Appadwedula, Swaroop - 0664 - MITLL

From:	Romero, David - 0662 - MITLL
Sent:	Monday, October 26, 2020 10:38 AM
To:	Appadwedula, Swaroop - 0664 - MITLL
Subject:	Part 1: I/Q data
Attachments:	read_interleaved_float32.m; sync_example.m

Swaroop,

Here's part of what we discussed. Below covers the received data for both transmit PA operating modes (I included the linear PA operating mode data in case it's useful), and further below I give the locations of the IQ data files that were transmitted.

All of the data below (received and transmitter source data) is sampled at Fs = 8*5/6*1e6 samps/sec.

P1dB PA operation (corresponds to the 31 dB cancellation curve from the brief):
/afs/mitll/data/2239-2601/data/fromStrokkur/Experiments/30Sept2020/iqdata/C

Linear PA operation (corresponds to the 40 dB cancellation curve from the brief):
/afs/mitll/data/2239-2601/data/fromStrokkur/Experiments/01Oct2020/iqdata/C

Each of the above directories contain received data in files that are named, for example:
rx_file_30Sept2020_expC_noisegenon43dBatten_ptobatten00db_btobatten41db_PAon.dat

The thing to make note of in the naming convention is that

*_ptobatten00db_btobatten41db_*

means that the J/S for that experiment was approximately 41 dB +/-1dB, whereas a file with the name:

*_ptobatten40db_btobatten41db_*

means the J/S was around 0 dB +/-1 dB (the step attenuators in the test bed are not perfect 1 dB steps).

For the source data:

This is the file that contains the IQ samples of the communications signal (which was a repeating PRBS11 sequence with one bit (a 1) appended to the end to make each repetition of the bit sequence even length 2^11. The bits were mapped to QPSK and RRC pulse shaped, symbol rate is 5/6*1e6 syms/sec):
/afs/mitll/data/2239-2601/data/SourceData/mod_carrier_test_20200408T105551_1.dat

The jammer was the truncated white Gaussian noise (T-WGN) signal that was also pulse shaped using an RRC filter (this file is about 30 seconds long, has a symbol rate of 5/6*1e6 syms/sec):
/afs/mitll/data/2239-2601/data/SourceData/TWGN_waveform/tawgn_test_20200610T140054_1.dat

The data is formatted in the typical interleaved I/Q format (float32 for each part).

I'm attaching a simple script that searches for the sync peak of the T-WGN signal in one of the files in the 30Sept directory. If you just run that script (with the attached reader subfunction in your path) you will see that a nice peak is obtained beginning around what I've defined as sample block (or sync block index) 268.

I'll work on putting together a clear version of the receiver for the PRBS11 data. I, of course, already have it but I'm going to clean it up a bit.

David