Fact Sheet Chapter 2

Frequency Planning

$S = kN$

S = # of duplex channels in a cluster
k = # of radio channels
N = # of cells = cluster size

$C = mkN$

C = # of channels in a ~~cluster~~ system
m = # of cluster in the system

$N = i^2 + ij + j^2$ = location of nearest cochannel neighbor

i = # cells along hexagon chain
Turn 60° counter clockwise
j = # of cells to move

B = total Bandwidth = 33 MHz
B_c = channel Bandwidth = 25k × 2 simplex ch.
For $N=4$ # channels/cell = (33m/50k)/4

Cochannel Interference

$$\frac{S}{I} = \frac{(\sqrt{3N})^n}{i_0}$$

n = path loss exponent
i_0 = # of cells in first tier of interferers

$N=7$ $i_0=6$ TDMA $S/I > 15\,dB$

Adjacent Channel Interference

$S/I = 20^{-n}$

Traffic Intensity

$A_u = \lambda H$

A_u = traffic per user (Erlangs)
λ = average call requests/hr
H = length of call (hrs)

$A = U A_u$

A = traffic total in system (Erlangs)
U = # of users

$A_c = A/C$

C = # of channels in system
A_c = traffic per channel (Erlangs)

Grade of Service (GOS)
% of calls blocked
AMPS = 2%

Blocked calls cleared (Erlang B)

$$Pr(\text{blocking}) = \frac{\frac{A^c}{C!}}{\sum_{k=0}^{C} \frac{A^k}{k!}} = GOS$$

See Table 2.4

Blocked calls delayed (Erlang A)

$$Pr(\text{delay} > 0) = \frac{A^c}{A^c + C!\left(1 - \frac{A}{C}\right) \sum_{k=0}^{C-1} \frac{A^k}{k!}}$$

$$D = \text{av. delay} = Pr(\text{delay} > 0)\, \frac{H}{C - A}$$

See ~~Tables~~ figures 2.6 + 2.7
Example 2.4

Cell Splitting
Sectoring