Configuring a Cisco Broadband Fixed Wireless Point-to-Multipoint Wireless System

1 Introduction

This quick start card describes how to initially configure a wireless modem card and subscriber unit in a Cisco broadband fixed wireless point-to-multipoint system. The components of the system are shown in Figure 1.

✎ **Note** Cisco recommends that appropriate RF planning, including interference characterization, be done before installing the equipment.

Figure 1   Point-to-Multipoint Components
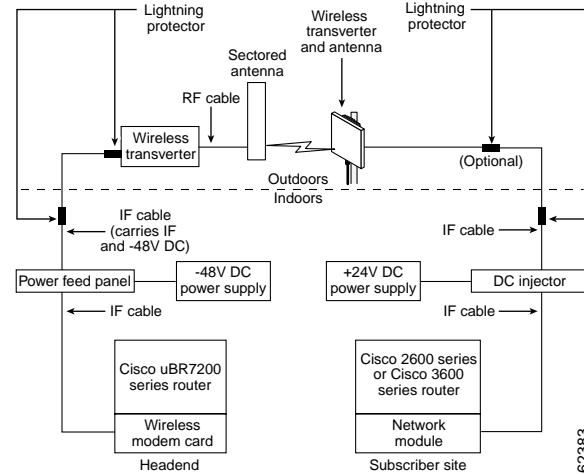
✎ **Note** Use a straight-through cable between the power feed panel and the headend wireless modem card.

✎ **Note** Follow the detailed installation procedures in the headend and subscriber unit installation guides. Make sure that all outdoor connections are properly water-sealed.

2 Preliminary Information

Before configuring the multipoint wireless link, have available the following information:

- Number of receive antennas (two for diversity)
- Required transmit power
- Downstream and upstream frequencies
- Target receive power
- IP address for the headend radio interface
- Modulation profile settings (downstream and upstream)
- Dynamic Host Configuration Protocol (DHCP) server address

3 Headend Configuration

To perform the initial headend configuration, use the following steps:

Step 1 Create at least two modulation profiles, one for downstream and one for upstream. Use the following command in EXEC mode to determine the available modulation profile options:

```
UBR01# show radio capability
 modulation-profile
```

Step 2 Note the parameters from the output of the above command and use the following command in global configuration mode to define the modulation profiles for upstream and downstream:

```
UBR01(config)# radio
 modulation-profile 1..32 bandwidth
 {6|3|1.5} throughput throughput in
 Mbps multipath-robustness
 {high|standard} burst-size medium
```

**Step 3** Configure the following parameters in radio interface mode:

```
UBR01(config-if)# radio
 receive-antenna {1|2}
UBR01(config-if)# radio
 transmit-power transmit power in dBm
UBR01(config-if)# radio downstream
 frequency frequency in KHz width 6
UBR01(config-if)# radio upstream
 frequency frequency in KHz width 6
UBR01(config-if)# ip address
 ipaddress subnet mask
UBR01(config-if)# radio upstream
 {0|1|2|3} target-receive-power
 power_level in dBm
```

Step 4 Apply the modulation profiles to downstream and upstream channels by using the following commands in radio interface mode:

```
UBR01(config-if)# radio downstream
 subchannel 1...7 modulation profile
 1...32
UBR01(config-if)# radio upstream
 {0|1|2|3} subchannel 1...7
modulation profile  1...32
```

The subchannel field corresponds to the subchannel numbering scheme shown in Figure 2. The Center frequency and the width are inferred from this subchannel assignment.

Figure 2   Subchannel Numbering
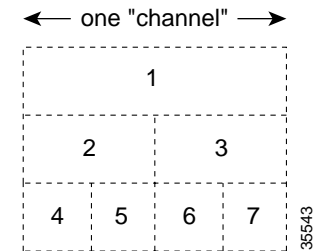
✎ **Note** The width specified in the modulation profile must match the subchannel that the downstream or upstream is being assigned to.

CISCO SYSTEMS

®

Step 5 Create a Data-over-Cable System Interface Specification (DOCSIS) provisioning file using DOCSIS CPE Configurator and copy it to slot 0 of the headend router. DOCSIS CPE Configurator can be downloaded from:

http://www.cisco.com/cgi-bin/tablebuild.pl/cpe-conf

(Download V2.1.)

Step 6 Create a DHCP server. For a lab test environment, a DHCP server can be created in the headend router itself. To set the DHCP server, use the following set of commands in global configuration mode:

```
UBR01(config)# ip dhcp
 excluded-address ip address of the
 HE radio interface
UBR01(config)# tftp-server
 slot0:DOCSIS Provisioning file name
UBR01(config)# ip dhcp pool pool name
UBR01(config)# network network
 address subnet mask
UBR01(config)# bootfile DOCSIS
 Provisioning file name
UBR01(config)# option 4 ip ip address
UBR01(config)# option 7 ip ip address
UBR01(config)# option 2 hex 0000.0000
UBR01(config)# lease
 {[days|hours|minutes] | [infinite]}
```

Step 7 When all parameters have been configured, bring up the upstream and downstream channels. Use the following commands in radio interface mode:

```
UBR01(config-if)# no radio upstream
{0|1|2|3} shutdown
UBR01(config-if)# no shut
```

The carrier light comes on.

4 Subscriber Configuration

To perform the initial subscriber configuration, use the following steps:

Step 1 Boot up the subscriber unit.

Step 2 Bring up the link using the **no shut** command in radio interface mode.

```
router(config-if)# no shut
```

The carrier light comes on.

5 Verifying the Connection

Verifying the link integrity is extremely important. Without sufficient fade margin (based on the RF plan), the link is susceptible to changes in the RF environment.

To verify the connection, use the following steps:

Step 1 Verify communication between the headend and subscriber by running a **ping** command from each site.

Step 2 Once both sites are verified, determine the Received Signal Power and Signal to Interference plus Noise Ratio (SINR) using the following subscriber unit histogram command in radio interface mode:

```
router(config-if)# radio histogram
rf-rx-power-ant1
router(config-if)# radio histogram
{sinr-ant1|sinr-ant2} duration 5
update 5
```

These histogram commands collect the data for 5 seconds and print the data on the screen after 5 seconds.

Step 3 At the headend, use the following commands in radio interface and EXEC modes:

```
UBR01(config-if)# radio histogram
rf-rx-power-ant1 subscriber mac
address duration 6000 update 10 sum
true
```

```
UBR01(config-if)# radio histogram
sinr-ant1 subscriber mac address
duration 6000 update 10 sum true
UBR01(config-if)# end
UBR01# ping subscriber ip address
UBR01# show interface radio slot/port
hist-data rf-rx-power-ant1 subscriber
mac address
```

These histogram commands collect the data for 100 minutes and print the accumulated data on the screen every 10 seconds.

Please refer to the *Cisco Broadband Fixed Wireless Site Planning Guide* for acceptable values of Received Signal Power and SINR for the required bandwidth and throughput.