

ABSTRACT

DCS 1800 is *Digital Cellular System on 1800 Mhz band frequency* which developed by ETSI (*European Telecommunication Standards Institution*). This system is a derivation from GSM 900 Mhz which is a success cellular standard widely used in many European and Asia countries. On BTS, a cellular communication system frequency band is divided into uplink and downlink frequency. Uplink frequency is the frequency that is used to send the signal from mobile station to BTS, while downlink frequency is the frequency that is used to send the signal from BTS to Mobile station. On DCS 1800 the uplink frequency band is 1710 MHz-1785 Mhz and the downlink frequency band is 1805MHz - 1880 MHz.

Generally, the existing transmission system in telecommunication network has higher capacity than it's actually needed by one user, thus it is possible to use the existing bandwidth as efficient as possible by more than one user. The technique to combine many signals then transmit them at the same time in one transmission canal is called *multiplexing*, and the equipment is called *multiplexer* (mux) while at the receiver, those signal combination is split based on their destination. This process is called demultiplexing, and the equipment that performed it is called *demultiplexer* (demux).

In this final project the realization of an RF Multiplexer for 1800 Frequency is done with Manifold-Coupled method using micro strip line made by duroid substance, filter chebychev with 0.1 dB ripple, using 1805-1880 MHz as the operating frequency which is the downlink frequency of DCS 1800 where the bandwidth of each sub-band is 15 Mhz. The result of the realization are 6.11 dB Insertion Loss and 20.61 dB Return Loss on center frequency of 1812.5 MHz, 10.10 dB Insertion Loss and 18.51 dB Return Loss on center frequency of 1842.5 MHz, and 9.21 dB Insertion Loss and 19.19 dB Return Loss on center frequency of 1872.5 MHz.

Key words : *Multiplexer, Manifold-Coupled, mikrostrip*