Operational description

Powerwave AR repeaters are used to fill out uncovered areas in cellular mobile systems, such as base station fringe areas, road tunnels, business and industrial buildings, etc. An AR repeater receives signals from a base station, amplifies and retransmits the signals to mobile stations. Also it receives, amplifies and retransmits signals in the opposite direction. Both directions are served simultaneously.

To be able to receive and transmit signals in both directions, the repeater is connected to a donor antenna directed towards the base station and to a service antenna directed towards the area to be covered. Control of the repeaters is performed using a desktop or notebook, which can communicate with the repeaters either locally or remotely via modem. Remote operation can be performed either via PSTN or a GSM net.

Uplink Signal Path

The uplink signal path, i.e. from the mobile station through the repeater to the base station, is identical to the downlink path but the other way round. Only some levels and component values differ.

Downlink signal path

The signal from the base station is received via the repeater BS antenna and is then forwarded through a directional coupler (DC). The signal passes a duplex filter (DPX), is amplified in a low noise amplifier (LNA), and enters the channel boards (CHA), which have two parallel channels each.

The first mixer stage on the CHA amplifier board, which is controlled by a synthesizer, converts the received frequency down to the IF frequency. The signal is then filtered by SAW bandpass filters and, not shown in the figure, amplified before it is fed to the second mixer stage for conversion back to the original frequency. The output signal from the mixer is then amplified in the power amplifier and fed to a combiner, which combines the signals from the two channels on the channel board.

The output signal passes a combiner (CMB), a duplex filter (DPX), and a directional coupler (DC), before it is fed to the repeater MS antenna.