

Mobile Communications

Problem Set 3

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1. Name and explain the different multiplexing procedures known from the lecture.
2. What is the limiting factor for the number of users in TDM/FDM and CDM systems?
3. What is described by the term "cell breathing"?
4. You are a mobile network operator assigned to cover the island of Rügen with an area of nearly $A = 1000 \text{ km}^2$. The bidding regulation enforces that your network must support at least $2 \cdot 10^4$ simultaneous connections over the whole island. To provide reasonable performance you demand a cochannel interference ratio of at least $\frac{S}{I} = 12 \text{ dB}$. The mobile communication system that you implement has the following properties:
 - area coverage of one cell: $A_{cell} = 2 \text{ km}^2$
 - 200 channels available per cluster
 - assume a loss coefficient of $\gamma = 4$

How would you dimension the deployed clusters?

(Hint: Use the theory provided in lecture 3 for calculating the cluster size N . Assume the following possible values for N : $N \in \{1, 3, 4, 7, 9\}$.)