METHOD, APPARATUS AND COMPUTER PROGRAM PRODUCT FOR AUTONOMOUS CELL CHANGE BY UE IN NETWORK

FIELD OF THE INVENTION

[0001] The present invention generally relates to cell change in a network. In particular, the invention relates to autonomous cell change by UE in wireless networks.

BACKGROUND

[0002] Under the quick development of mobile technique and various portable terminals providing attracting applications, people become more and more to rely on such portable terminals not only for entertainment but also for business. The portable or mobile terminal can be but is not limited to devices such as smart phones, laptop computers, handsets, stations, units, devices, multimedia tablets, Personal Digital Assistants (PDAs), or any combination thereof. Upon imposing such important role on those terminals, requirements on better quality of service and more capacity of the network fuel the operator and technical engineers to always seek improved solutions providing competitive products and services. Then Long Term Evolution (LTE) was introduced to alleviate such heavy burden on the networks. However, a non-ignorable percentage of the mobile traffic is generated from indoors, LTE operating at higher frequencies in fact cannot fully meet the increasing demand on speed of data traffic and quality of service. Therefore, in order to enhance the access ability and offload traffic in certain areas, heterogeneous networks and local area offloading concept are proposed. In this case, the severe distance between the expectations of users and the present situation was shortened, but another problem raise therefrom.

[0003] In the heterogeneous networks, significant amount of signaling typically exchanged between the user equipment (UE) and corresponding access node during the UE's moving across the networks.

SUMMARY

[0004] The present invention proposes a method, an apparatus and a computer program product to at least alleviate the signaling overhead of UE by enabling UE to autonomous cell change during its moving.

[0005] According to a first aspect of the present invention, there is provided a method comprising: determining at least one cell in a network sharing context of at least one user equipment with at least one other cell within the network; creating at least one measurement configuration being used by the at least one user equipment, wherein the at least one measurement configuration indicates at least to the at least one user equipment that it can decide whether to perform cell change without transmitting back its measurement report to its serving cell; and transmitting the created at least one measurement configuration to the at least one user equipment.

[0006] According to one embodiment of the invention, the determining step determines only neighbor cell(s) relative to the cell performing the method, and the created measurement configuration(s) is transmitted real-time, periodically or randomly. Alternatively or additionally, this step determines not only neighbor cell(s) but all the cells sharing context of user equipment with at least one other cell. In this case, such created measurement configuration(s) can be pre-loaded into user equipment, and then after it is powered on, updated measurement configuration(s) may be transmitted to the user equipment real-time, periodically or randomly, if any.

[0007] According to one embodiment of the invention, the created at least one measurement configuration indicates to the at least one user equipment such enabled self decision on cell change by a specific identifier and/or by any different configurations compared with normal measurement configurations of normal user equipment assisted and network controlled handover procedure.

[0008] According to one embodiment of the invention, the measurement can be performed at any appropriate frequencies comprising at least one of inter-frequency, intra-frequency and inter radio access technologies. This means the cell serving the user equipment and a potential targeted cell may work at the same frequency, different frequency and even different radio access technologies. If inter-frequency or inter radio access technologies is indicated in the measurement configuration, and cells can be identified by its operating frequency, such frequency information may help the UE to recognize the type of the measurement configuration, i.e., a normal one or the one for autonomous cell change.

[0009] According to one embodiment of the invention, the created measurement configuration further comprises information indicating at least one of following: at least one neighbor cell relative to the current serving cell of said at least one cell which shares the context with at least one other cell; at least one frequency to be measured; at least one measurement event; and event related parameter including threshold value and/or measurement gap. That is to say, a created measurement configuration can either indicate merely neighbor cell (s) supporting the autonomous cell change, or indicate all the cells determined as supporting the autonomous cell change. It is readily understand that the former one reduce the amount of data to be transmitted via network, while the latter one provide a relatively full information thus reduce the number of interactions through network. Then those skilled in the art can use either one or combination of the two according to specific network environment and corresponding requirements.

[0010] According to one embodiment of the invention, wherein the network is a heterogeneous network in which at least one small cell with a relatively smaller coverage locates adjacent to or within at least one of said at least one cell. In the latter case, an access node of said at least one cell acts as a concentrate access node, while an access node of said at least one small cell acts as a sub access node, wherein the concentrate access node provides access service to the sub-access node, and the method can be implemented by either the concentrate access node or the sub-access node.

[0011] According to one embodiment of the invention, the created measurement configuration will be used by the at least one user equipment when moving between said at least one cell and said at least one small cell, moving between the small cells, or moving between the cells. Specifically, the moving may from a sub-cell towards an area covered by its serving concentrate cell, another sub-cell within its serving concentrate cell, a neighbor cell/small cell or a sub-cell within a neighbor concentrate cell. In a reverse direction, user equipment may move from one cell to a neighbor cell/small cell, to a sub cell within this cell, or to a sub cell within one of its neighbor cell.

[0012] According to one embodiment of the invention, the network is a Long Term Evolution network.

[0013] According to one embodiment of the invention, an access node of the small cell (i.e., the cell with relatively small