Bandwidth required...

$r_b = 1\,\text{Mbit/s}$

$r_c = \frac{r_b}{2} = 3\,\text{Mbit/s}$

$B_T = \frac{r_c}{2}(1+\delta) \Rightarrow B_{T\,min} = \frac{r_c}{2} = 1{,}5\,\text{MHz}.$