

# Troubleshoot Common Issues on CG522-E and P-5GS6-GL Modules

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## Introduction

This document describes common configuration issues seen in Cisco CG522-E and P-5GS6-GL Modules.

## Prerequisites

### Requirements

Cisco recommends that you have basic knowledge of these topics:

- 5G Cellular Network Basics
- Cisco Cellular Gateway 522-E
- Cisco P-5GS6-GL module
- Cisco IOS® XE and Cisco IOS® CG

### Components Used

The information in this document is based on these software and hardware versions:

- Cisco Cellular Gateway 522-E with IOS® CG version 17.9.3a.
- Cisco IR1101 with IOS® XE version 17.9.3 with a P-5GS6-GL module plugged in.

This applies to a P-5GS6-GL module connected to a router in standalone mode, or a CG522-E in standalone or controller mode managed by SD-WAN. This document does not apply to a P-5GS6-GL module connected to a router in SD-WAN since command syntax is different.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

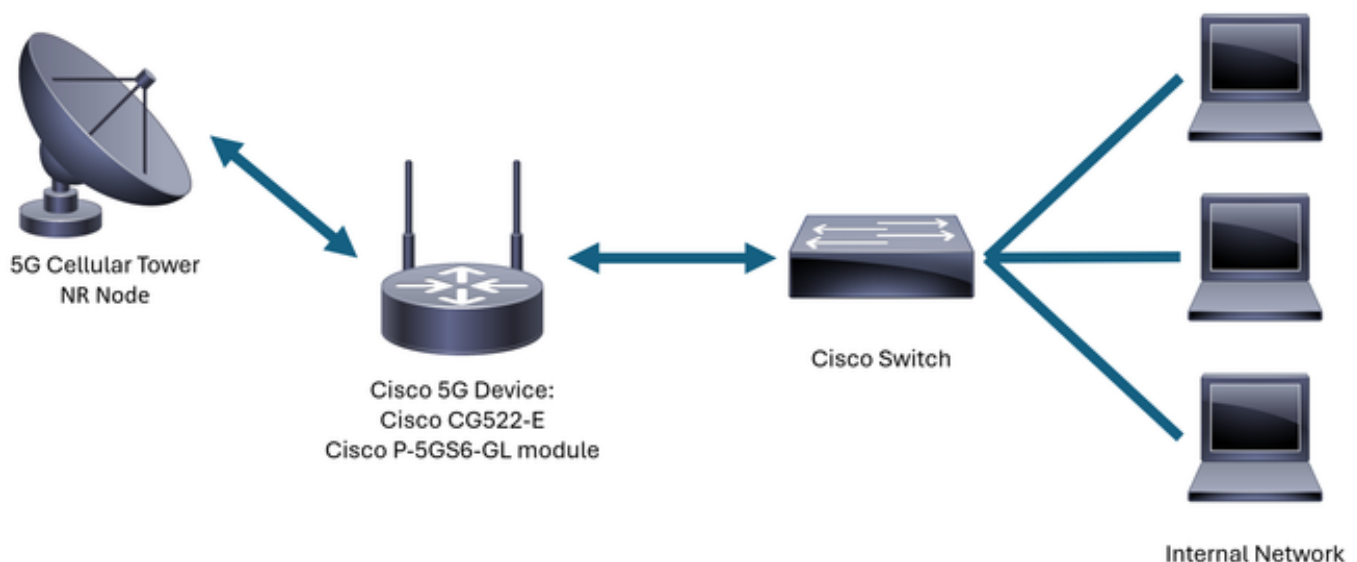
## Background information

5G technology is the fifth generation of cellular networks. It comes with a set of beneficial features, such as new theoretical throughput of almost 10 gigabytes per second, lower latency, better client data traffic so more users can be handled simultaneously while the network is used, and less battery consumption for mobile devices.

Today, more countries allow its usage, providers offer a network plan which includes it, and a high variety of devices support it. This has caused its implementation in different fields. For example, ambulances use it for remote communication, in stadiums a high number of clients connect without service loss, industries interconnect their locations, and people access to internet in their mobile phones.

Due to this broad adoption of 5G, Cisco has innovated with industrial devices capable of getting attached to it. The importance of understanding and configuring 5G Cisco products is imperative. Throughout this document, common issues are presented while their configuration related from physical to software conditions.

It is expected to have a connection from Cisco 5G device to the 5G New Radio (NR) Node which is also called a 5G Cellular Tower, so communication in 5G can happen:



## Common Issues either for a CG522-E or a P-5GS6-GL Module Connected to a Router

## Device not Attached to 5G Band

- Ensure with the carrier that the acquired network plan is activated for 5G band.
- Confirm with the carrier about 5G coverage area in the zone the 5G device is placed.

## Confirm the Device Detects the SIM

For a CG522-E:

```
<#root>
```

```
CellularGateway#
```

```
show cellular 1 sim
```

```
Cellular Dual SIM details:
```

```
SIM 0 = Present
```

```
SIM 1 = Not Present
```

```
Active SIM = 0 -----> Slot 0 is Active
```

For a P-5GS6-GL module connected to a router:

```
<#root>
```

```
isr#
```

```
show controller cellular 0/x/0 detail
```

```
Interface Cellular0/2/0
```

```
*
```

```
*
```

```
Cellular Dual SIM details:
```

```
-----
```

```
SIM 0 is present
```

```
SIM 1 is not present
```

```
SIM 0 is active SIM
```

## Confirm the Device Actively Uses Required SIM

For a CG522-E:

<#root>

CellularGateway#

show cellular 1 sim

Cellular Dual SIM details:

SIM 0 = Present

SIM 1 = Present

Active SIM = 0 -----> Slot 0 is Active

For a P-5GS6-GL module connected to a router:

<#root>

isr#

show controller cellular 0/x/0 detail

Interface Cellular0/2/0

\*

\*

Cellular Dual SIM details:

-----

SIM 0 is present

SIM 1 is not present

SIM 0 is active SIM

## Verify the IMSI and IMEI are Read from the SIM

For a CG522-E:

<#root>

CellularGateway#

show cellular 1 hardware

Modem Firmware Version = SWIX55C\_01.07.08.00 000000 jenkins

Device Model ID = EM9190

International Mobile Subscriber Identity (IMSI) = XXXXXXXXXXXXXXXXX

International Mobile Equipment Identity (IMEI) = XXXXXXXXXXXXXXXXX

Integrated Circuit Card ID (ICCID) = XXXXXXXXXXXXXXXXX

Mobile Subscriber Integrated Services Digital Network-Number (MSISDN) = XXXXXXXXXX

\*

\*

For a P-5GS6-GL module connected to a router:

```
<#root>
isr#
show cellular 0/X/0 all

Hardware Information
=====
Modem Firmware Version = M0H.020202
Host Firmware Version = A0H.000292
Device Model ID = FN980

International Mobile Subscriber Identity (IMSI) = XXXXXXXXXXXXXXXXX

International Mobile Equipment Identity (IMEI) = XXXXXXXXXXXXXXXXX

Integrated Circuit Card ID (ICCID) = XXXXXXXXXXXXXXXXX
Mobile Subscriber Integrated Services
Digital Network-Number (MSISDN) = XXXXXXXXXX
      *
      *
```

### Confirm the Configured APN is the Correct One

- Each carrier uses a specific Access Point Name (APN) which is provided when the cellular line is acquired. It depends on the contracted service whether you get a dynamic, static, or custom IP/service. The APN must be used so the device is attached to the cellular network.

For a CG5222-E, with the command **show cellular 1 profile** the configured APNs can be seen. A profile must be in Active state, which means it is attached:

```
<#root>
CellularGateway#
show cellular 1 profile

PROFILE ID  APN          PDP TYPE  STATE  AUTHENTICATION  USERNAME  PASSWORD
-----
1           IMS          IPv4
ACTIVE
none        -           -
```

For a P-5GS6-GL module connected to a router, with the command **show cellular 0/X/0 profile**, the same information is shown:

```
<#root>
```

isr#

show cellular 0/X/0 profile

Profile password Encryption level = 7

Profile 1 = INACTIVE \*\*

-----

PDP Type = IPv4v6

Access Point Name (APN) = ims

Authentication = None

Profile 2 = INACTIVE

-----

PDP Type = IPv4v6

Access Point Name (APN) = vzwadmin

Authentication = None

Profile 3 = ACTIVE\*

-----

PDP Type = IPv4v6

PDP address = XXX.XXX.XXX.XXX

IPv4 PDP Connection is successful

Access Point Name (APN) = VZWINTERNET

Authentication = None

Primary DNS address = XXX.XXX.XXX.XXX

Secondary DNS address = XXX.XXX.XXX.XXX

Profile 4 = INACTIVE

-----

PDP Type = IPv4v6

Access Point Name (APN) = vzwapp

Authentication = None

Profile 5 = INACTIVE

-----

PDP Type = IPv4v6

Access Point Name (APN) =

Authentication = None

```
Profile 6 = INACTIVE
-----
PDP Type = IPv4v6
Access Point Name (APN) = vzwclass6
Authentication = None
```

- \* - Default profile
- \*\* - LTE attach profile

## Confirm the Device is Attached to 5G Band

- For a CG522-E with 17.9.3 and above, this command reports when the device is connected to 5G technology:

```
<#root>
```

```
CellularGateway#
```

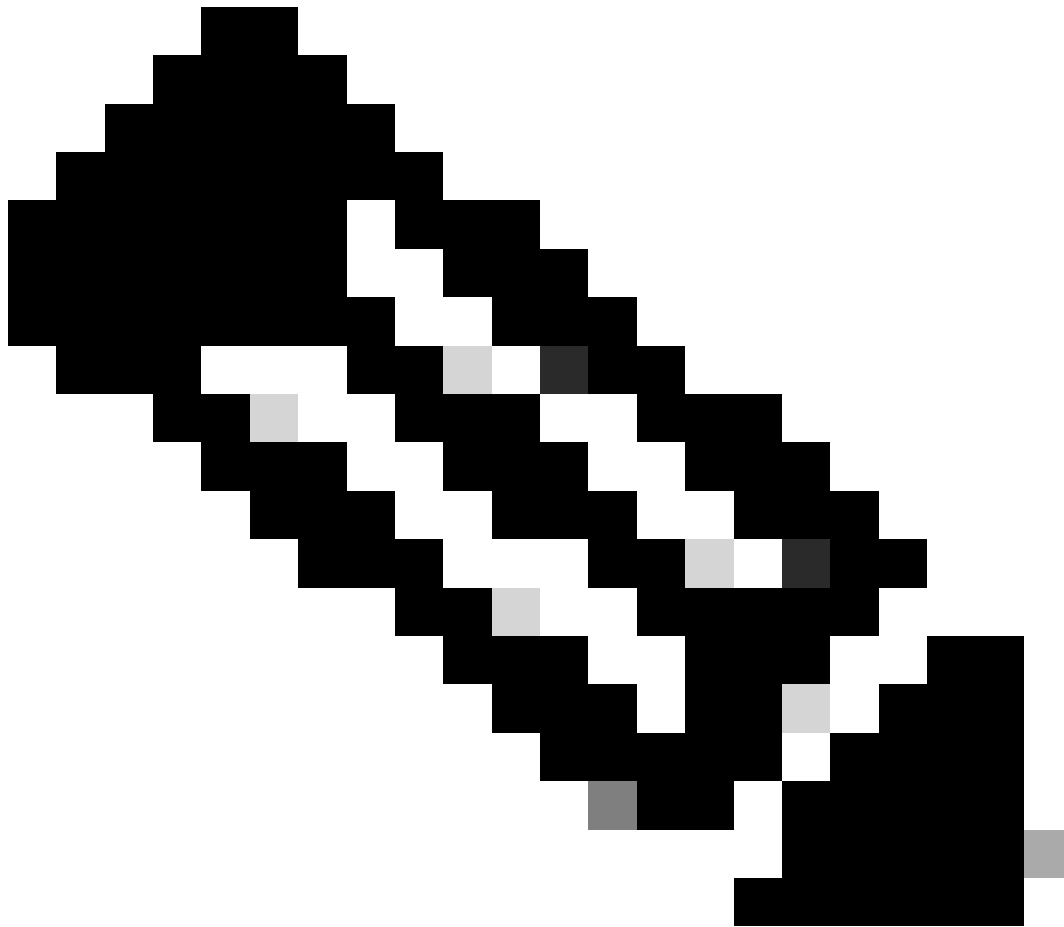
```
show cellular 0 radio
```

```
*
*
```

```
Network Change Event = activated 5G ENDC
```

## Verify Radio Values

- Refer to these reference values and corroborate the device is within them:
  1. Received Signal Strength Indication (RSSI) – Look for a value greater than -80 dBm (for example, -79 is greater than -80).
  2. Received Signal Reference Power (RSRP) – Look for a value greater than -105 dBm (for example, -104 is greater than -105).
  3. Reference Signal Received Quality (RSRQ) – Look for a value greater than -12 dB (for example, -11 is greater than -12).
  4. Signal to Noise Ratio (SNR) or Interference – Look for a value greater than 5 dB (for example, 6 is better than 5).



**Note:** These values must not be 0.

- 
- Here is an example of good values:

For a CG522-E:

```
<#root>
```

```
CellularGateway#
```

```
show cellular 0 radio
```

```
  *  
  *
```

```
Current Band = LTE
```

```
Current RSSI = -56 dBm
```



Current RSRP = -72 dBm

Current RSRQ = -6 dB

Current SNR = 12.4 dB

\*  
\*

For a P-5GS6-GL module connected to a router:

<#root>

isr#

show cellular 0/X/0 radio

\*  
\*

Current RSSI = -42 dBm

Current RSRP = -99 dBm

Current RSRQ = -5 dB

Current SNR = 10.6 dB

\*  
\*

If these values are not within the mentioned ranges, confirm that:

- All antennas are correctly installed. For a CG522-E:



- The antennas are correctly directed and point to the sky. For a CG522-E:



- In the case of a P-5GS6-GL module connected to a router, refer to [5G Sub-6 GHz Pluggable Interface Module](#), section Attaching an Antenna.
- There are no interferences such as microwaves, radars, and so on, where the device is placed.

## **Common Issues only for a CG522-E**

### **CG522-E does not Power Up when PoE is Used**

Verify that the device is PoE capable; in the ethernet port, a label with a lightning symbol must be present:

12V  $\equiv$  2.5A

$\leftrightarrow$  10G



---



**Note:** If a non-PoE unit is replaced, the same one is received.

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## Copy Upgrade Files to a CG522-E with Common TFTP Servers is not Successful

In this case, a switch can be used to make it act as the TFTP server. This workaround is for software and firmware upgrades.

1. In the switch, copy the file(s) to its flash, then enable it as TFTP:

```
<#root>
```

```
tftp-server flash:<filename>.nvu  
tftp-server flash:<filename>.cwe
```

2. In some cases, a USB connected to the switch can also be used as path:

```
<#root>
```

```
tftp-server usbflash0:<filename>.nvu
tftp-server usbflash0:<filename>.cwe
```

3. Then, in the CG, copy the files as usual:

```
<#root>
```

```
gw-action:request file download tftp://<tftp_ip_address>/<filename>.nvu create_dir fw_upgrade_add
```

```
gw-action:request file download tftp://<tftp_ip_address>/<filename>.cwe create_dir fw_upgrade_add
```

## Firmware Upgrade to a Newer Version when the CG522-E is Initially in 1.7.8

By default, most CGs contain 1.7.8 as firmware version. If an upgrade is required, first go to 1.7.13, and then to the desired version.

With the command **show cellular 1 hardware** the current firmware version is shown:

```
<#root>
```

```
CellularGateway#
```

```
show cellular 1 hardware
```

```
Modem Firmware Version = SWIX55C_
```

```
01.07.08.00
```

```
000000 jenkins
```

```
*
```

```
*
```

## Specific Firmware for the Device

- In some specific cases, a service provider requires specific firmware to be installed in a CG522-E, if that applies:

1. Use the command **show cellular 1 hardware** to identify the Device Model ID:

```
<#root>
```

```
CellularGateway#
```

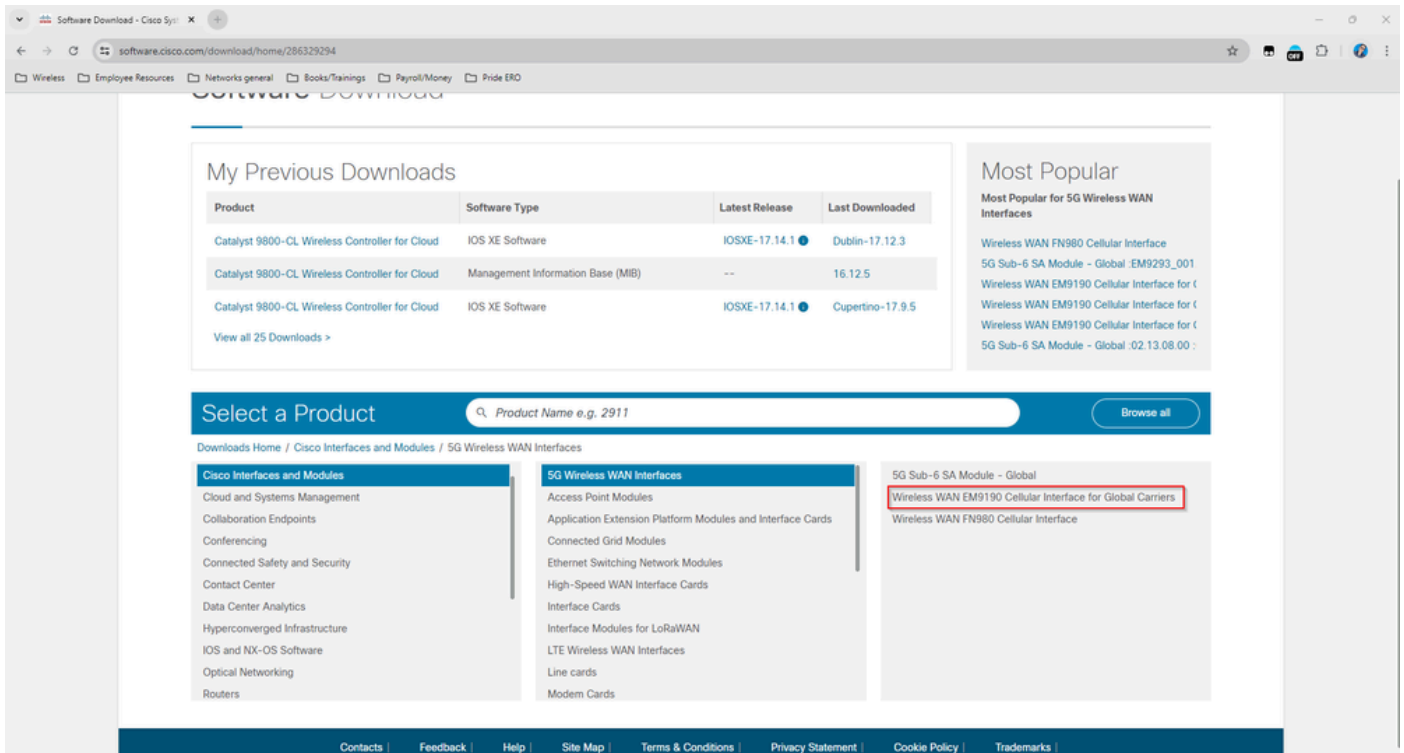
```
show cellular 1 hardware
```

```
Modem Firmware Version = SWIX55C_01.07.08.00 000000 jenkins
```

```
Device Model ID = EM9190
```

\*  
\*

2. Go to [Cisco Software Downloads](https://www.cisco.com/software) and select the correct model ID:



1. Go to Cellular Modem Firmware.
2. Look for the required firmware. Both **.cwe** and **.nvu** files are used in the upgrade.

## Common Issues only for P-5GS6-GL Modules Connected to a Router

### Module does not Automatically Connect to 5G after Reload

- A dialer in this platform is used to initiate the connection and checks if it remains Up to the carrier. When the dialer is properly configured, this output is shown:

```
<#root>
```

```
isr#
```

```
show dialer
```

```
Ce0/1/0 - dialer type = DIALER CWAN  
Idle timer (never), Fast idle timer (20 secs)  
Wait for carrier (30 secs), Re-enable (15 secs)
```

```
Dialer state is data link layer up
```

```
Dial reason: Dialing on watched route loss
```

Time until disconnect never

Current call connected 00:06:10

Connected to lte

Dial String	Successes	Failures	Last DNIS	Last status
lte	1	0	00:06:10	successful Default

- Ensure the dialer is configured as stated in the [Official Configuration Guide](#) section Configure Cellular Interface with dialer watch-group. The used IP address must be a dummy non-routable one.

## CLI Flooded by Carrier Aggregation Logs

Cisco has identified that when the carrier that the module is attached to uses Carrier Aggregation, the CLI of the IR1XXX router gets flooded with these logs:

```
Apr 5 23:53:17.057: %CELLWAN-2-NC_EVENT2: Cellular0/4/0: Network change event - activated 4G Carrier A
Apr 5 23:53:46.502: %CELLWAN-2-NC_EVENT2: Cellular0/4/0: Network change event - activated 4G Carrier A
```

However, this does not have any effects on functionality or performance and the behavior is tracked via Cisco bug ID [CSCwb47658](#).