1900 PCS Band	Channel	Frequency (MHz)	26 dB BW (MHz)	Growth (%)
CDMA AGC threshold	Low	1931.25	1.404	0.14
	Middle	1962.50	1.401	-0.36
	High	1993.75	1.402	0.14
CDMA +3dBm above the AGC threshold	Low	1931.25	1.404	0.14
	Middle	1962.50	1.408	0.14
	High	1993.75	1.403	0.21
1900 PCS Band	**Channel**	**Frequency (MHz)**	**26 dB BW (kHz)**	**Growth (%)**
GSM AGC threshold	Low	1930.20	313.3	1.13
	Middle	1962.50	309.1	0.03
	High	1994.80	309.2	-1.09
GSM +3dBm above the AGC threshold	Low	1930.20	310.8	0.32
	Middle	1962.50	309.8	0.26
	High	1994.80	315.9	1.06

*** Plots of results are the same as Section 7.**

8. OUT OF BAND REJECTION & MEAN OUTPUT POWER AND ZONE ENHANCER GAIN

FCC Rules

Test Requirement(s):

KDB 935210 D05 v01r02

Out of Band Rejection – Test for rejection of out of band signals. Filter freq. response plots are acceptable.

ISED Rules

Test Requirements:

RSS-131

5. Equipment standard specifications for zone enhancers working with equipment certified in RSSs listed in section 1 except RSS-119

5.2 Industrial Zone Enhancers

5.2.1 Out-of-band rejection

The gain-versus-frequency response and the 20 dB bandwidth of the zone enhancer shall be reported. The zone enhancer shall reject amplification of other signals outside the passband of the zone enhancer.

5.2.3 Mean output power and zone enhancer gain

The zone enhancer gain shall not exceed the nominal gain by more than 1.0 dB. Outside of the 20 dB bandwidth, the gain shall not exceed the gain at the 20 dB point.

Test Procedures:

Measurements were in accordance with the test methods section 3.3, 4.3 of KDB 935210 D05 v01r02.

3.3 EUT out-of-band rejection

a) Connect a signal generator to the input of the EUT.

b) Configure a swept CW signal with the following parameters:

1) Frequency range = ± 250 % of the passband from the center of the passband.

2) Level = a sufficient level to affirm that the out-of-band rejection is > 20 dB above the noise floor and will not engage the AGC during the entire sweep.

3) Dwell time = approx. 10 ms.

4) Number of points = SPAN/(RBW/2).

c) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.

d) Set the span of the spectrum analyzer to the same as the frequency range of the signal generator.

e) Set the resolution bandwidth of the spectrum analyzer to be 1 % to 5 % of the passband and

the video bandwidth shall be set to ≥ 3 × RBW.

f) Set the detector to Peak Max-Hold and wait for the spectrum analyzer's spectral display to fill.

g) Place a marker to the peak of the frequency response and record this frequency as f0.

h) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the −20 dB down amplitude to determine the 20 dB bandwidth. Capture the frequency response of the EUT.

4.3 PLMRS device out-of-band rejection

Adjust the internal gain control of the equipment under test to the maximum gain for which equipment certification is sought.

a) Connect a signal generator to the input of the EUT.

b) Configure a swept CW signal with the following parameters:

c) Frequency range = ± 250 % of the manufacturer's pass band.

d) The CW amplitude will be 3 dB below the AGC threshold (see 4.2) and but not activate the AGC threshold throughout the test.

e) Dwell time = approx. 10 ms.

f) Frequency step = 50 kHz.

g) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.

h) Set the resolution bandwidth of the spectrum analyzer between 1 % and 5 % of the manufacturer's pass band with the video bandwidth set to 3 × RBW.

i) Set the detector to Peak and the trace to Max-Hold.

j) After the trace is completely filled, place a marker at the peak amplitude, which is designated as f0, and with two additional markers (use the marker-delta method) at the 20 dB bandwidth (i.e., at the points where the gain has fallen by 20 dB).

k) Capture the frequency response plot and for inclusion in the test report.

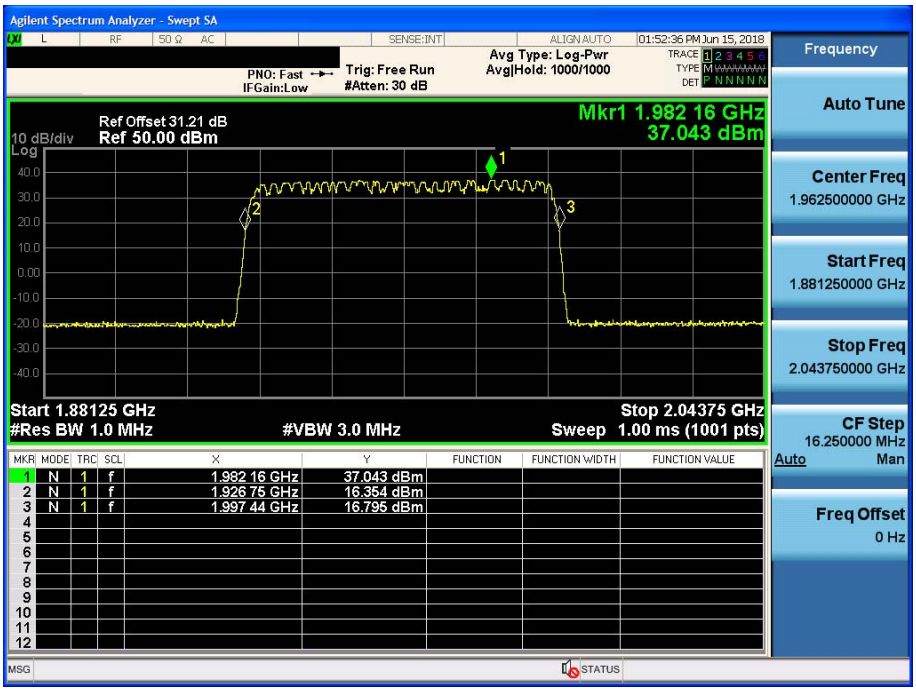
Test Results:

Input Signal	Input Level Input Signal : Sinusoidal	Maximum Amp Gain
1900 PCS Band	-20 dBm	57 dB

[Downlink]

Band	20 dB point frequency (MHz)	Output power (dBm)	Gain (dB)
1900 PCS	1 926.750 MHz ~ 1 997.440 MHz	37.043	57.043

Plot of Out of Band Rejection & Mean Output Power and Zone Enhancer Gain



9. SPURIOUS AND HARMONIC EMISSION AT ANTENNA TERMINAL

FCC Rules

Test Requirement(s):

§ 2.1051 Measurements required: Spurious emissions at antenna terminals:

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 24.238 Emission limitations for Broadband PCS equipment.

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

(a) *Out of band emissions.* The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

(b) *Measurement procedure.* Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 1 MHz or 1 percent of emission bandwidth, as specified). 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.

(c) *Alternative out of band emission limit.* Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas, in lieu of that set forth in this section, pursuant to a private contractual arrangement of all affected licensees and applicants. In this event, each party to such contract shall maintain a copy of the contract in their station files and disclose it to prospective assignees or transferees and, upon request, to the FCC.

(d) *Interference caused by out of band emissions.* If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

ISED Rules

Test Requirements:

RSS-133

6. Transmitter and Receiver Standard Specifications

6.5 Transmitter Unwanted Emissions

6.5.1 Out-of-Block Emissions

Equipment shall comply with the limits in (i) and (ii) below.

i. In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 $\log_{10}$p(watts).

ii. After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 $\log_{10}$p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

Test Procedures:

Measurements were in accordance with the test methods section 3.6 and 4.7 of KDB 935210 D05 v01r02.

3.6.1 General

Refer to the applicable rule part(s) for specified limits on unwanted (out-of-band/out-of-block and spurious) emissions.

Spurious emissions shall be measured using a single test signal sequentially tuned to the low, middle, and high channels or frequencies within each authorized frequency band of operation.

Out-of-band/out-of-block emissions (including intermodulation products) shall be measured under each of the following two stimulus conditions:

a) two adjacent test signals sequentially tuned to the lower and upper frequency band/block edges;

b) a single test signal, sequentially tuned to the lowest and highest frequencies or channels within the frequency band/block under examination.

NOTE—Single-channel boosters that cannot accommodate two simultaneous signals within the passband may be excluded from the test stipulated in step a).

3.6.2 Out-of-band/out-of-block emissions conducted measurements

a) Connect a signal generator to the input of the EUT.

If the signal generator is not capable of generating two modulated carriers simultaneously, then two discrete signal generators can be connected with an appropriate combining network to support this two-signal test.

b) Set the signal generator to produce two AWGN signals as previously described (e.g., 4.1 MHz

OBW).

c) Set the center frequencies such that the AWGN signals occupy adjacent channels, as defined by industry standards such as 3GPP or 3GPP2, at the upper edge of the frequency band or block under test.

d) Set the composite power levels such that the input signal is just below the AGC threshold (see 3.2), but not more than 0.5 dB below. The composite power can be measured using the procedures provided in KDB Publication 971168, but it will be necessary to expand the power integration bandwidth so as to include both of the transmit channels. Alternatively, the composite power can be measured using an average power meter as described in KDB Publication 971168.

e) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.

f) Set the RBW = reference bandwidth in the applicable rule section for the supported frequency band (typically 1 % of the EBW or 100 kHz or 1 MHz)

g) Set the VBW = 3 × RBW.

h) Set the detector to power averaging (rms) detector.

i) Set the Sweep time = auto-couple.

j) Set the spectrum analyzer start frequency to the upper block edge frequency, and the stop frequency to the upper block edge frequency plus 300 kHz or 3 MHz, for frequencies below and above 1 GHz, respectively.

k) Trace average at least 100 traces in power averaging (rms) mode.

l) Use the marker function to find the maximum power level.

m) Capture the spectrum analyzer trace of the power level for inclusion in the test report.

n) Repeat steps k) to m) with the composite input power level set to 3 dB above the AGC threshold.

o) Reset the frequencies of the input signals to the lower edge of the frequency block or band under test.

p) Reset the spectrum analyzer start frequency to the lower block edge frequency minus 300 kHz or 3 MHz, for frequencies below and above 1 GHz, respectively, and the stop frequency to the lower band or block edge frequency.

q) Repeat steps k) to n).

r) Repeat steps a) to q) with the signal generator configured for a single test signal tuned as close as possible to the block edges.

s) Repeat steps a) to r) with the narrowband test signal.

t) Repeat steps a) to s) for all authorized frequency bands or blocks used by the EUT.

3.6.3 Spurious emissions conducted measurements

a) Connect a signal generator to the input of the EUT.

b) Set the signal generator to produce the broadband test signal as previously described (i.e., 4.1 MHz OBW AWGN).

c) Set the center frequency of the test signal to the lowest available channel within the frequency band or block.
d) Set the EUT input power to a level that is just below the AGC threshold (see 3.2), but not more than 0.5 dB below.
e) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.
f) Set the RBW = reference bandwidth in the applicable rule section for the supported frequency band of operation (e.g., reference bandwidth is typically 100 kHz or 1 MHz).
g) Set the VBW ≥ 3 × RBW.
h) Set the Sweep time = auto-couple.
i) Set the spectrum analyzer start frequency to the lowest RF signal generated in the equipment, without going below 9 kHz, and the stop frequency to the lower band/block edge frequency minus 100 kHz or 1 MHz, as specified in the applicable rule part.
The number of measurement points in each sweep must be ≥ (2 × span/RBW), which may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.2
j) Select the power averaging (rms) detector function.
k) Trace average at least 10 traces in power averaging (rms) mode.
l) Use the peak marker function to identify the highest amplitude level over each measured frequency range. Record the frequency and amplitude and capture a plot for inclusion in the test report.
m) Reset the spectrum analyzer start frequency to the upper band/block edge frequency plus 100 kHz or 1 MHz, as specified in the applicable rule part, and the spectrum analyzer stop frequency to 10 times the highest frequency of the fundamental emission (see § 2.1057). The number of measurement points in each sweep must be ≥ (2 × span/RBW), which may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.
n) Trace average at least 10 traces in power averaging (rms) mode.
o) Use the peak marker function to identify the highest amplitude level over each of the measured frequency ranges. Record the frequency and amplitude and capture a plot for inclusion in the test report; also provide tabular data, if required.
p) Repeat steps i) to o) with the input test signals firstly tuned to a middle band/block frequency/channel, and then tuned to a high band/block frequency/channel.
q) Repeat steps b) to p) with the narrowband test signal.
r) Repeat steps b) to q) for all authorized frequency bands/blocks used by the EUT.

Notes:

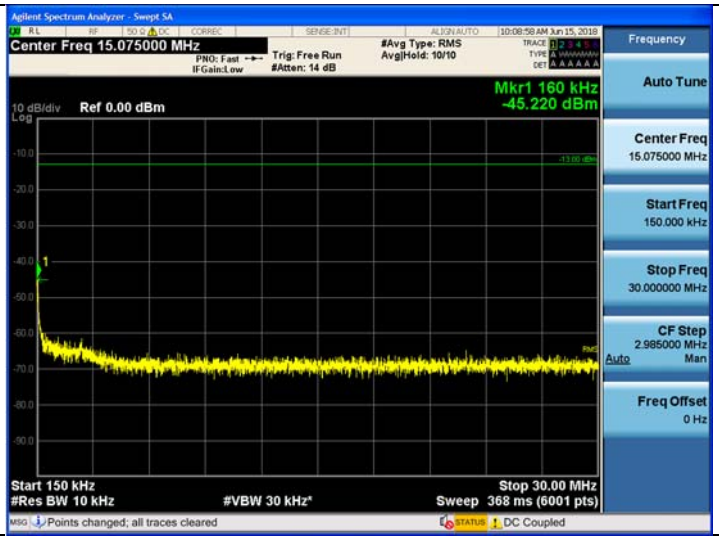
1. In 9 KHz-150 KHz and 150 KHz-30 MHz bands, RBW was reduced to 1% and 10% of the reference bandwidth for measuring unwanted emission level(typically, 100KHz if the authorized frequency band is below 1GHz) and power was integrated.(1% = +20 dB, 10% = +10 dB)
2. We have done CDMA and 1xEVDO / GSM and EDGE modulation test in technology. Test results are only attached worst cases.

Plots of Unwanted Conducted Emissions for 1900 PCS BAND LTE 5 MHz

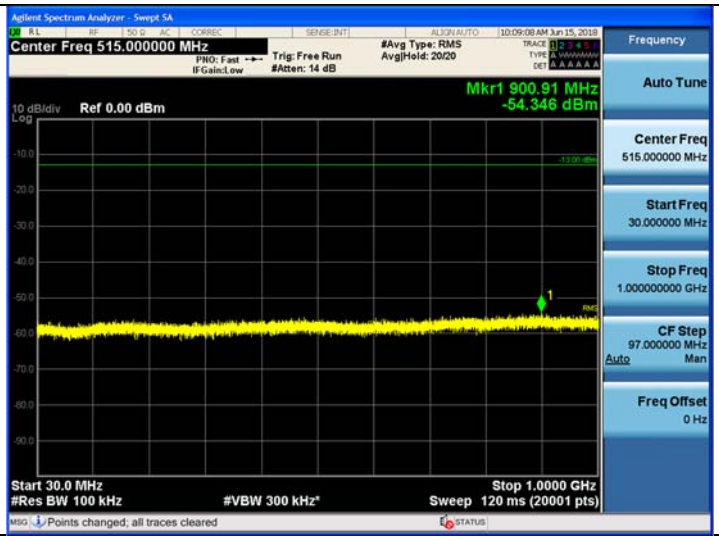
Low Channel

9 kHz ~ 150 kHz

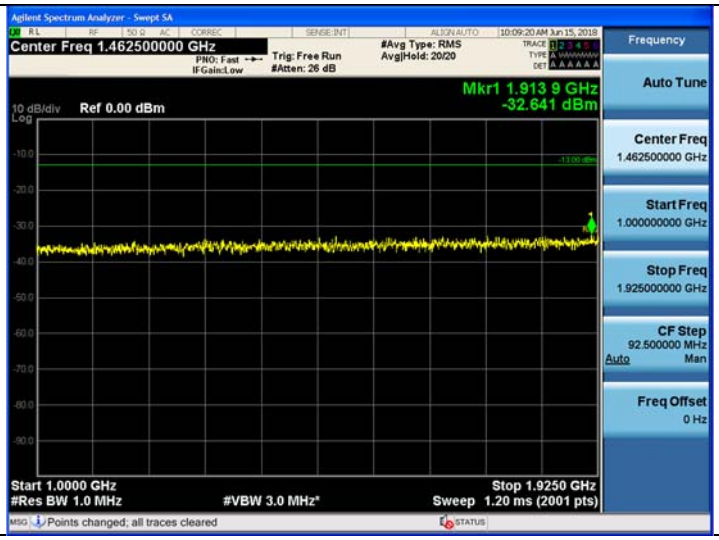
150 kHz ~ 30 MHz



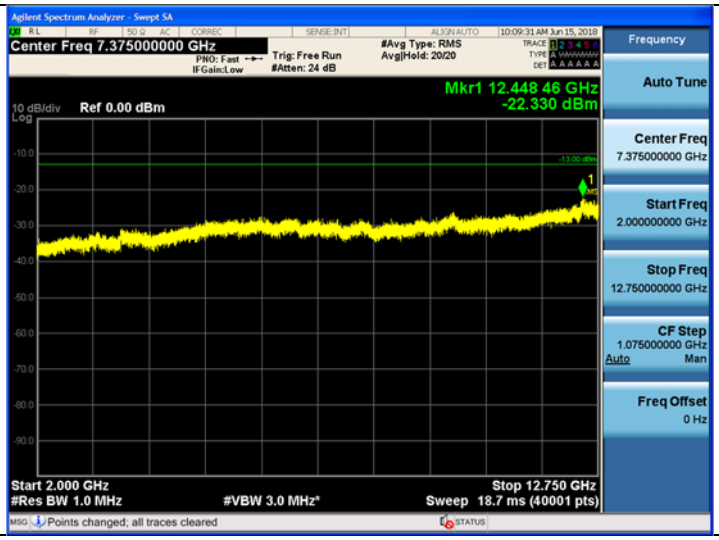
30 MHz – 1 GHz



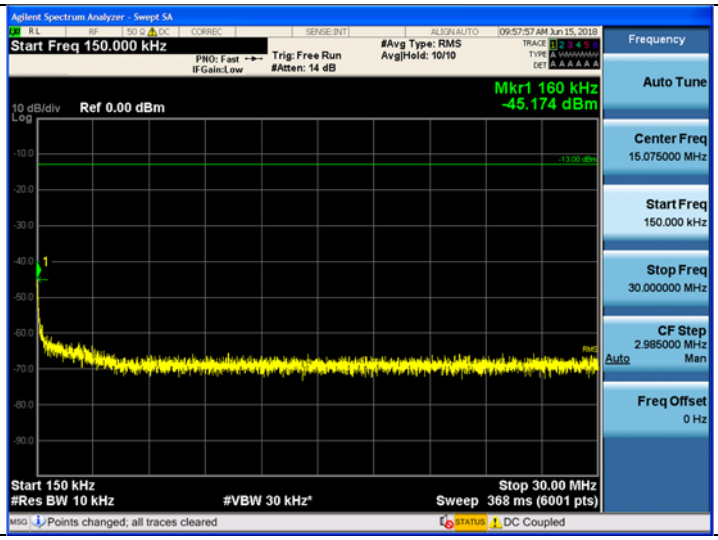
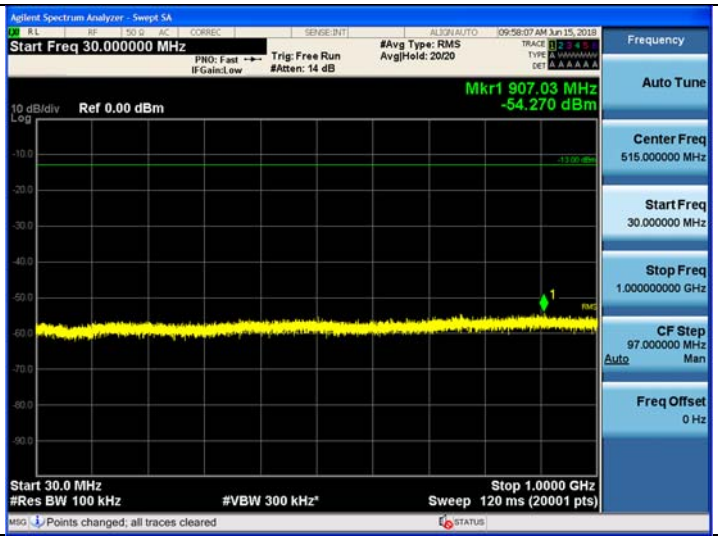
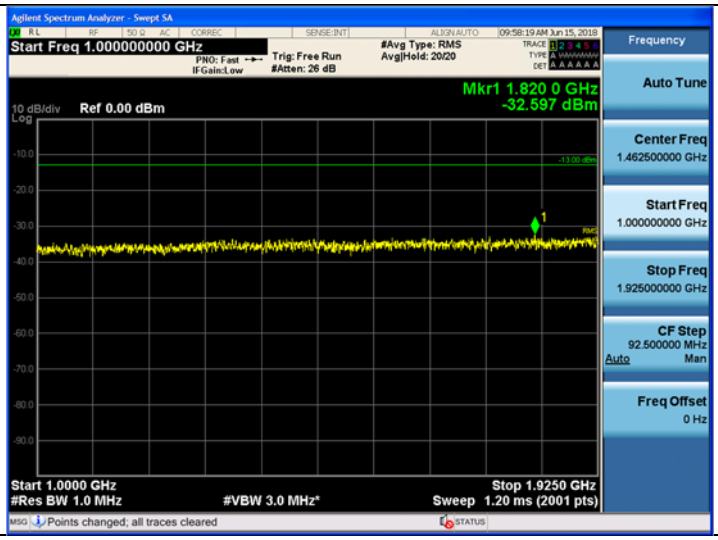
1 GHz – 1.925 GHz

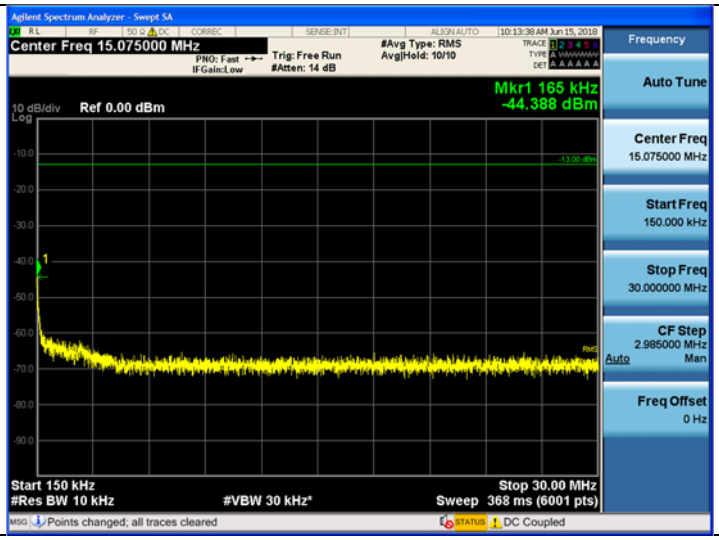
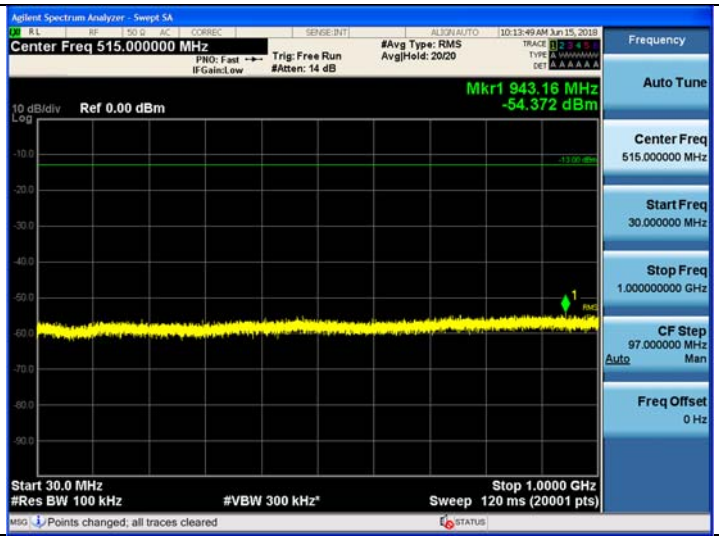
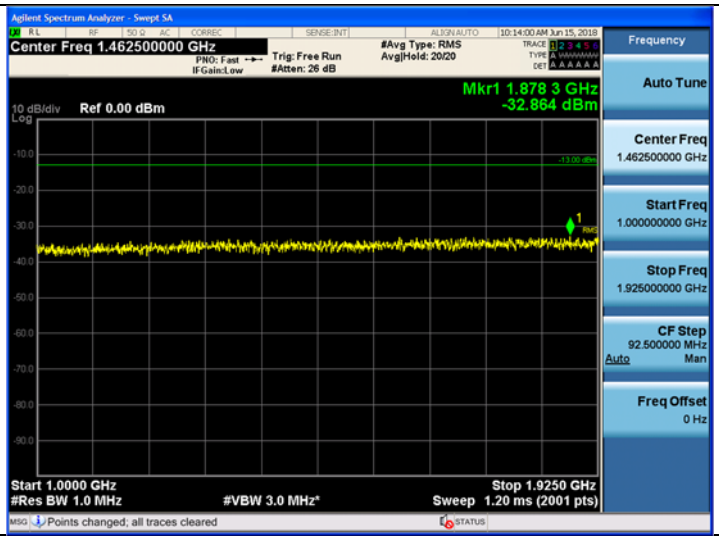
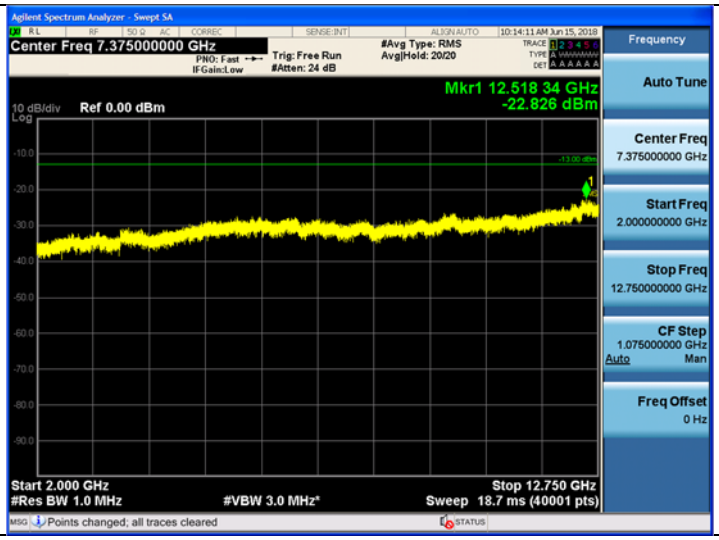


2 GHz – 12.75 GHz



12.75 GHz – 26.5 GHz

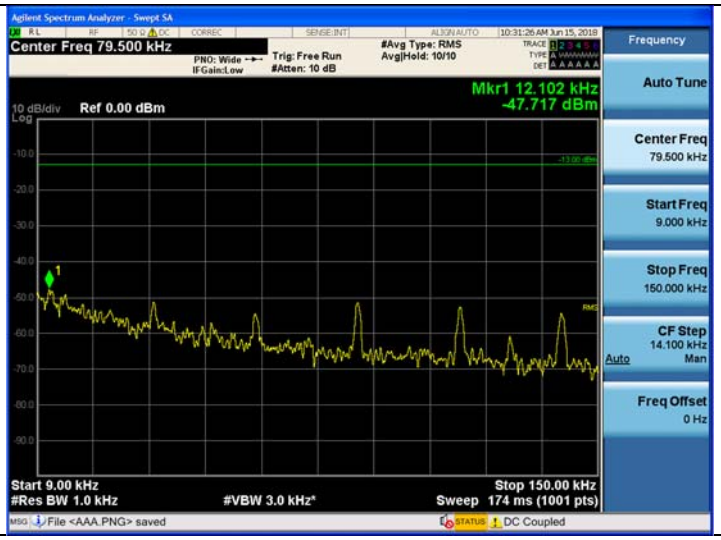
Middle Channel	
9 kHz ~ 150 kHz	**150 kHz ~ 30 MHz**
	
30 MHz – 1 GHz	**1 GHz – 1.925 GHz**
	
2 GHz – 12.75 GHz	**12.75 GHz – 26.5 GHz**
	

High Channel	
9 kHz ~ 150 kHz	**150 kHz ~ 30 MHz**
	
30 MHz – 1 GHz	**1 GHz – 1.925 GHz**
	
2 GHz – 12.75 GHz	**12.75 GHz – 26.5 GHz**
	

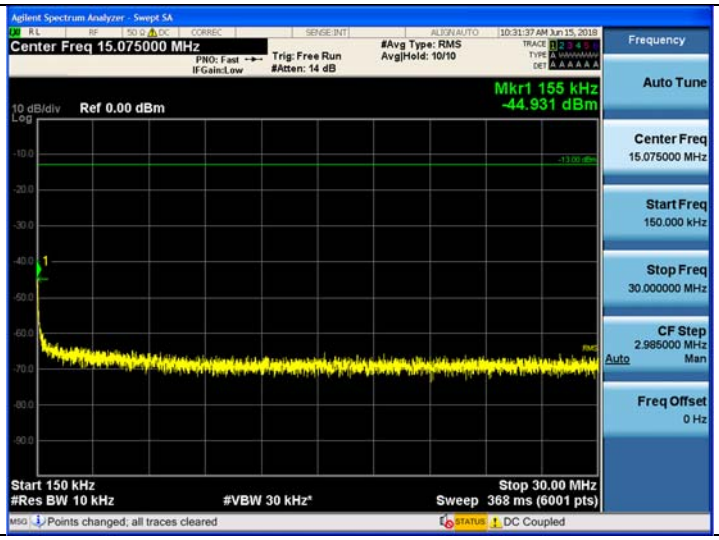
Plots of Unwanted Conducted Emissions for 1900 PCS BAND LTE 10 MHz

Low Channel

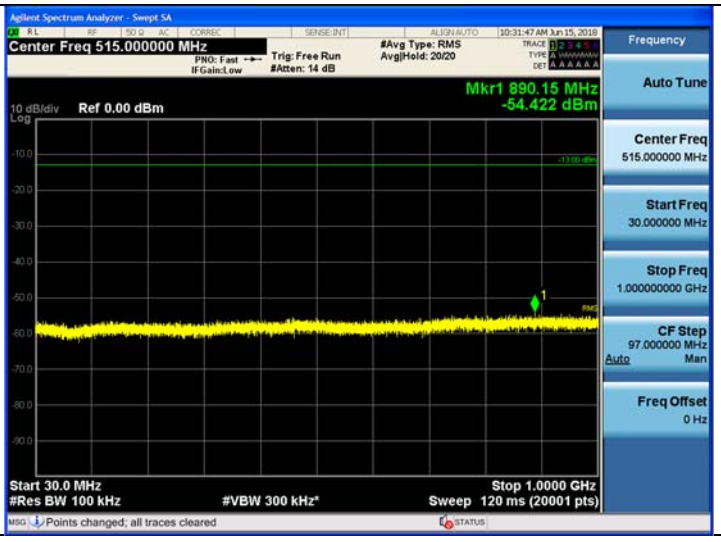
9 kHz ~ 150 kHz



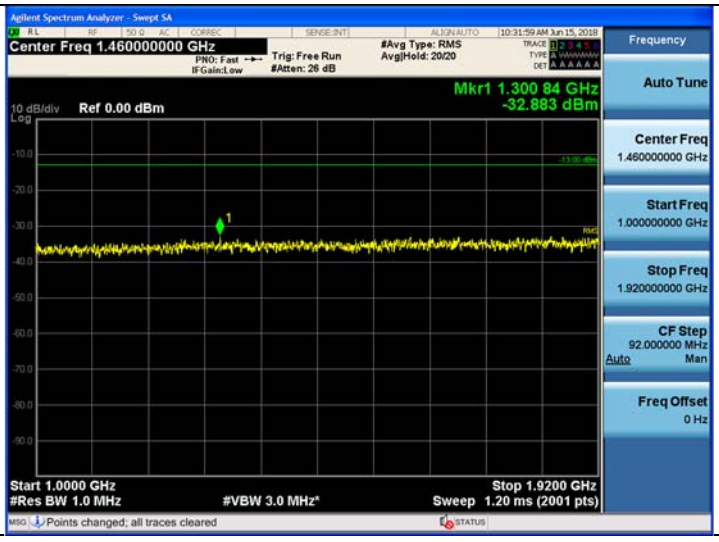
150 kHz ~ 30 MHz



30 MHz – 1 GHz

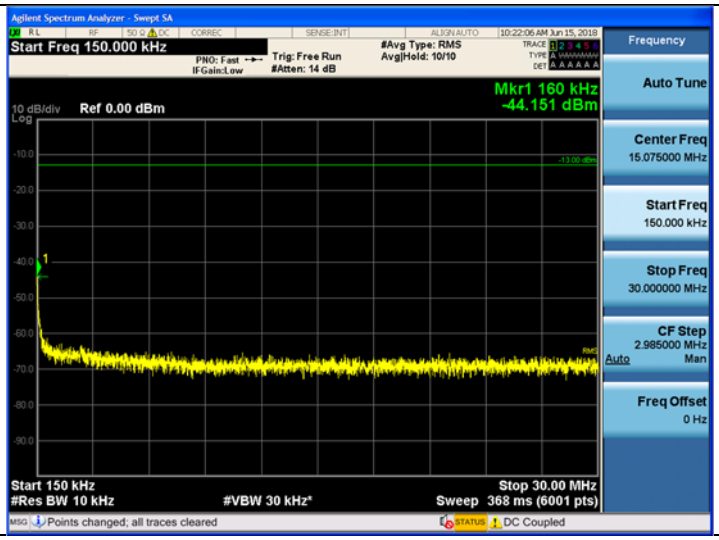
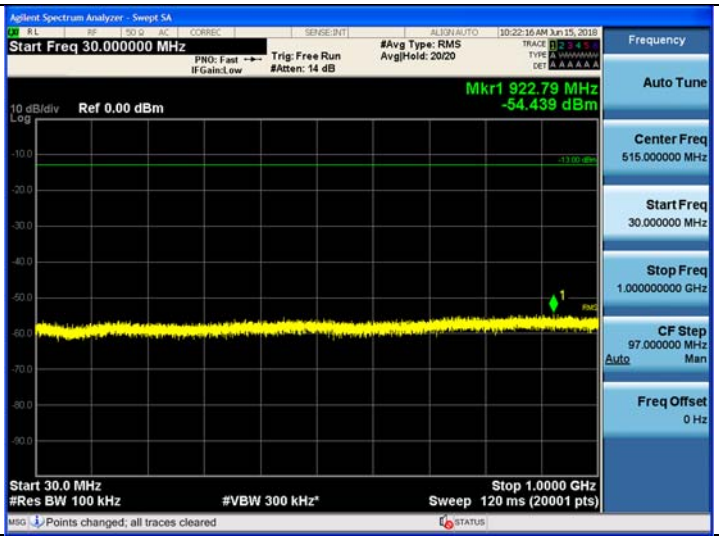
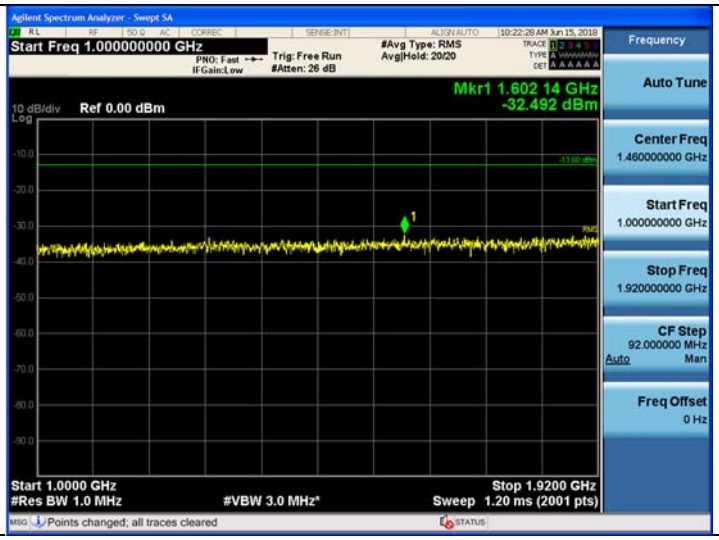


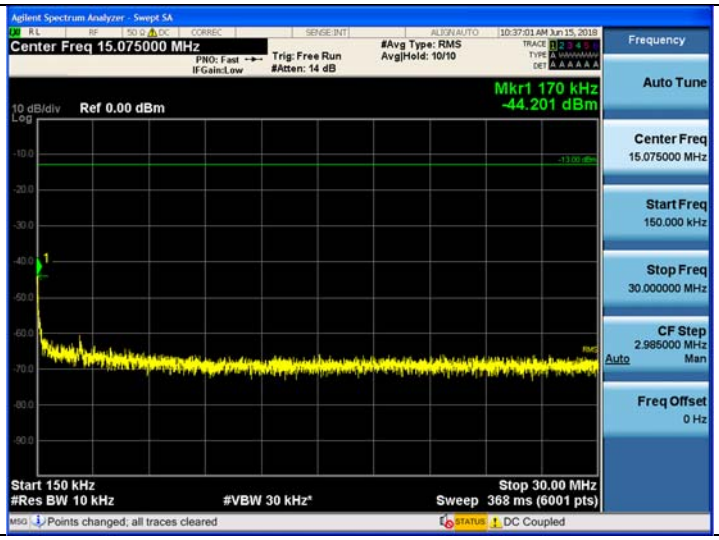
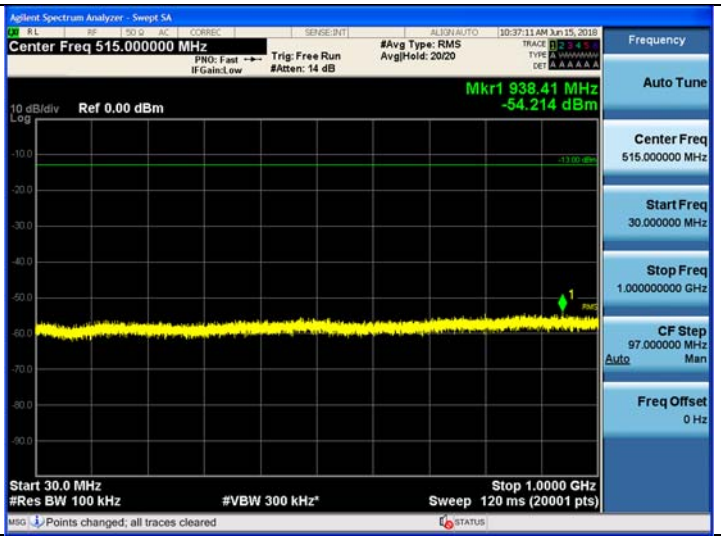
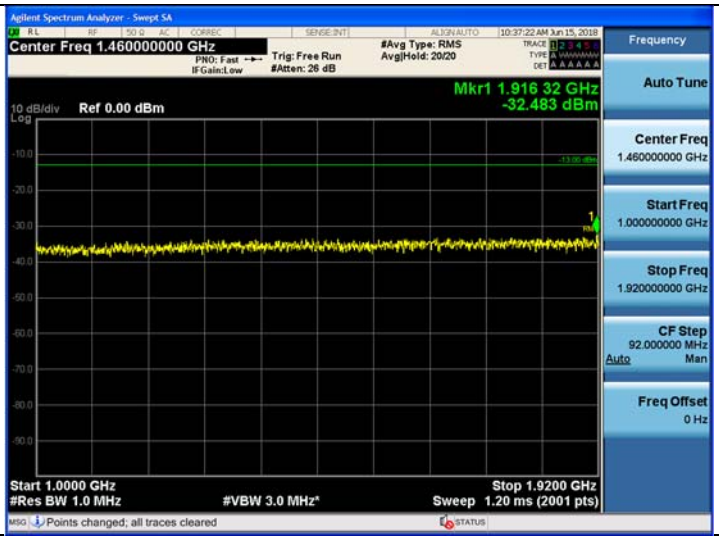
1 GHz – 1.920 GHz



2.005 GHz – 12.75 GHz

12.75 GHz – 26.5 GHz

Middle Channel	
9 kHz ~ 150 kHz	**150 kHz ~ 30 MHz**
	
30 MHz – 1 GHz	**1 GHz – 1.920 GHz**
	
2.005 GHz – 12.75 GHz	**12.75 GHz – 26.5 GHz**
	

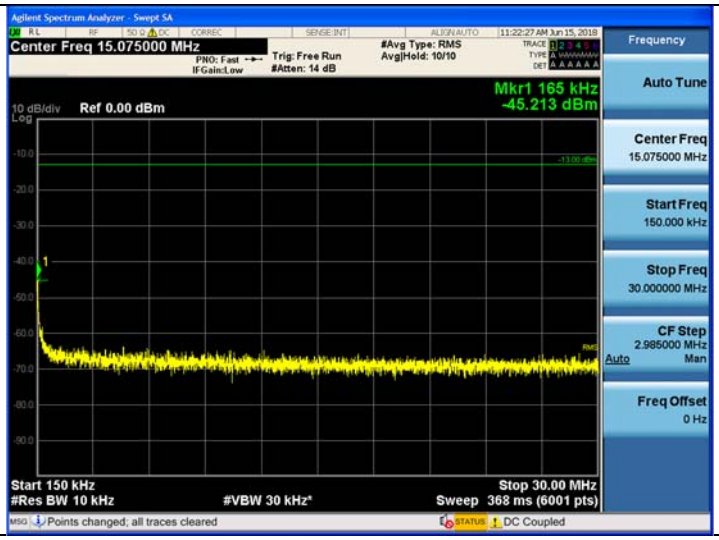
High Channel	
9 kHz ~ 150 kHz	**150 kHz ~ 30 MHz**
	
30 MHz – 1 GHz	**1 GHz – 1.920 GHz**
	
2.005 GHz – 12.75 GHz	**12.75 GHz – 26.5 GHz**
	

Plots of Unwanted Conducted Emissions for 1900 PCS BAND LTE 20 MHz

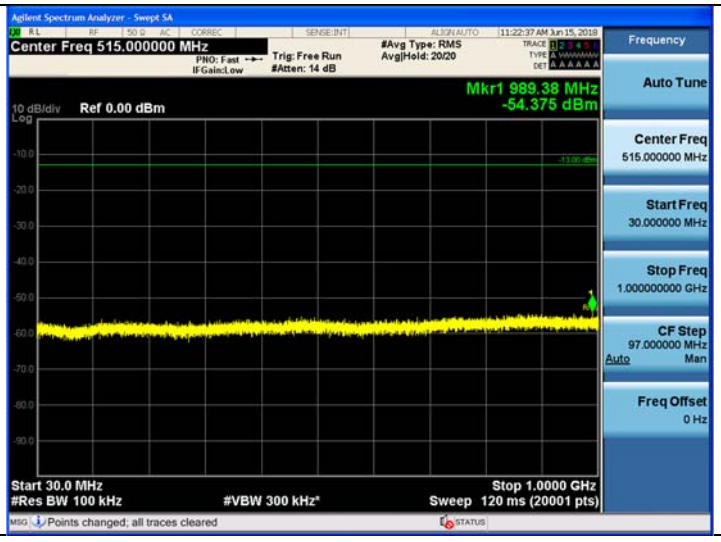
Low Channel

9 kHz ~ 150 kHz

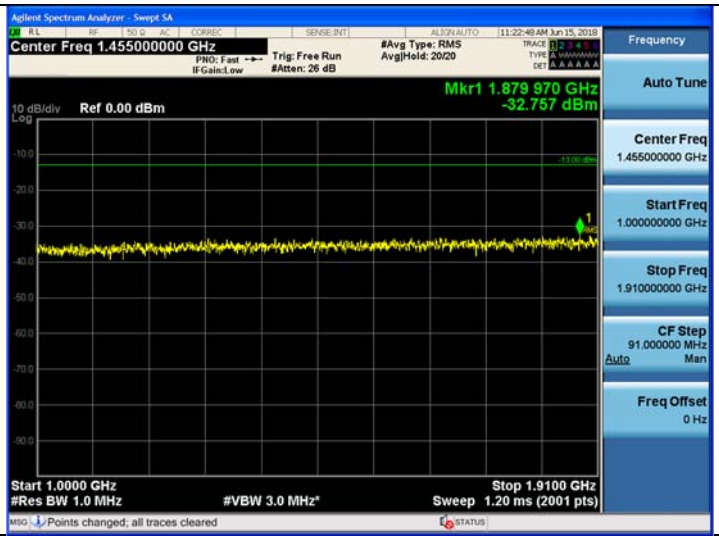
150 kHz ~ 30 MHz



30 MHz – 1 GHz

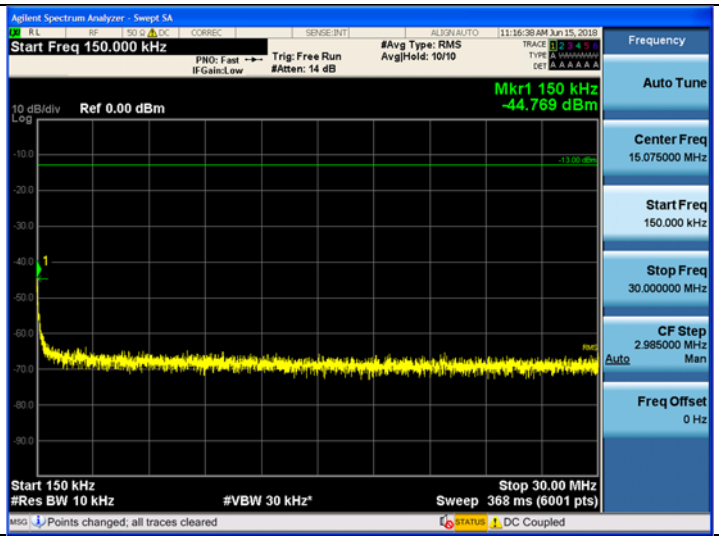
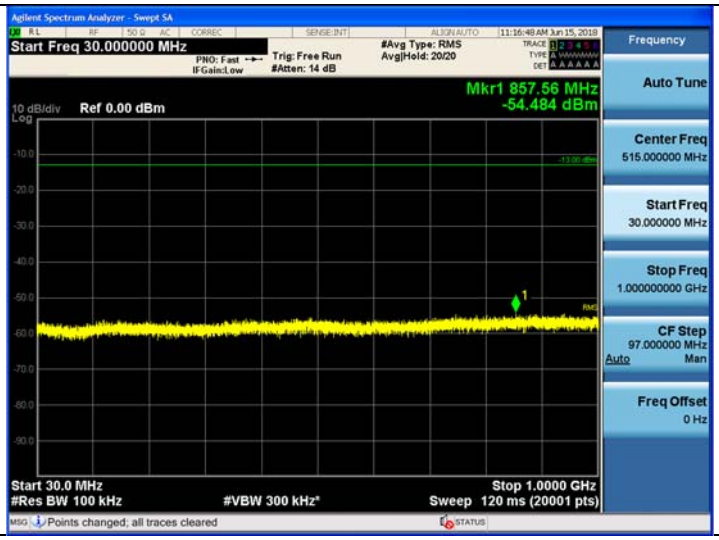
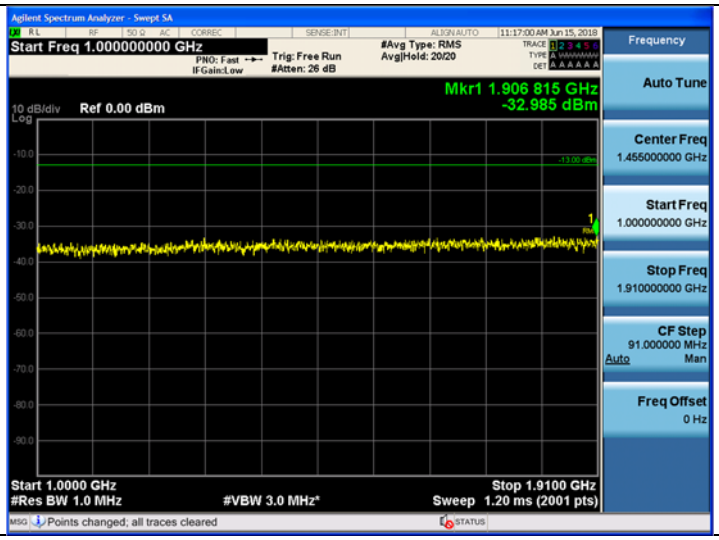


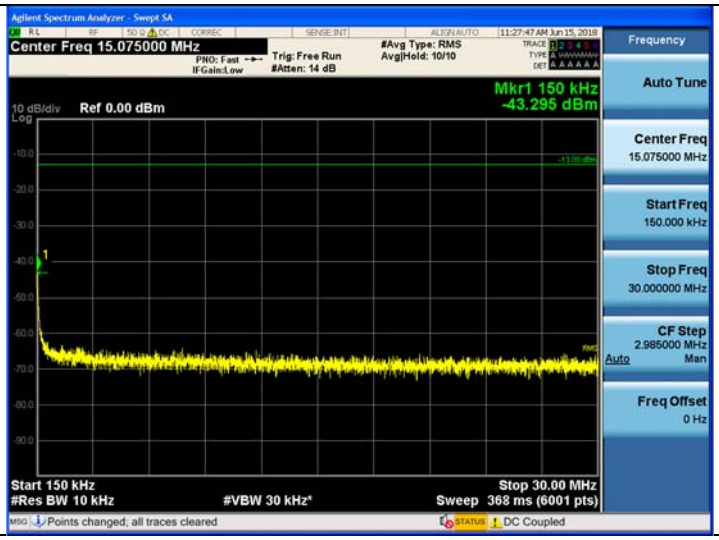
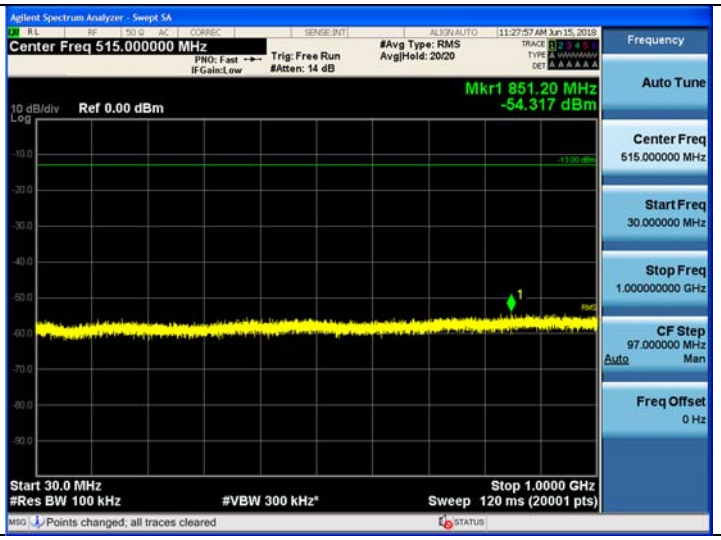
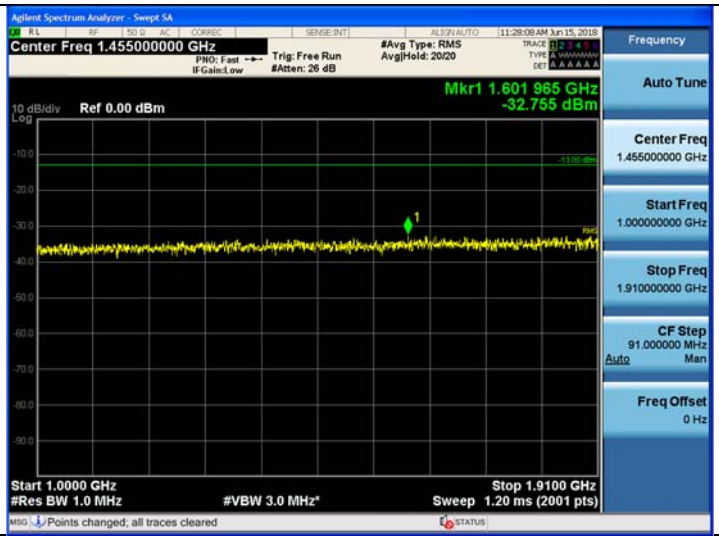
1 GHz – 1.910 GHz



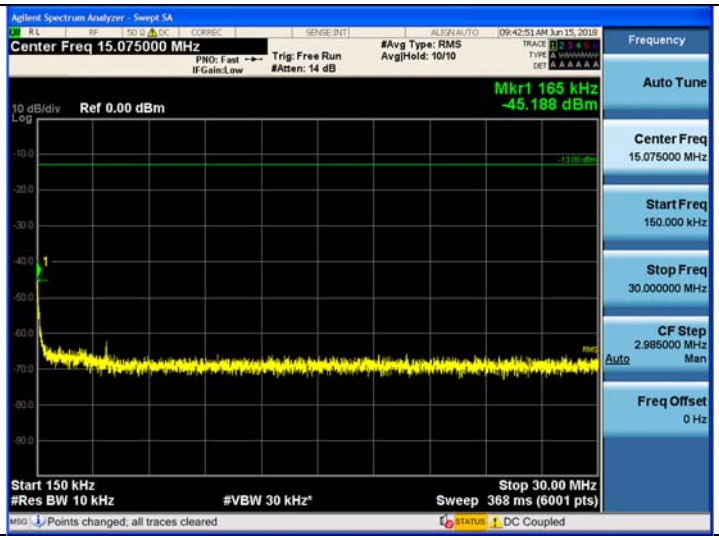
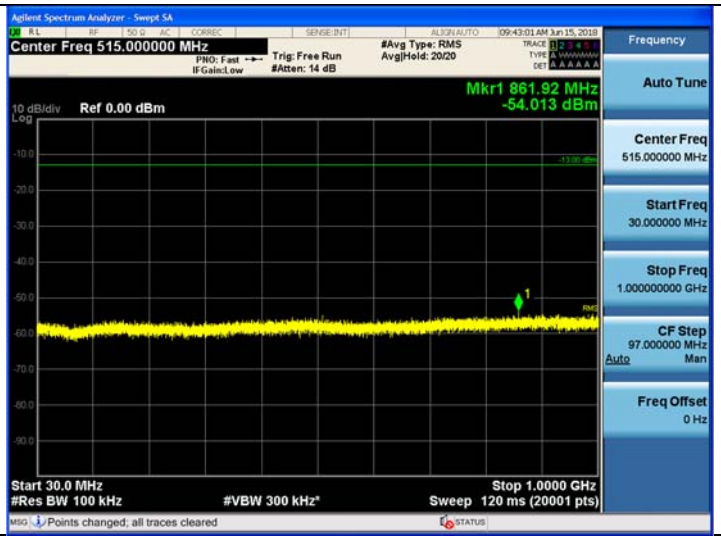
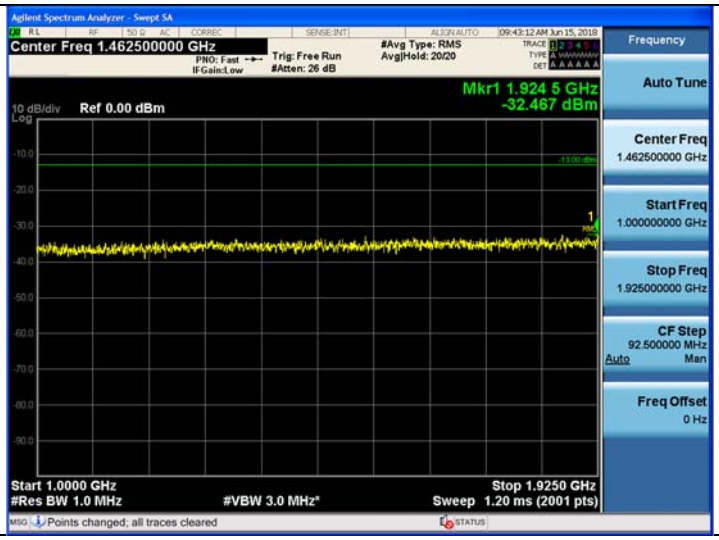
2.015 GHz – 12.75 GHz

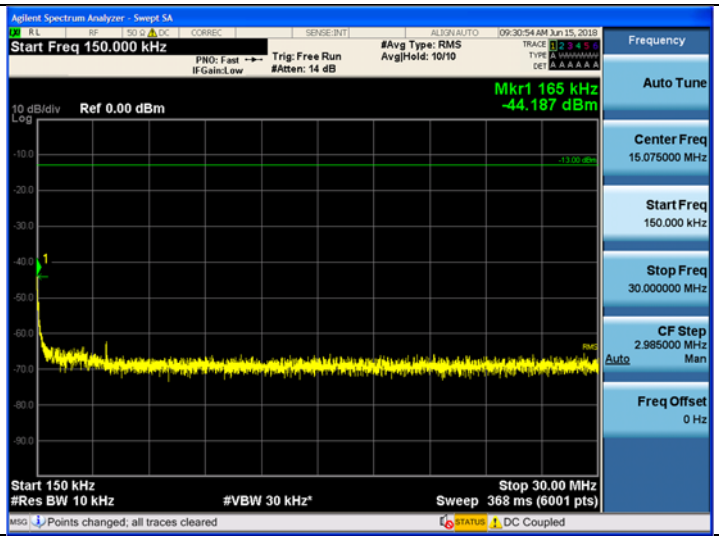
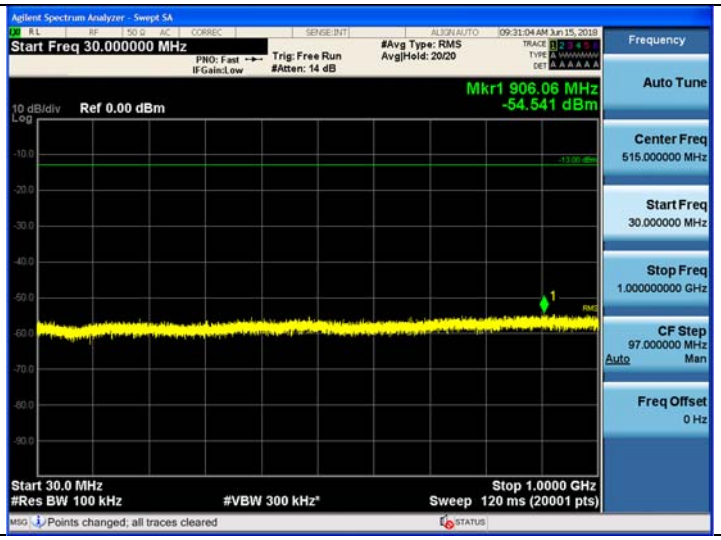
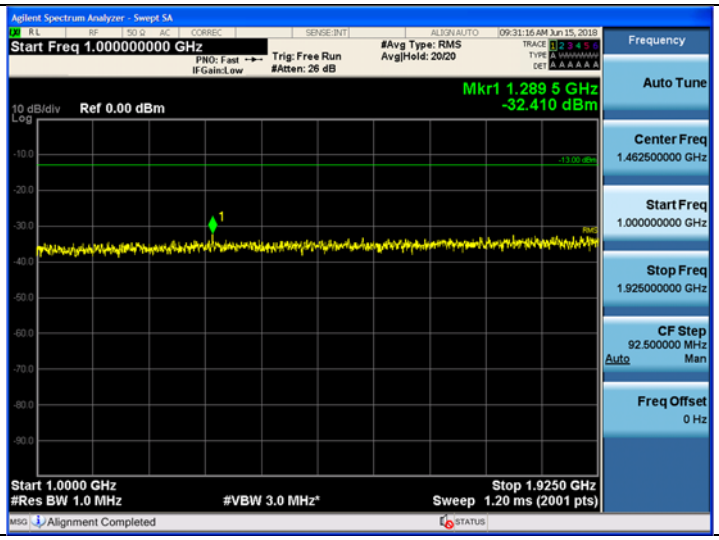
12.75 GHz – 26.5 GHz

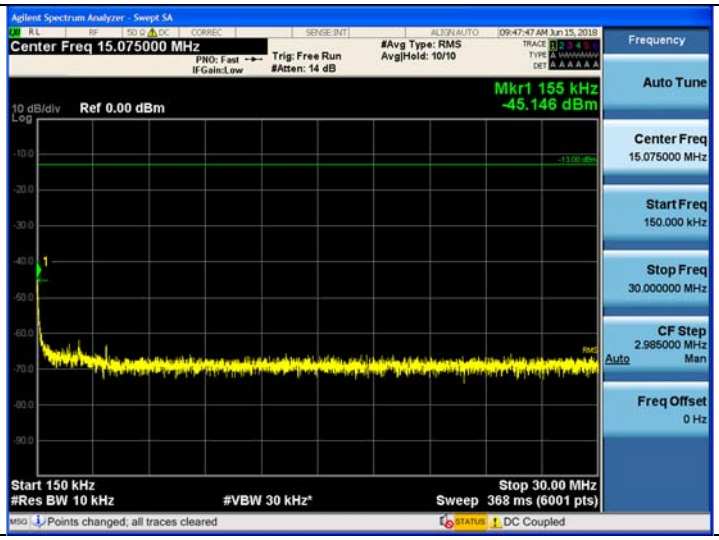
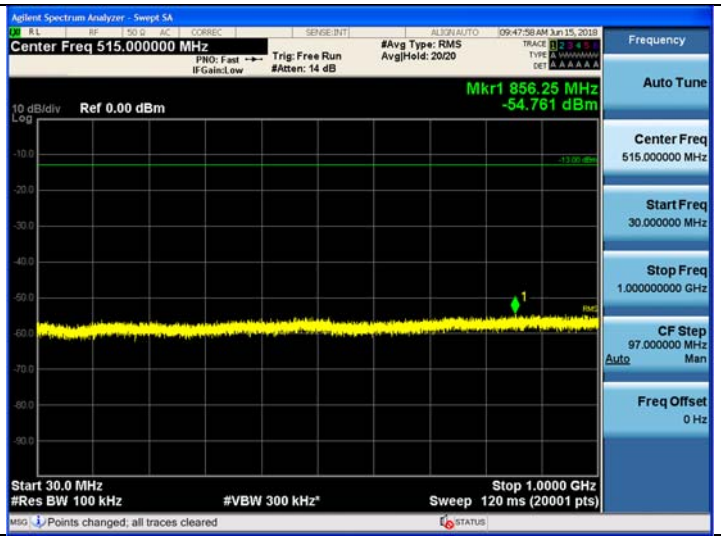
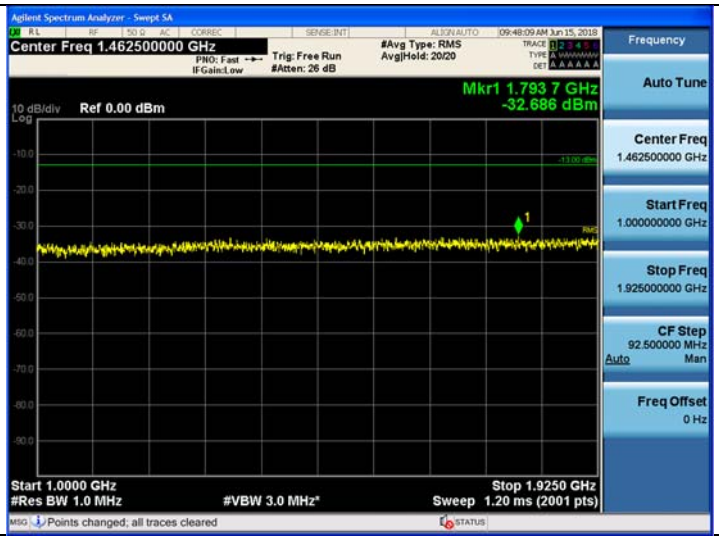
Middle Channel	
9 kHz ~ 150 kHz	**150 kHz ~ 30 MHz**
	
30 MHz – 1 GHz	**1 GHz – 1.910 GHz**
	
2.015 GHz – 12.75 GHz	**12.75 GHz – 26.5 GHz**
	

High Channel	
9 kHz ~ 150 kHz	**150 kHz ~ 30 MHz**
	
30 MHz – 1 GHz	**1 GHz – 1.910 GHz**
	
2.015 GHz – 12.75 GHz	**12.75 GHz – 26.5 GHz**
	

Plots of Unwanted Conducted Emissions for 1900 PCS BAND WCDMA

Low Channel	
9 kHz ~ 150 kHz	**150 kHz ~ 30 MHz**
	
30 MHz – 1 GHz	**1 GHz – 1.925 GHz**
	
2 GHz – 12.75 GHz	**12.75 GHz – 26.5 GHz**
	

Middle Channel	
9 kHz ~ 150 kHz	**150 kHz ~ 30 MHz**
	
30 MHz – 1 GHz	**1 GHz – 1.925 GHz**
	
2 GHz – 12.75 GHz	**12.75 GHz – 26.5 GHz**
	

High Channel	
9 kHz ~ 150 kHz	**150 kHz ~ 30 MHz**
	
30 MHz – 1 GHz	**1 GHz – 1.925 GHz**
	
2 GHz – 12.75 GHz	**12.75 GHz – 26.5 GHz**