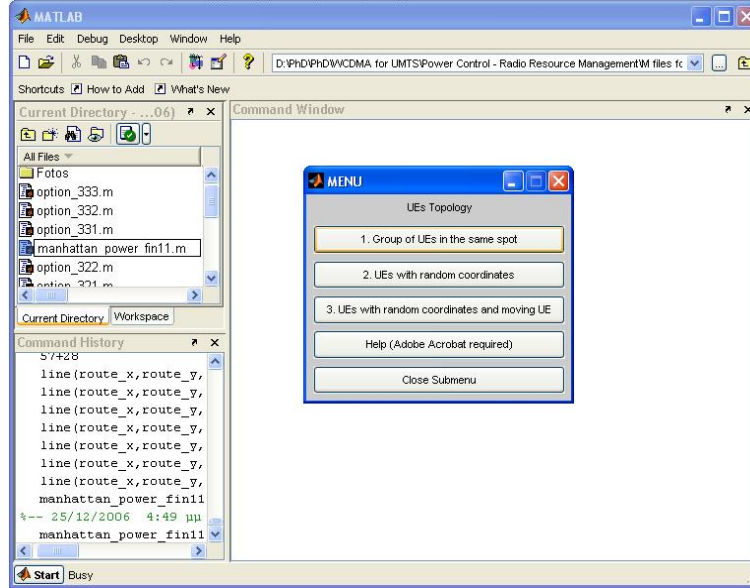


## UEs Topology Submenu

Until now the user has already set the Manhattan Environment, the Topology Parameters and the User Parameters. The next step is to place the UEs in the environment. The “UE Topology submenu” gives the user that possibility (Figure 1).



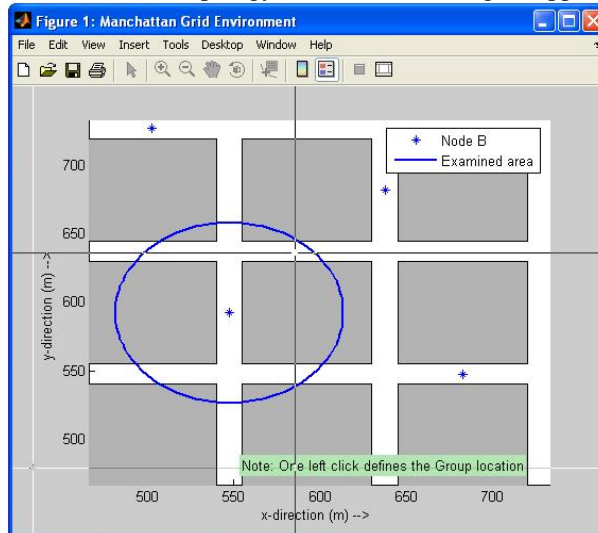
**Figure 1: UE Topology Submenu**

The program examines three different cases. The first case (“Group of UEs in the same spot”) assumes that all UEs are static and are placed at the same spot, so the group coordinates must be inserted just one time. The second case (“UEs with random coordinates”) assumes that all UEs are static and each UE has its own coordinates, so the UE coordinates must be inserted one time for every UE. Finally, the third case (“UEs with random coordinates and moving UE”) assumes that all UEs but one are static and have their own coordinates, so the UE coordinates must be inserted one time for every static UE. It also assumes that one UE is moving. If the user has set the number of UEs at 5, he has to:

- For case 1, set the group coordinates once,
- For case 2, set 5 times the coordinates for the corresponding UE,
- For case 3, set 4 times the coordinates for the corresponding static UE.

### ***Group of UEs in the same spot***

By clicking the first button of the “UE Topology submenu” a new figure appears (Figure 2).



**Figure 2: Group coordinates insertion**

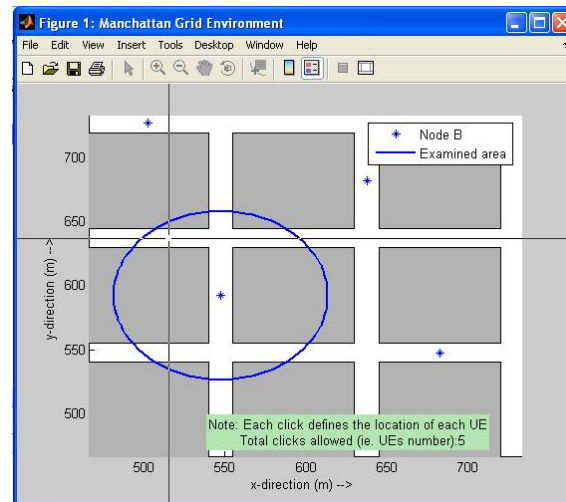
This is the figure where the user can interactively enter the group of UEs coordinates. As it has mentioned, the first button (“Group of UEs in the same spot”) assumes that all UEs are static and are

placed at the same spot, so the group coordinates must be inserted just one time. This is mentioned on the new figure as a note (highlighted with green colour).

It is on the user's hand to place the group wherever he wants. There is no restriction to where the group will be placed. However, the user is prompted to place the group of UEs in the interior of the circle with centre a Node B and radius equal to the range of the particular Node B. This circle is also depicted on Figure 2 ("Examined area"). Having decided to where the group will be placed, the user has just to click on the specific spot. One click defines the group coordinates. After clicking to define the group coordinates the "Static Users Submenu" appears.

### ***UEs with random coordinates***

By clicking the second button of the "UE Topology submenu" (Figure 1) a new figure appears (Figure 3).



**Figure 3: UE coordinates insertion**

This is the figure where the user can interactively enter the UE's coordinates. As it has mentioned, the second button ("UEs with random coordinates") assumes that all UEs are static and each UE has its own coordinates, so the UE coordinates must be inserted one time for every UE. This is mentioned on the new figure as a note (highlighted with green colour).

It is on the user's hand to place the UEs wherever he wants. There is no restriction to where the UEs will be placed. However, the user is prompted to place the UEs in the interior of the circle with centre a Node B and radius equal to the range of the particular Node B. This circle is also depicted on Figure 3 ("Examined area"). Having decided to where the UEs will be placed, the user has just to click on the specific spot. Each click defines each UE's coordinates. After clicking as many times as the number of UEs, the "Random Users Submenu" appears.

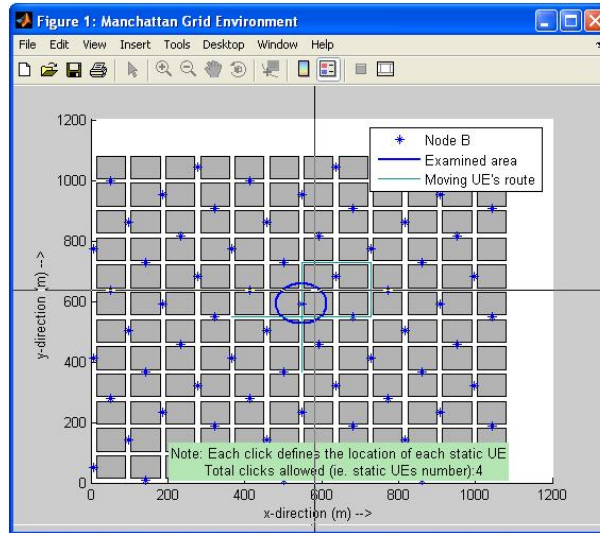
### ***UEs with random coordinates and moving UE***

By clicking the third button of the "UE Topology submenu" (Figure 1) a new figure appears (Figure 4). This is the figure where the user can interactively enter the static UE's coordinates. As it is mentioned, the third button ("UEs with random coordinates and moving UE") assumes that all UEs but one are static and have their own coordinates, so the UE coordinates must be inserted one time for every static UE. This is mentioned on the new figure as a note (highlighted with green colour). It also assumes that one UE is moving (the moving UE's route is predefined).

It is on the user's hand to place the static UEs wherever he wants. There is no restriction to where the UEs will be placed. The route of the moving UE is predefined and is depicted on Figure 4. The user is prompted to place the static UEs in the interior of the circle with centre a Node B and radius equal to the range of the particular Node B. This circle is also depicted on Figure 4 ("Examined area"). However, for the particular part of the program placing the static UEs near the moving UE's route would be a more wise selection\*. Having decided to where the static UEs will be placed, the user has just to click on the specific spot. Each click defines each static UE's coordinates. After clicking as many times as the number of static UEs a new window appears, titled "Moving UE: Paramaters Specification".

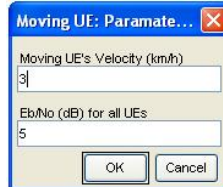
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\* Note: Placing the static UEs near the moving UE's route would be a more wise selection, especially when the "Moving UE's Active BS total power" is examined.



**Figure 4: Static UE's coordinates insertion**

With this window the user can set the moving UE's velocity and the  $E_b/N_0$  for the UEs (static and moving). The predefined moving UE's velocity is 3 Km/h, and the predefined  $E_b/N_0$  is 5 dB. By pressing OK the "Random Users and moving UE Submenu" appears.



**Figure 5: Moving UE: Paramaters Specification**

### ***Help (Adobe Acrobat required)***

Clicking this button opens this manual.

### ***Close Submenu***

Clicking this button closes the "UE Topology submenu" and returns to "Manhattan Environment Simulation Menu".