

METHODS AND APPARATUSES OF A SUCCESSFUL REPORT FOR AN LTM PROCEDURE

TECHNICAL FIELD

[0001] The present disclosure relates to wireless communications, and more specifically to methods and apparatuses of a successful report for a L1/L2-Triggered Mobility (LTM) cell switch procedure, including an LTM primary secondary cell group cell (PSCell) switch procedure or an LTM primary cell (PCell) switch procedure.

BACKGROUND

[0002] A wireless communications system may include one or multiple network communication devices, such as base stations, which may support wireless communications for one or multiple user communication devices, which may be otherwise known as user equipment (UE), or other suitable terminology. The wireless communications system may support wireless communications with one or multiple user communication devices by utilizing resources of the wireless communication system (e.g. time-domain resources (e.g. symbols, slots, subframes, frames, or the like) or frequency-domain resources (e.g. subcarriers, carriers, or the like). Additionally, the wireless communications system may support wireless communications across various radio access technologies including third generation (3G) radio access technology, fourth generation (4G) radio access technology, fifth generation (5G) radio access technology, among other suitable radio access technologies beyond 5G (e.g. sixth generation (6G)).

SUMMARY

[0003] An article "a" before an element is unrestricted and understood to refer to "at least one" of those elements or "one or more" of those elements. The terms "a," "at least one," "one or more," and "at least one of one or more" may be interchangeable. As used herein, including in the claims, "or" as used in a list of items (e.g. a list of items prefaced by a phrase such as "at least one of" or "one or more of" or "one or both of") indicates an inclusive list such that, for example, a list of at least one of A, B, or C means A or B or C or AB or AC or BC or ABC (i.e., A and B and C). Also, as used herein, the phrase "based on" shall not be construed as a reference to a closed set of conditions. For example, an example step that is described as

"based on condition A" may be based on both a condition A and a condition B without departing from the scope of the present disclosure. In other words, as used herein, the phrase "based on" shall be construed in the same manner as the phrase "based at least in part on. Further, as used herein, including in the claims, a "set" may include one or more elements.

[0004] In a master cell group (MCG) LTM procedure or an LTM PCell switch procedure from a source cell (or source PCell) to a target cell (or target PCell) in a dual connectivity scenario, a node which generates an RRC Reconfiguration message for the MCG LTM switch procedure or the LTM PCell switch procedure, or which determines to initiate MCG LTM may be a MN or a CU of the MN.

[0005] In a master cell group (MCG) LTM procedure or an LTM cell switch procedure from a source cell to a target cell in a single connectivity scenario, a node which generates an RRC Reconfiguration message for the MCG LTM switch procedure or the LTM cell switch procedure, or which determines to initiate LTM may be a source node to which the source cell belongs or a CU of the source node.

[0006] In a secondary cell group (SCG) LTM procedure or an LTM PSCell switch procedure from a source PSCell to a target PSCell in a dual connectivity scenario, a node which generates an RRC Reconfiguration message for the SCG LTM switch procedure or the LTM PSCell switch procedure, or which determines to initiate SCG LTM may be a MN or an SN or a CU of the MN or a CU of the SN, furthermore, the SN may be a node to which the serving PSCell or source PSCell belongs (e.g. a source SN), or the SN may be a node to which the target PSCell for LTM belongs (e.g. a target SN).

[0007] Some implementations of the present disclosure provide a user equipment (UE). The UE includes at least one memory; and at least one processor coupled to the at least one memory and configured to cause the UE to perform at least one of the following: receiving a configuration used for the UE to store or report successful L1/L2-Triggered Mobility (LTM) related information; or storing the successful LTM related information.

[0008] In some implementations of the UE described herein, the configuration is received in at least one of the following: a radio resource control (RRC) reconfiguration message; or a lower layer message concerning that an LTM cell switch execution is initiated.

[0009] In some implementations of the UE described herein, the configuration includes one or more thresholds, and the one or more thresholds comprise at least one of the following: at least one timer T310 related threshold; at least one timer T312 related threshold; or at least one timer T304 related threshold.

[0010] In some implementations of the UE described herein, the successful LTM related information is stored upon at least one of the following: a satisfaction of at least one trigger condition associated with the one or more thresholds; or a successful completion of an LTM cell switch execution.

[0011] In some implementations of the UE described herein, the satisfaction of the at least one trigger condition includes at least one of the following: a ratio between a value of elapsed running time of the timer T310 when an LTM cell switch execution is initiated and a configured value of the timer T310 is greater than the at least one timer T310 related threshold; a ratio between a value of elapsed running time of the timer T312 when the LTM cell switch execution is initiated and a configured value of the timer T312 is greater than the at least one timer T312 related threshold; or a ratio between a value of elapsed running time of the timer T304 and a configured value of the timer T304 is greater than the at least one timer T304 related threshold.

[0012] In some implementations of the UE described herein, the successful LTM related information is stored upon a successful completion of an LTM cell switch execution, and wherein the processor is configured to cause the UE to report the successful LTM related information after storing the successful LTM related information.

[0013] In some implementations of the UE described herein, the processor is configured to cause the UE to transmit an indication for availability of the successful LTM related information upon a successful completion of an LTM cell switch execution or after storing the successful LTM related information.

[0014] In some implementations of the UE described herein, the processor is configured to cause the UE to receive a request for reporting the successful LTM related information.

[0015] In some implementations of the UE described herein, the successful LTM related information includes at least one of the following: first information related to a latest

successful LTM cell switch execution; or second information related to one or more successful LTM cell switch executions.

[0016] In some implementations of the UE described herein, if the successful LTM related information includes the second information, the processor is configured to cause the UE to store or report the second information related to at most a fixed number of successful LTM cell switch executions in one Information Element (IE) or one UE variable or one report or one message.

[0017] In some implementations of the UE described herein, if a total number of successful LTM cell switch executions performed at the UE is greater than the fixed number, after storing the second information related to at most the fixed number of successful LTM cell switch executions in the one IE or the one UE variable or the one report or the one message, the processor is configured to cause the UE to store third information related to partial or whole of remaining successful LTM cell switch executions performed at the UE which are not covered in the second information in additional one or more IEs or UE variables or reports or messages.

[0018] In some implementations of the UE described herein, the processor is configured to cause the UE to: transmit an indication for availability of the second information after storing the second information; transmit an indication for availability of the third information after storing the third information; or transmit an indication for availability of the second information and the third information after storing the second information and the third information.

[0019] In some implementations of the UE described herein, if the successful LTM related information includes the second information, the processor is configured to cause the UE to store the second information related to successful LTM cell switch executions performed at the UE in one IE or one UE variable or one report or one message until a stopping indication.

[0020] In some implementations of the UE described herein, the stopping indication comprises at least one of the following: a normal handover (HO) is initiated; a conditional handover (CHO) is initiated; a dual active protocol stack (DAPS) HO is initiated; a normal primary secondary cell group cell (PSCell) change is initiated; a conditional PSCell change

(CPC) is initiated; an indication indicating to release LTM configuration is received; or a connection failure happens.

[0021] In some implementations of the UE described herein, the successful LTM related information includes at least one of the following: information regarding a source cell; information regarding a target cell; information regarding at least one neighbour cell; layer 1 (L1) measurement results of the source cell; L1 measurement results of the target cell; L1 measurement results of the at least one neighbour cell; information regarding at least one beam; an indication of a type of an LTM cell switch; information regarding one or more candidate cells configured for the LTM cell switch; configuration information for the one or more candidate cells; reference configuration information for the LTM cell switch; one or more channel state information (CSI) resources for the LTM cell switch; one or more time alignment (TA) values derived by a UE based TA measurement; one or more TA values for a random access channel (RACH)-less LTM cell switch; one or more contention-free random access resources; one or more cause values for storing the successful LTM related information; time elapsed between initiating an LTM cell switch execution and receiving an RRC reconfiguration message for the LTM cell switch; time elapsed between initiating the LTM cell switch execution and retrieval of the successful LTM related information; time elapsed between initiating the LTM cell switch execution and a successful completion of the LTM cell switch execution; or time elapsed between the successful completion of the LTM cell switch execution and reporting the successful LTM related information.

[0022] In some implementations of the UE described herein, the successful LTM related information is stored as or reported via at least one of the following reports: a successful handover report (SHR); a successful primary secondary cell (PSCell) change report (SPR); or a successful report for LTM cell switch.

[0023] In some implementations of the UE described herein, the processor is configured to cause the UE to transmit an indication of capability of the UE for supporting storage and reporting of the successful LTM related information.

[0024] In some implementations of the UE described herein, the successful LTM related information is associated with a master cell group (MCG) LTM cell switch procedure or a secondary cell group (SCG) LTM cell switch procedure.

[0025] Some implementations of the present disclosure provide a processor for wireless communication, comprising at least one controller coupled with at least one memory and configured to cause the processor to perform at least one of the following: receiving a configuration used for a user equipment (UE) to store or report successful L1/L2-Triggered Mobility (LTM) related information; or storing the successful LTM related information.

[0026] Some implementations of the present disclosure provide a method performed by a user equipment (UE). The method comprises at least one of the following: receiving a configuration used for the UE to store or report successful L1/L2-Triggered Mobility (LTM) related information; or storing the successful LTM related information.

[0027] Some implementations of the present disclosure provide a centralized unit (CU) of a base station (BS). The CU includes at least one memory; and at least one processor coupled to the at least one memory and configured to cause the CU to: obtain a configuration used for a user equipment (UE) to store or report successful L1/L2-Triggered Mobility (LTM) related information; and transmit the configuration.

[0028] In some implementations of the CU described herein, the configuration is transmitted to the UE in at least one of the following: a radio resource control (RRC) reconfiguration message; or a lower layer message concerning that LTM cell switch execution is initiated.

[0029] In some implementations of the CU described herein, to obtain the configuration, the processor is configured to cause the CU to: generate the configuration; or receive the configuration from at least one distributed unit (DU) of the BS, wherein the at least one DU includes at least one of the following: a source DU; a target DU; or at least one candidate target DU, wherein the configuration is transmitted to the source DU or the UE after obtaining the configuration.

[0030] In some implementations of the CU described herein, the configuration includes one or more thresholds, wherein the one or more thresholds are used for the UE to store the successful LTM related information upon at least one of the following: a satisfaction of at least one trigger condition associated with the one or more thresholds; or a successful completion of an LTM cell switch execution; and wherein the one or more thresholds

comprise at least one of the following: at least one timer T310 related threshold; at least one timer T312 related threshold; or at least one timer T304 related threshold.

[0031] In some implementations of the CU described herein, the satisfaction of the at least one trigger condition includes at least one of the following: a ratio between a value of elapsed running time of the timer T310 when an LTM cell switch execution is initiated and a configured value of the timer T310 is greater than the at least one timer T310 related threshold; a ratio between a value of elapsed running time of the timer T312 when the LTM cell switch execution is initiated and a configured value of the timer T312 is greater than the at least one timer T312 related threshold; or a ratio between a value of elapsed running time of the timer T304 and a configured value of the timer T304 is greater than the at least one timer T304 related threshold.

[0032] In some implementations of the CU described herein, the processor is configured to cause the CU to receive, from a target DU, an indication indicating an occurrence of one or more successful LTM cell switch executions in the target DU.

[0033] In some implementations of the CU described herein, the processor is configured to cause the CU to receive, from the UE, an indication for availability of the successful LTM related information.

[0034] In some implementations of the CU described herein, the processor is configured to cause the CU to transmit, to the UE, a request for reporting the successful LTM related information.

[0035] In some implementations of the CU described herein, the processor is configured to cause the CU to receive the successful LTM related information from the UE or from another serving node of the UE.

[0036] In some implementations of the CU described herein, the successful LTM related information includes at least one of the following: first information related to a latest successful LTM cell switch execution; or second information related to one or more successful LTM cell switch executions.

[0037] In some implementations of the CU described herein, the second information is included in: one Information Element (IE) or one UE variable or one report or one message; or multiple IEs or multiple UE variables or multiple reports or multiple messages.

[0038] In some implementations of the CU described herein, the processor is configured to cause the CU to: generate a value of a fixed number of successful LTM cell switch executions that the UE can at most store or report in one IE or one UE variable or one report or one message; and transmit the value of the fixed number to the UE or to a source DU.

[0039] In some implementations of the CU described herein, the configuration instructs the UE to store the second information related to successful LTM cell switch executions performed at the UE in one IE or one UE variable or one report or one message until a stopping indication.

[0040] In some implementations of the CU described herein, the stopping indication comprises at least one of the following: a normal handover (HO) is initiated; a conditional handover (CHO) is initiated; a dual active protocol stack (DAPS) HO is initiated; a normal primary secondary cell group cell (PSCell) change is initiated; a conditional PSCell change (CPC) is initiated; an indication indicating to release LTM configuration is received; or a connection failure happens.

[0041] In some implementations of the CU described herein, the successful LTM related information includes at least one of the following: information regarding a source cell; information regarding a target cell; information regarding at least one neighbour cell; layer 1 (L1) measurement results of the source cell; L1 measurement results of the target cell; L1 measurement results of the at least one neighbour cell; information regarding at least one beam; an indication of a type of an LTM cell switch; information regarding one or more candidate cells configured for the LTM cell switch; configuration information for the one or more candidate cells; reference configuration information for the LTM cell switch; one or more channel state information (CSI) resources for the LTM cell switch; one or more time alignment (TA) values derived by a UE based TA measurement; one or more TA values for a random access channel (RACH)-less LTM cell switch; one or more contention-free random access resources; one or more cause values for storing the successful LTM related information; time elapsed between initiating an LTM cell switch execution and receiving a

RRC reconfiguration message for the LTM cell switch; time elapsed between initiating the LTM cell switch execution and retrieval of the successful LTM related information; time elapsed between initiating the LTM cell switch execution and a successful completion of the LTM cell switch execution; or time elapsed between the successful completion of the LTM cell switch execution and reporting the successful LTM related information.

[0042] In some implementations of the CU described herein, the successful LTM related information is stored at the UE as or reported by the UE via at least one of the following reports: a successful handover report (SHR); a successful primary secondary cell (PSCell) change report (SPR); or a successful report for LTM cell switch.

[0043] In some implementations of the CU described herein, the processor is configured to cause the CU to transmit the successful LTM related information to at least one distributed unit (DU) of the BS, wherein the at least one DU includes at least one of the following: a source DU; a target DU; or at least one candidate target DU.

[0044] In some implementations of the CU described herein, the processor is configured to cause the CU to receive an indication of capability of the UE for supporting storage and reporting of the successful LTM related information.

[0045] In some implementations of the CU described herein, the successful LTM related information is associated with a master cell group (MCG) LTM cell switch procedure or a secondary cell group (SCG) LTM cell switch procedure.

[0046] Some implementations of the present disclosure provide a processor for wireless communication, comprising at least one controller coupled with at least one memory and configured to cause the processor to obtain a configuration used for a user equipment (UE) to store or report successful L1/L2-Triggered Mobility (LTM) related information; and transmit the configuration.

[0047] Some implementations of the present disclosure provide a method performed by a centralized unit (CU) of a base station (BS). The method comprises: obtaining a configuration used for a user equipment (UE) to store or report successful L1/L2-Triggered Mobility (LTM) related information; and transmitting the configuration.

[0048] Some implementations of the present disclosure provide a distributed unit (DU) of a base station (BS). The DU includes at least one memory; and at least one processor coupled to the at least one memory and configured to cause the DU to perform at least one of the following: obtaining a configuration used for a user equipment (UE) to store or report successful L1/L2-Triggered Mobility (LTM) related information; or transmitting the configuration to the UE or a centralized unit (CU) of the BS.

[0049] In some implementations of the DU described herein, the successful LTM related information includes at least one of the following: first information related to a latest successful LTM cell switch execution; or second information related to one or more successful LTM cell switch executions.

[0050] In some implementations of the DU described herein, if the successful LTM related information includes the second information, the second information related to at most a fixed number of successful LTM cell switch executions is stored or reported in one Information Element (IE) or one UE variable or one report or one message.

[0051] In some implementations of the DU described herein, if a total number of successful LTM cell switch executions performed at the UE is greater than the fixed number, after the second information related to the fixed number of successful LTM cell switch executions is stored in the one IE or the one UE variable or the one report or the one message, third information related to partial or whole of remaining successful LTM cell switch executions performed at the UE which are not covered in the second information is stored in additional one or more IEs or UE variables or reports or messages.

[0052] In some implementations of the DU described herein, if the successful LTM related information includes the second information, the second information related to successful LTM cell switch executions performed at the UE is stored in one IE or one UE variable or one report or one message until a stopping indication.

[0053] In some implementations of the DU described herein, the stopping indication comprises at least one of the following: a normal handover (HO) is initiated; a conditional handover (CHO) is initiated; a dual active protocol stack (DAPS) HO is initiated; a normal primary secondary cell group cell (PSCell) change is initiated; a conditional PSCell change

(CPC) is initiated; an indication indicating to release LTM configuration is received; or a connection failure happens.

[0054] In some implementations of the DU described herein, the successful LTM related information includes at least one of the following: information regarding a source cell; information regarding a target cell; information regarding at least one neighbour cell; layer 1 (L1) measurement results of the source cell; L1 measurement results of the target cell; L1 measurement results of the at least one neighbour cell; information regarding at least one beam; an indication of a type of an LTM cell switch; information regarding one or more candidate cells configured for the LTM cell switch; configuration information for the one or more candidate cells; reference configuration information for the LTM cell switch; one or more channel state information (CSI) resources for the LTM cell switch; one or more time alignment (TA) values derived by a UE based TA measurement; one or more TA values for a random access channel (RACH)-less LTM cell switch; one or more contention-free random access resources; one or more cause values for storing the successful LTM related information; time elapsed between initiating an LTM cell switch execution and receiving an RRC reconfiguration message for the LTM cell switch; time elapsed between initiating the LTM cell switch execution and retrieval of the successful LTM related information; time elapsed between initiating the LTM cell switch execution and a successful completion of the LTM cell switch execution; or time elapsed between the successful completion of the LTM cell switch execution and reporting the successful LTM related information.

[0055] In some implementations of the DU described herein, the successful LTM related information is stored as or reported via at least one of the following reports: a successful handover report (SHR); a successful primary secondary cell (PSCell) change report (SPR); or a successful report for LTM cell switch.

[0056] In some implementations of the DU described herein, the successful LTM related information is associated with a master cell group (MCG) LTM cell switch procedure or a secondary cell group (SCG) LTM cell switch procedure.

[0057] In some implementations of the DU described herein, the configuration includes one or more thresholds, if the DU is a source DU, to obtain the one or more thresholds, the processor is configured to cause the source DU to receive at least one timer T304 related

threshold from a centralized unit (CU), and wherein the at least one timer T304 related threshold is generated by the CU or by a target DU or by a candidate target DU.

[0058] In some implementations of the DU described herein, the configuration includes one or more thresholds, if the DU is a target DU or a candidate target DU, to obtain the one or more thresholds, the processor is configured to cause the target DU or the candidate target DU to: generate at least one timer T304 related threshold; and transmit the at least one timer T304 related threshold to a centralized unit (CU), wherein the CU is configured to transmit the at least one timer T304 related threshold to the UE or to a source DU.

[0059] In some implementations of the DU described herein, the configuration includes one or more thresholds, if the DU is a source DU, to obtain the one or more thresholds, the processor is configured to cause the source DU to receive at least one timer T310 related threshold or at least one timer T312 related threshold from a centralized unit (CU), and wherein the at least one timer T310 related threshold or the at least one timer T312 related threshold is generated by the CU.

[0060] In some implementations of the DU described herein, the configuration includes one or more thresholds, if the DU is a source DU to obtain the one or more thresholds, the processor is configured to cause the source DU to perform at least one of: generating at least one timer T310 related threshold or at least one timer T312 related threshold; transmitting the at least one timer T310 related threshold or at least one timer T312 related threshold to a centralized unit (CU); and receiving the configuration from the CU, wherein the configuration includes the at least one timer T310 related threshold or the at least one timer T312 related threshold.

[0061] In some implementations of the DU described herein, if the successful LTM related information is associated with a secondary cell group (SCG) LTM cell switch procedure, the CU is a CU of a secondary node (SN) which generates an RRC reconfiguration message including LTM related configuration for the SCG LTM cell switch procedure or which send the RRC reconfiguration message to the UE.

[0062] In some implementations of the DU described herein, if the successful LTM related information is associated with a secondary cell group (SCG) LTM cell switch procedure, the source DU is a DU of a secondary node (SN) which generates the RRC

reconfiguration message including LTM related configuration for the SCG LTM cell switch procedure or which sends the RRC reconfiguration message to the UE.

[0063] In some implementations of the DU described herein, if the successful LTM related information is associated with a secondary cell group (SCG) LTM cell switch procedure, the target DU or the candidate target DU is a DU of a secondary node (SN) which generates the RRC reconfiguration message including LTM related configuration for the SCG LTM cell switch procedure or which sends the RRC reconfiguration message to the UE.

[0064] In some implementations of the DU described herein, the processor is configured to cause the source DU to transmit the at least one timer T304 related threshold or the at least one timer T310 related threshold or the at least one timer T312 related threshold to the UE via a radio resource control (RRC) reconfiguration message or in a lower layer message concerning that an LTM cell switch execution is initiated.

[0065] Some implementations of the present disclosure provide a processor for wireless communication, comprising at least one controller coupled with at least one memory and configured to cause the processor to perform at least one of the following: obtaining a configuration used for a user equipment (UE) to store or report successful L1/L2-Triggered Mobility (LTM) related information; or transmitting the configuration to the UE or a centralized unit (CU) of the BS.

[0066] Some implementations of the present disclosure provide a method performed by a distributed unit (DU) of a base station (BS). The method comprises at least one of the following: obtaining a configuration used for a user equipment (UE) to store or report successful L1/L2-Triggered Mobility (LTM) related information; or transmitting the configuration to the UE or a centralized unit (CU) of the BS.

BRIEF DESCRIPTION OF THE DRAWINGS

[0067] Figure 1 illustrates an example of a wireless communications system in accordance with aspects of the present disclosure.

[0068] Figure 2 illustrates an example of a user equipment (UE) 200 in accordance with aspects of the present disclosure.

[0069] Figure 3 illustrates an example of a processor 300 in accordance with aspects of the present disclosure.

[0070] Figure 4 illustrates an example of a network equipment (NE) 400 in accordance with aspects of the present disclosure.

[0071] Figure 5A illustrates a schematic diagram of an intra-CU intra-DU mobility scenario in accordance with aspects of the present disclosure.

[0072] Figure 5B illustrates a schematic diagram of an intra-CU inter-DU mobility scenario in accordance with aspects of the present disclosure.

[0073] Figure 5C illustrates a schematic diagram of an inter-CU mobility scenario in accordance with aspects of the present disclosure.

[0074] Figure 6 illustrates a schematic diagram of an inter-DU intra-CU LTM procedure for intra-NR in accordance with aspects of the present disclosure.

[0075] Figures 7-9 illustrate flowcharts of methods related to an LTM cell switch procedure in accordance with aspects of the present disclosure.

DETAILED DESCRIPTION

[0076] In general, when a UE moves from one cell to another cell, at some point a serving cell change needs to be performed. In the legacy, the serving cell change is done by explicit RRC reconfiguration signalling (e.g. a handover (HO) command) to trigger the synchronization of a target cell based on L3 measurements report. It leads to longer latency, larger overhead, and longer interruption time than beam level mobility. Therefore, in 3GPP, LTM was approved to change a serving cell via L1/L2 signalling, in order to reduce the latency, overhead and interruption time.

[0077] LTM is a procedure in which a BS receives L1 measurement report(s) from a UE, and on their basis the BS changes UE's serving cell by a cell switch command signaled via a medium access control (MAC) control element (CE), e.g. LTM cell switch command MAC CE or LTM Command MAC CE. The cell switch command indicates a target cell for LTM e.g. an LTM candidate cell configuration that the BS previously prepared and provided to the

UE through RRC signalling. Then the UE switches to the target cell according to the cell switch command. The LTM procedure can be used to reduce the mobility latency.

[0078] When configured by the network, it is possible to activate transmission configuration indication (TCI) states of one or multiple cells that are different from the current serving cell. For instance, the TCI states of the LTM candidate cells can be activated in advance before any of those cells become the serving cell. This allows the UE to be DL synchronized with those cells, thereby facilitating a faster cell switch to one of those cells when cell switch is triggered.

[0079] "LTM candidate cell" refers to a candidate cell configured to the UE for LTM. There may be multiple LTM candidate cells prepared for the UE, where the LTM candidate cells may belong to the same or different candidate DUs.

[0080] "LTM candidate configuration" refers to a configuration part of an RRC Reconfiguration message associated with a candidate cell, e.g. for LTM. A candidate configuration can be a complete candidate configuration or a delta configuration relatively to a reference configuration.

[0081] "LTM reference configuration" refers to a configuration provided by the network to the UE that is common, within the same cell group, to a group of configured non-complete candidate configurations.

[0082] "L1/L2 Triggered Mobility" refers to a cell switch procedure that the network triggers via MAC CE based on L1 measurements.

[0083] "RACH-less LTM" refers to an LTM cell switch procedure where UE skips the random access procedure.

[0084] "Subsequent LTM" refers to an LTM cell switch procedures between candidate cells without RRC reconfiguration by the network in between. In some cases, subsequent LTM may be supported. Subsequent LTM means subsequent LTM cell switch procedures between LTM candidate cells where a UE does not need to be reconfigured by the network in between.

[0085] LTM is a cell switch procedure that the network triggers via a MAC CE based on L1 measurements. In 3GPP, LTM was approved to change a serving cell via L1/L2 signalling,

in order to reduce the latency, overhead and interruption time. The potential applicable scenarios of LTM include "intra-CU intra-DU LTM," "intra-CU inter-DU LTM," and "inter-CU LTM" as shown in Figures 5A-5C as described below.

- (1) Intra-CU intra-DU LTM/mobility: a UE moves between different cells within a DU.
- (2) Intra-CU inter-DU LTM/mobility: a UE moves between different cells belonging to different DUs but within a same CU.
- (3) Inter-CU LTM/mobility: a UE moves between different cells belonging to different DUs different CUs.

[0086] In general, one of the functions of Mobility Robustness Optimization (MRO) is to detect a sub-optimal successful handover event. The aim is to identify underlying conditions during successful ordinary handovers, successful DAPS handovers, or successful Conditional handovers. For analysis of successful handover, a UE may collect Successful Handover Report (SHR) based on configuration by network, if stored, and makes the SHR available to the network as specified in 3GPP standard document TS 38.331.

[0087] For SHR collected during intra-NR handover, if the target new radio (NR) node fetches the SHR from the UE and the trigger of SHR is timer T310 or T312, it may forward the information to the source NR node, i.e. the node handling the cell reported as source cell in this SHR, by using the ACCESS AND MOBILITY INDICATION message over Xn or by means of the Uplink RAN configuration transfer procedure and Downlink RAN configuration transfer procedure over NG. If the NG-RAN node that fetches the SHR from the UE is neither the source node nor the target node of the handover, it forwards the information to the node(s) which configured the SHR trigger causing the SHR to be generated, by using the ACCESS AND MOBILITY INDICATION message over Xn or by means of the Uplink RAN configuration transfer procedure and Downlink RAN configuration transfer procedure over NG. Upon retrieval of a SHR, the receiving node may analyse whether its mobility configuration needs adjustment.

[0088] In general, the objective of successful PSCell change Report (SPR) is to detect sub-optimal successful PSCell change/CPC or successful PSCell addition/CPA. For analysis of such sub-optimal successful PSCell change/CPC and successful PSCell addition/CPA, the UE may collect SPR based on the triggers configured by the network, if received, and makes

the SPR available to the network as specified in 3GPP standard document TS 38.331. For PSCell addition/CPA and PSCell change/CPC (MN or SN initiated), the target SN always decides the T304 trigger for SPR and performs root cause analysis. For SN-initiated PSCell change/CPC, the source SN decides the T310/T312 triggers for SPR and is responsible for SPR related optimizations e.g. to optimize PSCell change/CPC configuration or associated mobility thresholds or adjust T310/T312 timer values. For MN-initiated PSCell change/CPC, the MN decides the T310/T312 triggers for SPR. MN may optimize PSCell change/CPC configuration or associated mobility thresholds or both. Source SN may optimize lower layer issues e.g. adjust T310/T312 timer values. The SPR can be fetched from the UE by the MN only while the UE is still connected to the MN, or by a node different from the MN that sent the SPR configuration to the UE if the UE is not connected to the MN anymore. In case the SPR is retrieved in a node different from the MN that sent the SPR configuration to the UE, the SPR is first forwarded to that MN, which then forwards it to the respective SN(s) which should perform the SPR optimization.

[0089] In this disclosure, cell information includes PLMN-Identity, Cell Identity and TrackingAreaCode of the cell, or includes configuration ID of the cell, or includes PCI and carrier frequency information (e.g. ARFCN). The "successful cell change" refers to the UE's state, namely a successful completion of a random access (RA) procedure.

[0090] One objective for mobility enhancements in R18 is to specify MCG LTM procedure (i.e. a PCell switch procedure triggered by network via MAC CE based on L1 measurement) and SCG LTM procedure (i.e. a PSCell switch procedure triggered by network via MAC CE based on L1 measurement). In an MCG LTM or SCG LTM procedure, a near failure successful LTM execution may happen. In RAN plenary meeting for R19, majority companies propose to support MRO for near failure successful LTM. To improve mobility robustness, this disclosure considers MRO for near failure successful MCG LTM and MRO for near failure successful SCG LTM, including e.g. how to trigger condition for successful report for LTM; how to store, report and retrieve a successful report for LTM.

[0091] Currently, details regarding a successful report for LTM have not been discussed yet. Embodiments of the present disclosure aim to resolve the abovementioned issues.

[0092] Some embodiments of the present application define what is trigger condition(s) for a successful report for LTM and how to configure the trigger condition. For example, for MCG LTM, the successful report may be a SHR or other named report or a new introduced report. For SCG LTM, the successful report may be a SPR or other named report or a new introduced report. More specifically, some embodiments of the present application introduce timer T310 or T312 LTM specific trigger threshold(s) for the successful report. In one embodiment, LTM specific trigger threshold for successful report may be generated by CU of the LTM cell switch procedure, or by the relevant DU (e.g. source DU generates T310 or T312 related trigger threshold, target DU generates T304 related trigger threshold), LTM specific trigger threshold may be transmitted between CU and relevant DU(s). In another embodiment, LTM specific trigger threshold for successful report may be configured to the UE in an RRC Reconfiguration message for LTM procedure, or in the LTM Cell Switch Command MAC CE. Some embodiments of the present application introduce an optional UE capability for supporting the storage and delivery of information related with successful LTM.

[0093] Some embodiments of the present disclosure study a storing, reporting and retrieving mechanism of successful report for LTM. More specifically, in some embodiments of the present application, when at least one LTM specific trigger condition(s) is fulfilled, a UE stores successful LTM related information, e.g. including indication of the type of LTM cell switch, L1 measurement results when LTM Cell Switch Command MAC CE is received or when LTM cell switch execution is successful, time elapsed between LTM cell switch execution is initiated or triggered and report retrieval, and etc.. In some embodiments of the present application, if subsequent LTM is supported, a UE may log or store information related with multiple successful LTM cell switch executions in a same Information Element (IE) or UE variable or report, or, in multiple IEs or UE variables or reports separately.

[0094] In some embodiments of the present disclosure, the successful report may be stored at the UE and sent later, or the successful report may be sent immediately after the successful LTM cell switch execution. In some embodiments of the present disclosure, the successful report is delayed. In some embodiments, only the latest successful LTM cell switch execution is stored or reported by the UE. In some embodiments, the successful report

related to multiple successful LTM cell switch executions are stored or reported by the UE. In an embodiment, the UE may store or report at most maximum number (e.g. X) of successful LTM cell switch executions in one IE or one UE variable or one report, X may be configured by network or by default; when storing information related with at most maximum number (e.g. X) successful LTM cell switch executions, an indication for availability of successful report for LTM is sent by the UE to the network; if there are more than the configured maximum number (e.g. X) of successful LTM cell switch executions, additional IE(s) or UE variable(s) or report(s) would be initiated to store others, and the previous IE or UE variable or report would not be overridden. In another embodiment, the UE may store or report multiple LTM cell switch executions in one IE or one UE variable or one report until reconfiguration with sync on SpCell is initiated, or until receiving a message for LTM release, or until a connection failure happens.

[0095] In some embodiments of the present disclosure, the successful report is immediate. For example, upon a successful LTM cell switch execution, the UE may report the stored information related with this successful LTM cell switch execution.

[0096] In the present disclosure, the successful LTM related information may also be named as information related with successful LTM cell switch, a successful report for LTM, a successful report for LTM cell switch, a successful LTM report, a successful LTM cell switch report, or the like. For one instance, for MCG LTM, the successful LTM related information may be included in a SHR or other named report or a new introduced report, and the successful report may be a SHR or other named report or a new introduced report. For another instance, for SCG LTM, the successful LTM related information may be included in a SPR or other named report or a new introduced report, and the successful report may be a SPR or other named report or a new introduced report.

[0097] More details of the embodiments of the present disclosure will be illustrated in the following text in combination with the appended drawings.

[0098] Figure 1 illustrates an example of a wireless communications system 100 in accordance with aspects of the present disclosure. The wireless communications system 100 may include one or more NE 102, one or more UE 104, and a core network (CN) 106. The wireless communications system 100 may support various radio access technologies. In some

implementations, the wireless communications system 100 may be a 4G network, such as an LTE network or an LTE-Advanced (LTE-A) network. In some other implementations, the wireless communications system 100 may be a NR network, such as a 5G network, a 5G-Advanced (5G-A) network, or a 5G ultrawideband (5G-UWB) network. In other implementations, the wireless communications system 100 may be a combination of a 4G network and a 5G network, or other suitable radio access technology including Institute of Electrical and Electronics Engineers (IEEE) 802.11 (Wi-Fi), IEEE 802.16 (WiMAX), IEEE 802.20. The wireless communications system 100 may support radio access technologies beyond 5G, for example, 6G. Additionally, the wireless communications system 100 may support technologies, such as time division multiple access (TDMA), frequency division multiple access (FDMA), or code division multiple access (CDMA), etc.

[0099] The one or more NE 102 may be dispersed throughout a geographic region to form the wireless communications system 100. One or more of the NE 102 described herein may be or include or may be referred to as a network node, a base station, a network element, a network function, a network entity, a radio access network (RAN), a NodeB, an eNodeB (eNB), a next-generation NodeB (gNB), or other suitable terminology. An NE 102 and a UE 104 may communicate via a communication link, which may be a wireless or wired connection. For example, an NE 102 and a UE 104 may perform wireless communication (e.g. receive signaling, transmit signaling) over a Uu interface.

[0100] An NE 102 may provide a geographic coverage area for which the NE 102 may support services for one or more UEs 104 within the geographic coverage area. For example, an NE 102 and a UE 104 may support wireless communication of signals related to services (e.g. voice, video, packet data, messaging, broadcast, etc.) according to one or multiple radio access technologies. In some implementations, an NE 102 may be moveable, for example, a satellite associated with a non-terrestrial network (NTN). In some implementations, different geographic coverage areas 112 associated with the same or different radio access technologies may overlap, but the different geographic coverage areas may be associated with different NE 102.

[0101] The one or more UE 104 may be dispersed throughout a geographic region of the wireless communications system 100. A UE 104 may include or may be referred to as a remote unit, a mobile device, a wireless device, a remote device, a subscriber device, a

transmitter device, a receiver device, or some other suitable terminology. In some implementations, the UE 104 may be referred to as a unit, a station, a terminal, or a client, among other examples. Additionally, or alternatively, the UE 104 may be referred to as an Internet-of-Things (IoT) device, an Internet-of-Everything (IoE) device, or machine-type communication (MTC) device, among other examples.

[0102] A UE 104 may be able to support wireless communication directly with other UEs 104 over a communication link. For example, a UE 104 may support wireless communication directly with another UE 104 over a device-to-device (D2D) communication link. In some implementations, such as vehicle-to-vehicle (V2V) deployments, vehicle-to-everything (V2X) deployments, or cellular-V2X deployments, the communication link 114 may be referred to as a sidelink. For example, a UE 104 may support wireless communication directly with another UE 104 over a PC5 interface.

[0103] An NE 102 may support communications with the CN 106, or with another NE 102, or both. For example, an NE 102 may interface with other NE 102 or the CN 106 through one or more backhaul links (e.g. S1, N2, N2, or network interface). In some implementations, the NE 102 may communicate with each other directly. In some other implementations, the NE 102 may communicate with each other or indirectly (e.g. via the CN 106). In some implementations, one or more NE 102 may include subcomponents, such as an access network entity, which may be an example of an access node controller (ANC). An ANC may communicate with the one or more UEs 104 through one or more other access network transmission entities, which may be referred to as a radio heads, smart radio heads, or transmission-reception points (TRPs).

[0104] The CN 106 may support user authentication, access authorization, tracking, connectivity, and other access, routing, or mobility functions. The CN 106 may be an evolved packet core (EPC), or a 5G core (5GC), which may include a control plane entity that manages access and mobility (e.g. a mobility management entity (MME), an access and mobility management functions (AMF)) and a user plane entity that routes packets or interconnects to external networks (e.g. a serving gateway (S-GW), a Packet Data Network (PDN) gateway (P-GW), or a user plane function (UPF)). In some implementations, the control plane entity may manage non-access stratum (NAS) functions, such as mobility,

authentication, and bearer management (e.g. data bearers, signal bearers, etc.) for the one or more UEs 104 served by the one or more NE 102 associated with the CN 106.

[0105] The CN 106 may communicate with a packet data network over one or more backhaul links (e.g. via an S1, N2, N2, or another network interface). The packet data network may include an application server. In some implementations, one or more UEs 104 may communicate with the application server. A UE 104 may establish a session (e.g. a protocol data unit (PDU) session, or the like) with the CN 106 via an NE 102. The CN 106 may route traffic (e.g. control information, data, and the like) between the UE 104 and the application server using the established session (e.g. the established PDU session). The PDU session may be an example of a logical connection between the UE 104 and the CN 106 (e.g. one or more network functions of the CN 106).

[0106] In the wireless communications system 100, the NEs 102 and the UEs 104 may use resources of the wireless communications system 100 (e.g. time resources (e.g. symbols, slots, subframes, frames, or the like) or frequency resources (e.g. subcarriers, carriers)) to perform various operations (e.g. wireless communications). In some implementations, the NEs 102 and the UEs 104 may support different resource structures. For example, the NEs 102 and the UEs 104 may support different frame structures. In some implementations, such as in 4G, the NEs 102 and the UEs 104 may support a single frame structure. In some other implementations, such as in 5G and among other suitable radio access technologies, the NEs 102 and the UEs 104 may support various frame structures (i.e., multiple frame structures). The NEs 102 and the UEs 104 may support various frame structures based on one or more numerologies.

[0107] One or more numerologies may be supported in the wireless communications system 100, and a numerology may include a subcarrier spacing and a cyclic prefix. A first numerology (e.g. $\mu=0$) may be associated with a first subcarrier spacing (e.g. 15 kHz) and a normal cyclic prefix. In some implementations, the first numerology (e.g. $\mu=0$) associated with the first subcarrier spacing (e.g. 15 kHz) may utilize one slot per subframe. A second numerology (e.g. $\mu=1$) may be associated with a second subcarrier spacing (e.g. 30 kHz) and a normal cyclic prefix. A third numerology (e.g. $\mu=2$) may be associated with a third subcarrier spacing (e.g. 60 kHz) and a normal cyclic prefix or an extended cyclic prefix. A fourth numerology (e.g. $\mu=3$) may be associated with a fourth subcarrier spacing (e.g. 120

kHz) and a normal cyclic prefix. A fifth numerology (e.g. $\mu=4$) may be associated with a fifth subcarrier spacing (e.g. 240 kHz) and a normal cyclic prefix.

[0108] A time interval of a resource (e.g. a communication resource) may be organized according to frames (also referred to as radio frames). Each frame may have a duration, for example, a 10 millisecond (ms) duration. In some implementations, each frame may include multiple subframes. For example, each frame may include 10 subframes, and each subframe may have a duration, for example, a 1 ms duration. In some implementations, each frame may have the same duration. In some implementations, each subframe of a frame may have the same duration.

[0109] Additionally or alternatively, a time interval of a resource (e.g. a communication resource) may be organized according to slots. For example, a subframe may include a number (e.g. quantity) of slots. The number of slots in each subframe may also depend on the one or more numerologies supported in the wireless communications system 100. For instance, the first, second, third, fourth, and fifth numerologies (i.e., $\mu=0$, $\mu=1$, $\mu=2$, $\mu=3$, $\mu=4$) associated with respective subcarrier spacings of 15 kHz, 30 kHz, 60 kHz, 120 kHz, and 240 kHz may utilize a single slot per subframe, two slots per subframe, four slots per subframe, eight slots per subframe, and 16 slots per subframe, respectively. Each slot may include a number (e.g. quantity) of symbols (e.g. OFDM symbols). In some implementations, the number (e.g. quantity) of slots for a subframe may depend on a numerology. For a normal cyclic prefix, a slot may include 14 symbols. For an extended cyclic prefix (e.g. applicable for 60 kHz subcarrier spacing), a slot may include 12 symbols. The relationship between the number of symbols per slot, the number of slots per subframe, and the number of slots per frame for a normal cyclic prefix and an extended cyclic prefix may depend on a numerology. It should be understood that reference to a first numerology (e.g. $\mu=0$) associated with a first subcarrier spacing (e.g. 15 kHz) may be used interchangeably between subframes and slots.

[0110] In the wireless communications system 100, an electromagnetic (EM) spectrum may be split, based on frequency or wavelength, into various classes, frequency bands, frequency channels, etc. By way of example, the wireless communications system 100 may support one or multiple operating frequency bands, such as frequency range designations FR1 (410 MHz – 7.125 GHz), FR2 (24.25 GHz – 52.6 GHz), FR3 (7.125 GHz – 24.25 GHz), FR4 (52.6 GHz – 114.25 GHz), FR4a or FR4-1 (52.6 GHz – 71 GHz), and FR5 (114.25 GHz

– 300 GHz). In some implementations, the NEs 102 and the UEs 104 may perform wireless communications over one or more of the operating frequency bands. In some implementations, FR1 may be used by the NEs 102 and the UEs 104, among other equipment or devices for cellular communications traffic (e.g. control information, data). In some implementations, FR2 may be used by the NEs 102 and the UEs 104, among other equipment or devices for short-range, high data rate capabilities.

[0111] FR1 may be associated with one or multiple numerologies (e.g. at least three numerologies). For example, FR1 may be associated with a first numerology (e.g. $\mu=0$), which includes 15 kHz subcarrier spacing; a second numerology (e.g. $\mu=1$), which includes 30 kHz subcarrier spacing; and a third numerology (e.g. $\mu=2$), which includes 60 kHz subcarrier spacing. FR2 may be associated with one or multiple numerologies (e.g. at least 2 numerologies). For example, FR2 may be associated with a third numerology (e.g. $\mu=2$), which includes 60 kHz subcarrier spacing; and a fourth numerology (e.g. $\mu=3$), which includes 120 kHz subcarrier spacing.

[0112] Figure 2 illustrates an example of a UE 200 in accordance with aspects of the present disclosure. The UE 200 may include a processor 202, a memory 204, a controller 206, and a transceiver 208. The processor 202, the memory 204, the controller 206, or the transceiver 208, or various combinations thereof or various components thereof may be examples of means for performing various aspects of the present disclosure as described herein. These components may be coupled (e.g. operatively, communicatively, functionally, electronically, electrically) via one or more interfaces.

[0113] The processor 202, the memory 204, the controller 206, or the transceiver 208, or various combinations or components thereof may be implemented in hardware (e.g. circuitry). The hardware may include a processor, a digital signal processor (DSP), an application-specific integrated circuit (ASIC), or other programmable logic device, or any combination thereof configured as or otherwise supporting a means for performing the functions described in the present disclosure.

[0114] The processor 202 may include an intelligent hardware device (e.g. a general-purpose processor, a DSP, a CPU, an ASIC, an FPGA, or any combination thereof). In some implementations, the processor 202 may be configured to operate the memory 204. In some

other implementations, the memory 204 may be integrated into the processor 202. The processor 202 may be configured to execute computer-readable instructions stored in the memory 204 to cause the UE 200 to perform various functions of the present disclosure.

[0115] The memory 204 may include volatile or non-volatile memory. The memory 204 may store computer-readable, computer-executable code including instructions when executed by the processor 202 cause the UE 200 to perform various functions described herein. The code may be stored in a non-transitory computer-readable medium such the memory 204 or another type of memory. Computer-readable media includes both non-transitory computer storage media and communication media including any medium that facilitates transfer of a computer program from one place to another. A non-transitory storage medium may be any available medium that may be accessed by a general-purpose or special-purpose computer.

[0116] In some implementations, the processor 202 and the memory 204 coupled with the processor 202 may be configured to cause the UE 200 to perform one or more of the functions described herein (e.g. executing, by the processor 202, instructions stored in the memory 204). For example, the processor 202 may support wireless communication at the UE 200 in accordance with examples as disclosed with respect to Figure 7.

[0117] For example, the processor 202 may support wireless communication at the UE 200, and, the UE 200 may be configured to support means for receiving a configuration used for the UE to store or report successful L1/L2-Triggered Mobility (LTM) related information or information related with successful LTM cell switch; and means for storing the successful LTM related information or information related with successful LTM cell switch.

[0118] The controller 206 may manage input and output signals for the UE 200. The controller 206 may also manage peripherals not integrated into the UE 200. In some implementations, the controller 206 may utilize an operating system such as iOS®, ANDROID®, WINDOWS®, or other operating systems. In some implementations, the controller 206 may be implemented as part of the processor 202.

[0119] In some implementations, the UE 200 may include at least one transceiver 208. In some other implementations, the UE 200 may have more than one transceiver 208. The transceiver 208 may represent a wireless transceiver. The transceiver 208 may include one

or more receiver chains 210, one or more transmitter chains 212, or a combination thereof. The means for receiving abovementioned in the processor 202 or the means for transmitting in the processor 202 may be implemented via at least one transceiver 208.

[0120] A receiver chain 210 may be configured to receive signals (e.g. control information, data, packets) over a wireless medium. For example, the receiver chain 210 may include one or more antennas for receive the signal over the air or wireless medium. The receiver chain 210 may include at least one amplifier (e.g. a low-noise amplifier (LNA)) configured to amplify the received signal. The receiver chain 210 may include at least one demodulator configured to demodulate the receive signal and obtain the transmitted data by reversing the modulation technique applied during transmission of the signal. The receiver chain 210 may include at least one decoder for decoding the processing the demodulated signal to receive the transmitted data.

[0121] A transmitter chain 212 may be configured to generate and transmit signals (e.g. control information, data, packets). The transmitter chain 212 may include at least one modulator for modulating data onto a carrier signal, preparing the signal for transmission over a wireless medium. The at least one modulator may be configured to support one or more techniques such as amplitude modulation (AM), frequency modulation (FM), or digital modulation schemes like phase-shift keying (PSK) or quadrature amplitude modulation (QAM). The transmitter chain 212 may also include at least one power amplifier configured to amplify the modulated signal to an appropriate power level suitable for transmission over the wireless medium. The transmitter chain 212 may also include one or more antennas for transmitting the amplified signal into the air or wireless medium.

[0122] Figure 3 illustrates an example of a processor 300 in accordance with aspects of the present disclosure. The processor 300 may be an example of a processor configured to perform various operations in accordance with examples as described herein. The processor 300 may include a controller 302 configured to perform various operations in accordance with examples as described herein. The processor 300 may optionally include at least one memory 304, which may be, for example, an L1/L2/L3 cache. Additionally, or alternatively, the processor 300 may optionally include one or more arithmetic-logic units (ALUs) 306. One or more of these components may be in electronic communication or otherwise coupled

(e.g. operatively, communicatively, functionally, electronically, electrically) via one or more interfaces (e.g. buses).

[0123] The processor 300 may be a processor chipset and include a protocol stack (e.g. a software stack) executed by the processor chipset to perform various operations (e.g. receiving, obtaining, retrieving, transmitting, outputting, forwarding, storing, determining, identifying, accessing, writing, reading) in accordance with examples as described herein. The processor chipset may include one or more cores, one or more caches (e.g. memory local to or included in the processor chipset (e.g. the processor 300) or other memory (e.g. random access memory (RAM), read-only memory (ROM), dynamic RAM (DRAM), synchronous dynamic RAM (SDRAM), static RAM (SRAM), ferroelectric RAM (FeRAM), magnetic RAM (MRAM), resistive RAM (RRAM), flash memory, phase change memory (PCM), and others).

[0124] The controller 302 may be configured to manage and coordinate various operations (e.g. signaling, receiving, obtaining, retrieving, transmitting, outputting, forwarding, storing, determining, identifying, accessing, writing, reading) of the processor 300 to cause the processor 300 to support various operations in accordance with examples as described herein. For example, the controller 302 may operate as a control unit of the processor 300, generating control signals that manage the operation of various components of the processor 300. These control signals include enabling or disabling functional units, selecting data paths, initiating memory access, and coordinating timing of operations.

[0125] The controller 302 may be configured to fetch (e.g. obtain, retrieve, receive) instructions from the memory 304 and determine subsequent instruction(s) to be executed to cause the processor 300 to support various operations in accordance with examples as described herein. The controller 302 may be configured to track memory address of instructions associated with the memory 304. The controller 302 may be configured to decode instructions to determine the operation to be performed and the operands involved. For example, the controller 302 may be configured to interpret the instruction and determine control signals to be output to other components of the processor 300 to cause the processor 300 to support various operations in accordance with examples as described herein. Additionally, or alternatively, the controller 302 may be configured to manage flow of data within the processor 300. The controller 302 may be configured to control transfer of data

between registers, arithmetic logic units (ALUs), and other functional units of the processor 300.

[0126] The memory 304 may include one or more caches (e.g. memory local to or included in the processor 300 or other memory, such RAM, ROM, DRAM, SDRAM, SRAM, MRAM, flash memory, etc. In some implementations, the memory 304 may reside within or on a processor chipset (e.g. local to the processor 300). In some other implementations, the memory 304 may reside external to the processor chipset (e.g. remote to the processor 300).

[0127] The memory 304 may store computer-readable, computer-executable code including instructions that, when executed by the processor 300, cause the processor 300 to perform various functions described herein. The code may be stored in a non-transitory computer-readable medium such as system memory or another type of memory. The controller 302 and/or the processor 300 may be configured to execute computer-readable instructions stored in the memory 304 to cause the processor 300 to perform various functions. For example, the processor 300 and/or the controller 302 may be coupled with or to the memory 304, the processor 300, the controller 302, and the memory 304 may be configured to perform various functions described herein. In some examples, the processor 300 may include multiple processors and the memory 304 may include multiple memories. One or more of the multiple processors may be coupled with one or more of the multiple memories, which may, individually or collectively, be configured to perform various functions herein.

[0128] The one or more ALUs 306 may be configured to support various operations in accordance with examples as described herein. In some implementations, the one or more ALUs 306 may reside within or on a processor chipset (e.g. the processor 300). In some other implementations, the one or more ALUs 306 may reside external to the processor chipset (e.g. the processor 300). One or more ALUs 306 may perform one or more computations such as addition, subtraction, multiplication, and division on data. For example, one or more ALUs 306 may receive input operands and an operation code, which determines an operation to be executed. One or more ALUs 306 be configured with a variety of logical and arithmetic circuits, including adders, subtractors, shifters, and logic gates, to process and manipulate the data according to the operation. Additionally, or alternatively, the one or more ALUs 306 may support logical operations such as AND, OR, exclusive-OR (XOR), not-OR (NOR), and

not-AND (NAND), enabling the one or more ALUs 306 to handle conditional operations, comparisons, and bitwise operations.

[0129] The processor 300 may support wireless communication in accordance with examples as disclosed herein.

[0130] In some implementations, the processor 300 may be configured to support means for performing operations of a UE. The processor 300 may be configured to or operable to support means for receiving a configuration used for the UE to store or report successful LTM related information or information related with successful LTM cell switch; and means for storing the successful LTM related information or information related with successful LTM cell switch.

[0131] In some implementations, the processor 300 may be configured to support means for performing operations of a CU of a BS. The processor 300 may be configured to or operable to support means for obtaining a configuration used for a UE to store or report successful LTM related information or information related with successful LTM cell switch, and means for transmitting the configuration.

[0132] In some implementations, the processor 300 may be configured to support means for performing operations of a DU of a BS. The processor 300 may be configured to or operable to support means for obtaining a configuration used for a UE to store or report successful LTM related information or information related with successful LTM cell switch; and means for transmitting the configuration to the UE or a CU of the BS.

[0133] It should be appreciated by persons skilled in the art that the components in exemplary processor 300 may be changed, for example, some of the components in exemplary processor 300 may be omitted or modified or new component(s) may be added to exemplary processor 300, without departing from the spirit and scope of the disclosure. For example, in some embodiments, the processor 300 may not include the ALUs 306.

[0134] Figure 4 illustrates an example of a NE 400 in accordance with aspects of the present disclosure. The NE 400 may include a processor 402, a memory 404, a controller 406, and a transceiver 408. The processor 402, the memory 404, the controller 406, or the transceiver 408, or various combinations thereof or various components thereof may be examples of means for performing various aspects of the present disclosure as described

herein. These components may be coupled (e.g. operatively, communicatively, functionally, electronically, electrically) via one or more interfaces.

[0135] The processor 402, the memory 404, the controller 406, or the transceiver 408, or various combinations or components thereof may be implemented in hardware (e.g. circuitry). The hardware may include a processor, a digital signal processor (DSP), an application-specific integrated circuit (ASIC), or other programmable logic device, or any combination thereof configured as or otherwise supporting a means for performing the functions described in the present disclosure.

[0136] The processor 402 may include an intelligent hardware device (e.g. a general-purpose processor, a DSP, a CPU, an ASIC, an FPGA, or any combination thereof). In some implementations, the processor 402 may be configured to operate the memory 404. In some other implementations, the memory 404 may be integrated into the processor 402. The processor 402 may be configured to execute computer-readable instructions stored in the memory 404 to cause the NE 400 to perform various functions of the present disclosure.

[0137] The memory 404 may include volatile or non-volatile memory. The memory 404 may store computer-readable, computer-executable code including instructions when executed by the processor 402 cause the NE 400 to perform various functions described herein. The code may be stored in a non-transitory computer-readable medium such the memory 404 or another type of memory. Computer-readable media includes both non-transitory computer storage media and communication media including any medium that facilitates transfer of a computer program from one place to another. A non-transitory storage medium may be any available medium that may be accessed by a general-purpose or special-purpose computer.

[0138] In some implementations, the processor 402 and the memory 404 coupled with the processor 402 may be configured to cause the NE 400 to perform one or more of the functions described herein (e.g. executing, by the processor 402, instructions stored in the memory 404). For example, the processor 402 may support wireless communication at the NE 400 in accordance with examples as disclosed herein.

[0139] In some implementations, the NE 400 may be a CU of a BS, and the NE 400 may be configured to support means for obtaining a configuration used for a UE to store or report

successful LTM related information or information related with successful LTM cell switch, and means for transmitting the configuration.

[0140] In some implementations, the NE 400 may be a DU of a BS, and the NE 400 may be configured to support means for obtaining a configuration used for a UE to store or report successful LTM related information or information related with successful LTM cell switch; and means for transmitting the configuration to the UE or a CU of the BS.

[0141] The controller 406 may manage input and output signals for the NE 400. The controller 406 may also manage peripherals not integrated into the NE 400. In some implementations, the controller 406 may utilize an operating system such as iOS®, ANDROID®, WINDOWS®, or other operating systems. In some implementations, the controller 406 may be implemented as part of the processor 402.

[0142] In some implementations, the NE 400 may include at least one transceiver 408. In some other implementations, the NE 400 may have more than one transceiver 408. The transceiver 408 may represent a wireless transceiver. The transceiver 408 may include one or more receiver chains 410, one or more transmitter chains 412, or a combination thereof. The means for receiving or the means for transmitting abovementioned in the processor 402 may be implemented via at least one transceiver 408.

[0143] A receiver chain 410 may be configured to receive signals (e.g. control information, data, packets) over a wireless medium. For example, the receiver chain 410 may include one or more antennas for receive the signal over the air or wireless medium. The receiver chain 410 may include at least one amplifier (e.g. a low-noise amplifier (LNA)) configured to amplify the received signal. The receiver chain 410 may include at least one demodulator configured to demodulate the receive signal and obtain the transmitted data by reversing the modulation technique applied during transmission of the signal. The receiver chain 410 may include at least one decoder for decoding the processing the demodulated signal to receive the transmitted data.

[0144] A transmitter chain 412 may be configured to generate and transmit signals (e.g. control information, data, packets). The transmitter chain 412 may include at least one modulator for modulating data onto a carrier signal, preparing the signal for transmission over a wireless medium. The at least one modulator may be configured to support one or

more techniques such as amplitude modulation (AM), frequency modulation (FM), or digital modulation schemes like phase-shift keying (PSK) or quadrature amplitude modulation (QAM). The transmitter chain 412 may also include at least one power amplifier configured to amplify the modulated signal to an appropriate power level suitable for transmission over the wireless medium. The transmitter chain 412 may also include one or more antennas for transmitting the amplified signal into the air or wireless medium.

[0145] It should be appreciated by persons skilled in the art that the components in exemplary NE 400 may be changed, for example, some of the components in exemplary NE 400 may be omitted or modified or new component(s) may be added to exemplary NE 400, without departing from the spirit and scope of the disclosure. For example, in some embodiments, the NE 400 may not include the controller 406.

[0146] Figure 5A illustrates a schematic diagram of an intra-CU intra-DU mobility scenario in accordance with aspects of the present disclosure. The wireless communication system in Figure 5A includes a DU, a UE (e.g. UE 101A), and some access nodes (e.g. access node 102A and access node 103A). The access node 102A and access node 103A are controlled by the DU, and provides services for UEs within cell #1 and cell #2 respectively. Even though there are only one UE and two access nodes in Figure 5A, persons skilled in the art will recognize that any number of UEs and access nodes may be included in the wireless communication system.

[0147] In Figure 5A, UE 101A is moving from cell #1 to cell #2, and may perform an LTM cell switch procedure from cell #1 to access to cell #2, which is an LTM cell switch procedure performed between different cells within a DU. This scenario may be referred to as intra-CU intra-DU LTM/mobility. In short, this scenario may be called as intra-DU LTM/mobility.

[0148] Figure 5B illustrates a schematic diagram of an intra-CU inter-DU mobility scenario in accordance with aspects of the present disclosure. The wireless communication system in Figure 5B includes a CU, a UE (e.g. UE 101B), and some DUs (e.g. DU #1 and DU #2). DU #1 and DU #2 are controlled by the CU, and provides services for UEs within cell #A and cell #B respectively. Even though there are only one UE and two DUs in Figure

5B, persons skilled in the art will recognize that any number of UEs and DUs may be included in the wireless communication system.

[0149] In Figure 5B, UE 101B is moving from cell #A to cell #B, and may perform an LTM cell switch procedure from cell #A to access to cell #B, which is an LTM cell switch procedure performed between different cells belonging to different DUs but within the same CU. This scenario may be referred to as intra-CU inter-DU LTM/mobility. In short, this scenario may be called as inter-DU LTM/mobility.

[0150] Figure 5C illustrates a schematic diagram of an inter-CU mobility scenario in accordance with aspects of the present disclosure. The wireless communication system in Figure 5C includes some CUs (e.g. CU #1 and CU #2), a UE (e.g. UE 101C), and some DUs (e.g. DU #A and DU #B). DU #A is controlled by CU #1 and provides services for UEs within cell #X. DU #B is controlled by CU #2 and provides services for UEs within cell #Y. Even though there are only one UE, two DUs, and two CUs in Figure 5C, persons skilled in the art will recognize that any number of UEs, DUs, and CUs may be included in the wireless communication system.

[0151] In Figure 5C, UE 101C is moving from cell #X to cell #Y, and may perform an LTM cell switch procedure from cell #X to access to cell #Y, which is an LTM cell switch procedure performed between different cells belonging to different DUs within different CUs. This scenario may be referred to as inter-CU LTM/mobility.

[0152] Figure 6 illustrates a schematic diagram of an inter-DU intra-CU LTM procedure for intra-NR in accordance with aspects of the present disclosure. An inter-DU intra-CU LTM procedure is used for the case when a UE moves from one DU to another DU within the same CU during NR operation for LTM.

[0153] In the embodiments of Figure 6, a wireless communication system includes a UE, a source DU (which may also be referred to a serving DU, the source DU serves the UE before an LTM procedure is triggered), a target DU, one or more candidate DUs (which may also be referred to as "(candidate) target DU(s)," "candidate target DU(s)" or "candidate DU(s)" in Figure 6), and a CU. The source DU and the target DU or the one or more candidate DUs are within the CU. In SCG LTM, the source DU and the target DU or the one or more candidate DUs are within the SN, the CU is a CU of the SN. The UE is moving from

the source DU to the target DU or one of the one or more candidate DUs. The source DU may manage (or control) the serving cell of the UE, and one or more source cells. The serving cell and the one or more source cells are considered as in the source DU. Each candidate DU of the candidate DU(s) may manage one or more LTM candidate cells, and the one or more candidate cells are considered as in each candidate DU. One of the one or more candidate DUs manages the LTM candidate cell to which the UE may be switched. In some embodiments, the LTM candidate cell to which the UE may be switched to may be referred to as the "LTM candidate target cell." When one LTM candidate cell is selected as a target cell for LTM by the network or is indicated in the LTM cell switch MAC CE, the LTM candidate cell can be called as an LTM target cell. Then, the candidate DU which manages or controls the LTM candidate cell can be called as a target DU, i.e. the LTM target cell is managed by the target DU, and the LTM candidate cell is managed by the candidate target DU. In MCG LTM, above "cell" can also be called as PCell; and in SCG LTM, above "cell" can also be called as PSCell.

[0154] In operation 601, the UE sends a measurement report to the source DU containing measurements of neighboring cells. The source DU sends an UL RRC message transfer message conveying the received measurement report message to the CU.

[0155] In operation 602, the CU determines to initiate LTM configuration.

[0156] In operation 603, the CU sends a UE context setup request message to the candidate DU, containing one target candidate cell ID. The CU indicates the source DU ID, and requests PRACH resources from the Candidate DU.

[0157] In operation 604, if the candidate DU accepts the request of LTM configuration, it responds with a UE context setup response message including the generated lower layer RRC configuration (e.g. transmission configuration indication (TCI) state configuration and RACH configuration) and the RS configuration for the accepted LTM candidate cell.

[0158] In operation 605, the CU sends a UE context modification request message to the source DU including the collected RS configuration, TCI state configuration and RACH configuration for the accepted LTM candidate cell(s) in other DUs.

[0159] In operation 606, the source DU responds with a UE context modification response message which may include the RS configuration of the source cell, prepared LTM candidate cells and the generated CSI resource configuration.

[0160] In operation 607, the CU sends a UE context modification request message to the candidate DU(s) containing the cell ID(s) of the prepared LTM candidate cell(s) and associated RS configuration for each LTM candidate cell in other candidate DU(s). In some cases, the source cell may be configured as one LTM candidate cell.

[0161] In operation 608, the candidate DU responds with a UE context modification response message including the generated CSI resource configuration.

[0162] In operation 609, the CU sends a DL RRC message transfer message to the source DU, which includes the generated RRC reconfiguration message with the LTM configuration.

[0163] In operation 610, the source DU forwards the received RRC reconfiguration message to the UE.

[0164] In operation 611, the UE responds to the source DU with an RRC reconfiguration complete message.

[0165] In operation 612, the source DU forwards the RRC reconfiguration complete message to the CU via an UL RRC message transfer message.

[0166] In operation 613 (optional), early synchronization may be performed.

[0167] In operations 614 and 615 (optional), the candidate DU sends the TA value, the associated CFRA resource information, the candidate cell ID and the source DU ID to the source DU via the DU-CU TA INFORMATION TRANSFER and CU-DU TA INFORMATION TRANSFER messages, for which the source DU ID is omitted in the CU-DU TA INFORMATION TRANSFER message.

[0168] In operation 616, the UE sends an L1 measurement report to the source DU.

[0169] In operation 617, the source DU decides to execute LTM cell switch to an LTM candidate target cell.

[0170] In operation 618, the source DU sends a cell switch command to the UE.

[0171] In operation 619, the source DU sends the DU-CU cell switch notification message to the CU to indicate the initiation of the LTM command to the UE including the target cell ID and the selected beam information.

[0172] In operation 620, the CU sends the target cell ID and the TCI state ID to the target DU in the CU-DU cell switch notification message.

[0173] In operation 621, the target DU detects the access of the UE.

[0174] In operation 622, the target DU sends the access success message to the CU with the target cell ID.

[0175] In operation 623, the UE sends an RRC reconfiguration complete message to the target DU.

[0176] In operation 624, the target DU forwards the RRC reconfiguration complete message to the CU via an UL RRC message transfer message.

[0177] In operation 625 (optional), the CU may send a UE context release command message to the source DU to release the resources of prepared cells.

[0178] In operation 626 (optional), the source DU responds with a UE context release complete message.

[0179] Some embodiments of the present disclosure refer to an intra-DU intra-CU LTM procedure for intra-NR, wherein the serving or source cell and one or more LTM candidate cells are considered as in the same DU. A wireless communication system of the intra-DU LTM procedure includes a UE, a DU (which may also be referred to a source or serving DU, or a target DU, or a candidate DU), and a CU. The source DU is within the CU. That is to say, different from the source DU and the target DU or the candidate DU(s) in Figure 6, the intra-DU LTM procedure only refers to one DU, i.e. the source DU and the target DU or the candidate DU(s) are the same node. In an intra-DU LTM procedure, the messages transferred between the DU and the CU are similar as the messages transferred between the source DU or the target DU or the one or more candidate DUs and the CU in an inter-DU LTM procedure as described in the embodiments of Figure 6.

[0180] Figure 7 illustrates a flowchart of a method related to an LTM cell switch procedure in accordance with aspects of the present disclosure. The operations of the method may be implemented by a UE as described herein. In some implementations, the UE may execute a set of instructions to control the function elements of the UE to perform the described functions. In some implementations, aspects of operations 702 and 704 may be performed by UE 200, UE 101A, UE 101B, or UE 101C, as described with reference to Figures 2 and 5A-5C. Each of operations 702 and 704 may be performed in accordance with examples as described herein.

[0181] At operation 702, the method may include receiving, by a UE, a configuration (denoted as "configuration #1") used for the UE to store or report successful LTM related information. For example, a successful LTM may refer to at least one of the following cases:

- (1) an LTM cell switch execution is successful; or
- (2) the UE successfully switches to a target cell which is indicated in an LTM cell switch command MAC CE; or
- (3) upon the UE receives an indication from a lower layer indicating that the LTM cell switch execution has been successfully completed.

[0182] In some embodiments of the present disclosure, configuration #1 is received in: (1) a radio resource control (RRC) reconfiguration message; and/or (2) a lower layer message concerning that an LTM cell switch execution is initiated or triggered, e.g. an LTM Cell Switch Command MAC CE.

[0183] In some embodiments, configuration #1 includes one or more thresholds. The one or more thresholds may comprise at least one of the following:

- (1) at least one timer T310 related threshold;
- (2) at least one timer T312 related threshold; or
- (3) at least one timer T304 related threshold.

[0184] At operation 704, the method may include transmitting the successful LTM related information. The successful LTM related information may also be named as information related with successful LTM cell switch, a successful report for LTM, a

successful report for LTM cell switch, a successful LTM report, a successful LTM cell switch report, or the like. For one instance, for MCG LTM, the successful LTM related information may be included in a SHR or other named report or a new introduced report, and the successful report may be a SHR or other named report or a new introduced report. For another instance, for SCG LTM, the successful LTM related information may be included in a SPR or other named report or a new introduced report, and the successful report may be a SPR or other named report or a new introduced report.

[0185] In some embodiments of the present disclosure, the successful LTM related information is associated with a master cell group (MCG) LTM cell switch procedure or a secondary cell group (SCG) LTM cell switch procedure.

[0186] In some embodiments, the successful LTM related information is stored upon at least one of the following:

- (1) a satisfaction of at least one trigger condition associated with the one or more thresholds;
or
- (2) a successful completion of an LTM cell switch execution. The successful completion of an LTM cell switch execution may refer to at least one of the following cases:
 - a) LTM cell switch execution is successful; or
 - b) the UE successfully switches to target cell which is indicated in LTM cell switch command MAC CE; or
 - c) upon the UE receives an indication from lower layer indicating that the LTM cell switch execution has been successfully completed

[0187] In some embodiments, the satisfaction of the at least one trigger condition includes at least one of the following:

- (1) "a ratio between a value of elapsed running time of the timer T310 when an LTM cell switch execution is initiated or triggered and a configured value of the timer T310 (e.g. that is configured while the UE was connected to the source cell before executing the LTM cell switch)" is greater than "the at least one timer T310 related threshold", wherein "an LTM cell switch execution is initiated or triggered" can also be called as "when

reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is received”; or

- (2) "a ratio between a value of elapsed running time of the timer T312 when the LTM cell switch execution is initiated or triggered and a configured value of the timer T312 (e.g. that is configured while the UE was connected to the source cell before executing the LTM cell switch)" is greater than "the at least one timer T312 related threshold", wherein "an LTM cell switch execution is initiated or triggered" can also be called as "when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is received"; or
- (3) "a ratio between a value of elapsed running time of the timer T304 and a configured value of the timer T304" is greater than "the at least one timer T304 related threshold".

[0188] In some embodiments of the present disclosure, the successful LTM related information is stored upon a successful completion of an LTM cell switch execution, and the UE may report the successful LTM related information (e.g. in an RRC Reconfiguration Complete message or other message) after storing the successful LTM related information.

[0189] In some embodiments of the present disclosure, the UE may transmit an indication for availability of the successful LTM related information (e.g. in an RRC Reconfiguration Complete message or other message) upon a successful completion of an LTM cell switch execution or after storing the successful LTM related information.

[0190] In some embodiments of the present disclosure, the UE may receive a request for reporting the successful LTM related information.

[0191] In some embodiments of the present disclosure, the successful LTM related information includes at least one of the following:

- (1) information (denoted as "information #1") related to a successful LTM cell switch execution, e.g. the successful LTM cell switch execution may be a latest successful LTM cell switch execution or any successful LTM cell switch execution; or
- (2) information (denoted as "information #2") related to one or more successful LTM cell switch executions.

[0192] In some embodiments, if the successful LTM related information includes information #2, the UE may store or report information #2 related to at most a fixed number of successful LTM cell switch executions in one Information Element (IE) or one UE variable or one report or one message. For example, the fixed number is a maximum number (e.g. X), which may be configured by network (e.g. the network may be a CU of the LTM procedure or a CU which generates the RRC reconfiguration message including LTM related configuration for the LTM cell switch procedure or which sends the RRC reconfiguration message to the UE) or may be of a default value. In some other embodiments, if the successful LTM related information includes information #2, the UE may store or report information #2 related to at least a fixed number of successful LTM cell switch executions in one Information Element (IE) or one UE variable or one report or one message. For example, the fixed number is a minimum number (e.g. Y), which may be configured by a network (e.g. the network may be a CU of the LTM procedure or a CU which generates the RRC reconfiguration message including LTM related configuration for the LTM cell switch procedure or which sends the RRC reconfiguration message to the UE) or may be of a default value.

[0193] In some embodiments, if a total number of successful LTM cell switch executions performed at the UE (e.g. in one LTM cell switch procedure) is greater than the fixed number, after storing information #2 related to at most the fixed number of successful LTM cell switch executions in the one IE or the one UE variable or the one report or the one message, the UE may store information (denoted as "information #3") related to partial or whole of remaining successful LTM cell switch executions performed at the UE which are not covered in information #2 in additional one or more IEs or UE variables or reports or messages. In these embodiments, because a subsequent LTM is supported, multiple LTM cell switch executions are performed at the UE.

[0194] In some embodiments of the present disclosure, the UE may:

- (1) transmit an indication for availability of information #2, e.g. in RRC Reconfiguration Complete message or other message, after storing information #2;
- (2) transmit an indication for availability of information #3 after storing information #3; or
- (3) transmit an indication for availability of information #2 and information #3 after storing information #2 and information #3.

[0195] In some embodiments of the present disclosure, if the successful LTM related information includes information #2, the UE may store information #2 related to successful LTM cell switch executions performed at the UE in one IE or one UE variable or one report or one message until a stopping indication. In some embodiments, the stopping indication comprises at least one of the following:

- (1) a normal handover (HO) is initiated;
- (2) a conditional handover (CHO) is initiated;
- (3) a dual active protocol stack (DAPS) HO is initiated;
- (4) a normal PSCell change is initiated;
- (5) a conditional PSCell change (CPC) is initiated;
- (6) an indication indicating to release LTM configuration is received, e.g. until receiving a message to release LTM configuration (e.g. a RRC message that indicates the UE to release or stop LTM); or
- (7) a connection failure happens, e.g. for MCG LTM, until MCG failure or handover failure or an RLF happens; for SCG LTM, until SCG failure or PSCell change failure happens.

[0196] In some embodiments of the present disclosure, the successful LTM related information includes at least one of the following:

- (1) information regarding a source cell (e.g. cell ID); for example, the cell ID may include LTM configuration ID of the source cell, PCI+ carrier frequency information (e.g. ARFCN), and/or, CGI-info (e.g. PLMN-Identity, Cell Identity and TrackingAreaCode);

- (2) information regarding a target cell (e.g. cell ID); for example, the cell ID may include configuration ID of the target cell e.g. which is indicated in LTM Cell Switch Command MAC CE (e.g. "Target Configuration ID" field in the LTM Cell Switch Command MAC CE), PCI+ carrier frequency information (e.g. ARFCN), and/or, CGI-info (e.g. PLMN-Identity, Cell Identity and TrackingAreaCode);
- (3) information regarding at least one neighbour cell (e.g. the information includes cell ID of each neighbour cell, and/or one flag to indicate whether a measured neighbour cell included in the L1 or L3 measurement results is an LTM candidate cell);
- (4) layer 1 (L1) measurement results of the source cell;
- (5) L1 measurement results of the target cell;
- (6) L1 measurement results of the at least one neighbour cell;
- (7) information regarding at least one beam;
- (8) an indication of a type of an LTM cell switch;
- (9) information regarding one or more candidate cells configured for the LTM cell switch, e.g. the latest configured one or more LTM candidate cells;
- (10) configuration information for the one or more candidate cells;
- (11) reference configuration information for the LTM cell switch;
- (12) one or more channel state information (CSI) resources for the LTM cell switch;
- (13) one or more time alignment (TA) values derived by a UE based TA measurement;
- (14) one or more TA values for a random access channel (RACH)-less LTM cell switch;
- (15) one or more contention-free random access resources;
- (16) one or more cause values for storing the successful LTM related information or a successful report for the LTM cell switch;
- (17) time elapsed between initiating or triggering an LTM cell switch execution and receiving an RRC reconfiguration message for the LTM cell switch, e.g. a latest RRC reconfiguration message for the LTM cell switch procedure;

- (18) time elapsed between initiating or triggering the LTM cell switch execution and retrieval of the successful LTM related information, e.g. retrieval of the successful report for LTM;
- (19) time elapsed between initiating or triggering the LTM cell switch execution and a successful completion of the LTM cell switch execution; or
- (20) time elapsed between the successful completion of the LTM cell switch execution and reporting the successful LTM related information.

[0197] In the embodiments of the present disclosure, the L1 measurement results means the results measured when LTM cell switch execution is initiated or triggered (or when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is received), or when LTM cell switch execution is successful, or upon an indication from lower layer that the LTM cell switch execution has been successfully completed.

[0198] In some embodiments of the present disclosure, the successful LTM related information is stored as or reported via at least one of the following reports:

- (1) a successful handover report (SHR);
- (2) a successful PSCell change report (SPR);
- (3) a successful report for LTM cell switch;
- (4) a successful LTM report; or
- (5) a successful LTM cell switch report.

[0199] In some embodiments of the present disclosure, the UE may transmit an indication of capability of the UE for supporting storage and reporting of the successful LTM related information.

[0200] It should be noted that the method described in Figure 7 describes possible implementations, and that the operations and the steps may be rearranged or otherwise

eliminated or modified and that other implementations are possible, without departing from the spirit and scope of the disclosure.

[0201] Figure 8 illustrates a further flowchart of a method related to an LTM cell switch procedure in accordance with aspects of the present disclosure. The operations of the method may be implemented by a network node, e.g. a CU of a BS as described herein. The CU is of the LTM procedure, or is a node which generates the RRC reconfiguration message including LTM related configuration for the LTM cell switch procedure or a node which sends the RRC reconfiguration message for the LTM cell switch procedure to the UE. In some implementations, the CU may execute a set of instructions to control the function elements of the CU to perform the described functions. In some implementations, aspects of operations 802 and 804 may be performed by NE 400 as described with reference to Figure 4. Each of operations 802 and 804 may be performed in accordance with examples as described herein.

[0202] At operation 802, the method may include obtaining, by a CU of a BS, a configuration used for a UE to store or report successful LTM related information. At operation 804, the method may include transmitting the configuration by the CU. In some embodiments, the configuration is transmitted to the source DU or the UE after obtaining the configuration.

[0203] In some embodiments of the present disclosure, the configuration is received in: (1) a radio resource control (RRC) reconfiguration message; and/or (2) a lower layer message concerning that an LTM cell switch execution is initiated or triggered, e.g. an LTM Cell Switch Command MAC CE. In some embodiments, the configuration may include the same elements (e.g. one or more thresholds are used for the UE to store the successful LTM related information) as those of configuration #1 as described in the embodiments of Figure 7. For example, as described in the embodiments of Figure 7, the one or more thresholds comprise at least one of: at least one timer T310 related threshold; at least one timer T312 related threshold; or at least one timer T304 related threshold.

[0204] In some embodiments, to obtain the configuration at operation 802, the CU may generate the configuration, or receive the configuration from at least one DU of the BS. Then,

the configuration may be transmitted to the source DU or the UE. For instance, the at least one DU includes at least one of the following:

- (1) a source DU;
- (2) a target DU; or
- (3) at least one candidate target DU.

[0205] In some embodiments, the CU may receive, from a target DU, an indication indicating an occurrence of one or more successful LTM cell switch executions in the target DU. The indication may be an ACCESS SUCCESS or UL RRC MESSAGE TRANSFER or RACH indication message or other existing message or a new defined message, or, the indication may be an explicit indication or a flag or an explicit IE included in the ACCESS SUCCESS or UL RRC MESSAGE TRANSFER or RACH indication message or other existing message or a new defined message.

[0206] In some embodiments, the CU may receive, from the UE, an indication (e.g. which is included in an RRC Reconfiguration Complete message) for availability of the successful LTM related information.

[0207] In some embodiments, the CU may transmit, to the UE, a request for reporting the successful LTM related information, e.g. via a UE information request message or other message.

[0208] In some embodiments, the CU may receive the successful LTM related information from the UE (e.g. in a UE information response message or RRC Reconfiguration Complete message or other message) or from a serving node of the UE. The successful LTM related information may include the same elements as those of the successful LTM related information as described in the embodiments of Figure 7.

[0209] In some embodiments, the CU may generate a value of a fixed number (e.g. maximum number X) of successful LTM cell switch executions that the UE can at most store or report in one IE or one UE variable or one report or one message. Then, the CU may transmit the value of the fixed number to the UE (e.g. via an RRC Reconfiguration message or an LTM Cell Switch Command MAC CE) or to a source DU.

[0210] In some embodiments of the present disclosure, the configuration instructs the UE to store information related to successful LTM cell switch executions performed at the UE (e.g. information #2 as described in the embodiments of Figure 7) in one IE or one UE variable or one report or one message until a stopping indication. The stopping indication may be the same as the stopping indication as described in the embodiments of Figure 7.

[0211] In some embodiments, the CU may transmit the successful LTM related information to at least one DU of the BS, which includes at least one of: (1) a source DU; (2) a target DU; or (3) at least one candidate target DU.

[0212] In some embodiments, the CU may receive an indication of capability of the UE for supporting storage and reporting of the successful LTM related information.

[0213] Figure 9 illustrates another flowchart of a method related to an LTM cell switch procedure in accordance with aspects of the present disclosure. The operations of the method may be implemented by a network node, e.g. a DU of a BS as described herein. In some implementations, the DU may execute a set of instructions to control the function elements of the CU to perform the described functions. In some implementations, aspects of operations 902 and 904 may be performed by NE 400 as described with reference to Figure 4. Each of operations 902 and 904 may be performed in accordance with examples as described herein.

[0214] At operation 902, the method may include obtaining, by a DU of a BS, a configuration used for a UE to store or report successful LTM related information. The successful LTM related information may include the same elements as those of the successful LTM related information as described in the embodiments of Figure 7.

[0215] At operation 904, the method may include transmitting the configuration by the DU to the UE or a CU of the BS. In some embodiments, the configuration may include the same elements (e.g. one or more thresholds are used for the UE to store the successful LTM related information) as those of configuration #1 as described in the embodiments of Figure 7. For example, as described in the embodiments of Figure 7, the one or more thresholds comprise at least one of: at least one timer T310 related threshold; at least one timer T312 related threshold; or at least one timer T304 related threshold.

[0216] In some embodiments of the present disclosure, if the DU is a source DU, to obtain the one or more thresholds included in the configuration, the source DU may perform at least one of:

- (1) generating at least one timer T310 related threshold or at least one timer T312 related threshold;
- (2) transmitting the at least one timer T310 related threshold or at least one timer T312 related threshold to a CU; and
- (3) receiving the configuration from the CU, wherein the configuration includes the at least one timer T310 related threshold or the at least one timer T312 related threshold.

[0217] In some embodiments, if the successful LTM related information is associated with a SCG LTM cell switch procedure, the CU is a CU of a SN which generates an RRC reconfiguration message including LTM related configuration for the SCG LTM cell switch procedure or which send the RRC reconfiguration message to the UE. For example, the LTM related configuration is a candidate configuration (i.e. a configuration part of an RRC Reconfiguration message associated with a candidate cell, e.g. for LTM) and/or a reference configuration (i.e. a configuration provided by the network to the UE that is common, within the same cell group, to a group of configured non-complete candidate configurations).

[0218] In some embodiments, if the successful LTM related information is associated with a SCG LTM cell switch procedure, the source DU is a DU of a SN which generates the RRC reconfiguration message including LTM related configuration for the SCG LTM cell switch procedure or which sends the RRC reconfiguration message to the UE.

[0219] In some embodiments, if the successful LTM related information is associated with a SCG LTM cell switch procedure, the target DU or the candidate target DU is a DU of a SN which generates the RRC reconfiguration message including LTM related configuration for the SCG LTM cell switch procedure or which sends the RRC reconfiguration message to the UE.

[0220] In some embodiments, the source DU may transmit the at least one timer T304 related threshold or the at least one timer T310 related threshold or the at least one timer T312 related threshold to the UE via an RRC reconfiguration message or in a lower layer

message concerning that an LTM cell switch execution is initiated (e.g. an LTM cell switch command MAC CE).

[0221] The following text describes specific embodiments of the flowcharts as shown and illustrated above, i.e., Embodiments 1 and 2 for an MCG LTM procedure, and Embodiments 3 and 4 for an SCG LTM procedure.

[0222] Embodiment 1 (trigger condition(s) for successful report for an MCG LTM procedure)

[0223] Embodiment 1-1 (what is trigger condition(s))

[0224] For MCG LTM (e.g. PCell change triggered by LTM Cell Switch Command MAC CE), trigger condition(s) for a UE to log or store or generate successful report (e.g. the successful report may be SHR or other named report or a new introduced report) for LTM, or log or store or generate successful LTM related information or information related with successful LTM cell switch, are configured to the UE.

[0225] For example, for MCG LTM, a network configures configuration for successful LTM related information or information related with successful LTM cell switch to the UE, with at least one of the following triggering conditions:

- (1) At least one T304 related threshold, e.g. a threshold for the ratio in percentage between the elapsed T304 timer and the configured value of the T304 timer. The at least one T304 related trigger threshold may be per cell (e.g. for each LTM candidate cell, network decides or generates the at least one T304 related trigger threshold, and the at least one T304 related trigger threshold for successful report for LTM is configured to the UE per cell), or per UE (e.g. only one T304 related trigger threshold is configured to the UE, i.e. for each LTM candidate cell, the T304 related trigger threshold for successful report for LTM is same).
- (2) At least one T310 related threshold, e.g. a threshold for the ratio in percentage between the elapsed T310 timer when an LTM cell switch execution is initiated or triggered (or when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning

that the LTM cell switch execution is triggered is initiated) and the configured value of the T310 timer. The at least one T310 related trigger threshold may be per cell (e.g. for each LTM candidate cell, network decides or generates the at least one T310 related trigger threshold, and the at least one T310 related trigger threshold for successful report for LTM is configured to the UE per cell), or per UE (e.g. only one T310 related trigger threshold is configured to the UE, i.e. for each LTM candidate cell, the T310 related trigger threshold for successful report for LTM is same).

- (3) At least one T312 related threshold, e.g. a threshold for the ratio in percentage between the elapsed T312 timer when an LTM cell switch execution is initiated or triggered (or when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is initiated) and the configured value of the T312 timer. T312 related trigger threshold may be per cell (e.g. for each LTM candidate cell, network decides or generates the at least one T312 related trigger threshold, and the at least one T312 related trigger threshold for successful report for LTM is configured to the UE per cell), or per UE (e.g. only one T312 related trigger threshold is configured to the UE, i.e. for each LTM candidate cell, the T312 related trigger threshold for successful report for LTM is same).

[0226] For MCG LTM, the at least one T304 related threshold is related to target cell or target PCell, and the at least one T310 related threshold or the at least one T312 related threshold is related to source cell or source PCell.

[0227] Embodiment 1-2 (how to configure trigger condition)

[0228] For MCG LTM, to configure the at least one T304 related trigger threshold as mentioned in Embodiment 1-1 (e.g. which may be presented by a new introduced IE e.g. thresholdPercentageT304forMCGLTM or other named IE, or by an existing IE), there may be following two options in different embodiments, i.e. Option #1 and Option #2.

[0229] Option #1: the at least one T304 related trigger threshold is generated or decided by CU of the LTM cell switch procedure (or CU which generates the RRC Reconfiguration message including the LTM candidate cell configurations of one or multiple LTM candidate

cells, or CU which generates or sends the RRC Reconfiguration message for the LTM procedure to the UE), the at least one T304 related trigger threshold may be configured to the UE in the RRC Reconfiguration message for LTM procedure (i.e. CU generates the at least one T304 related trigger threshold, then, CU sends the at least one T304 related trigger threshold to the source DU in RRC Reconfiguration via F1 interface, and then, source DU sends the at least one T304 related trigger threshold to the UE via the RRC Reconfiguration message in Uu interface), or the at least one T304 related trigger threshold may be configured to the UE in the LTM Cell Switch Command MAC CE (i.e. CU generates the at least one T304 related trigger threshold, then, CU sends the at least one T304 related trigger threshold to the source DU, and then, source DU sends the at least one T304 related trigger threshold to the UE via LTM Cell Switch Command MAC CE).

[0230] Option #2: the at least one T304 related trigger threshold is generated or decided by (candidate) target DU to which the (candidate) target cell belongs, the at least one T304 related trigger threshold may be configured to the UE in the RRC Reconfiguration message for LTM procedure (i.e. (candidate) target DU generates the at least one T304 related trigger threshold, then, (candidate) target DU sends the at least one T304 related trigger threshold to the CU, and then, CU sends the at least one T304 related trigger threshold to the UE in RRC Reconfiguration message via source DU, e.g. CU sends the at least one T304 related trigger threshold to the source DU in RRC Reconfiguration via F1 interface, and then, source DU sends the at least one T304 related trigger threshold to the UE via the RRC Reconfiguration message in Uu interface), or the at least one T304 related trigger threshold may be configured to the UE in the LTM Cell Switch Command MAC CE (i.e. (candidate) target DU generates the at least one T304 related trigger threshold, then, (candidate) target DU sends the at least one T304 related trigger threshold to the CU, then, CU sends the at least one T304 related trigger threshold to the source DU, and then, source DU sends the at least one T304 related trigger threshold to the UE via LTM Cell Switch Command MAC CE).

[0231] For MCG LTM, to configure the at least one T310 related trigger threshold as mentioned in Embodiment 1-1 (e.g. which may be presented by a new introduced IE e.g. thresholdPercentageT310forMCGLTM or other named IE, or by an existing IE), or, to configure the at least one T312 related trigger threshold as mentioned in Embodiment 1-1 (e.g. which may be presented by a new introduced IE e.g.

thresholdPercentageT312forMCGLTM or other named IE, or by an existing IE), there may be following two options in different embodiments, i.e. Option #A and Option #B.

[0232] Option #A: the at least one T310 related trigger threshold or the at least one T312 related trigger threshold is generated or decided by CU of the LTM cell switch procedure (or CU which generates the RRC Reconfiguration message including the LTM candidate cell configurations of one or multiple LTM candidate cells, or CU which generates or sends the RRC Reconfiguration message for the LTM procedure to the UE), the at least one T310 related trigger threshold or the at least one T312 related trigger threshold may be configured to the UE in the RRC Reconfiguration message for LTM procedure (i.e. CU generates the at least one T310 related trigger threshold or the at least one T312 related trigger threshold, then, CU sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the source DU in RRC Reconfiguration via F1 interface, and then, source DU sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the UE via the RRC Reconfiguration message in Uu interface), or the at least one T310 related trigger threshold or the at least one T312 related trigger threshold may be configured to the UE in the LTM Cell Switch Command MAC CE (i.e. CU generates the at least one T310 related trigger threshold or the at least one T312 related trigger threshold, and then, CU sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the source DU, and then, source DU sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the UE via LTM Cell Switch Command MAC CE).

[0233] Option #B: the at least one T310 related trigger threshold or the at least one T312 related trigger threshold is generated or decided by source DU to which the source cell or serving cell belongs, the at least one T310 related trigger threshold or the at least one T312 related trigger threshold may be configured to the UE in the RRC Reconfiguration message for LTM procedure (i.e. source DU generates the at least one T310 related trigger threshold or the at least one T312 related trigger threshold, then, source DU sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the CU, then, CU sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the UE in RRC Reconfiguration message via source DU, e.g. CU sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to

the source DU in RRC Reconfiguration via F1 interface, and then, source DU sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the UE via the RRC Reconfiguration message in Uu interface), or the at least one T310 related trigger threshold or the at least one T312 related trigger threshold may be configured to the UE in the LTM Cell Switch Command MAC CE (i.e. source DU generates the at least one T310 related trigger threshold or the at least one T312 related trigger threshold, and then, source DU sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the UE via LTM Cell Switch Command MAC CE).

[0234] Embodiment 1-3 (UE capability)

[0235] Since configuration (e.g. trigger condition(s) as mentioned in Embodiment 1-1) for the UE to store or generate or report the (near-failure) successful LTM related information or information related with (near-failure) successful LTM cell switch is required, network needs to know UE capability in order to configure proper configuration to trigger successful report for LTM, we need to consider UE capability for storing or reporting (near-failure) successful LTM related information or information related with (near-failure) successful LTM cell switch execution(s), an optional UE capability is introduced.

[0236] For MCG LTM, storing or reporting MCG LTM related information is optional even if UE supports MCG LTM procedure, and there may be following two options in different embodiments, i.e. Option #a and Option #b.

[0237] Option #a: (Optional with capability signalling) Storing or reporting information related with (near-failure) successful MCG LTM is optional even if UE supports MCG LTM mechanism, and this capability is explicitly signalled by the UE to network, i.e. introduce a new UE capability bit (optional with signalling) for supporting the storage and delivery of information related with successful LTM, e.g. upon request from the network, the new UE capability bit is introduced for a successful report (e.g. the successful report may be SHR or other named report or a new introduced report) for an LTM cell switch. For example, include an optional UE capability indication for successful report (e.g. the successful report may be SHR or other named report or a new introduced report) for LTM e.g. in a UE Capability Information message, this bit indicates whether the UE supports the storage and delivery of successful report for MCG LTM switch scenario or LTM PCell switch scenario. For another

example, the existing optional UE capability indication for Successful HO report, i.e. success-HO-Report-r17, is reused in a UE Capability Information message, for MCG LTM switch scenario or LTM cell/PCell switch scenario.

[0238] Option #b: (Optional without capability signalling) Storing or reporting information related with (near-failure) successful MCG LTM is optional, and no explicit capability bit is signalled by the UE. In Option #b, introduce an optional feature without signalling for successful report (e.g. the successful report may be SHR or other named report or a new introduced report) for LTM.

[0239] For an RLF report for MCG LTM, it is an optional feature without signalling. For an RA report for LTM (e.g. for an RA report for MCG LTM), it is an optional feature without signalling.

[0240] Embodiment 2 (UE behavior of storing or reporting for an MCG LTM procedure)

[0241] Embodiment 2-1 (when to trigger storing successful report)

[0242] When at least one configured trigger condition is fulfilled, and/or, LTM cell switch execution towards target cell is successful, the UE logs or stores information related with this successful LTM cell switch in an IE or in a UE variable, the IE or the UE variable may be a new one which is different from the one for existing successful report (e.g. the IE or the UE variable may be a new one which is different from the one for SHR for MCG LTM), or may be same as the one used for existing successful report (e.g. the IE or the UE variable may be same as the one for SHR for MCG LTM). When subsequent LTM is supported, if there are more than one successful LTM cell switch executions performed at UE after receiving the RRC reconfiguration for LTM procedure, the UE may log or store information related with multiple successful LTM cell switch executions (e.g. especially for the case that if subsequent LTM is supported, subsequent LTM executions are performed) in a same IE or UE variable or report, or, in multiple IEs or UE variables or reports separately.

[0243] For example, when at least one of the following trigger condition is fulfilled, and/or, LTM cell switch execution is successful, the UE logs or stores successful LTM related information or information related with successful LTM cell switch:

- (1) if the ratio between the value of the elapsed time of the timer T310 when an LTM cell switch execution is initiated or triggered (or when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is received) and the configured value of the timer T310 (e.g. that is configured while the UE was connected to the source cell before executing the LTM cell switch), is greater than the threshold (i.e. the at least one T310 related threshold as mentioned in Embodiment 1-1);
- (2) if the T312 associated to the measurement identity of the target cell was running at the time of initiating the LTM cell switch execution, and, if the ratio between the value of the elapsed time of the timer T312 when an LTM cell switch execution is initiated or triggered (or when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is received) and the configured value of the timer T312 (e.g. that is configured while the UE was connected to the source cell before executing the LTM cell switch), is greater than the threshold (i.e. the at least one T312 related threshold as mentioned in Embodiment 1-1); or
- (3) if the ratio between the value of the elapsed time of the timer T304 and the configured value of the timer T304 (e.g. included in the RRC reconfiguration message for LTM procedure), is greater than the threshold (i.e. the at least one T304 related threshold as mentioned in Embodiment 1-1).

[0244] Embodiment 2-2 (info stored or reported)

[0245] For MCG LTM, information related with successful LTM cell switch, or successful LTM related information, or successful report (e.g. SHR or other named report or a new introduced report) for LTM can include at least one of:

- (1) information of source cell (e.g. cell ID); for example, the cell ID may include LTM configuration ID of the source cell, PCI+ carrier frequency information (e.g. ARFCN), and/or, CGI-info (e.g. PLMN-Identity, Cell Identity and TrackingAreaCode);

- (2) information of target cell (e.g. cell ID); for example, the cell ID may include configuration ID of the target cell e.g. which is indicated in LTM Cell Switch Command MAC CE (e.g. "Target Configuration ID" field in the LTM Cell Switch Command MAC CE), PCI+ carrier frequency information (e.g. ARFCN), and/or, CGI-info (e.g. PLMN-Identity, Cell Identity and TrackingAreaCode);
- (3) information of beam (e.g. TCI state ID), if indicated in LTM Cell Switch Command MAC CE;
- (4) information of one or more neighbour cells (e.g. the information includes cell ID of each neighbour cell, and/or one flag to indicate whether a measured neighbour cell included in the L1 or L3 measurement results is an LTM candidate cell);
- (5) an indication of the type of LTM cell switch, or an indication concerning a near-failure successful LTM cell switch or the report is for an LTM cell switch procedure, e.g. introduce a new type for last mobility type e.g. MCG LTM cell switch; or an explicit indication of the type of LTM cell switch; or a new one-bit flag (e.g. add an indicator in the report indicating whether the last executed mobility was a MCG LTM cell switch)
- (6) List of the latest configured LTM candidate cell(s) (e.g. cell ID), for example, which are not included in the L1 or L3 measurement results; for example, the cell ID may include configuration ID of the LTM candidate cell(s), PCI+ carrier frequency information (e.g. ARFCN), and/or, CGI-info (e.g. PLMN-Identity, Cell Identity and TrackingAreaCode);
- (7) TA value derived by UE based TA measurement if any;
- (8) TA value for RACH-less LTM (e.g. Timing Advance Command), if included in LTM Cell Switch Command MAC CE;
- (9) contention-free Random Access Resources (e.g. Random Access Preamble index, PRACH Mask index, SS/PBCH index), if included in LTM Cell Switch Command MAC CE;
- (10) cause value for successful report, e.g. to indicate which trigger condition is fulfilled;
- (11) time elapsed between LTM cell switch execution is initiated or triggered (or when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception

of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is received) and the corresponding RRC reconfiguration message for LTM is received;

- (12) time elapsed between LTM cell switch execution is initiated or triggered (or when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is received) and report retrieval;
- (13) time elapsed between the LTM cell switch execution is initiated or triggered and the execution is successful (e.g. the UE successfully access to the target cell, in another example, CU can derive this time duration e.g. which is equal to the time between receiving the DU-CU LTM CELL SWITCH NOTIFICATION message for the target cell and receiving the ACCESS SUCCESS message for the target cell);
- (14) time elapsed between the LTM cell switch execution is successful and the stored information or report is reported;
- (15) L1 measurement results of source cell, target cell, or neighbour cell(s) when LTM cell switch execution is initiated or triggered (or when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is received), or when LTM cell switch execution is successful, or upon an indication from lower layer that the LTM cell switch execution has been successfully completed;
- (16) a reference configuration for LTM, e.g. which is represented by IE ltm-ReferenceConfiguration-r18 configured in the RRC Reconfiguration message for the LTM procedure e.g. which includes the LTM candidate cell configurations of one or multiple LTM candidate cells;
- (17) a list of LTM candidate cell configurations, each configuration is used to configure an LTM candidate cell, e.g. which is represented by IE LTM-Candidate-r18 configured in the RRC Reconfiguration message for the LTM procedure, for example, the configuration

at least includes LTM-CandidateId, delta configuration which is on top of the reference configuration, configuration for early UL-Sync, ltm-NoResetID, TCI-States of LTM candidate cell and etc.; or

- (18) a group of one or more CSI resources for an LTM candidate cell configuration, e.g. which is represented by IE LTM-CSI-ResourceConfig configured in the RRC Reconfiguration message for the LTM procedure.

[0246] For MCG LTM, when there are more than one successful LTM cell switch executions performed at UE after receiving the RRC reconfiguration message for the LTM procedure, and/or, trigger condition(s) of these LTM cell switch executions are fulfilled, the UE may log or store information related with these successful LTM cell switch executions, e.g. for each of these successful LTM cell switch executions, at least one of above information is stored or logged or reported. For example, for these successful LTM cell switch executions, at least one of: a list of source cell information, a list of target cell information, a list of neighbour cells information, a list of L1 measurement results, a list of cause value, and/or a list of above time information may be stored or logged or reported in one IE or UE variable or report, or in multiple IEs or UE variables or reports.

[0247] Embodiment 2-3 (how to store or report)

[0248] For the reporting mechanism of successful report (e.g. for MCG LTM, successful report may be SHR or other named report or a new introduced report) or successful LTM related information or information related with successful LTM cell switch, the successful report or successful LTM related information or information related with successful LTM cell switch can be stored at the UE and sent to network later, or is sent immediately after successful LTM cell switch execution.

[0249] In Embodiment 2-3-1, the successful report (e.g. for MCG LTM, successful report may be SHR or other named report or a new introduced report) or successful LTM related information or information related with successful LTM cell switch is sent immediately after a successful LTM cell switch execution, there may be following two options in different embodiments, i.e. Option #i and Option #ii.

- (1) Option #i: Upon a successful LTM cell switch execution, the UE may report the stored information related with this successful LTM cell switch execution (detailed information

stored or reported can refer to Embodiment 2-2), e.g. in RRC Reconfiguration Complete message or other message.

- (2) Option #ii: Upon a successful LTM cell switch execution, the UE may send an indication for availability of successful report for LTM, or an indication for availability of information related with successful LTM cell switch or successful LTM related information, e.g. in RRC Reconfiguration Complete message or other message. After receiving the indication, network may request the successful report for LTM or successful LTM related information from the UE e.g. via UE information request message or other message, and then, the UE may send the successful report for LTM or successful LTM related information to network e.g. via UE information response message or other message (e.g. for MCG LTM, the network may be the node or the CU which generates or configures the RRC Reconfiguration message for the LTM procedure).

[0250] In Embodiment 2-3-2, the successful report (e.g. for MCG LTM, the successful report may be SHR or other named report or a new introduced report) or successful LTM related information or information related with successful LTM cell switch is not sent immediately to network, there may be following two options in different embodiments, i.e. Option #X and Option #Y.

[0251] Option #X: only the latest successful LTM cell switch execution is stored or reported by the UE.

[0252] Option #Y: multiple successful LTM cell switch executions are stored or reported by the UE (e.g. especially when subsequent LTM is supported)

- (1) Option #Y-1 (limited number of successful LTM cell switch executions in one report):

The UE may store or report at most maximum number of successful LTM cell switch executions (e.g. at most X successful LTM cell switch executions) in one UE variable or one report or one message. For example, for MCG LTM, the UE may store or report at most maximum number of successful LTM cell switch executions (e.g. at most X successful LTM PCell switch executions) in one UE variable or one report or one message. The maximum number (e.g. X) can be configured by network or by default. For one example, for MCG LTM, the node or the CU which generates or configures the RRC Reconfiguration message for the LTM procedure may configure the maximum

number (e.g. X) of successful LTM cell switch executions the UE can at most log or store or report e.g. in one IE or UE variable or report or RRC message to the UE. For another example, the maximum number (e.g. X) of successful LTM cell switch executions the UE can at most log or store or report e.g. in one IE or UE variable or report or RRC message may be a default value configured in the UE. When storing information related with maximum number of successful LTM cell switch executions (e.g. at most X successful LTM cell switch executions), the UE may send an indication for availability of successful report for LTM or information related with maximum number of successful LTM cell switch executions (e.g. at most X successful LTM cell switch executions) or successful LTM related information to network (e.g. for MCG LTM, the network may be the node or the CU which generates or configures the RRC Reconfiguration message for the LTM procedure, or a new serving node of the UE). If there are more than the configured maximum number (e.g. X) of successful LTM cell switch executions performed at UE after receiving the RRC reconfiguration message for LTM procedure, upon the UE logs or stores or includes information related with the configured maximum number (e.g. X) of successful LTM cell switch executions in one IE or UE variable or report, additional one or more IEs or UE variables or reports would be initiated or generated to log or store or include the others (e.g. at most configured maximum number (e.g. X or other configured value) of successful LTM cell switch executions may be stored in the additional one or more IEs or UE variables or reports, or all the left successful LTM cell switch executions may be stored in one additional IE or UE variable or report), and the previous IE or UE variable or report would not be overridden.

- (2) Option #Y-2: (no limitation in one report) The UE may store or report multiple successful LTM cell switch executions in one IE or UE variable or report or message until reconfiguration with sync on SpCell is initiated (e.g. for MCG LTM, until normal handover or CHO or DAPS HO is initiated), or until receiving a message indicating to release LTM configuration (e.g. a RRC message that indicates the UE to release or stop LTM), or until a connection failure happens (e.g. for MCG LTM, until MCG failure or handover failure or an RLF happens). For one example, network (e.g. for MCG LTM, the network may be the node or the CU which generates or configures the RRC Reconfiguration message for the LTM procedure) may configure the UE to store or report multiple successful LTM cell switch executions in one IE or UE variable or report or

message until reconfiguration with sync on SpCell is initiated or until receiving a message indicating to release LTM configuration or until a connection failure happens. For another example, it is a default UE behaviour. The information related with multiple successful LTM cell switch executions may be reported together or separately. The information related with multiple successful LTM cell switch executions may be sent to network together with failure related information, or the information related with multiple successful LTM cell switch executions and failure related information may be sent to network separately.

[0253] Embodiment 2-4 (how to retrieve the report)

[0254] The logged or stored successful LTM related information, or information related with one or more successful LTM cell switches can be sent by the UE to network via one report or multiple reports. The report may be a new introduced one (e.g. the new report can be named as successful LTM report or successful MCG LTM report or successful LTM cell switch report or other name) or reusing the existing report (e.g. for MCG LTM, SHR is reused).

[0255] One solution is a UE based solution:

[0256] after storing or logging successful LTM related information, an indication for availability of successful report for LTM or successful LTM related information may be transmitted to network by the UE (e.g. for MCG LTM, the network may be the node or the CU which generates or configures the RRC Reconfiguration message for the LTM procedure, or a new serving node of the UE). After receiving the indication, network may request the successful report for LTM or successful LTM related information from the UE e.g. via UE information request message or other message, and then, the UE may send the successful report for LTM or successful LTM related information to network e.g. via UE information response message or other message. The potential three UE based options are as below, i.e., Options 1-3:

(1) Option 1: upon storing or logging information related with any successful LTM cell switch, an indication for availability of successful report for LTM or successful LTM related information may be transmitted to network by the UE.

- (2) Option 2: when storing or logging information related with at most M (e.g. M or less than M) successful LTM cell switch executions, an indication for availability of successful report for LTM or successful LTM related information may be transmitted to network by the UE. The value of M may be configured to the UE by network or by default.
- (3) Option 3: when storing or logging information related with at least N (e.g. N or more than N) successful LTM cell switch executions, an indication for availability of successful report for LTM or successful LTM related information may be transmitted to network by the UE. The value of N may be configured to the UE by network or by default.

[0257] Another solution is a network based solution:

[0258] for MCG LTM, when a UE performs successful access attempts to the target cell (e.g. via RACH based LTM cell switch or RACH-less based LTM cell switch), the target DU to which the target cell belongs may inform the CU (e.g. CU is a node which generates or configures the RRC Reconfiguration message for the LTM procedure, the CU controls or manages the target DU) about the occurrences of successful access procedures in the target DU e.g. via an ACCESS SUCCESS or UL RRC MESSAGE TRANSFER or RACH indication message or other existing message or a new defined message. The CU may then retrieve the successful report for LTM from the UE(s) based on the received F1AP signalling from the target DU, e.g. the CU may request the successful report for LTM or successful LTM related information from the UE e.g. via UE Information Request message or other message, the UE may transmit the successful report for LTM or successful LTM related information to CU e.g. via UE Information Response message or other message.

[0259] For MCG LTM:

- (1) If the receiving network is a node #1 or CU #1 which is a new serving node of the UE, the receiving network (e.g. node #1 or CU #1) may forward the received successful report (e.g. SHR or other named report or a new introduced report) for LTM or successful LTM related information or information related with one or more successful LTM cell switch executions to the node #2 or CU #2 which generates or configures the RRC Reconfiguration message for the LTM procedure for the UE, via an ACCESS AND MOBILITY INDICATION message or other XnAP message (over XnAP), or via Uplink/Downlink RAN configuration transfer or other NGAP message (over NGAP),

and then, CU #2 may transfer the received successful report for LTM or successful LTM related information or information related with one or more successful LTM cell switch executions to relevant DU(s) (e.g. via an ACCESS AND MOBILITY INDICATION message or other F1AP message (over F1AP), the DU may be source DU which sends the LTM Cell Switch Command MAC CE to the UE, or the DU may be target DU to which the target cell belongs). CU #2 or relevant DU(s) may analyse whether or how LTM related configuration needs adjustment and/or perform corresponding adjustments for MRO, such adjustments may result in changes of configuration for LTM e.g. including one or more LTM candidate cells, or RACH resources for accessing to target cell, or RACH configuration for early TA acquisition.

- (2) If the receiving network is the CU #2 which generates or configures the RRC Reconfiguration message for the LTM procedure for the UE, CU #2 may transfer the received successful report (e.g. SHR or other named report or a new introduced report) for LTM or successful LTM related information or information related with one or more successful LTM cell switch executions to relevant DU(s) (e.g. via an ACCESS AND MOBILITY INDICATION message or other F1AP message (over F1AP), the DU may be source DU which sends the LTM Cell Switch Command MAC CE to the UE, or the DU may be target DU to which the target cell belongs). CU #2 or relevant DU(s) may analyse whether or how LTM related configuration needs adjustment and/or perform corresponding adjustments for MRO, such adjustments may result in changes of configuration for LTM e.g. including one or more LTM candidate cells, or RACH resources for accessing to target cell, or RACH configuration for early TA acquisition.

[0260] Embodiment 3 (trigger condition(s) for successful report for an SCG LTM procedure)

[0261] Embodiment 3-1 (what is trigger condition(s))

[0262] For SCG LTM (e.g. intra-SN PSCell change triggered by LTM Cell Switch Command MAC CE), trigger condition(s) for the UE to log or store or generate successful report (e.g. the successful report may be SPR or other named report or a new introduced report) for LTM, or log or store or generate successful LTM related information or information related with successful LTM cell switch, are configured to the UE.

[0263] For example, for SCG LTM, network configures configuration for successful LTM related information or information related with successful LTM cell switch to the UE, with at least one of the following triggering conditions:

- (1) At least one T304 related threshold, e.g. a threshold for the ratio in percentage between the elapsed T304 timer and the configured value of the T304 timer. The at least one T304 related trigger threshold may be per cell (e.g. for each LTM candidate cell, network decides or generates the at least one T304 related trigger threshold, and the at least one T304 related trigger threshold for successful report for LTM is configured to the UE per cell), or per UE (e.g. only one T304 related trigger threshold is configured to the UE, i.e. for each LTM candidate cell, the T304 related trigger threshold for successful report for LTM is same).
- (2) At least one T310 related threshold, e.g. a threshold for the ratio in percentage between the elapsed T310 timer when an LTM cell switch execution is initiated or triggered (or when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is initiated) and the configured value of the T310 timer. The at least one T310 related trigger threshold may be per cell (e.g. for each LTM candidate cell, network decides or generates the at least one T310 related trigger threshold, and the at least one T310 related trigger threshold for successful report for LTM is configured to the UE per cell), or per UE (e.g. only one T310 related trigger threshold is configured to the UE, i.e. for each LTM candidate cell, the T310 related trigger threshold for successful report for LTM is same).
- (3) At least one T312 related threshold, e.g. a threshold for the ratio in percentage between the elapsed T312 timer when an LTM cell switch execution is initiated or triggered (or when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is initiated) and the configured value of the T312 timer. T312 related trigger threshold may be per cell (e.g. for each LTM candidate cell, network decides or generates the at least one T312 related trigger threshold,

and the at least one T312 related trigger threshold for successful report for LTM is configured to the UE per cell), or per UE (e.g. only one T312 related trigger threshold is configured to the UE, i.e. for each LTM candidate cell, the T312 related trigger threshold for successful report for LTM is same).

[0264] For SCG LTM, the at least one T304 related threshold is related to target PSCell or target PCell, and the at least one T310 related threshold or the at least one T312 related threshold is related to source PSCell.

[0265] Embodiment 3-2 (how to configure trigger condition)

[0266] For SCG LTM, to configure the at least one T304 related trigger threshold as mentioned in Embodiment 3-1 (e.g. which may be presented by a new introduced IE e.g. thresholdPercentageT304forSCGLTM or other named IE, or by an existing IE), there may be following two options in different embodiments, i.e. Option #M and Option #N.

[0267] Option #M: the at least one T304 related trigger threshold is generated or decided by CU of SN of the LTM cell switch procedure (or CU of SN which generates the RRC Reconfiguration message including the LTM candidate cell configurations of one or multiple LTM candidate cells, or CU of SN which generates or sends the RRC Reconfiguration message for the LTM procedure to the UE), the at least one T304 related trigger threshold may be configured to the UE in the RRC Reconfiguration message for LTM procedure (i.e. CU of SN generates the at least one T304 related trigger threshold, then, CU of SN sends the at least one T304 related trigger threshold to the source DU of SN in RRC Reconfiguration via F1 interface, and then, source DU of SN sends the at least one T304 related trigger threshold to the UE via the RRC Reconfiguration message in Uu interface), or the at least one T304 related trigger threshold may be configured to the UE in the LTM Cell Switch Command MAC CE (i.e. CU of SN generates the at least one T304 related trigger threshold, then, CU of SN sends the at least one T304 related trigger threshold to the source DU of SN, and then, source DU of SN sends the at least one T304 related trigger threshold to the UE via LTM Cell Switch Command MAC CE).

[0268] Option #N: the at least one T304 related trigger threshold is generated or decided by (candidate) target DU of SN to which the (candidate) target PSCell belongs, the at least one T304 related trigger threshold may be configured to the UE in the RRC Reconfiguration

message for LTM procedure (i.e. (candidate) target DU of SN generates the at least one T304 related trigger threshold, then, (candidate) target DU of SN sends the at least one T304 related trigger threshold to the CU of SN, and then, CU of SN sends the at least one T304 related trigger threshold to the UE in RRC Reconfiguration message via source DU of SN, e.g. CU of SN sends the at least one T304 related trigger threshold to the source DU of SN in RRC Reconfiguration via F1 interface, and then, source DU of SN sends the at least one T304 related trigger threshold to the UE via the RRC Reconfiguration message in Uu interface), or the at least one T304 related trigger threshold may be configured to the UE in the LTM Cell Switch Command MAC CE (i.e. (candidate) target DU of SN generates the at least one T304 related trigger threshold, and then, (candidate) target DU of SN sends the at least one T304 related trigger threshold to the CU of SN, then, CU of SN sends the at least one T304 related trigger threshold to the source DU of SN, and then, source DU of SN sends the at least one T304 related trigger threshold to the UE via LTM Cell Switch Command MAC CE).

[0269] For SCG LTM, to configure the at least one T310 related trigger threshold as mentioned in Embodiment 3-1 (e.g. which may be presented by a new introduced IE e.g. thresholdPercentageT310forSCGLTM or other named IE, or by an existing IE), or, to configure the at least one T312 related trigger threshold as mentioned in Embodiment 3-1 (e.g. which may be presented by a new introduced IE e.g. thresholdPercentageT312forSCGLTM or other named IE, or by an existing IE), there may be following two options in different embodiments, i.e. Option #K and Option #L:

[0270] Option #K: the at least one T310 related trigger threshold or the at least one T312 related trigger threshold is generated or decided by CU of SN of the LTM cell switch procedure (or CU of SN which generates the RRC Reconfiguration message including the LTM candidate cell configurations of one or multiple LTM candidate cells, or CU of SN which generates or sends the RRC Reconfiguration message for the LTM procedure to the UE), the at least one T310 related trigger threshold or the at least one T312 related trigger threshold may be configured to the UE in the RRC Reconfiguration message for LTM procedure (i.e. CU of SN generates the at least one T310 related trigger threshold or the at least one T312 related trigger threshold, then, CU of SN sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the source DU of SN in RRC Reconfiguration via F1 interface, and then, source DU of SN sends the at least one T310

related trigger threshold or the at least one T312 related trigger threshold to the UE via the RRC Reconfiguration message in Uu interface), or the at least one T310 related trigger threshold or the at least one T312 related trigger threshold may be configured to the UE in the LTM Cell Switch Command MAC CE (i.e. CU of SN generates the at least one T310 related trigger threshold or the at least one T312 related trigger threshold, then, CU of SN sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the source DU of SN, and then, source DU of SN sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the UE via LTM Cell Switch Command MAC CE).

[0271] Option #L: the at least one T310 related trigger threshold or the at least one T312 related trigger threshold is generated or decided by source DU of SN to which the source cell or serving cell belongs, the at least one T310 related trigger threshold or the at least one T312 related trigger threshold may be configured to the UE in the RRC Reconfiguration message for LTM procedure (i.e. source DU of SN generates the at least one T310 related trigger threshold or the at least one T312 related trigger threshold, then, source DU of SN sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the CU of SN, then, CU of SN sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the UE in RRC Reconfiguration message via source DU of SN, e.g. CU of SN sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the source DU of SN in RRC Reconfiguration via F1 interface, and then, source DU of SN sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the UE via the RRC Reconfiguration message in Uu interface), or the at least one T310 related trigger threshold or the at least one T312 related trigger threshold may be configured to the UE in the LTM Cell Switch Command MAC CE (i.e. source DU of SN generates the at least one T310 related trigger threshold or the at least one T312 related trigger threshold, and then, source DU of SN sends the at least one T310 related trigger threshold or the at least one T312 related trigger threshold to the UE via LTM Cell Switch Command MAC CE).

[0272] Embodiment 3-3 (UE capability)

[0273] Since configuration (e.g. trigger condition(s) as mentioned in Embodiment 3-1) for the UE to store or generate or report the (near-failure) successful LTM related information

or information related with (near-failure) successful LTM cell switch is required, network needs to know UE capability in order to configure proper configuration to trigger successful report for LTM, we need to consider UE capability for storing or reporting (near-failure) successful LTM related information or information related with (near-failure) successful LTM cell switch execution(s), an optional UE capability is introduced.

[0274] For SCG LTM, storing or reporting SCG LTM related information is optional even if UE supports SCG LTM procedure, and there may be following two options in different embodiments, i.e. Option #C and Option #D.

[0275] Option #C: (Optional with capability signalling) Storing or reporting information related with (near-failure) successful SCG LTM is optional even if UE supports SCG LTM mechanism, and this capability is explicitly signalled by the UE to network, i.e. introduce a new UE capability bit (optional with signalling) for supporting the storage and delivery of information related with successful LTM, e.g. upon request from the network, the new UE capability bit is introduced for a successful report (e.g. the successful report may be SPR or other named report or a new introduced report) for an LTM cell switch. For example, include an optional UE capability indication for successful report (e.g. the successful report may be SPR or other named report or a new introduced report) for LTM e.g. in a UE Capability Information message, this bit indicates whether the UE supports the storage and delivery of successful report for SCG LTM switch scenario or LTM PSCell switch scenario. For another example, the existing optional UE capability indication for SPR is reused in a UE Capability Information message, for SCG LTM switch scenario or LTM PSCell switch scenario.

[0276] Option #D: (Optional without capability signalling) Storing or reporting information related with (near-failure) successful SCG LTM is optional, and no explicit capability bit is signalled by the UE. In Option #D, introduce an optional feature without signalling for successful report (e.g. the successful report may be SPR or other named report or a new introduced report) for LTM.

[0277] For an SCG failure information message for SCG LTM, it is an optional feature without signalling. For an RA report for LTM (e.g. for an RA report for SCG LTM), it is an optional feature without signalling.

[0278] Embodiment 4 (UE behavior of storing or reporting for an SCG LTM procedure)

[0279] Embodiment 4-1 (when to trigger storing successful report)

[0280] When at least one configured trigger condition is fulfilled, and/or, LTM cell switch execution towards target cell is successful, the UE logs or stores information related with this successful LTM cell switch in an IE or in a UE variable, the IE or the UE variable may be a new one which is different from the one for existing successful report (e.g. the IE or the UE variable may be a new one which is different from the one for SPR for SCG LTM), or may be same as the one used for existing successful report (e.g. the IE or the UE variable may be same as the one for SPR for SCG LTM). When subsequent LTM is supported, if there are more than one successful LTM cell switch executions performed at UE after receiving the RRC reconfiguration for LTM procedure, the UE may log or store information related with multiple successful LTM cell switch executions (e.g. especially for the case that if subsequent LTM is supported, subsequent LTM executions are performed) in a same IE or UE variable or report, or, in multiple IEs or UE variables or reports separately.

[0281] For example, when at least one of the following trigger condition is fulfilled, and/or, LTM cell switch execution is successful, the UE logs or stores successful LTM related information or information related with successful LTM cell switch:

- (1) if the ratio between the value of the elapsed time of the timer T310 when an LTM cell switch execution is initiated or triggered (or when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is received) and the configured value of the timer T310 (e.g. that is configured while the UE was connected to the source PSCell before executing the LTM cell switch), is greater than the threshold (i.e. the at least one T310 related threshold as mentioned in Embodiment 3-1).
- (2) if the T312 associated to the measurement identity of the target PSCell was running at the time of initiating the LTM cell switch execution procedure, and, if the ratio between the value of the elapsed time of the timer T312 when an LTM cell switch execution is initiated or triggered (or when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when

receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is received) and the configured value of the timer T312 (e.g. that is configured while the UE was connected to the source PSCell before executing the LTM cell switch), is greater than the threshold (i.e. the at least one T312 related threshold as mentioned in Embodiment 3-1).

- (3) if the ratio between the value of the elapsed time of the timer T304 and the configured value of the timer T304 (e.g. included in the RRC reconfiguration message for LTM procedure), is greater than the threshold (i.e. the at least one T304 related threshold as mentioned in Embodiment 3-1).

[0282] Embodiment 4-2 (info stored or reported)

[0283] For SCG LTM, information related with successful LTM cell switch, or successful LTM related information, or successful report (e.g. SPR or other named report or a new introduced report) for LTM can include at least one of:

- (1) information of source PSCell (e.g. cell ID); for example, the cell ID may include LTM configuration ID of the source PSCell, PCI+ carrier frequency information (e.g. ARFCN), and/or, CGI-info (e.g. PLMN-Identity, Cell Identity and TrackingAreaCode);
- (2) information of target PSCell (e.g. cell ID); for example, the cell ID may include configuration ID of the target PSCell e.g. which is indicated in LTM Cell Switch Command MAC CE (e.g. "Target Configuration ID" field in the LTM Cell Switch Command MAC CE), PCI+ carrier frequency information (e.g. ARFCN), and/or, CGI-info (e.g. PLMN-Identity, Cell Identity and TrackingAreaCode);
- (3) information of beam (e.g. TCI state ID), if indicated in LTM Cell Switch Command MAC CE;
- (4) information of one or more neighbour cells (e.g. the information includes cell ID of each neighbour cell, and/or one flag to indicate whether a measured neighbour cell included in the L1 or L3 measurement results is an LTM candidate cell);
- (5) an indication of the type of LTM cell switch, or an indication concerning a near-failure successful LTM cell switch or the report is for an LTM cell switch procedure, e.g. introduce a new type for last mobility type e.g. SCG LTM cell switch; or an explicit

indication of the type of LTM cell switch; or a new one-bit flag (e.g. add an indicator in the report indicating whether the last executed mobility was a SCG LTM cell switch)

- (6) List of the latest configured LTM candidate cell(s) (e.g. cell ID), for example, which are not included in the L1 or L3 measurement results; for example, the cell ID may include configuration ID of the LTM candidate PSCell(s), PCI+ carrier frequency information (e.g. ARFCN), and/or, CGI-info (e.g. PLMN-Identity, Cell Identity and TrackingAreaCode);
- (7) TA value derived by UE based TA measurement if any;
- (8) TA value for RACH-less LTM (e.g. Timing Advance Command), if included in LTM Cell Switch Command MAC CE;
- (9) contention-free Random Access Resources (e.g. Random Access Preamble index, PRACH Mask index, SS/PBCH index), if included in LTM Cell Switch Command MAC CE;
- (10) cause value for successful report, e.g. to indicate which trigger condition is fulfilled;
- (11) time elapsed between LTM cell switch execution is initiated or triggered (or when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is received) and the corresponding RRC reconfiguration message for LTM is received;
- (12) time elapsed between LTM cell switch execution is initiated or triggered (or when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is received) and report retrieval;
- (13) time elapsed between the LTM cell switch execution towards the target PSCell and the execution is successful (e.g. the UE successfully access to the target PSCell);

- (14) time elapsed between the LTM cell switch execution towards the target PSCell is successful and the stored information or report is reported;
- (15) L1 measurement results of source PSCell, target PSCell, or neighbour cell(s) when LTM cell switch execution is initiated or triggered (or when reconfiguration with sync for LTM cell switch is initiated or triggered, or when reception of the LTM Cell Switch Command MAC CE, or when receiving trigger for LTM cell switch from lower layer, or when an indication from lower layer concerning that the LTM cell switch execution is triggered is received), or when LTM cell switch execution is successful, or upon an indication from lower layer that the LTM cell switch execution has been successfully completed;
- (16) a reference configuration for LTM, e.g. which is represented by IE ltm-ReferenceConfiguration-r18 configured in the RRC Reconfiguration message for the LTM procedure e.g. which includes the LTM candidate cell configurations of one or multiple LTM candidate cells;
- (17) a list of LTM candidate cell configurations, each configuration is used to configure an LTM candidate cell, e.g. which is represented by IE LTM-Candidate-r18 configured in the RRC Reconfiguration message for the LTM procedure for example, the configuration at least includes LTM-CandidateId, delta configuration which is on top of the reference configuration, configuration for early UL-Sync, ltm-NoResetID, TCI-States of LTM candidate cell and etc.; or
- (18) a group of one or more CSI resources for an LTM candidate cell configuration, e.g. which is represented by IE LTM-CSI-ResourceConfig configured in the RRC Reconfiguration message for the LTM procedure.

[0284] For SCG LTM, when there are more than one successful LTM cell switch executions performed at UE after receiving the RRC reconfiguration message for the LTM procedure, and/or, trigger condition(s) of these LTM cell switch executions are fulfilled, the UE may log or store information related with these successful LTM cell switch executions, e.g. for each of these successful LTM cell switch executions, at least one of above information is stored or logged or reported. For example, for these successful LTM cell switch executions, at least one of: a list of source PSCell information, a list of target PSCell

information, a list of neighbour cells information, a list of L1 measurement results, a list of cause value, and/or a list of above time information may be stored or logged or reported in one IE or UE variable or report, or in multiple IEs or UE variables or reports.

[0285] Embodiment 4-3 (how to store or report)

[0286] For the reporting mechanism of successful report (e.g. for SCG LTM, successful report may be SPR or other named report or a new introduced report) or successful LTM related information or information related with successful LTM cell switch, the successful report or successful LTM related information or information related with successful LTM cell switch can be stored at the UE and sent to network later, or is sent immediately after successful LTM cell switch execution.

[0287] In Embodiment 4-3-1, the successful report (e.g. for SCG LTM, successful report may be SPR or other named report or a new introduced report) or successful LTM related information or information related with successful LTM cell switch is sent immediately after a successful LTM cell switch execution, and there may be following two options in different embodiments, i.e. Option #O and Option #P:

[0288] Option #O: Upon a successful LTM cell switch execution, the UE may report the stored information related with this successful LTM cell switch execution (detailed information stored or reported can refer to Embodiment 4-2), e.g. in RRC Reconfiguration Complete message or other message.

[0289] Option #P: Upon a successful LTM cell switch execution, the UE may send an indication for availability of successful report for LTM, or an indication for availability of information related with successful LTM cell switch or successful LTM related information, e.g. in RRC Reconfiguration Complete message or other message. After receiving the indication, network may request the successful report for LTM or successful LTM related information from the UE e.g. via UE information request message or other message, and then, the UE may send the successful report for LTM or successful LTM related information to network e.g. via UE information response message or other message (e.g. for SCG LTM, the network may be the SN or the CU of SN which generates or configures the RRC Reconfiguration message for the LTM procedure, or the MN or the CU of MN).

[0290] In Embodiment 4-3-2, the successful report (e.g. for SCG LTM, the successful report may be SPR or other named report or a new introduced report) or successful LTM related information or information related with successful LTM cell switch is not sent immediately to network, and there may be following two options in different embodiments, i.e. Option #R and Option #S.

[0291] Option #R: only the latest successful LTM cell switch execution is stored or reported by the UE.

[0292] Option #S: multiple successful LTM cell switch executions are stored or reported by the UE (e.g. especially when subsequent LTM is supported). There may be following two options in different embodiments:

(1) Option #S-1 (limited number of successful LTM cell switch executions in one report):

The UE may store or report at most maximum number of successful LTM cell switch executions (e.g. at most X successful LTM cell switch executions) in one UE variable or one report or one message. For example, for SCG LTM, the UE may store or report at most maximum number of successful LTM cell switch executions (e.g. at most X successful LTM PSCell switch executions) in one UE variable or one report or one message. The maximum number (e.g. X) can be configured by network or by default, for one example, for SCG LTM, the SN or the CU of SN which generates or configures the RRC Reconfiguration message for the LTM procedure, or the MN or the CU of the MN may configure the maximum number (e.g. X) of successful LTM cell switch executions the UE can at most log or store or report e.g. in one IE or UE variable or report or RRC message to the UE; for another example, the maximum number (e.g. X) of successful LTM cell switch executions the UE can at most log or store or report e.g. in one IE or UE variable or report or RRC message may be a default value configured in the UE. When storing information related with maximum number of successful LTM cell switch executions (e.g. at most X successful LTM cell switch executions), the UE may send an indication for availability of successful report for LTM or information related with maximum number of successful LTM cell switch executions (e.g. at most X successful LTM cell switch executions) or successful LTM related information to network (e.g. for SCG LTM, the network may be the SN or the CU of SN which generates or configures the RRC Reconfiguration message for the LTM procedure, or the MN or the CU of MN,

or a new serving node of the UE). If there are more than the configured maximum number (e.g. X) of successful LTM cell switch executions performed at UE after receiving the RRC reconfiguration message for LTM procedure, upon the UE logs or stores or includes information related with the configured maximum number (e.g. X) of successful LTM cell switch executions in one IE or UE variable or report, additional one or more IEs or UE variables or reports would be initiated or generated to log or store or include the others (e.g. at most configured maximum number (e.g. X or other configured value) of successful LTM cell switch executions may be stored in the additional one or more IEs or UE variables or reports, or all the left successful LTM cell switch executions may be stored in one additional IE or UE variable or report), and the previous IE or UE variable or report would not be overridden.

- (2) Option #S-2: (no limitation in one report) The UE may store or report multiple successful LTM cell switch executions in one IE or UE variable or report or message until reconfiguration with sync on SpCell is initiated (e.g. for SCG LTM, until normal PSCell change or CPC is initiated), or until receiving a message indicating to release LTM configuration (e.g. a RRC message that indicates the UE to release or stop LTM), or until a connection failure happens (e.g. for SCG LTM, until SCG failure or PSCell change failure happens). For one example, network (e.g. for SCG LTM, the network may be the SN or the CU of SN which generates or configures the RRC Reconfiguration message for the LTM procedure, or the MN or the CU of MN) may configure the UE to store or report multiple successful LTM cell switch executions in one IE or UE variable or report or message until reconfiguration with sync on SpCell is initiated or until receiving a message indicating to release LTM configuration or until a connection failure happens. For another example, it is a default UE behaviour. The information related with multiple successful LTM cell switch executions may be reported together or separately. The information related with multiple successful LTM cell switch executions may be sent to network together with failure related information, or the information related with multiple successful LTM cell switch executions and failure related information may be sent to network separately.

[0293] Embodiment 4-4 (how to retrieve the report)

[0294] The logged or stored successful LTM related information, or information related with one or more successful LTM cell switches can be sent by the UE to network via one report or multiple reports. The report may be a new introduced one (e.g. the new report can be named as successful LTM report or successful SCG LTM report or successful LTM cell switch report or other name) or reusing the existing report (e.g. for SCG LTM, SPR is reused).

[0295] One solution is a UE based solution:

[0296] after storing or logging successful LTM related information, an indication for availability of successful report for LTM or successful LTM related information may be transmitted to network by the UE (e.g. for SCG LTM, the network may be the SN or the CU of SN which generates or configures the RRC Reconfiguration message for the LTM procedure, or the MN or the CU of MN, or a new serving node of the UE). After receiving the indication, network may request the successful report for LTM or successful LTM related information from the UE e.g. via UE information request message or other message, and then, the UE may send the successful report for LTM or successful LTM related information to network e.g. via UE information response message or other message. The potential UE based options are as below:

- (1) Option #1a: upon storing or logging information related with any successful LTM cell switch, an indication for availability of successful report for LTM or successful LTM related information may be transmitted to network by the UE.
- (2) Option #2a: when storing or logging information related with at most M (e.g. M or less than M) successful LTM cell switch executions, an indication for availability of successful report for LTM or successful LTM related information may be transmitted to network by the UE. The value of M may be configured to the UE by network or by default.
- (3) Option #3a: when storing or logging information related with at least N (e.g. N or more than N) successful LTM cell switch executions, an indication for availability of successful report for LTM or successful LTM related information may be transmitted to network by the UE. The value of N may be configured to the UE by network or by default.

[0297] Another solution is a network based solution:

[0298] for SCG LTM, when a UE performs successful access attempts to the target PSCell (e.g. via RACH based LTM cell switch or RACH-less based LTM cell switch), the target DU of SN to which the target PSCell belongs may inform the CU of SN (e.g. SN is a node which generates or configures the RRC Reconfiguration message for the LTM procedure) about the occurrences of successful access procedures in the target DU of SN e.g. via an ACCESS SUCCESS or UL RRC MESSAGE TRANSFER or RACH indication message or other existing message or a new defined message. There may be following two alternatives in different embodiments, i.e. Alternative #1 and Alternative #2.

- (1) Alternative #1: SN or the CU of SN may retrieve the successful report for LTM from the UE(s) e.g. based on the received F1AP signalling from the target DU of SN, for example, SN or the CU of SN may request the successful report for LTM or successful LTM related information from the UE e.g. via UE Information Request message or other message, the UE may transmit the successful report for LTM or successful LTM related information to the SN or the CU of SN e.g. via UE Information Response message or other message.
- (2) Alternative #2: SN (or CU of SN) may inform MN (or CU of MN) about the occurrences of successful access procedures in SN e.g. via an ACCESS SUCCESS or RACH indication message or other existing message or a new defined message, MN (or CU of MN) may request the successful report for LTM or successful LTM related information from the UE e.g. via UE Information Request message or other message, the UE may transmit the successful report for LTM or successful LTM related information to the MN (or CU of MN) e.g. via UE Information Response message or other message. Then, MN (or CU of MN) forward the successful report for LTM or successful LTM related information to the SN (or CU of SN) e.g. via an ACCESS SUCCESS or other existing message or a new defined message.

[0299] For SCG LTM:

- (1) If the receiving network is a node #1 or CU #1 which is a new serving node of the UE, the receiving network (e.g. node #1 or CU #1) may forward the received successful report (e.g. SPR or other named report or a new introduced report) for LTM or successful LTM related information or information related with one or more successful LTM cell switch executions to MN. Then, MN may send the successful report (e.g. SPR or other named

report or a new introduced report) for LTM or successful LTM related information or information related with one or more successful LTM cell switch executions to the SN or CU of SN which generates or configures the RRC Reconfiguration message for the LTM procedure for the UE, via an ACCESS AND MOBILITY INDICATION message or other message. Then, the SN or CU of SN may transfer the received successful report (e.g. SPR or other named report or a new introduced report) for LTM or successful LTM related information or information related with one or more successful LTM cell switch executions to relevant DU(s) (e.g. via an ACCESS AND MOBILITY INDICATION message or other F1AP message, the DU may be source DU of SN which sends the LTM Cell Switch Command MAC CE to the UE, or the DU may be target DU of SN to which the target PSCell belongs). SN or CU of SN or relevant DU(s) of SN may analyse whether or how LTM related configuration needs adjustment and/or perform corresponding adjustments for MRO, such adjustments may result in changes of configuration for LTM e.g. including one or more LTM candidate cells, or RACH resources for accessing to target PSCell, or RACH configuration for early TA acquisition.

- (2) If the receiving network is SN or CU of SN which generates or configures the RRC Reconfiguration message for the LTM procedure for the UE, CU of SN may transfer the received successful report (e.g. SPR or other named report or a new introduced report) for LTM or successful LTM related information or information related with one or more successful LTM cell switch executions to relevant DU(s) (e.g. via an ACCESS AND MOBILITY INDICATION message or other F1AP message, the DU may be source DU of SN which sends the LTM Cell Switch Command MAC CE to the UE, or the DU may be target DU of SN to which the target PSCell belongs). CU of SN or relevant DU(s) of SN may analyse whether or how LTM related configuration needs adjustment and/or perform corresponding adjustments for MRO, such adjustments may result in changes of configuration for LTM e.g. including one or more LTM candidate cells, or RACH resources for accessing to target PSCell, or RACH configuration for early TA acquisition.
- (3) If the receiving network is MN, MN may send the received successful report (e.g. SPR or other named report or a new introduced report) for LTM or successful LTM related information or information related with one or more successful LTM cell switch executions to the SN or CU of SN which generates or configures the RRC

Reconfiguration message for the LTM procedure for the UE, via an ACCESS AND MOBILITY INDICATION message or other message. Then, the SN or CU of SN may transfer the received successful report (e.g. SPR or other named report or a new introduced report) for LTM or successful LTM related information or information related with one or more successful LTM cell switch executions to relevant DU(s) (e.g. via an ACCESS AND MOBILITY INDICATION message or other F1AP message, the DU may be source DU of SN which sends the LTM Cell Switch Command MAC CE to the UE, or the DU may be target DU of SN to which the target cell belongs). SN or CU of SN or relevant DU(s) of SN may analyse whether or how LTM related configuration needs adjustment and/or perform corresponding adjustments for MRO, such adjustments may result in changes of configuration for LTM e.g. including one or more LTM candidate cells, or RACH resources for accessing to target PSCell, or RACH configuration for early TA acquisition.

[0300] The description herein is provided to enable a person having ordinary skill in the art to make or use the disclosure. Various modifications to the disclosure will be apparent to a person having ordinary skill in the art, and the generic principles defined herein may be applied to other variations without departing from the scope of the disclosure. Thus, the disclosure is not limited to the examples and designs described herein but is to be accorded the broadest scope consistent with the principles and novel features disclosed herein.

What is claimed:

1. A user equipment (UE), comprising:
 - at least one memory; and
 - at least one processor coupled to the at least one memory and configured to cause the UE to perform at least one of the following:
 - receiving a configuration used for the UE to store or report successful L1/L2-Triggered Mobility (LTM) related information; or
 - storing the successful LTM related information.
2. The UE of Claim 1, wherein the configuration is received in at least one of the following:
 - a radio resource control (RRC) reconfiguration message; or
 - a lower layer message concerning that an LTM cell switch execution is initiated.
3. The UE of Claim 1, wherein the configuration includes one or more thresholds, and the one or more thresholds comprise at least one of the following:
 - at least one timer T310 related threshold;
 - at least one timer T312 related threshold; or
 - at least one timer T304 related threshold.
4. The UE of Claim 3, wherein the successful LTM related information is stored upon at least one of the following:
 - a satisfaction of at least one trigger condition associated with the one or more thresholds; or
 - a successful completion of an LTM cell switch execution.
5. The UE of Claim 4, wherein the satisfaction of the at least one trigger condition includes at least one of the following:
 - a ratio between a value of elapsed running time of the timer T310 when an LTM cell switch execution is initiated and a configured value of the timer T310 is greater than the at least one timer T310 related threshold;
 - a ratio between a value of elapsed running time of the timer T312 when the LTM cell switch execution is initiated and a configured value of the timer T312 is greater than the at least one timer T312 related threshold; or

a ratio between a value of elapsed running time of the timer T304 and a configured value of the timer T304 is greater than the at least one timer T304 related threshold.

6. The UE of Claim 1, wherein the successful LTM related information is stored upon a successful completion of an LTM cell switch execution, and wherein the processor is configured to cause the UE to report the successful LTM related information after storing the successful LTM related information.
7. The UE of Claim 6, wherein the processor is configured to cause the UE to transmit an indication for availability of the successful LTM related information upon a successful completion of an LTM cell switch execution or after storing the successful LTM related information.
8. The UE of Claim 1, wherein the successful LTM related information includes at least one of the following:
 - first information related to a latest successful LTM cell switch execution; or
 - second information related to one or more successful LTM cell switch executions.
9. The UE of Claim 8, if the successful LTM related information includes the second information, the processor is configured to cause the UE to store or report the second information related to at most a fixed number of successful LTM cell switch executions in one Information Element (IE) or one UE variable or one report or one message.
10. The UE of Claim 8, if the successful LTM related information includes the second information, the processor is configured to cause the UE to store the second information related to successful LTM cell switch executions performed at the UE in one IE or one UE variable or one report or one message until a stopping indication.
11. The UE of Claim 1, wherein the successful LTM related information includes at least one of the following:
 - information regarding a source cell;
 - information regarding a target cell;
 - information regarding at least one neighbour cell;
 - layer 1 (L1) measurement results of the source cell;

L1 measurement results of the target cell;
L1 measurement results of the at least one neighbour cell;
information regarding at least one beam;
an indication of a type of an LTM cell switch;
information regarding one or more candidate cells configured for the LTM cell switch;
configuration information for the one or more candidate cells;
reference configuration information for the LTM cell switch;
one or more channel state information (CSI) resources for the LTM cell switch;
one or more time alignment (TA) values derived by a UE based TA measurement;
one or more TA values for a random access channel (RACH)-less LTM cell switch;
one or more contention-free random access resources;
one or more cause values for storing the successful LTM related information;
time elapsed between initiating an LTM cell switch execution and receiving an RRC reconfiguration message for the LTM cell switch;
time elapsed between initiating the LTM cell switch execution and retrieval of the successful LTM related information;
time elapsed between initiating the LTM cell switch execution and a successful completion of the LTM cell switch execution; or
time elapsed between the successful completion of the LTM cell switch execution and reporting the successful LTM related information.

12. A centralized unit (CU) of a base station (BS), comprising:

at least one memory; and
at least one processor coupled to the at least one memory and configured to cause the CU to:
obtain a configuration used for a user equipment (UE) to store or report successful L1/L2-Triggered Mobility (LTM) related information; and
transmit the configuration.

13. The CU of Claim 12, to obtain the configuration, the processor is configured to cause the CU to:

generate the configuration; or

receive the configuration from at least one distributed unit (DU) of the BS, wherein the at least one DU includes at least one of the following:

- a source DU;
- a target DU; or
- at least one candidate target DU,

wherein the configuration is transmitted to the source DU or the UE after obtaining the configuration.

14. The CU of Claim 12, wherein the processor is configured to cause the CU to receive, from a target DU, an indication indicating an occurrence of one or more successful LTM cell switch executions in the target DU.

15. A distributed unit (DU) of a base station (BS), comprising:

at least one memory; and

at least one processor coupled to the at least one memory and configured to cause the DU to perform at least one of the following:

- obtaining a configuration used for a user equipment (UE) to store or report successful L1/L2-Triggered Mobility (LTM) related information; or
- transmitting the configuration to the UE or a centralized unit (CU) of the BS.

16. The DU of Claim 15, wherein the configuration includes one or more thresholds, if the DU is a source DU, to obtain the one or more thresholds, the processor is configured to cause the source DU to receive at least one timer T304 related threshold from a centralized unit (CU), and wherein the at least one timer T304 related threshold is generated by the CU or by a target DU or by a candidate target DU.

17. The DU of Claim 15, wherein the configuration includes one or more thresholds, if the DU is a target DU or a candidate target DU, to obtain the one or more thresholds, the processor is configured to cause the target DU or the candidate target DU to:

generate at least one timer T304 related threshold; and

transmit the at least one timer T304 related threshold to a centralized unit (CU), wherein the CU is configured to transmit the at least one timer T304 related threshold to the UE or to a source DU.

18. The DU of Claim 15, wherein the configuration includes one or more thresholds, if the DU is a source DU, to obtain the one or more thresholds, the processor is configured to cause the source DU to receive at least one timer T310 related threshold or at least one timer T312 related threshold from a centralized unit (CU), and wherein the at least one timer T310 related threshold or the at least one timer T312 related threshold is generated by the CU.
19. The DU of Claim 15, wherein the configuration includes one or more thresholds, if the DU is a source DU to obtain the one or more thresholds, the processor is configured to cause the source DU to perform at least one of:
- generating at least one timer T310 related threshold or at least one timer T312 related threshold;
 - transmitting the at least one timer T310 related threshold or at least one timer T312 related threshold to a centralized unit (CU); and
 - receiving the configuration from the CU, wherein the configuration includes the at least one timer T310 related threshold or the at least one timer T312 related threshold.
20. A processor for wireless communication, comprising:
- at least one controller coupled with at least one memory and configured to cause the processor to perform at least one of the following:
 - receiving a configuration used for a user equipment (UE) to store or report successful L1/L2-Triggered Mobility (LTM) related information; or
 - storing the successful LTM related information.