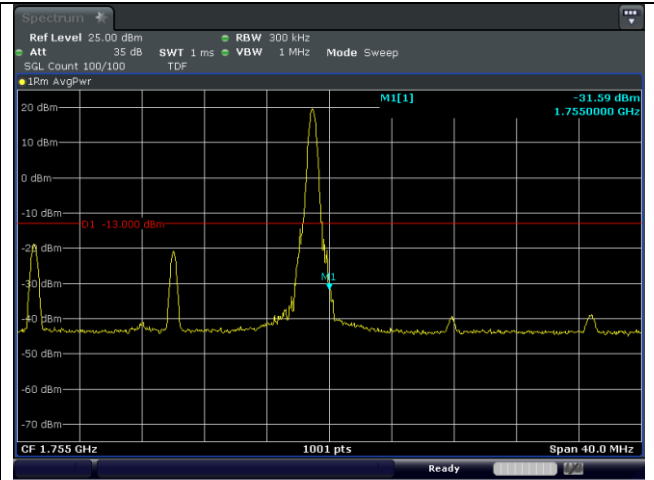
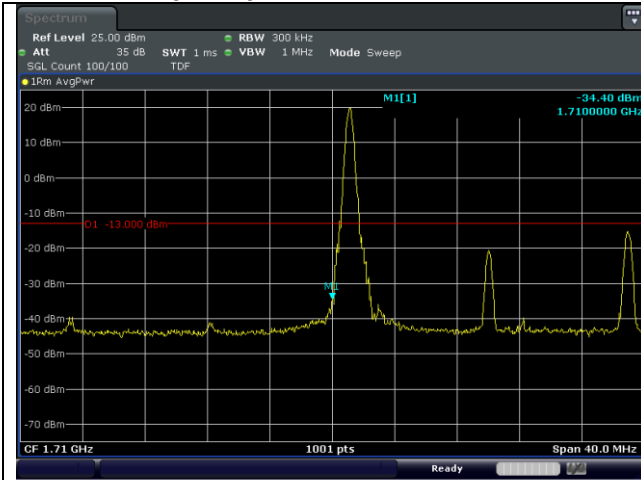
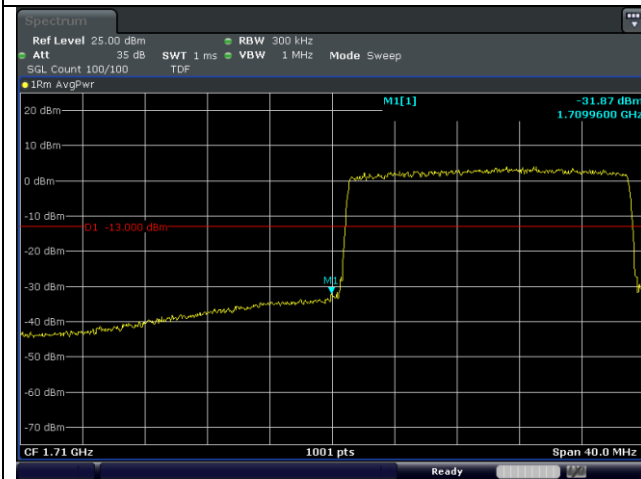


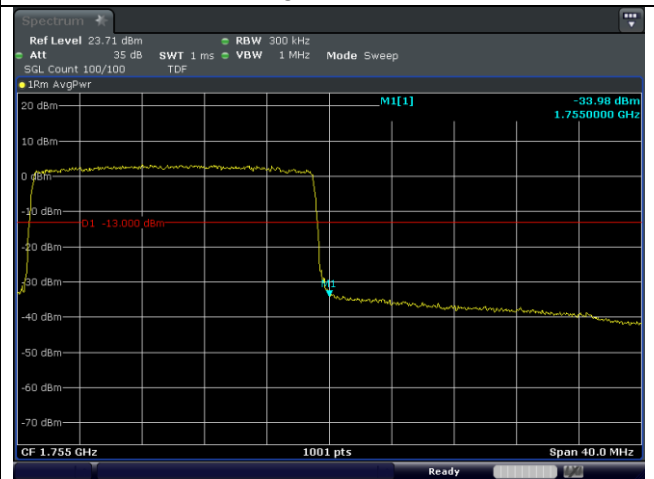
LTE band 4 (20 MHz)



16QAM Low Channel - 1 RB



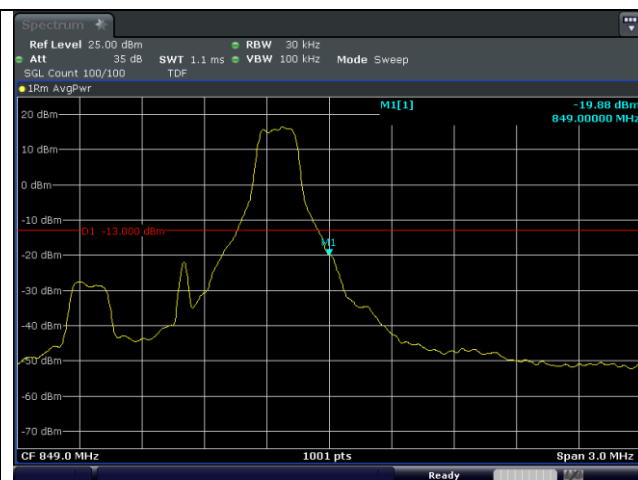
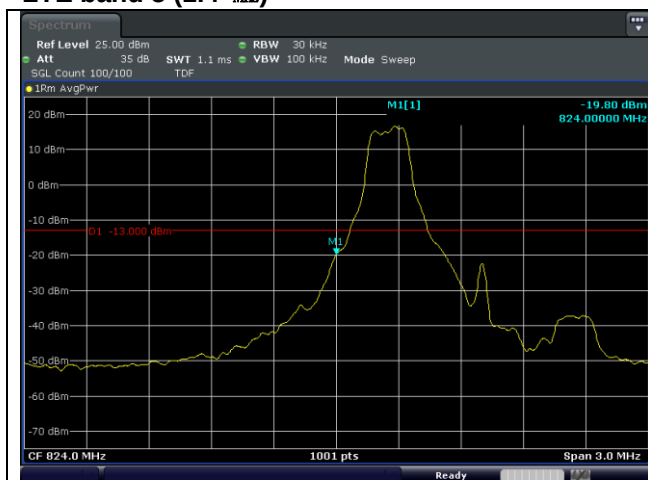
16QAM High Channel - 1 RB



16QAM Low Channel - Full RB

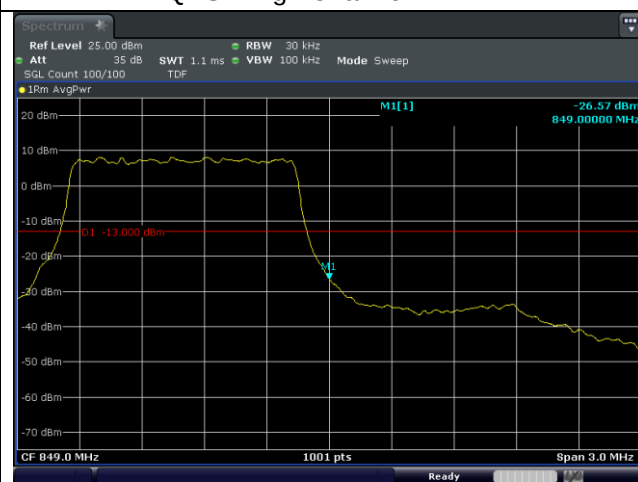
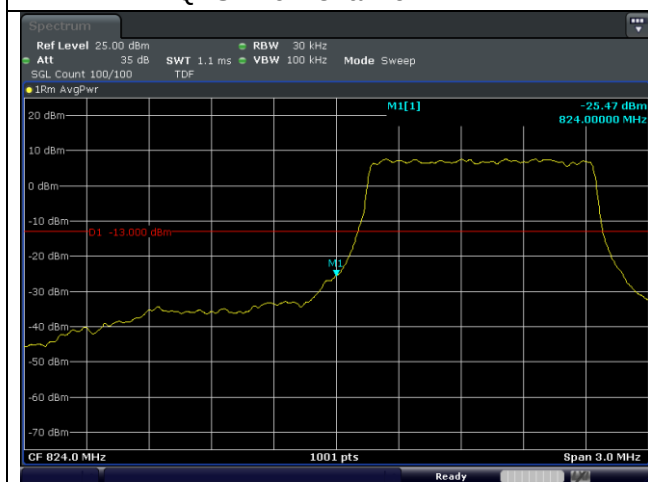
16QAM High Channel - Full RB

LTE band 5 (1.4 MHz)



QPSK Low Channel - 1 RB

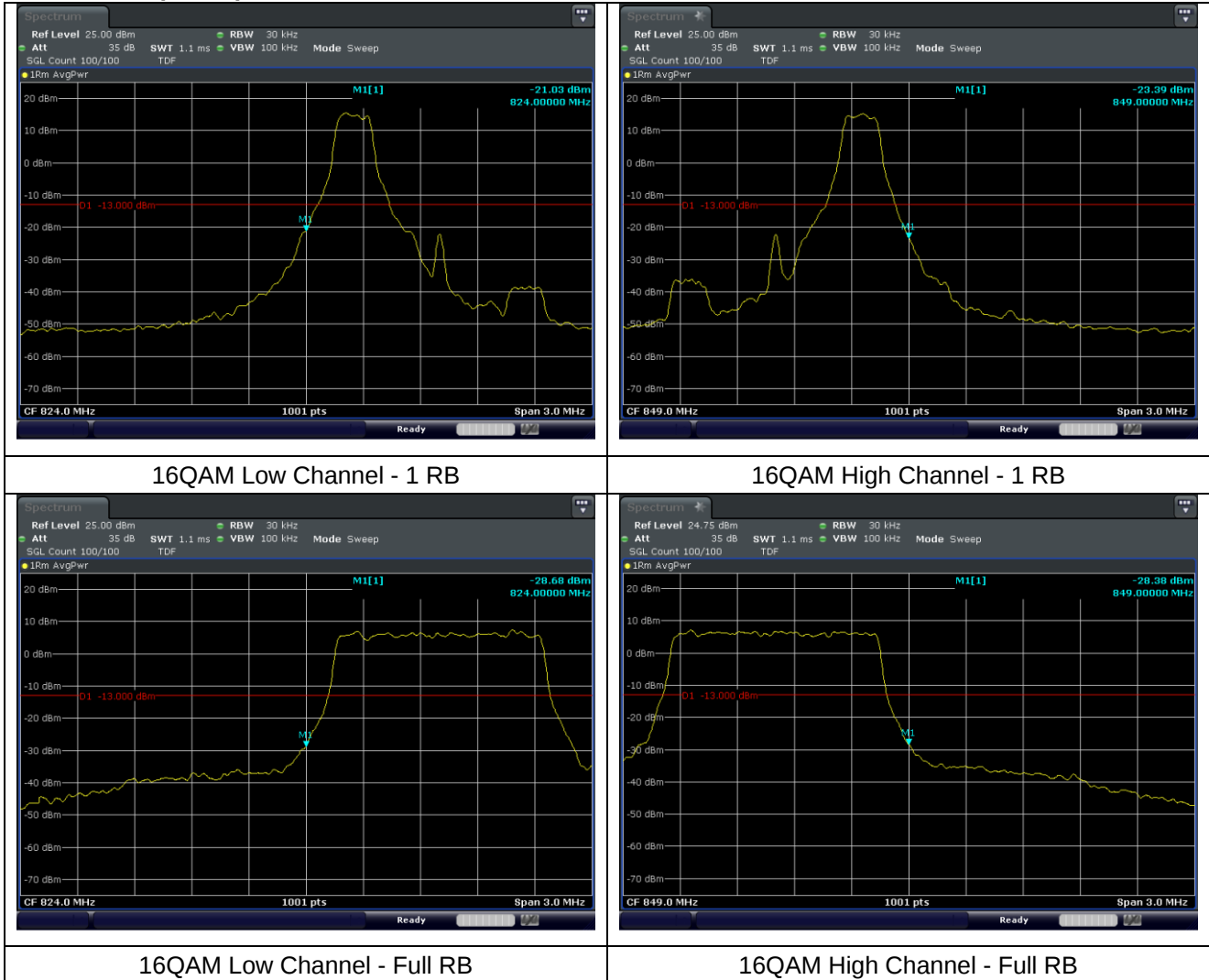
QPSK High Channel - 1 RB



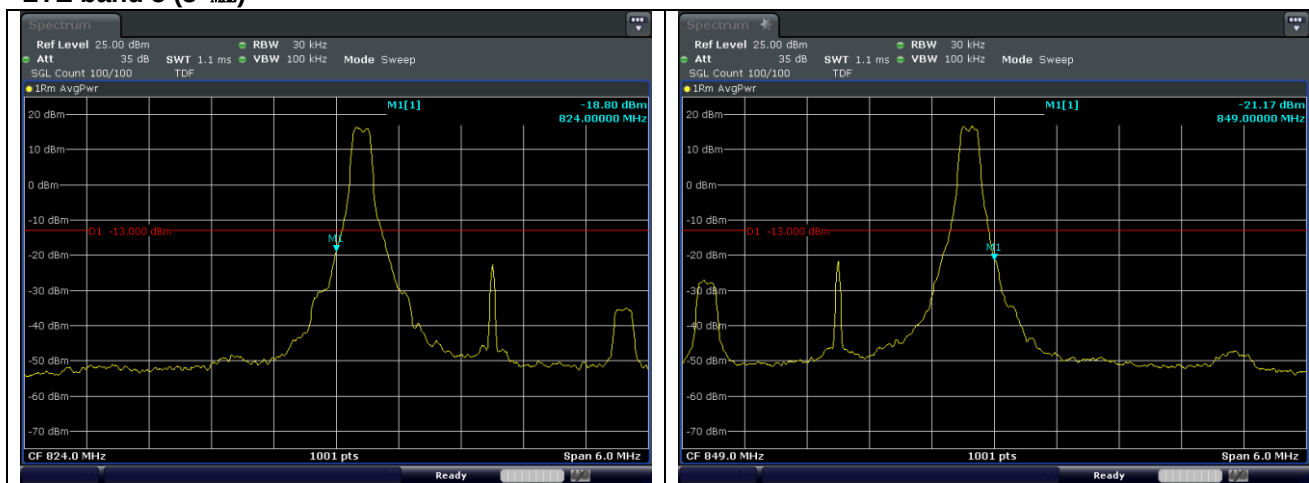
QPSK Low Channel - Full RB

QPSK High Channel - Full RB

LTE band 5 (1.4 MHz)

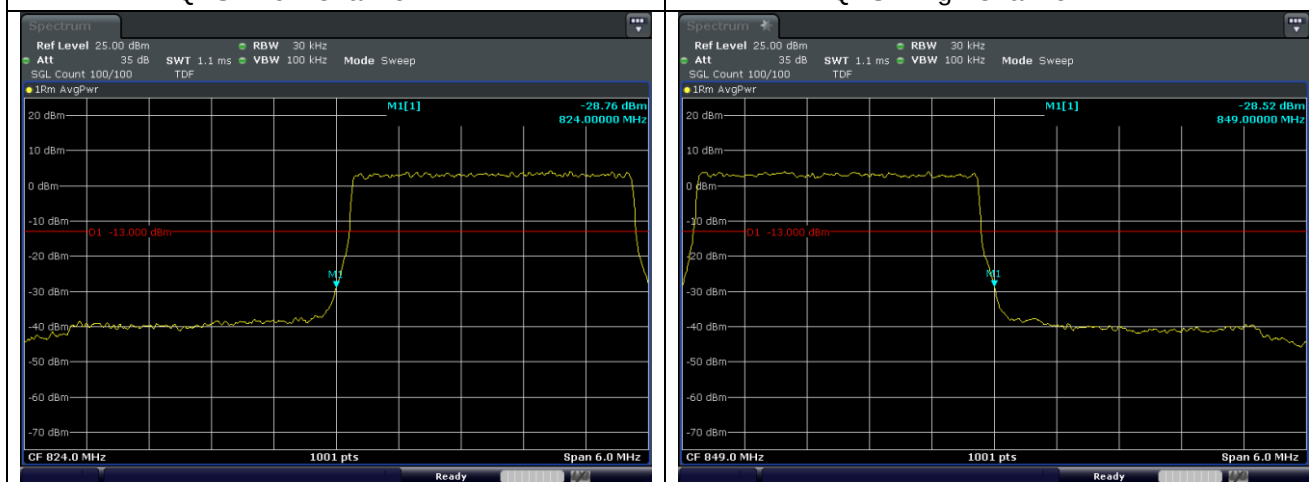


LTE band 5 (3 MHz)



QPSK Low Channel - 1 RB

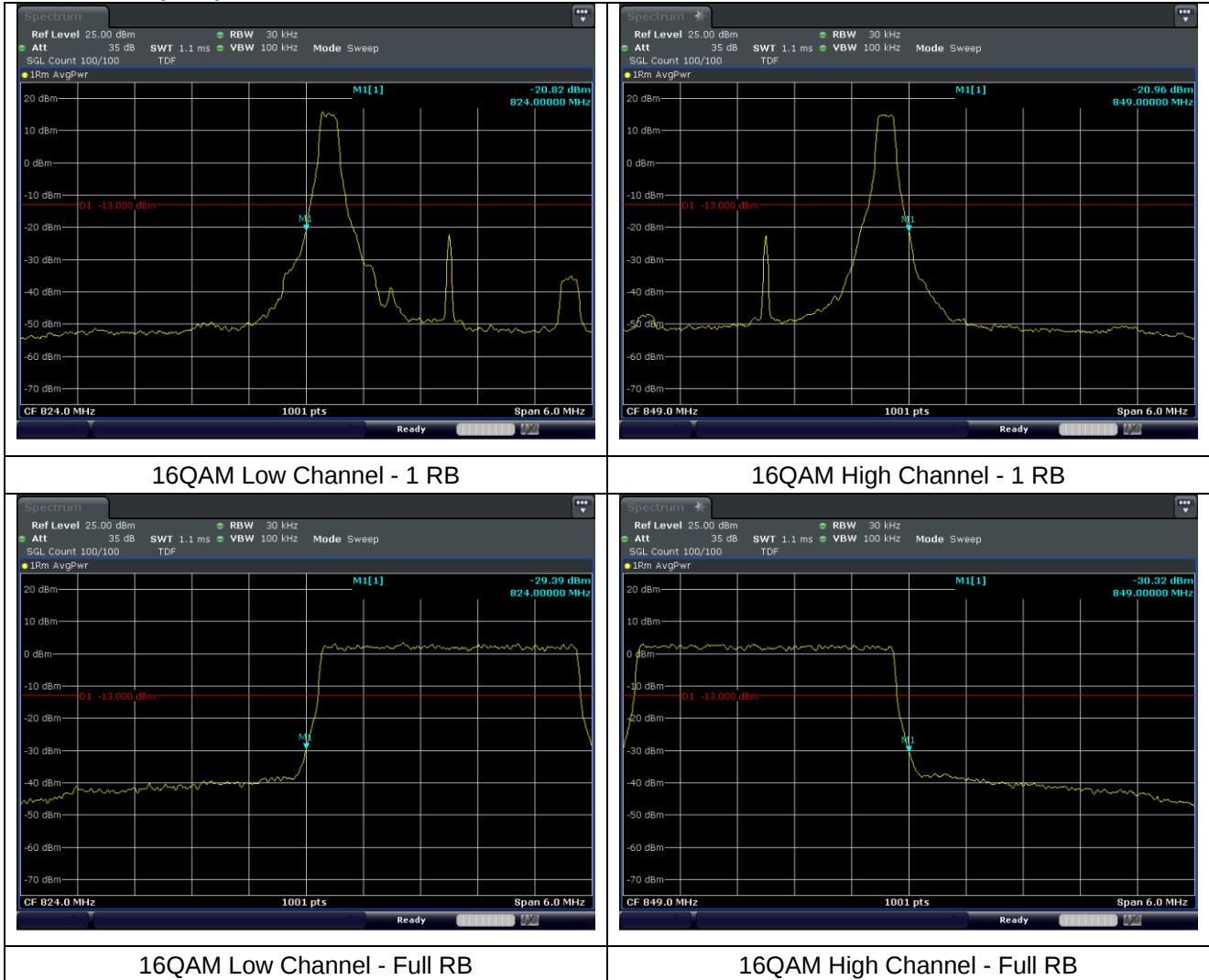
QPSK High Channel - 1 RB



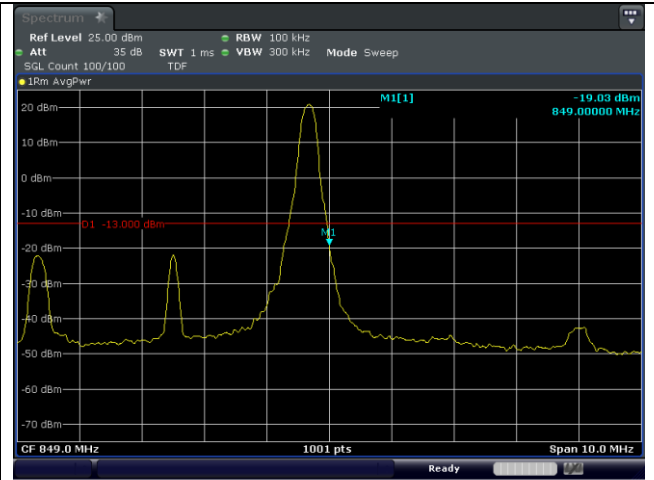
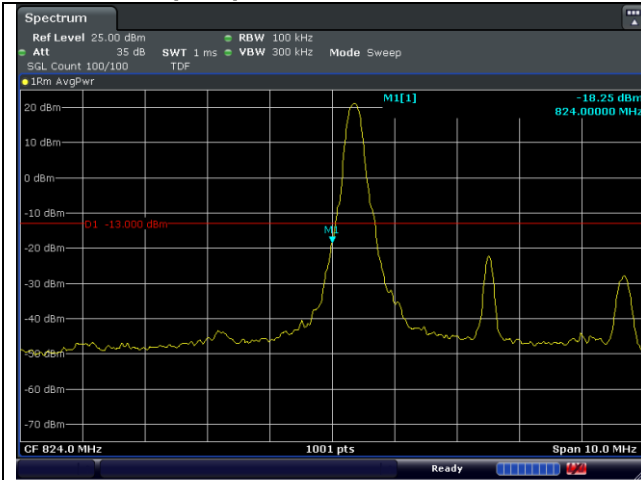
QPSK Low Channel - Full RB

QPSK High Channel - Full RB

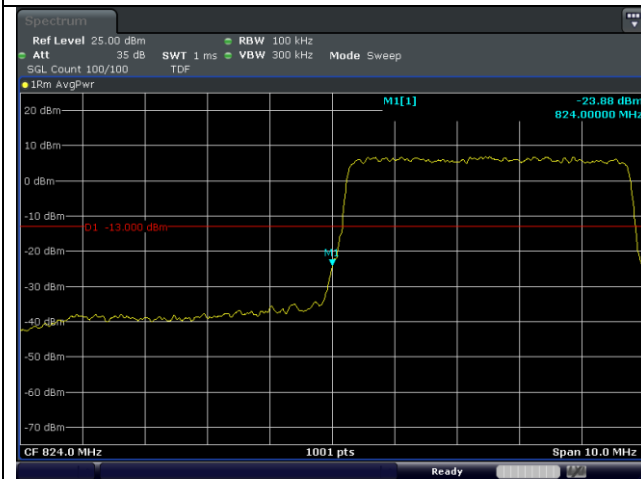
LTE band 5 (3 MHz)



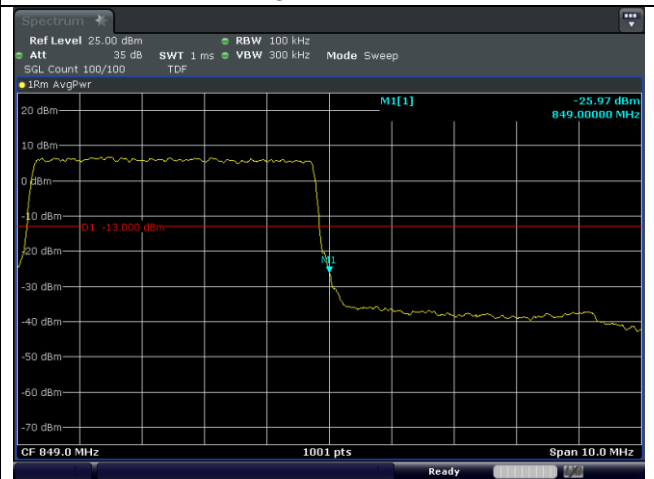
LTE band 5 (5 MHz)



QPSK Low Channel - 1 RB



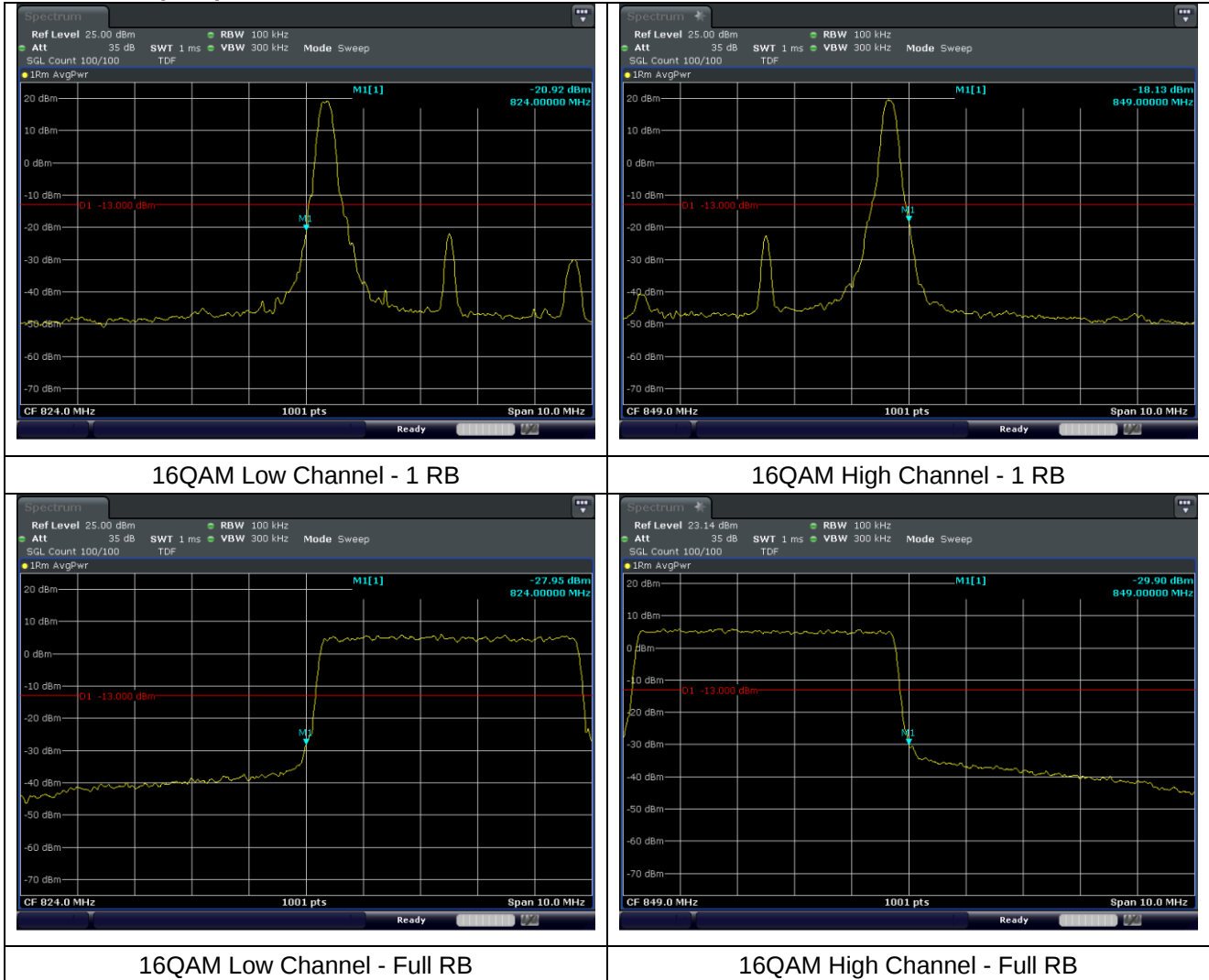
QPSK High Channel - 1 RB



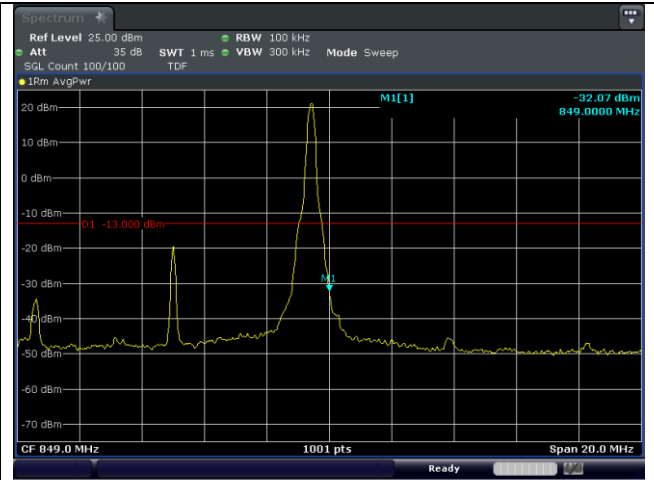
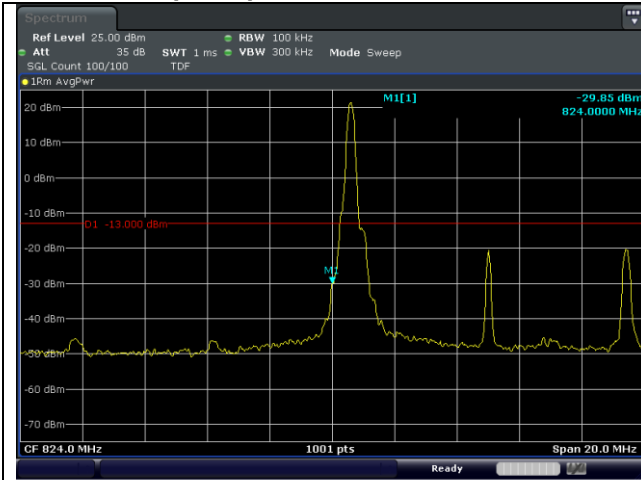
QPSK Low Channel - Full RB

QPSK High Channel - Full RB

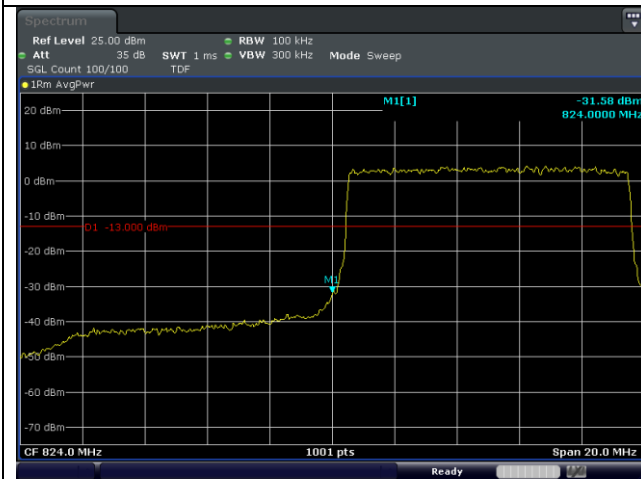
LTE band 5 (5 MHz)



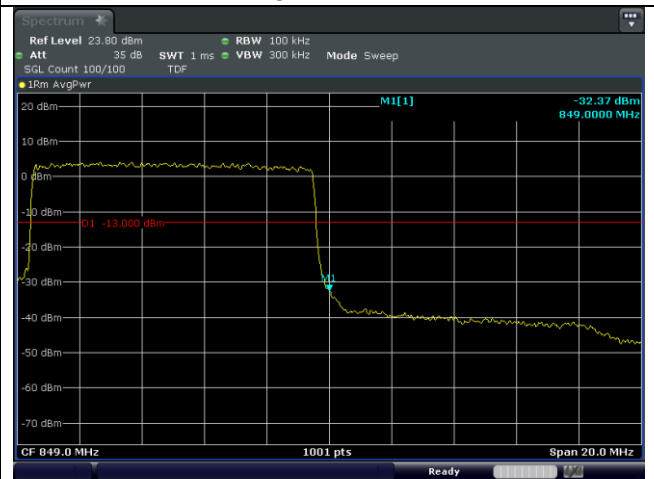
LTE band 5 (10 MHz)



QPSK Low Channel - 1 RB



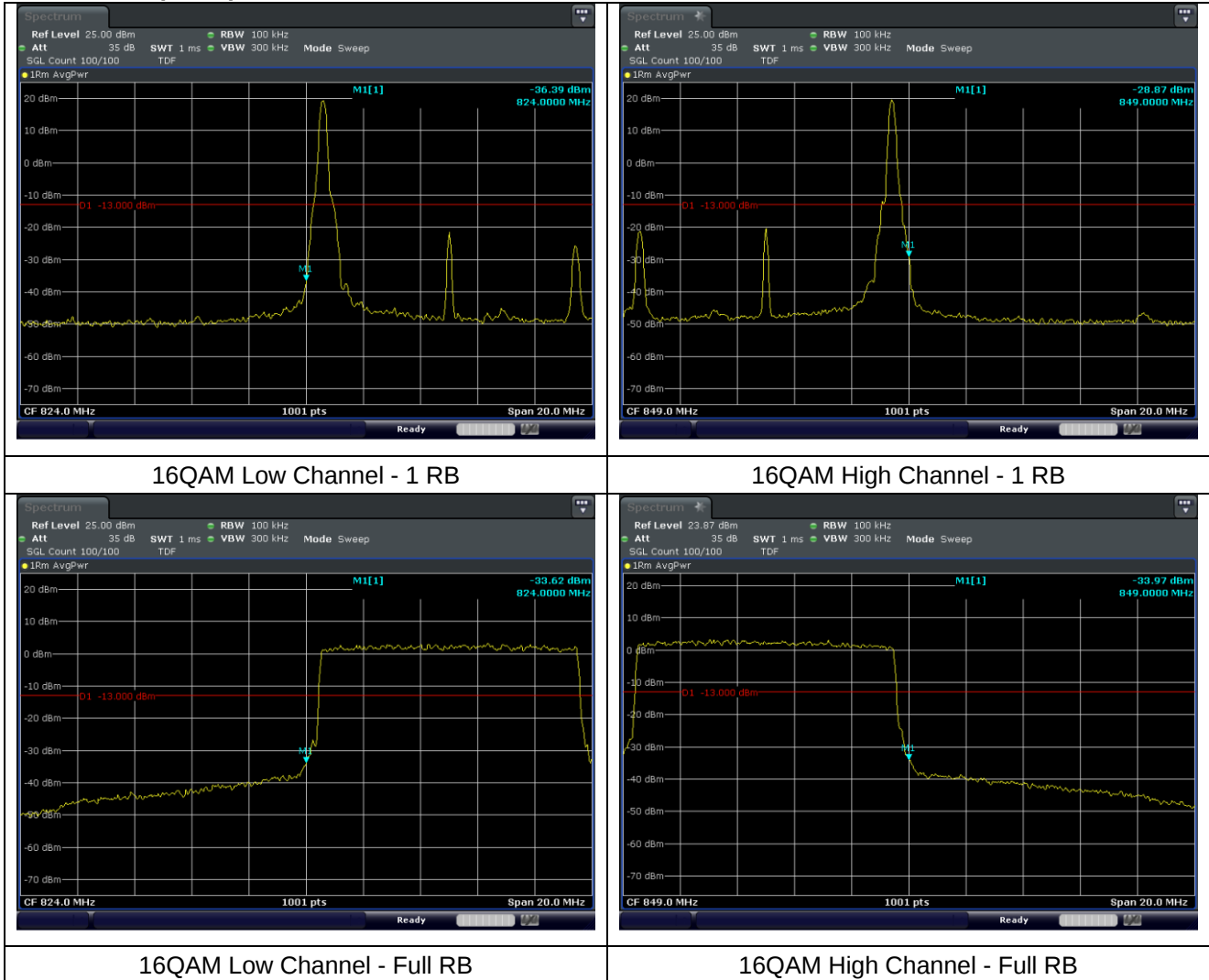
QPSK High Channel - 1 RB



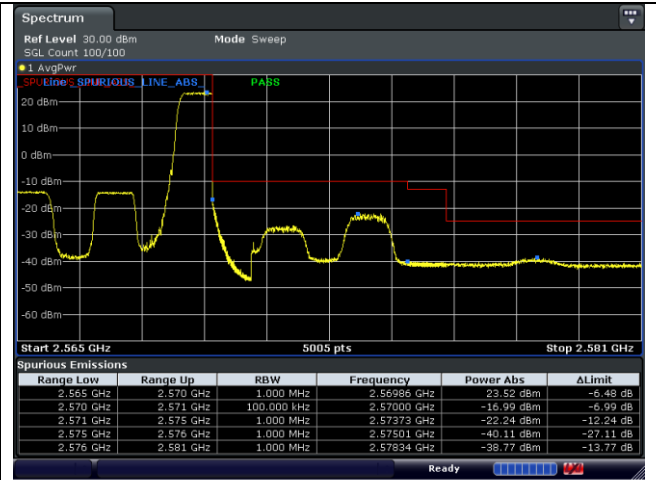
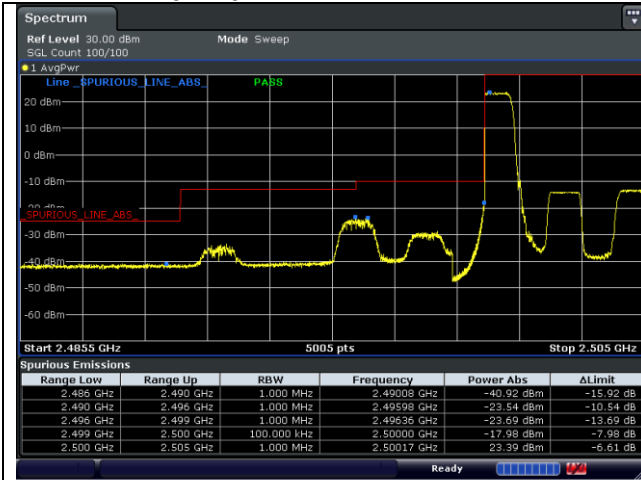
QPSK Low Channel - Full RB

QPSK High Channel - Full RB

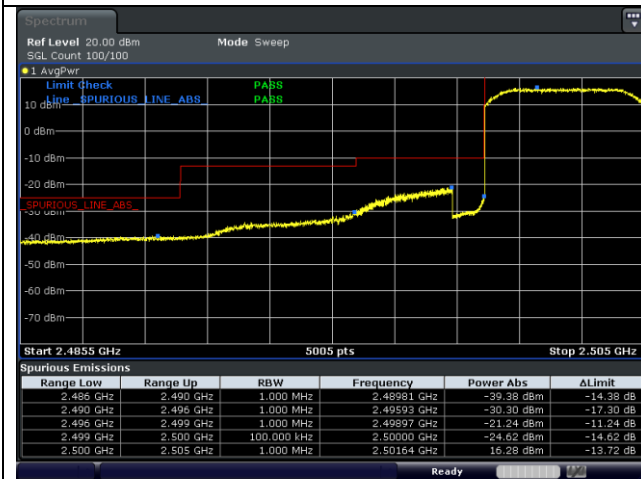
LTE band 5 (10 MHz)



LTE band 7 (5 MHz)



QPSK Low Channel - 1 RB



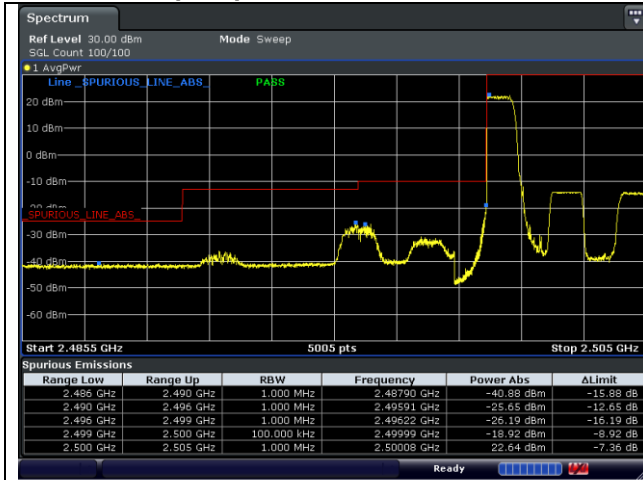
QPSK High Channel - 1 RB



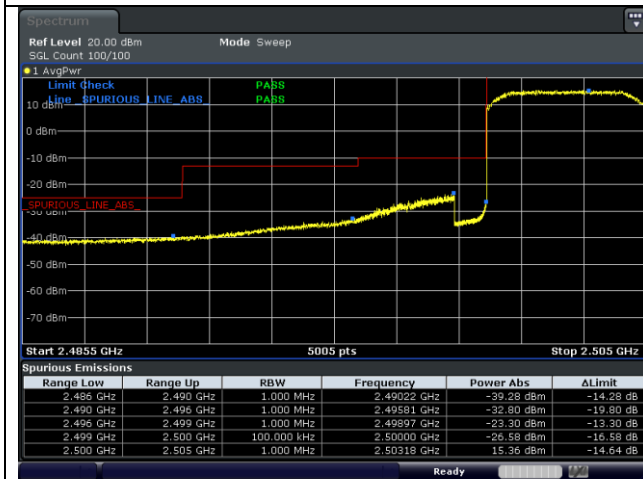
QPSK Low Channel - Full RB

QPSK High Channel - Full RB

LTE band 7 (5 MHz)



16QAM Low Channel - 1 RB



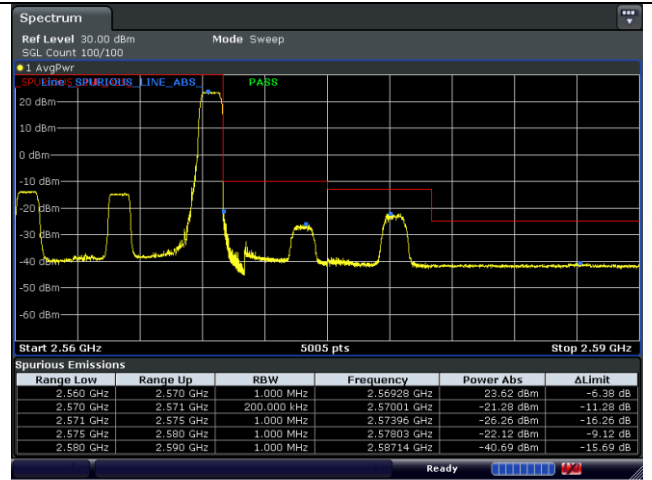
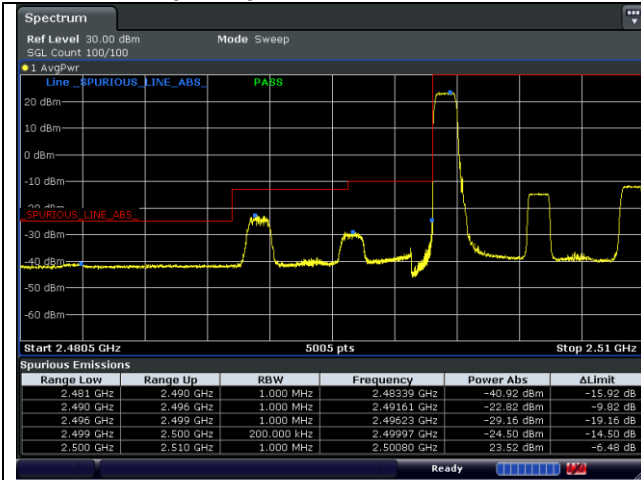
16QAM High Channel - 1 RB



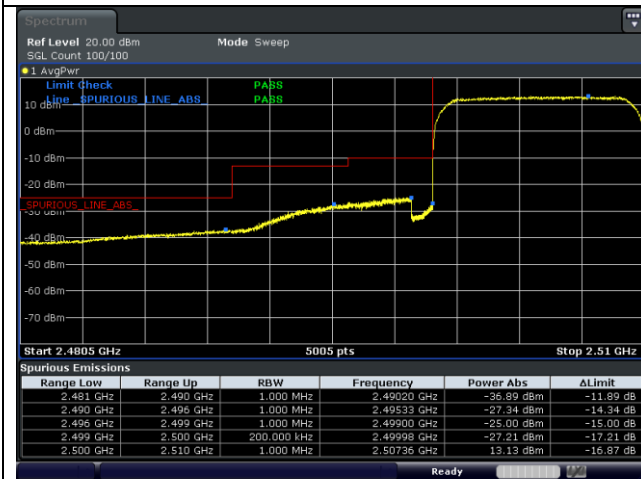
16QAM Low Channel - Full RB

16QAM High Channel - Full RB

LTE band 7 (10 MHz)



QPSK Low Channel - 1 RB



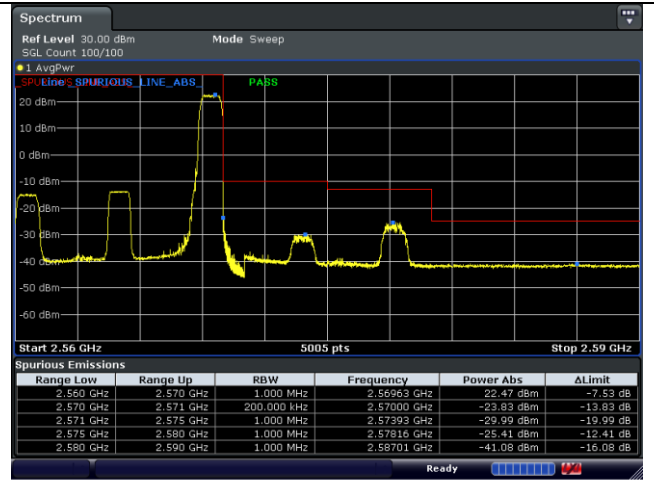
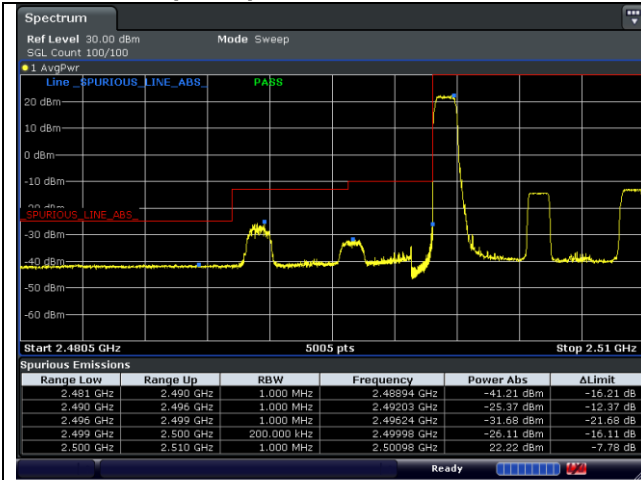
QPSK High Channel - 1 RB



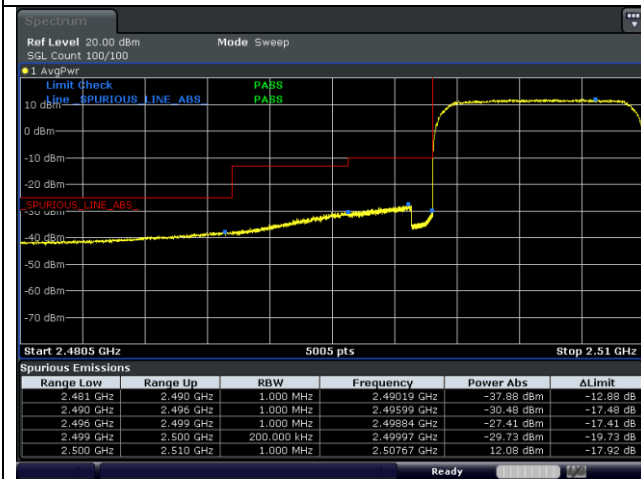
QPSK Low Channel - Full RB

QPSK High Channel - Full RB

LTE band 7 (10 MHz)



16QAM Low Channel - 1 RB



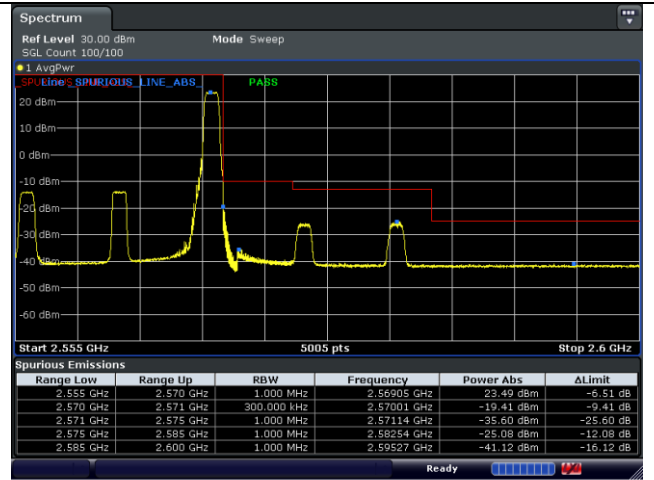
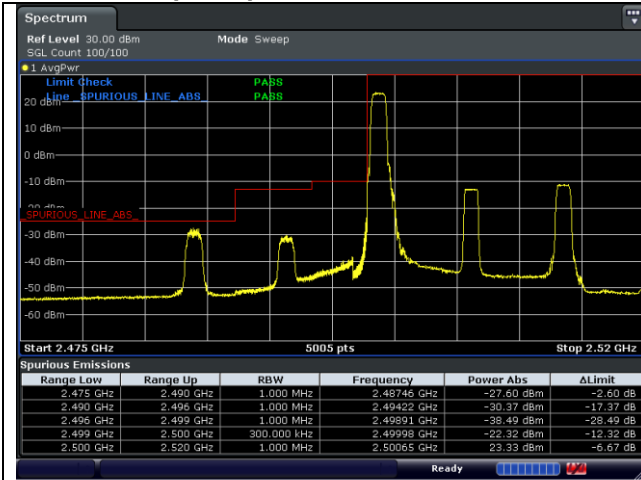
16QAM High Channel - 1 RB



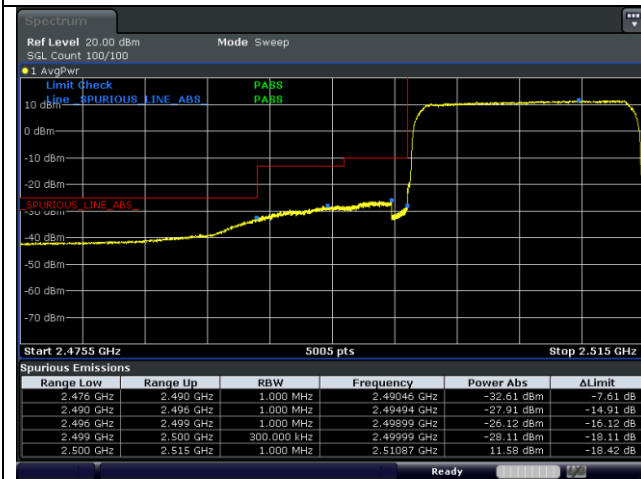
16QAM Low Channel - Full RB

16QAM High Channel - Full RB

LTE band 7 (15 MHz)



QPSK Low Channel - 1 RB



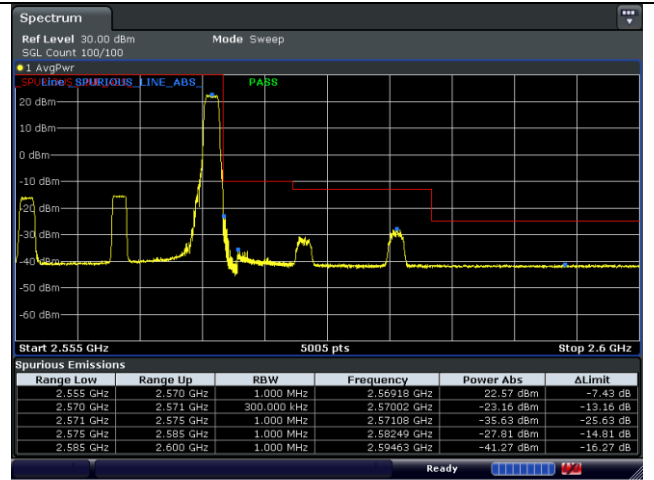
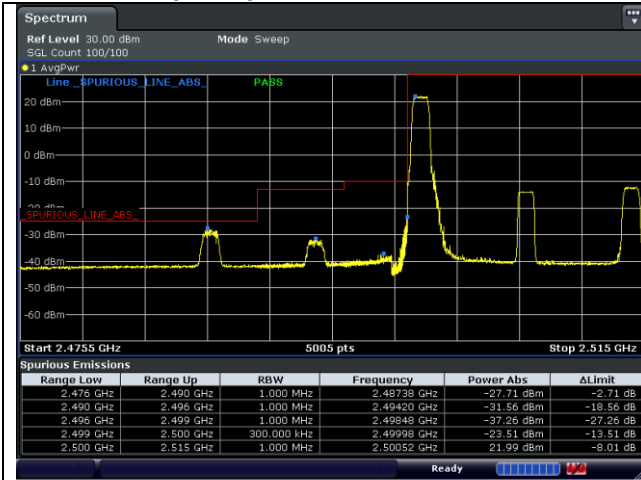
QPSK High Channel - 1 RB



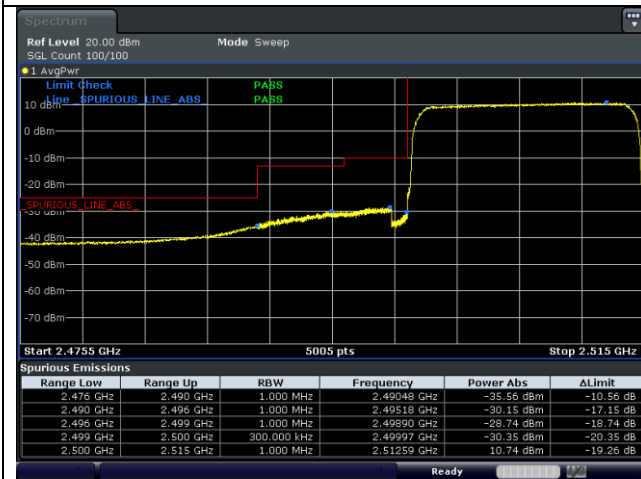
QPSK Low Channel - Full RB

QPSK High Channel - Full RB

LTE band 7 (15 MHz)



16QAM Low Channel - 1 RB



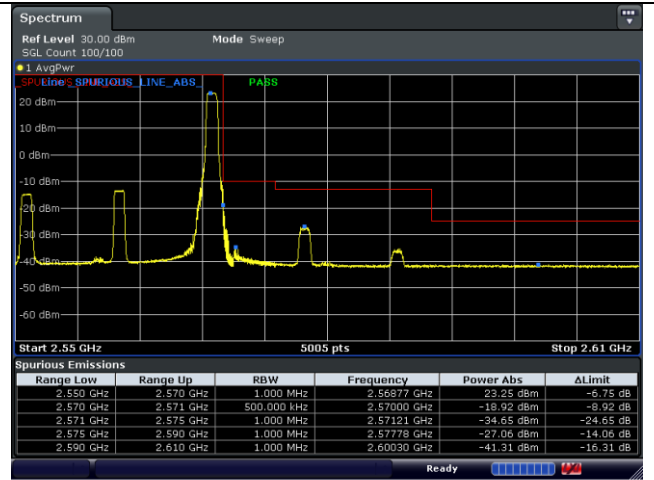
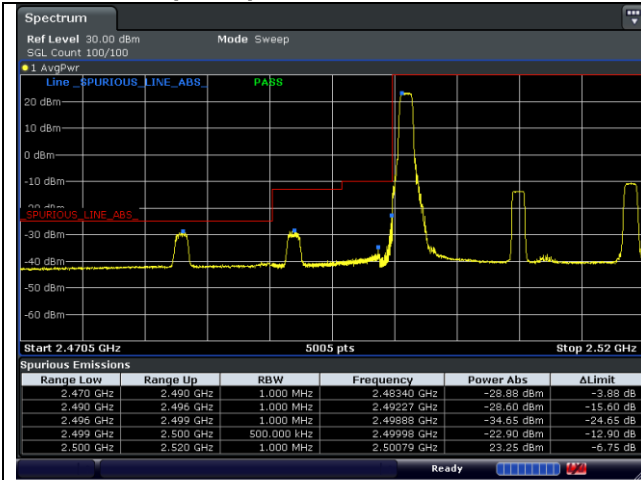
16QAM High Channel - 1 RB



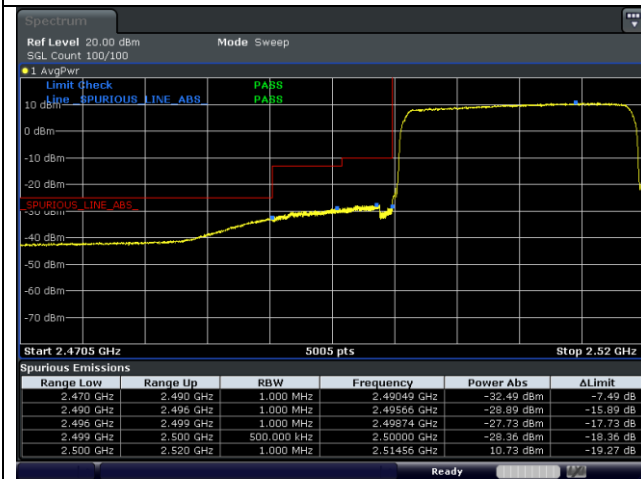
16QAM Low Channel - Full RB

16QAM High Channel - Full RB

LTE band 7 (20 MHz)



QPSK Low Channel - 1 RB



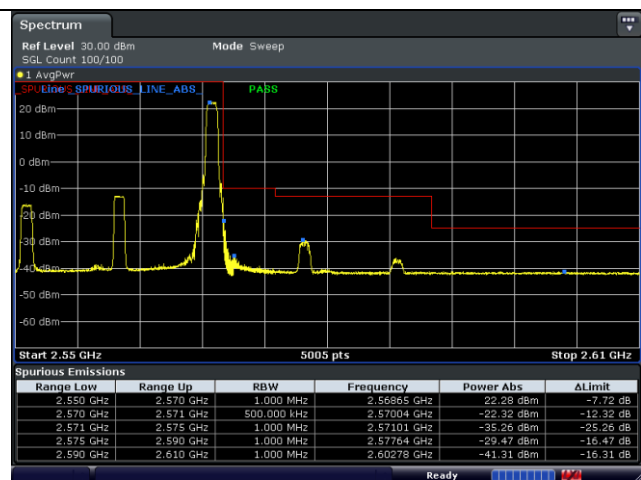
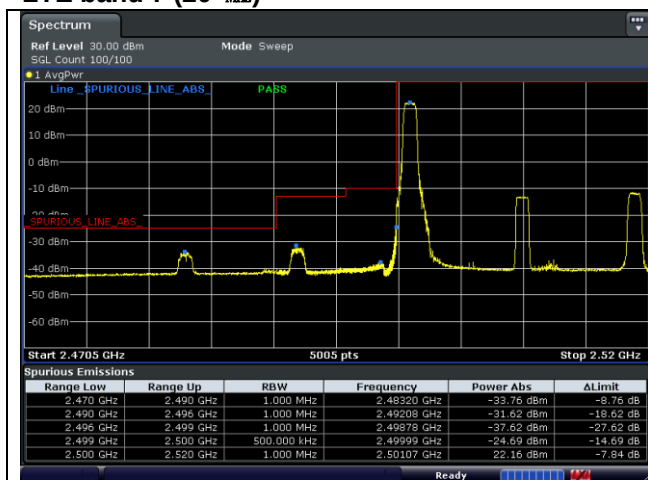
QPSK High Channel - 1 RB



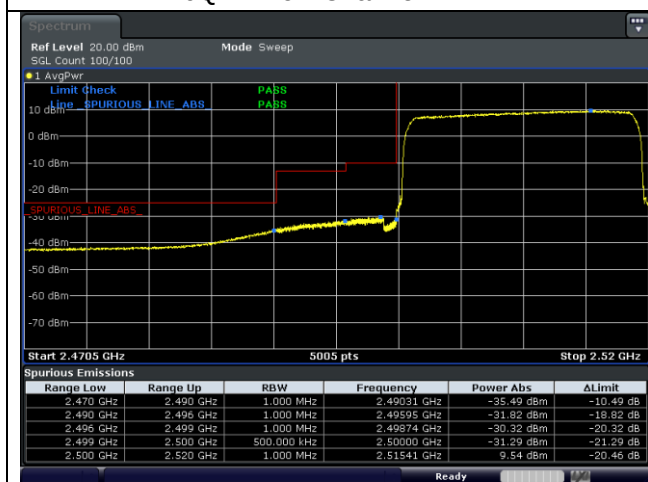
QPSK Low Channel - Full RB

QPSK High Channel - Full RB

LTE band 7 (20 MHz)



16QAM Low Channel - 1 RB



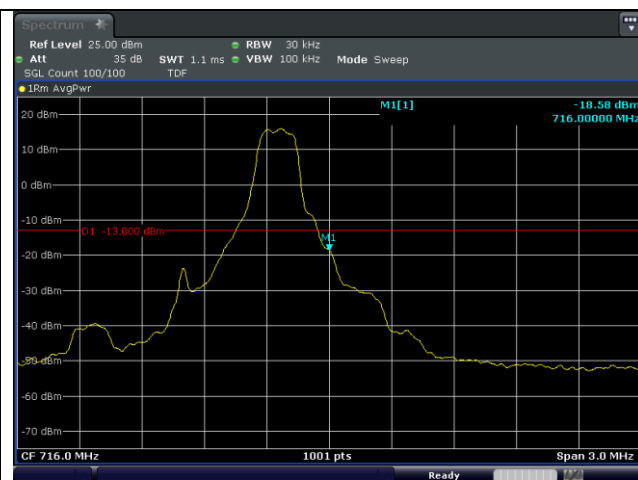
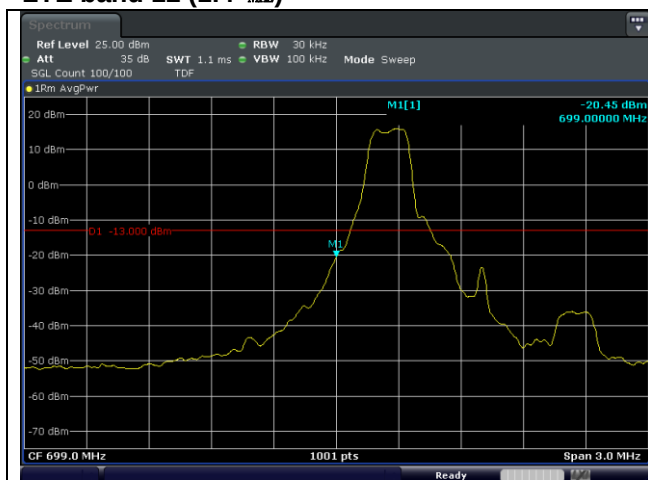
16QAM High Channel - 1 RB



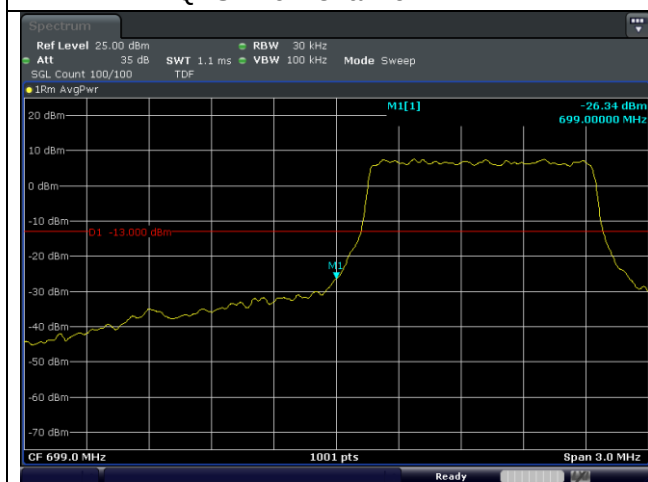
16QAM Low Channel - Full RB

16QAM High Channel - Full RB

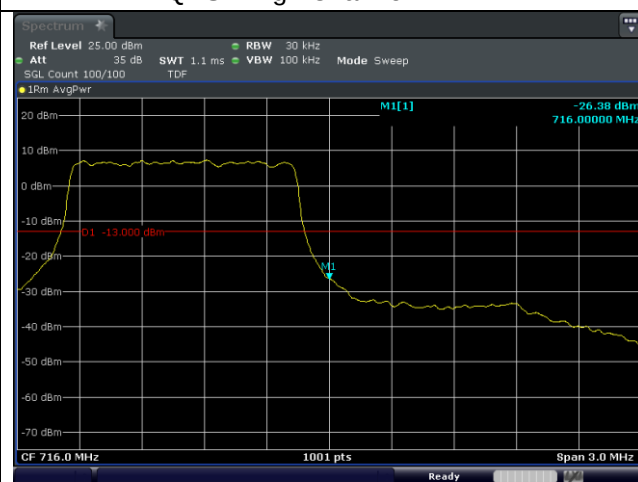
LTE band 12 (1.4 MHz)



QPSK Low Channel - 1 RB



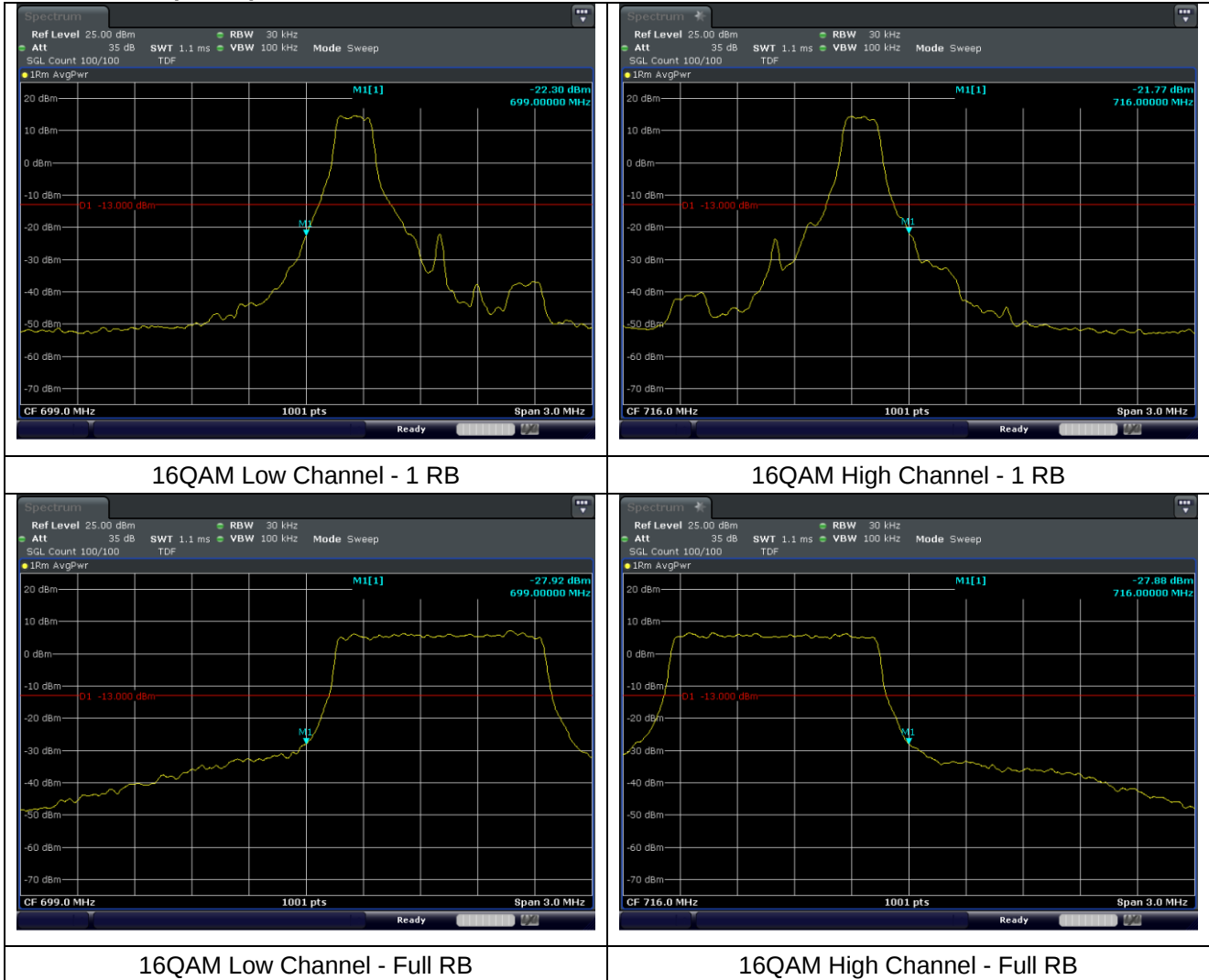
QPSK High Channel - 1 RB



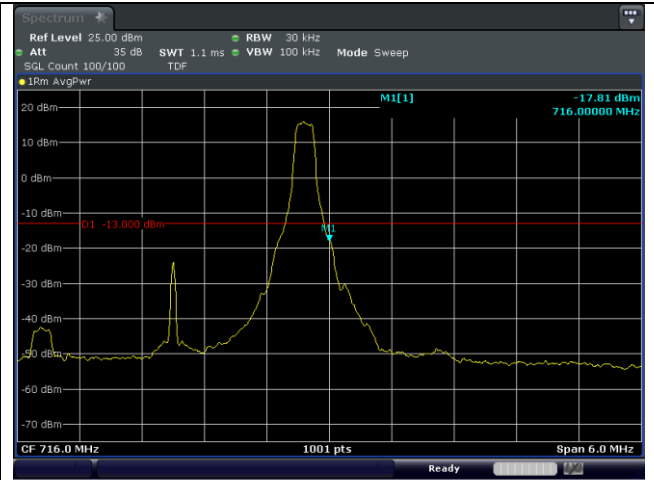
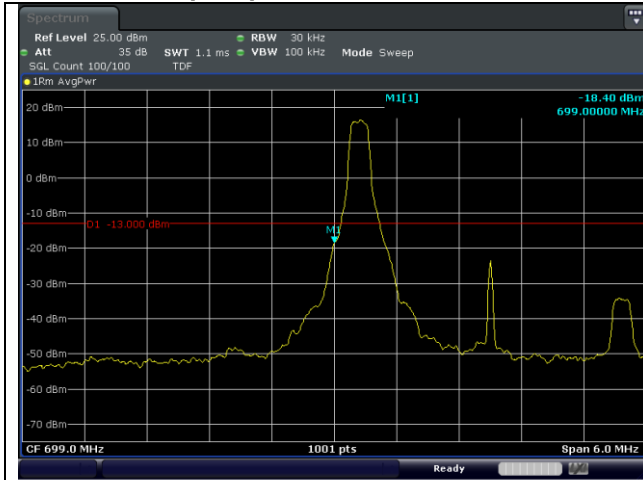
QPSK Low Channel - Full RB

QPSK High Channel - Full RB

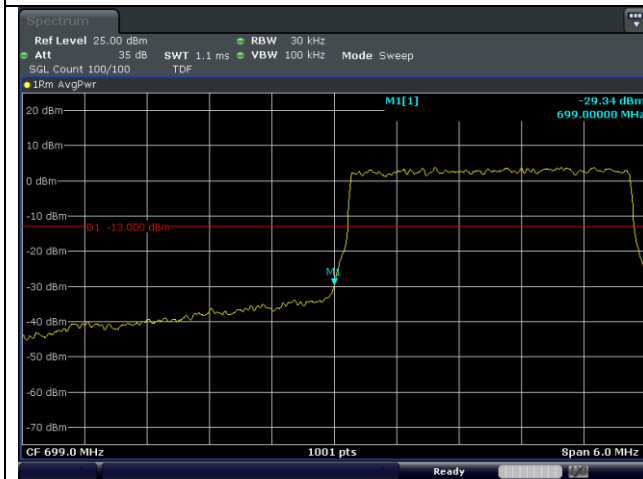
LTE band 12 (1.4 MHz)



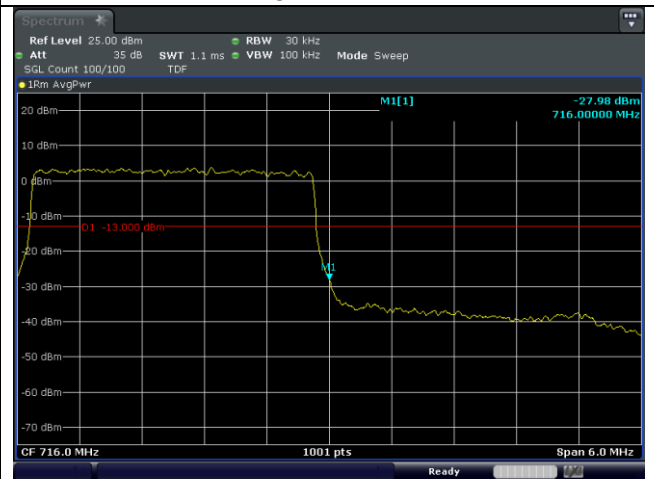
LTE band 12 (3 MHz)



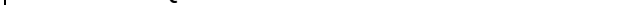
QPSK Low Channel - 1 RB



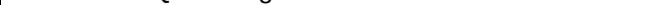
QPSK High Channel - 1 RB



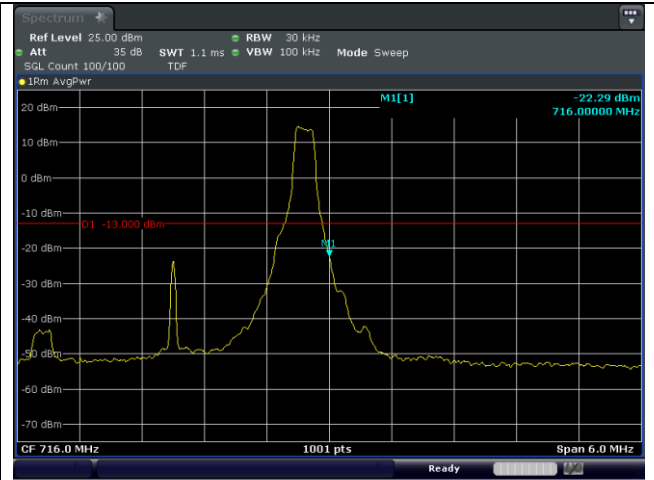
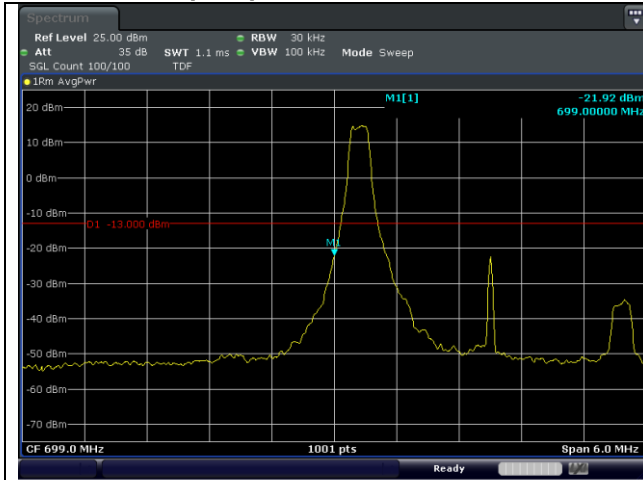
QPSK Low Channel - Full RB



QPSK High Channel - Full RB

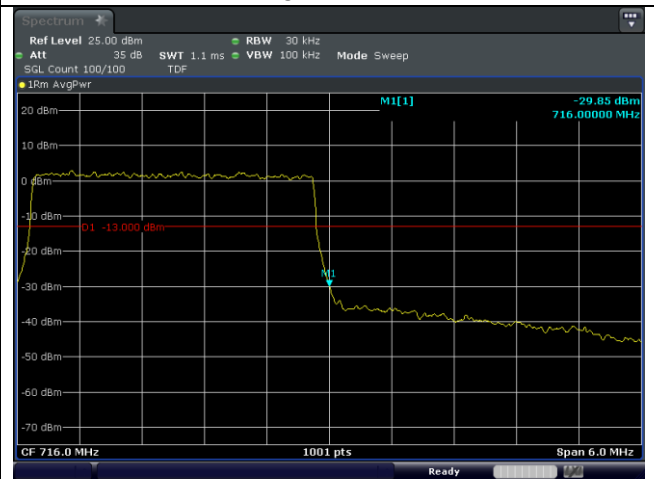
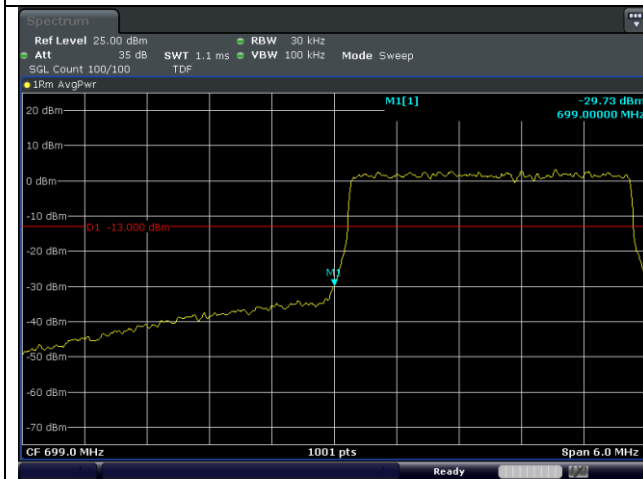


LTE band 12 (3 MHz)



16QAM Low Channel - 1 RB

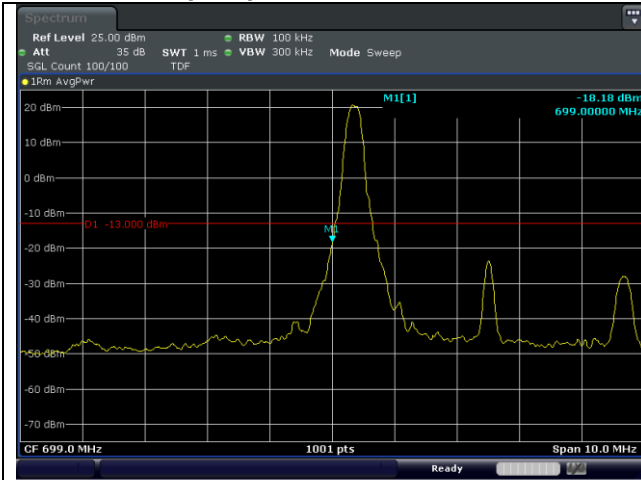
16QAM High Channel - 1 RB



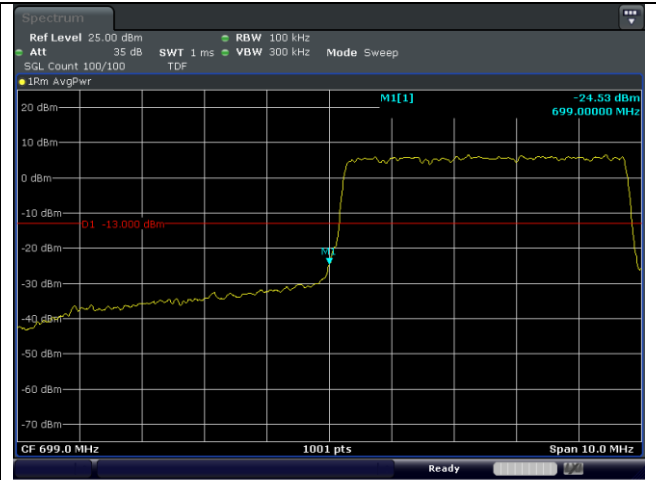
16QAM Low Channel - Full RB

16QAM High Channel - Full RB

LTE band 12 (5 MHz)

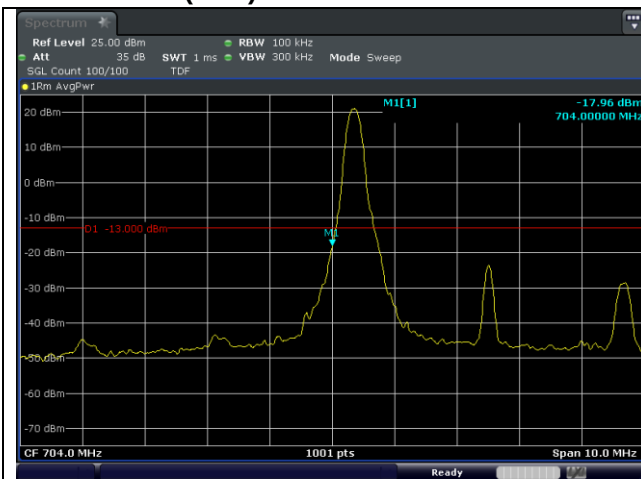


QPSK Low Channel - 1 RB

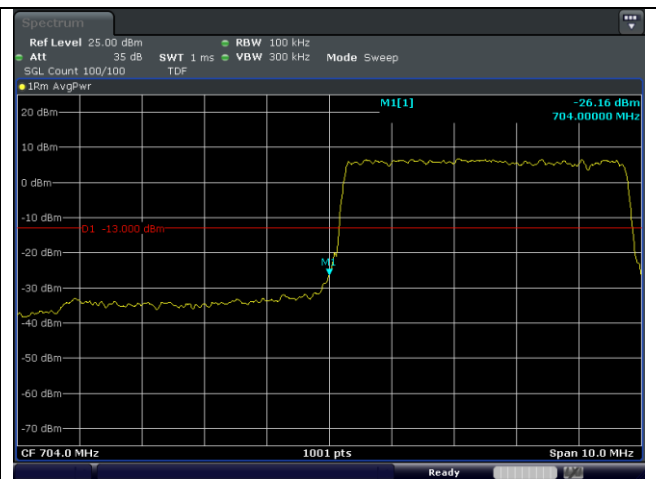


QPSK Low Channel - Full RB

LTE band 17 (5 MHz)

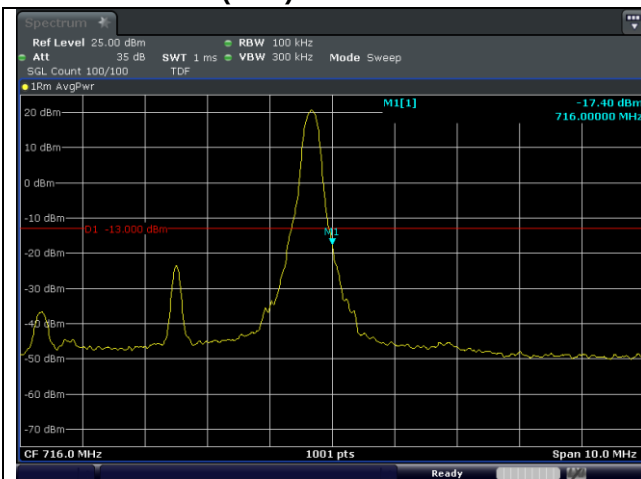


QPSK Low Channel - 1 RB

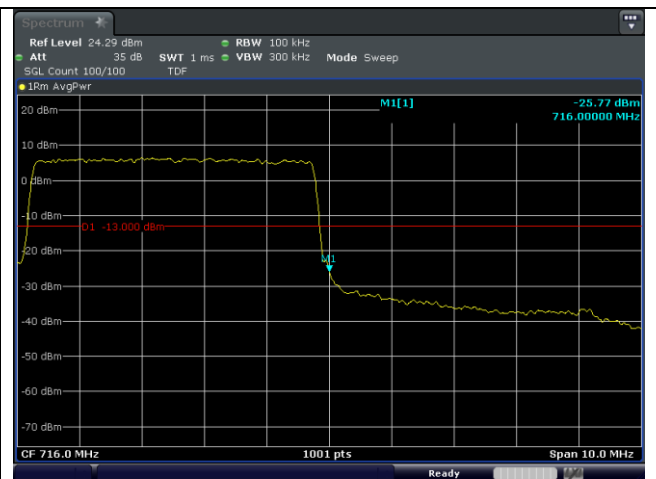


QPSK Low Channel - Full RB

LTE band 12/17 (5 MHz)

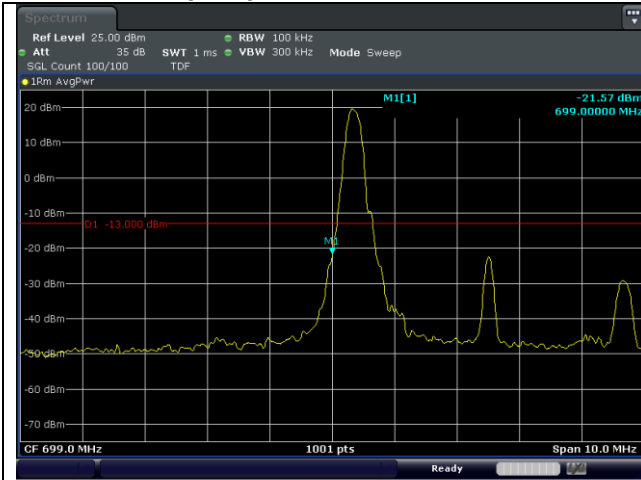


QPSK High Channel - 1 RB

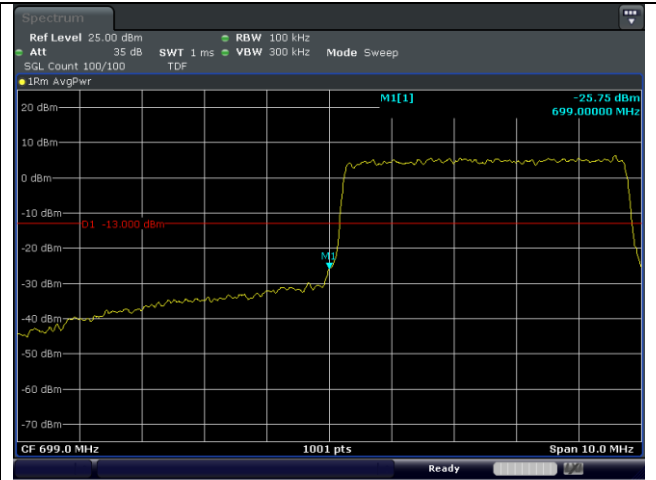


QPSK High Channel - Full RB

LTE band 12 (5 MHz)

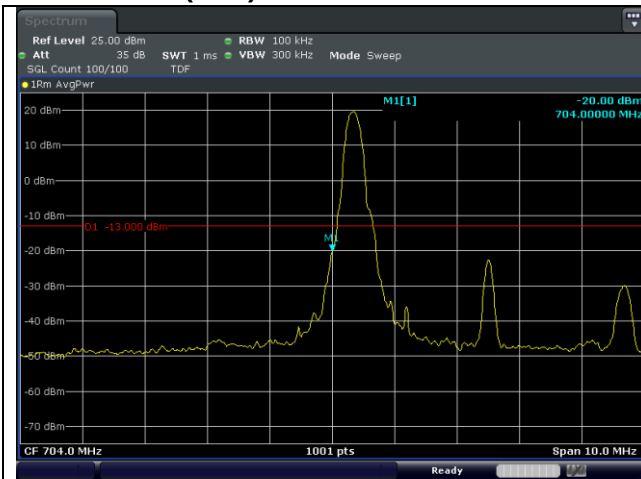


16QAM Low Channel - 1 RB

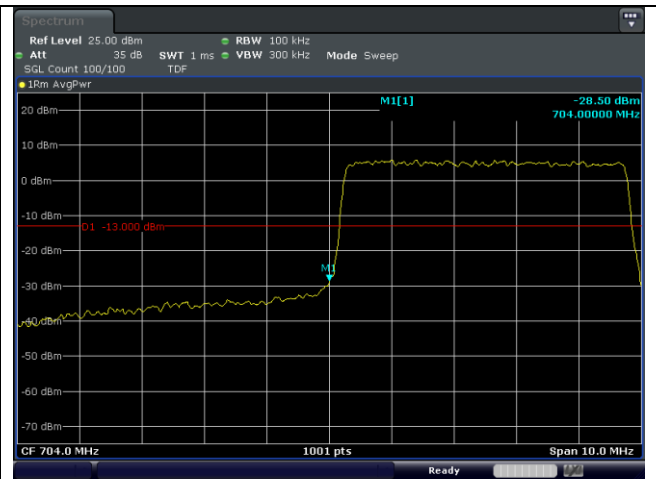


16QAM Low Channel - Full RB

LTE band 17 (5 MHz)

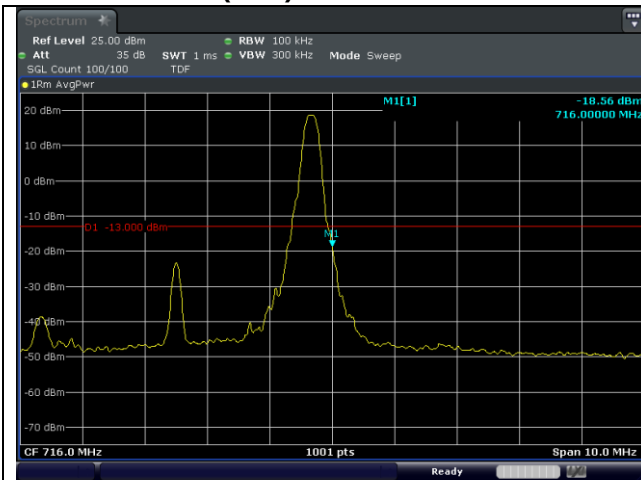


16QAM Low Channel - 1 RB

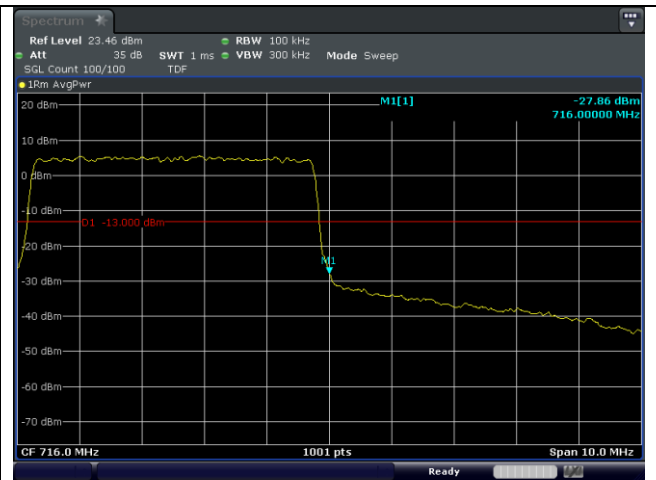


16QAM Low Channel - Full RB

LTE band 12/17 (5 MHz)

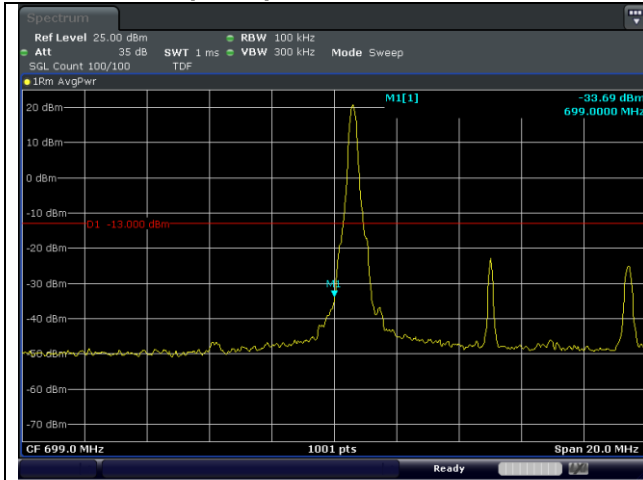


16QAM High Channel - 1 RB

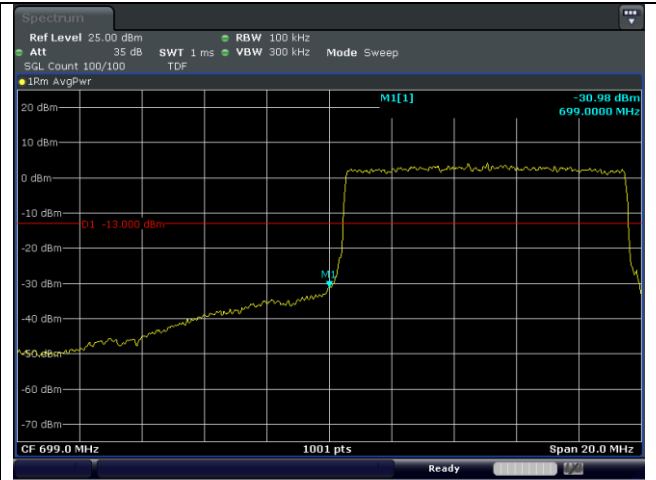


16QAM High Channel - Full RB

LTE band 12 (10 MHz)

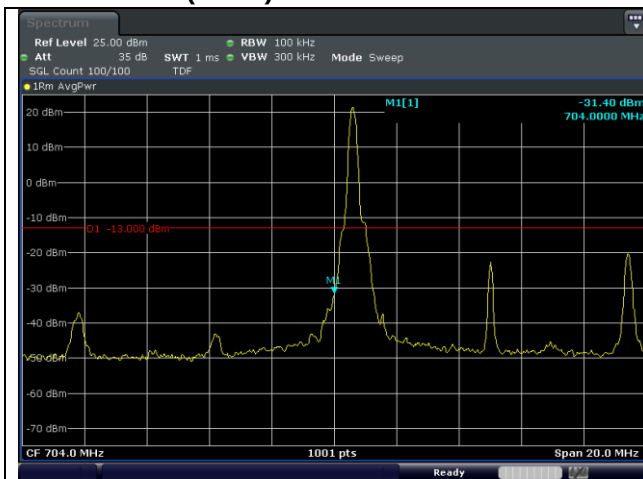


QPSK Low Channel - 1 RB

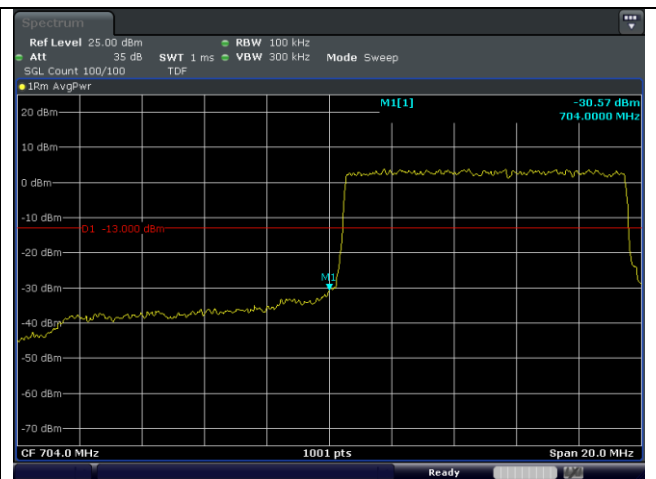


QPSK Low Channel - Full RB

LTE band 17 (10 MHz)

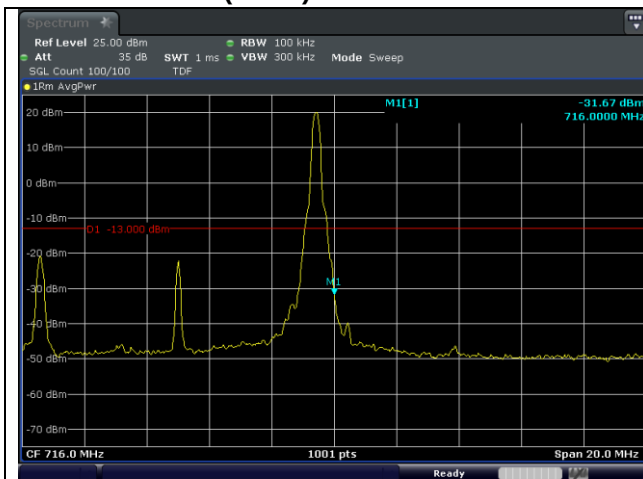


QPSK Low Channel - 1 RB

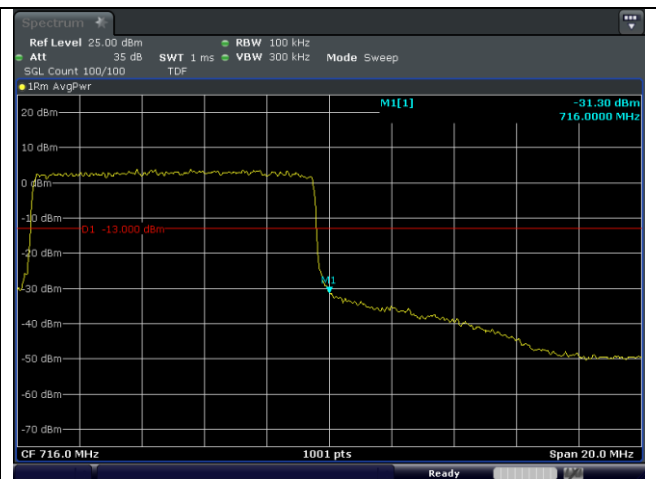


QPSK Low Channel - Full RB

LTE band 12/17 (10 MHz)

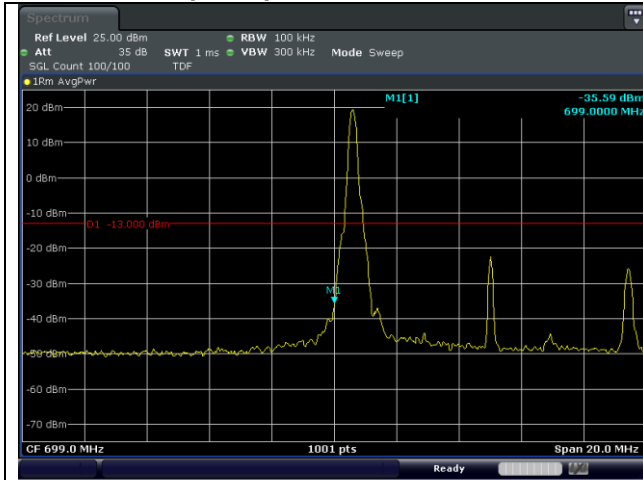


QPSK High Channel - 1 RB

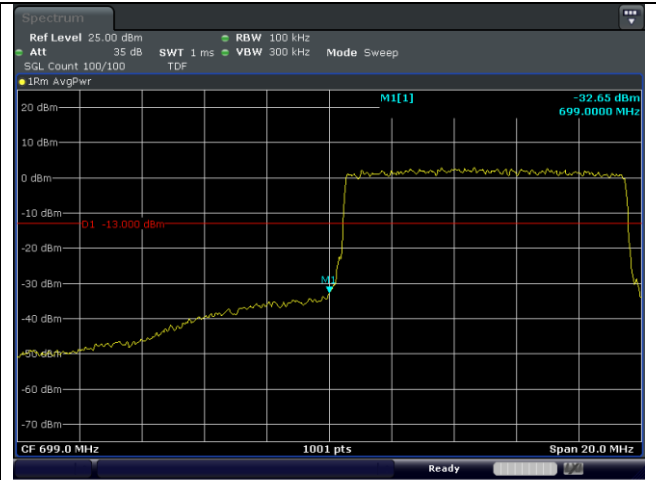


QPSK High Channel - Full RB

LTE band 12 (10 MHz)

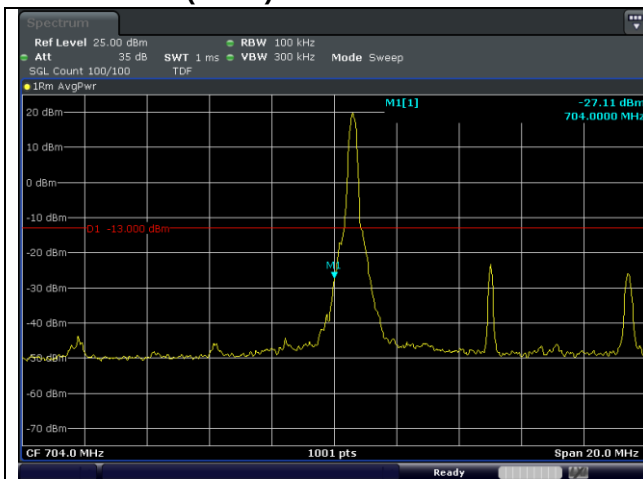


16QAM Low Channel - 1 RB

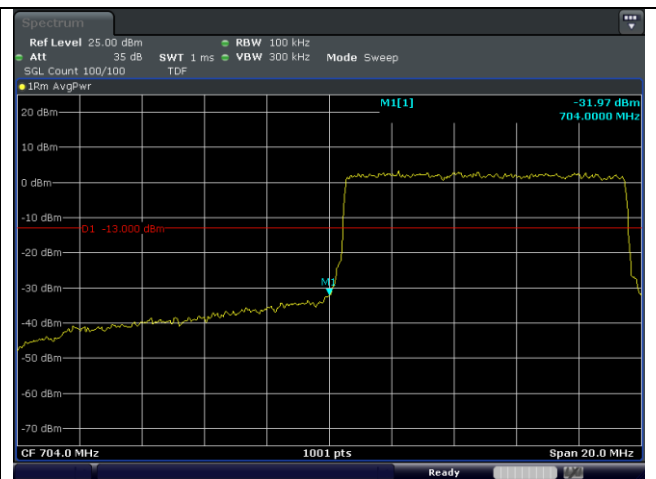


16QAM Low Channel - Full RB

LTE band 17 (10 MHz)

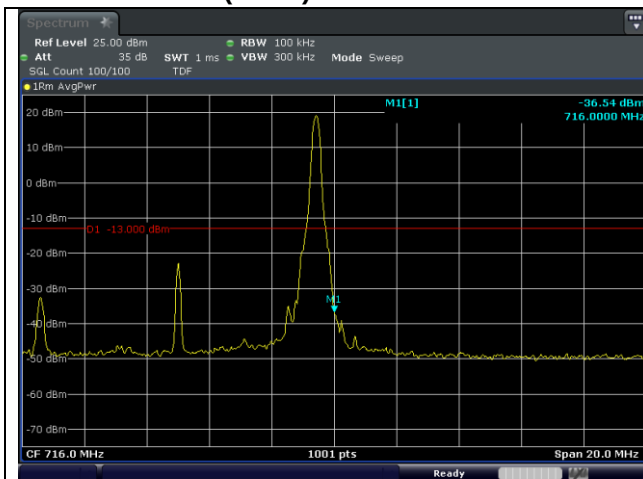


16QAM Low Channel - 1 RB

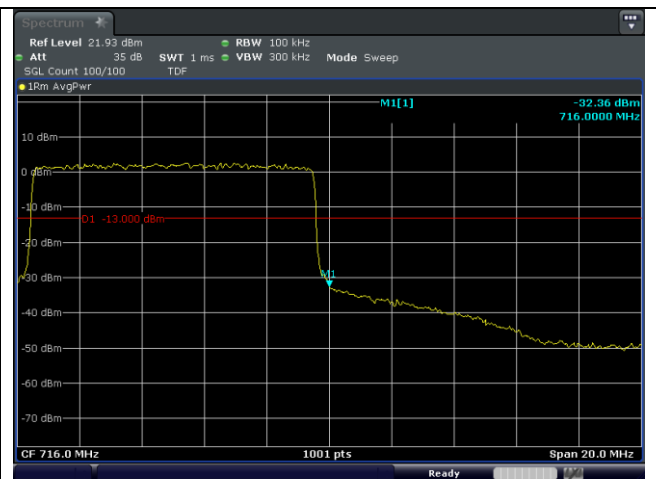


16QAM Low Channel - Full RB

LTE band 12/17 (10 MHz)



16QAM High Channel - 1 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.

IC

- RSS-Gen Issue 5

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

a. at the temperatures of -30°C (-22°F), $+20^{\circ}\text{C}$ ($+68^{\circ}\text{F}$) and $+50^{\circ}\text{C}$ ($+122^{\circ}\text{F}$), and at the manufacturer's rated supply voltage

- RSS-130 Issue 2

4.5, 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

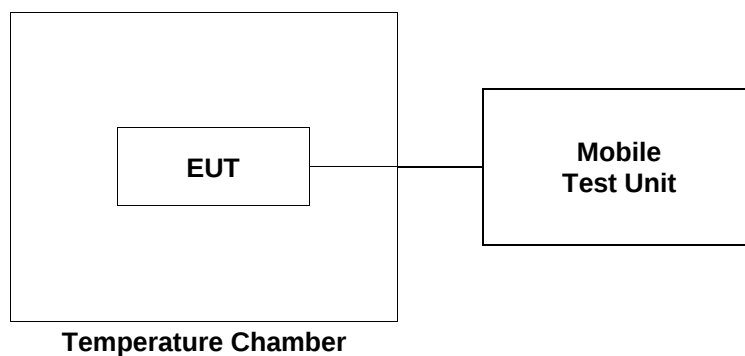
5.4, the frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block or frequency block group when tested to the temperature and supply voltage variations specified in RSS-Gen.

- 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 % R.H.

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	-3.52	0.000 30
40		-4.21	-0.000 06
30		-4.56	-0.000 25
20(Ref.)		-4.09	-
10		-2.56	0.000 81
0		-2.72	0.000 73
-10		-3.21	0.000 47
-20		-1.56	0.001 35
-30		-4.42	-0.000 18
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.40 (85%)	-3.95	0.000 07
	4.60 (115%)	-4.11	-0.000 01

LTE band 4 at middle channel

Reference Frequency: 1 732.5 MHz			
Frequency Stability versus Temperature			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
50	4.00	-0.19	-0.000 82
40		0.39	-0.000 48
30		1.02	-0.000 12
20(Ref.)		1.23	-
10		2.16	0.000 54
0		1.30	0.000 04
-10		1.73	0.000 29
-20		2.33	0.000 63
-30		-1.79	-0.001 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%)	1.20	-0.000 02
	4.60 (115%)	1.15	-0.000 05

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	-0.56	0.000 65
40		-0.79	0.000 37
30		-2.09	-0.001 18
20(Ref.)		-1.10	-
10		0.23	0.001 59
0		-0.36	0.000 88
-10		1.13	0.002 67
-20		0.23	0.001 59
-30		-0.77	0.000 39
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.40 (85%)	-0.13	0.001 16
	4.60 (115%)	-0.95	0.000 18

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	-1.76	0.000 93
40		-2.90	0.000 48
30		-3.38	0.000 29
20(Ref.)		-4.12	-
10		-3.06	0.000 42
0		-3.30	0.000 32
-10		-2.40	0.000 68
-20		-3.09	0.000 41
-30		-7.40	-0.001 29
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.40 (85%)	-4.05	0.000 03
	4.60 (115%)	-4.25	-0.000 05

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	-0.20	0.001 31
40		-0.39	0.001 05
30		-0.69	0.000 62
20(Ref.)		-1.13	-
10		0.40	0.002 16
0		0.97	0.002 97
-10		-0.34	0.001 12
-20		0.74	0.002 64
-30		0.34	0.002 08
Frequency Stability versus Power Supply			
Environment Temperature (°C)	Power Supplied (V)	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
20	3.40 (85%)	-1.45	-0.000 45
	4.60 (115%)	-1.33	-0.000 28

- End of the Test Report -