

9.10 OFDMA UL power control

In OFDMA UL, the power control is applied to the active users (i.e. the mobile users with specific RBs) so that the UE Tx power is adjusted with respect to the effective path loss (i.e. based on the MCL) to the BS it is connected to. In 3GPP [12], the UL power control is defined so that the UE transmit power is set such as:

$$P_t = P_{\max} \times \min \left\{ 1, \max \left[R_{\min}, \left(\frac{CL}{CL_{x-ile}} \right)^\gamma \right] \right\} \quad (\text{Eq. 63})$$

where:

- P_t is the UE Tx power in dBm;
- P_{\max} is the maximum transmit power in dBm;
- R_{\min} is the minimum power reduction ratio to prevent UEs with good channels to transmit at very low power level. R_{\min} is set by P_{\min} / P_{\max} ;
- CL is the effective path loss in dB for the UE from its serving BS;
- CL_{x-ile} is the x-percentile effective path loss (plus shadowing) value. CL_{x-ile} is defined here as the value in the CDF, which is greater than the effective path loss of x percent of the MSs in the cell from the BS (i.e. it corresponds to the parameter “power Scale Threshold”). It is set by default to 0.9, but you can change it;
- γ is assumed to equal to 1 by default in SEAMCAT.

With this power control scheme, the 1-x percent of UEs that have a path-loss greater than CL_{x-ile} will transmit at P_{\max} , i.e. are not power controlled. Annex A15.6 provides further information about the implementation and the usage of the OFDMA UL power control.

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