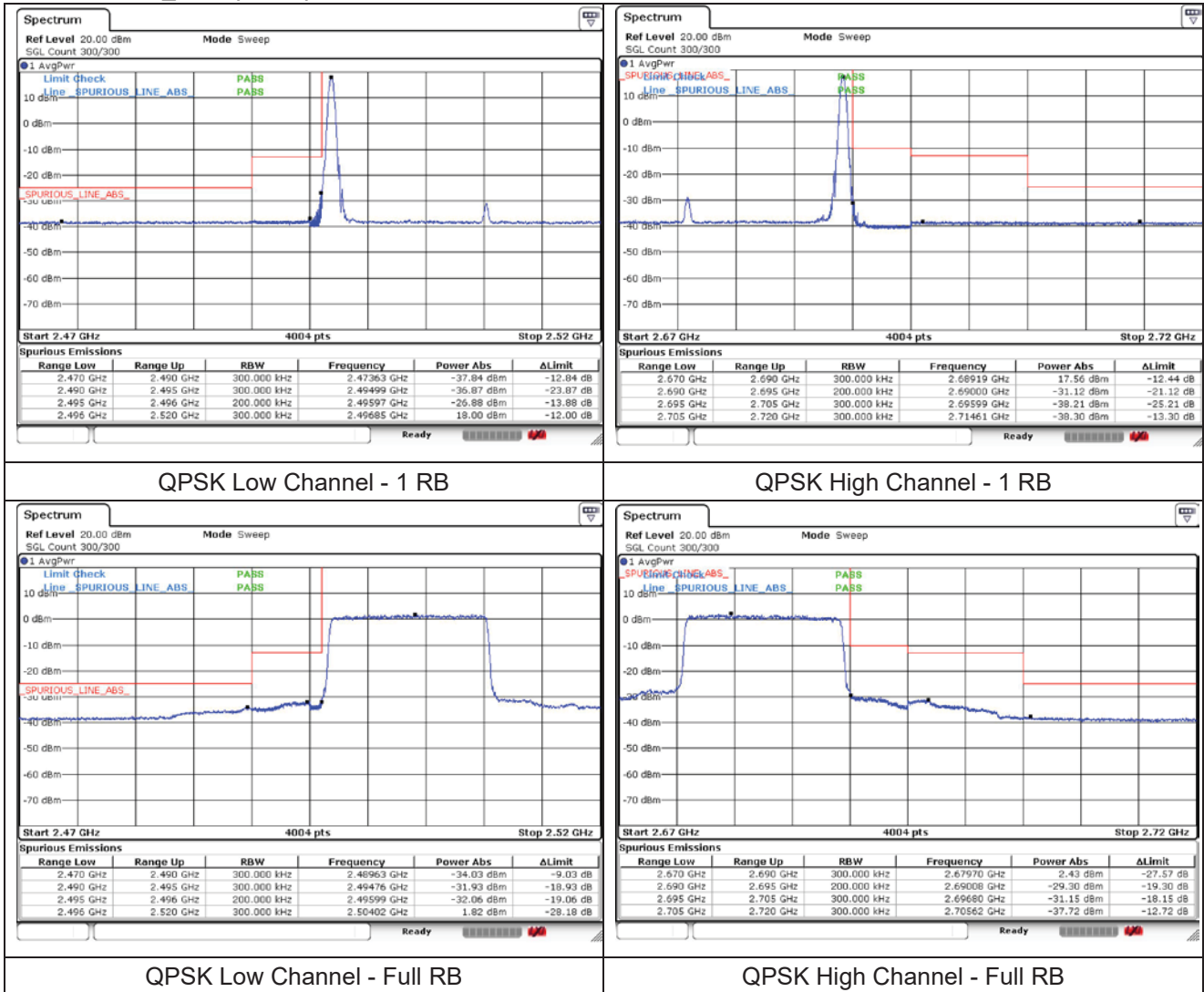
QPSK High Channel - 1 RB



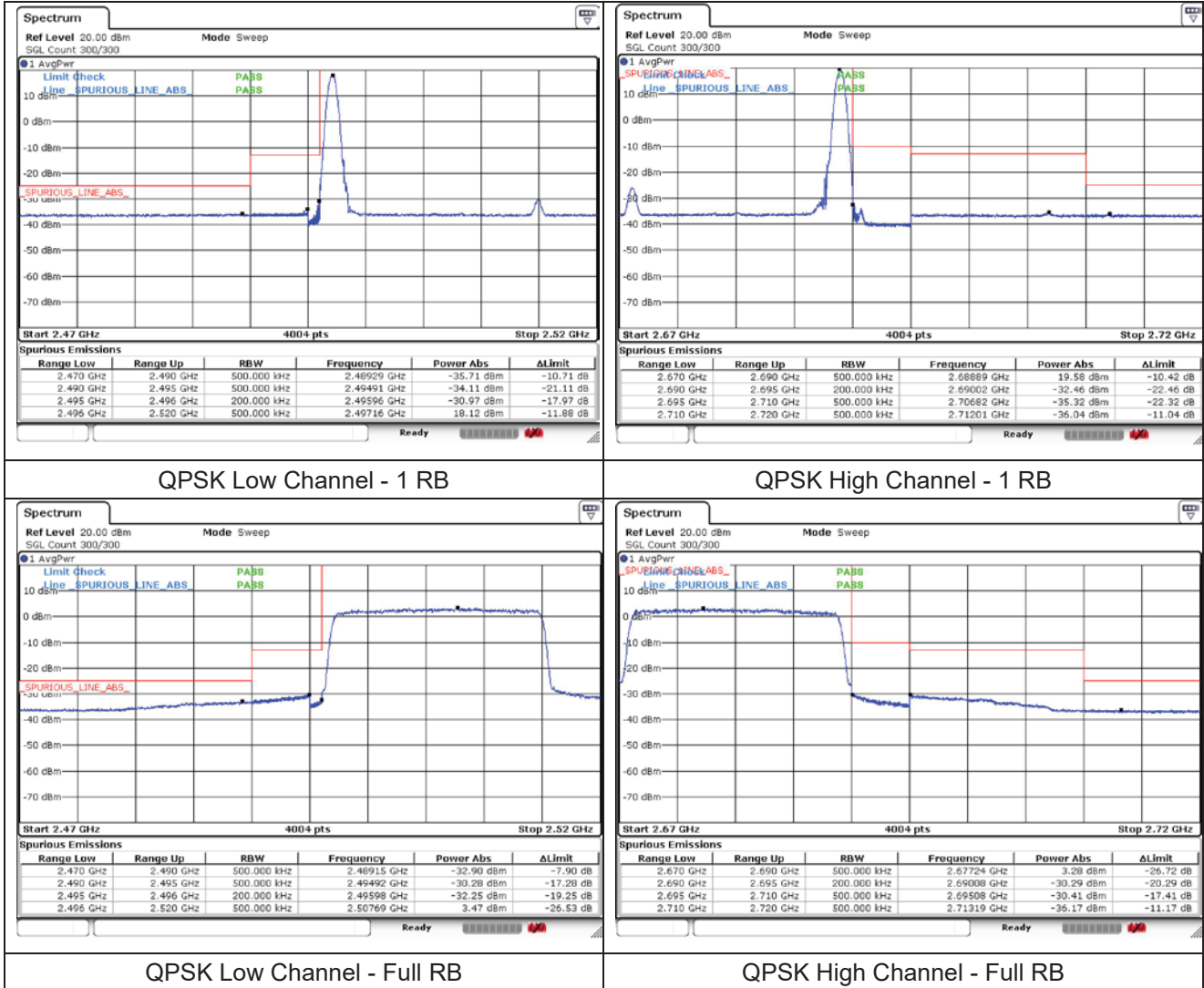
QPSK Low Channel - Full RB

QPSK High Channel - Full RB

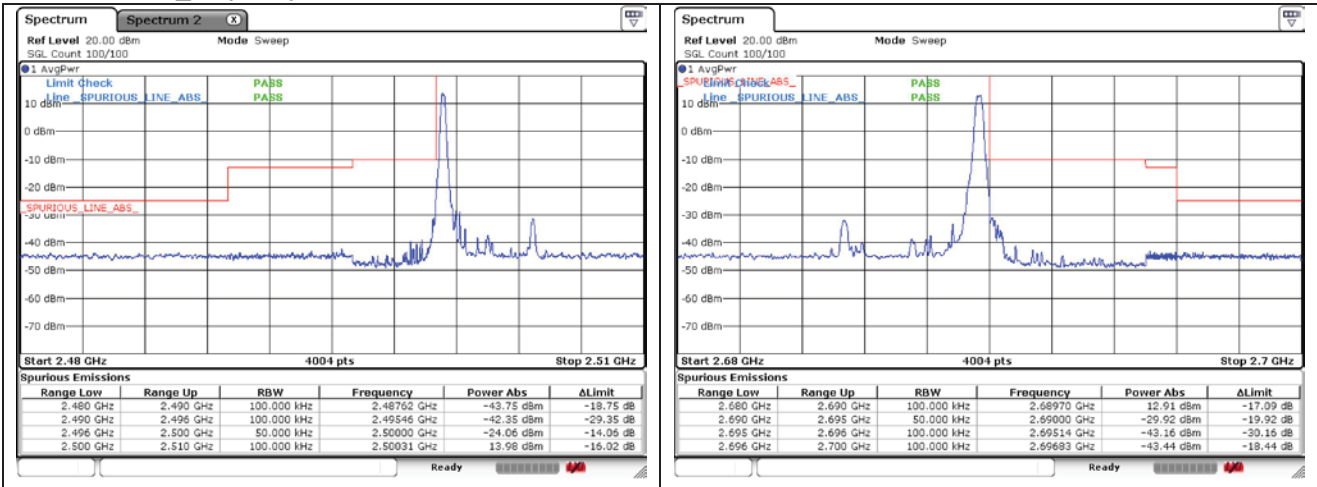
LTE band 41_FCC (15 MHz)



LTE band 41_FCC (20 MHz)

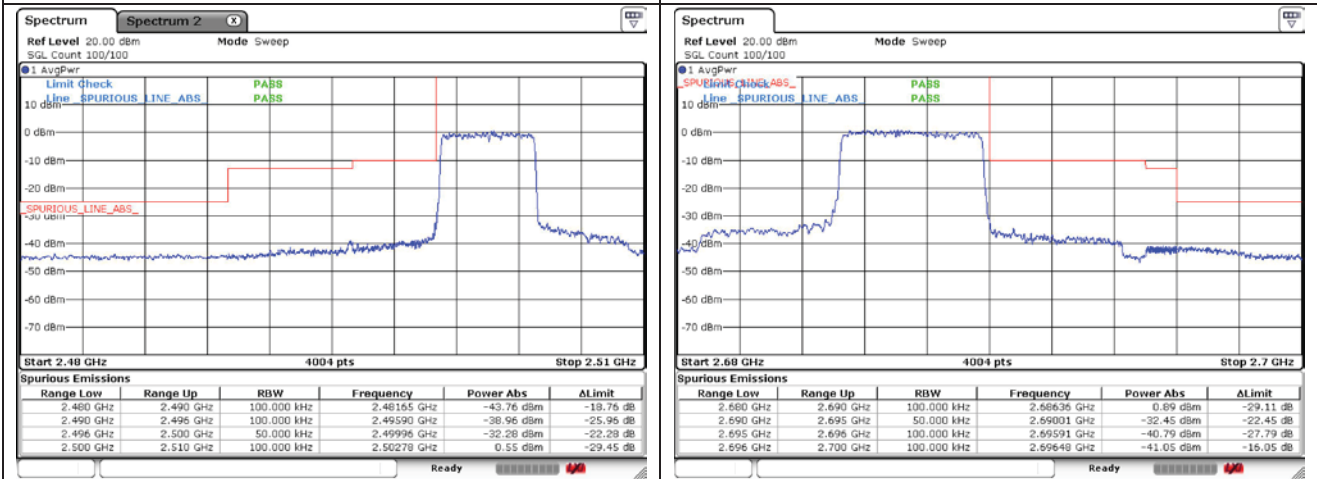


LTE band 41_IC (5 MHz)



QPSK Low Channel - 1 RB

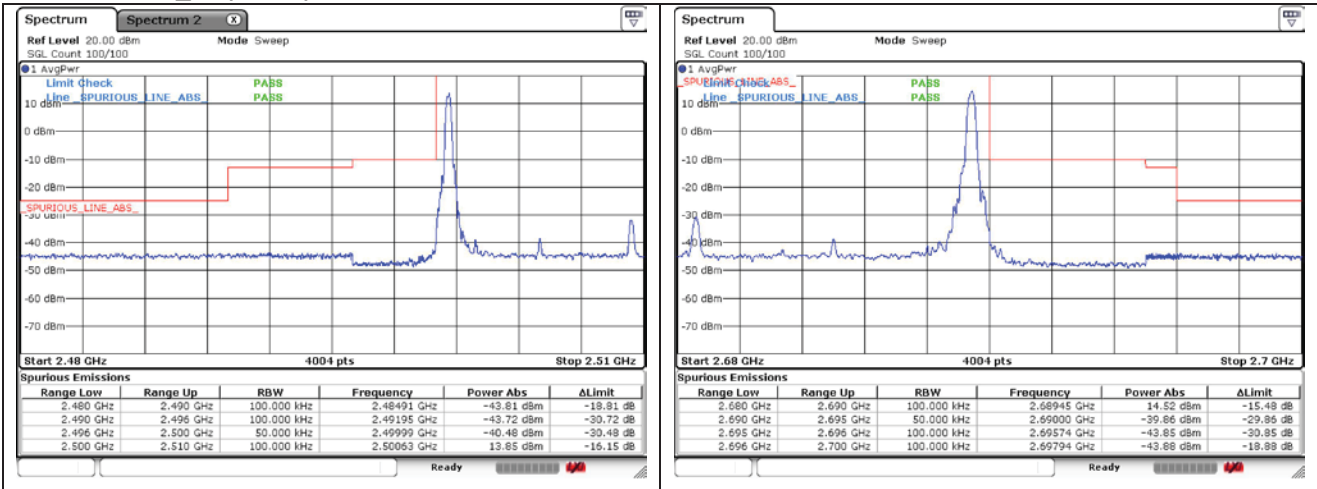
QPSK High Channel - 1 RB



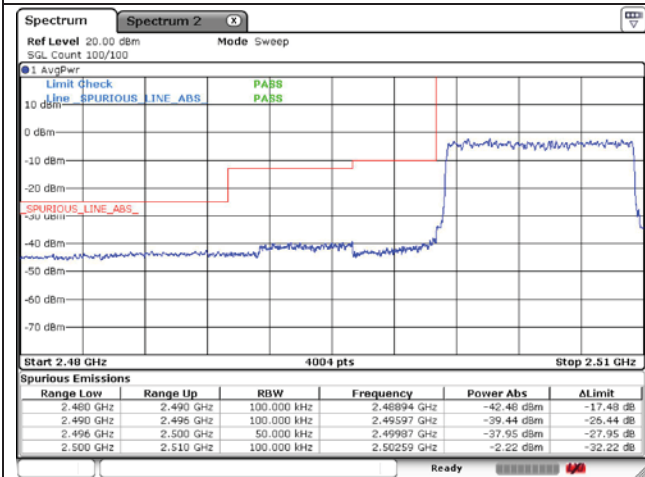
QPSK Low Channel - Full RB

QPSK High Channel - Full RB

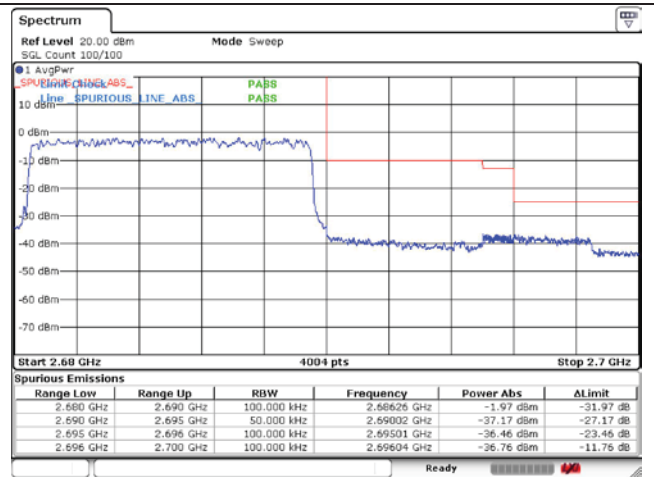
LTE band 41_IC (10 MHz)



QPSK Low Channel - 1 RB



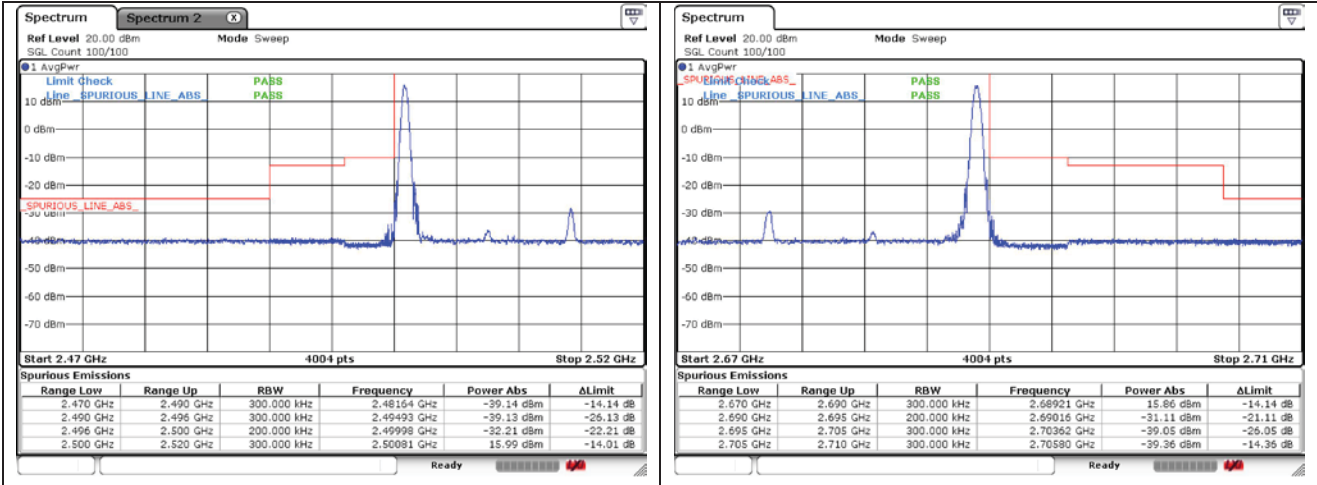
QPSK High Channel - 1 RB



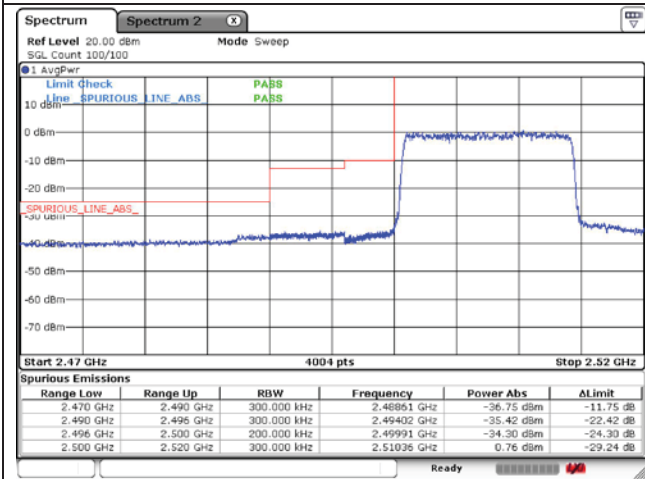
QPSK Low Channel - Full RB

QPSK High Channel - Full RB

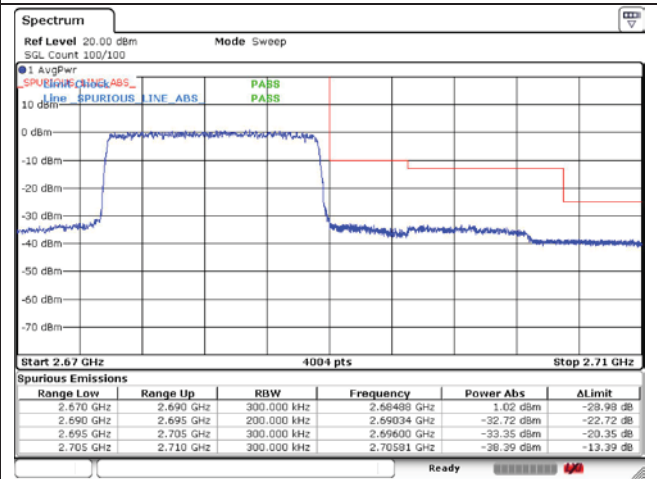
LTE band 41_IC (15 MHz)



QPSK Low Channel - 1 RB



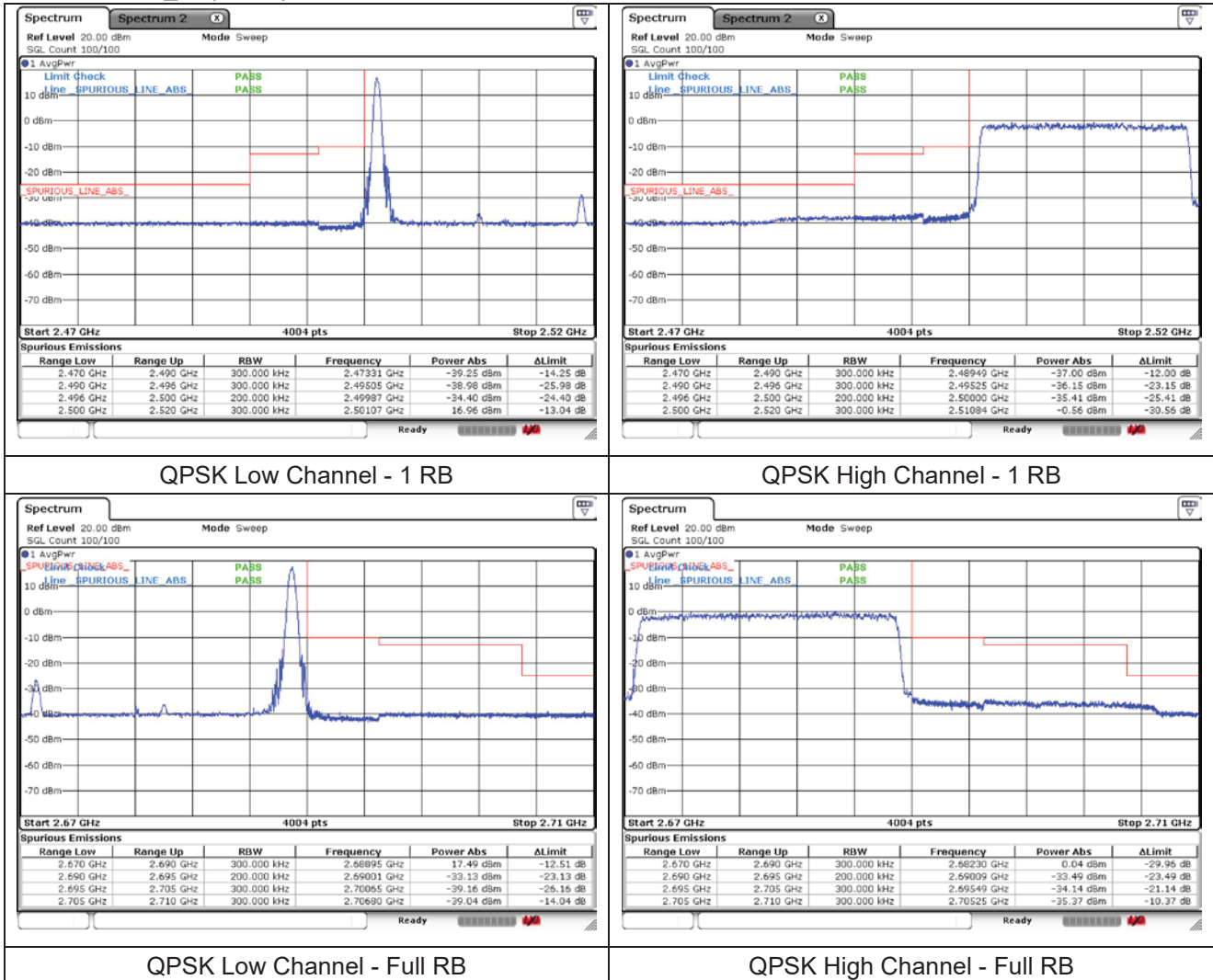
QPSK High Channel - 1 RB



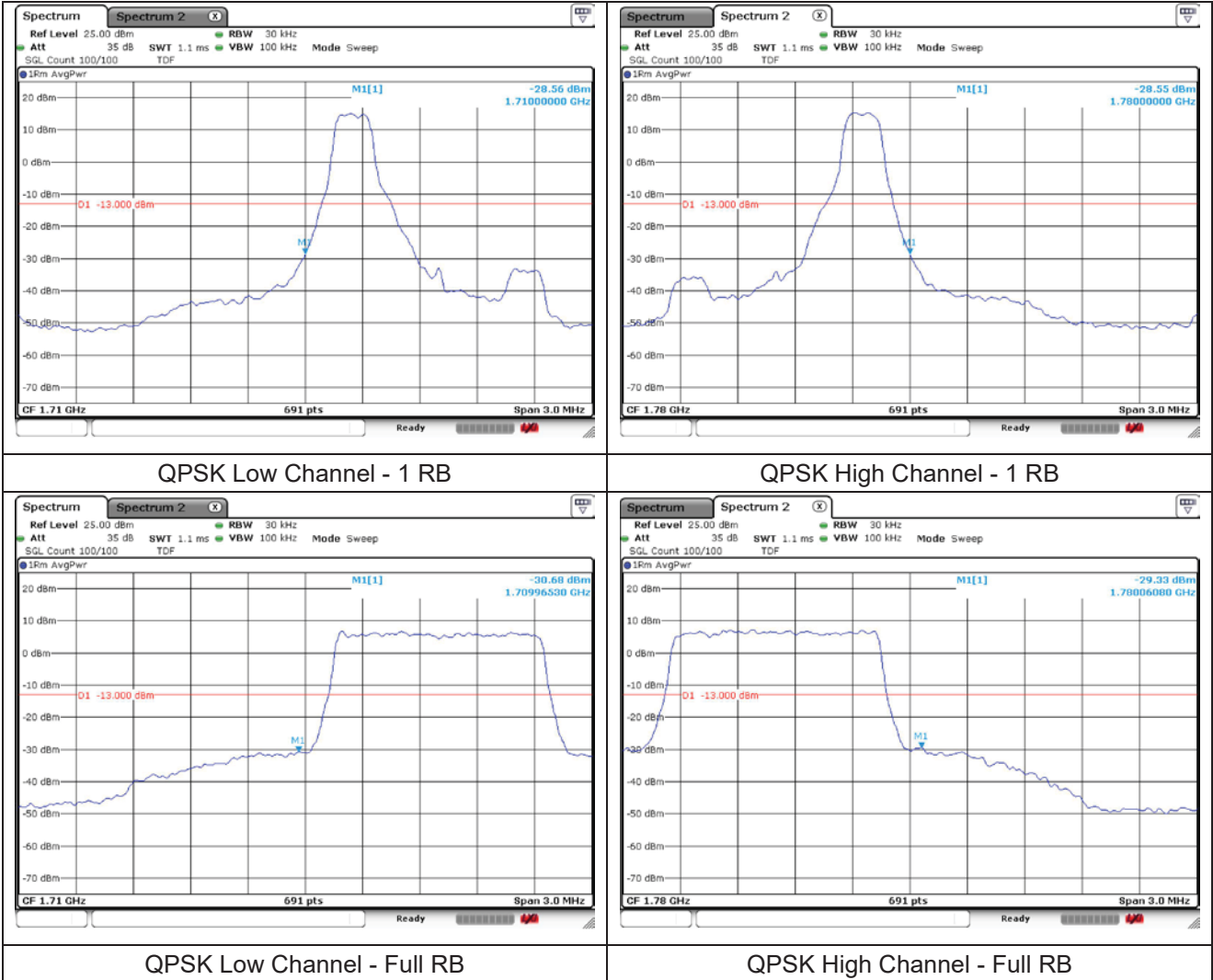
QPSK Low Channel - Full RB

QPSK High Channel - Full RB

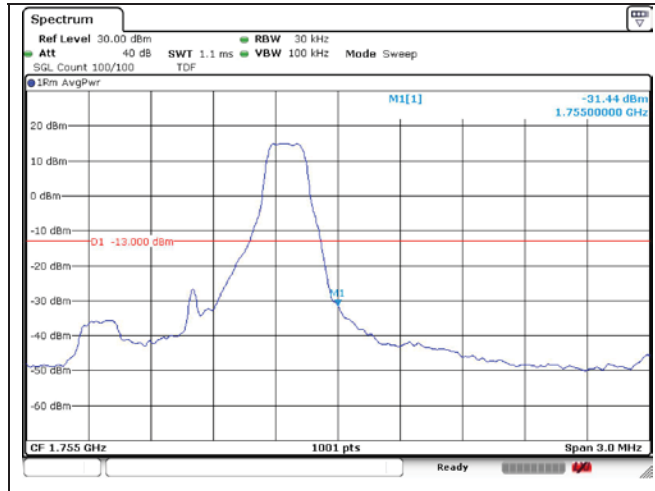
LTE band 41_IC (20 MHz)



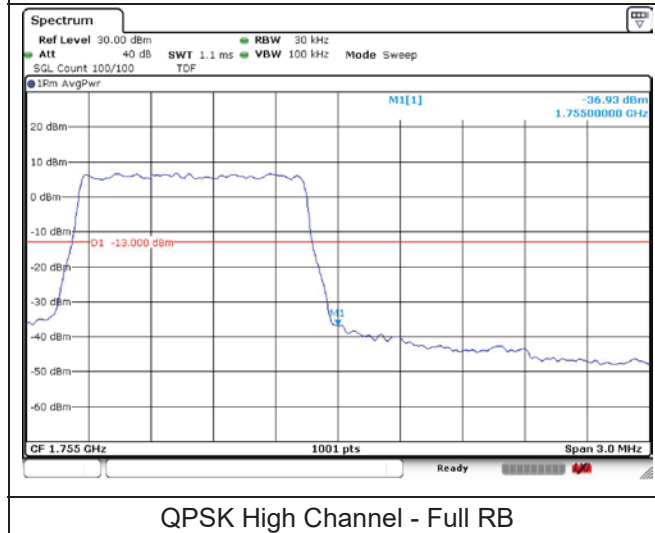
LTE band 66/4 (1.4 MHz)



LTE band 4 (1.4 MHz)

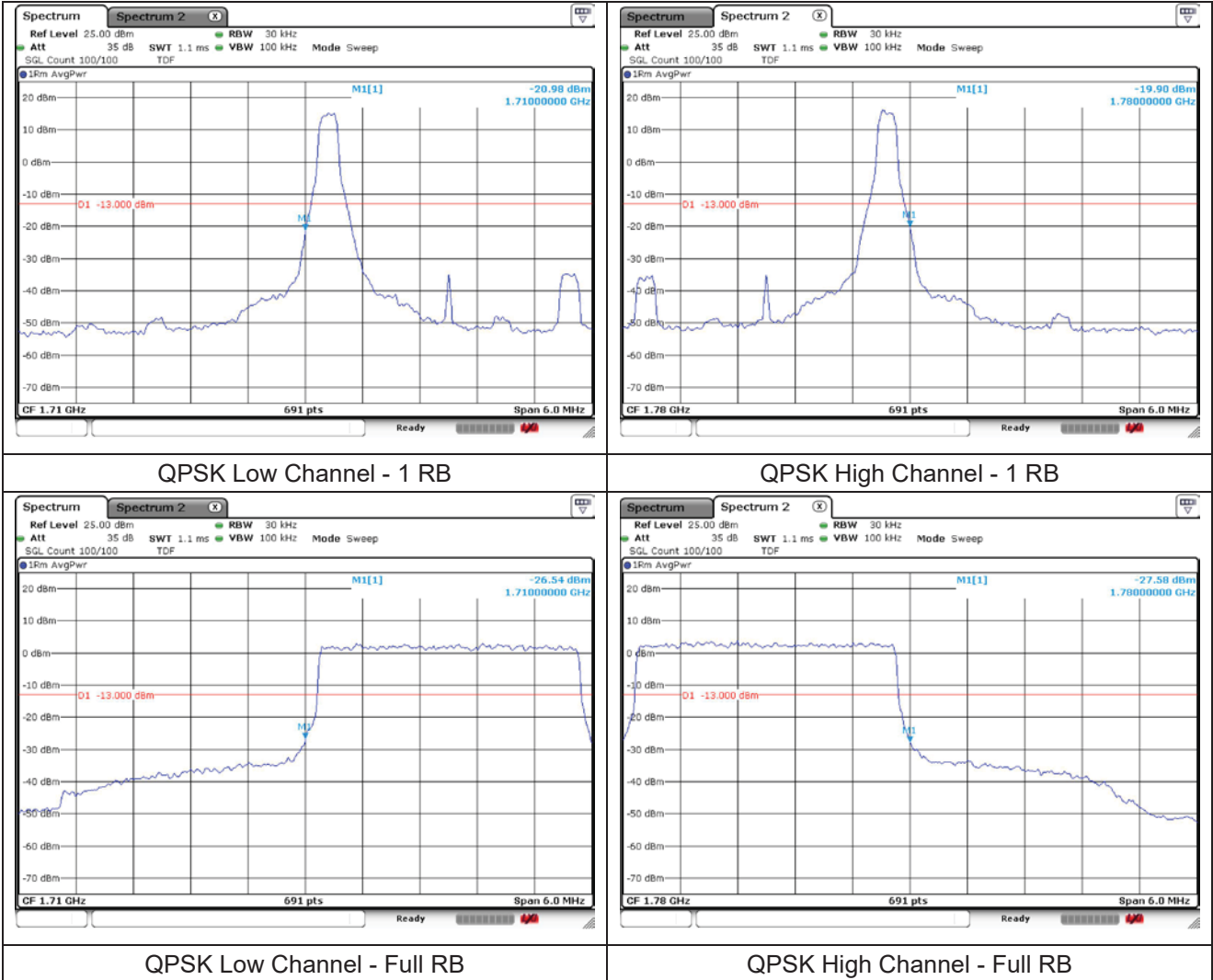


QPSK High Channel - 1 RB

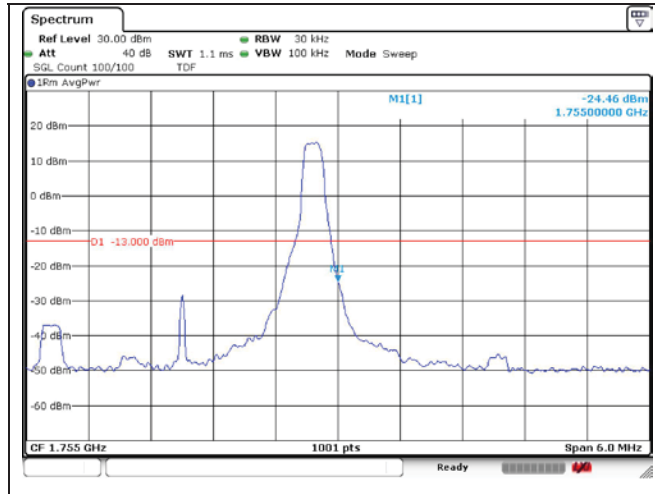


QPSK High Channel - Full RB

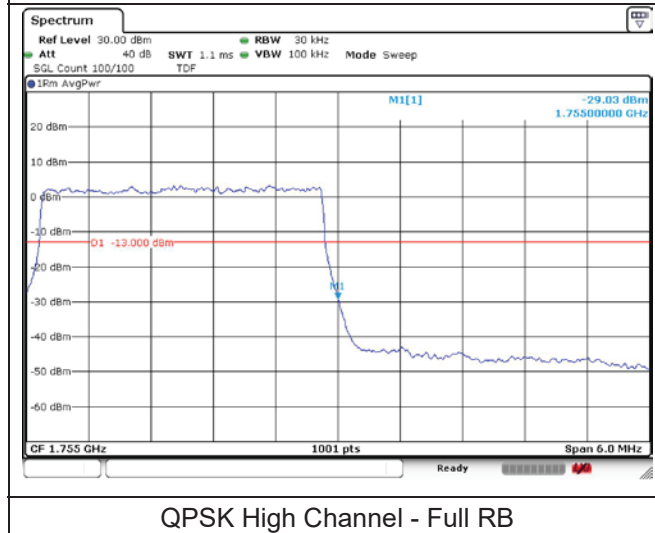
LTE band 66/4 (3 MHz)



LTE band 4 (3 MHz)

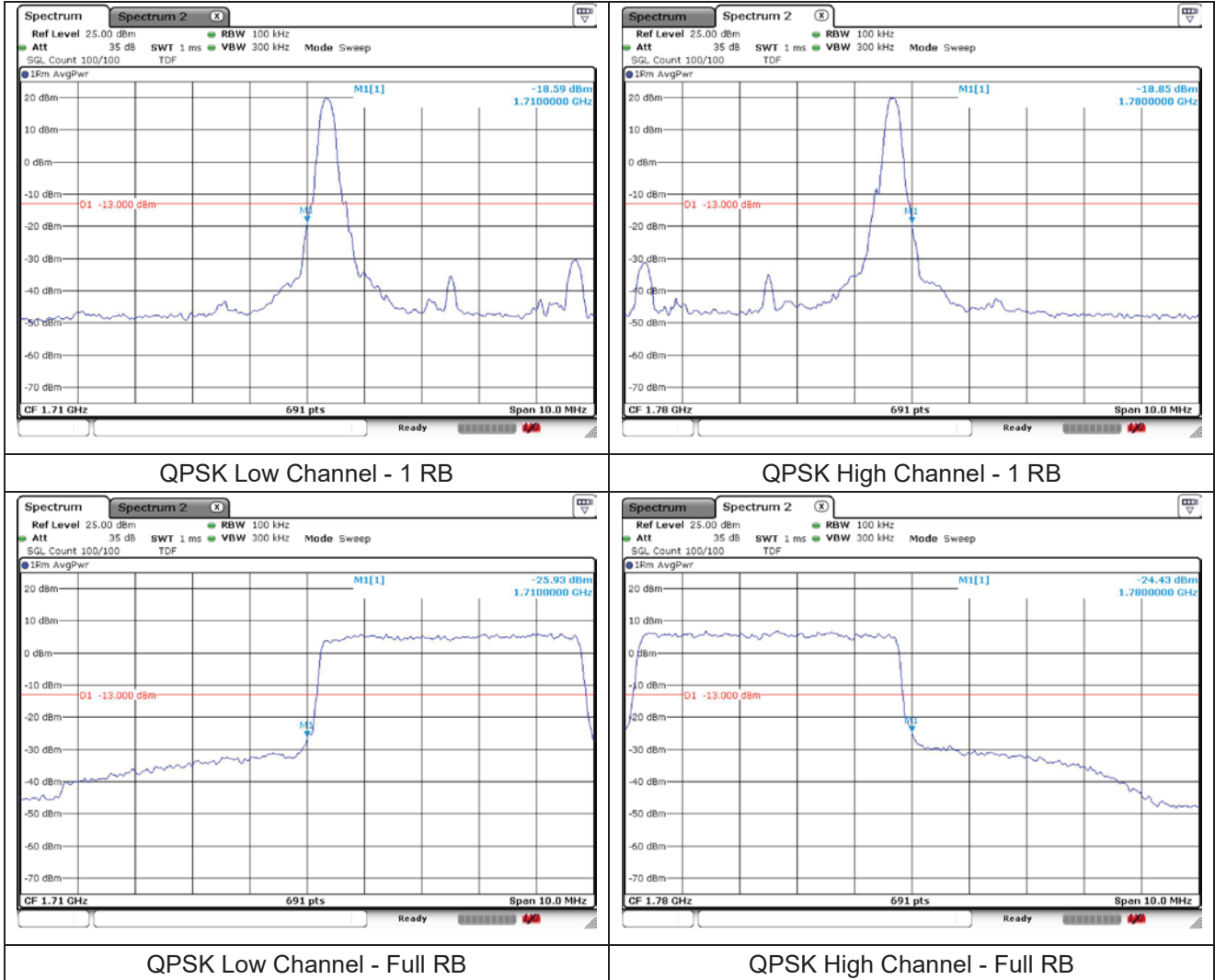


QPSK High Channel - 1 RB

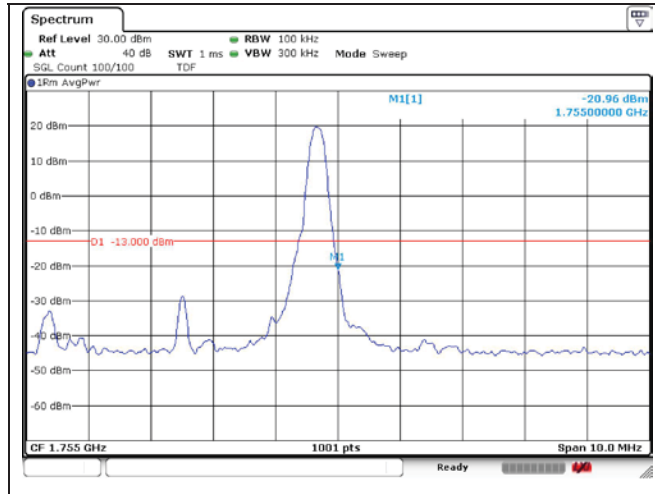


QPSK High Channel - Full RB

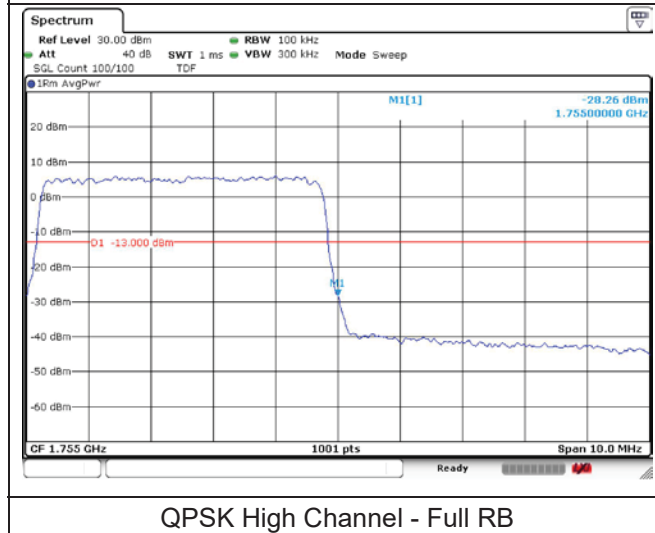
LTE band 66/4 (5 MHz)



LTE band 4 (5 MHz)

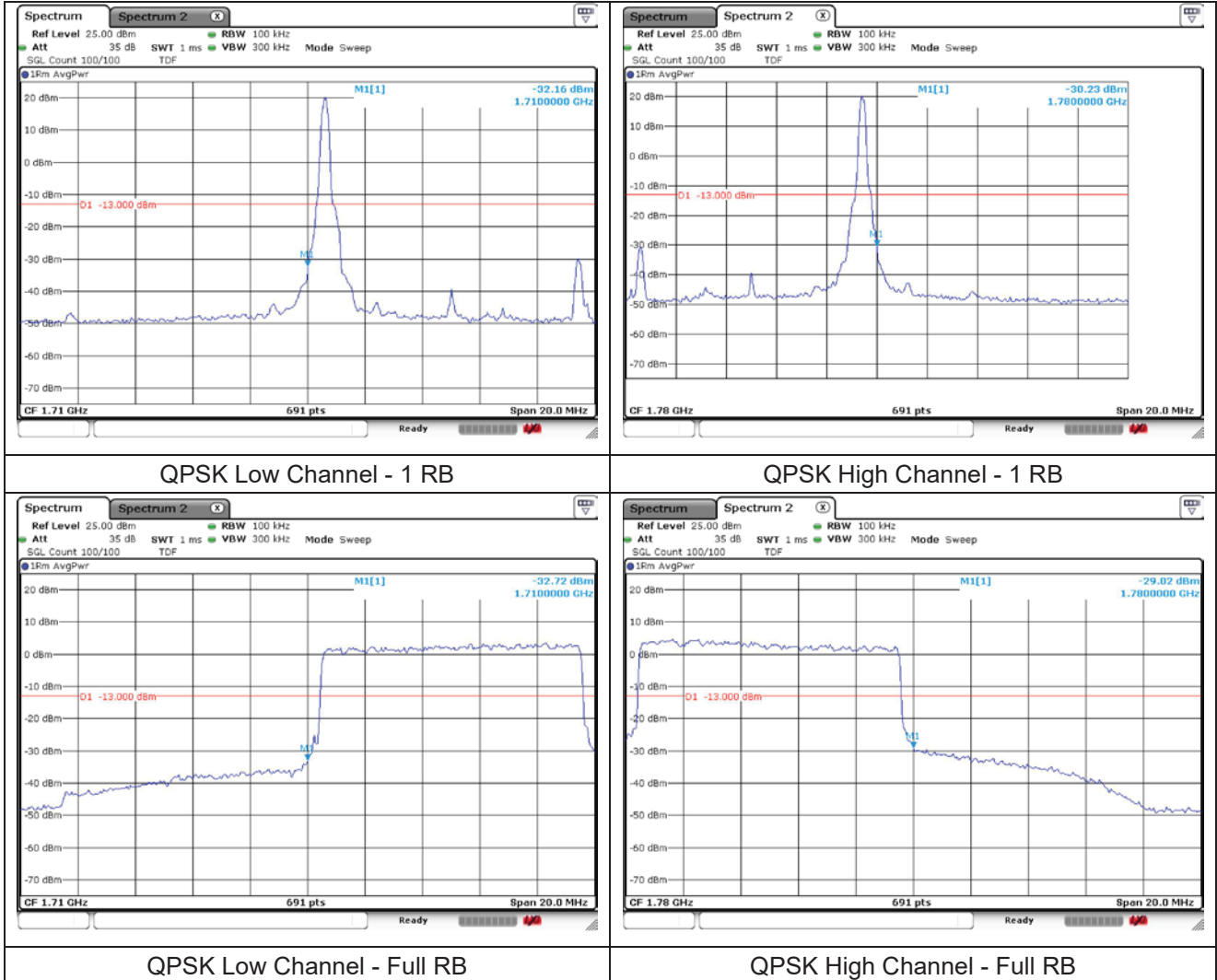


QPSK High Channel - 1 RB

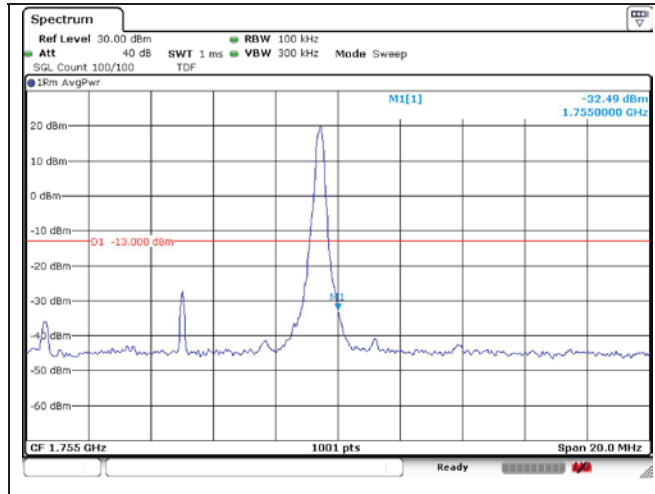


QPSK High Channel - Full RB

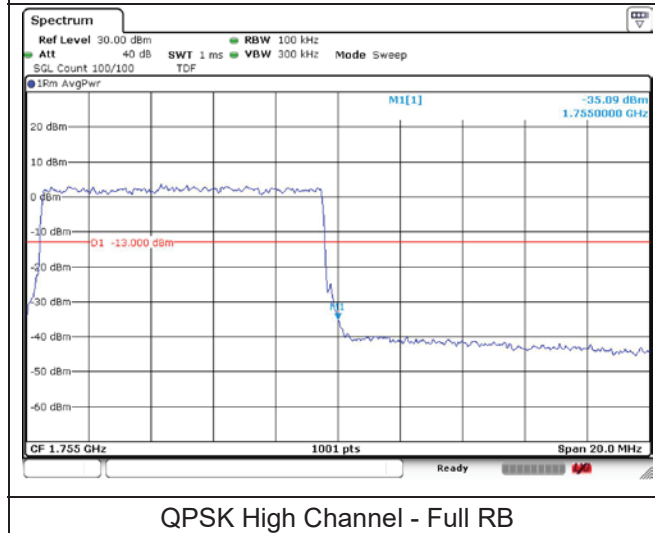
LTE band 66/4 (10 MHz)



LTE band 4 (10 MHz)

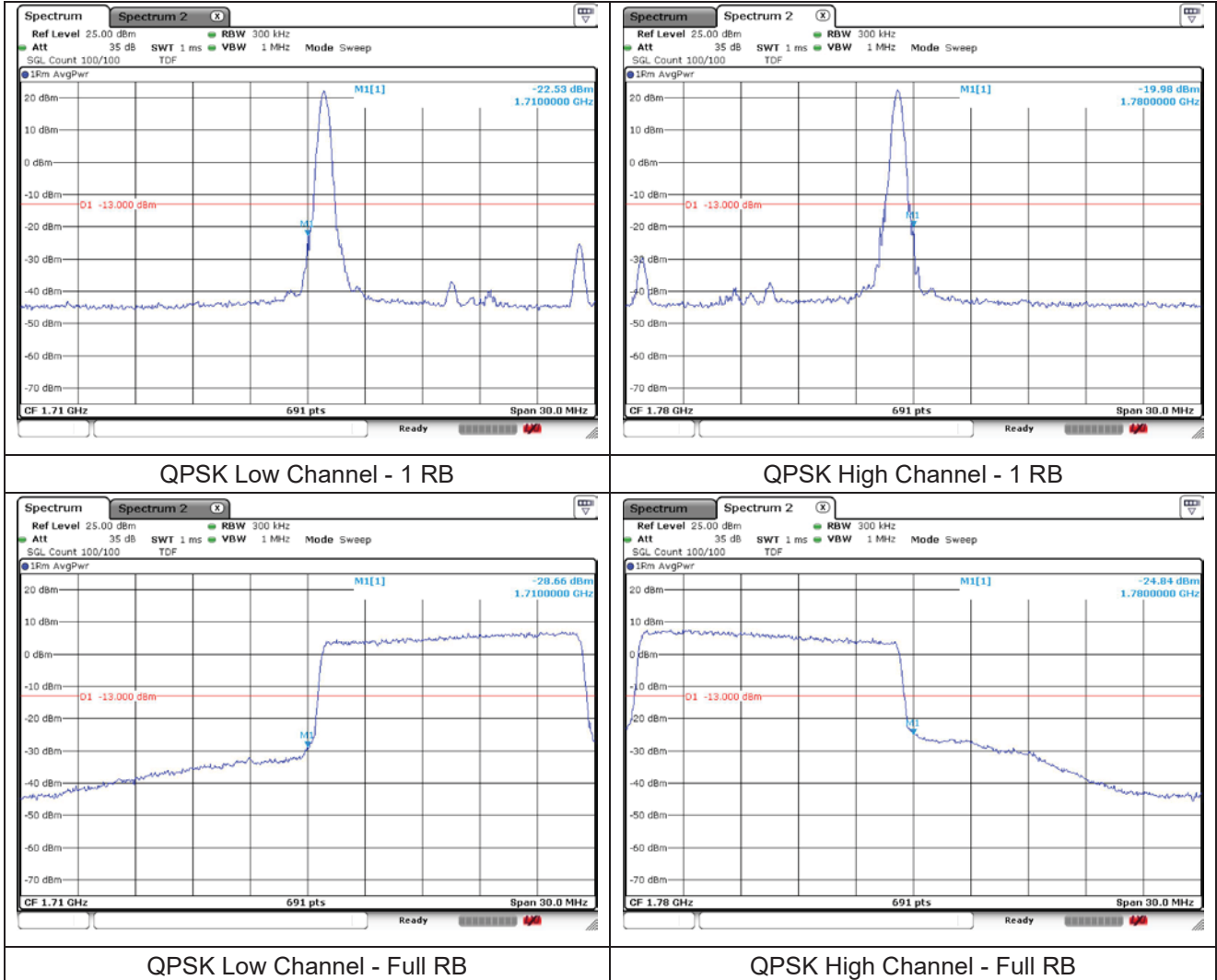


QPSK High Channel - 1 RB

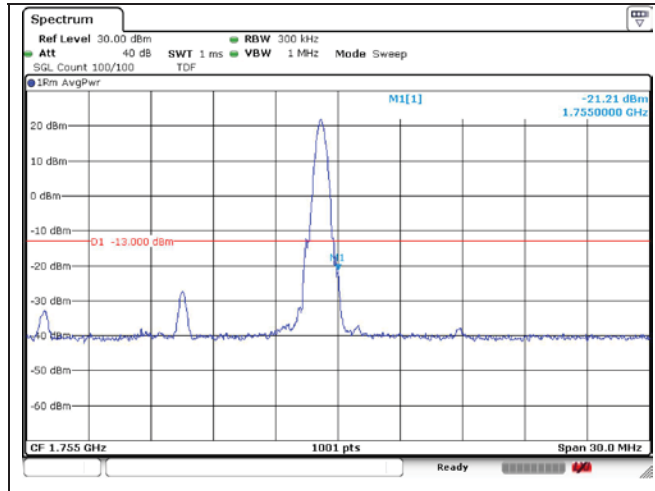


QPSK High Channel - Full RB

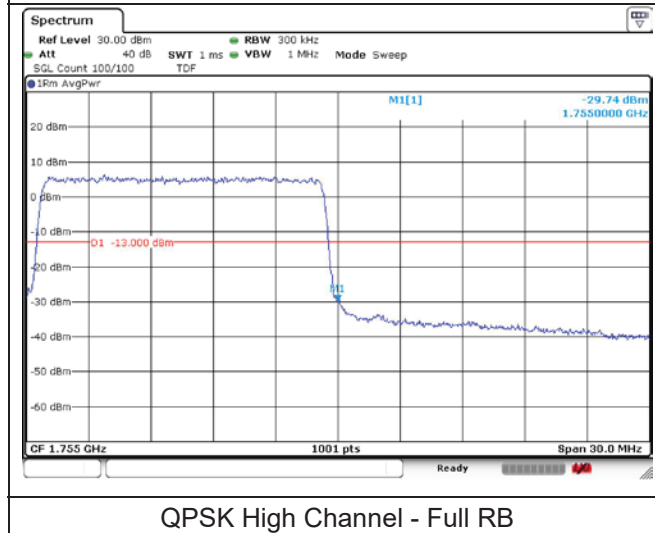
LTE band 66/4 (15 MHz)



LTE band 4 (15 MHz)

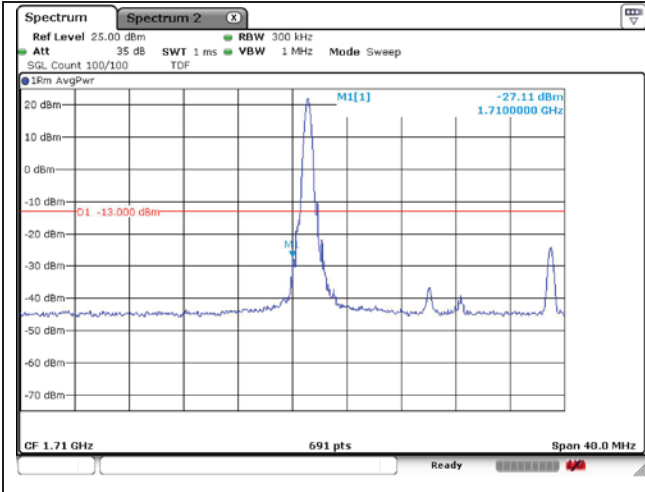


QPSK High Channel - 1 RB

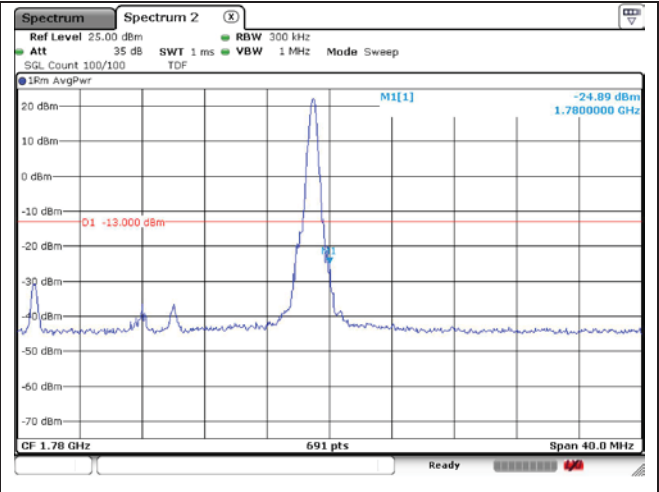


QPSK High Channel - Full RB

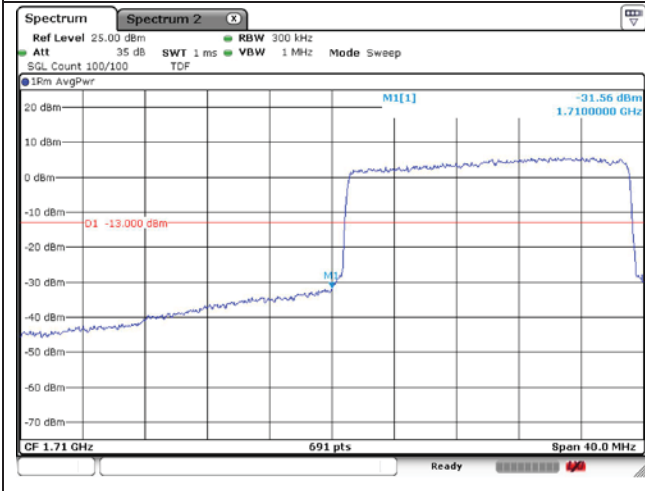
LTE band 66/4 (20 MHz)



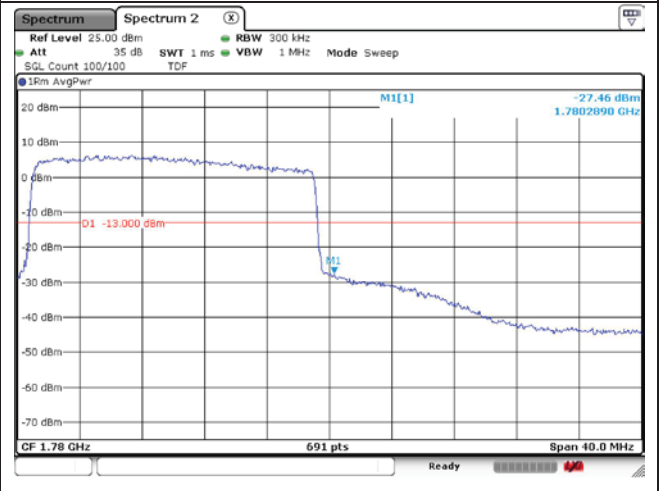
QPSK Low Channel - 1 RB



QPSK High Channel - 1 RB

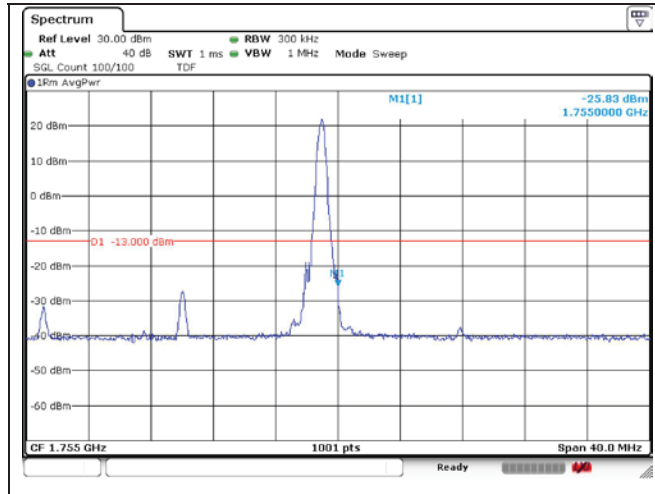


QPSK Low Channel - Full RB

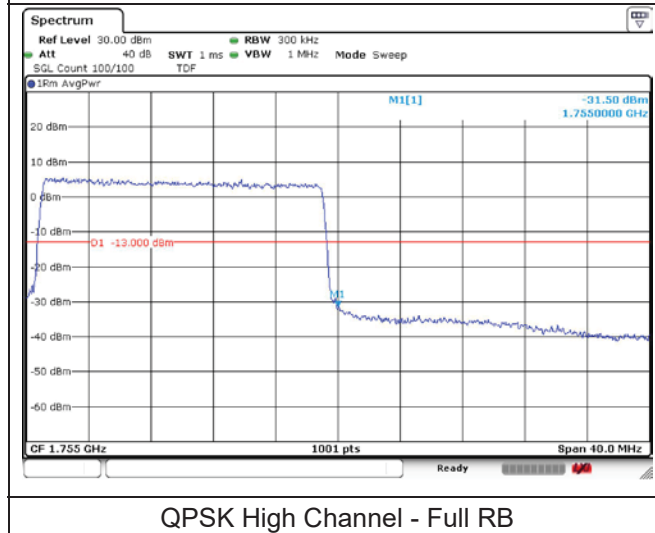


QPSK High Channel - Full RB

LTE band 4 (20 MHz)

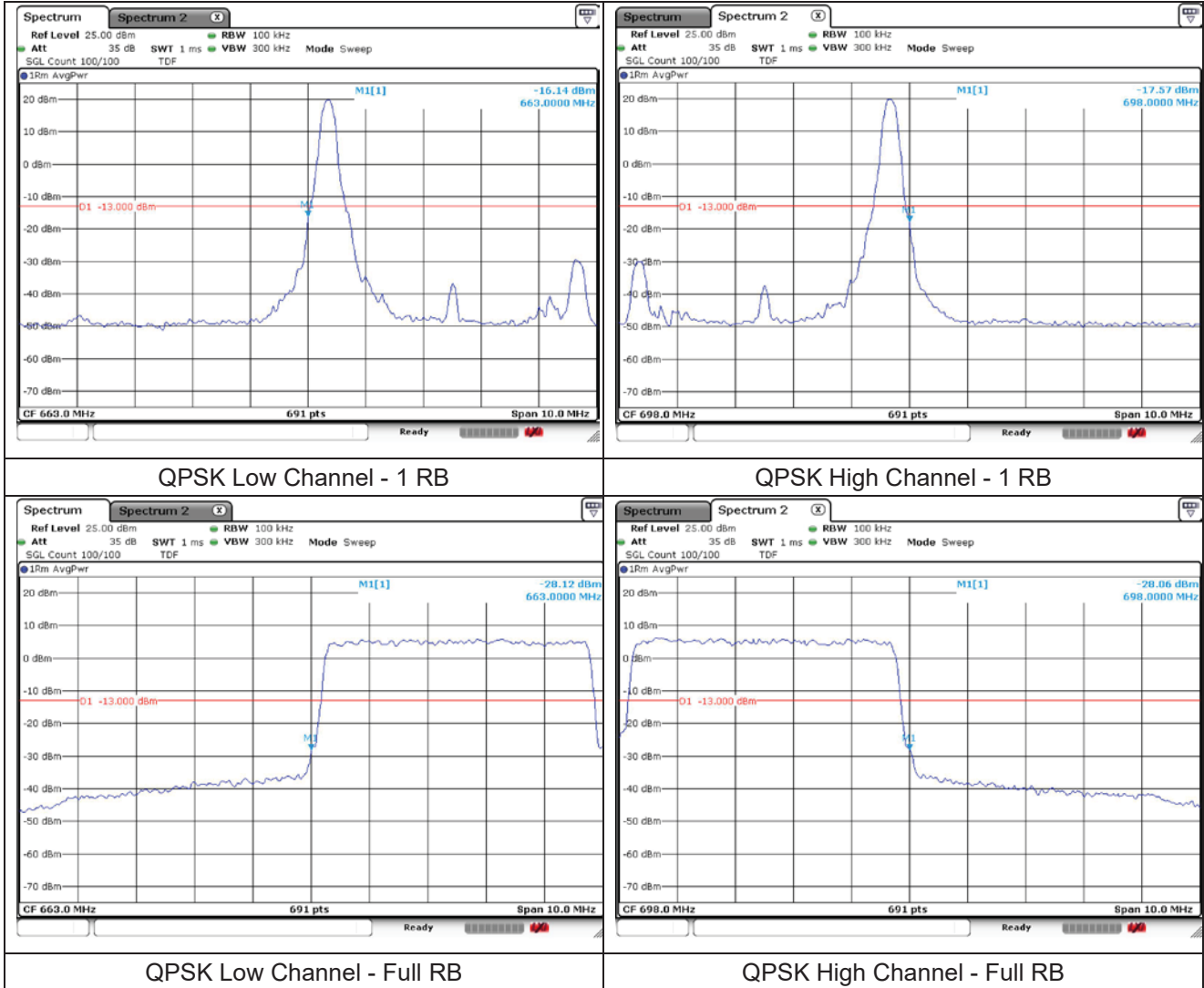


QPSK High Channel - 1 RB

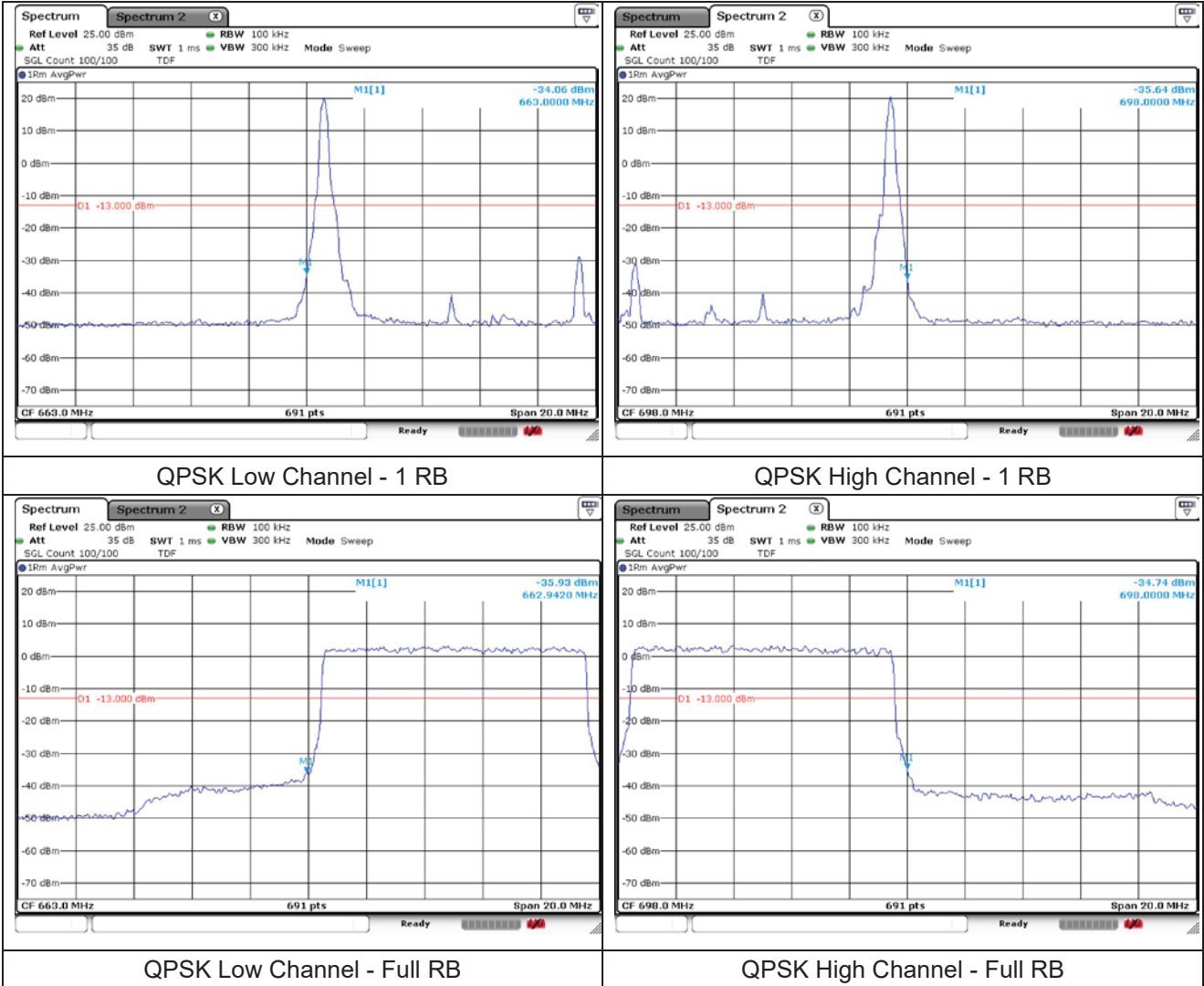


QPSK High Channel - Full RB

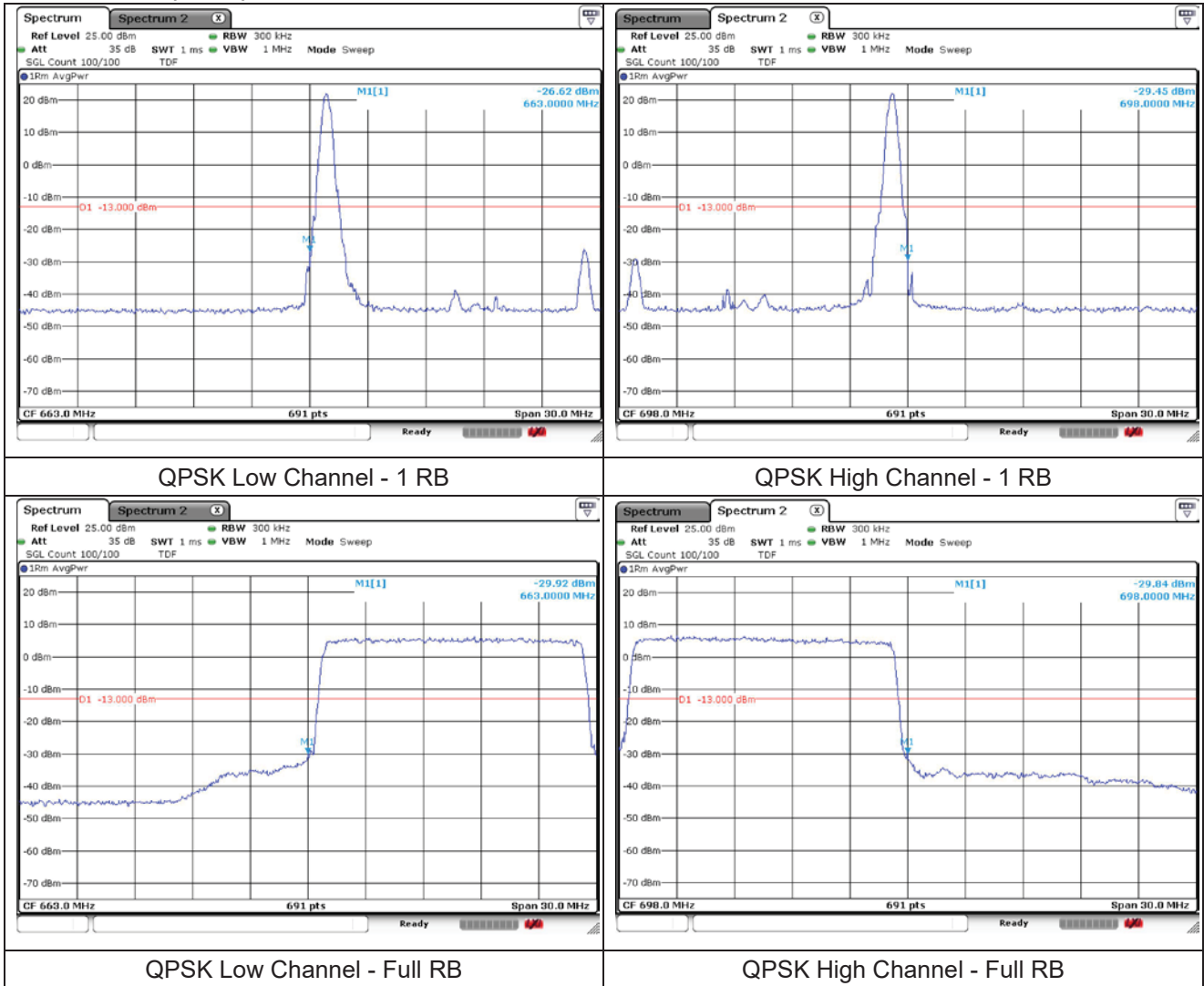
LTE band 71 (5 MHz)



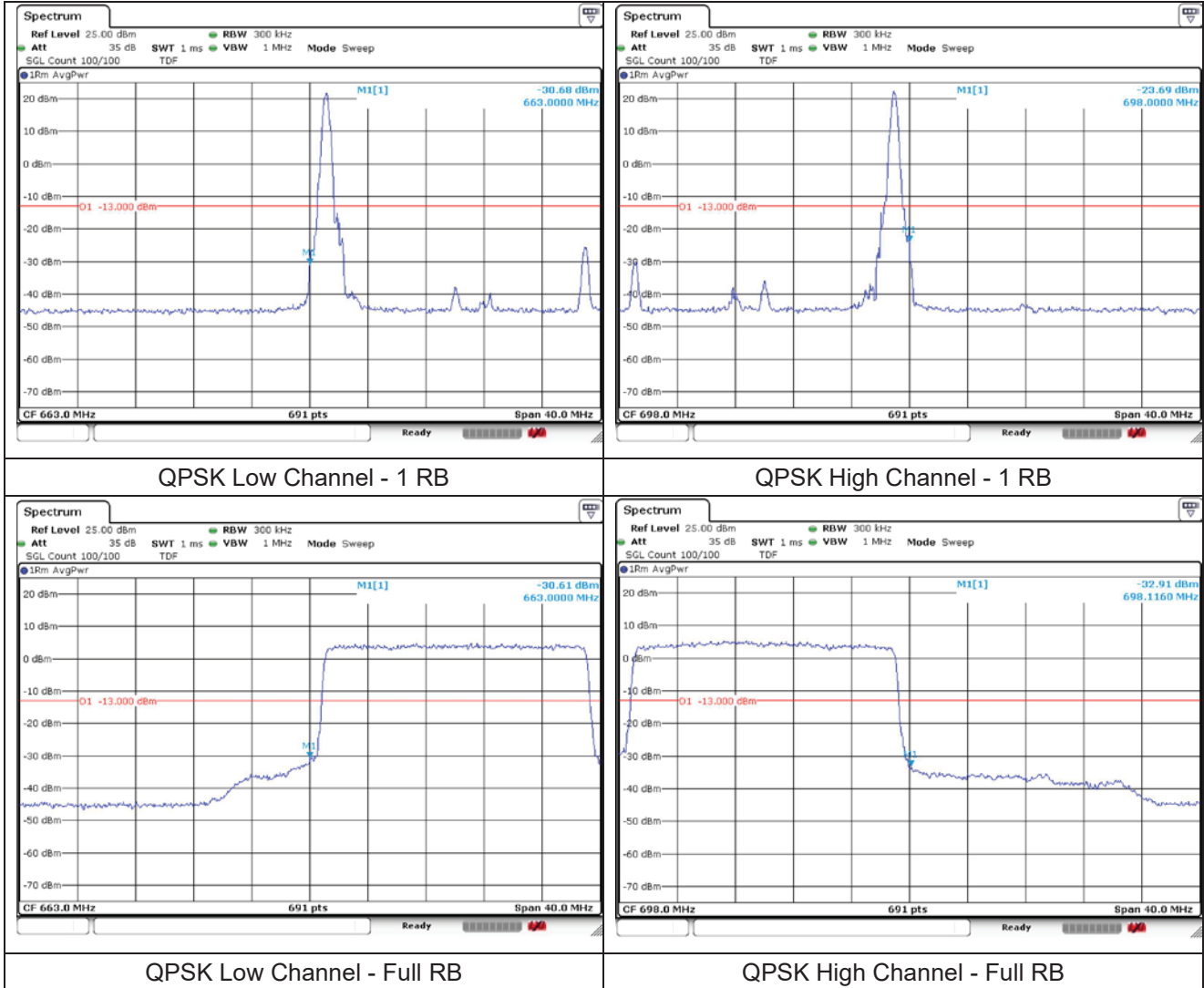
LTE band 71 (10 MHz)



LTE band 71 (15 MHz)



LTE band 71 (20 MHz)



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 3

5.3, the carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations and ±1.5 ppm for base stations.

- 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 3

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

- RSS-199 Issue 3

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

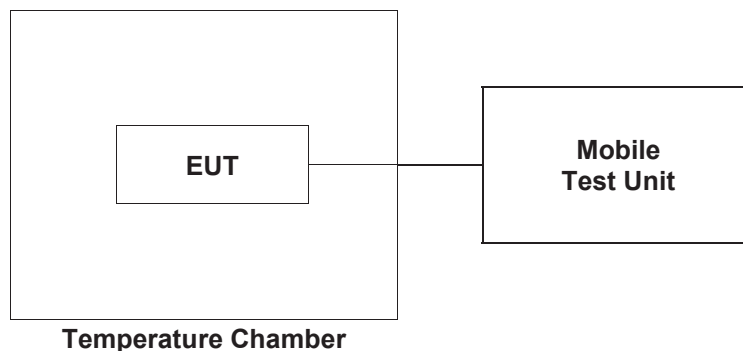
(a) the frequency offset shall be measured according to the procedure described in RSS-Gen and recorded.

(b) using a resolution bandwidth equal to that permitted within the 1 MHz band immediately outside the channel edge, as found in section 4.5, reference points will be selected at the unwanted emission limits, which comply with the attenuation specified in section 4.5 for the type of device under test, on the emission mask of the lowest and highest channels. The frequency at these points shall be recorded as f_L and f_H respectively.

The applicant shall ensure compliance with frequency stability requirements by showing that f_L minus the frequency offset and f_H plus the frequency offset is within the frequency range in which the equipment is designed to operate.

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.

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	12.5	3.20	0.007 67
40		2.50	0.006 82
30		-0.60	0.003 04
23		-3.10	-
10		2.70	0.007 06
0		1.70	0.005 84
-10		0.70	0.004 63
-20		-1.60	0.001 83
-30		-2.10	0.001 22
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	14.375	-3.50	-0.000 49
	10.625	-2.90	0.000 24

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	12.5	-3.30	-0.000 43
40		6.40	0.003 39
30		2.50	0.001 85
23		-2.20	-
10		-1.40	0.000 32
0		-3.10	-0.000 36
-10		-5.10	-0.001 14
-20		-3.20	-0.000 39
-30		5.30	0.002 96
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	14.375	1.30	0.0013 81
	10.625	5.20	0.0029 19

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	12.5	1.30	-0.002 69
40		-6.40	-0.013 57
30		1.10	-0.002 97
23		3.20	-
10		-4.20	-0.010 46
0		-4.20	-0.010 46
-10		5.40	0.003 11
-20		1.30	-0.002 69
-30		2.60	-0.000 85
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	14.375	4.30	0.001 55
	10.625	-3.20	-0.009 05

LTE band 13 at middle channel

Reference Frequency: 782.0 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	12.5	6.20	0.004 86
40		5.60	0.004 09
30		1.10	-0.001 66
23		2.40	-
10		-1.10	-0.004 48
0		-1.60	-0.005 12
-10		-3.10	-0.007 03
-20		2.40	0.000 00
-30		2.80	0.000 51
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	14.375	-3.10	-0.007 03
	10.625	2.50	0.000 13

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	12.5	3.20	-0.000 48
40		2.80	-0.000 69
30		3.10	-0.000 53
23		4.10	-
10		-1.80	-0.003 13
0		2.10	-0.001 06
-10		-3.40	-0.003 98
-20		4.70	0.000 32
-30		2.40	-0.000 90
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	14.375	-3.10	-0.003 82
	10.625	-2.40	-0.003 45

LTE band 41 at middle channel

Reference Frequency: 2 593.0 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	12.5	2.40	0.001 81
40		4.60	0.002 66
30		-2.10	0.000 08
23		-2.30	-
10		4.40	0.002 58
0		-3.40	-0.000 42
-10		1.50	0.001 47
-20		-5.10	-0.001 08
-30		1.20	0.001 35
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	14.375	1.60	0.001 50
	10.625	4.30	0.002 55

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	12.5	5.50	0.004 01
40		7.10	0.004 93
30		-2.30	-0.000 46
23		-1.50	-
10		2.10	0.002 06
0		3.30	0.002 75
-10		-2.10	-0.000 34
-20		-4.40	-0.001 66
-30		-3.90	-0.001 38
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	14.375	-4.40	-0.001 66
	10.625	1.50	0.001 72

LTE band 71 at middle channel

Reference Frequency: 680.5 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	12.5	6.30	0.014 55
40		4.70	0.012 20
30		-4.10	-0.000 73
23		-3.60	-
10		-1.80	0.002 65
0		5.10	0.012 78
-10		4.90	0.012 49
-20		-3.80	-0.000 29
-30		5.70	0.013 67
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	14.375	4.1	0.011 32
	10.625	2.4	0.008 82

- End of the Test Report -