Configuring Cellular 3G Settings

This chapter provides details on how to configure the cellular 3G settings on the Cisco 910 Industrial Routers (hereafter referred to as the router).

The cellular 3G interface can be configured only on the IR910G-K9 and IR910G-NA-K9 model of Cisco 910 Industrial Routers.

This chapter includes the following sections:

- Information About the 3G Module, page 1
- Configuring Cellular 3G Settings, page 1
- Monitoring Cellular 3G Information, page 7

Information About the 3G Module

The 3G module of the router is a compact, lightweight, wireless UMTS and CDMA based modem. The wireless UMTS-based modem provides data connectivity on HSDPA and HSUPA, WCDMA, EDGE, GPRS, and CDMA EVDO Rev A, 1X networks as following:

- GSM850
- EGSM900
- DCS1800
- PCS1900
- Band 1 (UMTS2100)
- Band 2 (UMTS1900)
- Band 5 (UMTS850)
- Band 6 (UMTS800)
- RX diversity Band 2 (UMTS1900)
- RX diversity Band 5 (UMTS850)
- BC0 (CDMA 800)
- BC1 (CDMA 1900)

Configuring Cellular 3G Settings

This section include the following information:

- Configuring Cellular Controller, page 2
- Configuring Cellular Interface, page 2
Configuring Cellular Controller

Beginning in privileged EXEC mode, follow these steps to configure the cellular controller on the router:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. configure terminal</td>
<td>Enter global configuration mode.</td>
</tr>
<tr>
<td>2. controller cellular unit</td>
<td>Specify the cellular controller.</td>
</tr>
<tr>
<td>3. [no] radio off</td>
<td>(Optional) Turn off or turn on the radio power.</td>
</tr>
</tbody>
</table>
| 4. gsm sim profile profile_number | (Optional) Configure the SIM card to use profiles for GSM.  
For profile_number, specify a value from 1 to 16. |
| 5. sim authenticate pin | (Optional) Store the SIM CHV1 code for verification.  
For pin, specify the character code provided by your carrier to lock or unlock the SIM card. The code contains 4 to 8 characters. |
| 6. cellular mode {1 | 2} | Switch the firmware between UMTS and CDMA for SIM or RUIM card.  
- 1—Activate China Unicom (UMTS).  
- 2—Activate China Telecom (CDMA). |
| 7. exit | Return to global configuration mode. |
| 8. copy running-config startup-config | (Optional) Save your entries in the configuration file. |

The following example shows how to configure the cellular controller for UMTS:

Router# configure terminal  
Router(config)# controller cellular 0  
Router(config-controller)# cellular mode 1  
Router(config-controller)# gsm sim profile 10  
Router(config-controller)# sim authenticate 1234  
Router(config-controller)# exit  
Router(config)#

Configuring Cellular Interface

Beginning in privileged EXEC mode, follow these steps to configure the cellular interface on the router:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. configure terminal</td>
<td>Enter global configuration mode.</td>
</tr>
</tbody>
</table>
| 2. chat-script script_name [expect1 send1] [expect2 send2] ... | Create a script that will place a call over a modem.  
For expect send, specify pairs of information elements—an item to expect and an item to send in response. |
| 3. interface cellular unit | Specify the cellular interface and enter interface configuration mode. |
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The following example shows how to configure the cellular interface:

Router# configure terminal
Router(config)# interface cellular 0
Router(config-if)# ip address negotiated
Router(config-if)# dialer in-band
Router(config-if)# dialer idle-timeout 30
Router(config-if)# dialer string gsm
Router(config-if)# ppp chap hostname cisco@wwan.ccs
Router(config-if)# ppp chap password cisco
Router(config-if)# exit
Router(config)#

Configuring Activation of Account Using OSTAP

To activate a wireless account using over-the-air service provisioning (OTASP), use the `cellular cdma activate otasp` command in privileged EXEC mode.

**Note:** The modem activation process is specific to the carrier. Check with your carrier if they support manual activation using OTASP.

```
   cellular 0 cdma activate otasp phone_number
```

**Syntax Description**

| `phone_number` | Phone number that you must dial to begin activation using OTASP. This number is specific to a wireless provider. For Verizon Wireless, it is *22899. |

**Examples**

Router# cellular 0 cdma activate otasp Verizon account provision

Router# cellular 0 cdma activate otasp phone_number WORD Dialing number used during OTASP process, usually *22899
Router# **cellular 0 cdma activate otasp *22899**
Checking radio signal...  
Radio signal: RSSI: -55 dBm, ECIO: -0.5 dBm.  
Radio signal is good.  
Beginning OTASP activation...  
OTASP number: *22899  
Activation OK, code: 0  
Router#

The error code in the output and the definition are described as following:

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Activation OK</td>
</tr>
<tr>
<td>1</td>
<td>Activation cancelled by user</td>
</tr>
<tr>
<td>2</td>
<td>Device not ready</td>
</tr>
<tr>
<td>3</td>
<td>Write dummy NAI number failed</td>
</tr>
<tr>
<td>4</td>
<td>Write MN-HA SPI failed</td>
</tr>
<tr>
<td>5</td>
<td>Write Rev-Tun failed</td>
</tr>
<tr>
<td>6</td>
<td>Enable profile failed</td>
</tr>
<tr>
<td>7</td>
<td>Restore NAI failed</td>
</tr>
<tr>
<td>8</td>
<td>NAI restore completed</td>
</tr>
<tr>
<td>9</td>
<td>NAI number not updated during OTASP</td>
</tr>
<tr>
<td>10</td>
<td>Service not activated during OTASP</td>
</tr>
</tbody>
</table>
Configuring Cellular Mode and Band

Use the following commands to configure CDMA mode and GSM band:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **cellular unit cdma mode mode** | Configure the network registration mode to CDMA. For `mode`, specify one of the following options:  
  - 1xRTT—Technology-specific protocol is CDMA 1xRTT  
  - 1xEVDO—Technology-specific protocol is CDMA 1xEVDO  
  - hybrid—Connect to hybrid technology protocol  
  
  **Note:** A service mode change is followed by a modem reset. |
| **cellular unit gsm band band** | Specify the GSM/WCDMA frequency band. Only the bands that can be selected by the modem are listed. For `band`, specify one of the following options:  
  - auto-band—Auto Band  
  - gsm-all-bands—All GSM bands  
  - wcdma-all-bands—All WCDMA bands |
| **cellular unit gsm plmn {search | select {auto | manual}}** | Configure public land mobile networks (PLMN).  
  - search—Search for available PLMNs.  
  - select—Manually or automatically select from the available PLMNs in an area to attach the modem to.  
    - auto—Allows automatically selection of the PLMN for the modem.  
    - manual—Allows manual selection of the PLMN for the modem |

The following example shows how to configure the network registration mode to CDMA hybrid:

```
Router# cellular 0 cdma mode hybrid
```

The following example shows how to configure the GSM band to auto band:

```
Router# cellular 0 gsm band auto-band
```

The following example shows how to configure PLMN search:

```
Router# cellular 0 gsm plmn search
```

The following example shows how to configure PLMN auto selection:

```
Router# cellular 0 gsm plmn select auto
```
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Configuring GSM Profiles

Beginning in privileged EXEC mode, follow these steps to configure the cellular parameters on the router:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>cellular unit gsm create</strong> profile_number apn [authentication_type username password] [protocol]</td>
<td>Create or modify a gsm modem data profile.</td>
</tr>
<tr>
<td></td>
<td>■ For profile_number, specify the number for the profile to be created.</td>
</tr>
<tr>
<td></td>
<td>■ For apn, specify the Access Point Name (APN). APN is provided by the service provider.</td>
</tr>
<tr>
<td></td>
<td>■ (Optional) For authentication_type, specify CHAP or PAP. If you specify the authentication type, enter username and password which are provided by the service provider.</td>
</tr>
<tr>
<td></td>
<td>■ (Optional) For protocol, choose an option for the network protocol: IPv4, PPP, IPv6, or IPv4v6.</td>
</tr>
</tbody>
</table>

To delete a GSM profile, use the **cellular unit gsm create profile_number** command.

2. **exit**                                     | Return to global configuration mode.                                    |

3. **copy running-config startup-config**      | (Optional) Save your entries in the configuration file.                |

The following example shows how to configure a GSM profile:

```
Router# cellular 0 gsm profile create 3 apn.com chap gsm gsmPassword ipv4
```

Working With the SIM Card

PIN is a 4 to 8 character code provided by the carrier to lock or unlock the SIM card.

This section provide information on operating with the SIM card PIN code:

- Changing the PIN, page 6
- Locking the SIM Card, page 6
- Unlocking the SIM Card, page 7
- Unblocking the SIM Card, page 7

Changing the PIN

To change the CHV1 PIN for the SIM card, use the **cellular unit sim change-pin old_pin new_pin** privileged EXEC command.

Example:

```
Router# cellular 0 sim change-pin 1234 5678
```

Locking the SIM Card

To lock the SIM card provided by the service provider, use the **cellular unit sim lock pin** privileged EXEC command.
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Example:

Router# `cellular 0 sim lock 1234`

Unlocking the SIM Card

To unlock the SIM card provided by the service provider, use the `cellular unit sim unlock pin` privileged EXEC command.

Example:

Router# `cellular 0 sim unlock 1234`

Unblocking the SIM Card

The PUK is an 8-digit CHV1 code that you obtain from the carrier. When the CHV1 is blocked after the wrong input of PINs for four times, you must unblock the SIM card by providing PUK and a new PIN.

The SIM card will no longer be available again after you input the wrong PUK or PIN for 10 times.

To unblock the SIM card provided by the service provider when the CHV1 has been blocked, use the `cellular unit sim unblock puk new_pin` privileged EXEC command.

Example:

Router# `cellular 0 sim unblock 60265772 1234`

Monitoring Cellular 3G Information

You can display specific statistics of the cellular settings. Table 24 lists the privileged EXEC commands for displaying cellular information.

Table 24 Commands to Monitor Cellular Information

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show cellular unit all</code></td>
<td>Display all the cellular 3G information on the router.</td>
</tr>
<tr>
<td><code>show cellular unit connection</code></td>
<td>Display current active connection state and data statistics.</td>
</tr>
<tr>
<td><code>show cellular unit hardware</code></td>
<td>Display hardware information of the router.</td>
</tr>
<tr>
<td><code>show cellular unit network</code></td>
<td>Display information about the carrier network and service.</td>
</tr>
<tr>
<td><code>show cellular unit profile</code></td>
<td>Display the 3G profile information.</td>
</tr>
<tr>
<td><code>show cellular unit radio</code></td>
<td>Display the 3G radio statistics.</td>
</tr>
<tr>
<td><code>show cellular unit security</code></td>
<td>Display the SIM card status and modem lock state.</td>
</tr>
</tbody>
</table>

The following example shows a sample output of the `show cellular unit all` command:

Router# `show cellular 0 all`

Hardware Information

-----------------------
Modem Firmware Version = D3200-HCAUTNZ-SW6620U0002000002 1
Modem Firmware built = Dec 24 2012 13:26:55
Hardware Version = 3
Electronic Serial Number (ESN) = 80EFE08B
Preferred Roaming List (PRL) Version = Unavailable
International Mobile Subscriber Identity (IMSI) = 466974804454330
International Mobile Equipment Identity (IMEI) = 013484000020678
Integrated Circuit Card ID (ICCID) =
Current Modem Temperature =
Modem Status =

Profile Information
=============
Profile 1 = INACTIVE*
--------
PDP Type = IPv4
Authentication = None
Access Point Name (APN) = internet
Username: 
Source Address = 0.0.0.0
Primary DNS address= 0.0.0.0

Profile 2 = INACTIVE
--------
PDP Type = IPv4
Authentication = None
Access Point Name (APN) = twm
Username: 
Source Address = 0.0.0.0
Primary DNS address= 0.0.0.0

* - Default profile

Data Connection Information
============================
Current Transmitted = 0 bytes, Received = 0 bytes
Total Transmitted = 0 KB, Received = 0 KB
Current Call Status = DISCONNECTED
Current Call Duration = 30 secs
Total Call Duration = 4482879 seconds

Network Information
===================
Current Service Status = UMTS
Current Roaming Status =
Packet Service = None
Packet Session Status = Connected
Network Selection Mode = Automatic
Network = twm
Mobile Country Code (MCC) =
Mobile Network Code (MNC) =

Radio Information
=================
Radio power mode = on
Current RSSI = -114 dBm, ECIO = -14 dBm
Current Channel Number = 0
Current Band Class = 80

Modem Security Information
==========================
Modem PIN Security = ENABLED
SIM Status = OK
SIM User Operation Required = CHV1
Number of Retries remaining = 3

The following example shows a sample output of the show cellular unit connection command:

Router# show cellular 0 connection
Data Transmitted = 0 bytes, Received = 0 bytes
Total Transmitted = 0 KB, Received = 0 KB
Current Call Status = DISCONNECTED
Current Call Duration = 30 secs
Total Call Duration = 4482879 seconds

The following example shows a sample output of the `show cellular unit network` command:

Router# `show cellular 0 network`
Current Service Status = UMTS
Current Roaming Status =
Packet Service = None
Packet Session Status = Connected
Network Selection Mode = Automatic
Network = twm
Mobile Country Code (MCC) =
Mobile Network Code (MNC) =

The following example shows a sample output of the `show cellular unit profile` command:

Router# `show cellular 0 profile`
Profile 1 = INACTIVE*
--------
PDP Type = IPv4
Authentication = None
Access Point Name (APN) = internet
Username: 
Source Address = 0.0.0.0
Primary DNS address= 0.0.0.0

Profile 2 = INACTIVE
--------
PDP Type = IPv4
Authentication = None
Access Point Name (APN) = twm
Username: 
Source Address = 0.0.0.0
Primary DNS address= 0.0.0.0

* - Default profile

The following example shows a sample output of the `show cellular unit radio` command:

Router# `show cellular 0 radio`
Radio power mode = on
Current RSSI = -114 dBm, ECIO = -14 dBm
Current Channel Number = 0
Current Band Class = 80

The following example shows a sample output of the `show cellular unit security` command:

Router# `show cellular 0 security`
Modem PIN Security = ENABLED
SIM Status = OK
SIM User Operation Required = CHV1
Number of Retries remaining = 3