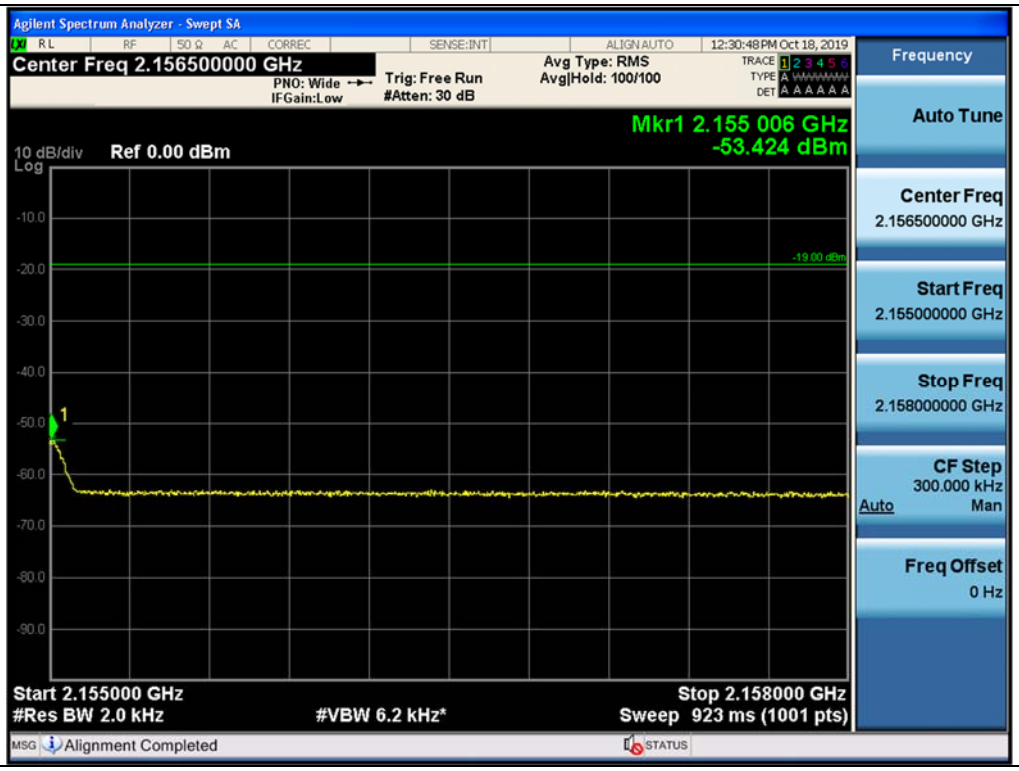
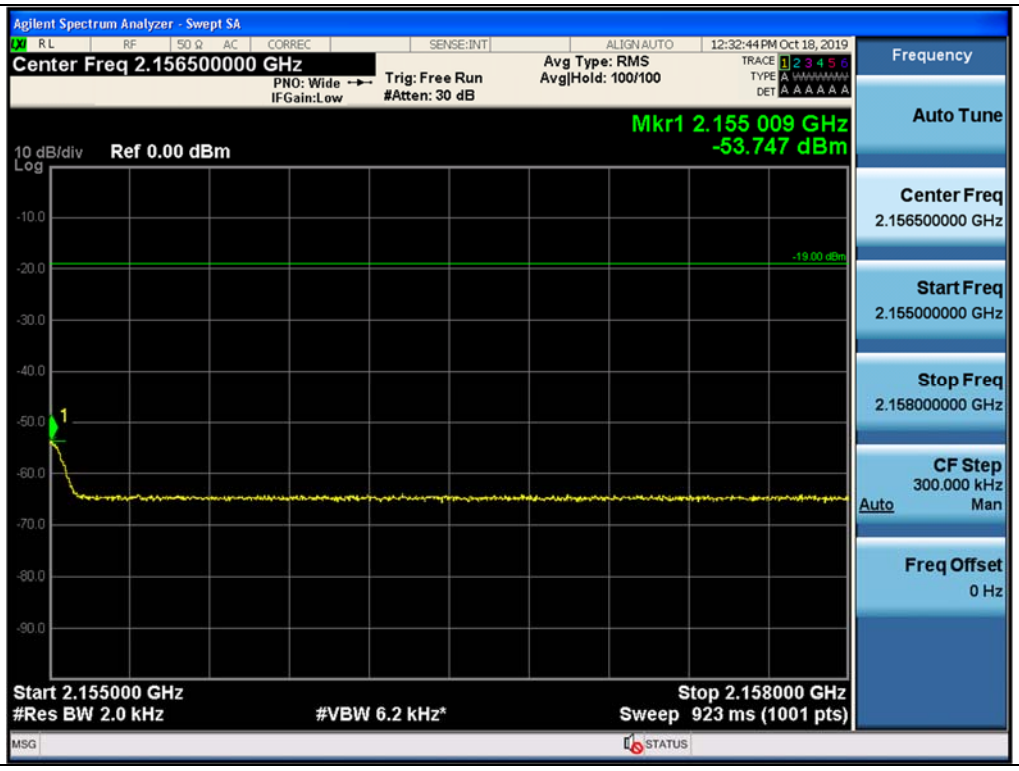
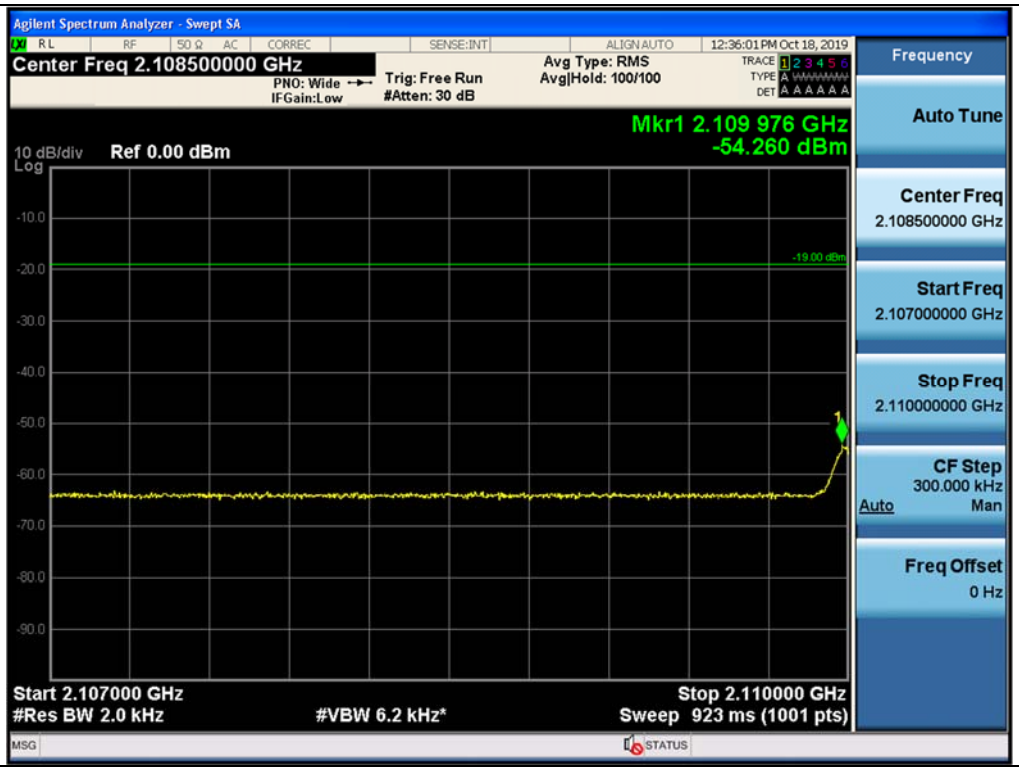
Out-of-Band Emissions / AWS-1 / Downlink / GSM / Upper Edge / AGC threshold


Out-of-Band Emissions / AWS-1 / Downlink / GSM / Upper Edge / AGC threshold +10 dB


Out-of-Band Emissions / AWS-1 / Downlink / GSM / Lower Edge / AGC threshold


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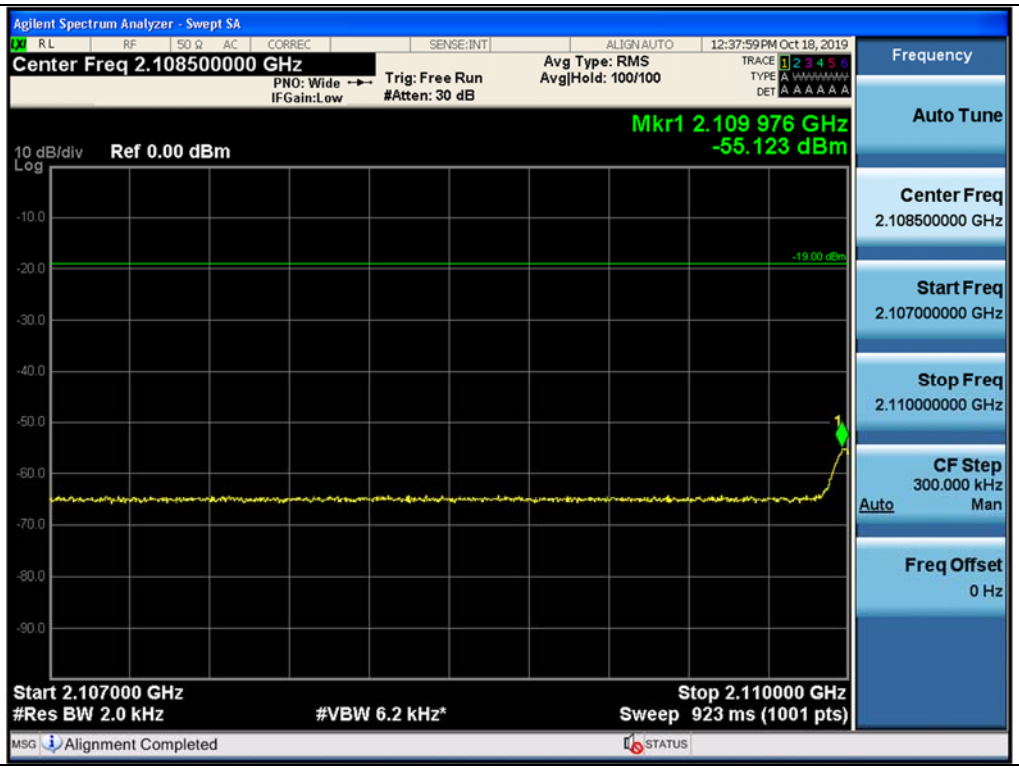
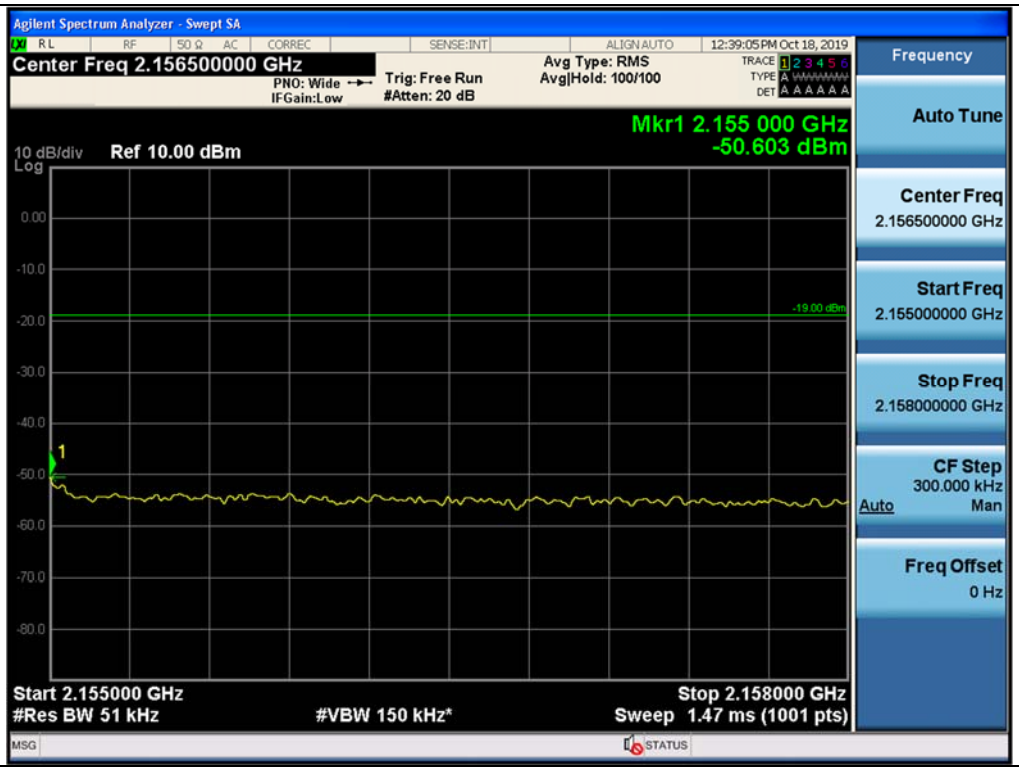
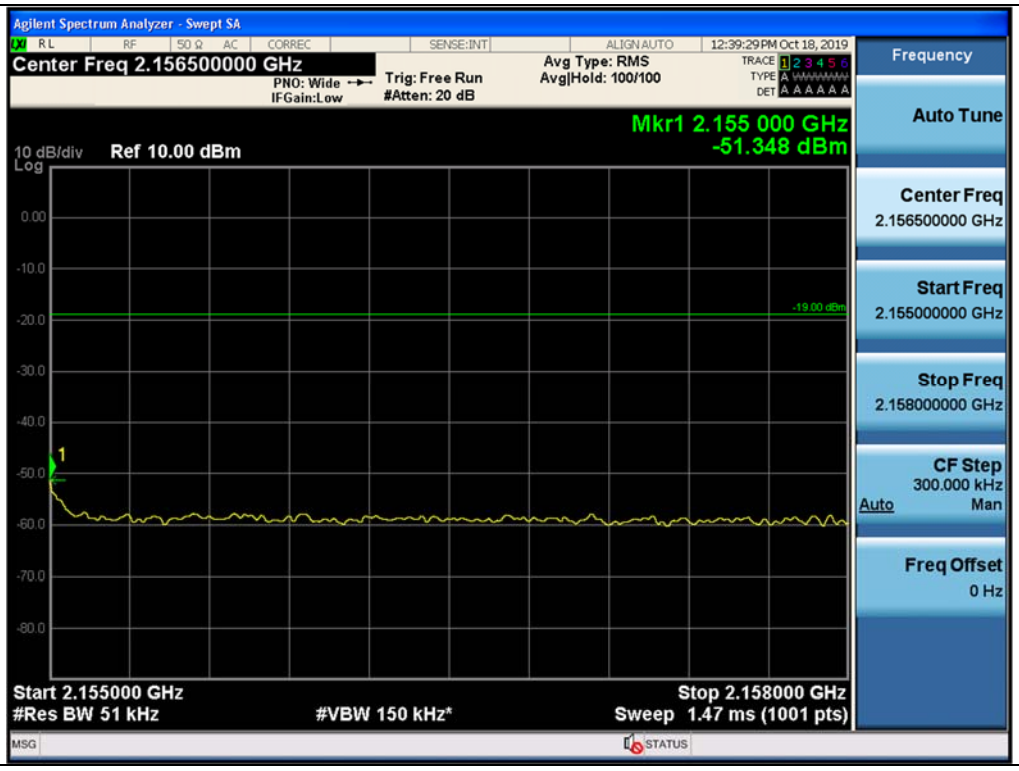


Out-of-Band Emissions / AWS-1 / Downlink / LTE 5 MHz / Upper Edge / AGC threshold


Out-of-Band Emissions / AWS-1 / Downlink / LTE 5 MHz / Upper Edge / AGC threshold +10 dB


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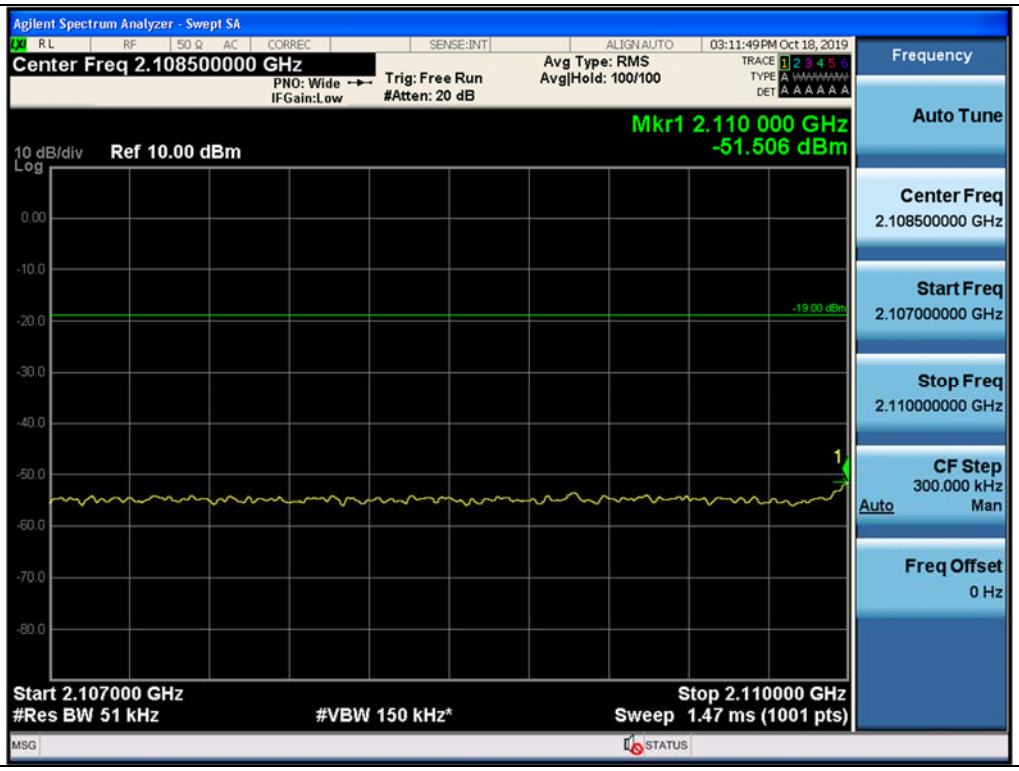

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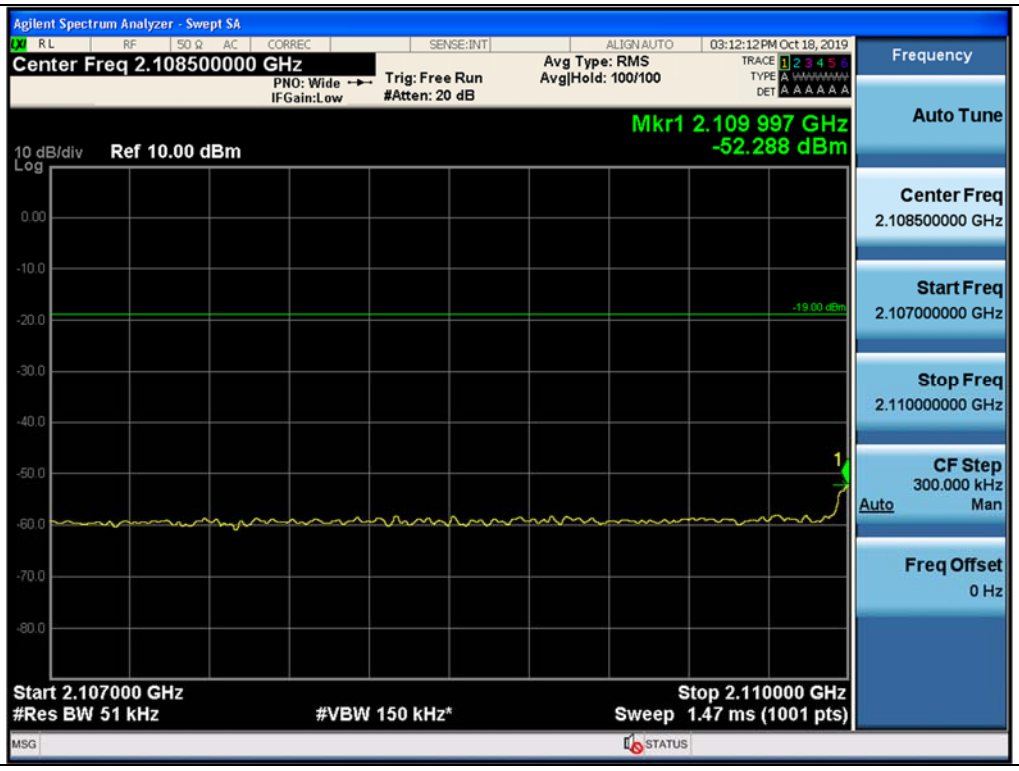
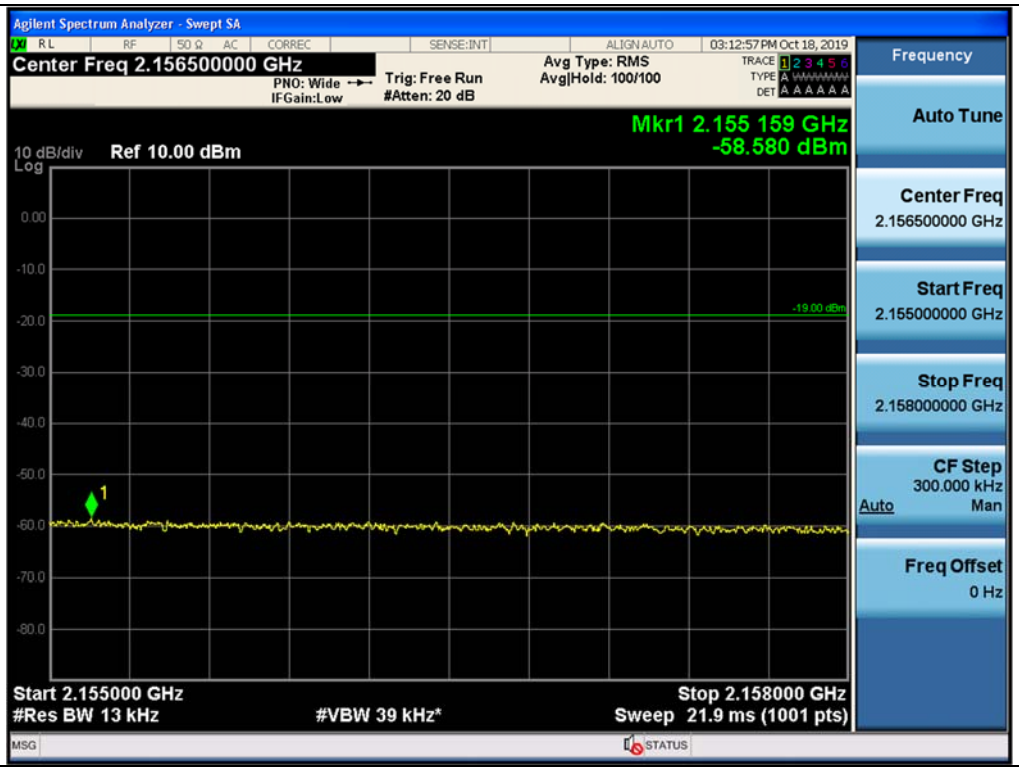
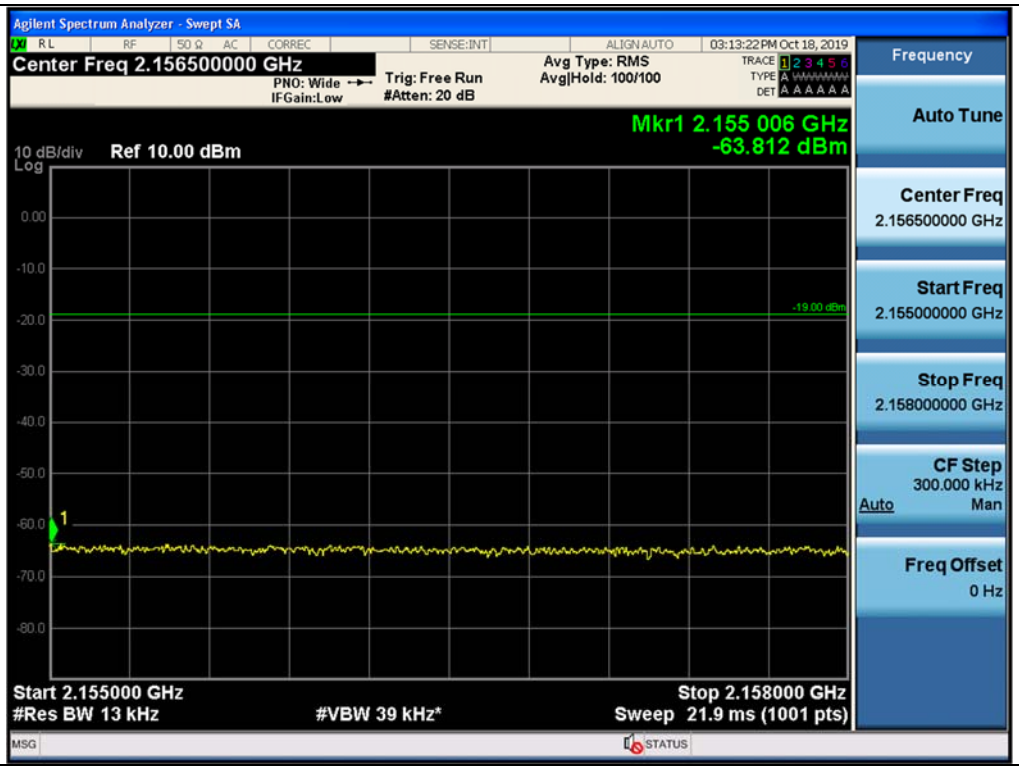
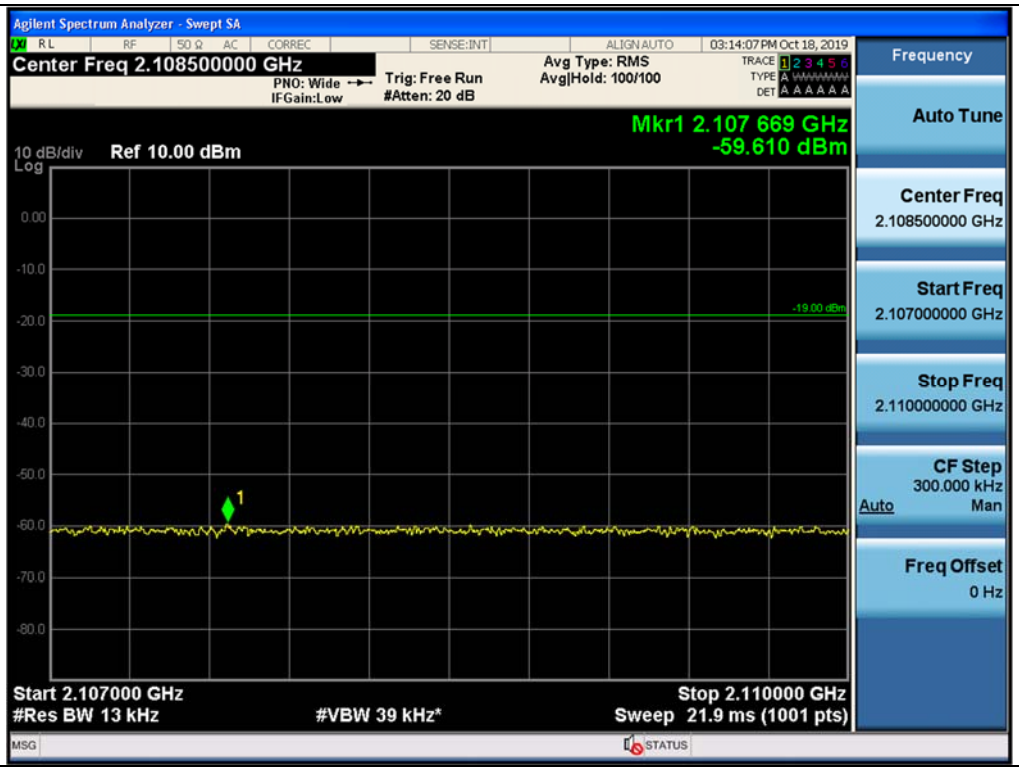
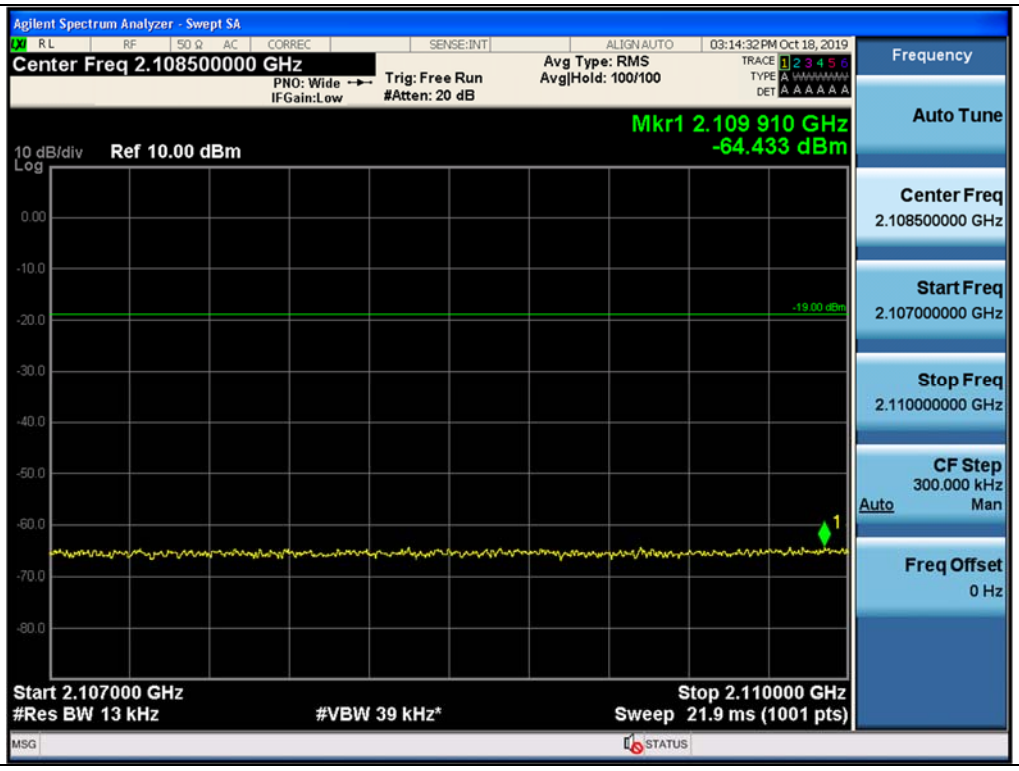
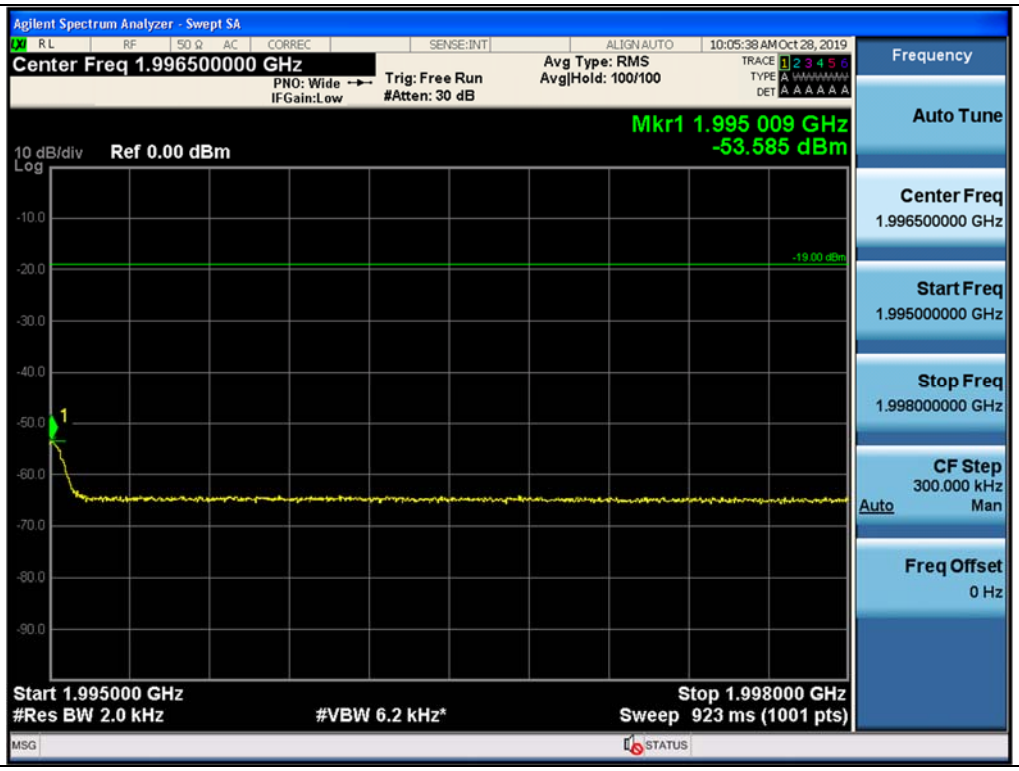


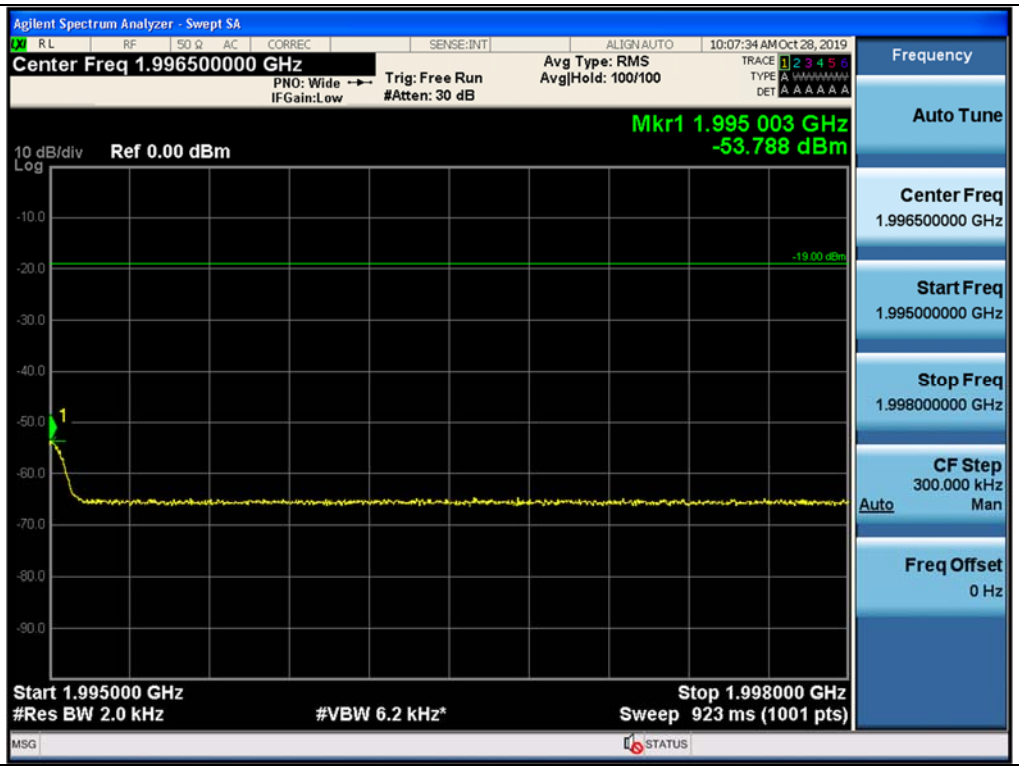
Out-of-Band Emissions / AWS-1 / Downlink / CDMA / Upper Edge / AGC threshold


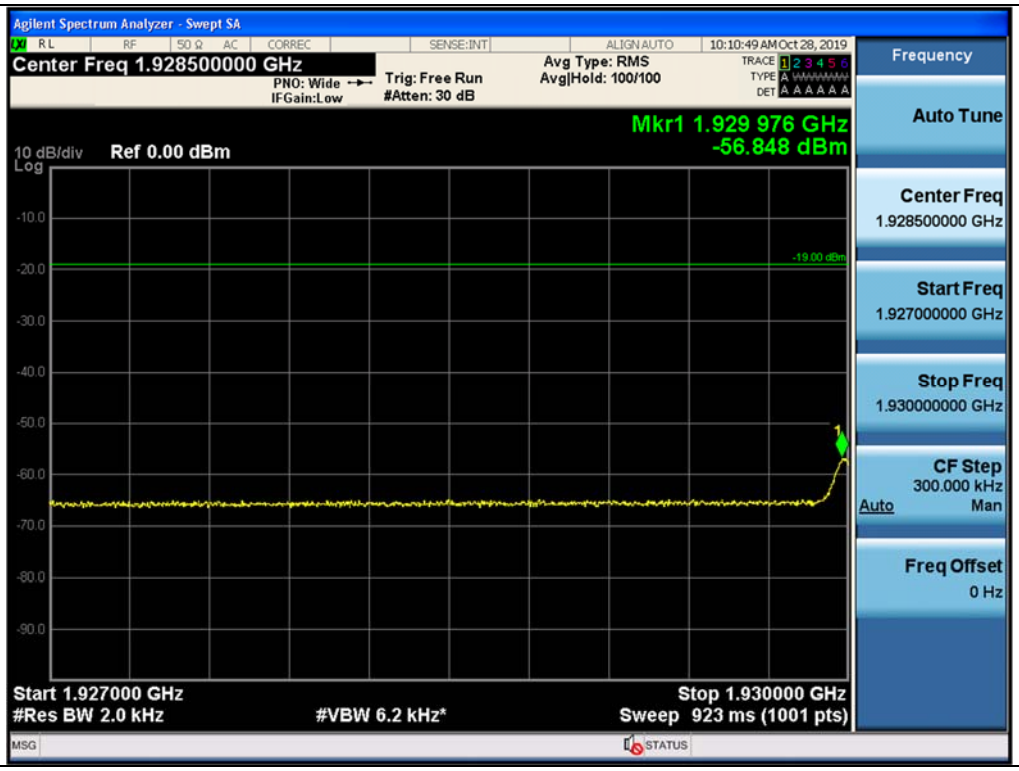
Out-of-Band Emissions / AWS-1 / Downlink / CDMA / Upper Edge / AGC threshold +10 dB


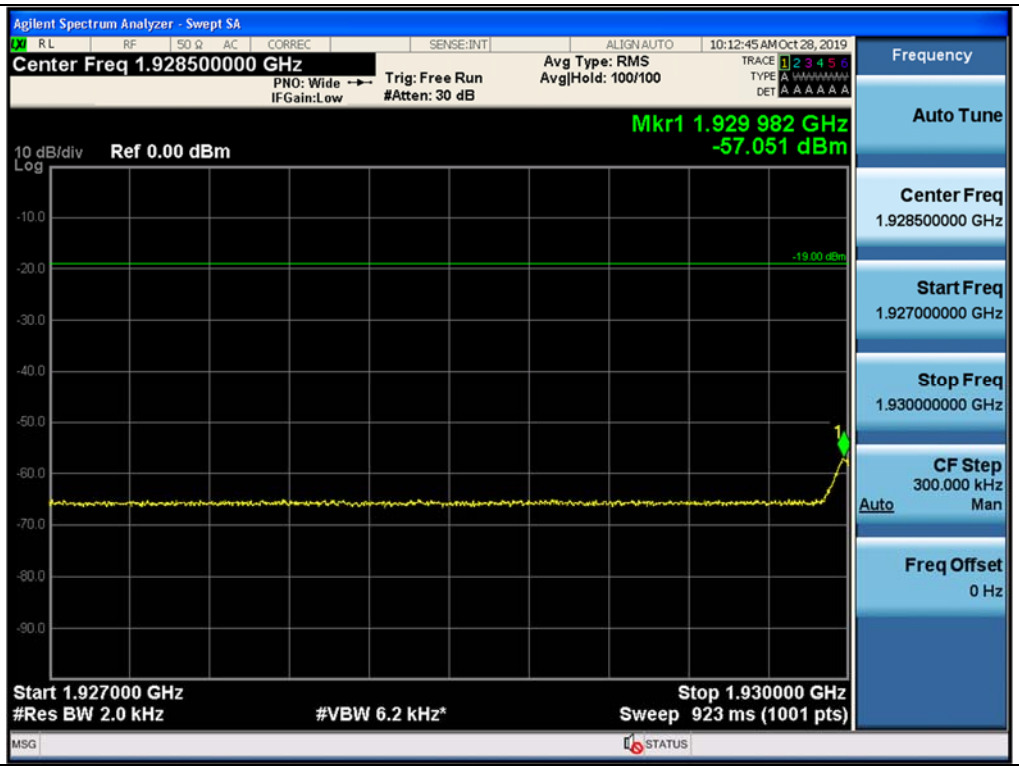
Out-of-Band Emissions / AWS-1 / Downlink / CDMA / Lower Edge / AGC threshold


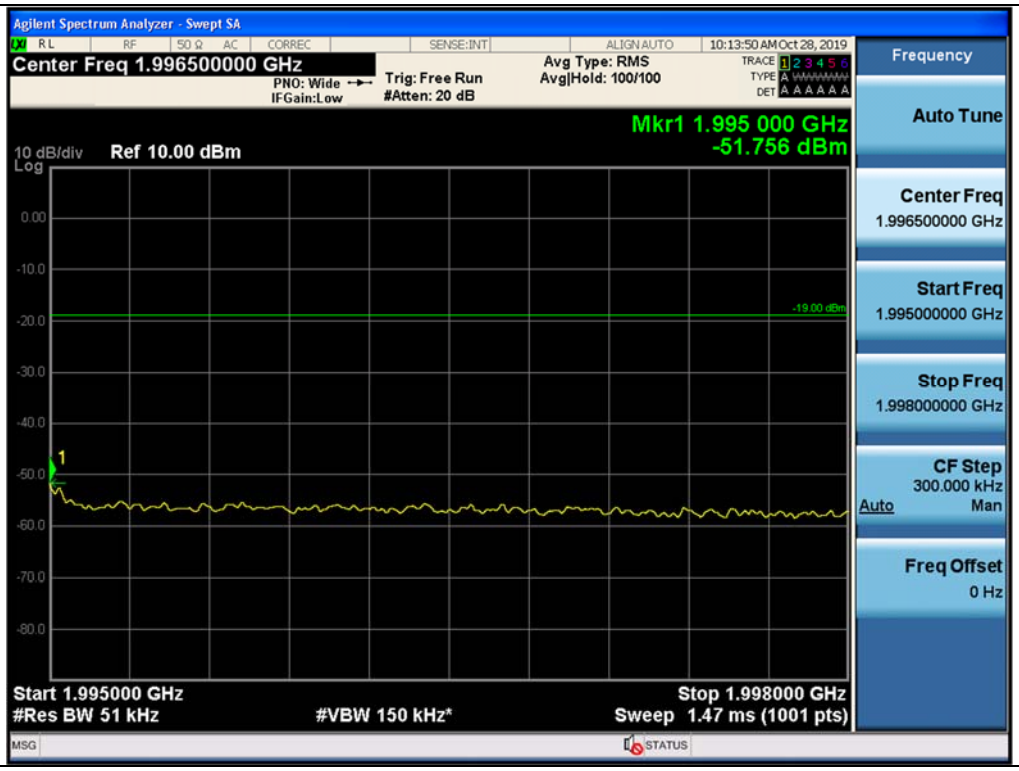
Out-of-Band Emissions / AWS-1 / Downlink / CDMA / Lower Edge / AGC threshold +10 dB


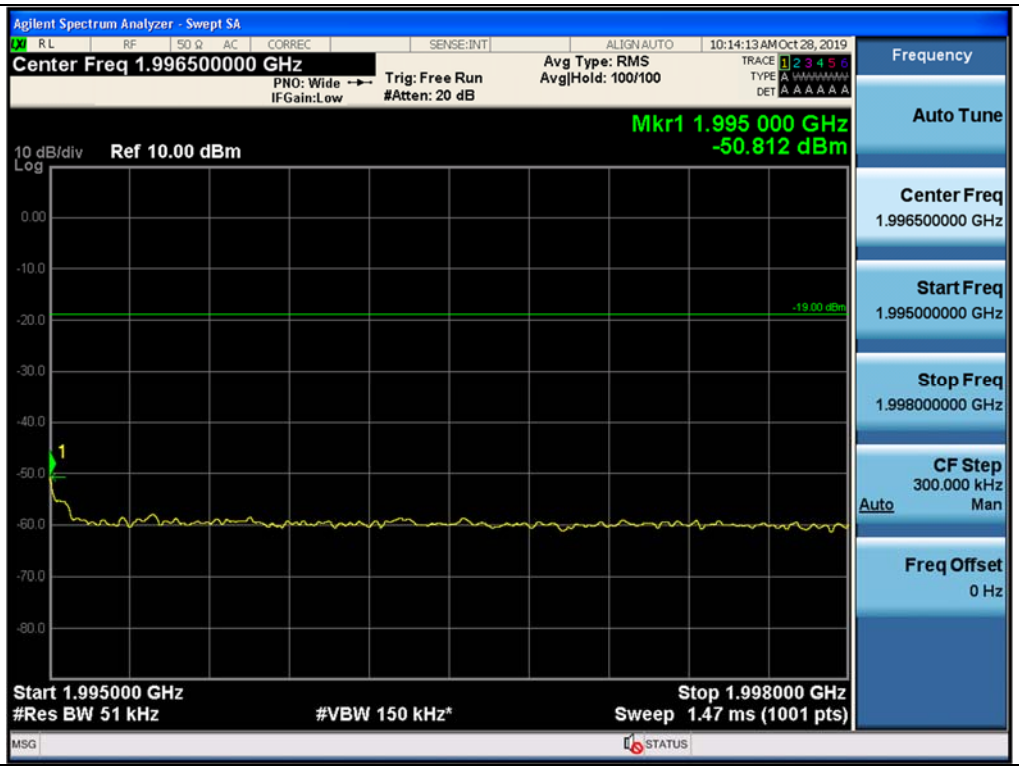
Out-of-Band Emissions / Broadband PCS / Downlink / GSM / Upper Edge / AGC threshold


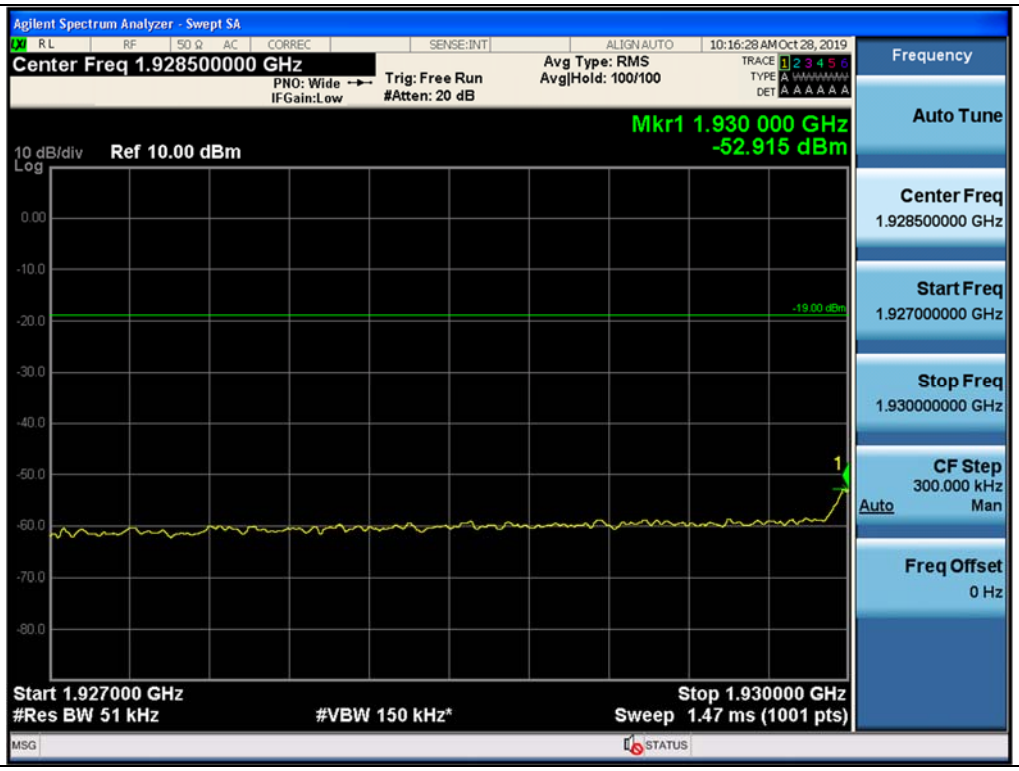
Out-of-Band Emissions / Broadband PCS / Downlink / GSM / Upper Edge / AGC threshold +10 dB


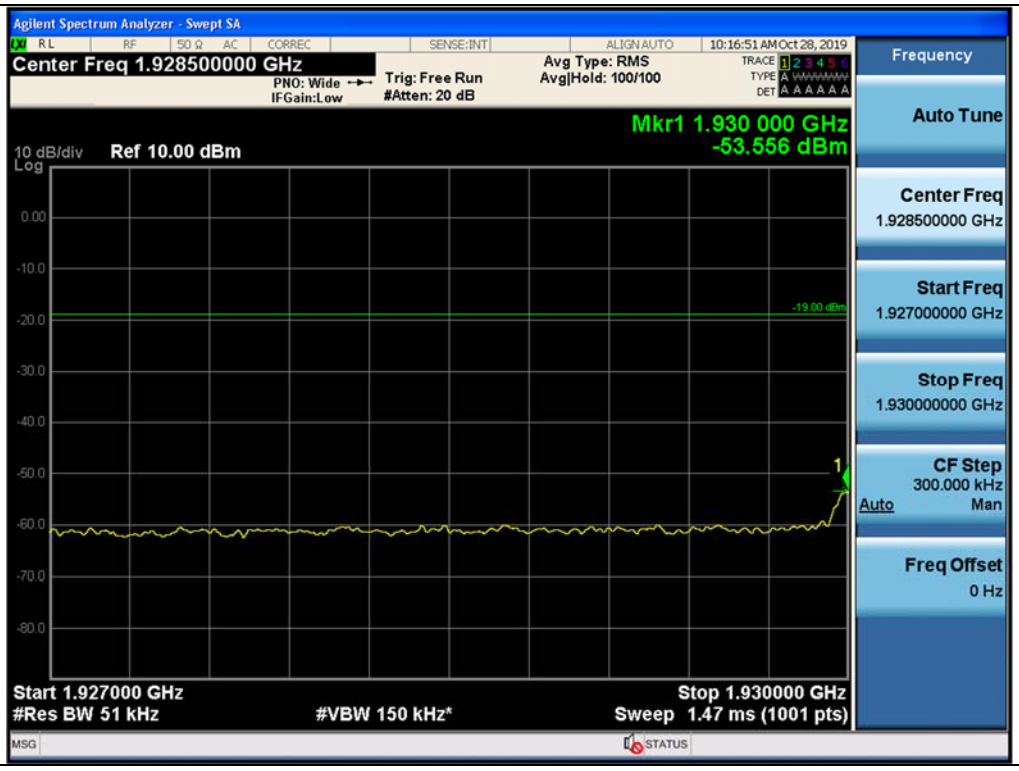
Out-of-Band Emissions / Broadband PCS / Downlink / GSM / Lower Edge / AGC threshold


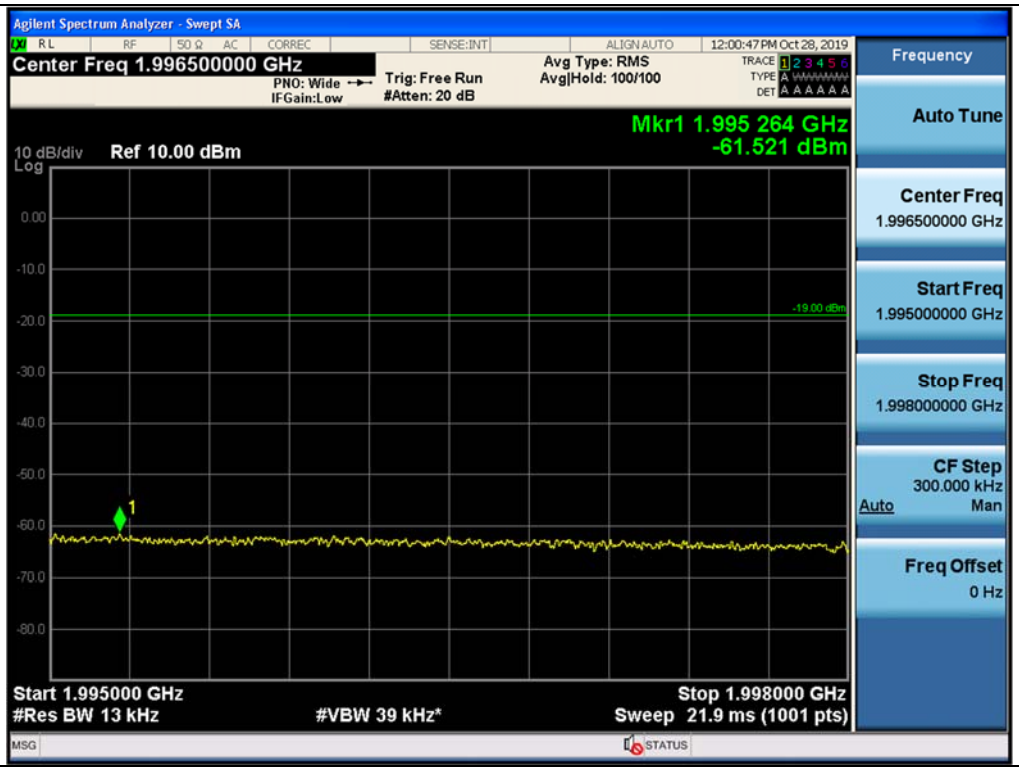
Out-of-Band Emissions / Broadband PCS / Downlink / GSM / Lower Edge / AGC threshold +10 dB


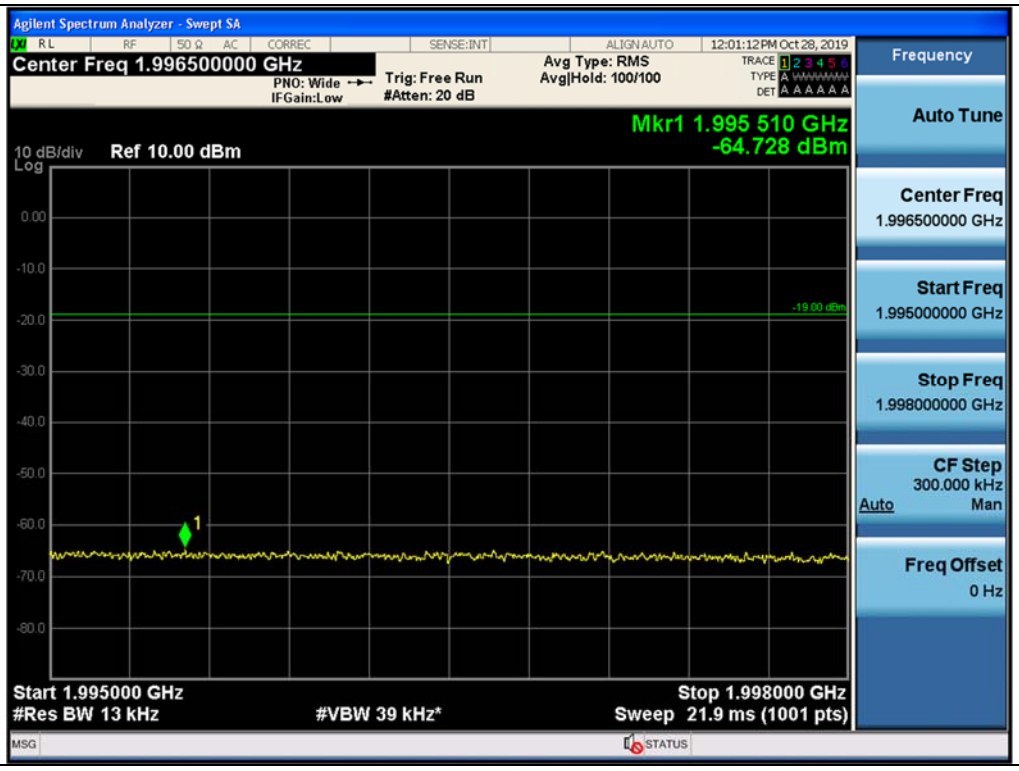
Out-of-Band Emissions / Broadband PCS / Downlink / LTE 5 MHz / Upper Edge / AGC threshold


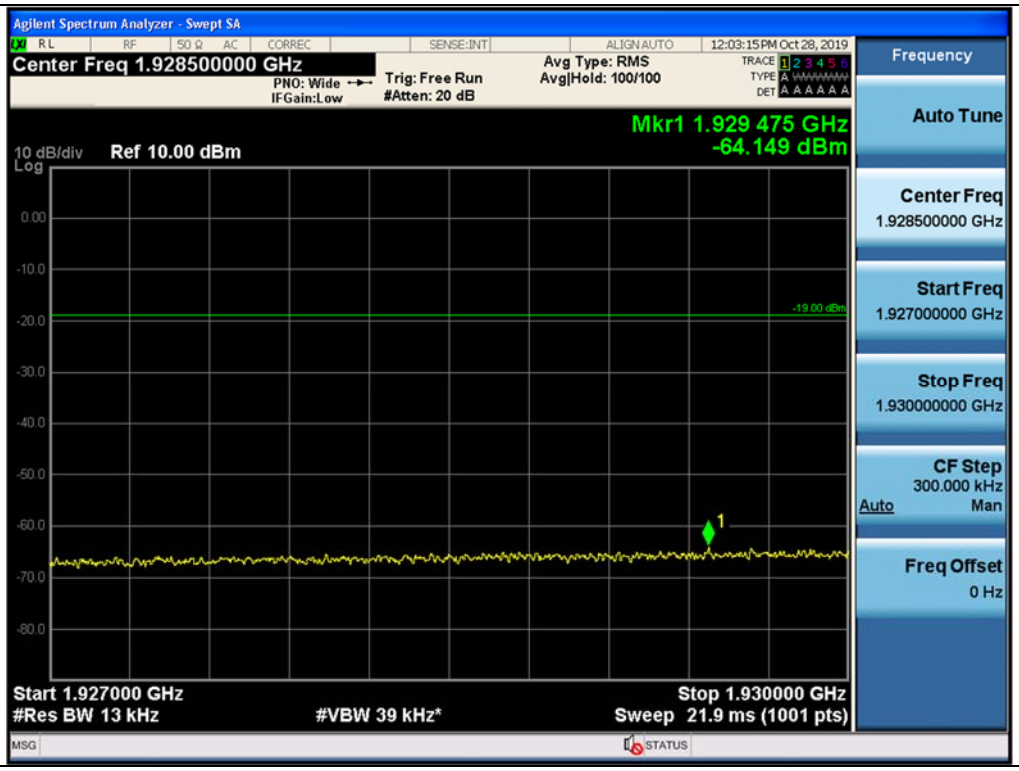
Out-of-Band Emissions / Broadband PCS / Downlink / LTE 5 MHz / Upper Edge / AGC threshold +10 dB


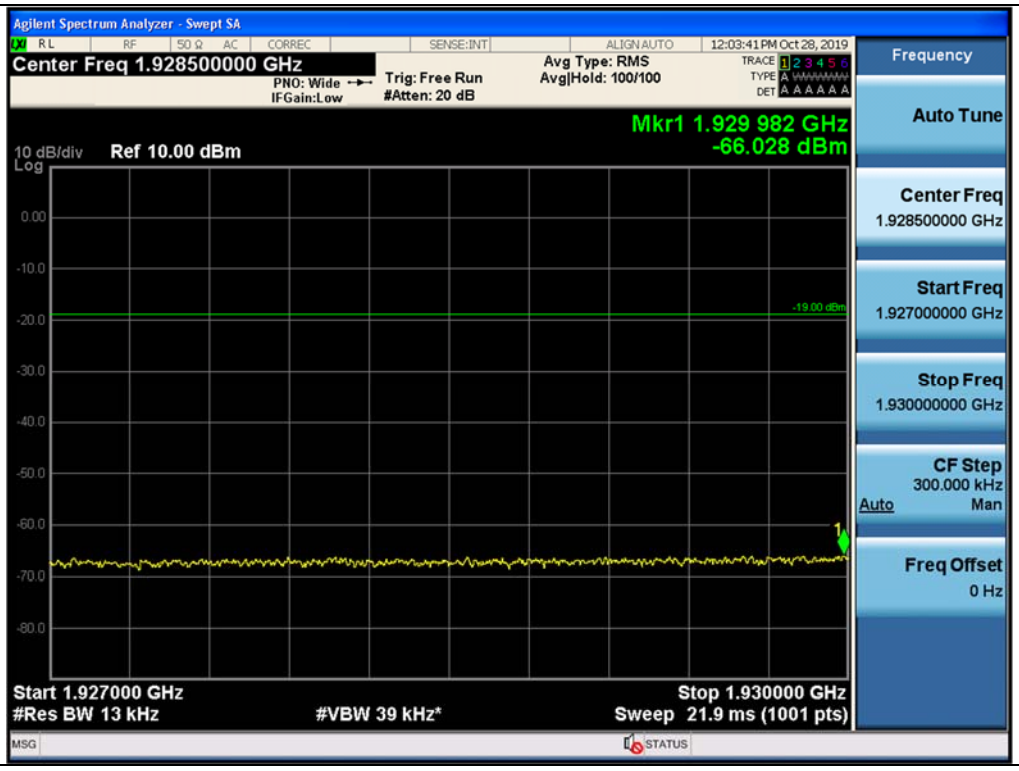
Out-of-Band Emissions / Broadband PCS / Downlink / LTE 5 MHz / Lower Edge / AGC threshold


Out-of-Band Emissions / Broadband PCS / Downlink / LTE 5 MHz / Lower Edge / AGC threshold +10 dB


Out-of-Band Emissions / Broadband PCS / Downlink / CDMA / Upper Edge / AGC threshold


Out-of-Band Emissions / Broadband PCS / Downlink / CDMA / Upper Edge / AGC threshold +10 dB


Out-of-Band Emissions / Broadband PCS / Downlink / CDMA / Lower Edge / AGC threshold


Out-of-Band Emissions / Broadband PCS / Downlink / CDMA / Lower Edge / AGC threshold +10 dB


5.6. CONDUCTED SPURIOUS EMISSIONS

Test Requirements:

§ 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 reference bandwidth as follows:

(1) In the spectrum below 1 GHz, instrumentation should employ a reference 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 that the measured power is integrated over the full required reference 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.

(2) In the spectrum above 1 GHz, instrumentation should employ a reference bandwidth of 1 MHz.

§ 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.

§ 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;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to －70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and －80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(h) AWS emission limits

(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$ (P) dB.

(3) Measurement procedure.

(i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. 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.

(ii) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

(iii) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

Test Procedures:

Measurements were in accordance with the test methods section 7.6 of KDB 935210 D03 v04r03.

a) Begin with the uplink output (donor) port connected to the spectrum analyzer.
b) Configure the signal generator for AWGN with a 99% OBW of 4.1 MHz, with a center frequency corresponding to the center of the CMRS band under test.
c) Set the signal generator amplitude to the level determined in the power measurement procedure in maximum power measurement test.
d) Turn on the signal generator RF output and measure the spurious emission power levels with an appropriate measuring instrument as follows.

1) Set RBW = measurement bandwidth specified in the applicable rule section for the operational frequency band under consideration. Note that many of the individual rule sections permit the use of a narrower RBW [typically ≥ 1% of the emission bandwidth (EBW)] to enhance measurement accuracy, but the result must then be integrated over the specified measurement bandwidth.
2) Set VBW = 3 x RBW.
3) Select the power averaging (rms) detector.
4) Sweep time = auto-couple.
5) Set the analyzer start frequency to the lowest radio frequency 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. Note that the number of measurement points in each sweep must be ≥ (2 x span/RBW), which may require that the measurement range defined by the preceding start and stop frequencies be subdivided, depending on the available number of measurement points of the spectrum analyzer. Trace average at least 10 traces in power averaging (i.e., rms) mode.
6) 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.
7) Reset the 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 analyzer stop frequency to 10 times the highest frequency of the fundamental emission. Note that the number of measurement points in each sweep must be ≥ (2 x span/RBW) which may require that the measurement range defined by the start and stop frequencies above be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.
8) 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.

e) Repeat b) through d) for each supported frequency band of operation.

Note1. Except band of upper 700 MHz, '43 + 10 Log (Power) = -13 dBm' limit is applied for all spurious test.
For upper 700 MHz band, in 763-775 MHz and 793-805 MHz '65 + 10 log (Power) = -35 dBm (6.25 kHz RBW)' limit is applied. Additionally in 1559-1610 MHz shall be limited to －70 dBW/MHz (-40 dBm, 1 MHz RBW) and －80 dBW (-50 dBm, 700 Hz RBW) EIRP.

Note2. Coupling In 9 kHz-150 kHz and 150 kHz-30 MHz bands, RBW was reduced to 1 kHz and 10 kHz and correction factor was applied according to section 5.7.2 of ANSI C63.26-2015.

Band	9 ~ 150 kHz Correction	150 kHz ~ 30 MHz Correction
Below 1 GHz (Ref.RBW: 100 kHz)	20 dB	10 dB
Above 1 GHz (Ref.RBW: 1 MHz)	30 dB	20 dB

Note3. RBW and Band Separation is according to note 1 of out-of-band emissions test in this report

Test Results:

Tabulated Result of Uplink Conducted Spurious Emissions

Band	Range (MHz)	Frequency (MHz)	Limit (dBm)	Spurious Emission (dBm)
Lower 700 MHz	0.009 ~ 0.15	0.011 679	-13	-39.352
	0.15 ~ 30	0.150		-49.335
	30 ~ 703.9	703.02		-51.691
	716.1 ~ 2 000	1 735.86		-47.981
	2 000 ~ 4 000	2 678.10		-61.171
	4 000 ~ 6 000	5 801.70		-59.651
	6 000 ~ 8 000	7 617.25		-60.209
Upper 700 MHz	0.009 ~ 0.15	0.009 000		-38.794
	0.15 ~ 30	0.150		-49.960
	30 ~ 775.9	775.53		-47.710
	787.1 ~ 2 000	787.10		-45.545
	2 000 ~ 4 000	2 688.35		-61.335
	4 000 ~ 6 000	5 647.00		-59.711
	6 000 ~ 8 000	6 861.50		-60.380
	737 ~ 775	774.74	-46	-61.713
	793 ~ 805	793.22		-69.567
	1 559 ~ 1 610 (1 MHz)	1 562.52	-40	-53.963
	1 559 ~ 1 610 (700 Hz)-1	1 562.52	-50	-85.200
	1 559 ~ 1 610 (700 Hz)-2	1 578.50		-86.567
	1 559 ~ 1 610 (700 Hz)-3	1 587.71		-86.778
	1 559 ~ 1 610 (700 Hz)-4	1 609.28		-86.752

Band	Range (MHz)	Frequency (MHz)	Limit (dBm)	Spurious Emission (dBm)
Cellular	0.009 ~ 0.15	0.009 000	-13	-38.480
	0.15 ~ 30	0.160		-50.568
	30 ~ 823	781.49		-52.039
	850 ~ 1 000	850.13		-54.746
	1 000 ~ 10 000	1 733.95		-36.208
AWS-1	0.009 ~ 0.15	0.009 846		-30.288
	0.15 ~ 30	0.155		-39.307
	30 ~ 1 709	1 709.00		-40.970
	1 756 ~ 10 000	7 575.44		-39.213
	10 000 ~ 26 500	26 454.21		-34.686
Broadband PCS	0.009 ~ 0.15	0.009 000		-28.947
	0.15 ~ 30	0.150		-39.775
	30 ~ 1 849	1 733.04		-39.452
	1 916 ~ 10 000	7 607.14		-39.863
	10 000 ~ 26 500	26 496.29		-34.341

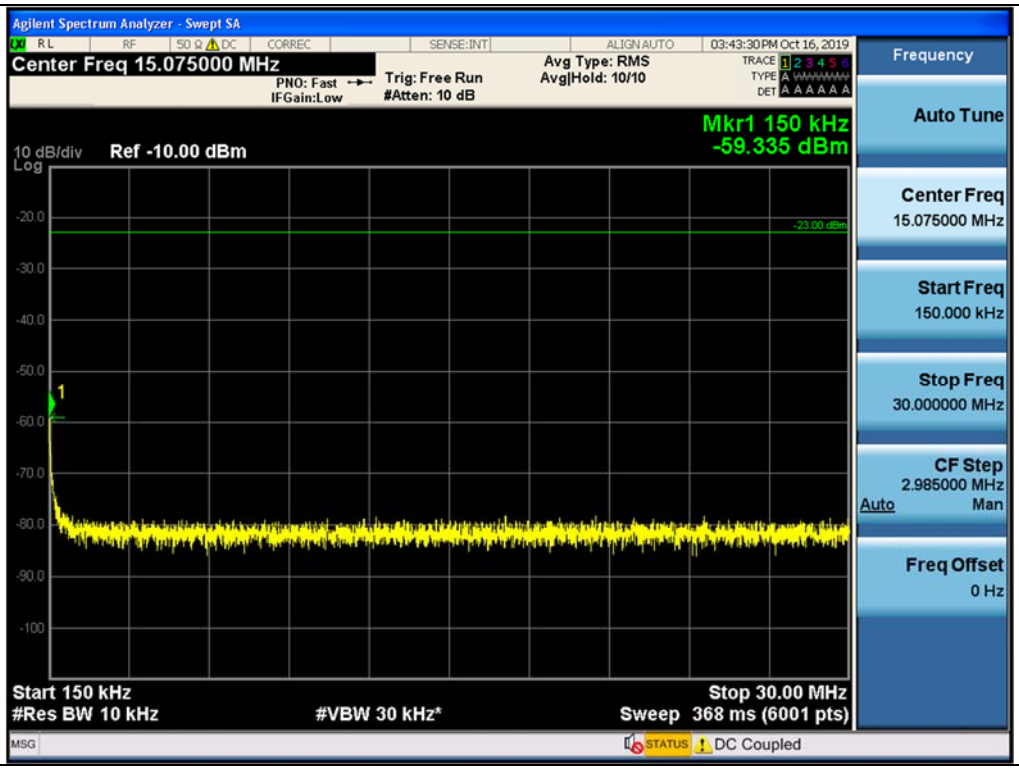
Tabulated Result of Downlink Conducted Spurious Emissions

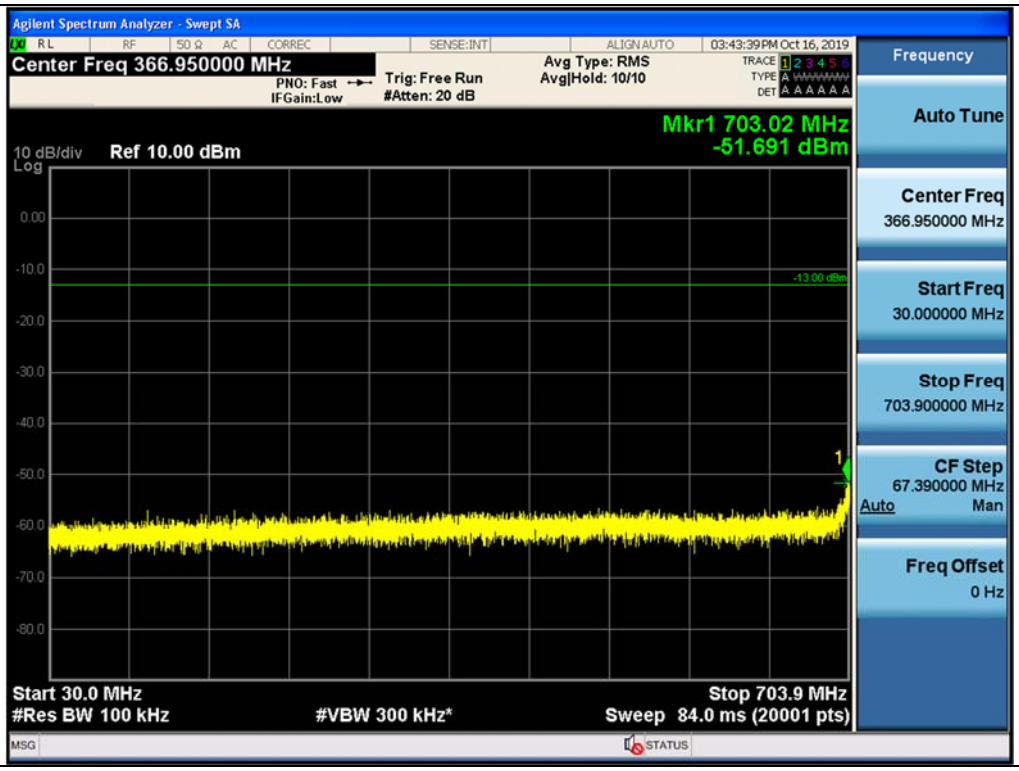
Band	Range (MHz)	Frequency (MHz)	Limit (dBm)	Spurious Emission (dBm)
Lower 700 MHz	0.009 ~ 0.15	0.009 000	-13	-38.636
	0.15 ~ 30	0.150		-50.695
	30 ~ 733.9	733.86		-51.972
	746.1 ~ 2 000	1 973.63		-46.396
	2 000 ~ 4 000	2 151.20		-46.904
	4 000 ~ 6 000	5 744.15		-59.462
	6 000 ~ 8 000	6 464.65		-60.378
Upper 700 MHz	0.009 ~ 0.15	0.010 833		-38.489
	0.15 ~ 30	0.150		-49.827
	30 ~ 745.9	733.55		-51.773
	757.1 ~ 2 000	1 974.35		-46.725
	2 000 ~ 4 000	2 149.20		-47.538
	4 000 ~ 6 000	5 892.20		-59.368
	6 000 ~ 8 000	7 515.60		-59.897
	737 ~ 775	765.67	-46	-79.262
	793 ~ 805	800.21		-79.116
	1 559 ~ 1 610 (1 MHz)	1 603.88	-40	-57.079
	1 559 ~ 1 610 (700 Hz)-1	1 568.06	-50	-87.270
	1 559 ~ 1 610 (700 Hz)-2	1 584.78		-86.853
	1 559 ~ 1 610 (700 Hz)-3	1 589.62		-86.694
	1 559 ~ 1 610 (700 Hz)-4	1 607.08		-86.906

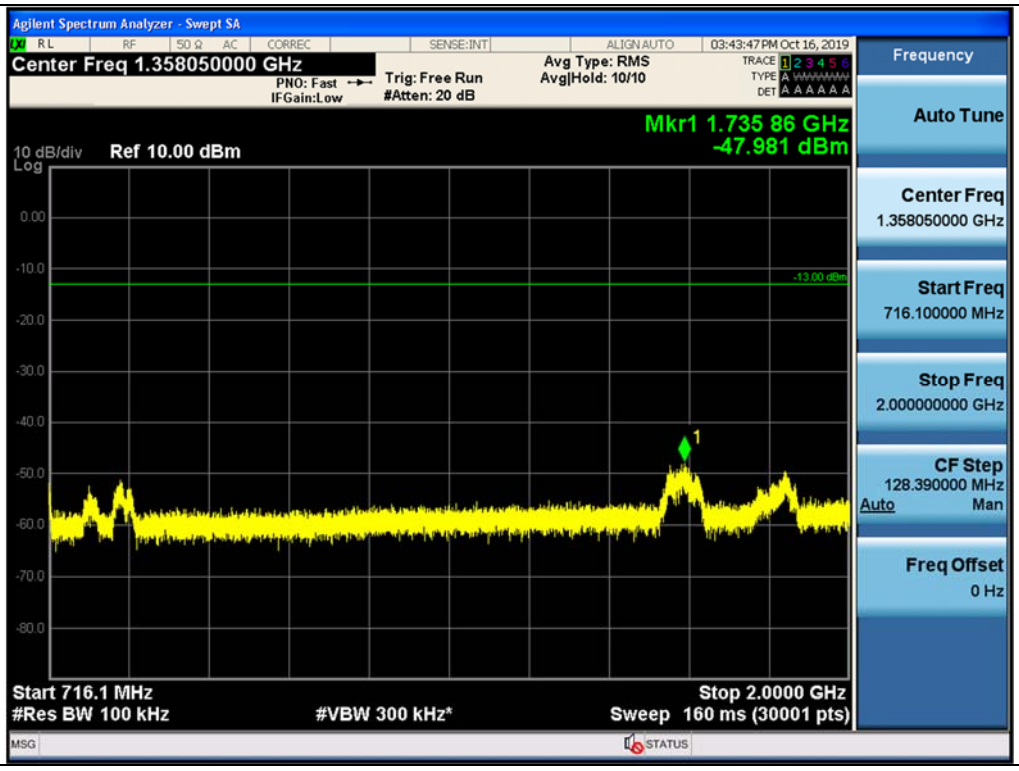
Band	Range (MHz)	Frequency (MHz)	Limit (dBm)	Spurious Emission (dBm)
Cellular	0.009 ~ 0.15	0.009 705	-13	-38.322
	0.15 ~ 30	0.150		-49.171
	30 ~ 868	737.65		-52.650
	895 ~ 1 000	895.46		-53.924
	1 000 ~ 10 000	2 149.30		-37.379
AWS-1	0.009 ~ 0.15	0.009 846		-28.693
	0.15 ~ 30	0.155		-40.150
	30 ~ 2 109	887.48		-30.777
	2 156 ~ 10 000	7 554.63		-39.081
	10 000 ~ 26 500	25 796.28		-34.790
Broadband PCS	0.009 ~ 0.15	0.010 974		-29.884
	0.15 ~ 30	0.150		-38.453
	30 ~ 1 929	893.10		-33.312
	1 996 ~ 10 000	2 148.08		-37.918
	10 000 ~ 26 500	26 499.59		-34.487

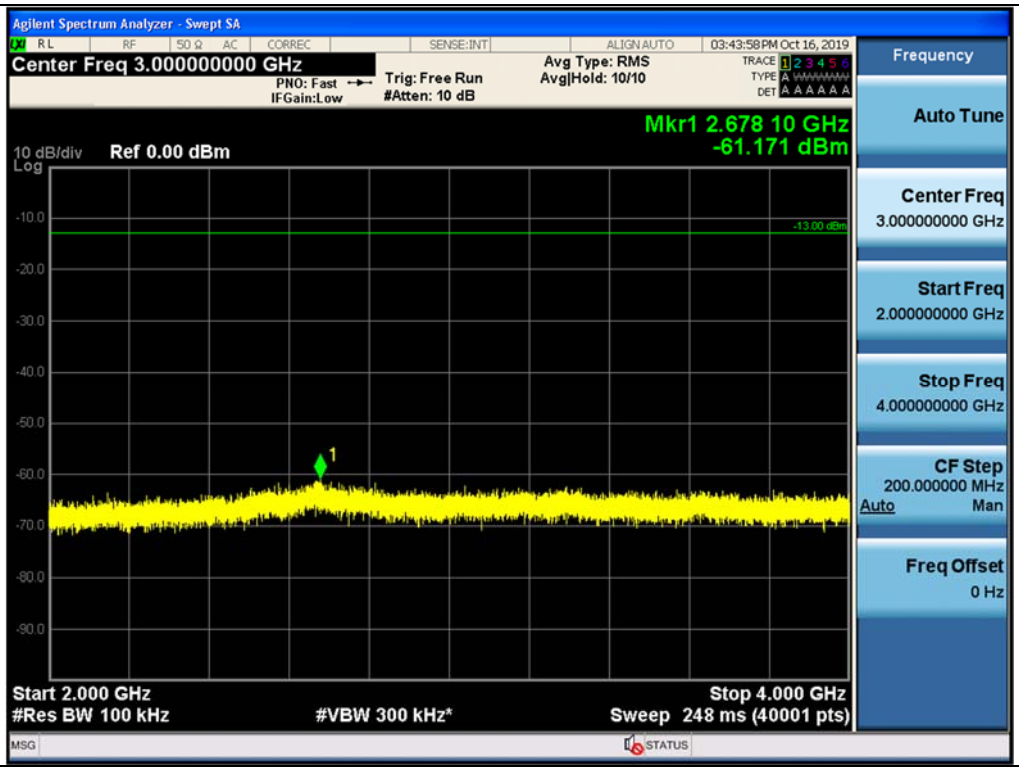
Plot data of Conducted Spurious Emissions

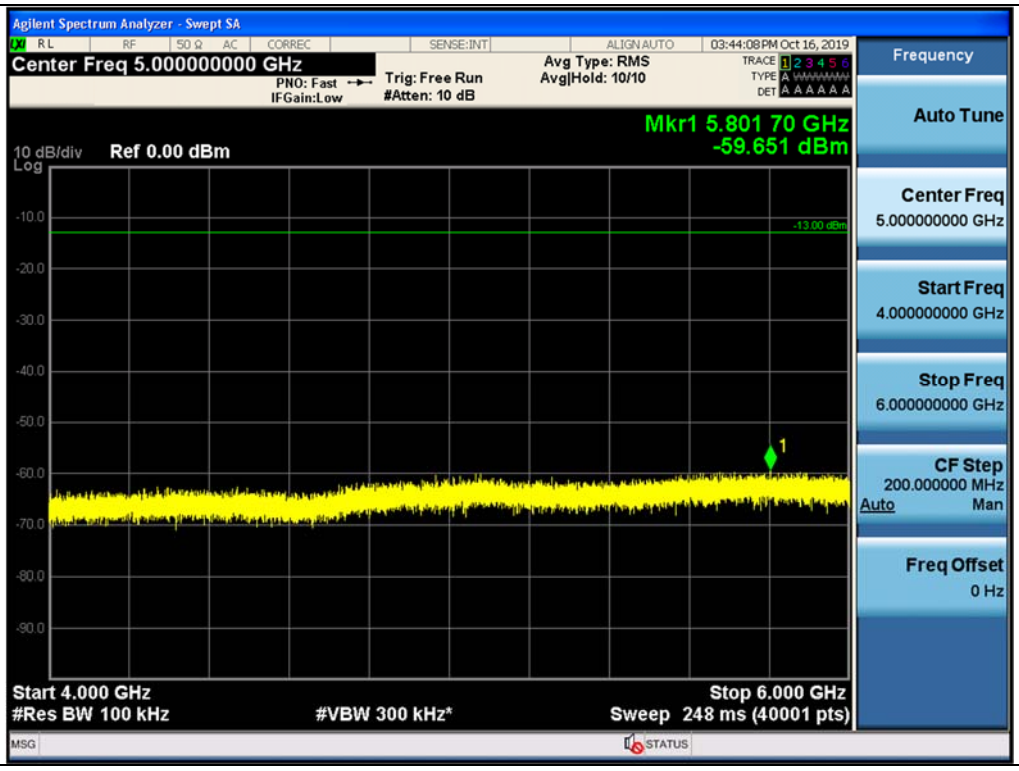
Conducted Spurious Emissions / Lower 700 MHz / Uplink / 9 kHz ~ 150 kHz

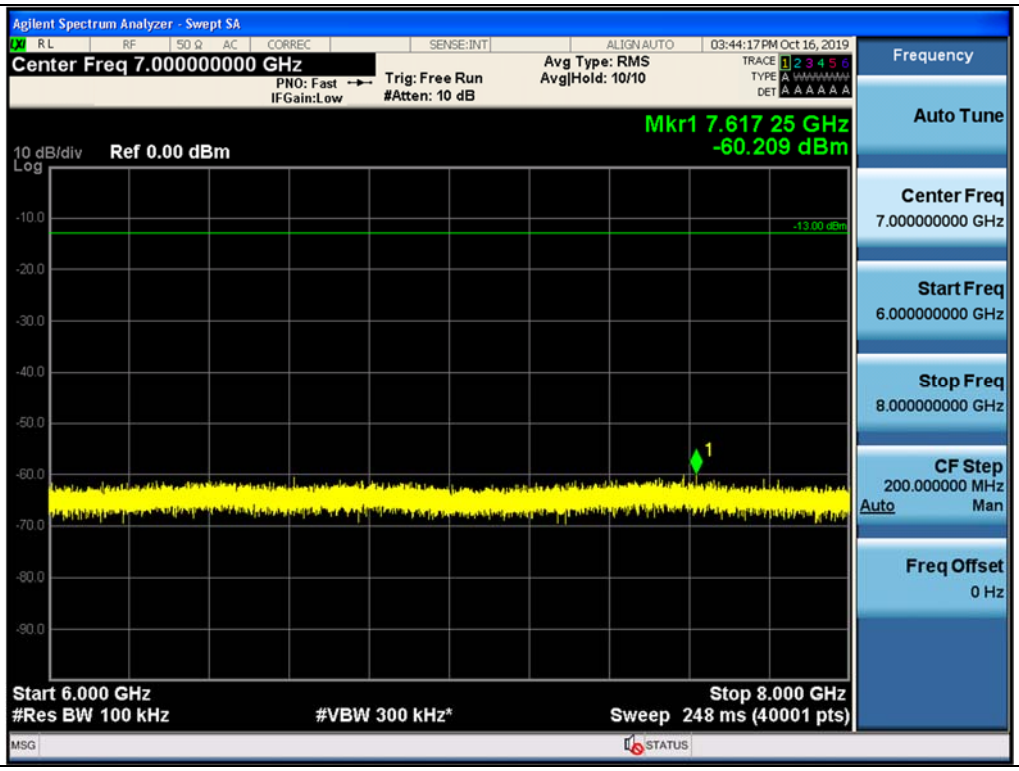

Conducted Spurious Emissions / Lower 700 MHz / Uplink / 150 kHz ~ 30 MHz


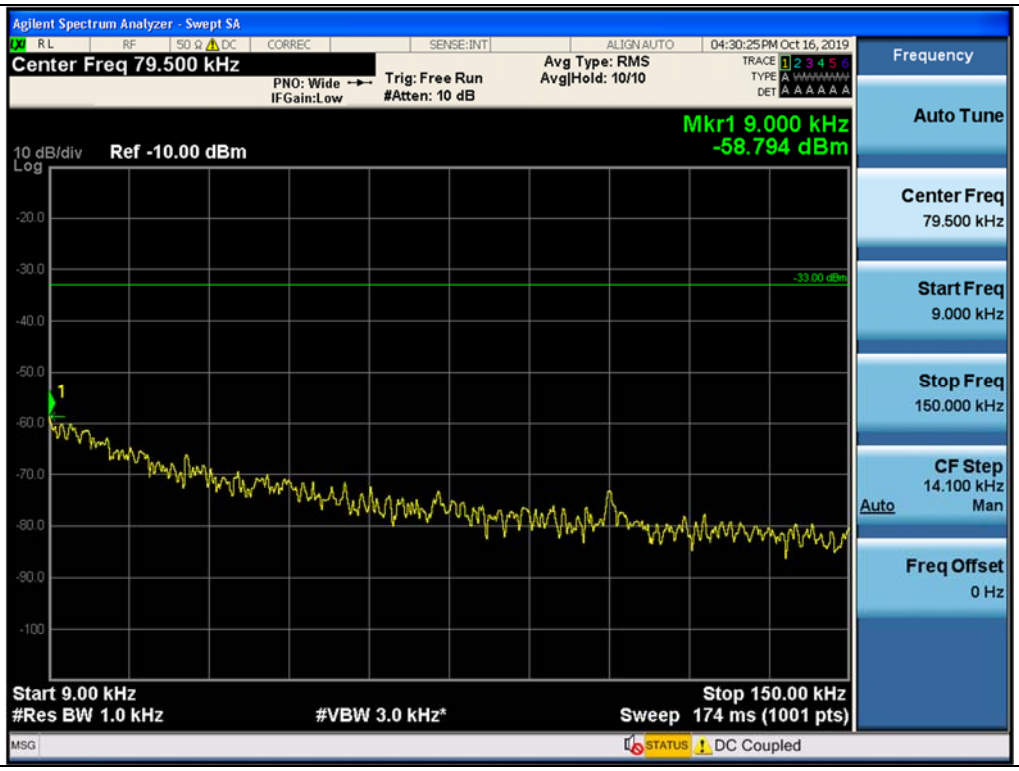
Conducted Spurious Emissions / Lower 700 MHz / Uplink / 30 MHz ~ 703.9 MHz


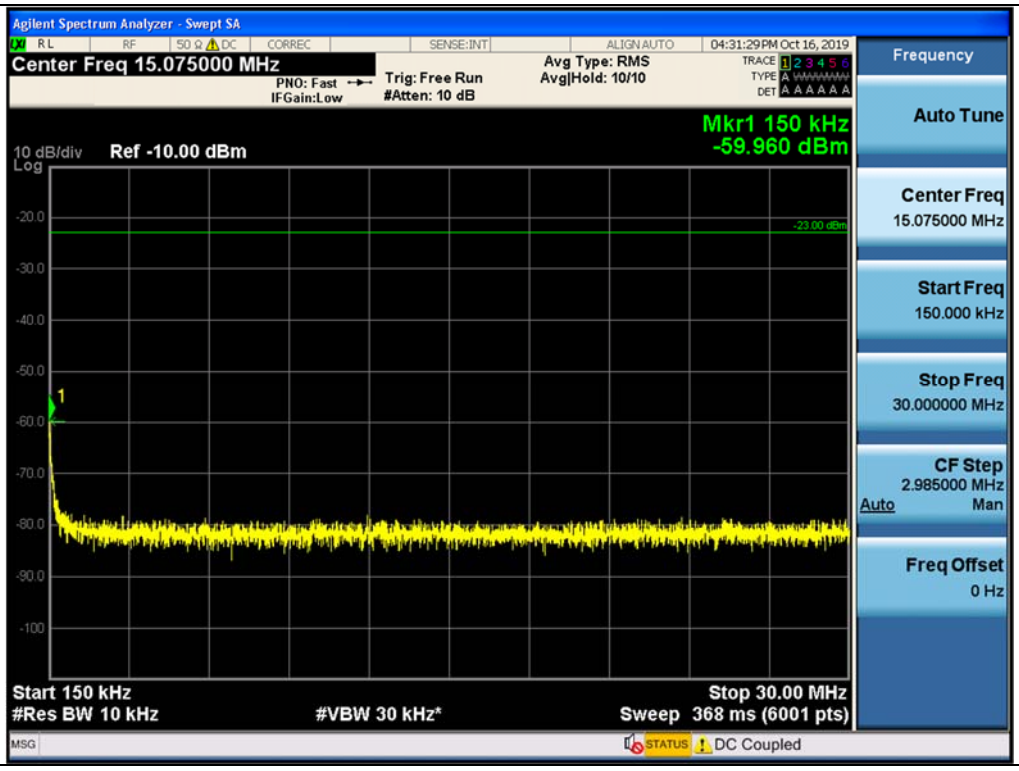
Conducted Spurious Emissions / Lower 700 MHz / Uplink / 716.1 MHz ~ 2 GHz


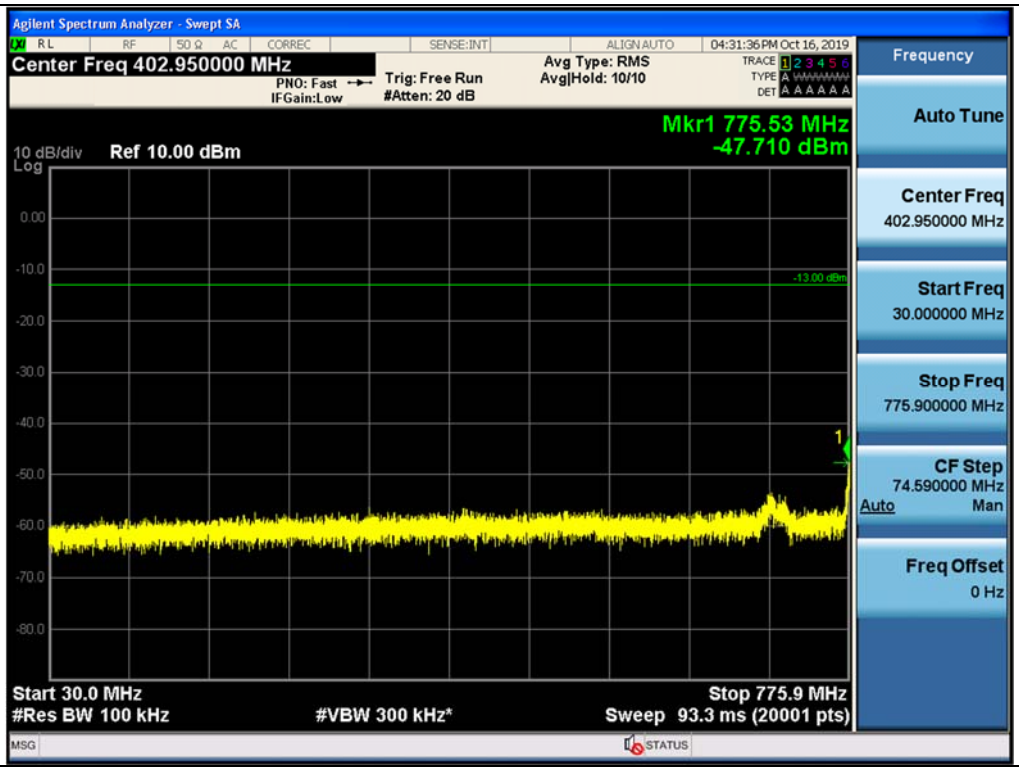
Conducted Spurious Emissions / Lower 700 MHz / Uplink / 2 GHz ~ 4 GHz


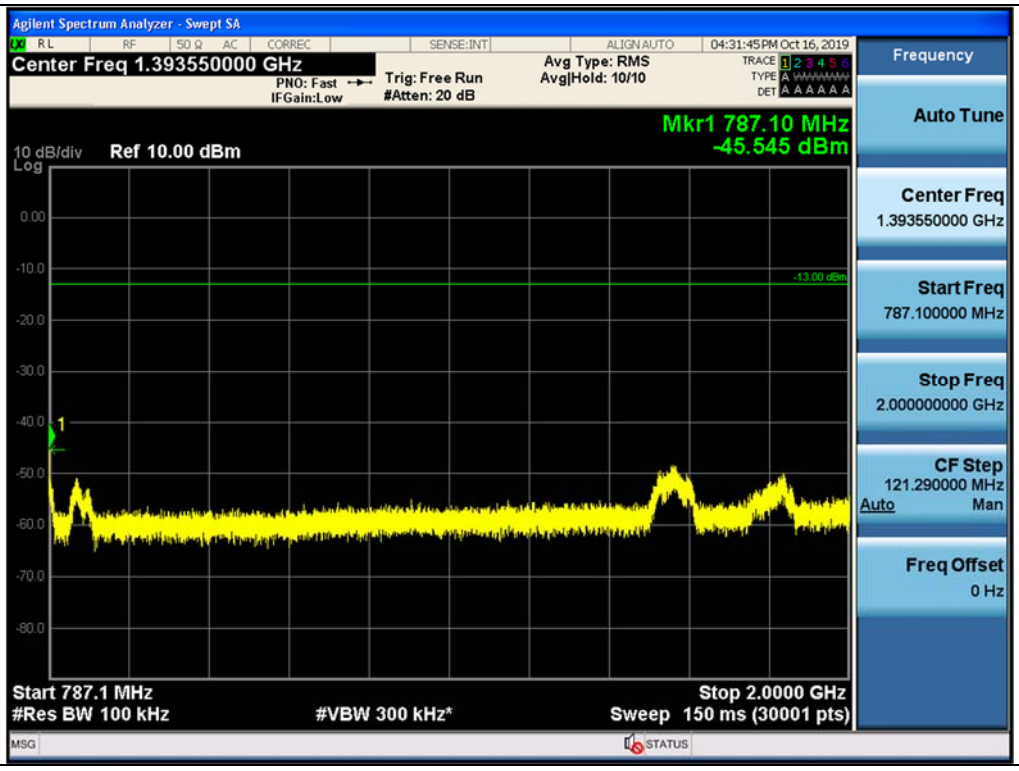
Conducted Spurious Emissions / Lower 700 MHz / Uplink / 4 GHz ~ 6 GHz


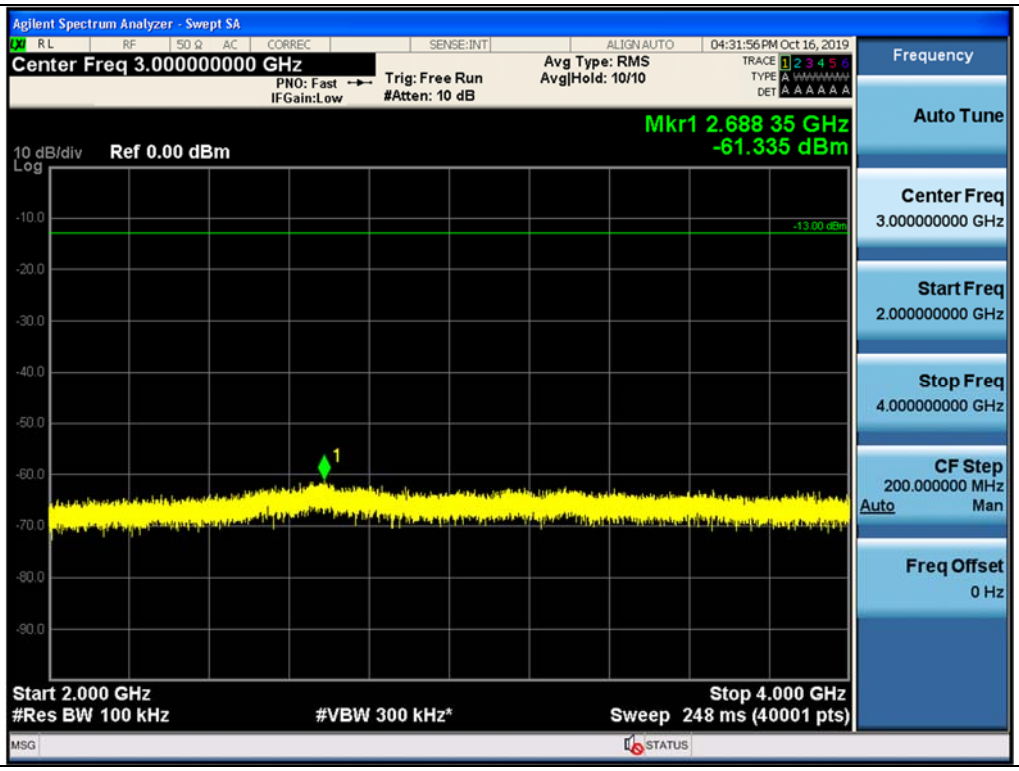
Conducted Spurious Emissions / Lower 700 MHz / Uplink / 6 GHz ~ 8 GHz


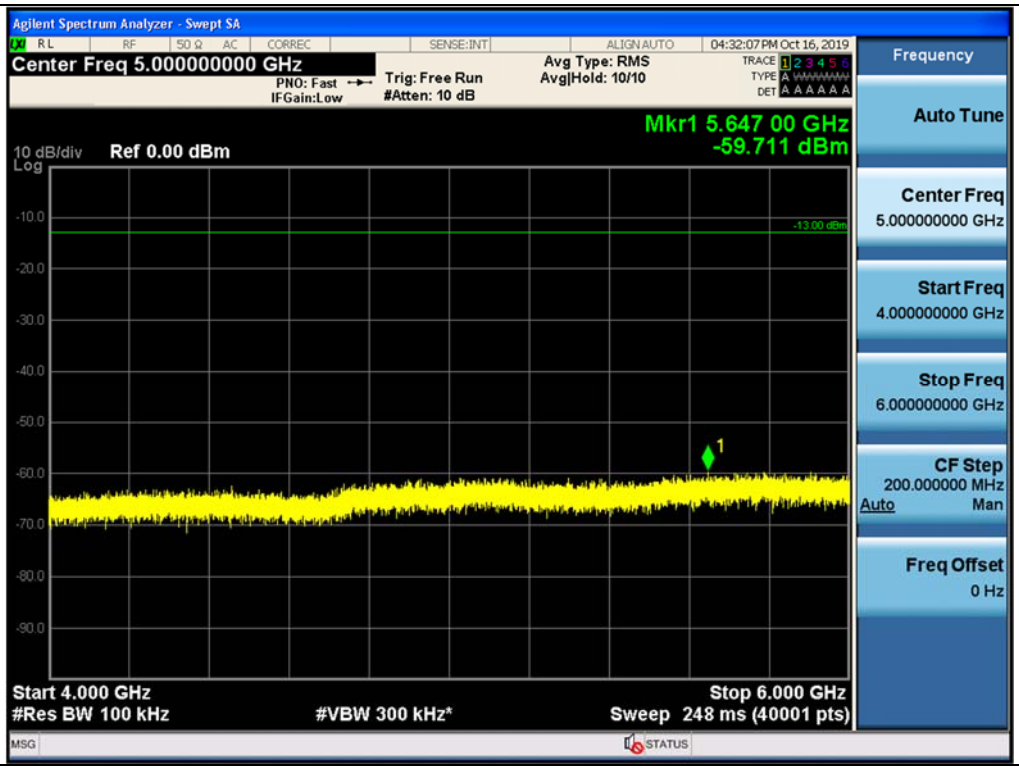
Conducted Spurious Emissions / Upper 700 MHz / Uplink / 9 kHz ~ 150 kHz


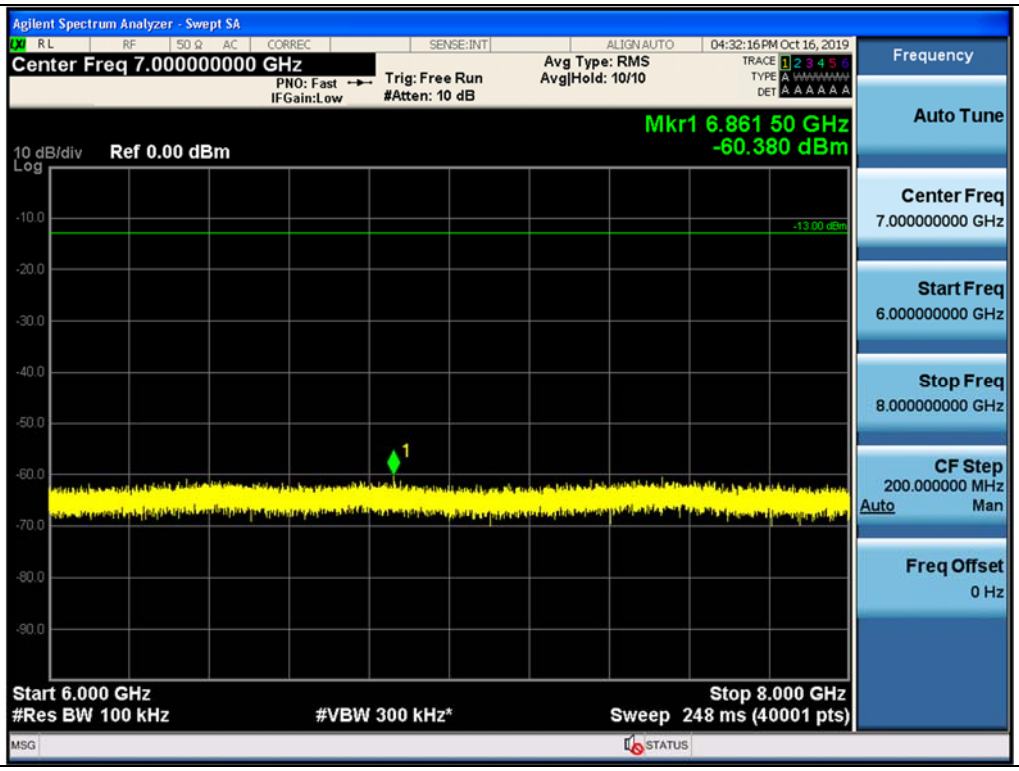
Conducted Spurious Emissions / Upper 700 MHz / Uplink / 150 kHz ~ 30 MHz


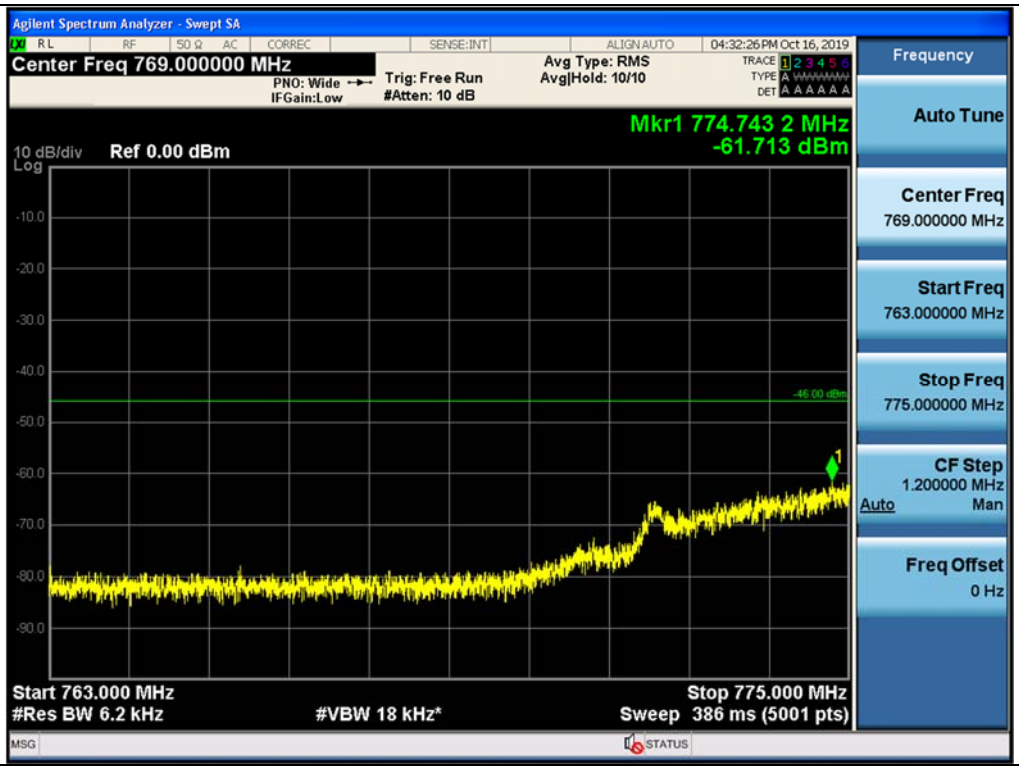
Conducted Spurious Emissions / Upper 700 MHz / Uplink / 30 MHz ~ 775.9 MHz


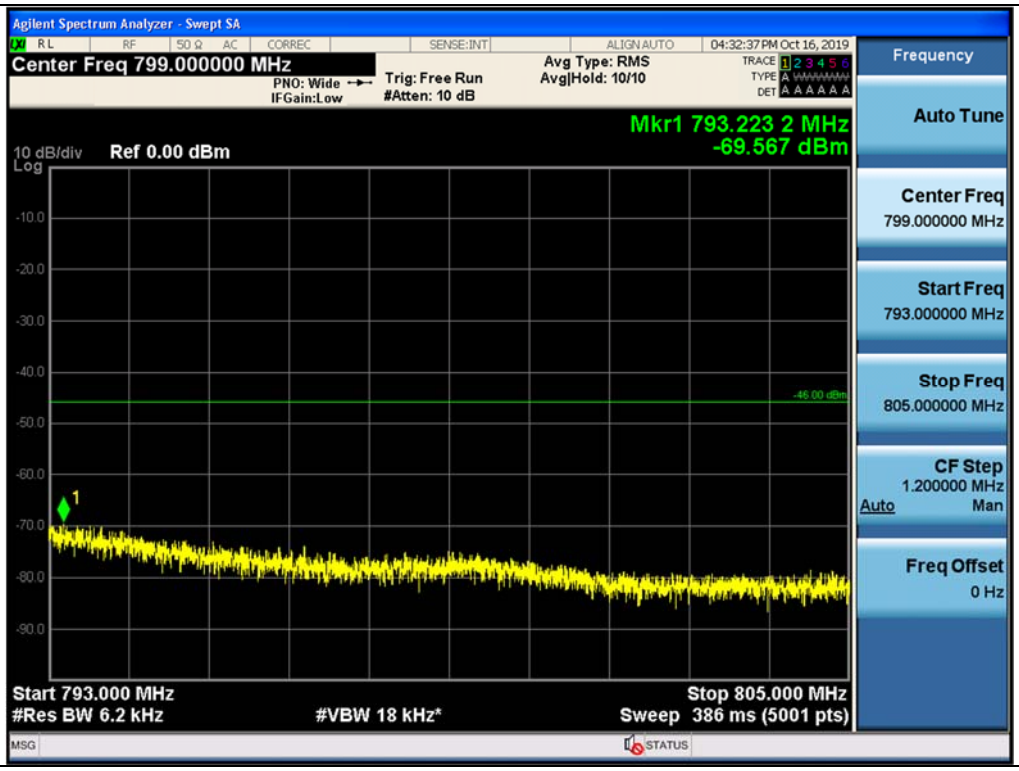
Conducted Spurious Emissions / Upper 700 MHz / Uplink / 787.1 MHz ~ 2 GHz


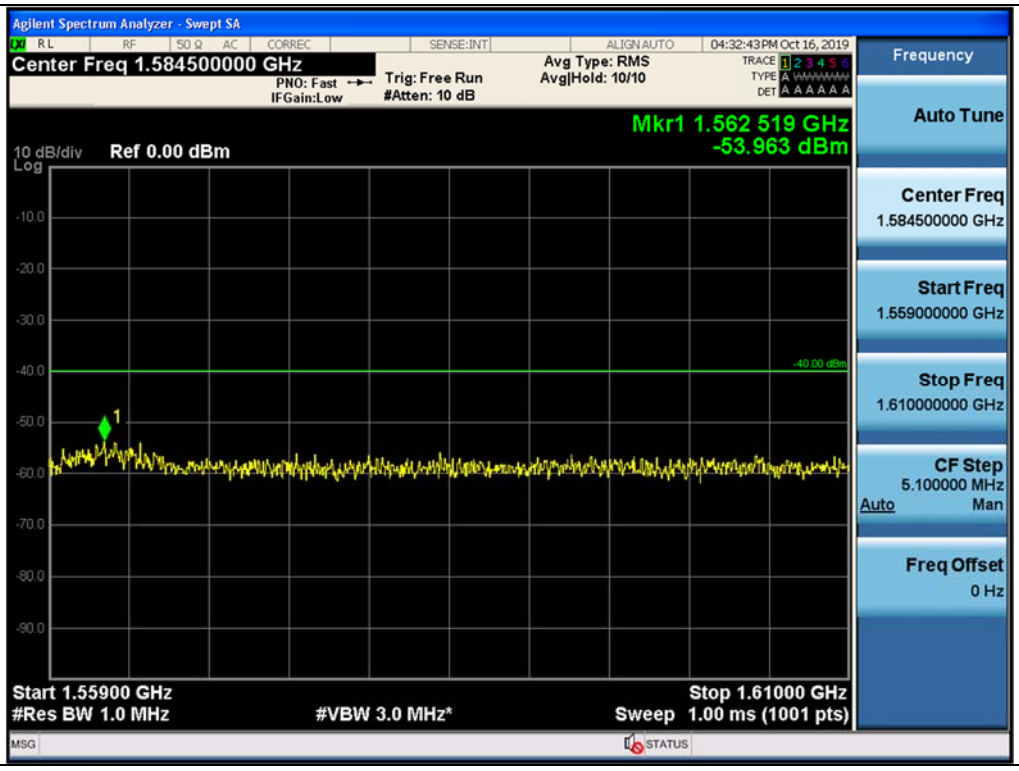
Conducted Spurious Emissions / Upper 700 MHz / Uplink / 2 GHz ~ 4 GHz


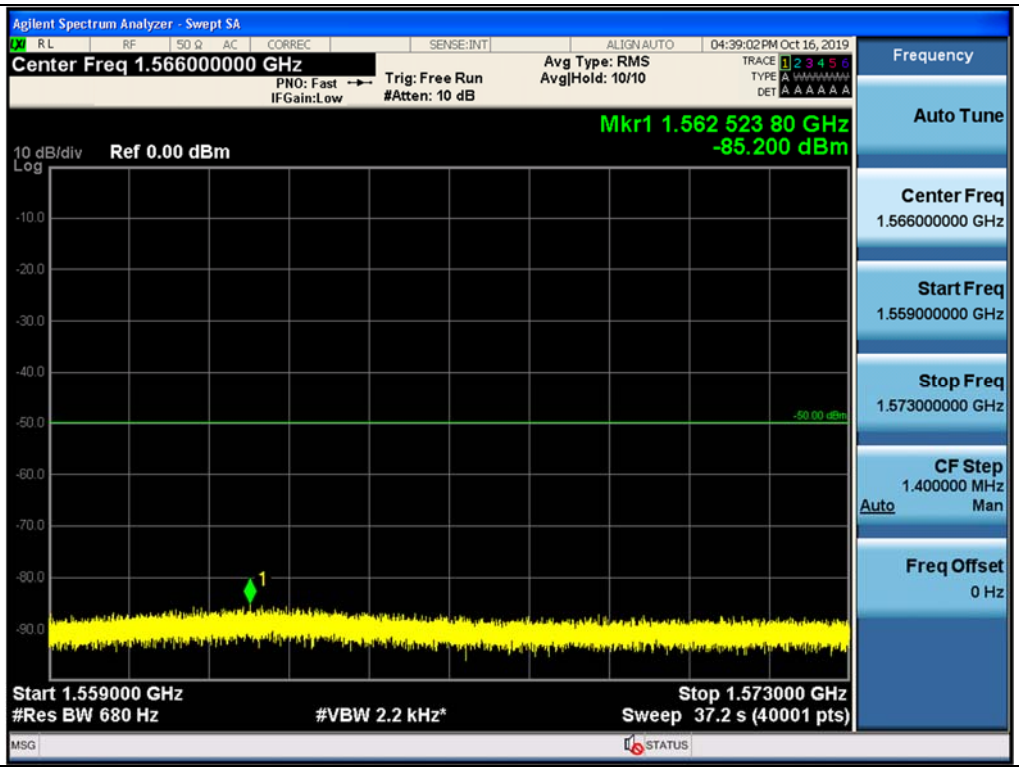
Conducted Spurious Emissions / Upper 700 MHz / Uplink / 4 GHz ~ 6 GHz


Conducted Spurious Emissions / Upper 700 MHz / Uplink / 6 GHz ~ 8 GHz


Conducted Spurious Emissions / Upper 700 MHz / Uplink / 763 MHz ~ 775 MHz


Conducted Spurious Emissions / Upper 700 MHz / Uplink / 793 MHz ~ 805 MHz


Conducted Spurious Emissions / Upper 700 MHz / Uplink / 1.559 GHz ~ 1.610 GHz (1 MHz)


Conducted Spurious Emissions / Upper 700 MHz / Uplink / 1.559 GHz ~ 1.573 GHz (700 Hz)


Conducted Spurious Emissions / Upper 700 MHz / Uplink / 1.573 GHz ~ 1.587 GHz (700 Hz)