Recall that a locally finite Borel measure μ is said to be C-doubling on $\mathbb{R}^n$ if for any Euclidean ball $B(x,r) \subset \mathbb{R}^n$ we have

$$\mu(B(x,2r)) < C\mu(B(x,r))\,.$$

Explicitly construct a measure on $\mathbb{R}$ which is C-doubling for some $C > 1$ and is singular with respect to Lebesgue measure on the real line.