

ABS Seminar no.3

T.1

Let the LTE system use bandwidth: $W = 5[\text{MHz}]$, what is the maximum possible data rate when RCF shaping is used and $\rho = 0,22$ for modulations:

- a) QPSK
- b) 16QAM
- c) 64QAM

T.2

The transmission system has at the input of the decision block SNR: $\frac{S}{N} = 35$. We assume transmission over the AWGN channel, while the available bandwidth is: $W = 2400 \text{ Hz}$.

- a) What can be for a given ratio $\frac{S}{N}$ max. data rate?
- b) What must be the min. ratio of $\frac{S}{N}$ if we require a data rate $R_b = 4800 \text{ b/s}$?

T.3

Let assume that $\gamma \rightarrow 0$ (or $W \rightarrow \infty$) calculate the limit for minimal value of $\frac{E_b}{N_0}$ in dB below which can be no error-free communication at any information rate. Use the identity: $\lim_{x \rightarrow 0} (1+x)^{1/x} = e$.