

## DAFTAR ISI

|  |             |
|--|-------------|
| <b>LEMBAR PENGESAHAN</b> .....                                 | <b>ii</b>   |
| <b>LEMBAR PERNYATAAN ORISINALITAS</b> .....                    | <b>iii</b>  |
| <b>ABSTRAK</b> .....   | <b>iv</b>   |
| <b>ABSTRACT</b> .....  | <b>v</b>    |
| <b>UCAPAN TERIMAKASIH</b> .....                                | <b>vi</b>   |
| <b>KATA PENGANTAR</b> .....                                    | <b>vii</b>  |
| <b>DAFTAR ISI</b> .....  | <b>viii</b> |
| <b>DAFTAR GAMBAR</b> .....                                     | <b>xi</b>   |
| <b>DAFTAR TABEL</b> .....                                      | <b>xiii</b> |
| <b>DAFTAR ISTILAH</b> .....                                    | <b>xiv</b>  |
| <b>DAFTAR SINGKATAN</b> .....                                  | <b>xv</b>   |
| <b>DAFTAR LAMPIRAN</b> .....                                   | <b>xvi</b>  |
| <b>BAB I PENDAHULUAN</b> .....                                 | <b>18</b>   |
| 1.1 Latar Belakang Masalah .....                               | 18          |
| 1.2 Rumusan Masalah .....                                      | 19          |
| 1.3 Tujuan Penelitian .....                                    | 20          |
| 1.4 Batasan Masalah .....                                      | 20          |
| 1.5 Metode Penelitian .....                                    | 21          |
| 1.6 Sistematika Penelitian .....                               | 22          |
| <b>BAB II DASAR TEORI</b> .....                                | <b>23</b>   |
| 2.1 <i>Radio Over Fiber</i> .....                              | 23          |
| 2.1.1 Kelebihan <i>Radio Over Fiber</i> .....                  | 25          |
| 2.1.2 Keterbatasan <i>Radio Over Fiber</i> .....               | 26          |
| 2.2 <i>Phase-Shift Keying</i> .....                            | 26          |
| 2.2.1 <i>Binary Phase-Shift Keying (BPSK)</i> .....            | 27          |
| 2.2.2 <i>Quadrature Phase-Shift Keying (QPSK)</i> .....        | 27          |
| 2.2.3 <i>Offset Quadrature Phase-Shift Keying (OQSK)</i> ..... | 28          |
| 2.2.4 <i>Coherent Phase-Shift Keying (CPSK)</i> .....          | 28          |
| 2.2.5 <i>Differential Phase-Shift Keying (DPSK)</i> .....      | 28          |
| 2.3 <i>Mach-Zehnder Modulator</i> .....                        | 29          |

|   |  |           |
|---|--|-----------|
| 2.4                                       | <i>Optical Amplifier</i> .....   | 30        |
| 2.4.1                                     | <i>Erbium-Doped Fiber Amplifier (EDFA)</i> .....                       | 31        |
| 2.5                                       | <i>Line Coding</i> .....   | 32        |
| 2.5.1                                     | <i>Return to Zero (RZ)</i> .....                                       | 32        |
| 2.5.2                                     | <i>Non-Return to Zero (NRZ)</i> .....                                  | 33        |
| 2.6                                       | <i>Eye Diagram</i> .....   | 33        |
| 2.7                                       | <i>Parameter Analisis</i> .....  | 35        |
| 2.7.1                                     | <i>Power Link Budget (PLB)</i> .....                                   | 35        |
| 2.7.2                                     | <i>Rise Time Budget (RTB)</i> .....                                    | 36        |
| 2.7.3                                     | <i>Signal to Noise Ratio (SNR)</i> .....                               | 37        |
| 2.7.4                                     | <i>Q-Factor</i> .....  | 38        |
| 2.7.5                                     | <i>Bit Error Rate (BER)</i> .....                                      | 38        |
| <b>BAB III PERENCANAAN SISTEM</b> .....   |  | <b>39</b> |
| 3.1                                       | <i>Diagram Alir Penelitian</i> .....                                   | 40        |
| 3.2                                       | <i>Model Sistem</i> .....  | 40        |
| 3.3                                       | <i>Penentuan Parameter</i> .....                                       | 41        |
| 3.3.1                                     | <i>Parameter Transmitter Block</i> .....                               | 42        |
| 3.3.2                                     | <i>Parameter Optical Link</i> .....                                    | 42        |
| 3.3.3                                     | <i>Parameter Receiver Block</i> .....                                  | 43        |
| 3.4                                       | <i>Skenario Penelitian</i> .....                                       | 44        |
| 3.5                                       | <i>Perhitungan Parameter Performansi</i> .....                         | 44        |
| 3.5.1                                     | <i>Perhitungan Power Link Budget (PLB)</i> .....                       | 45        |
| 3.5.2                                     | <i>Perhitungan Rise Time Budget (RTB)</i> .....                        | 46        |
| 3.5.3                                     | <i>Perhitungan Signal to Noise Ratio (SNR)</i> .....                   | 47        |
| 3.5.4                                     | <i>Perhitungan Q-Factor</i> .....                                      | 48        |
| 3.5.5                                     | <i>Perhitungan Bit Error Rate (BER)</i> .....                          | 48        |
| 3.6                                       | <i>Set Up Simulasi Jaringan Radio over Fiber</i> .....                 | 49        |
| <b>BAB IV ANALISIS DAN SIMULASI</b> ..... |  | <b>51</b> |
| 4.1                                       | <i>Hasil RF Spectrum Analyzer</i> .....                                | 51        |
| 4.2                                       | <i>Hasil Optical Spectrum Analyzer</i> .....                           | 52        |
| 4.3                                       | <i>Analisis Hasil Simulasi Terhadap Power Link Budget</i> .....        | 53        |
| 4.4                                       | <i>Analisis Hasil Perhitungan Terhadap SNR, Q-Factor dan BER</i> ..... | 55        |

|   |           |
|---|-----------|
| 4.5 Analisis Hasil Simulasi Terhadap <i>Q-Factor</i> dan BER..... | 56        |
| 4.5.1 Analisis Hasil Simulasi Terhadap <i>Q-Factor</i> .....      | 56        |
| 4.5.2 Analisis Hasil Simulasi Terhadap BER .....                  | 58        |
| <b>BAB V KESIMPULAN DAN SARAN .....</b>                           | <b>60</b> |
| 5.1 Kesimpulan.....   | 60        |
| 5.2 Saran .....   | 61        |
| <b>DAFTAR PUSTAKA .....</b>                                       | <b>62</b> |
| <b>LAMPIRAN.....</b>  | <b>64</b> |