HomeCell 2.0
Dual Frequency Bi-Directional Amplifier
Theory of Operation

1.0 Overview

HomeCell 2.0 is a dual frequency bi-directional amplifier for the purpose of boosting "cellular" signals to create coverage where poor or now coverage exists. An omni directional antenna is mounted where good signal exists and a cable is connected between this antenna and HomeCell, the amplifier. The amplifier amplifies the signal it receives from the antenna, amplifies it and retransmits the signal in the area of the HomeCell amplifier. Conversely the cellular telephone signal in the immediate area of HomeCell is received by the amplifier and distributed back to the local cell tower through the cable and the antenna outside the residence.

In addition, HomeCell is capable of performing in both "cellular" bands. These are the 800 MHz "Cellular" band and the 1800 MHz "PCS" bands. This allows for HomeCell to be transparent to the customer's cellular usage.

2.0 Operational Specifications

HomeCell 2.0 is a bi-directional dual band RF amplifier.

"Uplink" is defined as HomeCell transmitting amplified cell phone hand set information to the wireless service provider,

"Downlink is defined as the signal from the cellular or wireless provider received by HomeCell and redistributed in the "non-service" area.

The two "bands" are:
1) The traditional "cellular band", (uplink 824-849 MHz), (downlink 869-894 MHz), and
2) The traditional "PCS band", (uplink 1850-1910 MHz), (downlink 1930-1990MHz)

Signal protocol supported TDMA, CDMA, GSM850, GSM1900, AMPS, GPRS, and PCS.

The maximum output power of the Cellular Band Uplink is 3 watts.
The maximum output power of the PCS Band Uplink is 2 watts.

Uplink maximum gain in both bands is 55 dB.
Downlink maximum gain in both bands is 60 dB.

DC Power is supplied via an AC converter with 5 volt/max 1 amp output to connector J7.

3.0 Internal Operation

Downlink Circuitry - Input to the downlink circuitry starts at the BNC connector J6 per the schematic diagram. The two bands are then separated through a duplexer and each band subsequently passes through another duplexer to separate the transmit form the receive bands.

The downlink signal is then processed through a series of band pass filters and amplifiers to give the desired output. The amplified downlink signal is then re-coupled to the uplink signal and the other band respectively and presented at the into antenna connector J5.

Uplink Circuitry – Input to the uplink circuitry is the reverse path of the downlink circuitry. Input to the uplink circuitry starts at the connector J5. The two bands are then separated through a duplexer and each band subsequently passes through another duplexer to separate the transmit form the receive bands.

The uplink signal is then processed through a series of band pass filters and amplifiers to give the desired output. The last amplifier stage is a feedback controlled amplifier that maintains signal output to the required 3 watts for the “cellular” band and 2 watts for the “PCS” band . The amplified uplink signal is then re-coupled to the downlink signal and the other band respectively and presented at the into antenna connector J6.