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The AdaptaSite™

General Description:

The AirNet AdaptaSite Radio (AR) is a translating repeater intended for use in PCS1900 communications. The AR can extend the range of large capacity basestation to remote cells. This means the expensive processing required in the basestation can be centrally located and used to control a larger coverage area. Instead of having to purchase multiple BTS units, a service provider can buy a single BTS and multiple ARRs to cover the same area. The AR uses in-band radio frequency channels to backhaul the traffic in the coverage area to and from the serving BTS. For each AR deployed, four downlink frequencies and Four uplink frequencies are necessary. The first frequencies, the ground frequencies, links the mobile station and the AR. The second set of frequencies are the backhaul frequencies which links the AR to its serving BTS. To the mobile user, an AR appears as a Dual channel basestation. The AR provides Four low noise receive paths for each radio channel. The Receive diversity reception ANT connections helps reduce the Rayleigh Fading, which can destroy communication links. Internal processing selects and retransmits the best of these independent receive paths.

Note: the AR does no modulation or demodulation at this time. But Future model will (Therefore it will require Class 2 Change to FCC Part 24 application at later date). Also, 2 different vendors of the power amplifier and modular AC/DC power supply are to be inclusive in the initial submission.

The AR hardware is housed in a NEMA-2 enclosure suitable for a wall or a tower. Five antennas are external to the enclosure and are connected by low-loss RF cable. Four of these antennas are dedicated for transmit and receive of the ground frequencies in the AR cell.. The backhaul antenna provides transmit and receive of backhaul frequencies.

A block diagram of the AR is shown below. The backhaul antenna receives up to 2 channels from its serving Base station in the frequency range of 1930-1990 MHz. It down-converts these signals to an IF, and then Up-converts based on a different LO and re-transmits the channel to the mobile station at a different frequency in the same band via the diplexed ground antennas. This is the downlink path of the AR. Similarly, each of the four antennae receives a single channel from a mobile station in the frequency range of 1850 to 1910 MHz. Two sets of identical paths down-convert the signals to an IF, where the diversity selection is made. The chosen signal is then up-converted based on a different LO and re-transmitted to the Base Station (BTS).