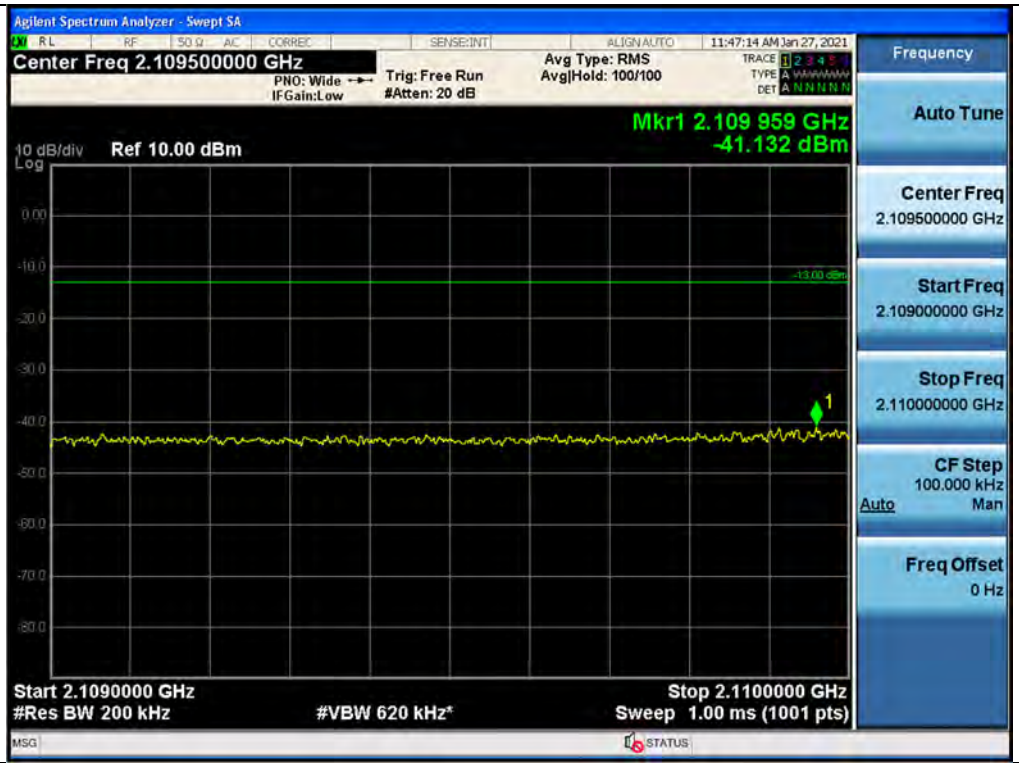
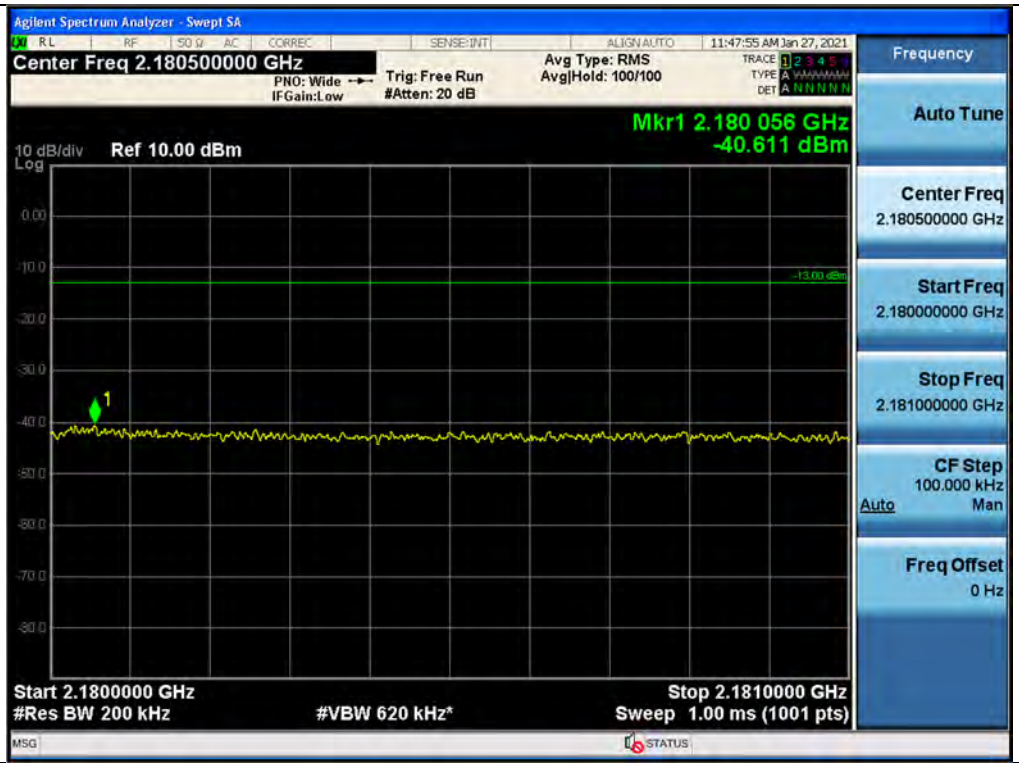
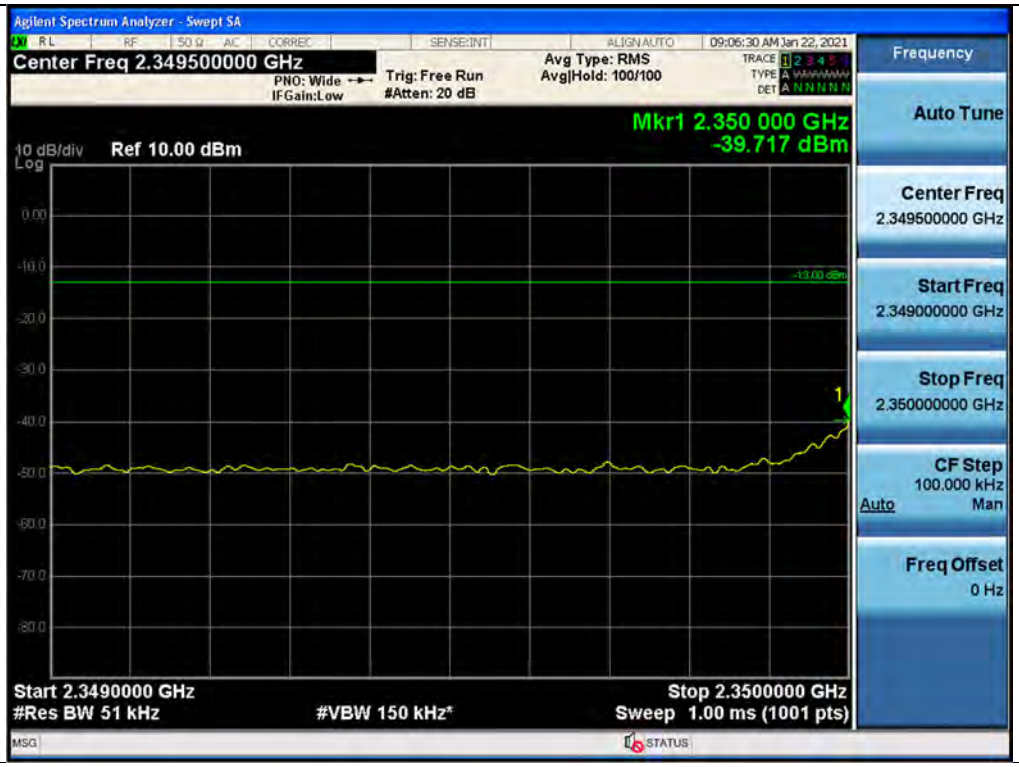
+3 dB above Out-of-band (two adjacent test signals) / AWS13 / Downlink / LTE 20 MHz / Lower



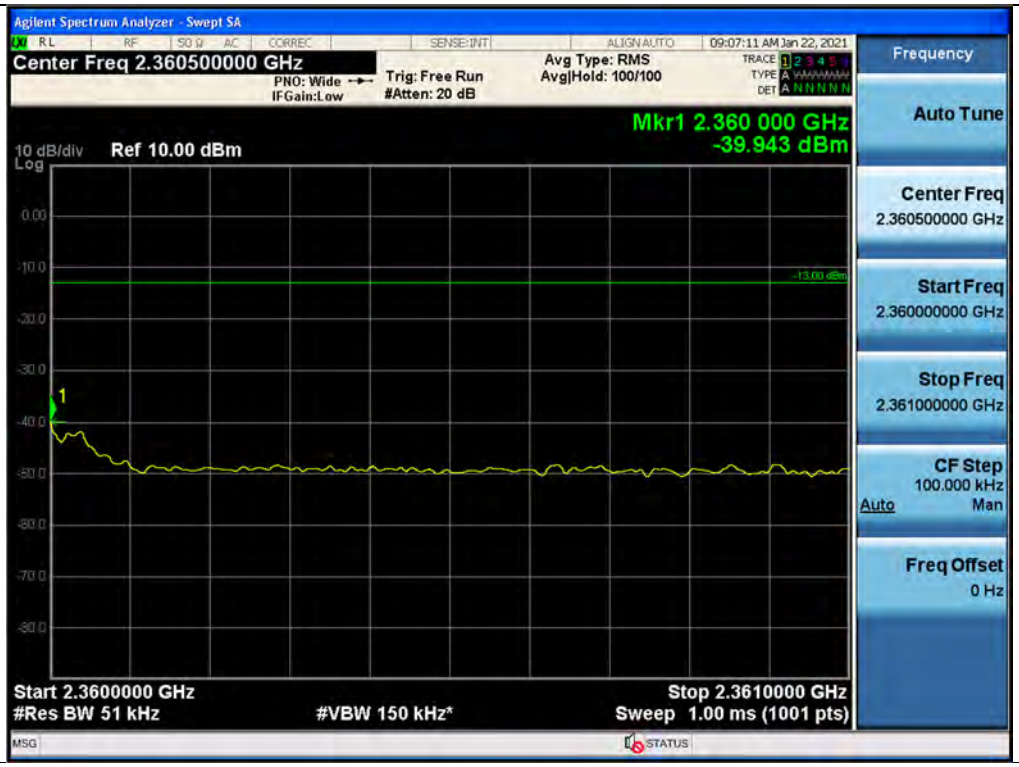
+3 dB above Out-of-band (two adjacent test signals) / AWS13 / Downlink / LTE 20 MHz / Upper



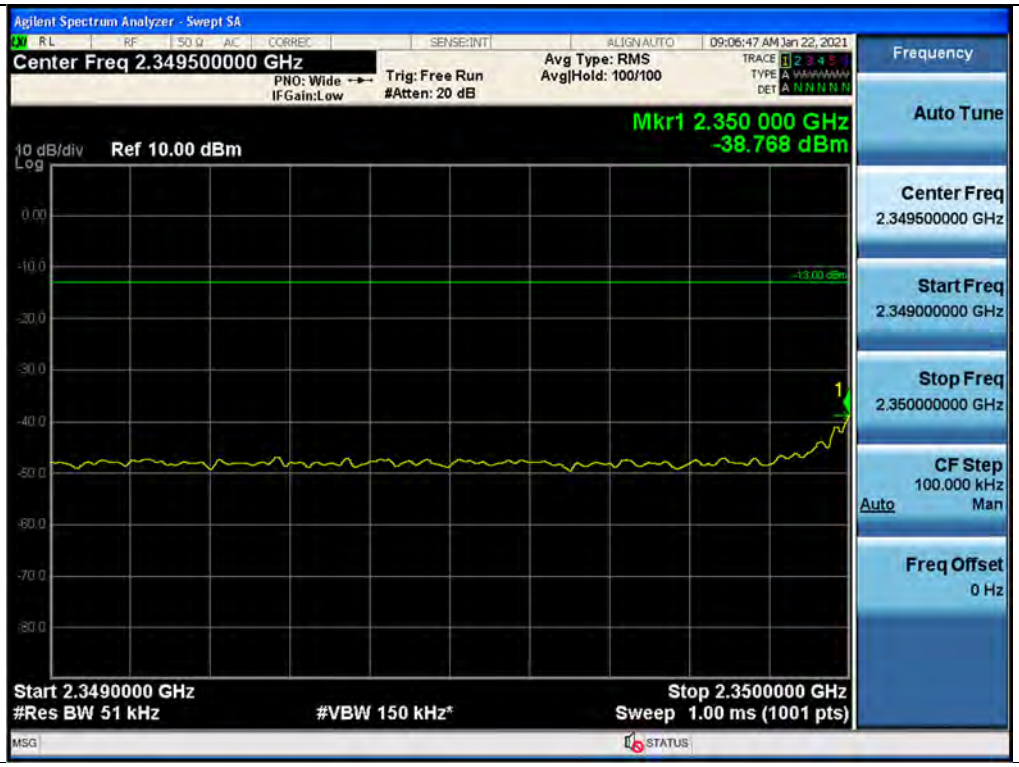
Out-of-band (two adjacent test signals) / WCS / Downlink / LTE 5 MHz / Lower



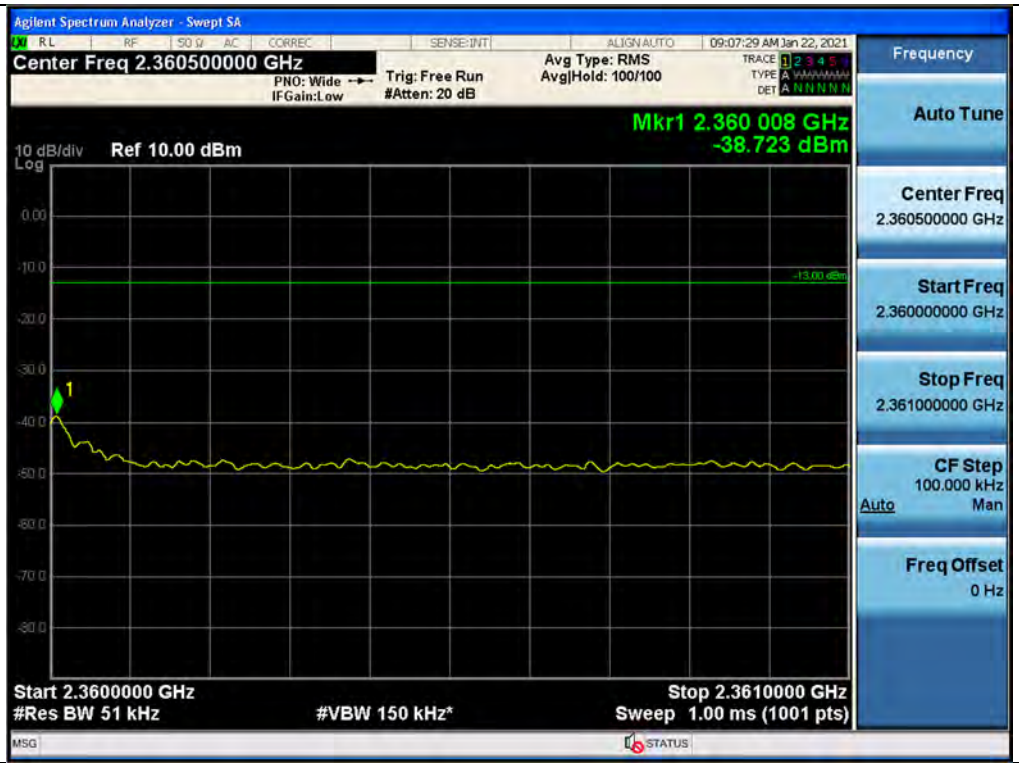
Out-of-band (two adjacent test signals) / WCS / Downlink / LTE 5 MHz / Upper



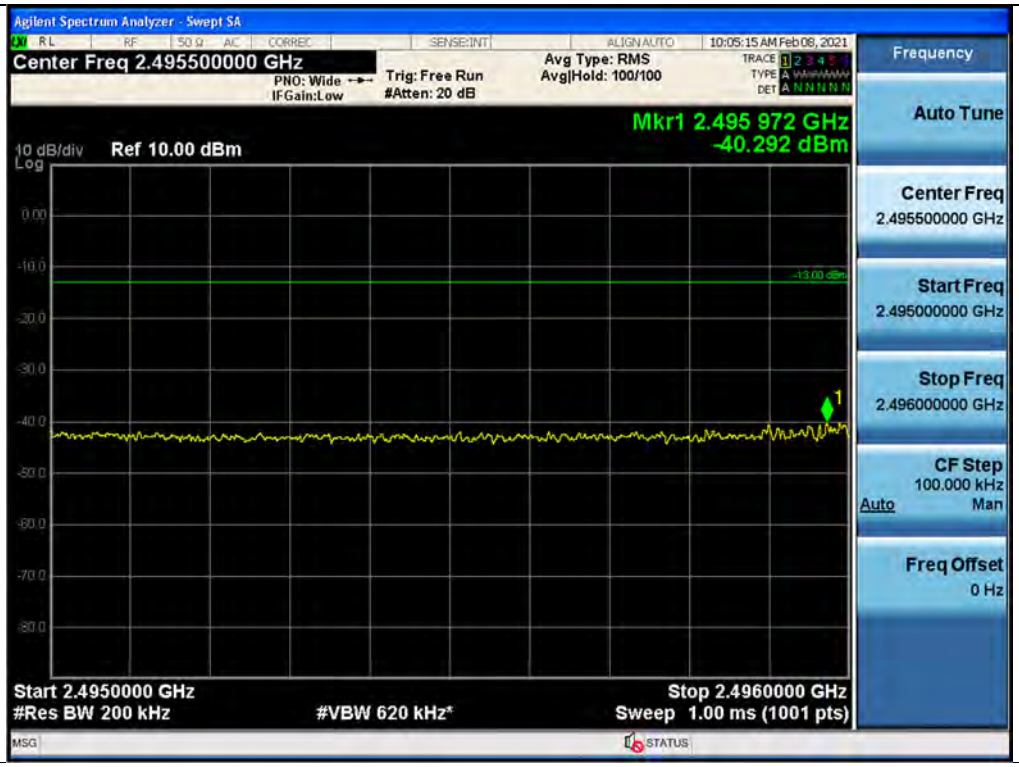
+3 dB above Out-of-band (two adjacent test signals) / WCS / Downlink / LTE 5 MHz / Lower



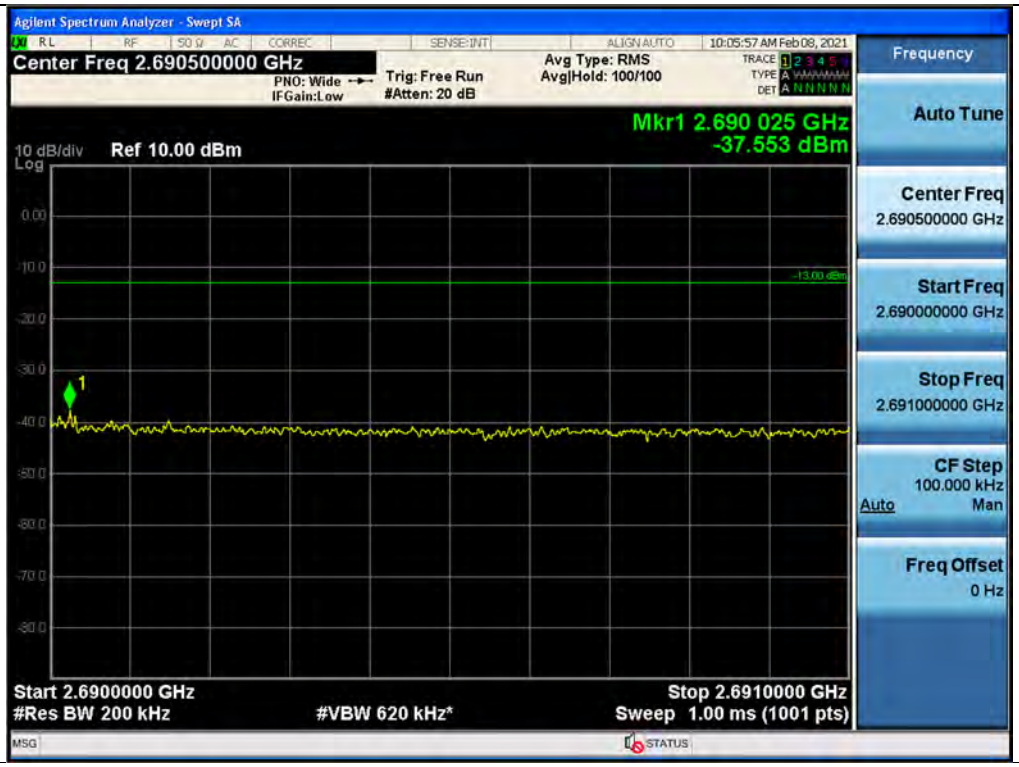
+3 dB above Out-of-band (two adjacent test signals) / WCS / Downlink / LTE 5 MHz / Upper



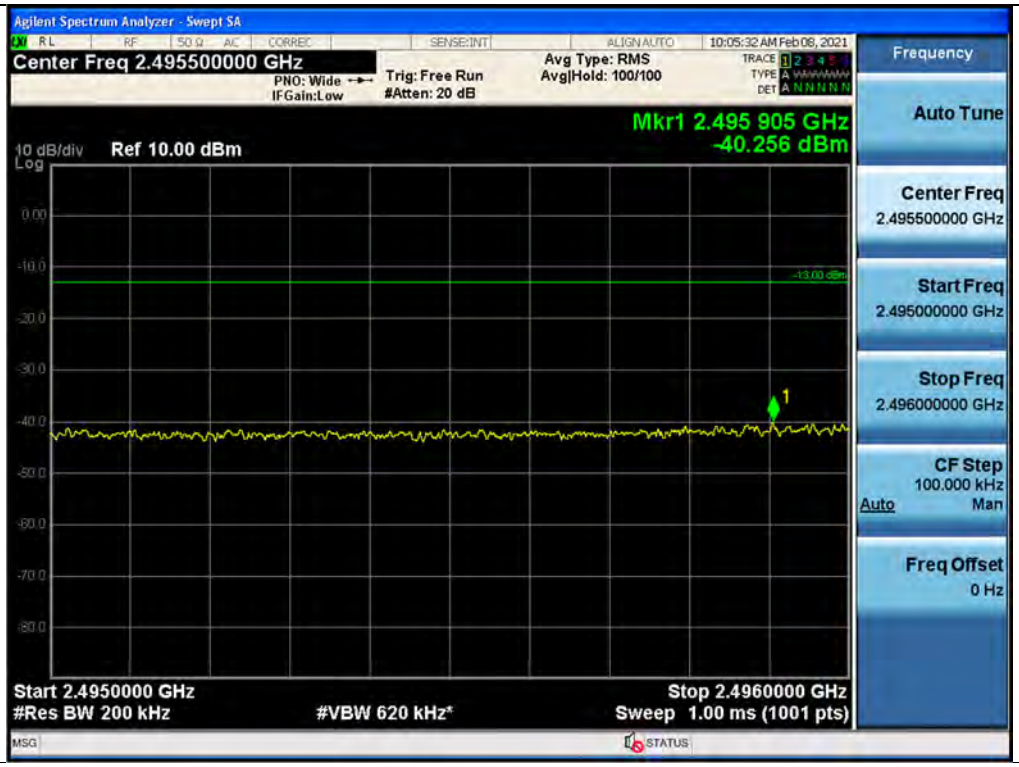
Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / LTE 20 MHz / Lower



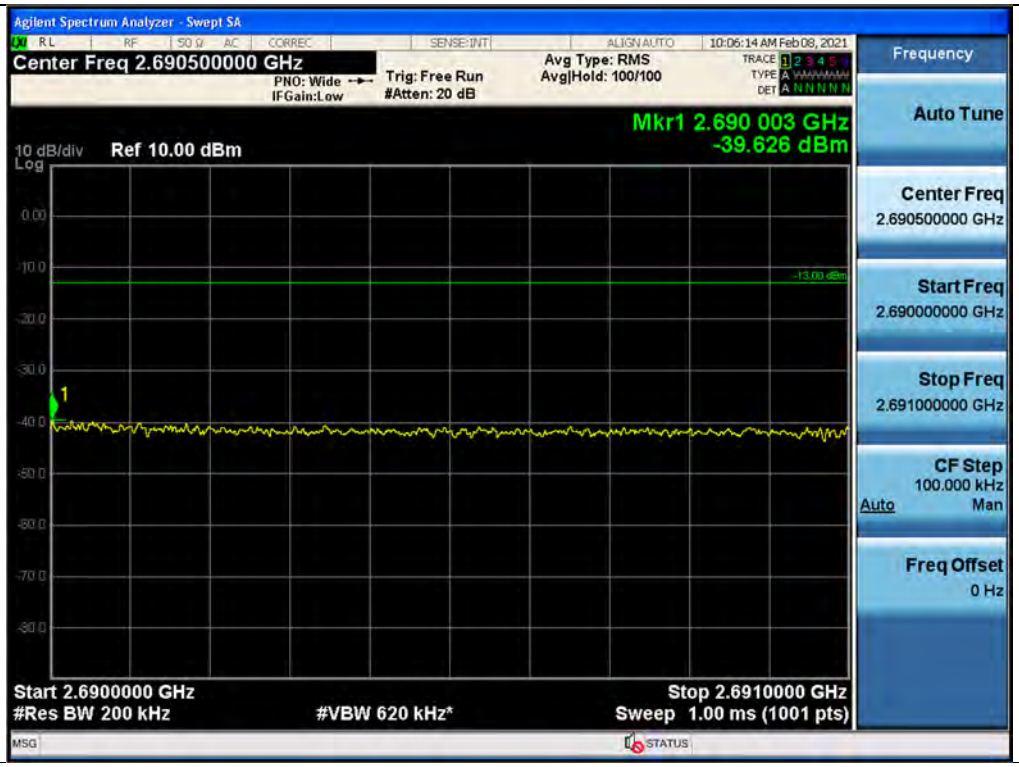
Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / LTE 20 MHz / Upper



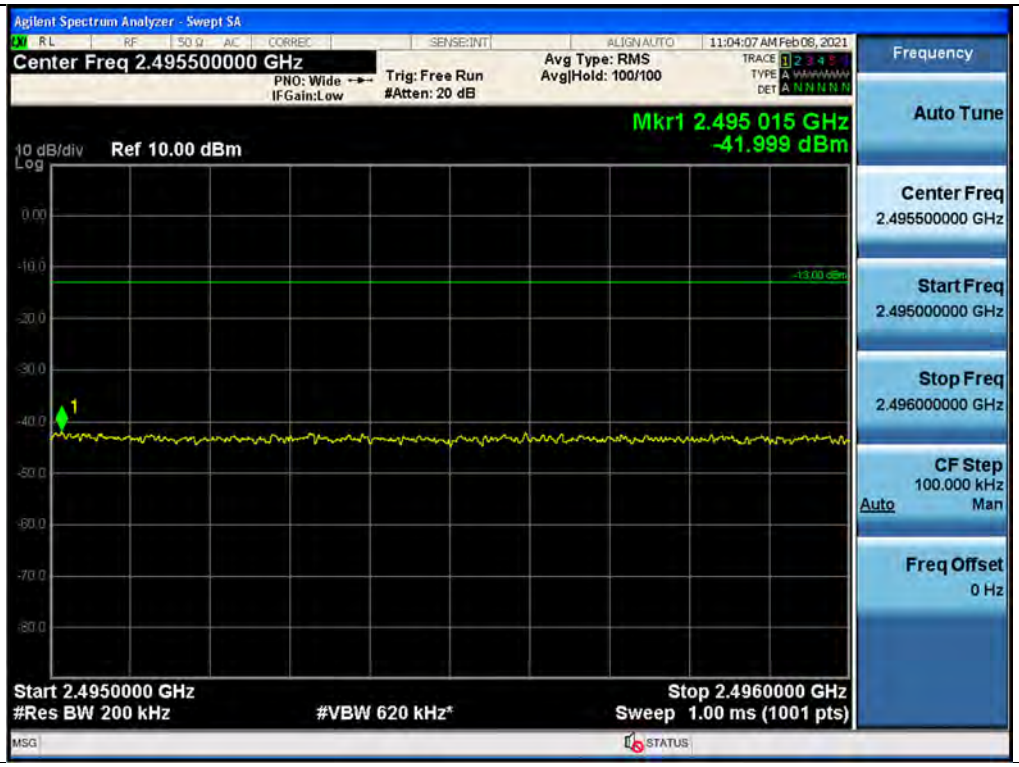
+3 dB above Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / LTE 20 MHz / Lower



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

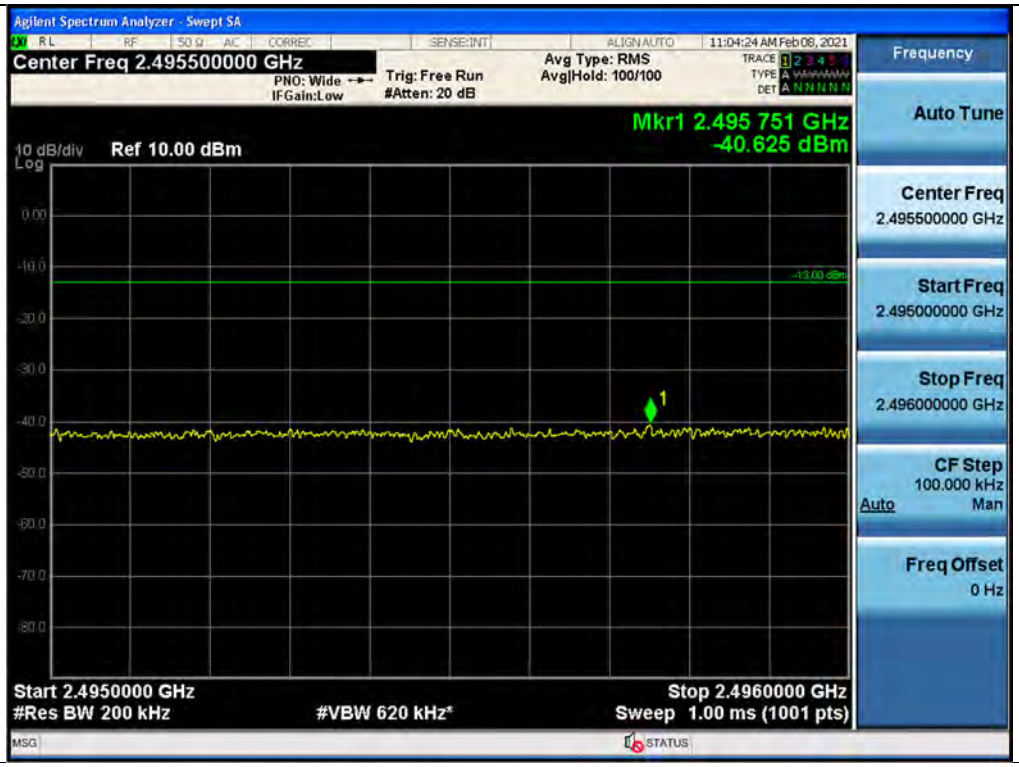


Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / 5G NR 20 MHz / Lower

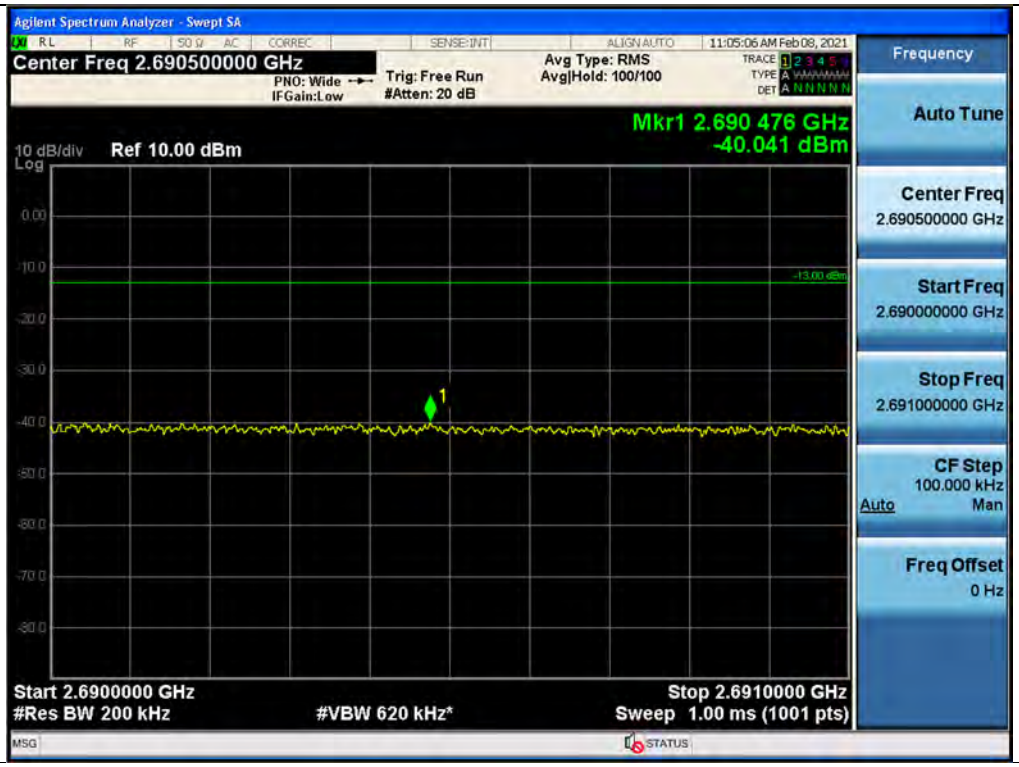


Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / 5G NR 20 MHz / Upper

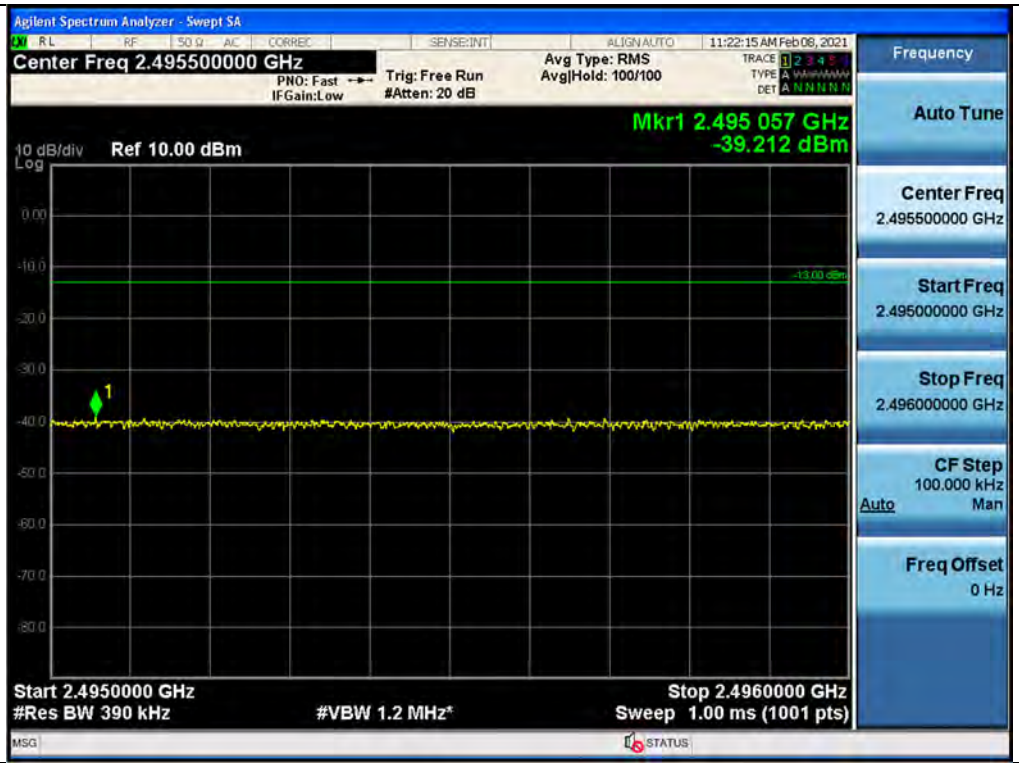
+3 dB above Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / 5G NR 20 MHz / Lower



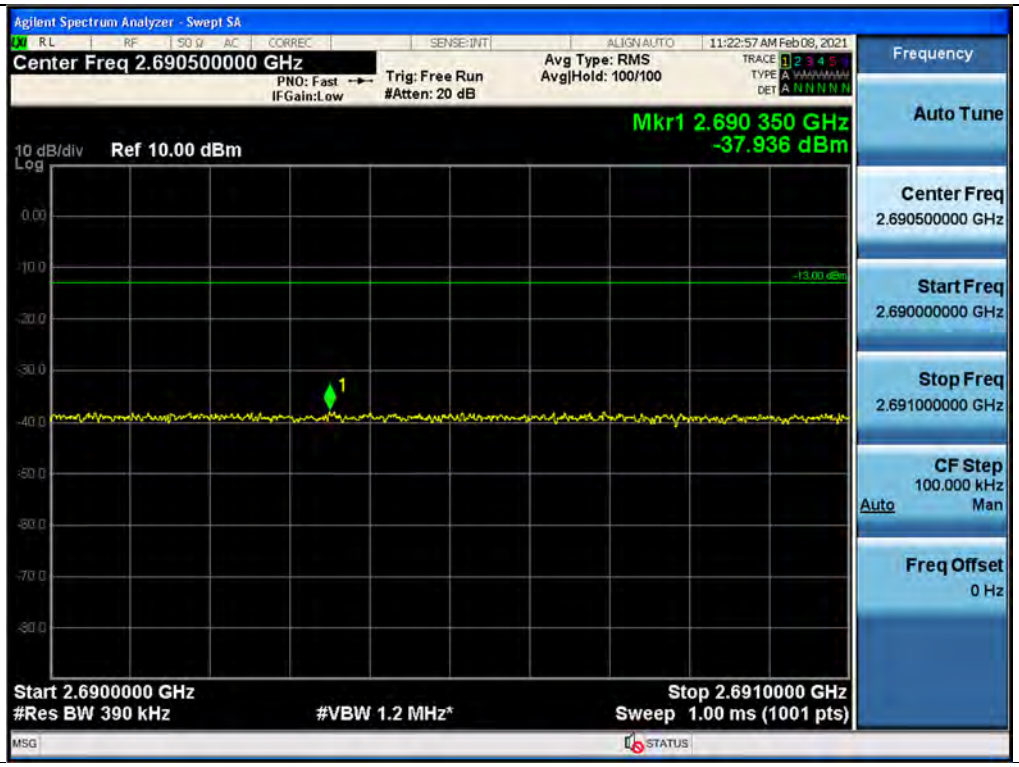
+3 dB above Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / 5G NR 20 MHz / Upper



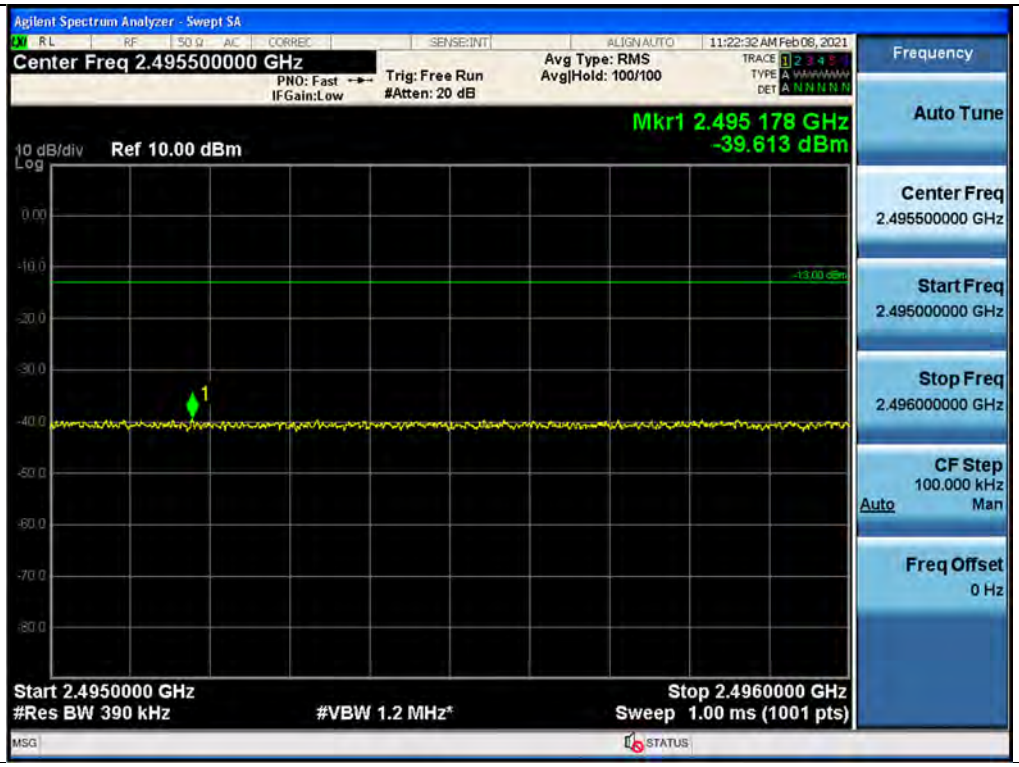
Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / 5G NR 40 MHz / Lower



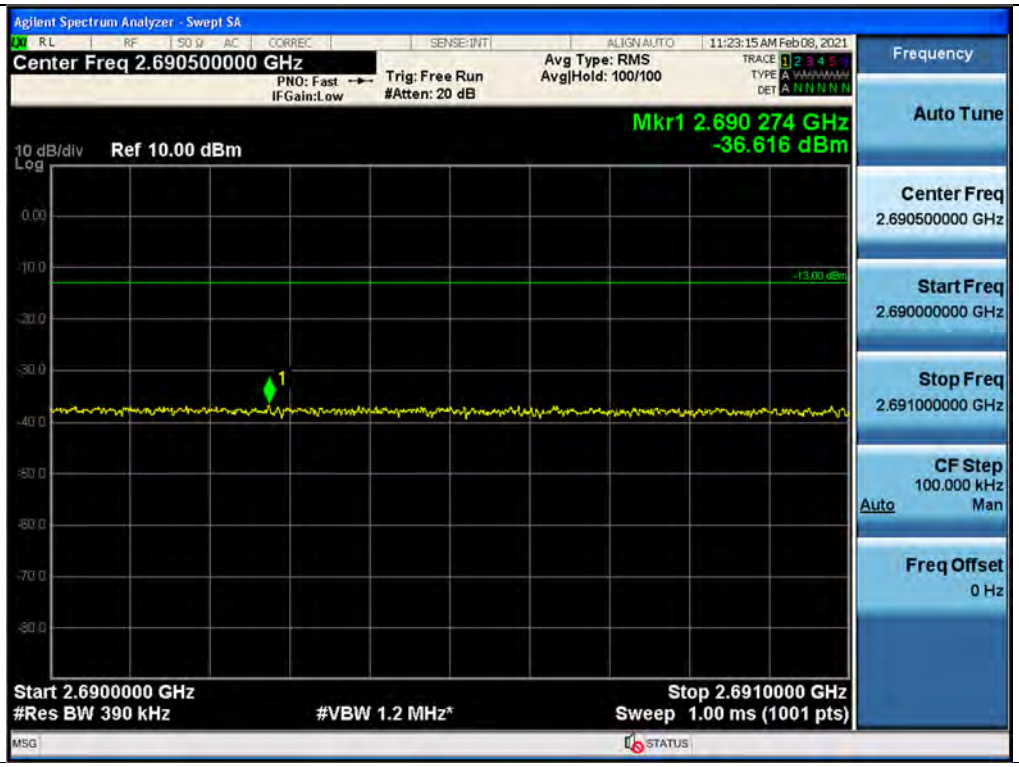
Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / 5G NR 40 MHz / Upper



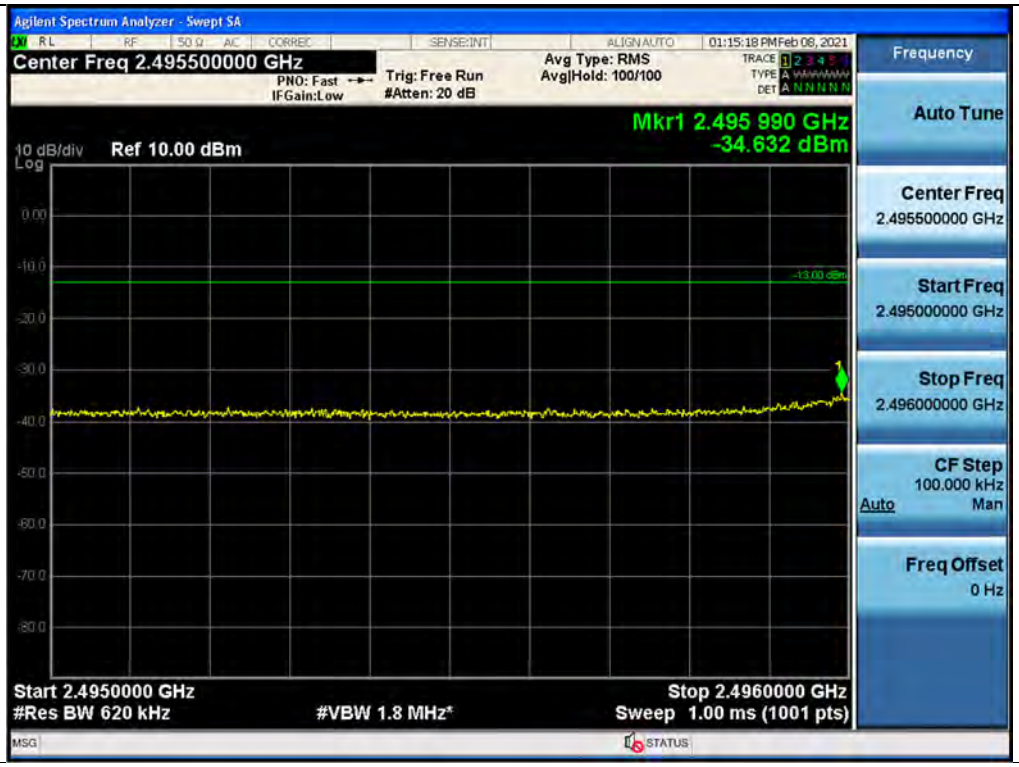
+3 dB above Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / 5G NR 40 MHz / Lower



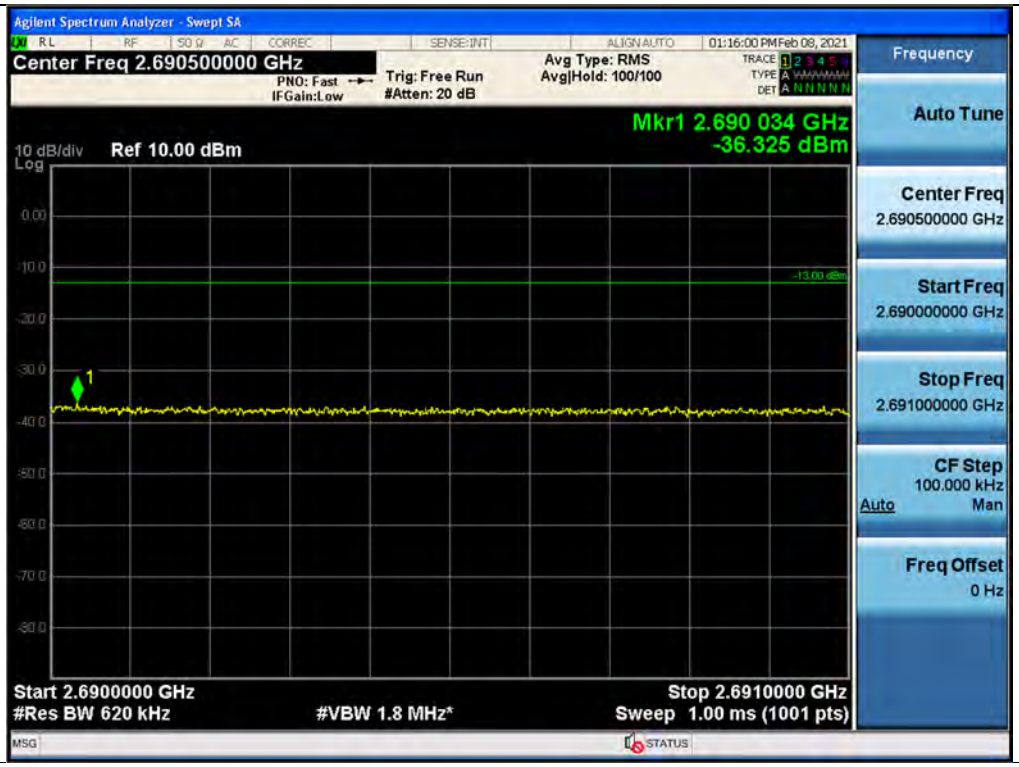
+3 dB above Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / 5G NR 40 MHz / Upper



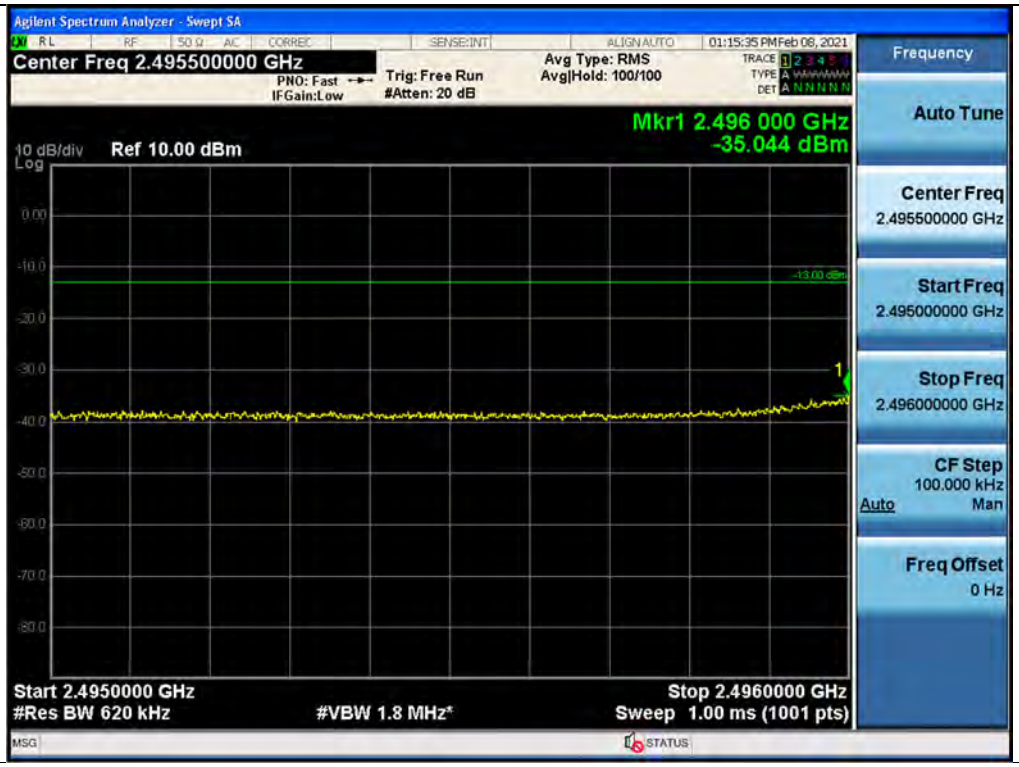
Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / 5G NR 60 MHz / Lower



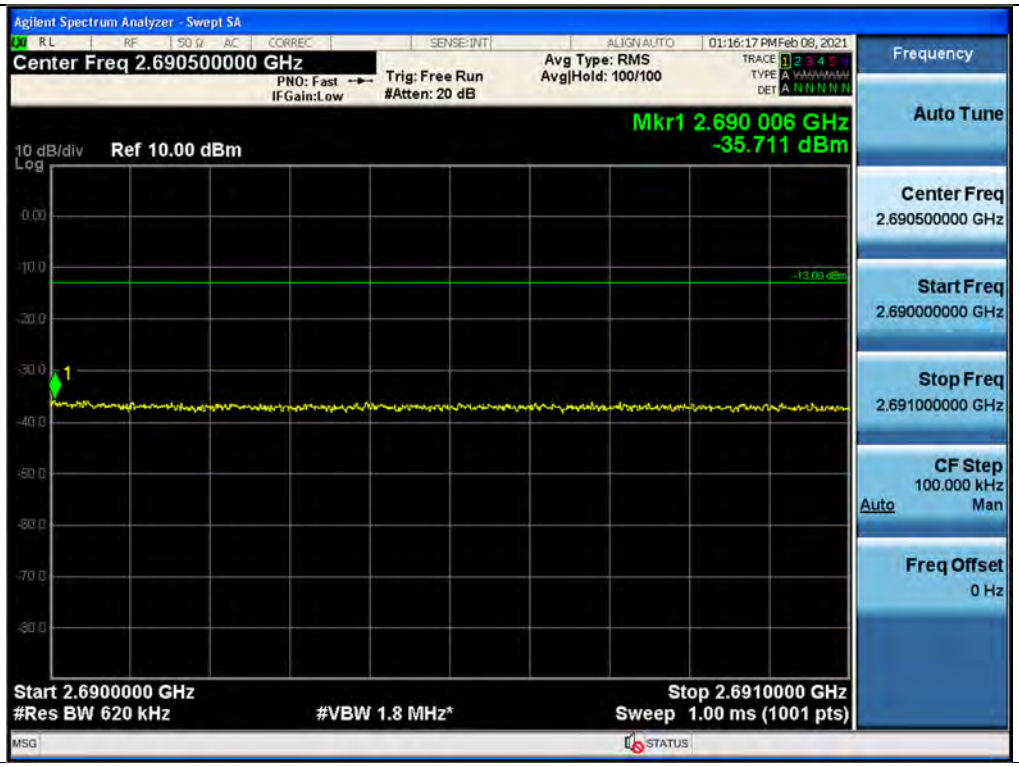
Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / 5G NR 60 MHz / Upper



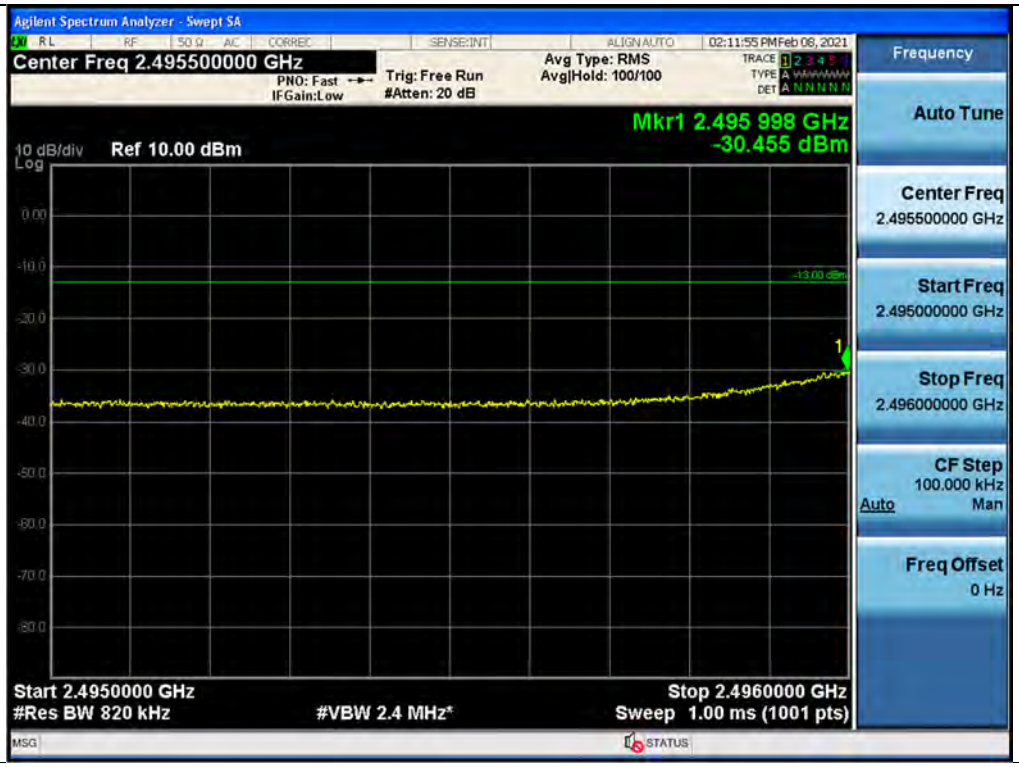
+3 dB above Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / 5G NR 60 MHz / Lower



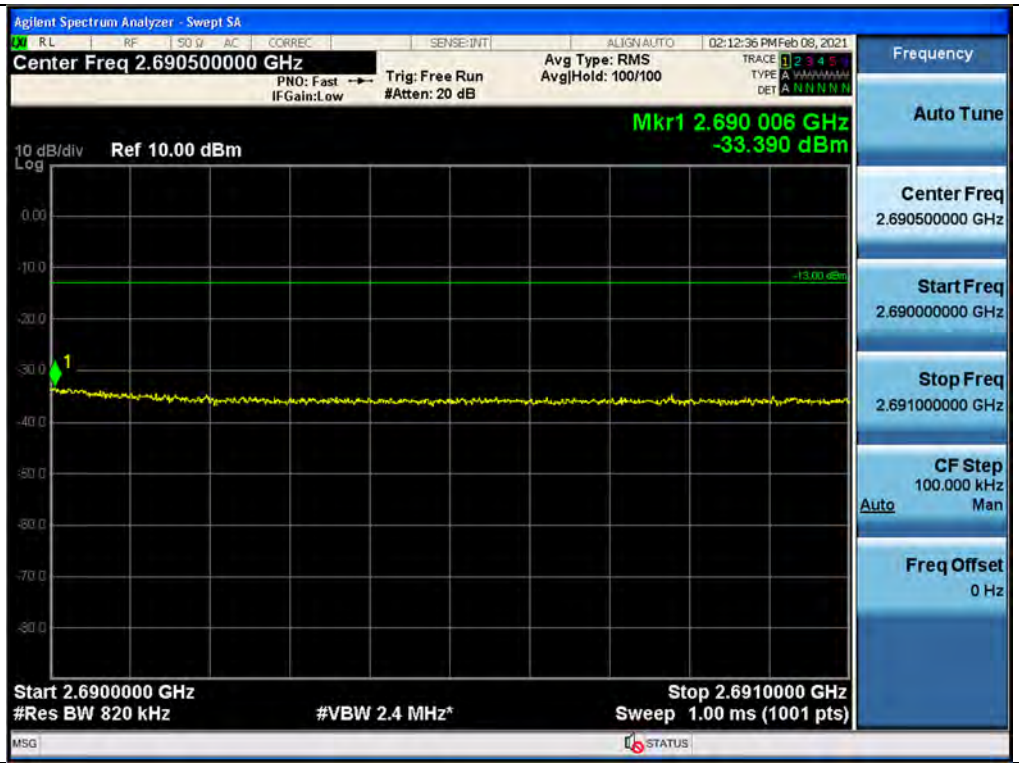
+3 dB above Out-of-band (two adjacent test signals) / BRS/EBS /Downlink / 5G NR 60 MHz / Upper



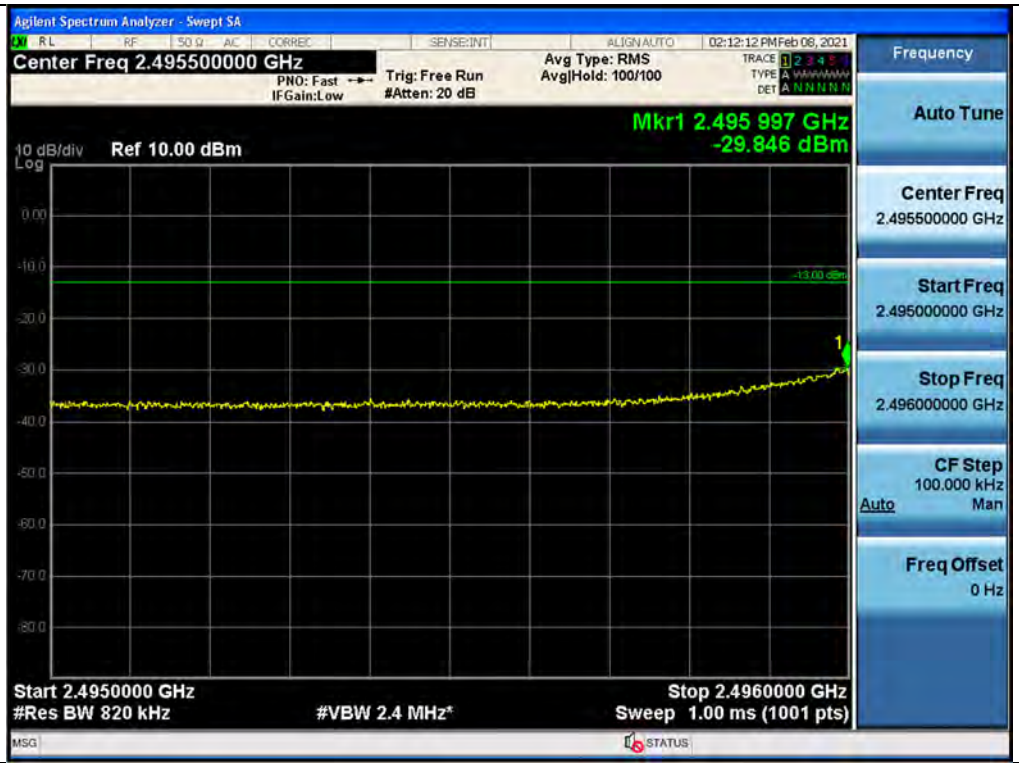
Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / 5G NR 80 MHz / Lower



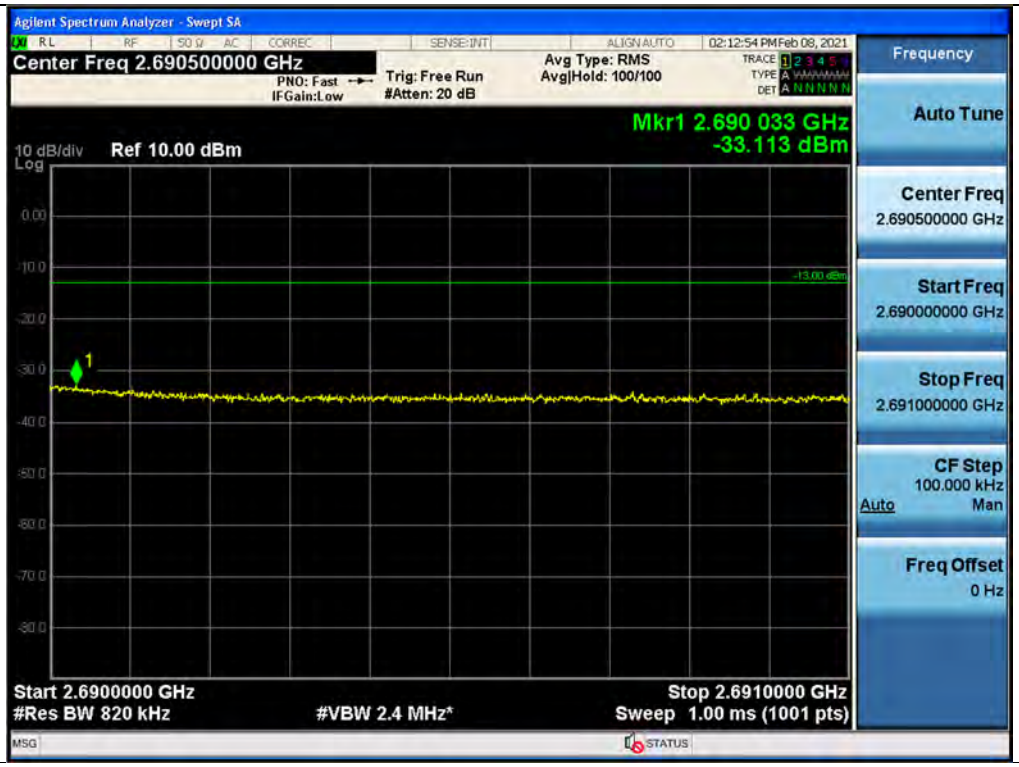
Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / 5G NR 80 MHz / Upper



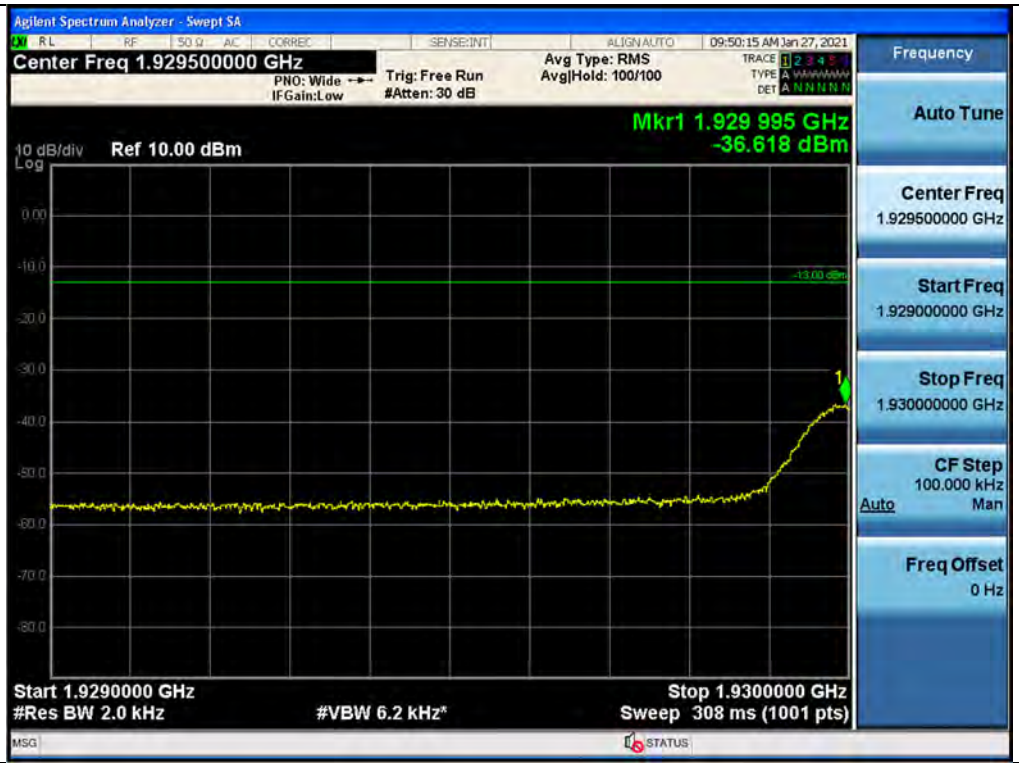
+3 dB above Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / 5G NR 80 MHz / Lower



+3 dB above Out-of-band (two adjacent test signals) / BRS/EBS / Downlink / 5G NR 80 MHz / Upper

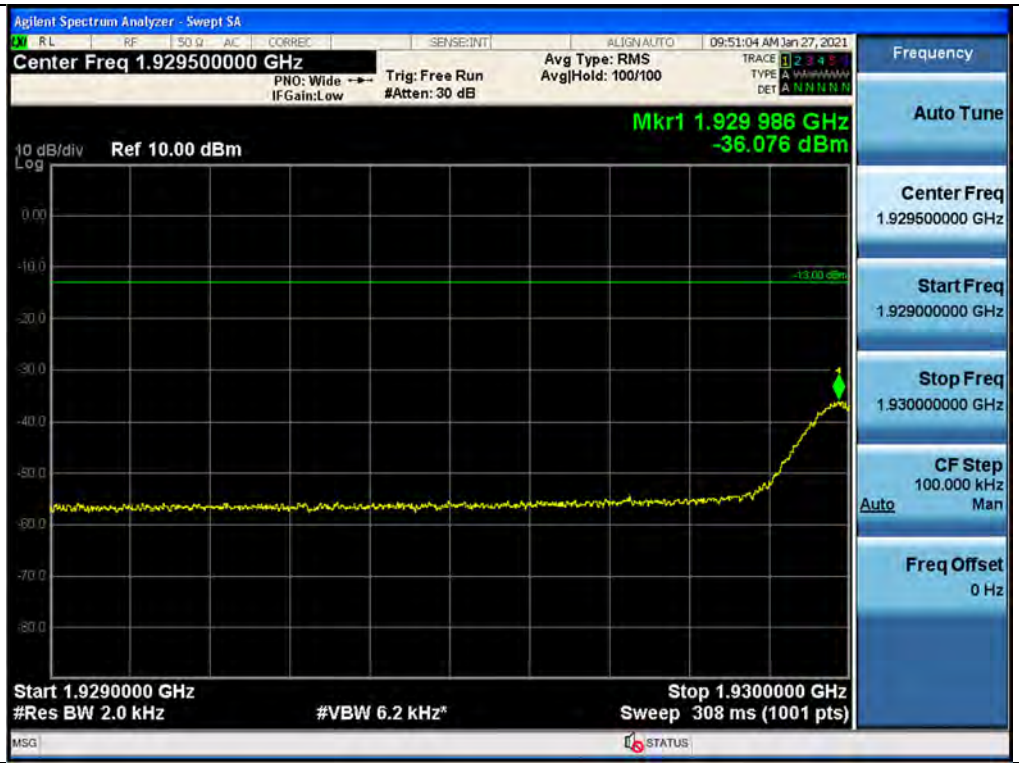


Out-of-band (single test signals) / Broadband PCS / Downlink / GSM / Lower



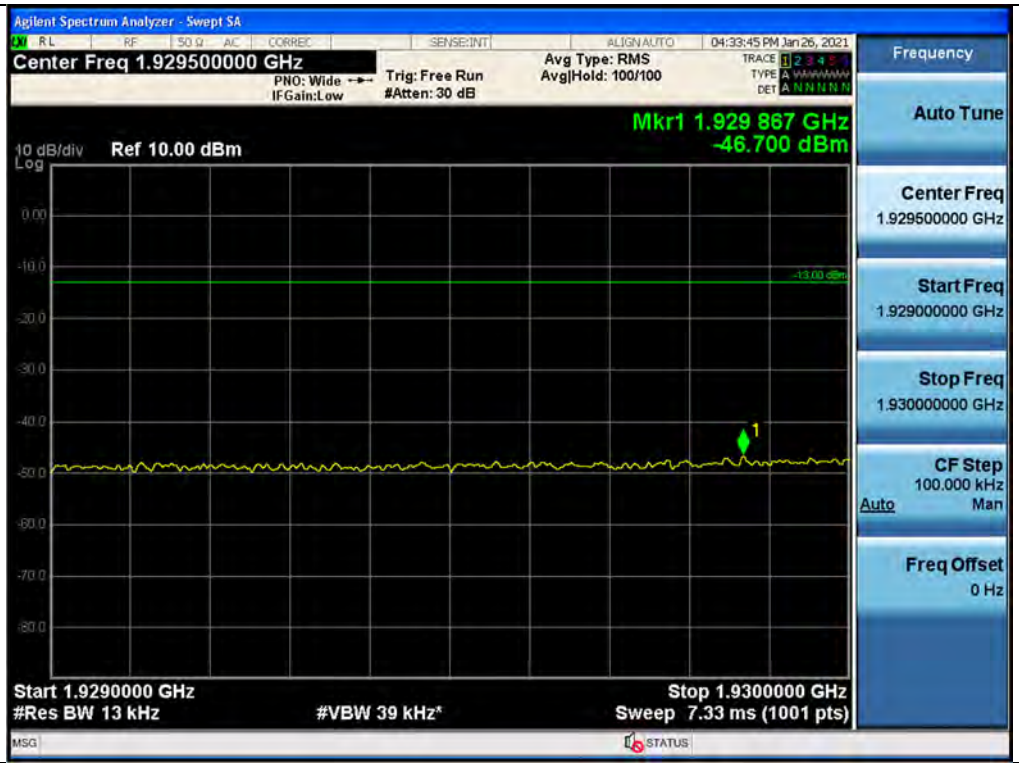
Out-of-band (single test signals) / Broadband PCS / Downlink / GSM / Upper

+3 dB above Out-of-band (single test signals) / Broadband PCS / Downlink / GSM / Lower

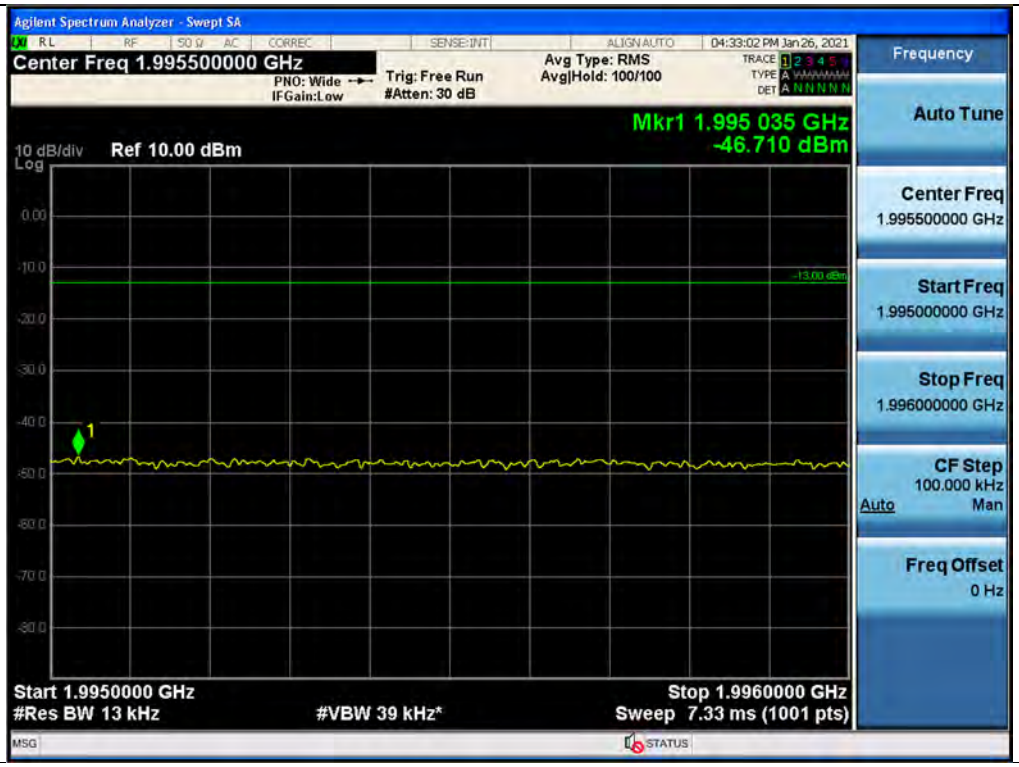


+3 dB above Out-of-band (single test signals) / Broadband PCS / Downlink / GSM / Upper

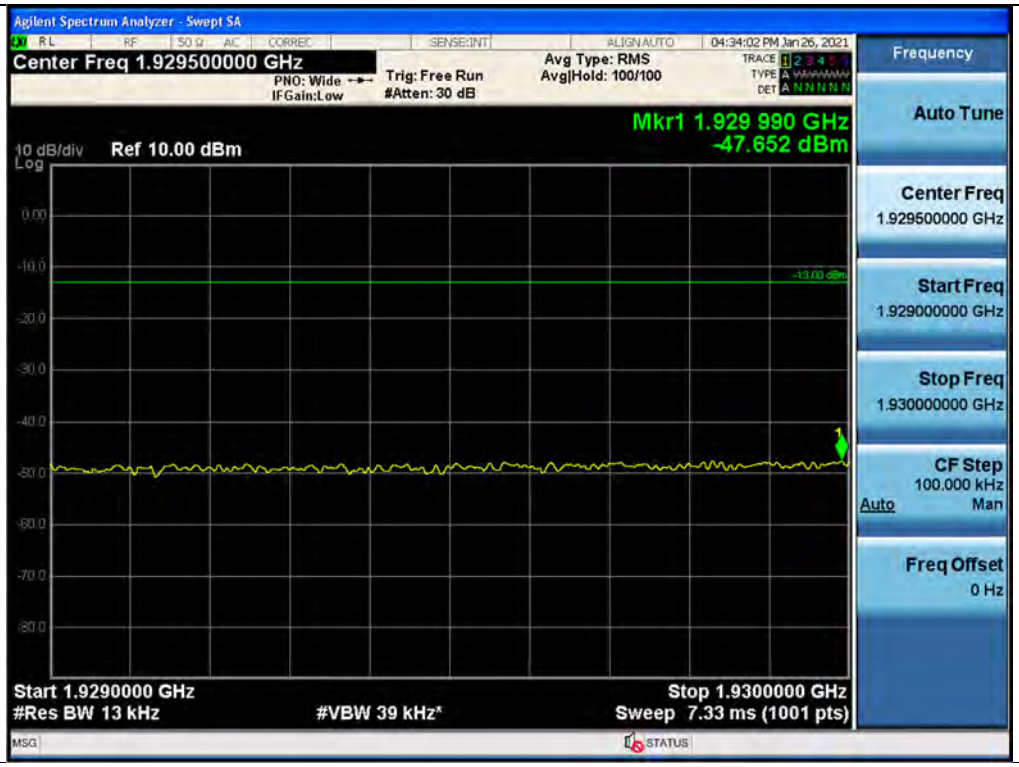
Out-of-band (single test signals) / Broadband PCS / Downlink / CDMA / Lower



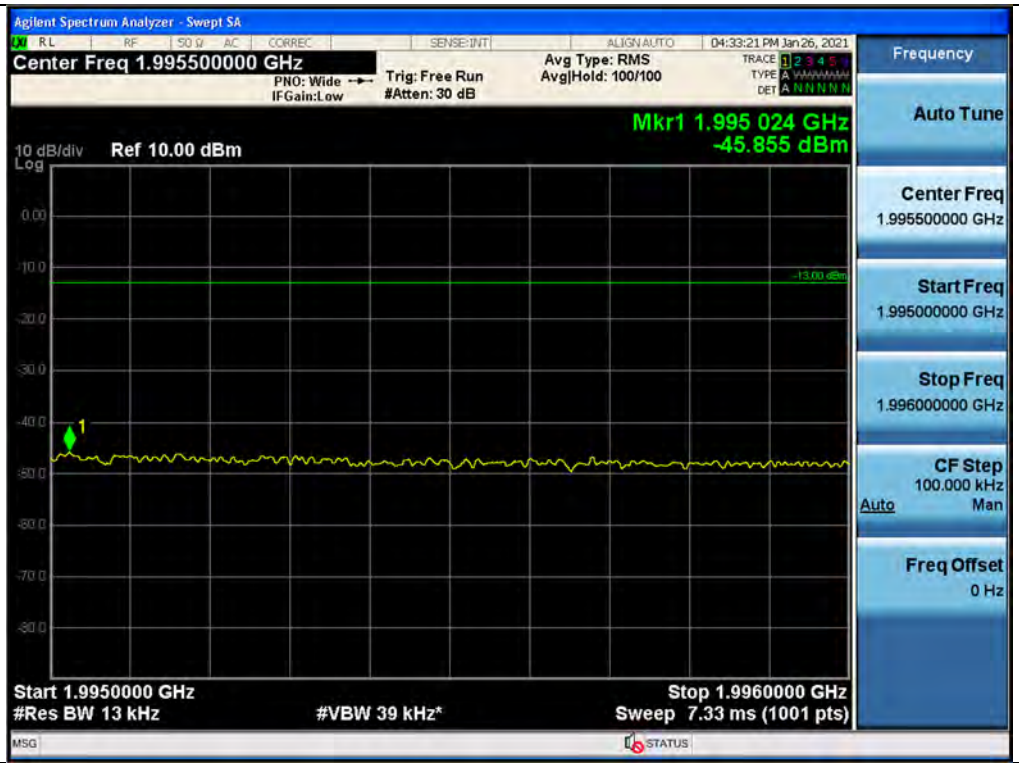
Out-of-band (single test signals) / Broadband PCS / Downlink / CDMA / Upper



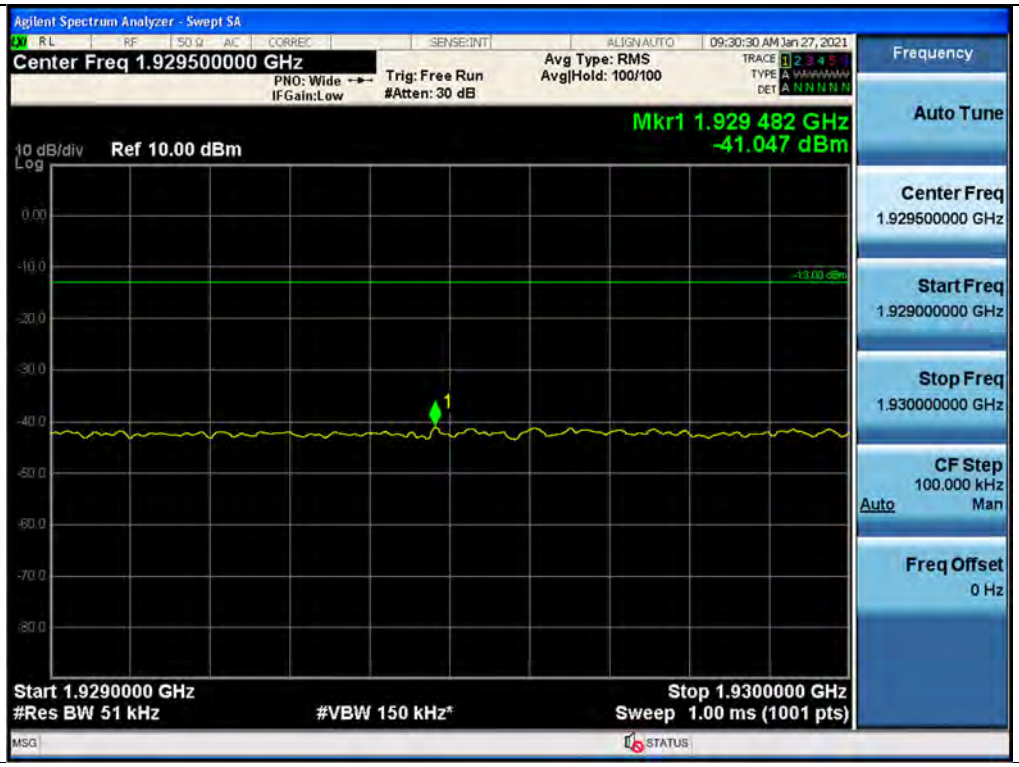
+3 dB above Out-of-band (single test signals) / Broadband PCS / Downlink / CDMA / Lower



+3 dB above Out-of-band (single test signals) / Broadband PCS / Downlink / CDMA / Upper

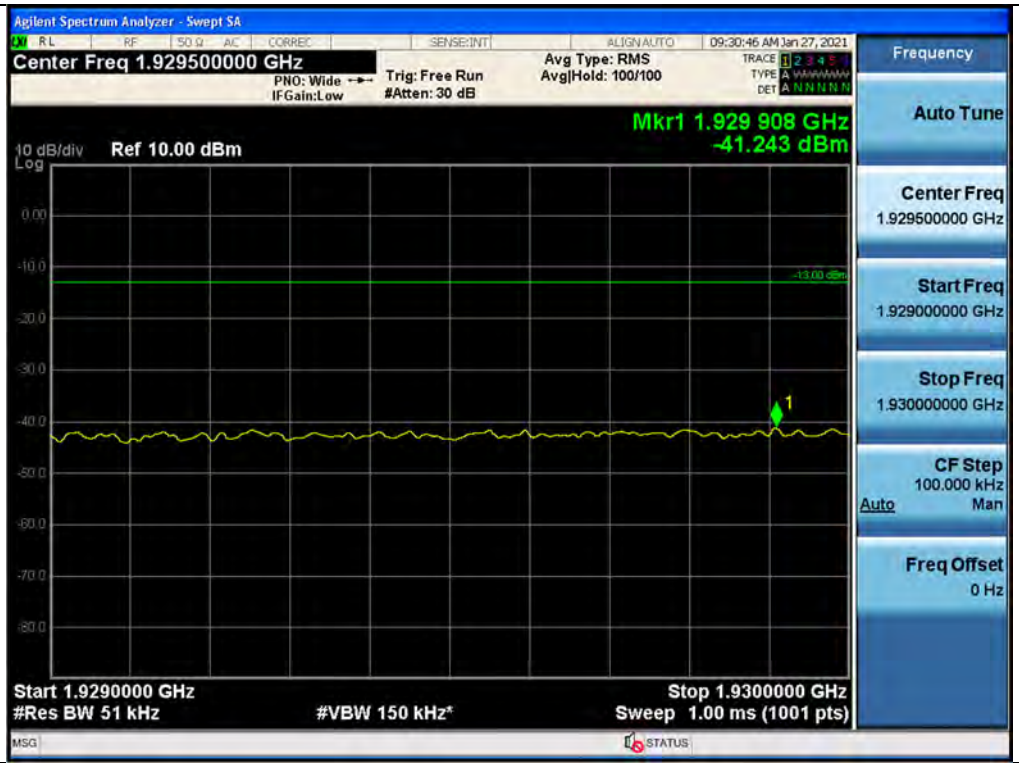


Out-of-band (single test signals) / Broadband PCS / Downlink / WCDMA / Lower

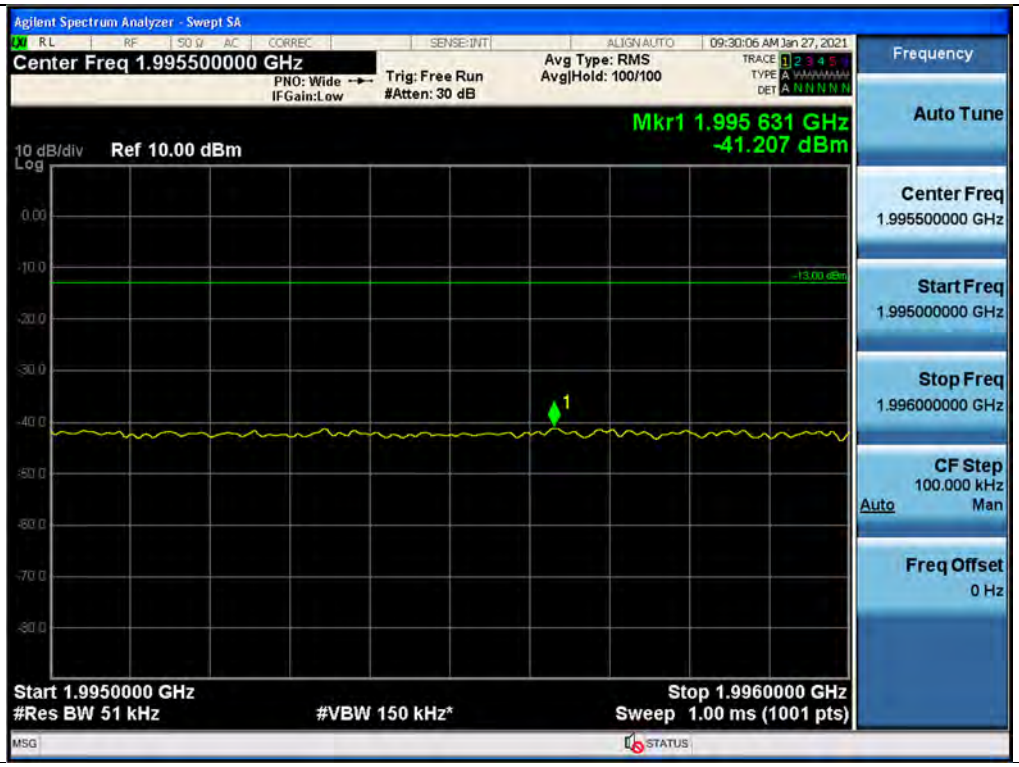


Out-of-band (single test signals) / Broadband PCS / Downlink / WCDMA / Upper

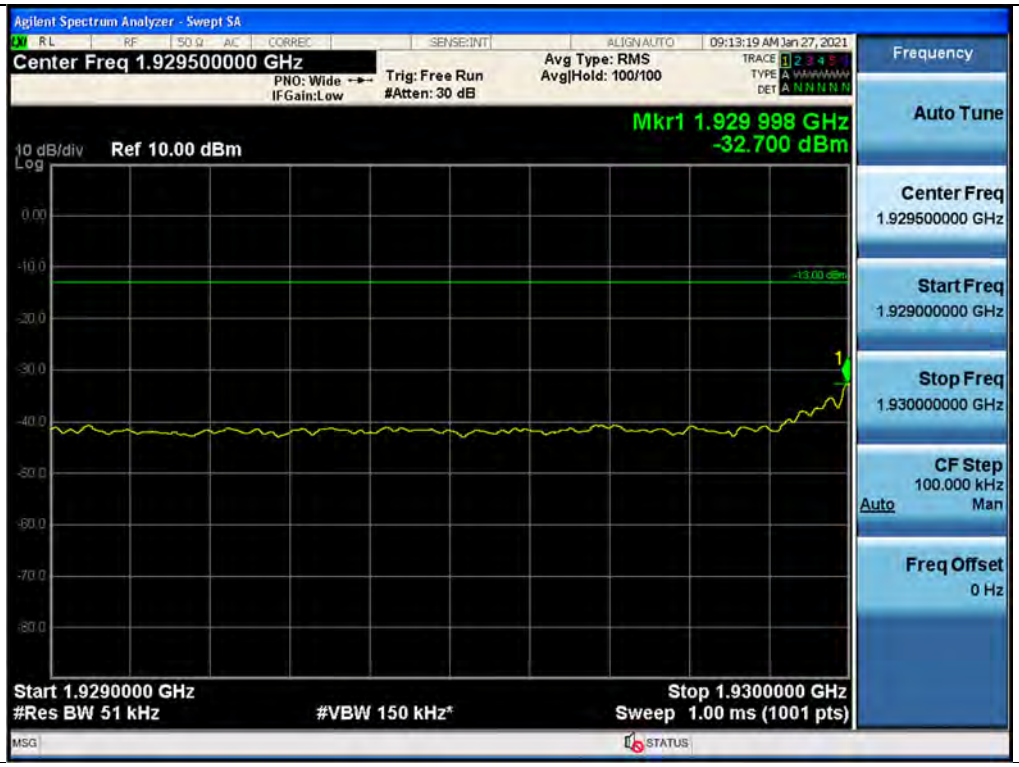
+3 dB above Out-of-band (single test signals) / Broadband PCS / Downlink / WCDMA / Lower



+3 dB above Out-of-band (single test signals) / Broadband PCS / Downlink / WCDMA / Upper



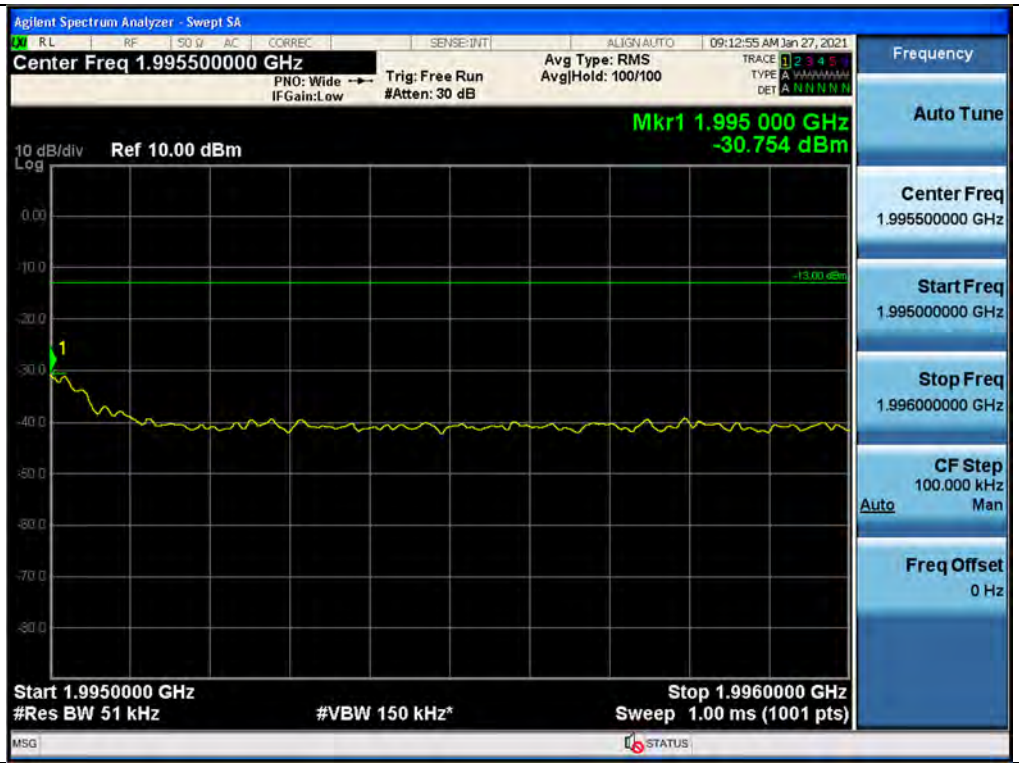
Out-of-band (single test signals) / Broadband PCS / Downlink / LTE 5 MHz / Lower



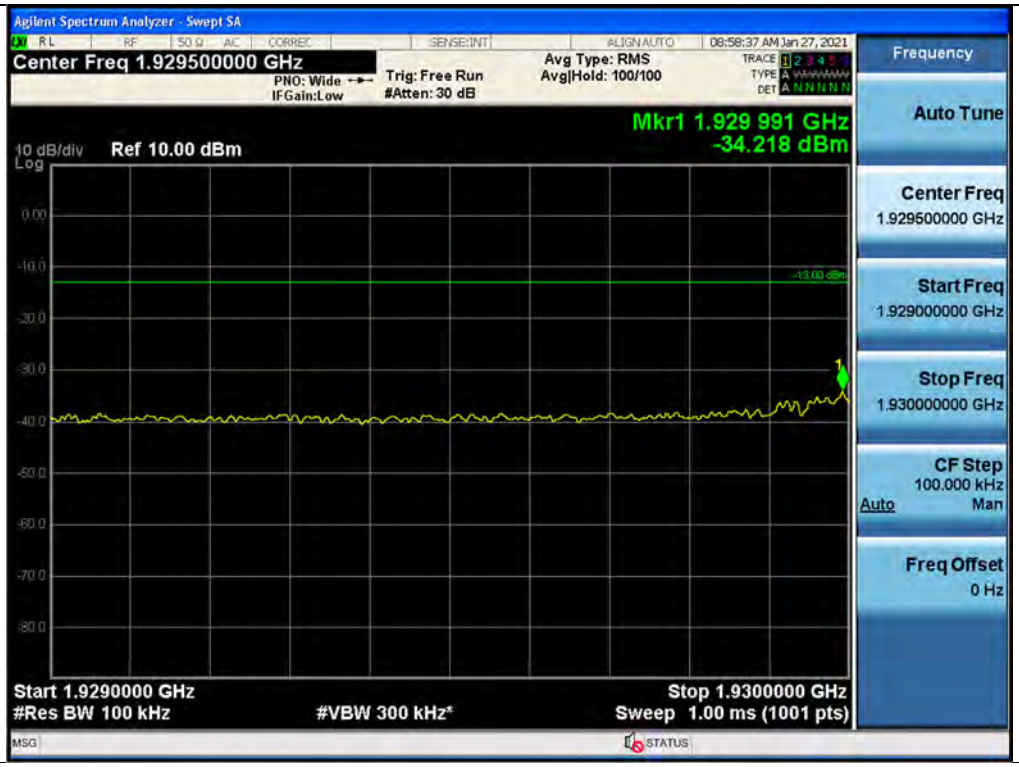
Out-of-band (single test signals) / Broadband PCS / Downlink / LTE 5 MHz / Upper

+3 dB above Out-of-band (single test signals) / Broadband PCS / Downlink / LTE 5 MHz / Lower

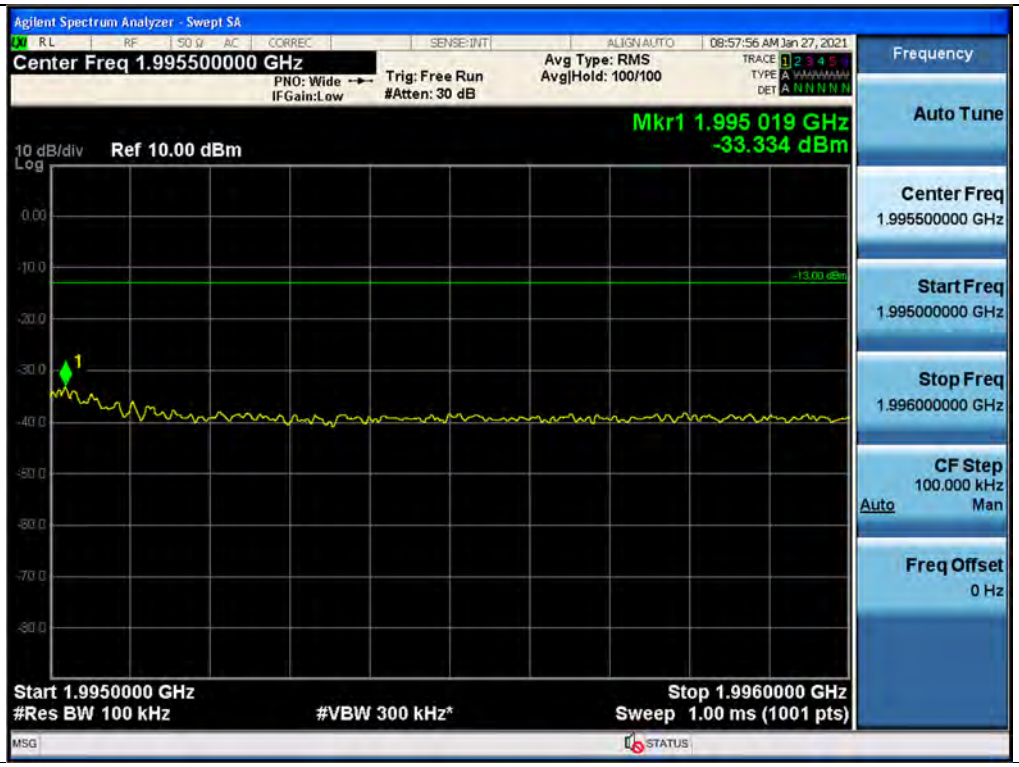
+3 dB above Out-of-band (single test signals) / Broadband PCS / Downlink / LTE 5 MHz / Upper



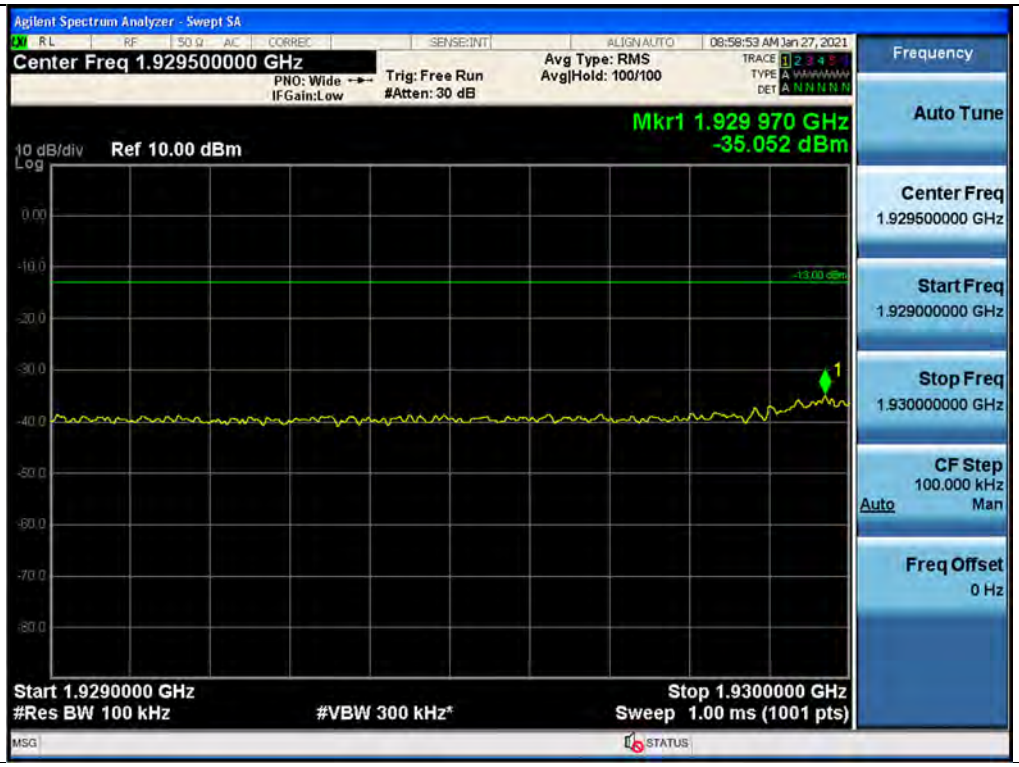
Out-of-band (single test signals) / Broadband PCS / Downlink / LTE 10 MHz / Lower



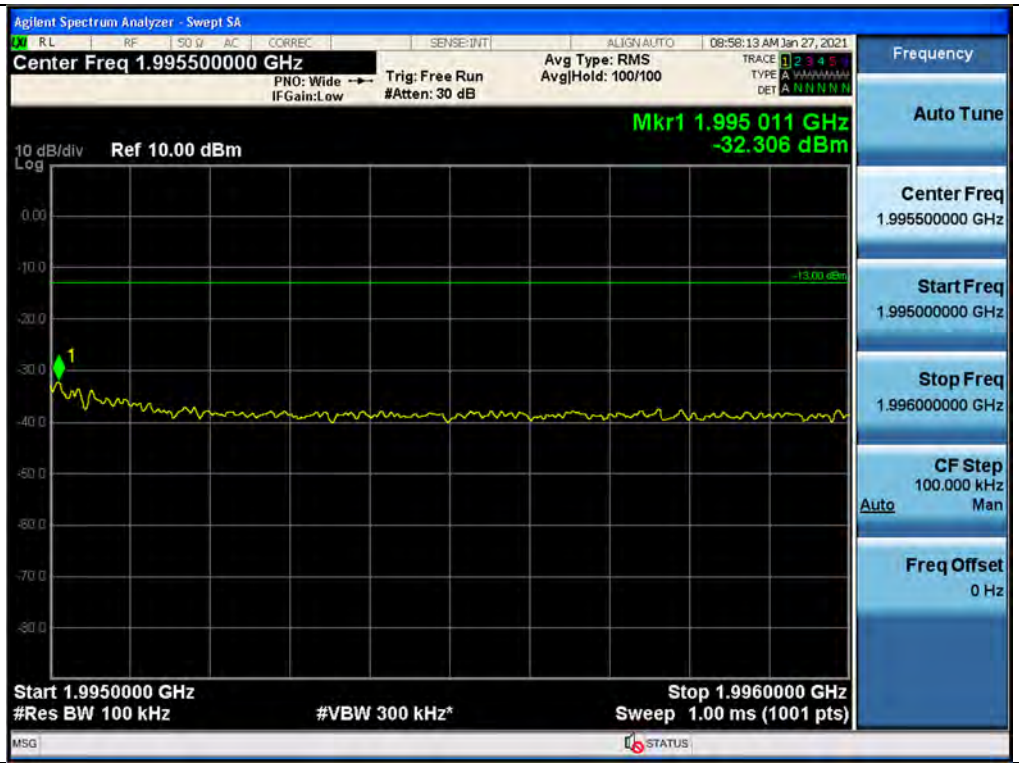
Out-of-band (single test signals) / Broadband PCS / Downlink / LTE 10 MHz / Upper



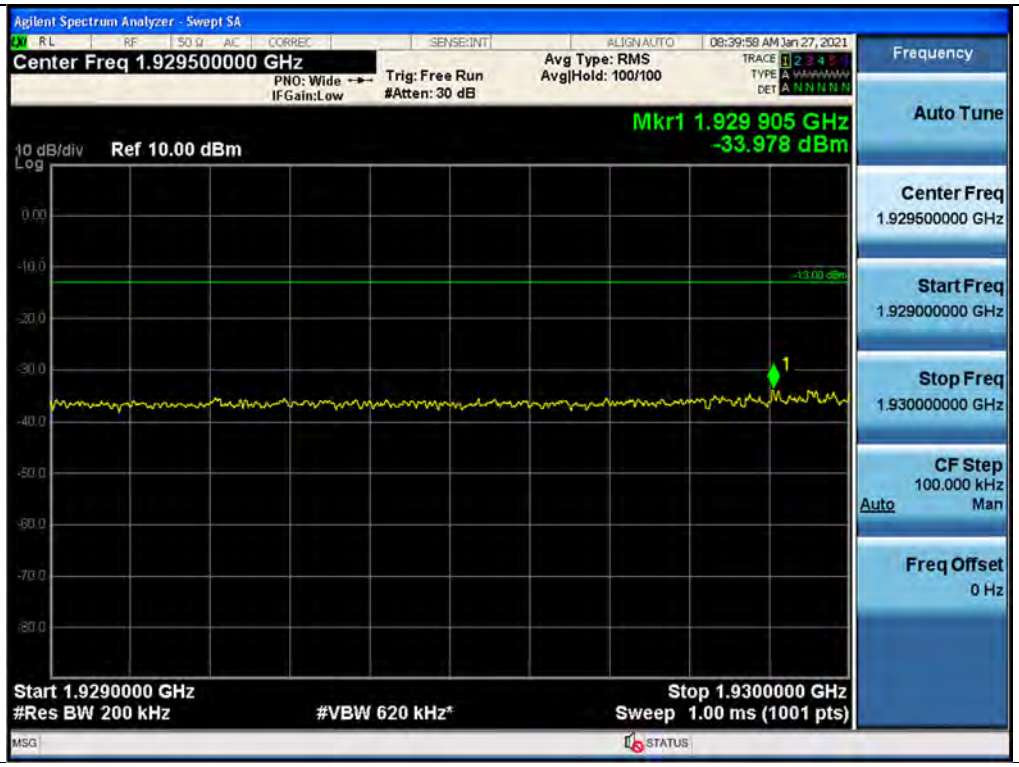
+3 dB above Out-of-band (single test signals) / Broadband PCS / Downlink / LTE 10 MHz / Lower



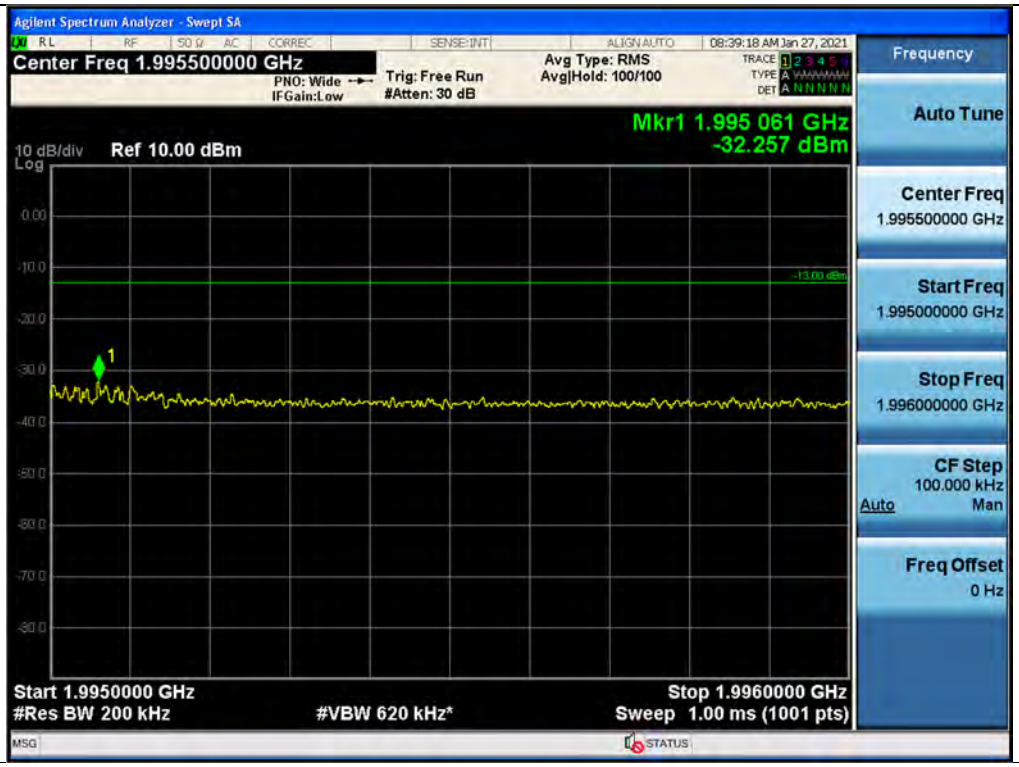
+3 dB above Out-of-band (single test signals) / Broadband PCS / Downlink / LTE 10 MHz / Upper



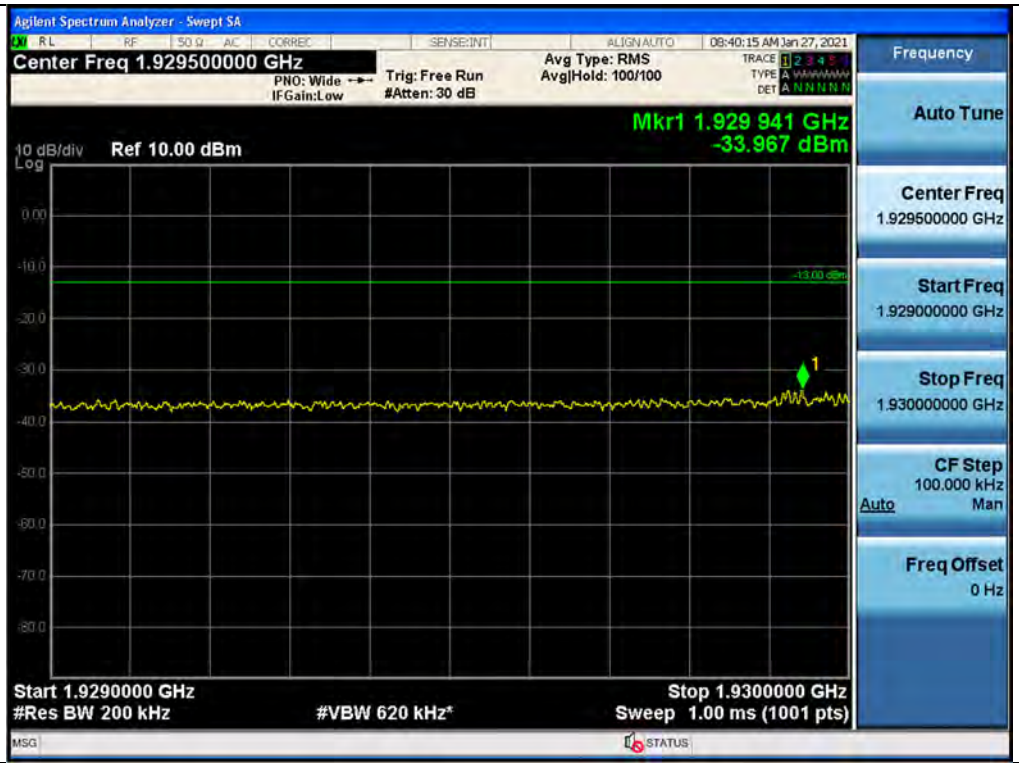
Out-of-band (single test signals) / Broadband PCS / Downlink / LTE 20 MHz / Lower



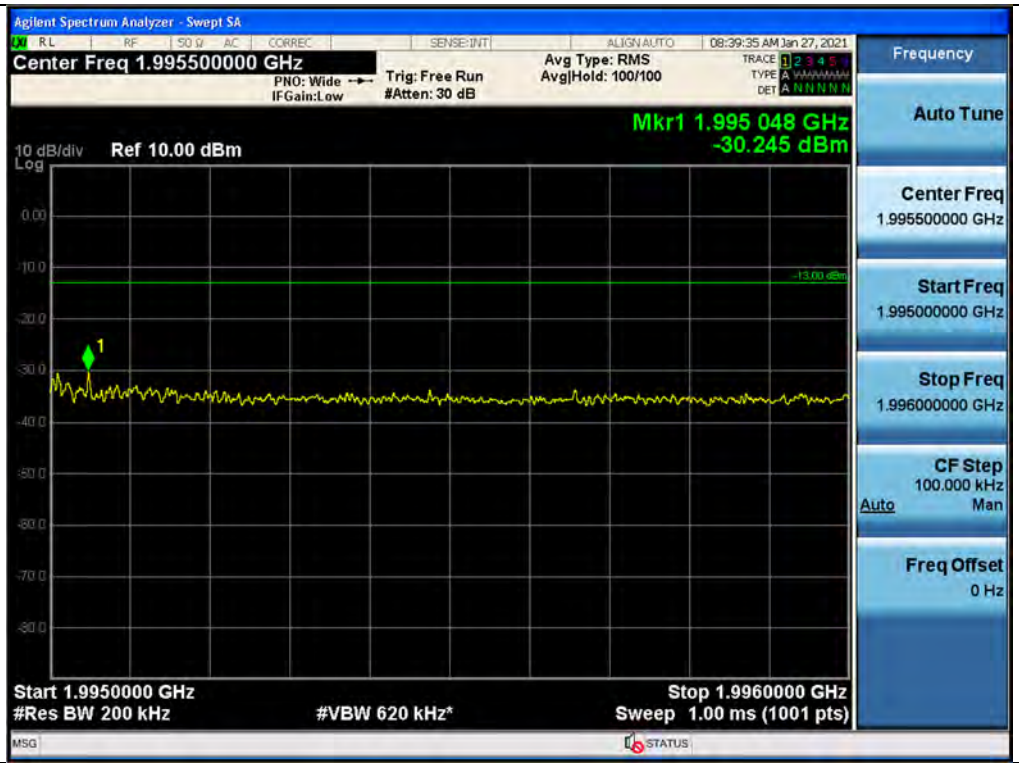
Out-of-band (single test signals) / Broadband PCS / Downlink / LTE 20 MHz / Upper



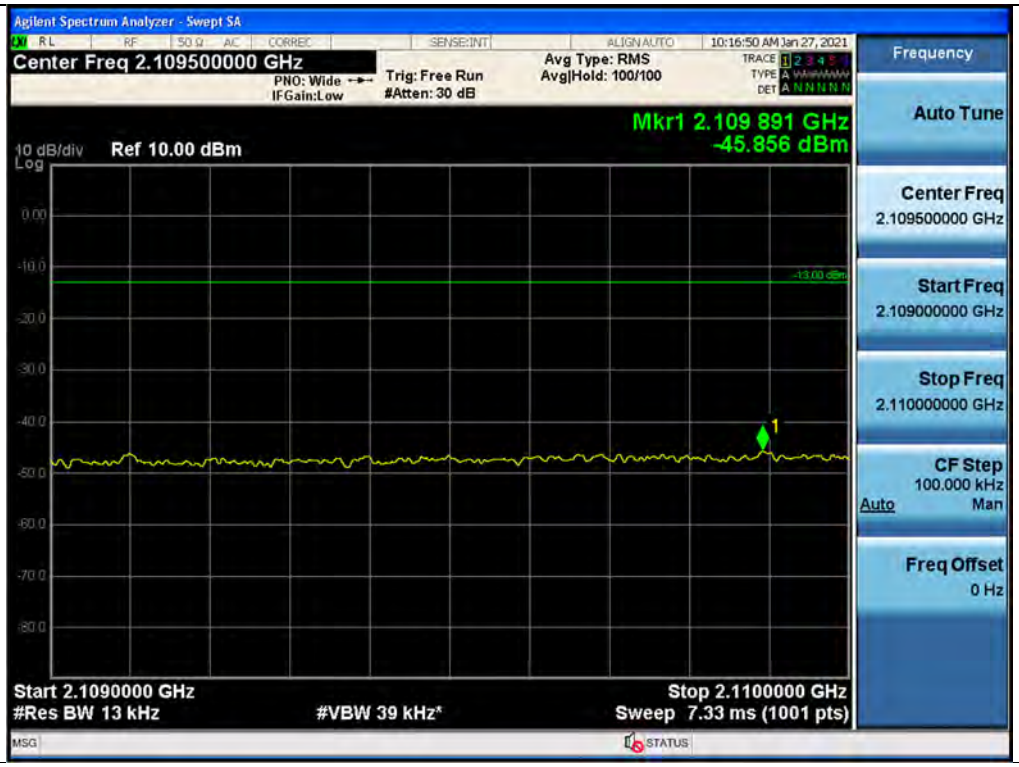
+3 dB above Out-of-band (single test signals) / Broadband PCS / Downlink / LTE 20 MHz / Lower



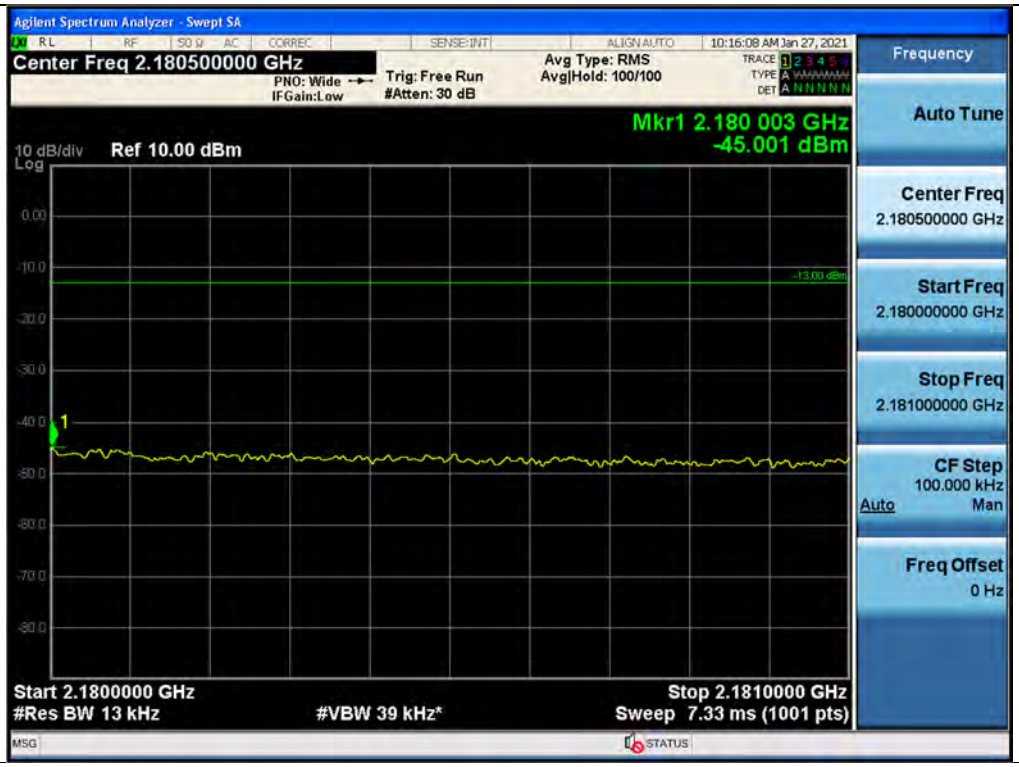
+3 dB above Out-of-band (single test signals) / Broadband PCS / Downlink / LTE 20 MHz / Upper



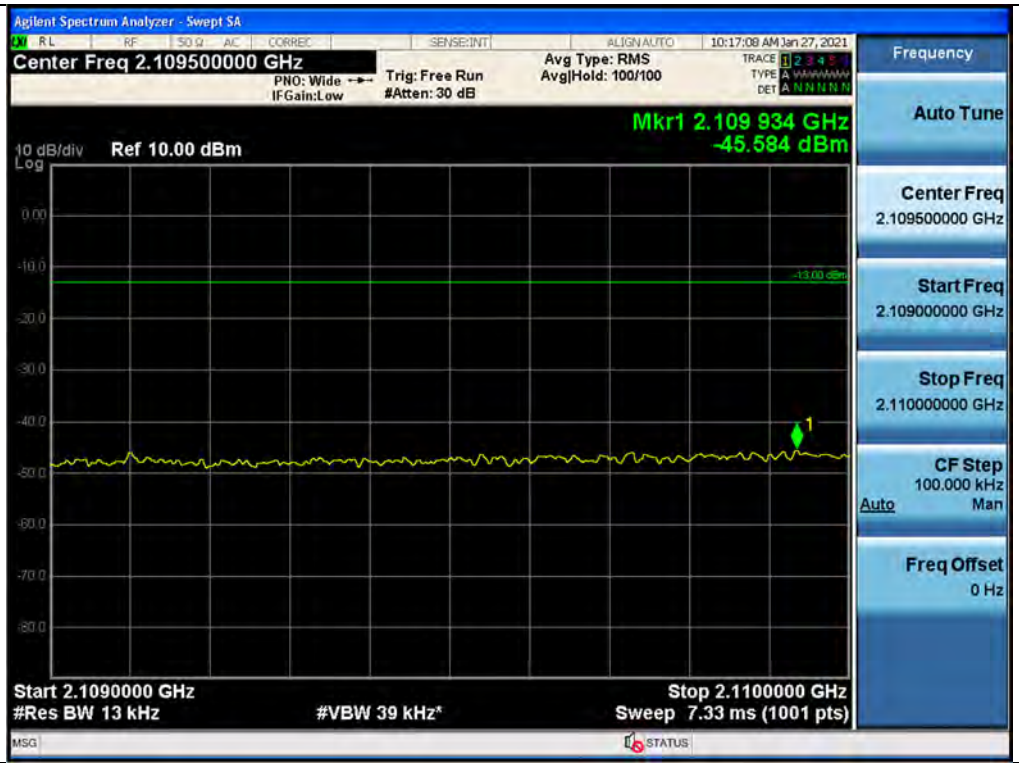
Out-of-band (single test signals) / AWS13 / Downlink / CDMA / Lower



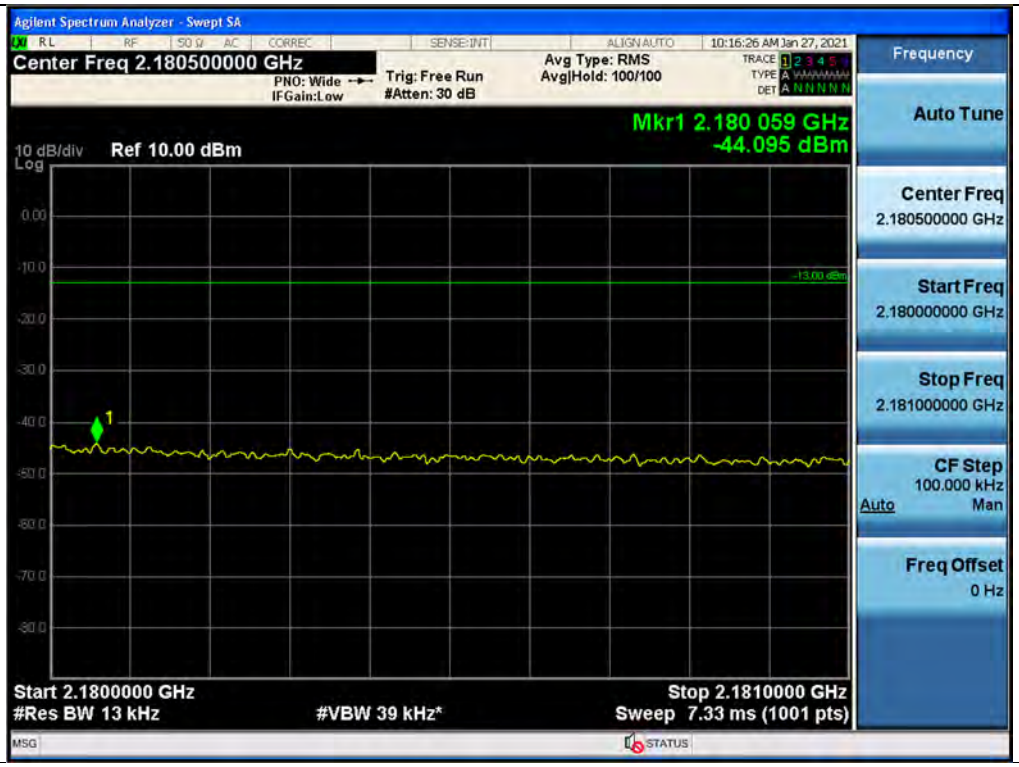
Out-of-band (single test signals) / AWS13 / Downlink / CDMA / Upper



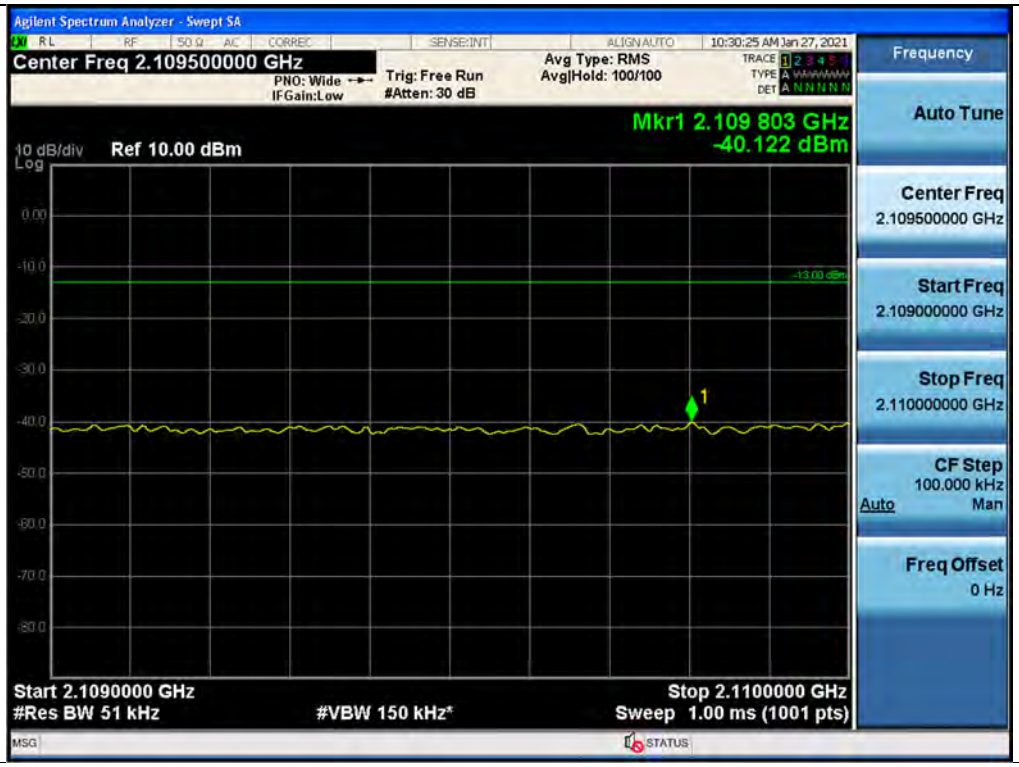
+3 dB above Out-of-band (single test signals) / AWS13 / Downlink / CDMA / Lower



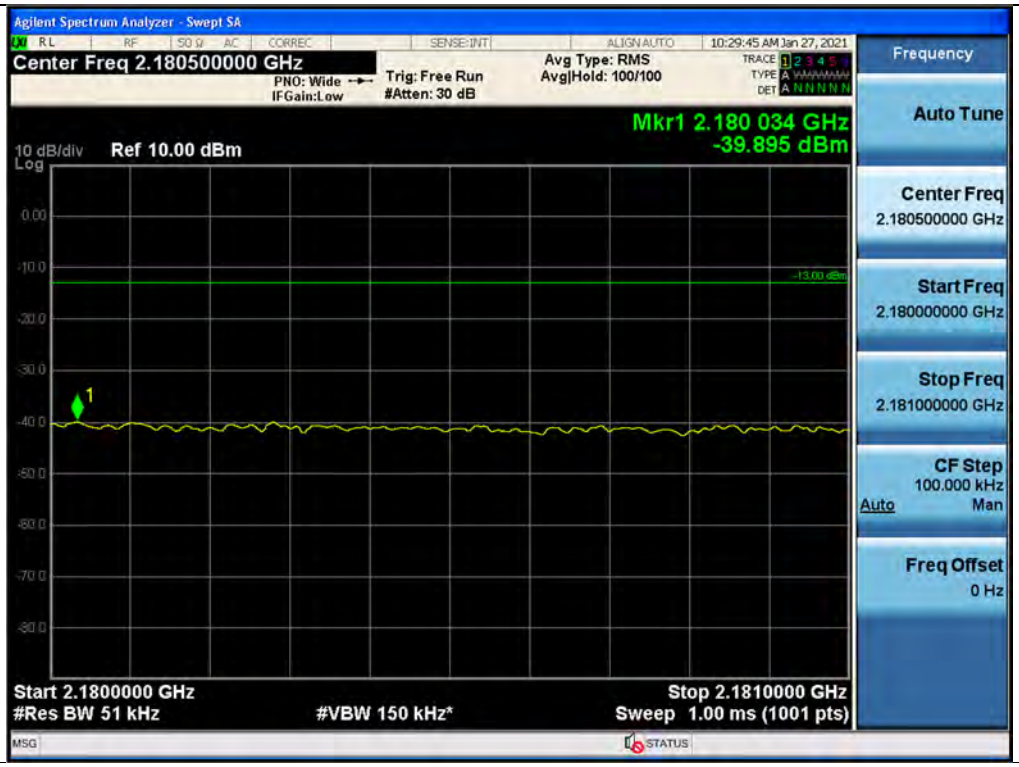
+3 dB above Out-of-band (single test signals) / AWS13 / Downlink / CDMA / Upper



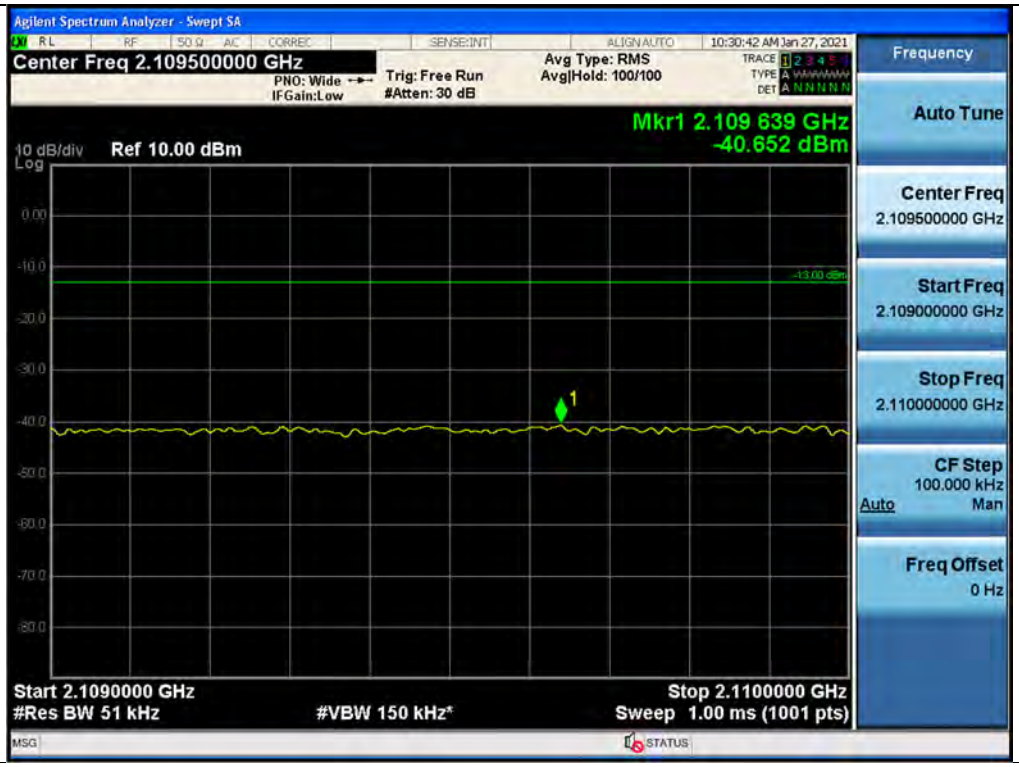
Out-of-band (single test signals) / AWS13 / Downlink / WCDMA / Lower



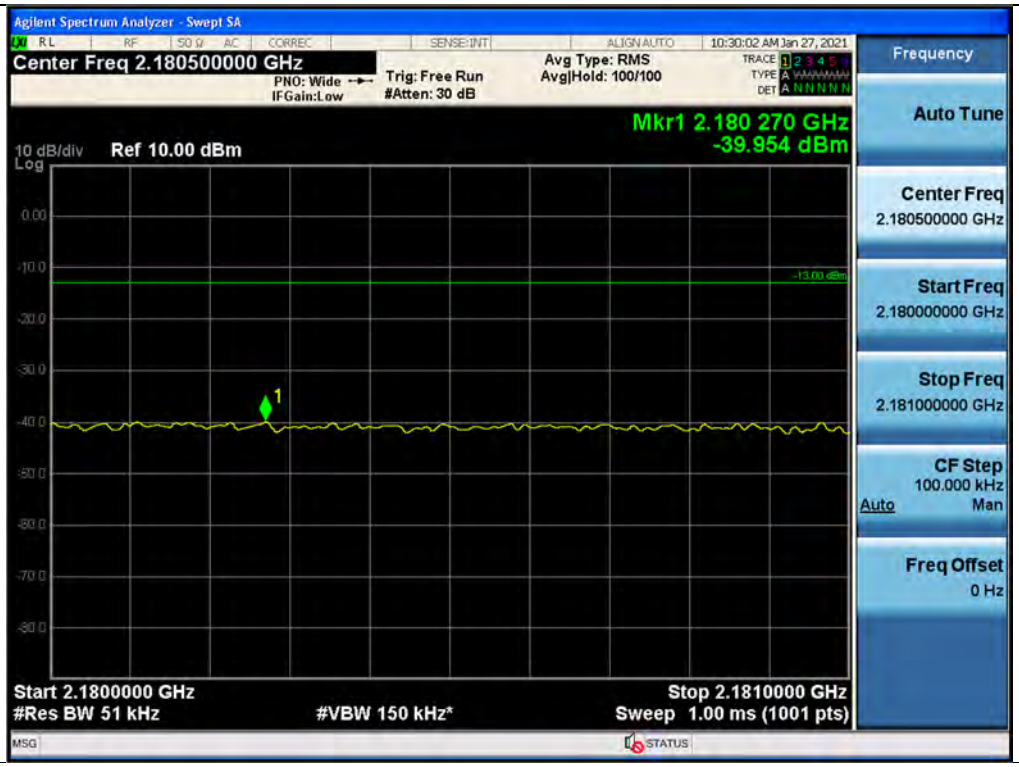
Out-of-band (single test signals) / AWS13 / Downlink / WCDMA / Upper



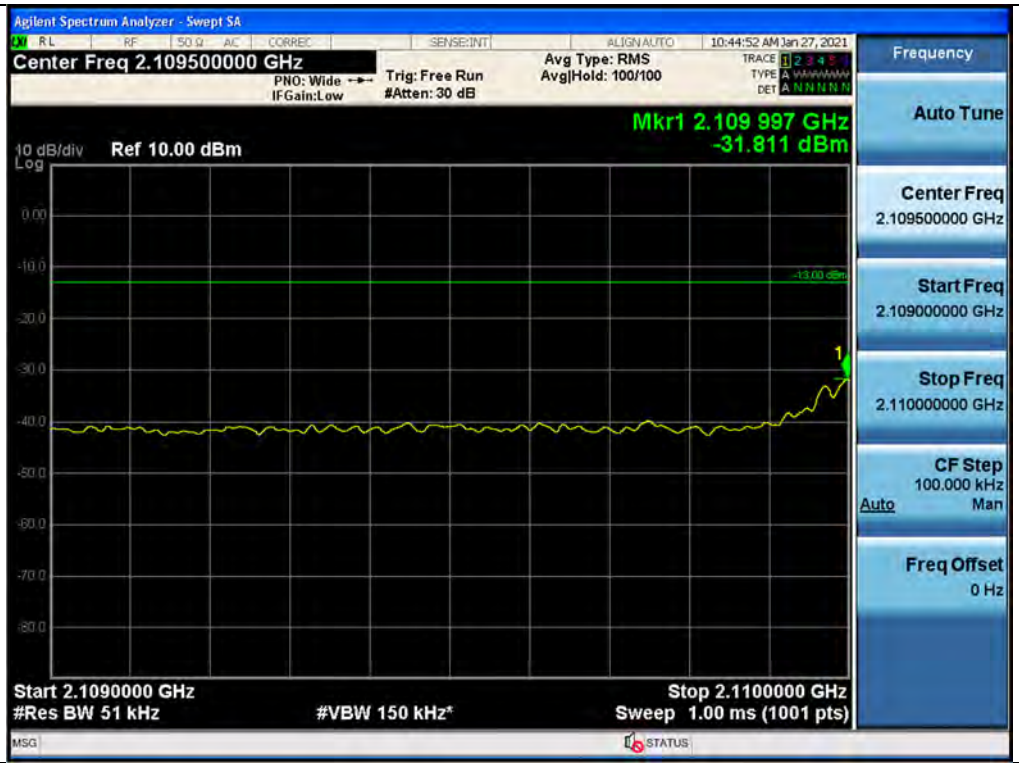
+3 dB above Out-of-band (single test signals) / AWS13 / Downlink / WCDMA / Lower



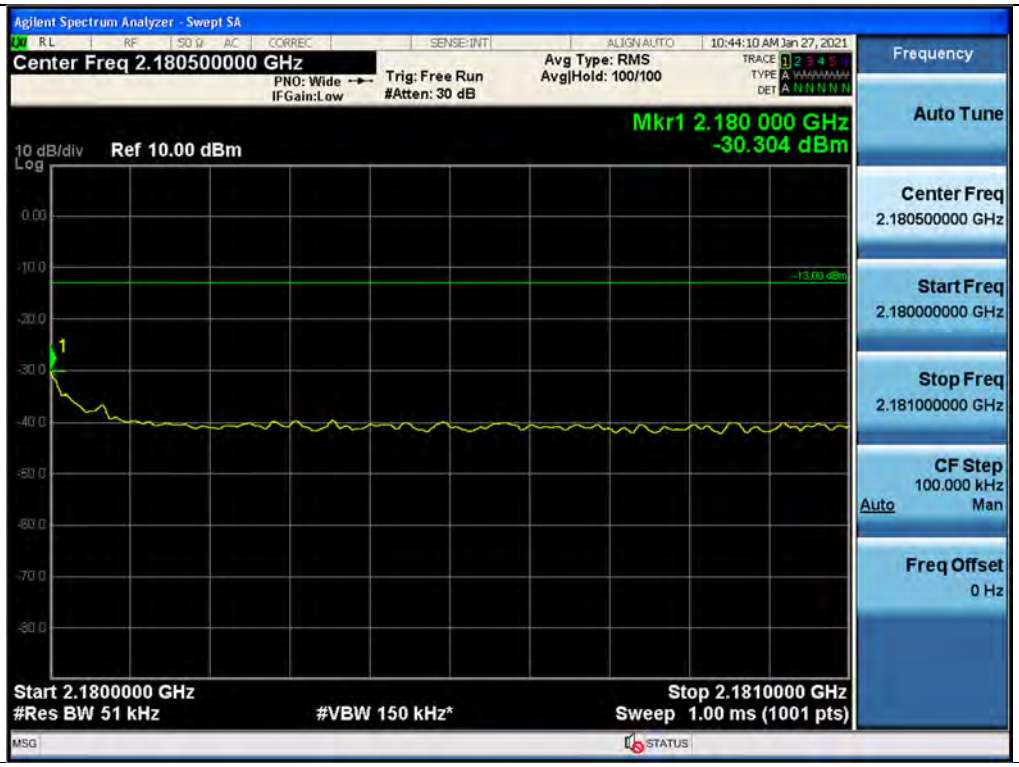
+3 dB above Out-of-band (single test signals) / AWS13 / Downlink / WCDMA / Upper



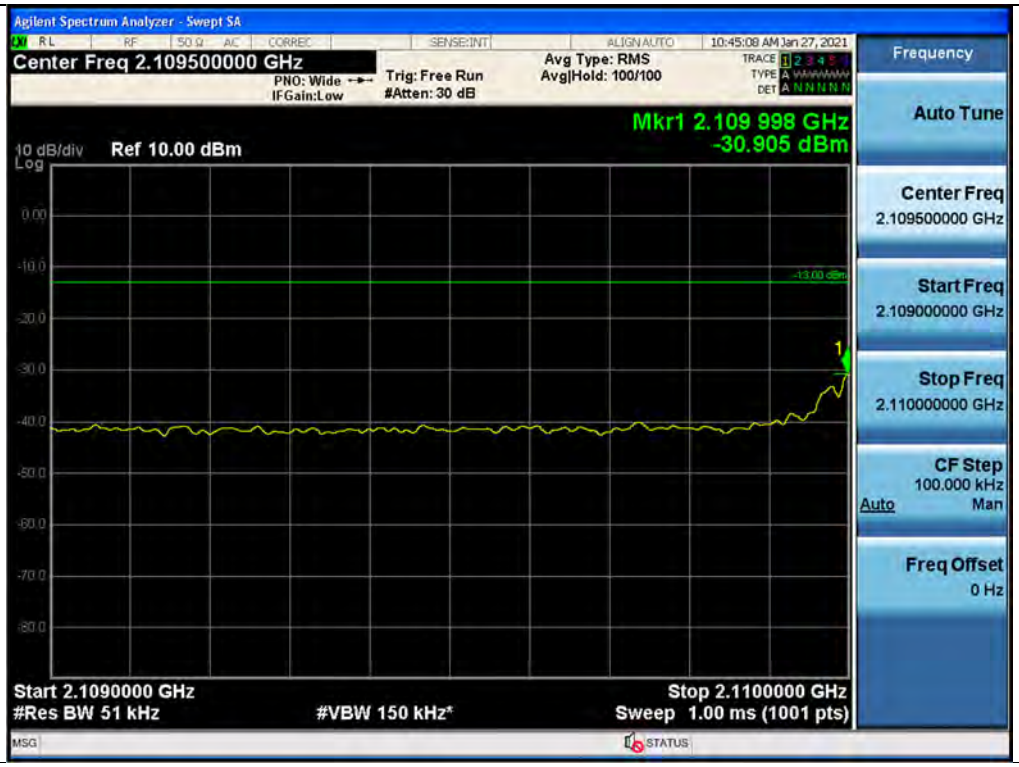
Out-of-band (single test signals) / AWS13 / Downlink / LTE 5 MHz / Lower



Out-of-band (single test signals) / AWS13 / Downlink / LTE 5 MHz / Upper

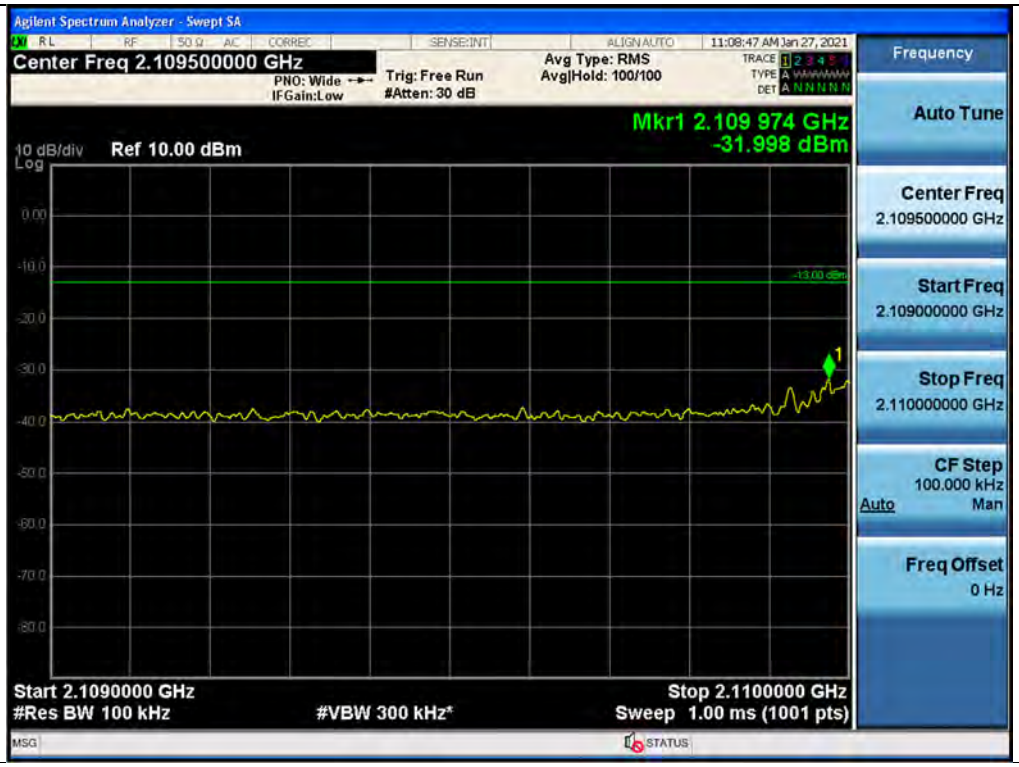


+3 dB above Out-of-band (single test signals) / AWS13 / Downlink / LTE 5 MHz / Lower

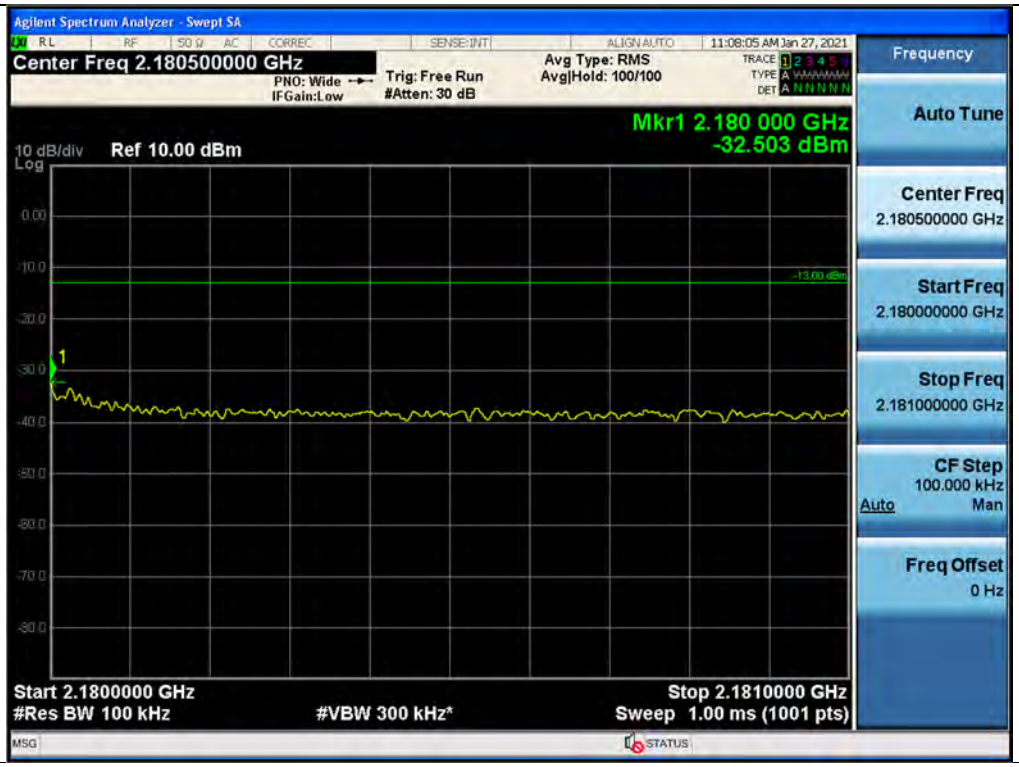


+3 dB above Out-of-band (single test signals) / AWS13 / Downlink / LTE 5 MHz / Upper

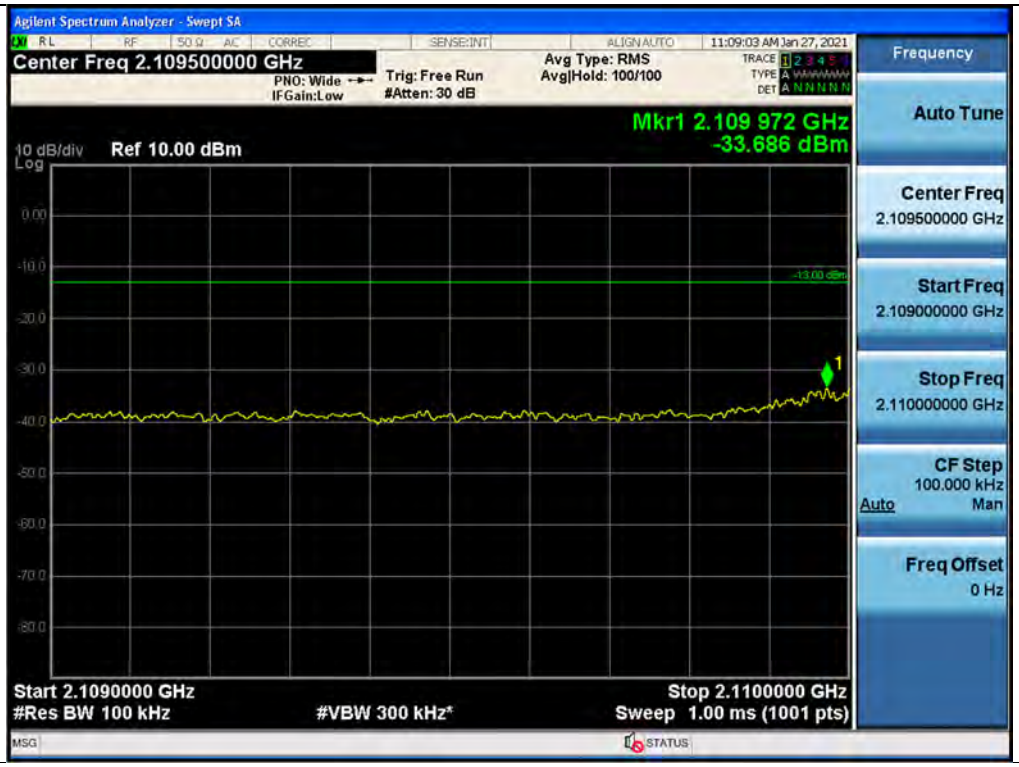
Out-of-band (single test signals) / AWS13 / Downlink / LTE 10 MHz / Lower



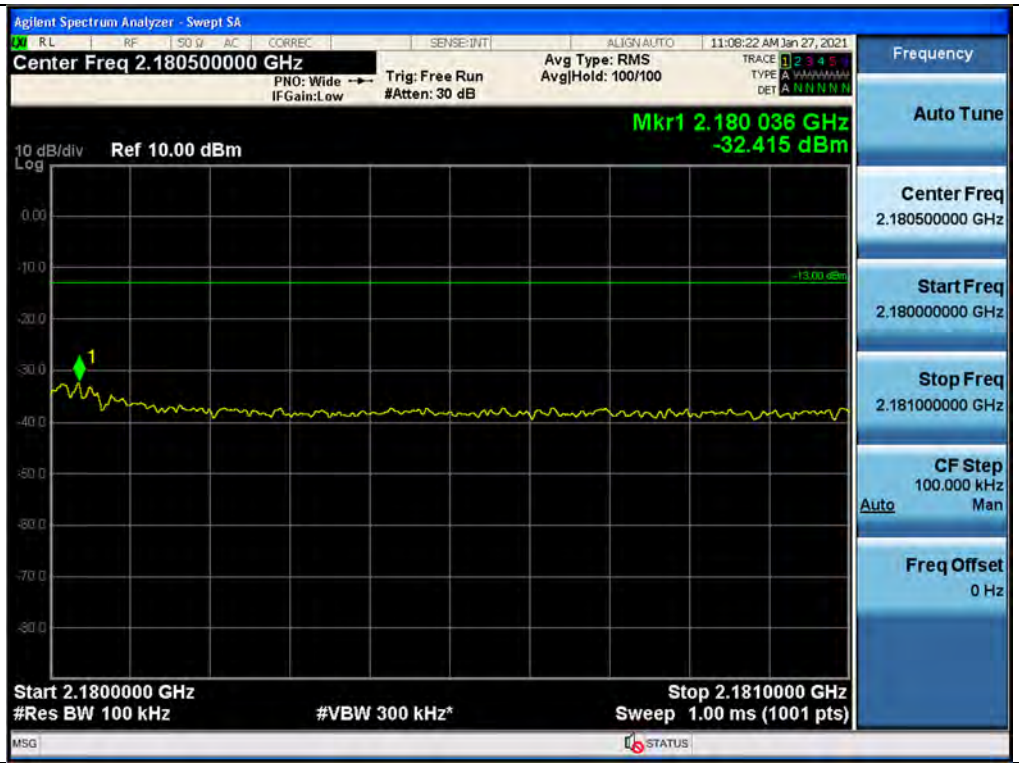
Out-of-band (single test signals) / AWS13 / Downlink / LTE 10 MHz / Upper



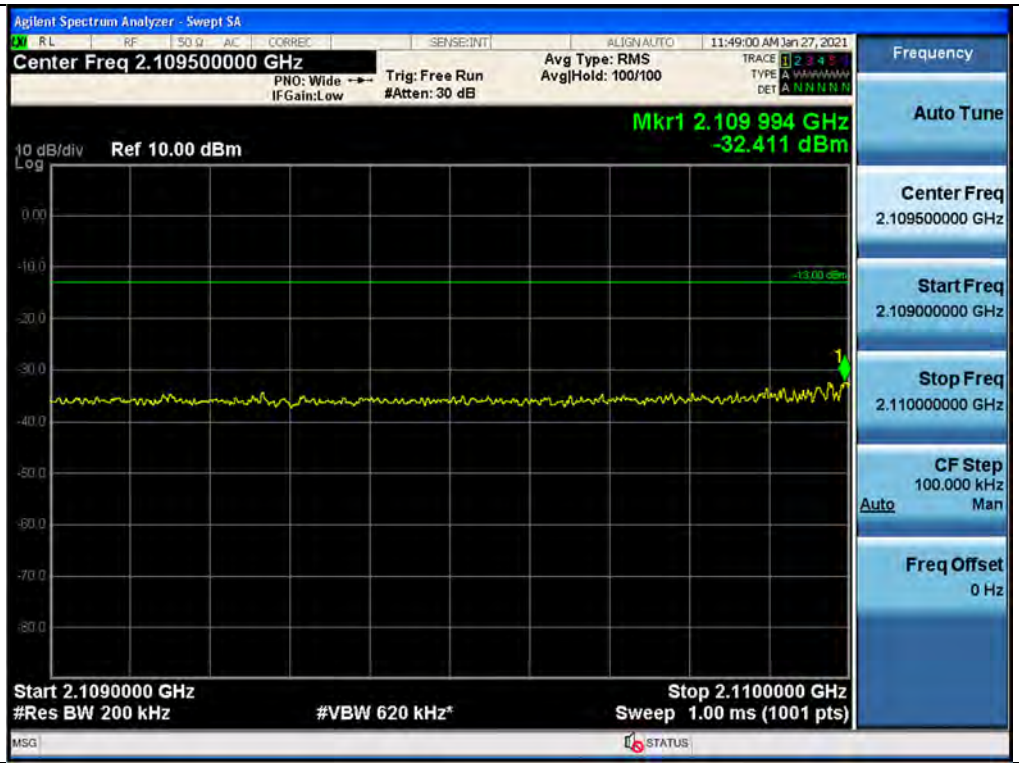
+3 dB above Out-of-band (single test signals) / AWS13 / Downlink / LTE 10 MHz / Lower



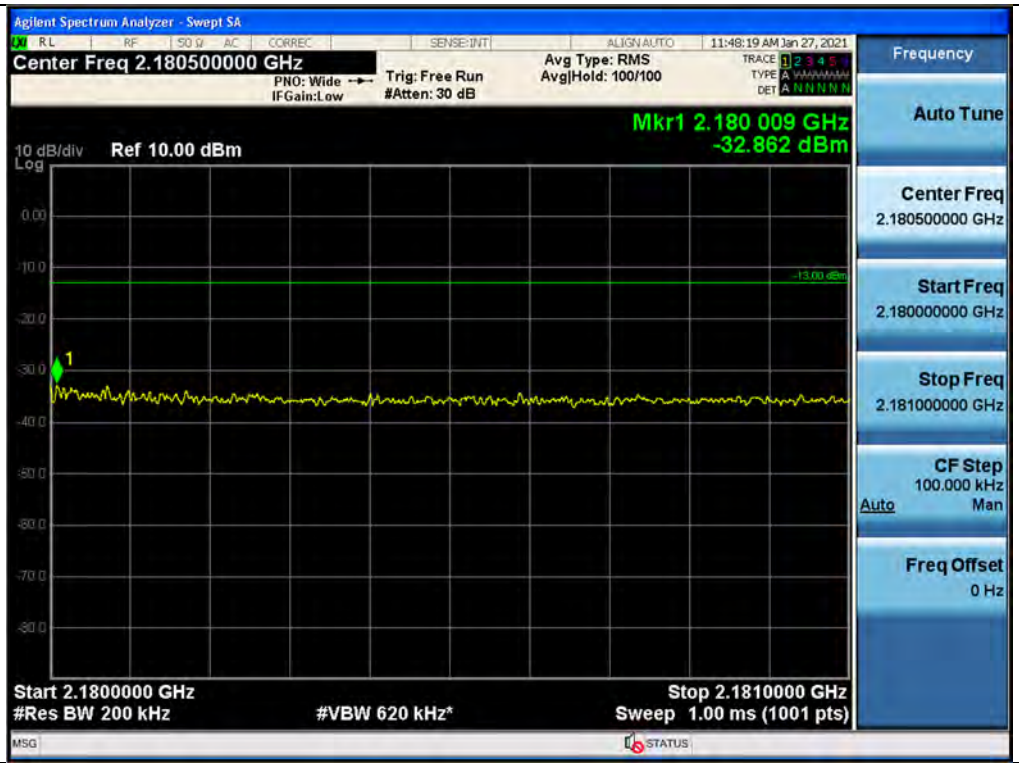
+3 dB above Out-of-band (single test signals) / AWS13 / Downlink / LTE 10 MHz / Upper



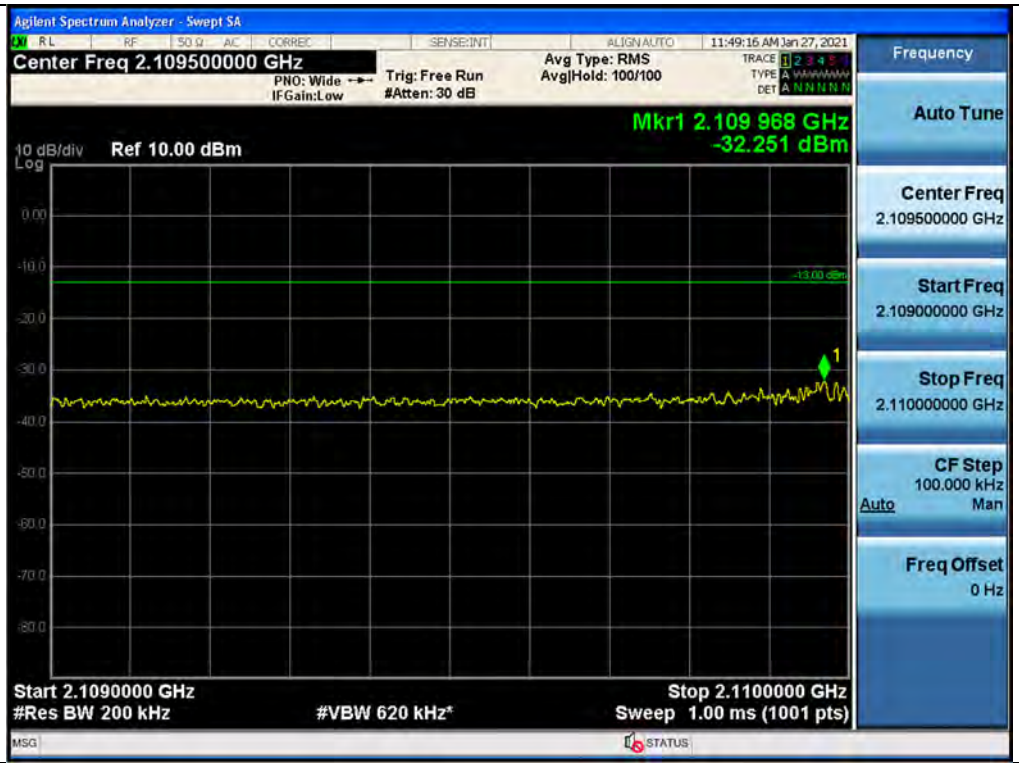
Out-of-band (single test signals) / AWS13 / Downlink / LTE 20 MHz / Lower



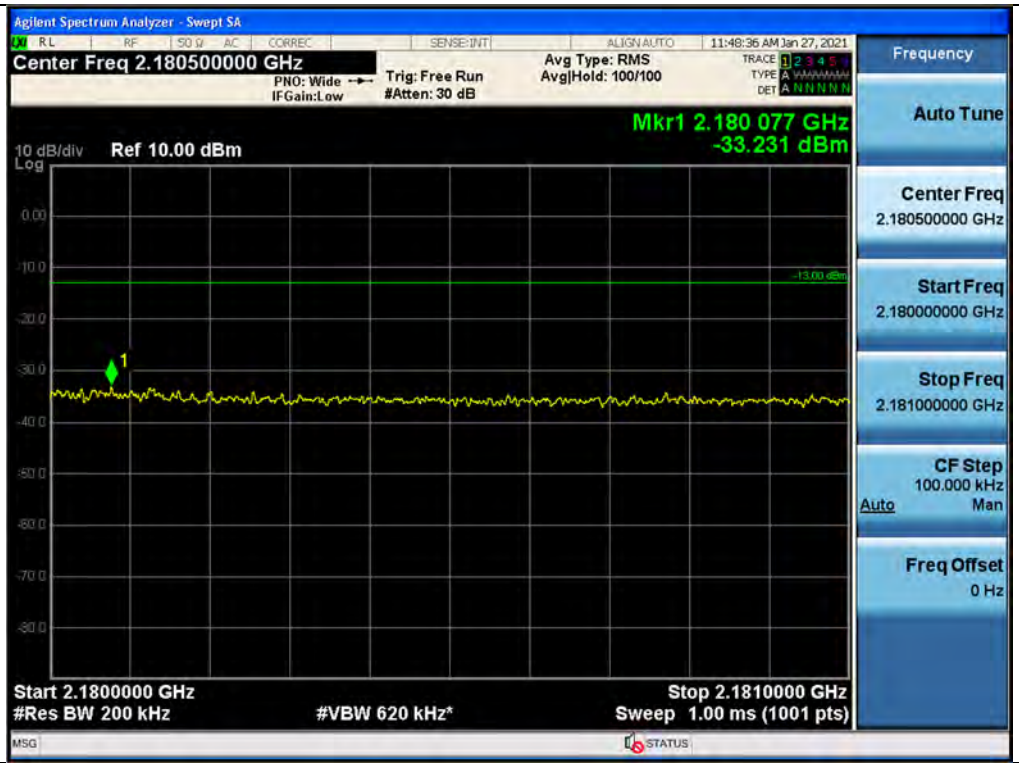
Out-of-band (single test signals) / AWS13 / Downlink / LTE 20 MHz / Upper



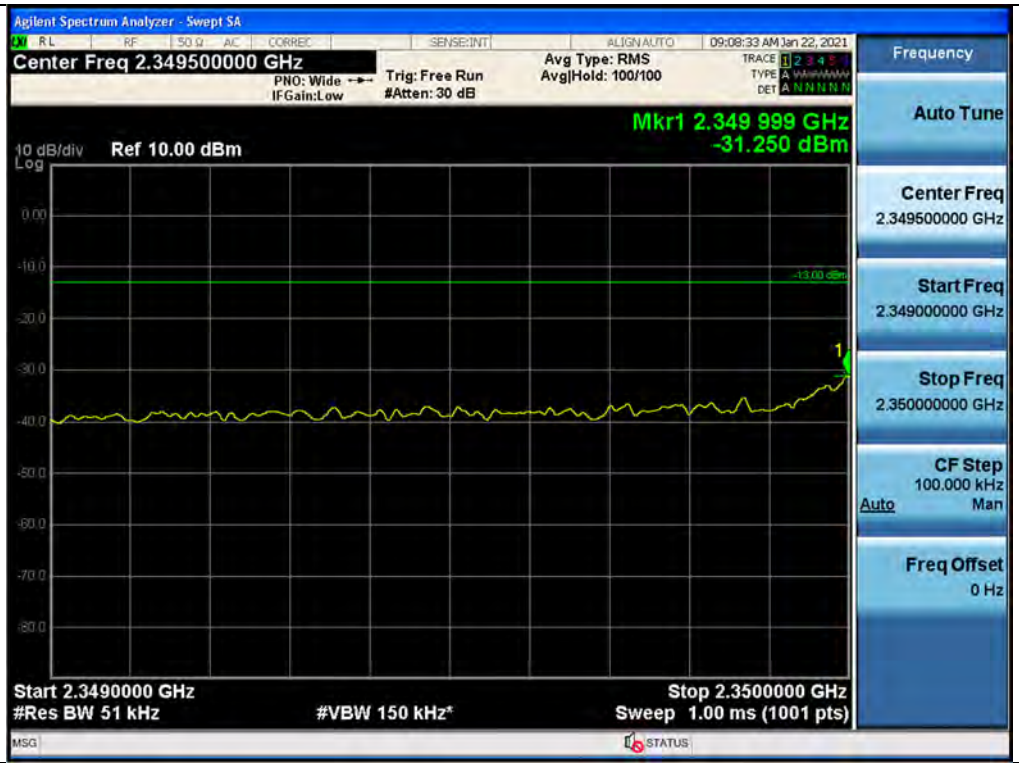
+3 dB above Out-of-band (single test signals) / AWS13 / Downlink / LTE 20 MHz / Lower



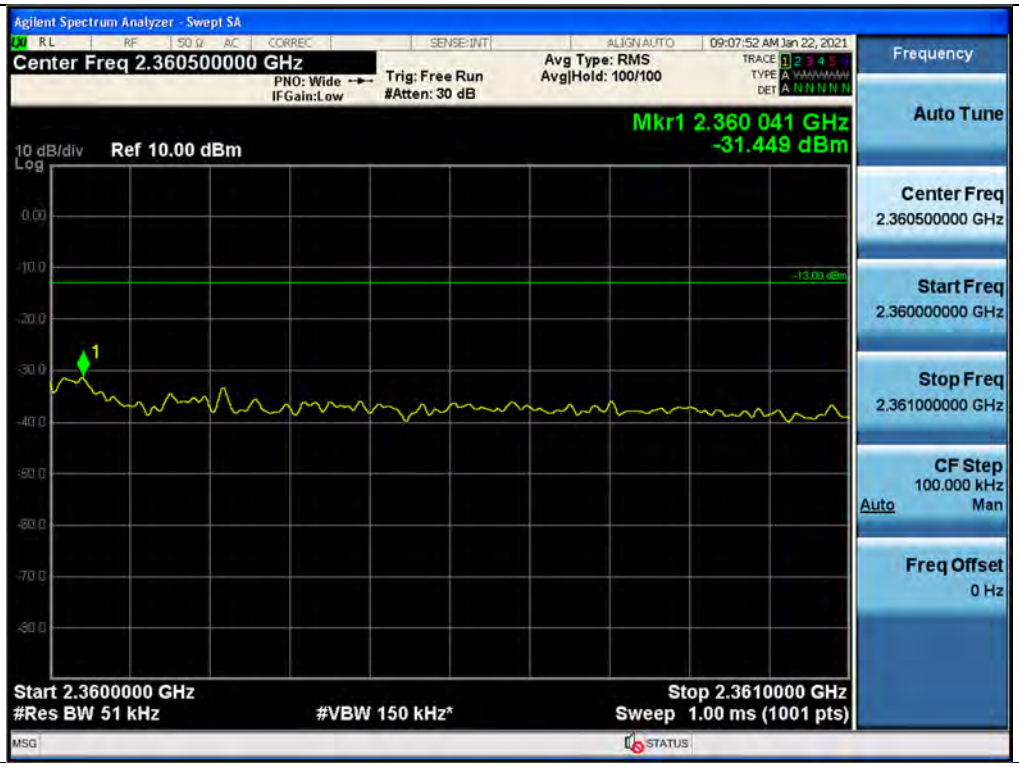
+3 dB above Out-of-band (single test signals) / AWS13 / Downlink / LTE 20 MHz / Upper



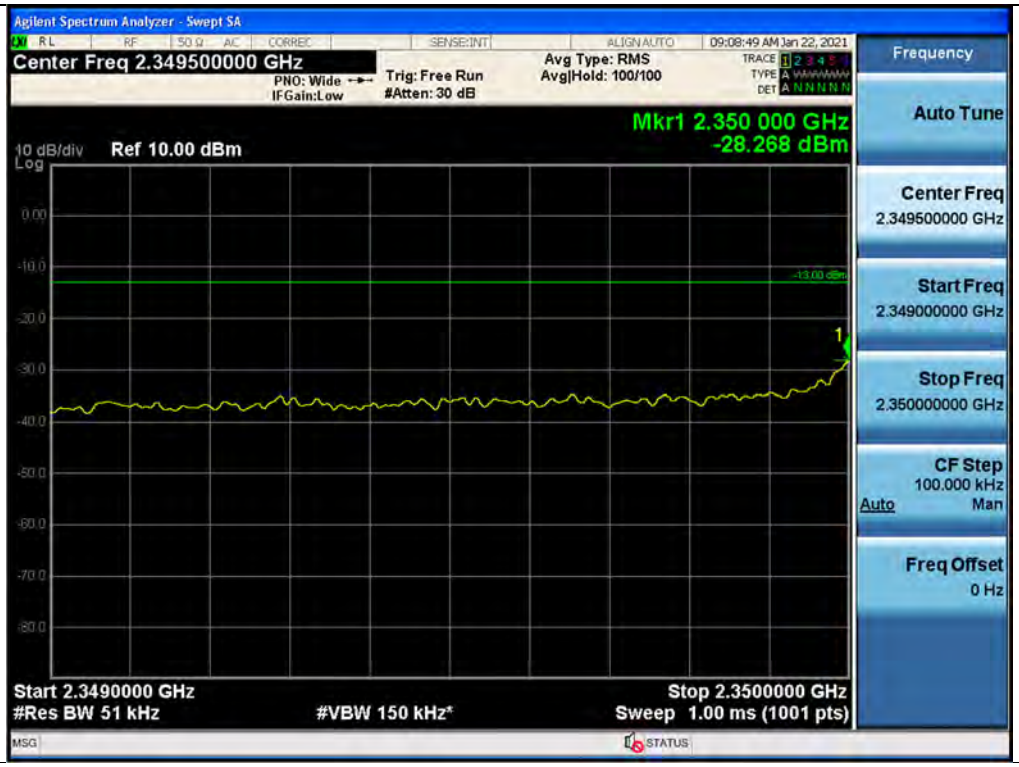
Out-of-band (single test signals) / WCS / Downlink / LTE 5 MHz / Lower



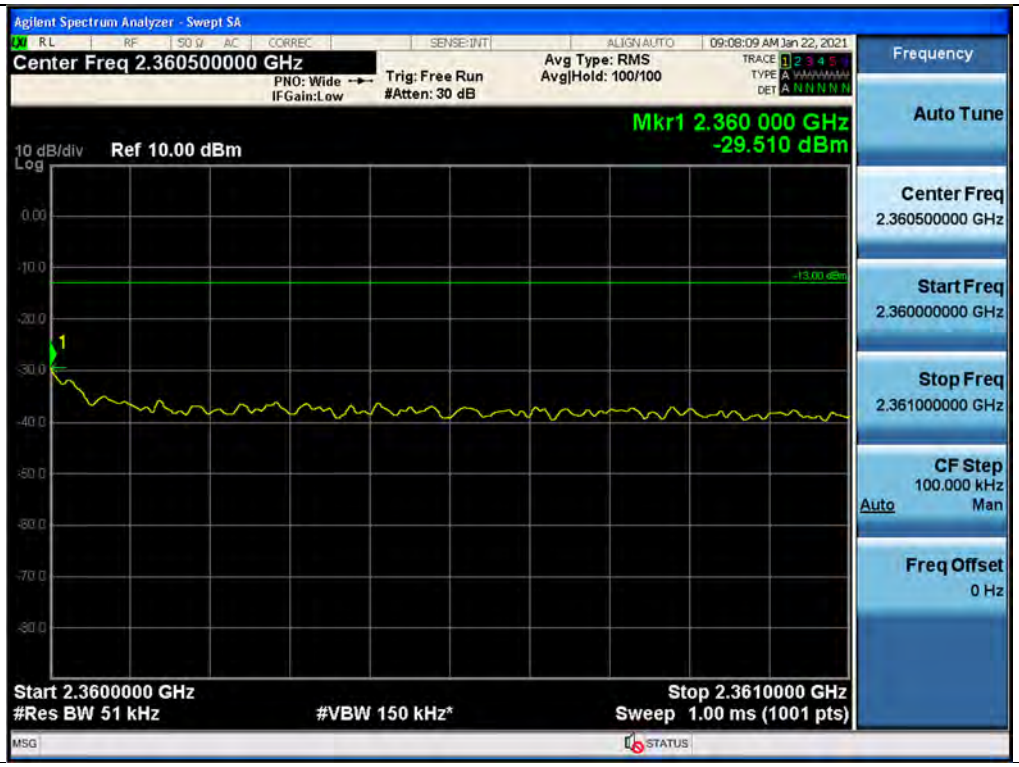
Out-of-band (single test signals) / WCS / Downlink / LTE 5 MHz / Upper



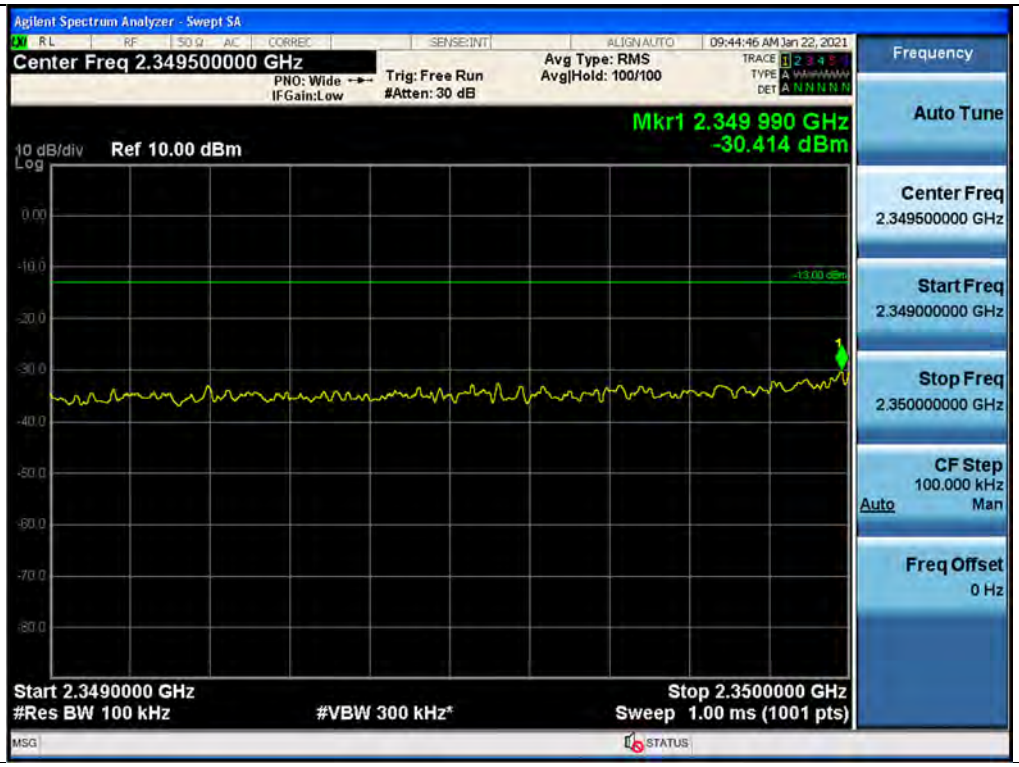
+3 dB above Out-of-band (single test signals) / WCS / Downlink / LTE 5 MHz / Lower



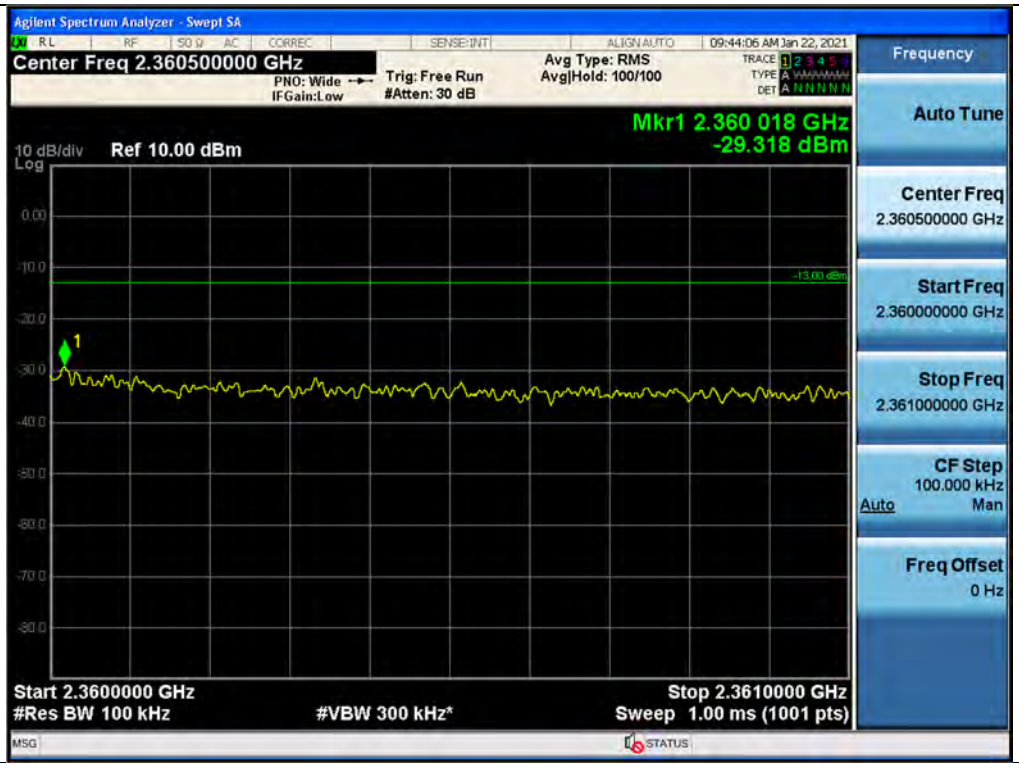
+3 dB above Out-of-band (single test signals) / WCS / Downlink / LTE 5 MHz / Upper



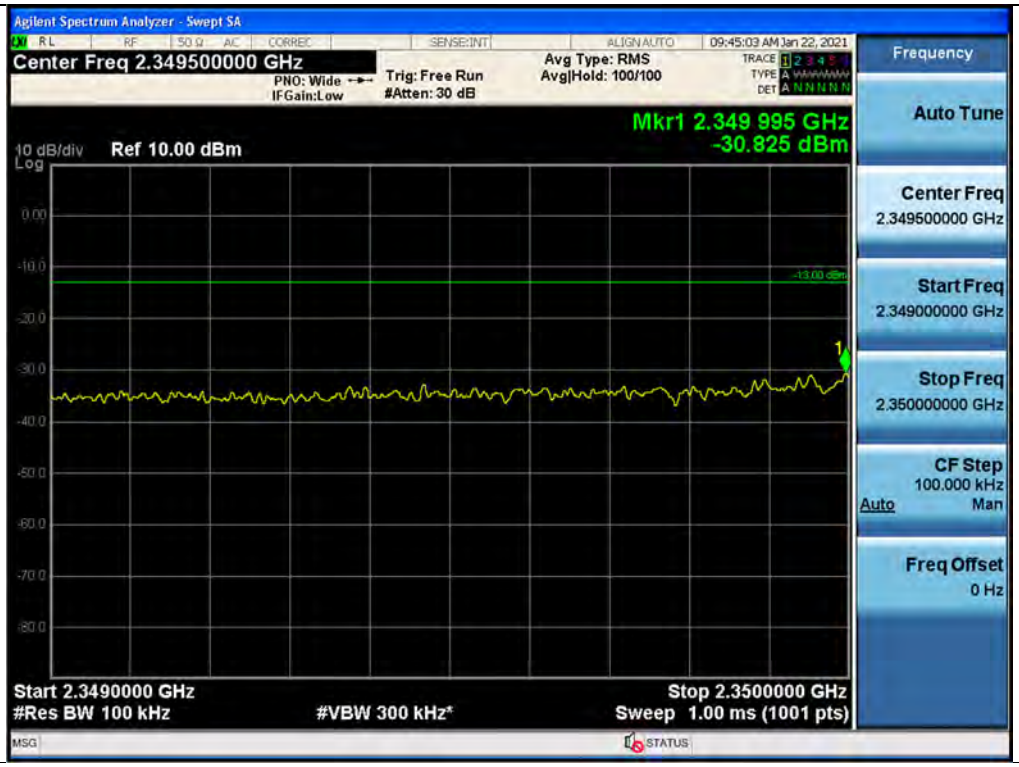
Out-of-band (single test signals) / WCS / Downlink / LTE 10 MHz / Lower



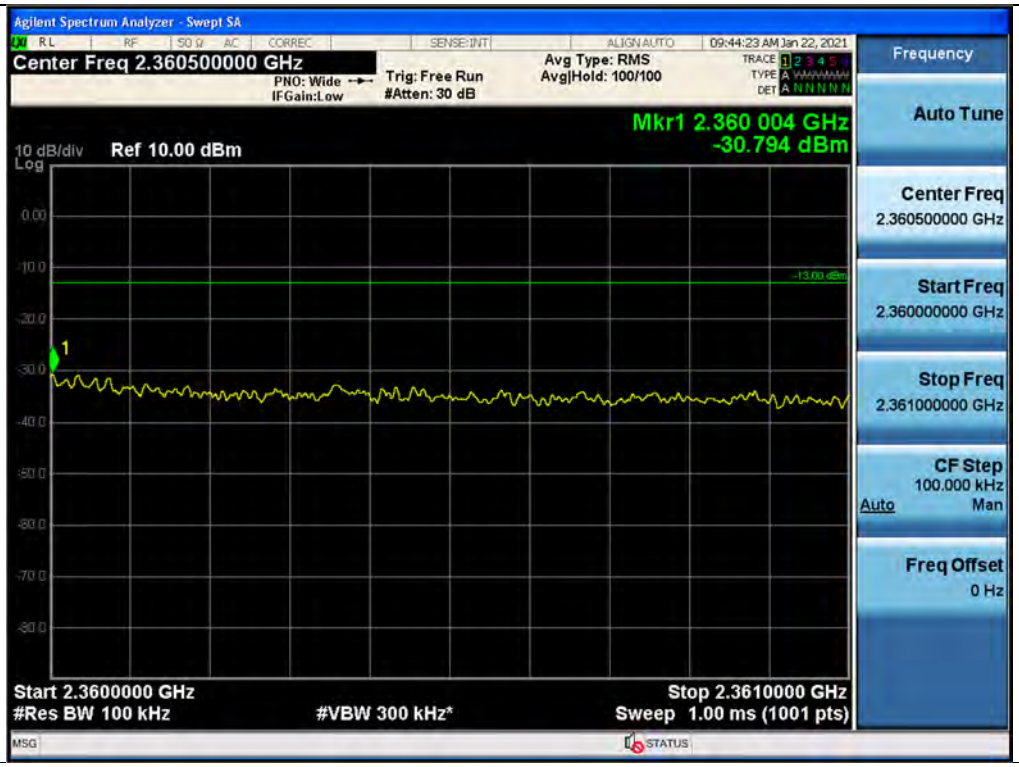
Out-of-band (single test signals) / WCS / Downlink / LTE 10 MHz / Upper



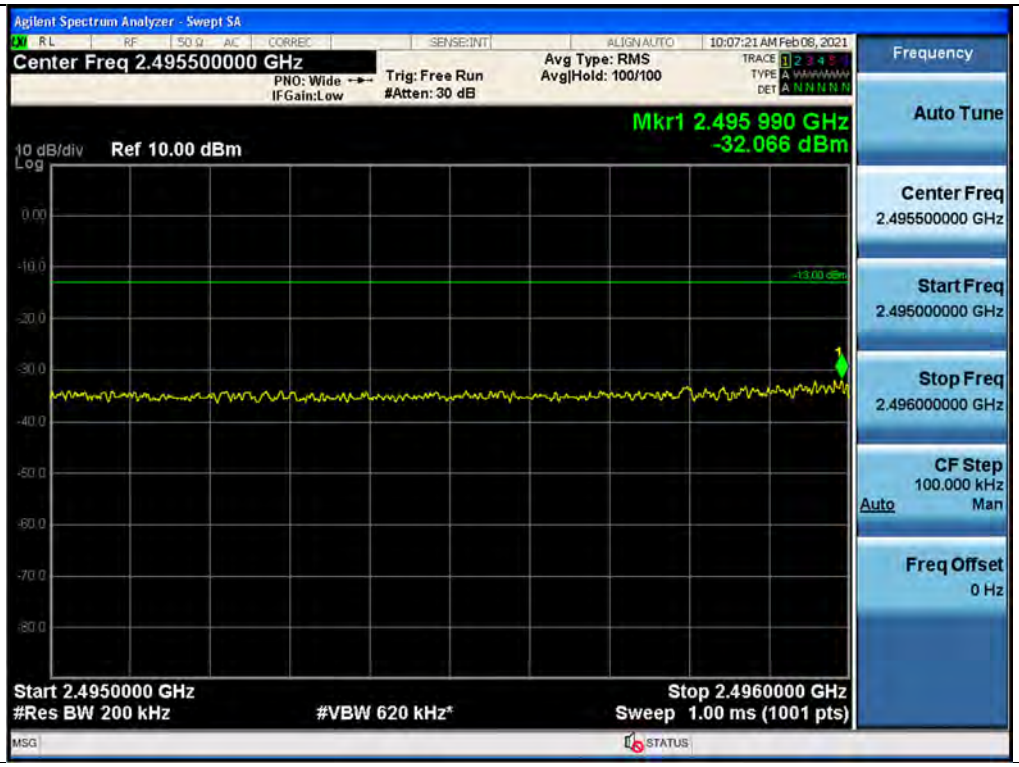
+3 dB above Out-of-band (single test signals) / WCS / Downlink / LTE 10 MHz / Lower



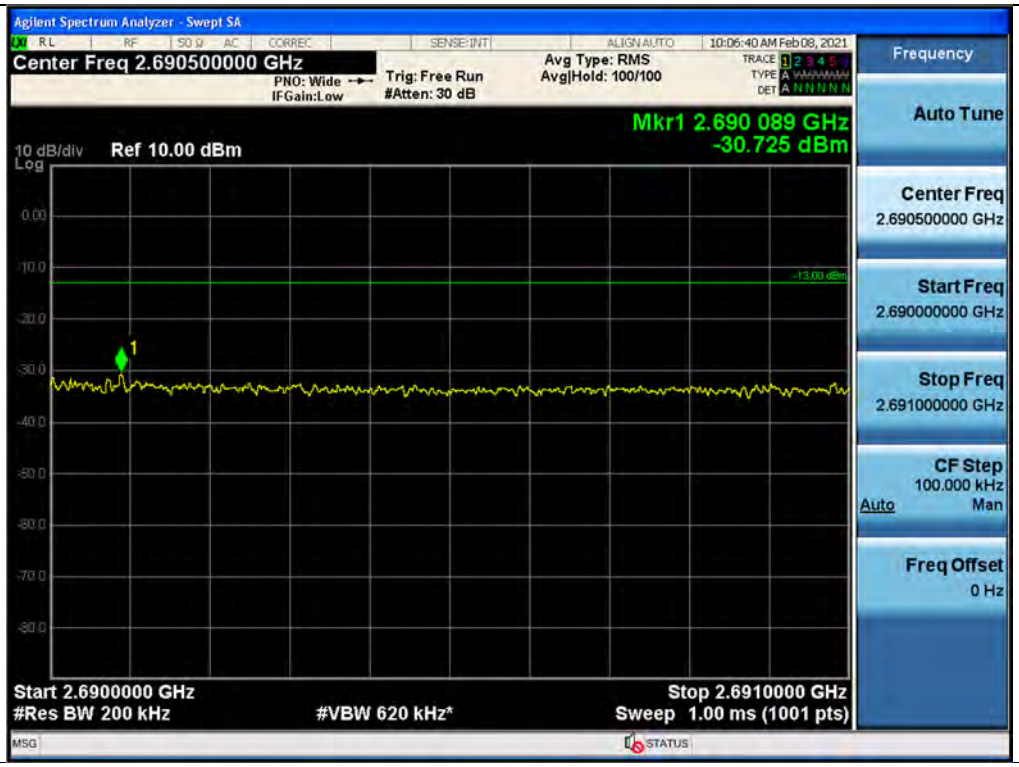
+3 dB above Out-of-band (single test signals) / WCS / Downlink / LTE 10 MHz / Upper



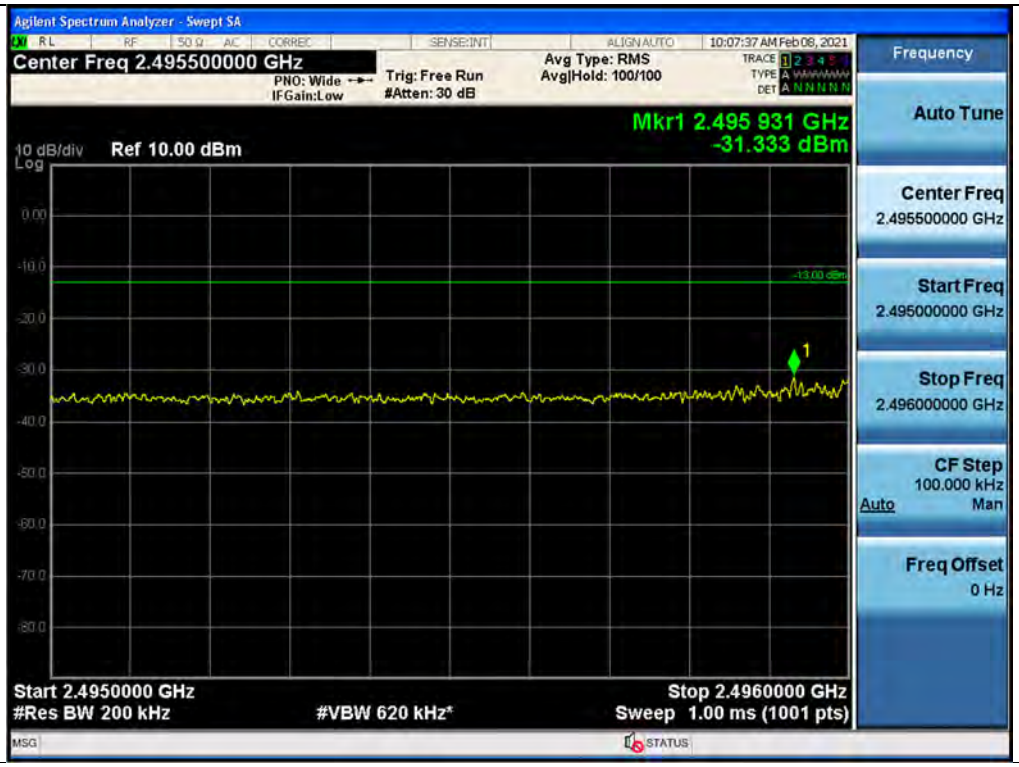
Out-of-band (single test signals) / BRS/EBS / Downlink / LTE 20 MHz / Lower



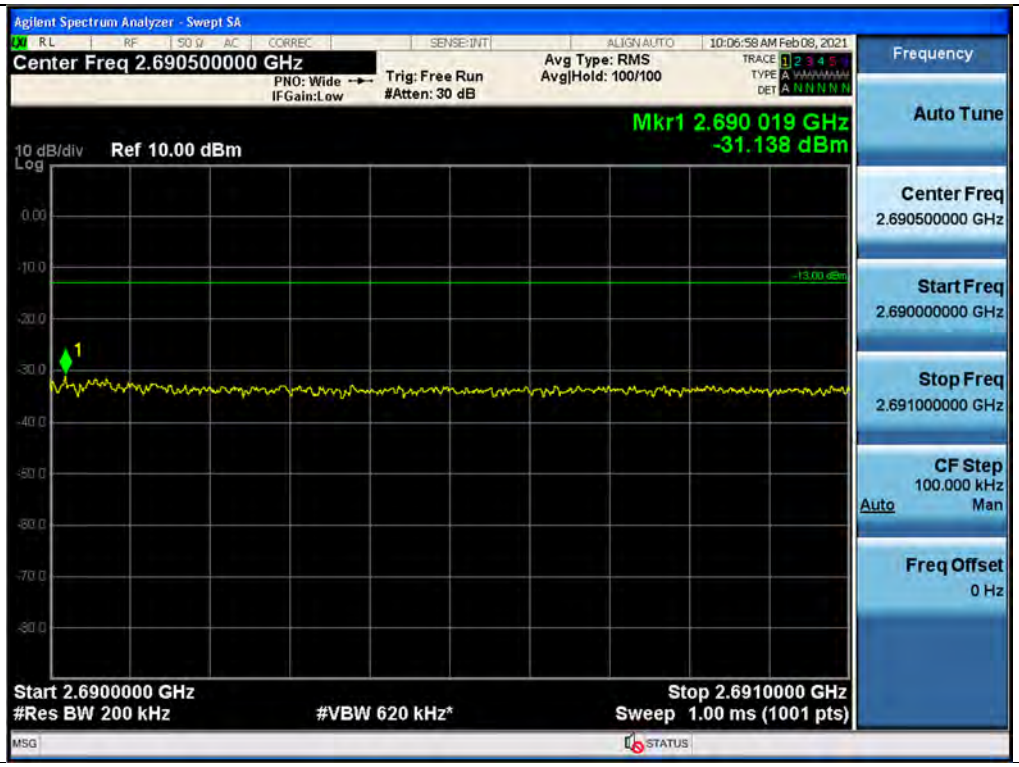
Out-of-band (single test signals) / BRS/EBS / Downlink / LTE 20 MHz / Upper



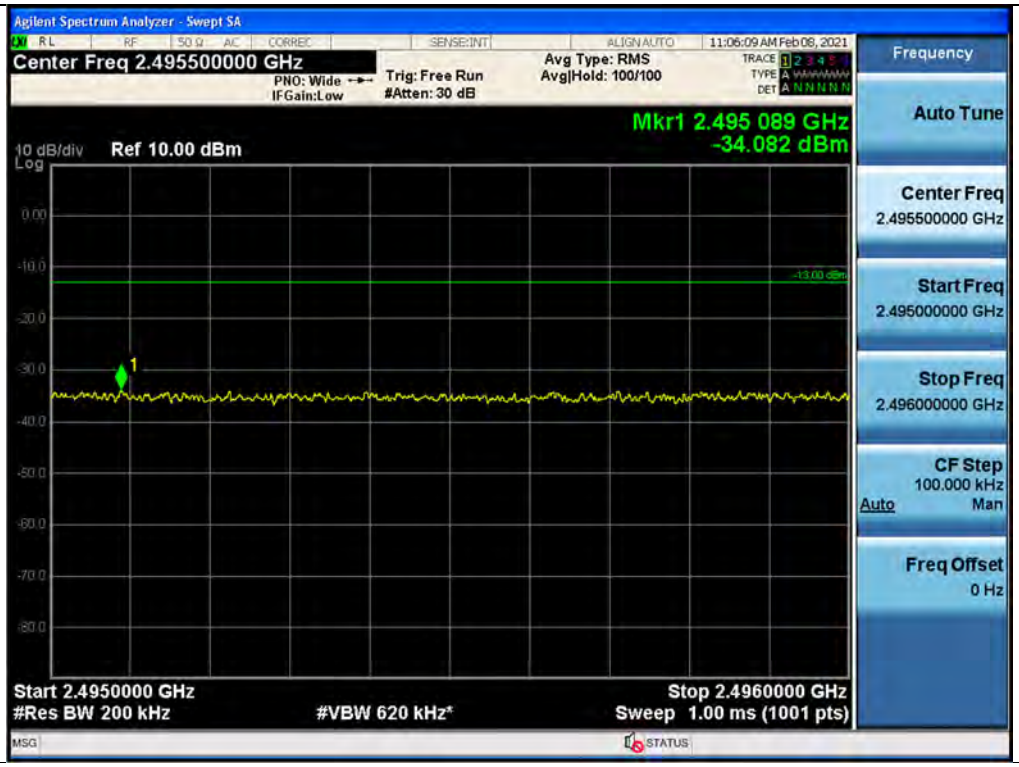
+3 dB above Out-of-band (single test signals) / BRS/EBS / Downlink / LTE 20 MHz / Lower



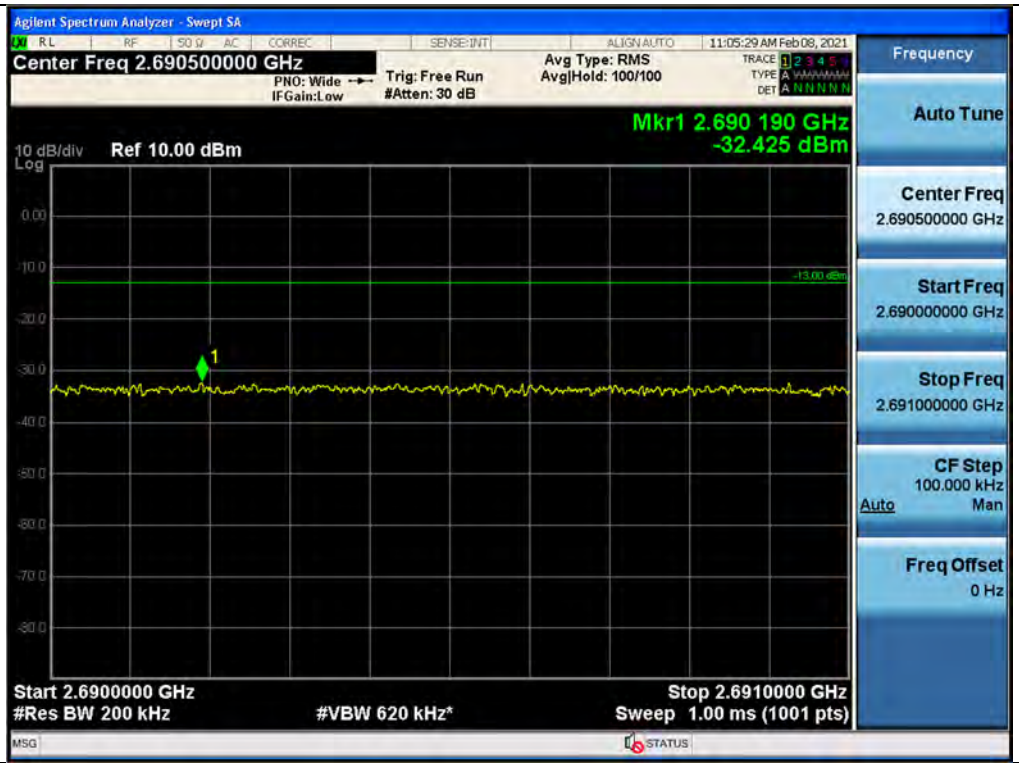
+3 dB above Out-of-band (single test signals) / BRS/EBS / Downlink / LTE 20 MHz / Upper



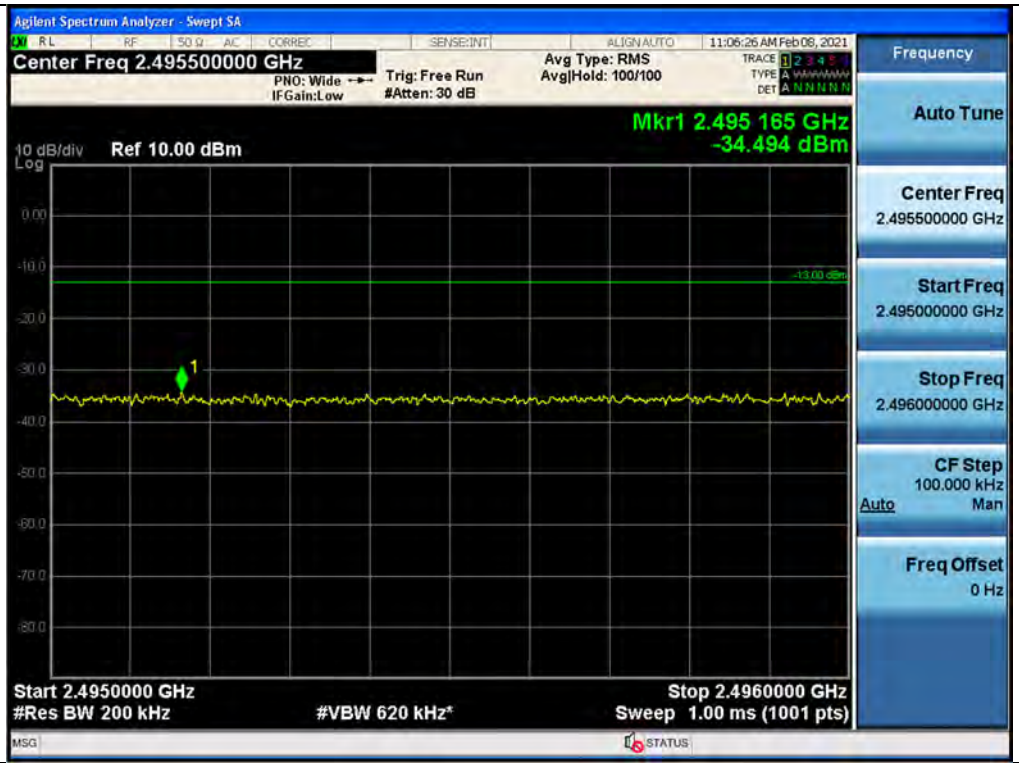
Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 20 MHz / Lower



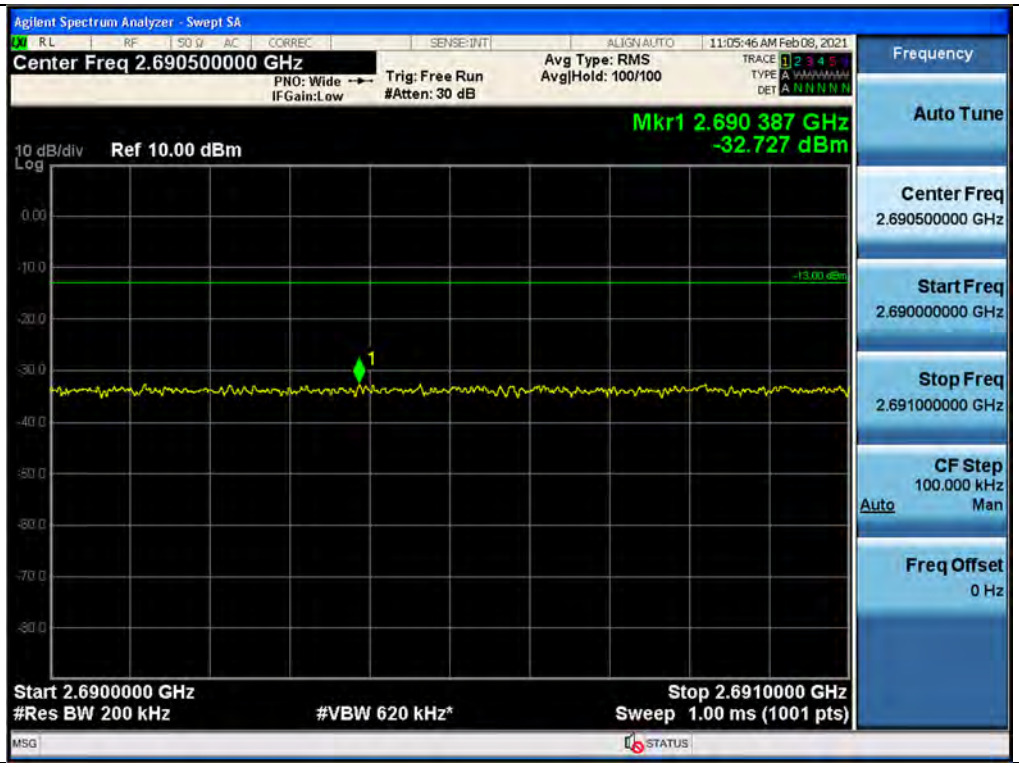
Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 20 MHz / Upper



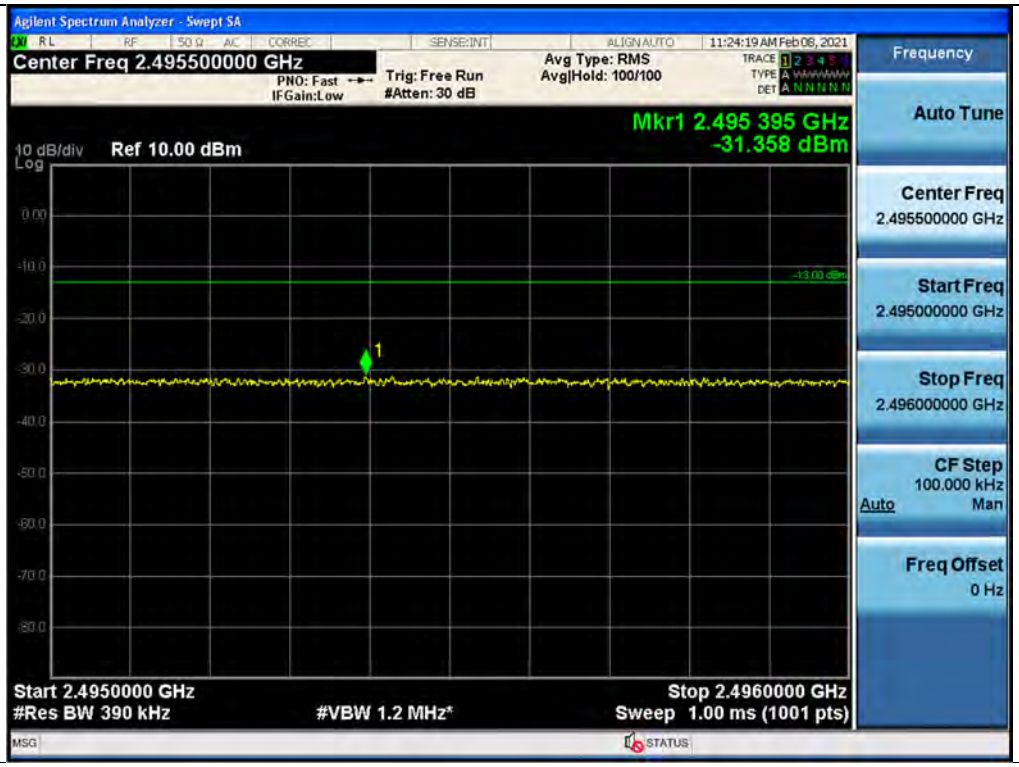
+3 dB above Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 20 MHz / Lower



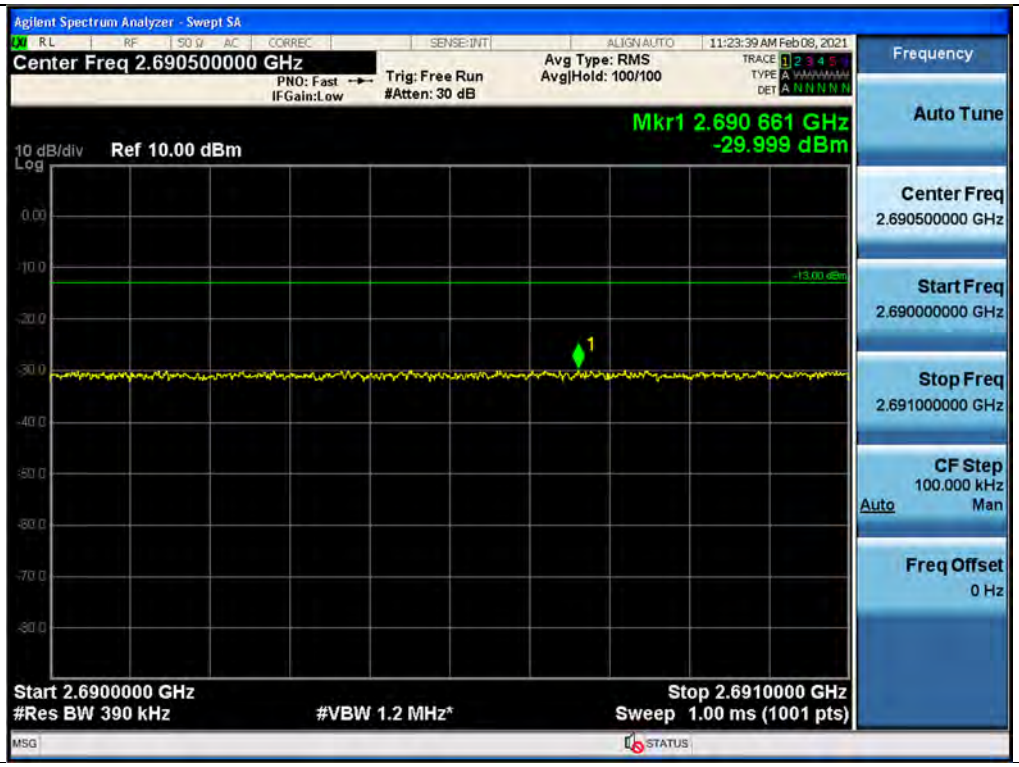
+3 dB above Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 20 MHz / Upper



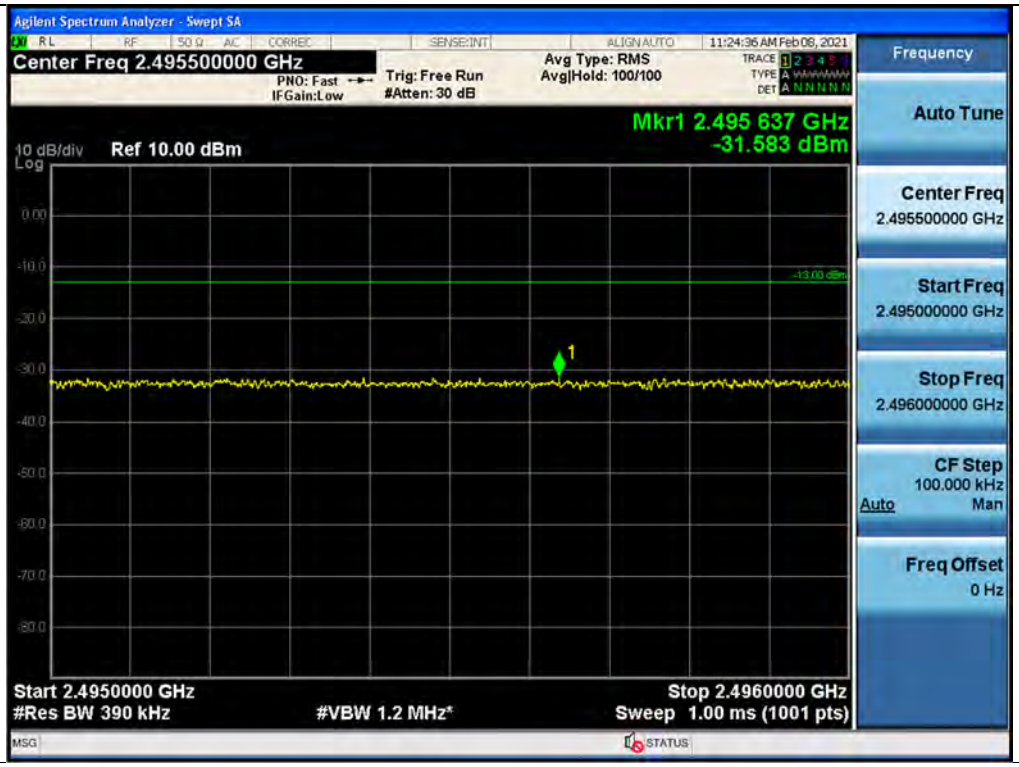
Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 40 MHz / Lower



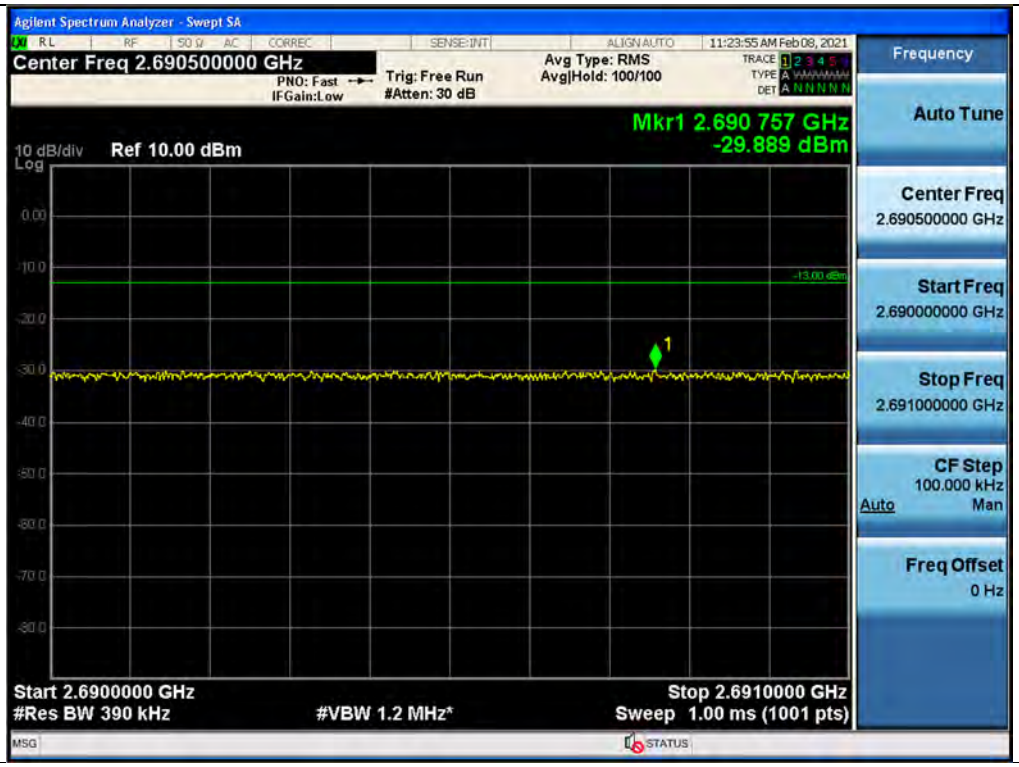
Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 40 MHz / Upper



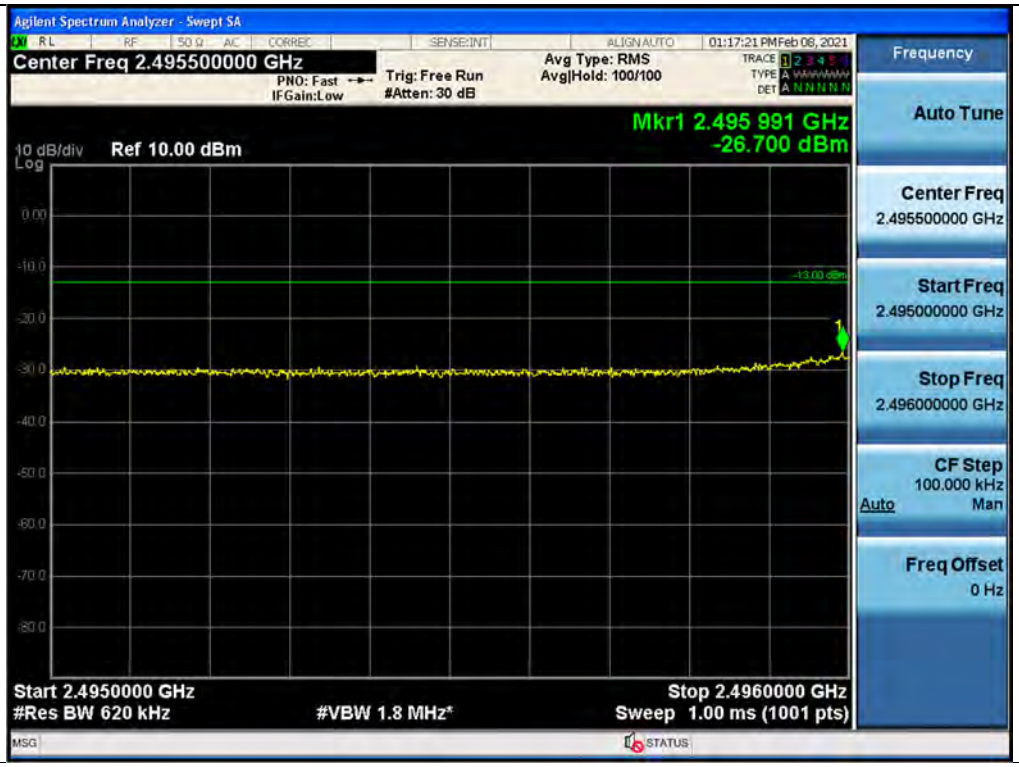
+3 dB above Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 40 MHz / Lower



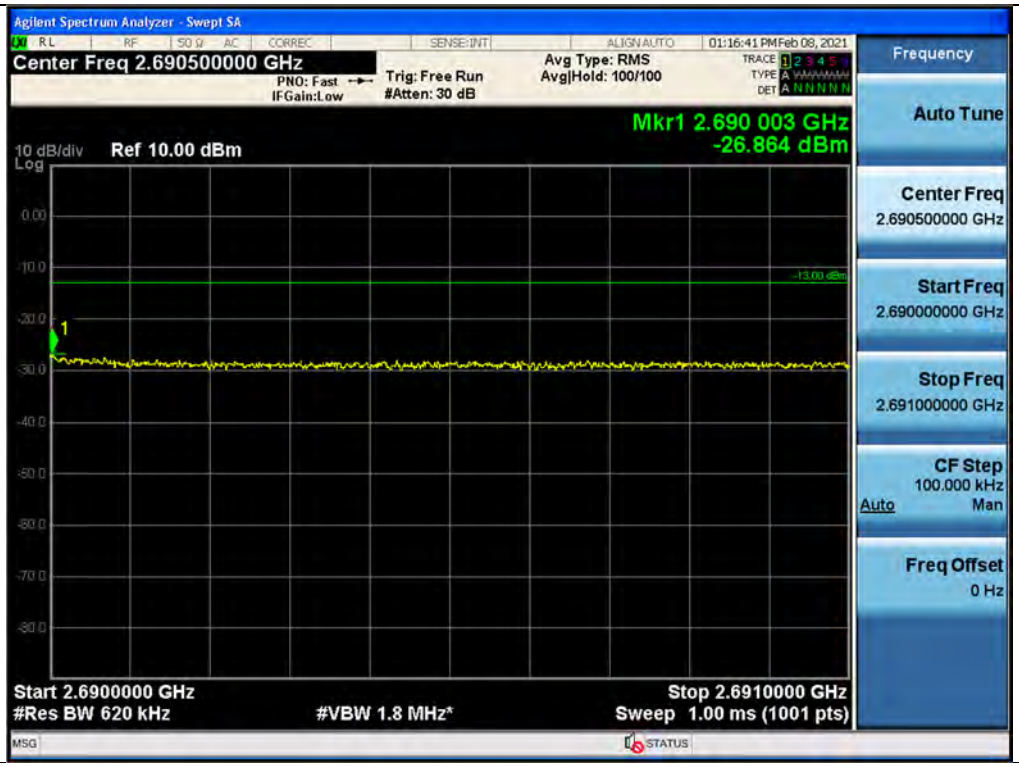
+3 dB above Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 40 MHz / Upper



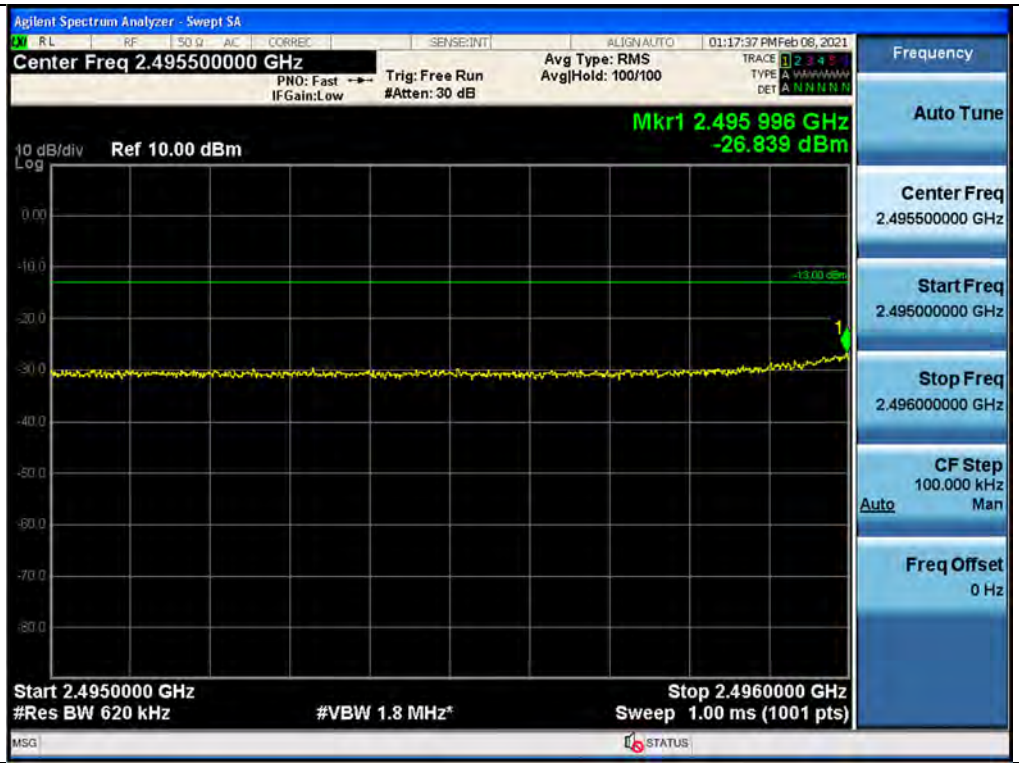
Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 60 MHz / Lower



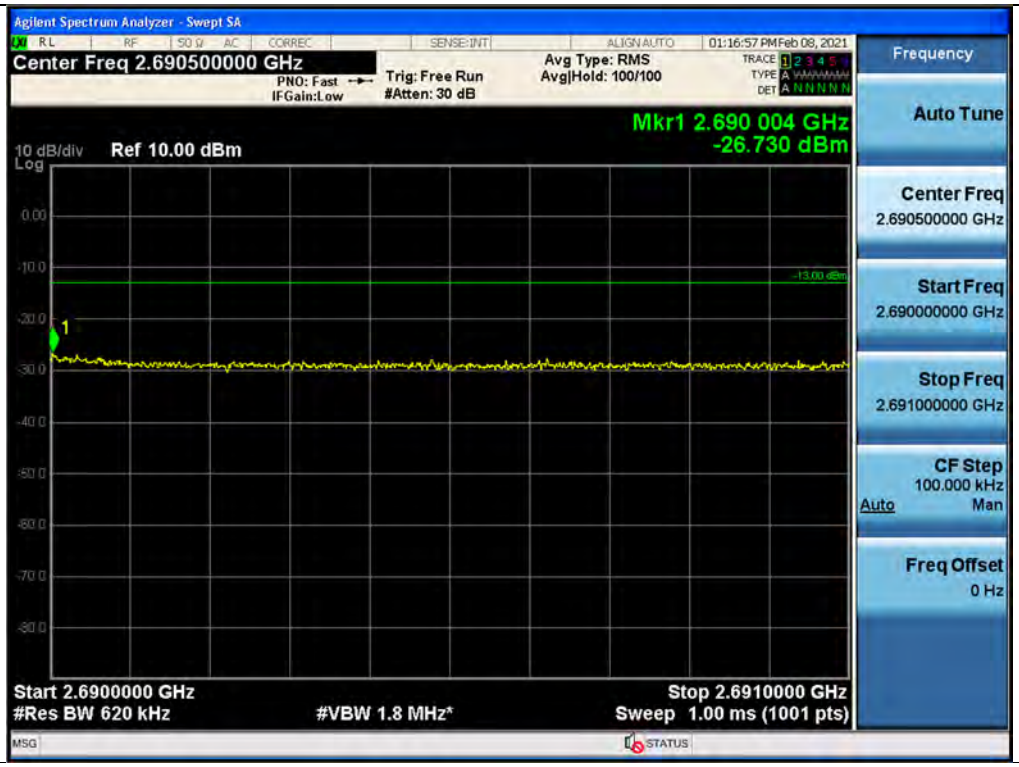
Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 60 MHz / Upper



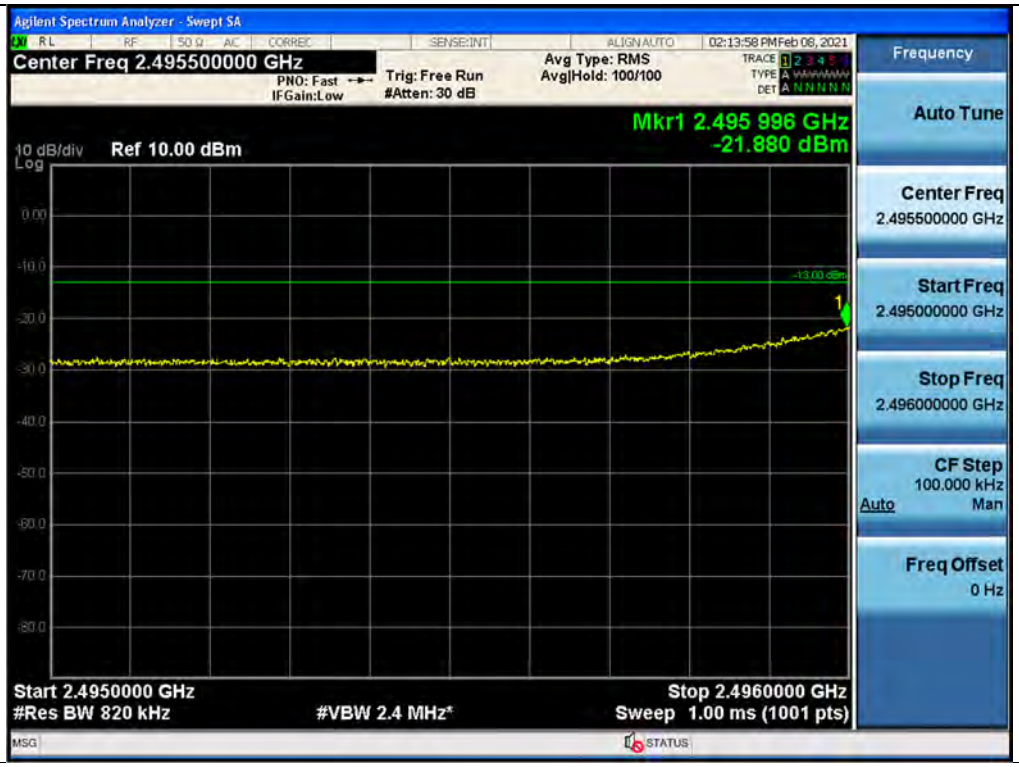
+3 dB above Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 60 MHz / Lower



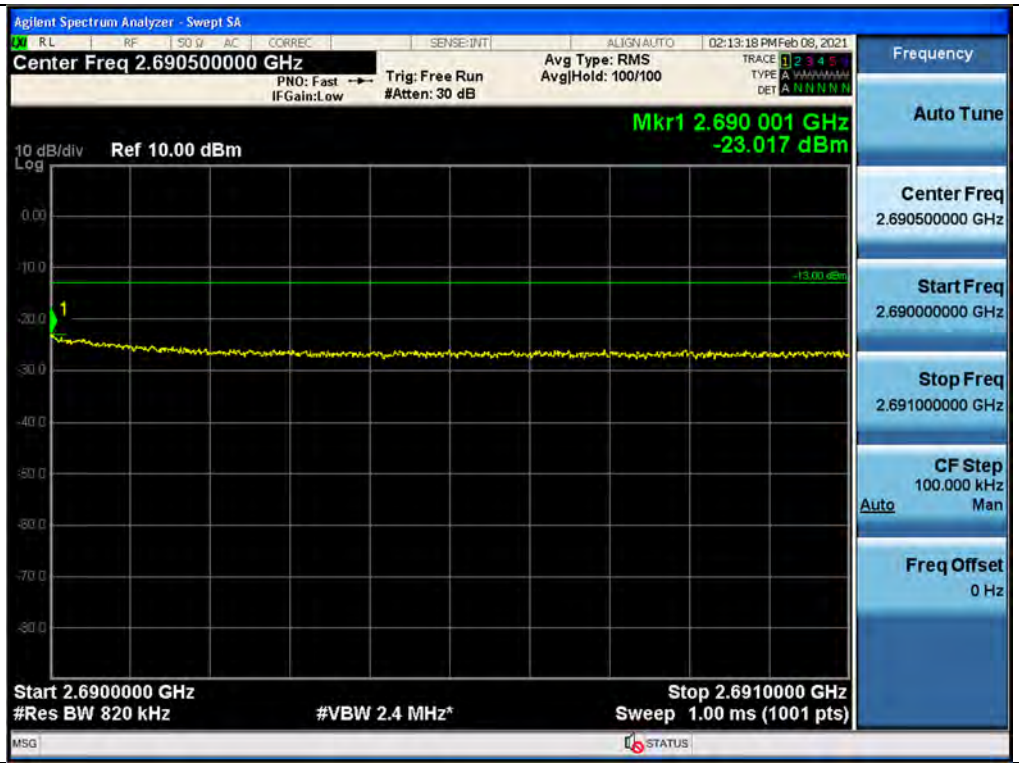
+3 dB above Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 60 MHz / Upper



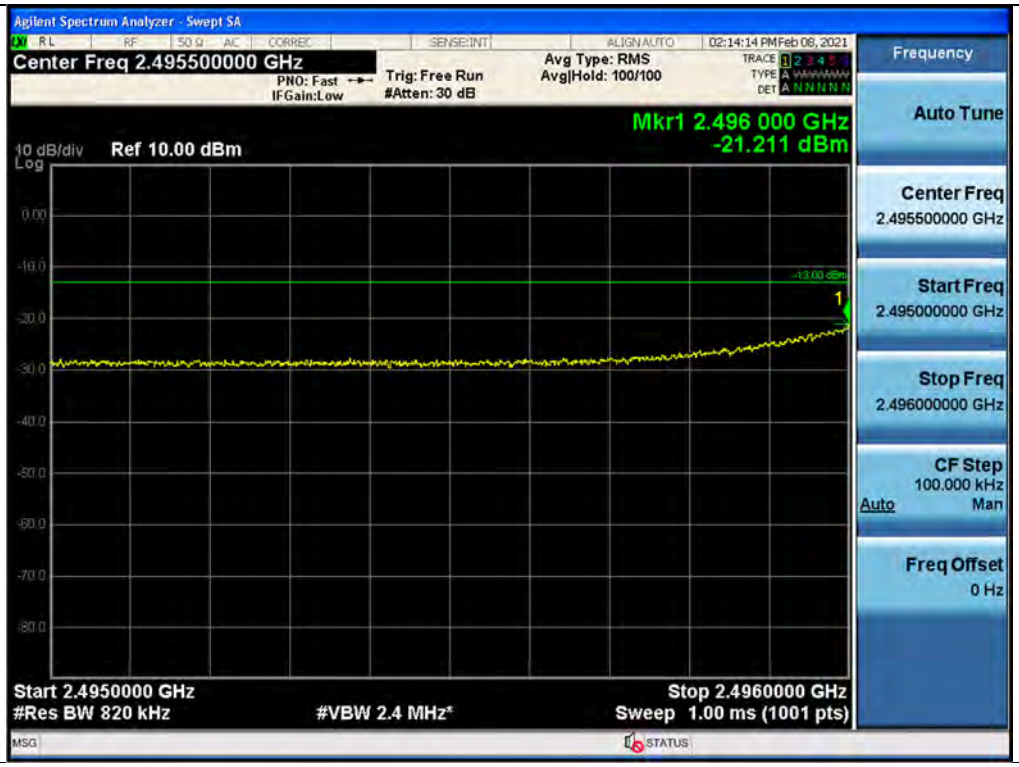
Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 80 MHz / Lower



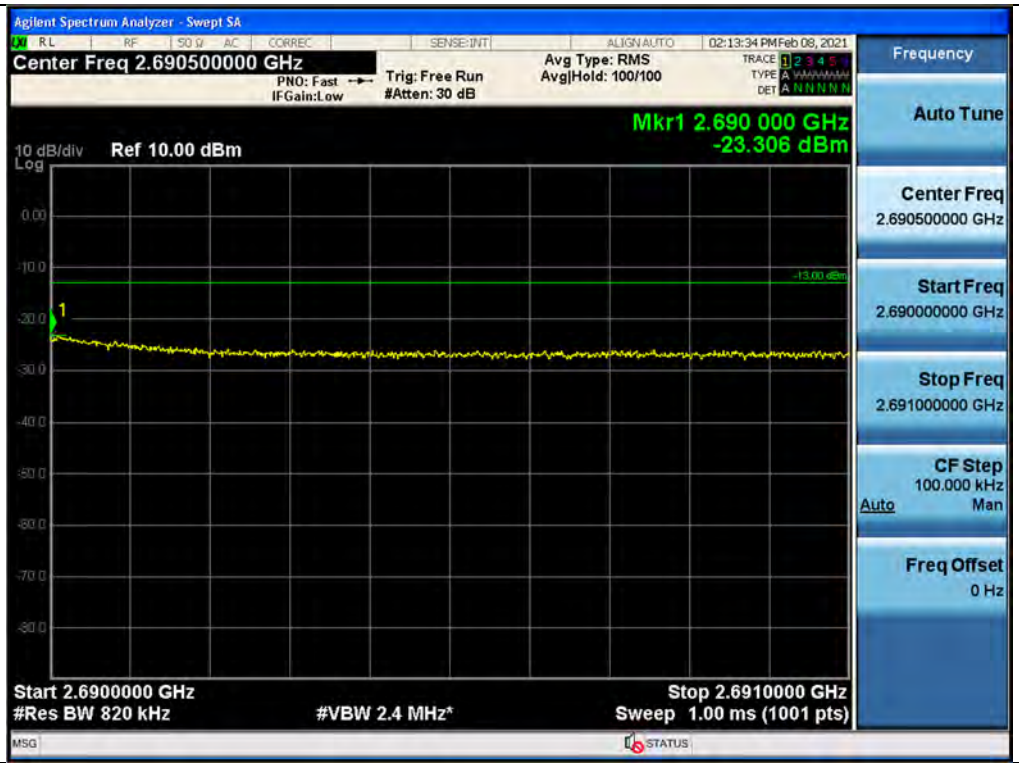
Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 80 MHz / Upper



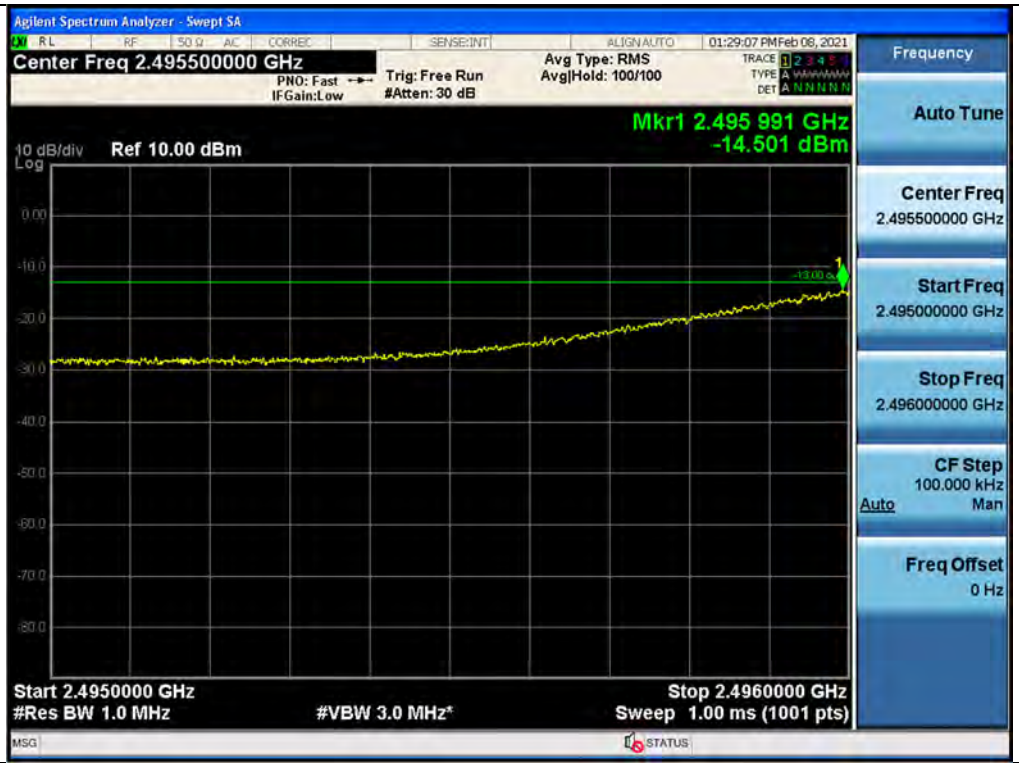
+3 dB above Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 80 MHz / Lower



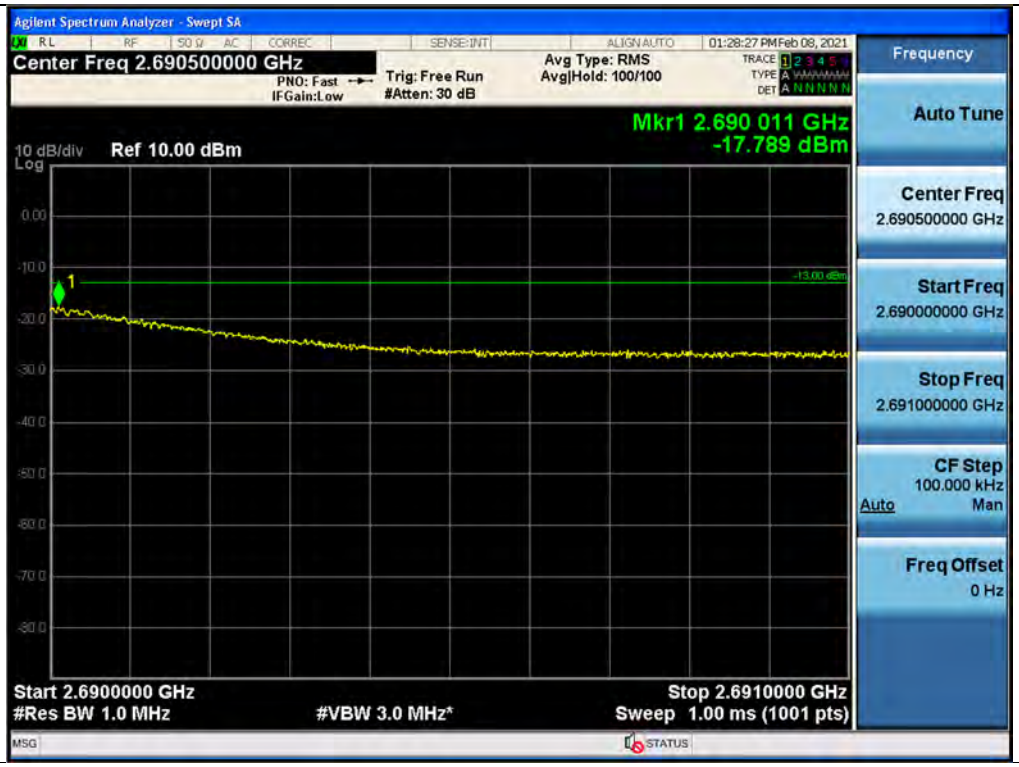
+3 dB above Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 80 MHz / Upper



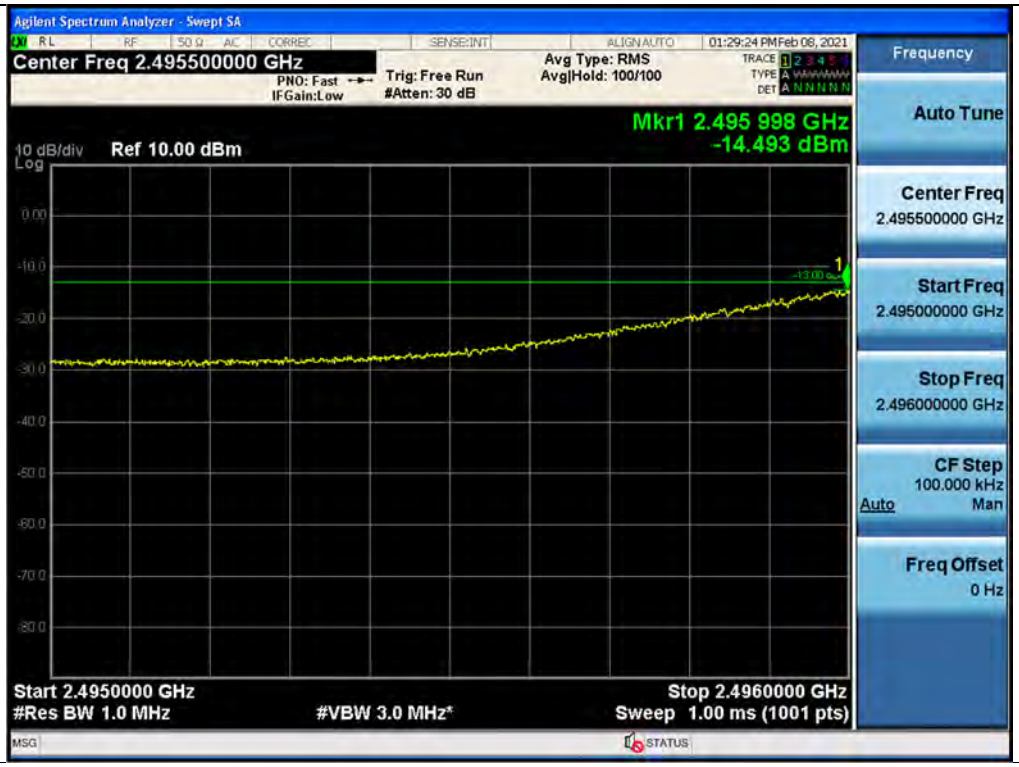
Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 100 MHz / Lower



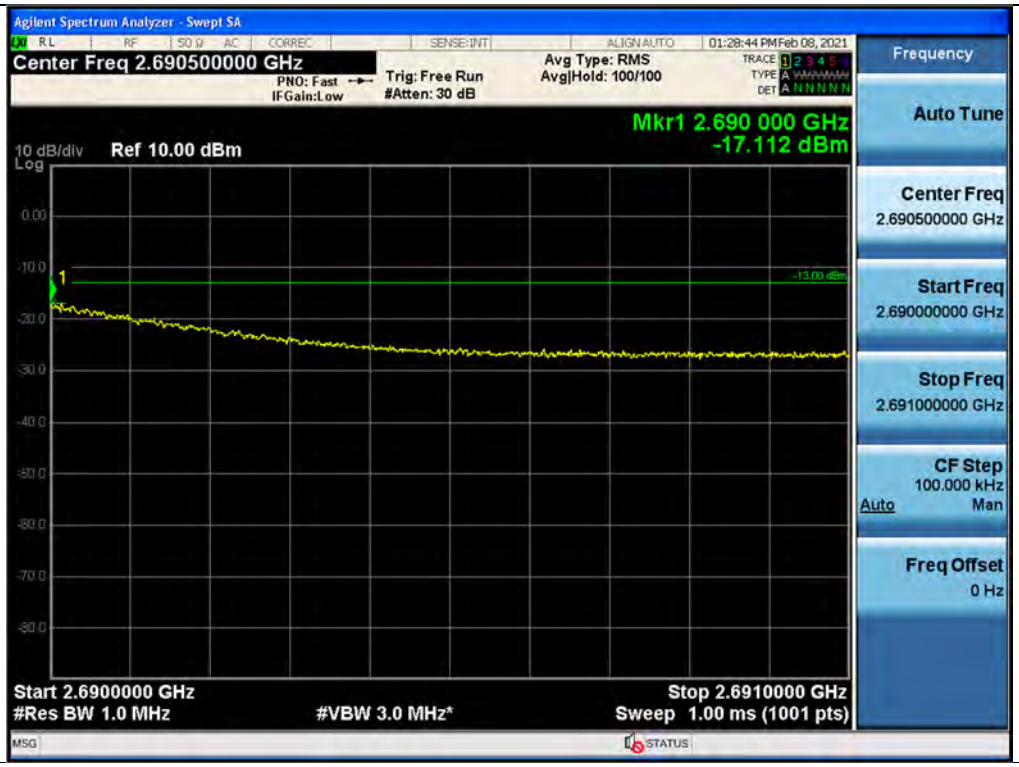
Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 100 MHz / Upper



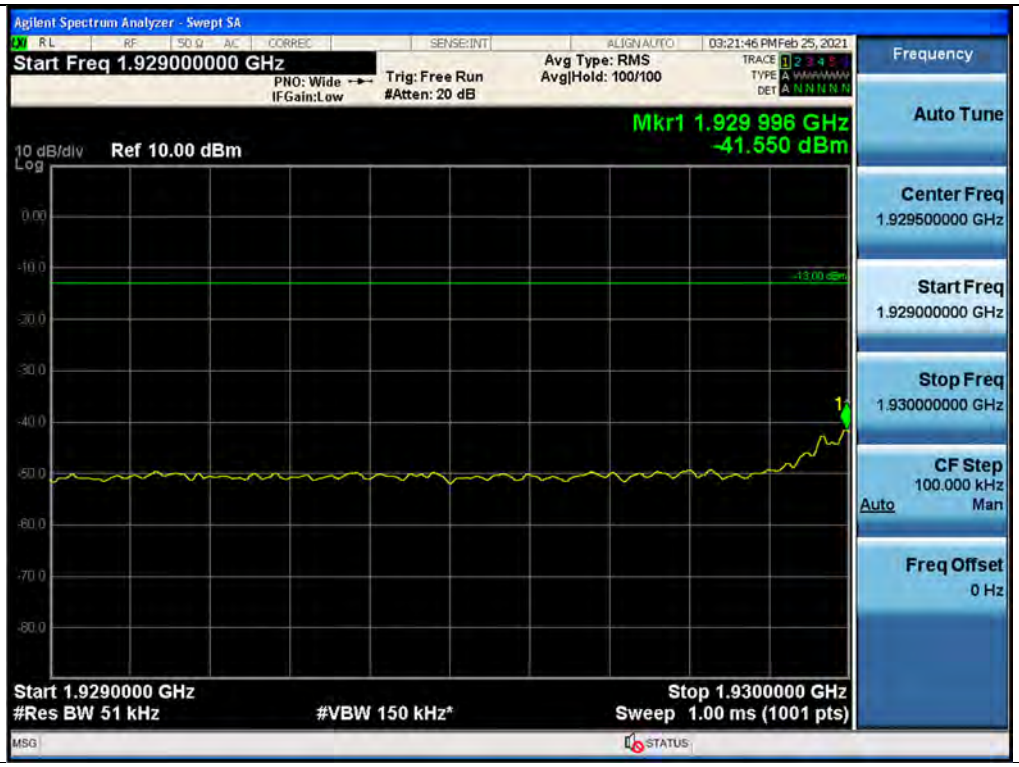
+3 dB above Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 100 MHz / Lower



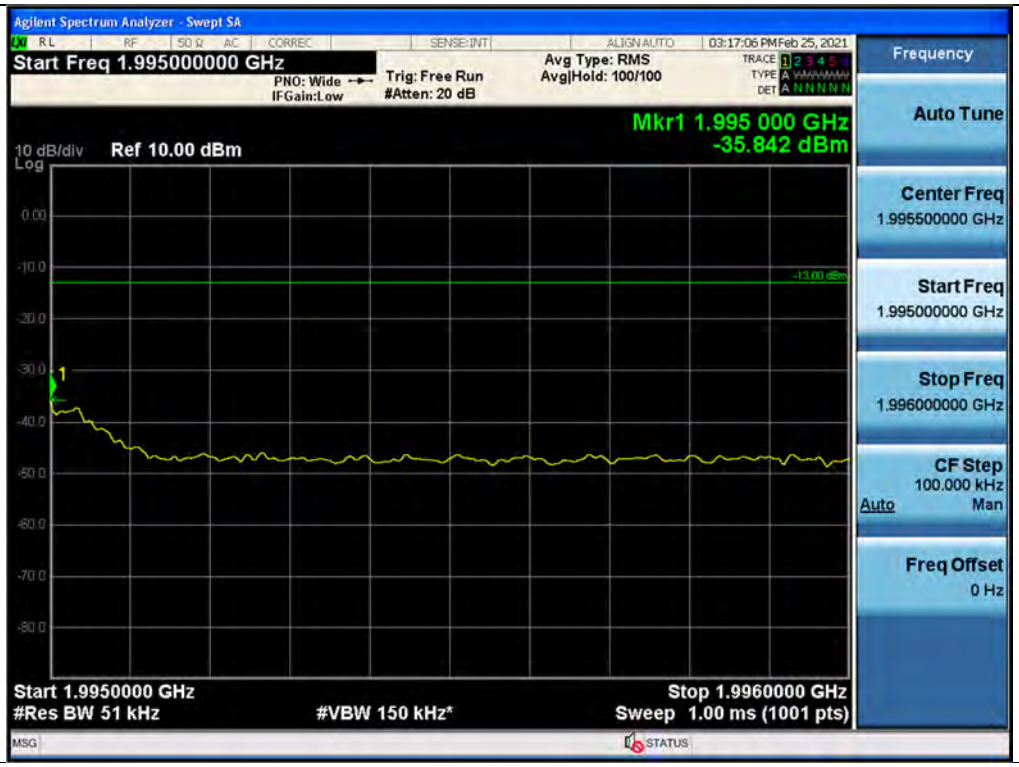
+3 dB above Out-of-band (single test signals) / BRS/EBS / Downlink / 5G NR 100 MHz / Upper



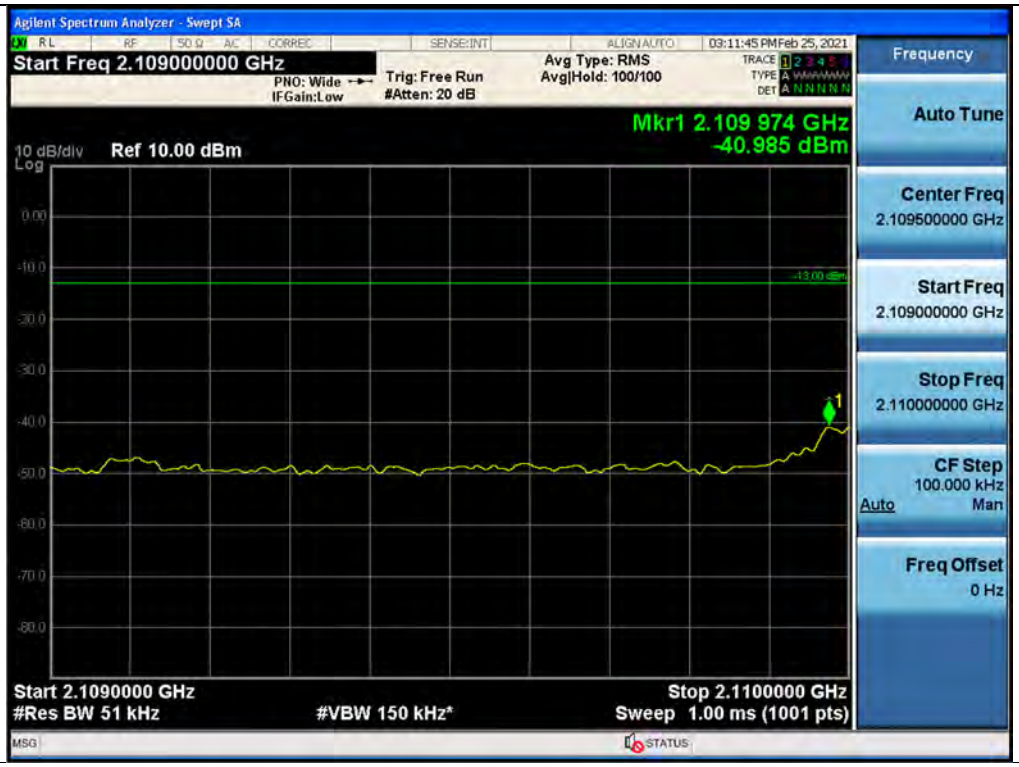
Out-of-band (two adjacent test signals) / Simultaneous / Broadband PCS / Downlink / Lower



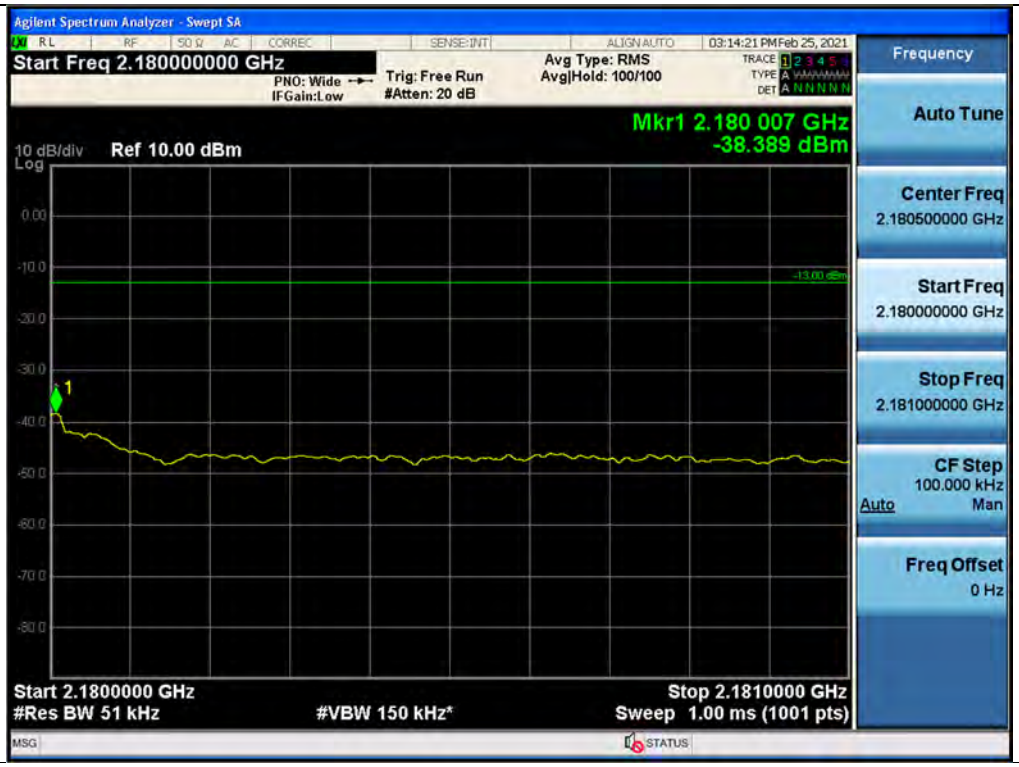
Out-of-band (two adjacent test signals) / Simultaneous / Broadband PCS / Downlink / Upper



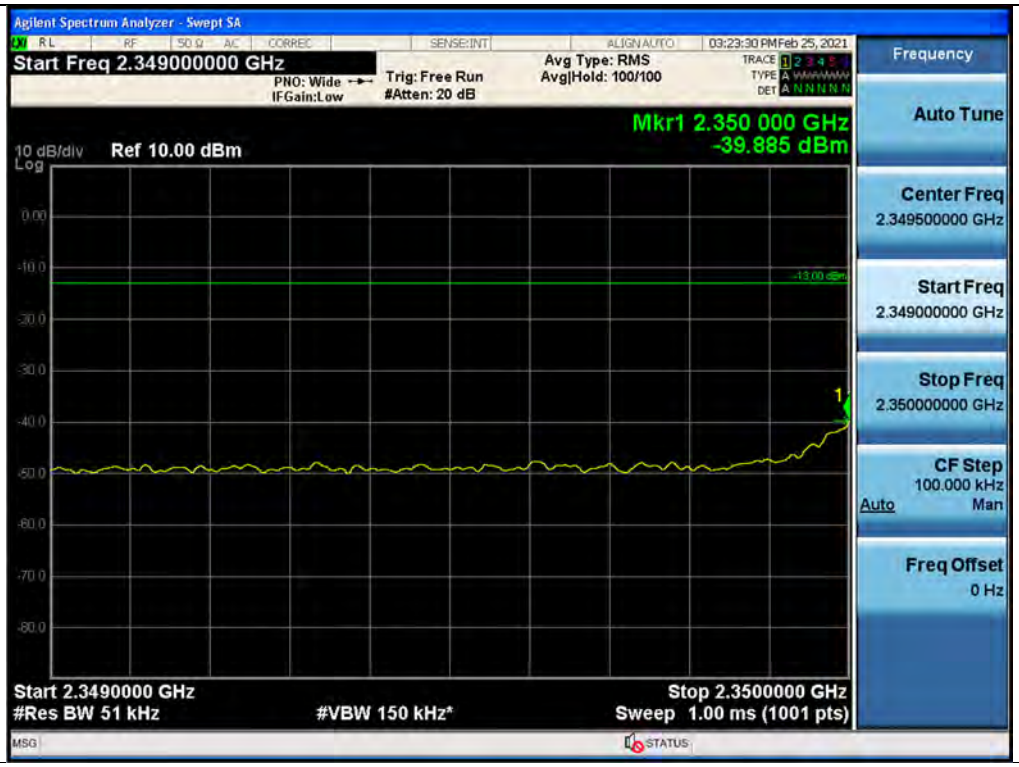
Out-of-band (two adjacent test signals) / Simultaneous / AWS13 / Downlink / Lower



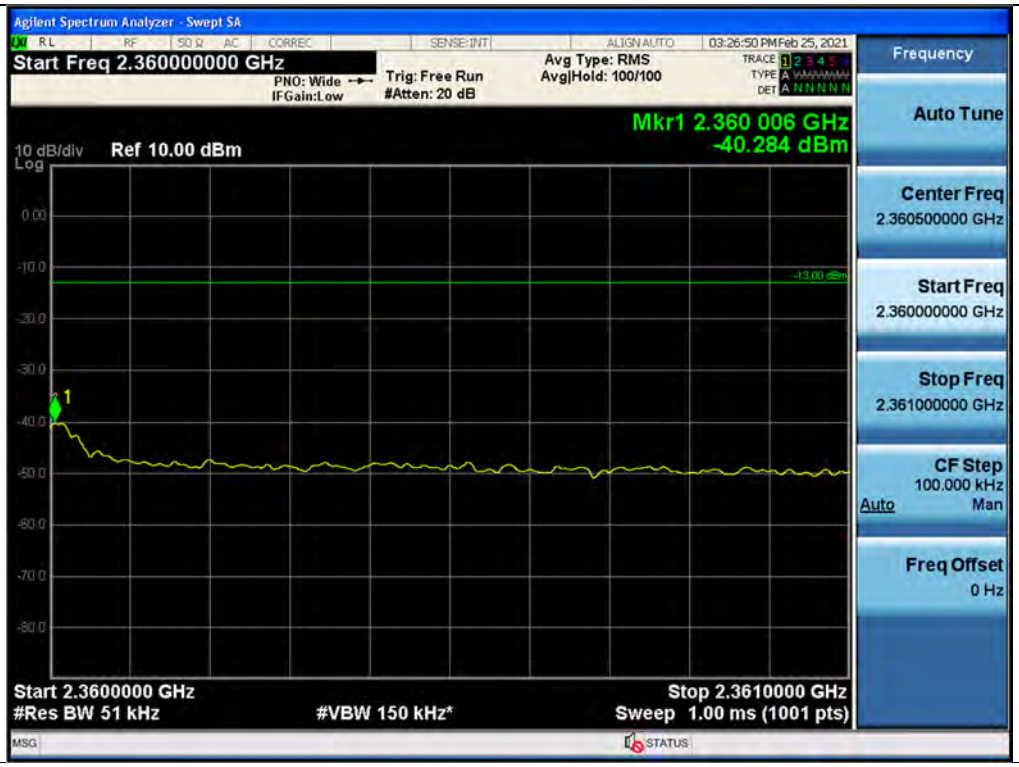
Out-of-band (two adjacent test signals) / Simultaneous / AWS13 / Downlink / Upper



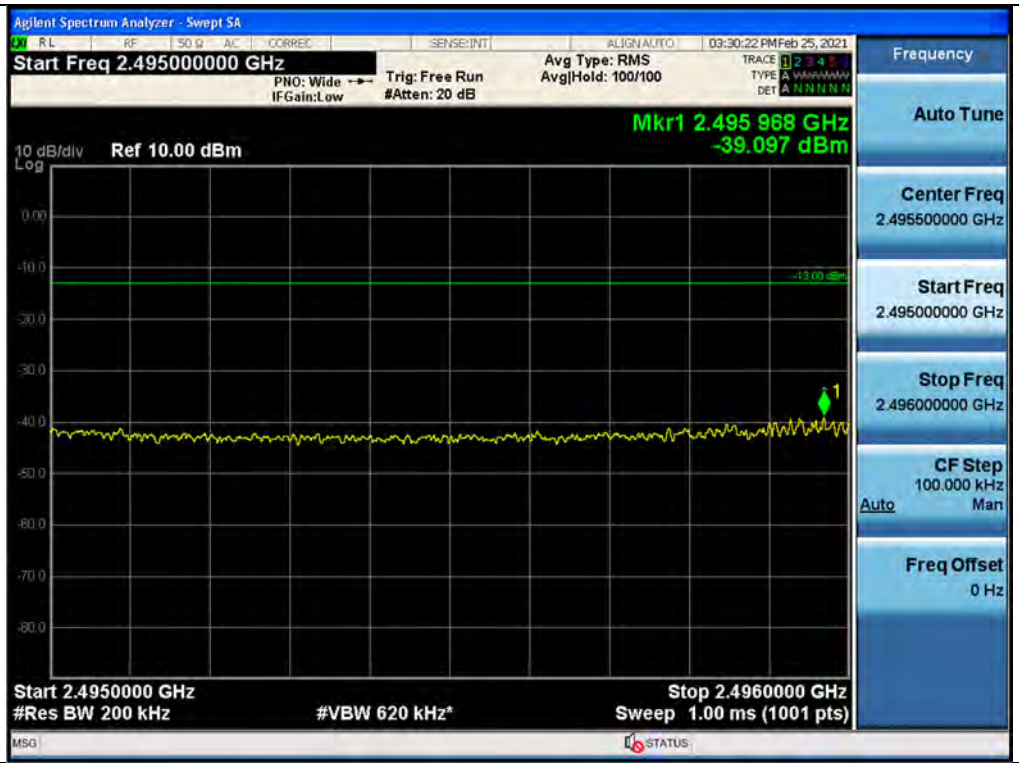
Out-of-band (two adjacent test signals) / Simultaneous / WCS / Downlink / Lower



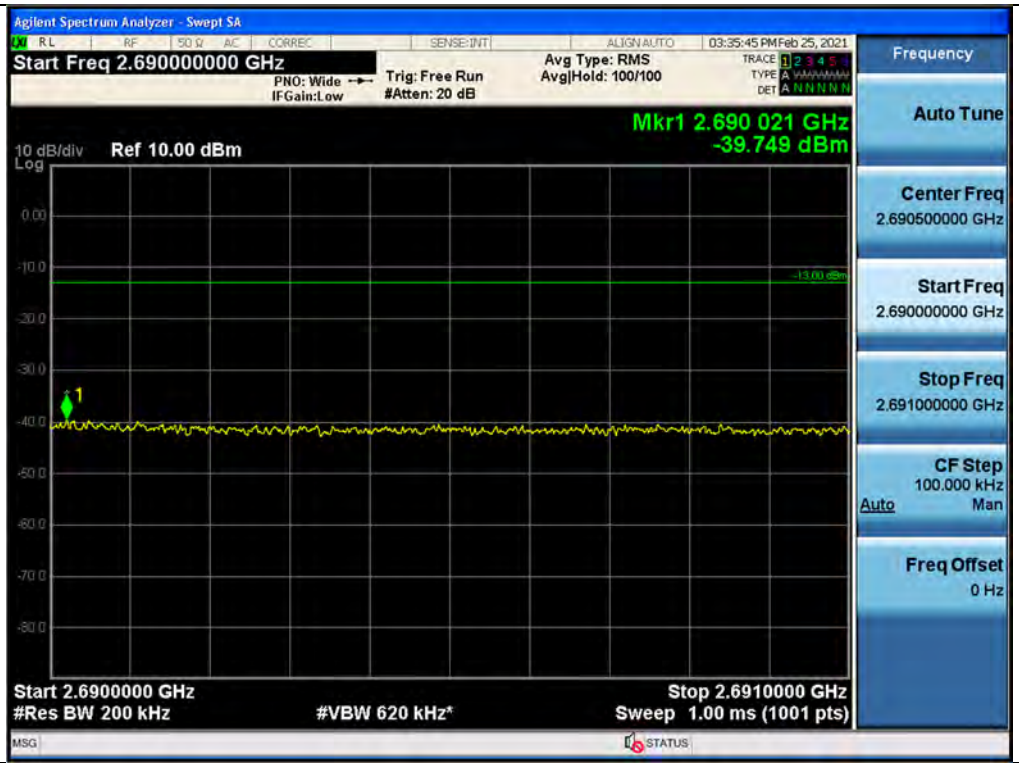
Out-of-band (two adjacent test signals) / Simultaneous / WCS / Downlink / Upper



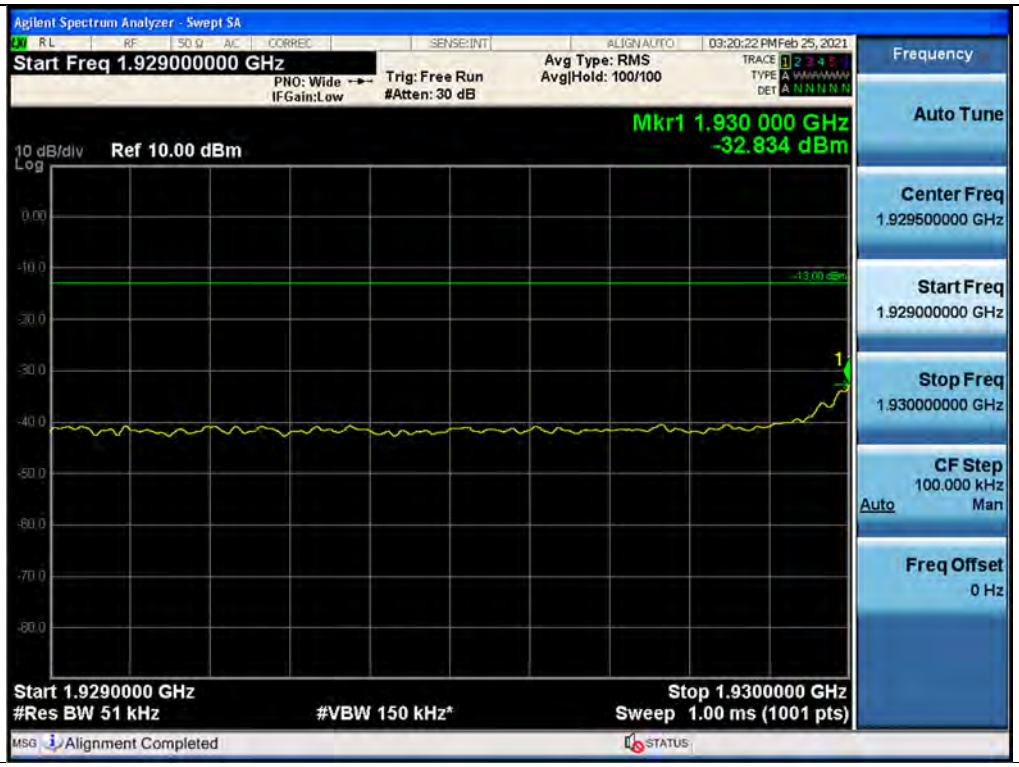
Out-of-band (two adjacent test signals) / Simultaneous / BRS/EBS / Downlink / Lower



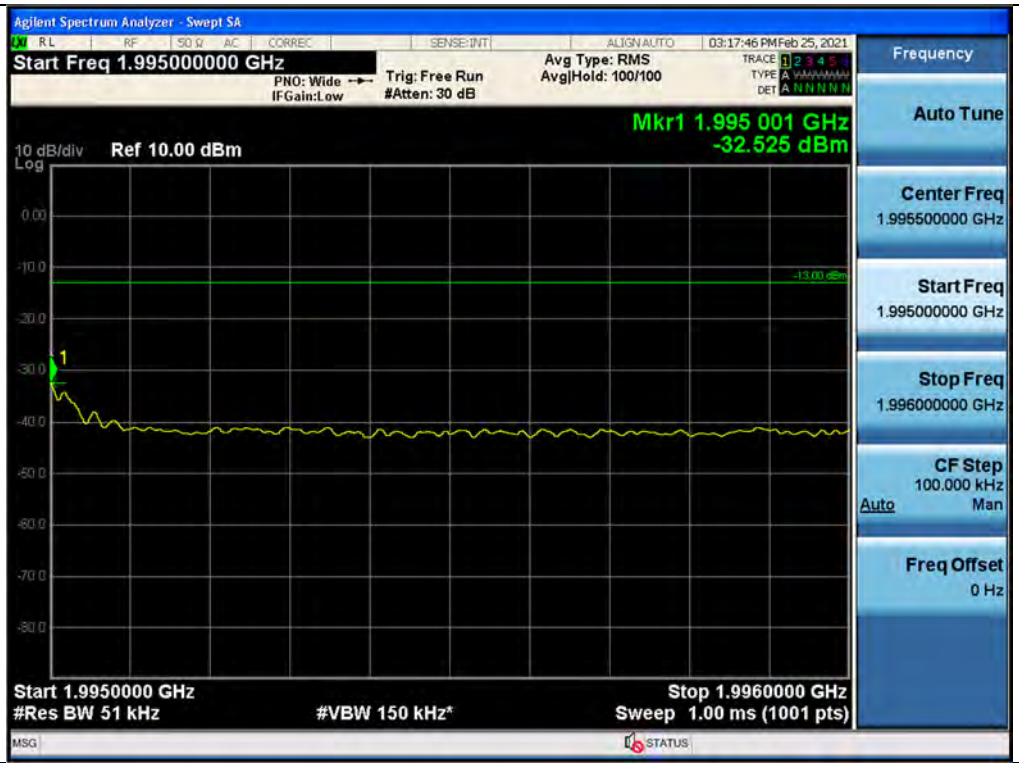
Out-of-band (two adjacent test signals) / Simultaneous / BRS/EBS / Downlink / Upper



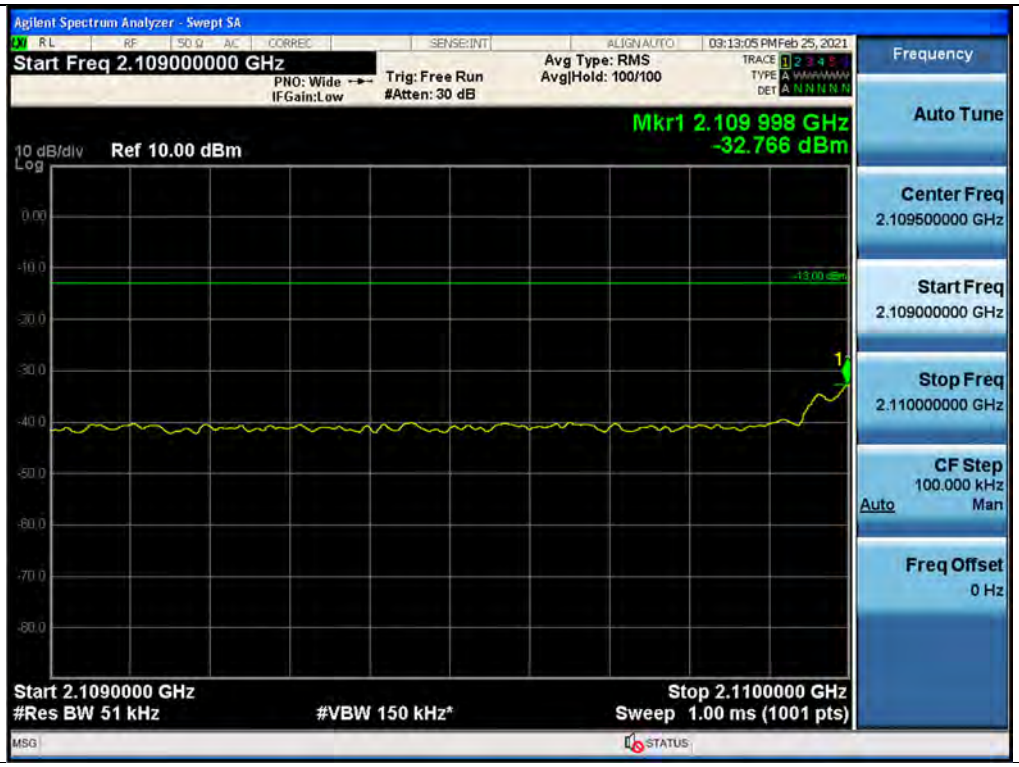
Out-of-band (single test signals) / Simultaneous / Broadband PCS / Downlink / Lower



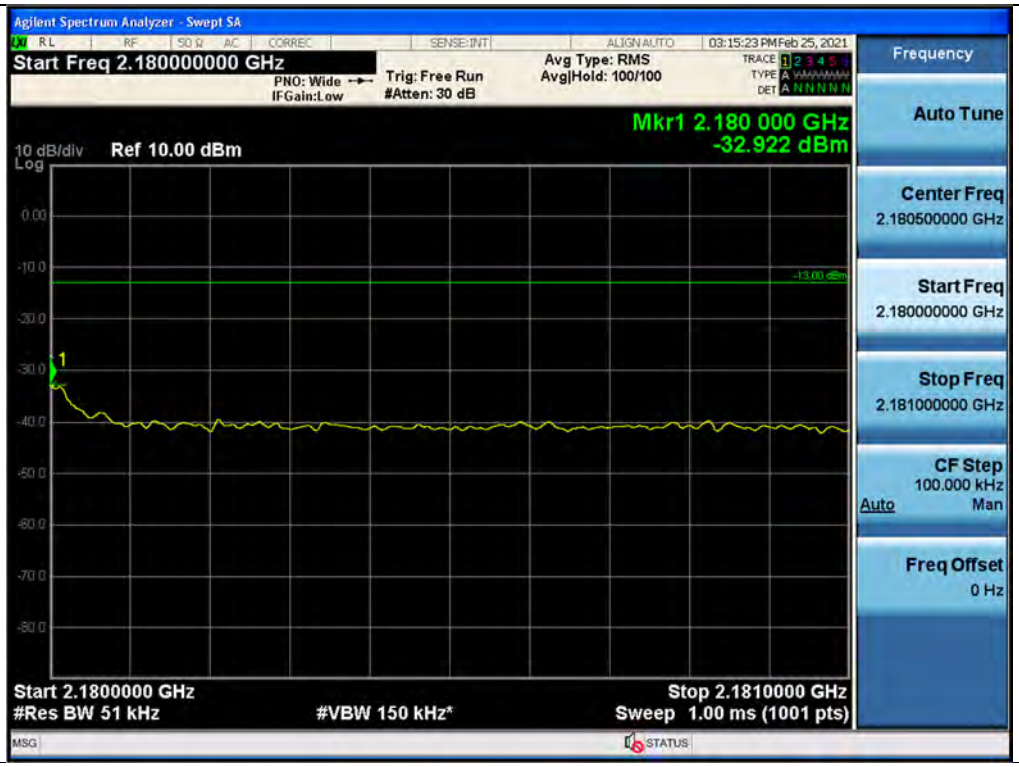
Out-of-band (single test signals) / Simultaneous / Broadband PCS / Downlink / Upper



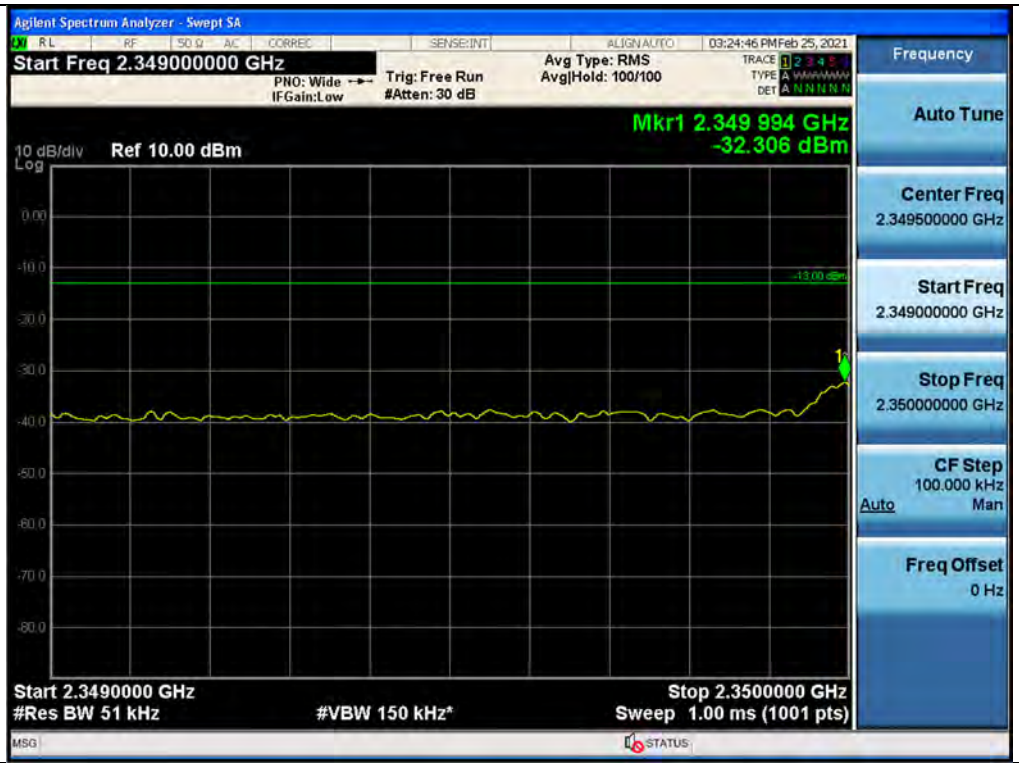
Out-of-band (single test signals) / Simultaneous / AWS13 / Downlink / Lower



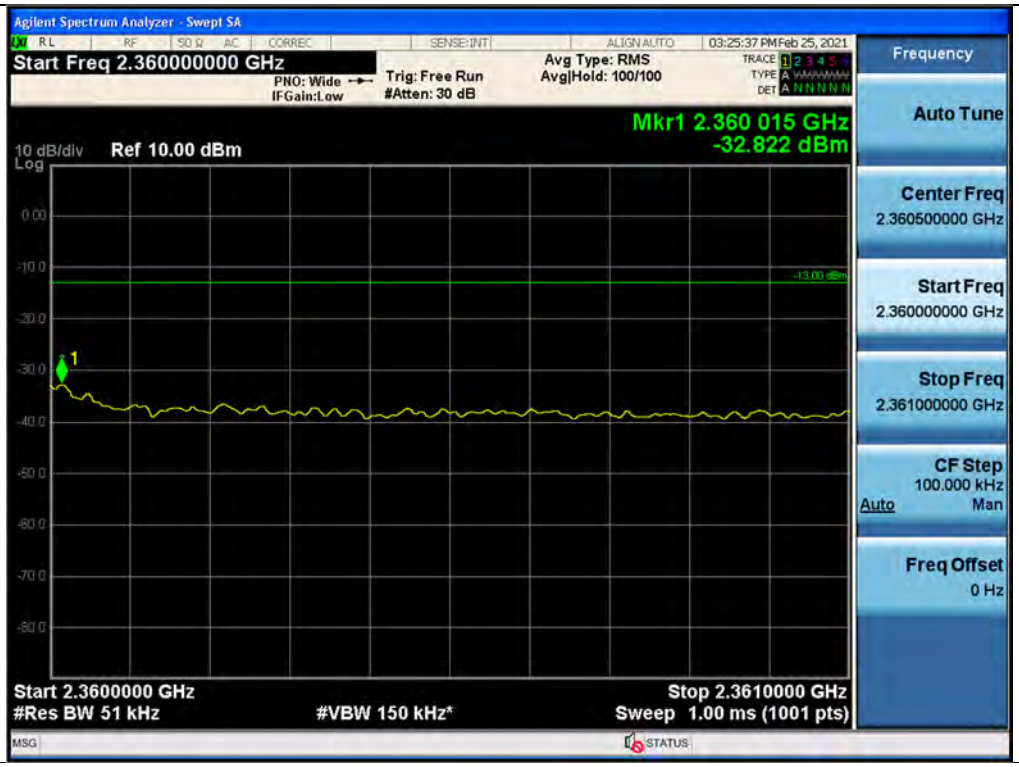
Out-of-band (single test signals) / Simultaneous / AWS13 / Downlink / Upper



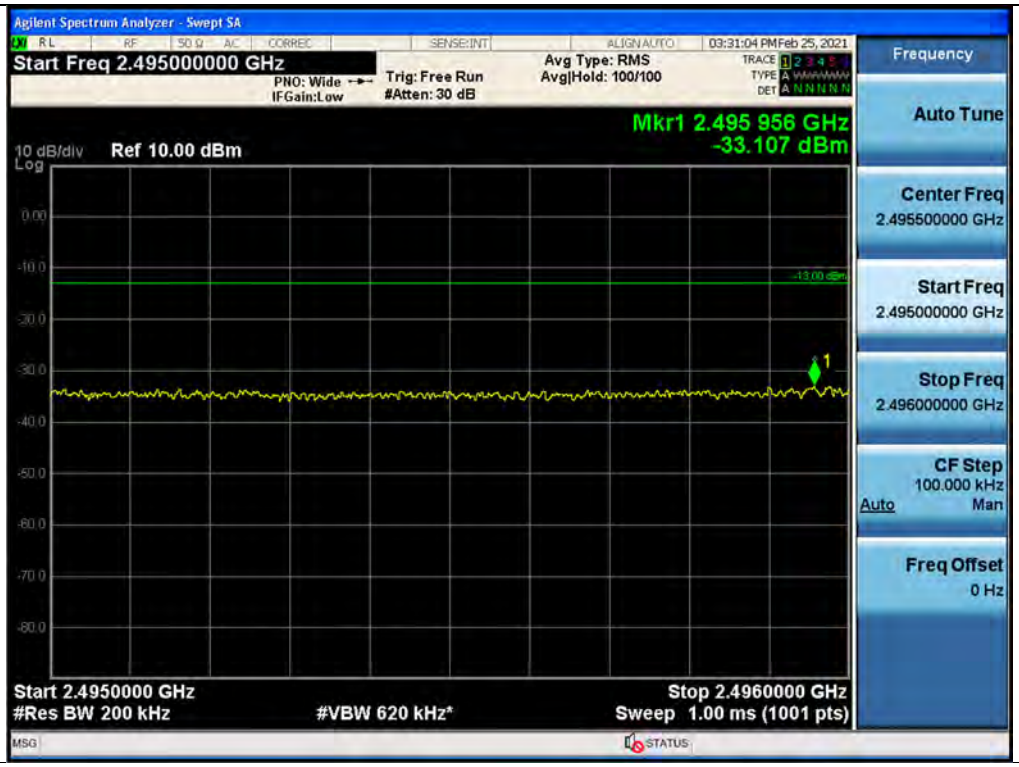
Out-of-band (single test signals) / Simultaneous / WCS / Downlink / Lower



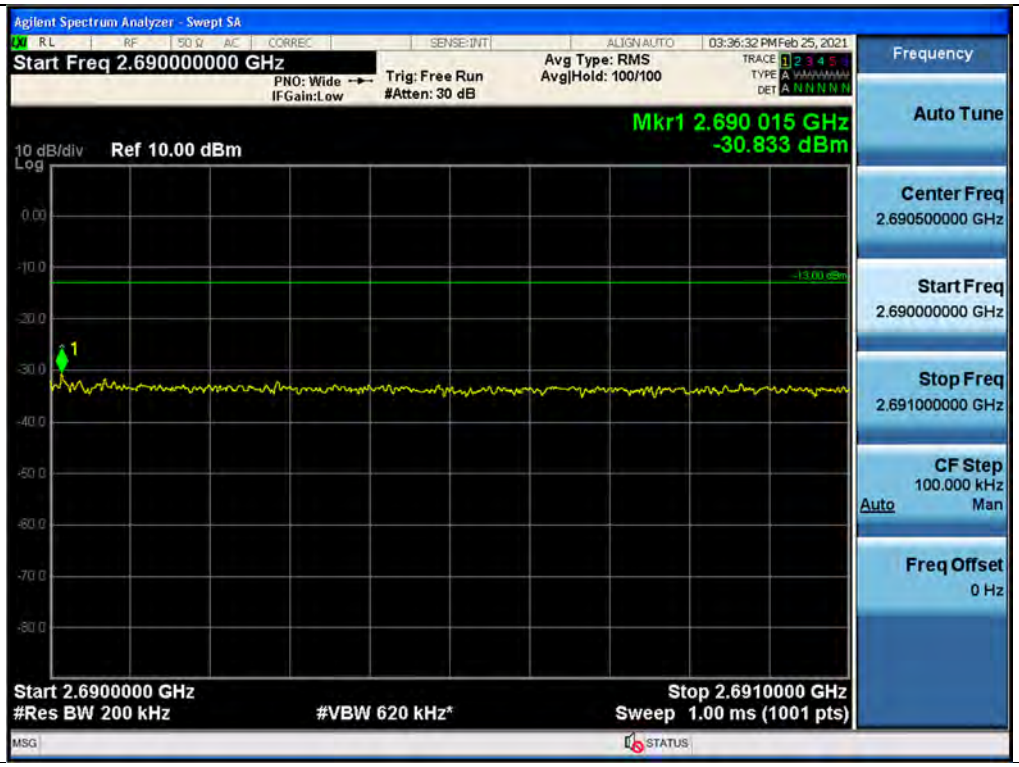
Out-of-band (single test signals) / Simultaneous / WCS / Downlink / Upper



Out-of-band (single test signals) / Simultaneous / BRS/EBS / Downlink / Lower



Out-of-band (single test signals) / Simultaneous / BRS/EBS / Downlink / Upper

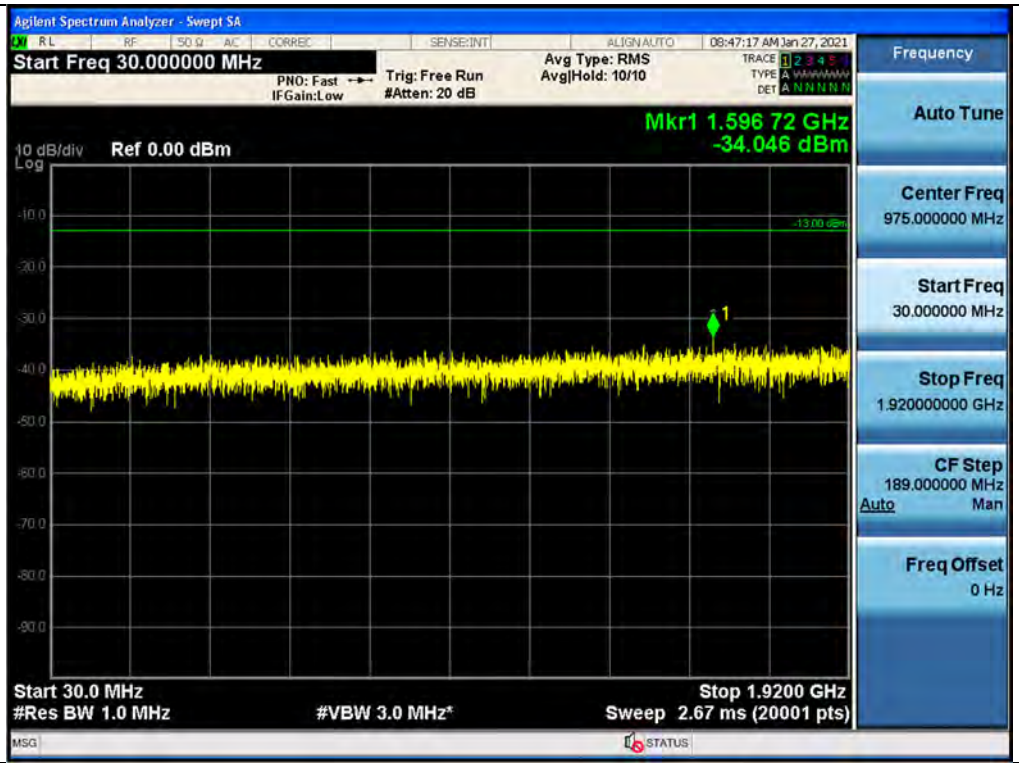


Plot data of Spurious Emissions

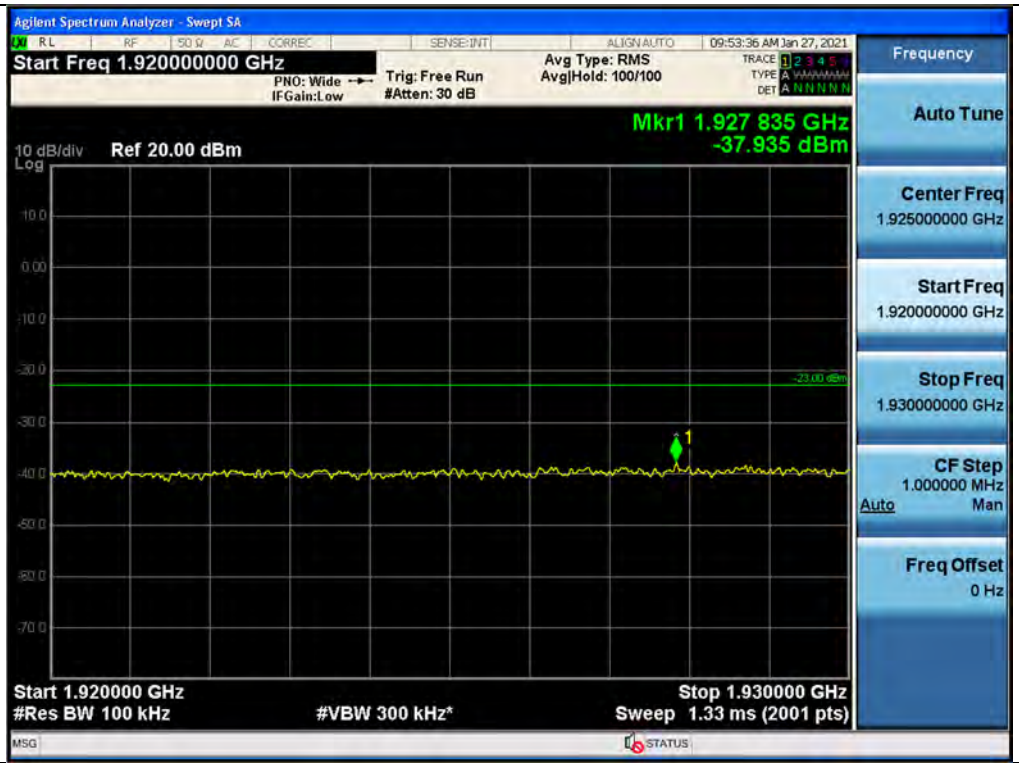
Spurious / Broadband PCS / Downlink / WCDMA / High / 9 kHz ~ 150 kHz

Spurious / Broadband PCS / Downlink / LTE 20 MHz / Middle / 150 kHz ~ 30 MHz

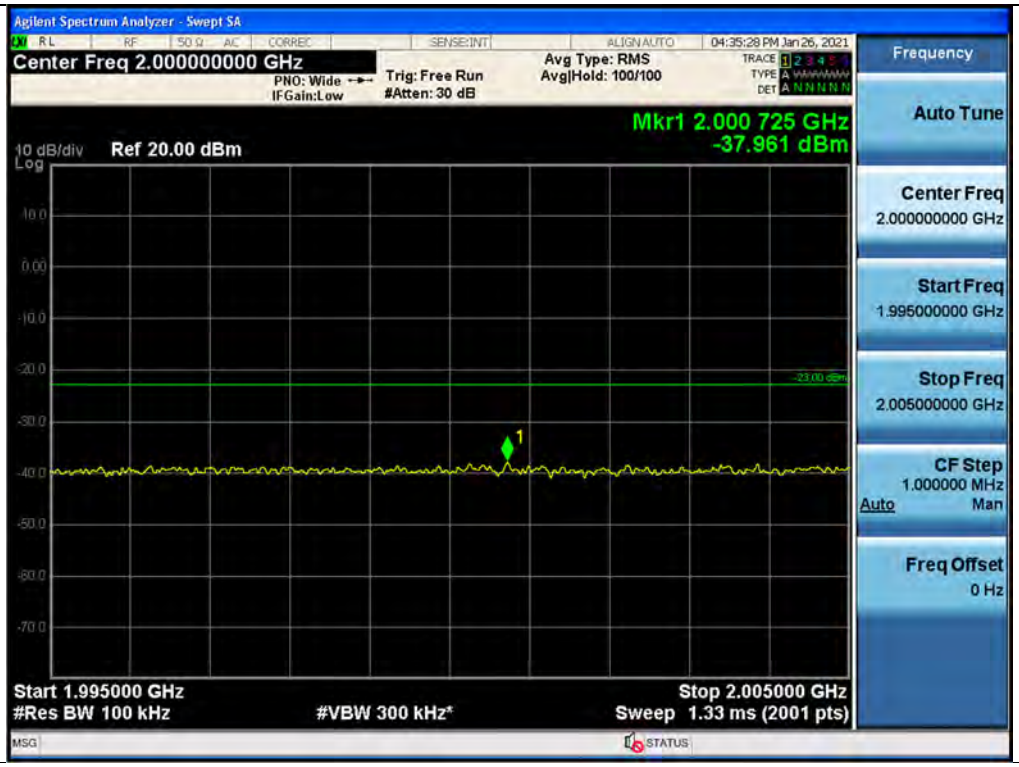
Spurious / Broadband PCS / Downlink / LTE 20 MHz / High / 30 MHz ~ Low Edge - 10 MHz



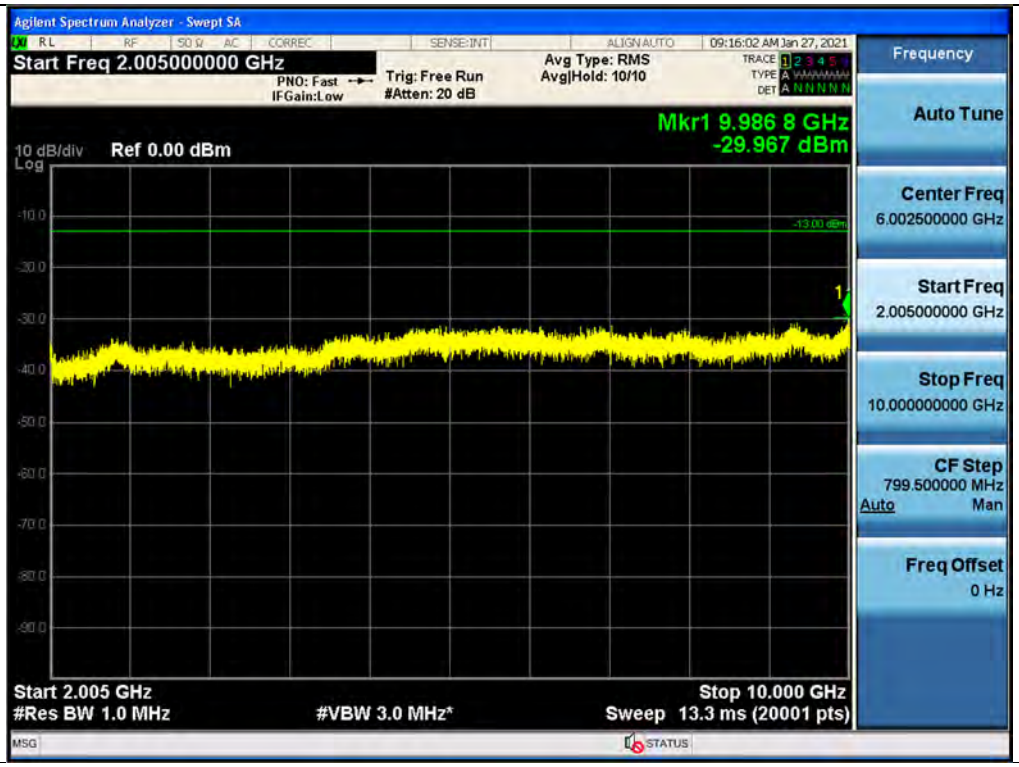
Spurious / Broadband PCS / Downlink / GSM / Middle / Low Edge - 10 MHz ~ Low Edge



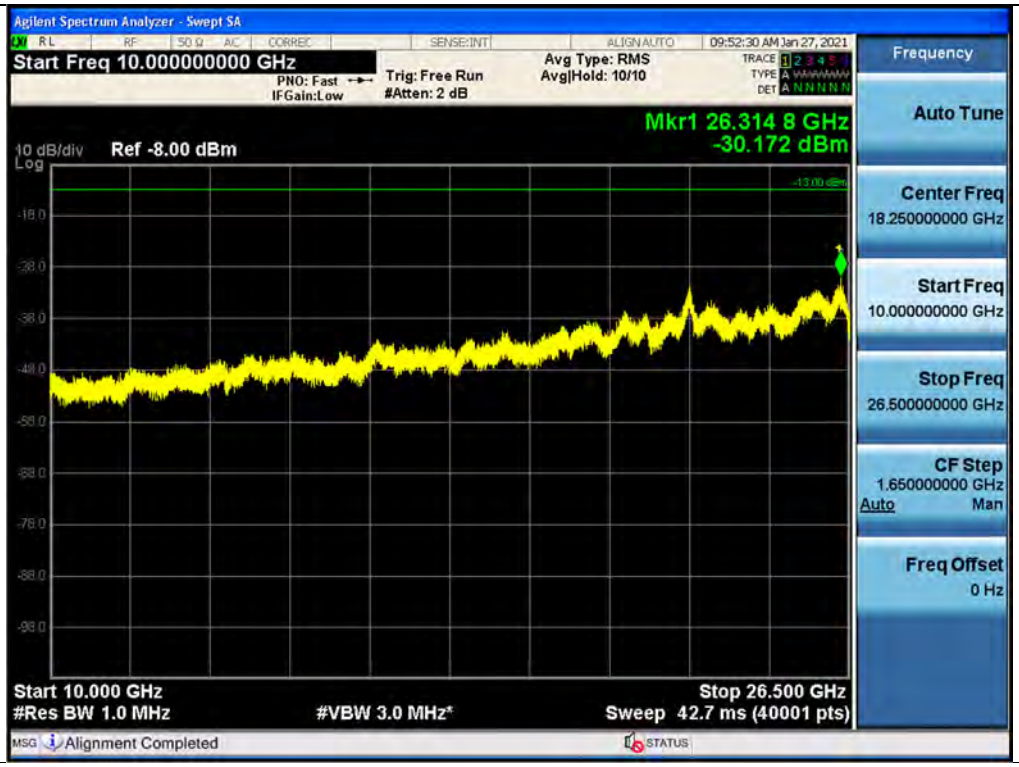
Spurious / Broadband PCS / Downlink / CDMA / Low / High Edge ~ High Edge + 10 MHz



Spurious / Broadband PCS / Downlink / LTE 5 MHz / Low / High Edge + 10 MHz ~ 2 GHz

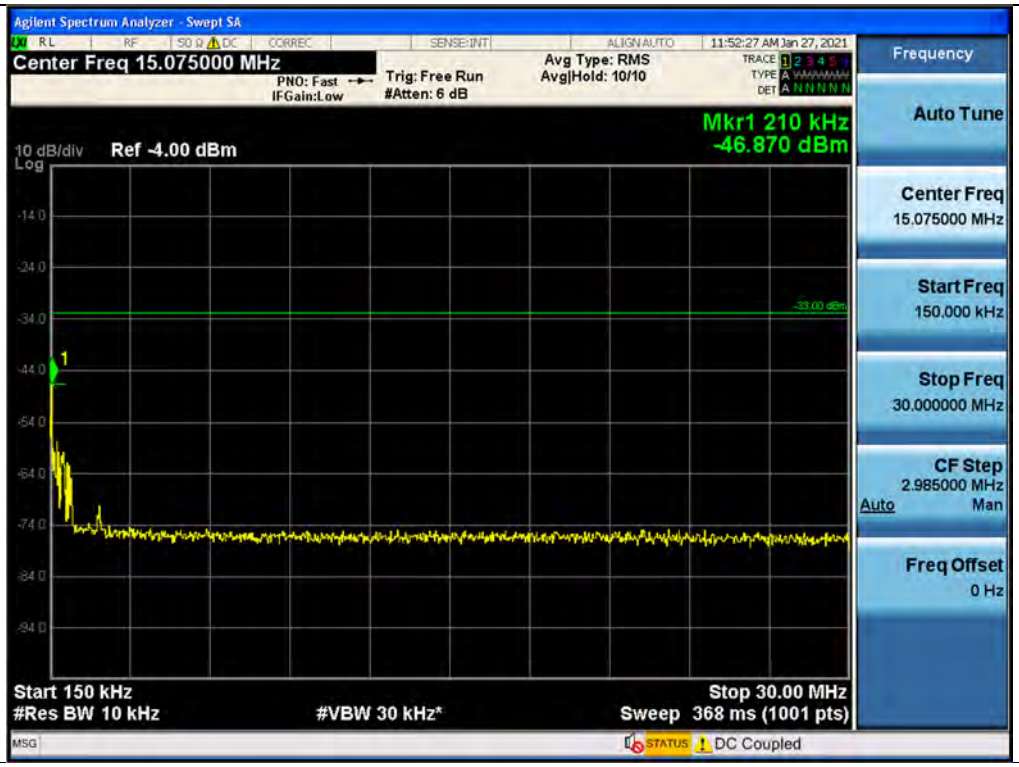


Spurious / Broadband PCS / Downlink / GSM / Low / 2 GHz ~ 4 GHz

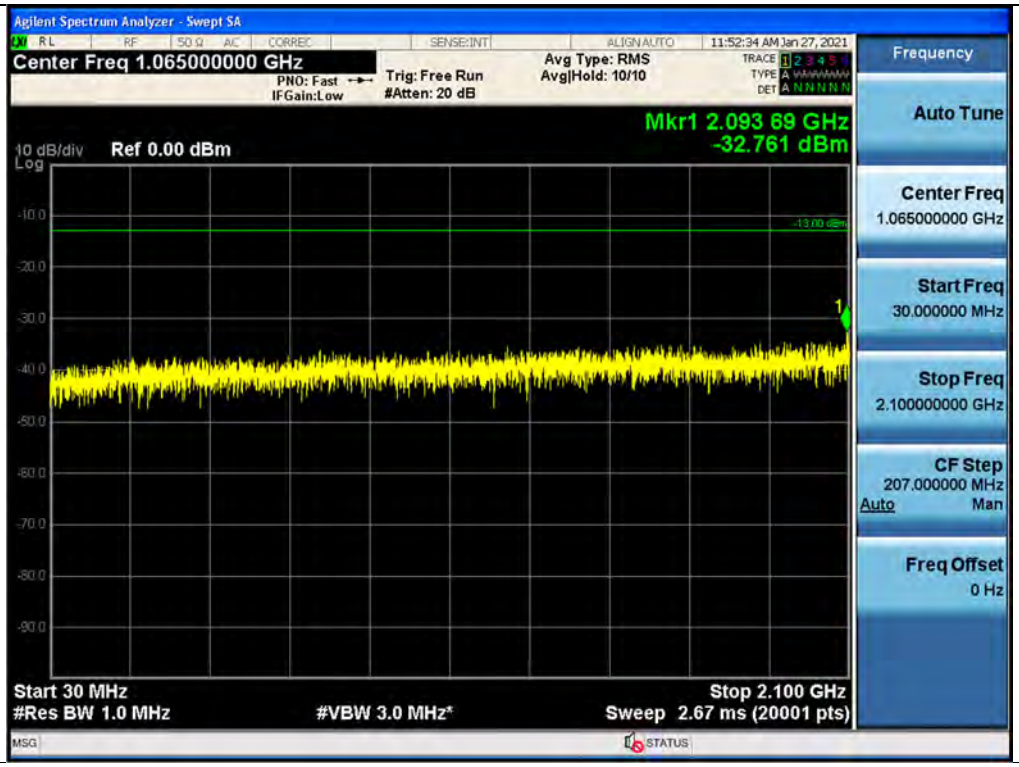


Spurious / AWS13 / Downlink / LTE 20 MHz / Middle / 9 kHz ~ 150 kHz

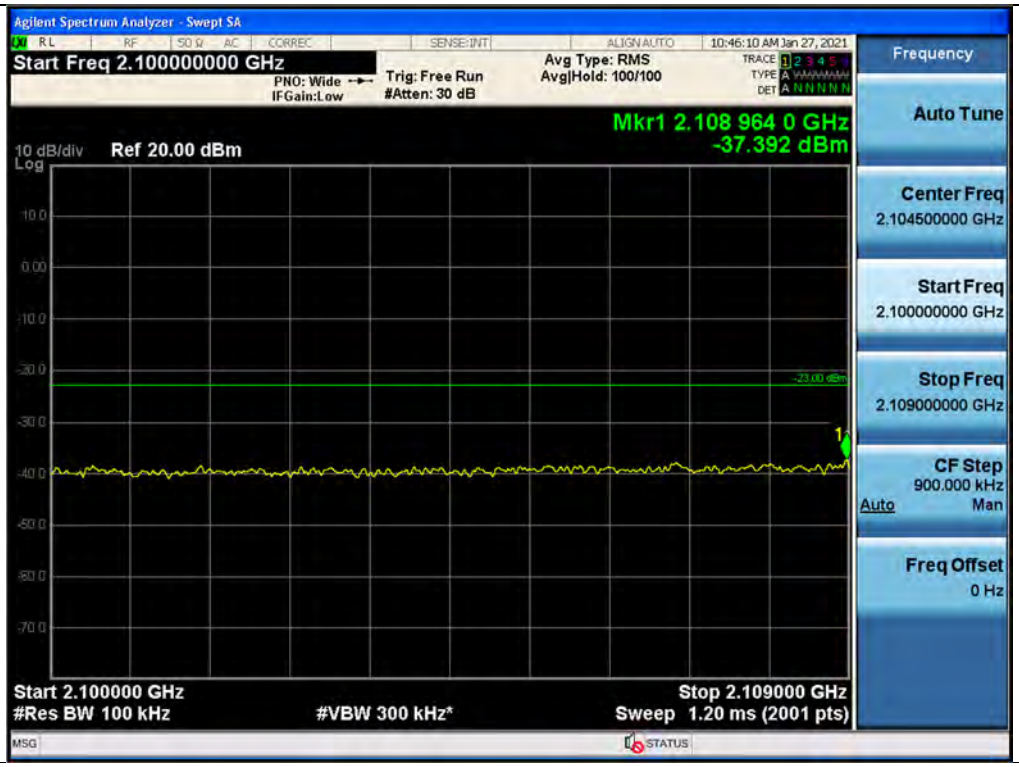
Spurious / AWS13 / Downlink / LTE 20 MHz / High / 150 kHz ~ 30 MHz



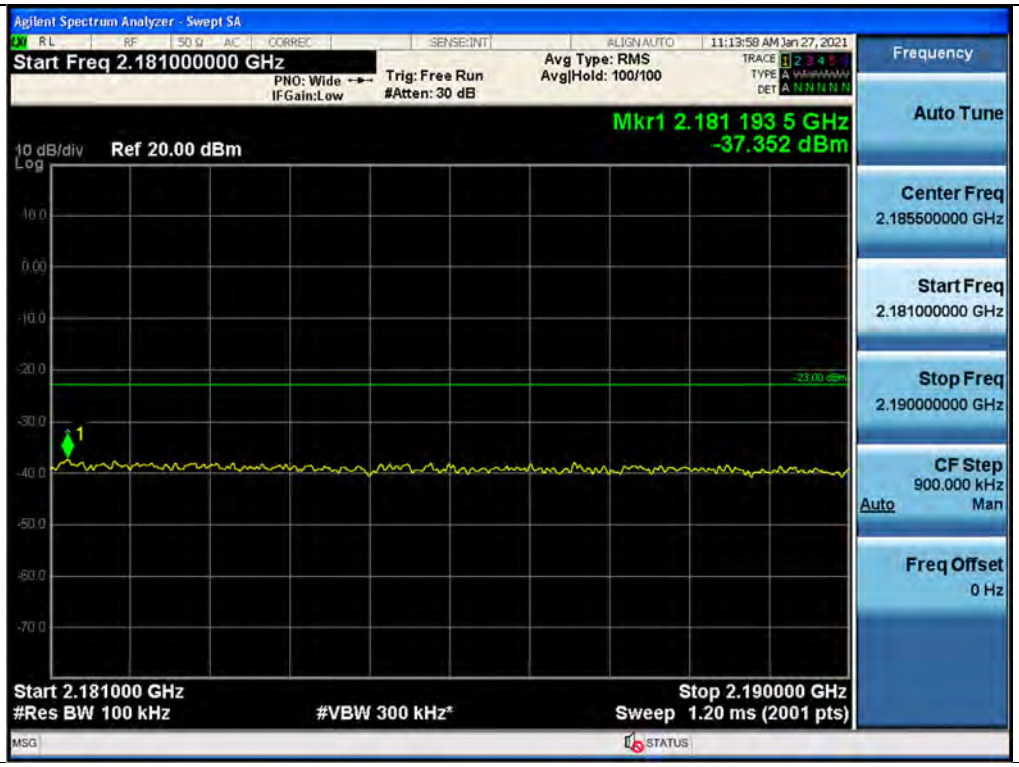
Spurious / AWS13 / Downlink / LTE 20 MHz / High / 30 MHz ~ Low Edge - 10 MHz



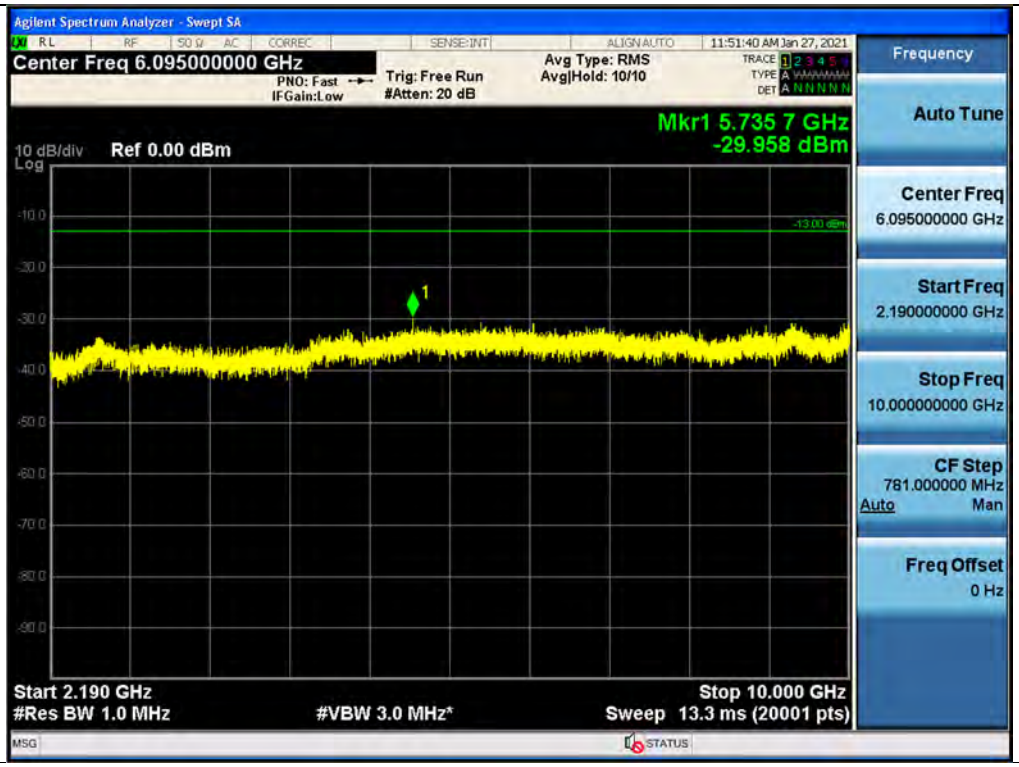
Spurious / AWS13 / Downlink / LTE 5 MHz / Low / Low Edge - 10 MHz ~ Low Edge



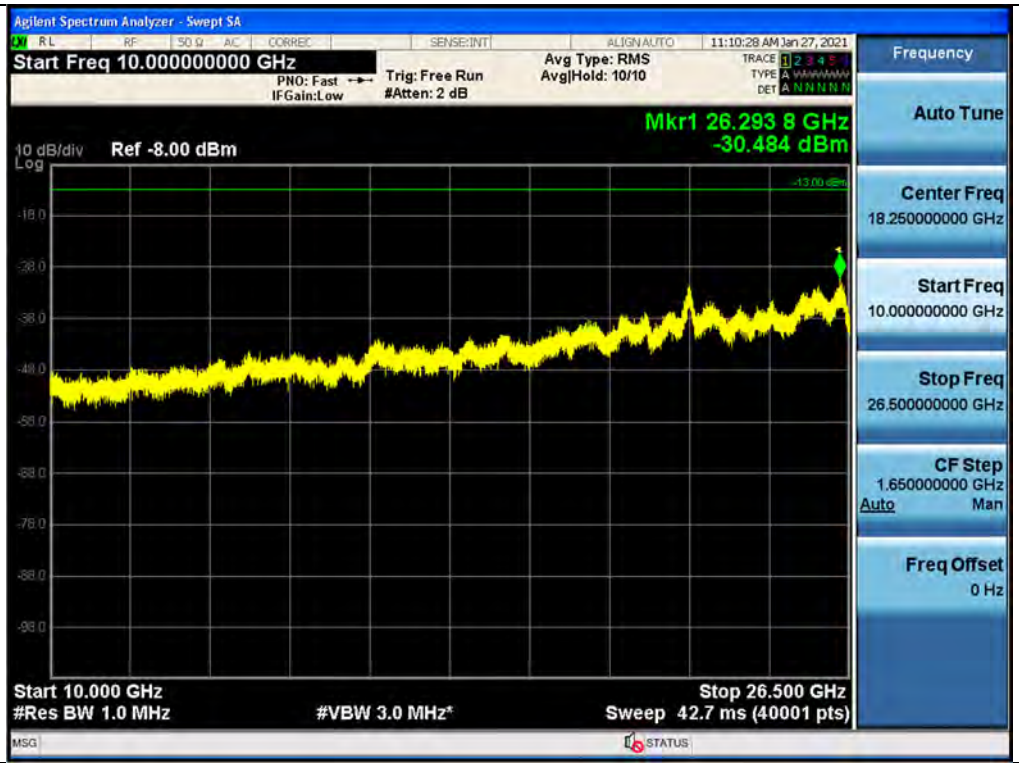
Spurious / AWS13 / Downlink / LTE 10 MHz / High / High Edge ~ High Edge + 10 MHz



Spurious / AWS13 / Downlink / LTE 20 MHz / Middle / High Edge + 10 MHz ~ 2 GHz

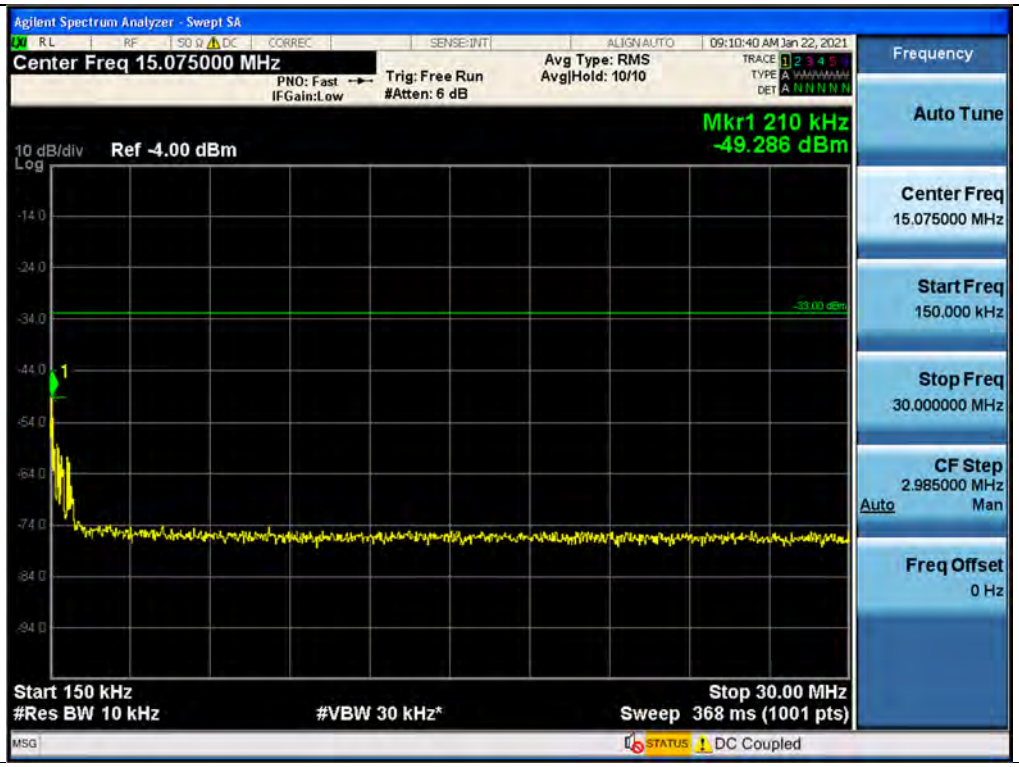


Spurious / AWS13 / Downlink / LTE 10 MHz / Low / 2 GHz ~ 4 GHz

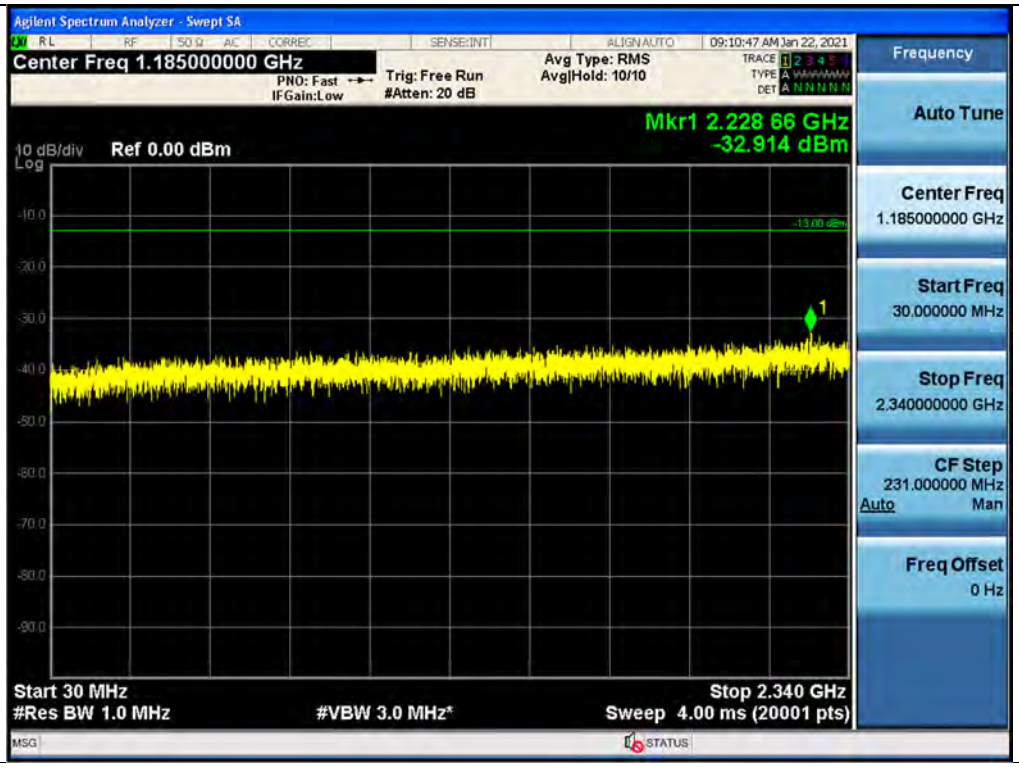


Spurious / WCS / Downlink / LTE 5 MHz / Low / 9 kHz ~ 150 kHz

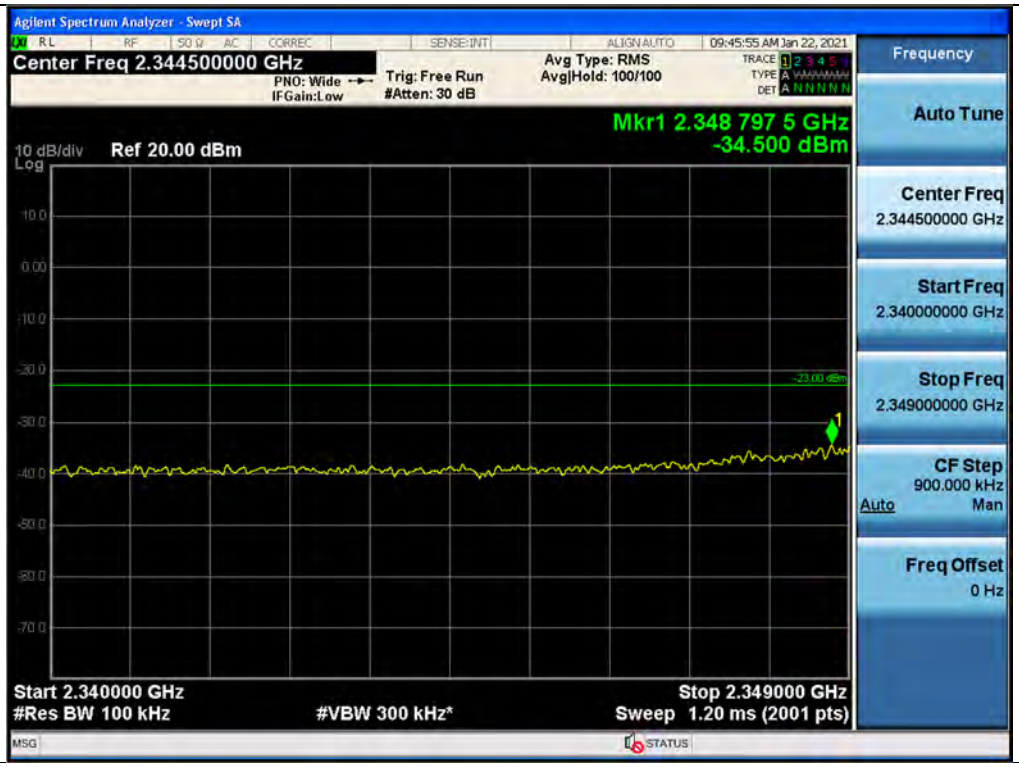
Spurious / WCS / Downlink / LTE 5 MHz / Middle / 150 kHz ~ 30 MHz



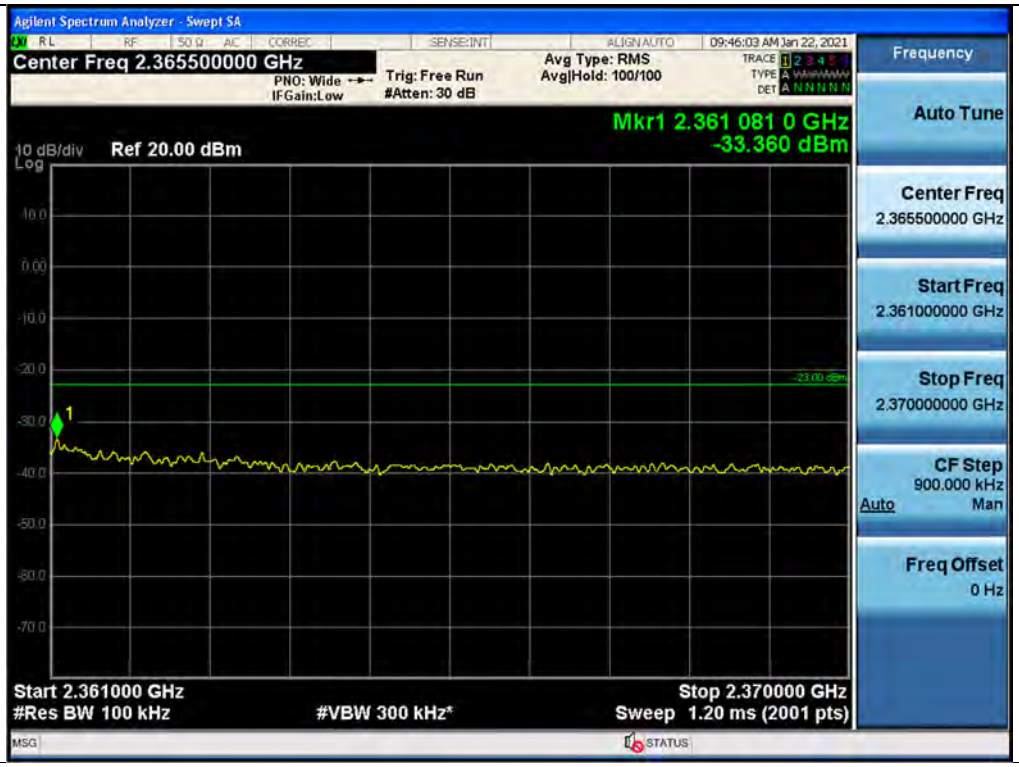
Spurious / WCS / Downlink / LTE 5 MHz / Middle / 30 MHz ~ Low Edge - 10 MHz



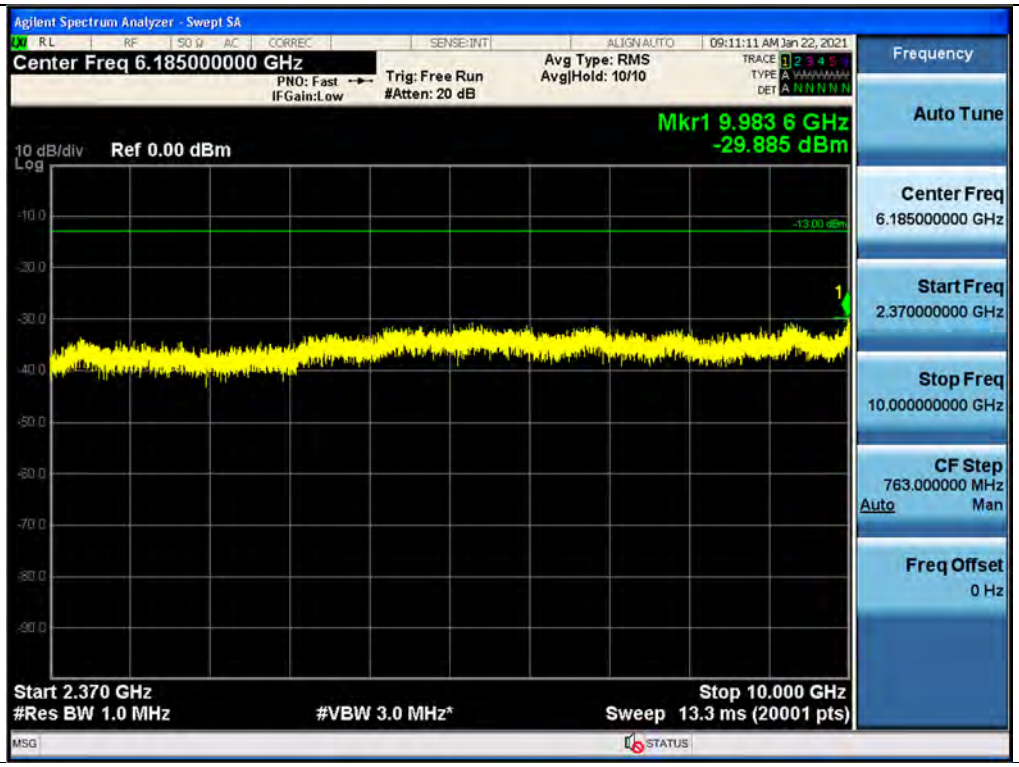
Spurious / WCS / Downlink / LTE 10 MHz / Middle / Low Edge - 10 MHz ~ Low Edge



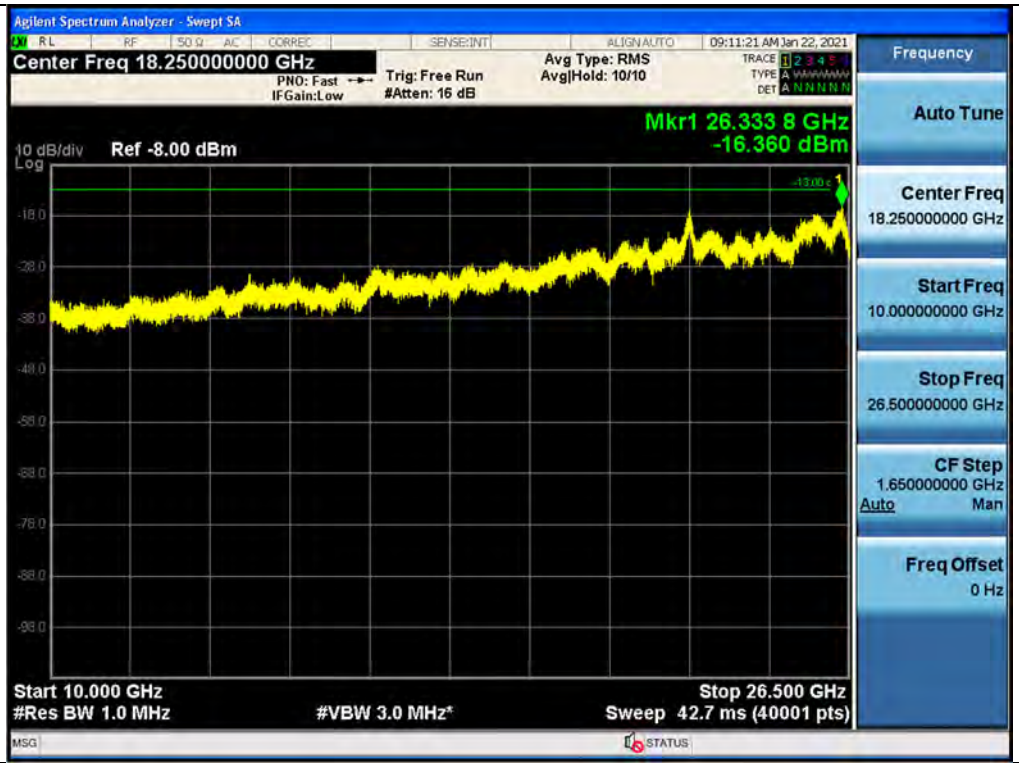
Spurious / WCS / Downlink / LTE 10 MHz / Middle / High Edge ~ High Edge + 10 MHz



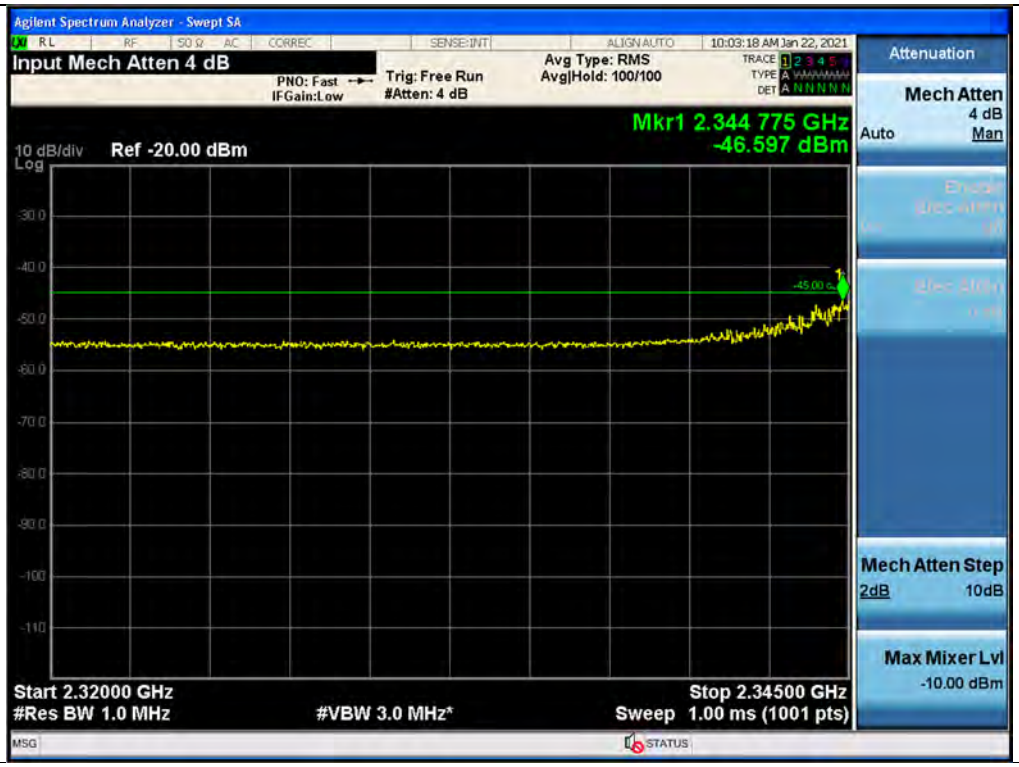
Spurious / WCS / Downlink / LTE 5 MHz / Middle / High Edge + 10 MHz ~ 2 GHz



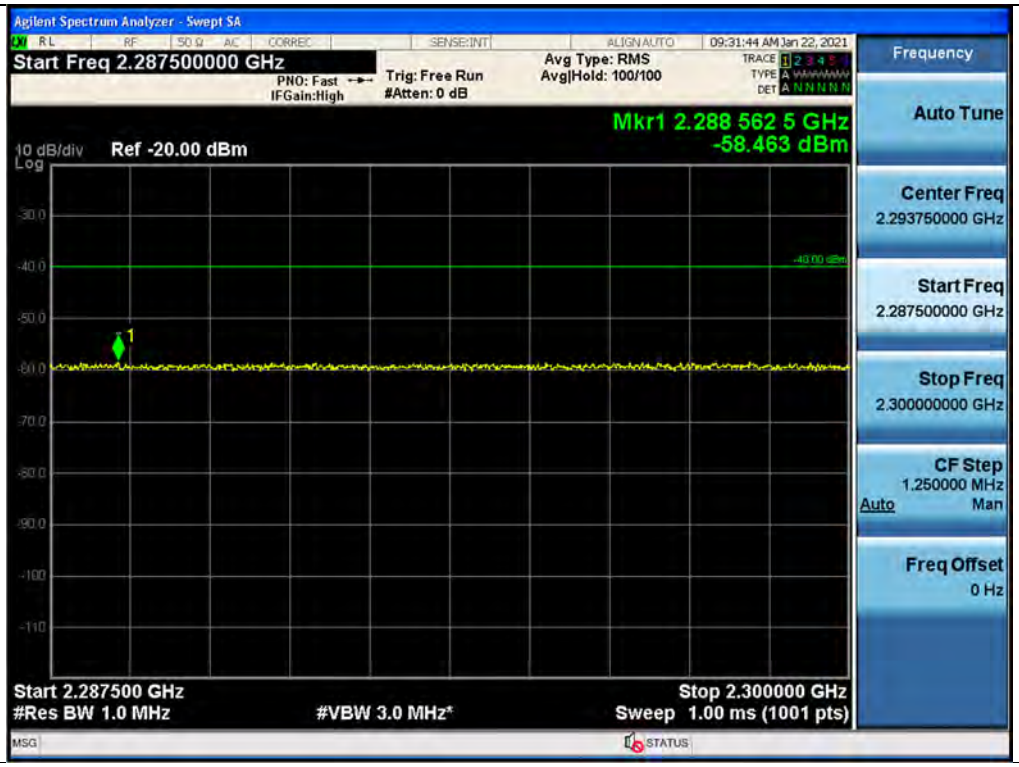
Spurious / WCS / Downlink / LTE 5 MHz / Middle / 2 GHz ~ 4 GHz



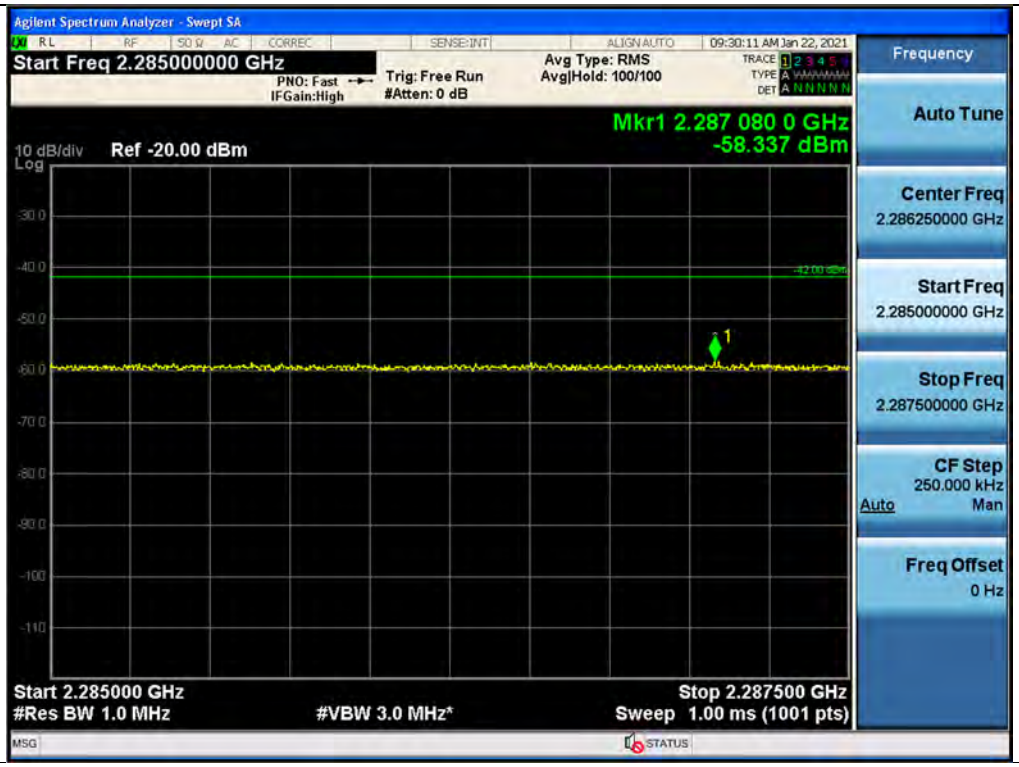
Spurious / WCS / Downlink / LTE 10 MHz / Middle / Additional Band 1 / 2320 MHz ~ 2345 MHz



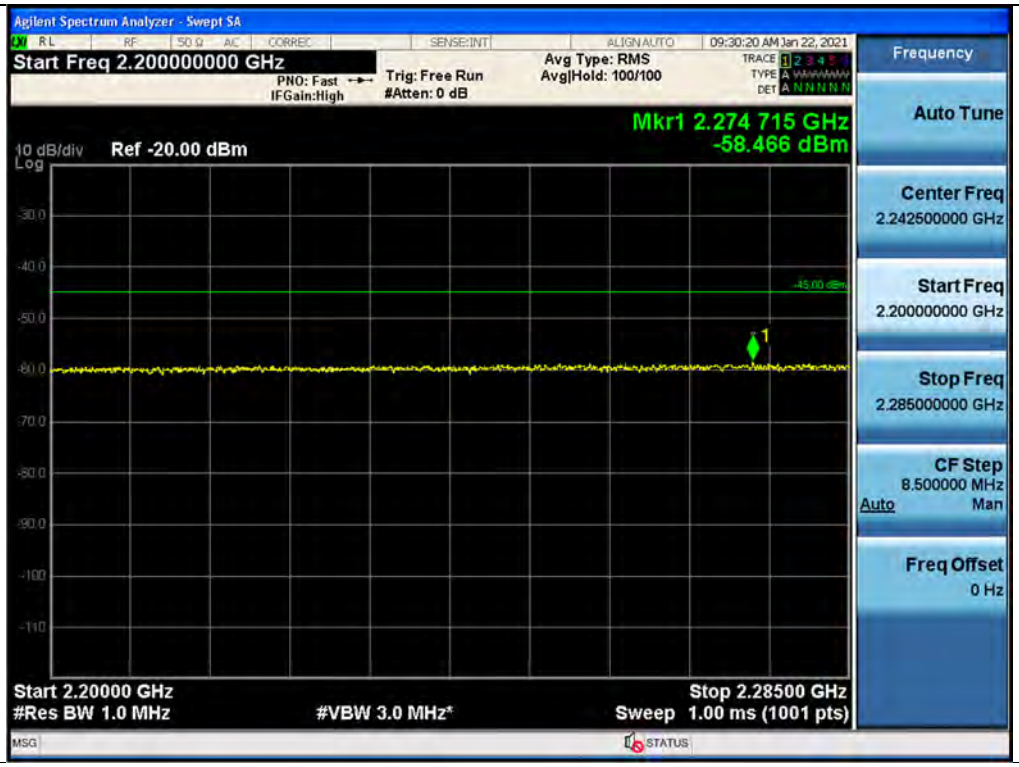
Spurious / WCS / Downlink / LTE 5 MHz / Middle / Additional Band 2 / 2287.5 MHz ~ 2300 MHz



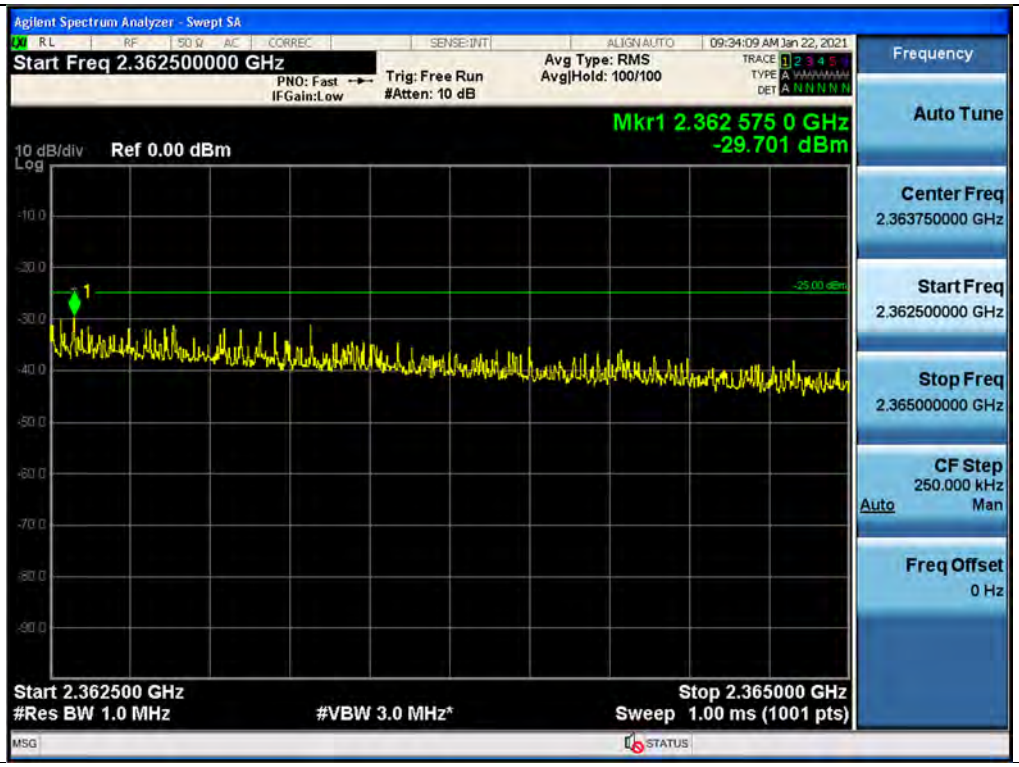
Spurious / WCS / Downlink / LTE 5 MHz / Low / Additional Band 3 / 2285 MHz ~ 2287.5 MHz



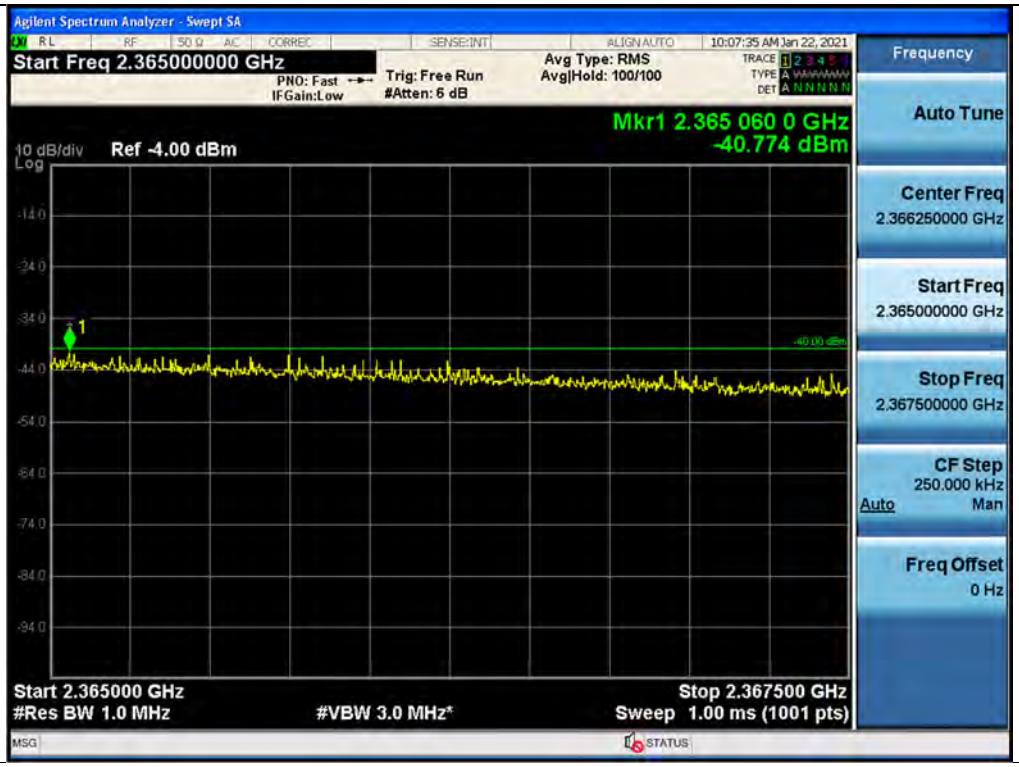
Spurious / WCS / Downlink / LTE 5 MHz / Low / Additional Band 4 / 2200 MHz ~ 2285 MHz



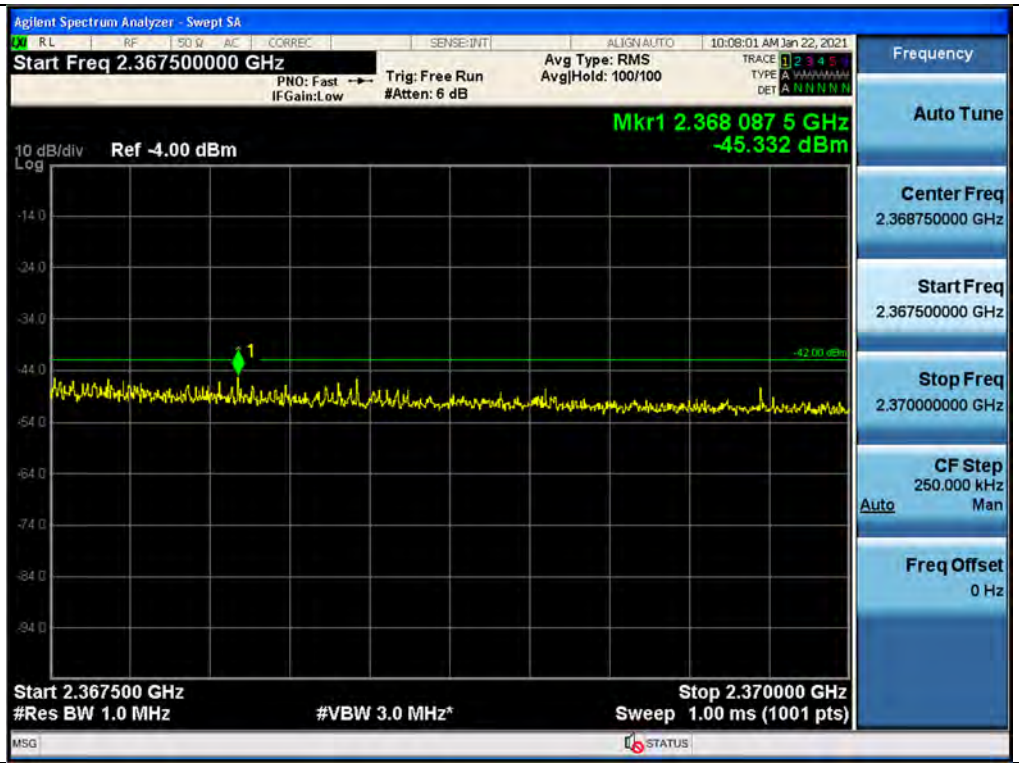
Spurious / WCS / Downlink / LTE 5 MHz / High / Additional Band 5 / 2362.5 MHz ~ 2365 MHz



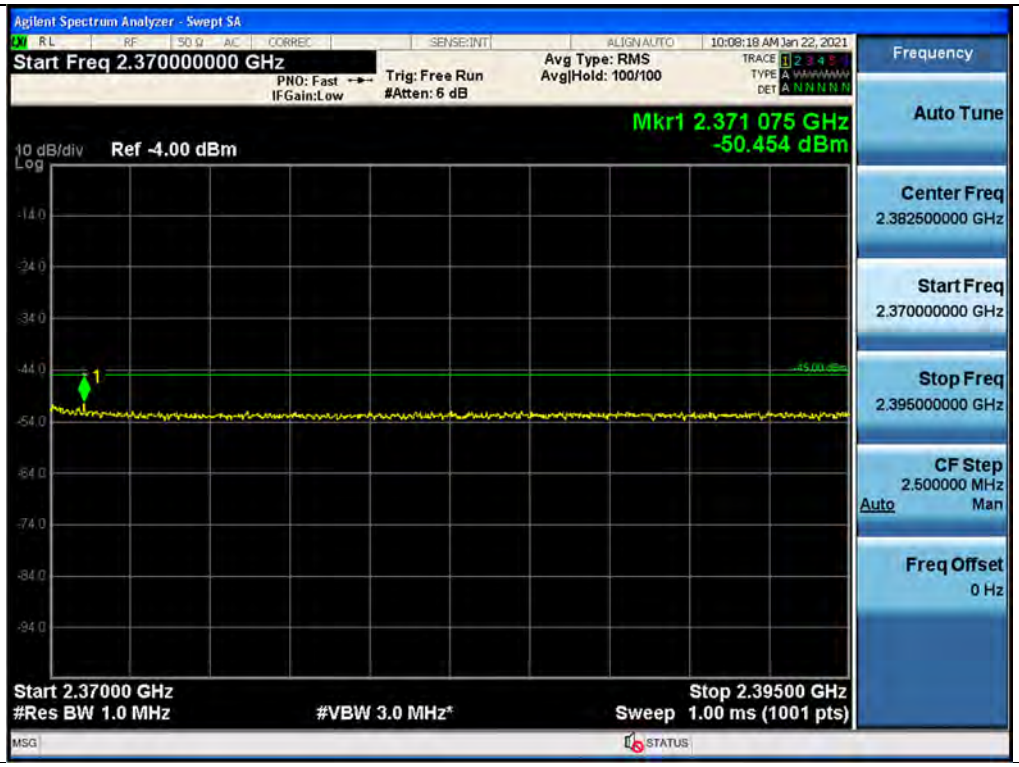
Spurious / WCS / Downlink / LTE 10 MHz / Middle / Additional Band 6 / 2365 MHz ~ 2367.5 MHz



Spurious / WCS / Downlink / LTE 10 MHz / Middle / Additional Band 7 / 2367.5 MHz ~ 2370 MHz

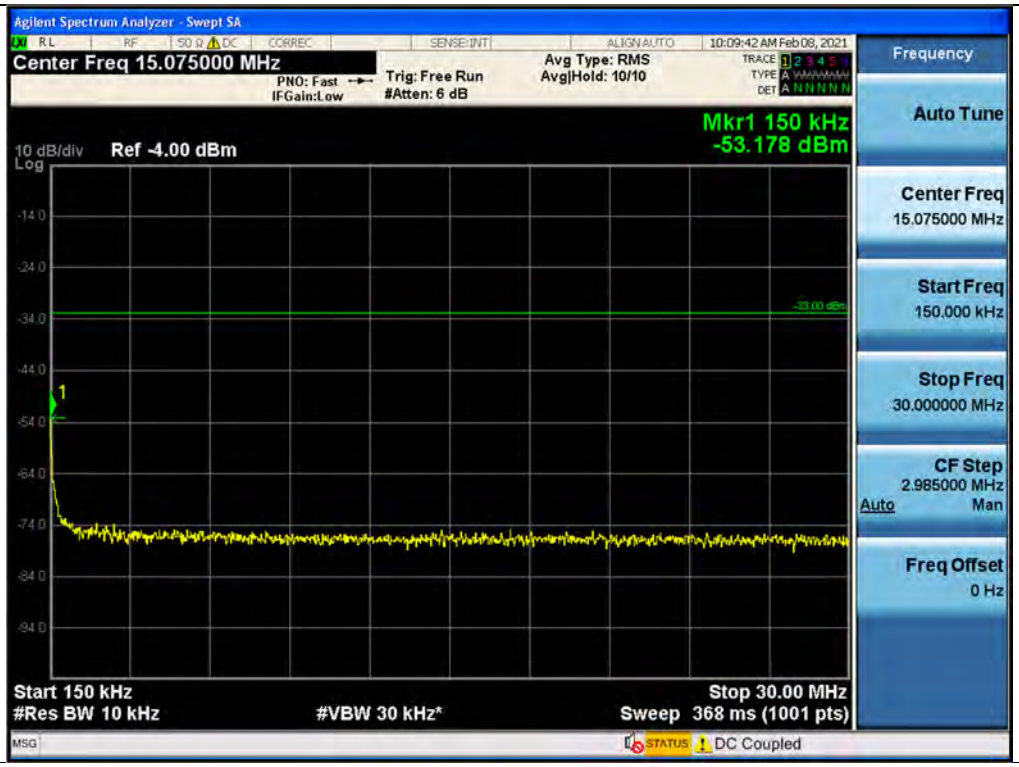


Spurious / WCS / Downlink / LTE 10 MHz / Middle / Additional Band 8 / 2370 MHz ~ 2395 MHz

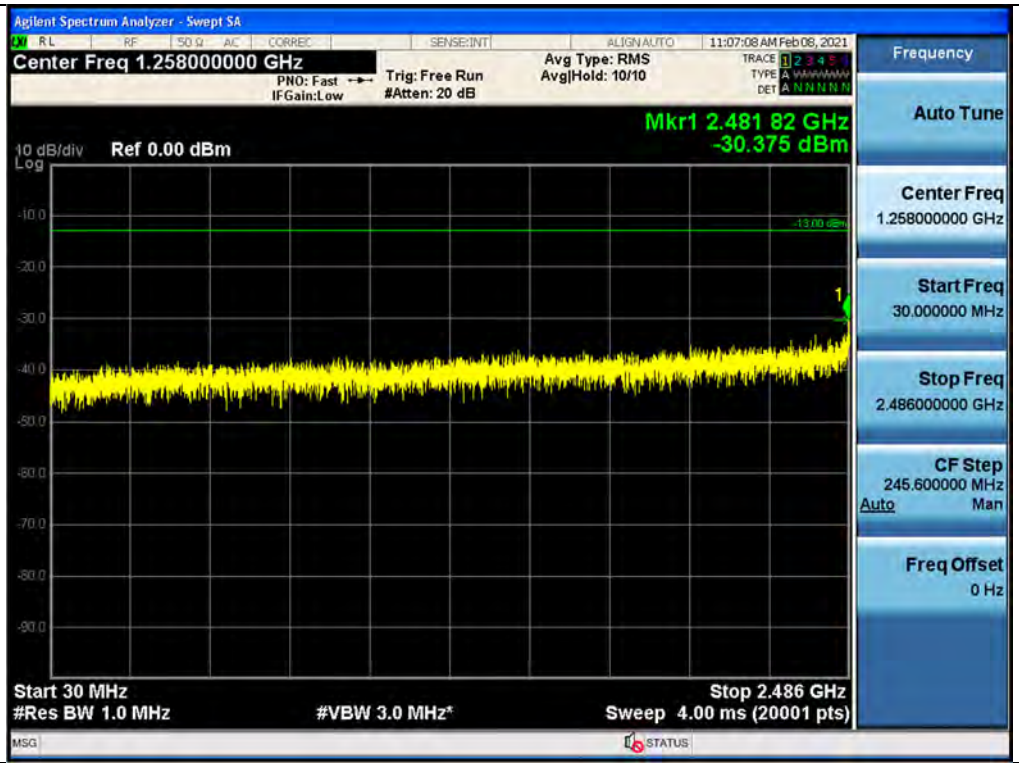


Spurious / BRS/EBS / Downlink / 5G NR 80 MHz / Low / 9 kHz ~ 150 kHz

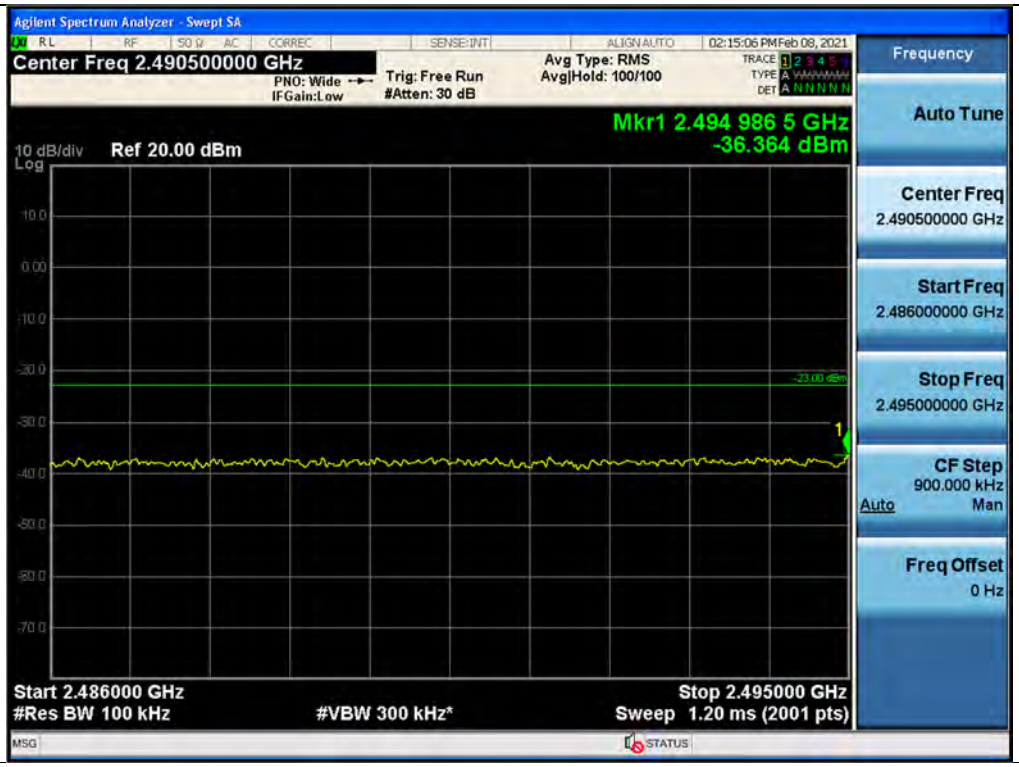
Spurious / BRS/EBS / Downlink / LTE 20 MHz / Low / 150 kHz ~ 30 MHz



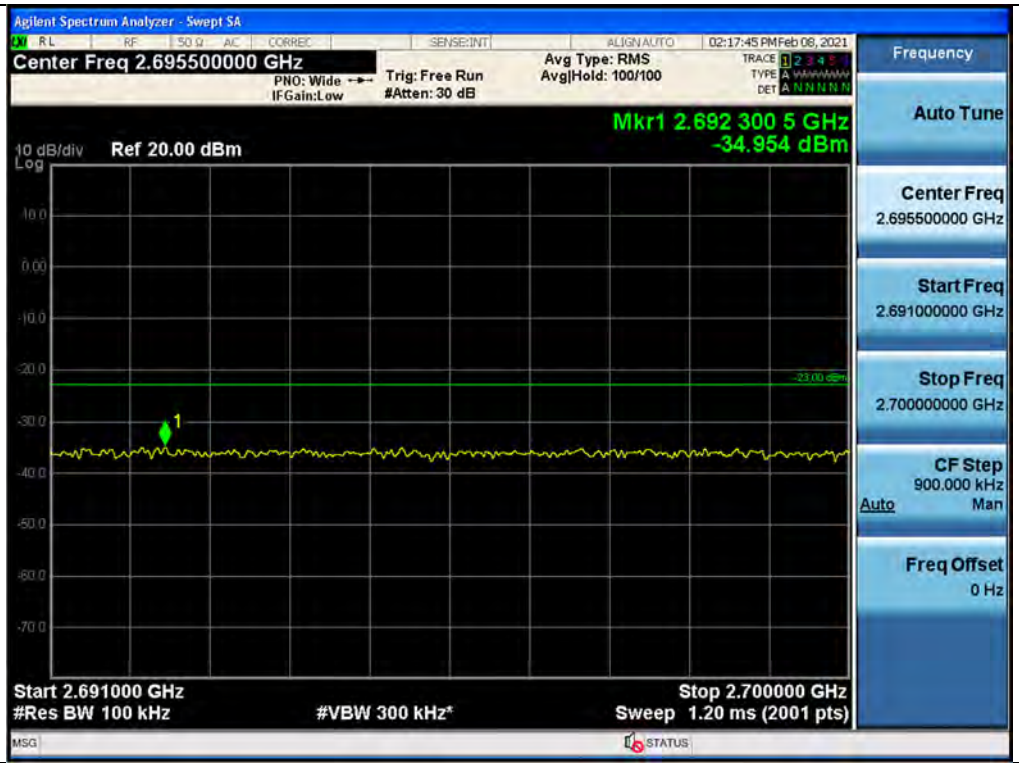
Spurious / BRS/EBS / Downlink / 5G NR 20 MHz / Low / 30 MHz ~ Low Edge - 10 MHz



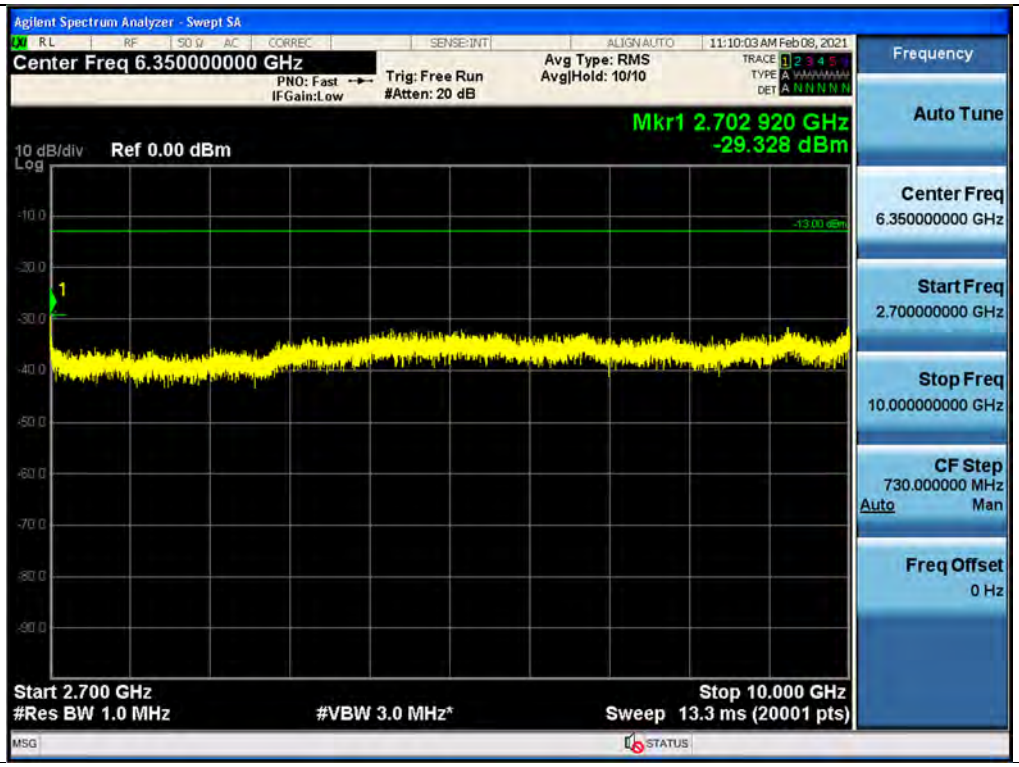
Spurious / BRS/EBS / Downlink / 5G NR 80 MHz / Low / Low Edge - 10 MHz ~ Low Edge



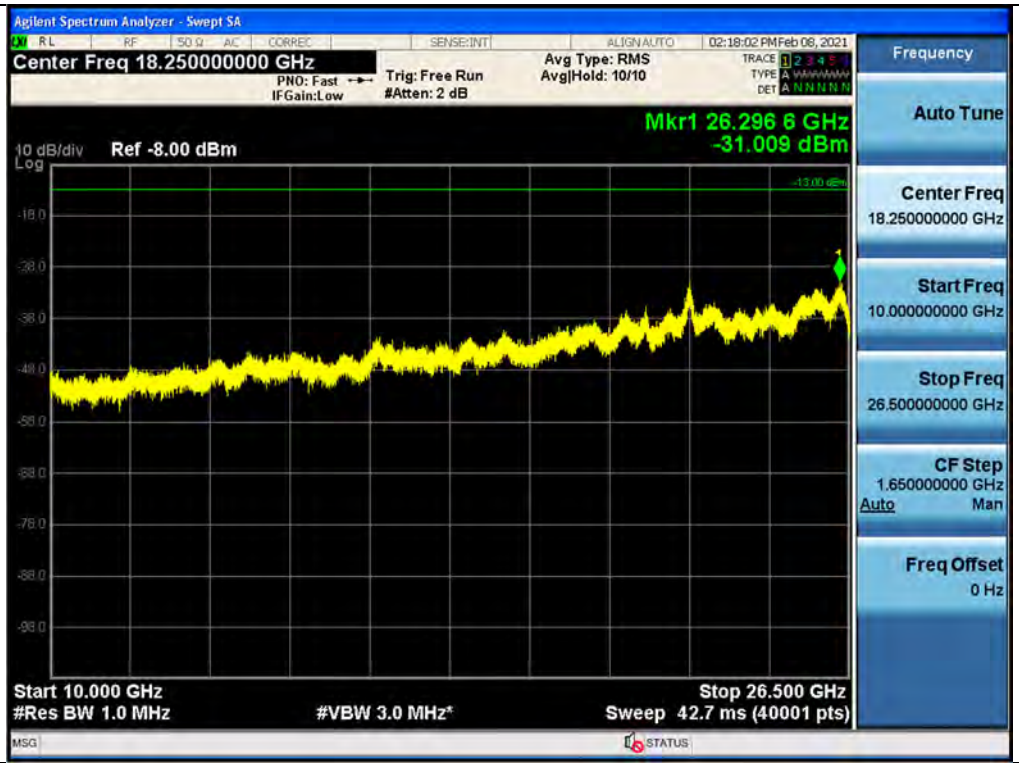
Spurious / BRS/EBS / Downlink / 5G NR 80 MHz / High / High Edge ~ High Edge + 10 MHz



Spurious / BRS/EBS / Downlink / 5G NR 20 MHz / High / High Edge + 10 MHz ~ 2 GHz



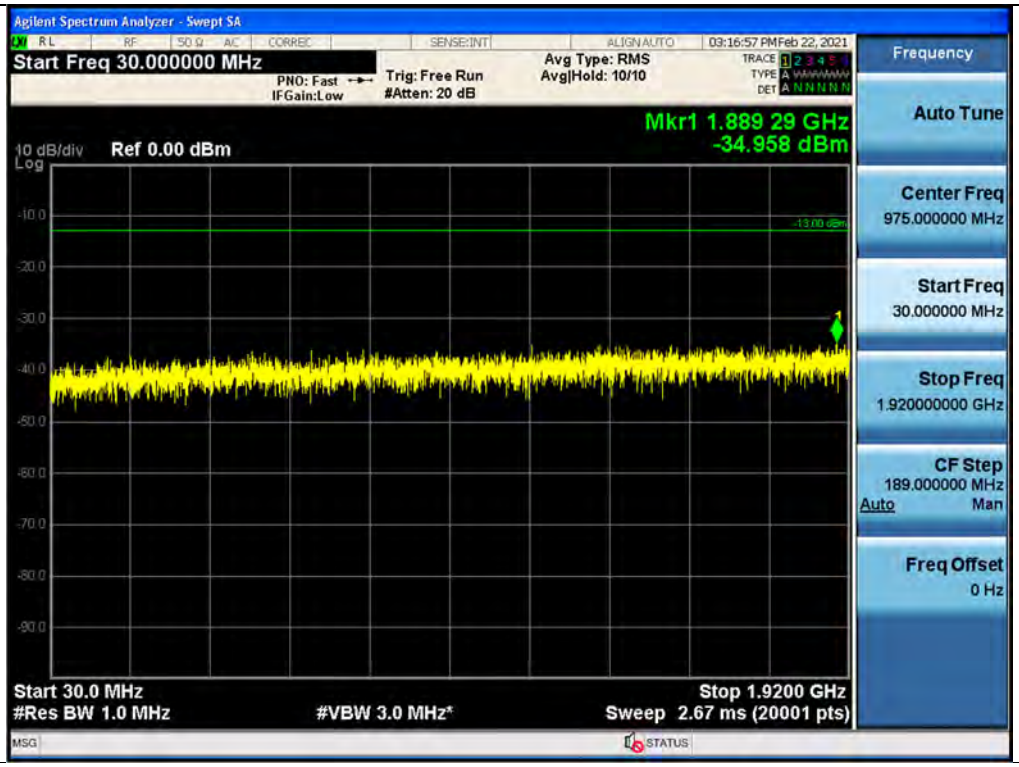
Spurious / BRS/EBS / Downlink / 5G NR 80 MHz / High / 2 GHz ~ 4 GHz



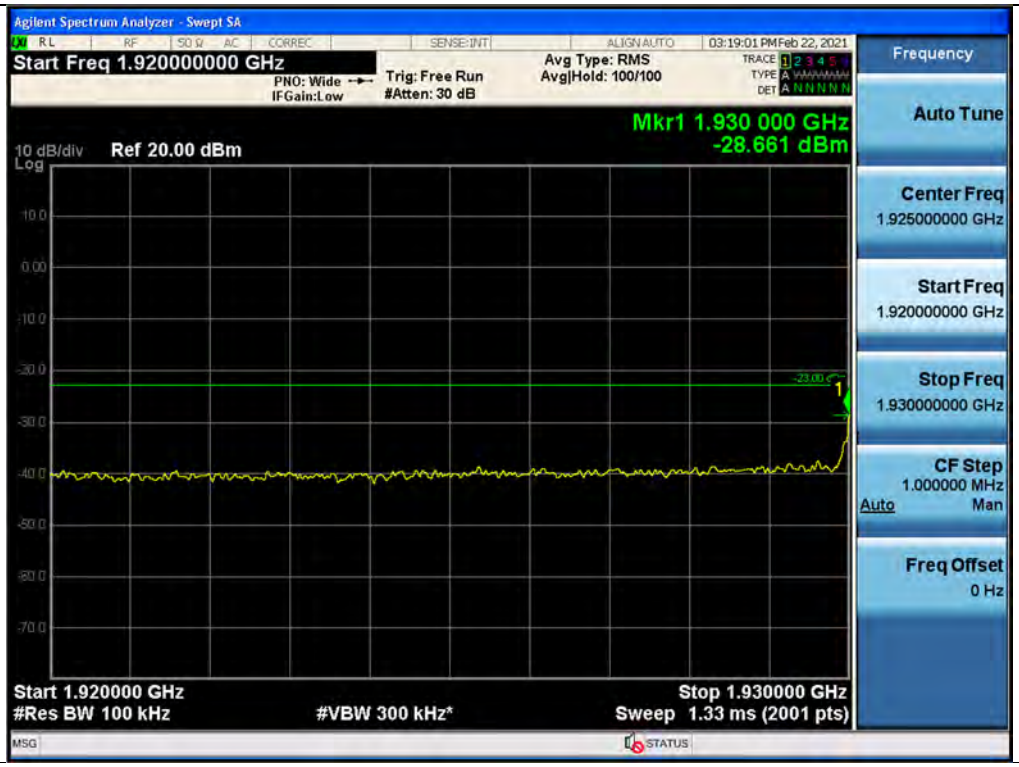
Spurious / Simultaneous / Downlink / 9 kHz ~ 150 kHz

Spurious / Simultaneous / Downlink / 150 kHz ~ 30 MHz

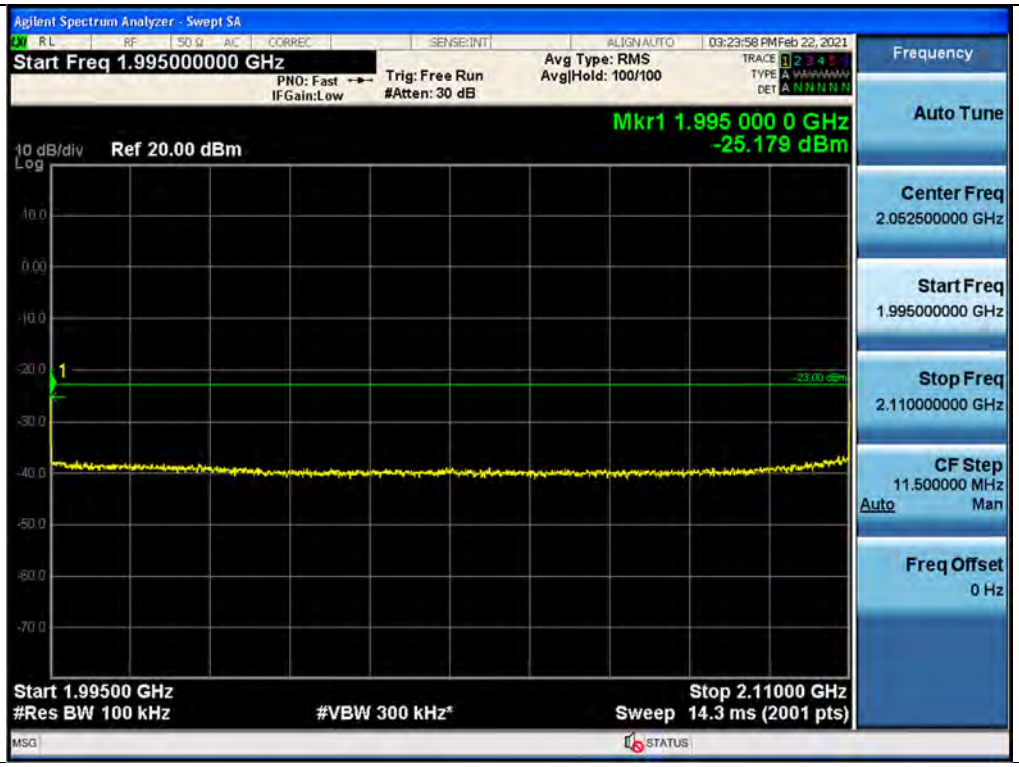
Spurious / Simultaneous / Downlink / 30 MHz ~ 1920 MHz



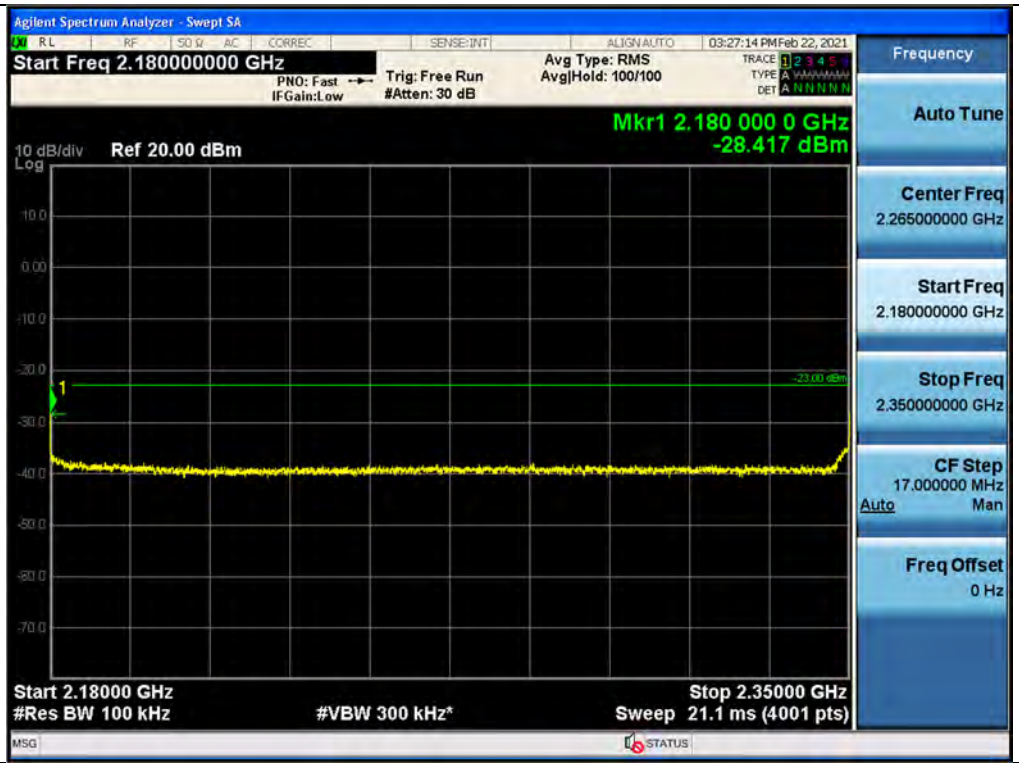
Spurious / Simultaneous / Downlink / 1920 MHz ~1930 MHz



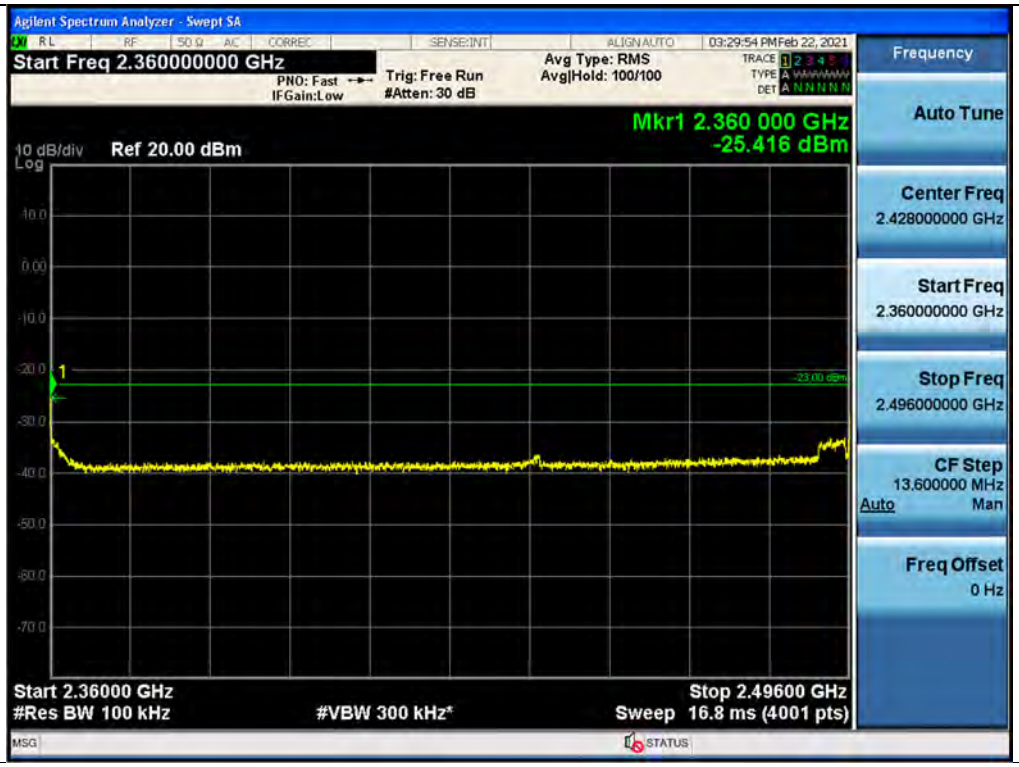
Spurious / Simultaneous / Downlink / 1995 MHz ~ 2110 MHz



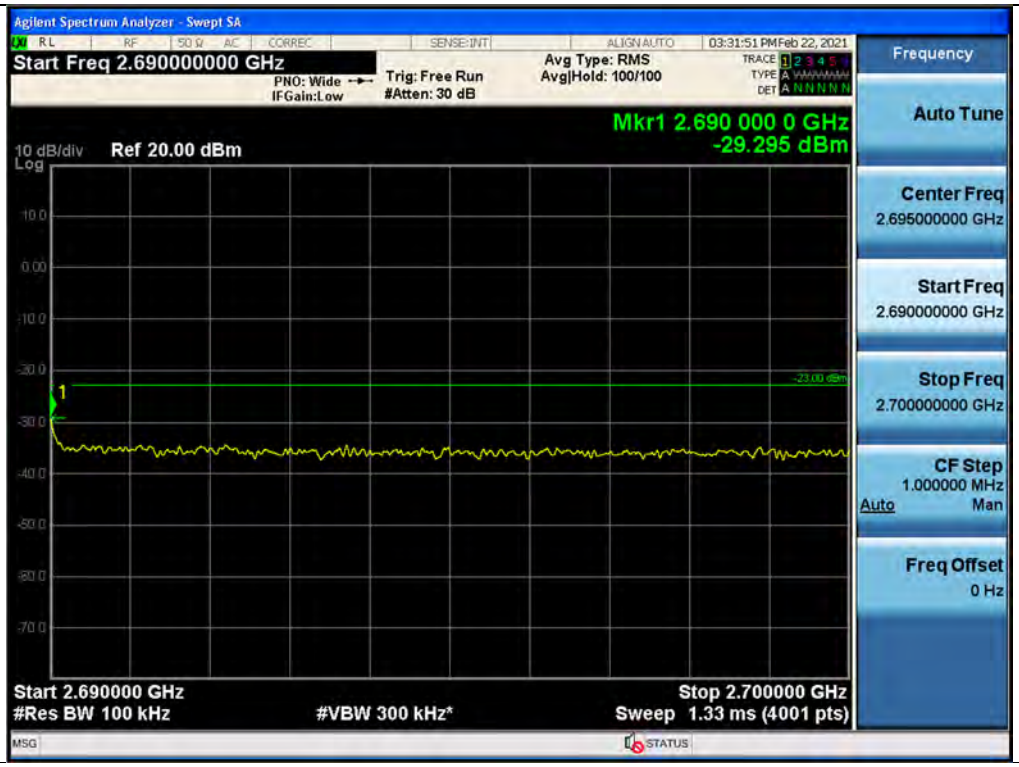
Spurious / Simultaneous / Downlink / 2180 MHz ~ 2350 MHz



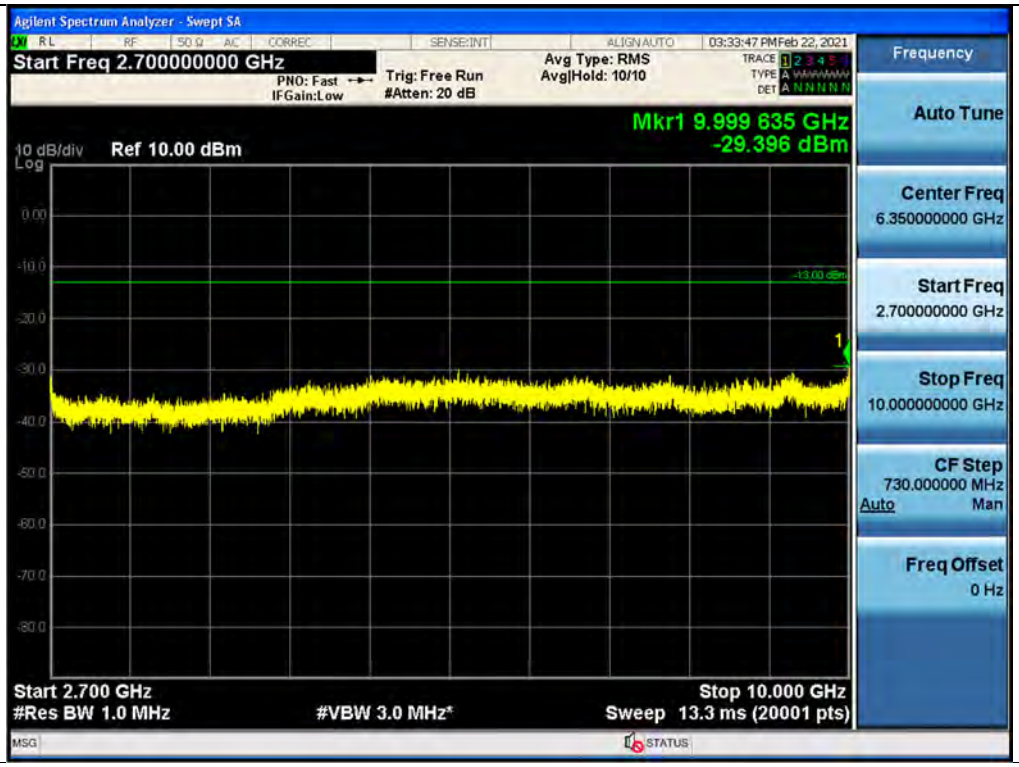
Spurious / Simultaneous / Downlink / 2360 MHz ~ 2496 MHz



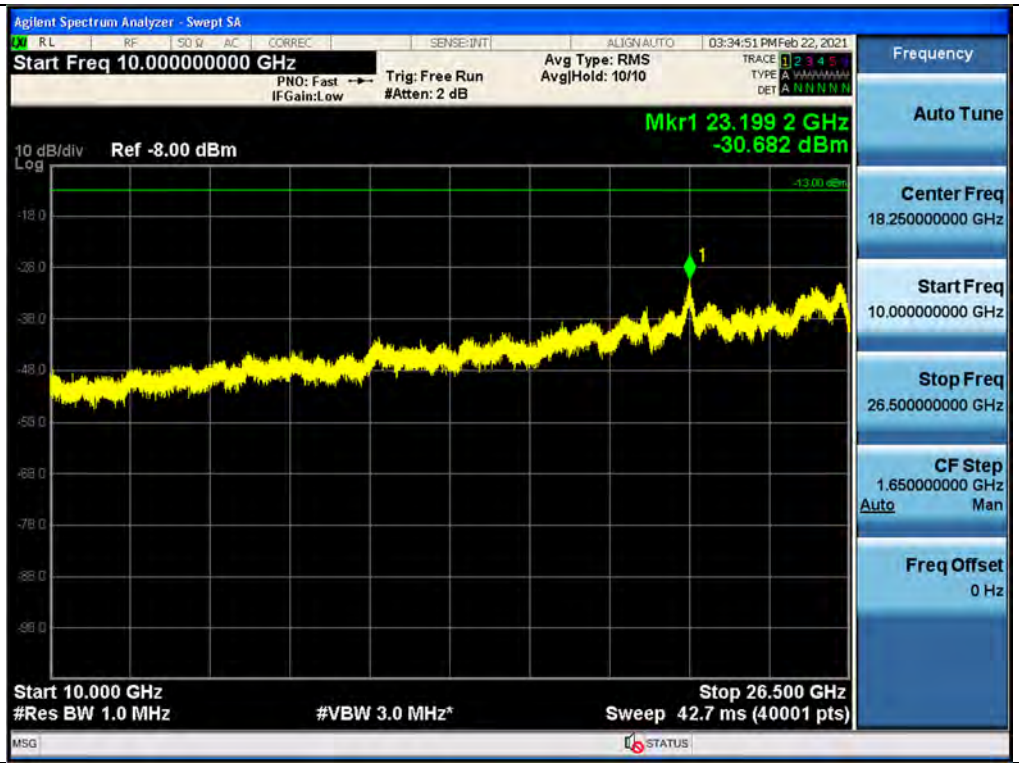
Spurious / Simultaneous / Downlink / 2690 MHz ~ 2700 MHz



Spurious / Simultaneous / Downlink / 2700 MHz ~ 10 GHz



Spurious / Simultaneous / Downlink / 10 GHz ~ 26.5 GHz



5.6. RADIATED SPURIOUS EMISSIONS

Test Requirements:

§ 2.1053 Measurements required: Field strength of spurious radiation.

(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of § 2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.

(b) The measurements specified in paragraph (a) of this section shall be made for the following equipment:

(1) Those in which the spurious emissions are required to be 60 dB or more below the mean power of the transmitter.

(2) All equipment operating on frequencies higher than 25 MHz.

(3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.

(4) Other types of equipment as required, when deemed necessary by the Commission.

Test Procedures:

Because KDB 935210 D05 procedure does not provide this requirement, measurements were in accordance with the test methods section 5.5 of ANSI C63.26-2015

a) Place the EUT in the center of the turntable. The EUT shall be configured to transmit into the standard non-radiating load (for measuring radiated spurious emissions), connected with cables of minimal length unless specified otherwise. If the EUT uses an adjustable antenna, the antenna shall be positioned to the length that produces the worst case emission at the fundamental operating frequency.

b) Each emission under consideration shall be evaluated:

1) Raise and lower the measurement antenna in accordance 5.5.2, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.

2) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.

3) Return the turntable to the azimuth where the highest emission amplitude level was observed.

4) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.

5) Record the measured emission amplitude level and frequency using the appropriate RBW.

c) Repeat step b) for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.

Test Result:

Broadband PCS _ Downlink

Mode	Frequency (MHz)	Measured Level (dBuV)	Ant. Factor (dB/m)	A.G. + C.L.+ H.P.F. (dB)	Pol.	Measured Power (dBm)	Result (dBm/m)
GSM	4 623.62	47.00	30.80	27.54	V	-48.20	-44.940
CDMA	4 623.62	46.21	30.80	27.54	V	-48.99	-45.730
WCDMA	4 623.62	45.59	30.80	27.54	V	-49.61	-46.350
LTE 5 MHz	4 623.62	45.77	30.80	27.54	V	-49.43	-46.170
LTE 10 MHz	4 623.62	46.32	30.80	27.54	V	-48.88	-45.620
LTE 20 MHz	4 623.62	45.45	30.80	27.54	V	-49.75	-46.490

* C.L.: Cable Loss / A.G.: Amp. Gain / H.P.F.: High Pass Filter

AWS13_Downlink

Mode	Frequency (MHz)	Measured Level (dBuV)	Ant. Factor (dB/m)	A.G. + C.L.+ H.P.F. (dB)	Pol.	Measured Power (dBm)	Result (dBm/m)
CDMA	4 623.62	45.05	30.80	27.54	V	-50.15	-46.890
WCDMA	4 623.62	44.31	30.80	27.54	V	-50.89	-47.630
LTE 5 MHz	4 623.70	43.38	30.80	27.54	V	-51.82	-48.560
LTE 10 MHz	4 623.70	44.85	30.80	27.54	V	-50.35	-47.090
LTE 20 MHz	3 064.75	44.12	28.80	27.54	V	-51.08	-52.580

* C.L.: Cable Loss / A.G.: Amp. Gain / H.P.F.: High Pass Filter

WCS _ Downlink

Mode	Frequency (MHz)	Measured Level (dBuV)	Ant. Factor (dB/m)	A.G. + C.L.+ H.P.F. (dB)	Pol.	Measured Power (dBm)	Result (dBm/m)
LTE 5 MHz	4 623.70	44.88	30.80	27.54	V	-50.32	-47.060
LTE 10 MHz	4 623.70	45.62	30.80	27.54	V	-49.58	-46.320

* C.L.: Cable Loss / A.G.: Amp. Gain / H.P.F.: High Pass Filter

BRS/EBS _Downlink

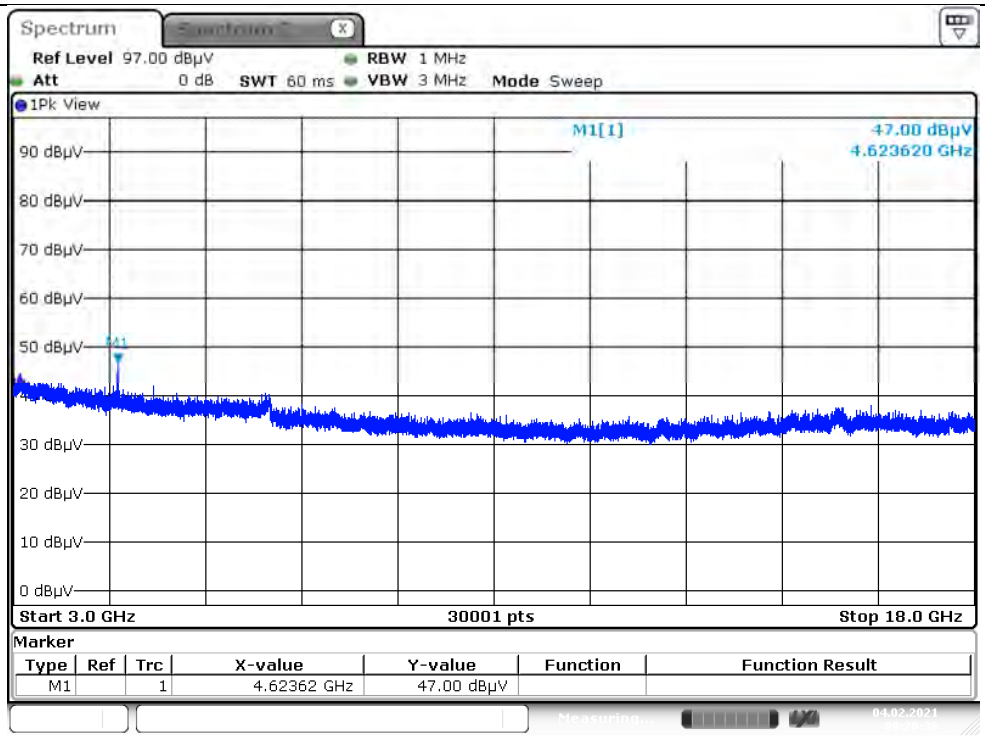
Mode	Frequency (MHz)	Measured Level (dBuV)	Ant. Factor (dB/m)	A.G. + C.L.+ H.P.F. (dB)	Pol.	Measured Power (dBm)	Result (dBm/m)
LTE 20 MHz	4 623.20	46.24	30.80	27.54	V	-48.96	-45.700
NR 20 MHz	4 623.20	45.86	30.80	27.54	V	-49.34	-46.080
NR 40 MHz	4 623.70	45.94	30.80	27.54	V	-49.26	-46.000
NR 60 MHz	4 623.20	46.69	30.80	27.54	V	-48.51	-45.250
NR 80 MHz	4 623.20	46.66	30.80	27.54	V	-48.54	-45.280
NR 100 MHz	4 623.70	46.72	30.80	27.54	V	-48.48	-45.220

* C.L.: Cable Loss / A.G.: Amp. Gain / H.P.F.: High Pass Filter

Note1. We have done horizontal and vertical polarization in detecting antenna.
Note2. The amplitude of the spurious domain emission attenuated by more than 20 dB over the permissible value was not recorded according to ANSI C63.26, clause 5.1.1., c).
Note3. Test data were only the worst case.
Note4. Among the data of simultaneous and single band emission conditions, the single emission condition is the worst.

Plot data of radiated spurious emissions

Downlink / Broadband PCS / GSM



Note : Only the worst case plots for Radiated Spurious Emissions.

6. Annex A_EUT AND TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2102-FC033-P