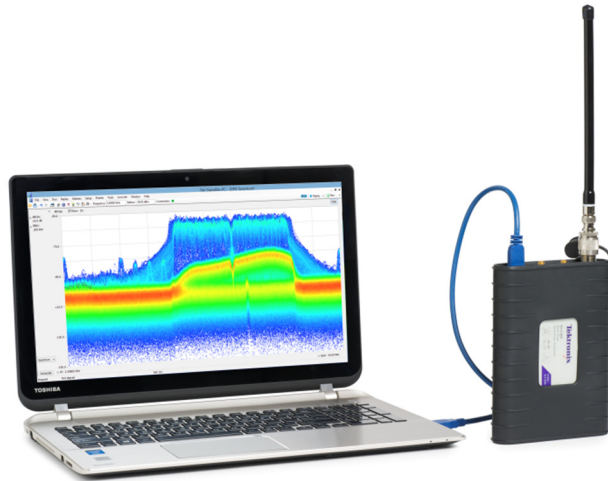


# Tektronix RSA306 USB Spectrum Analyzer

## - Simple Demos



The Demo of the RSA306 is easy. Even you do not have signal generators, devices under test, or demo boards, using the whip antenna provided in box, you can demodulate and listen to the signals from the local FM broadcasting station, or see the real-time spectrum of the signals in the ISM band created by your smart phone, and show how the RSA306 can be used in interference-hunting. The pre-compliance measurements of electromagnetic interference (EMI) are also easy to demo. This demo guide shows how to use the RSA306 in off-air applications.

<b>Setup</b>		Page 1
Installing SignalVu-PC		Page 2
Activating SignalVu-PC		Page 2
Setting up Live link		Page 2
<b>Over-the-air Demo:</b>		
Demo 1	FM listening	Page 3
Demo 2	ISM band DPX	Page 4
Demo 3	EMI spurious	Page 6

The .tiq setup files are provided for each Demo. You can recall them if you have any problems with your setup.

## Setup

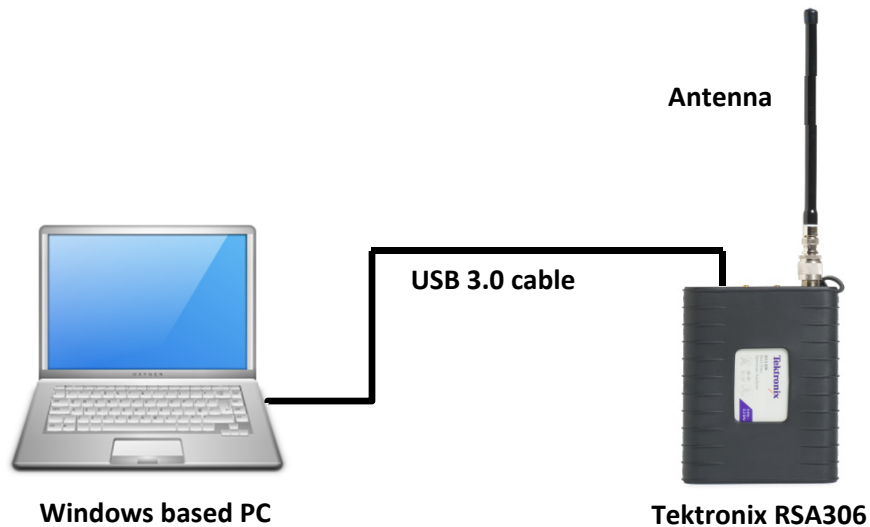
As with any test, one of the first steps is to connect the instrument to the device under test. For the initial exploration, a whip antenna has been provided to receive signals needed for the Demo. After you've completed the Demo and have gained an understanding of how the RSA306 operates, please feel free to connect to your own system and see how the RSA306 can help in your day-to-day work.

### 1 Setup the RSA306

- Power the RSA306 by connecting the USB 3.0 cable to the USB 3.0 port of your PC.
- Install the N-BNC adaptor on RSA306.

### 2 Connect the antenna

- Connect the whip antenna provided in the box to the RF port of the RSA306.



### 3 Install and setup SignalVu-PC

- Install the SignalVu-PC software provided on the USB drive, or you can download from Tek.com.
- Use the Live Link in SignalVu-PC to build up the communication between the PC and the connected RSA306.

## Installing SignalVu-PC

SignalVu-PC can be downloaded from the Tektronix.com or included in the USB drive in the box.

1. Use Windows Explorer to navigate to the folder you extracted from the archive.
2. Double-click Setup.exe. Follow the on-screen instructions to install the software.
3. When installation is almost complete, a dialog box will appear to let you choose if you want to install TekVISA. TekVISA is optimized for SignalVu-PC, especially for instrument searching, and is the recommended VISA application. You may also use another VISA application, such as NIVISA. To bypass TekVISA installation, uncheck the box.

**TekVISA is NOT necessary to run SignalVu-PC with RSA306.**

## Activating SignalVu-PC

The SignalVu-PC SVE is free to use, so no activation is needed. To activate the other options in SignalVu-PC,

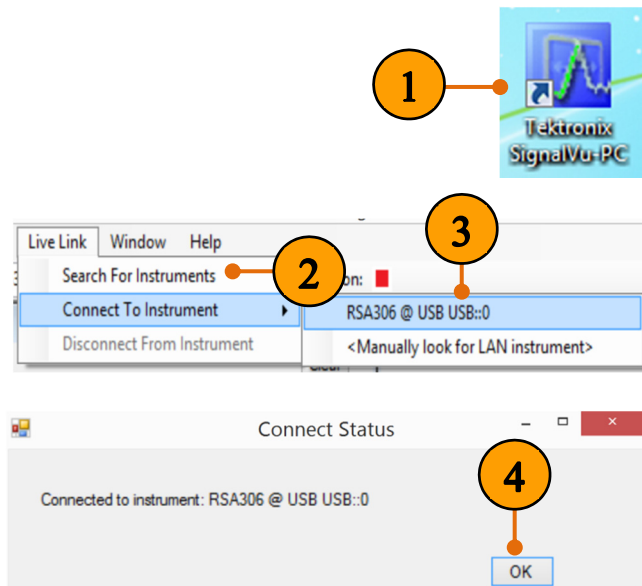
1. Launch SignalVu-PC. A window will be displayed stating that no license was found.
2. In the dialog, select *I have a key – activate now*.
3. In the Enter Activation Key text box, enter the activation key for SignalVu-PC.
4. Click OK in the License Activation window. SignalVu-PC will contact the license server and install a license file provided by the license server.

## Setting up Live link

1. Double click the **SignalVu-PC** icon on the Desktop of PC to start the application.
2. Click **Live Link** on the menu bar to view the drop down menu. Click **Search for Instrument**.

A notification will briefly appear stating that the instrument was found.

3. Click **Connect To Instrument**. Select **RSA306@USB USB::0**. Note: initial connection of the instrument can take up to 20 seconds on a new installation.
4. A Connect Status dialog box will appear to confirm the instrument is connected. Click **OK**.



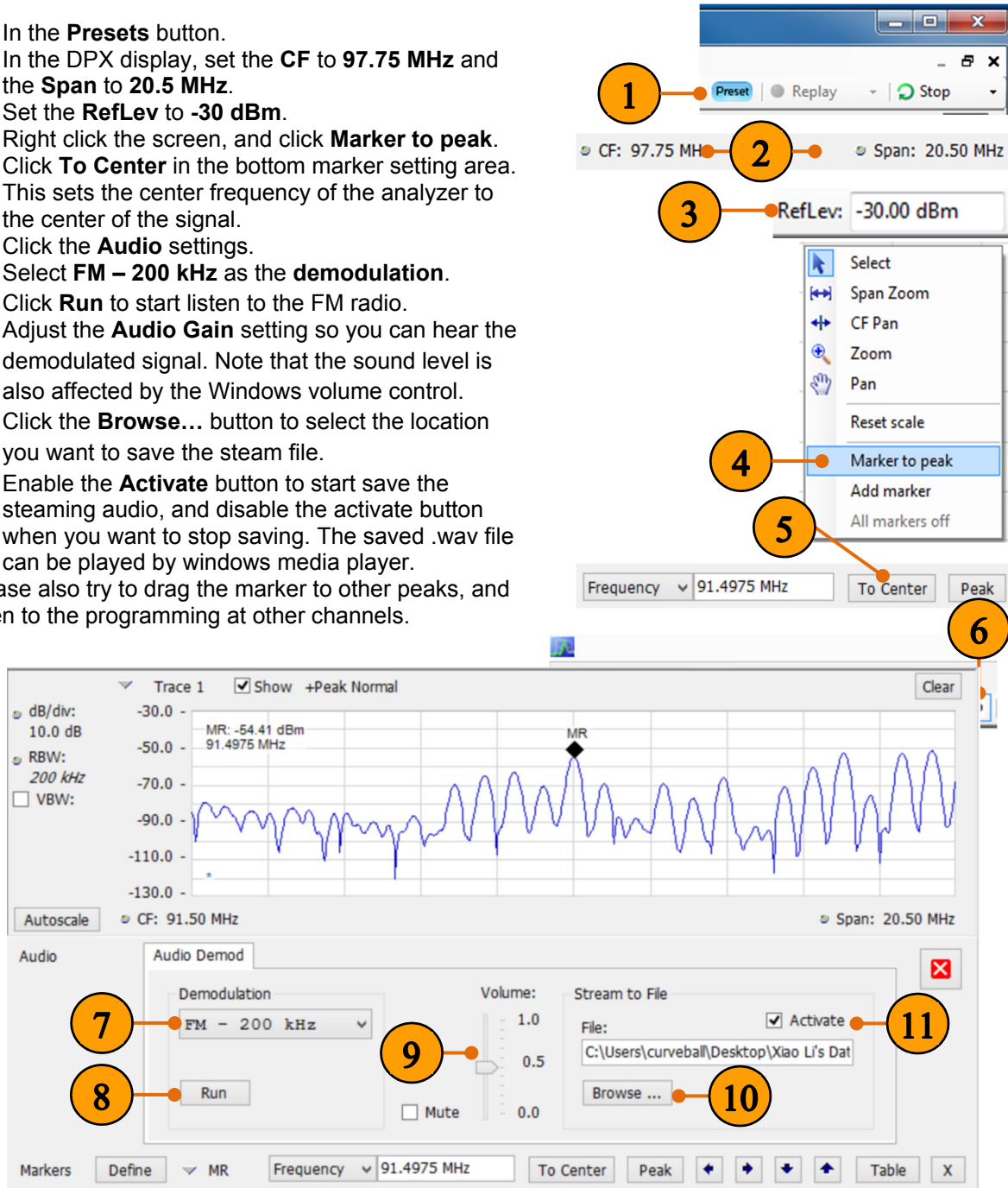
### Quick Tips: Live Link

You can quickly verify connection status by looking at the connection indicator square on the menu bar. It is green (■) when an instrument is connected. It is red (■) when it is not. You can also view the name of the instrument that is connected by hovering the mouse indicator over the ■.

### Demo 1: FM listening

The RSA306 Series USB Spectrum Analyzers can demodulate audio signals, which can help you to identify unknown radio signals. You access the Audio Demod tab from the Settings control panel of the DPX Spectrum plot display. This Demo shows how to use RSA306 to demodulate the local FM radio signals and listen to your programming.

1. In the **Presets** button.
  2. In the DPX display, set the **CF** to **97.75 MHz** and the **Span** to **20.5 MHz**.
  3. Set the **RefLev** to **-30 dBm**.
  4. Right click the screen, and click **Marker to peak**.
  5. Click **To Center** in the bottom marker setting area. This sets the center frequency of the analyzer to the center of the signal.
  6. Click the **Audio** settings.
  7. Select **FM – 200 kHz** as the **demodulation**.
  8. Click **Run** to start listen to the FM radio.
  9. Adjust the **Audio Gain** setting so you can hear the demodulated signal. Note that the sound level is also affected by the Windows volume control.
  10. Click the **Browse...** button to select the location you want to save the steam file.
  11. Enable the **Activate** button to start save the steaming audio, and disable the activate button when you want to stop saving. The saved .wav file can be played by windows media player.
- Please also try to drag the marker to other peaks, and listen to the programming at other channels.



## Demo 2: ISM band DPX

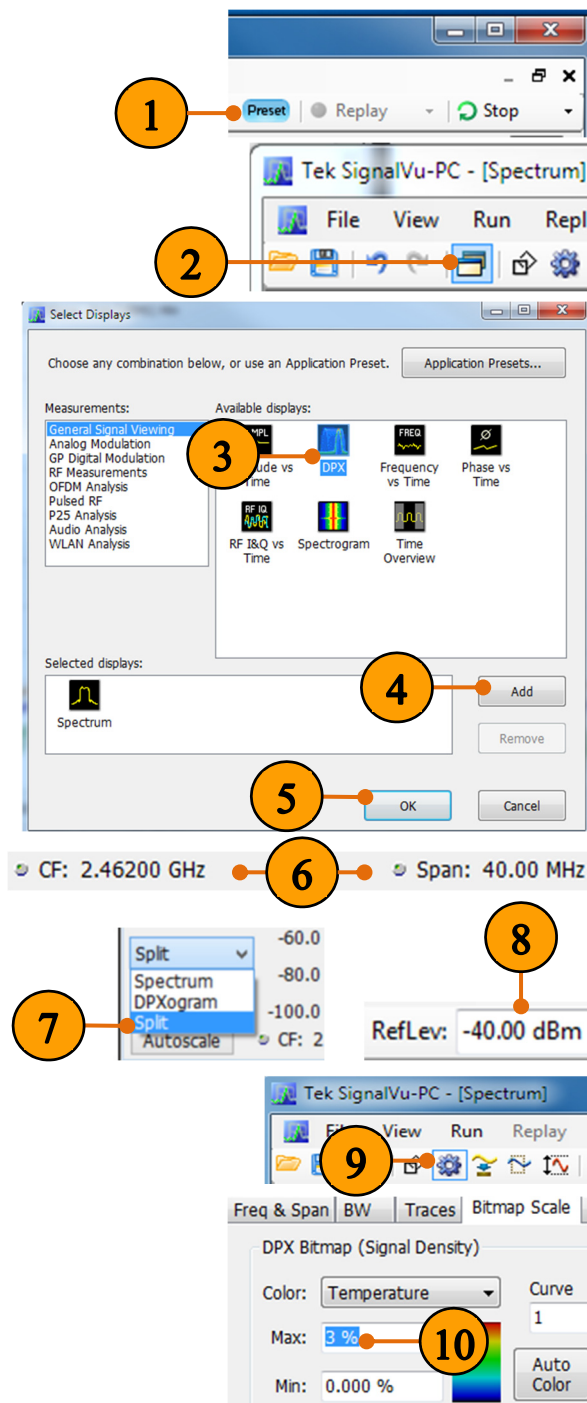
The real time engine of the RSA306 series is designed to address the measurement challenges associated with dynamic RF signals such as the bursted packet transmissions of WLAN and Bluetooth. Combo devices that use both Bluetooth and 802.11b/g/n WLAN networks have a unique set of RF interference problems because they share the same 2.4 GHz Industrial/Scientific/Medical (ISM) frequency band. In this example, we will explore this real-world problem using a whip antenna.

1. In the **Presets** button.
2. Click the **Display** button.
3. Under the **General Signal Viewing**, select **DPX** from the **Available displays box**.
4. Click the **Add** button. This will add the **DPX** icon to the **Selected Displays box** (and remove it from the Available displays box).
5. Click the **OK** button.
6. In the DPX display, set the **CF** to **2462 MHz** or to the **center frequency of one of the WLAN channels**. See the quick tip below. Set the **Span** to **40 MHz**.

### Quick Tip: 2.4GHz WLAN Channels

There are 14 channels designated in the 2.4 GHz range (2400–2483.5 MHz) spaced 5 MHz apart. Channels 1(2412 MHz), 6 (2437 MHz), and 11 (2462 MHz) are the most common channels to choose, and most routers will use one of them as the default channel.

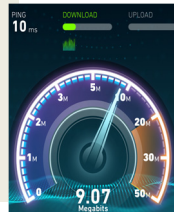
7. Select the **Split** view.
8. Set the **RefLev** to **-40 dBm**.
9. In the DPX display, and click the **settings** button.
10. Under the **Bitmap Scale** tab, set the **Max** scale to **3%** for the DPX Spectrum Display.
11. Under the **Ampl Scale** tab, set the **Max** color scale to **-40 dBm** for the DPXogram Display.



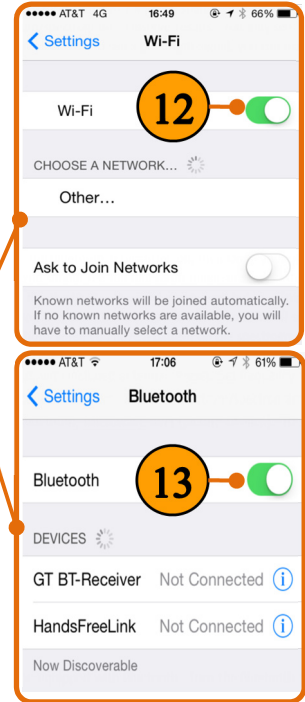
- Turn the **WLAN** function **Off**, then **On** in your smart phone/tablet/PC while monitoring the DPX display. Check the DPX display to see if you can see the spectrum of the WLAN signals. If no signal, you can change the center frequency of the RSA306 to other.

**Quick Tip: Wi-Fi Test mode**

To have a better observation of the WLAN activities in the DPX display. You can cause both uplink and downlink activity on your device by navigating to an “internet speed testing” webpage to test both the uploading and downloading speed, and monitor the DPX display of the RSA306 at the same time.

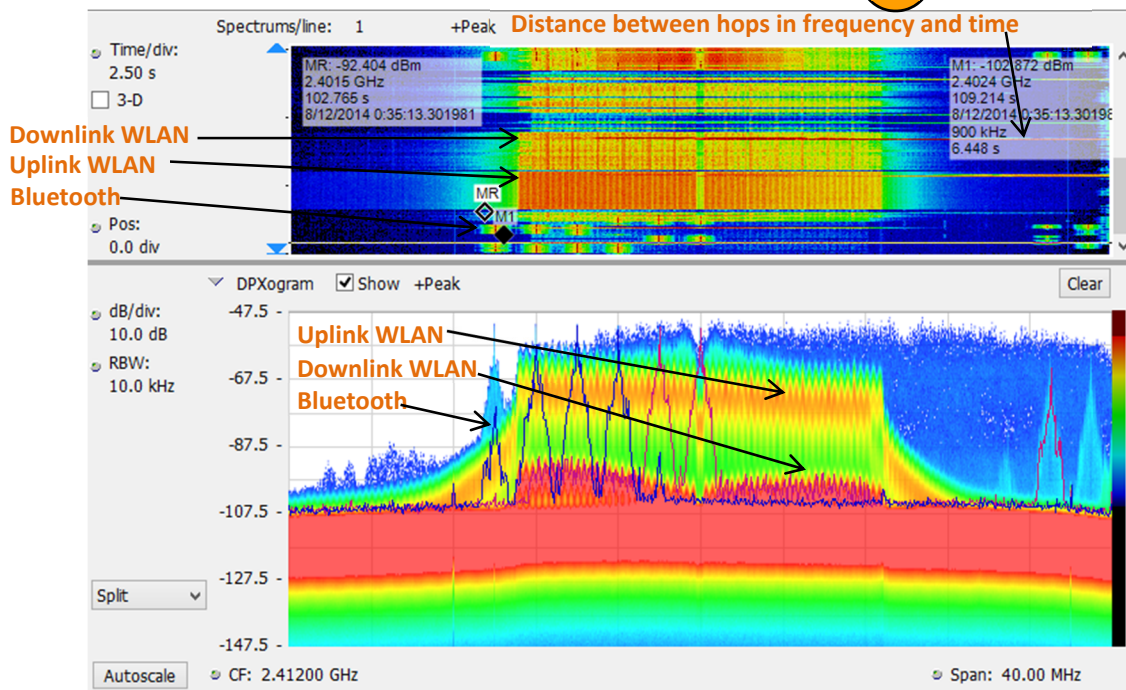
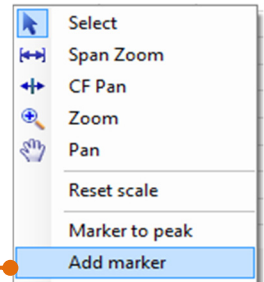


On your smart phone, tablet, or PC



- Turn the **Bluetooth** function **Off**, then **On** in your smart phone/tablet/PC while monitoring the DPX display.
- Click **Stop** to stop the acquisitions when you have a pattern on the spectrogram you would like to examine.
- Right click the display, and click **Add markers** twice to add two markers. Then you can measure the distance between hops in frequency and time using the markers on the spectrogram.

You can see a typical WLAN interchange between a nearby smart phone/tablet/PC and a more-distant network access point (AP). The smart phone/tablet/PC signal is nearly 30 dB stronger than the AP's signal because it is closer to measurement antenna. At the same screen, you can also see the Bluetooth signals, and even the measurements of the time and frequency intervals between those hop signals.




### Demo 3: EMI spurious

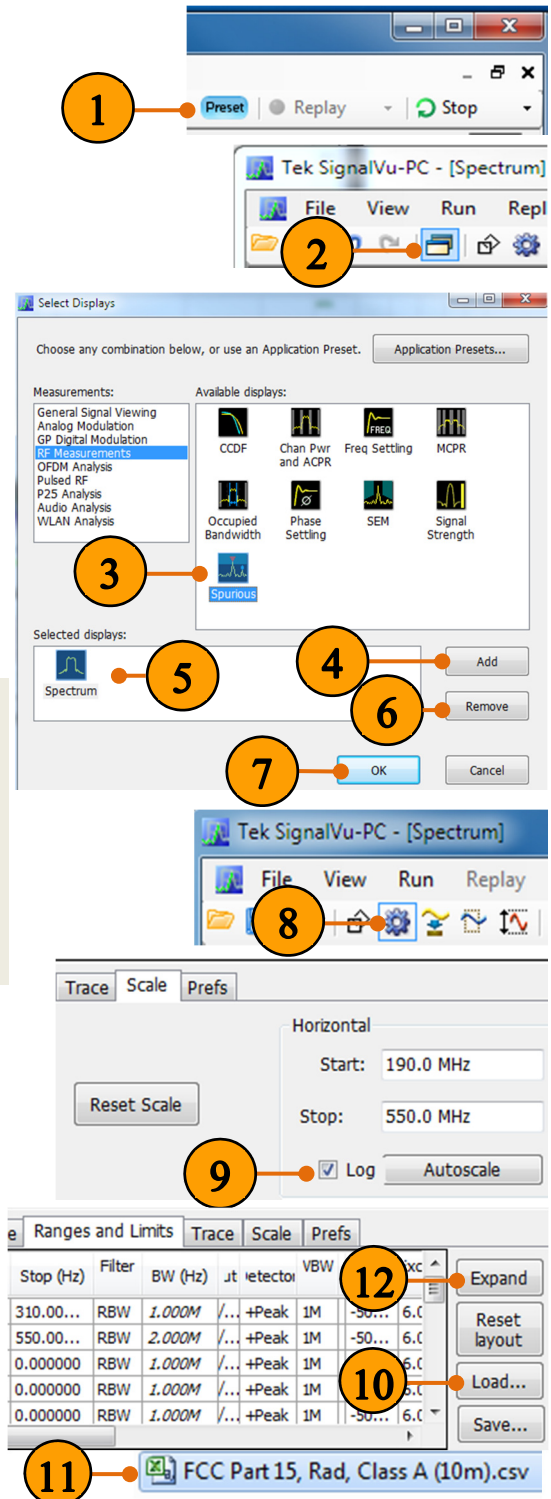
The spurious measurement in the RSA306 is set up to change limits vs. frequency, and antenna correction factors have been applied, resulting in the sloped noise floor of the displayed signal. Violations above the user-set limits are shown in red on the table. This example shows how to use the spurious display in RSA306 to perform EMI pre-compliance and diagnostics.

1. Click **Presets**.
2. Click the **Display** button.
3. Under the **RF Measurement**, select **Spurious** from the **Available displays box**.
4. Click **Add** to add the application to the Selected Displays list.
5. Select the **Spectrum** icon in the Selected Displays list.
6. Click **Remove** to clear the icon from the list.
7. Click **OK**.
8. Click the **settings** button.
9. In the **Scale** tab, select the **Log** scale to reset the display to show the frequency axis in a logarithmic scale.

#### Quick Tips: Loss correction

The External Gain/Loss Correction tab under the amplitude control panel (  ) allows you to apply a correction to a signal to compensate for the use of external equipment, such as an amplifier or attenuator. External Loss Table can be used to apply a frequency dependent gain/loss correction to the signal.

10. Under the **Ranges and Limits** tab, click **Load** to select the appropriate limit line and measurement condition.
11. Please select **FCC Part 15, Rad, Class A (10m).csv** from the C:/SignalVu-PC Files/Examples directory for this exercise.
12. A larger new resized window of range and limit table can be displayed by clicking **Expand**.



You can edit the start and stop range, filter shape, RBW, VBW, detector, threshold and excursion, limit line.

After loading the spurious table, your display should look similar to the picture below. The green bar is the loaded limit line as standards.

	On	Start (Hz)	Stop (Hz)	Filter Shape	BW (Hz)	Auto	Detector	VBW (Hz)	VBW On	Threshld (dBm)	Excorsn	Mask	Abs Start (dBm)	Abs Stop (dBm)	Abs Same	Rel Start (dB)	Rel Stop (dB)	Rel Same
A	✓	30.000000M	88.000000M	CISPR	120.000k	✓	CISPR ...	1k		-87.99	6.0	Abs	-67.99	-67.99		-30.000	-30.000	
B	✓	88.000000M	216.000000M	CISPR	120.000k	✓	CISPR ...	9k		-83.49	6.0	Abs	-63.49	-63.49		-30.000	-30.000	
C	✓	216.000000M	960.000000M	CISPR	120.000k	✓	CISPR ...	3k		-80.49	6.0	Abs	-60.49	-60.49		-30.000	-30.000	
D	✓	960.000000M	6.000000G	CISPR	1.000M	✓	CISPR ...	30k		-77.49	6.0	Abs	-57.49	-57.49		-30.000	-30.000	
E		0.000000	0.000000	RBW	1.000M	✓	+Peak	1M		-50.00	6.0	Abs	-50.00	-50.00		-30.000	-30.000	
F		0.000000	0.000000	RBW	1.000M	✓	+Peak	1M		-50.00	6.0	Abs	-50.00	-50.00		-30.000	-30.000	
G		0.000000	0.000000	RBW	1.000M	✓	+Peak	1M		-50.00	6.0	Abs	-50.00	-50.00		-30.000	-30.000	
H		0.000000	0.000000	RBW	1.000M	✓	+Peak	1M		-50.00	6.0	Abs	-50.00	-50.00		-30.000	-30.000	
I		0.000000	0.000000	RBW	1.000M	✓	+Peak	1M		-50.00	6.0	Abs	-50.00	-50.00		-30.000	-30.000	
J		0.000000	0.000000	RBW	1.000M	✓	+Peak	1M		-50.00	6.0	Abs	-50.00	-50.00		-30.000	-30.000	
K		0.000000	0.000000	RBW	1.000M	✓	+Peak	1M		-50.00	6.0	Abs	-50.00	-50.00		-30.000	-30.000	

