

Device Management System

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Aeris is a wireless network operator with privileged access on the SS7 carrier interconnect network. This network allows Aeris to connect directly to the switches that form the fabric of our network and allows for transport of application data through the Aeris operations center to your host application environment.

Tools and information are provided for managing your devices on the Company network: online device management and web services.

Online device management provides an interactive user interface that is accessed through the Operations tab of the Company Customer Portal. This tool supports device provisioning, changing the status and rate plan of the device, and querying for device information. This tool is recommended for use when deploying one or a few devices. If a larger number of devices are to be deployed, use the Web services tool.

Web services is a programmatic tool for developing the interface application to activate, change status and rate plan, or query your device on the Company network. Along with the specifications, sample code is provided on the Company Customer Portal as an example application. The Web services specifications and sample code are

available through the Operations tab of the Company Customer Portal. This tool is recommended when deploying a large number of devices for commercial operations.

Note: To access the Device Management tools, your secure connection (VPN or leased line) with the Company network must be enabled.

Document Structure

Following is a summary of the contents of this document.

Chapter 2: Online CDMA Device Management

This chapter provides information about using the interactive user interface for CDMA device management. This tool is designed for use during test and development, and to manage, analyze, and troubleshoot selected devices after commercial deployment.

- Activate a device on the Company network
- Change the rate plan of a device
- Cancel a device
- Query (retrieve) information about a device

Chapter 3 Online GSM/GPRS Device Management

This chapter provides information about using the interactive user interface for GSM/GPRS device management. This tool is designed for use during test and development, and to manage, analyze, and troubleshoot selected devices after commercial deployment.

- Activate a device on the Company network
- Change the rate plan of a device
- Cancel a device
- Query (retrieve) information about a device

Chapter 4: Mobile Device Management

This chapter describes the information provided in Web services. This tool is designed for large-scale commercial deployment, to manage several devices.

- Access to functional sample code for application interface
- Access to specifications for your device to communicate on the Company network

Chapter 5 MIN and IMSI Tutorial

This chapter provides a high-level tutorial about registering devices with Company MINs and IMSIs.

- MIN format and functions, device identification, troubleshooting
- MIN acquisition with rate plans, cancellation
- IMSI format and functions, future use

Target Audience

This document is intended for those deploying units on an Company network.

If you are new to this subject matter, it is recommended that you first read *Chapter 5: MIN and IMSI Tutorial*.

Terms and Acronyms

The following technical terms are used in this Device Management.

A-Key. Authentication Key

CC. Country Code

CDMA. Code Division Multiple Access

ESN. Electronic Serial Number

HLR. Home Location Register

ICCID. Integrated Circuit Card Identifier of the SIM card

IMSI. International Mobile Subscriber Identity

MDN. Mobile Directory Number – the actual phone number for a wireless subscriber

MIN. Mobile Identification Number

MO. Mobile Originated

MS. Mobile Station

MSA. Master Service Agreement.

MSISDN. Mobile Station International Subscriber Directory Number

MT. Mobile Terminated

NANPA. North American Numbering Plan Area

NC. Network Code

NPA. Number Plan Area – the first three digits of MIN, similar to an area code

PSTN. Public Switched Telephone Network

SIM. Subscriber Identity Module (card)

SN. Subscriber Number

UIM. User Identity Module (card)

WLNP. Wireless Local Number Portability

Related Documents

- *CDMA Network Services Launch Kit*
- *GSM/GPRS Network Services Launch Kit*

Related Documents

- *Master Service Agreement (MSA)*
- *Mobile Device Management System Webservices specification*
- *Qualification Testing (available soon)*

Online CDMA Device Management

Online device management provides an interactive user interface to provision, change device status, cancel, change rate plans, and query devices. This tool should be used to manage and update individual devices. Uses for this tool include provisioning and managing devices during device application development and test, and troubleshooting a selected device that has been chimerically deployed, which is not functioning correctly or as expected.

Once your application has been commercially deployed and devices are to be provisioned and managed, it is recommended that you use the *Company Mobile Device Management Services* to manage large-scale commercial operations. This system provides a programmatic approach to device management. For more information, see “Mobile Device Management” on page 39.

Note: To access the Device Management tools, your secure connection (VPN or leased line) with the Company network must be enabled. For more information, refer to the *CDMA Network Services Launch Kit*.

Available Functions

This section describes the specific functionality available via the online device management tool. The following functionality is available and may be accessed through the Customer Portal:

- Provision a Device
- Change Rate Plan
- Cancel a Device
- Query Device Information
- Make a Device Billable

Each of these functions are described below.

Provision a Device

Provision a Device is used to provision a new device for test or commercial deployment; rate plans are assigned during this process.

Devices are billed as follows:

- For devices that have been provisioned, but are not yet under an executed MSA (Master Service Agreement) with Company, billing will occur when the first data transmission occurs, such as SMS, *MicroBurst*, or an IP session. All transmissions will be charged. This typically applies to devices that are under test and development, but have not yet been commercially released on the Company network.
- For devices that have been provisioned and an MSA has been executed for those devices, the device will become billable as per the negotiated triggers of the agreement. An example of a trigger is the time after a device was provisioned, how many data transmissions occurred, etc. The rate plans (which your company negotiated with Company) will be defined in the Pricing Attachment of the MSA. This typically applies to devices that have been commercially released on the Company network.

Before deploying a commercial application on the Company network, the device must be approved by Com-

pany. For more information, refer to the *CDMA Network Services Launch Kit*.

Change Rate Plan

Devices that are deployed on the Company network incur charges with each transmission; transmission charges are based on pre-defined rate plans. The specific rate plan that is assigned to a device may be changed using this function. A rate plan change takes effect the first day of the next billing cycle after the date that the change is made. For most Company customers, this is the first day of the next month.

If a particular device is being tested prior to commercial release on the Company network, development and test rates are available. The development and test rates are provided on the Customer Portal.

When you execute a MSA (Master Service Agreement) with Company, the rate plans that are associated with your device will be defined in the Pricing Attachment of the MSA, and will be populated on the online device management tool.

Cancel a Device

Cancelling a device is ending the billing of a device that will no longer transmit on the Company network—the intention is to remove the service of the device. This change takes effect the day after submitting the change of device status.

Should transmission occur from a device that has been cancelled, you will be billed the *Developer* billing rate, and a reactivation fee will be applied. You are responsible for all the transmissions from your devices on the Company network.

Query—Retrieve Device Information

Query allows you to view the current and historical information of a selected device.

The current data lists the following information:

ESN – Electronic Serial Number

MIN – Mobile Identification Number

Service Name – is defined by your company. The Service Name may represent a specific end-user application, a customer your company is servicing, how the devices under that Service Name are routed or handled, etc. Typically, more than one Service Name is defined per account. A device can be provisioned to only one Service Name.

Device Status – the status of the device: “Provision”, “Bill”, or “Cancel”

Rate Plan – the billing plan for the device

The historical data shows the previous device status and billing rates that were applied to the device, the dates of the changes, and who implemented the changes.

Security and Device Management

Accessing the online device management tools requires two separate logins. The first login is to access the Customer Portal. The second login is to access the online device management tools that are located on the Operations tab of the Customer Portal.

You will receive the prompt to log in with the second user name and password after clicking the Operations tab of the Company Customer Portal – that user name and password will be associated with the account that contains the device you wish to manage.

The first user name and password are associated with a specific role: Manager, Developer, Accountant, and Guest. Of those four roles, only two roles have access to Device Management: Manager and Developer. For more

information about user roles and the Customer Portal, see the *CDMA Network Services Launch Kit*.

The following sections provide information and instructions on how to access and use the Online Device Management tools.

How to Access Online Device Management

Online device management tools enable you to provision, modify billing, cancel, and retrieve information about a device. To access these online features, you must log into the Company Customer Portal, then select the Operations tab to access the online tools.

The instructions follow. It is assumed that you have already logged onto the Customer Portal, and that you have the necessary user name and password to access the online device management tools for your devices.

1. On the Welcome Page of the Customer Portal, click the *Operations* tab.

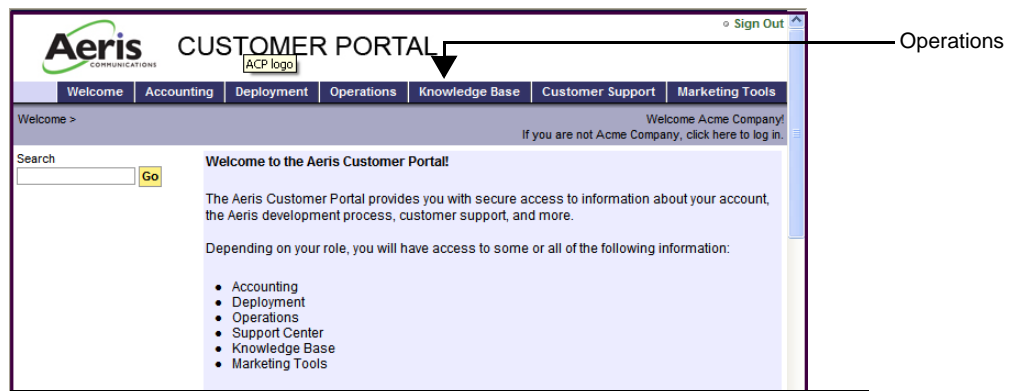


Figure 1. Access Device Management

2. On the Operations window, click on *Online Device Management*.

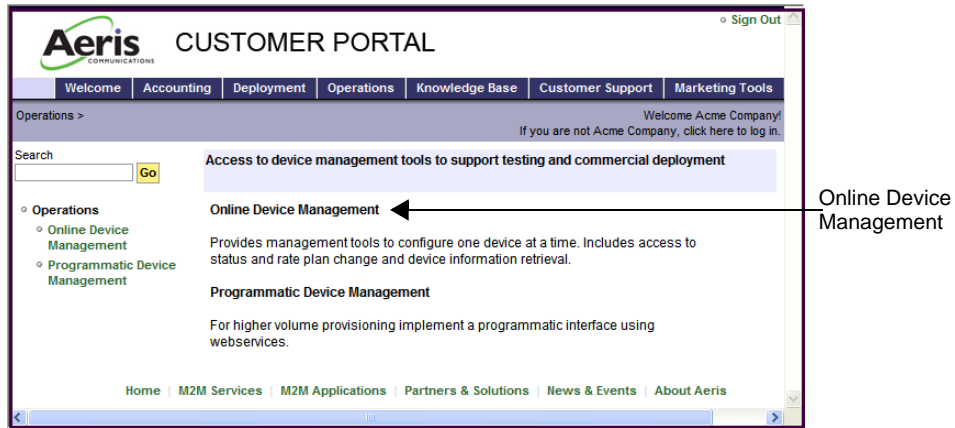


Figure 2. Device Management Menu

3. On the next window log in using your user name and password to access the online device management tools.

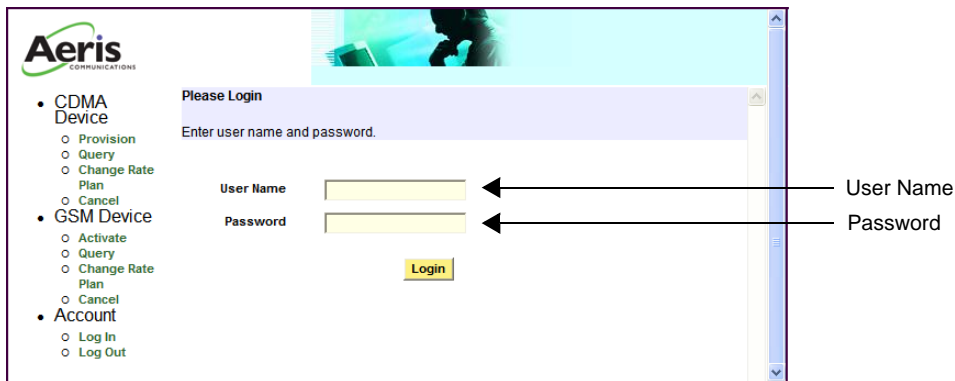


Figure 3. Log In to CDMA Device

4. You now have access to the online device management tools. The user name and password that you used for logging in, and the account identification related with the user name and password, will be displayed on each web page as shown in Figure 4 on page 14.

If an error message is displayed, ensure that you entered your user name and password correctly.

When managing devices that are associated with different accounts, you will need to log out then log in with the correct user name and password for the account associated with the device(s).

For technical assistance, contact the Company Developer Support. For contact information and how to request assistance (email address, online forms, etc.), refer to the *CDMA Network Services Launch Kit*.

The online tools are described in the following sections.

Online Device Management

The following sections provide information and instructions for using the device management tools:

- “Provision” on page 13
- “Change Rate Plan” on page 16
- “Cancel” on page 18
- “Query” on page 20

Note: For input text fields such as ESN and MIN, the examples show using a hyphen, such as ddd-ddddddd for ESN. Alternatively, the hyphen can be replaced with a space, or not used (**ddd dddddd** or **dddddddddd**).

Provision

This section provides instructions to provision a device on the Aeris network. It is assumed that you have already logged in as described in “How to Access Online Device Management” on page 11.

1. On the CDMA Device Management menu, select *Provision*.

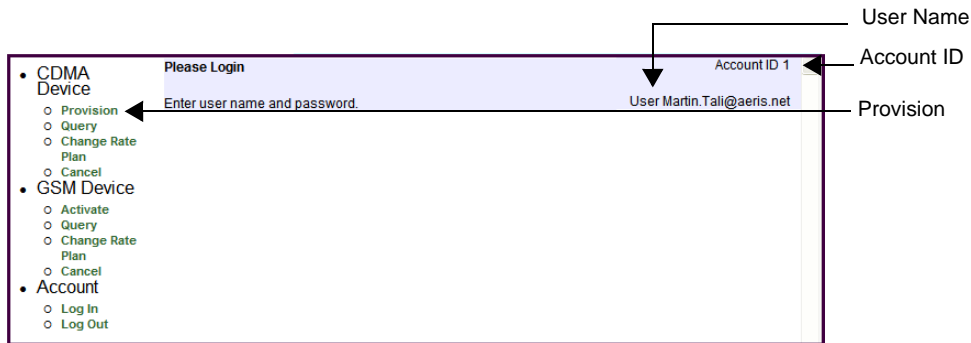


Figure 4. Access Provision

2. On the Provision input page, enter the following items.

ESN—the Electronic Serial Number of this device, which is entered in one input field in the following format: ddd-ddddddd. “d” represents an digit: 0..9.

RF Module—the module in the device to be provisioned, which is selected from a drop menu. Only RF modules, which match the service agreement in your contract with Company, will be available for selection.

Firmware Version—the firmware of the selected RF module (device), which is selected from a drop menu. The available firmware versions are related to the modules listed in RF Modules—this selection is available after selecting the RF Module.

Service Name—identifies the service with which the device is associated, which is defined by your company.

Rate Plan—the rate (billing) plan for the device. The rate plans are the pre-negotiated pricing as listed in the *Company Master Service Agreement (MSA)*.

Application Type—fixed or mobile. A *fixed* application is installed at a location and is not moved; a *mobile* application is installed in an item that travels from

location to location. *This data entry is optional; the data entries above are required.*

Figure 5. Provision a Device Input Page

3. After entering the required information, click the *Submit* button.

If you decide to make changes, to stop the process and start over, click the *Cancel* button—this must be done before clicking the *Submit* button.

4. If all of the entered information is correct, the device will be assigned a MIN (Mobile Identification Number), and an IMSI (International Mobile Subscriber Identity).

Figure 6. Provision Device Results

5. Provisioning the device is complete; it can now be used on the Company network. It is strongly recommended to set up the rate plan for this device. See “Change Rate Plan” on page 16.

Provision Errors

If there are any errors with the input fields, an error message will be displayed. If this type of error occurs, correct the noted error and click the *Submit* button.

Following are examples of possible errors:

- One or more of the required fields was not entered before clicking the *Submit* button.
- The syntax of the input data is not correct, such as an incorrect character or an extra space.
- The device is already provisioned. In this case, an error message will be displayed.
- An error message states the device does not belong to you, or that the user name and password are incorrect. In this case, ensure that you entered the correct user name and password for the selected device, and that the ESN and/or MIN that you entered is correct.

Change Rate Plan

After a device has been provisioned, the rate plan can be changed.

This section provides instructions to change the rate plan (billing rate) of the selected device. It is assumed that you have already logged in as described in “How to Access Online Device Management” on page 11.

1. On the CDMA Device menu, click *Change Rate Plan* from either the navigator column.

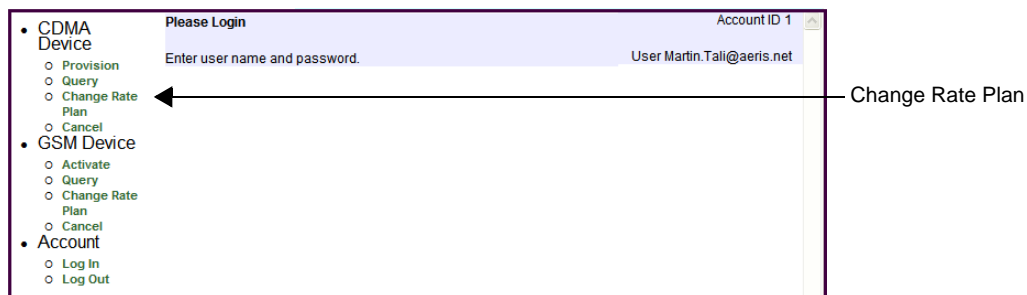


Figure 7. Change Rate Plan

2. Enter ESN or MIN in the appropriate text field, then click the *Submit* button. It is optional to enter both ESN and MIN.

Enter ESN in the ESN text field in the following format: ddd-ddddddd.

Enter MIN in the MIN text field in the following format: ddd-ddd-dddd

“d” represents an digit: 0..9.

The screenshot shows a web interface titled "Change Rate Plan" for Account ID 10199. The user is jewel.baldwin@cybersensor.com. The form prompts the user to "Enter MIN or ESN for device to change rate plan." There are two text input fields: "ESN" with a placeholder "(ddd-ddddddd)" and "MIN" with a placeholder "(ddd-ddd-dddd)". A yellow "Submit" button is located below the fields. A red asterisk indicates required fields. A note at the bottom states: "(1) Note: To view current device status, go to [Query](#)".

Figure 8. Change Rate Plan Input

3. Select the desired rate plan from the Rate Plan drop menu, then click the *Confirm* button.

The available rate plans are either the pre-negotiated pricing attached to the *Company Master Service Agreement* (MSA) or the *Developer* rates. For more information about rate plans, see “Change Rate Plan” on page 9.

To stop this operation and restart it, click the *Cancel* button—this should be done before clicking the *Confirm* button.

The screenshot shows the "Change Rate Plan" form with the following details: ESN * 236-02451072, MIN * 176-700-0261, and IMSI. The "Rate Plan *" dropdown menu is open, showing options: 10 change to 40, 1, 10, 40, and 100. The "Effective Date" is 2007-03-01. There are yellow "Confirm" and "Cancel" buttons. A red asterisk indicates required fields.

Figure 9. Rate Plan Input Field

4. The figure below shows an example of the output results.

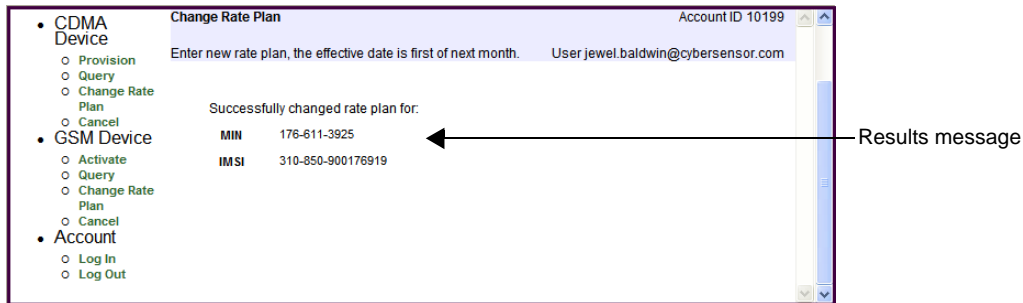


Figure 10. Rate Plan Output Results

5. Changing the Rate Plan is now complete. The new rate plan will take effect the first day of the next billing cycle.

Change Rate Plan Errors

- If an error message is displayed, most likely the device is not yet provisioned. To provision the device, see “Provision” on page 13.
- An error message states the device does not belong to you, or that the user name and password are incorrect. In this case, ensure that you entered the correct user name and password for the selected device, and that the ESN and/or MIN that you entered is correct.

Cancel

A provisioned device can be cancelled—removed from billing and no longer used on the Company network unless provisioned again.

When a device is cancelled, the MIN assigned to the device is suspended for up to six months. After that period, the MIN is returned to the *general pool* for reuse—it is available for provisioning another device. Once cancelled, the MIN cannot be retrieved by the device.

This section provides instructions to cancel a selected device from the Company network. It is assumed that you have already logged in as described in “How to Access Online Device Management” on page 11.

1. On the CDMA Device menu, click *Cancel* from the navigator column.

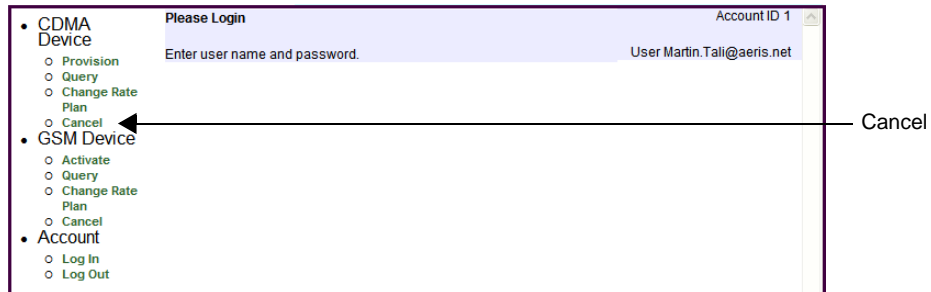


Figure 11. Cancel

2. Enter ESN or MIN in the appropriate text field. It is optional to enter both fields.
Enter ESN in the ESN text field in the following format: ddd-ddddddd.
Enter MIN in the MIN text field in the following format: ddd-ddd-dddd
“d” represents an digit: 0..9.

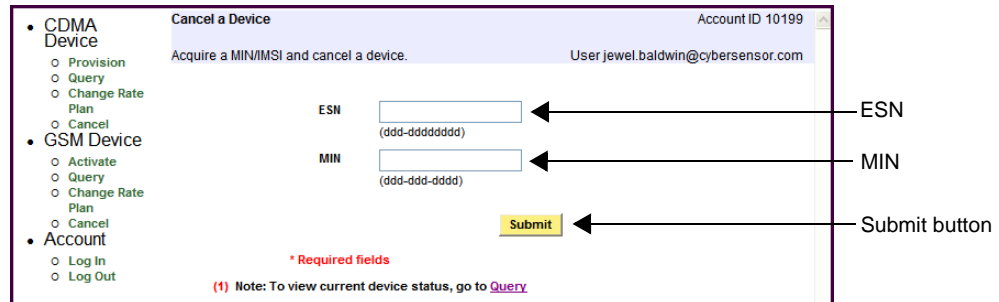


Figure 12. Cancel Input Screen

3. On the next screen, click the *Confirm* button.

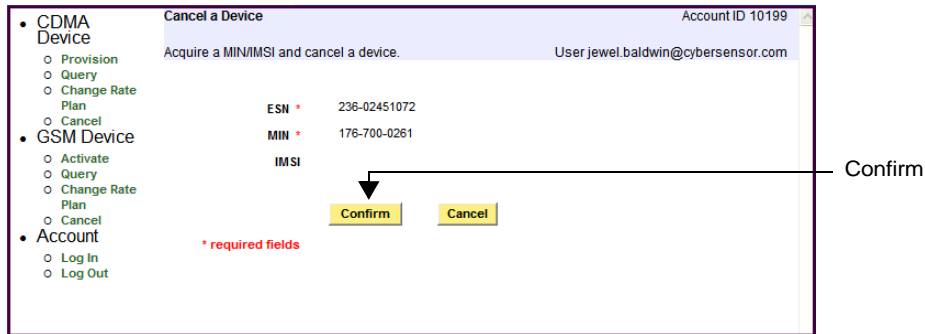


Figure 13. Cancel Confirm Input

The results screen will be displayed as follows.

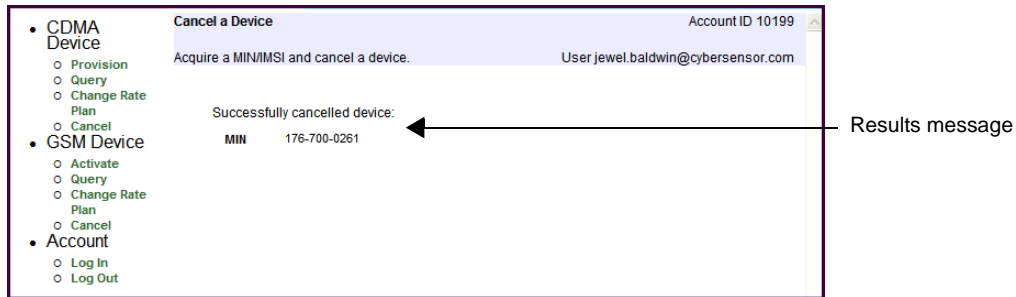


Figure 14. Cancel Input Results

Cancel Errors

- If an error message is displayed, most likely the device is not yet provisioned. To provision the device, see “Provision” on page 13.
- Format errors can also occur, such as an extra space that was typed into the input text field. Re-enter the data correctly.
- An error message states the device does not belong to you, or that the user name and password are incorrect. In this case, ensure that you entered the correct user name and password for the selected device, and that the ESN and/or MIN that you entered is correct.

Query

Query allows you to view the current status and rate plan of a device, and a history of changes that were made with

that device. This feature can also be used to retrieve the MIN of a device.

This section provides instructions to retrieve the current and historical information of a selected device. It is assumed that you have already logged in as described in “How to Access Online Device Management” on page 11.

1. On the Device Management page, click *Query* from the navigator column.

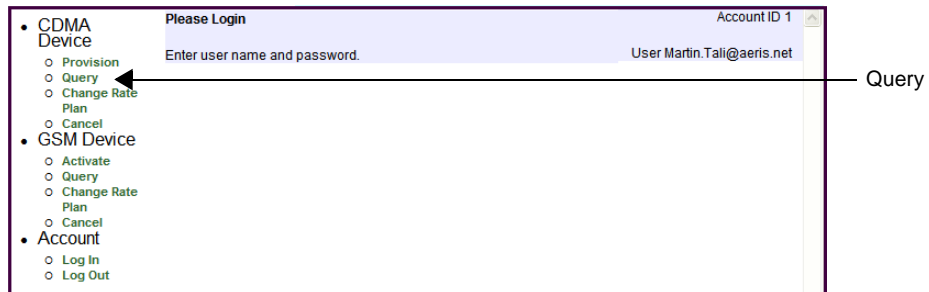


Figure 15. Query Device

2. Enter either ESN or MIN in the appropriate text field. Enter ESN in the ESN text field in the following format: ddd-ddddddd. Enter MIN in the MIN text field in the following format: ddd-ddd-dddd “d” represents an digit: 0..9.

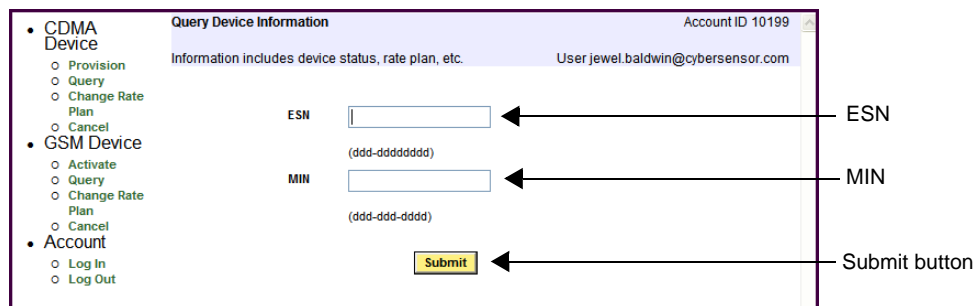


Figure 16. Query Device Input

3. The figure below shows an example of the output when MIN was entered.

- CDMA Device
 - Provision
 - Query
 - Change Rate Plan
 - Cancel
- GSM Device
 - Activate
 - Query
 - Change Rate Plan
 - Cancel
- Account
 - Log In
 - Log Out

Query Device Information
Account ID 10199

Information includes device status, rate plan, etc. User jewel.baldwin@cybersensor.com

ESN	236-02451072				
MIN	176-700-0261				
RF Module	7845C				
Firmware Version	1.21				
Device Status	Provision				
Rate Plan	40				
Service Name	cyberD				

Status Change History

Date	Effective Date	End Date	Primary MIN	ESN	Status	Plan	Changed By
2007-02-22	2007-02-22	2007-02-28	176-700-0261	236-02451072	Provision	10	aerisdev
2007-01-09	2007-01-09		176-700-0261	236-02101072	Cancel		aerisdev
2007-02-22	2007-03-01		176-700-0261	236-02451072	Provision	40	aerisdev
2007-01-09	2007-01-09	2007-01-08	176-700-0261	236-02101072	Provision		aerisdev

←

Current status

←

Status history

Figure 17. Query Device Input

Query Errors

- If an error message is displayed, most likely the device is not yet provisioned. To provision the device, see “Provision” on page 13.
- Format errors can also occur, such as an extra space that was typed into the input text field. Re-enter the data correctly.
- An error message states the device does not belong to you, or that the user name and password are incorrect. In this case, ensure that you entered the correct user name and password for the selected device, and that the ESN and/or MIN that you entered is correct.

Online GSM/GPRS Device Management

Online device management provides an interactive user interface to provision, change device status, cancel, change rate plans, and query devices. This tool should be used to manage and update individual devices. Uses for this tool include provisioning and managing devices during device application development and test, and troubleshooting a selected device that has been chimerically deployed, which is not functioning correctly or as expected.

Once your application has been commercially deployed and devices are to be activated and managed, it is recommended that you use the *Company Mobile Device Management Services* to manage large-scale commercial operations. This system provides a programmatic approach to device management. For more information, see “Mobile Device Management” on page 39.

Note: To access the Device Management tools, your secure connection (VPN or leased line) with the Company network must be enabled. For more information, refer to the *GSM/GPRS Network Services Launch Kit*.

Available Functions

This chapter provides information about the online device management tool, an interactive user interface that is accessed through the Company Customer Portal. This tool enables you to perform the following operations:

Activate a Device

Use this function to activate a device for use on the Company network. When a device is activated, billing is immediately started.

Before activation, the device must be certified by Cingular, and the SIM card for the device must be ordered from Company and installed in the device. For more information about device approval and ordering SIM cards, refer to the *GSM/GPRS Network Services Launch Kit*.

Change Rate Plan

Devices that are deployed on the Company network incur charges with each transmission; transmission charges are based on pre-defined rate plans. The specific rate plan that is assigned to a device may be changed using this function. A rate plan change takes effect the first day of the next billing cycle after the date that the change is made. For most Company customers, this is the first day of the next month.

If a particular device is being tested prior to commercial release on the Company network, development and test rates are available. The development and test rates are provided on the Customer Portal.

When you execute a MSA (Master Service Agreement) with Company, the rate plans that are associated with your device will be defined in the Pricing Attachment of the MSA, and will be populated on the online device management tool.

Cancel a Device

Cancelling a device is used to end the billing of a device that will no longer transmit on the Company network: the intention is to remove the service of the device. This change takes effect the day after submitting the change of device status.

Should transmission occur from a device that has been cancelled, you will be billed the *Developer* billing rate, and a reactivation fee will be applied. You are responsible for all the transmissions from your devices on the Company network.

Query—Retrieve Device Information

Query allows you to view the current setup of a selected device. The following information will be displayed:

ICCID – Integrated Circuit Card IDentifier

IMSI – International Mobile Subscriber Identity

MSISDN – Mobile Station International Subscriber Directory Number

RF Module – the RF module of the device

Firmware Version – the firmware version of the RF module

Service Name – is defined by your company. The Service Name may represent a specific end-user application, a customer your company is servicing, how the devices under that Service Name are routed or handled, etc. Typically, more than one Service Name is defined per account. A device can be provisioned to only one Service Name.

Device Status – the status of the device: “Bill” or “Cancel”

Rate Plan – the billing plan for the device

Make a Device Billable

Use this function to modify the state of your device from *Provision* to *Bill*. Access Fees and rate plans do not take effect until after the status of a device has been changed from Provision to Bill. Once a device is in the Bill state, it is charged access fees and rate plans as described on the Customer Portal for development and test units or as described in the Pricing Attachment of your MSA with Company.

Security and Device Management

Accessing the online device management tools requires two separate logins. The first login is to access the Company Customer Portal. The second login is to access the online device management tools through the Operations tab.

You will receive the prompt to log in with the second user name and password after clicking the Operations tab of the Company Customer Portal – that user name and password will be associated with the account that contains the device you wish to manage.

The second user name and password are also associated with a specific role: Manager, Developer, Accountant, and Guest. Of those four roles, only two roles have access to Device Management: Manager and Developer. For more information about user roles and the Customer Portal, see the *GSM/GPRS Network Services Launch Kit*.

The following sections provide information and instructions about using Device Management services.

How to Access Online Device Management

Online device management tools enable you to activate, modify billing, cancel, and retrieve information about a device. To access these online features, you must log into

the Company Customer Portal, then select the Operations tab to access the online tools.

The instructions follow. It is assumed you have already logged onto the Customer Portal, and that you have the necessary user name and password to access online device management tools for your devices.

1. On the Welcome Page of the Customer Portal, click the *Operations* tab.

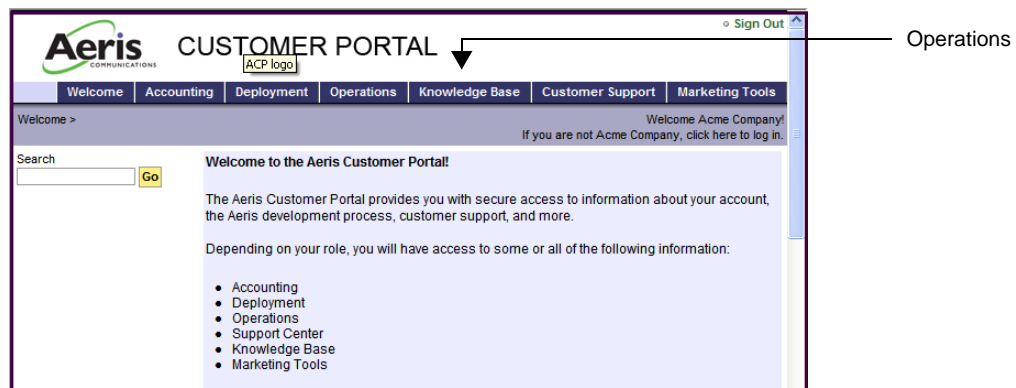


Figure 18. Access Device Management

2. On the Operations window, click on *Device Management*.
3. On the next window, log in using your user name and password to access the online device management tools.

This user name and password are tied to the account where your device resides. If you need to work on devices that are registered in different accounts, you will need to log out of the current process, and then log in to the desired account, using that associated user name and password.

The screenshot shows the Aeris Communications website interface. On the left is a navigation menu with categories: CDMA Device (Provision, Query, Change Rate Plan, Cancel), GSM Device (Activate, Query, Change Rate Plan, Cancel), and Account (Log In, Log Out). The main content area is titled 'Please Login' and contains the text 'Enter user name and password.' Below this are two text input fields: 'User Name' and 'Password'. A yellow 'Login' button is located below the 'Password' field. Two black arrows originate from the text 'User Name' and 'Password' on the right side of the image and point to the corresponding input fields.

Figure 19. Log In to GSM Device

4. You now have access to the online device management tools. The user name and password that you used for logging in, and the account identification related with the user name and password, will be displayed on each page as shown in Figure 20 on page 29.

If an error message is displayed, ensure that you entered your user name and password correctly.

When managing devices that are associated with different accounts, you will need to log out then log in with the correct user name and password for the account associated with the device(s). The assignment of a device to an account has been determined by your company.

For technical assistance, contact Company Developer Support. For contact information and how to request assistance (email address, online forms, etc.), refer to the *GSM/GPRS Network Services Launch Kit*.

The online tools are described in the following sections.

Online Device Management

The following sections provide information and instructions for using the device management tools:

- “Activate” on page 29
- “Change Rate Plan” on page 32
- “Cancel” on page 34

- “Query” on page 36

Activate

This section provides instructions to activate a device on the Aeris network. It is assumed that you have already logged in as described in “How to Access Online Device Management” on page 26.

1. On the GSM Device menu, select *Activate*.

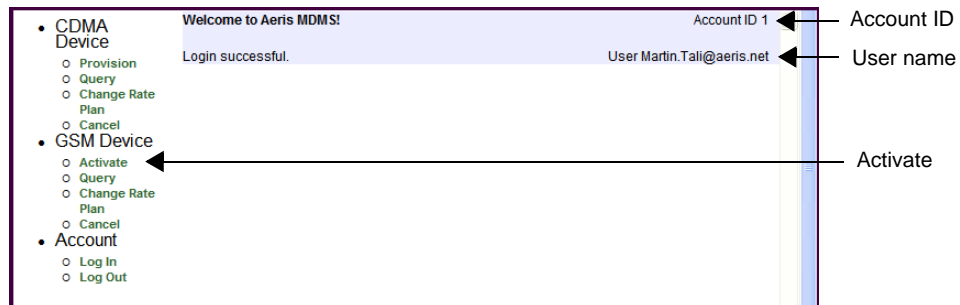


Figure 20. Access Activate

2. On the Activate input page, enter the following items:
 - ICCID**—the Integrated Circuit Card IDentifier of the SIM card assigned to the device, which is entered in the text field in the following format: dddddddddddddddddddd.
 - “d” represents digits 0..9; ICCID consists of 20 digits.
 - Service Name**—selected from a drop menu. Service Name identifies the service with which the device is associated, which is defined by your company.
 - RF Module**—the module in the device to be activated, which is selected from a drop menu. Only RF modules, which match the service agreement in your contract with Company, will be available for selection.
 - Firmware Version**—the firmware of the selected RF module (device), which is selected from a drop menu. The available firmware versions are related to the modules listed in RF Modules—this selection is available after selecting the RF Module.

Rate Plan—the rate (billing) plan for the device. The rate plans are the pre-negotiated pricing as listed in the *Company Master Service Agreement (MSA)*.

Application Type—fixed or mobile. A *fixed* application is installed at a location and is not moved; a *mobile* application is installed in an item that travels from location to location. *This data entry is optional; the data entries above are required.*

The screenshot shows a web form titled "Provision a Device" for Account ID 10199. The form contains the following fields and options:

- ICCID * (text input field)
- Service Name * (dropdown menu, selected: cyberD)
- RF Module * (dropdown menu, selected: - Select -)
- Firmware Version * (dropdown menu, selected: - Select -)
- Rate Plan (dropdown menu, selected: - Select -)
- Application Type (dropdown menu, selected: Fixed)

A "Submit" button is located below the Application Type field. A sidebar on the left lists navigation options for CDMA Device, GSM Device, and Account. Arrows on the right side of the form point to each of the input fields with labels: ICCID, Service Name, RF Module, FW Version, Rate Plan, and Application Type.

Figure 21. Activate Input Data

3. After entering the required information, click the *Submit* button.

To stop this operation and restart it, click the *Cancel* button—this should be done before clicking the *Submit* button.

4. If all of the entered information is correct, a message will be displayed on the screen as shown below.

The screenshot shows a web page titled "Activate a Device" for Account ID 1. The page displays the following message:

Device activated as follows:
ICCID: 89014103200971608820

A "Results message" label with an arrow points to the text above. The sidebar on the left lists navigation options for CDMA Device, GSM Device, and Account.

Figure 22. Activate Results

5. The online process to activate the device is complete; due to the processing time required by the carrier, it will take 2–15 minutes before the device is activated on the network. At that time, the IMSI and MSISDN numbers will be assigned to the device.

To confirm the activation is successful, use the Query screen to verify that the IMSI and MSISDN numbers have been assigned (see “Query – Retrieve Device Information” on page 25).

To query the device, you will need the ICCID number.

Note: It may take up to 15 minutes before the device has been assigned the IMSI and MSISDN numbers, and is active on the Company network.

After the device has been activated, it is strongly recommended to set up the rate plan for this device. See “Change Rate Plan” on page 32.

Activation Errors

If there are any errors with the input fields, an error message will be displayed. If this type of error occurs, correct the noted error and click the *Submit* button.

Following are examples of possible errors:

- One or more of the required fields was not entered before clicking the *Submit* button.
- The syntax of the input data is not correct, such as an incorrect character or an extra space.
- If the device is already activated, an error message will be displayed. This type of error can occur for the following reasons:

The device has been previously activated.

The device was cancelled less than five (5) minutes ago. Although confirmation messages are immediately displayed on the screen, cancelling or other changes to a device take about five minutes to register with the database. See “Cancel” on page 34.

- The error message states the device does not belong to you, or that the user name or password are incorrect. Ensure that you entered the correct user name and password for the selected device, and that the ICCID number you entered is correct.

Change Rate Plan

After a device has been activated, the rate plan can be changed.

This section provides instructions to change the rate plan (billing rate) of the selected device. It is assumed that you have already logged in as described in “How to Access Online Device Management” on page 26.

1. On the GSM Device menu, click on *Change Rate Plan* from the navigator column.

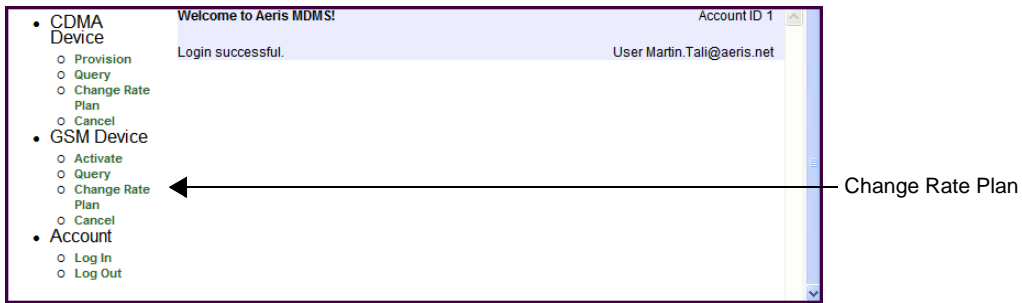


Figure 23. Access Change Rate Plan

2. Enter ICCID in the text field, then click the *Submit* button. Refer to the figure below.

The format of ICCID is: dddddddddddddddddddd
“d” represents digits 0..9; ICCID consists of 20 digits.

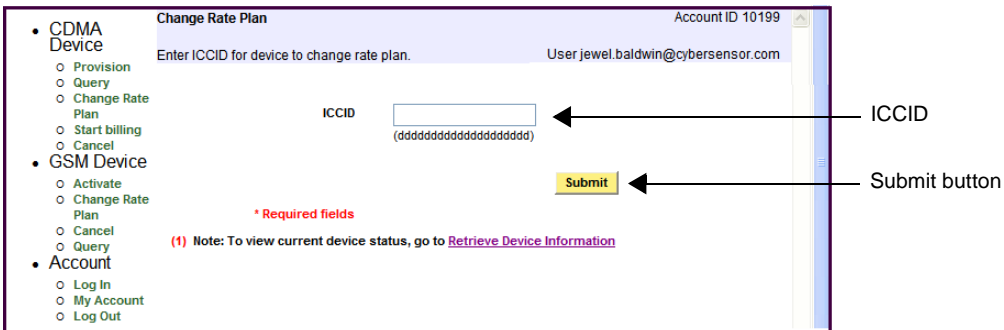


Figure 24. Change Rate Plan Input

3. Select the desired rate plan from the Rate Plan drop menu, then click the *Confirm* button. Refer to the figure below.

The available rate plans are either the pre-negotiated pricing attached to the *Company Master Service Agree-*

ment (MSA) or the *Developer* rates. For more information about rate plans, see “Change Rate Plan” on page 24

To stop this operation and restart it, click the *Cancel* button—this should be done before clicking the *Confirm* button.

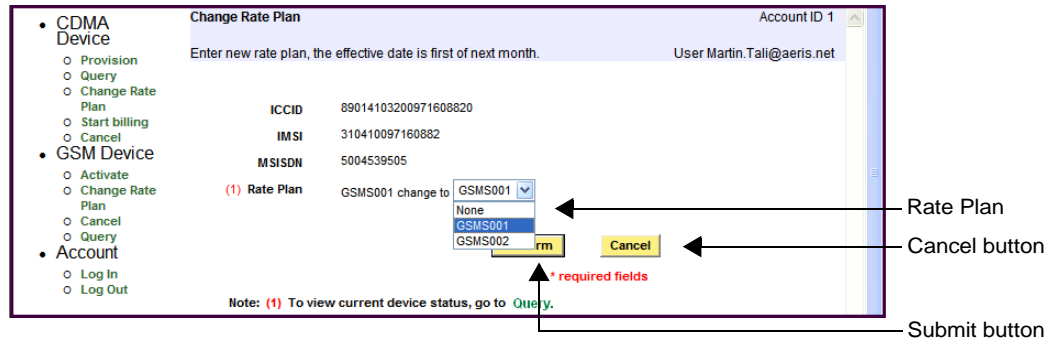


Figure 25. Select Rate Plan

4. If changing the Rate Plan is successful, a message will be displayed as shown below.

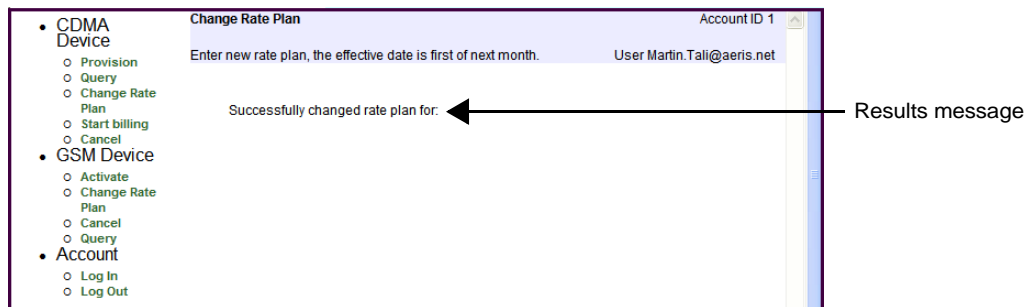


Figure 26. Rate Plan Output

Changing the Rate Plan is now complete. The new rate plan will be in effect the first day of the next billing cycle.

Change Rate Plan Errors

- If an error message is displayed, most likely the device is not yet activated. To activate the device, see “Activate” on page 29.
- The error message states the device does not belong to you, or that the user name or password are incorrect.

Ensure that you entered the correct user name and password for the selected device, and that the ICCID number you entered is correct.

Cancel

An activated device can be cancelled – removed from billing and no longer used on the Company network.

This section provides instructions to cancel a selected device from the Company network. It is assumed that you have already logged in as described in “How to Access Online Device Management” on page 26.

1. On the GSM Device menu, click on *Cancel* from the navigator column.

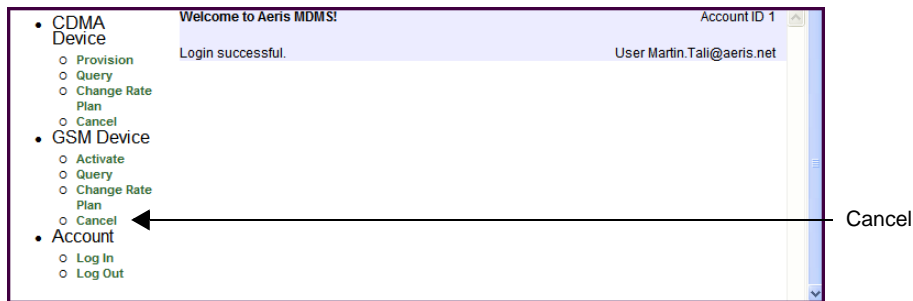


Figure 27. Access Cancel

2. Enter ICCID in the text field in the following format:
dddddddddddddddddddd
“d” represents digits 0..9; ICCID consists of 20 digits.

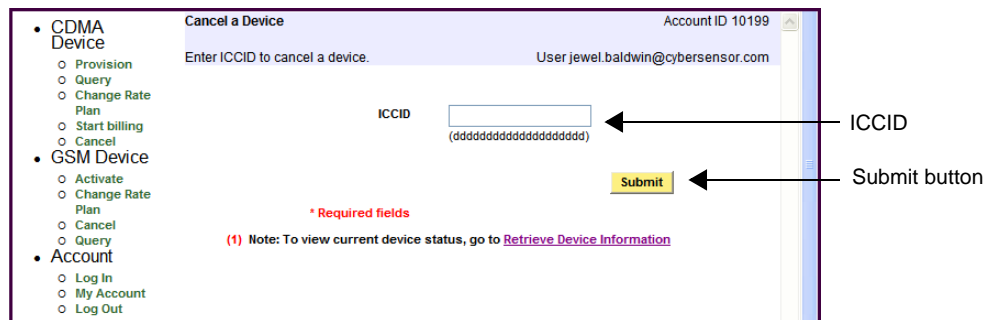


Figure 28. Cancel Input Screen

3. On the next screen, confirm the selected device is to be cancelled: click the *Confirm* button.

To stop this operation and restart it, click the *Cancel* button—this should be done before clicking the *Confirm* button.

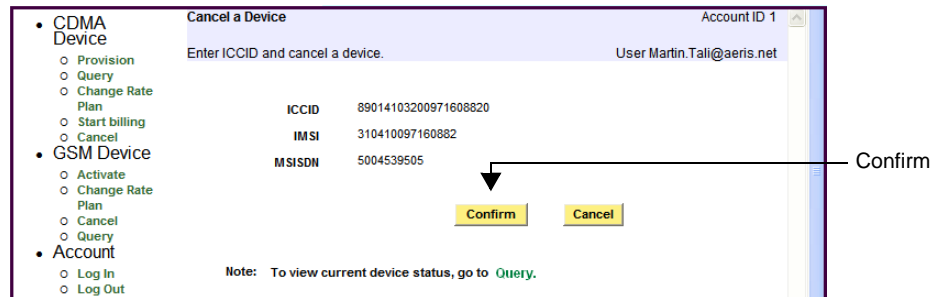


Figure 29. Cancel Confirm Input

The results screen will be displayed as follows.

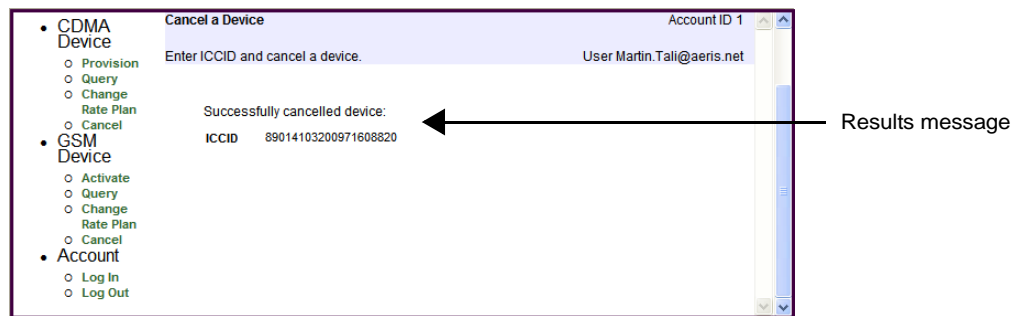


Figure 30. Cancel Results Output

4. Cancelling the device is now complete, which will take effect the next day. It is now assumed the device will not transmit on the Company network; if the device does process transmissions after cancellation, charges will be incurred.

Cancel Errors

- If an error message is displayed, most likely the device is not yet activated. To activate the device, see “Activate” on page 29.
- Format errors can also occur, such as an extra space that was typed into the input text field. Re-enter the data correctly.

- The error message states the device does not belong to you, or that the user name or password are incorrect. Ensure that you entered the correct user name and password for the selected device, and that the ICCID number you entered is correct.

Query

Query allows you to view the current status and rate plan of a device.

This section provides instructions to retrieve the current and historical information of a selected device. It is assumed that you have already logged in as described in “How to Access Online Device Management” on page 26.

1. On the Device Management page, click on *Query* from the navigator column.

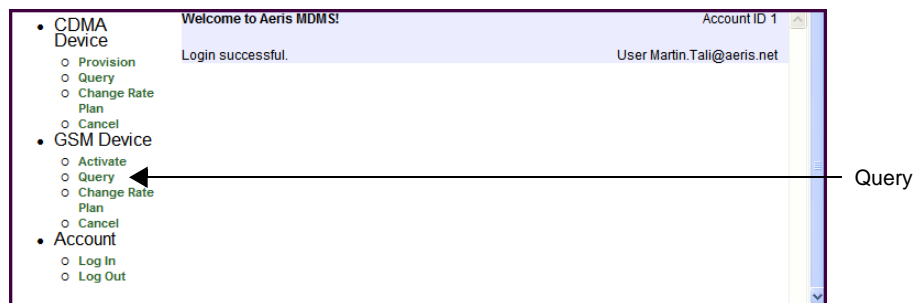


Figure 31. Access Query

2. Enter ICCID in the text field, then click the *Submit* button.

The data format: dddddddddddddddddddd.

“d” represents digits 0..9; ICCID consists of 20 digits.

The screenshot shows a web interface for 'Retrieve Device Information'. On the left is a navigation menu with categories: CDMA Device (Provision, Query, Change Rate Plan, Start billing, Cancel), GSM Device (Activate, Change Rate Plan, Cancel, Query), and Account (Log In, My Account, Log Out). The main content area has a header 'Retrieve Device Information' and 'Account ID 10199'. Below the header, it says 'Information includes device status, rate plan, etc.' and 'User jewel.baldwin@cybersensor.com'. The form contains an 'ICCID' label, an empty text input field, and a '(dddddddddddddddd)' placeholder. Below the input field is a yellow 'Submit' button. A red asterisk and the text '* Required fields' are positioned to the left of the input field. Two arrows from the right point to the 'ICCID' label and the 'Submit' button.

Figure 32. Query Input

3. The figure below shows an example of the Query output.

The screenshot shows the 'Retrieve Device Information' page with the results of a query. The header includes 'Account ID 1' and 'User Martin.Tali@aeris.net'. The results are presented in a table format:

ICCID	89014103200971608820
IMSI	310410097160882
MSISDN	5004539505
RF Module	GSMTEST
Firmware Version	1.0
Device Status	BILL
Rate Plan	GSMS001

Figure 33. Query Results

Query Errors

- If an error message is displayed, most likely the device is not yet activated, as displayed below. To activate the device, see “Activate” on page 29.
- Format errors can also occur, such as an extra space that was typed into the input text field. Re-enter the data correctly.
- The error message states the device does not belong to you, or that the user name or password are incorrect. Ensure that you entered the correct user name and password for the selected device, and that the ICCID number you entered is correct.

For managing a large number of devices, Company provides a programmatic approach to device management. The Mobile Device Management (MDM) system provides specifications and sample code for developing an application to activate, cancel, and bill your device on the Company network.

This specification and sample code are available on the Customer Portal.

Access Mobile Device Management

This section provides instructions to access the web services, and information about the material. It is assumed that you have already logged onto the Company Customer Portal as described in the appropriate Launch Kit: *GSM/GPRS Network Services Launch Kit* or *CDMA Network Services Launch Kit*.

1. On the Welcome Page of the Customer Portal, click the *Operations* tab.

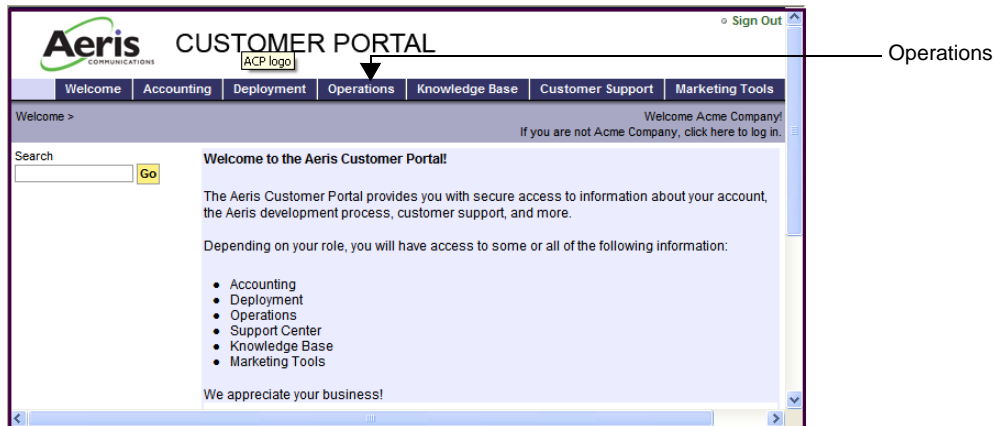


Figure 34. Operations Tab

2. On the *Operations* window, click on *Programmatic Device Management*.

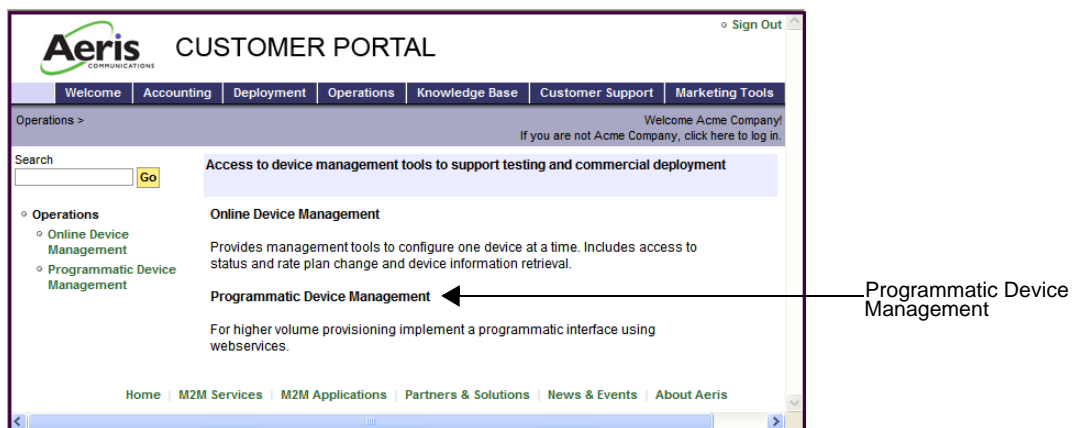


Figure 35. Access Device Management

This menu allows downloading information for developing a software application to use the MDM capabilities:

- “Company Device Management Sample Client” on page 41, which provides sample code for device management.
- “Company Device Management System” on page 41, which provides software specifications for device management and billing.

Company Device Management Sample Client

This link provides functional sample code that is written in Virtual Basic. All the software components are compressed in a ZIP file that you can download and extract.

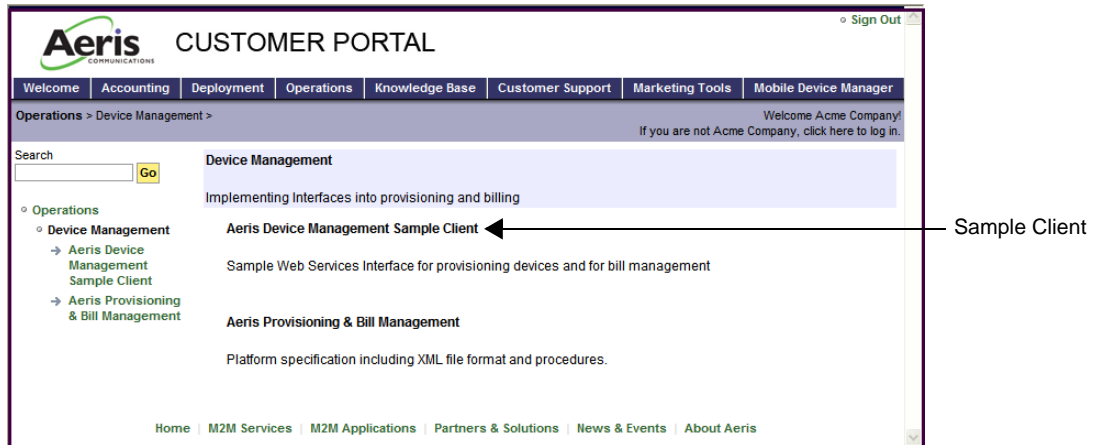


Figure 36. Access Sample Client

Company Device Management System

This link provides access to the Mobile Device Management Systems specification document, which you can view online or download and print.

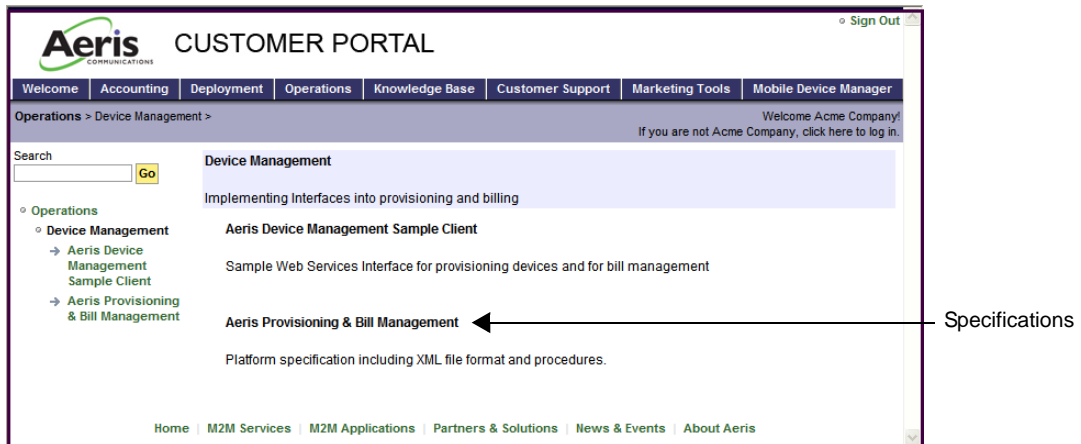


Figure 37. Access Management Specifications

Company's CDMA-only and CDMA/AMPS dual-mode devices (Devices) use a Mobile Identification Number (MIN) to operate for ANSI-41 networks: EIA-53 Analog AMPS, IS-95 and IS-2000 CDMA, IS-136 TDMA.

Note: To provide long-term support for device applications on the Company network, Company requires that all devices load *both* MINs and IMSIs during the provisioning process.

This tutorial introduces MINs and IMSIs as follows:

- For ANSI-41 devices, an overview to MINs and the other terms used by carriers and module manufacturers today.
- For GSM and ANSI-41 (future) devices, an overview of IMSIs and the other terms used by the GSM networks today.

Note: This document is a high-level tutorial on Company MINs and IMSIs; this is *not* a detailed engineering specification.

To use a web-based application to provision and manage the MINs assigned to you by Company, please refer to the

appropriate document: the *CDMA Network Services Launch Kit* or the *GSM/GPRS Network Services Launch Kit*.

To develop an XML-based programmatic interface into our provisioning systems, specific details are available in a separate document, *Mobile Device Management Specification*, which is available from Company.

MIN Overview

Note: This information of this section applies only to CDMA devices; it does not apply to GSM devices.

Mobile Identification Number (MIN) . is a fixed length number that identifies a wireless subscriber on an ANSI-41 wireless network. This applies to Company's CDMA-only and CDMA/AMPS Dual-Mode services.

The MIN is a ten-digit number that resembles a conventional NANPA telephone number, with a three-digit area code—often referred to as a Number Plan Area (NPA)—followed by a seven-digit number. However, unlike *conventional* telephone numbers MINs are used by individual carriers.

Additionally, Company's MINs have specially allocated NPA values that prevent the numbers from being dialed from landline or wireless telephones; they can only be accessed through Company. Each NPA has up to 10 million available numbers¹.

Because Company numbers are not dialable from the PSTN, Company continues to assign the MIN = MDN. When paired with the module's Electronic Serial Number (ESN), it creates a unique identification method for each device. When teamed with the Authentication Key (A-Key), it provides a robust method for ensuring that only valid Company customers actually use the Company network.

1. As described later in this document, some numbers in each NPA are restricted for use by Company.

Mobile Directory Number (MDN). is the actual phone number for a wireless subscriber. In the North American Numbering Plan Area (NANPA)², the MIN and MDN formats appear identical. Until recently, most US carriers assigned the MIN equal to the MDN.

Due to a 2003 FCC ruling, which mandated Wireless Local Number Portability (WLNP), the function of the MIN and MDN have diverged.

Since that time, the MDN is now the actual phone number, or the number that anyone can use on the Public Switched Telephone Network (PSTN) to dial the wireless subscriber. This is the number that is printed on business cards and can be ported from one network to another.

However, as previously stated, Company MIN numbers are not dialable from the PSTN.

Company MIN Numbering Format

All Company MINs conform to the following format:

MMM-NNN-XXXX

Where:

MMM = a number from 175 through 185³ (inclusive)

NNN = a number from 000 through 999

XXXX = a number from 0000 through 9999

Basic MIN Functions

The MIN and ESN combination support the functions described in this section.

2. For more information, refer to <http://www.nanpa.com>.

3. These numbers are assigned to Company by the International Forum on ANSI-41 Standards Technology (<http://www.ifast.org>).

Registering and Authenticating Devices

Registering a device on the Company network is done using the MIN. The MIN for each device is stored in Company's Home Location Register (HLR). This information allows Company to interwork, via the SS7 network, with the underlying roaming carrier for registration and authentication.

The MIN/ESN combination, in conjunction with the A-Key, acts as a security check for the Company network. If Company receives a MIN/ESN pair that is not valid, or an A-Key that is not matched to the MIN/ESN pair, Company does not allow the device to operate on its network.

Communication with the Device, both Mobile Originated⁴ (MO) and Mobile Terminated (MT)

Once registered and authenticated, the device is ready to send and receive data. The MIN is part of the SS7 packets exchanged between Company and the roaming carrier to transmit the data (MicroBurst and SMS), establish the session (1XRTT) or establish a voice call.

Identifying the Customer to be Billed

Because the MIN is unique and stored in Company's HLR, the MIN is used to identify the customer to whom the device belongs. All traffic to and from that device is billed to the customer to whom the MIN belongs.

Troubleshooting a Device

If the customer is unable to communicate with a particular device, it is critical for Company to know the location of the device in order to troubleshoot the problem. The MIN allows Company to locate the device within its network.

Roaming

All Devices are configured so that the MIN, when registered with the local carrier, looks like a roamer to that carrier.

4. 1XRTT services must initialize as Mobile Originated sessions.

MIN Acquisition

All MINs are treated equally within the Company numbering management systems.

Company IMSI Overview

Note: Although IMSI is available for both CDMA and GSM technologies, IMSI is not yet widely used for CDMA. However, to continue support—without interruption—when IMSI becomes commonly used with CDMA, Company requires that all devices be registered with IMSI numbers.

Introduction

In GSM technologies, GSM, GPRS and EDGE, each Device is identified with an IMSI. An IMSI is a fifteen-digit number that follows a well-recognized, world-wide, International format.

The IMSI is generally stored in a Subscriber Identity Module (SIM) card that is placed inside the Mobile Station (MS) hardware. In addition, GSM companies in the US also assign a Mobile Station International Subscriber Directory Number (MSISDN), which is a ten-digit number that is used to dial the MS on the PSTN.

In ANSI-41 technologies (e.g., ANSI-95 and ANSI-2000 CDMA and ANSI-136 TDMA), there exists an analogous User Identity Module (UIM) card concept, but currently, this is not widely deployed. Therefore, in most deployments of ANSI-41 technologies that use an IMSI, the IMSI is stored inside the cellular radio module (Module) in a non-volatile data storage location.

However, it is noted that IMSIs are becoming more widespread on digital ANSI-41 networks. In the near future, it is estimated that all devices will need IMSIs (instead of MINs) for proper operations. To ensure continuous operations, Company requires that all customers load *both* MINS and Commercial IMSIs into the ANSI-41 Devices

during the provisioning process. The IMSIs, while not in significant use today, provide each Device with a future-proof upgrade capability that requires no action on the part of a customer. With this requirement, when IMSI support is required by the ANSI-41 network, the Module will make the change transparently.

IMSI-based network deployment will require information similar to that contained in this document. Company will provide customers with appropriate information well in advance of any IMSI-based network deployment and will also provide, for deployed ANSI-41 Devices and Approved Applications, appropriate Company API upgrades and backwards compatibility support during a transition period.

IMSI Numbering Format

All Company IMSIs conform to the following numbering format:

CCC-NNN-XXX-XXX-XXX

Where:

CCC = Country Code (CC), currently set to 310.

NNN = Network Code (NC), currently set to 850.

XXX-XXX-XXX = Subscriber Number (SN), a number from 000-000-000 to 999-999-999.

