

ABSTRACT

Nanosatellite use Low Earth orbit for their orbit, using Low earth orbit for their orbit offer some advantages, such as shorter time-delay propagation and smaller propagation attenuation, compared to MEO and GEO. Beside compare to the others orbit, LEO has multipath fading advantage compare to terrestrial mobile communication system. Even LEO offers some advantage, but LEO has some disadvantages too. Doppler Effect is one of the disadvantages in Low Earth Orbit, beside Doppler Effect, LEO has the others disadvantages such as brief time-visibility. Beside of disadvantages of the propagation in LEO, nanosatellite has disadvantage in power limited of system.

Data transmission on nanosatellite use a variety of ways to overcome the various problems caused by unstable conditions of propagation channel, one of them is the technique of error correction channel coding techniques. The addition of Forward Error Correction (FEC) is expected to reduce the quantity of bit error rate (BER) as an impact of a large data transfer fast and beside of power limited in nanosatellite data transmission. One of Forward Error Control type is Turbo Code.. The advantage of turbo code is a minimum power usage at each modulation so possible to send of the very low power level signal.

Based on the overall simulation results, we can conclude that using Turbo code with variation of code rate, modulation, interleaver and constraint length can get a BER increasing too, with FEC code rate and modulation system that influence to quantity of bit rate. To get a quality BER as a big 10^{-4} , on code rate 1/3 needed SNR 1,8 dB with a coding gain as a big 6,2 dB. Modulator using a BPSK signal modulation get a better performance than QPSK because it can reach a BER target 10^{-4} in SNR as a big 4 dB with coding gain as a big 3,5 dB and the use of the Random interleaver shows excellent performance in terms of improving the BER. When system using a Random Interleaver BER target BER 10^{-4} can be reached at SNR 7,5 dB with coding gain as a big 1 dB, with bit rate optimum 13,8 Mbps in recommendation system from this simulation by FEC turbo code 1/3 and BPSK modulation system. For elevation angel that change from 0° to 180° , the system can increase the bit rate with combination of code rate FEC and modulation system, and bit rate maximum can be reached at elevation angel 90° in 55,55 Mbps, with code rate FEC of turbo code and QPSK modulation.

Key word: nanosatellite, turbo code, bit rate