

## Example

$$R_b = 10 \text{ kbps}$$

$$W_1 = 2 \text{ MHz}$$

$$W_2 = 200 \text{ MHz}$$

### • FDMA :

$$W = k \cdot z R_b$$

$$\longrightarrow k_1 = 100$$

$$k_2 = 10000$$

### • TDMA :

$$W = k \cdot z R_b$$

$$\longrightarrow k_1 = 100$$

$$k_2 = 10000$$

### • DS-CDMA

$$P_e = 10^{-3} \equiv \text{SINR} = 4.85$$

$$W = z/T_c$$

$$\longrightarrow T_{c1} = 1 \mu\text{sec} \quad \& \quad T_{c2} = 0.01 \mu\text{sec}$$

$$R_b = 10 \text{ kbps}$$

$$\longrightarrow$$

$$T_b = 100 \mu\text{sec}$$

$$k = 1 + \frac{z T_b/T_c}{\text{SINR}}$$

$$\longrightarrow k_1 = 42$$

$$k_2 = 4124$$

for  $\alpha = 35\%$

$$k = 1 + \frac{z T_b/T_c}{\alpha \cdot \text{SINR}}$$

$$\longrightarrow k_1 = 118$$

$$k_2 = 11783$$

### • Slow FH-CDMA

$$P_e = 10^{-3}$$

$$W = z/T_c$$

$$\longrightarrow T_{c1} = 1 \mu\text{sec}$$

$$T_{c2} = 0.01 \mu\text{sec}$$

$$\longrightarrow N_{f1} = 100$$

$$N_{f2} = 10000$$

$$W = N_f \cdot z/T_b$$

$$P_e = 1 - \left(1 - \frac{1}{N_f}\right)^{k-1}$$

$$\left(1 - \frac{1}{N_f}\right)^{k-1} = 0.999$$

$$k = 1 + \frac{\ln 0.999}{\ln (1 - 1/N_f)}$$

$$\longrightarrow k_1 = 1$$

$$k_2 = 11$$