The Latest

RackRF One Signal Generator

Up

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Signal Generators are important tools to test HAM radio equipment. A very simple version that can generate 4 different carriers in some of the HAM radio bands is used to illustrate the possibilities of the HackRF One and other SDR systems.

First step is to set up a few variables within GNU Radio Companion. When a new project is created there is one variable provided called samp_rate. This is used to define the sample rates used for the DA/AD converters in the SDR. HackRF One operates with sample rates between 1 and 20 million in steps of 1 million.

In this example there are two additional variables added. The first one is to set the drive or output level. This is created as a variable called drive with a min and max value of 0 and 1 respectively. The UI element is a knob, but there are several other ways to control the values of any variable from the GUI. For the frequency I chose a radio button style with 4 available options, one for each band and coded the frequencies tbe 50.1MHz (6m), 144.1MHZ (2m), 432.100 (70cm) and 1296.1MHZ (23cm). Having a simple input to enter the exact frequency is another option.

The two active component is the Constant Source used to generate the RF signal and the Soapy HackRF Sink to communicate with the hardware to generate the signal. In more advanced systems the source could be generated from audio files or a microphone input to allow transmission of a real signal.

When the application is running it will generate an application as shown below:

A copy of the GNU Radio Companion project file can be downloaded here.

To test the system I used my HT to listen to one of the 4 frequencies, turn up the drive until the signal was received. The maximum output power of the HackRF One device is in the range of 0-15dBm depending on the frequency selected.

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