Configuring and Monitoring P-LTE-450 MHz Modules

Table 1: Feature History

Feature Name	Release Information	Description
Configuring and Monitoring P-LTE-450 modules using Cisco SD-WAN Manager	Cisco IOS XE Catalyst SD-WAN Release 17.18.1a and Cisco Catalyst SD-WAN Manager Release 20.18.1	You can configure category P Long-Term Evolution (LTE) 450MHz Pluggable Interface Module (PIM), referred to as P-LTE-450, on rugged series routers using the Ethernet interface in Cisco SD-WAN Manager. Additionally, Cisco SD-WAN Manager enables you to monitor the module's performance through the monitoring dashboard. Cisco IR1101 Rugged Series Router and Cisco IR1800 Rugged Series Router support P-LTE-450 modules.

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Configuring and monitoring P-LTE-450 modules

A P-LTE-450 module configuration and monitoring is a network management solution that:

- Enables configuration of P-LTE-450 modules through the Ethernet Interface option in Cisco SD-WAN Manager.
- Support real-time monitoring of the P-LTE-450 module's performance on Cisco SD-WAN Manager monitoring dashboard, and
- Simplifies usage of LTE 450 MHz for industrial applications.

P-LTE-450 Pluggable Interface Module

P-LTE-450 PIM enables reliable Long-Term Evolution (LTE) connectivity, specifically tailored for the 450 MHz frequency band, which is widely used in critical communication scenarios such as utility networks, public safety, and rural broadband.

P-LTE-450 module is similar to a Catalyst Cellular Gateway with the following features:

- The modem is an IP passthrough for both IPv4 and IPv6 traffic.
- The management interface, GigabitEthernet 0/1/0 (Base chassis), or GigabitEthernet 0/4/0 (Expansion module), is configured under Cisco IOS XE.

Key difference with LTE modules

P-LTE-450 MHz modules is different from regular LTE modules on the IOS XE platform with a few notable differences. Some of the key differences are:

- IP passthrough is configured on the Gigabit Ethernet interface instead of the cellular interface.
- Allows minimum P-LTE-450 cellular configuration through Cisco IOS XE config mode under Gigabit Ethernet 0/x/0 interface through lte 450 xxx commands.
- Supports GPS connectivity through SMA(f) connector.

  There is no Cisco IOS XE support equivalent to Cellular PIM for GPS features.

Note For more information about , see P-LTE 450 Support and 450MHz Category-4 LTE PIM.

Prerequisite for configuring P-LTE-450 MHz modules

Minimum supported release for configuring P-LTE-450 MHz modules using Cisco SD-WAN Manager is Cisco Catalyst SD-WAN Manager Release 20.18.1 and Cisco IOS XE Catalyst SD-WAN Release 17.18.1a.

- The P-LTE-450 requires Network Advantage license to be recognized under Cisco IOS XE. For more information about licensing policy, see Smart Licensing Using Policy (SLP).
- Thermal Considerations: The host router and the P-LTE-450 module is able to boot up and operate at a lower temperature than the radio module on the P-LTE-450. The radio module will not operate at a temperature below -30° C (-22° F).

Restrictions for configuring P-LTE-450 modules

Avoid Using P-LTE-450 as a Primary Link for PNP

Do not configure the P-LTE-450 module as a primary link for Plug and Play (PNP) deployments.

Platform supports only one P-LTE-450 module

Configure only a single P-LTE-450 module on each platform.

Place P-LTE-450 Only in Supported Slots

Configure the P-LTE-450 module only in slot 0/1 or slot 0/4 due to hardware limitations.

Configure a P-LTE-450 module using Configuration Group and CLI Add-on Profile

To configure a P-LTE-450 module with the **Ethernet Interface** option in Configuration Group and CLI Add-on Profile, follow these steps:

Before you begin

- You must note the username and password that can be found on the sticker label that comes with the P-LTE-450 module. Before performing any P-LTE-450 parameter configuration, set the username and password using CLI.

Procedure

Step 1 Add the following commands in the add-on CLI profile:

```
lte450 band 31
lte450 profile id 2 apn <apn_name> authentication none pdn-type ipv4 vlan <vlan_number>
```

In the preceding command, do the following:

- Configure the username and password of the P-LTE-450 module using the Add-on Profile.
- Provide an appropriate apn_name such as ‘internet’. It should be communicated by your service provider.
- Provide an appropriate vlan_number such as ‘2’.
- Use band ‘`31’ or ‘72’`.

Example:

```
Device:interface GigabitEthernet0/4/0
 no shutdown
 ip address dhcp
 negotiation auto
lte450 credential username admin password VzbhPxZJ42WUhPHB
lte450 band 31
lte450 profile id 2 apn internet authentication none pdn-type ipv4 vlan 2
exit
```

Note
Commands in the CLI add-on Profile override configurations specified by corresponding configuration group features.

Step 2 Configure **Ethernet Interface** in Configuration Group using the **Transport VPN** profile.

Example:

```
Device:interface GigabitEthernet0/4/0.2
 description LTE450 Interface
 no shutdown
 encapsulation dot1Q 2
 ip address dhcp
exit
```

For more information about configuring Ethernet interface in Configuration Group, see Ethernet Interface.

Note
For the the P-LTE-450 module, in the **Interface Name*** field, enter either GigabitEthernet0/4/0.2 or GigabitEthernet0/1/0.2.

What to do next

After configuring the **Ethernet Interface** option, associate the Configuration Group containing the Transport profile to the **Ethernet Interface** option and attach it to the device. For more information, see Deploy a Configuration Group.

Monitor the P-LTE-450 module using Cisco Catalyst SD-WAN Manager

You can monitor the detailed hardware, radio-related, and network-specific information about the P-LTE-450 module using Cisco SD-WAN Manager.

Procedure

Step 1 From the Cisco SD-WAN Manager menu, choose **Monitor** > **Devices**.

Step 2 Choose a device from the list of devices that appear on the dashboard.

Step 3 Click **Real Time** in the left pane.

Step 4 Click **Device Options**, and choose a command.

Table 2: Device Options

Device Option	Command	Description
Cellular LTE450 Hardware	`show lte450 0/1/0 hardware`	Displays the details of modem and PIM information
Cellular LTE450 Radio	`show lte450 0/1/0 radio`	Displays the signal quality
Cellular LTE450 Network	`show lte450 0/1/0 network`	Displays the mobile network status

Monitor a P-LTE-450 module using CLI

You can monitor the hardware, radio, and network-specific details of the P-LTE-450 module using the following CLI commands.

show lte450 0/1/0 radio

The following is a sample output from the show lte450 0/1/0 radio command using the keyword lte450. The example shows

Example

```
Device# show lte450 0/1/0 radio
Signal quality
==============
RSSI = -77 dBm
RSRP = -99 dBm
RSRQ = -8 dB
SINR = 5 dB

Antenna signal quality
======================
Main RSSI = -78 dBm
Main RSRP = -101 dBm
Aux RSSI = -77 dB
Aux RSRP = -99 dB
```

show lte450 0/1/0 hardware

The following is a sample output from the show lte450 0/1/0 hardware hardware command using the keyword lte450. The example shows

Example

```
Device# show lte450 0/1/0 <hardware>

 System Status
=============
System time = Wed May 21 05:31:08 2025
Uptime = 2h 33m 48s
Load Average = 2.67 2.56 2.55
Free Disk space = 89204 KB
Free RAM = 54944 KB

Modem information
=================
Modem MAC = 88:5D:90:EF:FF:FF
Modem hardware version = ML620EU
Modem firmware version = 0.3.4.1/ML620EUV13_RELEASE_20240305
Modem temperature = 48.0 deg C

PIM information
===============
PIM MAC = FC:C2:3D:30:E3:F2
PIM hardware version = IPS-701-V3
PIM firmware version = IPS701-v1.3.0-Secured
PIM serial number = 50030301564
Management IPv4 Address = 192.168.200.1
Management IPv6 Address = fd00:ffff:c0:a8c8::1/64
PIM temperature = 49.5 deg C
```

```
GNSS Location Data
==================
Latitude =
Longitude =
Altitude =
Time =

Watchdog Statistics
===================
Hardware watchdog counter = 0
Modem watchdog counter = 0
```

show lte450 0/1/0 network

The following is a sample output from the show lte450 0/1/0 network command using the keyword lte450. The example shows

Example

```
Device# show lte450 0/1/0 network

Mobile network status
=====================
Connection Status = Online
Connection time = 2h 31m 21s
IMSI = 001010123456058
ICCID = 89860001010123456789
MSISDN =
APN-1 IPv4 address = 192.168.4.38
APN-1 IPv6 address = 2001:0468:3000:0008:2001:0468:3000:0008
APN-2 IPv4 address =
APN-2 IPv6 address =
APN-3 IPv4 address =
APN-3 IPv6 address =

Mobile connection information
=============================
IMEI = 862128050313077
System mode = LTE
EPS State = ATTACHED
RRC State = RRC IDLE
CEREG = 1
APN-1 APN name = ims.mnc001.mcc001.gprs
APN-2 APN name =
APN-3 APN name =
Band = 31
PLMN = 00101
Cell ID = 27447298
TAC = 0(1)
PCI = 2
TX power = 0
Bandwidth = 5MHz
LTE RX channel = 9895
LTE TX channel = 27785
Current upload = 0.0 Kbps
Current download = 0.0 Kbps
```

show lte450 0/1/0 all

The following is a sample output from the show lte450 0/1/0 all command using the keyword lte450 The example shows

Example

```
Device# show lte450 0/1/0 all
System Status
=============
System time = Wed May 21 05:31:44 2025
Uptime = 2h 34m 24s
Load Average = 2.47 2.53 2.54
Free Disk space = 89204 KB
Free RAM = 54944 KB

Modem information
=================
Modem MAC = 88:5D:90:EF:FF:FF
Modem hardware version = ML620EU
Modem firmware version = 0.3.4.1/ML620EUV13_RELEASE_20240305
Modem temperature = 48.0 deg C

PIM information
===============
PIM MAC = FC:C2:3D:30:E3:F2
PIM hardware version = IPS-701-V3
PIM firmware version = IPS701-v1.3.0-Secured
PIM serial number = 50030301564
Management IPv4 Address = 192.168.200.1
Management IPv6 Address = fd00:ffff:c0:a8c8::1/64
PIM temperature = 50.0 deg C

GNSS Location Data
==================
Latitude =
Longitude =
Altitude =
Time =

Watchdog Statistics
===================
Hardware watchdog counter = 0
Modem watchdog counter = 0

Mobile network status
=====================
Connection Status = Online
Connection time = 2h 31m 54s
IMSI = 001010123456058
ICCID = 89860001010123456789
MSISDN =
APN-1 IPv4 address = 192.168.4.38
APN-1 IPv6 address = 2001:0468:3000:0008:2001:0468:3000:0008
APN-2 IPv4 address =
APN-2 IPv6 address =
APN-3 IPv4 address =
APN-3 IPv6 address =

Mobile connection information
=============================
IMEI = 862128050313077
System mode = LTE
EPS State = ATTACHED
RRC State = RRC IDLE
CEREG = 1
APN-1 APN name = ims.mnc001.mcc001.gprs
APN-2 APN name =
APN-3 APN name =
```

```
Band = 31
PLMN = 00101
Cell ID = 27447298
TAC = 0(1)
PCI = 2
TX power = 0
Bandwidth = 5MHz
LTE RX channel = 9895
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Current upload = 0.0 Kbps
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Signal quality
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RSSI = -77 dBm
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```