Chapter 4
Conclusion

4-1 Conclusion

We have presented a theoretical model for the SG-DBR laser and the static tuning characteristics have been calculated. We simulate the spectra of the sampled gratings, derive the oscillation conditions, and simulate the characteristics of oscillation conditions such as oscillation wavelengths, the threshold gain and spectra of the sampled gratings with and without current injection in the sampled grating sections. We find that by current injection to the SG sections, the refractive index changes due to the free-carrier plasma effect, and this in turn changes the effective corrugation period and the Bragg frequency. The SG-DBR laser offers a unique combination of wide tuning range, good SMSR, and narrow linewidth. In addition, we demonstrate the SG-DBR laser can tune from 1521 nm-1573 nm include C band and observe the line-width of the SG-DBR laser is 4.7 MHz and switching time < 200 ns. Further, we demonstrate the SG-DBR laser can provide 40 ITU wavelength channels of 100GHz channel spacing with side-mode suppression ratio (SMSR) > 40dB, the output power greater than 7dBm, and a wavelength stability better than ± 1 GHz.