How To Create And Apply An Arbitrary Spectral Mask On WSA-408/308

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Introduction

Starting with software version 20260419, you can easily create, import and then display an arbitrary spectral mask on a WSA-408/308 spectral display. Right button 5 has added the Mask ON/OFF control, as shown in Figure 1.

Example

Figure 1 shows an NRSC (National Radio Systems Committee) spectral mask being applied on a WSA spectral display (span=200 kHz, RBW=200 Hz) for an AM modulated signal from a signal generator.

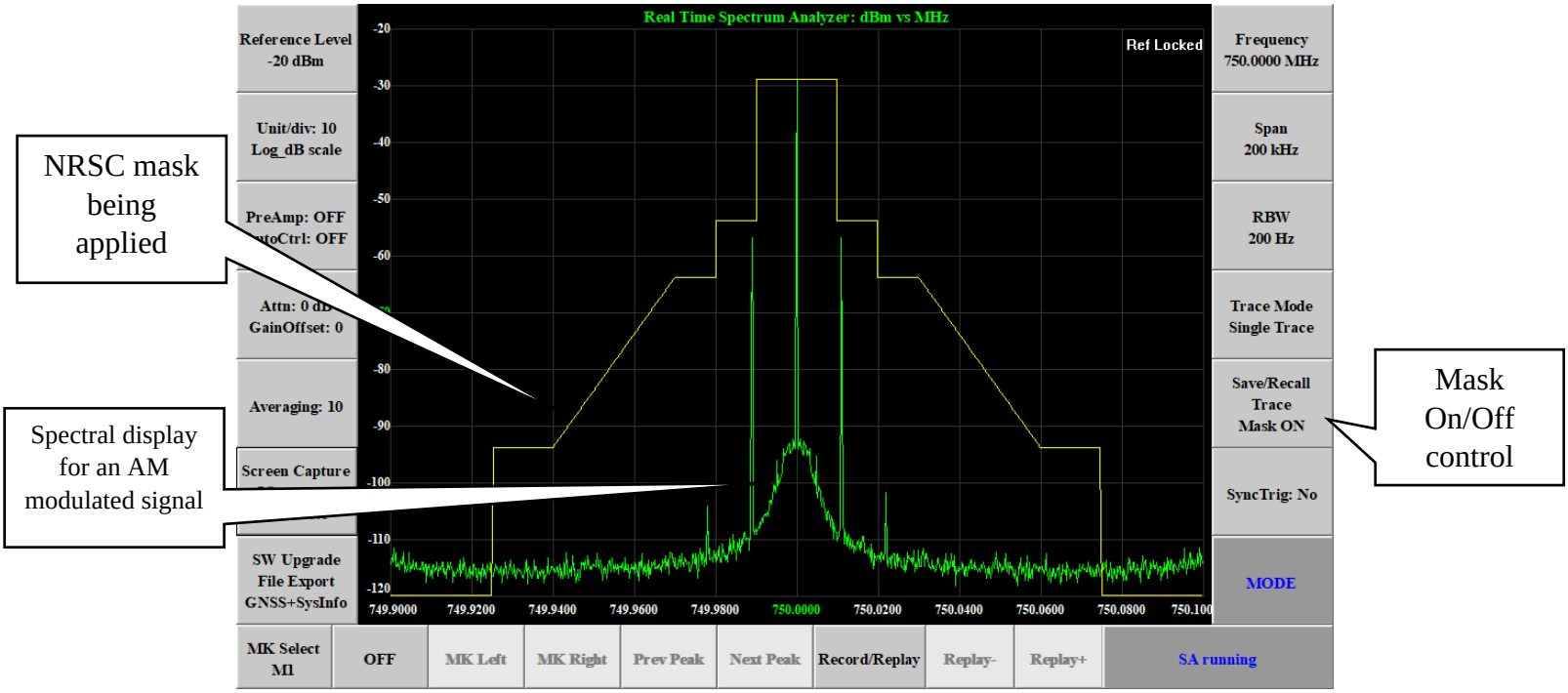

Figure 1 - An example showing NRSC mask being applied on the WSA-408/308 spectral display

The signal generator set up used to obtain the spectral display in Figure 1 is shown in Figure 2.

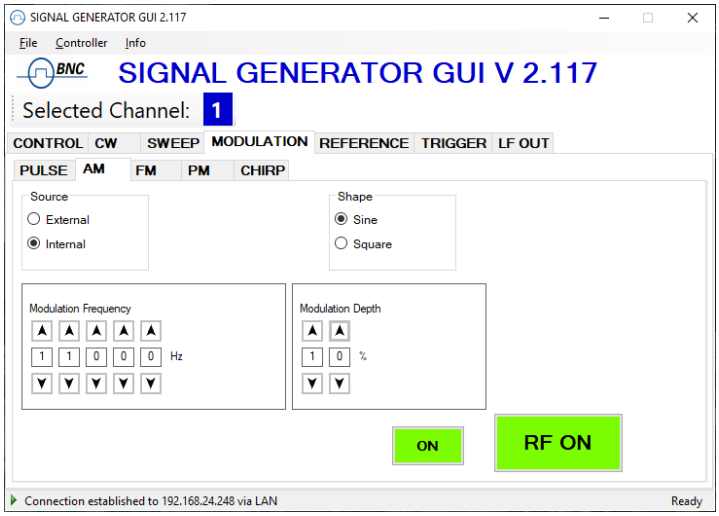

Figure 2 - AM modulation setup for spectral display shown in Figure 1

How to create an arbitrary spectral mask?

The user can create any spectral mask using simple Notepad or Excel on a PC to fulfill any requirements. Here we use an NRSC mask template to illustrate the creation process.

Figure 3 shows an NRSC mask template.

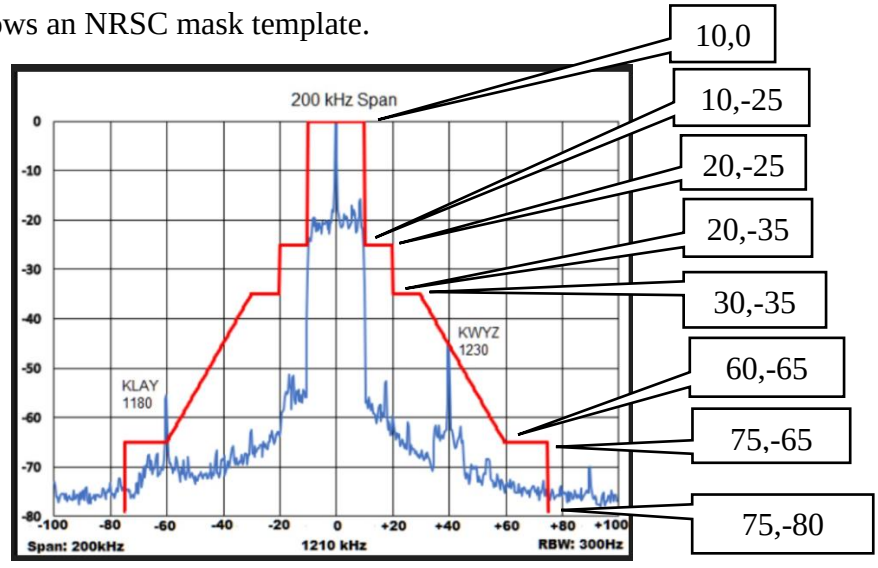

Figure 3 - A standard NSRC mask template

From Figure 3, we notice the following:

1. The mask is left-right symmetric in reference to the center frequency. The center frequency point's mask value is always assumed to be 0 dB.
2. The mask is totally defined by a set of turning points whose coordinates can be easily specified based on table or graph readings. On Figure 3, there are 8 turning points. Each point's coordinates in terms of frequency offset and mask value are marked in Figure 3. For example, the 1st turning point is (10,0), meaning it's 10 kHz offset and 0 dB mask value. The 4th turning point is (20,-35), meaning it's 20 kHz offset (from the center) and mask value is -35 dB. Typing all the 8 pairs of values into a simple text file using Notepad or Excel shown in Figure 4. Save the file, and then change the file's extension to ".msk" such as "NRSC.msk" as the final file name. Copy this file to a USB thumb-drive and plug this drive to a WSA-408 when you are planning to use the mask.

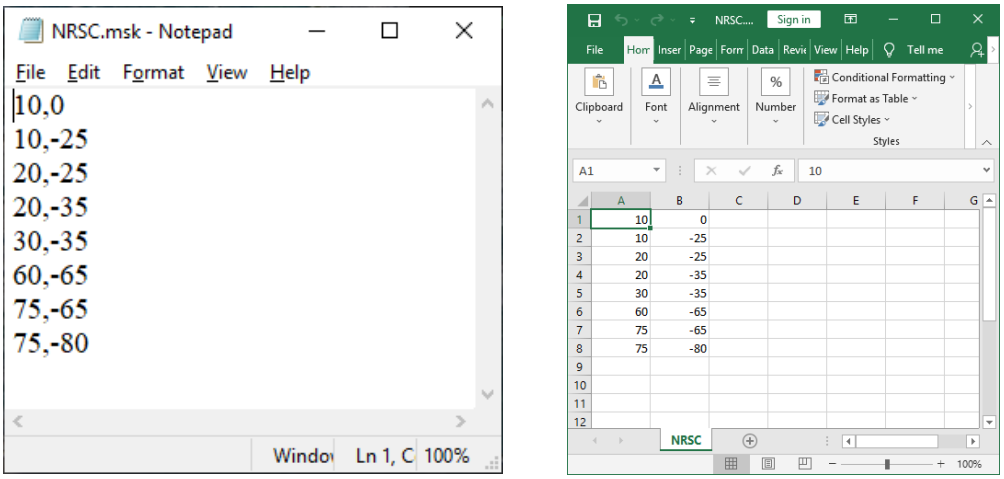

Figure 4 - The mask data file values when created with either Notepad (left) or Excel (right) matching the turning points shown in Figure 3

So, the file creation process is simply: for any mask requirements, locate all its turning points as shown in Figure 3. Find the each turning point's coordinate pairs in (frequency_offset_kHz, mask_value_dB), and type these numbers into a plain text file using Notepad on your PC. Essentially, we're creating a simple two-column text data array, where each data must be a signed integer. Each row contains two integers separated by "," and ends with a carriage return.

Save the file into whatever name you like, but to use it on a WSA-408/308, you must change the file name extension to ".msk", and then save the file to the root folder a USB-drive and plug this drive to a WSA-408.

How to apply the created mask?

On a running WSA-408/308, assuming a newly created mask file with extension ".msk" is already saved on a USB-drive and the drive is plugged into the WSA-408.

Under the Spectrum Analysis feature, set up the proper center frequency, span and RBW, then press the right 5 button, you'll see a dialog shown in Figure 5.

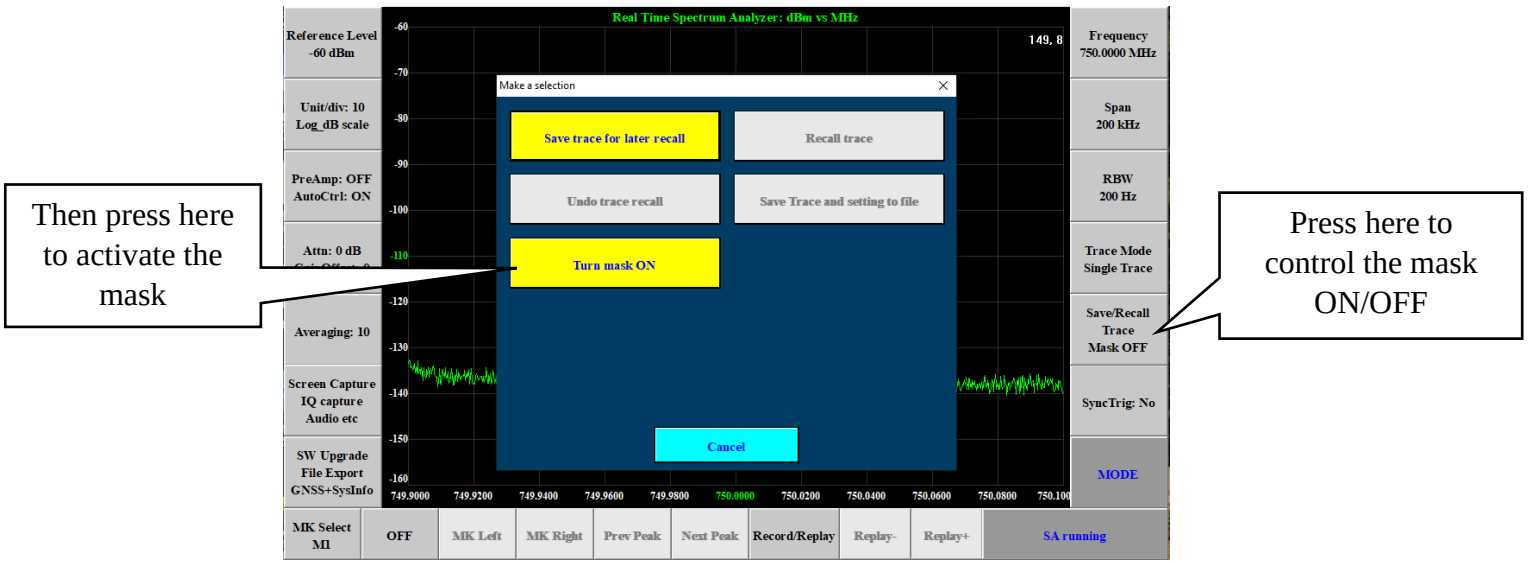

Figure 5 - Steps to activate the mask

After steps in Figure 5, you'll see a dialog in Figure 6. This dialog lists all the ".msk" files (up to 10 for now) you have in the USB drive. Just select the file name you want, and the mask will be applied, and the results will be as shown in Figure 1.

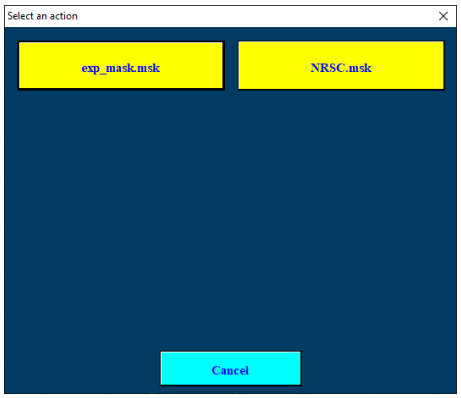

Figure 6 - All mask files (with extension ".msk") on a USB drive will be listed here

To turn the mask off, follow steps in Figure 5 and press "Turn mask OFF".