

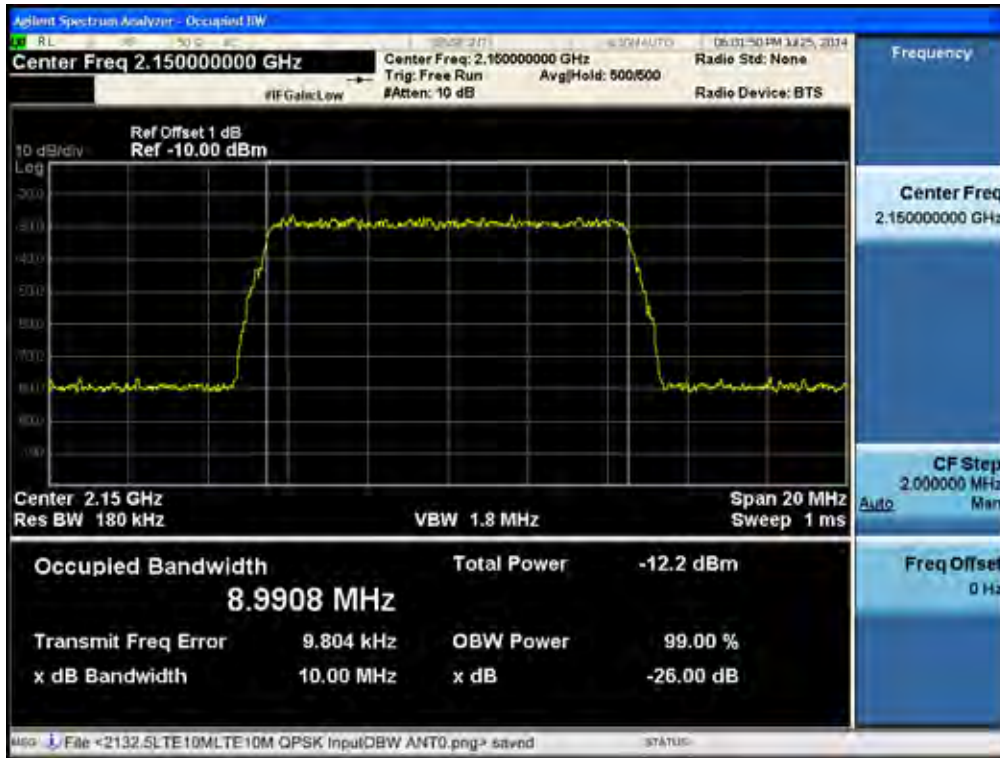
[Input LTE Downlink 10 MHz Low]



[Input LTE Downlink 10 MHz Middle]



[Input LTE Downlink 10 MHz High]



8. SPURIOUS AND HARMONIC EMISSION AT ANTENNA TERMINAL

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.

§ 22.917 Emission limitations for cellular equipment.

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone 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 100 kHz or greater. 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. 100 kHz 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.

§ 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.

§ 27.53 Emission limits

(h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

§ 27.53 Emission limits

(c) For operations in the 746–758 MHz band and the 776–788 MHz band, the power of any emission outside the 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, in accordance with the following:

(1) On any frequency outside the 746– 758 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;

(2) 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;

(3) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;

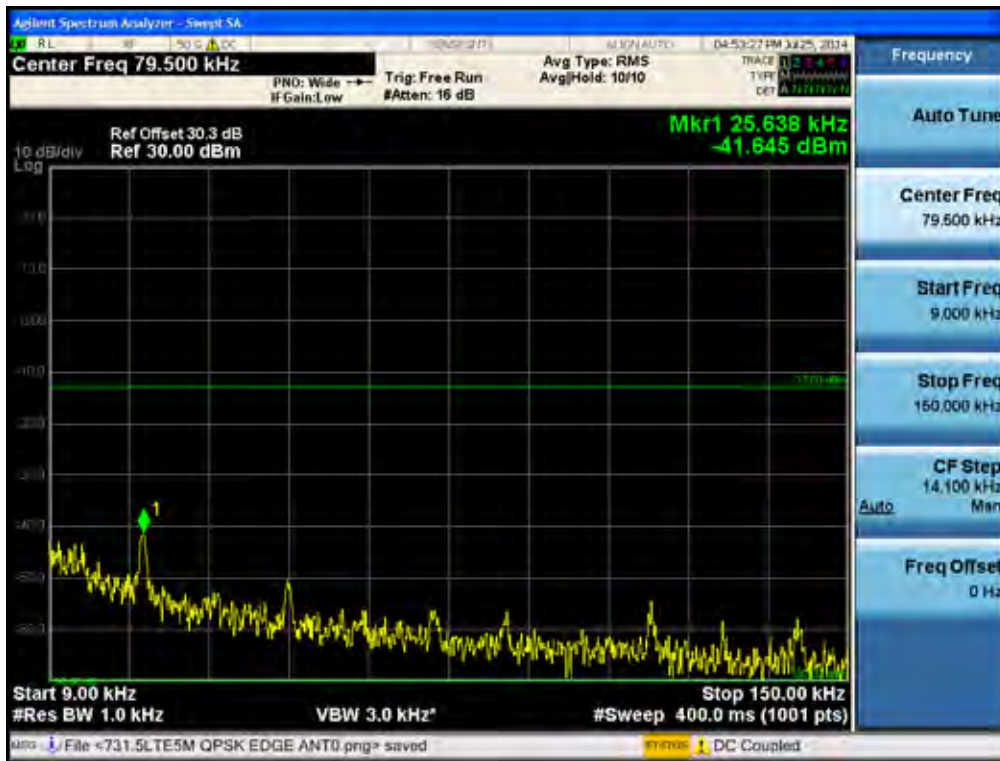
Test Procedures: A modulated carrier generated by the signal generator carrier was connected to either the Uplink or Downlink RF port at a maximum level as determined by the spectrum analyzer was connected to either the Uplink or Downlink port depending on the circuitry being measured.

The spectrum was investigated from 9 kHz to the 12.75 (700 MHz LTE Band, Cellular Band) and 26.5 GHz (PCS Band, AWS Band) of the carrier.

Test Results: The EUT complies with the requirements of this section. There were no Detectable Spurious emissions for this EUT.

**700 MHz LTE Band Plots of Spurious Emission
Conducted Spurious Emissions (9 kHz – 150 kHz)**

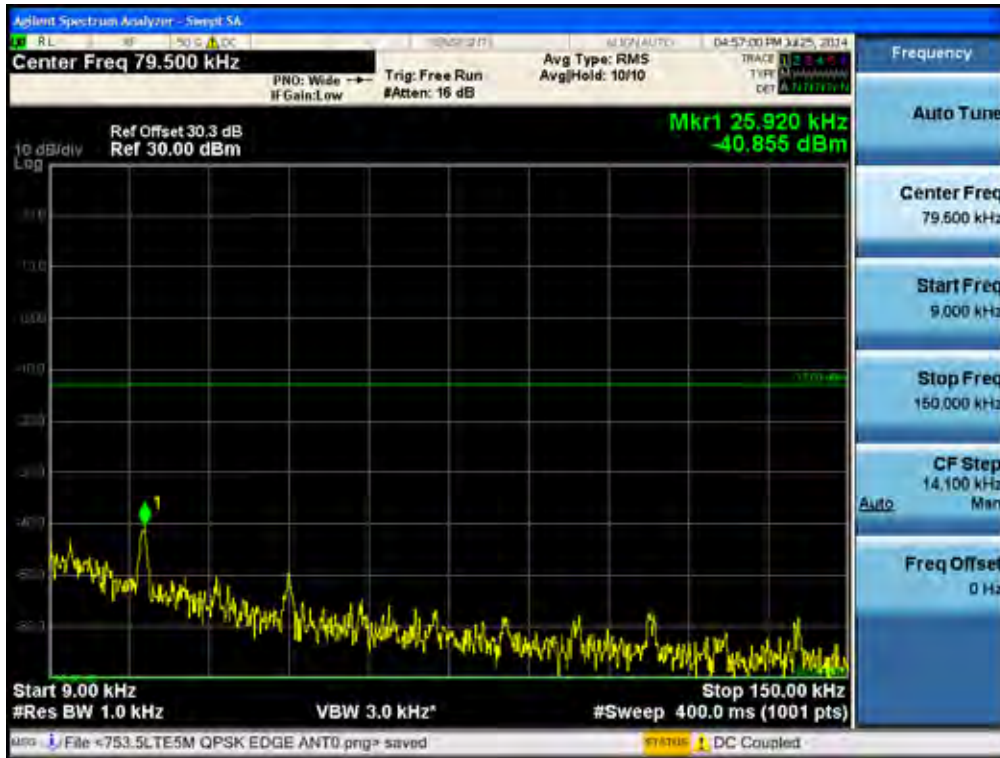
[LTE Downlink 5 MHz Low]



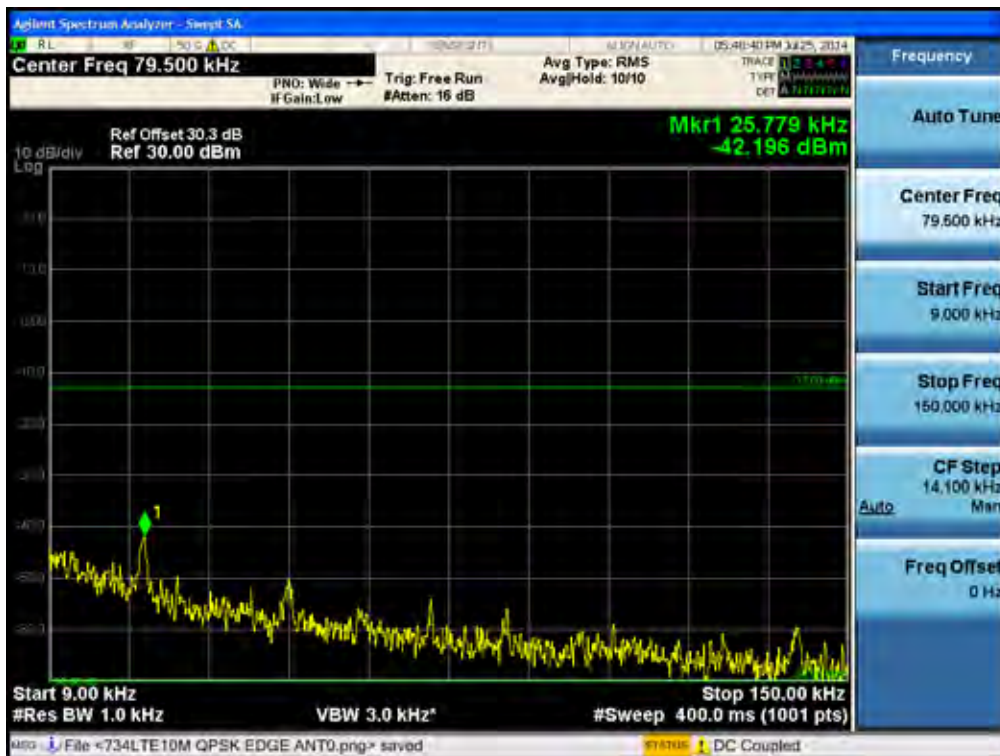
[LTE Downlink 5 MHz Middle]



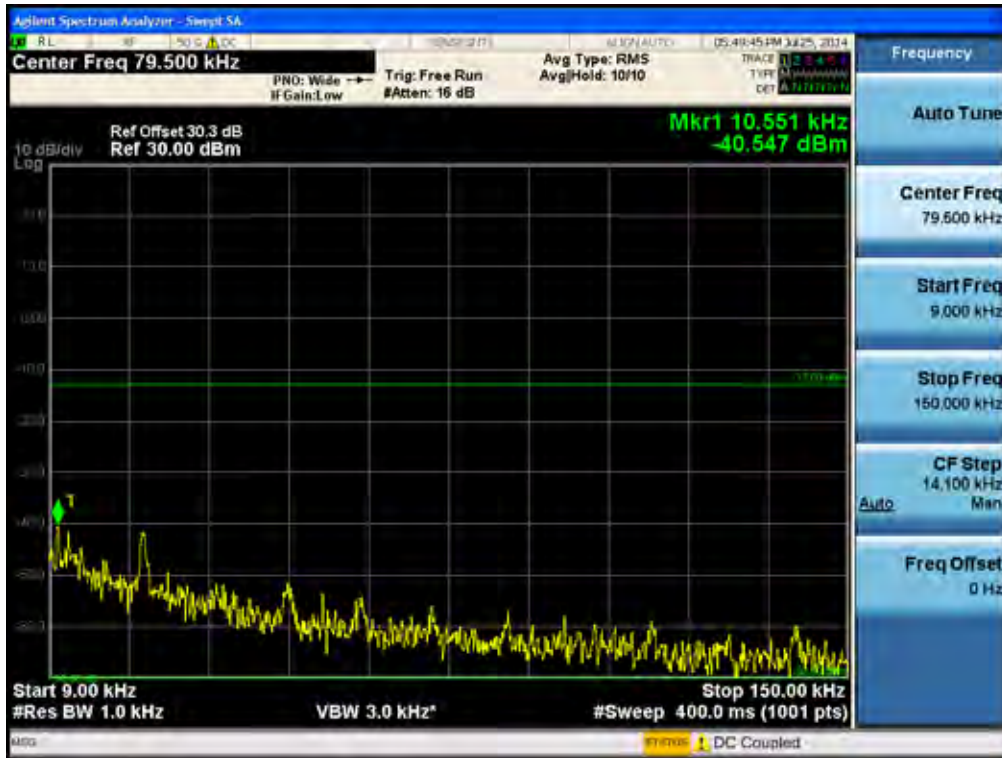
[LTE Downlink 5 MHz High]



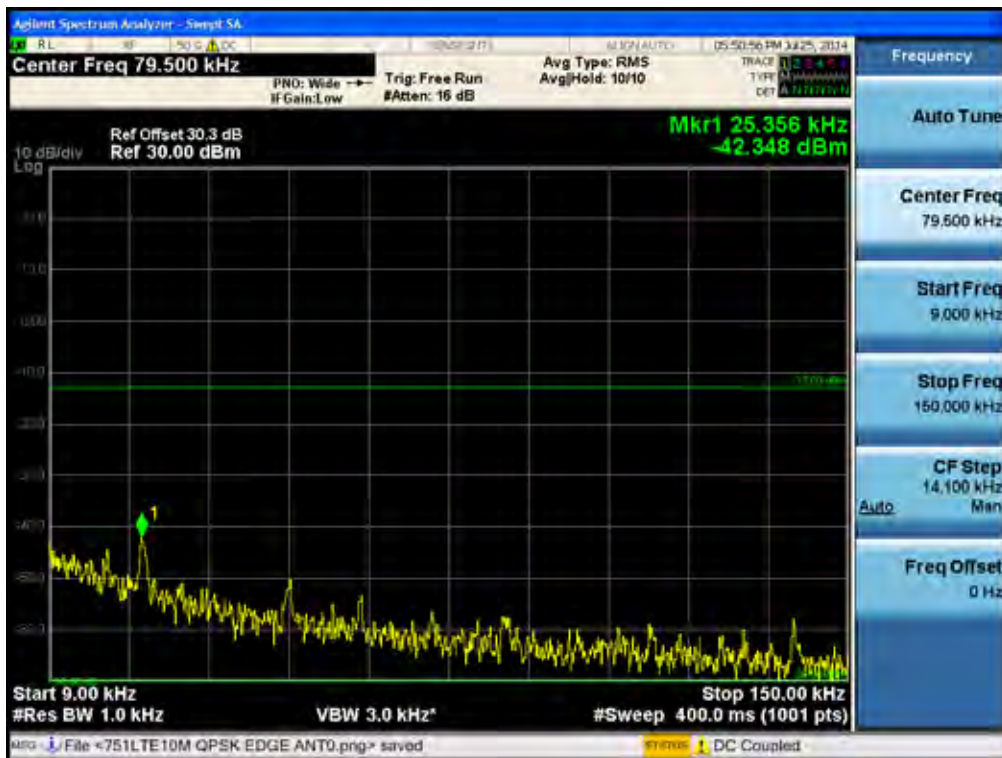
[LTE Downlink 10 MHz Low]



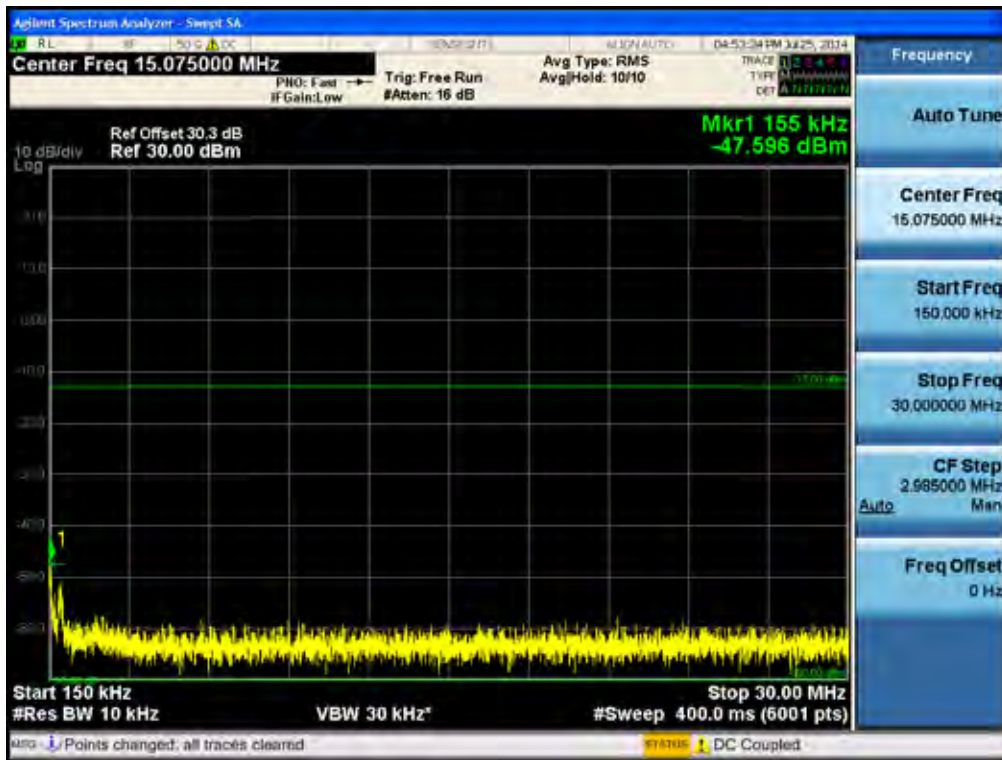
[LTE Downlink 10 MHz Middle]



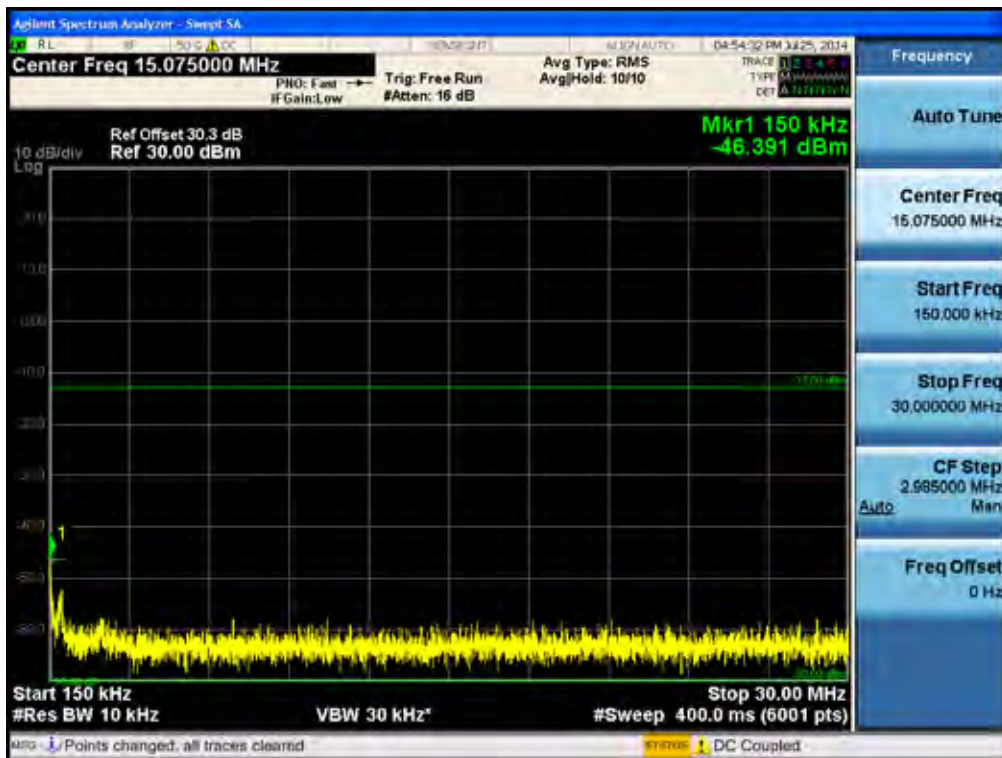
[LTE Downlink 10 MHz High]



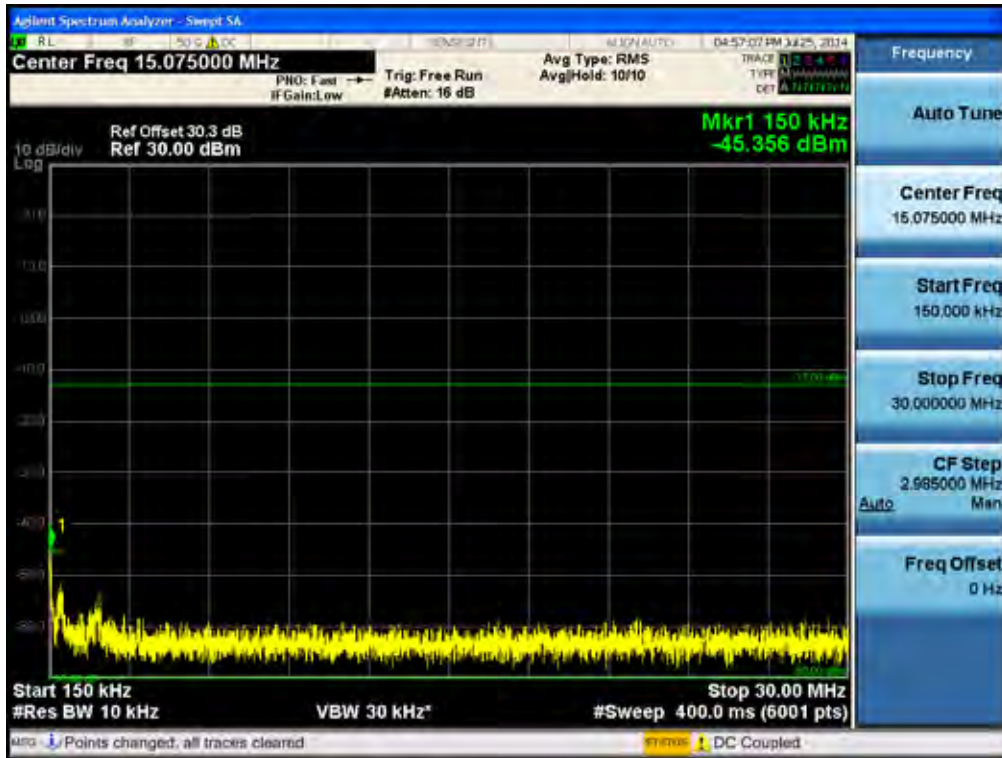
**Conducted Spurious Emissions (150 kHz – 30 MHz)
[LTE Downlink 5 MHz Low]**



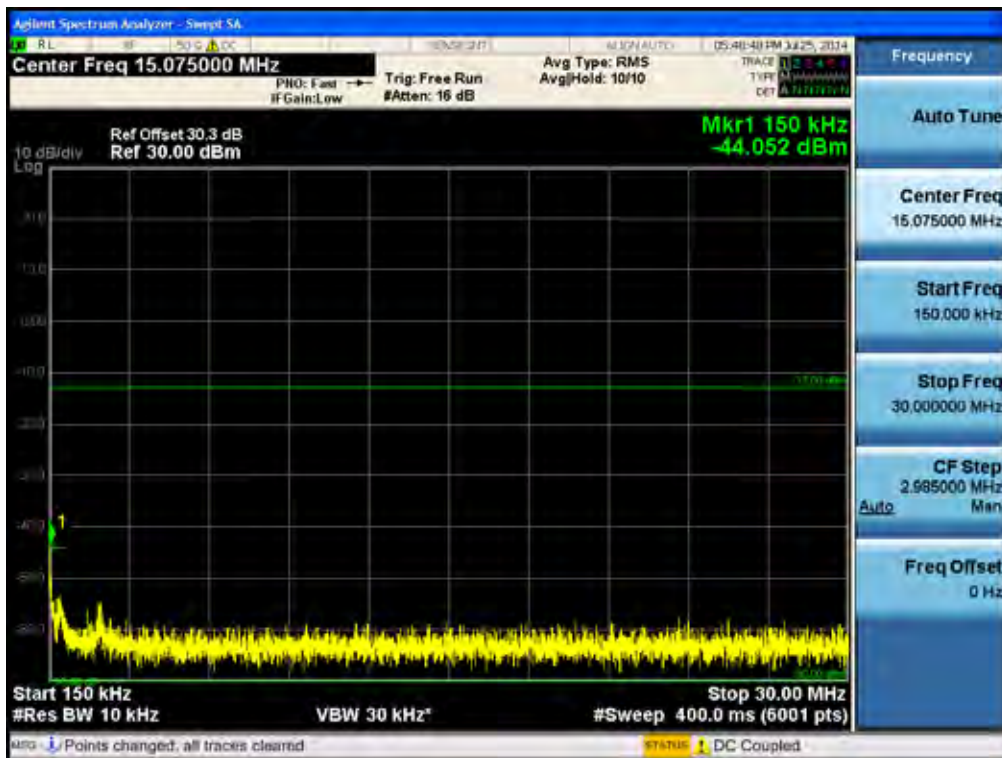
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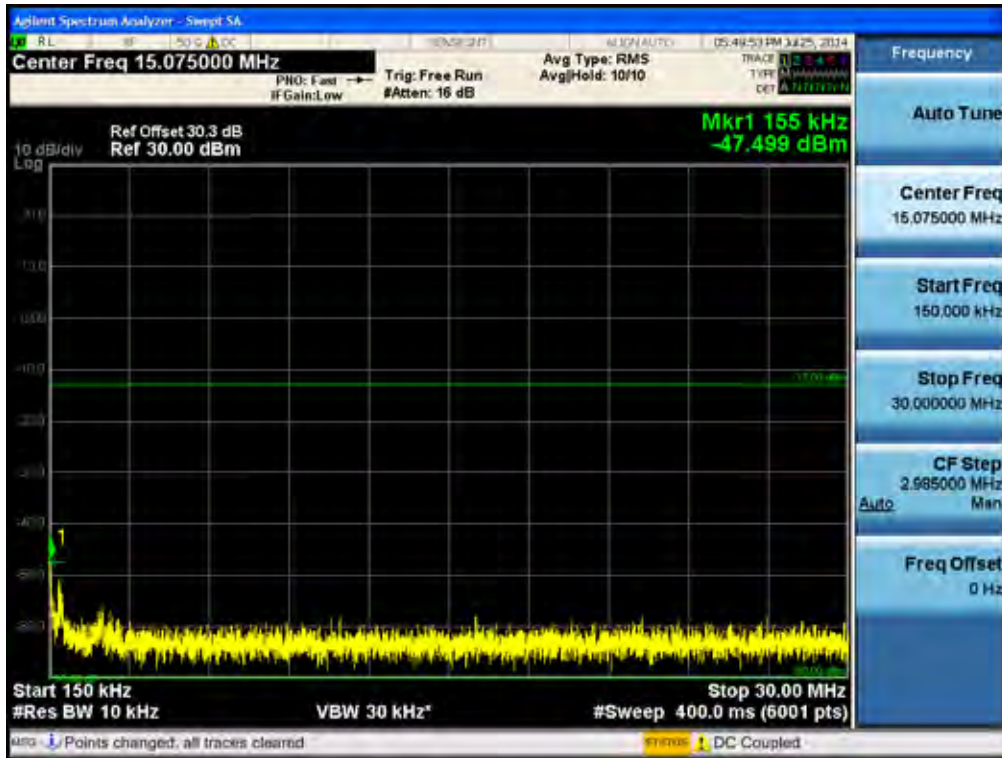
[LTE Downlink 5 MHz High]



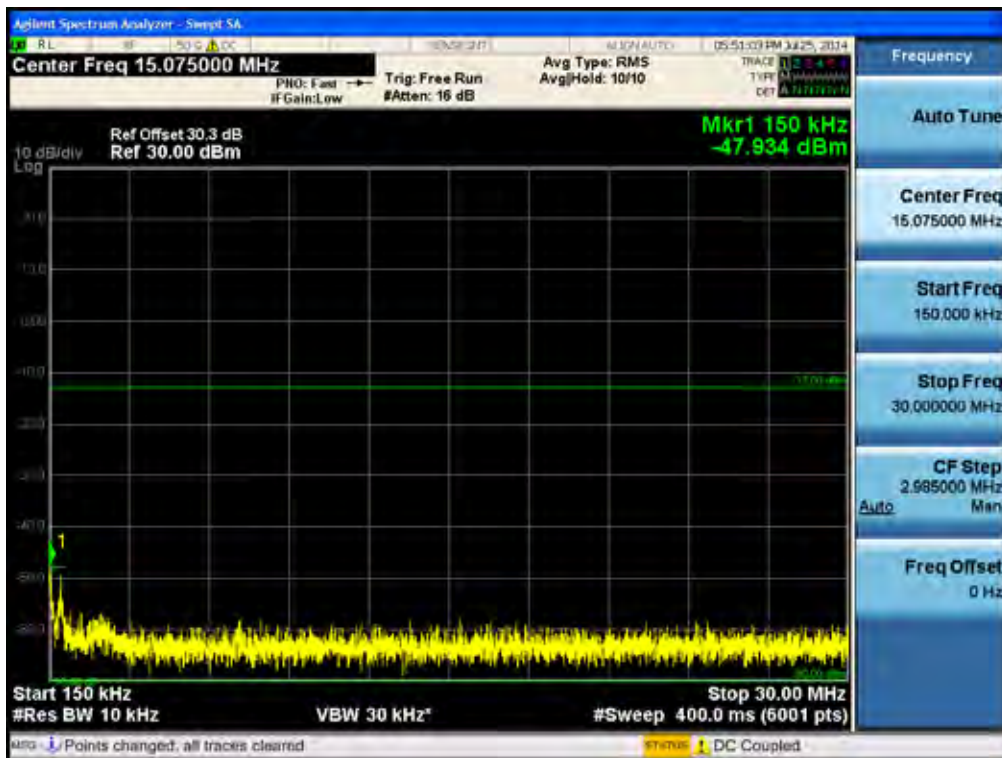
[LTE Downlink 10 MHz Low]



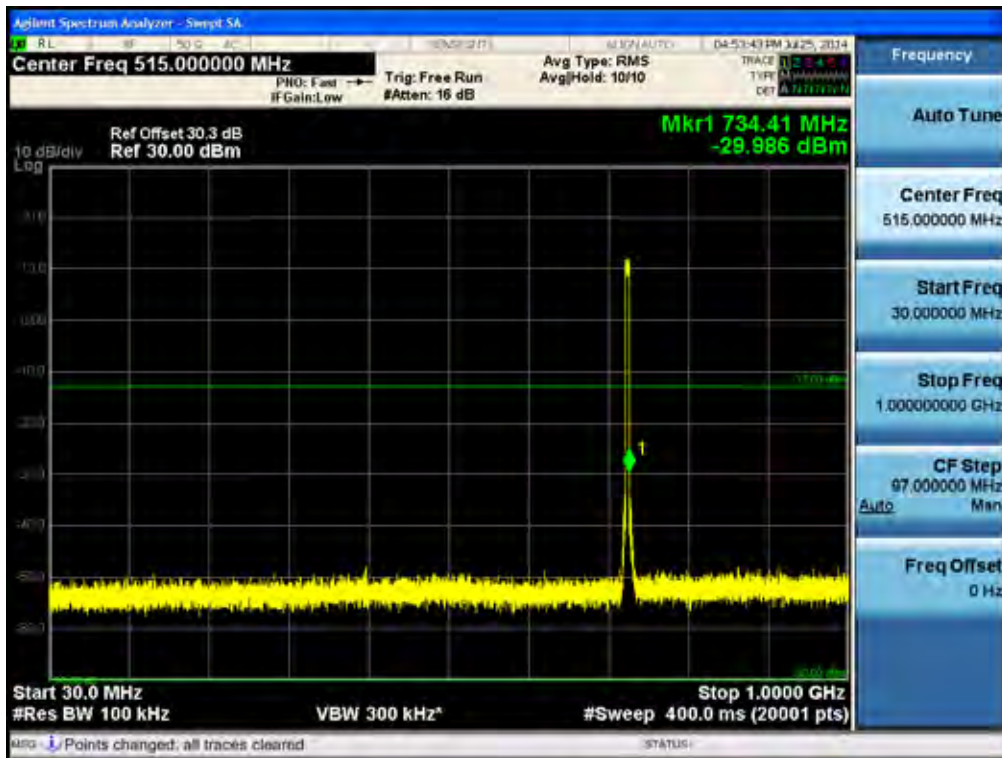
[LTE Downlink 10 MHz Middle]



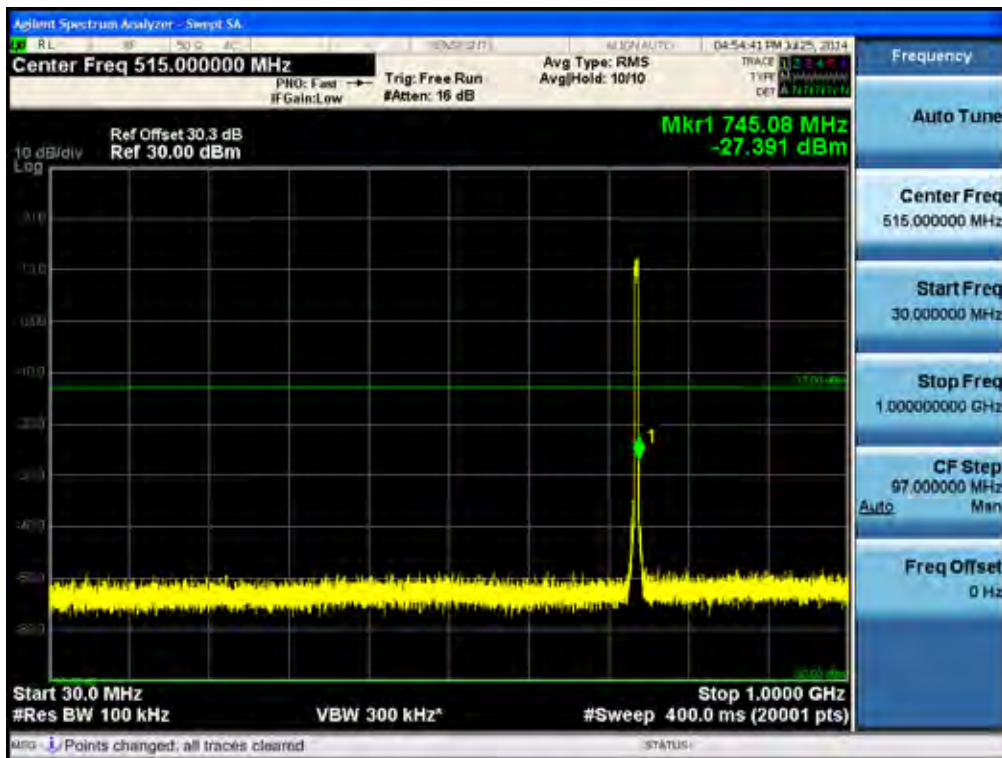
[LTE Downlink 10 MHz High]



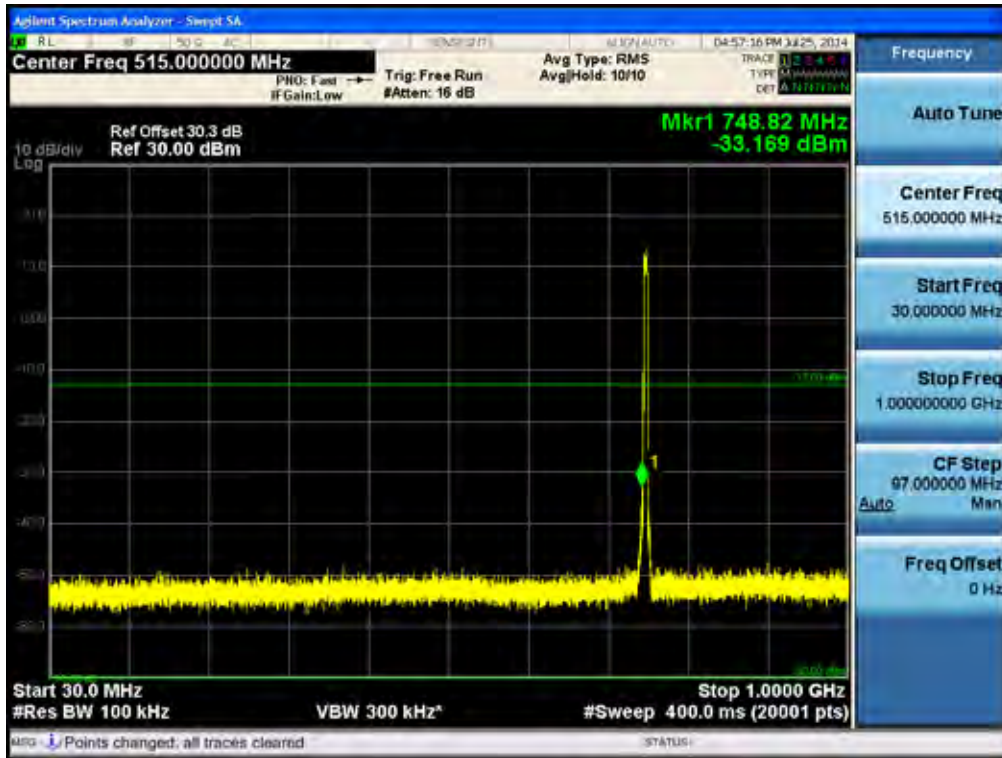
Conducted Spurious Emissions (30 MHz – 1 GHz)
[LTE Downlink 5 MHz Low]



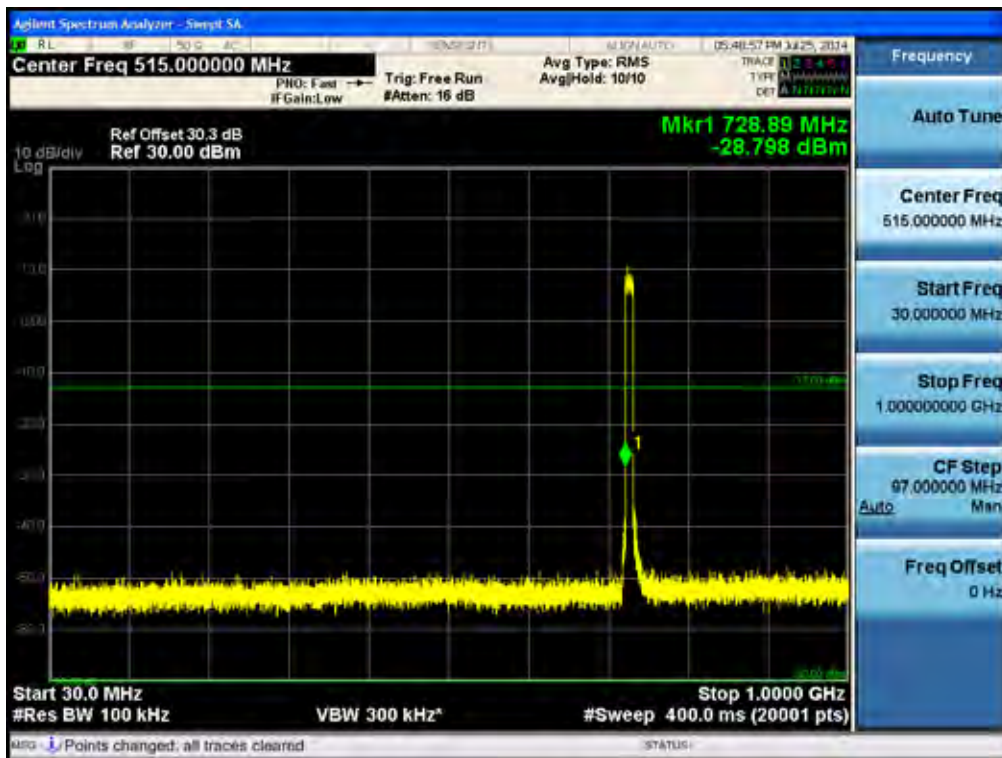
[LTE Downlink 5 MHz Middle]



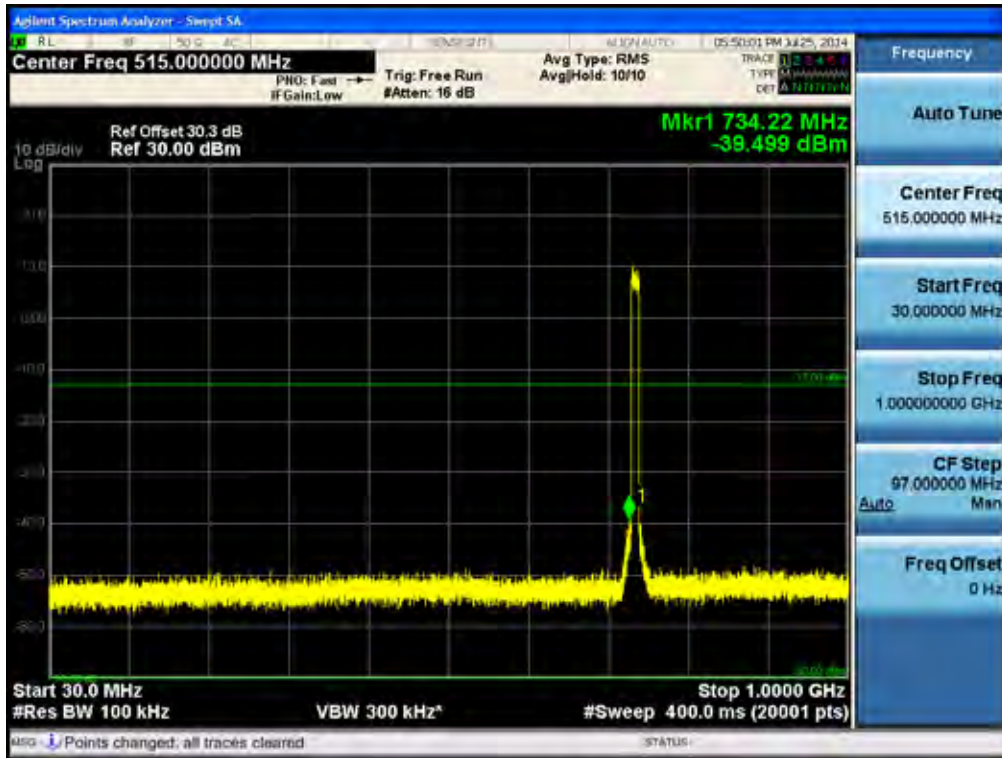
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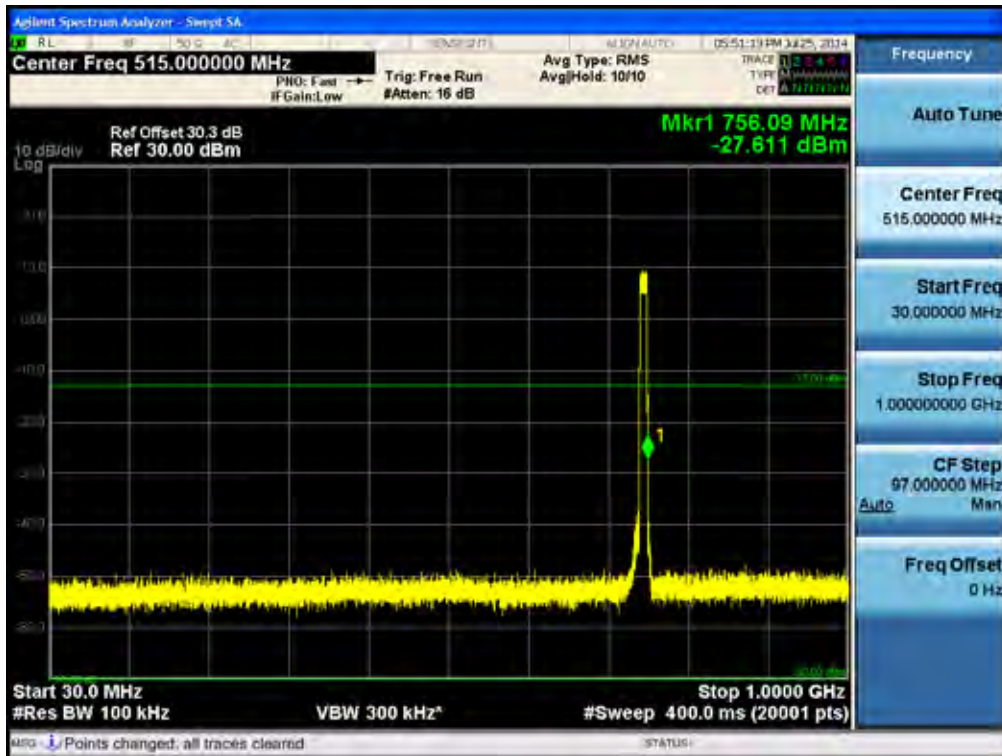
[LTE Downlink 10 MHz Low]



[LTE Downlink 10 MHz Middle]



[LTE Downlink 10 MHz High]



Conducted Spurious Emissions (1 GHz –12.75 GHz)
[LTE Downlink 5 MHz Low]



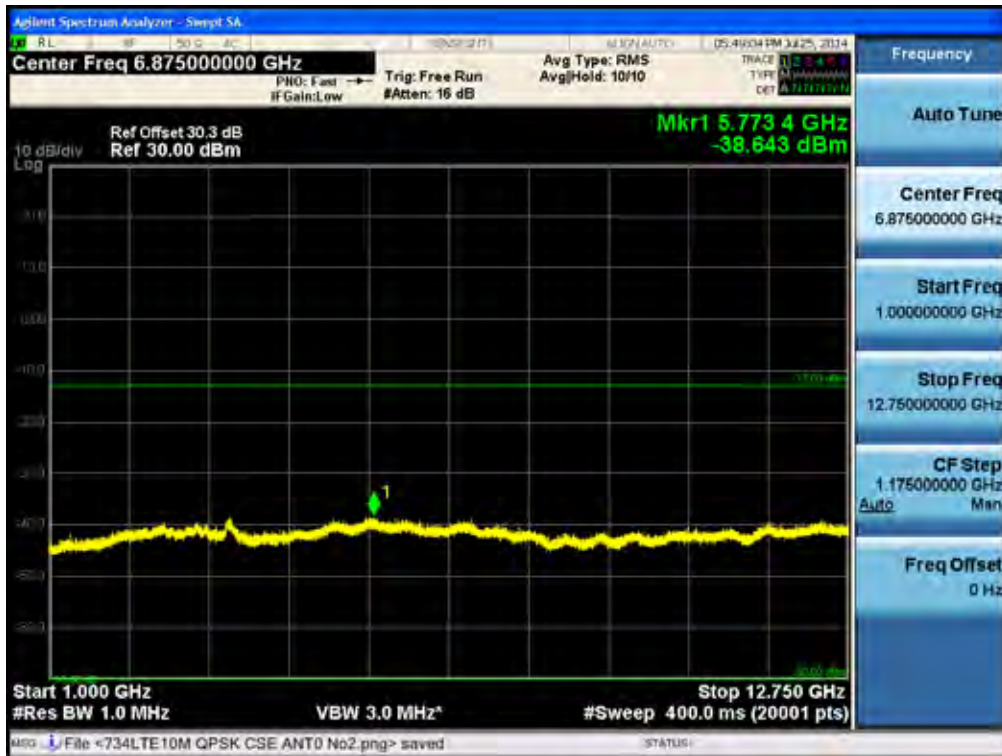
[LTE Downlink 5 MHz Middle]



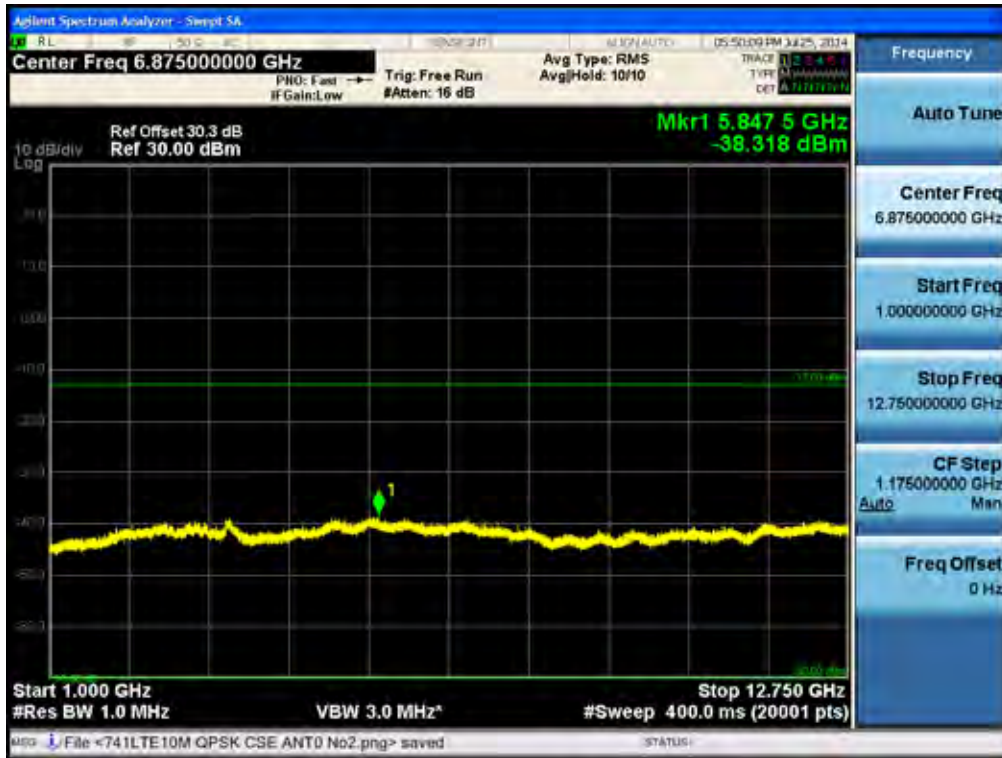
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[LTE Downlink 10 MHz Low]



[LTE Downlink 10 MHz Middle]

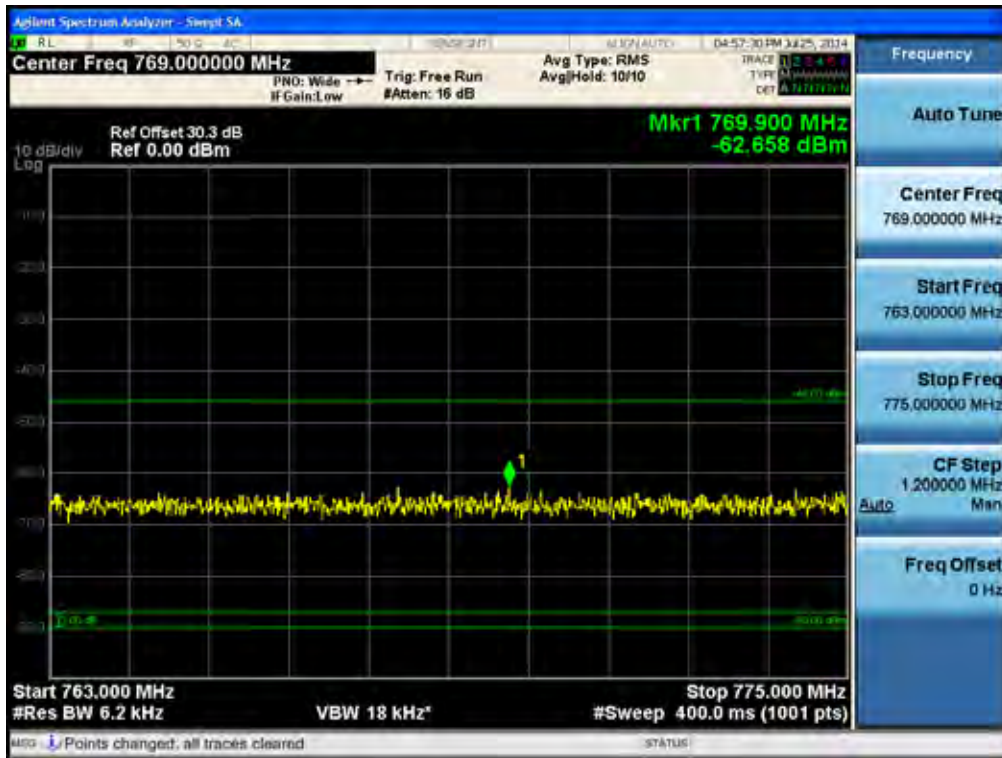


[LTE Downlink 10 MHz High]

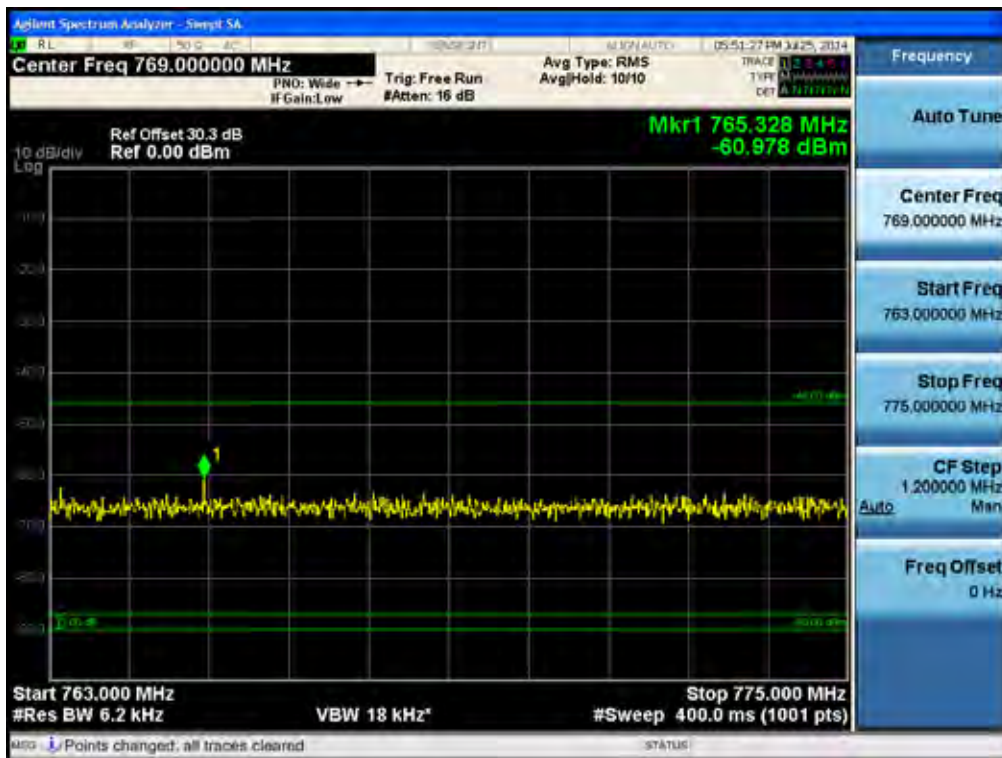


Conducted Spurious Emissions (763 MHz – 775 MHz)

[LTE Downlink 5 MHz High]

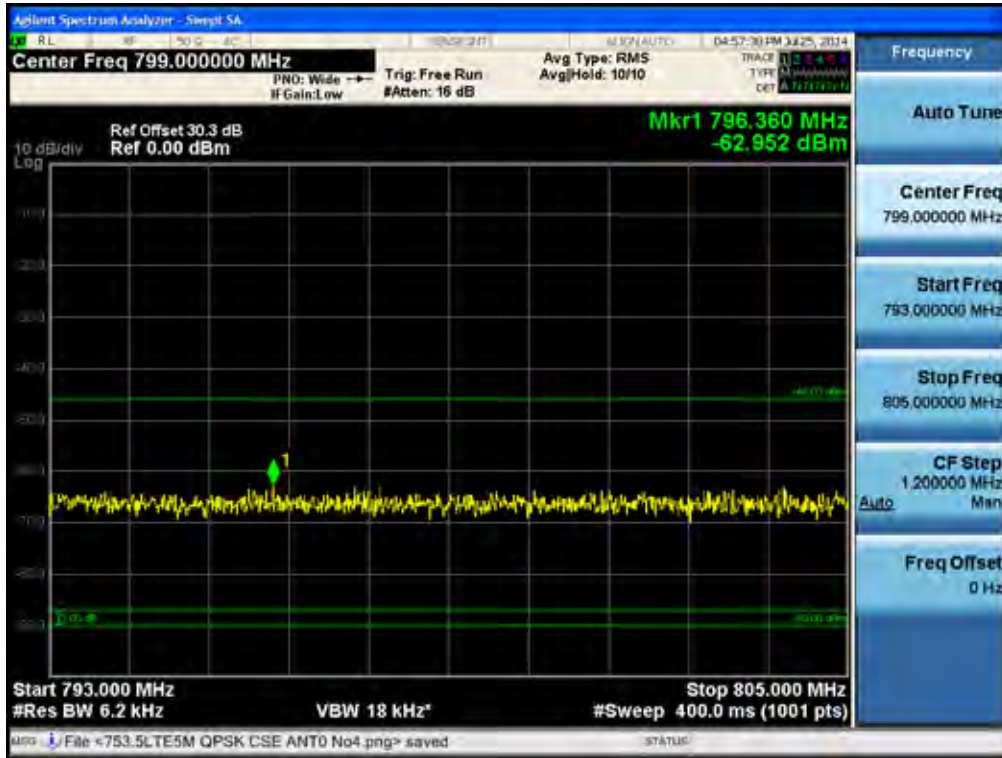


[LTE Downlink 10 MHz High]

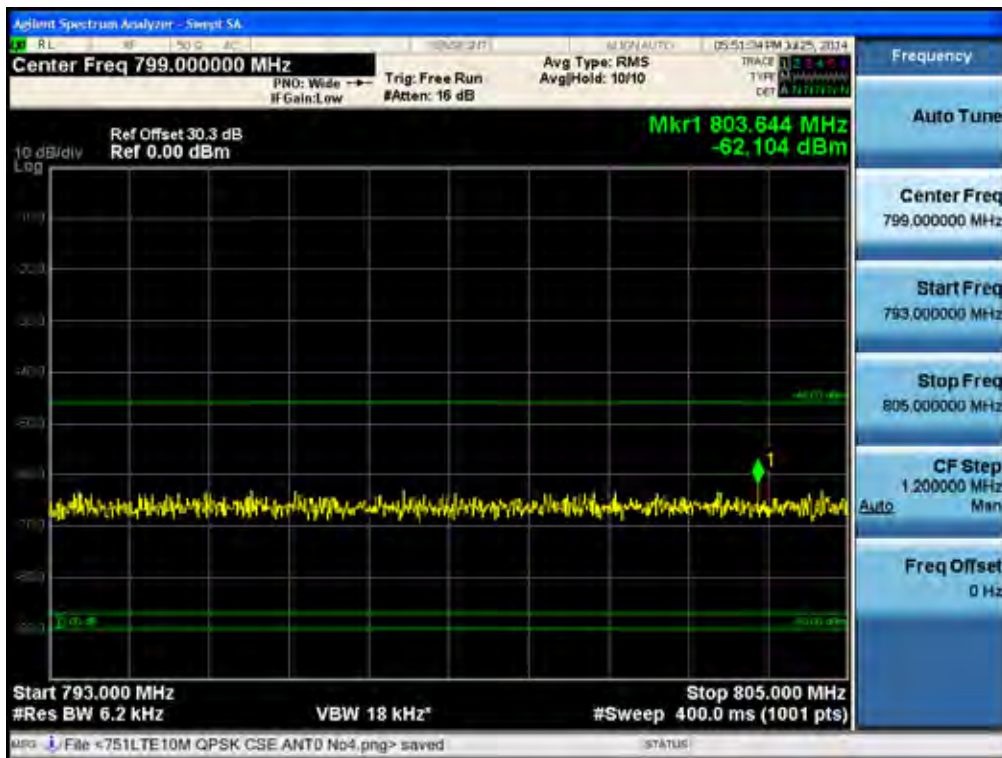


Conducted Spurious Emissions (793 MHz – 805 MHz)

[LTE Downlink 5 MHz High]

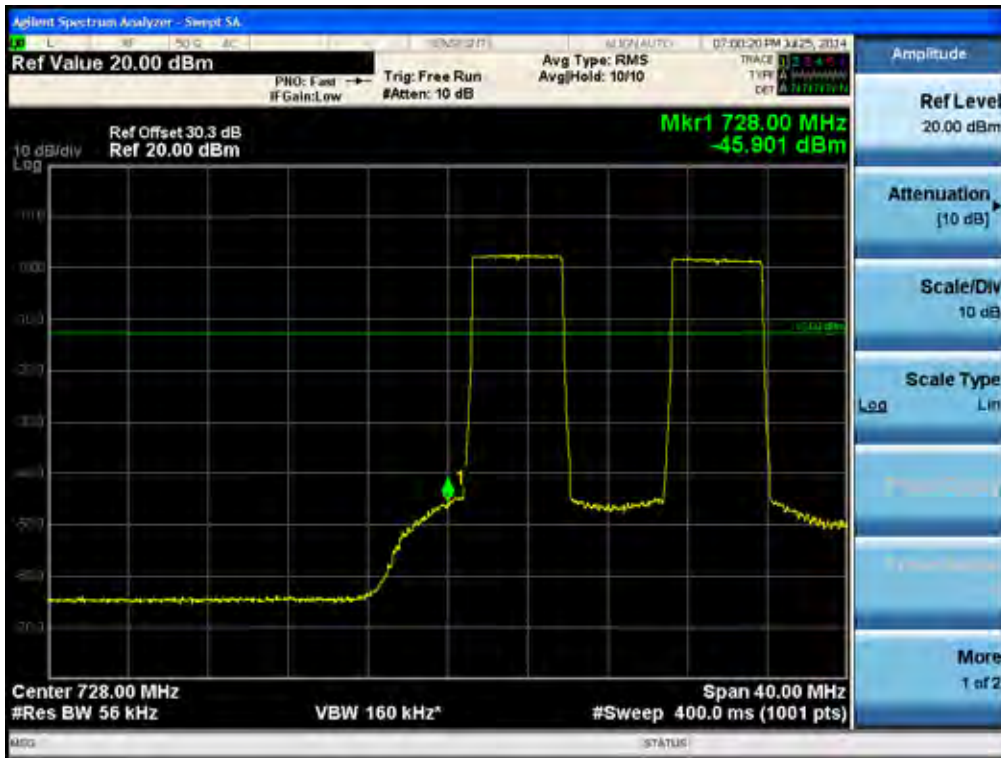


[LTE Downlink 10 MHz High]

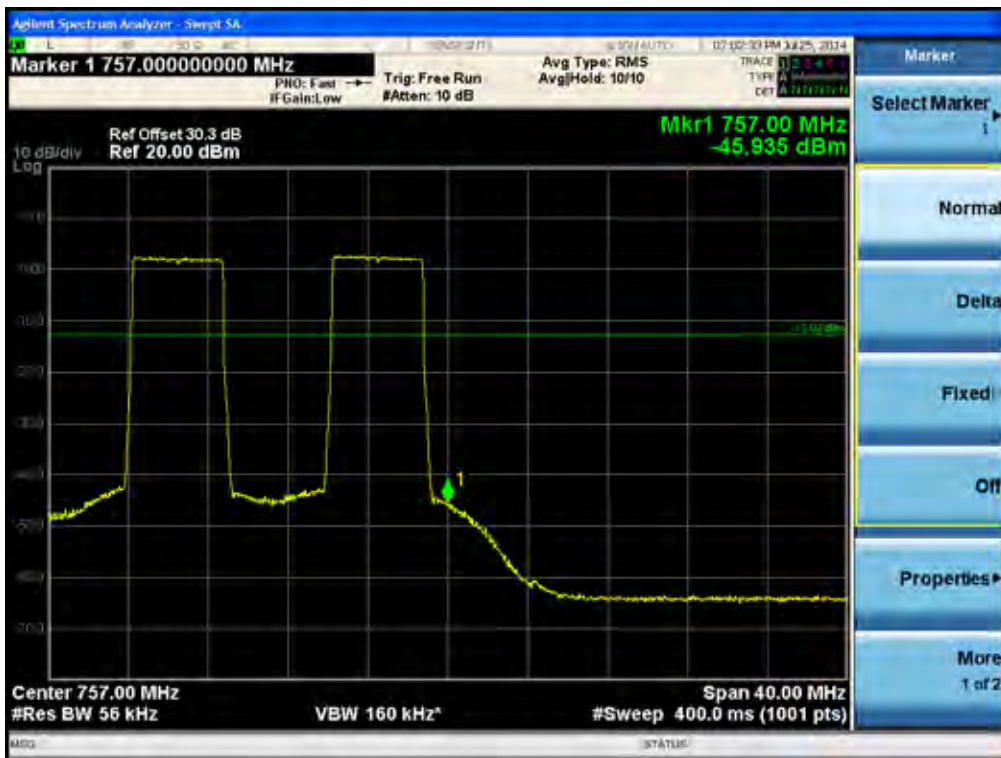


Intermodulation Spurious Emissions

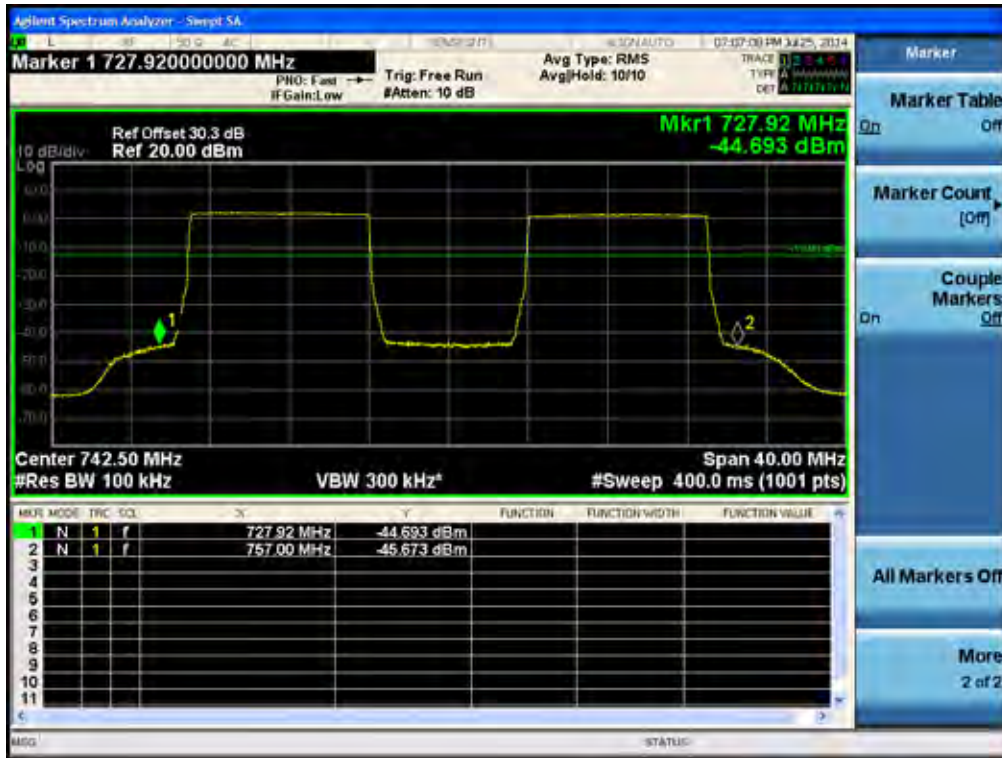
[LTE Downlink 5 MHz Low]



[LTE Downlink 5 MHz High]



[LTE Downlink 10 MHz]

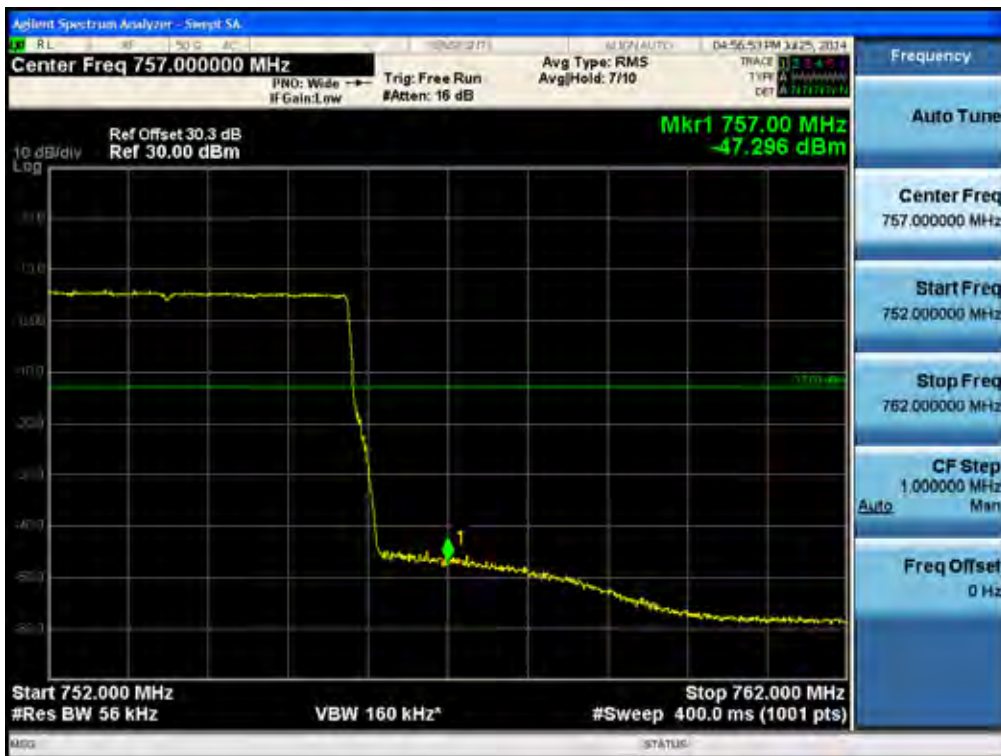


Band Edge

[LTE Downlink 5 MHz Low]



[LTE Downlink 5 MHz High]



[LTE Downlink 10 MHz Low]



[LTE Downlink 10 MHz High]

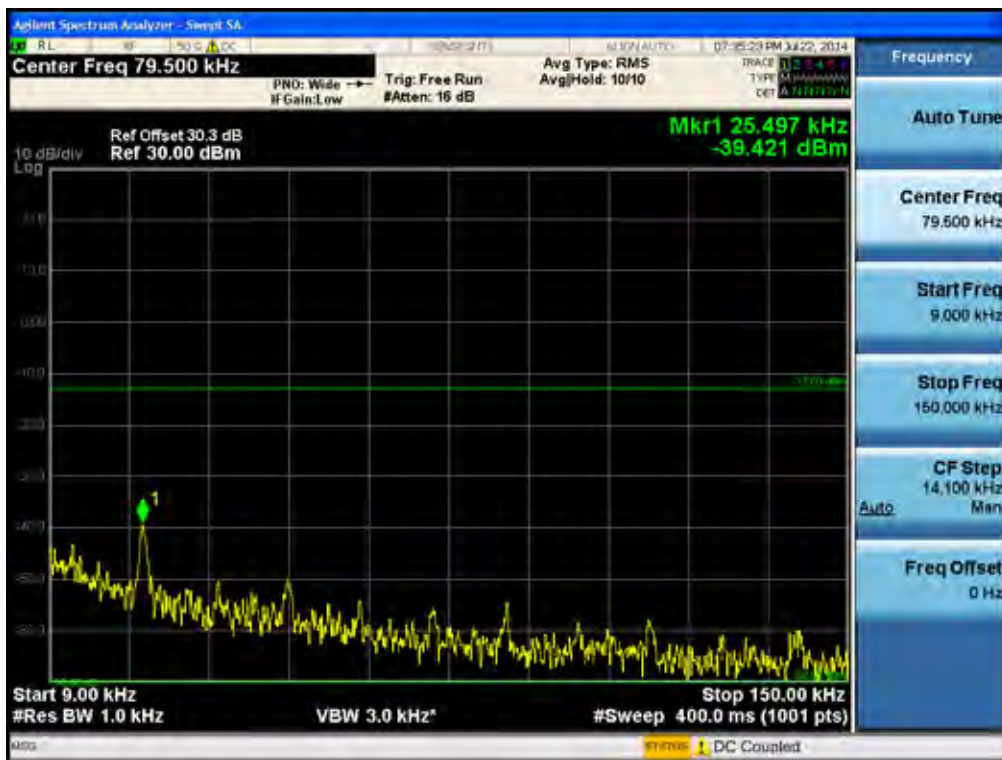


**Cellular Band Plots of Spurious Emission
Conducted Spurious Emissions (9 kHz – 150 kHz)**

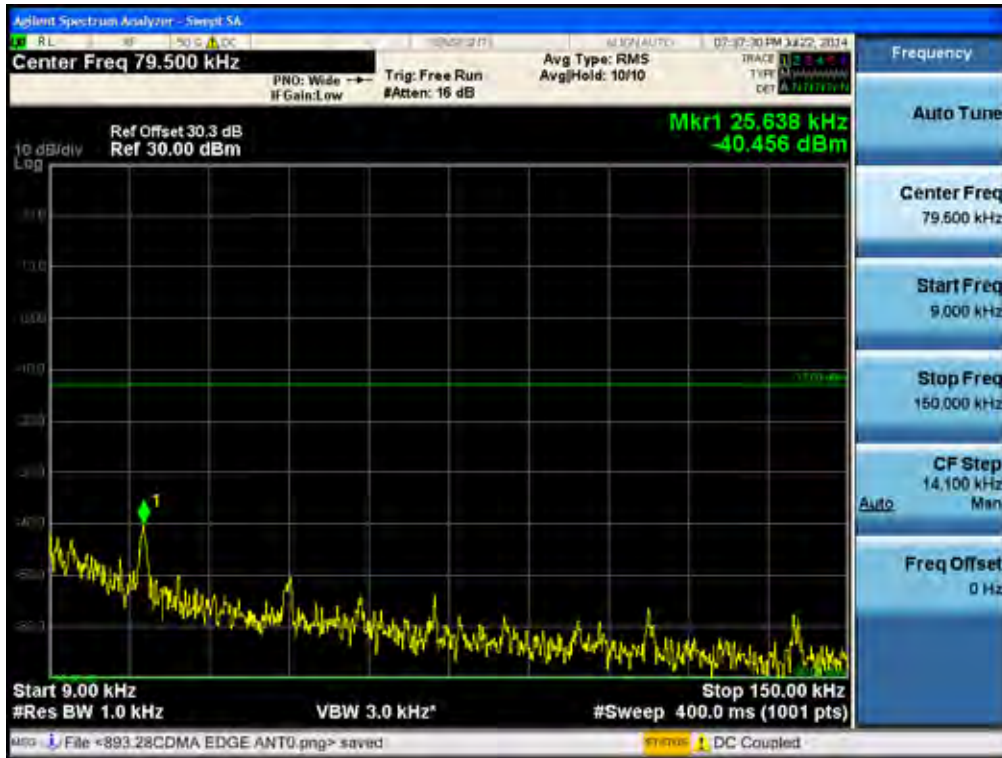
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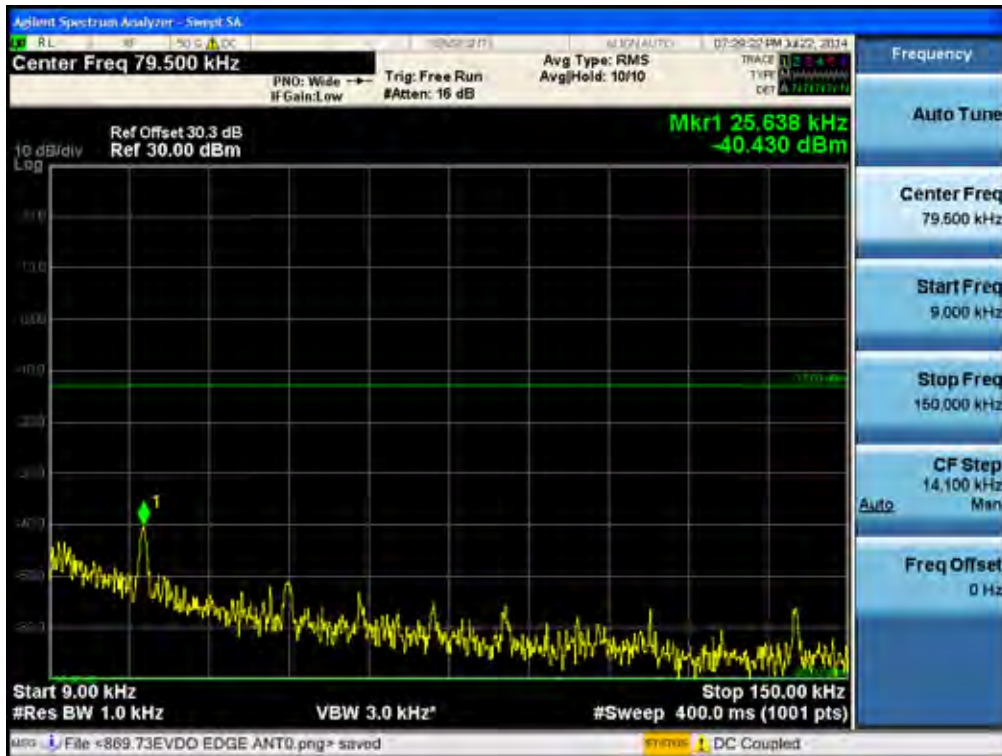
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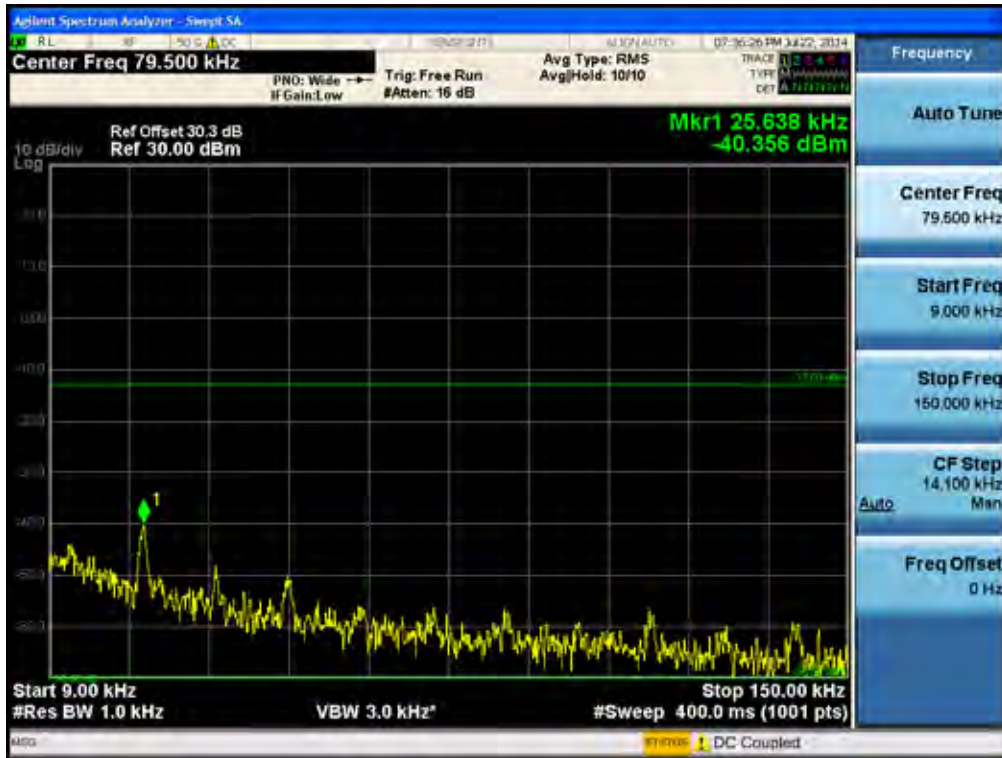
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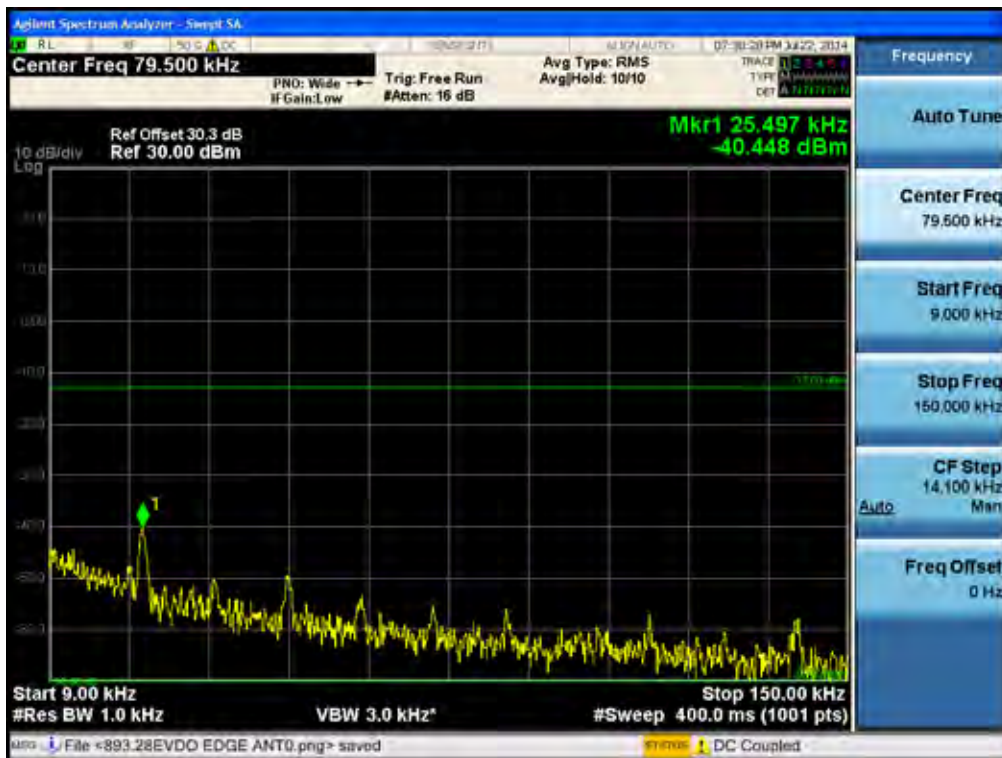
[CDMA EVDO Downlink Low]



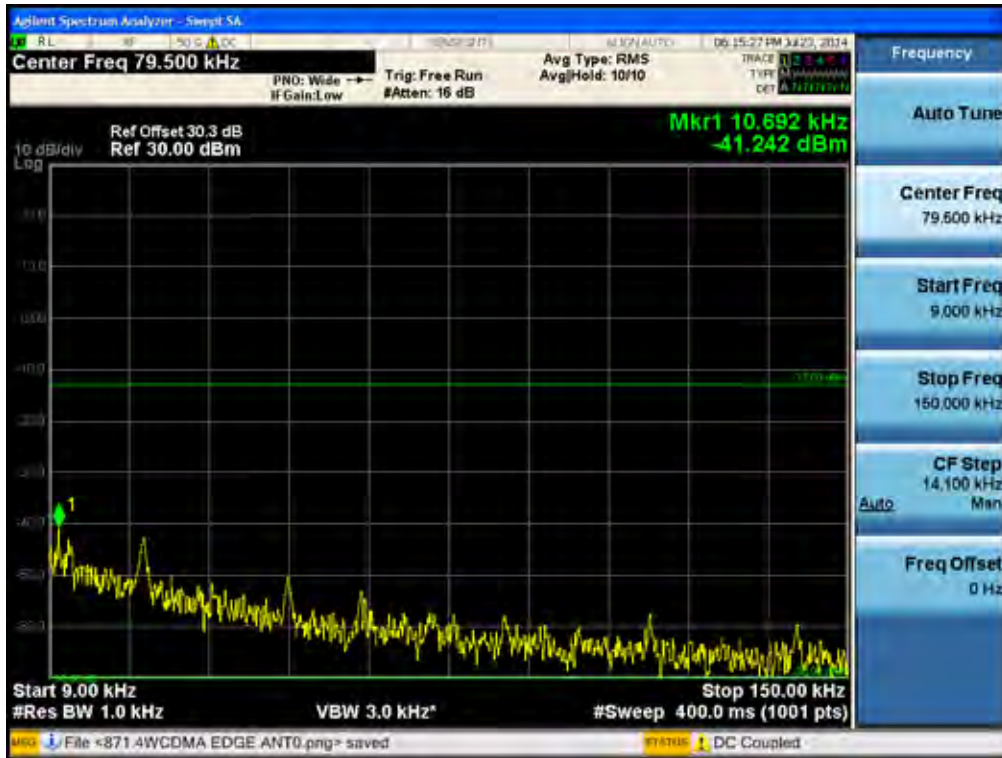
[CDMA EVDO Downlink Middle]



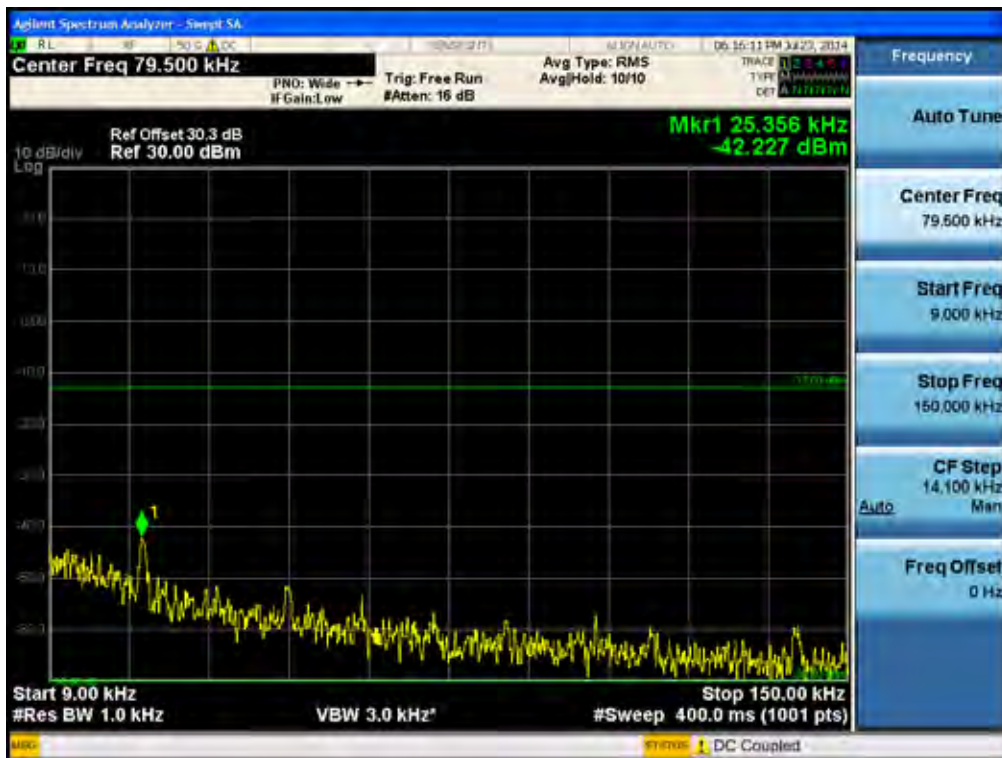
[CDMA EVDO Downlink High]



[WCDMA Downlink Low]



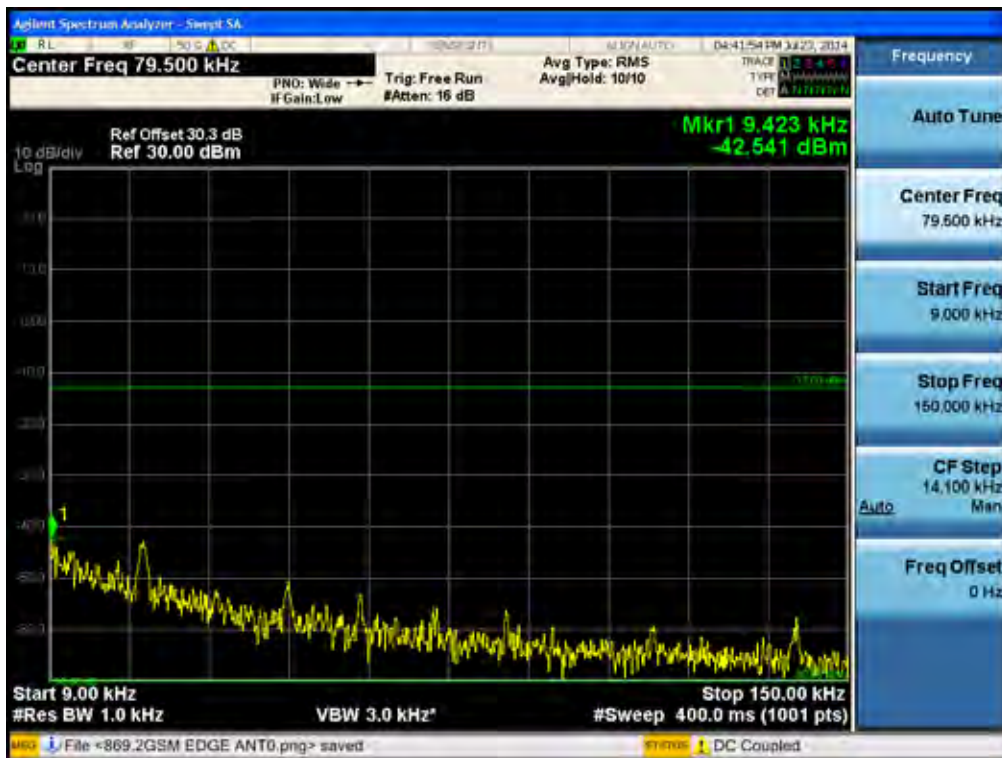
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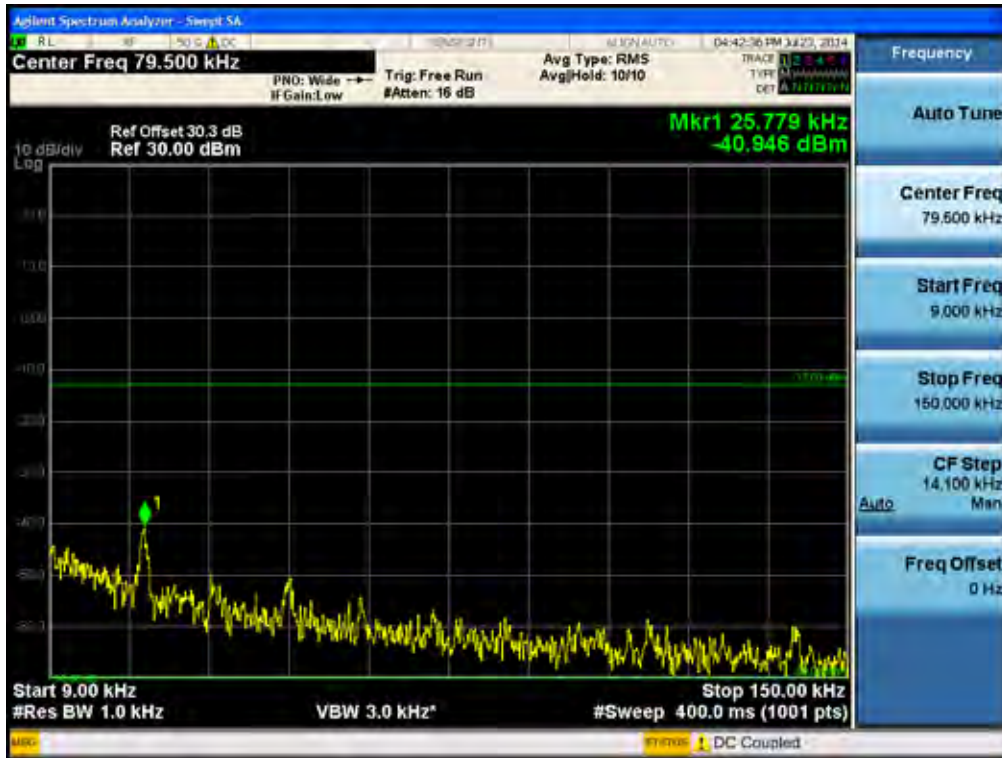
[WCDMA Downlink High]



[GSM Downlink Low]



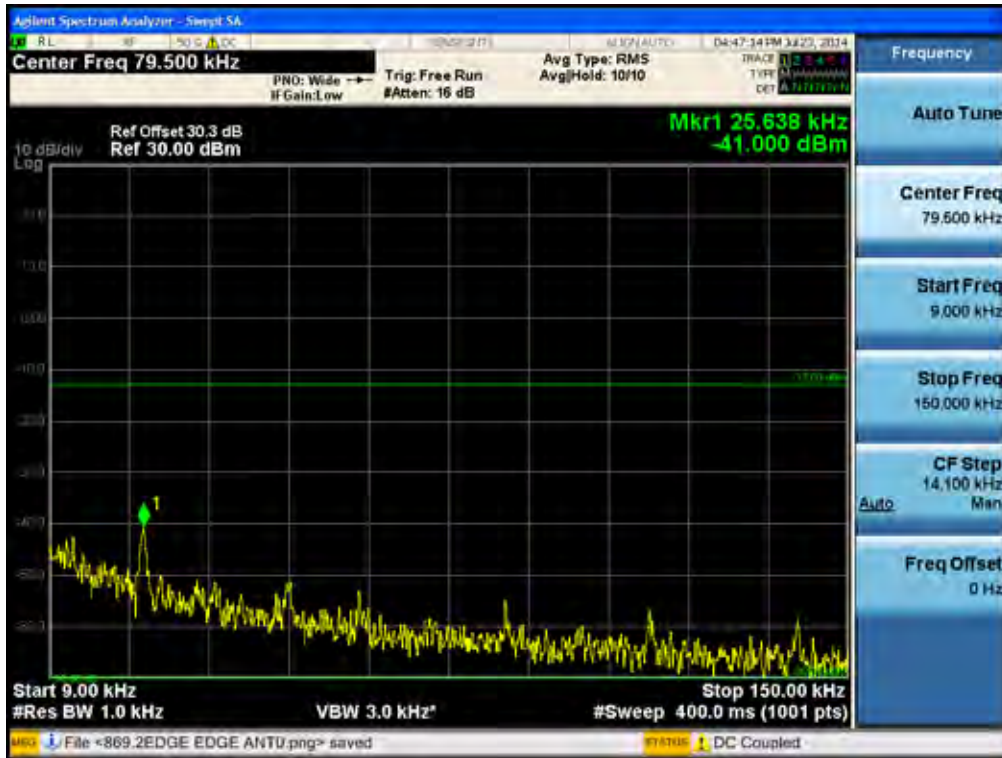
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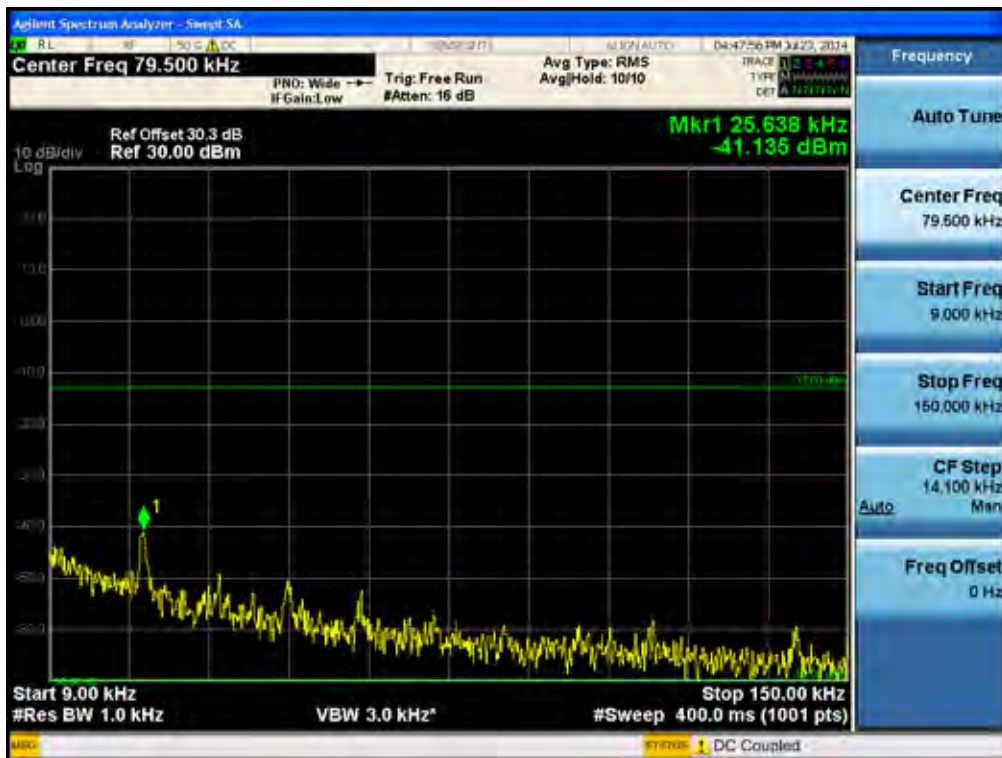
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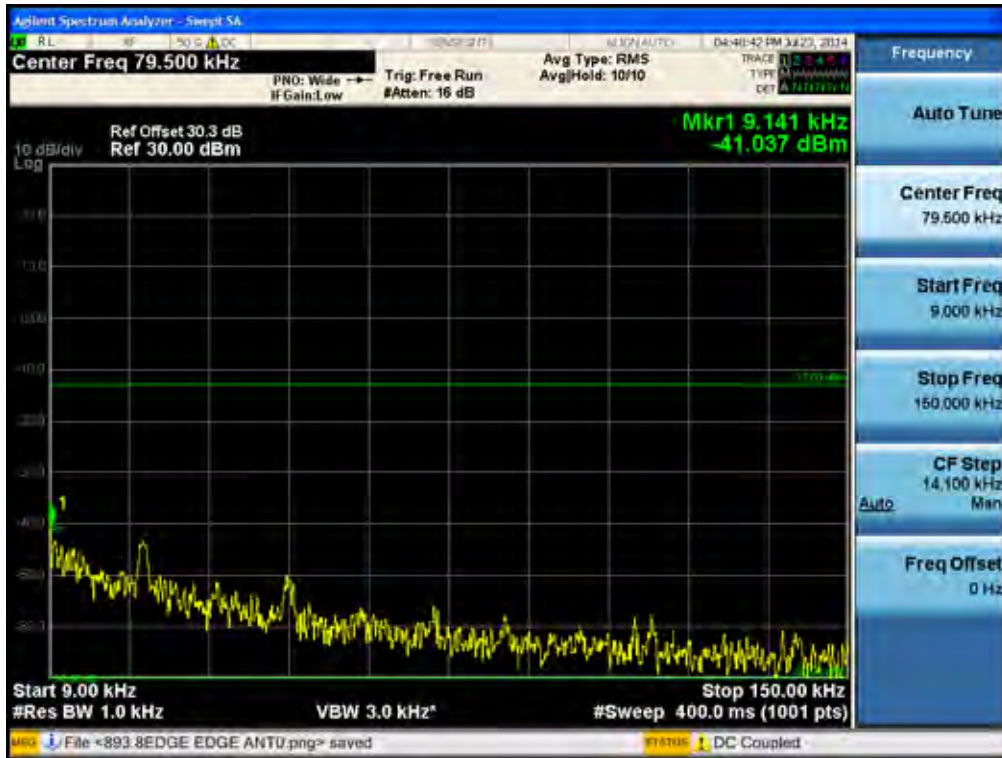
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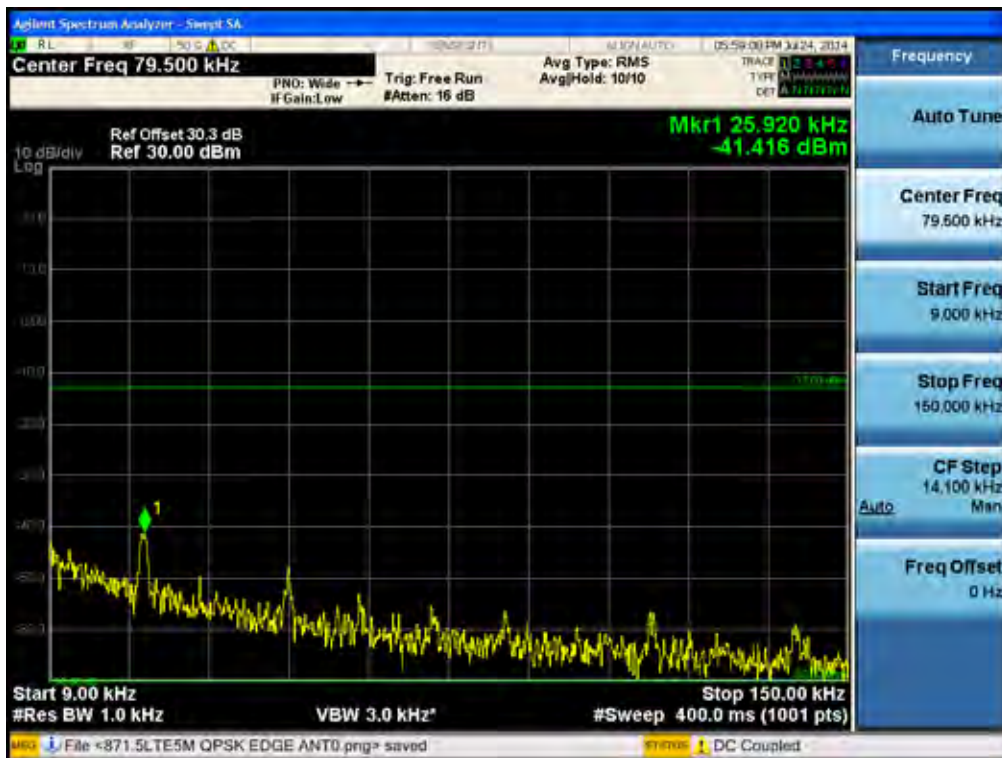
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[GSM EDGE Downlink High]



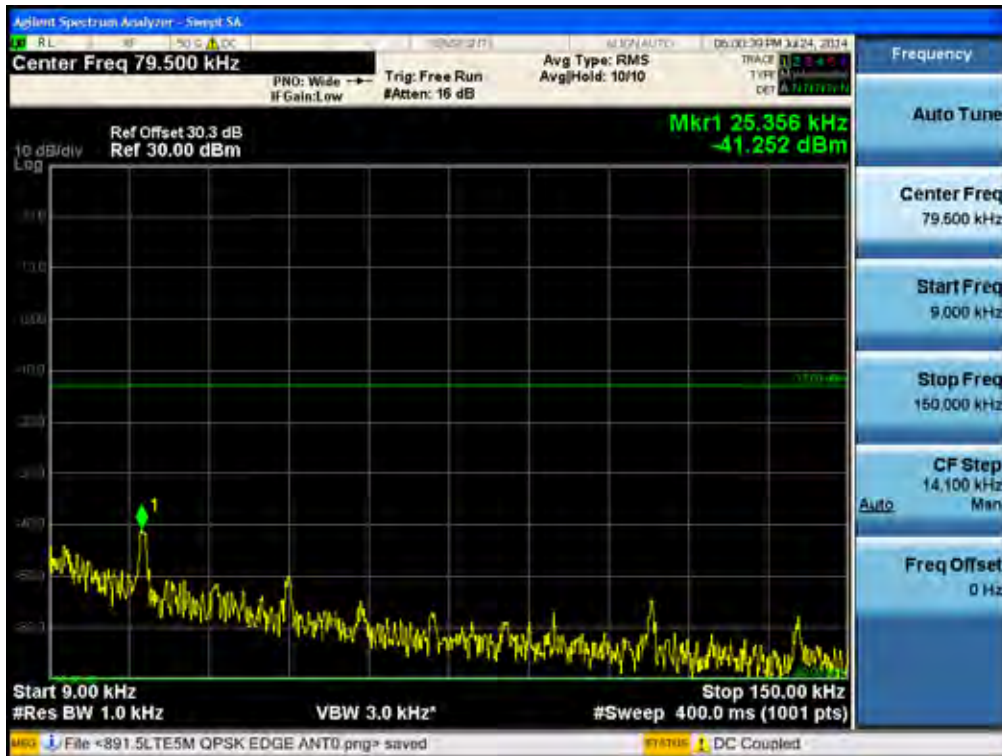
[LTE Downlink 5 MHz Low]



[LTE Downlink 5 MHz Middle]

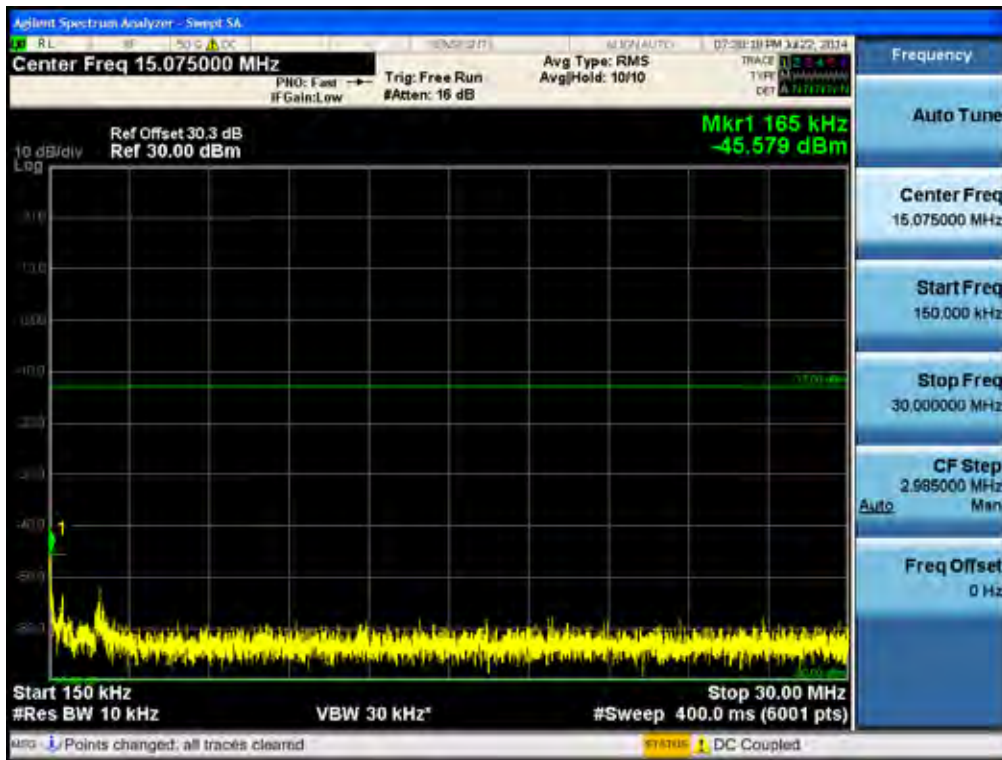


[LTE Downlink 5 MHz High]

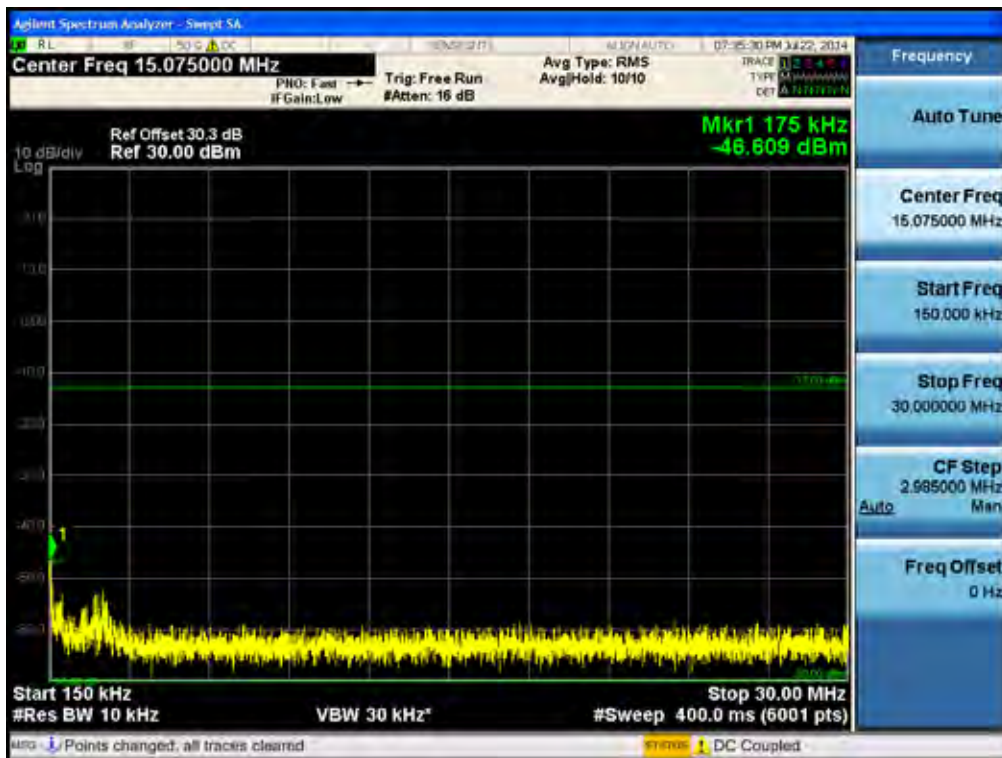


Conducted Spurious Emissions (150 kHz – 30 MHz)

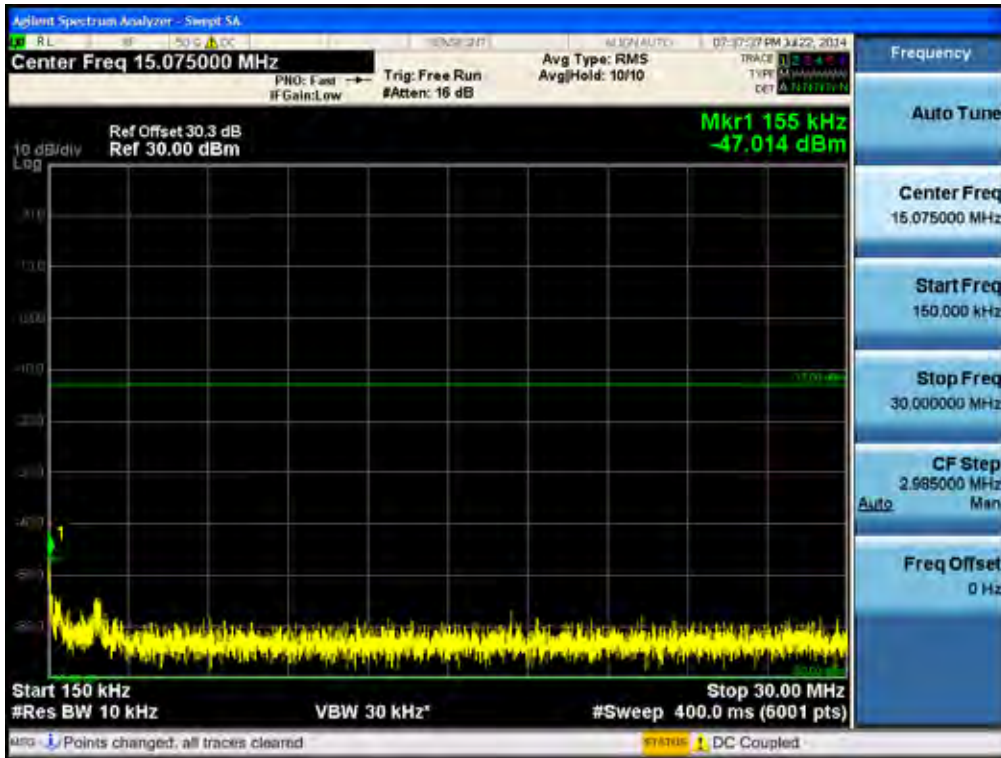
[CDMA Downlink Low]



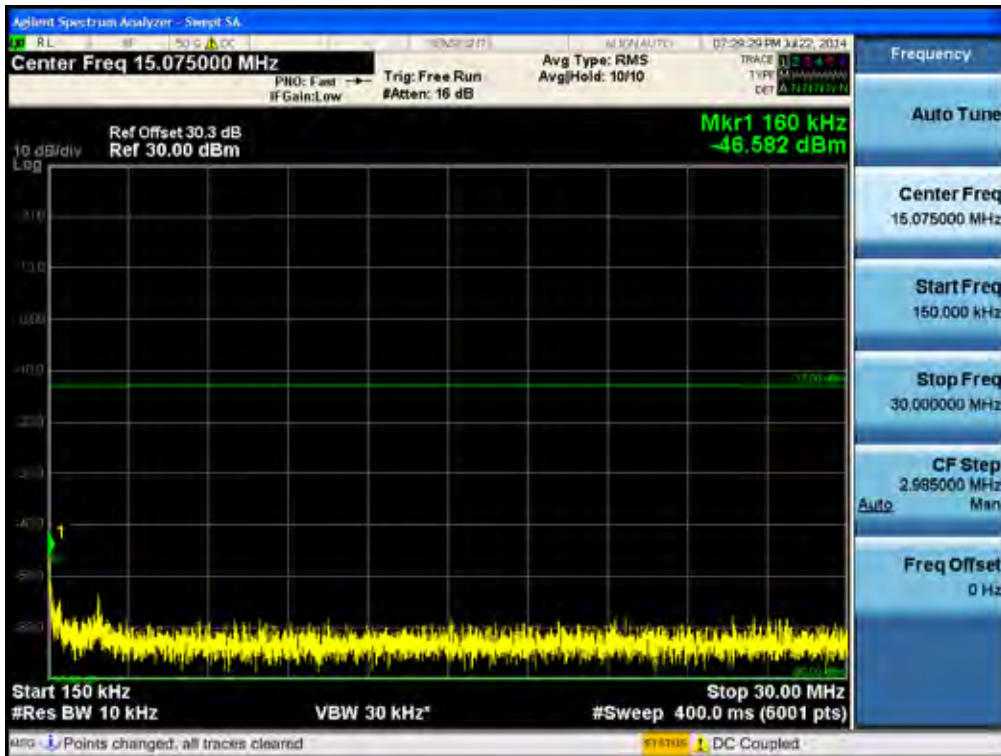
[CDMA Downlink Middle]



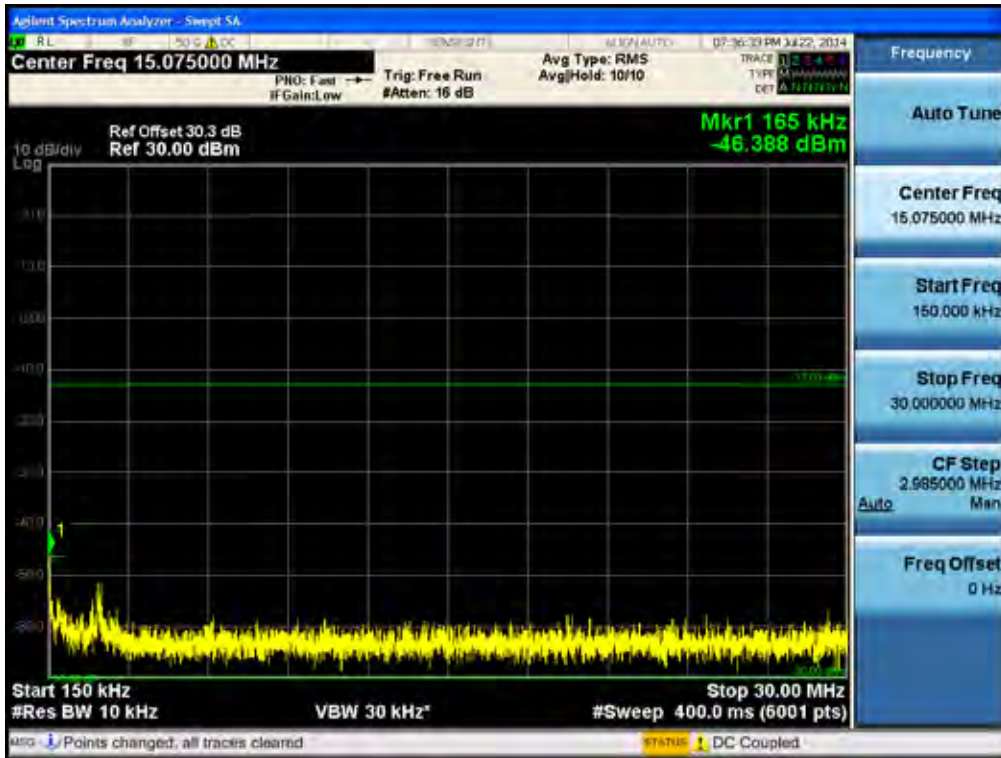
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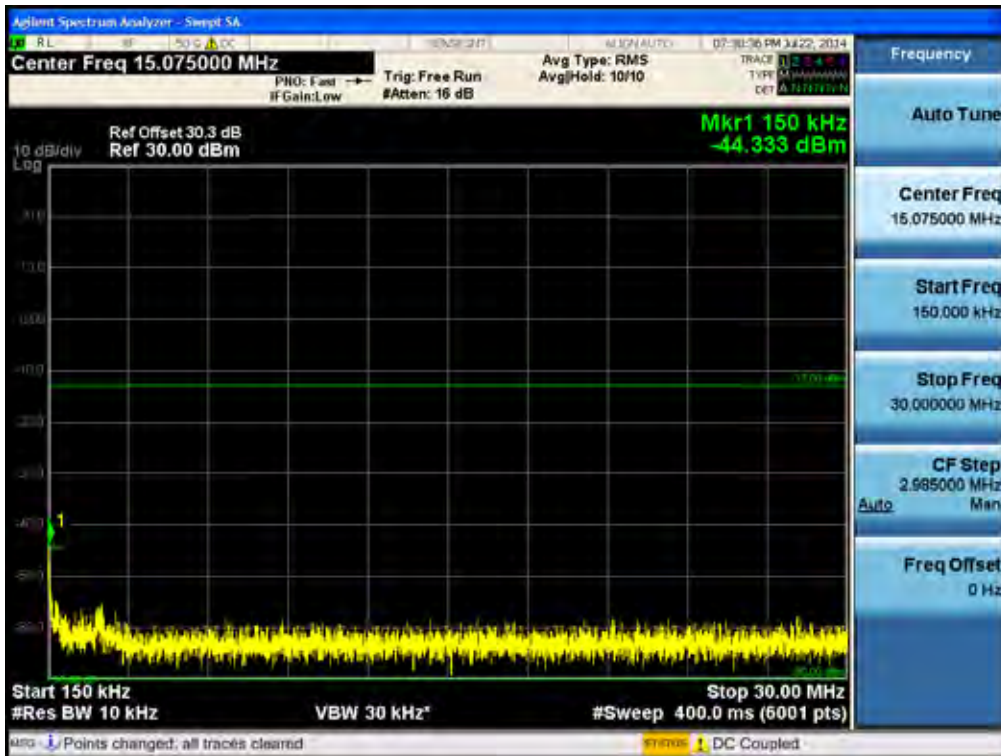
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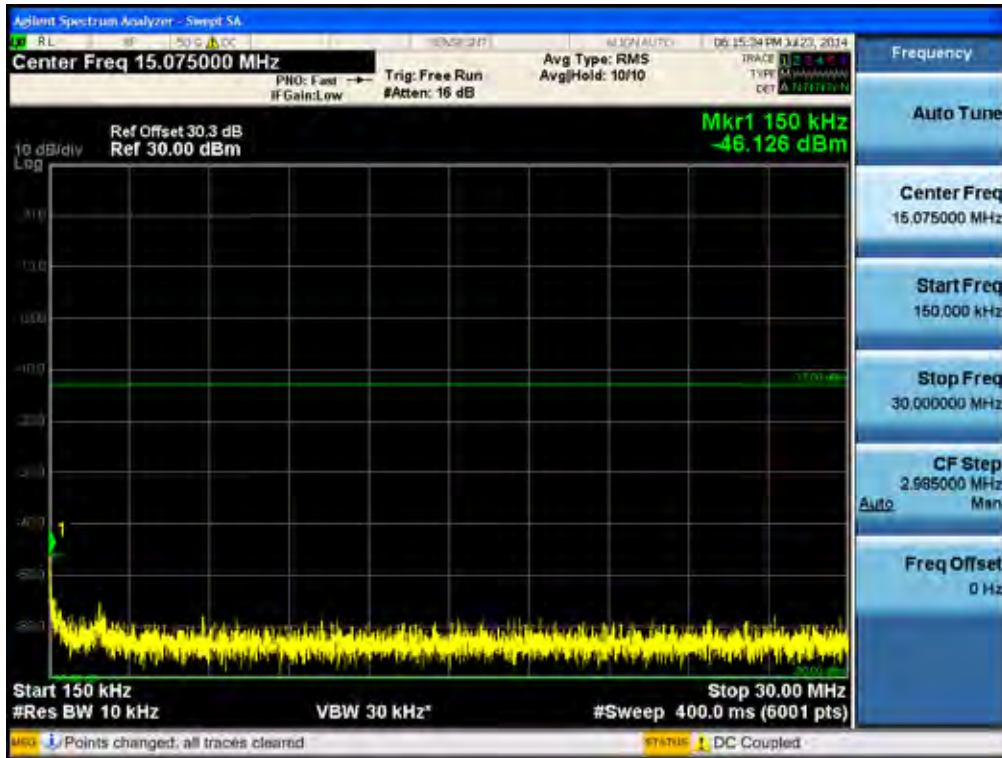
[CDMA EVDO Downlink Middle]



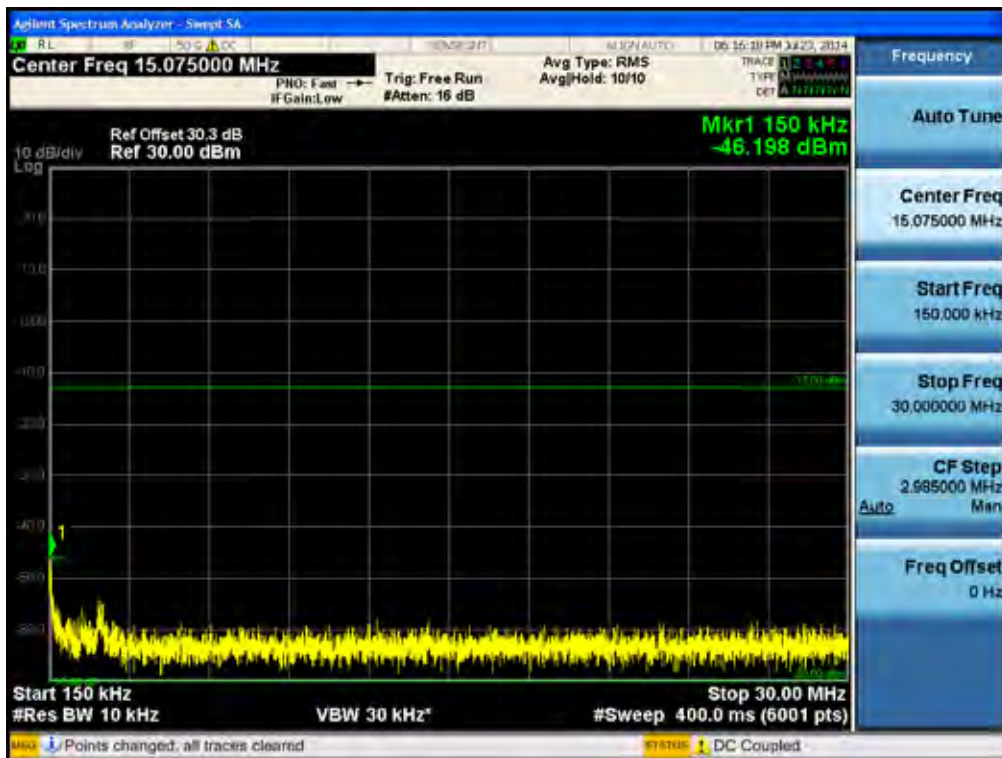
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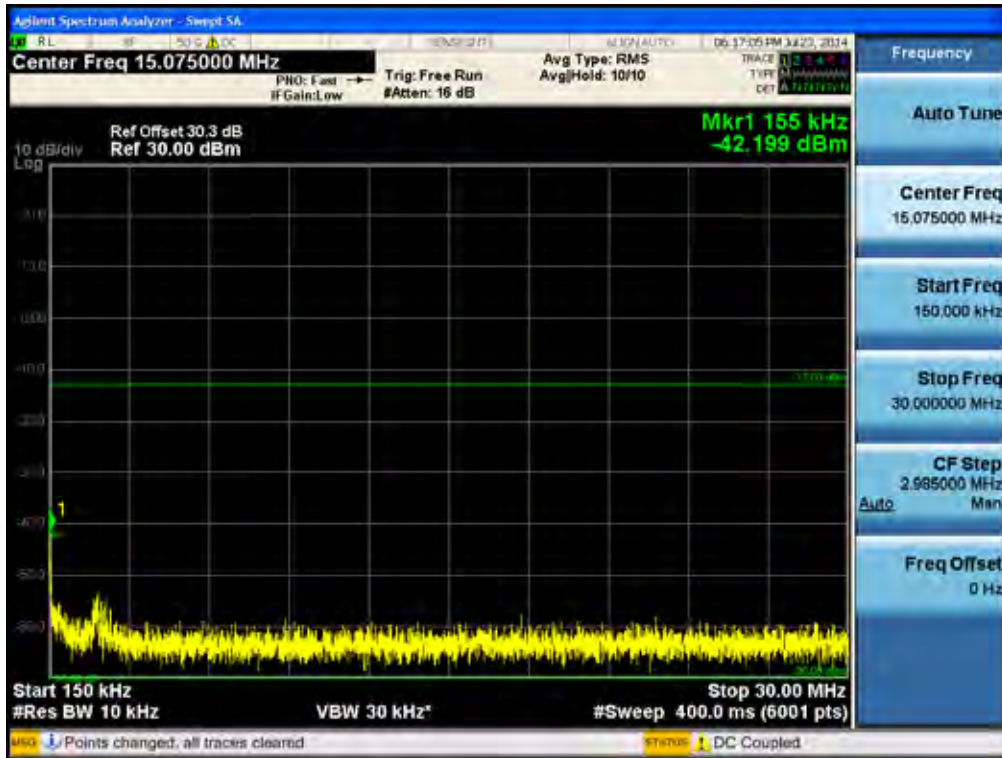
[WCDMA Downlink Low]



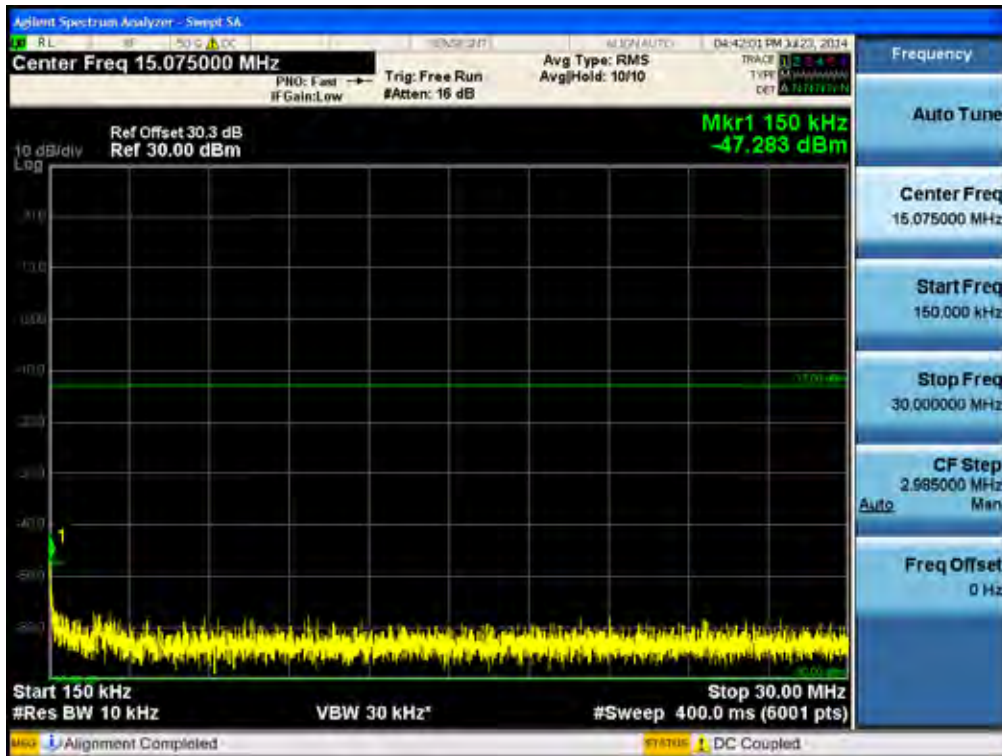
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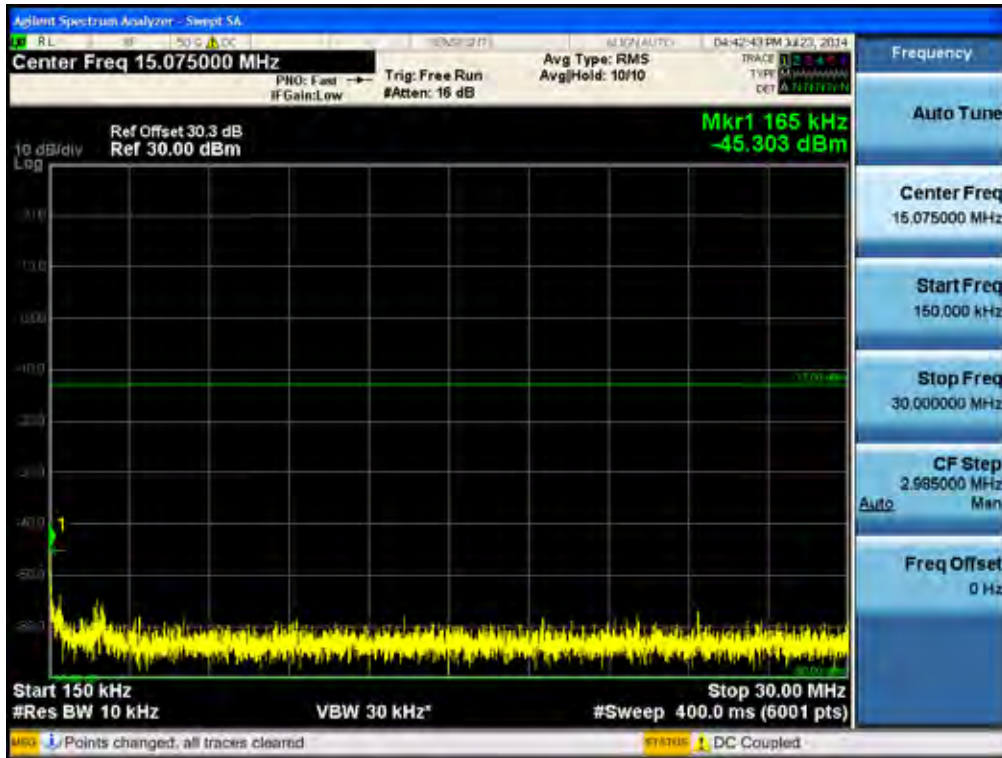
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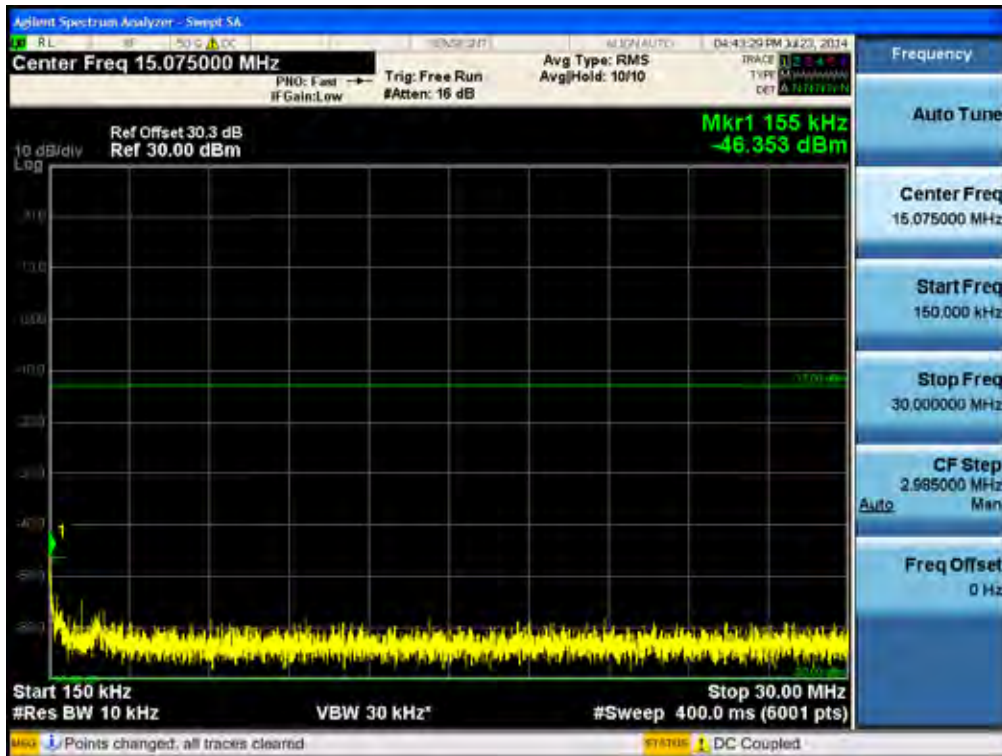
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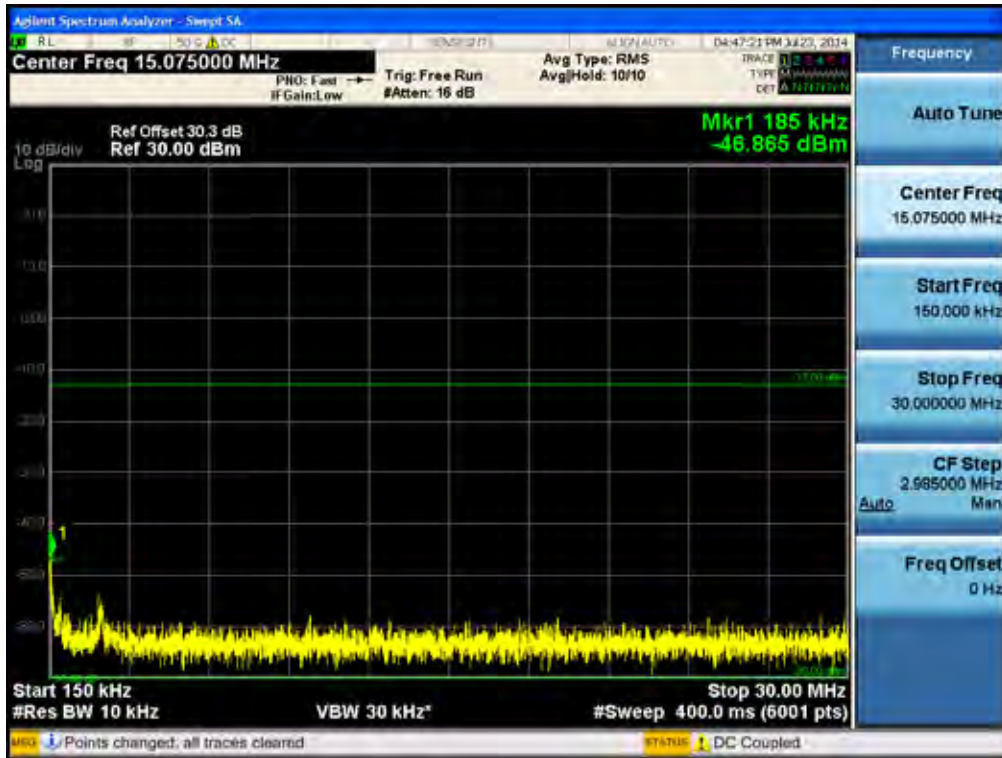
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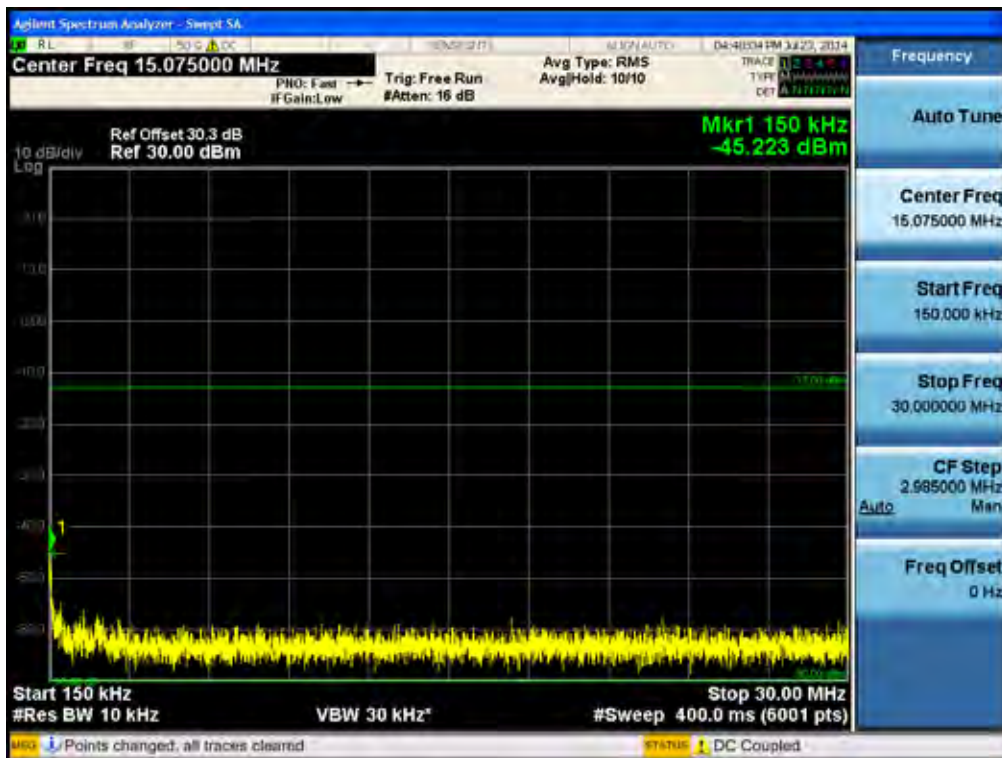
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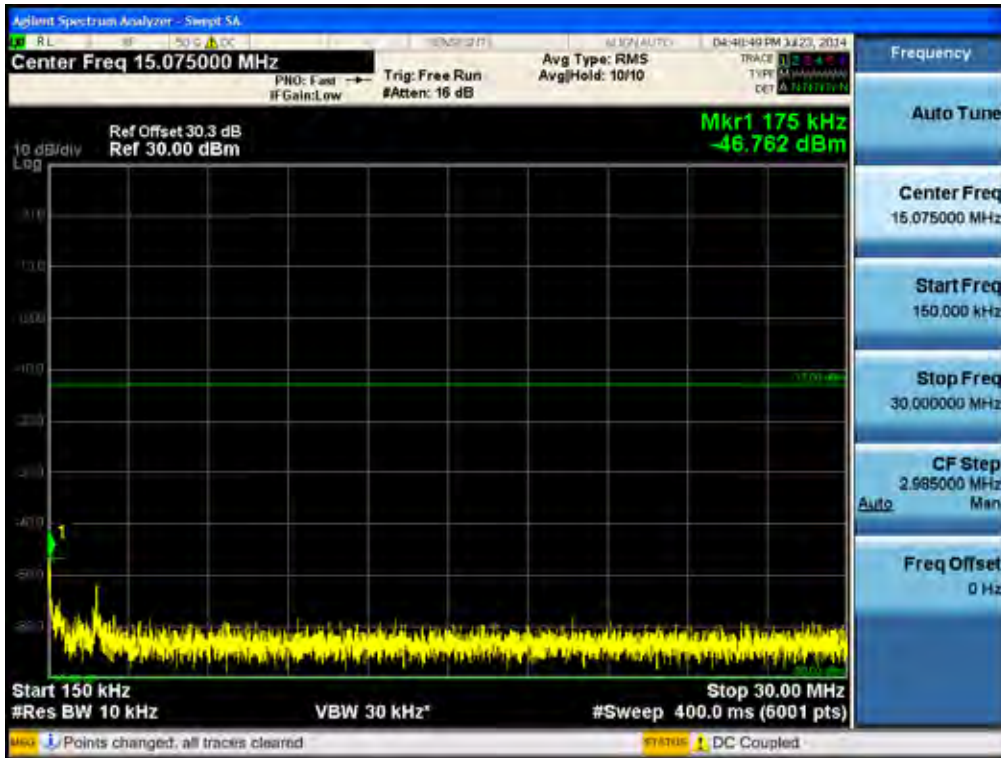
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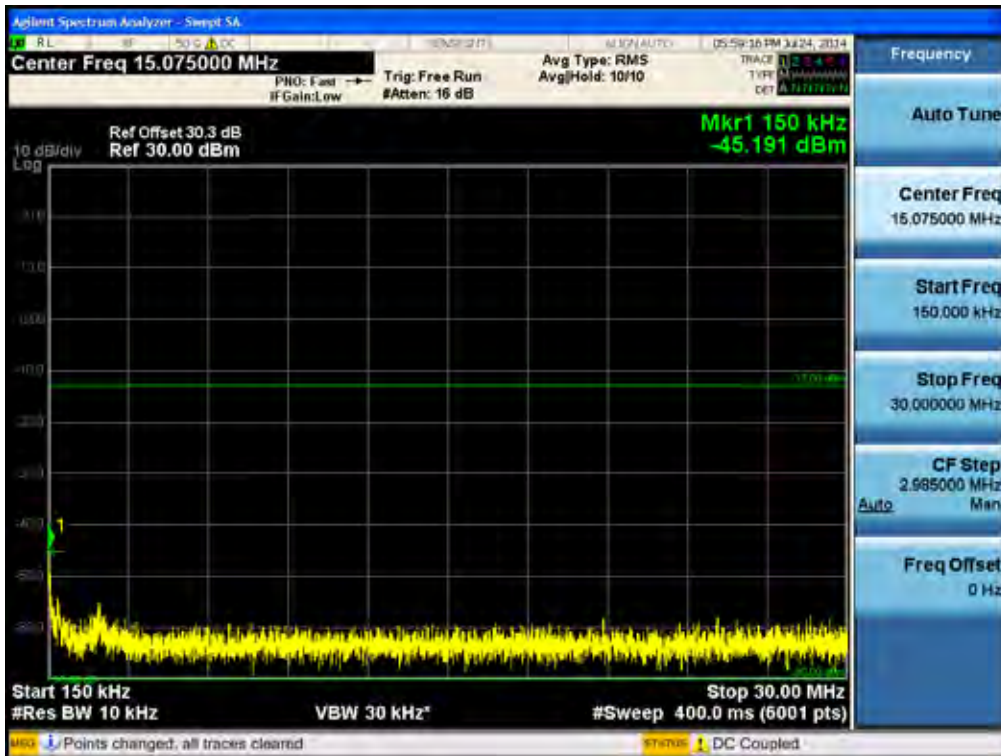
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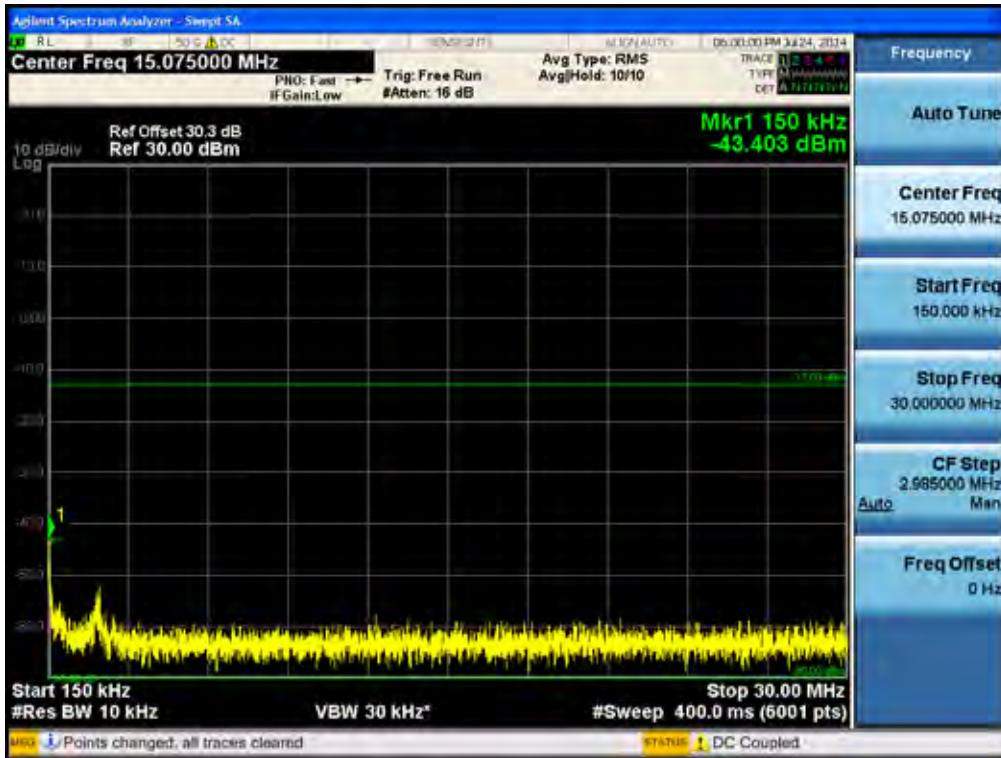
[GSM EDGE Downlink High]



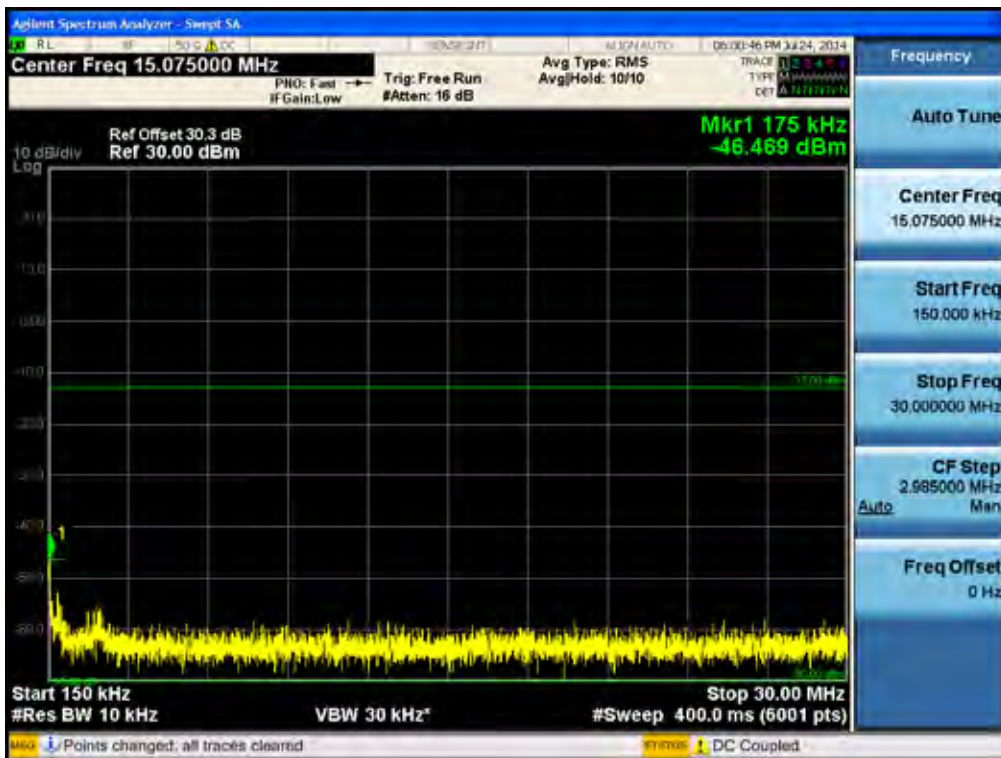
[LTE Downlink 5 MHz Low]



[LTE Downlink 5 MHz Middle]

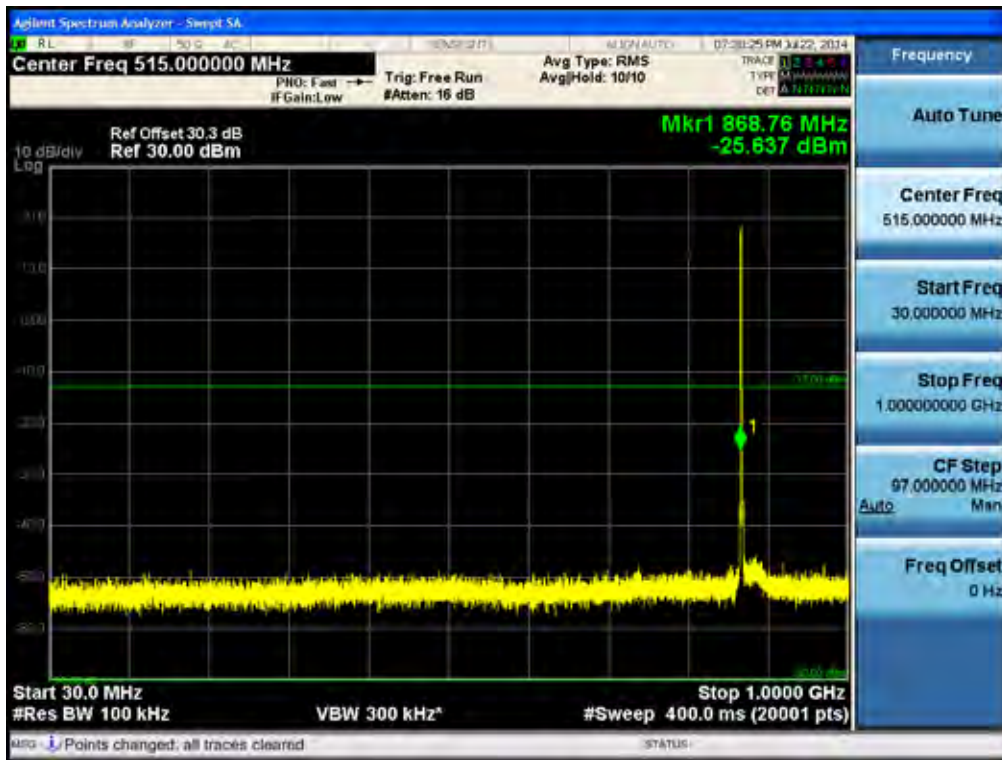


[LTE Downlink 5 MHz High]

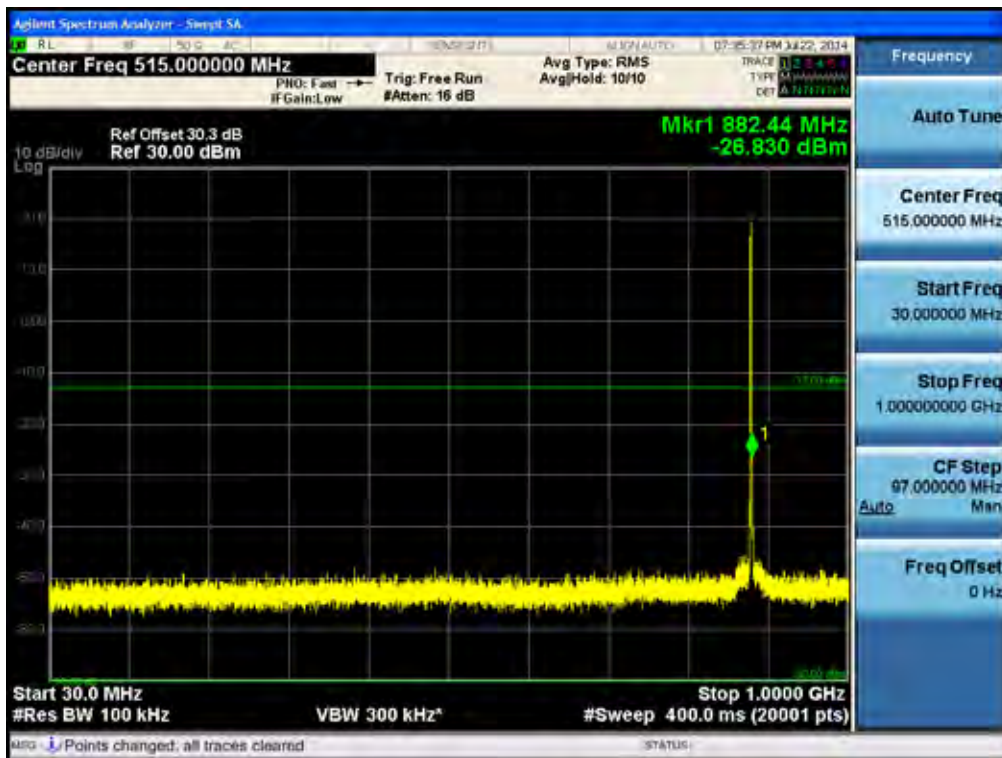


Conducted Spurious Emissions (30 MHz – 1 GHz)

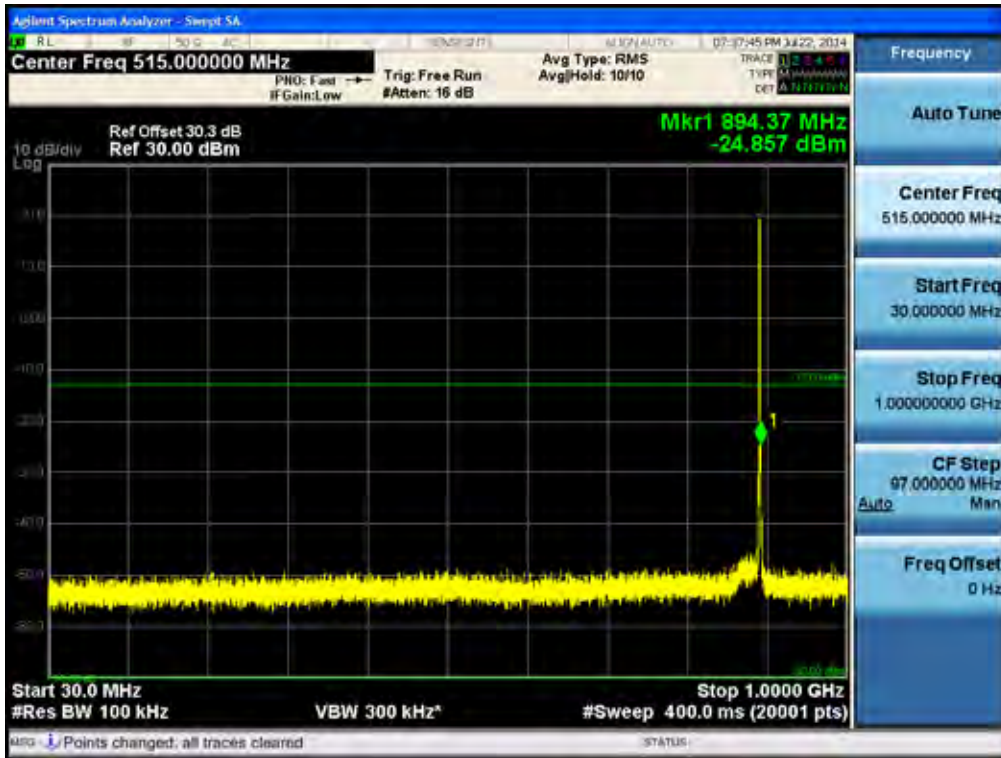
[CDMA Downlink Low]



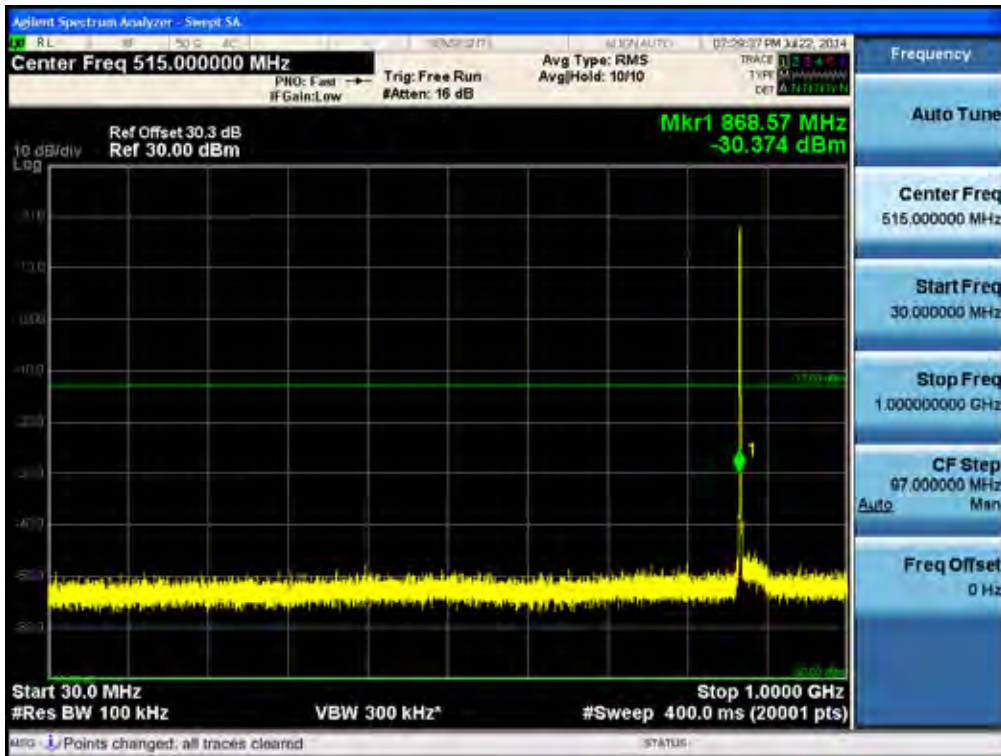
[CDMA Downlink Middle]



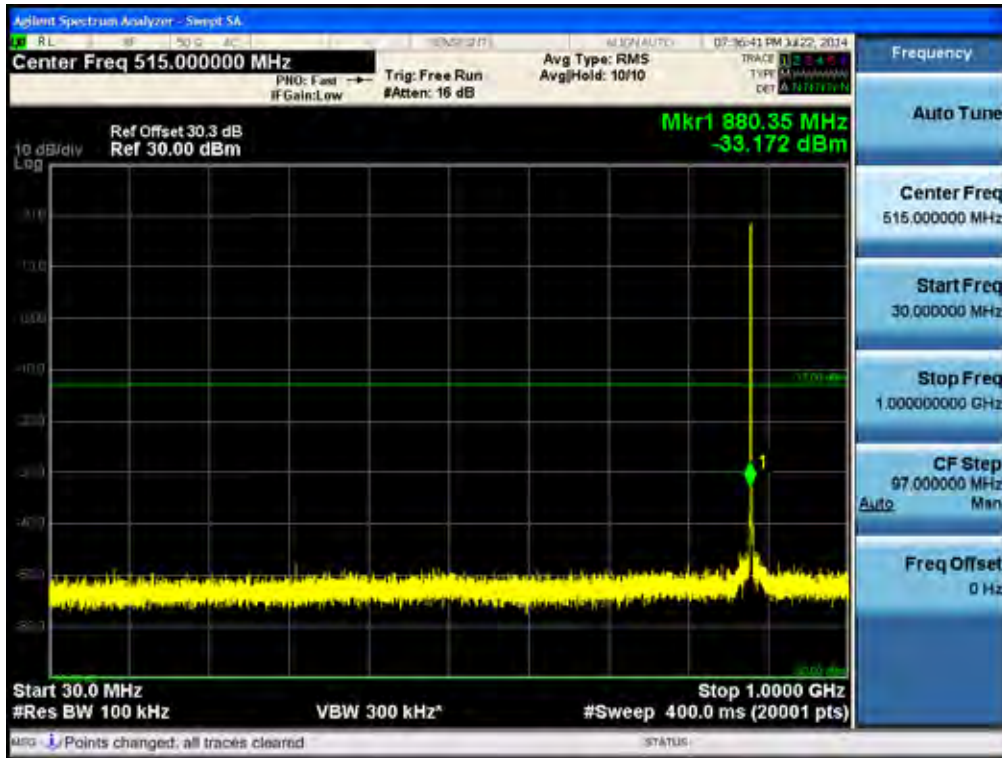
[CDMA Downlink High]



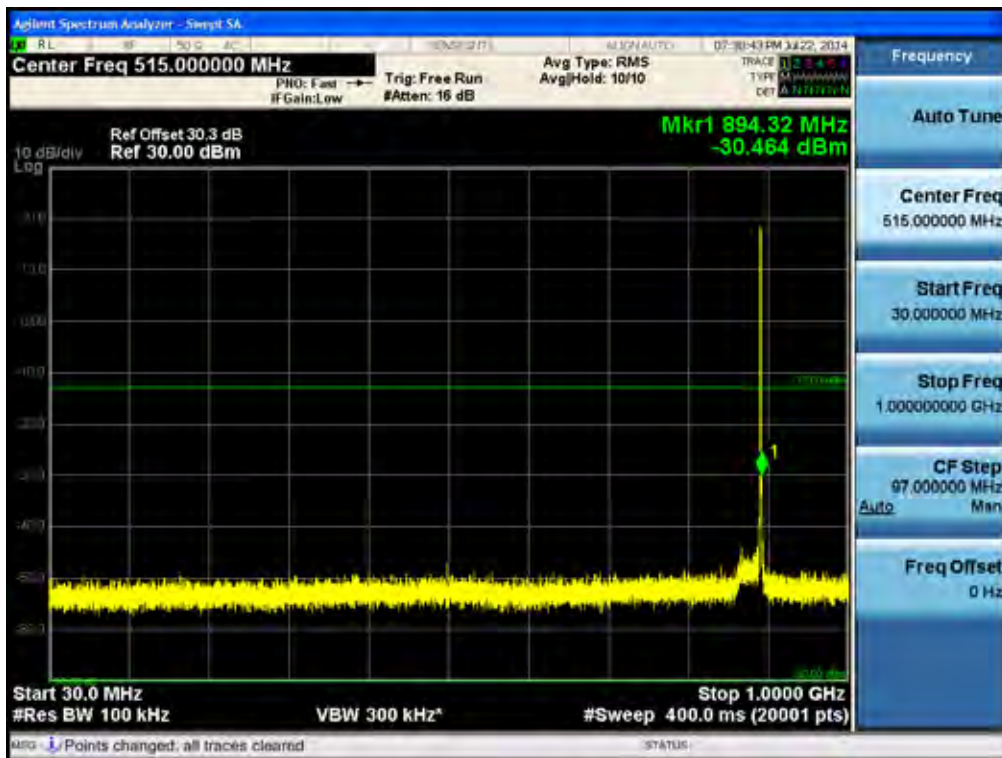
[CDMA EVDO Downlink Low]



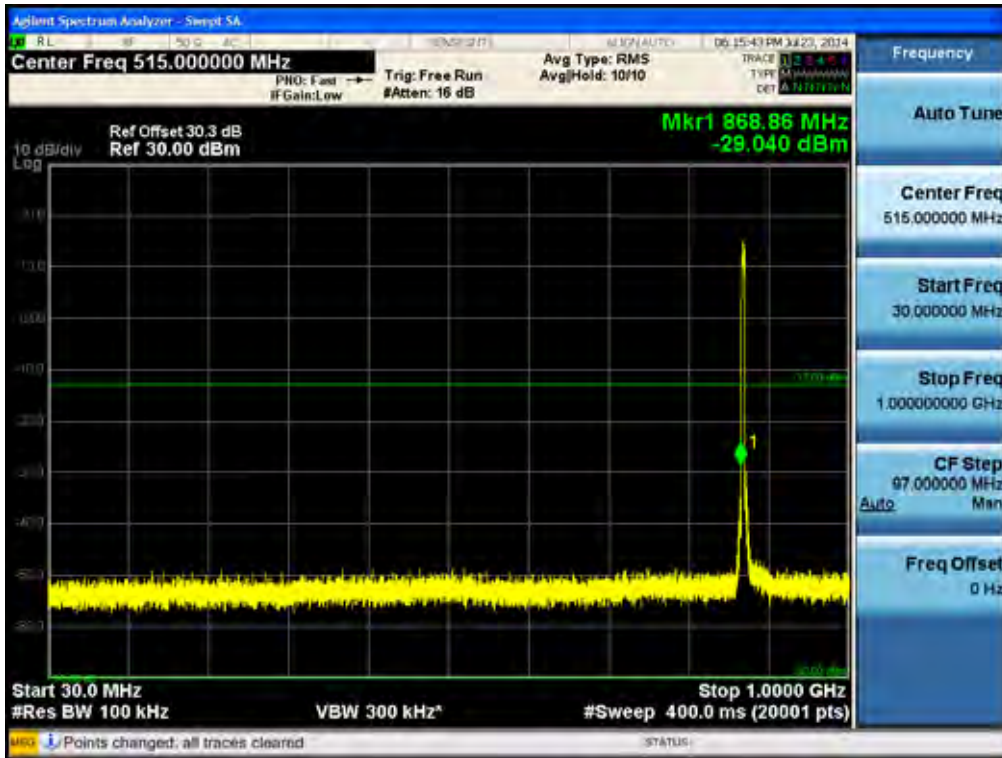
[CDMA EVDO Downlink Middle]



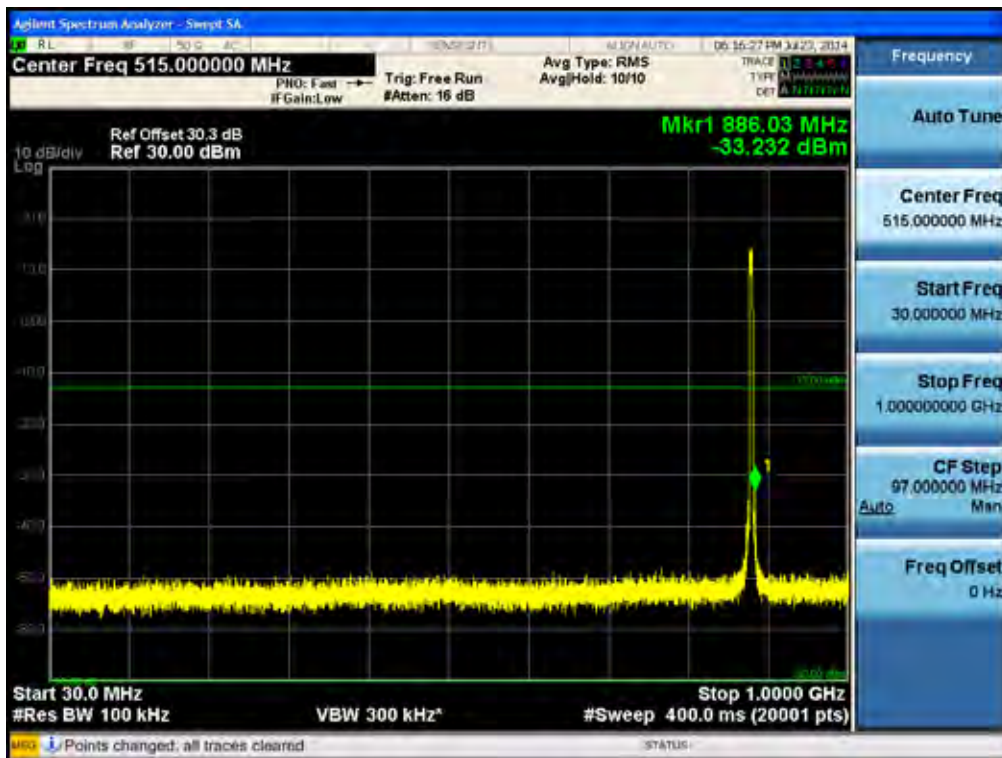
[CDMA EVDO Downlink High]



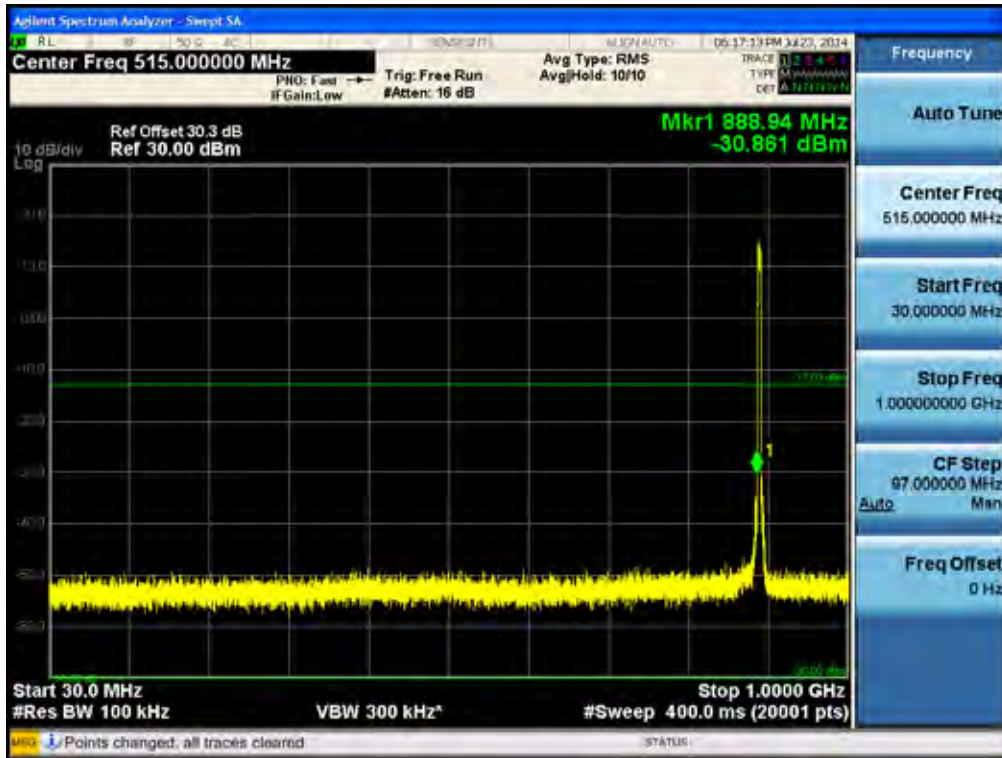
[WCDMA Downlink Low]



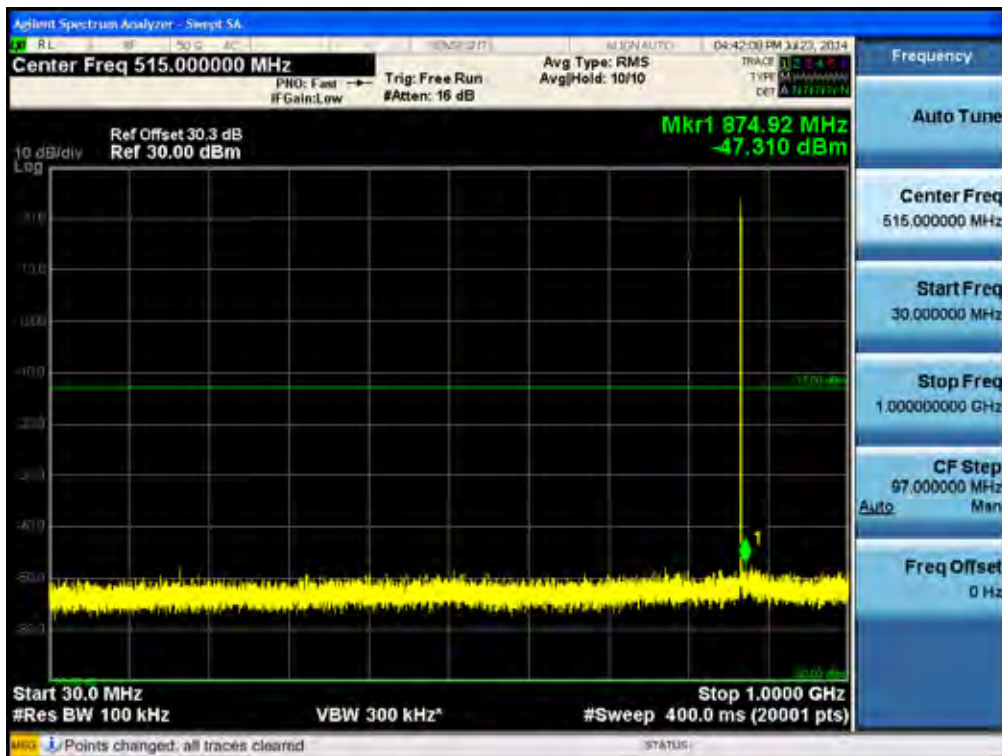
[WCDMA Downlink Middle]



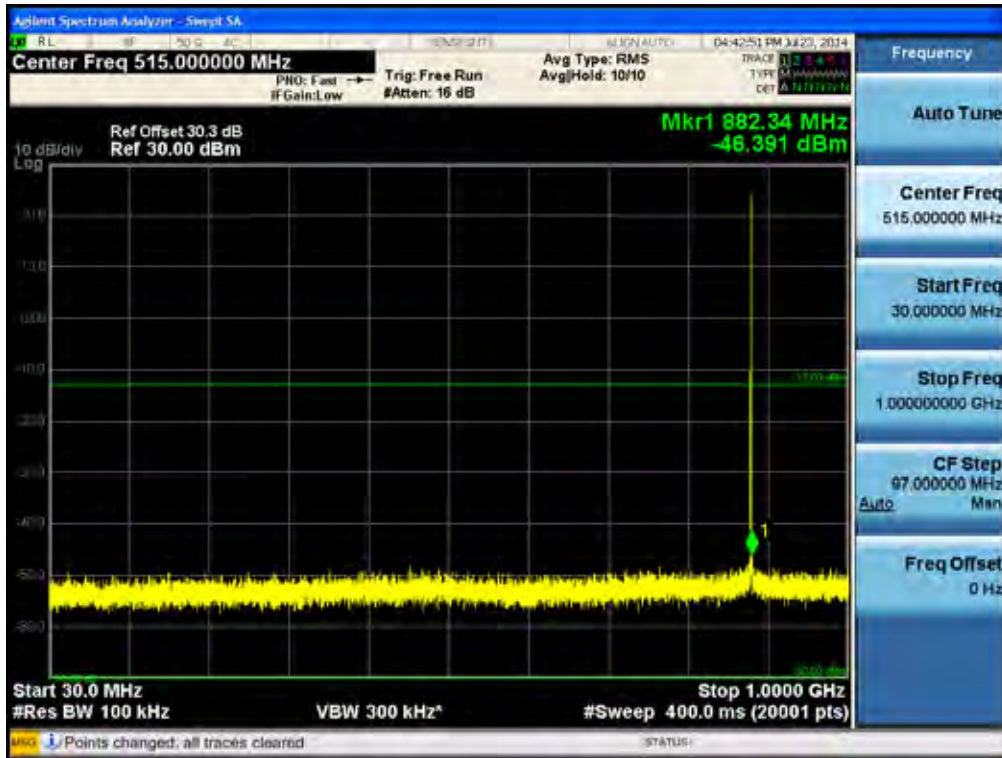
[WCDMA Downlink High]



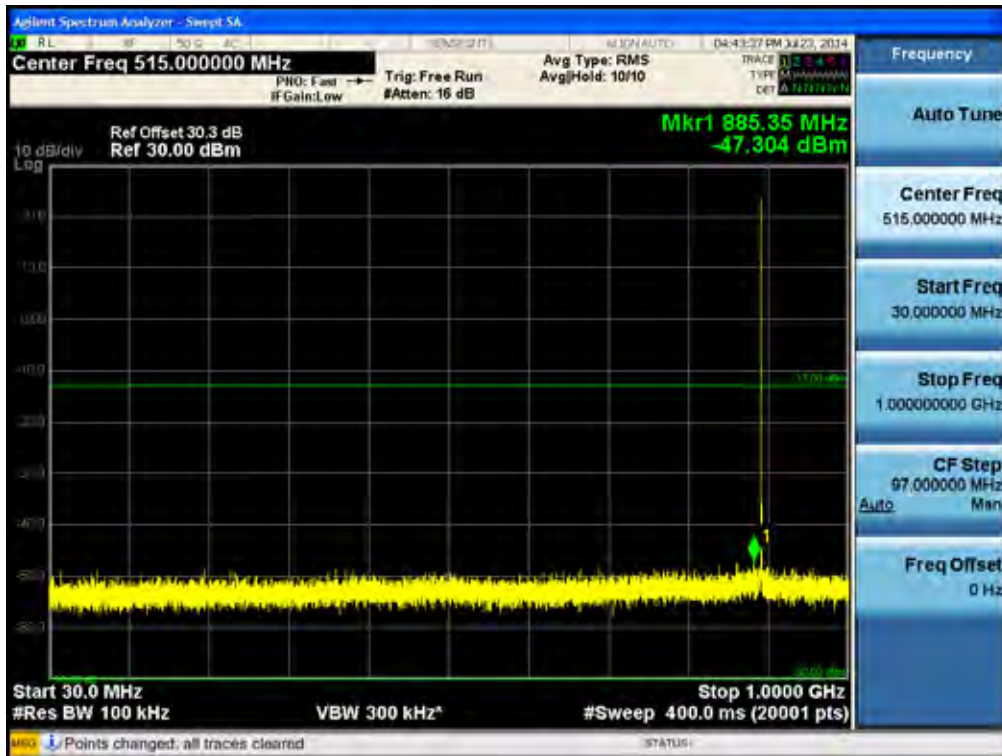
[GSM Downlink Low]



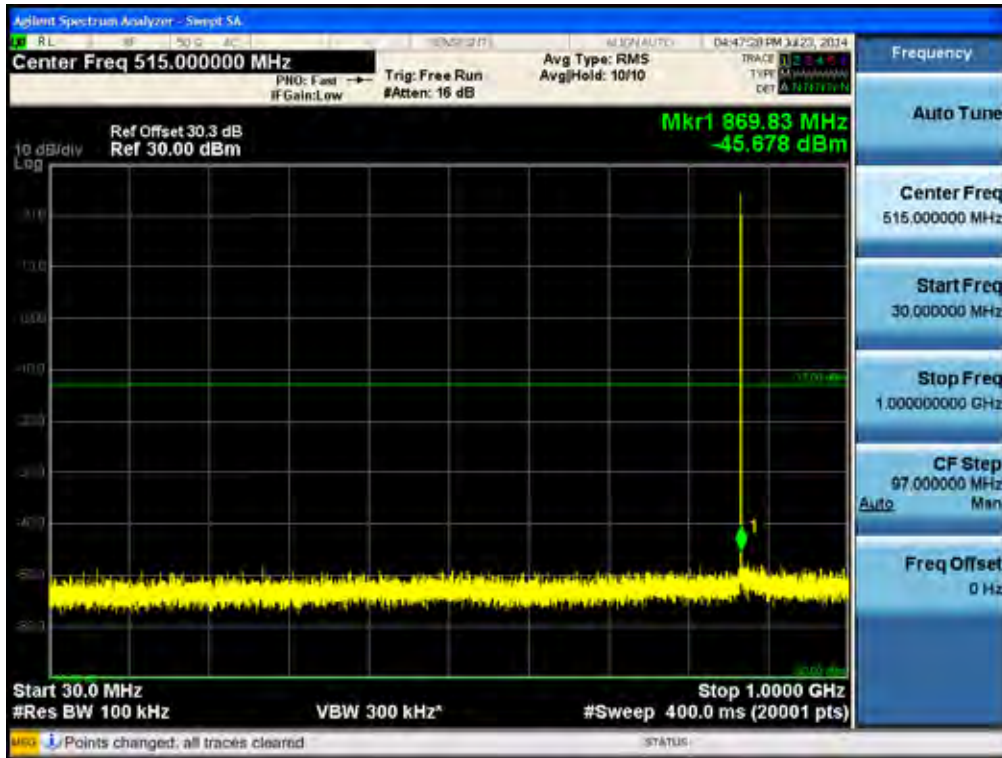
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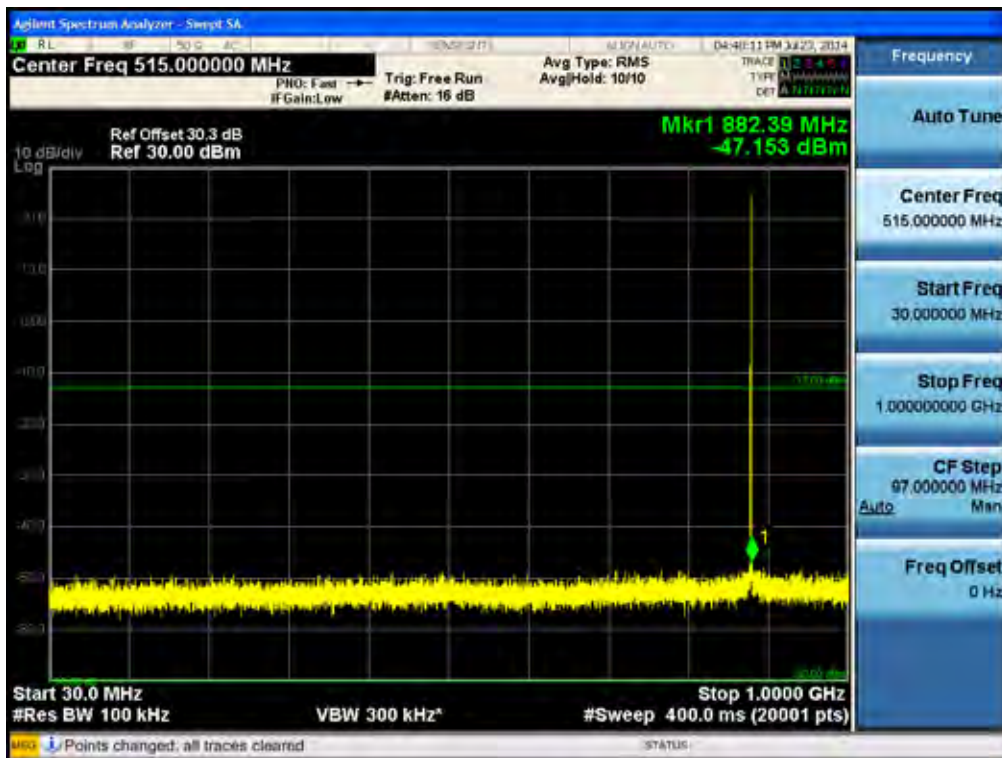
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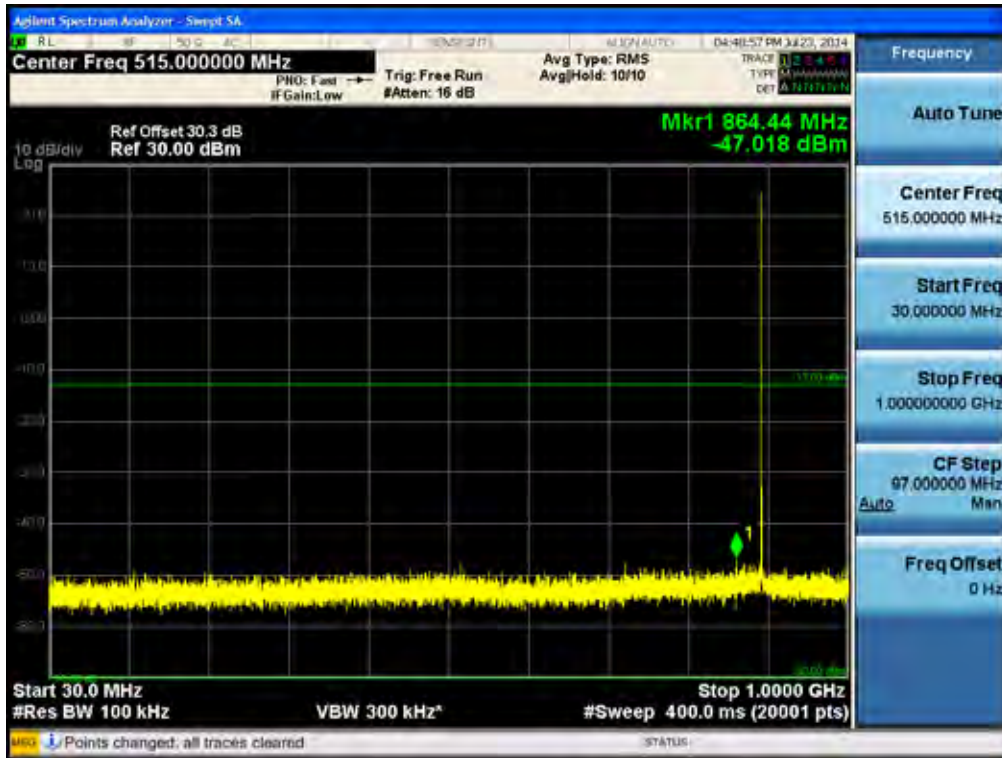
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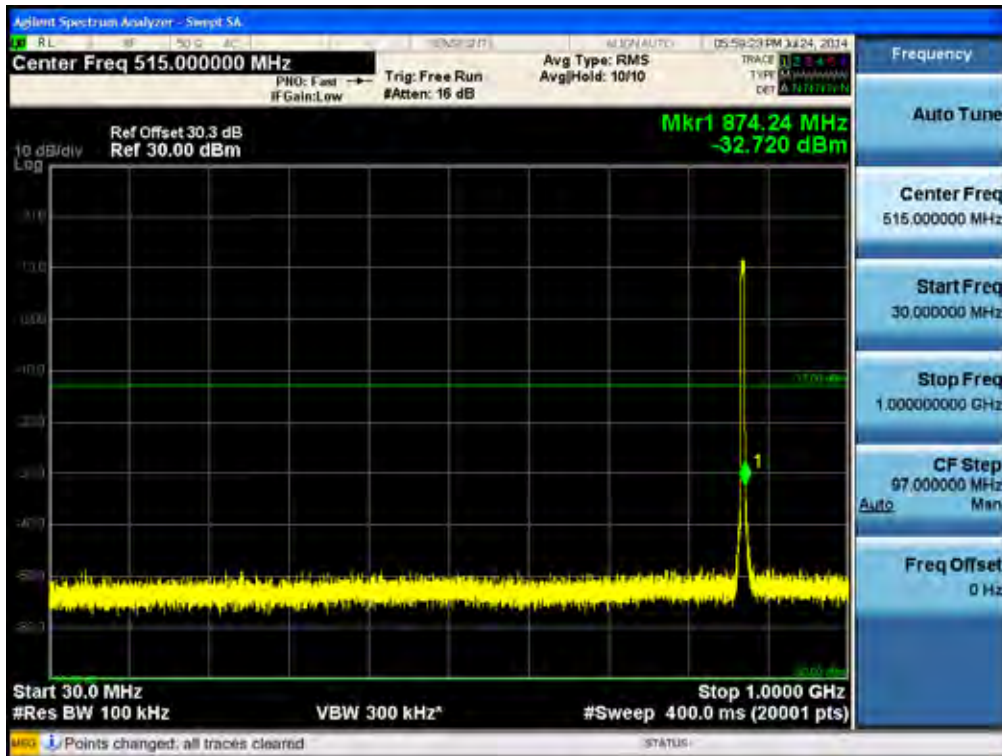
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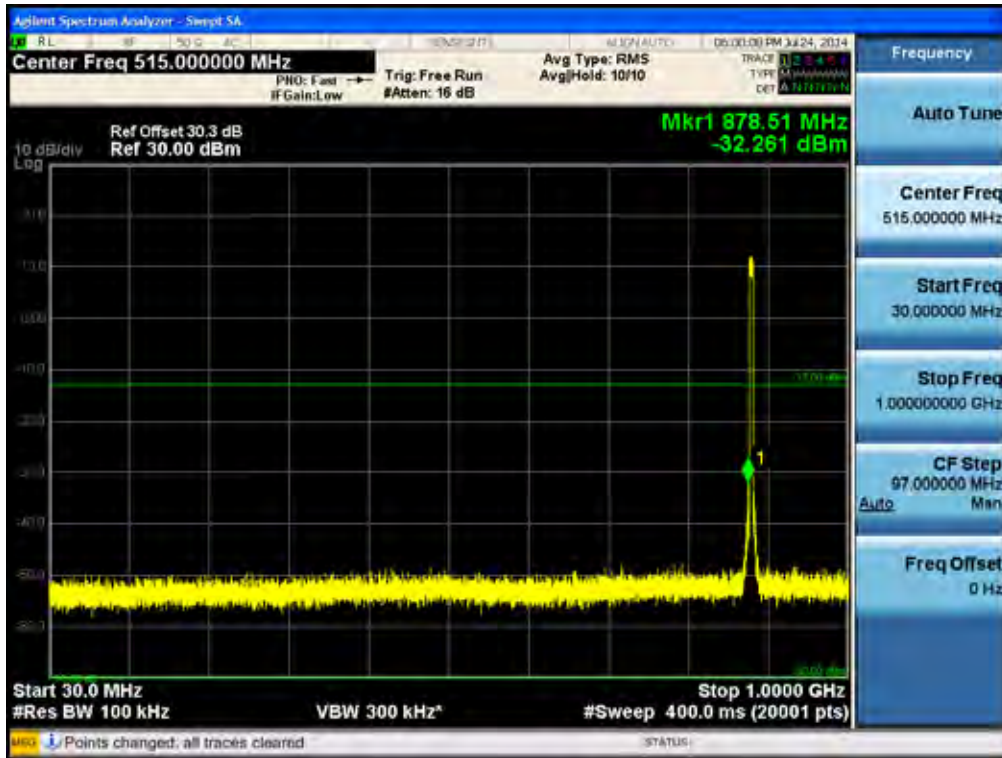
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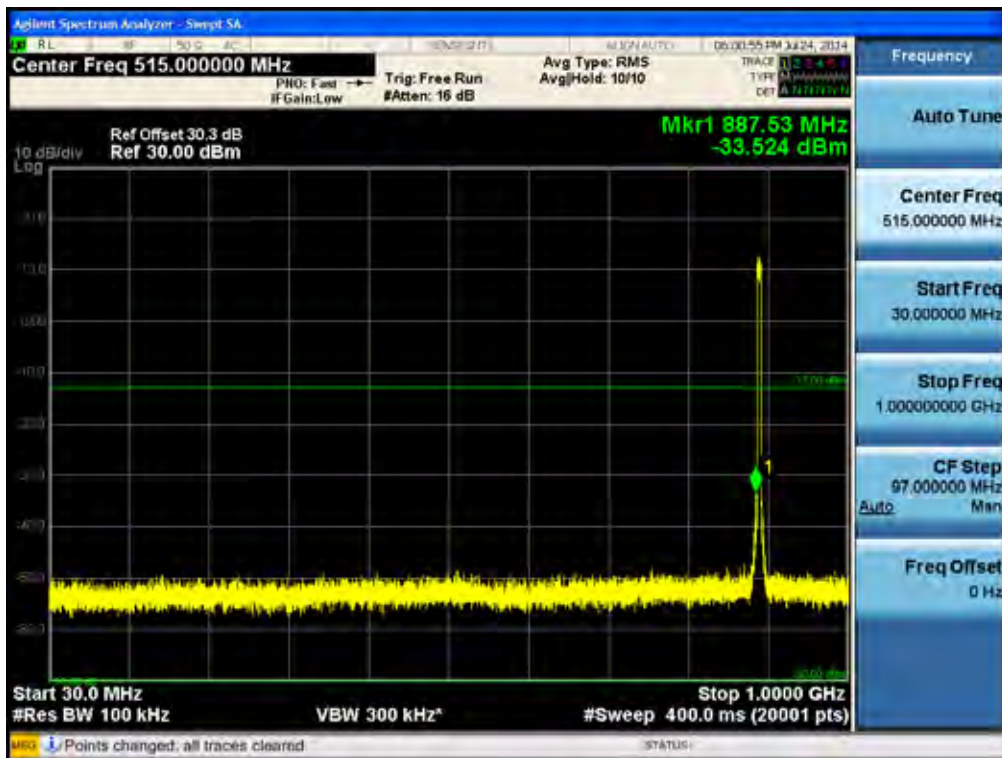
[LTE Downlink 5 MHz Low]



[LTE Downlink 5 MHz Middle]



[LTE Downlink 5 MHz High]



Conducted Spurious Emissions (1 GHz –12.75 GHz)
[CDMA Downlink Low]



[CDMA Downlink Middle]



[CDMA Downlink High]



[CDMA EVDO Downlink Low]



[CDMA EVDO Downlink Middle]



[CDMA EVDO Downlink High]



[WCDMA Downlink Low]



[WCDMA Downlink Middle]



[WCDMA Downlink High]



[GSM Downlink Low]



[GSM Downlink Middle]



[GSM Downlink High]



[GSM EDGE Downlink Low]



[GSM EDGE Downlink Middle]



[GSM EDGE Downlink High]



[LTE Downlink 5 MHz Low]



[LTE Downlink 5 MHz Middle]

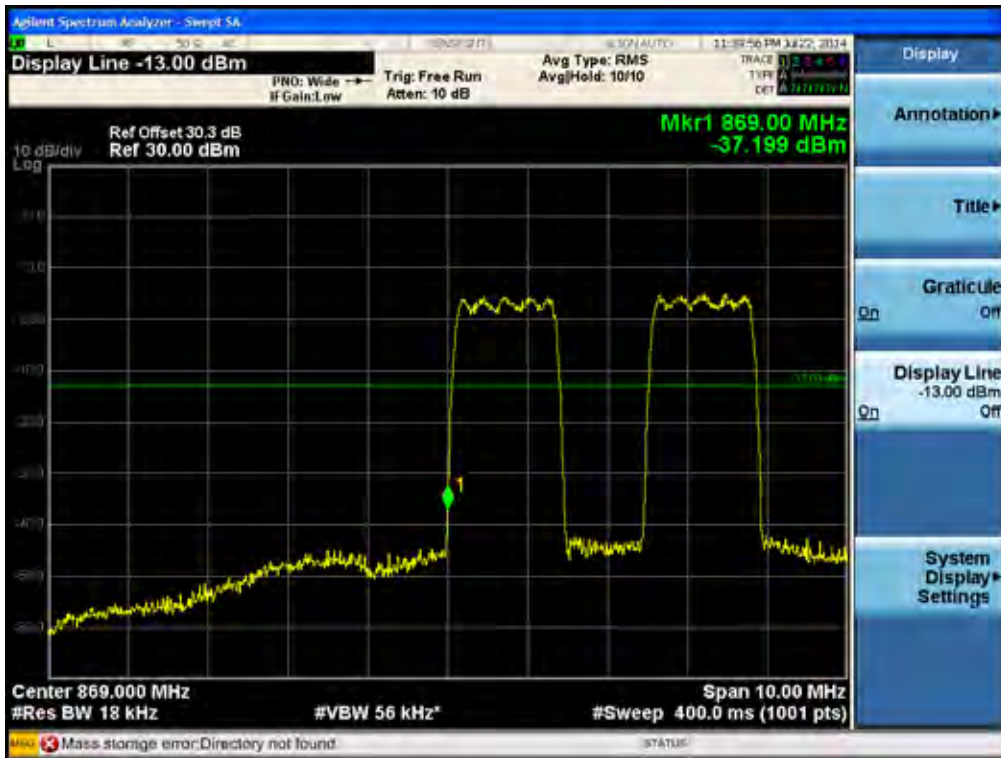


[LTE Downlink 5 MHz High]

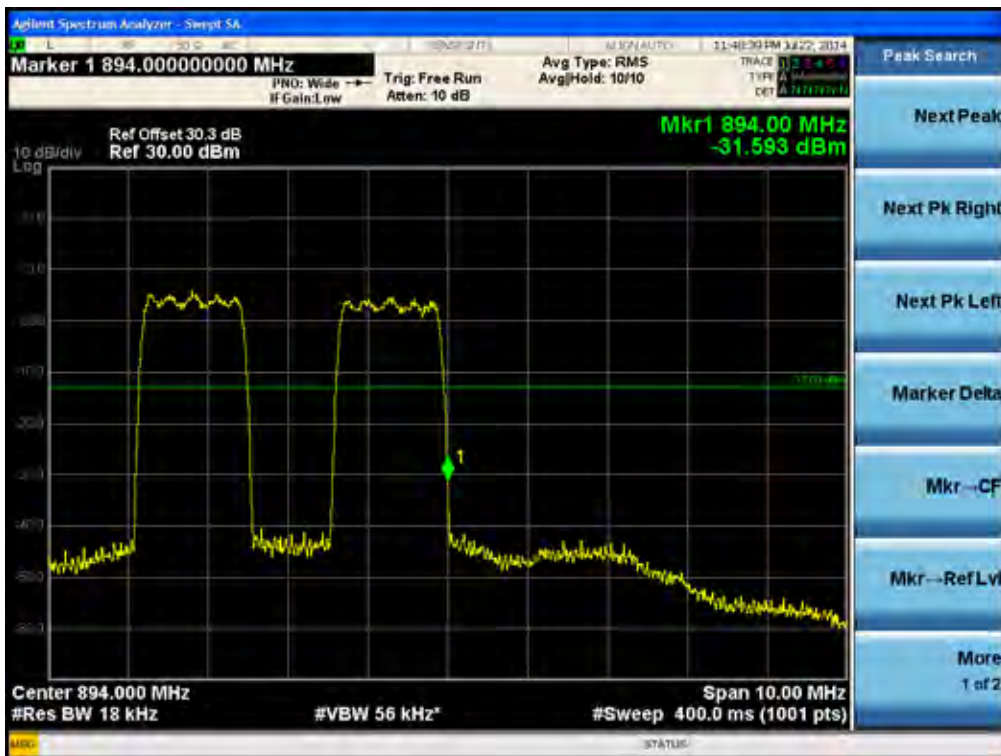


Intermodulation Spurious Emissions

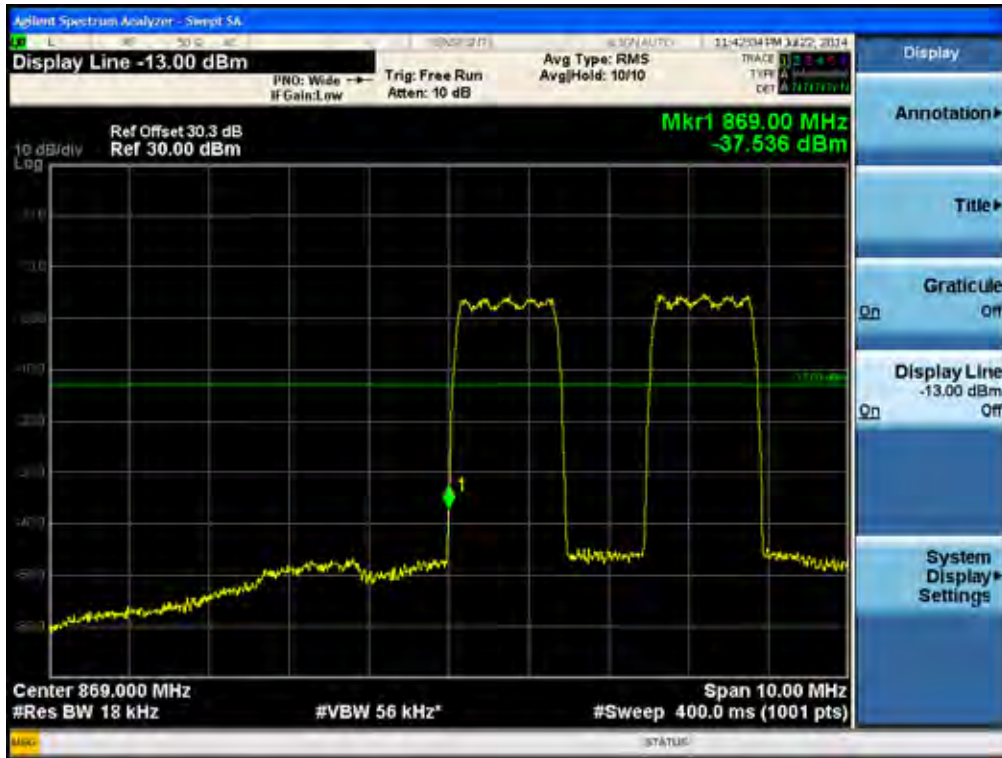
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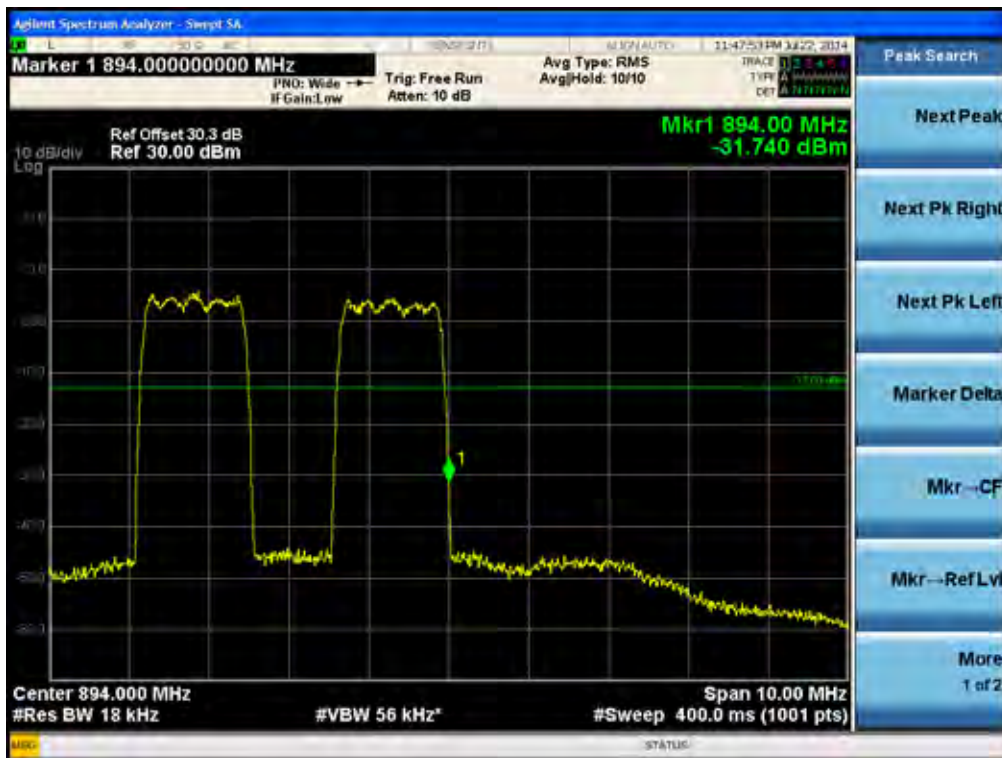
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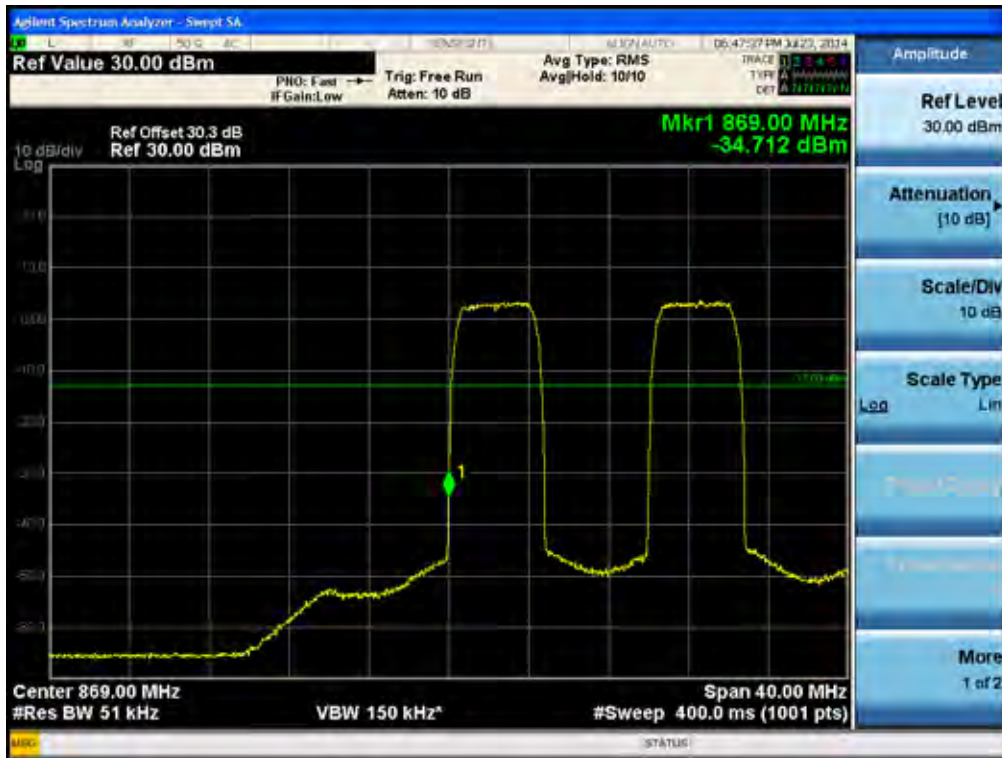
[CDMA EVDO Downlink Low]



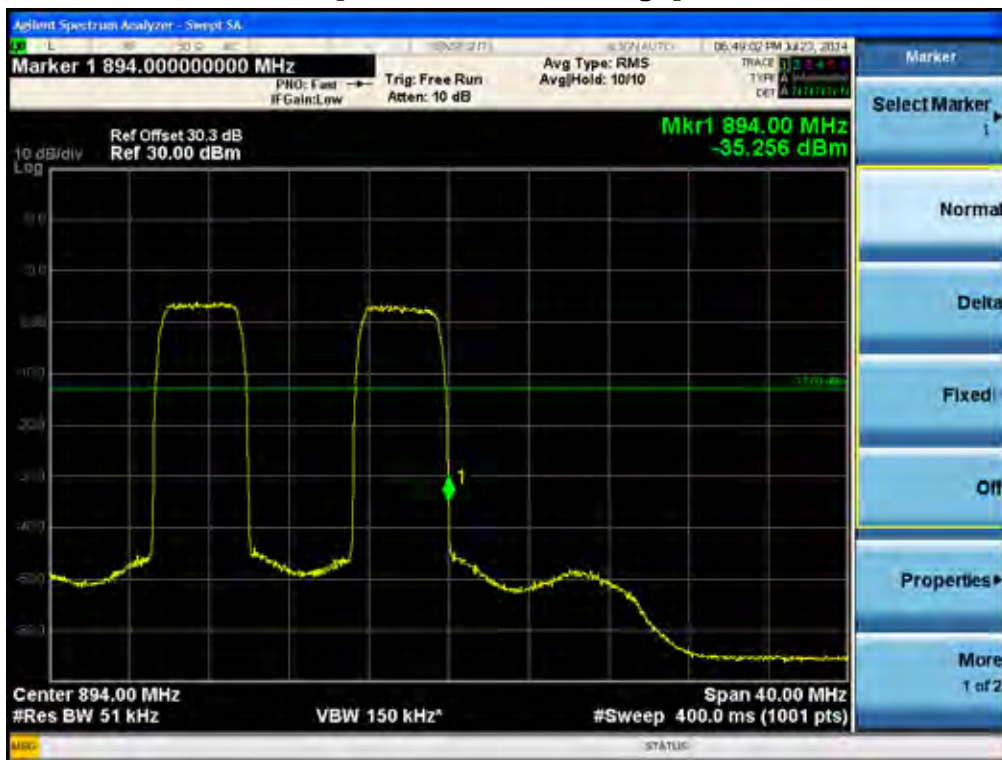
[CDMA EVDO Downlink High]



[WCDMA Downlink Low]



[WCDMA Downlink High]



[GSM Downlink Low]



[GSM Downlink High]



[GSM EDGE Downlink Low]



[GSM EDGE Downlink High]



[LTE5 Downlink Low]



[LTE5 Downlink High]



Band Edge

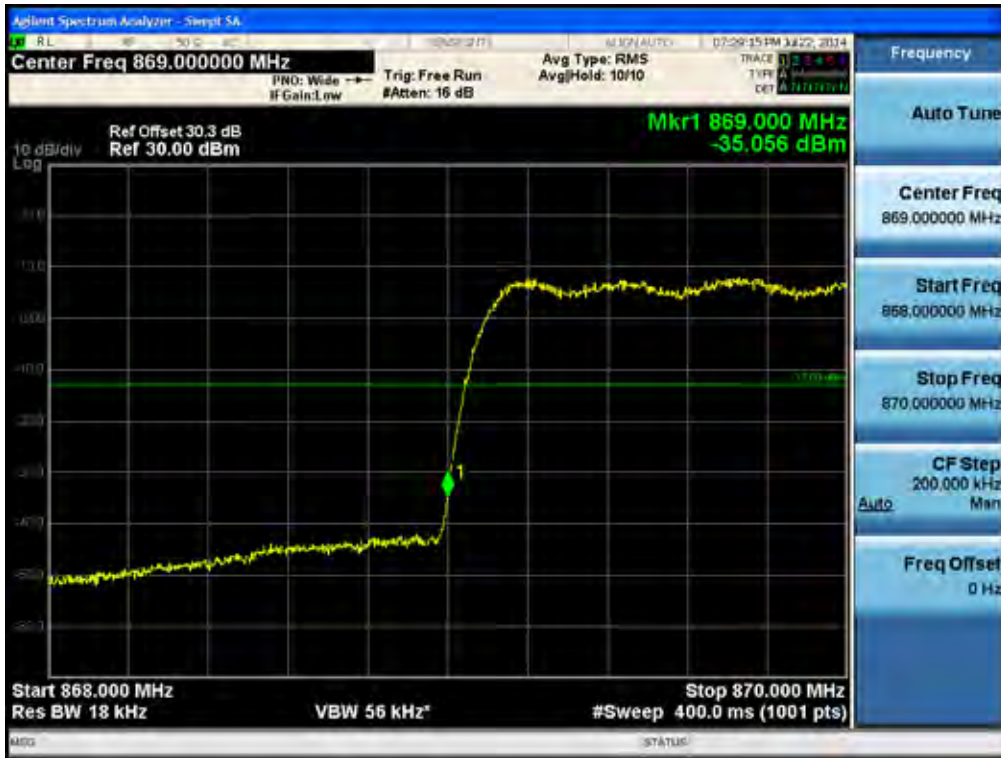
[CDMA Downlink Low]



[CDMA Downlink High]



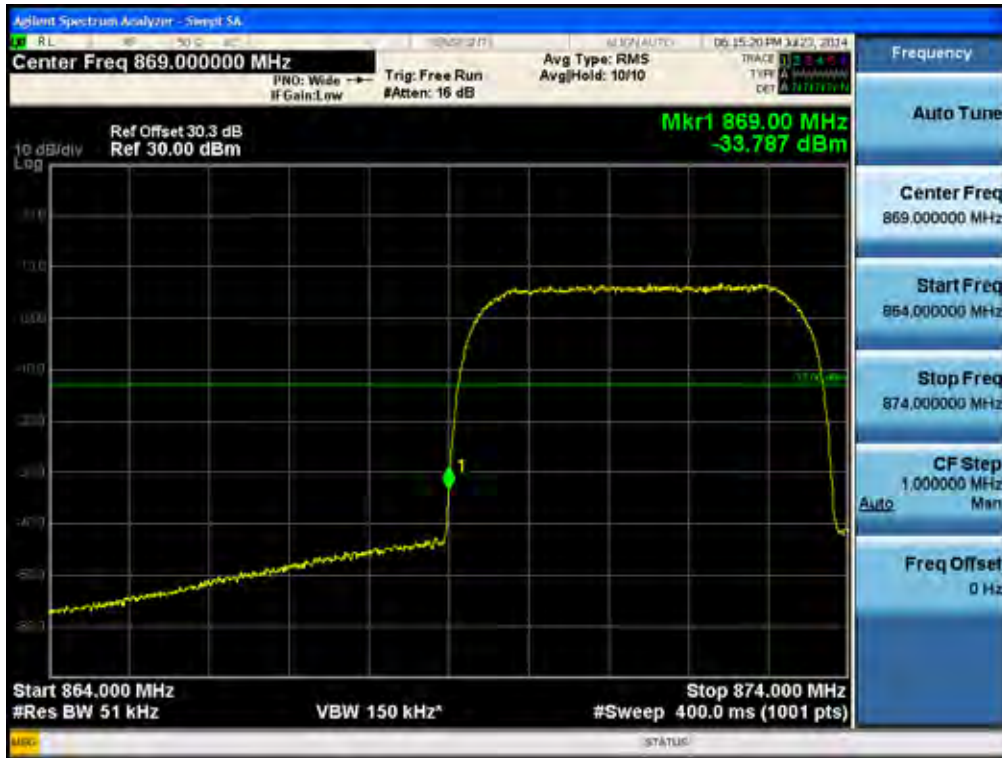
[CDMA EVDO Downlink Low]



[CDMA EVDO Downlink High]



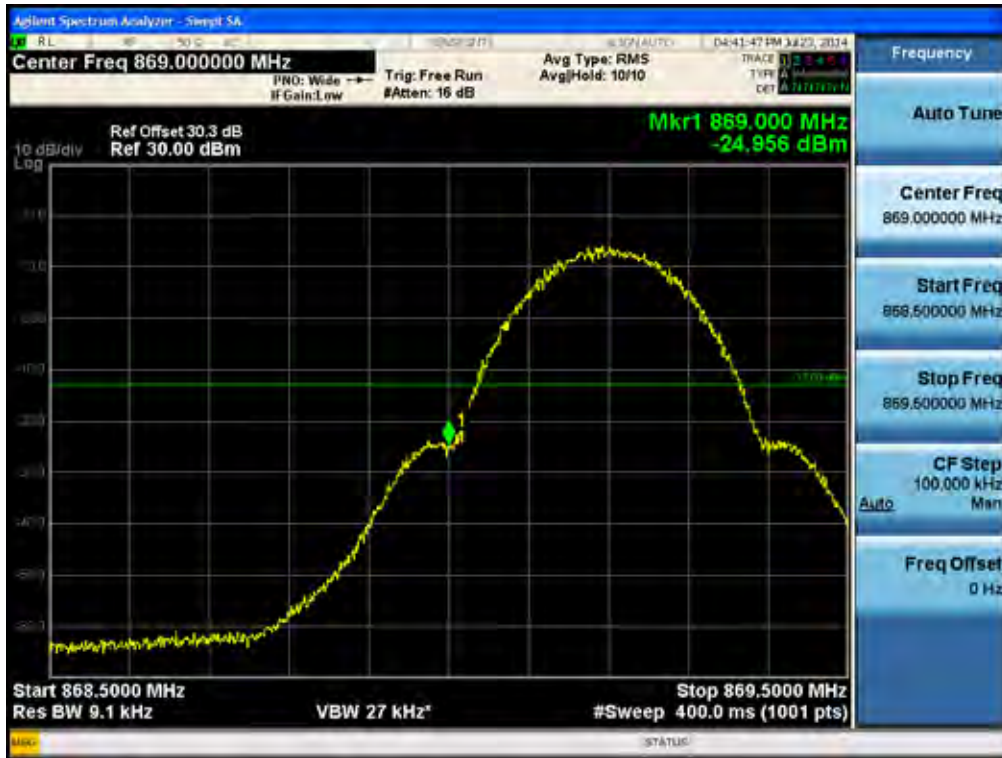
[WCDMA Downlink Low]



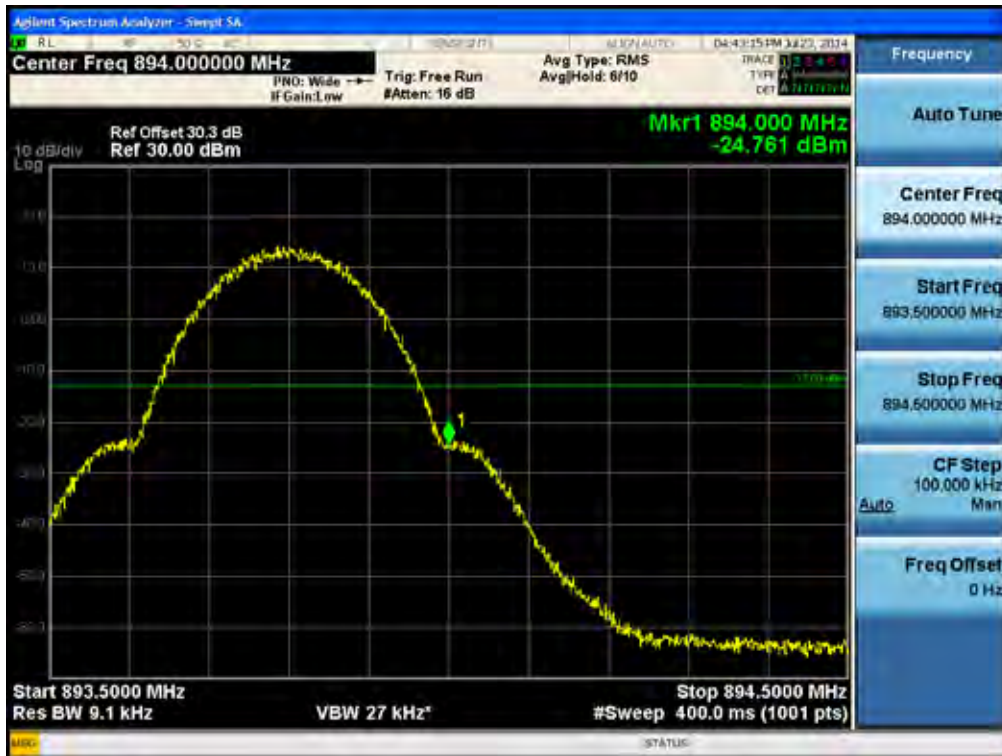
[WCDMA Downlink High]



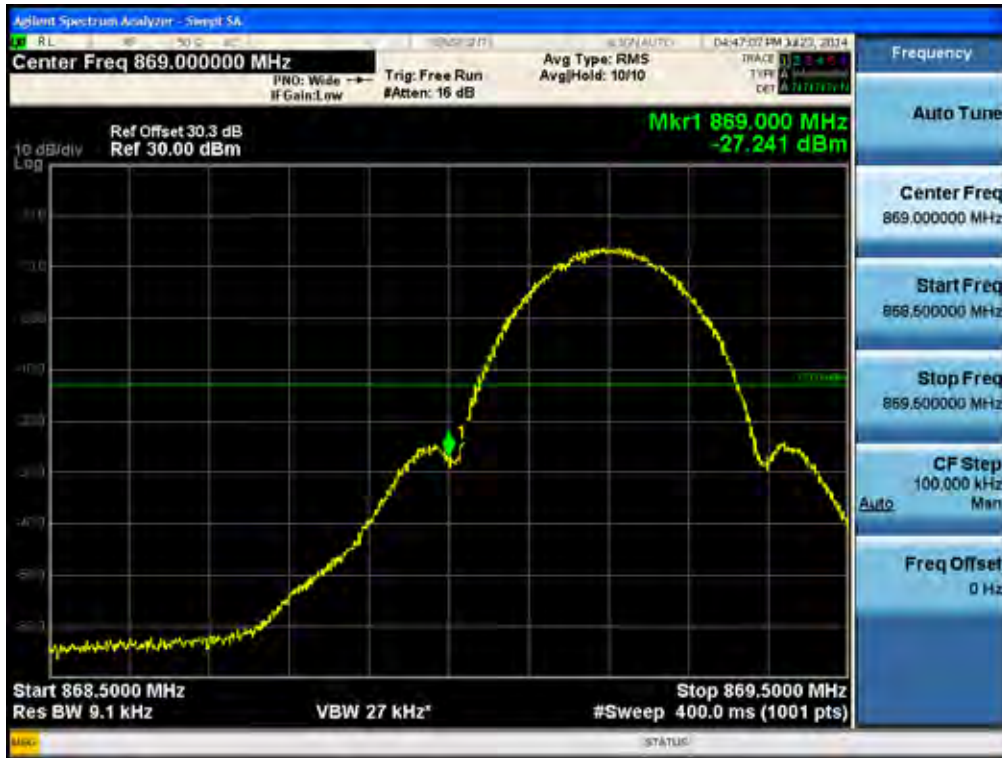
[GSM Downlink Low]



[GSM Downlink High]



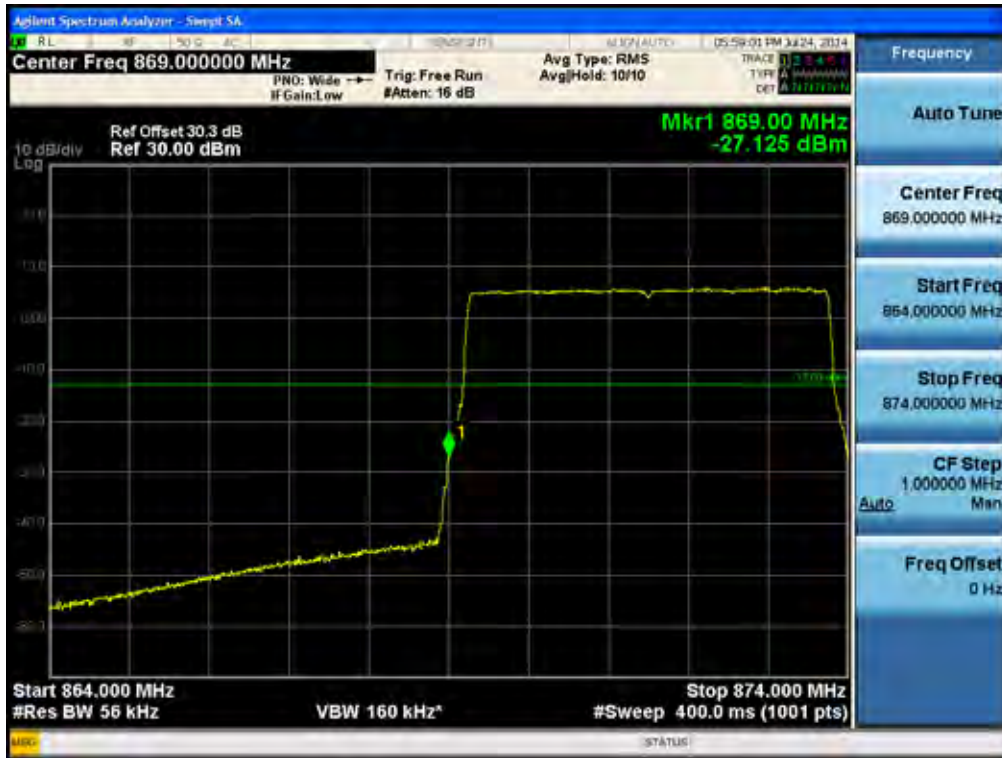
[GSM EDGE Downlink Low]



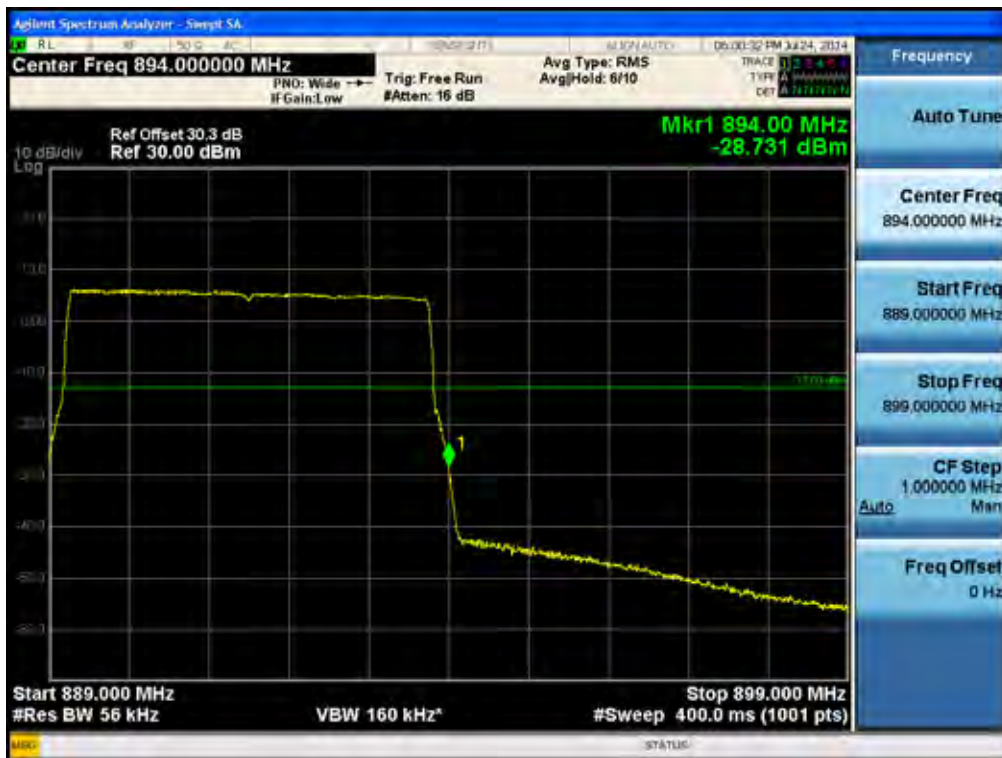
[GSM EDGE Downlink High]



[LTE Downlink 5 MHz Low]

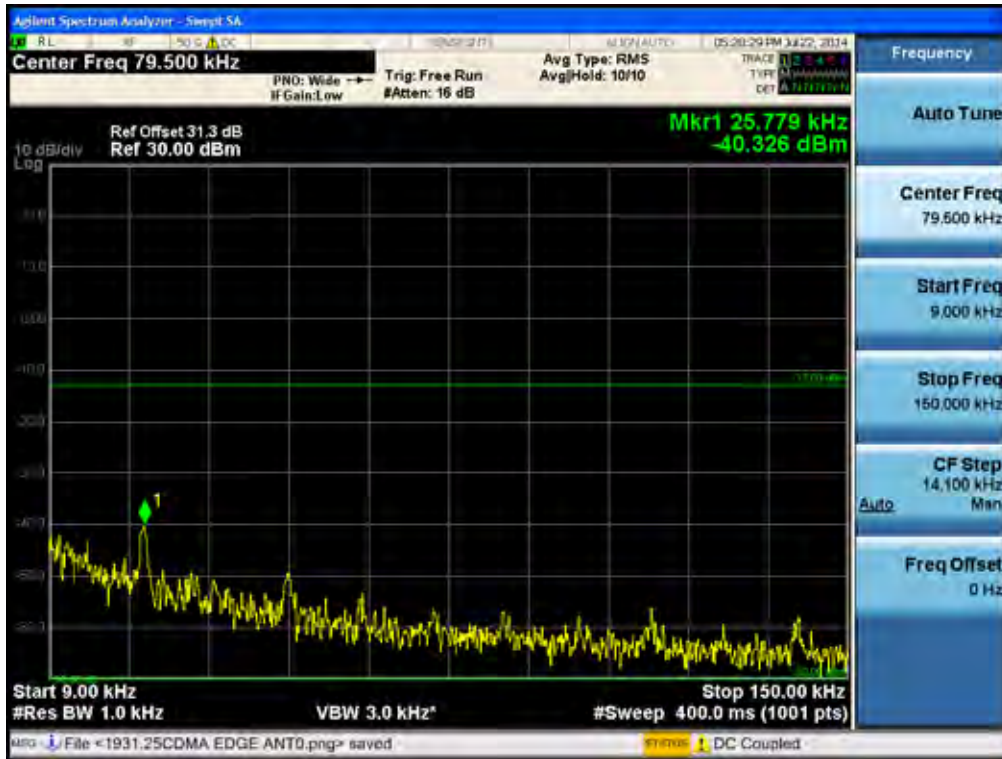


[LTE Downlink 5 MHz High]

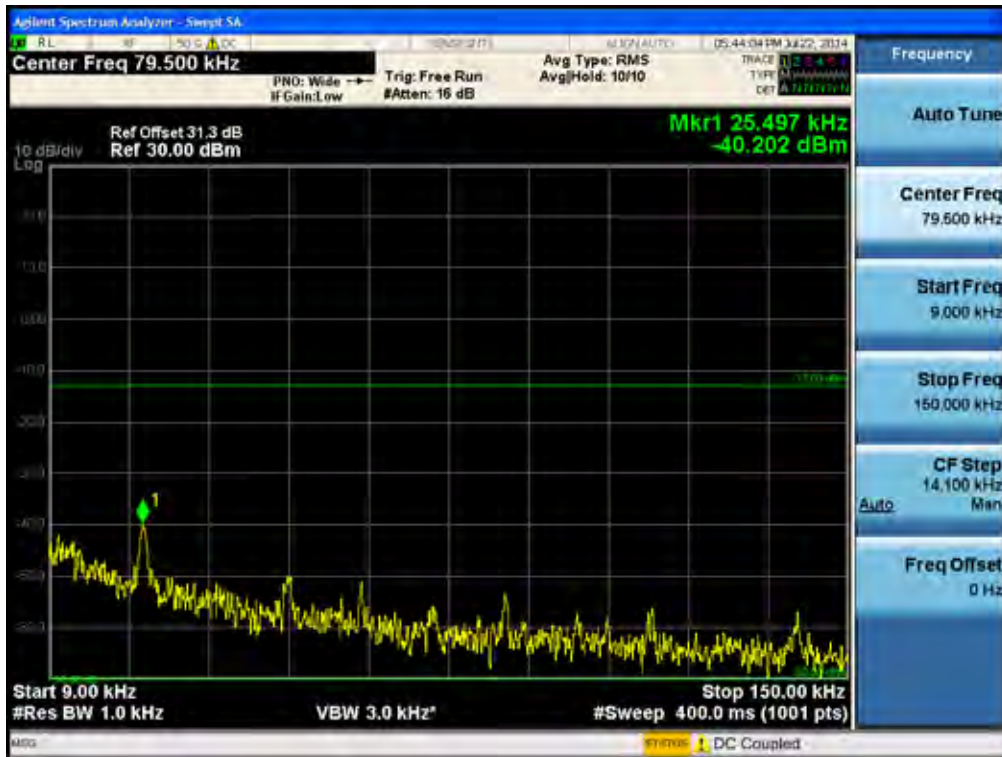


PCS Band Plots of Spurious Emission
Conducted Spurious Emissions (9 kHz – 150 kHz)

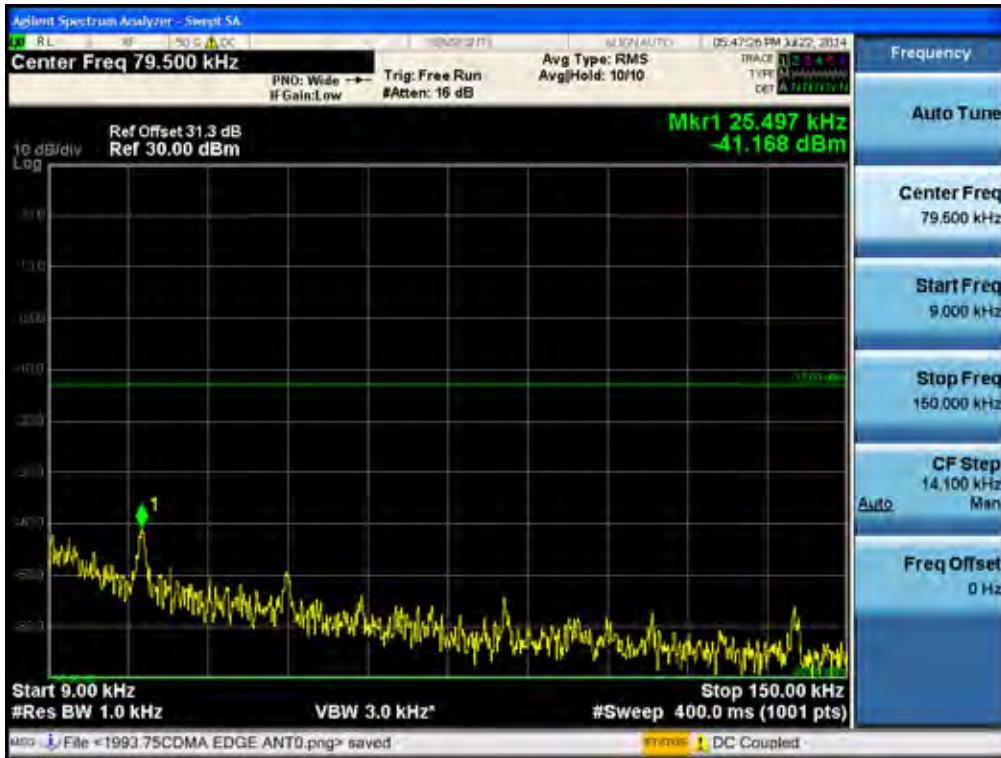
[CDMA Downlink Low]



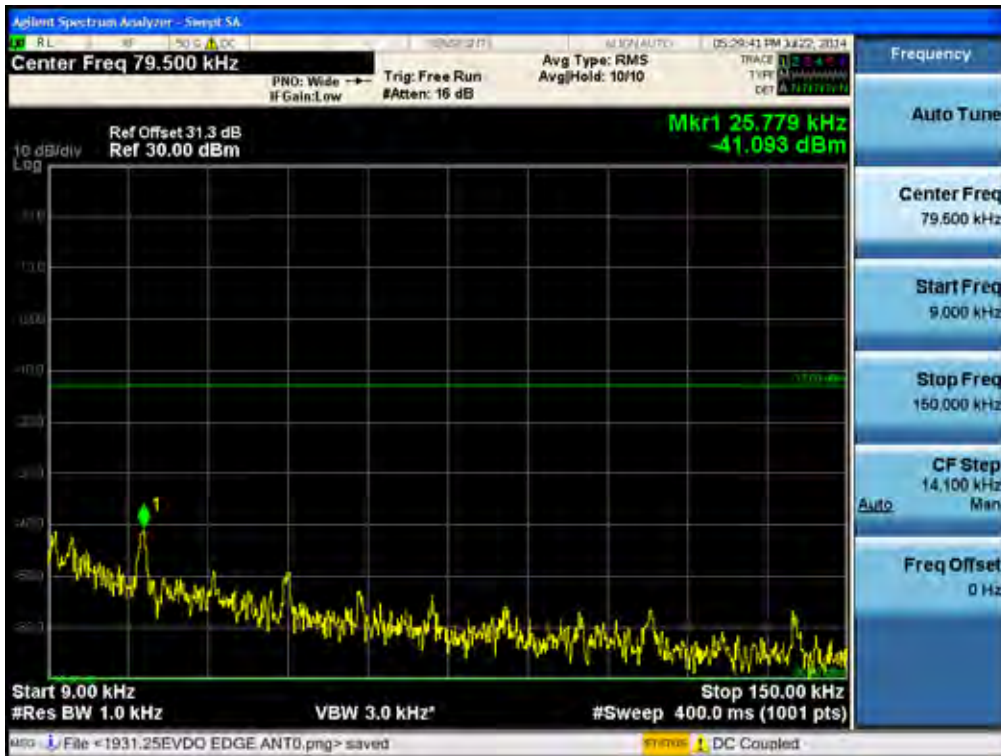
[CDMA Downlink Middle]



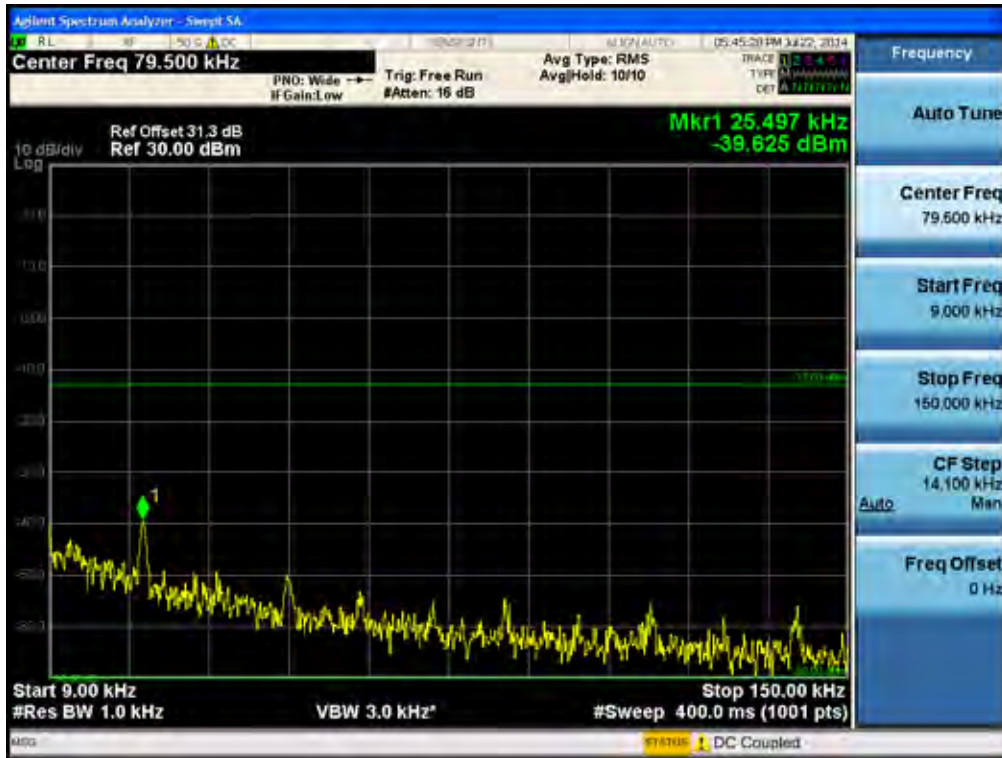
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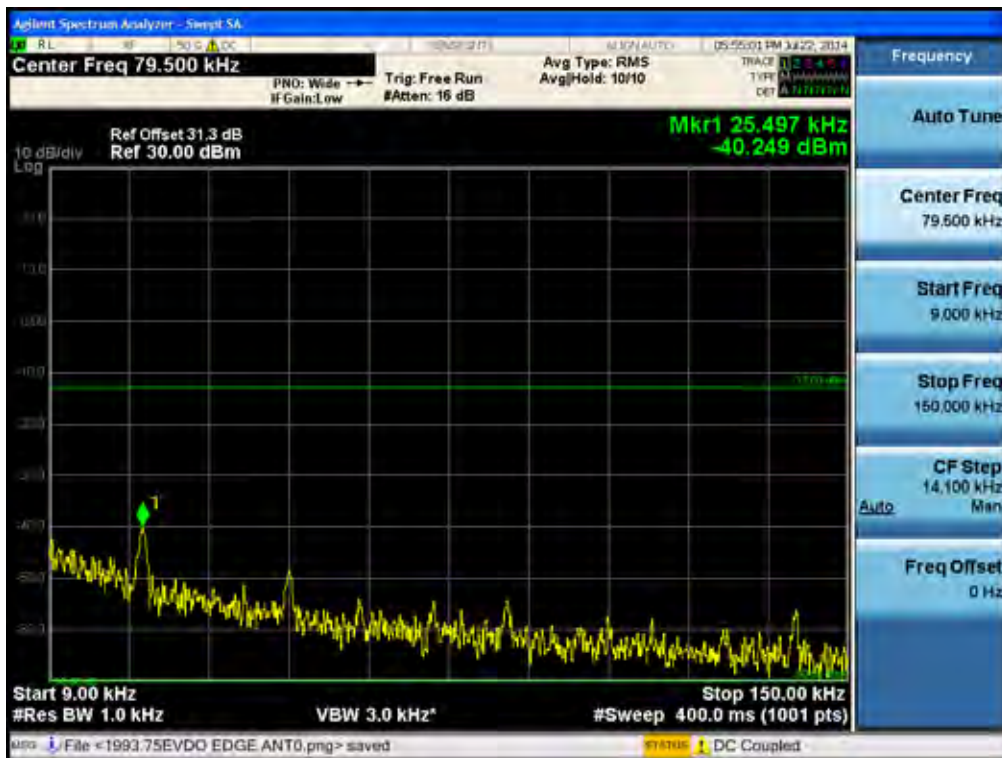
[CDMA EVDO Downlink Low]



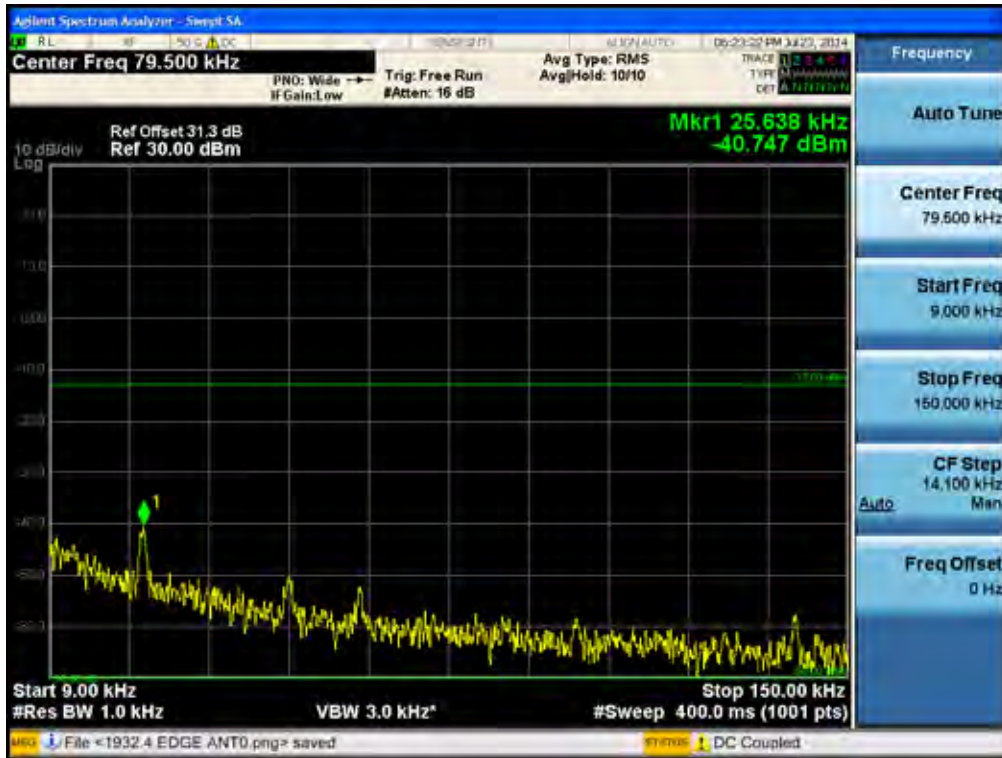
[CDMA EVDO Downlink Middle]



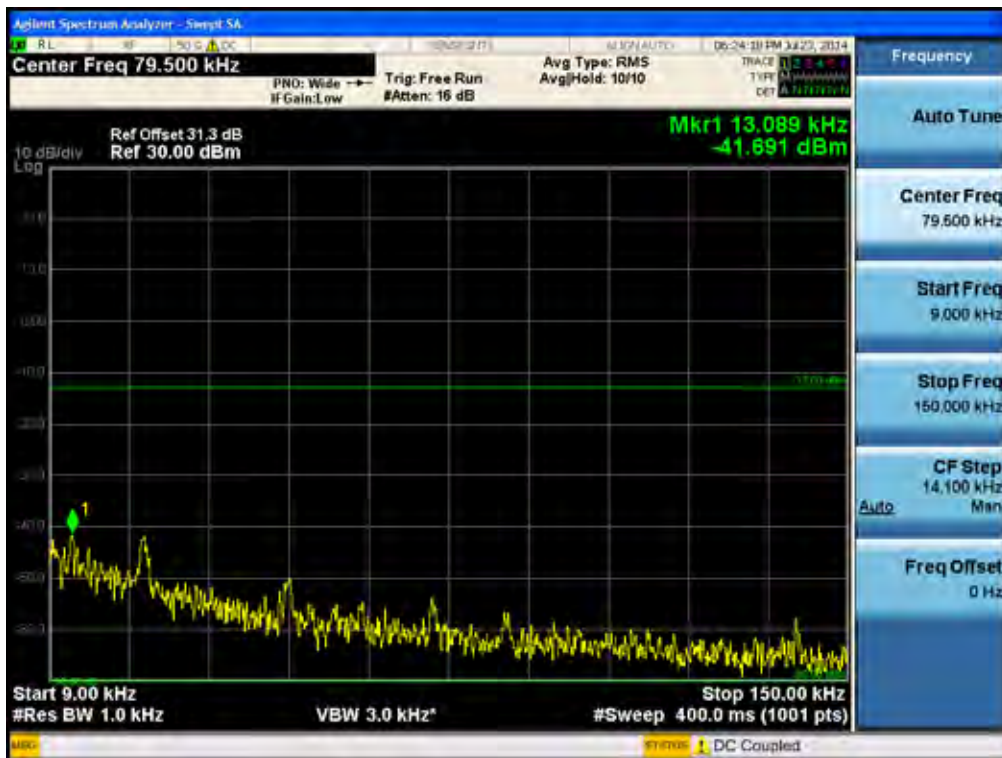
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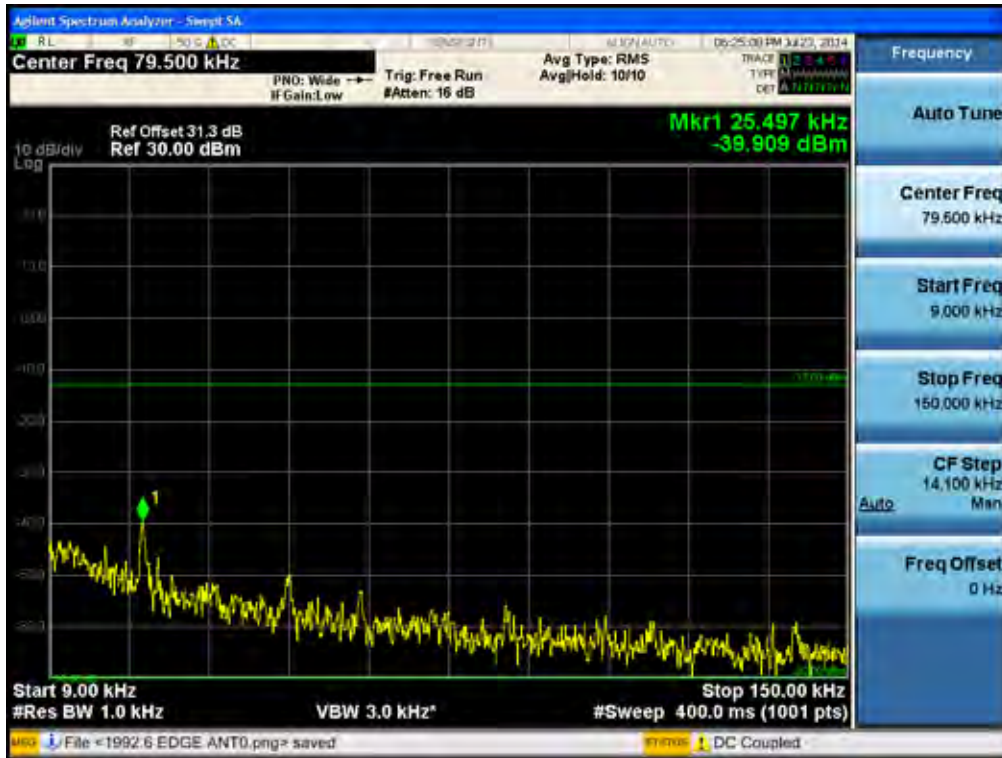
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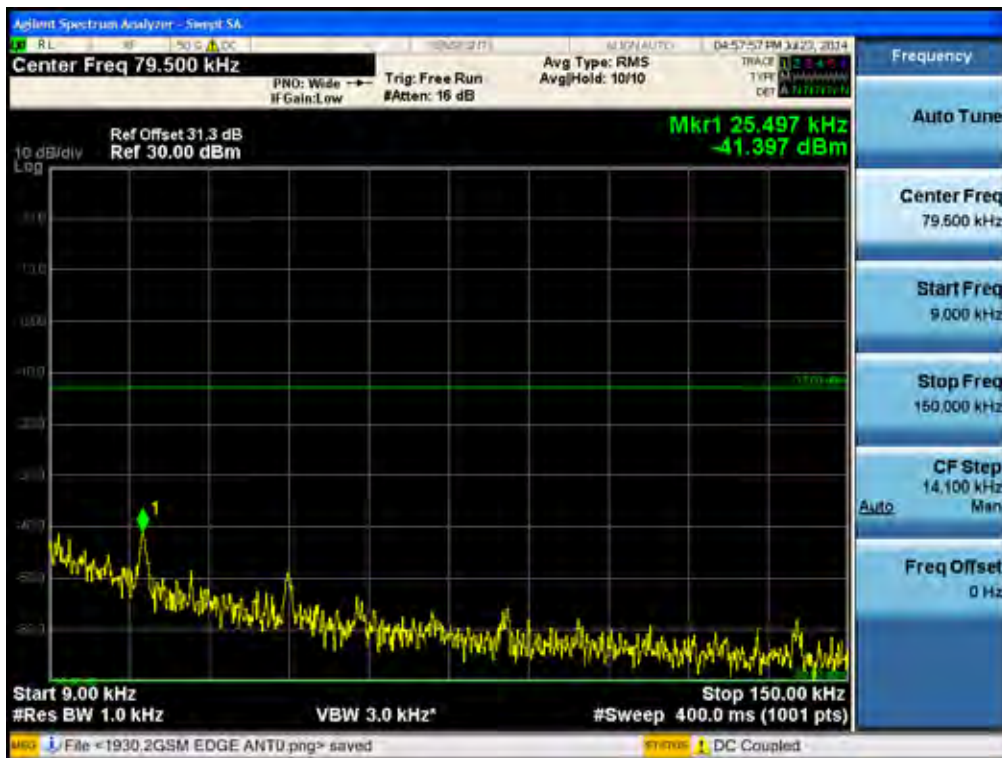
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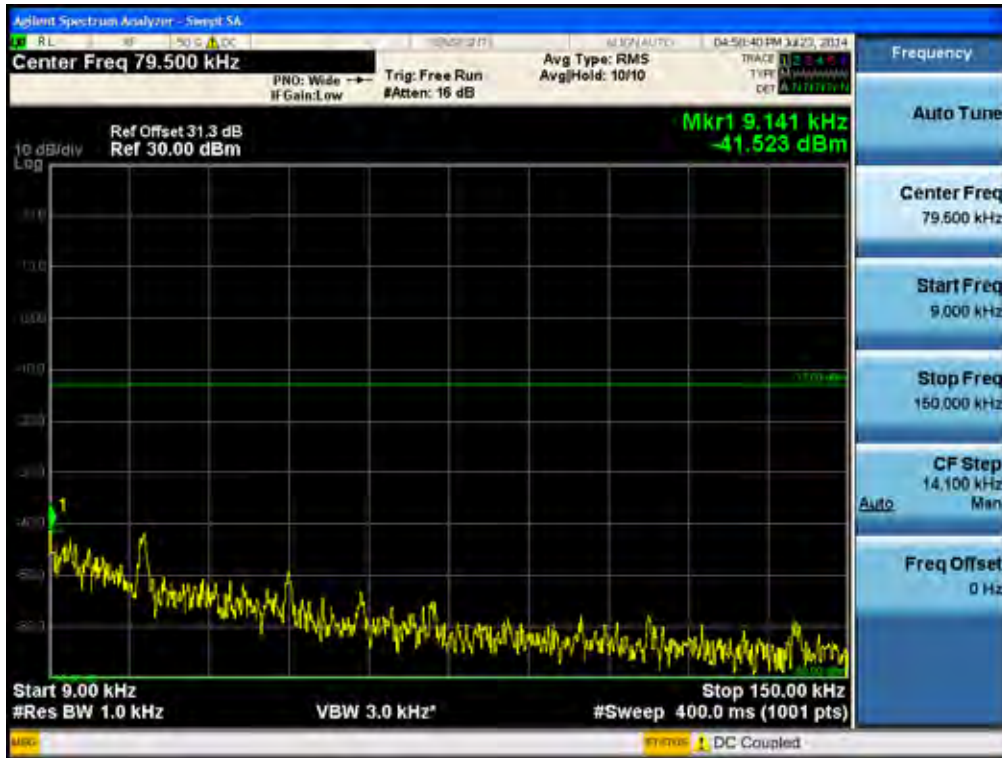
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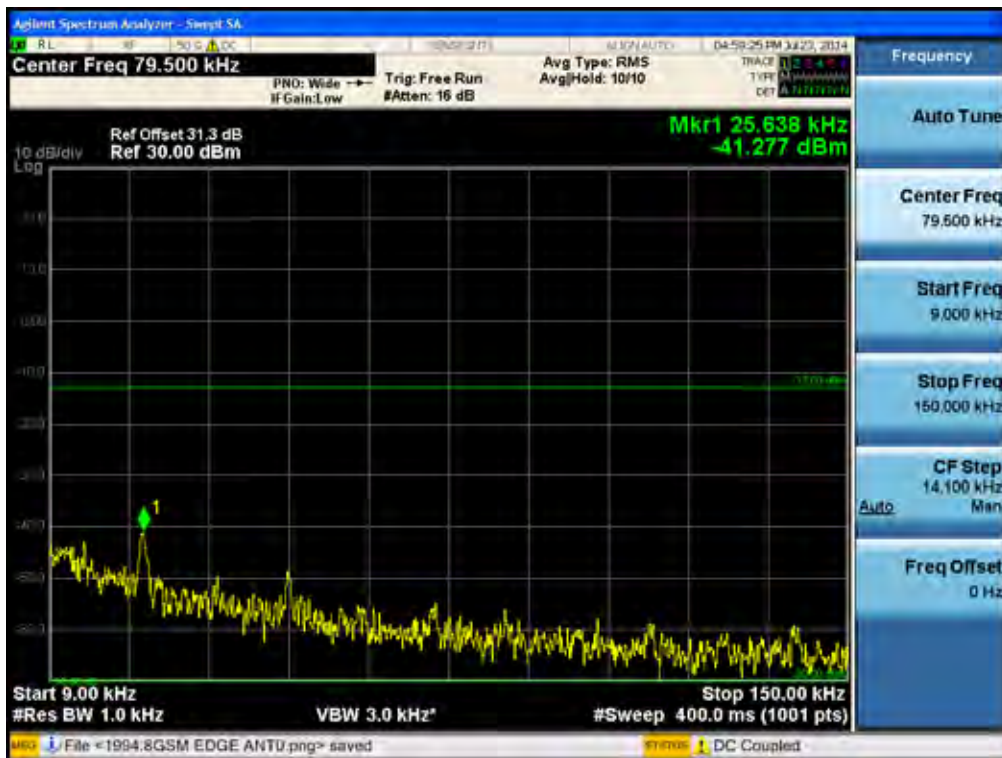
[GSM Downlink Low]



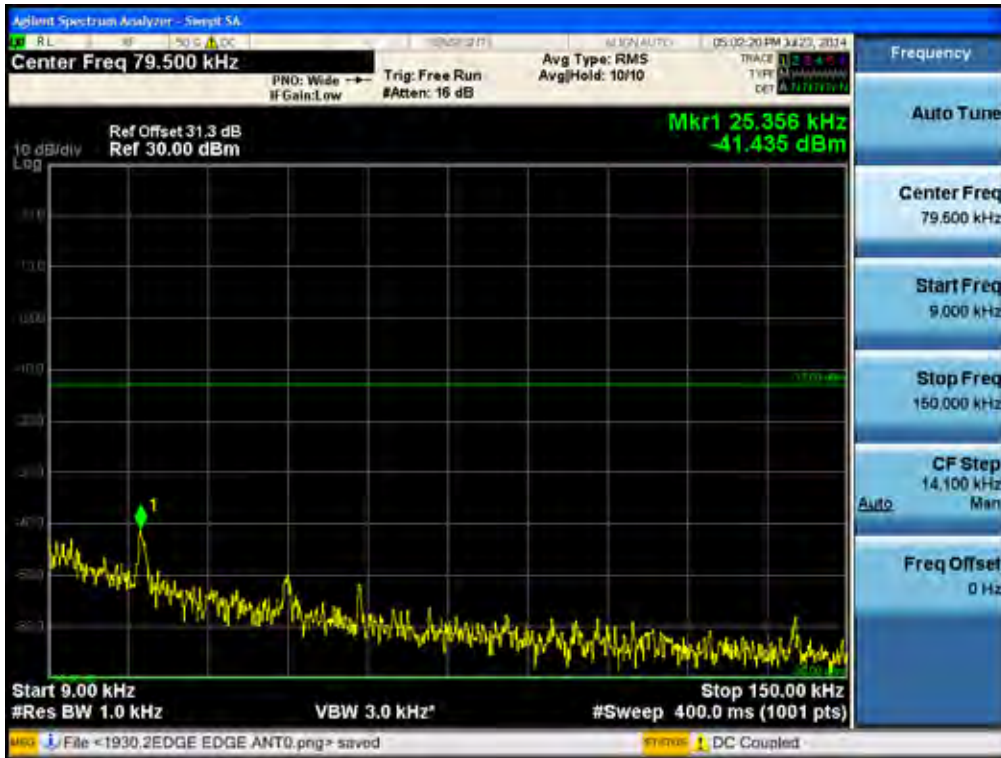
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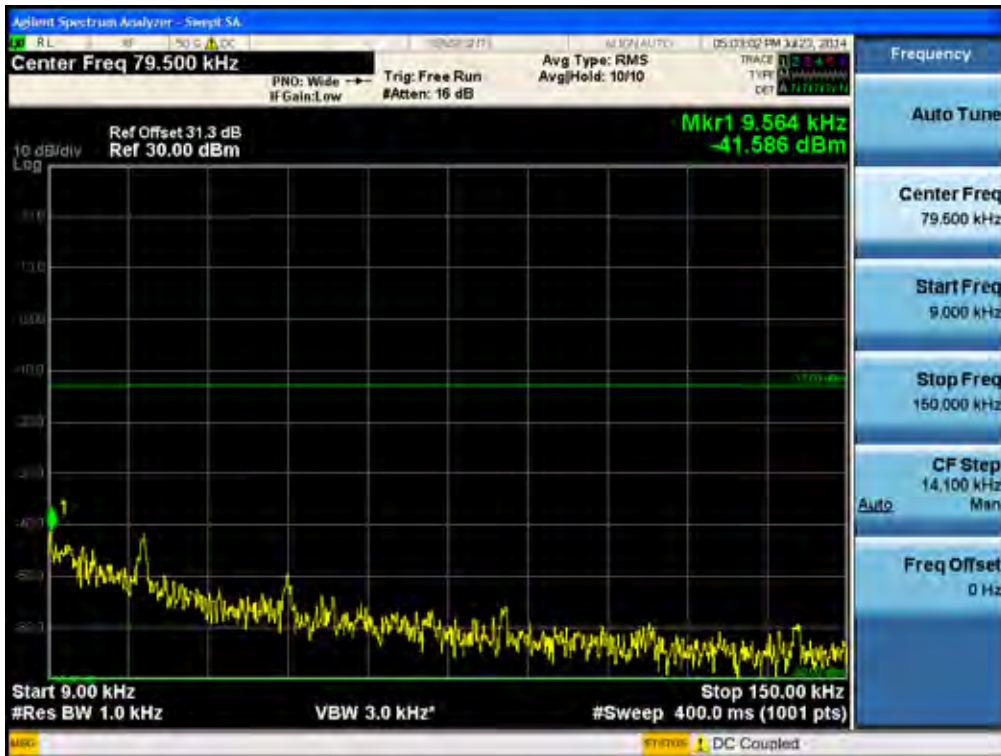
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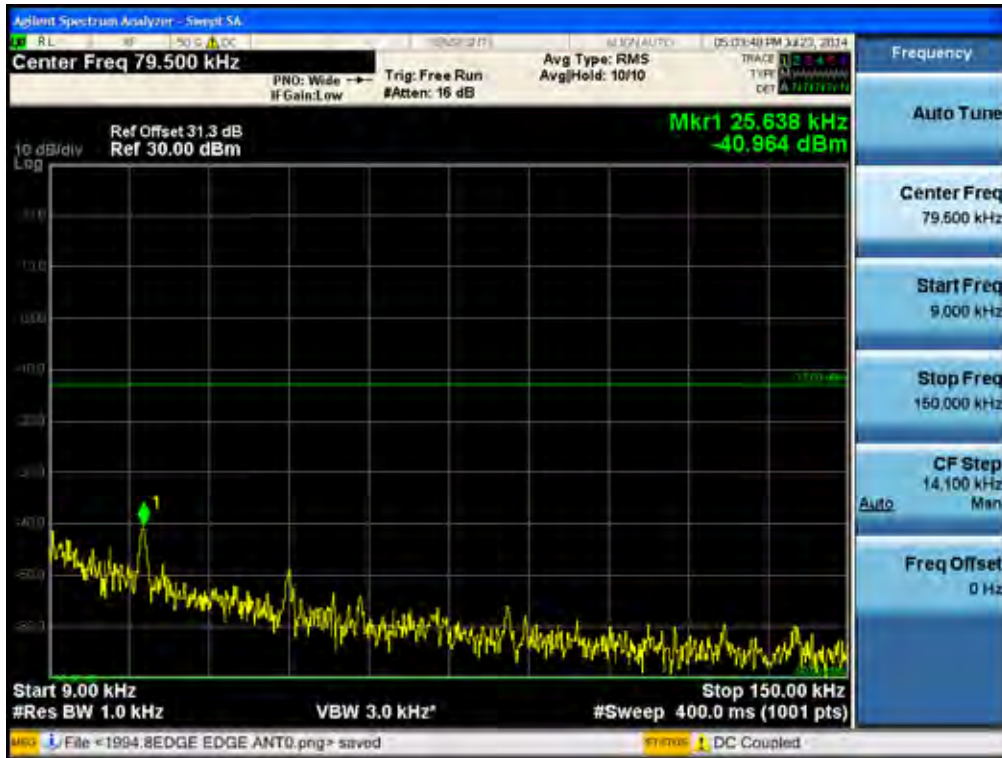
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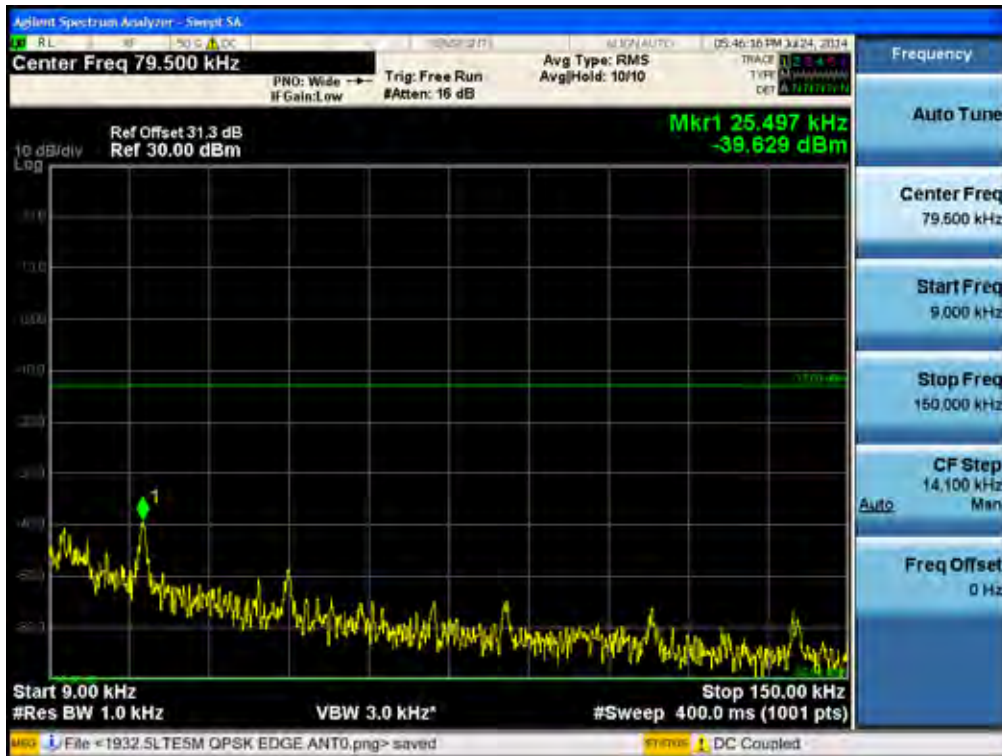
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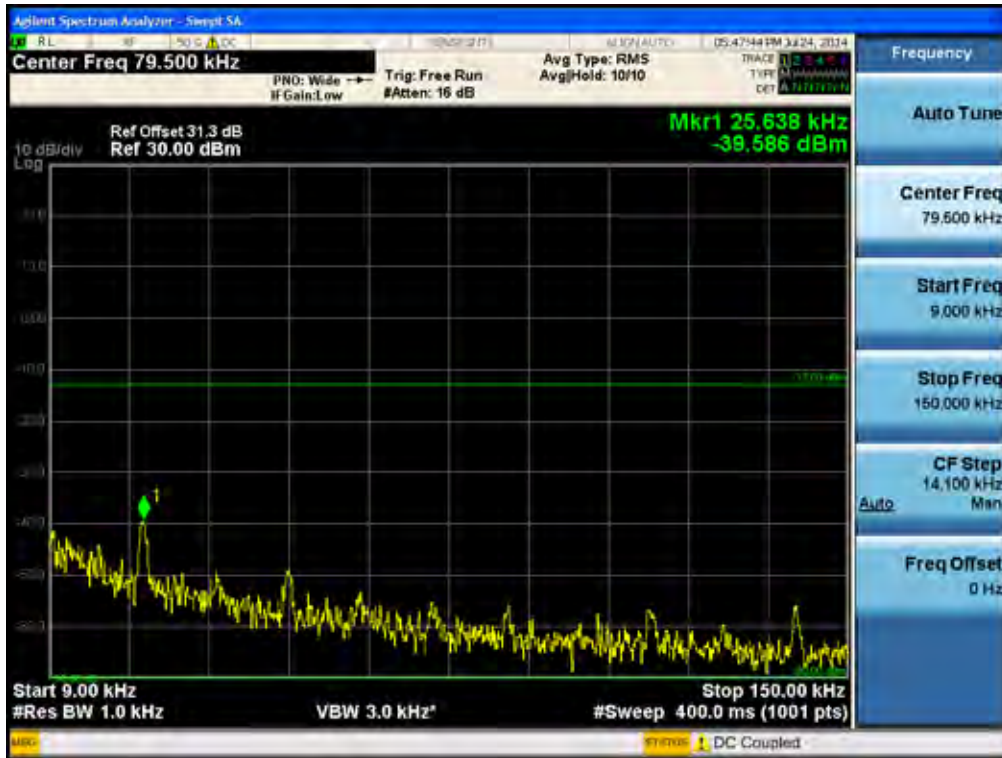
[GSM EDGE Downlink High]



[LTE Downlink 5 MHz Low]



[LTE Downlink 5 MHz Middle]



[LTE Downlink 5 MHz High]

