

5G Mobile Broadband UTM Firewall

Feature Overview and Configuration Guide

Introduction

This guide describes the AlliedWare Plus™ AR4050S-5G mobile broadband UTM firewall and how to configure it.

This model has the same features as the AR4050S with the addition of 5G. 5G is a 5th generation mobile communication system which offers high speed, large capacity and low latency. 5G allows you to connect multiple devices that you can use to link from remote offices to your local corporate network. You can also back up a wired Ethernet Internet connection on a corporate WAN.

The 5G feature uses an internal cellular modem that supports 5th generation mobile communication. This modem supports configuration of carrier information used to connect to mobile carrier networks. This modem connects automatically to 3G and 4G wireless networks giving you the best available connection. The router connects to the fastest available wireless technology. Dual SIM card slots support resilient mobile connectivity, with the ability to use SIM cards from two different carriers.

- **5G** refers to the internal Sierra Wireless EM9191 modem. It features a higher speed wireless connection that creates two WWAN interfaces. The interface '**wwan0**' is used for the internal EM9191 modem. The interface '**wwan1**' is available for external USB 3G and 4G cellular modems.
- For more information about using USB cellular modems to connect to 3G and 4G, see [USB Cellular Modem Feature Overview and Configuration Guide](#).

Products and software version that apply to this guide

This guide applies to AlliedWare Plus™ products that support 5G modems.

- AR-Series Mobile Broadband UTM Firewall model AT-AR4050S-5G - from version 5.5.2-0.2 onwards.
- Support for fixed transmit mode configuration - from version 5.5.2-2.1
- Device GUI support from DG version 2.14.0 onwards.

For further information regarding product support for this feature, see the following documents:

- The [product's Datasheet](#)
- The product's [Command Reference](#)
- [Getting Started with the Device GUI on UTM Firewalls](#)

These documents are available from the above links on our website at alliedtelesis.com.

Feature support may change in later software versions. For the latest information, see the above documents.

For information and support about 5G, firmware and PRI files available, contact:

- Allied Telesis at this email: 5g-support@alliedtelesis.co.nz.

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What does a 5G cellular modem do?

The AR-Series Firewall model AT-AR4050S-5G supports access to 5th generation wireless technology for mobile communication using an internal Sierra Wireless EM9191 modem. 5G is the fastest wireless mobile communication available.

5G Internal modem features

The 5G modem uses a WWAN interface and supports the following features:

- You can configure carrier information via commands to connect to carrier networks.
- You can configure an Access Point Name (APN) profile and attach it to the WWAN interface.
- The modem supports 3G, 4G and 5G networks. The modem automatically finds the fastest available network.
- Two WWAN interfaces are available. '**wwan0**' is reserved for the internal EM9191 modem and '**wwan1**' is available for an external USB cellular modem.
- The router can be an Allied Telesis Autonomous Management Framework (AMF) master. AMF backups are written to USB.

Available radio frequencies

Due to regulatory requirements, some radio frequency bands may not be supported depending on the carrier you are using and the region that you are in. For more information see the [product's Datasheet](#).

How does this feature work?

When you use the 5G modem for mobile communication the following applies:

1. Only Micro SIMS are supported (15mm x 12mm).

We do not recommend using Mini or Nano SIM cards because the SIM adapter that they require can cause problems if the SIM card detaches inside a slot.

Make sure that you insert the SIM card correctly:

- The card must be the right size for the slot.
- Check that the SIM card is the right way up. The gold contacts must be facing downwards.
- Make sure the SIM card is inserted the right way around. The corner cut-out should be inserted first.
- The gold contact area of the SIM card must be clean and undamaged.
- Make sure there are no foreign objects in the SIM card slot.

2. You must attach the Access Point Name (APN) profile to the **'wwan0'** interface.

See "[Attach the APN profile to the 'wwan0' interface and SIM slot](#)" on page 9.

- An APN profile must have a minimum configuration that includes the APN Name. The name field accepts any string. Some carriers do not require any configuration and will allow you to connect to their network as long as you have a valid SIM card.
- If an APN profile has a username configured, it must have a password and authentication method configured.
- An APN profile PDP (Packet Data Protocol) type defaults to both IPv4 and IPv6. Some carriers only support IPv4.

3. The SIM slots are disabled by default.

This is a method of preventing the WWAN interface from automatically requesting a connection when it is a factory clean device. For example, some carriers require only a valid SIM to connect to the network whereas other carriers are stricter.

4. The **'wwan1'** interface is reserved for external USB modems.

For more information about using USB cellular modems to connect to 3G and 4G, see [USB Cellular Modem Feature Overview and Configuration Guide](#).

The **'wwan0'** interface automatically gets assigned a IP address from the carrier. The speed and performance of the WWAN interface is limited to the performance of the local carrier (always less than 1 Gig).

The WWAN interface may go down if the SIM card runs out of credit or if the carrier network goes down. A failover will occur between the SIM slots when there is a backup SIM card in the neighboring slot. You can change the time interval using the command **sim failover-interval**. During the failover the WWAN interface loses its IP address and a new request occurs from the backup SIM.

Limitations

The following limitations apply to the 5G modem feature:

1. PIN numbers for SIM cards are not supported.
2. eSIMs (embedded SIM card) are not supported.
3. If the SIM slots failover from one carrier to another you may need to update the PRI carrier information. For more information, see "[Carrier support](#)" on page 22.
4. Band restrictions for regulatory compliance.
Due to regulatory requirements, some bands may not be supported depending on the carrier you are using and the region or country that you are in. For more information, see "[Band restrictions](#)" on page 14.

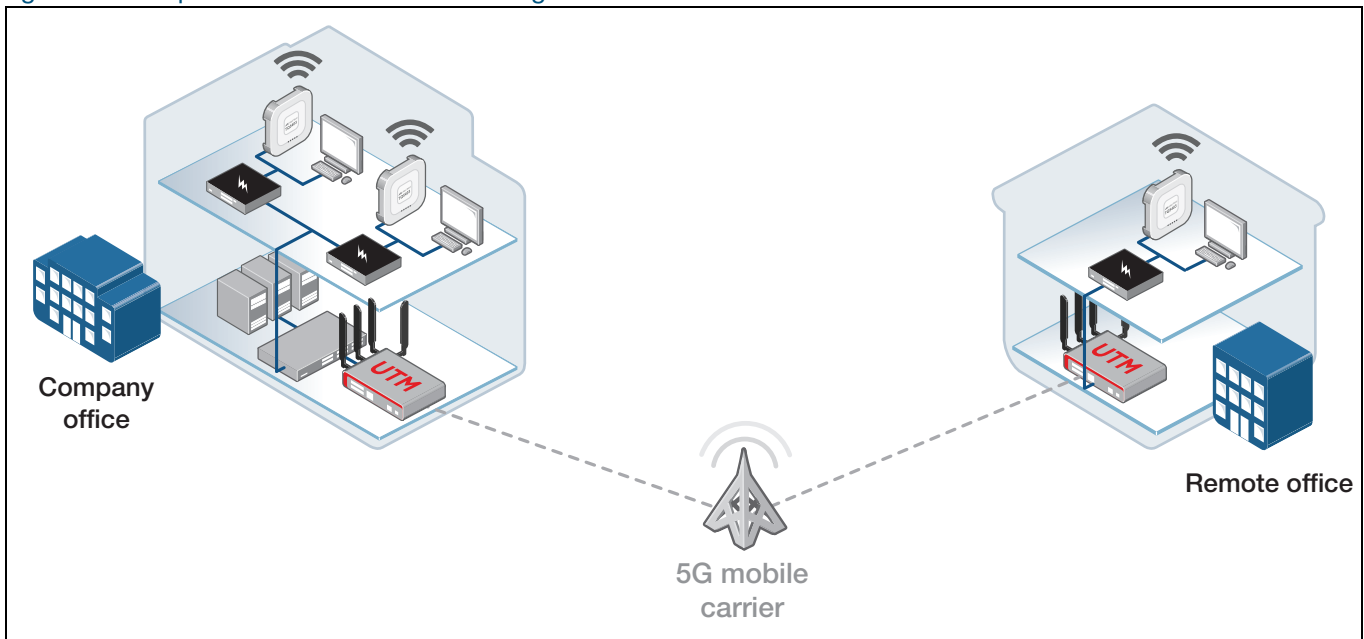
How to use the 5G cellular modem

A simple connection

This section describes some of the scenarios you can use the 5G cellular modem for. For step-by-step instructions, see "[Configuring a 5G modem using the 'wwan0' interface](#)" on page 9".

In this example the office LANs connect to the Internet via a 5G internal modem via the '**wwan0**' interface to access the cellular carrier network.

Figure 1: Example of a 5G modem connecting over the 'wwan0' interface

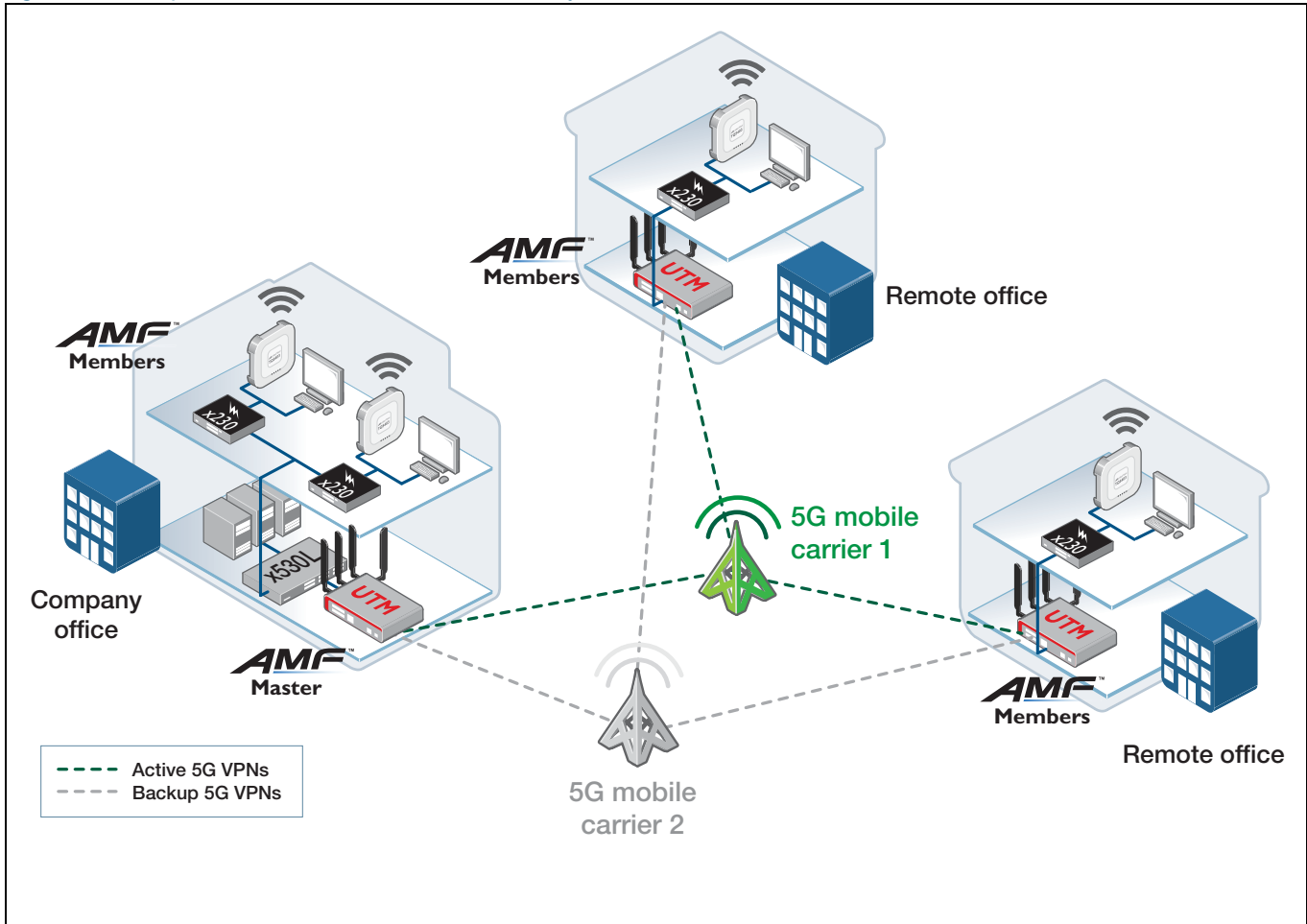


A backup and resiliency connection

5G mobile broadband provides a high performance solution for connecting rural or remote offices to the corporate network - ensuring they enjoy the same full access to on-line company resources and applications as those connected locally or over wired networks.

Installing 5G SIM cards from two different carriers enables a resilient business solution, with backup of inter-branch links, as even if the 5G signal from one carrier fails, the device can automatically connect to the alternate carrier using the second SIM. This ensures always-on access and connectivity right across all company locations.

Figure 2: Example of resilient 5G WAN connectivity with the dual SIM

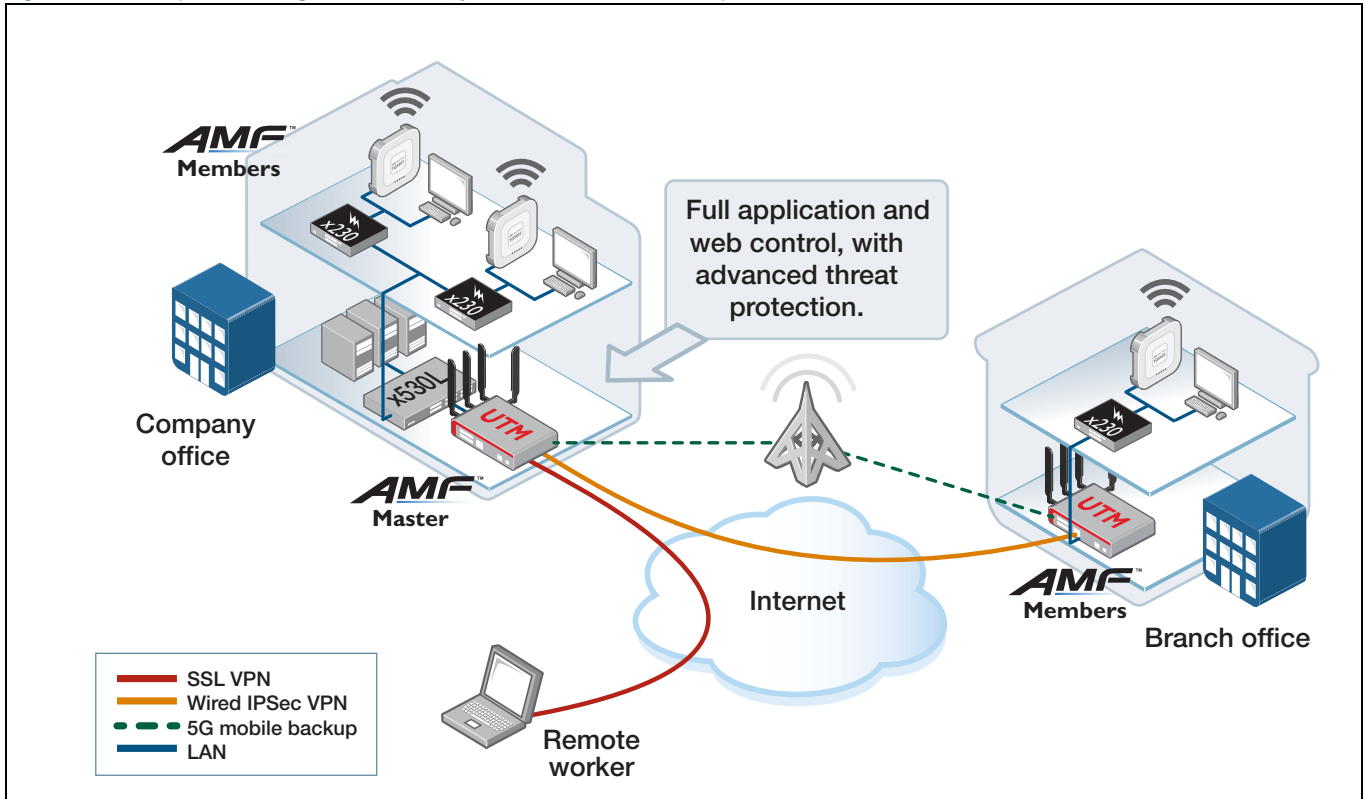


Integrated security with 5G WAN backup

This solution in the diagram below shows a UTM Firewall providing a wired site-to-site IPsec VPN connectivity between corporate offices, with 5G mobile network backup available if the wired VPN becomes unavailable. SSL VPNs allow access for remote connections, so that full access is always available. As well as securing remote connectivity, the firewall simultaneously ensures the security of inbound and outbound business data, with advanced threat protection features like IP reputation. Full application control allows organizations to control the applications their people use, and how they use them, so security and acceptable use policies can be enforced in ways that make sense for the business.

In addition to protecting and connecting modern networks, the firewalls are fully supported by AMF. AMF is a sophisticated suite of management tools that automate and simplify many day-to-day network administration tasks. Powerful features like centralized management, auto-backup, auto-upgrade, auto-provisioning and auto-recovery ensure streamlined networking. You can grow the network with plug-and-play simplicity, and network node recovery is fully zero-touch. The AR4050S-5G UTM firewall can operate as the AMF network master, storing firmware and configuration backups for up to 20 other network nodes.

Figure 3: Example of integrated security with 5G WAN backup



Other configuration solutions

See the AR4050S-5G [Datasheet](#) for more detail about configuration options, features and tools to get the best solutions for your router, including the following:

- **Integrated wireless network management**
 Autonomous Wave Control (AWC) allows you to set up and manage your wireless access points (APs) from the GUI of the AR4050S-5G. AWC uses wireless intelligence to automatically optimize wireless output and channel selection. It minimizes coverage gaps and reduces AP interference. This results in a high quality wireless experience that responds to network configuration changes and bandwidth demands from user devices. It also supports plug-and-play WLAN expansions, captive portal, Passpoint, and more.
- **Automated internal LAN security**
 When the AMF Security mini controller is integrated with the AR4050S-5G UTM firewall, traffic can be isolated anywhere in the network. These features automatically block threats such as targeted attacks or malware.

Configuring a 5G modem using the 'wwan0' interface

Detailed instructions for configuring the 5G modem are below. In summary, the process is:

1. Buy a micro SIM card and insert it into the SIM 1 or SIM 2 card slot.
2. Create a valid APN profile for the SIM card.
3. Give the APN profile a name.
4. Enable the SIM slot.
5. Attach the APN profile to the '**wwan0**' interface.

The following example shows the minimum configuration to connect to a WWAN interface:

Step 1: Insert the Micro SIM card

You can insert the Micro SIM card in either the SIM 1 slot or the SIM 2 slot. In this example the card is inserted in the SIM 1 slot.

Step 2: Add an APN profile and name of the carrier

In this example a profile called 'carrier1' is created with the carrier name 'carrier_name.co.nz'.

```
awplus# configure terminal
awplus(config)# apn carrier1
awplus(config-apn)# name carrier_name.co.nz
awplus(config-apn)# exit
```

Step 3: Enable the SIM card slot

In this example the SIM 1 card slot is enabled.

```
awplus(config)# sim enable sim1
```

Step 4: Attach the APN profile to the 'wwan0' interface and SIM slot

```
awplus(config)# interface wwan0
awplus(config-if)# apn sim1 carrier1
```

Optional configuration using the Device GUI

Each cellular carrier provides its own APN settings which may need to be configured for individual SIM cards. Allied Telesis provides these optional settings for an APN profile using the Device GUI:

1. From the main menu, go to **Network Infrastructure>Wireless WAN**.
2. Click on the **Carriers** tab.

From this dialog you can change the APN Name, Username, Password, Packet Data Protocol Type and Carrier Name.

To add a new APN profile, click the **+New APN profile** button. The **New APN Profile** dialog is displayed:

If you add a Username, you are required to enter a Password and authentication method. An APN profile PDP (Packet Data Protocol) type defaults to IPv4v6. Some carriers only support IPv4. You can get the details from your carrier.

The **SIM Configuration** dialog enables you to edit the failover interval time in seconds. Click the **Edit** button to change the time:

The failover interval in seconds can be from the range 60 to 3600. Enter the number of seconds for the interval in the **Edit failover interval** dialog:

Click the **Apply** button to make the change. The default is 300 seconds. If you click the **Reset** button the interval is set back to the default. The **Cancel** button allows you to backout without making any changes.

Optional configuration commands using the CLI

Use the command **username (config-apn)** to configure a username for an APN profile. The user name is provided by the mobile carrier:

username syntax

```
username <user-name>
no username
```

Use the command **password (config-apn)** to configure a password for an APN profile.

The password is provided by the mobile carrier:

password syntax

```
password <password>
no password <password>
```

Use the command **auth (config-apn)** to configure authentication used to connect to the mobile carrier. Authentication must be configured if you have a username and password that is provided by the mobile carrier:

auth syntax

```
auth {chap|mschapv2|pap}
no auth
```

The following example shows how to configure an APN profile named 'carrier1' with a name, username, encrypted password and authentication protocol:

example

```
awplus# configure terminal
awplus(config)# apn carrier1
awplus(config-apn)# name carrier1_name.co.nz
awplus(config-apn)# username carrier1user1
awplus(config-apn)# password secret-password
awplus(config-apn)# auth chap
```

output

```
apn carrier1
name carrier1_name.co.nz
username carrier1user1
password 8 FXszBwkQWncYsnQikDQBs8ZMFkCeLithliYgjc+idIw=
auth chap
```

Use the command **carrier (config-apn)** to configure a carrier image for an APN profile. Some carriers require a different PRI file to work. You may need to use this command when swapping between SIM cards or carriers. Use the command **show 5g carriers** to display carriers and PRI file names.

carrier syntax

```
carrier <carrier-name>
```

Use the command **pdp-type (config-apn)** to allow the Packet Data Protocol to be set. The PDP Type is the type of IP address assigned for connection to the carrier. For example, IPv4 or IPv6. The default is both IPv4 and IPv6. Use the command **show apn-profiles** to see what PDP Type is set.

PDP-type syntax

```
pdp-type {ipv4|ipv4v6|ipv6}
```

Use the command **sim failover-interval** to set the failover interval in seconds from the range 0 to 3600. The default is 300 seconds. Use the command **show 5g sim** to display details about the SIM card including the failover interval that is set.

SIM failover syntax

```
sim failover-interval <0-3600>
```

Support for fixed transmit mode configuration

From release 5.5.2-2.1 you can fix the transmission mode on your router. The main reason you may want to use this command is if you have a weak signal that causes your router to drop out and have communication errors.

For example, if you have a strong reliable 4G signal but a weak unreliable 5G signal. In this case you can use the command **transmit-mode** to force your router to use the 4G signal only. This prevents your router from unexpected drop outs and gives you a more reliable signal without interruption.

This command is run in Access Point Name Configuration mode. The default mode is automatic. This means your modem automatically connects between 3G, 4G and 5G transmit modes.

transmit-mode syntax

```
transmit-mode {3g|4g|3g-4g|4g-5g|3g-5g|auto}
no transmit-mode
```

Use the **no** variant of this command to set the transmission mode back to the default (automatic). You can also use the **auto** parameter to set it back to the default.

Examples To configure the transmit-mode '4g' for the APN profile 'carrier1', use the commands:

```
awplus# configure terminal
awplus(config)# apn carrier1
awplus(config-apn)# transmit-mode 4g
```

To set the transmit mode back to the default setting (automatic), for the APN profile 'carrier1', use the commands:

```
awplus# configure terminal
awplus(config)# apn carrier1
awplus(config-apn)# no transmit-mode
```

**Show
command**

Use the command **show 5g band** to display information about network modem bands and the transmit mode setting.

```
awplus#show 5g band

APN profile transmit mode Automatic (3g-4g-5g)

Bands available with active carrier
-----
RATs: WCDMA,LTE,NR5G
GWC: B1,B2,B4,B5,B6,B8,B9,B19
LTE:
B1,B2,B3,B4,B5,B7,B8,B12,B13,B14,B17,B18,B19,B20,B25,B26,B28,B29,B30,B32,
B34,B38,B39,B40,B41,B42,B46,B48,B66,B71
TDS:
NRSA: n1,n2,n3,n5,n28,n41,n66,n71,n77,n78,n79
NRNSA: n1,n2,n3,n5,n28,n41,n66,n71,n77,n78,n79

Bands excluded due to regulatory compliance
LTE : B30 and B48
NRSA : n41
NRNSA: n41
```

Band restrictions

Due to regulatory compliance, some bands may not be supported depending on the carrier you are using and the region or country that you are in. In the output example above LTE B30 and B48 are not available. The band n41 for NRSA and NRNSA are not available for firmware older than version 03.10.07.00.

To display band restrictions for your router in your country, use the command **show 5g band**. The example below shows the current band restrictions for Taiwan:

```
awplus#show 5g band

APN profile transmit mode Not Set

Bands available with active carrier GENERIC
-----
RATs : WCDMA,LTE,NR5G
GWC : B1,B2,B4,B5,B6,B8,B9,B19
LTE : B1,B2,B3,B4,B5,B7,B8,B12,B13,B14,B17,B18,B19,B20,B25,B26,B28,B29,B30,B32,
B34,B38,B39,B40,B41,B42,B46,B48,B66,B71
TDS :
NRSA : n1,n2,n3,n5,n28,n41,n66,n71,n77,n78,n79
NRNSA: n1,n2,n3,n5,n28,n41,n66,n71,n77,n78,n79

Bands excluded due to regulatory compliance
LTE : B30 and B48
Country Band Restrictions Applied: Taiwan

Bands available to use:
-----
GWC: B1 B8
LTE: B1 B3 B7 B8 B28 B38 B41
NRNSA: n1 n3 n28 n41 n78
NRSA: n1 n3 n28 n41 n78
```

Show commands to monitor what is happening

The **show 5g sim** command displays details about the SIM card, the state of the network and APN configuration attached to the SIM card. For the SIM card slot to be active the administration state must be up, a valid APN profile must be configured and attached to the '**wwan0**' interface.

```
awplus#show 5g sim
Slot 1 is : Present
Slot 1 administrative state : Up
Slot 1 present, up and configured : Yes
Slot 1 is : Active

Slot 1 APN : carrier1
Slot 1 APN name : carrierabc
Slot 1 User name : Not Set
Slot 1 Password : Not Set
Slot 1 Authentication type : Not Set
Slot 1 Packet data protocol type : ipv4v6
Slot 1 Transmit mode : Automatic (3g-4g-5g)
Slot 1 Carrier name : generic

Slot 2 is : Present
Slot 2 administrative state : Up
Slot 2 present, up and configured : Yes
Slot 2 is : Backup

Slot 2 APN : carrier2
Slot 2 APN name : carrierxyz
Slot 2 User name : Not Set
Slot 2 Password : Not Set
Slot 2 Authentication type : Not Set
Slot 2 Packet data protocol type : ipv4v6
Slot 2 Transmit mode : Automatic (3g-4g-5g)
Slot 2 Carrier name : generic

SIM Failover Interval : 300 seconds
Network is running : True
```

The **show 5g sim detail** command displays details about the active SIM such as the Integrated Circuit Card ID (ICCID). This 19-20 digit number is typically printed on the back of the SIM card. The ICCID is a globally unique serial number that identifies the SIM card.

```
awplus#show 5g sim detail

Current SIM Details:

Slot 1 is : Present
Slot 1 administrative state : Up
Slot 1 present, up and configured : Yes
Slot 1 is : Active

Slot 1 APN : carrier1
Slot 1 APN name : carrierabc
Slot 1 User name : Not Set
Slot 1 Password : Not Set
Slot 1 Authentication type : Not Set
Slot 1 Packet data protocol type : ipv4v6
Slot 1 Transmit mode : Automatic (3g-4g-5g)

Slot 1 Carrier name : generic
Slot 1 ICCID : 8964011910081631877
```

The **show 5g apn-profiles** command displays the profiles that have been configured and if they are accepted by the Sierra EM9191 internal modem.

```
awplus#show 5g apn-profiles
APN Profiles
```

No.	Profile	Parameter	Configuration
1	carrier1	APN Name	test1.com
1	carrier1	User Name	Not Set
1	carrier1	Password	Not Set
1	carrier1	Authentication	Not Set
1	carrier1	PDP Type	ipv4v6
1	carrier1	Carrier	generic
1	carrier1	Transmit Mode	Automatic (3g-4g-5g)
1	carrier1	Config Error	No
2	carrier2	APN Name	test2.com
2	carrier2	User Name	Jonathan
2	carrier2	Password	5Jw0JQFjnVj9D9GGInKljy31mc54u5Jx+9+EnojGev8=
2	carrier2	Authentication	PAP
2	carrier2	PDP Type	ipv4v6
2	carrier2	Carrier	DOCOMO
2	carrier2	Transmit Mode	Automatic (3g-4g-5g)
2	carrier2	Config Error	No

The **show 5g status** command displays the state of the network connection and information from the 5G modem. This includes what cell tower you are connected to and the signal strength. It also displays if the radio is enabled. The system mode lets you know if you are connected to a 3G (WCDMA), 4G (LTE) or 5G (ENDC) network.

```

awplus#show 5g status
Modem:
  Sierra Wireless, Incorporated
  EM9190 (351735110104094)
  Revision: G
  SWIX55C_01.07.03.00 000000 jenkins 2020/10/23 12:45:07
  Radio is enabled

Power Control:
!GSTATUS:
Current Time: 903          Temperature: 35
Modem Mitigate Level: 0   ModemProc Mitigate Level: 0
Reset Counter: 1          Mode: ONLINE
System mode: ENDC         PS state: Attached
LTE band: B7              LTE bw: 15 MHz
LTE Rx chan: 3375         LTE Tx chan: 21375
LTE SSC1 state:INACTIVE   LTE SSC1 band: B28
LTE SSC1 bw : 15 MHz      LTE SSC1 chan: 9485
LTE SSC2 state:INACTIVE   LTE SSC2 band: B3
LTE SSC2 bw : 20 MHz      LTE SSC2 chan: 1800
EMM state: Registered     Normal Service
RRC state: RRC Connected
IMS reg state: REGISTERED IMS mode: Normal
IMS Srv State: FULL SMS,NO VoIP

PCC RxM RSSI: -50         PCC RxM RSRP: -80
PCC RxD RSSI: ---         PCC RxD RSRP: ---
PCC RxM1 RSSI: ---        PCC RxM1 RSRP: ---
PCC RxD1 RSSI: ---        PCC RxD1 RSRP: ---
SCC1 RxM RSSI: -53        SCC1 RxM RSRP: -76
SCC1 RxD RSSI: -60        SCC1 RxD RSRP: -81
SCC2 RxM RSSI: -60        SCC2 RxM RSRP: -83
SCC2 RxD RSSI: -56        SCC2 RxD RSRP: -79
SCC2 RxM1 RSSI: ---       SCC2 RxM1 RSRP: ---
SCC2 RxD1 RSSI: ---       SCC2 RxD1 RSRP: ---
Tx Power: 2               TAC: b070 (45168)
RSRQ (dB): -9.0           Cell ID: 00142535 (1320245)
SINR (dB): 21.6

NR5G band: n78            NR5G bw: 60 MHz
NR5G Rx chan: 631132      NR5G Tx chan: 631132
NR5G RSRP (dBm): -90      NR5G RSRQ (dB): -12
NR5G SINR (dB): 12.5
5G NR Info:
!NRINFO:
Connectivity Mode: NSA

Cell ID: 126
NR5G band: n78            Carrier Index: 0
NR5G dl bw: 60 MHz        NR5G ul bw: 60 MHz
NR5G Rx chan: 631132      NR5G Tx chan: 631132
NR5G dl MIMO: 4           NR5G ul MIMO: 1
NR5G(sub6) RxM RSSI (dBm): -55.5      NR5G(sub6) RxD RSSI (dBm): -57.3
NR5G(sub6) RxM1 RSSI (dBm): -53.1      NR5G(sub6) RxD1 RSSI (dBm): -50.6

NR5G RSRP (dBm): -90      NR5G RSRQ (dB): -12
NR5G SINR (dB): 12.5

```

The **show 5g tech** command displays technical details about your 5G modem configuration and connection:

```

awplus#show 5g tech
+CGREG: 0,0
0.0: not registered, MT is not currently searching a new operator to register to
0.1: Registered, home network
0.2: Searching
0.3: Registration denied
0.4: Registered, non-home network

CPIN:
+CPIN: READY
READY: This means SIM PIN is already unlocked or lock has been disabled
SIM PIN: This means SIM PIN is locked and code is required
SIM PUK: Maximum number of retries to unlock has been reached ...

COPS:
+COPS: 0,0,"VF Stay Safe vodafone NZ",7
Print network details

CUSTOM:
!CUSTOM:
          GPSENABLE           0x01
          IPV6ENABLE          0x01
          SIMLPM               0x01
          IMCONFIG             0x02
          ICMPINTSRVDIS        0x01
          QXDMLOGENABLE        0x01

AT$QCPDPP
$QCPDPP: 1,0
$QCPDPP: 2,0
Report PDP-IP connection authentication parameters
QCTER:
$QCTER: 115200
Report TE-DCE baud rate

RXDEN:
!RXDEN: 1
Report WCDMA/LTE receive diversity

&V:
&C: 2; &D: 2; &E: 0; &F: 0; &S: 0; &W: 0; E: 1; L: 0; M: 0; Q: 0; V: 1;
X: 1; Z: 0; \Q: 3; \S: 0; \V: 0; O: 0; S0: 0; S2: 43; S3: 13; S4: 10;
S5: 8; S6: 2; S7: 0; S8: 2; S9: 6; S10: 14; S11: 95; S30: 0; S103: 1;
S104: 1; +FCLASS: 0; +ICF: 3,3; +IFC: 2,2; +IPR: 115200; +DR: 0;
+DS: 0,0,2048,6; +CME: 2; +WS46: 25; +CFUN: ; +CBST: 0,0,1;
+CRLP: (61,61,48,6,0),(61,61,48,6,1),(240,240,52,6,2);
+CV120: 1,1,1,0,0,0; +CHSN: 0,0,0,0; +CSSN: 0,0; +CREG: 0; +CGREG: 0;
+CEREG: 0; +C5GREG: 0; +CSCS: "IRA"; +CSTA: 129; +CR: 0; +CRC: 0;
+CGDCONT: (1,"IPV4V6","", "0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0), (2,"IPV4V6",
"ims", "0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0);
+CGDSCONT: ; +CGTFT: ; +CGEQREQ: ; +CGEQMIN: ; +CGEQOS: ; +CGQREQ: ;
+CGQMIN: ; +CGEREP: 0,0; +CGDATA: "PPP"; +CGCLASS: "A"; +CGPIAF: 0,0,0,0;
+CGSMS: 1; +CSMS: 0; +CMGF: 0; +CSAS: 0; +CRES: 0; +CSCA: " ";
+CSMP: ,,0,0; +CSDH: 0; +CSCB: 0,"",""; +C5GSMS: 0; +C5GUSMS: 0,0;
+ES: ,, ; +ESA: 0,,,0,0,255; +CMOD: 0; +CEMODE: 2; +CVHU: 1; ; ; ; ; ;
+CEMBMSCFG: 0; +CEMBMSSRV: 0,0,""; +CEMBMSSAI: 0,0;
+CPIN: ????????,????????; +CMEC: 0,0,0,0; +CIND: 0,4,1,1,0,0,1,0;
+CMER: 0,0,0,0,0; +CGATT: 1; +CGACT(1,1),(2,1); +CPBS: "SM";
+CPMS: "ME","ME","ME"; +CNMI: 0,0,0,0,0; +CMMS: 0; +CCUG: 0,0,0;
+COPS: 0,0,""; +CUSD: 0; +CAOC: 1; +CCWA: 0; +CPOL: 0,2,"",0,0,0,0;
+CPLS: 0; +CTZR: 0; +CTZU: 1; +CLIP: 0; +COLP: 0; +CDIP: 0; +CLIR: 0;
+CSDF: 1; +CEN: 0; +CMCCS: 0; ; *CNTI: 0; ^DSCI: 0; ^MODE: 0
Report everything

[/dev/cdc-wdm0] Packet statistics:
  Octets (in): '0'
  Packets (in): '0'
  Discards (in): '0'
  Errors (in): '0'
  Octets (out): '0'
  Packets (out): '0'
  Discards (out): '0'
  Errors (out): '0'

[/dev/cdc-wdm0] Subscriber ready status retrieved:
  Ready state: 'initialized'
  Subscriber ID: '530011114163187'
  SIM ICCID: '8964011910081631877F'
  Ready info: 'none'
  Telephone numbers: (0) 'unknown'

```

The **show 5g tech** (con't):

```

[/dev/cdc-wdm0] Registration status:
    Network error: 'unknown'
    Register state: 'home'
    Register mode: 'automatic'
    Available data classes: 'lte'
    Current cellular class: 'gsm'
    Provider ID: '53001'
    Provider name: 'vodafone NZ'
    Roaming text: 'unknown'
    Registration flags: 'packet-service-automatic-attach'
[/dev/cdc-wdm0] Successfully got status:
Common Info:
    Temperature: '29'
    Modem mode: 'online'
    System mode: 'lte'
    IMS registration state: 'full-srv'
    Packet service state: 'attached'
LTE info:
    Band: 'bc-7'
    Bandwidth: '15'
    RX channel: '3375'
    TX channel: '21375'
    EMM state: 'registered'
    EMM sub state: '0'
    EMM connection state: 'rrc-idle'
[/dev/cdc-wdm0] Successfully got operator name data
Service Provider Name
    Display Condition: '(NULL)'
    Name                : 'vodafone NZ'
NITZ information:
    Long Name: 'VF Stay Safe'
    Short Name: 'VF Stay Safe'
    Country: 'initials-do-not-add'

```

The **show 5g tech log** command displays technical details from a log when the modem attaches to a WWAN interface:

```

awplus#show 5g tech log

Loading profile at /flash/.configs/5g_modem.conf...
    APN: vodafone
    APN auth protocol: unset
    APN user: unset
    APN password: unset
    mbim-proxy: yes
    ip-type: ipv4v6
Stopping network with 'mbimcli -d /dev/cdc-wdm0 --disconnect --device-open-proxy
'...'
Network stop failed

Clearing state at /tmp/mbim-network-state-cdc-wdm0...
    Ready state: 'initialized'
Network started successfully
Requesting IPv4 and IPv6 information through mbimcli proxy:

[/dev/cdc-wdm0] IPv4 configuration available: 'address, gateway, dns, mtu'
    IP [0]: '100.105.163.81/30'
    Gateway: '100.105.163.82'
    DNS [0]: '203.118.191.1'
    DNS [1]: '203.109.191.1'
    MTU: '1500'

[/dev/cdc-wdm0] IPv6 configuration available: 'none'
Applying the following network interface configurations:
ip link set wwan0 down
ip addr flush dev wwan0
ip -6 addr flush dev wwan0
ip link set wwan0 up
ip addr add 100.105.163.81/30 dev wwan0
ip route add default via 100.105.163.82 dev wwan0
ip link set mtu 1500 dev wwan0
Network interface configurations completed.

```

The **show 5g tech config** command displays the active SIM configuration currently configured on your modem:

```
awplus#show 5g tech config
APN=vodafone
APN_USER=
APN_AUTH=
IP_TYPE=ipv4v6
PROXY=yes
```

The **show 5g tech firmware** command displays current firmware active on your modem:

```
awplus#show 5g tech firmware
AT!PRIID
  PRI Part Number: 9909484
Revision: 001.021
Customer: Generic

Carrier PRI: 9999999_9909619_SWIX55C_01.07.13.00_00_ATT_012.007_000
Carrier PRI: 9999999_9909622_SWIX55C_01.07.10.00_00_DCM_004.000_000
Carrier PRI: 9999999_9909622_SWIX55C_01.07.19.00_00_DOCOMO_004.007_000
Carrier PRI: 9999999_9909621_SWIX55C_01.07.19.00_00_GENERIC_016.010_000
Carrier PRI: 9999999_9910308_SWIX55C_01.07.13.00_00_TMO_001.005_000

AT!IMPREF
  !IMPREF:
  preferred fw version:      01.07.19.00
  preferred carrier name:    GENERIC
  preferred config name:    GENERIC_016.010_000
  preferred subpri index:   000
  current fw version:       01.07.19.00
  current carrier name:     GENERIC
  current config name:     GENERIC_016.010_000
  current subpri index:     000

AT!IMAGE
  TYPE SLOT STATUS LRU FAILURES UNIQUE_ID  BUILD_ID
FW  1    GOOD  1    0 0      ?_?      01.07.19.00_?
Max FW images: 1
Active FW image is at slot 1

TYPE SLOT STATUS LRU FAILURES UNIQUE_ID  BUILD_ID
PRI  FF   GOOD  0    0 0      012.007_000 01.07.13.00_ATT
PRI  FF   GOOD  0    0 0      004.000_000 01.07.10.00_DCM
PRI  FF   GOOD  0    0 0      004.007_000 01.07.19.00_DOCOMO
PRI  FF   GOOD  0    0 0      016.010_000 01.07.19.00_GENERIC
PRI  FF   GOOD  0    0 0      001.005_000 01.07.13.00_TMO
Max PRI images: 50

AT!RFCID
  !RFCID:
  CMW_HWID: 1007
  CMW_BID : 0
  MMW_HWID: 0
  MMW_BID : 0
awplus#
```

The command **show 5g carriers** displays information about carrier PRI files that are on the 5G router:

```

master#show 5g carriers

ID  Slot      Build ID      State
-----
1   Good      03.04.03.00_? Active
2   Empty
3   Empty      Not Set
                                     Not Set

Carrier
ID  Name      Build      Unique ID      State
-----
1   ATT       012.007_00 01.07.13.00_ATT Orphan
2   DOCOMO    030.012_00 03.04.03.00_DOCOMO Usable
3   DT        020.006_00 02.08.01.00_DT Orphan
4   GENERIC   030.012_00 03.04.03.00_GENERIC Active
5   TELSTRA   030.016_00 03.04.03.00_TELSTRA Usable
6   TMO       001.005_00 01.07.13.00_TMO Orphan
7   Telstra   020.002_00 02.08.01.00_Telstra Orphan
8   VERIZON   012.012_00 01.07.19.00_VERIZON Orphan

Preferred fw version:      03.04.03.00
Preferred carrier name:    GENERIC
Preferred config name:     GENERIC_030.012_000
Preferred subpri index:    000
Current fw version:        03.04.03.00
Current carrier name:      GENERIC
Current config name:       GENERIC_030.012_000
Current subpri index:      000

```

The command **show interface** displays information about the 5G 'wwan0' link.

```

awplus#show int wwan0
Interface wwan0
  Link is UP, administrative state is UP
  Hardware is WWAN
  IPv4 address 153.141.243.249/30
  index 14 metric 1 mtu 1500
  <UP,BROADCAST,RUNNING,NOARP,MULTICAST>
  VRF Binding: Not bound
  SNMP link-status traps: Disabled
  Router Advertisement is disabled
  Router Advertisement default routes are accepted
  Router Advertisement prefix info is accepted
    input packets 2292, bytes 134128, dropped 0, multicast packets 0
    output packets 2052, bytes 116454, multicast packets 0, broadcast packets 0
    input average rate : 30 seconds 64 bps, 5 minutes 91 bps
    output average rate: 30 seconds 35 bps, 5 minutes 57 bps
    input peak rate 3.19 Kbps at 2021/01/07 21:17:40
    output peak rate 2.78 Kbps at 2021/01/07 21:04:10
  Time since last state change: 0 days 00:54:35
</pre>

```

Carrier support

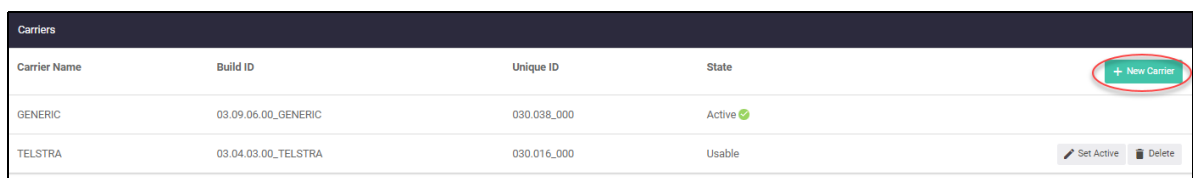
The EM9191 modem relies on firmware and production release information (PRI) files from Sierra Wireless. For information and support about 5G, firmware and PRI files available, contact Allied Telesis at this email 5g-support@alliedtelesis.co.nz.

Using the Device GUI to change a carrier PRI file

At times you may need to add a new carrier file to match the correct version of the firmware file. In this case the PRI file or firmware file could display as orphaned because the versions do not match. To configure carrier files follow the steps below:

1. From the main menu, go to **Network Infrastructure>Wireless WAN**.
2. Click on the **Carriers** tab.

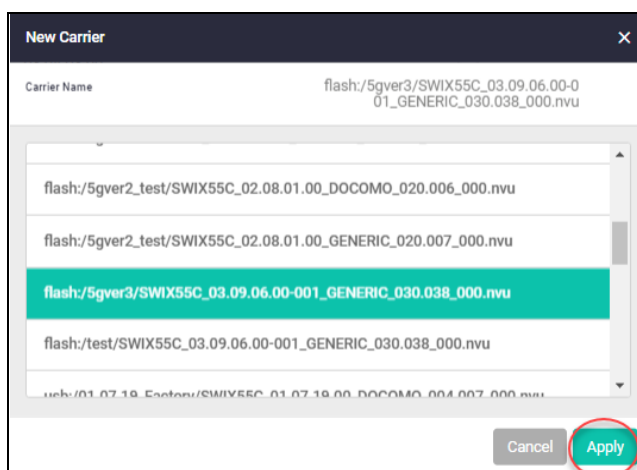
The **Carriers** dialog displays the carrier name, which build version it is, the unique file name ID and its current state:



Carrier Name	Build ID	Unique ID	State
GENERIC	03.09.06.00_GENERIC	030.038_000	Active ✔
TELSTRA	03.04.03.00_TELSTRA	030.016_000	Usable

You can also delete PRI files using the **Delete** button. The **Set Active** button allows you to change the active carrier.

3. If you need to add a new carrier PRI file, then click the **+New Carrier** button and then select which file you want to add:



4. Click the **Apply** button to select the file.
5. Check that you have the correct version of the carrier file from the **Carriers** dialog.

Using the CLI to change a carrier PRI file

The PRI file you need depends on your carrier. To determine which PRI is active on your router use the commands **show 5g carriers** and **show license**.

For example, the command **show 5g carriers** displays information about what carriers and firmware files are loaded on your router and which carrier and firmware file is active. In the following example the GENERIC carrier is active:

```
awplus#show 5g carriers

ID  Slot      Build ID      State
-----
1   Good      03.04.03.00_?  Usable
2   Good      03.09.03.00_?  Usable
3   Good      03.09.06.00_?  Active

Carrier
ID  Name      Unique ID      Build ID      State
-----
1   BELL      030.000_000    03.09.06.00_BELL    Usable
2   DOCOMO    030.012_001    03.04.03.00_DOCOMO  Usable
3   GENERIC  030.038_000  03.09.06.00_GENERIC Active
4   KDDI      030.016_000    03.09.03.00_KDDI    Usable
5   ORANGE    030.010_000    03.09.03.00_ORANGE  Usable
6   ROGERS    030.001_000    03.09.06.00_ROGERS  Usable
7   SOFTBANK  030.023_000    03.09.03.00_SOFTBANK Usable
8   TELSTRA  030.016_000    03.04.03.00_TELSTRA Usable
9   TMO       030.035_000    03.09.06.00_TMO     Usable
10  VERIZON   030.033_001    03.09.03.00_VERIZON Usable

Preferred fw version:      03.09.06.00
Preferred carrier name:    GENERIC
Preferred config name:     GENERIC_030.038_000
Preferred subpri index:    000
Current fw version:        03.09.06.00
Current carrier name:      GENERIC
Current config name:       GENERIC_030.038_000
Current subpri index:      000
```

The **show license** command displays the region for the router, in the following example the region is Global:

```
awplus#show license

Board region: Global

Feature licenses:

Index          : 1
License name    : Base License
Customer name   : Base License
```

Changing carriers by swapping the PRI

Firmware version 1, 3 and above

If the modem is running firmware version 3 (e.g. 03.04.03.00), it ships with ten PRI files. The active PRI file should be sufficient for the carrier. If it is not, there are two ways to swap PRI files:

1. You can configure the carrier name in the APN profile using the command **carrier** in APN mode. The carrier name must match the 'Carrier Name' in the **show 5g carriers** command. If you need

to support two carriers, we recommend using this method. If the WWAN interface goes down, it automatically swaps to the other carrier.

```
apn vodafone_5g
name vodafone
carrier GENERIC
```

2. You can also use the command **platform 5g carrier set**. This updates the active PRI carrier file:

```
awplus#platform 5g carrier set GENERIC
% Firmware is being updated to GENERIC.
Please wait a few seconds.
```

Firmware version 2

To support your chosen 5G carrier, you may need to swap your device's PRI file. The device may have shipped with the appropriate file. If not, contact Allied Telesis at this email:

5g-support@alliedtelesis.co.nz.

If the modem is running firmware version 2 (e.g. 02.08.01.00), you cannot directly swap between different PRI files. Instead, use one of the following options:

1. Install your PRI carrier file again using the command **platform 5g update pri**. The installed version automatically becomes the preferred version.
2. Or, alternately, you can use the command **platform 5g command** to update the active PRI file.

```
awplus#platform 5g command AT!CUSTOM="IMCONFIG",0x01
awplus#platform 5g command AT!RESET
awplus#platform 5g command AT!IMPREF="CARRIER_NAME"
awplus#platform 5g command AT!RESET
```

Deleting PRI files

To delete a PRI file, you have two options.

1. Use the command **platform 5g carrier delete**, for example to delete the PRI file for the carrier DOCOMO:

```
awplus#platform 5g carrier delete DOCOMO
Successful operation
```

2. Or, use the command **platform 5g delete pri**, for example to delete the PRI file for the carrier DOCOMO:

```
awplus#platform 5g delete pri DOCOMO
Successful operation
```

For example, to delete the firmware version file from slot 1 which is not active:

```
awplus#platform 5g delete firmware 1
Successful operation
```

Upgrading firmware and PRI files using the Device GUI

From Device GUI version 2.14.0 onwards, you can upgrade firmware and carrier files using the Device GUI. Before upgrading the firmware, capture a copy of what is currently present on your EM9191 modem.

To configure firmware and carrier files follow the steps below:

1. From the main menu, go to **Network Infrastructure>Wireless WAN**.
2. Click on the **Carriers** tab.
3. From the **Firmware Slots** dialog click on the **+ Add Firmware/Carrier** button:

Slot ID	Status	Build ID	State	
1	Good	03.04.03.00_?	Active ✔	+ Add Firmware/Carrier
2	Empty			Delete
3	Empty			Delete

4. From the **Add Firmware/Carrier** dialog, select the required firmware file and the matching carrier name file from their correct locations and click **Apply**:

Add Firmware/Carrier

Firmware: flash/5gver3/SWIX55C_03.09.06.00-01.cwe

flash/03.04.03.00/SWIX55C_03.04.03.00-001.cwe

flash/03.09.03.00/SWIX55C_03.09.03.00-001.cwe

flash/5gver2/SWIX55C_02.08.01.00.cwe

flash/5gver3/SWIX55C_03.09.06.00-001.cwe

usb/01.07.19_Factory/SWIX55C_01.07.19.00.cwe

Carrier Name: flash/5gver3/SWIX55C_03.09.06.00-01_GENERIC_030.038_000.nvu

flash/5gver2/SWIX55C_02.08.01.00_GENERIC_020.007_000.nvu

flash/5gver2_test/SWIX55C_02.08.01.00_DOCOMO_020.006_000.nvu

flash/5gver2_test/SWIX55C_02.08.01.00_GENERIC_020.007_000.nvu

flash/5gver3/SWIX55C_03.09.06.00-001_GENERIC_030.038_000.nvu

flash/test/SWIX55C_03.09.06.00-001_GENERIC_030.038_000.nvu

Cancel **Apply**

5. The following **Update Started** dialog appears, click the **OK** button to proceed:

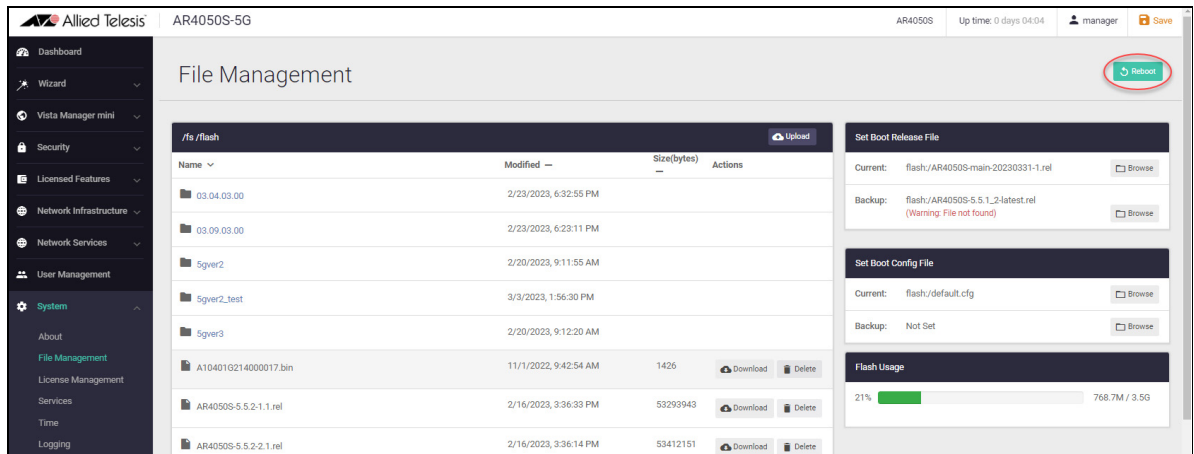
Update Started

Allow up to 2 minutes when upgrading firmware or carriers, followed by a reboot of the device.

OK

After allowing for a period of at least two minutes, you can then reboot your device.

6. To reboot your router, from the main menu, go to **System>File Management**:



7. Click the **Reboot** button and wait for the router to come back up.

From the **Carriers** tab, check the **Firmware Info** dialog to confirm that the firmware and carrier files you have upgraded are the preferred and current versions. Also check the **Firmware Slots** dialog and the **Carriers** dialog to confirm that the correct version is active.

Upgrading firmware and PRI files using the CLI

At times, you may need to update the PRI files and firmware files for your 5G modem, to provide new features and fix bugs.

Note: Firmware versions 1 and 2 support only one firmware slot. Version 3 supports 3 slots.

If you need to upgrade your firmware, follow this procedure:

Step 1: Capture your current settings

Before upgrading the firmware, capture a copy of what is currently present on your EM9191 modem. Use the command **show 5g tech firmware**.

Step 2: Disable the SIMs

Disable all installed SIMs before changing the firmware. The 'wwan0' port should be down. For example, use the command **no sim enable sim1** and **no sim enable sim2**.

Step 3: Get the new firmware and/or PRI files

Get the new files from Allied Telesis at this email: 5g-support@alliedtelesis.co.nz.

Step 4: Copy the new files onto the device

Copy the files into the desired directory. See the [Configuration and File Management Feature Overview Guide](#) for detailed information about copying files onto your device. There must be no other files in the directory. The firmware upgrade may fail if you leave older versions of PRI files and other files in the upgrade directory.

You can only have one **firmware** file in the directory. The firmware file is a large file, greater than 80 Megabytes. Its suffix ends in **'*.cwe'**.

You can have multiple **PRI** files. These files have the suffix **'*.nvu'** and need to be in the same directory as the firmware file. These PRI files tend to be smaller, usually less than 10 Megabytes.

If you need to delete unwanted files from your modem, use the **platform 5g delete** command. You cannot use the command **platform 5g delete** to remove files from usb or flash directories.

The PRI files need to be for the same software version as the firmware file. For example:

- The firmware file **SWIX55C_03.04.03.00-001.cwe** is for the software version **03.04.03**.
- The PRI file **SWIX55C_03.04.03.00-001_DOCOMO_030.012_001.nvu** is for the same software version.

Step 5: Update the firmware and/or PRI

To upgrade the firmware or PRI, use the command **platform 5g update**.

Syntax `platform 5g update firmware <fw-name> pri <pri-name> location <file>`

See ["Upgrading firmware versions: examples"](#) on page 28 and ["Upgrading or adding PRI files: example"](#) on page 40.

Step 6: Optionally, install other PRI files

With version 1 and 3 firmware, you can select other PRI files, using the **carrier** command. For example:

```
apn vodafone_5g
name vodafone
carrier generic
```

The maximum number of PRI files supported is 50.

Step 7: Check the firmware

Check that the EM9191 firmware is successfully updated with the **show 5g tech firmware** command.

Step 8: Save the configuration and reboot

We recommend that you reboot your router after you have upgraded the firmware. Use the **write** command to save the configuration and then the **reboot** command to reboot.

Note: If you go from firmware version 2 to version 3, the number of firmware slots supported goes from one to three on the EM9191 modem. You need to reboot, before another firmware upgrade can be performed.

You can roll a firmware image version back if you encounter problems with a newer version. See ["Troubleshooting" on page 43](#).

Deleting firmware files

Use the command **platform 5g delete** to delete a firmware version file. The firmware file must not be active. For example, if you try to delete firmware that is active the following message is displayed:

```
awplus#platform 5g delete firmware 2
%Firmware slot 2 version 03.04.03.00_x is active
```

Upgrading firmware versions: examples

This section contains examples of upgrades from various firmware versions to other versions.

Firmware version 3

From release 5.5.2-0.1 onwards, you can install multiple PRIs with firmware version 3, for example:

```
awplus#platform 5g update firmware SWIX55C_03.09.03.00-001.cwe pri
SWIX55C_03.09.03.00-001_SOFTBANK_030.023_000.nvu location usb:030903

awplus#platform 5g update firmware SWIX55C_03.09.06.00-001.cwe pri
SWIX55C_03.09.06.00-001_GENERIC_030.038_000.nvu location usb:030906

awplus#dir usb:

usb:/030906
 78074 -rwx Apr 25 2022 21:50:20 SWIX55C_03.09.06.00-001_BELL_030.000_000.nvu
 50406 -rwx Apr 25 2022 21:50:20 SWIX55C_03.09.06.00-001_GENERIC_030.038_000.nvu
 55790 -rwx Apr 25 2022 21:50:20 SWIX55C_03.09.06.00-001_ROGERS_030.001_000.nvu
 30372 -rwx Apr 25 2022 21:50:20 SWIX55C_03.09.06.00-001_TMO_030.035_000.nvu
 91579911 -rwx Apr 25 2022 21:50:06 SWIX55C_03.09.06.00-001.cwe

usb:/030903
 68593 -rwx Apr 25 2022 21:48:58 SWIX55C_03.09.03.00-001_KDDI_030.016_000.nvu
 30798 -rwx Apr 25 2022 21:48:58 SWIX55C_03.09.03.00-001_ORANGE_030.010_000.nvu
 30931 -rwx Apr 25 2022 21:48:58 SWIX55C_03.09.03.00-001_SOFTBANK_030.023_000.nvu
 74685 -rwx Apr 25 2022 21:48:58 SWIX55C_03.09.03.00-001_VERIZON_030.033_001.nvu
 91584007 -rwx Apr 25 2022 21:48:50 SWIX55C_03.09.03.00-001.cwe
```

The finished upgrade should look like this:

```
awplus#show 5g carriers
```

ID	Slot	Build ID	State
1	Good	03.09.03.00_?	Usable
2	Good	03.09.06.00_?	Usable
3	Good	03.04.03.00_?	Active

Carrier				
ID	Name	Unique ID	Build ID	State
1	ATT	020.007_000	02.08.01.00_ATT	Orphan
2	BELL	030.000_000	03.09.06.00_BELL	Usable
3	DOCOMO	030.012_001	03.04.03.00_DOCOMO	Active
4	GENERIC	030.038_000	03.09.06.00_GENERIC	Usable
5	KDDI	030.016_000	03.09.03.00_KDDI	Usable
6	ORANGE	030.010_000	03.09.03.00_ORANGE	Usable
7	ROGERS	030.001_000	03.09.06.00_ROGERS	Usable
8	SOFTBANK	030.023_000	03.09.03.00_SOFTBANK	Usable
9	TELSTRA	030.016_000	03.04.03.00_TELSTRA	Usable
10	TMO	030.035_000	03.09.06.00_TMO	Usable
11	VERIZON	030.033_001	03.09.03.00_VERIZON	Usable

```
Preferred fw version:      03.04.03.00
Preferred carrier name:    DOCOMO
Preferred config name:    DOCOMO_030.012_001
Preferred subpri index:    000
Current fw version:        03.04.03.00
Current carrier name:      DOCOMO
Current config name:      DOCOMO_030.012_001
Current subpri index:      000
```

Firmware version 2 to version 3

The following example shows upgrading from version 2 to version 3:

```
awplus#platform 5g update firmware SWIX55C_03.04.03.00-001.cwe pri SWIX55C_03.04
.03.00-001_DOCOMO_030.012_001.nvu location usb:0304
Backing up settings, please wait
Updating firmware SWIX55C_03.04.03.00-001.cwe SWIX55C_03.04.03.00-
001_DOCOMO_030.012_001.nvu
Application version: 1.0.2103.0
INFO: QDL Port   : /dev/wwan0p1SAHARA
INFO: Device Path: /dev/wwan0p2MBIM
INFO: FW Path    : /mnt/usb/0304
Target image Info:
Carrier       :DOCOMO
FW Version    :03.04.03.00
Model ID     :SWIX55C
Package ID    :001
PRI Version   :030.012
SKU          :9999999
Switching device into download mode ...
Modem Needs FW
Modem Needs PRI
Waiting for modem to disconnect from the host ...
Modem disconnected from host.
Waiting for modem to come up in BOOT and HOLD mode ...
BOOT and HOLD Mode. Downloading firmware ...
Downloading: /mnt/usb/0304/SWIX55C_03.04.03.00-001_TELSTRA_030.016_000.nvu
Downloading: /mnt/usb/0304/SWIX55C_03.04.03.00-001_DOCOMO_030.012_001.nvu
Downloading: /mnt/usb/0304/SWIX55C_03.04.03.00-001.cwe
FW download succeeded.
Waiting for modem to come up in ONLINE mode ...
Modem is now in ONLINE mode ...
FW update status: Successful
FW info from modem:
Model ID      : EM9191
FW Version    : SWIX55C_03.04.03.00
Carrier Name   : DOCOMO
Carrier PRI Revision: 030.012_001
Firmware Download Process completed
Backing up new settings
```

Use the command **show 5g tech firmware** to verify the upgrade:

```
awplus#show 5g tech firmware
AT!PRIID
    PRI Part Number: 9909738
Revision: 001.007
Customer: Generic

Carrier PRI: 9999999_9909622_SWIX55C_03.04.03.00_01_DOCOMO_030.012_001
Carrier PRI: 9999999_9909621_SWIX55C_02.08.01.00_00_GENERIC_020.007_001
Carrier PRI: 9999999_9910398_SWIX55C_03.04.03.00_01_TELSTRA_030.016_000

AT!IMPREF
!IMPREF:
preferred fw version:    03.04.03.00
preferred carrier name:  DOCOMO
preferred config name:   DOCOMO_030.012_001
preferred subpri index:  000
current fw version:      03.04.03.00
current carrier name:    DOCOMO
current config name:     DOCOMO_0
```

Firmware version 1.07 to version 2.08

If modems have SWIX55C_01.07.08.00 or SWIX55C_01.07.13.00 versions installed, you must go to version **SWIX55C_01.07.19.00** before going to SWIX55C_02.08.01.00. For example:

```
awplus#show 5g tech firmware
AT!PRIID
  PRI Part Number: 9909484
Revision: 001.021
Customer: Generic

Carrier PRI: 9999999_9909619_SWIX55C_01.07.13.00_00_ATT_012.007_000
Carrier PRI: 9999999_9910308_SWIX55C_01.07.13.00_00_TMO_001.005_000

AT!IMPREF
  !IMPREF:
preferred fw version:    01.07.13.00
preferred carrier name:  ATT
preferred config name:   ATT_012.007_000
preferred subpri index:  000
current fw version:     01.07.13.00
current carrier name:   ATT
current config name:    ATT_012.007_000
current subpri index:   000

AT!IMAGE
  TYPE SLOT STATUS LRU FAILURES UNIQUE_ID  BUILD_ID
FW  1    GOOD  1    0 0      ?_?      01.07.13.00_?
Max FW images: 1
Active FW image is at slot 1

TYPE SLOT STATUS LRU FAILURES UNIQUE_ID  BUILD_ID
PRI FF  GOOD  0    0 0      012.007_000 01.07.13.00_ATT
PRI FF  GOOD  0    0 0      001.005_000 01.07.13.00_TMO
Max PRI images: 50

awplus#dir  usb:0119
  89226639 -rwx Mar 02 2022 00:49:18 SWIX55C_01.07.19.00.cwe
   46769 -rwx Mar 02 2022 00:49:18 SWIX55C_01.07.19.00_DOCOMO_004.007_000.nvu
   68076 -rwx Mar 02 2022 00:49:18 SWIX55C_01.07.19.00_GENERIC_016.010_000.nvu
```

Use the command **platform 5g update firmware** to upgrade to version 01.07.19.00:

```
awplus#platform 5g update firmware SWIX55C_01.07.19.00.cwe pri SWIX55C_01.0
7.19.00_DOCOMO_004.007_000.nvu location usb:0119
Backing up settings, please wait
Updating firmware SWIX55C_01.07.19.00.cwe SWIX55C_01.07.19.00_DOCOMO_004.007_000.nvu
Application version: 1.0.2103.0
INFO: QDL Port : /dev/wwan0p1SAHARA
INFO: Device Path: /dev/wwan0p2MBIM
INFO: FW Path : /mnt/usb/0119
Target image Info:
Carrier :DOCOMO
FW Version :01.07.19.00
Model ID :SWIX55C
Package ID :000
PRI Version:004.007
SKU :9999999
Switching device into download mode ...
Modem Needs FW
Modem Needs PRI
Waiting for modem to disconnect from the host ...
Modem disconnected from host.
Waiting for modem to come up in BOOT and HOLD mode ...
BOOT and HOLD Mode. Downloading firmware ...
Downloading: /mnt/usb/0119/SWIX55C_01.07.19.00_GENERIC_016.010_000.nvu
Downloading: /mnt/usb/0119/SWIX55C_01.07.19.00_DOCOMO_004.007_000.nvu
Downloading: /mnt/usb/0119/SWIX55C_01.07.19.00.cwe
FW download succeeded.
Waiting for modem to come up in ONLINE mode ...
Modem is now in ONLINE mode ...
FW update status: Successful
FW info from modem:
Model ID : EM9191
FW Version : SWIX55C_01.07.19.00
Carrier Name : DOCOMO
Carrier PRI Revision: 004.007_000
Firmware Download Process completed
Backing up new settings
```

Use the command **show 5g tech firmware** to verify:

```
awplus#show 5g tech firmware
AT!PRIID
  PRI Part Number: 9909484
Revision: 001.021
Customer: Generic

Carrier PRI: 9999999_9909619_SWIX55C_01.07.13.00_00_ATT_012.007_000
Carrier PRI: 9999999_9909622_SWIX55C_01.07.19.00_00_DOCOMO_004.007_000
Carrier PRI: 9999999_9909621_SWIX55C_01.07.19.00_00_GENERIC_016.010_000
Carrier PRI: 9999999_9910308_SWIX55C_01.07.13.00_00_TMO_001.005_000

AT!IMPREF
  !IMPREF:
preferred fw version:    01.07.19.00
preferred carrier name:  DOCOMO
preferred config name:   DOCOMO_004.007_000
preferred subpri index:  000
current fw version:     01.07.19.00
current carrier name:   DOCOMO
current config name:    DOCOMO_004.007_000
current subpri index:   000

AT!IMAGE
  TYPE SLOT STATUS LRU FAILURES UNIQUE_ID  BUILD_ID
FW  1    GOOD  1   0 0      ?_?      01.07.19.00_?
Max FW images: 1
Active FW image is at slot 1

TYPE SLOT STATUS LRU FAILURES UNIQUE_ID  BUILD_ID
PRI  FF   GOOD  0   0 0      012.007_000 01.07.13.00_ATT
PRI  FF   GOOD  0   0 0      004.007_000 01.07.19.00_DOCOMO
PRI  FF   GOOD  0   0 0      016.010_000 01.07.19.00_GENERIC
PRI  FF   GOOD  0   0 0      001.005_000 01.07.13.00_TMO
Max PRI images: 50

awplus#dir  usb:0208a
  47165 -rwx Mar 02 2022 01:14:48 SWIX55C_02.08.01.00_DOCOMO_020.006_000.nvu
  47864 -rwx Mar 02 2022 01:14:22 SWIX55C_02.08.01.00_GENERIC_020.007_000.nvu
  89752751 -rwx Mar 02 2022 01:13:38 SWIX55C_02.08.01.00.cwe
```

Use the command **platform 5g update firmware** to upgrade to version 02.08.01.00:

```
awplus#platform 5g update firmware SWIX55C_02.08.01.00.cwe pri SWIX55C_02.08.01.00_DOCOMO_020.006_000.nvu location usb:0208a
Backing up settings, please wait
Updating firmware SWIX55C_02.08.01.00.cwe SWIX55C_02.08.01.00_DOCOMO_020.006_000.nvu
Application version: 1.0.2103.0
INFO: QDL Port : /dev/wwan0p1SAHARA
INFO: Device Path: /dev/wwan0p2MBIM
INFO: FW Path : /mnt/usb/0208a
Target image Info:
Carrier :DOCOMO
FW Version :02.08.01.00
Model ID :SWIX55C
Package ID :000
PRI Version:020.006
SKU :9999999
Switching device into download mode ...
Modem Needs FW
Modem Needs PRI
Waiting for modem to disconnect from the host ...
Modem disconnected from host.
Waiting for modem to come up in BOOT and HOLD mode ...
BOOT and HOLD Mode. Downloading firmware ...
Downloading: /mnt/usb/0208a/SWIX55C_02.08.01.00_DOCOMO_020.006_000.nvu
Downloading: /mnt/usb/0208a/SWIX55C_02.08.01.00_GENERIC_020.007_000.nvu
Downloading: /mnt/usb/0208a/SWIX55C_02.08.01.00.cwe
FW download succeeded.
Waiting for modem to come up in ONLINE mode ...
Modem is now in ONLINE mode ...
FW update status: Successful
FW info from modem:
Model ID : EM9191
FW Version : SWIX55C_02.08.01.00
Carrier Name : DOCOMO
Carrier PRI Revision: 020.006_000
Firmware Download Process completed
Backing up new settings
```

Use the command **show 5g tech firmware** to verify:

```
awplus#show 5g tech firmware
AT!PRIID
    PRI Part Number: 9909484
Revision: 001.021
Customer: Generic

Carrier PRI: 9999999_9909619_SWIX55C_01.07.13.00_00_ATT_012.007_000
Carrier PRI: 9999999_9909622_SWIX55C_02.08.01.00_00_DOCOMO_020.006_000
Carrier PRI: 9999999_9909621_SWIX55C_02.08.01.00_00_GENERIC_020.007_000
Carrier PRI: 9999999_9910308_SWIX55C_01.07.13.00_00_TMO_001.005_000

AT!IMPREF
    !IMPREF:
preferred fw version:    02.08.01.00
preferred carrier name:  DOCOMO
preferred config name:   DOCOMO_020.006_000
preferred subpri index:  000
current fw version:     02.08.01.00
current carrier name:   DOCOMO
current config name:    DOCOMO_020.006_000
current subpri index:   000

AT!IMAGE
    TYPE SLOT STATUS LRU FAILURES UNIQUE_ID  BUILD_ID
FW  1     EMPTY  0   0 0
Max FW images: 1
Active FW image is at slot 1

TYPE SLOT STATUS LRU FAILURES UNIQUE_ID  BUILD_ID
PRI  FF   GOOD   0   0 0      012.007_000 01.07.13.00_ATT
PRI  FF   GOOD   0   0 0      020.006_000 02.08.01.00_DOCOMO
PRI  FF   GOOD   0   0 0      020.007_000 02.08.01.00_GENERIC
PRI  FF   GOOD   0   0 0      001.005_000 01.07.13.00_TMO
Max PRI images: 50

AT!RFCID
    !RFCID:
CMW_HWID: 1007
CMW_BID : 0
MMW_HWID: 0
MMW_BID : 0
```

Firmware version 3 to version 1

If you need to downgrade firmware, see the example below. For example downgrading from version 03.04.03.00 to an earlier version 01.07.19.00:

```
awplus#show 5g carriers
```

ID	Slot	Build ID	State
1	Good	03.04.03.00_?	Active
2	Empty		Not Set
3	Empty		Not Set

ID	Carrier Name	Build	Unique ID	State
1	ATT	012.007_00	01.07.13.00_ATT	Orphan
2	DOCOMO	030.012_00	03.04.03.00_DOCOMO	Usable
3	DT	020.006_00	02.08.01.00_DT	Orphan
4	GENERIC	030.012_00	03.04.03.00_GENERIC	Active
5	TELSTRA	030.016_00	03.04.03.00_TELSTRA	Usable
6	TMO	001.005_00	01.07.13.00_TMO	Orphan
7	Telstra	020.002_00	02.08.01.00_Telstra	Orphan
8	VERIZON	012.012_00	01.07.19.00_VERIZON	Orphan


```
Preferred fw version:      03.04.03.00
Preferred carrier name:    GENERIC
Preferred config name:    GENERIC_030.012_000
Preferred subpri index:   000
Current fw version:       03.04.03.00
Current carrier name:     GENERIC
Current config name:     GENERIC_030.012_000
Current subpri index:    000
```

Use the **platform 5g update** command to downgrade to an earlier version 01.07.19.00:

```
awplus#platform 5g update firmware SWIX55C_01.07.19.00.cwe pri SWIX55C_01.07.19.00_VERIZON_012.012_000.nvu location usb:0107
Backing up settings, please wait
Updating firmware SWIX55C_01.07.19.00.cwe SWIX55C_01.07.19.00_VERIZON_012.012_000.nvu
Application version: 1.0.2111.0
INFO: QDL Port : /dev/wwan0p1SAHARA
INFO: Device Path: /dev/wwan0p2MBIM
INFO: FW Path : /mnt/usb/0107
Target image Info:
Carrier :VERIZON
FW Version :01.07.19.00
Model ID :SWIX55C
Package ID :000
PRI Version:012.012
SKU :9999999
Switching device into download mode ...
Modem Needs FW
Modem Needs PRI
Waiting for modem to disconnect from the host ...
Modem disconnected from host.
Waiting for modem to come up in BOOT and HOLD mode ...
BOOT and HOLD Mode. Downloading firmware ...
Downloading: /mnt/usb/0107/SWIX55C_01.07.19.00.cwe
Downloading: /mnt/usb/0107/SWIX55C_01.07.19.00_VERIZON_012.012_000.nvu
FW download succeeded.
Waiting for modem to come up in ONLINE mode ...
Modem is now in ONLINE mode ...
FW update status: Successful
FW info from modem:
Model ID : EM9191
FW Version : SWIX55C_01.07.19.00
Carrier Name : VERIZON
Carrier PRI Revision: 012.012_000
Firmware Download Process completed
Backing up new settings
```

Use the **show 5g carriers** command to verify the downgrade to version 01.07.19.00:

```
awplus#show 5g carriers
```

ID	Slot	Build ID	State
1	Good	03.04.03.00_?	Active

ID	Carrier Name	Build	Unique ID	State
1	ATT	012.007_00	01.07.13.00_ATT	Orphan
2	DOCOMO	030.012_00	03.04.03.00_DOCOMO	Usable
3	DT	020.006_00	02.08.01.00_DT	Orphan
4	GENERIC	030.012_00	03.04.03.00_GENERIC	Usable
5	TELSTRA	030.016_00	03.04.03.00_TELSTRA	Usable
6	TMO	001.005_00	01.07.13.00_TMO	Orphan
7	Telstra	020.002_00	02.08.01.00_Telstra	Orphan
8	VERIZON	012.012_00	01.07.19.00_VERIZON	Active

```
Preferred fw version:      01.07.19.00
Preferred carrier name:    VERIZON
Preferred config name:     VERIZON_012.012_000
Preferred subpri index:    000
Current fw version:        01.07.19.00
Current carrier name:      VERIZON
Current config name:       VERIZON_012.012_000
Current subpri index:      000
```

Use the **show 5g tech firmware** command to verify the firmware information to version 01.07.19.00:

```
awplus#show 5g tech firmware
AT!PRIID
    PRI Part Number: 9909484
Revision: 001.021
Customer: Generic

Carrier PRI: 9999999_9909619_SWIX55C_01.07.13.00_00_ATT_012.007_000
Carrier PRI: 9999999_9909622_SWIX55C_03.04.03.00_01_DOCOMO_030.012_001
Carrier PRI: 9999999_9910330_SWIX55C_02.08.01.00_00_DT_020.006_000
Carrier PRI: 9999999_9909621_SWIX55C_03.04.03.00_01_GENERIC_030.012_000
Carrier PRI: 9999999_9910398_SWIX55C_03.04.03.00_01_TELSTRA_030.016_000
Carrier PRI: 9999999_9910308_SWIX55C_01.07.13.00_00_TMO_001.005_000
Carrier PRI: 9999999_9910398_SWIX55C_02.08.01.00_00_Telstra_020.002_000
Carrier PRI: 9999999_9909620_SWIX55C_01.07.19.00_00_VERIZON_012.012_000

AT!IMPREF
    !IMPREF:
    preferred fw version:    01.07.19.00
    preferred carrier name:  VERIZON
    preferred config name:   VERIZON_012.012_000
    preferred subpri index:  000
    current fw version:      01.07.19.00
    current carrier name:    VERIZON
    current config name:     VERIZON_012.012_000
    current subpri index:    000

AT!IMAGE
    TYPE SLOT STATUS LRU FAILURES UNIQUE_ID   BUILD_ID
FW  1    GOOD  1    0 0      ?_?           03.04.03.00_?
Max FW images: 1
Active FW image is at slot 1

TYPE SLOT STATUS LRU FAILURES UNIQUE_ID   BUILD_ID
PRI  FF  GOOD  0    0 0      012.007_000  01.07.13.00_ATT
PRI  FF  GOOD  0    0 0      030.012_001  03.04.03.00_DOCOMO
PRI  FF  GOOD  0    0 0      020.006_000  02.08.01.00_DT
PRI  FF  GOOD  0    0 0      030.012_000  03.04.03.00_GENERIC
PRI  FF  GOOD  0    0 0      030.016_000  03.04.03.00_TELSTRA
PRI  FF  GOOD  0    0 0      001.005_000  01.07.13.00_TMO
PRI  FF  GOOD  0    0 0      020.002_000  02.08.01.00_Telstra
PRI  FF  GOOD  0    0 0      012.012_000  01.07.19.00_VERIZON
Max PRI images: 50

AT!RFCID
    !RFCID:
CMW_HWID: 1007
CMW_BID : 0
MMW_HWID: 0
MMW_BID : 0
```

Upgrading or adding PRI files: example

The following command and output examples show the GENERIC PRI version 020.007.001 being updated for firmware and PRI files to version 03.04.03.00. First use the **show 5g tech firmware** command to see the PRI and build ID for the GENERIC PRI:

```
awplus#show 5g tech firmware
AT!PRIID
  PRI Part Number: 9909738
Revision: 001.007
Customer: Generic

Carrier PRI: 9999999_9909622_SWIX55C_03.04.03.00_01_DOCOMO_030.012_001
Carrier PRI: 9999999_9909621_SWIX55C_02.08.01.00_00_GENERIC_020.007_001
Carrier PRI: 9999999_9910398_SWIX55C_03.04.03.00_01_TELSTRA_030.016_000

AT!IMPREF
!IMPREF:
preferred fw version:    03.04.03.00
preferred carrier name:  DOCOMO
preferred config name:   DOCOMO_030.012_001
preferred subpri index:  000
current fw version:      03.04.03.00
current carrier name:    DOCOMO
current config name:     DOCOMO_030.012_001
current subpri index:    000

AT!IMAGE
      TYPE SLOT STATUS LRU FAILURES UNIQUE_ID  BUILD_ID
FW   1   GOOD  127 0 0      ?_?      03.04.03.00_?
FW   2   EMPTY 0  0 0
FW   3   EMPTY 0  0 0
Max FW images: 3
Active FW image is at slot 1

      TYPE SLOT STATUS LRU FAILURES UNIQUE_ID  BUILD_ID
PRI  FF   GOOD  0  0 0      030.012_001 03.04.03.00_DOCOMO
PRI  FF   GOOD  0  0 0      020.007_001 02.08.01.00_GENERIC
PRI  FF   GOOD  0  0 0      030.016_000 03.04.03.00_TELSTRA
Max PRI images: 50

AT!RFCID
!RFCID:
CMW_HWID: 1007
CMW_BID : 0
MMW_HWID: 0
MMW_BID : 0
```

Use the command **platform 5g update** to upgrade the firmware and PRI files to version 03.04.03.00:

```
awplus#platform 5g update pri SWIX55C_03.04.03.00-001_GENERIC_030.012_000.nvu location
usb:pri3
Backing up settings, please wait
Updating PRI SWIX55C_03.04.03.00-001_GENERIC_030.012_000.nvu
Application version: 1.0.2103.0
INFO: QDL Port   : /dev/wwan0p1SAHARA
INFO: Device Path: /dev/wwan0p2MBIM
INFO: FW Path   : /mnt/usb/pri3
Switching device into download mode ...
Waiting for modem to disconnect from the host ...
Modem disconnected from host.
Waiting for modem to come up in BOOT and HOLD mode ...
BOOT and HOLD Mode. Downloading firmware ...
Downloading: /mnt/usb/pri3/SWIX55C_03.04.03.00-001_GENERIC_030.012_000.nvu
FW download succeeded.
Waiting for modem to come up in ONLINE mode ...
Modem is now in ONLINE mode ...
FW update status: Successful
FW info from modem:
Model ID           : EM9191
FW Version         : SWIX55C_03.04.03.00
Carrier Name       : DOCOMO
Carrier PRI Revision: 030.012_001
Firmware Download Process completed
Backing up new settings
```

Use the command **show 5g tech firmware** to verify the upgrade for firmware and PRI files to version 03.04.03.00:

```
awplus#show 5g tech firmware
AT!PRIID
  PRI Part Number: 9909738
Revision: 001.007
Customer: Generic

Carrier PRI: 9999999_9909622_SWIX55C_03.04.03.00_01_DOCOMO_030.012_001
Carrier PRI: 9999999_9909621_SWIX55C_03.04.03.00_01_GENERIC_030.012_000
Carrier PRI: 9999999_9910398_SWIX55C_03.04.03.00_01_TELSTRA_030.016_000

AT!IMPREF
  !IMPREF:
preferred fw version:    03.04.03.00
preferred carrier name:  DOCOMO
preferred config name:   DOCOMO_030.012_001
preferred subpri index:  000
current fw version:     03.04.03.00
current carrier name:   DOCOMO
current config name:    DOCOMO_030.012_001
current subpri index:   000

AT!IMAGE
  TYPE SLOT STATUS LRU FAILURES UNIQUE_ID  BUILD_ID
FW  1    GOOD  127 0 0      ?_?          03.04.03.00_?
FW  2    EMPTY 0  0 0
FW  3    EMPTY 0  0 0
Max FW images: 3
Active FW image is at slot 1

TYPE SLOT STATUS LRU FAILURES UNIQUE_ID  BUILD_ID
PRI  FF   GOOD  0  0 0      030.012_001 03.04.03.00_DOCOMO
PRI  FF   GOOD  0  0 0      030.012_000 03.04.03.00_GENERIC
PRI  FF   GOOD  0  0 0      030.016_000 03.04.03.00_TELSTRA
Max PRI images: 50

AT!RFCID
  !RFCID:
CMW_HWID: 1007
CMW_BID : 0
MMW_HWID: 0
MMW_BID : 0
```

Troubleshooting

The following issues may occur when swapping, upgrading or deleting PRI and firmware files.

- Your modem does not come on-line after an upgrade:

Reboot your router using the **reboot** command or,

Shutdown the 'wwan0' interface using the **shutdown** command and **no shutdown** command to bring it up again.

- Preferred firmware version does not match the current firmware version. For example, an extract from the **show 5g tech firmware** command:

```
AT!IMPREF
!IMPREF:
Preferred fw version:      02.08.01.00
Preferred carrier name:      ATT
Preferred config name:      ATT_020.007_000
Preferred subpri index:      000
Current fw version:       03.04.03.00
Current carrier name:        GENERIC
Current config name:         GENERIC_030.012_000
Current subpri index:        000
```

If your modem upgrade fails with the failed upgrade problem below, reboot your router using the **reboot** command. The upgrade should now work.

```
awplus#platform 5g update firmware SWIX55C_02.08.01.00.cwe pri
SWIX55C_02.08.01.00_ATT_020.007_000.nvu location usb:v2
Backing up settings, please wait
Updating firmware SWIX55C_02.08.01.00.cwe SWIX55C_02.08.01.00_ATT_020.007_000.nvu
Application version: 1.0.2111.0
INFO: QDL Port : /dev/wwan0p1SAHARA
INFO: Device Path: /dev/wwan0p2MBIM
INFO: FW Path : /mnt/usb/v2
Target image Info:
Carrier :ATT
FW Version :02.08.01.00
Model ID :SWIX55C
Package ID :000
PRI Version:020.007
SKU :9999999
Switching device into download mode ...
SetImagePreferences: unpack_fms_SetImagesPreference failed: 1003
SendImagePreferenceToModem failed: 119 1003
Backing up new settings
```

- Case sensitive carrier names

Sierra Wireless usually uses capital letters for carrier names. For example, version 3 uses 03.04.03.00_TELSTRA and version 2 uses 02.08.01.00_Telstra. The carrier name is not case sensitive for the **carrier** command but it is for the **platform** commands.

The PRI carrier files overwrite the older version when upgrading. If you do come across a difference such as in the output below, delete the lower case version to avoid confusion. Use the command **platform 5g delete pri telstra**. See the extract below from the **show 5g tech firmware** command:

```

TYPE SLOT STATUS LRU FAILURES UNIQUE_ID BUILD_ID
PRI FF GOOD 0 0 0 012.007_000 01.07.13.00_ATT
PRI FF GOOD 0 0 0 030.012_001 03.04.03.00_DOCOMO
PRI FF GOOD 0 0 0 020.006_000 02.08.01.00_DT
PRI FF GOOD 0 0 0 030.012_000 03.04.03.00_GENERIC
PRI FF GOOD 0 0 0 030.016_000 03.04.03.00_TELSTRA
PRI FF GOOD 0 0 0 001.005_000 01.07.13.00_TMO
PRI FF GOOD 0 0 0 020.002_000 02.08.01.00_Telstra
PRI FF GOOD 0 0 0 012.012_000 01.07.19.00_VERIZON
Max PRI images: 50

```

- Modem stops working

Try rebooting your router first. If this does not work, then capture a **show tech-support** display and contact Allied Telesis at this email: 5g-support@alliedtelesis.co.nz.

- Firmware image is at slot 255

See the output below which is an extract from the **show 5g tech firmware** command. See that the active firmware image is at slot 255. It should be from the range 1-3, but is displaying as 255. Also, the firmware versions do not match between the preferred and current versions. This is an example of a firmware upgrade which ended in error:

```

AT!IMPREF
!IMPREF:
preferredfwversion: 02.08.01.00
preferredcarriername: DOCOMO
preferredconfigname: DOCOMO_020.006_000
preferredsubpri index: 000
current fwversion: 03.04.03.00
current carriername: DOCOMO
current configname: DOCOMO_030.012_000
current subpri index: 000

fwversionmismatch
confignamemismatch

AT!IMAGE
TYPE SLOT STATUS LRU FAILURES UNIQUE_ID BUILD_ID
FW 1 GOOD 127 0 0 ?_? 03.04.03.00_?
FW 2 GOOD 128 0 0 ?_? 03.04.03.00_?
FW 3 EMPTY 0 0 0
Max FW images: 3
Active FW image is at slot 255

```

You can use the command **platform 5g carrier set** to another carrier, for example, in this case **platform 5g carrier set generic**. Or, try upgrading again to another release.

Try rebooting your router first. If this does not work, then capture a **show tech-support** display and contact Allied Telesis at this email: 5g-support@alliedtelesis.co.nz.

SIM card detection test

The following procedure is used to test SIM cards in both SIM 1 and SIM 2 card slots.

Step 1: Boot your router with no configuration and no SIM cards inserted

Step 2: Check that both SIM 1 and SIM 2 LEDs are off

Step 3: Configure your router

```
awplus# configure terminal
awplus(config)# sim enable sim1
awplus(config)# sim enable sim2
awplus(config)# apn carrier1
awplus(apn-config)# name carrier_name.co.nz
awplus(apn-config)# exit
awplus(config)# interface wwan0
awplus(config-if)# apn sim1 carrier1
awplus(config-if)# apn sim2 carrier1
awplus(config-if)# exit
awplus(config)#
```

Step 4: Display interface 'wwan0' information

Use the **show interface** command. Observe that the 'wwan0' interface administrative state is up:

```
awplus#show int wwan0
Interface wwan0
  Link is DOWN, administrative state is UP
  Hardware is WWAN
  index 14 metric 0 mtu 1428
  <BROADCAST,NOARP,MULTICAST>
  VRF Binding: Not bound
  SNMP link-status traps: Disabled
  Router Advertisement is disabled
  Router Advertisement default routes are accepted
  Router Advertisement prefix info is accepted
    input packets 0, bytes 0, dropped 0, multicast packets 0
    output packets 0, bytes 0, multicast packets 0, broadcast packets 0
    input average rate : 30 seconds 0 bps, 5 minutes 0 bps
    output average rate: 30 seconds 0 bps, 5 minutes 0 bps
  Time since last state change: 0 days 00:04:13
```

Step 5: Display SIM status

Use the **show 5g sim** command. Observe that both SIM 1 and SIM 2 slots are empty:

```
awplus#show 5g sim
SIM Status:

Slot 1 is : Empty
Slot 1 administrative state : Up
Slot 1 present, up and configured : No
Slot 1 is : Invalid
Slot 1 APN : carrier1
Slot 1 APN name : carrier_name.co.nz
Slot 1 User name : Not Set
Slot 1 Password : Not Set
Slot 1 Authentication type : Not Set
Slot 1 Packet data protocol type : ipv4-or-ipv6
Slot 1 Transmit mode : Automatic (3g-4g-5g)
Slot 1 Carrier name : generic

Slot 2 is : Empty
Slot 2 administrative state : Up
Slot 2 present, up and configured : No
Slot 2 is : Invalid

Slot 2 APN : carrier1
Slot 2 APN name : carrier_name.co.nz
Slot 2 User name : Not Set
Slot 2 Password : Not Set
Slot 2 Authentication type : Not Set
Slot 2 Packet data protocol type : ipv4-or-ipv6
Slot 2 Transmit mode : Automatic (3g-4g-5g)
Slot 2 Carrier name : generic

SIM Failover Interval : 300 seconds
Network is running : False
```

Step 6: Add a SIM card to both SIM 1 and SIM 2 card slots

Wait for 10 seconds and then enter the command **show 5g sim** to check that both SIM slots report that the cards are present. SIM 1 is detected first:

```
awplus#show 5g sim
SIM Status:

Slot 1 is : Present
Slot 1 administrative state : Up
Slot 1 present, up and configured : Yes
Slot 1 is : Active

Slot 1 APN : carrier1
Slot 1 APN name : carrier_name.co.nz
Slot 1 User name : Not Set
Slot 1 Password : Not Set
Slot 1 Authentication type : Not Set
Slot 1 Packet data protocol type : ipv4-or-ipv6
Slot 1 Transmit mode : Automatic (3g-4g-5g)
Slot 1 Carrier name : generic

Slot 2 is : Present
Slot 2 administrative state : Up
Slot 2 present, up and configured : Yes
Slot 2 is : Backup

Slot 2 APN : carrier1
Slot 2 APN name : carrier_name.co.nz
Slot 2 User name : Not Set
Slot 2 Password : Not Set
Slot 2 Authentication type : Not Set
Slot 2 Packet data protocol type : ipv4-or-ipv6
Slot 2 Transmit mode : Automatic (3g-4g-5g)
Slot 2 Carrier name : generic

SIM Failover Interval : 300 seconds
Network is running : True
```

Step 7: Check that SIM 1 LED is green and SIM 2 LED is amber**Step 8: Display the ICCID number**

Use the **show 5g sim detail** command to display details about the active SIM such as the Integrated Circuit Card ID (ICCID). This 19-20 digit number is typically printed on the back of the SIM card. The ICCID is a globally unique serial number that identifies the SIM card.

```
awplus#show 5g sim detail
Current SIM Details:

Slot 1 is : Present
Slot 1 administrative state : Up
Slot 1 present, up and configured : Yes
Slot 1 is : Active

Slot 1 APN : carrier1
Slot 1 APN name : carrier_name.co.nz
Slot 1 User name : Not Set
Slot 1 Password : Not Set
Slot 1 Authentication type : Not Set
Slot 1 Packet data protocol type : ipv4-or-ipv6
Slot 1 Transmit mode : Automatic (3g-4g-5g)

Slot 1 Carrier name : generic
Slot 1 ICCID : 8964011910081632115
```

Step 9: Disable SIM 1

Use the command **no sim enable** to disable SIM 1. SIM 2 automatically becomes the active SIM.

```
awplus(config)# no sim enable sim1
awplus(config)# end
```

Step 10: Display the SIM status

Use the command **show 5g sim**. Observe that the administrative state for slot 1 is down and is invalid, while slot 2 is up and is the backup:

```
awplus#show 5g sim
SIM Status:

Slot 1 is : Present
Slot 1 administrative state : Down
Slot 1 present, up and configured : Yes
Slot 1 is : Invalid

Slot 1 APN : carrier1
Slot 1 APN name : carrier_name.co.nz
Slot 1 User name : Not Set
Slot 1 Password : Not Set
Slot 1 Authentication type : Not Set
Slot 1 Packet data protocol type : ipv4-or-ipv6
Slot 1 Transmit mode : Automatic (3g-4g-5g)
Slot 1 Carrier name : generic

Slot 2 is : Present
Slot 2 administrative state : Up
Slot 2 present, up and configured : Yes
Slot 2 is : Backup

Slot 2 APN : carrier1
Slot 2 APN name : carrier_name.co.nz
Slot 2 User name : Not Set
Slot 2 Password : Not Set
Slot 2 Authentication type : Not Set
Slot 2 Packet data protocol type : ipv4-or-ipv6
Slot 2 Transmit mode : Automatic (3g-4g-5g)
Slot 2 Carrier name : generic

SIM Failover Interval : 300 seconds
Network is running : True
```

Step 11: Check the ICCID number

Use the command **show 5g sim detail**. Observe that the ICCID number has now changed to the SIM card in slot 2:

```
awplus#show 5g sim detail
Current SIM Details:

Slot 2 is : Present
Slot 2 administrative state : Up
Slot 2 present, up and configured : Yes
Slot 2 is : Active

Slot 2 APN : carrier1
Slot 2 APN name : carrier_name.co.nz
Slot 2 User name : Not Set
Slot 2 Password : Not Set
Slot 2 Authentication type : Not Set
Slot 2 Packet data protocol type : ipv4-or-ipv6
Slot 2 Transmit mode : Automatic (3g-4g-5g)

Slot 2 Carrier name : generic
Slot 2 ICCID : 8964011910081632116
```

Step 12: Check that the SIM 1 LED is amber and that the SIM 2 LED is green

Step 13: If one of the SIM card tests fail, then check the following:

Only Micro SIMS are supported (15mm x 12mm). We do not recommend using Mini or Nano SIM cards because the SIM adapter that they require can cause problems if the SIM card detaches. Make sure that you insert the SIM card correctly:

- The card must be the right size for the slot.
- Check that the SIM card is the right way up. The gold contacts must be facing downwards.
- Make sure the SIM card is inserted the right way around. The corner cut-out should be inserted first.
- The gold contact area of the SIM card must be clean and undamaged.
- Make sure there are no foreign objects in the SIM card slot.

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