The low frequency compressional magnetic perturbations, $\delta B_{\parallel}$, are commonly neglected in gyrokinetic simulations, which assume a low β plasma (β is the ratio of kinetic pressure to magnetic pressure). In the gyrokinetic theory, the fundamental operation of gyro-phase averaging reduces the number of dynamical variables from six to five. Consequently, the perpendicular Ampere's law for vector potential $\delta\vec{A}_{\perp}$ with two degrees of freedom may be replaced by the low frequency force balance equation with one degree of freedom. In this presentation the gyrokinetic-Maxwell system of equations is expressed fully in terms of the compressional component of the magnetic perturbation, $\delta B_{\parallel}$. This introduces a "gyro-surface" averaging of $\delta B_{\parallel}$ in the gyrocenter equations of motion; and similarly in the perpendicular Ampere's law, which takes the form of the low frequency perpendicular force balance equation. Since for global simulations in which equilibrium nonuniformities are important the spectral approach is in general difficult to implement, the gyro-surface averaging may be replaced by a discrete sum in the configuration space. For the typical wavelength of interest (on the order of the gyroradius), the gyro-surface averaging can be reduced to averaging along an effective gyro-orbit. The phase space integration in the force balance equation can be approximated by summing over carefully chosen samples in the magnetic moment coordinate, allowing for an efficient numerical implementation.