Spotwave Wireless Inc.
1 Hines Road, Unit 204
Ottawa ON K2K 3C7
Canada

Tel: (613) 591-1662
Fax: (613) 591-8107
www.spotwave.com

Subject: Operational Description of Spotcell 612

The SpotCell Outdoor Repeater is a fully adaptive, band-selective, on-frequency repeater for localized outdoor coverage. It uses proprietary, patent-pending, adaptive signal processing technology to implement critical adaptive algorithms that allow SpotCell to be installed and operated with minimal engineering intervention or support, and with no impact on the network. SpotCell's advanced features allows multiple units to be installed in a single sector, and dramatically reduce the cost of providing outdoor coverage as compared to conventional repeaters and or other local coverage enhancers (e.g., micro-cell site).

SpotCell has the following key features:

- Complete "out of the box" coverage solution (i.e., integral antennas, cables, weatherproof enclosures, mounting brackets & hardware).
- Simple, low cost installation. No knowledge of the network or base station locations is required eliminating the need for test equipment or special tools.
- Fully adaptive operation – self-adjusting for gain, isolation and signal levels.
- Distributed Gain Architecture, providing optimum performance through physical isolation.
- Reverse path noise management enables up to 10 units to be used per sector without impacting the noise floor.
- Fully transparent to IS-95, and 1XRTT CDMA technology.
- Carrier specific. Neither enhances nor degrades signals in other sub-bands.
- Full sub-band selectivity to support the various bandwidths of spectrum owned by Sprint PCS. The 5, 10, & 15 MHz bandwidths will satisfy 95% Network Operators requirements with additional variants available to serve the remaining markets.
- Coverage Antenna provides a 60˚ sectorial coverage area.
- Outdoor coverage range of up to 250m (825 ft) for -85 dBm forward path signal.
- Supports all-outdoor installation (NEMA 4 and 13 enclosures).

SpotCell processing is under the control of adaptive algorithm software. The adaptive algorithm continually monitors external and internal operating conditions and adjusts the operating parameters to provide a consistent coverage area while guaranteeing spectrum integrity. SpotCell continually monitors the signal received from the base station and level of isolation between the Donor and Coverage Units. Whenever there is a change in the received signal strength the algorithm adjusts the system gain to ensure a stable coverage area and manage noise levels. The system has been designed so that up to 10 SpotCell 612 units can be deployed in a single base station sector without any perceptible noise contribution.

If the signal from the desired Network Operator's base station were to disappear (during maintenance, for example) the Donor Unit will adjust its parameters based on the best available signal, ensuring continued service. If there is no network signal at all, then SpotCell will revert

to safe mode to protect network integrity. SpotCell automatically returns to full operation when the signal is restored.

SpotCell determines the system isolation between the Donor and Coverage Units and establishes the maximum system gain, by detecting its own feedback signal at a level that ensures a safe stability margin. Because SpotCell continuously monitors the amount of system isolation it can react immediately to any reduction in isolation by reducing gain. If the isolation level ever becomes very low the entire system will shutdown until the isolation is restored thereby preventing network noise and spurious signals. SpotCell products also use an integrated antenna technology, which has been optimized to provide a high degree of isolation between the donor and coverage units. In combination with the adaptive algorithms used to manage the system stability, this design approach maximizes the coverage available for a given amount of isolation, both at installation and throughout its deployment. The integrated design also maximizes the EIRP and sensitivity provided by the system PA and LNA.

By comparison, conventional repeaters are supplied with generic antenna interfaces requiring a considerable amount of engineering to maximize their coverage in each installation. Furthermore, because all the system gain is concentrated in one enclosure, the gain available from conventional repeaters is limited by packaging constraints. The distributed architecture used in SpotCell products means that they can provide up to 115dB of system gain. Because of their fixed gain operation, conventional systems need to be set up with a lower overall gain, reducing coverage. The cable losses to the antennas also reduce the sensitivity and EIRP, compared to an equivalent system with integrated antennas. These factors mean conventional repeaters can not be used where the base-station signal level is very low, or where the isolation is limited, and that higher gain, higher cost, antennas are typically required to achieve the same performance as a SpotCell.