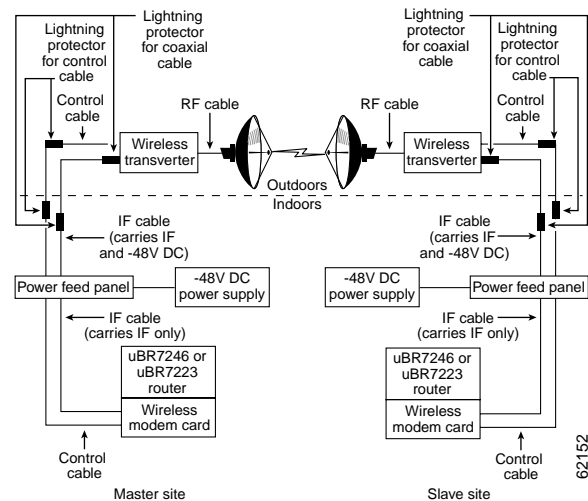


1 Introduction

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

Figure 1 Point-to-Point Components



Note Use a straight-through cable between the power feed panel and the wireless modem card.

2 Preliminary Information

Before configuring the wireless modem card, have available the following information:

- IP address for the radio interface
- Site designations (master or slave)
- Number of antennas (two for diversity)
- Transmit and receive frequencies

Note See Table 1 for U-NII band 6-MHz and 12-MHz center frequencies. See Table 2 for available band plans and frequency ranges.

- Duplexer orientation



Note The orientation of the installed duplexer determines its transmit and receive frequency. The orientation of one end of the link must be opposite to that of the other end. Also, the choice of Tx Hi or Rx Hi must match the frequencies configured for the wireless modem card.

- Channel bandwidth and throughput requirement (Refer to the *Cisco Broadband Fixed Wireless Site Planning Guide*.)
- Required transmit power (Refer to the *Cisco Broadband Fixed Wireless Site Planning Guide*.)
- Cable loss from the wireless modem card to each wireless transverter, including loss in the power feed panel and lightning protectors



Note See Table 3 for an example of estimated cable, connector, and equipment loss for a typical installation.

Table 1 U-NII Band Center Frequencies (MHz)

6 MHz Bandwidth	12 MHz Bandwidth
5730.00	5733.00
5736.00	5745.00
5742.00	5757.00
5748.00	5769.00
5754.00	5781.00
5760.00	5793.00
5766.00	5805.00
5772.00	5817.00
5778.00	—
5784.00	—
5790.00	—
5796.00	—
5802.00	—
5808.00	—
5814.00	—
5820.00	—

Table 2 U-NII Band Plans

Band Plan	Freq
Band Plan 1A	572
Band Plan 1B	577
Band Plan 2A	575
Band Plan 2B	579

Table 3 Estimated Cable

	Wireless Modem Card to Power Feed Panel	Power Panel to Primary Lightning Suppression
Cable length	4 feet	250
Cable type	RG-142	LMF
Loss per 100 feet	8dB @ 400 MHz	2.7 c
Connectors	2	2
Loss per connector	.25 dB	.25 c
Equipment loss	0.5 dB (power feed panel)	0.2 c (ligh supp sion)
Loss per segment	1.32 dB	7.45

Total loss = 10.62 dB

* Calculation shown is an example

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Commands in radio interface

Complete description of these refer to the *uBR7200 Series Universal Broadband Router Wireless Modem Card and Subsystem Installation and Configuration* document.

`ip address ipaddress subnet`

`radio master`
`radio receive-antennas`

`radio operating-band tx`
`rx frequency in MHz`
`radio channel-setup`
`throughput {high | medium |`

`radio cable-loss {1|2}`

`radio transmit-power`
`dBm`

end of the link in the same way except omit the radio master and the transmit and receive radio operating-band command.

4 Verifying the Connection

Verifying the radio interface connection can be done in stages to ensure that each component is cabled correctly and that the hardware is operating properly. The stages include:

- IF loopback
- RF loopbacks
- RF-to-RF link

IF Loopback


IF loopback confirms that the hardware is seated properly in the chassis and that the wireless modem card is functioning as expected. Use the following command in radio interface mode to perform and IF loopback:

```
UBR01(config-if)# loopback local if  
[main | diversity]
```

A successful loopback normally causes the green Carrier LED and the yellow Out of Service LED to come on.

RF Loopback

RF loopback confirms that the wiring to the transverter is correct, that communication has been established, and that the transverter appears to be operating correctly. Each transverter connection must be tested separately.

 **Note** This operation does not test the duplexer, which is the final stage before the signal is sent to the antenna.

Use the following command in radio interface mode to perform an RF loopback:

```
UBR01(config-if)# loopback local rf  
[main | diversity]
```

A successful loopback normally causes the green Carrier LED and the yellow Out of Service LED to come on.

RF-to-RF Link (Over the Air)

Once both sites pass the RF loopbacks, assuming that the antennas are already aligned, you can calculate the Received Signal Power for each antenna by running the following histogram in radio interface mode:

```
UBR01(config-if)# radio histogram totalGain  
antenna {1|2} 0 8 50 collectionInterval 60  
periodic 10 sum true tone average
```

To calculate the Average Received Power, use the average totalGain value from the histogram in the following equation:

Average Received Signal Power = $-96 + (\text{average totalGain}) / 2$ (measured in dBm)

The accuracy of the signal strength measured in this way is only about +/- 6dB.

This histogram collects data for 60 seconds and prints it to the screen after every 10 seconds.


To determine the Signal to Interference plus Noise Ratio (SINR), use the following histogram in radio interface mode:

```
UBR01(config-if)# radio histogram  
constVariance 0 8 50 collectionInterval 60  
periodic 10 sum true tone average
```

To convert constellation variance to SINR, use the average value from the histogram in the following equation:

Average SINR = $10 * \log_{10} (86016 / (\text{average constVar}))$

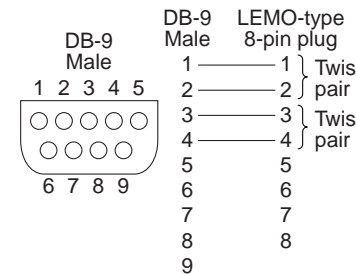
This histogram collects data for 60 seconds and prints it to the screen after every 10 seconds.


 **Note** These histograms can be customized to run for longer periods of time. Refer to the *Cisco uBR7200 Series Universal Broadband Router Wireless Modem Card and Subsystem Installation and Configuration* document.

5 Power Feed Panel Wireless Transverse Connectors

For the power-feed-panel-to-wireless connection, use a shielded DB9 LEMO-type connector. See Figure 2 for designations.

Figure 2 DB-9 to 8-Pin LEMO Connector



 **Note** The cable shield must be connected to the connector housing of the DB-9 (back shell) and the LEMO connector.