Application Note

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Installing and Using *IQCreator®* on the ATB-7300 Avionics Test Bench

IQCreator® is a powerful software tool that provides all the necessary features required for quick and easy generation of complex waveform files. The user can create any arbitrary waveform required for creating signals related to new avionics protocols. IQCreator® can also be used to create signals which include noise, interference, or other flaws to support advanced testing.

This application note explains how to install IQCreator® on the ATB-7300 Avionics Test Bench and demonstrates how to create a multi-carrier wave form to test adjacent channel rejection on VHF communications equipment.

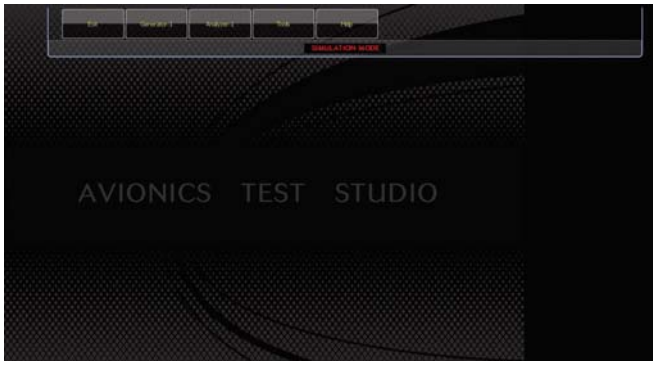
IQCreator® is available for free download from the Aeroflex Test Solutions web site: http://www.aeroflex.com/ats/. You will need a USB memory drive with 208 MB available space.

Under the Product Directory, select ">>PXI", then ">Application Software", then "> IQCreator®". Log in, or create your customer account and follow screen prompt to download the application. When prompted, save the downloaded file to a directory on the USB memory drive. The files will be stored on the USB memory drive as "IQ_Creator®_XX_X_X.zip"*.

You may wish to install a USB keyboard and mouse on the ATB-7300 to make the installation process easier.

You must exit the Avionics Test Studio to install new software.

On the ATB-7300 Avionics Test Studio pull down menu, select "Exit".



In the question box select "EXIT APPLICATION"

Install the USB memory drive to the ATB-7300 front panel USB port.

When prompted, select "Open folder to view files". In the USB memory drive directory, select the file "IQ_Creator®_XX_X_X.zip" and extract the files to a selected directory on the ATB-7300.

From the extracted files directory, select and run "IQCreator®_vXX_X_X_Setup.exe". Follow the screen prompts.

Once IQCreator® is installed it may be run from the Start Menu. Select the start button at the bottom left of the screen. Select the following directories:

All Programs

Aeroflex

IQCreator®

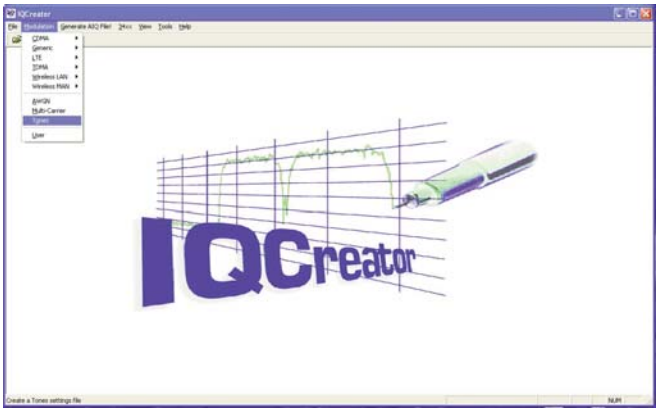
IQCreator®

The following section will describe how to use IQCreator® to generate a multi-carrier waveform. A user of the ATB-7300 may require 2 separate carrier frequencies to test specific functions of an LRU. For this example we will produce a multi-carrier waveform for testing adjacent channel rejection in VHF communications equipment.

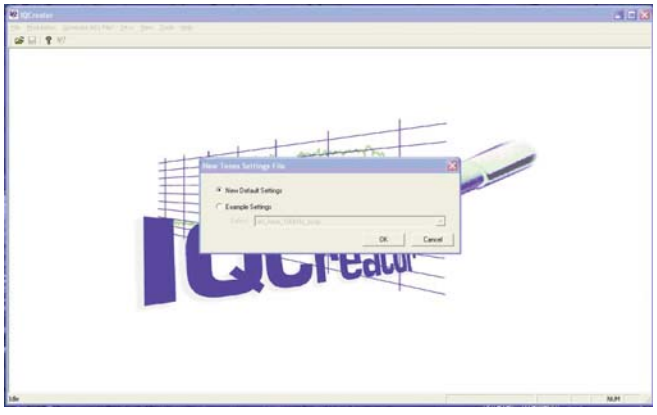
This process will create one carrier with single tone modulation on the channel frequency selected by the user and one carrier with single tone modulation 25 kHz (or one standard channel) below the first signal and 10 dBm down.

The first step will be to create the individual tones to be used for the multi-carrier. Different types of modulations can be mixed provided certain criteria are met. All files must have the same sampling rate or be integer multiples of each other and have the same file length in terms of time. For simplicity sake, this process will create similar single tone modulations.

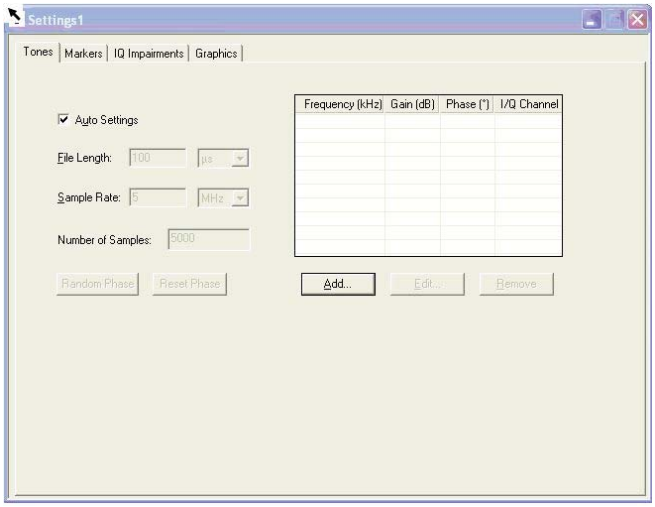
From the IQCreator® main screen select Modulation then Tones.



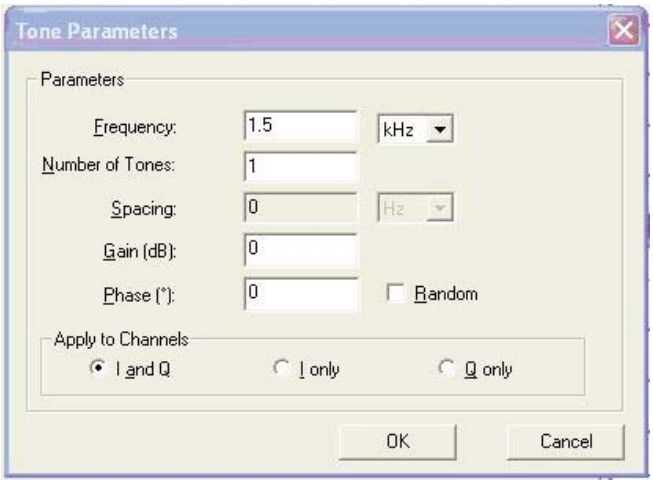
In the New Tones Settings File window select New Default Setting and click OK.



In the Settings window ensure Auto Settings is selected and click Add.

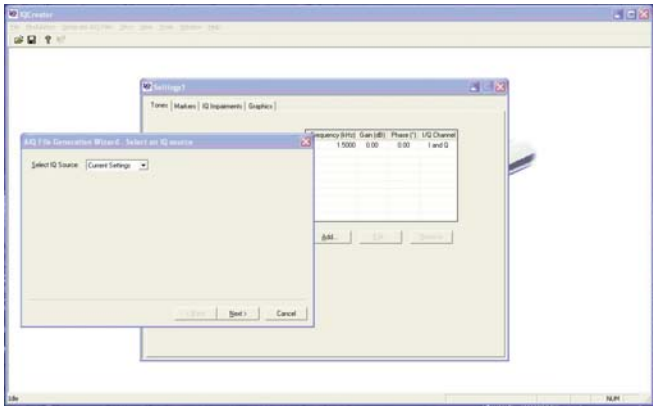


In the Tone Parameters window select a tone frequency of 1.5 kHz. Since this is a simple single tone modulation, all other fields may be left at the default. Click OK.



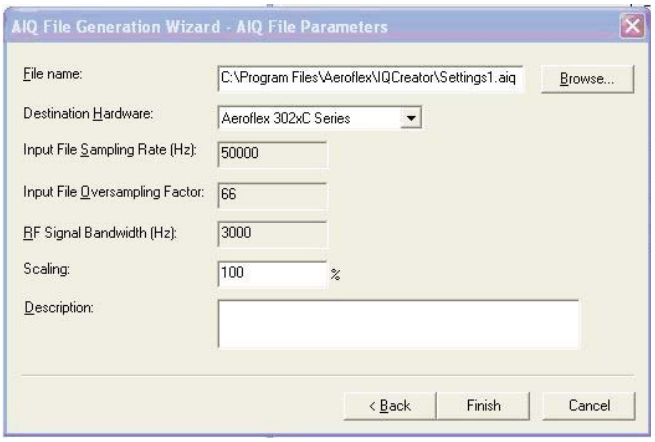
Save the created file in a user selected directory by clicking the disk icon in the upper left corner of the IQCreator® window. The file will be saved as an .iqc file.

The next step is to generate the AIQ file. Select Generate AIQ File!

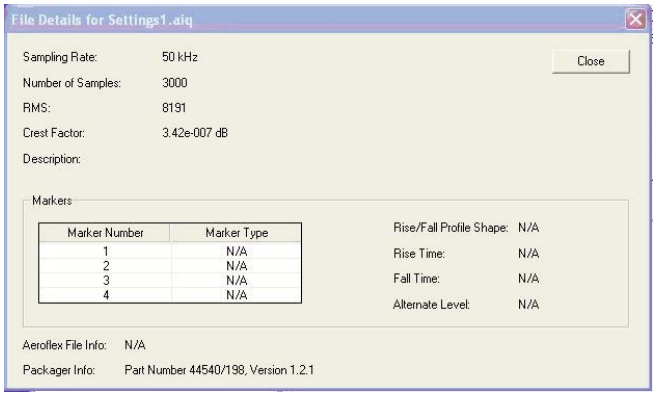


Ensure Current Settings is displayed in the Select IQ Source field and click Next>.

In the AIQ File Generation Wizard – AIQ File Parameters window, enter the user selected directory location and file name in the File Name field. In the Destination Hardware field select Aeroflex 302xC Series. Click Finish.



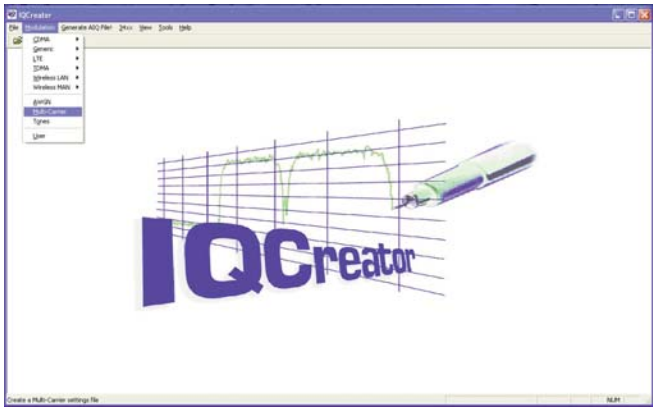
The following window will appear to confirm the file details. Click Close.



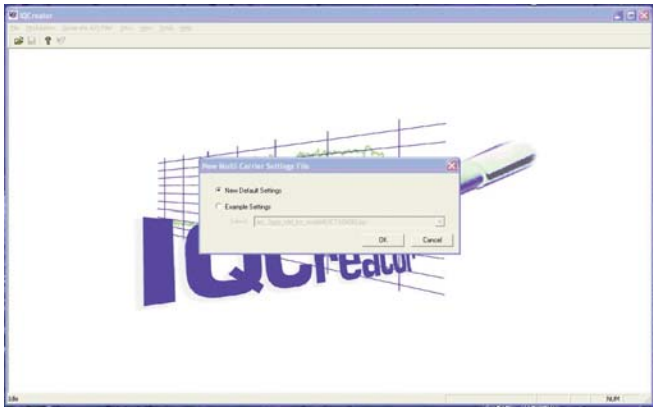
To create the 2nd tone, repeat the steps used to create Tone 1 using a tone frequency of 1 kHz. Save the settings as before in a user defined directory and file name.

Once the tones are created and saved, it is now time to create multi-carrier waveform.

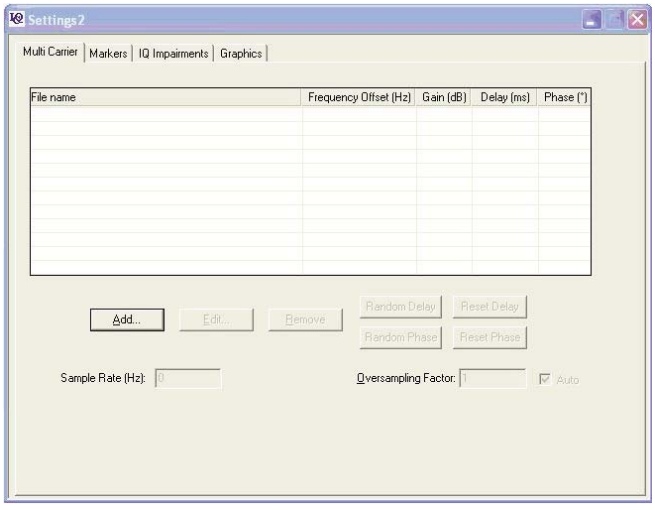
From the IQCreator® main screen select Modulation then Multi-Carrier.



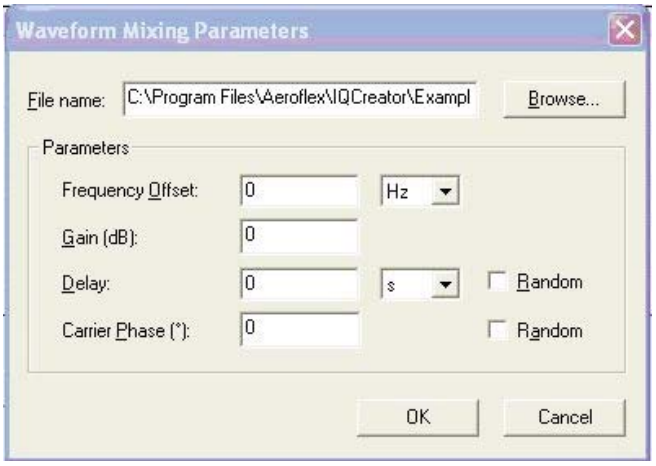
In the New Multi-Carrier Settings File window select New Default Setting and click OK.



In the Settings window click Add.

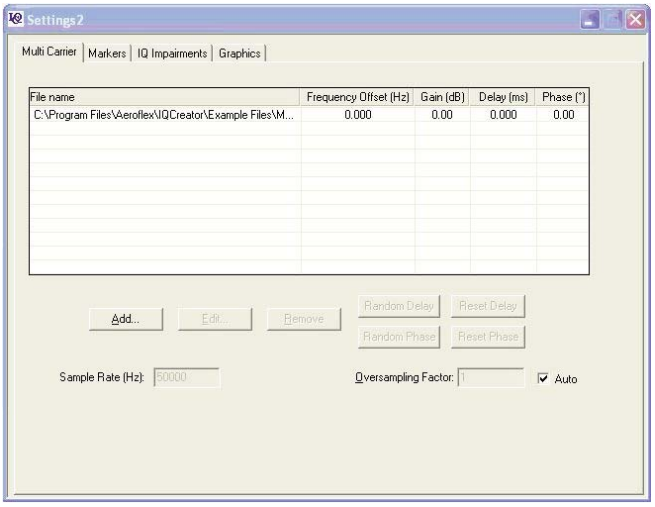


In the Waveform Mixing Parameters window, select the Tone 1 that was generated earlier from the user defined directory.

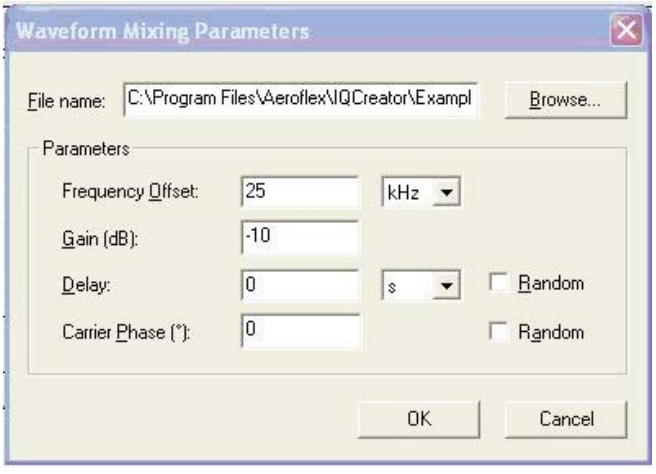


This tone will be used to generate the first modulated carrier. The Frequency Offset and Gain (dB) fields should be left at 0. Click OK.

The first selected modulation tone will now be displayed in the Settings window. Click Add to set up Tone 2.



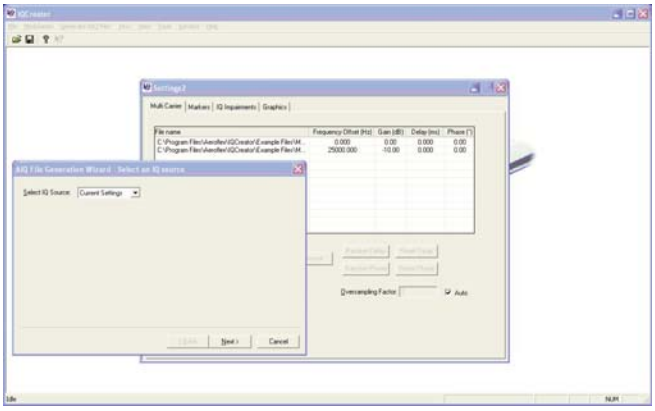
In the Waveform Mixing Parameters window, select the Tone 2 that was generated earlier from the user defined directory.



This tone will be used to generate the second modulated carrier. Set the Frequency Offset to 25 kHz (one standard channel space) and the Gain to -10. Click OK.

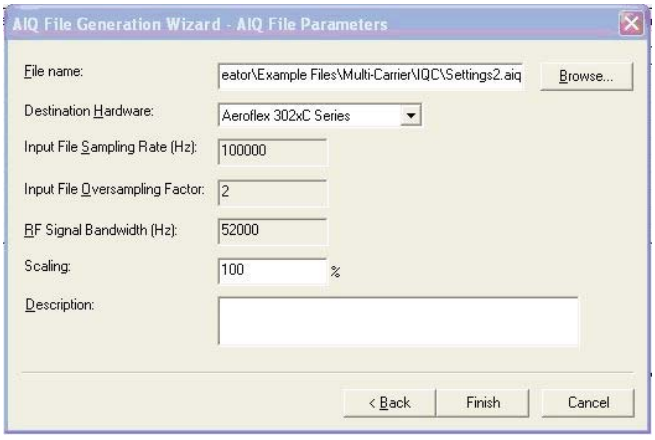
The second selected modulation tone will now be displayed in the Settings window. Save the created file in a user selected directory by clicking the disk icon in the upper left corner of the IQCreator® window. The file will be saved as an .iqc file.

The next step is to generate the AIQ file. Select Generate AIQ File!



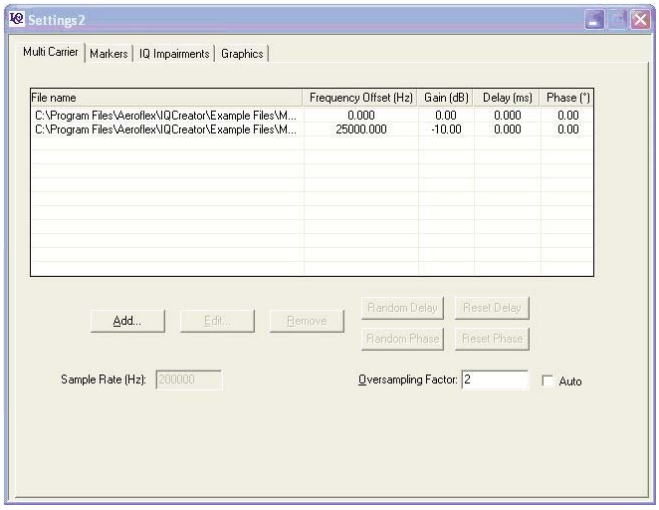
Ensure Current Settings is displayed in the Select IQ Source field and click Next>.

In the AIQ File Generation Wizard – AIQ File Parameters window, enter the user selected directory location and file name in the File Name field. In the Destination Hardware field select Aeroflex 302xC Series.



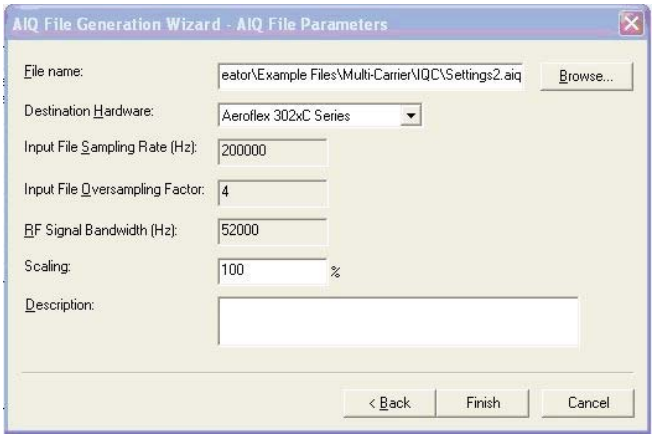
Note: AIQ file generation has a parameter that requires the sampling rate must be four times the baseband bandwidth. As in this case if the sampling rate is too slow an error will occur and the AIQ files will not be generated. To correct the error, cancel the AIQ File Generation and return to the Settings window.

Deselect the Auto setting next to the Oversampling Factor field and enter 2.



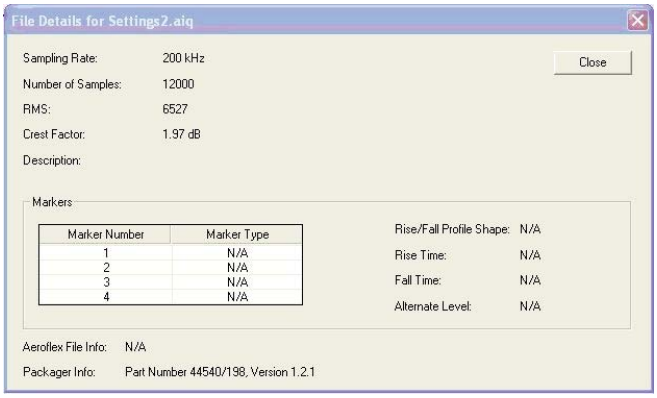
Once the correction is made, select Generate AIQ File!. Ensure Current Settings is displayed in the Select IQ Source field and click Next>.

In the AIQ File Generation Wizard – AIQ File Parameters window ,enter the user selected directory location and file name in the File Name field. In the Destination Hardware field, select Aeroflex 302xC Series.



Note that the Input File Oversampling Factor is now 4. Click Finish.

The following window will appear to confirm the file details. Click Close.



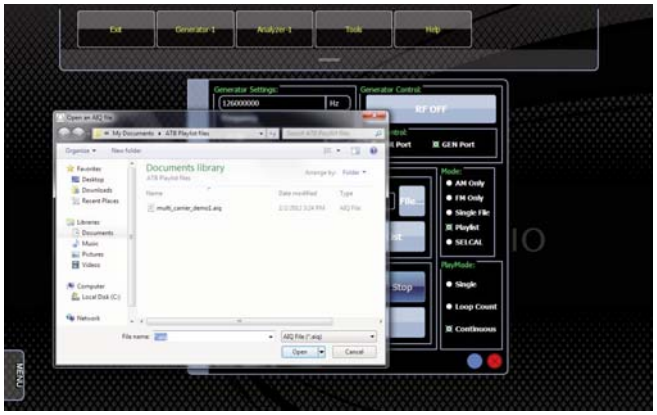
The multi-carrier AIQ file is complete and can be used to generate the test signal.

To demonstrate the waveform, start the ATB-7300 application and select VHF-1 from the Generator-1 dropdown menu.

Set the Generator Frequency to 126 MHz, RF Level to -20 dBm, Port Control to GEN Port, and turn the RF ON.

In the Mode: field select Playlist.

In the Playlist Setting: field select File… select the multi-carrier AIQ file from the user selected directory.



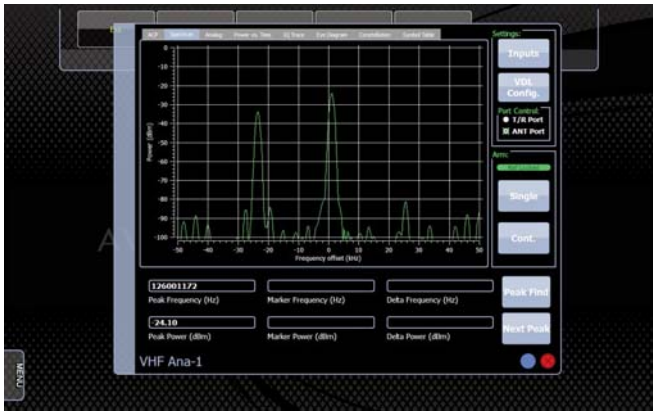
Once the file is opened in the Playlist Settings: select Add To List. In the PlayMode field, select Continuous, then select Play.

To monitor the multi-carrier waveform, connect the ATB-7300 GEN port to the ANT port. From the Analyzer-1 dropdown menu, select VHF-1. Select the Spectrum tab, set Port Control: to ANT Port and set the following inputs.

Frequency: 126.0 MHz

RF Input Level: 0.00 dBm

Span: 100.0 kHz



You can see the main carrier at 126.0 MHz with the second carrier at -25 kHz and -10 dBm from the main carrier.

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