

9.7 DL C/I calculation

The relationship between the contributors of the interference in a OFDMA network is illustrated in Figure 205.

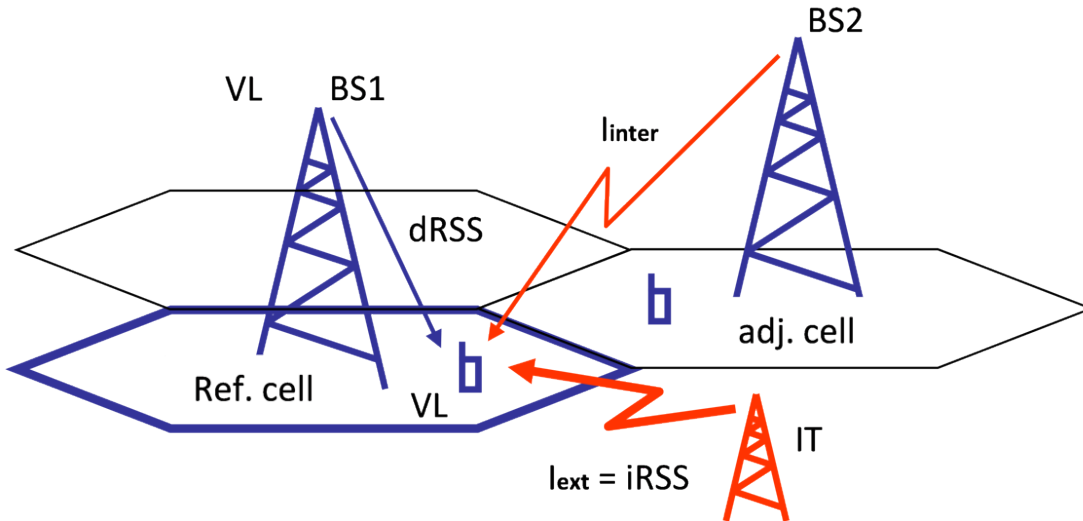


Figure 205: Illustration of the interference mechanism in the OFDMA module

Figure 205 illustrates the interference mechanism in the OFDMA module where the inter-system or also called self interference is noted “linter” and the interference from an “external” interference system is referred to as “ltext”. In the SEAMCAT OFDMA implementation, the term “BS” and “cell” have the same meaning.

The C/I calculation in DL is calculated as

$$C/I = \frac{C(j,k)}{I(j,k)} \quad (\text{Eq. 46})$$

where $C(j,k)$ is the received power at the k -th user from the serving BS, i.e., the j -th BS

$$C(j,k) = P_{BS}^{UE} \times \text{effective_pathloss}(BS_j, UE_{j,k}) \quad (\text{Eq. 47})$$

and where P_{BS}^{UE} is the power of resource block and *effective_pathloss* is defined as in Section 7.6.1.

$I(j,k)$ is the sum of the interference power

$$I(j, k) = I_{inter}(j, k) + I_{ext}(j, k) + N \quad (Eq. 48)$$

where

- $I_{inter}(j, k)$ is the adjacent cell interference (i.e. from the same victim system, i.e. denoted inter-system interference;
- $I_{ext}(j, k)$ is the interference from external interfering system(s) in adjacent channel, i.e. interference power into this resource block including ACIR;
- N is the noise floor.

$$I_{inter}(j, k) = \sum_{l=1, l \neq j}^{N_{cell}} P_{BS}^{UE} \times effective_pathloss(BS_l, UE_{j,k}) \quad (Eq. 49)$$

$$I_{ext}(j, k) = \sum_{m=1}^N iRSS_{unwanted}(ILT_m, UE_{j,k}) + iRSS_{blocking}(ILT_m, UE_{j,k}) \quad (Eq. 50)$$

$I_{ext}(j, k)$ is the interference to the the victim $UE_{j,k}$ from N interfering link transmitters (ILT). Note that the ACIR (Adjacent Channel Interference Ratio) is implicitly taken into account when both unwanted and blocking mechanism are summed in the computation. The unwanted and blocking are defined as follow

$$iRSS_{unwanted}(ILT_m, UE_{j,k}) = iRSS_{unwanted}(\text{over the size of the UE resource blocks}) \quad (Eq. 51)$$

for each of the victim $UE_{j,k}$'s frequency where the DL information is received. The ILT can be any generic systems or a BS/UEs of a cellular system.

$$iRSS_{blocking}(ILT_m, UE_{j,k}) = iRSS_{blocking}(\text{over system bandwidth}) \times \frac{N_{RB}}{M} \quad (Eq. 52)$$

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.

$$iRSS_{blocking}(ILT_m, UE_{j,k}) = iRSS_{blocking}(\text{over system bandwidth}) \times \frac{N_{RB}}{M} \quad (Eq. 53)$$

where $NoiseFigure_{UE}$ is the noise figure of a UE.

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