

ABSTRACT

This thesis studies Low Density Parity Check (LDPC) codes of Digital Video Broadcasting Second Generation (DVB-T2) to obtain good structure and performances for Indonesia DVB-T2 channel model. The first step of this thesis simulates performances of LDPC codes from DVB-T2 standard in Indonesia DVB-T2 channel model using computer-based simulation. All the code rates of DVB-T2 LDPC codes are evaluated, of which has a chance to become parameter for digital television standard in Indonesia can be known. This thesis also propose a modified DVB-T2 LDPC codes for standard of Indonesia.

To reduce the computational complexity of encoder and decoder, this thesis uses a downscaling technique and proposes downscaling technique using Progressive Edge-Growth (PEG) algorithm for LDPC codes of DVB-T2 with a reduced block length of 16200 bits to 270 bits. The results of downscaled LDPC codes are also expected to be used for devices consuming low power and low complexity such as device for Internet of Things (IoT) and drones.

This thesis obtained following results: (i) the structure of DVB-T2 LDPC codes with block length 16200 and 270 for each code rate, (ii) a technique for designing LDPC codes without girth 4 for LDPC codes construction, (iii) proposed technique to calculate girth from LDPC codes, and (iv) the simulation results showing acceptable Bit Error Rate (BER) performances of DVB-T2 LDPC codes under Additive White Gaussian Noise (AWGN) and frequency selective fading channel using Indonesia DVB-T2 channel model. The results of this thesis are expected to fasten the DVB-T2 implementation in Indonesia and assist in the development of small-sized LDPC codes for devices with low power and complexity.

Keywords: *Error correction coding, DVB-T2, LDPC codes, code rate*