LTE

Summary

```
Package: system
```

Support for Direct-IP mode type cards only. MBIM support is available in RouterOS v7 releases and MBIM driver is loaded automatically. If modem is not recognized in RouterOS v6 - Please test it in v7 releases before asking for support in RouterOS v6.

To enable access via a PPP interface instead of a LTE Interface, change direct IP mode with `/port firmware set ignore-directip-modem=yes` command and a reboot. Note that using PPP emulation mode you may not get the same throughput speeds as using the LTE interface emulation type.

> ⚠ For RouterOS v7 ignore-direct-modem parameter renamed to "mode" and moved to `/interface lte settings` menu.

LTE Client

```
Sub-menu: /interface lte
```

Properties

Property	Description
allow-roaming (*yes* | *no*; Default: **no**)	Enable data roaming for connecting to other countries data-providers. Not all LTE modems support this feature. Some modems, that do not fully support this feature, will connect to the network but will not establish an IP data connection with allow-roaming set to no.

apn-profiles (*string*; Default: **default**)	Which APN profile to use for this interface
band (*integer list*; Default: **""**)	LTE Frequency band used in communication `LTE Bands and bandwidths`
nr-band (*integer list*; Default: "")	5G NR Frequency band used in communication `5G NR Bands and bandwidths`
comment (*string*; Default: **""**)	Descriptive name of an item
disabled (*yes | no*; Default: **yes**)	Whether interface is disabled or not. By default it is disabled.
modem-init (*string*; Default: **""**)	Modem init string (AT command that will be executed at modem startup)
mtu (*integer*; Default: **1500**)	Maximum Transmission Unit. Max packet size that LTE interface will be able to send without packet fragmentation.
name (*string*; Default: **""**)	Descriptive name of the interface.
network-mode (*3g | gsm | lte | 5g*)	Select/force mode for LTE interface to operate with
operator (*integer*; Default: **""**)	used to lock device to specific operator full PLMN number is used for lock consisting from MCC+MNC. PLMN codes
pin (*integer*; Default: **""**)	SIM Card's PIN code.

APN profiles

All network related settings are moved under profiles, starting from RouterOS 6.41

```
Sub-menu: /interface lte apn
```

Property	Description
add-default-route (*yes | no*)	Whether to add default route to forward all traffic over the LTE interface.
apn (*string*)	Service Provider's Access Point Name
authentication (*pap | chap | none*; Default: **none**)	Allowed protocol to use for authentication
default-route-distance (*integer*; Default: **2**)	Sets distance value applied to auto created default route, if add-default-route is also selected. LTE route by default is with distance 2 to prefer wired routes over LTE
ip-type (*ipv4 | auto | ipv6*; Default: **auto**)	Requested PDN type
ipv6-interface (; Default:)	Interface on which to advertise IPv6 prefix
name (*string*; Default:)	APN profile name
number (*integer*; Default:)	APN profile number

passthrough-interface (; Default:)	Interface to passthrough IP configuration (activates passthrough)
passthrough-mac (*MAC*; Default: **auto**)	If set to auto, then will learn MAC from first packet
passthrough-subnet-selection (*auto / p2p*; Default: **auto**)	"auto" selects the smallest possible subnet to be used for the passthrough interface. "p2p" sets the passthrough interface subnet as /32 and picks gateway address from 10.177.0.0/16 range. The gateway address stays the same until the apn configuration is changed.
password (*string*; Default:)	Password used if any of the authentication protocols are active
use-network-apn (*yes / no*; Default: **yes**)	Parameter is available starting from RouterOS v7 and used only for MBIM modems. If set to yes, uses network provided APN.
use-peer-dns (*yes / no*; Default: **yes**)	If set to yes, uses DNS recieved from LTE interface
user (*integer*)	Username used if any of the authentication protocols are active

LTE settings

LTE and router-specific LTE settings. The menu is available starting from RouterOS v7.

```
Sub-menu: /interface lte settings
```

Property	Description
mode (*auto / mbim / serial*; *Default:* **auto**)	Operation mode setting. • auto - automatically select the operation mode. • serial - provide only serial ports • mbim - switch modem into MBIM mode if possible
firmware-path (*string*)	Firmware path in host OS. Modem gobi firmware
external-antenna (*auto / both / div / main / none*; Default: **auto**)	This setting is only available for "Chateau" routers, except for Chateau 5G versions. • auto - measures the signal levels on both internal and external antennas and selects the antennas with the best signal(RSRP). • both - both antennas are set to external • div - diversity antenna set to external • main - main antenna set to external • none - no external antenna selected(using internal antennas)
external-antenna-selected ()	This setting is only available for "Chateau" routers, except for Chateau 5G versions. Shows the currently selected antenna if "**external-antenna**" is set to "auto"
sim-slot ()	This setting is available for routers that have switchable SIM slots (LtAP, SXT). Selection options differ between products.

Scanner

It is possible to scan LTE interfaces with `/interface lte scan` command. Example:

```
[admin@MikroTik] > /interface lte scan duration=60 number=0
Columns: OPERATOR, MCC-MNC, RSSI, RSRP, RSRQ
OPERATOR  MCC-MNC RSSI     RSRP     RSRQ
LMT       24701   -36dBm   -63dBm   -7dB
```

Available properties:

Property	Description
duration (*integer*)	Duration of scan in seconds
freeze-frame-interval (*integer*)	time between data printout
number (*integer*)	Interface number or name

User Info command

It is possible to send special "info" command to LTE interface with `/interface lte info` command. In RouterOS v7 this command is moved to `/interface lte monitor` menu.

Properties (Up to 6.40)

Property	Description
user-command (*string*; Default: "")	send a command to LTE card to extract useful information, e.g. with AT commands
user-command-only (*yes | no*; Default:)	

User at-chat command

It is possible to send user defined "at-chat" command to LTE interface with `/interface lte at-chat` command.

```
[admin@MikroTik] > /interface lte at-chat lte1 input="AT"
  output: OK
```

It is also possible to use the "wait" parameter *wait=yes* with the command to make "at-chat" wait for 5 seconds and return all the output instead of returning only the first received data, this is useful for some commands that return multiline output or a large block of data.

```
[admin@MikroTik] > interface lte at-chat lte1 input="at+qcfg=?"
  output:

[admin@MikroTik] > interface lte at-chat lte1 input="at+qcfg=?" wait=yes
  output: +QCFG: "rrc",(0-5)
         +QCFG: "hsdpacat",(6,8,10-24)
         +QCFG: "hsupacat",(5,6)
         +QCFG: "pdp/duplicatechk",(0,1)
         +QCFG: "risignaltype",("respective","physical")
         +QCFG: "lte/bandprior",(1-43),(1-43),(1-43)
         +QCFG: "volte_disable",(0,1)
         +QCFG: "diversity/config",(4,6),(1-4),(0)
         +QCFG: "div_test_mode",(0,1)
         +QCFG: "usbspeed",("20","30")
         +QCFG: "data_interface",(0,1),(0,1)
         +QCFG: "pcie/mode",(0,1)
         +QCFG: "pcie_mbim",(0,1)
         +QCFG: "sms_control",(0,1),(0,1)
         +QCFG: "call_control",(0,1),(0,1)
         +QCFG: "usb/maxpower",(0-900)
         +QCFG: "efratctl",(0,1)
         +QCFG: "netmaskset",(0,1)[,<netmask>]
         +QCFG: "mmwave",ant_chip,ant_type
         +QCFG: "gatewayset",(0,1)[,<gateway>]
         +QCFG: "clat",(0,1),(0,1),<prefix>,(0,32,40,48,56,64,96),<fqdn>,(0,1),(0,1,2,4,8),(0,1),(0,1),(0,1,2),
(0,1,2)
         +QCFG: "usage/apmem"
         +QCFG: "enable_gea1"[,(0,1)]
         +QCFG: "dhcppktfltr",(0,1)
         OK
```

You can also use "at-chat" function in scripts and assign command output to variable.

```
[admin@MikroTik] > :global "lte_command" [/interface lte at-chat lte1 input="AT+CEREG?" as-value ]
[admin@MikroTik] > :put $"lte_command"
output=+CEREG: 0,1
OK
```

Quick setup example

Start with network settings -

⚠ This guide is for RouterOS versions starting from 6.41

Start with network settings - Add new connection parameters under LTE apn profile (provided by network provider):

```
/interface lte apn add name=profile1 apn=phoneprovider.net authentication=chap password=web user=web
```

Select newly created profile for LTE connection:

```
/interface lte set [find] apn-profiles=profile1
```

LTE interface should appear with running (R) flag:

```
[admin@MikroTik] > /interface lte print
Flags: X - disabled, R - running
0 R name="lte1" mtu=1500 mac-address=AA:AA:AA:AA:AA:AA
```

If required, add NAT Masquerade for LTE Interface to get internet to the local network:

```
/ip firewall nat add action=masquerade chain=srcnat out-interface=lte1
```

After interface is added, you can use "info" command to see what parameters client acquired (parameters returned depends on LTE hardware device):

```
[admin@MikroTik] > interface/lte/monitor
lte1
             status: connected
              model: EG18-EA
           revision: EG18EAPAR01A12M4G
   current-operator: LMT
     current-cellid: 3103242
             enb-id: 12122
          sector-id: 10
         phy-cellid: 480
         data-class: LTE
     session-uptime: 15m54s
               imei: 86981604098XXXX
               imsi: 24701060267XXXX
               uicc: 8937101122102057XXXX
       primary-band: B3@20Mhz earfcn: 1300 phy-cellid: 480
      dl-modulation: qpsk
                cqi: 7
                 ri: 2
                mcs: 1
               rssi: -68dBm
               rsrp: -97dBm
               rsrq: -9dB
               sinr: 6dB
```

Passthrough Example

Starting from RouterOS v6.41 some LTE interfaces support LTE Passthrough feature where the IP configuration is applied directly to the client device. In this case modem firmware is responsible for the IP configuration and router is used only to configure modem settings - APN, Network Technologies and IP-Type. In this configuration the router will not get IP configuration from the modem. The LTE Passthrough modem can pass both IPv4 and IPv6 addresses if that is supported by modem. Some modems support multiple APN where you can pass the traffic from each APN to a specific router interface.

Passthrough will only work for one host. Router will automatically detect MAC address of the first received packet and use it for the Passthrough. If there are multiple hosts on the network it is possible to lock the Passthrough to a specific MAC. On the host on the network where the Passthrough is providing the IP a DHCP-Client should be enabled on that interface to. Note, that it will not be possible to connect to the LTE router via public lte ip address or from the host which is used by the passthrough. It is suggested to create additional connection from the LTE router to the host for configuration purposes. For example vlan interface between the LTE router and host.

To enable the Passthrough a new entry is required or the default entry should be changed in the '/interface lte apn' menu

⚠ Passthrough is not supported by all chipsets.

Examples.

To configure the Passthrough on ether1:

```
[admin@MikroTik] > /interface lte apn add apn=apn1 passthrough-interface=ether1
[admin@MikroTik] > /interface lte set lte1 apn-profiles=apn1
```

To configure the Passthrough on ether1 host 00:0C:42:03:06:AB:

```
[admin@MikroTik] > /interface lte apn add apn=apn1 passthrough-interface=ether1 passthrough-mac=00:0C:42:03:06:
AB
[admin@MikroTik] > /interface lte set lte1 apn-profiles=apn1
```

To configure multiple APNs on ether1 and ether2:

```
[admin@MikroTik] > /interface lte apn add apn=apn1 passthrough-interface=ether1
[admin@MikroTik] > /interface lte apn add apn=apn2 passthrough-interface=ether2
[admin@MikroTik] > /interface lte set lte1 apn-profiles=apn1,apn2
```

To configure multiple APNs with the same APN for different interfaces:

```
[admin@MikroTik] > /interface lte apn add name=interface1 apn=apn1
[admin@MikroTik] > /interface lte apn add name=interface2 apn=apn1 passthrough-interface=ether1
[admin@MikroTik] > /interface lte set lte1 apn-profiles=interface1
[admin@MikroTik] > /interface lte set lte2 apn-profiles=interface2
```

Dual SIM

Boards with switchable SIM slots

RouterBoard	Modem slot	SIM slots	Switchable
LtAP	lower	2 | 3	Y
	upper	1	N
LtAP mini		up | down	Y
SXT R		a | b	Y

SIM slots switching commands

- RouterOS v7

```
/interface lte settings set sim-slot=down
```

- RouterOS v6 after 6.45.1

```
/system routerboard modem set sim-slot=down
```

- RouterOS v6 pre 6.45.1:

```
/system routerboard sim set sim-slot=down
```

For more reference please see board block diagram, Quick Guide and User manual.

Usage Example

Follow this link - Dual SIM Application, to see examples of how to change SIM slot based on roaming status and in case the interface status is down with help of RouterOS scripts and scheduler.

Tips and Tricks

This paragraph contains information for additional features and usage cases.

Find device location using Cell information

On devices using R11e-LTE International version card (wAP LTE kit) some extra information is provided under info command (from 6.41rc61)

```
   current-operator: 24701
               lac: 40
     current-cellid: 2514442
```

Property	Description
current-operator (*integer*; Default:)	Contains MCC and MNC. For example: current-operator: 24701 breaks to: MCC=247 MNC=01
lac (*integer*; Default:)	location area code (LAC)
current-cellid (*integer*; Default:)	Station identification number

Values can be used to find location in databases: Cell Id Finder

Using Cell lock

It is possible to lock R11e-LTE, R11e-LTE6 and R11e-4G modems and equipped devices to exact LTE tower. LTE info command provides currently used cellular tower information:

```
phy-cellid: 384
      earfcn: 1300 (band 3, bandwidth 20Mhz)
```

Property	Description
phy-cellid (*integer*; Default:)	Physical Cell Identification (PCI) of currently used cell tower.
earfcn (*integer*; Default:)	Absolute Radio Frequency Channel Number

Exact tower location as well as available bands and other information can be acquired from mobile carrier or by using online services:

CellMapper

By using those acquired variables it's possible to send AT command to modem for locking to tower in current format:

for R11e-LTE and R11e-LTE6

```
AT*Cell=<mode>,<NetworkMode>,<band>,<EARFCN>,<PCI>

where

<mode> :
0 – Cell/Frequency disabled
1 – Frequency lock enabled
2 – Cell lock enabled

<NetworkMode>
0 – GSM
1 – UMTS_TD
2 – UMTS_WB
3 – LTE

<band>
Not in use, leave this blank

<EARFCN>
earfcn from lte info

<PCI>
phy-cellid from lte info
```

To lock modem at previously used tower at-chat can be used:

```
/interface lte at-chat lte1 input="AT*Cell=2,3,,1300,384"
```

For R11e-LTE all set on locks are lost after reboot or modem reset. Cell data can be also gathered from "cell-monitor".

For R11e-LTE6 cell lock works only for the primary band, this can be useful if you have multiple channels on the same band and you want to lock it to a specific earfcn. Note, that cell lock is not band-specific and for ca-band it can also use other frequency bands, unless you use band lock.

Use cell lock to set the primary band to the 1300 earfcn and use the second channel for the ca-band:

```
/interface lte at-chat lte1 input="AT*Cell=2,3,,1300,138"
```

Now it uses the earfcn: 1300 for the primary channel:

```
    primary-band: B3@20Mhz earfcn: 1300 phy-cellid: 138
        ca-band: B3@5Mhz earfcn: 1417 phy-cellid: 138
```

You can also set it the other way around:

```
/interface lte at-chat lte1 input="AT*Cell=2,3,,1417,138"
```

Now it uses the earfcn: 1417 for the primary channel:

```
    primary-band: B3@5Mhz earfcn: 1417 phy-cellid: 138
        ca-band: B3@20Mhz earfcn: 1300 phy-cellid: 138
```

For R11e-LTE6 modem cell lock information will not be lost after reboot or modem reset. To remove cell lock use at-chat command:

```
/interface lte at-chat lte1 input="AT*Cell=0"
```

for R11e-4G

```
AT%CLCMD=<mode>,<mode2>,<EARFCN>,<PCI>,<PLMN>
AT%CLCMD=1,1,3250,244,\"24705\"
```

where

```
<mode> :
0 - Cell/Frequency disabled
1 - Cell lock enabled

<mode2> :
0 - Save lock for first scan
1 - Always use lock
(after each reset modem will clear out previous settings no matter what is used here)

<EARFCN>
earfcn from lte info

<PCI>
phy-cellid from lte info

<PLMN>
Mobile operator code
```

All PLMN codes available here this variable can be also left blank

To lock modem to the cell - modem needs to be in non operating state, easiest way for **R11e-4G** modem is to add CellLock line to "modem-init" string:

```
/interface lte set lte1 modem-init="AT%CLCMD=1,1,3250,244,\"24705\""
```

Multiple cells can also be added by providing list instead of one tower information in following format:

```
AT%CLCMD=<mode>,<mode2>,<EARFCN_1>,<PCI_1>,<PLMN_1>,<EARFCN_2>,<PCI_2>,<PLMN_2>
```

For example to lock to two different PCIs within same band and operator:

```
/interface lte set lte1 modem-init="AT%CLCMD=1,1,6300,384,\"24701\",6300,385,\"24701\""
```

for Chateau LTE12, Chateau 5G, LHG LTE18 and ATL LTE18

```
AT+QNWLOCK="common/4g",<num of cells>,[[<freq>,<pci>],...]
AT+QNWLOCK=\"common/4g\",1,6300,384
```

where

```
<num of cells>
number of cells to cell lock

<freq>
earfcn from lte info

<pci>
phy-cellid from lte info
```

Single cell lock example:

```
/interface lte at-chat lte1 input="AT+QNWLOCK=\"common/4g\",1,3050,448"
```

Query current configuration:

```
/interface lte at-chat lte1 input="AT+QNWLOCK=\"common/4g\""
```

Multiple cells can also be added to the cell lock. For example to lock to two different cells:

```
/interface lte at-chat lte1 input="AT+QNWLOCK=\"common/4g\",2,3050,448,1574,474"
```

To remove the cell lock use this at-chat command:

```
/interface lte at-chat lte1 input="at+qnwlock=\"common/4g\",0"
```

⚠ 1. Cell lock information will not be saved after a reboot or modem reset. 2. AT+QNWLOCK command can lock the cell and frequency. Therefore, the module can be given priority to register to the locked cell, however, according to the 3gpp protocol, the module will be redirected or handover to a cell with better signal instructions, even if it is not within the lock of the command. This phenomenon is normal.

for Fibocom FG621

AT+GTCELLLOCK=<mode>[,<rat>,<type>,<earfcn>[,<PCI>]]

where

< mode >: integer type; 0 Disable this function 1 Enable this function 2 Add new cell to be locked

<rat>: integer type; 0 LTE 1 WCDMA

<type>: integer type; 0 Lock PCI 1 Lock frequency

<earfcn>: integer type; the range is 0-65535.

<PCI>: integer type; If second parameter value is 0, the range is 0-503 for LTE If second parameter value is 1, the range is 0-512 for WCDMA

Example:

```
/interface lte at-chat lte1 input="AT+GTCELLLOCK=1,0,0,6175,176"
```

Cell Monitor

Cell monitor allows to scan available nearby mobile network cells:

```
[admin@MikroTik] > /interface lte cell-monitor lte1
PHY-CELLID BAND       PSC EARFCN            RSRP         RSRQ          RSSI          SINR
       49 B20          6300          -110dBm       -19.5dB
      272 B20          6300          -116dBm       -19.5dB
      374 B20          6300          -108dBm         -16dB
      384 B1           150           -105dBm       -13.5dB
      384 B3           1300          -106dBm         -12dB
      384 B7           2850          -107dBm       -11.5dB
      432 B7           2850          -119dBm       -19.5dB
```

Gathered data can be used for more precise location detection or for Cell lock.

⚠

⚠ Not all modems support this feature

Troubleshooting

Enable LTE logging:

```
[admin@MikroTik] > /system logging add topics=lte
```

Check for errors in log:

```
[admin@MikroTik] > /log print

11:08:59 lte,async lte1: sent AT+CPIN?
11:08:59 lte,async lte1: rcvd +CME ERROR: 10
```

search for CME error description online,

in this case: CME error 10 - SIM not inserted

Locking band on Huawei and other modems

To lock band for Huawei modems `/interface lte set lte1 band=""` option can't be used.

It is possible to use AT commands to lock to desired band manually.

To check all supported bands run at-chat command:

```
[admin@MikroTik] /interface lte at-chat lte1 input="AT^SYSCFGEX=\?"

output: ^SYSCFGEX: ("00","03","02","01","99"),((2000004e80380,"GSM850/GSM900/GSM1800/GSM1900/WCDMA BCI/WCDMA
BCII/WCDMA BCV/WCDMA BCVIII"),
(3fffffff,"All Bands")),(0-2),(0-4),((800d7,"LTE BC1/LTE BC2/LTE
BC3/LTE BC5/LTE BC7/LTE BC8/LTE BC20"),(7fffffffffffffff,"All Bands"))
OK
```

Example to lock to LTE band 7:

```
[admin@MikroTik] /interface lte set lte1 modem-init="AT^SYSCFGEX=\"03\",3FFFFFFF,2,4,40,,"
```

Change last part **40** to desired band specified hexadecimal value where:

```
4 LTE BC3
40 LTE BC7
80000 LTE BC20
7FFFFFFFFFFFFFFF  All bands
etc
```

All band HEX values and AT commands can be found in Huawei AT Command Interface Specification guide

Check if band is locked:

```
[admin@MikroTik] /interface lte at-chat lte1 input="AT^SYSCFGEX\?"

output: ^SYSCFGEX: "03",3FFFFFFF,0,2,40
OK
```

For more information check modem manufacturers AT command reference manuals.

mPCIe modems with RB9xx series devices

In case your modem is not being recognized after a soft reboot, then you might need to add a delay before the USB port is being initialized. This can be done using the following command:

```
/system routerboard settings set init-delay=5s
```

Boards with USB-A port and mPCIe

Some devices such as specific RB9xx's and the RBLtAP-2HnD share the same USB lines between a single mPCIe slot and a USB-A port. If auto switch is not taking place and a modem is not getting detected, you might need to switch manually to either use the USB-A or mini-PCIe:

```
/system routerboard usb set type=mini-PCIe
```

Modem firmware upgrade

> ⚠ Before attempting LTE modem firmware upgrade - upgrade RouterOS version to latest releases How To Upgrade RouterOS

Starting from RouterOS version 6.44beta20 it is possible to upgrade modems firmware. The firmware upgrade is also possible for the Chateau series products starting from 7.1beta1 version.

Firmware update is available only as FOTA Firmware Over The Air - firmware upgrade can only be done through working mobile connection for:

-)R11e-LTE
-)R11e-LTE-US

Firmware update available as FOTA and as well as upgrade from file for:

-)R11e-4G
-)R11e-LTE6

Firmware update available as FOTA with access to the internet over any interface:

-)EG12-EA (Chateau LTE12)
-)RG502Q-EA (Chateau 5G)
-)EG18-EA (LHG LTE18)

Firmware updates usually includes small improvements in stability or small bug fixes that can't be included into RouterOS.

Check currently used firmware version by running:

```
[admin@MikroTik] > /interface lte info lte1 once

-----
revision: "MikroTik_CP_2.160.000_v008"
-----
```

Check if new firmware is available:

```
[admin@MikroTik] > /interface lte firmware-upgrade lte1
   installed: MikroTik_CP_2.160.000_v008
      latest: MikroTik_CP_2.160.000_v010
```

Upgrade firmware:

```
[admin@MikroTik] > /interface lte firmware-upgrade lte1 upgrade=yes
   status: downloading via LTE connection (>2min)
```

ⓘ

> ℹ️ Whole upgrade process may take up to 10 minutes, depending on mobile connection speed.

After successful upgrade issue USB power-reset, reboot device or run AT+reset command, to update modem version readout under info command:

```
[admin@MikroTik] > /interface lte at-chat lte1 input="AT+reset"
```

if modem has issues connecting to cells after update, or there are any other unrelated issues - wipe old configuration with:

```
/interface lte at-chat lte1 input="AT+RSTSET"
```

Avoiding tethering speed throttling

Some operators (TMobile, YOTA etc.) allows unlimited data only for device SIM card is used on, all other data coming from mobile hotspots or tethering is highly limited by volume or by throughput speed. Some sources have found out that this limitation is done by monitoring TTL (Time To Live) values from packets to determinate if limitations need to be applied (TTL is decreased by 1 for each "hop" made). RouterOS allows changing the TTL parameter for packets going from the router to allow hiding sub networks. Keep in mind that this may conflict with fair use policy.

```
IPv4 mangle rule:
/ip firewall mangle
add action=change-ttl chain=postrouting new-ttl=set:65 out-interface=lte1 passthrough=yes
IPv6 mangle rule:
/ipv6 firewall mangle
add action=change-hop-limit chain=postrouting new-hop-limit=set:65 passthrough=yes
```

More information: YOTA, TMobile

Unlocking SIM card after multiple wrong PIN code attempts

After locking SIM card, unlock can be done through "at-chat"

Check current PIN code status:

```
/interface lte at-chat lte1 input="at+cpin\?"
```

If card is locked - unlock it by providing:

```
/interface lte at-chat lte1 input="AT+CPIN=\"PUK_code\",\"NEW_PIN\""
```

Replace PUK_code and NEW_PIN with matching values.

> ⚠️ The command for sim slot selection changes in v6.45.1 and again in v7. Some device models like SXT, have SIM slots named "a" and "b" instead of "up" and down"