Phase Shift Cavity Ring Down (PS-CRD) spectroscopy was used for the detection of \((v = 0 \rightarrow 6)\) C-H vibrational transition of deuterated methanes and the \((v = 0 \rightarrow 5)\) transition of HD at room temperature. A continuous wave dye laser in the wavelength range from 600 to 650 nm and with a 0.5 cm\(^{-1}\) resolution was electro-optically modulated, and passed through an optical cavity. The change in the phase angle of the modulated laser beam after passing through the cavity was recorded as a function of the wavelength. Absolute cross sections were obtained.