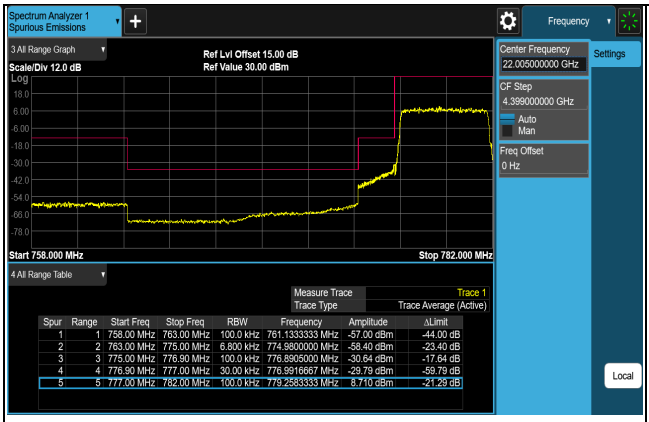
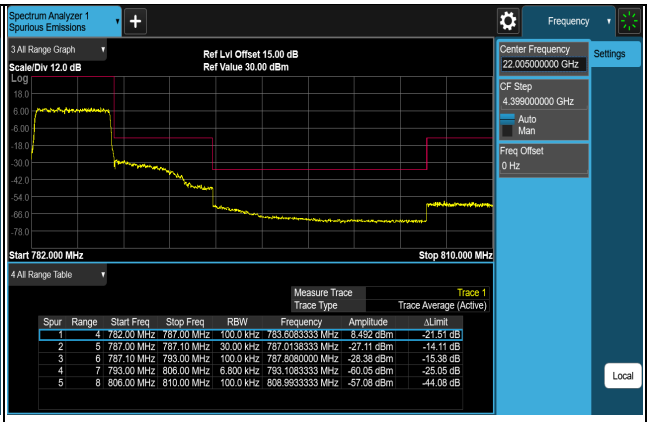
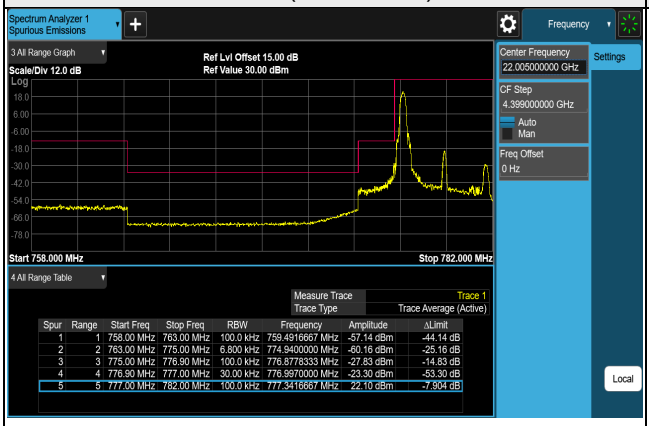
LTE Band 13 (Channel Bandwidth 5MHz)



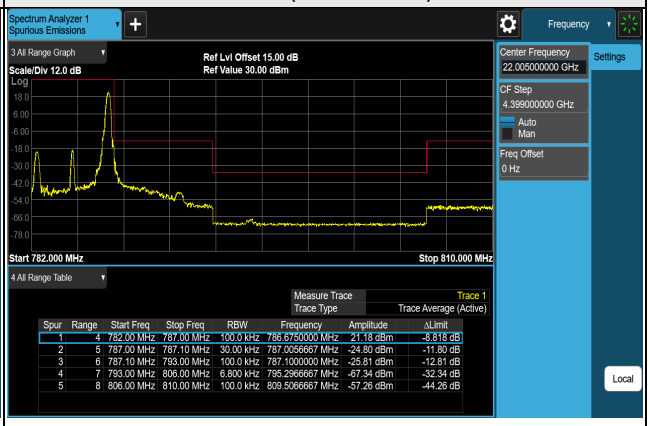
FULL (779.5 MHz)



FULL (784.5 MHz)

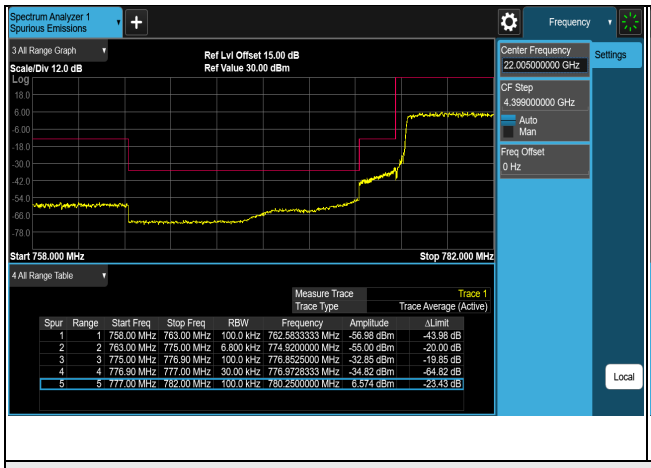


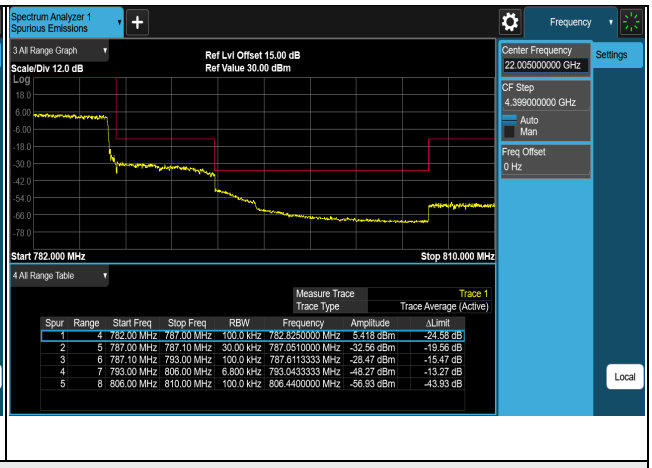
1RB (779.5 MHz)



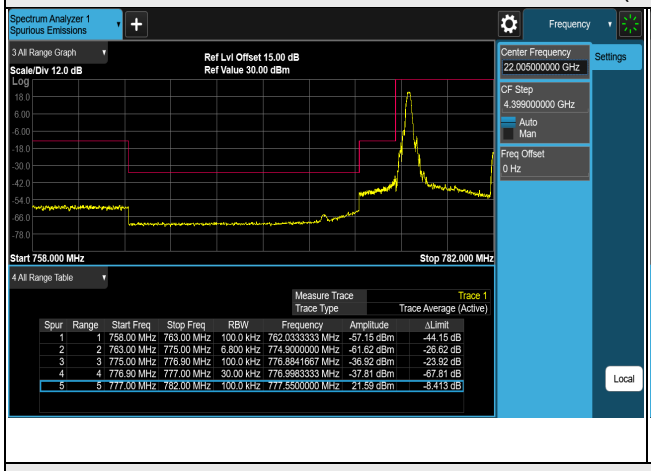
1RB (784.5 MHz)

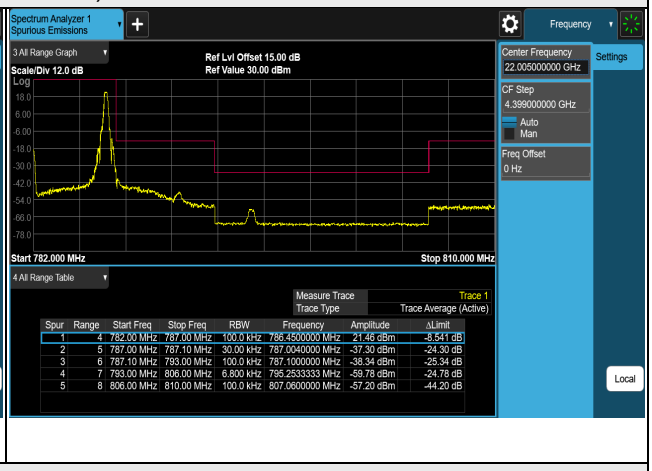
LTE Band 13 (Channel Bandwidth 10MHz)





FULL (782 MHz)





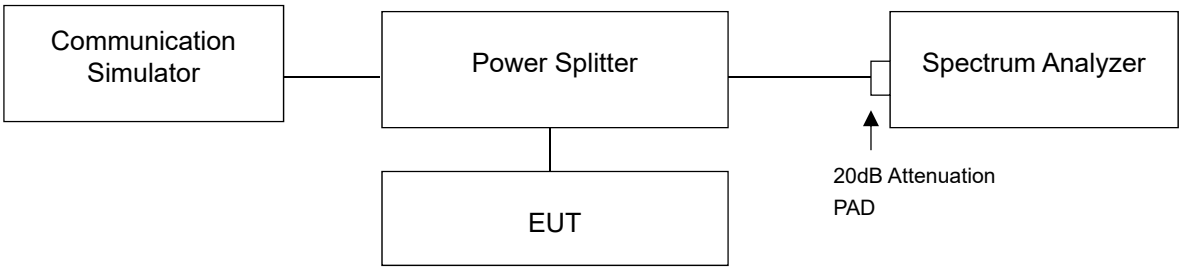
1RB (782 MHz)

4.6 Peak to Average Ratio

4.6.1 Limits of Peak to Average Ratio Measurement

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

4.6.2 Test Setup



4.6.3 Test Procedures

a. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

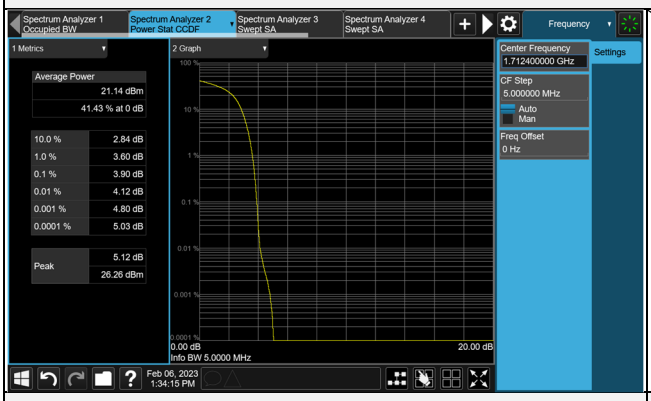
b. Set the number of counts to a value that stabilizes the measured CCDF curve;

c. Record the maximum PAPR level associated with a probability of 0.1%.

4.6.4 Test Results

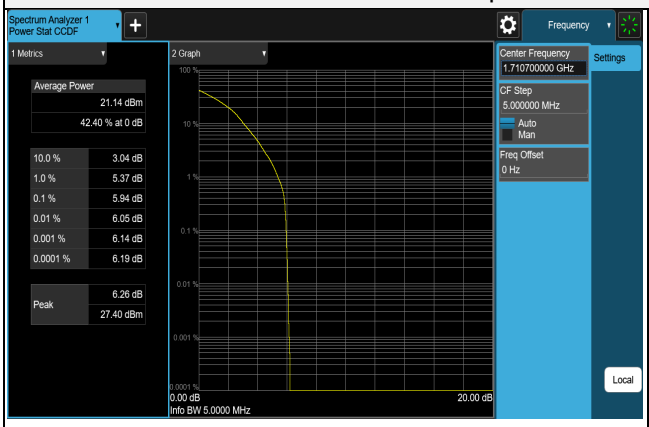
WCDMA Band 4

Test Condition	Channel	Frequency (MHz)	Measure. Value (dB)	Limit (dB)	Result
WCDMA	1312	1712.4	3.17	13	Pass
WCDMA	1413	1732.6	3.11	13	Pass
WCDMA	1513	1752.6	2.67	13	Pass
HSDPA	1312	1712.4	3.87	13	Pass
HSDPA	1413	1732.6	3.80	13	Pass
HSDPA	1513	1752.6	3.48	13	Pass
HSUPA	1312	1712.4	3.90	13	Pass
HSUPA	1413	1732.6	3.83	13	Pass
HSUPA	1513	1752.6	3.51	13	Pass

Spectrum Plot of Worst Value	
	
HSUPA CH 1312 (1712.4MHz)	

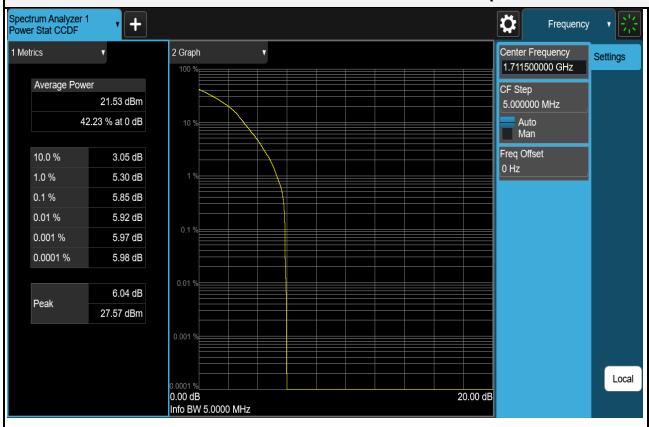
LTE Band 4 (Channel Bandwidth 1.4MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit (dB)	Result
QPSK	19957	1710.7	4.95	13	Pass
QPSK	20175	1732.5	4.81	13	Pass
QPSK	20393	1754.3	3.82	13	Pass
16QAM	19957	1710.7	5.94	13	Pass
16QAM	20175	1732.5	5.77	13	Pass
16QAM	20393	1754.3	4.78	13	Pass

Spectrum Plot of Worst Value	
	
16QAM CH 19957 (1710.7MHz)	

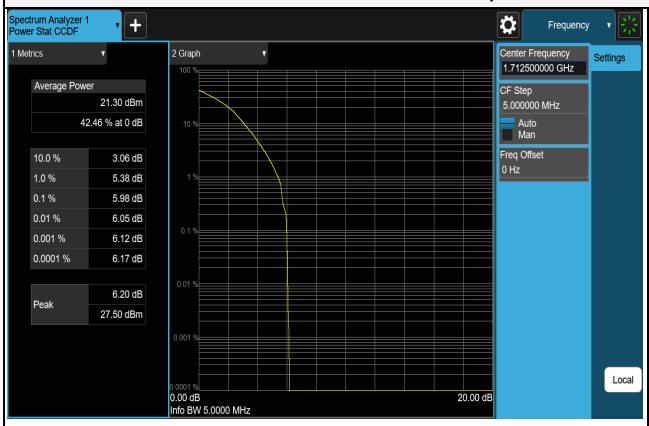
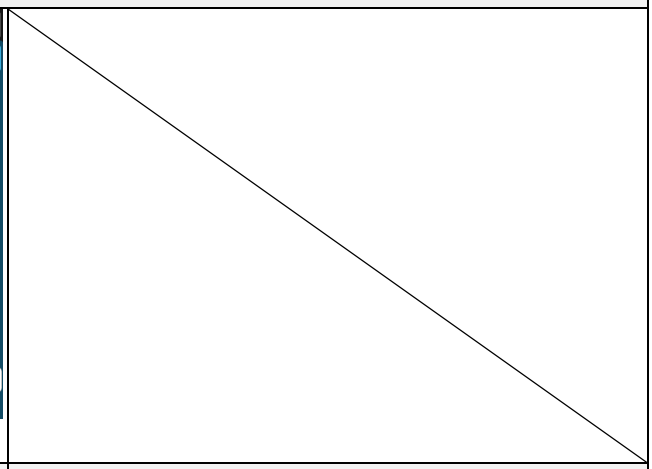
LTE Band 4 (Channel Bandwidth 3MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit (dB)	Result
QPSK	19965	1711.5	4.89	13	Pass
QPSK	20175	1732.5	4.79	13	Pass
QPSK	20385	1753.5	3.76	13	Pass
16QAM	19965	1711.5	5.85	13	Pass
16QAM	20175	1732.5	5.71	13	Pass
16QAM	20385	1753.5	4.68	13	Pass

Spectrum Plot of Worst Value	
	
16QAM CH 19965 (1711.5MHz)	

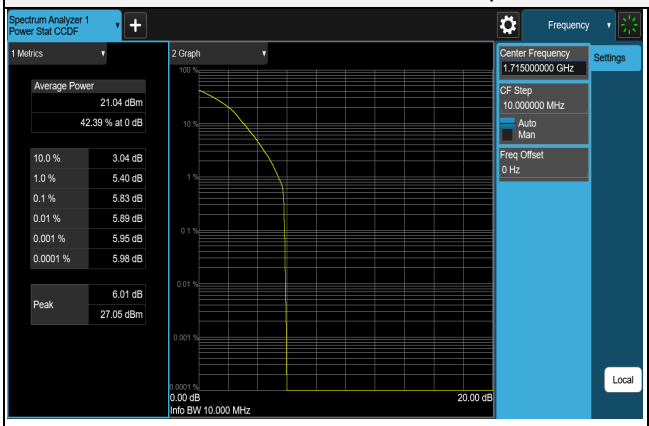
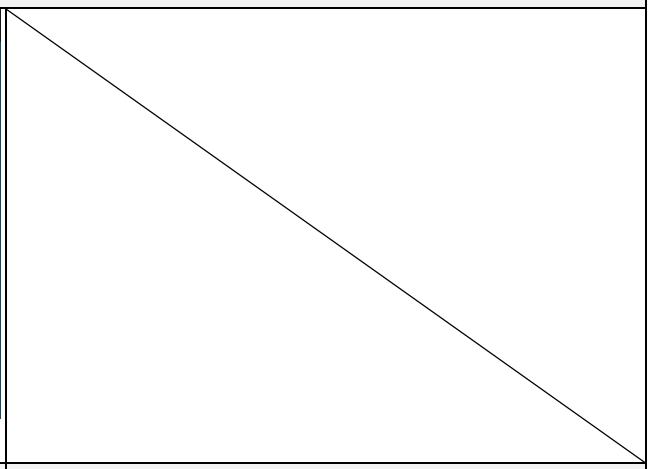
LTE Band 4 (Channel Bandwidth 5MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit (dB)	Result
QPSK	19975	1712.5	4.82	13	Pass
QPSK	20175	1732.5	4.70	13	Pass
QPSK	20375	1752.5	3.88	13	Pass
16QAM	19975	1712.5	5.98	13	Pass
16QAM	20175	1732.5	5.64	13	Pass
16QAM	20375	1752.5	4.80	13	Pass

Spectrum Plot of Worst Value	
	
16QAM CH 19975 (1712.5MHz)	

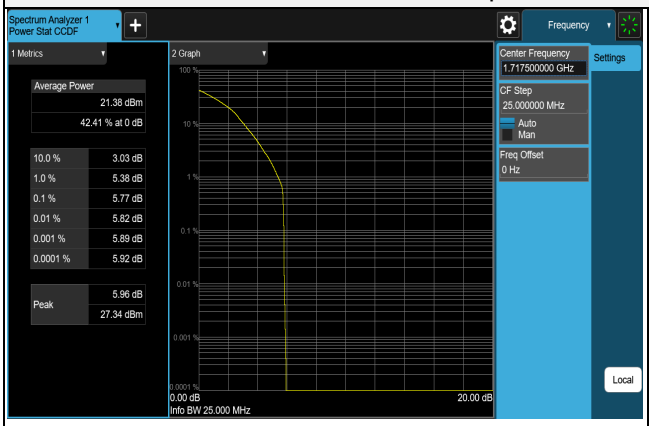
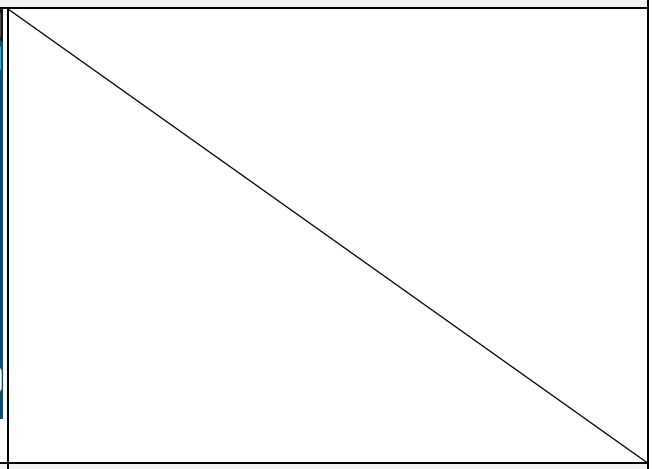
LTE Band 4 (Channel Bandwidth 10MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit (dB)	Result
QPSK	20000	1715	4.81	13	Pass
QPSK	20175	1732.5	4.75	13	Pass
QPSK	20350	1750	4.58	13	Pass
16QAM	20000	1715	5.83	13	Pass
16QAM	20175	1732.5	5.58	13	Pass
16QAM	20350	1750	5.51	13	Pass

Spectrum Plot of Worst Value	
	
16QAM CH 20000 (1715MHz)	

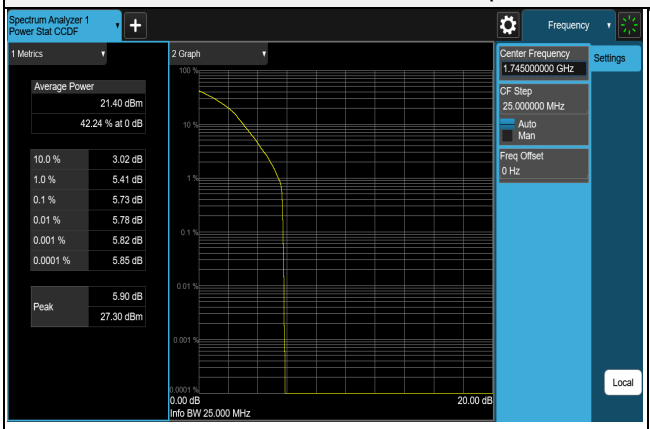
LTE Band 4 (Channel Bandwidth 15MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit (dB)	Result
QPSK	20025	1717.5	4.77	13	Pass
QPSK	20175	1732.5	4.48	13	Pass
QPSK	20325	1747.5	4.76	13	Pass
16QAM	20025	1717.5	5.77	13	Pass
16QAM	20175	1732.5	5.42	13	Pass
16QAM	20325	1747.5	5.75	13	Pass

Spectrum Plot of Worst Value	
	
16QAM CH 20025 (1717.5MHz)	

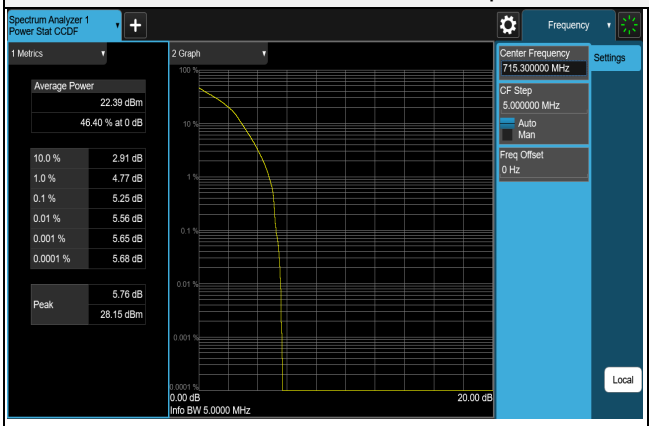
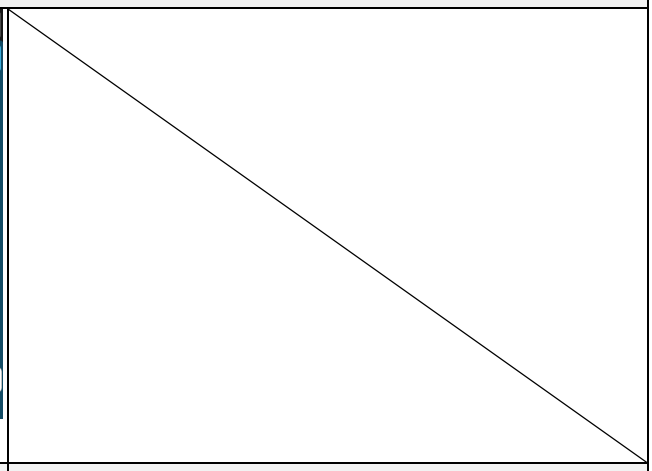
LTE Band 4 (Channel Bandwidth 20MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit (dB)	Result
QPSK	20050	1720	4.76	13	Pass
QPSK	20175	1732.5	4.34	13	Pass
QPSK	20300	1745	4.80	13	Pass
16QAM	20050	1720	5.70	13	Pass
16QAM	20175	1732.5	5.35	13	Pass
16QAM	20300	1745	5.73	13	Pass

Spectrum Plot of Worst Value	
	
16QAM CH 20300 (1745MHz)	

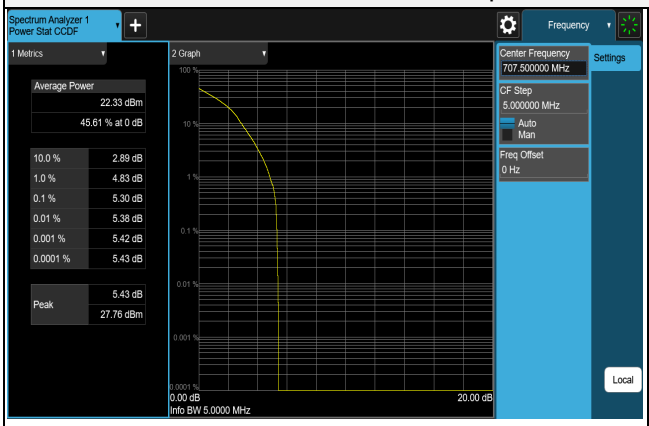
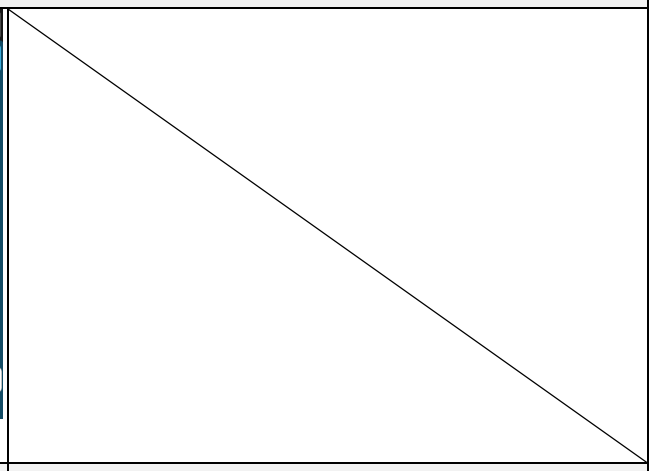
LTE Band 12 (Channel Bandwidth 1.4MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit (dB)	Result
QPSK	23017	699.7	4.34	13	Pass
QPSK	23095	707.5	4.50	13	Pass
QPSK	23173	715.3	4.51	13	Pass
16QAM	23017	699.7	5.20	13	Pass
16QAM	23095	707.5	5.19	13	Pass
16QAM	23173	715.3	5.25	13	Pass

Spectrum Plot of Worst Value	
	
16QAM CH 23173 (715.3MHz)	

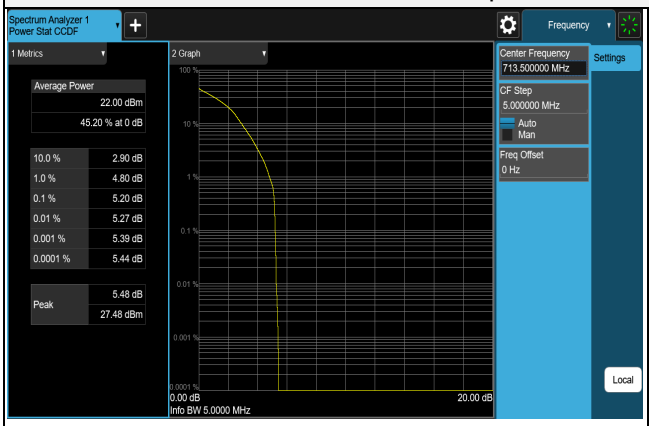
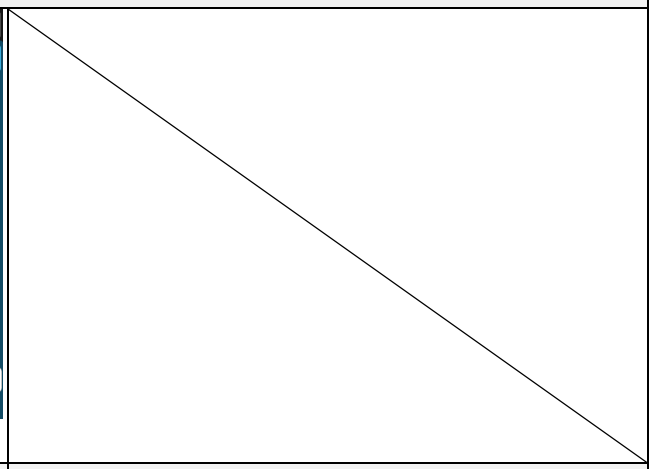
LTE Band 12 (Channel Bandwidth 3MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit (dB)	Result
QPSK	23025	700.5	4.33	13	Pass
QPSK	23095	707.5	4.54	13	Pass
QPSK	23165	714.5	4.40	13	Pass
16QAM	23025	700.5	5.13	13	Pass
16QAM	23095	707.5	5.30	13	Pass
16QAM	23165	714.5	5.01	13	Pass

Spectrum Plot of Worst Value	
	
16QAM CH 23095 (707.5MHz)	

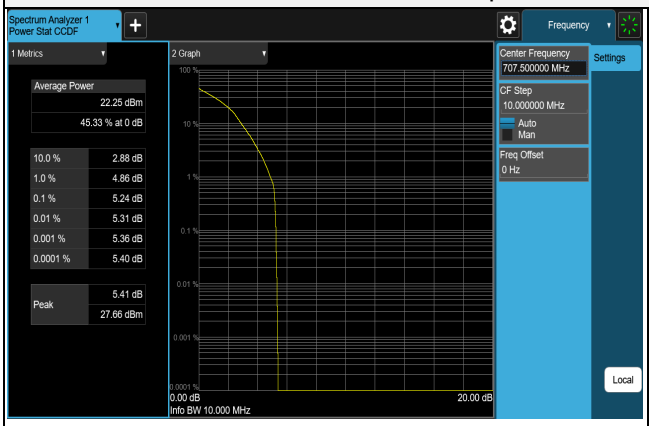
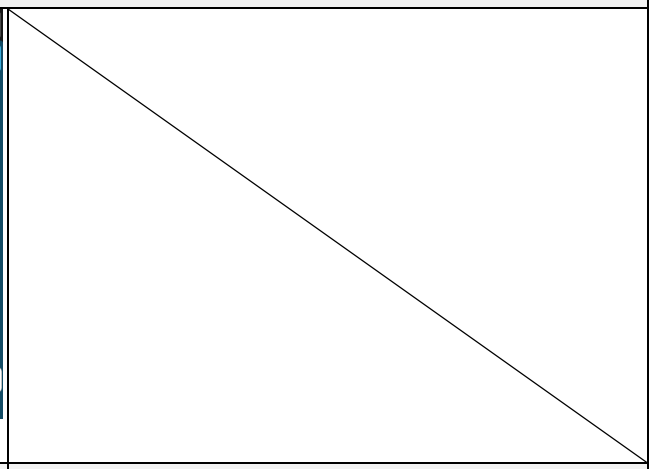
LTE Band 12 (Channel Bandwidth 5MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit (dB)	Result
QPSK	23035	701.5	4.31	13	Pass
QPSK	23095	707.5	4.23	13	Pass
QPSK	23155	713.5	4.35	13	Pass
16QAM	23035	701.5	5.12	13	Pass
16QAM	23095	707.5	5.15	13	Pass
16QAM	23155	713.5	5.20	13	Pass

Spectrum Plot of Worst Value	
	
16QAM CH 23155 (713.5MHz)	

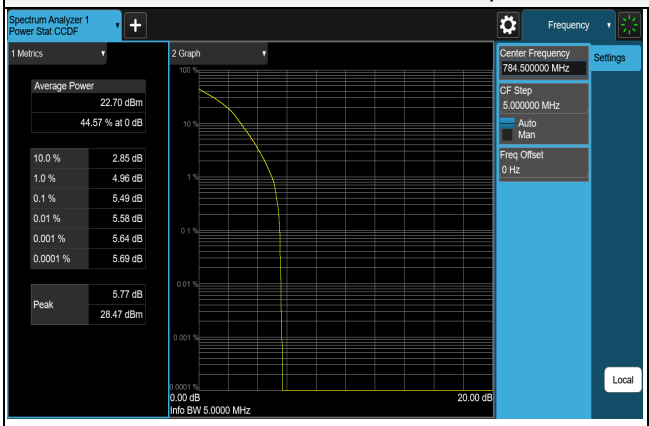
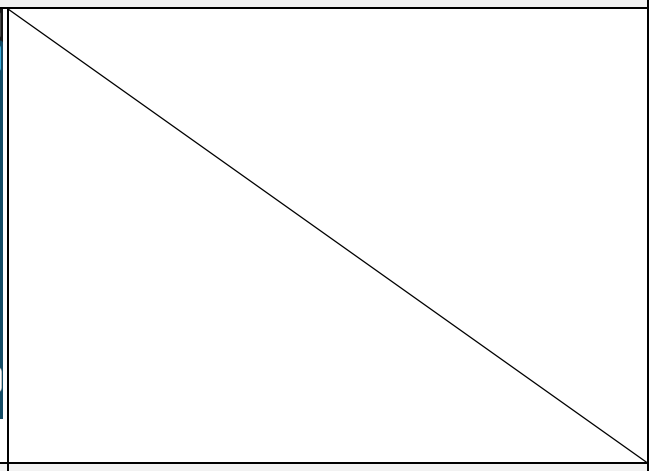
LTE Band 12 (Channel Bandwidth 10MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit (dB)	Result
QPSK	23060	704	4.07	13	Pass
QPSK	23095	707.5	4.43	13	Pass
QPSK	23130	711	4.19	13	Pass
16QAM	23060	704	5.14	13	Pass
16QAM	23095	707.5	5.24	13	Pass
16QAM	23130	711	5.19	13	Pass

Spectrum Plot of Worst Value	
	
16QAM CH 23095 (707.5MHz)	

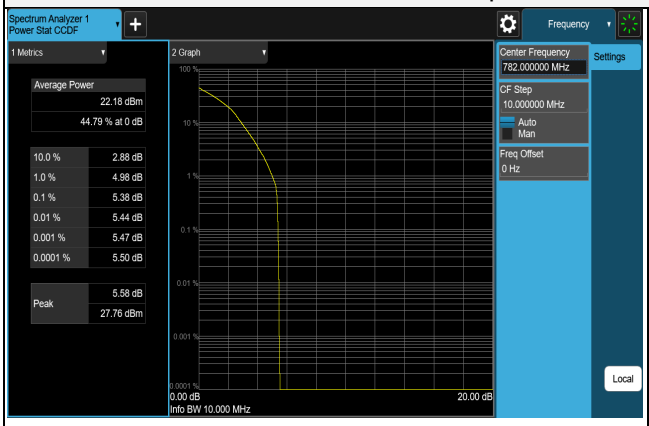
LTE Band 13 (Channel Bandwidth 5MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit (dB)	Result
QPSK	23205	779.5	4.32	13	Pass
QPSK	23230	782	4.38	13	Pass
QPSK	23255	784.5	4.48	13	Pass
16QAM	23205	779.5	5.32	13	Pass
16QAM	23230	782	5.27	13	Pass
16QAM	23255	784.5	5.49	13	Pass

Spectrum Plot of Worst Value	
	
16QAM CH 23255 (784.5MHz)	

LTE Band 13 (Channel Bandwidth 10MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit (dB)	Result
QPSK	23230	782	4.42	13	Pass
16QAM	23230	782	5.38	13	Pass

Spectrum Plot of Worst Value	
	
16QAM CH 23230 (782MHz)	

4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

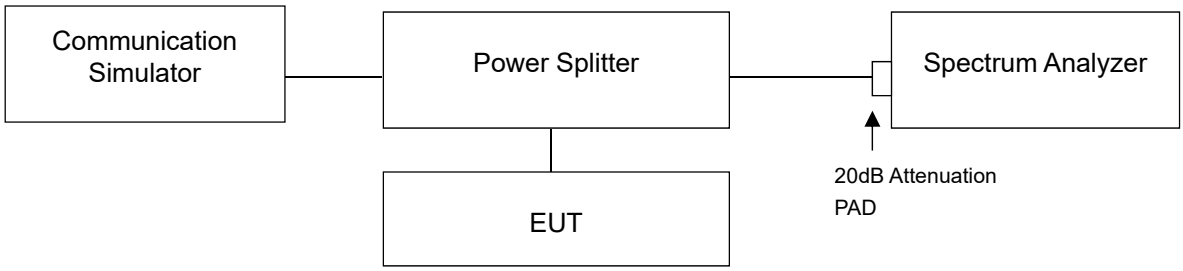
For WCDMA Band 4, LTE Band 4:
In the FCC 27.53(h),On any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB. The emission limit equal to –13dBm.

For LTE Band 12:
According to FCC 27.53(g) for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.

For LTE Band 13:
According to FCC 27.53(c)(2) for on any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB.

According to FCC 27.53(f) for operations in the 775-788 MHz, emissions in the band 1559-1610MHz shall be limited to -70 dBW/MHz. The limit of emissions is equal to -40 dBm

4.7.2 Test Setup



4.7.3 Test Procedure

a. All measurements were done at low and high channels operational frequency range.

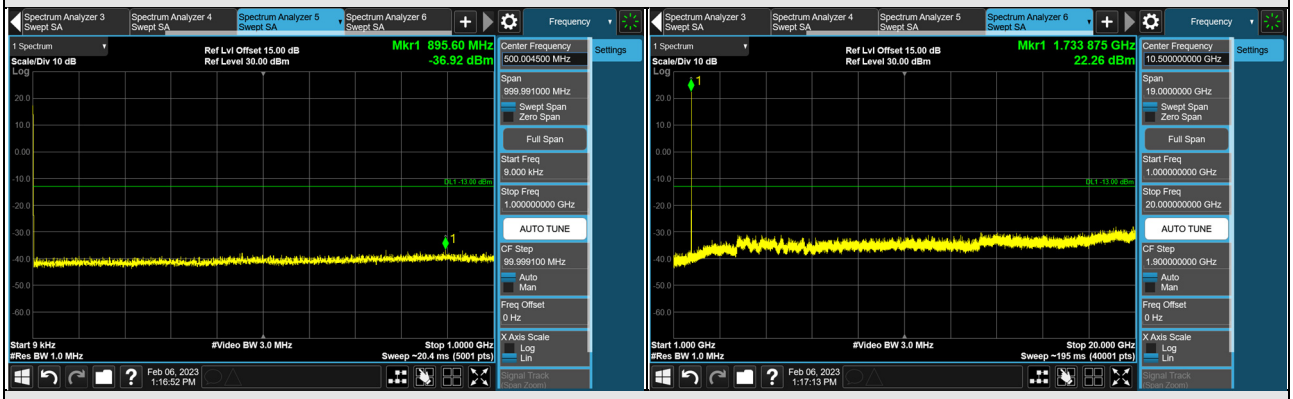
b. Measuring frequency range is from 9kHz to 1GHz. 20dB attenuation pad is connected with spectrum. Detector = average, RBW=1MHz and VBW=3MHz are for conducted emission measurement.

c. Measuring frequency range is from 1GHz to 8GHz / 9GHz / 18GHz / 20GHz. 20dB attenuation pad is connected with spectrum. Detector = average, RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

4.7.4 Test Results

WCDMA Band 4

CH 1312 (1712.4MHz)



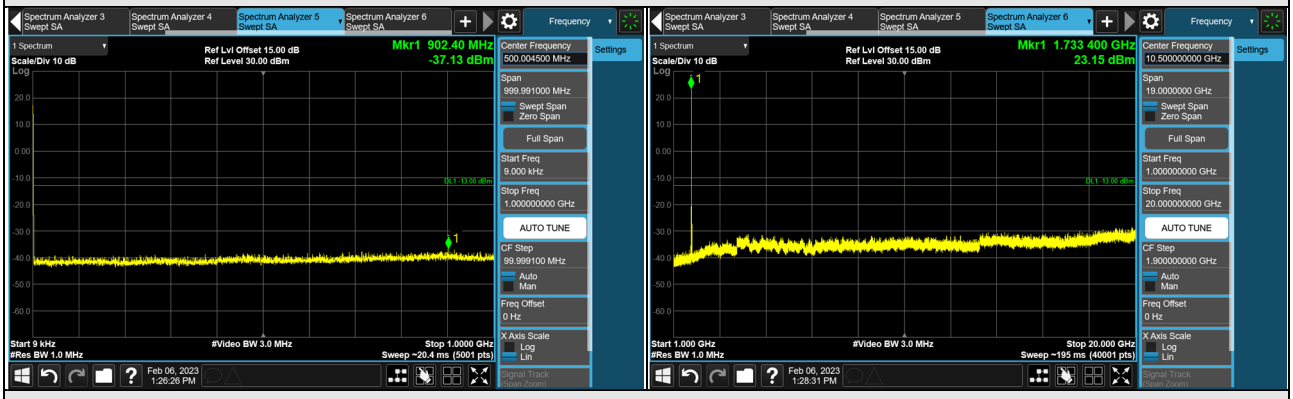
CH 1413 (1732.6MHz)

CH 1513 (1752.6MHz)

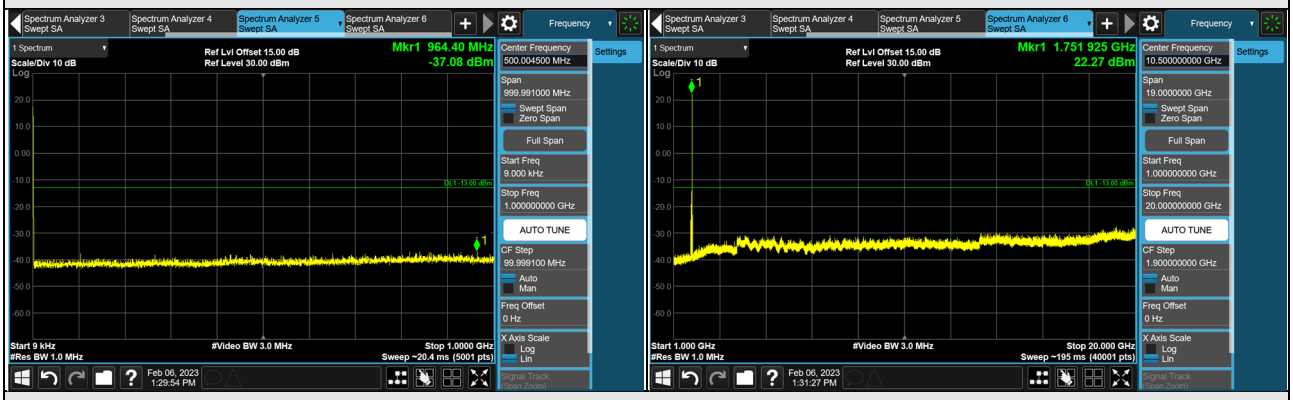
*The 9kHz signal over the limit is from Spectrum.

HSDPA

CH 1312 (1712.4MHz)



CH 1413 (1732.6MHz)

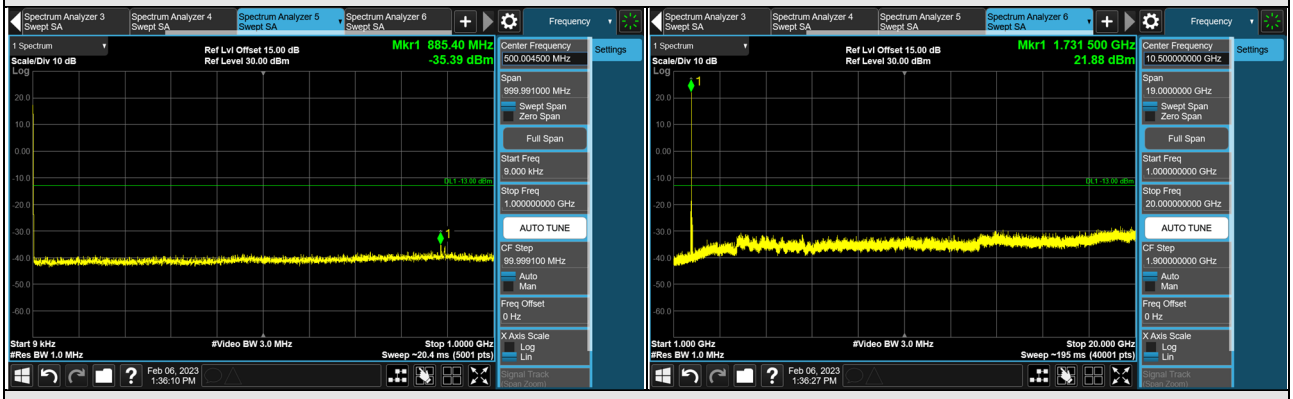


CH 1513 (1752.6MHz)

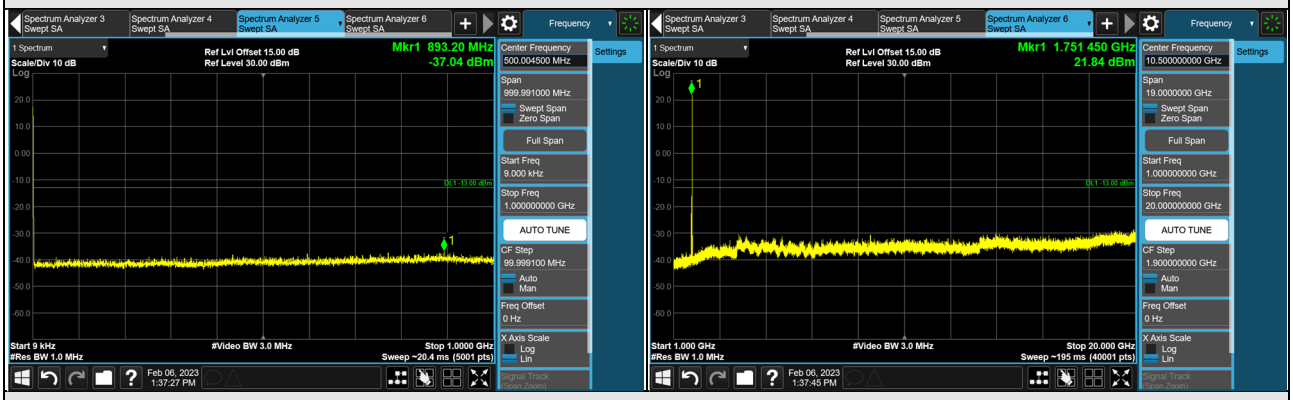
*The 9kHz signal over the limit is from Spectrum.

HSUPA

CH 1312 (1712.4MHz)



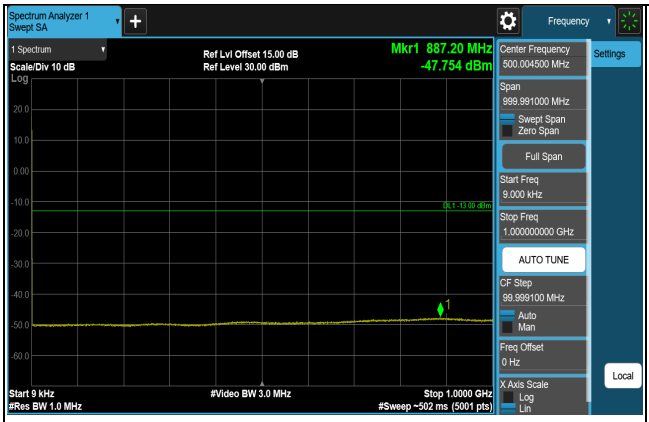
CH 1413 (1732.6MHz)

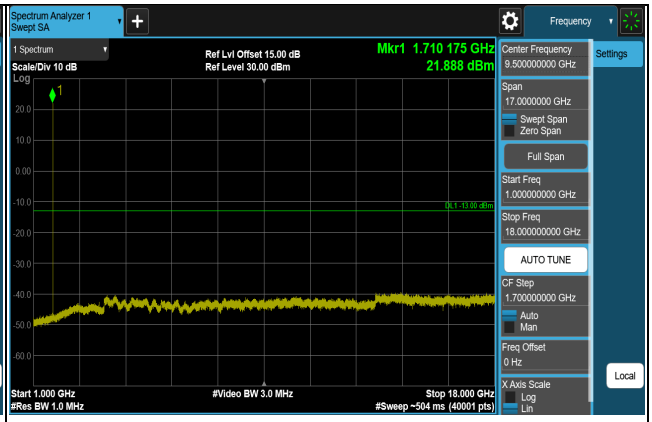


CH 1513 (1752.6MHz)

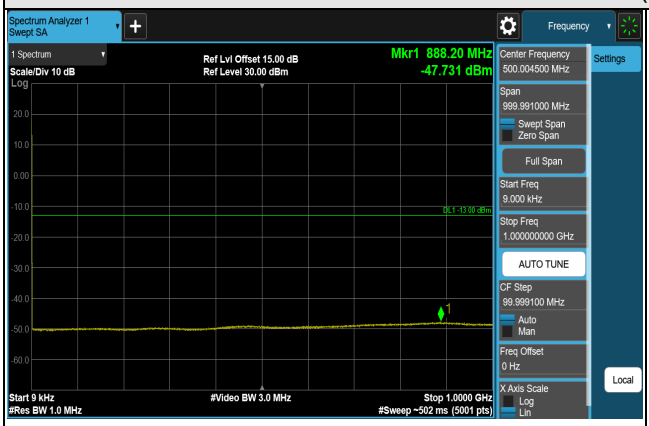
*The 9kHz signal over the limit is from Spectrum.

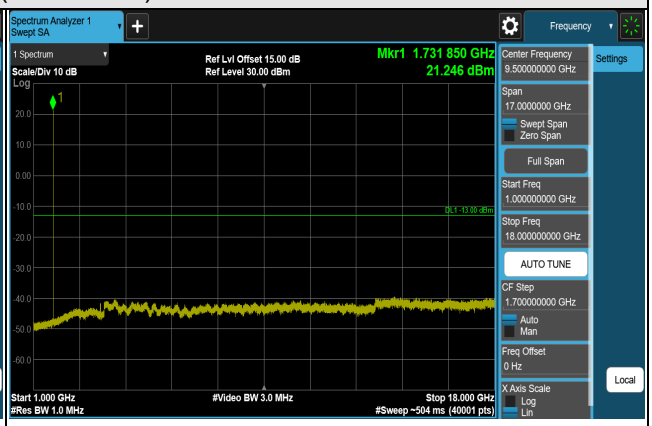
LTE Band 4 (Channel Bandwidth 1.4MHz)



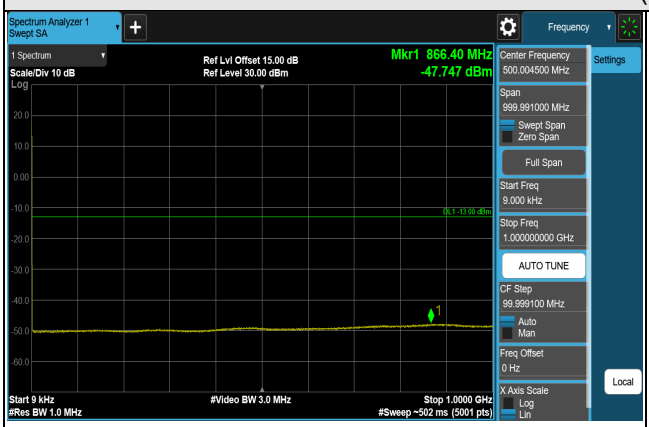


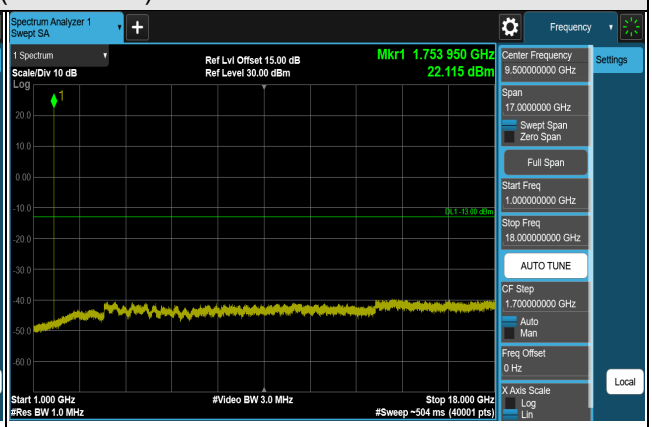
CH 19957 (1710.7MHz)





CH 20175 (1732.5MHz)

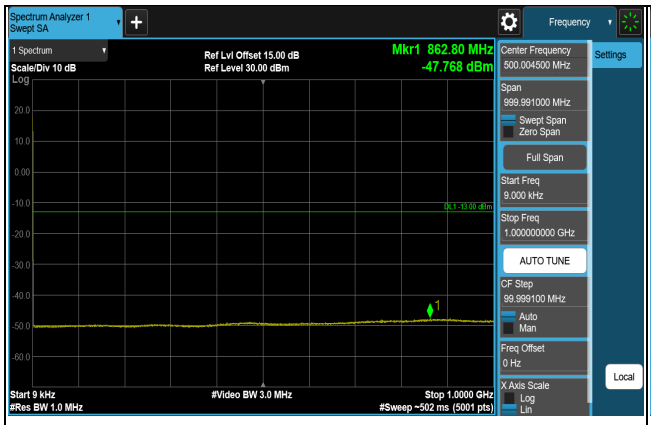


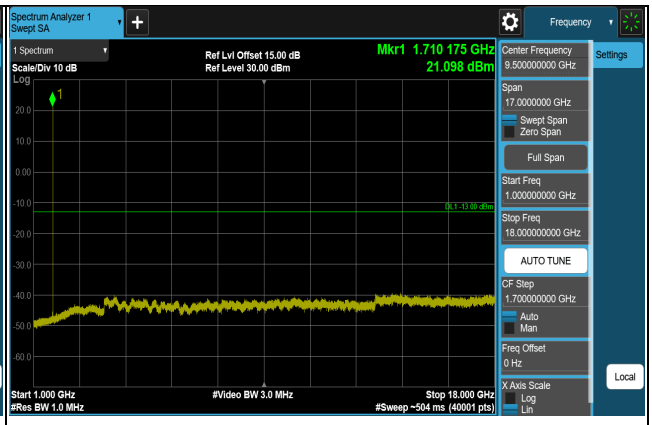


CH 20393 (1754.3MHz)

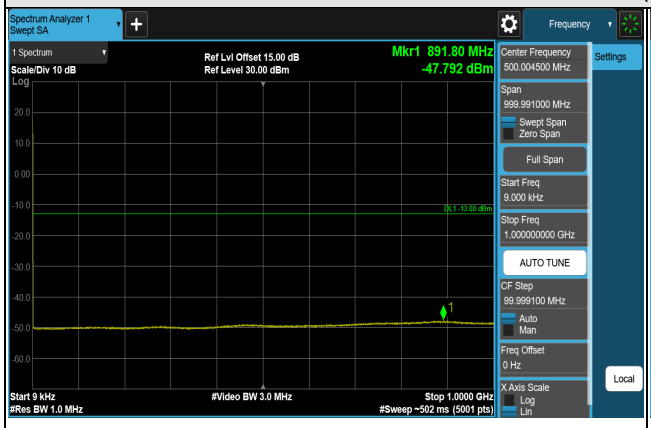
*The 9kHz signal over the limit is from Spectrum.

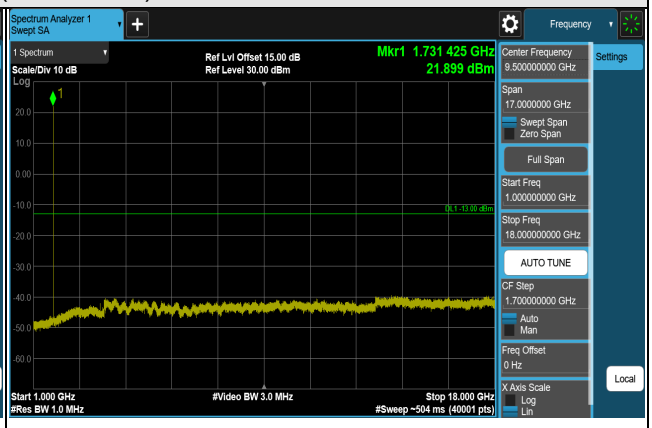
LTE Band 4 (Channel Bandwidth 3MHz)



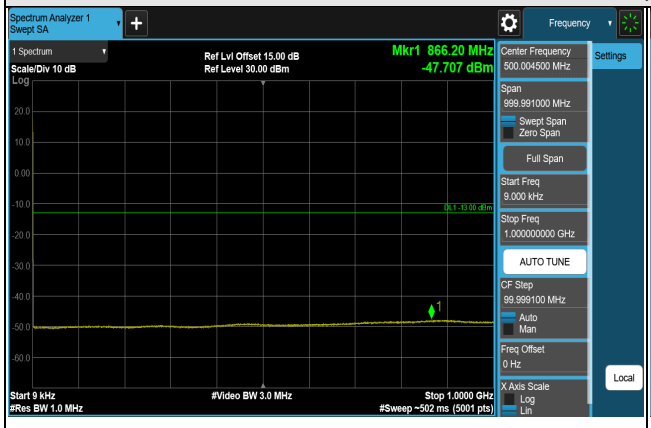


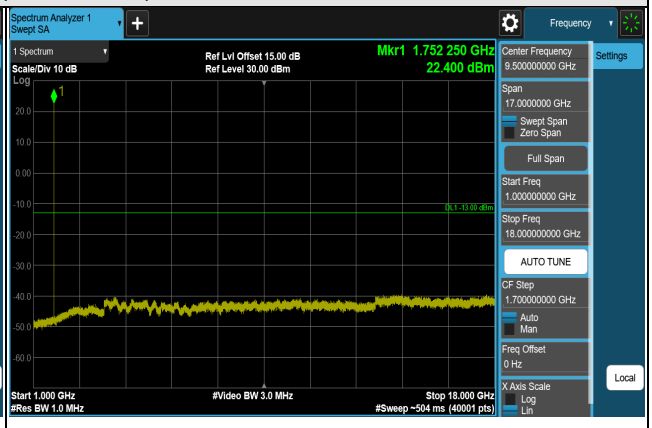
CH 19965 (1711.5MHz)





CH 20175 (1732.5MHz)

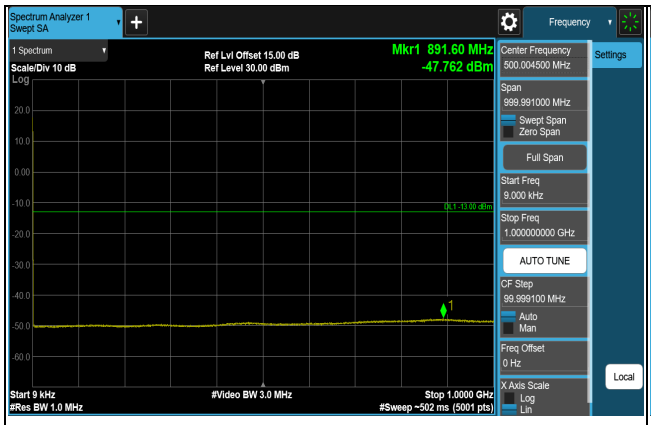


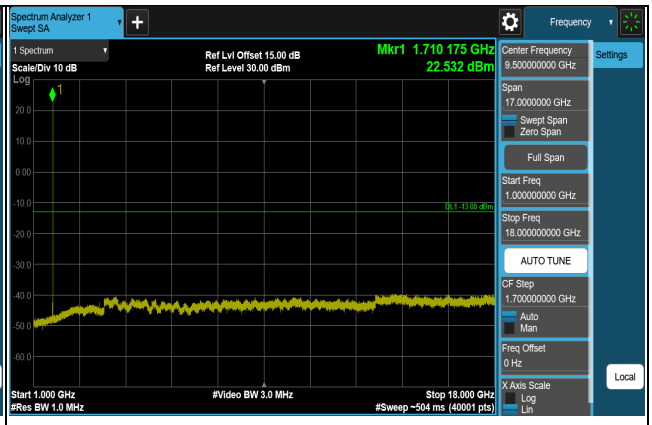


CH 20385 (1753.5MHz)

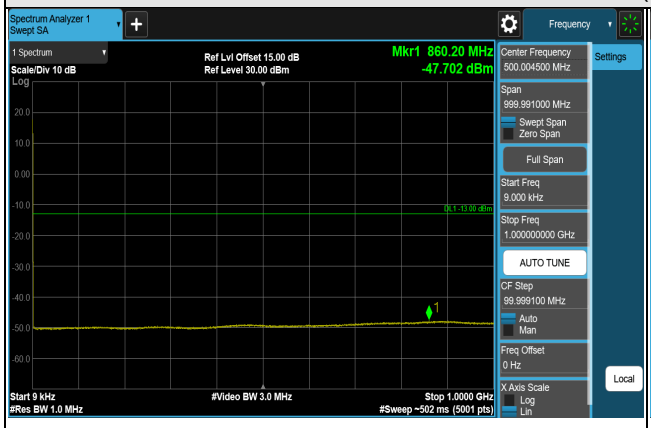
*The 9kHz signal over the limit is from Spectrum.

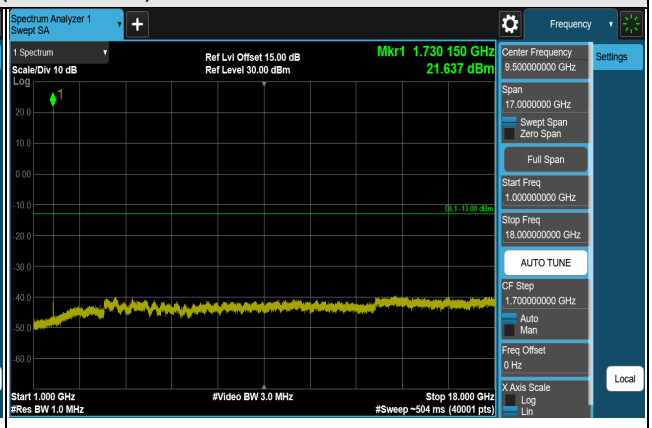
LTE Band 4 (Channel Bandwidth 5MHz)



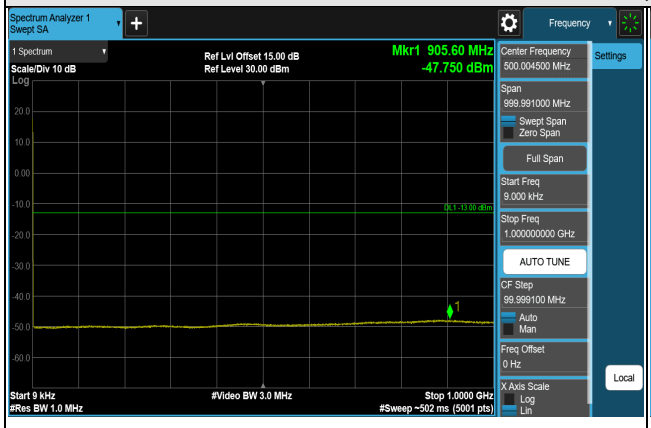


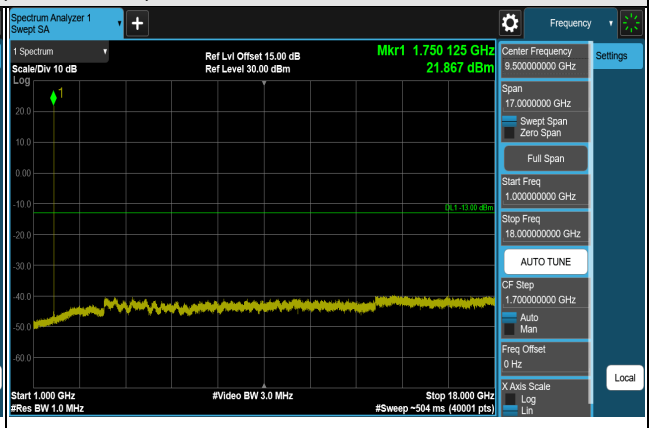
CH 19975 (1712.5MHz)





CH 20175 (1732.5MHz)





CH 20375 (1752.5MHz)

*The 9kHz signal over the limit is from Spectrum.