9.8 UL C/I calculation

The C/I calculation in UL is calculated so that *C(j,k)* is the received power from the $UE_{j,k}$ at the *j*-th BS.

$$\mathrm{C(j,k)} = \mathrm{P_t(j,k)} \times \mathrm{effective\_pathloss(UE_{j,k}, BS_j)} \quad \text{(Eq. 54)}$$

where P_t is the transmit power of the UE in dBm (see UL Power control below) and effective_pathloss is defined as in Section 7.6.1..

The total interference to a UL cellular system is derived from

$$I(j,k) = I_{\mathrm{inter}}(j,k) + I_{ext}(j,k) + N \quad \text{(Eq. 55)}$$

where

- I_{inter} is the interference coming from UEs of the same system but from adjacent cells, i.e. the inter-system interference from other cells. Since a fully orthogonal system is assumed, only UEs which transmit in the same frequency subcarriers will introduce interference to each other, hence only UEs in other cells with the same *k* index are considered;
- $I_{ext}(j,k)$ is the interference from external interfering system(s) in adjacent channel;
- *N* is the noise floor.

$$\mathrm{I_{inter}(j,k)} = \sum_{\mathrm{l=1, l \neq j}}^{\mathrm{N_{cell}}} \mathrm{P_t(l,k)} \times \mathrm{pathloss(UE_{l,k}, BS_j)} \quad \text{(Eq. 56)}$$

$$\mathrm{I_{ext}(j)} = \sum_{\mathrm{m=1}}^{\mathrm{N}} \mathrm{iRSS_{unwanted}(ILT_m, BS_j)} + \mathrm{iRSS_{blocking}(ILT_m, BS_j)} \quad \text{(Eq. 57)}$$

$I_{ext}(j,k)$ is the interference to the the victim BS_j from N interfering link transmitters (ILT), where

$$\mathrm{iRSS_{unwanted}(ILT_m, BS_j)} = \mathrm{iRSS_{unwanted}(over\backslash, the\ size\ of\ the\ UE\ resource\ blocks)} \quad \text{(Eq. 58)}$$

for each of the victim BS_j's frequency where the UL information is received. The ILT can be any generic systems or a BS/UEs of a cellular system.

$$\mathrm{iRSS_{blocking}(ILT_m, BS_j) = iRSS_{blocking}(over\backslash, system\ bandwidth) \times \frac{N_{RB}}{M}} \quad \text{(Eq. 59)}$$

at the victim system frequency. Where N_{RB} is the number of RBs (i.e. subcarriers) requested per UE , and M is the maximum number of RBs per BS.

$$N = 10^{\left(\frac{(-173.977+10log10(N_{RB} \times RBs_{Bandwidt\ \ h})+NoiseFigure\ _{BS})}{10}\right)} \quad \text{(Eq. 60)}$$

where *NoiseFigureBS* is the noise figure of a BS.

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