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Provisioning Guide for Terminus IoT Devices

Overview

This guide is designed to help streamline the provisioning process when working with CDMA/EVDO based modules and devices from Janus Remote Communications. The topics discussed will be what steps to take prior to beginning the provisioning session, the session itself and what is needed for each service type, and debugging a failed session.

Provisioning is required for all CDMA/EVDO based modems, this is because they lack a SIM card that carries all the account information. Instead, they use an over the air update to put the account information directly into the modem's memory for use. This process only needs to happen on a couple of occurrences:

1. Brand new module, it has no account information at all.
2. The account information has been adjusted and must be updated

The steps do not need to be done on every boot up, as all the information is saved into NVM (Non-Volatile Memory).

References:

Available on the Janus website: www.janus-rc.com

- Janus CF Plug-In User Manual
- Janus T2 User Manual
- Janus 400AP User Manual
- Janus CDMA864D User Manual

Available on the Telit website: www.telit.com

- Telit AT Commands Reference Guide for CE910 Series
- Telit CE910 Family Software User Guide
- Telit AT Commands Reference Guide for DE910 Series
- Telit DE910 Family Software User Guide

Applicable Products:

All CDMA and EVDO products.

This includes all versions of products that contain the following in their part numbers:

- CDMA910
- EVDO910
- CDMA400AP
- EVDO400AP

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Before You Begin:

1. Verify you are able to power up and communicate with the device, as the provisioning requires the usage of the AT Command interface. If not done yet, follow the unit's getting started section in the respective user manual. These steps can be done over the UART or USB.

2. Contact Verizon, Sprint, or an MVNO to set-up a service contract.

You will need to have the following information to set up service:

- Product Model Number. Example: CDMA864CF V3.00
- Product Manufacturer: Janus Remote Communications
- The modem MEID#. This is printed on a label on the device, and can also be obtained by issuing the AT command AT#MEID?

Note 1: Please remember to let them know when setting the account that this is for IoT, not a normal cell phone. There are differences that their system must account for.

Note 2: If PPP connections are to be used with the modem, tethering may need to be added to the account options.

Note 3: After the account is set up for the modem and verified as active and ready, it's recommended that you wait up to 24 hours before moving forward. Although the information has been entered, the network still needs time to set up to accept the new modem. If you attempt to move on and provision the modem, it may fail during the process. This will not harm or damage the modem in any way, but be aware that if the process fails this may be the only reason for it.

3. Make sure you are operating in the home network of the carrier. The modem MUST be in a covered home network area of the carrier to properly provision. There may be exceptions depending on a carrier's roaming agreements, but the rule of thumb is to simply be in the home network to avoid issues. The AT command AT+CREG? CANNOT be used to determine if an unprovisioned device is in the home network. It may report +CREG: 0,5 (roaming) with an unprovisioned device even when in the carrier's home network.

If you are unsure about being in the home network, you can use the AT command AT#CAI to determine what network the device is connecting to.

Enter: AT#CAI?

Response will look similar to: #CAI: 20,1,4944,10,425,368,9,6,6,-87,-8,0,2,0,0,0,2,0,0,0,0

The first number in the response is the system ID (SID). This can be used in conjunction with a national lookup to see if you are in your carrier's home area. SID directories can be found on the internet at the following url's:

ifast.org/SIDtables.htm

www.roamingzone.com/sid/

The SID of 20 in the above example shows the network to be Verizon Wireless.

4. Check that you have adequate signal strength to complete the provisioning process. Provisioning requires successful packet data transfers, and as such a reasonable signal strength must be maintained. You should check the signal strength as follows:

Enter the command AT+CSQ

The response will be +CSQ: <rssi>,<ber>

where <rssi> is the received signal strength. A value of 10 to 31 is recommended in order to complete the provisioning process. Note that a value of 99 indicates no signal.

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The Provisioning Process by Carrier

Sprint:

Activation on the Sprint network requires the module be powered up inside Sprint RF coverage. Powering up the module will trigger the network to provision all network information automatically into the module.

You can check the progress of the unit and ensure that the provisioning has completed by doing the following:

Ensure the modem is registered to the network.

Enter AT+CREG? and wait for response +CREG: 0,1 or +CREG: 0,5

Ensure Mobile IP is set to 2. (Verizon is 1, Sprint is 2)

Enter AT\$QCMIP=2 and wait for response OK

Verify the information by issuing AT\$QCMIPGETP

The response will look similar to this:

Profile:0 Enabled

NAI:A1000009D010CA@hcm.sprintpcs.com

Home Addr:0.0.0.0

Primary HA:68.28.15.12

Secondary HA:68.28.31.12

MN-AAA SPI:1234

MN-HA SPI:1234

Rev Tun:1

MN-AAA SS:Set

MN-HA SS:Set

A modem that has not completed the provisioning process will have the following characteristics:

Profile:0 Enabled

NAI: YOUR_TERMINALS_MEID@hcm.sprintpcs.com

A modem that has successfully completed the provisioning process will have the following characteristics:

Profile:1 Enabled

NAI: ASSIGNED_PHONE_NUMBER@hcm.sprintpcs.com

Once the profile has been filled and the unit provisioned, a final step should be done to ensure the provider roaming list is up to date.

Enter AT+PRL=2

Response: OK

After the OK, you will want to look for the following:

#905

#909

These signify the PRL update has completed successfully.

#913 means the operation has failed somewhere. You can simply continue, but you may need to contact the provider if you find you are having issues with registration.

If you need to contact the provider, you can find the PRL version to reference with "AT\$PRL?".

After receiving OK, return the PRL to an automatic update mode.

Enter AT+PRL=1

Response: OK

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The Provisioning Process by Carrier continued

Verizon:

The Verizon provisioning takes a more manual approach than Sprint, but still only requires a short operation to complete the process.

Ensure the module is registered on the network.

Enter AT+CREG?

Response: +CREG: 0,1 or +CREG:0,5

Ensure Mobile IP is set to 1. (Verizon is 1, Sprint is 2)

Enter AT\$QCMIP=1 and wait for response OK

Verify profile 0 is selected and enabled. This is required for Verizon

Enter AT\$QCMIPP?

Response: \$QCMIPP: 0

Enter AT\$QCMIPEP?

Response \$QCMIPEP: 1

Before going forward, check the profile information

Enter AT\$QCMIPGETP

Response should be similar to below:

Profile:0 Enabled

NAI:0000009609@vzw3g.com

Home Addr:0.0.0.0

Primary HA:255.255.255.255

Secondary HA:255.255.255.255

MN-AAA SPI:2

MN-HA SPI:300

Rev Tun:1

MN-AAA SS: MN-AAA SS:Set

MN-HA SS:MN-HA SS:Set

The NAI does not have a Mobile Device Number (MDN) yet. We see the profile 0 is selected, so now we move forward.

Enter ATD*22899; (semicolon included)

Response: OK

Wait for response #OTASP:0 (Start OTASP)

Wait for response #OTASP:1 (Start OTASP Commit)

Wait for response #OTASP:2 (End OTASP)

Wait for response NO CARRIER (The module will reboot)

If you receive a response #OTASP:5 (SPC Unlock Attempt Fail), or do not receive #OTASP:1 and #OTASP:2, the provisioning has failed somewhere. Please verify that your account has been set up, activated, and that you have been given an MDN and MSID for your module's MEID/ESN.

We can make sure the OTA information has been filled out now

Enter AT\$QCMIPGETP

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The Provisioning Process by Carrier continued Verizon continued

Response should be similar to below:

```
Profile:0 Enabled
NAI:<MDN>@vzw3g.com
Home Addr:0.0.0.0
Primary HA:255.255.255.255
Secondary HA:255.255.255.255
MN-AAA SPI:2
MN-HA SPI:300
Rev Tun:1
MN-AAA SS:Set
MN-HA SS:Set
```

We have one final step in which we open the PDP context for the first time to allow the network perform DMU (Dynamic Mobile IP key Update) if necessary.

```
Enter AT#SGACT=1,1
```

Wait for response: #SGACT: 172.16.254.1 (The response should be a valid IP address.)

At this point the module should be ready to use on the Verizon network.

To deactivate the context, use AT#SGACT=1,0

Aeris

Activation on the Aeris network requires the input of the MIN (equivalent to the MDN) into both NAMs of the module via AT commands, followed by a reset.

When the account has been activated, you should receive information on the module, which includes the following:

The module's 10 digit MDN.

Ensure the module is registered on the network:

```
Enter AT+CREG?
```

Response: +CREG: 0,1 or +CREG:0,5

Begin the process by writing the MIN value to both NAMs:

```
Enter AT#CURRNAM=1<cr>
```

Response: OK

```
Enter AT$MDN=<mdn><cr>
```

Response: OK

```
Enter AT#CURRNAM=0<cr>
```

Response: OK

```
Enter AT$MDN=<mdn><cr>
```

Response: OK

Perform a reset:

```
Enter AT$SPRESET
```

Response: OK

The module will be operational again in approximately 10 seconds.

Troubleshooting – If the provisioning process fails, there are a few common points that should be reviewed.

1. Make sure that the process has been followed exactly, with the correct profiles being selected. A common error is the wrong profile is set before moving forward.
2. Verify with the provider that the account that set up correctly for that modem's MEID, that the account is active, that it's been set for IoT, and that the profile has the correct technology type selected (1xRTT or EVDO).