

5.3 Occupied Bandwidth

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

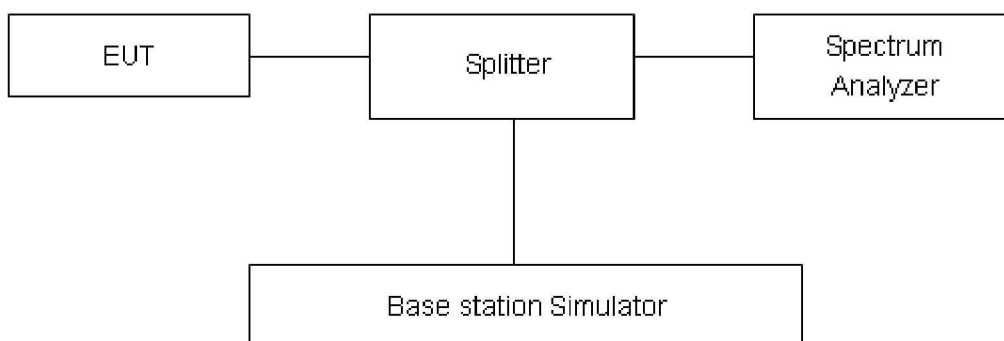
Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.

RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4/12/13 .

99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

No specific occupied bandwidth requirements in part 2.1049.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U=624\text{Hz}$.

Test Result

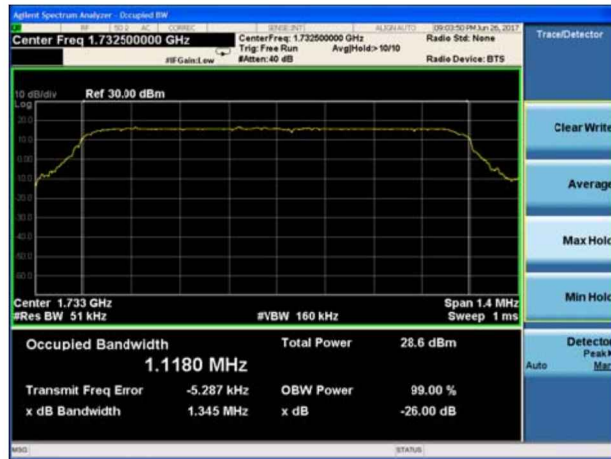
Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	RB	Index	Bandwidth(MHz)	
						99% Power	-26dBc
Band4	1.4MHz	QPSK	20175/1732.5	6#0	0	1.1180	1.345
		16QAM	20175/1732.5	6#0	0	0.93883	1.215
	3MHz	QPSK	20175/1732.5	6#0	0	1.15040	1.655
		16QAM	20175/1732.5	6#0	0	0.98073	1.337
	5MHz	QPSK	20175/1732.5	6#0	0	1.13010	1.472
		16QAM	20175/1732.5	6#0	0	1.0162	1.496
	10MHz	QPSK	20175/1732.5	6#0	0	1.1840	1.796
		16QAM	20175/1732.5	6#0	0	1.0660	1.795
	15MHz	QPSK	20175/1732.5	6#0	0	1.1955	1.894
		16QAM	20175/1732.5	6#0	0	1.0578	1.889
	20MHz	QPSK	20175/1732.5	6#0	0	1.2079	1.782
		16QAM	20175/1732.5	6#0	0	1.1125	1.862

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	RB	Index	Bandwidth(MHz)	
						99% Power	-26dBc
Band12	1.4MHz	QPSK	23095/707.5	6#0	0	1.1082	1.332
		16QAM	23095/707.5	6#0	0	0.93878	1.195
	3MHz	QPSK	23095/707.5	6#0	0	1.1525	1.66
		16QAM	23095/707.5	6#0	0	0.98517	1.343
	5MHz	QPSK	23095/707.5	6#0	0	1.1445	1.506
		16QAM	23095/707.5	6#0	0	0.97604	1.423
	10MHz	QPSK	23095/707.5	6#0	0	1.2051	1.738
		16QAM	23095/707.5	6#0	0	1.0835	1.731

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	RB	Index	Bandwidth(MHz)	
						99% Power	-26dBc
Band13	5MHz	QPSK	23230/782	6#0	0	1.149	1.481
		16QAM	23230/782	6#0	0	0.97695	1.356
	10MHz	QPSK	23230/782	6#0	0	1.1775	1.721
		16QAM	23230/782	6#0	0	1.0331	1.537



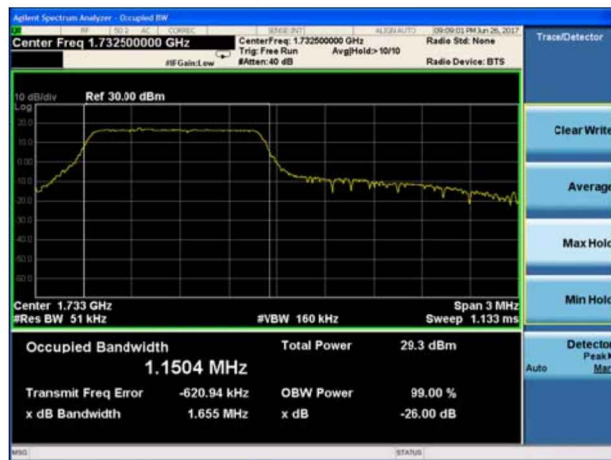
LTE Band 4 QPSK 1.4MHz CH-Middle



LTE Band 4 16QAM 1.4MHz CH-Middle



LTE Band 4 QPSK 3MHz CH-Middle



LTE Band 4 16QAM 3MHz CH-Middle



LTE Band 4 QPSK 5MHz CH-Middle



LTE Band 4 16QAM 5MHz CH-Middle





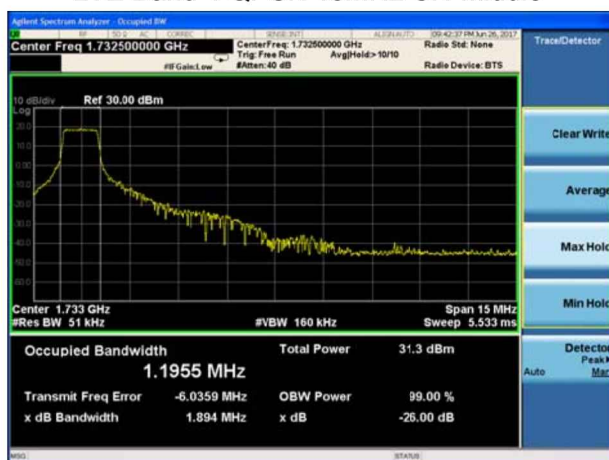
LTE Band 4 QPSK 10MHz CH-Middle



LTE Band 4 16QAM 10MHz CH-Middle



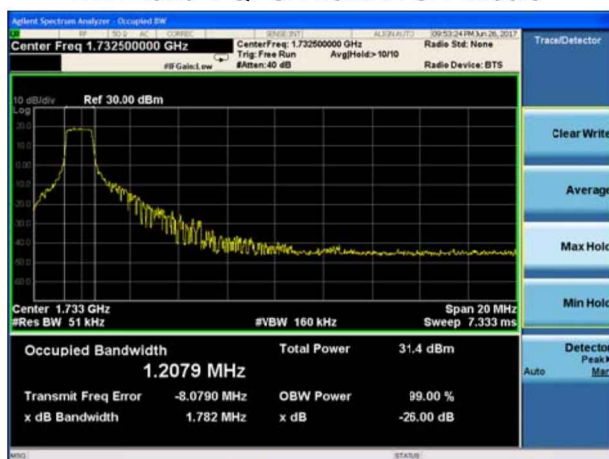
LTE Band 4 QPSK 15MHz CH-Middle



LTE Band 4 16QAM 15MHz CH-Middle



LTE Band 4 QPSK 20MHz CH-Middle

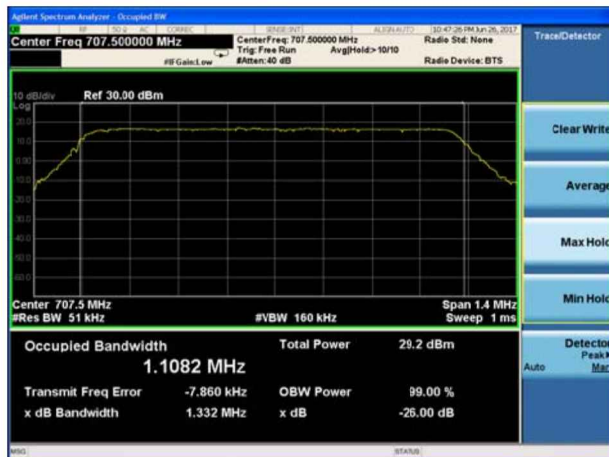


LTE Band 4 16QAM 20MHz CH-Middle





LTE Band 12 QPSK 1.4MHz CH-Middle



LTE Band 12 16QAM 1.4MHz CH-Middle



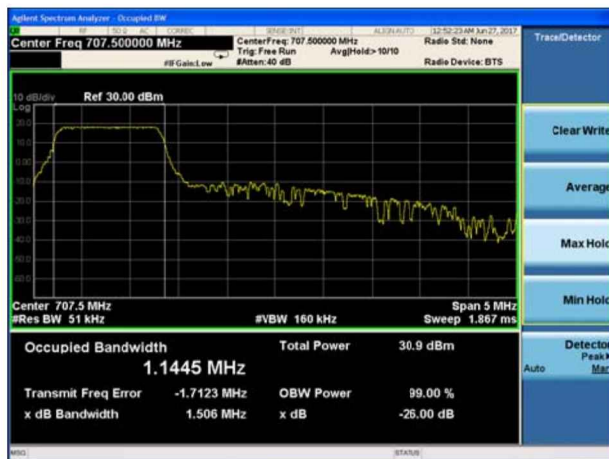
LTE Band 12 QPSK 3MHz CH-Middle



LTE Band 12 16QAM 3MHz CH-Middle



LTE Band 12 QPSK 5MHz CH-Middle



LTE Band 12 16QAM 5MHz CH-Middle





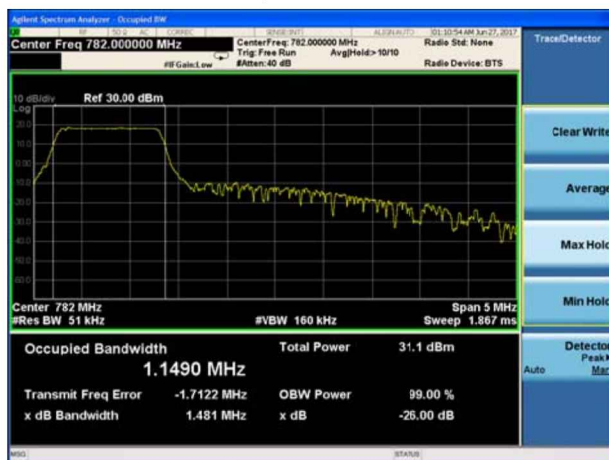
LTE Band 12 QPSK 10MHz CH-Middle



LTE Band 12 16QAM 10MHz CH-Middle



LTE Band 13 QPSK 5MHz CH-Middle



LTE Band 13 16QAM 5MHz CH-Middle



LTE Band 13 QPSK 10MHz CH-Middle



LTE Band 13 16QAM 10MHz CH-Middle



5.4 Band Edge Compliance

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured.

The testing follows KDB 971168 v02r02 Section 6.0

The EUT was connected to spectrum analyzer and system simulator via a power divider.

The band edges of low and high channels for the highest RF powers were measured.

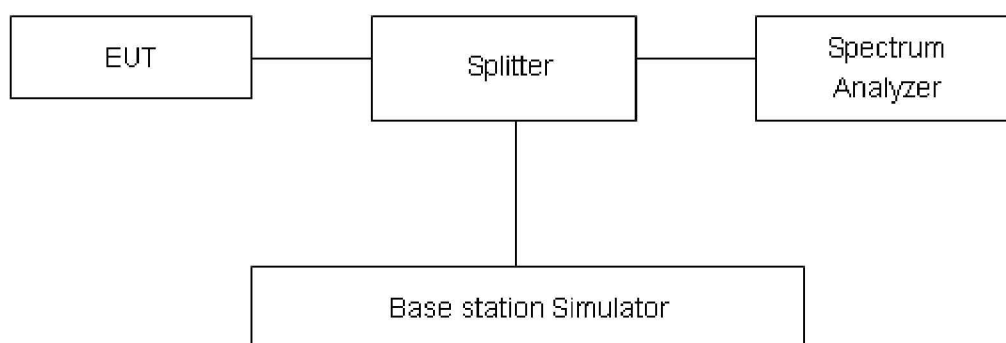
RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4/12/13 on spectrum analyzer.

Set spectrum analyzer with RMS detector.

The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

Checked that all the results comply with the emission limit line.

Test Setup



Limits

Rule Part 27.53(h)/ specifies that “ 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”

Part 27.53(g) specifies that “ For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log_{10} (P)$ dB.”

Part 27.53(m) (4)/ specifies that “for BRS and EBS stations. For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(4) of this section. In addition, the attenuation factor shall not be less that $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Example:

The limit line is derived from $43 + 10 \log (P)$ dB below the transmitter power P(Watts)

= $P(W) - [43 + 10 \log(P)]$ (dB)

= $[30 + 10 \log (P)]$ (dBm) - $[43 + 10 \log(P)]$ (dB) = -13dBm.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U=0.684$ dB.



Test Result

All the test traces in the plots shows the test results clearly.

LTE Band 4 QPSK 1.4MHz CH-Low, 1 RB



LTE Band 4 QPSK 1.4MHz CH-High, 1 RB



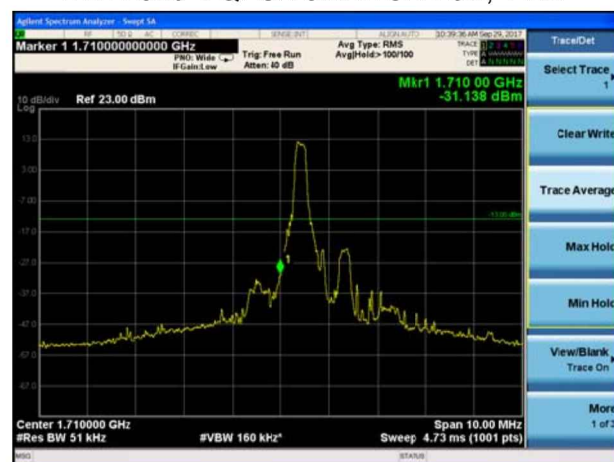
LTE Band 4 QPSK 1.4MHz CH-Low, 100%RB



LTE Band 4 QPSK 1.4MHz CH-High, 100%RB



LTE Band 4 QPSK 3MHz CH-Low, 1 RB



LTE Band 4 QPSK 3MHz CH-High, 1 RB





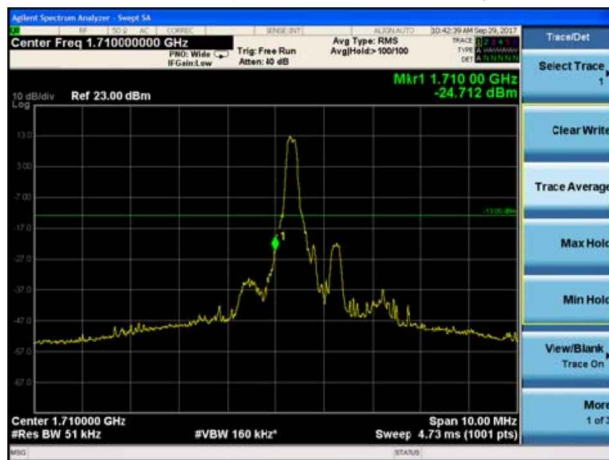
LTE Band 4 QPSK 3MHz CH-Low, 100%RB



LTE Band 4 QPSK 3MHz CH-High, 100%RB



LTE Band 4 QPSK 5MHz CH-Low, 1 RB



LTE Band 4 QPSK 5MHz CH-High, 1 RB



LTE Band 4 QPSK 5MHz CH-Low, 100%RB



LTE Band 4 QPSK 5MHz CH-High, 100%RB

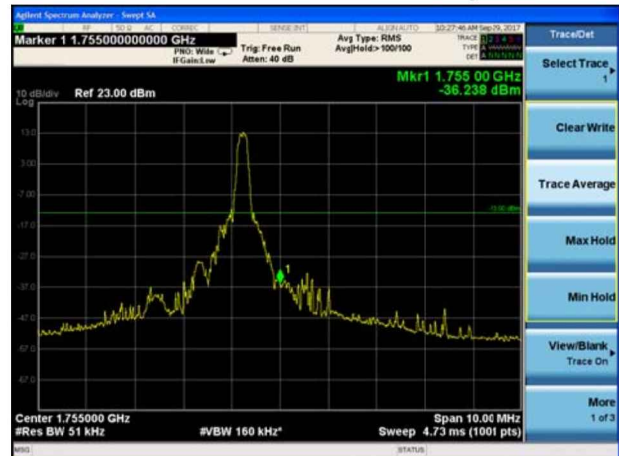




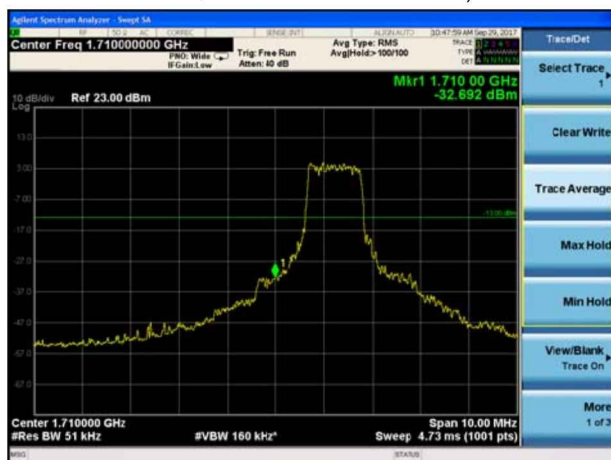
LTE Band 4 QPSK 10MHz CH-Low, 1 RB



LTE Band 4 QPSK 10MHz CH-High, 1 RB



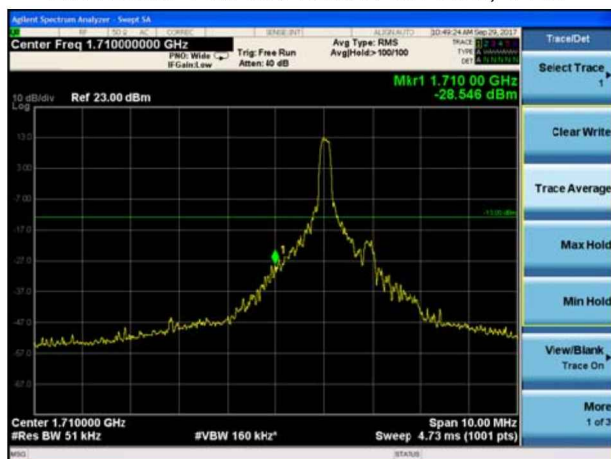
LTE Band 4 QPSK 10MHz CH-Low, 100%RB



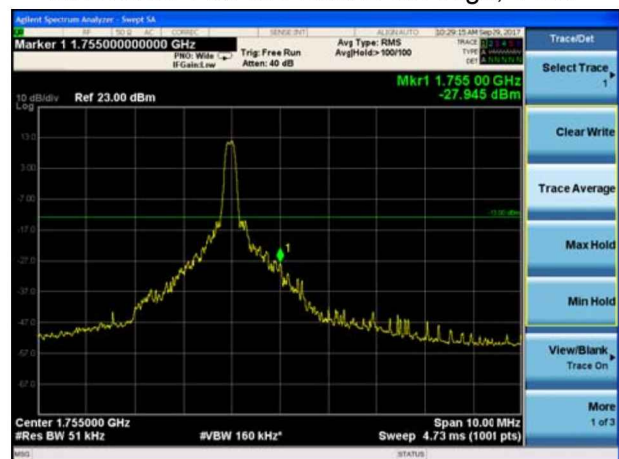
LTE Band 4 QPSK 10MHz CH-High, 100%RB



LTE Band 4 QPSK 15MHz CH-Low, 1 RB



LTE Band 4 QPSK 15MHz CH-High, 1 RB





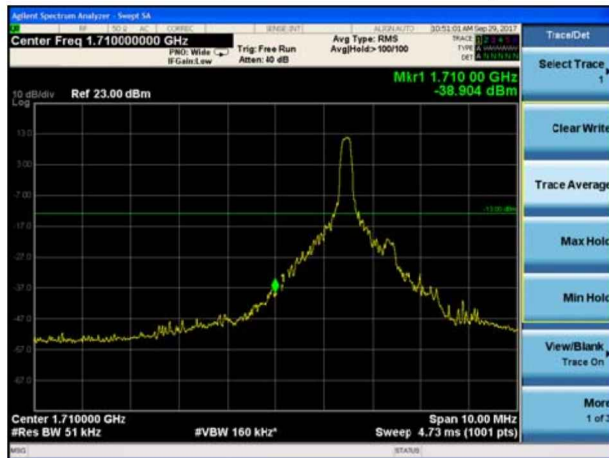
LTE Band 4 QPSK 15MHz CH-Low, 100%RB



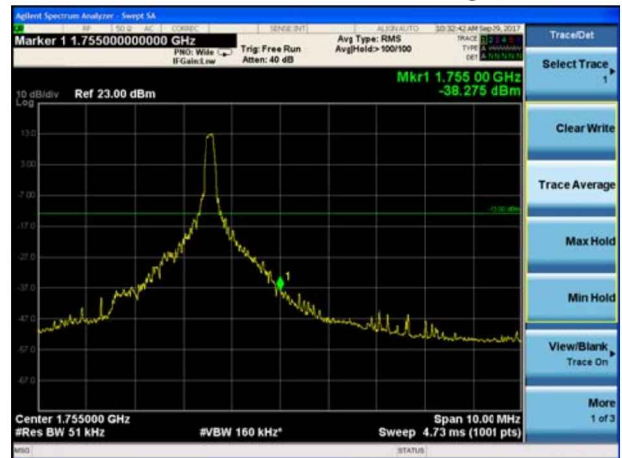
LTE Band 4 QPSK 15MHz CH-High, 100%RB



LTE Band 4 QPSK 20MHz CH-Low, 1 RB



LTE Band 4 QPSK 20MHz CH-High, 1 RB



LTE Band 4 QPSK 20MHz CH-Low, 100%RB



LTE Band 4 QPSK 20MHz CH-High, 100%RB





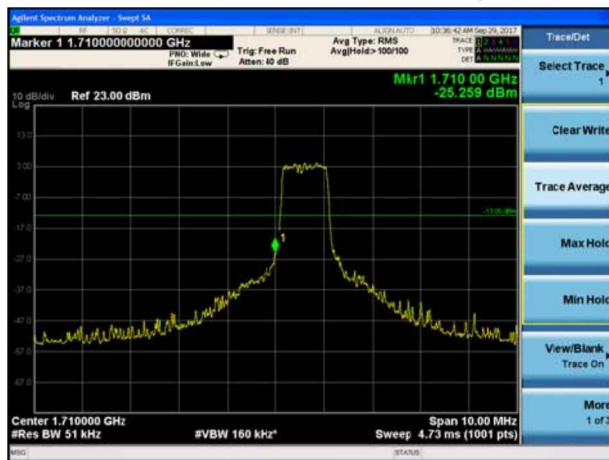
LTE Band 4 16QAM 1.4MHz CH-Low, 1 RB



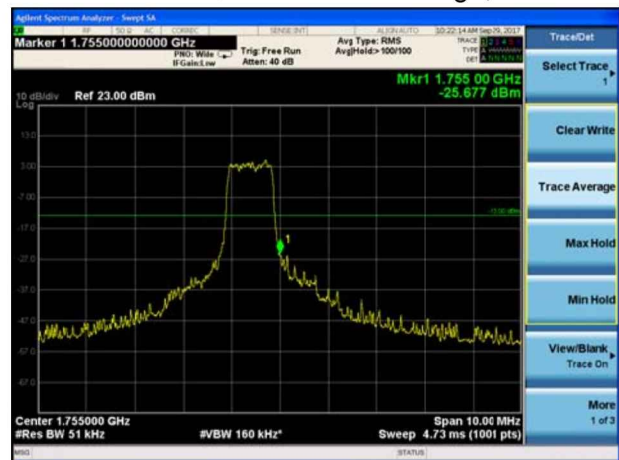
LTE Band 4 16QAM 1.4MHz CH-High, 1 RB



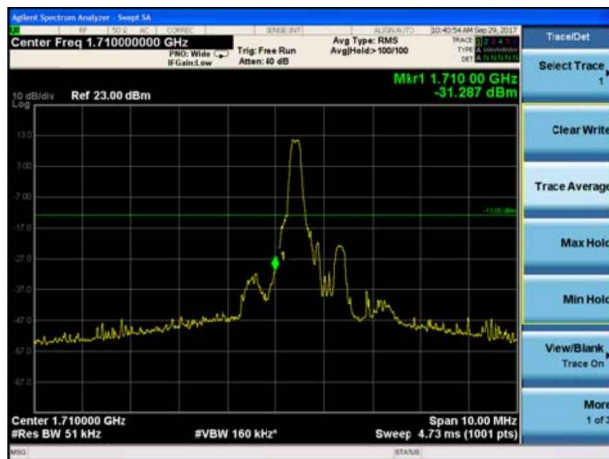
LTE Band 4 16QAM 1.4MHz CH-Low, 100%RB



LTE Band 4 16QAM 1.4MHz CH-High, 100%RB



LTE Band 4 16QAM 3MHz CH-Low, 1 RB

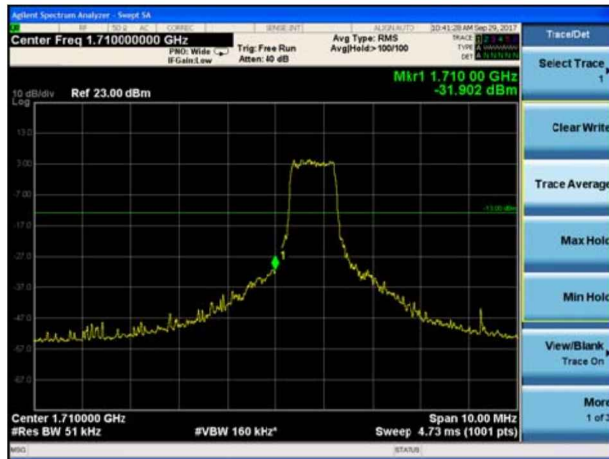


LTE Band 4 16QAM 3MHz CH-High, 1 RB





LTE Band 4 16QAM 3MHz CH-Low, 100%RB



LTE Band 4 16QAM 3MHz CH-High, 100%RB



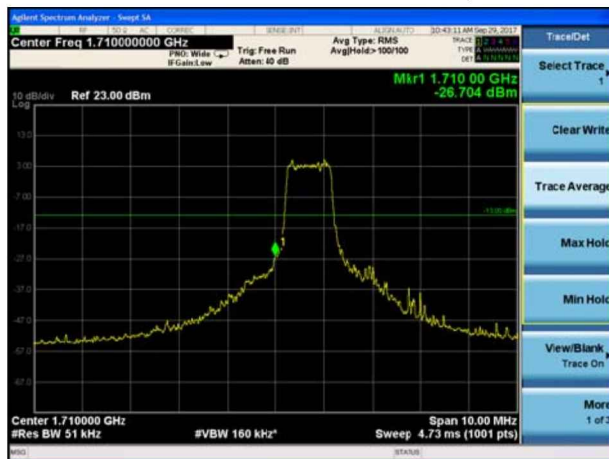
LTE Band 4 16QAM 5MHz CH-Low, 1 RB



LTE Band 4 16QAM 5MHz CH-High, 1 RB



LTE Band 4 16QAM 5MHz CH-Low, 100%RB



LTE Band 4 16QAM 5MHz CH-High, 100%RB

