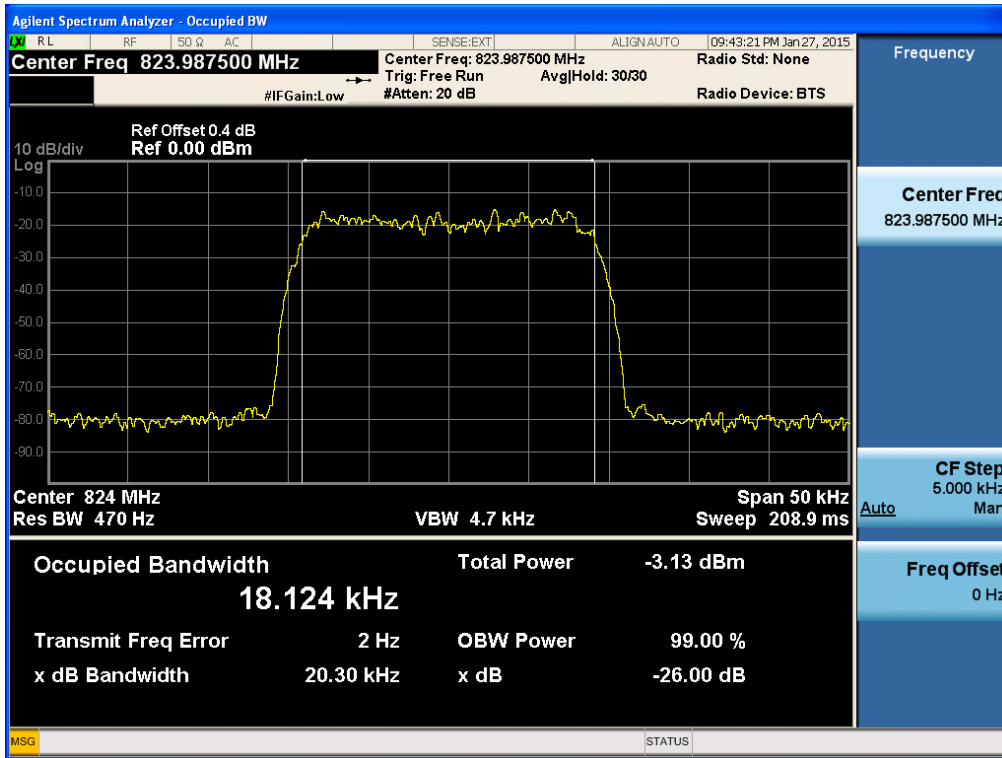
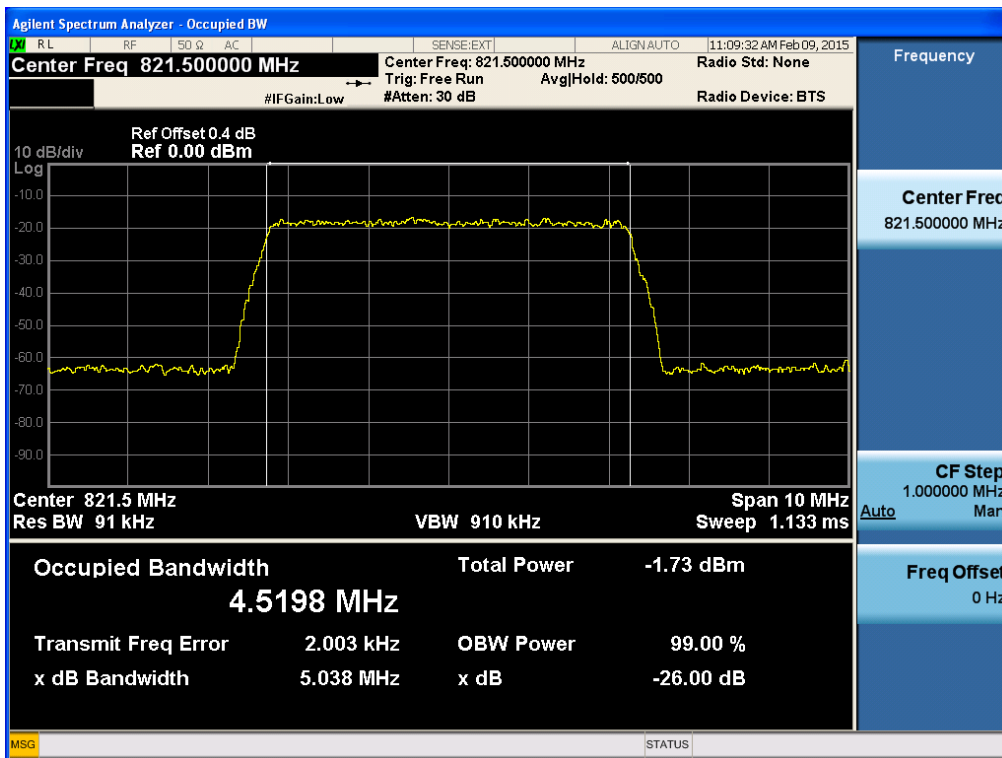


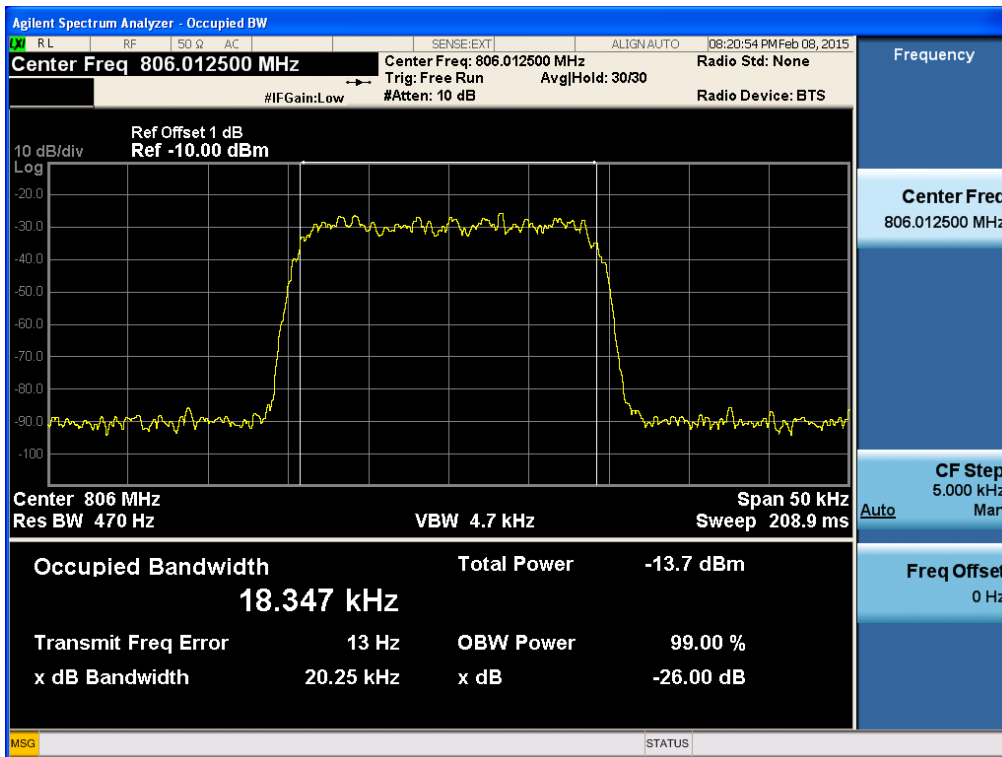
**[iDEN Output High]**



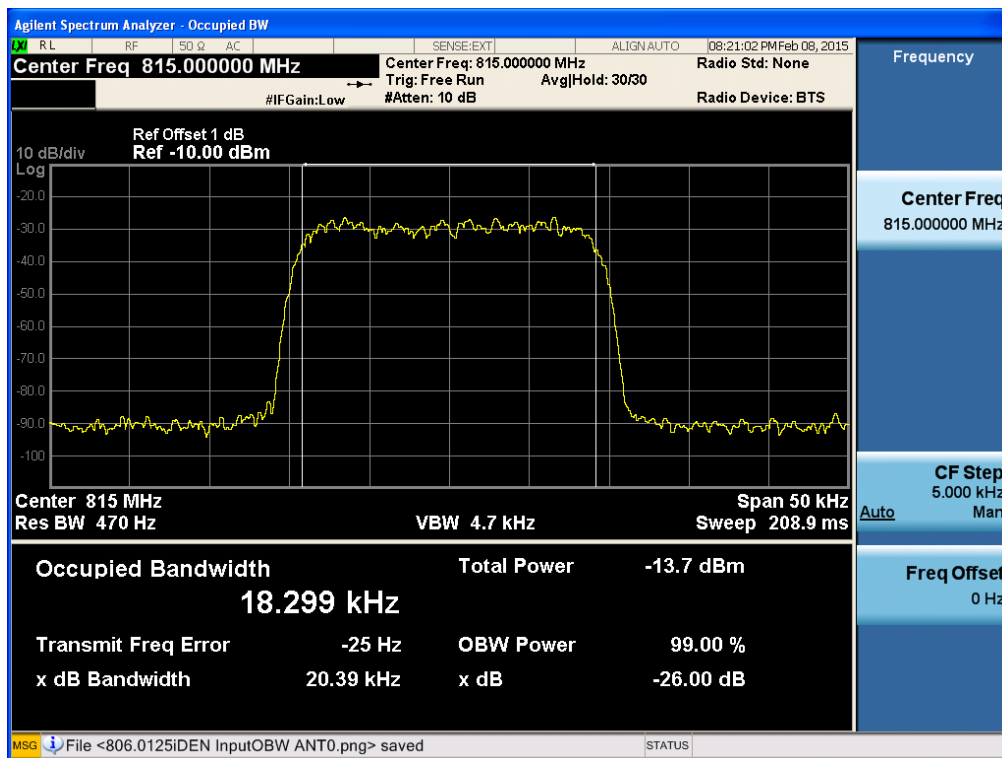
**[LTE 5 MHz Output]**



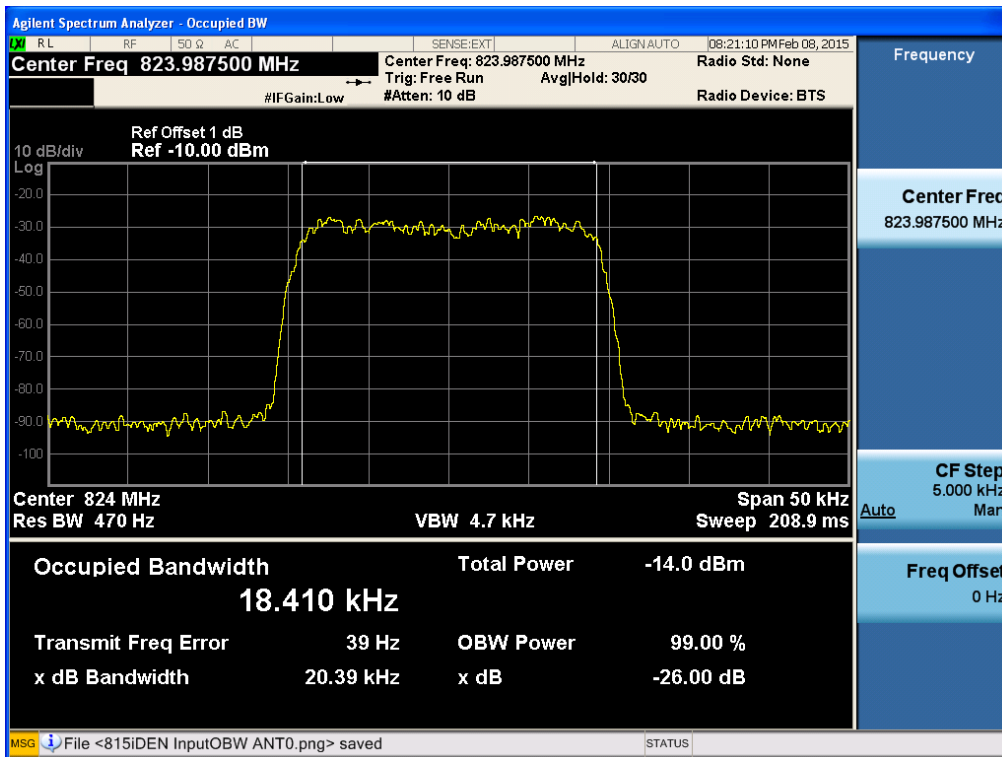
**[iDEN Input Low]**



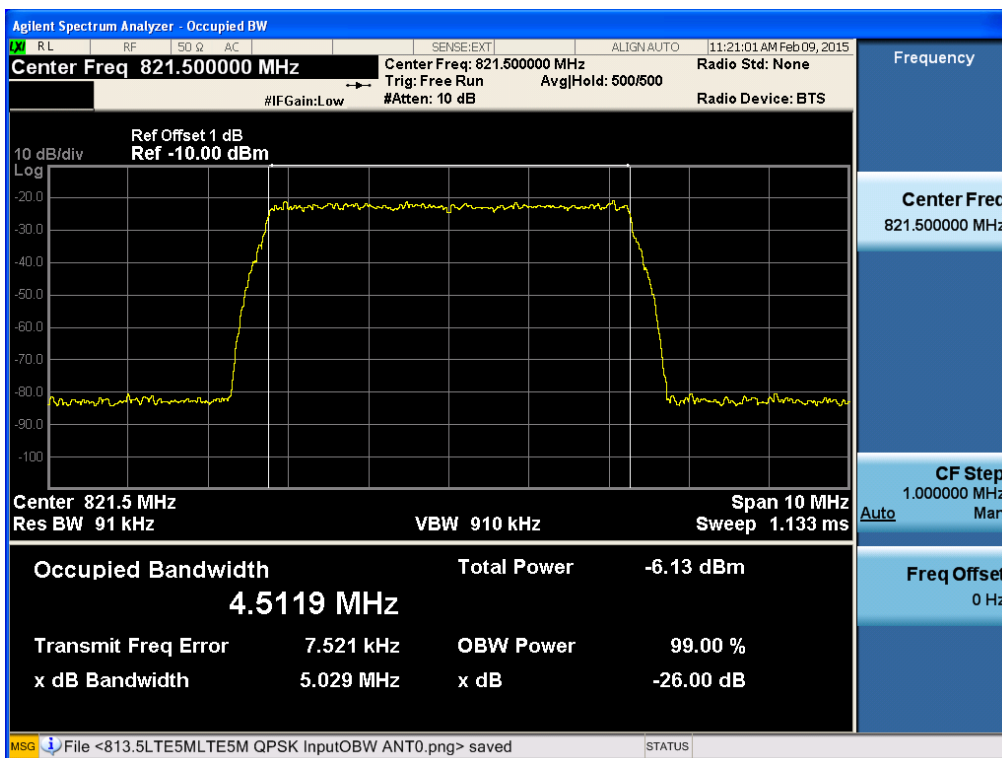
**[iDEN Input Middle]**



[iDEN Input High]

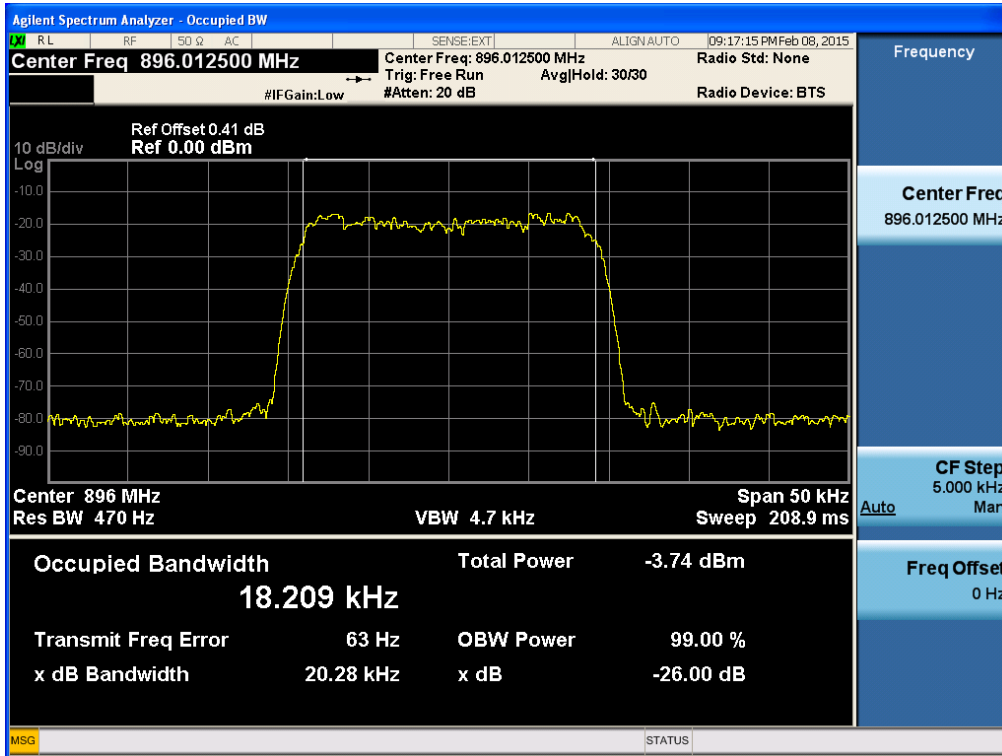


[LTE 5 MHz Input]

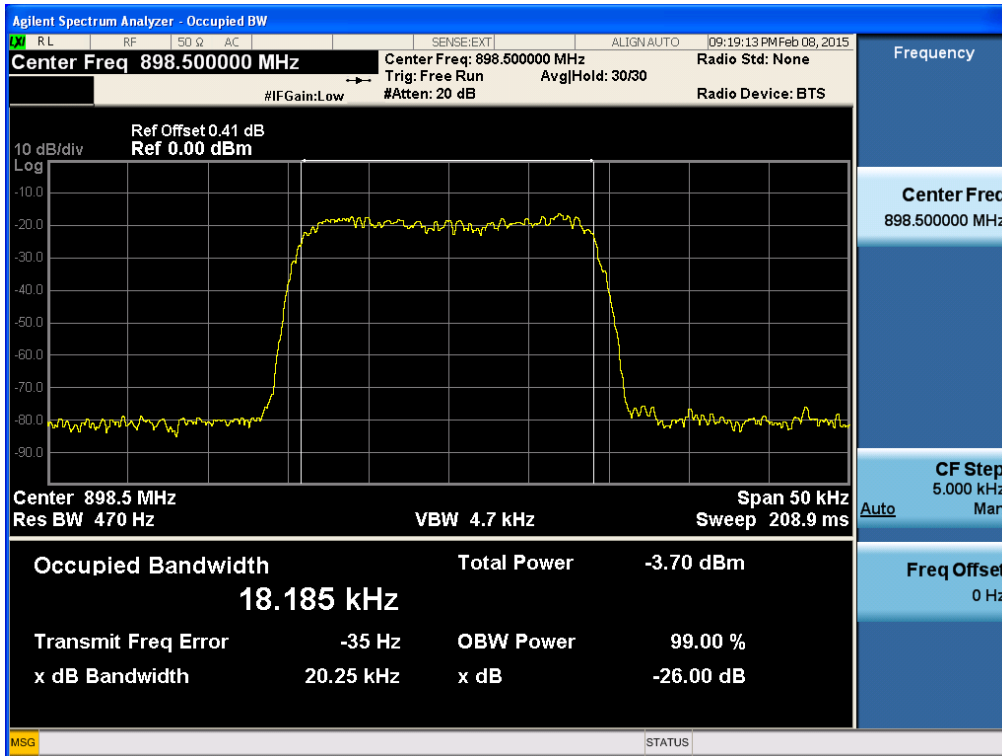


**iDEN 900**

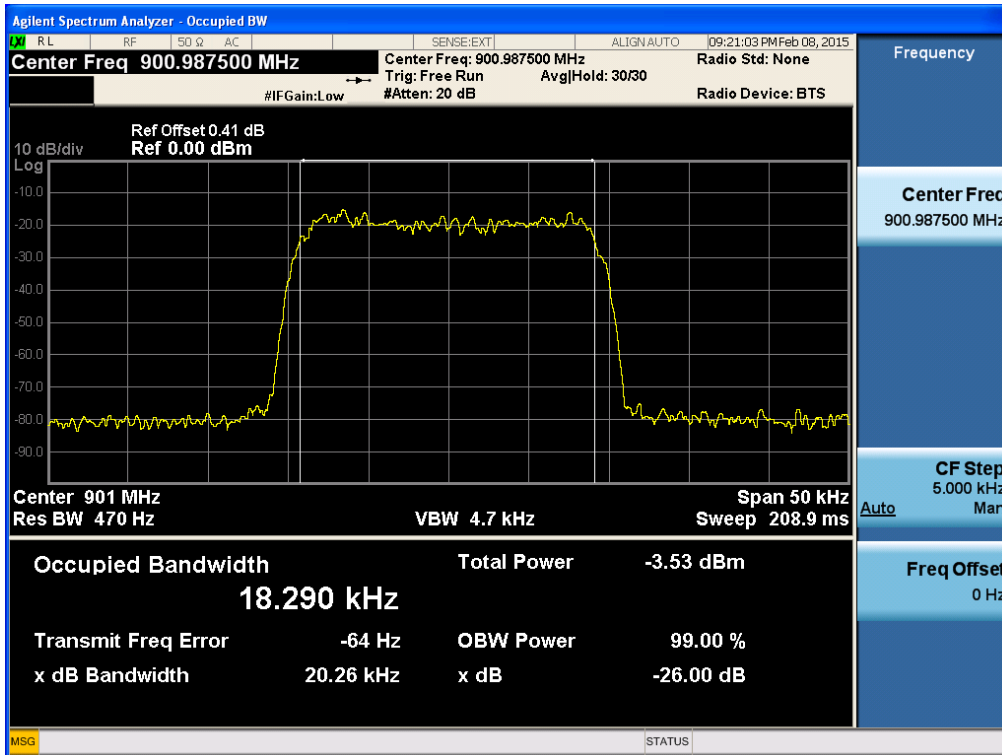
**[iDEN Output Low]**



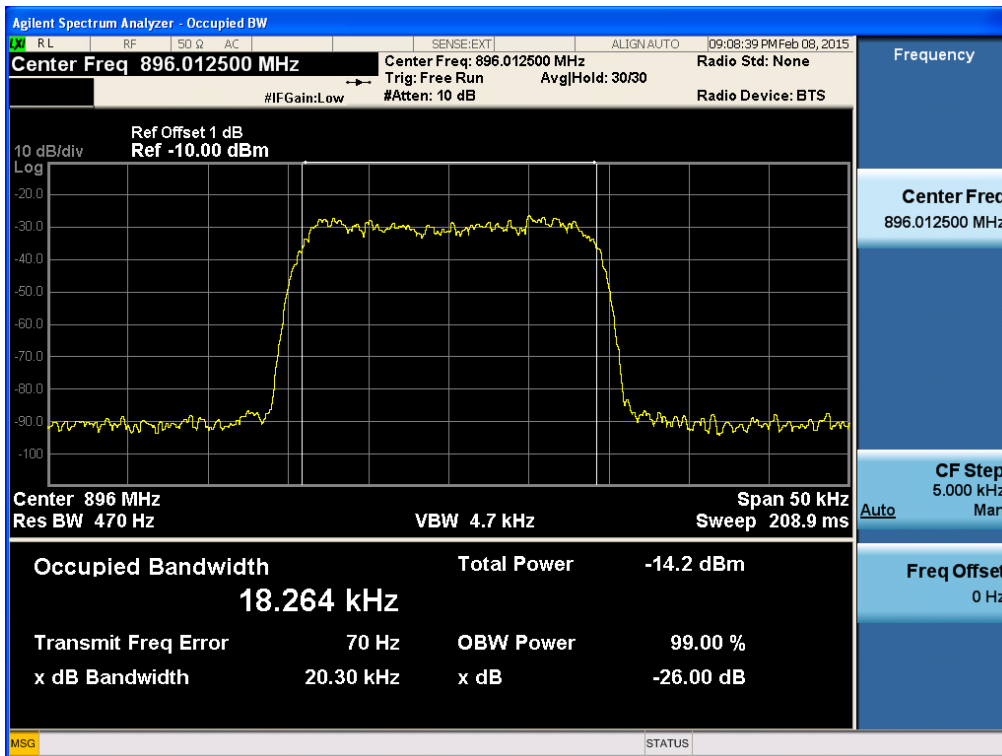
**[iDEN Output Middle]**



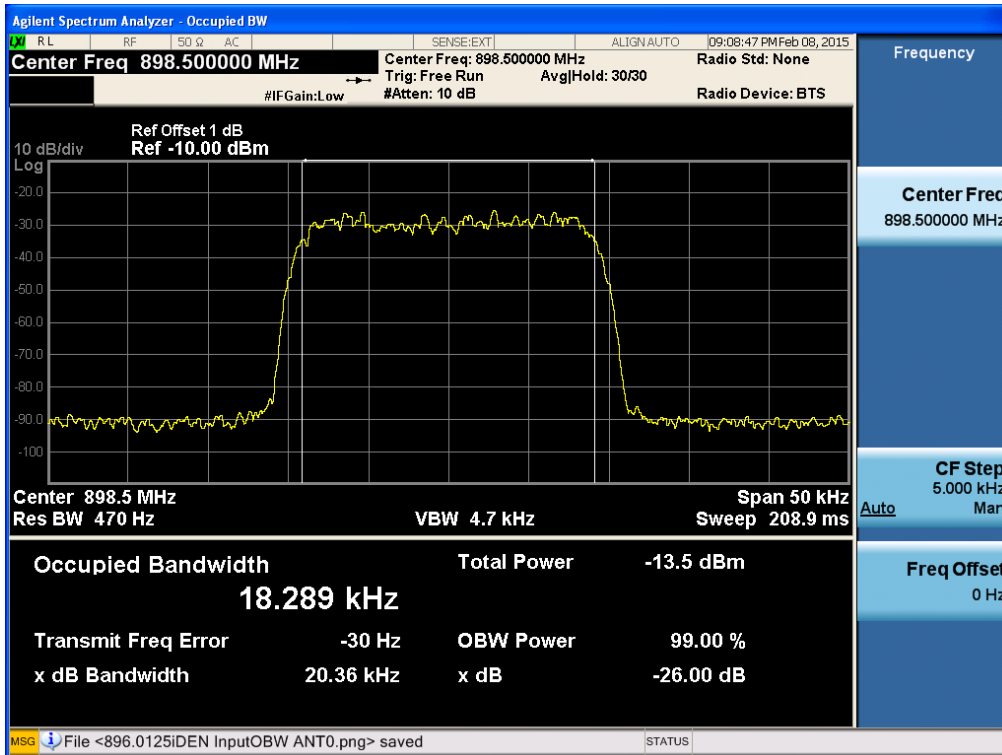
**[iDEN Output High]**



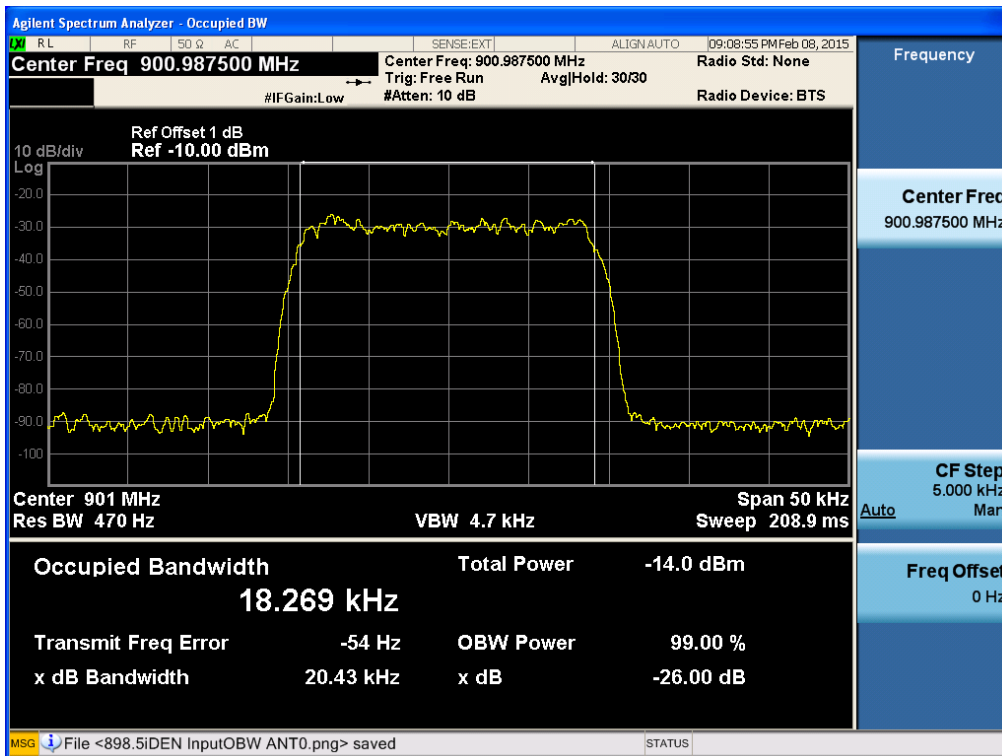
**[iDEN Input Low]**



**[iDEN Input Middle]**

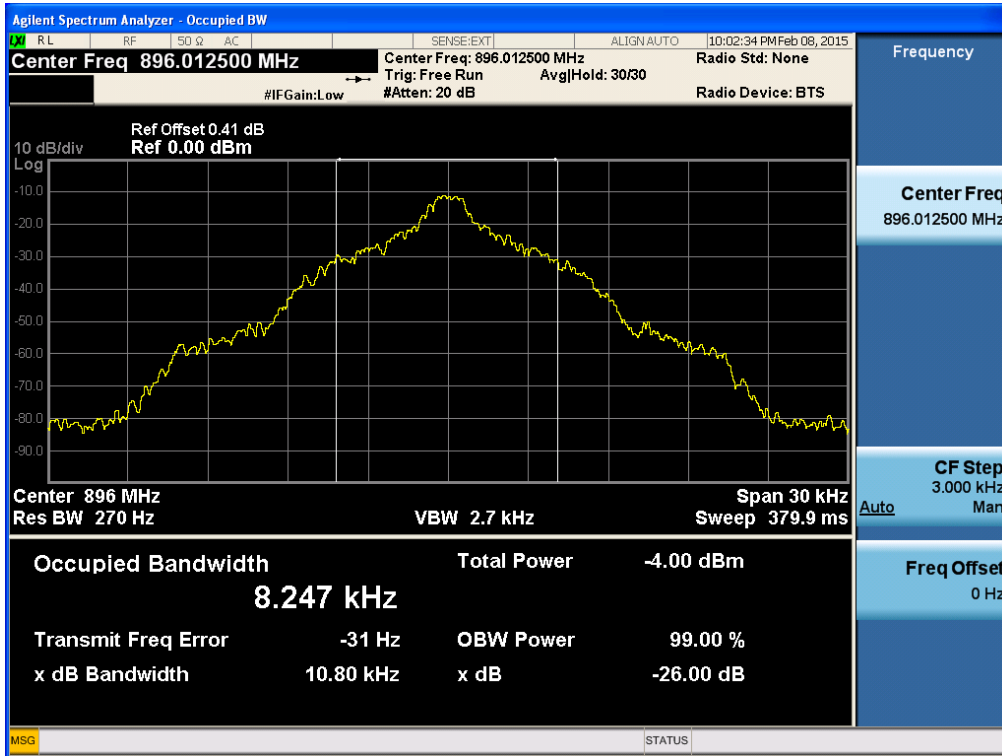


**[iDEN Input High]**

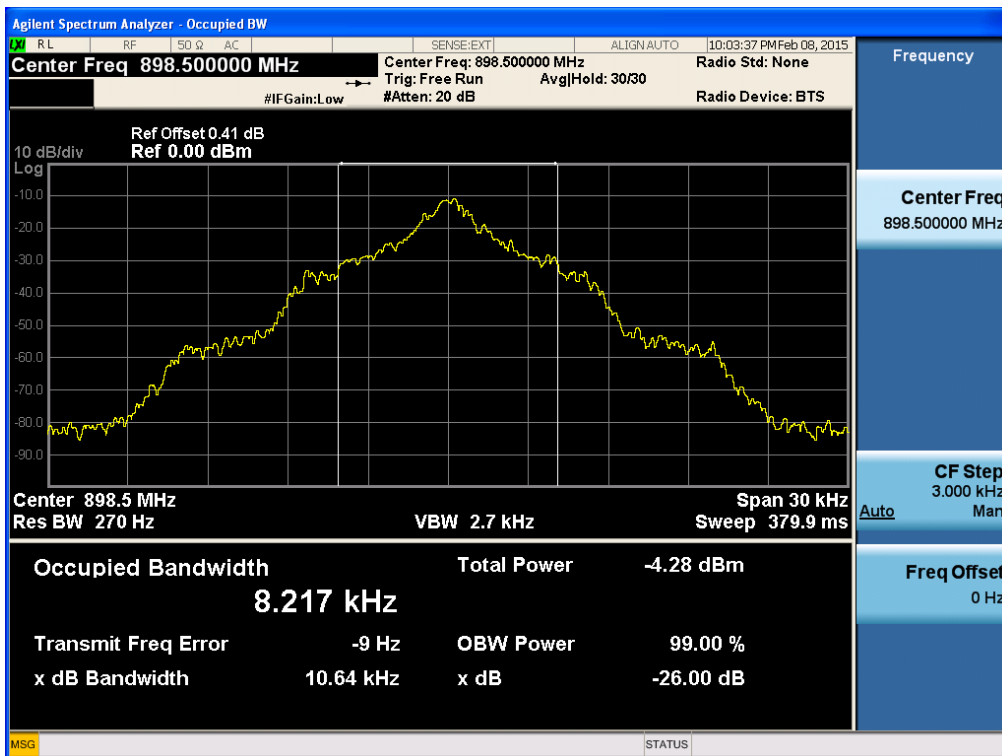


**FSK**

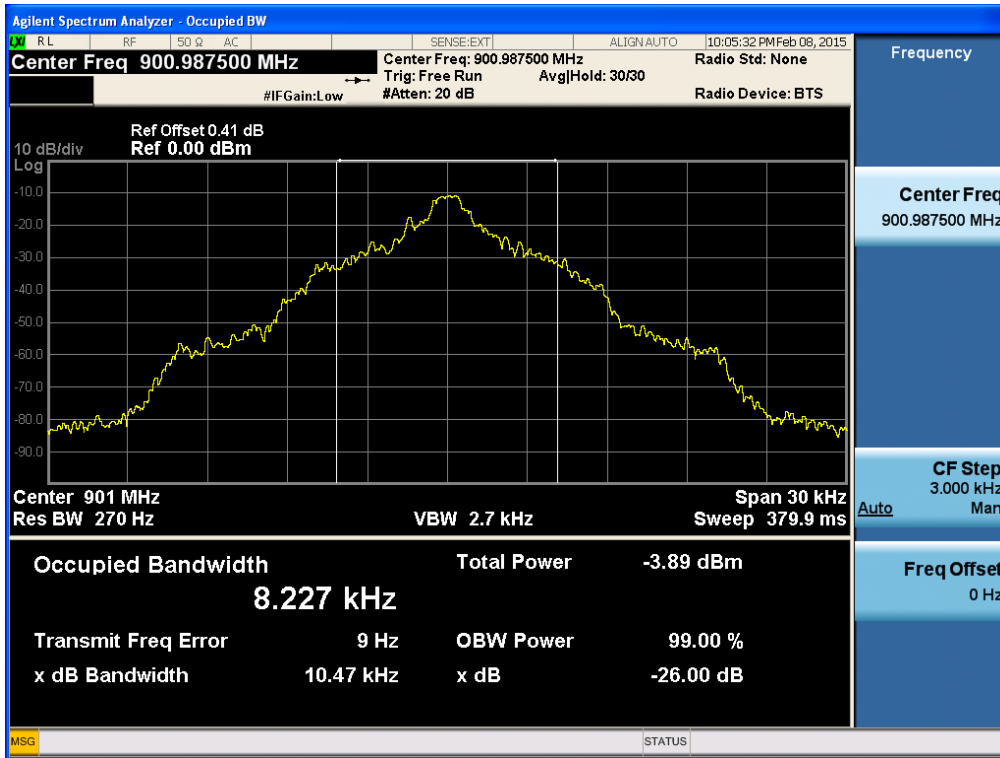
**[FSK Output Low]**



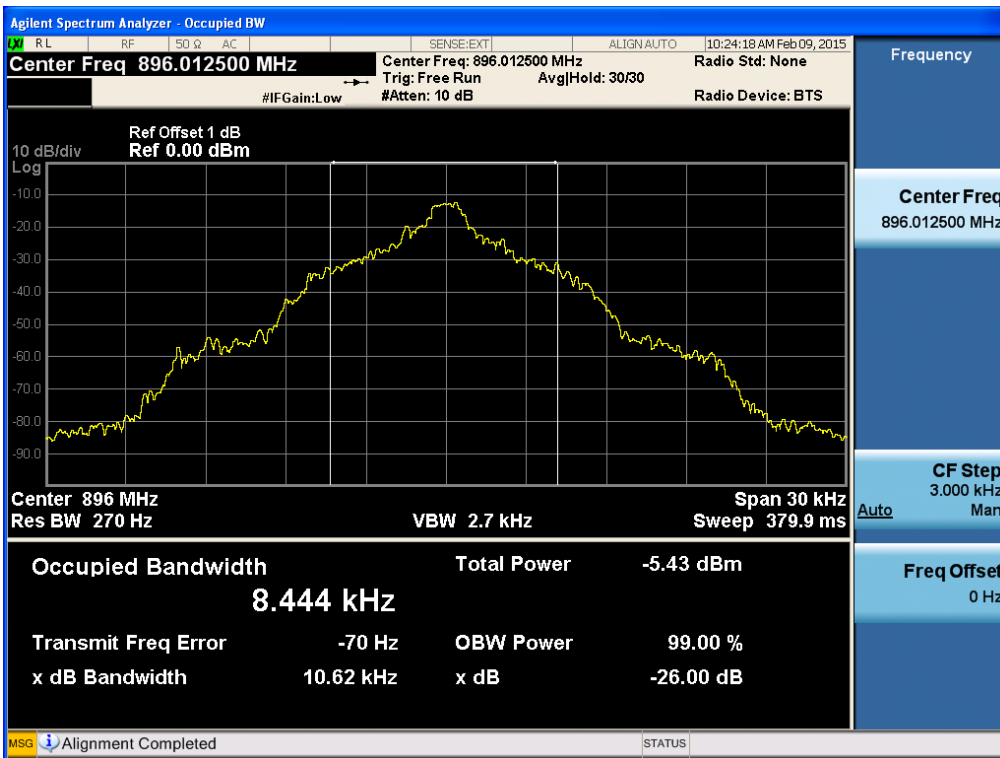
**[FSK Output Middle]**



[FSK Output High]

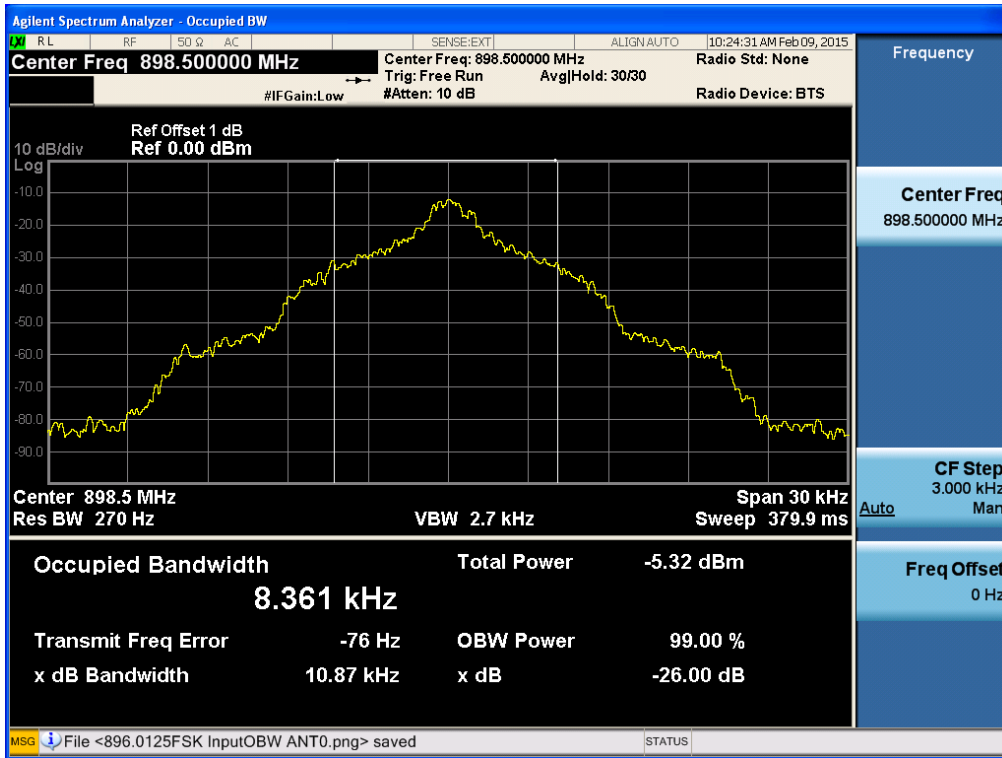


[FSK Input Low]

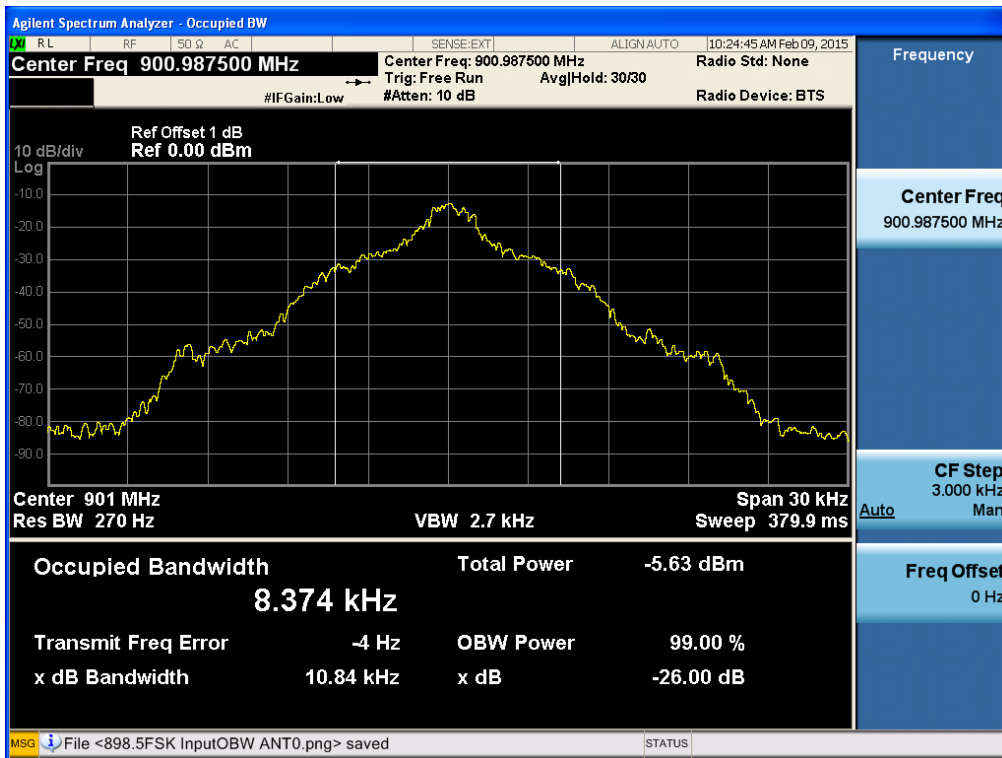




**[FSK Input Middle]**



**[FSK Input High]**



## 8. PASSBAND GAIN AND BANDWIDTH & OUT OF BAND REJECTION

### FCC Rules

#### Test Requirement(s): KDB 935210 D03 v02r01

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

### IC Rules

#### Test Requirements: RSS-131 6.1

The passband gain shall not exceed the nominal gain by more than 1.0 dB. The 20 dB bandwidth shall not exceed the nominal bandwidth that is stated by the manufacturer. Outside of the 20 dB bandwidth, the gain shall not exceed the gain at the 20 dB point.

#### Test Procedures: RSS-131 4.2

Adjust the internal gain control of the equipment under test to the nominal gain for which equipment certification is sought.

With the aid of a signal generator and spectrum analyzer, measure the 20 dB bandwidth of the amplifier (i.e. at the point where the gain has fallen by 20 dB).

Measure the gain-versus-frequency response of the amplifier from the midband frequency  $f_0$  of the passband up to at least  $f_0 + 250\%$  of the 20 dB bandwidth.

Signal generator sweep from the frequency more lower than the low frequency -250% to the frequency more higher than high frequency +250%.

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

Input Signal	Input Level (dBm)	Maximum Amp Gain
Sinusoidal	DL : -16 dBm	DL : 46 dB
	UL : -45 dBm	UL : 35 dB

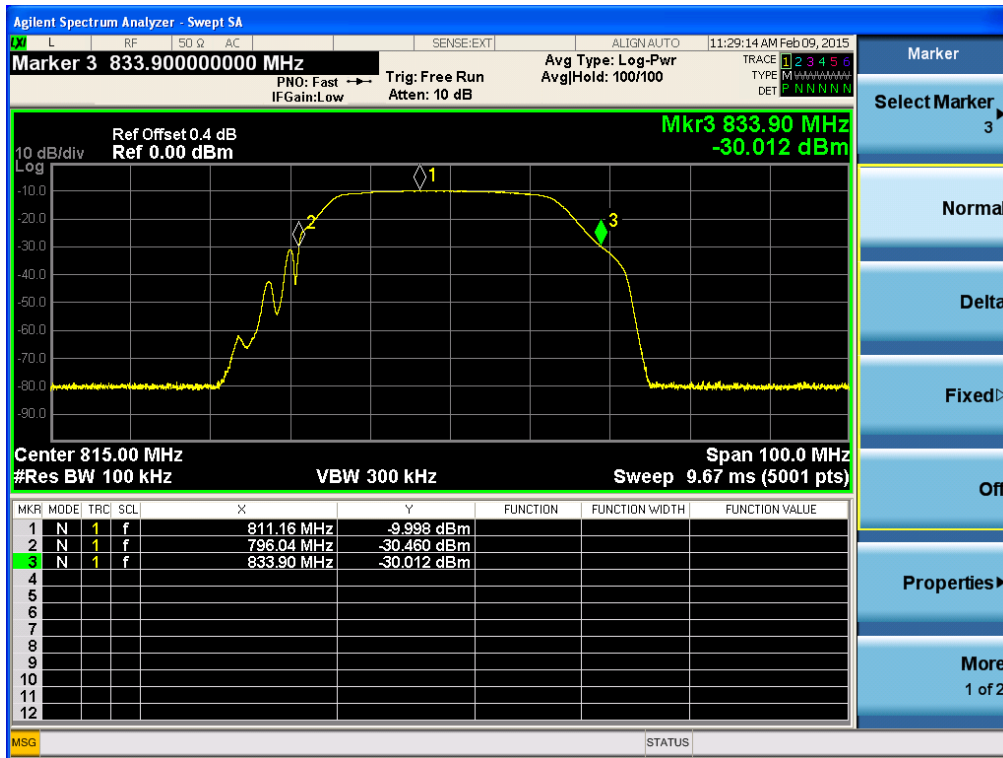
**Uplink****iDEN 800**

<b>20 dB point frequency (MHz)</b>	<b>Output power (dBm)</b>	<b>Gain (dB)</b>
811.16 ~ 833.90	-10.00	35.00

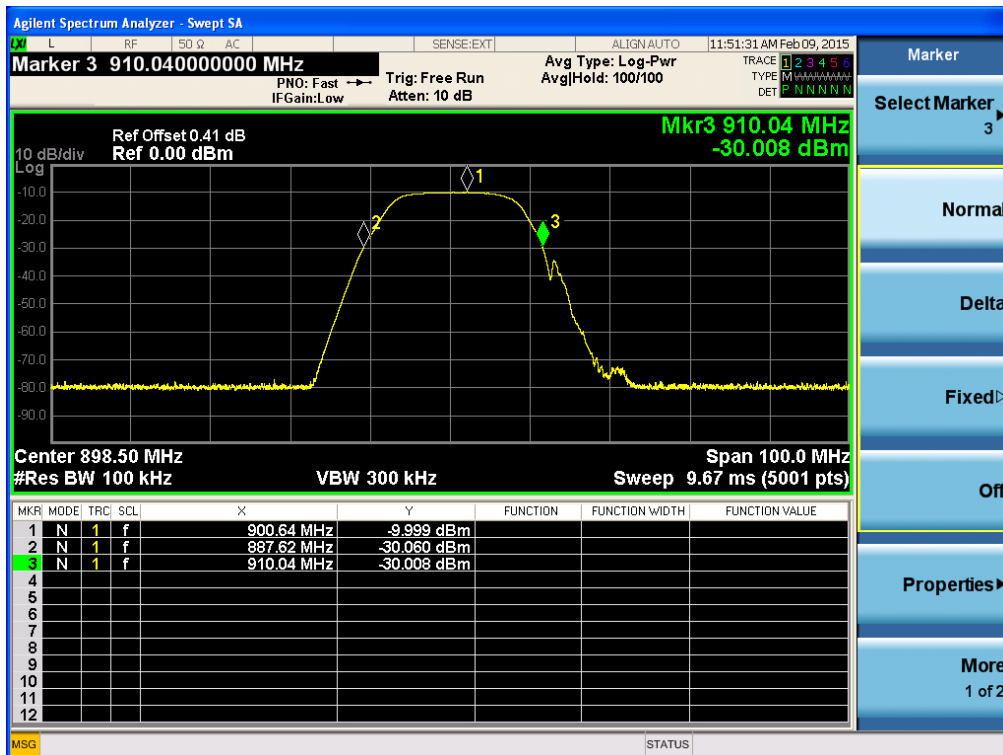
**iDEN 900**

<b>20 dB point frequency (MHz)</b>	<b>Output power (dBm)</b>	<b>Gain (dB)</b>
900.64 ~ 910.04	-10.00	35.00

**Plots of Passband Gain and Bandwidth & Out of Band Rejection for FCC  
[iDEN 800 MHz Band Uplink]**



**[iDEN 900 MHz Band Uplink]**



**Downlink**

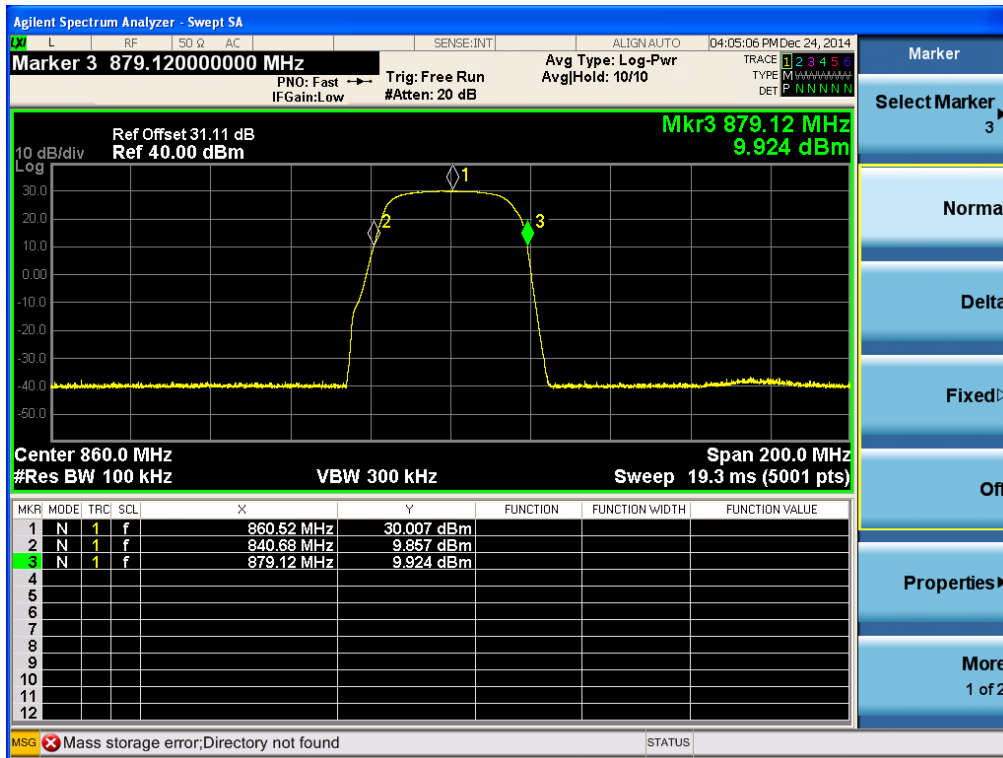
**iDEN 800**

<b>20 dB point frequency (MHz)</b>	<b>Output power (dBm)</b>	<b>Gain (dB)</b>
840.68 ~ 879.12	30.01	46.01

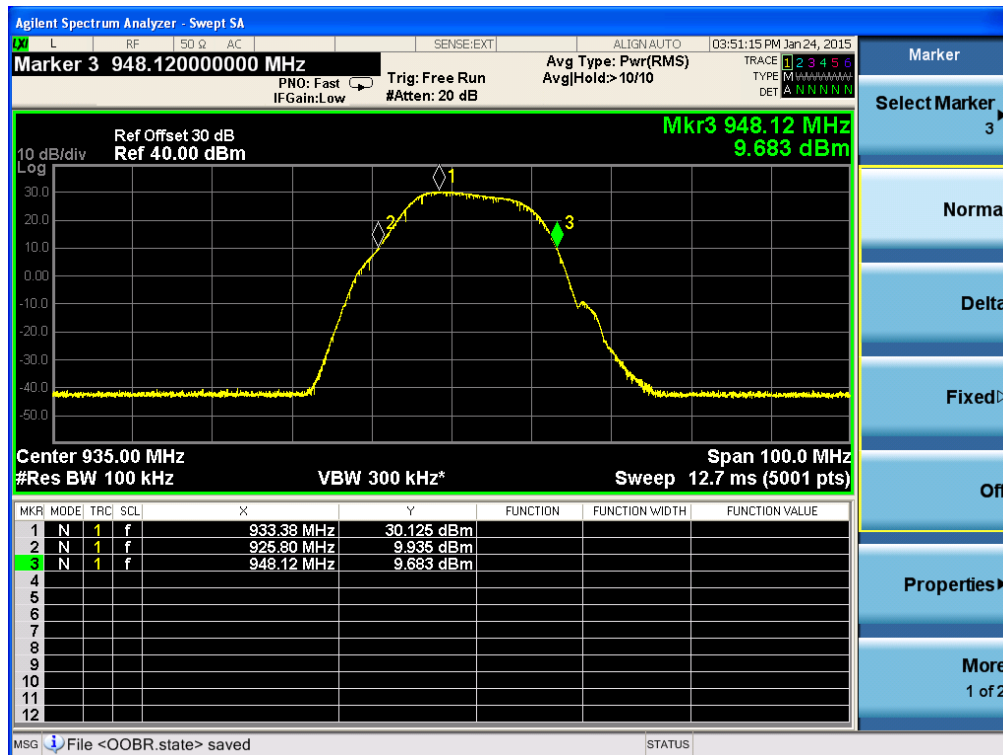
**iDEN 900**

<b>20 dB point frequency (MHz)</b>	<b>Output power (dBm)</b>	<b>Gain (dB)</b>
925.80 ~ 948.12	30.13	46.13

**Plots of Passband Gain and Bandwidth & Out of Band Rejection for IC  
[iDEN 800 MHz Band Downlink]**



**[iDEN 900 MHz Band Downlink]**



## 9. NOISE FIGURE

### FCC Rules

#### Test Requirement(s):

##### § 90.219 Use of signal boosters:

(e) (2) The noise figure of a signal booster must not exceed 9 dB in either direction.

##### Test Procedures:

Noise figure measured in the maximum gain of the repeater state.

Without input signal.

$$NF = NP - G - BCF + PNAD$$

$$NF = NP - G - 60 + 174$$

$$NF = NP - G + 114$$

NF=Noise Figure(dB)

NP=Noise power(dBm/MHz)

G=Maximum gain

BCF=Bandwidth Correction Factor=10log(1 MHz/1 Hz)=60

PNAD=Noise Power Density=174 dBm/Hz

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

Input Signal	Maximum Amp Gain
Without input signal	DL : 46 dB

### 800 MHz Band

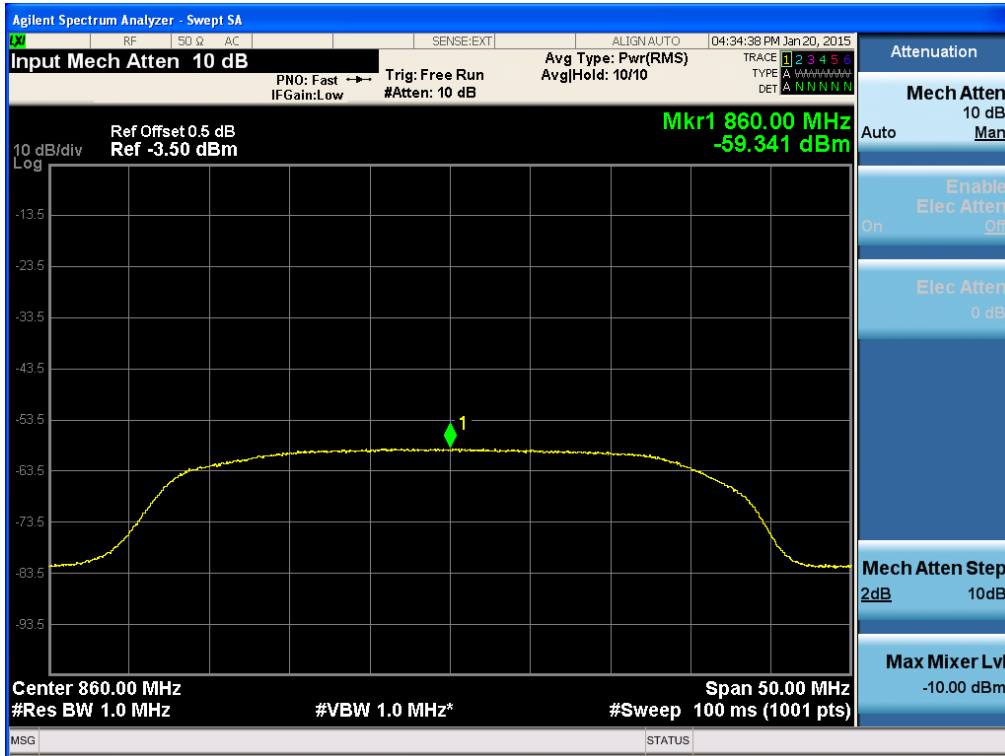
$$\text{Noise Figure} = -59.341 - 46 + 114 = 8.659 \text{ dB}$$

### 900 MHz Band

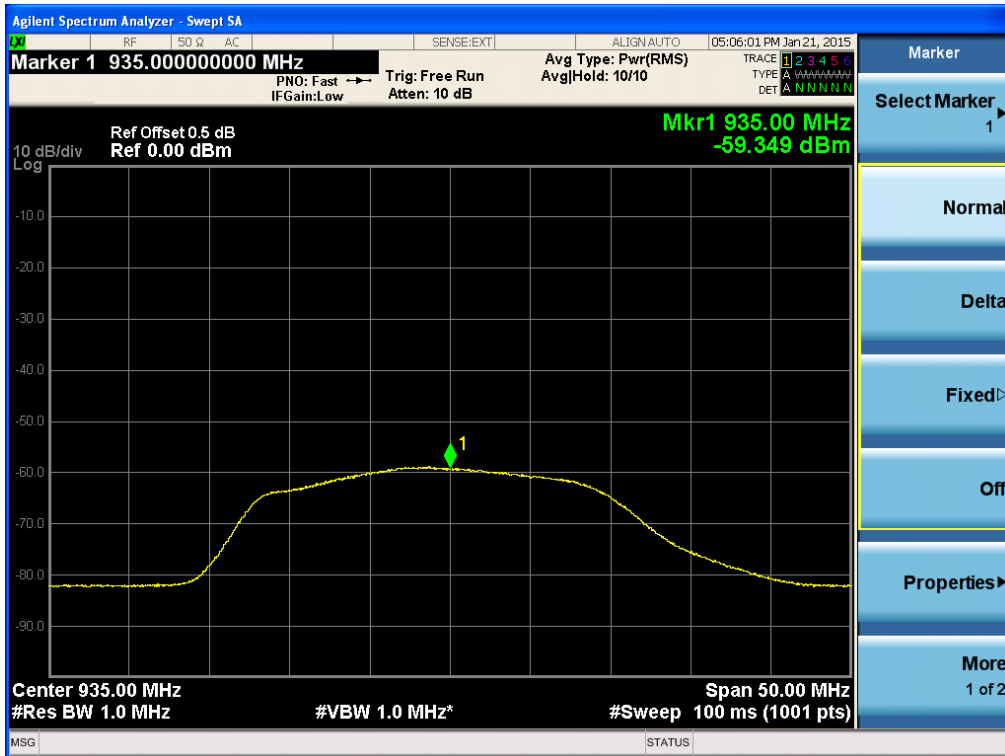
$$\text{Noise Figure} = -59.349 - 46 + 114 = 8.651 \text{ dB}$$

**Plots of Noise power**

**[800 MHz Band Downlink]**



**[900 MHz Band Downlink]**





## 10. EMISSION MASKS

### FCC Rules

#### Test Requirement(s):

##### § 90.210 Emission masks:

Except as indicated elsewhere in this part, transmitters used in the radio services governed by this part must comply with the emission masks outlined in this section. Unless otherwise stated, per paragraphs (d)(4), (e)(4), and (o) of this section, measurements of emission power can be expressed in either peak or average values provided that emission powers are expressed with the same parameters used to specify the unmodulated transmitter carrier power. For transmitters that do not produce a full power unmodulated carrier, reference to the unmodulated transmitter carrier power refers to the total power contained in the channel bandwidth. Unless indicated elsewhere in this part, the table in this section specifies the emission masks for equipment operating under this part.

#### APPLICABLE EMISSION MASKS

Frequency band (MHz)	Mask for equipment with audio low pass filter	Mask for equipment without audio low pass filter
Below 25 <sup>1</sup>	A or B	A or C
25-50	B	C
72-76	B	C
150-174 <sup>2</sup>	B, D, or E	C, D or E
150 paging only	B	C
220-222	F	F
421-512 <sup>2 5</sup>	B, D, or E	C, D, or E
450 paging only	B	G
806-809/851-854	B	H
809-824/854-869 <sup>3 5</sup>	B	G
896-901/935-940	I	J
902-928	K	K
929-930	B	G
4940-4990 MHz	L or M	L or M
5850-5925 <sup>4</sup>		
All other bands	B	C

(g) *Emission Mask G.* For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

- (1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 10 kHz, but no more than 250 percent of the authorized bandwidth: At least  $116 \log (f_d / 6.1)$  dB, or  $50 + 10 \log (P)$  dB, or 70 dB, whichever is the lesser attenuation;
- (2) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least  $43 + 10 \log (P)$  dB.

(h) *Emission Mask H.* For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

- (1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of 4 kHz or less: Zero dB.
- (2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 4 kHz, but no more than 8.5 kHz: At least  $107 \log (f_d / 4)$  dB;
- (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 8.5 kHz, but no more than 15 kHz: At least  $40.5 \log (f_d / 1.16)$  dB;
- (4) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 15 kHz, but no more than 25 kHz: At least  $116 \log (f_d / 6.1)$  dB;
- (5) On any frequency removed from the center of the authorized bandwidth by more than 25 kHz: At least  $43 + \log (P)$  dB.

(j) *Emission Mask J.* For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power of the transmitter (P) as follows:

- (1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 2.5 kHz, but no more than 6.25 kHz: At least  $53 \log (f_d / 2.5)$  dB;
- (2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 6.25 kHz, but no more than 9.5 kHz: At least  $103 \log (f_d / 3.9)$  dB;
- (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 9.5 kHz: At least  $157 \log (f_d / 5.3)$  dB, or

50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.

**Test Procedures:**

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.

Sufficient scans were taken to show Emission Mask.

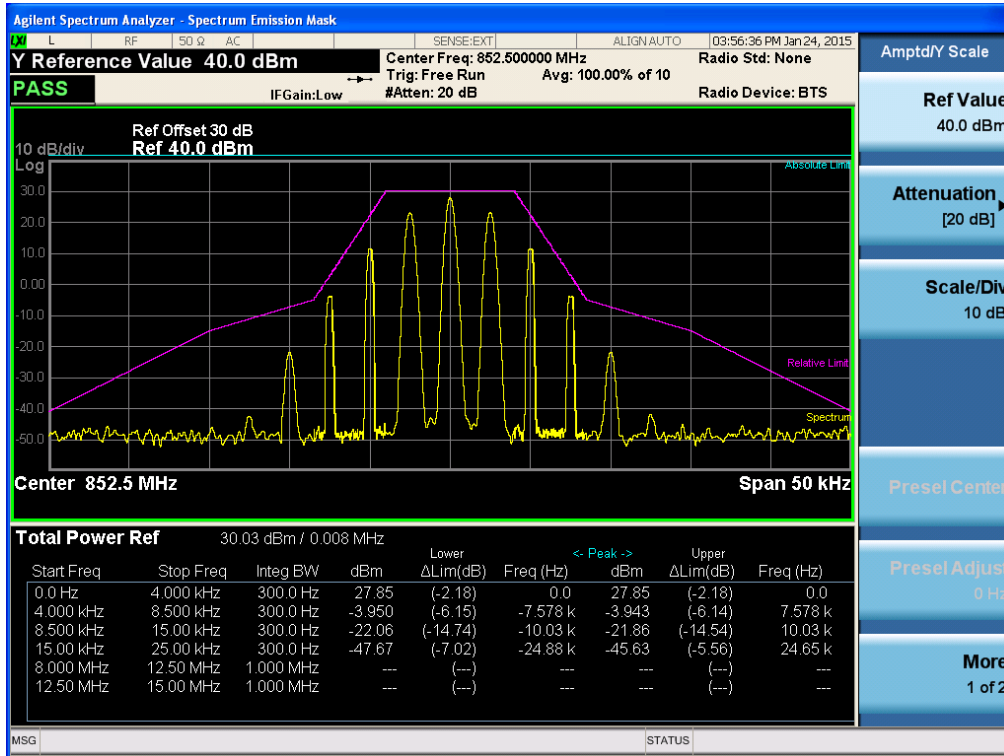
**Test Results:** The EUT complies with the requirements of this section.

Input Signal	Input Level (dBm)	Maximum Amp Gain
851 MHz ~ 854 MHz 806 MHz ~ 809 MHz FM modulation	DL : -16 dBm UL : -45 dBm	DL : 46 dB UL : 35 dB
854 MHz ~ 861 MHz 809 MHz ~ 816 MHz iDEN 25 kHz	DL : -16 dBm UL : -45 dBm	DL : 46 dB UL : 35 dB
929 MHz ~ 930 MHz iDEN 25 kHz	DL : -16 dBm UL : -45 dBm	DL : 46 dB UL : 35 dB
935 MHz ~ 940 MHz 896 MHz ~ 901 MHz FSK 12.5 kHz	DL : -16 dBm UL : -45 dBm	DL : 46 dB UL : 35 dB

**Downlink**

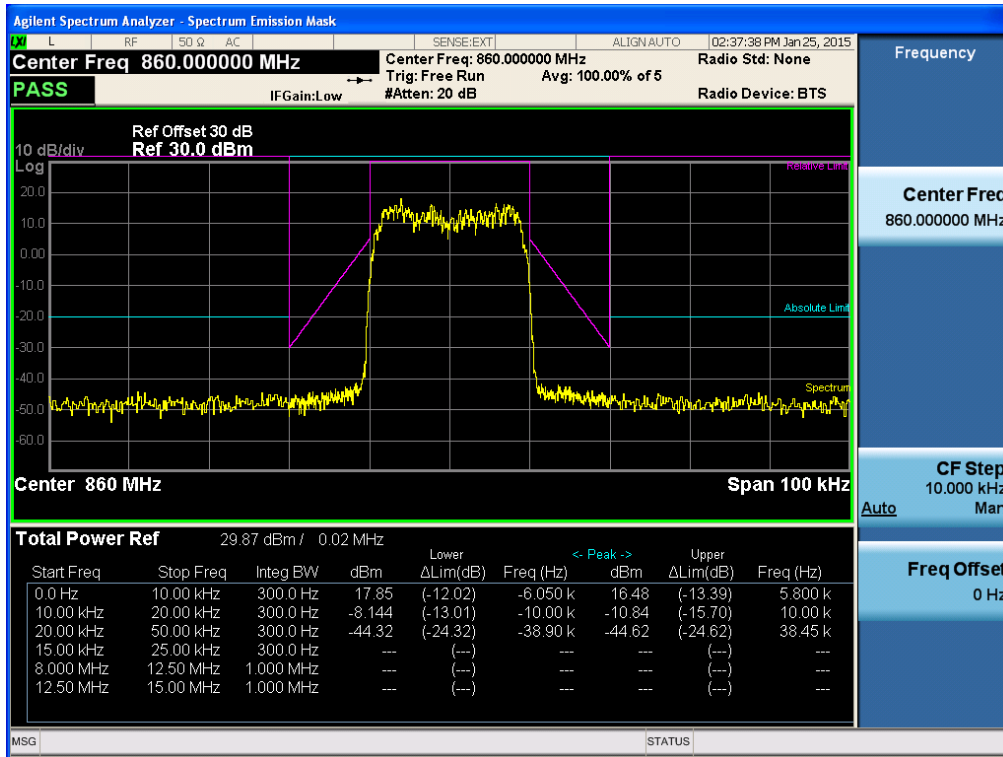
**Plots of Emission Mask H**

**[851 MHz ~ 854 MHz Downlink]**

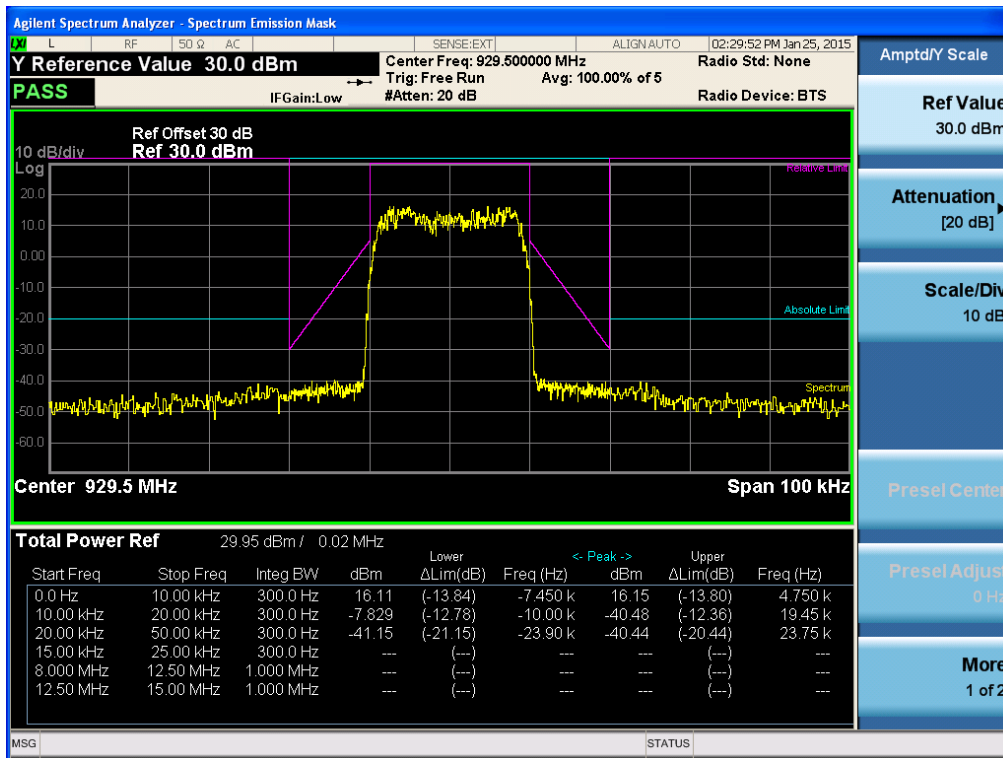


**Plots of Emission Mask G**

**[854 MHz ~ 869 MHz Downlink]**

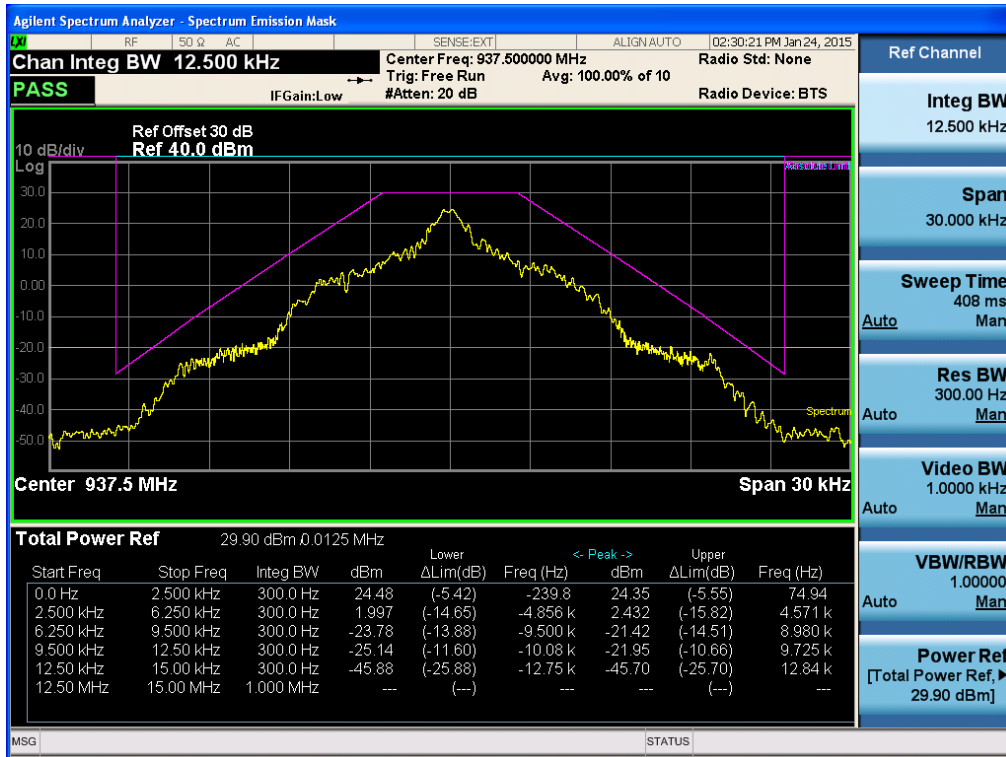


**[929 MHz ~ 930 MHz Downlink]**



**Plots of Emission Mask J**

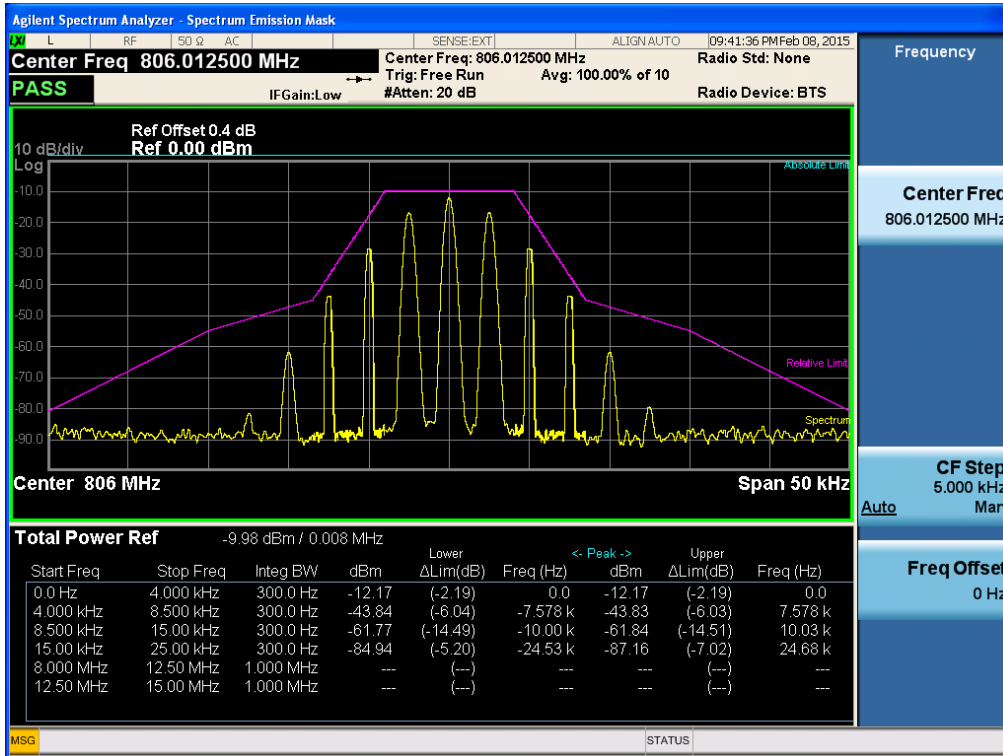
**[935 MHz ~ 940 MHz Downlink]**



**Uplink**

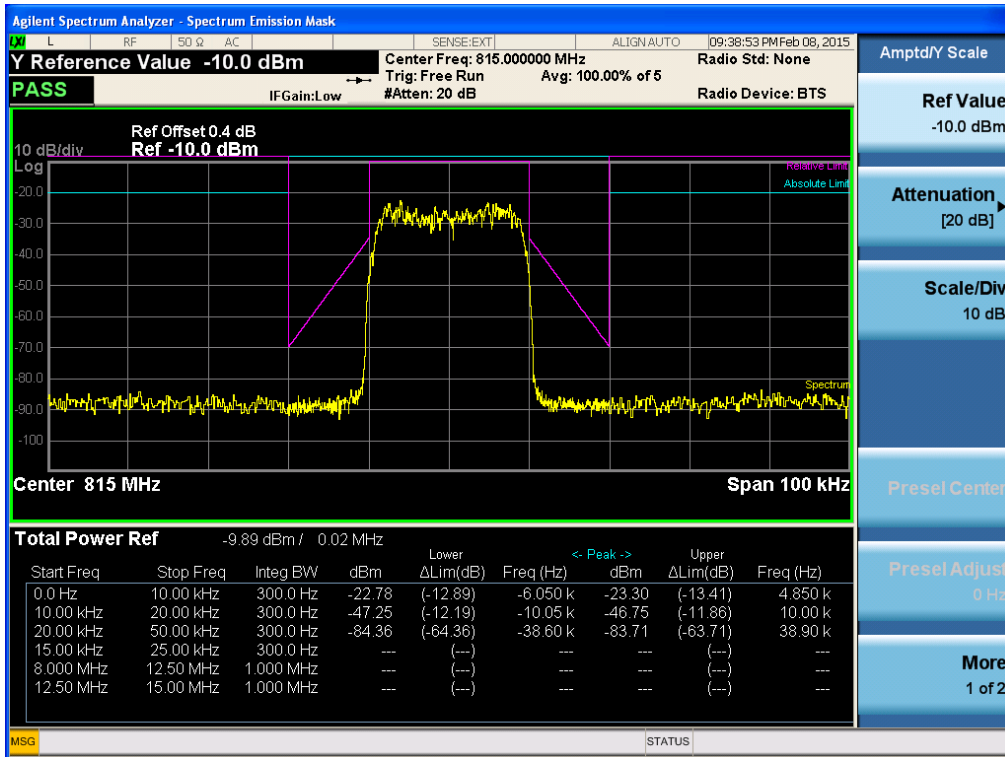
**Plots of Emission Mask H**

**[806 MHz ~ 809 MHz Uplink]**



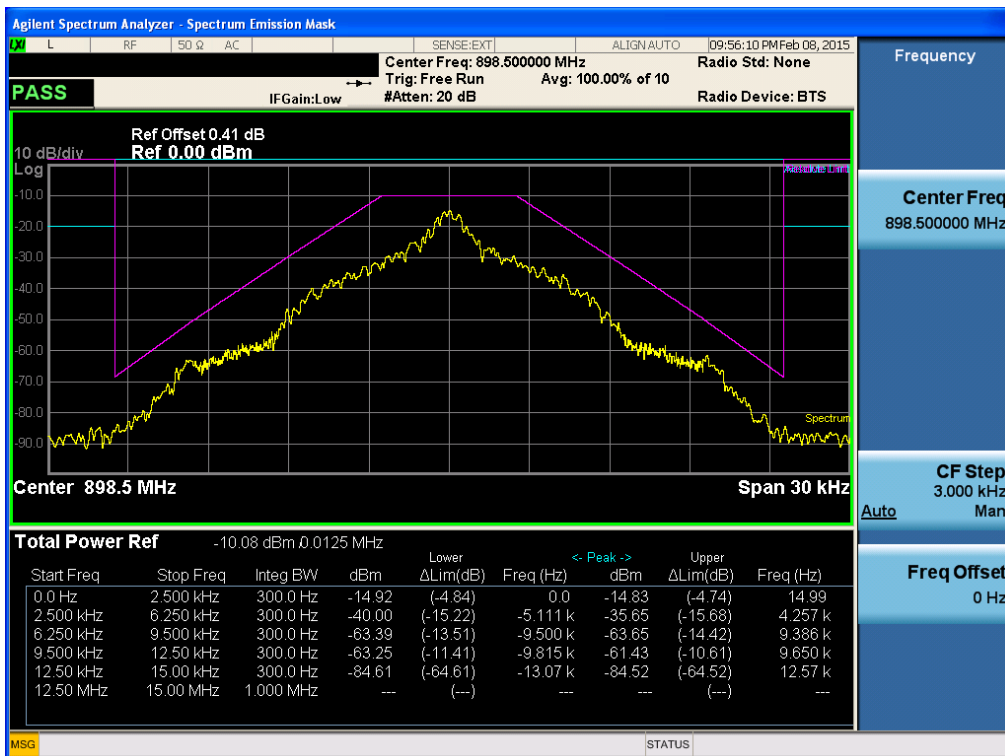
**Plots of Emission Mask G**

**[809 MHz ~ 824 MHz Uplink]**



**Plots of Emission Mask J**

**[896 MHz ~ 901 MHz Uplink]**





## 11. SPURIOUS AND HARMONIC EMISSION AT ANTENNA TERMINAL

### FCC Rules

#### Test Requirement(s):

##### **§ 2.1051 Measurements required: Spurious emissions at antenna terminals:**

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

##### **§90.691 Emission mask requirements for EA-based systems.**

(a) Out-of-band emission requirement shall apply only to the "outer" channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $116 \log_{10}(f/6.1)$  decibels or  $50 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

##### **§ 90.669 Emission limits.**

(a) On any frequency in an MTA licensee's spectrum block that is adjacent to a non-MTA frequency, the power of any emissions shall be attenuated below the transmitter power (P) by at least **43 plus 10 log<sub>10</sub>( P ) decibels or 80 decibels, whichever is the lesser attenuation.**

NOTE : The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power. (b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than

specified in this section.

**\* Note**

Test (a)-(1) was replaced by a band edge test.

**Test Procedures:**

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.

The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic

**IC Rules**

**Test Requirement(s): RSS-131 6.4**

Spurious emissions of zone enhancers and translators shall be suppressed as much as possible.

Spurious emissions shall be attenuated below the rated power of the enhancer by at least:

$43 + 10 \text{ Log}_{10}(\text{Prated in watts})$ , or 70 dB, whichever is less stringent.

**Note:** If the minimum standard is not met, check to see if the input signal generators have a high harmonic content.

**Test Procedures: RSS-131 4.4**

**4.4.1 Multi-channel Enhancer**

The spurious emissions of the equipment under test shall be measured using the two-tone method in section 4.3.1, with the two tones Po1 and Po2 set to the required levels. Using a spectrum analyser with a resolution bandwidth set at 100 kHz, search for spurious emissions from 30 MHz to at least 5 times the highest RF passband frequency. The search may omit the band that contains the test tones and intermodulation products.

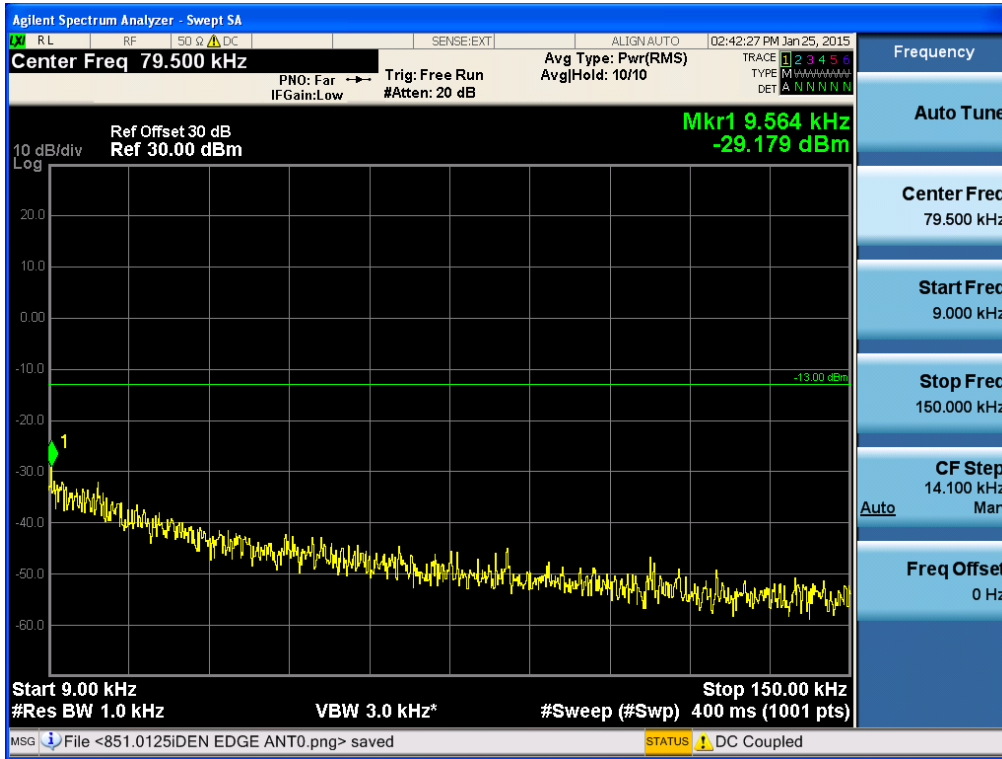
**4.4.2 Single channel Enhancer**

The enhancer shall be operated as described in section 4.3.2 during the search for spurious emissions.

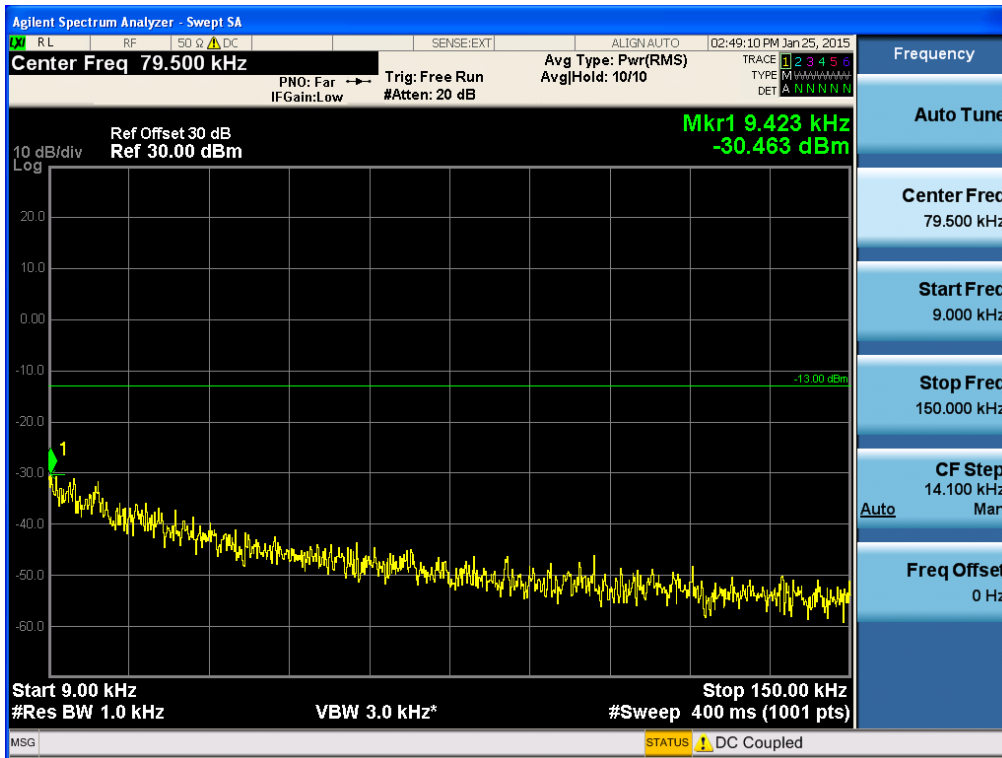
Using a spectrum analyser with a resolution bandwidth set at 100 kHz, search for spurious emissions from 30 MHz to at least 5 times the highest RF passband frequency. The search may omit the band that contains the input signal.

**Single channel Enhancer Plots of Spurious Emission\_Downlink  
iDEN 800  
Conducted Spurious Emissions (9 kHz – 150 kHz)**

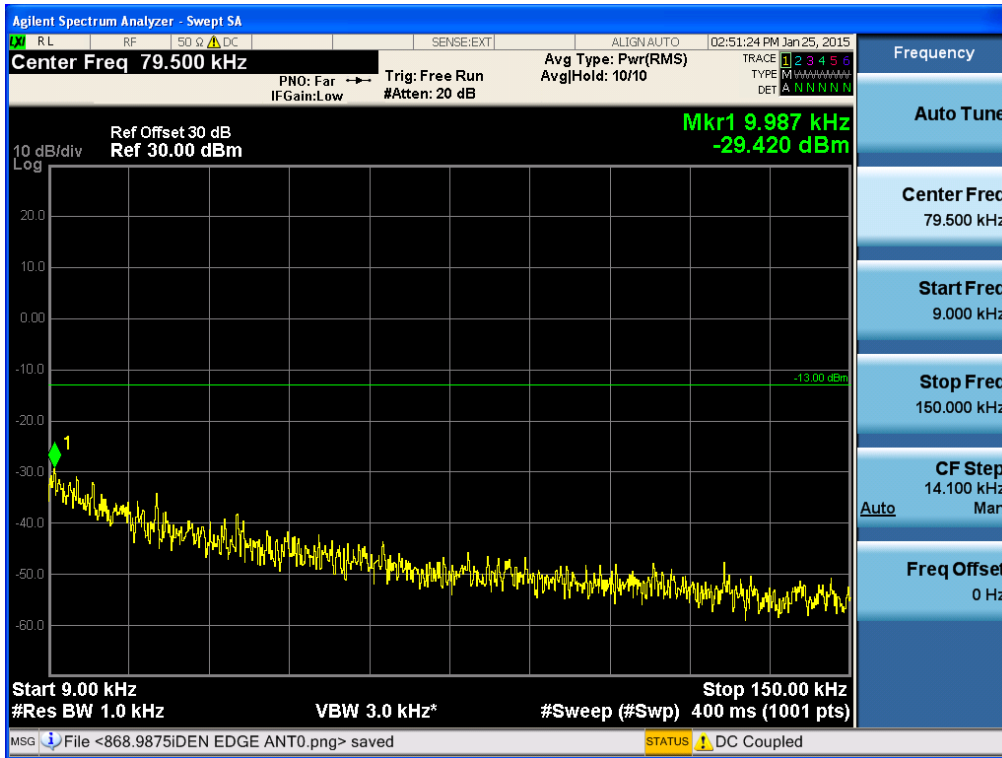
[IDEN Low]



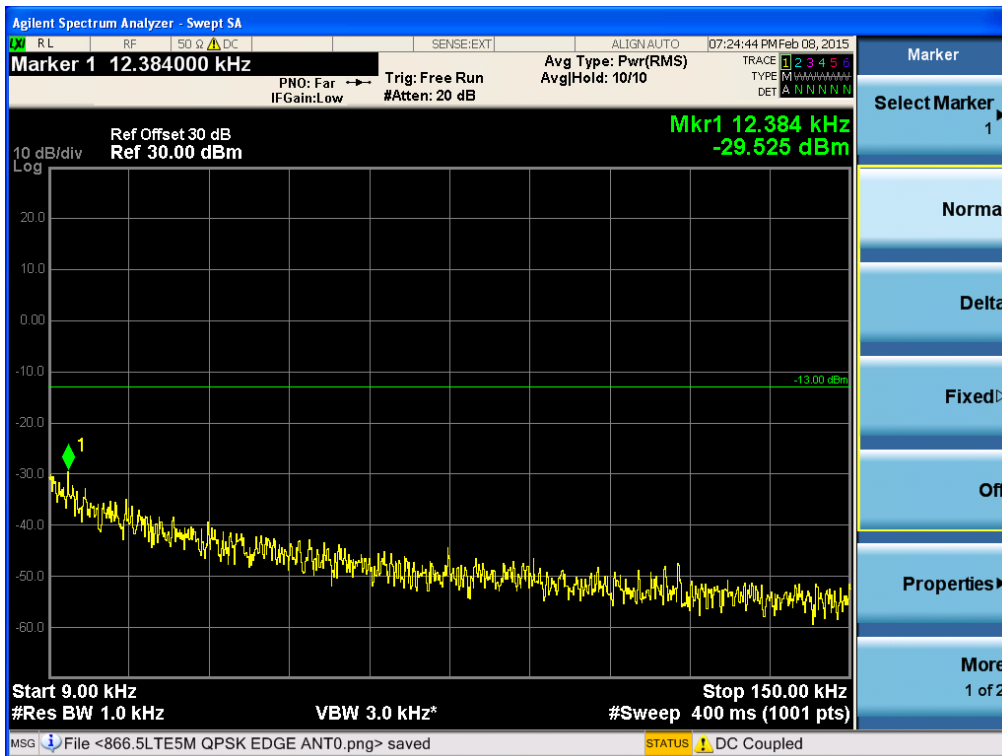
[IDEN Middle]



[IDEN High]

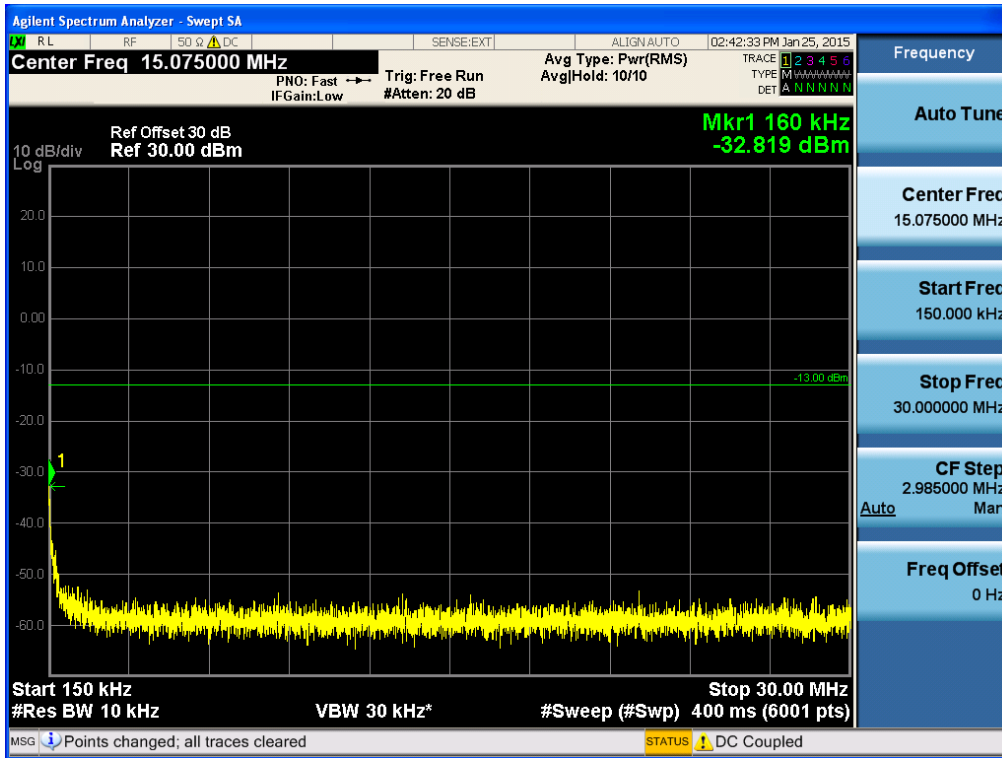


[LTE 5 MHz]

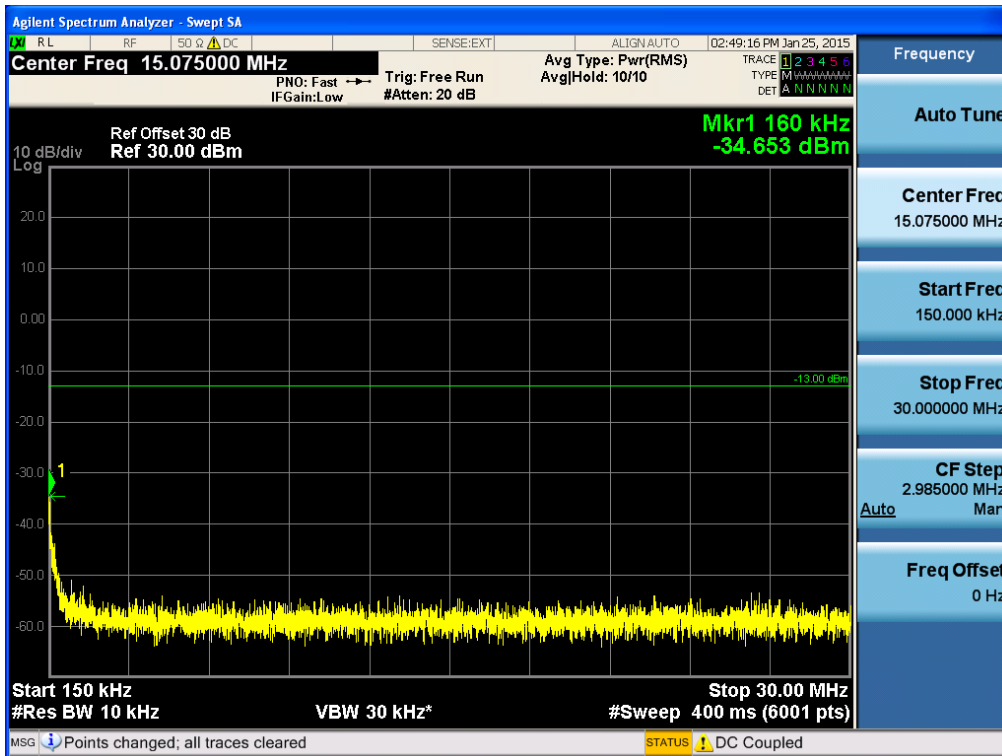


**Conducted Spurious Emissions (150 kHz – 30 MHz)**

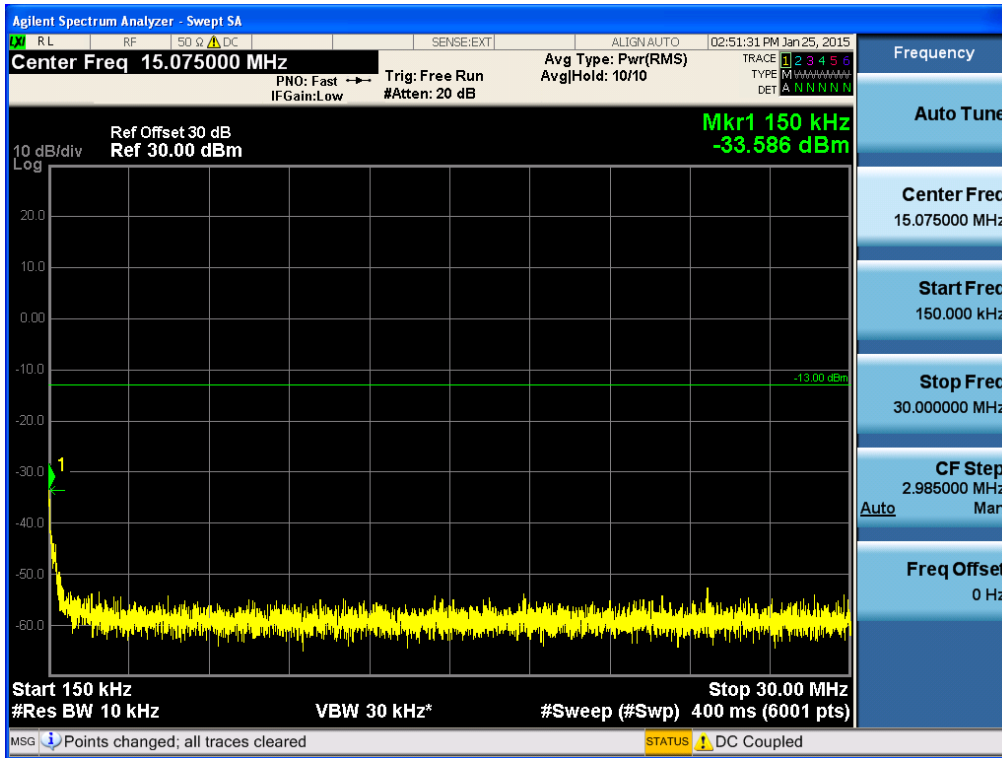
**[IDEN Low]**



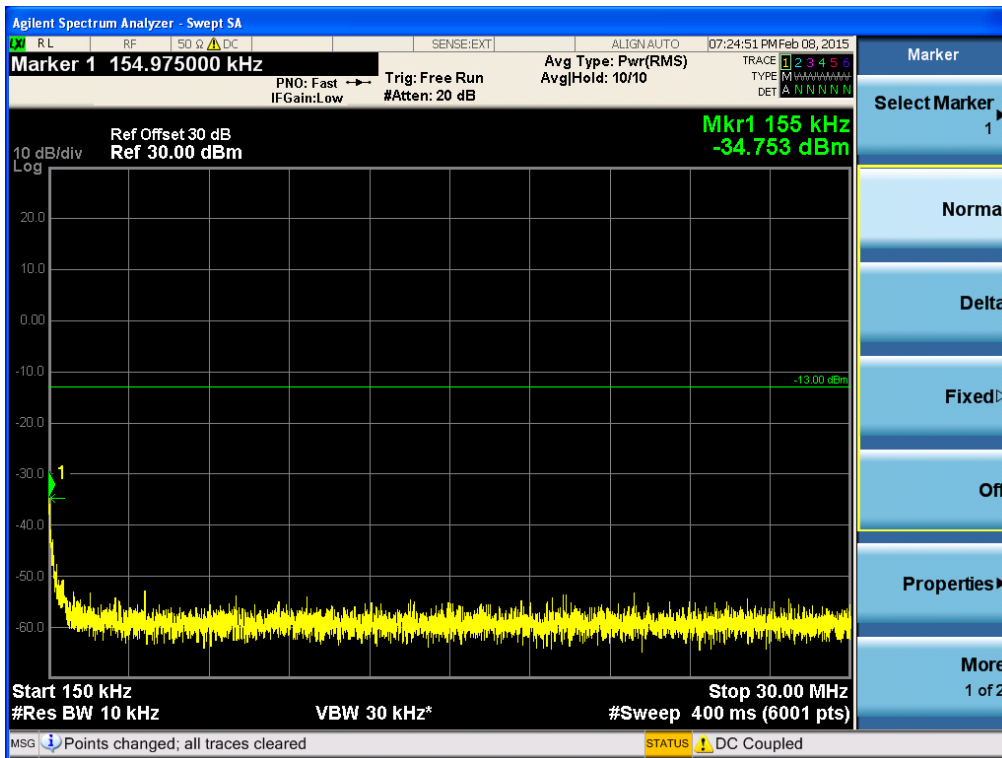
**[IDEN Middle]**



[IDEN High]

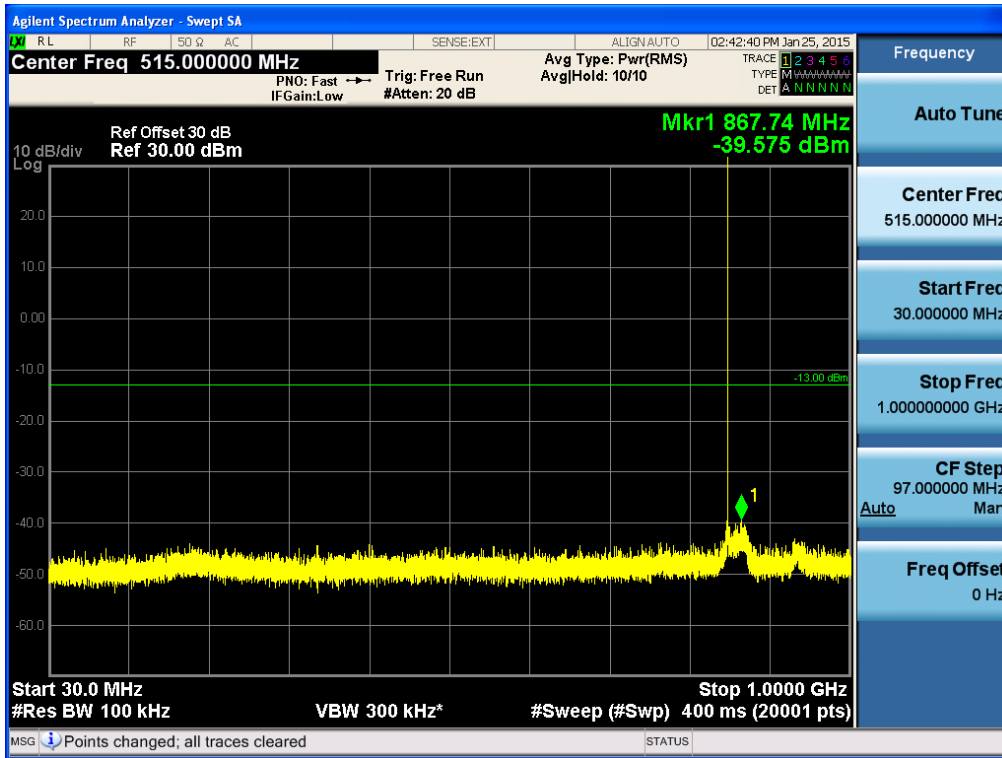


[LTE 5 MHz]

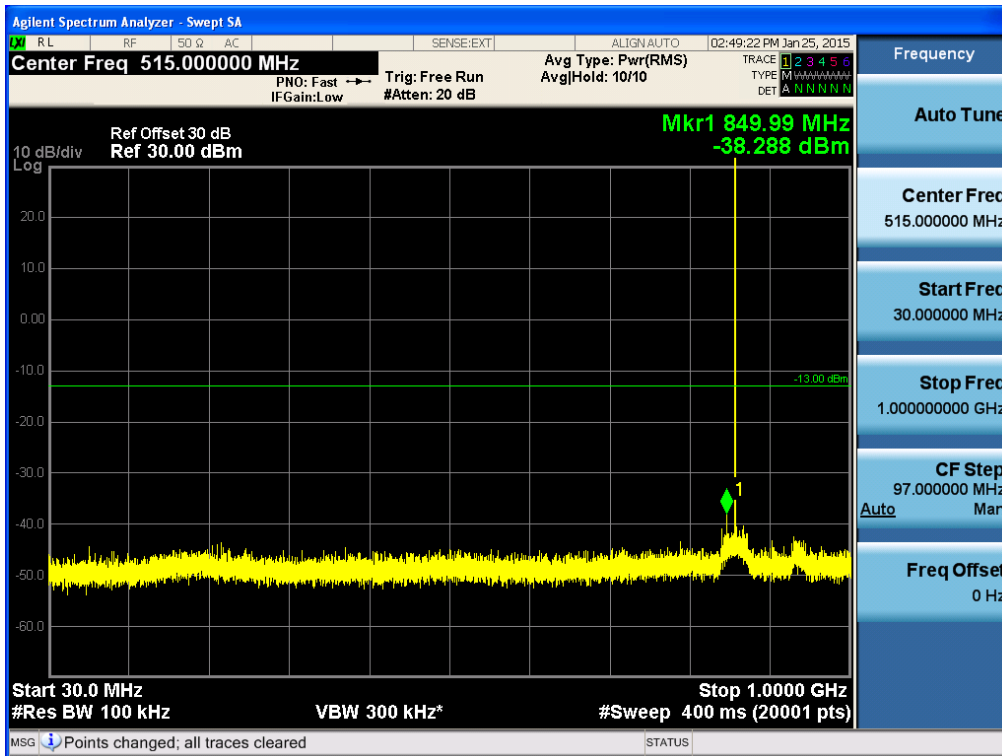


**Conducted Spurious Emissions (30 MHz – 1 GHz)**

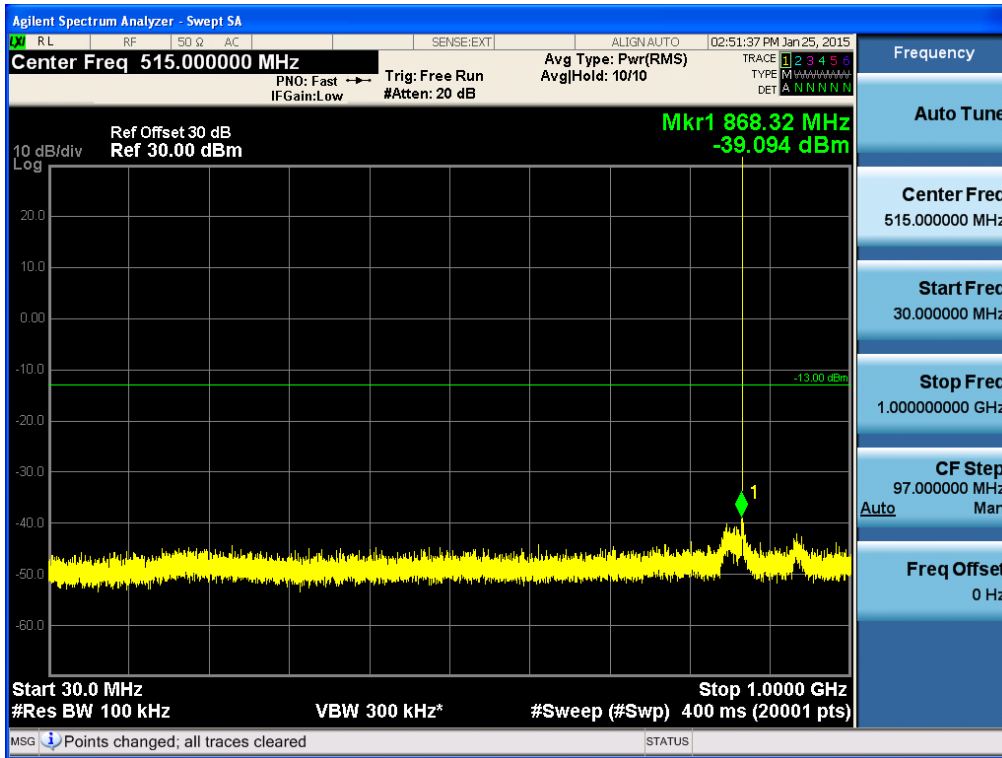
**[IDEN Low]**



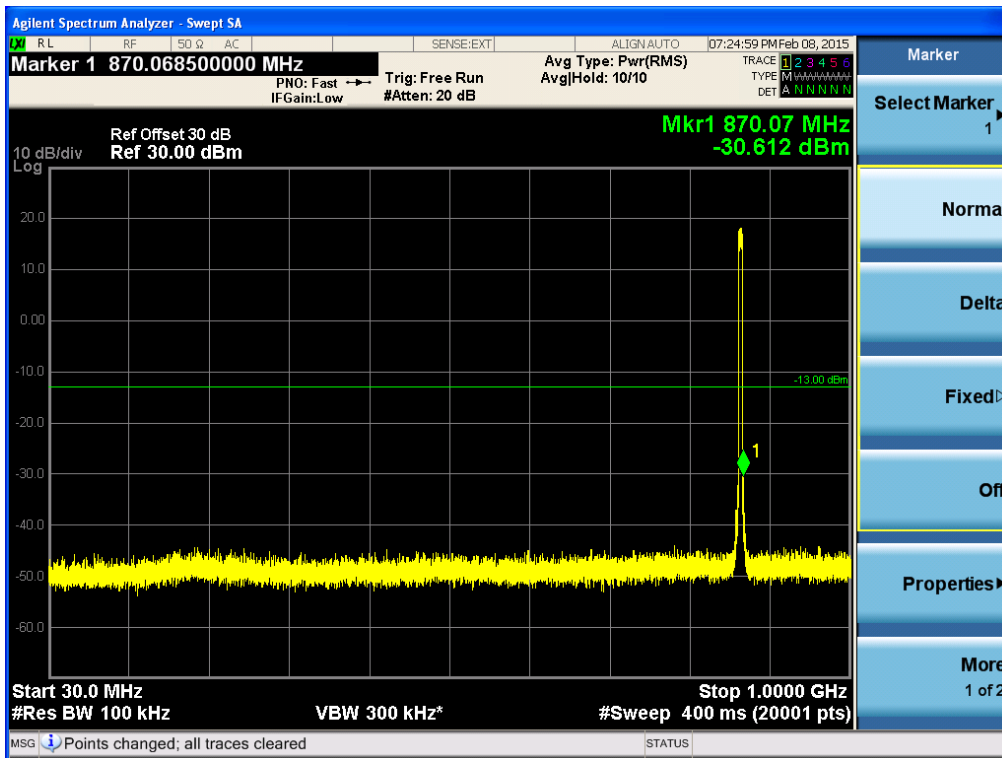
**[IDEN Middle]**



[IDEN High]



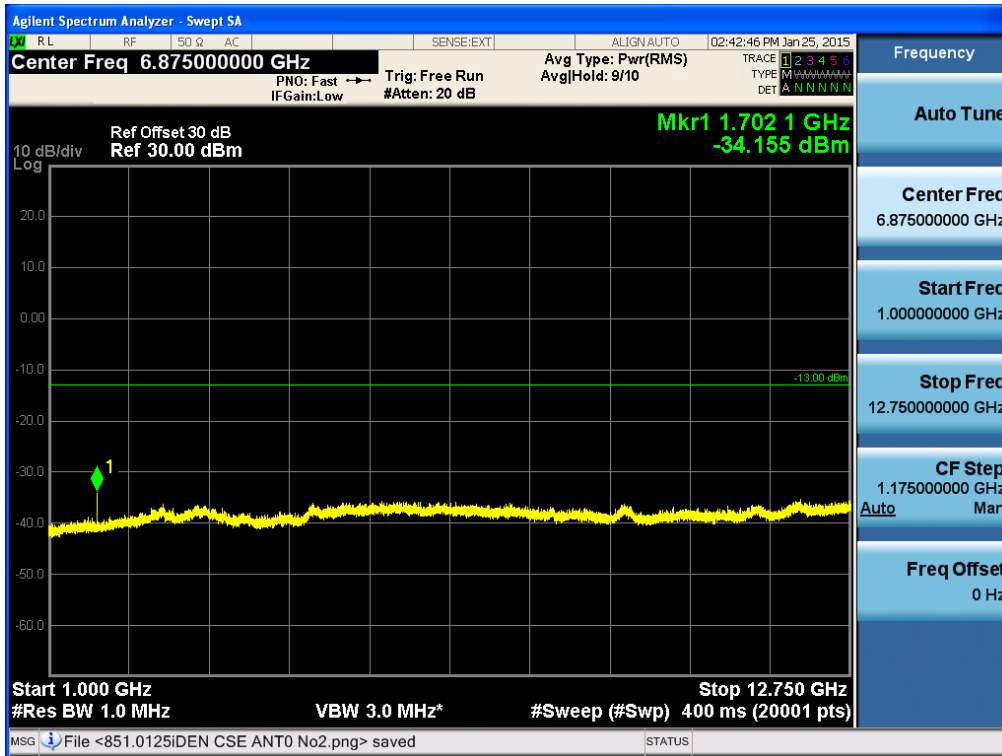
[LTE 5 MHz]



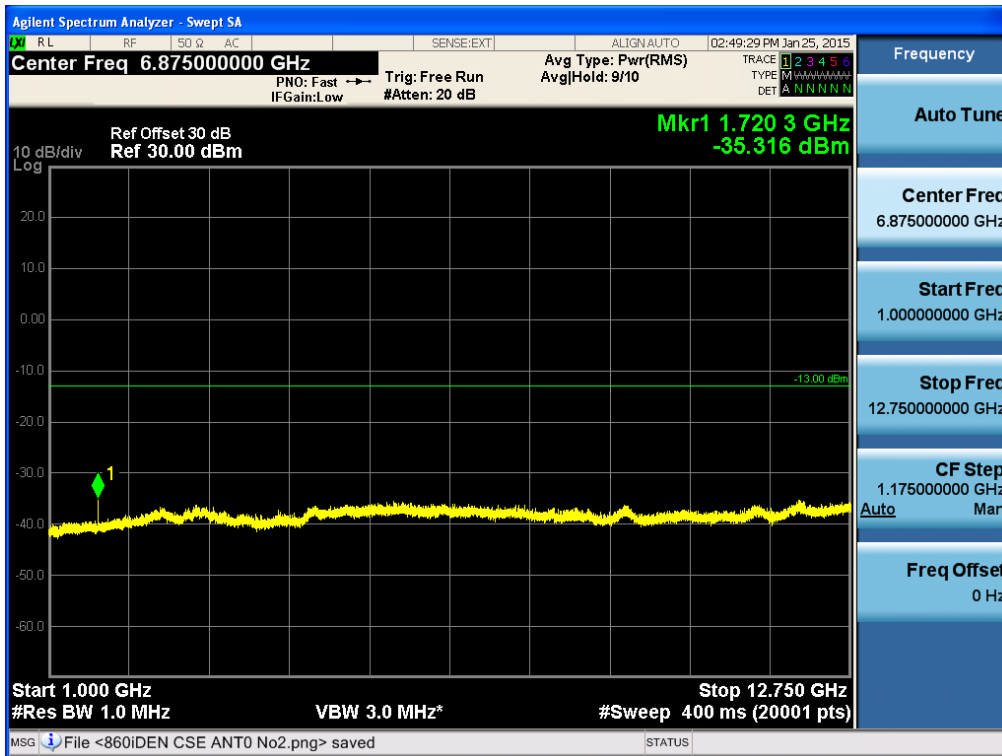


**Conducted Spurious Emissions (1 GHz –12.75 GHz)**

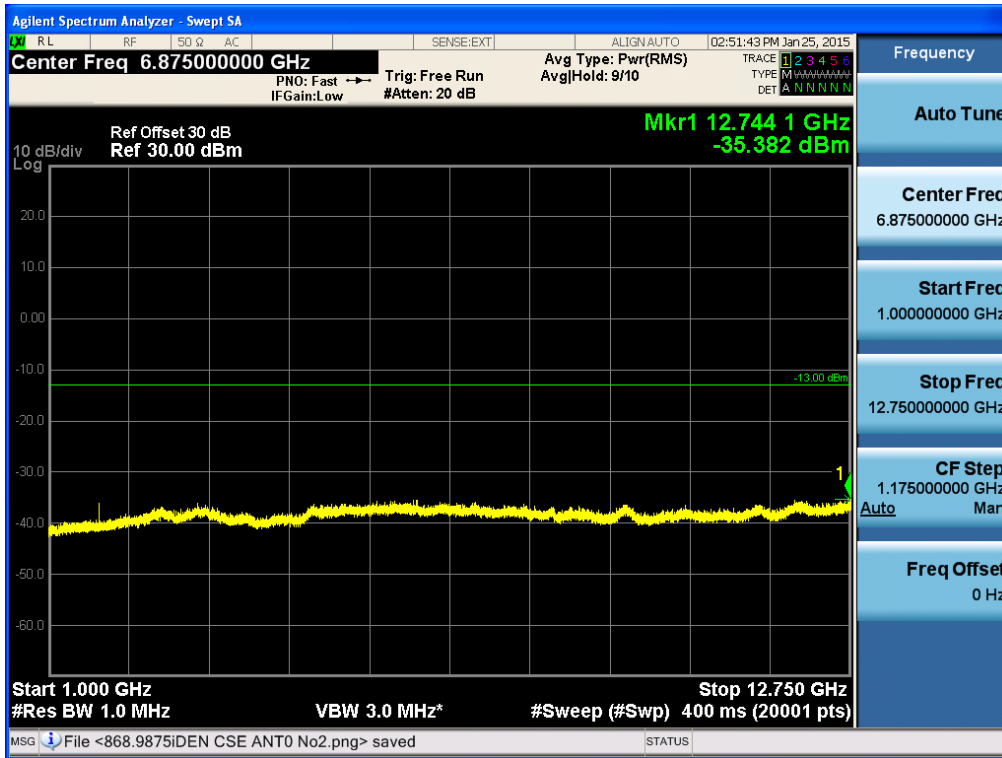
**[IDEN Low]**



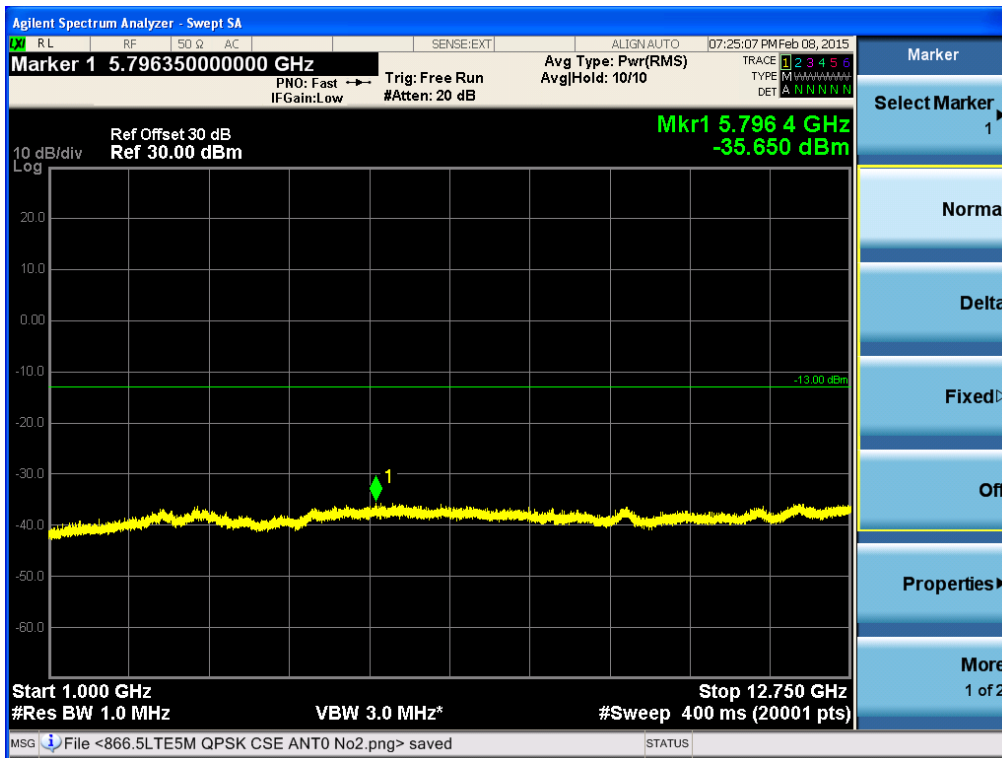
**[IDEN Middle]**



[IDEN High]



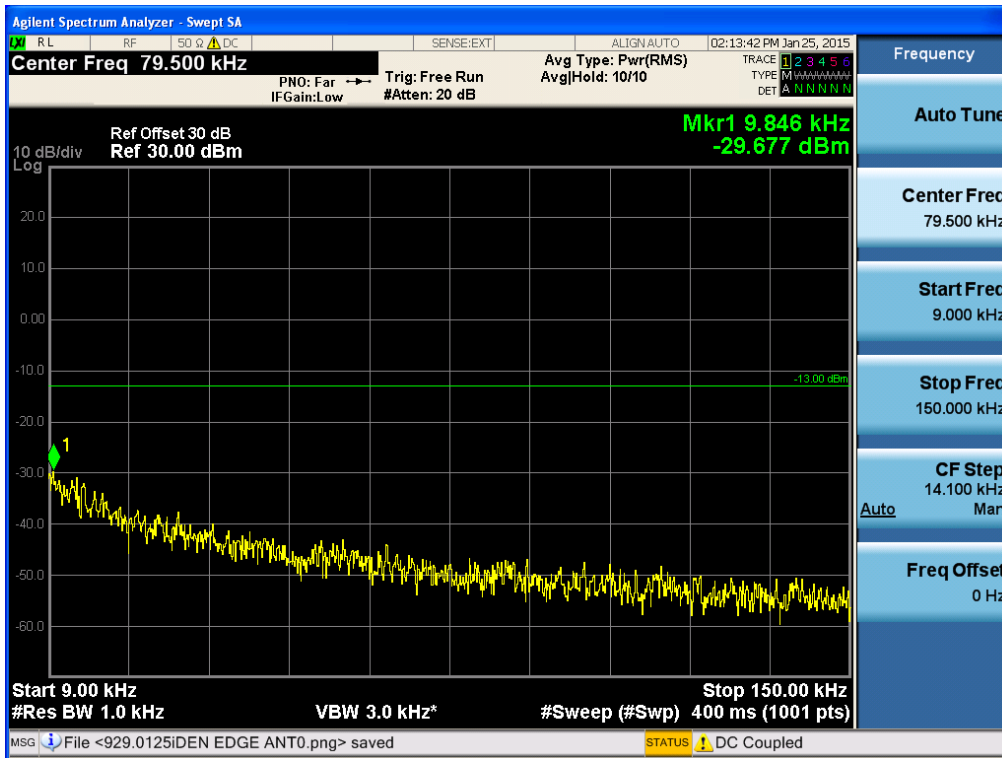
[LTE 5 MHz]



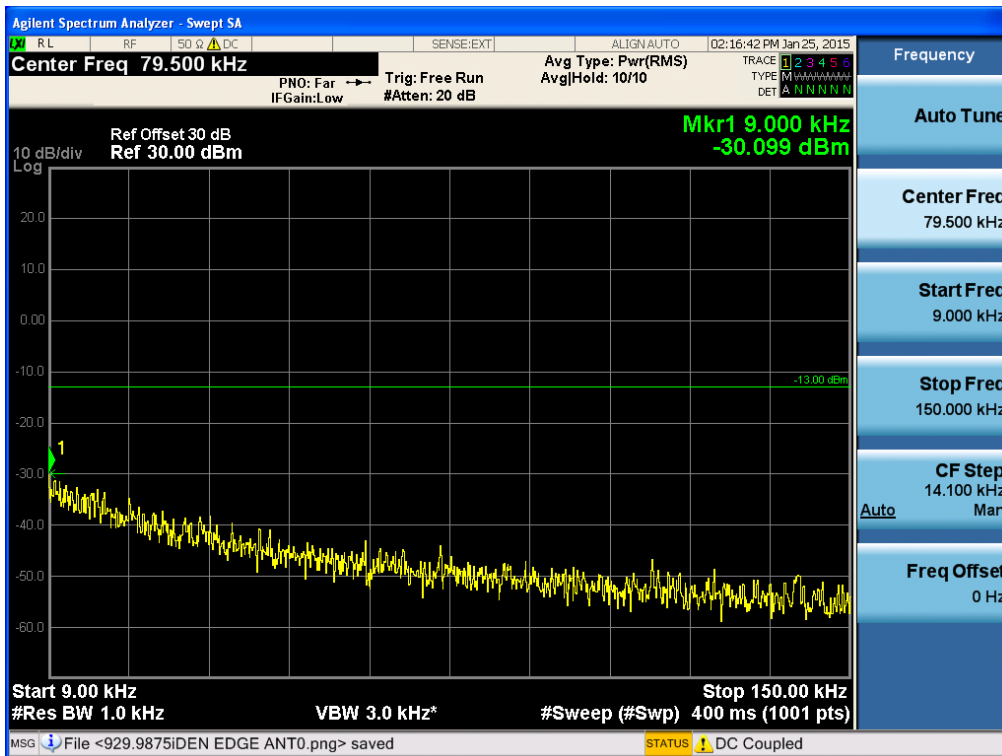
**iDEN 900**

**Conducted Spurious Emissions (9 kHz – 150 kHz)**

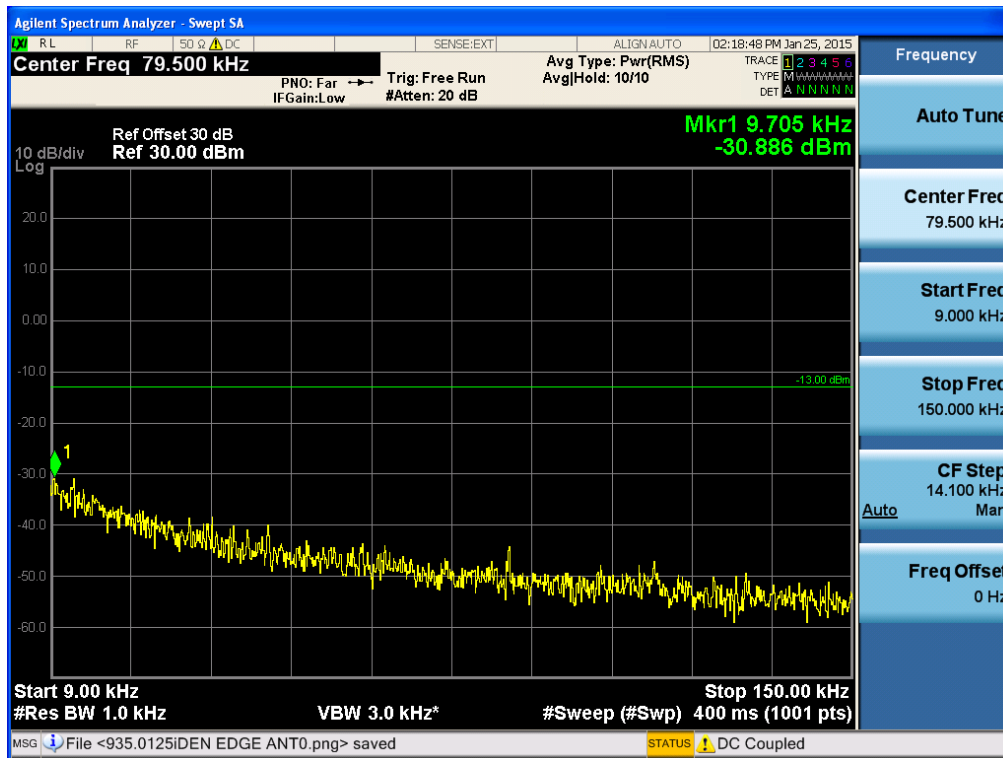
**[iDEN 929 MHz ~ 930 MHz Low]**



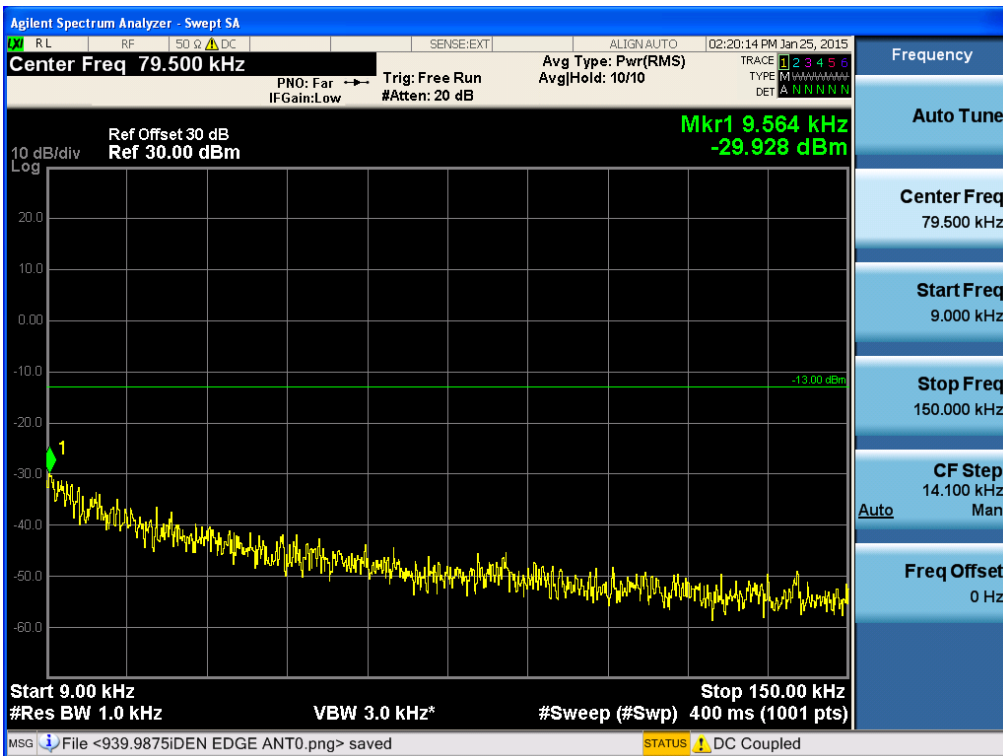
**[iDEN 929 MHz ~ 930 MHz High]**



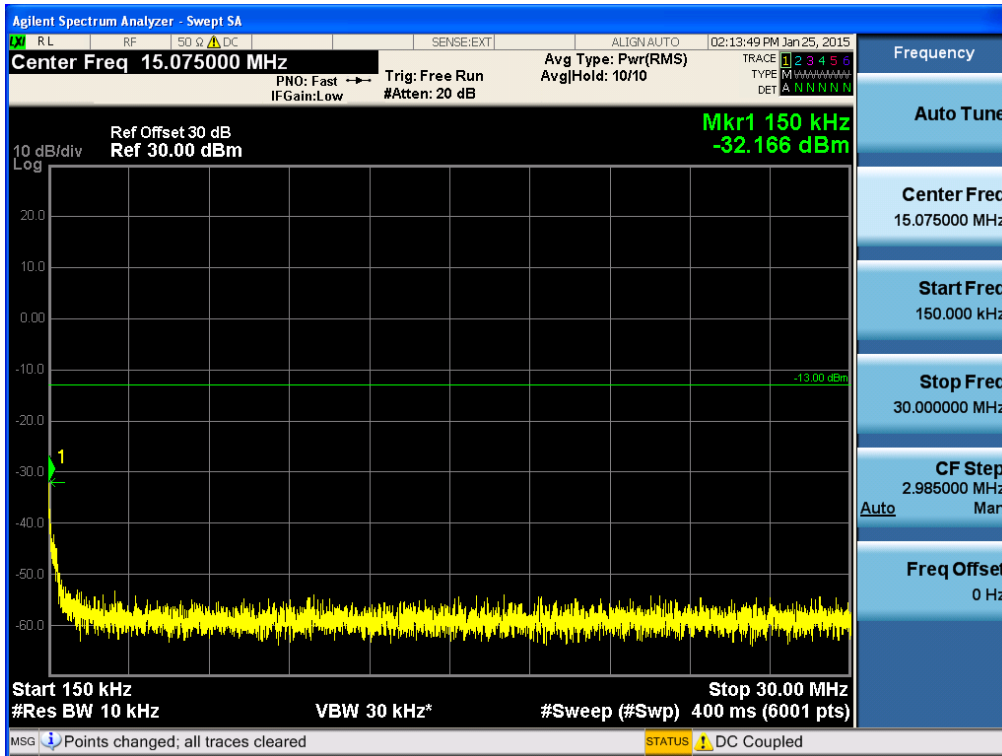
[IDEN 935 MHz ~ 940 MHz Low]



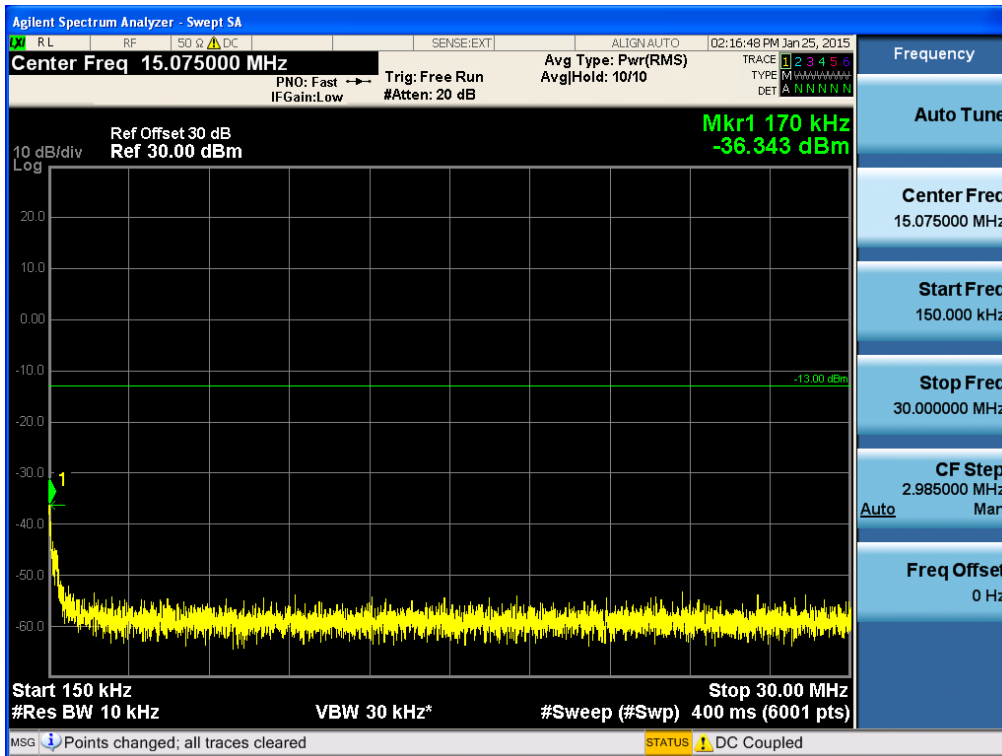
[IDEN 935 MHz ~ 940 MHz High]



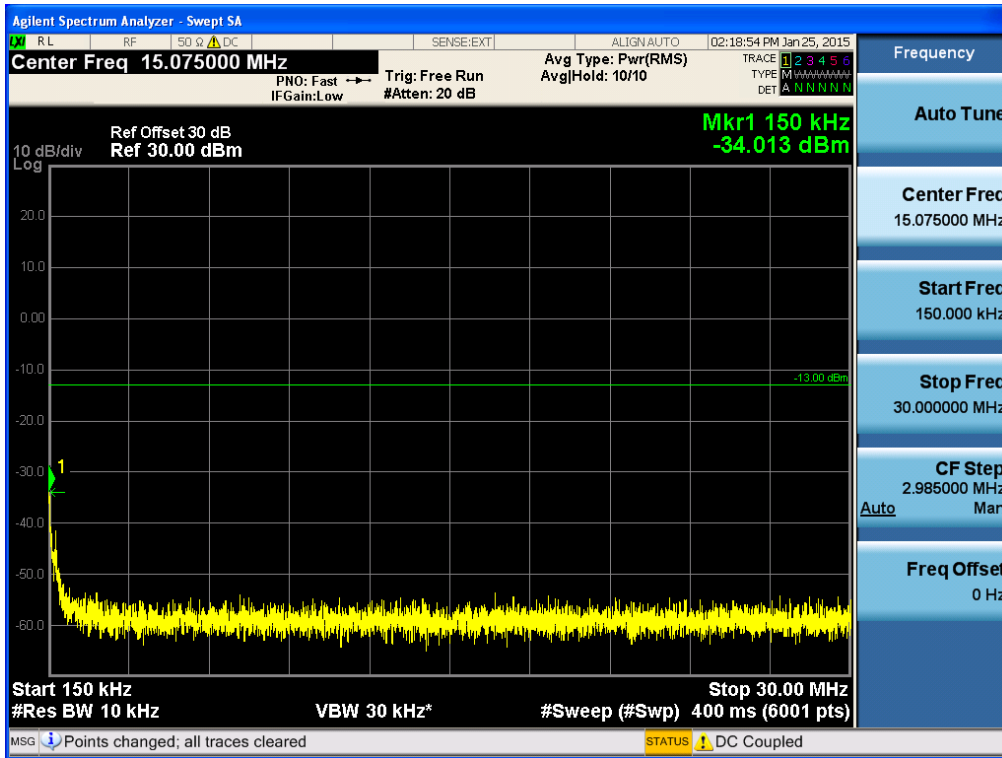
**Conducted Spurious Emissions (150 kHz – 30 MHz)**  
**[IDEN 929 MHz ~ 930 MHz Low]**



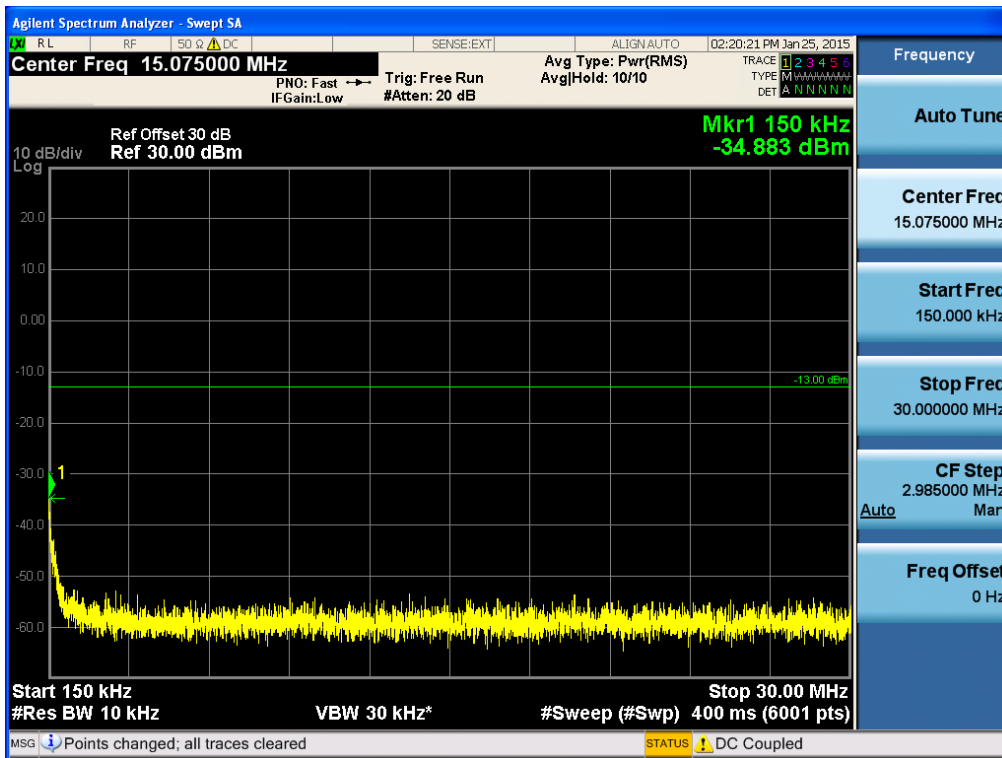
**[IDEN 929 MHz ~ 930 MHz High]**



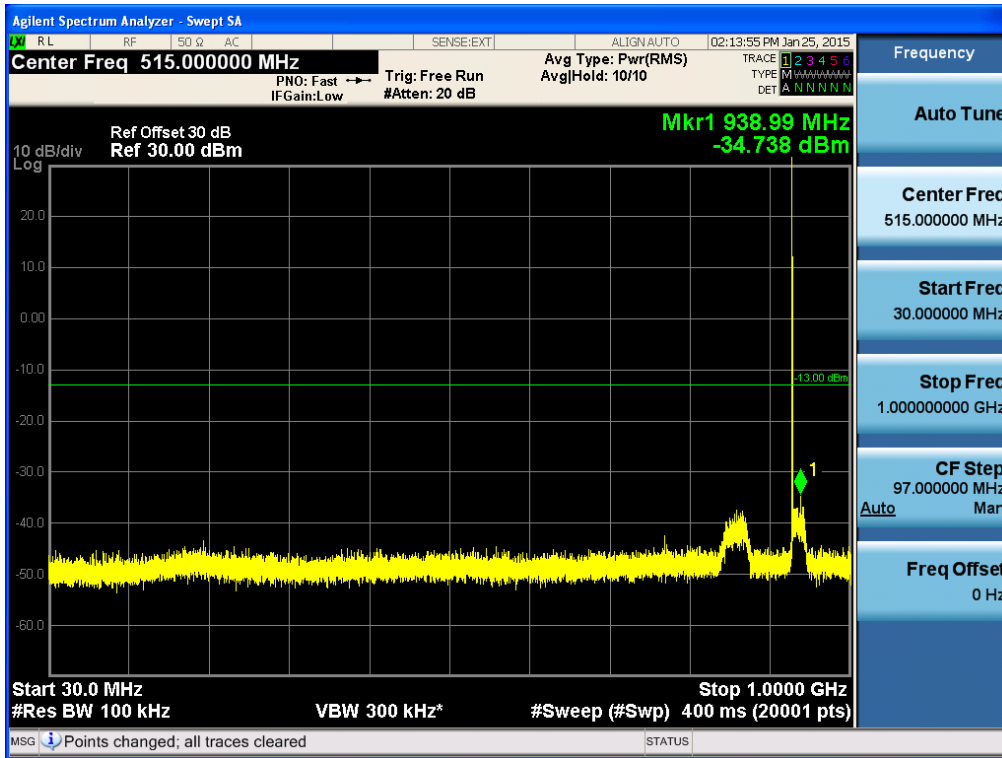
[IDEN 935 MHz ~ 940 MHz Low]



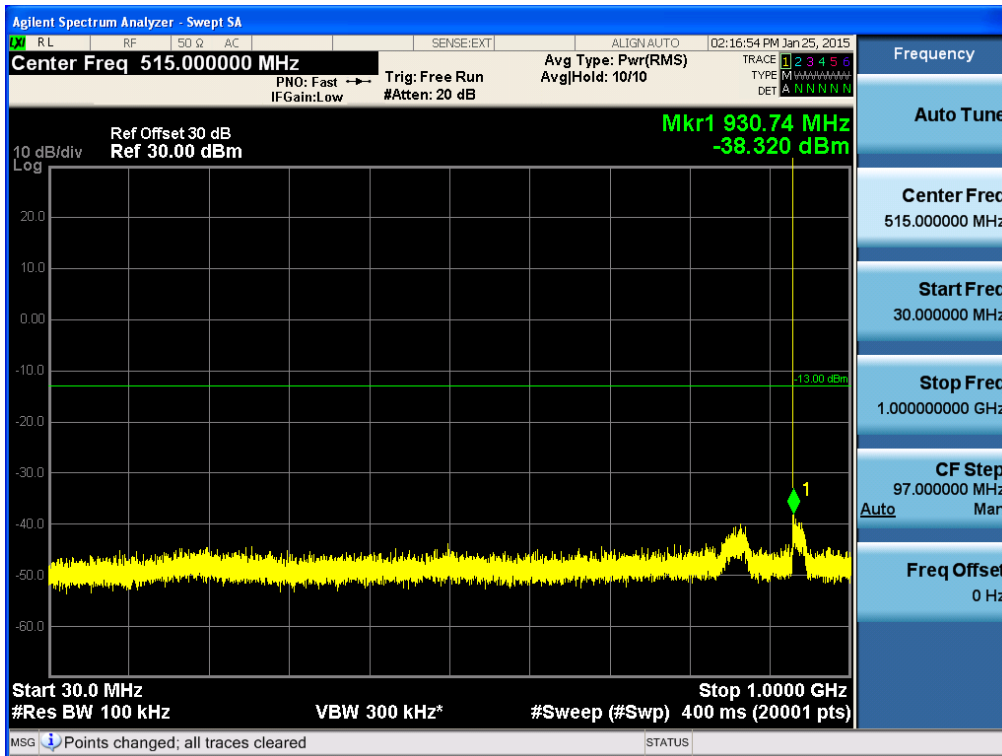
[IDEN 935 MHz ~ 940 MHz High]



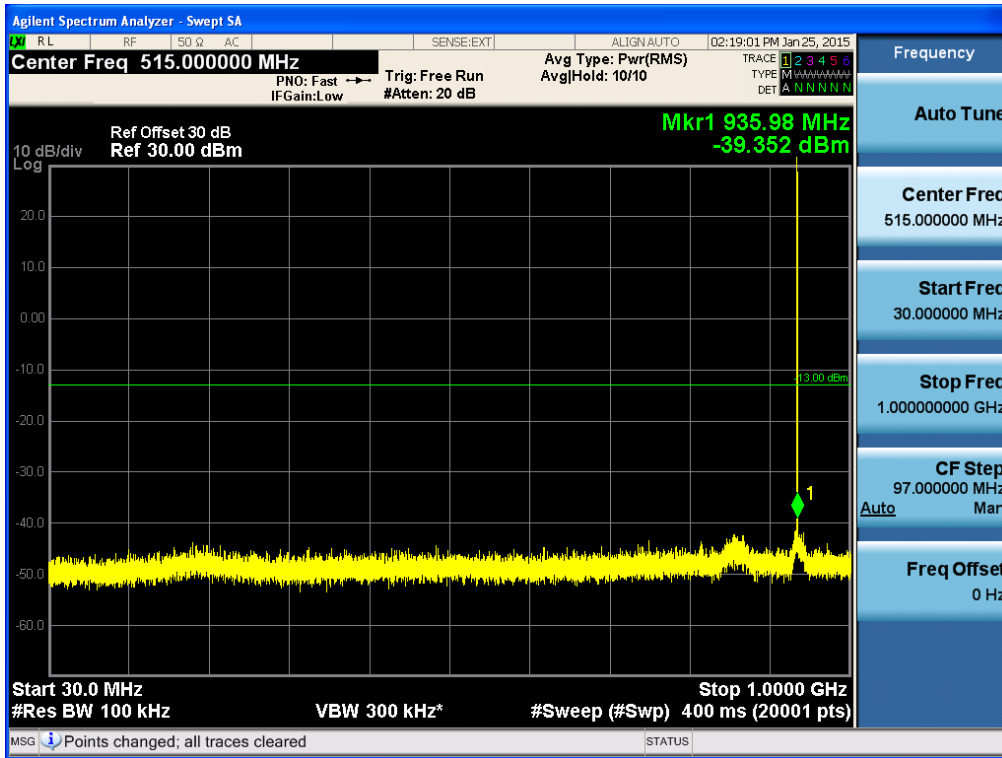
**Conducted Spurious Emissions (30 MHz – 1 GHz)**  
**[IDEN 929 MHz ~ 930 MHz Low]**



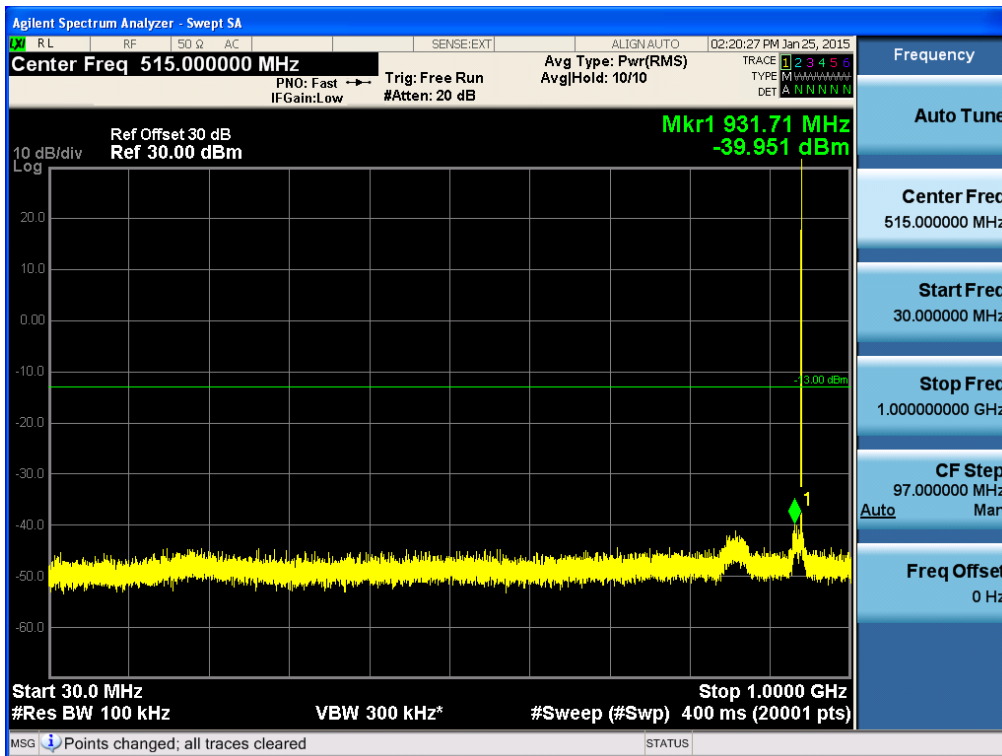
**[IDEN 929 MHz ~ 930 MHz High]**



[IDEN 935 MHz ~ 940 MHz Low]

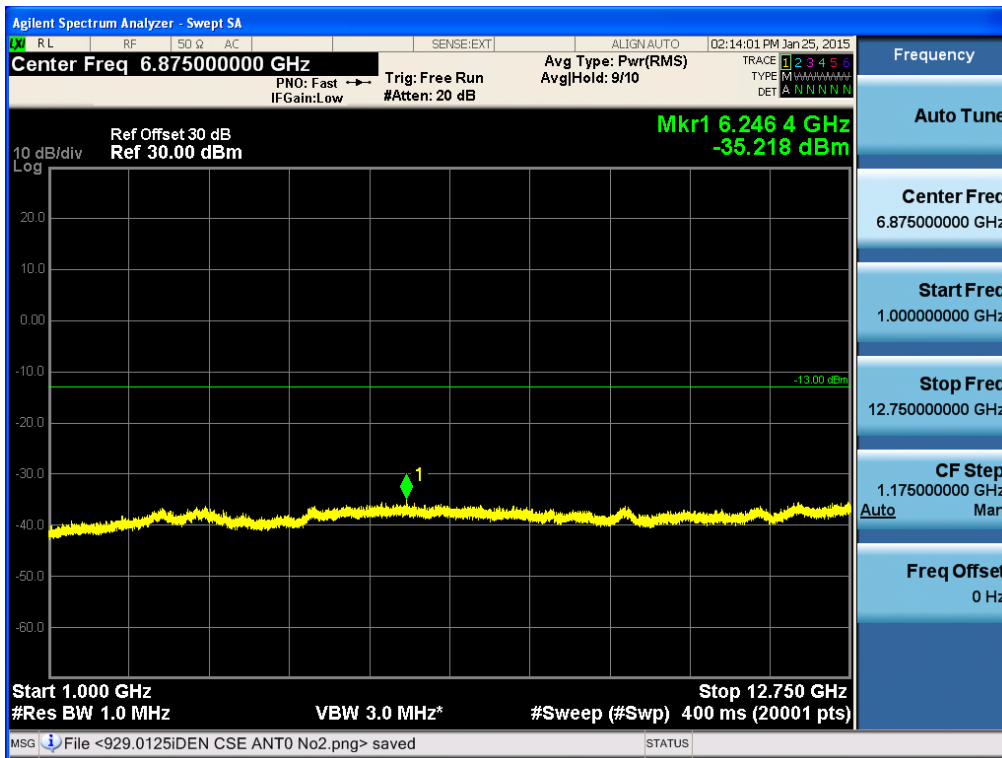


[IDEN 935 MHz ~ 940 MHz High]





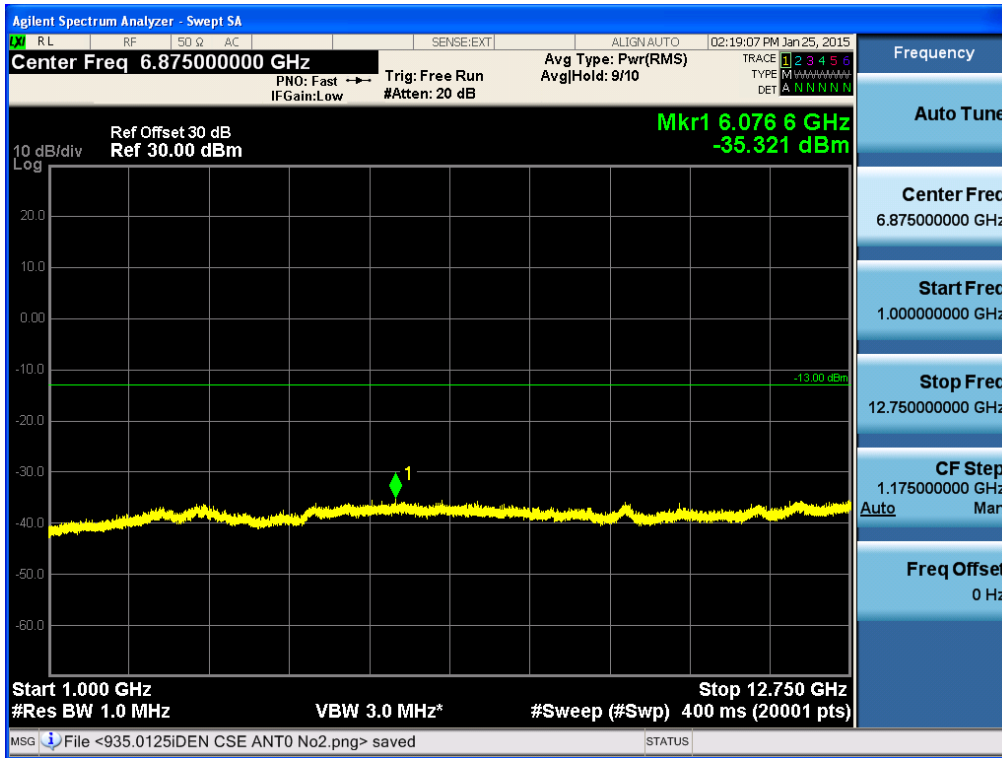
**Conducted Spurious Emissions (1 GHz –12.75 GHz)**  
**[IDEN 929 MHz ~ 930 MHz Low]**



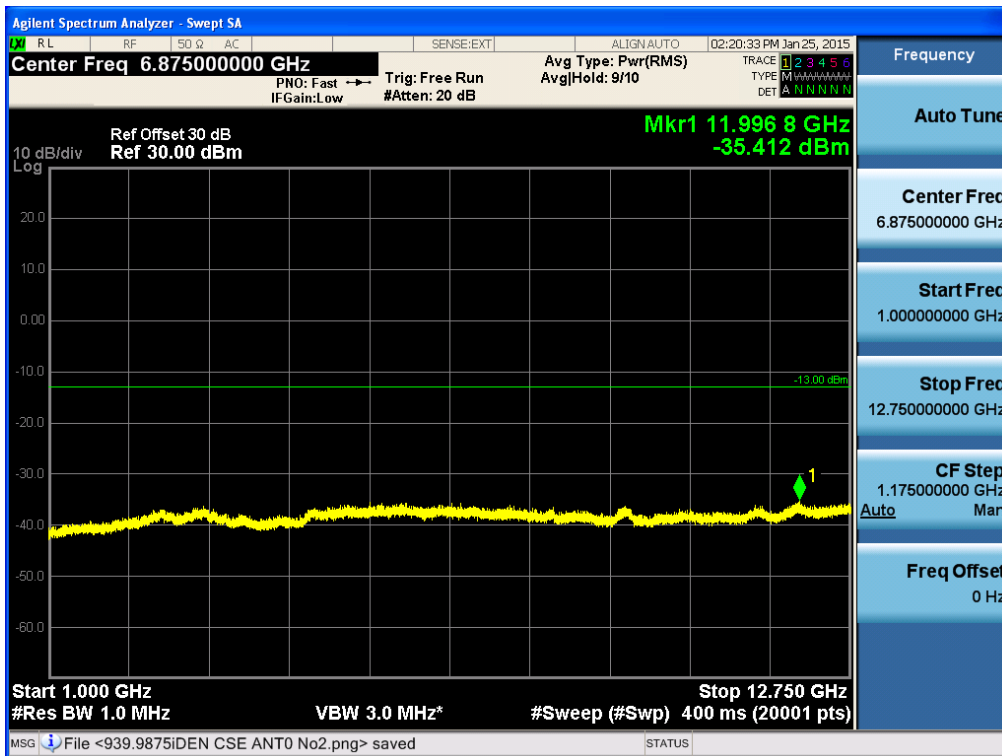
**[IDEN 929 MHz ~ 930 MHz High]**



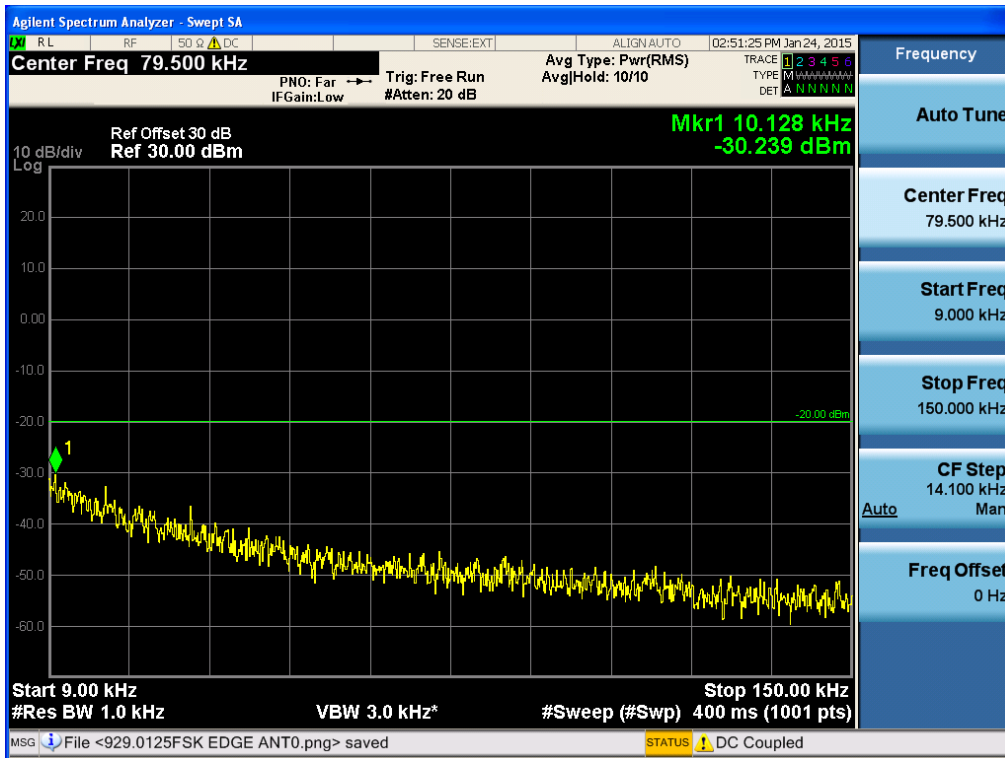
[IDEN 935 MHz ~ 940 MHz Low]



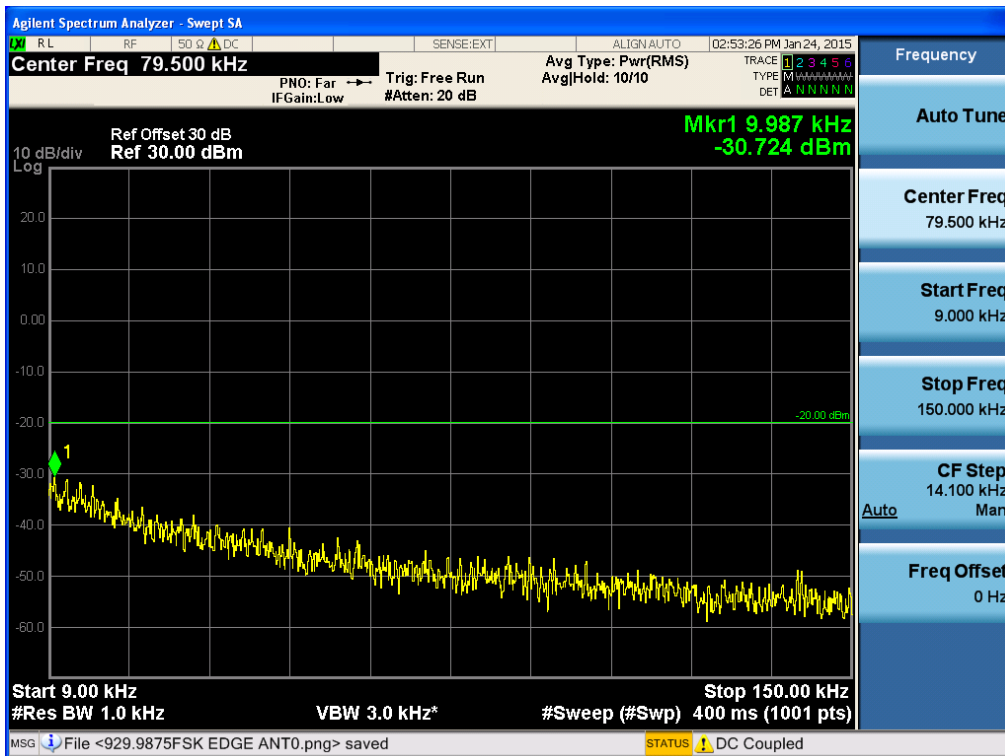
[IDEN 935 MHz ~ 940 MHz High]



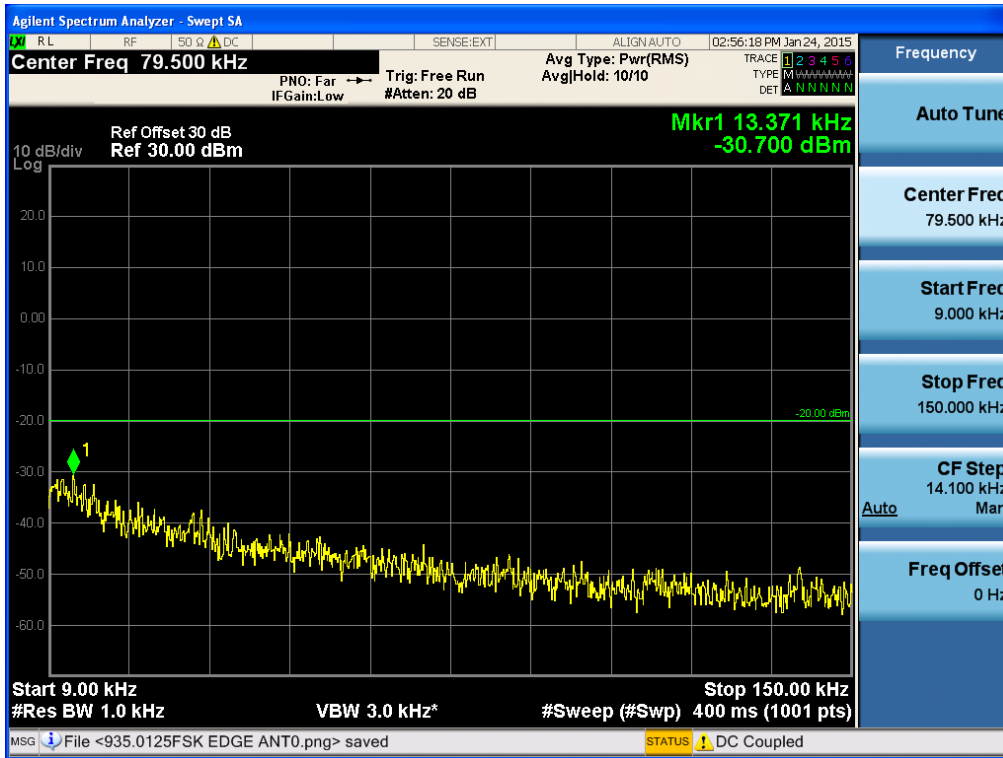
**FSK**  
**Conducted Spurious Emissions (9 kHz – 150 kHz)**  
**[FSK 929 MHz ~ 930 MHz Low]**



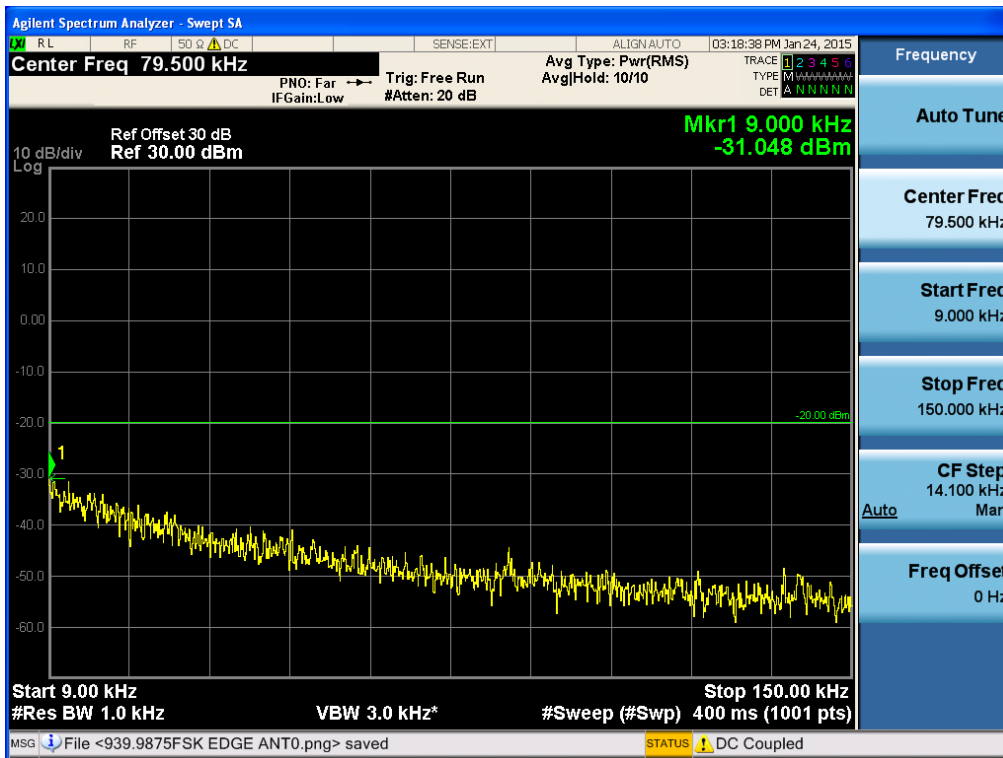
**[FSK 929 MHz ~ 930 MHz High]**



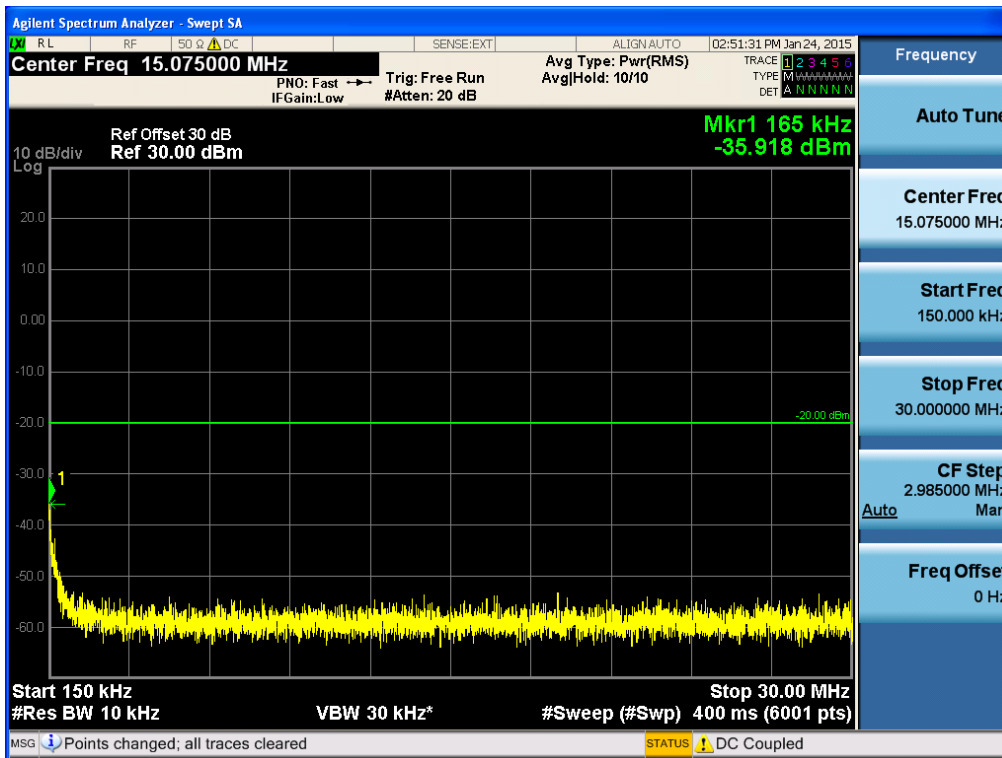
**[FSK 935 MHz ~ 940 MHz Low]**



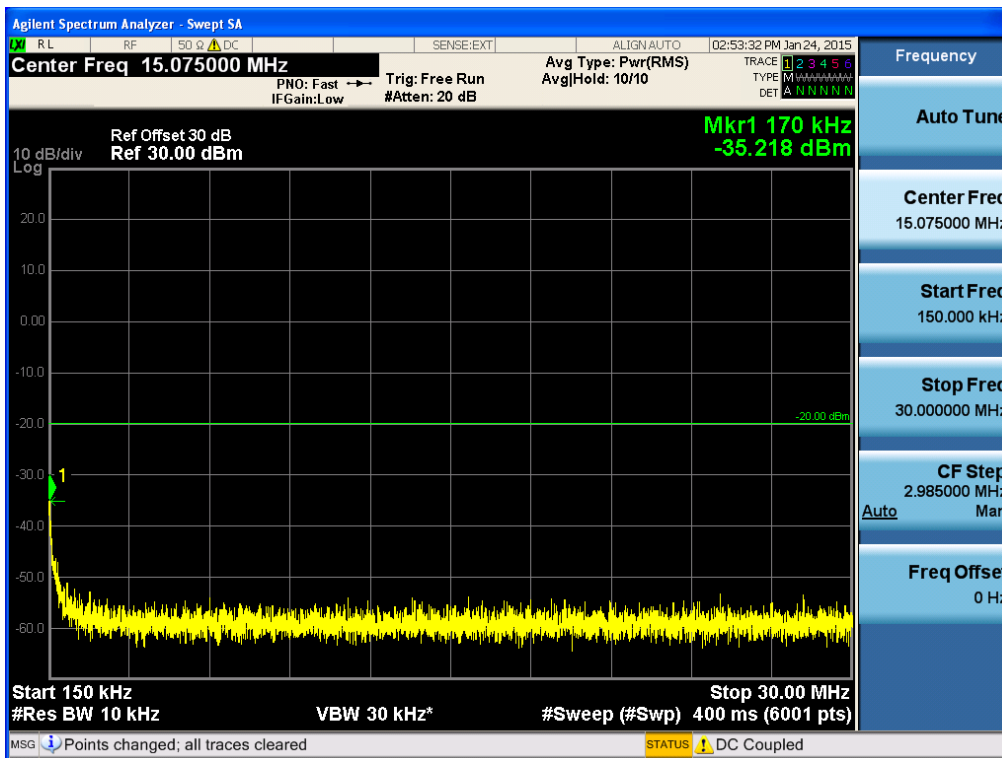
**[FSK 935 MHz ~ 940 MHz High]**



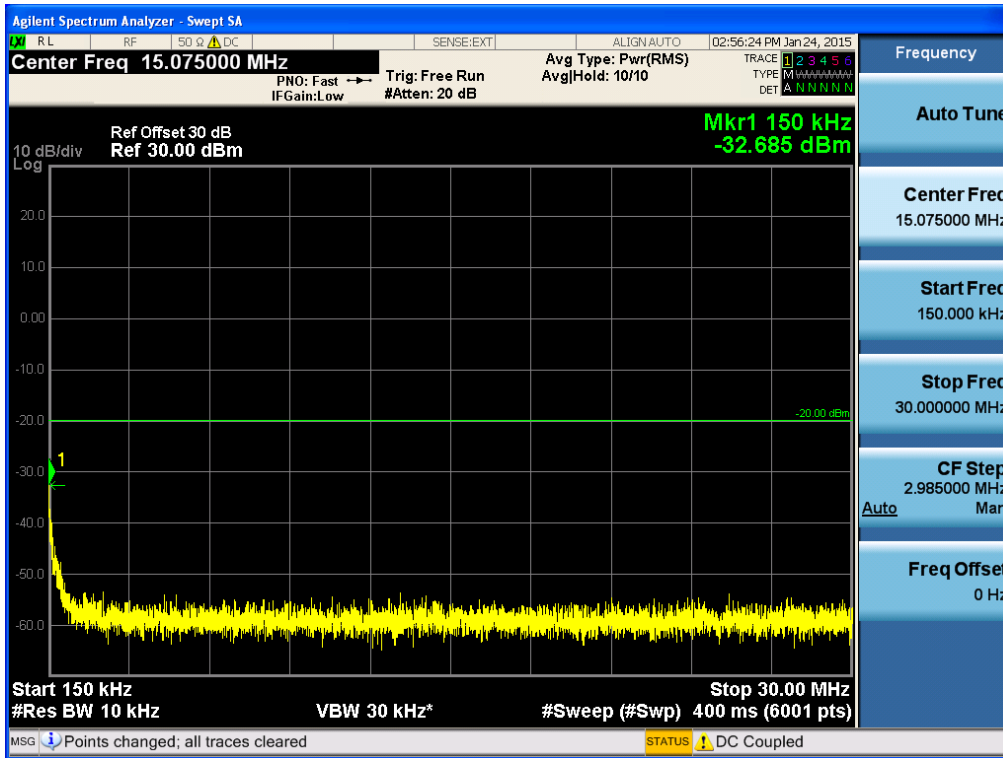
**Conducted Spurious Emissions (150 kHz – 30 MHz)**  
**[FSK 929 MHz ~ 930 MHz Low]**



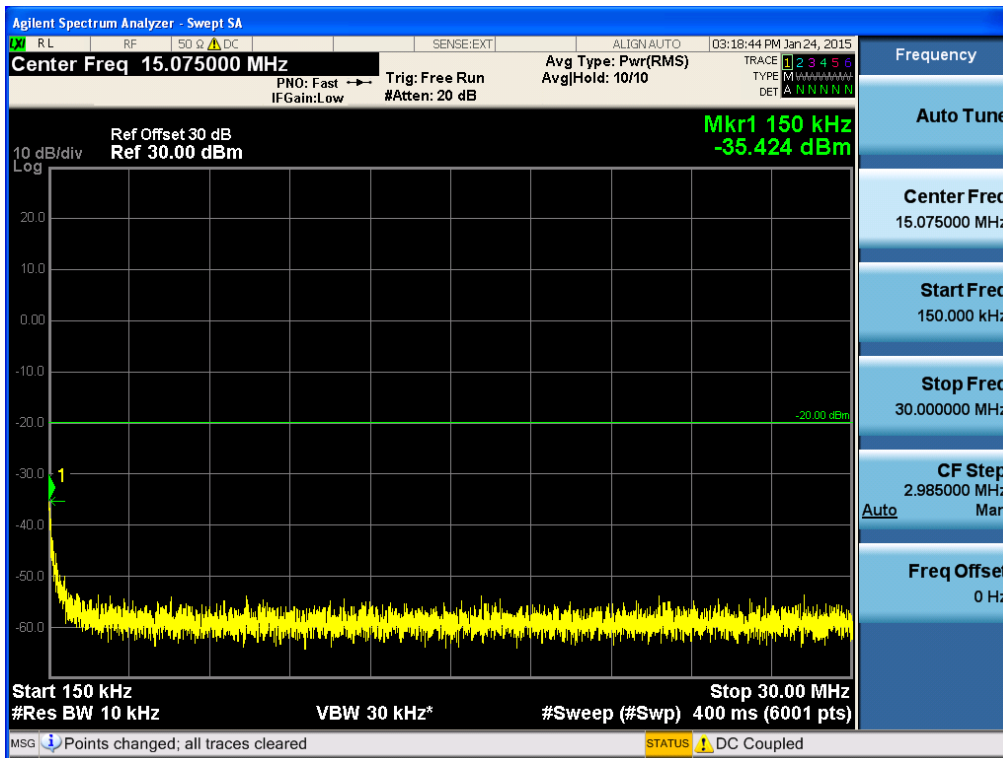
**[FSK 929 MHz ~ 930 MHz High]**



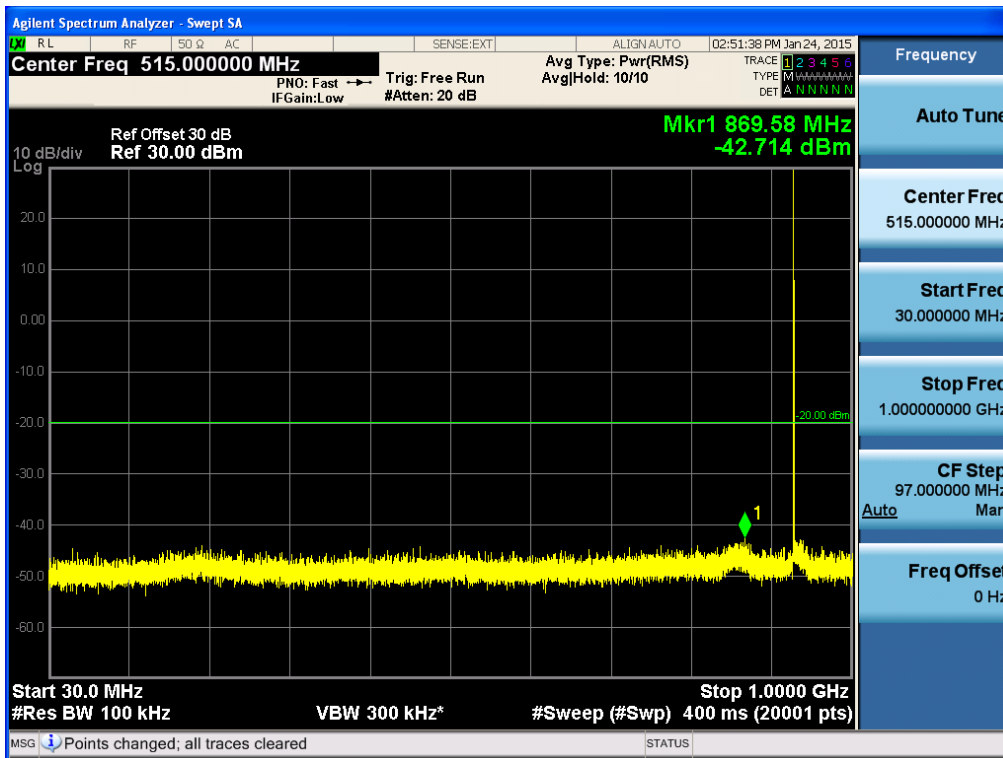
[FSK 935 MHz ~ 940 MHz Low]



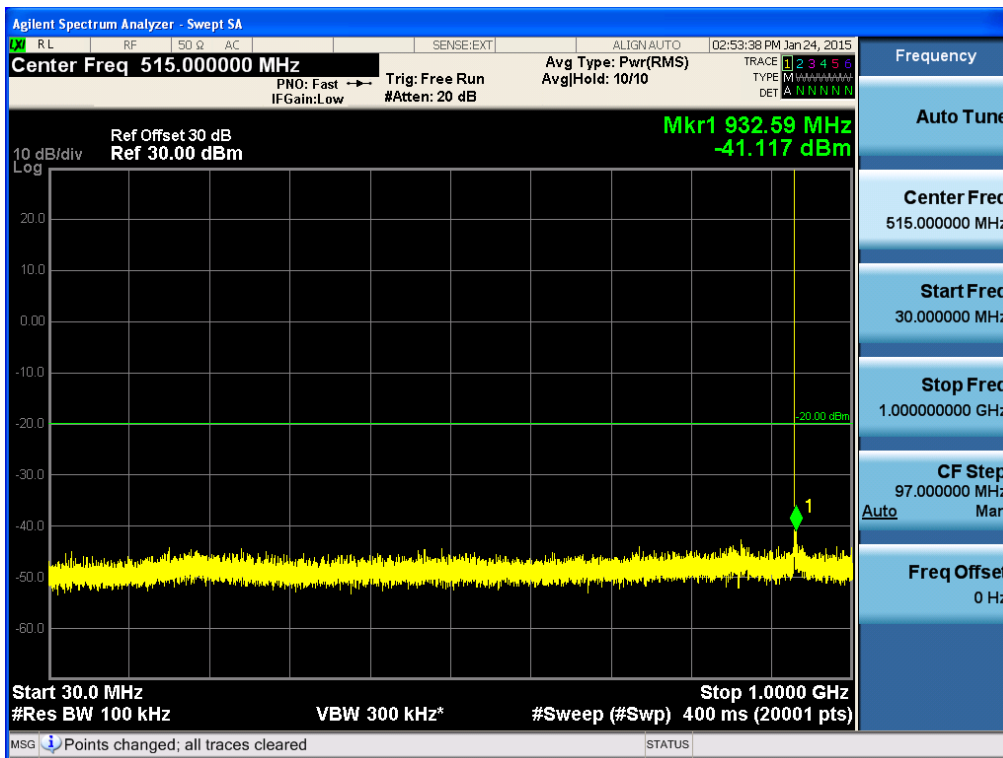
[FSK 935 MHz ~ 940 MHz High]



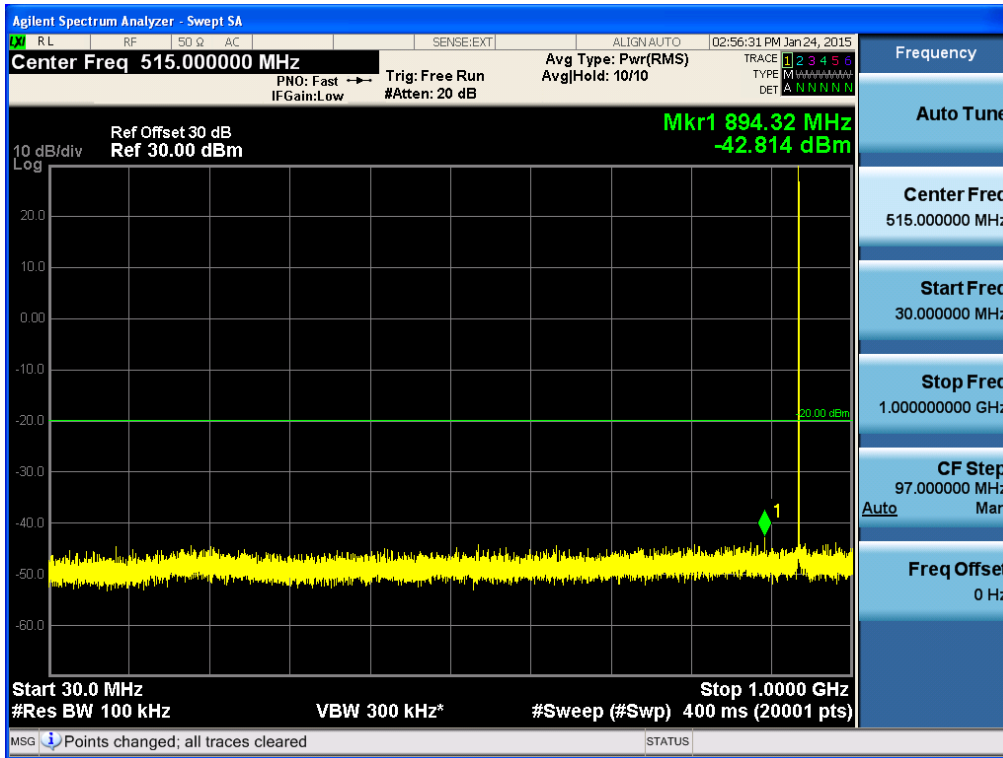
**Conducted Spurious Emissions (30 MHz – 1 GHz)**  
**[FSK 929 MHz ~ 930 MHz Low]**



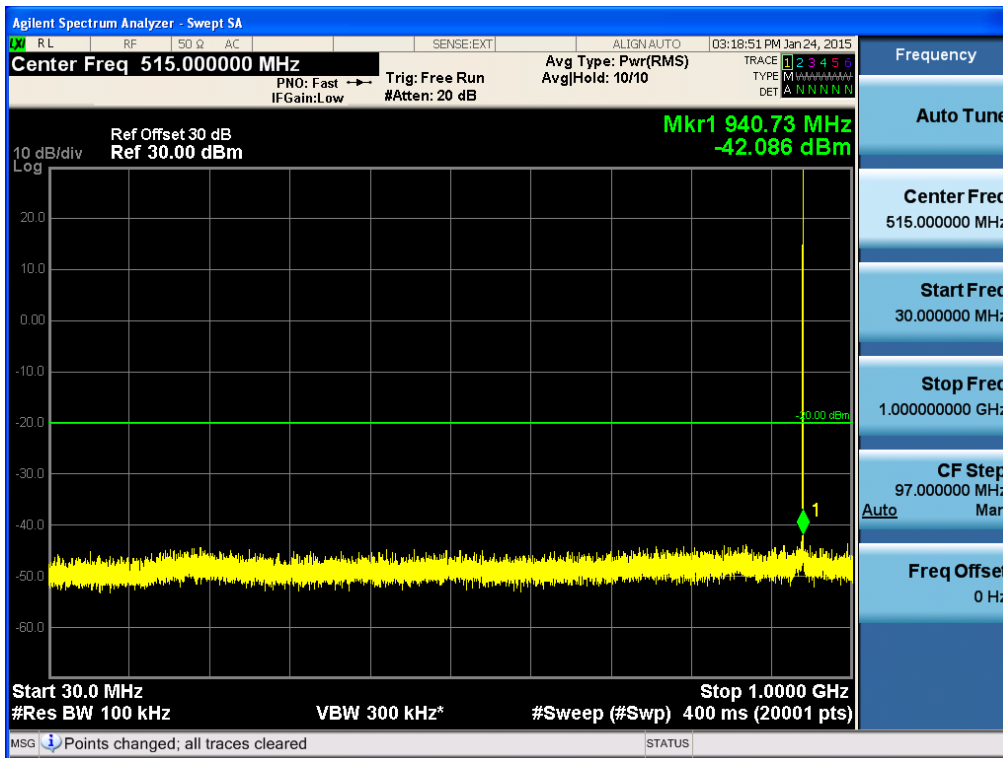
**[FSK 929 MHz ~ 930 MHz High]**



**[FSK 935 MHz ~ 940 MHz Low]**

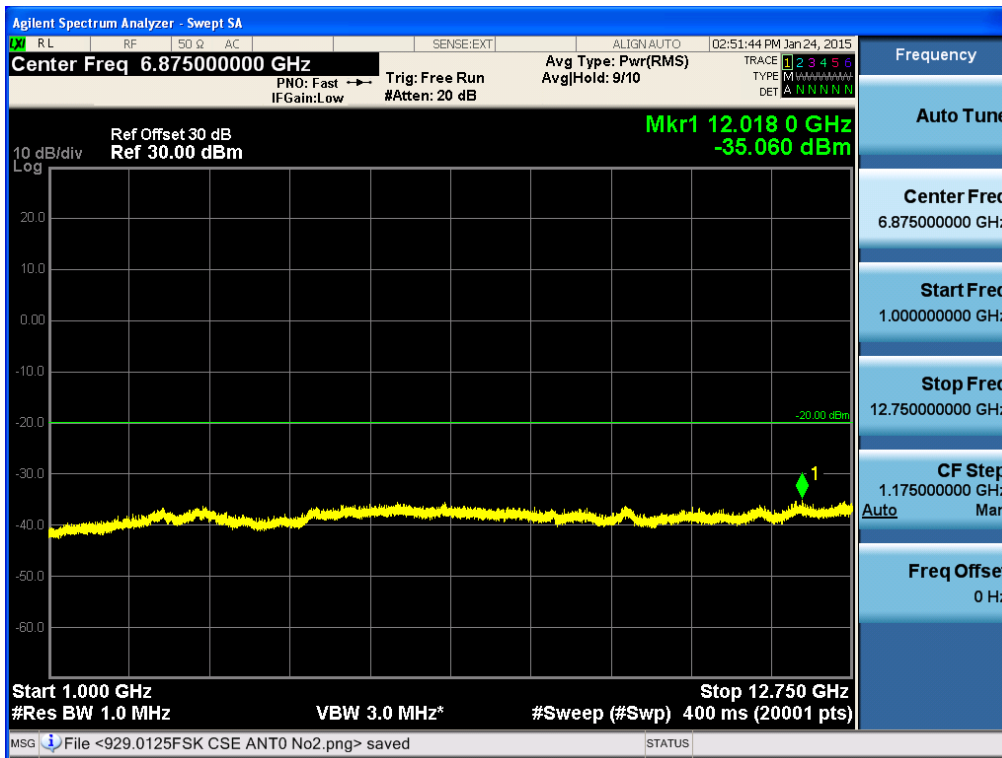


**[FSK 935 MHz ~ 940 MHz High]**

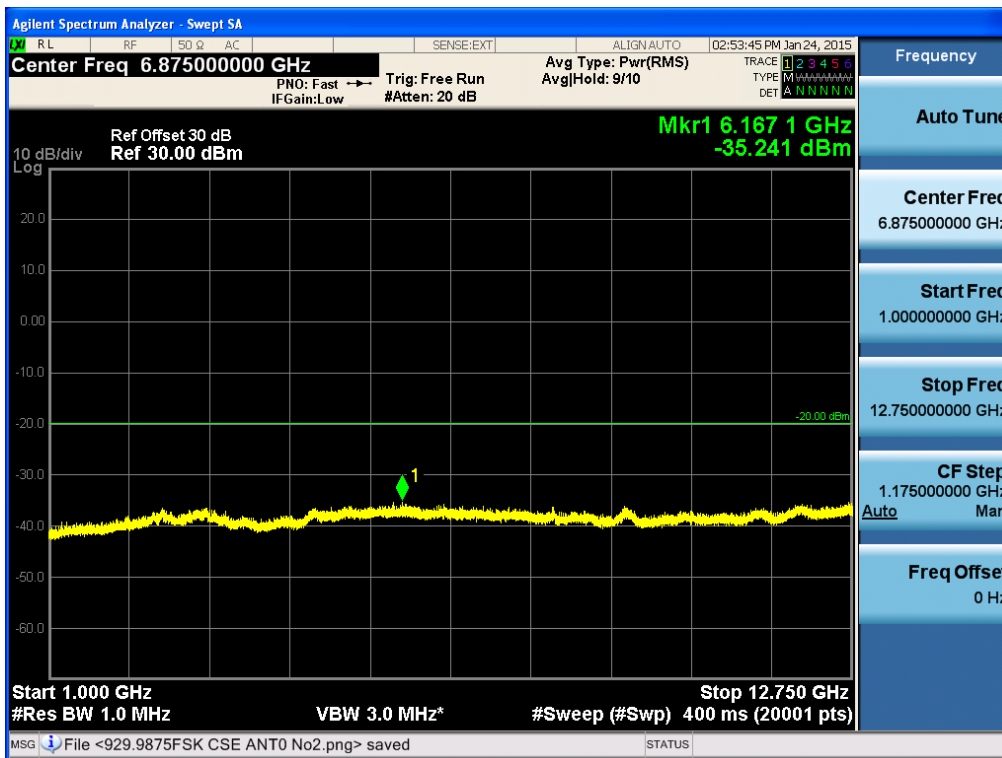




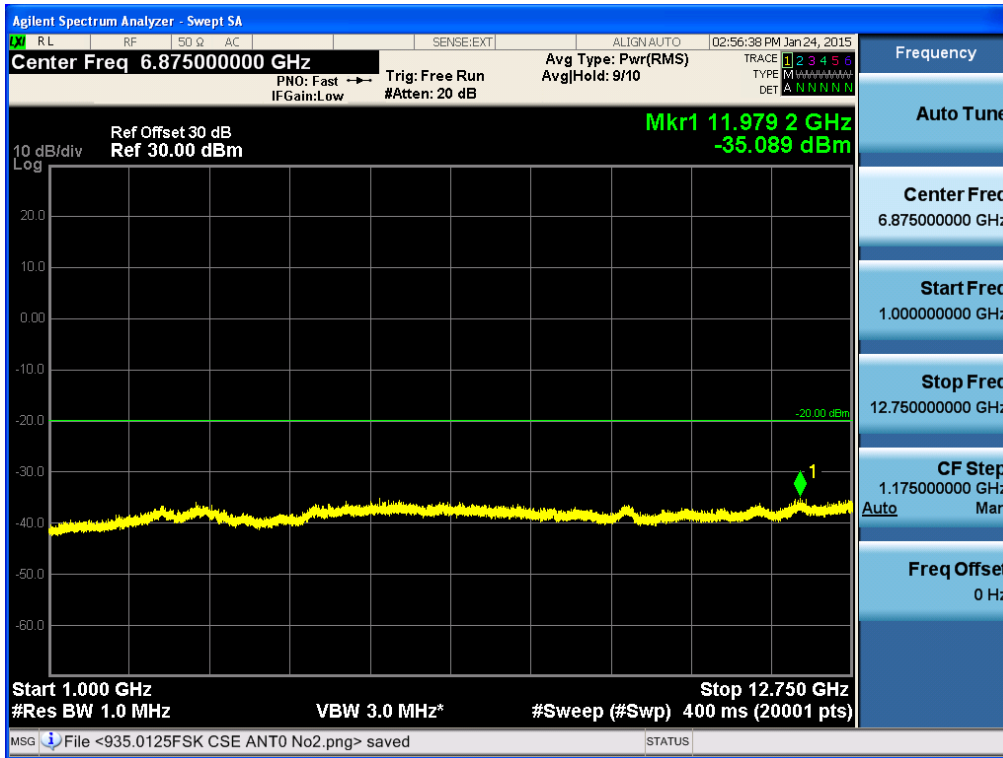
**Conducted Spurious Emissions (1 GHz –12.75 GHz)**  
**[FSK 929 MHz ~ 930 MHz Low]**



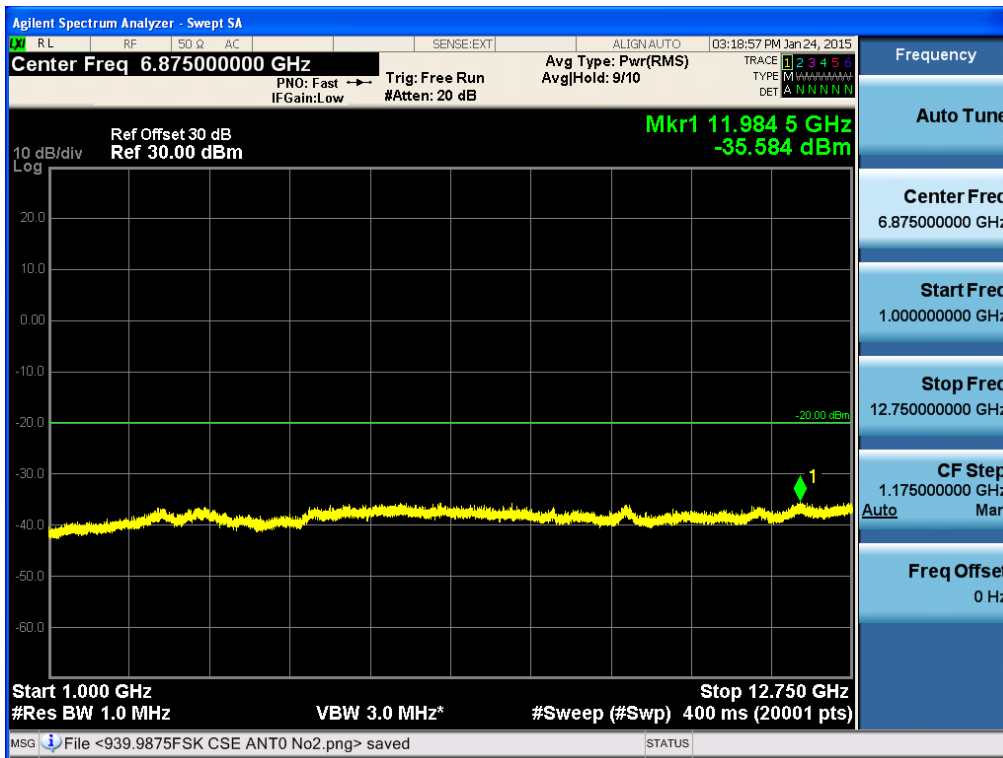
**[FSK 929 MHz ~ 930 MHz High]**



[FSK 935 MHz ~ 940 MHz Low]

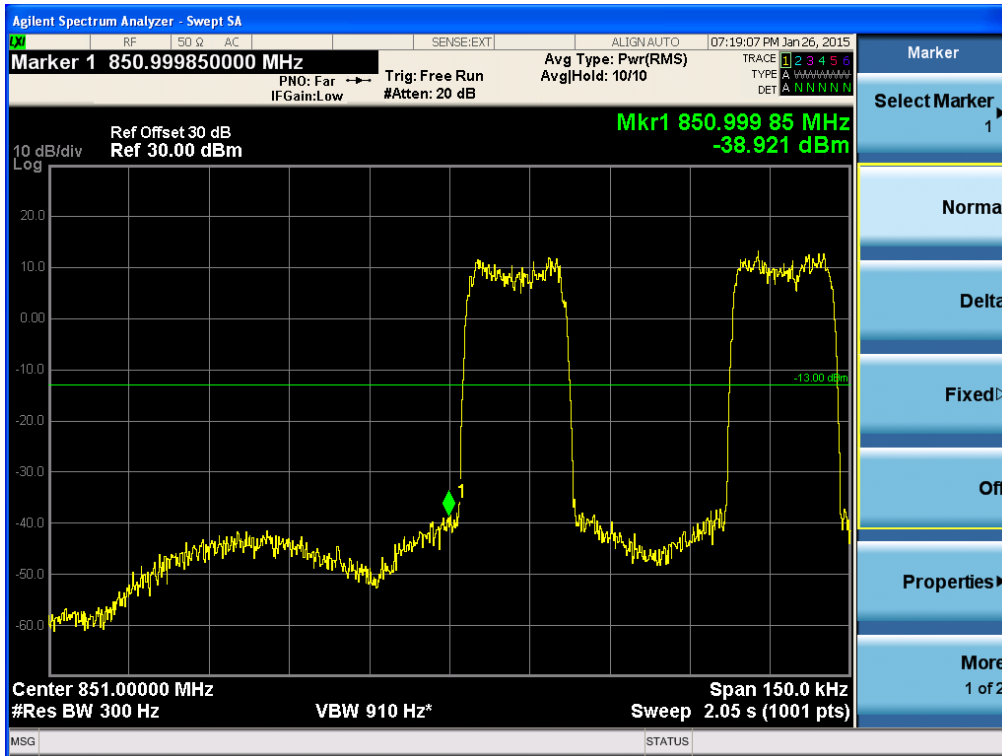


[FSK 935 MHz ~ 940 MHz High]

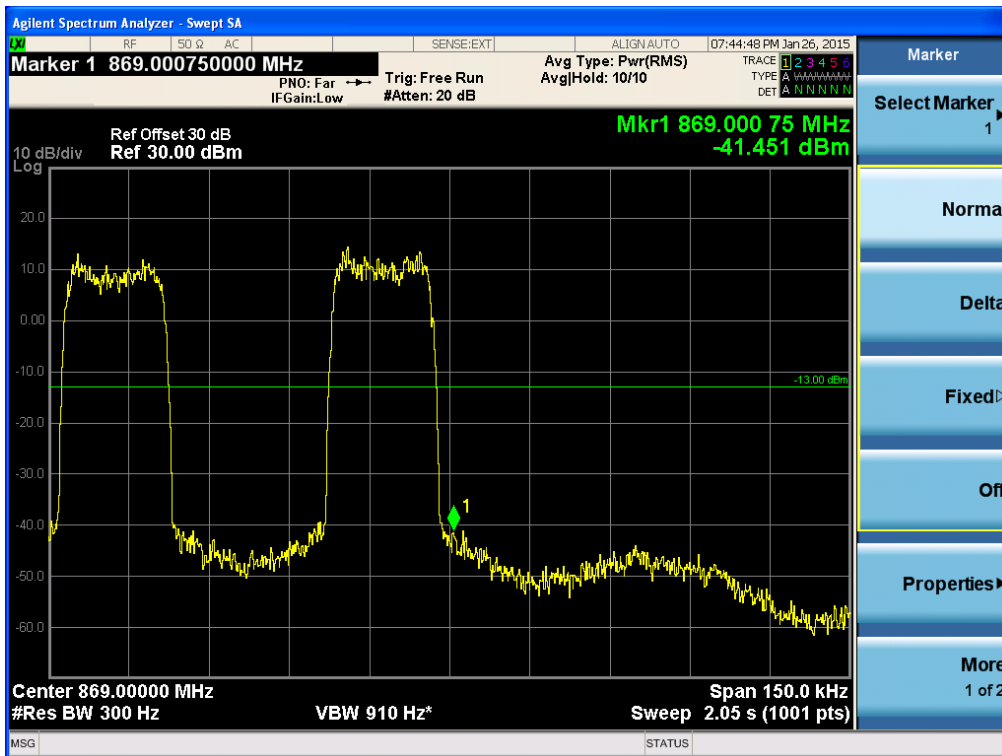


**Intermodulation Spurious Emissions for FCC  
iDEN 800**

[IDEN Low]

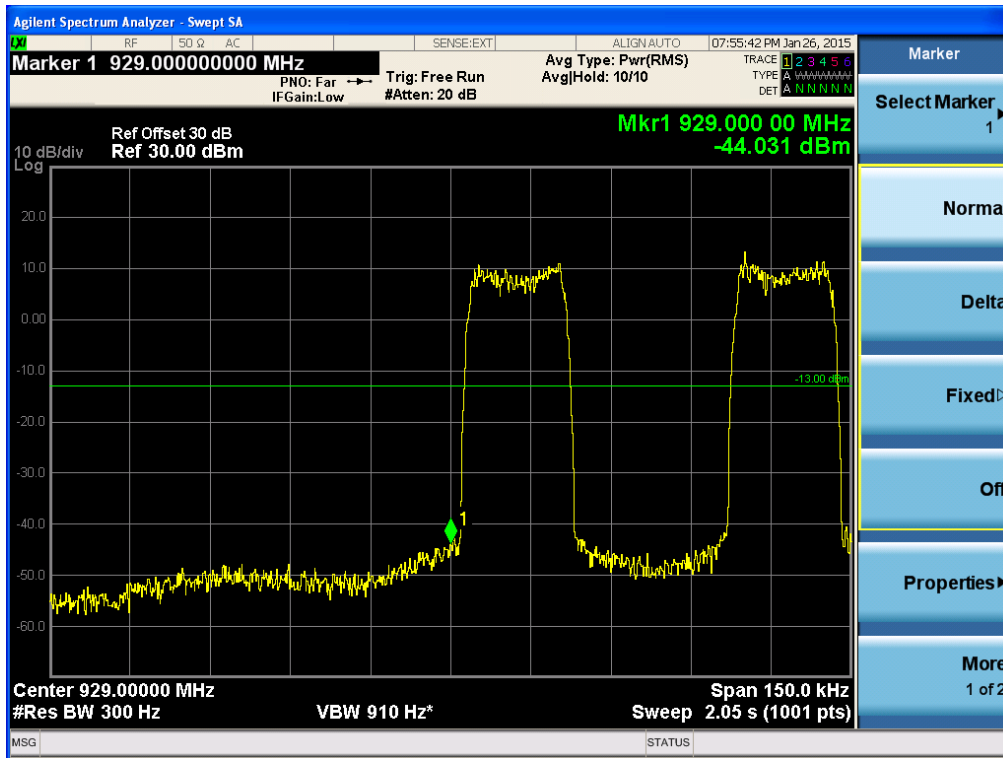


[IDEN High]

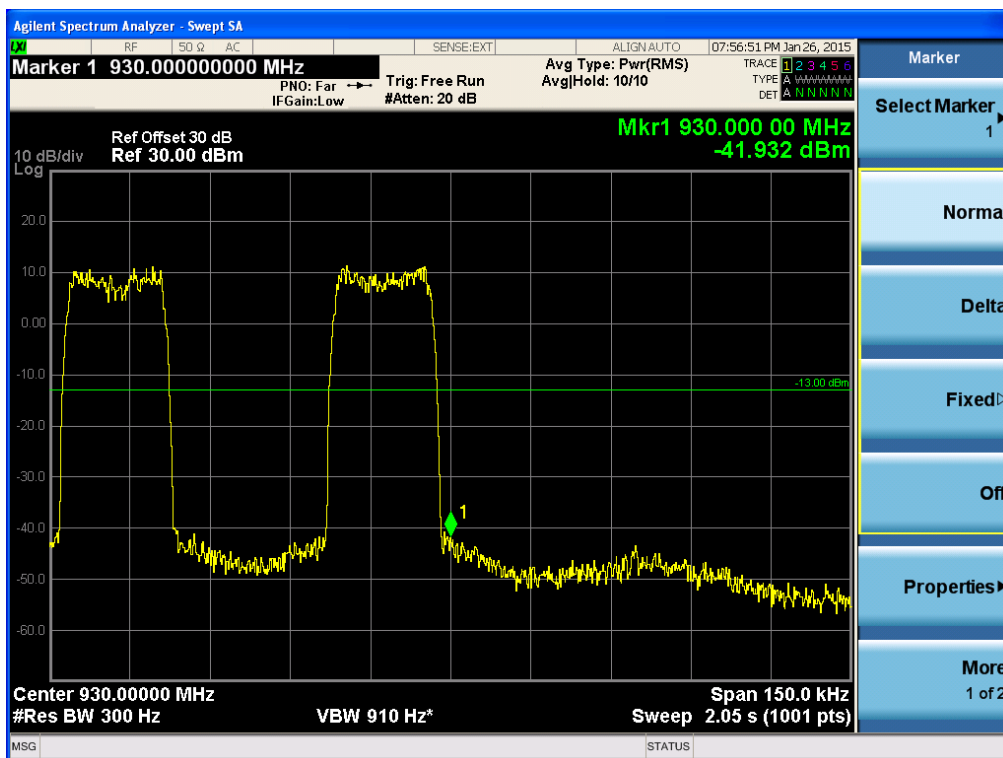


**iDEN 900**

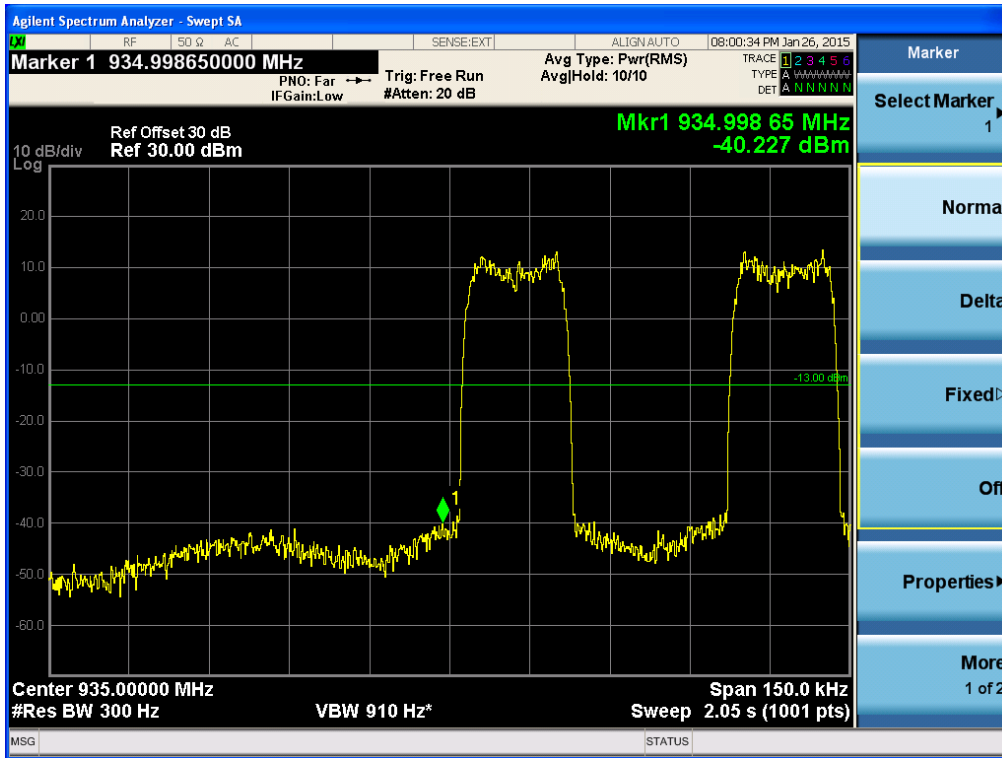
**[iDEN 929 MHz ~ 930 MHz Low]**



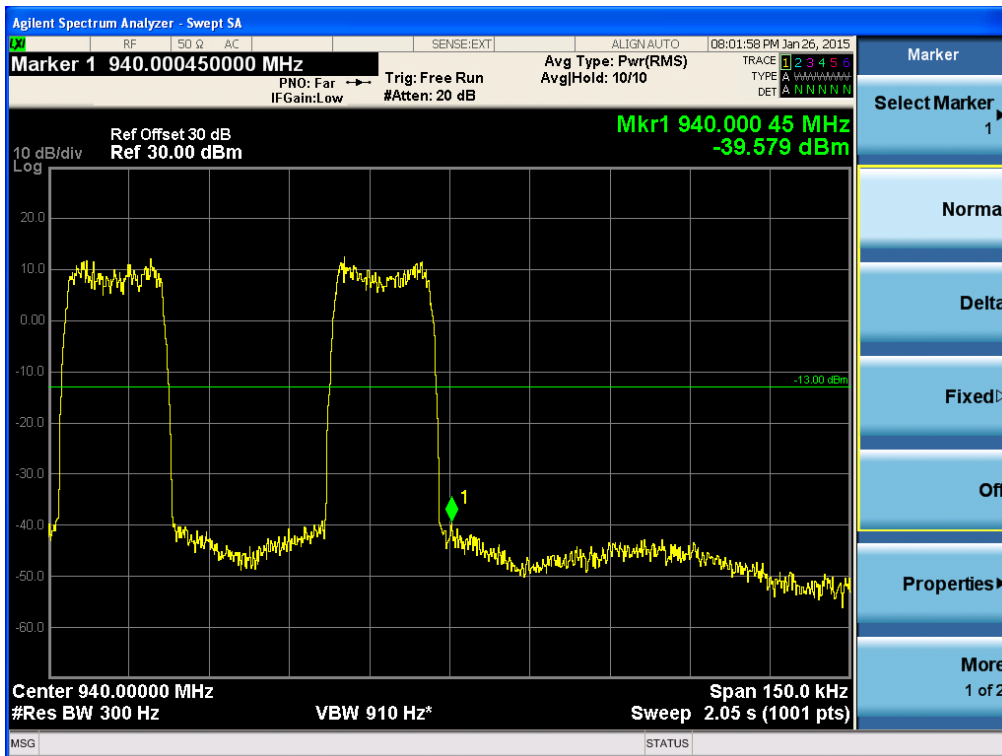
**[iDEN 929 MHz ~ 930 MHz High]**



[iDEN 935 MHz ~ 940 MHz Low]

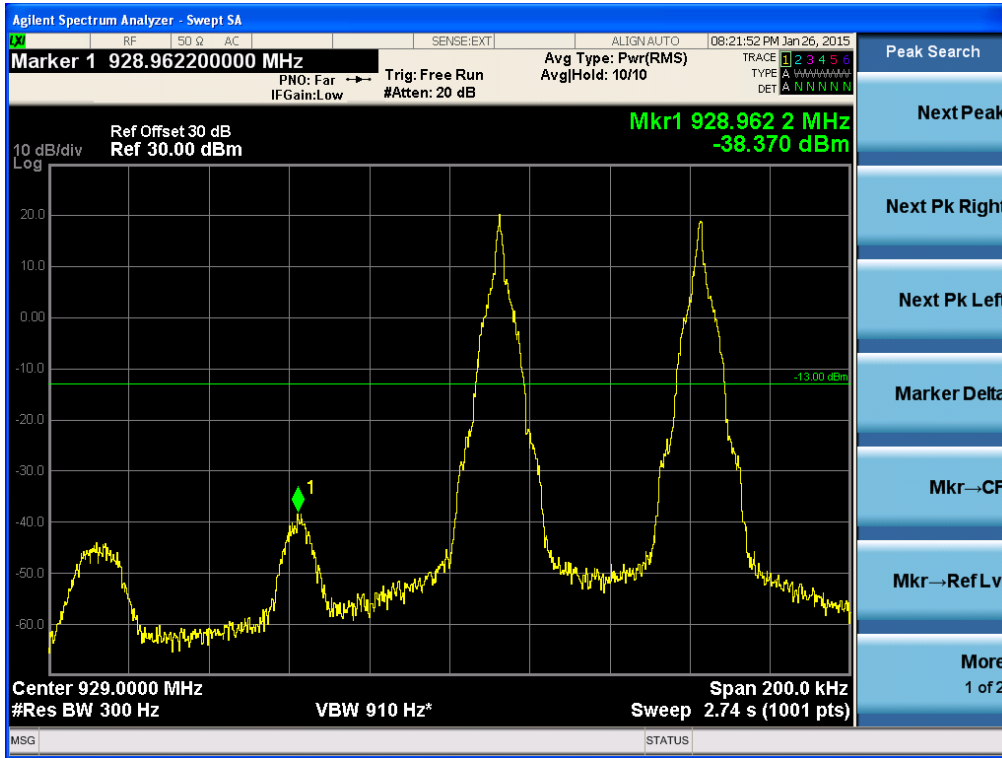


[iDEN 935 MHz ~ 940 MHz High]

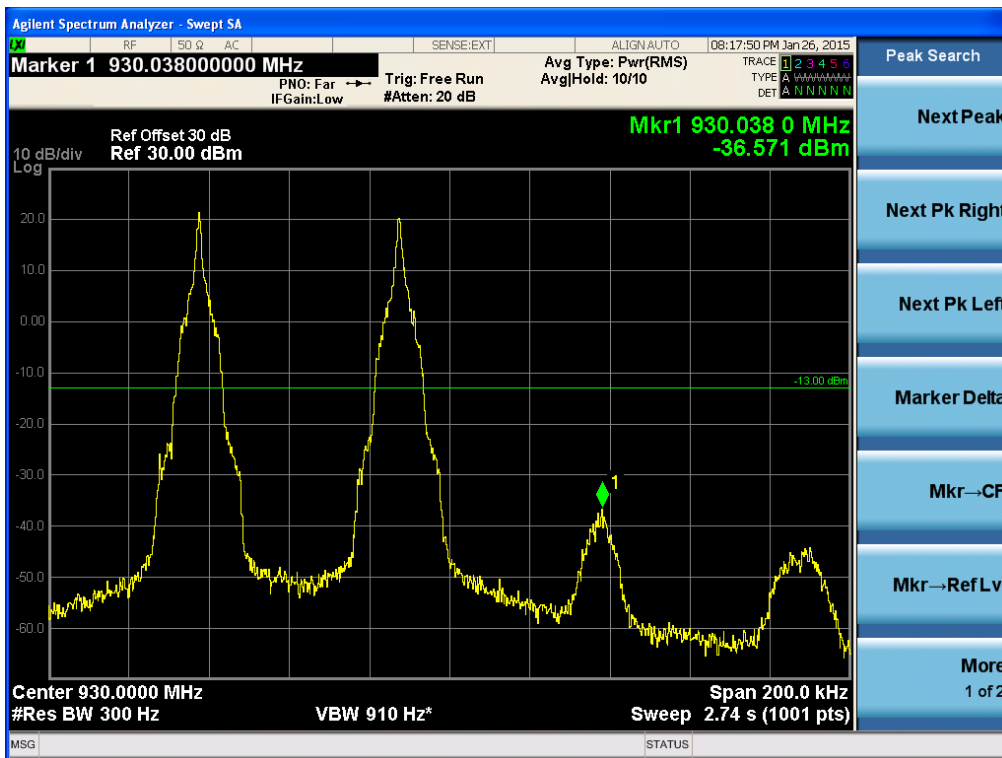


**FSK**

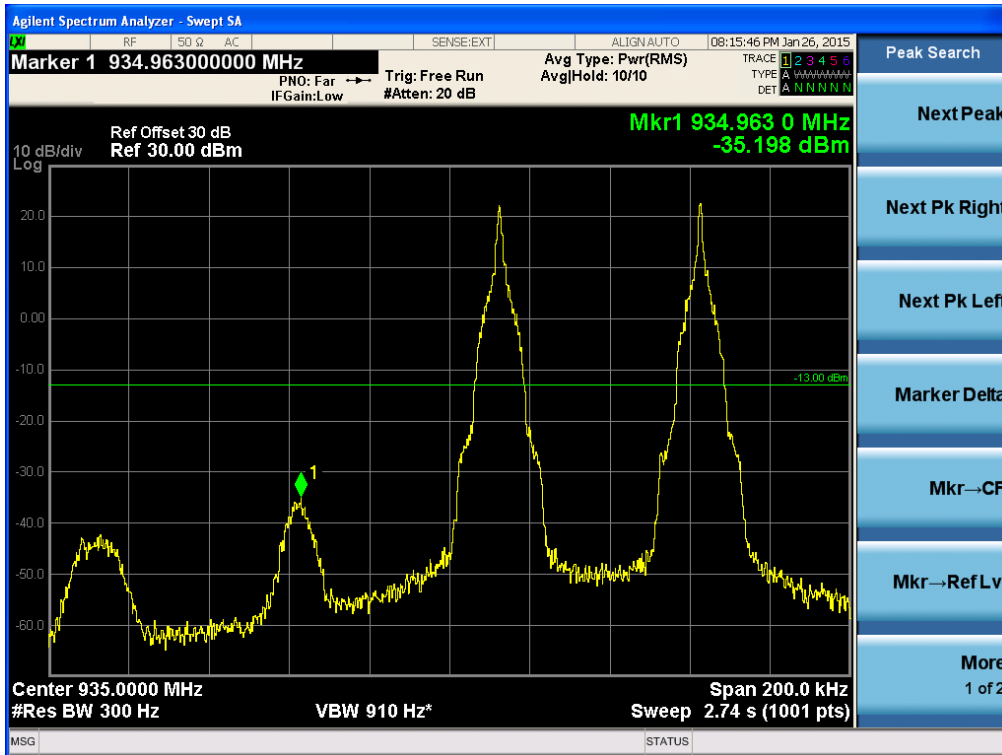
**[FSK 929 MHz ~ 930 MHz Low]**



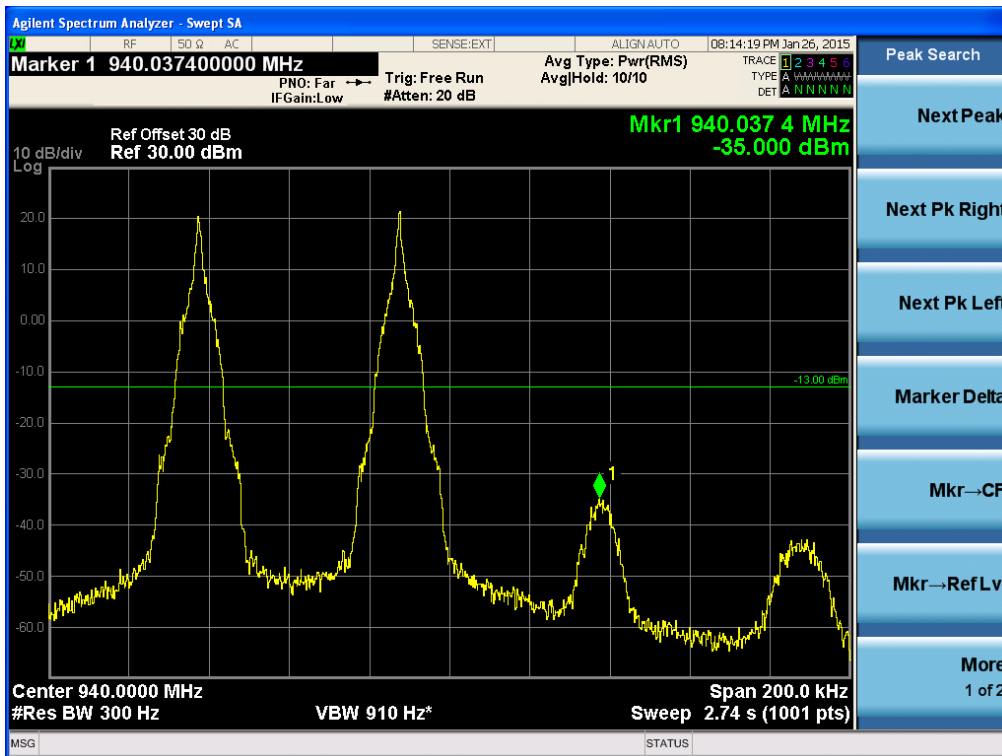
**[FSK 929 MHz ~ 930 MHz High]**



[FSK 935 MHz ~ 940 MHz Low]

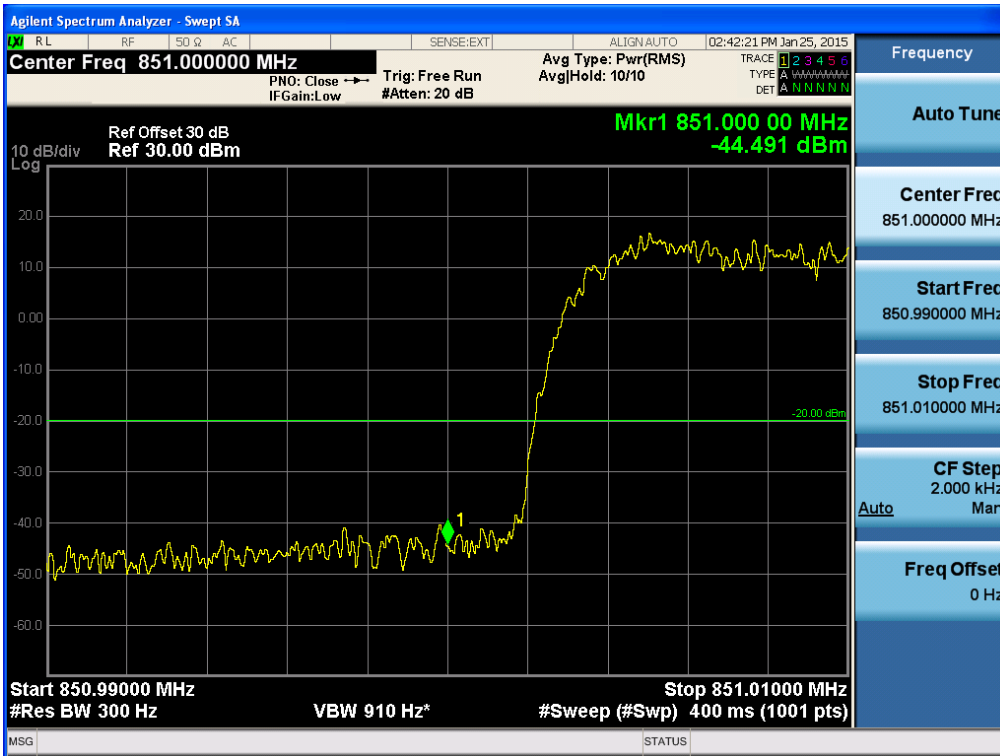


[FSK 935 MHz ~ 940 MHz High]

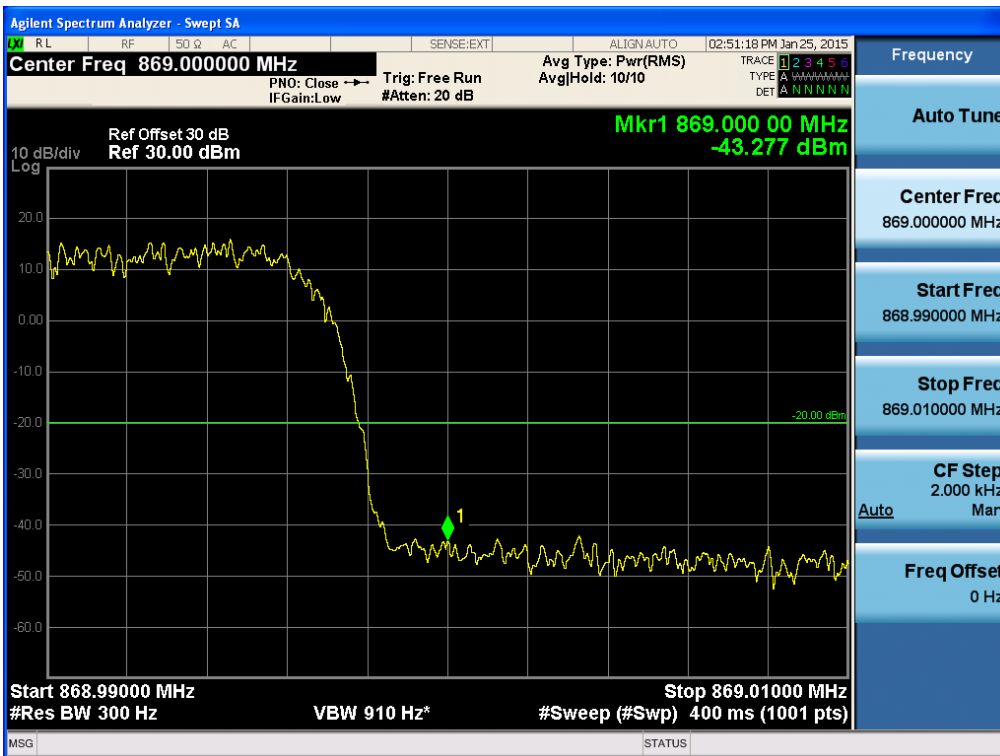


**Single channel Enhancer Band Edge for FCC  
iDEN 800**

**[IDEN Low]**

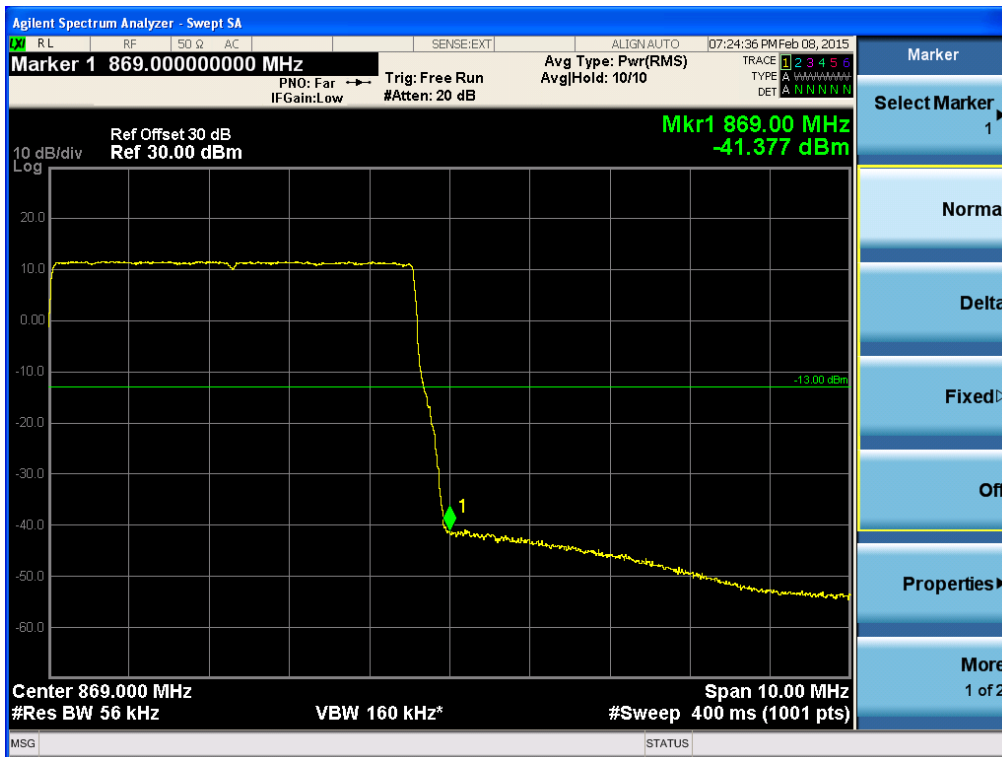


**[IDEN High]**



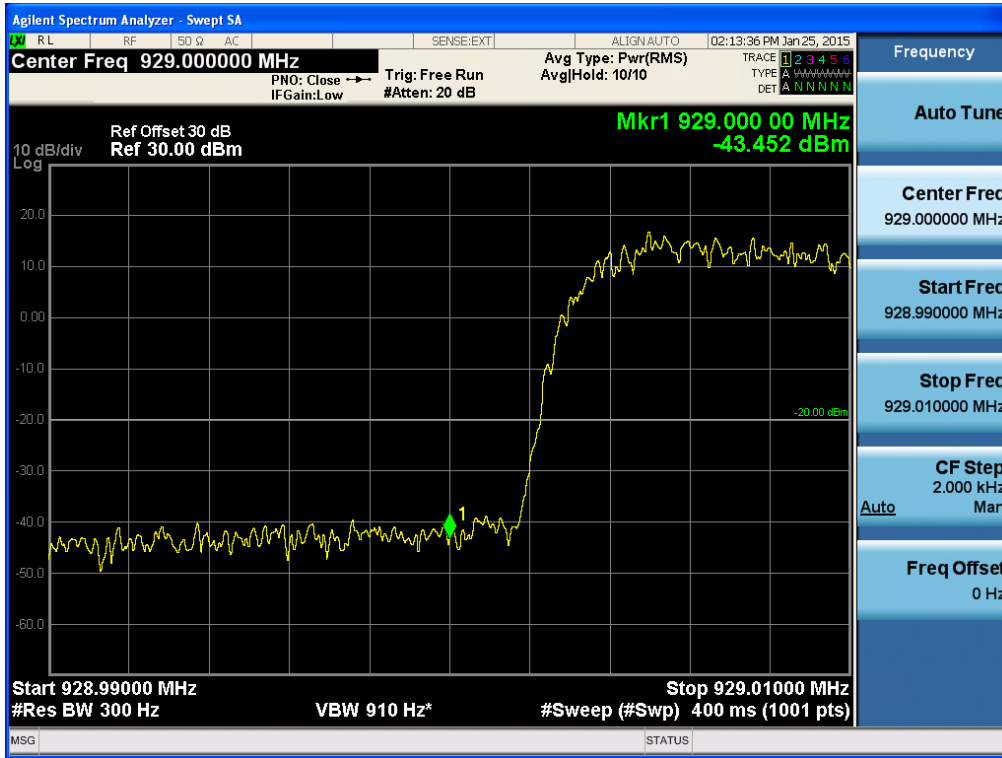


[LTE 5 MHz]

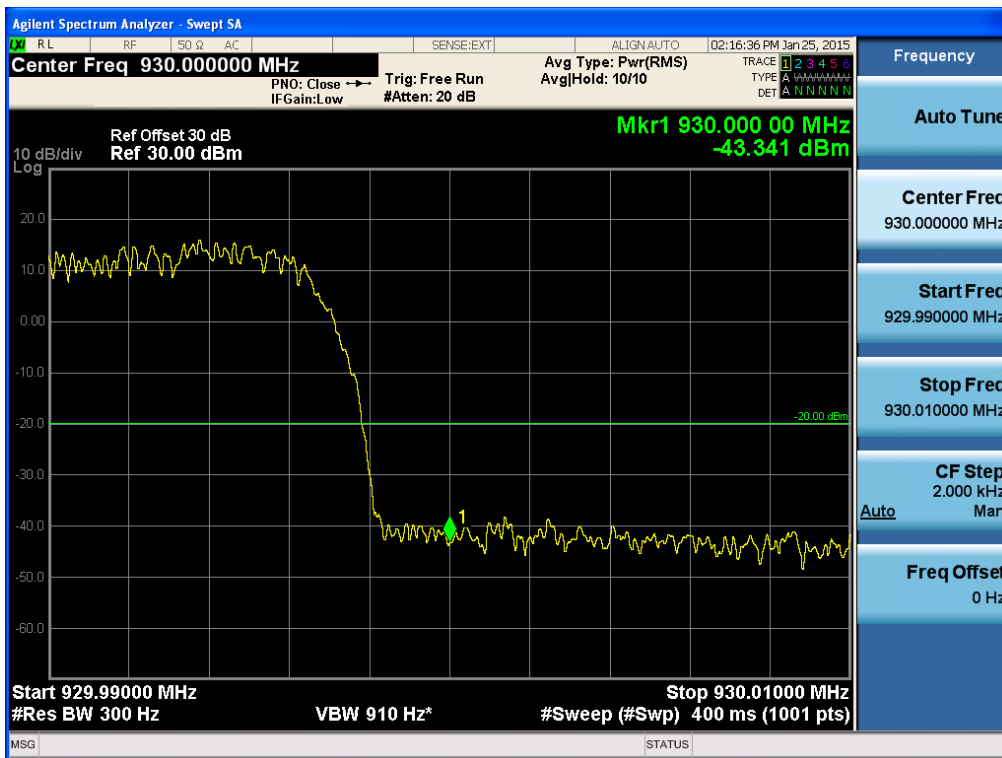


**iDEN 900**

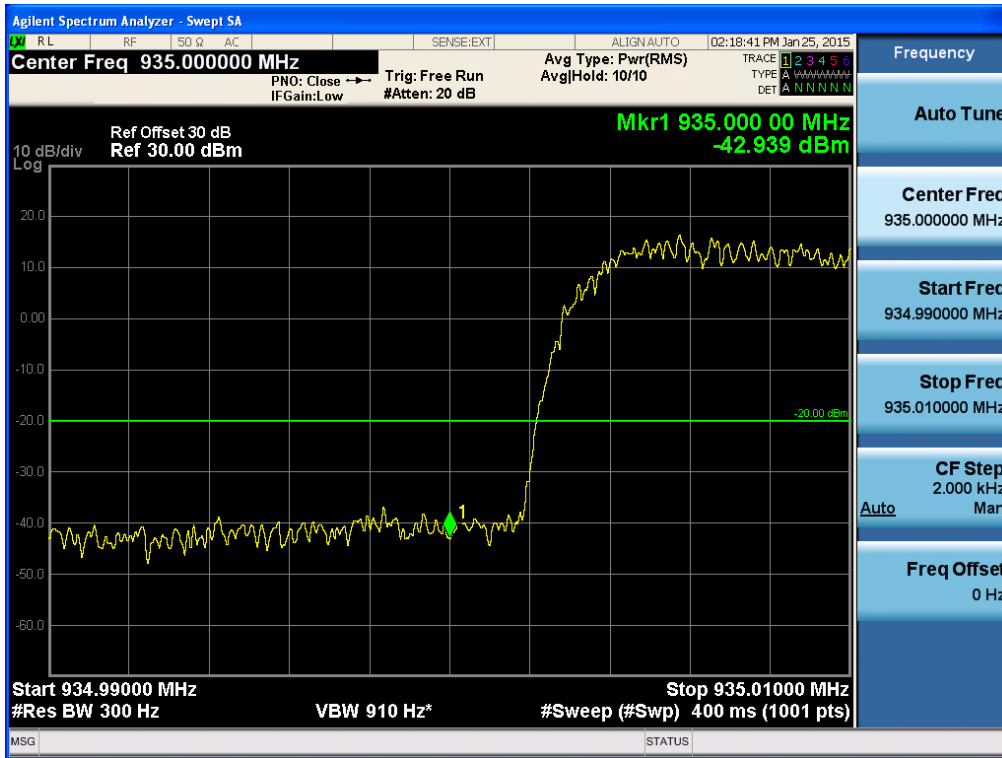
**[iDEN 929 MHz ~ 930 MHz Low]**



**[iDEN 929 MHz ~ 930 MHz High]**



[IDEN 935 MHz ~ 940 MHz Low]



[iDEN 935 MHz ~ 940 MHz High]

