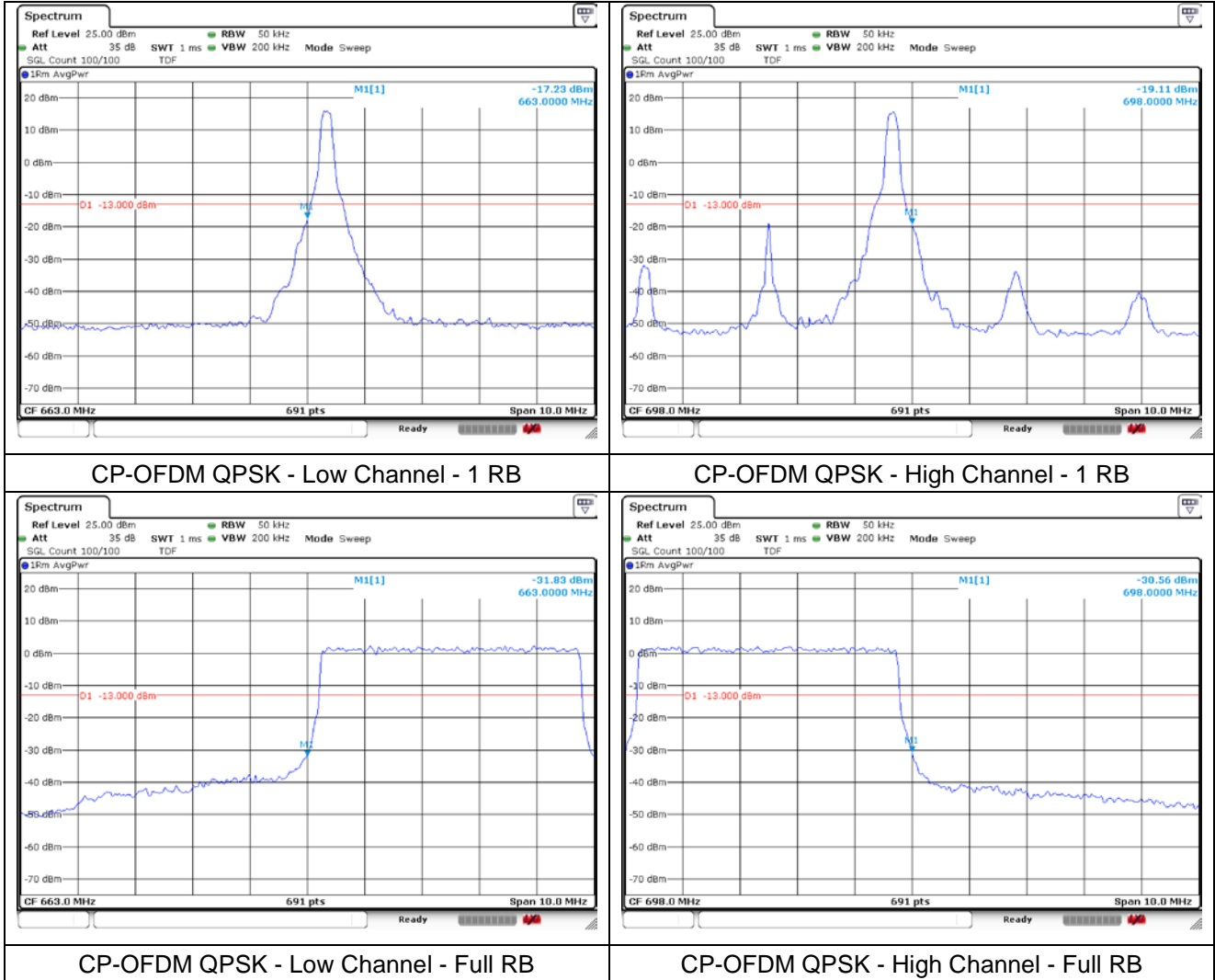
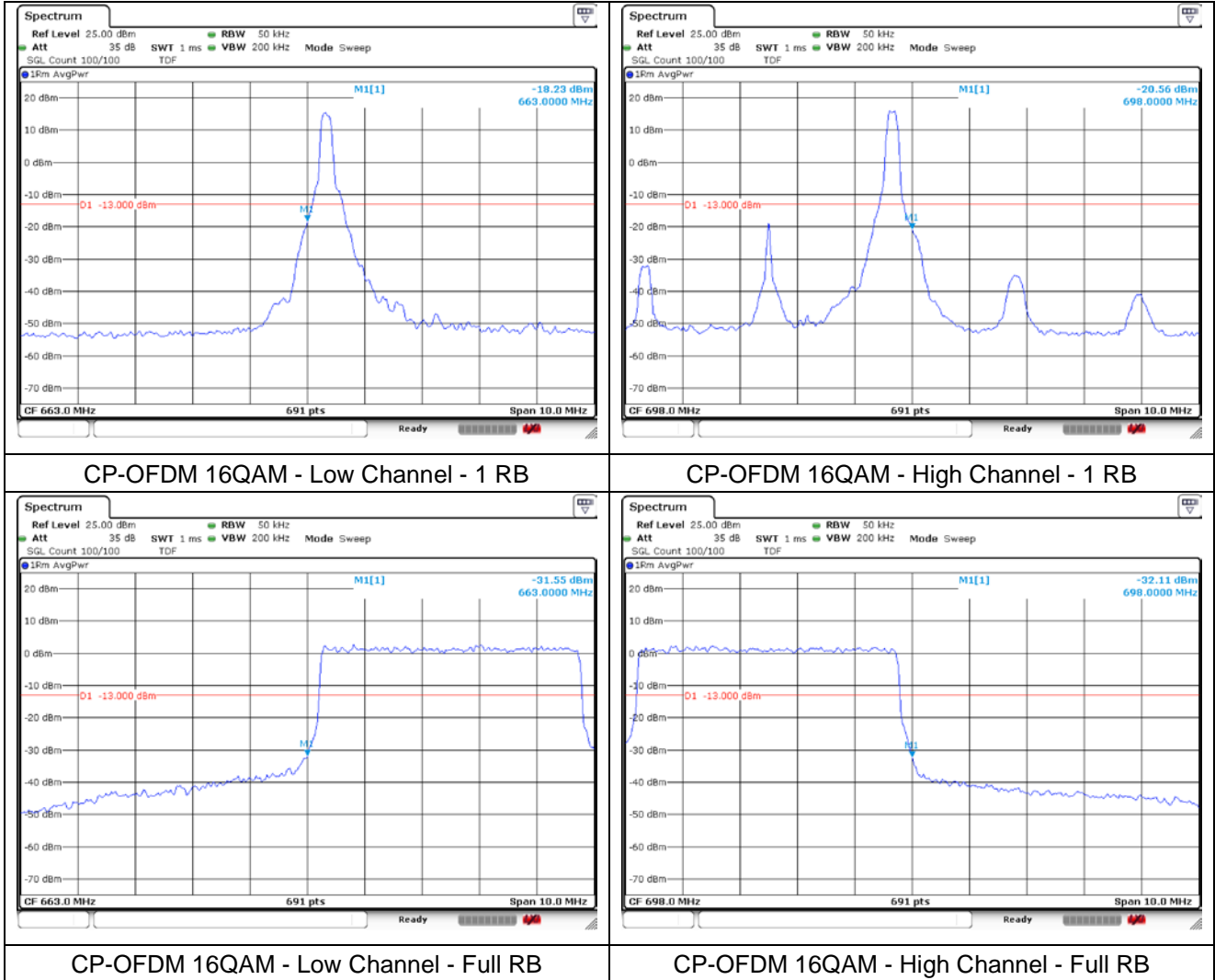


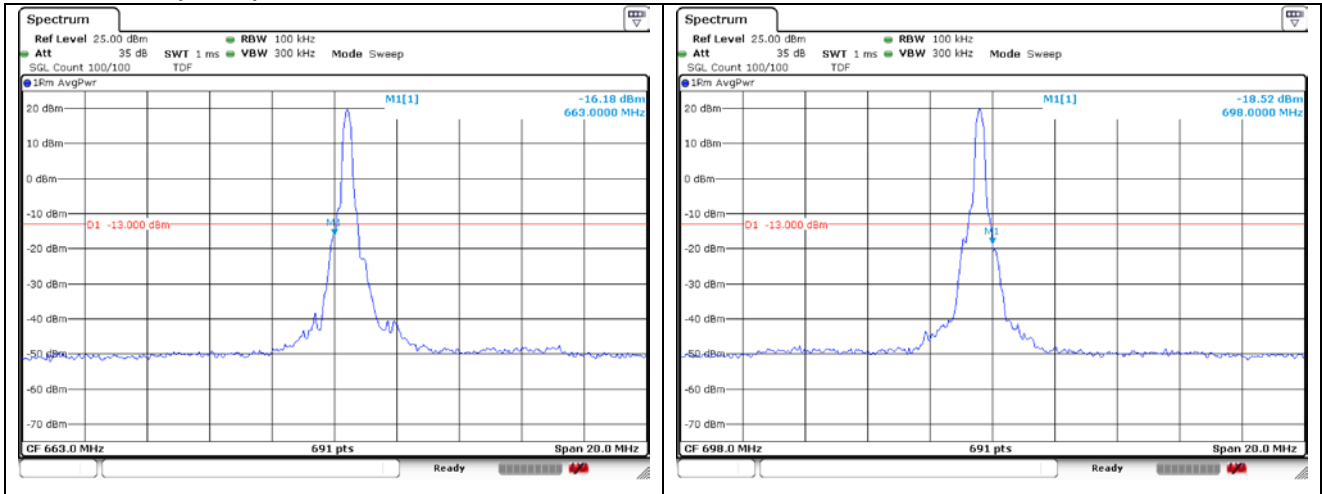
**NR band 71 (5 MHz)**



**NR band 71 (5 MHz)**

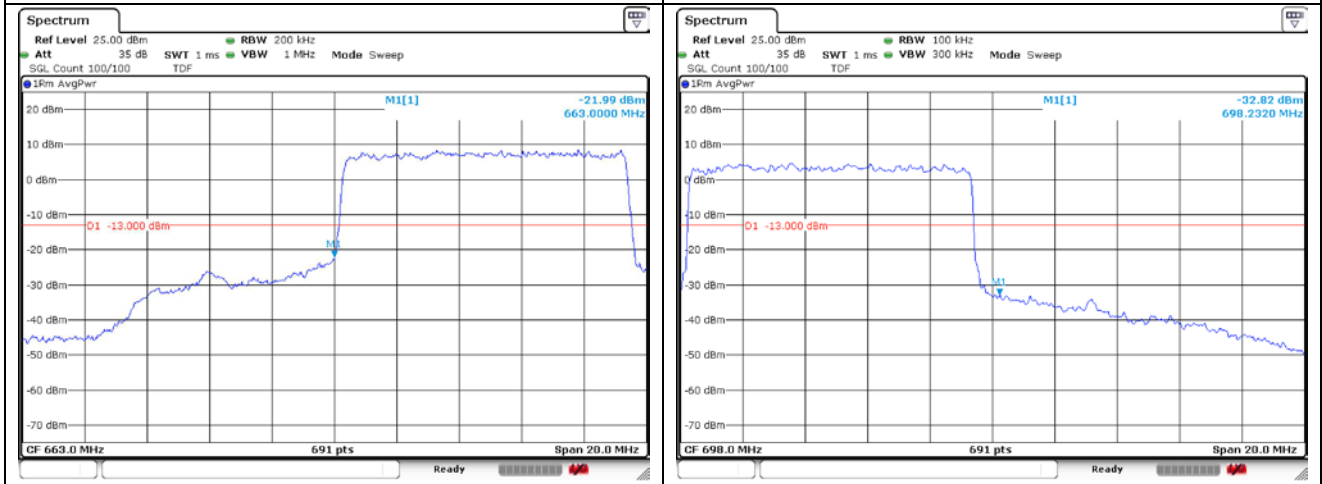


**NR band 71 (10 MHz)**



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

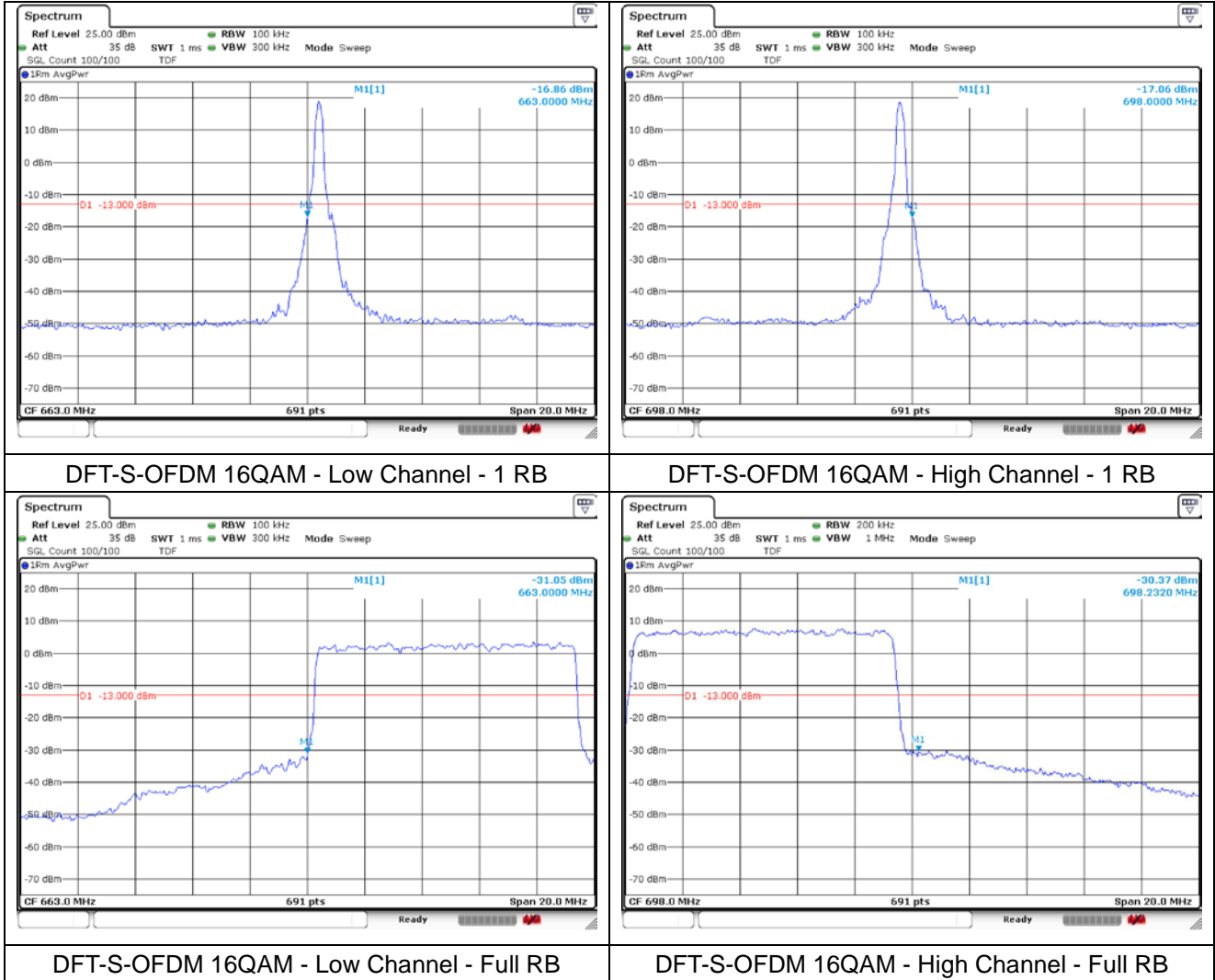
DFT-S-OFDM QPSK - High Channel - 1 RB



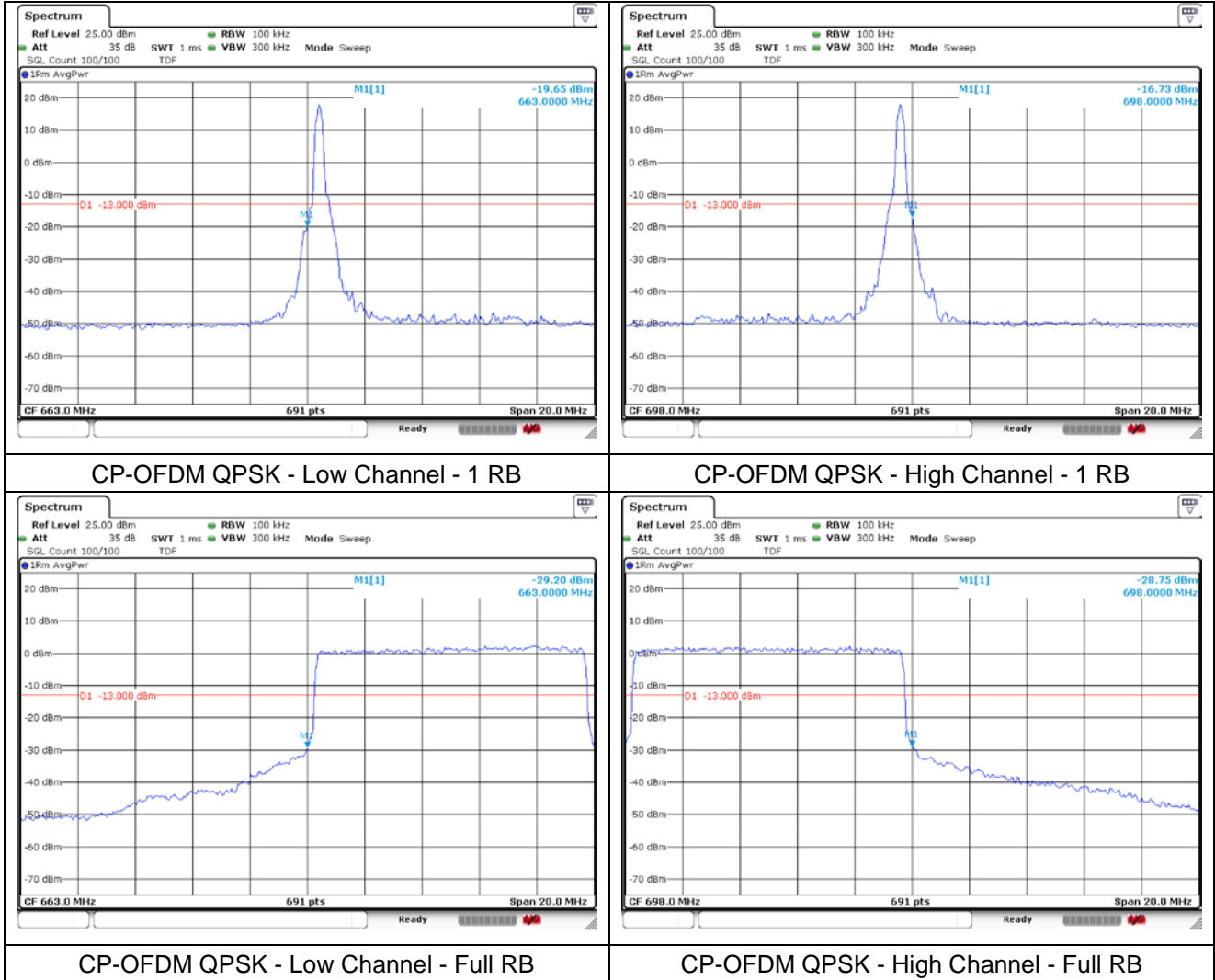
DFT-S-OFDM QPSK - Low Channel - Full RB

DFT-S-OFDM QPSK - High Channel - Full RB

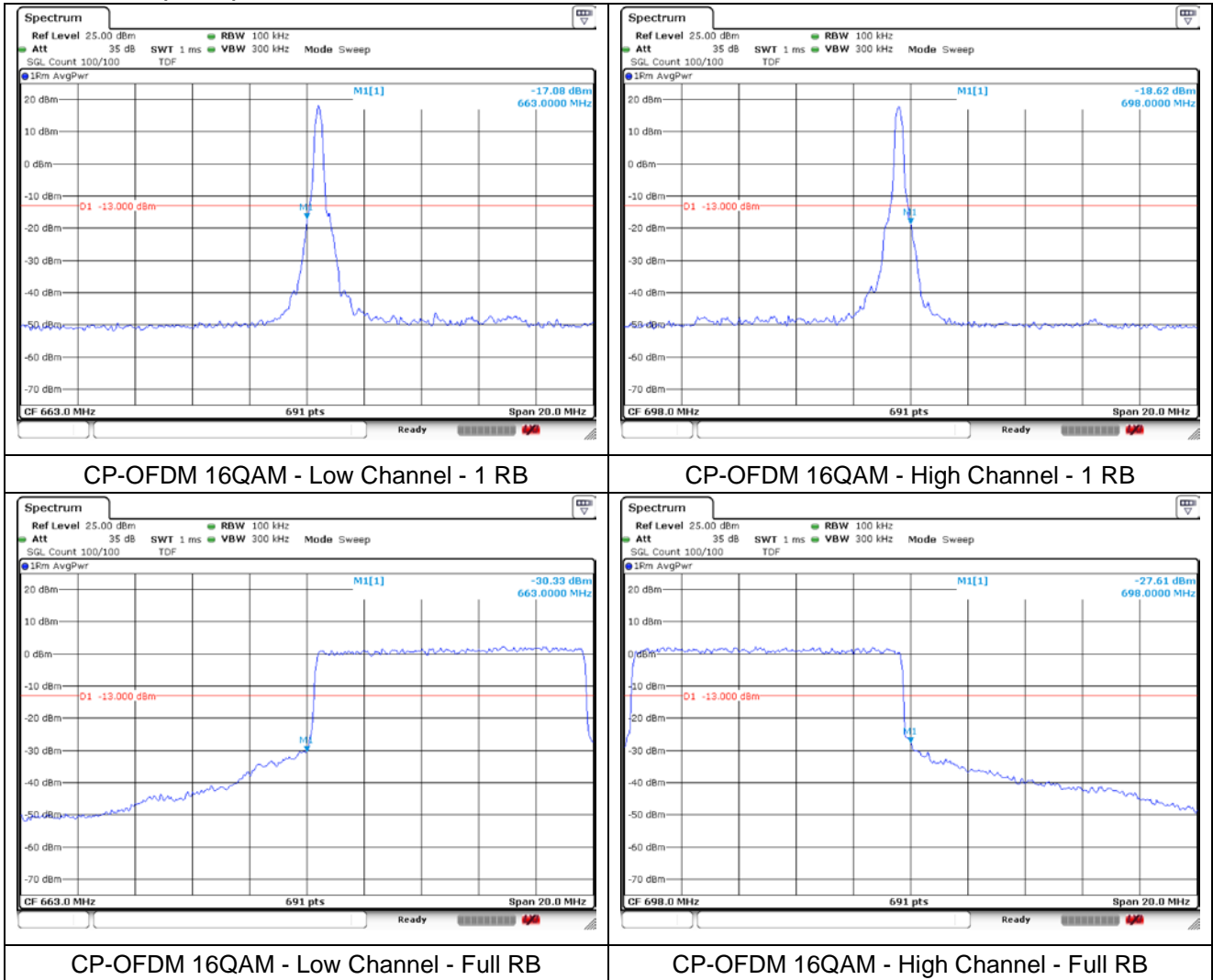
**NR band 71 (10 MHz)**



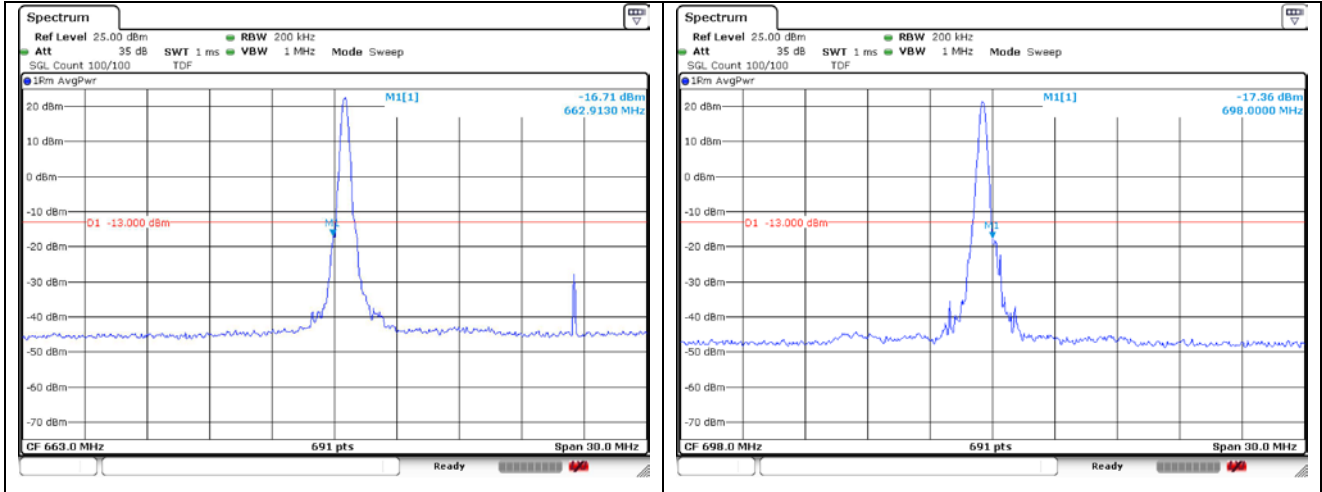
**NR band 71 (10 MHz)**



**NR band 71 (10 MHz)**

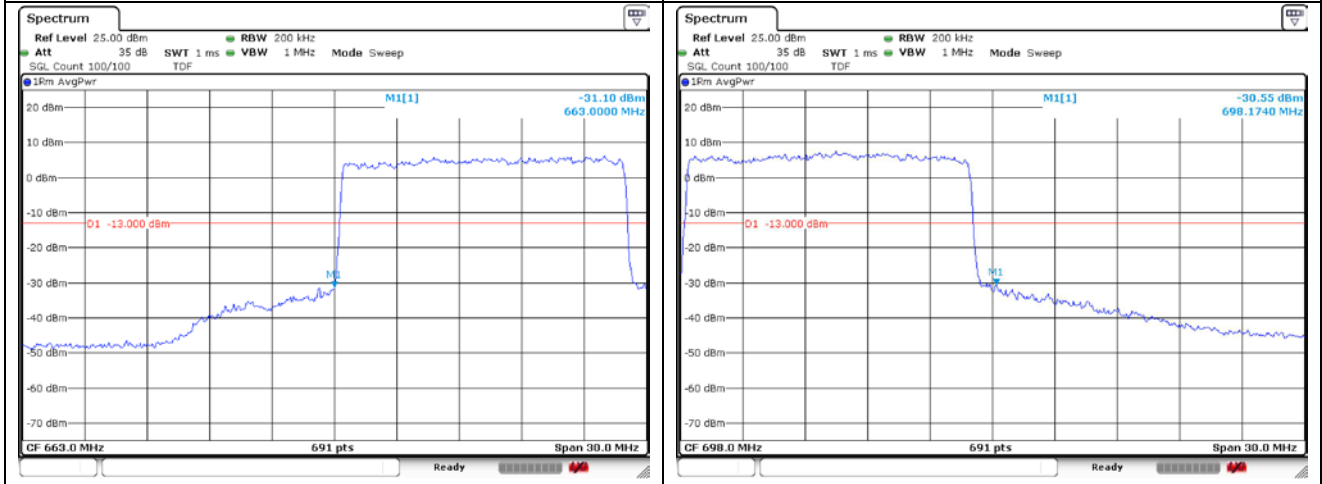


**NR band 71 (15 MHz)**



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

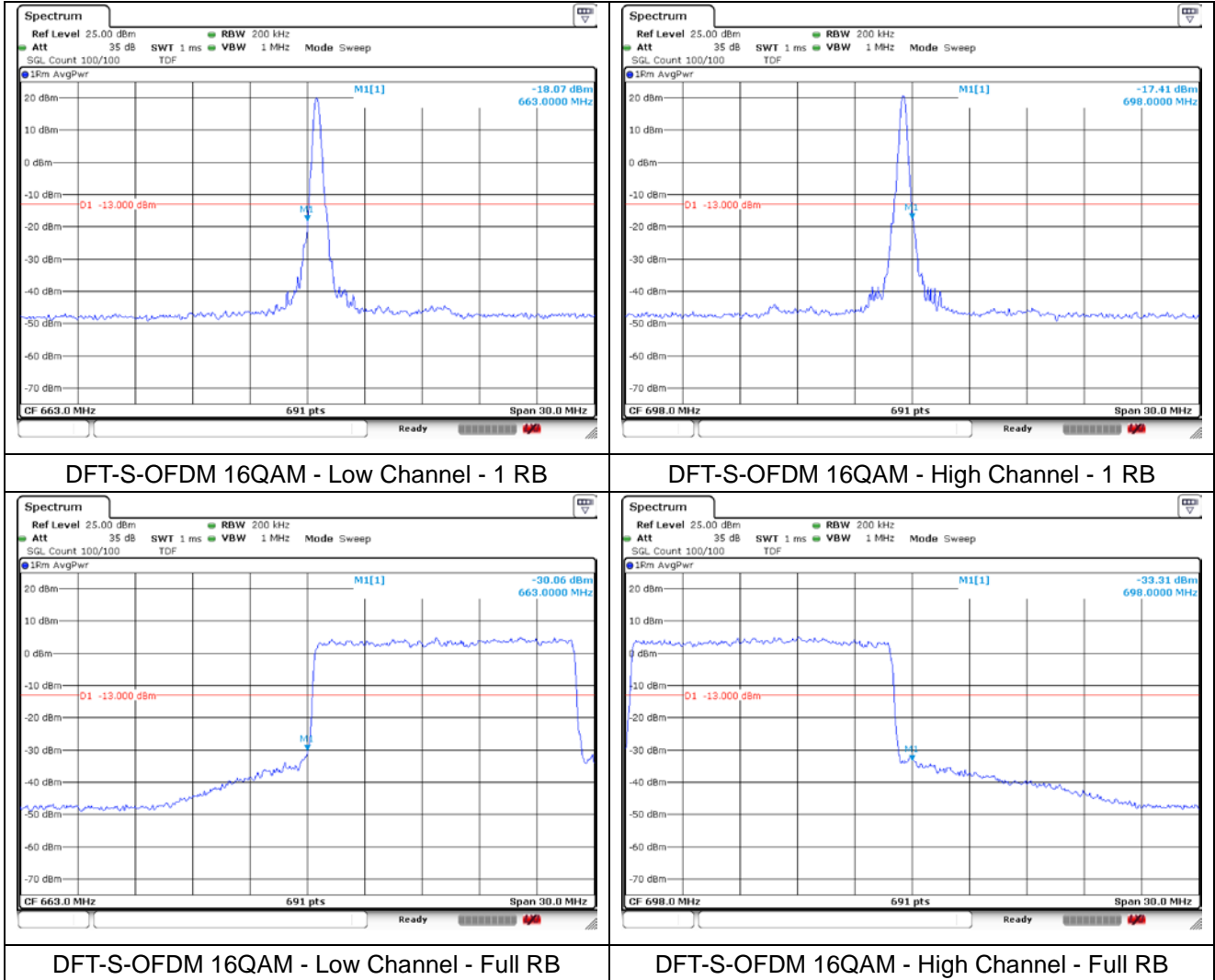
DFT-S-OFDM QPSK - High Channel - 1 RB



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

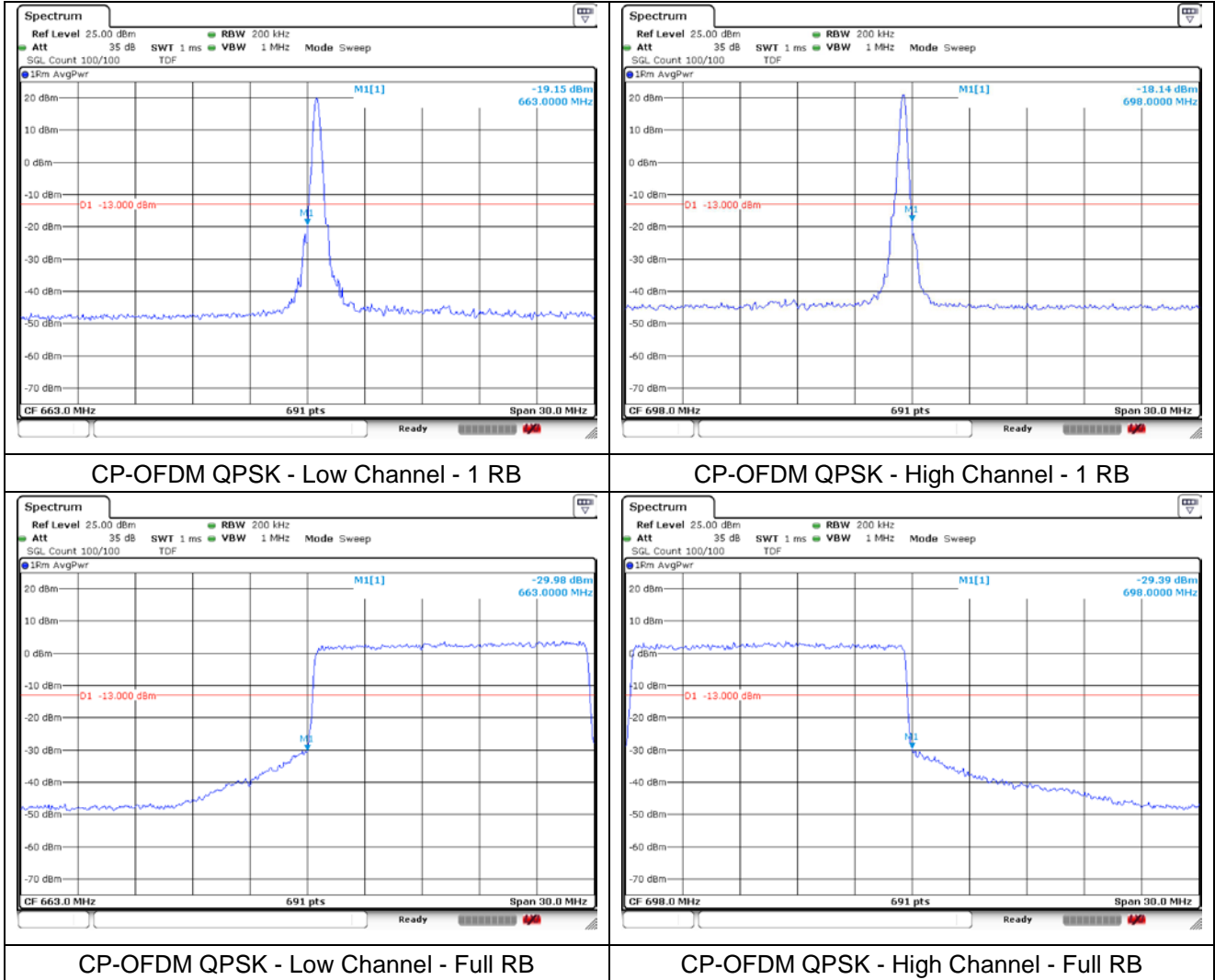
DFT-S-OFDM QPSK - High Channel - Full RB

**NR band 71 (15 MHz)**

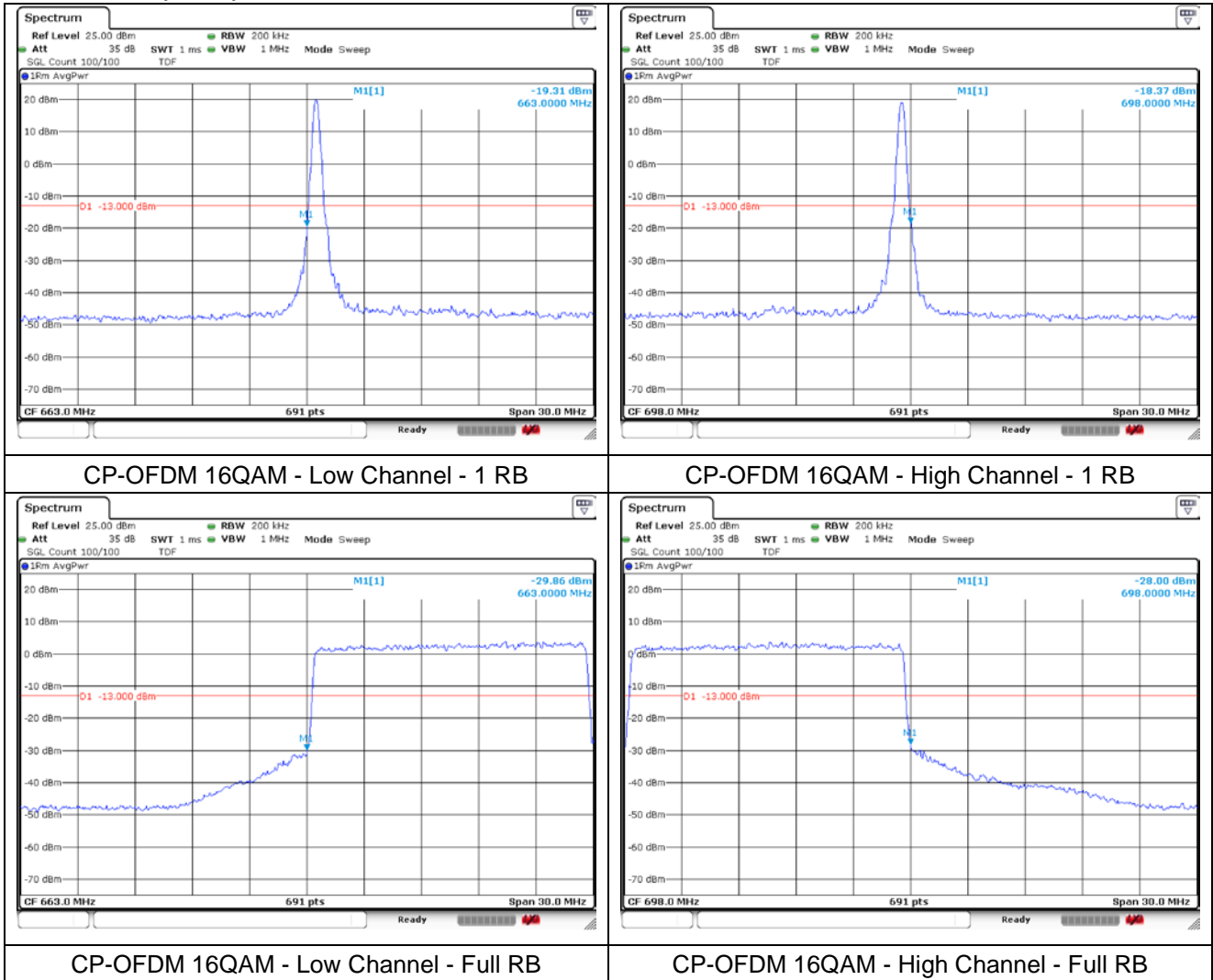




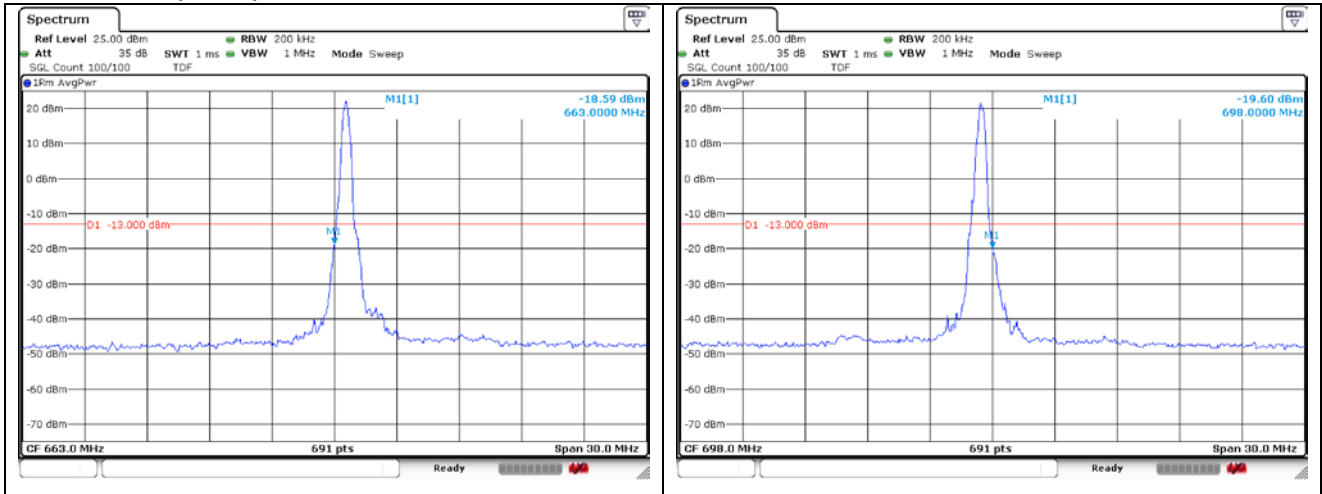
**NR band 71 (15 MHz)**



**NR band 71 (15 MHz)**

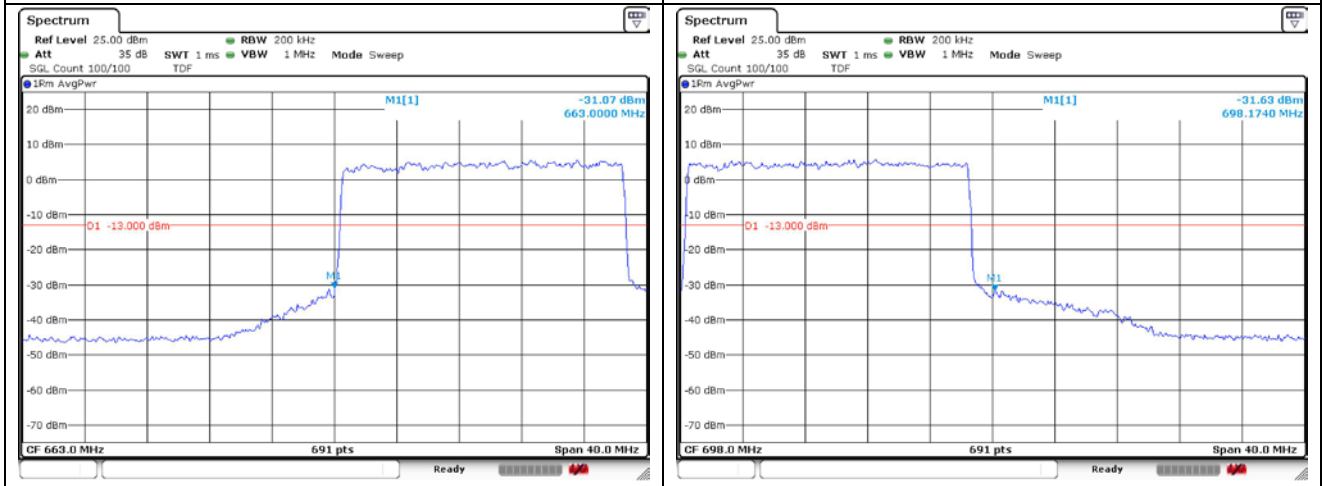


**NR band 71 (20 MHz)**



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

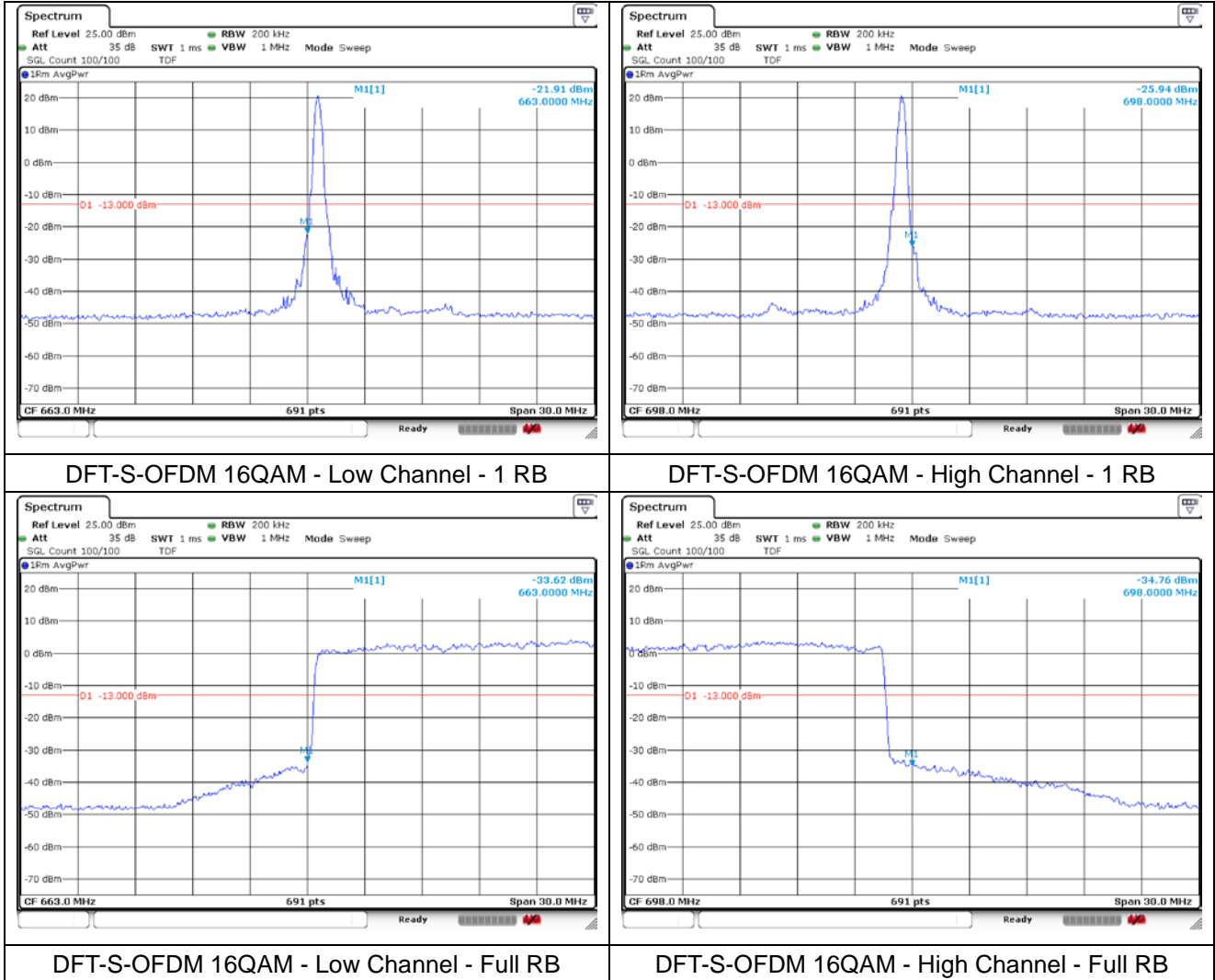
DFT-S-OFDM QPSK - High Channel - 1 RB



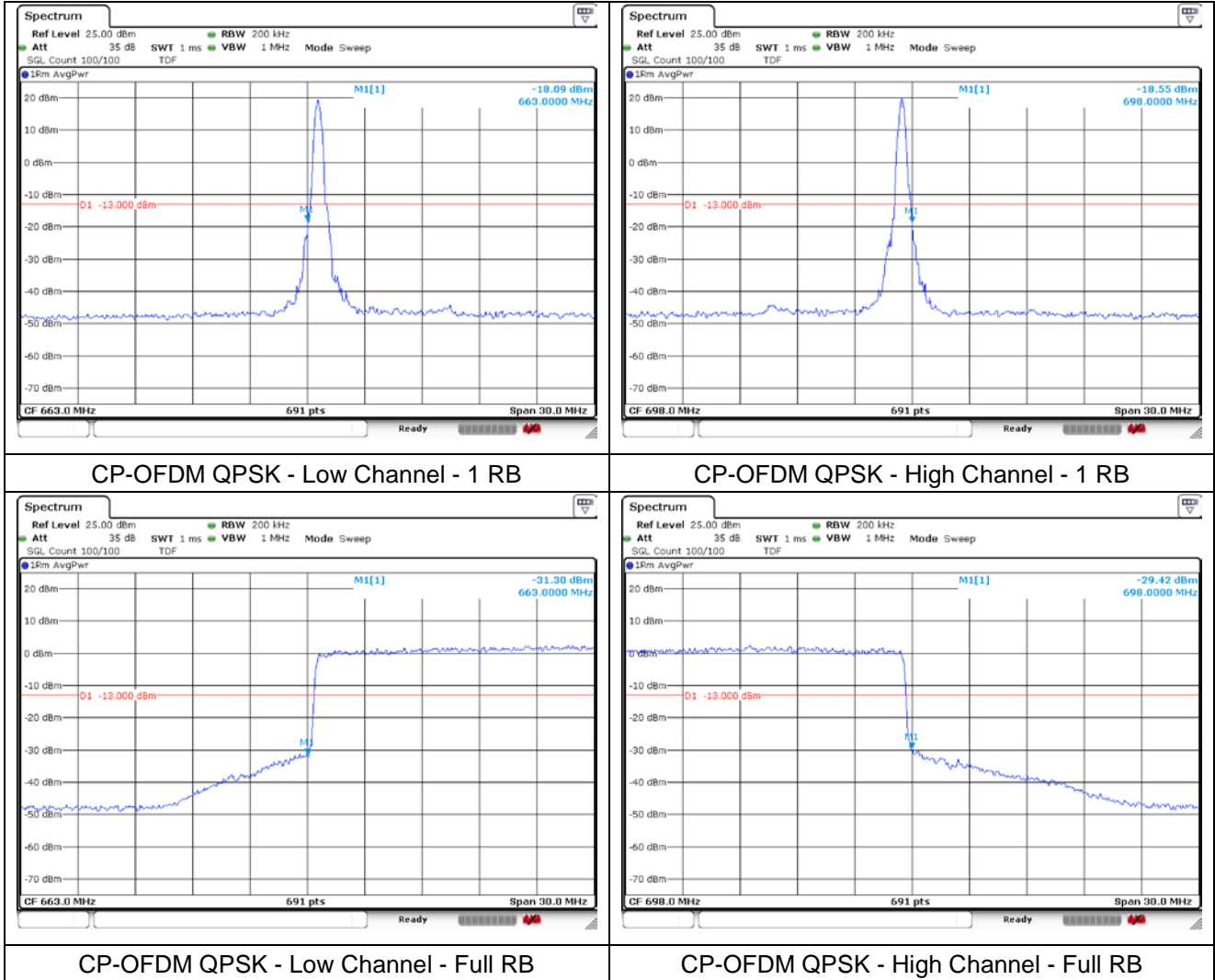
DFT-S-OFDM QPSK - Low Channel - Full RB

DFT-S-OFDM QPSK - High Channel - Full RB

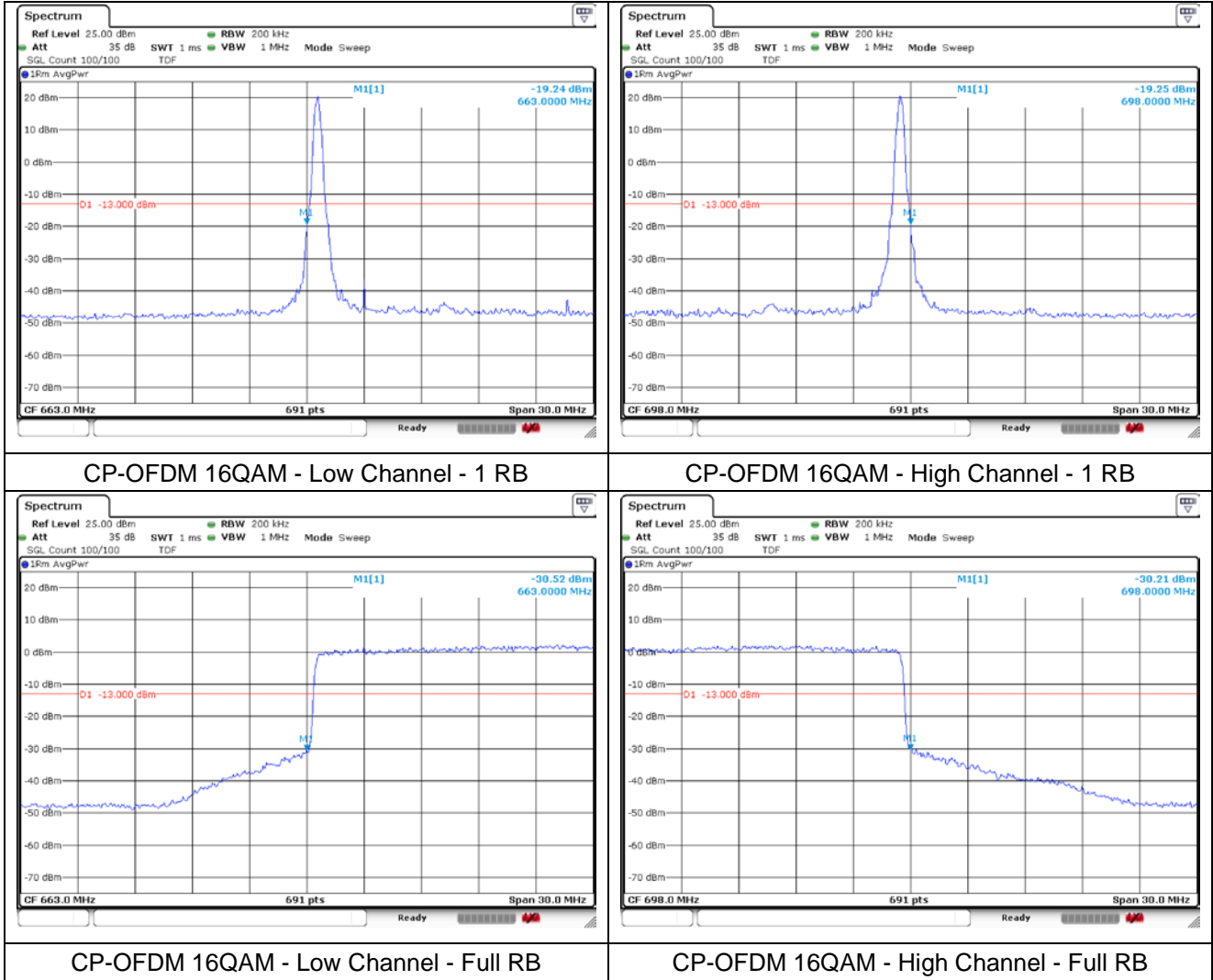
**NR band 71 (20 MHz)**



**NR band 71 (20 MHz)**



**NR 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.

- §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 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-140 Issue 1

4.2, the frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested at 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:

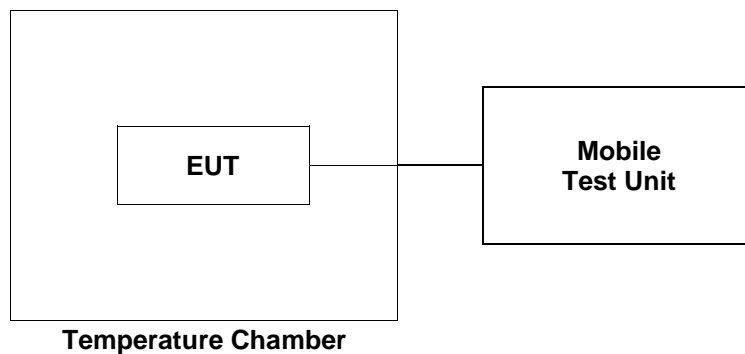
(a) the frequency offset shall be measured according to the procedure described in RSS-Gen and recorded.

(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.

#### NR band 7 at middle channel

Reference Frequency: 2 535 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	3.90	-19.50	-0.003 12
40		-20.40	-0.003 47
30		-17.70	-0.002 41
20(Ref.)		-11.60	-
10		-13.10	-0.000 59
0		-13.40	-0.000 71
-10		-15.80	-0.001 66
-20		-15.80	-0.001 66
-30		-19.40	-0.003 08
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.32 (85%)	-21.90	-0.004 06
	4.49 (115%)	-14.10	-0.000 99

**NR band 12 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	3.90	-8.20	0.000 71
40		-7.80	0.001 27
30		-8.30	0.000 57
20(Ref.)		-8.70	-
10		-6.60	0.002 97
0		-5.20	0.004 95
-10		-7.10	0.002 26
-20		-6.20	0.003 53
-30		-7.50	0.001 70
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.32 (85%)	-5.50	0.004 52
	4.49 (115%)	6.10	0.020 92

**NR 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	3.90	-7.10	0.001 53
40		-10.10	-0.002 30
30		-9.80	-0.001 92
20(Ref.)		-8.30	-
10		-9.70	-0.001 79
0		-10.10	-0.002 30
-10		-9.70	-0.001 79
-20		-7.20	0.001 41
-30		-7.70	0.000 77
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.32 (85%)	-7.80	0.000 64
	4.49 (115%)	-7.70	0.000 77

**NR band 14 at middle channel**

<b>Reference Frequency: 793 MHz</b>			
<b>Frequency Stability versus Temperature</b>			
<b>Environment Temperature (°C)</b>	<b>Power Supplied (V)</b>	<b>Frequency Measure with Time Elapse</b>	
		<b>Frequency Error (Hz)</b>	<b>ppm</b>
50	3.90	-4.40	0.001 13
40		-3.80	0.001 89
30		-4.10	0.001 51
20(Ref.)		-5.30	-
10		-5.50	-0.000 25
0		-4.50	0.001 01
-10		-4.20	0.001 39
-20		3.50	0.011 10
-30		6.70	0.015 13
<b>Frequency Stability versus Power Supply</b>			
<b>Environment Temperature (°C)</b>	<b>Power Supplied (V)</b>	<b>Frequency Measure with Time Elapse</b>	
		<b>Frequency Error (Hz)</b>	<b>ppm</b>
20	3.32 (85%)	-6.60	-0.001 64
	4.49 (115%)	-6.00	-0.000 88

**NR 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	3.90	-20.20	0.001 12
40		-18.30	0.002 12
30		-20.30	0.001 06
20(Ref.)		-22.30	-
10		-18.00	0.002 28
0		-17.20	0.002 71
-10		-15.10	0.003 82
-20		-17.90	0.002 34
-30		-18.10	0.002 23
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.32 (85%)	17.60	0.021 20
	4.49 (115%)	-21.30	0.000 53

**NR band 26/5\_Part22 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	3.90	-12.00	0.008 37
40		-13.60	0.006 46
30		-18.60	0.000 48
20(Ref.)		-19.00	-
10		-12.00	0.008 37
0		-12.50	0.007 77
-10		-9.90	0.010 88
-20		-8.50	0.012 55
-30		-11.40	0.009 09
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.32 (85%)	-10.60	0.010 04
	4.49 (115%)	-13.40	0.006 69

**NR band 26\_Part90 at middle channel**

Reference Frequency: 819 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	3.90	12.40	-0.002 81
40		11.40	-0.004 03
30		10.70	-0.004 88
20(Ref.)		14.70	-
10		12.50	-0.002 69
0		13.10	-0.001 95
-10		11.40	-0.004 03
-20		15.70	0.001 22
-30		14.10	-0.000 73
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.32 (85%)	12.50	-0.002 69
	4.49 (115%)	8.20	-0.007 94

**NR band 66 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	3.90	-11.70	0.000 52
40		-11.00	0.000 92
30		-12.30	0.000 17
20(Ref.)		-12.60	-
10		-12.20	0.000 23
0		-13.20	-0.000 34
-10		-12.80	-0.000 11
-20		-9.50	0.001 78
-30		-12.80	-0.000 11
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.32 (85%)	-11.20	0.000 80
	4.49 (115%)	-13.60	-0.000 57



**NR 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	3.90	-9.40	-0.001 91
40		-8.50	-0.000 59
30		-8.40	-0.000 44
20(Ref.)		-8.10	-
10		-7.80	0.000 44
0		-8.90	-0.001 18
-10		-9.30	-0.001 76
-20		-8.90	-0.001 18
-30		-9.70	-0.002 35
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.32 (85%)	-6.20	0.002 79
	4.49 (115%)	-7.70	0.000 59

**- End of the Test Report -**