Channel capacity:

$$C = B \cdot \log_2\left(1 + \frac{S}{N}\right)$$

B / Hz

$\text{Log}_{(a)}(x) = \ln(x)/\ln(a)$

1. $\frac{S}{N} = 7 \qquad B = 4000\ Hz$

$$C = 4000 \cdot \log_2(1+7) = 4000\left(\ln(8)/\ln(2)\right)$$

$$= 12000\ bps = 12\ Kbs$$

2. $\frac{S}{N} = 15 \qquad B = 3000\ Hz$

$$C = 3000 \cdot \log_2(1+15) = 3000\left(\ln(16)/\ln(2)\right)$$

$$= 12000\ bps$$

3. $\frac{S}{N} = 3162 \qquad B = 3000$

$$C = 3000 \cdot \log_2(1+3162) = 3000\left(\ln(3163)/\ln(2)\right)$$

$$= 34881.23352\ bps$$