Hi!
Manuscript Neuromed Submitted Submitted
Bruno Neuromed

WORKSHEET

The purpose of the computer workshop is to explain how the data is extracted from the CLEPS-E[1] box.

1) Assignment A: DAQ24

Q: Is the ok sensor as well as the same experiments with the DAQ24.

Notice some results are stored on account of the **/home/brainstimulation** user and **/opt/** system root utilities.

Please read the DAQ24 manual which in particular Lab 1, 2, 3 and 4 during the lab session.

Please change the code to change the parameters according to the instructions and the scalers (AIP and discriminator) measurements using the oscilloscope.

Please report the results and interpretations of the results.

Lab 1

- Lab 1.1: Changing the 50 Ω bandwidth
- Lab 1.2: Changing the 50 Ω with overall frequency carrier
- Lab 1.3: Changing the 50 Ω with overall frequency carrier
- Lab 1.4: Changing the 50 Ω with overall frequency carrier and Scheme

The equipments available for the Lab

Blue Shelter

- one Oscilloscope[2]
- one DT5740, 400 ch one channel, Δ_{ν} ;

AIP

- One Bladder's PI 8 with Electro Inserter
- One Bladder's PI 8 Inserter
- One Dark Cube (shroud)
- One Dark Cube (shroud)

Tools used to extract the data

1.2.4.2 Connecting the Quectel using Linux (as an alternative to Windows)

Step 1: Install minicom

```
sudo apt install -y epel apt-get -y install lsscsi minicom
```

Step 2: Extract the Quectel from usb/ttyUSB0 (/dev/ttyUSB0/quectel.conf) and run:

```
minicom -D /dev/ttyUSB0 -b 115200 -o -S /home/brainstimulation/.cnc/quectel.conf
```

Step 3: Check the Quectel is the only device that is plugged in:

```
lsusb
ls -ltrh /dev/ttyUSB*
dmesg | tail -n 20 | grep -i usb
```

Step 4: Check the Quectel is the only device that is plugged in:

```
Bus 002 Device 002: ID 8087:0024 Intel Corp. Integrated Rate Matching Hub
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 002: ID 8087:0024 Intel Corp. Integrated Rate Matching Hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
crw-rw-rw- 1 root dialout 188, 0 Jun 11 14:47 /dev/ttyUSB0
usb 1-1.2: USB disconnect, device number 6
usb 1-1.2: new full-speed USB device number 7 using ehci-pci
usb 1-1.2: New USB device found, idVendor=2c7c, idProduct=0125, bcdDevice= 3.18
usb 1-1.2: New USB device strings: Mfr=1, Product=2, SerialNumber=3
usb 1-1.2: Product: Quectel LTE Module
usb 1-1.2: Manufacturer: Quectel
usb 1-1.2: SerialNumber: 0123456789ABCDEF
usb 1-1.2: configurations=1
usb 1-1.2: USB disconnect, device number 7
usb 1-1.2: new full-speed USB device number 8 using ehci-pci
usb 1-1.2: New USB device found, idVendor=2c7c, idProduct=0125, bcdDevice= 3.18
usb 1-1.2: New USB device strings: Mfr=1, Product=2, SerialNumber=3
usb 1-1.2: Product: Quectel LTE Module
usb 1-1.2: Manufacturer: Quectel
usb 1-1.2: SerialNumber: 0123456789ABCDEF
usb 1-1.2: configurations=1
```

Step 5: Check the Quectel is the only device that is plugged in:

```
Welcome to minicom 2.8
OPTIONS: I18n
Compiled on Jan 1, 2023, 00:00
Port /dev/ttyUSB0, 14:47:17
Press Ctrl-A Z for help on special keys
AT+CGMI
AT+CGMI
AT+CGMI
```

```julia
# Define modulation orders and corresponding bits per symbol
modulation_orders = ["QPSK", "16QAM", "64QAM", "256QAM"]
bits_per_symbol = [2, 4, 6, 8]

# Calculate spectrum efficiency
dl_spectrum_efficiency = bits_per_symbol
ul_spectrum_efficiency = bits_per_symbol

# Print the table
println("| Modulation Order (DL , UL)     | DL spectrum efficiency (b/s/Hz) | UL spectrum efficiency (b/s/Hz)  |")
println("|--------------------------------|---------------------------------|----------------------------------|")
for i in 1:length(modulation_orders)
    @printf("| (%10s , %10s)      | %31.1f | %32.1f |\n",
        modulation_orders[i], modulation_orders[i], dl_spectrum_efficiency[i], ul_spectrum_efficiency[i])
end
```

```
| Modulation Order (DL , UL)     | DL spectrum efficiency (b/s/Hz) | UL spectrum efficiency (b/s/Hz)  |
|--------------------------------|---------------------------------|----------------------------------|
| (      QPSK ,       QPSK)      |                             2.0 |                              2.0 |
| (     16QAM ,      16QAM)      |                             4.0 |                              4.0 |
| (     64QAM ,      64QAM)      |                             6.0 |                              6.0 |
| (    256QAM ,     256QAM)      |                             8.0 |                              8.0 |
```

In [ ]: