9.11 Pathloss Correlation

The concept of a simple correlation model for shadow fading has been widely adopted in LTE co-existence studies mostly employed in uplink case. The propagation attenuation is modelled as the product of the path loss and the shadow fading. The shadow fading is well approximated by a log-normal distribution. Let z denotes shadow fading in dB with zero mean and variance σ^2. Then the shadow fading of path from one UE to the *i-th* BS is expressed as

$$\mathrm{zi} = \mathrm{a} * \mathrm{x} + \mathrm{b} * \mathrm{yi}, \quad \text{(Eq. 64)}$$

where $a^2+b^2=1$ and x and y_i are independent Gaussian distributed variables, both with zero mean and variance σ^2 . y_i and y_j for are independent as well.

Figure 207 presents how to set-up the pathloss correlation in SEAMCAT (only available for OFDMA). The panel is similar for the OFDMA DL and UL.

Figure 207: Illustration of the pathloss correlation – input parameters

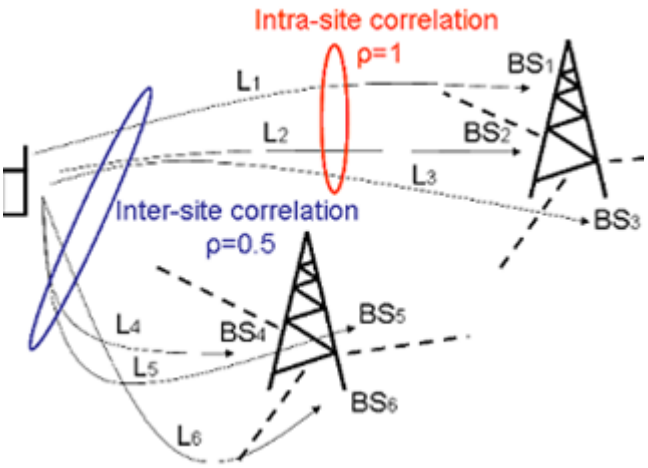

Figure 208: Illustration of the pathloss correlation principle

Thus, the correlation coefficient of the shadow fading from one UE to two different BSs, i.e., the *i-th* and *j-th* BS, is

$$\frac{E(z_i z_j)}{E(z_i^2)} = a^2 \quad \text{(Eq. 65)}$$

In most LTE studies, $a = b = 1/\sqrt{2}$ is assumed [10]. For cellurar systems with three-sector antennas, the shadowing correlation between sites (equivalent to BS in Omni antenna system) is of 0.5 and correlation between sectors of the same site is consequently of 1.

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