

Hands On LTE on OpenWrt

Supported hardware

- The supported LTE hardware in OpenWrt can be a minefield and my recommendation is to stick with those hardware that have been tested by the community to be confirmed working.
- In the past I tried to use a Huawei LTE USB stick.
- They can be running in two modes.
 - **RNDIS** https://openwrt.org/docs/guide-user/network/wan/wwan/ethernetoverusb_rndis
 - **NCM** https://openwrt.org/docs/guide-user/network/wan/wwan/ethernetoverusb_ncm
- The preferred mode is **NCM** but the with USB stick I had it was impossible to switch modes and I was stuck with **RNDIS** mode.
- Another time I had a Mikrotik Access Point flashed with OpenWrt that had one of their LTE modems (pcie card). After many days of trying various things I eventually just gave up and replaced the card with one that has proper OpenWrt support.
- Some Access Points that comes with LTE modems included are well supported in OpenWrt.
 - Cell-C / Belotech (https://openwrt.org/toh/cell_c/rtl30vw)
 - GL.iNet GL-MiFi (<https://openwrt.org/toh/gl.inet/gl-mifi>)

Packages to include

- To get the LTE modem working in OpenWrt you need to include some specific packages.
- There are also some optional packages that you can include since they come in handy.

Required

- kmod-usb-wdm
- kmod-usb-net
- kmod-usb-net-qmi-wwan
- libqmi
- uqmi
- kmod-mii

```
opkg update
opkg install kmod-mii kmod-usb-net kmod-usb-wdm kmod-usb-net-qmi-wwan uqmi
```

For Serial Support (AT Commands)

- kmod-usb-serial
- kmod-usb-serial-option
- kmod-usb-serial-wwan

```
opkg update
opkg install kmod-usb-serial-option kmod-usb-serial kmod-usb-serial-wwan
```

Optional

- qmi-utils
- picocom
- luci-proto-qmi

```
opkg update
opkg install picocom qmi-utils uci-proto-qmi
```

Interacting with the modem

- After you installed the packages reboot the Access Point.
- If everything works as intended you should see the following device

```
ls -l /dev/cdc-wdm0
```

- Now you can try to interact with the modem.

```
uqmi -d /dev/cdc-wdm0 --get-data-status
```

```
#This is the return
```

```
"connected"
```

```
uqmi -d /dev/cdc-wdm0 --get-signal-info
```

```
#This is the return
```

```
{
  "type": "lte",
  "rssi": -69,
  "rsrq": -11,
  "rsrp": -96,
  "snr": 11.000000
}
```

```
uqmi -d /dev/cdc-wdm0 --get-system-info
```

```
#This is the return
```

```
{
  "wcdma": {
    "service_status": "none",
    "true_service_status": "none",
    "preferred_data_path": false
  },
  "lte": {
    "service_status": "available",
    "true_service_status": "available",
    "preferred_data_path": false,
    "domain": "cs-ps",
    "service": "cs-ps",
    "roaming_status": "off",
    "forbidden": false,
    "mcc": "655",
    "mnc": "07",
    "tracking_area_code": 18,
    "enodeb_id": 18353,
    "cell_id": 80,
    "voice_support": true,
    "ims_voice_support": false,
    "cell_access_status": "all calls",
    "registration_restriction": 0,
  }
}
```

```
    "registration_domain": 0
  }
}
```

UCI Configuration

- The UCI system includes support for LTE configuration in `/etc/config/network`.
- The MESHdesk firmware will create the config section based on the configuration returned by the controller.
- Here is a sample section as reference

```
config interface 'wwan'
  option ifname 'wwan'
  option disabled '0'
  option wan_bridge '0'
  option device '/dev/cdc-wdm0'
  option apn 'lte.broadband.is'
  option proto 'qmi'
  option auth 'none'
```

- You can also install the **luci-proto-qmi** package which essentially does the same that MESHdesk and APdesk does but only local on the Access Point.

Using AT Commands

- We can use picocom terminal to reach the LTE modem

```
picocom /dev/ttyUSB2
```

- I had to first issue the following commands before the modem returned something for CUSD

```
AT+CMGF=1
OK
ATZ
OK
AT+CUSD=1,"*101#",15
OK
+CUSD: 0,"Balance: R 0.00 .Data: 25.83 MB.",15
```

- You can also issue the following command without needing to log into picocom

```
echo 'AT+CUSD=1,"*101#",15' | picocom -qrix 10000 /dev/ttyUSB2
#Here is what my provider returned
+CUSD: 0,"Balance: R 0.00 .Data: 6.40 MB.",15
```

From:
<https://www.radiusdesk.com/wiki/> - **RADIUSdesk**

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Last update: **2022/11/23 14:56**

