

The relationship between system capacity, voice quality and dropped call rate can be expressed using a common C/I parameter.

The capacity of the cellular system is denoted by 'm' and is given as,

$$m = \frac{B_T^* / B_C}{\sqrt{\frac{2}{3} (C/I)_S}} \quad \dots (1)$$

Where,

B_T / B_C = Total number of voice channels

$(C/I)_S$ = It is the required parameter to design a system.

Equation (1) is acquired by taking in to consideration six co-channel interferes that occur during busy hour that is the equation is acquired in worst case conditions.

Squaring on both sides of equation (1), we get,

$$m^2 = \frac{(B_T / B_C)^2}{\frac{2}{3} (C/I)_S}$$

$$\Rightarrow \frac{2}{3} (C/I)_S = \frac{(B_T / B_C)^2}{m^2}$$

$$\Rightarrow (C/I)_S = \frac{3 (B_T / B_C)^2}{2 m^2}$$

$$\therefore \left(\frac{C}{I} \right)_S = \frac{3 \left(\frac{B_T}{B_C} \right)^2}{m^2} \quad \dots (2)$$

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