Magnetic domain wall phases in perpendicularly magnetized ultrathin films. NIDAL ABU-LIBDEH, DAVID VENUS, Department of Physics and Astronomy, McMaster University — At low temperature, the ground state of a perpendicularly magnetized ultrathin film is the stripe domain state with an equilibrium density \( \langle n \rangle \) of domain walls that respond to the applied magnetic field with an equilibrium magnetic susceptibility \( \sim 1/\langle n \rangle \). The change in domain density with temperature involves the creation/annihilation of domain walls. We propose a simple relaxation model in which the domain wall creation/annihilation is an activated process. The model predicts a non-equilibrium domain density and thus an effective susceptibility that depends on the time scale of the measurements. We have measured the ac-magnetic susceptibility of perpendicularly magnetized ultrathin Fe films on a 2 ML Ni/W(110) substrate, as a function of temperature while changing the temperature at different heating rate \( R \) between 0.03K/s and 1K/s. In the low temperature range, the model calculations provide a consistent explanation of the measured susceptibility. In the high temperature range, the susceptibility measured with low heating rates \( 0.03K/s - 0.1K/s \), deviates from the calculation due to an increase of the high temperature half-width of the susceptibility. This has been tentatively interpreted as a phase change from the stripe domain phase to the tetragonal phase in which the domains have no preferred direction.