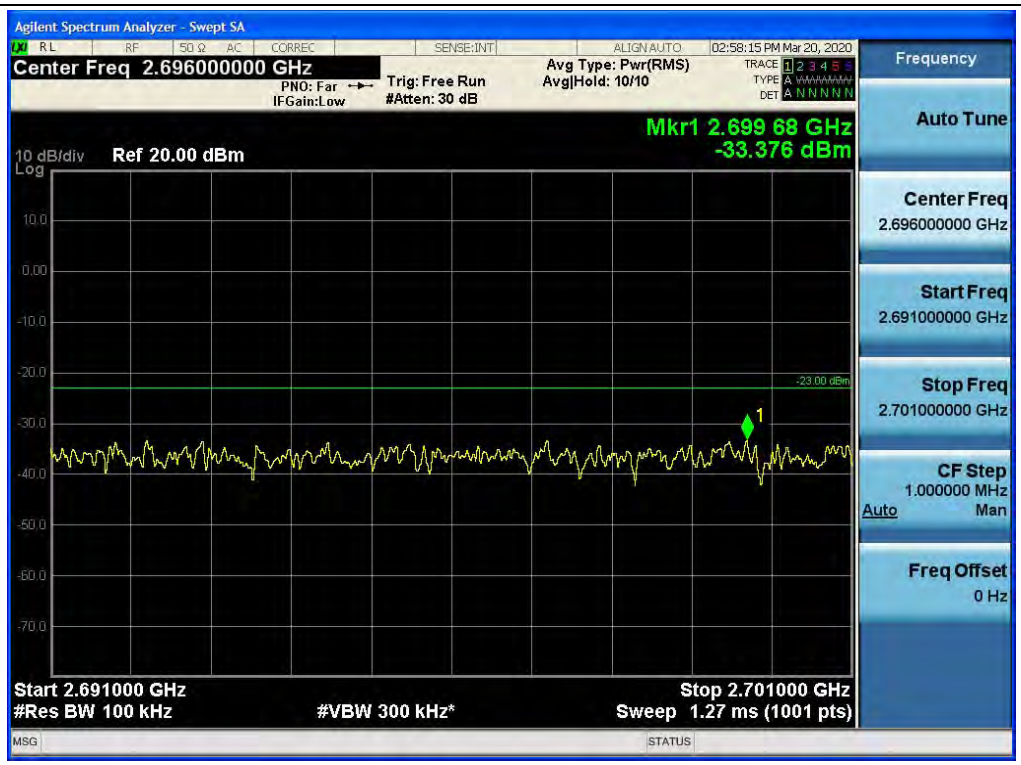
Spurious / BRS/EBS / Downlink / LTE 20 MHz / Low / High Edge ~ High Edge+10

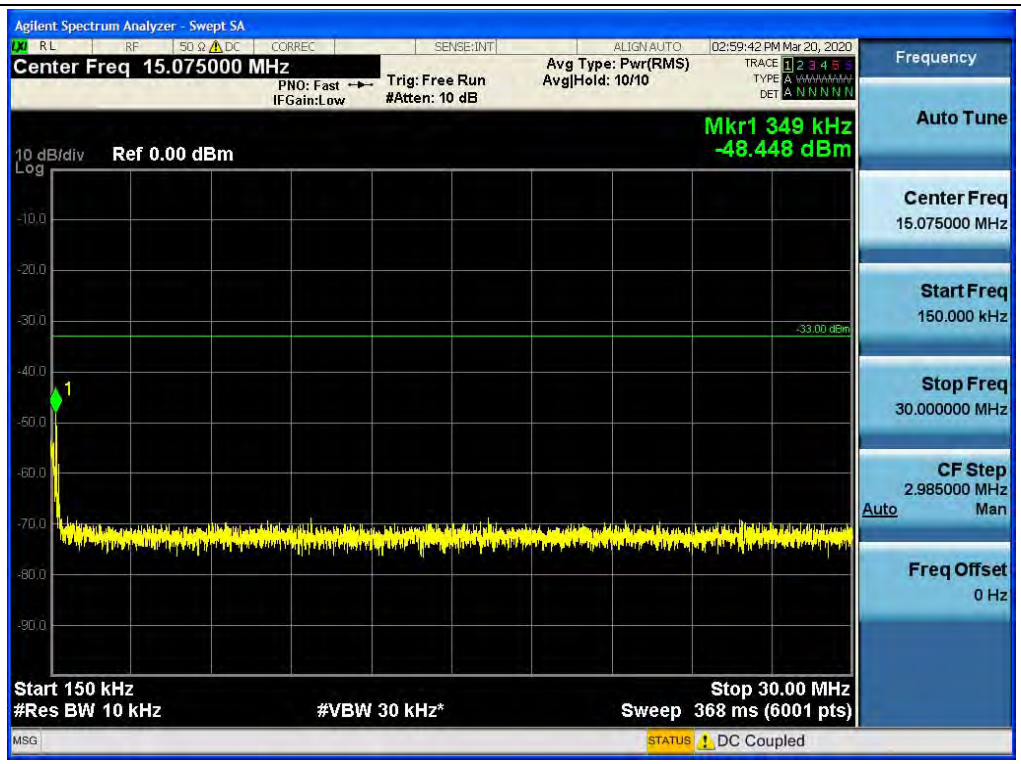


Spurious / BRS/EBS / Downlink / LTE 20 MHz / Low / High Edge+10 ~ 10 GHz

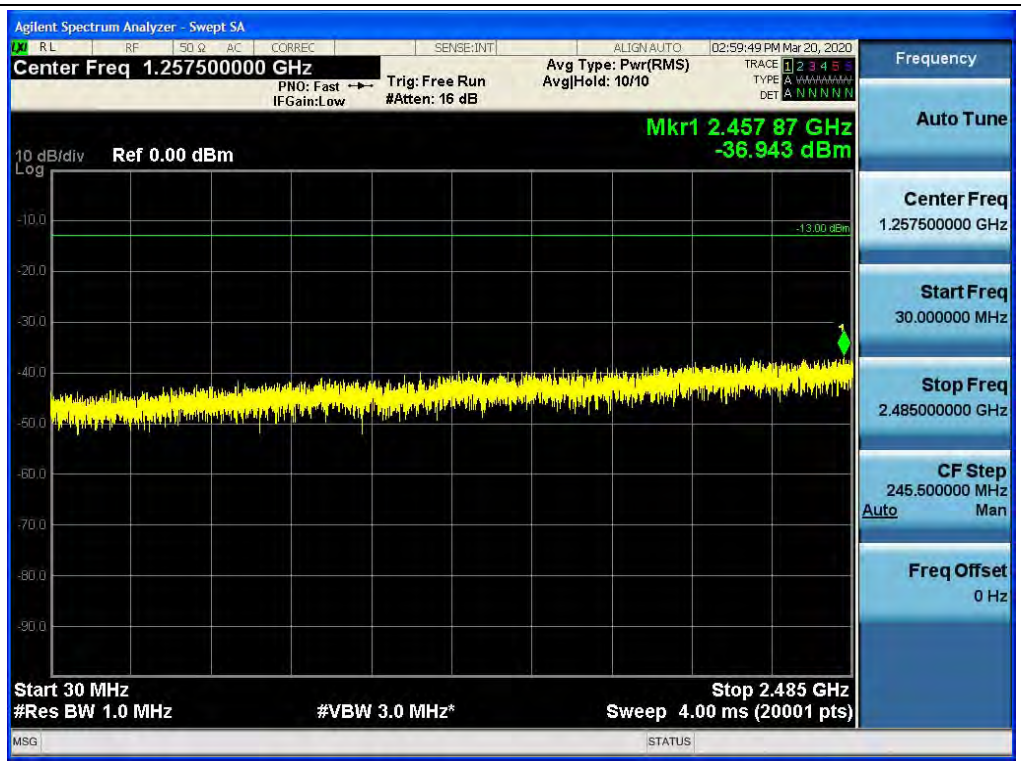
Spurious / BRS/EBS / Downlink / LTE 20 MHz / Low / 10 GHz ~ 26.5 GHz

Spurious / BRS/EBS / Downlink / LTE 20 MHz / Middle / 9 kHz ~ 150 kHz

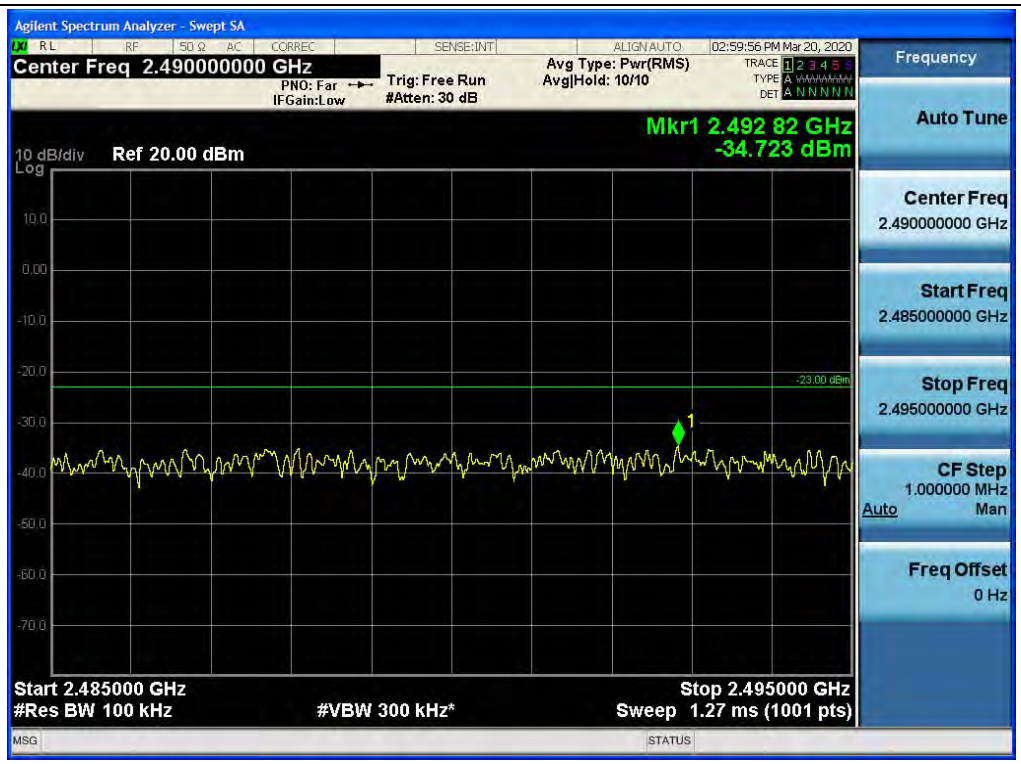
Spurious / BRS/EBS / Downlink / LTE 20 MHz / Middle / 150 kHz ~ 30 MHz



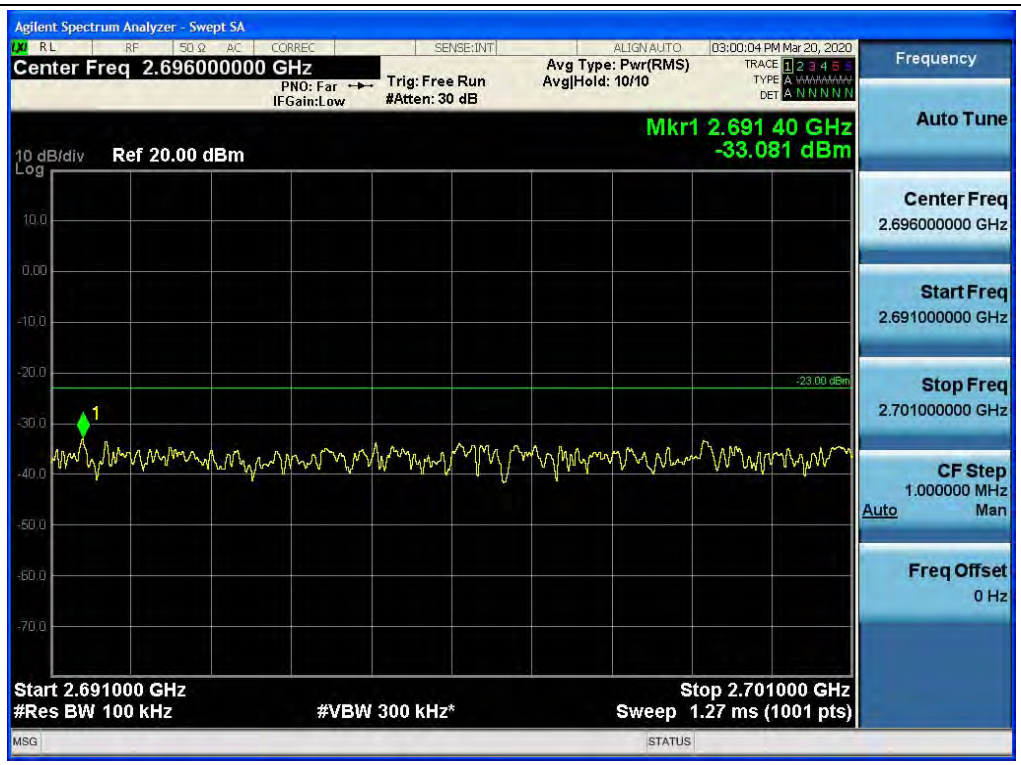
Spurious / BRS/EBS / Downlink / LTE 20 MHz / Middle / 30 MHz ~ Low Edge-10



Spurious / BRS/EBS / Downlink / LTE 20 MHz / Middle / Low Edge-10 ~ Low Edge



Spurious / BRS/EBS / Downlink / LTE 20 MHz / Middle / High Edge ~ High Edge+10

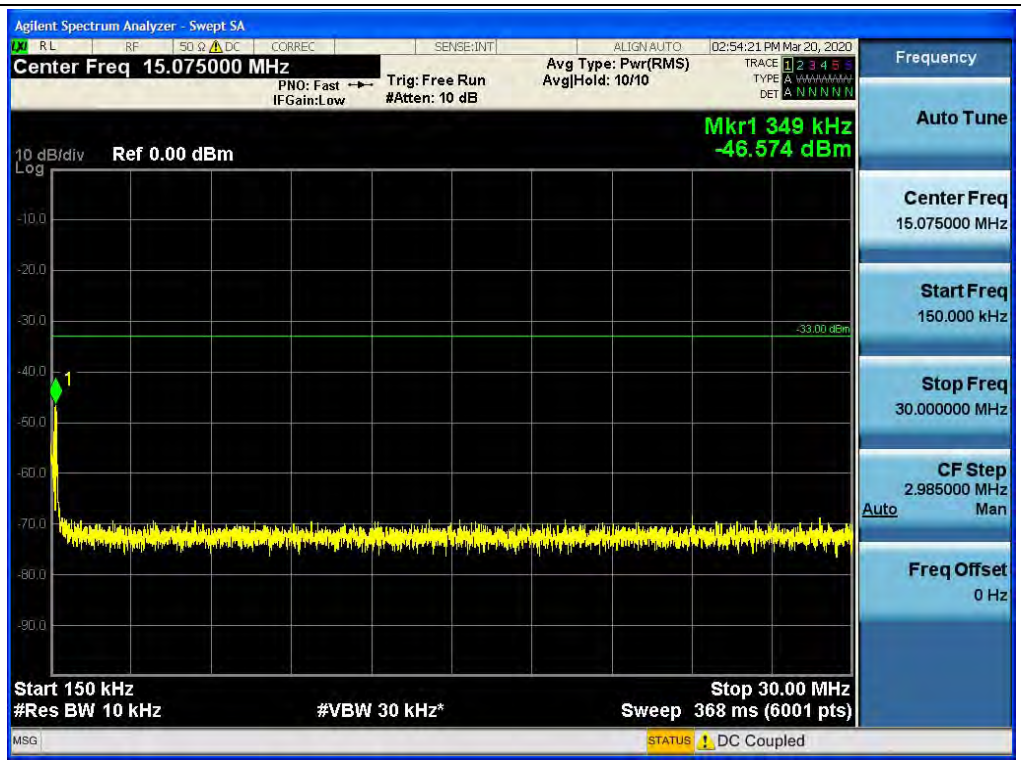


Spurious / BRS/EBS / Downlink / LTE 20 MHz / Middle / High Edge+10 ~ 10 GHz

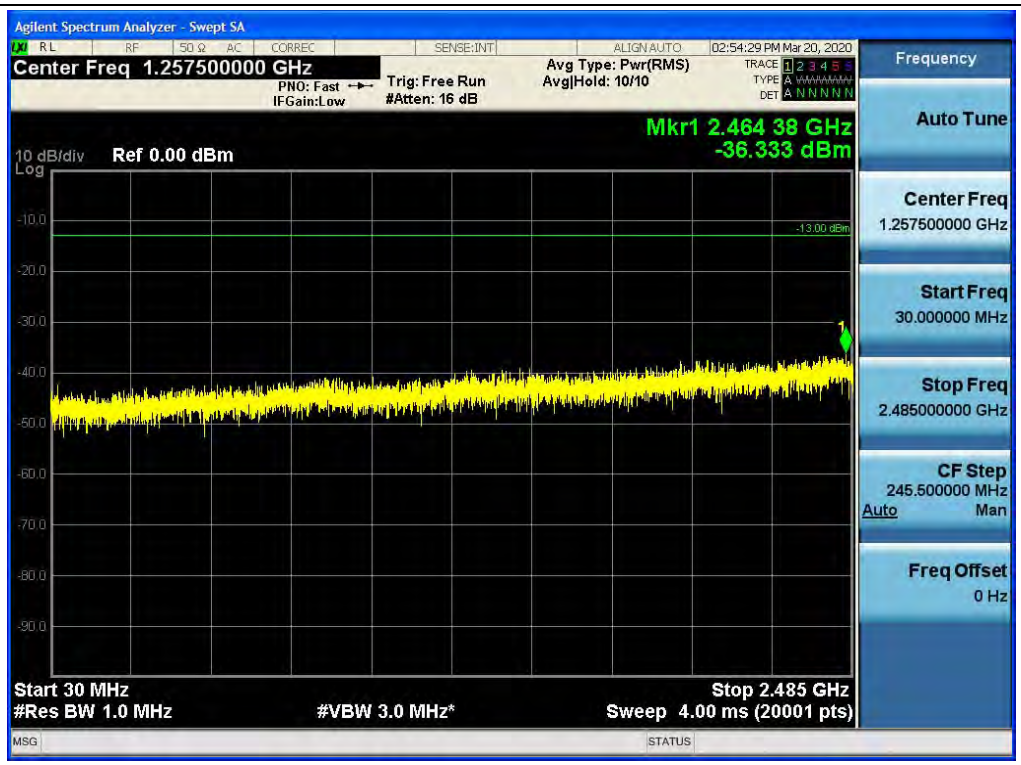
Spurious / BRS/EBS / Downlink / LTE 20 MHz / Middle / 10 GHz ~ 26.5 GHz

Spurious / BRS/EBS / Downlink / LTE 20 MHz / High / 9 kHz ~ 150 kHz

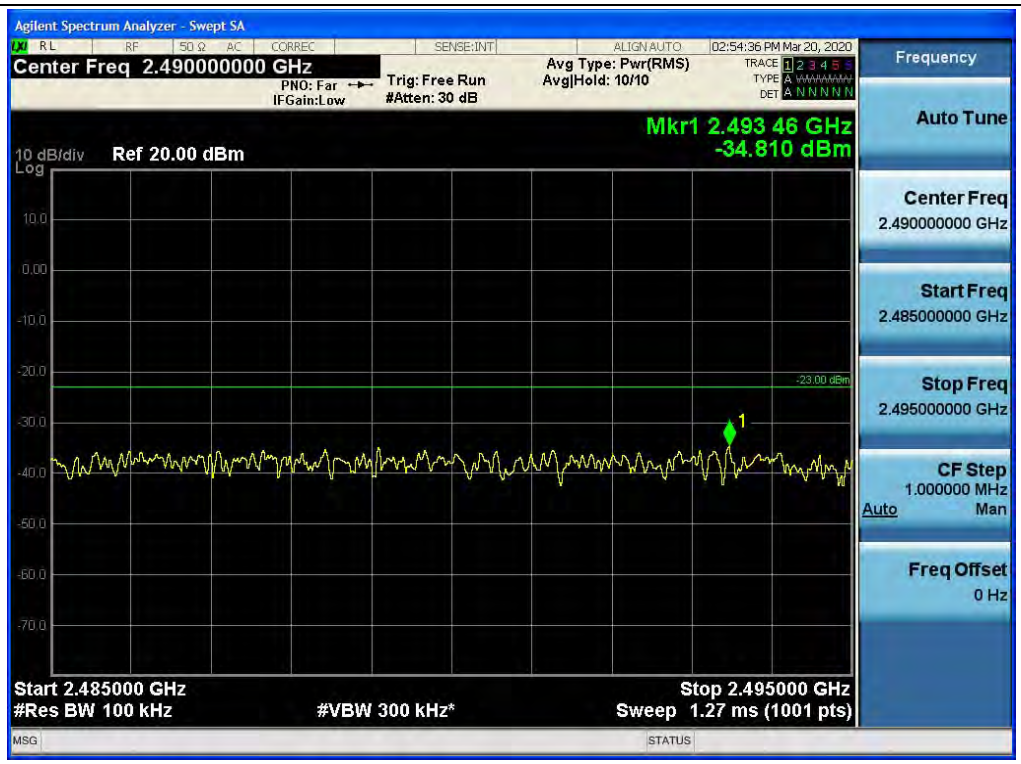
Spurious / BRS/EBS / Downlink / LTE 20 MHz / High / 150 kHz ~ 30 MHz



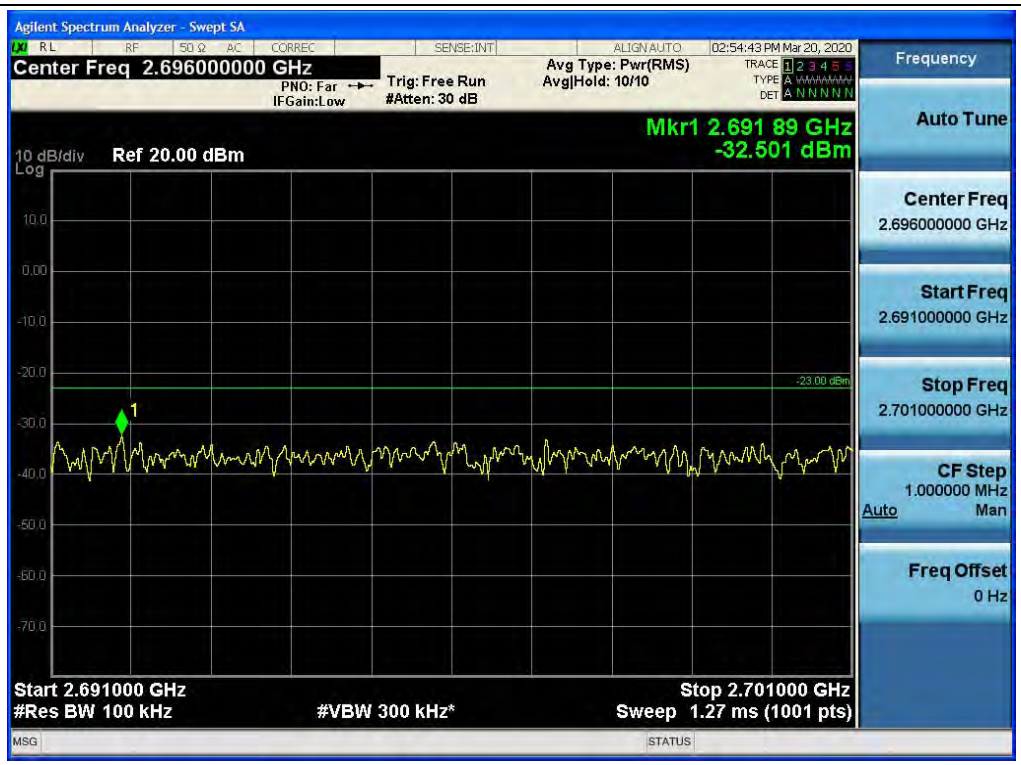
Spurious / BRS/EBS / Downlink / LTE 20 MHz / High / 30 MHz ~ Low Edge-10



Spurious / BRS/EBS / Downlink / LTE 20 MHz / High / Low Edge-10 ~ Low Edge



Spurious / BRS/EBS / Downlink / LTE 20 MHz / High / High Edge ~ High Edge+10

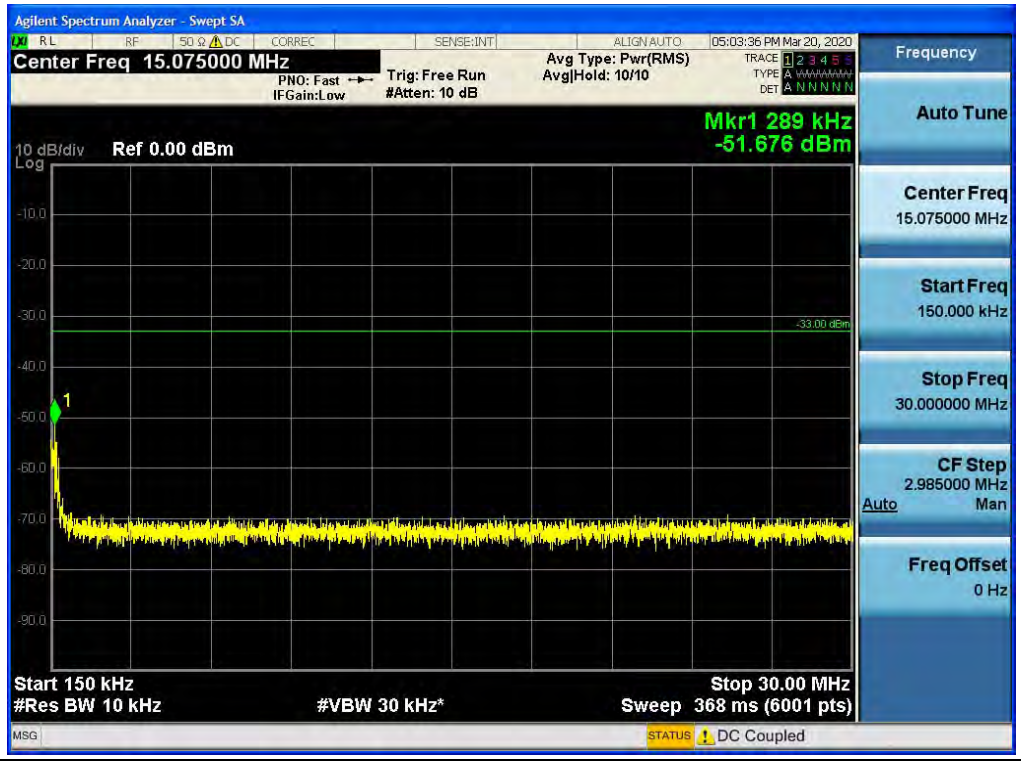


Spurious / BRS/EBS / Downlink / LTE 20 MHz / High / High Edge+10 ~ 10 GHz

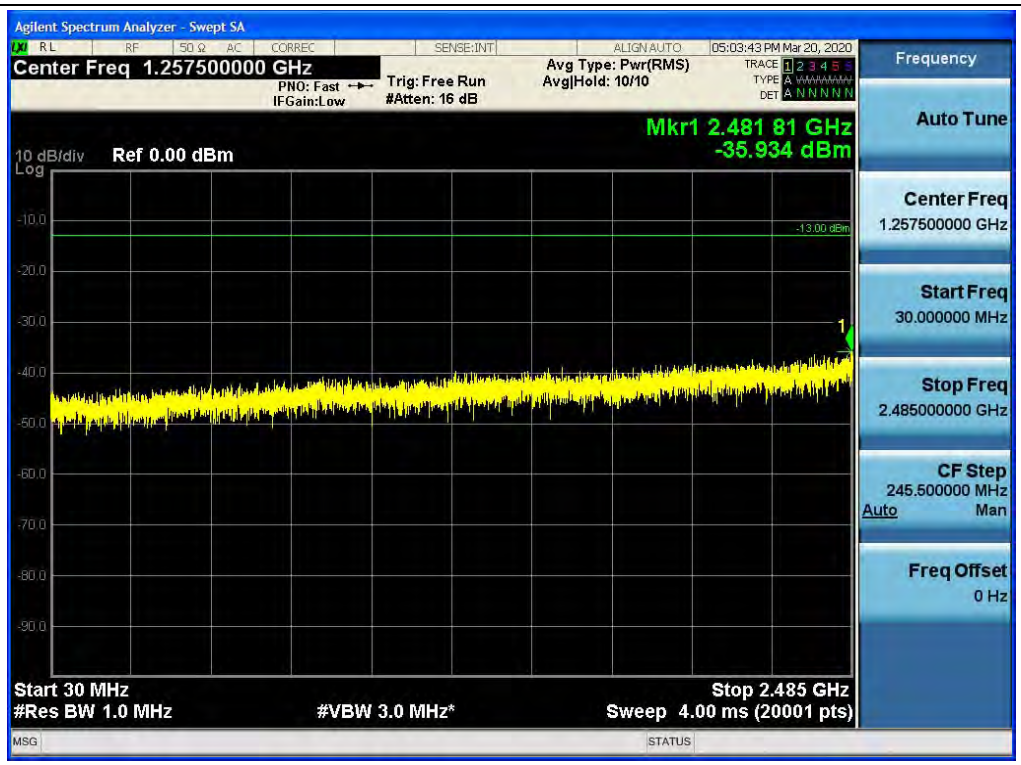
Spurious / BRS/EBS / Downlink / LTE 20 MHz / High / 10 GHz ~ 26.5 GHz

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

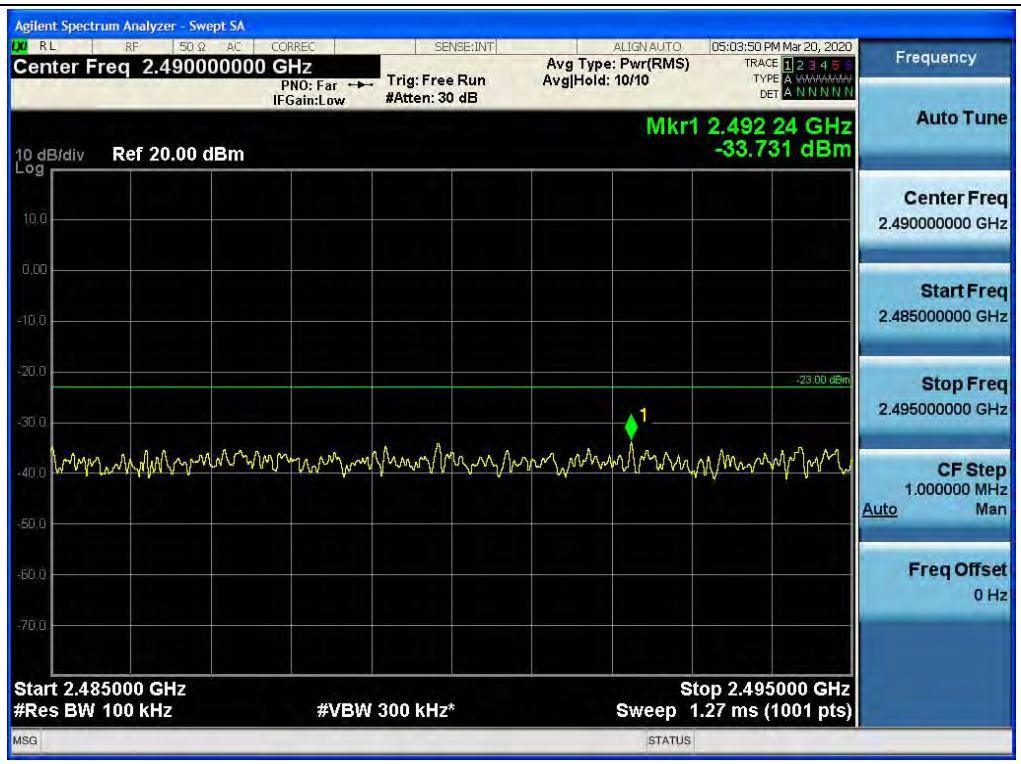
Spurious / BRS/EBS / Downlink / 5G NR 80M / Low / 150 kHz ~ 30 MHz



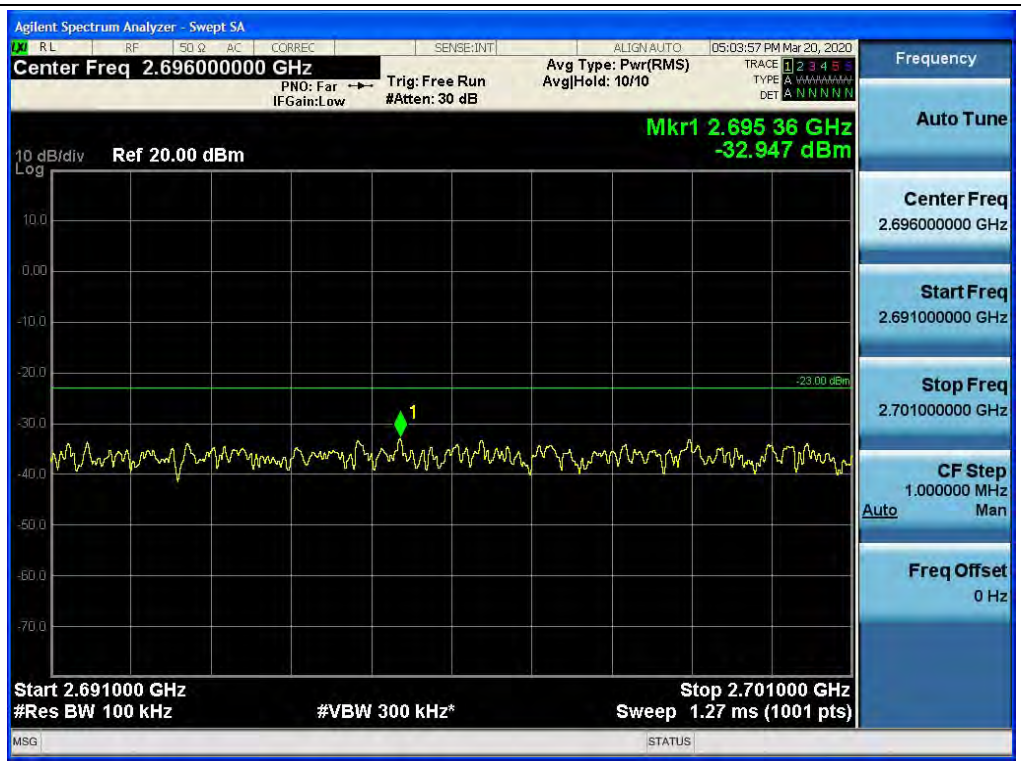
Spurious / BRS/EBS / Downlink / 5G NR 80M / Low / 30 MHz ~ Low Edge-10



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



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

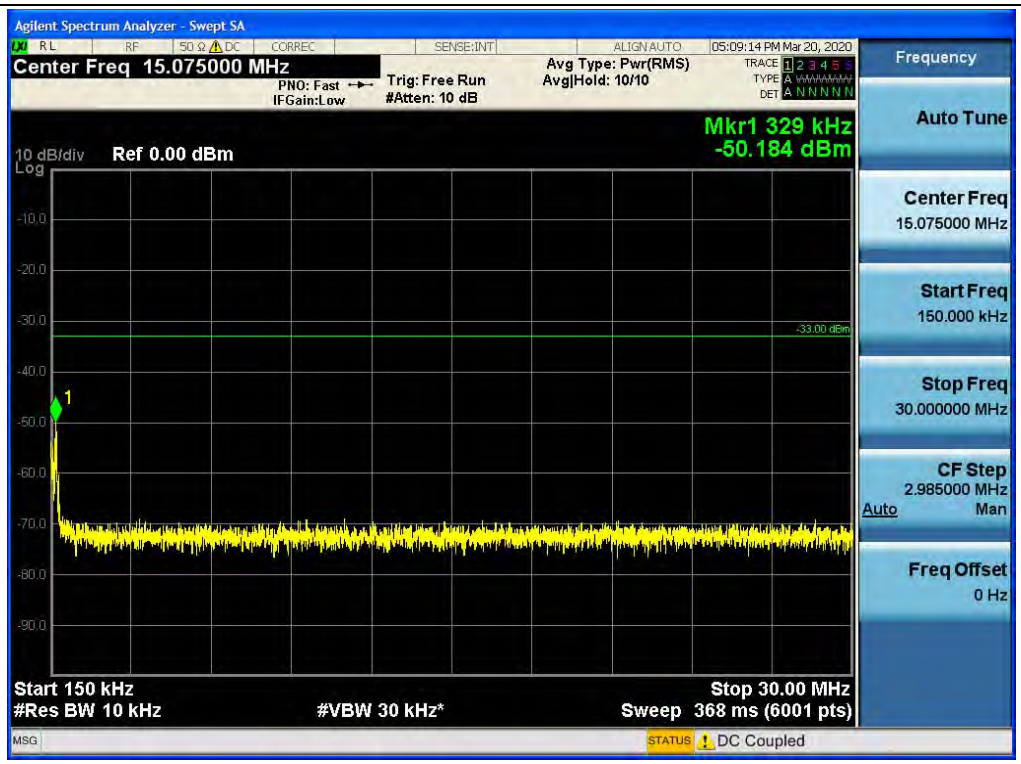


Spurious / BRS/EBS / Downlink / 5G NR 80M / Low / High Edge+10 ~ 10 GHz

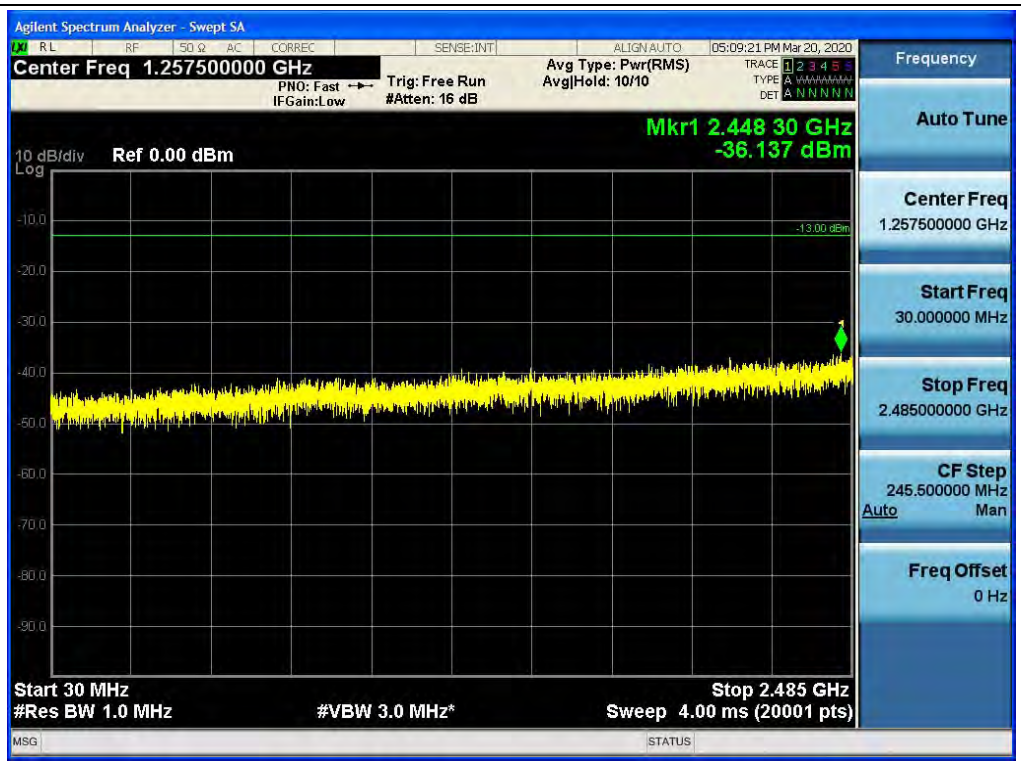
Spurious / BRS/EBS / Downlink / 5G NR 80M / Low / 10 GHz ~ 26.5 GHz

Spurious / BRS/EBS / Downlink / 5G NR 80M / Middle / 9 kHz ~ 150 kHz

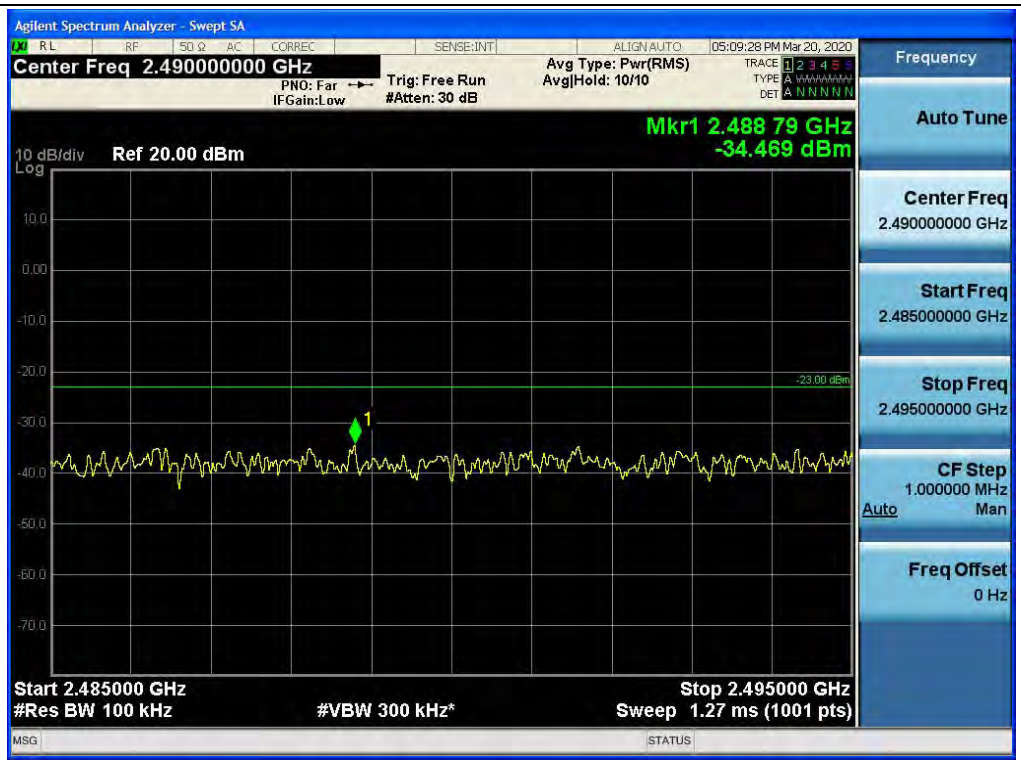
Spurious / BRS/EBS / Downlink / 5G NR 80M / Middle / 150 kHz ~ 30 MHz



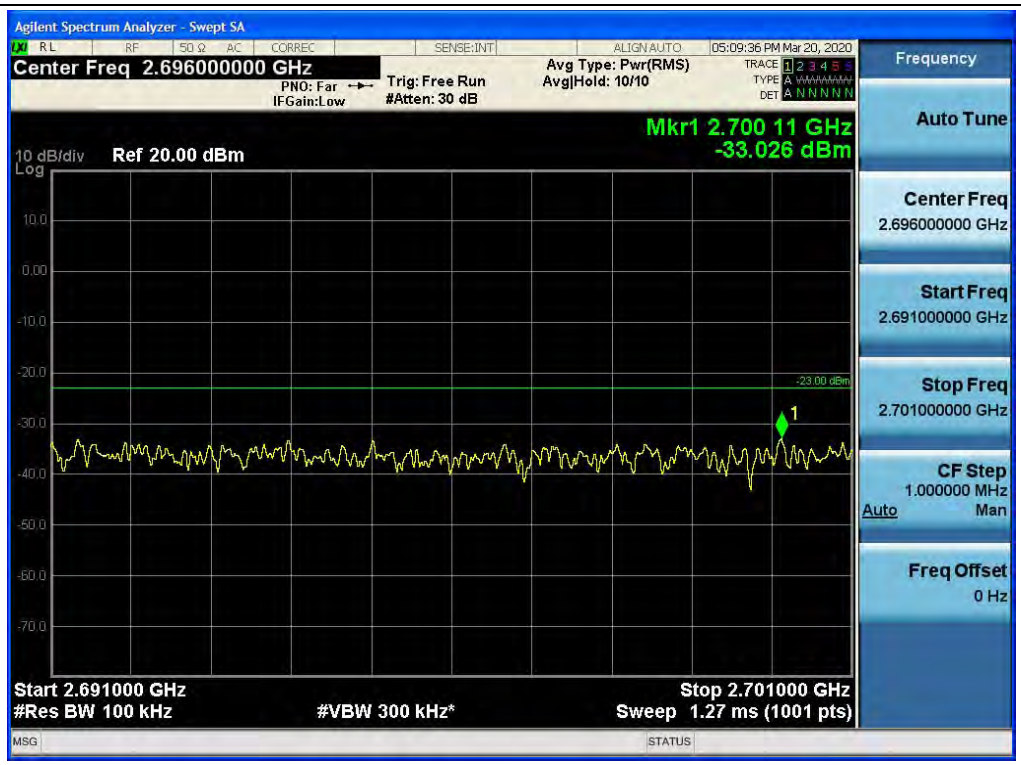
Spurious / BRS/EBS / Downlink / 5G NR 80M / Middle / 30 MHz ~ Low Edge-10



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



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

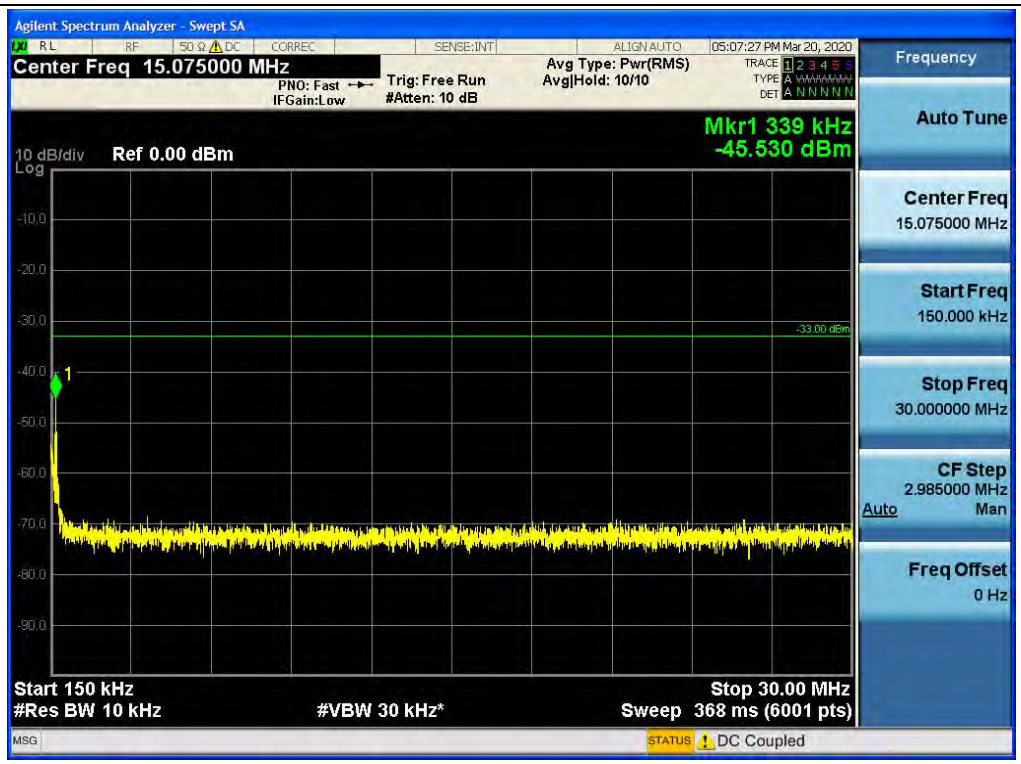


Spurious / BRS/EBS / Downlink / 5G NR 80M / Middle / High Edge+10 ~ 10 GHz

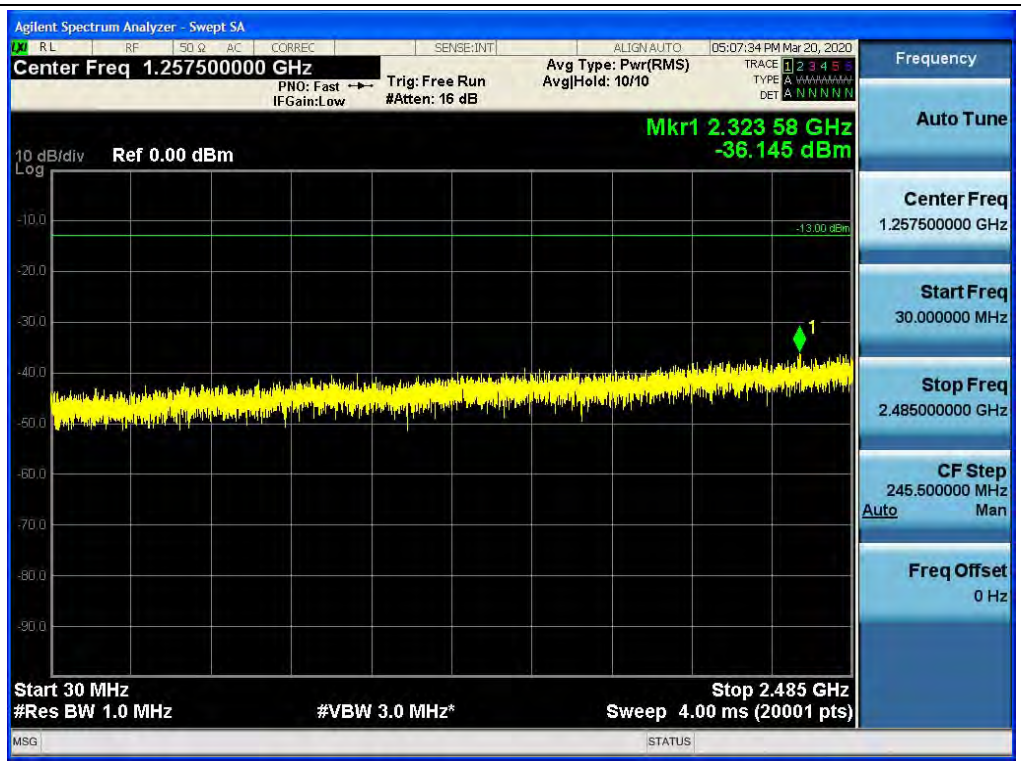
Spurious / BRS/EBS / Downlink / 5G NR 80M / Middle / 10 GHz ~ 26.5 GHz

Spurious / BRS/EBS / Downlink / 5G NR 80M / High / 9 kHz ~ 150 kHz

Spurious / BRS/EBS / Downlink / 5G NR 80M / High / 150 kHz ~ 30 MHz

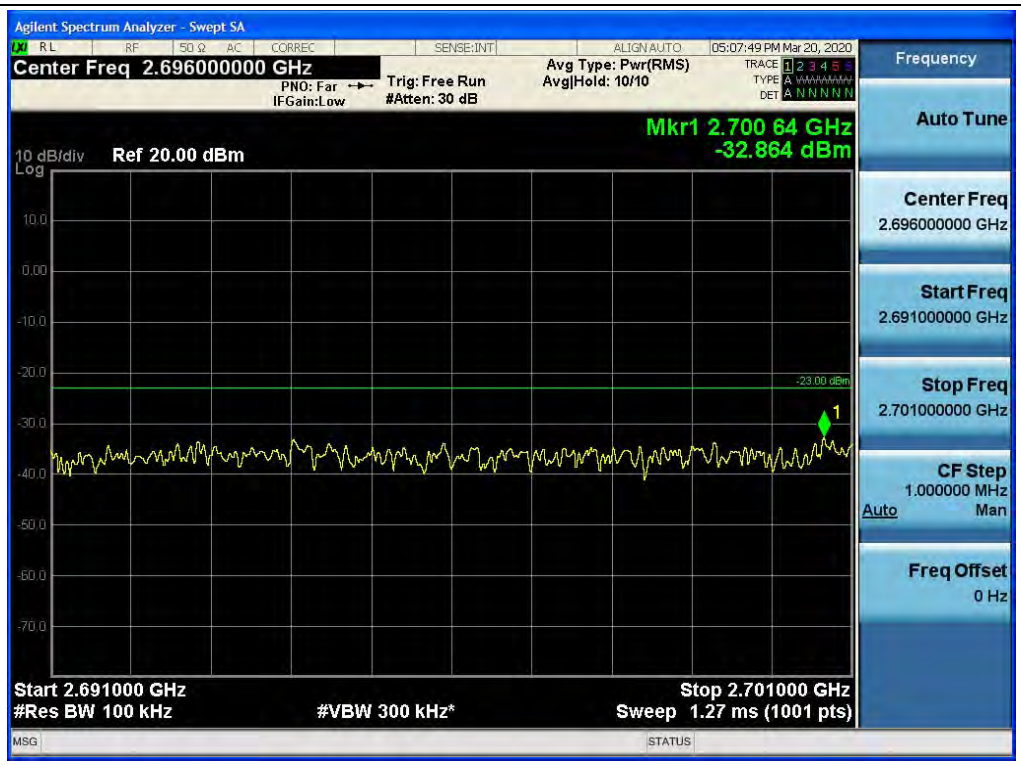


Spurious / BRS/EBS / Downlink / 5G NR 80M / High / 30 MHz ~ Low Edge-10



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

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

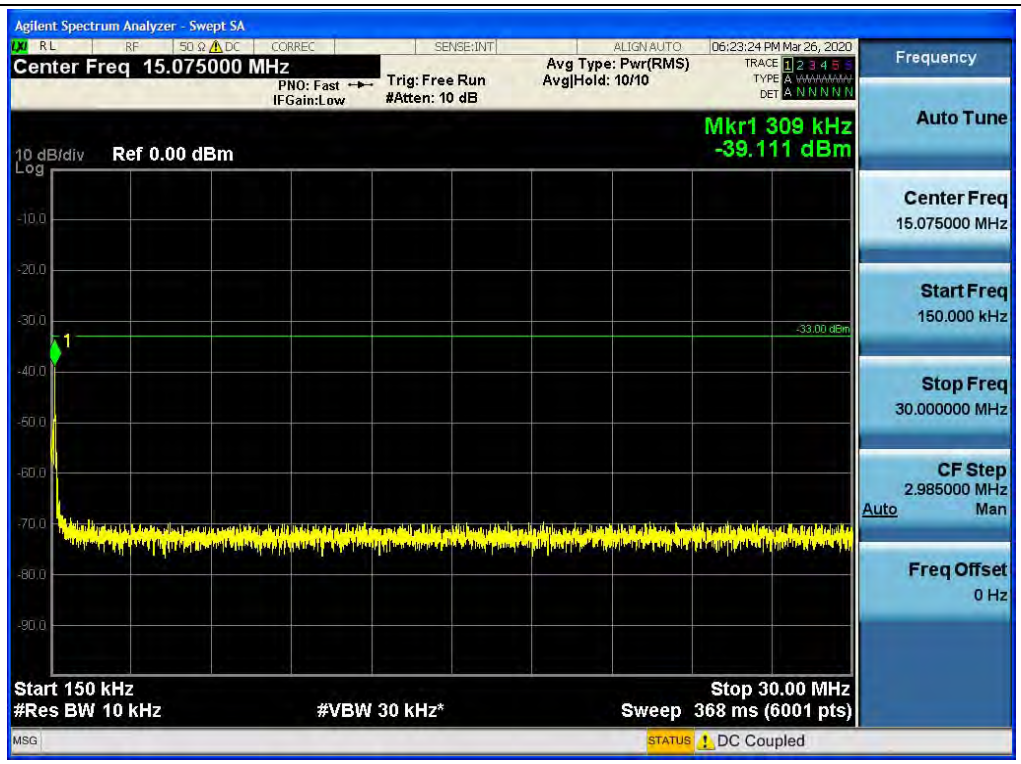


Spurious / BRS/EBS / Downlink / 5G NR 80M / High / High Edge+10 ~ 10 GHz

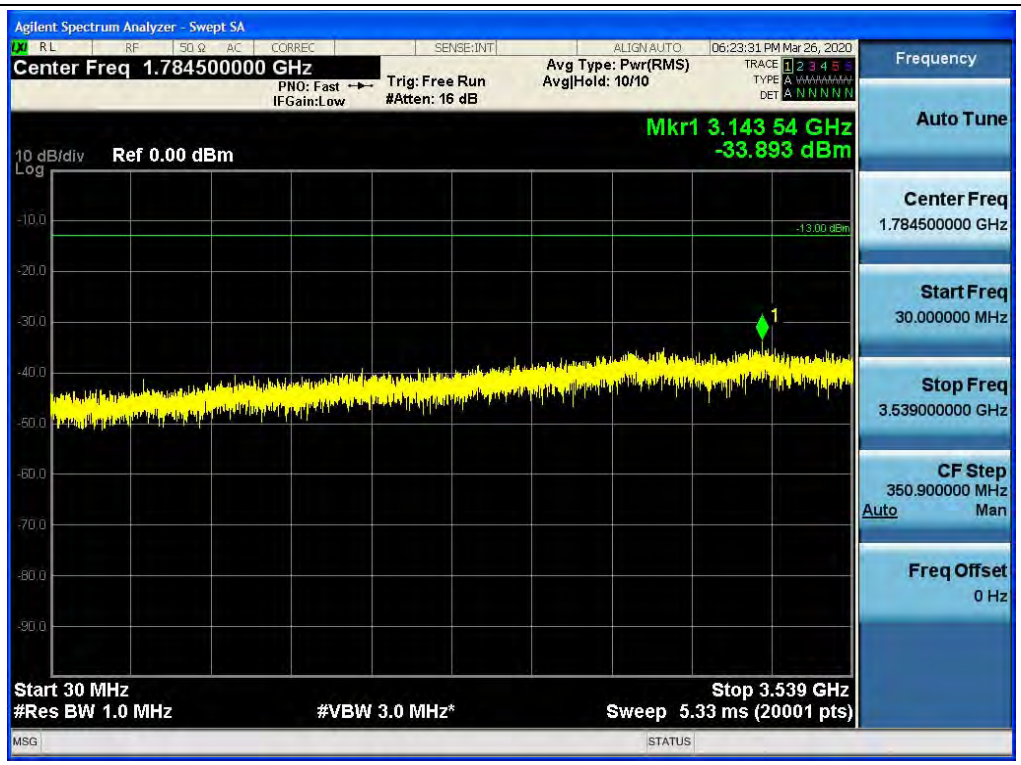
Spurious / BRS/EBS / Downlink / 5G NR 80M / High / 10 GHz ~ 26.5 GHz

Spurious / CBRS / Downlink / LTE 20 MHz / Low / 9 kHz ~ 150 kHz

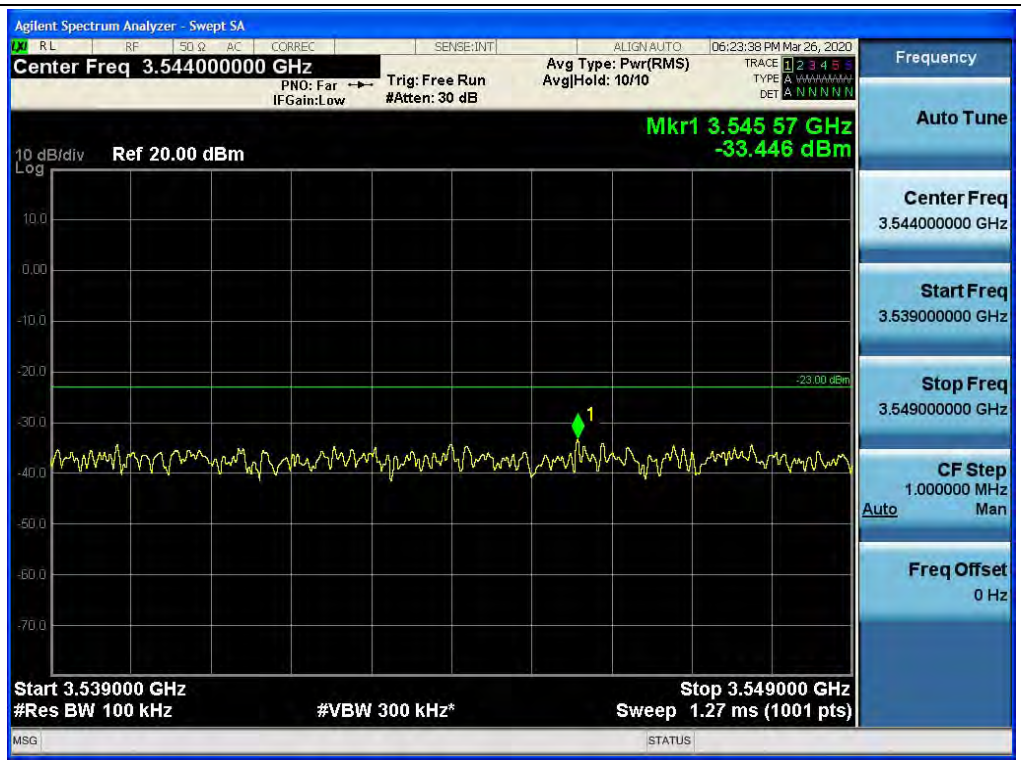
Spurious / CBRS / Downlink / LTE 20 MHz / Low / 150 kHz ~ 30 MHz



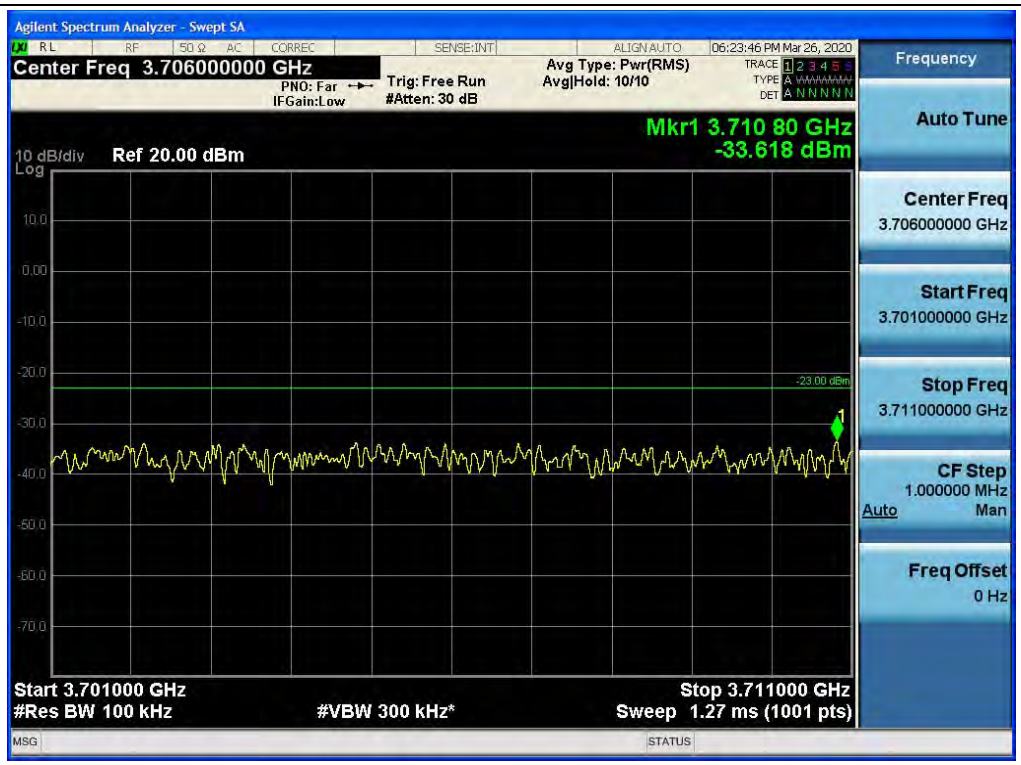
Spurious / CBRS / Downlink / LTE 20 MHz / Low / 30 MHz ~ Low Edge-10



Spurious / CBRS / Downlink / LTE 20 MHz / Low / Low Edge-10 ~ Low Edge



Spurious / CBRS / Downlink / LTE 20 MHz / Low / High Edge ~ High Edge+10

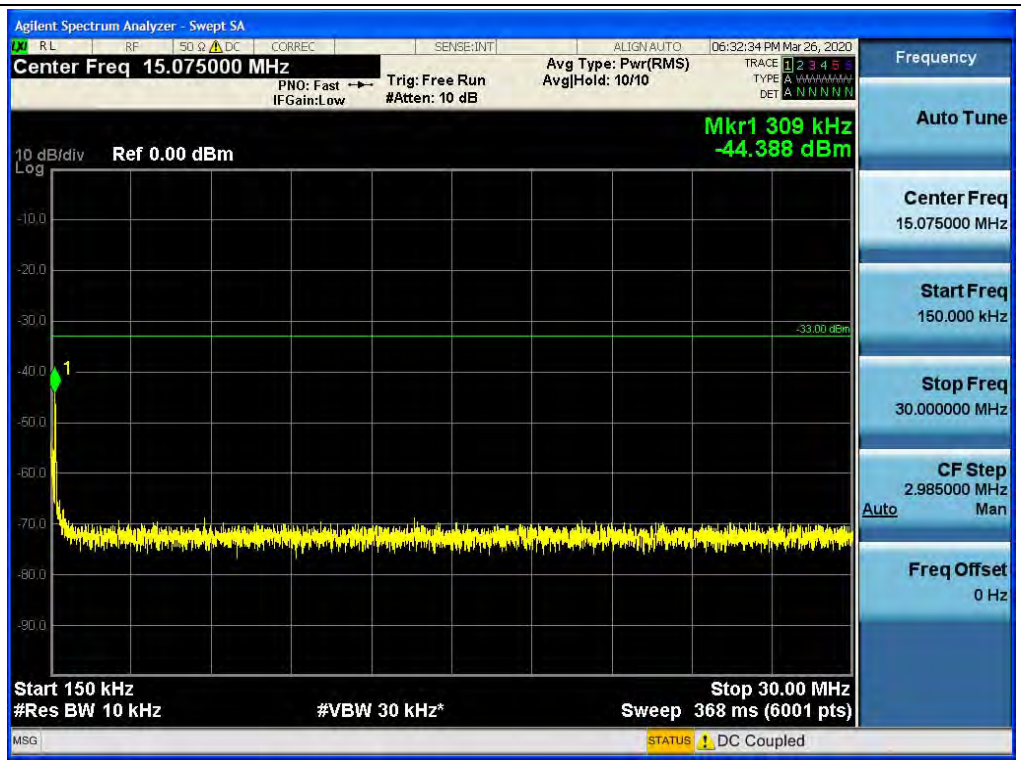


Spurious / CBRS / Downlink / LTE 20 MHz / Low / High Edge+10 ~ 10 GHz

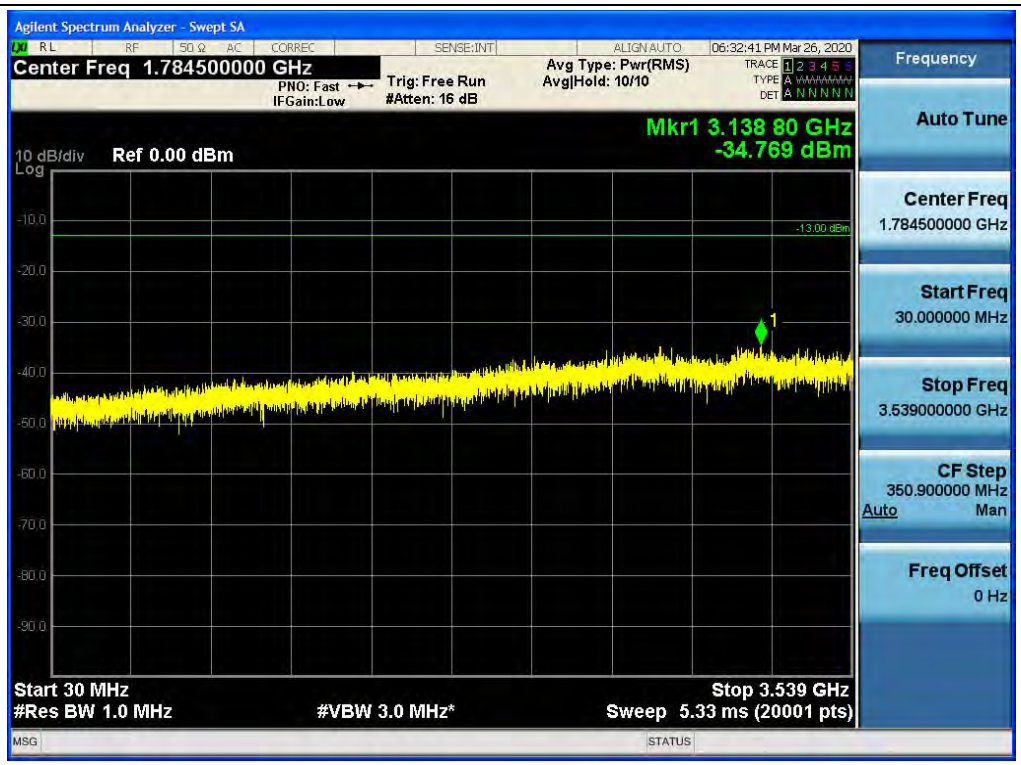
Spurious / CBRS / Downlink / LTE 20 MHz / Low / 10 GHz ~ 26.5 GHz

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

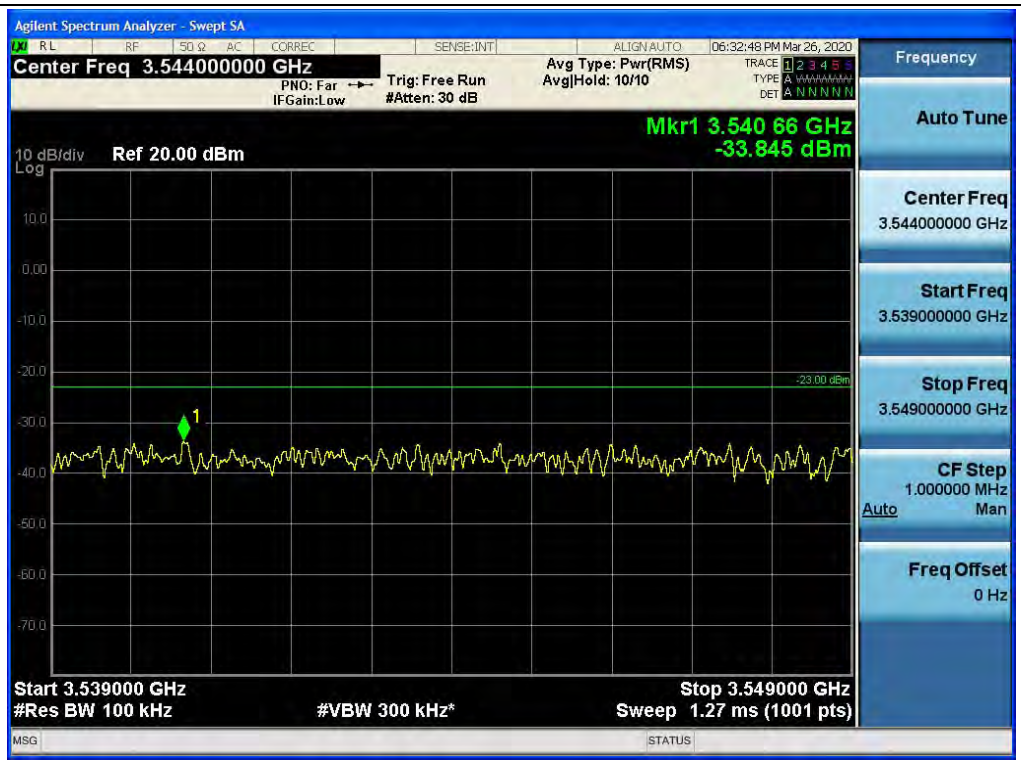
Spurious / CBRS / Downlink / LTE 20 MHz / Middle / 150 kHz ~ 30 MHz



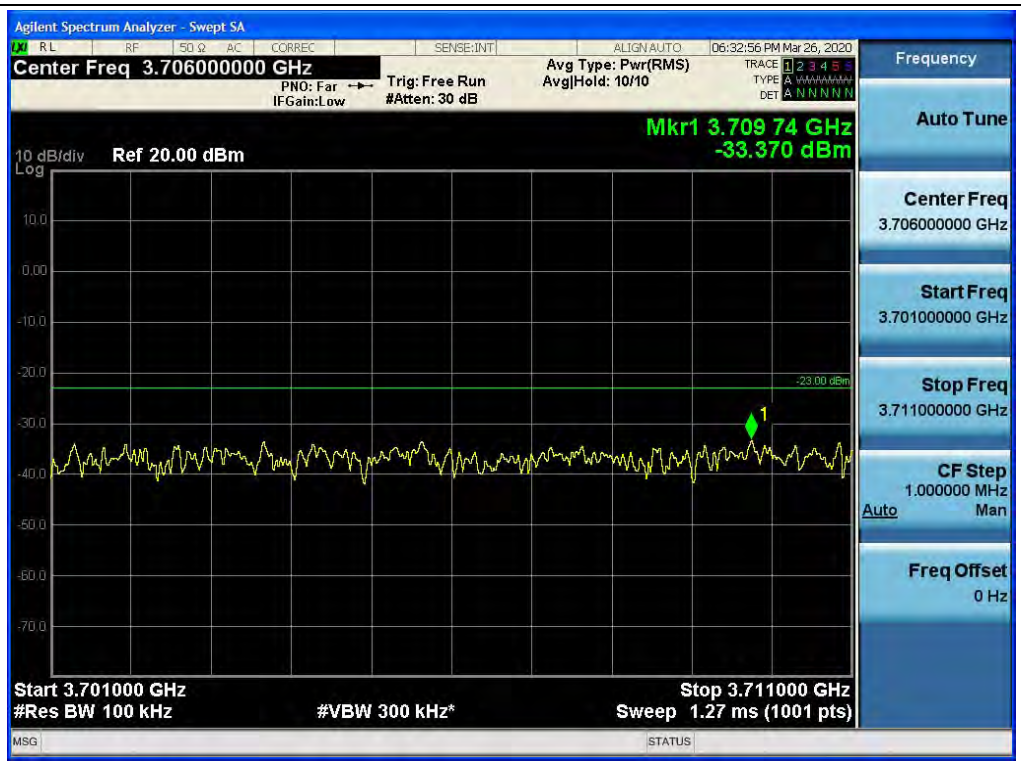
Spurious / CBRS / Downlink / LTE 20 MHz / Middle / 30 MHz ~ Low Edge-10



Spurious / CBRS / Downlink / LTE 20 MHz / Middle / Low Edge-10 ~ Low Edge



Spurious / CBRS / Downlink / LTE 20 MHz / Middle / High Edge ~ High Edge+10

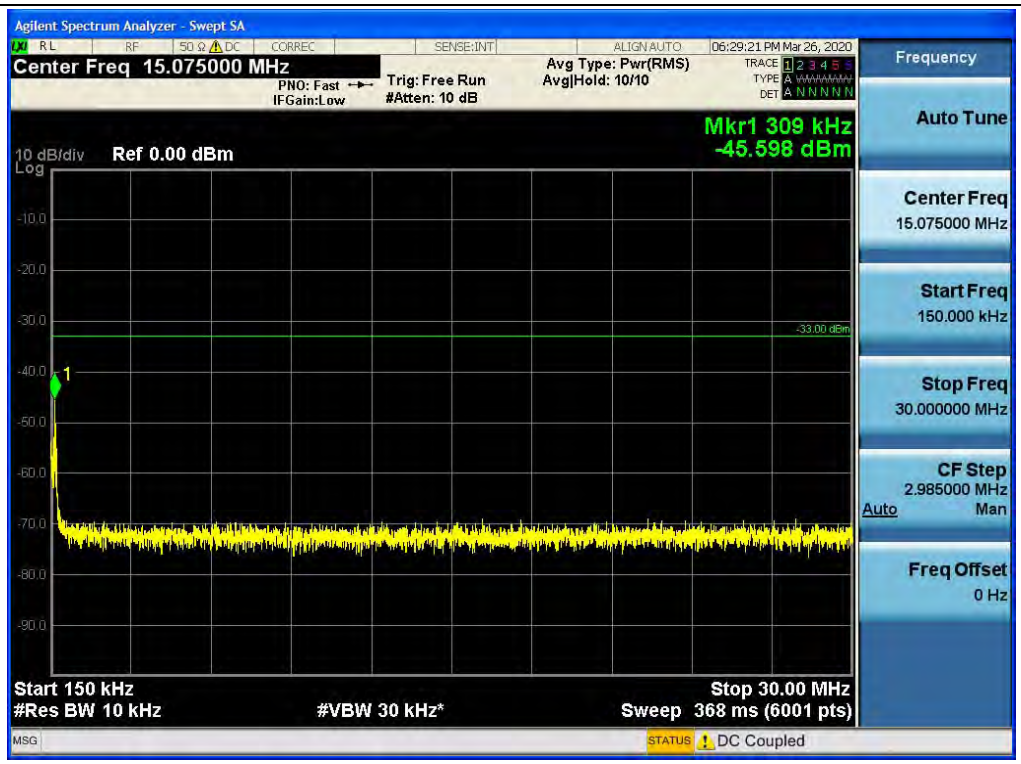


Spurious / CBRS / Downlink / LTE 20 MHz / Middle / High Edge+10 ~ 10 GHz

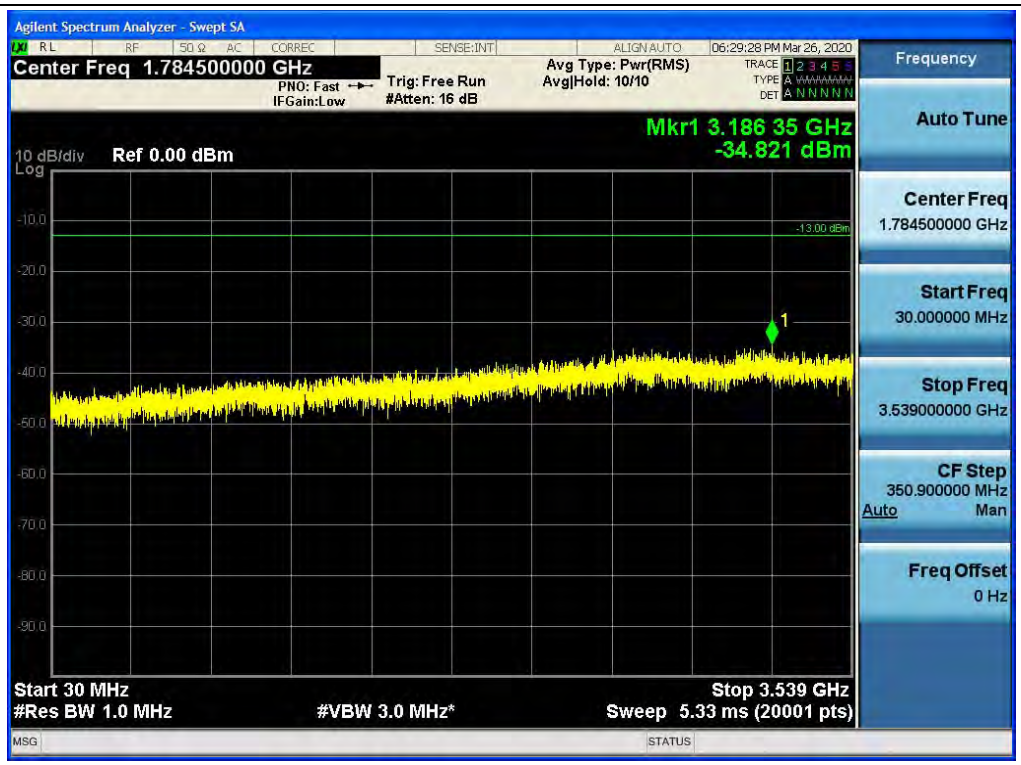
Spurious / CBRS / Downlink / LTE 20 MHz / Middle / 10 GHz ~ 26.5 GHz

Spurious / CBRS / Downlink / LTE 20 MHz / High / 9 kHz ~ 150 kHz

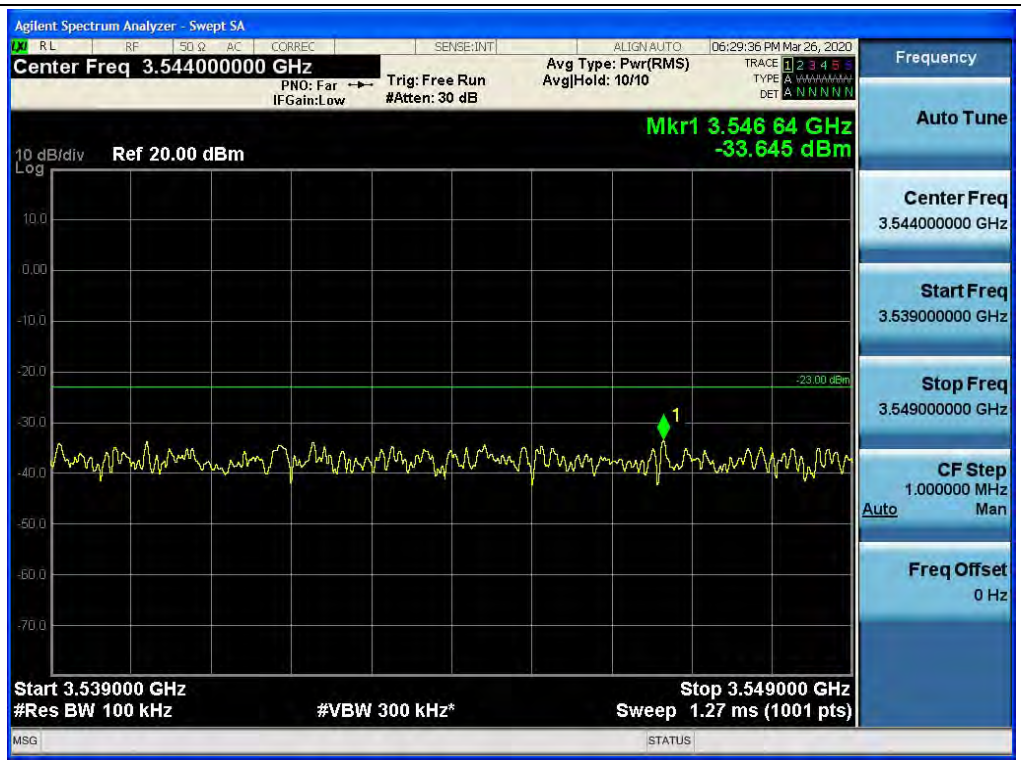
Spurious / CBRS / Downlink / LTE 20 MHz / High / 150 kHz ~ 30 MHz



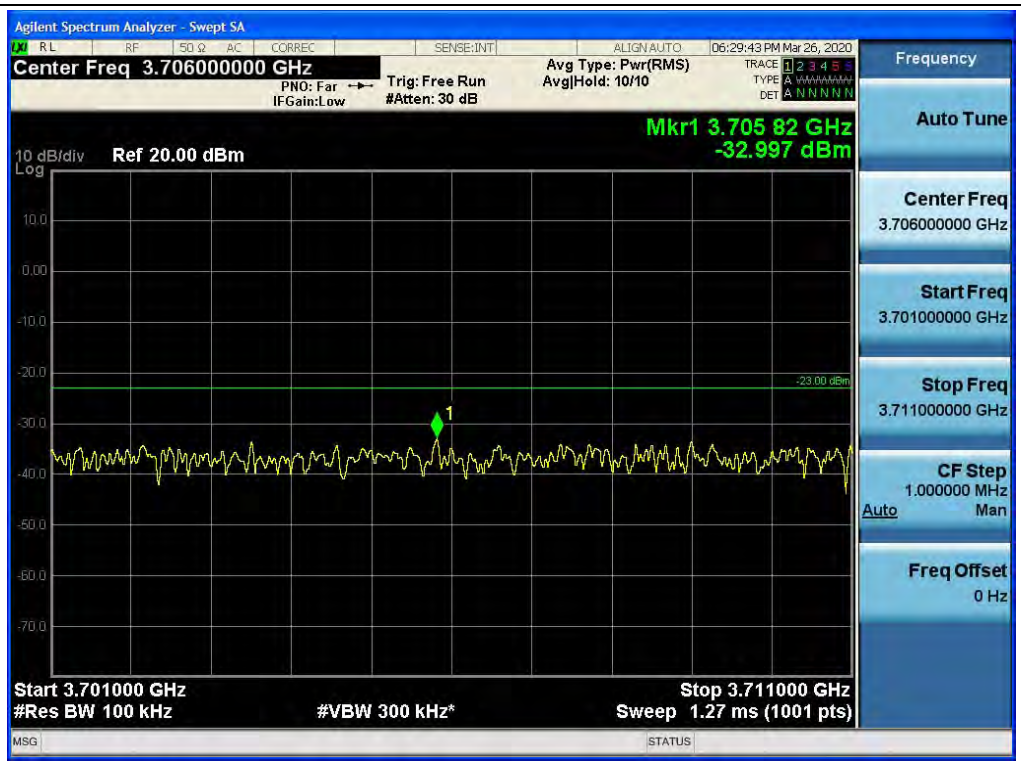
Spurious / CBRS / Downlink / LTE 20 MHz / High / 30 MHz ~ Low Edge-10



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



Spurious / CBRS / Downlink / LTE 20 MHz / High / High Edge ~ High Edge+10

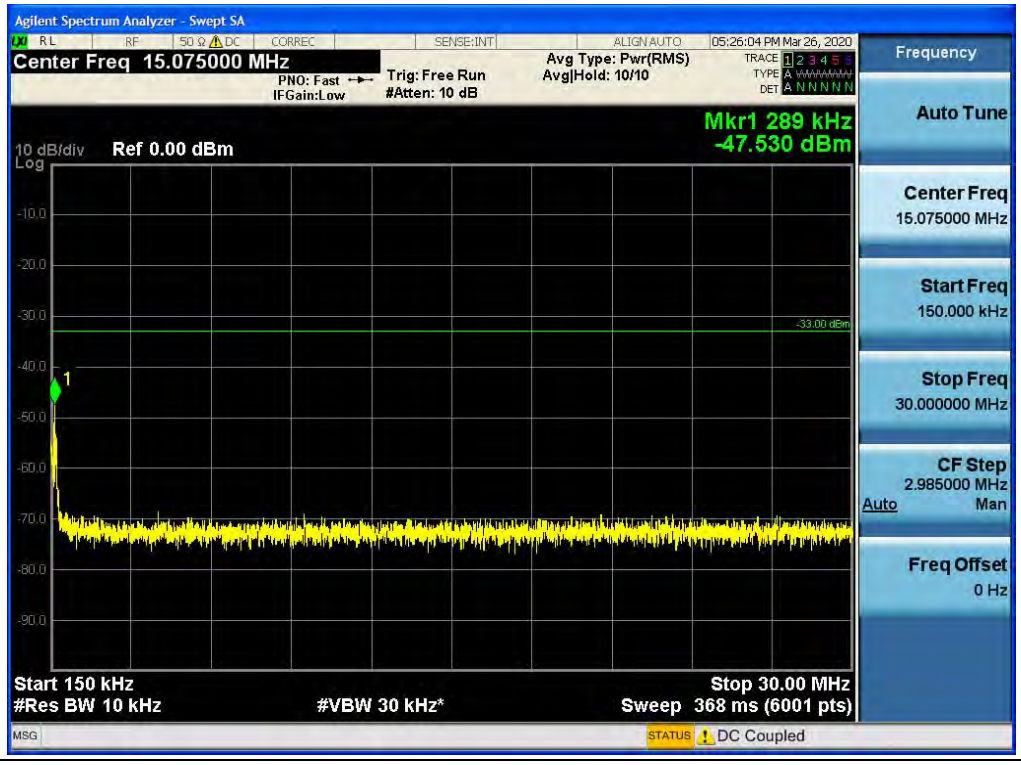


Spurious / CBRS / Downlink / LTE 20 MHz / High / High Edge+10 ~ 10 GHz

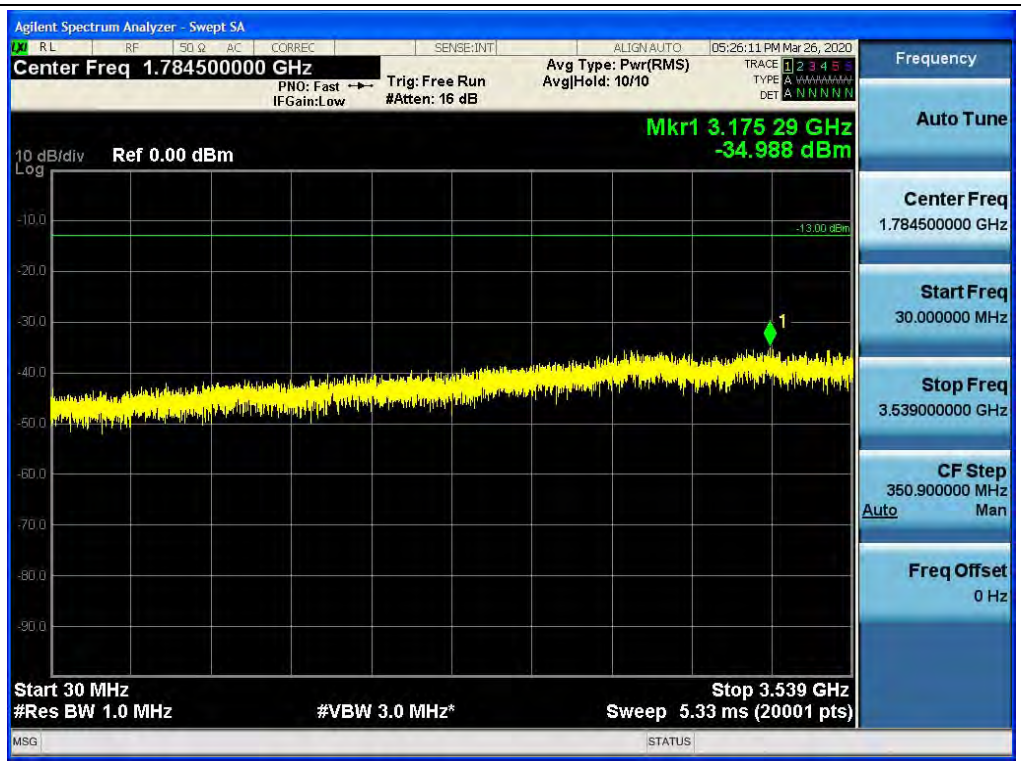
Spurious / CBRS / Downlink / LTE 20 MHz / High / 10 GHz ~ 26.5 GHz

Spurious / CBRS / Downlink / 5G NR 80M / Low / 9 kHz ~ 150 kHz

Spurious / CBRS / Downlink / 5G NR 80M / Low / 150 kHz ~ 30 MHz



Spurious / CBRS / Downlink / 5G NR 80M / Low / 30 MHz ~ Low Edge-10



Spurious / CBRS / Downlink / 5G NR 80M / Low / Low Edge-10 ~ Low Edge

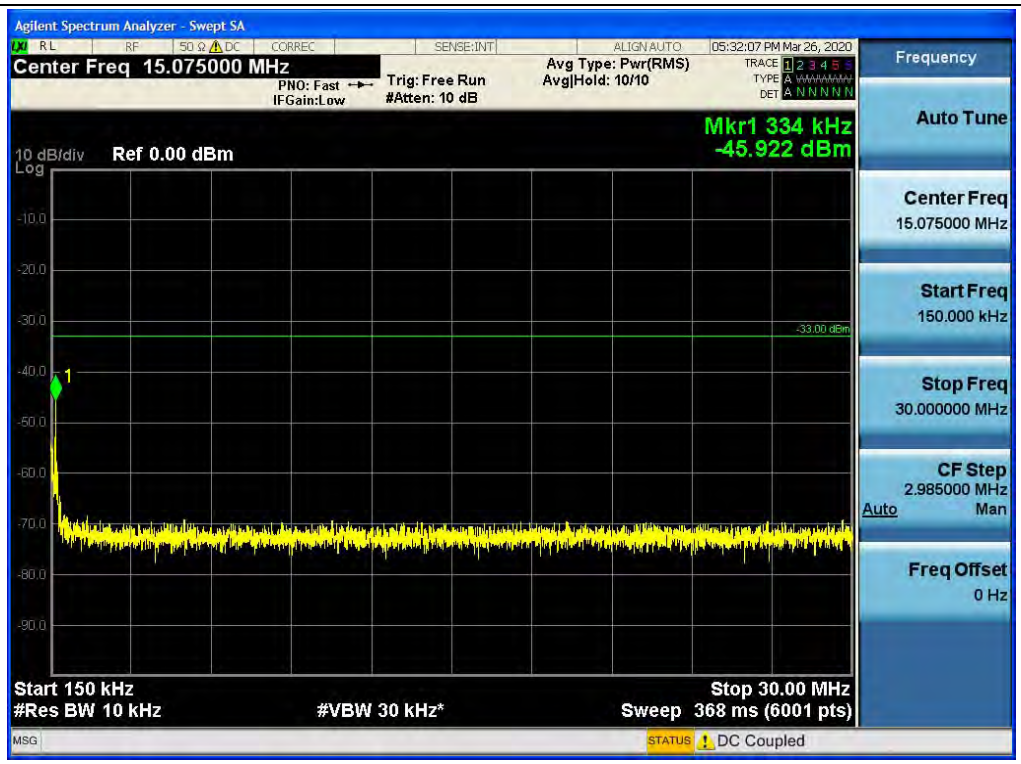
Spurious / CBRS / Downlink / 5G NR 80M / Low / High Edge ~ High Edge+10

Spurious / CBRS / Downlink / 5G NR 80M / Low / High Edge+10 ~ 10 GHz

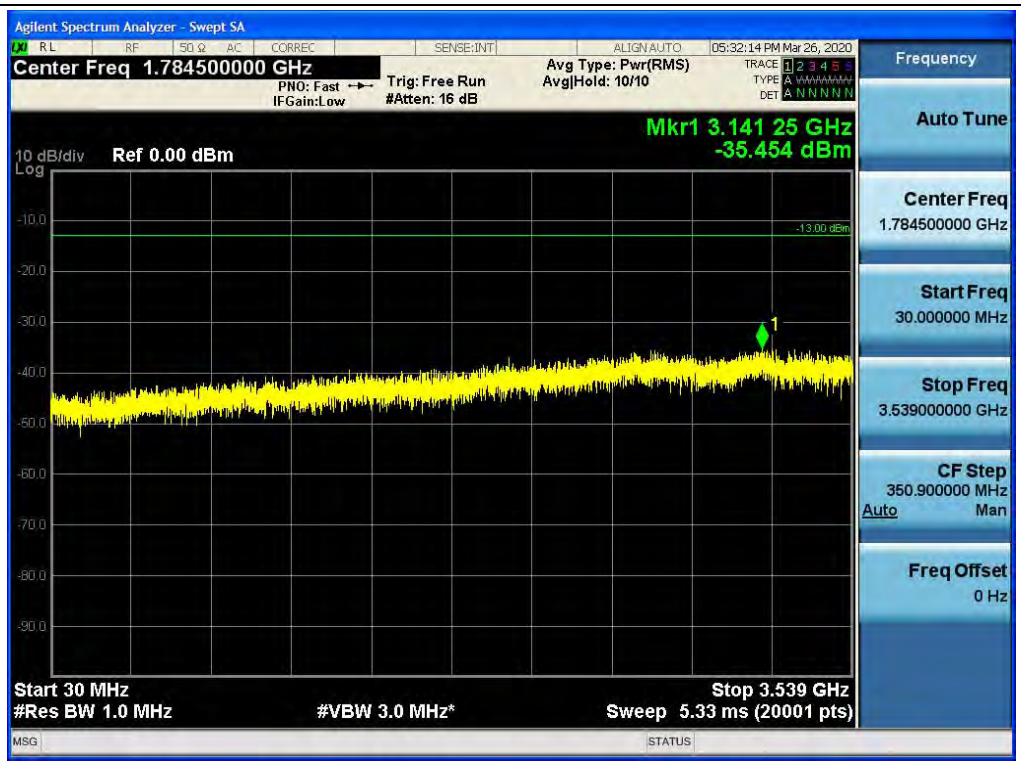
Spurious / CBRS / Downlink / 5G NR 80M / Low / 10 GHz ~ 26.5 GHz

Spurious / CBRS / Downlink / 5G NR 80M / Middle / 9 kHz ~ 150 kHz

Spurious / CBRS / Downlink / 5G NR 80M / Middle / 150 kHz ~ 30 MHz

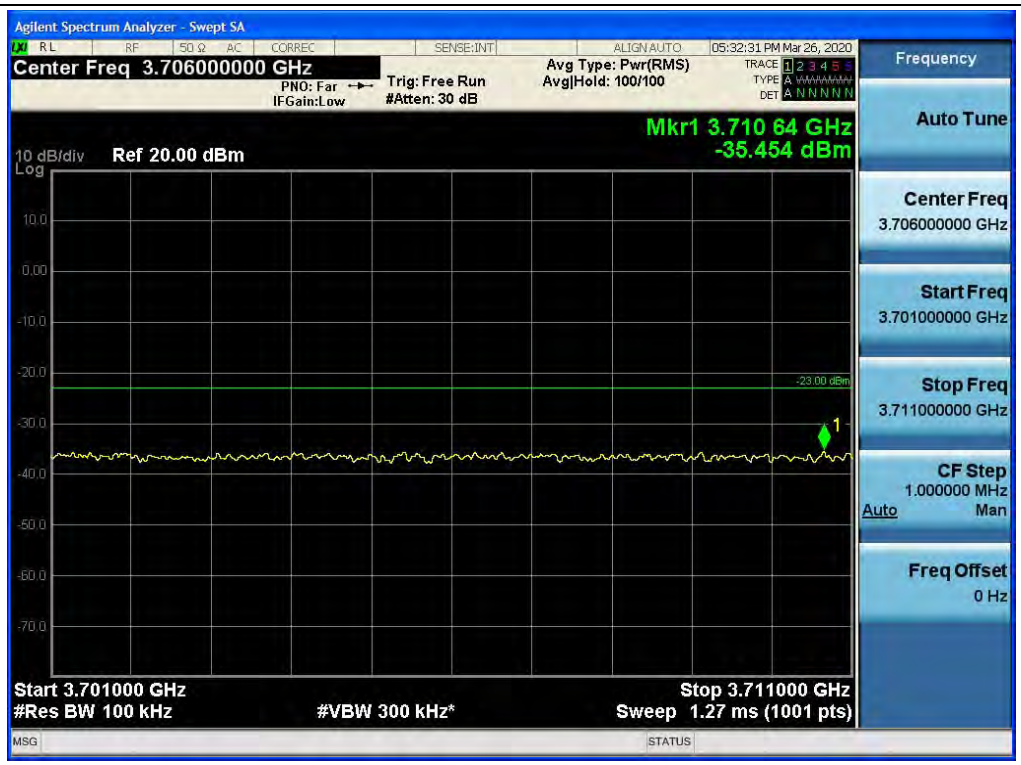


Spurious / CBRS / Downlink / 5G NR 80M / Middle / 30 MHz ~ Low Edge-10



Spurious / CBRS / Downlink / 5G NR 80M / Middle / Low Edge-10 ~ Low Edge

Spurious / CBRS / Downlink / 5G NR 80M / Middle / High Edge ~ High Edge+10

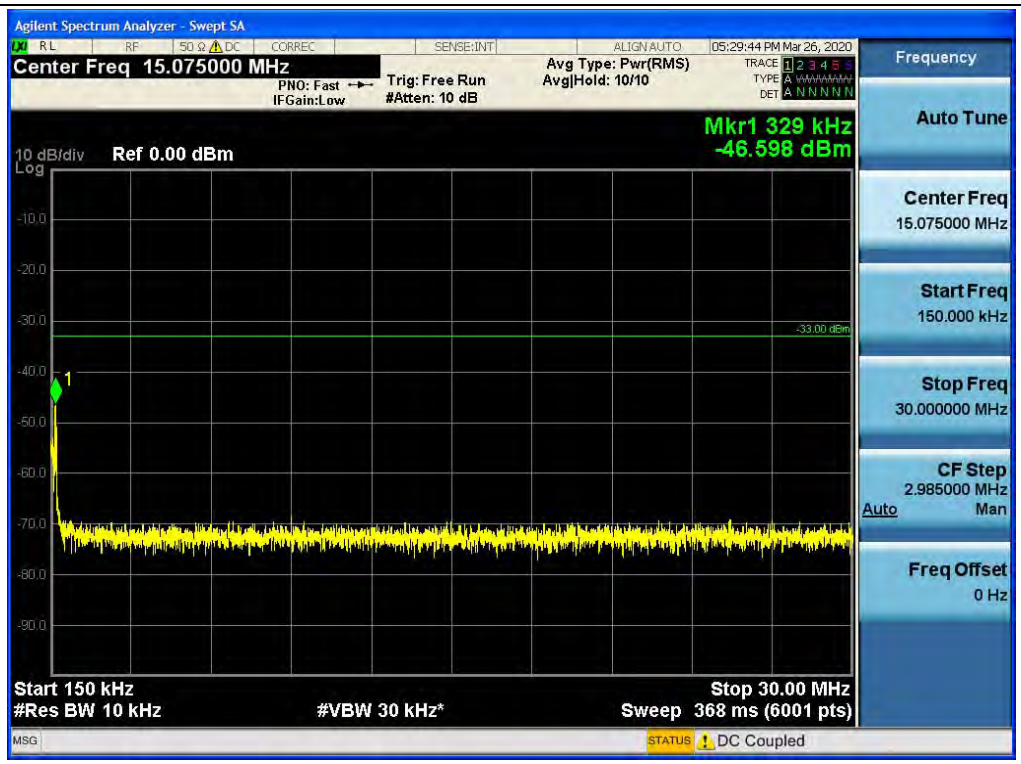


Spurious / CBRS / Downlink / 5G NR 80M / Middle / High Edge+10 ~ 10 GHz

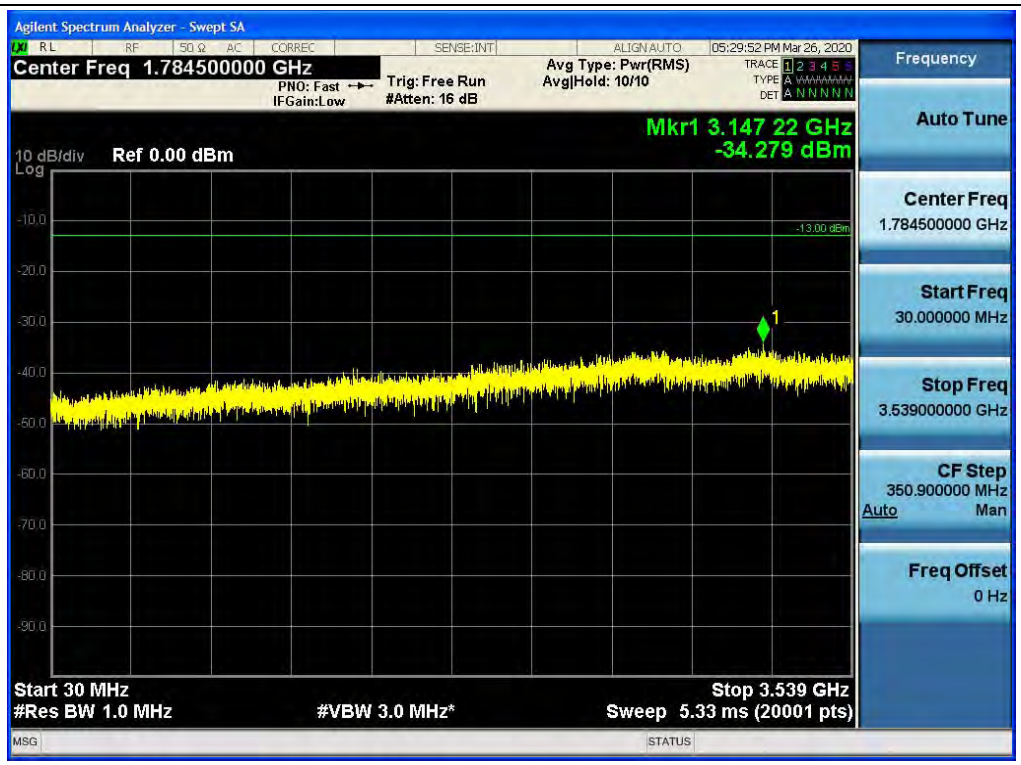
Spurious / CBRS / Downlink / 5G NR 80M / Middle / 10 GHz ~ 26.5 GHz

Spurious / CBRS / Downlink / 5G NR 80M / High / 9 kHz ~ 150 kHz

Spurious / CBRS / Downlink / 5G NR 80M / High / 150 kHz ~ 30 MHz



Spurious / CBRS / Downlink / 5G NR 80M / High / 30 MHz ~ Low Edge-10



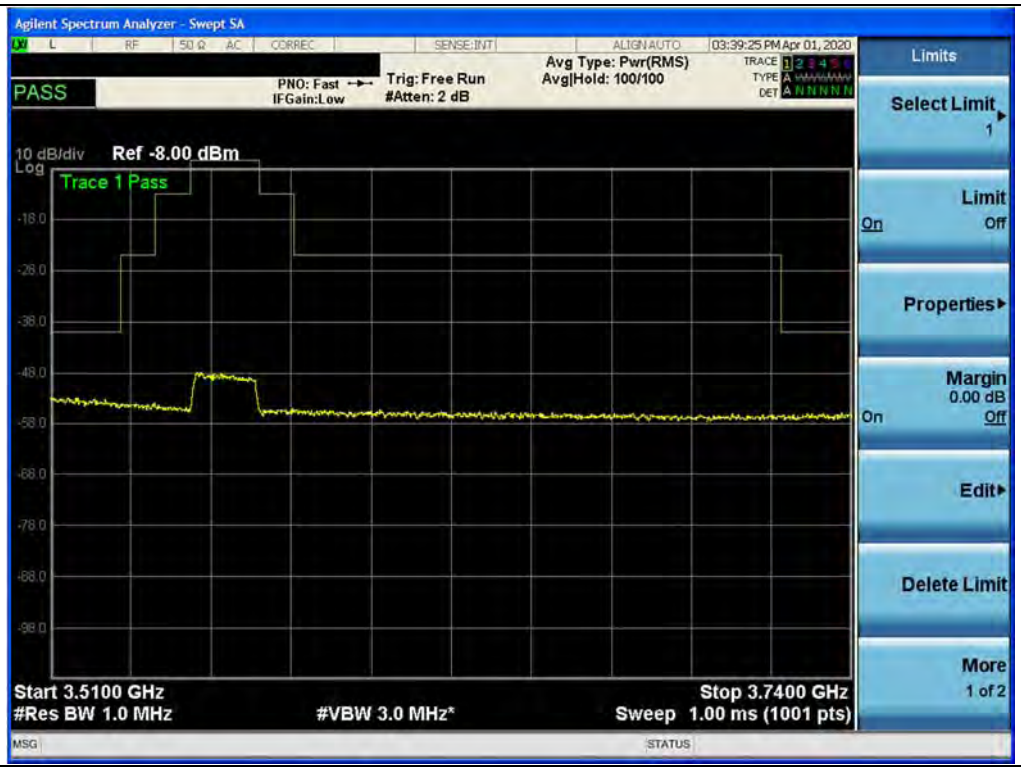
Spurious / CBRS / Downlink / 5G NR 80M / High / Low Edge-10 ~ Low Edge

Spurious / CBRS / Downlink / 5G NR 80M / High / High Edge ~ High Edge+10

Spurious / CBRS / Downlink / 5G NR 80M / High / High Edge+10 ~ 10 GHz

Spurious / CBRS / Downlink / 5G NR 80M / High / 10 GHz ~ 26.5 GHz

Mask / CBRS / Uplink / LTE 20M / Low



Mask / CBRS / Uplink / LTE 20M / Mid

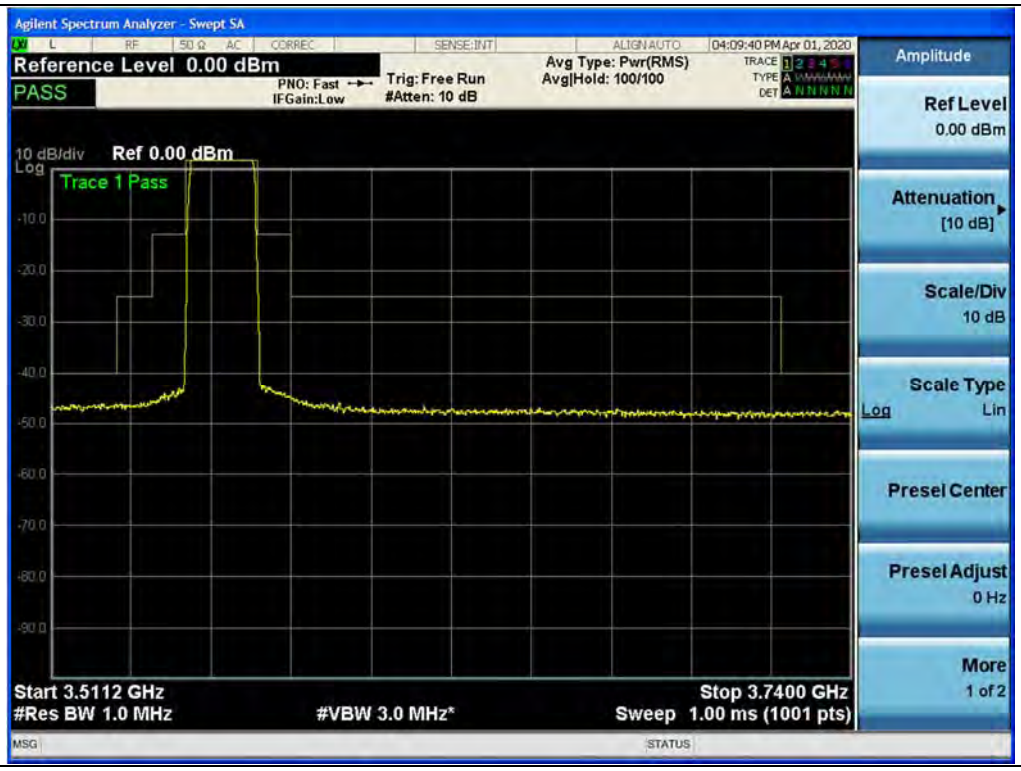
Mask / CBRS / Uplink / LTE 20M / High

Mask / CBRS / Uplink / 5G NR 80M / Low

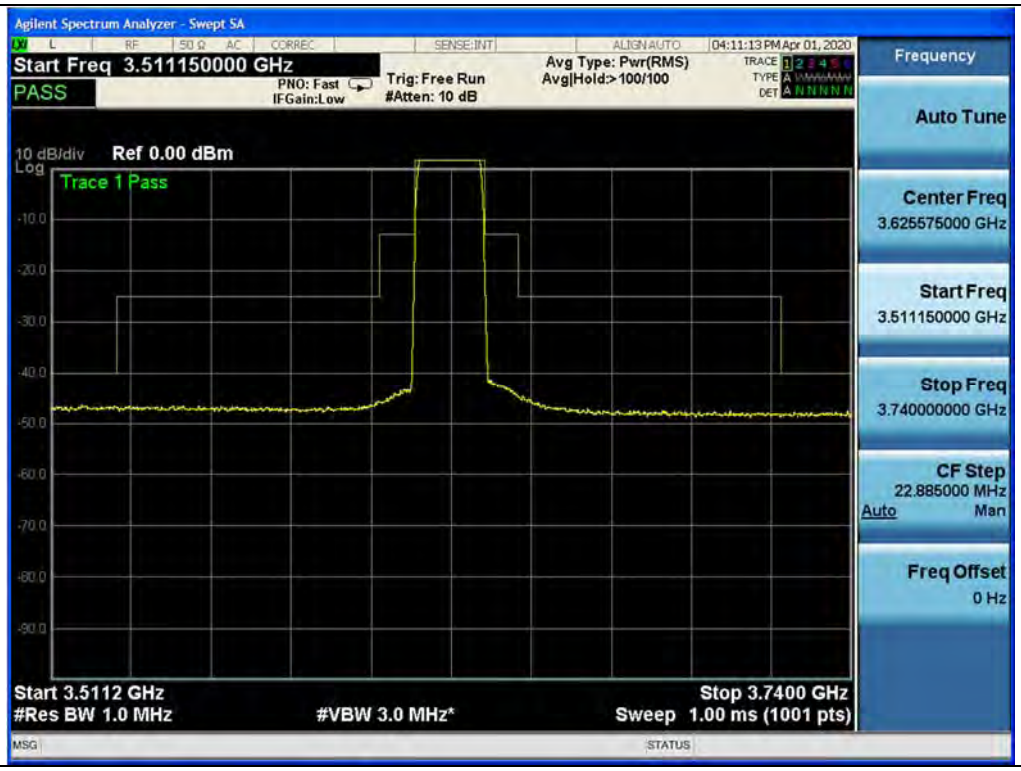
Mask / CBRS / Uplink / 5G NR 80M / Mid

Mask / CBRS / Uplink / 5G NR 80M / High

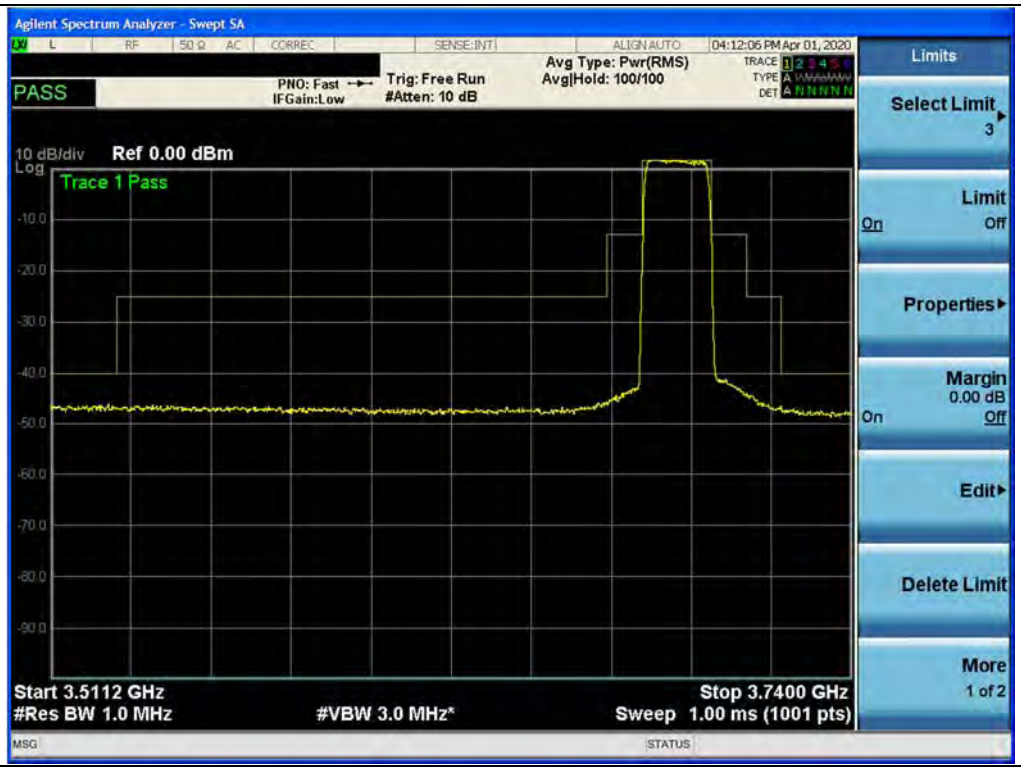
Mask / CBRS / Downlink / LTE 20M / Low



Mask / CBRS / Downlink / LTE 20M / Mid



Mask / CBRS / Downlink / LTE 20M / High



Mask / CBRS / Downlink / 5G NR 80M / Low

Mask / CBRS / Downlink / 5G NR 80M / Mid

Mask / CBRS / Downlink / 5G NR 80M / High

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:

700 Lower

Frequency (MHz)	Measured Level (dBuV)	Ant. Factor (dB/m)	C.L (dB)	A.G. + H.P.F. (dB)	D.F. (dB)	Pol.	Measured Power (dBm)	Result (dBm/m)
2,949.16	53.21	28.300	7.08	41.38	1.94	H	-41.99	-46.050
5,898.50	48.11	32.400	10.50	38.60	1.94	H	-47.09	-40.852

700 Upper

Frequency (MHz)	Measured Level (dBuV)	Ant. Factor (dB/m)	C.L (dB)	A.G. + H.P.F. (dB)	D.F. (dB)	Pol.	Measured Power (dBm)	Result (dBm/m)
2,335.63	56.80	28.550	7.45	38.62	1.94	H	-38.40	-39.080
5,898.50	44.01	32.400	10.50	38.60	1.94	H	-51.19	-44.952

ESMR

Frequency (MHz)	Measured Level (dBuV)	Ant. Factor (dB/m)	C.L (dB)	A.G. + H.P.F. (dB)	D.F. (dB)	Pol.	Measured Power (dBm)	Result (dBm/m)
2,112.50	54.09	27.200	5.82	43.08	1.94	H	-41.11	-49.230
2,949.44	48.28	28.300	7.08	41.38	1.94	H	-46.92	-50.980
5,898.13	43.98	32.400	10.50	38.60	1.94	H	-51.22	-44.982
8,847.50	38.93	37.600	13.19	37.65	1.94	H	-56.27	-41.190

* C.L.: Cable Loss / A.G.: Amp. Gain / H.P.F.: High Pass Filter / D.F.: Distance Factor (3.75 m)

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.

PCS

Frequency (MHz)	Measured Level (dBuV)	Ant. Factor (dB/m)	C.L (dB)	A.G. + H.P.F. (dB)	D.F. (dB)	Pol.	Measured Power (dBm)	Result (dBm/m)
5,898.50	42.25	28.780	7.28	40.18	1.94	H	-52.95	-55.130
7,222.06	38.22	36.080	11.74	37.95	1.94	H	-56.98	-45.170
8,846.88	37.77	37.600	13.19	37.65	1.94	H	-57.43	-42.350
11,796.88	34.15	38.800	15.77	35.66	1.94	H	-61.05	-40.200

AWS

Frequency (MHz)	Measured Level (dBuV)	Ant. Factor (dB/m)	C.L (dB)	A.G. + H.P.F. (dB)	D.F. (dB)	Pol.	Measured Power (dBm)	Result (dBm/m)
5,898.13	42.63	32.400	10.50	38.60	1.94	H	-52.57	-46.332
8,848.13	38.93	37.600	13.19	37.65	1.94	H	-56.27	-41.190

BRS

Frequency (MHz)	Measured Level (dBuV)	Ant. Factor (dB/m)	C.L (dB)	A.G. + H.P.F. (dB)	D.F. (dB)	Pol.	Measured Power (dBm)	Result (dBm/m)
5,898.13	43.46	32.400	10.50	38.60	1.94	H	-51.74	-45.502
6,198.13	48.95	32.700	10.76	38.56	1.94	H	-46.25	-39.410
8,847.50	39.81	37.600	13.19	37.65	1.94	H	-55.39	-40.310
12,395.63	37.47	38.410	16.30	35.28	1.94	H	-57.73	-36.360

* C.L.: Cable Loss / A.G.: Amp. Gain / H.P.F.: High Pass Filter / D.F.: Distance Factor (3.75 m)

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.

CBRS

Frequency (MHz)	Measured Level (dBuV)	Ant. Factor (dB/m)	C.L (dB)	A.G. + H.P.F. (dB)	D.F. (dB)	Pol.	Measured Power (dBm)	Result (dBm/m)
8,847.50	50.02	37.600	13.19	37.65	1.94	H	-45.18	-30.100
11,796.88	45.97	38.800	15.77	35.66	1.94	H	-49.23	-28.380
16,435.63	47.60	38.190	19.34	36.75	1.94	H	-47.60	-24.880

* C.L.: Cable Loss / A.G.: Amp. Gain / H.P.F.: High Pass Filter / D.F.: Distance Factor (3.75 m)

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.

5.7. End User Device Additional Requirements

Test Requirements:

§ 96.47 End User Device Additional Requirements

(a) End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation.

(1) An End User Device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD.

(b) Any device operated at higher power than specified for End User Devices in § 96.41 will be classified as, and subject to, the operational requirements of a CBSD.

Test Procedures:

KDB 940660 D01 v02, WINNF-TS-0122 V1.0.1

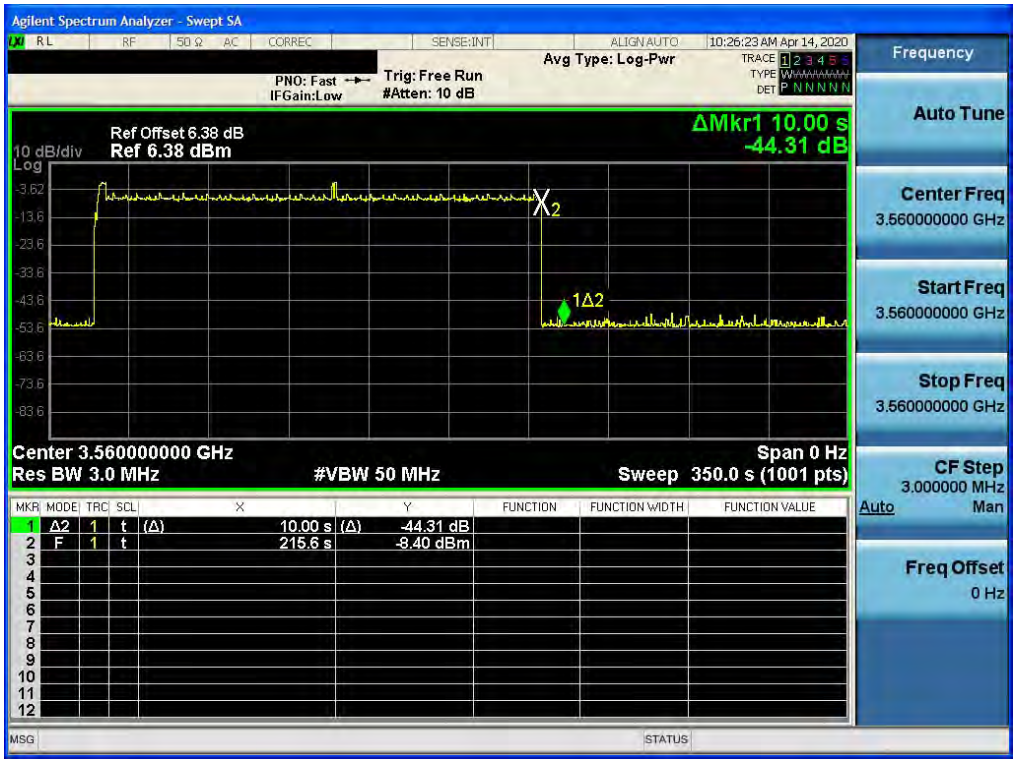
The EUT was connected via an RF Cable to a certified CBSD and spectrum analyzer.

The following procedure is performed by applying WINNF-TS-0122 CBRS CBSD Test Specification.

Note

This EUT is a repeater, but tested according to Part 96.47.

Frequency of Operations



Discontinues Operations within 10s

6. Annex A_EUT AND TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2004-FC046-P