Experiment No. - 3

AIM **To analyze the effect of propagation path loss exponent on cluster size and Signal to Interference Ratio.**

Theory

Cluster is defined as the group of cells which collectively uses the complete set of available channels. The cluster size N is defined as $N = i^2 + j^2 + ij$.
where i and j are non-negative integers. The signal to interference ratio **(SIR)** for a forward link is defined as

$$\frac{S}{I} = \frac{S}{\sum_{i=1}^{6} Ii}$$

where **S** is the signal power received by the user transmitted by its BS and **Ii** is the interference power received by the user from all the co- channel cells (Reuse)

$$SIR = \frac{R^{-n}}{\sum_{I=1}^{6} Di^{-n}}$$

where **R** is the distance between user and its BS and **Di** is the distance between user and all co channel cell BS. Assume all the co channel cells are at equidistance ($D_1 = D_2 = D_3 = D_4 = D_5 = D_6$)

$$\frac{S}{I} = \frac{R^{-n}}{\sum_{I=1}^{6} Di^{-n}} = \frac{(D/R)^n}{6}$$

$$\frac{S}{I} = \frac{(D/R)^n}{6} = \frac{(\sqrt{3N})^n}{6}$$

Where **n** is the propagation path loss exponent

Problem In a mobile system minimum S/I ratio of 15db is required to maintain a call what should be cluster size when path loss exponent is 3 and 4. If there are 6 co channel cells and analyze the results.

Answer the following question

1. What is the relation between frequency reuse ratio and system capacity?
2. Explain co-channel and adjacent channel interference.
3. Explain channel assignment schemes.

Result Analysis and Conclusion