

SpotCell™ Optimal “High Rise” Installations

SpotCell adaptive repeaters operate in the 800 and 1900 MHz frequency bands and provide always-on wireless coverage to areas that would otherwise have poor or non-existent coverage. Poor coverage can result from a weak or low-grade wireless signal caused by natural and urban obstructions between the wireless user and the nearest cell site.

This application note recommends steps that can be taken to ensure an optimal installation in “high rise” applications where:

- the signal path to the nearest base station is obstructed or
- wireless signals from many base stations are present.

Signal Quality/Strength and Isolation

A successful SpotCell installation, that maximizes coverage area, is dependent on good signal quality and strength as well as isolation.

The quality and strength of the signal received by the SpotCell Donor Unit (DU) has the most impact on system performance. Poor signal quality is usually caused by the presence of multiple base station signals at the DU.

Poor signal strength at the DU is usually caused by signal degradation (attenuation) from the base station to the SpotCell DU. Signal degradation can be caused by urban obstructions (buildings, walls, underground locations) as well as natural obstructions (foliage, hills, mountains).

A factor, often more easily addressed, is the isolation between the SpotCell DU and Coverage Unit (CU). Isolation is a measure of signal attenuation between the location of the DU and CU. The greater the attenuation between the DU and CU, the better the system gain can be optimized for greater coverage area.

Donor Unit Installation

During installation, the DU must be positioned to receive an adequate signal from the base station. For the SpotCell system to function properly, a signal of no less than -106 dBm in strength is required at the DU.

Although signal strength is sometimes an issue, a more common problem with high-rise applications is poor signal quality. The main reason for this poor signal quality is the presence of similar level signals from multiple base stations. Poor signal quality is typically classified as “Pilot pollution” or “co-channel collision”.

Installing the DU in the correct position will eliminate or reduce the problems caused by poor signal quality. To correctly position the DU in a high-rise installation, record from the CU (see Figure 1) the following information with the DU placed in different locations throughout the building.

- Number of bars () representing DU RSSI.
- Channel number (should be constant)
- Signal level fades. If present, fades are indicated by changes in the number of bars displayed when the DU is in a particular location.

While placing the DU in various locations, ensure that the DU is:

- at least 2ft from metallic thermal glass (Reference *SpotCell Application Note 102 Effects of Metallized Glass on Donor Unit*)
- pointed in a downward position. The downward orientation will help to align to a single Base Station, avoiding pilot pollution and co-channel collision.

The DU location with the highest RSSI, lowest fading, and a steady channel number, will be the best spot for the DU to receive the quality of signal needed by the SpotCell system to provide good wireless coverage.

Coverage Unit Installation

The following actions offer a review of CU placement and are not specific to “high-rise” applications.

As well as signal quality and strength, the performance of the SpotCell system is also dependent on the level of isolation. To provide the highest possible level of isolation, the SpotCell DU and CU must be installed as far from each other as the cable permits.

While in “active” mode the CU display will indicate system isolation ( , see Figure 2). The more isolation bars displayed (max. 5 bars) the more the system gain can be optimized to achieve the best possible coverage area.

To determine the optimal location for CU placement, move the CU about the desired coverage location, while monitoring the isolation indicator. Place the CU in the location that displays the highest number of isolation bars.

Reference SpotCell [Quick Install Guide](#) and [User Manual](#) for complete installation details.

Verification of System Performance

To verify that the SpotCell system is performing properly, place a call using an appropriate handset and verify operation throughout the desired coverage area.

If the call cannot be processed, additional adjustment of the DU will be required, paying specific attention to the items discussed in the “Donor Unit Installation” section.

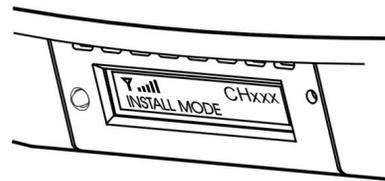


Figure 1 - Install Mode

RSSI Indicator (upper left indicator)

Channel Indicator (upper right indicator)

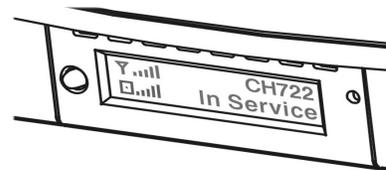


Figure 2 - Active mode

RSSI Indicator (upper left indicator)

System Isolation Indicator (bottom left indicator)