



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

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

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Overview

Cisco routers and cellular gateways use the cellular modems from Sierra Wireless Inc. and Telit. 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: This guide does not include cellular firmware upgrade via SDWAN solution.

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-LA (modem: EM7430)
 - P-LTEA-EA (modem: EM7455)
 - P-LTEA18-GL (modem: LM960A18)
 - P-5GS6-GL (modem: FN980)
- For Cisco products with cellular modems that are not listed above, see:
 - <https://www.cisco.com/c/en/us/td/docs/routers/IloT/firmware/IloT-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 Generic GCF & PTCRB Rogers Sprint Telus US Cellular Verizon	AT&T / FirstNet: Download Link Bell / Rogers / Telus: Download Link Generic GCF & PTCRB: Download Link Sprint: Download Link US Cellular: Download Link Verizon: Download Link
LM960A18	AT&T / FirstNet Bell Generic GCF & PTCRB NTT Docomo Telstra Telus T-Mobile Verizon	Global: Download Link North America: Download Link
EM9190	Generic GCF	Download Link
FN980	Generic GCF Generic PTCRB	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 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 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 done 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.

[illegible]

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 and EM7455 Modems

For EM7430 and EM7455 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 done 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

[illegible]

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 a 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#

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

Router#

Copy in
progress...

Mobile Subscriber Integrated Services
Digital Network-Number (MSISDN) = 14082216639
Modem Status = Modem Online
Current Modem Temperature = 34 deg C
PRI version = 4021, Carrier = ATT
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	Inactive
3	ATT	32.00.143	4021	Active

Firmware Activation mode = AUTO

Router#

Note: If certain carrier firmware deletion is required before firmware upgrade, use:

cellular <slot> lte firmware-delete <INDEX>

where the "INDEX" is seen from the "show cellular 1 firmware" output.

Step 7: Initiate a 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_lm960a18

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 00:49:00.803: %LINK-5-CHANGED: Interface Cellular0/2/0, changed state to administratively down
*Oct 27 00:49:00.807: %LINK-5-CHANGED: Interface Cellular0/2/1, changed state to administratively down
*Oct 27 00:49:20.806: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[unbind] State[1]
*Oct 27 00:49:21.820: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*Oct 27 00:49:21.813: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[remove] State[2]
*Oct 27 00:49:21.813: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[add] State[0]
*Oct 27 00:49:21.814: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[bind] State[0]
*Oct 27 00:56:51.958: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[unbind] State[0]
*Oct 27 00:56:52.976: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN

```

*Oct 27 00:56:52.965: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[remove] State[2]
F/W Upgrade: Firmware Upgrade has Completed Successfully
*Oct 27 00:57:05.105: %IOSXE-2-PLATFORM: R0/0: kernel: Interface 1 not present in whitelist (0x80000004). Exit...
*Oct 27 00:57:05.452: %IOSXE-2-PLATFORM: R0/0: kernel: Interface 6 not present in whitelist (0x80000004). Exit...
*Oct 27 00:57:05.457: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[add] State[1]
*Oct 27 00:57:05.607: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[bind] State[1]
*Oct 27 00:57:34.824: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[unbind] State[1]
*Oct 27 00:57:35.824: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[remove] State[2]
*Oct 27 00:57:53.115: %IOSXE-2-PLATFORM: R0/0: kernel: Interface 1 not present in whitelist (0x80000004). Exit...
*Oct 27 00:57:53.596: %IOSXE-2-PLATFORM: R0/0: kernel: Interface 6 not present in whitelist (0x80000004). Exit...
*Oct 27 00:57:53.590: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[add] State[1]
*Oct 27 00:57:53.907: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[bind] State[1]
*Oct 27 00:58:09.465: %IOSXE-3-PLATFORM: R0/0: ngiolite: modem qmi fds failed to initialize
*Oct 27 00:58:09.465: %IOSXE-3-PLATFORM: R0/0: ngiolite: CWAN:dev_ready_handler:QMI channels initialization
failed...retry_count[0] vendor:Telit
*Oct 27 00:58:36.305: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*Oct 27 00:59:49.271: %CELLWAN-2-MODEM_UP: Modem in slot 0/2 is now UP
*Oct 27 00:59:49.474: %CELLWAN-2-MODEM_RADIO: Cellular0/2/0 Modem radio has been turned on
*Oct 27 00:59:49.484: %CELLWAN-5-FIRMWARE_SWITCH: Firmware switchover initiated for modem in slot 0/2
*Oct 27 00:59:55.483: %CELLWAN-4-MODEM_RESTART_IND: Cellular0/2/0 Modem restart reason: Request Modem Reset
*Oct 27 00:59:59.516: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[unbind] State[1]
*Oct 27 01:00:00.528: %CELLWAN-2-MODEM_DOWN: Modem in slot 0/2 is DOWN
*Oct 27 01:00:00.519: %IOSXE-3-PLATFORM: R0/0: ngiolite: WWAN modem Action:[remove] State[2]
*Oct 27 01:02:28.946: %CELLWAN-2-MODEM_UP: Modem in slot 0/2 is now UP
*Oct 27 01:02:29.150: %CELLWAN-2-MODEM_RADIO: Cellular0/2/0 Modem radio has been turned on
*Oct 27 01:02:31.149: %LINK-3-UPDOWN: Interface Cellular0/2/0, changed state to down
*Oct 27 01:02:31.155: %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 = 32.00.147
Host Firmware Version = 32.00.007
Device Model ID = LM960A18
International Mobile Subscriber Identity (IMSI) = 310410819528409
International Mobile Equipment Identity (IMEI) = 358347100173635
Integrated Circuit Card ID (ICCID) = 89014103278195284099
Mobile Subscriber Integrated Services
Digital Network-Number (MSISDN) = 14082216639
Modem Status = Modem Online
Current Modem Temperature = 33 deg C
PRI version = 4024, Carrier = ATT
OEM PRI version = 32101006
Router#
Router#
Router#show cellular 0/2/0 firmware

```

Idx	Carrier	FwVersion	PriVersion	Status
1	Generic	32.00.116	1026	Inactive
2	Verizon	32.00.126	2022	Inactive
3	ATT	32.00.147	4024	Active
4	TMUS	32.00.156	5005	Inactive

```

Firmware Activation mode = AUTO
Router#

```

Step 9: For OEM PRI upgrade, repeat the above steps.

LM980A18 Modem (CG418-E)

For LM980A18 modem in CG418-E cellular gateway, there are 2 files for firmware upgrade.

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

These files are the same as LM980A18 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), firmware upgrade process needs to be done for each .BIN file separately.

Topology:



Procedure:

Note: The following examples are used with 17.06.01a 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 (based firmware + carrier PRI) 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  100.111.49.191 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 flash:LM960A18_Bundle_HO7_AT7_GN6_TM6_VZ6.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 100.111.49.191
Success :100.111.49.191 (100.111.49.191): 56 data bytes
100.111.49.191 ping statistics
5 packets transmitted, 5 packets received, 0% packet loss round
trip min/avg/max = 0.512/1.643/6.042 ms
```

```
CellularGateway#
```

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

CLI: gw-action:request file download filename <.BIN_firmware_file> tftpip <host_router_gig_ip> create_dir <folder_name>

```
CellularGateway# gw-action:request file download filename LM960A18_Bundle_HO7_AT7_GN6_TM6_VZ6.bin tftpip
100.111.49.191 create_dir fw_folder
INFO: Accessing file LM960A18_Bundle_HO7_AT7_GN6_TM6_VZ6.bin from 100.111.49.191
INFO: Please wait while the file is being downloaded
INFO: Created folder fw_folder
```

```
% Total  % Received % Xferd Average Speed  Time  Time  Time  Current
      Dload Upload  Total  Spent  Left  Speed
100 242M  0 242M  0  0 373k  0 --:--:-- 0:11:02 --:--:-- 373k
100 242M  0 242M  0  0 373k  0 --:--:-- 0:11:02 --:--:-- 373k
file received /flash/fw_folder/LM960A18_Bundle_HO7_AT7_GN6_TM6_VZ6.bin size(Bytes): 253791311
CellularGateway#
```

Note: This process takes up to 15 minutes.

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-- 253791311 Oct 26 23:20 LM960A18_Bundle_HO7_AT7_GN6_TM6_VZ6.bin
CellularGateway#
```

Step 7: Verify current firmware and carrier PRI versions.

```
CellularGateway# show cellular 1 hardware
Modem Firmware Version = 32.00.124
Host Firmware Version = 32.00.004_2
Device Model ID = LM960A18
International Mobile Subscriber Identity (IMSI) = 311480371731931
International Mobile Equipment Identity (IMEI) = 358347100098840
Integrated Circuit Card ID (ICCID) = 89148000003650136091
Mobile Subscriber Integrated Services Digital Network Number (MSISDN) = 4086098674
Current Modem Temperature = 33 deg C
```

```
PRI Version = 2020
```

```
Carrier = Verizon
```

```
OEM PRI Version = 32101006
```

```
Modem Status = MODEM_STATE_DNS_ACQUIRED
```

```
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 ACTIVE
3 ATT 32.00.143 4021 INACTIVE
```

```
CellularGateway#
```

Note: If certain carrier firmware deletion is required before firmware upgrade, use:

```
cellular 1 firmware-delete <INDEX>
```

where the "INDEX" is seen from the "show cellular 1 firmware" output.

Step 8: Initiate a 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# [ 3100.112347] GobiNet 2-1:1.2 usb0: kevent 11 may have been dropped
```

```
[ 3195.596978] GobiNet 2-1:1.2 usb0: kevent 11 may have been dropped
```

```
[ 3281.523255] GobiNet 2-1:1.2 usb0: kevent 11 may have been dropped
```

```
[ 3326.197272] chatter: wan0_discard: 96 | 60000000 00383aff fe800000 00000000 7d64ba9c 2ed2d223 ff020000 00000000
00000000 00000001 860012b5 00000000 00000000 00000000 01010250 f3000d01 030440c0 00000002 00000001 00000000
26001010 b0080329 00000000 00000000
```

```
[ 3336.293017] chatter: wan0_discard: 144 | 60000000 00683aff fe800000 00000000 d43861dc e9c10248 ff020000 00000000
00000000 00000001 86003082 ff40ffff 00000000 00000000 01010250 f3000d01 05010000 00000594 030440c0 ffffffff ffffffff
00000000 26001010 b008fd27 00000000 00000000 19050000 ffffffff 20014888 0068ff00 0608000d 00000000 20014888 0061ff00
0604000d 00000000
```

```
[ 3339.173157] chatter: wan0_discard: 144 | 60000000 00683aff fe800000 00000000 d43861dc e9c10248 ff020000 00000000
00000000 00000001 86003082 ff40ffff 00000000 00000000 01010250 f3000d01 05010000 00000594 030440c0 ffffffff ffffffff
00000000 26001010 b008fd27 00000000 00000000 19050000 ffffffff 20014888 0068ff00 0608000d 00000000 20014888 0061ff00
0604000d 00000000
```

CellularGateway#

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

CellularGateway# show cellular 1 hardware

Modem Firmware Version = 32.00.126

Host Firmware Version = 32.00.007

Device Model ID = LM960A18

International Mobile Subscriber Identity (IMSI) = 311480371731931

International Mobile Equipment Identity (IMEI) = 358347100098840

Integrated Circuit Card ID (ICCID) = 89148000003650136091

Mobile Subscriber Integrated Services Digital Network Number (MSISDN) = 4086098674

Current Modem Temperature = 34 deg C

PRI Version = 2022

Carrier = Verizon

OEM PRI Version = 32101006

Modem Status = MODEM_STATE_DNS_ACQUIRED

CellularGateway#

CellularGateway#

CellularGateway# show cellular 1 firmware

Firmware Activation Mode = AUTO

	FW	PRI		
INDEX	CARRIER	VERSION	VERSION	STATUS

1	Generic	32.00.116	1026	INACTIVE
2	Verizon	32.00.126	2022	ACTIVE
3	ATT	32.00.147	4024	INACTIVE
4	TMUS	32.00.156	5005	INACTIVE

CellularGateway#

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

EM9190 Modem

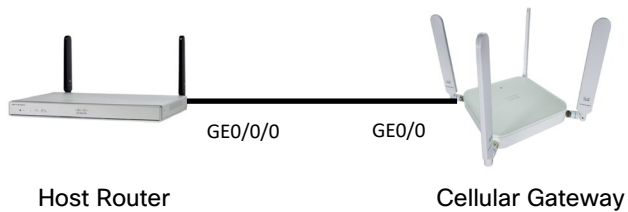
For EM9190 modem in CG522-E cellular gateway, there are 3 files for firmware upgrade.

- .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 done 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: The following examples are used with 17.06.01a 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#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ftp-server flash:EM9190_01.07.23.00-001.cwe
Router(config)#ftp-server flash:EM9190_01.07.23.00-001_VERIZON_012.019_000.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 = 0.496/0.568/0.814 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 filename <firmware_file> tftpip <host_router_gig_ip> create_dir <folder_name>

Copy .CWE file:

```
CellularGateway# gw-action:request file download filename EM9190_01.07.23.00-001.cwe tftpip 192.168.1.2 create_dir fw_folder
INFO: Accessing file EM9190_01.07.23.00-001.cwe from 192.168.1.2
INFO: Please wait while the file is being downloaded
INFO: Created folder fw_folder
```

% Total	% Received	% Xferd	Average Speed	Time	Time	Time	Current
		Dload	Upload	Total	Spent	Left	Speed
100	85.0M	0	85.0M	0	0	382k	0 --:--:-- 0:03:47 --:--:-- 381k
100	85.0M	0	85.0M	0	0	382k	0 --:--:-- 0:03:47 --:--:-- 382k

file received /flash/fw_folder/EM9190_01.07.23.00-001.cwe size(Bytes): 89226639
CellularGateway#

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

```
CellularGateway# gw-action:request file download filename EM9190_01.07.23.00-001_VERIZON_012.019_000.nvu tftpip
192.168.1.2 create_dir fw_folder
INFO: Accessing file EM9190_01.07.23.00-001_VERIZON_012.019_000.nvu from 192.168.1.2
INFO: Please wait while the file is being downloaded
INFO: fw_folder Directory already exists
```

% Total	% Received	% Xferd	Average Speed	Time	Time	Time	Current
		Dload	Upload	Total	Spent	Left	Speed
100	71825	0	71825	0	0	348k	0 --:--:-- --:--:-- --:--:-- 364k
100	71825	0	71825	0	0	348k	0 --:--:-- --:--:-- --:--:-- 348k

file received /flash/fw_folder/EM9190_01.07.23.00-001_VERIZON_012.019_000.nvu size(Bytes): 71825
CellularGateway#

Note: This process takes up to 15 minutes.

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-- 89226639 Aug 21 14:30 EM9190_01.07.23.00-001.cwe
-rw-r--r-- 71825 Aug 21 14:34 EM9190_01.07.23.00-001_VERIZON_012.019_000.nvu
CellularGateway#
```

Step 7: Verify current firmware and carrier PRI versions.

```

CellularGateway# show cellular 1 hardware
Modem Firmware Version = SWIX55C_01.07.19.00 000000 jenkins
Device Model ID = EM9190
International Mobile Subscriber Identity (IMSI) =
International Mobile Equipment Identity (IMEI) = 351735110112410
Integrated Circuit Card ID (ICCID) =
Mobile Subscriber Integrated Services Digital Network Number (MSISDN) =
Factory Serial Number (FSN) = 4H0335003502A1
Current Modem Temperature = 35 deg C
Carrier PRI SKU ID = 1104567
PRI Version = 012.012_000
Carrier = VERIZON
OEM PRI Version = 001.020
Modem Status = MODEM_STATE_NETWORK_READY
CellularGateway#
CellularGateway#
CellularGateway# show cellular 1 firmware
Firmware Activation Mode = MANUAL
INDEX CARRIER FW VERSION PRI VERSION STATUS
-----
1 VERIZON 01.07.19.00_VER 012.012_000 ACTIVE

CellularGateway#

```

Step 8: Initiate a 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_01.07.23.00 000000 jenkins
Device Model ID = EM9190
International Mobile Subscriber Identity (IMSI) =
International Mobile Equipment Identity (IMEI) = 351735110112410
Integrated Circuit Card ID (ICCID) =
Mobile Subscriber Integrated Services Digital Network Number (MSISDN) =
Factory Serial Number (FSN) = 4H0335003502A1
Current Modem Temperature = 35 deg C
Carrier PRI SKU ID = 1104567
PRI Version = 012.019_000
Carrier = VERIZON
OEM PRI Version = 001.020
Modem Status = MODEM_STATE_NETWORK_READY
CellularGateway#
CellularGateway#
CellularGateway# show cellular 1 firmware
Firmware Activation Mode = MANUAL
INDEX CARRIER FW VERSION PRI VERSION STATUS

```

CellularGateway#

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

FN980 Modem

For FN980 modem in P-5GS6-GL module, there are 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...

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