

SIMULTANEOUS CONFIGURATION FOR PCELL CHANGE AND PSCell ADDITION/CHANGE

TECHNICAL FIELD

[0001] The present disclosure relates to wireless communications, and more specifically to
5 a user equipment (UE), a master node (MN), a secondary node (SN), methods, apparatuses,
and computer readable medium for simultaneous configuration for primary cell (PCell)
change and primary secondary cell (PSCell) addition or change.

BACKGROUND

[0002] A wireless communications system may include one or multiple network
10 communication devices, such as base stations, which may be otherwise known as an eNodeB
(eNB), a next-generation NodeB (gNB), or other suitable terminology. Each network
communication devices, such as a base station 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
15 wireless communications with one or multiple user communication devices by utilizing
resources of the wireless communication system (e.g., time resources (e.g., symbols, slots,
subframes, frames, or the like) or frequency resources (e.g., subcarriers, carriers).
Additionally, the wireless communications system may support wireless communications
across various radio access technologies including third generation (3G) radio access
20 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)).

[0003] In the third generation partner project (3GPP), a work item on further new radio (NR)
mobility enhancements, named as layer 1/layer 2 triggered mobility (LTM), was approved to
25 change a serving cell via layer 1/layer 2 (L1/L2) signalling. LTM is a cell switch procedure
that the network triggers via a medium access control (MAC) control element (CE) based on
L1 measurements, in order to reduce the latency, overhead, and interruption time. It is
agreed that during a network triggered layer 3 (L3) handover or PSCell change, the UE does
not autonomously release the LTM configuration. However, PCell change and PSCell
30 addition/change may occur simultaneously, details of which should be studied.

SUMMARY

[0004] The present disclosure relates to a UE, an MN, an SN, methods, apparatuses, processors, and computer readable medium for simultaneous configuration for PCell change and PSCell addition/change. According to the proposed solution, the UE behavior is defined in case PCell change and PSCell addition/change occur simultaneously.

[0005] In some implementations, there is provided a UE. The UE comprises at least one memory; and at least one processor coupled with the at least one memory and configured to cause the UE to: receive, from an MN, a first configuration related to a PCell change; receive, from the MN or an SN, a second configuration related to a PSCell addition or PSCell change; and in accordance with a determination that the PCell change is triggered, perform a first operation; or in accordance with a determination that the PSCell addition or PSCell change is triggered, perform a second operation.

[0006] In some implementations, there is provided an MN. The MN comprises at least one memory; and at least one processor coupled with the at least one memory and configured to cause the MN to: transmit, to a UE, a first configuration related to a PCell change, wherein the UE is further configured with a second configuration related to a PSCell addition or PSCell change; and receive, from the UE, a report indicating that the PCell change or the PSCell addition or PSCell change is performed.

[0007] In some implementations, there is provided an SN. The SN comprises at least one memory; and at least one processor coupled with the at least one memory and configured to cause the SN to: transmit, to a UE, a second configuration related to a PSCell change, wherein the UE is further configured with a first configuration related to a PCell change; and receive, from the UE, a report indicating that the PCell change or the PSCell change is performed.

[0008] In some implementations, there is provided a method performed by the UE. The method comprises: receiving, from an MN, a first configuration related to a PCell change; receiving, from the MN or an SN, a second configuration related to a PSCell addition or PSCell change; and in accordance with a determination that the PCell change is triggered, performing a first operation; or in accordance with a determination that the PSCell addition or PSCell change is triggered, performing a second operation.

[0009] In some implementations, there is provided a method performed by the MN. The method comprises: transmitting, to a UE, a first configuration related to a PCell change, wherein the UE is further configured with a second configuration related to a PSCell addition

or PSCell change; and receiving, from the UE, a report indicating that the PCell change or the PSCell addition or PSCell change is performed.

[0010] In some implementations, there is provided a method performed by the SN. The method comprises: transmitting, to a UE, a second configuration related to a PSCell change, wherein the UE is further configured with a first configuration related to a PCell change; and receiving, from the UE, a report indicating that the PCell change or the PSCell change is performed.

[0011] In some implementations, there is provided a processor for wireless communication. The processor comprises at least one controller coupled with at least one memory and configured to cause the processor to: receive, from an MN, a first configuration related to a PCell change; receive, from the MN or an SN, a second configuration related to a PSCell addition or PSCell change; and in accordance with a determination that the PCell change is triggered, perform a first operation; or in accordance with a determination that the PSCell addition or PSCell change is triggered, perform a second operation.

[0012] In some implementations, there is provided a processor for wireless communication. The processor comprises at least one controller coupled with at least one memory and configured to cause the processor to: transmit, to a UE, a first configuration related to a PCell change, wherein the UE is further configured with a second configuration related to a PSCell addition or PSCell change; and receive, from the UE, a report indicating that the PCell change or the PSCell addition or PSCell change is performed.

[0013] In some implementations, there is provided a processor for wireless communication. The processor comprises at least one controller coupled with at least one memory and configured to cause the processor to: transmit, to a UE, a second configuration related to a PSCell change, wherein the UE is further configured with a first configuration related to a PCell change; and receive, from the UE, a report indicating that the PCell change or the PSCell change is performed.

[0014] In some implementations of the methods and the UE described herein, further comprising: in accordance with a determination that an execution condition of a candidate cell for the conditional handover (CHO) procedure is met, determining that the PCell change is triggered, wherein the first operation comprises one of: performing the CHO procedure towards the candidate cell; transmitting, to the SN, a first report indicating that the execution condition of the candidate cell for the CHO procedure is met; ignoring a secondary cell group

(SCG) LTM command during the CHO procedure; or releasing the second configuration of the LTM procedure for SCG.

[0015] In some implementations of the methods and the UE described herein, further comprising: in accordance with a determination that the CHO procedure is completed,
5 transmitting, to the SN, a second report indicating that the CHO procedure is completed.

[0016] In some implementations of the methods and the UE described herein, further comprising: in accordance with a determination that an SCG LTM command indicating a candidate cell is received, determining that the PSCell change is triggered, and wherein the second operation comprises one of: performing the LTM procedure for SCG towards the
10 candidate cell; stopping evaluating execution conditions for the CHO procedure; not executing the CHO procedure if an execution condition for the CHO procedure is met; or suspending the CHO procedure until the LTM procedure for SCG is completed.

[0017] In some implementations of the methods and the UE described herein, further comprising: in accordance with a determination that an LTM cell switch command for master
15 cell group (MCG) is received from the MN, determining that the PCell change is triggered, and wherein the first operation comprises one of: performing the MCG LTM procedure based on the LTM cell switch command for MCG; stopping evaluating conditions for the PSCell addition or PSCell change; releasing the second configuration of the PSCell addition or PSCell change; or performing both the MCG LTM procedure and the PSCell addition or
20 PSCell change in response to a condition of a candidate cell for the PSCell addition or PSCell change is met.

[0018] In some implementations of the methods and the UE described herein, the first operation further comprises: continuing evaluating conditions for the subsequent CPC procedure after the MCG LTM procedure is completed.

[0019] In some implementations of the methods and the UE described herein, further comprising: in accordance with a determination that a condition of a candidate cell for the PSCell addition or PSCell change is met, determining that the PSCell addition or PSCell
25 change is triggered, and wherein the second operation comprises one of: performing the PSCell addition or PSCell change for the candidate cell; ignoring an LTM cell switch command for MCG during the PSCell addition or PSCell change; transmitting, to the MN, a
30 third report indicating that the condition for the PSCell addition or PSCell change is met; releasing the first configuration of the MCG LTM procedure; or performing both the MCG

LTM procedure and the PSCell addition or PSCell change in response to receiving an LTM cell switch command for MCG from the MN.

[0020] In some implementations of the methods and the UE described herein, the second operation further comprises: transmitting, to the MN, an indication indicating that the LTM cell switch command for MCG is ignored due to an execution of the PSCell addition or PSCell change.

[0021] In some implementations of the methods and the MN described herein, further comprising: transmitting, to the UE, the second configuration related to the PSCell addition or PSCell change.

10 [0022] In some implementations of the methods and the MN described herein, further comprising: releasing the first configuration of the MCG LTM procedure, in response to the report being a third report indicating that the condition for the PSCell addition or PSCell change is met.

15 [0023] In some implementations of the methods and the MN described herein, further comprising: transmitting, to the UE, an LTM cell switch command for MCG; and receiving, from the UE, an indication indicating that the LTM cell switch command for MCG is ignored due to an execution of the PSCell addition or PSCell change.

20 [0024] In some implementations of the methods and the SN described herein, further comprising: receiving, from the UE, a second report indicating that the CHO procedure is completed.

[0025] In some implementations of the methods, the UE, the MN, and the SN described herein, the PCell change is a CHO procedure and the PSCell change is an LTM procedure for SCG.

25 [0026] In some implementations of the methods, the UE, the MN, and the SN described herein, the first report indicates a time duration for the CHO procedure.

[0027] In some implementations of the methods, the UE, the MN, and the SN described herein, the PCell change is a master cell group (MCG) LTM procedure, the PSCell addition is a conditional PSCell addition (CPA) procedure, and the PSCell change is one of: a conditional PSCell change (CPC) procedure, or the subsequent CPC procedure.

30 BRIEF DESCRIPTION OF THE DRAWINGS

- [0028] FIG. 1 illustrates an example of a wireless communications system in which some embodiments of the present disclosure can be implemented;
- [0029] FIG. 2A illustrates an overall procedure for LTM;
- [0030] FIG. 2B illustrates a schematic diagram of an example communication network in
5 which some embodiments of the present disclosure can be implemented;
- [0031] FIG. 3 illustrates a signalling chart illustrating a communication process in accordance with some example embodiments of the present disclosure;
- [0032] FIG. 4 illustrates a signalling chart illustrating a communication process in accordance with some example embodiments of the present disclosure;
- 10 [0033] FIG. 5 illustrates a signalling chart illustrating a communication process in accordance with some example embodiments of the present disclosure;
- [0034] FIG. 6A illustrates a schematic diagram of an example communication network in which some embodiments of the present disclosure can be implemented;
- [0035] FIG. 6B illustrates a signalling chart illustrating a communication process in
15 accordance with some example embodiments of the present disclosure;
- [0036] FIG. 7 illustrates an example of a device that is suitable for implementing embodiments of the present disclosure;
- [0037] FIG. 8 illustrates an example of a processor that is suitable for implementing some embodiments of the present disclosure;
- 20 [0038] FIG. 9 illustrates a flowchart of an example method implemented at a UE in accordance with aspects of the present disclosure;
- [0039] FIG. 10 illustrates a flowchart of an example method implemented at an MN in accordance with aspects of the present disclosure; and
- [0040] FIG. 11 illustrates a flowchart of an example method implemented at an SN in
25 accordance with aspects of the present disclosure.
- [0041] Throughout the drawings, the same or similar reference numerals represent the same or similar element.

DETAILED DESCRIPTION

[0042] Principles of the present disclosure will now be described with reference to some

embodiments. It is to be understood that these embodiments are described only for the purpose of illustration and help those skilled in the art to understand and implement the present disclosure, without suggesting any limitation as to the scope of the disclosure. The disclosure described herein can be implemented in various manners other than the ones
5 described below. In the following description and claims, unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skills in the art to which this disclosure belongs.

[0043] References in the present disclosure to “one embodiment,” “an example embodiment,” “an embodiment,” “some embodiments,” and the like indicate that the
10 embodiment(s) described may include a particular feature, structure, or characteristic, but it is not necessary that every embodiment includes the particular feature, structure, or characteristic. Moreover, such phrases do not necessarily refer to the same embodiment(s). Further, when a particular feature, structure, or characteristic is described in connection with an embodiment, it is submitted that it is within the knowledge of one skilled in the art to
15 affect such feature, structure, or characteristic in connection with other embodiments whether or not explicitly described.

[0044] It shall be understood that although the terms “first” and “second” or the like may be used herein to describe various elements, these elements should not be limited by these terms. These terms are only used to distinguish one element from another element. For
20 example, a first element could also be termed as a second element, and similarly, a second element could also be termed as a first element, without departing from the scope of embodiments. As used herein, the term “and/or” includes any and all combinations of one or more of the listed terms. In some examples, values, procedures, or apparatuses are referred to as “best,” “lowest,” “highest,” “minimum,” “maximum,” or the like. It will be
25 appreciated that such descriptions are intended to indicate that a selection among many used functional alternatives can be made, and such selections need not be better, smaller, higher, or otherwise preferable to other selections.

[0045] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of embodiments. As used herein, the singular forms
30 “a,” “an” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms “comprises,” “comprising,” “has,” “having,” “includes” and/or “including,” when used herein, specify the presence of stated features, elements, components and/or the like, but do not preclude the presence or

addition of one or more other features, elements, components and/or combinations thereof. For example, the term “includes” and its variants are to be read as open terms that mean “includes, but is not limited to.” The term “based on” is to be read as “based at least in part on.” The term “one embodiment” and “an embodiment” are to be read as “at least one embodiment.” The term “another embodiment” is to be read as “at least one other embodiment.” The use of an expression such as “A and/or B” can mean either “only A” or “only B” or “both A and B.” Other definitions, explicit and implicit, may be included below.

[0046] FIG. 1 illustrates an example of a wireless communications system 100 in which some embodiments of the present disclosure can be implemented. The wireless communications system 100 may include one or more network entities 102 (also referred to as network equipment (NE)), one or more UEs 104, a core network (CN) 106, and a packet data network 108. 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 a long term evolution (LTE) network or an LTE-Advanced (LTE-A) network. In some other implementations, the wireless communications system 100 may be a 5G network, such as a new radio (NR) 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. 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.

[0047] The one or more network entities 102 may be dispersed throughout a geographic region to form the wireless communications system 100. One or more of the network entities 102 described herein may be or include or may be referred to as a network node, a base station, a network element, a radio access network (RAN), a base transceiver station, an access point, a NodeB, an eNodeB (eNB), a next-generation NodeB (gNB), or other suitable terminology. A network entity 102 and a UE 104 may communicate via a communication link 110, which may be a wireless or wired connection. For example, a network entity 102 and a UE 104 may perform wireless communication (e.g., receive signaling, transmit signaling) over a Uu interface.

[0048] A network entity 102 may provide a geographic coverage area 112 for which the

network entity 102 may support services (e.g., voice, video, packet data, message, broadcast, etc.) for one or more UEs 104 within the geographic coverage area 112. For example, a network entity 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
5 multiple radio access technologies. In some implementations, a network entity 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 112 may be associated with different network entities 102. Information and signals
10 described herein may be represented using any of a variety of different technologies and techniques. For example, data, instructions, commands, information, signals, bits, symbols, and chips that may be referenced throughout the description may be represented by voltages, currents, electromagnetic waves, magnetic fields or particles, optical fields or particles, or any combination thereof.

15 **[0049]** The one or more UEs 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 mobile device, a wireless device, a remote device, a remote unit, a handheld device, or a subscriber 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.
20 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. In some implementations, a UE 104 may be stationary in the wireless communications system 100. In some other implementations, a UE 104 may be mobile in the wireless communications system 100.

25 **[0050]** The one or more UEs 104 may be devices in different forms or having different capabilities. Some examples of UEs 104 are illustrated in FIG. 1. A UE 104 may be capable of communicating with various types of devices, such as the network entities 102, other UEs 104, or network equipment (e.g., the CN 106, the packet data network 108, a relay device, an integrated access and backhaul (IAB) node, or another network equipment), as
30 shown in FIG. 1. Additionally, or alternatively, a UE 104 may support communication with other network entities 102 or UEs 104, which may act as relays in the wireless communications system 100.

[0051] A UE 104 may also be able to support wireless communication directly with other

UEs 104 over a communication link 114. 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
5 may be referred to as a sidelink (SL). For example, a UE 104 may support wireless communication directly with another UE 104 over a PC5 interface.

[0052] A network entity 102 may support communications with the CN 106, or with another network entity 102, or both. For example, a network entity 102 may interface with the CN 106 through one or more backhaul links 116 (e.g., via an S1, N2, N3, or another network
10 interface). The network entities 102 may communicate with each other over the backhaul links 116 (e.g., via an X2, Xn, or another network interface). In some implementations, the network entities 102 may communicate with each other directly (e.g., between the network entities 102). In some other implementations, the network entities 102 may communicate with each other or indirectly (e.g., via the CN 106). In some implementations, one or more
15 network entities 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).

20 [0053] In some implementations, a network entity 102 may be configured in a disaggregated architecture, which may be configured to utilize a protocol stack physically or logically distributed among two or more network entities 102, such as an integrated access backhaul (IAB) network, an open RAN (O-RAN) (e.g., a network configuration sponsored by the O-RAN Alliance), or a virtualized RAN (vRAN) (e.g., a cloud RAN (C-RAN)). For
25 example, a network entity 102 may include one or more of a central unit (CU), a distributed unit (DU), a radio unit (RU), a RAN Intelligent Controller (RIC) (e.g., a Near-Real Time RIC (Near-RT RIC), a Non-Real Time RIC (Non-RT RIC)), a Service Management and Orchestration (SMO) system, or any combination thereof.

[0054] An RU may also be referred to as a radio head, a smart radio head, a remote radio
30 head (RRH), a remote radio unit (RRU), or a transmission reception point (TRP). One or more components of the network entities 102 in a disaggregated RAN architecture may be co-located, or one or more components of the network entities 102 may be located in distributed locations (e.g., separate physical locations). In some implementations, one or

more network entities 102 of a disaggregated RAN architecture may be implemented as virtual units (e.g., a virtual CU (VCU), a virtual DU (VDU), a virtual RU (VRU)).

[0055] Split of functionality between a CU, a DU, and an RU may be flexible and may support different functionalities depending upon which functions (e.g., network layer
5 functions, protocol layer functions, baseband functions, radio frequency functions, and any combinations thereof) are performed at a CU, a DU, or an RU. For example, a functional split of a protocol stack may be employed between a CU and a DU such that the CU may support one or more layers of the protocol stack and the DU may support one or more different layers of the protocol stack. In some implementations, the CU may host upper
10 protocol layer (e.g., a layer 3 (L3), a layer 2 (L2)) functionality and signaling (e.g., Radio Resource Control (RRC), service data adaptation protocol (SDAP), Packet Data Convergence Protocol (PDCP)). The CU may be connected to one or more DUs or RUs, and the one or more DUs or RUs may host lower protocol layers, such as a layer 1 (L1) (e.g., physical (PHY) layer) or an L2 (e.g., radio link control (RLC) layer, medium access control (MAC) layer)
15 functionality and signaling, and may each be at least partially controlled by the CU.

[0056] Additionally, or alternatively, a functional split of the protocol stack may be employed between a DU and an RU such that the DU may support one or more layers of the protocol stack and the RU may support one or more different layers of the protocol stack. The DU may support one or multiple different cells (e.g., via one or more RUs). In some
20 implementations, a functional split between a CU and a DU, or between a DU and an RU may be within a protocol layer (e.g., some functions for a protocol layer may be performed by one of a CU, a DU, or an RU, while other functions of the protocol layer are performed by a different one of the CU, the DU, or the RU).

[0057] A CU may be functionally split further into CU control plane (CU-CP) and CU user plane (CU-UP) functions. A CU may be connected to one or more DUs via a midhaul communication link (e.g., F1, F1-C, F1-U), and a DU may be connected to one or more RUs via a fronthaul communication link (e.g., open fronthaul (FH) interface). In some implementations, a midhaul communication link or a fronthaul communication link may be implemented in accordance with an interface (e.g., a channel) between layers of a protocol
30 stack supported by respective network entities 102 that are in communication via such communication links.

[0058] 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 network entities 102 associated with the CN 106.

10 [0059] The CN 106 may communicate with the packet data network 108 over one or more backhaul links 116 (e.g., via an S1, N2, N3, or another network interface). The packet data network 108 may include an application server 118. In some implementations, one or more UEs 104 may communicate with the application server 118. A UE 104 may establish a session (e.g., a protocol data unit (PDU) session, or the like) with the CN 106 via a network entity 102. The CN 106 may route traffic (e.g., control information, data, and the like) between the UE 104 and the application server 118 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).

20 [0060] In the wireless communications system 100, the network entities 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 network entities 102 and the UEs 104 may support different resource structures. For example, the network entities 102 and the UEs 104 may support different frame structures. In some implementations, such as in 4G, the network entities 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 network entities 102 and the UEs 104 may support various frame structures (i.e., multiple frame structures). The network entities 102 and the UEs 104 may support various frame structures based on one or more numerologies.

30 [0061] 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 (CP). 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
5 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.

[0062] A time interval of a resource (e.g., a communication resource) may be organized
10 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
15 frame may have the same duration.

[0063] 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
20 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
25 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
30 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.

[0064] 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
5 (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 network entities 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 network entities 102 and the UEs 104, among other equipment or devices for cellular communications traffic (e.g., control information,
10 data). In some implementations, FR2 may be used by the network entities 102 and the UEs 104, among other equipment or devices for short-range, high data rate capabilities.

[0065] 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
15 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.

[0066] LTM is a procedure in which a gNB receives L1 measurement report(s) from a UE, and on their basis the gNB changes UE's serving cell by a cell switch command signalled via a MAC CE. The cell switch command indicates an LTM candidate cell configuration that the gNB previously prepared and provided to the UE through RRC signalling. Then the UE
20 switches to the target cell according to the cell switch command. The LTM procedure can
25 be used to reduce the mobility latency.

[0067] Cell switch command is conveyed in a MAC CE, which contains the necessary information to perform the LTM cell switch, including at least a candidate configuration index. Cell-specific, radio bearer, and measurement configurations can be part of an LTM candidate cell configuration. FIG. 2A illustrates an overall procedure for LTM.

[0068] At step 1 in FIG. 2A, the UE sends a *MeasurementReport* message to the gNB. The gNB decides to configure LTM and initiates candidate cell(s) preparation. At step 2, the gNB transmits an *RRCReconfiguration* message to the UE including the LTM candidate cell

configurations of one or multiple candidate cells. At step 3, the UE stores the LTM candidate cell configurations and transmits an *RRCReconfigurationComplete* message to the gNB.

5 [0069] At step 4a, the UE may performs DL synchronization with candidate cell(s) before receiving the cell switch command. It is understood that DL synchronization for candidate cell(s) before cell switch command is supported, at least based on synchronization signal block (SSB).

10 [0070] At step 4b, if requested by the network, the UE performs early time advance (TA) acquisition with candidate cell(s) before receiving the cell switch command. This is done via CFRA triggered by a PDCCH order from the source cell, following which the UE sends preamble towards the indicated candidate cell. In order to minimize the data interruption of the source cell due to CFRA towards the candidate cell(s), the UE doesn't receive RAR for the purpose of TA value acquisition and the TA value of the candidate cell is indicated in the cell switch command. The UE doesn't maintain the TA timer for the candidate cell and
15 relies on network implementation to guarantee the TA validity.

[0071] At step 5, the UE performs L1 measurements on the configured candidate cell(s) and transmits L1 measurement reports to the gNB. L1 measurement should be performed as long as apply the RRC reconfiguration in step 2.

20 [0072] At step 6, the gNB decides to execute cell switch to a target cell and transmits a MAC CE triggering cell switch by including the candidate configuration index of the target cell. The UE switches to the target cell and applies the configuration indicated by candidate configuration index.

[0073] At step 7, the UE performs the random access procedure towards the target cell, if UE does not have valid TA of the target cell.

25 [0074] At step 8, the UE completes the LTM cell switch procedure by sending *RRCReconfigurationComplete* message to target cell. If the UE has performed a RA procedure in step 7, the UE considers that LTM execution is successfully completed when the random access procedure is successfully completed. For random access channel (RACH)-less LTM, the UE considers that LTM execution is successfully completed when
30 the UE determines that the network has successfully received its first UL data. The UE determines successful reception of its first UL data by receiving a PDCCH addressing the UE's C-RNTI in the target cell, which schedules a new transmission following the first UL

data.

[0075] The procedure over the air interface described in FIG. 2A is applicable to both intra-DU LTM and inter-DU LTM. The overall LTM procedures over F1-C and Xn interface will be repeated in the present disclosure.

- 5 [0076] L3 handover may happen while LTM is configured, evaluated, or used. However, it is not discussed whether LTM can be configured simultaneously with condition-based handover. If the coexistence is allowed, PCell change and PSCell change may occur simultaneously, and further details should be studied.

[0077] Embodiments of the present disclosure provide a solution of communication. In
10 the solution, a UE may receive a first configuration related to PCell change and a second configuration related to PSCell addition or PSCell change. The UE may further perform a corresponding operation in case PCell change is triggered or PSCell addition or PSCell change is triggered. Therefore, a simultaneous configuration for PCell change and PSCell addition/change is supported and the UE behavior is defined. Accordingly, the
15 communication at the UE may be guaranteed. Principles and implementations of the present disclosure will be described in detail below with reference to the figures.

[0078] FIG. 2B illustrates a schematic diagram of an example communication network 200 in which some embodiments of the present disclosure can be implemented. As shown in FIG. 2B, the communication network 200 may include an MN 210, an SN 220, an SN 230,
20 and a UE 240, which may communicate with each other. With reference to FIG. 1, each of the MN 210, the SN 220, the SN 230 may be one network entity 102, and the UE 240 may be one UE 104.

[0079] It is to be understood that the number of devices in FIG. 2B is given for the purpose of illustration without suggesting any limitations to the present disclosure. For example,
25 there may be multiple SNs for the UE 240 during an inter-SN mobility. For example, the UE 240 may be configured with carrier aggregation (CA) or dual connectivity (DC).

[0080] In the present disclosure, a PCell refers to a primary cell of a master cell group (MCG), and a PSCell refers to a primary cell of a secondary cell group (SCG).

[0081] FIG. 3 illustrates a signalling chart illustrating a communication process 300 in
30 accordance with some example embodiments of the present disclosure. The process 300 may involve the MN 210, the SN 220 and the UE 240 as shown in FIG. 2B. It would be appreciated that the process 300 may be applied to other communication scenarios, which

will not be described in detail.

[0082] The UE 240 accesses both the MN 210 and the SN 220 via DC, that is the UE 240 accesses the network via DC including MCG and SCG. The UE 240 may transmit a measurement report to the MN 210 and the SN 220 respectively. For example, the measurement report may indicate cell quantities of neighbors cells and the serving cell.

[0083] In the process 300, the MN 210 transmits a first configuration related to PCell change to the UE 240 at 310. In some implementations, the first configuration may include a CHO configuration related to multiple candidate cells. In some implementations, the UE 240 may start evaluating CHO condition(s) upon receiving the CHO configuration.

[0084] In the process 300, the SN 220 transmits a second configuration related to PSCell change to the UE 240 at 320. In some implementations, the second configuration may include an LTM configuration for SCG (SCG LTM configuration).

[0085] In some example embodiments, in case of SN initiated SCG LTM without MN involvement, the SN 220 may transmit the LTM configuration for SCG to the UE 240 directly, if a signalling radio bearer (SRB) between the SN 220 and the UE 240 has been configured. For example, if SRB3 is configured, the SRB3 may be used for the transmission between the SN 220 and the UE 240.

[0086] In some examples, if the SRB between the SN 220 and the UE 240 is not configured, the SN 220 may transmit the LTM configuration for SCG to the UE 240 via the MN 210. For example, the SN 220 transmits the LTM configuration for SCG to the MN 210, and the MN 210 forwards the LTM configuration for SCG to the UE 240.

[0087] In some examples, an RRC configuration message may be transmitted to the UE 240, and the RRC configuration message includes the LTM configuration for SCG. For example, the RRC configuration message may include an information element (IE), such as *LTM-Config*, which carries the LTM configuration for SCG.

[0088] In some examples, the LTM configuration for SCG may further include another configuration, e.g. RACH resource for early TA acquisition.

[0089] According to the first configuration related to PCell change and the second configuration related to PSCell change, the PCell change may be triggered and the PSCell change may be triggered. In case the PCell change is triggered first, the operation 330 may

be performed. In case the PSCell change is triggered first, the operation 340 may be performed.

[0090] The UE 240 may determine that an execution condition of a candidate cell of the CHO configuration is met at 331, that is, if an execution condition of a candidate cell of the CHO configuration is met, the PCell change is triggered. In addition, the UE 240 performs the CHO procedure towards the candidate cell at 332. For example, the candidate cell is a candidate PCell.

[0091] In some implementations, the UE 240 may transmit a first report to the SN 220 at 333, for example, the first report may be transmitted via an RRC message or via a MAC CE. In some examples, the first report may indicate that the PCell change is triggered. In some examples, the first report may indicate that an execution condition of a candidate cell of the CHO configuration is met. In some examples, the first report may indicate that the CHO procedure towards the candidate cell is performing. In some examples, the first report may indicate that the SCG LTM is not allowed.

[0092] In some examples, the first report may also indicate a time duration of the CHO procedure. For example, a timer (such as T304) may be started at the UE 240 when the CHO procedure is starting, and the time duration may be a time length of the timer. For example, the first report may include a value of the timer to indicate the time duration.

[0093] In some examples, based on receiving the first report, the SN 220 may stop triggering the SCG LTM at 334, that is, the SN 220 will not transmit an SCG LTM command (i.e. LTM command for SCG) within the time duration.

[0094] In some examples, the UE 240 may further transmit a second report to the SN 220 when the CHO procedure is completed, for example, the second report may be transmitted via an RRC message or via a MAC CE. For example, the second report may indicate that the CHO procedure is completed. For example, the second report may indicate that the SCG LTM is allowed. As such, after receiving the second report, the SN 220 may trigger the SCG LTM is needed.

[0095] In some implementations, the UE 240 may receive an SCG LTM command from the SN 220 at 335 during the CHO procedure, and the UE 240 may ignore the SCG LTM command at 336. In some examples, when the UE 240 receives the SCG LTM command while the UE 240 is performing the CHO procedure, the UE 240 will not perform the LTM procedure for SCG (which may also be called as an SCG LTM procedure). In some

examples, the SCG LTM procedure may be performed based on the SCG LTM command after the CHO procedure is completed.

[0096] In some implementations, the UE 240 may receive an SCG LTM command from the SN 220 at 337 during the CHO procedure, and the UE 240 may perform a re-establishment procedure. That is, the UE 240 performs a re-establishment procedure at 338 when the UE 240 receives the SCG LTM command while the CHO procedure is ongoing.

[0097] In some implementations, the UE 240 may release the LTM configuration for SCG at 339. In some examples, when the CHO procedure is triggered/started or when the CHO procedure is completed, the UE 240 may release the LTM configuration for SCG.

10 [0098] In the operation 340, the SN 220 transmits an SCG LTM command to the UE 240 at 341 while the UE 240 is still evaluating the execution condition(s) for CHO configuration. In some implementations, the SCG LTM command from the SN 220 may include an index of a candidate cell, e.g. indicating a candidate PSCell. In addition, the UE 240 performs the SCG LTM procedure towards the candidate cell based on the SCG LTM command at 342.

15 [0099] In some implementations, the UE 240 may stop evaluating the execution conditions for the CHO procedure at 343. In some examples, when the SCG LTM command is received, the evaluation of the conditions will be stopped. In some examples, the UE 240 may continue evaluating the execution conditions for the CHO procedure after the SCG LTM procedure is completed. For example, the evaluation of the execution conditions may be started, restarted, or resumed once the UE 240 completes the SCG LTM procedure.

[00100] In some implementations, the UE 240 may perform a re-establishment procedure at 344, e.g. when an execution condition for CHO procedure is met while the UE 240 is performing the SCG LTM procedure.

25 [00101] In some implementations, the UE 240 does not perform the CHO procedure at 345, if an execution condition for CHO procedure is met while the UE 240 is performing the SCG LTM procedure. For example, the UE 240 may continue evaluating the execution condition but not perform the CHO procedure.

[00102] In some implementations, the UE 240 may suspend the CHO procedure at 346 until the SCG LTM procedure is completed. In some examples, the UE 240 may determine that an execution condition for CHO procedure is met while the UE 240 is performing the SCG LTM procedure, and the UE 240 may continue performing the SCG LTM procedure but

suspend the CHO procedure. In some examples, the CHO procedure may be started after the SCG LTM procedure is completed.

[00103] In some implementations, a DU of the SN 220 may provide a cell switching notification to a CU of the SN 220, and in addition the CU of the SN 220 may transmit a notification to the MN 210 at 347. For example, the notification may be transmitted to a CU of the MN 210 via Xn interface.

[00104] According to embodiments with reference to FIG. 3, when the CHO configuration and the SCG LTM configuration are both configured to the UE 240, the behaviors are defined, and accordingly the mobility of the UE 240 can be guaranteed. It is to be understood that if it is not allowed to configure both the CHO configuration and the SCG LTM configuration, then one of the CHO configuration and the SCG LTM configuration may be released.

[00105] FIG. 4 illustrates a signalling chart illustrating a communication process 400 in accordance with some example embodiments of the present disclosure. The process 400 may involve the MN 210 and the UE 240 as shown in FIG. 2B. It would be appreciated that the process 400 may be applied to other communication scenarios, which will not be described in detail.

[00106] The UE 240 accesses the network via MCG. The UE 240 may transmit a measurement report to the MN 210. For example, the measurement report may indicate cell quantities of neighbors cells and the serving cell.

[00107] In the process 400, the MN 210 transmits a first configuration related to PCell change to the UE 240 at 410. In some implementations, the first configuration may include an LTM configuration for MCG (MCG LTM configuration).

[00108] In the process 400, the MN 210 transmits a second configuration related to PSCell addition to the UE 240 at 420. In some implementations, the second configuration may include a CPA configuration for at least one candidate cell. In some implementations, the UE 240 may start evaluating one or more conditions of a candidate cell for CPA upon receiving the CPA configuration.

[00109] According to the first configuration related to PCell change and the second configuration related to PSCell addition, the PCell change may be triggered and the PSCell addition may be triggered. In case the PCell change is triggered first, the operation 430 may be performed. In case the PSCell addition is triggered first, the operation 440 may be performed.

[00110] In the operation 430, the MN 210 transmits an LTM cell switch command for MCG to the UE 240 at 431, while the UE 240 is still evaluating the condition(s) for CPA. In some implementations, the LTM cell switch command for MCG may also be referred to as an MCG LTM cell switch command or an MCG LTM command. In addition, the UE 240 performs the MCG LTM procedure (which may also be called as an LTM procedure for MCG) based on the LTM cell switch command for MCG at 432.

[00111] In some implementations, the UE 240 may stop evaluating the conditions for CPA at 433. In some examples, when the MCG LTM cell switch command is received or when the MCG LTM procedure is performing, the evaluation of the conditions will be stopped.

[00112] In some implementations, the UE 240 may release the CPA configuration at 434. In some examples, when the MCG LTM cell switch command is received or when the MCG LTM procedure is performing or when the MCG LTM procedure is completed, the UE may release the CPA configuration.

[00113] In some implementations, simultaneous PCell change and PSCell addition is allowed, if a condition for CPA is met while the UE 240 is performing the MCG LTM procedure, the UE 240 may perform both the MCG LTM procedure and the CPA procedure in parallel at 435.

[00114] In the operation 440, the UE 240 may determine that a condition for CPA is met at 441, that is, if a condition for CPA is met, the PSCell addition is triggered. In addition, the UE 240 performs the CPA procedure at 442. For example, a condition for a candidate PSCell is met, and a CPA procedure for the candidate cell is performed.

[00115] In some implementations, the UE 240 may receive an LTM cell switch command for MCG from the MN 210 at 443 during the CPA procedure, and the UE 240 may ignore the LTM cell switch command for MCG at 444. In some examples, the UE 240 may transmit an indication to the MN 210, where the indication may indicate that the LTM cell switch command for MCG from the MN 210 is ignored by the UE 240 due to an execution of CPA.

[00116] In some implementations, the UE 240 may receive an LTM cell switch command for MCG from the MN 210 at 445 during the CPA procedure, and the UE 240 may determine to stop the CPA and perform the MCG LTM procedure at 446 based on the LTM cell switch command for MCG from the MN 210.

[00117] In some implementations, the UE 240 may transmit a third report to the MN 210 at 447. In some examples, the third report may indicate that the PSCell addition (i.e. CPA) is

triggered. In some examples, the third report may indicate that a condition for CPA is met. In some examples, the third report may indicate that the MCG LTM configuration should be released. In some examples, based on receiving the third report, the MN 210 may release the MCG LTM configuration at 448. In some examples, the UE 240 may release the first
5 configuration of MCG LTM after the CPA procedure.

[00118] In some implementations, simultaneous PCell change and PSCell addition is allowed, if an LTM cell switch command for MCG is received from the MN 210 while the UE 240 is performing the CPA procedure, the UE 240 may perform both the MCG LTM procedure and the CPA procedure in parallel at 449.

10 [00119] According to embodiments with reference to FIG. 4, when the MCG LTM configuration and the CPA configuration are both configured to the UE 240, the behaviors are defined, and accordingly the mobility of the UE 240 can be guaranteed. It is to be understood that if it is not allowed to configure both the MCG LTM configuration and the CPA configuration, then one of the MCG LTM configuration and the CPA configuration may
15 be released.

[00120] FIG. 5 illustrates a signalling chart illustrating a communication process 500 in accordance with some example embodiments of the present disclosure. The process 500 may involve the MN 210, the SN 220 and the UE 240 as shown in FIG. 2B. It would be appreciated that the process 500 may be applied to other communication scenarios, which
20 will not be described in detail.

[00121] The UE 240 accesses both the MN 210 and the SN 220 via DC, that is the UE 240 accesses the network via DC including MCG and SCG. The UE 240 may transmit a measurement report at least to the MN 210. For example, the measurement report may indicate cell quantities of neighbors cells and the serving cell.

25 [00122] In the process 500, the MN 210 transmits a first configuration related to PCell change to the UE 240 at 510. In some implementations, the first configuration may include an LTM configuration for MCG (MCG LTM configuration).

[00123] In the process 500, the MN 210 or the SN 220 transmits a second configuration related to PSCell change to the UE 240 at 520. In some implementations, the second
30 configuration may include a CPC configuration for at least one candidate cell or a subsequent CPC (SCPC) configuration for at least one candidate cell. In some implementations, the

UE 240 may start evaluating one or more conditions of a candidate cell for CPC or SCPC upon receiving the CPC/SCPS configuration.

[00124] In some examples, for MN initiated CPC/SCPC procedure or SN initiated inter-SN CPC/SCPC procedure, the MN 210 may transmit the second configuration related to PSCell change. In some examples, for SN initiated intra-SN CPC/SCPC procedure, the SN 220 may transmit the second configuration related to PSCell change.

[00125] According to the first configuration related to PCell change and the second configuration related to PSCell change, the PCell change may be triggered and the PSCell change may be triggered. In case the PCell change is triggered first, the operation 530 may be performed. In case the PSCell change is triggered first, the operation 540 may be performed.

[00126] In the operation 530, the MN 210 transmits an LTM cell switch command for MCG to the UE 240 at 531, while the UE 240 is still evaluating the condition(s) for CPC/SCPC. In some implementations, the LTM cell switch command for MCG may also be referred to as an MCG LTM cell switch command or an MCG LTM command. In addition, the UE 240 performs the MCG LTM procedure based on the LTM cell switch command for MCG at 532.

[00127] In some implementations, the UE 240 may stop evaluating the conditions for CPC/SCPC at 533. In some examples, when the MCG LTM cell switch command is received or when the MCG LTM procedure is performing, the evaluation of the conditions will be stopped. In some examples, the UE 240 may continue evaluating the condition for SCPC after completing the MCG LTM procedure.

[00128] In some implementations, the UE 240 may release the CPC/SCPC configuration at 534. In some examples, when the MCG LTM cell switch command is received or when the MCG LTM procedure is performing or when the MCG LTM procedure is completed, the UE may release the CPC/SCPC configuration.

[00129] In some implementations, simultaneous PCell change and PSCell change is allowed, if a condition for CPC/SCPC is met while the UE 240 is performing the MCG LTM procedure, the UE 240 may perform both the MCG LTM procedure and the CPC/SCPC procedure in parallel at 535.

[00130] In the operation 540, the UE 240 may determine that a condition for CPC/SCPC is met at 541, that is, if a condition for CPC/SCPC is met, the PSCell change is triggered. In

addition, the UE 240 performs the CPC/SCPC procedure at 542. For example, a condition for a candidate PSCell is met, and a CPC/SCPC procedure for the candidate cell is performed.

[00131] For example, for an intra-SN CPC/SCPC procedure, the candidate cell may belong to the SN 220. For example, for an inter-SN CPC/SCPC procedure, the candidate cell may belong to another SN, such as SN 230.

[00132] In some implementations, the UE 240 may receive an LTM cell switch command for MCG from the MN 210 at 543 during the CPC/SCPC procedure, and the UE 240 may ignore the LTM cell switch command for MCG at 544. In some examples, the UE 240 may transmit an indication to the MN 210, where the indication may indicate that the LTM cell switch command for MCG from the MN 210 is ignored by the UE 240 due to an execution of CPC/SCPC.

[00133] In some implementations, the UE 240 may receive an LTM cell switch command for MCG from the MN 210 at 545 during the CPC/SCPC procedure, and the UE 240 may determine to stop the CPC/SCPC and perform the MCG LTM procedure at 546 based on the LTM cell switch command for MCG from the MN 210.

[00134] In some implementations, the UE 240 may transmit a third report to the MN 210 at 547, for example, the third report may be transmitted via an RRC message or via a MAC CE. In some examples, the third report may indicate that the PSCell change (i.e. CPC/SCPC) is triggered. In some examples, the third report may indicate that a condition for CPC/SCPC is met. In some examples, the third report may indicate that the MCG LTM configuration should be released. In some examples, based on receiving the third report, the MN 210 may determine to release the MCG LTM configuration or to keep the MCG LTM configuration at 548.

[00135] In some implementations, simultaneous PCell change and PSCell change is allowed, if an LTM cell switch command for MCG is received from the MN 210 while the UE 240 is performing the CPC/SCPC procedure, the UE 240 may perform both the MCG LTM procedure and the CPC/SCPC procedure in parallel at 549.

[00136] According to embodiments with reference to FIG. 5, when the MCG LTM configuration and the CPC/SCPC configuration are both configured to the UE 240, the behaviors are defined, and accordingly the mobility of the UE 240 can be guaranteed. It is to be understood that if it is not allowed to configure both the MCG LTM configuration and

the CPC/SCPC configuration, then one of the MCG LTM configuration and the CPC/SCPC configuration may be released.

[00137] FIG. 6A illustrates a schematic diagram of an example communication network 600 in which some embodiments of the present disclosure can be implemented. As shown in FIG. 6A, the communication network 600 may include a CU 610, a DU 620, and a UE 640. The UE 640 connects to the DU 620, which is controlled by the CU 610. Due to mobility of the UE 640, it may switch to the DU 625, which is controlled by the CU 615. With reference to FIG. 1, each of the CU 610, CU 615, DU 620, DU 625 may be part of one network entity 102, and the UE 640 may be one UE 104.

[00138] In the network 600, the CU 610 may be a source CU (or a source gNB) for the UE 640, the DU 620 may be a source DU for the UE 640, while the CU 615 and the DU 625 are target CU and target DU for the UE 640 respectively.

[00139] It is to be understood that the number of devices in FIG. 6A is given for the purpose of illustration without suggesting any limitations to the present disclosure. For example, there may be one or more DUs connected to the CU 610/615. For example, the UE 640 may be configured with carrier aggregation (CA) or dual connectivity (DC).

[00140] FIG. 6B illustrates a signalling chart illustrating a communication process 650 in accordance with some example embodiments of the present disclosure. The process 650 may involve the UE 640, the source DU 620, the source CU 610, the target CU 615, and the target DU 625 as shown in FIG. 6A. It would be appreciated that the process 650 may be applied to other communication scenarios, which will not be described in detail.

[00141] The UE 640 may access the network via DC including MCG and SCG or access the network via only MCG. In case the UE accesses both an MN and an SN via DC, the UE 640 may transmit a measurement report to the MN and the SN respectively. For example, the measurement report may indicate cell quantities of neighbors cells and the serving cell.

[00142] In the process 650, the UE 640 receives, at 601, a CHO configuration and an MCG LTM configuration from the serving gNB, such as the source CU 610. In some implementations, the CHO configuration is related to one or more than one candidate cell, and the UE 640 starts evaluating CHO candidate cells upon reception of the CHO configuration. In some implementations, the MCG LTM configuration is related to one or more than one candidate cell.

[00143] In some example embodiments, the UE 640 may receive an RRC configuration message which includes LTM configuration e.g. *LTM-Config* IE. The LTM configuration may further include the configuration e.g. RACH resource for early TA acquisition to the UE 640.

5 [00144] When configured by the network, it is possible to activate TCI states of one or multiple cells that are different from the current serving cell. For instance, the TCI states of the LTM candidate cells can be activated in advance before any of those cells become the serving cell. This allows the UE 640 to be DL synchronized with those cells, thereby facilitating a faster cell switch to one of those cells when cell switch is triggered. In this
10 way, the UE 640 stores activated TCI state for some LTM candidate cells.

[00145] When configured by the network, it is possible to initiate UL TA acquisition procedure to one or multiple cells that are different from the current serving cell. For instance, the network (e.g. the source CU 610 or source DU 620) may request the UE 640 to perform early TA acquisition of a candidate cell before a cell switch. The early TA
15 acquisition is triggered by a PDCCH order. The candidate gNB-DU (such as DU 625) to which the candidate cell belongs calculates the TA value and sends it to the source DU 620 via the target CU 615 and the source CU 610. The serving cell/DU 620 sends the TA value in the LTM cell switch command MAC CE to the UE 640 when triggering the LTM cell switch. In this way, the source DU 620 stores early TA value for some LTM candidate cells.

20 [00146] In the process 650, the UE 640 performs a CHO procedure towards a candidate cell at 602. Specifically, once the execution condition related to one CHO candidate cell is met, the UE 640 is triggered to perform CHO towards this candidate cell.

[00147] In some implementations, if a radio link failure (RLF) happens, the UE 640 may be triggered to initiate a cell selection for re-establishment purpose (not shown in FIG. 6B). In
25 some examples, if the LTM candidate cell or CHO candidate cell is selected, the UE 640 may perform the LTM procedure or the CHO procedure instead of performing re-establishment.

[00148] In some implementations, after the UE 640 is triggered to perform the CHO procedure towards the candidate cell or after the UE 640 successfully performs the CHO procedure towards the candidate cell, the UE 640 may continue storing the activated TCI state
30 for some candidate cells. In some examples, the RACH resource for early TA acquisition and CSI resource configuration may also be stored by the UE 640.

[00149] In some implementations, after the UE 640 is triggered to perform the CHO procedure towards the candidate cell or after the UE 640 successfully performs the CHO procedure towards the candidate cell, the UE 640 may release the activated TCI state for some candidate cells.

- 5 [00150] In the process 650, the target DU 625 transmits an access success message to the target CU 615 at 611. In some implementations, the access success message at 611 may be transmitted with a target cell ID after the successful CHO procedure, the LTM based recovery, or the CHO based recovery.

- 10 [00151] In the process 650, the target CU 615 transmits a handover success message to the source CU 610 at 612. In some implementations, once the target CU 615 receives the access success message, the target CU 615 transmits the an Xn message including the target cell ID and some indication to the source CU 610, for example, the Xn message may be a handover success message. In some examples, the handover success message may be used to inform that the UE 640 has successfully accessed the target cell.

- 15 [00152] In some examples, the handover success message may include one or more of the following: a request of TCI state activation, a request of RACH resource for early TA acquisition, a request of CSI resource configuration, or a request of early TA value stored in source DU 620.

- 20 [00153] In the process 650, the source CU 610 transmits a request to the source DU 620 at 613. In some implementations, once the source CU 610 receives the Xn message (include one or more requests) from the target CU 615, the source CU 610 may transmit the request to the source DU 620. In some examples, the request at 613 may include the one or more requests that included in the Xn message from the target CU 615. In some examples, the request at 613 may include one or more of the following: a request of TCI state activation, a request of RACH resource for early TA acquisition, a request of CSI resource configuration, or a request of early TA value stored in source DU 620.

[00154] In the process 650, the source DU 620 transmits a response to the source CU 610 at 614. In some implementations, the response at 614 may include the activated TCI state for some candidate cells and/or early TA value for some candidate cells.

- 30 [00155] In the process 650, the source CU 610 transmits another Xn message to the target CU 615 at 616, and the target CU 615 further transmits another message to the target DU 625 at 617. In some examples, each of the Xn message at 616 and the message at 617 may

include the activated TCI state for some candidate cells and/or early TA value for some candidate cells. In other words, the activated TCI state for some candidate cells and/or early TA value for some candidate cells may be forwarded by the source CU 610 and the target CU 615 from the source DU 620 to the target DU 625.

5 [00156] In some other example implementations, as shown in FIG. 6B, the UE 640 may transmit a report to the target DU 625 at 618, and the report may include an indication indicating that the activated TCI state for some candidate cells and/or early TA value for some candidate cells are available at the UE 640.

10 [00157] In some examples, if the target DU 625 needs the activated TCI state for some candidate cells and/or early TA value for some candidate cells, the target DU 625 may further transmit a further request to the UE 640 in response to receiving the report. In addition, the UE 640 may transmit a further message to the target DU 625, where the further message may include the activated TCI state for some candidate cells and/or early TA value for some candidate cells.

15 [00158] In some other examples, if the target DU 625 does not need them, the target DU 625 may transmit a removing indication to the UE 640, and in addition the UE 640 may remove (or delete, release) the activated TCI state for some candidate cells and/or early TA value for some candidate cells based on the removing indication.

20 [00159] It is to be understood that the step 618 may be omitted in some cases. In some other cases, if the step 618 is performed, then the request of TCI state activation in the access success message at 611, in the handover success message at 612, and in the request at 613 may be removed, and accordingly the activated TCI state for some candidate cells in the response at 614, in the Xn message at 616, and in the message at 617 may be removed.

25 [00160] According to some embodiments with reference to FIGS. 6A-6B, a solution of transferring the activated TCI state and/or early TA after CHO (or CHO based recovery, or LTM based recovery) is provided.

30 [00161] FIG. 7 illustrates an example of a device 700 that is suitable for implementing embodiments of the present disclosure. The device 700 may be an example of a UE or a BS as described herein. The device 700 may support wireless communication with a UE, an MN, an SN, a CU, a DU, or any combination thereof. The device 700 may include components for bi-directional communications including components for transmitting and receiving communications, such as a processor 702, a memory 704, a transceiver 706, and,

optionally, an I/O controller 708. 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).

[00162] The processor 702, the memory 704, the transceiver 706, or various combinations thereof or various components thereof may be examples of means for performing various aspects of the present disclosure as described herein. For example, the processor 702, the memory 704, the transceiver 706, or various combinations or components thereof may support a method for performing one or more of the operations described herein.

[00163] In some implementations, the processor 702, the memory 704, the transceiver 706, or various combinations or components thereof may be implemented in hardware (e.g., in communications management circuitry). The hardware may include a processor, a digital signal processor (DSP), an application-specific integrated circuit (ASIC), a field-programmable gate array (FPGA) or other programmable logic device, a discrete gate or transistor logic, discrete hardware components, or any combination thereof configured as or otherwise supporting a means for performing the functions described in the present disclosure. In some implementations, the processor 702 and the memory 704 coupled with the processor 702 may be configured to perform one or more of the functions described herein (e.g., executing, by the processor 702, instructions stored in the memory 704).

[00164] For example, the processor 702 may support wireless communication at the device 700 in accordance with examples as disclosed herein. The processor 702 may be configured to operable to support a means for operations discussed above.

[00165] The processor 702 may include an intelligent hardware device (e.g., a general-purpose processor, a DSP, a CPU, a microcontroller, an ASIC, an FPGA, a programmable logic device, a discrete gate or transistor logic component, a discrete hardware component, or any combination thereof). In some implementations, the processor 702 may be configured to operate a memory array using a memory controller. In some other implementations, a memory controller may be integrated into the processor 702. The processor 702 may be configured to execute computer-readable instructions stored in a memory (e.g., the memory 704) to cause the device 700 to perform various functions of the present disclosure.

[00166] The memory 704 may include random access memory (RAM) and read-only memory (ROM). The memory 704 may store computer-readable, computer-executable

code including instructions that, when executed by the processor 702 cause the device 700 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. In some implementations, the code may not be directly executable by the processor 702 but may cause
5 a computer (e.g., when compiled and executed) to perform functions described herein. In some implementations, the memory 704 may include, among other things, a basic I/O system (BIOS) which may control basic hardware or software operation such as the interaction with peripheral components or devices.

[00167] The I/O controller 708 may manage input and output signals for the device 700.
10 The I/O controller 708 may also manage peripherals not integrated into the device 700. In some implementations, the I/O controller 708 may represent a physical connection or port to an external peripheral. In some implementations, the I/O controller 708 may utilize an operating system such as iOS®, ANDROID®, MS-WINDOWS®, OS/2®, UNIX®, LINUX®, or another known operating system. In some implementations, the I/O controller
15 708 may be implemented as part of a processor, such as the processor 702. In some implementations, a user may interact with the device 700 via the I/O controller 708 or via hardware components controlled by the I/O controller 708.

[00168] In some implementations, the device 700 may include a single antenna 710. However, in some other implementations, the device 700 may have more than one antenna
20 710 (i.e., multiple antennas), including multiple antenna panels or antenna arrays, which may be capable of concurrently transmitting or receiving multiple wireless transmissions. The transceiver 706 may communicate bi-directionally, via the one or more antennas 710, wired, or wireless links as described herein. For example, the transceiver 706 may represent a wireless transceiver and may communicate bi-directionally with another wireless transceiver.
25 The transceiver 706 may also include a modem to modulate the packets, to provide the modulated packets to one or more antennas 710 for transmission, and to demodulate packets received from the one or more antennas 710. The transceiver 706 may include one or more transmit chains, one or more receive chains, or a combination thereof.

[00169] A transmit chain may be configured to generate and transmit signals (e.g., control
30 information, data, packets). The transmit chain 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 transmit chain 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 transmit chain may also include one or more antennas 710 for transmitting the amplified signal into the air or wireless medium.

[00170] A receive chain may be configured to receive signals (e.g., control information, data, packets) over a wireless medium. For example, the receive chain may include one or more antennas 710 for receive the signal over the air or wireless medium. The receive chain may include at least one amplifier (e.g., a low-noise amplifier (LNA)) configured to amplify the received signal. The receive chain 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 receive chain may include at least one decoder for decoding the processing the demodulated signal to receive the transmitted data.

[00171] FIG. 8 illustrates an example of a processor 800 that is suitable for implementing some embodiments of the present disclosure. The processor 800 may be an example of a processor configured to perform various operations in accordance with examples as described herein. The processor 800 may include a controller 802 configured to perform various operations in accordance with examples as described herein. The processor 800 may optionally include at least one memory 804, such as L1/L2/L3 cache. Additionally, or alternatively, the processor 800 may optionally include one or more arithmetic-logic units (ALUs) 806. 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).

[00172] The processor 800 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 800) 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).

[00173] The controller 802 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 800 to cause the processor 800 to support various operations in accordance with examples as described herein. For example, the controller 802 may operate as a control unit of the processor 800, generating control signals that manage the operation of various components of the processor 800. These control signals include enabling or disabling functional units, selecting data paths, initiating memory access, and coordinating timing of operations.

10 [00174] The controller 802 may be configured to fetch (e.g., obtain, retrieve, receive) instructions from the memory 804 and determine subsequent instruction(s) to be executed to cause the processor 800 to support various operations in accordance with examples as described herein. The controller 802 may be configured to track memory address of instructions associated with the memory 804. The controller 802 may be configured to
15 decode instructions to determine the operation to be performed and the operands involved. For example, the controller 802 may be configured to interpret the instruction and determine control signals to be output to other components of the processor 800 to cause the processor 800 to support various operations in accordance with examples as described herein. Additionally, or alternatively, the controller 802 may be configured to manage flow of data
20 within the processor 800. The controller 802 may be configured to control transfer of data between registers, arithmetic logic units (ALUs), and other functional units of the processor 800.

[00175] The memory 804 may include one or more caches (e.g., memory local to or included in the processor 800 or other memory, such RAM, ROM, DRAM, SDRAM, SRAM, MRAM, flash memory, etc. In some implementations, the memory 804 may reside within or on a processor chipset (e.g., local to the processor 800). In some other implementations, the memory 804 may reside external to the processor chipset (e.g., remote to the processor 800).

[00176] The memory 804 may store computer-readable, computer-executable code including instructions that, when executed by the processor 800, cause the processor 800 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 802 and/or the processor 800 may be configured to execute computer-readable instructions stored

in the memory 804 to cause the processor 800 to perform various functions. For example, the processor 800 and/or the controller 802 may be coupled with or to the memory 804, the processor 800, the controller 802, and the memory 804 may be configured to perform various functions described herein. In some examples, the processor 800 may include multiple
5 processors and the memory 804 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.

[00177] The one or more ALUs 806 may be configured to support various operations in accordance with examples as described herein. In some implementations, the one or more
10 ALUs 806 may reside within or on a processor chipset (e.g., the processor 800). In some other implementations, the one or more ALUs 806 may reside external to the processor chipset (e.g., the processor 800). One or more ALUs 806 may perform one or more computations such as addition, subtraction, multiplication, and division on data. For example, one or more ALUs 806 may receive input operands and an operation code, which
15 determines an operation to be executed. One or more ALUs 806 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 806 may support logical operations such as AND, OR, exclusive-OR (XOR), not-OR (NOR), and not-AND (NAND), enabling the one or more
20 ALUs 806 to handle conditional operations, comparisons, and bitwise operations.

[00178] The processor 800 may support wireless communication in accordance with examples as disclosed herein. The processor 800 may be configured to or operable to support a means for operations described in some embodiments of the present disclosure.

[00179] FIG. 9 illustrates a flowchart of a method 900 performed by a UE in accordance with
25 aspects of the present disclosure. The operations of the method 900 may be implemented by a device or its components as described herein. For example, the operations of the method 900 may be performed by the UE 240 in FIG. 2B. In some implementations, the device may execute a set of instructions to control the function elements of the device to perform the described functions. Additionally, or alternatively, the device may perform
30 aspects of the described functions using special-purpose hardware.

[00180] At 910, the method may include receiving, from an MN, a first configuration related to a PCell change. The operations of 910 may be performed in accordance with examples

as described herein. In some implementations, aspects of the operations of 910 may be performed by the UE 240 as described with reference to FIG. 2B.

[00181] At 920, the method may include receiving, from the MN or an SN, a second configuration related to a PSCell addition or PSCell change. The operations of 920 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 920 may be performed by the UE 240 as described with reference to FIG. 2B.

[00182] At 930, the method may include in accordance with a determination that the PCell change is triggered, performing a first operation. The operations of 930 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 930 may be performed by the UE 240 as described with reference to FIG. 2B.

[00183] At 940, the method may include in accordance with a determination that the PSCell addition or PSCell change is triggered, performing a second operation. The operations of 940 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 940 may be performed by the UE 240 as described with reference to FIG. 2B.

[00184] FIG. 10 illustrates a flowchart of a method 1000 performed by an MN in accordance with aspects of the present disclosure. The operations of the method 1000 may be implemented by a device or its components as described herein. For example, the operations of the method 1000 may be performed by the MN 210 in FIG. 2B. In some implementations, the device may execute a set of instructions to control the function elements of the device to perform the described functions. Additionally, or alternatively, the device may perform aspects of the described functions using special-purpose hardware.

[00185] At 1010, the method may include transmitting, to a UE, a first configuration related to a PCell change, wherein the UE is further configured with a second configuration related to a PSCell addition or PSCell change. The operations of 1010 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1010 may be performed by the MN 210 as described with reference to FIG. 2B.

[00186] At 1020, the method may include receiving, from the UE, a report indicating that the PCell change or the PSCell addition or PSCell change is performed. The operations of 1020 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1020 may be performed by the MN 210 as

described with reference to FIG. 2B.

[00187] FIG. 11 illustrates a flowchart of a method 1100 performed by an SN in accordance with aspects of the present disclosure. The operations of the method 1100 may be implemented by a device or its components as described herein. For example, the operations of the method 1100 may be performed by the SN 220 in FIG. 2B. In some implementations, the device may execute a set of instructions to control the function elements of the device to perform the described functions. Additionally, or alternatively, the device may perform aspects of the described functions using special-purpose hardware.

[00188] At 1110, the method may include transmitting, to a UE, a second configuration related to a PSCell change, wherein the UE is further configured with a first configuration related to a PCell change. The operations of 1110 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1110 may be performed by the SN 220 as described with reference to FIG. 2B.

[00189] At 1120, the method may include receiving, from the UE, a report indicating that the PCell change or the PSCell change is performed. The operations of 1120 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1120 may be performed by the SN 220 as described with reference to FIG. 2B.

[00190] It should be noted that the methods described herein describes possible implementations, and that the operations and the steps may be rearranged or otherwise modified and that other implementations are possible. Further, aspects from two or more of the methods may be combined.

[00191] The various illustrative blocks and components described in connection with the disclosure herein may be implemented or performed with a general-purpose processor, a DSP, an ASIC, a CPU, an FPGA or other programmable logic device, discrete gate or transistor logic, discrete hardware components, or any combination thereof designed to perform the functions described herein. A general-purpose processor may be a microprocessor, but in the alternative, the processor may be any processor, controller, microcontroller, or state machine. A processor may also be implemented as a combination of computing devices (e.g., a combination of a DSP and a microprocessor, multiple microprocessors, one or more microprocessors in conjunction with a DSP core, or any other such configuration).

[00192] The functions described herein may be implemented in hardware, software executed

by a processor, firmware, or any combination thereof. If implemented in software executed by a processor, the functions may be stored on or transmitted over as one or more instructions or code on a computer-readable medium. Other examples and implementations are within the scope of the disclosure and appended claims. For example, due to the nature of software, 5 functions described herein may be implemented using software executed by a processor, hardware, firmware, hardwiring, or combinations of any of these. Features implementing functions may also be physically located at various positions, including being distributed such that portions of functions are implemented at different physical locations.

[00193] Computer-readable media includes both non-transitory computer storage media and 10 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. By way of example, non-transitory computer-readable media may include RAM, ROM, electrically erasable programmable ROM (EEPROM), flash memory, compact disk (CD) ROM or other 15 optical disk storage, magnetic disk storage or other magnetic storage devices, or any other non-transitory medium that may be used to carry or store desired program code means in the form of instructions or data structures and that may be accessed by a general-purpose or special-purpose computer, or a general-purpose or special-purpose processor.

[00194] As used herein, including in the claims, an article “a” before an element is 20 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 25 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 30 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.

[00195] 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.

CLAIMS

What is claimed is:

1. A user equipment (UE) comprising:
at least one memory; and
5 at least one processor coupled with the at least one memory and configured to cause the UE to:
receive, from a master node (MN), a first configuration related to a primary cell (PCell) change;
receive, from the MN or a secondary node (SN), a second configuration related
10 to a primary secondary cell (PSCell) addition or PSCell change; and
in accordance with a determination that the PCell change is triggered, perform a first operation; or
in accordance with a determination that the PSCell addition or PSCell change is triggered, perform a second operation.
15
2. The UE of claim 1, wherein the PCell change is a conditional handover (CHO) procedure and the PSCell change is a layer 1 or layer 2 triggered mobility (LTM) procedure for secondary cell group (SCG).
- 20 3. The UE of claim 2, wherein the at least one processor is further configured to cause the UE to:
in accordance with a determination that an execution condition of a candidate cell for the CHO procedure is met, determine that the PCell change is triggered,
and wherein the first operation comprises one of:
25 performing the CHO procedure towards the candidate cell;
transmitting, to the SN, a first report indicating that the execution condition of the candidate cell for the CHO procedure is met;
ignoring an SCG LTM command during the CHO procedure; or
releasing the second configuration of the LTM procedure for SCG.
30
4. The UE of claim 3, wherein the first report indicates a time duration for the CHO procedure.

5. The UE of claim 3, wherein the first operation further comprises:
in accordance with a determination that the CHO procedure is completed, transmit,
to the SN, a second report indicating that the CHO procedure is completed.

5 6. The UE of claim 2, wherein the at least one processor is further configured to
cause the UE to:

in accordance with a determination that an SCG LTM command indicating a
candidate cell is received, determine that the PSCell change is triggered,

and wherein the second operation comprises one of:

- 10 performing the LTM procedure for SCG towards the candidate cell;
stopping evaluating execution conditions for the CHO procedure;
not executing the CHO procedure if an execution condition for the CHO
procedure is met; or
suspending the CHO procedure until the LTM procedure for SCG is completed.

15 7. The UE of claim 1, wherein the PCell change is a master cell group (MCG)
LTM procedure, the PSCell addition is a conditional PSCell addition (CPA) procedure, and
the PSCell change is one of: a conditional PSCell change (CPC) procedure, or the subsequent
CPC procedure.

20 8. The UE of claim 7, wherein the at least one processor is further configured to
cause the UE to:

in accordance with a determination that an LTM cell switch command for MCG is
received from the MN, determine that the PCell change is triggered,

25 and wherein the first operation comprises one of:

performing the MCG LTM procedure based on the LTM cell switch command
for MCG;

stopping evaluating conditions for the PSCell addition or PSCell change;

releasing the second configuration of the PSCell addition or PSCell change; or

- 30 performing both the MCG LTM procedure and the PSCell addition or PSCell
change in response to a condition of a candidate cell for the PSCell addition or PSCell change
is met.

9. The UE of claim 8, wherein the first operation further comprises:

continuing evaluating conditions for the subsequent CPC procedure after the MCG LTM procedure is completed.

10. The UE of claim 7, wherein the at least one processor is further configured to
5 cause the UE to:

in accordance with a determination that a condition of a candidate cell for the PSCell addition or PSCell change is met, determine that the PSCell addition or PSCell change is triggered,

and wherein the second operation comprises one of:

- 10 performing the PSCell addition or PSCell change for the candidate cell;
ignoring an LTM cell switch command for MCG during the PSCell addition or PSCell change;
transmitting, to the MN, a third report indicating that the condition for the PSCell addition or PSCell change is met;
15 releasing the first configuration of the MCG LTM procedure; or
performing both the MCG LTM procedure and the PSCell addition or PSCell change in response to receiving an LTM cell switch command for MCG from the MN.

11. The UE of claim 10, wherein the second operation further comprises:
20 transmitting, to the MN, an indication indicating that the LTM cell switch command for MCG is ignored due to an execution of the PSCell addition or PSCell change.

12. A master node (MN) comprising:
at least one memory; and
25 at least one processor coupled with the at least one memory and configured to cause the MN to:

- transmit, to a user equipment (UE), a first configuration related to a primary cell (PCell) change, wherein the UE is further configured with a second configuration related to a primary secondary cell (PSCell) addition or PSCell change; and
30 receive, from the UE, a report indicating that the PCell change or the PSCell addition or PSCell change is performed.

13. The MN of claim 12, wherein the at least one processor is further configured to cause the MN to:

transmit, to the UE, the second configuration related to the PSCell addition or PSCell change.

14. The MN of claim 12, wherein the PCell change is a conditional handover (CHO) procedure and the PSCell change is a layer 1 or layer 2 triggered mobility (LTM) procedure for secondary cell group (SCG).

15. The MN of claim 12, wherein the PCell change is a master cell group (MCG) LTM procedure, the PSCell addition is a conditional PSCell addition (CPA) procedure, and the PSCell change is one of: a conditional PSCell change (CPC) procedure, or the subsequent CPC procedure.

16. The MN of claim 15, wherein the report comprises a third report indicating that the condition for the PSCell addition or PSCell change is met.

17. The MN of claim 16, wherein the at least one processor is further configured to cause the MN to:

release the first configuration of the MCG LTM procedure.

18. The MN of claim 15, wherein the at least one processor is further configured to cause the MN to:

transmit, to the UE, an LTM cell switch command for MCG; and

receive, from the UE, an indication indicating that the LTM cell switch command for MCG is ignored due to an execution of the PSCell addition or PSCell change.

19. A secondary node (SN) comprising:
at least one memory; and
at least one processor coupled with the at least one memory and configured to cause the SN to:

transmit, to a user equipment (UE), a second configuration related to a primary secondary cell (PSCell) change, wherein the UE is further configured with a first configuration related to a primary cell (PCell) change; and

receive, from the UE, a report indicating that the PCell change or the PSCell change is performed.

20. The SN of claim 19, wherein the PCell change is a conditional handover (CHO) procedure and the PSCell change is a layer 1 or layer 2 triggered mobility (LTM) procedure for secondary cell group (SCG).