

Support for P-LTE-450 Pluggable Interface Module

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Support for P-LTE-450 Pluggable Interface Module

The Cisco Catalyst IR1800 Rugged Series Router now supports the 450MHz category P Long-Term Evolution (LTE) Pluggable Interface Module (PIM), referred to as P-LTE-450. The LTE-450 PIM uses the 450MHz frequency to address LTE use cases primarily targeting utility, public safety, and critical infrastructure maintained by public organizations in Europe and other countries. The module supports only Band 31 and 72, which are the LTE operating frequency bands. Due to hardware limitations, P-LTE-450 is supported only on slot 0/4.

Unlike regular LTE modules, the P-LTE-450 has some differences on the IOS-XE platform. Some of the key differences are:

- IP pass through is on Gigabit Ethernet interfaces rather than cellular interfaces.
- Troubleshooting commands are from the Web user interface of third-party hardware.

Note

- Throughout the user documentation, you can see the module referred to as P-LTE-450, the Cisco product name. The module is designed and manufactured by Intelliport, which refers to it as the IPS-701. Both names are present in the documentation.
- Starting with Cisco IOS XE 26.1.1, the **dhcp-default-gateway assign** and **dhcp-default-gateway dont-assign** CLI commands are supported on P-LTE-450 sub-interfaces.

The show command output displays interface details:

```
router#show run | sec 0/4/0
interface GigabitEthernet0/4/0
ip address dhcp
negotiation auto
```

```
ipv6 dhcp client request vendor
ipv6 address autoconfig
ipv6 enable
interface GigabitEthernet0/4/0.2
encapsulation dot1Q 2
ip address dhcp
ipv6 dhcp client request vendor
ipv6 address autoconfig


router#show ip int br
Interface IP-Address OK? Method Status Protocol
GigabitEthernet0/0/0 10.195.236.86 YES NVRAM up up
GigabitEthernet0/1/0 unassigned YES unset down down
GigabitEthernet0/1/1 unassigned YES unset down down
GigabitEthernet0/1/2 unassigned YES unset up up
GigabitEthernet0/1/3 unassigned YES unset down down
Wl0/1/4 unassigned YES unset up up
GigabitEthernet0/4/0 192.168.200.194 YES DHCP up up
GigabitEthernet0/4/0.2 192.168.4.6 YES DHCP up up
GigabitEthernet0/4/0.3 192.168.5.2 YES DHCP up up
Async0/2/0 unassigned YES unset up down
Vlan1 192.168.50.1 YES NVRAM up up
```

For more information on how to configure the router interface for the P-LTE-450 module, See

- Configuring the Router Interface for the P-LTE-450 Module
- Cellular Pluggable Interface Module Configuration Guide
- LTE 450MHz Alliance

Enhancing P-LTE-450 Network Management Through SNMP MIB Objects

In P-LTE-450 networks, routers can provide crucial quality metrics through Simple Network Management Protocol (SNMP) Management Information Base (MIB) objects. Specifically, Cisco IR1101 and IR1800 routers equipped with the P-LTE-450 Pluggable Interface Module (PIM) allows you to integrate seamlessly with existing SNMP-based management tools to report their status and quality metrics.

The router identifies the P-LTE-450 module as an Ethernet interface, specifically Gigabit Ethernet 0/1/0, rather than a cellular interface.. For LTE450 0/1/0 radio parameters to be supported through SNMP, a new MIB file named **Cisco-LTE450-MIB.my** needs to be created. This MIB file includes specific fields to capture radio signal quality metrics.

Supported SNMP MIBs

The **CISCO-LTE450-MIB** SNMP is supported on **Cisco P_ LTE_450 MIB**.

CISCO-LTE450-MIB supports the following MIB fields:

- `**CiscoLte450Entry**`: Main entry point for the MIB
- `**ciscoLte450PortIndex**`: Index for the port (GigabitEthernet0/1/0)
- `**ciscoLte450Rssi**`: RSSI value
- `**ciscoLte450Rsrp**`: RSRP value

- `**ciscoLte450Rsrq**`: RSRQ value
- `**ciscoLte450Sinr**`: SINR value
- `**ciscoLte450RssiMain**`: RSSI value for the main antenna
- `**ciscoLte450RsrpMain**`: RSRP value for the main antenna
- `**ciscoLte450RssiAux**`: RSSI value for the auxiliary antenna
- `**ciscoLte450RsrpAux**`: RSRP value for the auxiliary antenna

View Radio Signal Quality Metrics

The following example displays the signal quality and antenna signal quality of SNMP Cisco 4G LTE 450 configuration:

```
Router#show lte450 0/1/0 radio
Signal quality
==============
RSSI = -88 dBm
RSRP = -114 dBm
RSRQ = -12 dB
SINR = 0 dB

Antenna signal quality
======================
Main RSSI = -87 dBm
Main RSRP = -112 dBm
Aux RSSI = -104 dBm
Aux RSRP = -143 dBm
```

VRF for the P-LTE-450 Module

Virtual Routing Forwarding (VRF) for the LTE450 module creates a separate routing table. This isolates LTE450 traffic, such as monitoring, management, or dedicated data flows. It ensures segregation from other network services on the device.

Starting from IOS-XE 17.18.1a, you can enable VRF to provision LTE450 parameters through the LTE450 management interface. You can enable VRF on 450 PIM management interface to enable HTTP request from router to the webserver of P-LTE-450, and get response from the webserver of P-LTE-450.

Table 1: Feature History Table

Feature	Release Information	Feature Description
VRF for the P-LTE-450 Module	IOS-XE 17.18.1a	You can now enable VRF to provision LTE450 parameters through the LTE450 management interface. You can also enable VRF on 450 PIM management interface to enable HTTP request from router to the webserver of P-LTE-450 and get response from the webserver of P-LTE-450. **Note** The IR1800 router supports the P-LTE-450 module only in slot 4. The IR1101 supports this module in the Base or in the IRM-1100 Expansion Module attached through the Compute Module slot (which is located on the bottom side of the IR1101 Base).

Configure VRF for the P-LTE-450 module

Perform these steps to configure VRF for the P-LTE-450 module.

Procedure

Step 1 Use the **configure** command to enter the global configuration mode.

Example:

```
Router# configure
```

Step 2 Use the **vrf definition** command to create a VRF.

Example:

```
Router(config)# vrf definition lte450_mgmt
```

Step 3 Use the **address-family** command to to set the address family to either IPv4 or IPv6 for traffic routing.

Example:

```
Router(config-vrf-lte450_mgmt)# address-family ipv4
```

Step 4 Use the **exit-address-family** command to exit from the address family configuration mode.

Example:

```
Router(config-vrf-lte450_mgmt-address-family)# exit-address-family
```

Step 5 Use the **exit** command to exit from the VRF configuration mode.

Example:

```
Router(config-vrf-lte450_mgmt)# exit
```

Step 6 Use the **interface** command to configure LTE450 management interface.

Example:

```
Router(config)# interface GigabitEthernet0/1/0
```

Step 7 Use the **description** command to add a description to the interface.

Example:

```
Router(config-if)# description LTE450 Management Interface
```

Step 8 Use the **vrf forwarding** command to associate the LTE 450 management interface with a VRF for traffic routing.

Example:

```
Router(config-if)# vrf forwarding lte450_mgmt
```

Step 9 Use the **ip address dhcp** command for the main interface to retrieve the management address.

Example:

```
Router(config-if)# ip address dhcp
```

Step 10 Use the **negotiation auto** command to configure auto-negotiation to handle different speeds on hardware.

Example:

```
Router(config-if)# negotiation auto
```

Step 11 Use the **lte450 band** command to configure the LTE 450 MHz modem band value.

Example:

```
Router(config-if)# lte450 band 31
/* Possible values are 31 or 72*/
```

Step 12 Use the **end** commad to save and exit the configuration.

Example:

```
Router(config-if)# end
```

Upgrade the P-LTE-450 PIM

Use this task to upgrade the P-LTE-450 PIM firmware on the Cisco Catalyst IR1101 router.

Before you begin

- Ensure the firmware image file is successfully copied to the router's flash memory before initiating the upgrade.

- You can use the **hw-module** command to trigger the firmware update process for the specific PIM slot and subslot.
- Firmware downgrade is not supported by the P-LTE-450 module software.
- You must set the username and password on the module before you perform the firmware upgrade. The credentials can be found on the sticker attached to the module.
- The PIM and Modem firmware can be found in the intelliport website.

Procedure

Step 1 Use the **upgrade hw-module subslot** <*slot*> / <*subslot*> **lte450 pim bootflash:** / <*filename*> command for executing firmware upgrade of P-LTE-450 PIM.

Example:

```
upgrade hw-module subslot 0/1 lte450 pim bootflash:/pim-firmware-filename
```

Step 2 Use the **upgrade hw-module subslot** <*slot*> / <*subslot*> **lte450 modem bootflash:** / <*filename*> command for executing firmware upgrade of modem.

Example:

```
upgrade hw-module subslot 0/1 lte450 modem bootflash:/modem-firmware-filename
```

Note
These delays occur during the upgrade proceedure till it completes:

- Firmware upgrade: The upgrade process typically takes 5–7 minutes to complete.
- Automatic reload: Following the upgrade, the module automatically initiates a reload, which requires an additional 3–5 minutes.
- For post-upgrade delay: Once the module is online there is an additional delay of 2–3 minutes before getting the router prompt.
- Total wait time: The total wait time from the start to end of the upgrade procedure is 10-12 minutes.
- Once PIM module is up, check FW **sh lte450 0/x/0 hardware**.