

METHODS AND APPARATUSES FOR BOTH INTRA-BS AND INTER-BS LTM PROCEDURES

TECHNICAL FIELD

[0001] The present disclosure relates to wireless communications, and more specifically to methods and apparatuses for both an intra-BS (base station) lower layer-Triggered Mobility (LTM) procedure and an inter-BS LTM procedure. LTM may also be named as a L1/L2 lower layer-Triggered Mobility or the like.

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] Some implementations of the present disclosure provide a first centralized unit (CU) of a first base station (BS). The first CU includes at least one memory; and at least one processor coupled to the at least one memory and configured to cause the first CU to: receive, from a source distributed unit (DU) of the first BS, first information related to one or more candidate cells associated with a lower layer-triggered mobility (LTM) cell switch of a user equipment (UE) from a source cell of the source DU towards a first candidate cell; and transmit both second information related to the one or more candidate cells and the received first information to a candidate DU of the first BS or to a second CU of a second BS, wherein the first candidate cell is related to the candidate DU or the second CU.

[0005] In some implementations of the first CU described herein, the first candidate cell is a candidate primary cell (PCell) or a candidate primary secondary cell group cell (PSCell).

[0006] In some implementations of the first CU described herein, the first information includes at least one of the following: activated transmission configuration indication (TCI) state information associated with the one or more candidate cells; random access channel (RACH) resource information for an early timing advance (TA) acquisition associated with the one or more candidate cells; one or more early TA values associated with the one or more candidate cells; remaining length information of a time alignment timer (TAT) for the one or more early TA values; identifier (ID) information of the one or more candidate cells; ID information of the first candidate cell; or ID information of the UE.

[0007] In some implementations of the first CU described herein, the second information includes at least one of the following: one or more early TA values associated with the one or more candidate cells; remaining length information of a time alignment timer (TAT) for the one or more early TA values; LTM channel state information (CSI) resource configuration information; a UE measured TA ID for the one or more candidate cells; or No Layer-2 (L2) reset ID for the one or more candidate cells.

[0008] In some implementations of the first CU described herein, the first information and the second information are received or transmitted via at least one of the following: a radio resource control (RRC) message transfer message; an RRC delivery report message; a UE context modification required message; or a UE context modification request message.

[0009] In some implementations of the first CU described herein, the first information is received after the source DU is configured to transmit an LTM cell switch command for triggering the LTM cell switch to the UE.

[0010] In some implementations of the first CU described herein, the first information and the second information are transmitted after the first CU receives an indication of completing the LTM cell switch.

[0011] 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: receive, from a source distributed unit (DU) of a first base station (BS), first information related to one or more candidate cells associated with a lower layer-triggered mobility (LTM) cell switch of a user equipment (UE) from a source cell of the source DU towards a first candidate cell; and transmit both second information related to the one or more candidate cells and the received first information to a candidate DU of the first BS or to a second centralized unit (CU) of a second BS, wherein the first candidate cell is related to the candidate DU or the second CU.

[0012] Some implementations of the present disclosure provide a method performed by a first centralized unit (CU) of a base station (BS). The method includes: receiving, from a source distributed unit (DU) of the first BS, first information related to one or more candidate cells associated with a lower layer-triggered mobility (LTM) cell switch of a user equipment (UE) from a source cell of the source DU towards a first candidate cell; and transmitting both second information related to the one or more candidate cells and the received first information to a candidate DU of the first BS or to a second CU of a second BS, wherein the first candidate cell is related to the candidate DU or the second CU.

[0013] Some implementations of the present disclosure provide a source distributed unit (DU) of a first 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 source DU to:

determine to trigger a user equipment (UE) to perform a lower layer-triggered mobility (LTM) cell switch from a source cell of the source DU towards a first candidate cell; and transmit first information related to one or more candidate cells associated with the LTM cell switch to a first centralized unit (CU) of the first BS, wherein the first candidate cell is related to a candidate DU of the first BS or a second CU of a second BS.

[0014] In some implementations of the source DU described herein, the first candidate cell is a candidate primary cell (PCell) or a candidate primary secondary cell group cell (PSCell).

[0015] In some implementations of the source DU described herein, the first information includes at least one of the following: activated transmission configuration indication (TCI) state information associated with the one or more candidate cells; random access channel (RACH) resource information for an early timing advance (TA) acquisition associated with the one or more candidate cells; one or more early TA values associated with the one or more candidate cells; remaining length information of a time alignment timer (TAT) for the one or more early TA values; identifier (ID) information of the one or more candidate cells; ID information of the first candidate cell; or ID information of the UE.

[0016] In some implementations of the source DU described herein, the first information is transmitted via at least one of the following: a radio resource control (RRC) message transfer message; an RRC delivery report message; or a UE context modification required message.

[0017] 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: determine to trigger a user equipment (UE) to perform a lower layer-triggered mobility (LTM) cell switch from a source cell of a source distributed unit (DU) of a first base station (BS) towards a first candidate cell; and transmit first information related to one or more candidate cells associated with the LTM cell switch to a first centralized unit (CU) of the first BS, wherein the first candidate cell is related to a candidate DU of the first BS or a second CU of a second BS.

[0018] Some implementations of the present disclosure provide a method performed by a source distributed unit (DU) of a first base station (BS). The method includes: determining

to trigger a user equipment (UE) to perform a lower layer-triggered mobility (LTM) cell switch from a source cell of the source DU towards a first candidate cell; and transmitting first information related to one or more candidate cells associated with the LTM cell switch to a first centralized unit (CU) of the first BS, wherein the first candidate cell is related to a candidate DU of the first BS or a second CU of a second BS.

[0019] Some implementations of the present disclosure provide a second centralized unit (CU) of a second base station (BS). The second CU includes at least one memory; and at least one processor coupled to the at least one memory and configured to cause the second CU to: receive, from a first CU of a first BS, information related to one or more candidate cells associated with a lower layer-triggered mobility (LTM) cell switch of a user equipment (UE) from a source cell of a source distributed unit (DU) of the first BS towards a first candidate cell; and transmit the received information to a candidate DU of the second BS, wherein the first candidate cell is related to the candidate DU, and wherein the received information includes: first information transmitted from the source DU to the first CU; and second information transmitted from the first CU.

[0020] In some implementations of the second CU described herein, the first candidate cell is a candidate primary cell (PCell) or a candidate primary secondary cell group cell (PSCell).

[0021] In some implementations of the second CU described herein, the first information includes at least one of the following: activated transmission configuration indication (TCI) state information associated with the one or more candidate cells; random access channel (RACH) resource information for an early timing advance (TA) acquisition associated with the one or more candidate cells; one or more early TA values associated with the one or more candidate cells; remaining length information of a time alignment timer (TAT) for the one or more early TA values; identifier (ID) information of the one or more candidate cells; ID information of the first candidate cell; or ID information of the UE.

[0022] In some implementations of the second CU described herein, the second information includes at least one of the following: one or more early TA values associated with the one or more candidate cells; remaining length information of a time alignment timer (TAT) for the one or more early TA values; LTM channel state information (CSI) resource

configuration information; a UE measured TA ID for the one or more candidate cells; or No Layer-2 (L2) reset ID for the one or more candidate cells.

[0023] In some implementations of the second CU described herein, the information is received via at least one of the following: an RRC message transfer message; an RRC delivery report message; or a UE context modification request message.

[0024] 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: receive, from a first centralized unit (CU) of a first base station (BS), information related to one or more candidate cells associated with a lower layer-triggered mobility (LTM) cell switch of a user equipment (UE) from a source cell of a source distributed unit (DU) of the first BS towards a first candidate cell; and transmit the received information to a candidate DU of a second BS, wherein the first candidate cell is related to the candidate DU, and wherein the received information includes: first information transmitted from the source DU to the first CU; and second information transmitted from the first CU.

[0025] Some implementations of the present disclosure provide a method performed by a second centralized unit (CU) of a second base station (BS). The method includes: receiving, from a first CU of a first BS, information related to one or more candidate cells associated with a lower layer-triggered mobility (LTM) cell switch of a user equipment (UE) from a source cell of a source distributed unit (DU) of the first BS towards a first candidate cell; and transmitting the received information to a candidate DU of the second BS, wherein the first candidate cell is related to the candidate DU, and wherein the received information includes: first information transmitted from the source DU to the first CU; and second information transmitted from the first CU.

[0026] Some implementations of the present disclosure provide a first base station (BS). The first BS includes at least one memory; and at least one processor coupled to the at least one memory and configured to cause the first BS to: transmit, to a second BS, a request related to a user equipment (UE) based timing advance (TA) measurement or a No Layer-2 (L2) reset for a lower layer-triggered mobility (LTM) cell switch from a source cell of the

first BS towards a first candidate cell of the second BS; and receive a response related to the UE based TA measurement or the No L2 reset from the second BS.

[0027] In some implementations of the first BS described herein, the candidate cell is a candidate primary cell (PCell) or a candidate primary secondary cell group cell (PSCell).

[0028] In some implementations of the first BS described herein, the request includes at least one of the following: information to request the second BS to provide a candidate cell list, wherein the UE can acquire a TA value for a candidate cell within the candidate cell list by performing the UE based TA measurement when the LTM cell switch is executed from the source cell to the candidate cell within the candidate cell list; information to request the second BS to indicate whether a second candidate cell of the second BS has a same candidate DU as one or more candidate cells of the second BS, wherein the UE can acquire a TA value for the second candidate cell by performing the UE based TA measurement when the LTM cell switch is executed from the source cell to the second candidate cell; information to request the second BS to provide identifier (ID) information of a candidate DU related to the second candidate cell; or an ID range for UE measured TA reserved for the one or more candidate cells of the second BS.

[0029] In some implementations of the first BS described herein, the request includes at least one of the following: information to request the second BS to provide a candidate cell list, wherein the UE does not perform an L2 reset for each candidate cell within the candidate cell list when the UE performs the LTM cell switch from the source cell to the each candidate cell within the candidate cell list; information to request the second BS to indicate whether a second candidate cell of the second BS has a same candidate DU as one or more candidate cells of the second BS, wherein the UE does not perform the L2 reset for the second candidate cell when the UE performs the LTM cell switch from the source cell to the second candidate cell; information to request the second BS to provide identifier (ID) information of a candidate DU related to the second candidate cell; or an ID range of a set of candidate cells reserved for the No L2 reset.

[0030] In some implementations of the first BS described herein, if the second candidate cell has the same candidate DU as the one or more candidate cells, the request further includes identifier (ID) information of the second candidate cell.

[0031] In some implementations of the first BS described herein, the response includes at least one of the following: a candidate cell list, wherein the UE can acquire a TA value for a candidate cell within the candidate cell list by performing the UE based TA measurement when the LTM cell switch is executed from the source cell to the candidate cell within the candidate cell list; information to indicate whether a second candidate cell of the second BS has a same candidate DU as one or more candidate cells of the second BS, wherein the UE can acquire a TA value for the second candidate cell by performing the UE based TA measurement when the LTM cell switch is executed from the source cell to the second candidate cell; identifier (ID) information of a candidate DU related to the second candidate cell; or an ID range for UE measured TA reserved for the one or more candidate cells of the second BS.

[0032] In some implementations of the first BS described herein, the response includes at least one of the following: a candidate cell list, wherein the UE does not perform an L2 reset for each candidate cell within the candidate cell list when the UE performs the LTM cell switch from the source cell to the each candidate cell within the candidate cell list; information to indicate whether a second candidate cell of the second BS has a same candidate DU as one or more candidate cells of the second BS, wherein the UE does not perform the L2 reset for the second candidate cell when the UE performs the LTM cell switch from the source cell to the second candidate cell; identifier (ID) information of a candidate DU related to the second candidate cell; or an ID range of a set of candidate cells reserved for the No L2 reset.

[0033] In some implementations of the first BS described herein, if the second candidate cell has the same candidate DU as the one or more candidate cells, the response further includes identifier (ID) information of the second candidate cell.

[0034] 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: transmit, to a second base station (BS), a request related to a user equipment (UE) based timing advance (TA) measurement or a No Layer-2 (L2) reset for a lower layer-triggered mobility (LTM) cell switch from a source cell of a first BS towards a first candidate cell of the second BS; and receive a response related to the UE based TA measurement or the No L2 reset from the second BS.

[0035] Some implementations of the present disclosure provide a method performed by a first base station (BS). The method includes: transmitting, to a second BS, a request related to a user equipment (UE) based timing advance (TA) measurement or a No Layer-2 (L2) reset for a lower layer-triggered mobility (LTM) cell switch from a source cell of the first BS towards a first candidate cell of the second BS; and receiving a response related to the UE based TA measurement or the No L2 reset from the second BS.

[0036] Some implementations of the present disclosure provide a second base station (BS). The second BS includes at least one memory; and at least one processor coupled to the at least one memory and configured to cause the second BS to: receive, from a first BS, a request related to a user equipment (UE) based timing advance (TA) measurement or a No Layer-2 (L2) reset for a lower layer-triggered mobility (LTM) cell switch from a source cell of the first BS towards a first candidate cell of the second BS; and transmit a response related to the UE based TA measurement or the No L2 reset to the first BS.

[0037] In some implementations of the second BS described herein, the candidate cell is a candidate primary cell (PCell) or a candidate primary secondary cell group cell (PSCell).

[0038] In some implementations of the second BS described herein, the request includes at least one of the following: information to request the second BS to provide a candidate cell list, wherein the UE can acquire a TA value for a candidate cell within the candidate cell list by performing the UE based TA measurement when the LTM cell switch is executed from the source cell to the candidate cell within the candidate cell list; information to request the second BS to indicate whether a second candidate cell of the second BS has a same candidate DU as one or more candidate cells of the second BS, wherein the UE can acquire a TA value for the second candidate cell by performing the UE based TA measurement when the LTM cell switch is executed from the source cell to the second candidate cell; information to request the second BS to provide identifier (ID) information of a candidate DU related to the second candidate cell; or an ID range for UE measured TA reserved for the one or more candidate cells of the second BS.

[0039] In some implementations of the second BS described herein, the request includes at least one of the following: information to request the second BS to provide a candidate cell list, wherein the UE does not perform an LTM L2 reset for each candidate cell within the

candidate cell list when the UE performs the LTM cell switch from the source cell to the each candidate cell within the candidate cell list; information to request the second BS to indicate whether a second candidate cell of the second BS has a same candidate DU as one or more candidate cells of the second BS, wherein the UE does not perform the L2 reset for the second candidate cell when the UE performs the LTM cell switch from the source cell to the second candidate cell; information to request the second BS to provide identifier (ID) information of a candidate DU related to the second candidate cell; or an ID range of a set of candidate cells reserved for the No L2 reset.

[0040] In some implementations of the second BS described herein, if the first candidate cell has the same candidate DU as the one or more candidate cells, the request further includes identifier (ID) information of the first candidate cell.

[0041] In some implementations of the second BS described herein, the response includes at least one of the following: a candidate cell list, wherein the UE can acquire a TA value for a candidate cell within the candidate cell list by performing the UE based TA measurement when the LTM cell switch is executed from the source cell to the candidate cell within the candidate cell list; information to indicate whether a second candidate cell of the second BS has a same candidate DU as one or more candidate cells of the second BS, wherein the UE can acquire a TA value for the first candidate cell by performing the UE based TA measurement when the LTM cell switch is executed from the source cell to the second candidate cell; identifier (ID) information of a candidate DU related to the second candidate cell; or an ID range for UE measured TA reserved for the one or more candidate cells of the second BS.

[0042] In some implementations of the second BS described herein, the response includes at least one of the following: a candidate cell list, wherein the UE does not perform an L2 reset for each candidate cell within the candidate cell list when the UE performs the LTM cell switch from the source cell to the each candidate cell within the candidate cell list; information to indicate whether a second candidate cell of the second BS has a same candidate DU as one or more candidate cells of the second BS, wherein the UE does not perform the L2 reset for the second candidate cell when the UE performs the LTM cell switch from the source cell to the second candidate cell; identifier (ID) information of a candidate

DU related to the second candidate cell; or an ID range of a set of candidate cells reserved for the No L2 reset.

[0043] In some implementations of the second BS described herein, if the first candidate cell has the same candidate DU as the one or more candidate cells, the response further includes identifier (ID) information of the first candidate cell.

[0044] 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: receive, from a first base station (BS), a request related to a user equipment (UE) based timing advance (TA) measurement or a No Layer-2 (L2) reset for a lower layer-triggered mobility (LTM) cell switch from a source cell of the first BS towards a first candidate cell of a second BS; and transmit a response related to the UE based TA measurement or the No L2 reset to the first BS.

[0045] Some implementations of the present disclosure provide a method performed by a second base station (BS). The method includes: receiving, from a first BS, a request related to a user equipment (UE) based timing advance (TA) measurement or a No Layer-2 (L2) reset for a lower layer-triggered mobility (LTM) cell switch from a source cell of the first BS towards a first candidate cell of the second BS; and transmitting a response related to the UE based TA measurement or the No L2 reset to the first BS.

BRIEF DESCRIPTION OF THE DRAWINGS

[0046] Figure 1 illustrates an example of a wireless communications system in accordance with aspects of the present disclosure.

[0047] Figure 2 illustrates an example of a user equipment (UE) 200 in accordance with aspects of the present disclosure.

[0048] Figure 3 illustrates an example of a processor 300 in accordance with aspects of the present disclosure.

[0049] Figure 4 illustrates an example of a network equipment (NE) 400 in accordance with aspects of the present disclosure.

[0050] Figure 5A illustrates a schematic diagram of an intra-CU intra-DU mobility scenario in accordance with aspects of the present disclosure.

[0051] Figure 5B illustrates a schematic diagram of an intra-CU inter-DU mobility scenario in accordance with aspects of the present disclosure.

[0052] Figure 5C illustrates a schematic diagram of an inter-CU mobility scenario in accordance with aspects of the present disclosure.

[0053] Figures 6-10 illustrate flowcharts of a method related to an LTM cell switch procedure in accordance with aspects of the present disclosure.

[0054] Figure 11 illustrates a schematic diagram of an intra-CU LTM procedure in accordance with aspects of the present disclosure.

[0055] Figure 12 illustrates a schematic diagram of an inter-CU LTM procedure in accordance with aspects of the present disclosure.

[0056] Figure 13 illustrates another schematic diagram of an inter-CU LTM procedure in accordance with aspects of the present disclosure.

DETAILED DESCRIPTION

[0057] 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 Layer-3 (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.

[0058] 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 MAC CE. The cell switch command indicates 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.

[0059] In some cases, subsequent LTM may be supported. Subsequent LTM means subsequent LTM cell switch procedures between candidate cells where a UE does not need to be reconfigured by the network in between.

[0060] A supervision timer can be used to detect a failure of an LTM execution or an LTM cell switch procedure, wherein an LTM procedure fails if the LTM supervision timer expires, upon which a UE initiates an RRC connection re-establishment procedure. For example, legacy T304 timer is used as the supervision timer to supervision the LTM cell switch procedure.

[0061] "LTM candidate cell" refers to a candidate cell configured to a 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.

[0062] "LTM candidate cell configuration" refers to a configuration associated with an LTM candidate cell. An LTM candidate cell configuration can be a complete LTM candidate cell configuration or a delta (difference) configuration with respect to an LTM reference configuration. Each LTM candidate cell configuration may be identified by an index, called as LTM candidate cell configuration index, LTM candidate configuration index, or other names. In one example, the LTM candidate cell configuration index is LTM-CandidateId, which is used to identity an LTM candidate cell configuration.

[0063] "LTM Reference Configuration" refers to a configuration provided by the network to the UE that is common to all the configured LTM candidate cells. It is used by the UE to generate a complete LTM candidate cell configuration (i.e., by applying an LTM candidate cell configuration on top of an LTM reference configuration).

[0064] "Complete LTM Candidate Cell Configuration" refers to a configuration that contains all the necessary fields needed to perform an LTM cell switch procedure. This configuration can be an LTM candidate cell configuration itself or be generated by applying an LTM candidate cell configuration on top of an LTM reference configuration.

[0065] MCG LTM is a PCell switch procedure that the network triggers via a medium access control (MAC) control element (CE) based on L1 measurements. SCG LTM is a PSCell switch procedure that the network triggers via a medium access control (MAC) control element (CE) based on L1 measurements. 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 mobility: a UE moves between different cells within a DU.
- (2) Intra-CU inter-DU mobility: a UE moves between different cells belonging to different DUs but within a CU.
- (3) Inter-CU mobility: a UE moves between different cells belonging to different DUs different CUs.

[0066] One objective for mobility enhancements in 3GPP Rel-18 is to specify an LTM procedure (i.e. a PCell or PSCell switch procedure triggered by the network via MAC CE based on L1 measurement). Currently, following issues regarding an LTM procedure need to be considered, including, e.g. what is the behaviors of network nodes after a UE performs an intra-CU LTM or an inter-CU LTM procedure, how to enhance a handover preparation phase to support different functions in an intra-CU LTM procedure or an inter-CU LTM procedure, e.g., via an Xn or F1 interface. Currently, details regarding Xn and F1 enhancements for both intra-BS and inter-BS LTM procedures have not been discussed yet. Embodiments of the present disclosure aim to resolve the abovementioned issues.

[0067] In some embodiments of the present disclosure, a UE may receive a TCI state activation by a Candidate Cell TCI States Activation/Deactivation MAC CE for multiple candidate cells, e.g., candidate cell #a and candidate cell #b. After the UE switches to candidate cell #a upon reception of an LTM cell switch command, this issue of whether the UE continues to keep the activated TCI state for candidate cell #b needs to be solved. This issue aims to propose that if the UE is allowed to keep the activated TCI state after the cell switch, a source DU needs to inform the new serving cell because the new serving cell or DU needs to update the TCI state. The issue of how to handle the activated TCI state after Intra-CU LTM or Inter-CU LTM if the activated TCI state will be kept needs to be solved, but the details of such solution have not be discussed.

[0068] In some embodiments of the present disclosure, in an LTM procedure, a source gNB-DU may send an LTM CELL CHANGE NOTIFICATION message to a gNB-CU to indicate the initiation of the LTM command to a UE including the target cell ID and the TCI state ID. Then, the gNB-CU may send the target cell ID and the TCI state ID to the target

gNB-DU. After intra or inter LTM cell switching, the UE will continue keeping the LTM candidate cell. An issue needs to be solved is that a source CU may transfer a RACH resource for early TA acquisition to a target DU of the new serving cell, e.g., a RACH resource for early TA acquisition per a candidate cell.

[0069] In some embodiments of the present disclosure, an early TA value stored in a source DU and additional information, e.g., a remaining value for TAT should be transferred to a target DU via an Xn interface and an F1 interface. For instance, after executing an inter-CU LTM, an early TA value stored in a source DU may be transferred to a new serving gNB-DU via an Xn interface and an F1 interface.

[0070] In some embodiments of the present disclosure, after an inter-CU cell switch towards a target BS, the target BS should be aware of the CSI resource configuration. An issue needs to be solved is that how to get the CSI resource configuration. For instance, the LTM channel state information (CSI) resource configuration is generated by the CU. After executing the inter-CU LTM or Layer-3 (L3) handover, CSI resource configuration may be transferred to a target CU.

[0071] In some embodiments of the present disclosure, after an intra-CU LTM or inter-CU LTM towards a target cell, CU and DU of the target cell may be aware of a UE Measured TA ID for all candidate cells and NoReset ID for all candidate cells. For instance, the UE Measured TA ID for all candidate cells and NoReset ID for all candidate cells may be transferred to the target DU via an Xn interface and an F1 interface.

[0072] In some embodiments of the present disclosure, an Xn interface enhancement for a handover preparation phase is designed to support a UE Measured TA ID in an inter-BS LTM.

[0073] In some embodiments of the present disclosure, an Xn interface enhancement for a handover preparation phase is designed to support No Reset ID in an inter-BS LTM.

[0074] More details of the embodiments of the present disclosure will be illustrated in the following text in combination with the appended drawings.

[0075] 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.

[0076] 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.

[0077] 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.

[0078] 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.

[0079] 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.

[0080] 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).

[0081] 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.

[0082] 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).

[0083] 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.

[0084] 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.

[0085] 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.

[0086] 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.

[0087] 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.

[0088] 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.

[0089] 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.

[0090] 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.

[0091] 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.

[0092] 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.

[0093] 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).

[0094] 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.

[0095] 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.

[0096] 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.

[0097] 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.

[0098] 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).

[0099] 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).

[0100] 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.

[0101] 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.

[0102] 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).

[0103] 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.

[0104] 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.

[0105] The processor 300 may support wireless communication in accordance with examples as disclosed herein.

[0106] In some implementations, the processor 300 may be configured to support means for performing operations as described with respect to Figure 6. For example, the processor 300 may be configured to or operable to support: a means for receiving, from a source DU of a first BS, first information related to one or more candidate cells associated with an LTM cell switch of a UE from a source cell of the source DU towards a first candidate cell; and a means for transmitting both second information related to the one or more candidate cells and the received first information to a candidate DU of the first BS or to a second CU of a second BS, wherein the first candidate cell is related to the candidate DU or the second CU.

[0107] In some implementations, the processor 300 may be configured to support means for performing operations as described with respect to Figure 7. For example, the processor 300 may be configured to or operable to support: a means for determining to trigger a UE to perform an LTM cell switch from a source cell of a source DU of a first BS towards a first candidate cell; and a means for transmitting first information related to one or more candidate cells associated with the LTM cell switch to a first CU of the first BS, wherein the first candidate cell is related to a candidate DU of the first BS or a second CU of a second BS.

[0108] In some implementations, the processor 300 may be configured to support means for performing operations as described with respect to Figure 8. For example, the processor 300 may be configured to or operable to support: a means for receiving, from a first CU of a first BS, information related to one or more candidate cells associated with an LTM cell switch of a UE from a source cell of a source DU of the first BS towards a first candidate cell; and a means for transmitting the received information to a candidate DU of a second BS, wherein the first candidate cell is related to the candidate DU, and wherein the received information includes: first information transmitted from the source DU to the first CU; and second information transmitted from the first CU.

[0109] In some implementations, the processor 300 may be configured to support means for performing operations as described with respect to Figure 9. For example, the processor 300 may be configured to or operable to support: a means for transmitting, to a second BS, a request related to a UE based TA measurement or a No Layer-2 (L2) reset for an LTM cell switch from a source cell of a first BS towards a first candidate cell of the second BS; and a means for receiving a response related to the UE based TA measurement or the No L2 reset from the second BS.

[0110] In some additional implementations, the processor 300 may be configured to support means for performing operations as described with respect to Figure 10. For example, the processor 300 may be configured to or operable to support: a means for receiving, from a first BS, a request related to a UE based TA measurement or a No Layer-2 (L2) reset for an LTM cell switch from a source cell of the first BS towards a first candidate cell of a second BS; and a means for transmitting a response related to the UE based TA measurement or the No L2 reset to the first BS.

[0111] 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.

[0112] 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.

[0113] 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.

[0114] 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.

[0115] 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.

[0116] 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. For example, the NE 400 may be configured to support means for performing the operations as described with respect to Figure 6 or operations of a candidate target SN as described below.

[0117] In some implementations, the NE 400 may be a first CU of a first BS. The NE 400 may be configured to support: a means for receiving, from a source DU of the first BS, first information related to one or more candidate cells associated with an LTM cell switch of a UE from a source cell of the source DU towards a first candidate cell; and a means for transmitting both second information related to the one or more candidate cells and the received first information to a candidate DU of the first BS or to a second CU of a second BS, wherein the first candidate cell is related to the candidate DU or the second CU.

[0118] In some implementations, the NE 400 may be a source DU of a first BS and configured to support: a means for determining to trigger a UE to perform an LTM cell switch from a source cell of a source DU of a first BS towards a first candidate cell; and a means for transmitting first information related to one or more candidate cells associated with the LTM

cell switch to a first CU of the first BS, wherein the first candidate cell is related to a candidate DU of the first BS or a second CU of a second BS.

[0119] In some implementations, the NE 400 may be a second CU of a second BS and configured to support: a means for receiving, from a first CU of a first BS, information related to one or more candidate cells associated with an LTM cell switch of a UE from a source cell of a source DU of the first BS towards a first candidate cell; and a means for transmitting the received information to a candidate DU of the second BS, wherein the first candidate cell is related to the candidate DU, and wherein the received information includes: first information transmitted from the source DU to the first CU; and second information transmitted from the first CU.

[0120] In some implementations, the NE 400 may be a first BS and configured to support: a means for transmitting, to a second BS, a request related to a UE based TA measurement or a No Layer-2 (L2) reset for an LTM cell switch from a source cell of the first BS towards a first candidate cell of the second BS; and a means for receiving a response related to the UE based TA measurement or the No L2 reset from the second BS.

[0121] In some additional implementations, the NE 400 may be a second BS and configured to support: a means for receiving, from a first BS, a request related to a UE based TA measurement or a No Layer-2 (L2) reset for an LTM cell switch from a source cell of the first BS towards a first candidate cell of the second BS; and a means for transmitting a response related to the UE based TA measurement or the No L2 reset to the first BS.

[0122] 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.

[0123] 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.

[0124] 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.

[0125] 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.

[0126] 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.

[0127] 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.

[0128] In Figure 5A, UE 101A is moving from cell #1 to cell #2, and may perform a handover procedure from cell #1 to access to cell #2, which is a handover procedure performed between different cells within a DU. This scenario may be referred to as intra-CU intra-DU mobility. In short, this scenario may be called as intra-DU mobility.

[0129] 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.

[0130] In Figure 5B, UE 101B is moving from cell #A to cell #B, and may perform a handover procedure from cell #A to access to cell #B, which is a handover 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 mobility. In short, this scenario may be called as inter-DU mobility.

[0131] 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.

[0132] In Figure 5C, UE 101C is moving from cell #X to cell #Y, and may perform a handover procedure from cell #X to access to cell #Y, which is a handover procedure

performed between different cells belonging to different DUs within different CUs. This scenario may be referred to as inter-CU mobility.

[0133] Figure 6 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 network node as described herein. In some implementations, the network node may be a CU of a BS, and 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 602 and 604 may be performed by NE 400 as described with reference to Figure 4. Each of operations 602 and 604 may be performed in accordance with examples as described herein. Specific examples are described in the embodiments of Figure 11 and Figure 13 as follows.

[0134] At operation 602, the method may include receiving, by a CU of a BS (denoted as "BS #1") from a source DU of BS #1, information (denoted as "information #1") related to one or more candidate cells associated with an LTM cell switch of a UE from a source cell of the source DU of BS #1 towards a candidate cell (denoted as "candidate cell #1", which may also be named as a target cell or a candidate target cell).

[0135] At operation 604, the method may include transmitting both information related to the one or more candidate cells (denoted as "information #2") and information #1 by the CU of BS #1 to a candidate DU of BS #1 or to a CU of another BS (denoted as "BS #2"). Candidate cell #1 may be related to the candidate DU of BS #1, e.g., in an intra-CU mobility scenario. Candidate cell #1 may be related to or BS #2, e.g., in an inter-CU mobility scenario.

[0136] In some implementations, candidate cell #1 is a candidate PCell, e.g., the UE accesses the serving BS (i.e., BS #1) via an MCG only. In some other implementations, candidate cell #1 is a candidate PSCell, e.g., the UE accesses the serving BS via a dual connectivity (DC) scenario.

[0137] In some implementations, information #1 includes at least one of the following:

- (1) activated transmission configuration indication (TCI) state information associated with the one or more candidate cells;

- (2) random access channel (RACH) resource information for an early timing advance (TA) acquisition associated with the one or more candidate cells;
- (3) one or more early TA values associated with the one or more candidate cells;
- (4) remaining length information of a time alignment timer (TAT) for the one or more early TA values;
- (5) identifier (ID) information of the one or more candidate cells;
- (6) ID information of candidate cell #1, e.g., a target cell ID; or
- (7) ID information of the UE, e.g., UE ID.

[0138] In some implementations, information #2 includes at least one of the following:

- (1) One or more early TA values associated with the one or more candidate cells.
- (2) Remaining length information of a time alignment timer (TAT) for the one or more early TA values.
- (3) LTM channel state information (CSI) resource configuration information.
- (4) A UE measured TA ID for the one or more candidate cells, e.g., a UE measured TA ID.
- (5) No Layer-2 (L2) reset ID for the one or more candidate cells, e.g., a NoReset ID.

[0139] For example, in some embodiments of the present disclosure, a UE Measured TA ID for a serving cell may be denoted as "*ltm-ServingCellUE-MeasuredTA-ID*", which is configured in *LTM-Config* information element (IE). This IE is used by the UE to determine on whether UE-based TA measurements should be performed when an LTM cell switch procedure is triggered towards an LTM candidate cell. When the UE receives an LTM cell switch command towards a candidate cell, if the value of *ltm-UE-MeasuredTA-ID* contained within the *LTM-Candidate IE* is equal to the value of *ltm-ServingCellUE-MeasuredTA-ID*. The AS layer of the UE may inform lower layers that the UE should perform UE-based TA measurements. Otherwise, the UE may replace the value of *ltm-ServingCellUE-MeasuredTA-ID* with the value of *ltm-UE-MeasuredTA-ID* in the *LTM-Candidate*.

[0140] In some embodiments of the present disclosure, a UE Measured TA ID for candidate cell(s) may be denoted as *ltm-UE-MeasuredTA-ID* or the like.

[0141] A LTM NoReset operation means that a UE does not perform a L2 reset operation for a candidate cell when the UE performs an LTM cell switching from a source cell to the candidate cell. For example, in some embodiments of the present disclosure, a NoReset ID for a serving cell may be denoted as "*ltm-ServingCellNoResetID*", which is configured in *LTM-Config* IE. This field is used by the UE to determine on whether L2 reset should be performed when an LTM cell switch procedure is triggered towards an LTM candidate cell. When the UE receives an LTM cell switch command towards a candidate cell, if the value of *ltm-NoResetID* contained within the *LTM-Candidate IE* is equal to the value of *ltm-ServingCellNoResetID*, the UE may continue using the current RLC entity. Otherwise, the UE may replace the value of *ltm-ServingCellNoResetID* with the value of *ltm-NoResetID* in the *LTM-Candidate*.

[0142] In some embodiments of the present disclosure, a NoReset ID for candidate cell(s) may be denoted as *ltm-NoResetID* or the like.

[0143] In some implementations, information #1 and information #2 may be received or transmitted via at least one of the following:

- (1) an RRC message transfer message;
- (2) an RRC delivery report message;
- (3) a UE context modification required message; or
- (4) a UE context modification request message.

[0144] In an implementation, information #1 is received after the source DU of BS #1 is configured to transmit a cell switch command for triggering the LTM cell switch to the UE.

[0145] In an implementation, information #1 and information #2 are transmitted after the CU of BS #1 receives an indication of completing the LTM cell switch.

[0146] It should be noted that the method described in Figure 6 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.

[0147] 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 network node as described herein. In some implementations, the network node may be a source DU of a BS, and may execute a set of instructions to control the function elements of the source DU to perform the described functions. In some implementations, aspects of operations 702 and 704 may be performed by NE 400 as described with reference to Figure 4. Each of operations 702 and 704 may be performed in accordance with examples as described herein. Specific examples are described in the embodiments of Figure 11 and Figure 13 as follows.

[0148] At operation 702, the method may include determining, by a source DU of a BS (e.g., "BS #1" as described in the embodiments of Figure 6), to trigger a UE to perform an LTM cell switch from a source cell of the source DU of BS #1 towards a candidate cell (e.g., "candidate cell #1" as described in the embodiments of Figure 6).

[0149] Candidate cell #1 may be related to a candidate DU of BS #1, e.g., in an intra-CU mobility scenario. Candidate cell #1 may be related to a CU of another BS (e.g., "BS #2" as described in the embodiments of Figure 6), e.g., in an inter-CU mobility scenario.

[0150] In some implementations, candidate cell #1 is a candidate PCell, e.g., the UE accesses the serving BS (i.e., BS #1) via an MCG only. In some other implementations, candidate cell #1 is a candidate PSCell, e.g., the UE accesses the serving BS via a DC scenario.

[0151] At operation 704, the method may include transmitting information (e.g., "information #1" as described in the embodiments of Figure 6) related to one or more candidate cells associated with the LTM cell switch by the source DU of BS #1 to a CU of BS #1.

[0152] For instance, information #1 may include the same elements as described in the embodiments of Figure 6. In some implementations, information #1 is transmitted via at least one of the following:

- (1) an RRC message transfer message;
- (2) an RRC delivery report message; or

(3) a UE context modification required message.

[0153] 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.

[0154] Figure 8 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 network node as described herein. In some implementations, the network node may be a CU of a BS (e.g., a candidate CU in an inter-CU mobility scenario), and 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. Specific examples are described in the embodiments of Figure 11 and Figure 13 as follows.

[0155] At operation 802, the method may include receiving, by a CU (e.g., a candidate CU) of a BS (e.g., "BS #2" as described in the embodiments of Figure 6) from a CU (e.g., a source CU) of another BS (e.g., "BS #1" as described in the embodiments of Figure 6), information related to one or more candidate cells associated with an LTM cell switch of a UE from a source cell of a source DU of BS #1 towards a candidate cell (e.g., "candidate cell #1" as described in the embodiments of Figure 6).

[0156] In some implementations, the information at operation 802 is received via at least one of the following:

- (1) an RRC message transfer message;
- (2) an RRC delivery report message; or
- (3) a UE context modification request message.

[0157] At operation 804, the method may include transmitting the received information by the CU of BS #2 to a candidate DU of BS #2. Candidate cell #1 may be related to the candidate DU of BS #2. In some implementations, candidate cell #1 is a candidate PCell, e.g., the UE accesses the serving BS (i.e., BS #1) via an MCG only. In some other

implementations, candidate cell #1 is a candidate PSCell, e.g., the UE accesses the serving BS via a DC scenario.

[0158] In some implementations, the information received at operation 802 includes:

- (1) Information transmitted from the source DU to the CU of BS #1 (e.g., "information #1" as described in the embodiments of Figure 6); and
- (2) information transmitted from the CU of BS #1 (e.g., "information #2" as described in the embodiments of Figure 6). For Example, information #2 is stored at the source CU of BS #1 and transmitted from the CU of BS #1.

[0159] For instance, information #1 or information #2 may include the same elements as described in the embodiments of Figure 6.

[0160] It should be noted that the method described in Figure 8 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.

[0161] Figure 9 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 network node as described herein. In some implementations, the network node may be a BS (e.g. a source BS or a source CU in an inter-CU mobility scenario), and may execute a set of instructions to control the function elements of the BS 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. Specific examples are described in the embodiments of Figure 12 and Figure 13 as follows.

[0162] At operation 902, the method may include transmitting, by a BS (e.g., "BS #1" as described in the embodiments of Figure 6) to another BS (e.g., "BS #2" as described in the embodiments of Figure 6), a request related to a UE based TA measurement or a No Layer-2 (L2) reset for an LTM cell switch from a source cell of BS #1 towards a candidate cell of BS #2 (e.g., "candidate cell #1" as described in the embodiments of Figure 6).

[0163] At operation 904, the method may include receiving a response related to the UE based TA measurement or the No L2 reset by BS #1 from BS #2.

[0164] In some implementations, candidate cell #1 is a candidate PCell, e.g., the UE accesses the serving BS (i.e., BS #1) via an MCG only. In some other implementations, candidate cell #1 is a candidate PSCell, e.g., the UE accesses the serving BS via a DC scenario.

[0165] For instance, the request at operation 902 may be a handover request. In some implementations, the request at operation 902 includes at least one of the following:

- (1) information to request BS #2 to provide a candidate cell list, wherein the UE can acquire a TA value for a candidate cell within the candidate cell list by performing the UE based TA measurement when the LTM cell switch is executed from the source cell to the candidate cell within the candidate cell list;
- (2) information to request BS #2 to indicate whether a candidate cell (denoted as "candidate cell #2") of BS #2 has a same candidate DU as one or more candidate cells of BS #2 (e.g., one or more candidate cells configured to the UE), wherein the UE can acquire a TA value for candidate cell #2 by performing the UE based TA measurement when the LTM cell switch is executed from the source cell to candidate cell #2;
- (3) information to request BS #2 to provide ID information of a candidate DU related to candidate cell #2; or
- (4) an ID range for UE measured TA reserved for the one or more candidate cells of BS #2, e.g., an ID range for candidate cell(s) of BS #2 which is reserved for the UE based TA measurements.

[0166] In an implementation, if candidate cell #2 has the same candidate DU as the one or more candidate cells of BS #2, the request further includes ID information of candidate cell #2, e.g., a cell ID.

[0167] In some implementations, the request at operation 902 includes at least one of the following:

- (1) information to request BS #2 to provide a candidate cell list, wherein the UE does not perform an L2 reset (i.e., NoReset) for each candidate cell within the candidate cell list when the UE performs the LTM cell switch from the source cell to the each candidate cell within the candidate cell list;
- (2) information to request BS #2 to indicate whether a candidate cell (denoted as "candidate cell #3") of BS #2 has a same candidate DU as one or more candidate cells of BS #2 (e.g., one or more candidate cells configured for the UE), wherein the UE does not perform the L2 reset (i.e., NoReset) for candidate cell #3 when the UE performs the LTM cell switch from the source cell to candidate cell #3;
- (3) information to request BS #2 to provide ID information of a candidate DU related to candidate cell #3; or
- (4) an ID range of a set of candidate cells reserved for the No L2 reset, e.g., an ID range for candidate cell(s) which is reserved for the UE not performing the L2 reset operation.

[0168] In an implementation, if candidate cell #3 has the same candidate DU as the one or more candidate cells of BS #2, the request further includes ID information of candidate cell #3.

[0169] In some implementations, the response at operation 904 includes at least one of the following:

- (1) a candidate cell list, wherein the UE can acquire a TA value for a candidate cell within the candidate cell list by performing the UE based TA measurement when the LTM cell switch is executed from the source cell to the candidate cell within the candidate cell list;
- (2) information to indicate whether a candidate cell (denoted as "candidate cell #4") of BS #2 has a same candidate DU as one or more candidate cells of BS #2 (e.g., one or more candidate cells configured for the UE), wherein the UE can acquire a TA value for candidate cell #4 by performing the UE based TA measurement when the LTM cell switch is executed from the source cell to candidate cell #4;
- (3) ID information of a candidate DU related to candidate cell #4; or
- (4) an ID range for UE measured TA reserved for the one or more candidate cells of BS #2.

[0170] In an implementation, if candidate cell #4 has the same candidate DU as the one or more candidate cells of BS #2, the response further includes ID information of candidate cell #4.

[0171] In some implementations, the response at operation 904 includes at least one of the following:

- (1) a candidate cell list, wherein the UE does not perform an L2 reset for each candidate cell within the candidate cell list when the UE performs the LTM cell switch from the source cell to the each candidate cell within the candidate cell list;
- (2) information to indicate whether a candidate cell (denoted as "candidate cell #5") of BS #2 has a same candidate DU as one or more candidate cells of BS #2 (e.g., one or more candidate cells configured for the UE), wherein the UE does not perform the L2 reset for candidate cell #5 when the UE performs the LTM cell switch from the source cell to candidate cell #5;
- (3) ID information of a candidate DU related to the candidate cell #5; or
- (4) an ID range of a set of candidate cells reserved for the No L2 reset.

[0172] In an implementation, if candidate cell #5 has the same candidate DU as the one or more candidate cells of BS #2, the response further includes ID information of candidate cell #5.

[0173] It should be noted that the method described in Figure 9 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.

[0174] Figure 10 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 network node as described herein. In some implementations, the network node may be a BS (e.g. a candidate BS or a candidate CU in an inter-CU mobility scenario), and may execute a set of instructions to control the function elements of the BS to perform the described functions. In some implementations, aspects of operations 1002 and 1004 may be performed by NE 400 as described with reference to Figure 4. Each of operations

1002 and 1004 may be performed in accordance with examples as described herein. Specific examples are described in the embodiments of Figure 12 and Figure 13 as follows.

[0175] At operation 1002, the method may include receive, by a BS (e.g., "BS #2" as described in the embodiments of Figure 6) from another BS (e.g., "BS #1" as described in the embodiments of Figure 6), a request related to a UE based TA measurement or a No Layer-2 (L2) reset for an LTM cell switch from a source cell of BS #1 towards a candidate cell of BS #2 (e.g., "candidate cell #1" as described in the embodiments of Figure 6).

[0176] In some implementations, candidate cell #1 is a candidate PCell, e.g., the UE accesses the serving BS (i.e., BS #1) via an MCG only. In some other implementations, candidate cell #1 is a candidate PSCell, e.g., the UE accesses the serving BS via a DC scenario.

[0177] At operation 1004, the method may include transmitting a response related to the UE based TA measurement or the No L2 reset by BS #2 to BS #1.

[0178] In some implementations, the request at operation 1002 may include the same elements as those of the request at operation 902 as described in the embodiments of Figure 9. In some implementations, the response at operation 1004 may include the same elements as those of the response at operation 904 as described in the embodiments of Figure 9.

[0179] It should be noted that the method described in Figure 10 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.

[0180] Figure 11 illustrates a schematic diagram of an intra-CU LTM procedure in accordance with aspects of the present disclosure. Details described in all other embodiments of the present disclosure are applicable for the embodiments shown in Figure 11.

[0181] As shown in Figure 11, BS 1105 (e.g. BS #1 as described in the embodiments of Figure 6) is in CU-DU architecture, and includes source DU 1102, candidate DU 1103 and CU 1104. In the embodiments of Figure 11, a cell switching operation performed by UE 1101 refers to an Intra-CU mobility scenario in which a source cell and a target cell are in

the same CU. For instance, source DU 1102 and candidate DU 1103 are managed by the same CU 1104.

[0182] In the exemplary flowchart 1100 as shown in Figure 11 in operation 111, UE 1101 may access the serving BS (e.g. BS 1105) via an MCG only or a DC scenario. UE 1101 may send a measurement report to the serving BS. The serving BS may include a CU (e.g. gNB-CU) and one or more DUs (e.g. gNB-DUs). A serving cell is associated with a CU and a DU. There is an F1 interface between the DU and the CU. For example, in some embodiments of Figure 11 related to an MCG LTM procedure, BS 1105 is an MCG BS (e.g. MCG gNB) and includes CU 1104, source DU 1102, and candidate DU 1103. BS 1105 may include one or more other candidate DUs (not shown in Figure 11). In some implementations, UE 1101 may send the measurement report to CU 1104 via source DU 1102.

[0183] In operation 112, source CU 1104 of serving BS 1105 (MCG or SCG) may determine to initiate a L1/L2 based inter-cell mobility configuration procedure, i.e., making a L1/L2 based inter-cell mobility configuration decision.

[0184] In operation 113, CU 1104 will prepare LTM candidate cell configuration(s) for one or more candidate cell(s). For example, CU 1104 may receive an RACH resource for an early TA acquisition and the corresponding candidate cell from each candidate DU (including candidate DU 1103).

[0185] In operation 114, CU 1104 transmits the LTM cell configuration(s) to source DU 1102. BS 1105 may generate an RRC reconfiguration message based on the configuration(s) from the candidate cell(s) and transmit the RRC reconfiguration message to UE 1101. The RRC reconfiguration message includes the candidate cell configuration(s) for LTM.

[0186] In operation 115, source DU 1102 transmits the RRC reconfiguration message associated with one or more candidate cells for LTM configuration(s) to UE 1101. In some embodiments, source DU 1102 may also transmit an MAC CE to activate TCI state (beam) for some candidate cells.

[0187] In operation 116, source DU 1102 transmits an LTM cell switch command to UE 1101. For example, the LTM cell switch command includes ID information of a candidate target cell (i.e., a target cell, e.g., candidate cell #1) belonging to candidate DU 1103. Candidate cell #1 and the source cell of source DU 1102 are from the same CU 1104, i.e., in

an Intra-CU mobility scenario. UE 1101 may perform an LTM cell switch towards candidate cell #1 in response to the reception of the LTM cell switch command.

[0188] In operation 117, source DU 1102 may transmit at least one of the following information to CU 1104 via an F1 interface. The F1 message carrying such information could be an RRC Message Transfer message, an RRC DELIVERY REPORT message, or a UE CONTEXT MODIFICATION REQUIRED message.

- (1) activated TCI state(s) of one or more candidate cells (e.g., candidate cell(s) other than candidate cell #1);
- (2) RACH resource(s) for early TA acquisition of one or more candidate cells (e.g., candidate cell(s) other than candidate cell #1); or
- (3) early TA value(s) and/or remaining value for TAT(s) of one or more candidate cells (e.g., candidate cell(s) other than candidate cell #1). For example, source DU 1102 may receive the early TA value(s) of the one or more candidate cells from the candidate DU(s) via CU 1104.

[0189] In operation 118, after CU 1104 receives the above information from source DU 1102, CU 1104 will transfer at least one of such information to the candidate DU (e.g., candidate DU 1103) of the candidate (new serving) cell via an F1 interface. Candidate DU 1103 serving candidate cell #1 to which UE 1101 switches will receive such information from CU 1104. The F1 message could be an RRC Message Transfer message, an RRC DELIVERY REPORT message, or a UE CONTEXT MODIFICATION REQUEST message.

[0190] Figure 12 illustrates a schematic diagram of an inter-CU LTM procedure in accordance with aspects of the present disclosure. Details described in all other embodiments of the present disclosure are applicable for the embodiments shown in Figure 12.

[0191] As shown in Figure 12, BS 1204 is in CU-DU architectures, and includes source DU 1202 and source CU 1203. BS 1207 is in CU-DU architectures, and includes candidate CU 1206 and candidate DU 1205. BS 1207 may include one or more other candidate DUs (not shown in Figure 12).

[0192] In the embodiments of Figure 12, a cell switching operation performed by UE 1201 refers to an Inter-CU mobility scenario in which a source cell and a target cell are

located at different CUs. For instance, as shown in Figure 12, source DU 1202 and candidate DU 1205 are managed by different CUs, i.e., source CU 1203 and candidate CU 1206.

[0193] In the exemplary flowchart 1200 as shown in Figure 12, in operation 121, UE 1201 may access the serving BS (e.g. BS 1204) (e.g. BS #1 as described in the embodiments of Figure 9) via an MCG only or a DC scenario. UE 1201 may send a measurement report to the serving BS. The serving BS may include a CU (e.g. gNB-CU) and one or more DUs (e.g. gNB-DUs). A serving cell is associated with a CU and a DU. There is an F1 interface between the DU and the CU. For example, in the embodiments of Figure 12 related to an MCG LTM procedure, BS 1204 is an MCG BS (e.g. MCG gNB). In some implementations, UE 1201 may send the measurement report to source CU 1203 via source DU 1202.

[0194] In operation 122, source CU 1203 of serving BS 1204 (MCG or SCG) may determine to initiate a L1/L2 based inter-cell mobility configuration procedure, i.e., making a L1/L2 based inter-cell mobility configuration decision.

[0195] In operation 123, source CU 1203 may transmit a handover request for LTM preparation to candidate CU 1206 of BS 1207 (e.g. BS #2 as described in the embodiments of Figure 9).

[0196] For instance, in some embodiments, the handover request in operation 123 may include at least one of the following information:

- (1) Information to request BS 1207 to provide a candidate cell list, wherein UE 1201 can acquire a TA value for a candidate cell within the candidate cell list by performing the UE based TA measurement when the LTM cell switch is executed from the source cell of BS 1204 to the candidate cell within the candidate cell list. For instance, this information is for requesting a candidate gNB or CU to provide a candidate cell list on which a UE can get a TA value via a UE based measurement TA for this candidate cell included in the handover request.
- (2) Information to request BS 1207 to indicate whether a candidate cell (e.g., candidate cell #2 as described in the embodiments of Figure 9) of BS 1207 has a same candidate DU as one or more candidate cells of BS 1207 (e.g., one or more candidate cells configured to UE 1201), wherein UE 1201 can acquire a TA value for candidate cell #2 by performing the UE based TA measurement when the LTM cell switch is executed from the source

cell of BS 1204 to candidate cell #2 of BS 1207. For example, if candidate cell #2 has the same candidate DU as the one or more candidate cells of BS 1207, the handover request further includes ID information of candidate cell #2. For instance, this information is for requesting a candidate gNB or CU to indicate whether the candidate cell has the same candidate DU as the candidate cell for this UE. If the candidate has the same candidate DU as the candidate cell, the cell ID may be provided by the candidate gNB or CU as well. The cell ID can be a physical cell identifier (PCI).

- (3) Information to request BS 1207 to provide ID information of a candidate DU (e.g., candidate DU 1205) related to candidate cell #2. For instance, this information is for requesting a target gNB or CU to provide an ID of the candidate DU that is related to a candidate cell. The target gNB or CU may provide an ID or index of the candidate DU. Then, the source gNB or CU can differentiate whether the candidate cell is the same as or different from the candidate cell.
- (4) An ID range for UE measured TA reserved for the one or more candidate cells of BS 1207 (e.g., one or more candidate cells configured to UE 1201). For instance, a source gNB or CU transmits the reserved ID range of UE measured TA to each candidate gNB. Each candidate gNB can set the ID for each candidate cell belonging to this gNB.

[0197] In some embodiments, the handover request in operation 123 may include at least one of the following information:

- (1) Information to request BS 1207 to provide a candidate cell list, wherein UE 1201 does not perform an L2 reset for each candidate cell within the candidate cell list when UE 1201 performs the LTM cell switch from the source cell of BS 1204 to the each candidate cell within the candidate cell list. For instance, this information is for requesting a target gNB or CU to provide a candidate cell list on which a UE can perform no reset for this candidate cell included in the handover request.
- (2) Information to request BS 1207 to indicate whether a candidate cell (e.g., candidate cell #3 as described in the embodiments of Figure 9) of BS 1207 has a same candidate DU as one or more candidate cells of BS 1207 (e.g., candidate cell(s) configured for UE 1201), wherein UE 1201 does not perform the L2 reset for candidate cell #3 when UE 1201 performs the LTM cell switch from the source cell of BS 1204 to candidate cell #3. For

example, if candidate cell #3 has the same candidate DU as the one or more candidate cells of BS 1207, the handover request further includes ID information of candidate cell #3. For instance, this information is for requesting a target gNB or CU to provide information of the candidate DU related to the candidate cell. The target gNB or CU may provide an ID or index of the candidate DU. Then, a source gNB can differentiate whether the candidate cell is the same as or different from the candidate cell.

- (3) Information to request BS 1207 to provide ID information of a candidate DU related to candidate cell #3. For instance, this information is for requesting a target gNB or CU to indicate whether the candidate cell has the same candidate DU as the prepared candidate cell for this UE. If the candidate has the same candidate DU as the candidate cell, the cell ID should be provided by the target gNB or CU as well. The cell ID can be PCI.
- (4) An ID range of a set of candidate cells reserved for the No L2 reset. For instance, a source gNB transmits the reserved ID range of UE based measurement TA to each candidate gNB. Each candidate gNB can set the ID for each candidate cell belonging to this gNB.

[0198] The handover request in operation 123 may include all or a part of the elements described above in different embodiments.

[0199] In operation 124, candidate CU 1206 may inform candidate DU(s) (e.g., candidate DU 1205) associated with candidate cell(s) to prepare the configuration(s).

[0200] In operation 125, candidate CU 1206 may transmit a response to source CU 1203 via an Xn interface. The response in operation 125 may include elements corresponding to the elements in the handover request in operation 123.

[0201] For instance, in some embodiments, the response in operation 125 may include at least one of the following information:

- (1) a candidate cell list, wherein UE 1201 can acquire a TA value for a candidate cell within the candidate cell list by performing the UE based TA measurement when the LTM cell switch is executed from the source cell of BS 1204 to the candidate cell within the candidate cell list.

- (2) Information to indicate whether a candidate cell (e.g., candidate cell #4 as described in the embodiments of Figure 9) of BS 1207 has a same candidate DU as one or more candidate cells of BS 1207 (e.g., candidate cell(s) configured for UE 1201), wherein UE 1201 can acquire a TA value for candidate cell #4 by performing the UE based TA measurement when the LTM cell switch is executed from the source cell of BS 1204 to candidate cell #4. In an implementation, if candidate cell #4 has the same candidate DU as the one or more candidate cells of BS 1207, the response further includes ID information of candidate cell #4.
- (3) ID information of a candidate DU related to candidate cell #4.
- (4) An ID range for UE measured TA reserved for the one or more candidate cells of BS 1207.

[0202] In some embodiments, the response in operation 125 may include at least one of the following information:

- (1) A candidate cell list, wherein UE 1201 does not perform an L2 reset for each candidate cell within the candidate cell list when UE 1201 performs the LTM cell switch from the source cell of BS 1204 to the each candidate cell within the candidate cell list.
- (2) Information to indicate whether a candidate cell (e.g., candidate cell #5 as described in the embodiments of Figure 9) of BS 1207 has a same candidate DU as one or more candidate cells of BS 1207 (e.g., candidate cell(s) configured for UE 1201), wherein UE 1201 does not perform the L2 reset for candidate cell #5 when UE 1201 performs the LTM cell switch from the source cell of BS 1204 to candidate cell #5. In an implementation, if candidate cell #5 has the same candidate DU as the one or more candidate cells of BS 1207, the response further includes ID information of candidate cell #5.
- (3) ID information of a candidate DU related to candidate cell #5.
- (4) An ID range of a set of candidate cells reserved for the No L2 reset.

[0203] The response in operation 125 may include all or a part of the elements described above in different embodiments.

[0204] In operation 126, source CU 1203 may receive the following information associated with the candidate cell(s) from candidate CU 1206 (i.e., target CU 1206):

- (1) An RACH resource for an early TA acquisition and the corresponding candidate cell(s) from candidate DU(s) (e.g., candidate DU 1205).
- (2) Reference signal (RS) configuration(s).

[0205] In operation 127, source CU 1203 transmits the LTM cell configuration(s) to UE 1201 via source DU 1202. For instance, BS 1204 may generate an RRC reconfiguration message based on the configuration(s) from the candidate cell(s) and transmit the RRC reconfiguration message to UE 1201 in operation 127. The RRC reconfiguration message may include candidate cell configuration(s) for LTM. In some embodiments, source DU 1202 may transmit an MAC CE to activate TCI state (beam) for some candidate cell(s).

[0206] In operation 128, source DU 1202 may transmit an LTM cell switch command to UE 1201. The LTM cell switch command may include a candidate cell (i.e., a target cell, e.g., candidate cell #1) belonging to candidate DU 1205, i.e., a different DU from source DU 1202. The LTM cell switch command may include a candidate cell belonging to candidate DU 1205. Then, UE 1201 may perform a cell switch towards candidate cell #1 in response to the reception of the LTM cell switch command.

[0207] Figure 13 illustrates another schematic diagram of an inter-CU LTM procedure in accordance with aspects of the present disclosure. Details described in all other embodiments of the present disclosure are applicable for the embodiments shown in Figure 13.

[0208] As shown in Figure 13, BS 1304 is in CU-DU architectures, and includes source DU 1302 and source CU 1303. BS 1307 is in CU-DU architectures, and includes candidate DU 1305 and candidate CU 1306. BS 1307 may include one or more other candidate DUs (not shown in Figure 13).

[0209] In the embodiments of Figure 13, a cell switching operation performed by UE 1301 refers to an Inter-CU mobility scenario in which a source cell and a target cell are located at different CUs. For instance, as shown in Figure 13, source DU 1302 and candidate DU 1305 are managed by different CUs, i.e., source CU 1303 and candidate CU 1306.

[0210] In the exemplary flowchart 1300 as shown in Figure 13, in operation 131, UE 1301 may access the serving BS (e.g. BS 1304) (e.g. BS #1 as described in the embodiments of Figure 9) via an MCG only or a DC scenario. UE 1301 may send a measurement report to the serving BS. The serving BS may include a CU (e.g. gNB-CU) and one or more DUs (e.g. gNB-DUs). A serving cell is associated with a CU and a DU. There is an F1 interface between the DU and the CU. For example, in the embodiments of Figure 13 related to an MCG LTM procedure, BS 1304 is an MCG BS (e.g. MCG gNB). In some implementations, UE 1301 may send the measurement report to source CU 1303 via source DU 1302.

[0211] In operation 132, source CU 1303 of serving BS 1304 (MCG or SCG) may determine to initiate a L1/L2 based inter-cell mobility configuration procedure, i.e., making a L1/L2 based inter-cell mobility configuration decision.

[0212] In operation 133, source CU 1303 may transmit a handover request for LTM preparation to candidate CU 1306 of BS 1307 (e.g. BS #2 as described in the embodiments of Figure 9).

[0213] For instance, in some embodiments, the handover request in operation 133 may include at least one of the following information:

- (1) Information to request BS 1307 to provide a candidate cell list, wherein UE 1301 can acquire a TA value for a candidate cell within the candidate cell list by performing the UE based TA measurement when the LTM cell switch is executed from the source cell of BS 1304 to the candidate cell within the candidate cell list. For instance, this information is for requesting a candidate gNB or CU to provide a candidate cell list on which a UE can get a TA value via a UE based measurement TA for this candidate cell included in the handover request.
- (2) Information to request BS 1307 to indicate whether a candidate cell (e.g., candidate cell #2 as described in the embodiments of Figure 9) of BS 1307 has a same candidate DU as one or more candidate cells of BS 1307 (e.g., one or more candidate cells configured to UE 1301), wherein UE 1301 can acquire a TA value for candidate cell #2 by performing the UE based TA measurement when the LTM cell switch is executed from the source cell of BS 1304 to candidate cell #2 of BS 1307. For example, if candidate cell #2 has the same candidate DU as the one or more candidate cells of BS 1307, the handover

request further includes ID information of candidate cell #2. For instance, this information is for requesting a candidate gNB or CU to indicate whether the candidate cell has the same candidate DU as the candidate cell for this UE. If the candidate has the same candidate DU as the candidate cell, the cell ID may be provided by the candidate gNB or CU as well. The cell ID can be a physical cell identifier (PCI).

- (3) Information to request BS 1307 to provide ID information of a candidate DU (e.g., candidate DU 1305) related to candidate cell #2. For instance, this information is for requesting a target gNB or CU to provide an ID of the candidate DU that is related to a candidate cell. The target gNB or CU may provide an ID or index of the candidate DU. Then, the source gNB or CU can differentiate whether the candidate cell is the same as or different from the candidate cell.
- (4) An ID range for UE measured TA reserved for the one or more candidate cells of BS 1307 (e.g., one or more candidate cells configured to UE 1301). For instance, a source gNB or CU transmits the reserved ID range of UE measured TA to each candidate gNB. Each candidate gNB can set the ID for each candidate cell belonging to this gNB.

[0214] In some embodiments, the handover request in operation 133 may include at least one of the following information:

- (1) Information to request BS 1307 to provide a candidate cell list, wherein UE 1301 does not perform an L2 reset for each candidate cell within the candidate cell list when UE 1301 performs the LTM cell switch from the source cell of BS 1304 to the each candidate cell within the candidate cell list. For instance, this information is for requesting a target gNB or CU to provide a candidate cell list on which a UE can perform no reset for this candidate cell included in the handover request.
- (2) Information to request BS 1307 to indicate whether a candidate cell (e.g., candidate cell #3 as described in the embodiments of Figure 9) of BS 1307 has a same candidate DU as one or more candidate cells of BS 1307 (e.g., candidate cell(s) configured for UE 1301), wherein UE 1301 does not perform the L2 reset for candidate cell #3 when UE 1301 performs the LTM cell switch from the source cell of BS 1304 to candidate cell #3. For example, if candidate cell #3 has the same candidate DU as the one or more candidate cells of BS 1307, the handover request further includes ID information of candidate cell

#3. For instance, this information is for requesting a target gNB or CU to provide information of the candidate DU related to the candidate cell. The target gNB or CU may provide an ID or index of the candidate DU. Then, a source gNB can differentiate whether the candidate cell is the same as or different from the candidate cell.

- (3) Information to request BS 1307 to provide ID information of a candidate DU related to candidate cell #3. For instance, this information is for requesting a target gNB or CU to indicate whether the candidate cell has the same candidate DU as the prepared candidate cell for this UE. If the candidate has the same candidate DU as the candidate cell, the cell ID should be provided by the target gNB or CU as well. The cell ID can be PCI.
- (4) An ID range of a set of candidate cells reserved for the No L2 reset. For instance, a source gNB transmits the reserved ID range of UE based measurement TA to each candidate gNB. Each candidate gNB can set the ID for each candidate cell belonging to this gNB.

[0215] The handover request in operation 133 may include all or a part of the elements described above in different embodiments.

[0216] In operation 134, candidate CU 1306 may inform candidate DU(s) (e.g., candidate DU 1305) associated with candidate cell(s) to prepare the configuration(s).

[0217] In operation 135, candidate CU 1306 (i.e., target CU 1306) may transmit RS configuration(s) of its candidate DU(s) (including candidate DU 1305) to source CU 1303.

[0218] In operation 136, source CU 1303 may transmit, to each candidate DU (including candidate DU 1305) (i.e., all candidate DU(s) of BS 1307 and other candidate BS(s) not shown in Figure 13), the RS configuration(s) of serving DU 1302 (if this is an LTM candidate cell) and/or the RS configuration(s) of other candidate DU(s) (including of other candidate DU(s) of other candidate BS(s) not shown in Figure 13), to generate the corresponding L1 configuration(s) for LTM.

[0219] In operation 137, candidate DU 1305 may generate the RS configuration(s) and send the RS configuration(s) to source CU 1303 via candidate CU 1306.

[0220] In operation 138, source CU 1303 may transmit, to source DU 1302, the RS configuration(s) per an LTM candidate cell and RACH resource(s) for early TA acquisition (when source CU 1303 receives LTM candidate configuration(s) from candidate DU 1305).

[0221] In operation 139, candidate CU 1306 may transmit a response to source CU 1303 via an Xn interface. The response in operation 139 may include elements corresponding to the elements in the handover request in operation 133.

[0222] For instance, in some embodiments, the response in operation 139 may include at least one of the following information:

- (1) a candidate cell list, wherein UE 1301 can acquire a TA value for a candidate cell within the candidate cell list by performing the UE based TA measurement when the LTM cell switch is executed from the source cell of BS 1304 to the candidate cell within the candidate cell list.
- (2) Information to indicate whether a candidate cell (e.g., candidate cell #4 as described in the embodiments of Figure 9) of BS 1307 has a same candidate DU as one or more candidate cells of BS 1307 (e.g., candidate cell(s) configured for UE 1301), wherein UE 1301 can acquire a TA value for candidate cell #4 by performing the UE based TA measurement when the LTM cell switch is executed from the source cell of BS 1304 to candidate cell #4. In an implementation, if candidate cell #4 has the same candidate DU as the one or more candidate cells of BS 1307, the response further includes ID information of candidate cell #4.
- (3) ID information of a candidate DU related to candidate cell #4.
- (4) An ID range for UE measured TA reserved for the one or more candidate cells of BS 1307.

[0223] In some embodiments, the response in operation 139 may include at least one of the following information:

- (1) A candidate cell list, wherein UE 1301 does not perform an L2 reset for each candidate cell within the candidate cell list when UE 1301 performs the LTM cell switch from the source cell of BS 1304 to the each candidate cell within the candidate cell list.

(2) Information to indicate whether a candidate cell (e.g., candidate cell #5 as described in the embodiments of Figure 9) of BS 1307 has a same candidate DU as one or more candidate cells of BS 1307 (e.g., candidate cell(s) configured for UE 1301), wherein UE 1301 does not perform the L2 reset for candidate cell #5 when UE 1301 performs the LTM cell switch from the source cell of BS 1304 to candidate cell #5. In an implementation, if candidate cell #5 has the same candidate DU as the one or more candidate cells of BS 1307, the response further includes ID information of candidate cell #5.

(3) ID information of a candidate DU related to candidate cell #5.

(4) An ID range of a set of candidate cells reserved for the No L2 reset.

[0224] The response in operation 139 may include all or a part of the elements described above in different embodiments.

[0225] In operation 140, candidate CU 1306 (i.e., target CU 1306) may transmit the following information associated with the candidate cell(s) to source CU 1303:

(1) An RACH resource for an early TA acquisition and the corresponding candidate cell(s) from candidate DU(s) (e.g., candidate DU 1305).

(2) Reference signal (RS) configuration(s).

[0226] In operation 141, source CU 1303 transmits the LTM cell configuration(s) to UE 1301 via source DU 1302. For instance, BS 1304 may generate an RRC reconfiguration message based on the configuration(s) from the candidate cell(s) and transmit the RRC reconfiguration message to UE 1301 in operation 141. The RRC reconfiguration message may include candidate cell configuration(s) for LTM. In some embodiments, source DU 1302 may transmit an MAC CE to activate TCI state (beam) for some candidate cell(s).

[0227] In operation 142, source DU 1302 may transmit an LTM cell switch command to UE 1301. The LTM cell switch command may include a candidate cell (e.g., candidate cell #1) belonging to candidate DU 1305, i.e., a different DU from source DU 1302. Then, UE 1301 may perform a cell switch towards candidate cell #1 in response to the reception of the LTM cell switch command.

[0228] In operation 143, source DU 1302 may transmit at least one of the following information to source CU 1303 via an F1 interface. The F1 message could be an RRC Message Transfer message, an RRC DELIVERY REPORT message or a UE CONTEXT MODIFICATION REQUIRED message.

- (1) activated TCI state(s) of one or more candidate cells (e.g., candidate cell(s) other than candidate cell #1);
- (2) RACH resource(s) for early TA acquisition of one or more candidate cells (e.g., candidate cell(s) other than candidate cell #1); or
- (3) early TA value(s) and/or remaining value for TAT(s) of one or more candidate cells (e.g., candidate cell(s) other than candidate cell #1). For example, source DU 1302 may receive the early TA value(s) of the one or more candidate cells from the candidate DU(s) via source CU 1303.

[0229] In operation 144, source CU 1303 may transfer at least one of the received information and/or additional information to candidate CU 1306. For instance, source CU 1303 may transmit at least one of the following information to candidate CU 1306:

- (1) activated TCI state(s) of one or more candidate cells (e.g., candidate cell(s) other than candidate cell #1);
- (2) RACH resource(s) for early TA acquisition of one or more candidate cells (e.g., candidate cell(s) other than candidate cell #1);
- (3) early TA value(s) and/or remaining value for TAT(s) of one or more candidate cells (e.g., candidate cell(s) other than candidate cell #1). For example, source DU 1302 may receive the early TA value(s) of the one or more candidate cells from the candidate DU(s) via source CU 1303;
- (4) LTM channel state information (CSI) resource configuration(s);
- (5) UE Measured TA ID(s) for all candidate cell(s) (e.g., candidate cell(s) other than candidate cell #1); or
- (6) Noreset ID(s) for all candidate cell(s) (e.g., candidate cell(s) other than candidate cell #1).

[0230] In operation 145, candidate CU 1306 may transfer at least one of the received information and/or additional information to candidate DU(s) (e.g., candidate DU 1305 of the candidate (new serving) cell) via an F1 interface. The F1 message could be an RRC Message Transfer message, an RRC DELIVERY REPORT message, or a UE CONTEXT MODIFICATION REQUEST message.

[0231] For instance, candidate DU 1305 serving candidate cell#1 to which UE 1301 switches will receive at least one of the following information from candidate CU 1306:

- (1) activated TCI state(s) of one or more candidate cells (e.g., candidate cell(s) other than candidate cell #1);
- (2) RACH resource(s) for early TA acquisition of one or more candidate cells (e.g., candidate cell(s) other than candidate cell #1);
- (3) early TA value(s) and/or remaining value for TAT(s) of one or more candidate cells (e.g., candidate cell(s) other than candidate cell #1). For example, source DU 1302 may receive the early TA value(s) of the one or more candidate cells from the candidate DU(s) via source CU 1303;
- (4) LTM CSI resource configuration(s);
- (5) UE Measured TA ID(s) for all candidate cell(s) (e.g., candidate cell(s) other than candidate cell #1); or
- (6) Noreset ID(s) for all candidate cell(s) (e.g., candidate cell(s) other than candidate cell #1).

[0232] 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 first centralized unit (CU) of a first 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 first CU to:
 - receive, from a source distributed unit (DU) of the first BS, first information related to one or more candidate cells associated with a lower layer-triggered mobility (LTM) cell switch of a user equipment (UE) from a source cell of the source DU towards a first candidate cell; and
 - transmit both second information related to the one or more candidate cells and the received first information to a candidate DU of the first BS or to a second CU of a second BS, wherein the first candidate cell is related to the candidate DU or the second CU.
2. The first CU of Claim 1, wherein the first candidate cell is a candidate primary cell (PCell) or a candidate primary secondary cell group cell (PSCell).
3. The first CU of Claim 1, wherein the first information includes at least one of the following:
 - activated transmission configuration indication (TCI) state information associated with the one or more candidate cells;
 - random access channel (RACH) resource information for an early timing advance (TA) acquisition associated with the one or more candidate cells;
 - one or more early TA values associated with the one or more candidate cells;
 - remaining length information of a time alignment timer (TAT) for the one or more early TA values;
 - identifier (ID) information of the one or more candidate cells;
 - ID information of the first candidate cell; or
 - ID information of the UE.
4. The first CU of Claim 1, wherein the second information includes at least one of the following:
 - one or more early TA values associated with the one or more candidate cells;

remaining length information of a time alignment timer (TAT) for the one or more early TA values;

LTM channel state information (CSI) resource configuration information;

a UE measured TA ID for the one or more candidate cells; or

No Layer-2 (L2) reset ID for the one or more candidate cells.

5. The first CU of Claim 1, wherein the first information and the second information are received or transmitted via at least one of the following:
 - a radio resource control (RRC) message transfer message;
 - an RRC delivery report message;
 - a UE context modification required message; or
 - a UE context modification request message.
6. The first CU of Claim 1 or Claim 5, wherein the first information is received after the source DU is configured to transmit an LTM cell switch command for triggering the LTM cell switch to the UE.
7. The first CU of Claim 1 or Claim 5, wherein the first information and the second information are transmitted after the first CU receives an indication of completing the LTM cell switch.
8. A source distributed unit (DU) of a first 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 source DU to:
 - determine to trigger a user equipment (UE) to perform a lower layer-triggered mobility (LTM) cell switch from a source cell of the source DU towards a first candidate cell; and
 - transmit first information related to one or more candidate cells associated with the LTM cell switch to a first centralized unit (CU) of the first BS, wherein the first candidate cell is related to a candidate DU of the first BS or a second CU of a second BS.
9. The source DU of Claim 8, wherein the first candidate cell is a candidate primary cell

(PCell) or a candidate primary secondary cell group cell (PSCell).

10. The source DU of Claim 8, wherein the first information includes at least one of the following:

activated transmission configuration indication (TCI) state information associated with the one or more candidate cells;

random access channel (RACH) resource information for an early timing advance (TA) acquisition associated with the one or more candidate cells;

one or more early TA values associated with the one or more candidate cells;

remaining length information of a time alignment timer (TAT) for the one or more early TA values;

identifier (ID) information of the one or more candidate cells;

ID information of the first candidate cell; or

ID information of the UE.

11. The source DU of Claim 8, wherein the first information is transmitted via at least one of the following:

a radio resource control (RRC) message transfer message;

an RRC delivery report message; or

a UE context modification required message.

12. A second centralized unit (CU) of a second 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 second CU to:

receive, from a first CU of a first BS, information related to one or more candidate cells associated with a lower layer-triggered mobility (LTM) cell switch of a user equipment (UE) from a source cell of a source distributed unit (DU) of the first BS towards a first candidate cell; and

transmit the received information to a candidate DU of the second BS, wherein the first candidate cell is related to the candidate DU, and wherein the received information includes:

first information transmitted from the source DU to the first CU; and

second information transmitted from the first CU.

13. The second CU of Claim 12, wherein the first candidate cell is a candidate primary cell (PCell) or a candidate primary secondary cell group cell (PSCell).
14. The second CU of Claim 12, wherein the first information includes at least one of the following:
 - activated transmission configuration indication (TCI) state information associated with the one or more candidate cells;
 - random access channel (RACH) resource information for an early timing advance (TA) acquisition associated with the one or more candidate cells;
 - one or more early TA values associated with the one or more candidate cells;
 - remaining length information of a time alignment timer (TAT) for the one or more early TA values;
 - identifier (ID) information of the one or more candidate cells;
 - ID information of the first candidate cell; or
 - ID information of the UE.
15. The second CU of Claim 12, wherein the second information includes at least one of the following:
 - one or more early TA values associated with the one or more candidate cells;
 - remaining length information of a time alignment timer (TAT) for the one or more early TA values;
 - LTM channel state information (CSI) resource configuration information;
 - a UE measured TA ID for the one or more candidate cells; or
 - No Layer-2 (L2) reset ID for the one or more candidate cells.
16. The second CU of Claim 12, wherein the information is received via at least one of the following:
 - an RRC message transfer message;
 - an RRC delivery report message; or
 - a UE context modification request message.
17. A processor for wireless communication, comprising:

at least one controller coupled with at least one memory and configured to cause the processor to:

receive, from a source distributed unit (DU) of a first base station (BS), first information related to one or more candidate cells associated with a lower layer-triggered mobility (LTM) cell switch of a user equipment (UE) from a source cell of the source DU towards a first candidate cell; and

transmit both second information related to the one or more candidate cells and the received first information to a candidate DU of the first BS or to a second centralized unit (CU) of a second BS, wherein the first candidate cell is related to the candidate DU or the second CU.

18. A processor for wireless communication, comprising:

at least one controller coupled with at least one memory and configured to cause the processor to:

determine to trigger a user equipment (UE) to perform a lower layer-triggered mobility (LTM) cell switch from a source cell of a source distributed unit (DU) of a first base station (BS) towards a first candidate cell; and

transmit first information related to one or more candidate cells associated with the LTM cell switch to a first centralized unit (CU) of the first BS, wherein the first candidate cell is related to a candidate DU of the first BS or a second CU of a second BS.

19. A processor for wireless communication, comprising:

at least one controller coupled with at least one memory and configured to cause the processor to:

receive, from a first centralized unit (CU) of a first base station (BS), information related to one or more candidate cells associated with a lower layer-triggered mobility (LTM) cell switch of a user equipment (UE) from a source cell of a source distributed unit (DU) of the first BS towards a first candidate cell; and

transmit the received information to a candidate DU of the second BS, wherein the first candidate cell is related to the candidate DU, and wherein the received information includes:

first information transmitted from the source DU to the first CU; and

second information transmitted from the first CU.

20. A method performed by a first centralized unit (CU) of a first base station (BS), comprising:

receiving, from a source distributed unit (DU) of the first BS, first information related to one or more candidate cells associated with a lower layer-triggered mobility (LTM) cell switch of a user equipment (UE) from a source cell of the source DU towards a first candidate cell; and

transmitting both second information related to the one or more candidate cells and the received first information to a candidate DU of the first BS or to a second CU of a second BS, wherein the first candidate cell is related to the candidate DU or the second CU.