Test Procedures:

Measurements were in accordance with the test methods section 3.6 of KDB 935210 D05 v01r03.

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.

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, 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.

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.

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.

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, 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.

g) Set the VBW $\geq$ 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 $\geq$ (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.

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. The number of measurement points in each sweep must be $\geq$ (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.

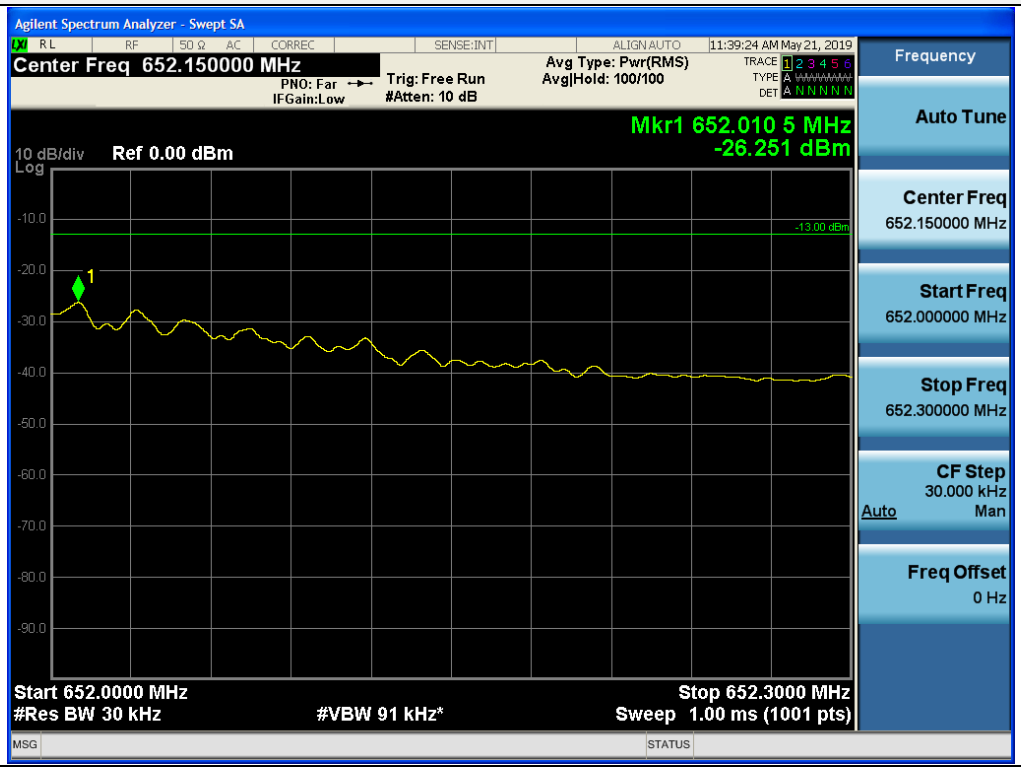
Note: *In 9 kHz-150 kHz and 150 kHz-30 MHz bands, RBW was reduced to 0.1 % and 1 % of the reference bandwidth for measuring unwanted emission level (typically, 1 MHz if the authorized frequency band is above 1 GHz) and power was integrated.(1% = +30 dB, 10% = +20 dB)*

Test Results: Plot data of Out-of-band/out-of-block emissions

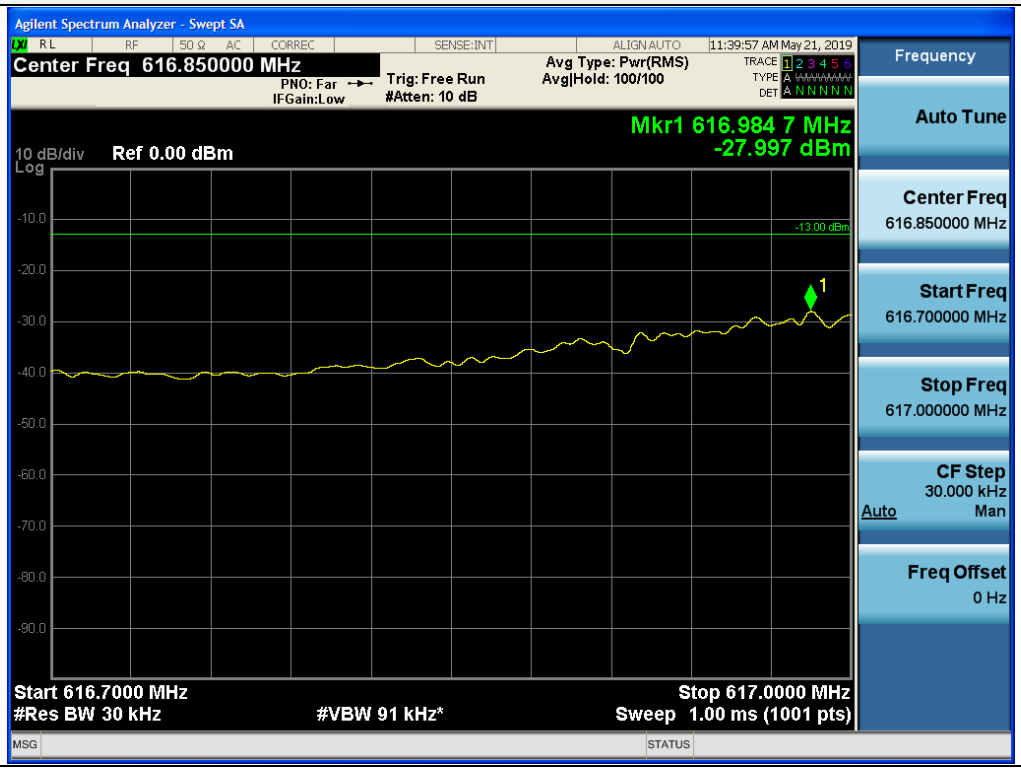
Out-of-band (two adjacent test signals) / 600 MHz Service / Downlink / LTE 5 MHz / Upper


Out-of-band (two adjacent test signals) / 600 MHz Service / Downlink / LTE 5 MHz / Lower

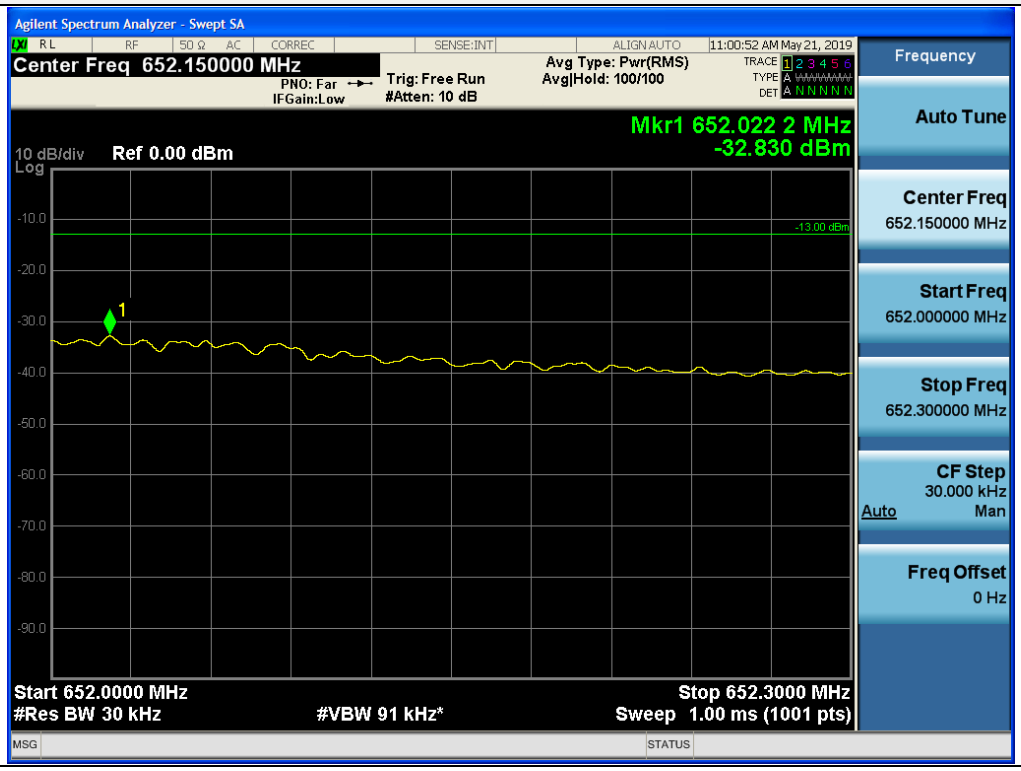

Out-of-band (two adjacent test signals) / 600 MHz Service / Downlink / LTE 10 MHz / Upper



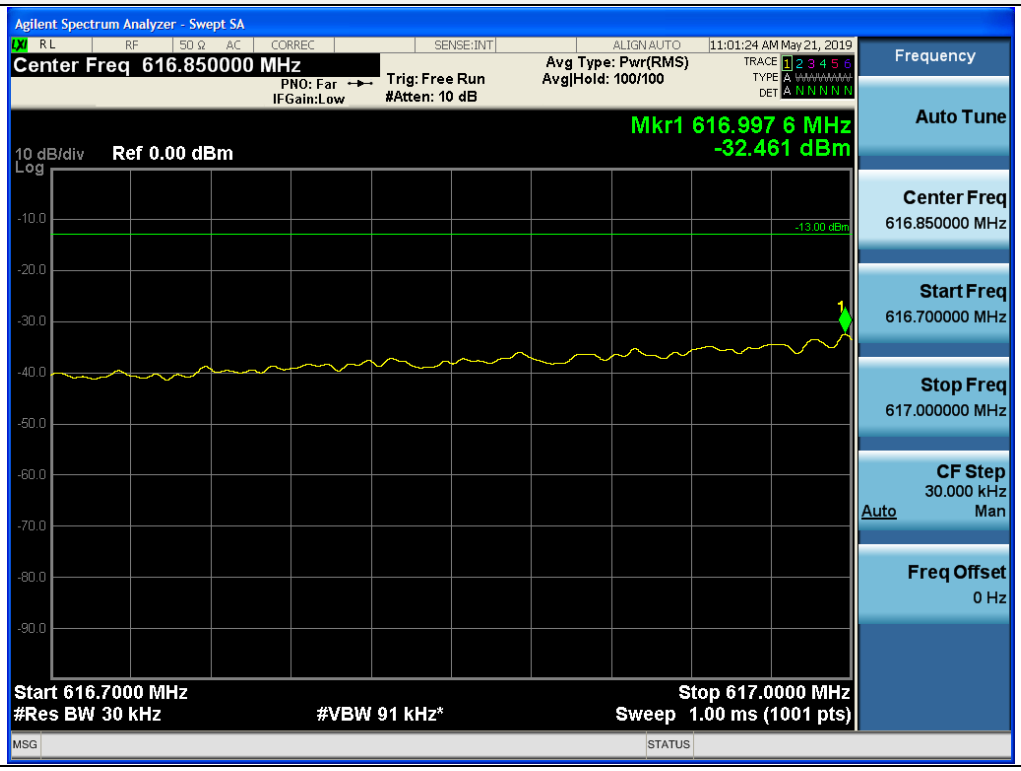
Out-of-band (two adjacent test signals) / 600 MHz Service / Downlink / LTE 10 MHz / Lower



Out-of-band (two adjacent test signals) / 600 MHz Service / Downlink / LTE 20 MHz / Upper

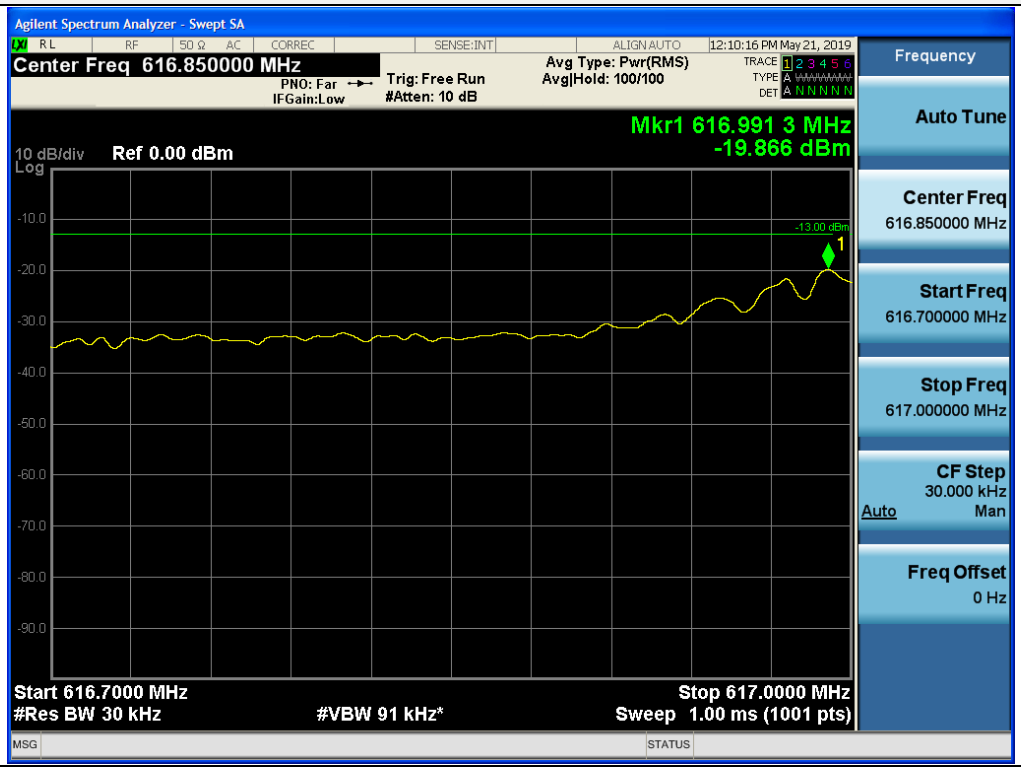


Out-of-band (two adjacent test signals) / 600 MHz Service / Downlink / LTE 20 MHz / Lower

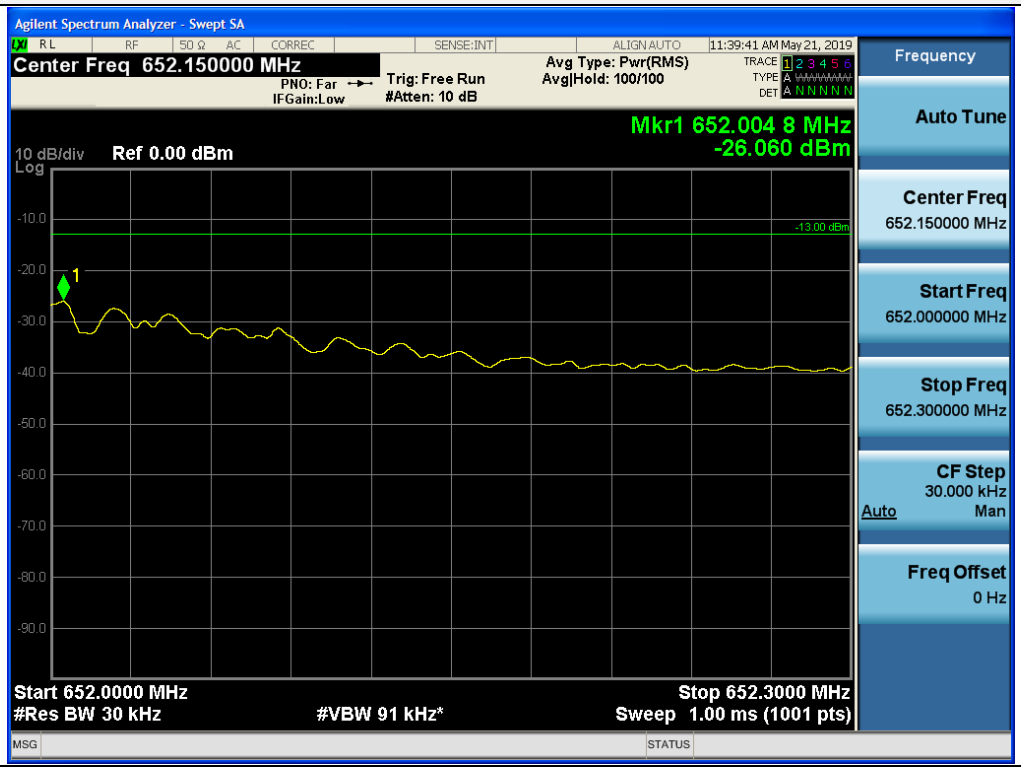


+3 dB above Out-of-band (two adjacent test signals) / 600 MHz Service / Downlink / LTE 5 MHz / Upper

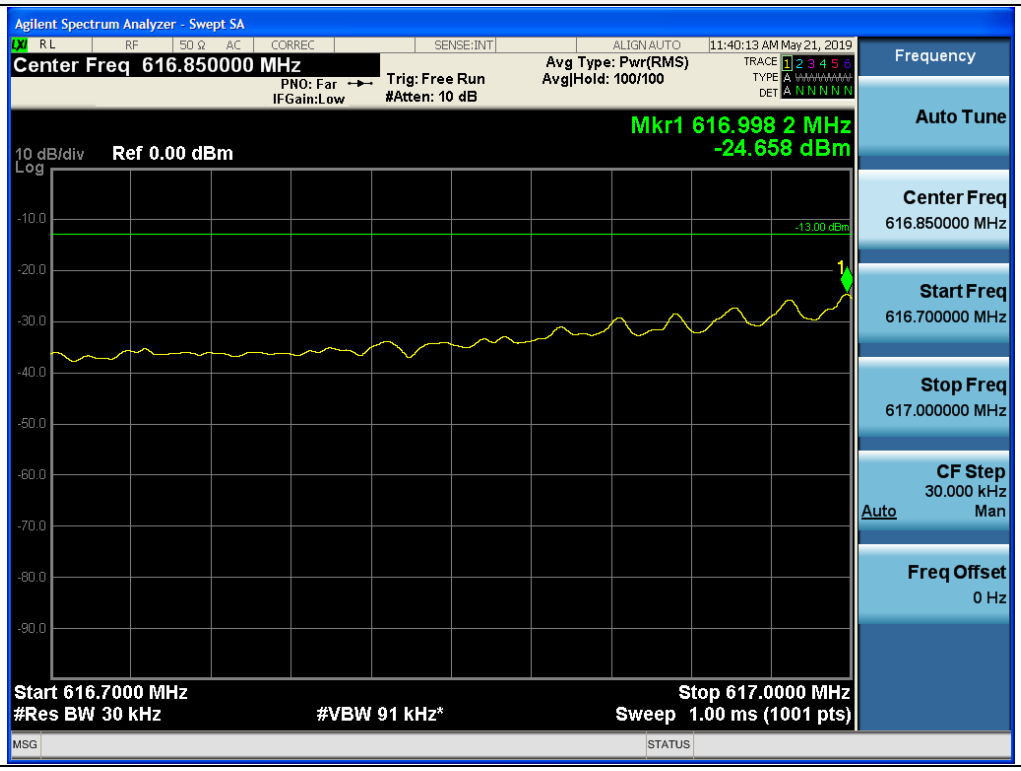
+3 dB above Out-of-band (two adjacent test signals) / 600 MHz Service / Downlink / LTE 5 MHz / Lower



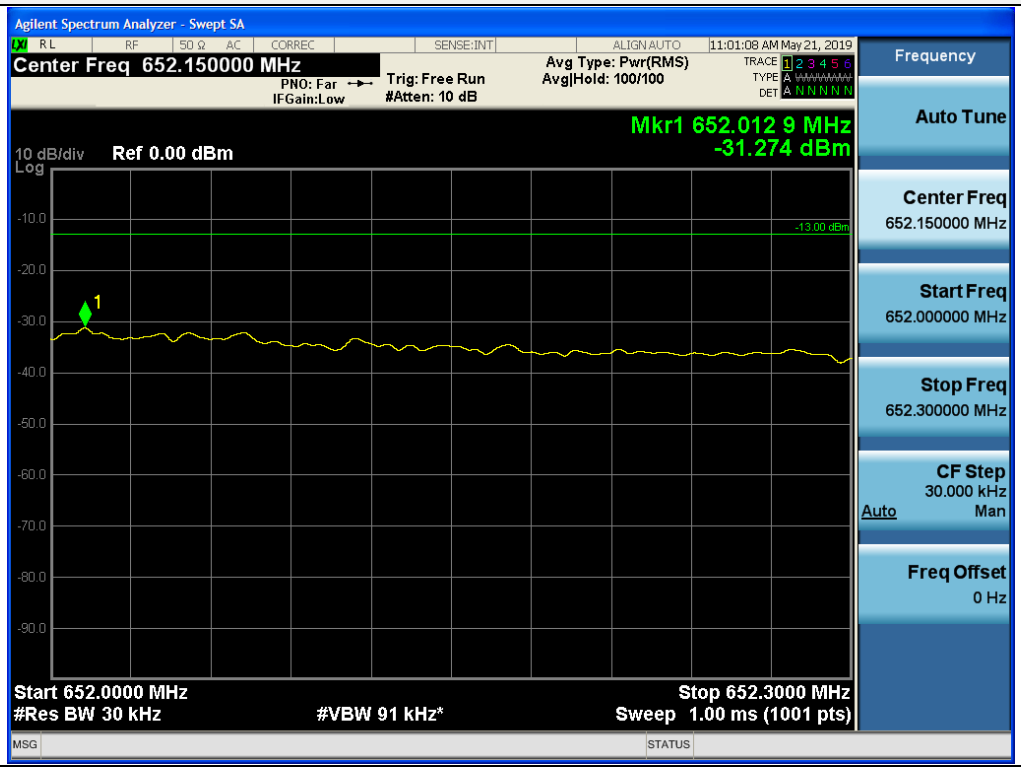
+3 dB above Out-of-band (two adjacent test signals) / 600 MHz Service / Downlink / LTE 10 MHz / Upper



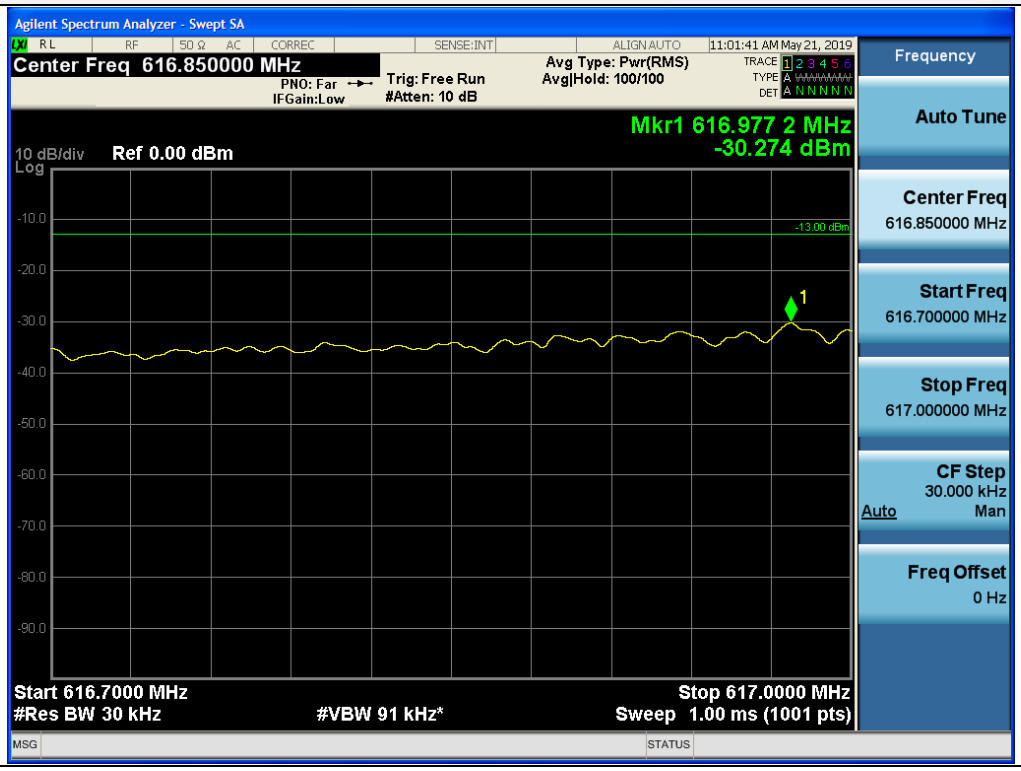
+3 dB above Out-of-band (two adjacent test signals) / 600 MHz Service / Downlink / LTE 10 MHz / Lower



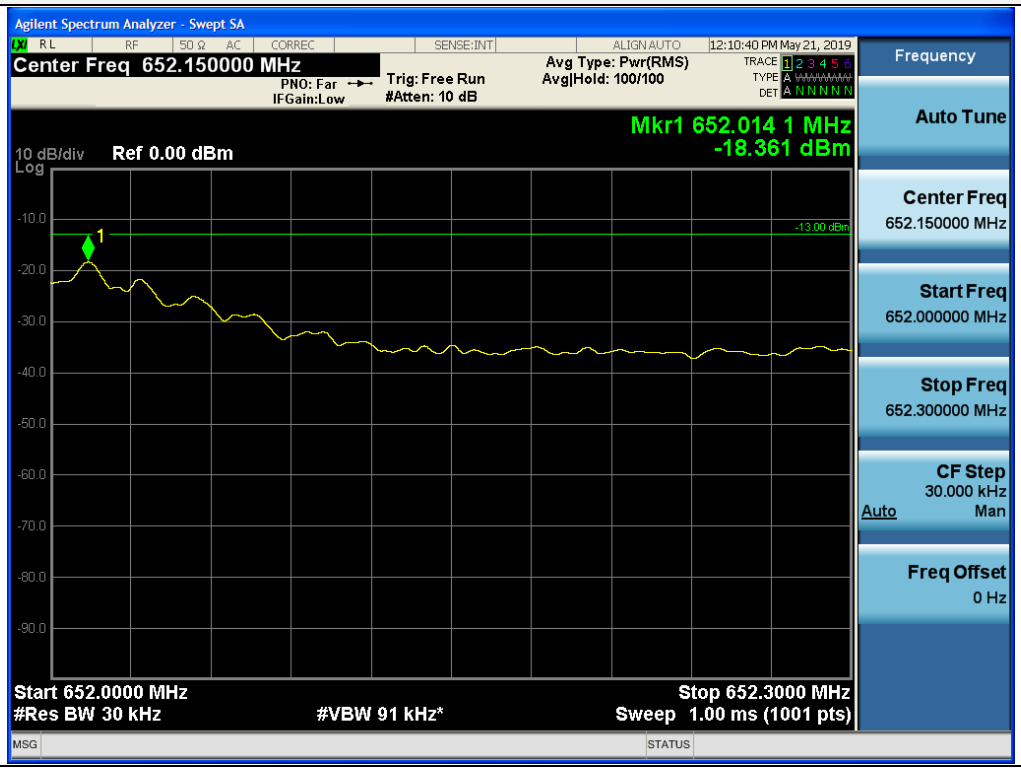
+3 dB above Out-of-band (two adjacent test signals) / 600 MHz Service / Downlink / LTE 20 MHz / Upper



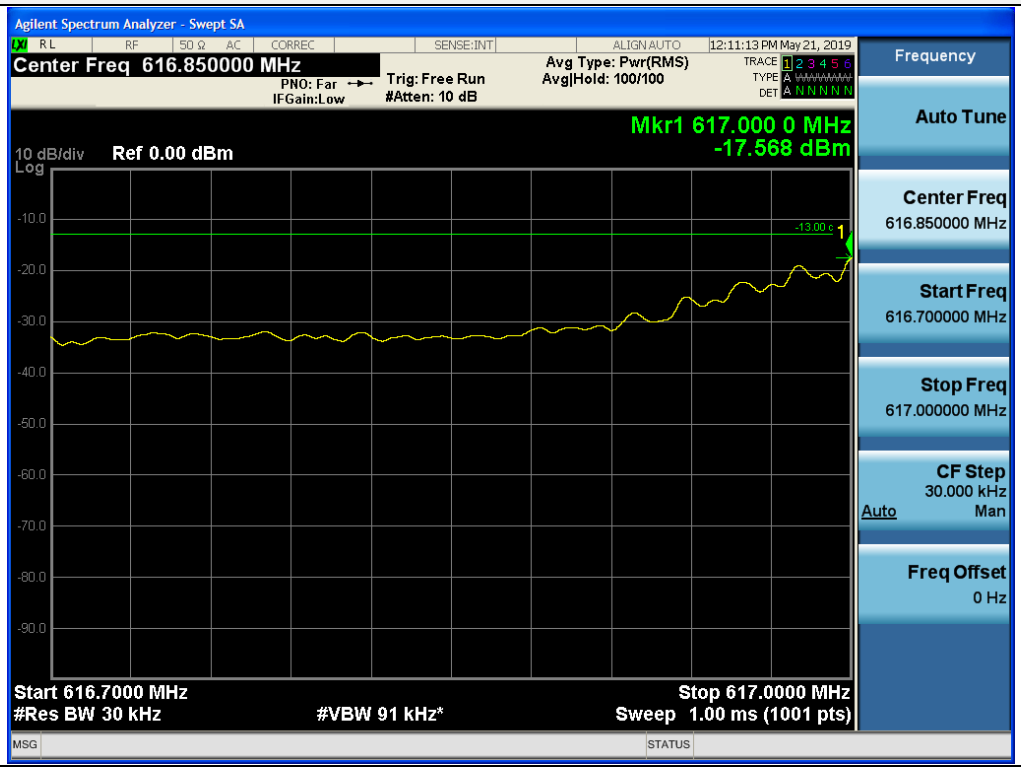
+3 dB above Out-of-band (two adjacent test signals) / 600 MHz Service / Downlink / LTE 20 MHz / Lower



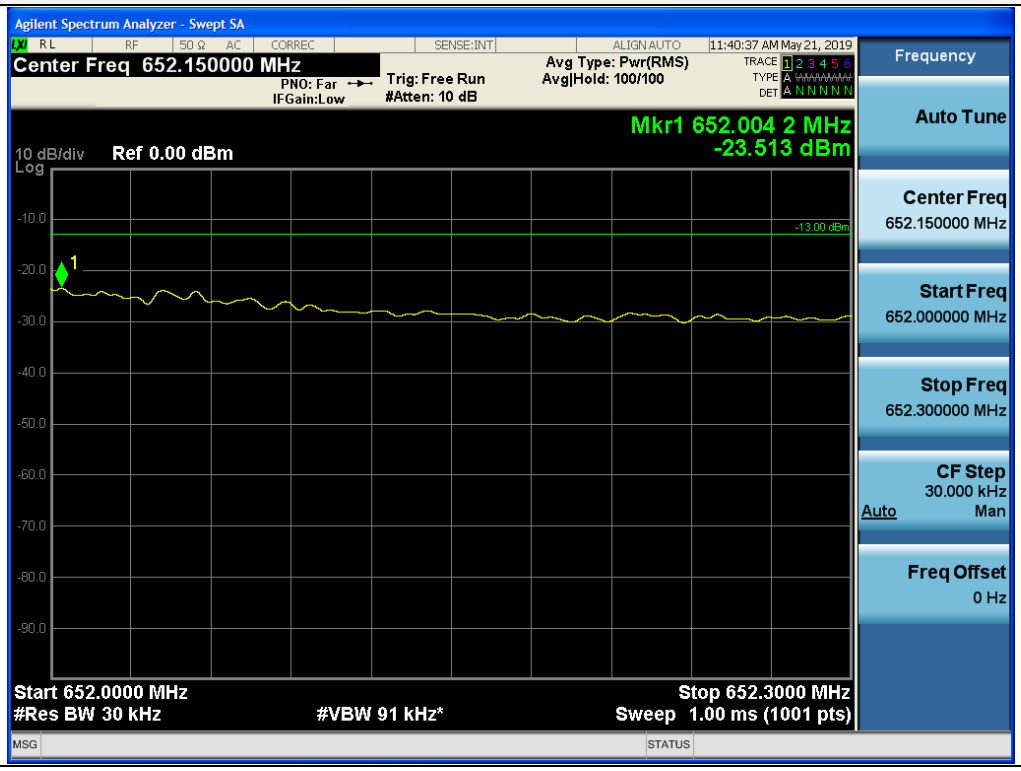
Out-of-band (single test signal) / 600 MHz Service / Downlink / LTE 5 MHz / Upper



Out-of-band (single test signal) / 600 MHz Service / Downlink / LTE 5 MHz / Lower

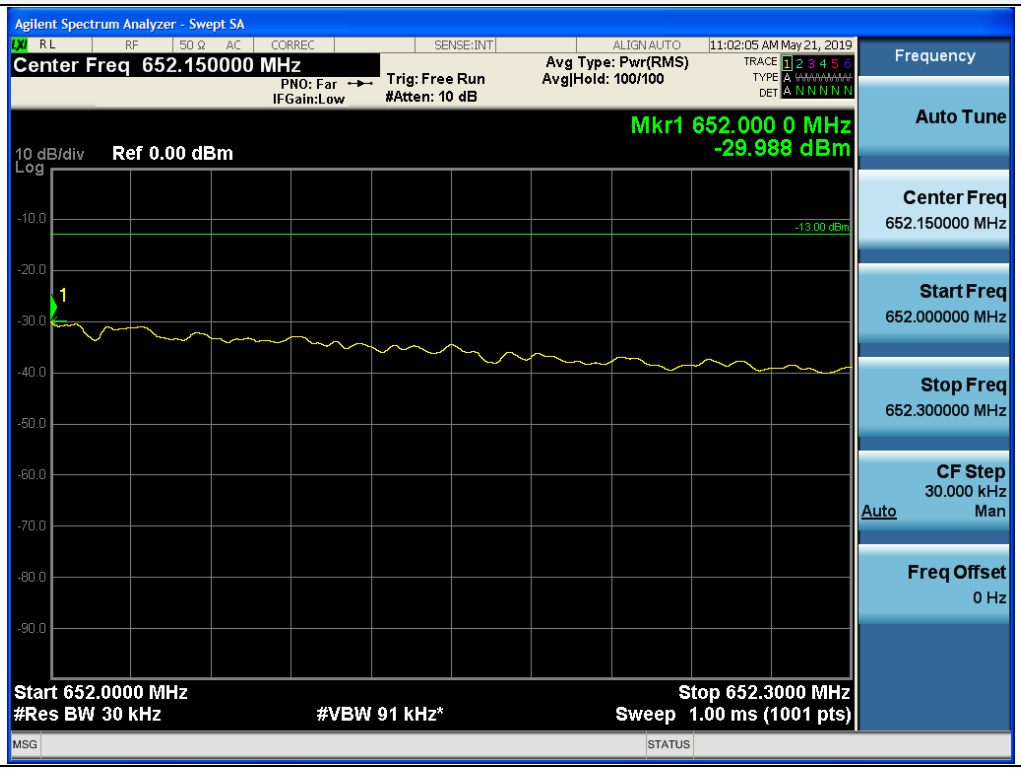


Out-of-band (single test signal) / 600 MHz Service / Downlink / LTE 10 MHz / Upper

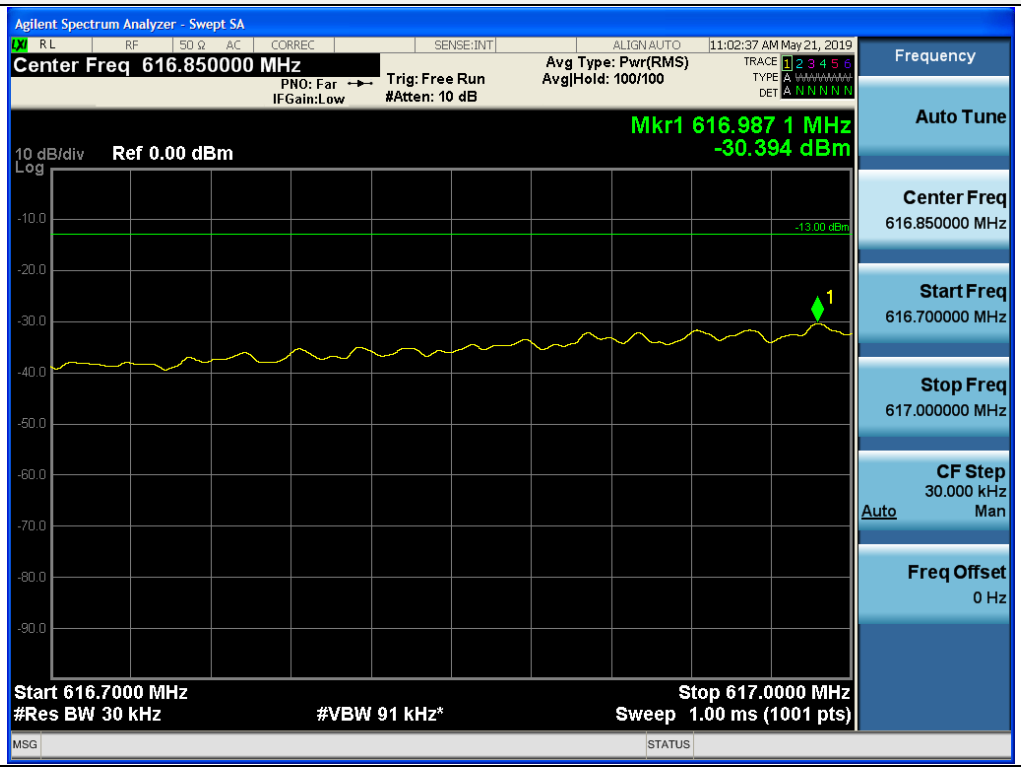


Out-of-band (single test signal) / 600 MHz Service / Downlink / LTE 10 MHz / Lower

Out-of-band (single test signal) / 600 MHz Service / Downlink / LTE 20 MHz / Upper

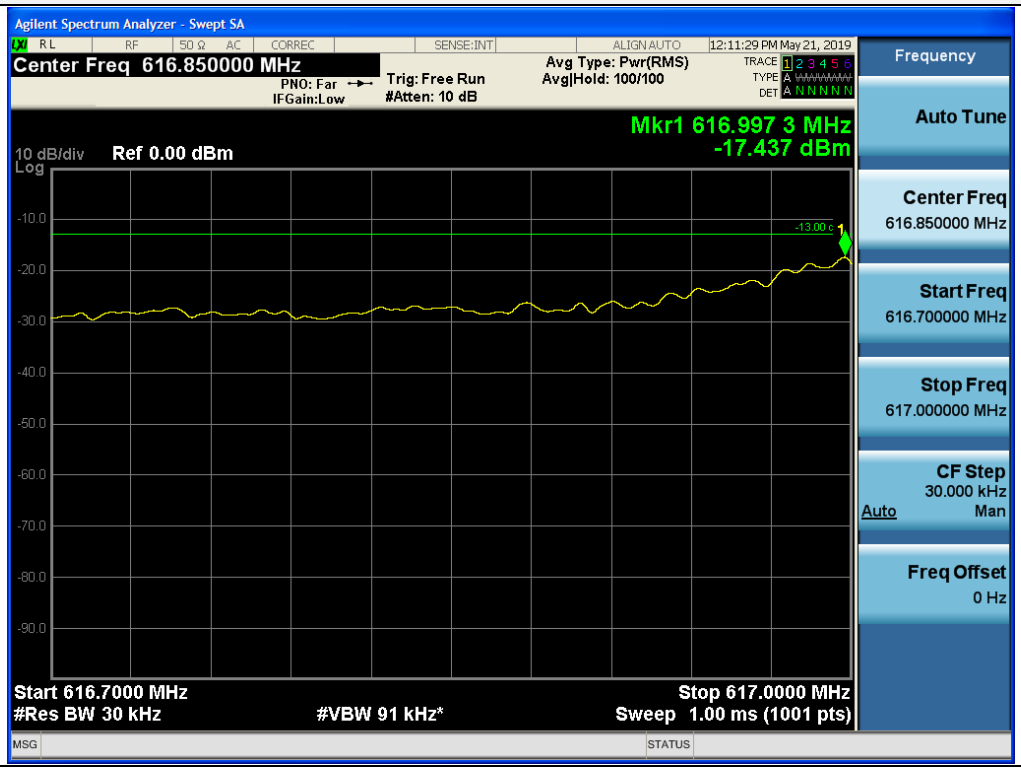


Out-of-band (single test signal) / 600 MHz Service / Downlink / LTE 20 MHz / Lower



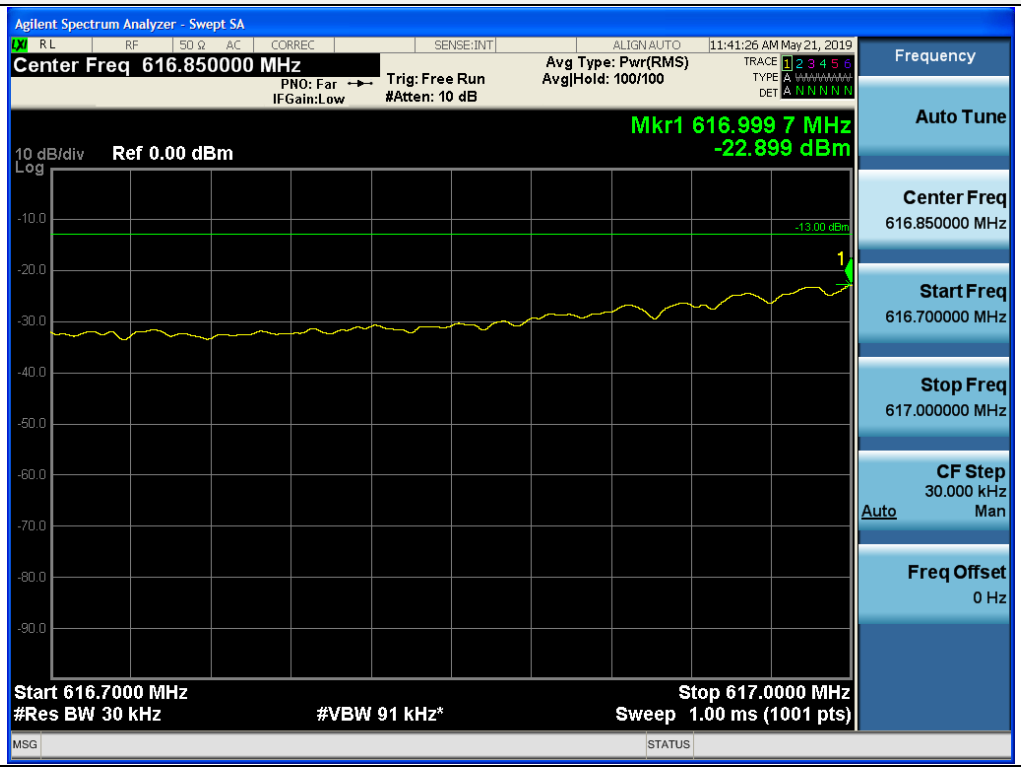
+3 dB above Out-of-band (single test signal) / 600 MHz Service / Downlink / LTE 5 MHz / Upper

+3 dB above Out-of-band (single test signal) / 600 MHz Service / Downlink / LTE 5 MHz / Lower

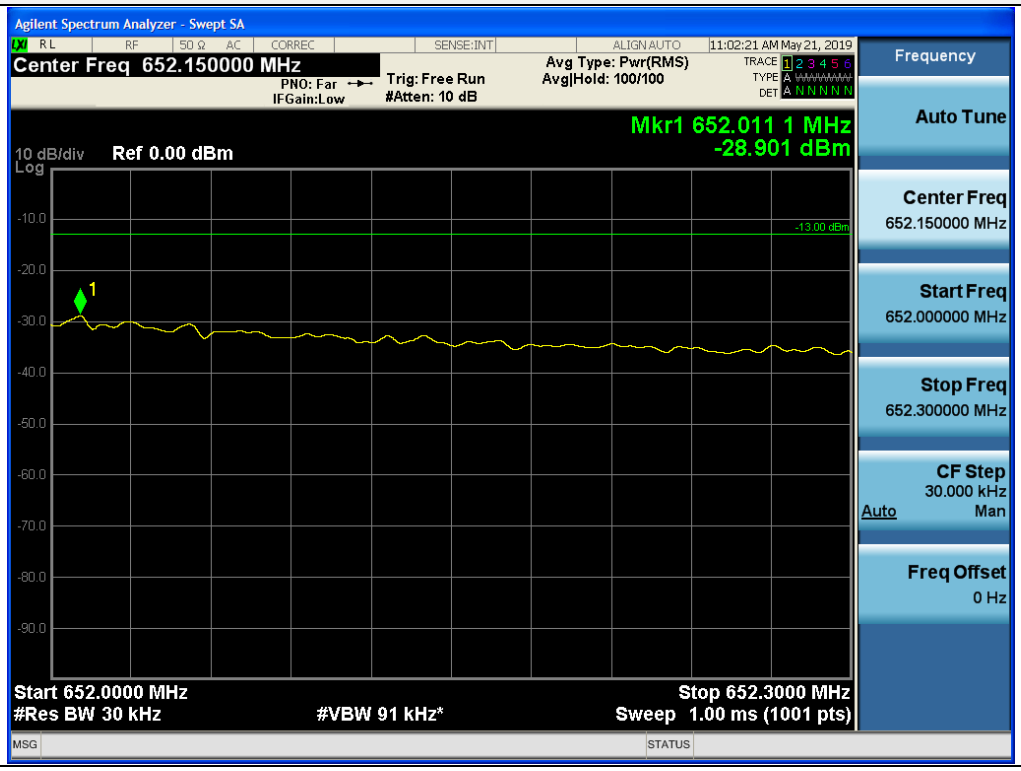


+3 dB above Out-of-band (single test signal) / 600 MHz Service / Downlink / LTE 10 MHz / Upper

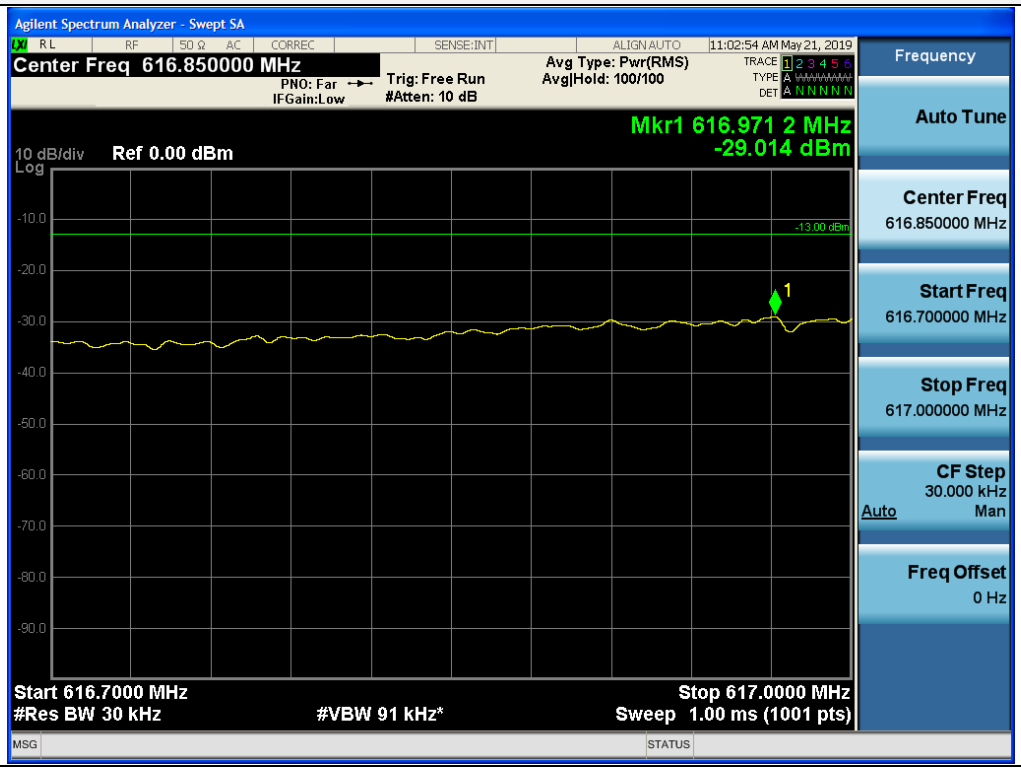
+3 dB above Out-of-band (single test signal) / 600 MHz Service / Downlink / LTE 10 MHz / Lower



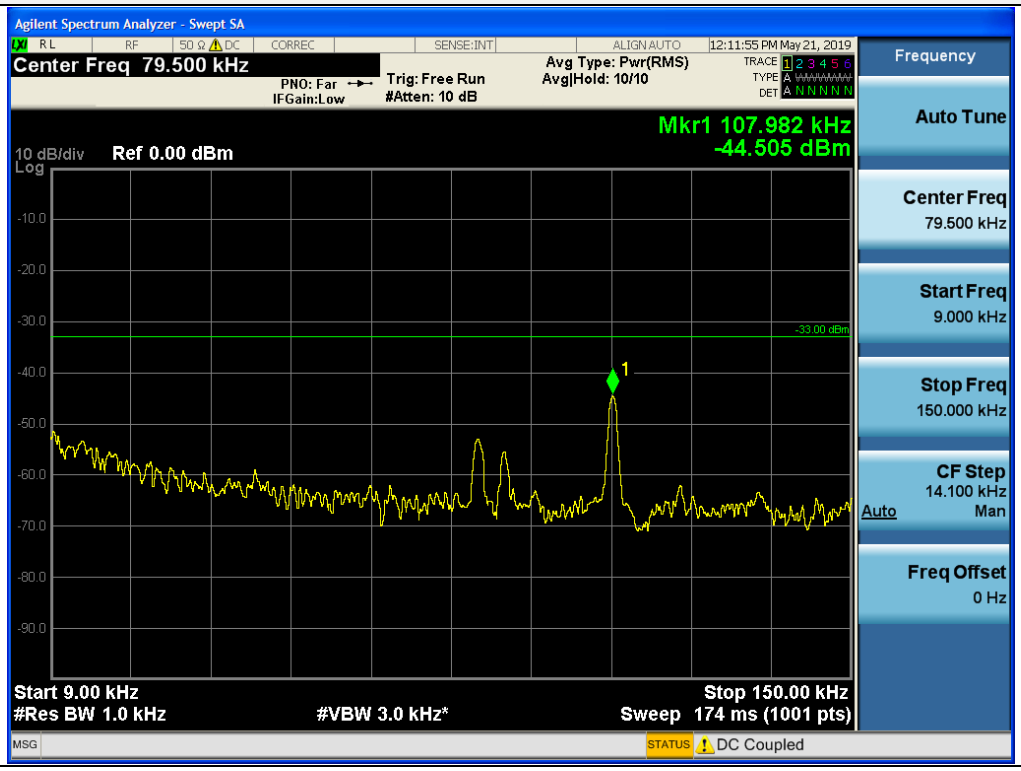
+3 dB above Out-of-band (single test signal) / 600 MHz Service / Downlink / LTE 20 MHz / Upper

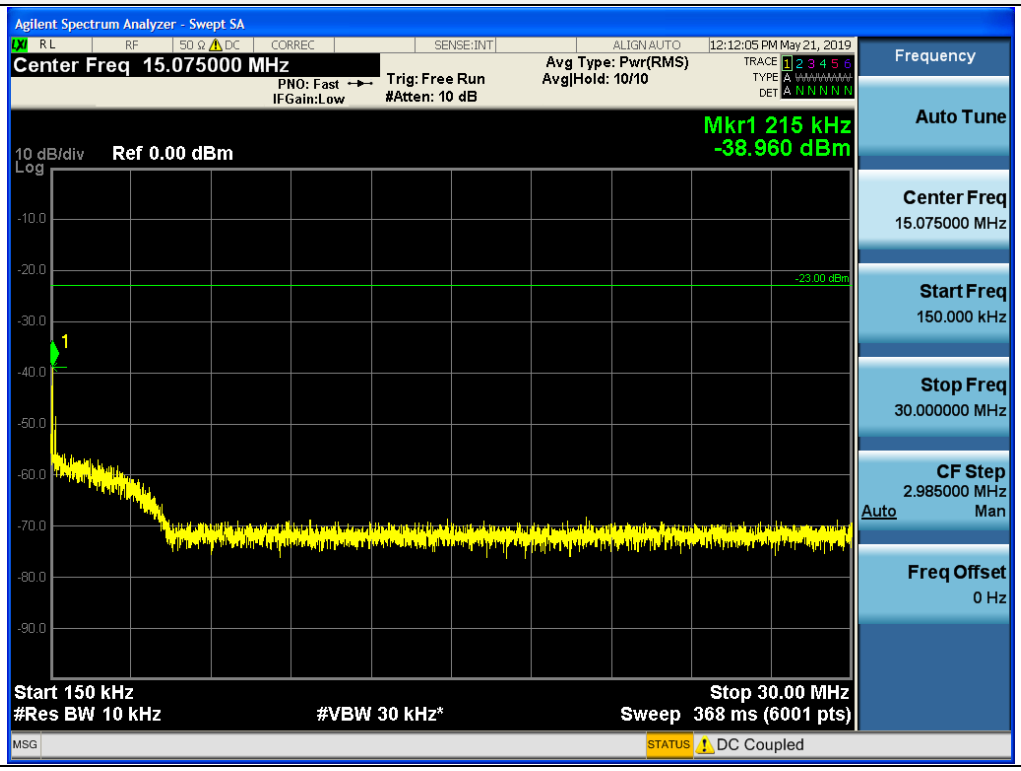


+3 dB above Out-of-band (single test signal) / 600 MHz Service / Downlink / LTE 20 MHz / Lower

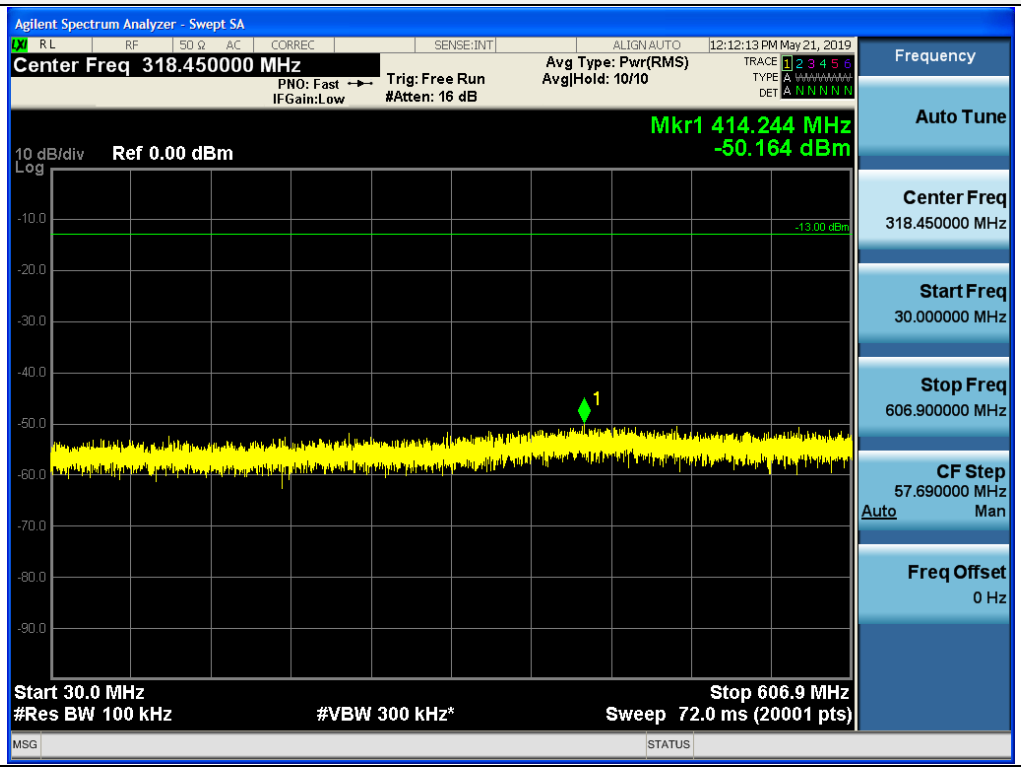


Plot data of Spurious Emissions

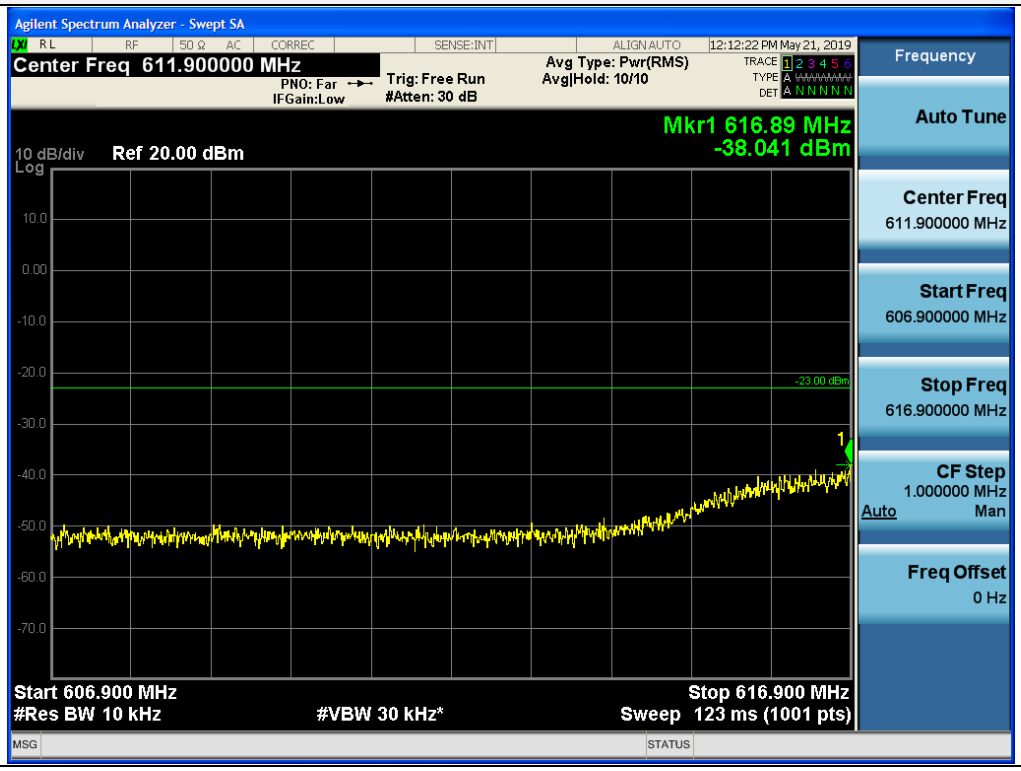
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / Low / 9 kHz ~ 150 kHz


Spurious / 600 MHz Service / Downlink / LTE 5 MHz / Low / 150 kHz ~ 30 MHz


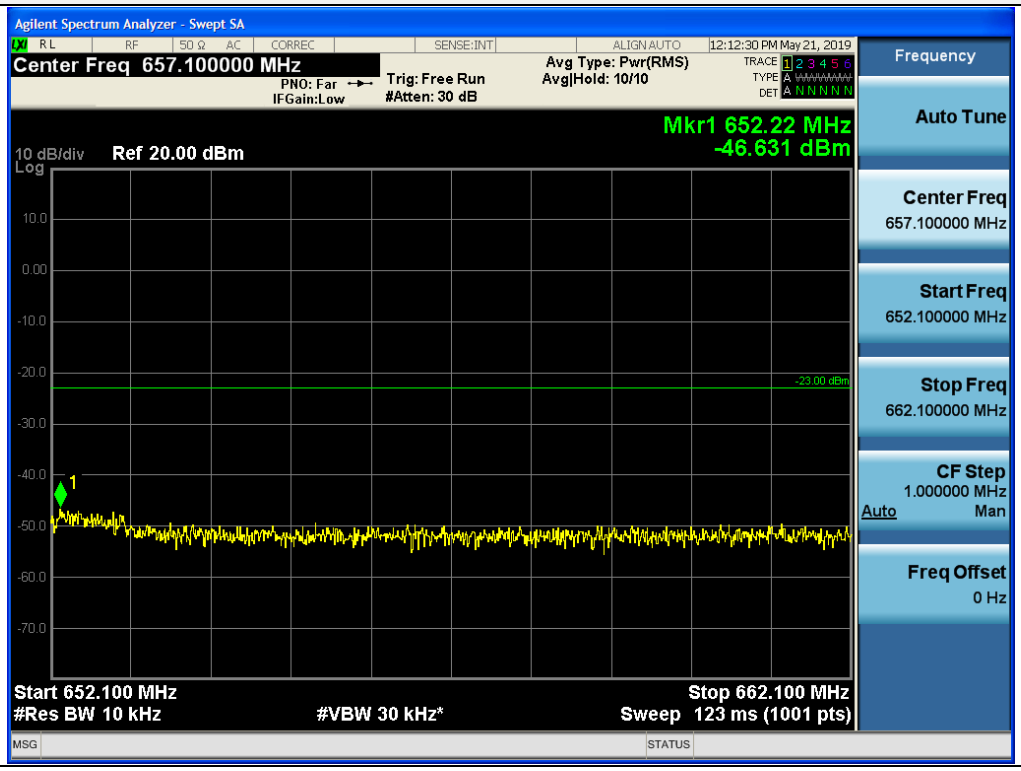
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / Low / 30 MHz ~ Low Edge – 10.1 MHz – 10.1 MHz



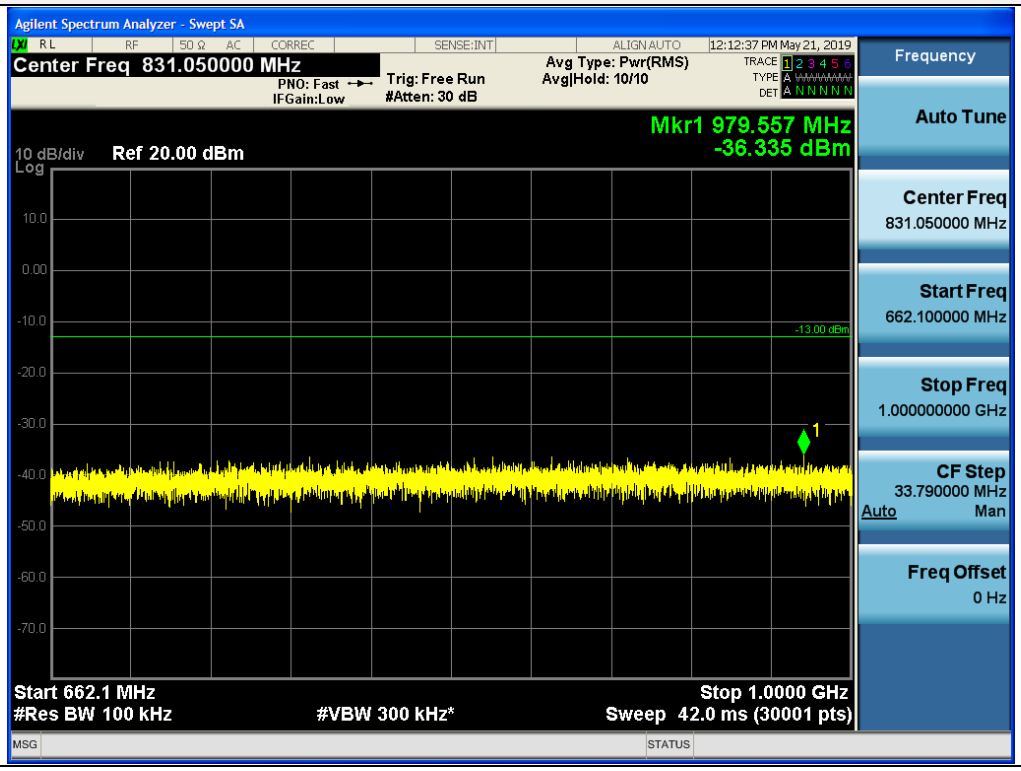
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / Low / Low Edge – 10.1 MHz ~ Low Edge – 0.1 MHz



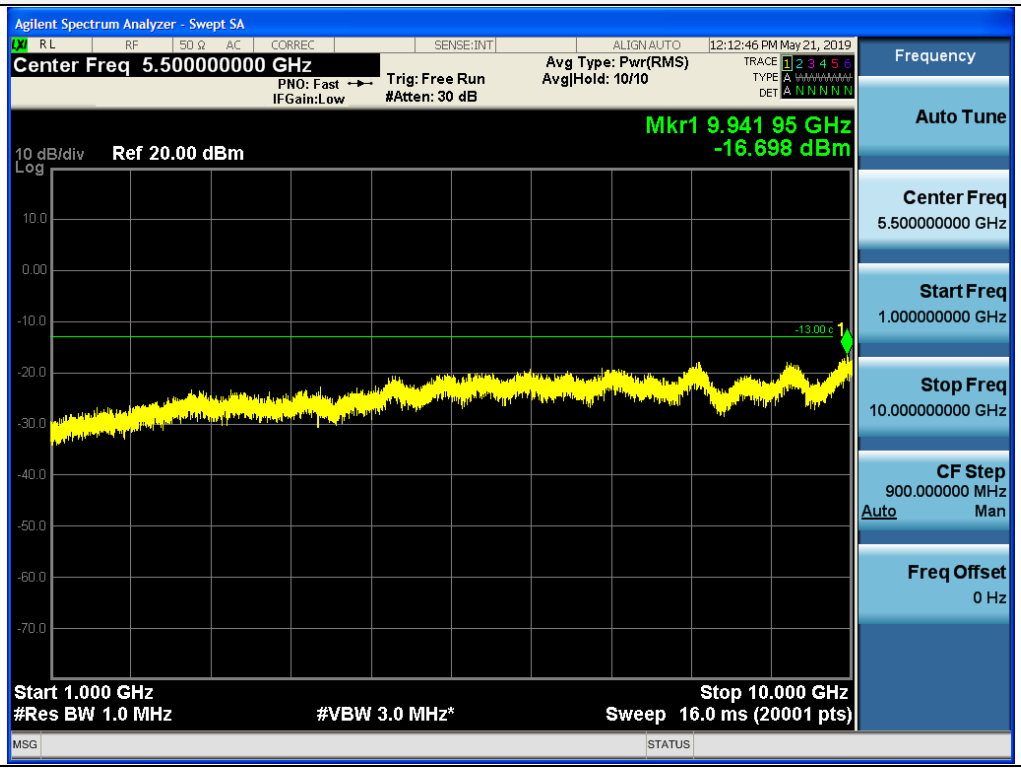
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / Low / High Edge + 0.1 MHz ~ High Edge + 10.1 MHz



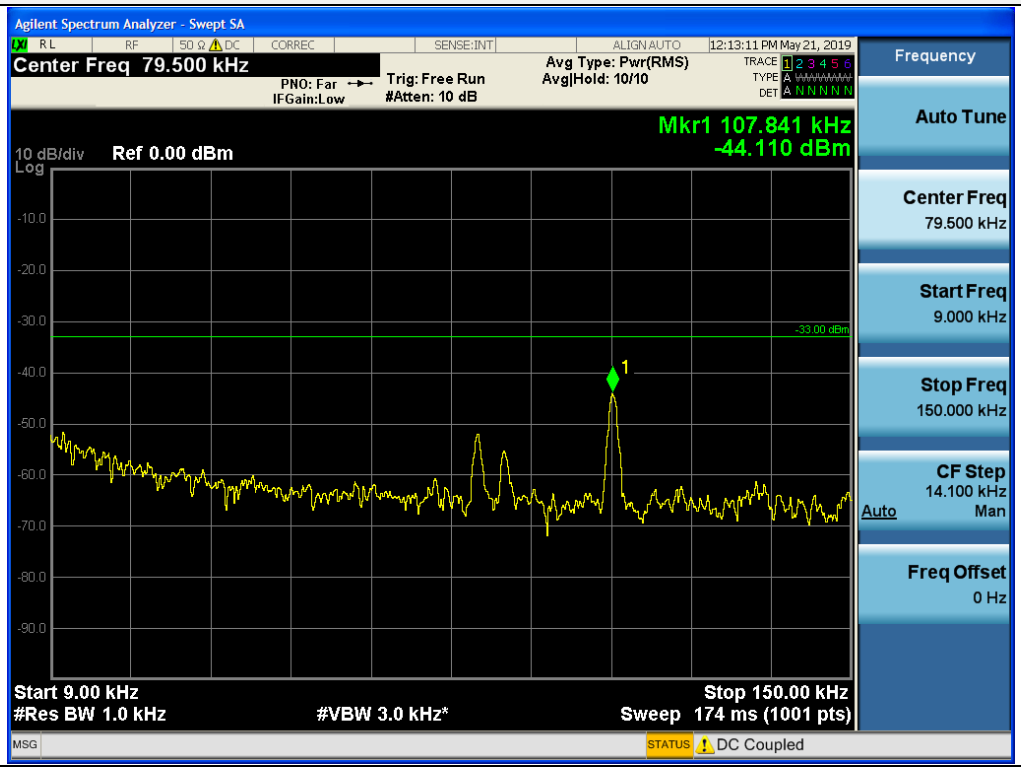
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / Low / High Edge + 10.1 MHz ~ 1 GHz



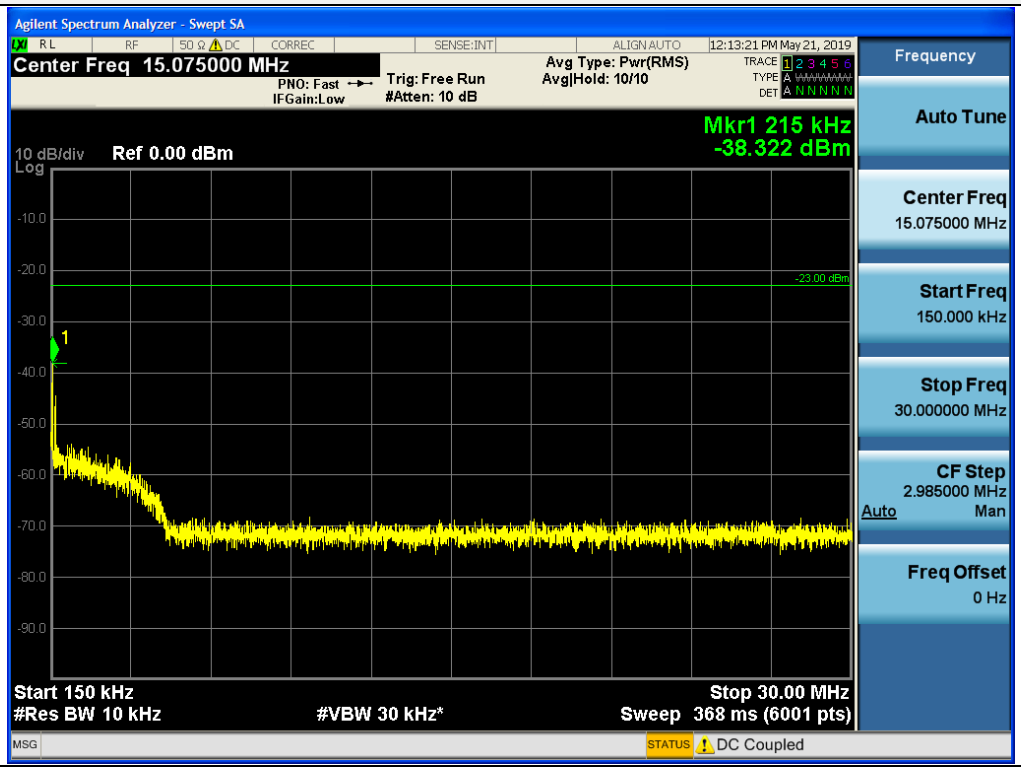
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / Low / 1 GHz ~ 10 GHz



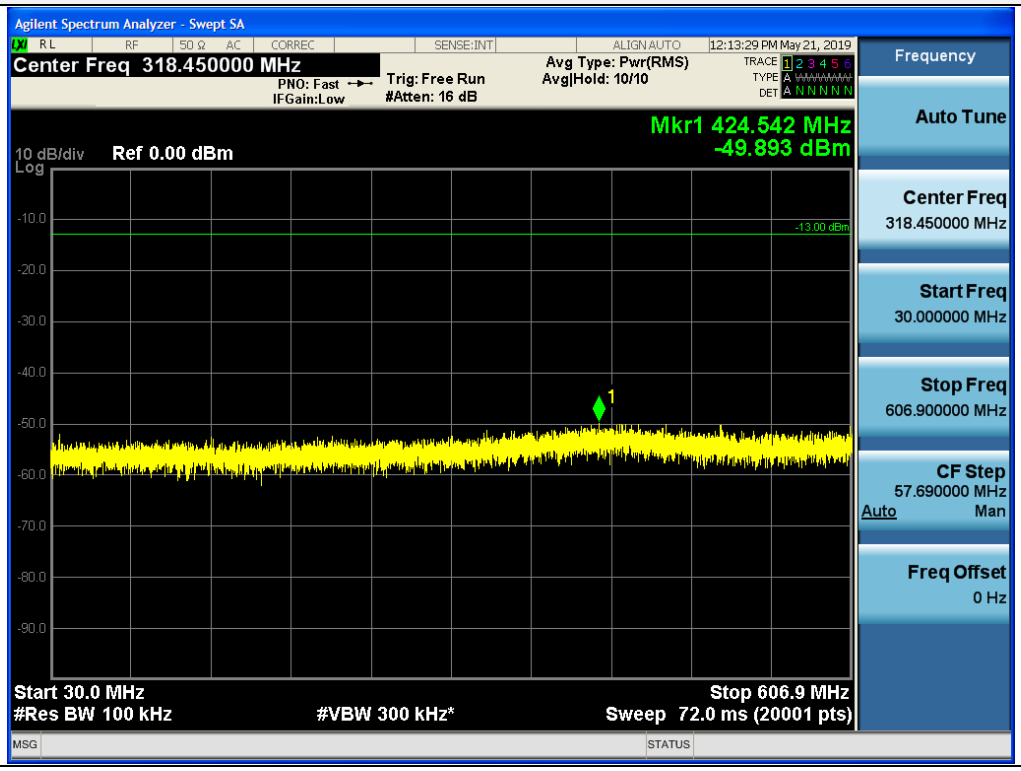
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / Middle / 9 kHz ~ 150 kHz



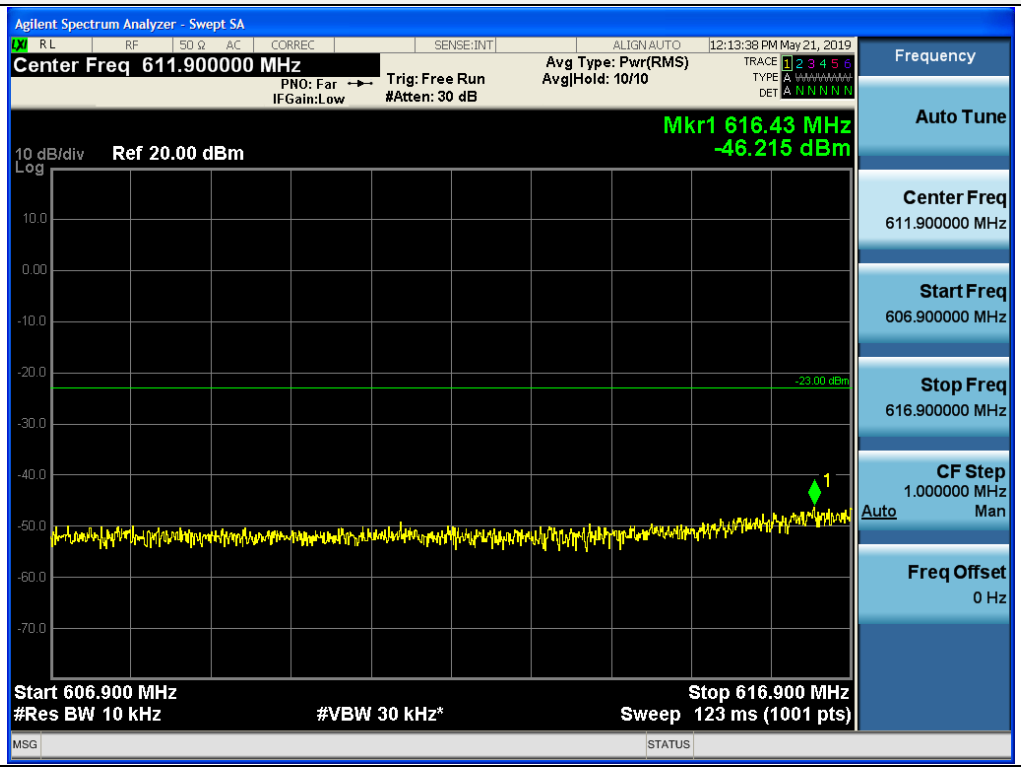
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / Middle / 150 kHz ~ 30 MHz



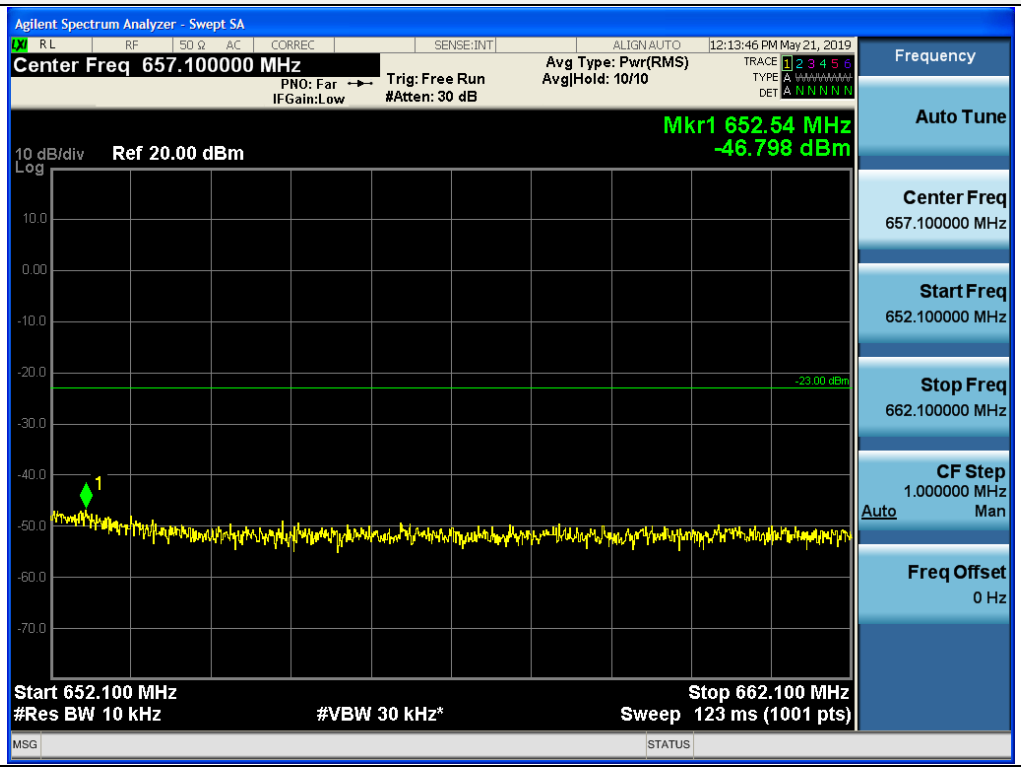
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / Middle / 30 MHz ~ Low Edge – 10.1 MHz – 10.1 MHz



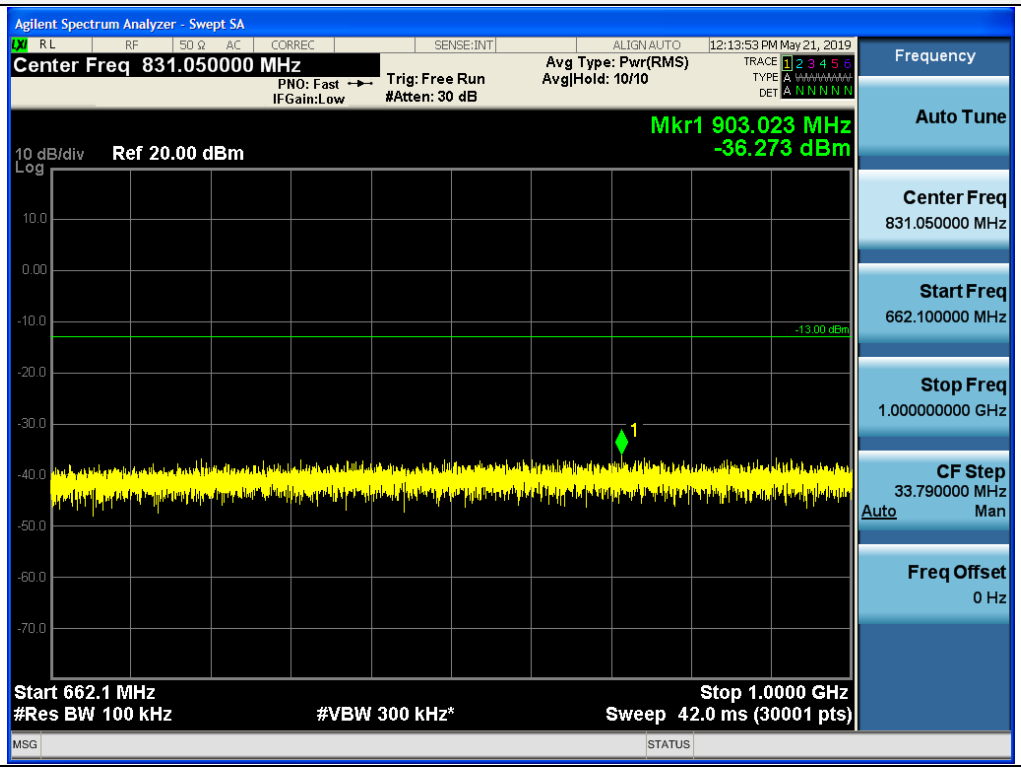
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / Middle / Low Edge – 10.1 MHz ~ Low Edge – 0.1 MHz



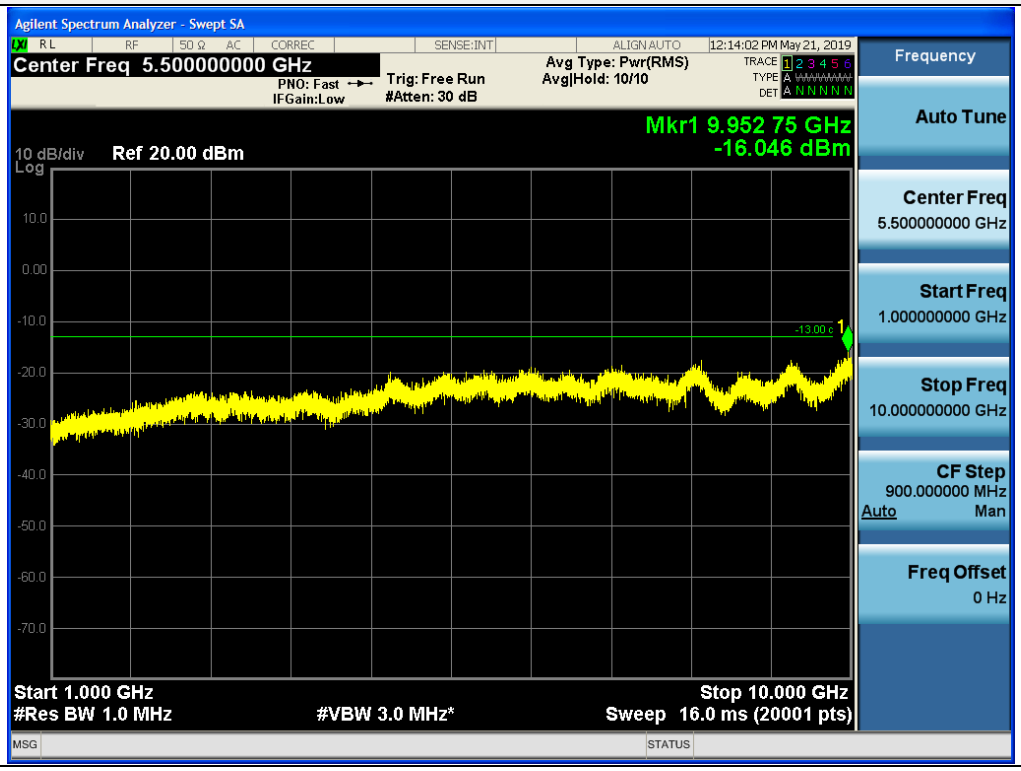
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / Middle / High Edge + 0.1 MHz ~ High Edge + 10.1 MHz



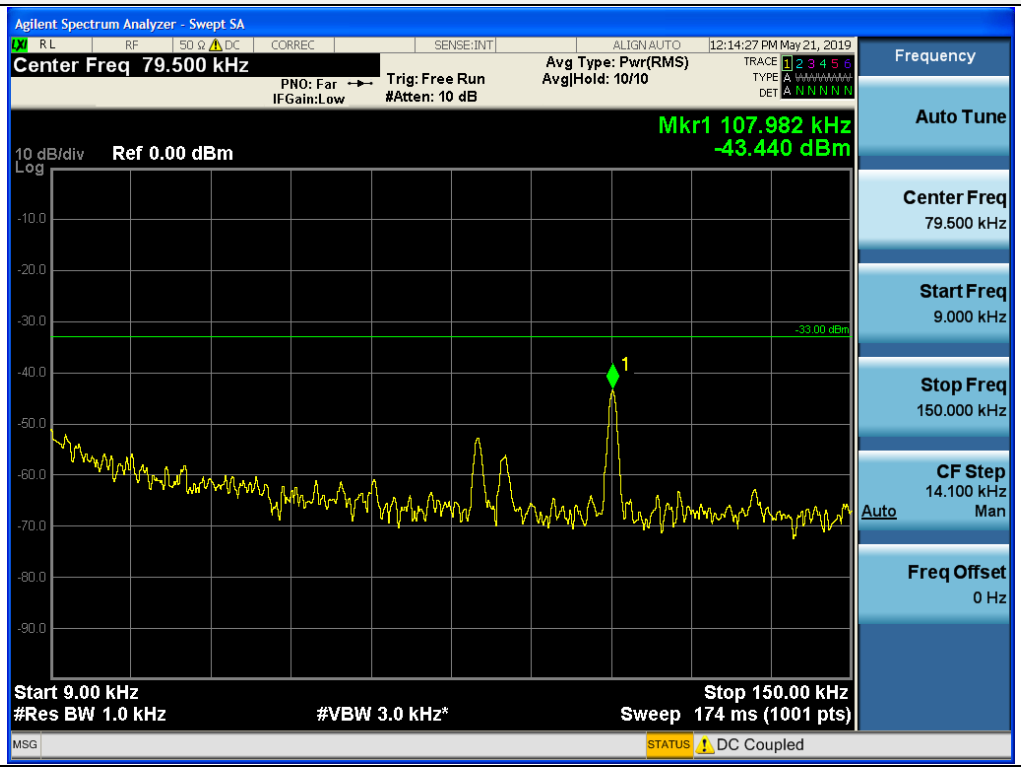
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / Middle / High Edge + 10.1 MHz ~ 1 GHz



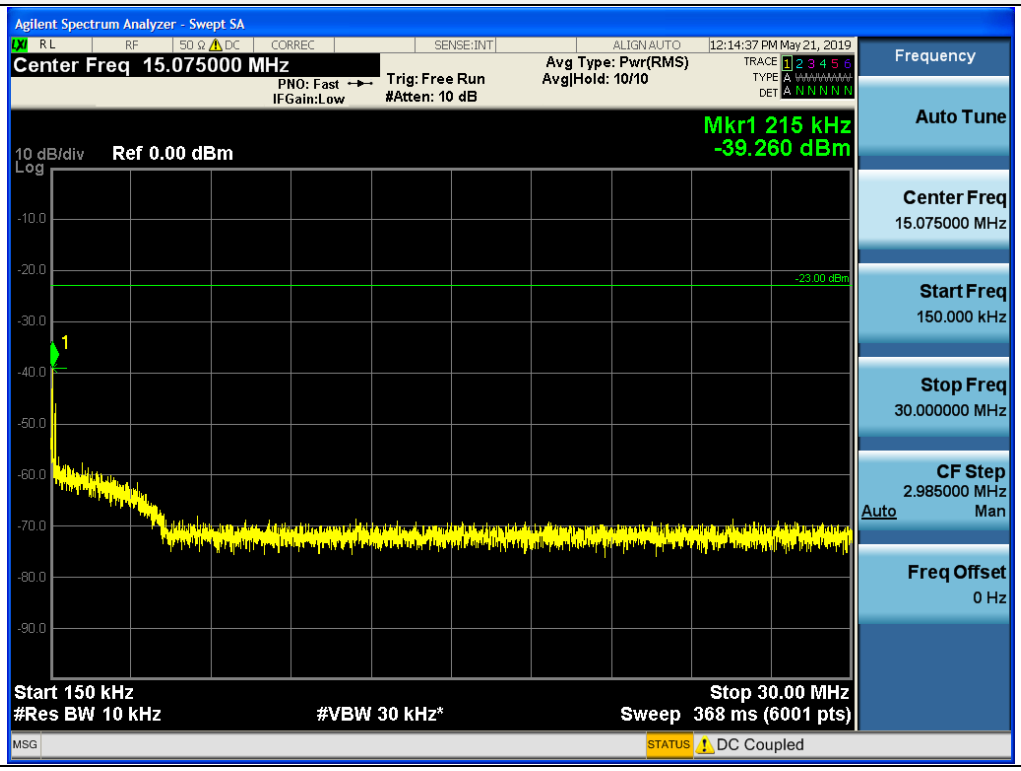
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / Middle / 1 GHz ~ 10 GHz



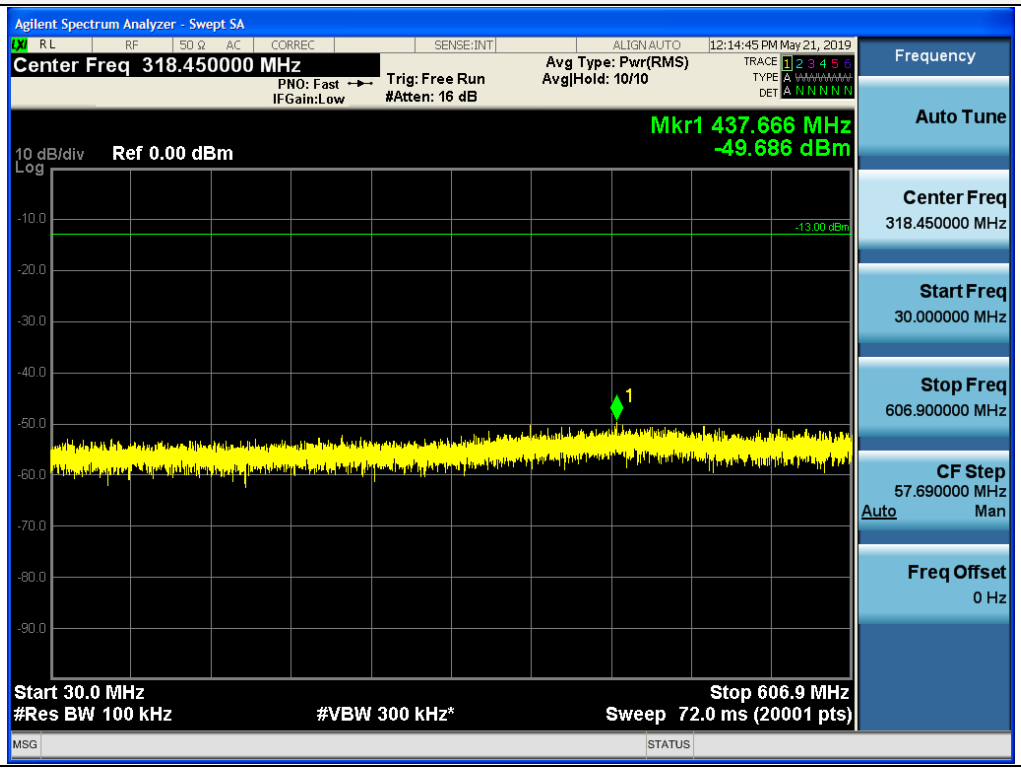
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / High / 9 kHz ~ 150 kHz



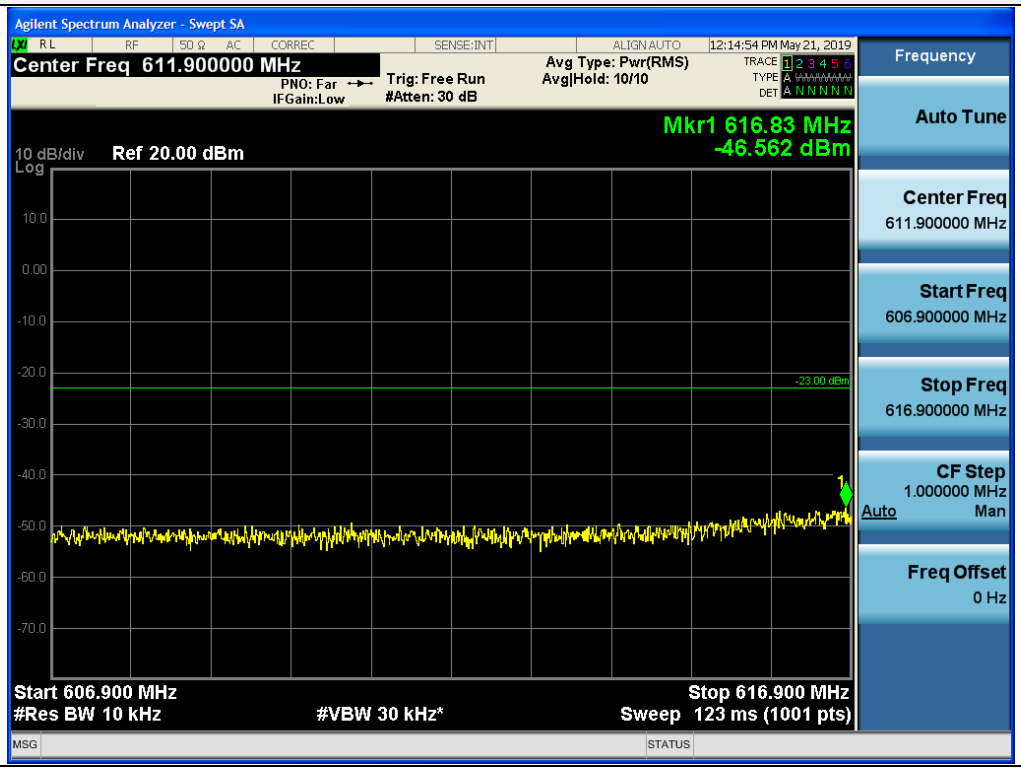
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / High / 150 kHz ~ 30 MHz



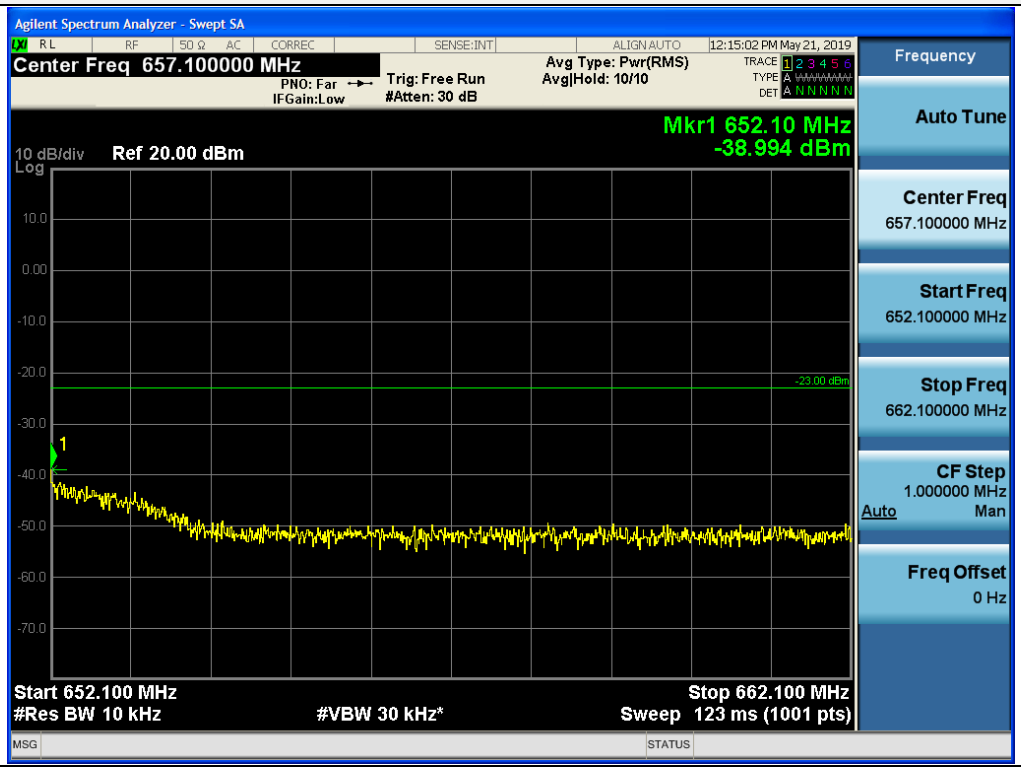
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / High / 30 MHz ~ Low Edge – 10.1 MHz – 10.1 MHz



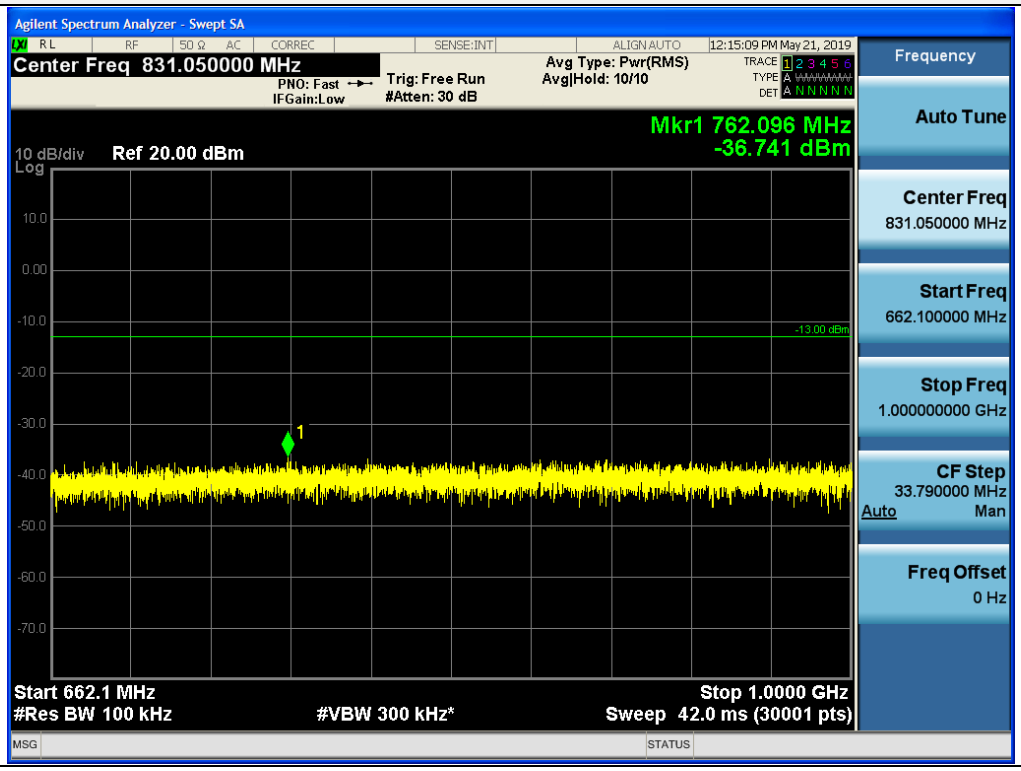
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / High / Low Edge – 10.1 MHz ~ Low Edge – 0.1 MHz



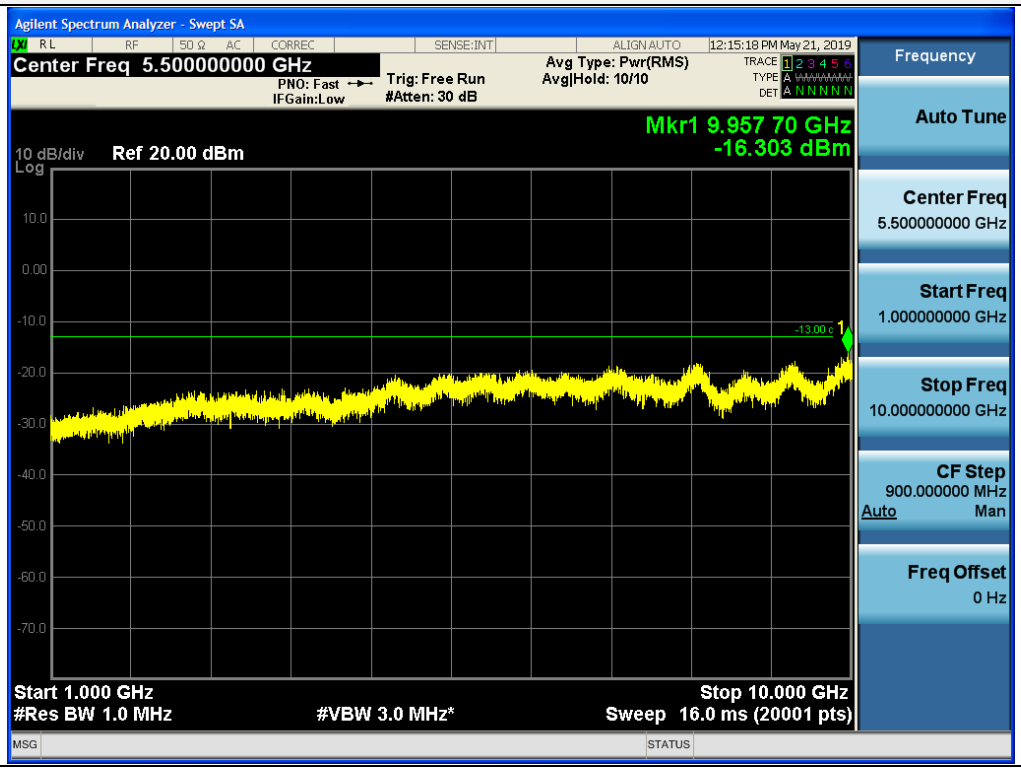
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / High / High Edge + 0.1 MHz ~ High Edge + 10.1 MHz



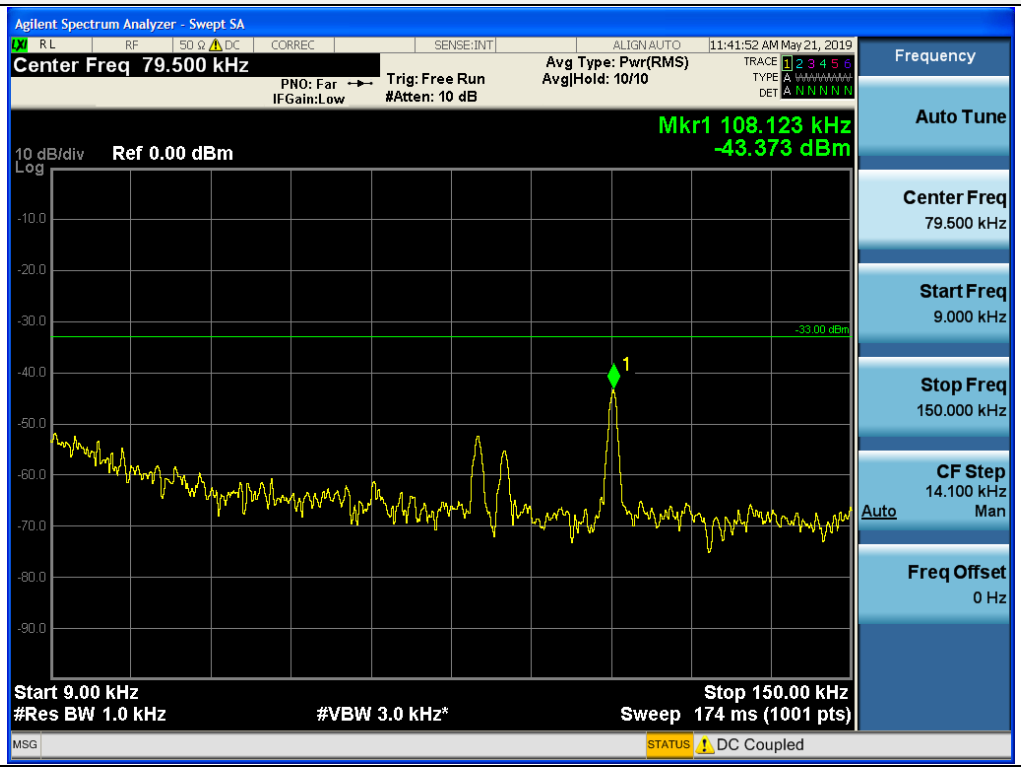
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / High / High Edge + 10.1 MHz ~ 1 GHz



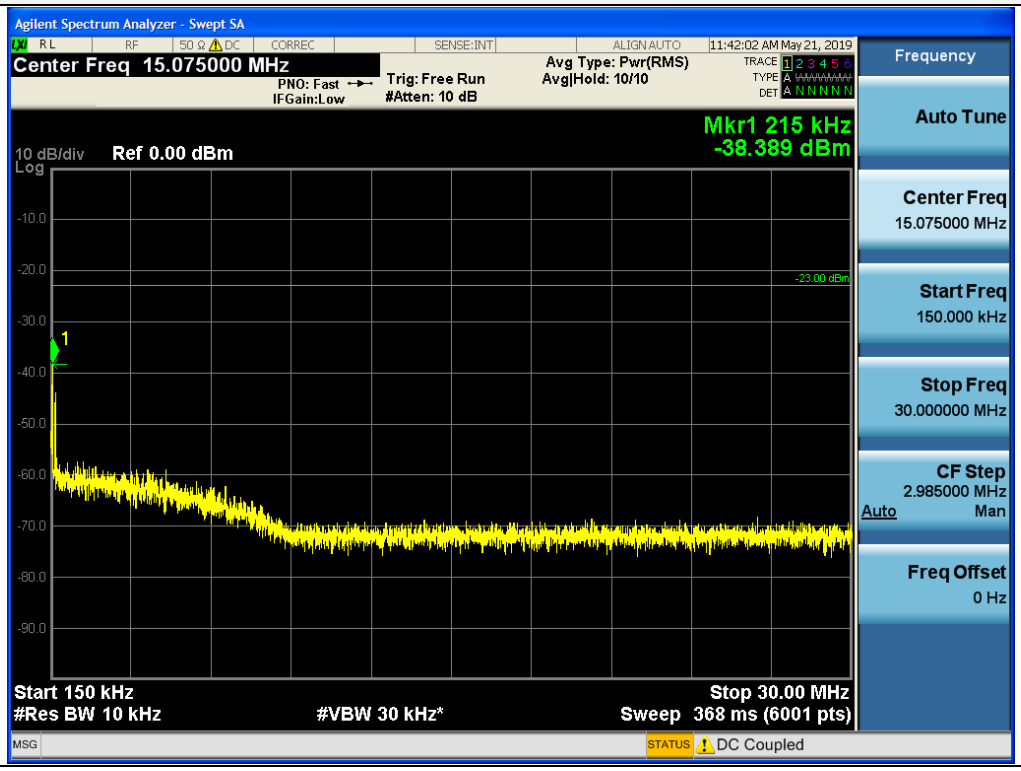
Spurious / 600 MHz Service / Downlink / LTE 5 MHz / High / 1 GHz ~ 10 GHz



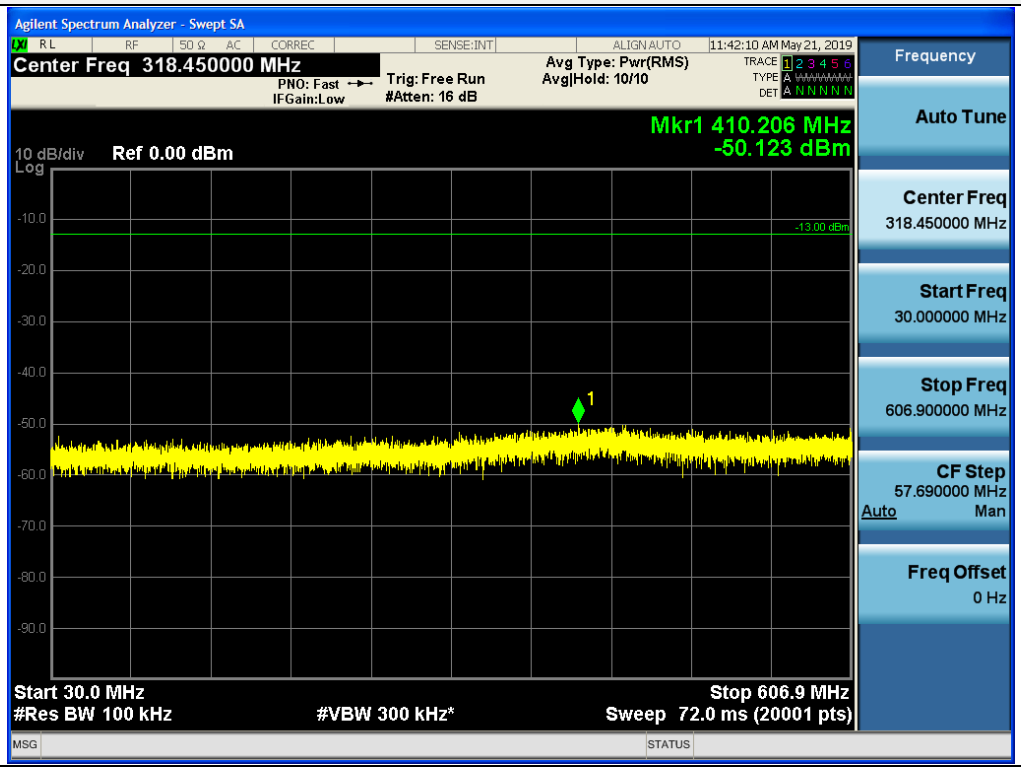
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / Low / 9 kHz ~ 150 kHz



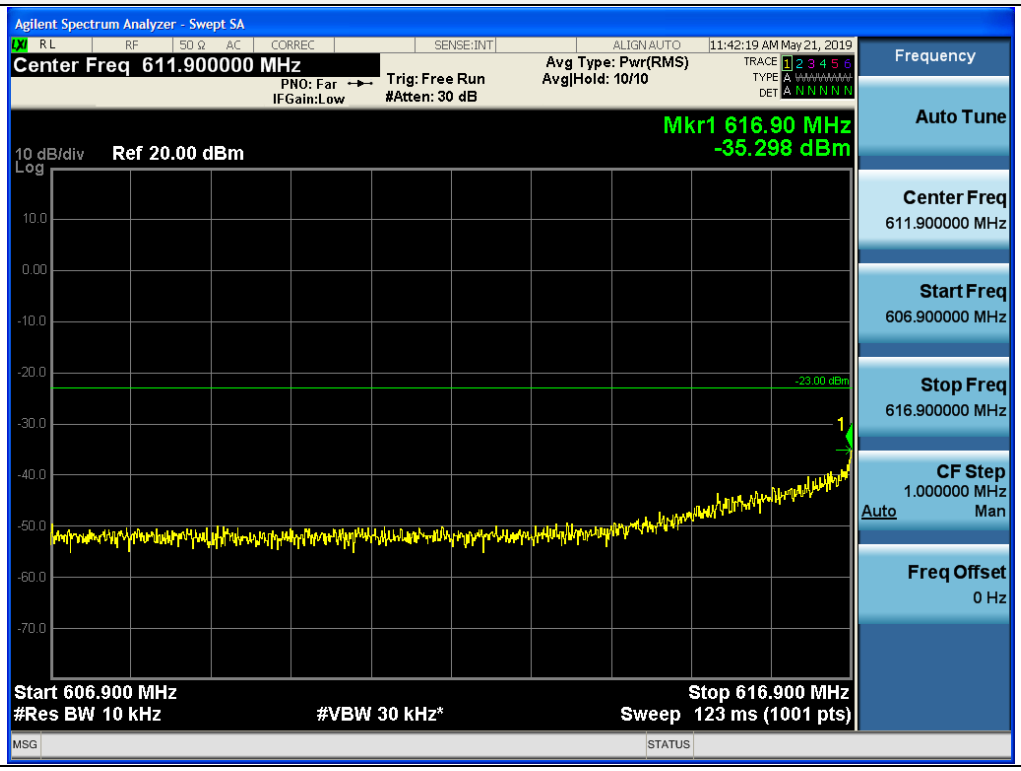
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / Low / 150 kHz ~ 30 MHz



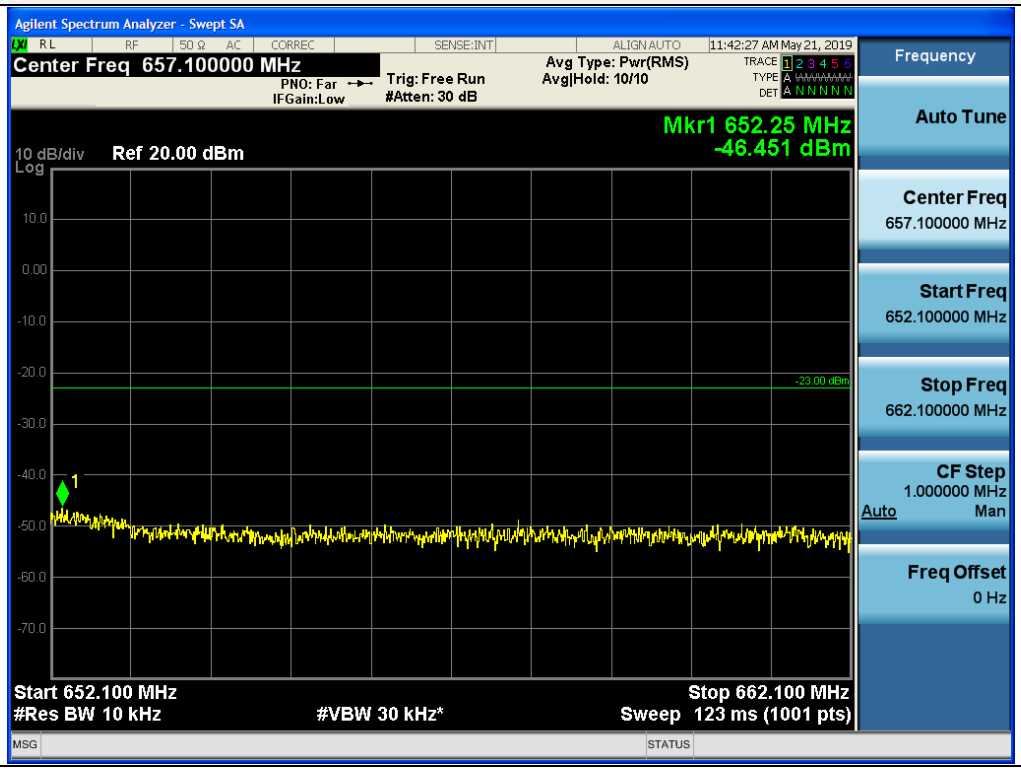
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / Low / 30 MHz ~ Low Edge – 10.1 MHz – 10.1 MHz



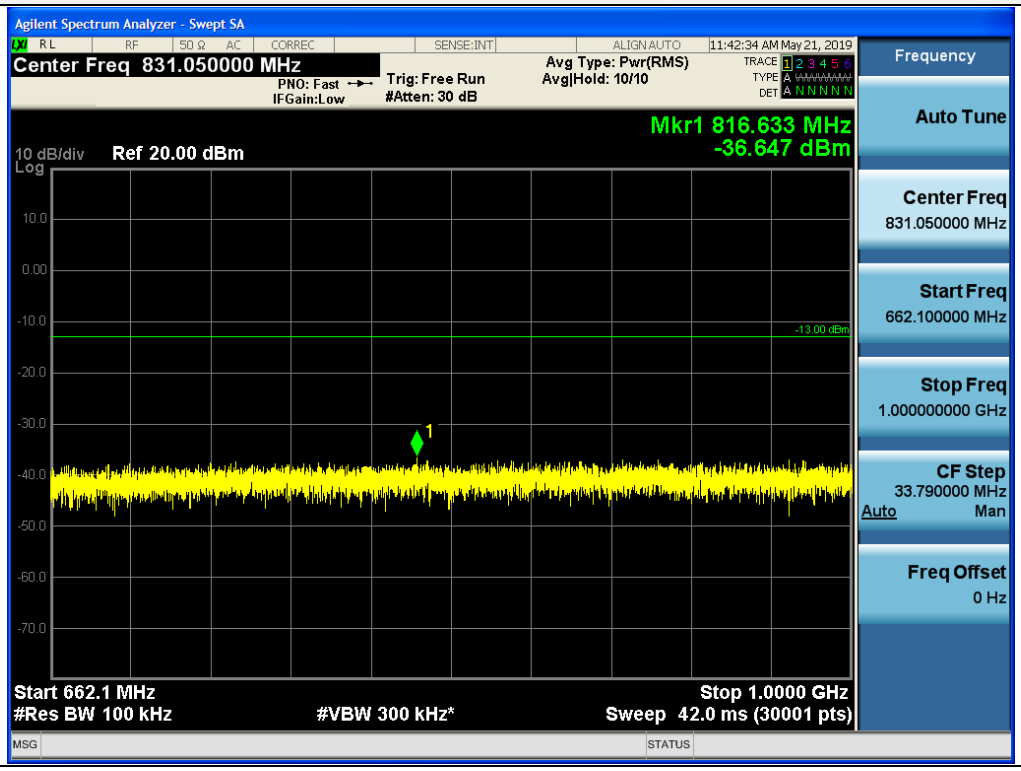
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / Low / Low Edge – 10.1 MHz ~ Low Edge – 0.1 MHz



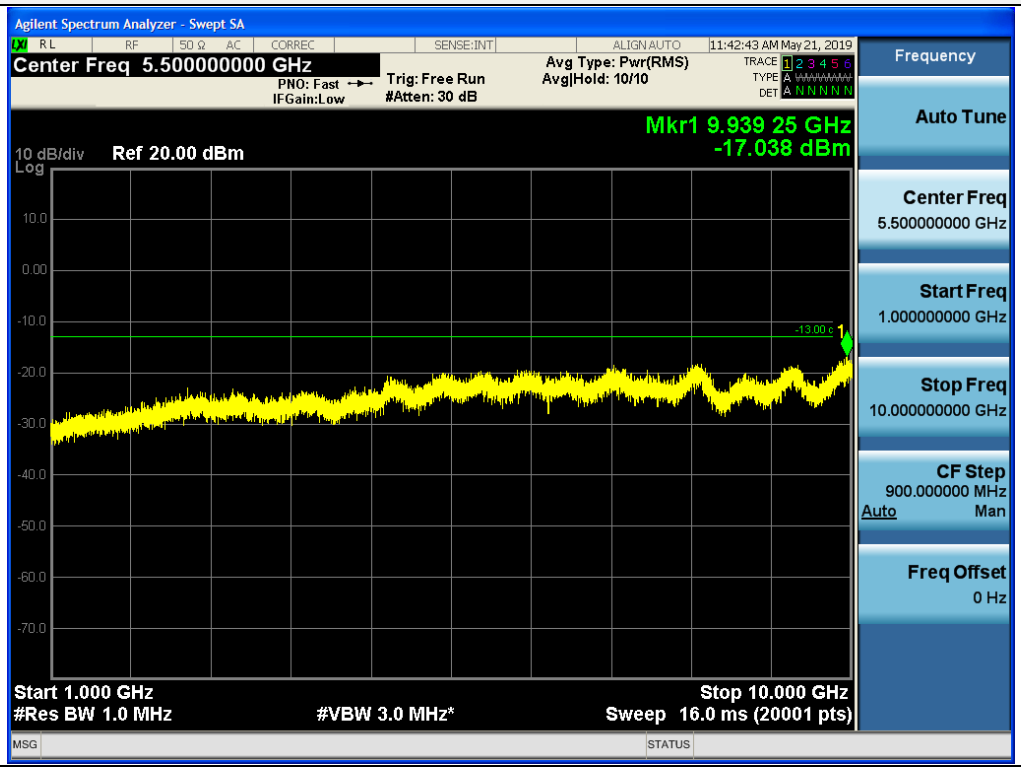
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / Low / High Edge + 0.1 MHz ~ High Edge + 10.1 MHz



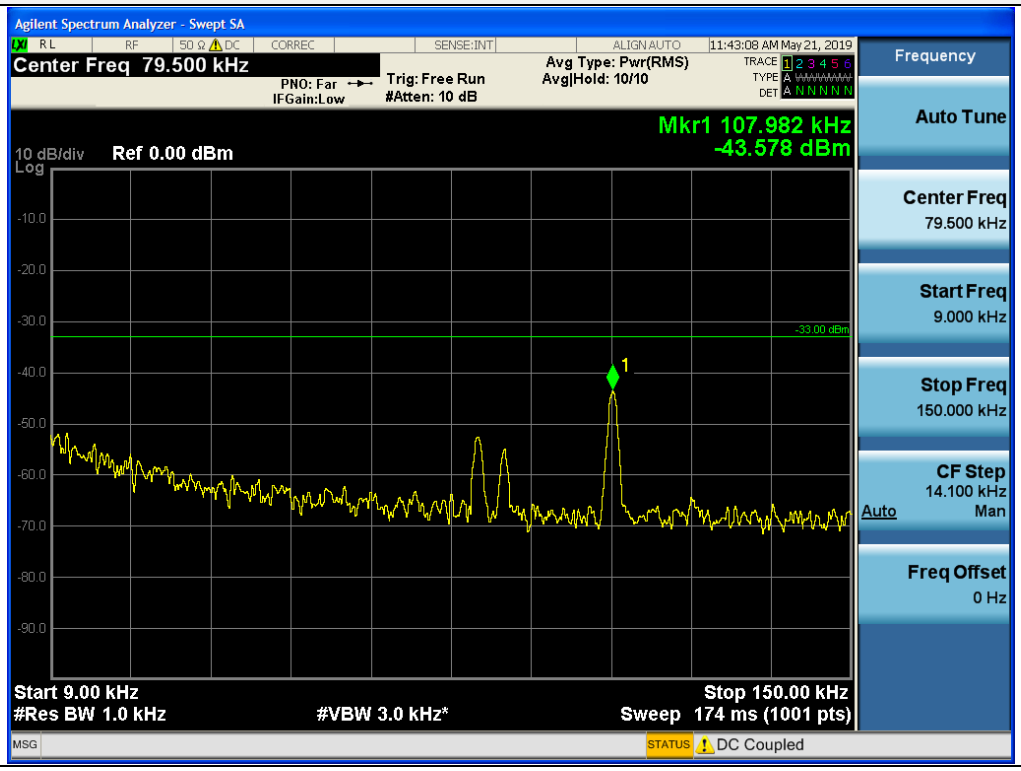
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / Low / High Edge + 10.1 MHz ~ 1 GHz



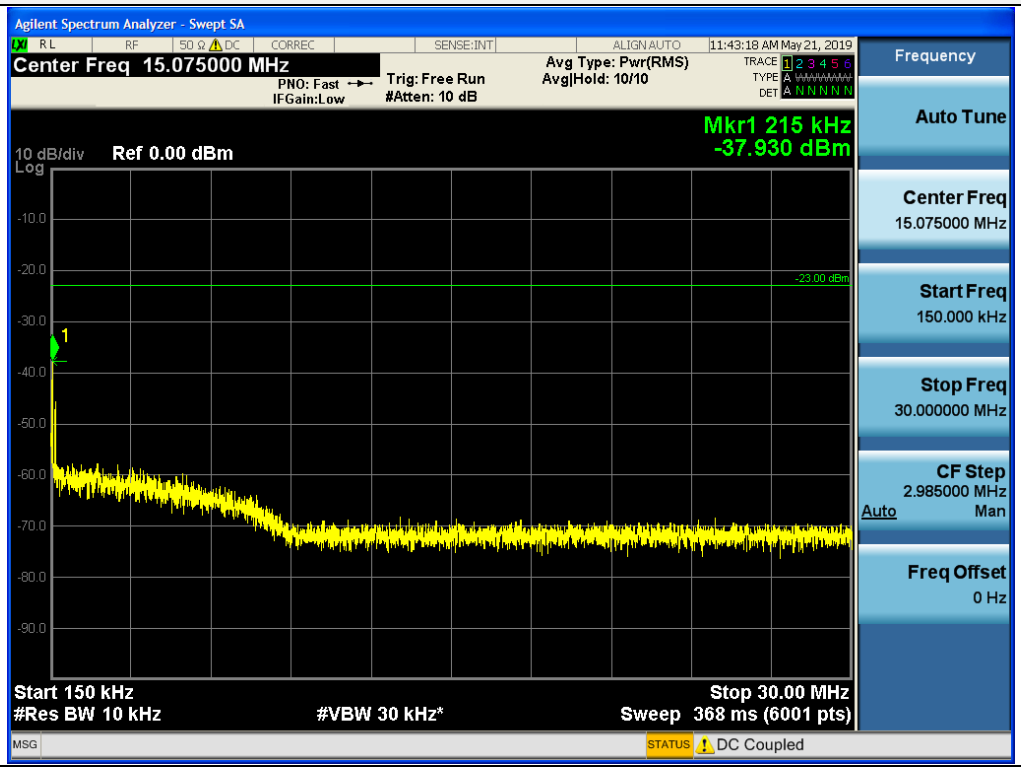
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / Low / 1 GHz ~ 10 GHz



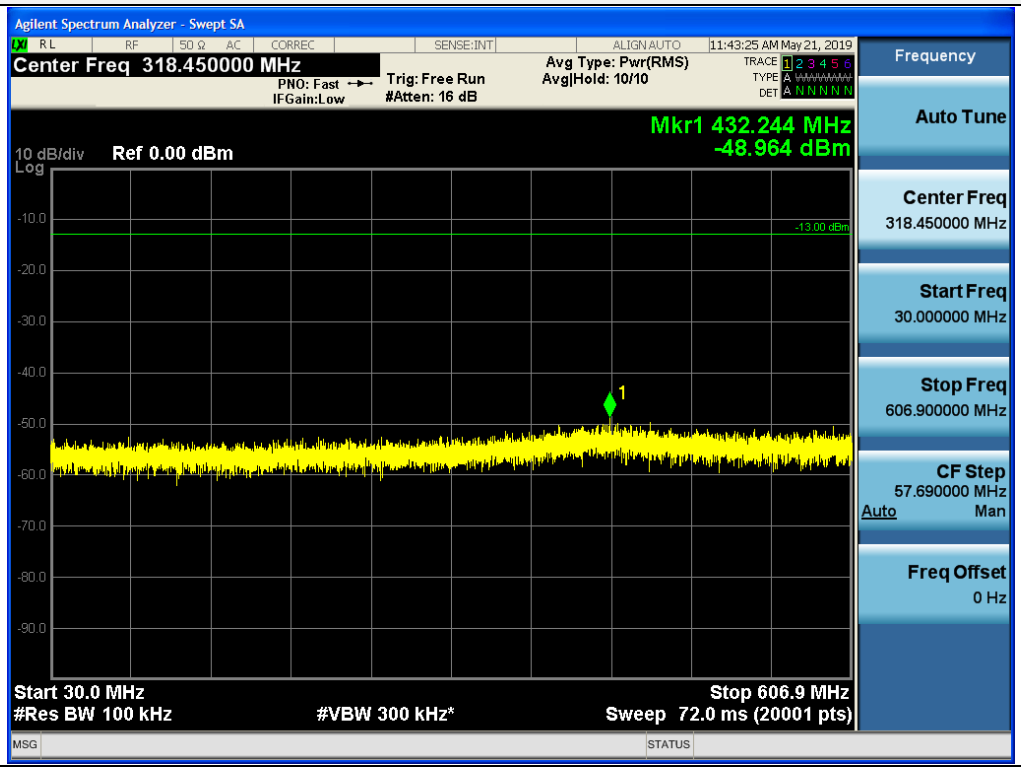
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / Middle / 9 kHz ~ 150 kHz



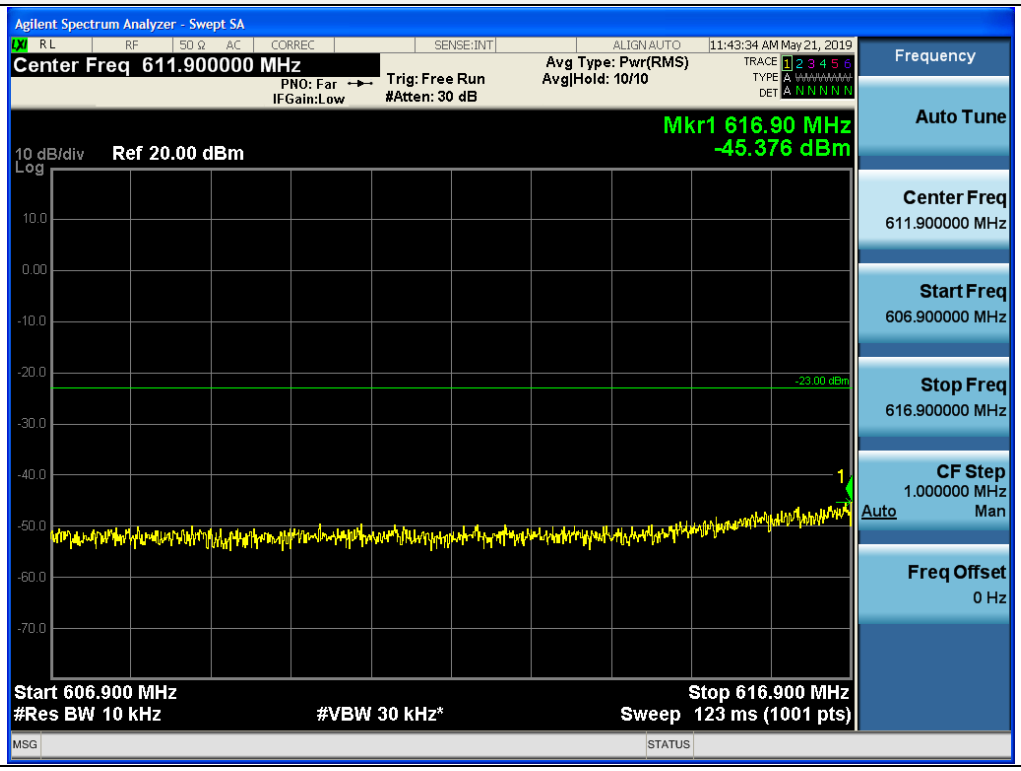
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / Middle / 150 kHz ~ 30 MHz



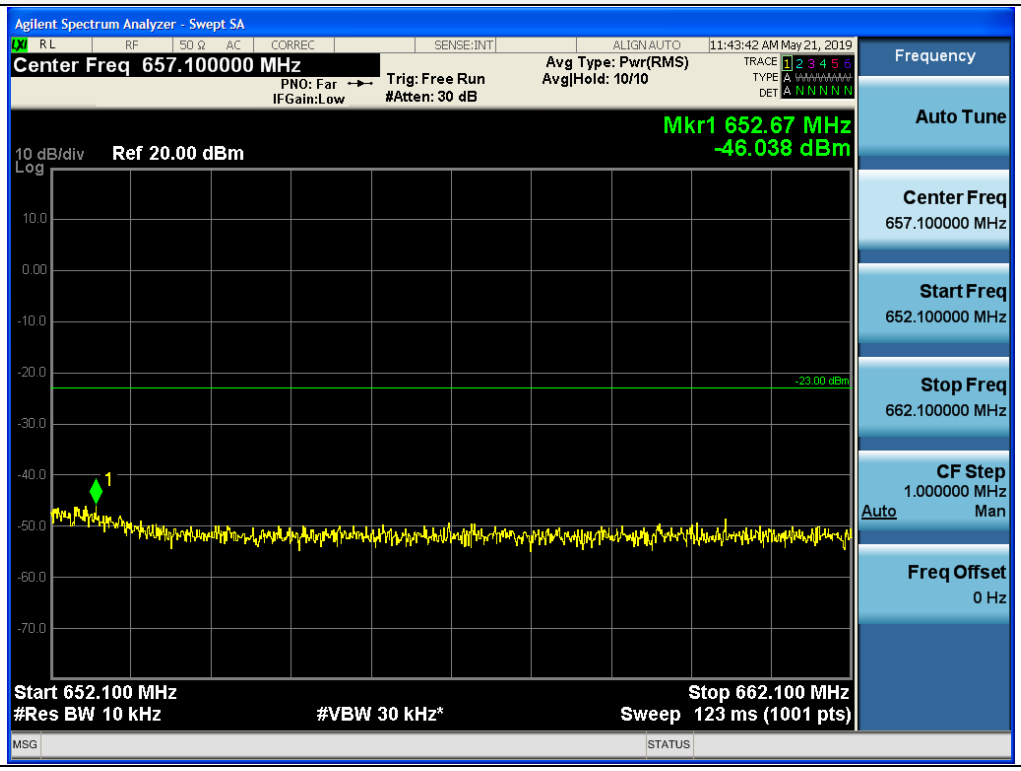
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / Middle / 30 MHz ~ Low Edge – 10.1 MHz – 10.1 MHz



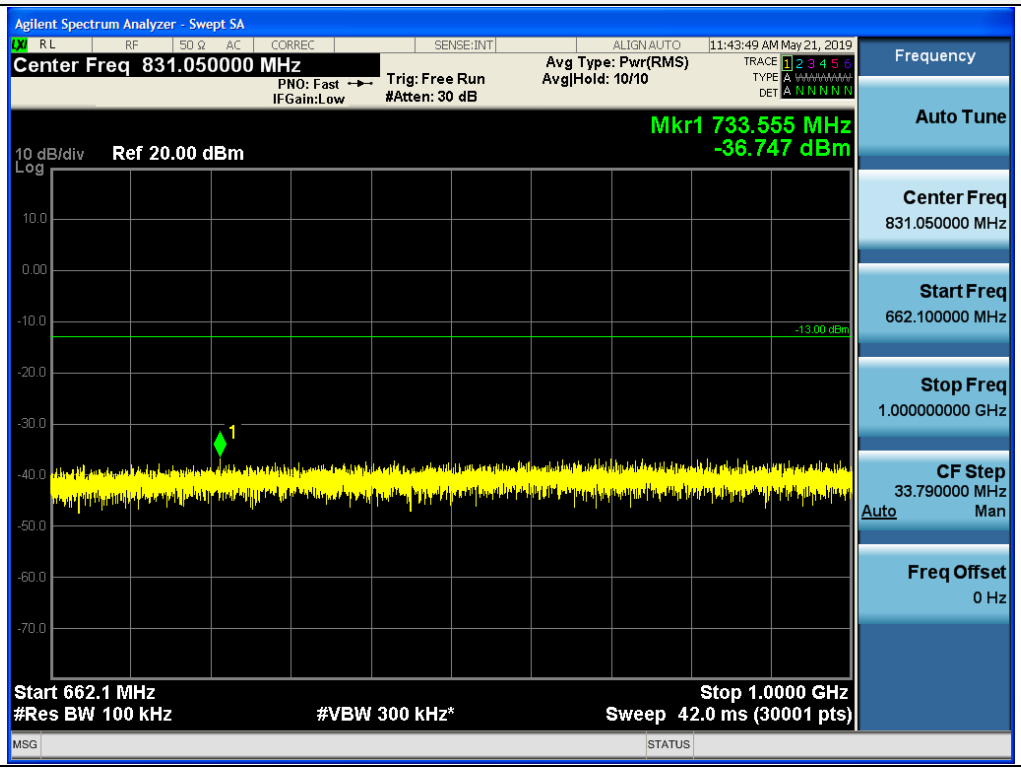
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / Middle / Low Edge – 10.1 MHz ~ Low Edge – 0.1 MHz



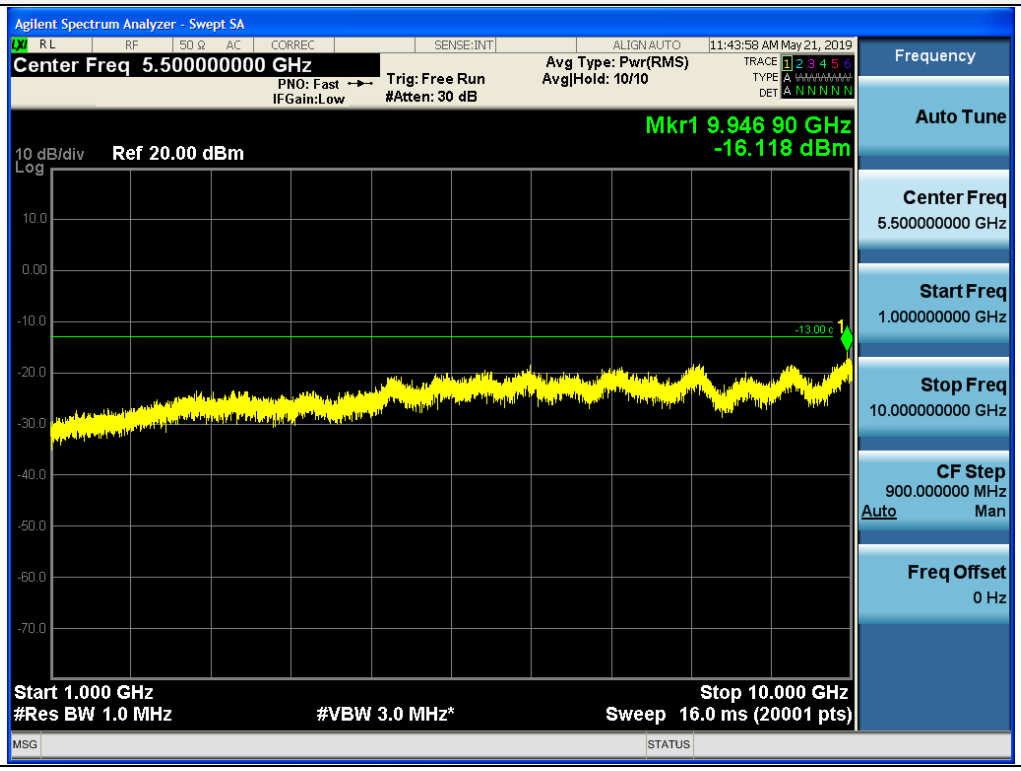
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / Middle / High Edge + 0.1 MHz ~ High Edge + 10.1 MHz



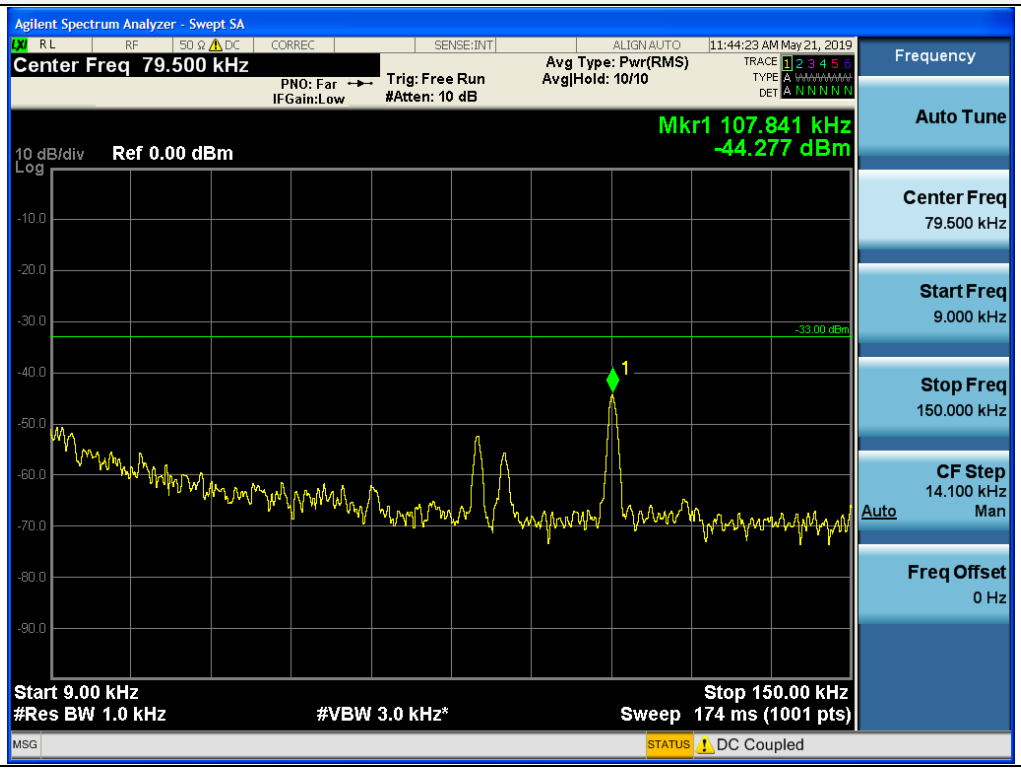
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / Middle / High Edge + 10.1 MHz ~ 1 GHz



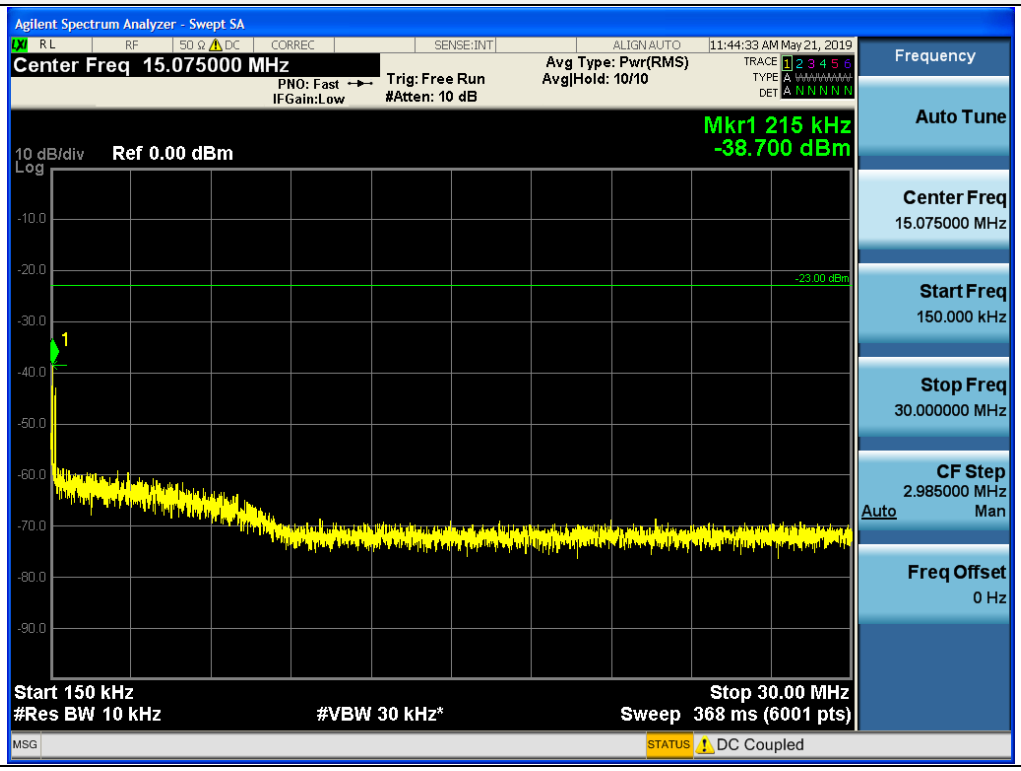
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / Middle / 1 GHz ~ 10 GHz



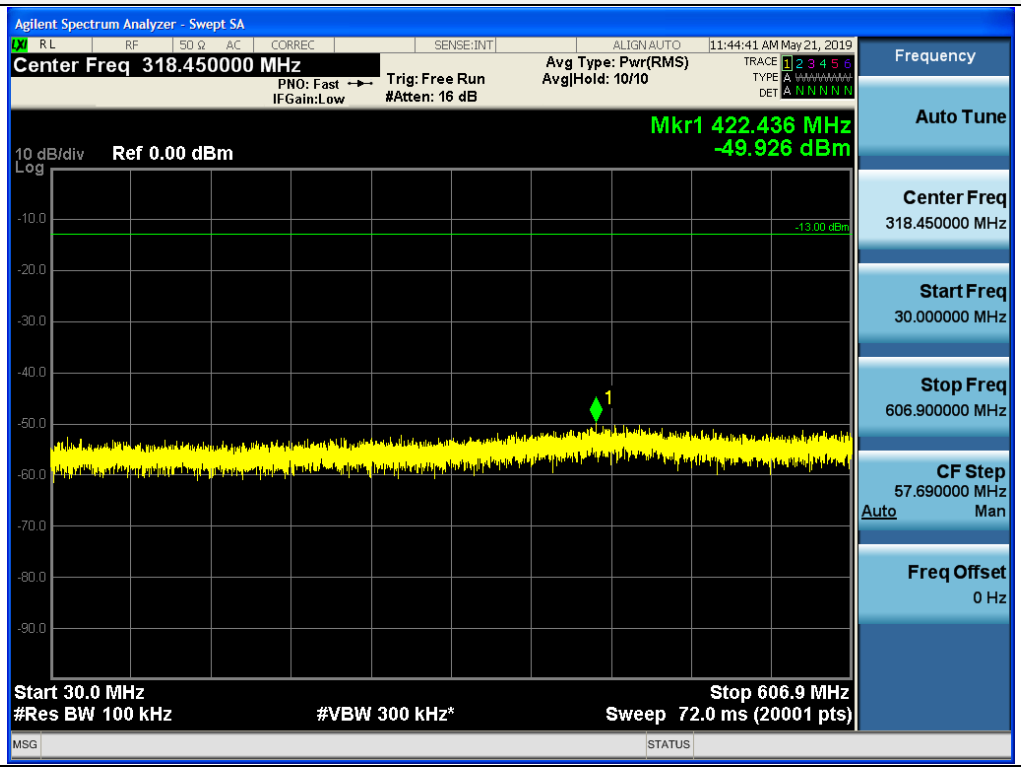
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / High / 9 kHz ~ 150 kHz



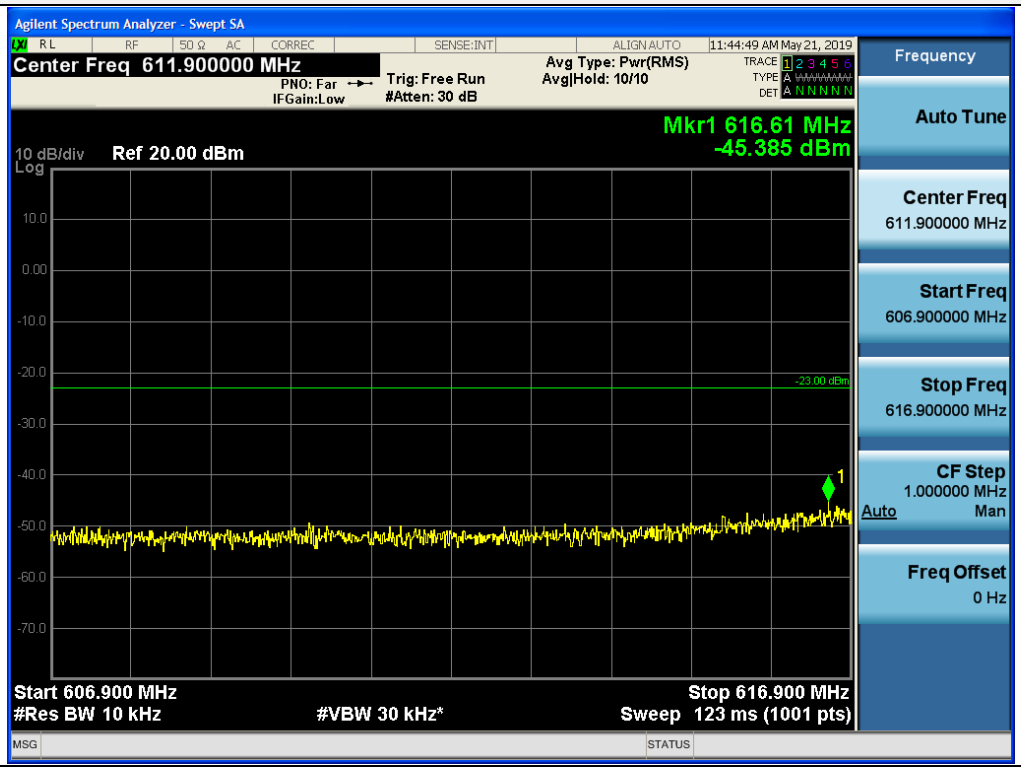
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / High / 150 kHz ~ 30 MHz



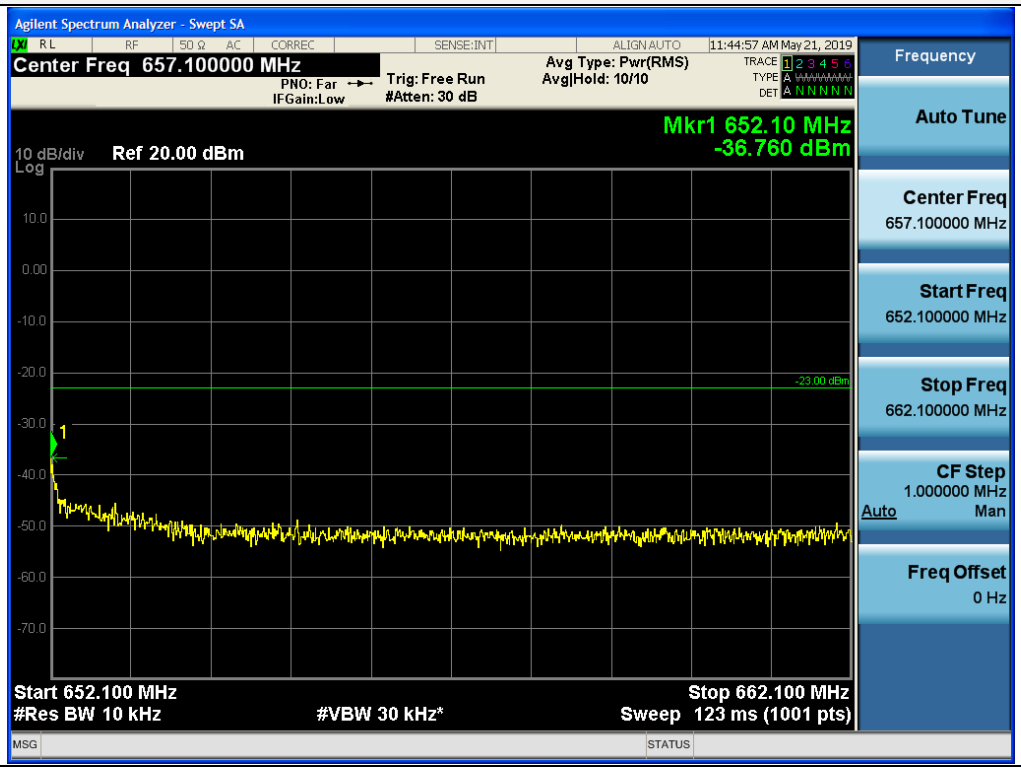
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / High / 30 MHz ~ Low Edge – 10.1 MHz – 10.1 MHz



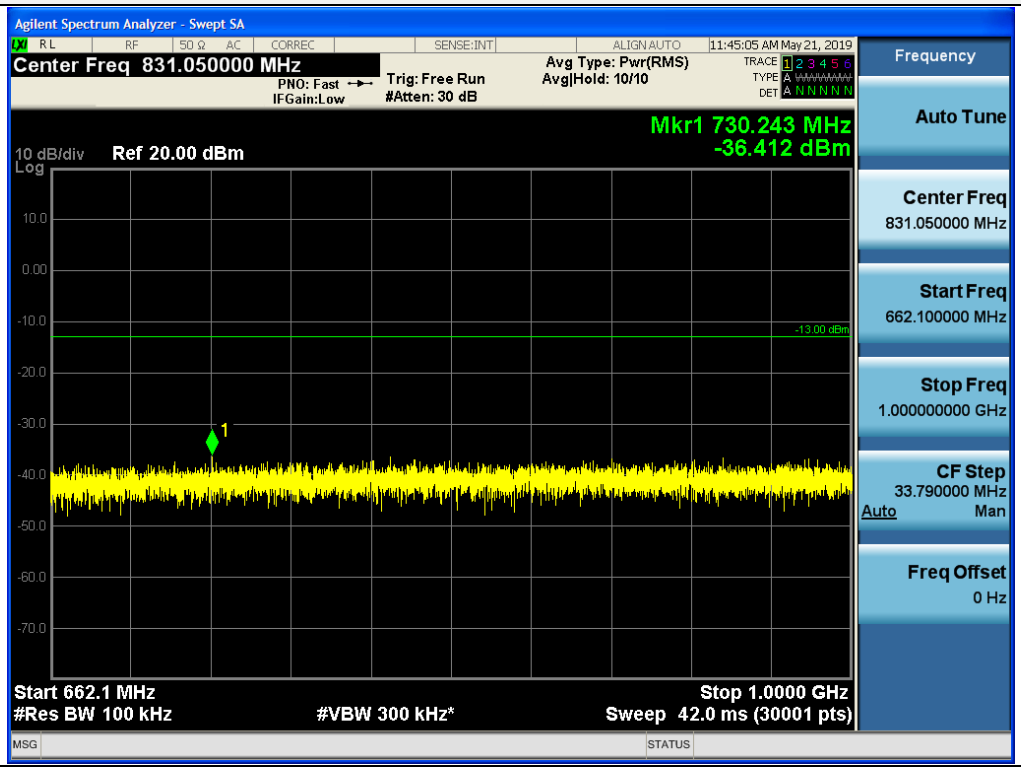
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / High / Low Edge – 10.1 MHz ~ Low Edge – 0.1 MHz



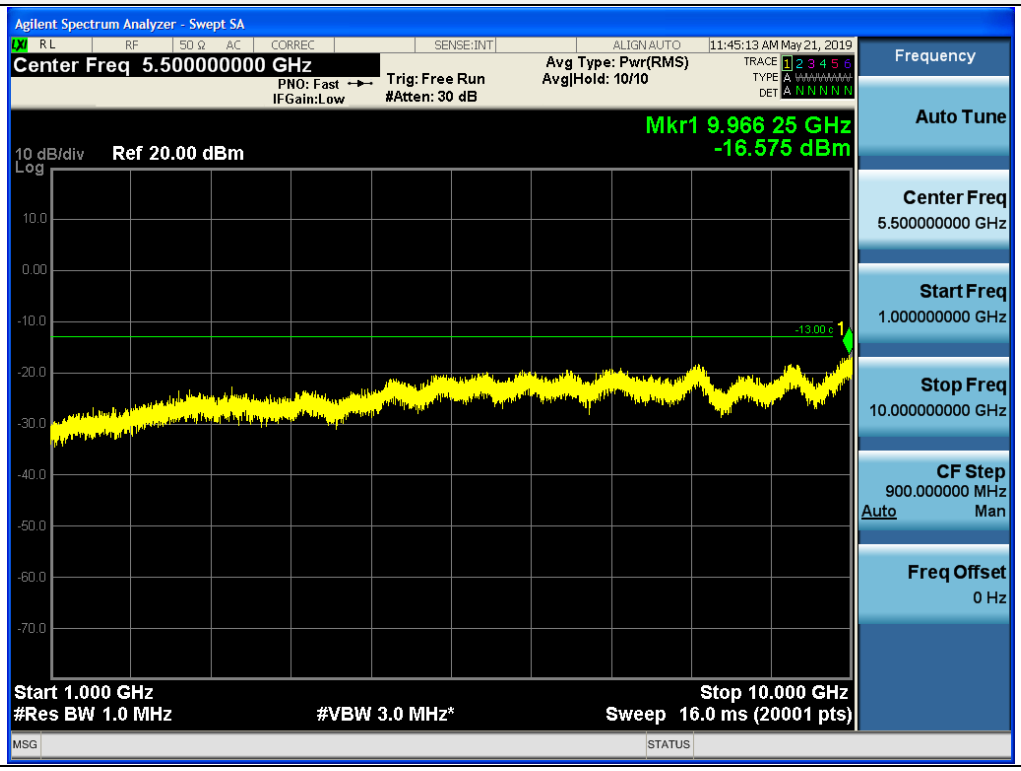
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / High / High Edge + 0.1 MHz ~ High Edge + 10.1 MHz



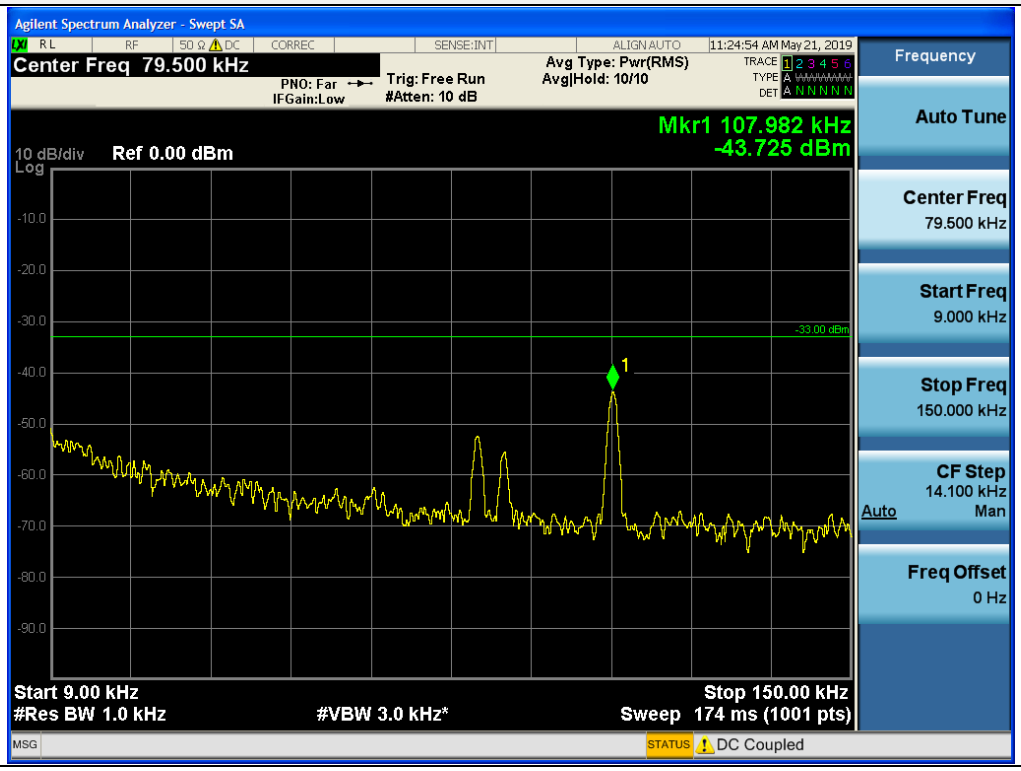
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / High / High Edge + 10.1 MHz ~ 1 GHz



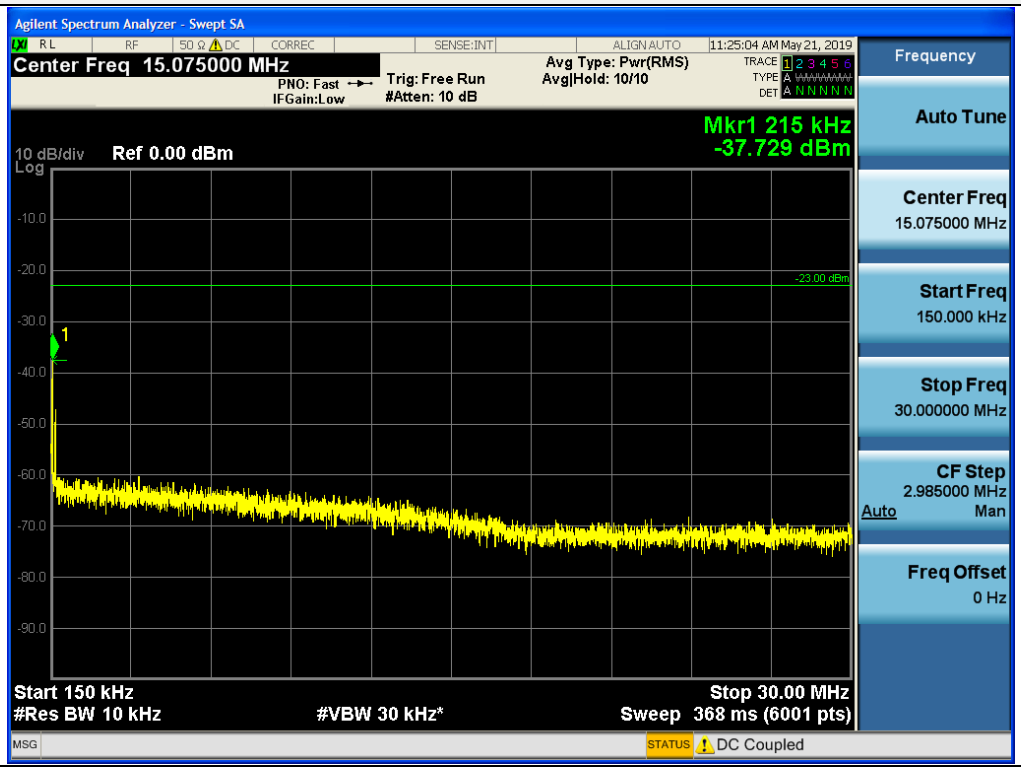
Spurious / 600 MHz Service / Downlink / LTE 10 MHz / High / 1 GHz ~ 10 GHz



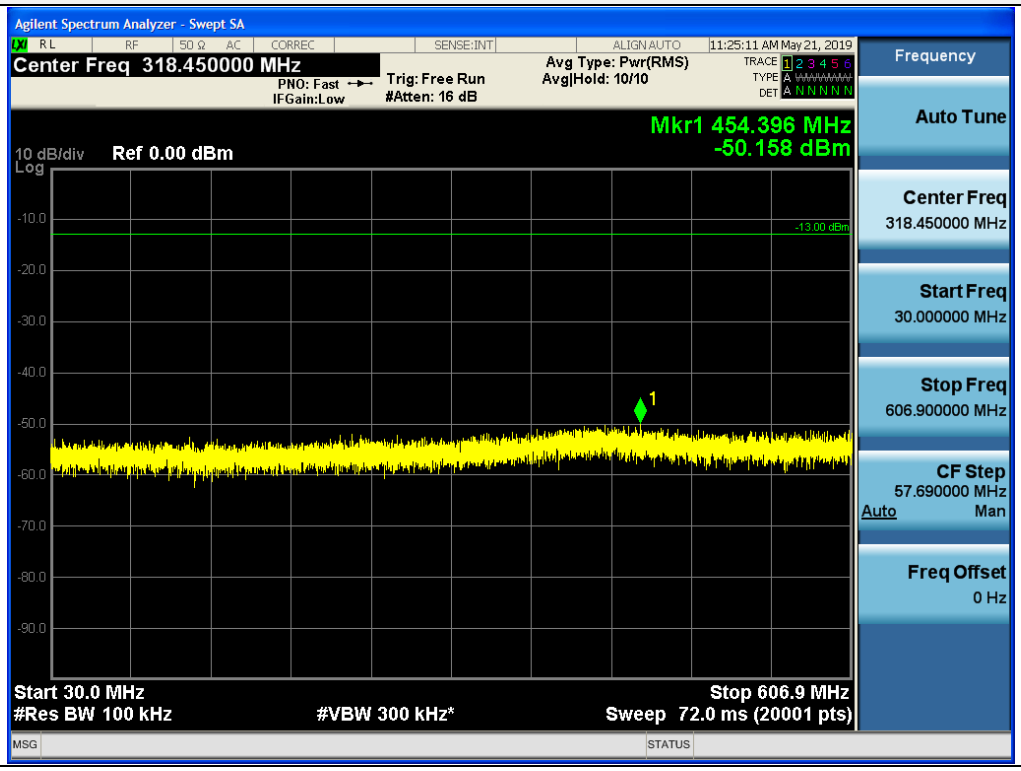
Spurious / 600 MHz Service / Downlink / LTE 20 MHz / Low / 9 kHz ~ 150 kHz



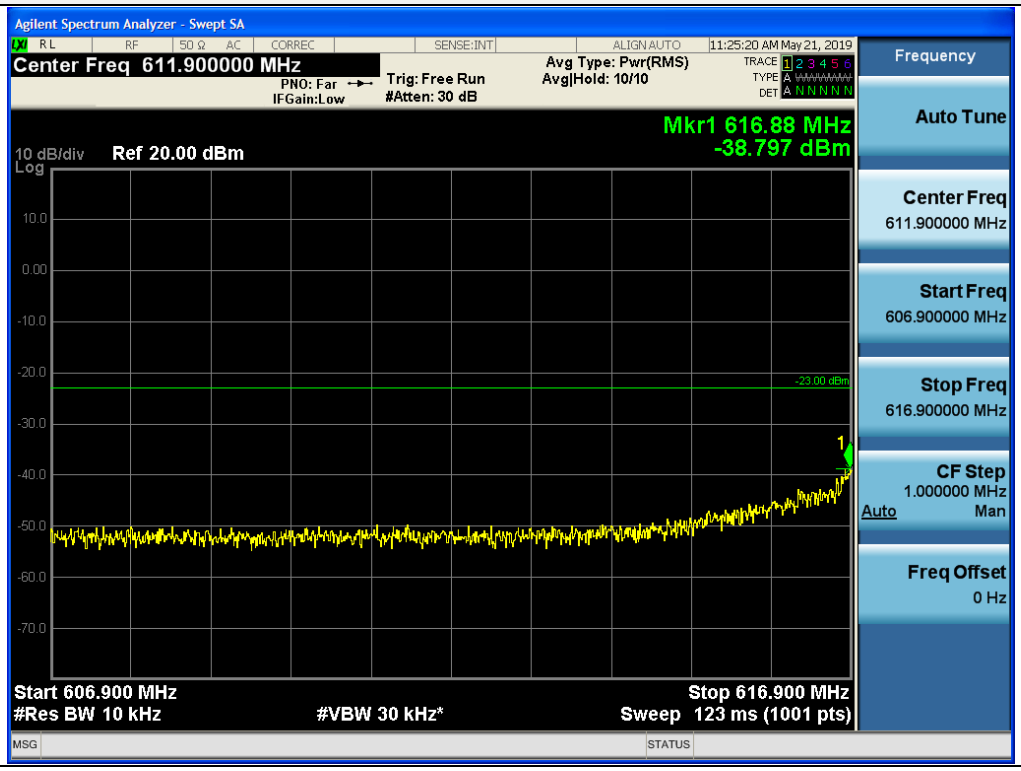
Spurious / 600 MHz Service / Downlink / LTE 20 MHz / Low / 150 kHz ~ 30 MHz



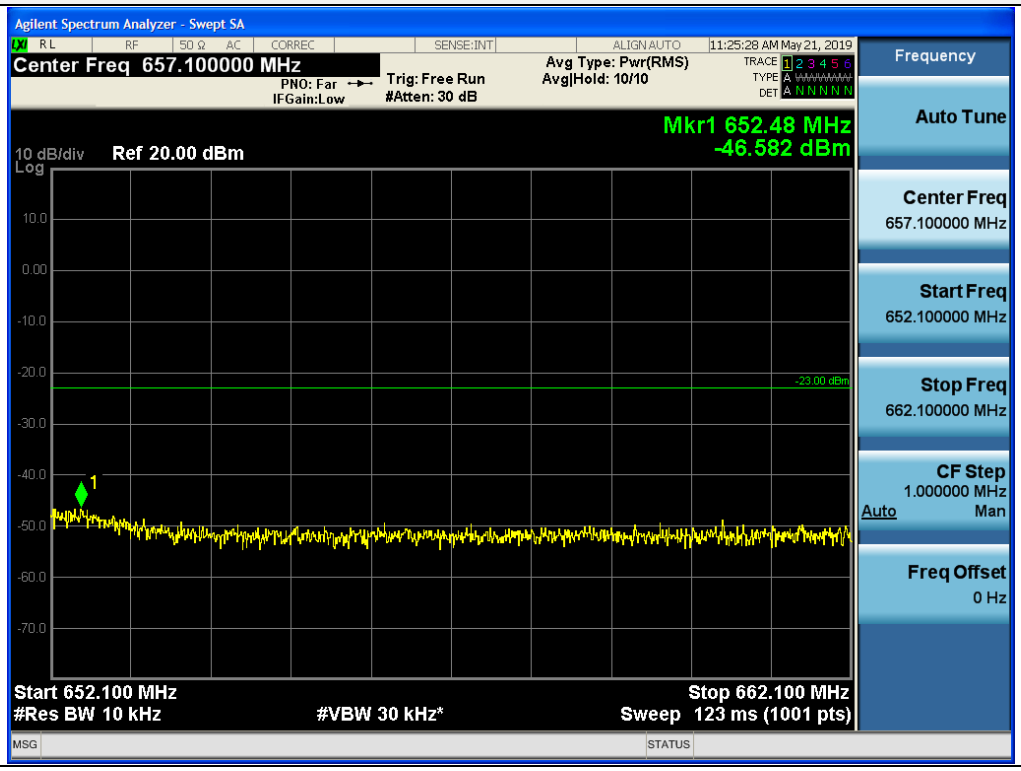
Spurious / 600 MHz Service / Downlink / LTE 20 MHz / Low / 30 MHz ~ Low Edge – 10.1 MHz – 10.1 MHz



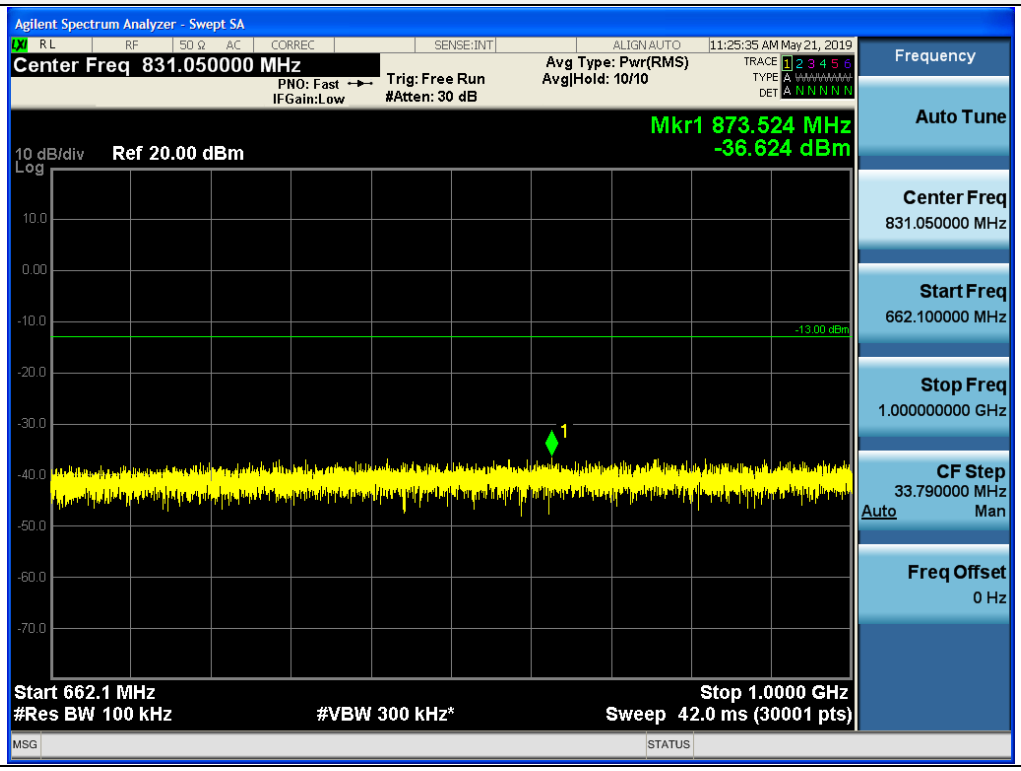
Spurious / 600 MHz Service / Downlink / LTE 20 MHz / Low / Low Edge – 10.1 MHz ~ Low Edge – 0.1 MHz



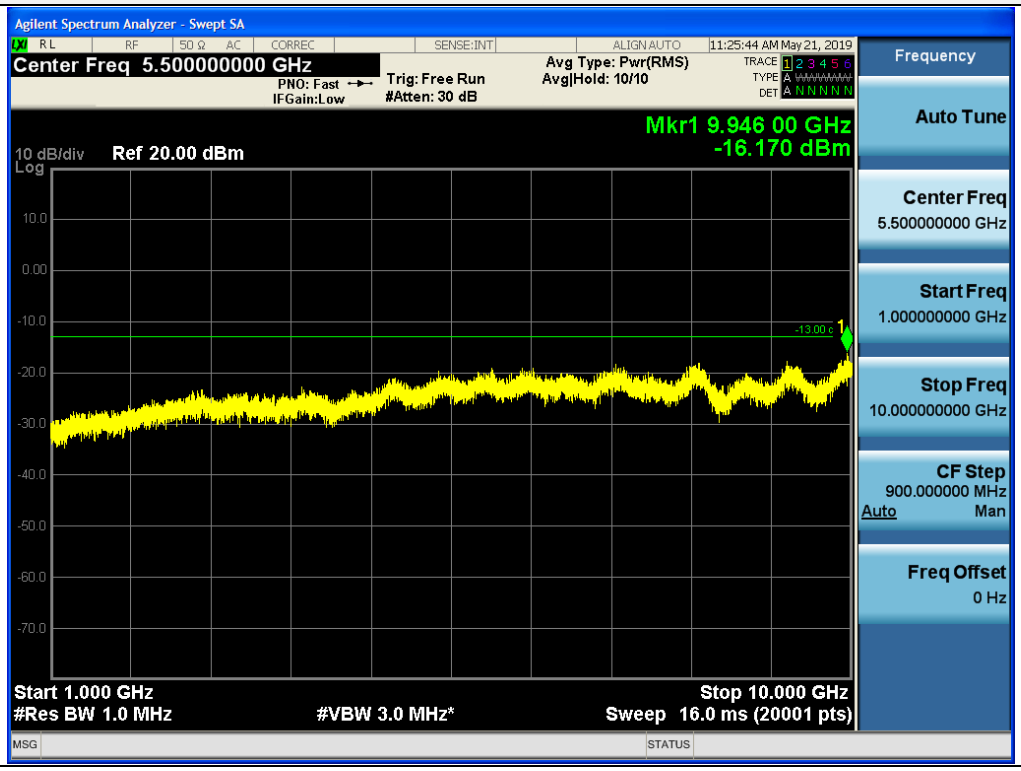
Spurious / 600 MHz Service / Downlink / LTE 20 MHz / Low / High Edge + 0.1 MHz ~ High Edge + 10 MHz



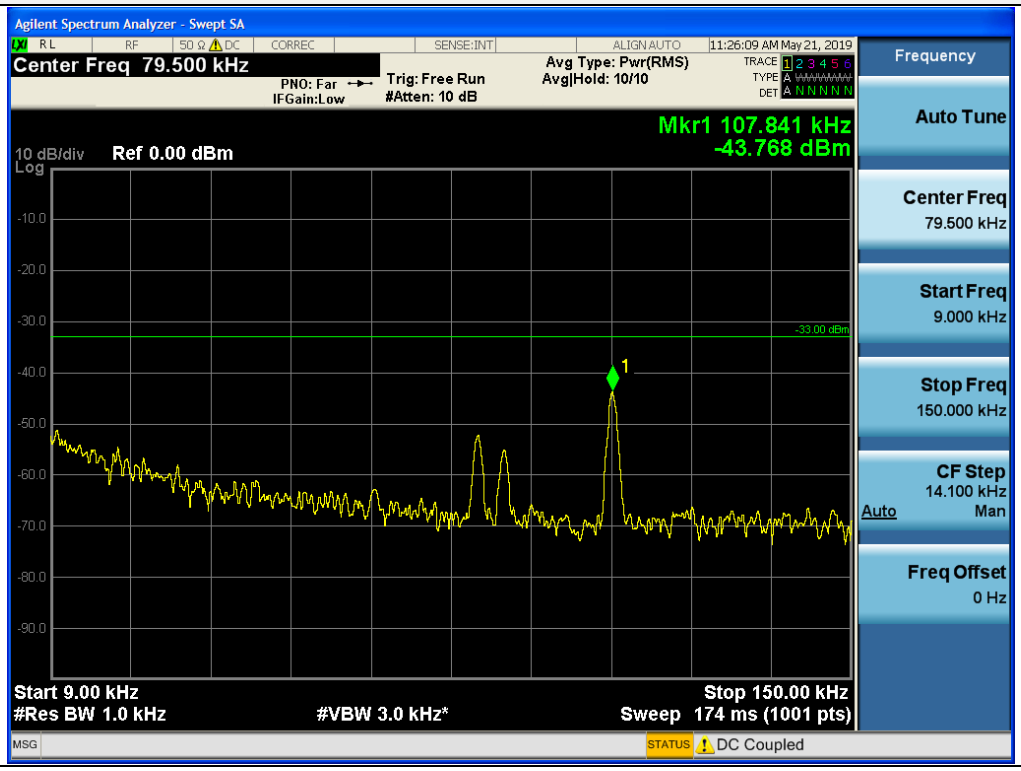
Spurious / 600 MHz Service / Downlink / LTE 20 MHz / Low / High Edge + 10.1 MHz ~ 1 GHz



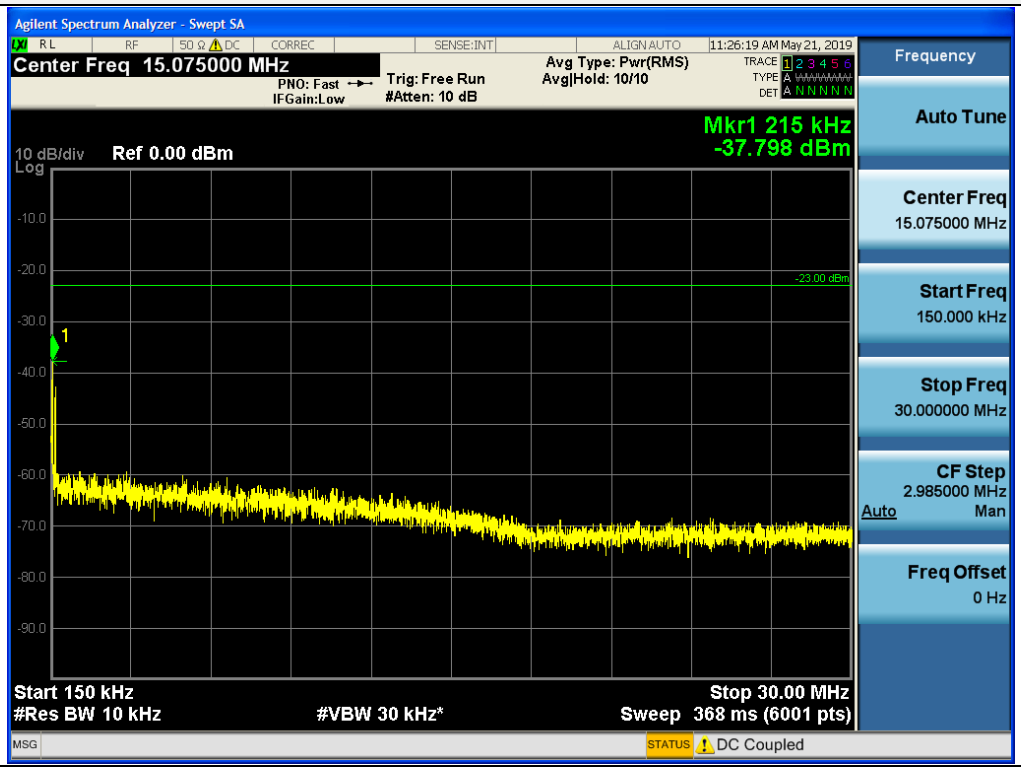
Spurious / 600 MHz Service / Downlink / LTE 20 MHz / Low / 1 GHz ~ 10 GHz



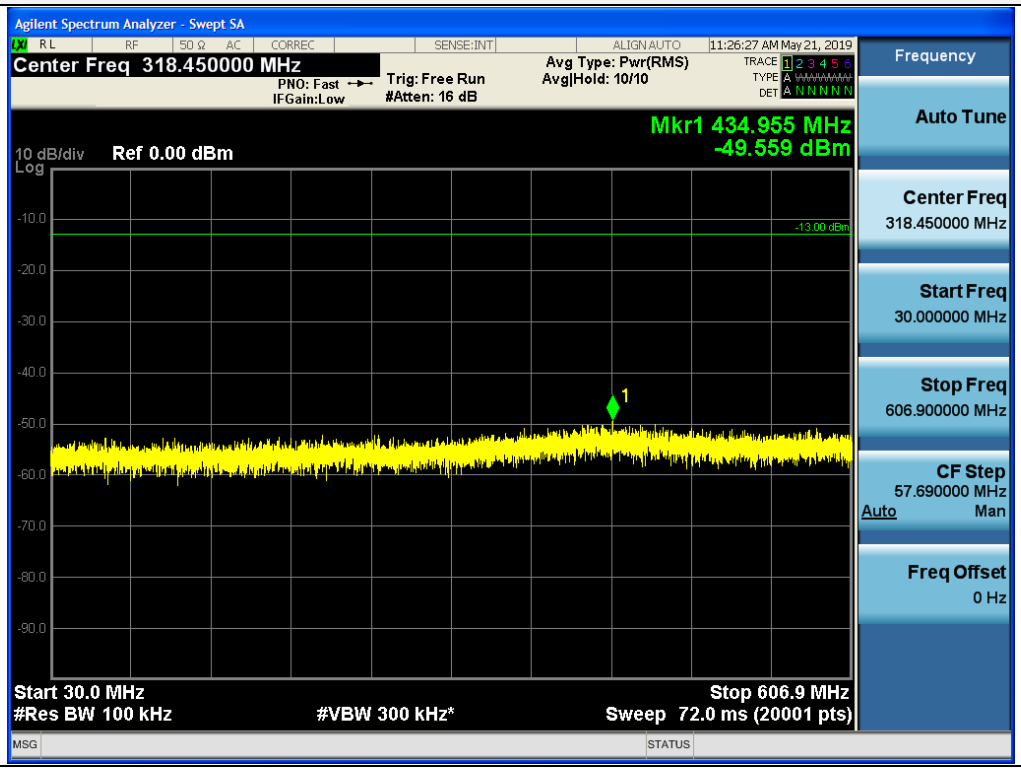
Spurious / 600 MHz Service / Downlink / LTE 20 MHz / Middle / 9 kHz ~ 150 kHz



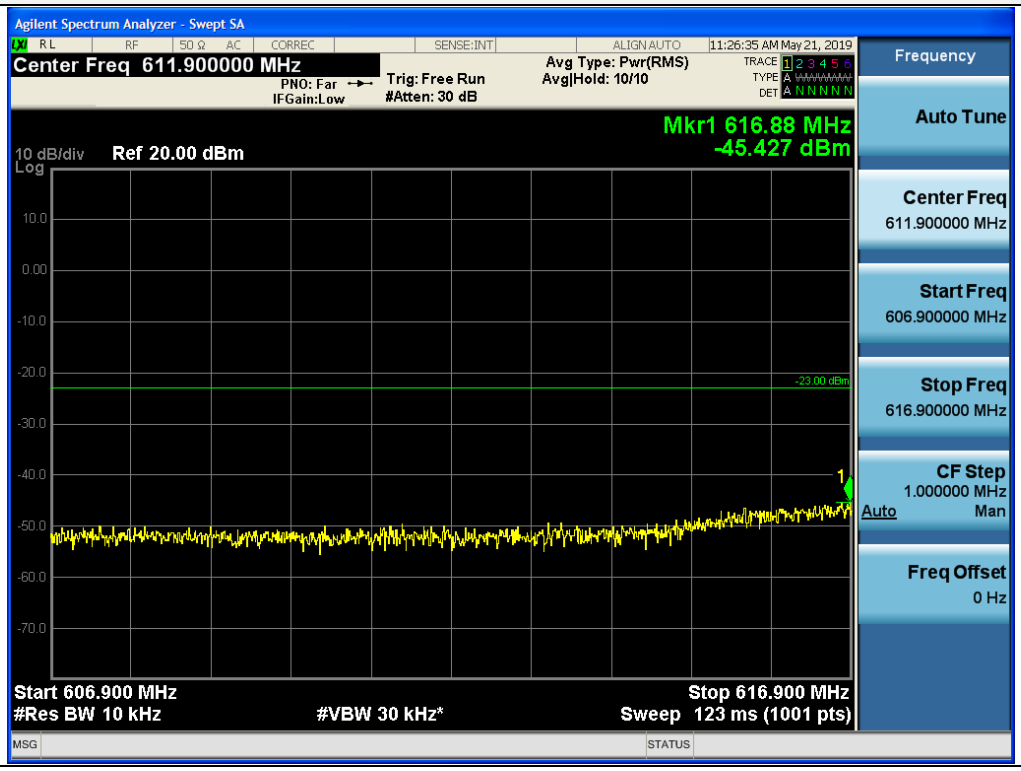
Spurious / 600 MHz Service / Downlink / LTE 20 MHz / Middle / 150 kHz ~ 30 MHz



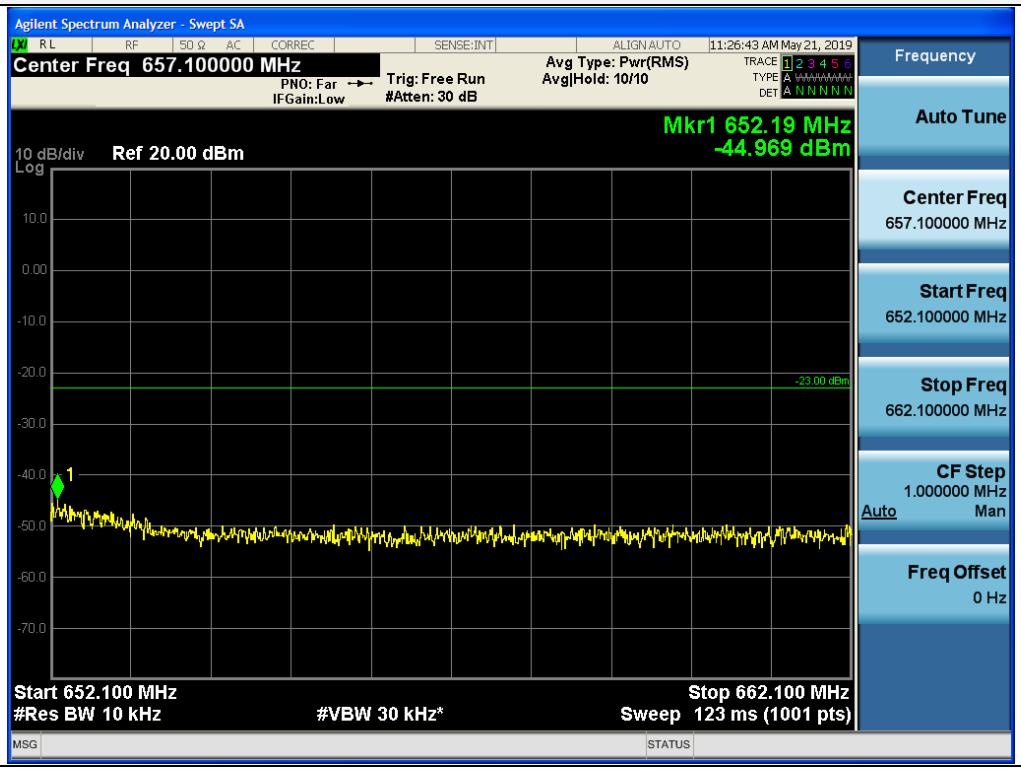
Spurious / 600 MHz Service / Downlink / LTE 20 MHz / Middle / 30 MHz ~ Low Edge – 10.1 MHz – 10.1 MHz



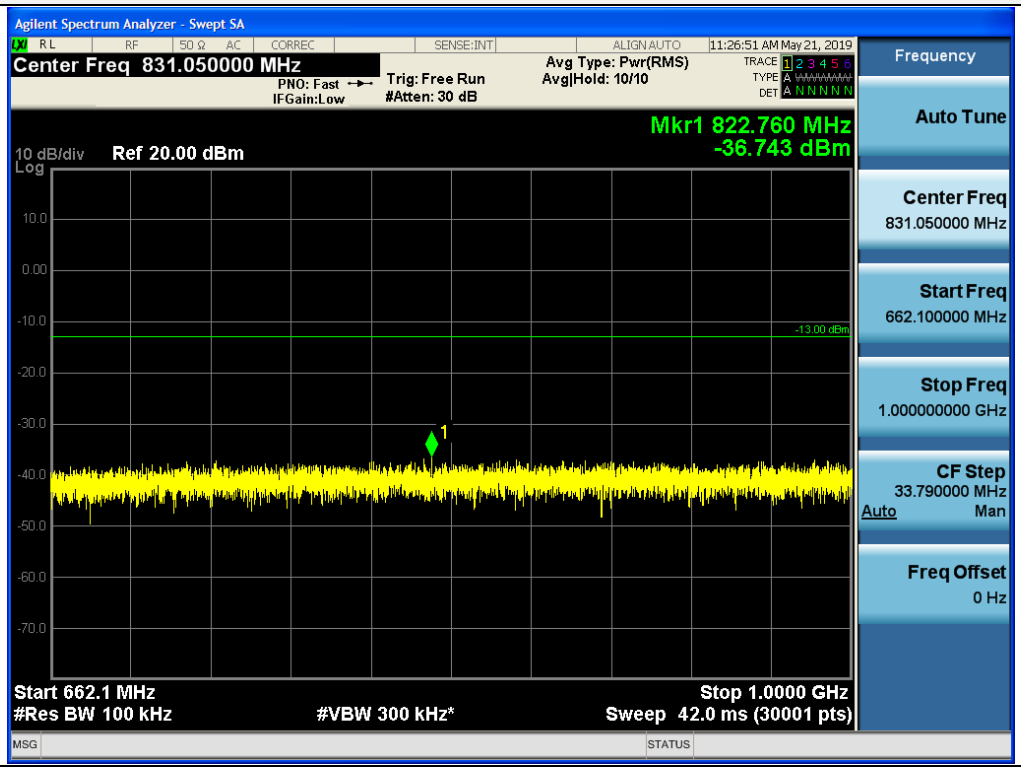
Spurious / 600 MHz Service / Downlink / LTE 20 MHz / Middle / Low Edge – 10.1 MHz ~ Low Edge – 0.1 MHz



Spurious / 600 MHz Service / Downlink / LTE 20 MHz / Middle / High Edge + 0.1 MHz ~ High Edge + 10.1 MHz



Spurious / 600 MHz Service / Downlink / LTE 20 MHz / Middle / High Edge + 10.1 MHz ~ 1 GHz



Spurious / 600 MHz Service / Downlink / LTE 20 MHz / Middle / 1 GHz ~ 10 GHz