

4. Occupied Bandwidth

4.1. Limit

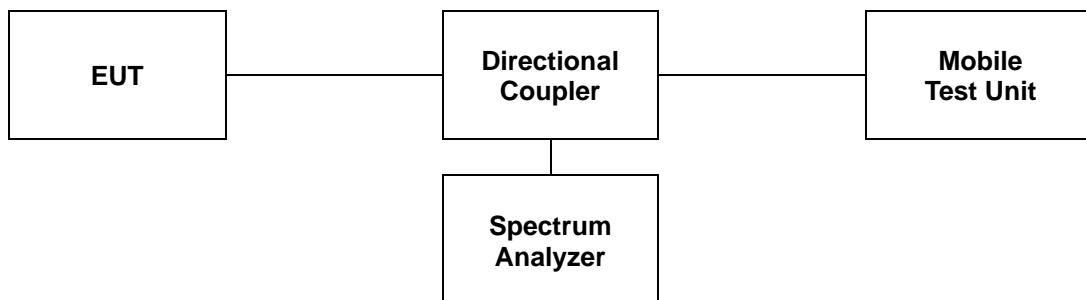
CFR 47, Section FCC §2.1049.

4.2. Test Procedure

The test follows section 5.4.4 of ANSI C63.26-2015.

- a. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (typically a span of $1.5 \times \text{OBW}$ is sufficient).
- b. The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1 % to 5 % of the anticipated OBW, and the VBW shall be set $\geq 3 \times \text{RBW}$.
- c. Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
- d. Set the detection mode to peak, and the trace mode to max-hold.
- e. If the instrument does not have a 99 % OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5 % of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5 % of the total is reached and record that frequency as the upper OBW frequency. The 99 % power OBW can be determined by computing the difference these two frequencies.
- f. The OBW shall be reported and plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s).

For the 99 % emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99 % emission bandwidth).



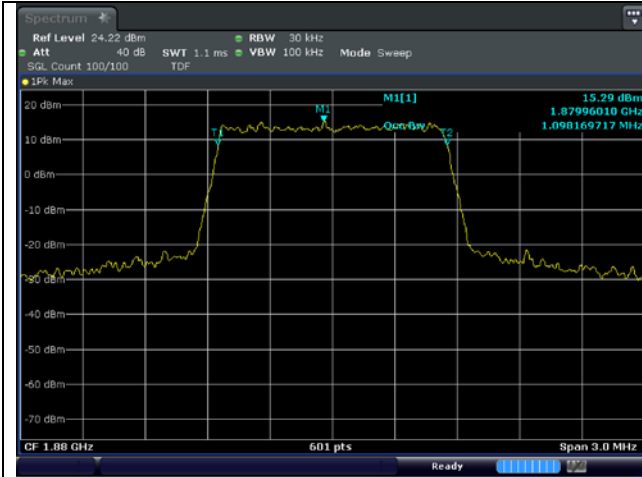
4.3 Test Results

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

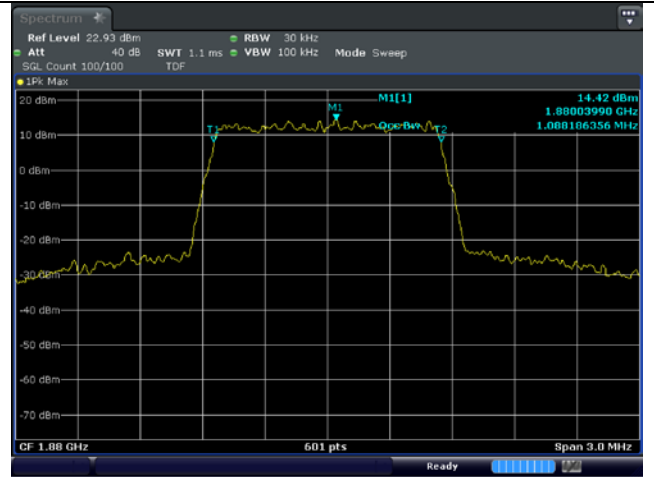
Band	Bandwidth (MHz)	Frequency (MHz)	Occupied Bandwidth (MHz)	
			QPSK	16QAM
2	1.4	1 880.0	1.098	1.088
	3		2.696	2.686
	5		4.493	4.493
	10		8.952	8.985
	15		13.478	13.527
	20		17.945	17.970
4	1.4	1 732.5	1.088	1.093
	3		2.686	2.686
	5		4.509	4.493
	10		8.985	8.952
	15		13.478	13.527
	20		17.837	17.970
7	5	2 535.0	4.493	4.509
	10		8.952	8.918
	15		13.527	13.527
	20		17.837	17.903
12/17	1.4	707.5	1.088	1.088
	3		2.686	2.686
	5		4.493	4.493
	10		8.952	8.952
26 Part 22	1.4	836.5	1.098	1.098
	3		2.686	2.686
	5		4.509	4.493
	10		8.918	8.918
	15	831.5	13.527	13.478
26 Part 90	1.4	819.0	1.098	1.088
	3		2.686	2.686
	5		4.509	4.493
	10		8.918	8.952
	15	821.5	13.428	13.428
41	5	2 593.0	4.493	4.509
	10		8.918	8.918
	15		13.478	13.478
	20		17.903	17.903

- Test plots

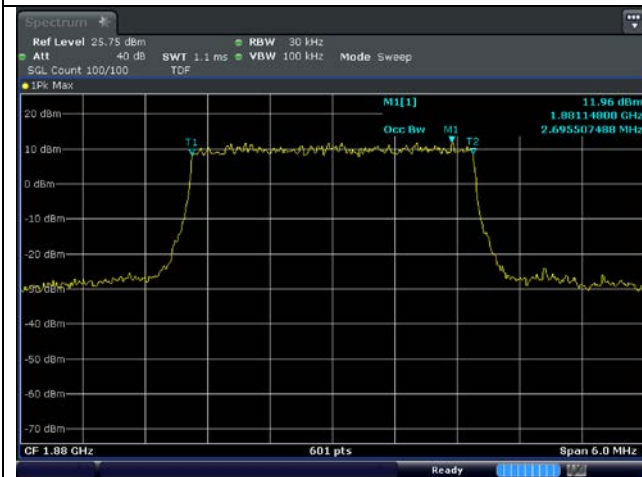
LTE band 2



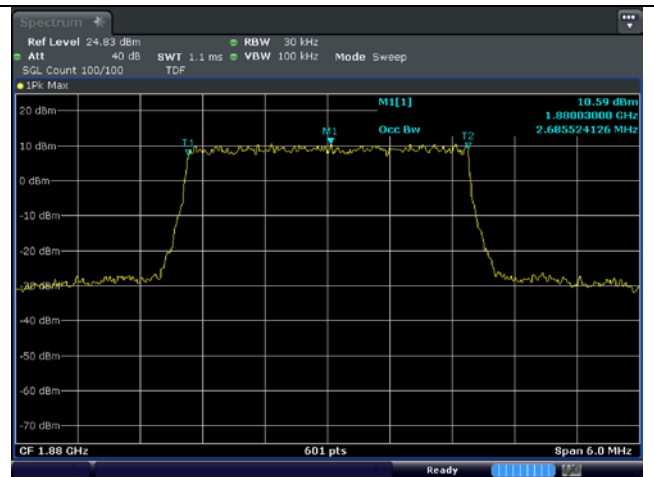
1.4 MHz QPSK Middle Channel - Full RB



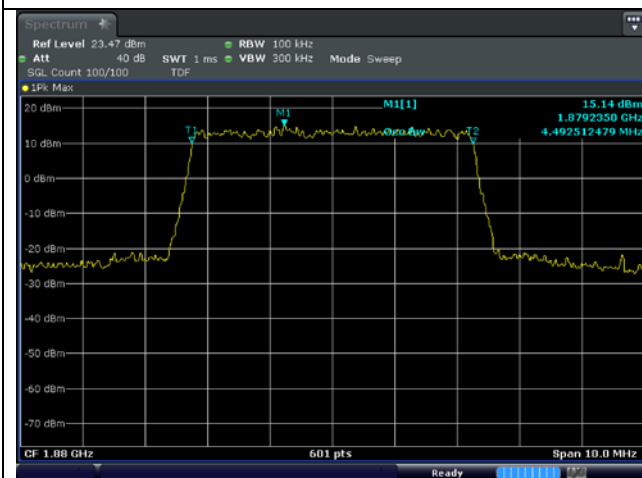
1.4 MHz 16QAM Middle Channel - Full RB



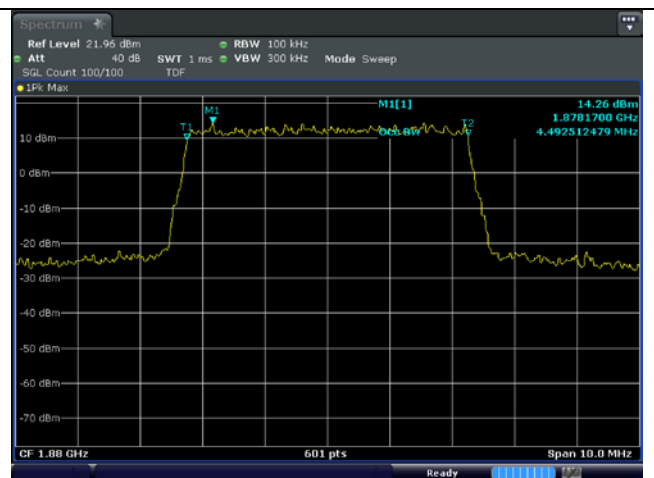
3 MHz QPSK Middle Channel - Full RB



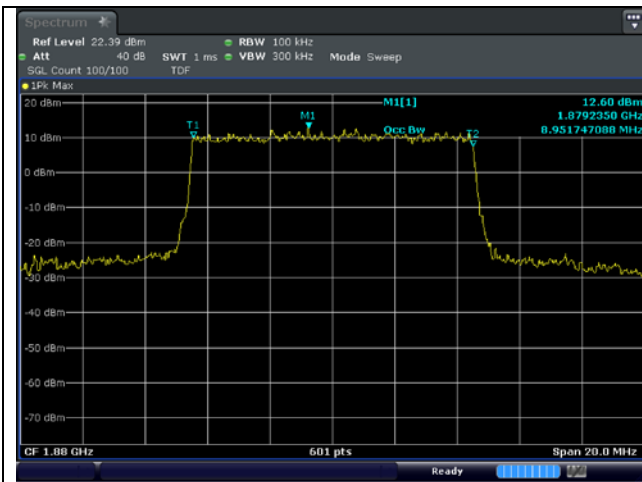
3 MHz 16QAM Middle Channel - Full RB



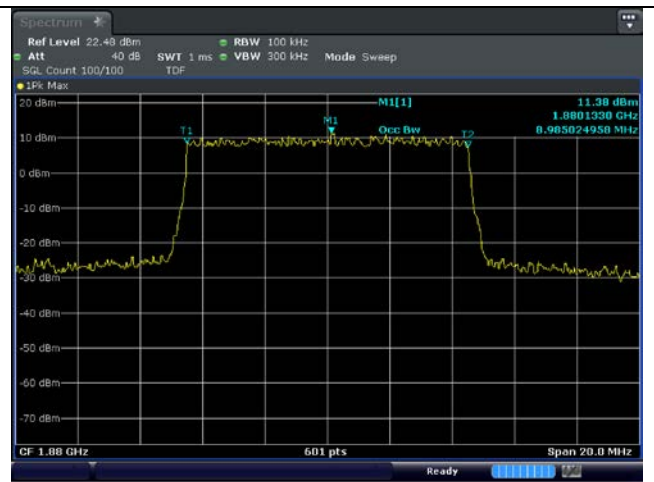
5 MHz QPSK Middle Channel - Full RB



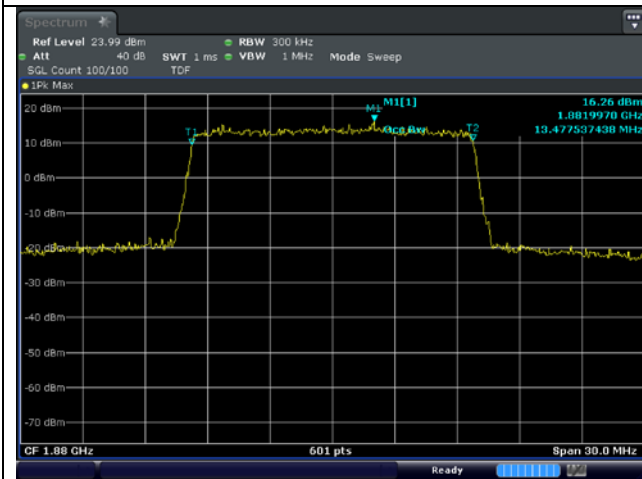
5 MHz 16QAM Middle Channel - Full RB



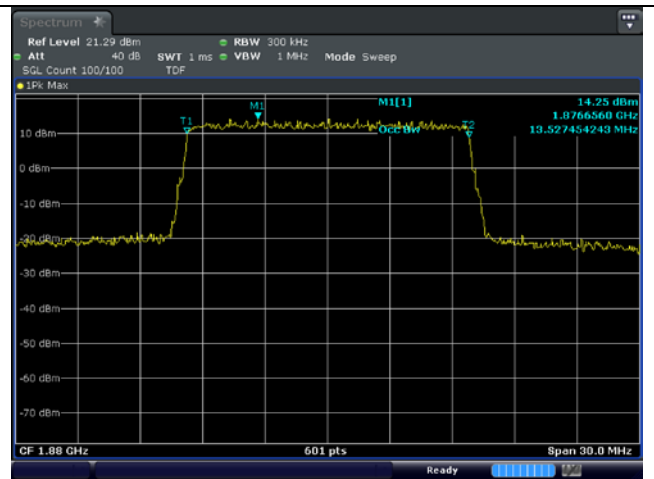
10 MHz QPSK Middle Channel - Full RB



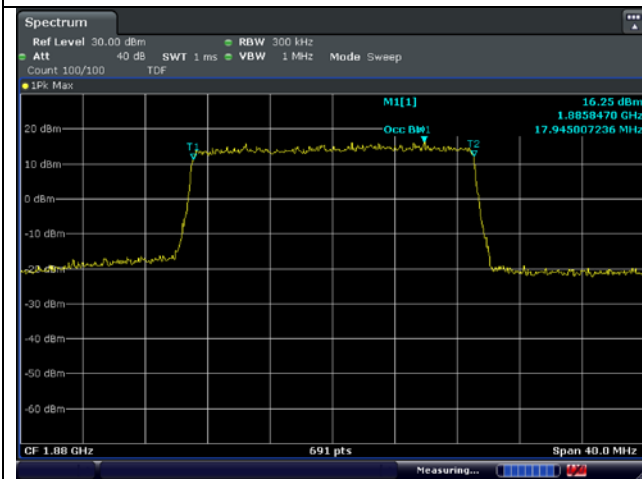
10 MHz 16QAM Middle Channel - Full RB



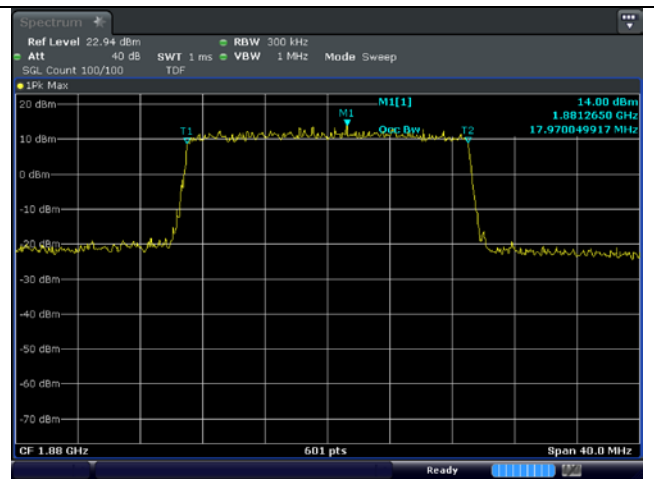
15 MHz QPSK Middle Channel - Full RB



15 MHz 16QAM Middle Channel - Full RB

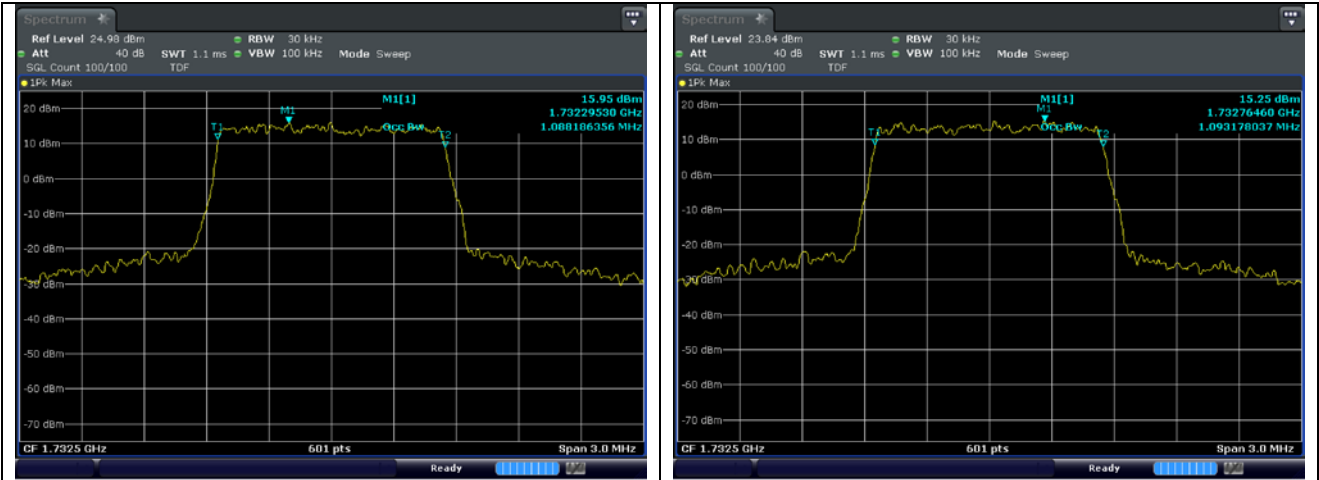


20 MHz QPSK Middle Channel - Full RB



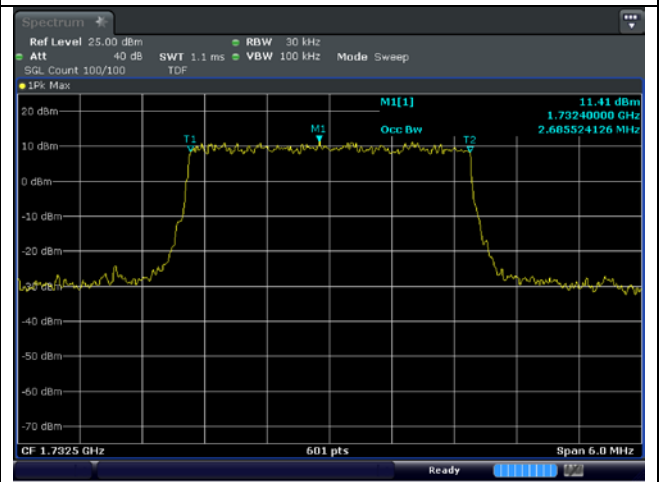
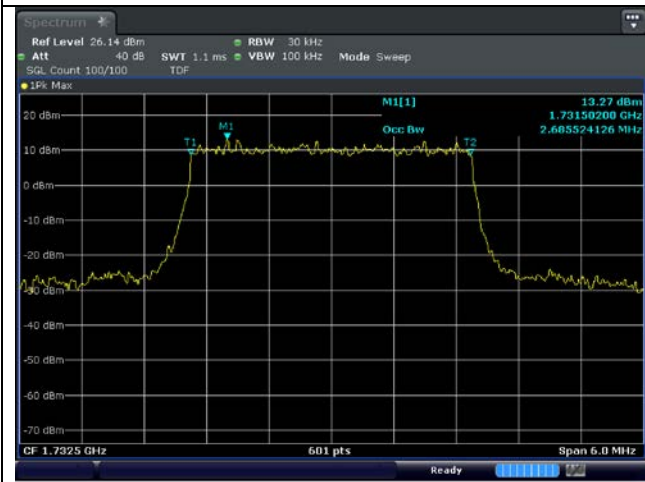
20 MHz 16QAM Middle Channel - Full RB

LTE band 4



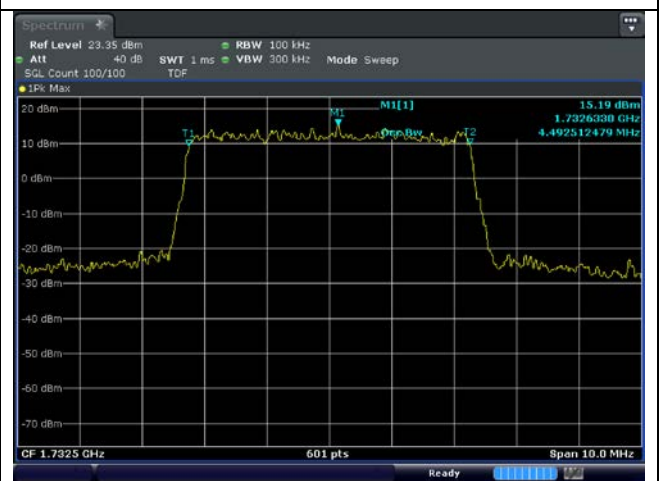
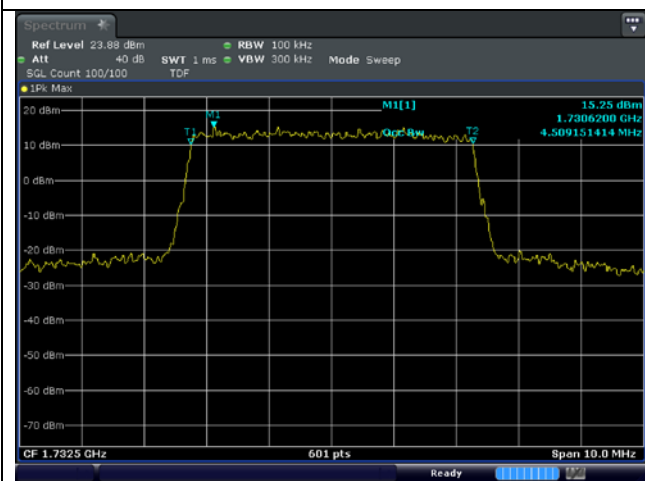
1.4 MHz QPSK Middle Channel - Full RB

1.4 MHz 16QAM Middle Channel - Full RB



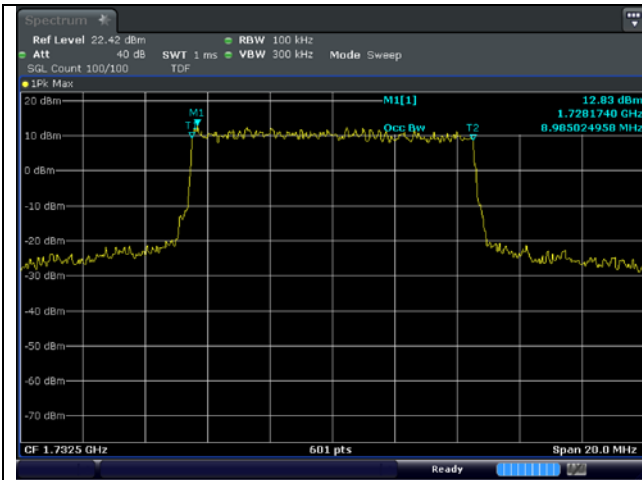
3 MHz QPSK Middle Channel - Full RB

3 MHz 16QAM Middle Channel - Full RB

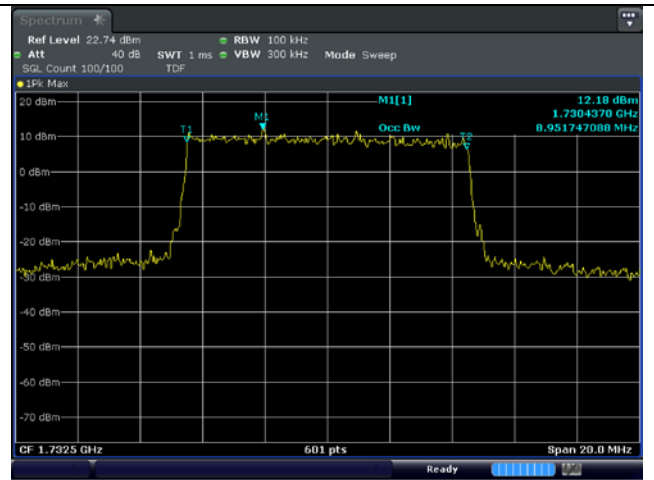


5 MHz QPSK Middle Channel - Full RB

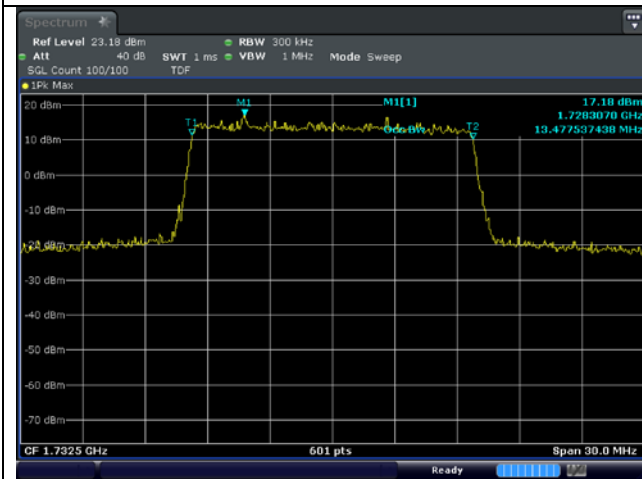
5 MHz 16QAM Middle Channel - Full RB



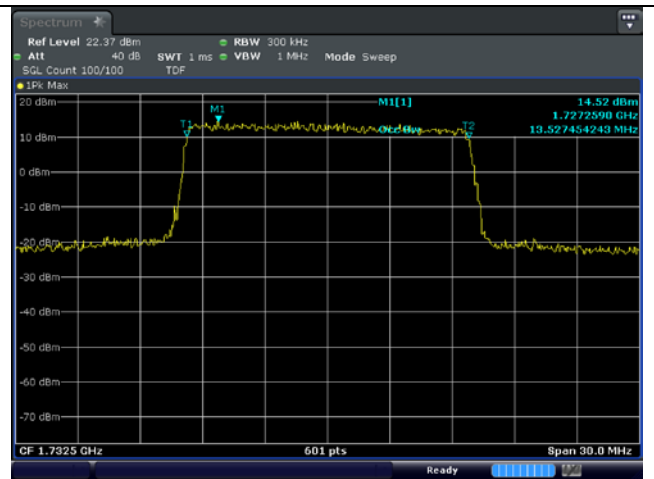
10 MHz QPSK Middle Channel - Full RB



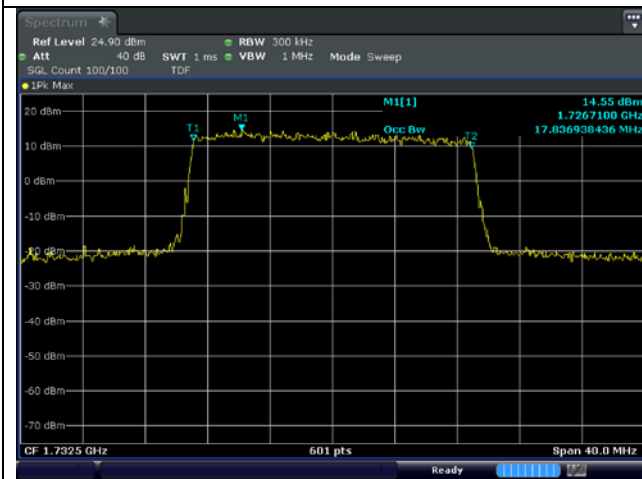
10 MHz 16QAM Middle Channel - Full RB



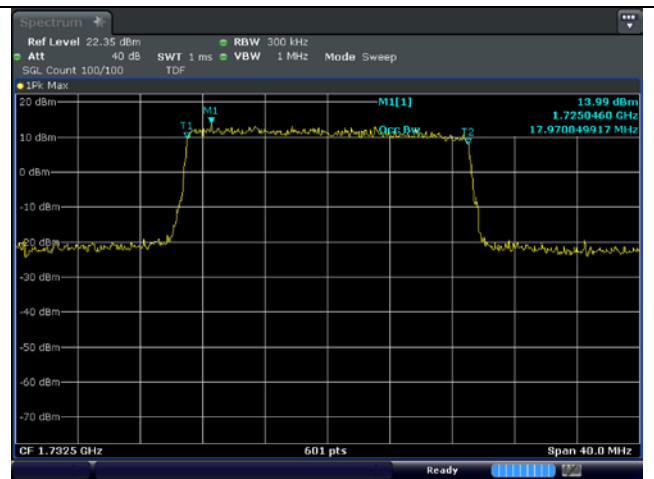
15 MHz QPSK Middle Channel - Full RB



15 MHz 16QAM Middle Channel - Full RB

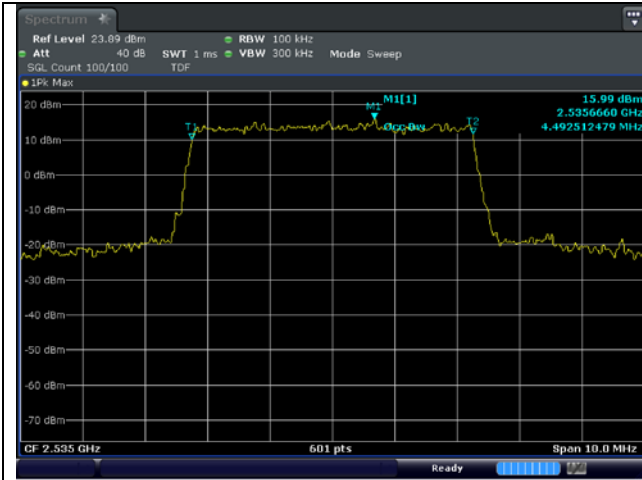


20 MHz QPSK Middle Channel - Full RB

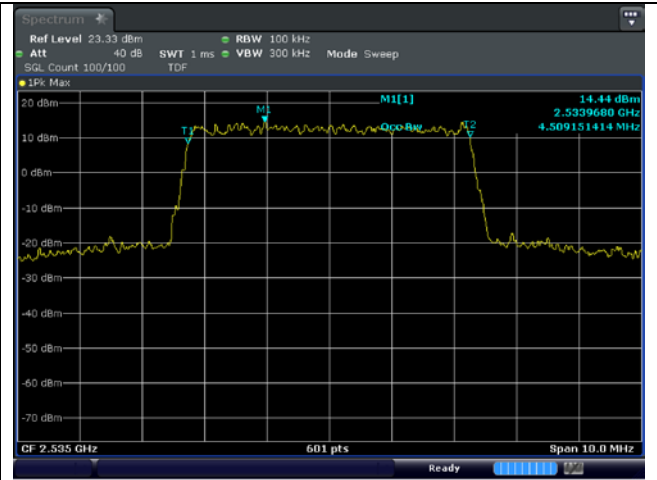


20 MHz 16QAM Middle Channel - Full RB

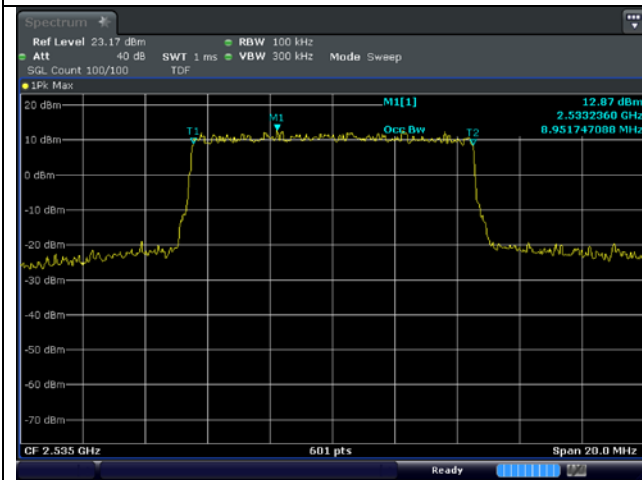
LTE band 7



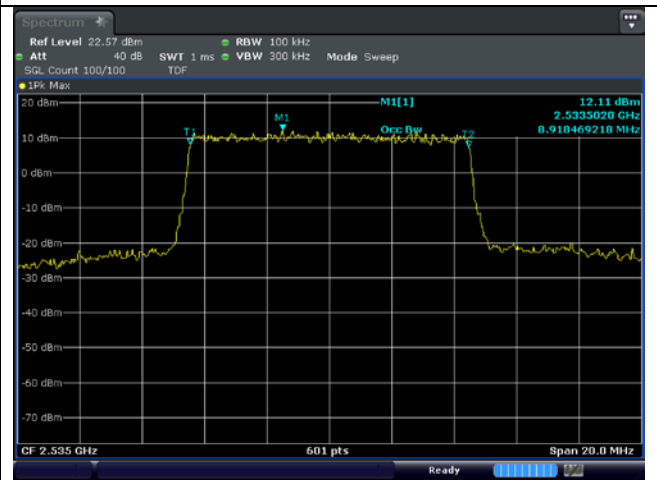
5 MHz QPSK Middle Channel - Full RB



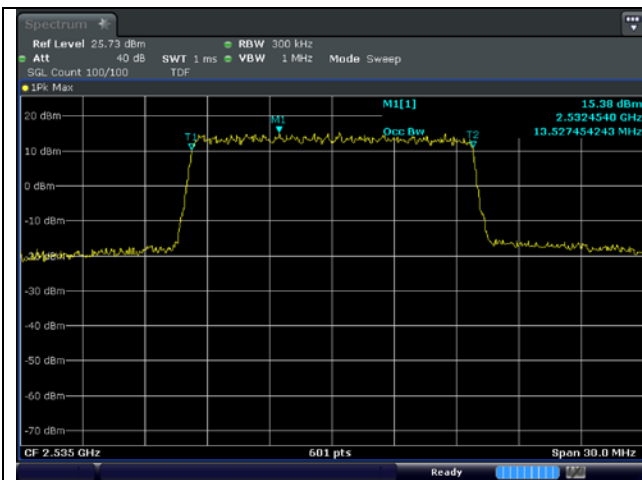
5 MHz 16QAM Middle Channel - Full RB



10 MHz QPSK Middle Channel - Full RB



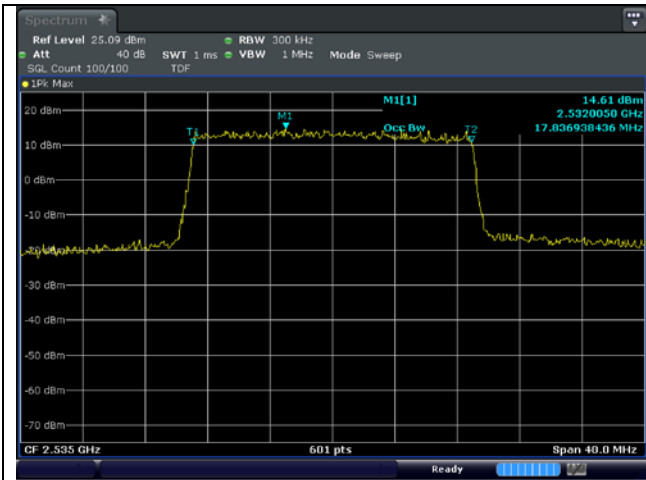
10 MHz 16QAM Middle Channel - Full RB



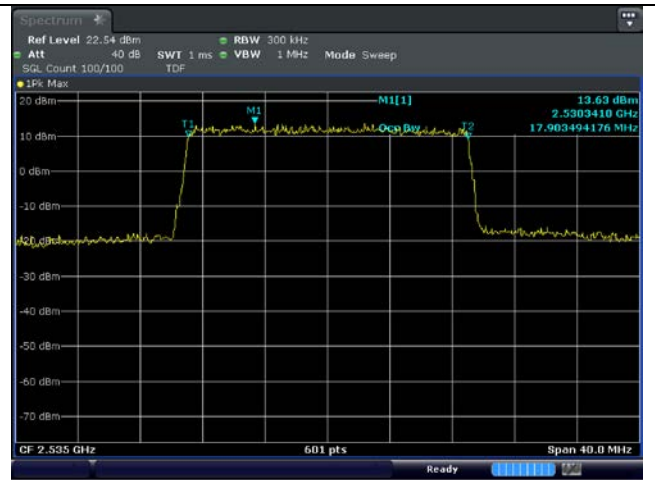
15 MHz QPSK Middle Channel - Full RB



15 MHz 16QAM Middle Channel - Full RB

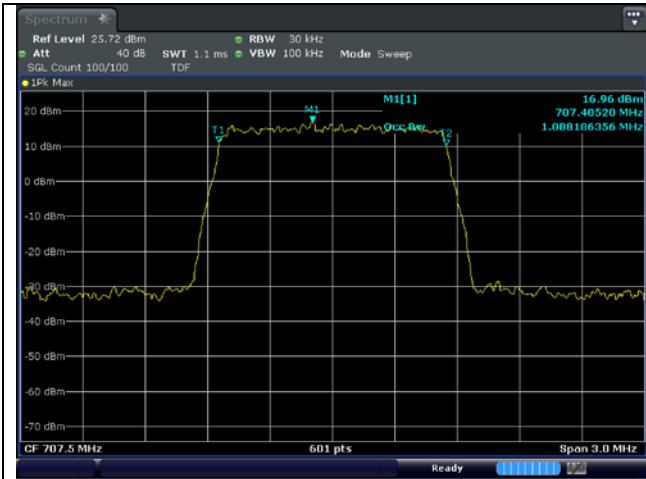


20 MHz QPSK Middle Channel - Full RB

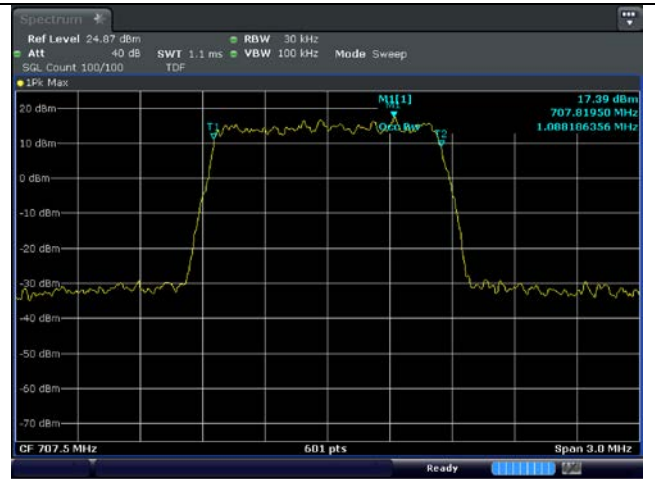


20 MHz 16QAM Middle Channel - Full RB

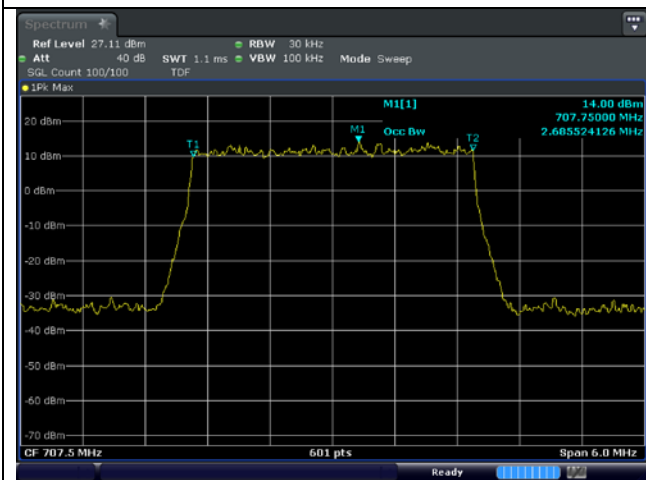
LTE band 12/17



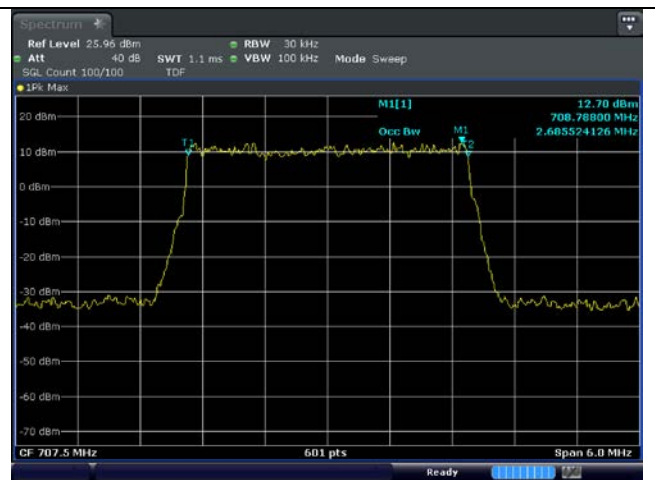
1.4 MHz QPSK Middle Channel - Full RB



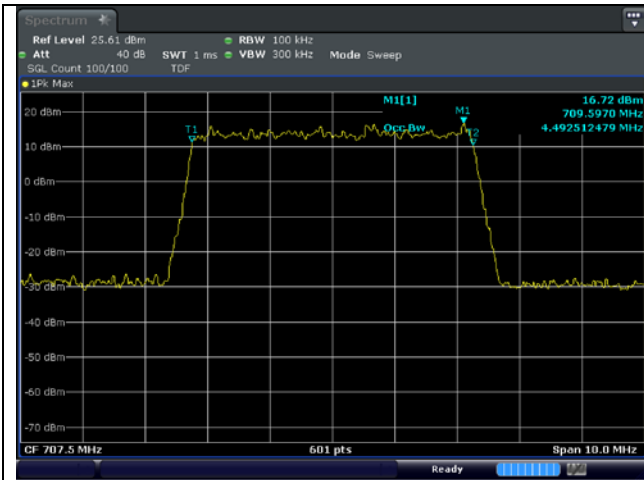
1.4 MHz 16QAM Middle Channel - Full RB



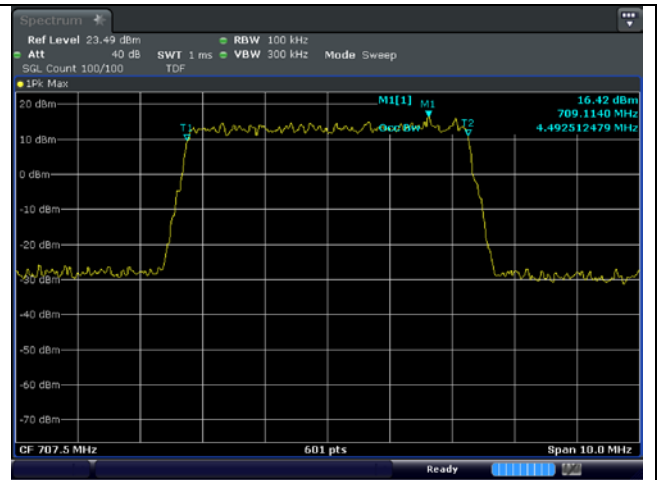
3 MHz QPSK Middle Channel - Full RB



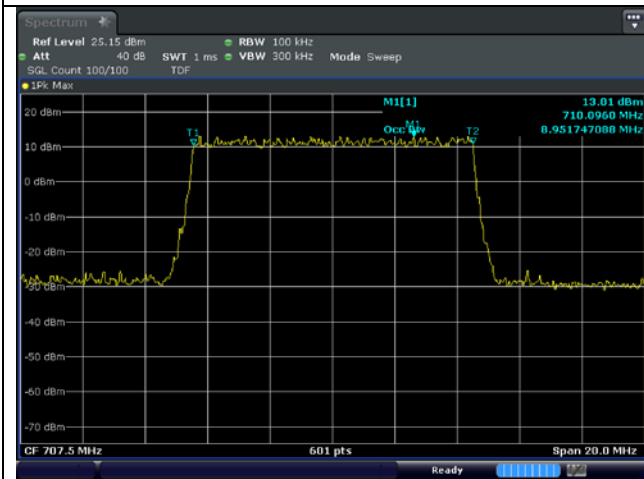
3 MHz 16QAM Middle Channel - Full RB



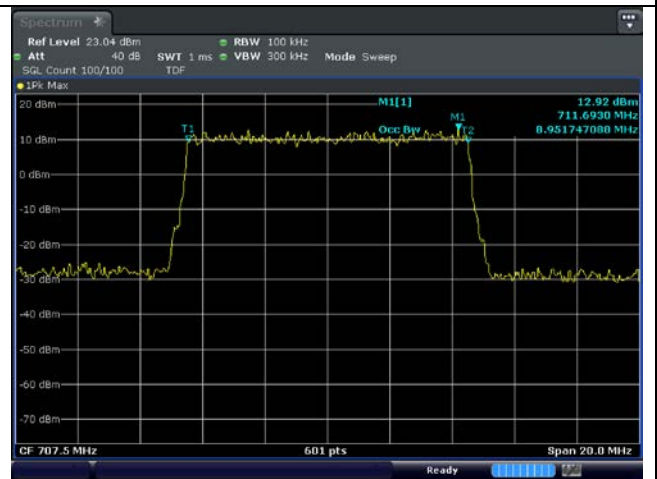
5 MHz QPSK Middle Channel - Full RB



5 MHz 16QAM Middle Channel - Full RB

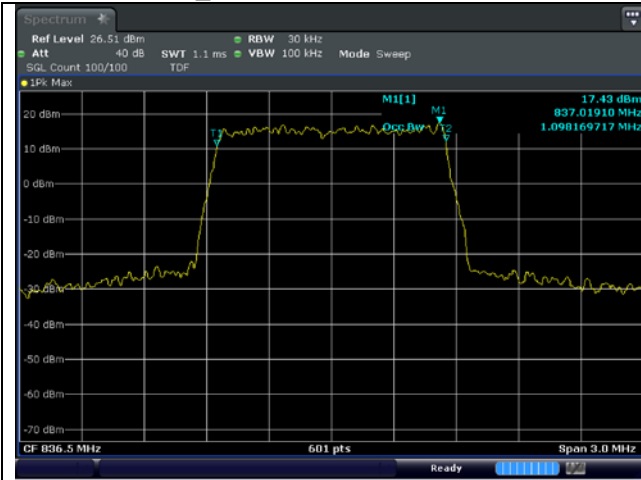


10 MHz QPSK Middle Channel - Full RB

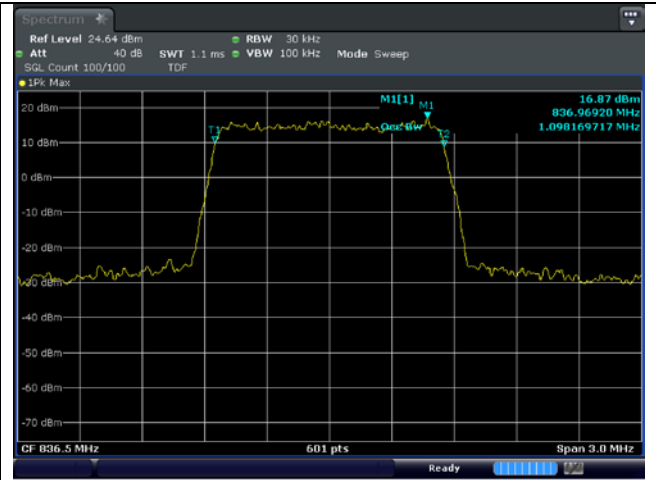


10 MHz 16QAM Middle Channel - Full RB

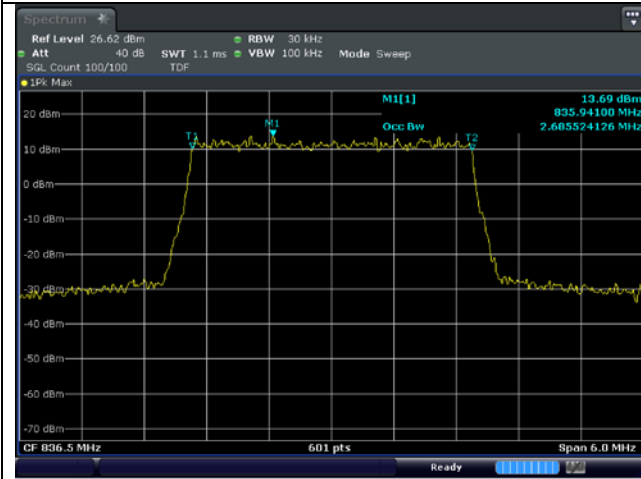
LTE band 26/5_Part 22



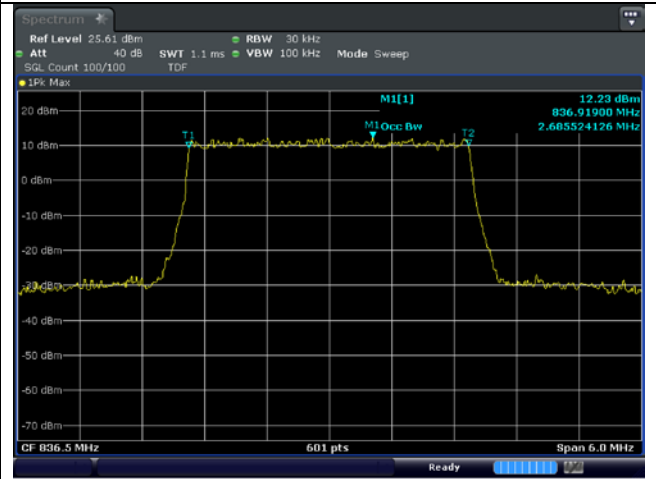
1.4 MHz QPSK Middle Channel - Full RB



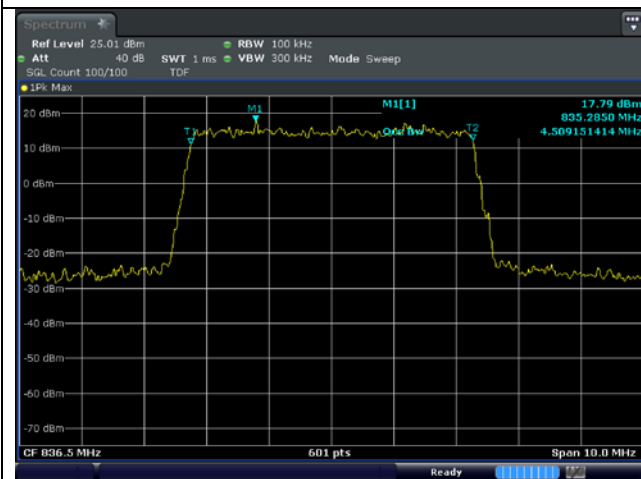
1.4 MHz 16QAM Middle Channel - Full RB



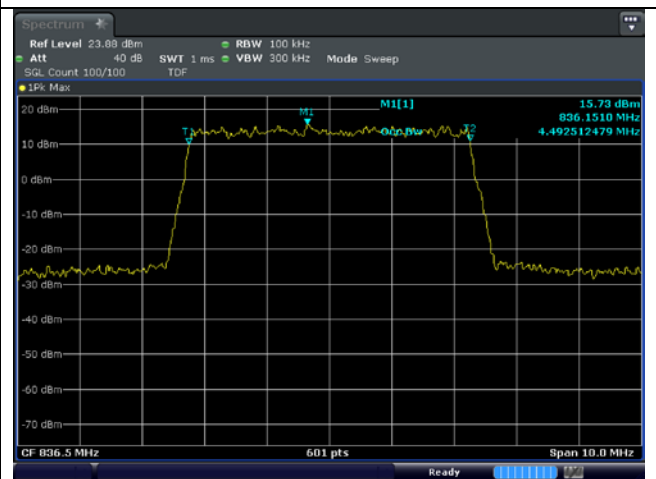
3 MHz QPSK Middle Channel - Full RB



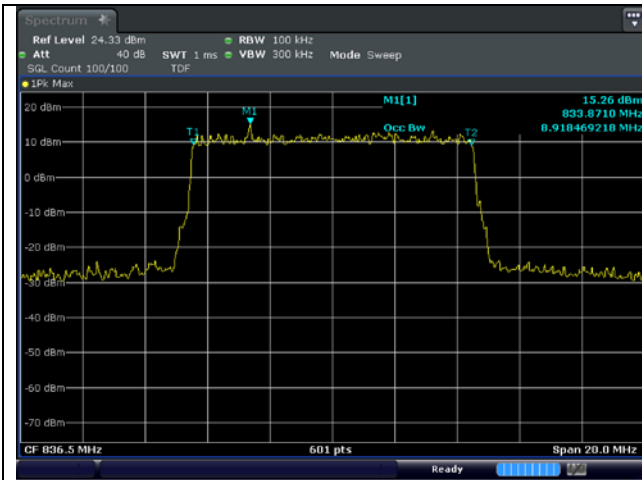
3 MHz 16QAM Middle Channel - Full RB



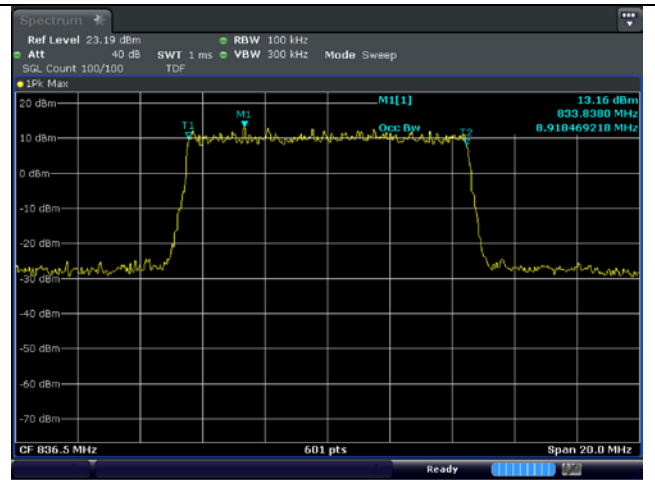
5 MHz QPSK Middle Channel - Full RB



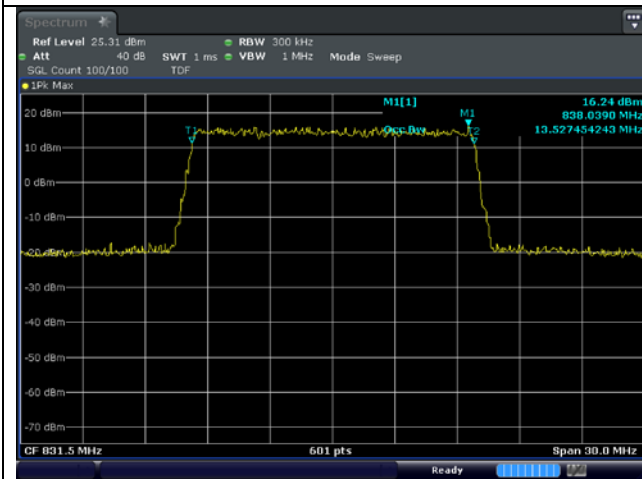
5 MHz 16QAM Middle Channel - Full RB



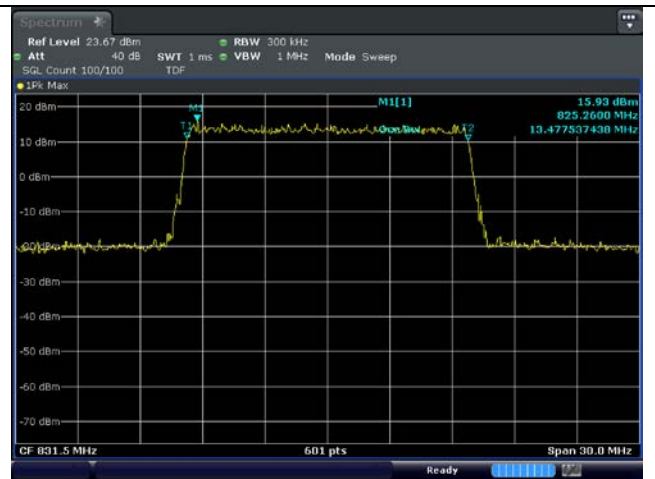
10 MHz QPSK Middle Channel - Full RB



10 MHz 16QAM Middle Channel - Full RB

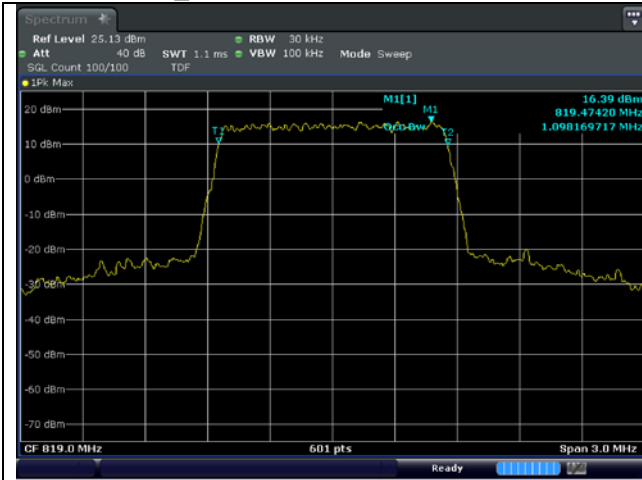


15 MHz QPSK Low Channel - Full RB

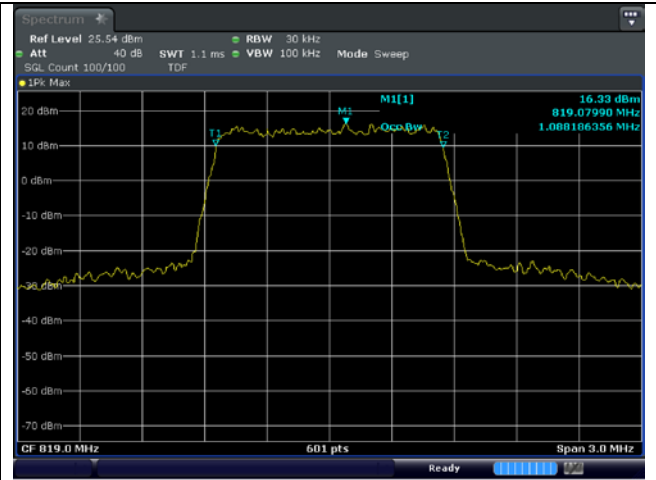


15 MHz 16QAM Low Channel - Full RB

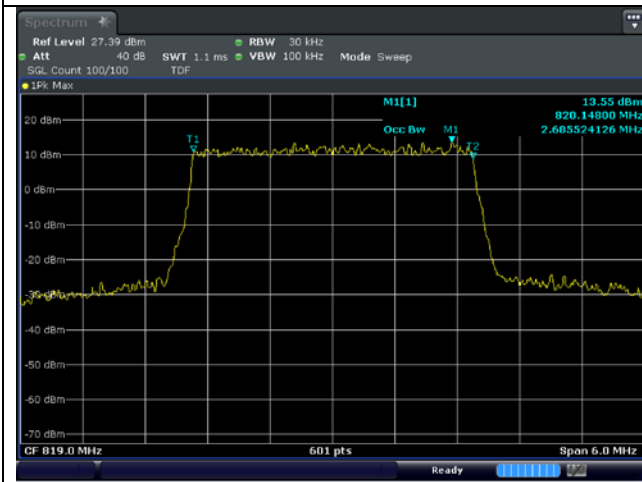
LTE band 26 Part 20



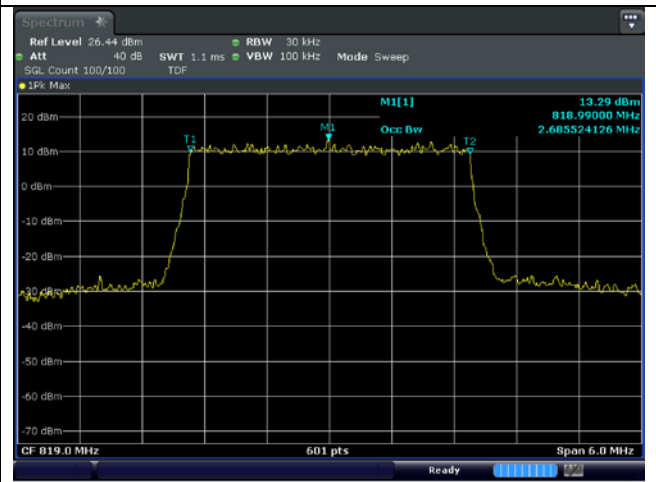
1.4 MHz QPSK Middle Channel - Full RB



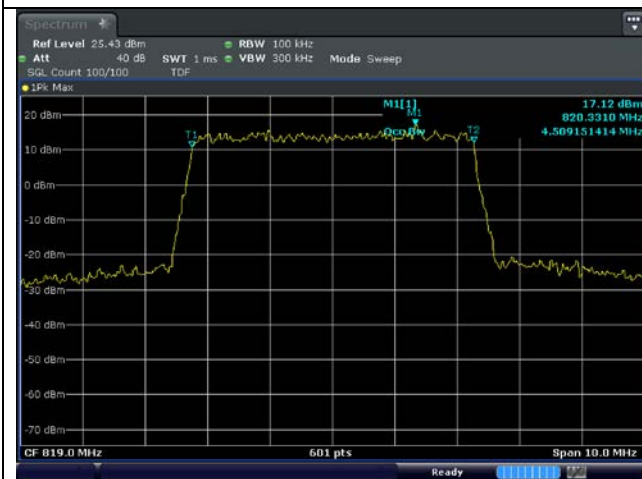
1.4 MHz 16QAM Middle Channel - Full RB



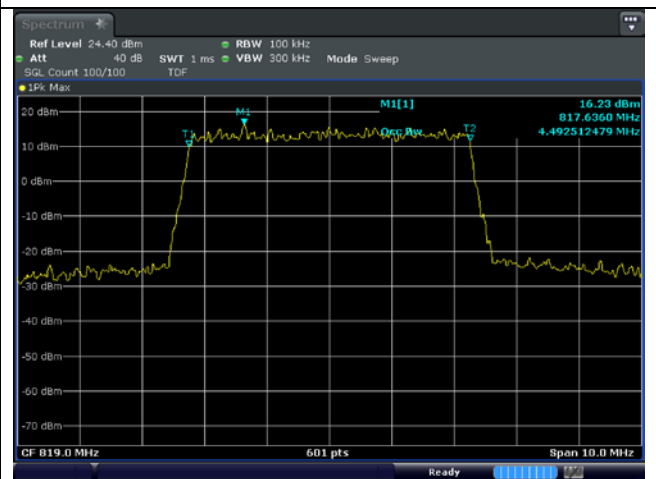
3 MHz QPSK Middle Channel - Full RB



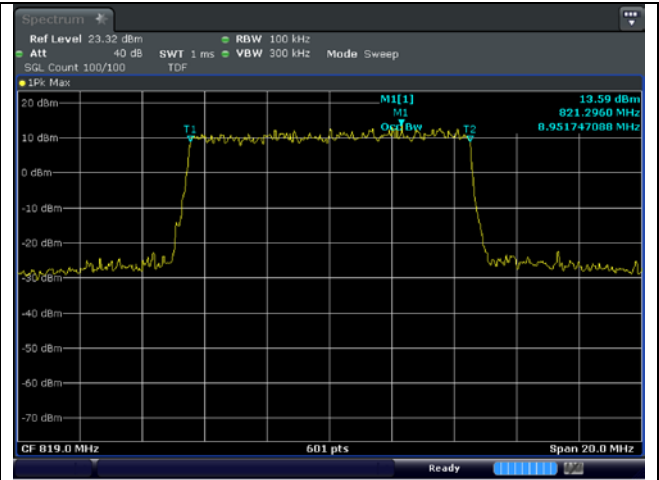
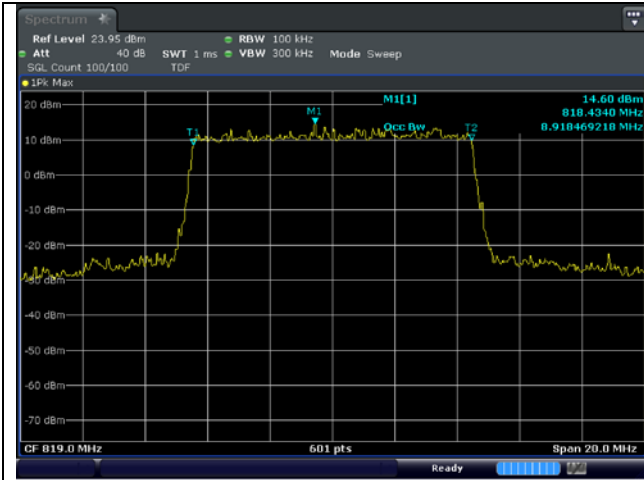
3 MHz 16QAM Middle Channel - Full RB



5 MHz QPSK Middle Channel - Full RB

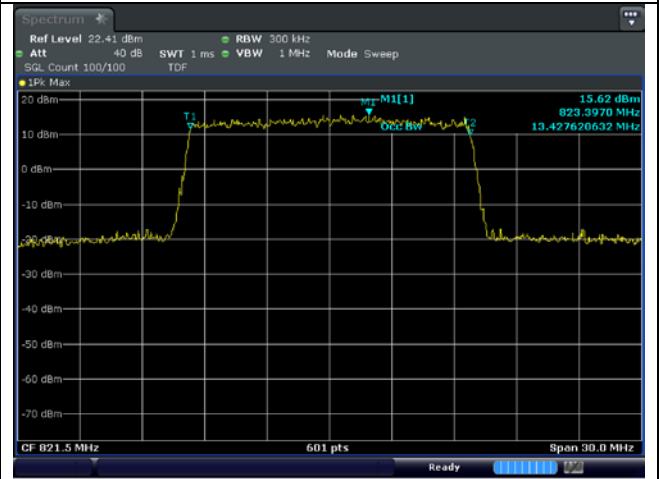
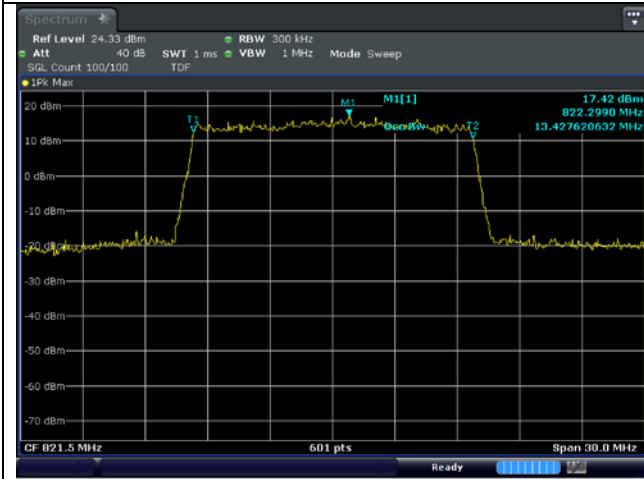


5 MHz 16QAM Middle Channel - Full RB



10 MHz QPSK Middle Channel - Full RB

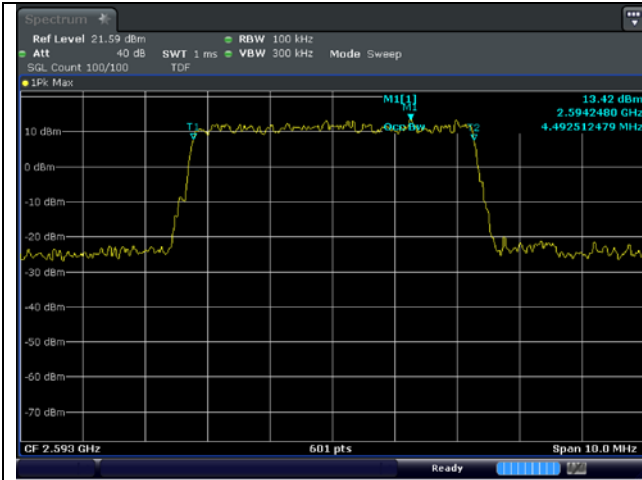
10 MHz 16QAM Middle Channel - Full RB



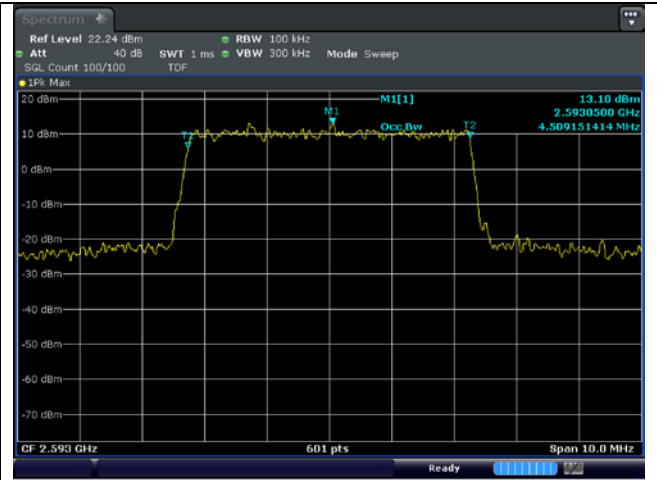
15 MHz QPSK Low Channel - Full RB

15 MHz 16QAM Low Channel - Full RB

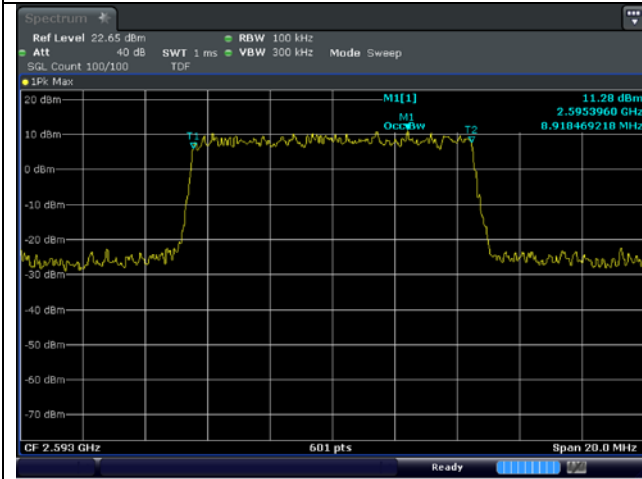
LTE band 41



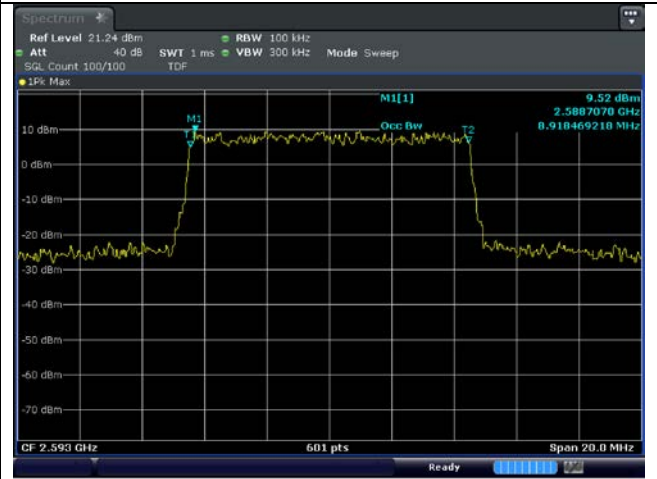
5 MHz QPSK Middle Channel - Full RB



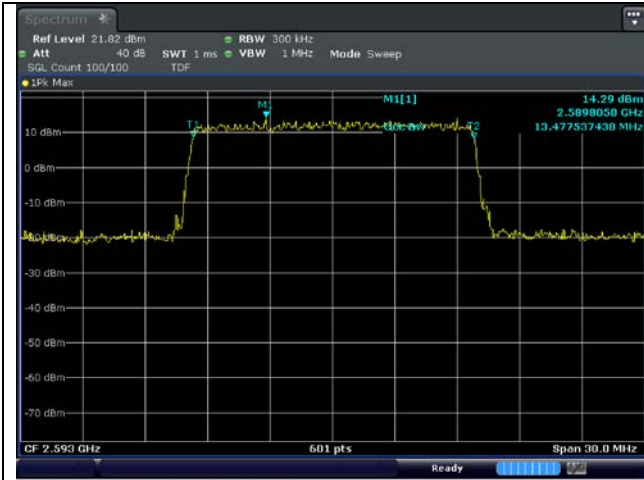
5 MHz 16QAM Middle Channel - Full RB



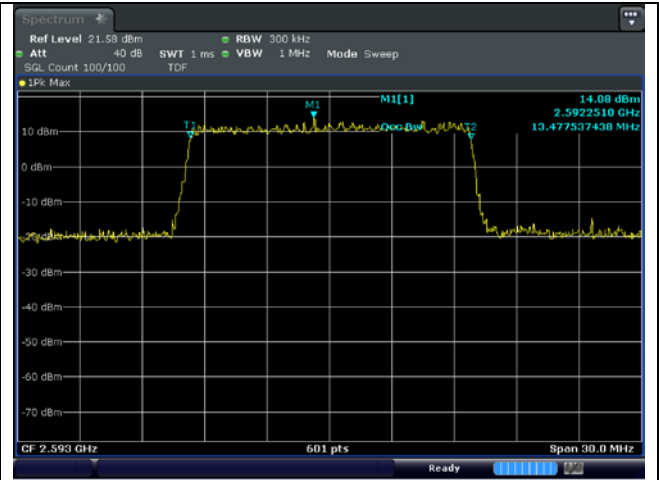
10 MHz QPSK Middle Channel - Full RB



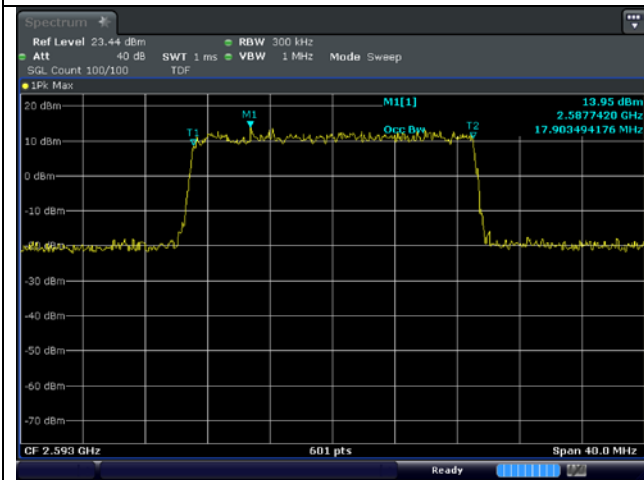
10 MHz 16QAM Middle Channel - Full RB



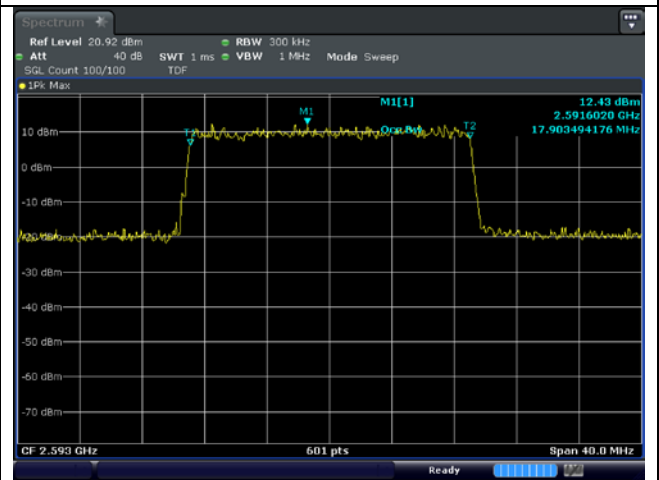
15 MHz QPSK Middle Channel - Full RB



15 MHz 16QAM Middle Channel - Full RB



20 MHz QPSK Middle Channel - Full RB



20 MHz 16QAM Middle Channel - Full RB