

### Exercise 3: Demodulating AM and SSB Signals

The USRP can be used to capture and store up to 64 MHz of spectrum. As illustrated in the presentation, the spectrum of this data file can be examined using MATLAB. By viewing the spectrum we can find the frequencies at which signal appear. When viewing the spectrum, remember that:

- The center or zero frequency corresponds to the frequency that the USRP is tuned to.
- The spectrum is inverted. That is, a signal that appears at 10 KHz below the center (i.e. -10000) is really 10 KHz above the center.

A number of data files containing sections of the spectrum with active signals can be found at: [http://www.kd7lmo.net/ground\\_gnuradio\\_ota.html](http://www.kd7lmo.net/ground_gnuradio_ota.html)

1. Select one of the data files to download that includes SSB signals. It is recommended that you start with the one at 7.200 MHz that was discussed in the presentation. The files are compressed.
2. Use MATLAB to examine the spectrum of the signal and identify frequencies that contain strong signals.
3. Use `ssb_rcv_file.py` to demodulate the signals. The correct form for executing this program is:

```
./ssb_rcv_file.py filename carrieroffset 1500 l or u
```

- `carrieroffset` is the frequency that the signal is offset from the center (remember the inversion)
  - `l` or `u` refers to LSB (`l`) or USB (`u`)
  - `filename` is the name of your data file and should have a `.dat` suffix
4. Record a list of the carrier offset frequencies at which you were able to demodulate signals. Also note whether they are lower or upper sideband.