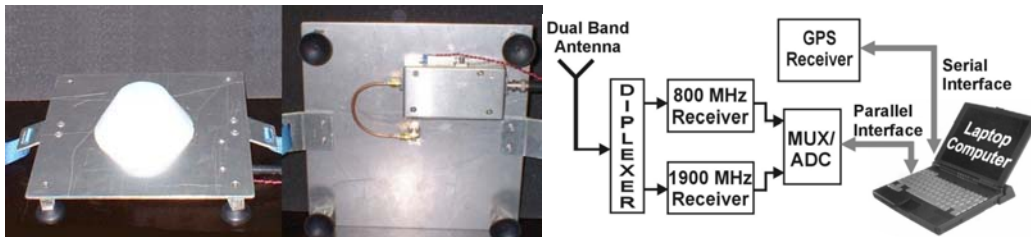


RF Field Mapping System for Cellular Base Stations

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Opposition to cellular base station siting based on concerns about possible adverse health effects persist. Reports of research linking electromagnetic energy from mobile handsets to cancer fuel these fears despite the obvious difference in exposure levels between handset and base station emissions. Allaying these fears using existing data for base station emissions, if available, is difficult since it usually consists of spot measurements taken many months or years previously. The general public's belief that the build-out of additional services is accompanied by a concurrent rise in power levels generally leads to suspicion of the old data. There is a desire to know current emission levels especially in residential areas, school zones and hospitals.

The goal of this work is to develop specialized instrumentation for measuring the patterns of radiofrequency (RF) field intensity in areas near base stations. We have developed low-cost, portable equipment capable of measuring the total RF power density (PD) in the two mobile cellular bands (800 MHz and 1900 MHz) versus geographic position measured with a Global Positioning Satellite (GPS) receiver. The equipment consists of a dual band antenna/diplexer, a direct conversion receiver for each band, an analog-to-digital converter (ADC) and the GPS receiver (Magellan Meridien). A photograph of an early prototype (less the GPS) is shown below along with its block diagram.



Digitally sampled PD outputs are fed to the parallel port of a laptop computer while the GPS data is read from a serial port. The software controls selection of the band, timing of the readings and storage of the data in text files for later use with a spreadsheet. For vehicle mounted operation, measurements can be taken at either regular time or distance traveled intervals. An example of vehicular measurements (800 MHz) taken in the city of Ottawa is shown in the plot below. All PD levels are referenced to the Canadian Safety Code 6 exposure limit for the 800 MHz band.

