Recently DeMille et al. \textsuperscript{a} proposed using \(^{87}\text{SrF}\) and other heavy diatomic molecules to measure nuclear spin-dependent parity violation (NSD-PV). In this scheme the \(N=0\) (+-parity) levels of the \(X^2\Sigma^+\) \((v=0)\) state will be magnetically tuned into near degeneracy with the \(N=1\) (-parity) levels. The pairs of nearly degenerate levels are mixed by NSD-PV interactions. The process will be monitored using the optical \(A^2\Pi-X^2\Sigma^+\) transition. Here we report on the analysis of the \(1,0\) band for \(^{88}\text{SrF}\) and the \(0,0\) band for \(^{87}\text{SrF}\) of the \(A^2\Pi-X^2\Sigma^+\) system recorded at near natural linewidth limit. A combined fit of the optical spectra with the previously recorded rf-transitions\textsuperscript{b} and pure rotational transitions\textsuperscript{c} was performed.