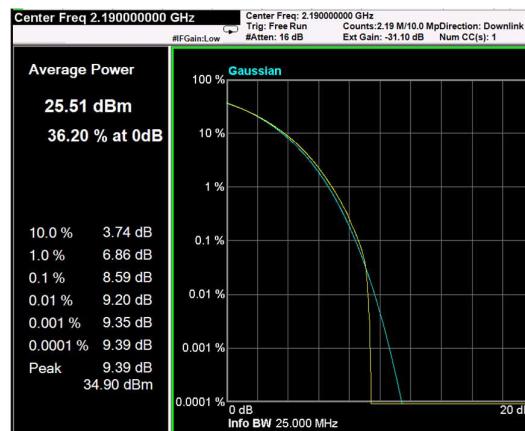
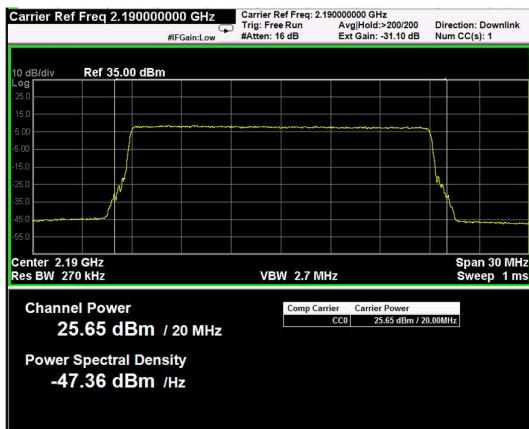


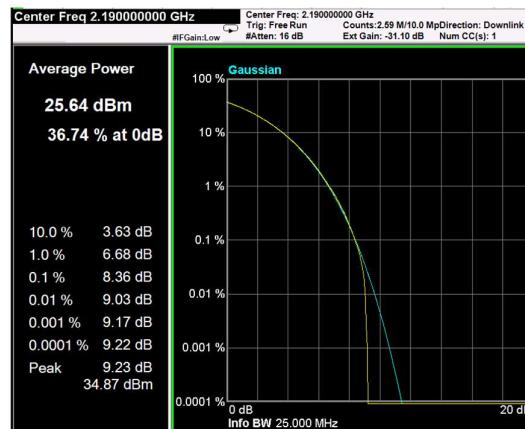
Channel: MIDDLE, Modulation: QPSK,  
BW=20MHz, Channel Power



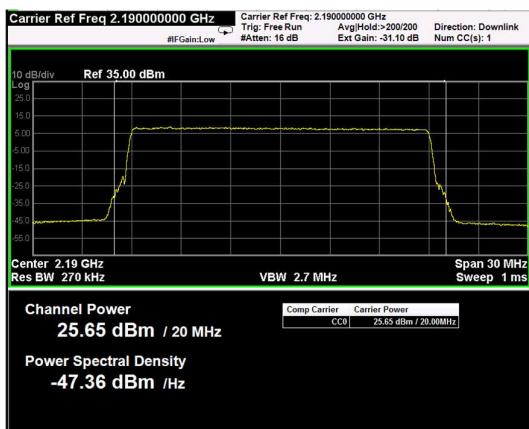
Channel: MIDDLE, Modulation: QPSK,  
BW=20MHz, CCDF



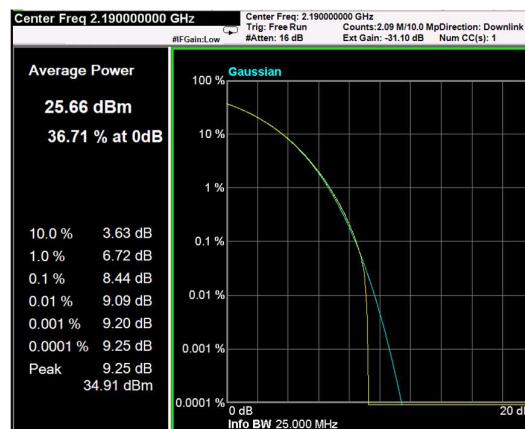
Channel: MIDDLE, Modulation: 16QAM,  
BW=20MHz, Channel Power



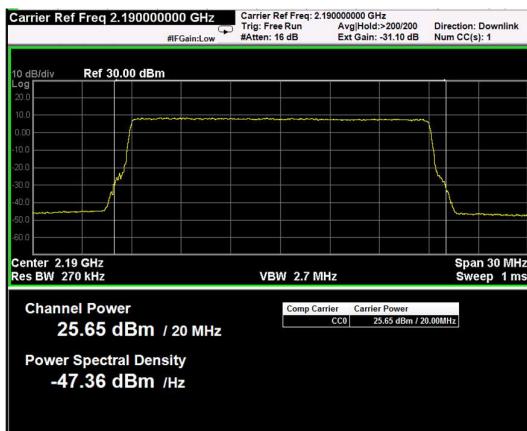
Channel: MIDDLE, Modulation: 16QAM,  
BW=20MHz, CCDF



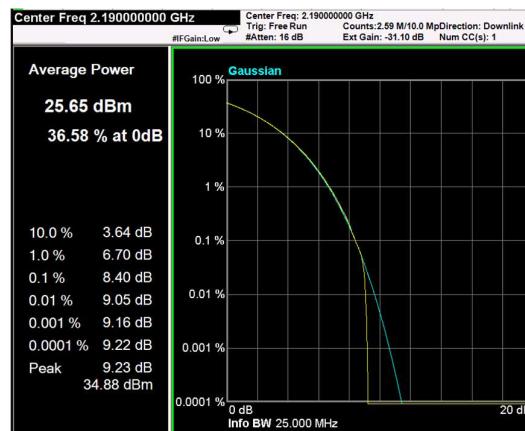
Channel: MIDDLE, Modulation: 64QAM,  
BW=20MHz, Channel Power



Channel: MIDDLE, Modulation: 64QAM,  
BW=20MHz, CCDF



Channel: MIDDLE, Modulation: 256QAM,  
BW=20MHz, Channel Power

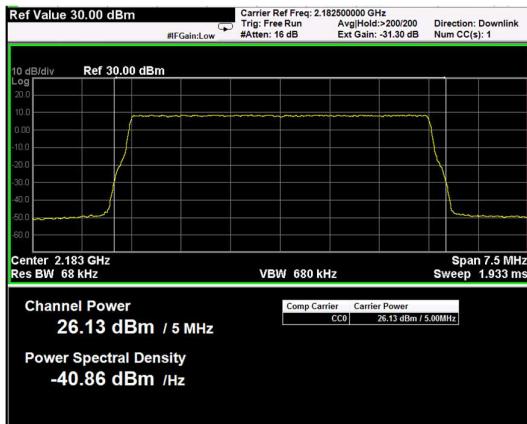


Channel: MIDDLE, Modulation: 256QAM,  
BW=20MHz, CCDF

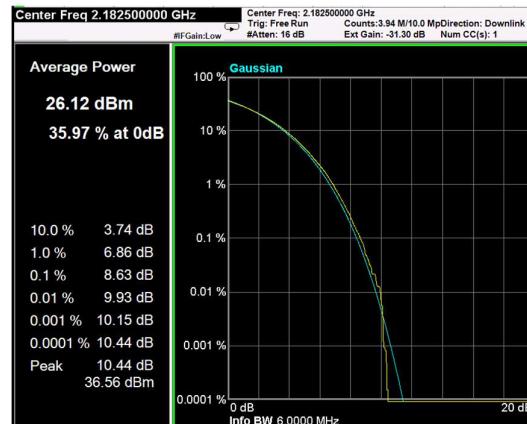
PAR measure is performed by the “CCDF” function installed on Spectrum analyzer that provides average power (the same measured with “Channel power” function), peak power and PAR.

**RF PORT 2**

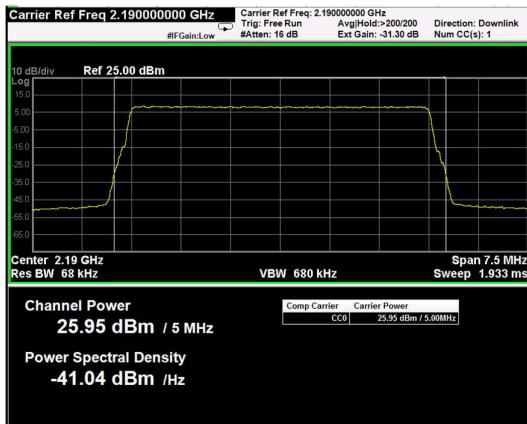
Test data					
Direction	Modulation	Frequency (MHz)	RF output Power (dBm)	RF output channel Power (W)	PAR (dB)
Down-link	LTE 5MHz (QPSK)	2182.5	26.13	0.410	10.44
Down-link	LTE 5MHz (QPSK)	2190	25.95	0.394	10.5
Down-link	LTE 5MHz (QPSK)	2197.5	25.72	0.373	10.48
Down-link	LTE 5MHz (16QAM)	2182.5	26.12	0.409	10.34
Down-link	LTE 5MHz (16QAM)	2190	25.97	0.395	10.4
Down-link	LTE 5MHz (16QAM)	2197.5	25.69	0.371	10.3
Down-link	LTE 5MHz (64QAM)	2182.5	26.11	0.408	10.44
Down-link	LTE 5MHz (64QAM)	2190	25.97	0.395	10.5
Down-link	LTE 5MHz (64QAM)	2197.5	25.72	0.373	10.48
Down-link	LTE 5MHz (256QAM)	2182.5	26.12	0.409	10.44
Down-link	LTE 5MHz (256QAM)	2190	25.96	0.394	10.5
Down-link	LTE 5MHz (256QAM)	2197.5	25.71	0.372	10.48



Channel: BOTTOM, Modulation: QPSK,  
BW=5MHz, Channel Power



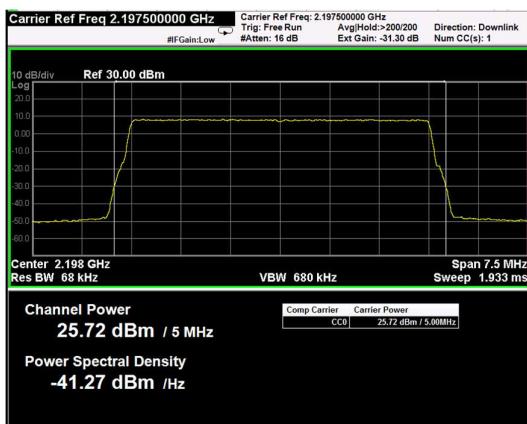
Channel: BOTTOM, Modulation: QPSK,  
BW=5MHz, CCDF



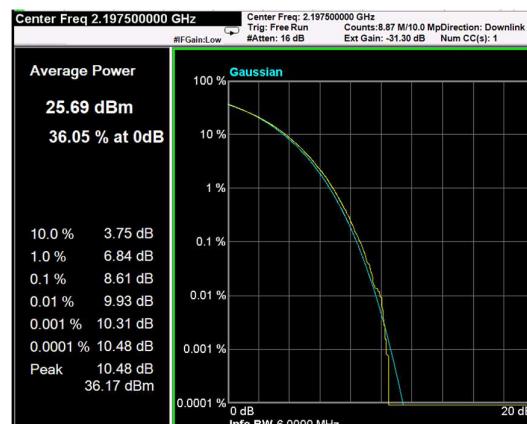
Channel: MIDDLE, Modulation: QPSK,  
BW=5MHz, Channel Power



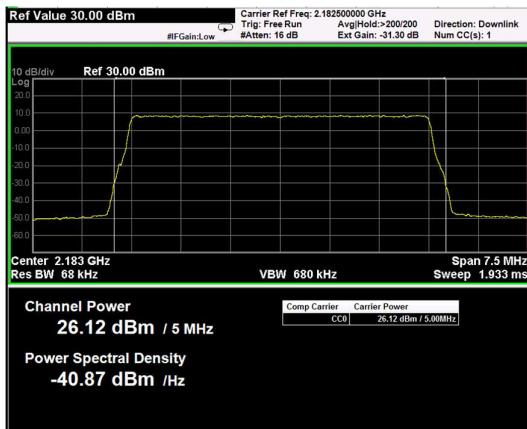
Channel: MIDDLE, Modulation: QPSK,  
BW=5MHz, CCDF



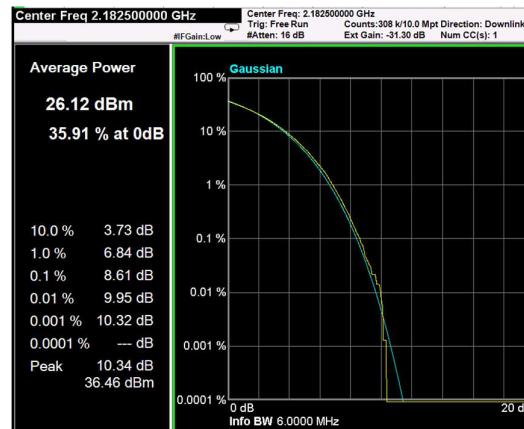
Channel: TOP, Modulation: QPSK,  
BW=5MHz, Channel Power



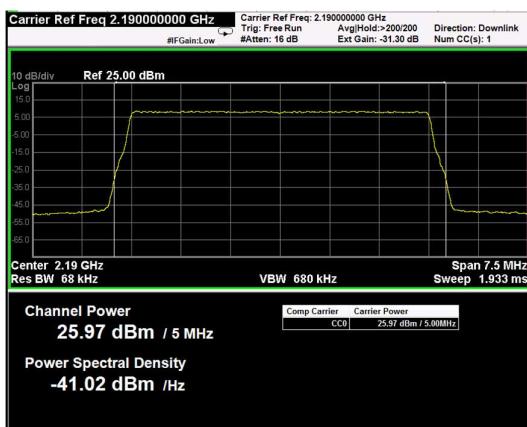
Channel: TOP, Modulation: QPSK,  
BW=5MHz, CCDF



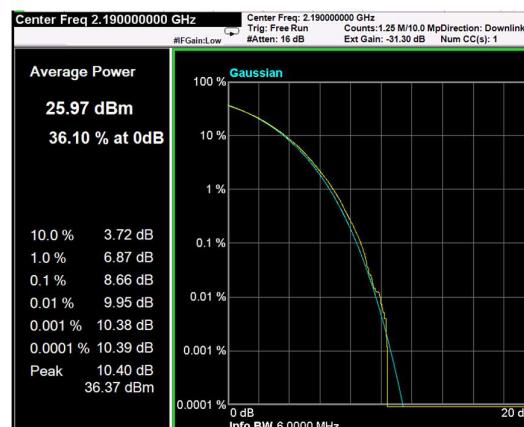
Channel: BOTTOM, Modulation: 16QAM,  
BW=5MHz, Channel Power



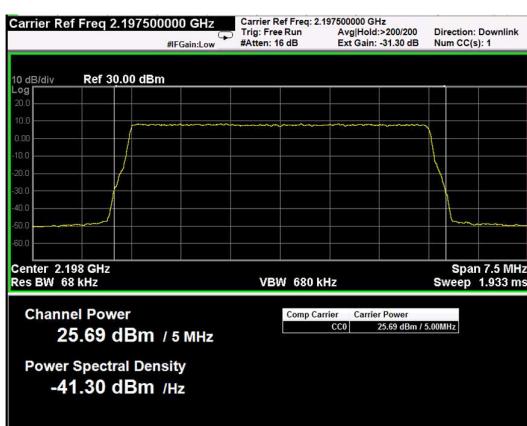
Channel: BOTTOM, Modulation: 16QAM,  
BW=5MHz, CCDF



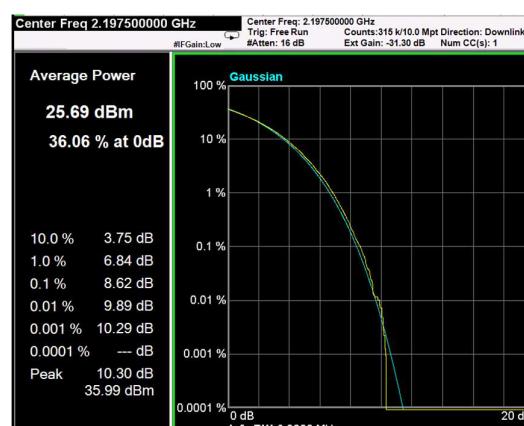
Channel: MIDDLE, Modulation: 16QAM,  
BW=5MHz, Channel Power



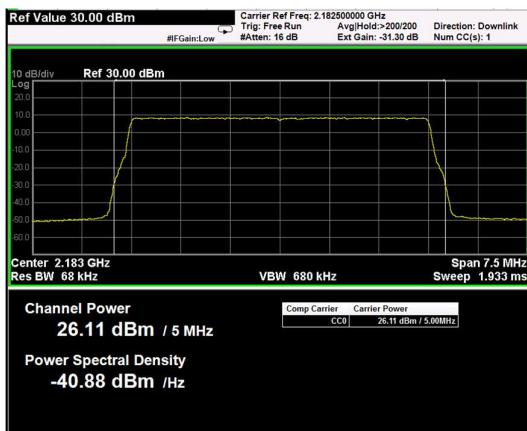
Channel: MIDDLE, Modulation: 16QAM,  
BW=5MHz, CCDF



Channel: TOP, Modulation: 16QAM,  
BW=5MHz, Channel Power



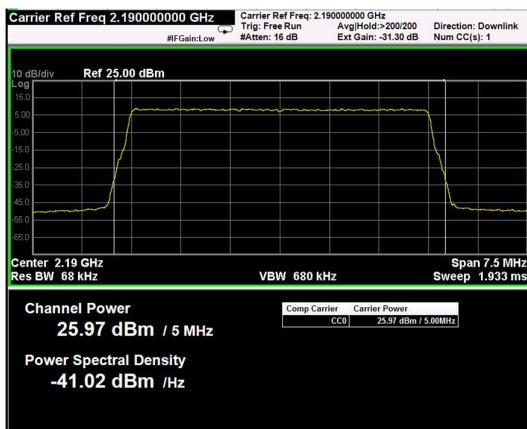
Channel: TOP, Modulation: 16QAM,  
BW=5MHz, CCDF



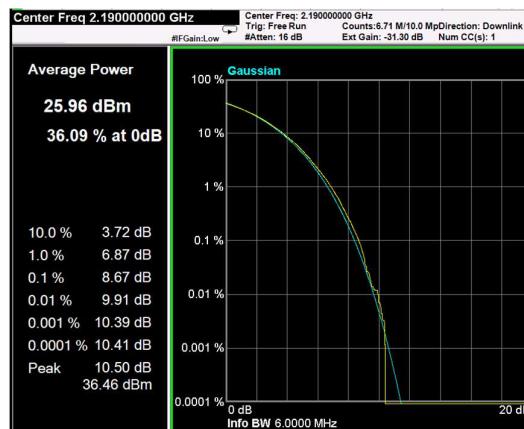
Channel: BOTTOM, Modulation: 64QAM,  
BW=5MHz, Channel Power



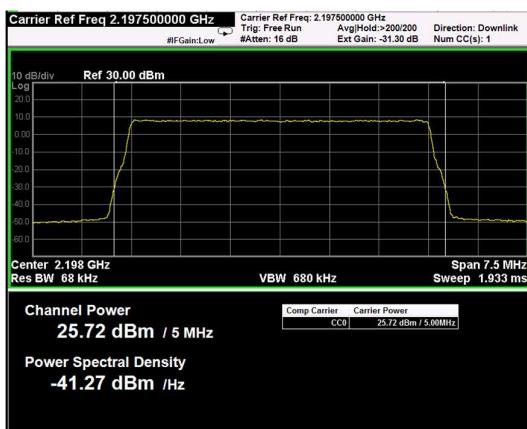
Channel: BOTTOM, Modulation: 64QAM,  
BW=5MHz, CCDF



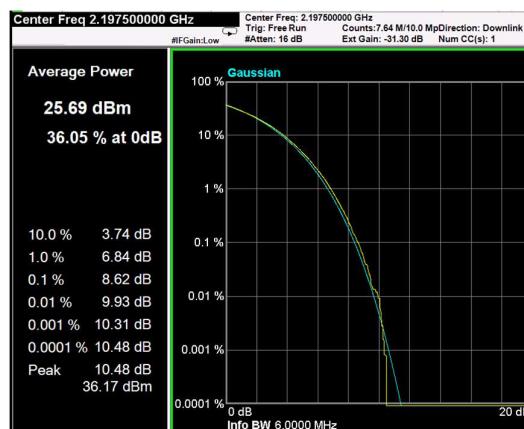
Channel: MIDDLE, Modulation: 64QAM,  
BW=5MHz, Channel Power



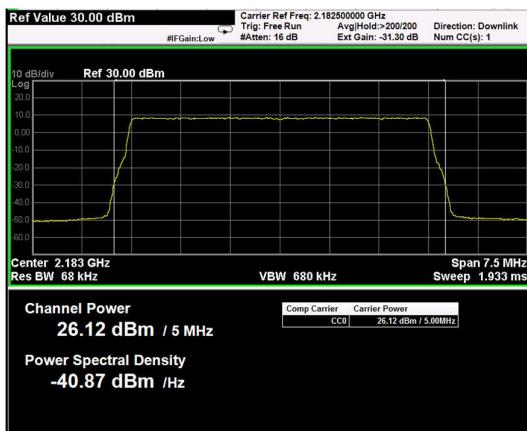
Channel: MIDDLE, Modulation: 64QAM,  
BW=5MHz, CCDF



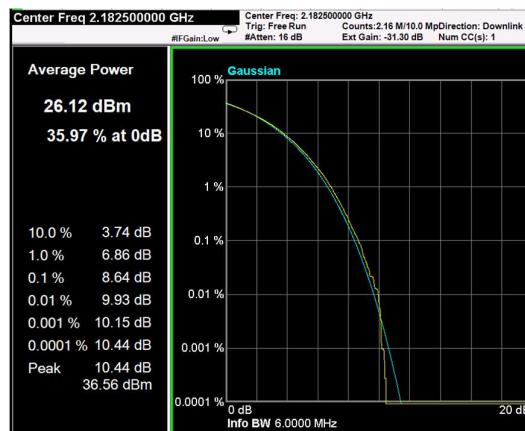
Channel: TOP, Modulation: 64QAM,  
BW=5MHz, Channel Power



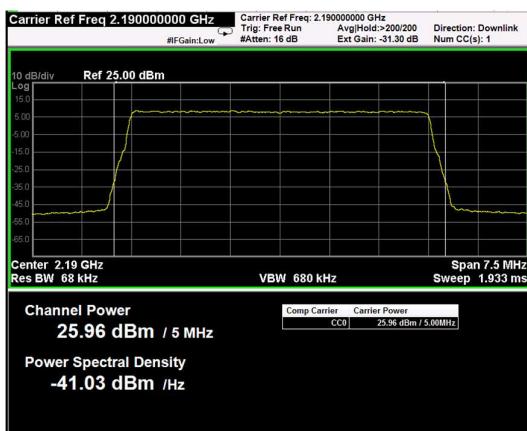
Channel: TOP, Modulation: 64QAM,  
BW=5MHz, CCDF



Channel: BOTTOM, Modulation: 256QAM, BW=5MHz, Channel Power



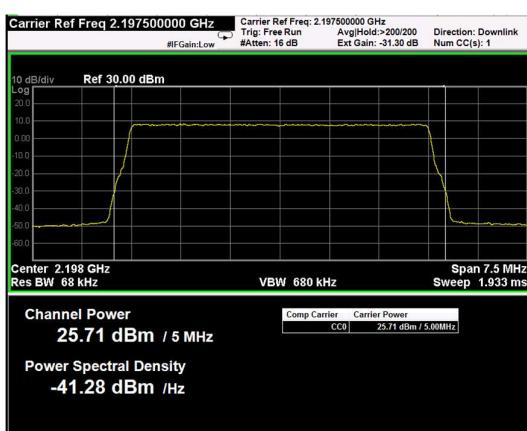
Channel: BOTTOM, Modulation: 256QAM, BW=5MHz, CCDF



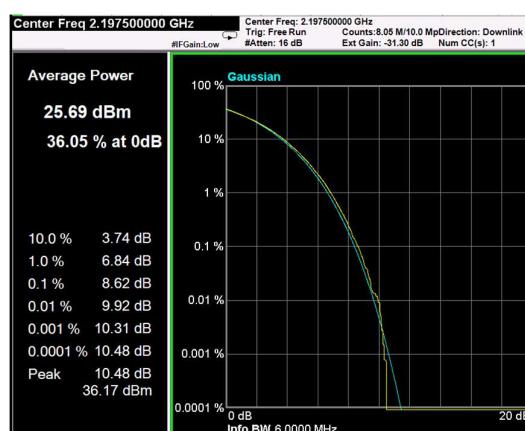
Channel: MIDDLE, Modulation: 256QAM, BW=5MHz, Channel Power



Channel: MIDDLE, Modulation: 256QAM, BW=5MHz, CCDF



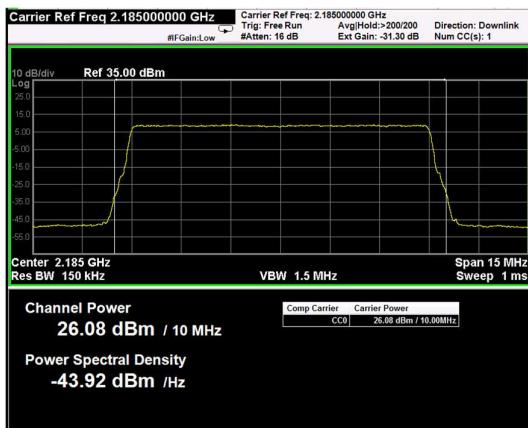
Channel: TOP, Modulation: 256QAM, BW=5MHz, Channel Power



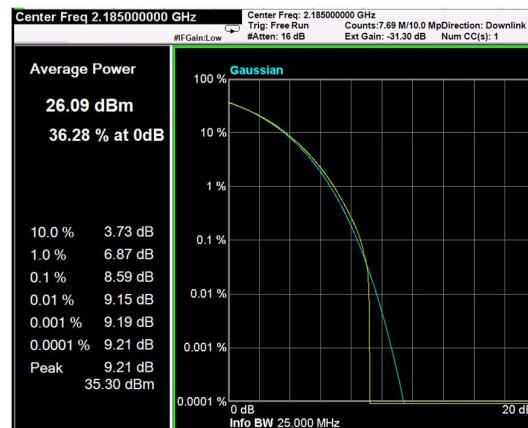
Channel: TOP, Modulation: 256QAM, BW=5MHz, CCDF



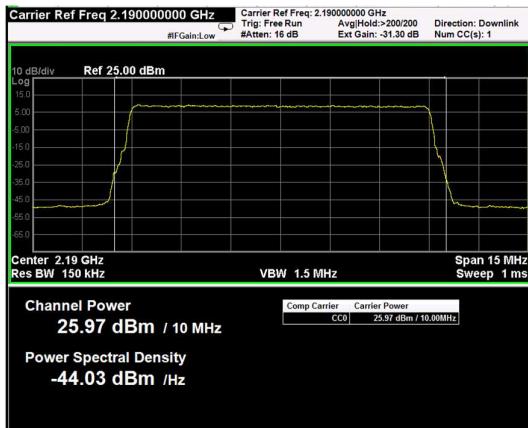
Test data					
Direction	Modulation	Frequency (MHz)	RF output Power (dBm)	RF output channel Power (W)	PAR (dB)
Down-link	LTE 10MHz (QPSK)	2185	26.08	0.406	9.21
Down-link	LTE 10MHz (QPSK)	2190	25.97	0.395	9.3
Down-link	LTE 10MHz (QPSK)	2195	25.83	0.383	9.34
Down-link	LTE 10MHz (16QAM)	2185	26.12	0.409	9.22
Down-link	LTE 10MHz (16QAM)	2190	25.99	0.397	9.29
Down-link	LTE 10MHz (16QAM)	2195	25.83	0.383	9.31
Down-link	LTE 10MHz (64QAM)	2185	26.09	0.406	9.21
Down-link	LTE 10MHz (64QAM)	2190	26.01	0.399	9.3
Down-link	LTE 10MHz (64QAM)	2195	25.82	0.382	9.32
Down-link	LTE 10MHz (256QAM)	2185	26.08	0.406	9.21
Down-link	LTE 10MHz (256QAM)	2190	26	0.398	9.3
Down-link	LTE 10MHz (256QAM)	2195	25.84	0.384	9.32



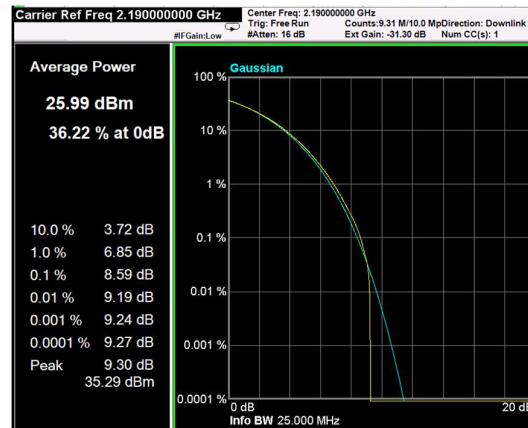
Channel: BOTTOM, Modulation: QPSK, BW=10MHz, Channel Power



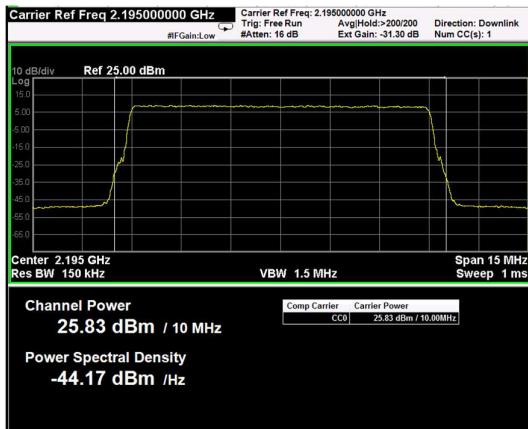
Channel: BOTTOM, Modulation: QPSK, BW=10MHz, CCDF



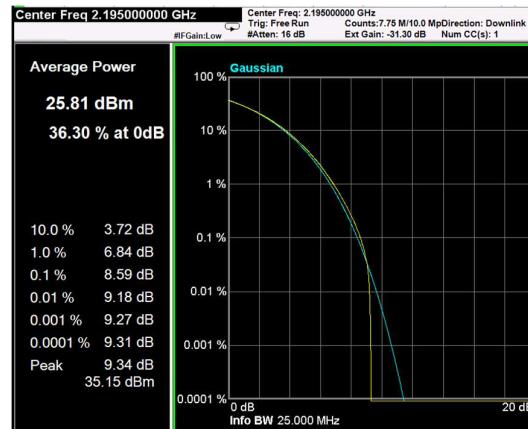
Channel: MIDDLE, Modulation: QPSK, BW=10MHz, Channel Power



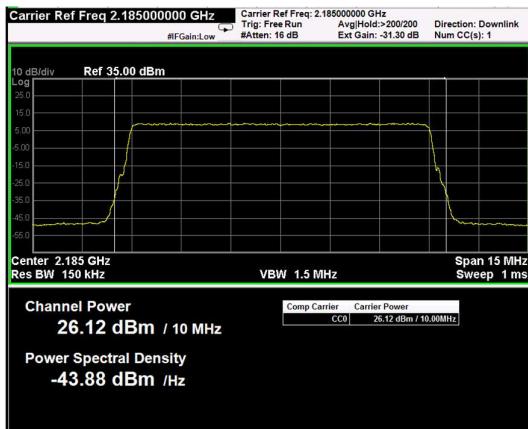
Channel: MIDDLE, Modulation: QPSK, BW=10MHz, CCDF



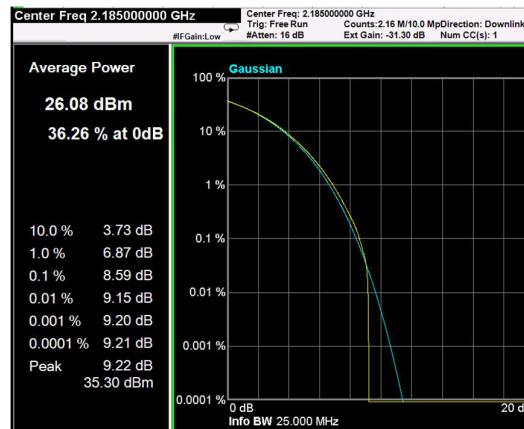
Channel: TOP, Modulation: QPSK, BW=10MHz, Channel Power



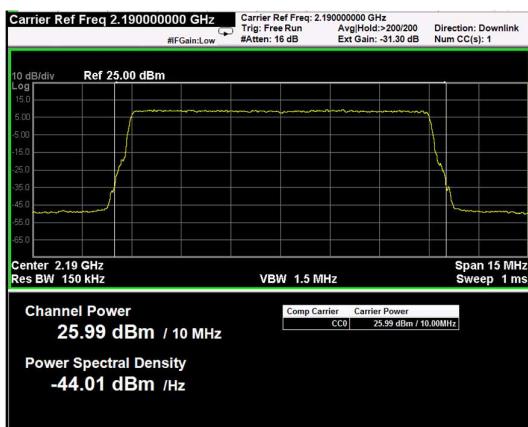
Channel: TOP, Modulation: QPSK, BW=10MHz, CCDF



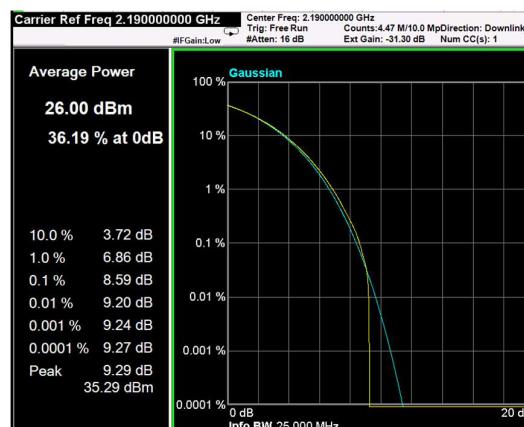
Channel: BOTTOM, Modulation: 16QAM,  
BW=10MHz, Channel Power



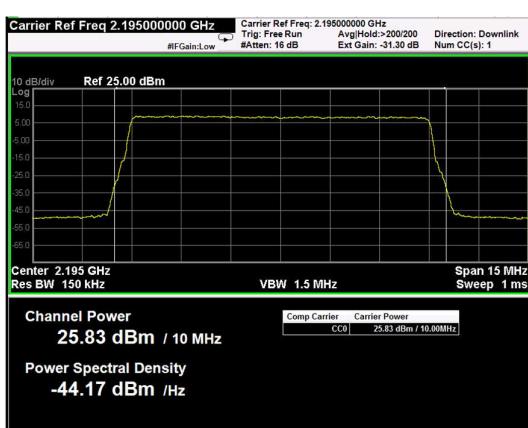
Channel: BOTTOM, Modulation: 16QAM,  
BW=10MHz, CCDF



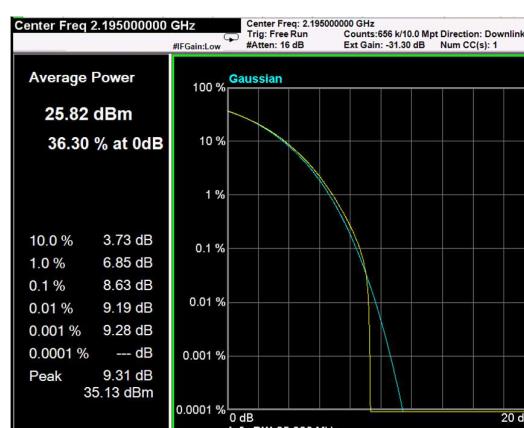
Channel: MIDDLE, Modulation: 16QAM,  
BW=10MHz, Channel Power



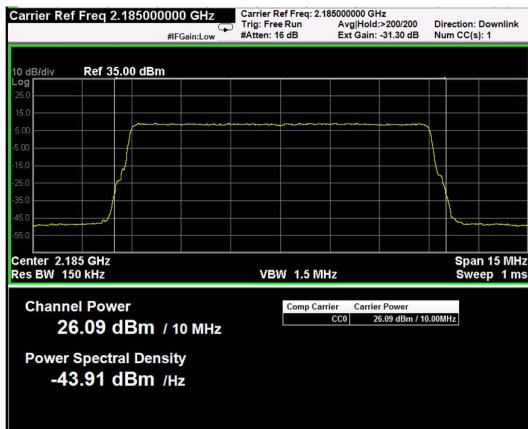
Channel: MIDDLE, Modulation: 16QAM,  
BW=10MHz, CCDF



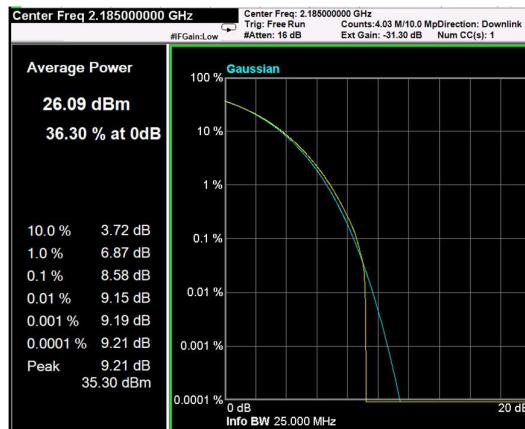
Channel: TOP, Modulation: 16QAM,  
BW=10MHz, Channel Power



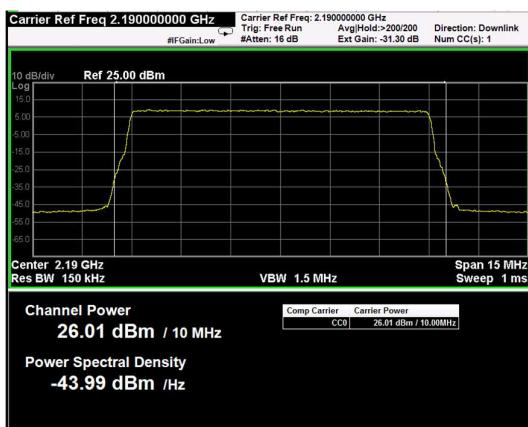
Channel: TOP, Modulation: 16QAM,  
BW=10MHz, CCDF



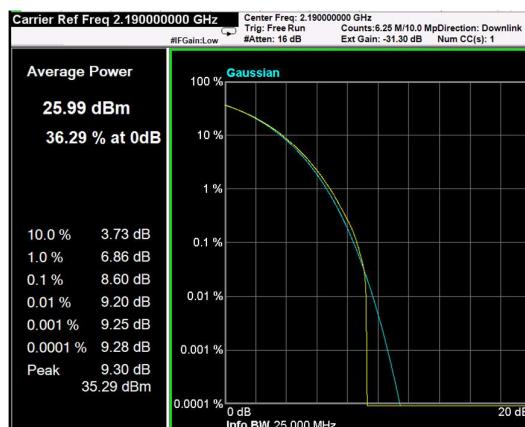
Channel: BOTTOM, Modulation: 64QAM,  
BW=10MHz, Channel Power



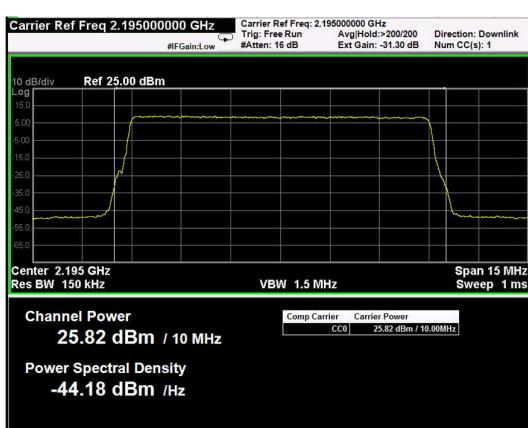
Channel: BOTTOM, Modulation: 64QAM,  
BW=10MHz, CCDF



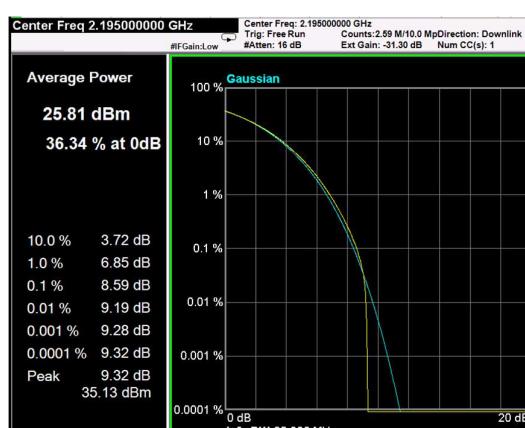
Channel: MIDDLE, Modulation: 64QAM,  
BW=10MHz, Channel Power



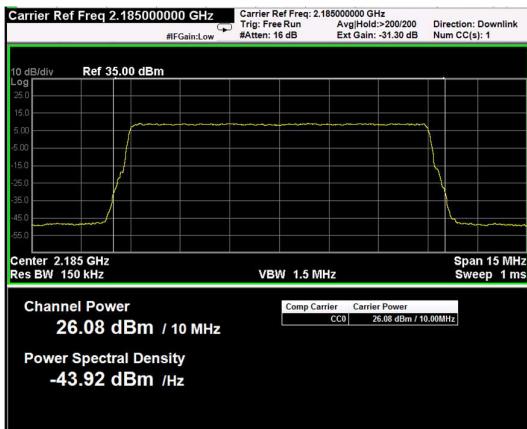
Channel: MIDDLE, Modulation: 64QAM,  
BW=10MHz, CCDF



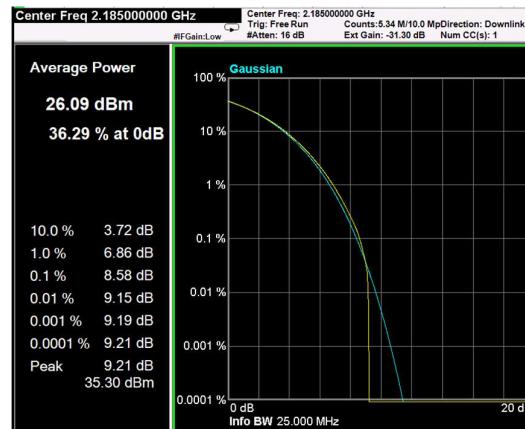
Channel: TOP, Modulation: 64QAM,  
BW=10MHz, Channel Power



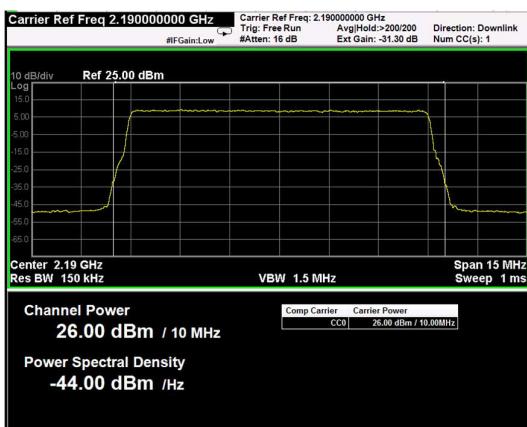
Channel: TOP, Modulation: 64QAM,  
BW=10MHz, CCDF



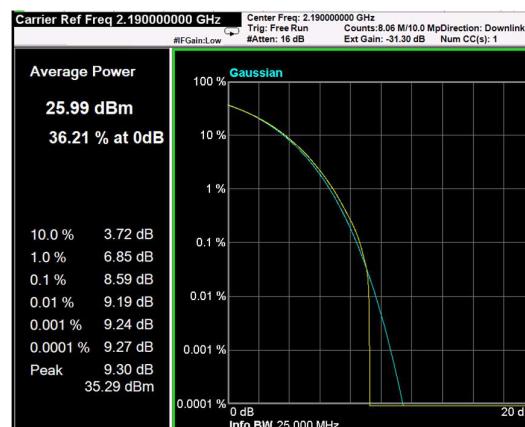
Channel: BOTTOM, Modulation: 256QAM,  
BW=10MHz, Channel Power



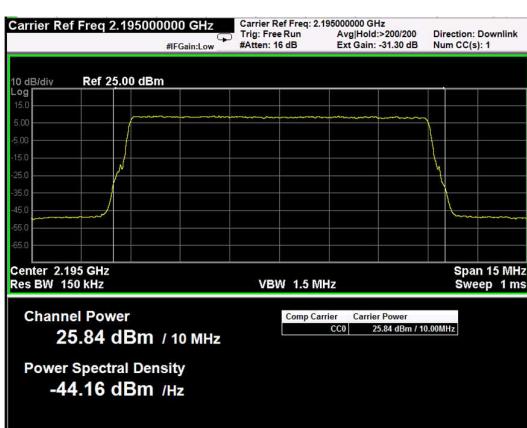
Channel: BOTTOM, Modulation: 256QAM,  
BW=10MHz, CCDF



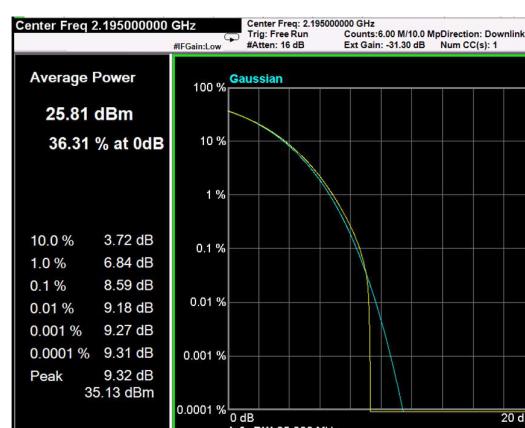
Channel: MIDDLE, Modulation: 256QAM,  
BW=10MHz, Channel Power



Channel: MIDDLE, Modulation: 256QAM,  
BW=10MHz, CCDF



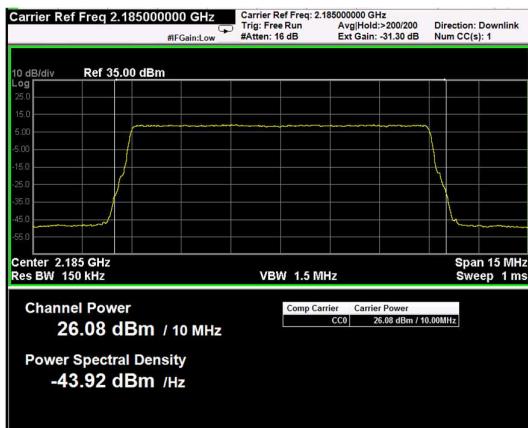
Channel: TOP, Modulation: 256QAM,  
BW=10MHz, Channel Power



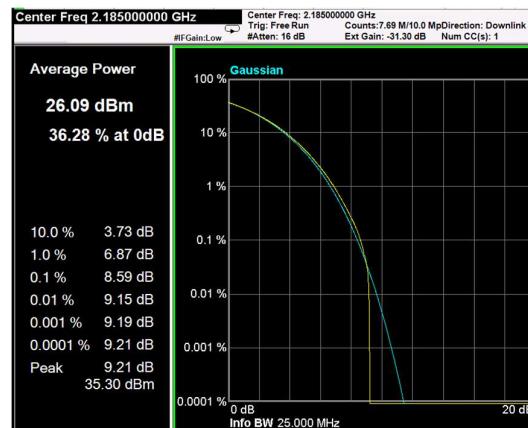
Channel: TOP, Modulation: 256QAM,  
BW=10MHz, CCDF



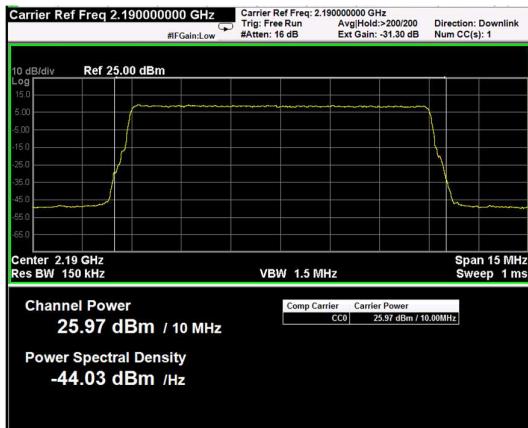
Test data					
Direction	Modulation	Frequency (MHz)	RF output Power (dBm)	RF output channel Power (W)	PAR (dB)
Down-link	LTE 15MHz (QPSK)	2187.5	26.08	0.406	9.21
Down-link	LTE 15MHz (QPSK)	2190	25.97	0.395	9.3
Down-link	LTE 15MHz (QPSK)	2192.5	25.83	0.383	9.34
Down-link	LTE 15MHz (16QAM)	2187.5	26.12	0.409	9.22
Down-link	LTE 15MHz (16QAM)	2190	25.99	0.397	9.29
Down-link	LTE 15MHz (16QAM)	2192.5	25.83	0.383	9.31
Down-link	LTE 15MHz (64QAM)	2187.5	26.09	0.406	9.21
Down-link	LTE 15MHz (64QAM)	2190	26.01	0.399	9.3
Down-link	LTE 15MHz (64QAM)	2192.5	25.82	0.382	9.32
Down-link	LTE 15MHz (256QAM)	2187.5	26.08	0.406	9.21
Down-link	LTE 15MHz (256QAM)	2190	26	0.398	9.3
Down-link	LTE 15MHz (256QAM)	2192.5	25.84	0.384	9.32



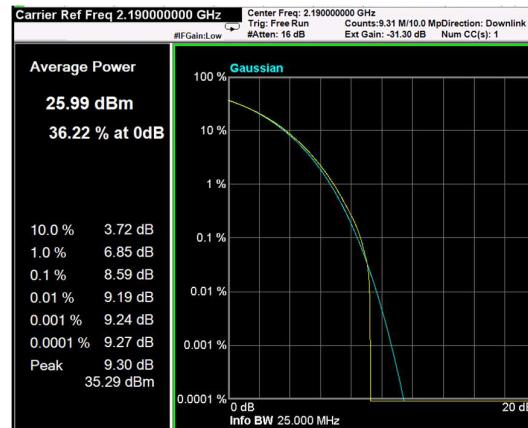
Channel: BOTTOM, Modulation: QPSK,  
BW=15MHz, Channel Power



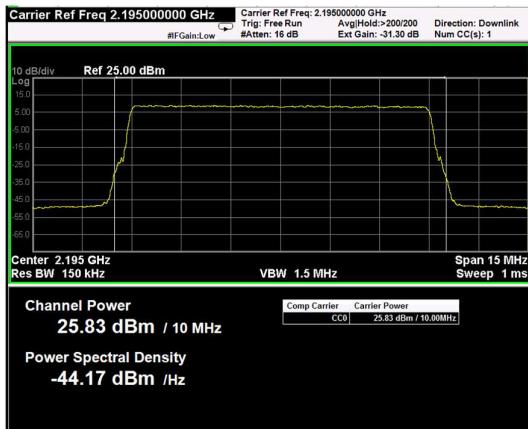
Channel: BOTTOM, Modulation: QPSK,  
BW=15MHz, CCDF



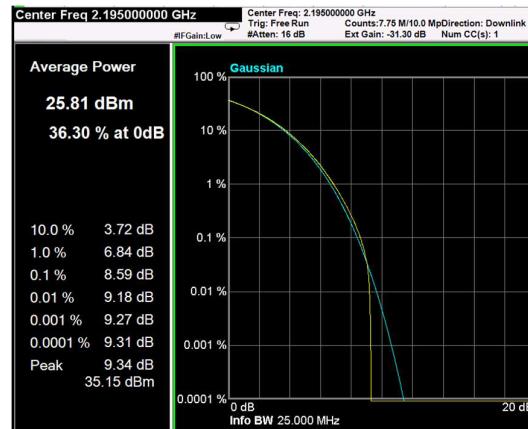
Channel: MIDDLE, Modulation: QPSK,  
BW=15MHz, Channel Power



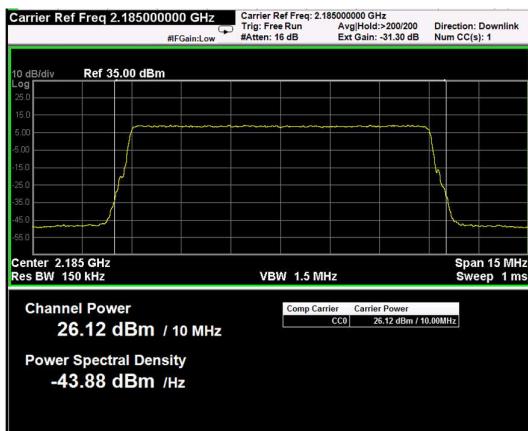
Channel: MIDDLE, Modulation: QPSK,  
BW=15MHz, CCDF



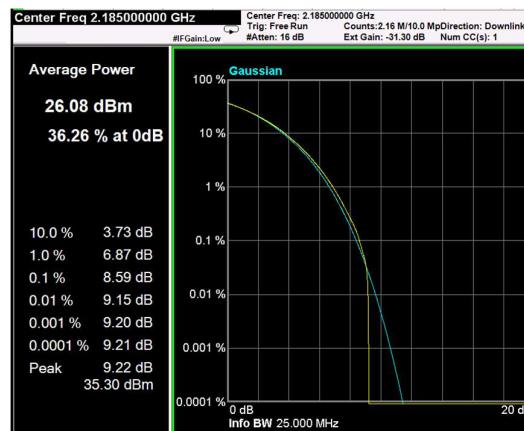
Channel: TOP, Modulation: QPSK,  
BW=15MHz, Channel Power



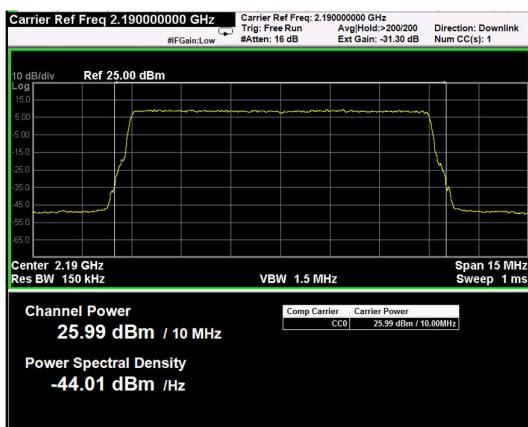
Channel: TOP, Modulation: QPSK,  
BW=15MHz, CCDF



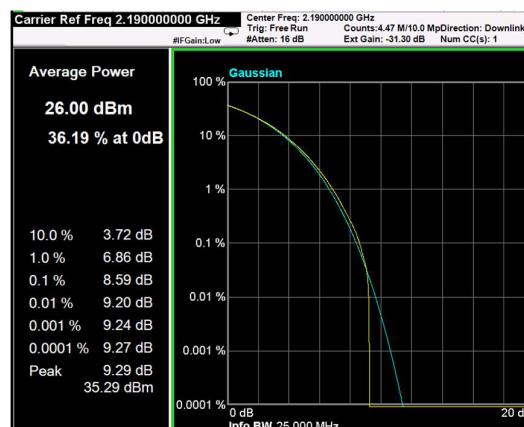
Channel: BOTTOM, Modulation: 16QAM,  
BW=15MHz, Channel Power



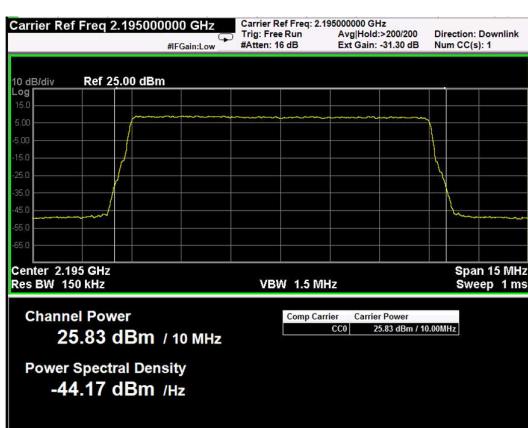
Channel: BOTTOM, Modulation: 16QAM,  
BW=15MHz, CCDF



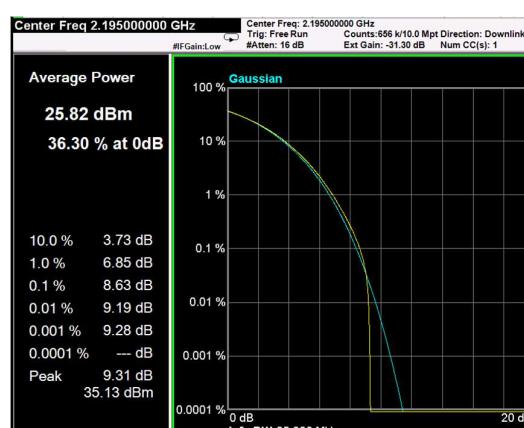
Channel: MIDDLE, Modulation: 16QAM,  
BW=15MHz, Channel Power



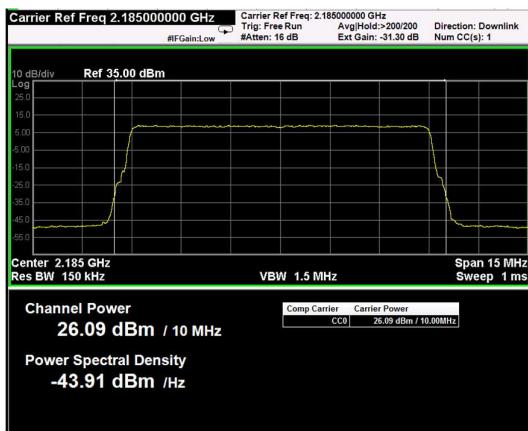
Channel: MIDDLE, Modulation: 16QAM,  
BW=15MHz, CCDF



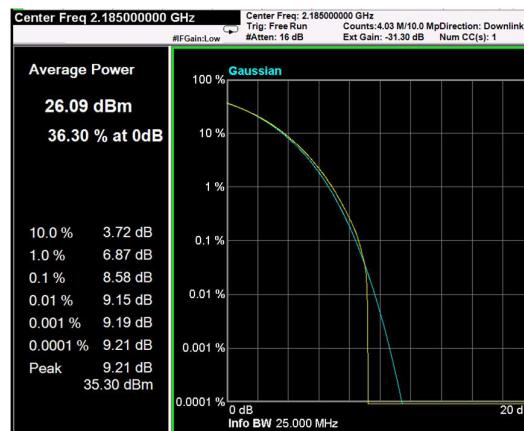
Channel: TOP, Modulation: 16QAM,  
BW=15MHz, Channel Power



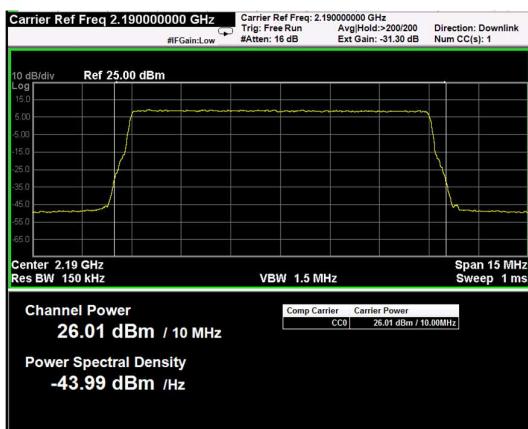
Channel: TOP, Modulation: 16QAM,  
BW=15MHz, CCDF



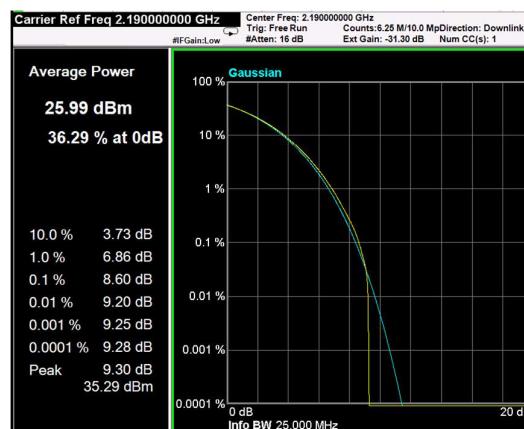
Channel: BOTTOM, Modulation: 64QAM,  
BW=15MHz, Channel Power



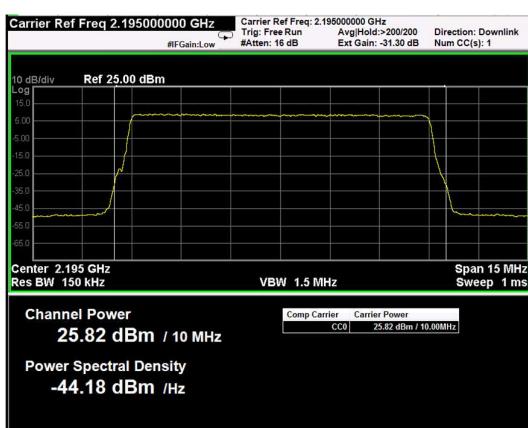
Channel: BOTTOM, Modulation: 64QAM,  
BW=15MHz, CCDF



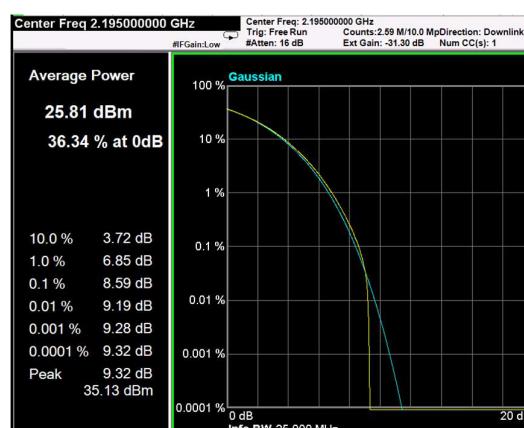
Channel: MIDDLE, Modulation: 64QAM,  
BW=15MHz, Channel Power



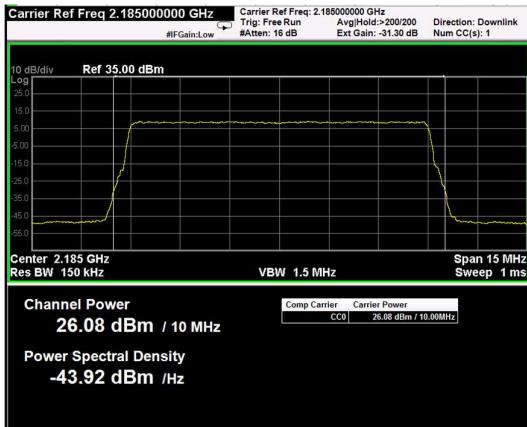
Channel: MIDDLE, Modulation: 64QAM,  
BW=15MHz, CCDF



Channel: TOP, Modulation: 64QAM,  
BW=15MHz, Channel Power



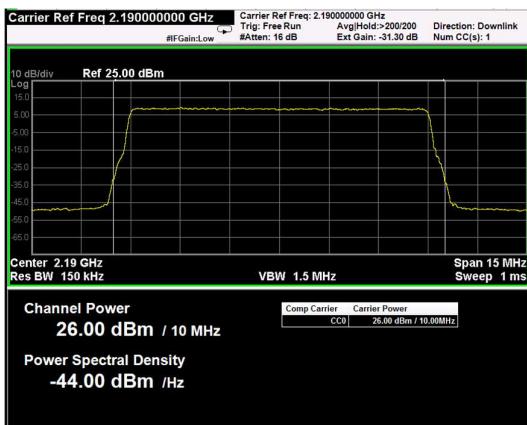
Channel: TOP, Modulation: 64QAM,  
BW=15MHz, CCDF



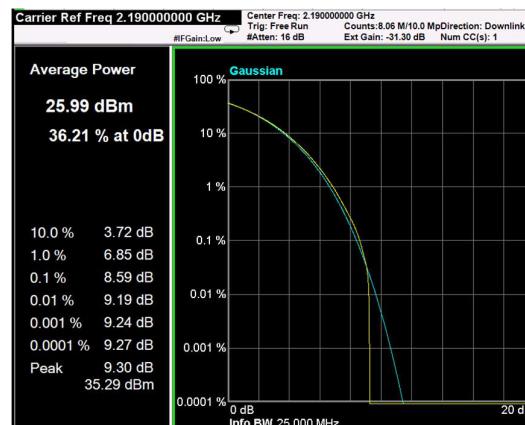
Channel: BOTTOM, Modulation: 256QAM,  
BW=15MHz, Channel Power



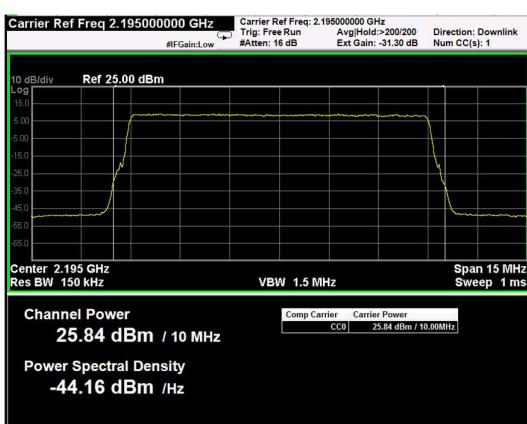
Channel: BOTTOM, Modulation: 256QAM,  
BW=15MHz, CCDF



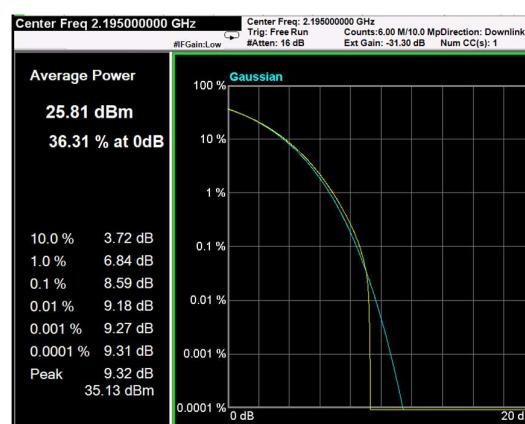
Channel: MIDDLE, Modulation: 256QAM,  
BW=15MHz, Channel Power



Channel: MIDDLE, Modulation: 256QAM,  
BW=15MHz, CCDF



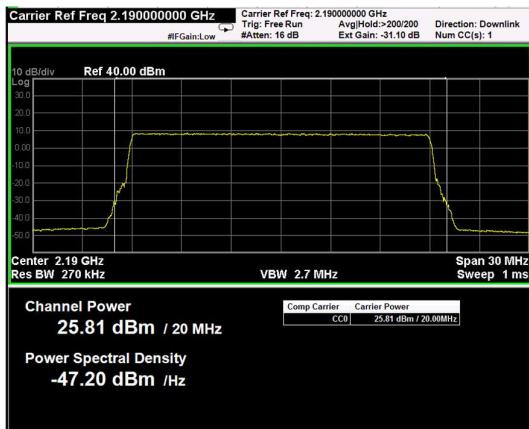
Channel: TOP, Modulation: 256QAM,  
BW=15MHz, Channel Power



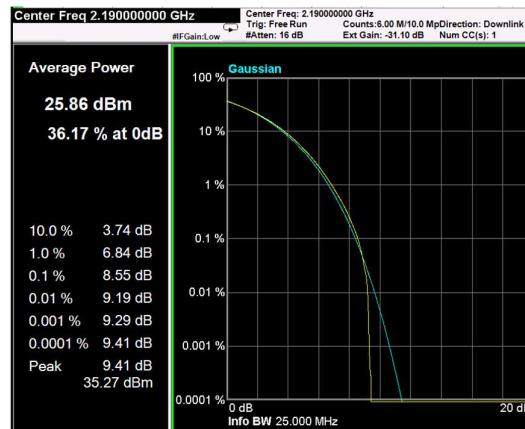
Channel: TOP, Modulation: 256QAM,  
BW=15MHz, CCDF



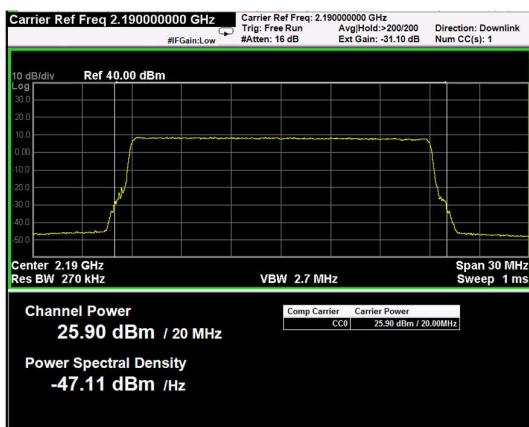
Test data					
Direction	Modulation	Frequency (MHz)	RF output Power (dBm)	RF output channel Power (W)	PAR (dB)
Down-link	LTE 20MHz (QPSK)	2190	25.81	0.381	9.41
Down-link	LTE 20MHz (16QAM)	2190	25.9	0.389	9.42
Down-link	LTE 20MHz (64QAM)	2190	25.89	0.388	9.46
Down-link	LTE 20MHz (256QAM)	2190	25.82	0.382	9.41



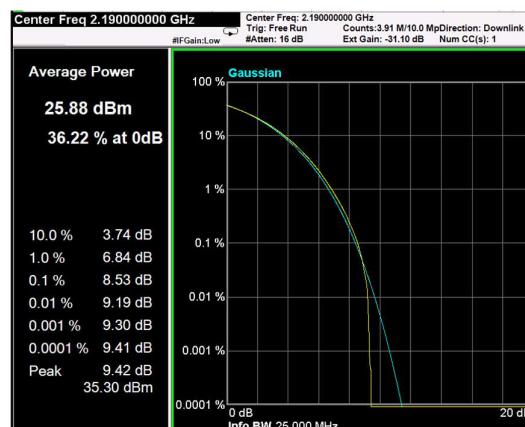
Channel: MIDDLE, Modulation: QPSK,  
BW=20MHz, Channel Power



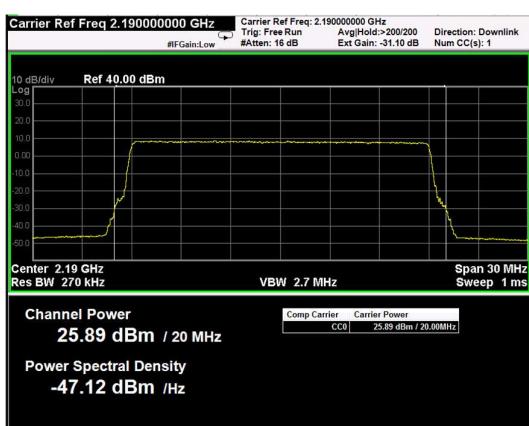
Channel: MIDDLE, Modulation: QPSK,  
BW=20MHz, CCDF



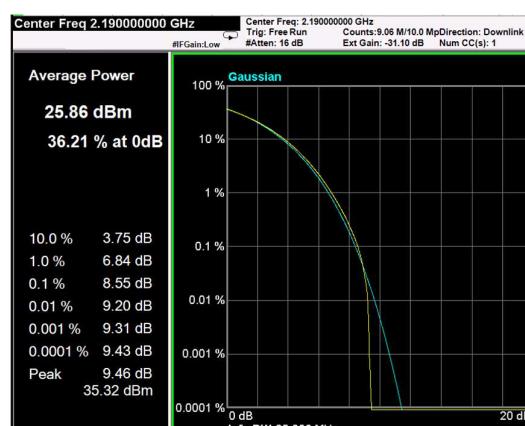
Channel: MIDDLE, Modulation: 16QAM,  
BW=20MHz, Channel Power



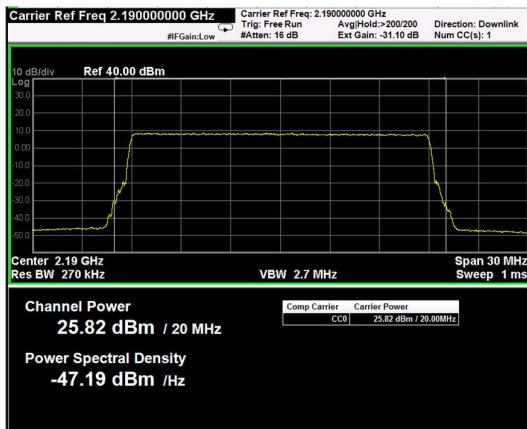
Channel: MIDDLE, Modulation: 16QAM,  
BW=20MHz, CCDF



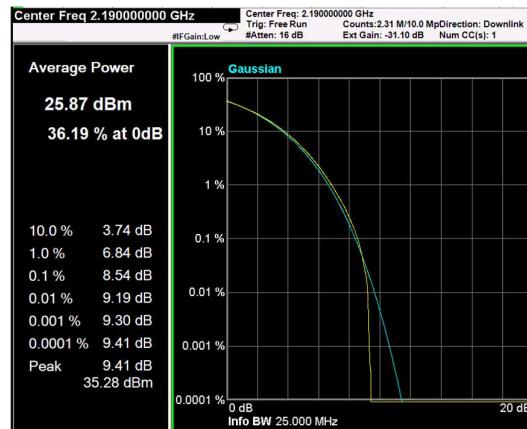
Channel: MIDDLE, Modulation: 64QAM,  
BW=20MHz, Channel Power



Channel: MIDDLE, Modulation: 64QAM,  
BW=20MHz, CCDF



Channel: MIDDLE, Modulation: 256QAM,  
BW=20MHz, Channel Power



Channel: MIDDLE, Modulation: 256QAM,  
BW=20MHz, CCDF



## Clause 27.53(h) Spurious emissions at RF antenna connector

### (h) AWS emission limits:

(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10} (P)$  dB.

### (3) Measurement procedure.

(i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(ii) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

(iii) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

Test date: [04/03/2019 to 05/10/2019](#)

Test results: [Pass](#)

### Special notes

1) Limit of spurious emission at RF connector has been calculated following the indication in the "662911 D01 Multiple Transmitter Output v02r01" Clause 3) a) iii) with N Ant = 2.

$$10\log(N_{Ant}) = 10\log(2) = 3 \text{ dB}$$

$$\text{Limit} = -13\text{dBm} - 3\text{dBm} = -16\text{dBm}$$

2) Limit of band edges Inter modulation has been calculated following the indication in the "662911 D01 Multiple Transmitter Output v02r01" Clause 3) a) iii) with N Ant = 2 considering RBW=100kHz.

$$\text{Limit(RBW=1MHz)} = -13\text{dBm} \rightarrow \text{Limit(RBW=100kHz)} = -23\text{dBm}$$

$$10\log(N_{Ant}) = 10\log(2) = 3 \text{ dB}$$

$$\text{Limit} = -23\text{dBm} - 3\text{dBm} = -26\text{dBm}$$



## Clause 27.53 (h) Spurious emissions at RF antenna connector, continued

## Test data

**See Plots below**

## Spurious emissions measurement results:

Frequency (MHz)	Spurious emission (dBm)	Limit (dBm)	Margin (dB)
<u>Low channel</u>			
First channel	Negligible	-16	
<u>Mid channel</u>			
2190 MHz	Negligible	-16	
<u>High channel</u>			
Last channel	Negligible	-16	

**Test data: Spurious Emissions at antenna terminal**
**RF PORT 1**

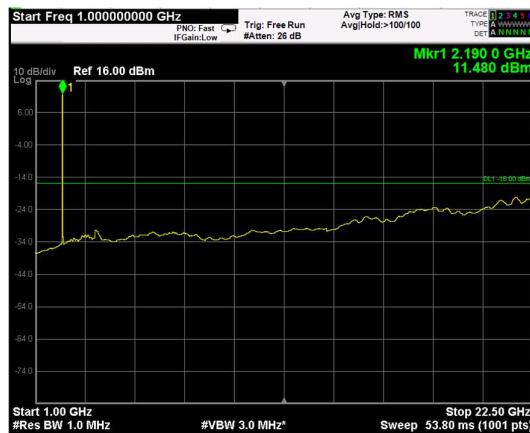

Channel: BOTTOM, Modulation: QPSK,  
BW=5MHz, Range: Lower



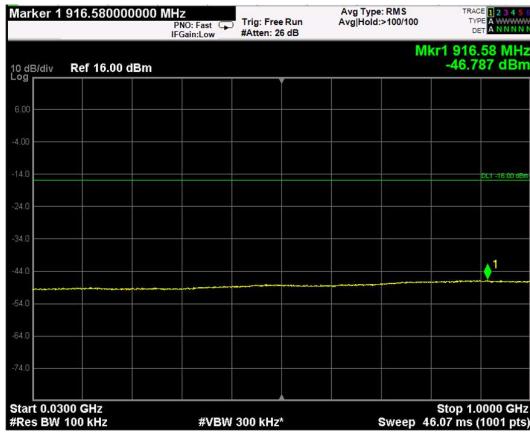
Channel: BOTTOM, Modulation: QPSK,  
BW=5MHz, Range: Upper



Channel: MIDDLE, Modulation: QPSK,  
BW=5MHz, Range: Lower



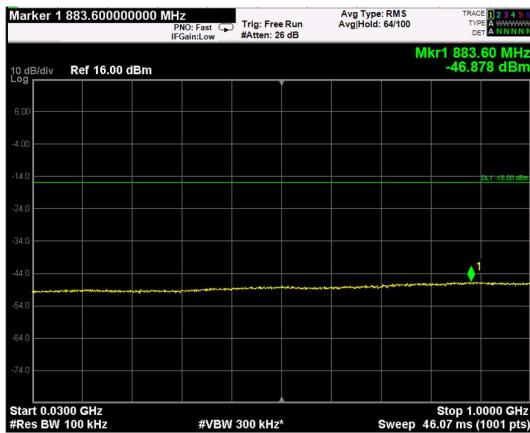
Channel: MIDDLE, Modulation: QPSK,  
BW=5MHz, Range: Upper



Channel: TOP, Modulation: QPSK,  
BW=5MHz, Range: Lower



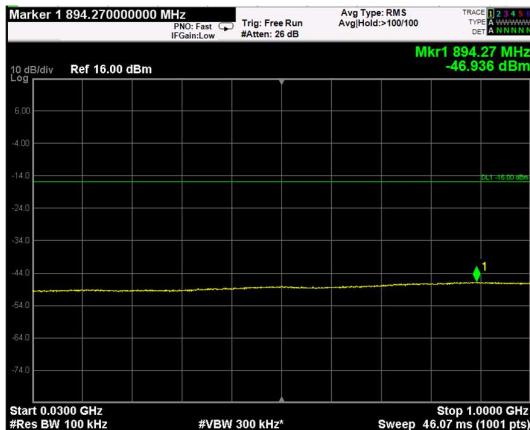
Channel: TOP, Modulation: QPSK,  
BW=5MHz, Range: Upper



Channel: BOTTOM, Modulation: 16QAM,  
BW=5MHz, Range: Lower



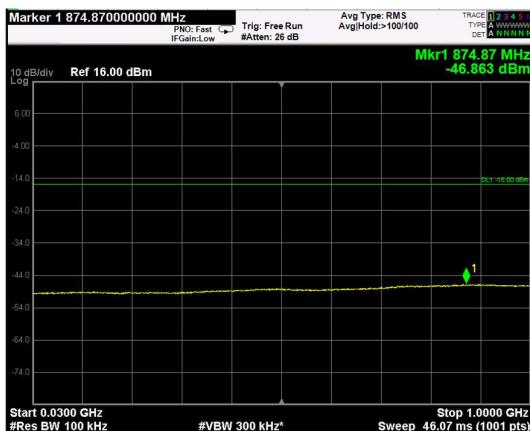
Channel: BOTTOM, Modulation: 16QAM,  
BW=5MHz, Range: Upper



Channel: MIDDLE, Modulation: 16QAM,  
BW=5MHz, Range: Lower



Channel: MIDDLE, Modulation: 16QAM,  
BW=5MHz, Range: Upper



Channel: TOP, Modulation: 16QAM,  
BW=5MHz, Range: Lower



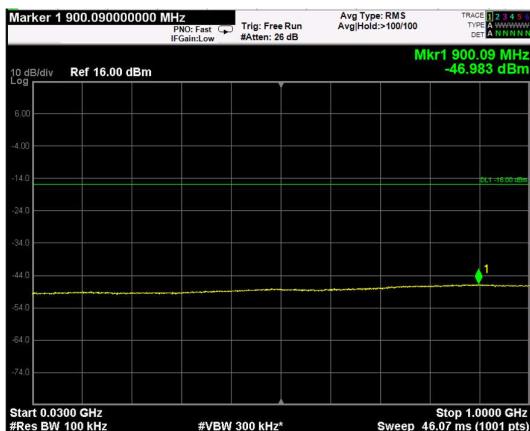
Channel: TOP, Modulation: 16QAM,  
BW=5MHz, Range: Upper



Channel: BOTTOM, Modulation: 64QAM,  
BW=5MHz, Range: Lower



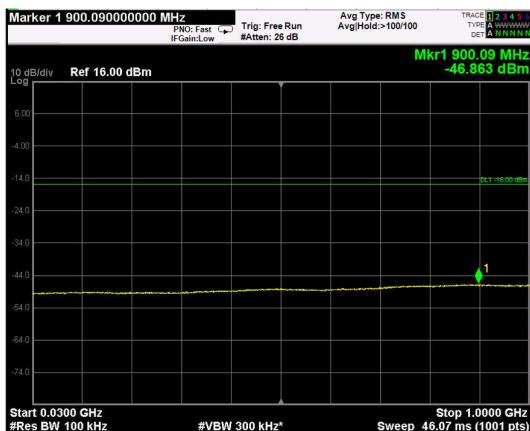
Channel: BOTTOM, Modulation: 64QAM,  
BW=5MHz, Range: Upper



Channel: MIDDLE, Modulation: 64QAM,  
BW=5MHz, Range: Lower



Channel: MIDDLE, Modulation: 64QAM,  
BW=5MHz, Range: Upper



Channel: TOP, Modulation: 64QAM,  
BW=5MHz, Range: Lower



Channel: TOP, Modulation: 64QAM,  
BW=5MHz, Range: Upper