Let $\ell = \frac{n}{k}$. The repeated subsequence has length at most $\lfloor \ell \rfloor \le 7$.
1. dfs, there are only ℓ possible characters with frequency $\ge \frac{1}{\ell}$. $O(\ell! \cdot n)$.
2. randomly select an interval with length $\ell + 1$ and verify all its $2^{\ell+1}$ possible subsequences. $O(2^\ell \cdot \text{poly}(\ell) \cdot n \cdot \log \frac{1}{\epsilon})$ (the $\text{poly}(\ell)$ factor is improvable). see my article https://leetcode-cn.com/problems/longest-subsequence-repeated-k-times/solution/yi-ge-xi-qi-yi-dian-de-sui-ji-suan-fa-by-kyja/

References