Cisco Firmware Upgrade Guide for 4G LTE and 5G Cellular Modems

This guide provides information about upgrading 4G LTE and 5G cellular modem firmware on Cisco routers, modules, and cellular gateways.

Document History

Version	Date	Updates
1.0	April 19, 2022	Initial release.
2.0	March 1, 2023	Update EM9190 Modem section with minimum FW requirement.
3.0	May 31, 2023	Update LM960A18 Modem (P-LTEA18-GL), LM960A18 Modem (CG418-E), and EM9190 Modem sections with new FW process and logs
4.0	March 28, 2024	Added EM74x1 and EM9293 modems information.

Rev 4.0

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Overview

Cisco routers and cellular gateways use the cellular modems from Semtech (formerly Sierra Wireless Inc.) and Telit Cinterion. Both modem vendors build Cisco specific firmware packages for their respective modems embedded in the routers and cellular gateways based on the firmware that have been certified by network carriers. These firmware that the modems run on, undergo a thorough testing in the Cisco lab to ensure a seamless integration and functioning between the modem firmware and Cisco IOS. Once evaluated, the firmware are then posted on the Cisco website from where the customers can download them.

Note: For cellular firmware upgrade via SDWAN solution, see https://www.cisco.com/c/en/us/td/docs/routers/sdwan/configuration/Monitor-And-Maintain/monitor-maintain-book/m-cell-modem-firmware-upgrade.html.

List of Cisco products that support 4G LTE and 5G cellular modems

- The following Cisco products support pluggable modules with cellular modems.
  - Cisco 1000 Series Integrated Services Routers
  - Cisco 4000 Series Integrated Services Routers
  - Cisco Enterprise Network Compute System (ENCS) 5400 Series
  - Cisco Catalyst 8200 UCPE Platform
  - Cisco Catalyst 8300 Series Edge Platforms

- The following Cisco products have integrated cellular modems.
  - Cisco Catalyst Cellular Gateway Series
  - Cisco 900 Series Integrated Services Routers
  - Cisco 1000 Series Integrated Services Routers

- The following Cisco pluggable modules have cellular modems.
  - D-LTE-AS (modem: WP7608)
  - D-LTE-GB (modem: WP7607)
  - D-LTE-NA (modem: WP7610)

  - P-LTE-AU (modem: WP7609)
  - P-LTE-GB (modem: WP7607)
  - P-LTE-IN (modem: WP7608)
  - P-LTE-JN (modem: WP7605)
  - P-LTE-MNA (modem: WP7610)
  - P-LTE-US (modem: WP7603)
  - P-LTE-VZ (modem: WP7601)

  - NIM-LTEA-EA (modem: EM7455)
  - NIM-LTEA-LA (modem: EM7430)
  - P-LTEA-EA (modem: EM7455)
  - P-LTEA-LA (modem: EM7430)

  - P-LTEA7-EAL (modem: EM7421)
  - P-LTEA7-JP (modem: EM7431)
  - P-LTEA7-NA (modem: EM7411)

  - P-LTEA18-GL (modem: LM960A18)

  - P-5GS6-GL (modem: FN980)

  - P-5GS6-R16SA-GL (modem: EM9293)

- For Cisco products with cellular modems that are not listed above, see:
  - https://www.cisco.com/c/en/us/td/docs/routers/IIoT/firmware/IIoT-Firmware.html
  - https://www.cisco.com/c/en/us/td/docs/routers/access/interfaces/firmware/Firmware_Upgrade.html

Cellular Modem and Firmware Location

Modem	Supported Carrier	Link to Download
WP7601	Verizon	Download Link
WP7603	AT&T / FirstNet Generic PTCRB Rogers	Download Link
WP7605	KDDI NTT Docomo Softbank	Download Link
WP7607	Generic GCF (EU)	Download Link
WP7608	Generic GCF (India and Asia)	Download Link
WP7609	Telstra Generic GCF (AU, NZ, Brazil)	Download Link
WP7610	AT&T / FirstNet Generic PTCRB Rogers Verizon	Download Link
EM7430	Generic GCF KDDI NTT Docomo Softbank Telstra	KDDI / NTT Docomo / Softbank: Download Link Generic GCF: Download Link Telstra: Download Link
EM7455	AT&T / FirstNet Bell Canada Generic GCF & PTCRB Rogers Sprint Telus US Cellular Verizon	AT&T / FirstNet: Download Link Bell Canada / Rogers / Telus: Download Link Generic GCF & PTCRB: Download Link Sprint: Download Link US Cellular: Download Link Verizon: Download Link
EM7411	AT&T Generic PTCRB Rogers T-Mobile Verizon	Download Link
EM7421	Generic GCF	Download Link
EM7431	Generic GCF KDDI NTT Docomo Softbank	Download Link
LM960A18	AT&T / FirstNet Bell Canada Generic GCF & PTCRB NTT Docomo Rogers Telstra Telus T-Mobile Verizon	Global: Download Link North America: Download Link
EM9190	AT&T / FirstNet Bell Canada Generic GCF & PTCRB KDDI NTT Docomo Softbank T-Mobile Telstra Verizon	Download Link
FN980	AT&T / FirstNet Bell Canada Generic GCF & PTCRB NTT Docomo T-Mobile Telstra Verizon	Download Link

EM9293	AT&T Generic GCF & PTCRB T-Mobile Verizon	Download Link

Note: For modems that are not listed above, see:

- https://www.cisco.com/c/en/us/td/docs/routers/IIoT/firmware/IIoT-Firmware.html
- https://www.cisco.com/c/en/us/td/docs/routers/access/interfaces/firmware/Firmware_Upgrade.html

Identifying the Modem, Firmware Version, Carrier PRI Version, and OEM PRI Version

Issue the following command to identify which modem model and versions currently in the router.

CLI: show cellular <slot> hardware

```
Router#show cellular 0/2/0 hardware
Modem Firmware Version = SWI9X30C_02.33.03.00 ← firmware version
Device Model ID =  EM7455 ← modem model
International Mobile Subscriber Identity (IMSI) = 311480371731931
International Mobile Equipment Identity (IMEI) = 356129070231177
Integrated Circuit Card ID (ICCID) = 89148000003650136091
Mobile Subscriber Integrated Services
Digital Network-Number (MSISDN) = 4086098674
Factory Serial Number (FSN) = LF819406150210
Modem Status = Modem Online
Current Modem Temperature = 31 deg C
PRI SKU ID = 1102526, PRI version = 002.079_002, Carrier = VERIZON ← carrier and carrier PRI version
OEM PRI version = 000.012 ← OEM PRI version
Router#
```

The following command lists all the firmware and carrier PRI versions in the modem.

CLI: show cellular <slot> firmware

```
Router#show cellular 0/2/0 firmware
 Idx Carrier      FwVersion        PriVersion   Status
 1   ATT          02.32.08.00      002.067_001  Inactive
 2   BELL         02.24.05.06      001.005_000  Inactive
 3   GENERIC      02.30.01.01      002.045_001  Inactive
 4   ROGERS       02.30.01.01      001.023_000  Inactive
 5   SPRINT       02.30.01.01      002.045_000  Inactive
 6   TELUS        02.30.01.01      001.023_000  Inactive
 7   US-Cellular  02.30.01.01      000.020_000  Inactive
 8   VERIZON      02.30.01.01      002.052_003  Active
 9   VODAFONE     02.24.03.00      001.001_000  Inactive

Firmware Activation mode  =  AUTO
Router#
```

General Guideline for Cellular Modem Firmware Upgrade

- Modem firmware downgrade is not supported.
- Only use firmware and OEM PRI files from Cisco links listed above.
- Use the latest Cisco IOS for performing firmware upgrades is highly recommended.
  Note: The reason for this is that with every successive IOS release, there are fixes and enhancements that go into the Cisco IOS to address firmware upgrade related and other issues.

Procedure for Modem Firmware Upgrade

Note: Modem firmware downgrade is not supported.

WP76xx Modem Series

For WP76xx modem series, there are 2 types of files for firmware upgrade:

- .SPK (based firmware + particular carrier PRI files)
- .NVU (OEM PRI file)

To update all 3 versions (based firmware, carrier PRI, and OEM PRI), firmware upgrade process needs to be performed for each file separately.

Procedure:

Note: The following examples are used with 17.06.01a version on Cisco C1121-4PLTEP router.

Step 1: Upgrade the router to latest Cisco IOS at Software Download.

Step 2: Based on the modem model in the router, download the latest .SPK and .NVU files from the link provided above.

Step 3: Create a folder in the router's bootflash to host each file.

```
Router#mkdir bootflash:fw_att_wp7610
Create directory filename [fw_att_wp7610]?
Created dir bootflash:/fw_att_wp7610
Router#
Router#
Router#mkdir bootflash:oem_pri_wp7610
Create directory filename [oem_pri_wp7610]?
Created dir bootflash:/oem_pri_wp7610
Router#
```

Step 4: Copy the downloaded files to the newly created folders.

```
Router#copy usb0:/wp7610_fw/WP76xx_02.37.00.00_ATT_002.098_000.spk bootflash:/fw_att_wp7610/
Destination filename [/fw_att_wp7610/WP76xx_02.37.00.00_ATT_002.098_000.spk]?
Copy in
progress...CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
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CCCCCCCCCCCCCCCCCC
69681604 bytes copied in 4.356 secs (15996695 bytes/sec)
Router#
Router#
```

```
Router#copy usb0:/wp7610_fw/WP7610_1104490_02.37.06.00_00_Cisco_001.002_000.nvu bootflash:/oem_pri_wp7610/
Destination filename [/oem_pri_wp7610/WP7610_1104490_02.37.06.00_00_Cisco_001.002_000.nvu]?
Copy in progress...C
26612 bytes copied in 0.032 secs (831625 bytes/sec)
Router#
```

Step 5: Verify the files were correctly copied to the newly created folders.

```
Router#dir bootflash:fw_att_wp7610
Directory of bootflash:/fw_att_wp7610/

16322   -rw-        69681604  Oct 15 2021 00:37:59 +00:00  WP76xx_02.37.00.00_ATT_002.098_000.spk

2908606464 bytes total (517758976 bytes free)
Router#
Router#
Router#dir bootflash:oem_pri_wp7610
Directory of bootflash:/oem_pri_wp7610/

24482   -rw-          26612  Oct 15 2021 00:41:12 +00:00  WP7610_1104490_02.37.06.00_00_Cisco_001.002_000.nvu

2908606464 bytes total (517758976 bytes free)
Router#
```

Step 6: Verify current firmware, carrier PRI, and OEM PRI versions.

```
Router#show cellular 0/2/0 hardware
Modem Firmware Version = SWI9X07Y_02.28.03.01
Device Model ID =  WP7610
International Mobile Subscriber Identity (IMSI) = 310410819528409
International Mobile Equipment Identity (IMEI) = 356307100171171
Integrated Circuit Card ID (ICCID) = 89014103278195284099
Mobile Subscriber Integrated Services
Digital Network-Number (MSISDN) = 14082216639
Factory Serial Number (FSN) = ZT953188681410
Modem Status = Modem Online
Current Modem Temperature = 32 deg C
PRI SKU ID = 1104490, PRI version = 002.071_000, Carrier = ATT
OEM PRI version = 001.001
Router#
Router#
Router#show cellular 0/2/0 firmware
 Idx Carrier     FwVersion      PriVersion   Status
 1   ATT         02.28.03.01    002.071_000  Active
 2   GENERIC     02.28.03.01    002.064_000  Inactive
 3   VERIZON     02.28.03.04    002.075_000  Inactive

Firmware Activation mode  =  AUTO
Router#
```

Step 7: Initiate modem firmware upgrade using the microcode reload command.

Important: Do not remove power or reload the router during the firmware upgrade process.

CLI: microcode reload cellular 0 <slot> modem-provision bootflash:<folder_name>

Upgrading the firmware and carrier PRI:

```
Router#microcode reload cellular 0 2 modem-provision bootflash:fw_att_wp7610
```

```
Reload microcode? [confirm]
Log status of firmware download in router flash?[confirm]
Firmware download status will be logged in bootflash:fwlogfile
Microcode Reload Process launched for cwan slot/bay =0/2; hw type=0x102download option = 0

Router#
*******************************************************
 The interface will be Shut Down for Firmware Upgrade
 This will terminate any active data connections.
*******************************************************Success !! send FW Upgrade command to card

**************************
 Modem will be upgraded!
 Upgrade process will take up to 15 minutes. During
 this time the modem will be unusable.
 Please do not remove power or reload the router during
 the upgrade process.
**************************
*Oct 15 00:45:17.349: %LINK-5-CHANGED: Interface Cellular0/2/0, changed state to administratively down
*Oct 15 00:45:17.350: %LINK-5-CHANGED: Interface Cellular0/2/1, changed state to administratively down
----------------------------
FIRMWARE INFO BEFORE UPGRADE:
Modem Device ID: WP7610  MODEM F/W Boot Version: SWI9X07Y_02.28.03.01
Modem F/W App Version: SWI9X07Y_02.28.03.01      Modem SKU ID: 1104490
Modem Package Identifier:
Modem PRI Ver: 001.001   Modem Carrier Name: ATT
Modem Carrier Revision: 002.071_000
----------------------------
*Oct 15 00:45:20.688: %IOSXE-3-PLATFORM: R0/0: ngiolite:   libSDP_BuildImagesPreferenceRequest called for SPK file
*Oct 15 00:45:21.352: %IOSXE-3-PLATFORM: R0/0: kernel: GobiSerial driver ttyUSB2: usb_serial_generic_submit_read_urb -
usb_submit_urb failed: -19
*Oct 15 00:45:21.356: %IOSXE-3-PLATFORM: R0/0: kernel: GobiSerial driver ttyUSB2: usb_serial_generic_submit_read_urb -
usb_submit_urb failed: -19
*Oct 15 00:45:21.949: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[unbind] State[1]
*Oct 15 00:45:22.964: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*Oct 15 00:45:22.955: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[remove] State[2]
*Oct 15 00:45:41.066: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[add] State[0]
*Oct 15 00:45:41.166: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[bind] State[0]
FW_UPGRADE: Upgrade begin at Fri Oct 15 00:45:43 2021
FW_UPGRADE: Upgrade end at Fri Oct 15 00:47:07 2021
FW_UPGRADE: Firmware upgrade success.....
FW_UPGRADE: Waiting for modem to become online
*Oct 15 00:47:06.492: %IOSXE-3-PLATFORM: R0/0: kernel: GobiSerial driver ttyUSB0: usb_serial_generic_submit_read_urb -
usb_submit_urb failed: -19
*Oct 15 00:47:06.493: %IOSXE-3-PLATFORM: R0/0: kernel: GobiSerial driver ttyUSB0: usb_serial_generic_submit_read_urb -
usb_submit_urb failed: -19
*Oct 15 00:47:06.561: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[unbind] State[0]
*Oct 15 00:47:07.570: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*Oct 15 00:47:07.564: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[remove] State[2]
*Oct 15 00:47:23.461: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[add] State[1]
*Oct 15 00:47:23.601: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[bind] State[1]
----------------------------
FIRMWARE INFO AFTER UPGRADE:
Modem Device ID: WP7610  MODEM F/W Boot Version: SWI9X07Y_02.37.00.00
Modem F/W App Version: SWI9X07Y_02.37.00.00      Modem SKU ID: 1104490
Modem Package Identifier:
Modem PRI Ver: 001.001   Modem Carrier Name: ATT
Modem Carrier Revision: 002.098_000
----------------------------
F/W Upgrade: Firmware Upgrade has Completed Successfully
```

*Oct 15 00:49:23.957: Setting the band preference on modem for sim 0 to match the configured settings

*Oct 15 00:49:36.957: %CELLWAN-2-MODEM_UP: Modem in slot 0/2 is now UP
*Oct 15 00:49:37.162: %CELLWAN-2-MODEM_RADIO: Cellular0/2/0 Modem radio has been turned on
*Oct 15 00:49:37.171: %CELLWAN-5-FIRMWARE_SWITCH: Firmware switchover initiated for modem in slot 0/2
*Oct 15 00:49:43.169: %CELLWAN-4-MODEM_RESTART_IND: Cellular0/2/0 Modem restart reason: Request Modem Reset
*Oct 15 00:49:43.642: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[unbind] State[1]
*Oct 15 00:49:44.658: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*Oct 15 00:49:44.651: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[remove] State[2]
*Oct 15 00:50:11.072: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[add] State[1]
*Oct 15 00:50:11.217: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[bind] State[1]
*Oct 15 00:52:21.960: %CELLWAN-2-MODEM_UP: Modem in slot 0/2 is now UP
*Oct 15 00:52:22.163: %CELLWAN-2-MODEM_RADIO: Cellular0/2/0 Modem radio has been turned on
*Oct 15 00:52:24.161: %LINK-3-UPDOWN: Interface Cellular0/2/0, changed state to down
*Oct 15 00:52:24.164: %LINK-3-UPDOWN: Interface Cellular0/2/1, changed state to down
Router#

Upgrading OEM PRI:

Router#microcode reload cellular 0 2 modem-provision bootflash:oem_pri_wp7610
Reload microcode? [confirm]
Log status of firmware download in router flash?[confirm]
Firmware download status will be logged in bootflash:fwlogfile
Microcode Reload Process launched for cwan slot/bay =0/2; hw type=0x102download option = 0

Router#
****
 The interface will be Shut Down for Firmware Upgrade
 This will terminate any active data connections.
**********Success !! send FW Upgrade command to card

****
 Modem will be upgraded!
 Upgrade process will take up to 15 minutes. During
 this time the modem will be unusable.
 Please do not remove power or reload the router during
 the upgrade process.
****
*Oct 15 00:58:05.400: %LINK-5-CHANGED: Interface Cellular0/2/0, changed state to administratively down
*Oct 15 00:58:05.401: %LINK-5-CHANGED: Interface Cellular0/2/1, changed state to administratively down
----
FIRMWARE INFO BEFORE UPGRADE:
Modem Device ID: WP7610 MODEM F/W Boot Version: SWI9X07Y_02.37.00.00
Modem F/W App Version: SWI9X07Y_02.37.00.00 Modem SKU ID: 1104490
Modem Package Identifier:
Modem PRI Ver: 001.001 Modem Carrier Name: ATT
Modem Carrier Revision: 002.098_000

OEM PRI for SKU :1104490.
*Oct 15 00:58:09.124: %IOSXE-3-PLATFORM: R0/0: kernel: GobiSerial driver ttyUSB2: usb_serial_generic_submit_read_urb - usb_submit_urb failed: -19
*Oct 15 00:58:09.124: %IOSXE-3-PLATFORM: R0/0: kernel: GobiSerial driver ttyUSB2: usb_serial_generic_submit_read_urb - usb_submit_urb failed: -19
*Oct 15 00:58:09.722: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[unbind] State[1]
*Oct 15 00:58:10.734: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*Oct 15 00:58:10.725: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[remove] State[2]
*Oct 15 00:58:28.241: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[add] State[0]
*Oct 15 00:58:28.332: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[bind] State[0]
FW_UPGRADE: Upgrade begin at Fri Oct 15 00:58:30 2021
FW_UPGRADE: Upgrade end at Fri Oct 15 00:58:56 2021

```
FW_UPGRADE: Firmware upgrade success.....
FW_UPGRADE: Waiting for modem to become online
*Oct 15 00:58:55.296: %IOSXE-3-PLATFORM: R0/0: kernel: GobiSerial driver ttyUSB0: usb_serial_generic_submit_read_urb -
usb_submit_urb failed: -19
*Oct 15 00:58:55.296: %IOSXE-3-PLATFORM: R0/0: kernel: GobiSerial driver ttyUSB0: usb_serial_generic_submit_read_urb -
usb_submit_urb failed: -19
*Oct 15 00:58:55.343: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[unbind] State[0]
*Oct 15 00:58:56.358: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*Oct 15 00:58:56.346: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[remove] State[2]
*Oct 15 00:59:12.168: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[add] State[1]
*Oct 15 00:59:12.288: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[bind] State[1]
----------------------------
FIRMWARE INFO AFTER UPGRADE:
Modem Device ID: WP7610  MODEM F/W Boot Version: SWI9X07Y_02.37.00.00
Modem F/W App Version: SWI9X07Y_02.37.00.00      Modem SKU ID: 1104490
Modem Package Identifier:
Modem PRI Ver: 001.002   Modem Carrier Name:
Modem Carrier Revision:
----------------------------
F/W Upgrade: Firmware Upgrade has Completed Successfully
*Oct 15 00:59:58.849: %IOSXE-3-PLATFORM: R0/0: ngiolite: modem qmi fds failed to initialize
*Oct 15 00:59:58.849: %IOSXE-3-PLATFORM: R0/0: ngiolite: CWAN:dev_ready_handler:QMI channels initialization
failed...retry_count[0] vendor:Sierra
*Oct 15 01:00:35.856: %IOSXE-3-PLATFORM: R0/0: ngiolite: modem qmi fds failed to initialize
*Oct 15 01:01:12.862: %IOSXE-3-PLATFORM: R0/0: ngiolite: modem qmi fds failed to initialize
*Oct 15 01:01:15.181: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[unbind] State[1]
*Oct 15 01:01:16.259: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[remove] State[2]
*Oct 15 01:01:16.264: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[add] State[1]
*Oct 15 01:01:16.390: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[bind] State[1]
*Oct 15 01:01:47.051: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*Oct 15 01:02:49.988: Setting the band preference on modem for sim 0 to match the configured settings

*Oct 15 01:03:02.990: %CELLWAN-2-MODEM_UP: Modem in slot 0/2 is now UP
*Oct 15 01:03:03.193: %CELLWAN-2-MODEM_RADIO: Cellular0/2/0 Modem radio has been turned on
*Oct 15 01:03:05.193: %LINK-3-UPDOWN: Interface Cellular0/2/0, changed state to down
*Oct 15 01:03:05.194: %LINK-3-UPDOWN: Interface Cellular0/2/1, changed state to down
Router#
```

Step 8: Verify the modem's firmware, carrier PRI, and OEM PRI were upgraded successfully.

```
Router#show cellular 0/2/0 hardware
Modem Firmware Version = SWI9X07Y_02.37.00.00
Device Model ID =  WP7610
International Mobile Subscriber Identity (IMSI) = 310410819528409
International Mobile Equipment Identity (IMEI) = 356307100171171
Integrated Circuit Card ID (ICCID) = 89014103278195284099
Mobile Subscriber Integrated Services
Digital Network-Number (MSISDN) = 14082216639
Factory Serial Number (FSN) = ZT953188681410
Modem Status = Modem Online
Current Modem Temperature = 33 deg C
PRI SKU ID = 1104490, PRI version = 002.098_000, Carrier = ATT
OEM PRI version = 001.002
Router#
Router#
Router#show cellular 0/2/0 firmware
 Idx Carrier     FwVersion       PriVersion   Status
 1   ATT         02.37.00.00     002.098_000  Active
 2   GENERIC     02.28.03.01     002.064_000  Inactive
 3   VERIZON     02.28.03.04     002.075_000  Inactive
```

```
Firmware Activation mode  =  AUTO
Router#
```

EM7430, EM7455, EM7411, EM7421, EM7431, and EM9293 Modems

For EM7430, EM7455, EM7411, EM7421, EM7431, and EM9293 modems, there are 3 files for firmware upgrade.

- .CWE (based firmware file)
- .NVU (carrier PRI file)
- .NVU (OEM PRI file)

To update all 3 versions (based firmware, carrier PRI, and OEM PRI), firmware upgrade process needs to be performed 2 separate times:

- 1st time with .CWE (based firmware file) and .NVU (carrier PRI file) in 1 folder.
- 2nd time with .NVU (OEM PRI file) in 1 folder.

Procedure:

Note: The following examples are used with 17.06.01a version on Cisco C1121-4PLTEP router.

Step 1: Upgrade the router to latest Cisco IOS at Software Download.

Step 2: Based on the modem model in the router, download the latest .CWE and .NVU files from the link provided above.

Step 3: Create 2 folders in the router's bootflash for each firmware upgrade process.

```
Router#mkdir bootflash:fw_vzw_em7455
Create directory filename [fw_vzw_em7455]?
Created dir bootflash:/fw_vzw_em7455
Router#
Router#
Router#mkdir bootflash:oem_pri_em7455
Create directory filename [oem_pri_em7455]?
Created dir bootflash:/oem_pri_em7455
Router#
```

Step 4: Copy the downloaded files to the newly created folders.

```
Router#copy usb0:/7455_fw/74xx_02.33.03.00.cwe bootflash:/fw_vzw_em7455/
Destination filename [/fw_vzw_em7455/74xx_02.33.03.00.cwe]?
Copy in
progress...CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
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64426341 bytes copied in 3.520 secs (18302938 bytes/sec)
Router#
Router#
Router#copy usb0:/7455_fw/7455_02.33.03.00_VERIZON_002.079_001.nvu bootflash:/fw_vzw_em7455/
Destination filename [/fw_vzw_em7455/7455_02.33.03.00_VERIZON_002.079_001.nvu]?
Copy in progress...C
17447 bytes copied in 0.024 secs (726958 bytes/sec)
```

```
Router#
Router#
Router#copy usb0:/7455_oem_pri/EM7455_1102526_02.33.03.00_00_Cisco_000.016_000.nvu bootflash:/oem_pri_em7455/
Destination filename [/oem_pri_em7455/EM7455_1102526_02.33.03.00_00_Cisco_000.016_000.nvu]?
Copy in progress...C
18051 bytes copied in 0.028 secs (644679 bytes/sec)
Router#
```

Step 5: Verify the files were correctly copied to the newly created folders.

```
Router#dir bootflash:fw_vzw_em7455
Directory of bootflash:/fw_vzw_em7455/

146884  -rw-          17447  Oct 27 2021 04:48:09 +00:00  7455_02.33.03.00_VERIZON_002.079_001.nvu
106090  -rw-       64426341  Oct 27 2021 04:46:21 +00:00  74xx_02.33.03.00.cwe

2908606464 bytes total (201584640 bytes free)
Router#
Router#
Router#dir bootflash:oem_pri_em7455
Directory of bootflash:/oem_pri_em7455/

155047  -rw-          18051  Oct 27 2021 04:52:38 +00:00  EM7455_1102526_02.33.03.00_00_Cisco_000.016_000.nvu

2908606464 bytes total (201584640 bytes free)
Router#
```

Step 6: Verify current firmware, carrier PRI, and OEM PRI versions.

```
Router#show cellular 0/2/0 hardware
Modem Firmware Version = SWI9X30C_02.30.01.01
Device Model ID =  EM7455
International Mobile Subscriber Identity (IMSI) = 311480371731931
International Mobile Equipment Identity (IMEI) = 356129073232008
Integrated Circuit Card ID (ICCID) = 89148000003650136091
Mobile Subscriber Integrated Services
Digital Network-Number (MSISDN) = 4086098674
Factory Serial Number (FSN) = LF103794050210
Modem Status = Modem Online
Current Modem Temperature = 36 deg C
PRI SKU ID = 1102526, PRI version = 002.052_003, Carrier = VERIZON
OEM PRI version = 000.012
Router#
Router#
Router#show cellular 0/2/0 firmware
 Idx Carrier      FwVersion       PriVersion   Status
 1   ATT          02.32.08.00     002.067_001  Inactive
 2   BELL         02.24.05.06     001.005_000  Inactive
 3   GENERIC      02.30.01.01     002.045_001  Inactive
 4   ROGERS       02.30.01.01     001.023_000  Inactive
 5   SPRINT       02.30.01.01     002.045_000  Inactive
 6   TELUS        02.30.01.01     001.023_000  Inactive
 7   US-Cellular  02.30.01.01     000.020_000  Inactive
 8   VERIZON      02.30.01.01     002.052_003  Active
 9   VODAFONE     02.24.03.00     001.001_000  Inactive

Firmware Activation mode  =  AUTO
Router#
```

Step 7: Initiate modem firmware upgrade using the microcode reload command.

Important: Do not remove power or reload the router during the firmware upgrade process.

CLI: microcode reload cellular 0 <slot> modem-provision bootflash:<folder_name>

Upgrading the firmware and carrier PRI:

```
Router#microcode reload cellular 0 2 modem-provision bootflash:fw_vzw_em7455
Reload microcode? [confirm]
Log status of firmware download in router flash?[confirm]
Firmware download status will be logged in bootflash:fwlogfile
Microcode Reload Process launched for cwan slot/bay =0/2; hw type=0x102download option = 0

Router#
**********************************************************
 The interface will be Shut Down for Firmware Upgrade
 This will terminate any active data connections.
**********************************************************Success !! send FW Upgrade command to card

**************************
 Modem will be upgraded!
 Upgrade process will take up to 15 minutes. During
 this time the modem will be unusable.
 Please do not remove power or reload the router during
 the upgrade process.
**************************
*Oct 27 05:01:56.150: %LINK-5-CHANGED: Interface Cellular0/2/0, changed state to administratively down
*Oct 27 05:01:56.155: %LINK-5-CHANGED: Interface Cellular0/2/1, changed state to administratively down
----------------------------
FIRMWARE INFO BEFORE UPGRADE:
Modem Device ID: EM7455  MODEM F/W Boot Version: SWI9X30C_02.30.01.01
Modem F/W App Version: SWI9X30C_02.30.01.01      Modem SKU ID: 1102526
Modem Package Identifier:
Modem PRI Ver: 000.012   Modem Carrier Name: VERIZON
Modem Carrier Revision: 002.052_003
----------------------------
FW_UPGRADE: Modem needs CWE, PRI
*Oct 27 05:02:20.571: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[unbind] State[1]
*Oct 27 05:02:21.577: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[remove] State[0]
FW_UPGRADE: Upgrade begin at Wed Oct 27 05:02:24 2021
FW_UPGRADE: Upgrade end at Wed Oct 27 05:03:35 2021
FW_UPGRADE: Firmware upgrade success.....
FW_UPGRADE: Waiting for modem to become online
*Oct 27 05:03:35.331: %IOSXE-3-PLATFORM: R0/0: kernel: GobiSerial driver ttyUSB0: usb_serial_generic_submit_read_urb -
usb_submit_urb failed: -19
*Oct 27 05:03:35.331: %IOSXE-3-PLATFORM: R0/0: kernel: GobiSerial driver ttyUSB0: usb_serial_generic_submit_read_urb -
usb_submit_urb failed: -19
*Oct 27 05:03:45.785: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[add] State[1]
*Oct 27 05:03:45.927: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[bind] State[1]
----------------------------
FIRMWARE INFO AFTER UPGRADE:
Modem Device ID: EM7455  MODEM F/W Boot Version: SWI9X30C_02.33.03.00
Modem F/W App Version: SWI9X30C_02.33.03.00      Modem SKU ID: 1102526
Modem Package Identifier:
Modem PRI Ver: 000.012   Modem Carrier Name: VERIZON
Modem Carrier Revision: 002.079_001
----------------------------
F/W Upgrade: Firmware Upgrade has Completed Successfully
*Oct 27 05:05:56.936: %CELLWAN-2-MODEM_UP: Modem in slot 0/2 is now UP
*Oct 27 05:05:57.141: %CELLWAN-2-MODEM_RADIO: Cellular0/2/0 Modem radio has been turned on
```

```
*Oct 27 05:05:57.152: %CELLWAN-5-FIRMWARE_SWITCH: Firmware switchover initiated for modem in slot 0/2
*Oct 27 05:06:03.152: %CELLWAN-4-MODEM_RESTART_IND: Cellular0/2/0 Modem restart reason: Request Modem Reset
*Oct 27 05:06:23.214: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[unbind] State[1]
*Oct 27 05:06:24.230: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*Oct 27 05:06:24.223: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[remove] State[2]
*Oct 27 05:06:30.672: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[add] State[1]
*Oct 27 05:06:30.846: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[bind] State[1]
*Oct 27 05:08:41.959: %CELLWAN-2-MODEM_UP: Modem in slot 0/2 is now UP
*Oct 27 05:08:42.162: %CELLWAN-2-MODEM_RADIO: Cellular0/2/0 Modem radio has been turned on
*Oct 27 05:08:44.159: %LINK-3-UPDOWN: Interface Cellular0/2/0, changed state to down
*Oct 27 05:08:44.163: %LINK-3-UPDOWN: Interface Cellular0/2/1, changed state to down
*Oct 27 05:09:09.216: %LINK-3-UPDOWN: Interface Cellular0/2/0, changed state to up
*Oct 27 05:09:10.216: %LINEPROTO-5-UPDOWN: Line protocol on Interface Cellular0/2/0, changed state to up
Router#
```

Upgrading OEM PRI:

```
Router#microcode reload cellular 0 2 modem-provision bootflash:oem_pri_em7455
Reload microcode? [confirm]
Log status of firmware download in router flash?[confirm]
Firmware download status will be logged in bootflash:fwlogfile
Microcode Reload Process launched for cwan slot/bay =0/2; hw type=0x102download option = 0

Router#
**********************************************************
 The interface will be Shut Down for Firmware Upgrade
 This will terminate any active data connections.
**********************************************************Success !! send FW Upgrade command to card

*Oct 27 05:10:29.468: %LINK-3-UPDOWN: Interface Cellular0/2/0, changed state to down
*Oct 27 05:10:30.468: %LINEPROTO-5-UPDOWN: Line protocol on Interface Cellular0/2/0, changed state to down
**************************
 Modem will be upgraded!
 Upgrade process will take up to 15 minutes. During
 this time the modem will be unusable.
 Please do not remove power or reload the router during
 the upgrade process.
**************************
*Oct 27 05:10:34.476: %LINK-5-CHANGED: Interface Cellular0/2/0, changed state to administratively down
*Oct 27 05:10:36.480: %LINK-5-CHANGED: Interface Cellular0/2/1, changed state to administratively down
----------------------------
FIRMWARE INFO BEFORE UPGRADE:
Modem Device ID: EM7455  MODEM F/W Boot Version: SWI9X30C_02.33.03.00
Modem F/W App Version: SWI9X30C_02.33.03.00      Modem SKU ID: 1102526
Modem Package Identifier:
Modem PRI Ver: 000.012   Modem Carrier Name: VERIZON
Modem Carrier Revision: 002.079_001
----------------------------
OEM PRI for SKU :1102526.
*Oct 27 05:10:55.092: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[unbind] State[1]
*Oct 27 05:10:56.094: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[remove] State[0]
FW_UPGRADE: Upgrade begin at Wed Oct 27 05:10:58 2021
FW_UPGRADE: Upgrade end at Wed Oct 27 05:11:00 2021
FW_UPGRADE: Firmware upgrade success.....
FW_UPGRADE: Waiting for modem to become online
*Oct 27 05:11:00.225: %IOSXE-3-PLATFORM: R0/0: kernel: GobiSerial driver ttyUSB0: usb_serial_generic_submit_read_urb -
usb_submit_urb failed: -19
*Oct 27 05:11:00.225: %IOSXE-3-PLATFORM: R0/0: kernel: GobiSerial driver ttyUSB0: usb_serial_generic_submit_read_urb -
usb_submit_urb failed: -19
*Oct 27 05:11:07.693: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[add] State[1]
```

```
*Oct 27 05:11:07.841: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[bind] State[1]
----------------------------
FIRMWARE INFO AFTER UPGRADE:
Modem Device ID: EM7455  MODEM F/W Boot Version: SWI9X30C_02.33.03.00
Modem F/W App Version: SWI9X30C_02.33.03.00      Modem SKU ID: 1102526
Modem Package Identifier:
Modem PRI Ver: 000.016   Modem Carrier Name: VERIZON
Modem Carrier Revision: 002.079_001
----------------------------
F/W Upgrade: Firmware Upgrade has Completed Successfully
*Oct 27 05:13:18.936: %CELLWAN-2-MODEM_UP: Modem in slot 0/2 is now UP
*Oct 27 05:13:19.141: %CELLWAN-2-MODEM_RADIO: Cellular0/2/0 Modem radio has been turned on
*Oct 27 05:13:21.140: %LINK-3-UPDOWN: Interface Cellular0/2/0, changed state to down
*Oct 27 05:13:21.143: %LINK-3-UPDOWN: Interface Cellular0/2/1, changed state to down
Router#
```

Step 8: Verify the modem's firmware, carrier PRI, and OEM PRI were upgraded successfully.

```
Router#show cellular 0/2/0 hardware
Modem Firmware Version = SWI9X30C_02.33.03.00
Device Model ID =  EM7455
International Mobile Subscriber Identity (IMSI) = 311480371731931
International Mobile Equipment Identity (IMEI) = 356129073232008
Integrated Circuit Card ID (ICCID) = 89148000003650136091
Mobile Subscriber Integrated Services
Digital Network-Number (MSISDN) = 4086098674
Factory Serial Number (FSN) = LF103794050210
Modem Status = Modem Online
Current Modem Temperature = 37 deg C
PRI SKU ID = 1102526, PRI version = 002.079_001, Carrier = VERIZON
OEM PRI version = 000.016
Router#
Router#
Router#show cellular 0/2/0 firmware
 Idx Carrier      FwVersion       PriVersion   Status
 1   ATT          02.32.08.00     002.067_001  Inactive
 2   GENERIC      02.30.01.01     002.045_001  Inactive
 3   SPRINT       02.30.01.01     002.045_000  Inactive
 4   VERIZON      02.33.03.00     002.079_001  Active
 5   VODAFONE     02.24.03.00     001.001_000  Inactive

Firmware Activation mode  =  AUTO
Router#
```

LM960A18 Modem (P-LTEA18-GL)

For LM960A18 modem in P-LTEAP18-GL module, there is 1 bundle file for firmware upgrade.

- .BIN (bundle file that has based firmware + all carrier PRI + OEM PRI files)

To update all 3 versions (based firmware, carrier PRI, and OEM PRI), only 1 firmware upgrade process is needed.

Procedure:

Note: The following examples are used with 17.11.01a version on Cisco C1121-4PLTEP router.

Step 1: Upgrade the router to latest Cisco IOS at Software Download.

Step 2: Download the latest .BIN file for LM960A18 modem from the link provided above.

Step 3: Create a folder in the router's bootflash to host the .BIN file.

```
Router#mkdir bootflash:fw_folder
Create directory filename [fw_folder]?
Created dir bootflash:/fw_folder
Router#
```

Step 4: Copy the downloaded .BIN file to the newly created folder.

```
Router#copy usb0:LM960A18_Bundle_HO9_AT8_GN9_TM8_VZ8.bin bootflash:/fw_folder/
Destination filename [/fw_folder/LM960A18_Bundle_HO9_AT8_GN9_TM8_VZ8.bin]?
Copy in
progress...CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
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CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
256334330 bytes copied in 12.768 secs (20076310 bytes/sec)
Router#
```

Step 5: Verify the .BIN file was correctly copied to the newly created folder.

```
Router#dir bootflash:fw_folder
Directory of bootflash:/fw_folder/

16322   -rw-       256334330  May 30 2023 06:02:45 +00:00  LM960A18_Bundle_HO9_AT8_GN9_TM8_VZ8.bin

2908606464 bytes total (650420224 bytes free)
Router#
```

Step 6: Verify current firmware, carrier PRI, and OEM PRI versions.

```
Router#show cellular 0/2/0 hardware
Modem Firmware Version = 32.00.124
Host Firmware Version = 32.00.004_2
Device Model ID =  LM960A18
International Mobile Subscriber Identity (IMSI) = 311480590277912
International Mobile Equipment Identity (IMEI) = 358347100173239
Integrated Circuit Card ID (ICCID) = 89148000006103564728
Mobile Subscriber Integrated Services
Digital Network-Number (MSISDN) = 4085153589
Modem Status = Modem Online
Current Modem Temperature = 30 deg C
PRI version = 2020, Carrier = Verizon
OEM PRI version = 32101006
Router#
Router#
Router#show cellular 0/2/0 firmware
 Idx Carrier           FwVersion      PriVersion   Status
 1   Generic            32.00.114      1023        Inactive
 2   Verizon            32.00.124      2020        Active
 3   ATT               32.00.143      4021        Inactive

Firmware Activation mode  =  AUTO
Router#
```

Step 7: Initiate modem firmware upgrade using the microcode reload command.

Important: Do not remove power or reload the router during the firmware upgrade process.

CLI: microcode reload cellular 0 <slot> modem-provision bootflash:<folder_name>

```
Router#microcode reload cellular 0 2 modem-provision bootflash:fw_folder
Reload microcode? [confirm]
Log status of firmware download in router flash?[confirm]
Firmware download status will be logged in bootflash:fwlogfile
Microcode Reload Process launched for cwan slot/bay =0/2; hw type=0x102download option = 0

Router#
**************************************************
 The interface will be Shut Down for Firmware Upgrade
 This will terminate any active data connections.
**************************************************Success !! send FW Upgrade command to card

*************************
 Modem will be upgraded!
 Upgrade process will take up to 15 minutes. During
 this time the modem will be unusable.
 Please do not remove power or reload the router during
 the upgrade process.
*************************
*May 30 16:47:20.139: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[unbind] State[1]
*May 30 16:47:21.157: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*May 30 16:47:21.145: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[remove] State[2]
*May 30 16:47:21.146: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[add] State[0]
*May 30 16:47:21.148: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[bind] State[0]
*May 30 16:55:23.161: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[unbind] State[0]
*May 30 16:55:24.173: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*May 30 16:55:24.163: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[remove] State[2]
F/W Upgrade: Firmware Upgrade has Completed Successfully
*May 30 16:55:36.434: %IOSXE-2-PLATFORM: R0/0: kernel: Interface 1 not present in whitelist (0x80000004). Exit...
*May 30 16:55:36.709: %IOSXE-2-PLATFORM: R0/0: kernel: Interface 6 not present in whitelist (0x80000004). Exit...
*May 30 16:55:36.716: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[add] State[1]
*May 30 16:55:36.883: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[bind] State[1]
*May 30 16:56:01.723: %IOSXE-3-PLATFORM: R0/0: ngiolite: modem qmi fds failed to initialize
*May 30 16:56:01.723: %IOSXE-3-PLATFORM: R0/0: ngiolite: CWAN:dev_ready_handler:QMI channels initialization
failed...retry_count[0] vendor:Telit
*May 30 16:56:30.279: %CELLWAN-6-SNMP_MODEM_FW_UPDATED: [Cellular0/2/0]: Update SNMP modem firmware version
from 32.00.004_2 to 32.00.009 !
*May 30 16:56:41.278: %CELLWAN-2-MODEM_UP: Modem in slot 0/2 is now UP
*May 30 16:56:41.481: %CELLWAN-2-MODEM_RADIO: Cellular0/2/0 Modem radio has been turned on
*May 30 16:56:41.483: %CELLWAN-5-FIRMWARE_SWITCH: Firmware switchover initiated for modem in slot 0/2
*May 30 16:56:47.482: %CELLWAN-4-MODEM_RESTART_IND: Cellular0/2/0 Modem restart reason: Request Modem Reset
*May 30 16:56:50.719: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[unbind] State[1]
*May 30 16:56:51.737: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*May 30 16:56:51.727: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[remove] State[2]
*May 30 16:57:08.894: %IOSXE-2-PLATFORM: R0/0: kernel: Interface 1 not present in whitelist (0x80000004). Exit...
*May 30 16:57:09.163: %IOSXE-2-PLATFORM: R0/0: kernel: Interface 6 not present in whitelist (0x80000004). Exit...
*May 30 16:57:09.170: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[add] State[1]
*May 30 16:57:09.357: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[bind] State[1]
*May 30 16:57:28.526: %IOSXE-3-PLATFORM: R0/0: ngiolite: modem qmi fds failed to initialize
*May 30 16:57:28.526: %IOSXE-3-PLATFORM: R0/0: ngiolite: CWAN:dev_ready_handler:QMI channels initialization
failed...retry_count[0] vendor:Telit
*May 30 16:58:06.991: %CELLWAN-2-MODEM_UP: Modem in slot 0/2 is now UP
*May 30 16:58:07.195: %CELLWAN-2-MODEM_RADIO: Cellular0/2/0 Modem radio has been turned on
Router#
```

Step 8: Verify the modem's firmware, carrier PRI, and OEM PRI were upgraded successfully.

```
Router#show cellular 0/2/0 hardware
Modem Firmware Version = 32.00.128
Host Firmware Version = 32.00.009
Device Model ID =  LM960A18
International Mobile Subscriber Identity (IMSI) = 311480590277912
International Mobile Equipment Identity (IMEI) = 358347100173239
Integrated Circuit Card ID (ICCID) = 89148000006103564728
Mobile Subscriber Integrated Services
Digital Network-Number (MSISDN) = 4085153589
Modem Status = Modem Online
Current Modem Temperature = 32 deg C
PRI version = 2022, Carrier = Verizon
OEM PRI version = 32101008
Router#
Router#
Router#show cellular 0/2/0 firmware
 Idx Carrier             FwVersion       PriVersion   Status
 1   Generic             32.00.119       1027         Inactive
 2   Verizon             32.00.128       2022         Active
 3   ATT                 32.00.148       4024         Inactive
 4   TMUS                32.00.158       5007         Inactive
Firmware Activation mode  =  AUTO
```

LM960A18 Modem (CG418-E)

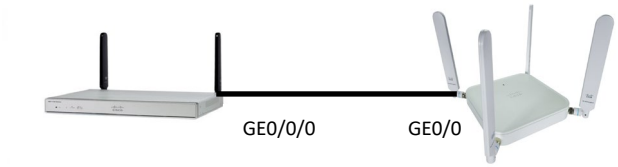
For LM960A18 modem in CG418-E cellular gateway, there is 1 bundle file for firmware upgrade.

- .BIN (bundle file that has based firmware + all carrier PRI + OEM PRI files)

This file is the same as LM960A18 modem in P-LTEA18-GL module. However, the firmware upgrade process is different.

Note: To update all 3 versions (based firmware, carrier PRI, and OEM PRI), only 1 firmware upgrade process is needed.

Topology:



Host Router Cellular Gateway

Procedure:

Note: The following examples are used with 17.11.1a version on CG418-E cellular gateway.

Step 1: Upgrade the Cellular Gateway to latest Cisco IOS at Software Download.

Step 2: Download the latest .BIN file for LM960A18 modem from the link provided above on the Host Router.

Step 3: Setup the Host Router with the necessary configurations.

A: Setup for IP DHCP on the Gigabit Ethernet interface.

```
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet 0/0/0
Router(config-if)#ip address dhcp
Router(config-if)#end
Router#
```

B: Confirm that Host Router's Gigabit Ethernet interface obtain IP DHCP address.

```
Router#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0/0   10.220.156.116  YES DHCP   up                    up
GigabitEthernet0/0/1   unassigned      YES NVRAM  down                  down
GigabitEthernet0/1/0   unassigned      YES unset  down                  down
GigabitEthernet0/1/1   unassigned      YES unset  down                  down
GigabitEthernet0/1/2   unassigned      YES unset  down                  down
GigabitEthernet0/1/3   unassigned      YES unset  down                  down
Loopback1              1.1.1.1         YES NVRAM  up                    up
Vlan1                  unassigned      YES unset  up                    down
Router#
```

Note: If cellular interface on Cellular Gateway has not obtained IP address from cellular network, this Host Router should see IP DHCP address of 192.168.1.2 with mask 255.255.255.0 assigned to the Gigabit Ethernet interface. The Gigabit Ethernet

interface of the Cellular Gateway would have IP address 192.168.1.1 with mask of 255.255.255.0. In the above example, cellular interface on Cellular Gateway obtained IP address from cellular network.

C: Setup the downloaded .BIN file for Cellular Gateway to TFTP from.

```
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#tftp-server bootflash:LM960A18_Bundle_HO9_AT8_GN9_TM8_VZ8.bin
Router(config)#end
Router#
```

Step 4: Verify connectivity between Cellular Gateway and Host Router via pinging from Cellular Gateway.

```
CellularGateway# gw-action:request ping 10.220.156.116
Success :10.220.156.116 (10.220.156.116): 56 data bytes
 10.220.156.116 ping statistics
 5 packets transmitted, 5 packets received, 0% packet loss round
trip min/avg/max = 0.500/0.780/1.713 ms

CellularGateway#
```

Step 5: Download the .BIN file from the Host Router onto the Cellular Gateway.

CLI: gw-action:request file download <*string> create_dir <folder_name>
where "*string" = tftp://<ip>/<path>/<filename> or sftp://<ip>/<file-path>/<file-name>@<user>:<password>

```
CellularGateway# gw-action:request file download tftp://10.220.156.116/LM960A18_Bundle_HO9_AT8_GN9_TM8_VZ8.bin
create_dir fw_folder
INFO: Created folder fw_folder
INFO: Accessing file LM960A18_Bundle_HO9_AT8_GN9_TM8_VZ8.bin from
tftp://10.220.156.116/LM960A18_Bundle_HO9_AT8_GN9_TM8_VZ8.bin
INFO: Please wait while the file is being downloaded to /flash/fw_folder/LM960A18_Bundle_HO9_AT8_GN9_TM8_VZ8.bin
file received /flash/fw_folder/LM960A18_Bundle_HO9_AT8_GN9_TM8_VZ8.bin size(Bytes): 256334330
CellularGateway#
```

Notes:

- This process takes up to 15 minutes.
- For IOS CG Release 17.7.1a or earlier, use the following CLI instead.
  CLI: gw-action:request file download filename <firmware_file> tftpip <host_router_gig_ip> create_dir <folder_name>

Step 6: Verify the .BIN file was correctly downloaded into the newly created folder.

```
CellularGateway# gw-action:request file list fw_folder
-rw-r--r--    256334330 May 30 05:40 LM960A18_Bundle_HO9_AT8_GN9_TM8_VZ8.bin
CellularGateway#
```

Step 7: Verify current firmware, carrier PRI, and OEM PRI versions.

```
CellularGateway# show cellular 1 hardware
Modem Firmware Version = 32.00.143
Host Firmware Version = 32.00.004_2
Device Model ID = LM960A18
International Mobile Subscriber Identity (IMSI) = 310410819528409
International Mobile Equipment Identity (IMEI) = 358347100098840
Integrated Circuit Card ID (ICCID) = 89014103278195284099
Mobile Subscriber Integrated Services Digital Network Number (MSISDN) = 14082216639
Current Modem Temperature = 35 deg C
```

```
PRI Version = 4021
Carrier = ATT
OEM PRI Version = 32101006
Modem Status = MODEM_STATE_DNS_ACQUIRED
Host Device Manufacturer = Cisco Systems, Inc.
Host Device Model = CG418-E
Host Device Software Version = 17.11.1a.0.230095.1680716017..Bengaluru
Host Device ID = 10JbWPwEQg
CellularGateway#
CellularGateway#
CellularGateway# show cellular 1 firmware
Firmware Activation Mode = AUTO
              FW         PRI
INDEX  CARRIER  VERSION    VERSION  STATUS
------------------------------------------------
1      Generic  32.00.114  1023     INACTIVE
2      Verizon  32.00.124  2020     INACTIVE
3      ATT      32.00.143  4021     ACTIVE

CellularGateway#
```

Step 8: Initiate modem firmware upgrade.

Important: Do not remove power or reload the router during the firmware upgrade process.

CLI: cellular 1 upgrade firmware /flash/<folder_name>

Note: This process takes up to 15 minutes.

```
CellularGateway# cellular 1 upgrade firmware /flash/fw_folder
status inprogress
response Firmware upgrade is in progress!!!
CellularGateway#
CellularGateway# [ 5294.991395] GobiNet 2-1:1.2 usb0: kevent 11 may have been dropped
[ 5367.974902] GobiNet 2-1:1.2 usb0: kevent 11 may have been dropped

CellularGateway#
```

Step 9: Verify the modem's firmware, carrier PRI, and OEM PRI were upgraded successfully.

```
CellularGateway# show cellular 1 hardware
Modem Firmware Version = 32.00.148
Host Firmware Version = 32.00.009
Device Model ID = LM960A18
International Mobile Subscriber Identity (IMSI) = 310410819528409
International Mobile Equipment Identity (IMEI) = 358347100098840
Integrated Circuit Card ID (ICCID) = 89014103278195284099
Mobile Subscriber Integrated Services Digital Network Number (MSISDN) = 14082216639
Current Modem Temperature = 35 deg C
PRI Version = 4024
Carrier = ATT
OEM PRI Version = 32101008
Modem Status = MODEM_STATE_DNS_ACQUIRED
Host Device Manufacturer = Cisco Systems, Inc.
Host Device Model = CG418-E
Host Device Software Version = 17.11.1a.0.230095.1680716017..Bengaluru
Host Device ID = 10JbWPwEQg
CellularGateway#
CellularGateway#
```

```
CellularGateway# show cellular 1 firmware
Firmware Activation Mode = AUTO
              FW         PRI
INDEX  CARRIER  VERSION    VERSION  STATUS
------------------------------------------------
1      Generic  32.00.119  1027     INACTIVE
2      Verizon  32.00.128  2022     INACTIVE
3      ATT      32.00.148  4024     ACTIVE
4      TMUS     32.00.158  5007     INACTIVE

CellularGateway#
```

EM9190 Modem

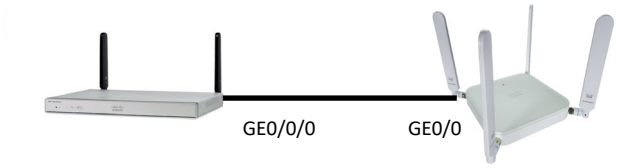
For EM9190 modem in CG522-E cellular gateway, there are 3 files for firmware upgrade.

- .CWE (based firmware file)
- .NVU (carrier PRI file)
- .NVU (OEM PRI file)

To update all 3 versions (based firmware, carrier PRI, and OEM PRI), firmware upgrade process needs to be performed 2 separate times:

- 1st time with .CWE (based firmware file) and .NVU (carrier PRI file) in 1 folder.
- 2nd time with .NVU (OEM PRI file) in 1 folder.

Topology:



Procedure:

Note: Before you begin this procedure, make sure you have met the following modem firmware requirements:

If the modem firmware currently has Generic FW version 01.07.08.00, the modem will first need to be upgraded to Generic FW version 01.07.13.00 (Download Link). Once that firmware upgrade is complete, the modem can then be upgraded to any carrier firmware version 03.09.11.00 and later.

1) 01.07.08.00 Generic FW --> 01.07.13.00 Generic FW
2) 01.07.13.00 Generic FW --> any 03.09.11.00 carrier FW and later

Note: The following examples are used with 17.11.1a version on CG522-E cellular gateway.

Step 1: Upgrade the Cellular Gateway to latest Cisco IOS at Software Download.

Step 2: Download the latest .CWE and .NVU (carrier PRI) files for EM9190 modem from the link provided above on the Host Router.

Step 3: Setup the Host Router with the necessary configurations.

A: Setup for IP DHCP on the Gigabit Ethernet interface.

```
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet 0/0/0
Router(config-if)#ip address dhcp
Router(config-if)#end
Router#
```

B: Confirm that Host Router's Gigabit Ethernet interface obtain IP DHCP address.

```
Router#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0/0   192.168.1.2     YES DHCP   up                    up
```

```
GigabitEthernet0/0/1   unassigned      YES NVRAM  down                    down
GigabitEthernet0/1/0   unassigned      YES unset  down                    down
GigabitEthernet0/1/1   unassigned      YES unset  down                    down
GigabitEthernet0/1/2   unassigned      YES unset  down                    down
GigabitEthernet0/1/3   unassigned      YES unset  down                    down
Loopback1              1.1.1.1         YES NVRAM  up                      up
Vlan1                  unassigned      YES unset  up                      down
Router#
```

Note: If cellular interface on Cellular Gateway has obtained IP address from cellular network, this Host Router should see the same IP address of the cellular interface assigned to the Gigabit Ethernet interface. In the above example, cellular interface did not obtain IP address from cellular network and hence, got 192.168.1.2 IP address from the Cellular Gateway.

C: Setup the downloaded .CWE and .NVU (carrier PRI) files for Cellular Gateway to TFTP from.

```
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#tftp-server flash:EM9190_03.09.11.00-002.cwe
Router(config)#tftp-server flash:EM9190_03.09.11.00-001_GENERIC_030.044_006.nvu
Router(config)#end
Router#
```

Step 4: Verify connectivity between Cellular Gateway and Host Router via pinging from Cellular Gateway.

```
CellularGateway# gw-action:request ping 192.168.1.2
Success :192.168.1.2 (192.168.1.2): 56 data bytes
 192.168.1.2 ping statistics
 5 packets transmitted, 5 packets received, 0% packet loss round
trip min/avg/max = 0.464/0.498/0.554 ms

CellularGateway#
```

Step 5: Download the .CWE and .NVU (carrier PRI) files from the Host Router onto the Cellular Gateway.

CLI: gw-action:request file download <*string> create_dir <folder_name>
where "*string" = tftp://<ip>/<path>/<filename> or sftp://<ip>/<file-path>/<file-name>@<user>:<password>

Copy .CWE file:

```
CellularGateway# gw-action:request file download tftp://192.168.1.2/EM9190_03.09.11.00-002.cwe create_dir fw_folder
INFO: Created folder fw_folder
INFO: Accessing file EM9190_03.09.11.00-002.cwe from tftp://192.168.1.2/EM9190_03.09.11.00-002.cwe
INFO: Please wait while the file is being downloaded to /flash/fw_folder/EM9190_03.09.11.00-002.cwe
file received /flash/fw_folder/EM9190_03.09.11.00-002.cwe size(Bytes): 91579911
CellularGateway#
```

Copy .NVU (carrier PRI) file to the same "fw_folder" folder:

```
CellularGateway# gw-action:request file download tftp://192.168.1.2/EM9190_03.09.11.00-001_GENERIC_030.044_006.nvu
create_dir fw_folder
INFO: fw_folder Directory already exists
INFO: Accessing file EM9190_03.09.11.00-001_GENERIC_030.044_006.nvu from tftp://192.168.1.2/EM9190_03.09.11.00-
001_GENERIC_030.044_006.nvu
INFO: Please wait while the file is being downloaded to /flash/fw_folder/EM9190_03.09.11.00-001_GENERIC_030.044_006.nvu
file received /flash/fw_folder/EM9190_03.09.11.00-001_GENERIC_030.044_006.nvu size(Bytes): 50575
CellularGateway#
```

Notes:

- This process takes up to 15 minutes.

- For IOS CG Release 17.7.1a or earlier, use the following CLI instead.
  CLI: gw-action:request file download filename <firmware_file> tftpip <host_router_gig_ip> create_dir <folder_name>

Step 6: Verify the .CWE and .NVU (carrier PRI) files were correctly downloaded into the newly created folder.

```
CellularGateway# gw-action:request file list fw_folder
-rw-r--r--       50575 May 19 06:57 EM9190_03.09.11.00-001_GENERIC_030.044_006.nvu
-rw-r--r--    91579911 May 19 06:50 EM9190_03.09.11.00-002.cwe
CellularGateway#
```

Step 7: Verify current firmware and carrier PRI versions.

```
CellularGateway# show cellular 1 hardware
Modem Firmware Version = SWIX55C_01.07.13.00 000000 jenkins
Device Model ID = EM9190
International Mobile Subscriber Identity (IMSI) = 123456700004023
International Mobile Equipment Identity (IMEI) = 356805510129085
Integrated Circuit Card ID (ICCID) = 8952530076180184023
Mobile Subscriber Integrated Services Digital Network Number (MSISDN) =
Factory Serial Number (FSN) = 4H1531500901A1
Current Modem Temperature = 35 deg C
PRI SKU ID = 1104703
PRI Version = 016.006_004
Carrier = GENERIC
OEM PRI Version = 001.006
Modem Status = MODEM_STATE_NETWORK_READY
CellularGateway#
CellularGateway#
CellularGateway# show cellular 1 firmware
Firmware Activation Mode = AUTO
INDEX  CARRIER  FW VERSION       PRI VERSION  STATUS
------------------------------------------------------
1      GENERIC  01.07.13.00_GEN  016.006_004  ACTIVE

CellularGateway#
```

Step 8: Initiate modem firmware upgrade.

Important: Do not remove power or reload the router during the firmware upgrade process.

CLI: cellular 1 upgrade firmware /flash/<folder_name>

Note: This process takes up to 15 minutes.

```
CellularGateway# cellular 1 upgrade firmware /flash/fw_folder
status inprogress
response Firmware upgrade is in progress!!!
CellularGateway#
```

Step 9: Verify the modem's firmware and carrier PRI were upgraded successfully.

```
CellularGateway# show cellular 1 hardware
Modem Firmware Version = SWIX55C_03.09.11.00 7bf975 jenkins
Device Model ID = EM9190
International Mobile Subscriber Identity (IMSI) = 123456700004023
International Mobile Equipment Identity (IMEI) = 356805510129085
Integrated Circuit Card ID (ICCID) = 8952530076180184023
Mobile Subscriber Integrated Services Digital Network Number (MSISDN) =
Factory Serial Number (FSN) = 4H1531500901A1
```

```
Current Modem Temperature = 35 deg C
PRI SKU ID = 1104703
PRI Version = 030.044_006
Carrier = GENERIC
OEM PRI Version = 001.006
Modem Status = MODEM_STATE_NETWORK_READY
CellularGateway#
CellularGateway#
CellularGateway# show cellular 1 firmware
Firmware Activation Mode = AUTO
INDEX  CARRIER  FW VERSION       PRI VERSION  STATUS
------------------------------------------------------------
1      GENERIC  03.09.11.00_GEN  030.044_006  ACTIVE

CellularGateway#
```

Step 10: For OEM PRI upgrade, repeat the above steps.

FN980 Modem

For FN980 modem in P-5GS6-GL module, there is 1 bundle file for firmware upgrade.

- .BIN (bundle file that has based firmware + all carrier PRI + OEM PRI files)

To update all 3 versions (based firmware, carrier PRI, and OEM PRI), only 1 firmware upgrade process is needed.

Procedure:

Note: The following examples are used with 17.06.01a version on Cisco C8200L-1N-4T router.

Step 1: Upgrade the router to latest Cisco IOS at Software Download.

Step 2: Download the latest .BIN file for FN980 modem from the link provided above.

Step 3: Create a folder in the router's bootflash to host the .BIN file.

```
Router#mkdir bootflash:fw_fn980
Create directory filename [fw_fn980]?
Created dir bootflash:/fw_fn980
Router#
```

Step 4: Copy the downloaded .BIN file to the newly created folder.

```
Router#copy usb0:FN980_Bundle_38.02.0202_0730_106.bin bootflash:/fw_fn980/
Destination filename [/fw_fn980/FN980_Bundle_38.02.0202_0730_106.bin]?
Copy in
progress...CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
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CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
195943687 bytes copied in 9.740 secs (20117422 bytes/sec)
Router#
```

Step 5: Verify the .BIN file was correctly copied to the newly created folder.

```
Router#dir bootflash:fw_fn980
Directory of bootflash:/fw_fn980/

16326   -rw-        195943687  Oct 29 2021 05:46:59 +00:00  FN980_Bundle_38.02.0202_0730_106.bin

2908606464 bytes total (80187392 bytes free)
Router#
```

Step 6: Verify current firmware, carrier PRI, and OEM PRI versions.

```
Router#show cellular 0/2/0 hardware
Modem Firmware Version = M0H.020201
Host Firmware Version = A0H.000201
Device Model ID =  FN980
International Mobile Subscriber Identity (IMSI) = 310410819528409
International Mobile Equipment Identity (IMEI) = 359661100031117
Integrated Circuit Card ID (ICCID) = 89014103278195284099
Mobile Subscriber Integrated Services
Digital Network-Number (MSISDN) = 14082216639
Modem Status = Modem Online
Current Modem Temperature = 35 deg C
PRI version = 0560-104, Carrier = AT&T
OEM PRI version = 0560-104
Router#
Router#
Router#show cellular 0/2/0 firmware
 Idx Carrier      FwVersion       PriVersion   Status
 1                M0H.020201      0560         Active

Firmware Activation mode  =  AUTO

Modem image running: Main
Mobile Network Operator: AT&T
Number of MNO's = 9
 Index MNO ID  MNO NAME
 1     0       Generic GCF
 2     1       Generic PTCRB
 3     10      AT&T
 4     11      T-Mobile
 5     12      Verizon Wireless
 6     20      SK Telecom
 7     30      NTT Docomo
 8     31      KDDI
 9     40      Telstra
Router#
```

Step 7: Initiate modem firmware upgrade using the microcode reload command.

Important: Do not remove power or reload the router during the firmware upgrade process.

CLI: microcode reload cellular 0 <slot> modem-provision bootflash:<folder_name>

```
Router#microcode reload cellular 0 2 modem-provision bootflash:fw_fn980
Reload microcode? [confirm]
Log status of firmware download in router flash?[confirm]
Firmware download status will be logged in bootflash:fwlogfile
Microcode Reload Process launched for cwan slot/bay =0/2; hw type=0x102download option = 0

Router#
**************************************************
 The interface will be Shut Down for Firmware Upgrade
 This will terminate any active data connections.
**************************************************Success !! send FW Upgrade command to card

*************************
 Modem will be upgraded!
 Upgrade process will take up to 15 minutes. During
 this time the modem will be unusable.
 Please do not remove power or reload the router during
 the upgrade process.
*************************
*Oct 29 05:58:47.738: %LINK-5-CHANGED: Interface Cellular0/2/0, changed state to administratively down
*Oct 29 05:58:47.743: %LINK-5-CHANGED: Interface Cellular0/2/1, changed state to administratively down
*Oct 29 05:59:05.417: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[unbind] State[1]
*Oct 29 05:59:06.441: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*Oct 29 05:59:06.425: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[remove] State[2]
*Oct 29 05:59:06.425: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[add] State[0]
*Oct 29 05:59:06.426: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[bind] State[0]
*Oct 29 06:03:45.619: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[unbind] State[0]
*Oct 29 06:03:46.628: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*Oct 29 06:03:46.619: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[remove] State[2]
F/W Upgrade: Firmware Upgrade has Completed Successfully
*Oct 29 06:03:55.445: %IOSXE-2-PLATFORM: R0/0: kernel: Interface 1 not present in whitelist (0x80000004). Exit...
*Oct 29 06:03:55.836: %IOSXE-2-PLATFORM: R0/0: kernel: Interface 6 not present in whitelist (0x80000004). Exit...
*Oct 29 06:03:55.835: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[add] State[1]
*Oct 29 06:03:55.991: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[bind] State[1]
*Oct 29 06:04:22.259: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[unbind] State[1]
*Oct 29 06:04:23.259: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[remove] State[2]
*Oct 29 06:04:31.761: %IOSXE-2-PLATFORM: R0/0: kernel: Interface 1 not present in whitelist (0x80000004). Exit...
*Oct 29 06:04:32.141: %IOSXE-2-PLATFORM: R0/0: kernel: Interface 6 not present in whitelist (0x80000004). Exit...
*Oct 29 06:04:32.128: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[add] State[1]
*Oct 29 06:04:32.289: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[bind] State[1]
*Oct 29 06:04:59.841: %IOSXE-3-PLATFORM: R0/0: ngiolite: modem qmi fds failed to initialize
*Oct 29 06:04:59.841: %IOSXE-3-PLATFORM: R0/0: ngiolite: CWAN:dev_ready_handler:QMI channels initialization
failed...retry_count[0] vendor:Telit
*Oct 29 06:05:26.807: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*Oct 29 06:06:29.974: Setting the band preference on modem for sim 0 to match the configured settings

*Oct 29 06:06:42.975: %CELLWAN-2-MODEM_UP: Modem in slot 0/2 is now UP
*Oct 29 06:06:43.177: %CELLWAN-2-MODEM_RADIO: Cellular0/2/0 Modem radio has been turned on
*Oct 29 06:06:43.190: %CELLWAN-5-FIRMWARE_SWITCH: Firmware switchover initiated for modem in slot 0/2
*Oct 29 06:06:49.191: %CELLWAN-4-MODEM_RESTART_IND: Cellular0/2/0 Modem restart reason: Request Modem Reset
*Oct 29 06:07:10.293: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[unbind] State[1]
*Oct 29 06:07:11.304: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*Oct 29 06:07:11.299: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[remove] State[2]
*Oct 29 06:07:19.364: %IOSXE-2-PLATFORM: R0/0: kernel: Interface 1 not present in whitelist (0x80000004). Exit...
*Oct 29 06:07:19.735: %IOSXE-2-PLATFORM: R0/0: kernel: Interface 6 not present in whitelist (0x80000004). Exit...
*Oct 29 06:07:19.737: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[add] State[1]
*Oct 29 06:07:19.905: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem  Action:[bind] State[1]
```

```
*Oct 29 06:09:20.978: Setting the band preference on modem for sim 0 to match the configured settings

*Oct 29 06:09:33.978: %CELLWAN-2-MODEM_UP: Modem in slot 0/2 is now UP
*Oct 29 06:09:34.184: %CELLWAN-2-MODEM_RADIO: Cellular0/2/0 Modem radio has been turned on
*Oct 29 06:09:36.182: %LINK-3-UPDOWN: Interface Cellular0/2/0, changed state to down
*Oct 29 06:09:36.186: %LINK-3-UPDOWN: Interface Cellular0/2/1, changed state to down
Router#
```

Step 8: Verify the modem's firmware and carrier PRI were upgraded successfully.

```
Router#show cellular 0/2/0 hardware
Modem Firmware Version = M0H.020202
Host Firmware Version = A0H.000202
Device Model ID =  FN980
International Mobile Subscriber Identity (IMSI) = 310410819528409
International Mobile Equipment Identity (IMEI) = 359661100031117
Integrated Circuit Card ID (ICCID) = 89014103278195284099
Mobile Subscriber Integrated Services
Digital Network-Number (MSISDN) = 14082216639
Modem Status = Modem Online
Current Modem Temperature = 35 deg C
PRI version = 0730-106, Carrier = AT&T
OEM PRI version = 0730-106
Router#
Router#
Router#show cellular 0/2/0 firmware
 Idx Carrier      FwVersion       PriVersion   Status
 1               M0H.020202      0730         Active

Firmware Activation mode  =  AUTO

Modem image running: Main
Mobile Network Operator: AT&T
Number of MNO's = 11
 Index MNO ID  MNO NAME
 1     0       Generic GCF
 2     1       Generic PTCRB
 3     10      AT&T
 4     11      T-Mobile
 5     12      Verizon Wireless
 6     20      SK Telecom
 7     21      SK Telecom Dongle
 8     30      NTT Docomo
 9     31      KDDI
 10    40      Telstra
 11    50      Anatel
Router#
```

Additional Notes

- For cellular firmware upgrade via SDWAN solution, see https://www.cisco.com/c/en/us/td/docs/routers/sdwan/configuration/Monitor-And-Maintain/monitor-maintain-book/m-cell-modem-firmware-upgrade.html.

- For firmware upgrade on Cisco Catalyst 8200 UCPE platform, see https://www.cisco.com/c/en/us/td/docs/routers/nfvis/config/nfvis-4/nfvis-config-guide-4/m-platform-specific-configurations.html#Cisco_Concept.dita_8c47220a-b0a7-4187-bf69-25696e5dadaa

- For modems that are not listed above, see https://www.cisco.com/c/en/us/td/docs/routers/IIoT/firmware/IIoT-Firmware.html https://www.cisco.com/c/en/us/td/docs/routers/access/interfaces/firmware/Firmware_Upgrade.html