ABSTRACT

Indonesia is a disaster sensitive area that can cause the Global System for Mobile Communication (GSM) service damaged. Therefore, a low cost and easy install GSM service is needed to overcome these issues. Open Base Transceiver Station (OpenBTS) is one of the option that can be used. Not only can connected to existing cellular network, OpenBTS can also stand alone as a private network.

In this final project study, OpenBTS coverage area design on Institut Teknologi Telkom campus area made consists of two phases; capacity design and coverage design. There are two design scenarios in this final project, namely balanced user distribution and unbalanced user distribution. Both of them use three conditions, *low-rate* (the ratio of active and idle users is 0,1), normal (0,1183), and high-rate (0,2). Capacity design produces the cell radius value and the number of cells. The second phase consists of radio link budget calculation based on service availability at the cell-edge standard (also called coverage probability at the cell-edge) and simulation to obtain the average value of Receive Signal Level (RSL). The propagation model used is COST-Hata and the frequency band is DCS 1800 MHz. Atoll 2.8.1 software is used to simulate the design in order to obtain the average value of RSL.

The number of cells needed to cover Institut Teknologi Telkom campus area according to the result of the design is obtained between 10-20 cells. Cell radius between 58.23 to 107.73 meters. Maximum path loss is obtained between 93.27 dB to 100.75 dB. As for the Maximum Allowable Path Loss (MAPL) based on service availability at the cell-edge standard is obtained 99.9223 dB. Maximum base station transmit power of all conditions is 9.54 dB_m or below the maximum transmit power capability of OpenBTS, which is 20 dB_m. The average value of RSL based on simulation results is obtained between -89.35 dB_m to -85.03 dB_m. All conditions except low-rate of unbalanced user distribution condition meet the 75% availability standard. While, low-rate of unbalanced user distribution condition itself only achieves 72%, so it does not meet the service availability at the cell-edge standard.

Keywords: coverage area, GSM, atoll, OpenBTS, service availability at the cell-edge (coverage probability at the cell-edge), receive signal level