

**Table 0-12. Base Station Test Page**

Field/Control	Description
	<ul style="list-style-type: none"> <li>Run as Master – Starts the test with the radio as the master.</li> <li>Run as Slave – Starts the test with the radio as the slave.</li> </ul>
(4) Control Buttons	<ul style="list-style-type: none"> <li>Reboot – reboots the system.</li> </ul>

**Notes:**

- Executing any of the tests from this page requires a reboot of the system to return the radio to normal operation.

**Base Station Admin Page**

The screenshot shows the Aeronix 802.16 Tactical Radio Admin Page. On the left, a vertical sidebar menu lists various administrative functions: Home, S/W Config, Radio Control, Service Flows, Registered SSs, ACM Params, Status, Bit Status, Maintenance, Network Status, Power Settings, Test, Admin (which is selected), SW Update, Version, Save Settings, Contact, and Logout.

The main content area has two sections:

- Key Management:** A table showing key slots and their details. The table has columns for Slot, Key Tag, and Owner. The data is as follows:
 

Slot	Key Tag	Owner
0	356274DC0000356274DC356274F8356274E00003356275000006	User
1	356274DC0001356274DC356274F8356274E0000435627500009	User
2	356274DC0004356274DC356274F8356274E000073562750000C	User
3	356274DC0009356274DC356274F8356274E0000C3562750000F	User
4	356274DC0010356274DC356274F8356274E00013356275000012	User

 Below the table are buttons for "Current Eff. Key: 2", "Effective Key" dropdown ("Key 2"), and "Set".
- Account Management:** A table showing account names and user types. The table has columns for Account Name and User Type. The data is as follows:
 

Account Name	User Type
bin	Crypto Officer
daemon	User

 Below the table are buttons for "ADD ENTRY", "MODIFY ENTRY ...", "REMOVE ENTRY ...", and "CANCEL".

Table 0-13. Base Station Admin Page		
	Field/Control	Description
(1)	Key Management	Provides the crypto user with the capability to choose the active key slot by selecting the slot from the drop down menu and clicking the set button.
(2)	Account Management	Provides each user with the capability to change their account passwords.

## Base Station Software Update Page

The screenshot shows a web-based interface for managing a tactical radio. The main title is "Aeronix 802.16 Tactical Radio". On the left, there's a vertical sidebar with a teal header labeled "Base Station" containing the following buttons: Home, S/W Config, Radio Control, Service Flows, Registered SSs, ACM Params, Status, Bit Status, Maintenance, Network Status, Power Settings, Test, Admin, SW Update (which is highlighted in yellow), Version, Save Settings, Contact, and Logout. The main content area has a blue header "Software Update" with sub-fields: "File Path" (with a "Browse..." button) and "Update Type" (a dropdown menu showing "Kernel" as the selected option, along with Mac Software, FPGA, and Scripts). To the right of the "Update Type" dropdown is a "Start Update" button. A callout bubble with a circle points to the "Update Type" dropdown menu.

Table 0-14. Base Station Software Update Page		
	Field/Control	Description
(1)	Software Update	Provides the crypto user with the capability to update the software on the unit. <ul style="list-style-type: none"> <li>• File Path – location of the new file to</li> </ul>

Table 0-14. Base Station Software Update Page		
	Field/Control	Description
		<p>update on the unit.</p> <ul style="list-style-type: none"> <li>• Update type – the type of file on the unit to update.</li> <li>• Start update button – initiates the update process</li> </ul>

## Base Station Version Page

A screenshot of the Aeronix 802.16 Tactical Radio Base Station Version Page. The left sidebar shows navigation links for Home, S/W Config, Radio Control, Service Flows, Registered SSs, ACM Params, Status, Bit Status, Maintenance, Network Status, Power Settings, Test, Admin, SW Update, Version (which is highlighted), Save Settings, Contact, and Logout. The main content area has a title bar "Aeronix 802.16 Tactical Radio". Below it, the "H/W and S/W Versions" section contains "GUI Software Information" with Version R6BWReqTxPwr10MOneAcmTestFIPS-NewPages and Build Date Oct 29 2008 12:11:02. The "Network Addresses" section lists Server IP Address 0.0.0.0, Internal IP Address 10.1.100.1, and MAC Address 00-61-65-6E-64-00. The "MAC BS Version Information" section includes MAC CVS Tag R6\_NoGuardandACMMergeTEST, BS MAC Created on Oct 29 2008 15:01:14, and BS AECD Driver Created on Oct 29 2008 15:02:02. The "Phy Versions" section lists Modem Identification 0xae80216d, Modem Version 0x08070381, Modem S Version 0x06c306ba, Filter FPGA Version 10.8, AGC Version 10, and Phy Serial Num 00021026. Callouts numbered 1 through 7 point to specific fields: 1 points to the GUI Software Information section; 2 points to the Server IP Address; 3 points to the Internal IP Address; 4 points to the MAC Address; 5 points to the MAC CVS Tag; 6 points to the BS MAC Created on date; and 7 points to the Modem Identification.

Table 0-15. Base Station Version Page		
	Field/Control	Description
(1)	GUI Software Information	Date and Time of current GUI build
(2)	Server IP Address	Ethernet IP Address of Base Station
(3)	Internal IP Address	MAC S/W network interface IP Address

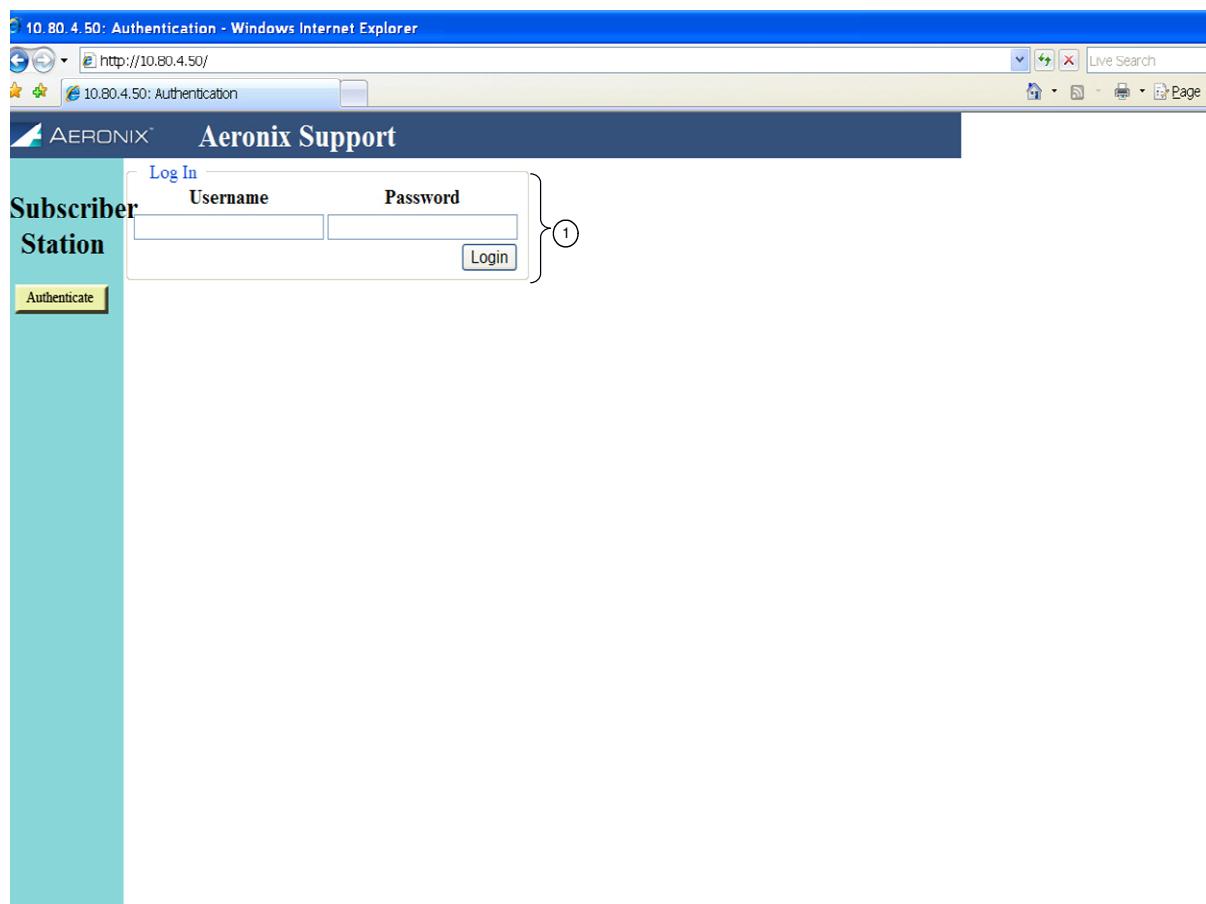
Table 0-15. Base Station Version Page		
	Field/Control	Description
(4)	MAC Address	MAC H/W Address of Base Station network interface
(5)	MAC CVS Tag	BS MAC S/W current version
(6)	BS MAC Dates	BS MAC modules build date and time
(7)	Phy Versions	Firmware versions for PHY and Serial Number of PHY hardware

## Base Station Contact Page

The contact page provides contact information for the 802.16 product.

## Subscriber Station Login Page

The subscriber station requires a login for access to configuration screens. The subscriber station contains one crypto officer login and one user login. Access to certain configuration items is restricted for the user login.

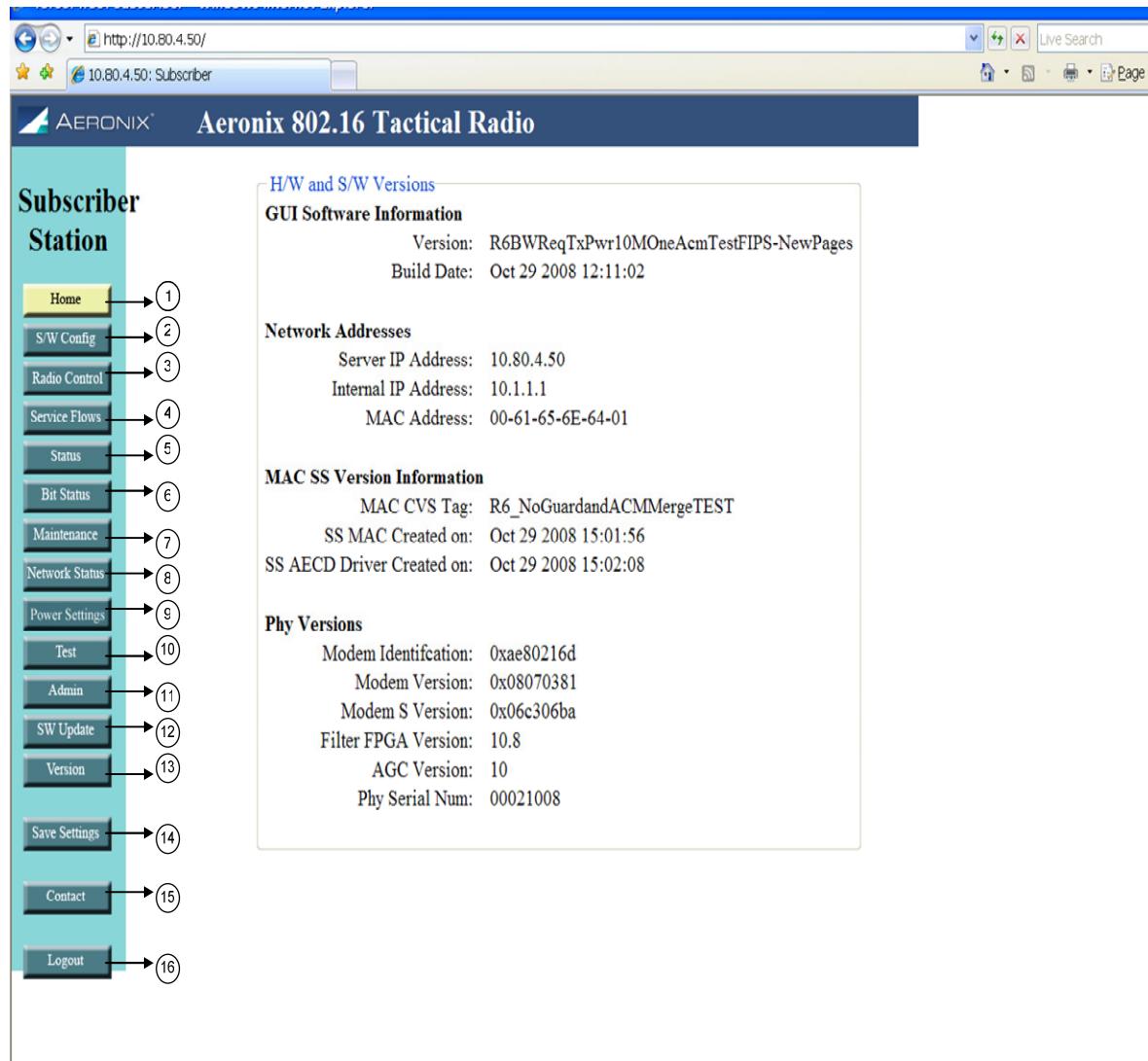


**Table 0-16. Subscriber Station Login Page**

	Link	Description
(1)	Login	Location to provide the username and password

## Subscriber Station Home Page

The subscriber station home page contains HTML links to the status and configuration pages for the 802.16 radio product family.



**Table 0-17. Subscriber Station Home Page**

Field/Control	Description
(1) Home	HTML Link to the Home page that displays network access information as well as the hardware and software version information.
(2) SW Config	HTML Link to the software configuration page; the configuration page contains the needed tools to define and configure the external systems interaction with the 802.16 radio.
(3) Radio Control	HTML Link to the Radio Control Page; the radio control page contains channel, initial ranging and TRANSEC parameters. The user has limited capabilities for TRANSEC and keying.

**Table 0-17. Subscriber Station Home Page**

	<b>Field/Control</b>	<b>Description</b>
(4)	Service Flow	HTML Link to the Service Flow page; the service flow page displays the current service flows within the node and the current state of each service flow; this page is used to enable or disable the ARQ.
(5)	Status	HTML Link to the Status page; the status page contains operating status of the radio.
(6)	Bit Status	HTML Link to the Bit Status results page. This page provides results of the test executed at startup.
(7)	Maintenance	HTML Link to the Maintenance; the maintenance page contains information for debugging and antenna pointing.
(8)	Network Status	HTML Link to the Network Status page; this page provides transmit and receive status for the Ethernet interface.
(9)	Power Settings	HTML link to the Power Settings page; this page provides the capability to enter gain settings and cable loss settings for ranging purposes.
(10)	Test	HTML Link to the Test page for running either a CW test or BER test.
(11)	Admin	HTML Link to the administration page. This page provides TRANSEC key selection and password changing capabilities. The user login does not have access to the TRANSEC key selection functions.
(12)	Software Update	HTML Link to the software update page. This page provides the capability to update the software to the crypto officer only.
(13)	Version	HTML Link to Version page; the version page contains the hardware and software version information.
(14)	Save Settings	Save Settings control key will save the current selected values in each GUI screen to the Base Station database. <b>Additions, modifications or deletions are not permanently saved to the database unless this control key is selected.</b>
(15)	Contact	HTML Link to the Contact Page; the contact page contains Aeronix Inc. contact information.
(16)	Logout	The logout control key logs the current user out of the system.

## Subscriber Station Software Configuration Page

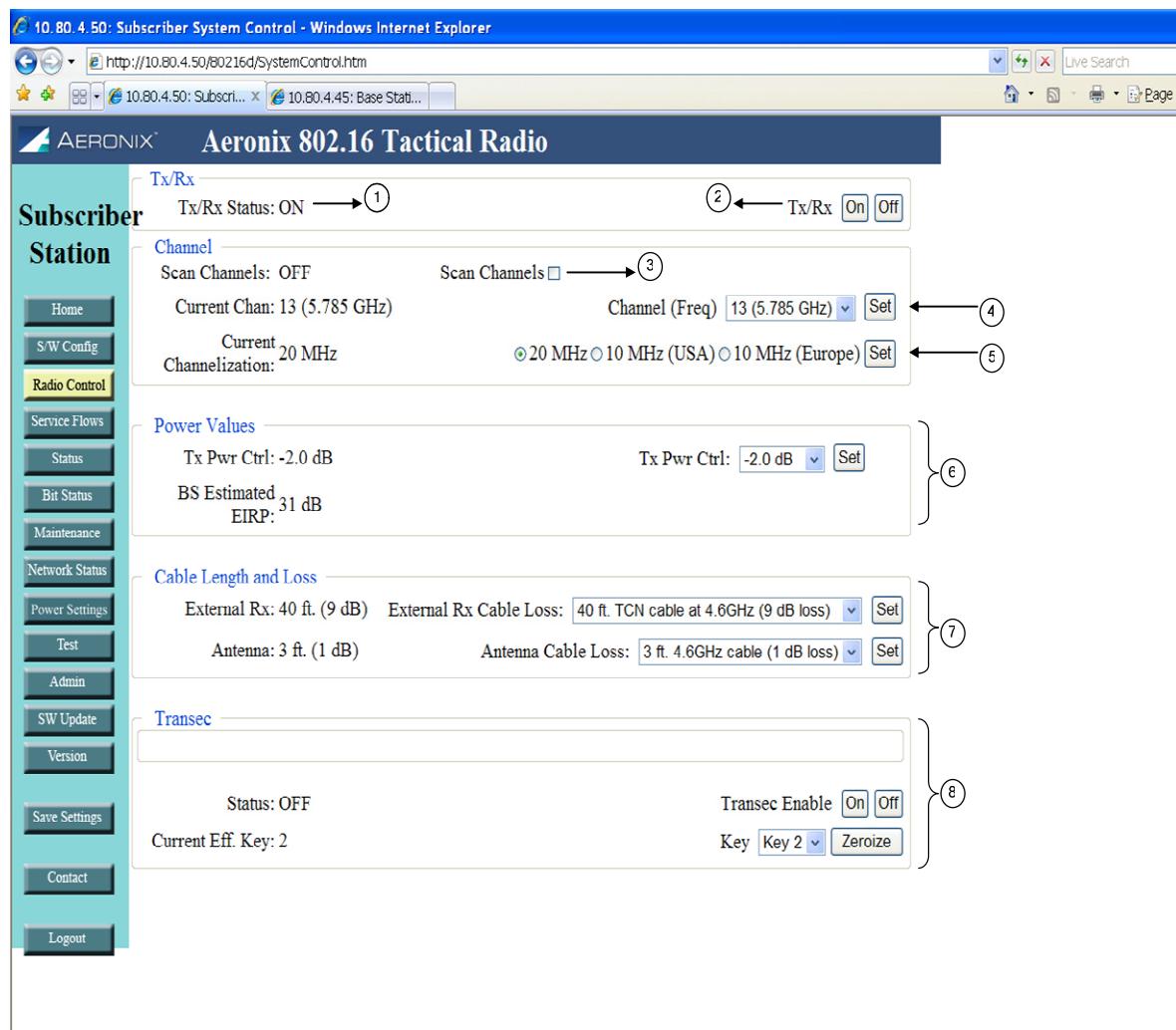
This page is for display only and shows the classifier rules received from the base station.

The screenshot shows a web-based configuration interface for an Aeronix 802.16 Tactical Radio. The title bar reads "Aeronix 802.16 Tactical Radio". On the left, a vertical menu for "Subscriber Station" lists various configuration options: Home, S/W Config (highlighted in yellow), Radio Control, Service Flows, Status, Bit Status, Maintenance, Network Status, Power Settings, Test, Admin, SW Update, Version, Save Settings, Contact, and Logout.

The main content area displays a table titled "Class Rules". The table has columns: Index, SF, Src MAC, Src Mask, Dest MAC, and Dest MASK. It contains two rows:

Index	SF	Src MAC	Src Mask	Dest MAC	Dest MASK
1	5	00-61-65-6E-64-01	FF-FF-FF-FF-FF-FF	00-61-65-6E-64-00	FF-FF-FF-FF-FF-FF
2	5	00-61-65-6E-64-01	FF-FF-FF-FF-FF-FF	00-61-65-6E-64-02	FF-FF-FF-FF-FF-FF

A curly brace on the right side of the table is labeled with the number "1", indicating that both rows belong to the same class rule definition.

**Subscriber Station Radio Control Page****Table 0-18. Subscriber Station Radio Control Page**

Field/Control	Description
(1) Tx/Rx Status	The Tx/Rx Status indicates if the user has selected the Tx/Rx control on or off.
(2) Tx/Rx On and Off Buttons	Buttons to select the Tx/Rx function to be turned on or off. When turned off the subscriber will not transmit or receive.
(3) Scan Channels	Scan Channels allows the subscriber to scan all channels in a frequency band searching for a valid base station signal. Select the box to turn scan channels on. The scan channels display of the left of the screen shows the current scan channels setting. If scan channels is off the subscriber only uses the current channel.
(4) Channel	Displays channel information for the subscriber station. <ul style="list-style-type: none"> <li>• Current Channel – displays the current channel of the subscriber station.</li> </ul>

**Table 0-18. Subscriber Station Radio Control Page**

<b>Field/Control</b>	<b>Description</b>
	<ul style="list-style-type: none"> <li>• Channel (Freq) – drop down to choose a different channel for the subscriber station.</li> <li>• Set Button – changes the current channel of the subscriber station to the channel selected by the channel (freq) drop down.</li> </ul>
(5) Channelization	<p>Allows the user to choose the channelization of the radio.</p> <ul style="list-style-type: none"> <li>• Cur Channelization – Displays the current channelization setting of the radio.</li> <li>• Channelization Selection – Allows the selection of channelization. <b>The 10MHz Europe is not enabled in this release.</b></li> <li>• Set Button – changes the current channelization selected by the user.</li> </ul>
(6) Power Values	<p>Allows the user to adjust the transmit power of the radio.</p> <ul style="list-style-type: none"> <li>• Tx Pwr Ctrl – the value on the left of the screen shows the current setting. The drop down on the right side of the screen allows the user to choose a different setting. Any grey value in the drop down is not currently supported in the product.</li> <li>• Set Button – changes the transmit power control parameter to the chosen value from the drop down.</li> <li>• BS Estimated EIRP – the value is an estimated EIRP based upon configuration settings and received RSSI readings.</li> </ul>
(7) Cable Length	<p>Allows the user to define certain cable length values. The choices are defined on the Power Settings configuration page by a privileged user.</p> <ul style="list-style-type: none"> <li>• External Rx – the current cable length and loss defined in the system for the external receive cable.</li> <li>• External Rx Cable Loss – drop down to choose the receive cable length and loss in dB for the external receive cable.</li> <li>• Set Button – changes the external receive cable loss parameter in the radio.</li> <li>• Antenna – the current cable length and loss defined in the system for the antenna cable.</li> <li>• Antenna Cable Loss – drop down to choose the antenna cable loss parameter.</li> <li>• Set Button – changes the antenna cable loss parameter in the radio.</li> </ul>
(8) Transec	<p>Displays the settings for Transec capability.</p> <ul style="list-style-type: none"> <li>• Status - Displays whether Transec is on or off on the base station.</li> </ul>

**Table 0-18. Subscriber Station Radio Control Page**

Field/Control	Description
	<ul style="list-style-type: none"><li>• Transec On/Off – buttons to turn Transec on or off. The crypto user is the only user that can turn Transec off.</li><li>• Current Effective Key – displays the key slot of the current effective key. The current key is selected on the Admin page by the crypto officer.</li><li>• Key – drop down to select a key slot to zeroize.</li><li>• Zeroize – button to initiate the zeroization of the key slot selected in the key drop down.</li></ul>

## Subscriber Station Service Flow Page

**Service Flows**

Index	CID	Direction	State	Service Class	Max Sustained Rate
4	65	Downstream	Active	BE_MAX	50000.000 Kbps
5	66	Upstream	Active	BE_MAX	50000.000 Kbps

**Downstream Burst Profiles**

Index	DIUC	DCD	FEC Code	CINR Mandatory Exit	CINR Minimum Entry	FEC Mandatory Exit	FEC Minimum Entry
1	2	BPSK	1/2	6	9	1	0
2	3	QPSK	1/2	10	12	8	0
3	4	QPSK	3/4	12	17	12	0
4	5	QAM16	1/2	17	19	16	0
5	6	QAM16	3/4	19	21	24	0
6	7	QAM64	2/3	21	24	32	0
7	8	QAM64	3/4	24	26	36	0

**Upstream Burst Profiles**

Index	UIUC	FEC
1	5	BPSK 1/2
2	6	QPSK 1/2
3	7	QPSK 3/4
4	8	QAM16 1/2
5	9	QAM16 3/4
6	10	QAM64 2/3
7	11	QAM64 3/4

**Table 0-19. Subscriber Station Service Flow Page**

Field	Description
(1) Service Flows	<p>Displays every service flow that is currently configured in the base station for the subscriber station. Displays the following fields:</p> <ul style="list-style-type: none"> <li>• Index - Actual index number assigned to the service flow.</li> <li>• CID - Basic CID for this service flow.</li> <li>• Direction - Direction is either upstream or downstream.</li> <li>• State - States can be Provisioned, Admitted, or Active. Provisioned is a service flow that was configured but the subscriber has not yet established communication with the base station. Admitted is a state in which a subscriber is registered and allowed in the system but is not yet flowing traffic. Active is a flow that currently has traffic or the ability to pass traffic.</li> <li>• Service Class - The textual name of a configured</li> </ul>

<b>Table 0-19. Subscriber Station Service Flow Page</b>		
	<b>Field</b>	<b>Description</b>
		<p>service class that the node is using for QOS parameters.</p> <ul style="list-style-type: none"> <li>• Max Sustained Rate - QOS parameter that defines the maximum sustained rate that will be made available to the flow.</li> </ul>
(2)	Downstream Burst Profiles	<p>Displays the downstream burst profiles which define the FEC types that the base station uses for transmissions. These fields are configured on the base station.</p> <p>Entry Fields (display only):</p> <ul style="list-style-type: none"> <li>• Index - the index into the burst profile table for the entry. This field is not entered by the user.</li> <li>• DIUC – the DIUC for the entry. This field is not entered by the user.</li> <li>• DCD FEC Code – drop down menu to choose the FEC to use for the burst profile. This defines the modulation type and forward error correction.</li> <li>• CINR Mandatory Exit – Threshold value of CINR in dB that is used as a decision point to exit the use of this profile. Valid values are 1-65.</li> <li>• CINR Minimum Entry - Threshold value of CINR in dB that is used as a decision point to enter the use of this profile. Valid values are 1-65.</li> <li>• FEC Mandatory Exit – Threshold value of FEC errors that is used as a decision point for exiting a current modulation. The unit of this value is bits per symbol.</li> <li>• FEC Mandatory Entry – Threshold value of FEC errors that is used as a decision point for entering a modulation. The unit of this value is bits per symbol.</li> </ul>
(3)	Upstream Burst Profiles	<p>Displays the upstream burst profiles which define the FEC types that the subscriber stations use for transmissions. The current implementation uses the same values for upstream as downstream for CINR and FEC entry and exit.</p> <p>Entry Fields (display only):</p> <ul style="list-style-type: none"> <li>• Index - the index into the burst profile table for the entry.</li> <li>• UIUC – the UIUC for the entry.</li> </ul> <p>FEC – type of modulation and forward error correction of the burst profile.</p>

## Subscriber Station Status Page

**Aeronix 802.16 Tactical Radio**

**Subscriber Station**

**Status**

- Current Channel: 13 (5.785 GHz)
- MAC Address: 00-61-65-6E-64-01
- BS Estimated EIRP: 31 dB
- Tx/Rx: ON
- Current Channelization: 20 MHz
- Transec Status: OFF

**Network Connection Status**

- Front Panel: Base █ Sync █ Recv █ Xmit █
- Connection Status: Sync'd

Subscriber SFID	Current Modulation Type	Avg CINR	Avg Lvl'd RSSI	Level
4	QAM64 3/4	29	-49	<span style="background-color: #00A0A0; color: white;">█</span>

**Table 0-20. Subscriber Station Status Page**

	Field/Control	Description
①	Status	<p>Status displays a subset of current settings.</p> <ul style="list-style-type: none"> <li>• Current Channel – the current 802.16 specified channel that the subscriber station uses for transmit and receive in scan channels is disabled.</li> <li>• MAC Address – The IEEE 802.16 MAC address of the subscriber station.</li> <li>• BS Estimated EIRP – Displays the estimated EIRP of the subscriber station based upon user configured gain a loss values.</li> <li>• Tx/Rx - Status indicating whether the base station Tx/Rx capability is currently on or off.</li> <li>• Current Channelization– displays the</li> </ul>

<b>Table 0-20. Subscriber Station Status Page</b>		
	Field/Control	Description
		<p>channelization of the subscriber station.</p> <ul style="list-style-type: none"> <li>• Transec Status – displays the current status of Transec (on.off)</li> </ul>
(2)	Network Connection Status	<ul style="list-style-type: none"> <li>• Front Panel - Displays the PHY status lights on an interval basis.</li> <li>• Connection Status – The status of the connection from the perspective of the MAC.</li> </ul>
(3)	Status Table	<p>Displays the status of each subscriber connection.</p> <ul style="list-style-type: none"> <li>• Subscriber SFID - Contains the service flow ID of the downstream service flow to the subscriber.</li> <li>• Current Modulation Type – Contains the current modulation/FEC type for the receive connection. The display show the modulation of the receive frame at the time sampled.</li> <li>• Avg CINR – Displays the average CINR value for the receive connection.</li> <li>• Avg Leveled RSSI – Displays the average leveled RSSI value for the receive connection. The value is calculated from the receive loss and gain values entered by the user and the actual RSSI value received by the PHY.</li> <li>• Level – Displays the level of the RSSI.</li> </ul>

### Subscriber Station Bit Status Page

This page shows the results of the bit tests executed at startup. The names and number of tests may change due to FIPS requirement changes.

The screenshot shows a web browser window for the Aeronix 802.16 Tactical Radio. The URL is <http://10.80.4.50/80216d/Bitstatus.htm>. The page title is "Aeronix 802.16 Tactical Radio". On the left, there is a vertical navigation menu titled "Subscriber Station" with various buttons: Home, S/W Config, Radio Control, Service Flows, Status, Bit Status (which is highlighted in yellow), Maintenance, Network Status, Power Settings, Test, Admin, SW Update, Version, Save Settings, Contact, and Logout. The main content area displays "Bit Status" and "Kernel Bit Status" with the following information:

Kernel Bit Status	
RAM Test:	OK
Flash Test:	OK
Kernel Status:	OK
Network Status:	OK
Phy Link:	UP

## Subscriber Station Maintenance Page

**Node Maintenance**

Reboot This Node Now **REBOOT ...** Use Default Database **Use Default DB**

**Channel Maintenance Status**

SFID	Current CINR	Average CINR	Current RSSI	Average RSSI	Current Lvl'd RSSI	Average Lvl'd RSSI	Avg Freq Offset (Hz)	Clock Adjust	FEC Corrected Bits	Average FEC Corrected Bits
4	36	30	-26	-27	-48	-49	-624	0	0	0

**Tx/Rx Maintenance Status**

Rx Frames	Invalid Frames	CRCs Rx	Reset Rx	Tx Frames	Tx Drop
16212600	10	0	66	4053153	0

**Ranging Environment**

Antenna		Transmit (Tx)				Receive (Rx)			
Antenna Gain	Antenna Cable Loss	PA Tx Gain	External Tx Cable Loss	Internal Tx Cable Loss	Tx Power Control	LNA Rx Gain	External Rx Cable Loss	Internal Rx Cable Loss	
6 dB	1 dB	38 dB	9 dB	1 dB	-2.0 dB	32 dB	9 dB	1 dB	

**Board Temperature's**

Phy Temperature
51 °C
123.8 °F

**Table 0-21. Subscriber Station Maintenance Page**

	<b>Field/Control</b>	<b>Description</b>
(1)	Node Maintenance	<p>Provides a method of rebooting the system without a power cycle.</p> <p>Provides a method to revert back to the default database.</p>
(2)	Channel Maintenance Status	<p>Provides some additional values on a connection basis for debugging and antenna pointing purposes.</p> <ul style="list-style-type: none"> <li>• Current CINR – the instantaneous CINR for the connection.</li> <li>• Average CINR – the average CINR of the connection over a period of received frames.</li> <li>• Current RSSI – the instantaneous RSSI for the connection.</li> <li>• Average RSSI – the average RSSI of the connection over a period of received</li> </ul>

**Table 0-21. Subscriber Station Maintenance Page**

Field/Control	Description
	<p>frames.</p> <ul style="list-style-type: none"> <li>• Current Leveled RSSI – the current leveled RSSI value for the connection. The leveled RSSI reflects the loss and gain values from the output of the PHY (including the transmit power attenuation value) to the PA/LNA.</li> <li>• Average Leveled RSSI – the average leveled RSSI value of the connection over a period of received frames.</li> <li>• Average Frequency Offset – the average frequency offset of the connection over a period of received frames.</li> <li>• FEC Corrected Bits – the instantaneous forward error correction corrected bits</li> <li>• Average FEC Corrected Bits – the average forward error correction corrected bits for the connection</li> </ul>
(3)	<p>Tx/Rx Status</p> <p>Maintenance</p> <p>Provides the Tx and Rx frame counts and well as error counts for debugging.</p> <ul style="list-style-type: none"> <li>• Rx Frames – the number of frames received</li> <li>• Invalid Frames – the number of frames received that were invalid</li> <li>• CRCs Rx – the number of CRCs received</li> <li>• Reset Rx – the number of times the receive path has been reset</li> <li>• Tx Frames – the number of frame transmitted</li> <li>• Tx Drop – the number of transmit frames that were dropped by the classifiers</li> </ul>
(4)	Ranging Environment
(5)	PHY Temperature

**Subscriber Station Network Status Page**

The screenshot shows a web browser window for the Aeronix 802.16 Tactical Radio. The URL is <http://10.0.0.4.50/B021Gd/Network-Status.htm>. The main content area displays the 'Aeronix 802.16 Tactical Radio' logo and the 'Network Status' section. Below it is a table showing network statistics:

	Packets	Errors	Dropped	Overruns	Frames	Carrier
Rx	201855	0	0	0	0	N/A
Tx	72633	0	0	0	N/A	0

A callout circle labeled '1' points to the 'Network Status' table.

**Table 0-22. Subscriber Station Network Status**

	<b>Field/Control</b>	<b>Description</b>
(1)	Network Status	Displays the number of transmitted and received frames on the network side of the radio. This reflects the eth0 interface in a non-bridging configuration and the mybridge interface in a bridging configuration.

## Subscriber Station Power Settings Page

**10.80.4.50: Subscriber Power Settings - Windows Internet Explorer**

http://10.80.4.50/80216d/PowerSettings.htm

10.80.4.50: Subscri... 10.80.4.45: Base Stat...

**Aeronix 802.16 Tactical Radio**

**Subscriber Station**

- Home
- S/W Config
- Radio Control
- Service Flows
- Status
- Bit Status
- Maintenance
- Network Status
- Power Settings**
- Test
- Admin
- SW Update
- Version
- Save Settings
- Contact
- Logout

**Static Gain and Loss**

Gain:	Loss:
PA Tx Gain: 38 dB	Internal Rx Cable Loss: 1 dB
LNA Rx Gain: 32 dB	Internal Tx Cable Loss: 1 dB
Antenna Gain: 6 dB	

**External Rx Cable Menu**

External Rx Cable Loss:	Comments:
40 ft. 9 dB	TCN cable at 4.6GHz
40 ft. 10 dB	TCN cable at 5.8GHz
47 ft. 9 dB	VWP cable at 4.6GHz

**External Tx Cable Menu**

External Tx Cable Loss:	Comments:
40 ft. 9 dB	TCN cable at 4.6GHz
40 ft. 10 dB	TCN cable at 5.8GHz
47 ft. 9 dB	VWP cable at 4.6GHz

①, ②, ③

**10.80.4.50: Subscriber Power Settings - Windows Internet Explorer**

http://10.80.4.50/80216d/PowerSettings.htm

10.80.4.50: Subscri... 10.80.4.45: Base Stat...

**Logout**

**Antenna Cable Menu**

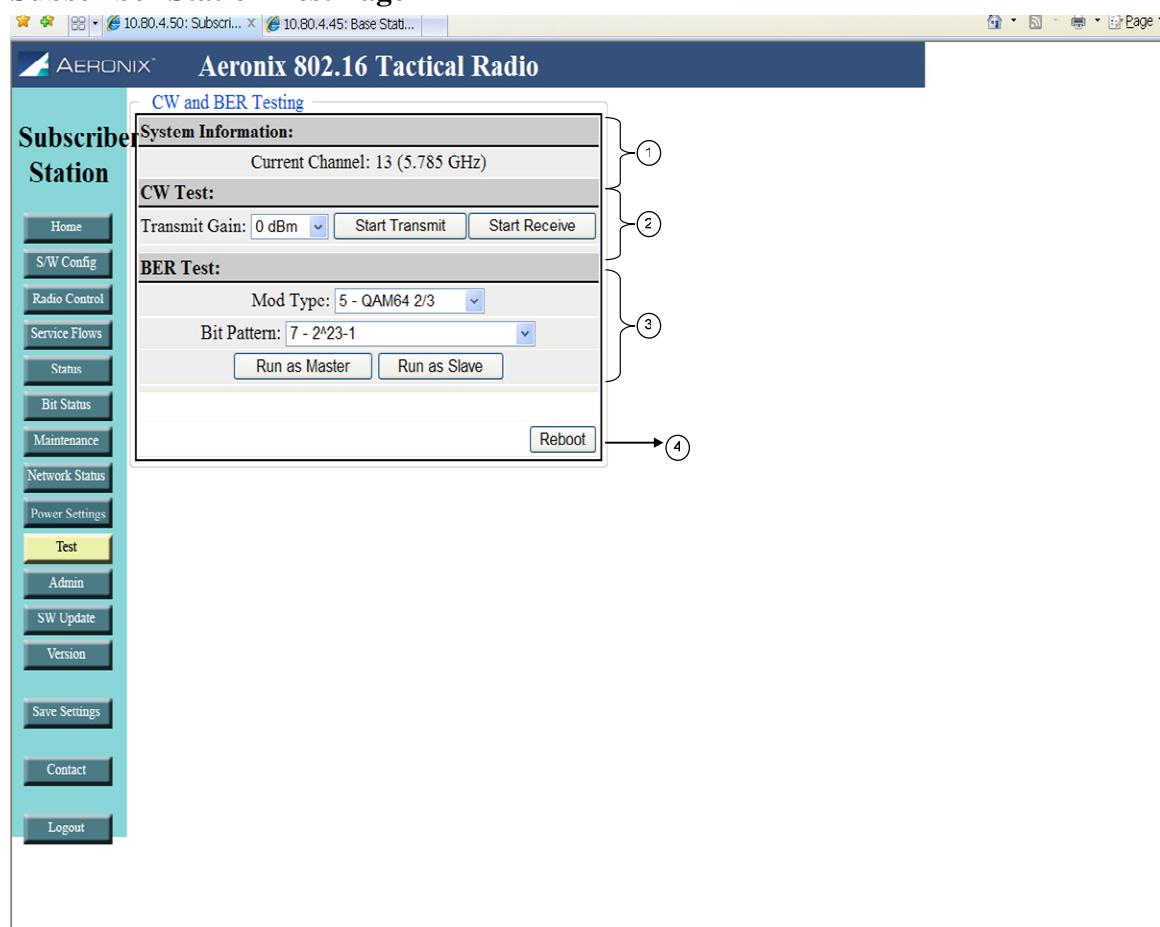
Antenna Cable Loss:	Comments:
3 ft. 1 dB	4.6GHz cable
6 ft. 1 dB	5.8GHz cable
0 ft. 0 dB	

④

<b>Table 0-23. Subscriber Station Power Settings Page</b>		
	<b>Field/Control</b>	<b>Description</b>
(1)	Static Gain and Loss	<ul style="list-style-type: none"> <li>PA Tx Gain – the transmit gain of the power amplifier located outside of the radio</li> <li>LNA Rx Gain – the receive gain of the low noise amplifier located outside of the radio</li> <li>Antenna Gain – the gain of the antenna located outside of the radio</li> <li>Internal Rx Cable Loss - the loss of the cable and any other components in the receive path inside of the radio box but external to the PHY</li> <li>Internal Tx Cable Loss – the loss of the cable and any other components in the transmit path inside of the radio box but external to the PHY</li> <li>Attenuation – the change in transmit power of the PHY</li> </ul>
(2)	External Rx Cable Menu	<ul style="list-style-type: none"> <li>Contains up to three entries for external receive cable loss values. This value represents the receive cable between the radio unit and the receive LNA. The user inputs the length of the cable in feet and the loss value in dB. The comment field is optional. The first value entered will be the default value that gets used initially for ranging, leveled RSSI and EIRP calculations. To change the values used go to the Radio Control page.</li> </ul>
(3)	External Tx Cable Menu	<ul style="list-style-type: none"> <li>Contains up to three entries for the transmit cable loss values. This value represents the cable between the radio unit and the transmit power amplifier. The user inputs the length of the cable in feet and the loss value in dB. The comment field is optional.</li> </ul>
(4)	Antenna Cable Menu	<ul style="list-style-type: none"> <li>Contains up to three entries for the antenna cable loss values. This value represents the cable between the power head and the antenna. The user inputs the length of the cable in feet and the loss value in dB. The comment field is optional.</li> </ul>

## Notes:

- The Set button in each section is used to place the current values entered into the database.

**Subscriber Station Test Page****Table 0-24. Subscriber Station Test Page**

	<b>Field/Control</b>	<b>Description</b>
(1)	System Information	Provides the current channel information of the radio
(2)	CW Test	<p>Provides the capability to execute a continuous waveform test.</p> <ul style="list-style-type: none"> <li>• Transmit Gain – Selection of the transmit gain desired from the pull down menu.</li> <li>• Start Transmit – Starts the transmission of a CW</li> <li>• Start Receive – Starts the receive of a CW</li> </ul>
(3)	BER Test	<p>Provides the capability to execute a bit error rate test.</p> <ul style="list-style-type: none"> <li>• Mod Type – Defines the modulation type used during the test.</li> <li>• Bit Pattern – Define the bit pattern used during the test.</li> <li>• Run as Master – Starts the test with the radio as the master.</li> </ul>

**Table 0-24. Subscriber Station Test Page**

Field/Control	Description
	<ul style="list-style-type: none"> <li>Run as Slave – Starts the test with the radio as the slave.</li> </ul>
(4) Control Buttons	<ul style="list-style-type: none"> <li>Reboot – reboots the system.</li> </ul>

**Notes:**

- Executing any of the tests from this page requires a reboot of the system to return the radio to normal operation.

**Subscriber Admin Page**

**Key Management**

Slot	Key Tag	Owner
0	346274DC0000346274DC346274F8346274E0000334627500006	User
1	346274DC0001346274DC346274F8346274E0000434627500009	User
2	346274DC0004346274DC346274F8346274E000073462750000C	User
3	346274DC0009346274DC346274F8346274E0000C3462750000F	User
4	346274DC0010346274DC346274F8346274E0001334627500012	User

Current Eff. Key: 2      Effective Key: Key 2      Set

**Account Management**

Account Name	User Type
bin	Crypto Officer
daemon	User

ADD ENTRY    MODIFY ENTRY ...    REMOVE ENTRY ...    CANCEL

<b>Table 0-25. Subscriber Station Admin Page</b>		
	<b>Field/Control</b>	<b>Description</b>
(1)	Key Management	Provides the crypto user with the capability to choose the active key slot by selecting the slot from the drop down menu and clicking the set button.
(2)	Account Management	Provides each user with the capability to change account passwords.

## Subscriber Software Update Page

The screenshot shows the 'Subscriber Station Admin Page' for the Aeronix 802.16 Tactical Radio. The left sidebar contains navigation links: Home, S/W Config, Radio Control, Service Flows, Status, Bit Status, Maintenance, Network Status, Power Settings, Test, Admin, SW Update (which is highlighted in yellow), Version, Save Settings, Contact, and Logout. The main content area is titled 'Aeronix 802.16 Tactical Radio'. It features a 'Software Update' form with fields for 'File Path' (with a 'Browse...' button) and 'Update Type' (a dropdown menu currently set to 'Kernel'). To the right of the 'Start Update' button is a circled number '(1)', indicating the point of interest.

**Table 0-26. Subscriber Station Software Update Page**

	<b>Field/Control</b>	<b>Description</b>
(1)	Software Update	<p>Provides the crypto user with the capability to choose to update the software on the unit.</p> <ul style="list-style-type: none"> <li>• File Path – location of the file to update on the unit.</li> <li>• Update type – the type of file on the unit to update.</li> </ul>

**Table 0-26. Subscriber Station Software Update Page**

Field/Control	Description
	<ul style="list-style-type: none"> <li>Start update button – initiates the update process</li> </ul>

**Subscriber Station Version Page**

The screenshot shows the 'Aeronix 802.16 Tactical Radio' Subscriber Station Version Page. The left sidebar contains navigation buttons: Home, S/W Config, Radio Control, Service Flows, Status, Bit Status, Maintenance, Network Status, Power Settings, Test, Admin, SW Update, Version (which is highlighted), Save Settings, Contact, and Logout.

The main content area is titled 'Aeronix 802.16 Tactical Radio' and 'Subscriber Station'. It displays the following information:

- H/W and S/W Versions**
  - GUI Software Information**: Version: R6BWReqTxPwr10MOneAcmTestFIPS-NewPages, Build Date: Oct 29 2008 12:11:02. Grouped by circle ①.
- Network Addresses**
  - Server IP Address: 10.80.4.50 → circle ②
  - Internal IP Address: 10.1.1.1 → circle ③
  - MAC Address: 00-61-65-6E-64-01 → circle ④
- MAC SS Version Information**
  - MAC CVS Tag: R6\_NoGuardandACMMergeTEST → circle ⑤
  - SS MAC Created on: Oct 29 2008 15:01:56
  - SS AECD Driver Created on: Oct 29 2008 15:02:08
- Phy Versions**
  - Modem Identification: 0xae80216d
  - Modem Version: 0x08070381
  - Modem S Version: 0x06c306ba
  - Filter FPGA Version: 10.8
  - AGC Version: 10
  - Phy Serial Num: 00021008

A vertical callout diagram on the right side groups the information into seven sections, each labeled with a circled number:

- ① GUI Software Information
- ② Server IP Address
- ③ Internal IP Address
- ④ MAC Address
- ⑤ MAC CVS Tag
- ⑥ SS MAC Dates
- ⑦ Phy Versions

**Table 0-27. Subscriber Station Version Page**

Field/Control	Description
① GUI Software Information	Date and Time of current GUI build
② Server IP Address	Ethernet IP Address of Base Station
③ Internal IP Address	MAC S/W network interface IP Address
④ MAC Address	MAC H/W Address of SS network interface
⑤ MAC CVS Tag	SS MAC S/W current version
⑥ BS MAC Dates	SS MAC modules build date and time

Table 0-27. Subscriber Station Version Page		
	Field/Control	Description
(7)	Phy Versions	Firmware versions for PHY and Serial Number of PHY

## Contact Page

The contact page provides contact information for the 802.16 product.

## 5.0 SYSTEM SETUP AND CONFIGURATION EXAMPLE

### 5.1 Bridging Mode Scenario

Setup a simple BS – SS Bridging configuration with one external network node on the SS and one external node on the BS. For a user scenario you should substitute users' addresses for BS, SS, PC1, and PC2.

In the bridging mode, use of internal MAC addresses is required. For the current radios the BS MAC is 00:61:65:6e:64:00 and SS MAC is 00:61:65:6e:64:nn where nn equals the subscriber number configured in the start script.

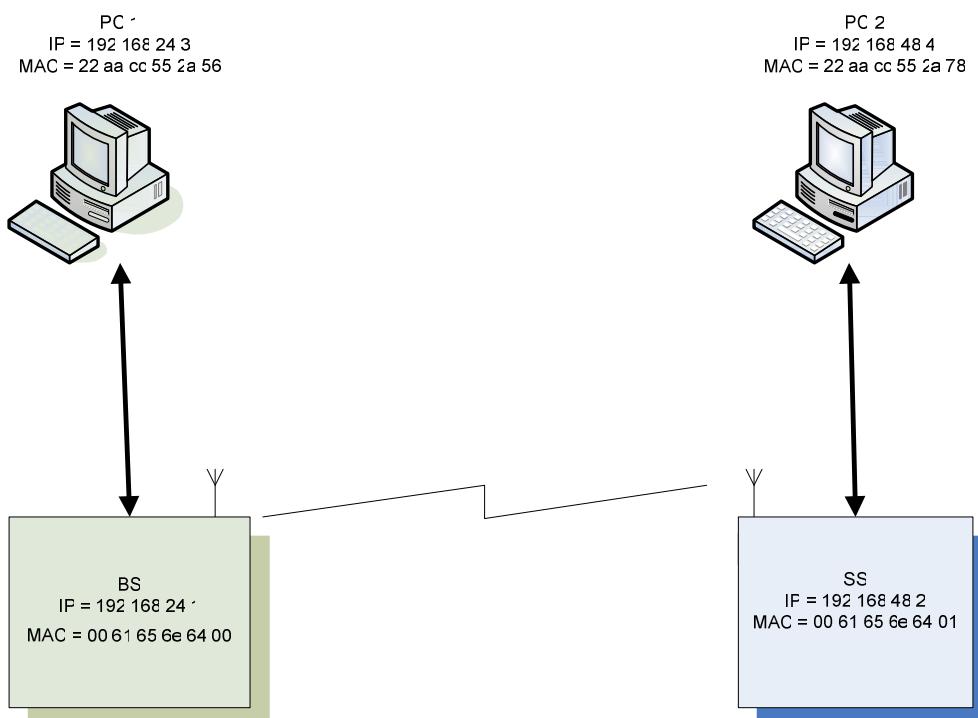


Figure 13. Example Bridging Setup Scenario

### 5.2 Bridging Base Station Configuration Mode

- 1) Turn AER16 Power ON.
- 2) Connect to AER16 Users Port with terminal emulator. (Baud = 115200, 8-N-1 no flow control)
- 3) \$ cd /mnt/jffs2
- 4) \$ cp startShimBridgeBS start
- 5) \$ vi start
  - a. Change ifconfig line to use desired IP address "192.168.24.1"
  - b. Save file.

- 6) If you have upgraded to a release of code that has database changes, now is the time to remove your old databases. Please refer to the release notes of each release to determine if a remove of the database is necessary.  
`rm /mnt/jffs2/database/*`
- 7) Open shell to radio and execute “reboot” to reboot the radio. < *reboot the machine or cycle power*>
- 8) From PC 1, bring up Internet Explorer.
- 9) In Internet explorer, put the following in the address field:
  - a. `http://192.168.24.1`
- 10) Follow the <S/W Config> link to the configuration page.
- 11) Configure a Service Class: A few default service classes are configured automatically. One of these may be sufficient for your needs and this step can be skipped.
  - a. Schedule Type = Best Effort, Latency = 80, Jitter = 20, Priority = 1
  - b. SC 1: (Name = “Gold”, Max Rate = 50,000 Kbps, Min Rate = 1,000 Kbps)
- 12) Now configure 2 Provisioned Service Flows (upstream and downstream) for the PCs and specify the desired bandwidth by choosing the appropriate service class. In bridging mode the MAC addresses in the service flows should be the one of the subscriber station. One can remove any existing service flows that are not being used prior to configuring additional ones.
  - a. SF 1: (SF Index = 4, MAC= 00 61 65 6e 64 01, Direction=Upstream, Service Class = Gold, State = Provisioned)
  - b. SF 2: (SF Index = 5, MAC= 00 61 65 6e 64 01, Direction=Downstream, Service Class = Gold, State = Provisioned)
- 13) Remove any existing classifiers then configure the classifiers. The classifiers allow data to flow through the system across the specified service flows. Shown below are the classifiers for the upstream and downstream service flows configured previously. This example shows the configuration of classifiers using MAC addresses. The SF Index must match the SF Index of the corresponding service flow.
  - a. Class 1: (SF Index = 4, Src Mac = 22 aa cc 55 2a 78, Dst Mac = 22 aa cc 55 2a 56, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
  - b. Class 2: (SF Index = 5, Src Mac = 22 aa cc 55 2a 56, Dst Mac = 22 aa cc 55 2a 78, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
- 14) Follow the <Radio Control> Link.
- 15) Select the desired channel from the Channel (Freq) drop down menu. One should select a frequency that is in the same band as power head being used.
- 16) Click the Set button next to the drop down.
- 17) Set Tx/Rx to ON if it is not.
- 18) Configure the Tx gain and hit the corresponding set button.
- 19) Enable or disable TRANSEC.
- 20) If TRANSEC is enabled, enter the KEY and hit the corresponding Load Now button or make no changes and run with the default key.

- 21) Click the Save Settings button to save the newly selected values to the database.
- 22) Proceed to SS configuration.

### 5.3 Bridging Subscriber Station Configuration Mode

1. Turn Power ON.
2. Connect to Users Port with terminal emulator. (Baud = 115200, 8-N-1 no flow control)
3. \$ cp startShimBridgeSS start
4. \$ cd /mnt/jffs2
5. \$ vi start
  - a. Change ifconfig line to use desired IP address “192.168.24.2”
  - b. Change this line ‘insmod macss.ko subscriberNumber=1’ to = the desired subscriber number
  - c. Save file.
6. If you have upgraded to a release of code that has database changes, now is the time to remove your old databases. Please refer to the release notes of each release to determine if a removal of the database is necessary. If removal is necessary, type:  

```
rm /mnt/jffs2/database/*
```
7. Reboot the unit by typing “reboot” at the console prompt or power cycle the unit.
8. From PC 2, bring up an Internet browser. Make sure you have configured the PC network parameters.
9. In the browser, put the following in the address field:
  - a. http://192.168.24.2
10. Follow the <Radio Control> Link.
11. Select the desired channel from the Channel (Freq) drop down menu. The channel should match that of the base station.
12. Set Tx/Rx to ON.
13. Enable or disable TRANSEC to match the selection of the base station.
14. If TRANSEC is enabled, enter the KEY and hit the corresponding Load Now button or make no changes and run with the default key.
15. Click the Save Settings button to save the newly selected values to the database

### 5.3.1 Bridging Base Station Configuration Mode with two subscribers

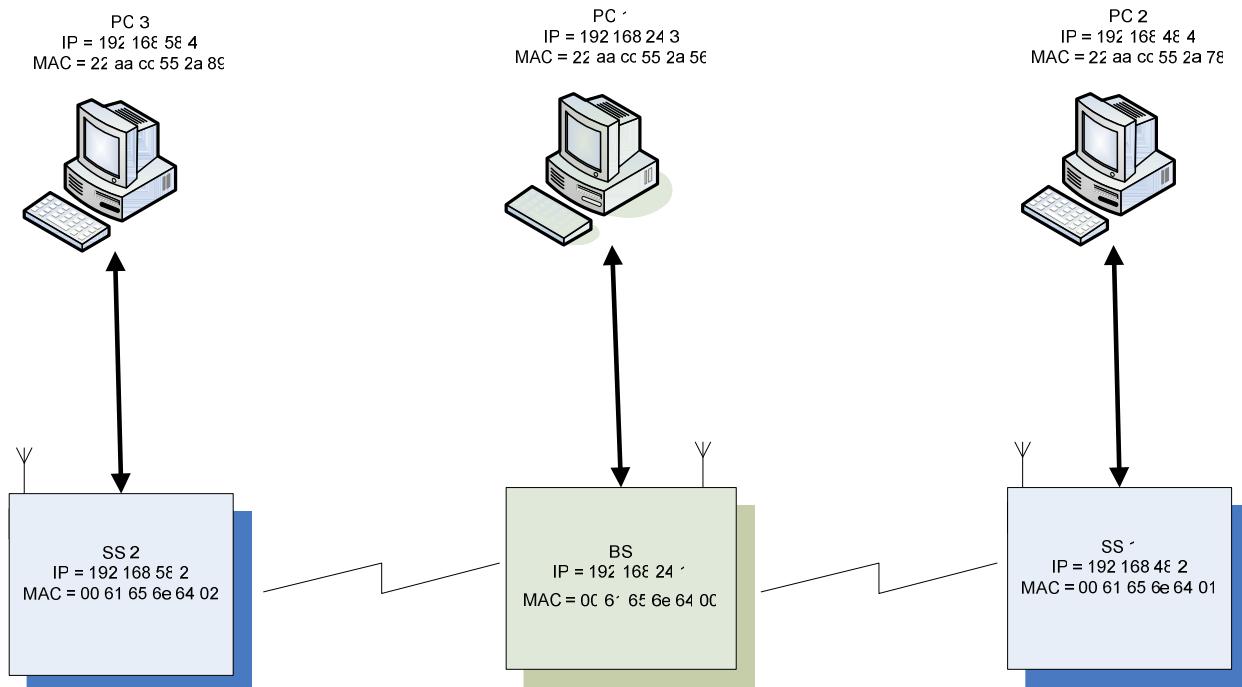


Figure 13.1 Example Bridging Setup Scenario 2 subscribers

- 1) Turn AER16 Power ON.
- 2) Connect to AER16 Users Port with terminal emulator. (Baud = 115200, 8-N-1 no flow control)
- 3) \$ cd /mnt/jffs2
- 4) \$ cp startShimBridgeBS start
- 5) \$ vi start
  - a. Change ifconfig line to use desired IP address “192.168.24.1”
  - b. Save file.
- 6) If you have upgraded to a release of code that has database changes, now is the time to remove your old databases. Please refer to the release notes of each release to determine if a remove of the database is necessary.  
rm /mnt/jffs2/database/\*
- 7) Open shell to radio and execute “reboot” to reboot the radio. <reboot the machine or cycle power>
- 8) From PC 1, bring up Internet Explorer.
- 9) In Internet explorer, put the following in the address field:
  - a. <http://192.168.24.1>
- 10) Follow the <S/W Config> link to the configuration page.

11) Configure a Service Class: A few default service classes are configured automatically. One of these may be sufficient for your needs and this step can be skipped.

- a. Schedule Type = Best Effort, Latency = 80, Jitter = 20, Priority = 1
- b. SC 1: (Name = "Gold", Max Rate = 50,000 Kbps, Min Rate = 1,000 Kbps)

12) Now configure 2 Provisioned Service Flows (upstream and downstream) for the PCs and specify the desired bandwidth by choosing the appropriate service class. In bridging mode the MAC addresses in the service flows should be the one of the subscriber station. One can remove any existing service flows that are not being used prior to configuring additional ones.

- a. SF 1: (SF Index = 4, MAC= 00 61 65 6e 64 01, Direction=Upstream, Service Class = Gold, State = Provisioned)
- b. SF 2: (SF Index = 5, MAC= 00 61 65 6e 64 01, Direction=Downstream, Service Class = Gold, State = Provisioned)
- c. SF 1: (SF Index = 6, MAC= 00 61 65 6e 64 02, Direction=Upstream, Service Class = Gold, State = Provisioned)
- d. SF 2: (SF Index = 7, MAC= 00 61 65 6e 64 02, Direction=Downstream, Service Class = Gold, State = Provisioned)

13) Remove any existing classifiers then configure the classifiers. The classifiers allow data to flow through the system across the specified service flows. Shown below are the classifiers for the upstream and downstream service flows configured previously. This example shows the configuration of classifiers using MAC addresses. The SF Index must match the SF Index of the corresponding service flow.

- a. Class 1: (SF Index = 4, Src Mac = 22 aa cc 55 2a 78, Dst Mac = 22 aa cc 55 2a 56, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
- b. Class 2: (SF Index = 5, Src Mac = 22 aa cc 55 2a 56, Dst Mac = 22 aa cc 55 2a 78, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
- c. Class 3: (SF Index = 6, Src Mac = 22 aa cc 55 2a 89, Dst Mac = 22 aa cc 55 2a 56, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
- d. Class 4: (SF Index = 7, Src Mac = 22 aa cc 55 2a 56, Dst Mac = 22 aa cc 55 2a 89, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
- e. Class 5: (SF Index = 4, Src Mac = 22 aa cc 55 2a 78, Dst Mac = 22 aa cc 55 2a 89, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
- f. Class 6: Check forward flag (SF Index = 5, Src Mac = 22 aa cc 55 2a 89, Dst Mac = 22 aa cc 55 2a 78, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
- g. Class 7: (SF Index = 6, Src Mac = 22 aa cc 55 2a 89, Dst Mac = 22 aa cc 55 2a 78, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
- h. Class 8: Check forward flag (SF Index = 7, Src Mac = 22 aa cc 55 2a 78, Dst Mac = 22 aa cc 55 2a 89, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)

14) Follow the <Radio Control> Link.

15) Select the desired channel from the Channel (Freq) drop down menu. One should select a frequency that is in the same band as power head being used.

16) Click the Set button next to the drop down.

- 17) Set Tx/Rx to ON if it is not.
- 18) Configure the Tx gain and hit the corresponding set button.
- 19) Enable or disable TRANSEC.
- 20) If TRANSEC is enabled, enter the KEY and hit the corresponding Load Now button or make no changes and run with the default key.
- 21) Click the Save Settings button to save the newly selected values to the database.
- 22) Proceed to SS configuration.

#### 5.4 Non-Bridging Mode Scenario

Setup a simple BS – SS non-bridging configuration with one external network node on the SS and one external node on the BS. For a user scenario you should substitute user's addresses for BS, SS, PC1, and PC2.

In the non-bridging mode, use of internal MAC addresses is required. For the current radios the BS MAC is 00:61:65:6e:64:00 and SS MAC is 00:61:65:6e:64:nn where nn equals the subscriber number configured in the start script.

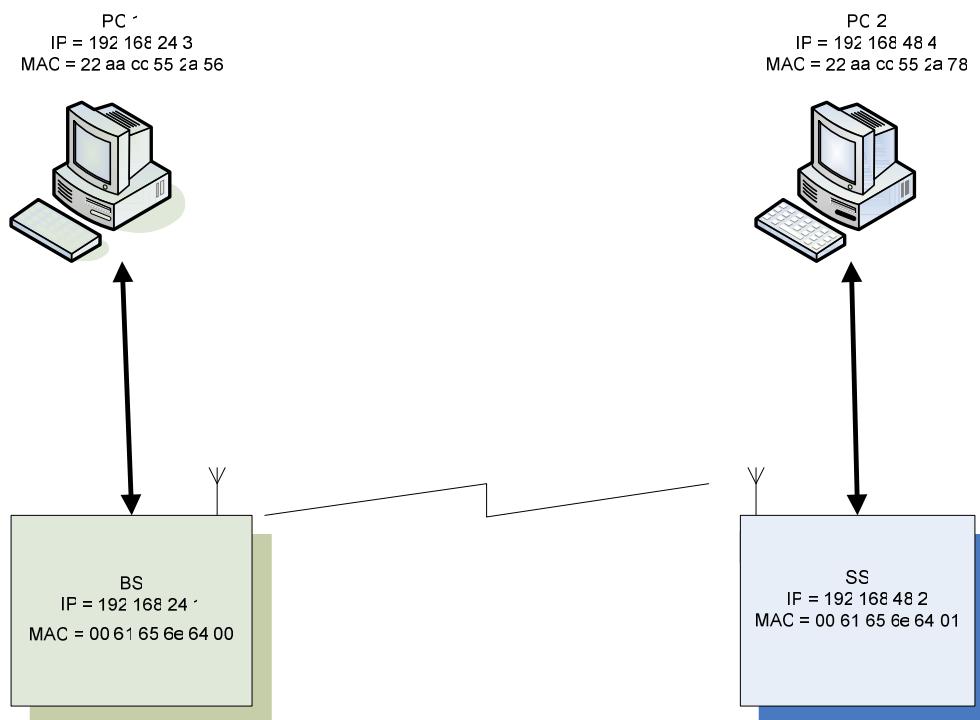


Figure 14. Example Non-Bridging Setup Scenario

## 5.5 Non-Bridging Base Station Configuration Mode

1. Turn AER16 Power ON.
2. Connect to AER16 Users Port with terminal emulator. (Baud = 115200, 8-N-1 no flow control)
3. \$ cd /mnt/jffs2
4. \$ cp startShimBS start
5. \$ vi start
  - a. Change ‘ifconfig eth0’ line to use desired IP address “192.168.24.1”
  - b. Modify the “route add” line to have the appropriate -net address. For the net address use “192.168.48.0”.
  - c. Save file.
6. If you have upgraded to a release of code that has database changes, now is the time to remove your old databases. Please refer to the release notes of each release to determine if a removal of the database is necessary. If removal is necessary, type:  
`rm /mnt/jffs2/database/*`
7. Reboot the unit by typing “reboot” at the console prompt or power cycle the unit.
8. From PC 1, bring up an Internet browser. Make sure you have configured the PC network parameters.
9. In the browser, put the following in the address field:
  - a. `http://192.168.24.1`
10. Follow the <S/W Config> link to the configuration page.
11. Configure a Service Class: A few default service classes are configured automatically. One of these may be sufficient for your needs and this step can be skipped.
  - a. Schedule Type = Best Effort, latency = 80, Jitter = 20, Priority = 1
  - b. SC 1: (Name = “Gold”, Max Rate = 50,000 Kbps, Min Rate = 1,000 Kbps)
12. Now configure 2 Provisioned Service Flows (upstream and downstream) for the PCs and specify the desired bandwidth by choosing the appropriate service class if they do not already exist. To display the MAC address of the radio, open a shell and execute “ifconfig | more”.
  - a. SF 1: (SF Index = 4, MAC= 00 61 65 6e 64 01, Direction=Upstream, Service Class = Gold, State = Provisioned)
  - b. SF 2: (SF Index = 5, MAC= 00 61 65 6e 64 01, Direction=Downstream, Service Class = Gold, State = Provisioned)
13. Remove any existing classifiers that are not needed and then configure the classifiers. Classifiers allow data to flow through the system across the specified service flows. Below are the classifiers for the upstream and downstream service flows configured using MAC addresses. The SF Index must match the SF Index of the corresponding service flow.
  - a. Class 1: (SF Index = 4, Src Mac = 00 61 65 6e 64 01, Dst Mac = 00 61 65 6e 64 00, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)

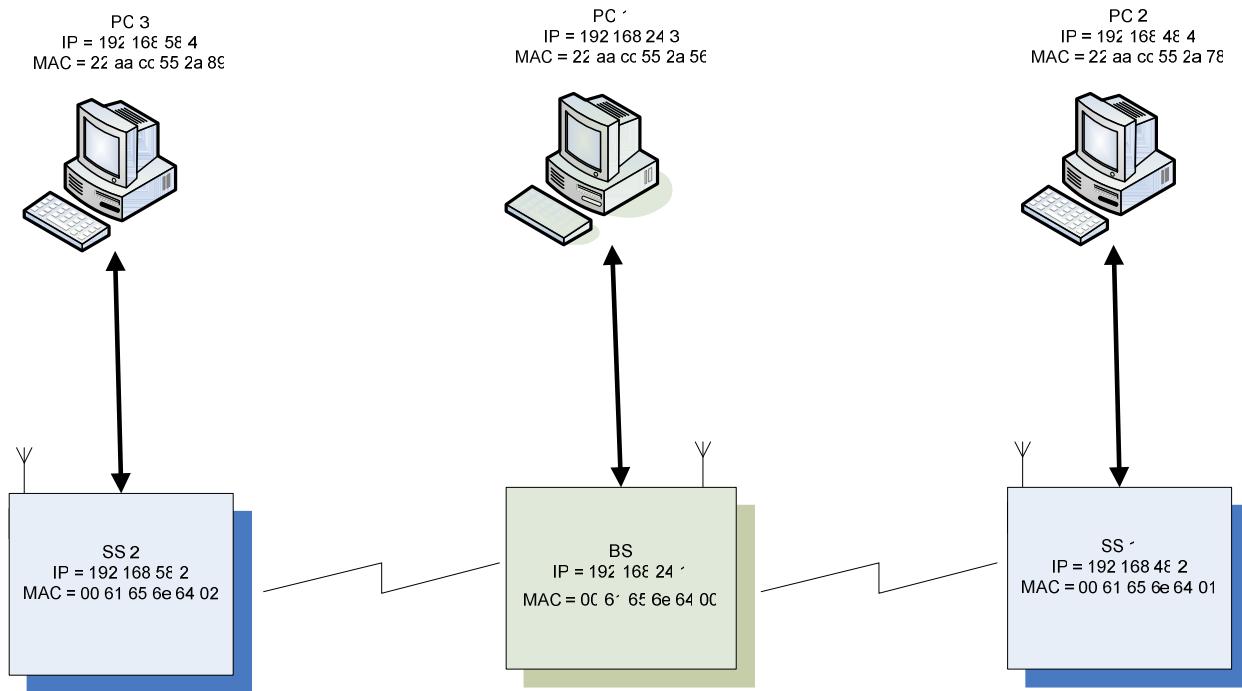
- b. Class 2: (SF Index = 5, Src Mac = 00 61 65 6e 64 00, Dst Mac = 00 61 65 6e 64 01, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
- 14. Follow the <Radio Control> Link.
- 15. Select the desired channel from the Channel (Freq) drop down menu.
- 16. Click the Set button next to the drop down.
- 17. Set Tx/Rx to ON if it is not.
- 18. Configure the max distance for SS acquisition.
- 19. Click the set button in the ranging environment section of the Radio Control screen.
- 20. Enable or disable TRANSEC.
- 21. If TRANSEC is enabled, enter the KEY and hit the corresponding Load Now button or make no changes and run with the default key.
- 22. Click the Save Settings button to save the newly selected values to the database.
- 23. Proceed to SS configuration.

## 5.6 Non-Bridging Subscriber Station Configuration Mode

1. Turn Power ON.
2. Connect to Users Port with terminal emulator. (Baud = 115200, 8-N-1 no flow control)
3. \$ cd /mnt/jffs2
4. \$ cp startShimSS start
5. vi start
  - a. Change ‘ifconfig eth0’ line to use desired IP address “192.168.48.2”
  - b. Change this line ‘insmod macss.ko subscriberNumber=1’ to = the desired subscriber number. If multiple subscribers increase number accordingly.
  - c. Modify the “route add” line to have the appropriate -net address. For the net address use “192.168.24.0”.
  - d. Save the file.
6. If you have upgraded to a release of code that has database changes, now is the time to remove your old databases. Please refer to the release notes of each release to determine if a removal of the database is necessary. If removal is necessary, type:  

```
rm /mnt/jffs2/database/*
```
7. Reboot the unit by typing “reboot” at the console prompt or power cycle the unit.
8. From PC 2, bring up an Internet browser. Make sure you have configured the PC network parameters.
9. In the browser, put the following in the address field:
  - a. http://192.168.48.2
10. Follow the <Radio Control> Link.
11. Select the desired channel from the Channel (Freq) drop down menu. The channel should match that of the base station.
12. Set Tx/Rx to ON.
13. Enable or disable TRANSEC to match the selection of the base station.
14. If TRANSEC is enabled, enter the KEY and hit the corresponding Load Now button or make no changes and run with the default key.
15. Click the Save Settings button to save the newly selected values to the database.

### 5.6.1 Non-Bridging Base Station Configuration Mode with Two subscribers



**Figure 14.1 Non –Bridging Example with 2 Subscribers**

1. Turn AER16 Power ON.
2. Connect to AER16 Users Port with terminal emulator. (Baud = 115200, 8-N-1 no flow control)
3. \$ cd /mnt/jffs2
4. \$ cp startShimBS start
5. \$ vi start
  - a. Change ‘ifconfig eth0’ line to use desired IP address “192.168.24.1”
  - b. Modify the “route add” line to have the appropriate -net address. For the net address use “192.168.48.0”.
  - c. Save file.
6. If you have upgraded to a release of code that has database changes, now is the time to remove your old databases. Please refer to the release notes of each release to determine if a removal of the database is necessary. If removal is necessary, type:  
`rm /mnt/jffs2/database/*`
7. Reboot the unit by typing “reboot” at the console prompt or power cycle the unit.
8. From PC 1, bring up an Internet browser. Make sure you have configured the PC network parameters.
9. In the browser, put the following in the address field:

- a. <http://192.168.24.1>
10. Follow the <S/W Config> link to the configuration page.
11. Configure a Service Class: A few default service classes are configured automatically. One of these may be sufficient for your needs and this step can be skipped.
  - 1) Schedule Type = Best Effort, latency = 80, Jitter = 20, Priority = 1
  - 2) SC 1: (Name = "Gold", Max Rate = 50,000 Kbps, Min Rate = 1,000 Kbps)
12. Now configure 2 Provisioned Service Flows (upstream and downstream) for the PCs and specify the desired bandwidth by choosing the appropriate service class if they do not already exist. To display the MAC address of the radio, open a shell and execute "ifconfig | more".
  - a. SF 1: (SF Index = 4, MAC= 00 61 65 6e 64 01, Direction=Upstream, Service Class = Gold, State = Provisioned)
  - b. SF 2: (SF Index = 5, MAC= 00 61 65 6e 64 01, Direction=Downstream, Service Class = Gold, State = Provisioned)
  - c. SF 1: (SF Index = 6, MAC= 00 61 65 6e 64 02, Direction=Upstream, Service Class = Gold, State = Provisioned)
  - d. SF 2: (SF Index = 7, MAC= 00 61 65 6e 64 02, Direction=Downstream, Service Class = Gold, State = Provisioned)
13. Remove any existing classifiers that are not needed and then configure the classifiers. Classifiers allow data to flow through the system across the specified service flows. Below are the classifiers for the upstream and downstream service flows configured using MAC addresses. The SF Index must match the SF Index of the corresponding service flow.
  - a. Class 1: (SF Index = 4, Src Mac = 00 61 65 6e 64 01, Dst Mac = 00 61 65 6e 64 00, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
  - b. Class 2: (SF Index = 5, Src Mac = 00 61 65 6e 64 00, Dst Mac = 00 61 65 6e 64 01, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
  - c. Class 3: (SF Index = 6, Src Mac = 00 61 65 6e 64 02, Dst Mac = 00 61 65 6e 64 00, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
  - d. Class 4: (SF Index = 7, Src Mac = 00 61 65 6e 64 00, Dst Mac = 00 61 65 6e 64 02, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
  - e. Class 5: (SF Index = 4, Src Mac = 00 61 65 6e 64 01, Dst Mac = 00 61 65 6e 64 02, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
  - f. Class 6: Check forward flag (SF Index = 5, Src Mac = 00 61 65 6e 64 02, Dst Mac = 00 61 65 6e 64 01, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
  - g. Class 5: (SF Index = 6, Src Mac = 00 61 65 6e 64 02, Dst Mac = 00 61 65 6e 64 01, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
  - h. Class 6: Check forward flag (SF Index = 7, Src Mac = 00 61 65 6e 64 01, Dst Mac = 00 61 65 6e 64 02, Src Mask = ff ff ff ff ff ff, Dst Mask = ff ff ff ff ff ff)
14. Follow the <Radio Control> Link.
15. Select the desired channel from the Channel (Freq) drop down menu.
16. Click the Set button next to the drop down.

17. Set Tx/Rx to ON if it is not.
18. Configure the max distance for SS acquisition.
19. Click the set button in the ranging environment section of the Radio Control screen.
20. Enable or disable TRANSEC.
21. If TRANSEC is enabled, enter the KEY and hit the corresponding Load Now button or make no changes and run with the default key.
22. Click the Save Settings button to save the newly selected values to the database.
23. Proceed to SS configuration.

## 6.0 PERFORMANCE

### Radio Performance

The 802.16 Radio meets or exceeds the performance parameters listed in Table 6-1.

<b>Table 6-1. Modem Performance</b>			
<b>Parameter</b>	<b>Value</b>		<b>Units</b>
Band 1 Channel Center Frequencies	5.745, 5.765, 5.785, 5.805, 5.825	+/- 1 ppm @ 25 °C	GHz
Band 2 Channel Center Frequencies	4.52, 4.54, 4.56, 4.58, 4.6, 4.62, 4.64, 4.66, 4.68	+/- 1.5 ppm -40 °C to +70 °C	GHz
<b>Transmitter:</b>	<b>25 °C</b>	<b>-40 °C to +70 °C</b>	
Average (RMS) Output Power	0 +/-1dB		dBm
Peak Output Power	+27 +/-1dB	25 °C value - 3dBm/+1.5dBm	dBm
Transmit 1dB Output Compression	+37		dBm
VSWR	2:1		
Channel Bandwidth	15.6		MHz
LO leakage	15.3		dBm
<b>Receiver:</b>			
Input Damage Level	13		dBm
Input 1 dB compression <sup>1</sup>	-7.8	-9.4 to -6.4	dBm
Input 1 dB compression <sup>2</sup>	-6.4	-7.2 to -5.7	dBm
Input Third Order Intercept <sup>1</sup>	3	2 to 4.7	dBm
Input Third Order Intercept <sup>2</sup>	7.8	6.9 to 8.5	dBm
LO leakage	-25		dBm
VSWR	2:1		
Noise Figure	8 db Max	25 °C value +/- 1 dB	dB

<sup>1</sup> With front end attenuator off

<sup>2</sup> With front end attenuator on

### 6.1 Receiver Sensitivity

The sensitivity of the 802.16 Modem Module receiver conforms to Section 8.3.11.1 of the IEEE 802.16D5-2004 specification. The receiver Signal to Noise Ratio (SNR) assumptions are listed in Table 6-2.

<b>Table 6-2. Receiver SNR Assumptions</b>			
<b>Modulation</b>	<b>Coding Rate</b>	<b>Receiver SNR (dB)</b>	<b>Receiver Sensitivity (8dB NF &amp; 5dB IL)</b>
BPSK	1/2	6.4	-85.6 dBm
QPSK	1/2	9.4	-82.6 dBm
	3/4	11.2	-80.8 dBm
16 QAM	1/2	16.4	-75.6 dBm
	3/4	18.2	-73.8 dBm
64 QAM	2/3	22.7	-69.3 dBm
	3/4	24.4	-67.6 dBm

## 6.2 User Data Rates

The 802.16 Modem Module PHY modulates and de-modulates the data packets as specified in Table 5-3 . The user throughput for the 10 MHz and 20 MHz bandwidths can be found in Table

**Table 6-3. User Data Rates 10 MHz 20 MHz Bandwidth**

Modulation	Cyclic prefix	Uncoded block size (bytes/symbol)	Coded block size (bytes)	Overall coding rate	RS code	CC code rate	10MHz BW Burst Data rate (Mbs)	20 MHz BW Burst Data rate (Mbs)	SNR Eb/No
BPSK	1/4	4	24	1/6	(12,4,4)	1/2	1	2	
BPSK	1/4	12	24	1/2	None	1/2	3	6	6.4
BPSK	1/4	24	24	NA	None	NA	6	12	11(est)
QPSK	1/4	24	48	1/2	(32,24,4)	2/3	6	12	9.4
QPSK	1/4	36	48	3/4	(40,36,3)	5/6	10	18	11.2
QPSK	1/4	48	48	NA	None	NA	13	24	14(est)
16-QAM	1/4	48	96	1/2	(64,48,8)	2/3	13	24	16.4
16-QAM	1/4	72	96	3/4	(80,72,4)	5/6	20	36	18.2
16-QAM	1/4	96	96	NA	None	NA	27	48	19(est)
64-QAM	1/4	96	144	2/3	(108,96,6)	3/4	27	48	22.7
64-QAM	1/8	96	144	2/3	(108,96,6)	3/4	30	53.33	22.7
64-QAM	1/8	108	144	3/4	(120,108,6)	5/6	34	60	24.4
64-QAM	1/16	108	144	3/4	(120,108,6)	5/6	36	63.53	24.4
64-QAM	1/32	108	144	3/4	(120,108,6)	5/6	37	65.45	24.4
64-QAM	1/4	144	144	NA	None	NA	41	72	25(est)
8PSK	1/4	32	72	8/18	(48,32,8)	2/3	9	16	
8PSK	1/4	42	72	7/12	(54,42,6)	3/4	12	21	
8PSK	1/4	72	72	NA	None	NA	20	36	
16PSK	1/4	48	96	1/2	(64,48,8)	2/3	13	24	
16PSK	1/4	72	96	3/4	(80,72,4)	5/6	20	36	
16PSK	1/4	96	96	NA	None	NA	27	48	

Table 5-5 User Throughput for 10 MHZ Channel Bandwidth vs Number of Nodes in the Network

Modulation	Coded Link Rate	1 Node Link Thruput Mb/s	2 Node Link Thruput Mb/s	3 Node Link Thruput Mb/s	4 Node Link Thruput Mb/s	5 Node Link Thruput Mb/s	6 Node Link Thruput Mb/s	7 Node Link Thruput Mb/s	8 Node Link Thruput Mb/s	9 - 20 Node Link Thruput Mb/s
BPSK 1/2	6 Mbps	2.6	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.3
QPSK 1/2	12 Mbps	5.1	5.0	5.0	4.9	4.9	4.8	4.8	4.7	4.7
QPSK 3/4	18 Mbps	7.6	7.5	7.4	7.4	7.3	7.2	7.1	7.1	7.0
16-QAM 1/2	24 Mbps	10.2	10.1	10.0	9.9	9.8	9.7	9.6	9.5	9.4
16-QAM 3/4	36 Mbps	15.3	15.1	15.0	14.8	14.7	14.5	14.4	14.2	14.1
64-QAM 2/3	48 Mbps	20.4	20.2	20.0	19.8	19.6	19.4	19.2	19.0	18.8
64-QAM 3/4	54 Mbps	23.0	22.7	22.5	22.3	22.0	21.8	21.6	21.3	21.1
8-PSK 1/2	18 Mbps	7.7	7.6	7.5	7.4	7.3	7.3	7.2	7.1	7.0
16-PSK 1/2	24 Mbps	10.2	10.1	10.0	9.9	9.8	9.7	9.6	9.5	9.4
16-PSK 3/4	36 Mbps	15.3	15.1	15.0	14.8	14.7	14.5	14.4	14.2	14.1

Table 5-4 User Throughput for 20 MHZ Channel Bandwidth vs Number of Nodes in the Network

Modulation	Coded Link Rate	1 Node Link Thruput Mb/s	2 Node Link Thruput Mb/s	3 Node Link Thruput Mb/s	4 Node Link Thruput Mb/s	5 Node Link Thruput Mb/s	6 Node Link Thruput Mb/s	7 Node Link Thruput Mb/s	8 Node Link Thruput Mb/s	9 - 20 Nodes Link Thruput Mb/s
BPSK 1/2	6 Mbps	5.1	5.0	5.0	4.9	4.9	4.8	4.8	4.7	4.7
QPSK 1/2	12 Mbps	10.2	10.1	10.0	9.9	9.8	9.7	9.6	9.5	9.4
QPSK 3/4	18 Mbps	15.2	15.0	14.9	14.7	14.6	14.4	14.3	14.1	14.0
16-QAM 1/2	24 Mbps	20.4	20.2	20.0	19.8	19.6	19.4	19.2	19.0	18.8
16-QAM 3/4	36 Mbps	30.6	30.3	30.0	29.7	29.4	29.1	28.8	28.5	28.2
64-QAM 2/3	48 Mbps	40.8	40.4	40.0	39.6	39.2	38.8	38.4	37.9	37.5
64-QAM 3/4	54 Mbps	45.9	45.4	45.0	44.5	44.1	43.6	43.1	42.7	42.2
8-PSK 1/2	18 Mbps	15.3	15.1	15.0	14.8	14.7	14.5	14.4	14.2	14.1
16-PSK 1/2	24 Mbps	20.4	20.2	20.0	19.8	19.6	19.4	19.2	19.0	18.8
16-PSK 3/4	36 Mbps	30.6	30.3	30.0	29.7	29.4	29.1	28.8	28.5	28.2

## APPENDIX: DEFINITIONS, ACRONYMS, AND ABBREVIATIONS

The section provides the necessary definitions, acronyms, and abbreviations relevant to this document and necessary in order to understand this document.

ACID – ARQ Channel ID

ARQ – Automatic Repeat Request

ATM – Asynchronous Transfer Mode

Authentication – Verification of the source of information

BS – Base Station

CCV – Clock Comparison Value

CDMA – Code Division Multiple Access

CID – Connection Identifier

CINR – Carrier to Interference and Noise Ratio

CS – Convergence Sub-layer

DCD – Downlink Channel Descriptor

DFS – Dynamic Frequency Selection

DIUC – Downlink Interval Usage Code

DL – Downlink

EIRP – Effective Isotropic Radiated Power

GPS – Global Positioning System

H-ARQ – Hybrid Automatic Repeat Request

HMAC – Hashed Message Authentication Code

HW – Hardware

Instantiate – Create an entity from an abstraction.

Integrity – Verification that the information has not been altered.

I/O – Input/Output

IP – Internet Protocol

JTRS – Joint Tactical Radio System

MAC – Media Access Control

MSB – Most Significant Bit

OFDM – Orthogonal Frequency Division Multiplexing

OFDMA – Orthogonal Frequency Division Multiple Access

OS – Operating System

PDU – Payload Data Unit  
PHS – Payload Header Suppression  
PHY – Physical Layer  
PKM – Privacy Key Management  
QoS – Quality of Service  
RSSI – Received Signal Strength Indicator  
RTG – Receive/Transmit Transition Gap  
SDU – Service Data Unit  
SFID – Service Flow ID  
SS – Subscriber Station  
SW – Software  
TCP – Transmission Control Protocol  
TLV – Type Length Value  
TRANSEC – Transmission Security  
TTG – Transmit/Receive Transition Gap  
UCD – Uplink Channel Descriptor  
UDP – User Datagram Protocol  
UIUC – Uplink Interval Usage Code  
UL - Uplink  
VLAN – Virtual Local Area Network