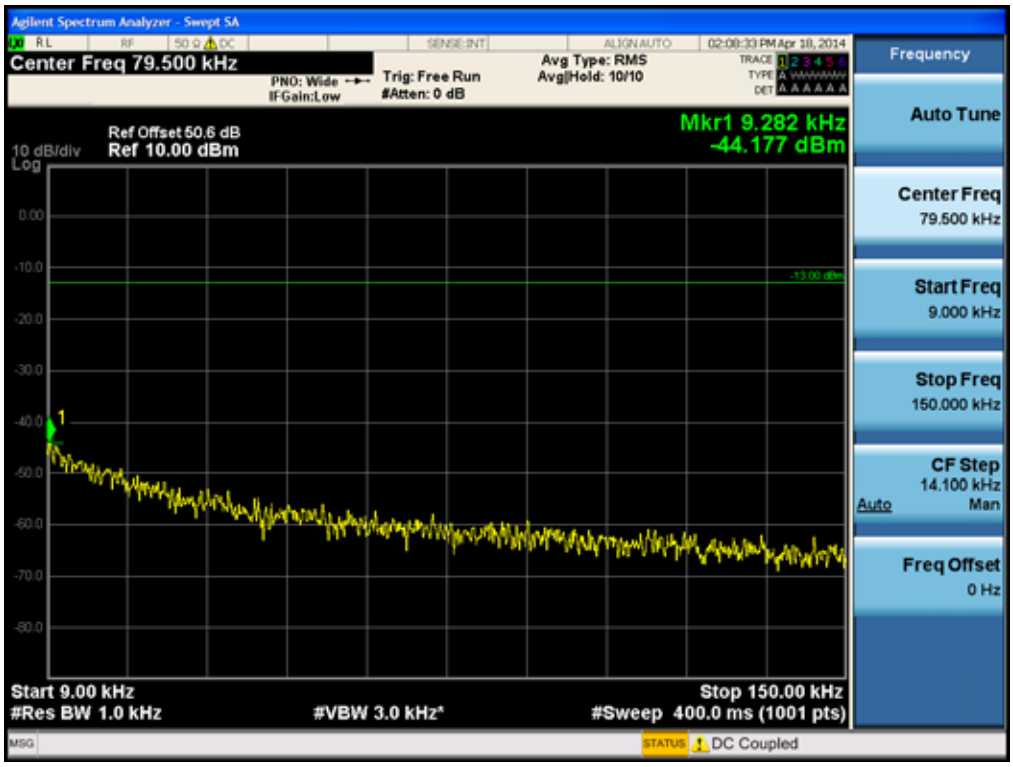
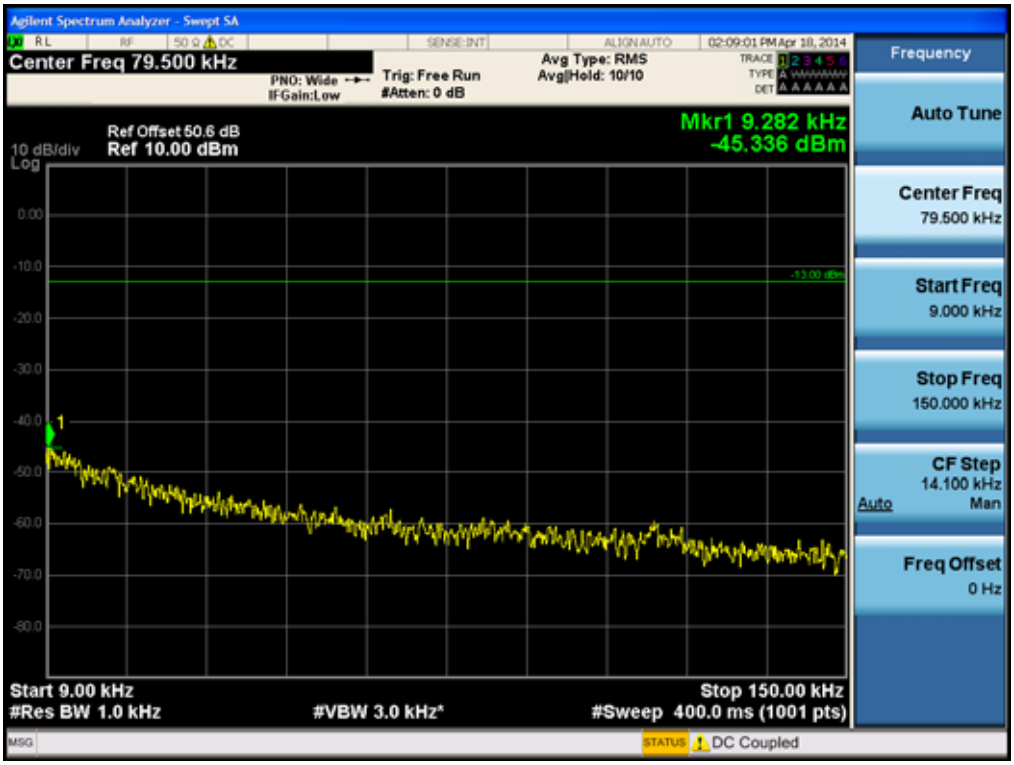
[LTE Uplink 15 MHz Middle]

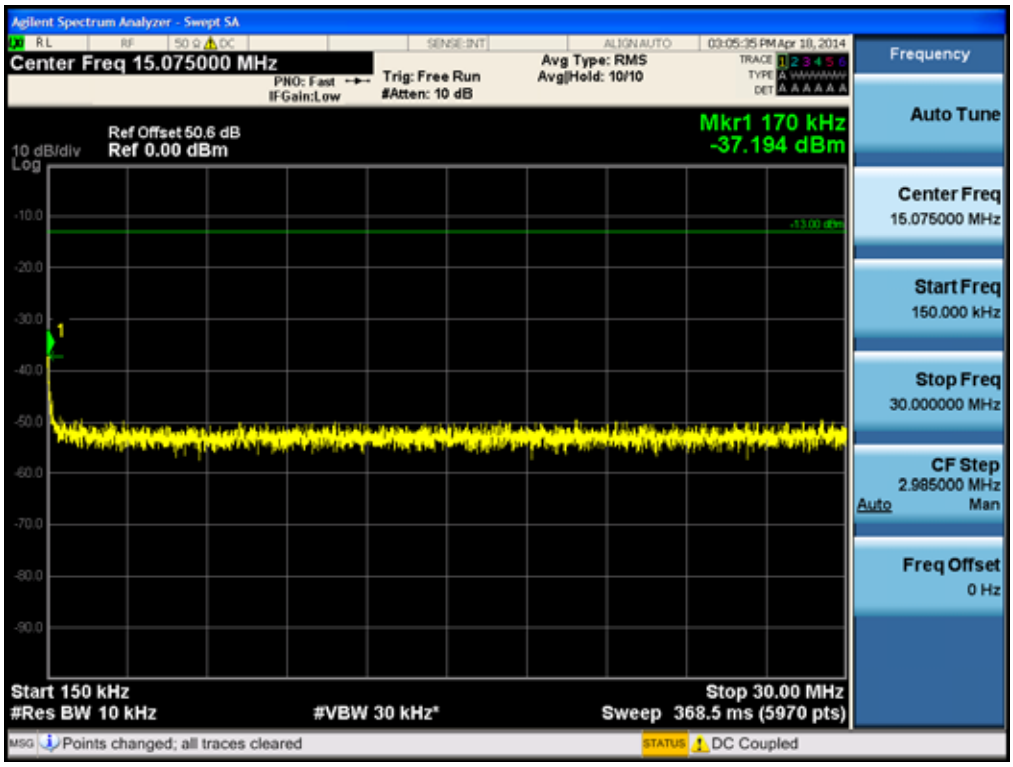


[LTE Uplink 15 MHz High]

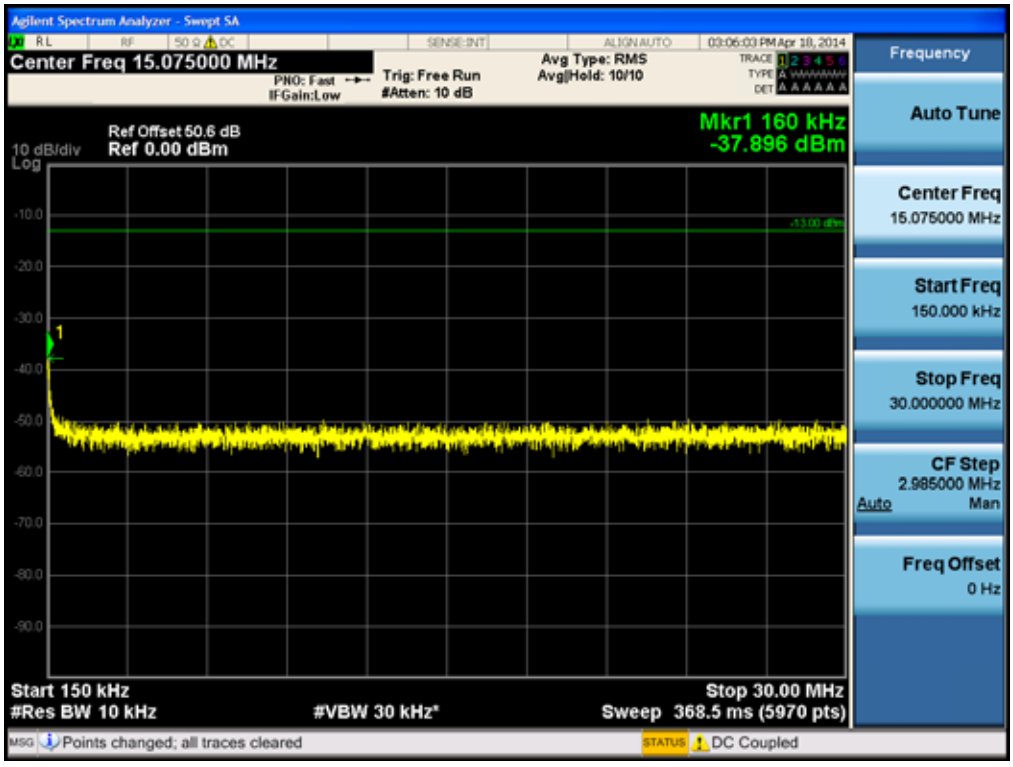


Conducted Spurious Emissions (150 kHz – 30 MHz)

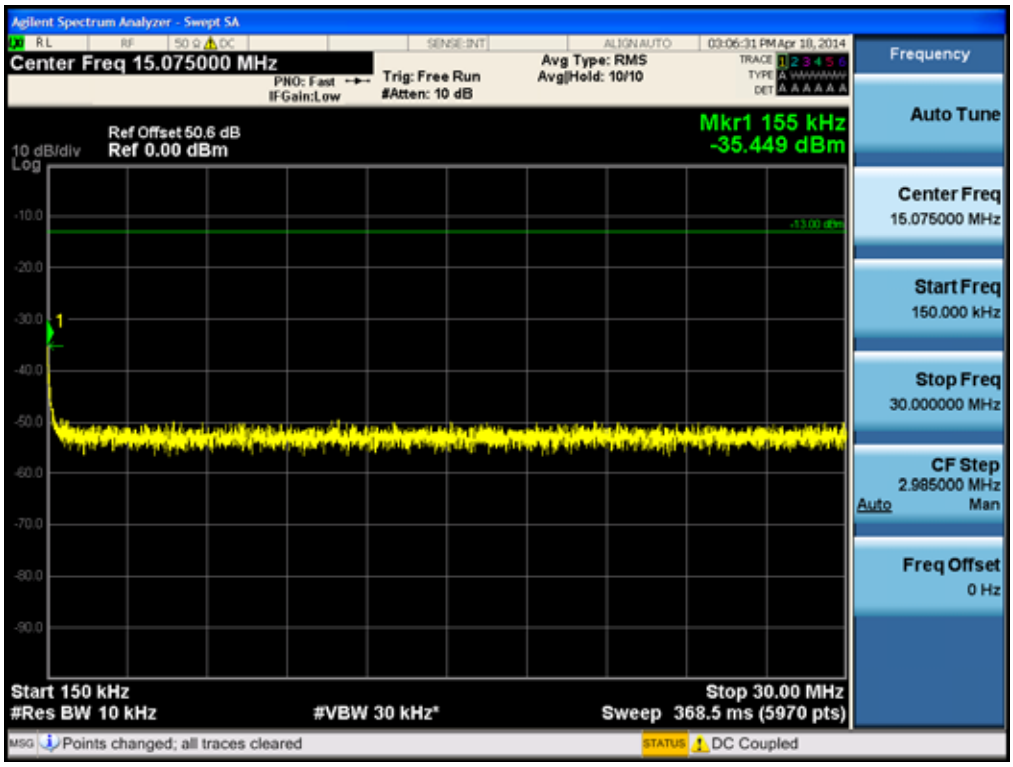
[CDMA Downlink Low]



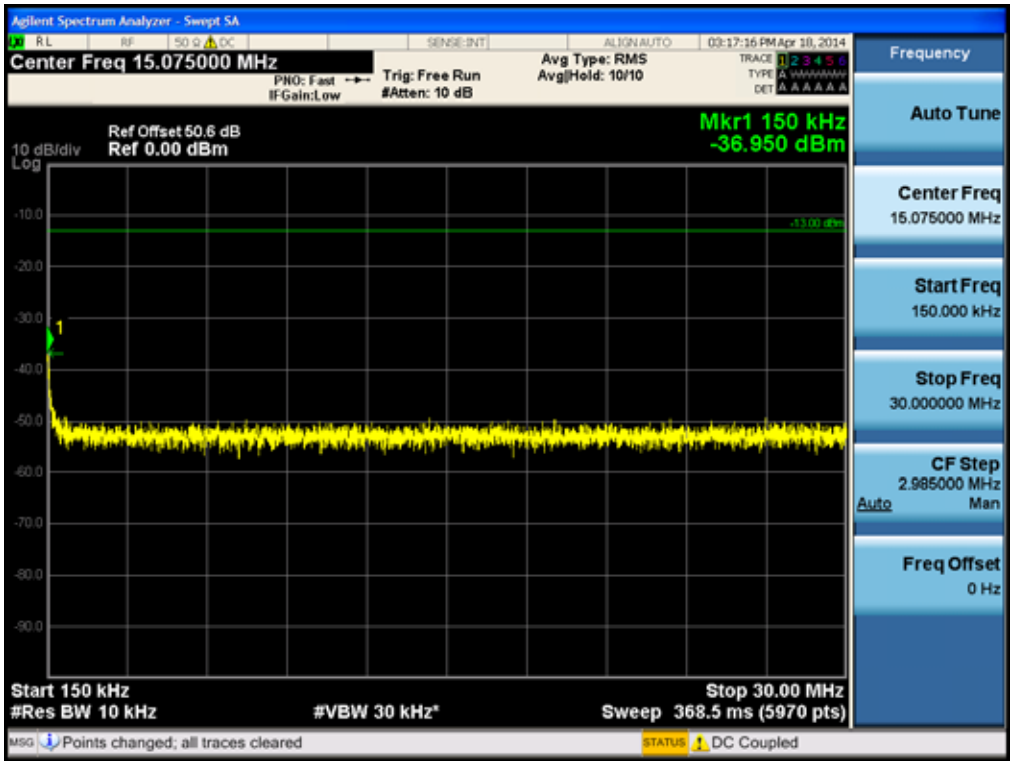
[CDMA Downlink Middle]



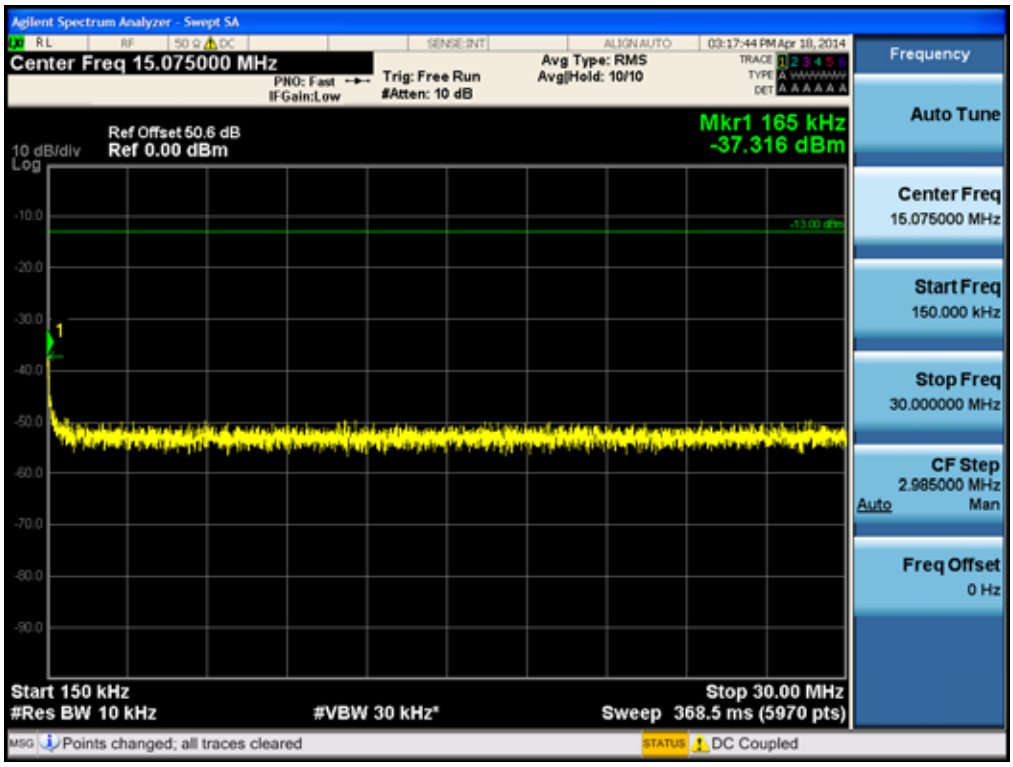
[CDMA Downlink High]



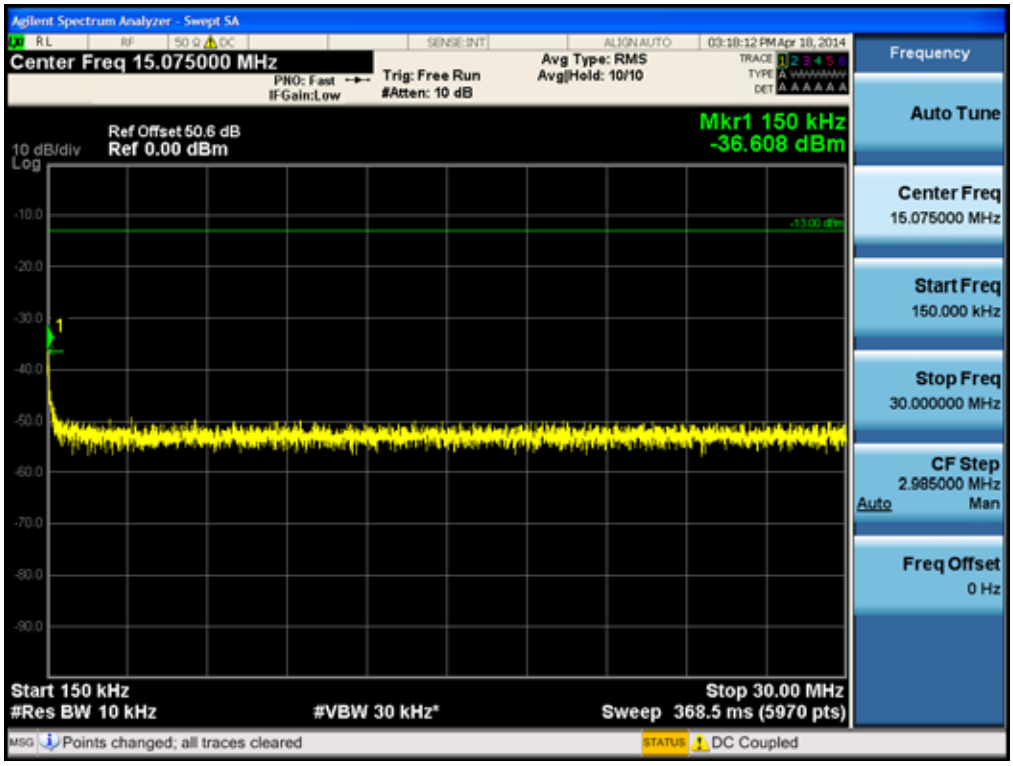
[WCDMA Downlink Low]



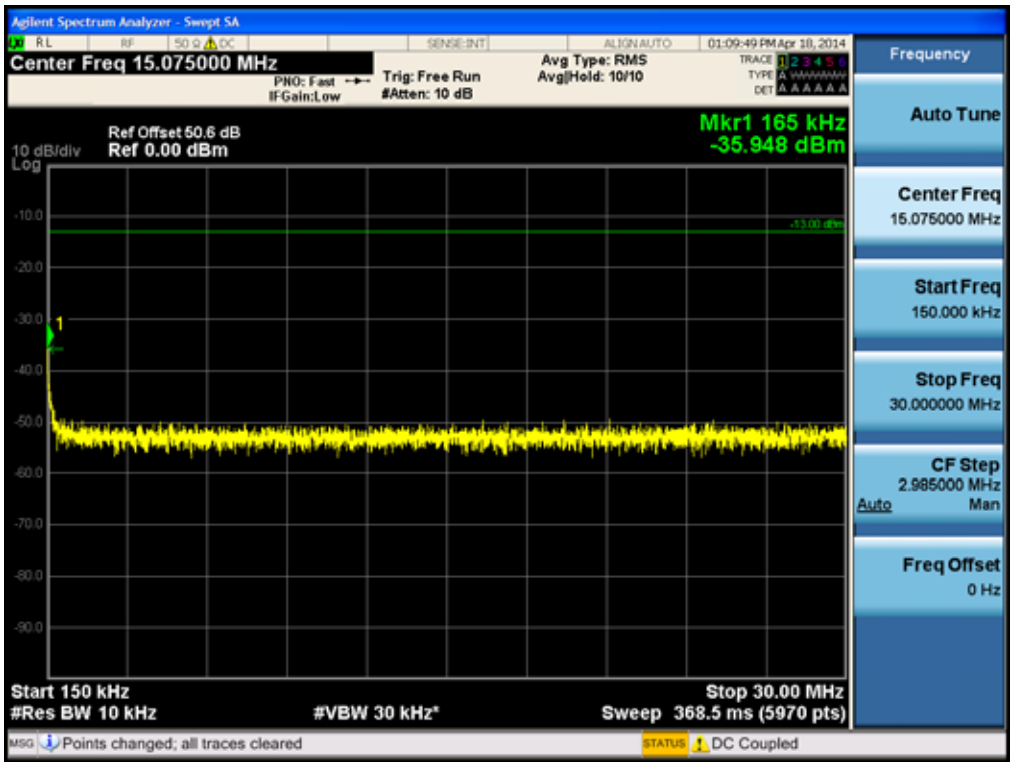
[WCDMA Downlink Middle]



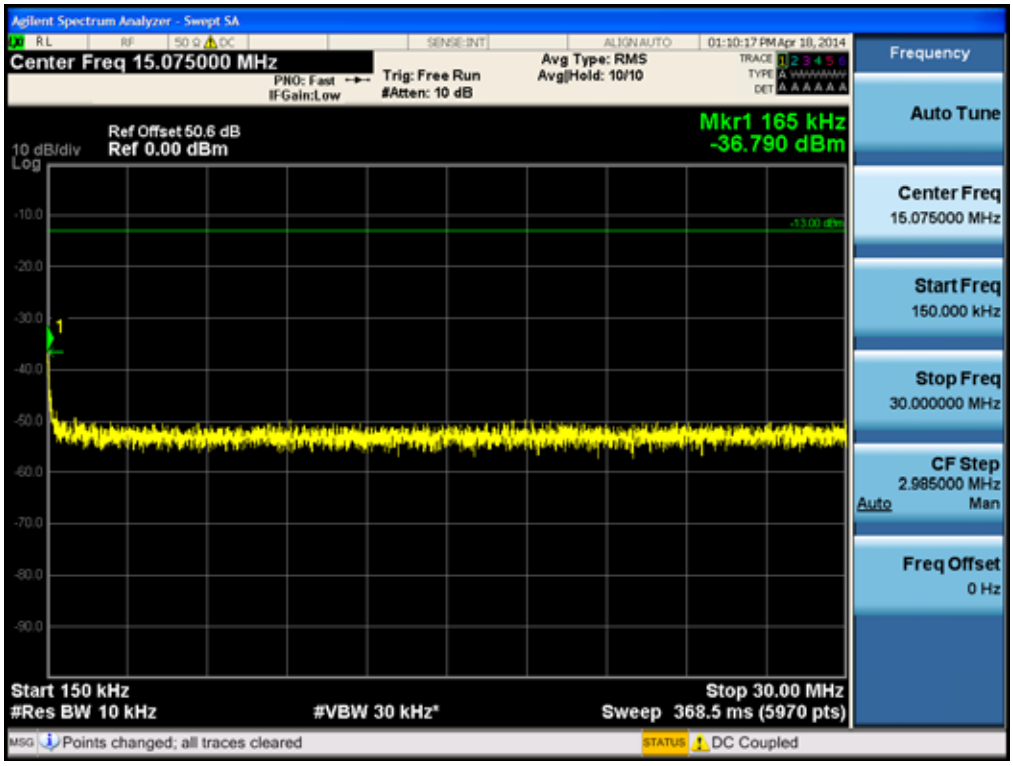
[WCDMA Downlink High]



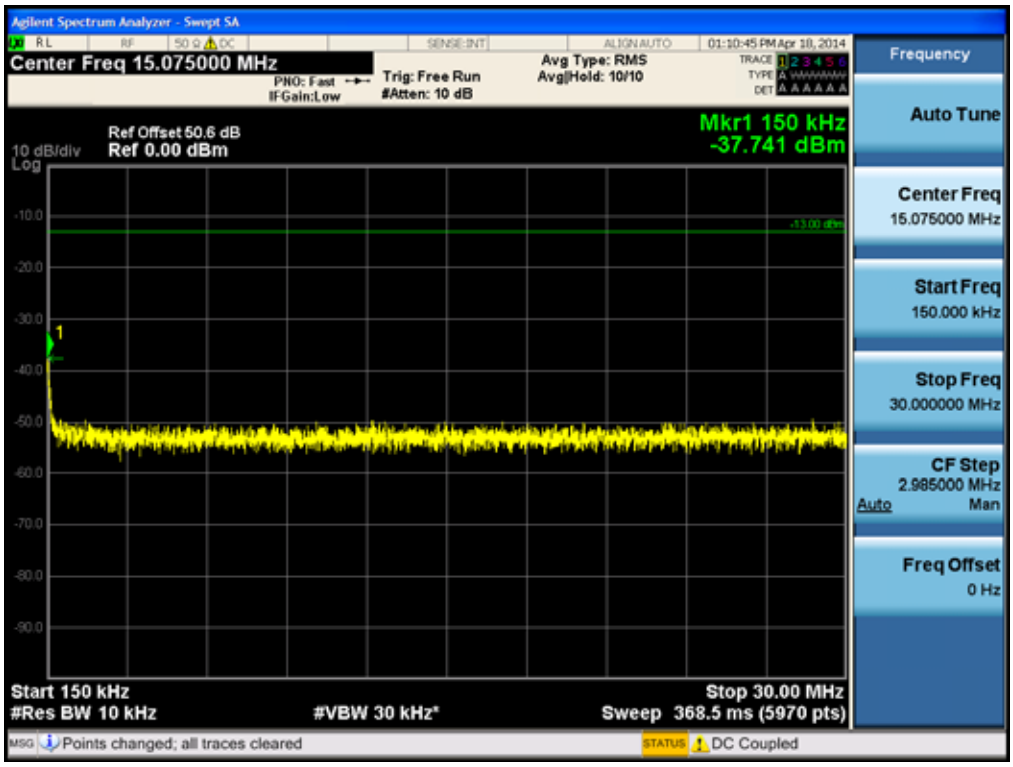
[LTE Downlink 5 MHz Low]



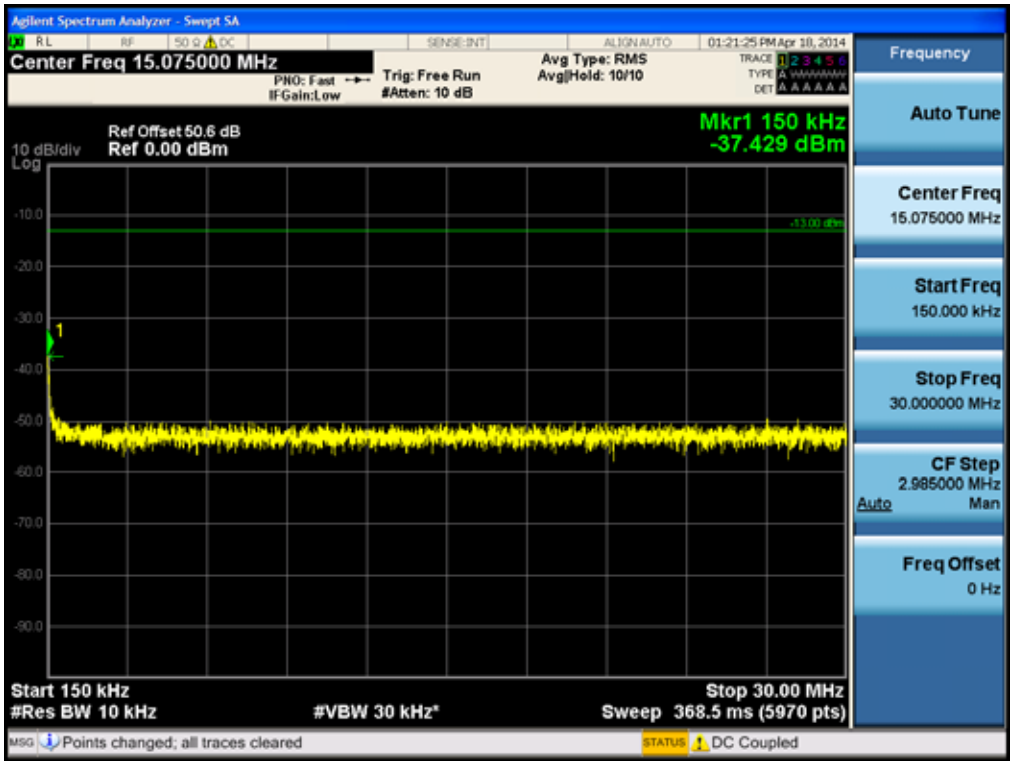
[LTE Downlink 5 MHz Middle]



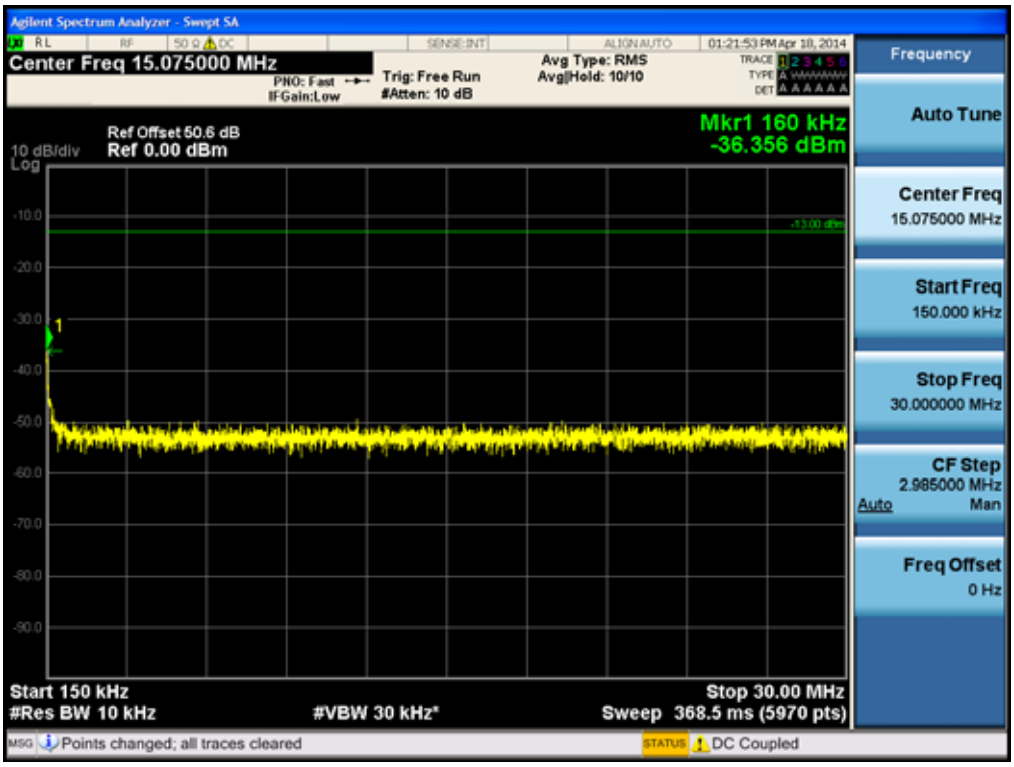
[LTE Downlink 5 MHz High]



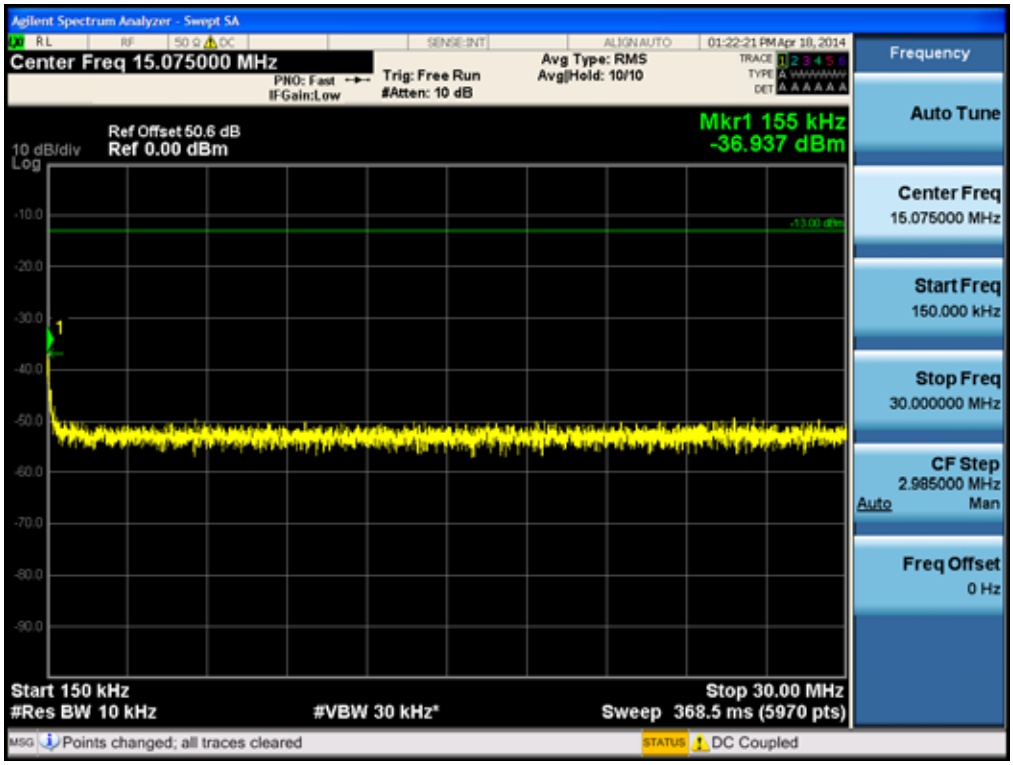
[LTE Downlink 10 MHz Low]



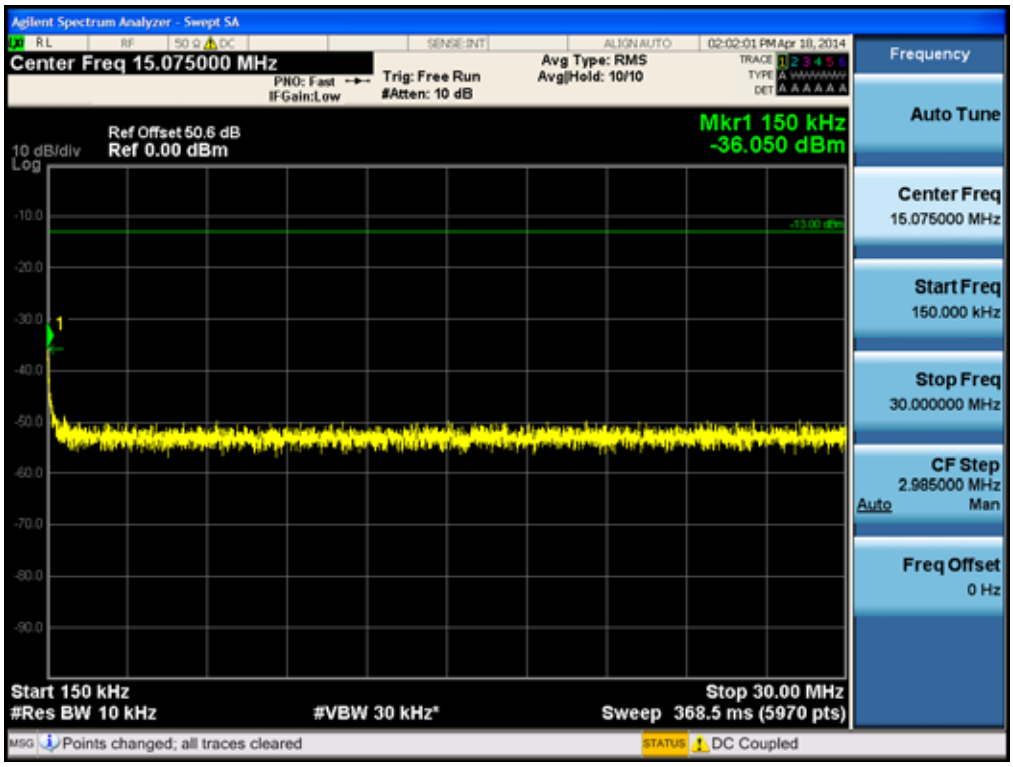
[LTE Downlink 10 MHz Middle]



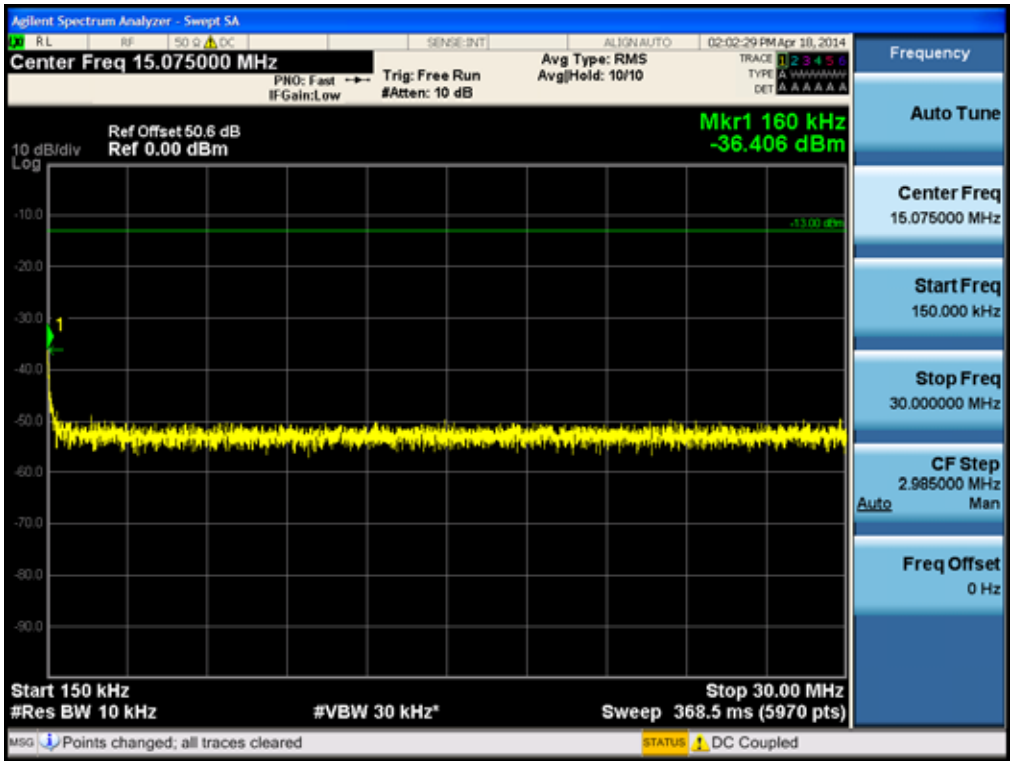
[LTE Downlink 10 MHz High]



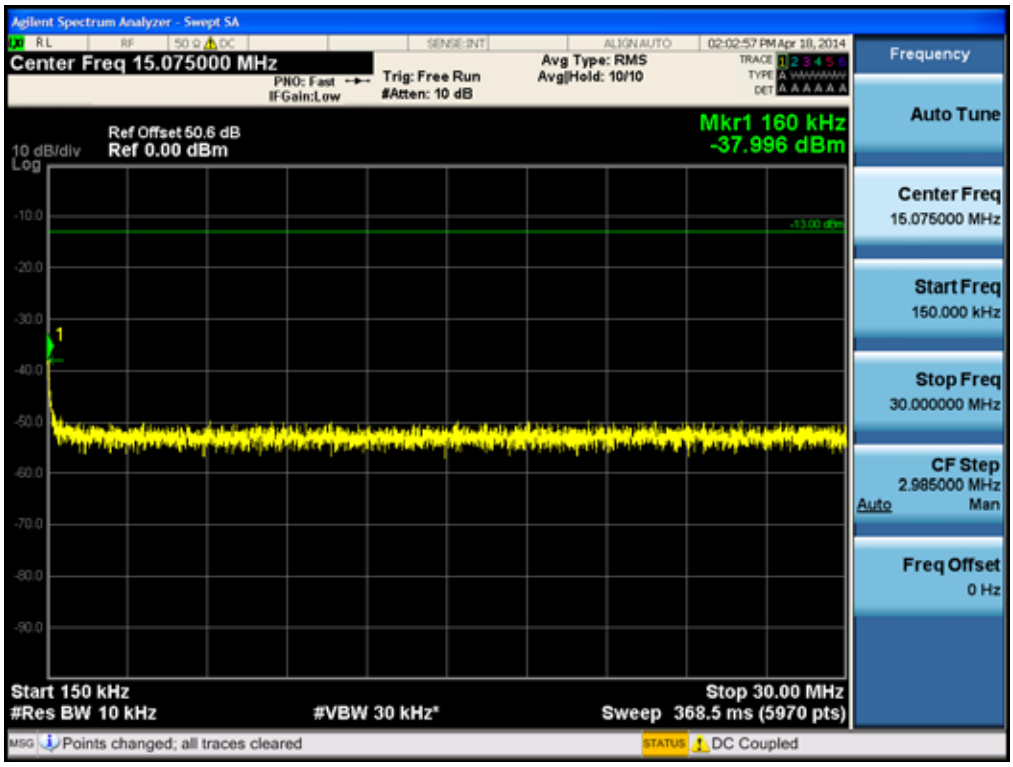
[LTE Downlink 15 MHz Low]



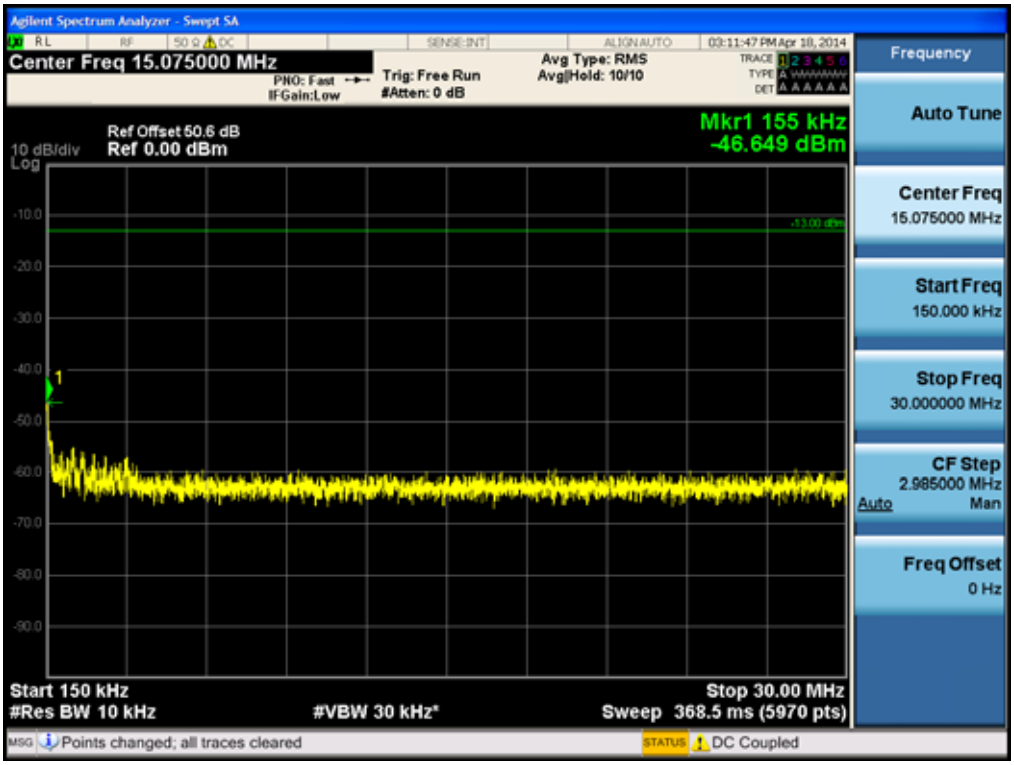
[LTE Downlink 15 MHz Middle]



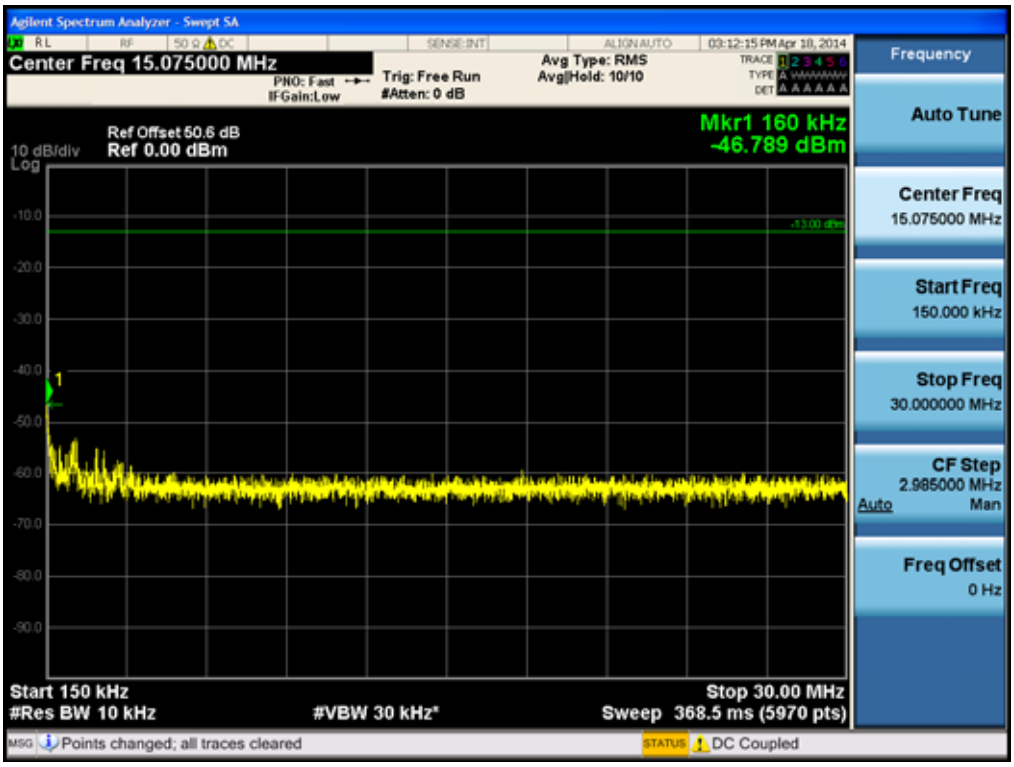
[LTE Downlink 15 MHz High]



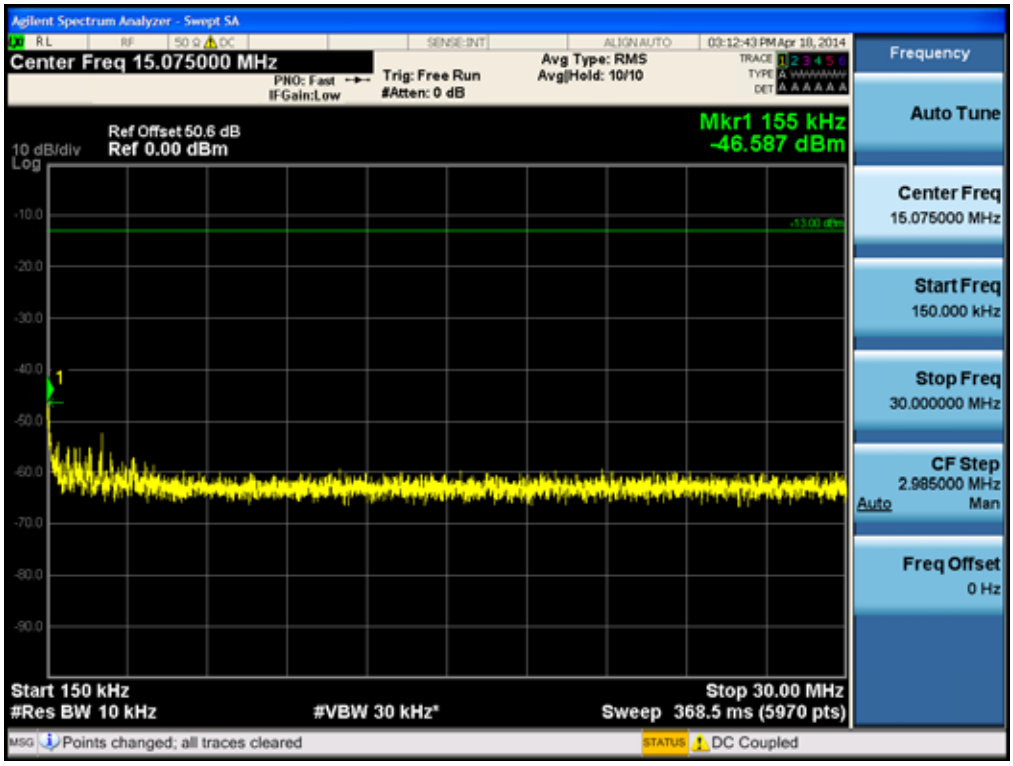
[CDMA Uplink Low]



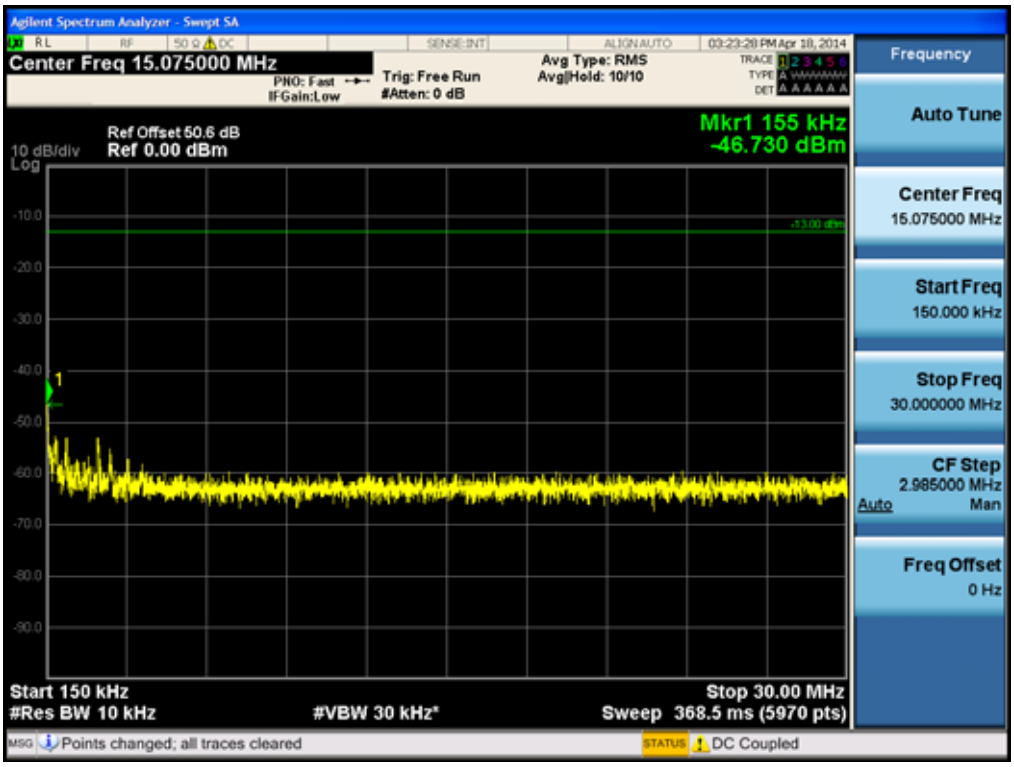
[CDMA Uplink Middle]



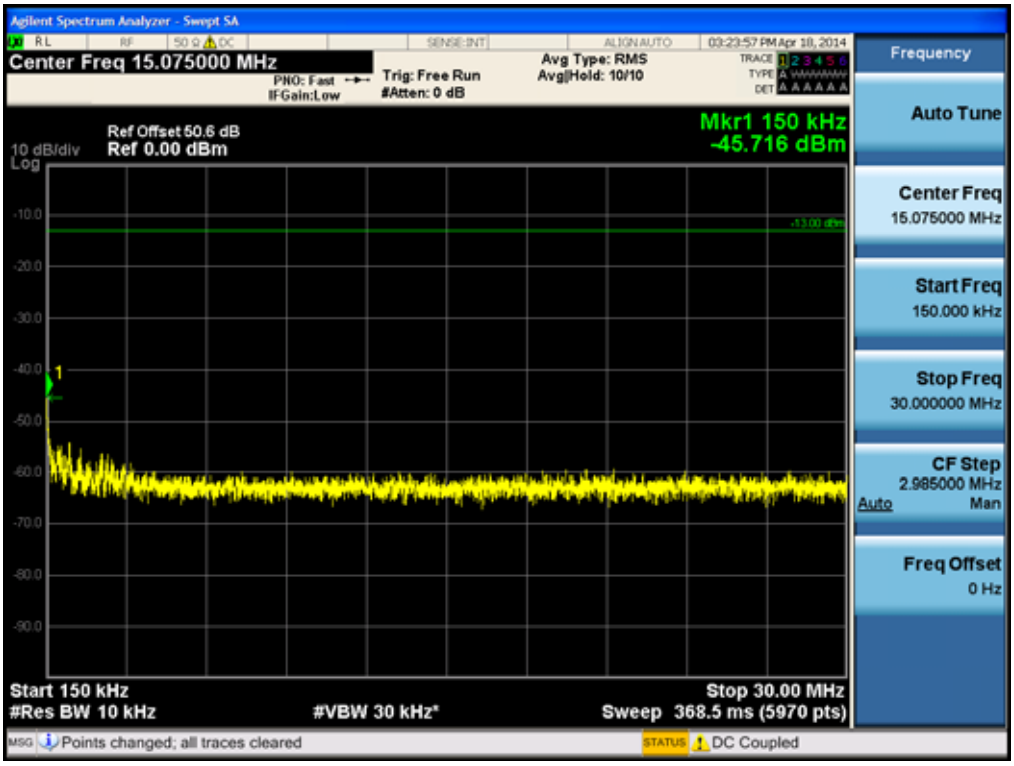
[CDMA Uplink High]



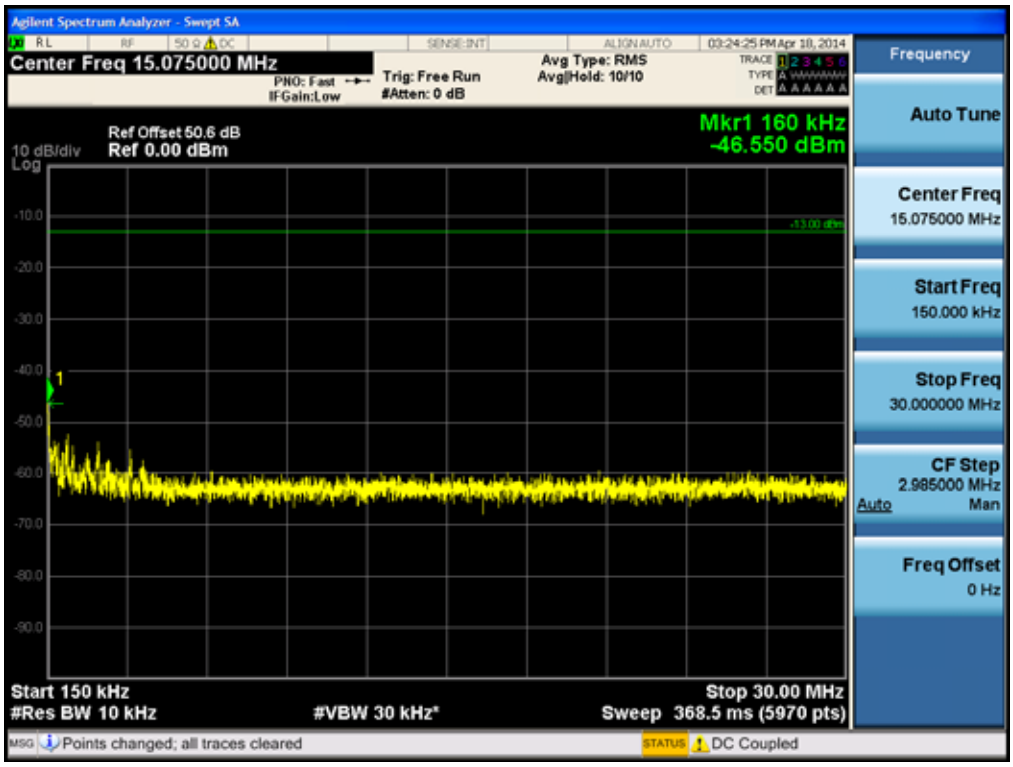
[WCDMA Uplink Low]



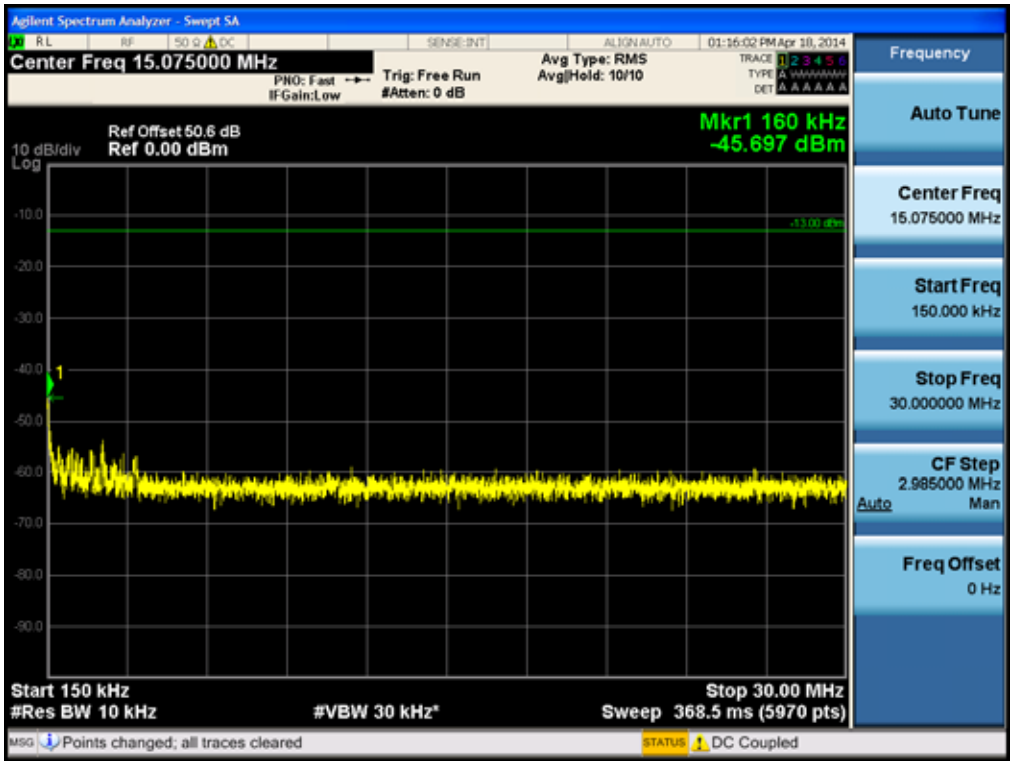
[WCDMA Uplink Middle]



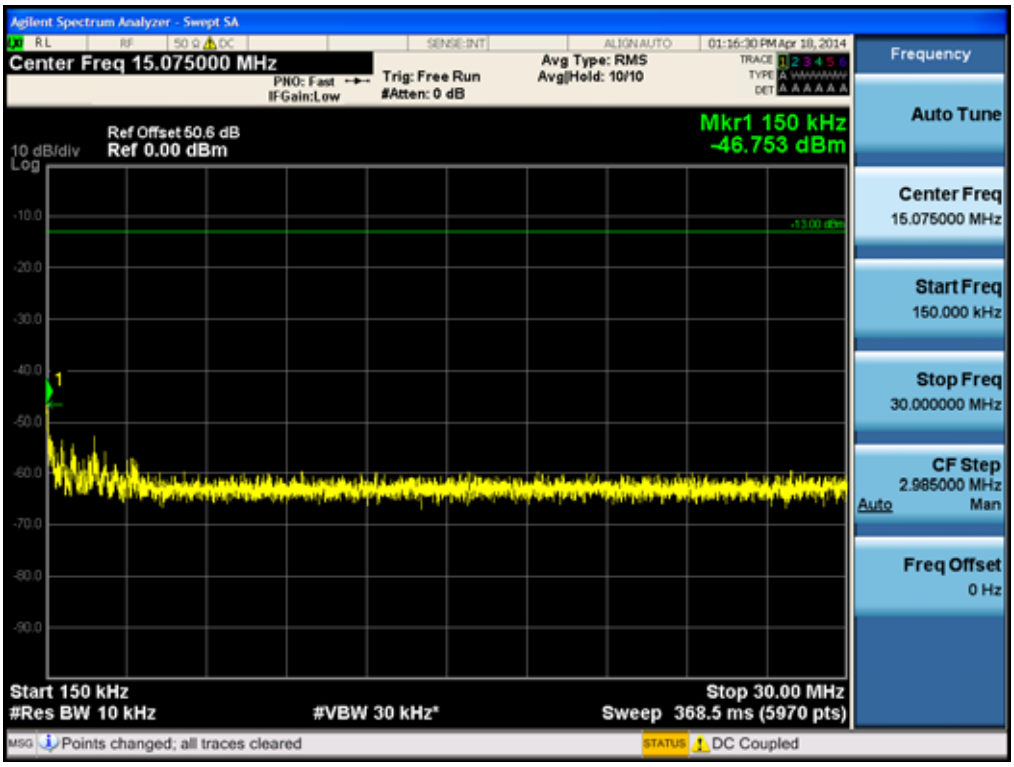
[WCDMA Uplink High]



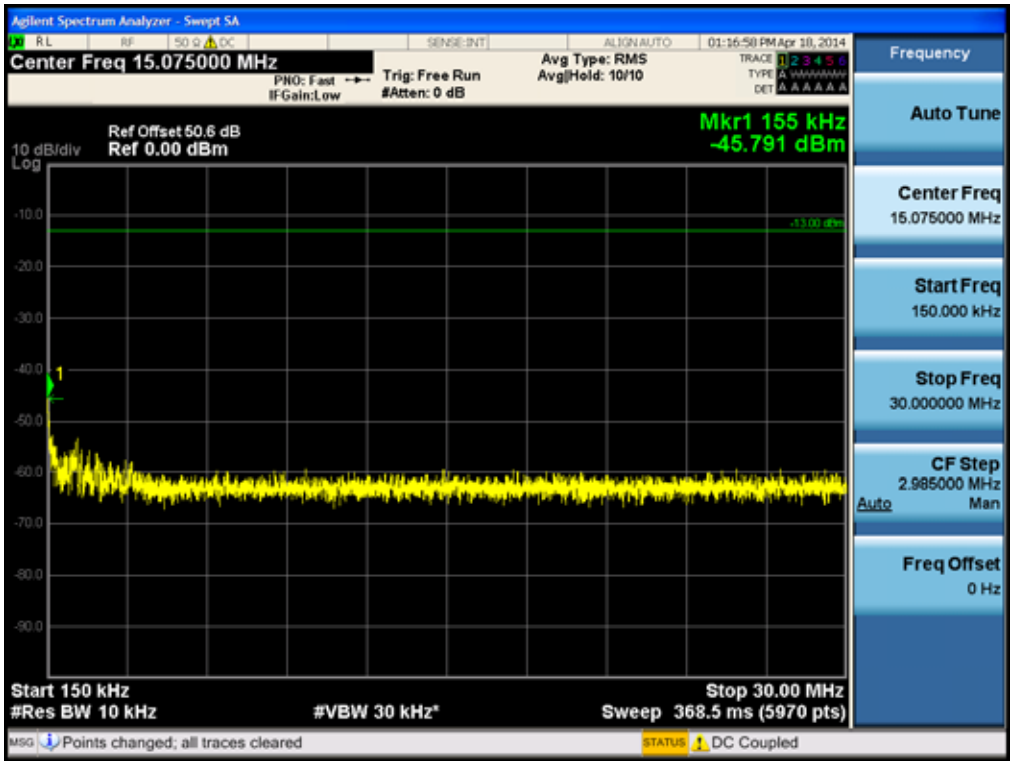
[LTE Uplink 5 MHz Low]



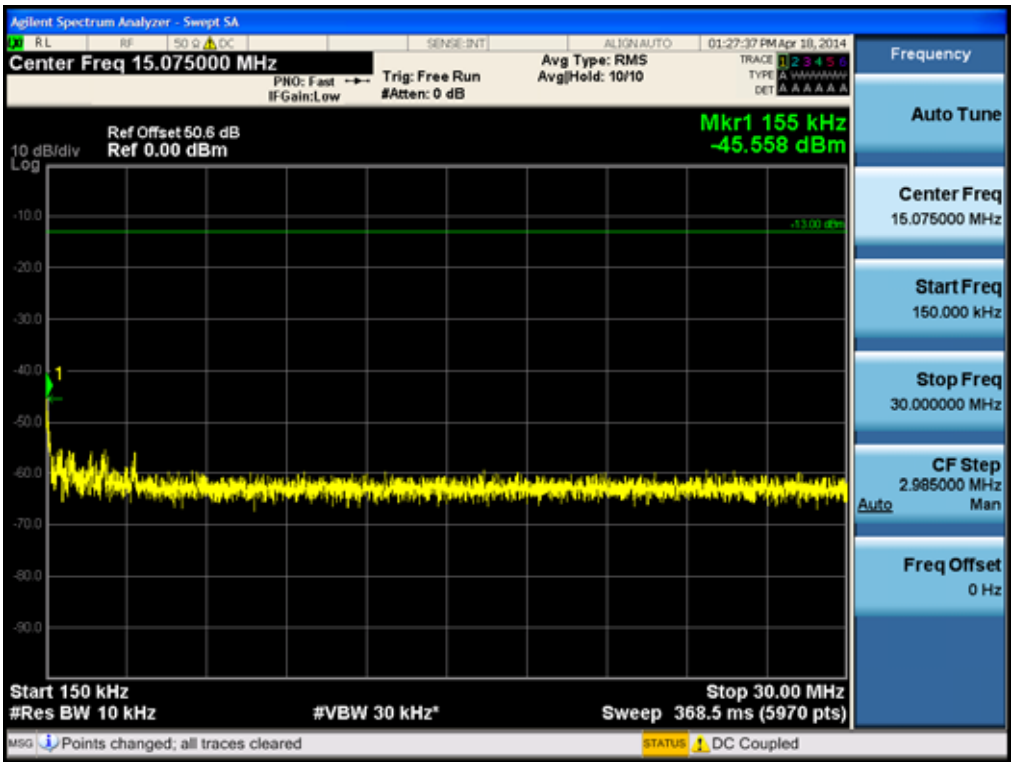
[LTE Uplink 5 MHz Middle]



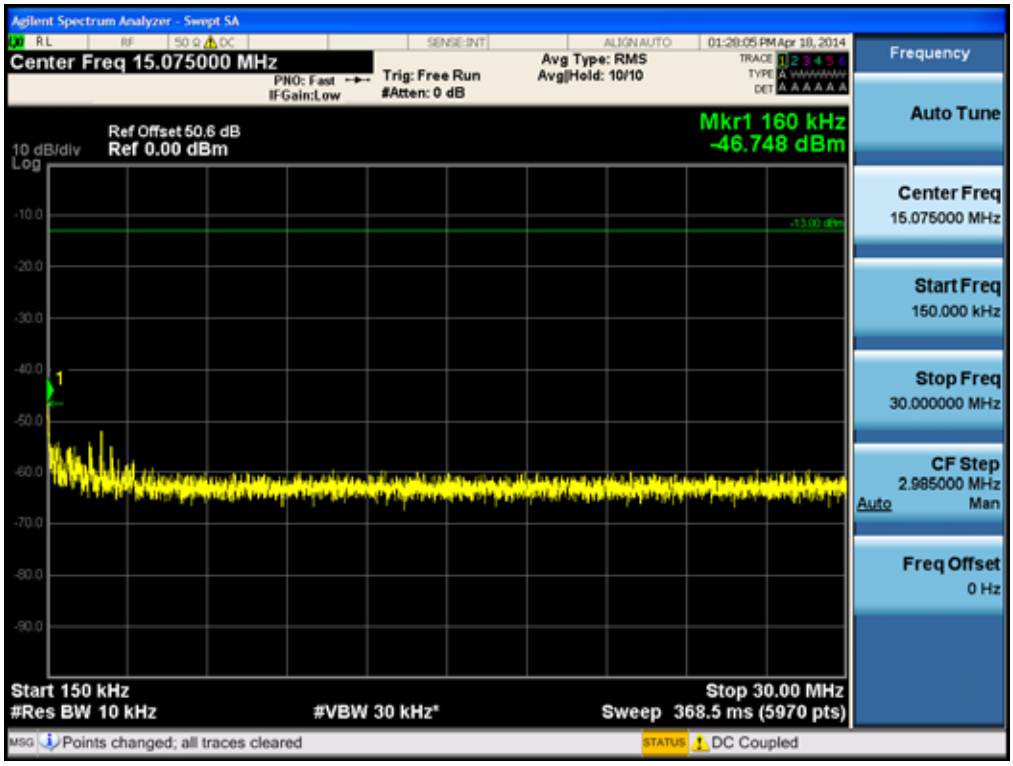
[LTE Uplink 5 MHz High]



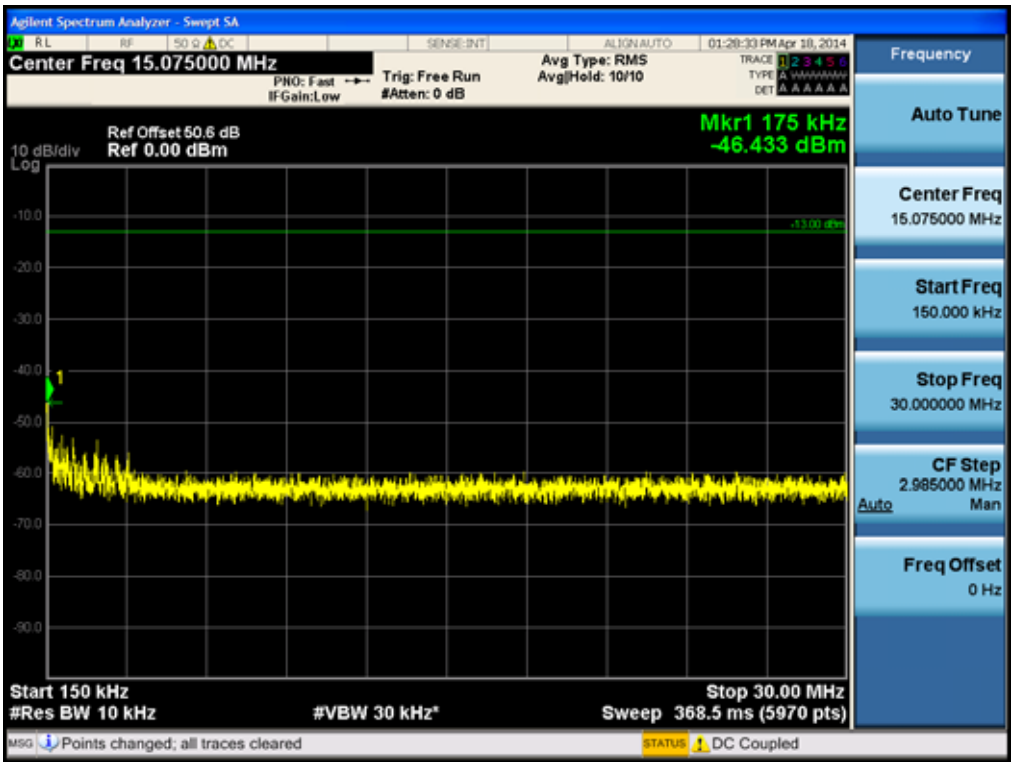
[LTE Uplink 10 MHz Low]



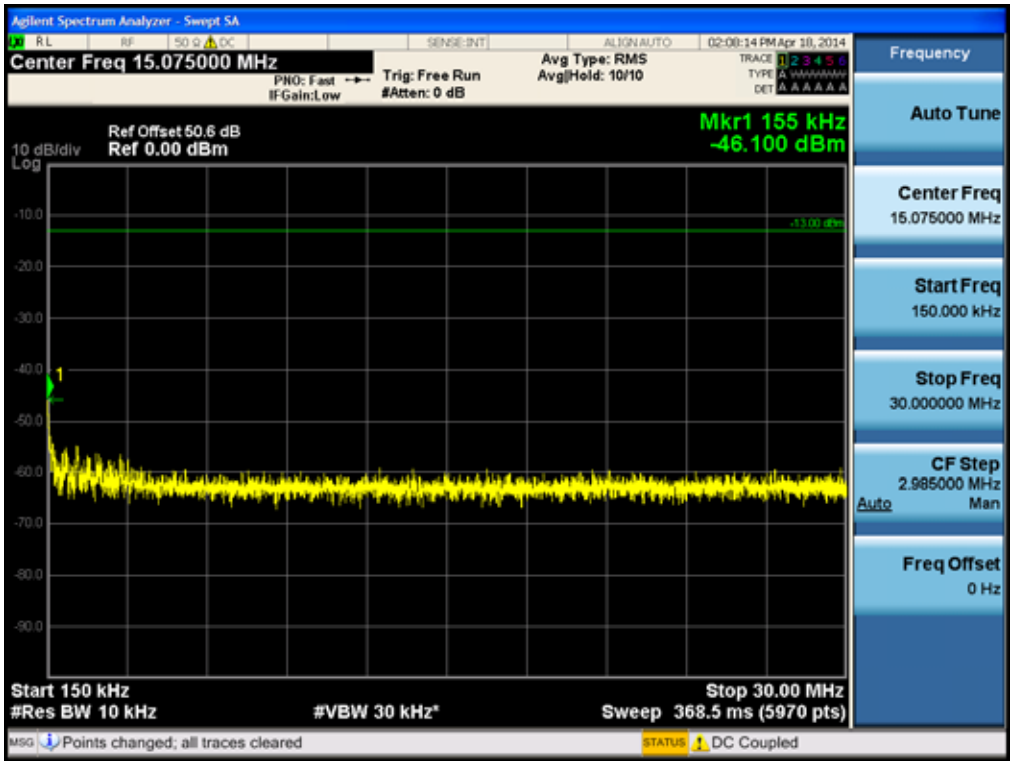
[LTE Uplink 10 MHz Middle]



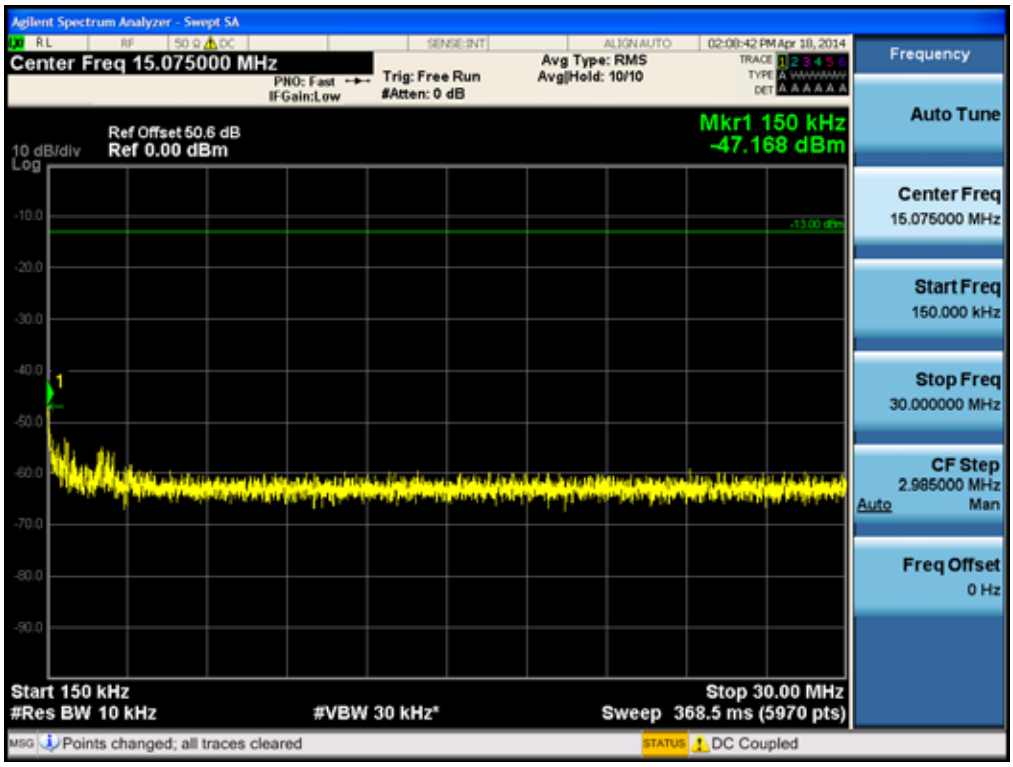
[LTE Uplink 10 MHz High]



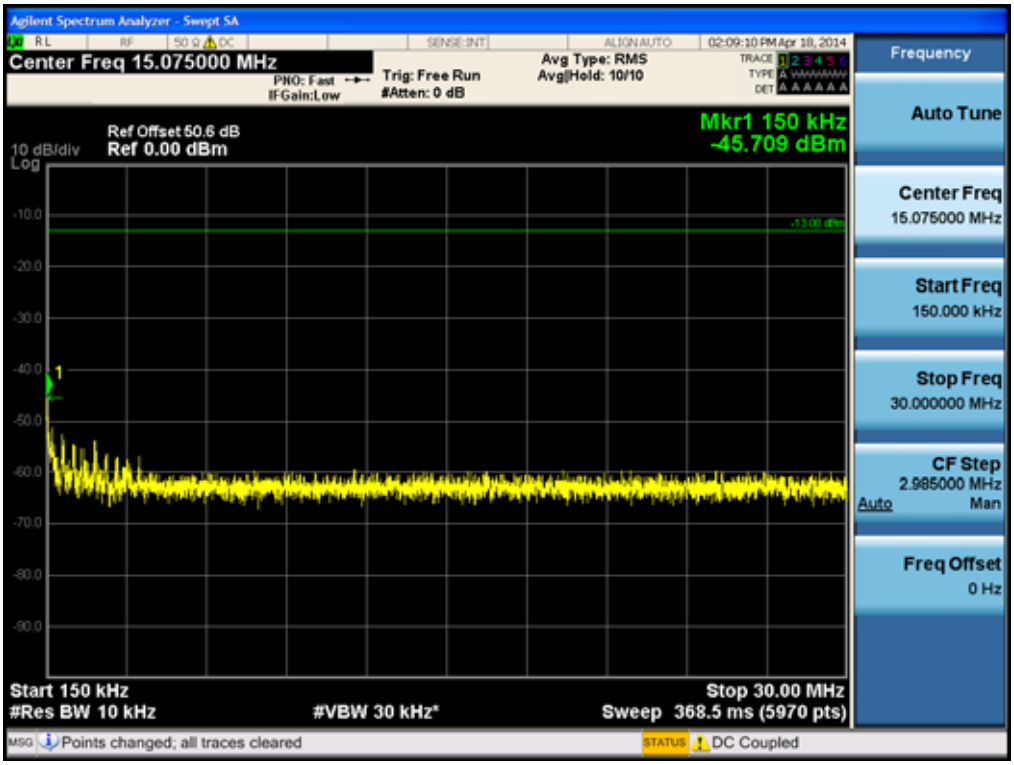
[LTE Uplink 15 MHz Low]



[LTE Uplink 15 MHz Middle]



[LTE Uplink 15 MHz High]



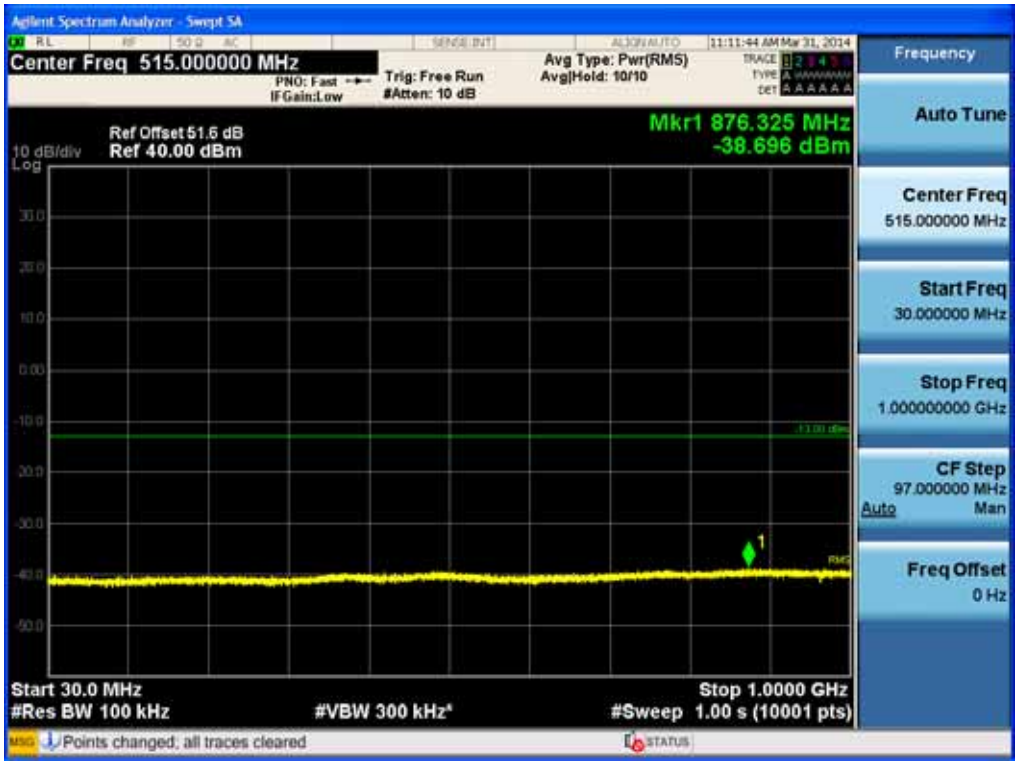
Conducted Spurious Emissions (30 MHz – 1 GHz)

[CDMA Downlink Low]

[CDMA Downlink Middle]

[CDMA Downlink High]

[WCDMA Downlink Low]



[WCDMA Downlink Middle]

[WCDMA Downlink High]

[LTE Downlink 5 MHz Low]

[LTE Downlink 5 MHz Middle]

[LTE Downlink 5 MHz High]

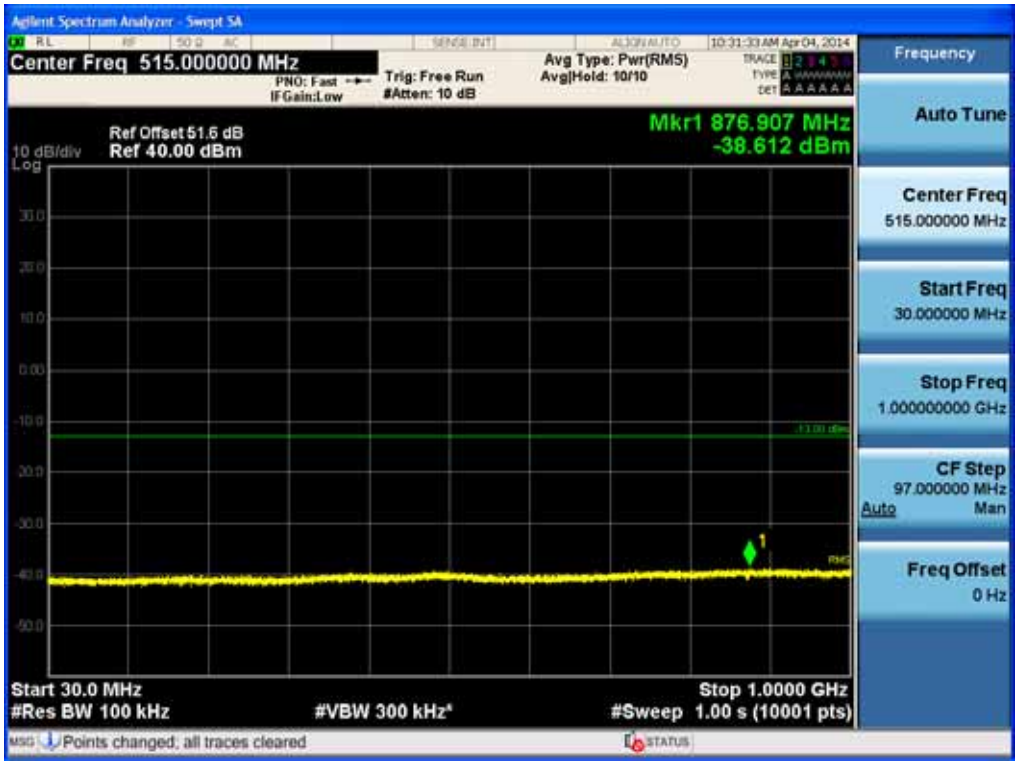
[LTE Downlink 10 MHz Low]

[LTE Downlink 10 MHz Middle]

[LTE Downlink 10 MHz High]

[LTE Downlink 15 MHz Low]

[LTE Downlink 15 MHz Middle]



[LTE Downlink 15 MHz High]

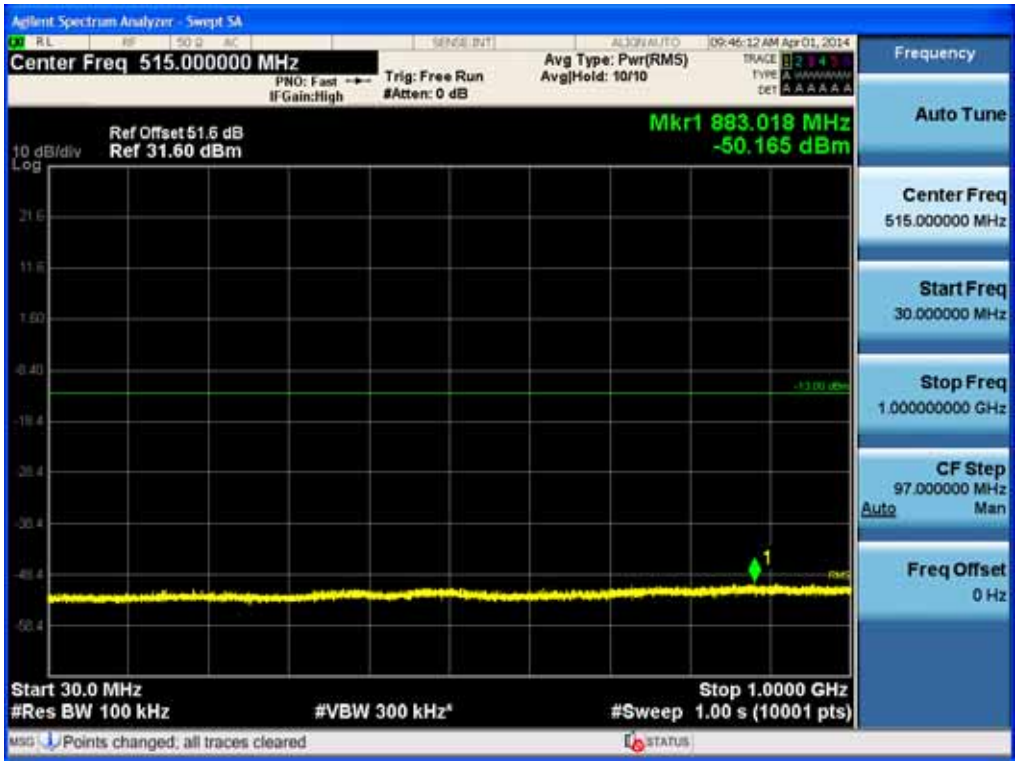
[CDMA Uplink Low]

[CDMA Uplink Middle]

[CDMA Uplink High]

[WCDMA Uplink Low]

[WCDMA Uplink Middle]



[WCDMA Uplink High]

[LTE Uplink 5 MHz Low]

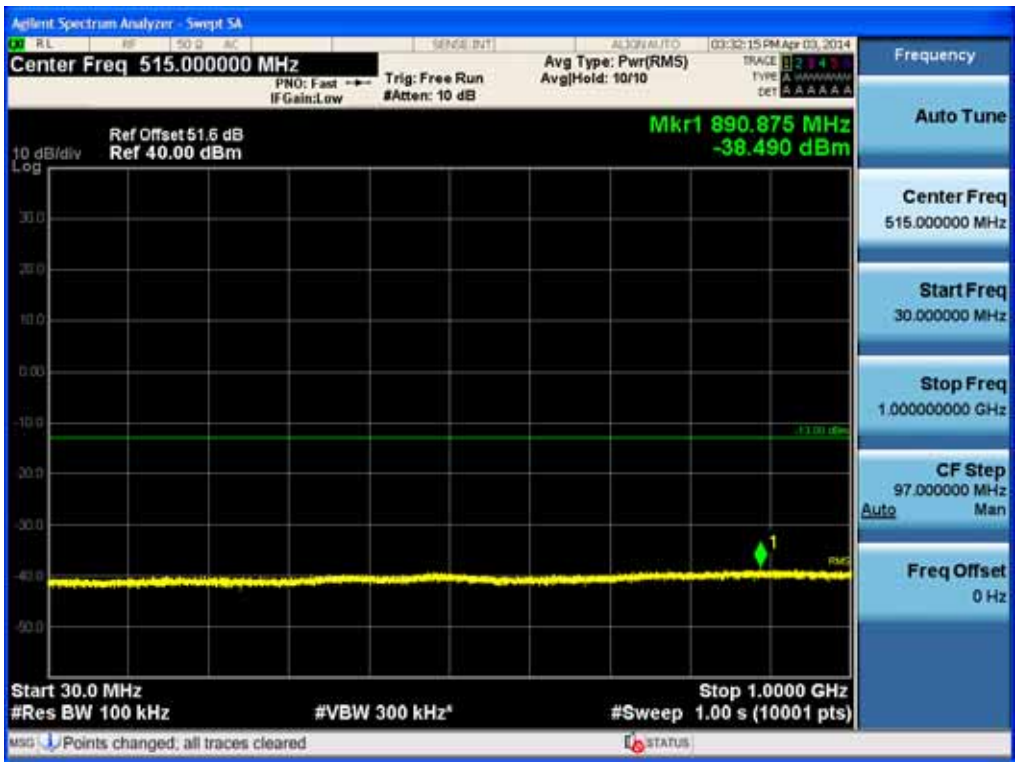
[LTE Uplink 5 MHz Middle]

[LTE Uplink 5 MHz High]

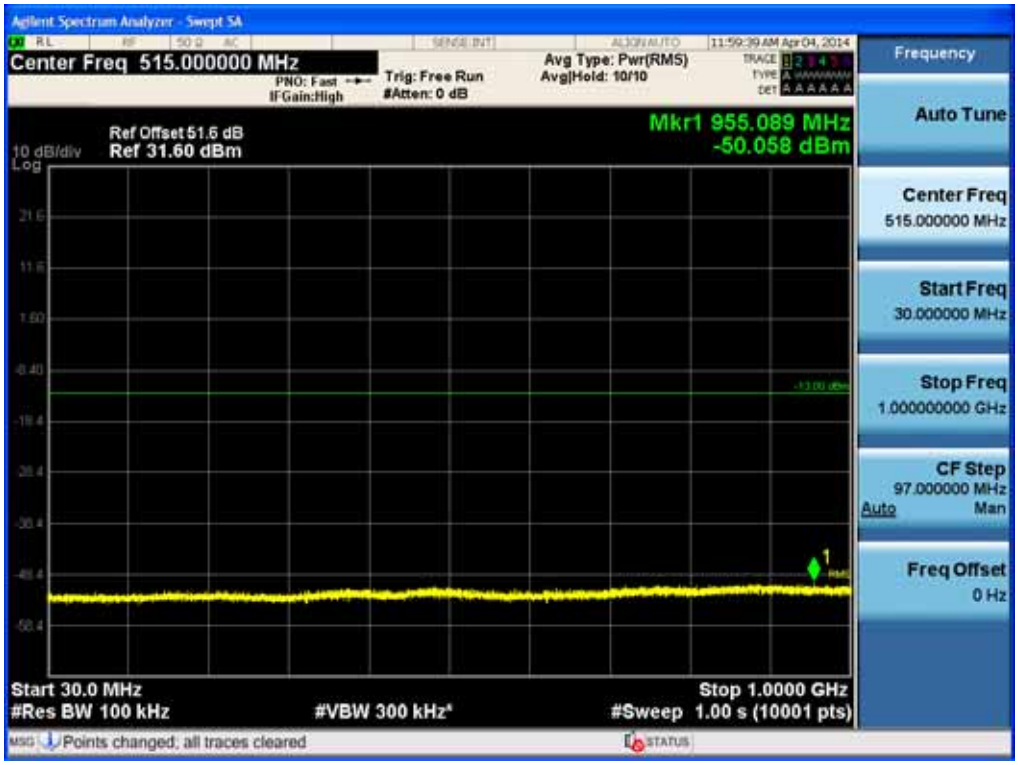
[LTE Uplink 10 MHz Low]

[LTE Uplink 10 MHz Middle]

[LTE Uplink 10 MHz High]



[LTE Uplink 15 MHz Low]



[LTE Uplink 15 MHz Middle]

[LTE Uplink 15 MHz High]

Conducted Spurious Emissions (1 GHz –26.5 GHz)

[CDMA Downlink Low]

[CDMA Downlink Middle]

[CDMA Downlink High]

[WCDMA Downlink Low]

[WCDMA Downlink Middle]

[WCDMA Downlink High]

[LTE Downlink 5 MHz Low]

[LTE Downlink 5 MHz Middle]

[LTE Downlink 5 MHz High]

[LTE Downlink 10 MHz Low]

[LTE Downlink 10 MHz Middle]

[LTE Downlink 10 MHz High]

[LTE Downlink 15 MHz Low]

[LTE Downlink 15 MHz Middle]

[LTE Downlink 15 MHz High]

[CDMA Uplink Low]

[CDMA Uplink Middle]

[CDMA Uplink High]

[WCDMA Uplink Low]

[WCDMA Uplink Middle]

[WCDMA Uplink High]

[LTE Uplink 5 MHz Low]

[LTE Uplink 5 MHz Middle]

[LTEA Uplink 5 MHz High]

[LTE Uplink 10 MHz Low]

[LTE Uplink 10 MHz Middle]

[LTE Uplink 10 MHz High]

[LTE Uplink 15 MHz Low]

[LTE Uplink 15 MHz Middle]

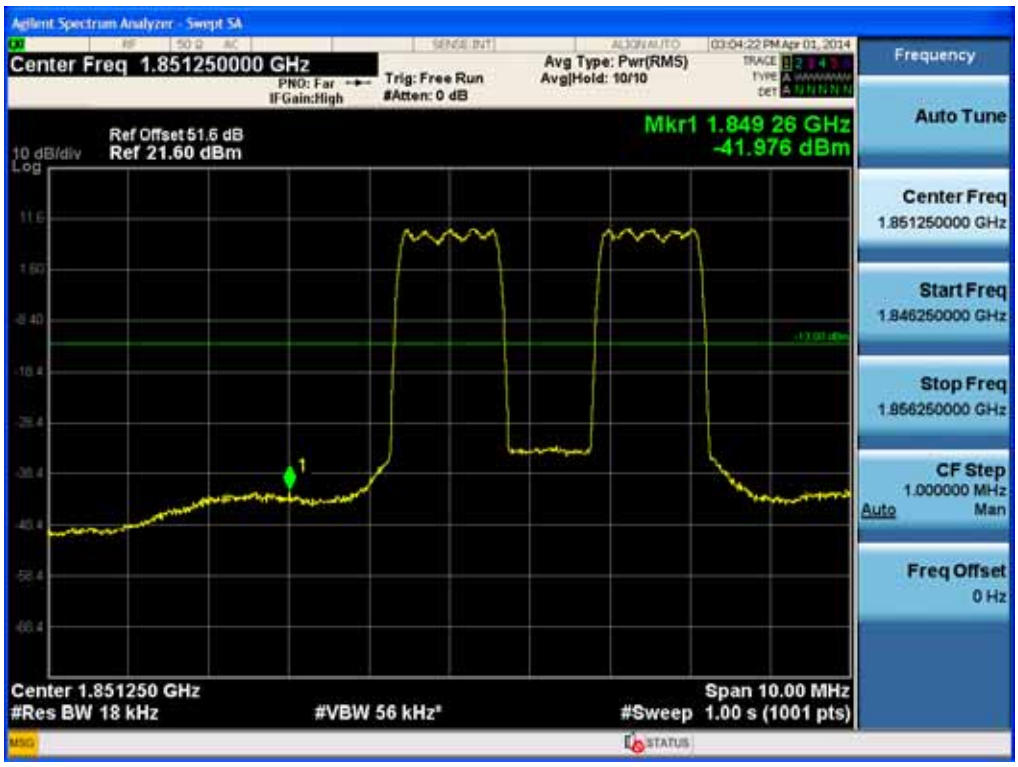
[LTE Uplink 15 MHz High]

Intermodulation Spurious Emissions

[CDMA Downlink Low]

[CDMA Downlink High]

[CDMA Uplink Low]



[CDMA Uplink High]

[WCDMA, LTE]

*** Were omitted test Because the device amplifies only one selected channel.**

Band Edge

[CDMA Downlink Low]

[CDMA Downlink High]

[WCDMA Downlink Low]

[WCDMA Downlink High]

[LTE Downlink 5 MHz Low]

[LTE Downlink 5 MHz High]

[LTE Downlink 10 MHz Low]

[LTE Downlink 10 MHz High]

[LTE Downlink 15 MHz Low]

[LTE Downlink 15 MHz High]

[CDMA Uplink Low]

[CDMA Uplink High]

[WCDMA Uplink Low]

[WCDMA Uplink High]

[LTE Uplink 5 MHz Low]

[LTE Uplink 5 MHz High]

[LTE Uplink 10 MHz Low]

[LTE Uplink 10 MHz High]

[LTE Uplink 15 MHz Low]

[LTE Uplink 15 MHz High]

9. OUT OF BAND REJECTION

Test Requirement(s): KDB 935210 D02 v01r01

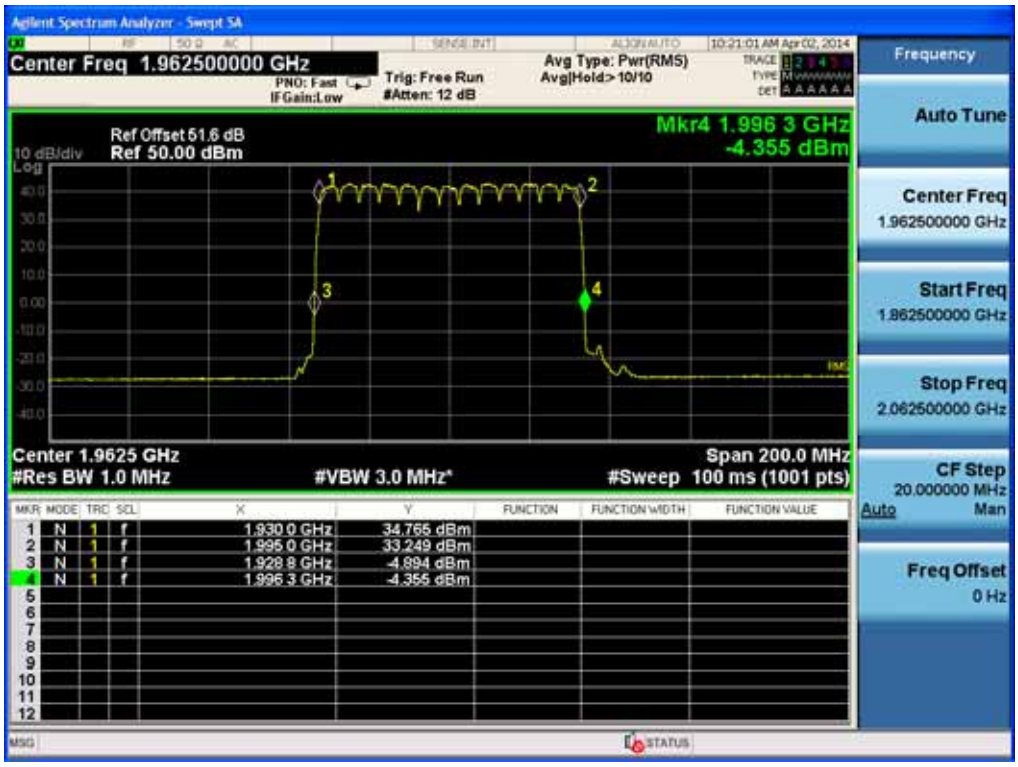
Out of Band Rejection – Test for rejection of out of band signals. Filter freq. response plots are acceptable.

Test Procedures: A modulated carrier generated by the signal generator carrier was connected to either the Uplink or Downlink RF port at a maximum level as determined by the spectrum analyzer was connected to either the Uplink or Downlink port depending on the circuitry being measured. Signal generator sweep from the frequency more lower than the operating frequency to the frequency more higher than it, find the product band filter characteristic

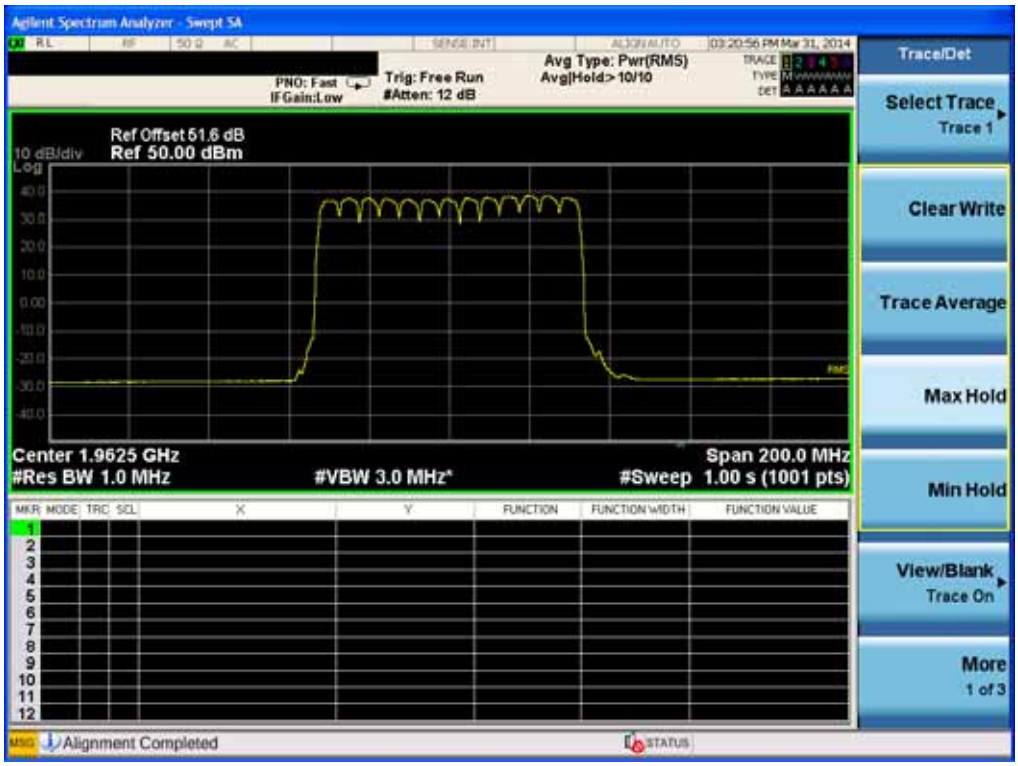
Test Results: The EUT complies with the requirements of this section.

Out of Band Rejection

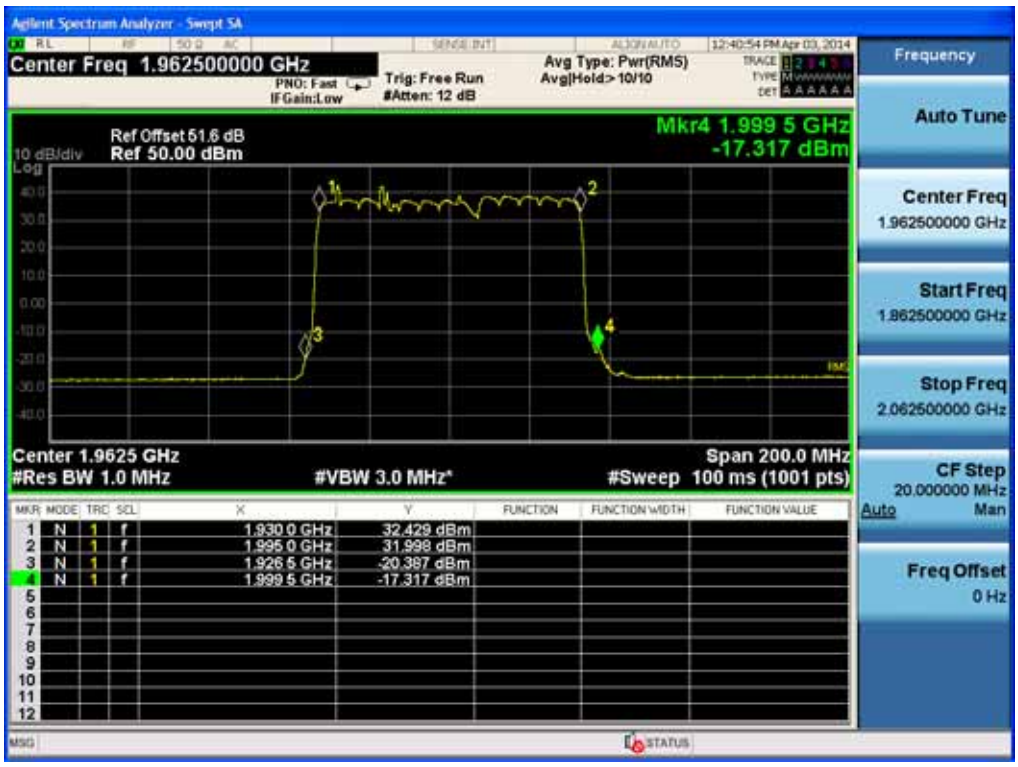
[CDMA Downlink]



[WCDMA Downlink]

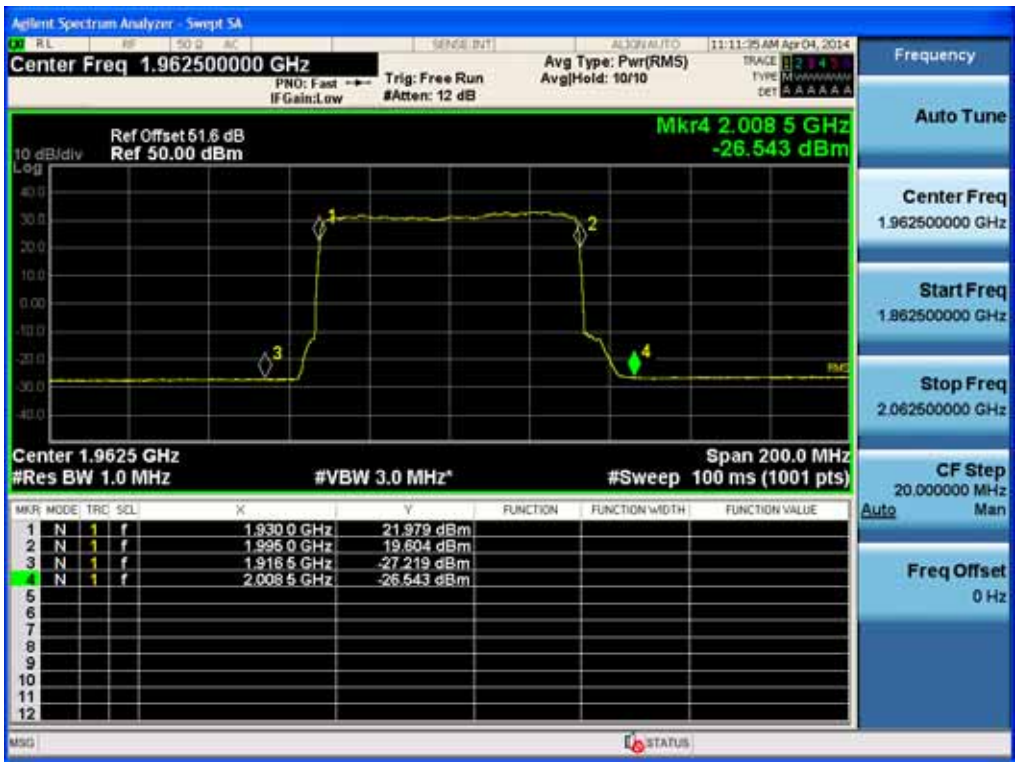


[LTE Downlink 5 MHz]



[LTE Downlink 10 MHz]

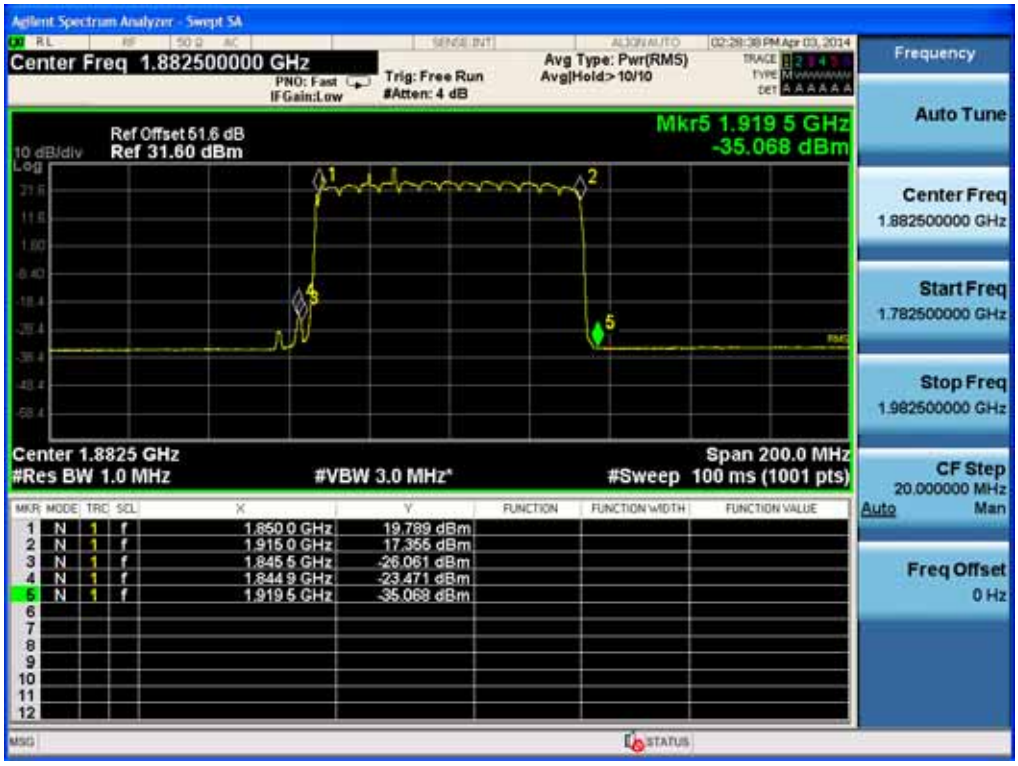
[LTE Downlink 15 MHz]



[CDMA Uplink]

[WCDMA Uplink]

[LTE Uplink 5 MHz]



[LTE Uplink 10 MHz]

[LTE Uplink 15 MHz]

10. FIELD STRENGTH OF SPURIOUS RADIATION

Test Requirement(s): § 2.1053 Measurements required: Field strength of spurious radiation.

§ 2.1053 (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 half-wave dipole antennas.

§ 2.1053 (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: As required by 47 CFR 2.1053, *field strength of radiated spurious measurements* were made in accordance with the procedures of ANSI/TIA-603-C-2004 "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards".

Radiated emission measurements were performed inside a 3 meter semi-anechoic chamber.

The EUT was set at a distance of 3m from the receiving antenna. The EUT's RF ports

were terminated to 50ohm load. The EUT was set to transmit at the low, mid and high channels of the transmitter frequency range at its maximum power level. The EUT was rotated about 360

and the receiving antenna scanned from 1-3m in order to capture the maximum emission. A calibrated antenna source was positioned in place of the EUT and the previously recorded signal was duplicated. The maximum EIRP of the emission was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried. out with the receiving antenna in both vertical and horizontal polarization. Harmonic emissions up to the 10th or 40GHz, whichever was the lesser, were investigated.

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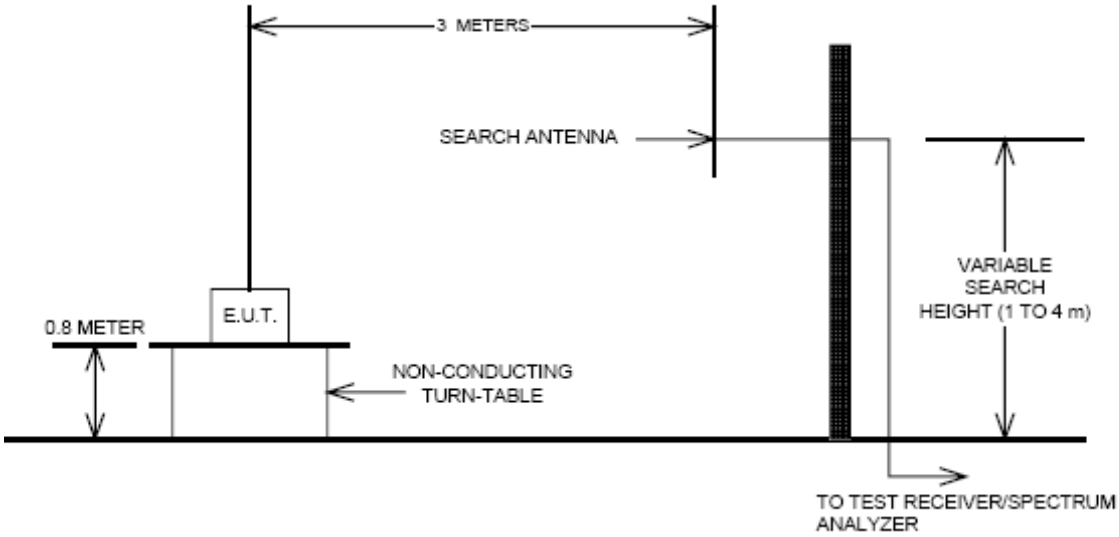
Radiated Spurious Emissions Test Setup



Test Result:

CDMA

[Downlink]

Mode	Frequency	Freq.(MHz)	Substitute Level [dBm]	Ant. Gain (dBi)	C.L	Pol.	EIRP (dBm)	Margin (dB)
CDMA	1931.25	3862.50	-30.64	12.62	7.89	V	-25.91	12.91
	1962.50	3925.00	-35.07	12.67	7.97	V	-30.37	17.37
	1993.75	3987.50	-32.31	12.72	8.69	V	-28.28	15.28

[Uplink]

Mode	Frequency	Freq.(MHz)	Substitute Level [dBm]	Ant. Gain (dBi)	C.L	Pol.	EIRP (dBm)	Margin (dB)
CDMA	1851.25	3702.50	-40.81	12.50	7.95	V	-36.26	23.26
	1882.50	3765.00	-36.61	12.55	8.11	V	-32.17	19.17
	1913.75	3827.50	-35.40	12.60	7.71	V	-30.51	17.51

WCDMA

[Downlink]

Mode	Frequency	Freq.(MHz)	Substitute Level [dBm]	Ant. Gain (dBi)	C.L	Pol.	EIRP (dBm)	Margin (dB)
WCDMA	1932.50	3865.00	-34.51	12.62	7.89	V	-29.78	16.78
	1962.50	3925.00	-37.28	12.67	7.97	V	-32.58	19.58
	1992.50	3985.00	-37.55	12.72	8.69	V	-33.52	20.52

[Uplink]

Mode	Frequency	Freq.(MHz)	Substitute Level [dBm]	Ant. Gain (dBi)	C.L	Pol.	EIRP (dBm)	Margin (dB)
WCDMA	1852.50	3705.00	-43.83	12.50	7.95	V	-39.28	26.28
	1882.50	3765.00	-39.44	12.55	8.11	V	-35.00	22.00
	1912.50	3825.00	-39.57	12.59	7.71	V	-34.69	21.69

LTE

[Downlink]

Mode	Frequency	Freq.(MHz)	Substitute Level [dBm]	Ant. Gain (dBi)	C.L	Pol.	EIRP (dBm)	Margin (dB)
LTE	1932.50	3865.00	-37.08	12.62	7.89	V	-32.35	19.35
	1962.50	3925.00	-39.90	12.67	7.97	V	-35.20	22.20
	1992.50	3985.00	-37.25	12.72	8.69	V	-33.22	20.22

[Uplink]

Mode	Frequency	Freq.(MHz)	Substitute Level [dBm]	Ant. Gain (dBi)	C.L	Pol.	EIRP (dBm)	Margin (dB)
LTE	1852.50	3705.00	-43.55	12.50	7.95	V	-39.00	26.00
	1882.50	3765.00	-43.38	12.55	8.11	V	-38.94	25.94
	1912.50	3825.00	-42.27	12.59	7.71	V	-37.39	24.39

11. FREQUENCY STABILITY OVER TEMPERATURE AND VOLTAGE VARIATIONS

Test Requirement(s): §2.1055(a)(1) , § 24.235

Test Procedures:

As required by 47 CFR 2.1055, *Frequency Stability measurements* were made at the RF output terminals using a Spectrum Analyzer.

The EUT was placed in the Environmental Chamber.

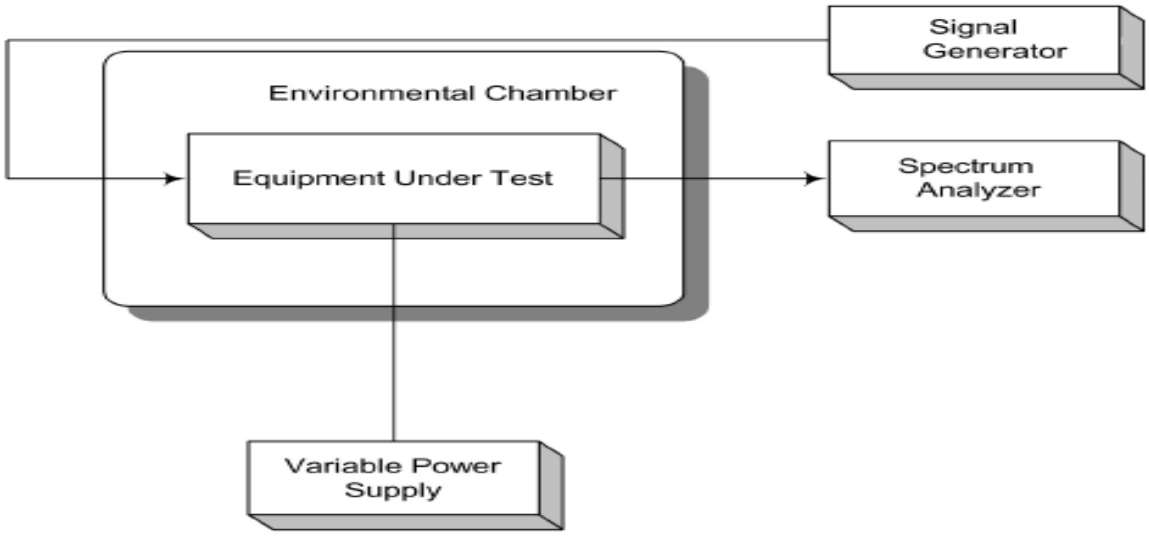
A CW signal was injected into the EUT at the appropriate RF level. The frequency counter option on the Spectrum Analyzer was used to measure frequency deviations.

The frequency drift was investigated for every 10 °C increment until the unit is stabilized then recorded the reading in tabular format with the temperature range of -30 to 50 °C.

Voltage supplied to EUT is 110 Vac reference temperature was done at 20°C.

The voltage was varied by ± 15 % of nominal

Test Setup:



Test Results:

The E.U.T was found in compliance for Frequency Stability and Voltage Test

Frequency Stability and Voltage Test Results

Reference: 110 Vac at 20°C **Freq.** = 1962.5 MHz

Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	1 962 499 999.991	-0.009	0.000	0.0000
	-30	1 962 500 000.013	0.013	0.022	0.0000
	-20	1 962 499 999.998	-0.002	0.007	0.0000
	-10	1 962 499 999.999	-0.001	0.008	0.0000
	0	1 962 499 999.997	-0.003	0.006	0.0000
	+10	1 962 499 999.998	-0.002	0.007	0.0000
	+30	1 962 500 000.003	0.003	0.012	0.0000
	+40	1 962 500 000.002	0.002	0.011	0.0000
	+50	1 962 499 999.984	-0.016	-0.007	0.0000
115%	+20	1 962 500 000.003	0.003	0.012	0.0000
85%	+20	1 962 500 000.004	0.004	0.013	0.0000

[Downlink]

Reference: 110 Vac at 20°C **Freq.** = 1882.5 MHz

Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	+20(Ref)	1 882 500 000.009	0.009	0.000	0.0000
	-30	1 882 499 999.997	-0.003	-0.012	0.0000
	-20	1 882 500 000.002	0.002	-0.007	0.0000
	-10	1 882 500 000.000	0.000	-0.009	0.0000
	0	1 882 499 999.998	-0.002	-0.011	0.0000
	+10	1 882 500 000.003	0.003	-0.006	0.0000
	+30	1 882 500 000.002	0.002	-0.007	0.0000
	+40	1 882 499 999.997	-0.003	-0.012	0.0000
	+50	1 882 500 000.005	0.005	-0.004	0.0000
115%	+20	1 882 500 000.012	0.012	0.003	0.0000
85%	+20	1 882 499 999.996	-0.004	-0.013	0.0000

[Uplink]

12. RF EXPOSURE STATEMENT

1. LIMITS

According to §1.1310 and §2.1091 RF exposure is calculated.

(B) Limits for General Population/Uncontrolled Exposures

Frequency range (MHz)	Electric field Strength (V/m)	Magnetic field Strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
0.3 - 1.34	614	1.63	*(100)	30
1.34 - 30	824/f	2.19/f	*(180/ f^2)	30
30 - 300	27.5	0.073	0.2	30
300 - 1500	……...	……...	f/1500	30
1500 - 100.000	……...	……...	1.0	30

F = frequency in MHz

* = Plane-wave equivalent power density

2. MAXIMUM PERMISSIBLE EXPOSURE Prediction

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG/4\pi R^2$

S = Power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

This system is below 1640 W eirp but the MPE exhibit should clearly show this by including the eirp for uplink and downlink sides:

- Downlink 20W output power and 18dBi antenna gain = 1276W eirp
- Uplink 1W output power and 18dBi antenna gain = 64.4W eirp

Ideally include a sentence such as: *Since the eirp is below 1640 W for both uplink and down link, routine evaluation and warning labels described in 1.1307 are not required for this system when installed with antenna gains not exceeding 18dBi*

2-1 Limit (Down Link)

Max Peak output Power at antenna input terminal	43.06	dBm
Max Peak output Power at antenna input terminal	20.230	W
Prediction distance	400.000	cm
Prediction frequency	1931.25	MHz
Antenna Gain(typical)	18.00	dBi
Antenna Gain(numeric)	63.096	-
Power density at prediction frequency (S)	0.63485	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.00000	mW/cm^2

2-2 Limit (Up Link)

Max Peak output Power at antenna input terminal	30.09	dBm
Max Peak output Power at antenna input terminal	1020.94	mW
Prediction distance	400.0000	cm
Prediction frequency	1882.50	MHz
Antenna Gain(typical)	18.00	dBi
Antenna Gain(numeric)	63.096	-
Power density at prediction frequency (S)	0.03204	mW/cm^2
MPE limit for uncontrolled exposure at prediction frequency	1.00000	mW/cm^2

3. RESULTS

The power density level at 400 cm is 0.63485 mW/cm², which is below the uncontrolled exposure limit of 1.0 mW/cm² at Down Link

The power density level at 400 cm is 0.03204 mW/cm², which is below the uncontrolled exposure limit of 1.0 mW/cm² at Up Link

Simultaneous MPE at 400 cm is (0.63485/1.0) + (0.03204/1.0) = 0.66689 < 1.0