OFDMA Algorithm

1 INTRODUCTION

Similarly to the CDMA GUI, When a scenario contains one or more OFDMA networks SEAMCAT preserves the status of the simulated systems for the last snapshot. The last snapshot is presented in Figure 1.

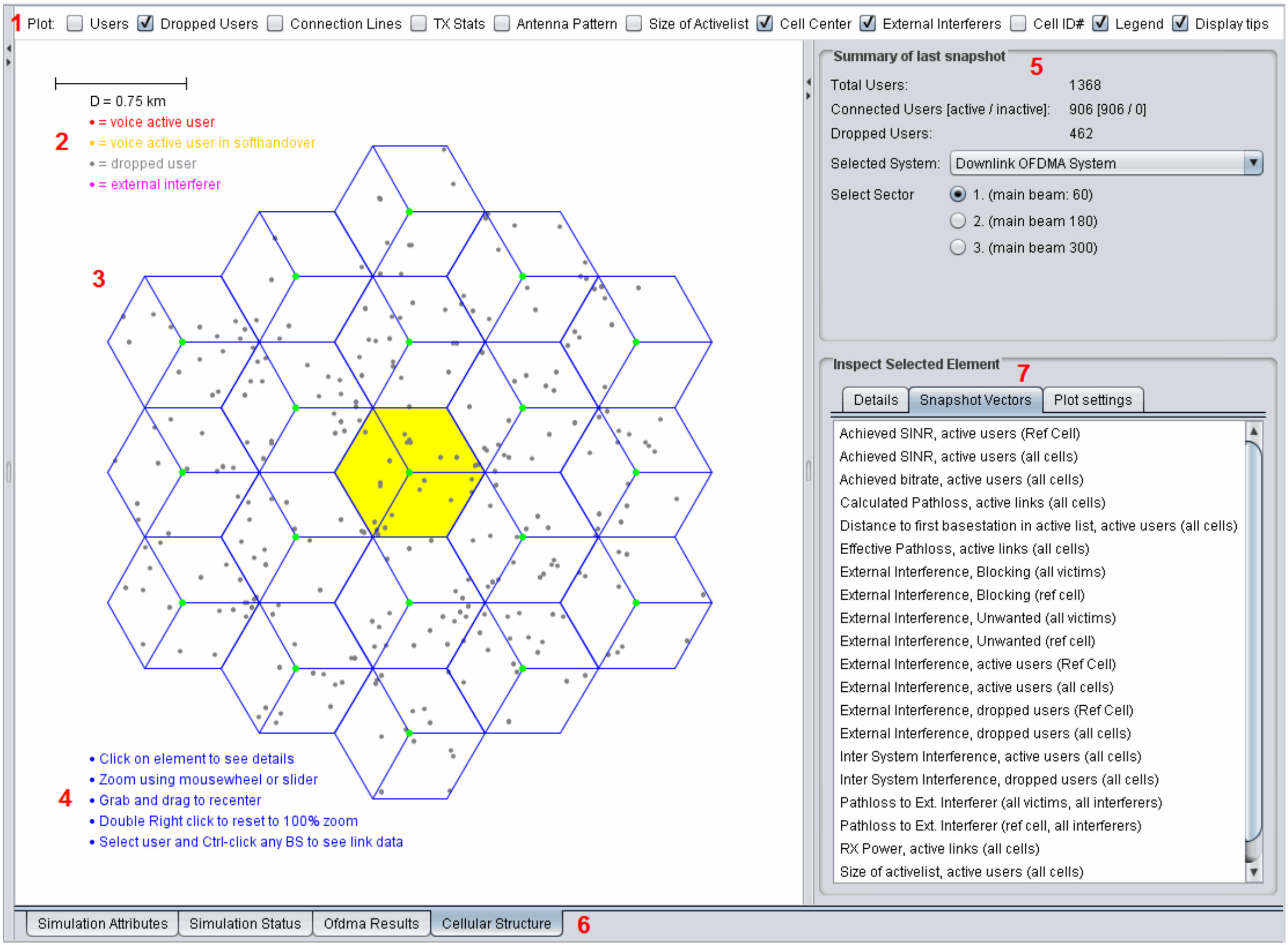

Figure 1: OFDMA system details

Elements #1 to #6 of Figure 1 are shared components from the CDMA module.

Component #6, presents the user with a flexible access to vector results of the OFDMA module, so that users are able to probe various elements of the simulation.

2 DL ALGORITHM

For i=1:# of snapshots

1. Distribute sufficiently many UEs randomly throughout the system area such that to each cell within the HO margin of 3 dB the same number K of users is allocated as active UEs.

   - Calculate the pathloss from each UE to all cells and find the smallest pathloss
   - Link the UE randomly to a cell to which the pathloss is within the smallest pathloss plus the HO margin of 3 dB

- Select *K* UEs randomly from all the UEs linked to one cell as active UEs. These K active UEs will be scheduled during this snapshot.
- Note: a full load system is assumed, namely, all available resource blocks (RBs) will be allocated to active UEs. And each UE is scheduled with the same number N of RBs. Thus, the BS transmit power per UE is fixed.

  Let P_{BS}^{Max} denotes the maximum transmit power of BS

  $M = N \times K$ is the number of all available RBs in each cell

  P_{BS}^{UE} is the transmit power from BS to the active UE, and

  $$P_{BS}^{UE} = P_{BS}^{Max} \frac{N}{M}.$$

2. Calculate DL C/I for all active UEs in all cells.

   - Loop over all cells from $j = 1$ to N_{cell} (the number of cells in the system area e.g. 57 for 19 sites with tri-sector antennas)
   - Loop over all active UEs from $k = 1$ to K
   - For the k-th active UE in the j-th cell (i.e. $UE_{j,k}$) its C/I is denoted by $\frac{C(j,k)}{I(j,k)}$,

4. Determine the throughput for each UE with its C/I according to the link-to-system level mapping.
5. Collect statistics.

3 UL ALGORITHM

For i=1:# of snapshots

1. Distribute sufficiently many UEs randomly throughout the system area such that to each cell within the HO margin of 3 dB the same number K of users is allocated as active UEs
   - Calculate the pathloss from each UE to all cells and find the smallest pathloss
   - Link the UE randomly to a cell to which the pathloss is within the smallest pathloss plus the HO margin of 3 dB
   - Select *K* UEs randomly from all the UEs linked to one cell as active UEs. These K active UEs will be scheduled during this snapshot
   - Note: a full load system is assumed, namely, all available RBs will be allocated to active UEs. And each UE is scheduled with the same number N of RBs.
2. Perform UL power control
3. Calculate UL C/I for all active UEs in all cells.
   - Loop over all cells from $j = 1$ to N_{cell} (the number of cells in the system area e.g. 57 for 19 sites with tri-sector antennas)
   - Loop over all active UEs from $k = 1$ to K
   - For the k-th active UE in the j-th cell (i.e. $UE_{j,k}$) its C/I is denoted by $\frac{C(j,k)}{I(j,k)}$.
4. Determine the throughput for each UE with its C/I according to the link-to-system level mapping.
5. Collect statistics.