The electric field gradient (efg) at the Nb site in the intermetallic compounds Nb$_3$X (X = Al, In, Si, Ge, Sn) was measured by the Perturbed Angular Correlation (PAC) method using the well-known gamma-gamma cascade of 133 - 482 keV in $^{181}$Ta from the $\beta^-$ decay of $^{181}$Hf, substituting approximately 0.1 atom percent of Nb. The PAC results show that $V_{zz}$ drops by nearly 40% when X changes from Al to In, and by about 25% when X changes from Si to Ge and Sn. This behavior is most probably related to the change in the degree of sp hybridization in these compounds. The $V_{zz}$ values of the studied compounds do not follow the well known universal correlation for the efg's in non-cubic metals but the observed trend is well reproduced by results of ab-initio electronic structure calculations. In the case of Nb$_3$Al a linear temperature dependence of the quadrupole frequencies was observed in the temperature range of 6.5 to 1210 K.

**Key words:** Electric Field Gradient; PAC Measurements; Nb-based Alloys; Quadrupole Interactions.