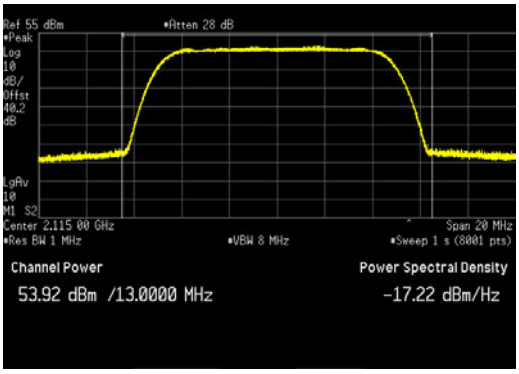
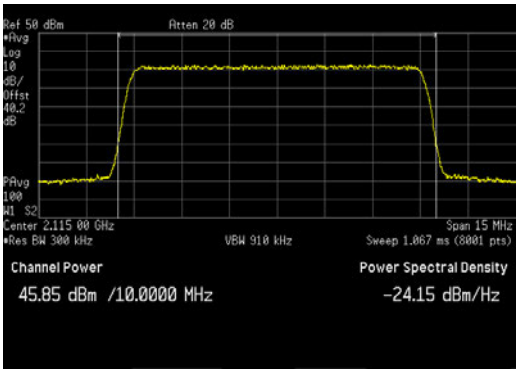
LTE10 Channel Power Plots for Antenna Port 2 and 256QAM Modulation:

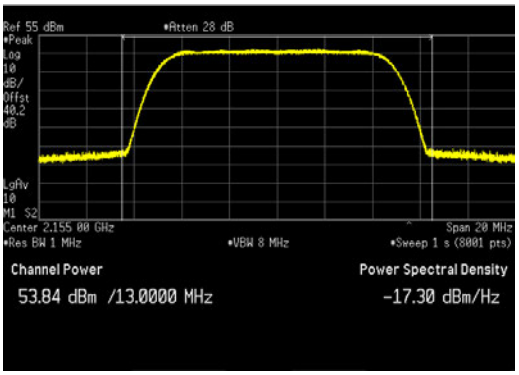
LTE10_Bottom Channel_Peak



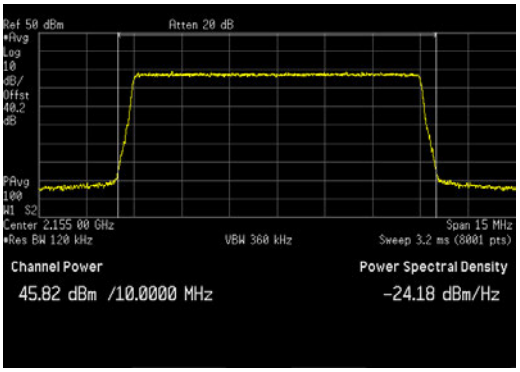
LTE10_Bottom Channel_Average



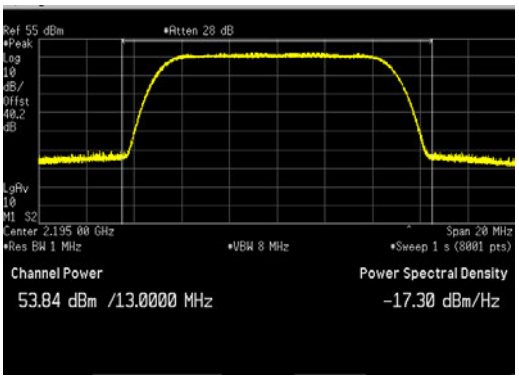
LTE10_Middle Channel_Peak



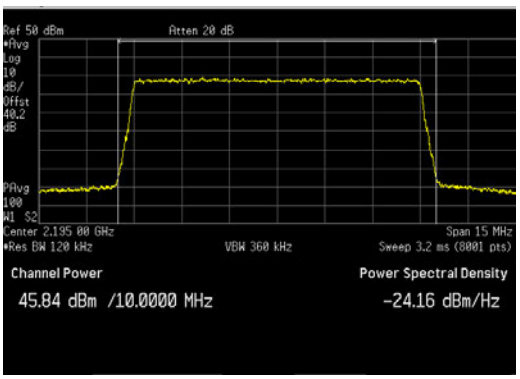
LTE10_Middle Channel_Average



LTE10_Top Channel_Peak

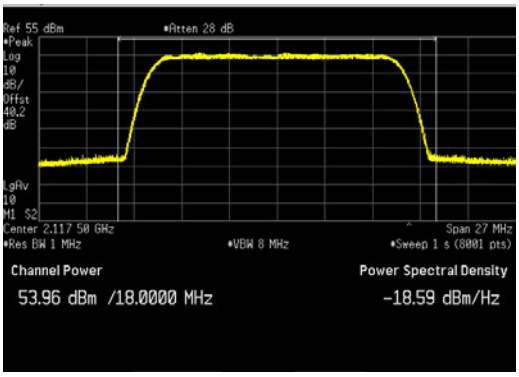


LTE10_Top Channel_Average

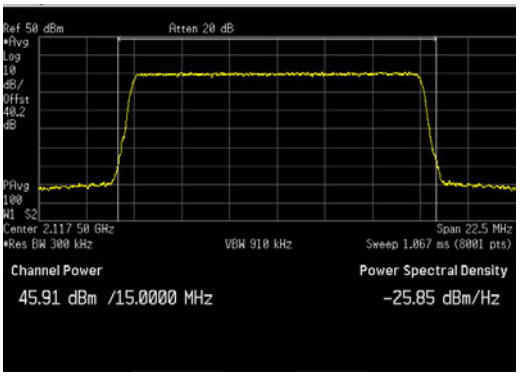


LTE15 Channel Power Plots for Antenna Port 2 and 256QAM Modulation:

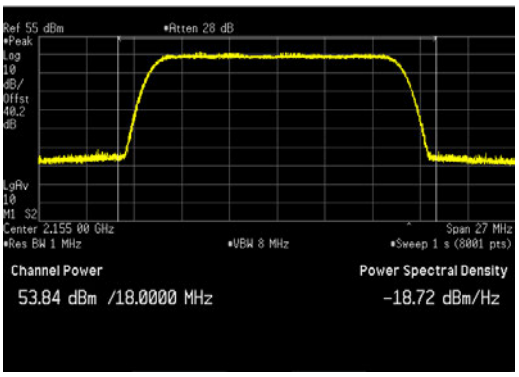
LTE15_Bottom Channel_Peak



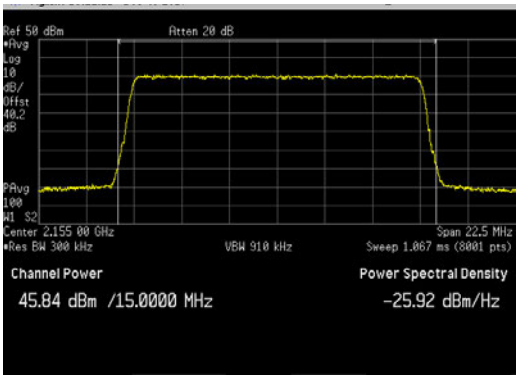
LTE15_Bottom Channel_Average



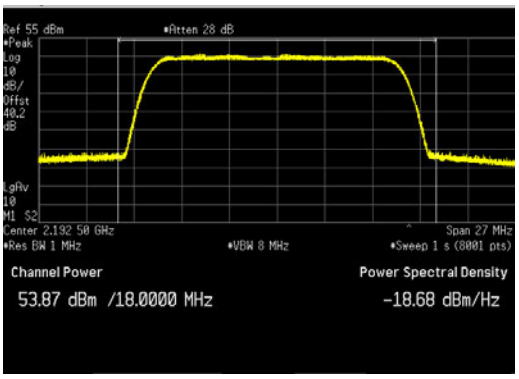
LTE15_Middle Channel_Peak



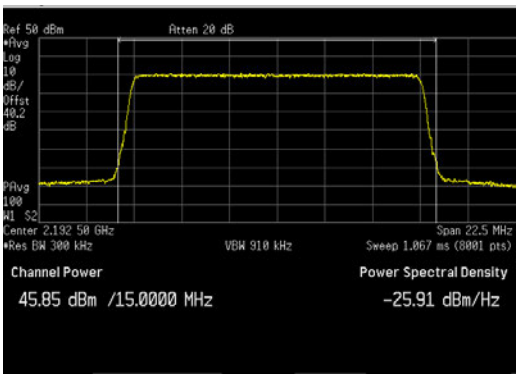
LTE15_Middle Channel_Average



LTE15_Top Channel_Peak

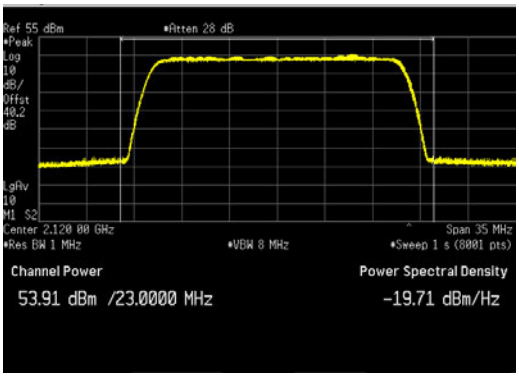


LTE15_Top Channel_Average

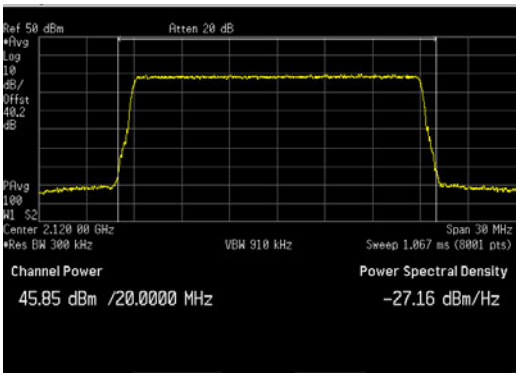


LTE20 Channel Power Plots for Antenna Port 2 and 256QAM Modulation:

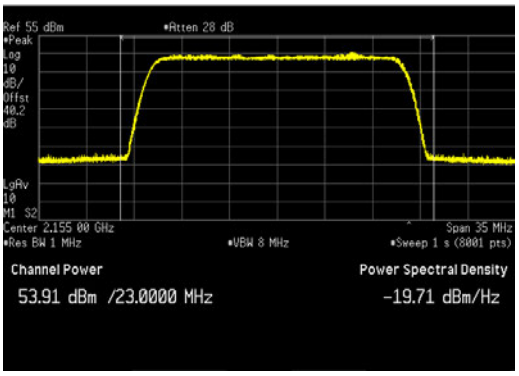
LTE20_Bottom Channel_Peak



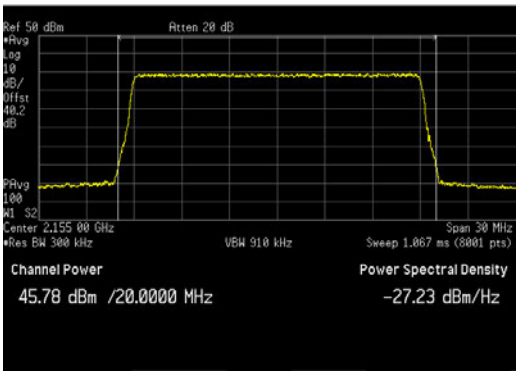
LTE20_Bottom Channel_Average



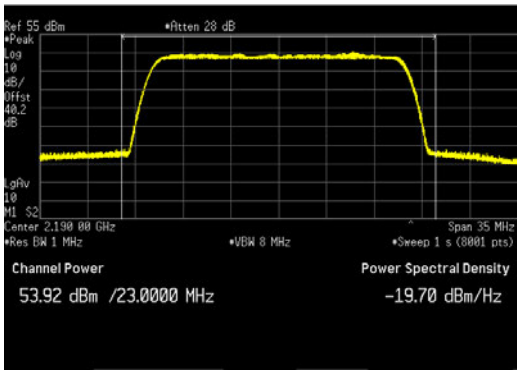
LTE20_Middle Channel_Peak



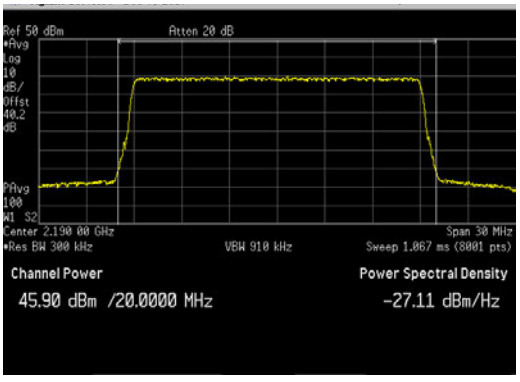
LTE20_Middle Channel_Average



LTE20_Top Channel_Peak



LTE20_Top Channel_Average



Emission Bandwidth (26 dB down and 99%)

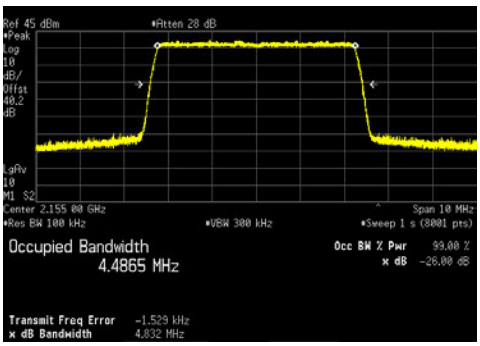
Emission bandwidth measurements were made at antenna port 2 on the middle channel with maximum RF output power. All available LTE modulations (QPSK, 16QAM, 64QAM and 256QAM) were used. All available LTE channel bandwidths (5MHz, 10MHz, 15MHz, and 20MHz) were used. The results are provided in the following table (largest value per modulation are highlighted).

LTE Channel Bandwidth	Modulation Type							
	QPSK		16QAM		64QAM		256QAM	
	26dB (MHz)	99% (MHz)	26dB (MHz)	99% (MHz)	26dB (MHz)	99% (MHz)	26dB (MHz)	99% (MHz)
5M	4.832	4.4865	4.814	4.4736	**4.836**	4.4903	4.835	**4.4916**
10M	9.642	8.9700	9.609	**8.9897**	**9.651**	8.9718	9.646	8.9699
15M	14.451	13.4613	14.414	**13.4732**	**14.491**	13.4609	14.459	13.4573
20M	19.245	17.9345	19.227	**17.9630**	**19.283**	17.9391	19.343	17.9396

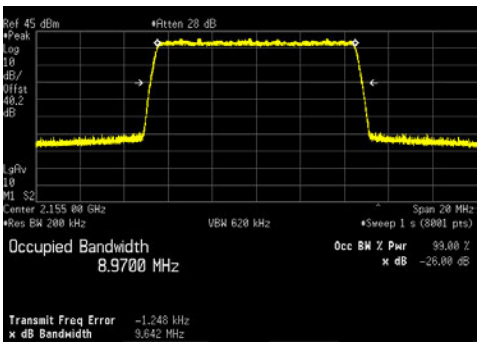
Emission bandwidth measurement data are provided in the following pages.

LTE5 and LTE10 Emission Bandwidth Plots on the Middle Channel for Antenna Port 2:

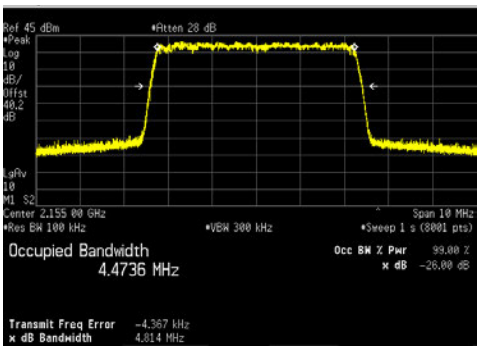
LTE5_QPSK



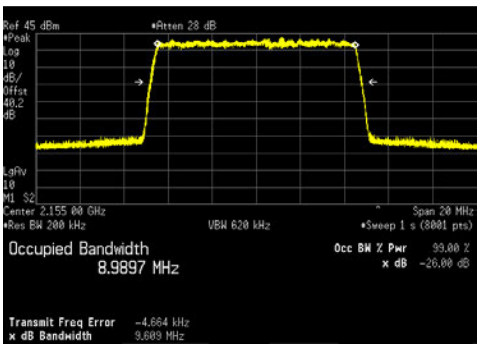
LTE10_ QPSK



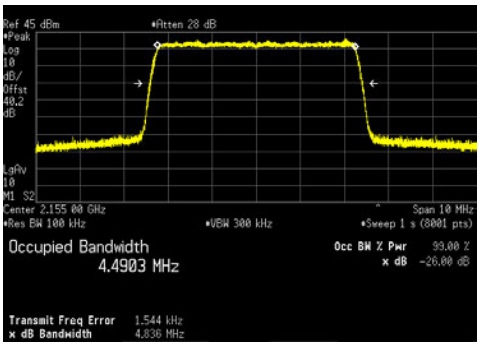
LTE5_16QAM



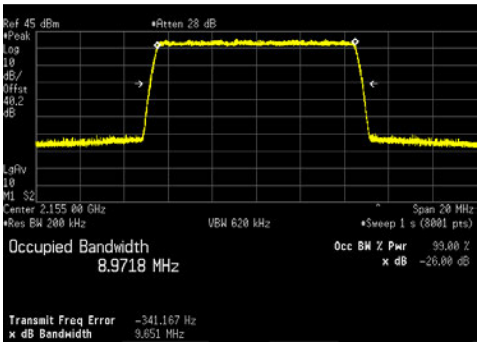
LTE10_16QAM



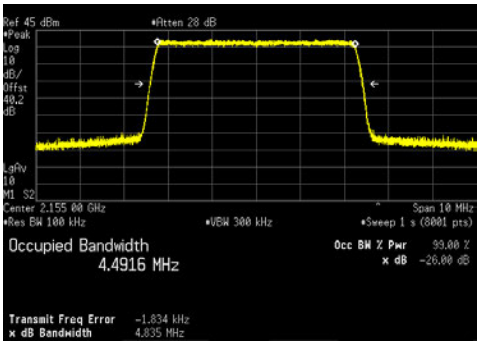
LTE5_64QAM



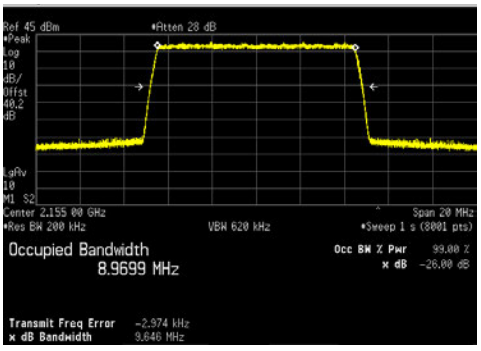
LTE10_64QAM



LTE5_256QAM

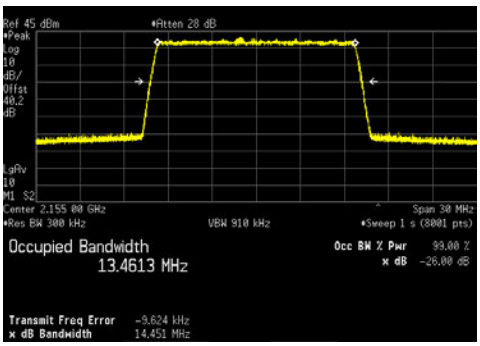


LTE10_256QAM

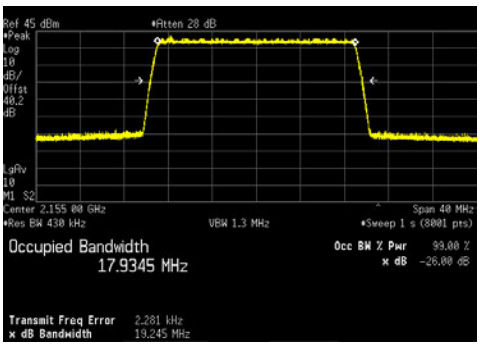


LTE15 and LTE20 Emission Bandwidth Plots on the Middle Channel for Antenna Port 2:

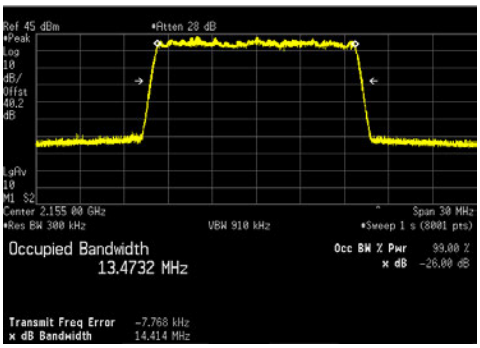
LTE15_QPSK



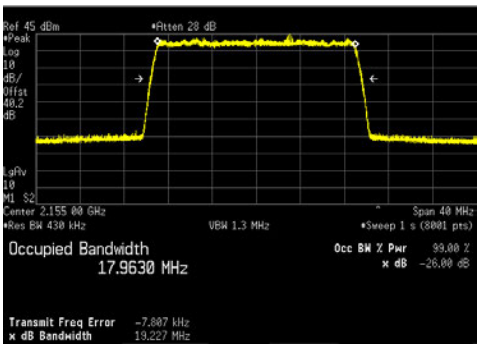
LTE20_ QPSK



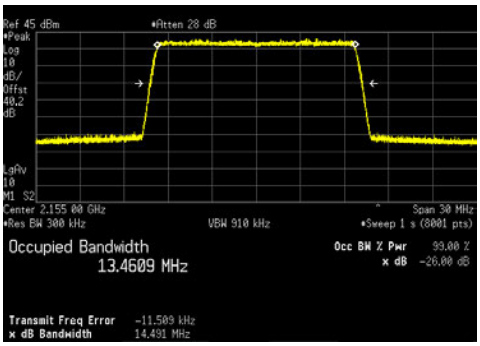
LTE15_16QAM



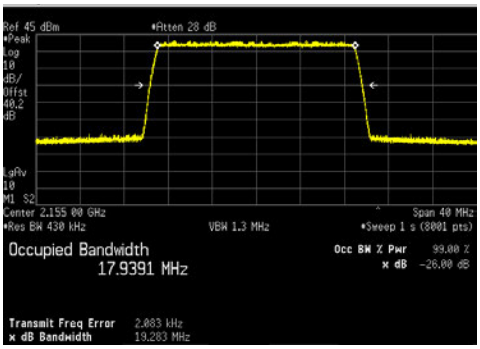
LTE20_16QAM



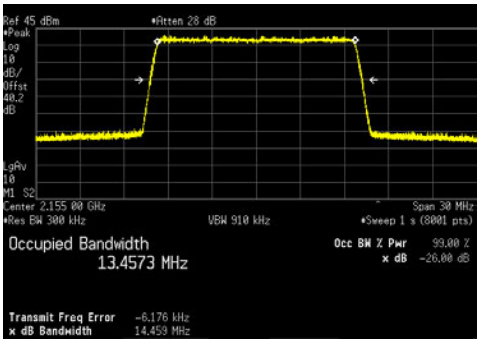
LTE15_64QAM



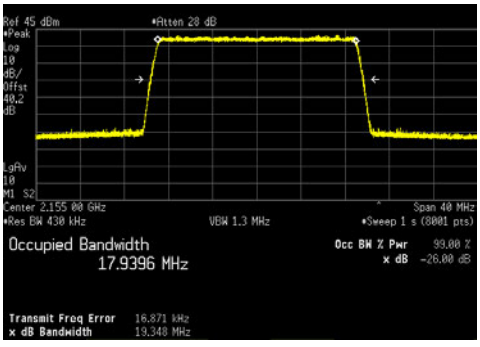
LTE20_64QAM



LTE15_256QAM



LTE20_256QAM



Antenna Port Conducted Band Edge

Conducted band edge measurements were made at RRH antenna port 2. The RRH was operated at the band edge frequencies with all modulation types (QPSK, 16QAM, 64QAM and 256QAM) for 5MHz, 10MHz, 15MHz and 20MHz LTE bandwidths.

The limit of -19dBm was used in the certification testing. The limit is adjusted to -19dBm [-13dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

Measurements were performed with the spectrum analyzer in the RMS average mode over 100 traces. In the 1MHz bands outside and adjacent to the frequency block, a resolution bandwidth of 1% of the emission bandwidth was used. In the 1 to 2MHz frequency range outside the band edge (i.e.: 2108 to 2109MHz and 2201 to 2202MHz bands) the RBW was again reduced to 1% of the emission bandwidth and the power integrated over 1MHz. In the 2 to 5MHz frequency range outside the band edge (i.e.: 2105 to 2108MHz and 2202 to 2205MHz bands) a 1MHz RBW and 3MHz VBW was used. An additional measurement was performed for the dual LTE5 cases to show compliance at the upper and lower band edges.

The results are summarized in the following table. The highest (worst case) emissions from the measurement data are provided.

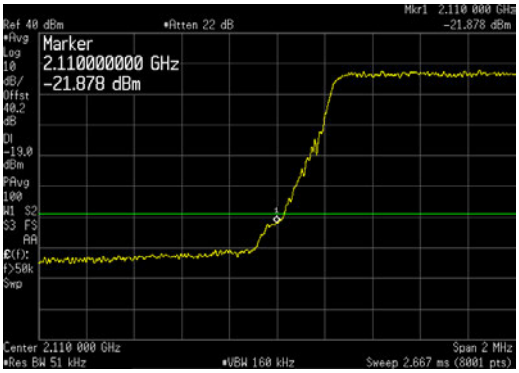
LTE Bandwidth	LTE - QPSK		LTE - 16QAM		LTE - 64QAM		LTE - 256QAM	
	Bottom Channel	Top Channel	Bottom Channel	Top Channel	Bottom Channel	Top Channel	Bottom Channel	Top Channel
5M	-20.888	-20.688	-21.378	-21.260	-21.367	-20.687	-21.138	-20.134
10M	-23.183	-21.263	-23.170	-20.813	-23.195	-21.571	-22.680	-20.746
15M	-23.464	-20.681	-23.561	-21.659	-23.345	-21.105	-24.169	-20.949
20M	-24.278	-21.114	-24.473	-21.250	-24.114	-20.926	-24.022	-21.436
Dual 5M	-22.093	-20.400	-21.355	-20.140	-21.584	-20.396	-21.619	-20.441

The total measurement RF path loss of the test setup (attenuator and test cables) was 40.2 dB and is accounted for by the spectrum analyzer reference level offset.

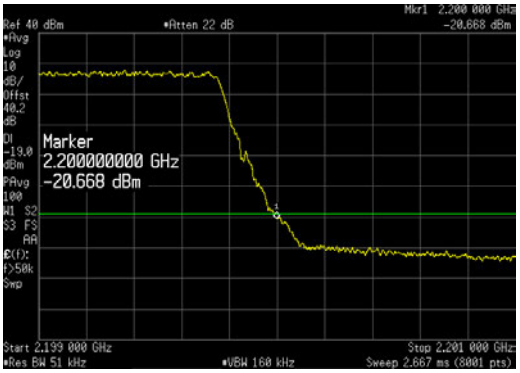
Conducted band edge measurements are provided in the following pages.

LTE5 Band Edge Plots for Antenna Port 2 and QPSK Modulation:

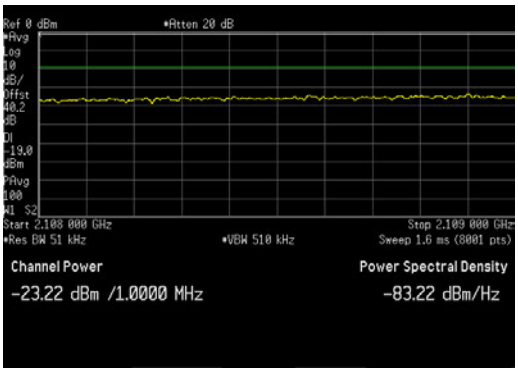
LTE5_Bottom Channel_LBE_2109 to 2111MHz



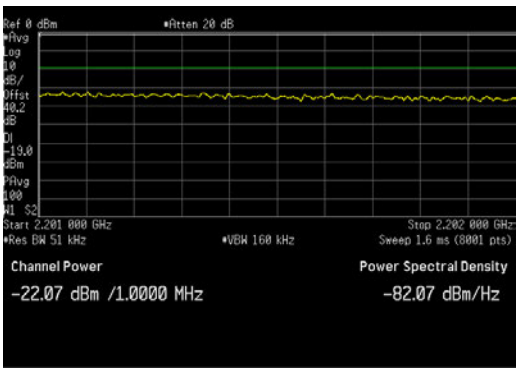
LTE5_Top Channel_UBE_2199 to 2201MHz



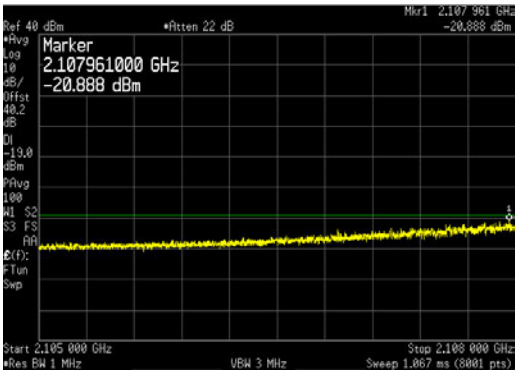
LTE5_Bottom Channel_LBE_2108 to 2109MHz



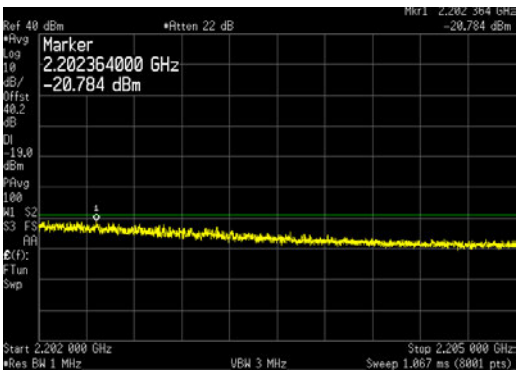
LTE5_Top Channel_UBE_2201 to 2202MHz



LTE5_Bottom Channel_LBE_2105 to 2108MHz

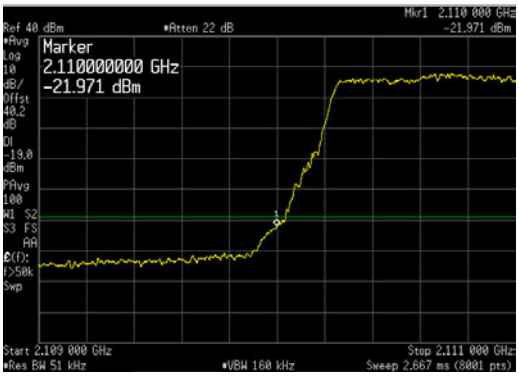


LTE5_Top Channel_UBE_2202 to 2205MHz

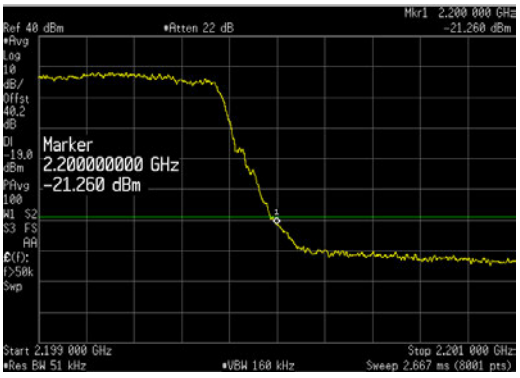


LTE5 Band Edge Plots for Antenna Port 2 and 16QAM Modulation:

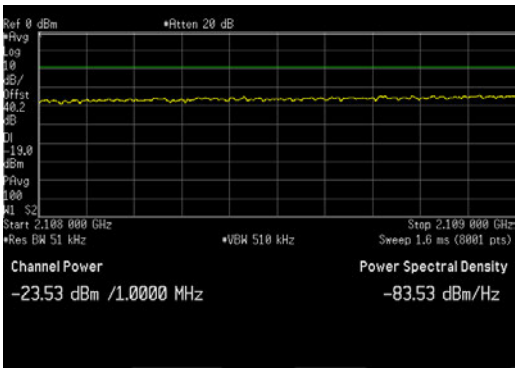
LTE5_Bottom Channel_LBE_2109 to 2111MHz



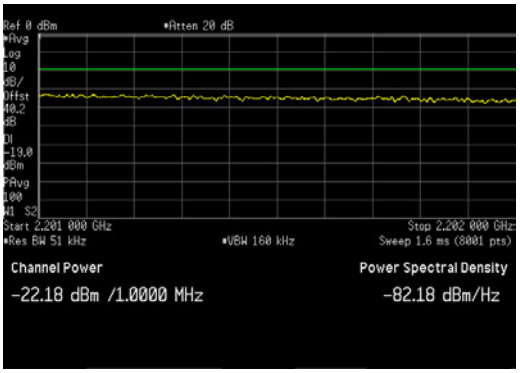
LTE5_Top Channel_UBE_2199 to 2201MHz



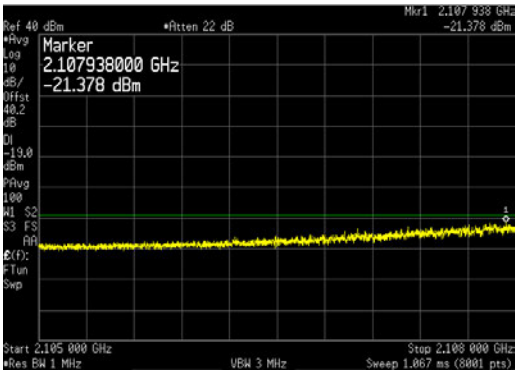
LTE5_Bottom Channel_LBE_2108 to 2109MHz



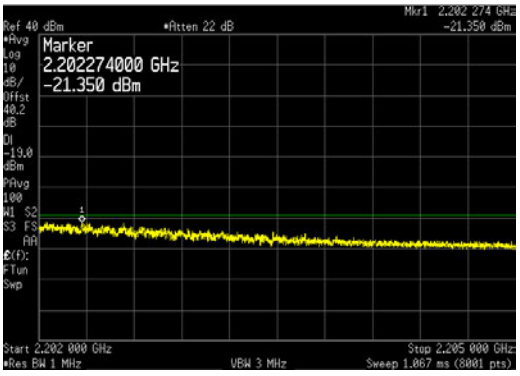
LTE5_Top Channel_UBE_2201 to 2202MHz



LTE5_Bottom Channel_LBE_2105 to 2108MHz

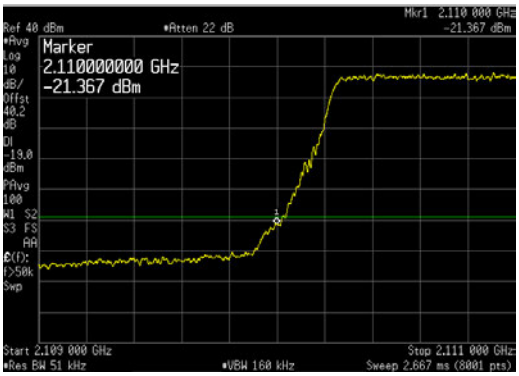


LTE5_Top Channel_UBE_2202 to 2205MHz

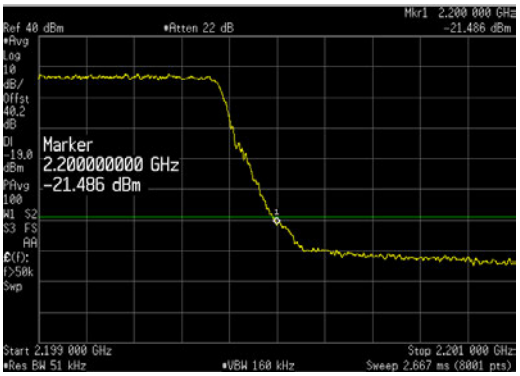


LTE5 Band Edge Plots for Antenna Port 2 and 64QAM Modulation:

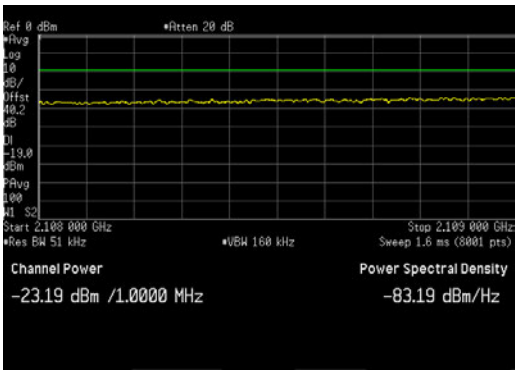
LTE5_Bottom Channel_LBE_2109 to 2111MHz



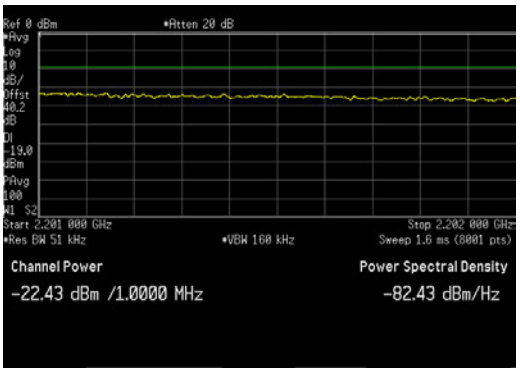
LTE5_Top Channel_UBE_2199 to 2201MHz



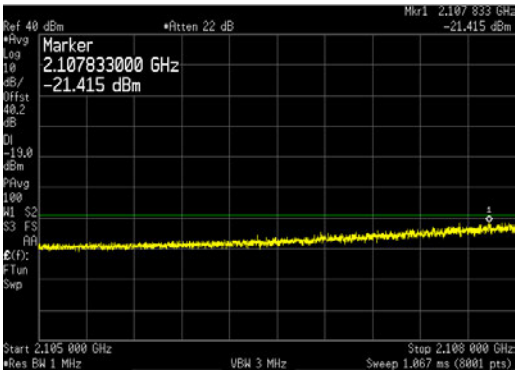
LTE5_Bottom Channel_LBE_2108 to 2109MHz



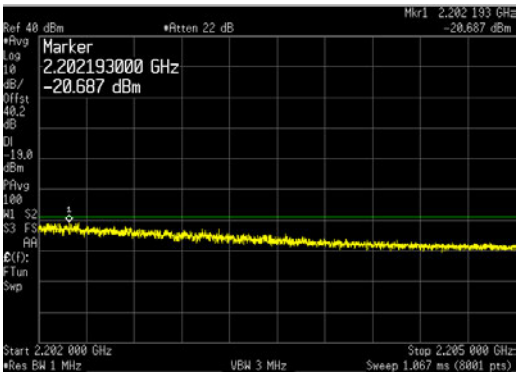
LTE5_Top Channel_UBE_2201 to 2202MHz



LTE5_Bottom Channel_LBE_2105 to 2108MHz

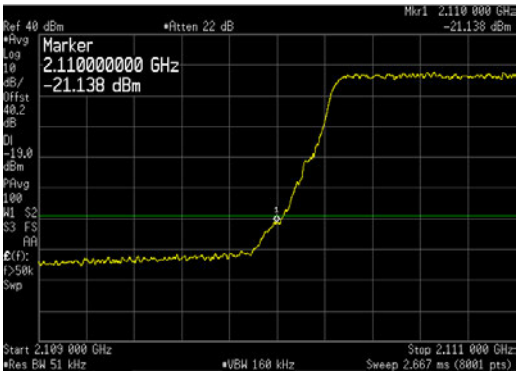


LTE5_Top Channel_UBE_2202 to 2205MHz

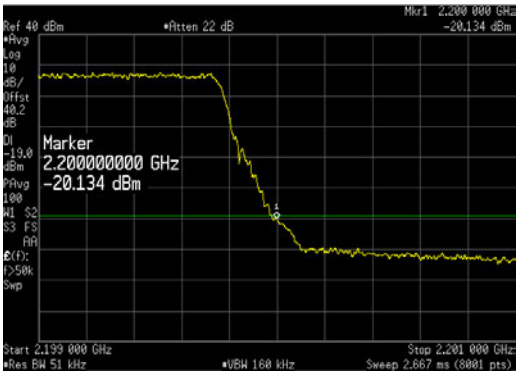


LTE5 Band Edge Plots for Antenna Port 2 and 256QAM Modulation:

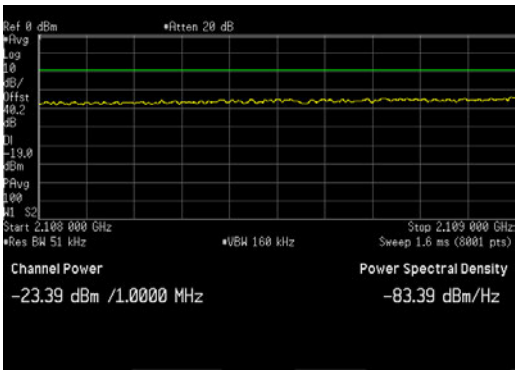
LTE5_Bottom Channel_LBE_2109 to 2111MHz



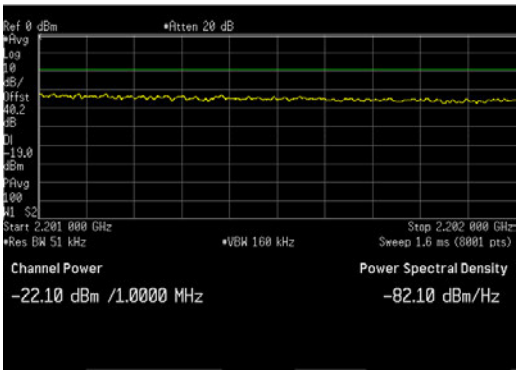
LTE5_Top Channel_UBE_2199 to 2201MHz



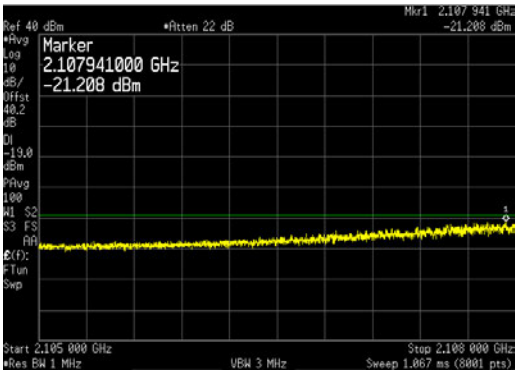
LTE5_Bottom Channel_LBE_2108 to 2109MHz



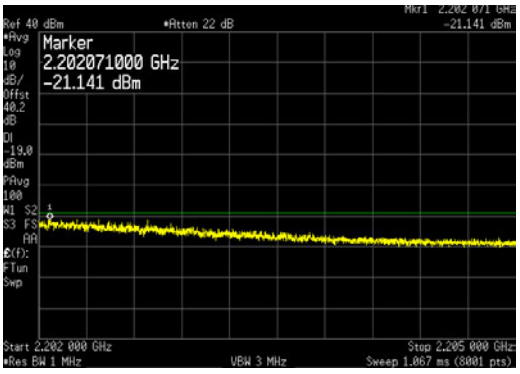
LTE5_Top Channel_UBE_2201 to 2202MHz



LTE5_Bottom Channel_LBE_2105 to 2108MHz

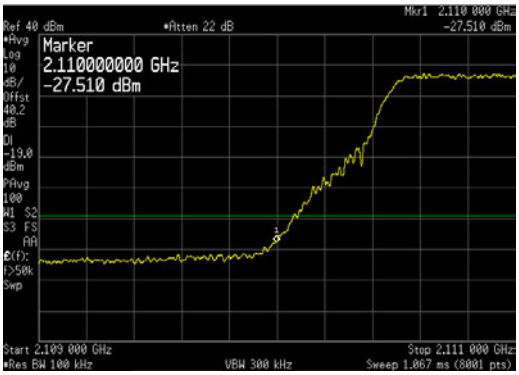


LTE5_Top Channel_UBE_2202 to 2205MHz

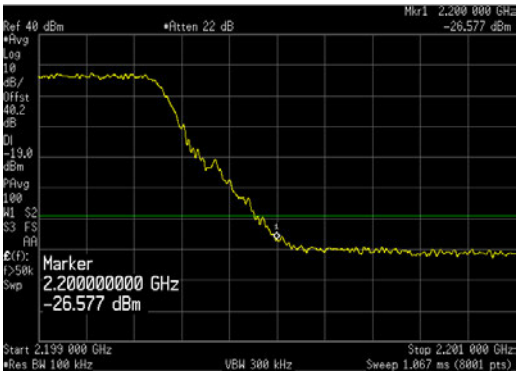


LTE10 Band Edge Plots for Antenna Port 2 and QPSK Modulation:

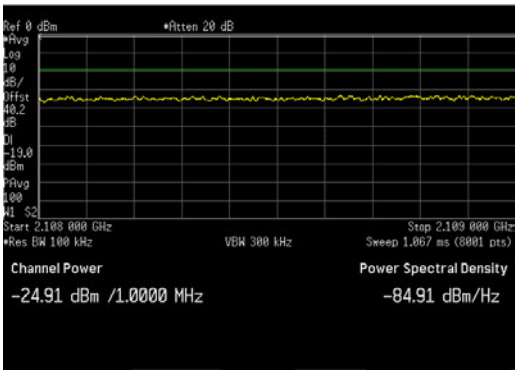
LTE10_Bottom Channel_LBE_2109 to 2111MHz



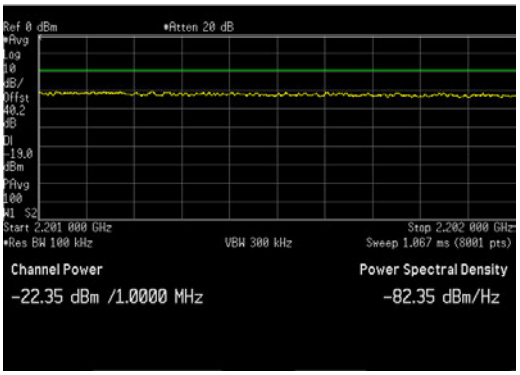
LTE10_Top Channel_UBE_2199 to 2201MHz



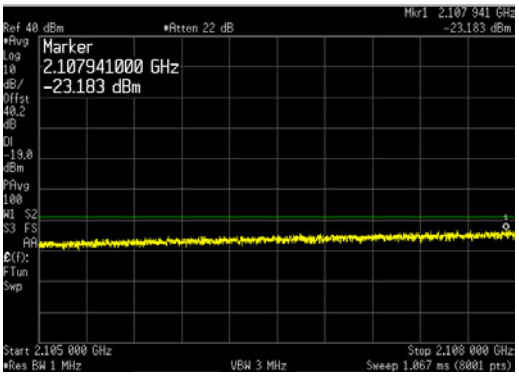
LTE10_Bottom Channel_LBE_2108 to 2109MHz



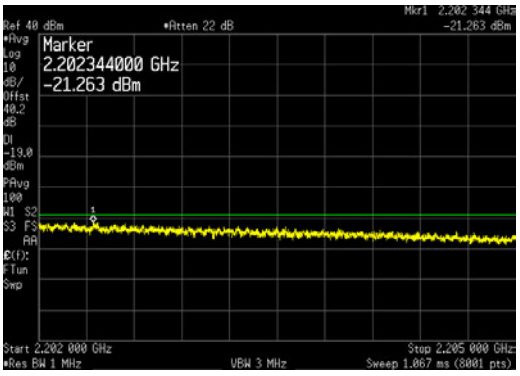
LTE10_Top Channel_UBE_2201 to 2202MHz



LTE10_Bottom Channel_LBE_2105 to 2108MHz

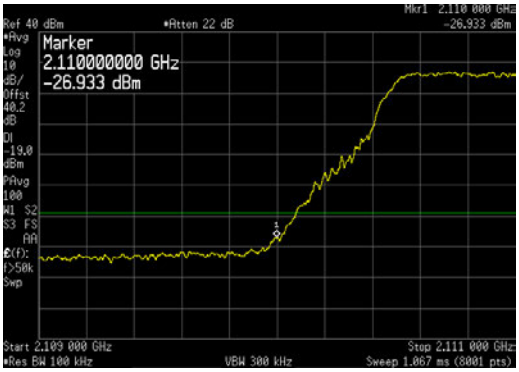


LTE10_Top Channel_UBE_2202 to 2205MHz

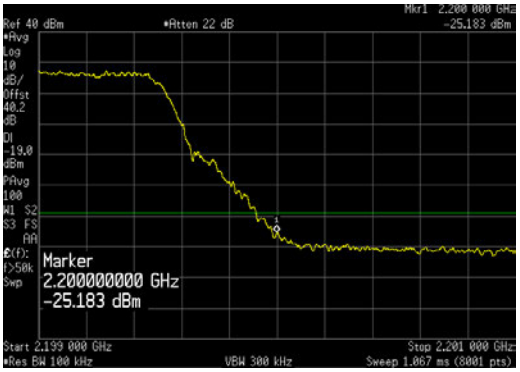


LTE10 Band Edge Plots for Antenna Port 2 and 16QAM Modulation:

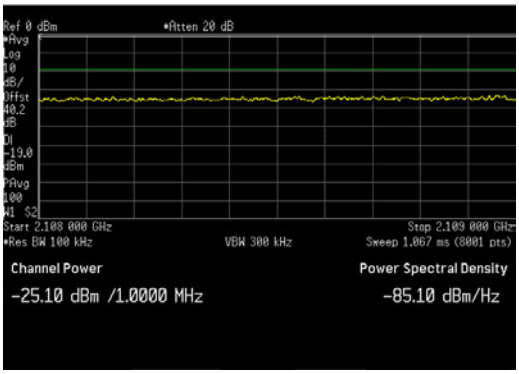
LTE10_Bottom Channel_LBE_2109 to 2111MHz



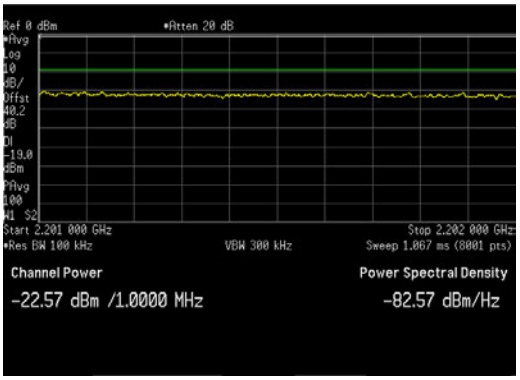
LTE10_Top Channel_UBE_2199 to 2201MHz



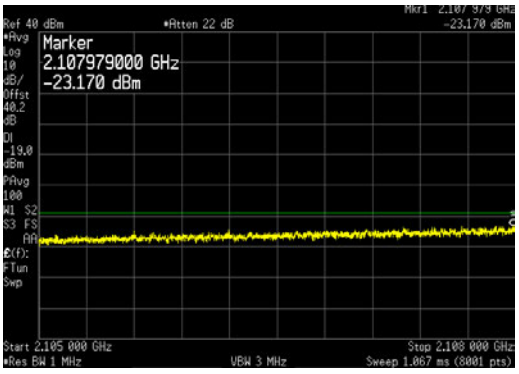
LTE10_Bottom Channel_LBE_2108 to 2109MHz



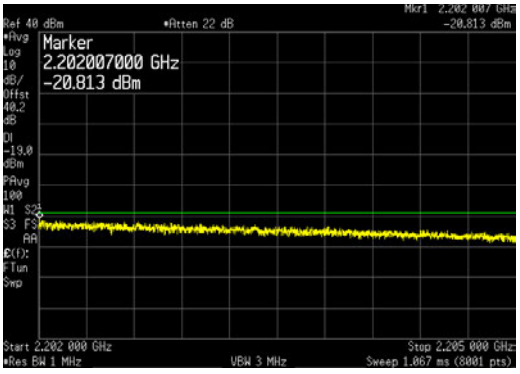
LTE10_Top Channel_UBE_2201 to 2202MHz



LTE10_Bottom Channel_LBE_2105 to 2108MHz

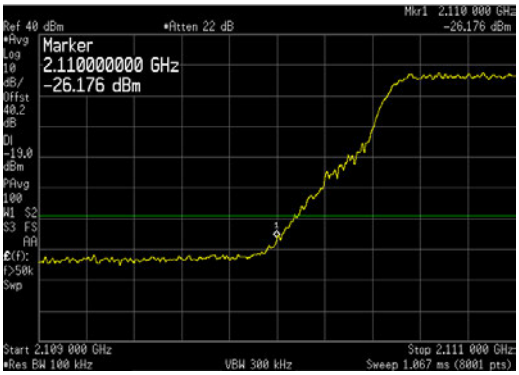


LTE10_Top Channel_UBE_2202 to 2205MHz

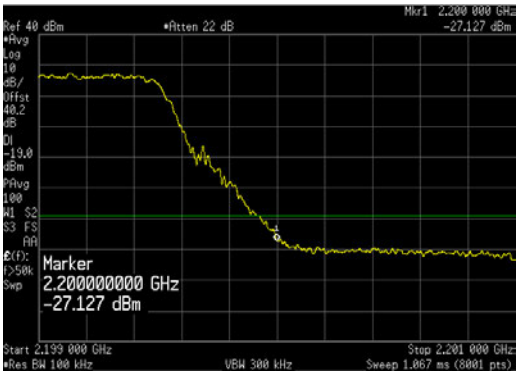


LTE10 Band Edge Plots for Antenna Port 2 and 64QAM Modulation:

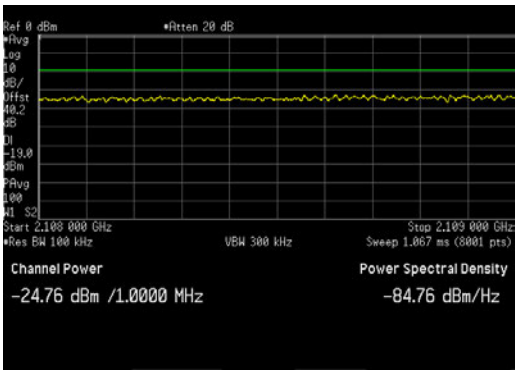
LTE10_Bottom Channel_LBE_2109 to 2111MHz



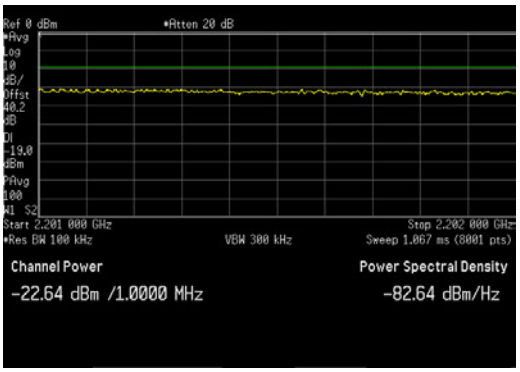
LTE10_Top Channel_UBE_2199 to 2201MHz



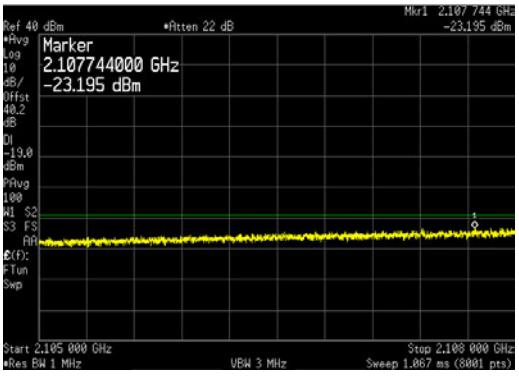
LTE10_Bottom Channel_LBE_2108 to 2109MHz



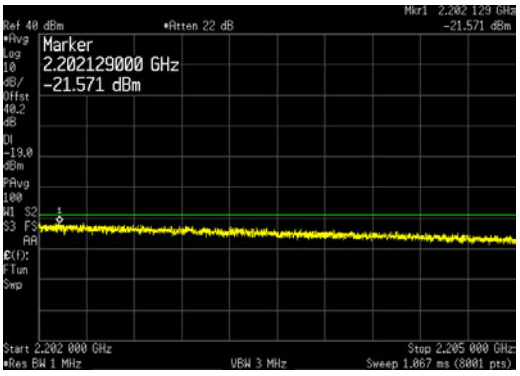
LTE10_Top Channel_UBE_2201 to 2202MHz



LTE10_Bottom Channel_LBE_2105 to 2108MHz

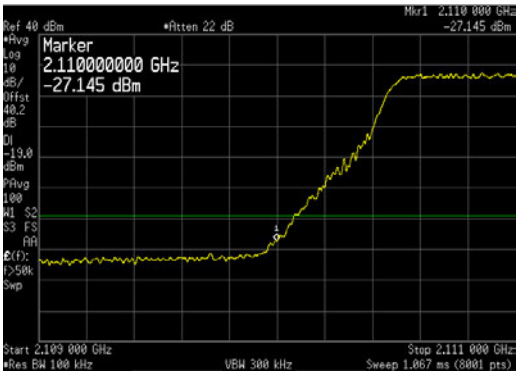


LTE10_Top Channel_UBE_2202 to 2205MHz

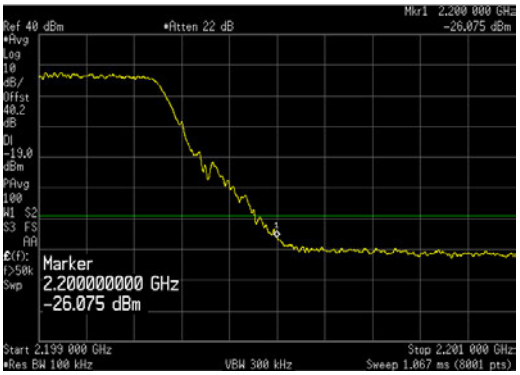


LTE10 Band Edge Plots for Antenna Port 2 and 256QAM Modulation:

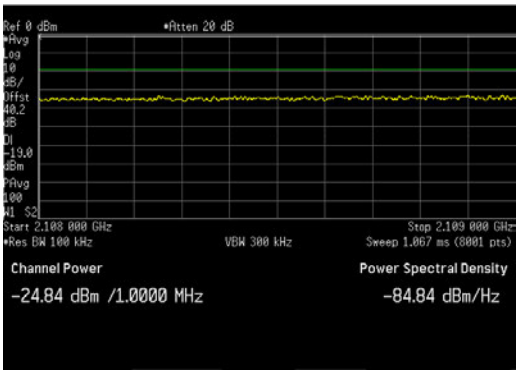
LTE10_Bottom Channel_LBE_2109 to 2111MHz



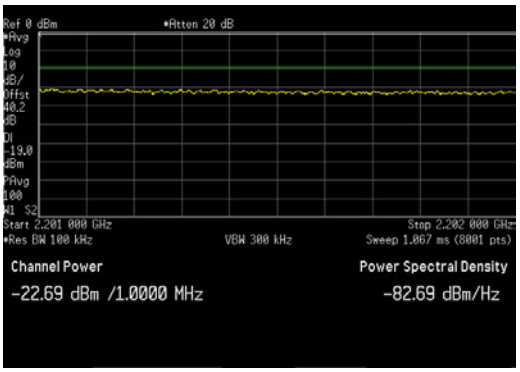
LTE10_Top Channel_UBE_2199 to 2201MHz



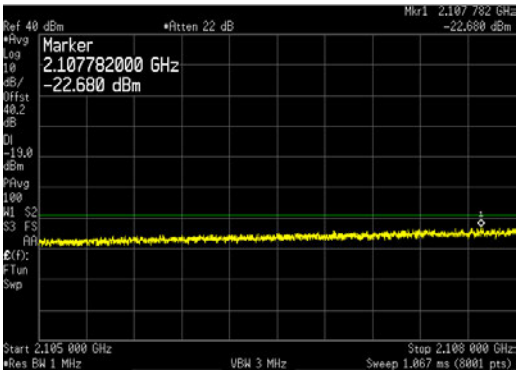
LTE10_Bottom Channel_LBE_2108 to 2109MHz



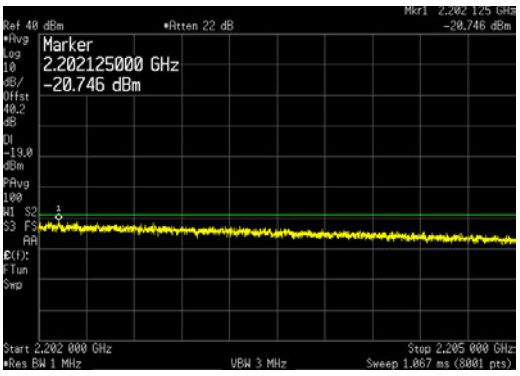
LTE10_Top Channel_UBE_2201 to 2202MHz



LTE10_Bottom Channel_LBE_2105 to 2108MHz

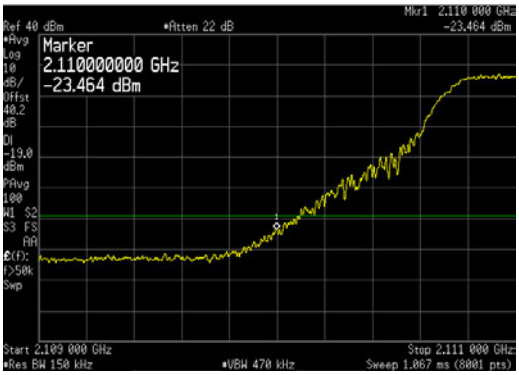


LTE10_Top Channel_UBE_2202 to 2205MHz

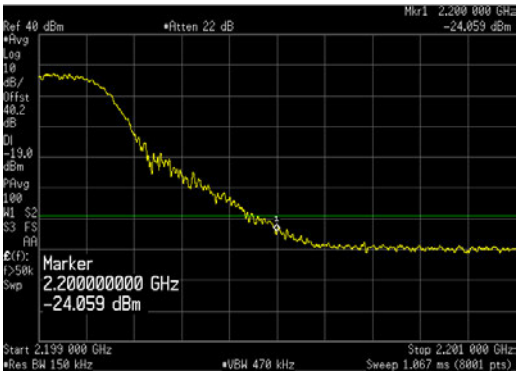


LTE15 Band Edge Plots for Antenna Port 2 and QPSK Modulation:

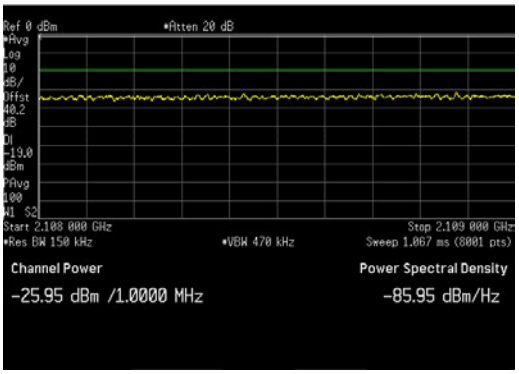
LTE15_Bottom Channel_LBE_2109 to 2111MHz



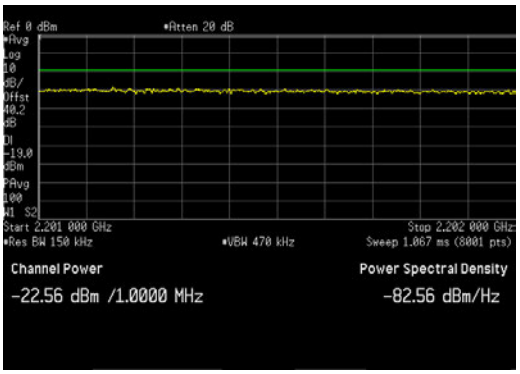
LTE15_Top Channel_UBE_2199 to 2201MHz



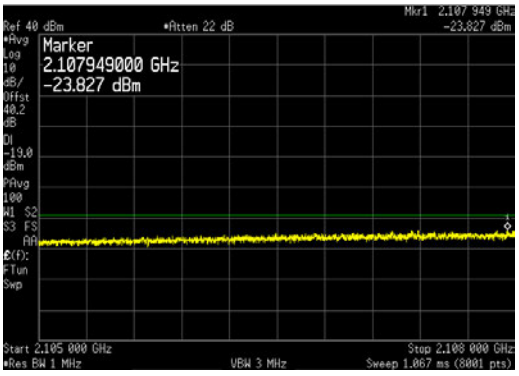
LTE15_Bottom Channel_LBE_2108 to 2109MHz



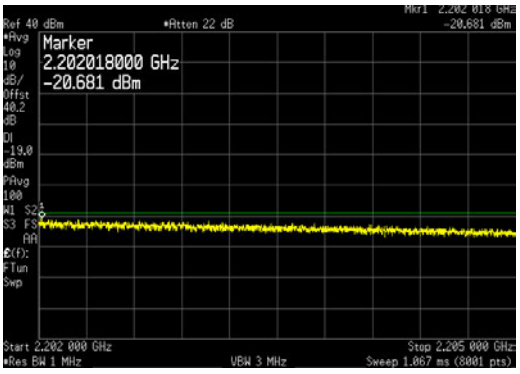
LTE15_Top Channel_UBE_2201 to 2202MHz



LTE15_Bottom Channel_LBE_2105 to 2108MHz



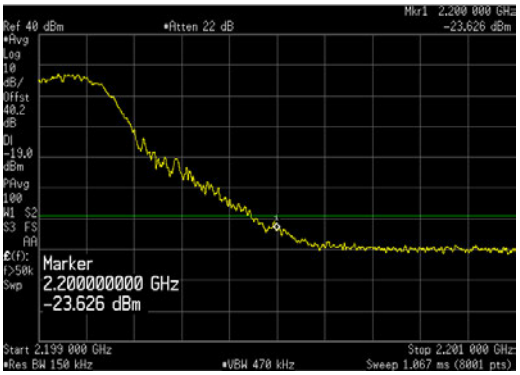
LTE15_Top Channel_UBE_2202 to 2205MHz



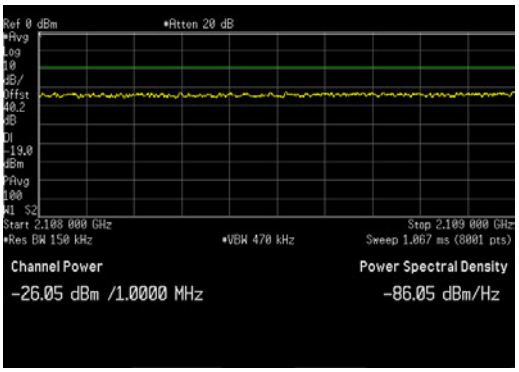
LTE15 Band Edge Plots for Antenna Port 2 and 16QAM Modulation:

LTE15_Bottom Channel_LBE_2109 to 2111MHz

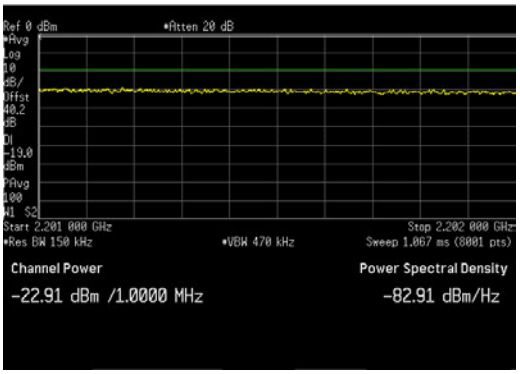
LTE15_Top Channel_UBE_2199 to 2201MHz



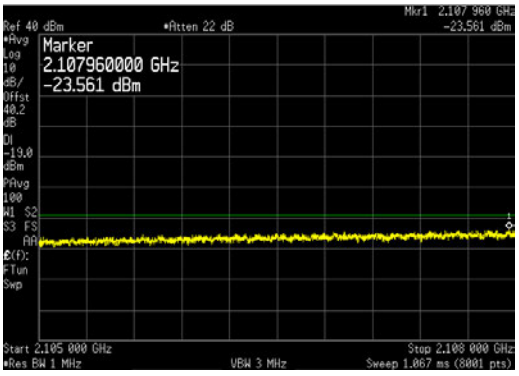
LTE15_Bottom Channel_LBE_2108 to 2109MHz



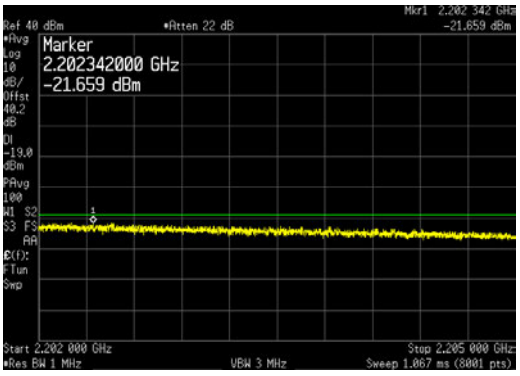
LTE15_Top Channel_UBE_2201 to 2202MHz



LTE15_Bottom Channel_LBE_2105 to 2108MHz



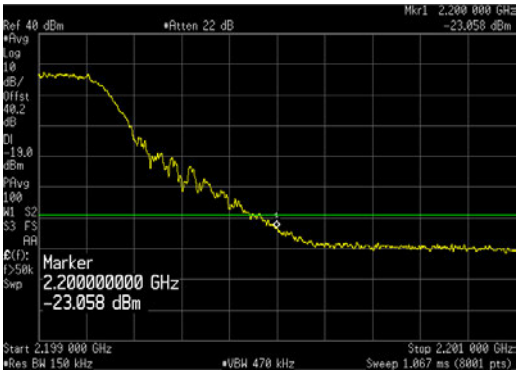
LTE15_Top Channel_UBE_2202 to 2205MHz



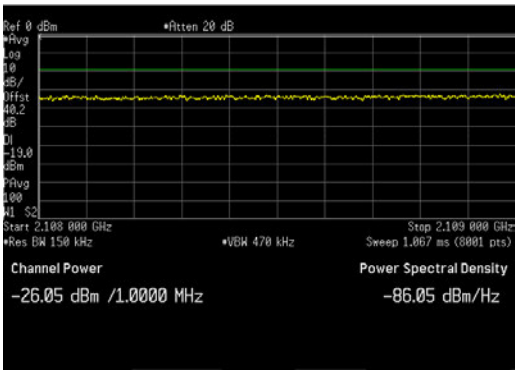
LTE15 Band Edge Plots for Antenna Port 2 and 64QAM Modulation:

LTE15_Bottom Channel_LBE_2109 to 2111MHz

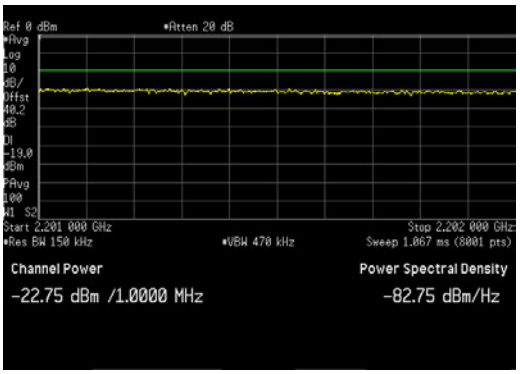
LTE15_Top Channel_UBE_2199 to 2201MHz



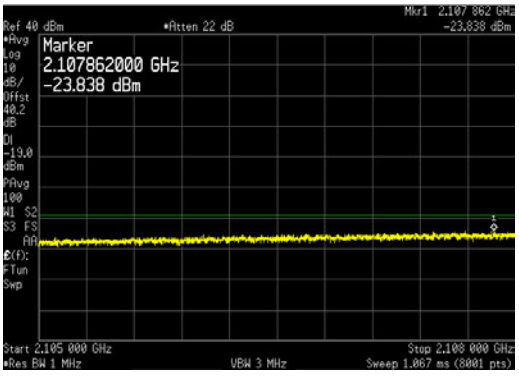
LTE15_Bottom Channel_LBE_2108 to 2109MHz



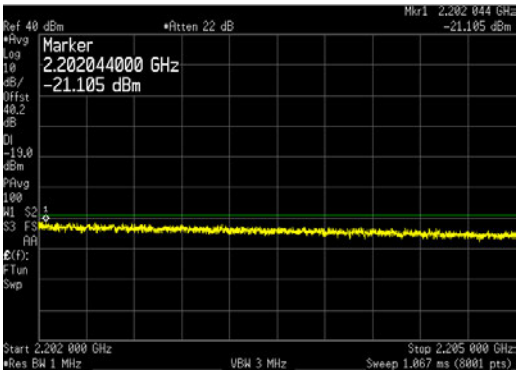
LTE15_Top Channel_UBE_2201 to 2202MHz



LTE15_Bottom Channel_LBE_2105 to 2108MHz

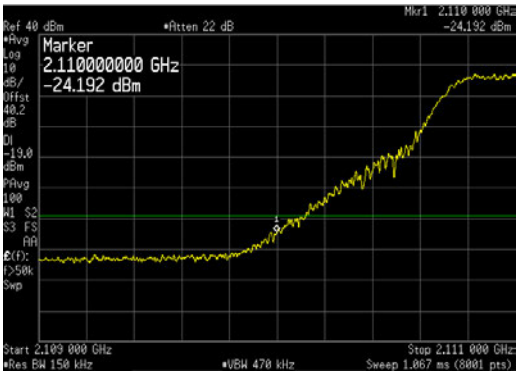


LTE15_Top Channel_UBE_2202 to 2205MHz

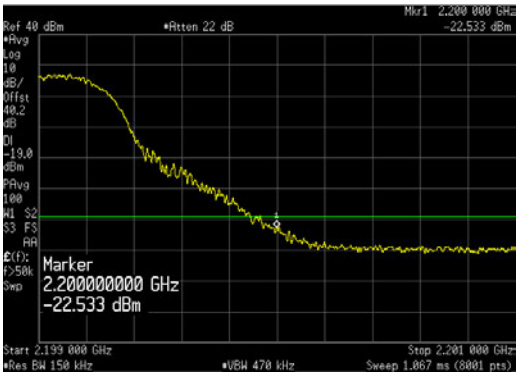


LTE15 Band Edge Plots for Antenna Port 2 and 256QAM Modulation:

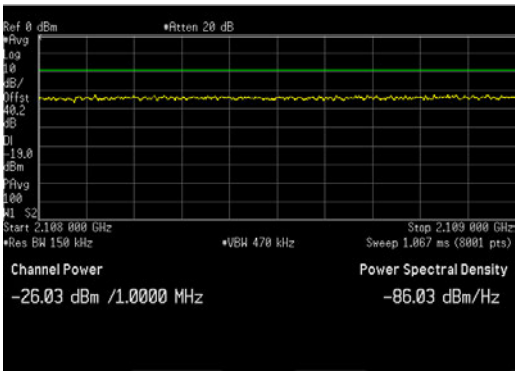
LTE15_Bottom Channel_LBE_2109 to 2111MHz



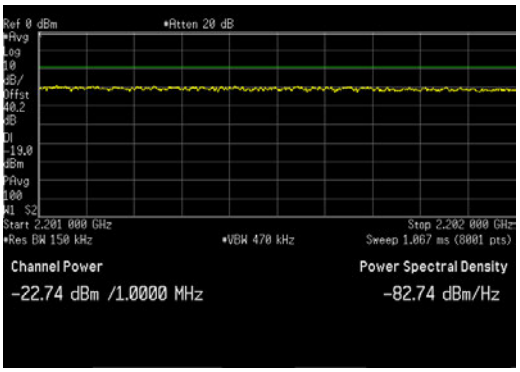
LTE15_Top Channel_UBE_2199 to 2201MHz



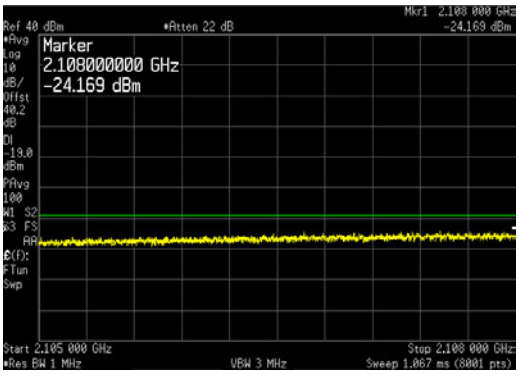
LTE15_Bottom Channel_LBE_2108 to 2109MHz



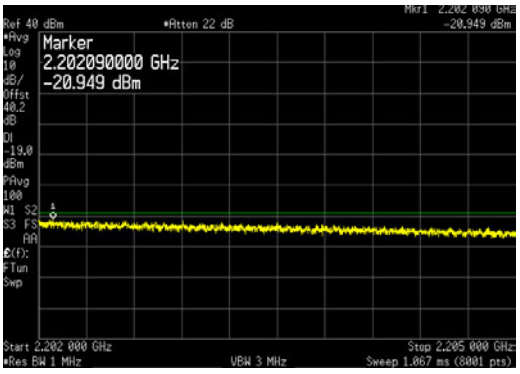
LTE15_Top Channel_UBE_2201 to 2202MHz



LTE15_Bottom Channel_LBE_2105 to 2108MHz

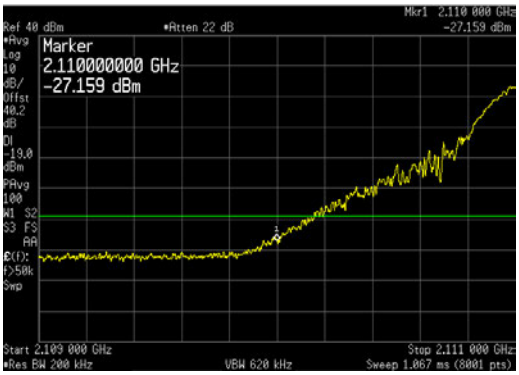


LTE15_Top Channel_UBE_2202 to 2205MHz

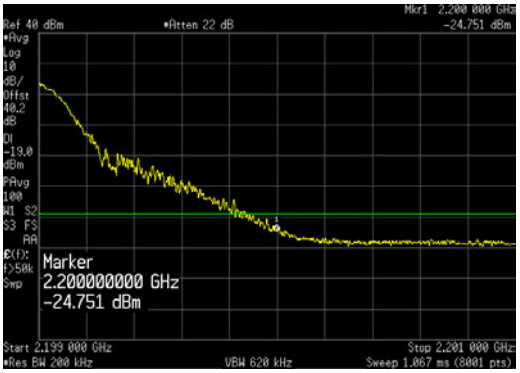


LTE20 Band Edge Plots for Antenna Port 2 and QPSK Modulation:

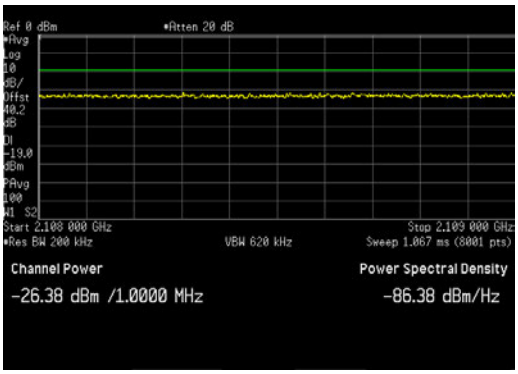
LTE20_Bottom Channel_LBE_2109 to 2111MHz



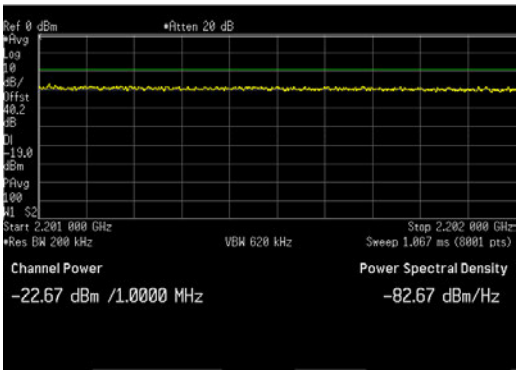
LTE20_Top Channel_UBE_2199 to 2201MHz



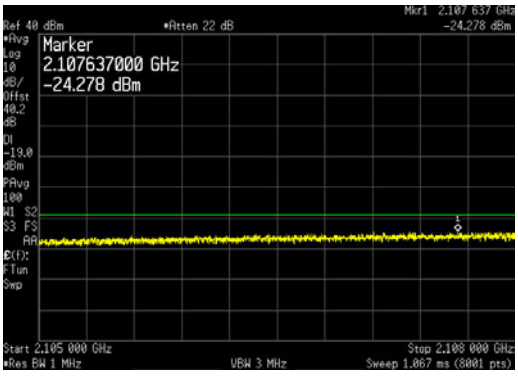
LTE20_Bottom Channel_LBE_2108 to 2109MHz



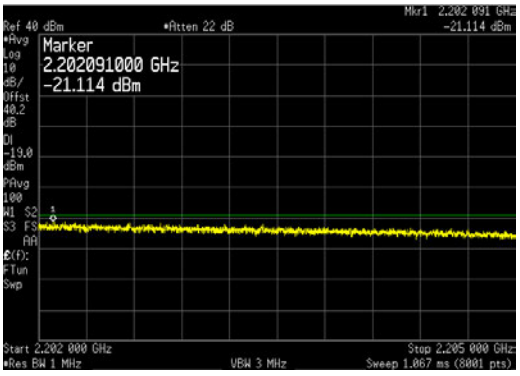
LTE20_Top Channel_UBE_2201 to 2202MHz



LTE20_Bottom Channel_LBE_2105 to 2108MHz

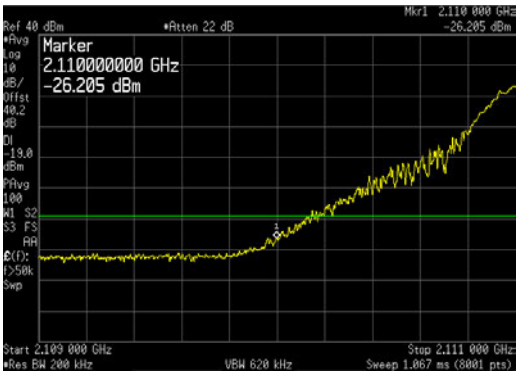


LTE20_Top Channel_UBE_2202 to 2205MHz

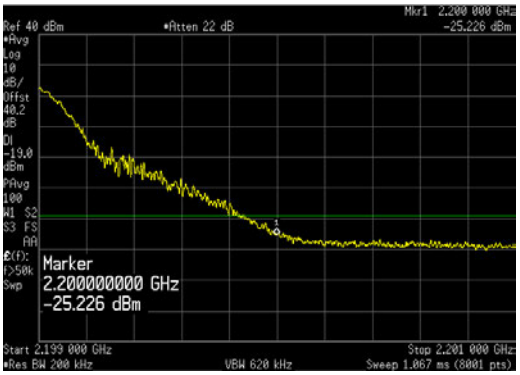


LTE20 Band Edge Plots for Antenna Port 2 and 16QAM Modulation:

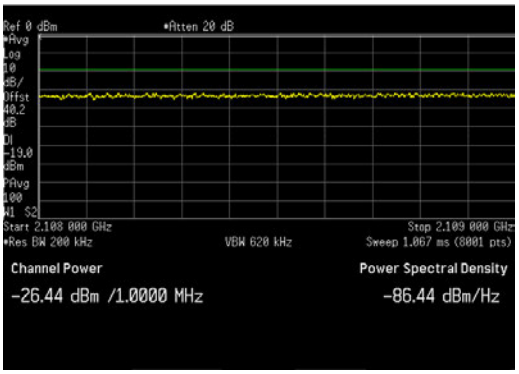
LTE20_Bottom Channel_LBE_2109 to 2111MHz



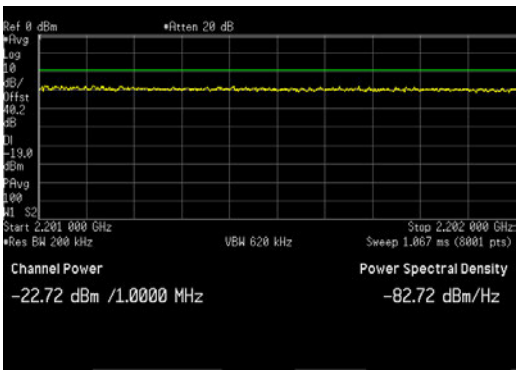
LTE20_Top Channel_UBE_2199 to 2201MHz



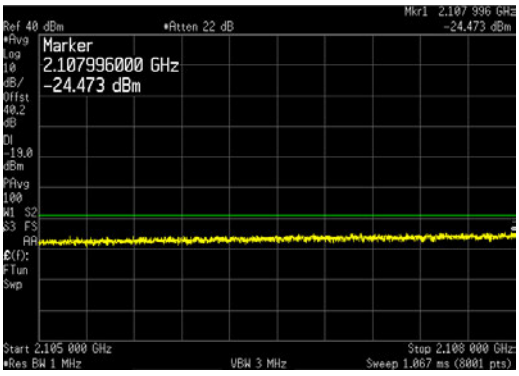
LTE20_Bottom Channel_LBE_2108 to 2109MHz



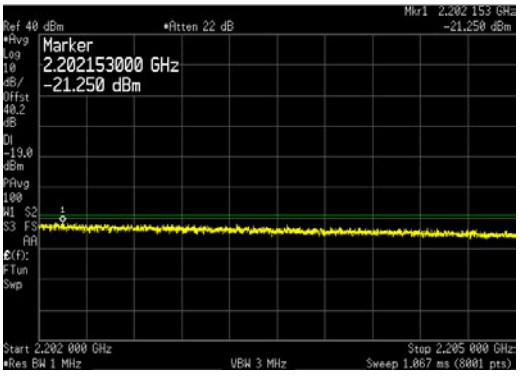
LTE20_Top Channel_UBE_2201 to 2202MHz



LTE20_Bottom Channel_LBE_2105 to 2108MHz

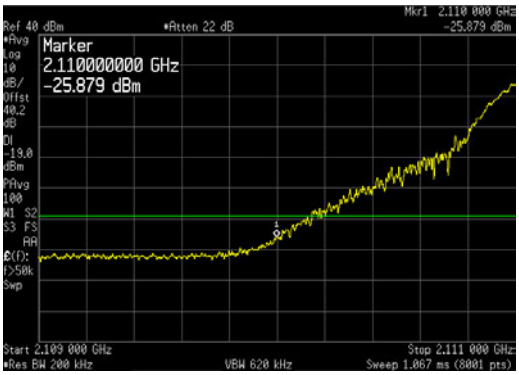


LTE20_Top Channel_UBE_2202 to 2205MHz

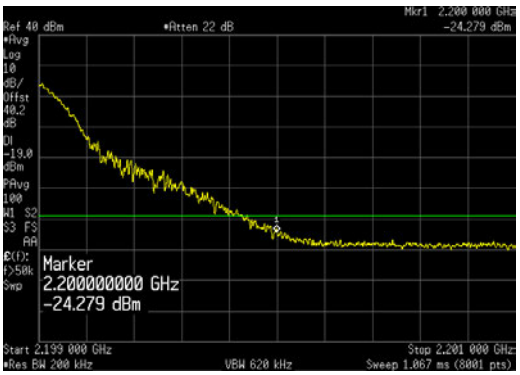


LTE20 Band Edge Plots for Antenna Port 2 and 64QAM Modulation:

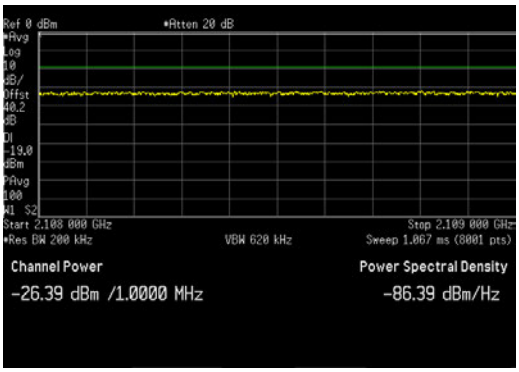
LTE20_Bottom Channel_LBE_2109 to 2111MHz



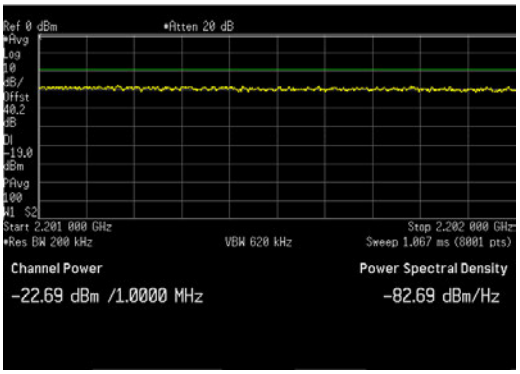
LTE20_Top Channel_UBE_2199 to 2201MHz



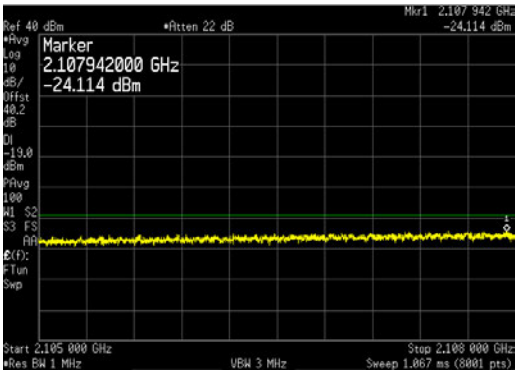
LTE20_Bottom Channel_LBE_2108 to 2109MHz



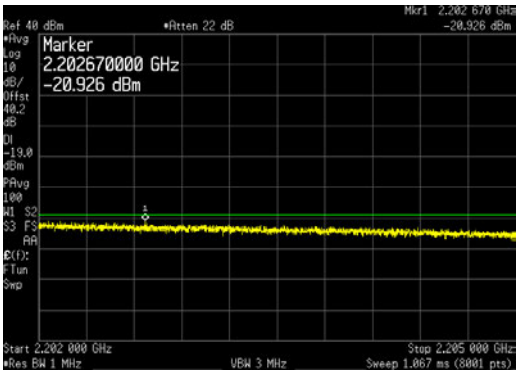
LTE20_Top Channel_UBE_2201 to 2202MHz



LTE20_Bottom Channel_LBE_2105 to 2108MHz

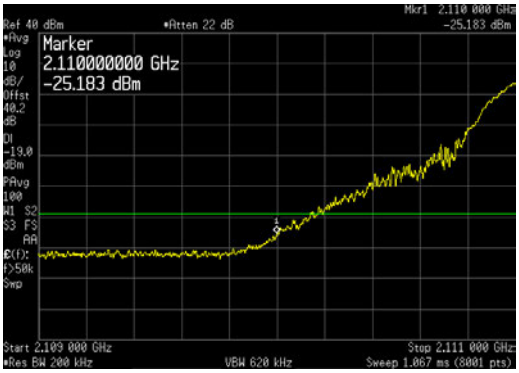


LTE20_Top Channel_UBE_2202 to 2205MHz

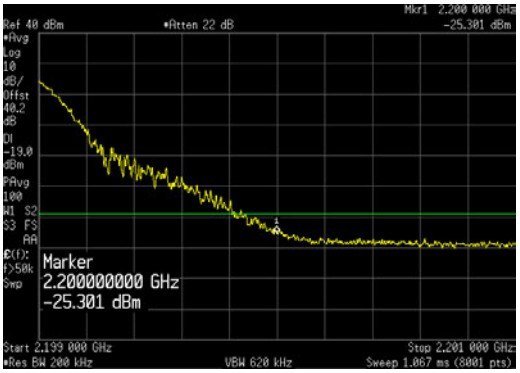


LTE20 Band Edge Plots for Antenna Port 2 and 256QAM Modulation:

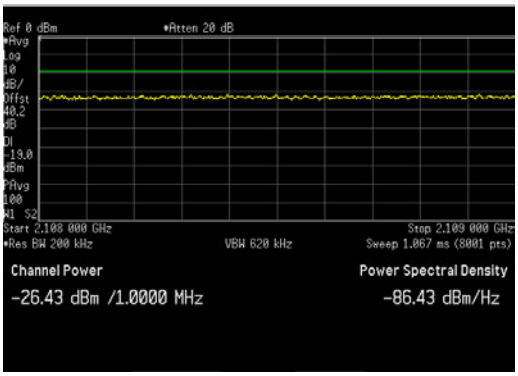
LTE20_Bottom Channel_LBE_2109 to 2111MHz



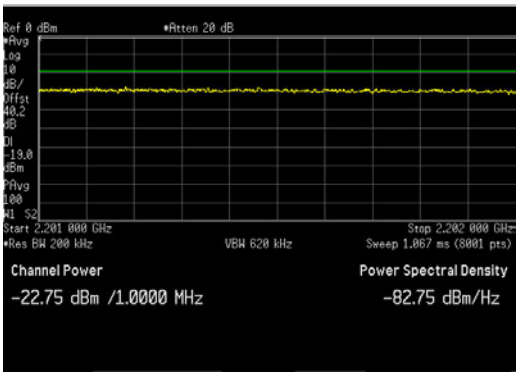
LTE20_Top Channel_UBE_2199 to 2201MHz



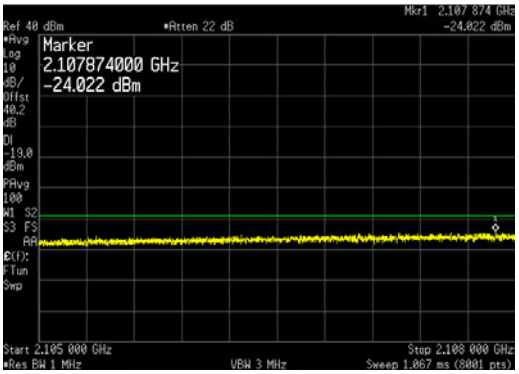
LTE20_Bottom Channel_LBE_2108 to 2109MHz



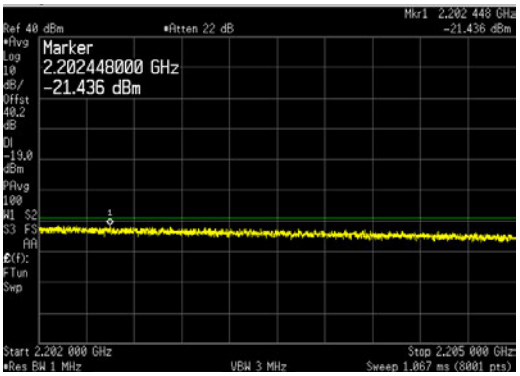
LTE20_Top Channel_UBE_2201 to 2202MHz



LTE20_Bottom Channel_LBE_2105 to 2108MHz

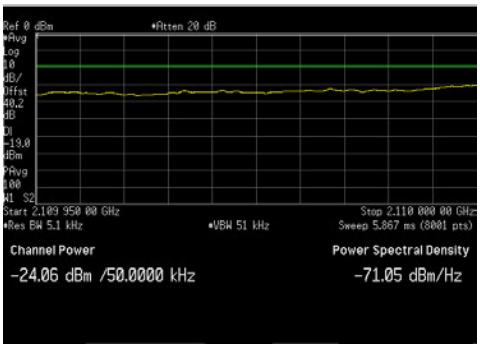


LTE20_Top Channel_UBE_2202 to 2205MHz

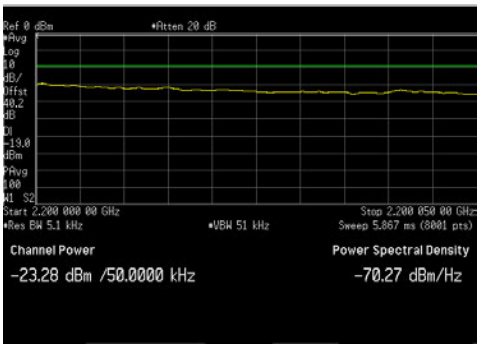


Dual LTE5_Band Edge Plots for Antenna Port 2 and QPSK Modulation:

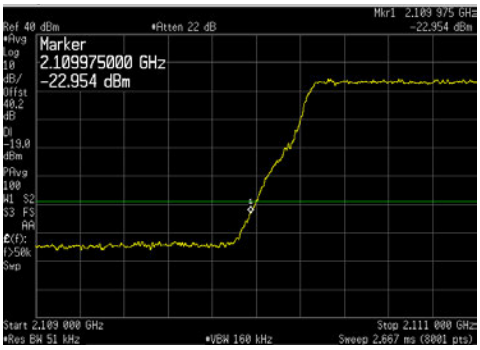
Dual LTE5_Bot Ch_LBE_2109.95 to 2110.00MHz



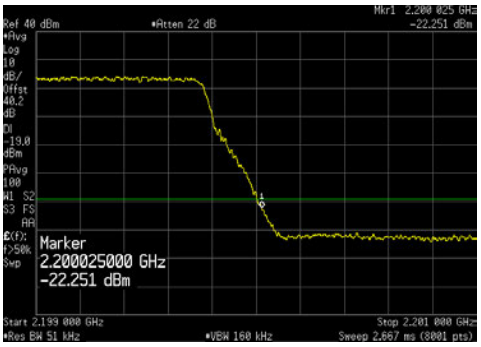
Dual LTE5_Top Ch_UBE_2200.00 to 2200.05MHz



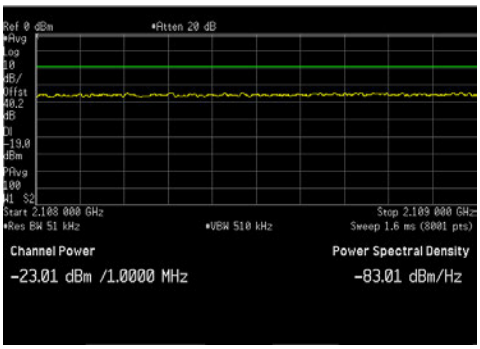
Dual LTE5_Bot Ch_LBE_2109 to 2111MHz



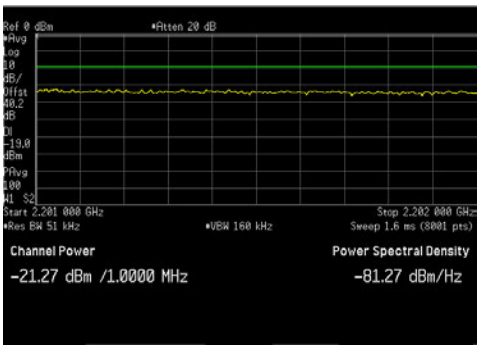
Dual LTE5_Top Ch_UBE_2199 to 2201MHz



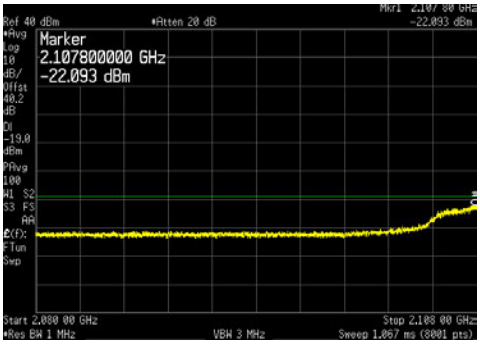
Dual LTE5_Bot Ch_LBE_2108 to 2109MHz



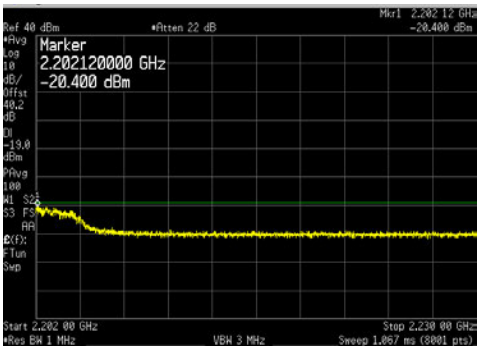
Dual LTE5_Top Ch_UBE_2201 to 2202MHz



Dual LTE5_Bot Ch_LBE_2080 to 2108MHz

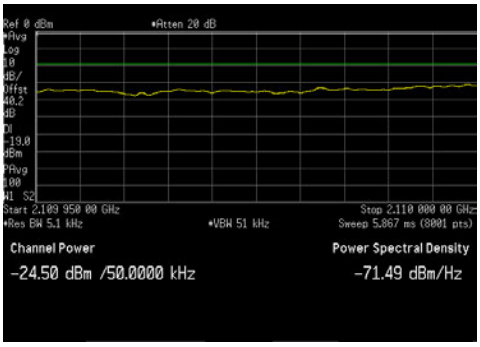


Dual LTE5_Top Ch_UBE_2202 to 2230MHz

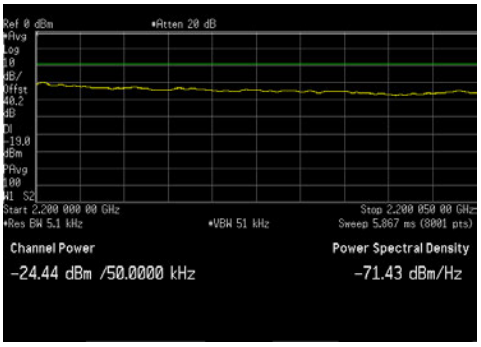


Dual LTE5_Band Edge Plots for Antenna Port 2 and 16QAM Modulation:

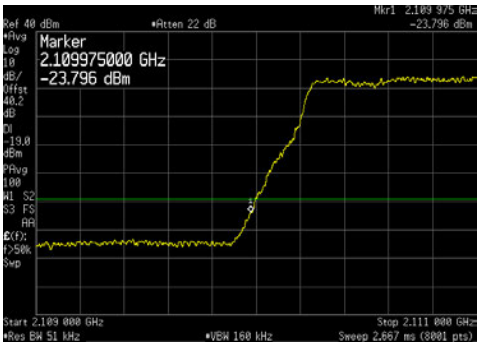
Dual LTE5_Bot Ch_LBE_2109.95 to 2110.00MHz



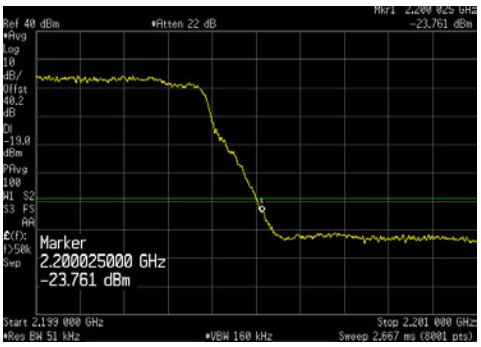
Dual LTE5_Top Ch_UBE_2200.00 to 2200.05MHz



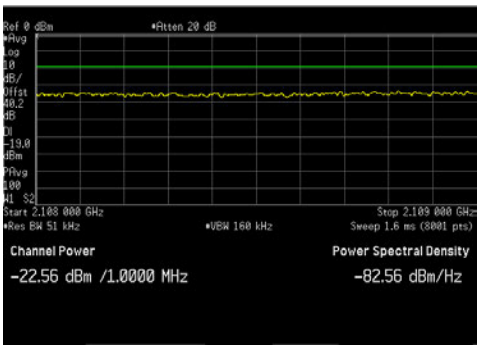
Dual LTE5_Bot Ch_LBE_2109 to 2111MHz



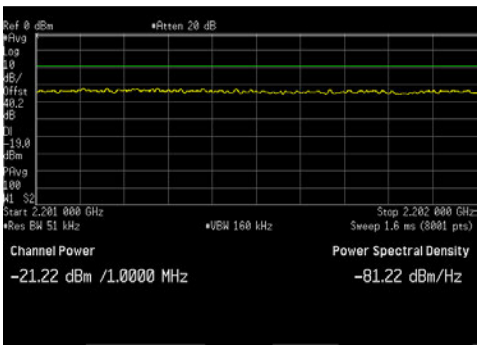
Dual LTE5_Top Ch_UBE_2199 to 2201MHz



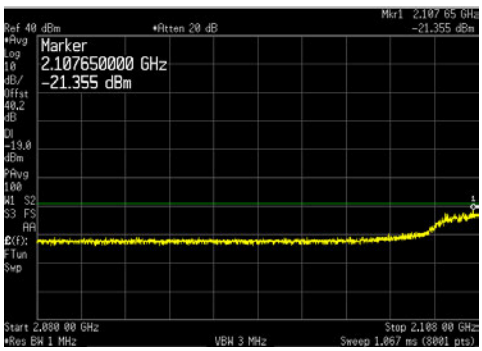
Dual LTE5_Bot Ch_LBE_2108 to 2109MHz



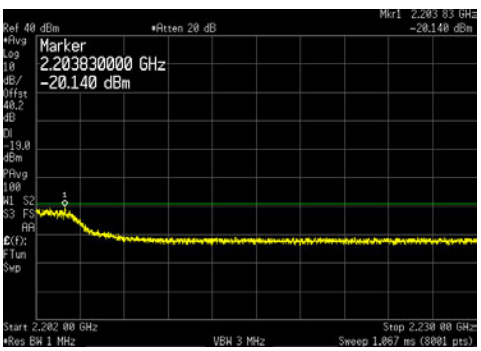
Dual LTE5_Top Ch_UBE_2201 to 2202MHz



Dual LTE5_Bot Ch_LBE_2080 to 2108MHz

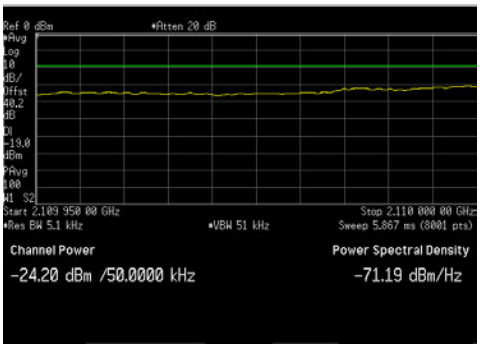


Dual LTE5_Top Ch_UBE_2202 to 2230MHz

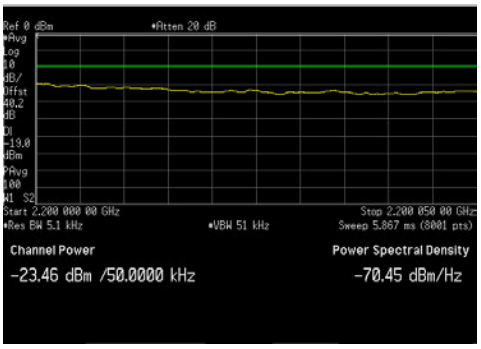


Dual LTE5_Band Edge Plots for Antenna Port 2 and 64QAM Modulation:

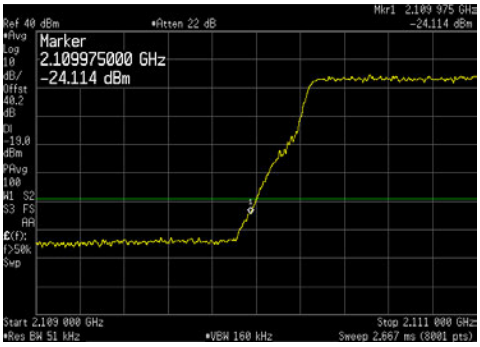
Dual LTE5_Bot Ch_LBE_2109.95 to 2110.00MHz



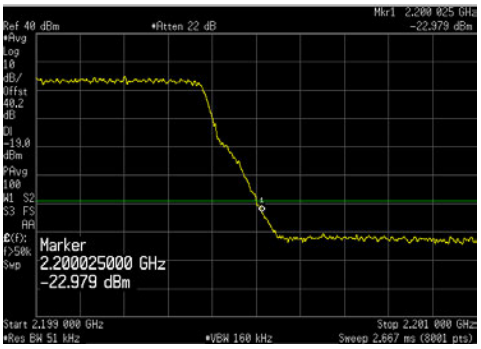
Dual LTE5_Top Ch_UBE_2200.00 to 2200.05MHz



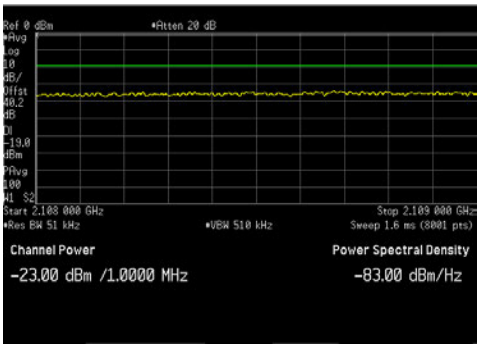
Dual LTE5_Bot Ch_LBE_2109 to 2111MHz



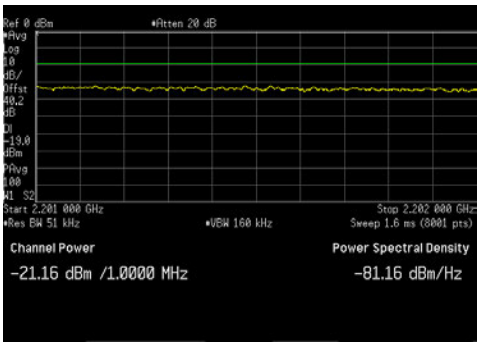
Dual LTE5_Top Ch_UBE_2199 to 2201MHz



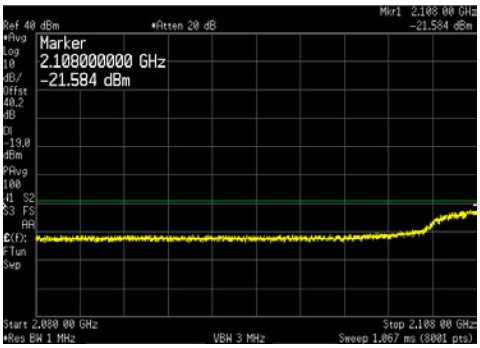
Dual LTE5_Bot Ch_LBE_2108 to 2109MHz



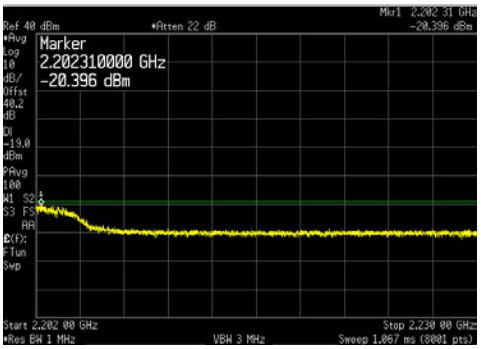
Dual LTE5_Top Ch_UBE_2201 to 2202MHz



Dual LTE5_Bot Ch_LBE_2080 to 2108MHz

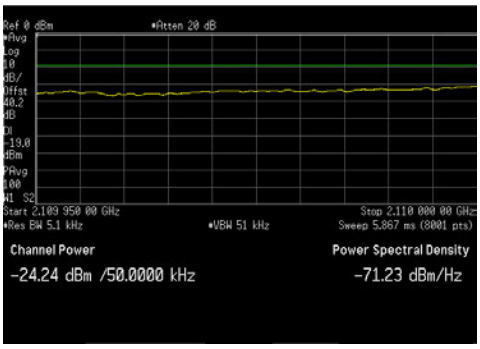


Dual LTE5_Top Ch_UBE_2202 to 2230MHz

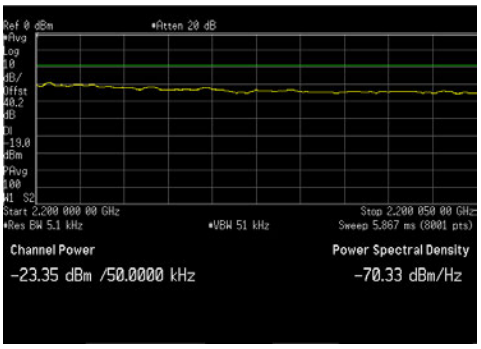


Dual LTE5_Band Edge Plots for Antenna Port 2 and 256QAM Modulation:

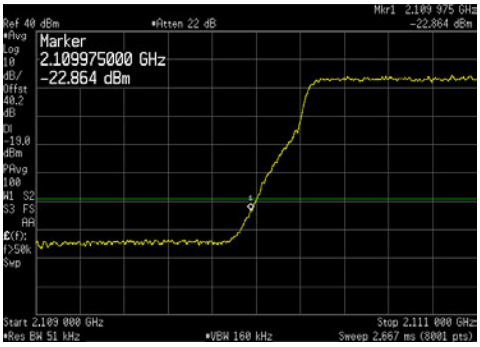
Dual LTE5_Bot Ch_LBE_2109.95 to 2110.00MHz



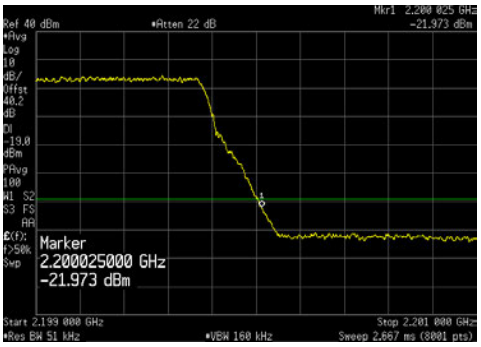
Dual LTE5_Top Ch_UBE_2200.00 to 2200.05MHz



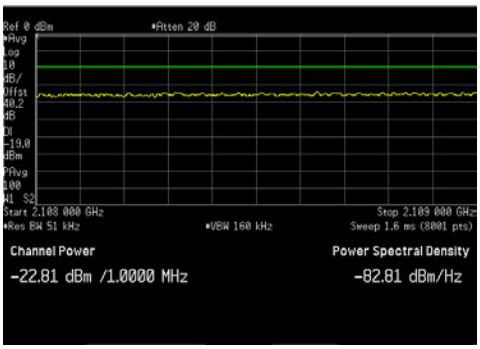
Dual LTE5_Bot Ch_LBE_2109 to 2111MHz



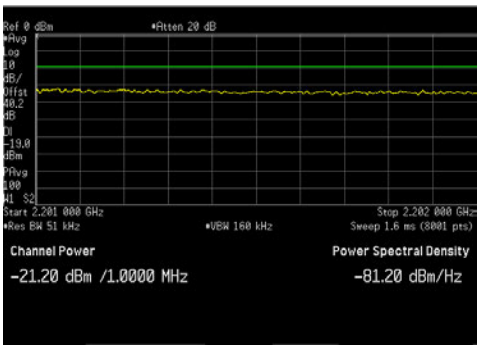
Dual LTE5_Top Ch_UBE_2199 to 2201MHz



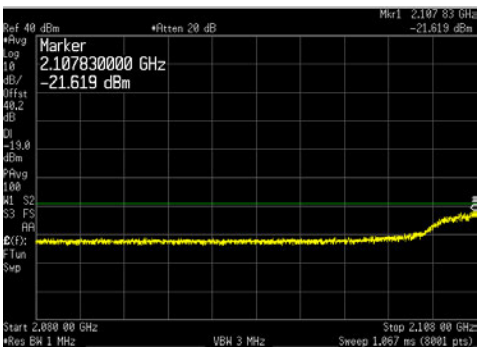
Dual LTE5_Bot Ch_LBE_2108 to 2109MHz



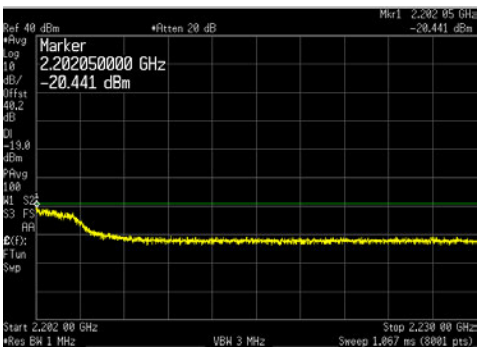
Dual LTE5_Top Ch_UBE_2201 to 2202MHz



Dual LTE5_Bot Ch_LBE_2080 to 2108MHz



Dual LTE5_Top Ch_UBE_2202 to 2230MHz



Transmitter Antenna Port Conducted Emissions

Transmitter conducted emission measurements were made at RRH antenna port 2. Measurements were performed over the 9kHz to 22GHz frequency range. The RRH was operated on the PCS middle channel (1962.5MHz) and AWS middle channel (2155.0MHz) simultaneously with all LTE modulation types (QPSK, 16QAM, 64QAM and 256QAM) for LTE bandwidths of 5MHz, 10MHz, 15MHz and 20MHz.

The limit of -19dBm was used in the certification testing. The limit is adjusted to -19dBm [-13dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter. The required measurement parameters include a 1MHz bandwidth with power measured in average value (since transmitter power was measured in average value).

Measurements were performed with a spectrum analyzer using a peak detector with max hold over 50 sweeps (except for the 20MHz to 3GHz frequency range). Measurements for the 20MHz to 3GHz frequency range were performed with the spectrum analyzer in the RMS average mode over 100 traces.

The limit for the 9kHz to 150kHz frequency range was adjusted to –49dBm to correct for a spectrum analyzer RBW of 1kHz versus required RBW of 1MHz [i.e.: -49dBm = -19dBm -10log(1MHz/1kHz)]. The limit for the 150kHz to 20MHz frequency range was adjusted to –29dBm to correct for a spectrum analyzer RBW of 100kHz versus required RBW of 1MHz [i.e.: -29dBm = -19dBm -10log(1MHz/100kHz)]. The required limit of -19dBm with a RBW of 1MHz was used for all other frequency ranges.

The spectrum analyzer settings that were used for this test are summarized in the following table.

Frequency Range	RBW	VBW	Number of Data Points	Detector	Sweep Time	Max Hold over	Offset Note (1)
9kHz to 150kHz	1kHz	3kHz	8001	Peak	Auto	50 Sweeps	28.0dB
150kHz to 20MHz	100kHz	300kHz	8001	Peak	Auto	50 Sweeps	28.0dB
20MHz to 3GHz	1MHz	3MHz	8001	Average	Auto	Note (2)	40.2dB
3GHz to 6GHz	1MHz	3MHz	8001	Peak	Auto	50 Sweeps	40.0dB
6GHz to 10GHz	1MHz	3MHz	8001	Peak	Auto	50 Sweeps	30.6dB
10GHz to 14GHz	1MHz	3MHz	8001	Peak	Auto	50 Sweeps	32.5dB
14GHz to 18GHz	1MHz	3MHz	8001	Peak	Auto	50 Sweeps	34.0dB
18GHz to 22GHz	1MHz	3MHz	8001	Peak	Auto	50 Sweeps	39.5dB

Note 1: The total measurement RF path loss of the test setup (attenuators, test cables and filters) is accounted for by the spectrum analyzer reference level offset.
Note 2: Max Hold not used and instead measurements were performed with the spectrum analyzer in the RMS average mode over 100 traces.

A low pass filter was used to reduce measurement instrumentation noise floor for the frequency ranges less than 20MHz. A high pass filter was used to reduce measurement instrumentation noise floor for the frequency ranges above 6GHz. The total measurement RF path loss of the test setup (attenuators, low pass filter, high pass filter and test cables) as shown in the table is accounted for by the spectrum analyzer reference level offset. The display line on the plots reflects the required limit.

Conducted spurious emission plots/measurements are provided in Appendix A.