

3.10 Determining RF Signal Levels

An operational host/remote pair has forward and reverse path RF signals passing through it between the SDR BTS application and the cell phone user. The RF signals are transported in digital format as RF spectrum data by way of fiber or fiber-to-free-space optics links between the host unit (Host PCIx Card) and remote unit (in both directions).

To view RF signal levels for a host/remote pair

1. From the **View** menu, select the site names of a host/remote pair.
2. Click on the host **RF** tab for the host or remote unit to view RF signal levels and associated information for the selected unit (see Figure 33).
3. To interpret host display, see [Topic 4.4.2, Host RF Window, on page 71](#). To interpret remote display, see [Topic 4.5.2, Remote RF Window, on page 82](#).



Figure 33. RF Display Example

To view RF signal levels using the NOC-NEM interface

Use the `GET DATA` command (see [Topic 5.5.7 on page 105](#)).

3.11 Setting RF Forward Attenuation

Using the remote unit RF window, you can adjust the current attenuation setting for the RF forward path. This setting affects the strength of the forward path RF analog signal transmitted from the remote unit antenna. Adjustments made in EMS are passed to the remote unit control software, which operates a digital attenuator. The attenuator provides an attenuation adjustment range of 0 to 31 dB, and can be set in 1 dB increments. Any input signal with a level of -9 dBm to -40 dBm (composite) can be adjusted to the required level using the forward path attenuator.

NOTE: Default settings for the attenuator are the maximum, 31 dB.

NOTE: An external attenuator is required if more than 30 dB of attenuation is required to adjust the input RF signal to the required level.

To adjust the attenuator, use the procedure below.

To enter attenuation settings for a host RF signal

1. From the **View** menu, select the names of a host/remote pair.
2. Click on remote **RF** tab to view the remote **RF** window (for an example, see [Figure 33 on page 43](#)).
3. Click on the **Edit** button in the **Remote Fwd Att** area in the window to display the **Remote Fwd Att** dialog shown in [Figure 34](#). (The **Edit** button to be clicked on is in the lower right in the figure.)

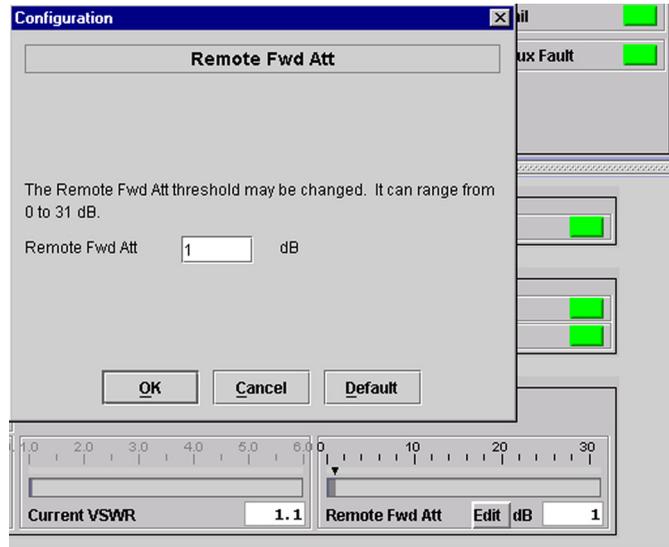


Figure 34. Attenuation Area in RF Window

4. In the **Remote Fwd Att** dialog, key in the desired setting as shown in the example in [Figure 35](#).

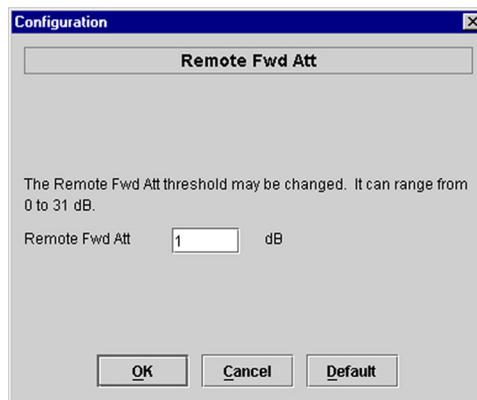


Figure 35. Entering Remote Forward Attenuation

5. When done, click on the **OK** button.

To enter forward path attenuation values using NOC-NEM interface

Use the `SET THRESHOLD` command (see [Topic 5.5.18 on page 115](#)).

3.12 Defining RF Logical Channels

Using the host **SDR Config** window, shown in [Figure 36](#), you can define a logical RF channel and enter gain settings for each path within the channel. A logical RF channel is a multiplex of up to eight RF voice channels. A logical RF channel consists of a forward path, a primary reverse path, and a secondary reverse path, if supported by the remote unit. The gain setting is simply a number that affects the amount of gain to applied to the signal within the specified path. A negative value results in attenuation. Each gain setting increment corresponds approximately to 1 dBm of adjustment.

To define an RF logical channel

1. From the **View** menu, select the names of a host/remote pair.
2. Click on the host **SDR Cfg** tab to display the window shown in [Figure 36](#). (This example shows typical a data display for logical RF channels that are already defined.)

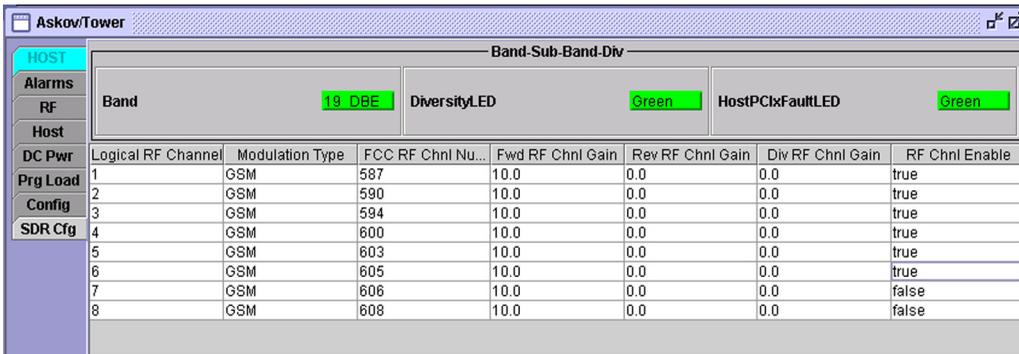


Figure 36. Host SDR Cfg Window

3. Determine which logical RF channel you want to enter data for. To enter values for that channel, move across in the same row in the window. The system supports up to eight logical channels.
4. Click on the **Modulation Type** field to display a pulldown list such as shown in [Figure 37](#). From the list, select the modulation type of the channel being configured.

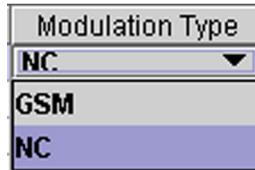


Figure 37. Modulation Type

- Click in the **FCC RF Chnl Number** field and from the pulldown list select an FCC channel number as shown in the example in [Figure 38](#). Based on modulation type, band, and sub-band, EMS will list only available FCC channel numbers.

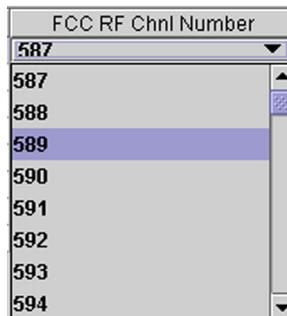


Figure 38. FCC RF Chnl Number (Example)

- Click in the **Fwd RF Chnl Gain** field to display a pulldown list such shown in [Figure 39](#). Select the item for the desired gain setting for the forward path. The range of possible values is from 10 to -20 dBm. The standard value for this field is 10.



Figure 39. Fwd RF Chnl Gain

7. Click in the **Rev RF Chnl Gain** field to display a pulldown list. Select the item for the desired amount of signal gain. The range of possible values is from 10 to -20 dBm. The standard value for this field is 0.
8. If the remote unit supports the diversity option (second reverse path), click on the **Div RF Chnl Gain** field to display the pulldown list. Select the item for the desired amount of signal gain. The range of possible values is from 10 to -20 dBm. The standard value for this field is 0.
9. Use the last field on the right, **RF Chnl Enable**, to enable the channel if it will go into immediate use. To enable the channel, click on the field to set the displayed value to “true.” If the channel should not be enabled at this time, let it stay at the value “false.” When a value is changed in this field, a box appears temporarily as shown in [Figure 40](#).

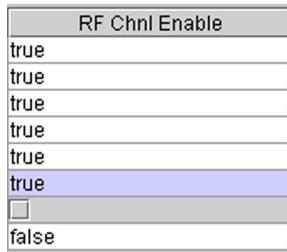


Figure 40. Setting Channel Enable

10. When done, exit the window to proceed with other tasks if desired.

To do this same task using the NOC-NEM interface

You cannot use NOC-NEM to perform these tasks.

3.13 Setting Operating Mode

A host/remote pair has three user-selectable operating modes plus two modes that happen automatically when a program file is downloaded. User-selectable modes can be started or stopped using the **OpMode** window, shown in [Figure 41](#).

To set operating modes

1. From the **Tools** menu, select **Opmode**.
2. Click on the host or remote name.
3. For a description of the modes, refer to [Topic 4.1.4 on page 60](#). The modes are the same for the host and remote units.

CAUTION! Care is needed to prevent damage to the system in **Test Mode**. **Test Mode** causes the system to ignore alarms that would otherwise prevent RF signals from being transported.

4. Select an operating mode using the pull-down menu after first checking the CAUTION statements above.
5. Stop an operating mode by selecting another mode. (In the end, select **Norml** mode to return the host/remote pair to normal operation.)

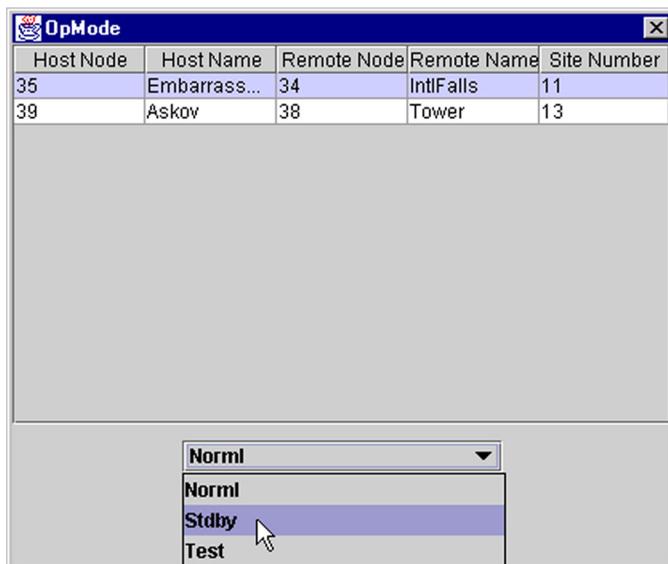


Figure 41. Selecting an Operating Mode

3.14 Downloading Program Files

The host and remote **Prg Load** windows are used to download program files to a host/remote unit. The downloaded file may be either a control program or a Field Programmable Gate Array (FPGA). The file is downloaded from the EMS computer to the host/remote control board.

The loaded files have file names in the following format:

<Name><Version>.sr where

<Name> = program name

<Version> = software version number in major.minor.rev.build form

Figure 42 shows the host and remote **Prg Load** windows. Table 3 describes the programs identified in the window.

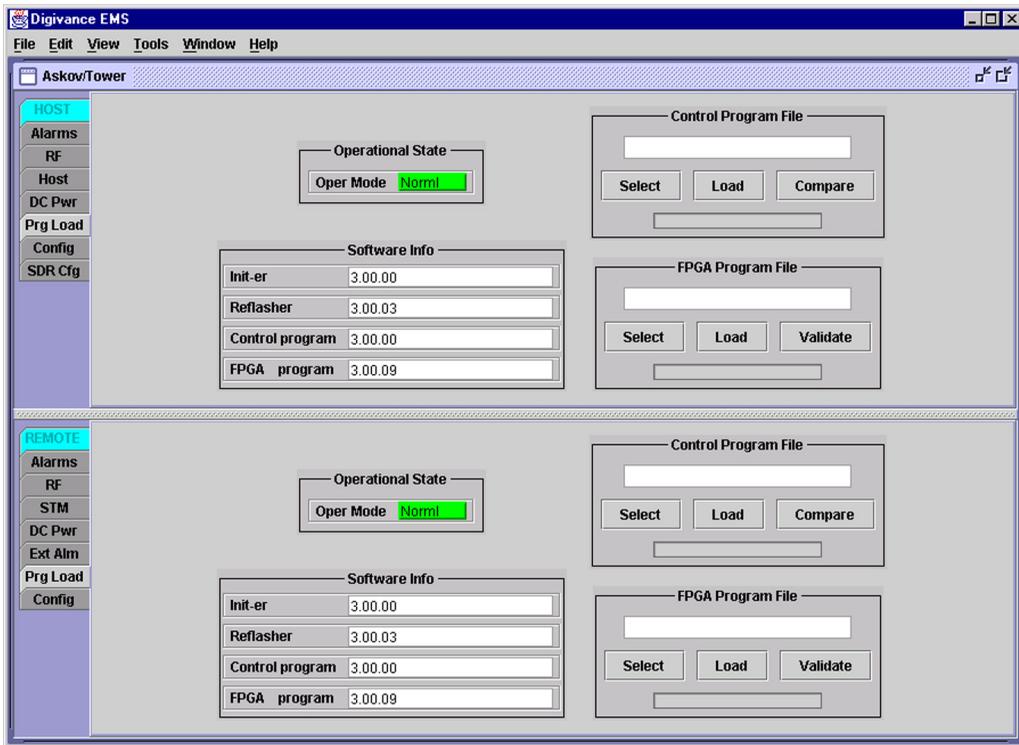


Figure 42. Host and Remote Prg Load Windows

Table 3: Host and Remote Programs

<NAME>	DESCRIPTION	CAN DOWNLOAD?
Host Unit		
SDR HIniter	Host Initialization Program version	No
SDR HReflsh	Host Reprogram Program version	No
HMR HstCP	Host Control Program version	Yes
FPGA Program	Field Programmable Gate Array version	Yes
Remote Unit		
SDR RInter	Remote Initialization Program version	No
SDR RReflsh	Remote Reprogram Program version	No
HMR RemCP	Remote Control Program version	Yes
FPGA Program	Field Programmable Gate Array version	Yes

To load a program file

1. Load programs from source CD-ROM to known folder on EMS computer.
2. In EMS, select names of a host/remote pair from **View** menu.
3. Click on the host or remote **Prg Load** tab (as appropriate) to view the host or remote program load window, shown in [Figure 42](#).
4. Click on the **Select** button and browse to find the program to be loaded.
5. Depending in whether the file being loaded is a control program or FPGA, proceed as follows:
 - a. If loading a control program, click on the **Compare** button to verify that the file you are about to load is a newer version (greater version number) than the program than the file already loaded on the unit
 - b. If loading an FPGA, first check the **FPGA Program** field. If it contains the word “UNKNOWN,” the unit has older type hardware with a non-replaceable FPGA, so you cannot proceed. If the field contains a version number, click on the **Validate** button to verify that the FPGA is functional (working). When you get a message back that the FPGA is functional, you can proceed.