ABSTRACT

A mobile voice channel is a high priority service in cellular communication systems, has a wide coverage, and is almost always available. With these advantages, mobile voice channels can be used to transmit digital data remotely in rural areas that are not covered with 3G/4G networks. In a mobile voice channel, the Adaptive Multi Rate (AMR) whose rate can vary from 4.75 to 12.2 kbps is used today as a vocoder. In data communication through AMR channel with non-adaptive modulation, the modulation configuration must work on the lowest AMR rate, so the configuration is not optimal for higher channel rates. To optimize the data transmission rate within an AMR channel, we proposed an adaptive M-ary Frequency Shift Keying (MFSK) modulation method with a zero crossing demodulator. The Adaptive MFSK modulation is designed to adjust its modulation configurations based on a quality of the channel that shown by vocoder rate. In this project, using signal quality indicator provided by GSM modem, the modulator adjust its symbol time length to fit the maximum bit error rate (BER). Demodulator detects the symbol without need the symbol length information and counts the bit error rate. The adaptive MFSK modulation proposed in this research has higher data rate than fixed lower

rate modulation in the similar BER range. The adaptive modulation has lower BER than fixed higher rate modulation in the similar data rate range.

Keywords: adaptive modulation, MFSK, voice channel, zero crossing demodulator, adaptive multi rate.