$$\left| \frac{1}{n} \sum_{i \in [n]} \ell(x_i, y_i; A_S) - \frac{1}{|S|} \sum_{j \in S} \ell(x_j, y_j; A_S) \right| \leq \mathcal{O}(\delta_s) + \mathcal{O}\left(\frac{1}{\sqrt{n}} \right)$$