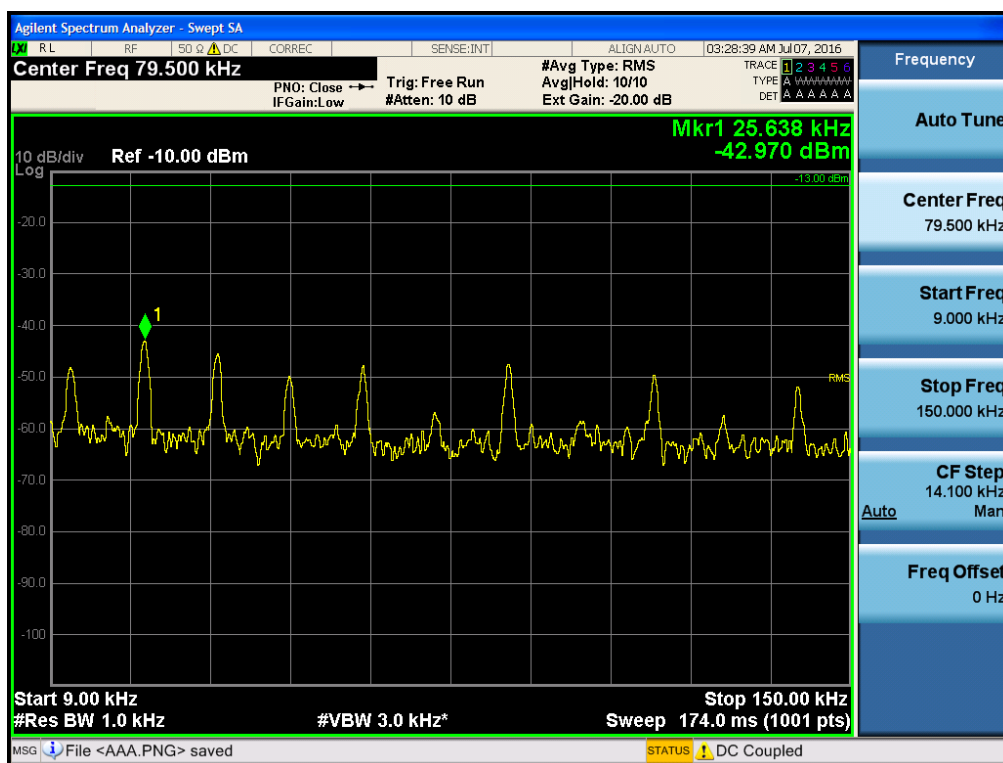
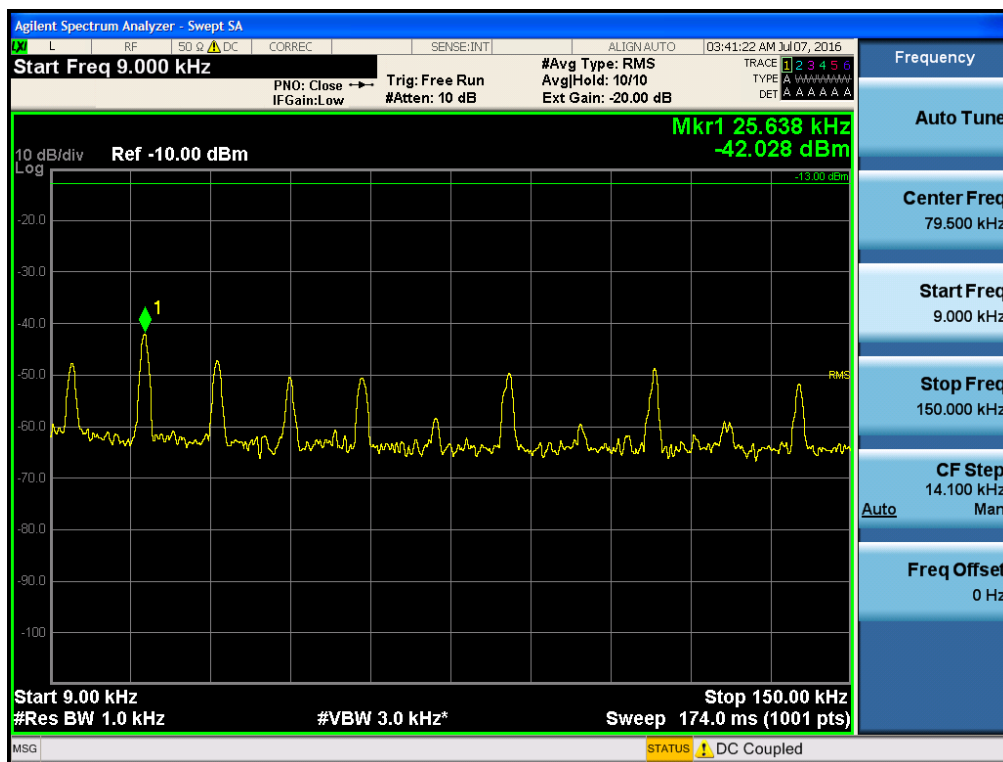


## Single channel Enhancer Plots of Spurious Emission for PCS1900 BAND CDMA Conducted Spurious Emissions (9 kHz – 150 kHz)

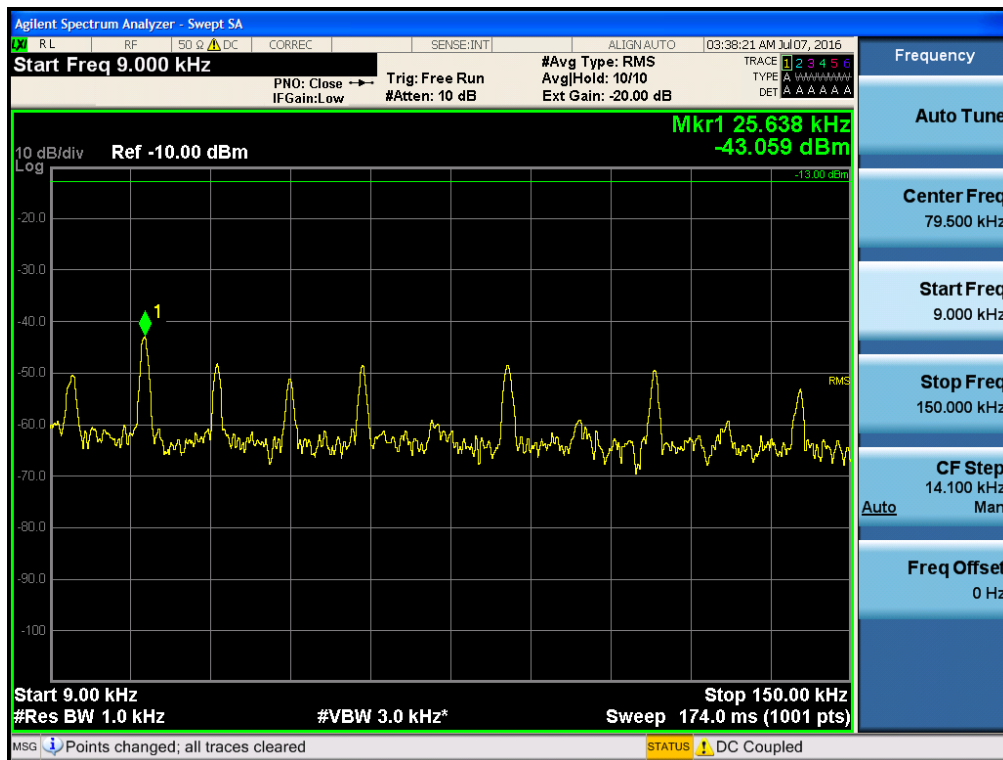
[Downlink Low]



[Downlink Middle]

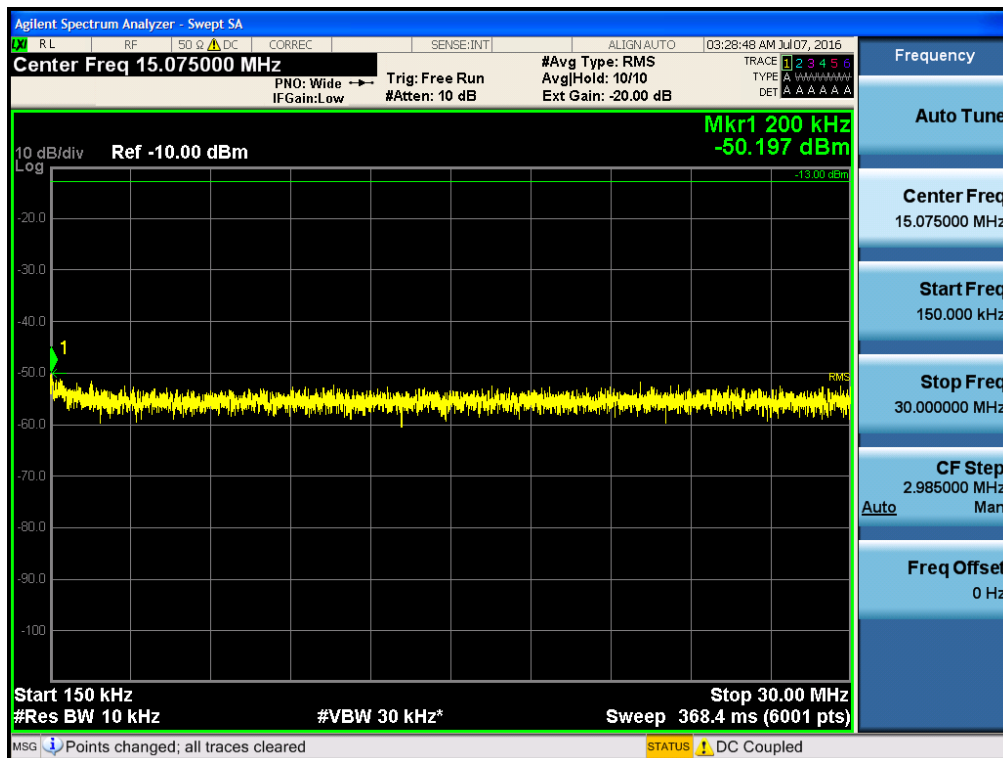


[Downlink High]

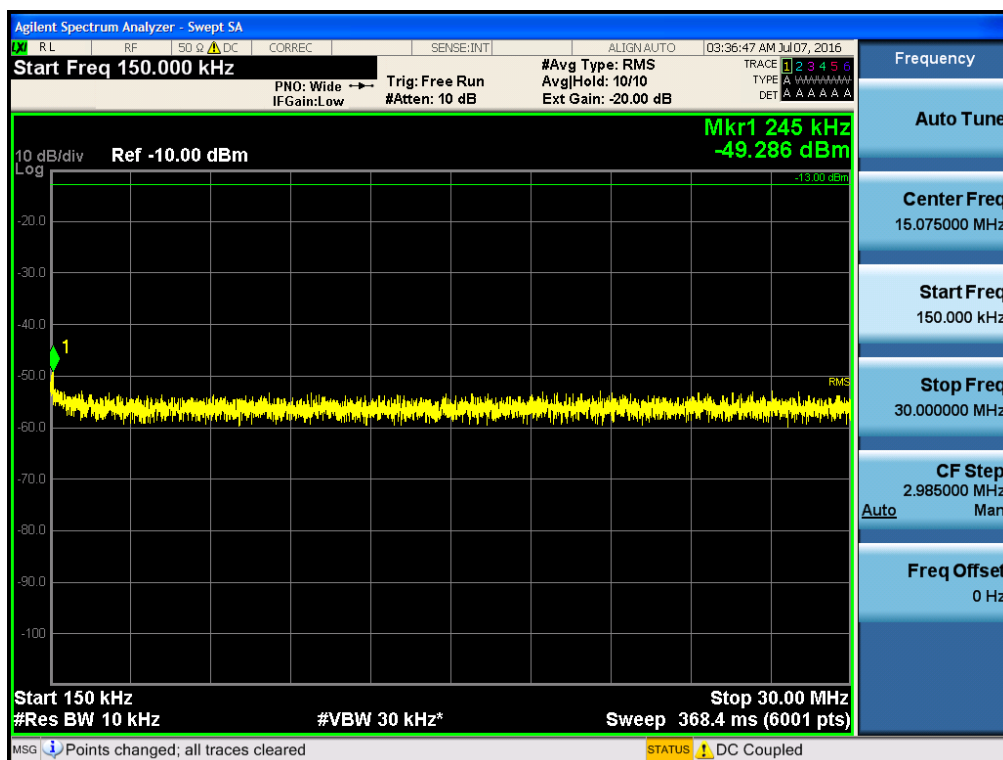


## Conducted Spurious Emissions (150 kHz – 30 MHz)

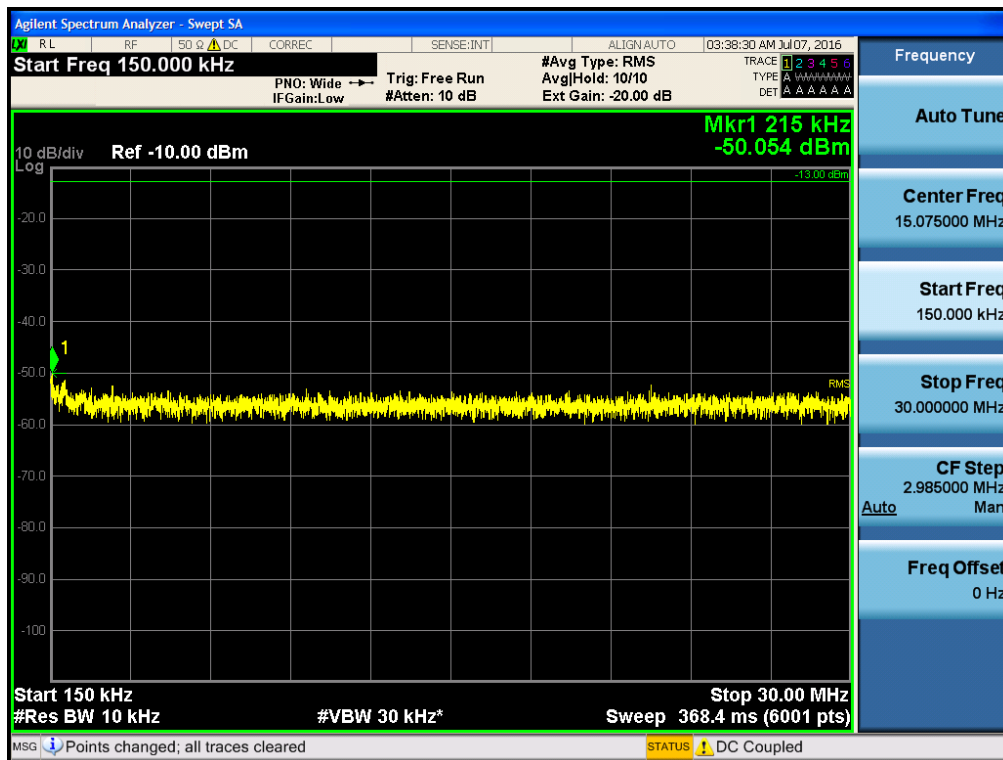
### [Downlink Low]



### [Downlink Middle]

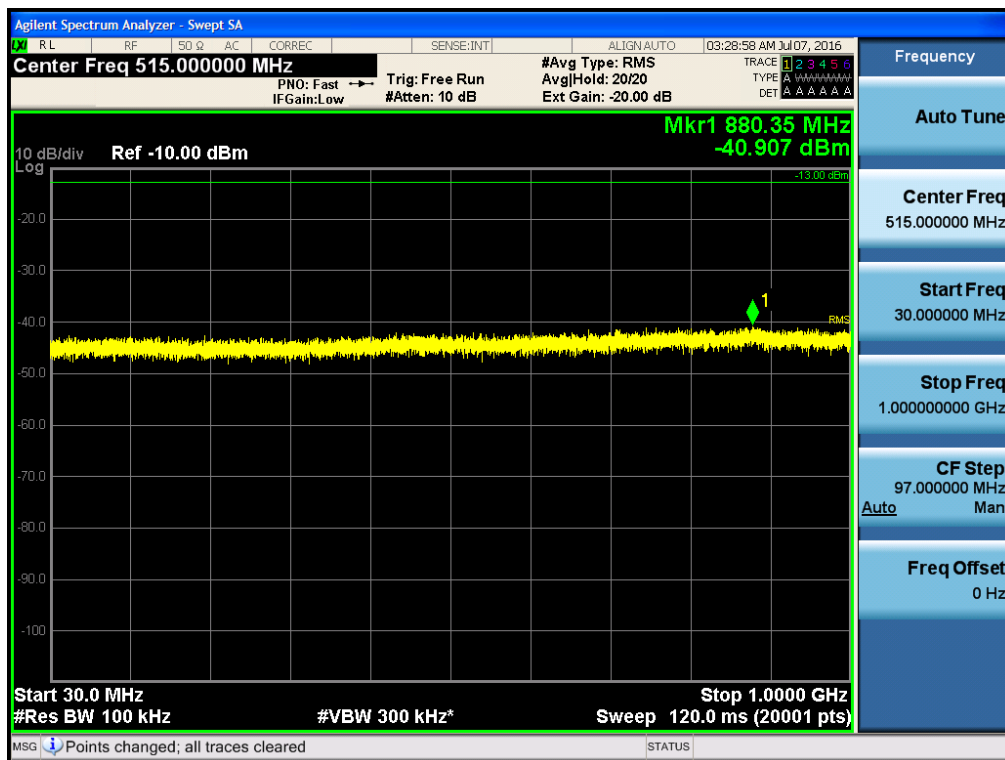


[Downlink High]

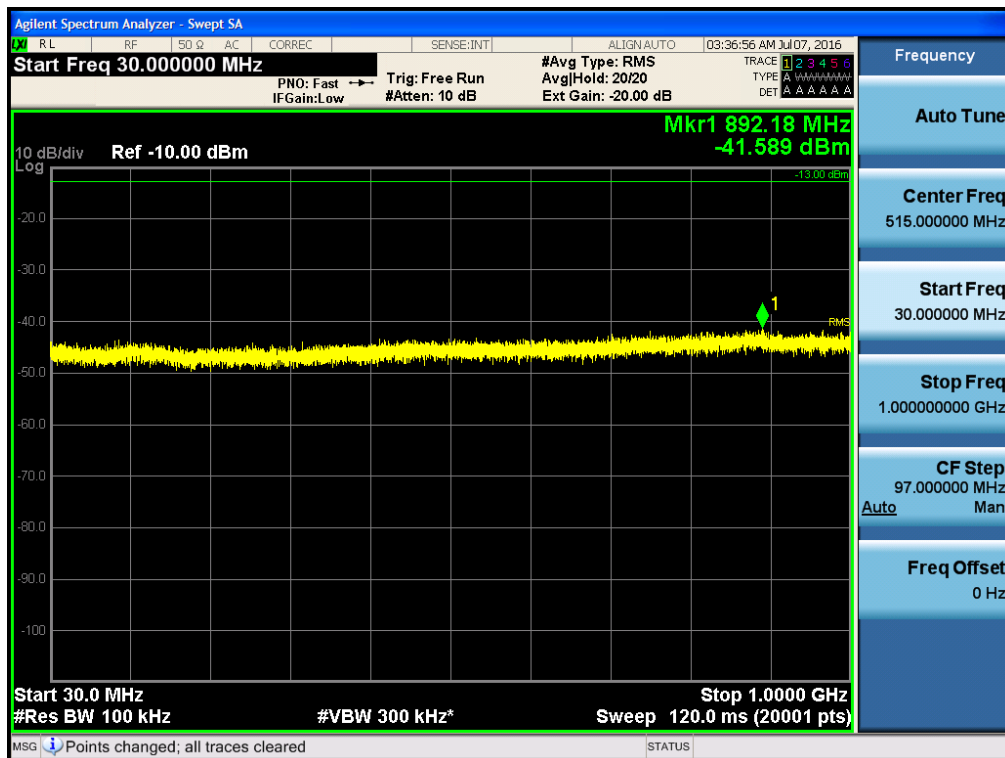


## Conducted Spurious Emissions (30 MHz – 1 GHz)

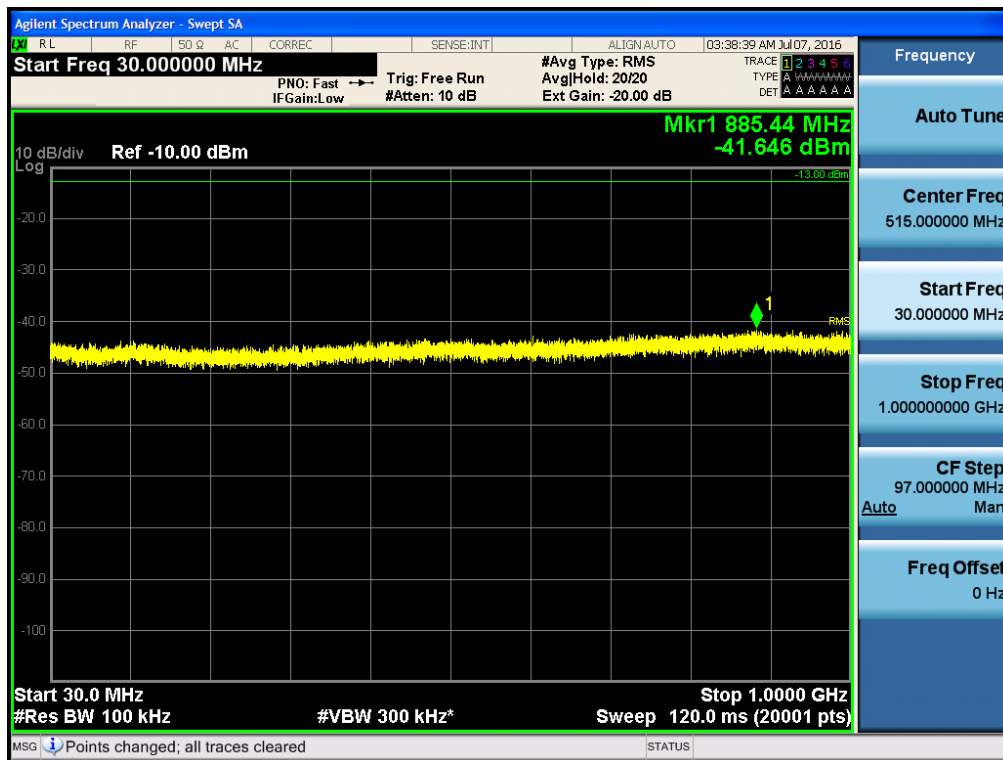
[Downlink Low]



[Downlink Middle]

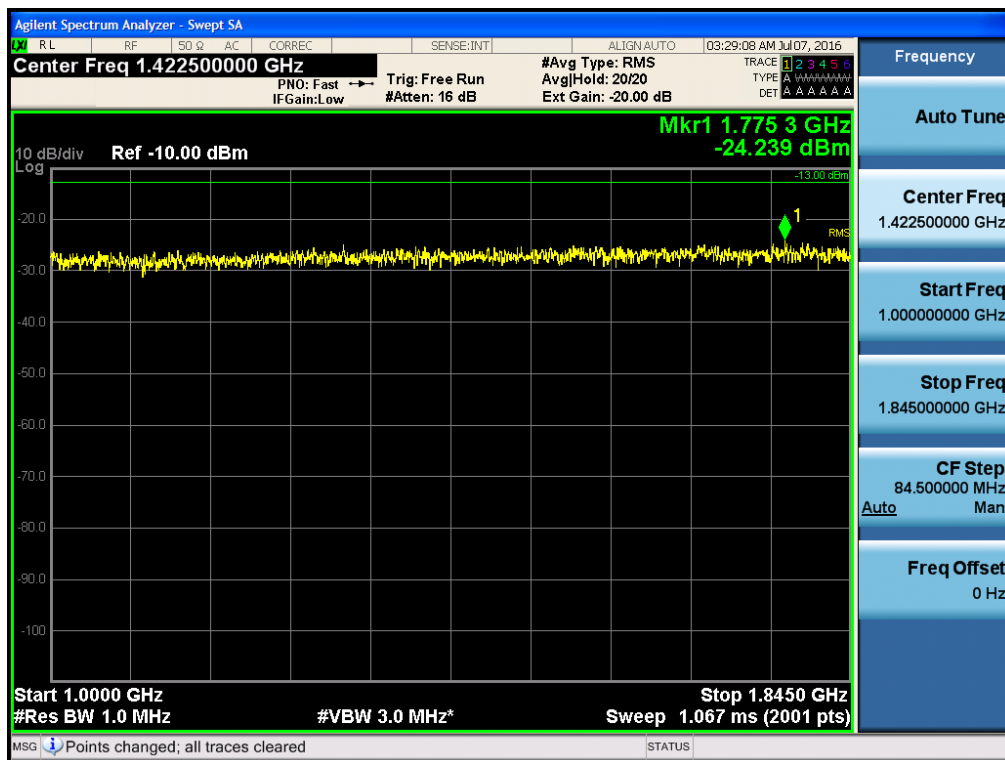


[Downlink High]



## Conducted Spurious Emissions (1 GHz – 26.5 GHz)

### [Downlink Low]-1



### [Downlink Low]-2

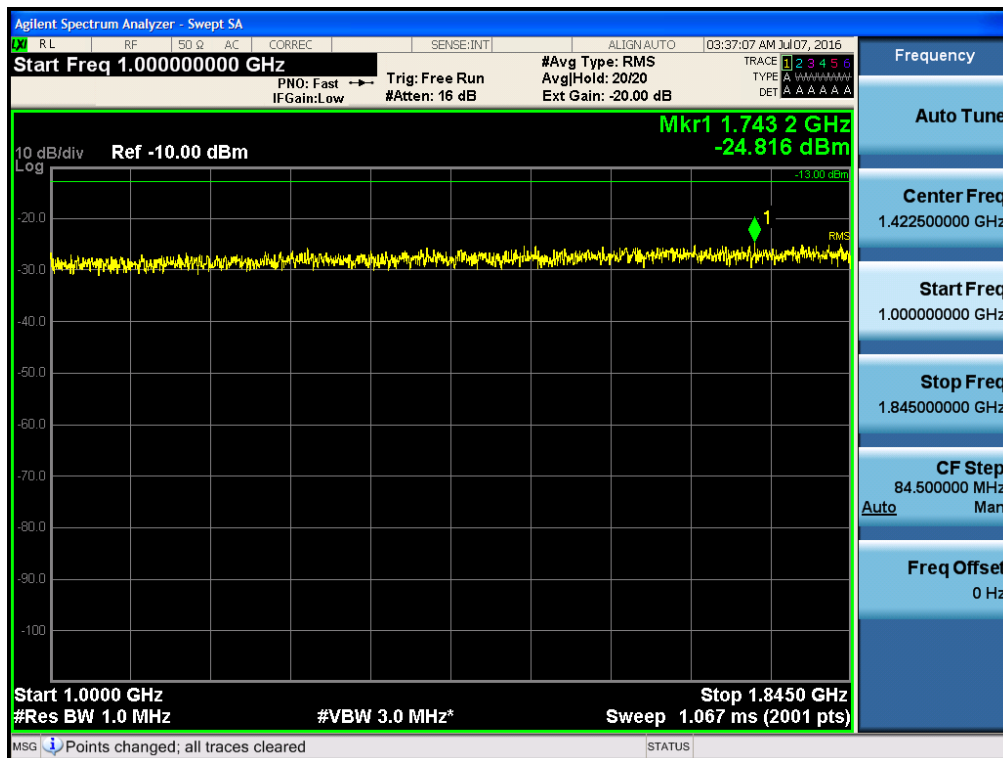


[Downlink Low]-3

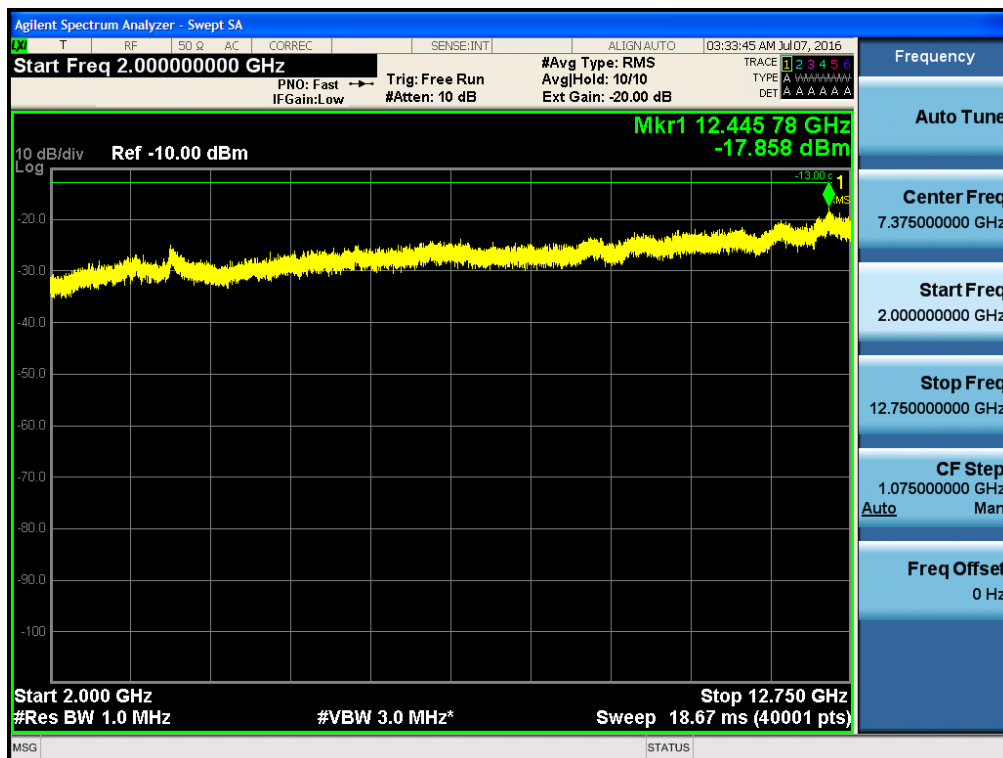




[Downlink Middle]-1



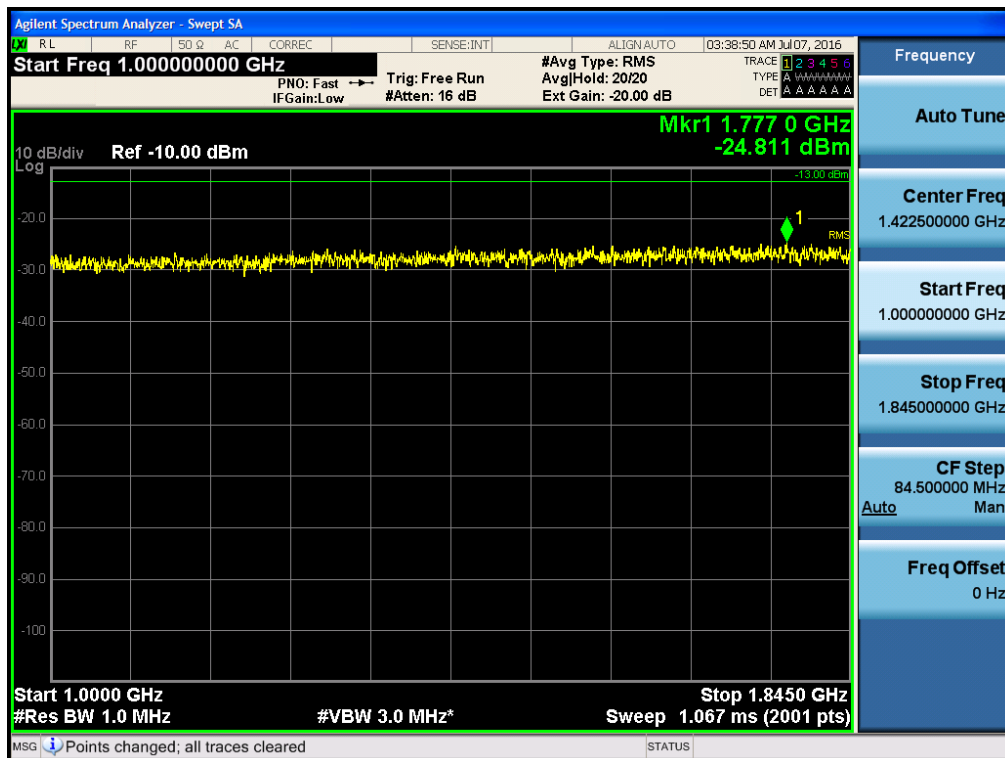
[Downlink Middle]-2



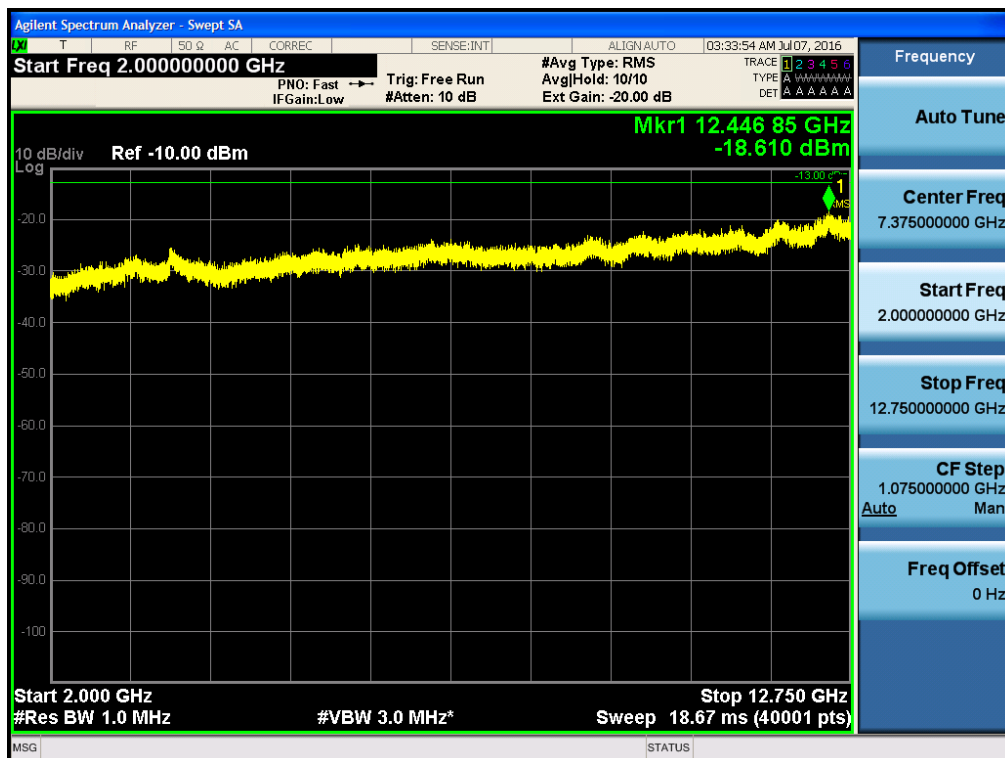
[Downlink Middle]-3



[Downlink High]-1



[Downlink High]-2

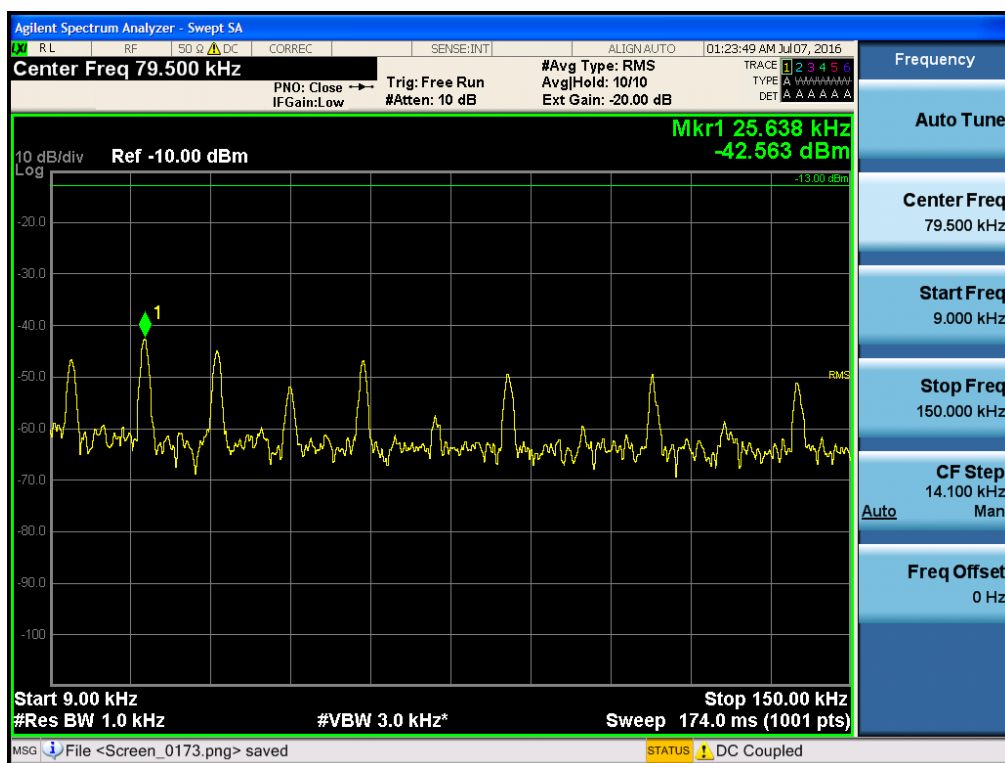


[Downlink High]-3

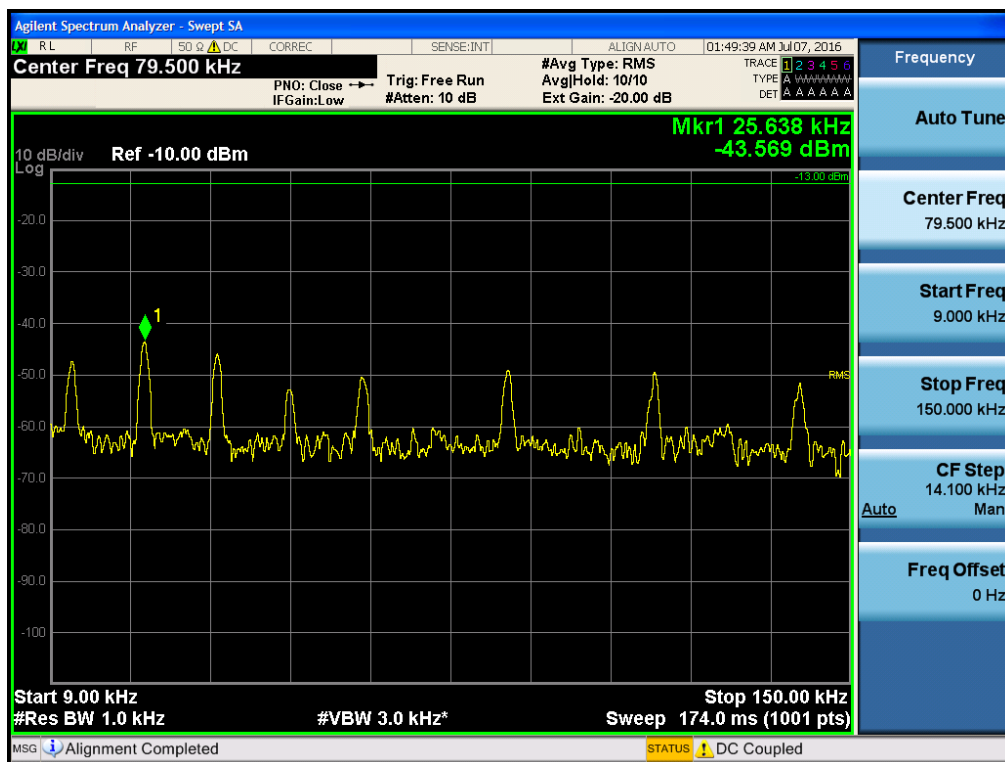


## Single channel Enhancer Plots of Spurious Emission for PCS1900 BAND WCDMA Conducted Spurious Emissions (9 kHz – 150 kHz)

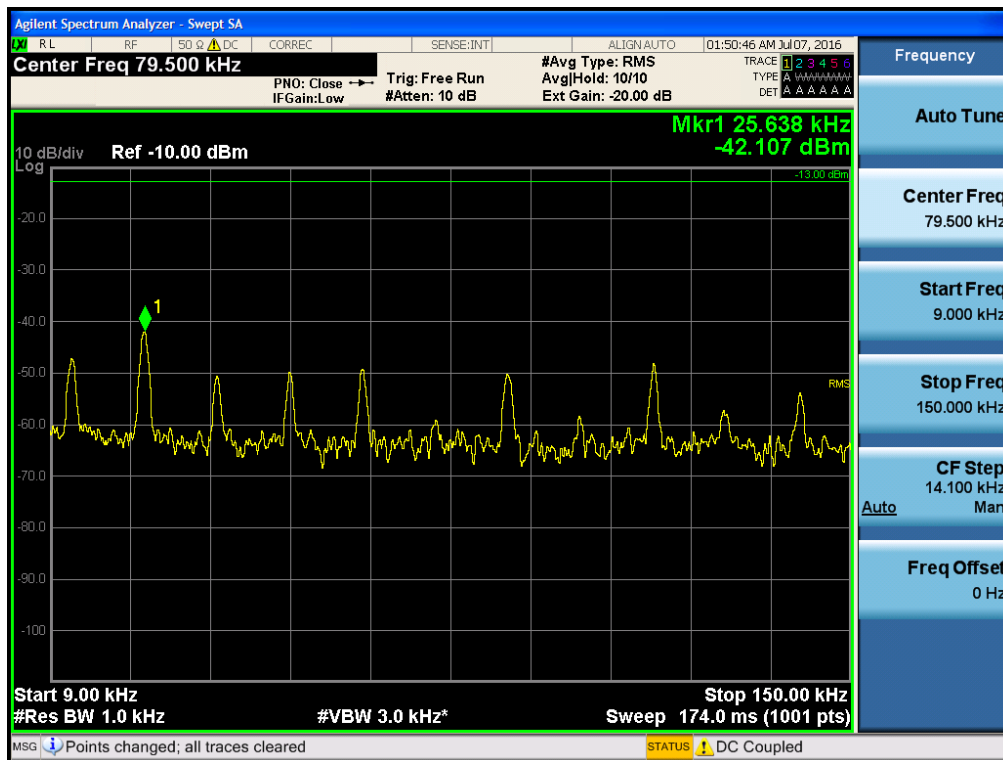
[Downlink Low]



[Downlink Middle]

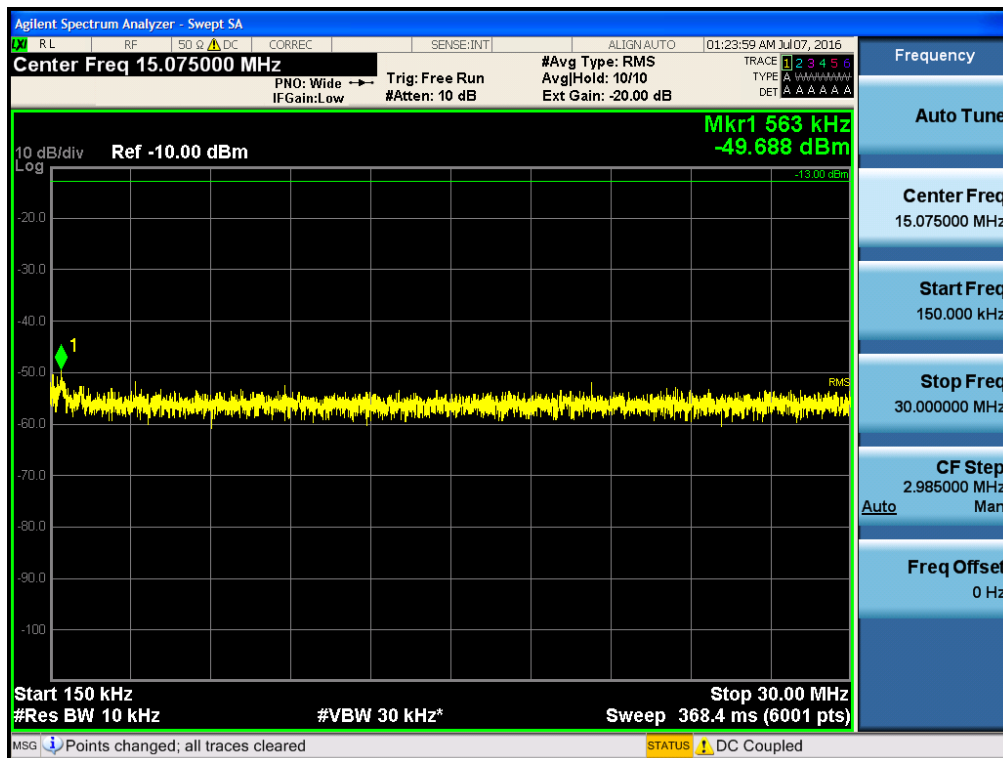


[Downlink High]

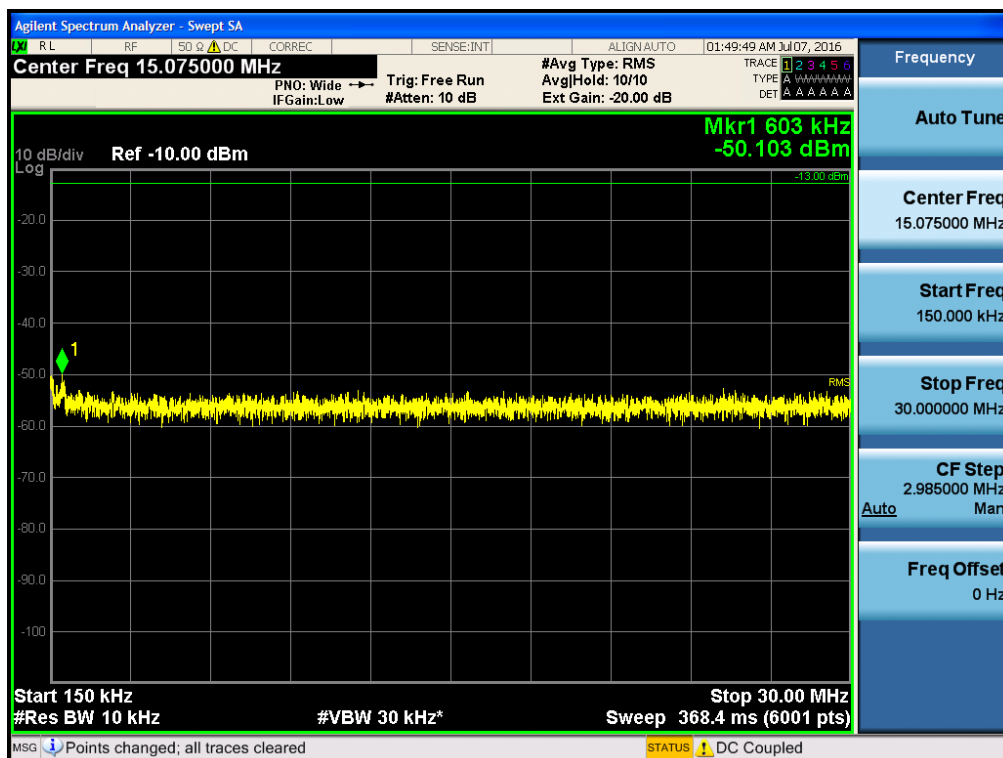


## Conducted Spurious Emissions (150 kHz – 30 MHz)

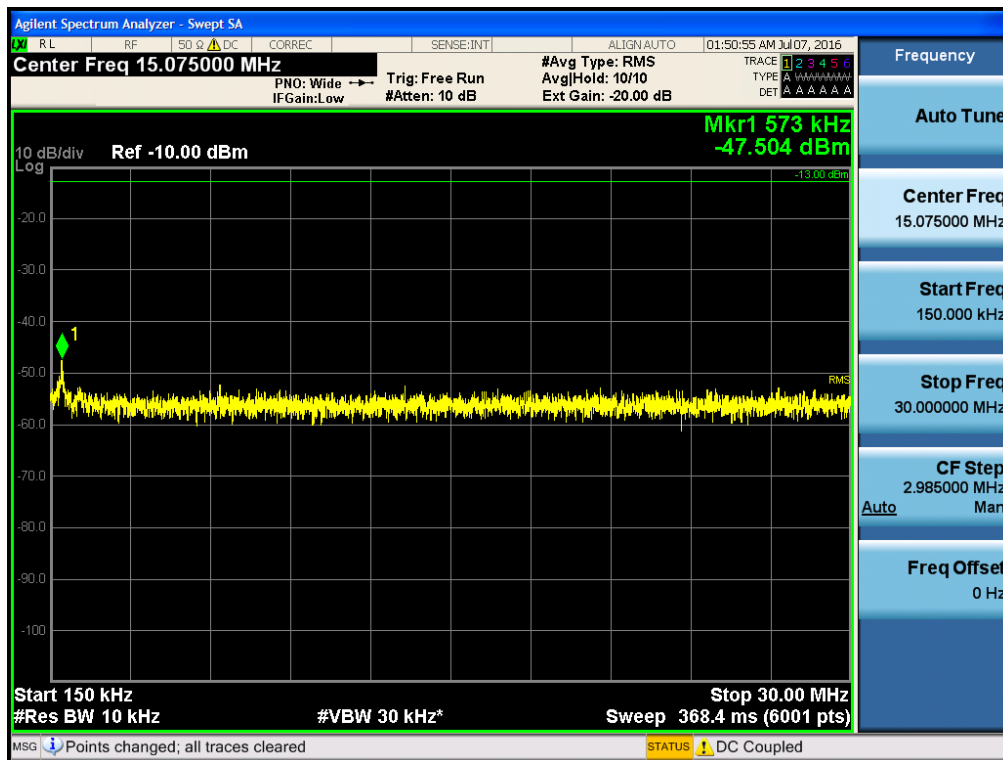
### [Downlink Low]



### [Downlink Middle]



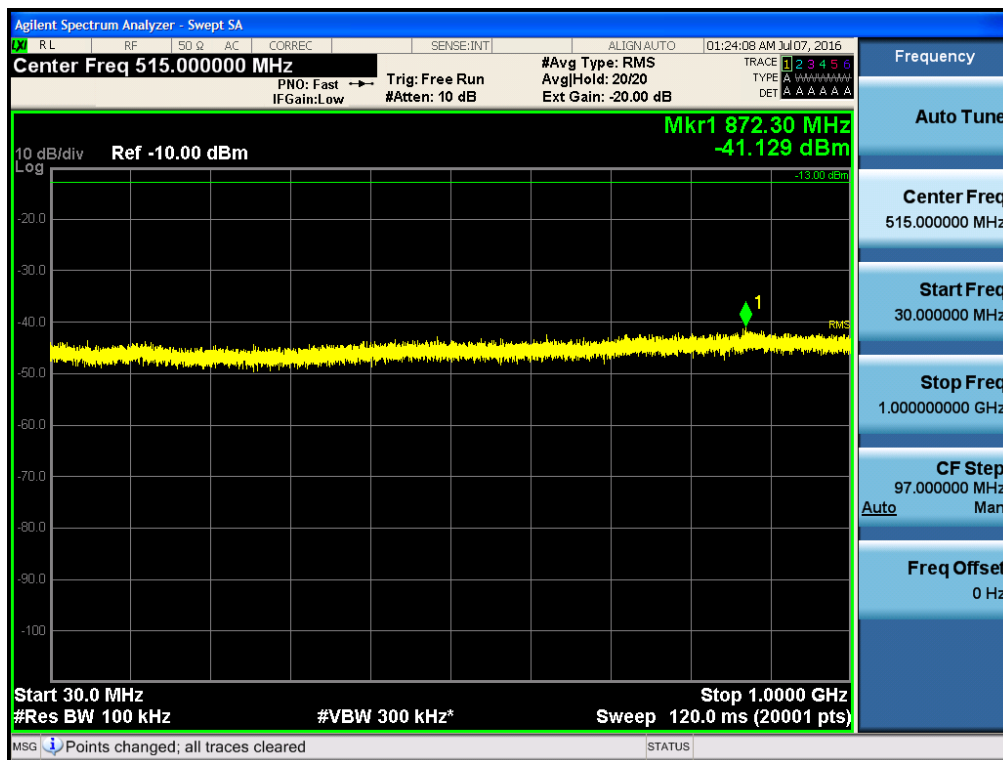
[Downlink High]



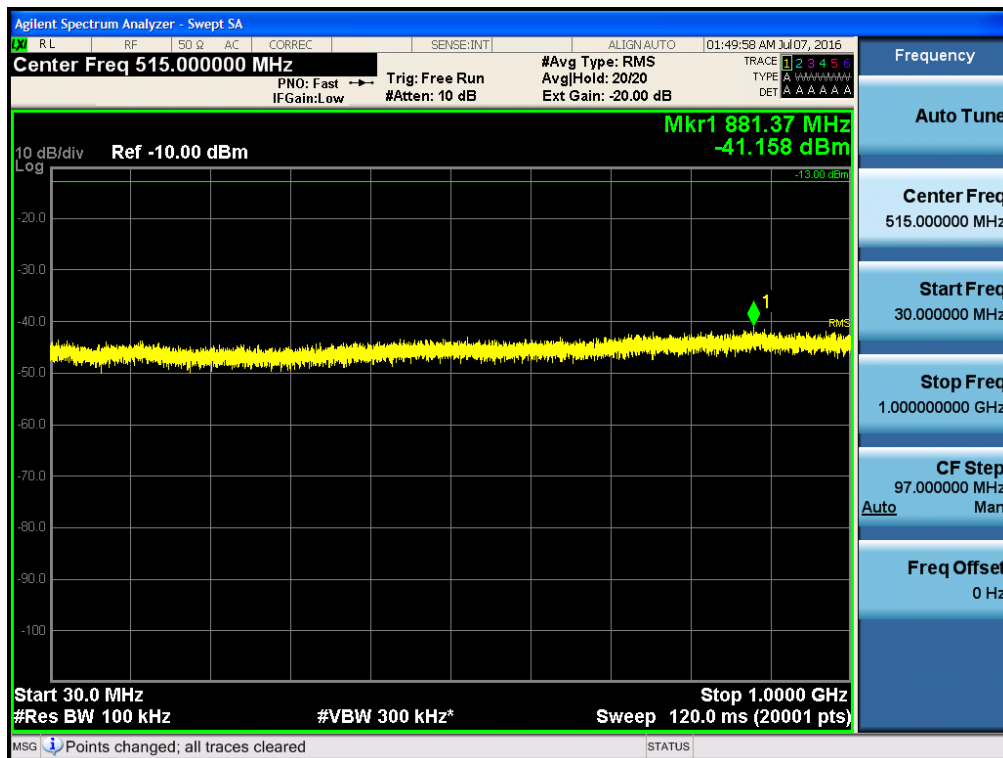


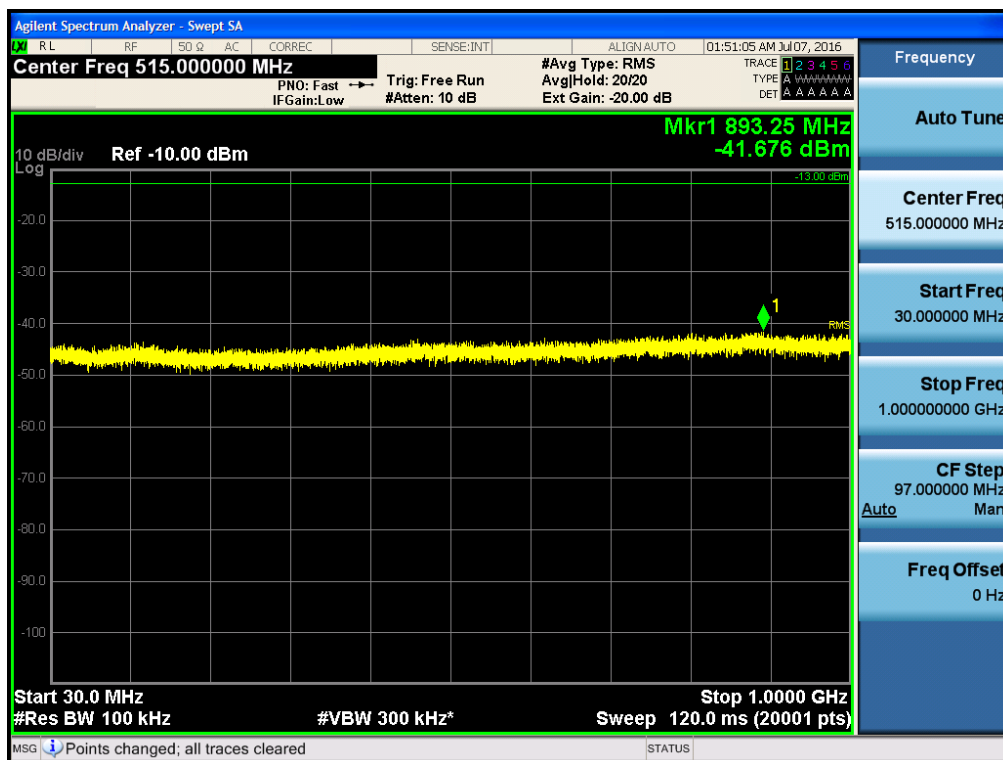
## Conducted Spurious Emissions (30 MHz – 1 GHz)

[Downlink Low]



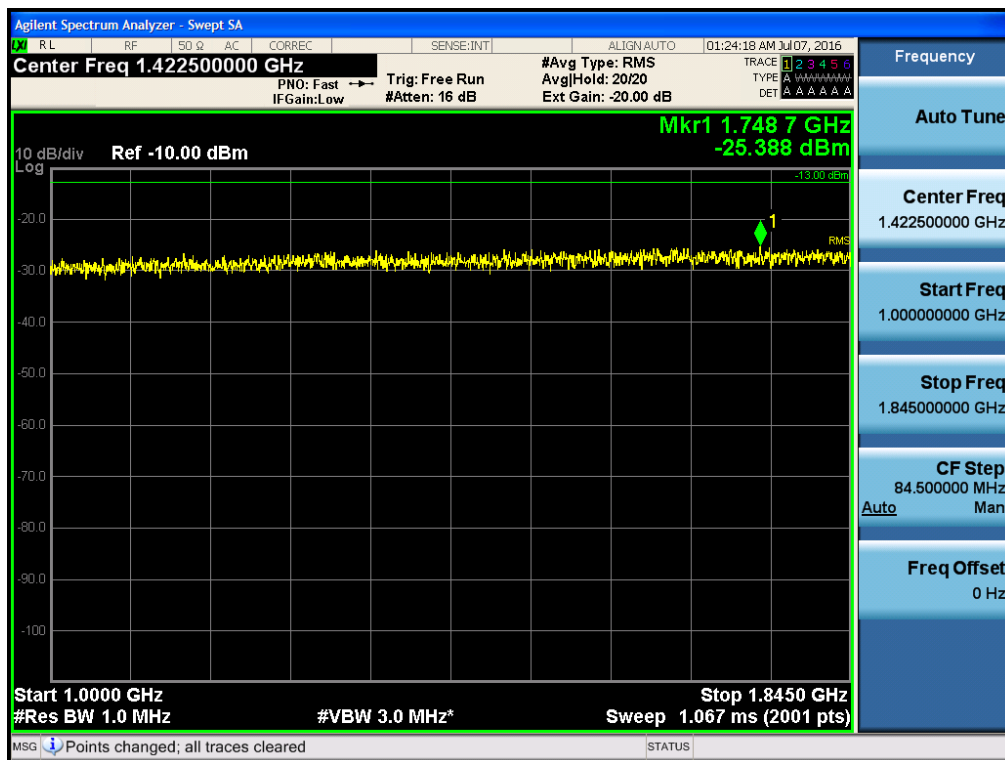
[Downlink Middle]





## Conducted Spurious Emissions (1 GHz – 26.5 GHz)

### [Downlink Low]-1



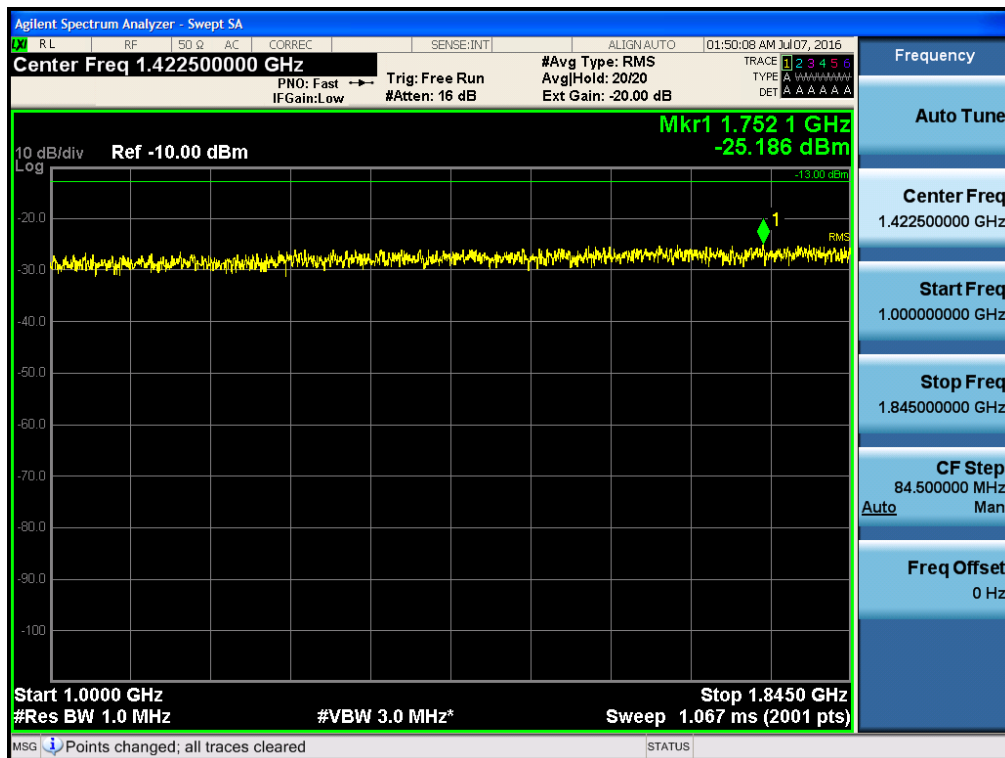
### [Downlink Low]-2



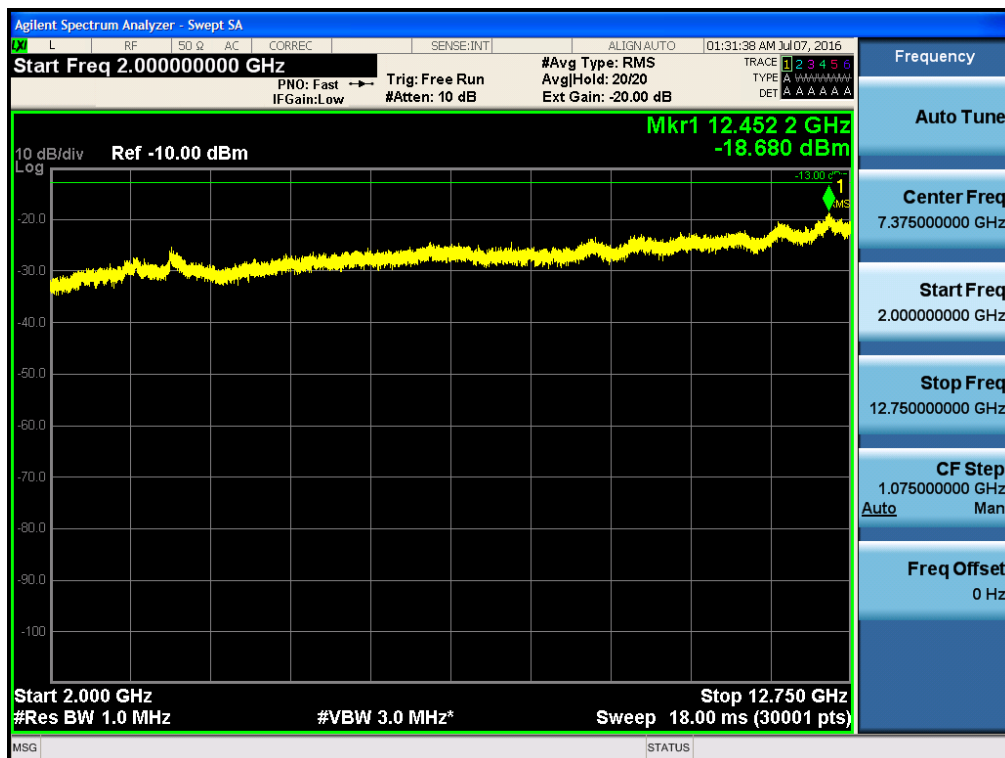
[Downlink Low]-3



[Downlink Middle]-1



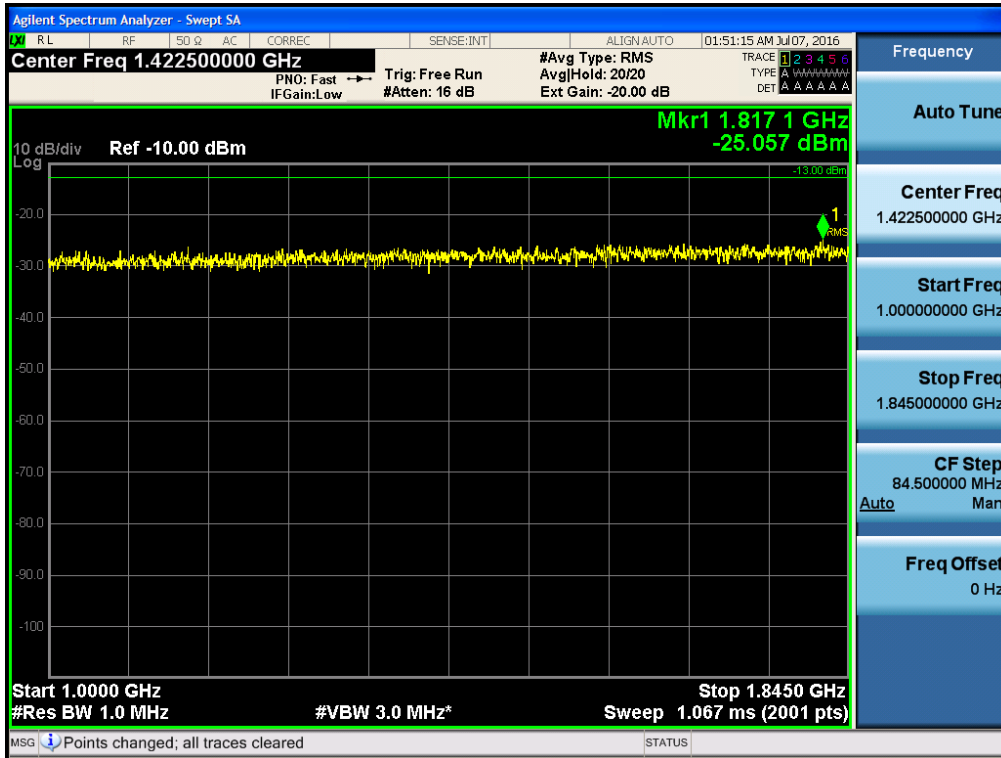
[Downlink Middle]-2



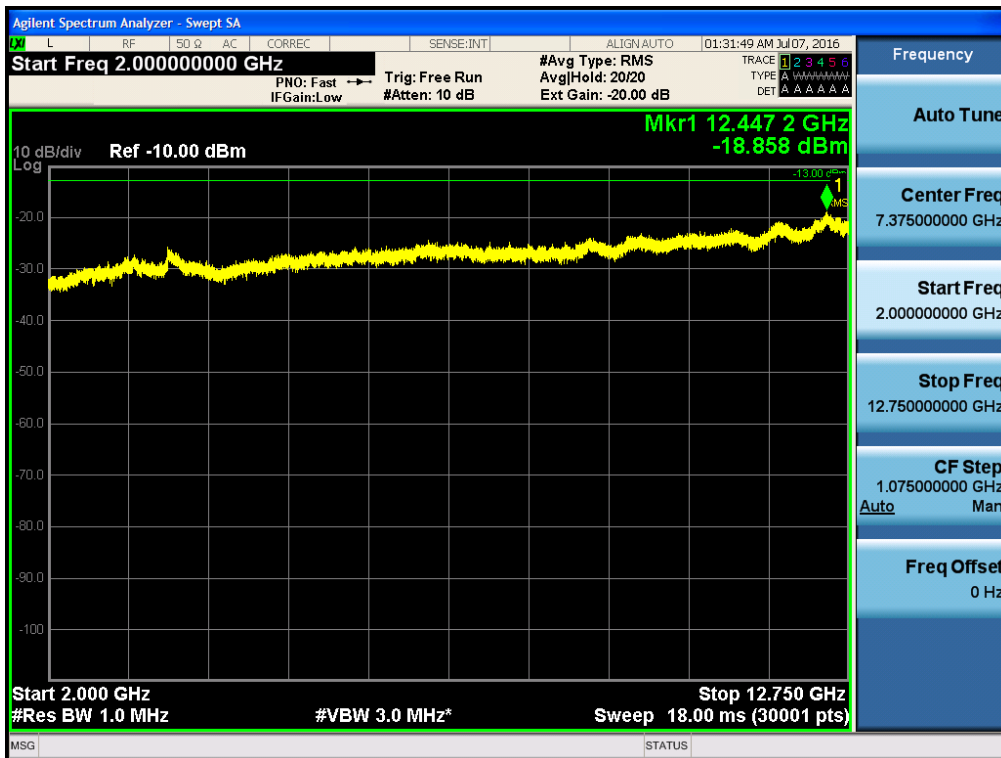
[Downlink Middle]-3



[Downlink High]-1



[Downlink High]-2



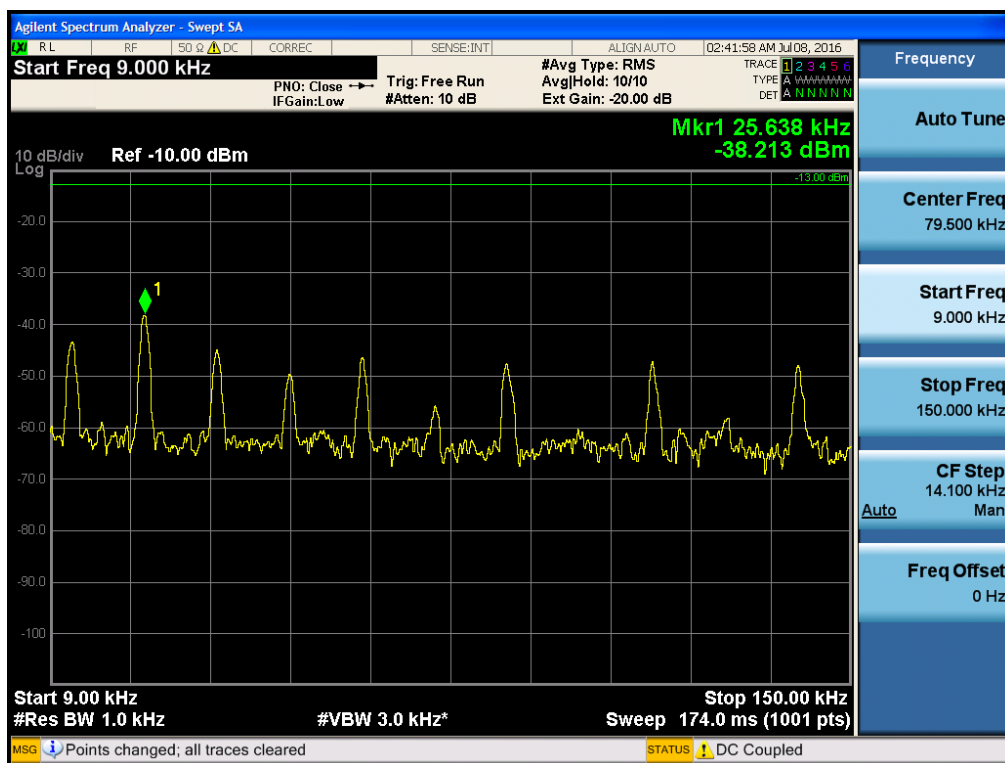
[Downlink High]-3



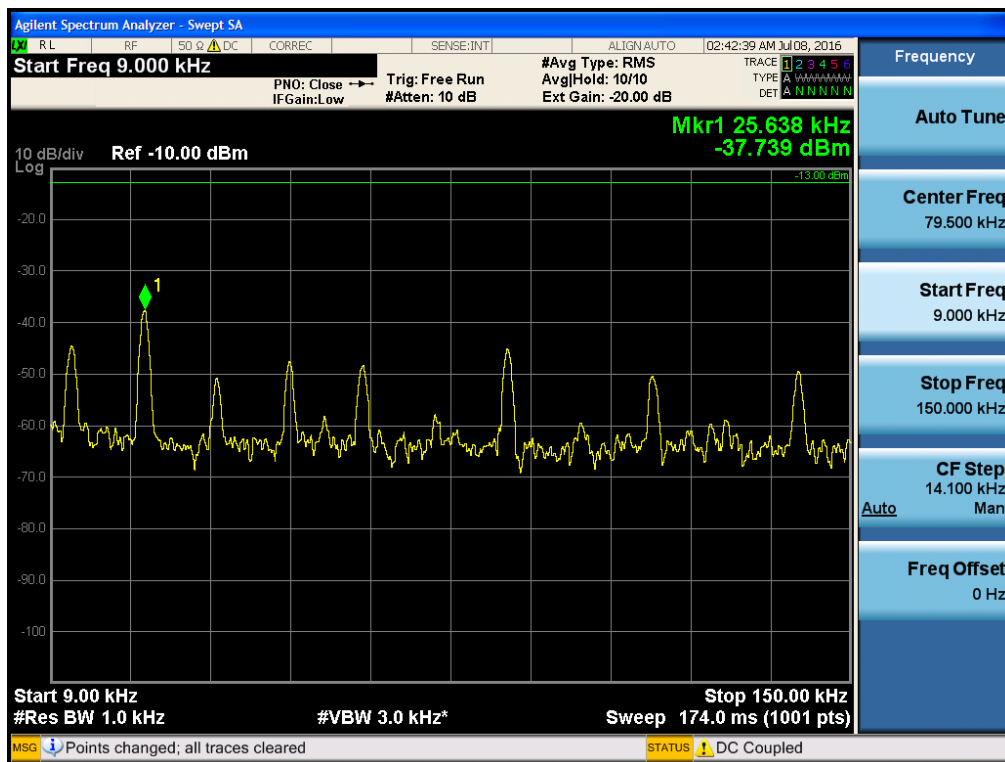


## Multi channel Enhancer Plots of Spurious Emission for IC\_AWS BAND Conducted Spurious Emissions (9 kHz – 150 kHz)

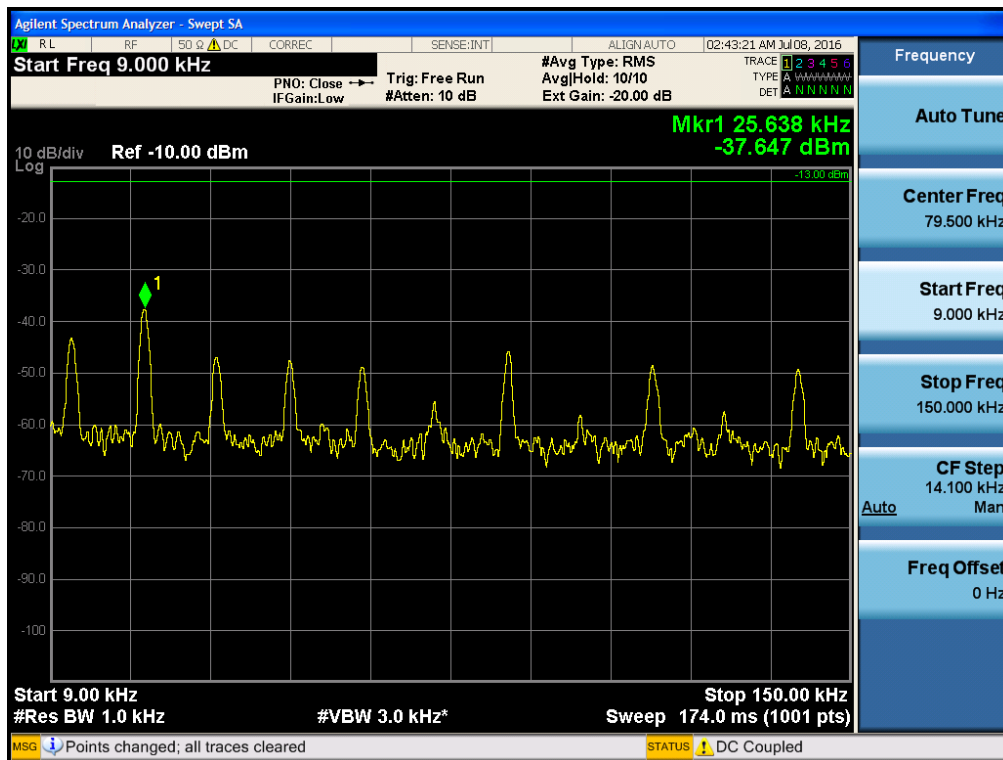
[Downlink Low]



[Downlink Middle]

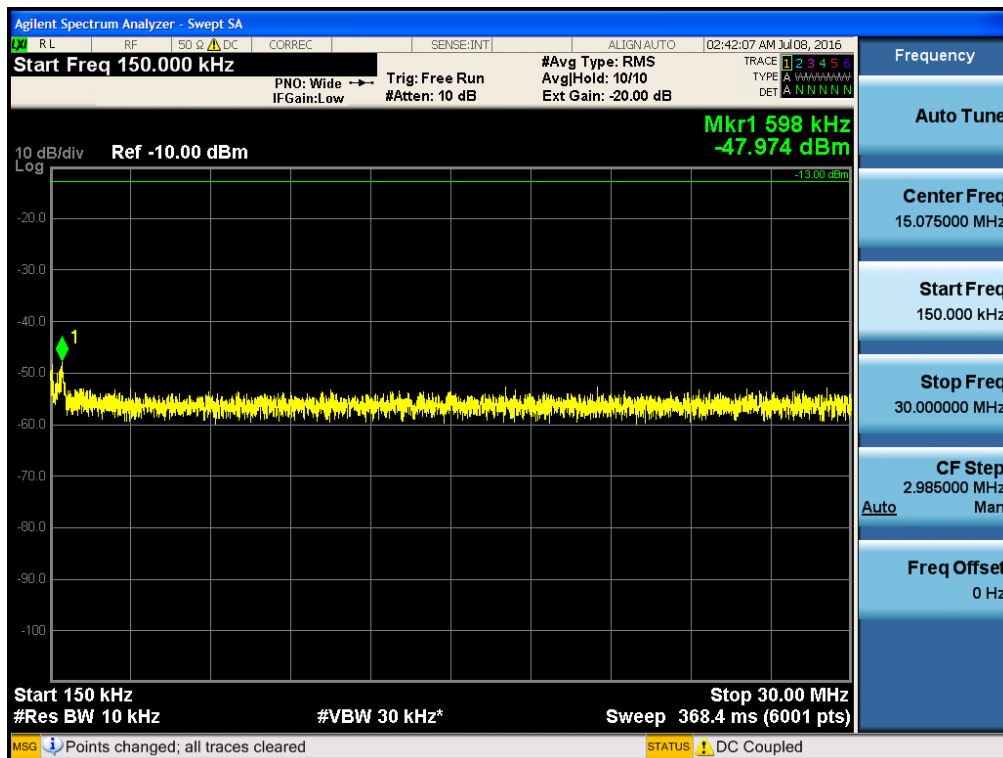


[Downlink High]

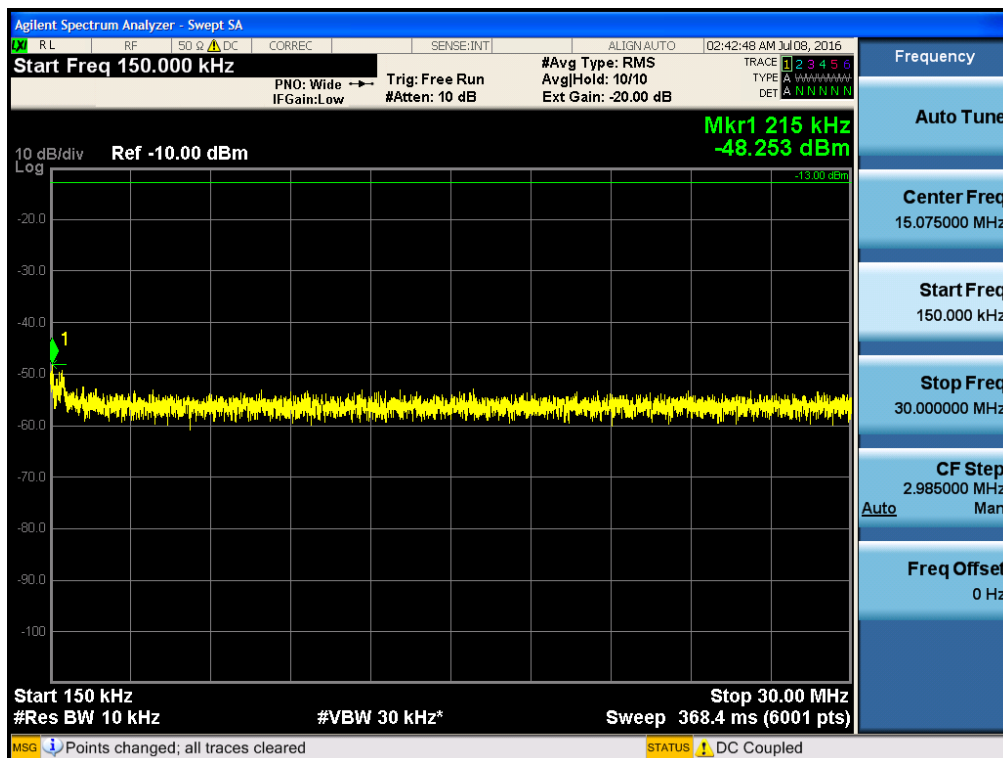


## Conducted Spurious Emissions (150 kHz – 30 MHz)

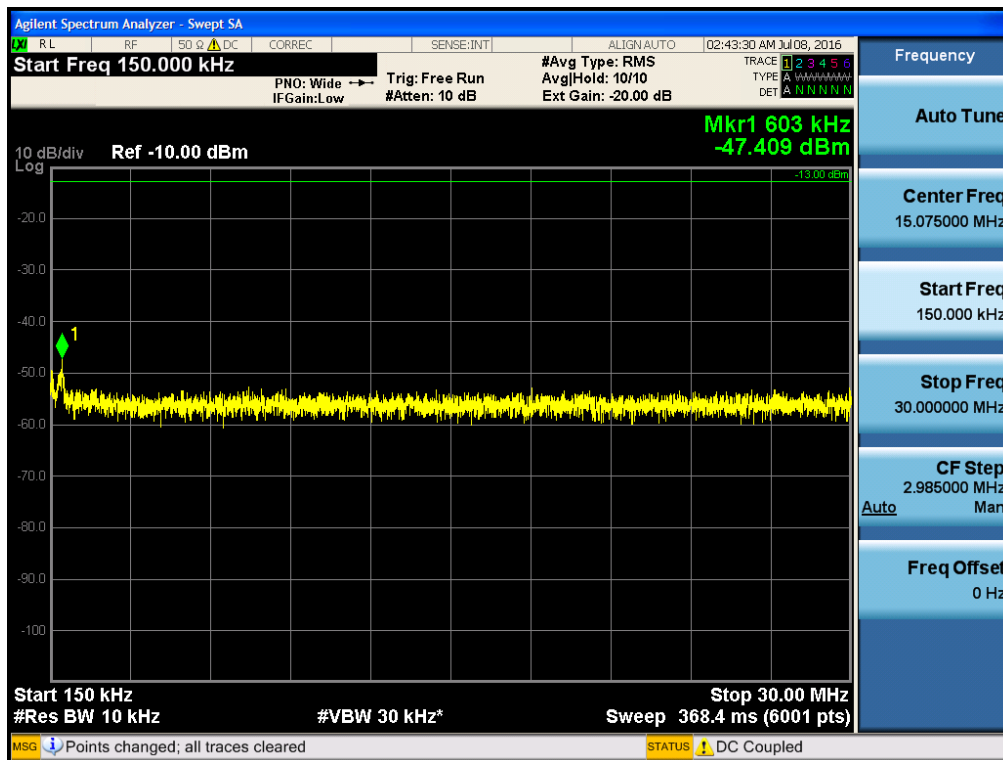
[Downlink Low]



[Downlink Middle]

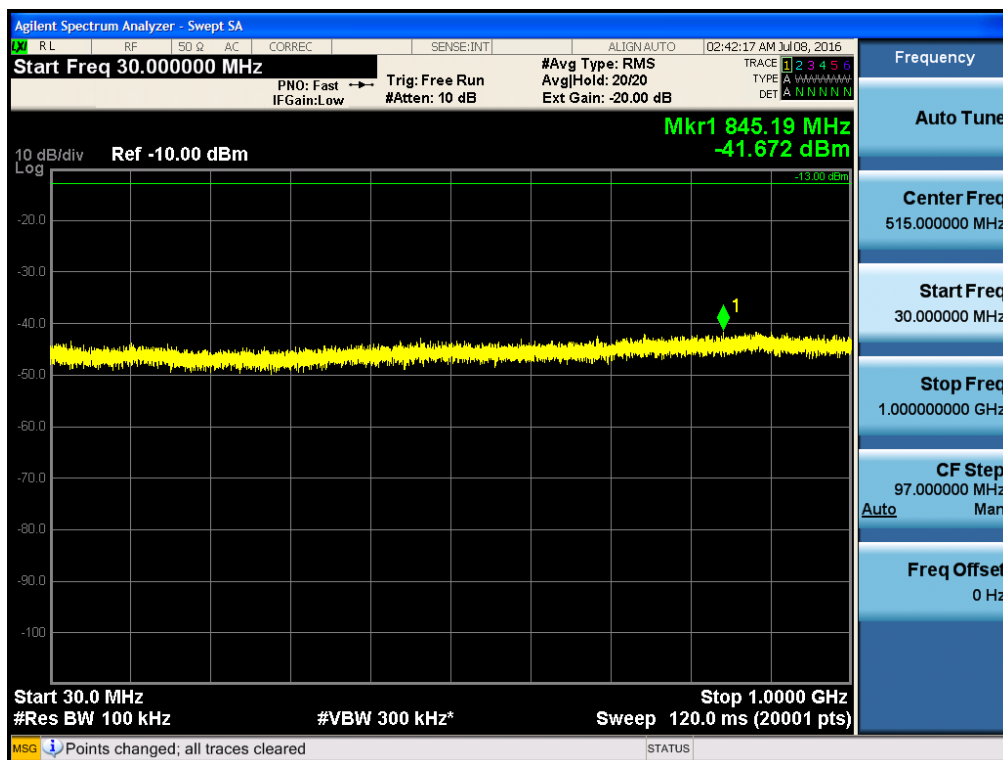


[Downlink High]

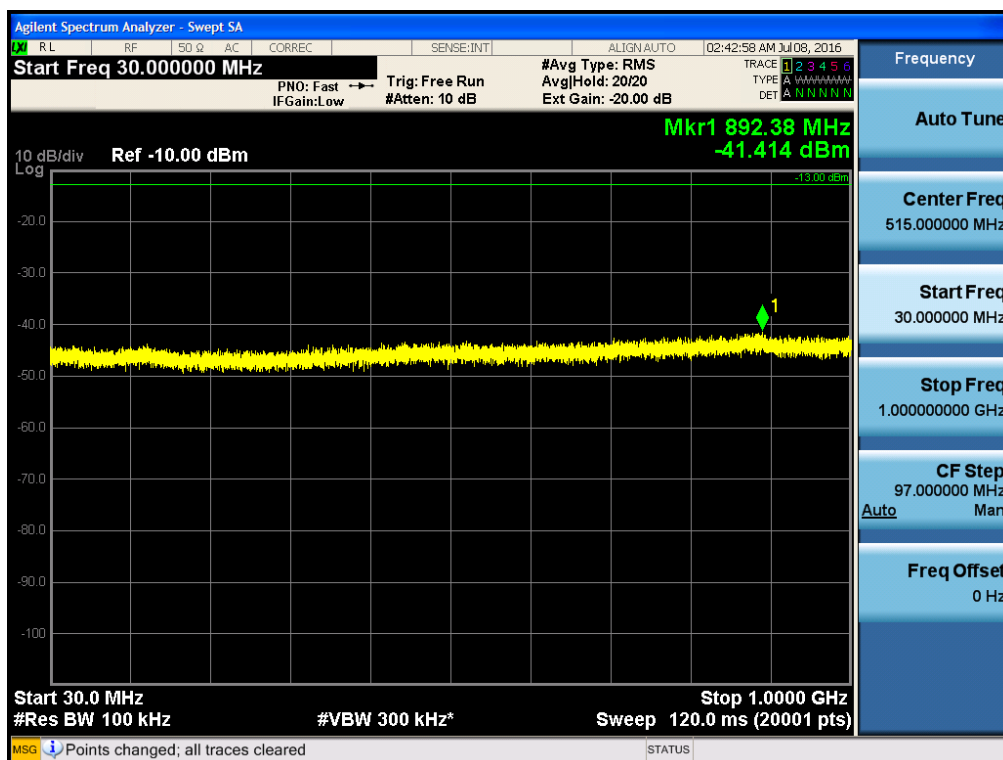


## Conducted Spurious Emissions (30 MHz – 1 GHz)

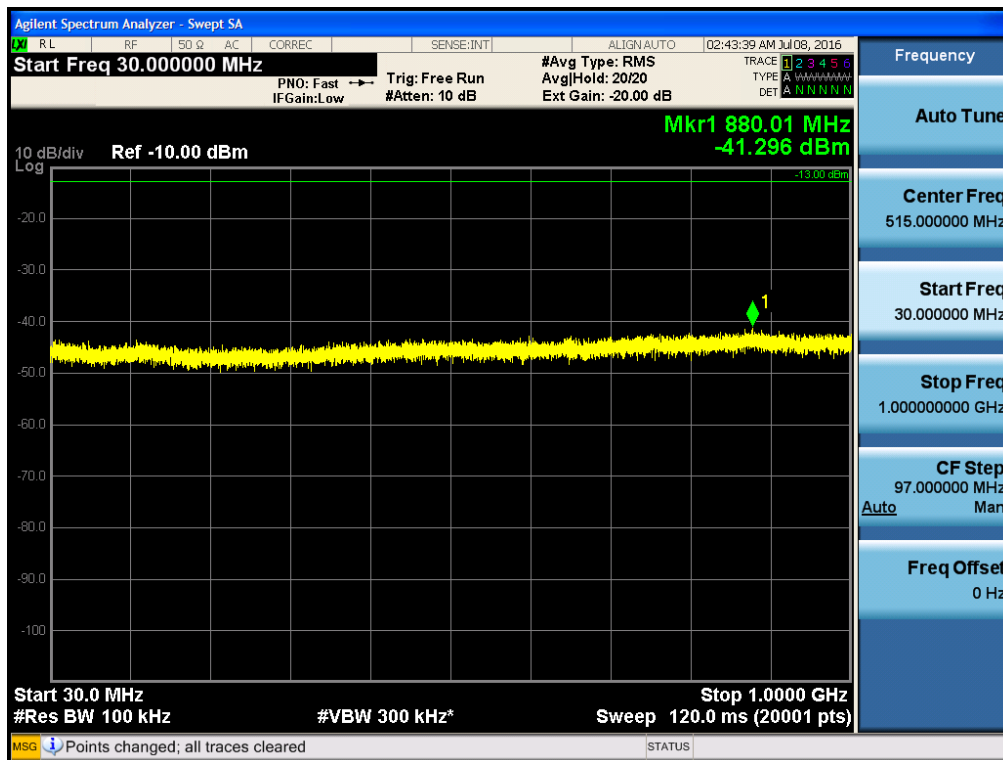
### [Downlink Low]



### [Downlink Middle]

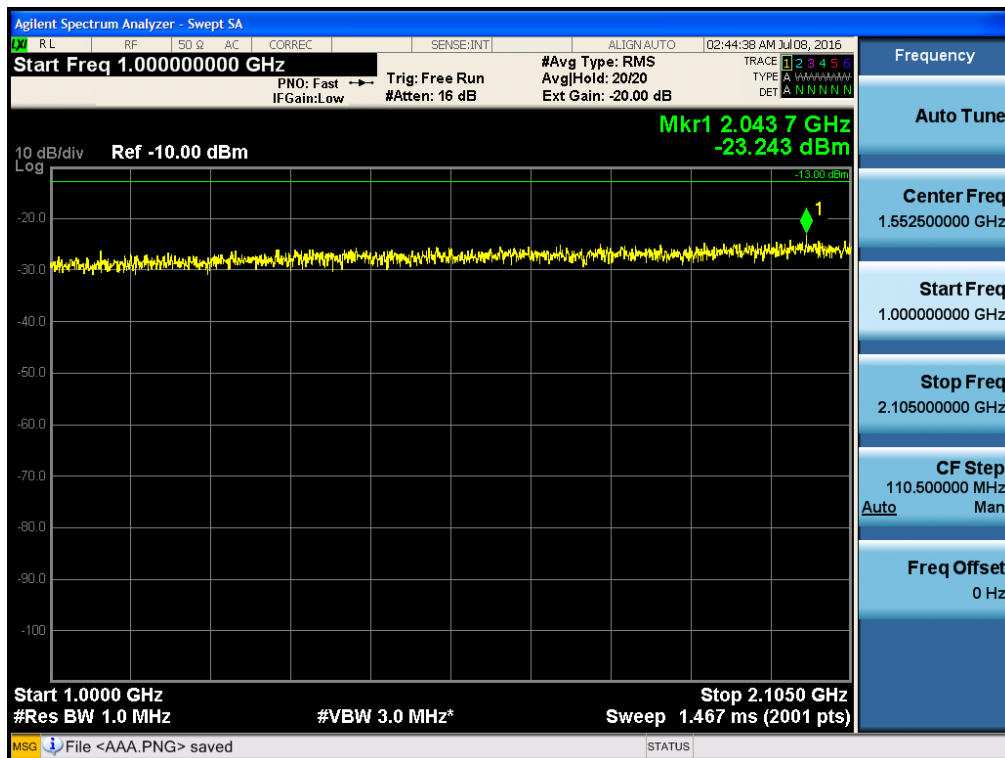


[Downlink High]

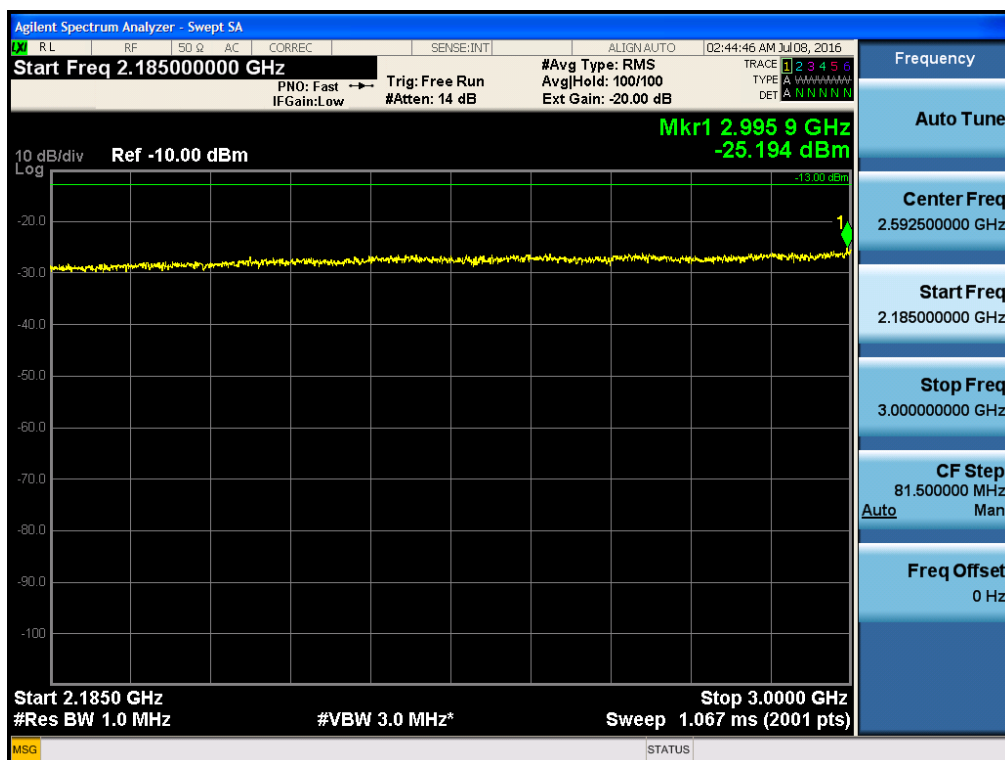


## Conducted Spurious Emissions (1 GHz –26.5 GHz)

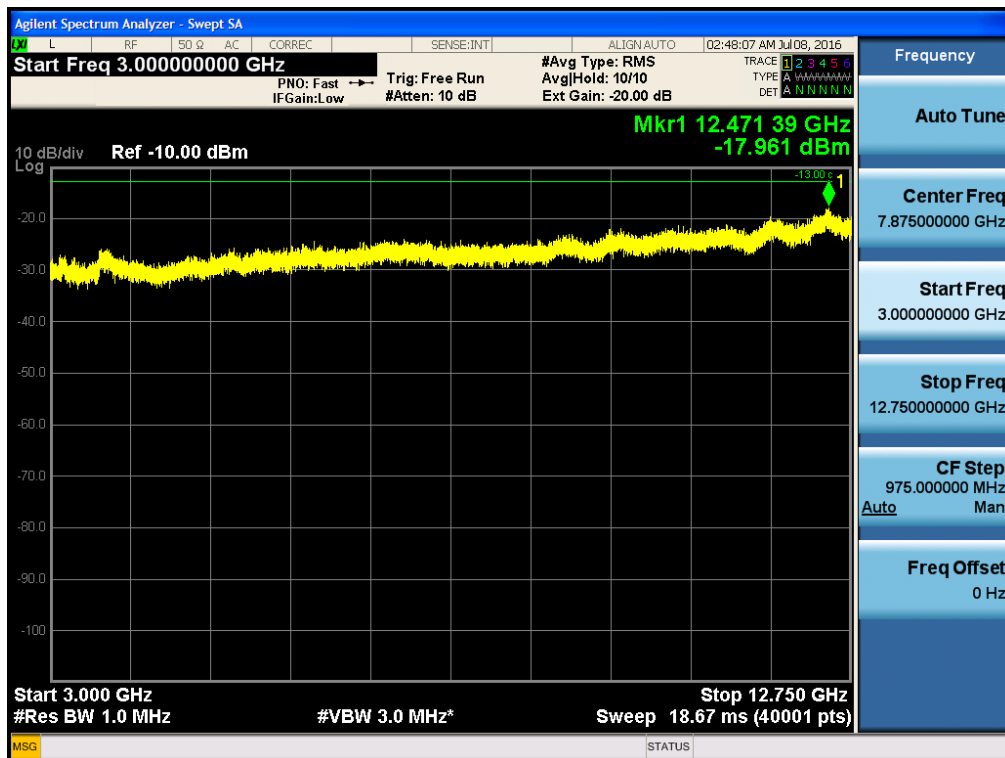
### [Downlink Low]-1



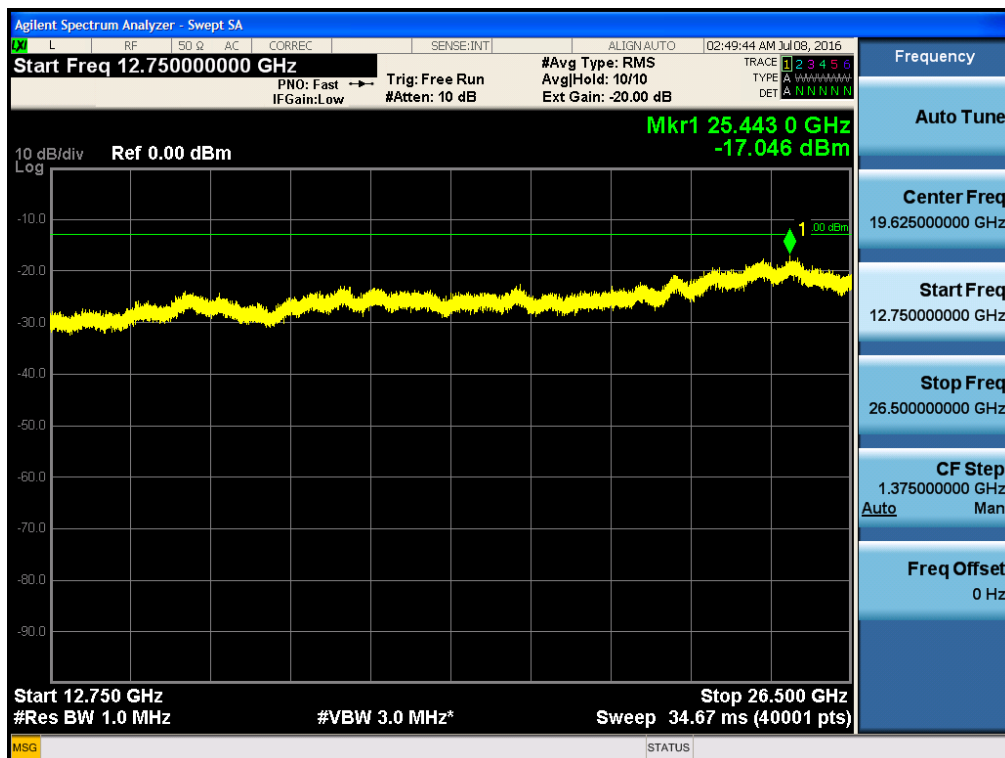
### [Downlink Low]-2



[Downlink Low]-3

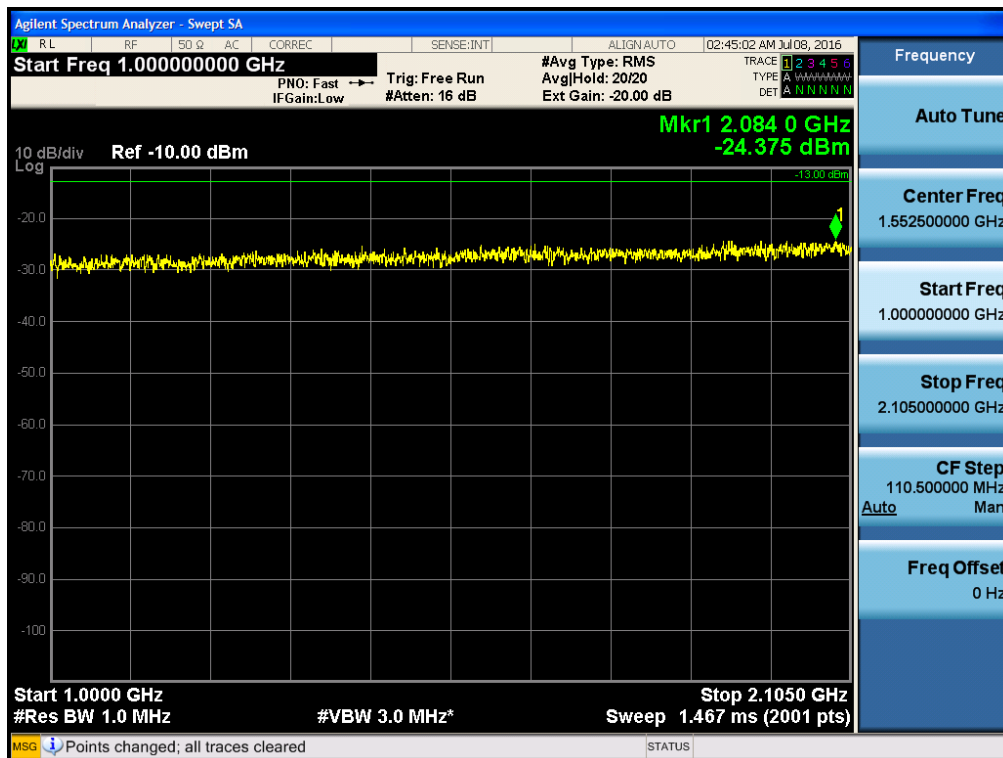


[Downlink Low]-4

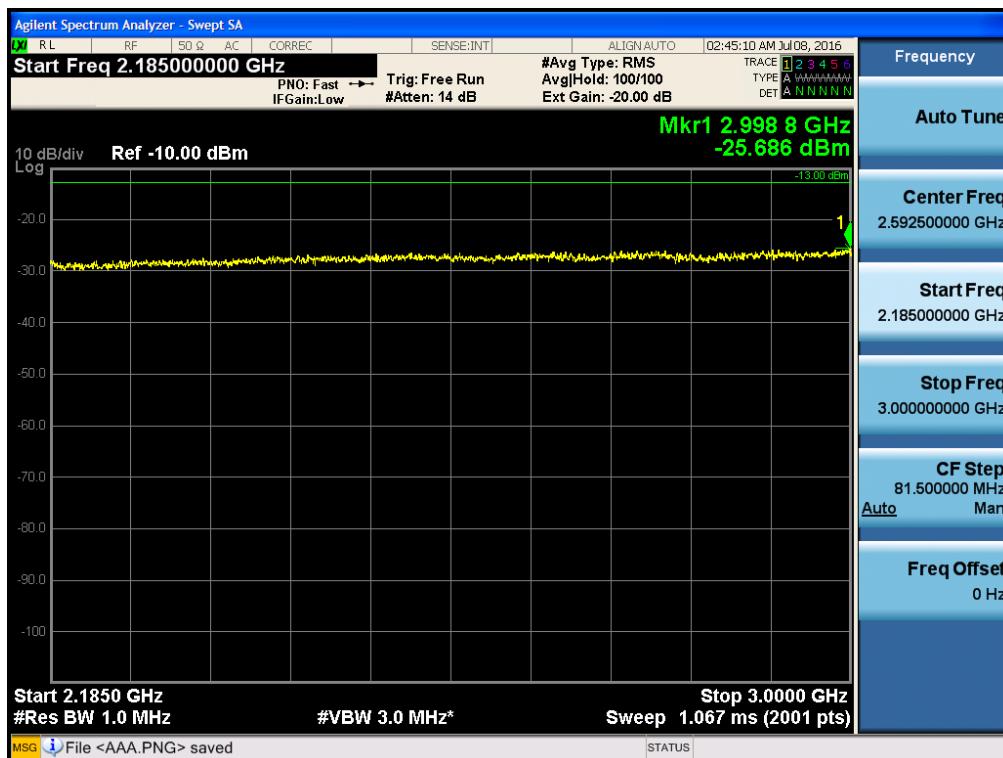




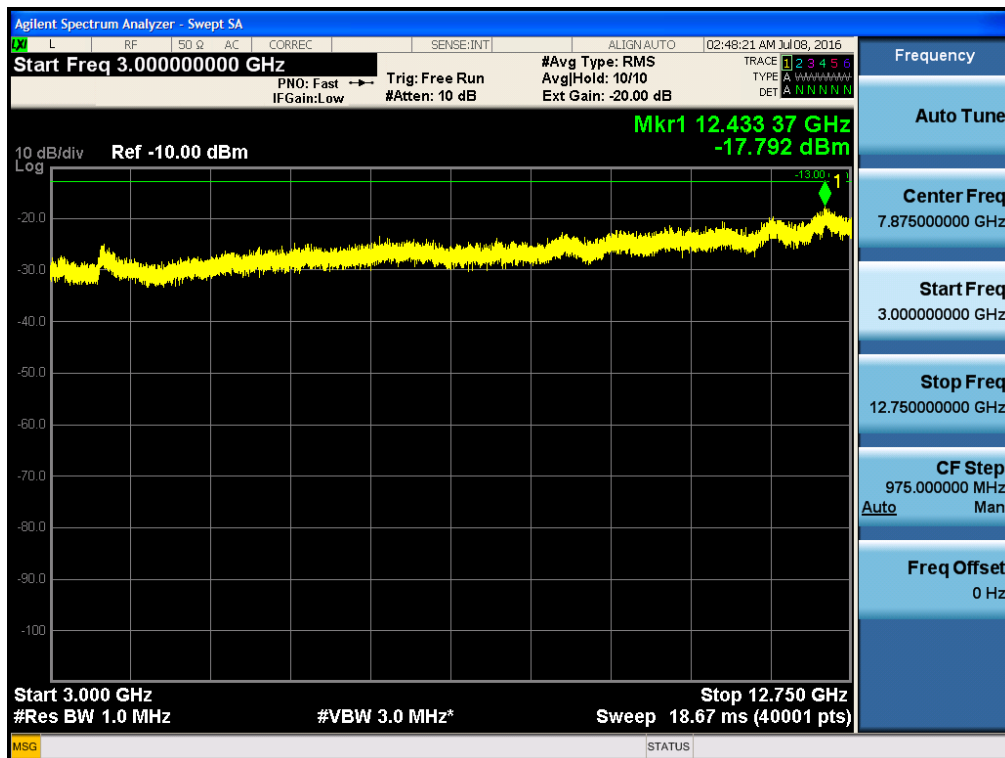
[Downlink Middle]-1



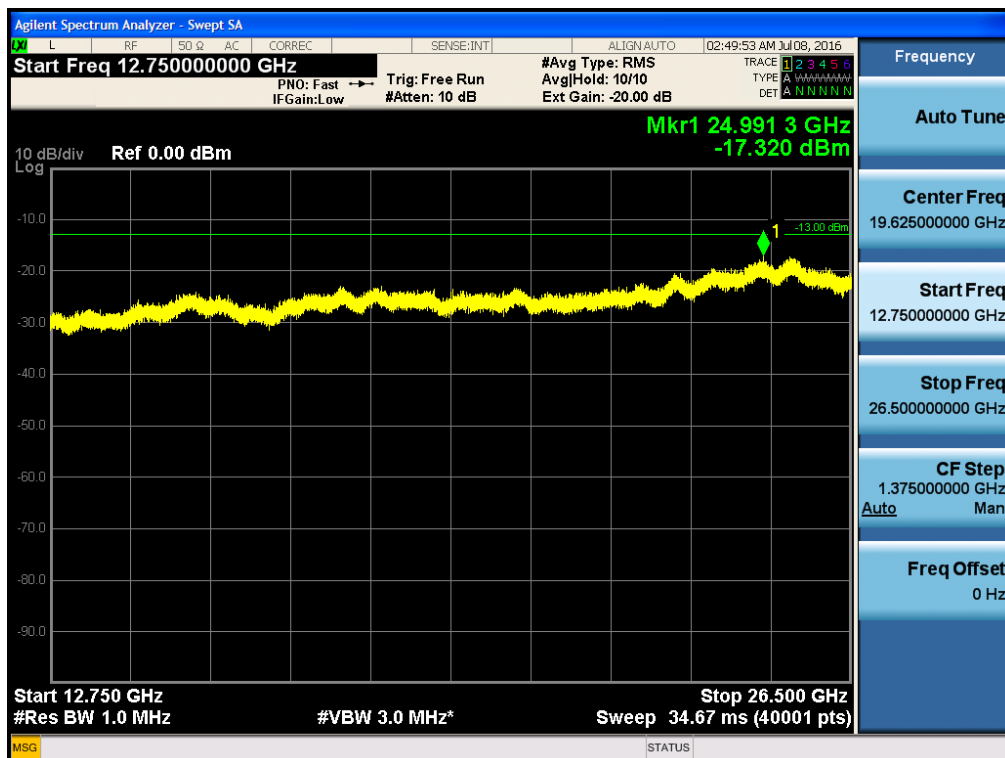
[Downlink Middle]-2



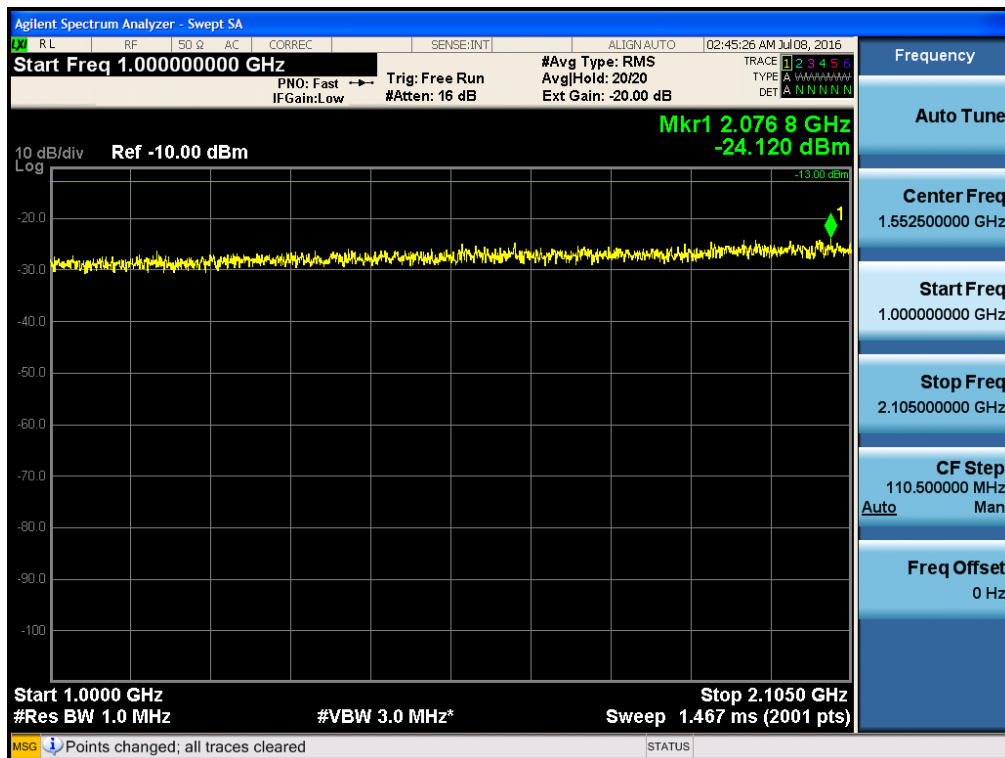
[Downlink Middle]-3



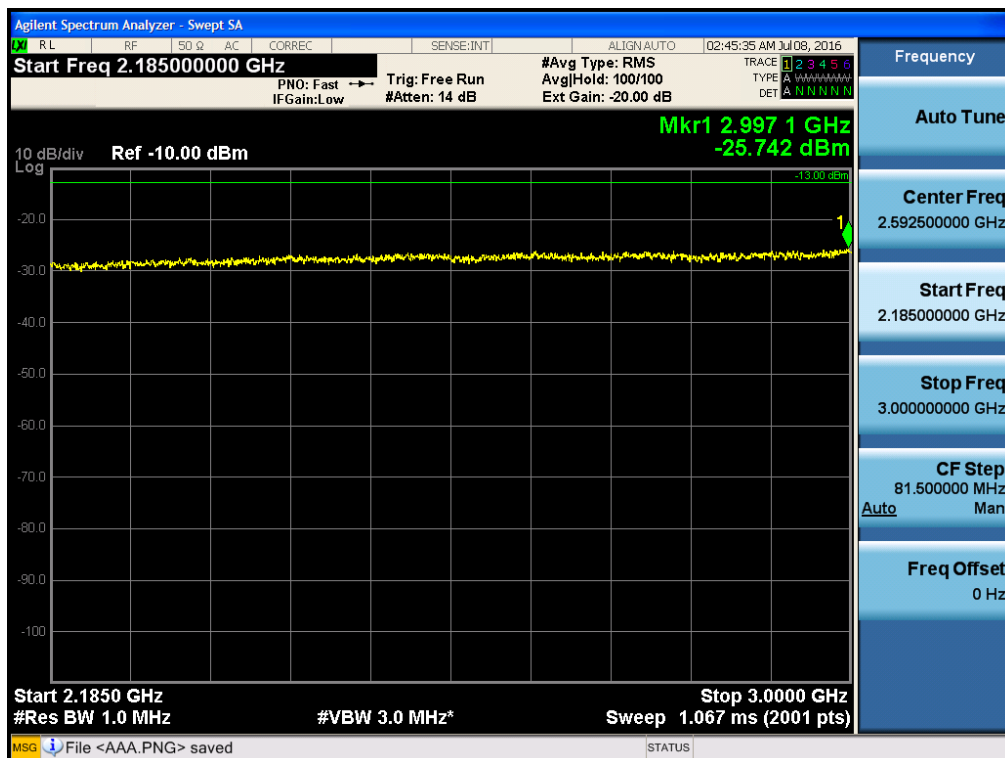
[Downlink Middle]-4



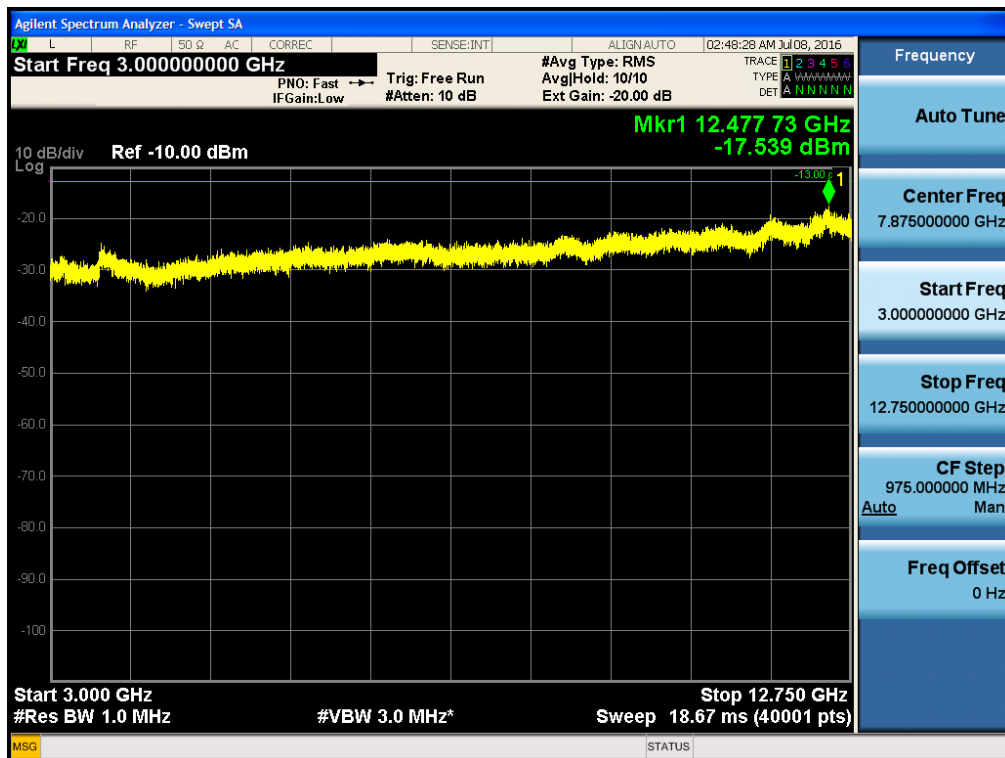
[Downlink High]-1



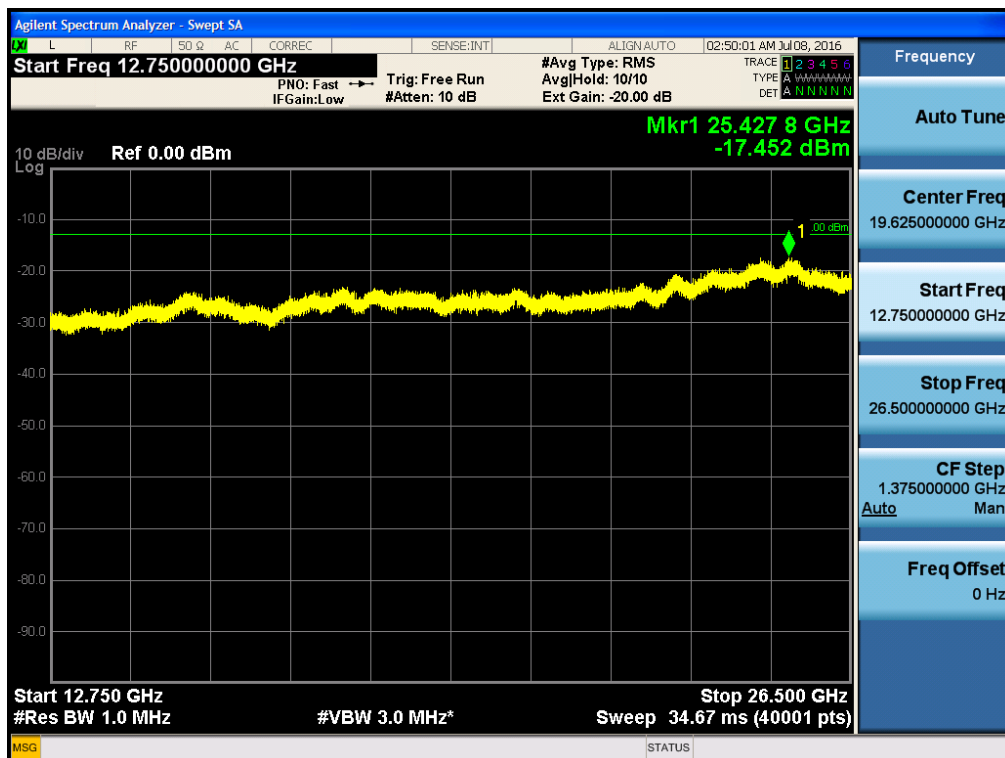
[Downlink High]-2



[Downlink High]-3

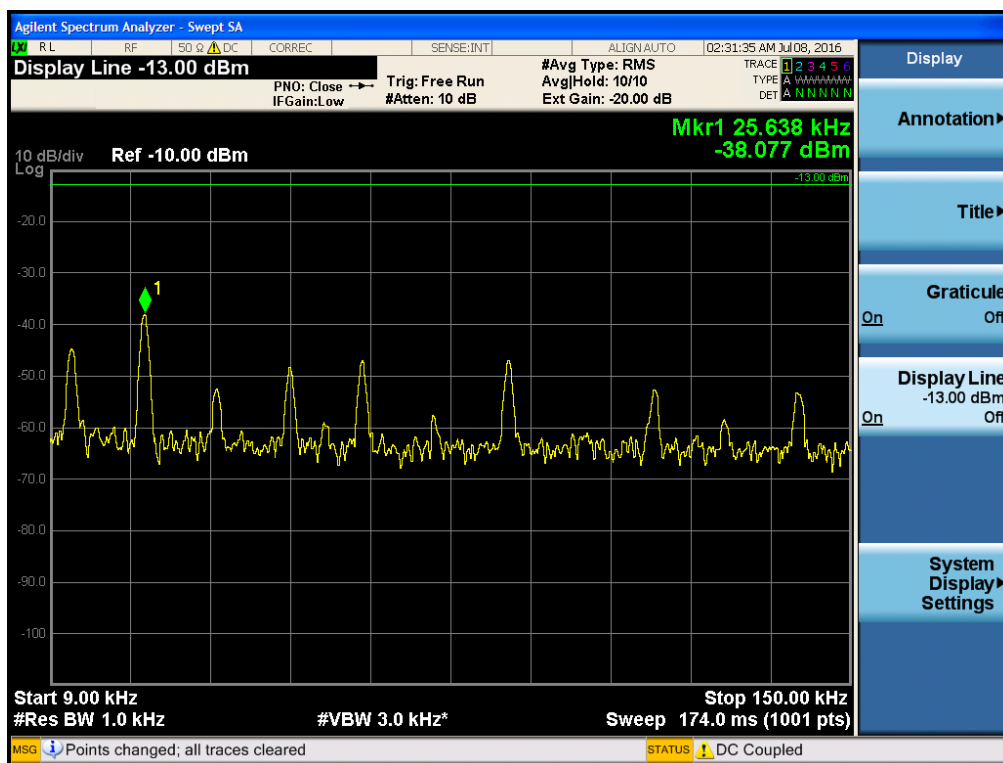


[Downlink High]-4

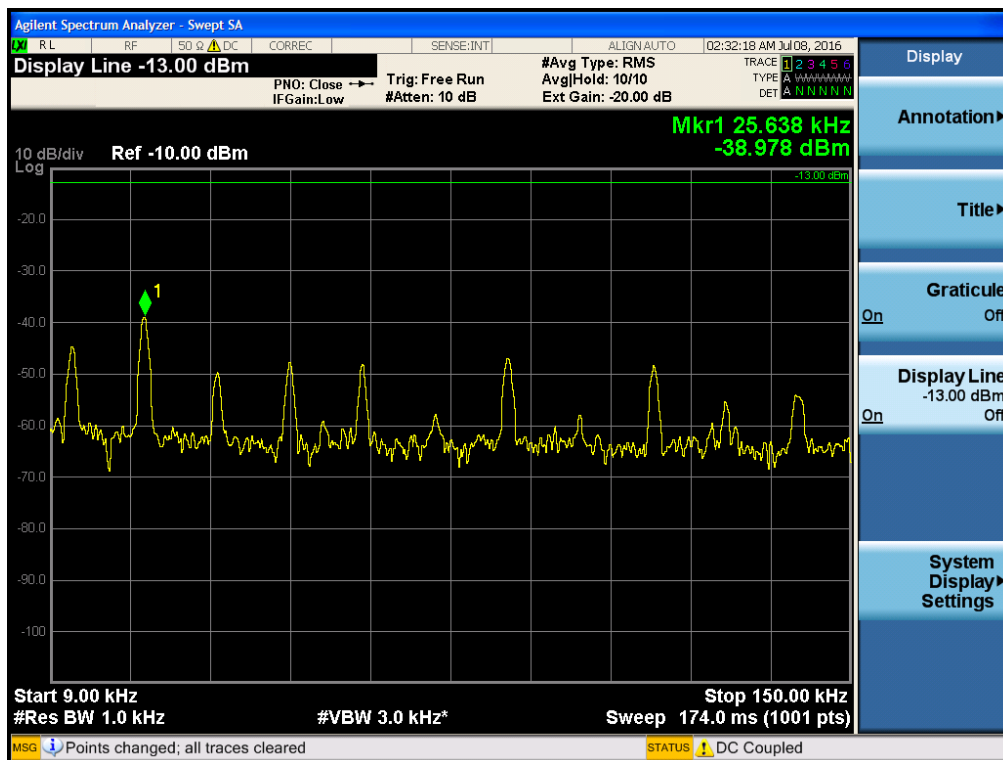


## Multi channel Enhancer Plots of Spurious Emission for IC\_1900 PCS BAND Conducted Spurious Emissions (9 kHz – 150 kHz)

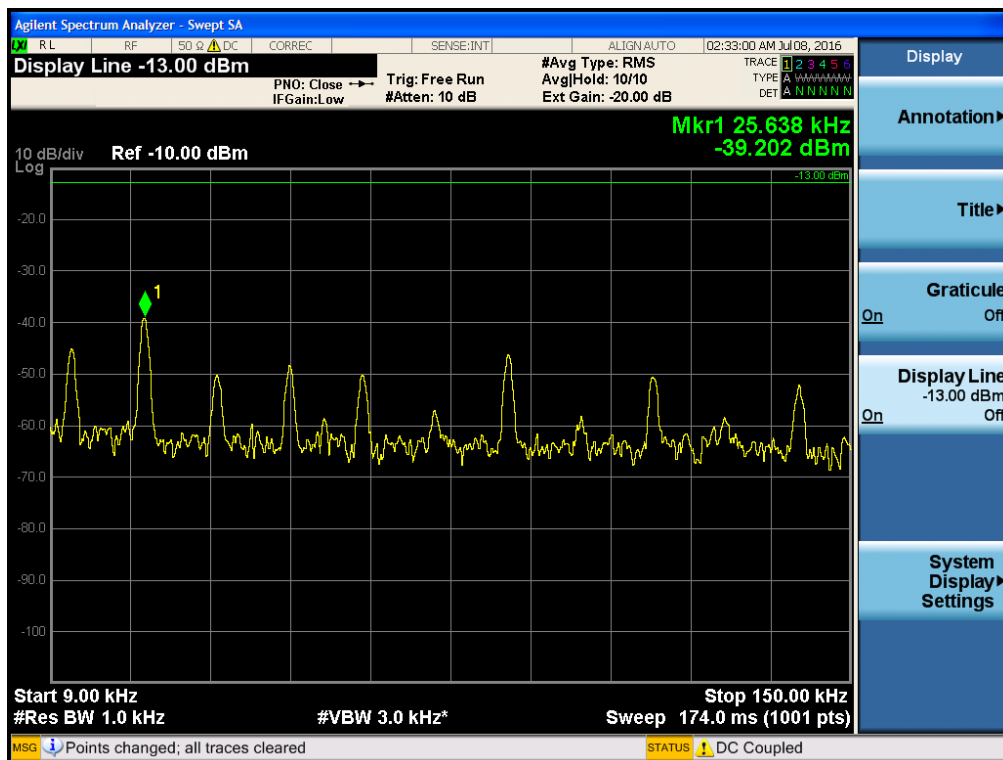
[Downlink Low]



[Downlink Middle]

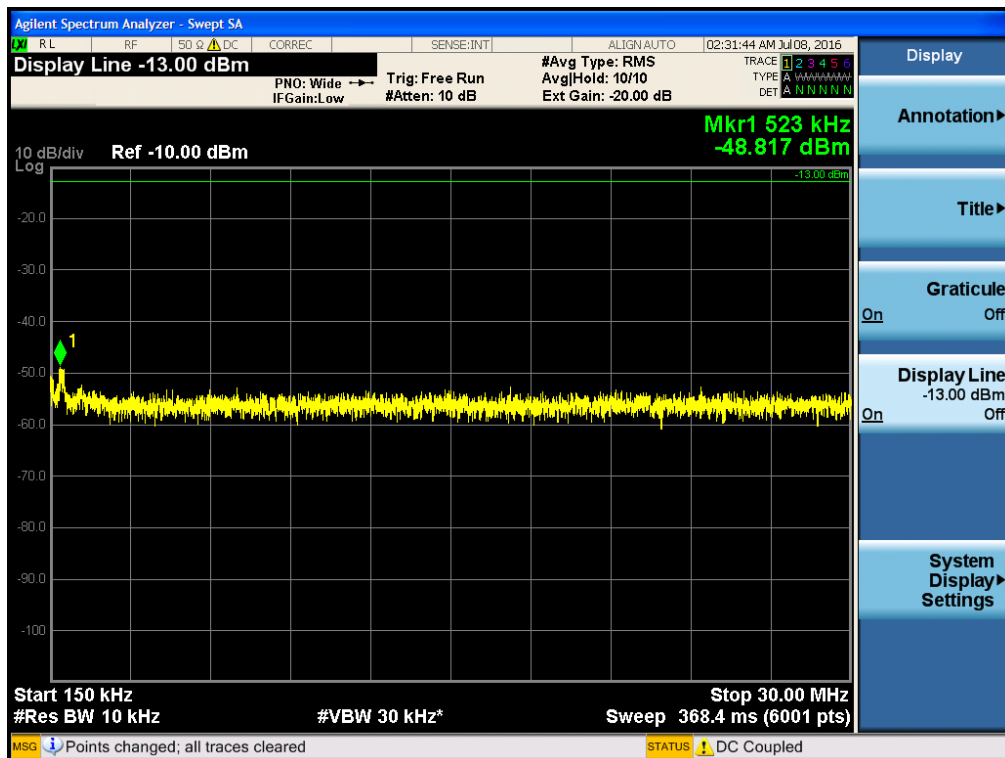


[Downlink High]

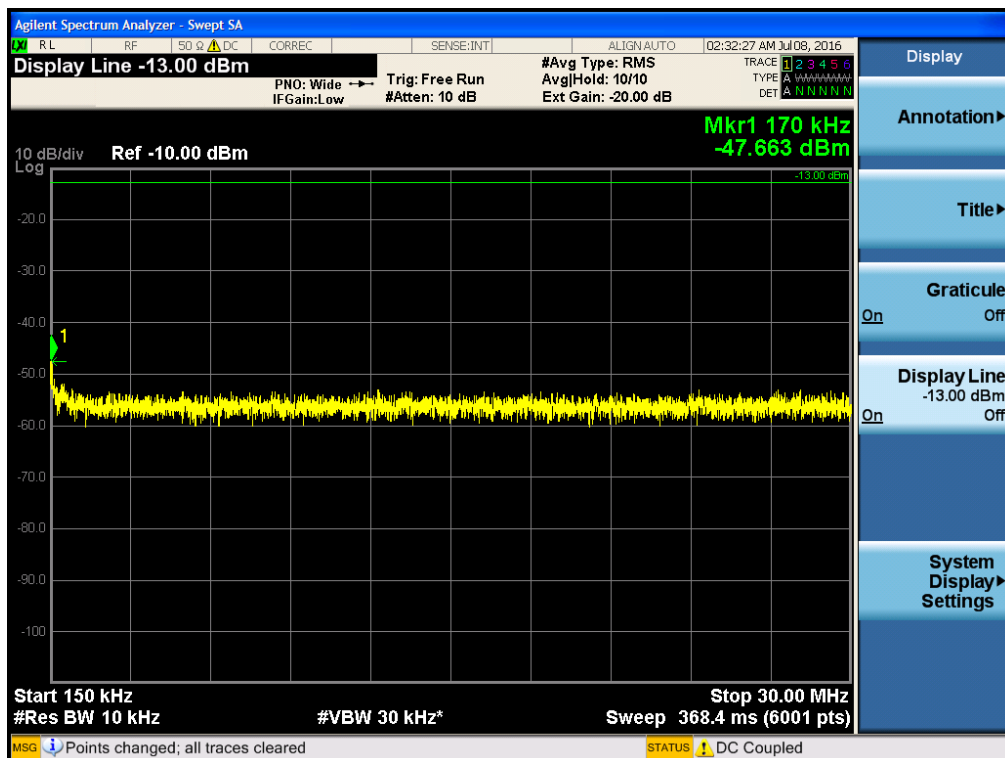


## Conducted Spurious Emissions (150 kHz – 30 MHz)

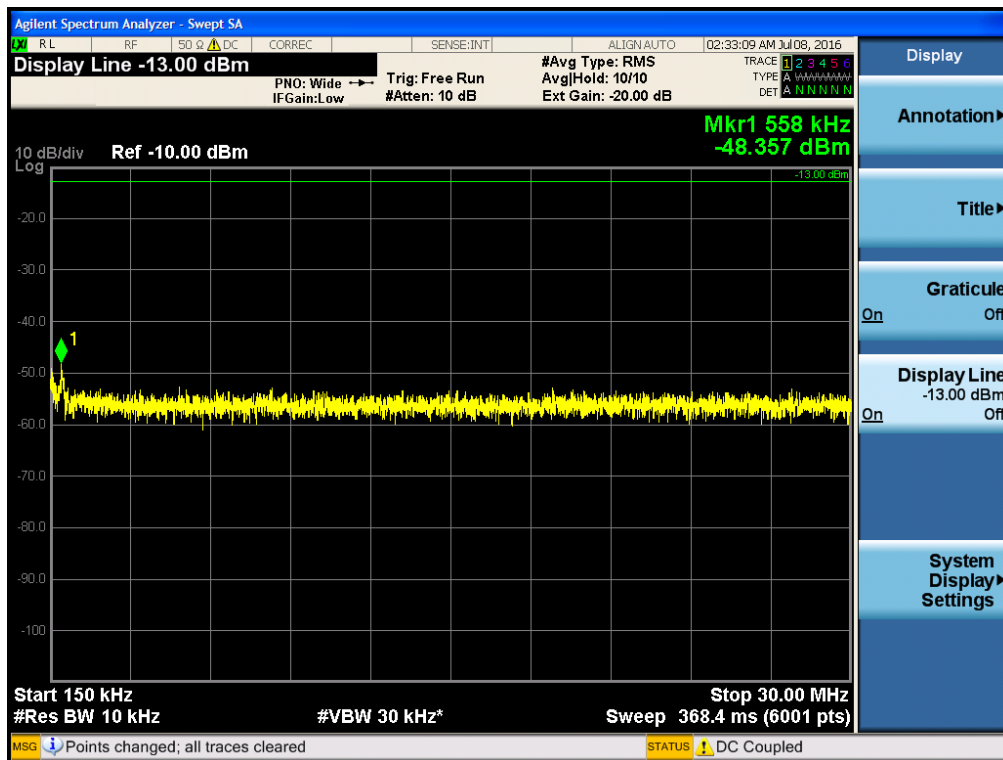
[Downlink Low]



[Downlink Middle]



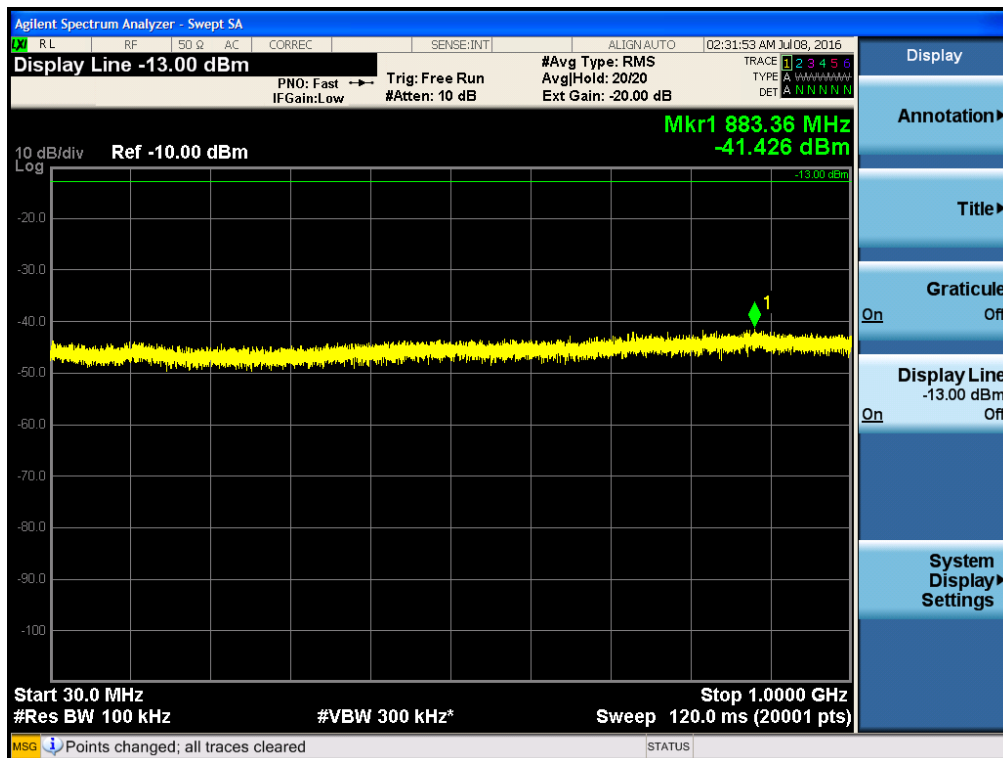
[Downlink High]



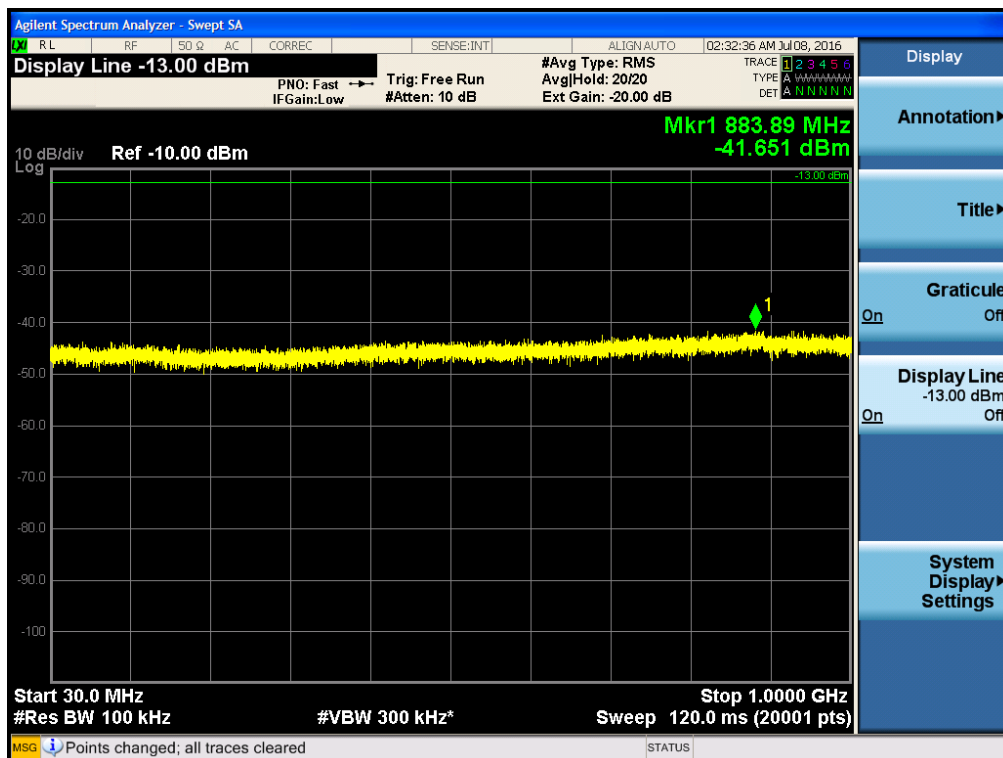


## Conducted Spurious Emissions (30 MHz – 1 GHz)

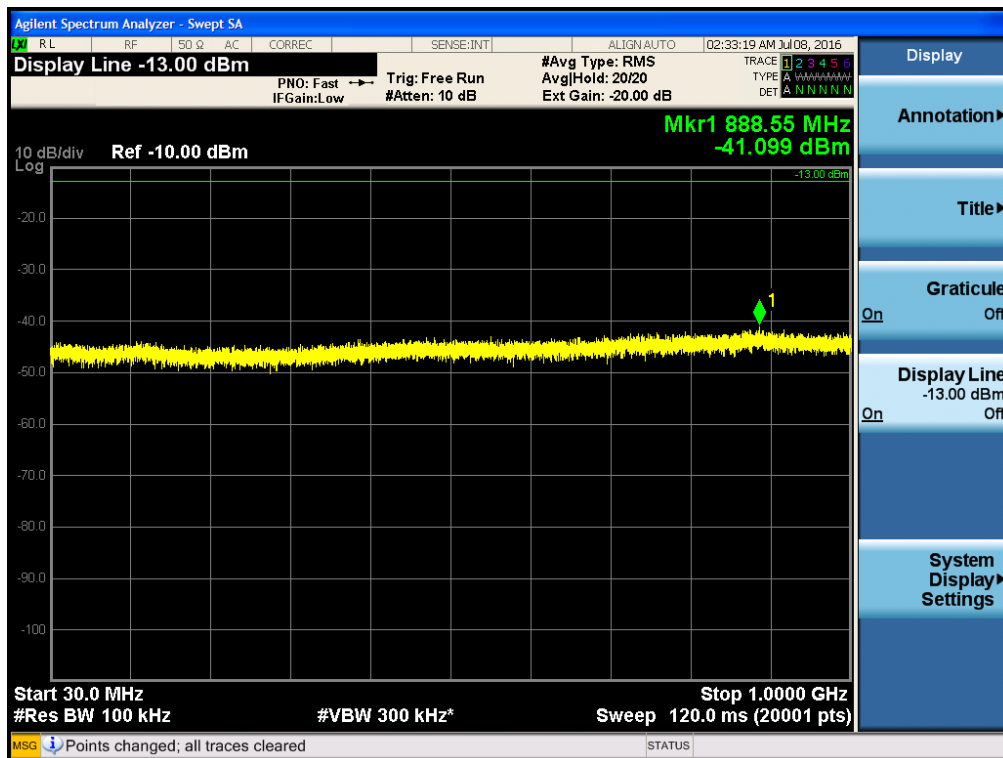
### [Downlink Low]



### [Downlink Middle]

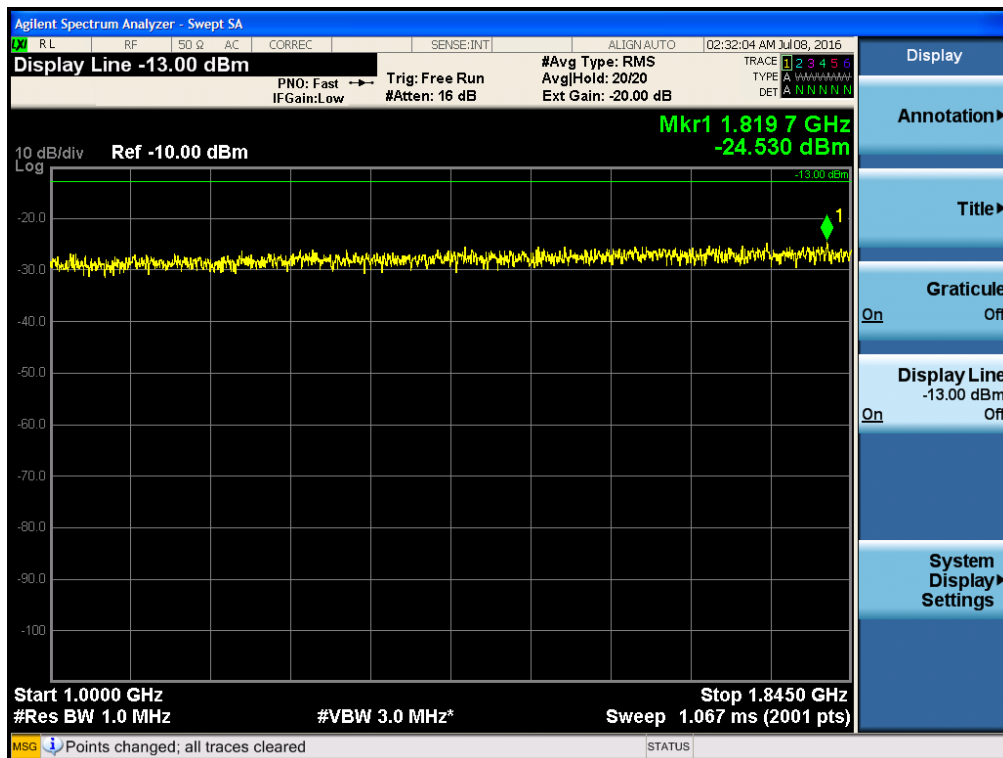


[Downlink High]

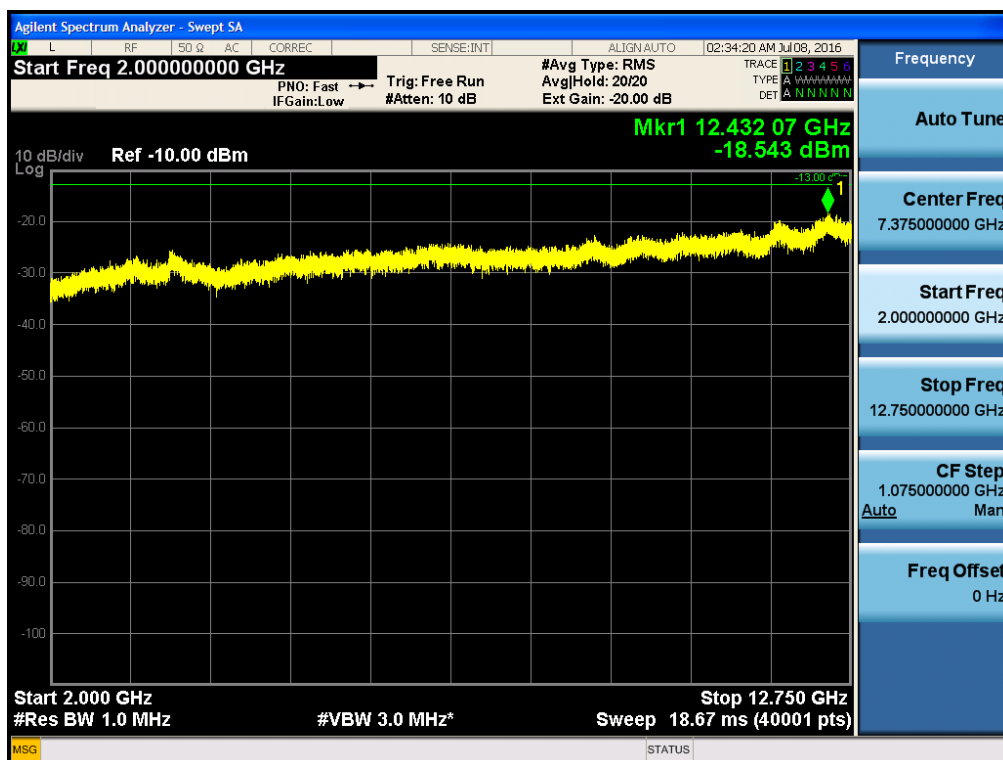


## Conducted Spurious Emissions (1 GHz –26.5 GHz)

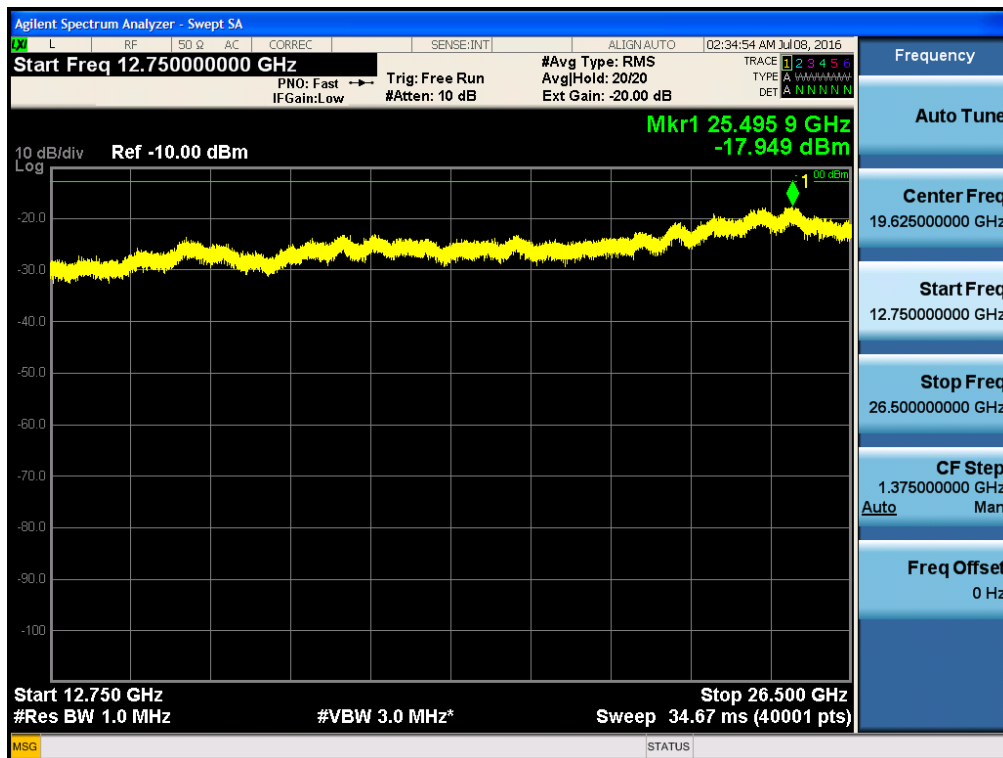
### [Downlink Low]-1



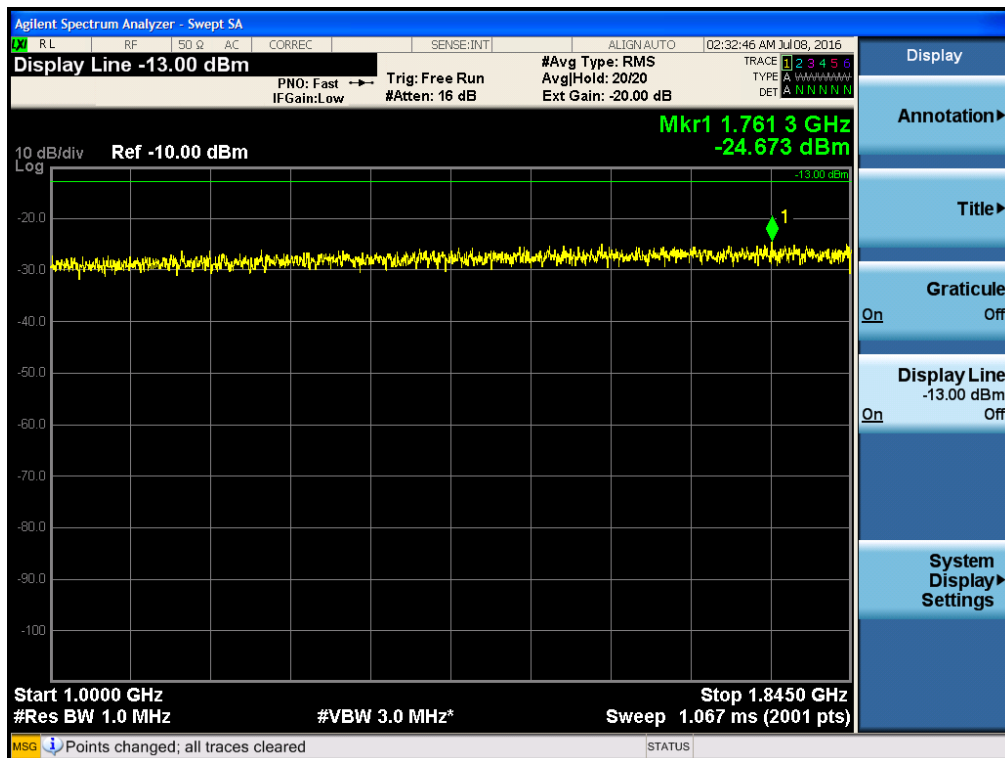
### [Downlink Low]-2



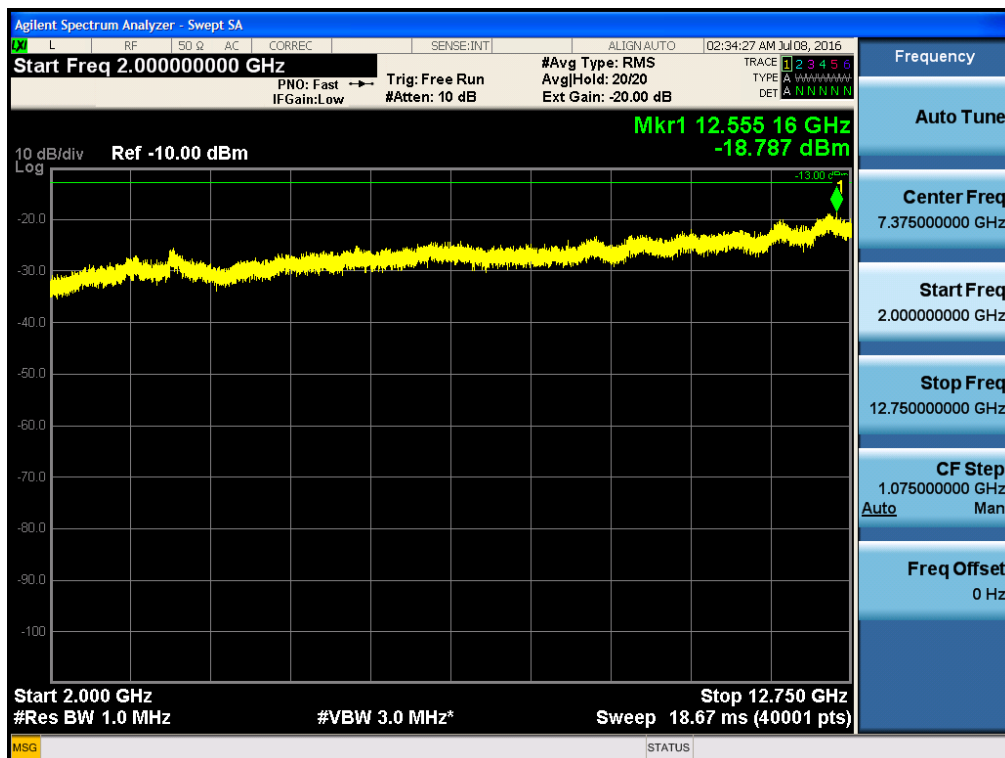
[Downlink Low]-3



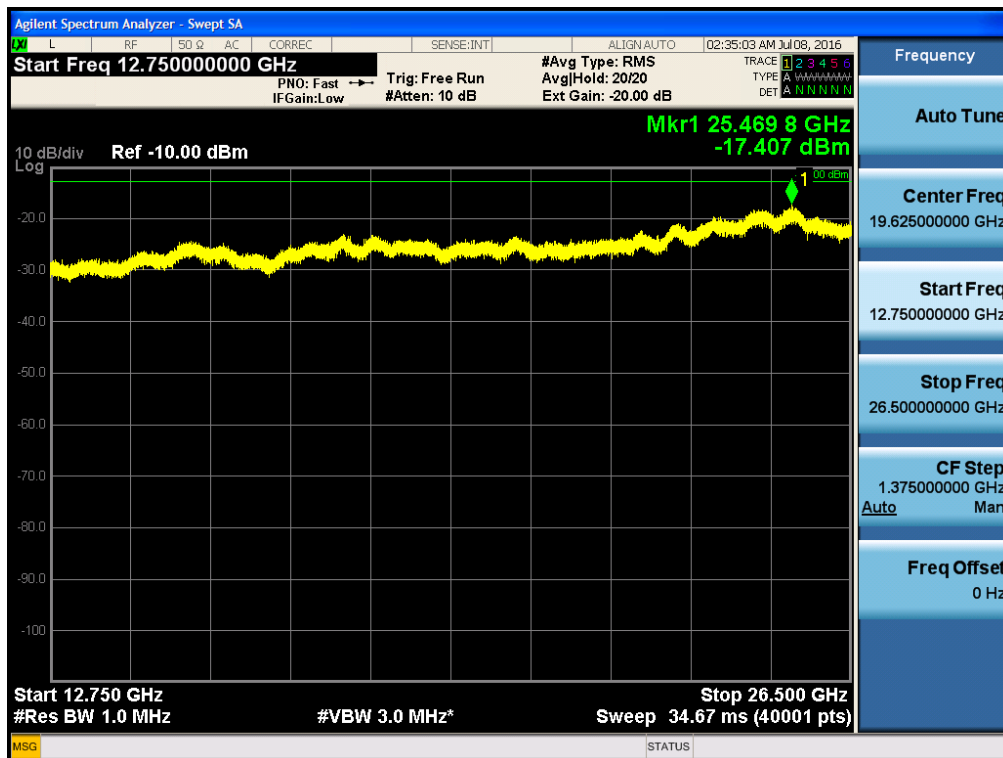
[Downlink Middle]-1



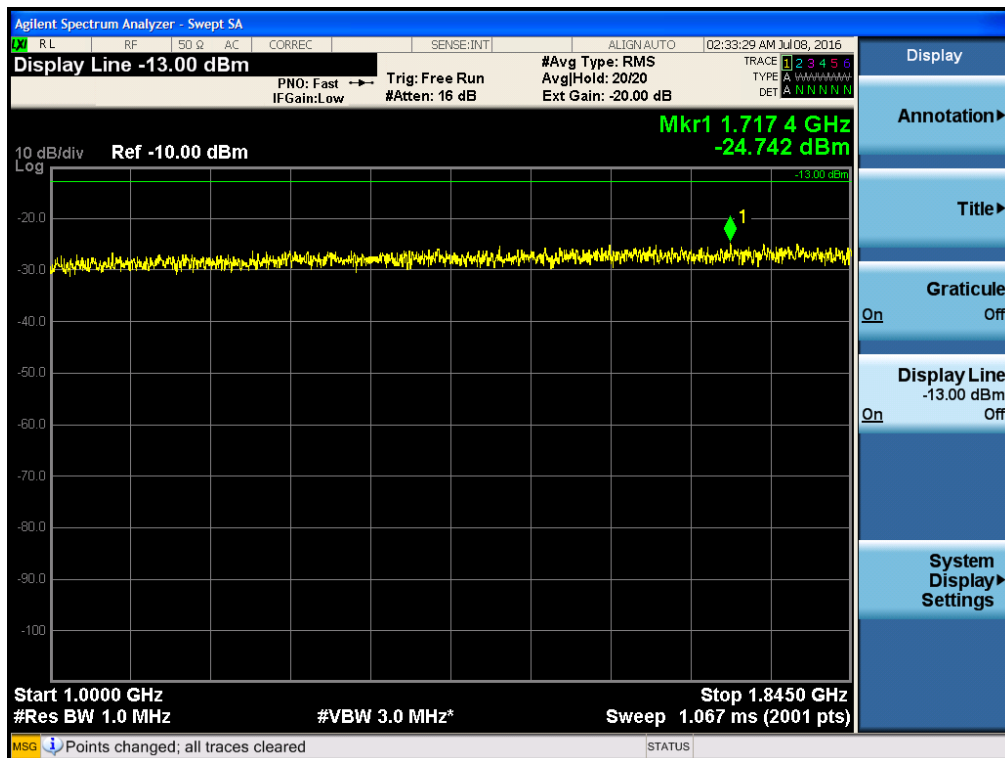
[Downlink Middle]-2



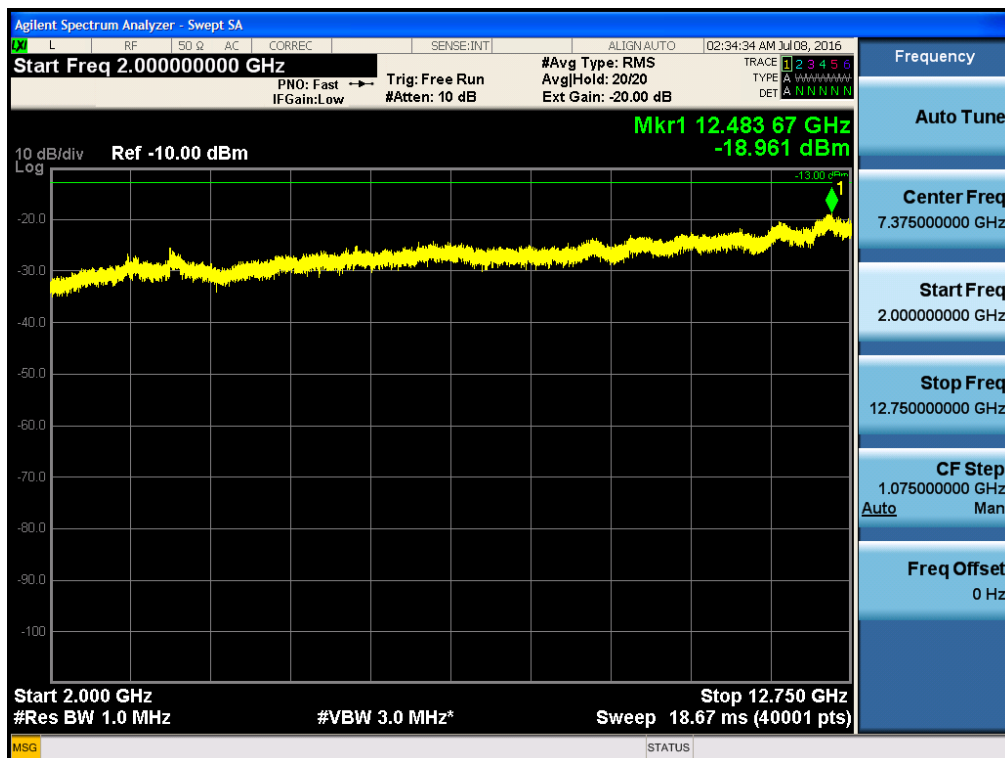
[Downlink Middle]-3



[Downlink High]-1



[Downlink High]-2



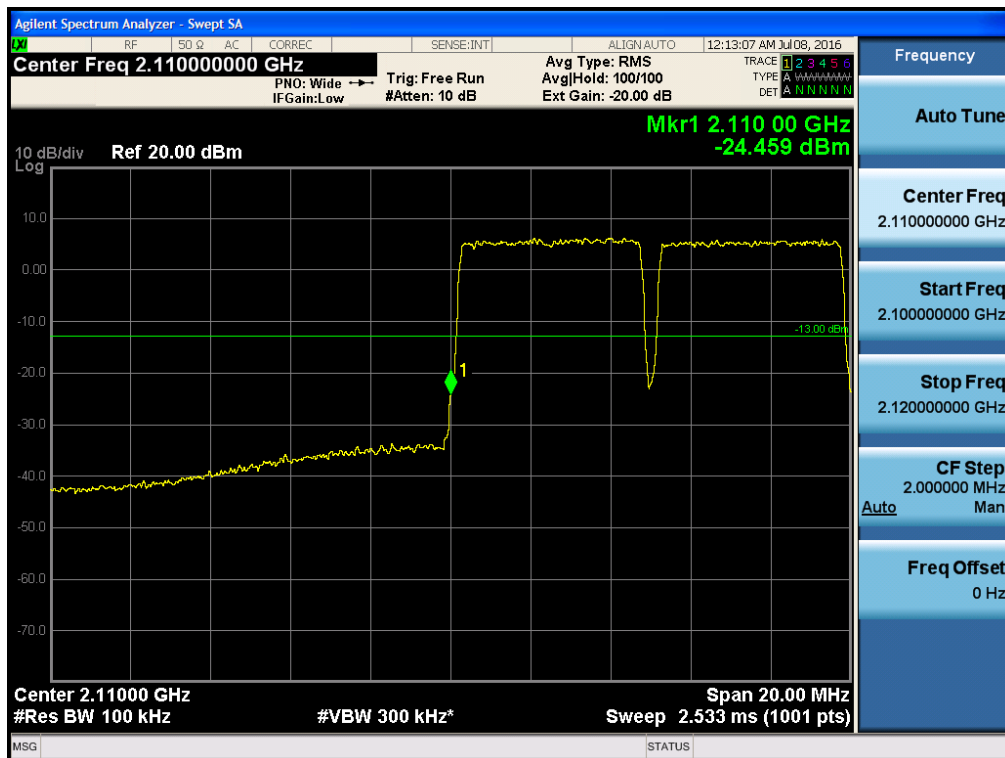
[Downlink High]-3



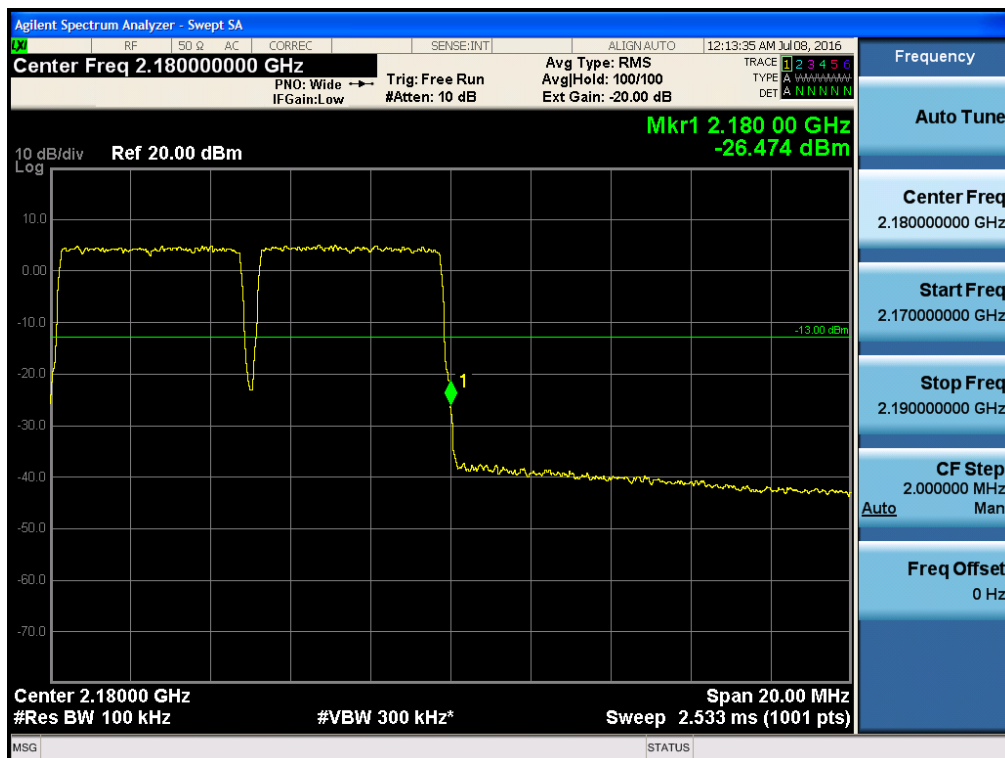


## Intermodulation Spurious Emissions for FCC\_AWS BAND LTE 5 MHz

### [Downlink Low]

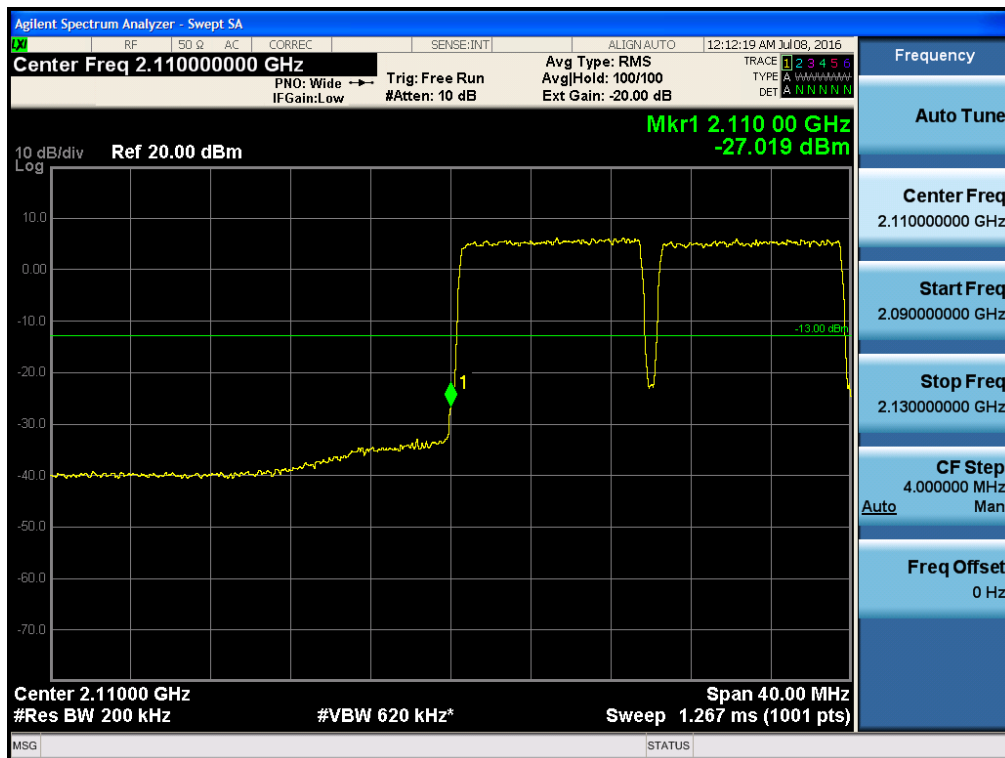


### [Downlink High]

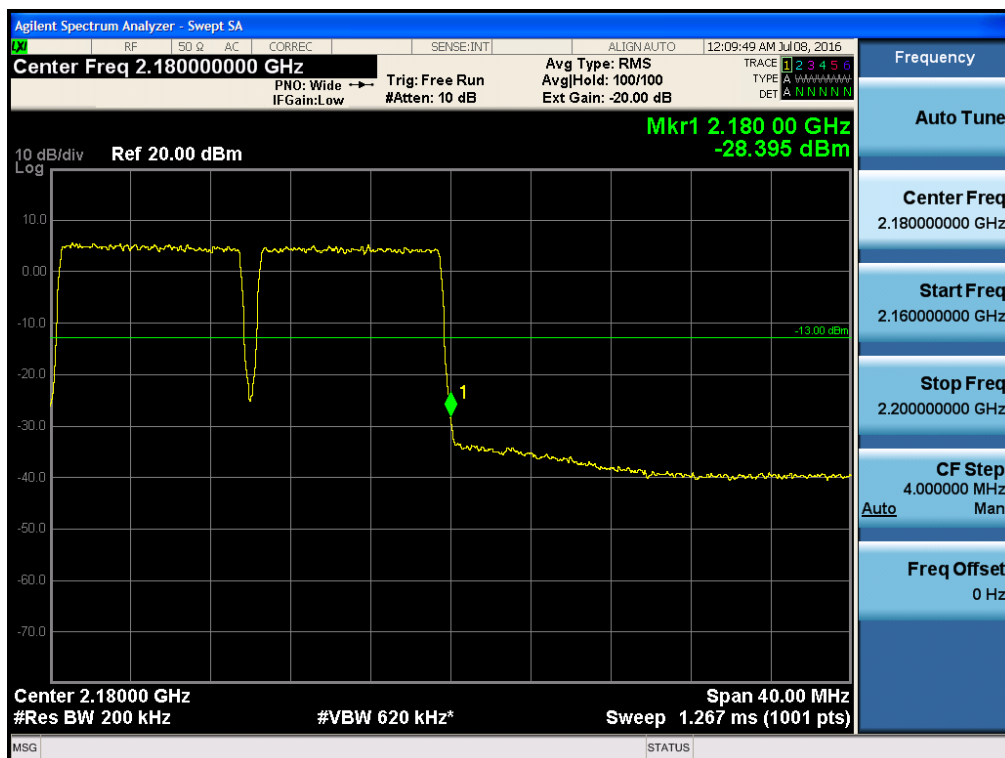


## Intermodulation Spurious Emissions for FCC\_AWSBAND LTE 10 MHz

### [Downlink Low]

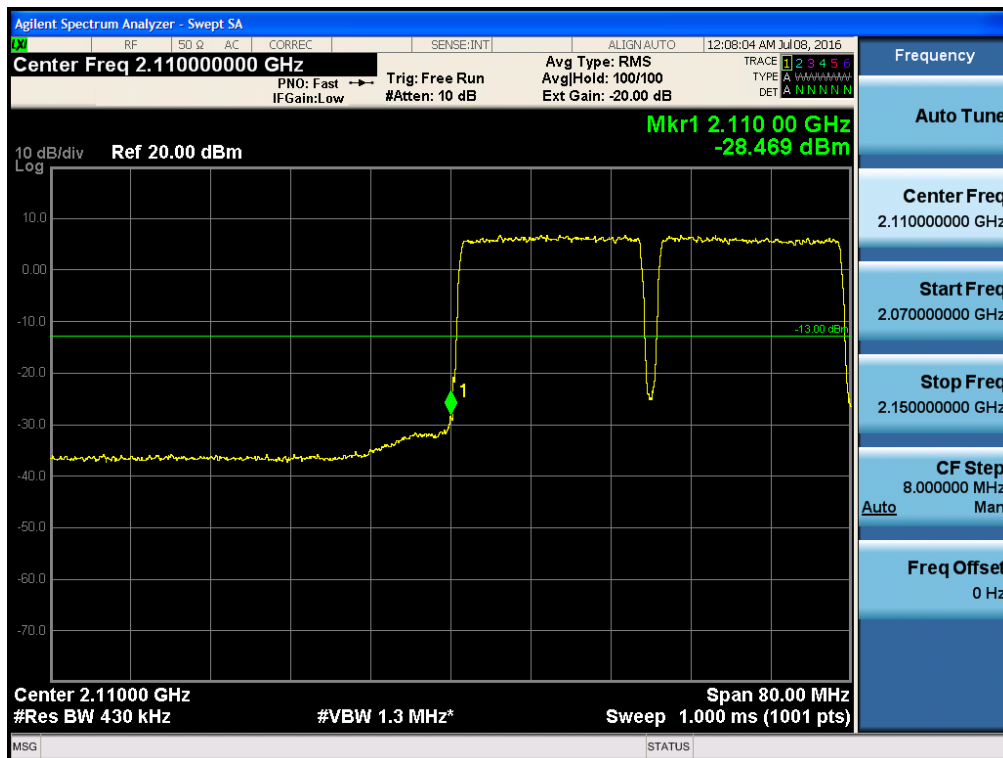


### [Downlink High]

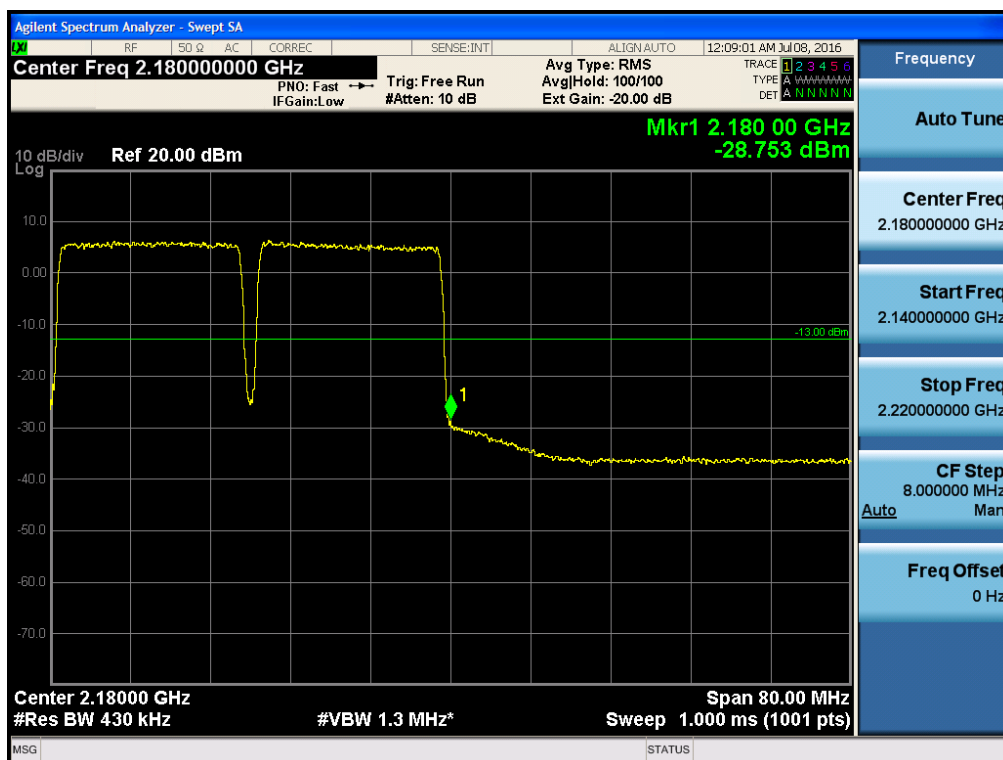


## Intermodulation Spurious Emissions for FCC\_AWSBAND LTE 20 MHz

### [Downlink Low]

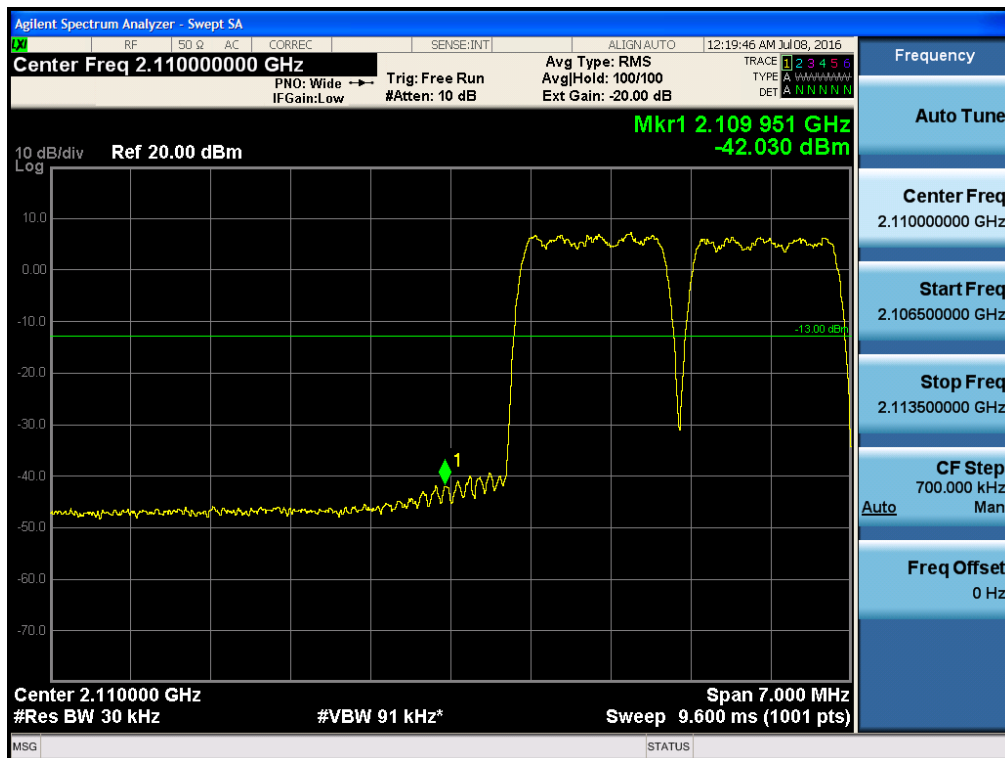


### [Downlink High]

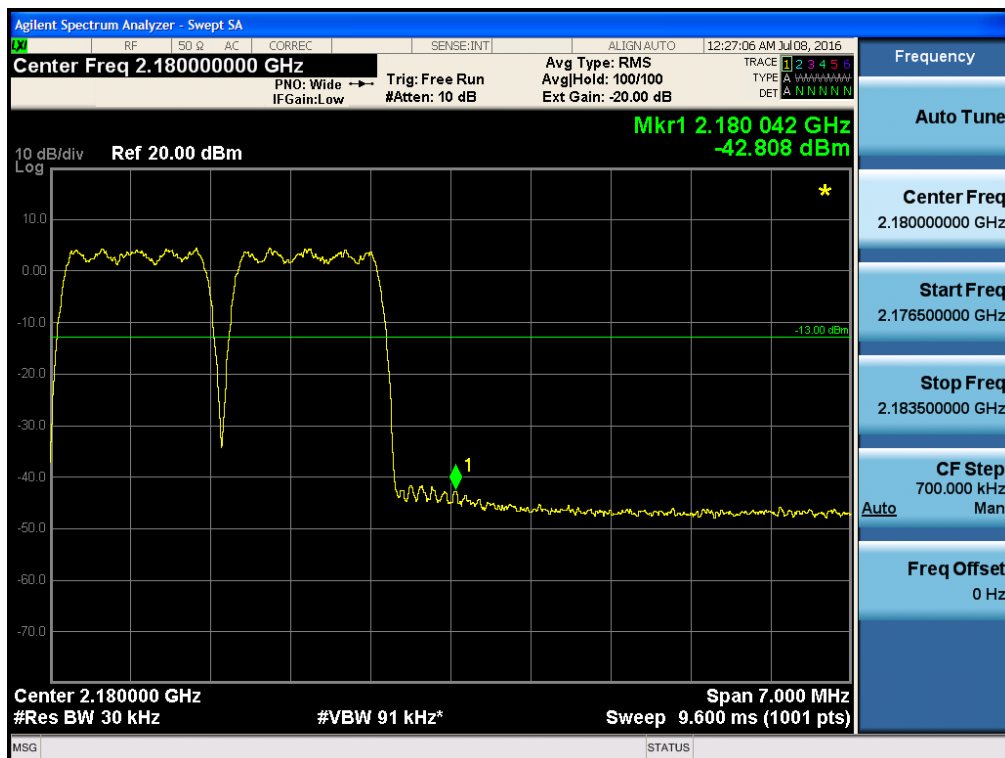


## Intermodulation Spurious Emissions for FCC\_AWS CDMA

### [Downlink Low]

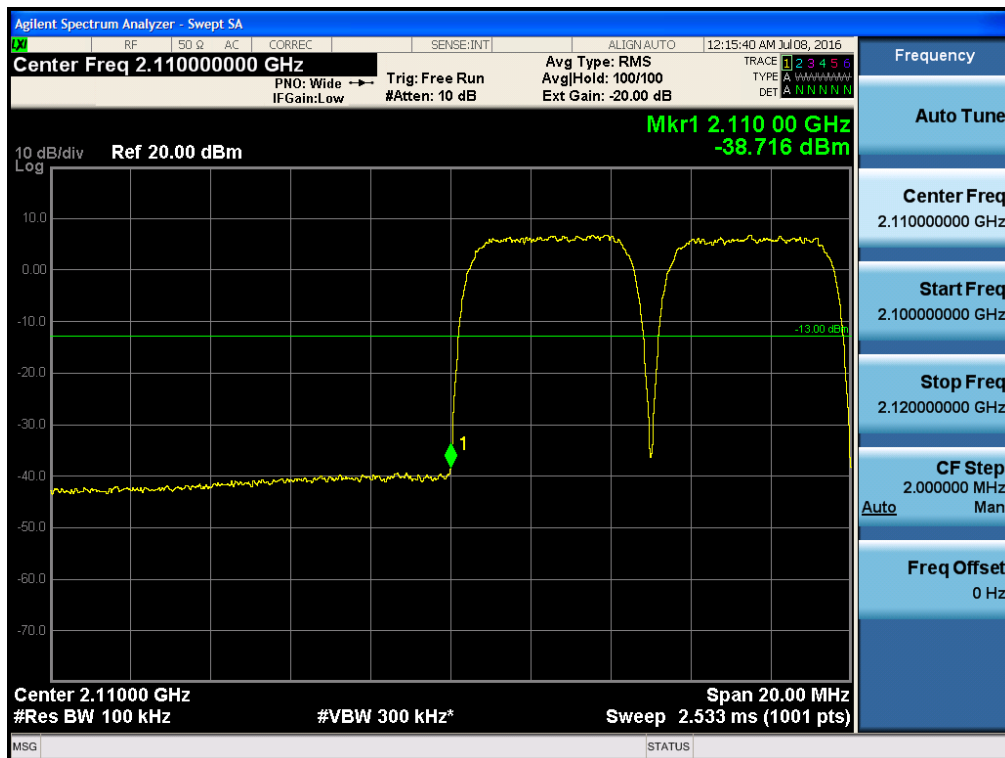


### [Downlink High]

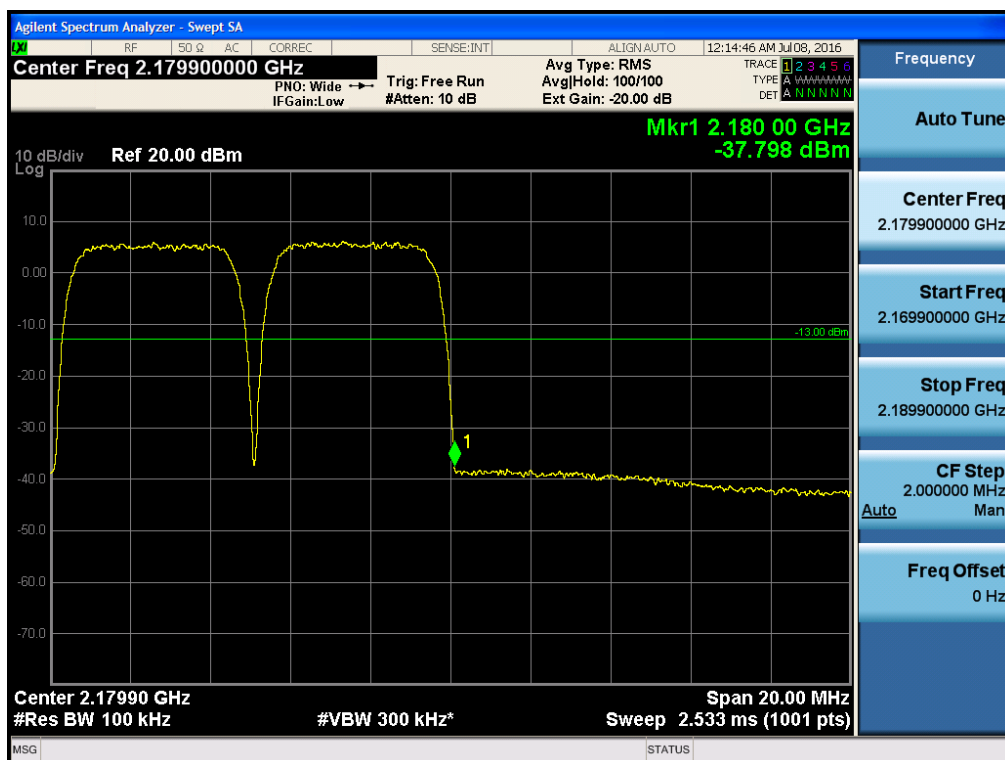


## Intermodulation Spurious Emissions for FCC\_AWS BAND WCDMA

### [Downlink Low]

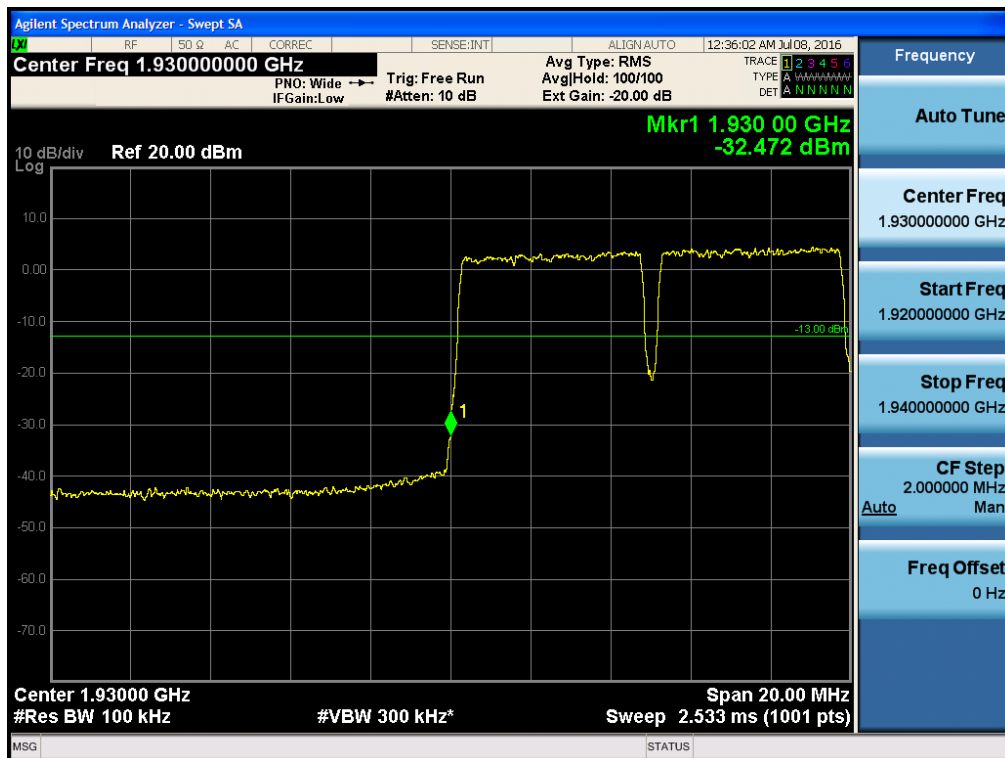


### [Downlink High]

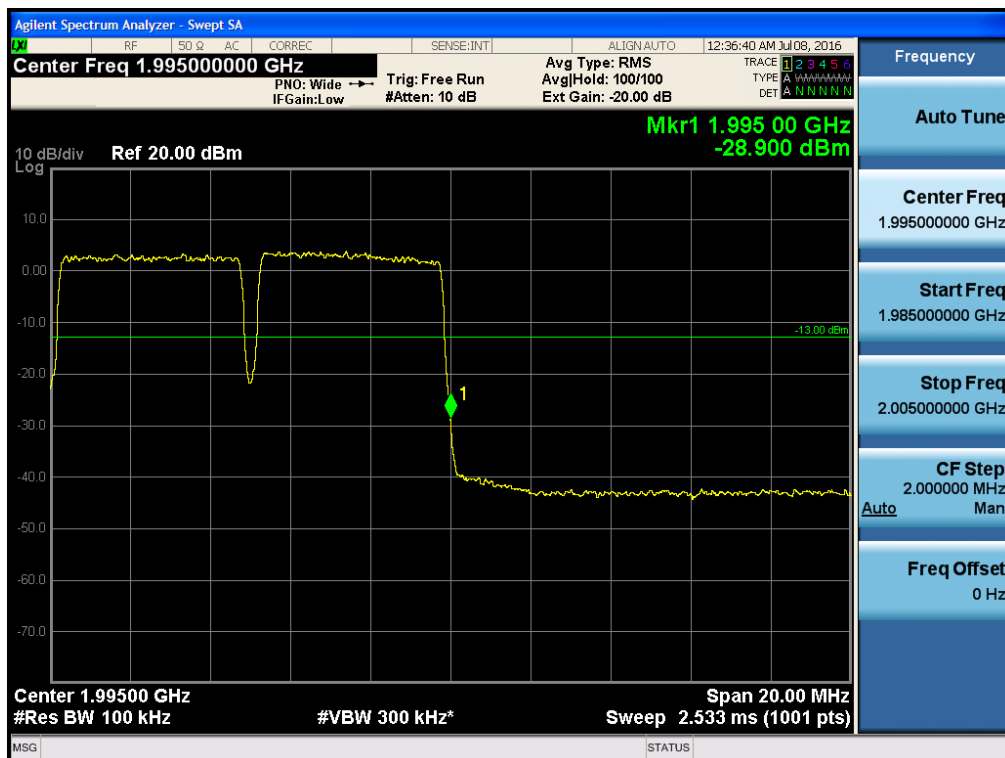


## Intermodulation Spurious Emissions for FCC\_1900 PCS BAND LTE 5 MHz

### [Downlink Low]

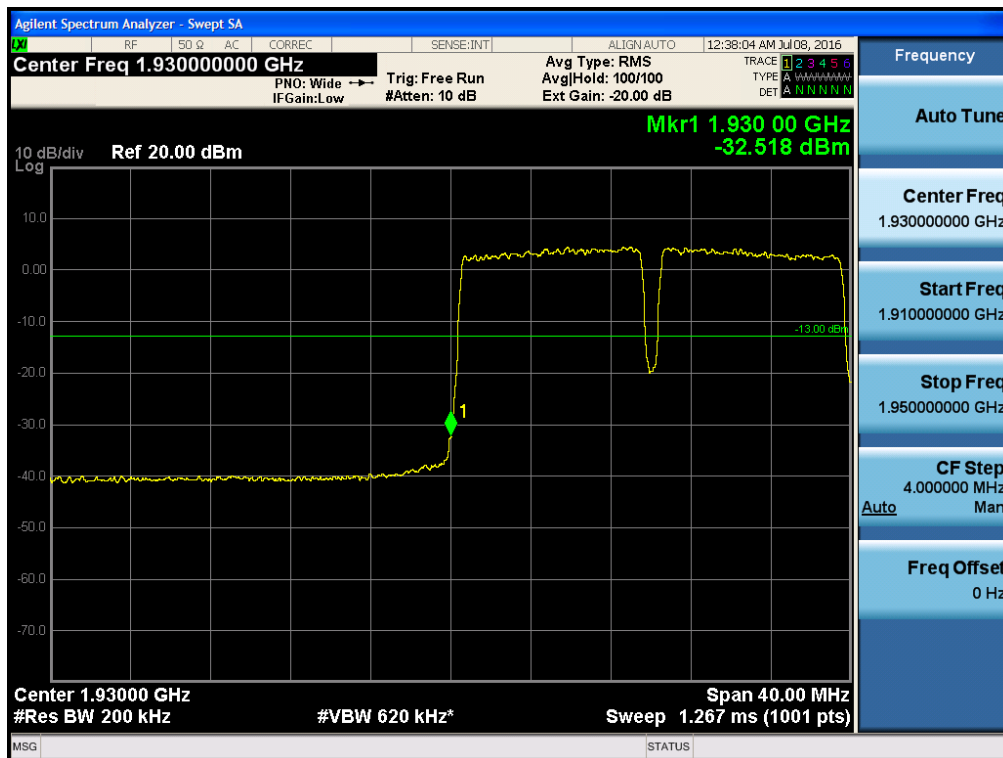


### [Downlink High]

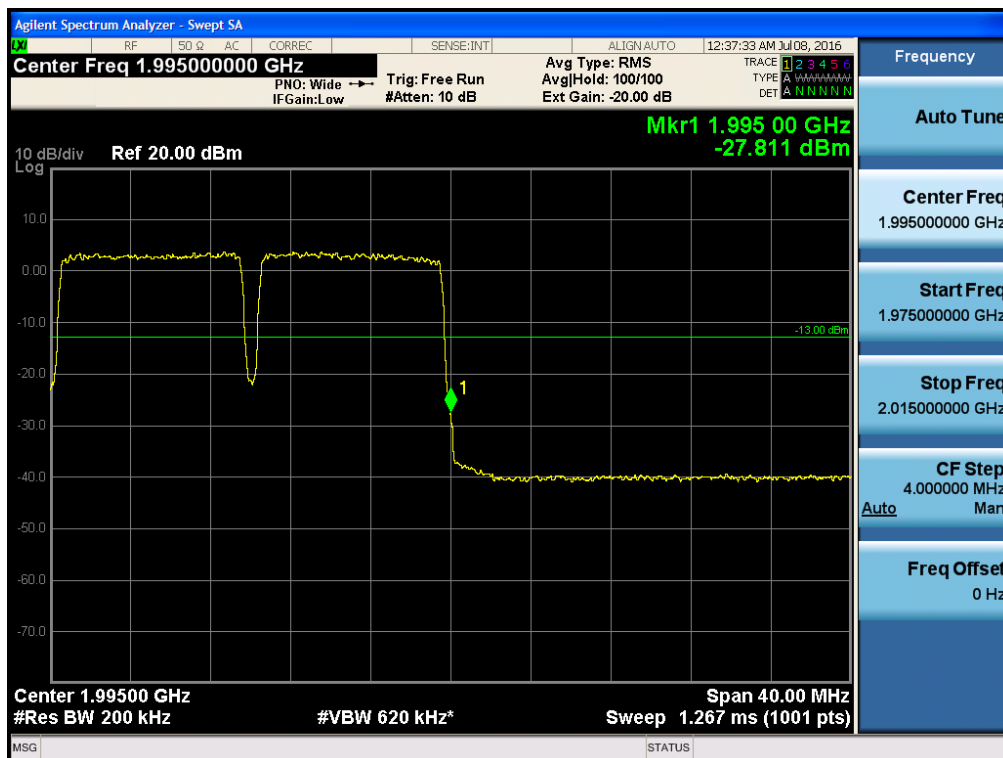


## Intermodulation Spurious Emissions for FCC\_1900 PCS BAND LTE 10 MHz

### [Downlink Low]

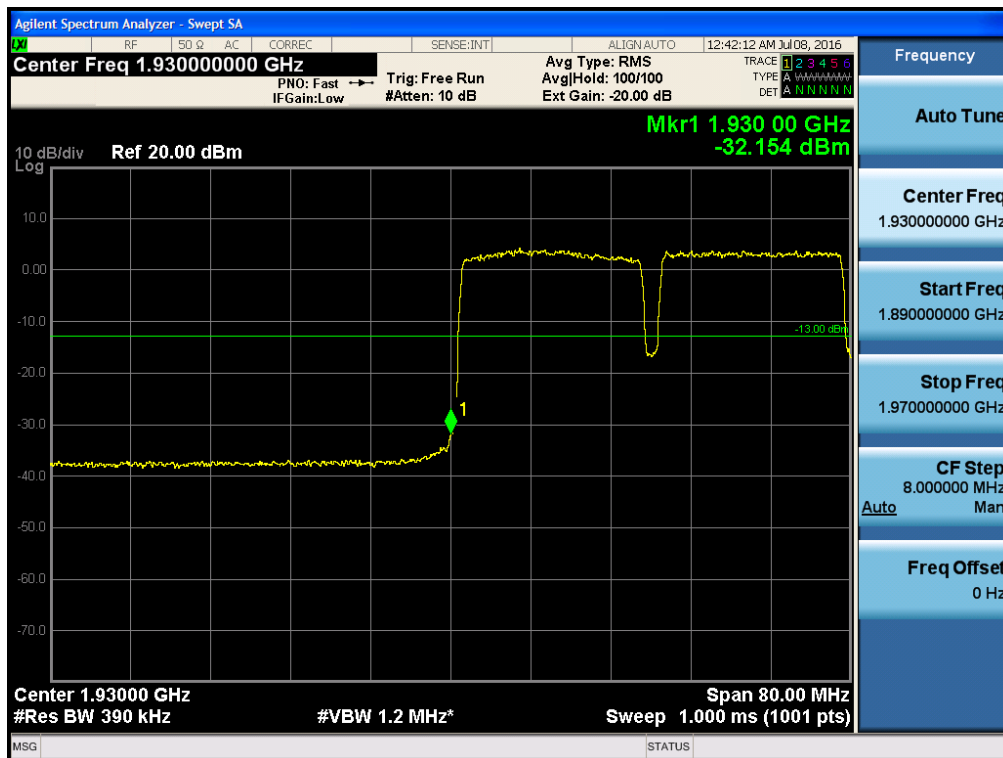


### [Downlink High]

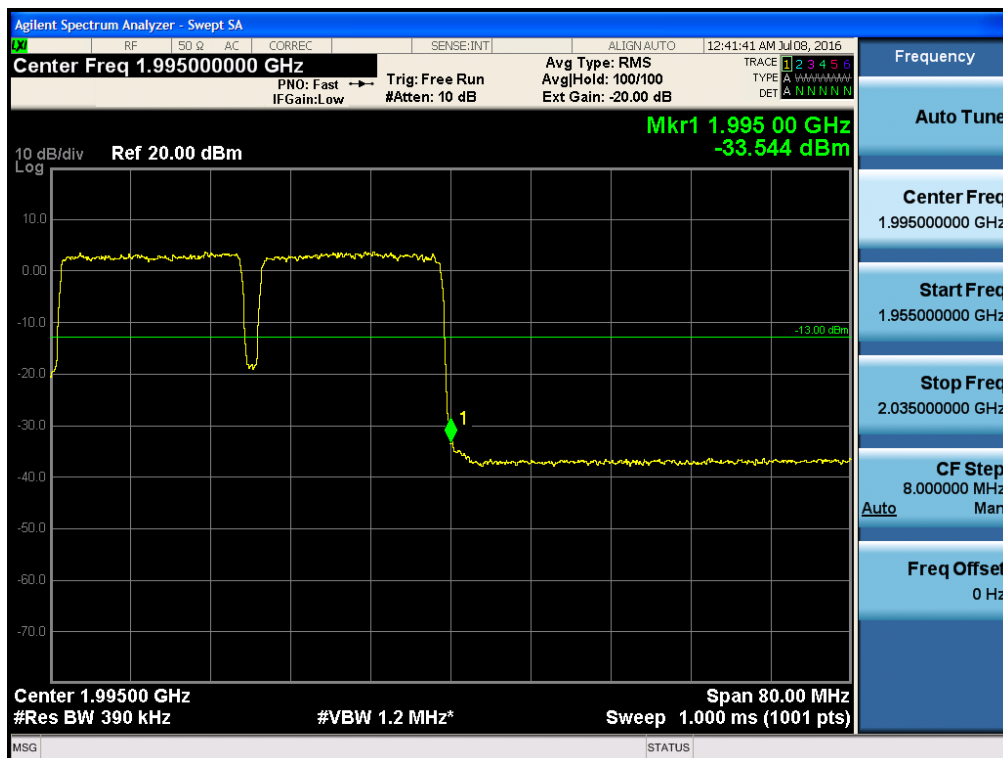


## Intermodulation Spurious Emissions for FCC\_1900 PCS BAND LTE 20 MHz

### [Downlink Low]



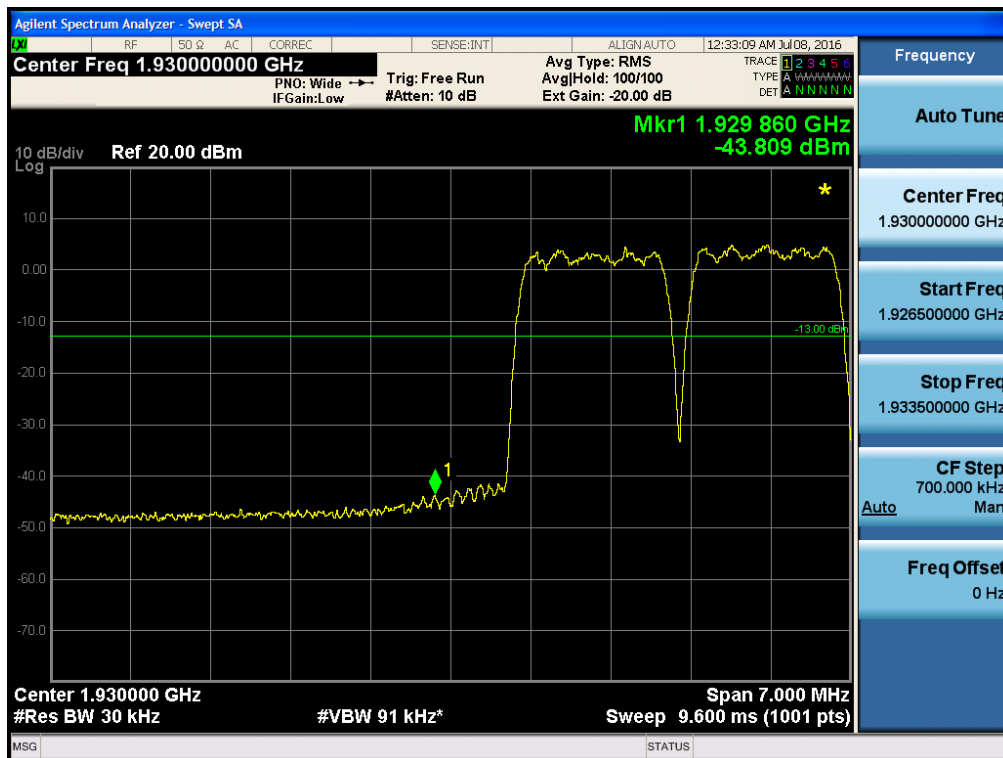
### [Downlink High]



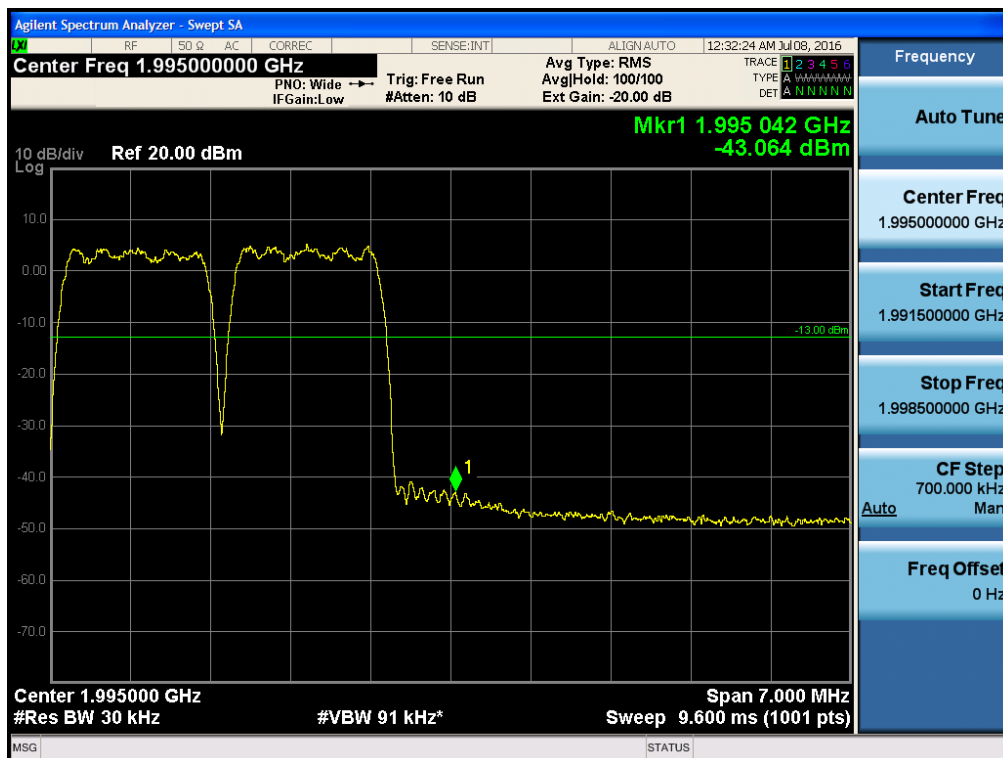


## Intermodulation Spurious Emissions for FCC\_1900 PCS BAND CDMA

### [Downlink Low]

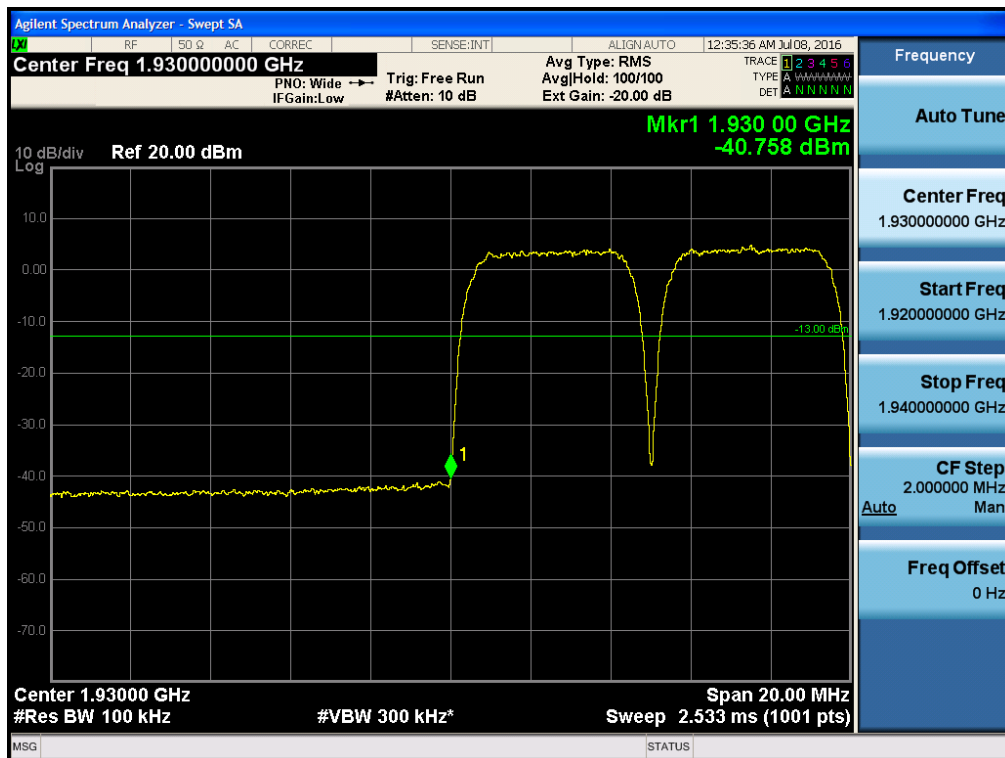


### [Downlink High]

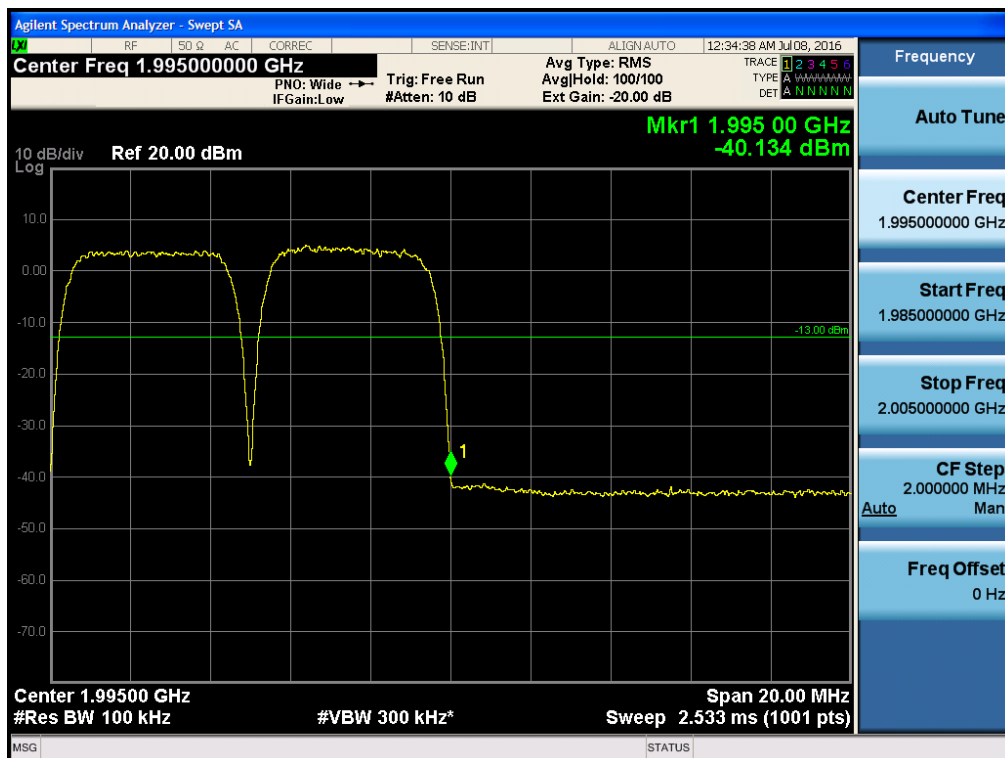


## Intermodulation Spurious Emissions for FCC\_1900 PCS BAND WCDMA

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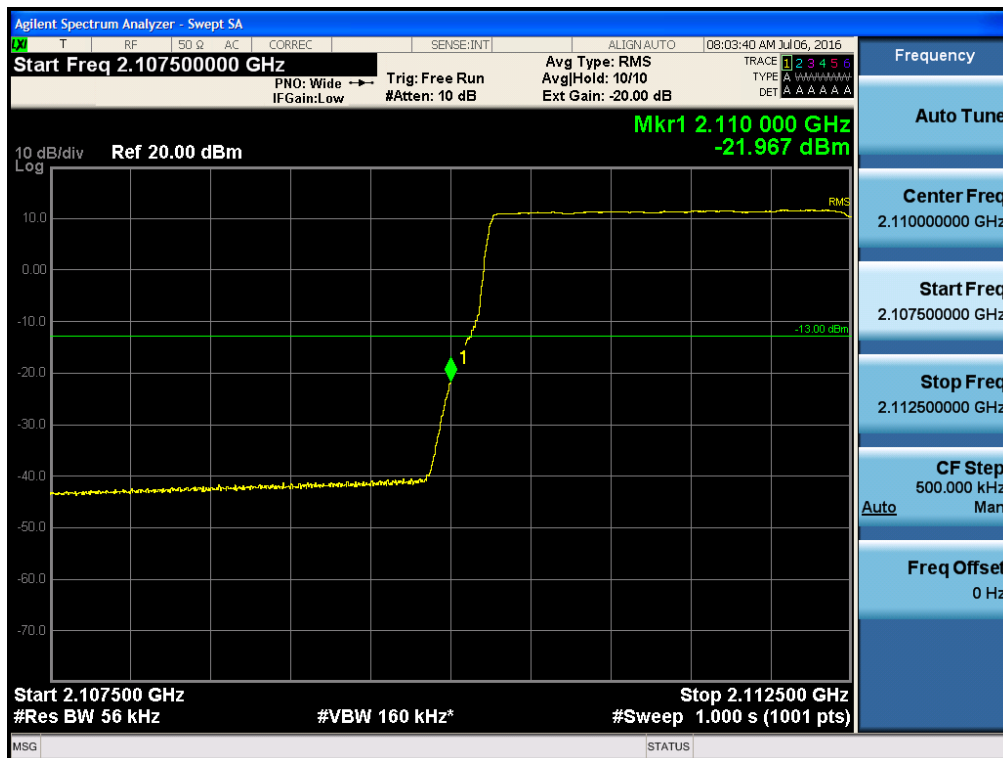


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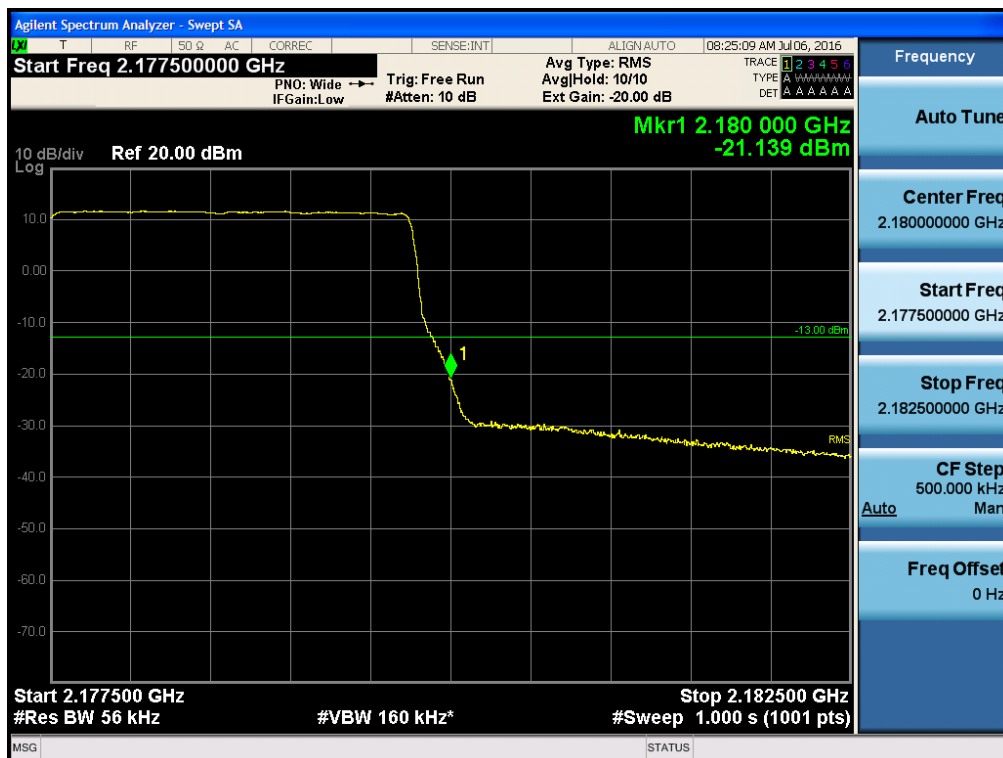


## Single channel Enhancer Band Edge\_AWS BAND LTE 5 MHz

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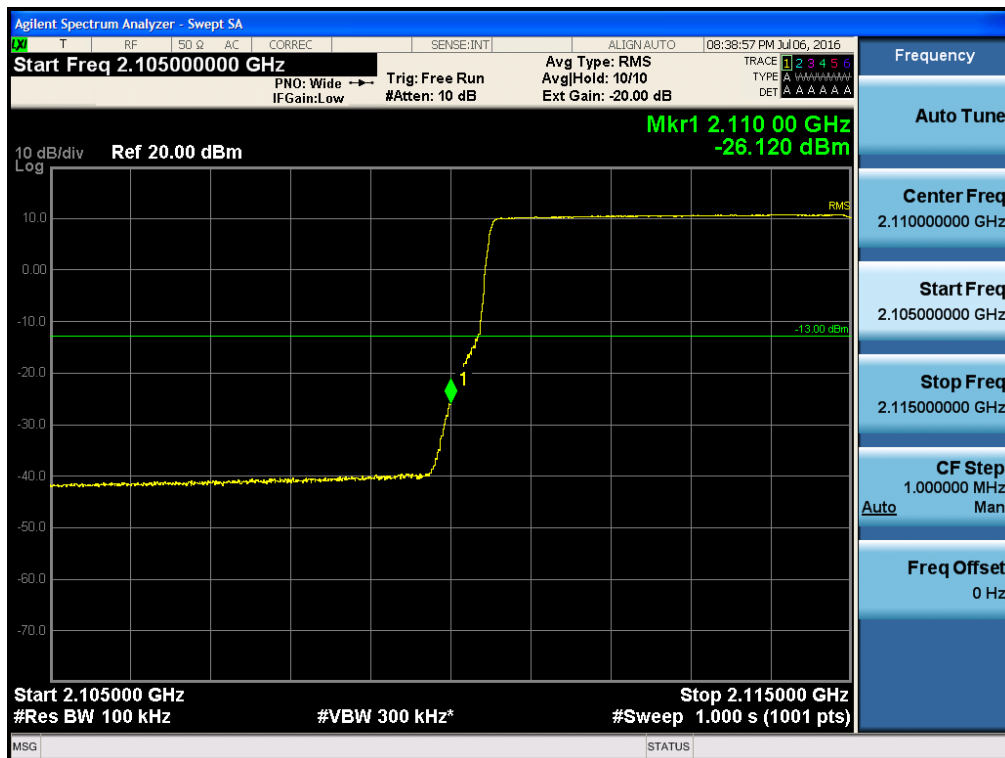


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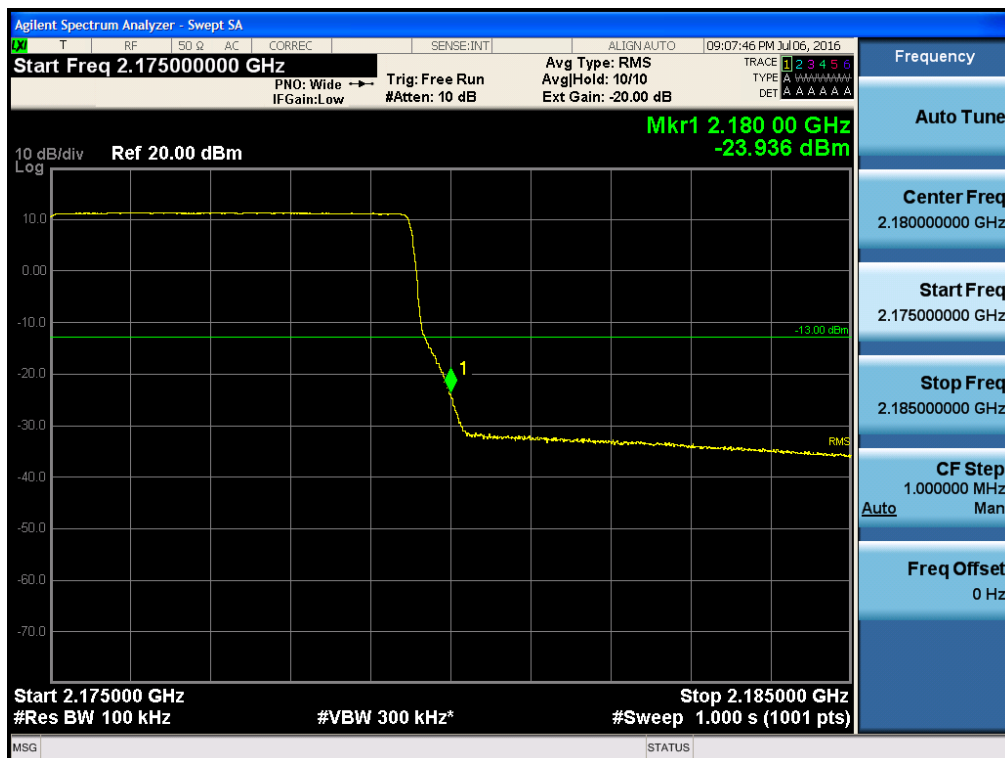


## Single channel Enhancer Band Edge\_AWS BAND LTE 10 MHz

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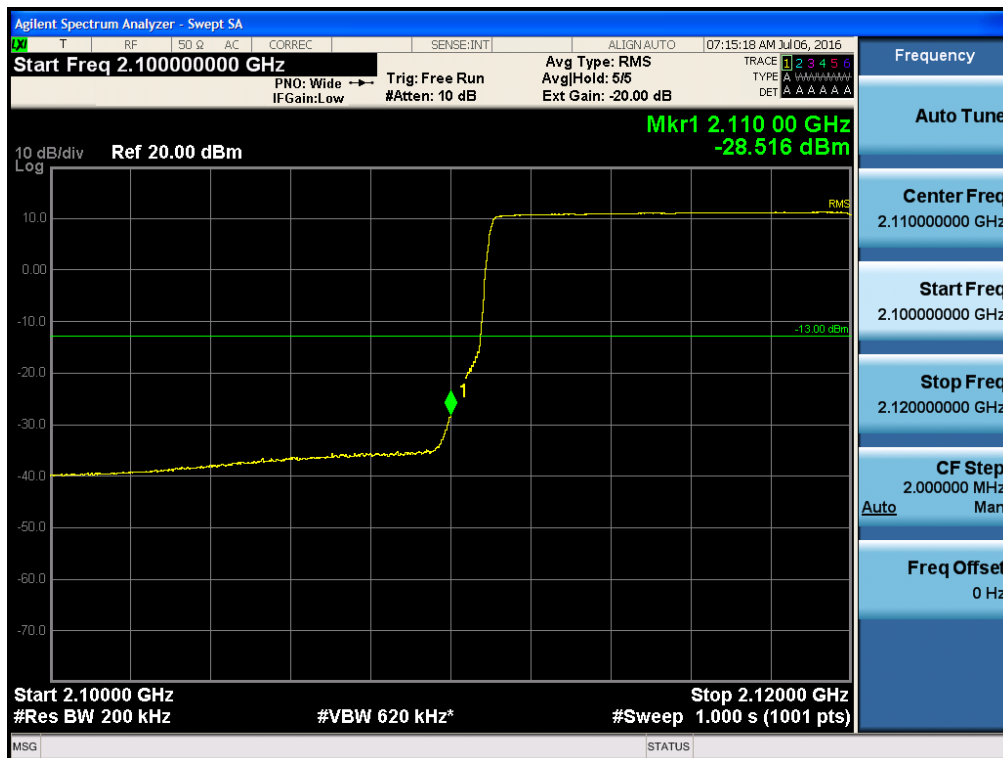


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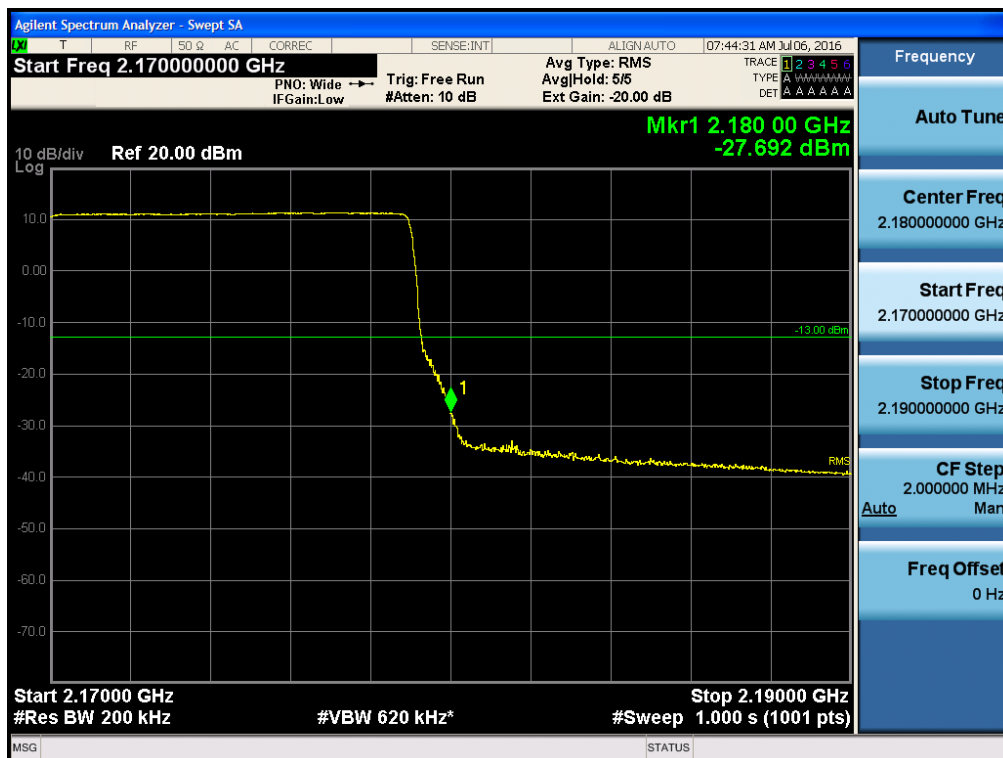


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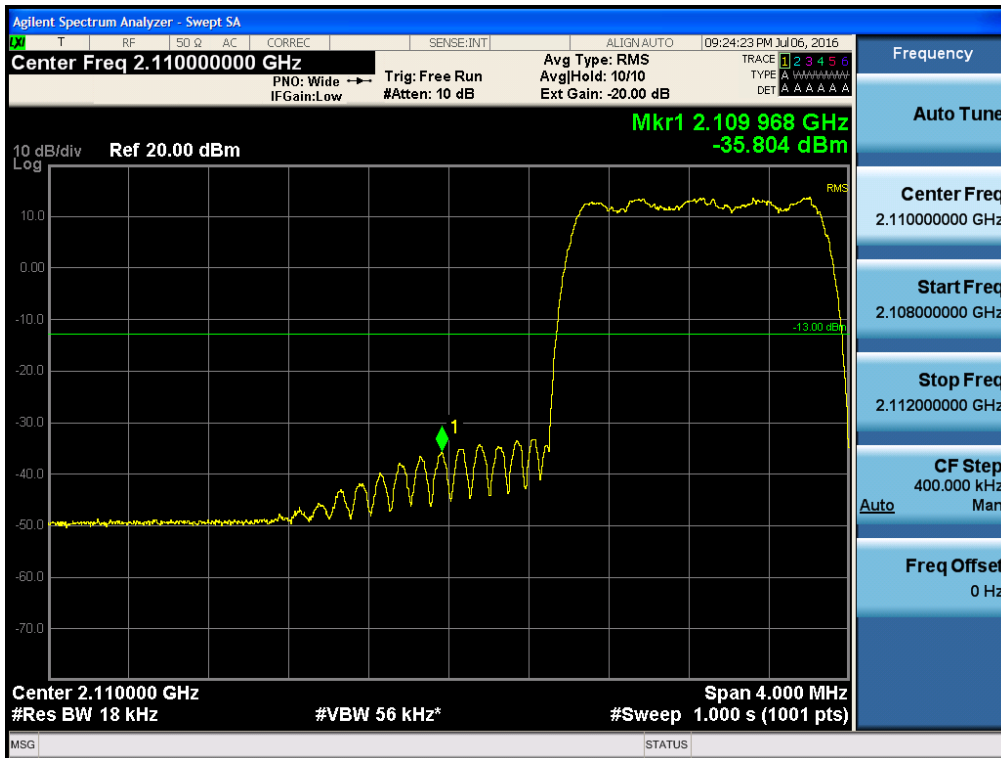


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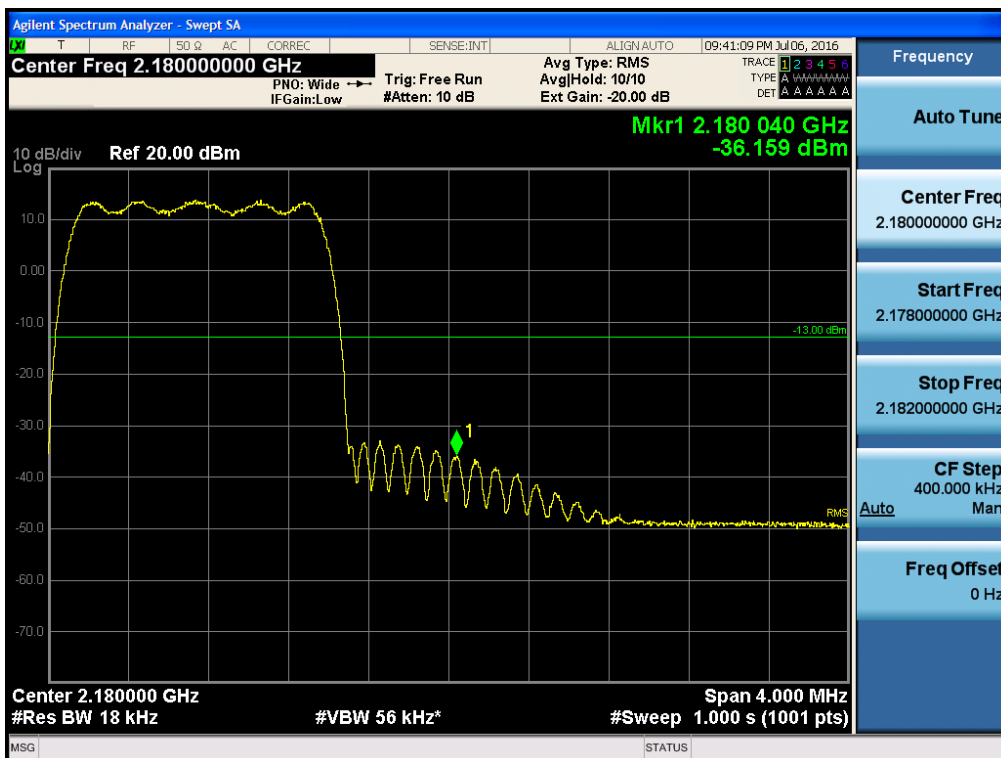


## Single channel Enhancer Band Edge\_AWS BAND CDMA

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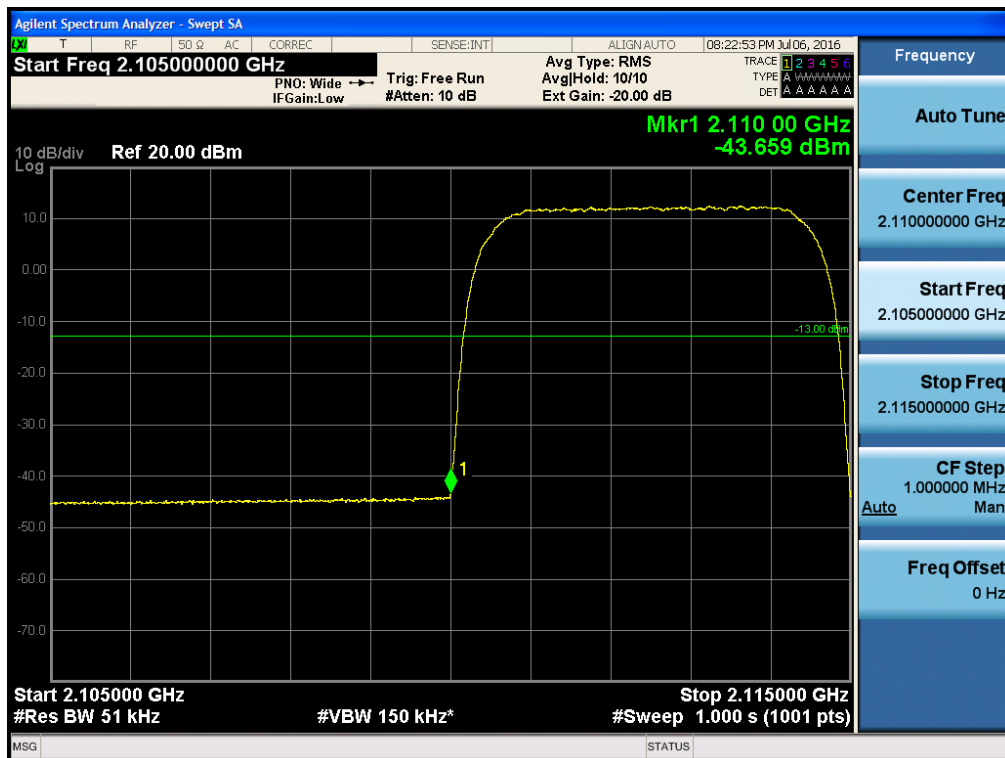


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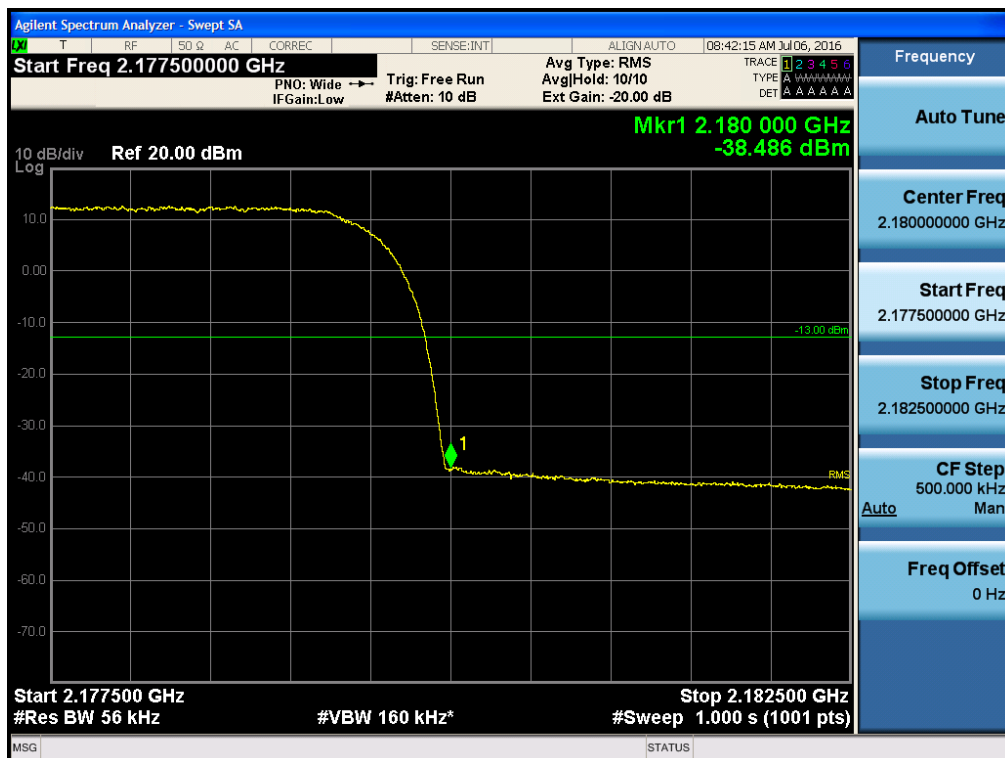


## Single channel Enhancer Band Edge\_AWS BAND WCDMA

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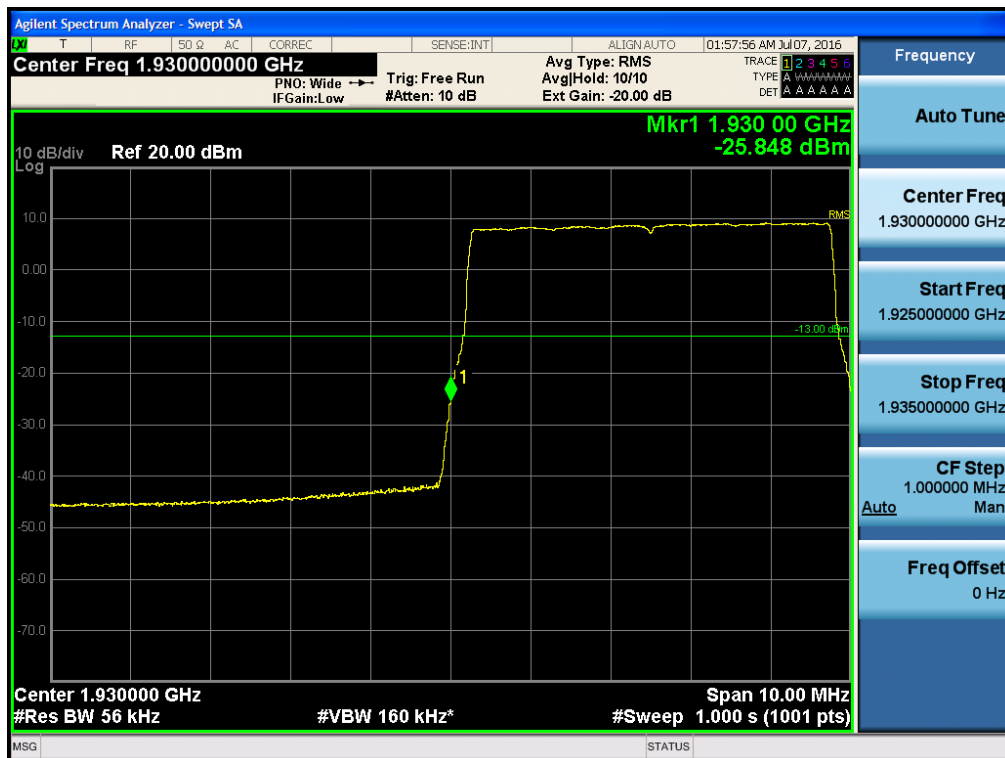


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## Single channel Enhancer Band Edge\_1900 PCS BAND LTE 5 MHz

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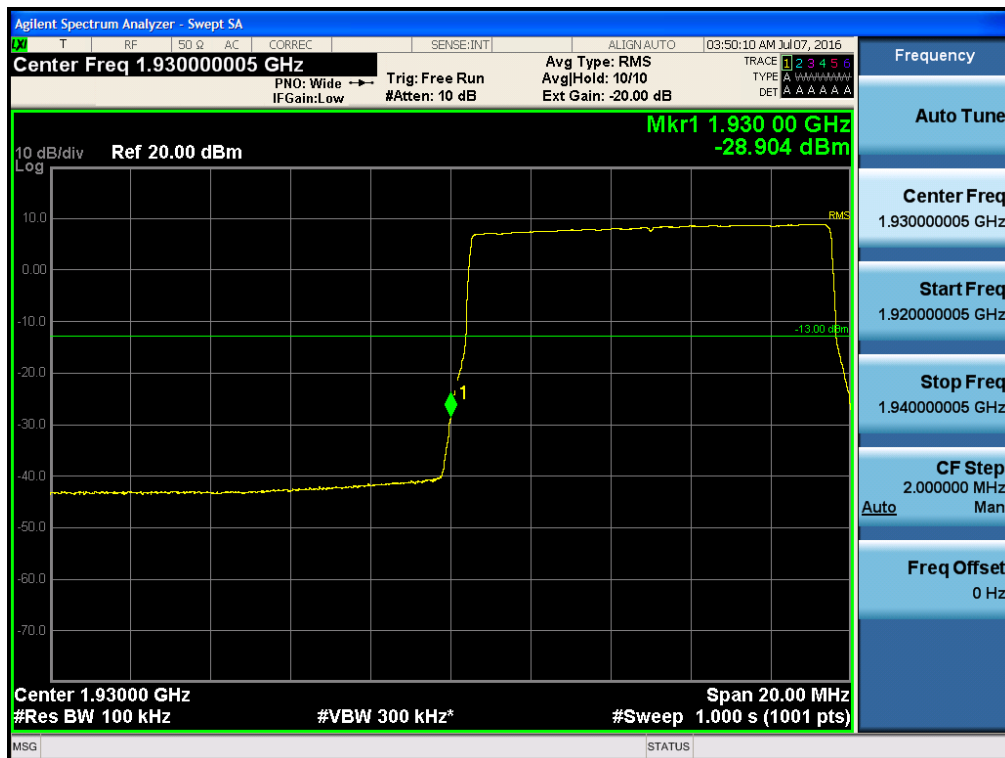
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## Single channel Enhancer Band Edge\_1900 PCS BAND LTE 10 MHz

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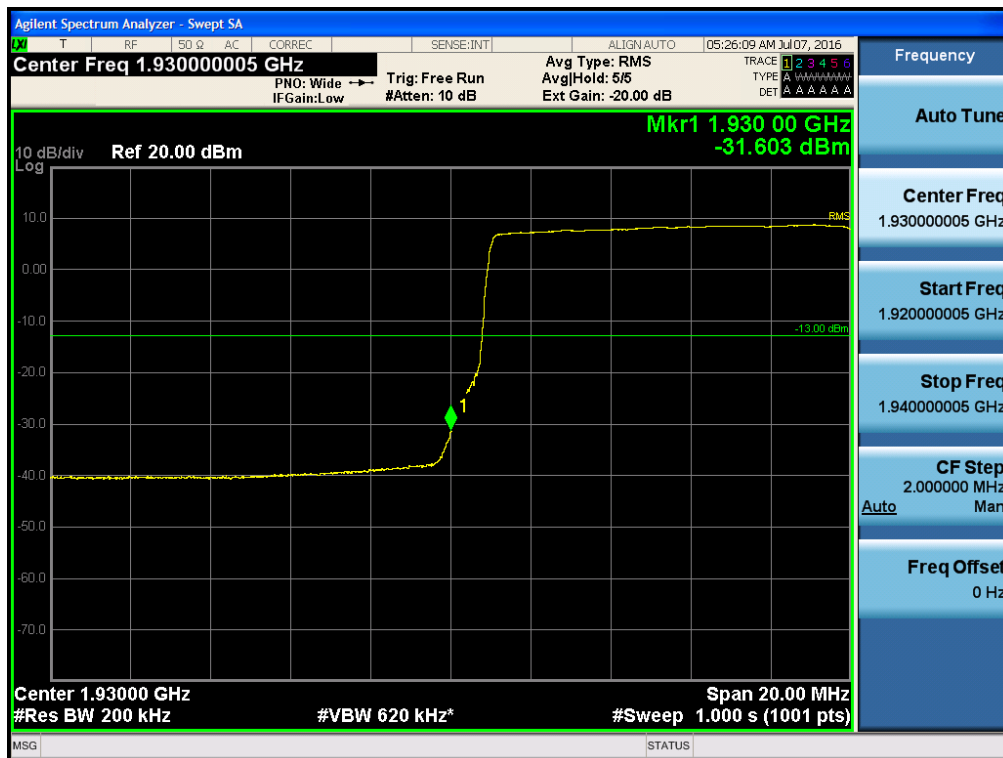


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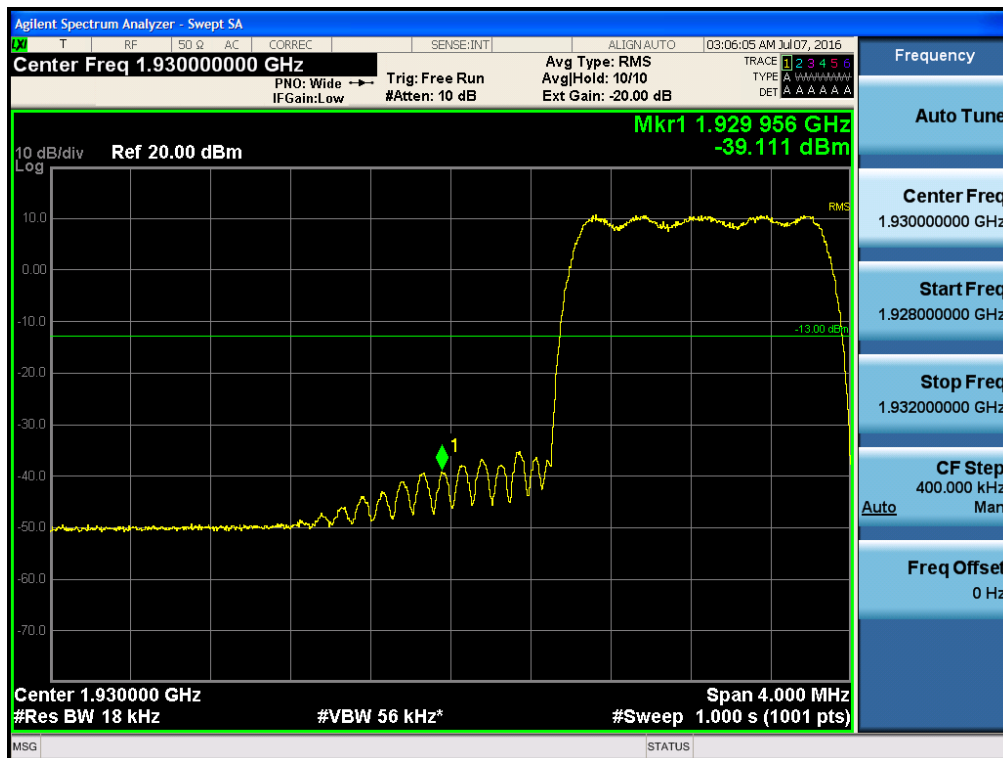


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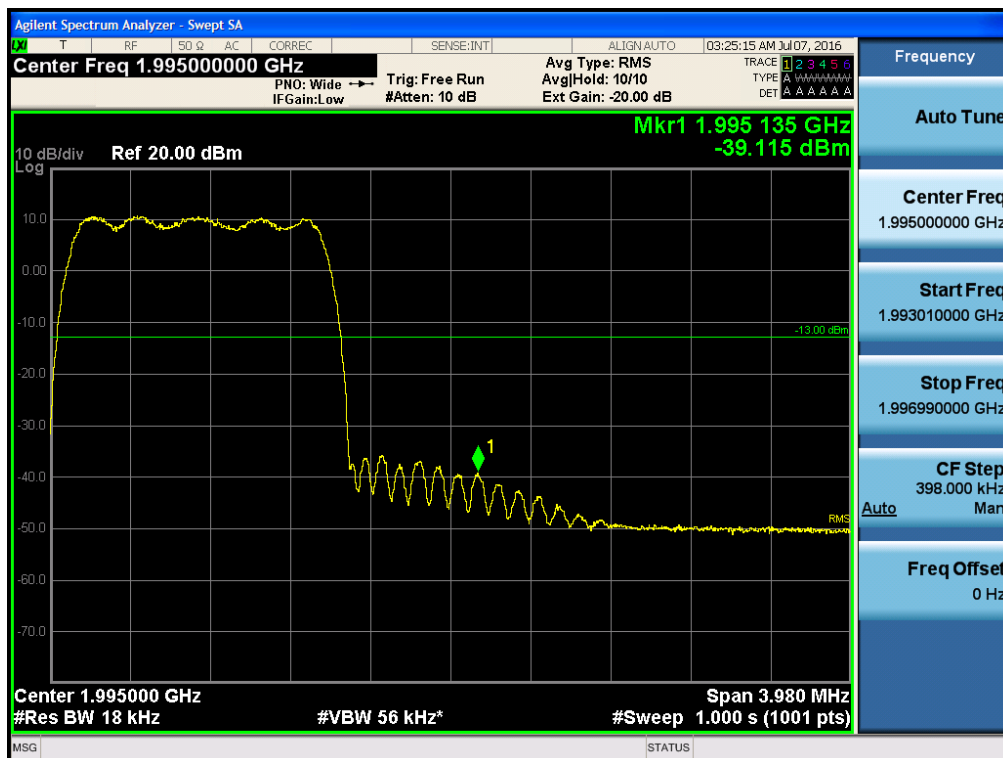


## Single channel Enhancer Band Edge\_1900 PCS BAND CDMA

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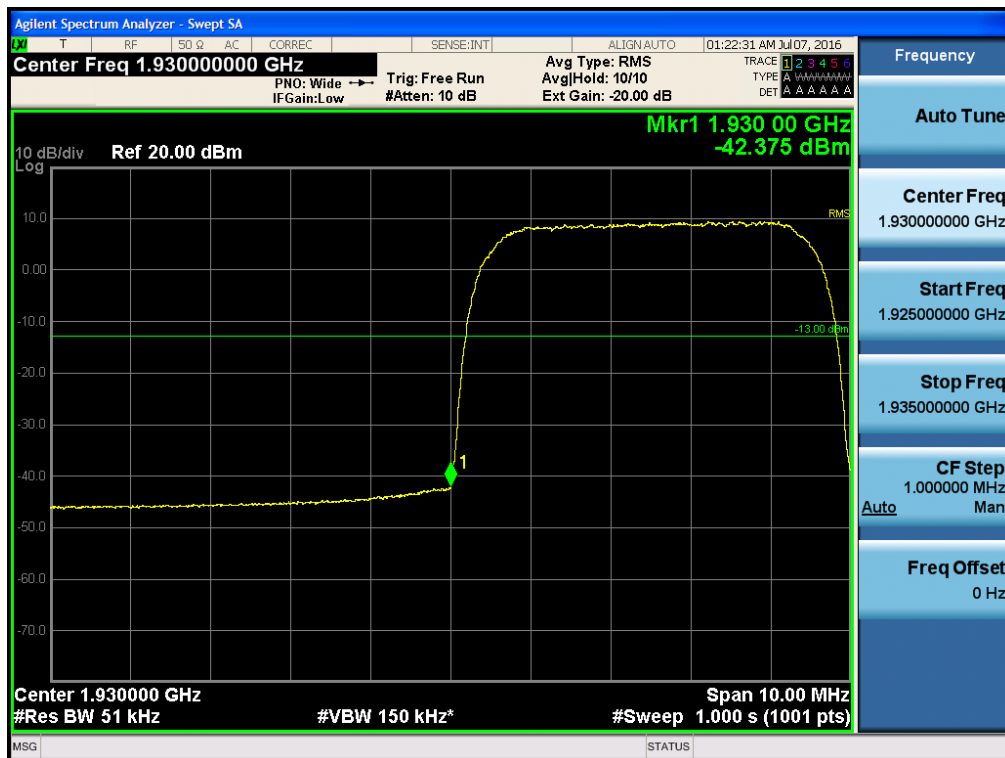


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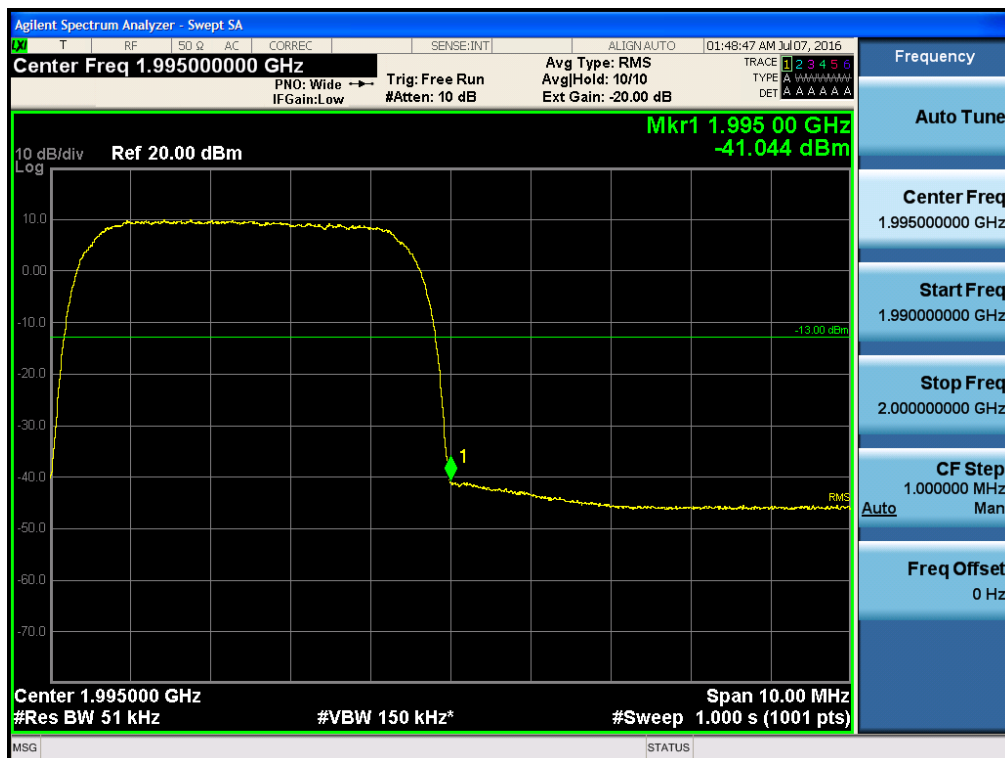


## Single channel Enhancer Band Edge\_1900 PCS BAND WCDMA

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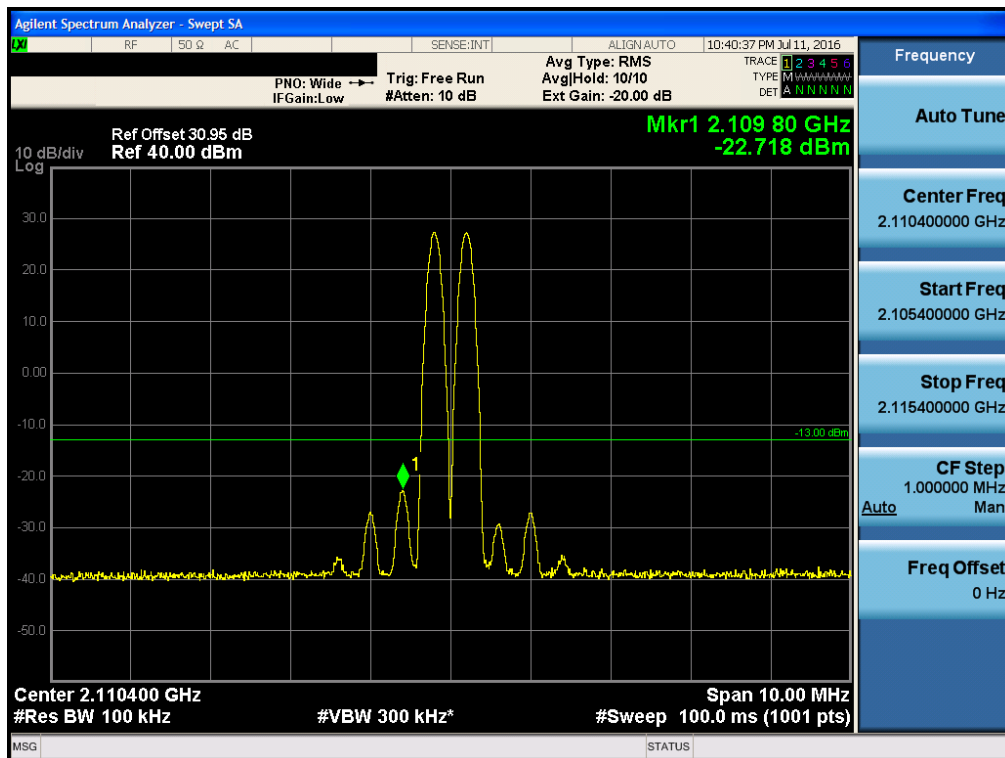


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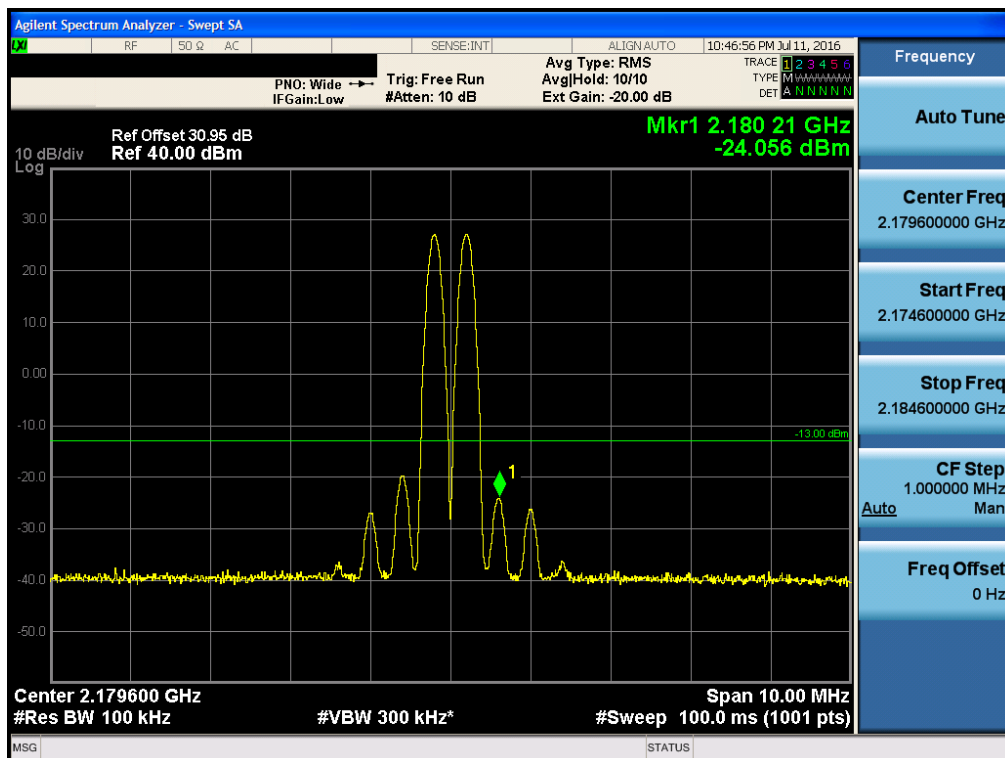


## Multi channel Enhancer Band Edge for IC\_AWS BAND

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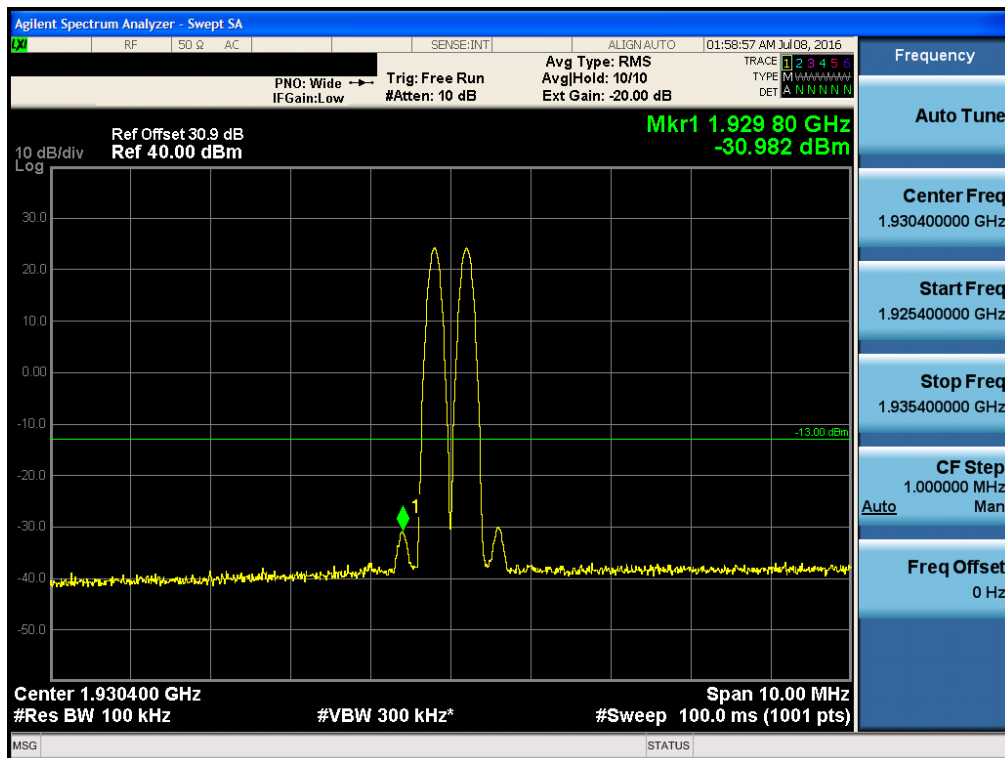


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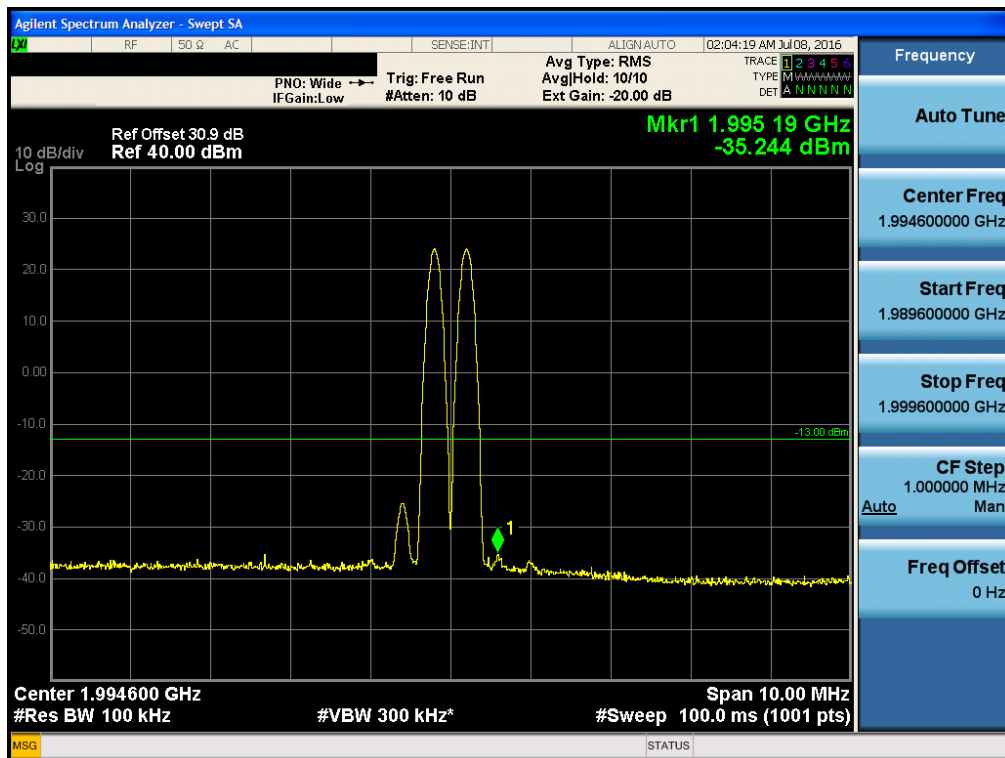


## Multi channel Enhancer Band Edge for IC\_PCS1900 BAND

### [Downlink Low]



### [Downlink High]



## 10. RADIATED SPURIOUS EMISSIONS

**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-D-2010 "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

•

The diagram illustrates the experimental setup for measuring the radiation pattern of a UWB antenna. The setup includes the following components and dimensions:

- EUT (Under Test):** A small rectangular object placed on a **Turntable**.
- Antenna tower:** A vertical structure supporting the **Horn antenna**.
- Horn antenna:** A large, flared antenna mounted on the tower.
- Spectrum analyzer:** A device connected to the horn antenna via a cable, with a **Pre-amp** (pre-amplifier) in the signal path.
- Absorbers:** A series of vertical rods or structures positioned below the turntable and antenna tower.
- Dimensions:**
  - Horizontal distance between the turntable and the antenna tower:  $3.75\text{ m}$ .
  - Vertical distance from the turntable to the antenna tower:  $4\text{ m}$ .
  - Vertical distance from the turntable to the absorbers:  $0.8\text{ m}$  and  $1\text{ m}$ .
  - Horizontal distance from the turntable to the absorbers:  $3.75\text{ m}$ .

1. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor( reference distance : 3 m).
2. Distance extrapolation factor =  $20 \log (\text{test distance} / \text{specific distance})$  (dB)



## Test Result:

Note.

Input signal is the CW signal.

### AWS

Voltage supplied to EUT	Ch.	Freq.(MHz)	Measured Level [dBuV/m]	Ant. Factor [dB/m]	C.L [dB]	Amp. Gain [dB]	H.P.F. [dB]	D.F. [dB]	Pol.	Measured Power [dBm]	Result [dBm]
120 Vac	Low	4,220.40	75.14	30.248	4.17	44.90	-0.83	1.96	V	-20.06	-29.412
	Mid	4,290.00	84.74	30.392	3.53	44.56	-0.17	1.96	V	-10.46	-19.308
	High	4,359.60	66.36	30.508	4.62	44.62	-0.36	1.96	V	-28.84	-36.732

Voltage supplied to EUT	Ch.	Freq.(MHz)	Measured Level [dBuV/m]	Ant. Factor [dB/m]	C.L [dB]	Amp. Gain [dB]	H.P.F. [dB]	D.F. [dB]	Pol.	Measured Power [dBm]	Result [dBm]
-48 Vdc	Low	4,220.40	75.02	30.248	4.17	44.90	-0.83	1.96	V	-20.18	-29.532
	Mid	4,290.00	84.33	30.392	3.53	44.56	-0.17	1.96	V	-10.87	-19.718
	High	4,359.60	66.09	30.508	4.62	44.62	-0.36	1.96	V	-29.11	-37.002

## Test Result:

Note.

Input signal is the CW signal.

Harmonics were not found.

### PCS 1900

Voltage supplied to EUT	Ch.	Freq.(MHz)	Measured Level [dBuV/m]	Ant. Factor [dB/m]	C.L [dB]	Amp. Gain [dB]	H.P.F. [dB]	D.F. [dB]	Pol.	Measured Power [dBm]	Result [dBm]
120 Vac	Low	No critical peaks found									
	Mid										
	High										

Voltage supplied to EUT	Ch.	Freq.(MHz)	Measured Level [dBuV/m]	Ant. Factor [dB/m]	C.L [dB]	Amp. Gain [dB]	H.P.F. [dB]	D.F. [dB]	Pol.	Measured Power [dBm]	Result [dBm]
-48 Vdc	Low	No critical peaks found									
	Mid										
	High										

## 11. FREQUENCY STABILITY OVER TEMPERATURE AND VOLTAGE VARIATIONS

### FCC Rules

**Test Requirement(s):** §2.1055(a)(1), § 27.54

### 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.

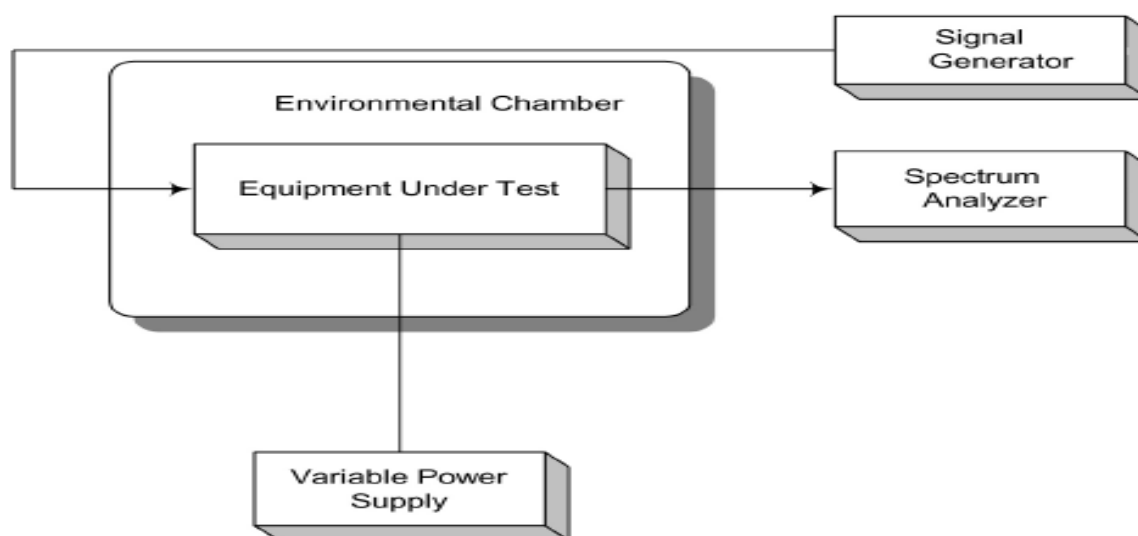
A CW signal was injected into the EUT at the appropriate RF level. The frequency counter option on the Spectrum Analyzer was used to measure frequency deviations.

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  $\pm 15\%$  of nominal

### Test Setup:



**IC Rules****Test Requirement(s): RSS-131 6.5**

A band translator is essentially a repeater station and should introduce as little frequency error as possible. The frequency stability should therefore meet the objectives of the overall land mobile or cellular service for which it serves. Better frequency stability than the minimum standard cited below will therefore be required in some cases.

The frequency stability shall be within 1.5 parts per million (0.00015%).

**Test Procedures: RSS-131 4.5**

In addition, the local oscillator frequency stability of the band translator shall be reported.

Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at +20 °C and rated supply voltage.

The following temperature and supply voltage ranges apply:

- (a) at 10 degree intervals of temperatures between -30 °C and +50 °C, and at the manufacturer's rated-supply voltage; and
- (b) at +20 °C temperature and 15% supply voltage variations.

## Test Results:

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

## Frequency Stability and Voltage Test Results

### [AWS BAND]

Reference: 120 Vac at 20°C    Freq. = 2145.00 MHz

Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	ppm
100%	+20(Ref)	2145 000 000	-0.003	0.00000
	-30	2145 000 000	0.021	0.00000
	-20	2145 000 000	-0.056	-0.00003
	-10	2145 000 000	0.011	0.00000
	0	2145 000 000	0.103	0.00004
	+10	2145 000 000	-0.082	-0.00004
	+30	2145 000 000	0.007	0.00000
	+40	2145 000 000	-0.114	-0.00005
	+50	2145 000 000	0.001	0.00000
115%	+20	2145 000 000	0.014	0.00000
85%	+20	2145 000 000	0.020	0.00000

## [1900 PCS BAND]

Reference: 120 Vac at 20°C    Freq. = 1962.50 MHz

Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	ppm
100%	+20(Ref)	2145 000 000	0.012	0.00000
	-30	2145 000 000	-0.065	-0.00003
	-20	2145 000 000	-0.101	-0.00004
	-10	2145 000 000	-0.043	-0.00002
	0	2145 000 000	-0.013	-0.00001
	+10	2145 000 000	-0.046	-0.00002
	+30	2145 000 000	0.109	0.00004
	+40	2145 000 000	-0.150	-0.00006
	+50	2145 000 000	0.056	0.00002
115%	+20	2145 000 000	0.011	0.00000
85%	+20	2145 000 000	-0.031	-0.00002