

## ABSTRACT

Community needs for data communications requires data exchange process is fast, easy and mobile. To meet this requirement, 3GPP issues HSDPA technology (High Speed Downlink Packet Access) which belong to the 3G generation. Indoor users who crowded the great buildings such as shopping centers, offices and other public places often get poor HSDPA signal quality. This is caused by the construction of buildings with a variety of materials that become a barrier signal propagation and worsens the quality of service perceived by users. One of the possible solutions or alternatives to these problems is the femtocell.

In this Final Project, performance measurements done on indoor HSDPA data services that include assessment of parameters RSCP (Receive Signal Code Power),  $E_c / N_0$  (Energy per chip-to-Total Noise) and the throughput received by user. Obtained an average value of RSCP is -98,7783 dBm, the average value of  $E_c / N_0$  is -9,96 dB, and the average throughput values is 94,29 kbit/s. Obtained from these results that the push factors needed femtocell is in terms of coverage.

Calculation of the number of femtocells needed in building B using COST 231 Multiwall propagation model that takes into account loss of wall and floor which the signal through and obtained the number of femtocells as many as 15 pieces. Placement of 15 pieces femtocells deployed on three different floors with the distribution of 6 pieces on the first floor, 5 pieces on the second floor, and 4 pieces on the third floor. Femtocell placement simulation using RPS (Radiowave Propagation Simulator) software. The output is in terms of coverage of the plot, best serving transmitter, and the spread of the signal to interference ratio. From the result showed an average coverage on the first floor is - 60.20 dBm, - 64.91 dBm on the second floor and - 65.08 dBm at the third floor. While the SIR average on the first floor is 16.84 dB, 25.10 dB average on the second floor and average 27.32 dB on the third floor.

**Keyword : 3G, HSDPA, femtocell**