

## ABSTRACT

Indonesian topology condition is archipelago and reach service from terrestrial cellular communication system is limited in urban and suburban area, enable in a cellular terrestrial network planning use satellite link, particularly to serve user in rural area.

In this Final Task is made GEO satellite link planning with satellite is used Telkom-2 satellite. Link planning involves choosing ground segment technologies are modulation technique, coding, and earth station antenna diameter transmitter and receiver. These parameters decide power transmit per carrier in order result of link planning is recommended. The most efficient result of link planning which is support the development of GSM network consist of two BTS with each earth station transmitter and receiver technology are use 8-PSK modulation, and turbo coding, with earth station transmitter antenna diameter (TX) = 3.8 meter and earth station receiver antenna diameter (RX) = 3.8 meter both link Denpasar-Moni and vise versa. Power transmit required per carrier SB 1 for link Denpasar-Moni is 3.35 dBw and link Moni-Denpasar for SB 1 is 3.71 dBw. And power transmit required per carrier SB 2 for link Denpasar-Moni is 3.44 dBw and link Moni-Denpasar for SB 2 is 3.81 dBw. Transponder power per carrier utilization SB 1 for link Denpasar-Moni is 2.16 % from overall satellite amplifier transponder and link Moni-Denpasar for SB 1 is 2.41 %. Transponder power per carrier utilization SB 2 for link Denpasar-Moni is 2.20 % from overall satellite amplifier transponder and link Moni-Denpasar for SB 2 is 2.47 %. Bandwidth transmit required per carrier utilization is 3.54 % from overall satellite transponder (36 MHz) for both link Denpasar-Moni and vise versa, so total transponder bandwidth utilization is 7.08 % or 2.5488 MHz. Satellite operation is bandwidth limited.

Satellite transponder utilization per carrier in the optimal bandwidth and power are used in GSM (*Global System for Mobile*) cellular communication system development involve signal transmission between BSC (*Base Station Controller*) with BTS (*Base Transceiver Station*).

Digital satellite communication performance can be measured from BER (*Bit Error Rate*) receive signal at earth station, in this planning is  $10^{-8}$ .