Measuring and GeoMapping Ambient RF Energy for Battery Free Applications

Pandian, Vikram

Recent research efforts in ambient RF energy harvesting are being focused on designing ultra-low power battery free products and maximizing the efficiency of RF harvesting circuits. But the vital information that researchers lack in is how much RF energy is present at a given geographical location and whether their product will be getting enough power to operate at that specific area of usage. The objective of this project is to find the amount of ambient RF energy available in a given location to power battery free products. This will be achieved by designing and building a novel, handheld, low cost, RF Power Measurement and Mapping System to measure the DC power level that can be harvested from the ambient RF signals (such as cellular signals, TV broadcasting waves, and WiFi signals) and visually GeoMap it using the GPS coordinates. The constructed hardware portion of the RF Power Measurement System consists of the Arduino microcontroller which houses the RF Power Detector chip, wideband antenna, Bluetooth Module, and connecting wires. The Arduino is programmed to capture the RF Power data from the RF Power Detector chip and send it to the Mobile Application. The developed Android App is able to communicate with the Arduino via Bluetooth and receive the captured RF Power data from it. The data is uploaded to the webserver along with GPS coordinates. The created website stores the uploaded data from the app to the online database. This data is then GeoMapped, which visually represents the areas with the various RF Power levels. In conclusion, a RF Power Harvest Meter has been successfully designed and calibrated for statistical uses. The device is able to precisely measure the RF Power Level at a specific GPS Location and Geo-Map it on a server.

Awards Won:

Fourth Award of $500