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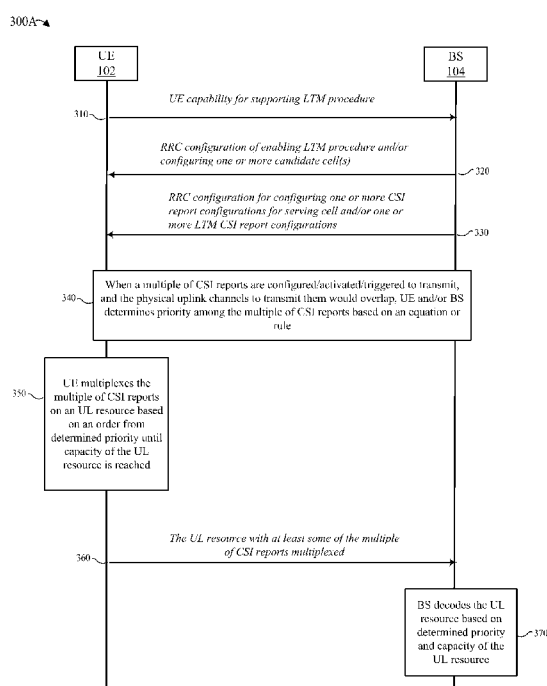


FIG. 3A

(57) Abstract: Example methods, systems, and techniques are disclosed for determining respective priorities of multiple channel state information (CSI) reports to be multiplexed in one CSI report. Multiple CSI reports may be scheduled to be transmitted over a common uplink resource, causing a conflicting overlap. Multiplexing the multiple CSI reports based on the respective priorities resolves the conflict. An example wireless communication method by a user equipment (UE) 102 includes receiving 330, from a network entity, a configuration configuring at least one CSI report for a serving cell and at least one LTM beam report. The UE then transmits 360, to the network entity, a report based on priority of the at least one CSI report and the at least one LTM beam report. The UE may compute the priority using a single formula or separate formulas for the at least one CSI report and the at least one LTM beam report.

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METHOD AND APPARATUS FOR DETERMINING PRIORITY OF CHANNEL STATE INFORMATION REPORTS IN A WIRELESS COMMUNICATION SYSTEM

FIELD

[0001] This disclosure relates generally to wireless communications and, more particularly, to reporting channel state information (CSI).

BACKGROUND

[0002] This background description is provided for the purpose of generally presenting the context of the disclosure. Work of the presently named inventors, to the extent it is described in this background section, as well as aspects of the description that may not otherwise qualify as prior art at the time of filing, are neither expressly nor impliedly admitted as prior art against the present disclosure.

[0003] Multiple channel state information (CSI) reports may be scheduled to be transmitted in the same slot, causing a conflicting overlap (or collision) at least in time domain. Under such situation, the multiple CSI reports may be transmitted and/or multiplex over a common uplink resource. Such an overlap of multiple CSI reports may take place in scenarios where a set of CSI reports are configured for serving cells (may be referred to as serving cell CSI reports), and another set of CSI reports are configured for candidate/target cells for lower layer triggered mobility (LTM) (may be referred to as LTM beam reports or LTM beam report when the CSI reports for LTM only reports L1-RSRP and/or L1-SINR). When these CSI reports are scheduled to be transmitted with such an overlap, the serving cell CSI reports and the LTM beam reports (e.g., another set of CSI reports) may be multiplexed according to priority rules. Additionally, a portion of a CSI report or the entire CSI report may need to be truncated or dropped in view of limited capacity of uplink resources.

[0004] LTM may enhance UE mobility by reducing latency when the UE performs cell switching (e.g., when a UE moves from a source cell to a target cell). Currently, cell switching often requires many higher layer message exchanges and reconfigurations, which may induce substantial latency. An LTM procedure may reduce the latency issue. The network entity may configure one or more candidate/target cell configuration(s) for the UE. Thereafter, the network entity may transmit a cell switch command (CSC) to the UE indicating a target cell. The UE, based on the CSC, switches from the source cell to the target cell. This way, exchanges of higher layer messages and/or related reconfigurations may be avoided.

[0005] For the network entity to decide which candidate cell may serve as target cell, the network entity may trigger CSI measurement and reporting for reference signals (RSs) transmitted from the candidate cells. Based on the CSI report(s) of candidate cells received from the UE, the network entity may then decide which target cell to be included in the CSC accordingly. Currently, the support for such operations is based on CSI report with at least layer 1 reference signal received power (L1-RSRP) of synchronization signal blocks (SSBs) from candidate cell(s) (may be referred to as LTM beam report). However, the priority rules for multiplexing the LTM beam reports with other CSI reports configured for serving cells have not been specified.

SUMMARY

[0006] The present disclosure provides methods, systems, and techniques for determining respective priorities of multiple channel state information (CSI) reports to be multiplexed in one common uplink resource. In some scenarios, multiple CSI reports may be scheduled to be transmitted over a common uplink resource, due to a conflicting overlap (or collision). Such an overlap of multiple CSI reports may take place in scenarios where a set of CSI reports are configured for serving cells, and another set of CSI reports are configured for candidate/target cells for lower layer triggered mobility (LTM) (may be referred to as LTM beam reports). When these CSI reports are scheduled to be transmitted with such an overlap, the serving cell CSI reports and the LTM beam reports may be multiplexed in an order based on their respective priorities. Sometimes a portion of a CSI report or the entire CSI report may need to be truncated or dropped in view of limited uplink resources. The present disclosure provides a mechanism for determining the CSI priorities for multiplexing the serving cell CSI reports and the LTM beam reports, so the truncation, if needed, would unlikely impact LTM procedures. The mechanism can also be applied when these CSI reports to be multiplexed or with overlap are all LTM beam reports.

[0007] The disclosed methods also handle whether and how to indicate a CSI triggering state including both the serving cell CSI reports and the LTM beam reports. The present disclosure provides techniques for determining the priority of CSI reports including CSI reports for serving cells and LTM beam reports for candidate cells. Additionally, the present disclosure provides methods of handling CSI triggering states. Currently, a “CSI request” field in a downlink control information (DCI) indicates one of the configured CSI triggering states. Each configured CSI triggering state may involve one or more CSI reports for serving

cells. The standard has not specified whether a CSI triggering state may involve CSI reports for serving cells and LTM beam reports jointly. The present disclosure provides example methods of UE capability that handles the CSI triggering states.

[0008] According to general aspects of this disclosure, a method for wireless communications by a user equipment (UE) includes receiving, from a network entity, a configuration configuring at least one serving cell CSI report and at least one LTM beam report. Herein, the terms “LTM beam report,” “CSI report for LTM,” “LTM report,” or other similar terms are interchangeable in the context of CSI reporting involving LTM. The UE then transmits, to the network entity, a report with uplink control information (UCI) or CSI multiplexed based on a priority of the at least one serving cell CSI report and the at least one LTM beam report.

[0009] In aspects, the UE receives, from the network entity, control signaling that configures a candidate cell of a LTM procedure; wherein the at least one LTM beam report is associated with the candidate cell and the at least one CSI report is associated with a serving cell. In some cases, the UE transmits to the network entity, an indication of a capability for supporting joint triggering of both the at least one serving cell CSI report and the at least one LTM beam report.

[0010] In aspects, the priority is based on at least one of a report type associated with the at least one serving cell CSI report and/or the at least one LTM beam report; time domain behavior associated with the at least one serving cell CSI report and/or the at least one LTM beam report; content associated with the at least one serving cell CSI report and/or the at least one LTM beam report; a cell index of serving cell associated with the at least one serving cell CSI report and/or a cell index of candidate cell associated with the at least one LTM beam report; or a report configuration identifier associated with the at least one serving cell CSI report and/or the at least one LTM beam report. For example, the disclosed techniques apply in cases when more than one LTM beam reports overlap without transmitting serving cell CSI reports.

[0011] In some cases, the priority includes (or is determined based on) respective priority values associated with the at least one serving cell CSI report and/or the least one LTM beam report. The UE determines the respective priority values based on one or more numerical values including: a first numerical value corresponding to the report type; a second numerical value corresponding to the time domain behavior of report; a third numerical value

corresponding to the report content; a fourth numerical value corresponding to the associated cell index; and a fifth numerical value corresponding to the report configuration identifier.

[0012] In aspects, the respective priority values for the at least one serving cell CSI report and the at least one LTM beam report are determined based on a common formula.

[0013] In some cases, the report type includes: a first report type associated with the at least one LTM beam report, and a second report type associated with the at least one serving cell CSI report, wherein the first report type has priority over the second report type.

[0014] In some cases, the time domain behavior includes: a first time domain behavior has a higher priority than a second time domain behavior. The first time domain behavior or the second time domain behavior may further include: an aperiodic time domain behavior, a semi-persistent time domain behavior with transmission on PUSCH, a semi-persistent time domain behavior with transmission on PUCCH, and a periodic time domain behavior; wherein the aperiodic time domain behavior has a higher priority than the semi-persistent time domain behavior with transmission on PUSCH, wherein the semi-persistent time domain behavior with transmission on PUSCH has a higher priority than the semi-persistent time domain behavior with transmission on PUCCH, wherein the semi-persistent time domain behavior with transmission on PUCCH has a higher priority than the periodic time domain behavior.

[0015] In some cases, the content includes: a first content associated with the at least one CSI report with a reference signal received power (RSRP) or signal-to-interference plus noise ratio (SINR), and a second content associated with the at least one CSI report without the RSRP or SINR; wherein the first content has a higher priority than the second content.

[0016] In some cases, the cell index includes: a first cell index associated with the at least one LTM beam report, and a second cell index associated with the at least one serving cell CSI report; wherein the first cell index has a higher priority than the second cell index. For LTM beam reports, a LTM beam report associated with lower cell index has a higher priority than a LTM beam report associated with higher cell index. For serving cell CSI reports, a serving cell CSI report associated with lower cell index has a higher priority than a serving cell CSI report associated with higher cell index.

[0017] In some cases, the report configuration identifier includes: a first report configuration identifier associated with the at least one LTM beam report, and a second report configuration identifier associated with the at least serving cell one CSI report;

wherein the first report configuration identifier has a higher priority than the second report configuration identifier. For LTM beam reports, a LTM beam report associated with lower report configuration identifier has a higher priority than a LTM beam report associated with higher report configuration identifier. For serving cell CSI reports, a serving cell CSI report associated with lower report configuration identifier has a higher priority than a serving cell CSI report associated with higher report configuration identifier.

[0018] In aspects, a first priority value associated with the at least one serving cell CSI report is based on a first formula, and a second priority value associated with the at least one LTM beam report is based on a second formula different from the first formula. In some cases, the UE transmits the report by: including, in an uplink resource in one slot, one or more LTM beam reports ordered by the second priority value associated with the at least one LTM beam report; and thereafter including, in a remaining available portion of the uplink resource, one or more serving cell CSI reports, if any in the slot, ordered by the first priority value associated with the at least one serving cell CSI report.

[0019] In aspects, the UE receives, from the network entity, downlink control information (DCI) including one or more fields to trigger: the at least one serving cell CSI report, the at least one LTM beam report, or both the at least one serving cell CSI report and the at least one LTM beam report.

[0020] According to general aspects of this disclosure, a method for wireless communications by a network entity includes transmitting, to a UE, a configuration configuring at least one serving cell CSI report and at least one LTM beam report. The network entity receives, from the UE, a report based on a priority of the at least one serving cell CSI report and/or the at least one LTM beam report.

[0021] In aspects, the priority is based on at least one of: a report type associated with the at least one CSI report; time domain behavior associated with the at least one CSI report; content associated with the at least one serving cell CSI report and/or the at least one LTM beam report; a cell index associated with the at least one serving cell CSI report and/or the at least one LTM beam report; or a report configuration identifier associated with the at least one serving cell CSI report and/or the at least one LTM beam report.

[0022] According to general aspects of this disclosure, an apparatus includes one or more radio frequency (RF) modems; a processor coupled to the one or more RF modems; and at least one memory storing executable instructions. The executable instructions manipulate at

least one of the processor or the one or more RF modems to perform the above methods, which are discussed in details herein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] Fig. 1A illustrates a diagram of a wireless communications system that includes multiple user equipments (UEs) and network entities in communication over one or more cells, according to aspects of this disclosure.

[0024] Fig. 1B is a block diagram of another example wireless communication system of that of Fig. 1A for implementing the techniques of this disclosure.

[0025] Fig. 1C is a block diagram of an example base station including a central unit (CU) and a distributed unit (DU) of a distributed base station that may operate in the system of Fig. 1B.

[0026] Fig. 2A is a block diagram of an example protocol stack according to which the UE of Figs. 1A-B may communicate with base stations.

[0027] Fig. 2B is a block diagram of an example protocol stack according to which the UE of Figs. 1A-B may communicate with a DU and a CU of a base station.

[0028] Fig. 3A is an example diagram of signaling operations of determining priority of CSI reports for serving cells and generating CSI reports for target or candidate cells, in accordance with aspects of this disclosure.

[0029] Fig. 3B is an example diagram of signaling operations of determining priority of CSI reports for serving cells and generating CSI reports for target or candidate cells, in accordance with aspects of this disclosure.

[0030] Fig. 4 illustrates an example flowchart of a method performed by a UE, in accordance with aspects of this disclosure.

[0031] Fig. 5 illustrates an example flowchart of a method performed by a network entity, in accordance with aspects of this disclosure.

[0032] Fig. 6 is a diagram illustrating a hardware implementation for an example UE apparatus.

[0033] Fig. 7 is a diagram illustrating a hardware implementation for one or more example network entities.

[0034] Like numerals indicate like elements.

DETAILED DESCRIPTION

[0035] This disclosure provides methods and techniques on how to determine channel state information (CSI) report priority when uplink (UL) transmission carrying CSI reports for serving cells and UL transmission carrying CSI reports for lower layer triggered mobility (LTM) are scheduled to overlapped in at least one UL symbol. According to aspects of the present disclosure, a UE derives or determines priority of CSI reports for LTM and CSI reports for the serving cell. In addition, the network entity is able to trigger CSI reports for LTM and CSI reports for serving cells via one lower layer (e.g., Layer 1 (L1) or Layer 2 (L2)) signal, which reduces latency of CSI measurements and reports. LTM may be used interchangeably with L1/L2 triggered mobility. Otherwise, UE may not realize which CSI reports to transmit when UL transmissions carrying CSI reports for serving cells and/or UL transmissions carrying CSI reports for LTM are scheduled to overlap in at least one UL symbol.

[0036] In some scenarios, multiple CSI reports may be scheduled to be transmitted over a common uplink resource, due to a conflicting overlap (or collision). Such an overlap of multiple CSI reports may take place in scenarios where a set of CSI reports are configured for serving cells (may be referred to as serving cell CSI reports), and another set of CSI reports are configured for candidate/target cells for lower layer triggered mobility (LTM) (may be referred to as LTM beam reports or LTM beam reports). When these CSI reports are scheduled to be transmitted with such an overlap, the CSI reports and the LTM beam reports may be multiplexed in an order based on their respective priorities. Additionally, a portion of a CSI report or the entire CSI report may need to be truncated or dropped in view of limited uplink resources. The present disclosure provides a mechanism for determining the CSI priorities for multiplexing the serving cell CSI reports and/or the LTM beam reports. In addition, the disclosed methods also handle whether and how to indicate a CSI triggering state including both the serving cell CSI reports and/or the LTM beam reports.

[0037] LTM may enhance UE mobility by reducing latency when the UE performs cell switching (e.g., when a UE moves from a source cell to a target cell). Currently, cell switching often requires many higher layer message exchanges and reconfigurations, which may induce substantial latency. An LTM procedure may reduce the latency issue. The network entity may configure one or more candidate/target cell configuration(s) for the UE. Thereafter, the network entity may transmit a cell switch command (CSC) to the UE

indicating a target cell. The UE, based on the CSC, switches from the source cell to the target cell. This way, exchanges of higher layer messages and/or related reconfigurations may be avoided.

[0038] For the network entity to decide which candidate cell may serve as target cell, the network entity may trigger CSI measurement and reporting for reference signals (RSs) transmitted from the candidate cells. Based on the CSI report(s) of candidate cells received from the UE, the network entity may then decide which target cell to be included in the CSC accordingly. Currently, the support for such operations is based on CSI report with at least layer 1 reference signal received power (L1-RSRP) of synchronization signal blocks (SSBs) from candidate cell(s) (may be referred to as LTM beam report). However, the priority rules for multiplexing the LTM beam reports with other CSI reports configured for serving cells have not been specified. The present disclosure provides techniques for determining the priority of CSI reports including CSI reports for serving cells and LTM beam reports for candidate cells.

[0039] Additionally, the present disclosure provides methods of handling CSI triggering states. Currently, a “CSI request” field in a downlink control information (DCI) indicates one of the configured CSI triggering states. Each configured CSI triggering state may involve one or more CSI reports for serving cells. The standard has not specified whether a CSI triggering state may involve CSI reports for serving cells and LTM beam reports jointly. The present disclosure provides example methods of UE capability that handles the CSI triggering states.

[0040] Fig. 1A illustrates a diagram of a wireless communications system 100 associated with multiple cells 190. The wireless communications system includes user equipments (UEs) 102 and base stations/network entities 104. Some base stations may include an aggregated base station architecture and other base stations may include a disaggregated base station architecture. The aggregated base station architecture utilizes a radio protocol stack that is physically or logically integrated within a single radio access network (RAN) node. A disaggregated base station architecture utilizes a protocol stack that is physically or logically distributed among two or more units (e.g., radio unit (RU) 106, distributed unit (DU) 108, central unit (CU) 110). For example, a CU 110 is implemented within a RAN node, and one or more DUs 108 may be co-located with the CU 110, or alternatively, may be geographically or virtually distributed throughout one or multiple other RAN nodes. The DUs 108 may be implemented to communicate with one or more RUs 106. Any of the RU 106, the

DU 108 and the CU 110 may be implemented as virtual units, such as a virtual radio unit (VRU), a virtual distributed unit (VDU), or a virtual central unit (VCU). The base station/network entity 104 (e.g., an aggregated base station or disaggregated units of the base station, such as the RU 106 or the DU 108), may be referred to as a transmission reception point (TRP).

[0041] Operations of the base station (BS) 104 and/or network designs may be based on aggregation characteristics of base station functionality. For example, disaggregated base station architectures are utilized in an integrated access backhaul (IAB) network, an open-radio access network (O-RAN) network, or a virtualized radio access network (vRAN), which may also be referred to a cloud radio access network (C-RAN). Disaggregation may include distributing functionality across the two or more units at various physical locations, as well as distributing functionality for at least one unit virtually, which may enable flexibility in network designs. The various units of the disaggregated base station architecture, or the disaggregated RAN architecture, may be configured for wired or wireless communication with at least one other unit. For example, the base stations (BSs) 104d, 104e and/or the RUs 106a, 106b, 106c, 106d may communicate with the UEs 102a, 102b, 102c, 102d, and/or 102s via one or more radio frequency (RF) access links based on a Uu interface. In examples, multiple RUs 106 and/or BSs 104 may simultaneously serve the UEs 102, such as by intra-cell and/or inter-cell access links between the UEs 102 and the RUs 106/BSs 104.

[0042] The RU 106, the DU 108, and the CU 110 may include (or may be coupled to) one or more interfaces configured to transmit or receive information/signals via a wired or wireless transmission medium. For example, a wired interface may be configured to transmit or receive the information/signals over a wired transmission medium, such as via the fronthaul link 160 between the RU 106d and the baseband unit (BBU) 112 of the BS 104d associated with the cell 190d. The BBU 112 includes a DU 108 and a CU 110, which may also have a wired interface (e.g., midhaul link) configured between the DU 108 and the CU 110 to transmit or receive the information/signals between the DU 108 and the CU 110. In further examples, a wireless interface, which may include a receiver, a transmitter, or a transceiver, such as an RF transceiver, configured to transmit and/or receive the information/signals via the wireless transmission medium, such as for information communicated between the RU 106a of the cell 190a and the BS 104e of the cell 190e via cross-cell communication beams 136-138 of the RU 106a and the BS 104e.

[0043] The RUs 106 may be configured to implement lower layer functionality. For example, the RU 106 is controlled by the DU 108 and may correspond to a logical node that hosts RF processing functions, or lower layer PHY functionality, such as execution of fast Fourier transform (FFT), inverse FFT (iFFT), digital beamforming, physical random access channel (PRACH) extraction and filtering, etc. The functionality of the RU 106 may be based on the functional split, such as a functional split of lower layers.

[0044] The RUs 106 may transmit or receive over-the-air (OTA) communication with one or more UEs 102. For example, the RU 106b of the cell 190b communicates with the UE 102b of the cell 190b via a first set of communication beams 132 of the RU 106b and a second set of communication beams 134b of the UE 102b, which may correspond to inter-cell communication beams or, in some examples, cross-cell communication beams. For instance, the UE 102b of the cell 190b may communicate with the RU 106a of the cell 190a via a third set of communication beams 134a of the UE 102b and a fourth set of communication beams 136 of the RU 106a. DUs 108 may control both real-time and non-real-time features of control plane and user plane communications of the RUs 106.

[0045] Any combination of the RU 106, the DU 108, and the CU 110, or reference thereto individually, may correspond to a BS 104. Thus, the BS 104 may include at least one of the RU 106, the DU 108, or the CU 110. The BSs 104 provide the UEs 102 with access to a core network. The BSs 104 may relay communications between the UEs 102 and the core network (not shown). The BSs 104 may be associated with macrocells for higher-power cellular base stations and/or small cells for lower-power cellular base stations. For example, the cell 190e may correspond to a macrocell, whereas the cells 190a-190d may correspond to small cells. Small cells include femtocells, picocells, microcells, etc. A network that includes at least one macrocell and at least one small cell may be referred to as a “heterogeneous network.”

[0046] Transmissions from a UE 102 to a BS 104/RU 106 are referred to as uplink (UL) transmissions, whereas transmissions from the BS 104/RU 106 to the UE 102 are referred to as downlink (DL) transmissions. Uplink transmissions may also be referred to as reverse link transmissions and downlink transmissions may also be referred to as forward link transmissions. For example, the RU 106d utilizes antennas of the BS 104d of cell 190d to transmit a downlink/forward link communication to the UE 102d or receive an uplink/reverse link communication from the UE 102d based on the Uu interface associated with the access link between the UE 102d and the BS 104d/RU 106d.

[0047] Communication links between the UEs 102 and the BSs 104/RUs 106 may be based on multiple-input and multiple-output (MIMO) antenna technology, including spatial multiplexing, beamforming, and/or transmit diversity. The communication links may be associated with one or more carriers. The UEs 102 and the BSs 104/RUs 106 may utilize a spectrum bandwidth of Y MHz (e.g., 5, 10, 15, 20, 100, 400, 800, 1600, 2000, etc. MHz) per carrier allocated in a carrier aggregation of up to a total of Yx MHz, where x component carriers (CCs) are used for communication in each of the uplink and downlink directions. The carriers may or may not be adjacent to each other along a frequency spectrum. In examples, uplink and downlink carriers may be allocated in an asymmetric manner, with more or fewer carriers allocated to either the uplink or the downlink. A primary component carrier and one or more secondary component carriers may be included in the component carriers. The primary component carrier may be associated with a primary cell (Pcell) and a secondary component carrier may be associated with a secondary cell (Scell).

[0048] Some UEs 102, such as the UEs 102a and 102s, may perform device-to-device (D2D) communications over sidelink. For example, a sidelink communication/D2D link utilizes a spectrum for a wireless wide area network (WWAN) associated with uplink and downlink communications. Such sidelink/D2D communication may be performed through various wireless communications systems, such as wireless fidelity (Wi-Fi) systems, Bluetooth systems, Long Term Evolution (LTE) systems, New Radio (NR) systems, etc.

[0049] The UEs 102 and the BSs 104/RUs 106 may each include multiple antennas. The multiple antennas may correspond to antenna elements, antenna panels, and/or antenna arrays that may facilitate beamforming operations. For example, the RU 106b transmits a downlink beamformed signal based on a first set of communication beams 132 to the UE 102b in one or more transmit directions of the RU 106b. The UE 102b may receive the downlink beamformed signal based on a second set of communication beams 134b from the RU 106b in one or more receive directions of the UE 102b. In a further example, the UE 102b may also transmit an uplink beamformed signal (e.g., sounding reference signal (SRS)) to the RU 106b based on the second set of communication beams 134b in one or more transmit directions of the UE 102b. The RU 106b may receive the uplink beamformed signal from the UE 102b in one or more receive directions of the RU 106b. The UE 102b may perform beam training to determine the best receive and transmit directions for the beamformed signals. The transmit and receive directions for the UEs 102 and the BSs 104/RUs 106 may or may not be the same.

[0050] In further examples, beamformed signals may be communicated between a first base station/RU 106a and a second BS 104e. For instance, the BS 104e of the cell 190e may transmit a beamformed signal to the RU 106a based on the communication beams 138 in one or more transmit directions of the BS 104e. The RU 106a may receive the beamformed signal from the BS 104e of the cell 190e based on the RU communication beams 136 in one or more receive directions of the RU 106a. In further examples, the BS 104e transmits a downlink beamformed signal to the UE 102e based on the communication beams 138 in one or more transmit directions of the BS 104e. The UE 102e receives the downlink beamformed signal from the BS 104e based on UE communication beams 130 in one or more receive directions of the UE 102e. The UE 102e may also transmit an uplink beamformed signal to the BS 104e based on the UE communication beams 130 in one or more transmit directions of the UE 102e, such that the BS 104e may receive the uplink beamformed signal from the UE 102e in one or more receive directions of the BS 104e.

[0051] The BS 104 may include and/or be referred to as a network entity. That is, “network entity” may refer to the BS 104 or at least one unit of the BS 104, such as the RU 106, the DU 108, and/or the CU 110. The BS 104 may also include and/or be referred to as a next generation evolved Node B (ng-eNB), a next generation NB (gNB), an evolved NB (eNB), an access point, a base transceiver station, a radio base station, a radio transceiver, a transceiver function, a basic service set (BSS), an extended service set (ESS), a TRP, a network node, network equipment, or other related terminology. The BS 104 or an entity at the BS 104 may be implemented as an IAB node, a relay node, a sidelink node, an aggregated (monolithic) base station, or a disaggregated base station including one or more RUs 106, DUs 108, and/or CUs 110. A set of aggregated or disaggregated base stations may be referred to as a next generation-radio access network (NG-RAN). In some examples, the UE 102a operates in dual connectivity (DC) with the BS 104e and the base station/RU 106a. In such cases, the BS 104e may be a master node and the base station/RU 106a may be a secondary node.

[0052] Uplink/downlink signaling may also be communicated via a satellite positioning system (SPS) 114. In an example, the SPS 114 associated with the cell 190c may be in communication with one or more UEs 102, such as the UE 102c, and one or more BSs 104/RUs 106, such as the RU 106c. The SPS 114 may correspond to one or more of a Global Navigation Satellite System (GNSS), a global position system (GPS), a non-terrestrial network (NTN), or other satellite position/location system. The SPS 114 may be associated

with LTE signals, NR signals (e.g., based on round trip time (RTT) and/or multi-RTT), wireless local area network (WLAN) signals, a terrestrial beacon system (TBS), sensor-based information, NR enhanced cell ID (NR E-CID) techniques, downlink angle-of-departure (DL-AoD), downlink time difference of arrival (DL-TDOA), uplink time difference of arrival (UL-TDOA), uplink angle-of-arrival (UL-AoA), and/or other systems, signals, or sensors.

[0053] Still referring to Fig. 1A, in certain aspects, any of the UEs 102 may include a CSI report priority component 140 configured to receive, from the BS 104, a configuration configuring at least one CSI report for a serving cell and at least one LTM beam report. The CSI report priority component 140 transmits, to the BS 104, a report based on a priority of the at least one CSI report for the serving cell and the at least one LTM beam report.

[0054] Accordingly, Fig. 1A describes a wireless communication system that may be implemented in connection with aspects of one or more other figures described herein. Further, although the following description may be focused on 5G NR, the concepts described herein may be applicable to other similar areas, such as 5G-Advanced and future versions, LTE, LTE-advanced (LTE-A), and other wireless technologies, such as 6G.

[0055] Referring now to Fig. 1B, another example of the wireless communication system 100 includes the UE 102, the BS 104, the BS 106, and a core network (CN) 110. The BSs 104 and 106 may operate in a RAN 105 connected to the core network (CN) 110. The CN 110 may be implemented as an evolved packet core (EPC) 111 or a fifth generation (5G) core (5GC) 160, for example. The CN 110 may also be implemented as a sixth generation (6G) core in another example.

[0056] The BS 104 may cover one or more cells (e.g., cells 124 and 125) with one or more transmit and/or receive points (TRPs), and the base station 106 may similarly cover one or more cells (e.g., cell 126) with one or more TRPs. For example, the BS 104 operates cell 124 with TRPs 107-1 and 107-2 and operates cell 125 with TRP 107-3, and the base station 106 operates cell 126 with TRPs 108-1 and 108-2. The cells 124 and 125 are operated on the same carrier frequency/frequencies. The cell 126 may be operated on the same carrier frequency/frequencies as the cells 124 and 125. Alternatively, the cell 126 may be operated on different carrier frequency/frequencies from the cells 124 and 125. In some implementations, the BS 104 connects each of the TRPs 107-1, 107-2, and 107-3 via a fiber connection or an Ethernet connection. If the BS 104 is a gNB, the cells 124 and 125 are NR cells. If the BS 104 is an (ng-)eNB, the cells 124 and 125 are evolved universal terrestrial

radio access (EUTRA) cells. Similarly, if the base station 106 is a gNB, the cell 126 is an NR cell, and if the base station 106 is an (ng-)eNB, the cell 126 is an EUTRA cell. The cells 124, 125, and 126 may be in the same Radio Access Network Notification Areas (RNA) or different RNAs. In general, the RAN 105 may include any number of base stations, and each of the base stations may cover one, two, three, or any other suitable number of cells. The UE 102 may support at least a 5G NR (or simply, “NR”) or E-UTRA air interface to communicate with the BS 104 via the TRP 107-1, TRP 107-2, and/or TRP-3. Similarly, the UE 102 may support at least a 5G NR (or simply, “NR”) or E-UTRA air interface to communicate with the base station 106 via the TRP 108-1 and/or TRP 108-2. Each of the BSs 104, 106 may connect to the CN 110 via an interface (e.g., S1 or NG interface). The BSs 104 and 106 also may be interconnected via an interface (e.g., X2 or Xn interface) for interconnecting NG RAN nodes.

[0057] When a base station (e.g., the BS 104 or 106) transmits DL data via a TRP (e.g., the TRP 107-1, TRP 107-2, TRP 107-3, TRP 108-1, or TRP 108-2), the BS 104 may generate a packet including the data transmit the packet to the TRP 107-1. For example, the packet may be a fronthaul transport protocol data unit. The TRP extracts the data from the packet and transmits the data. In some implementations, the BS 104 may include control information for time-critical control and management information directly related to the data in the packet, and the TRP may transmit the data in accordance with the control information. In some implementations, the data includes In-phase and Quadrature (IQ) data, a physical layer bit sequence, or a MAC PDU. When the TRP receives data from a UE (e.g., UE 102), the TRP generates a packet including the data and transmit the packet to the BS 104. In some implementations, the data includes IQ data, a physical layer bit sequence, or a MAC PDU.

[0058] Among other components, the EPC 111 may include a Serving Gateway (SGW) 112, a Mobility Management Entity (MME) 114, and a Packet Data Network Gateway (PGW) 116. The SGW 112 in general is configured to transfer user-plane packets related to audio calls, video calls, Internet traffic, etc., and the MME 114 is configured to manage authentication, registration, paging, and other related functions. The PGW 116 provides connectivity from the UE 102 to one or more external packet data networks, e.g., an Internet network and/or an Internet Protocol (IP) Multimedia Subsystem (IMS) network. The 5GC 160 includes a User Plane Function (UPF) 162 and an Access and Mobility Management Function (AMF) 164, and/or Session Management Function (SMF) 166. Generally, the UPF 162 is configured to transfer user-plane packets related to audio calls, video calls, Internet

traffic, etc., the AMF 164 is configured to manage authentication, registration, paging, and other related functions, and the SMF 166 is configured to manage PDU sessions.

[0059] As illustrated in Fig. 1B, the BS 104 supports cells 124 and 125, and the base station 106 supports a cell 126. The cells 124, 125, and 126 may partially overlap, so that the UE 102 may select, reselect, or hand over from one of the cells 124, 125, and 126 to another. To directly exchange messages or information, the BS 104 and base station 106 may support an X2 or Xn interface. In general, the CN 110 may connect to any suitable number of base stations supporting NR cells and/or EUTRA cells.

[0060] The BS 104 is equipped with processing hardware 130 that may include one or more general-purpose processors (e.g., CPUs) and a non-transitory computer-readable memory storing instructions that the one or more general-purpose processors execute. Additionally or alternatively, the processing hardware 130 may include special-purpose processing units. The processing hardware 130 may include a PHY controller 132 configured to transmit data and control signal on physical DL channels and DL reference signals with one or more user devices (e.g., UE 102) via one or more TRPs (e.g., TRP 107-1, TRP 107-2, and/or TRP 107-3). The PHY controller 132 is also configured to receive data and control signal on physical UL channels and/or UL reference signals with the one or more user devices via the one or more TRPs (e.g., TRP 107-1, TRP 107-2, and/or TRP 107-3). The processing hardware 130 in an example implementation includes a MAC controller 134 configured to perform a random access (RA) procedure with one or more user devices, manage UL timing advance for the one or more user devices, receive UL MAC PDUs from the one or more user devices, and transmit DL MAC PDUs to the one or more user devices. The processing hardware 130 may further include an RRC controller 136 to implement procedures and messaging at the RRC sublayer of the protocol communication stack. The base station 106 may include processing hardware 141 that is similar to processing hardware 130. In particular, components 142, 144, and 146 may be similar to the components 132, 134, and 136, respectively.

[0061] The UE 102 is equipped with processing hardware 150 that may include one or more general-purpose processors such as CPUs and non-transitory computer-readable memory storing machine-readable instructions executable on the one or more general-purpose processors, and/or special-purpose processing units. The PHY controller 152 is also configured to receive data and control signal on physical DL channels and/or DL reference

signals with the BS 104 or 106 via one or more TRPs (e.g., TRP 107-1, TRP 107-2, TRP 107-3, TRP 108-1, and/or TRP 108-2). The PHY controller 152 is also configured to transmit data and control signal on physical UL channels and/or UL reference signals with the BS 104 or 106 via the one or more TRPs (e.g., TRP 107-1, TRP 107-2, TRP 107-3, TRP 108-1, and/or TRP 108-2). The processing hardware 150 in an example implementation includes a MAC controller 154 configured to perform a random access procedure with BS 104 or 106, manage UL timing advance for the one or more user devices, transmit UL MAC PDUs to the BS 104 or 106, and receive DL MAC PDUs from the BS 104 or 106. The processing hardware 150 may further include an RRC controller 156 to implement procedures and messaging at the RRC sublayer of the protocol communication stack.

[0062] Fig. 1C depicts an example distributed or disaggregated implementation of one or both of the BSs 104, 106. In this implementation, each of the BS 104 and/or 106 includes a central unit (CU) 172 and one or more distributed units (Dus) 174. The CU 172 includes processing hardware, such as one or more general-purpose processors (e.g., CPUs) and a computer-readable memory storing machine-readable instructions executable on the general-purpose processor(s), and/or special-purpose processing units. For example, the CU 172 may include a PDCP controller (e.g., PDCP controller 134, 144), an RRC controller (e.g., RRC controller 136, 146), and/or an RRC inactive controller (e.g., RRC inactive controller 138, 148). In some implementations, the CU 172 may include an RLC controller configured to manage or control one or more RLC operations or procedures. In some implementations, the CU 172 does not include an RLC controller.

[0063] Each of the Dus 174 also includes processing hardware that may include one or more general-purpose processors (e.g., CPUs) and computer-readable memory storing machine-readable instructions executable on the one or more general-purpose processors, and/or special-purpose processing units. For example, the processing hardware may include a MAC controller (e.g., MAC controller 132, 142) configured to manage or control one or more MAC operations or procedures (e.g., a random access procedure), and/or an RLC controller configured to manage or control one or more RLC operations or procedures. The processing hardware may also include a physical layer controller configured to manage or control one or more physical layer operations or procedures.

[0064] In some implementations, the RAN 105 supports Integrated Access and Backhaul (IAB) functionality. In some implementations, the DU 174 operates as an (IAB)-node, and the CU 172 operates as an IAB-donor.

[0065] In some implementations, the CU 172 may include a logical node CU-CP 172A that hosts the control plane part of the PDCP protocol of the CU 172. The CU 172 may also include logical node(s) CU-UP 172B that hosts the user plane part of the PDCP protocol and/or SDAP protocol of the CU 172. The CU-CP 172A may transmit control information (e.g., RRC messages, F1 application protocol messages), and the CU-UP 172B may transmit data packets (e.g., SDAP PDUs or IP packets).

[0066] The CU-CP 172A may be connected to multiple CU-Ups 172B through the E1 interface. The CU-CP 172A selects the appropriate CU-UP 172B for the requested services for the UE 102. In some implementations, a single CU-UP 172B may be connected to multiple CU-CPs 172A through the E1 interface. If the CU-CP 172A and DU(s) 174 belong to a gNB, the CU-CP 172A may be connected to one or more DU 174s through an F1-C interface and/or an F1-U interface. If the CU-CP 172A and DU(s) 174 belong to an ng-eNB, the CU-CP 172A may be connected to DU(s) 174 through a W1-C interface and/or a W1-U interface. In some implementations, one DU 174 may be connected to multiple CU-Ups 172B under the control of the same CU-CP 172A. In such cases, the connectivity between a CU-UP 172B and a DU 174 is established by the CU-CP 172A using Bearer Context Management functions.

[0067] Fig. 2A illustrates, in a simplified manner, an example protocol stack 200 according to which the UE 102 may communicate with an eNB/ng-eNB or a gNB (e.g., one or both of the BSs 104, 106).

[0068] In the example stack 200, a physical layer (PHY) 202A of EUTRA provides transport channels to the EUTRA MAC sublayer 204A, which in turn provides logical channels to the EUTRA RLC sublayer 206A. The EUTRA RLC sublayer 206A in turn provides RLC channels to a EUTRA PDCP sublayer 208 and, in some cases, to an NR PDCP sublayer 210. Similarly, the NR PHY 202B provides transport channels to the NR MAC sublayer 204B, which in turn provides logical channels to the NR RLC sublayer 206B. The NR RLC sublayer 206B in turn provides data transfer services to the NR PDCP sublayer 210. The NR PDCP sublayer 210 in turn may provide data transfer services to the SDAP sublayer 212 or an RRC sublayer (not shown in Fig. 2A). The UE 102, in some implementations,

supports both the EUTRA and the NR stack as shown in Fig. 2A, to support handover between EUTRA and NR base stations and/or to support dual connectivity (DC) over EUTRA and NR interfaces. Further, as illustrated in Fig. 2A, the UE 102 may support layering of NR PDCP 210 over EUTRA RLC 206A, and SDAP sublayer 212 over the NR PDCP sublayer 210.

[0069] The EUTRA PDCP sublayer 208 and the NR PDCP sublayer 210 receive packets (e.g., from an IP layer, layered directly or indirectly over the PDCP layer 208 or 210) that may be referred to as SDUs, and output packets (e.g., to the RLC layer 206A or 206B) that may be referred to as PDUs. Except where the difference between SDUs and PDUs is relevant, this disclosure for simplicity refers to both SDUs and PDUs as “packets.”

[0070] On a control plane, the EUTRA PDCP sublayer 208 and the NR PDCP sublayer 210 may provide signaling radio bearers (SRBs) to the RRC sublayer (not shown in Fig. 2A) to exchange RRC messages or NAS messages, for example. On a user plane, the EUTRA PDCP sublayer 208 and the NR PDCP sublayer 210 may provide data radio bearers (DRBs) to support data exchange. Data exchanged on the NR PDCP sublayer 210 may be SDAP PDUs, IP packets, or Ethernet packets.

[0071] Thus, it is possible to functionally split the radio protocol stack, as shown by the radio protocol stack 250 in Fig. 2B. The CU at one or both of the BSs 104, 106 may hold all the control and upper layer functionalities (e.g., RRC 214, SDAP 212, NR PDCP 210), while the lower layer operations (e.g., NR RLC 206B, NR MAC 204B, and NR PHY 202B) are delegated to the DU. To support connection to a 5GC, NR PDCP 210 provides SRBs to RRC 214, and NR PDCP 210 provides DRBs to SDAP 212 and SRBs to RRC 214.

[0072] Fig. 3A is an example diagram 300A of signaling operations of determining priority of CSI reports for serving cells and generating CSI reports for target or candidate cells, in accordance with aspects of this disclosure. In the example diagram 300A, the base station (BS) 104 may communicate with the UE 102 via TRPs 107-1, 107-2 or 107-3 as shown in Fig. 1B.

[0073] As shown in the example diagram 300A, the UE 102 transmit or report 310 UE capability(s) for supporting LTM procedures. The BS 104 transmits 320 configuration signaling, such as radio resource control (RRC) configuration to enable LTM procedure and/or configuring one or more candidate cell(s). The BS 104 then transmits 330 RRC configuration for configuring one or more CSI report configurations for serving cell and/or

one or more LTM CSI report configurations. In some implementations, the BS 104 may configure one or more LTM CSI report configurations via the transmission of RRC 320 instead.

[0074] When multiple CSI reports are configured/activated/triggered to transmit in the same slot, and the physical uplink channels to transmit the multiple CSI reports would overlap in time domain, the UE 102 and/or the BS 104 determine 340 priority among the multiple CSI reports based on a formula (e.g., an equation for computation) or rule as further discussed below.

[0075] Based on the determined priority, the UE 102 multiplexes 350 the multiple CSI reports on an UL resource based on an order from determined priority until capacity of the UL resource is reached. The remaining CSI reports may be dropped or truncated. The UE 102 transmits 360 the UL resource carrying at least some of the multiple CSI reports multiplexed (e.g., the CSI reports having relatively high priorities). Upon receiving the UL resource from the UE, the BS 104 decodes 370 the UL resource based on determined priority and capacity of the UL resource.

[0076] Fig. 3B is an example diagram 300B of signaling operations of determining priority of CSI reports for serving cells and generating CSI reports for target or candidate cells, in accordance with aspects of this disclosure. The example diagram 300B is similar to the example diagram 300A, with differences in how the priority of CSI reports is determined (e.g., using two formulas instead of one).

[0077] As shown in the example diagram 300B, similar to the operations in the example diagram 300A, the UE 102 transmit or report 310 UE capability(s) for supporting LTM procedures. The BS 104 transmits 320 configuration signaling, such as radio resource control (RRC) configuration to enable LTM procedure and/or configuring one or more candidate cell(s). The BS 104 then transmits 330 RRC configuration for configuring one or more CSI report configurations for serving cell and/or one or more LTM CSI report configurations. In some implementations, the BS 104 may configure one or more LTM CSI report configurations via the transmission of RRC 320 instead.

[0078] Unlike the operations shown in the example diagram 300A, in the example diagram 300B, when multiple CSI reports are configured/activated/triggered to transmit in the same slot, and the physical uplink channels to transmit the multiple CSI reports would overlap in time domain, the UE 102 and/or the BS 104 determine 342 priority among the multiple CSI

reports based on two formulas (e.g., two equations for computation), in which one formula is used for determining CSI reports for the serving cell and the other formula is used for determining CSI reports for LTM, as further discussed below.

[0079] The remaining operations in the diagram 300B are similar to those in the diagram 300A. That is, based on the determined priority, the UE 102 multiplexes 350 the multiple CSI reports on an UL resource based on an order from determined priority until capacity of the UL resource is reached. The remaining CSI reports may be dropped or truncated. The UE 102 transmits 360 the UL resource carrying at least some of the multiple CSI reports multiplexed (e.g., the CSI reports having relatively high priorities). Upon receiving the UL resource from the UE, the BS 104 decodes 370 the UL resource based on determined priority and capacity of the UL resource.

[0080] In some implementations, a TRP (e.g., TRP 107-1, TRP 107-2, TRP 107-3, TRP 108-1 and/or TRP 108-2 of Fig. 1B) may be associated with or identified by a TRP identifier. In some implementations, a network entity (e.g., the BS 104 of Figs. 3A and 3B, or the BS 104 or 106 of Figs. 1A and 1B) includes or configures a TRP identifier in UL configuration(s) that the network entity transmits to a UE (e.g., the UE 102 of Figs. 1A, 1B, 3A, and 3B) for UL transmission(s) via a TRP identified by the TRP identifier.

[0081] In some implementations, the UL configuration(s) include downlink control information (DCI) transmitted on a PDCCH, and/or physical uplink shared channel (PUSCH) configuration, physical uplink control channel (PUCCH) configuration and/or sounding reference signal (SRS) configuration included in a RRC message (e.g., RRC reconfiguration message or a RRC resume message) that the network entity transmits to the UE. In some implementations, the UL transmission(s) include PUSCH transmission(s), PUCCH transmission(s) and/or SRS transmission(s).

[0082] In some implementations, the network entity includes a TRP identifier in DL configuration(s) that the network entity transmits to the UE 102 for DL transmission(s) via a TRP identified by the TRP identifier. For example, the DL configuration(s) include DCI transmitted on a PDCCH, and/or channel state information (CSI) resource configuration, physical downlink shared channel (PDSCH) configuration(s) and/or physical downlink control channel (PDCCH) configuration(s) included in a RRC message (e.g., RRC reconfiguration message or a RRC resume message) that the network entity transmits to the UE. In some implementations, the DL transmission(s) include CSI reference signal (CSI-RS)

transmission(s), synchronization signal block (SSB) transmission(s), PDSCH transmission(s) and/or PDCCH transmission(s).

[0083] In some implementations, the network entity does not transmit/configure a TRP identifier to the UE and uses an implicit indication to indicate a TRP to the UE. For example, the implicit indication may be one of the following configuration parameters: a

CORESETPoolIndex, a value (candidate) of a *CORESETPoolIndex*, *dataScramblingIdentityPDSCH*, *dataScramblingIdentityPDSCH2-r16*, or *PUCCH-ResourceGroup-r16*. In such implementations, the UE derives a TRP (identifier) from the implicit indication. In some implementations, the network entity transmits a RRC message (e.g., RRC reconfiguration message or a RRC resume message) including the configuration parameters to the UE.

[0084] In some implementations, the network entity configures or indicates the UE a first TRP identifier. In some implementations, the UE derives a first TRP identifier (value). In some implementations, the network entity configures or indicates the UE a second TRP identifier (value). In some implementations, the UE derives a second TRP identifier (value). In some implementations, the first TRP identifier may be associated with the first TRP. In some implementations, the second TRP identifier may be associated with the second TRP.

[0085] In some implementations, the network entity configures that a serving cell is associated with the first TRP or the first TRP identifier (value). In some implementations, the network entity configures a first control resource set (CORESET) associated with the serving cell or first TRP. The network entity may configure *CORESETPoolIndex* #0 to identify the first CORESET. For example, the network entity may transmit to the UE a RRC message (e.g., a RRC setup message, a RRC reconfiguration message or a RRC resume message) configuring the first CORESET and/or including the *CORESETPoolIndex* #0. Thus, the UE monitors a PDCCH on the first CORESET to receive DCIs from the network entity, which implies that the UE monitors a PDCCH or receives DCIs via the first TRP from the network entity (i.e., from the first TRP). In such a case, the UE determines that *CORESETPoolIndex* #0 indicates a TRP (i.e., the first TRP) of the network entity.

[0086] For example, the network entity configures that the serving cell associated with the second TRP or the second TRP identifier (value). In other implementation, the second TAG is associated with a non-serving cell, and the network entity indicates or configures the

association in the second RRC message. The network entity configures the non-serving cell associated with the second TRP or the second TRP identifier (value).

[0087] In some implementations, the network entity configures a second CORESET is associated with the serving cell, non-serving cell or second TRP. The network entity may configure *CORESETPoolIndex* #1 to identify the second CORESET. For example, the network entity may transmit to the UE a RRC message (e.g., a RRC setup message, a RRC reconfiguration message or a RRC resume message) configuring the second CORESET and/or including the *CORESETPoolIndex* #1. Thus, the UE monitors a PDCCH on the second CORESET to receive DCIs from the network entity, which implies that the UE monitors a PDCCH or receives DCIs via the second TRP from the network entity (i.e., from the second TRP). In such a case, the UE determines that *CORESETPoolIndex* #1 indicates a TRP (the second TRP).

[0088] In some implementations, the network entity may configure the UE one or more additional PCI. The one or more additional PCI(s) may correspond to one or more neighboring cell(s) around the physical serving cell of the UE. In some cases, an additional PCI may be a physical cell index or a logical index corresponding to a physical cell index of a neighboring cell. If a CORESET or a TCI state or a RRC configuration is associated with or includes an additional PCI, it may imply that the CORESET or TCI state or RRC configuration is associated with or applied for or transmitted from a neighboring cell corresponding to the additional PCI.

[0089] In some implementations, the network entity may configure the UE one or more candidate cell configuration(s). The one or more candidate cell configuration(s) may include information of neighboring cell(s) or non-serving cell(s) of the UE. The one or more candidate cell configuration(s) may include information of candidate target cell of the UE for performing a LTM procedure. A candidate cell configuration may comprise or be one of a *RRCReconfiguration* message, a *CellGroupConfig* IE or a *SpCellConfig* IE. A candidate cell may be current configured/activated secondary cell (Scell) of the UE.

[0090] In some implementations, the candidate cell configuration may comprise at least one of: a candidate cell configuration ID, a PCI or a logical index of PCI (e.g., PCI index), one or more TCI state lists for a candidate cell, configuration for DL RS(s) (e.g., SSB or CSI-RS) for measuring layer 1 (L1) reference signal received power (L1-RSRP) and/or L1 signal-

to-interference plus noise ratio (L1-SINR) for/in a candidate cell, or configuration for UL RS(s) (e.g., SRS) for measuring UL CSI for/in a candidate cell.

[0091] In some implementations, the network entity may configure the UE at least an RS set. The UE may measure the at least RS set for measuring CSI and/or transmit CSI report for LTM. The UE may measure the at least RS set for L1-RSRP measurement. Additionally or alternatively, the UE may measure the at least RS set for L1-SINR measurement. The at least RS set may comprise only SSB resource(s). Additionally or alternatively, the at least RS set may comprise only CSI-RS resource(s). Additionally or alternatively, the at least RS set may comprise SSB resource(s) and CSI-RS resource(s).

[0092] In some implementations, the network entity may configure the at least RS set for all configured or activated candidate cell(s). This may imply the UE only measures the at least RS set for CSI measurement/report for all configured or activated candidate cell(s). In some implementations, the network entity may configure one RS set for each configured or activated candidate cell (separately). This may imply the UE measures different RS set for CSI measurement/report for different configured or activated candidate cell(s) accordingly.

[0093] In some implementations, the network entity may configure the UE a first set of CSI reports. In some implementations, the network entity may configure the UE each CSI report in the first set of CSI reports via each corresponding LTM CSI report configuration. In some implementations, the network entity may configure the UE a second set of CSI reports. In some implementations, the network entity may configure the UE each CSI report in the second set of CSI reports via each corresponding CSI report configuration for serving cell. The first set of CSI reports may comprise one or more CSI reports for target or candidate cell(s). The second set of CSI reports may comprise one or more CSI reports for serving cell(s).

[0094] Fig. 4 illustrates a flowchart of a method 400 of wireless communication at a UE. With reference to Figs. 1A, 1B, 3A, 3B, and 6, the method may be performed by the UE 102, the UE apparatus 602, etc., which may include the memory 626', 606', 616, and which may correspond to the entire UE 102 or the entire UE apparatus 602, or a component (e.g., the CSI report priority component 140) of the UE 102 or the UE apparatus 602, such as the wireless baseband processor 626 and/or the application processor 606.

[0095] As shown in Fig. 4, the method 400 starts by optionally transmitting 410, from the UE to a network entity, an indication of a capability for supporting joint triggering of both at

least one CSI report and at least one LTM beam report (similar to operations 310 of Figs. 3A and 3B).

[0096] The UE may receive 420 from the network entity control signaling that configures a candidate cell of a LTM procedure; wherein the at least one LTM beam report is associated with the candidate cell and the at least one CSI report is associated with a serving cell (similar to operations 320 of Figs. 3A and 3B). For example, the control signaling includes the RRC that enables LTM procedure and/or configures candidate cells.

[0097] The UE receives 430, from the network entity, a configuration configuring the at least one CSI report and the at least one LTM beam report (similar to operations 330 of Figs. 3A and 3B). In some aspects, the configuration includes an RRC message that configures one or more CSI report configurations for the serving cell and/or one or more LTM beam report configurations (e.g., for LTM CSI reports or LTM beam reports).

[0098] The UE transmits 460 transmit, to the network entity, a report based on priority of the at least one CSI report and the at least one LTM beam report (similar to operations 360 of Figs. 3A and 3B).

[0099] Fig. 5 is a flowchart of a method 500 of wireless communication at a network entity. The method 500 is complementary to the method 400 of Fig. 4. With reference to Figs. 1A, 1B, 3A, 3B, and 7, the method 500 may be performed by one or more network entities 104, which may correspond to a base station or a unit of the base station, such as the RU 106, the DU 108, the CU 110, an RU processor 706, a DU processor 726, a CU processor 746, etc. The one or more network entities 104 may include memory 706'/726'/746', which may correspond to an entirety of the one or more network entities 104, or a component of the one or more network entities 104, such as the RU processor 706, the DU processor 726, or the CU processor 746.

[0100] As shown in Fig. 5, the network entity optionally receives 510, from a UE, an indication of a capability for supporting joint triggering of both at least one channel state information (CSI) report for a serving cell and at least one lower-layer triggered mobility (LTM) beam report (similar to operations 310 of Figs. 3A and 3B).

[0101] The network entity optionally transmits 520, to the UE, control signaling that configures a candidate cell of a LTM procedure; wherein the at least one LTM beam report is associated with the candidate cell and the at least one CSI report is associated with a serving cell (similar to operations 320 of Figs. 3A and 3B).

[0102] The network entity transmits 530, to the UE, a configuration configuring the at least one CSI report and the at least one LTM beam report (similar to operations 330 of Figs. 3A and 3B). In some aspects, the configuration includes an RRC message that configures one or more CSI report configurations for the serving cell and/or one or more LTM beam report configurations (e.g., for LTM CSI reports or LTM beam reports).

[0103] The network entity then receives 560, from the UE, a report based on priority of the at least one CSI report and the at least one LTM beam report (similar to operations 360 of Figs. 3A and 3B). Various specific aspects of the method 400 and 500 are discussed in details below.

[0104] In some implementations, if the time occupancy of the physical channels scheduled to carry a multiple of CSI reports overlap in at least one OFDM symbol and are transmitted on the same carrier, the UE may multiplex the multiple CSI reports on a UL resource. In some cases, the multiple CSI reports may include part of the first set of CSI reports and/or part of the second set of CSI reports. The UE may multiplex the CSI report with highest priority among the multiple CSI reports first. If the capacity of the UL resource to transmit CSI report is not reached, the UE may multiplex the CSI report with second highest priority among the multiple CSI reports. The UE may multiplex the CSI report with next highest priority among the multiple CSI reports until the capacity of the UL resource to transmit CSI report is reached. The UE may drop CSI reports not (to be) multiplexed on the UL resource.

[0105] In some implementations (such as the operation 340 of Fig. 3A), the UE may determine priority or calculate priority value for a triggered/activated/configured CSI report from the first set of CSI reports in the multiple CSI reports. The UE may determine priority or calculate a priority value for a triggered/activated/configured CSI report from the second set of CSI reports in the multiple CSI reports. The UE may determine priority or calculate a priority value based on a single formula (e.g., an equation) or rule. The UE may determine a CSI report with lower priority value has higher priority over another one CSI report with higher priority value. The UE may determine a CSI report with lowest priority value has highest priority.

[0106] In some implementations, the UE may determine priority or calculate a priority value for a triggered/activated/configured CSI report based on a first criteria. The first criteria may be related to whether the CSI report is for target or candidate cell, or whether the CSI report is for serving cell. In one example, the first criteria may be related to whether the CSI

report is for a CSI report configuration for LTM or not, e.g., whether the CSI report is for a *LTM-CSI-ReportConfig* or a *CSI-ReportConfig*. Based on the first criteria, a CSI report for target or candidate cell may have higher priority or lower priority value than a CSI report for serving cell.

[0107] In some implementations, the UE may determine priority or calculate a priority value for a triggered/activated/configured CSI report based on a second criteria. The second criteria may be related to time domain behavior of the CSI report. Based on the second criteria, a CSI report may have higher priority or lower priority value according to the following example order: (1) aperiodic CSI report to be carried on PUSCH, (2) semi-persistent CSI report to be carried on PUSCH, (3) semi-persistent CSI report to be carried on PUCCH, and (4) periodic CSI report to be carried on PUCCH. For example, aperiodic CSI report to be carried on PUSCH has higher priority than periodic CSI report to be carried on PUCCH.

[0108] In some implementations, if the CSI report is initiated by the UE (e.g., CSI report via UE request), it may have a higher or lower priority value than the network triggered CSI report or some types of network triggered CSI report. In one example, the priority for the CSI report with different time domain behavior may be defined as follows (e.g., ranked from high priority to low priority): (1) aperiodic CSI report to be carried on PUSCH, (2) UE initiated/requested CSI report, if configured/enabled/supported, (3) semi-persistent CSI report to be carried on PUSCH, (4) semi-persistent CSI report to be carried on PUCCH, (5) periodic CSI report to be carried on PUCCH. In another one example, priority of UE initiated/requested CSI report, if configured/enabled/supported, may be higher than aperiodic CSI report to be carried on PUSCH.

[0109] In some implementations, the UE may determine priority or calculate a priority value for a triggered/activated/configured CSI report based on a third criteria. The third criteria may be related to CSI report quantity, e.g., whether the CSI report carries L1-RSRP or L1-SINR. Based on the third criteria, a CSI report carrying L1-RSRP or L1-SINR may have higher priority or lower priority value than a CSI report not carrying L1-RSRP or L1-SINR.

[0110] In some implementations, the UE may determine priority or calculate a priority value for a triggered/activated/configured CSI report based on a fourth criteria. The fourth criteria may be related to serving cell index of the serving cell where the CSI report

corresponds to, e.g., the serving cell to transmit the CSI report or the serving cell where the *CSI-ReportConfig* or *LTM-CSI-ReportConfig* is configured. Based on the fourth criteria, a CSI report corresponding to a serving cell with lower serving cell index may have higher priority or lower priority value than a CSI report corresponding to a serving cell with higher serving cell index. When comparing or considering serving cell index of a CSI report for LTM, the UE may determine the serving cell index is index 0. When comparing or considering serving cell index of a CSI report for LTM, the UE may determine the serving cell index is index 0 if the CSI report for LTM includes beam report for serving cell or Pcell. When comparing or considering serving cell index of a CSI report for LTM, the UE may determine the serving cell index is the lowest or highest candidate cell index among candidate cell(s) reported in the CSI report for LTM. When comparing or considering serving cell index of a CSI report for LTM, the UE may determine the serving cell index is the lowest or highest candidate cell index or serving cell index among candidate cell(s) reported in the CSI report for LTM, if at least one candidate cell reported in the CSI report for LTM is an activated or deactivated serving cell.

[0111] In some implementations, the UE may determine priority or calculate a priority value for a triggered/activated/configured CSI report based on a fifth criteria. The fifth criteria may be related to configuration ID of the CSI report. For example, *reportConfigID* or LTM beam report configuration ID. Based on the fifth criteria, a CSI report with lower configuration ID may have higher priority or lower priority value than a CSI report with higher configuration ID.

[0112] In some implementations, the UE may determine priority or calculate a priority value for a triggered/activated/configured CSI report based on the following formula or equation:

$$\text{Pri}_{\text{CSI}}(x, y, k, c, s) = f(x) + f(y) + f(k) + f(c) + f(s)$$

where

- $x=0$ for a CSI report for target or candidate cell, $x=1$ for a CSI report for serving cell;
 - o One example of $f(x)$ is $f(x) = J_x \cdot N_{\text{cells}} \cdot M_s \cdot x$, where J_x can be predefined, e.g., a value larger than 2 or 6, e.g., $J_x=7$, or a value larger than 3, e.g., 4.

- $y=0$ for aperiodic CSI reports to be carried on PUSCH, $y=1$ for semi-persistent CSI reports to be carried on PUSCH, $y=2$ for semi-persistent CSI reports to be carried on PUCCH, and $y=3$ for periodic CSI reports to be carried on PUCCH;
 - One example of $f(y)$ is $f(y) = 2 \cdot N_{cells} \cdot M_s \cdot y$
- $k=0$ for CSI reports carrying L1-RSRP or L1-SINR and $k=1$ for CSI reports not carrying L1-RSRP or L1-SINR;
 - One example of $f(k)$ is $f(k) = N_{cells} \cdot M_s \cdot k$
- c is the serving cell index for the CSI report;
 - One example of $f(c)$ is $f(c) = M_s \cdot c$
- s is the *reportConfigID* or LTM beam report configuration ID;
 - One example of $f(s)$ is $f(s) = s$
- N_{cells} is the maximum number of serving cells, e.g., the value of the higher layer parameter *maxNrofServingCells*, and M_s is the maximum number of CSI report configuration for CSI report other than LTM or maximum number of CSI report configuration for LTM or maximum number of CSI report configuration for both LTM and non-LTM, e.g., the value of the higher layer parameter *maxNrofCSI-ReportConfigurations*.

[0113] In some implementations, the UE may compare or determine priority of a multiple of CSI reports based on the following criteria (details of which are discussed above): (1) the first criteria related to whether the CSI report is for the serving cell or the target cell, (2) the second criteria related to time domain behavior, if the previous comparison results in the same priority (value), (3) the third criteria related to CSI report quantity, if the previous comparison results in the same priority (value), (4) the fourth criteria related to the serving cell index, if the previous comparison results in the same priority (value), and (5) the fifth criteria related to the configuration ID of the CSI report, if the previous comparison results in the same priority (value).

[0114] In some implementations, the UE may determine priority or calculate a priority value for a triggered/activated/configured CSI report based on the following formula or equation:

$$\text{Pri}_{i\text{CSI}}(y, x, k, c, s) = f(y) + f(x) + f(k) + f(c) + f(s)$$

where

- $y=0$ for aperiodic CSI reports to be carried on PUSCH, $y=1$ for semi-persistent CSI reports to be carried on PUSCH, $y=2$ for semi-persistent CSI reports to be carried on PUCCH and $y=3$ for periodic CSI reports to be carried on PUCCH;
 - One example of $f(y)$ is $f(y) = J_y \cdot N_{cells} \cdot M_s \cdot y$, where J_y can be a value larger than or equal to 2, e.g., $J_y=2$ or 3.
- $x=0$ for a CSI report for target or candidate cell, $x=1$ for a CSI report for serving cell;
 - One example of $f(x)$ is $f(x) = J_x \cdot N_{cells} \cdot M_s \cdot x$, where J_x can be a value larger than 1, e.g., $J_x=1.5$ or 2.
- $k=0$ for CSI reports carrying L1-RSRP or L1-SINR and $k=1$ for CSI reports not carrying L1-RSRP or L1-SINR;
 - One example of $f(k)$ is $f(k) = N_{cells} \cdot M_s \cdot k$
- c is the serving cell index for the CSI report;
 - One example of $f(c)$ is $f(c) = M_s \cdot c$
- s is the *reportConfigID* or LTM beam report configuration ID;
 - One example of $f(s)$ is $f(s) = s$
- N_{cells} is the maximum number of serving cells, e.g., the value of the higher layer parameter *maxNrofServingCells*, and M_s is the maximum number of CSI report configuration for CSI report other than LTM or maximum number of CSI report configuration for LTM or maximum number of CSI report configuration for both LTM and non-LTM, e.g., the value of the higher layer parameter *maxNrofCSI-ReportConfigurations*.

[0115] In some implementations, the UE may compare or determine priority of a multiple of CSI reports based on the following criteria: (1) the second criteria, (2) the first criteria, if the previous comparison results in the same priority (value), (3) the third criteria, if the previous comparison results in the same priority (value), (4) the fourth criteria, if the previous comparison results in the same priority (value), (5) the fifth criteria, if the previous comparison results in the same priority (value).

[0116] In some implementations, the UE may determine priority or calculate a priority value for a triggered/activated/configured CSI report based on the following formula or equation:

$$\text{Pri}_{i\text{CSI}}(y, k, c, s) = f(y) + f(k) + f(c) + f(s)$$

where

- If the UE is triggered/activated/configured a CSI report for target or candidate cell by the NW entity in the multiple of CSI reports, $y=0$ for aperiodic CSI reports for target or candidate cell to be carried on PUSCH, $y=1$ for semi-persistent CSI reports for target or candidate cell to be carried on PUSCH, $y=2$ for semi-persistent CSI reports for target or candidate cell to be carried on PUSCH, $y=3$ for periodic CSI reports for target or candidate cell to be carried on PUCCH, $y=4$ for aperiodic CSI reports for serving cell to be carried on PUSCH, $y=5$ for semi-persistent CSI reports for serving cell to be carried on PUSCH, $y=6$ for semi-persistent CSI reports for serving cell to be carried on PUSCH, and $y=7$ for periodic CSI reports for serving cell to be carried on PUCCH. **Otherwise**, $y=0$ for aperiodic CSI reports for serving cell to be carried on PUSCH, $y=1$ for semi-persistent CSI reports for serving cell to be carried on PUSCH, $y=2$ for semi-persistent CSI reports for serving cell to be carried on PUCCH, and $y=3$ for periodic CSI reports for serving cell to be carried on PUCCH;
 - o Another implementation of determining value of y is $y=-4$ for aperiodic CSI reports for target or candidate cell to be carried on PUSCH, $y=-3$ for semi-persistent CSI reports for target or candidate cell to be carried on PUSCH, $y=-2$ for semi-persistent CSI reports for target or candidate cell to be carried on PUCCH, $y=-1$ for periodic CSI reports for target or candidate cell to be carried on PUCCH, $y=0$ for aperiodic CSI reports for serving cell to be carried on PUSCH, $y=1$ for semi-persistent CSI reports for serving cell to be carried on PUSCH, $y=2$ for semi-persistent CSI reports for serving cell to be carried on PUCCH, and $y=3$ for periodic CSI reports for serving cell to be carried on PUCCH
 - o One example of $f(y)$ is $f(y) = 2 \cdot N_{\text{cells}} \cdot M_s \cdot y$
- $k=0$ for CSI reports carrying L1-RSRP or L1-SINR and $k=1$ for CSI reports not carrying L1-RSRP or L1-SINR;

- One example of $f(k)$ is $f(k) = N_{cells} \cdot M_s \cdot k$
- c is the serving cell index for the CSI report;
 - One example of $f(c)$ is $f(c) = M_s \cdot c$
- s is the *reportConfigID* or LTM beam report configuration ID;
 - One example of $f(s)$ is $f(s) = s$
- N_{cells} is the maximum number of serving cells, e.g., the value of the higher layer parameter *maxNrofServingCells*, and M_s is the maximum number of CSI report configuration for CSI report other than LTM or maximum number of CSI report configuration for LTM or maximum number of CSI report configuration for both LTM and non-LTM, e.g., the value of the higher layer parameter *maxNrofCSI-ReportConfigurations*.

[0117] In some implementations, the UE may compare or determine priority of a multiple of CSI reports based on the following criteria.

[0118] First, the priority comparison may be based on the second criteria with more details, where a CSI report may have higher priority or lower priority value according to the following order (e.g., high priority first): (1) aperiodic CSI reports for target or candidate cell to be carried on PUSCH, (2) semi-persistent CSI reports for target or candidate cell to be carried on PUSCH, (3) semi-persistent CSI reports for target or candidate cell to be carried on PUCCH, (4) periodic CSI reports for target or candidate cell to be carried on PUCCH, (5) aperiodic CSI reports for serving cell to be carried on PUSCH, (6) semi-persistent CSI reports for serving cell to be carried on PUSCH, (7) semi-persistent CSI reports for serving cell to be carried on PUCCH, (8) periodic CSI reports for serving cell to be carried on PUCCH.

[0119] Second, the priority comparison may be based on the third criteria, if the previous comparison results in the same priority (value). Third, the priority comparison may be based on the fourth criteria, if the previous comparison results in the same priority (value). Fourth, the priority comparison may be based on the fifth criteria, if the previous comparison results in the same priority (value).

[0120] In some implementations, the UE may determine priority or calculate a priority value for a triggered/activated/configured CSI report based on the following formula or equation:

$$\text{Pri}_{i\text{CSI}}(y, k, c, s) = f(y) + f(k) + f(c) + f(s)$$

where

- $y=0$ for aperiodic CSI reports to be carried on PUSCH, $y=1$ for semi-persistent CSI reports to be carried on PUSCH, $y=2$ for semi-persistent CSI reports to be carried on PUCCH, $y=3$ for periodic CSI reports to be carried on PUCCH;
 - One example of $f(y)$ is $f(y) = J_y \cdot N_{\text{cells}} \cdot M_s \cdot y$, where J_y can be 2 or 3 or other value. The value of J_y may be determined based on whether a UE is configured or triggered a CSI report for target or candidate cell. In one example, if a UE is configured or triggered a CSI report for target or candidate cell, J_y is 3; otherwise, J_y is 2. Alternatively, the value of J_y may be predefined.
- If the UE is triggered/activated/configured a CSI report for target or candidate cell by the NW entity in the multiple of CSI reports, $k=0$ for CSI reports for candidate cell or target cell, $k=1$ for CSI reports carrying L1-RSRP or L1-SINR for serving cell and $k=2$ for CSI reports not carrying L1-RSRP or L1-SINR for serving cell. Otherwise, $k=0$ for CSI reports carrying L1-RSRP or L1-SINR for serving cell and $k=1$ for CSI reports not carrying L1-RSRP or L1-SINR for serving cell;
 - Another implementation of determining value of k is $k=-1$ for CSI reports for candidate cell or target cell, $k=0$ for CSI reports carrying L1-RSRP or L1-SINR for serving cell and $k=1$ for CSI reports not carrying L1-RSRP or L1-SINR for serving cell.
 - One example of $f(k)$ is $f(k) = N_{\text{cells}} \cdot M_s \cdot k$
- c is the serving cell index for the CSI report;
 - One example of $f(c)$ is $f(c) = M_s \cdot c$
- s is the *reportConfigID* or LTM beam report configuration ID;
 - One example of $f(s)$ is $f(s) = s$

- N_{cells} is the maximum number of serving cells, e.g., the value of the higher layer parameter $maxNrofServingCells$, and M_s is the maximum number of CSI report configuration for CSI report other than LTM or maximum number of CSI report configuration for LTM or maximum number of CSI report configuration for both LTM and non-LTM, e.g., the value of the higher layer parameter $maxNrofCSI-ReportConfigurations$.

[0121] In some implementations, the UE may compare or determine priority of a multiple of CSI reports based on the following criteria. First, the priority comparison is based on the second criteria. Second, the priority comparison is based on the third criteria with more details, if the previous comparison results in the same priority (value), where a CSI report may have higher priority or lower priority value according to the following order: (1) CSI reports for candidate cell or target cell, (2) CSI reports carrying L1-RSRP or L1-SINR for serving cell, and (3) CSI reports not carrying L1-RSRP or L1-SINR for serving cell. Fourth, the priority comparison is based on the fourth criteria, if the previous comparison results in the same priority (value). Finally, the priority comparison is based on the fifth criteria, if the previous comparison results in the same priority (value).

[0122] In some implementations, the UE may determine priority or calculate a priority value for a triggered/activated/configured CSI report based on the following formula or equation:

$$Pri_{iCSI}(y, k, c, s) = f(y) + f(k) + f(c) + f(s)$$

where

- $y=0$ for aperiodic CSI reports to be carried on PUSCH, $y=1$ for semi-persistent CSI reports to be carried on PUSCH, $y=2$ for semi-persistent CSI reports to be carried on PUCCH, $y=3$ for periodic CSI reports to be carried on PUCCH;
 - o One example of $f(y)$ is $f(y) = J_y \cdot N_{cells} \cdot M_s \cdot y$, where J_y can be 2 or 3 or 4 or other value.
- $k=0$ for CSI reports carrying L1-RSRP or L1-SINR and $k=1$ for CSI reports not carrying L1-RSRP or L1-SINR;
 - o One example of $f(k)$ is $f(k) = J_k \cdot N_{cells} \cdot M_s \cdot k$, where J_k can be 2 or 3 or other value. The value of J_k may be determined based on whether a UE is

configured or triggered a CSI report for target or candidate cell. In one example, if a UE is configured or triggered a CSI report for target or candidate cell, J_k is 2; otherwise, J_k is 1. Alternatively, the value of J_k may be predefined.

- If the UE is triggered/activated/configured a CSI report for target or candidate cell by the NW entity in the multiple of CSI reports, c is the serving cell index for CSI reports for target or candidate cell, and c is the serving cell index plus N_{cells} for CSI reports for serving cell. Otherwise, c is the serving cell index for CSI reports for serving cell;
 - Another implementation of determining value of c : $c = - (N_{cells} - \text{the serving cell index})$ for CSI reports for target or candidate cell, and c is the serving cell index for CSI reports for serving cell
 - One example of $f(c)$ is $f(c) = M_s \cdot c$
- s is the *reportConfigID* or LTM beam report configuration ID;
 - One example of $f(s)$ is $f(s) = s$
- N_{cells} is the maximum number of serving cells, e.g., the value of the higher layer parameter *maxNrofServingCells*, and M_s is the maximum number of CSI report configuration for CSI report other than LTM or maximum number of CSI report configuration for LTM or maximum number of CSI report configuration for both LTM and non-LTM, e.g., the value of the higher layer parameter *maxNrofCSI-ReportConfigurations*.

[0123] In some implementations, the UE may compare or determine priority of a multiple of CSI reports based on the following criteria. First, the priority comparison is based on the second criteria. Second, the priority comparison is based on the third criteria, if the previous comparison results in the same priority value. Third, the priority comparison is based on the fourth criteria with more details, if the previous comparison results in the same priority value, where a CSI report may have higher priority or lower priority value according to the following order: (1) lower serving cell index for CSI reports for target or candidate cell, and (2) lower serving cell index for CSI reports for serving cell. This may imply that CSI reports for target or candidate cell have higher priority or lower priority value than CSI reports for serving cell, even that cell index value of CSI reports for target or candidate cell is higher than that of CSI reports for serving cell. Fourth, the priority comparison is based on the fifth criteria, if the previous comparison results in the same priority value.

[0124] In some implementations, the UE may determine priority or calculate a priority value for a triggered/activated/configured CSI report based on the following formula or equation:

$$\text{Pri}_{i\text{CSI}}(y, k, c, s) = f(y) + f(k) + f(c) + f(s)$$

where

- $y=0$ for aperiodic CSI reports to be carried on PUSCH, $y=1$ for semi-persistent CSI reports to be carried on PUSCH, $y=2$ for semi-persistent CSI reports to be carried on PUCCH, $y=3$ for periodic CSI reports to be carried on PUCCH;
 - One example of $f(y)$ is $f(y) = J_y \cdot N_{\text{cells}} \cdot M_s \cdot y$, where J_y can be 2 or 3 or other value.
- $k=0$ for CSI reports carrying L1-RSRP or L1-SINR and $k=1$ for CSI reports not carrying L1-RSRP or L1-SINR;
 - One example of $f(k)$ is $f(k) = N_{\text{cells}} \cdot M_s \cdot k$
- c is the serving cell index;
 - One example of $f(c)$ is $f(c) = M_s \cdot c$
- If the UE is triggered/activated/configured a CSI report for target or candidate cell by the NW entity in the multiple of CSI reports, s is LTM beam report configuration ID for CSI reports for target or candidate cell, and $s = (N_s + \text{reportConfigID})$ for CSI reports for serving cell. Otherwise, s is the *reportConfigID* for CSI reports for serving cell;
 - Another implementation of determining value of s : $s = -(N_s - \text{LTM beam report configuration ID})$ for CSI reports for target or candidate cell, and s is the *reportConfigID* for CSI reports for serving cell
 - N_s may be total number of configured LTM beam report configurations for the UE or the maximum number of LTM beam report configurations that can be configured for the UE
 - One example of $f(s)$ is $f(s) = s$
- N_{cells} is the maximum number of serving cells, e.g., the value of the higher layer parameter *maxNrofServingCells*, and M_s is the maximum number of CSI report

configuration for CSI report other than LTM or maximum number of CSI report configuration for LTM or maximum number of CSI report configuration for both LTM and non-LTM, e.g., the value of the higher layer parameter *maxNrofCSI-ReportConfigurations*.

[0125] In some implementations, the UE may compare priority of a multiple of CSI reports based on the following criteria. First, the priority comparison is based on the second criteria. Second, the priority comparison is based on the third criteria, if the previous comparison results in the same priority (value). Third, the priority comparison is based on the fourth criteria, if the previous comparison results in the same priority (value). Fourth, the priority comparison is based on the fifth criteria with more details, if the previous comparison results in the same priority (value), where a CSI report may have higher priority or lower priority value according to the following order: (1) lower LTM beam report configuration ID for CSI reports for target or candidate cell, and (2) lower report configuration ID (e.g., *reportConfigID*) for CSI reports for serving cell. This may imply that CSI reports for target or candidate cell have higher priority or lower priority value than CSI reports for serving cell, even though the report configuration ID of CSI reports for target or candidate cell is higher than the report configuration ID of CSI reports for serving cell.

[0126] Regarding the second criteria, UE-initiated CSI report may be also considered. One example is UE-initiated CSI report has higher priority or lower priority value than aperiodic CSI report. Another one example is UE-initiated CSI report has lower priority or higher priority value than aperiodic CSI report, but higher priority or lower priority value than semi-persistent CSI reports to be carried on PUSCH.

[0127] In some implementations, if the time occupancy of the physical channels scheduled to carry a multiple of CSI reports overlap in at least one OFDM symbol and are transmitted on the same carrier, the UE may (attempt to) multiplex the multiple CSI reports on a UL resource. In some cases, the multiple CSI reports may include part of the first set of CSI reports and/or part of the second set of CSI reports. The UE may multiplex the CSI report with highest priority among the multiple CSI reports first. If the capacity of the UL resource to transmit CSI report is not reached, the UE may multiplex the CSI report with second highest priority among the multiple CSI reports. The UE may multiplex the CSI report with next highest priority among the multiple CSI reports until the capacity of the UL resource to

transmit CSI report is reached. The UE may drop CSI reports not (to be) multiplexed on the UL resource.

[0128] In some implementations (such as in the operation 342 of Fig. 3B), the UE may determine priority or calculate priority value for triggered/activated/configured CSI reports from the first set of CSI reports in the multiple CSI reports and triggered/activated/configured CSI reports from the second set of CSI reports in the multiple CSI reports separately. The UE may determine priority or calculate a priority value for triggered/activated/configured CSI reports from the first set of CSI reports via a first formula, equation, or rule. The UE may determine priority or calculate a priority value for triggered/activated/configured CSI reports from the second set of CSI reports via a second formula, equation, or rule.

[0129] Regardless of the first set or the second set of CSI reports, the UE may determine a CSI report with lower priority value has higher priority over another one CSI report with higher priority value. Regardless of the first set or the second set of CSI reports, the UE may determine a CSI report with lowest priority value has highest priority. In some cases, the first equation or rule may be associated with one or some of the first, second, third, fourth and fifth criteria mentioned in Embodiment 1. In some cases, the second equation or rule may be associated with one or some of the first, second, third, fourth and fifth criteria mentioned above.

[0130] In some implementations, the UE may determine priority or calculate a priority value for a triggered/activated/configured CSI report from the first set of CSI reports based on the following formula or equation as the first equation:

$$\text{Pri}_{i\text{CSI}}(y', k', c', s') = f(y') + f(k') + f(c') + f(s'),$$

or

$$\text{Pri}_{i\text{CSI}}(y', c', s') = f(y') + f(c') + f(s')$$

where

- $y'=0$ for aperiodic CSI reports for target or candidate cell to be carried on PUSCH, $y'=1$ for semi-persistent CSI reports for target or candidate cell to be carried on PUSCH, $y'=2$ for semi-persistent CSI reports for target or candidate cell to be carried on PUCCH, and $y'=3$ for periodic CSI reports for target or candidate cell to be carried on PUCCH;

- One example of $f(y')$ is $f(y') = 2 \cdot N_{cells} \cdot N_s \cdot y'$; another example of $f(y')$ is $f(y') = N_{cells} \cdot N_s \cdot y'$.
- If $f(k')$ is present in the first equation, $k'=0$ for CSI reports for target or candidate cell carrying L1-RSRP or L1-SINR and $k'=1$ for CSI reports for target or candidate cell not carrying L1-RSRP or L1-SINR;
 - One example of $f(k')$ is $f(k') = N_{cells} \cdot N_s \cdot k'$
- c' is the serving cell index;
 - One example of $f(c')$ is $f(c') = N_s \cdot c'$
- s' is the LTM beam report configuration ID;
 - One example of $f(s')$ is $f(s') = s'$
- N_{cells} is the maximum number of serving cells, e.g., the value of the higher layer parameter *maxNrofServingCells*, and N_s may be total number of configured LTM beam report configurations for the UE or the maximum number of LTM beam report configurations that can be configured for the UE.

[0131] In some implementations, the UE may compare or determine priority of CSI reports from the first set of CSI reports based on the following criteria. First, the priority comparison is based on the second criteria with more details, where a CSI report may have higher priority or lower priority value according to the following example order (high priority first): (1) aperiodic CSI reports for target or candidate cell to be carried on PUSCH, (2) semi-persistent CSI reports for target or candidate cell to be carried on PUSCH, (3) semi-persistent CSI reports for target or candidate cell to be carried on PUCCH, and (4) periodic CSI reports for target or candidate cell to be carried on PUCCH. Second, the priority comparison is based on the third criteria, if the previous comparison results in the same priority (value). Third, the priority comparison is based on the fourth criteria, if the previous comparison results in the same priority (value). Finally, the priority comparison is based on the fifth criteria, if the previous comparison results in the same priority (value).

[0132] In some implementations, the UE may compare or determine priority of CSI reports from the first set of CSI reports based on the following criteria. First, the priority comparison is based on the second criteria with more details, where a CSI report may have higher priority or lower priority value according to the following order: (1) aperiodic CSI reports for target or candidate cell to be carried on PUSCH, (2) semi-persistent CSI reports for target or

candidate cell to be carried on PUSCH, (3) semi-persistent CSI reports for target or candidate cell to be carried on PUCCH, and (4) periodic CSI reports for target or candidate cell to be carried on PUCCH. Second, the priority comparison is based on the fourth criteria, if the previous comparison results in the same priority (value). Third, the priority comparison is based on the fifth criteria, if the previous comparison results in the same priority (value).

[0133] In some implementations, the UE may determine priority or calculate a priority value for a triggered/activated/configured CSI report from the second set of CSI reports based on the following formula or equation:

$$\text{Pri}_{i\text{CSI}}(y, k, c, s) = f(y) + f(k) + f(c) + f(s)$$

where

- $y=0$ for aperiodic CSI reports for serving cell to be carried on PUSCH, $y=1$ for semi-persistent CSI reports for serving cell to be carried on PUSCH, $y=2$ for semi-persistent CSI reports for serving cell to be carried on PUCCH, and $y=3$ for periodic CSI reports for serving cell to be carried on PUCCH;
 - One example of $f(y)$ is $f(y) = 2 \cdot N_{\text{cells}} \cdot M_s \cdot y$
- $k=0$ for CSI reports for serving cell carrying L1-RSRP or L1-SINR and $k=1$ for CSI reports for serving cell not carrying L1-RSRP or L1-SINR;
 - One example of $f(k)$ is $f(k) = N_{\text{cells}} \cdot M_s \cdot k$
- c is the serving cell index;
 - One example of $f(c)$ is $f(c) = M_s \cdot c$
- s is the *reportConfigID*;
 - One example of $f(s)$ is $f(s) = s$
- N_{cells} is the maximum number of serving cells, e.g., the value of the higher layer parameter *maxNrofServingCells*, and M_s is the maximum number of CSI report configurations for CSI report other than LTM, e.g., the value of the higher layer parameter *maxNrofCSI-ReportConfigurations*.

[0134] In some implementations, the UE may compare or determine priority of CSI reports from the second set of CSI reports based on the following criteria. First, the priority comparison is based on the second criteria with more details, where a CSI report may have

higher priority or lower priority value according to the following order: (1) aperiodic CSI reports for serving cell to be carried on PUSCH, (2) semi-persistent CSI reports for serving cell to be carried on PUSCH, (3) semi-persistent CSI reports for serving cell to be carried on PUCCH, and (4) periodic CSI reports for serving cell to be carried on PUCCH. Second, the priority comparison is based on the third criteria, if the previous comparison results in the same priority (value). Third, the priority comparison is based on the fourth criteria, if the previous comparison results in the same priority (value). Fourth, the priority comparison is based on the fifth criteria, if the previous comparison results in the same priority (value).

[0135] In some implementations, after determining priority or calculating priority value for CSI reports from the first set of CSI reports and CSI reports from the second set of CSI reports separately, the UE may determine or compare priority of CSI reports from the first set of CSI reports and CSI reports from the second set of CSI reports jointly.

[0136] In some implementations, the UE determines that CSI reports from the first set of CSI reports always have higher priority than CSI reports from the second set of CSI reports. This may imply that a CSI report with lowest priority or highest priority value from the first set of CSI reports still has higher priority than a CSI report with highest priority or lowest priority value from the second set of CSI reports. This may imply that a periodic CSI report for target or candidate cell to be carried on PUCCH has higher priority than an aperiodic CSI report for serving cell to be carried on PUSCH.

[0137] In some implementations, the UE may determine or compare priority of CSI reports from the first set of CSI reports and CSI reports from the second set of CSI reports jointly based on the following steps. First, the UE determines whether there is one CSI report in the multiple CSI reports as being an aperiodic CSI report to be carried on PUSCH. If the UE determines that there is an aperiodic CSI report, whichever set of CSI reports where the CSI report belongs has higher priority than the other set of CSI reports.

[0138] For example, if the CSI report as being an aperiodic CSI report to be carried on PUSCH is from the first set of CSI reports, all CSI reports from the first set of CSI report in the multiple CSI reports have higher priority than all CSI reports from the second set of CSI report in the multiple CSI reports. This may imply a periodic CSI report for target or candidate cell to be carried on PUCCH has higher priority than a semi-persistent CSI report for serving cell to be carried on PUSCH, as long as there is one aperiodic CSI report to be carried on PUSCH from the first set of CSI reports in the multiple CSI reports.

[0139] If there is no aperiodic CSI report from the above step or if both sets have CSI report as being aperiodic CSI report in the multiple CSI reports, the UE determines whether there is one CSI report in the multiple CSI reports as being a semi-persistent CSI reports to be carried on PUSCH. If there is a semi-persistent CSI report, whichever set of CSI reports where the CSI report belongs has higher priority than the other set of CSI reports.

[0140] If there is no semi-persistent CSI report to be carried on PUSCH, or if both sets have CSI report as being semi-persistent CSI reports to be carried on PUSCH in the multiple CSI reports, the UE determines whether there is one CSI report in the multiple CSI reports as being a semi-persistent CSI reports to be carried on PUCCH. If yes, whichever set of CSI reports where the CSI report belongs has higher priority than the other set of CSI reports.

[0141] If there is no semi-persistent CSI report to be carried on PUSCH, or if both sets have CSI report as being semi-persistent CSI reports to be carried on PUCCH in the multiple CSI reports, the UE determines whether there is one CSI report in the multiple CSI reports as being a periodic CSI reports to be carried on PUCCH. If there is, whichever set of CSI reports where the CSI report belongs has higher priority than the other set of CSI reports.

[0142] Otherwise or if both sets have CSI report as being periodic CSI reports to be carried on PUCCH in the multiple CSI reports, the UE determines whether there is one CSI report in the multiple CSI reports carrying L1-RSRP or L1-SINR. If YES, whichever set of CSI reports where the CSI report belongs has higher priority than the other set of CSI reports.

[0143] If both sets have CSI reports carrying L1-RSRP or L1-SINR in the multiple CSI reports, the UE identifies a CSI report in the multiple CSI reports which is transmitted on or configured for a serving cell with the lowest cell index. Whichever set of CSI reports where the CSI report belongs has higher priority than the other set of CSI reports.

[0144] If both sets have CSI reports in the multiple CSI reports, which are transmitted on or configured for a serving cell with lowest cell index, the UE finds out a CSI report in the multiple CSI reports which has the lowest *reportConfigID* (if for serving cell) or the lowest LTM beam report configuration ID (if for target or candidate cell). Whichever set of CSI reports where the CSI report belongs has higher priority than the other set of CSI reports.

[0145] If both sets have CSI reports in the multiple CSI reports, which has the lowest *reportConfigID* (if for serving cell) or the lowest LTM beam report configuration ID (if for target or candidate cell), i.e., the lowest *reportConfigID* is equal to the lowest LTM beam

report configuration ID, the UE determines that the first set of CSI reports have higher priority than CSI reports from the second set of CSI reports.

[0146] In some implementations, the UE may determine or compare priority of CSI reports from the first set of CSI reports and CSI reports from the second set of CSI reports based on the priority value for the CSI report(s). The UE may determine or compare priority of CSI reports from the first set of CSI reports and CSI reports from the second set of CSI reports based on maximum or minimum or average or total priority value for the CSI report in each set. Then N_s and M_s may share the same value, which may be determined based on the maximum number of CSI report configuration for CSI report other than LTM or maximum number of CSI report configuration for LTM or maximum number of CSI report configuration for both LTM and non-LTM.

[0147] In some implementations, the network entity may configure the UE a CSI triggering list. In some cases, the CSI triggering list may be *CSI-AperiodicTriggerStateList*. The CSI triggering list may include one or more CSI triggering states. Each of the one or more CSI triggering states may be associated with or may include one or more CSI reports.

[0148] In some implementations, the network entity may further transmit a scheduling DCI (e.g., an UL grant or Side Link (SL) grant), which carries a CSI request field. Each codepoint of the CSI request field may be mapped to each CSI triggering states in the CSI triggering list. The network entity may trigger or indicate, to the UE, one or more CSI reports transmission via indicating one codepoint in the CSI request field in the scheduling DCI.

[0149] In some implementations, the network entity may refrain from configuring that a CSI triggering state include at least one CSI report for target or candidate cell and at least one CSI report for serving cell. This may imply that a CSI triggering state includes either all CSI report(s) for target or candidate cell(s) or all CSI report(s) for serving cell(s).

[0150] In some implementations, the network entity may configure that a CSI triggering state include at least one CSI report for target or candidate cell and at least one CSI report for serving cell. In some cases, the network entity may configure such configuration only when the UE supports that at least one CSI report for target or candidate cell and at least one CSI report for serving cell in a CSI triggering state. The UE may indicate, via a first UE capability, the UE supports such feature. The UE may indicate, via the first UE capability, supported number of CSI report for target or candidate cell and supported number of CSI reports for serving cell in a CSI triggering state.

[0151] In some implementations, the network entity may refrain from configuring that the CSI triggering state list includes at least one CSI triggering state triggering CSI reports for target or candidate cell and at least one CSI triggering state triggering CSI reports for serving cell.

[0152] In some implementations, the network entity may configure a first CSI triggering state list and/or a second CSI triggering state list. The first CSI triggering state list may only include CSI triggering states triggering CSI reports for target or candidate cell. The second CSI triggering state list may only include CSI triggering states triggering CSI reports for serving cell.

[0153] In some implementations, the scheduling DCI may carry two CSI request fields. In some cases, each codepoint of the first CSI request field may be mapped to each CSI triggering states in the first CSI triggering list. The network entity may trigger or indicate, to the UE, one or more CSI reports for target or candidate cell via indicating one codepoint in the first CSI request field in the scheduling DCI. In some cases, each codepoint of the second CSI request field may be mapped to each CSI triggering states in the second CSI triggering list. The network entity may trigger or indicate, to the UE, one or more CSI reports for serving cell via indicating one codepoint in the second CSI request field in the scheduling DCI.

[0154] In some implementations, the network entity may configure that the CSI triggering state list includes at least one CSI triggering state triggering CSI reports for target or candidate cell and at least one CSI triggering state triggering CSI reports for serving cell. In some cases, the network entity may configure such configuration only when the UE supports that at least one CSI triggering state triggering CSI reports for target or candidate cell and at least one CSI triggering state triggering CSI reports for serving cell in the CSI triggering state list. The UE may indicate, via a second UE capability, the UE supports such feature. The UE may indicate, via the second UE capability, supported number of CSI triggering states triggering CSI reports for target or candidate cell and supported number of CSI triggering states triggering CSI reports for serving cell in the CSI triggering state list.

[0155] A UE apparatus 602, as described in Fig. 6, may perform the method 400. The one or more network entities (or BS) 104, as described in Fig. 7, may perform the method 500.

[0156] Fig. 6 is a diagram 600 illustrating an example of a hardware implementation for a UE apparatus 602. The UE apparatus 602 may be the UE 102, a component of the UE 102, or

may implement UE functionality. The UE apparatus 602 may include an application processor 606, which may have on-chip memory 606'. In examples, the application processor 606 may be coupled to a secure digital (SD) card 608 and/or a display 610. The application processor 606 may also be coupled to a sensor(s) module 612, a power supply 614, an additional module of memory 616, a camera 618, and/or other related components. For example, the sensor(s) module 612 may control a barometric pressure sensor/altimeter, a motion sensor such as an inertial management unit (IMU), a gyroscope, accelerometer(s), a light detection and ranging (LIDAR) device, a radio-assisted detection and ranging (RADAR) device, a sound navigation and ranging (SONAR) device, a magnetometer, an audio device, and/or other technologies used for positioning.

[0157] The UE apparatus 602 may further include a wireless baseband processor 626, which may be referred to as a modem. The wireless baseband processor 626 may have on-chip memory 626'. Along with, and similar to, the application processor 606, the wireless baseband processor 626 may also be coupled to the sensor(s) module 612, the power supply 614, the additional module of memory 616, the camera 618, and/or other related components. The wireless baseband processor 626 may be additionally coupled to one or more subscriber identity module (SIM) card(s) 620 and/or one or more transceivers 630 (e.g., wireless RF transceivers).

[0158] Within the one or more transceivers 630, the UE apparatus 602 may include a Bluetooth module 632, a WLAN module 634, an SPS module 636 (e.g., GNSS module), and/or a cellular module 638. The Bluetooth module 632, the WLAN module 634, the SPS module 636, and the cellular module 638 may each include an on-chip transceiver (TRX), or in some cases, just a transmitter (TX) or just a receiver (RX). The Bluetooth module 632, the WLAN module 634, the SPS module 636, and the cellular module 638 may each include dedicated antennas and/or utilize antennas 640 for communication with one or more other nodes. For example, the UE apparatus 602 may communicate through the transceiver(s) 630 via the antennas 640 with another UE 102 (e.g., sidelink communication) and/or with a network entity 104 (e.g., uplink/downlink communication), where the network entity 104 may correspond to a base station or a unit of the base station, such as the RU 106, the DU 108, or the CU 110.

[0159] The wireless baseband processor 626 and the application processor 606 may each include a computer-readable medium / memory 626', 606', respectively. The additional

module of memory 616 may also be considered a computer-readable medium / memory. Each computer-readable medium / memory 626', 606', 616 may be non-transitory. The wireless baseband processor 626 and the application processor 606 may each be responsible for general processing, including execution of software stored on the computer-readable medium / memory 626', 606', 616. The software, when executed by the wireless baseband processor 626 / application processor 606, causes the wireless baseband processor 626 / application processor 606 to perform the various functions described herein. The computer-readable medium / memory may also be used for storing data that is manipulated by the wireless baseband processor 626 / application processor 606 when executing the software. The wireless baseband processor 626 / application processor 606 may be a component of the UE 102. The UE apparatus 602 may be a processor chip (e.g., modem and/or application) and include just the wireless baseband processor 626 and/or the application processor 606. In other examples, the UE apparatus 602 may be the entire UE 102 and include the additional modules of the apparatus 602.

[0160] As discussed in Figs. 1A and 1B and implemented with respect to Figs. 3A, 3B, and 4, the CSI report priority component 140 is configured to receive a configuration configuring the at least one CSI report for a serving cell and the at least one LTM beam report. The CSI report priority component is further to transmit a report based on priority of the at least one CSI report for the serving cell and the at least one LTM beam report.

[0161] The CSI report priority component 140 may be within the application processor 606 (e.g., at 140a), the wireless baseband processor 626 (e.g., at 140b), or both the application processor 606 and the wireless baseband processor 626. The CSI report priority component 140a-140b may be one or more hardware components specifically configured to carry out the stated processes/algorithm, implemented by one or more processors configured to perform the stated processes/algorithm, stored within a computer-readable medium for implementation by the one or more processors, or a combination thereof.

[0162] Fig. 7 is a diagram 700 illustrating an example of a hardware implementation for one or more network entities 104. The one or more network entities 104 may be a base station, a component of a base station, or may implement base station functionality. The one or more network entities 104 may include, or may correspond to, at least one of the RU 106, the DU, 108, or the CU 110. The CU 110 may include a CU processor 746, which may have on-chip memory 746'. In some aspects, the CU 110 may further include an additional module

of memory 756 and/or a communications interface 748, both of which may be coupled to the CU processor 746. The CU 110 may communicate with the DU 108 through a midhaul link 162, such as an F1 interface between the communications interface 748 of the CU 110 and a communications interface 728 of the DU 108.

[0163] The DU 108 may include a DU processor 726, which may have on-chip memory 726'. In some aspects, the DU 108 may further include an additional module of memory 736 and/or the communications interface 728, both of which may be coupled to the DU processor 726. The DU 108 may communicate with the RU 106 through a fronthaul link 160 between the communications interface 728 of the DU 108 and a communications interface 708 of the RU 106.

[0164] The RU 106 may include an RU processor 706, which may have on-chip memory 706'. In some aspects, the RU 106 may further include an additional module of memory 716, the communications interface 708, and one or more transceivers 730, all of which may be coupled to the RU processor 706. The RU 106 may further include antennas 740, which may be coupled to the one or more transceivers 730, such that the RU 106 may communicate through the one or more transceivers 730 via the antennas 740 with the UE 102.

[0165] The on-chip memory 706', 726', 746' and the additional modules of memory 716, 736, 756 may each be considered a computer-readable medium / memory. Each computer-readable medium / memory may be non-transitory. Each of the processors 706, 726, 746 is responsible for general processing, including execution of software stored on the computer-readable medium / memory. The software, when executed by the corresponding processor(s) 706, 726, 746 causes the processor(s) 706, 726, 746 to perform the various functions described herein. The computer-readable medium / memory may also be used for storing data that is manipulated by the processor(s) 706, 726, 746 when executing the software. In examples, the CSI report priority component 150 may sit at any of the one or more network entities 104, such as at the CU 110; both the CU 110 and the DU 108; each of the CU 110, the DU 108, and the RU 106; the DU 108; both the DU 108 and the RU 106; or the RU 106.

[0166] The CSI report priority component 150 may perform various operations and signaling (such as the operations in Figs. 3A, 3B, and 5) according to the examples provided herein and be within one or more processors of the one or more network entities 104, such as the RU processor 706 (e.g., at 150a), the DU processor 726 (e.g., at 150b), and/or the CU processor 746 (e.g., at 150c). The CSI report priority component 150a-150c may be one or

more hardware components specifically configured to carry out the stated processes/algorithm, implemented by one or more processors 706, 726, 746 configured to perform the stated processes/algorithm, stored within a computer-readable medium for implementation by the one or more processors 706, 726, 746, or a combination thereof.

[0167] The specific order or hierarchy of blocks in the processes and flowcharts disclosed herein are an illustration of example approaches. Hence, the specific order or hierarchy of blocks in the processes and flowcharts may be rearranged. Some blocks may also be combined or deleted. Dashed lines may indicate example/optional elements of the diagrams. The accompanying method claims present elements of the various blocks in an example order, and are not limited to the specific order or hierarchy presented in the claims, processes, and flowcharts.

[0168] The detailed description set forth herein describes various configurations in connection with the drawings and does not represent the only configurations in which the concepts described herein may be practiced. The detailed description includes specific details for the purpose of providing a thorough explanation of various concepts. However, these concepts may be practiced without these specific details. In some instances, well known structures and components are shown in block diagram form in order to avoid obscuring such concepts.

[0169] Aspects of wireless communication systems, such as telecommunication systems, are presented with reference to various apparatuses and methods. These apparatuses and methods are described in the following detailed description and are illustrated in the accompanying drawings by various blocks, components, circuits, processes, call flows, systems, algorithms, etc. (collectively referred to as “elements”). These elements may be implemented using electronic hardware, computer software, or combinations thereof. Whether such elements are implemented as hardware or software depends upon the particular application and design constraints imposed on the overall system.

[0170] An element, or any portion of an element, or any combination of elements may be implemented as a “processing system” that includes one or more processors. Examples of processors include microprocessors, microcontrollers, graphics processing units (GPUs), central processing units (CPUs), application processors, digital signal processors (DSPs), reduced instruction set computing (RISC) processors, systems-on-chip (SoC), baseband processors, field programmable gate arrays (FPGAs), programmable logic devices (PLDs),

state machines, gated logic, discrete hardware circuits, and other similar hardware configured to perform the various functionality described throughout this disclosure. One or more processors in the processing system may execute software, which may be referred to as software, firmware, middleware, microcode, hardware description language, or otherwise. Software may be construed broadly to mean instructions, instruction sets, code, code segments, program code, programs, subprograms, software components, applications, software applications, software packages, routines, subroutines, objects, executables, threads of execution, procedures, functions, or any combination thereof.

[0171] If the functionality described herein is implemented in software, the functions may be stored on, or encoded as, one or more instructions or code on a computer-readable medium, such as a non-transitory computer-readable storage medium. Computer-readable media includes computer storage media and may include a random-access memory (RAM), a read-only memory (ROM), an electrically erasable programmable ROM (EEPROM), optical disk storage, magnetic disk storage, other magnetic storage devices, combinations of these types of computer-readable media, or any other medium that may be used to store computer executable code in the form of instructions or data structures that may be accessed by a computer. Storage media may be any available media that may be accessed by a computer.

[0172] Aspects, implementations, and/or use cases described herein may be implemented across many differing platform types, devices, systems, shapes, sizes, and packaging arrangements. For example, the aspects, implementations, and/or use cases may come about via integrated chip implementations and other non-module-component based devices, such as end-user devices, vehicles, communication devices, computing devices, industrial equipment, retail/purchasing devices, medical devices, artificial intelligence (AI)-enabled devices, machine learning (ML)-enabled devices, etc. The aspects, implementations, and/or use cases may range from chip-level or modular components to non-modular or non-chip-level implementations, and further to aggregate, distributed, or original equipment manufacturer (OEM) devices or systems incorporating one or more techniques described herein.

[0173] Devices incorporating the aspects and features described herein may also include additional components and features for the implementation and practice of the claimed and described aspects and features. For example, transmission and reception of wireless signals necessarily includes a number of components for analog and digital purposes, such as hardware components, antennas, RF-chains, power amplifiers, modulators, buffers,

processor(s), interleavers, adders/summers, etc. Techniques described herein may be practiced in a wide variety of devices, chip-level components, systems, distributed arrangements, aggregated or disaggregated components, end-user devices, etc., of varying configurations.

[0174] The description herein is provided to enable a person skilled in the art to practice the various aspects described herein. Various modifications to these aspects will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other aspects. Thus, the claims are not limited to the aspects described herein, but are to be interpreted in view of the full scope of the present disclosure consistent with the language of the claims.

[0175] Reference to an element in the singular does not mean “one and only one” unless specifically stated, but rather “one or more.” Terms such as “if,” “when,” and “while” do not imply an immediate temporal relationship or reaction. That is, these phrases, e.g., “when,” do not imply an immediate action in response to or during the occurrence of an action, but simply imply that if a condition is met then an action will occur, but without requiring a specific or immediate time constraint for the action to occur. The terms “may,” “might,” and “may,” as used in this disclosure, often carry certain connotations. For example, “may” refers to a permissible feature that may or may not occur, “might” refers to a feature that probably occurs, and “may” refers to a capability (e.g., capable of). The phrase “For example” often carries a similar connotation to “may” and, therefore, “may” is sometimes excluded from sentences that include “for example” or other similar phrases.

[0176] Unless specifically stated otherwise, the term “some” refers to one or more. Combinations such as “at least one of A, B, or C” or “one or more of A, B, or C” include any combination of A, B, and/or C, such as A and B, A and C, B and C, or A and B and C, and may include multiples of A, multiples of B, and/or multiples of C, or may include A only, B only, or C only. Sets may be interpreted as a set of elements where the elements number one or more.

[0177] Unless otherwise specifically indicated, ordinal terms such as “first” and “second” do not necessarily imply an order in time, sequence, numerical value, etc., but are used to distinguish between different instances of a term or phrase that follows each ordinal term. Reference numbers, as used in the specification and figures, are sometimes cross-referenced among drawings to denote same or similar features. A feature that is exactly the same in

multiple drawings may be labeled with the same reference number in the multiple drawings. A feature that is similar among the multiple drawings, but not exactly the same, may be labeled with reference numbers that have different leading numbers, but have one or more of the same trailing numbers (e.g., 206, 306, 406, etc., may refer to similar features in the drawings). Sometimes an “X” is used to universally denote multiple variations of a feature. For instance, “X06” may universally refer to all reference numbers that end in “06” (e.g., 206, 306, 406, etc.).

[0178] It is noted that throughout this disclosure, a panel may mean that an antenna (port) group or an antenna (port) set. There may be more than one DL/UL beams associated with one panel. When one transmitting node (UE or NW) is performing a transmission via a panel, only one beam associated with the panel may be used to perform the transmission. For a transmitter comprising more than one panels, e.g., two panels, it may happen that two beams associated with the two panels respectively are used to perform a transmission.

[0179] It is noted that throughout this disclosure, the UE may have one or more of the following attributes or behaviors. The following attributes or behaviors of the UE may also imply associated attributes or behaviors of a network entity.

[0180] The UE may be configured with and/or served by the network entity in a serving cell.

[0181] The UE may (be configured to) communicate with the network entity in the serving cell.

[0182] The UE may be configured with one or more serving cells by the network entity, which may include the serving cell.

[0183] The UE may be activated or be indicated, by the network entity, to activate one or more serving cells, which may include the serving cell.

[0184] The UE may be configured and/or indicated, by the network entity, one or more BWP. The UE may be indicated and/or configured, by the network entity, a BWP (in the serving cell).

[0185] In some cases, the BWP may be activated as an active BWP.

[0186] In some cases, the BWP may be referred to an active BWP

[0187] In some cases, the BWP may be an active DL BWP.

[0188] In some cases, the BWP may be an active UL BWP.

[0189] In some cases, the BWP may be an initial BWP.

[0190] In some cases, the BWP may be a default BWP.

[0191] In some cases, the BWP may be a dormant BWP.

[0192] The UE may be in one of RRC_CONNECTED state, RRC_INACTIVE state or RRC_IDLE state.

[0193] It is noted that throughout this disclosure, a neighboring cell may be referred to or replaced with one or some of the followings: (1) a non-serving cell, (2) a cell with PCI different that of the serving cell, or (3) a TRP associated with a PCI different from that of the serving cell.

[0194] It is noted that throughout this disclosure, when a procedure or description is related to a serving cell, it may mean the procedure or description is related to an active (DL/UL) BWP in the serving cell.

[0195] It is noted that throughout this disclosure, a CSI report for target or candidate cell may be replaced with or referred to as a CSI report for LTM.

[0196] It is noted that throughout this disclosure, a CSI report for serving cell may be replaced with or referred to as a CSI report other than CSI report for LTM”, or a Type1/2 CSI report.

[0197] It is noted that throughout this disclosure, a serving cell index for a CSI report may be referred to as or stand for that a serving cell index of a serving cell where the CSI report is transmitted on, or a serving cell where the CSI report is configured for, or a serving cell where report configuration of the CSI report is configured in.

[0198] It is noted that throughout this disclosure, a panel may mean that an antenna (port) group or an antenna (port) set. There may be more than one DL/UL beams associated with one panel. When one transmitting node (UE or NW) is performing a transmission via a panel, only one beam associated with the panel may be used to perform the transmission. For a transmitter comprising more than one panels, e.g., two panels, it may happen that two beams associated with the two panels respectively are used to perform a transmission.

[0199] It is noted that throughout this disclosure, a TRP identifier may mean or be referred to a (candidate) value of a TRP identifier. The first TRP identifier may be a first candidate

value of a TRP identifier or a first TRP identifier value. The second TRP identifier may be a second candidate value of a TRP identifier or a second TRP identifier value.

[0200] It is noted that throughout this disclosure, a panel identifier may mean or be referred to a (candidate) value of a panel identifier. The first panel identifier may be a first candidate value of a panel identifier or a first panel identifier value. The second panel identifier may be a second candidate value of a panel identifier or a second panel identifier value.

[0201] It is noted that throughout this disclosure, when a procedure or description is related to a serving cell, it may mean the procedure or description is related to an active (DL/UL) BWP in the serving cell.

[0202] It is noted that throughout this disclosure, an expression of “X/Y” may include meaning of “X or Y”. It is noted that throughout this disclosure, an expression of “X/Y” may include meaning of “X and Y”. It is noted that throughout this disclosure, an expression of “X/Y” may include meaning of “X and/or Y”. It is noted that throughout this disclosure, an expression of “(A) B” or “B (A)” may include concept of “only B”. It is noted that throughout this disclosure, an expression of “(A) B” or “B (A)” may include concept of “A+B” or “B+A”.

[0203] It is noted that some or all of the foregoing or the following embodiments may be jointly combined or formed to be a new or another one embodiment.

[0204] It is noted that the foregoing or the following embodiments may be used to solve at least (but not limited to) the issue(s) or scenario(s) mentioned in this disclosure.

[0205] The following additional considerations may apply to the foregoing and the following discussions.

[0206] It is noted that any two or more than two of the foregoing or the following paragraphs, (sub)-bullets, points, actions, or claims described in each method/embodiment/implementation may be combined logically, reasonably, and properly to form a specific method.

[0207] It is noted that any sentence, paragraph, (sub)-bullet, point, action, or claim described in each of the foregoing or the following embodiment(s)/implementations/concept(s) may be implemented independently and separately to form a specific method. Dependency, e.g., “based on,” “more specifically,”

“where” or etc., in embodiment(s)/implementations/concept(s) mentioned in this disclosure is just one possible embodiment which would not restrict the specific method.

[0208] It is noted that, some or all of the following terminology and assumption may be used hereafter. A BS may include a network central unit or a network node in NR which is used to control one or multiple TRPs which are associated with one or multiple cells. Communication between BS and TRP(s) is via fronthaul. BS may be referred to as central unit (CU), eNB, gNB, or NodeB. A TRP may include a transmission and reception point provides network coverage and directly communicates with UEs. TRP may be referred to as distributed unit (DU) or network node. A cell may include one or multiple associated TRPs, e.g., coverage of the cell is composed of coverage of all associated TRP(s). One cell is controlled by one BS or a network entity. Cell may be referred to as TRP group (TRPG). A serving beam may include a beam generated by a network node, e.g., TRP, which is configured to be used to communicate with the UE, such as, for transmission and/or reception. A candidate beam for a UE is a candidate of a serving beam. Serving beam may or may not be candidate beam.

[0209] A user device in which the techniques of this disclosure may be implemented (e.g., the UE 102) may be any suitable device capable of wireless communications such as a smartphone, a tablet computer, a laptop computer, a mobile gaming console, a point-of-sale (POS) terminal, a health monitoring device, a drone, a camera, a media-streaming dongle or another personal media device, a wearable device such as a smartwatch, a wireless hotspot, a femtocell, or a broadband router. Further, the user device in some cases may be embedded in an electronic system such as the head unit of a vehicle or an advanced driver assistance system (ADAS). Still further, the user device may operate as an internet-of-things (IoT) device or a mobile-internet device (MID). Depending on the type, the user device may include one or more general-purpose processors, a computer-readable memory, a user interface, one or more network interfaces, one or more sensors, etc.

[0210] Certain embodiments are described in this disclosure as including logic or a number of components or modules. Modules may be software modules (e.g., code stored on non-transitory machine-readable medium) or hardware modules. A hardware module is a tangible unit capable of performing certain operations and may be configured or arranged in a certain manner. A hardware module may comprise dedicated circuitry or logic that is permanently configured (e.g., as a special-purpose processor, such as a field programmable gate array

(FPGA) or an application-specific integrated circuit (ASIC)) to perform certain operations. A hardware module may also comprise programmable logic or circuitry (e.g., as encompassed within a general-purpose processor or other programmable processor) that is temporarily configured by software to perform certain operations. The decision to implement a hardware module in dedicated and permanently configured circuitry, or in temporarily configured circuitry (e.g., configured by software) may be driven by cost and time considerations.

[0211] When implemented in software, the techniques may be provided as part of the operating system, a library used by multiple applications, a particular software application, etc. The software may be executed by one or more general-purpose processors or one or more special-purpose processors.

[0212] Structural and functional equivalents to elements of the various aspects described throughout this disclosure that are known or later come to be known to those of ordinary skill in the art are expressly incorporated herein by reference and are encompassed by the claims. The words “module,” “mechanism,” “element,” “device,” and the like may not be a substitute for the word “means.” As such, no claim element is to be construed as a means plus function unless the element is expressly recited using the phrase “means for.” As used herein, the phrase “based on” may not be construed as a reference to a closed set of information, one or more conditions, one or more factors, or the like. In other words, the phrase “based on A,” where “A” may be information, a condition, a factor, or the like, may be construed as “based at least on A” unless specifically recited differently.

CLAIMS

WHAT IS CLAIMED IS:

1. A method for wireless communications by a user equipment (UE), the method comprising:
 - receiving (330), from a network entity, a configuration configuring at least one channel state information (CSI) report for a serving cell and at least one lower-layer triggered mobility (LTM) beam report; and
 - transmitting (360), to the network entity, a report based on a priority of the at least one CSI report for the serving cell and the at least one LTM beam report.
2. The method of claim 1, further comprising:
 - receiving (320), from the network entity, control signaling that configures a candidate cell of a LTM procedure; wherein the at least one LTM beam report is associated with the candidate cell.
3. The method of claim 1 or 2, further comprising:
 - transmitting, to the network entity, an indication of a capability for supporting joint triggering of both the at least one CSI report and the at least one LTM beam report.
4. The method of any one of claims 1-3, wherein the priority is based on at least one of:
 - a report type associated with the at least one CSI report and the at least one LTM beam report;
 - time domain behavior associated with the at least one CSI report and the at least one LTM beam report;
 - content associated with the at least one CSI report and the at least one LTM beam report;
 - a cell index associated with the at least one CSI report and the at least one LTM beam report; or
 - a report configuration identifier associated with the at least one CSI report and the at least one LTM beam report.

5. The method of claim 4, wherein the priority includes respective priority values associated with the at least one CSI report and the least one LTM beam report, the method further comprising:

determining the respective priority values based on one or more numerical values including:

- a first numerical value corresponding to the report type;
- a second numerical value corresponding to the time domain behavior;
- a third numerical value corresponding to the content;
- a fourth numerical value corresponding to the cell index; and
- a fifth numerical value corresponding to the report configuration identifier.

6. The method of any one of claims 1-5, wherein the respective priority values for the at least one CSI report and the at least one LTM beam report are determined based on a common formula.

7. The method of claim 6, wherein the report type comprises:

- a first report type associated with the at least one LTM beam report, and
- a second report type associated with the at least one CSI report, wherein the first report type has priority over the second report type.

8. The method of claim 6, wherein the time domain behavior comprises:

- a first time domain behavior associated with the at least one LTM beam report, and
- a second time domain behavior associated with the at least one CSI report; wherein the first time domain behavior has a higher priority than the second time domain behavior.

9. The method of claim 8, wherein the first time domain behavior or the second time domain behavior further comprises:

- an aperiodic time domain behavior,
- a semi-persistent time domain behavior, and
- a periodic time domain behavior; wherein the aperiodic time domain behavior has a higher priority than the semi-persistent time domain behavior, wherein the semi-persistent time domain behavior has a higher priority than the periodic time domain behavior.

10. The method of claim 6, wherein the content comprises:
 - a first content associated with the at least one LTM beam report,
 - a second content associated with the at least one CSI report with a reference signal received power (RSRP) or signal-to-interference plus noise ratio (SINR), and
 - a third content associated with the at least one CSI report without the RSRP or SINR;wherein the first content has a higher priority than the second content, wherein the second content has a higher priority than the third content.
11. The method of claim 6, wherein the cell index comprises:
 - a first cell index associated with the at least one LTM beam report, and
 - a second cell index associated with the at least one CSI report; wherein the first cell index has a higher priority than the second cell index.
12. The method of claim 6, wherein the report configuration identifier comprises:
 - a first report configuration identifier associated with the at least one LTM beam report, and
 - a second report configuration identifier associated with the at least one CSI report;wherein the first report configuration identifier has a higher priority than the second report configuration identifier.
13. The method of any one of claims 1-5, wherein a first priority value associated with the at least one CSI report is based on a first formula, and a second priority value associated with the at least one LTM beam report is based on a second formula different from the first formula.
14. The method of claim 13, wherein transmitting the report comprises:
 - including, in an uplink resource, one or more LTM beam reports ordered by the second priority value associated with the at least one LTM beam report; and
 - thereafter including, in a remaining available portion of the uplink resource, one or more CSI reports ordered by the first priority value associated with the at least one CSI report.
15. The method of any one of claims 1-14, further comprising:

receiving, from the network entity, downlink control information (DCI) including one or more fields to trigger:

- the at least one CSI report,
- the at least one LTM beam report, or
- both the at least one CSI report and the at least one LTM beam report.

16. A method for wireless communications by a network entity, the method comprising:
transmitting (330), to a user equipment (UE), a configuration configuring at least one channel state information (CSI) report for a serving cell and at least one lower-layer triggered mobility (LTM) beam report; and

receiving (360), from the UE, a report based on a priority of the at least one CSI report for the serving cell and the at least one LTM beam report.

17. The method of claim 16, wherein the priority is based on at least one of:

- a report type associated with the at least one CSI report and the at least one LTM beam report;
- time domain behavior associated with the at least one CSI report and the at least one LTM beam report;
- content associated with the at least one CSI report and the at least one LTM beam report;
- a cell index associated with the at least one CSI report and the at least one LTM beam report; or
- a report configuration identifier associated with the at least one CSI report and the at least one LTM beam report.

18. An apparatus comprising:

- one or more radio frequency (RF) modems;
- a processor coupled to the one or more RF modems; and
- at least one memory storing executable instructions, the executable instructions to manipulate at least one of the processor or the one or more RF modems to perform the method of any of claims 1 to 17.

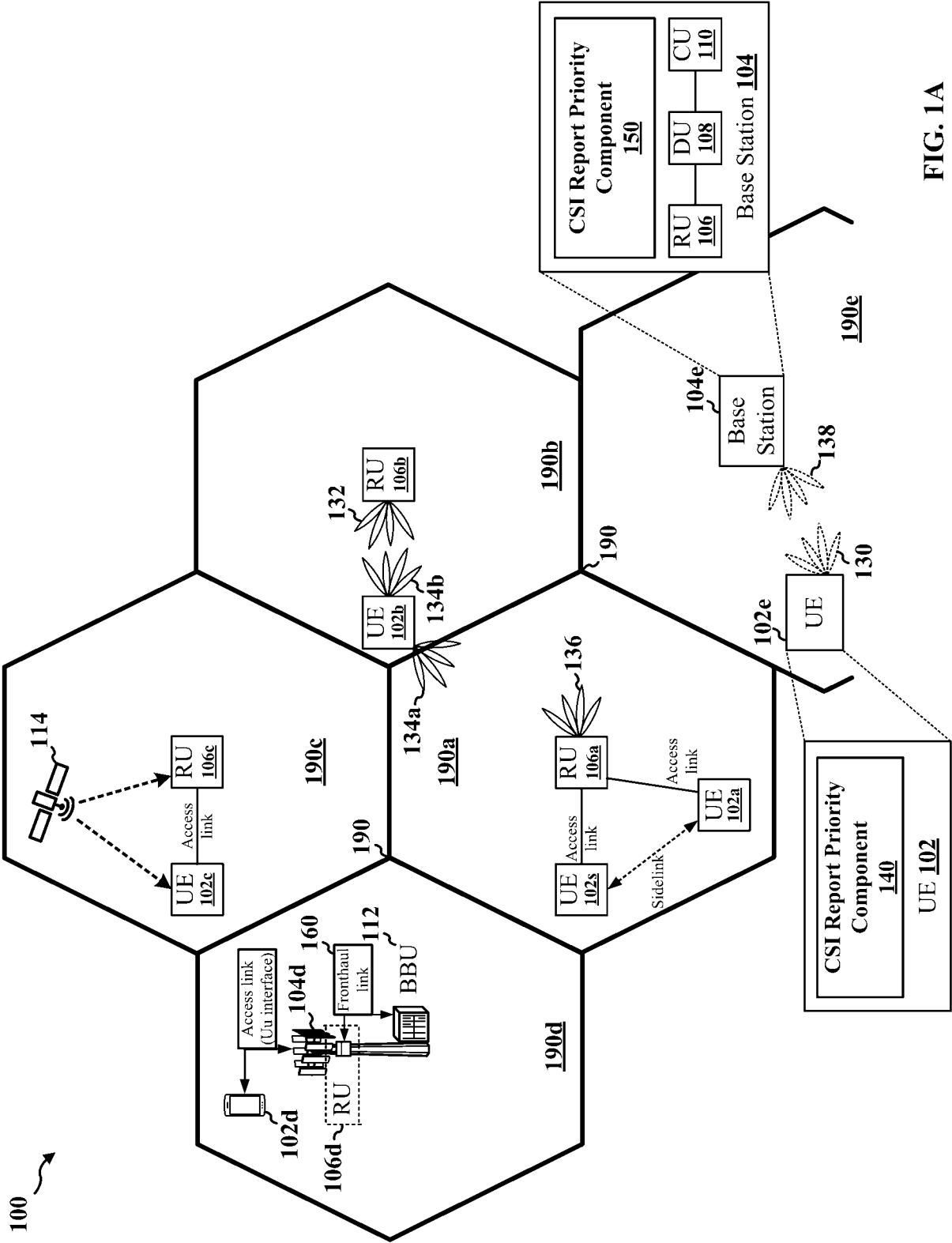


FIG. 1A

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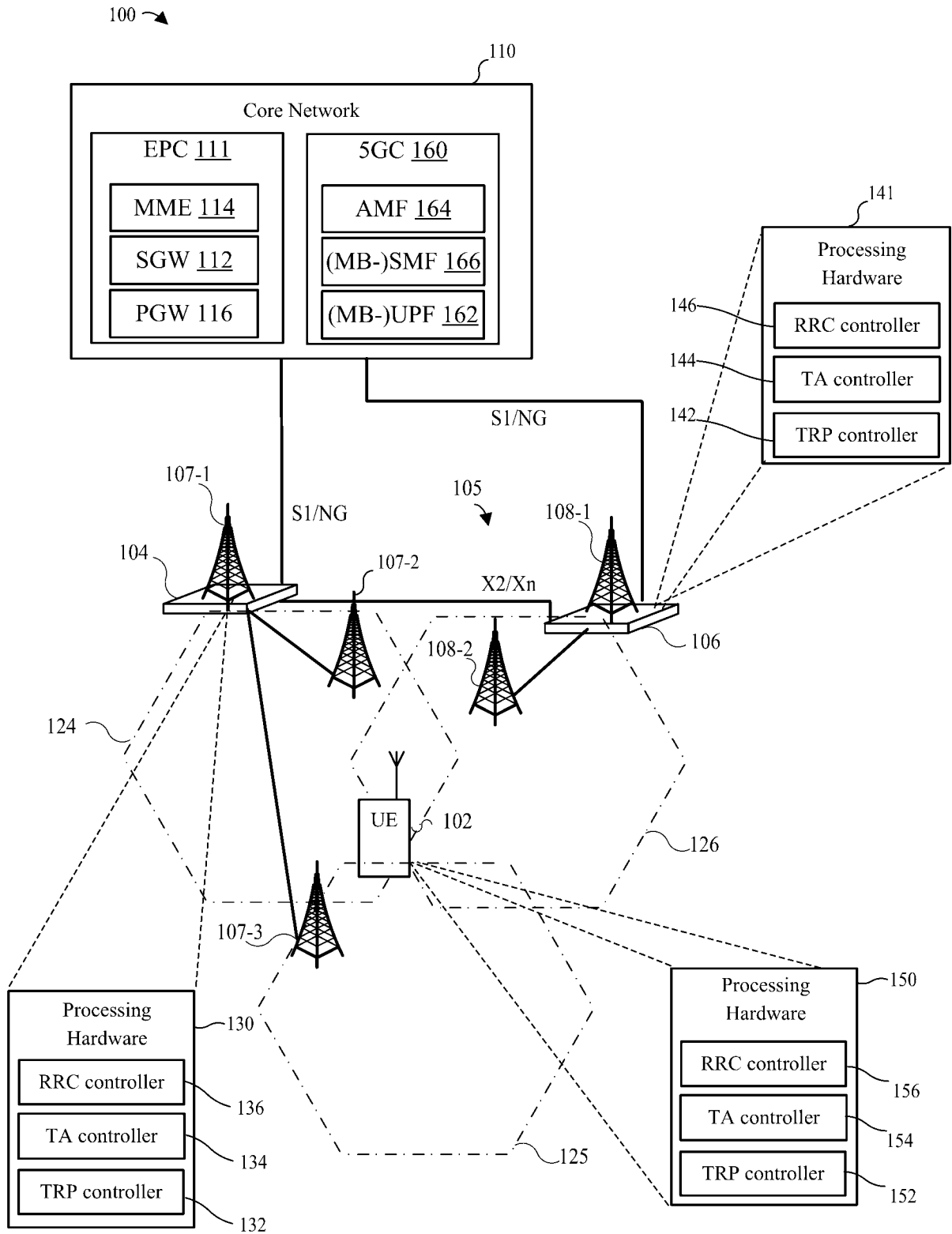


FIG. 1B

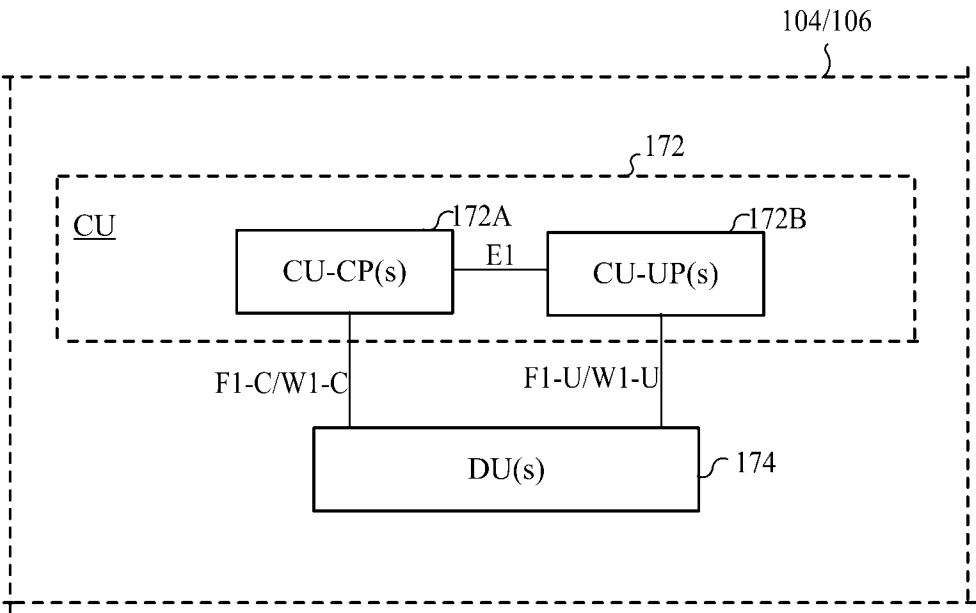


FIG. 1C

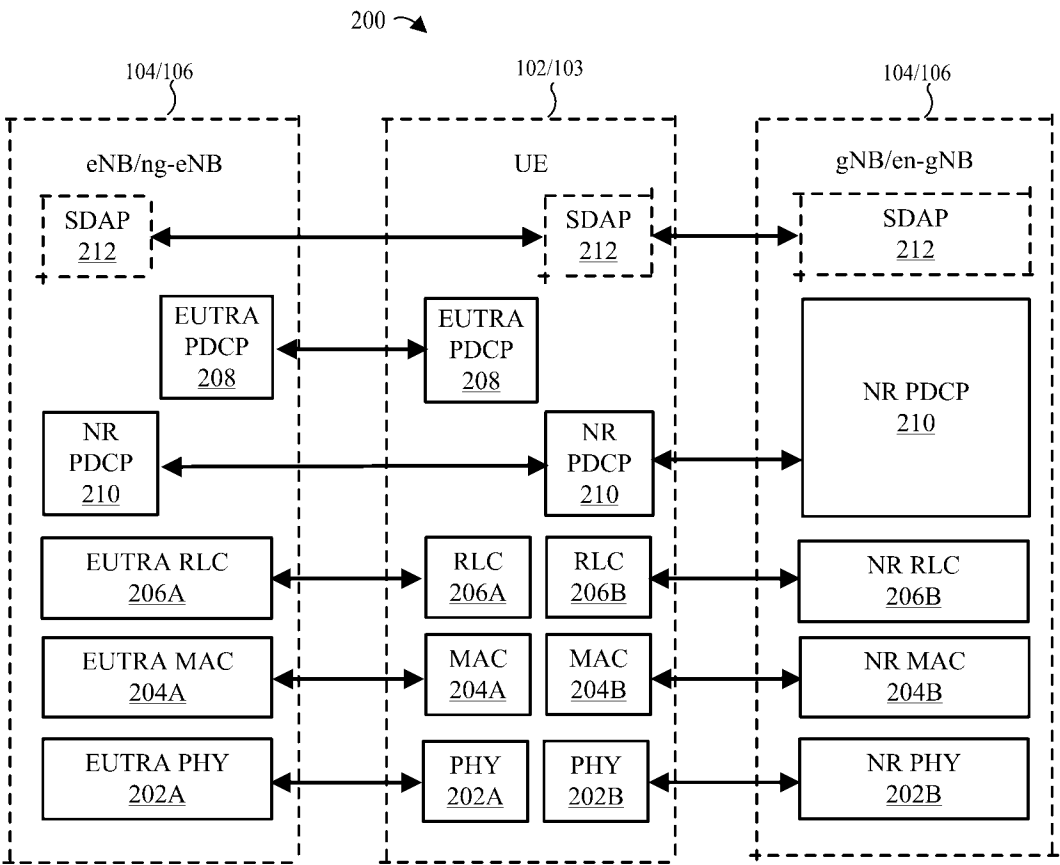


FIG. 2A

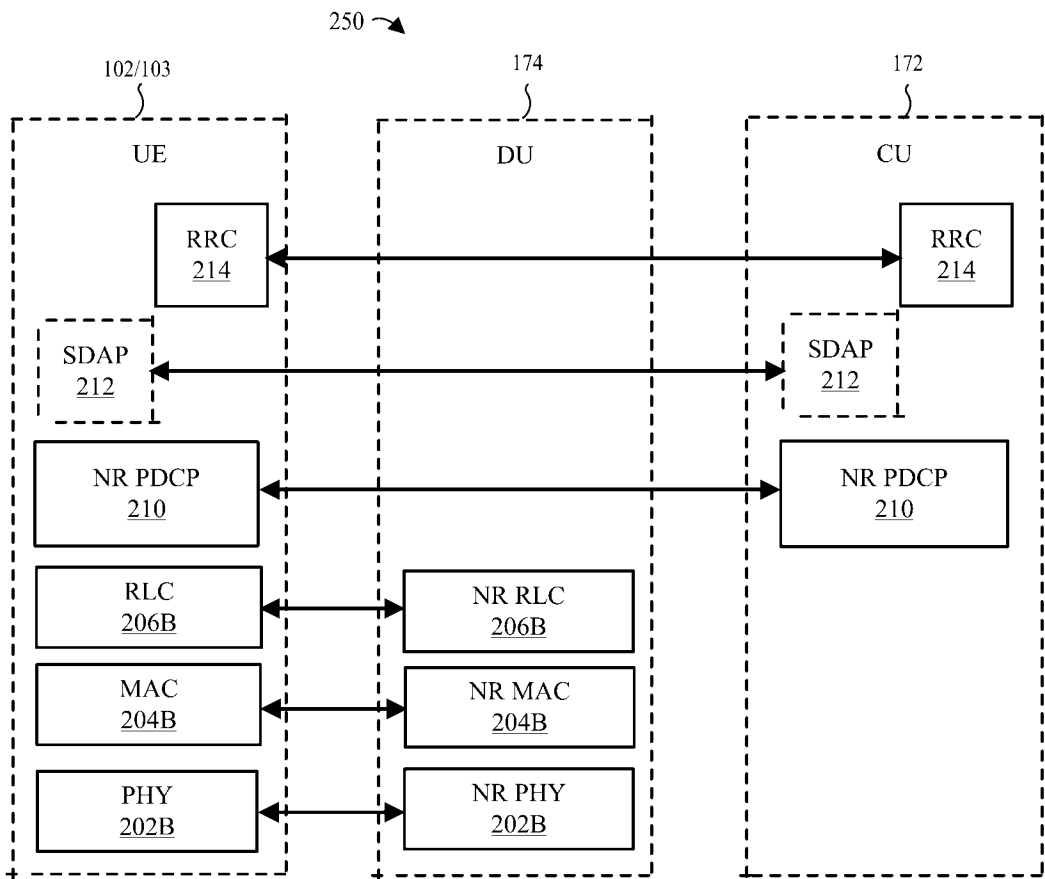


FIG. 2B

300A

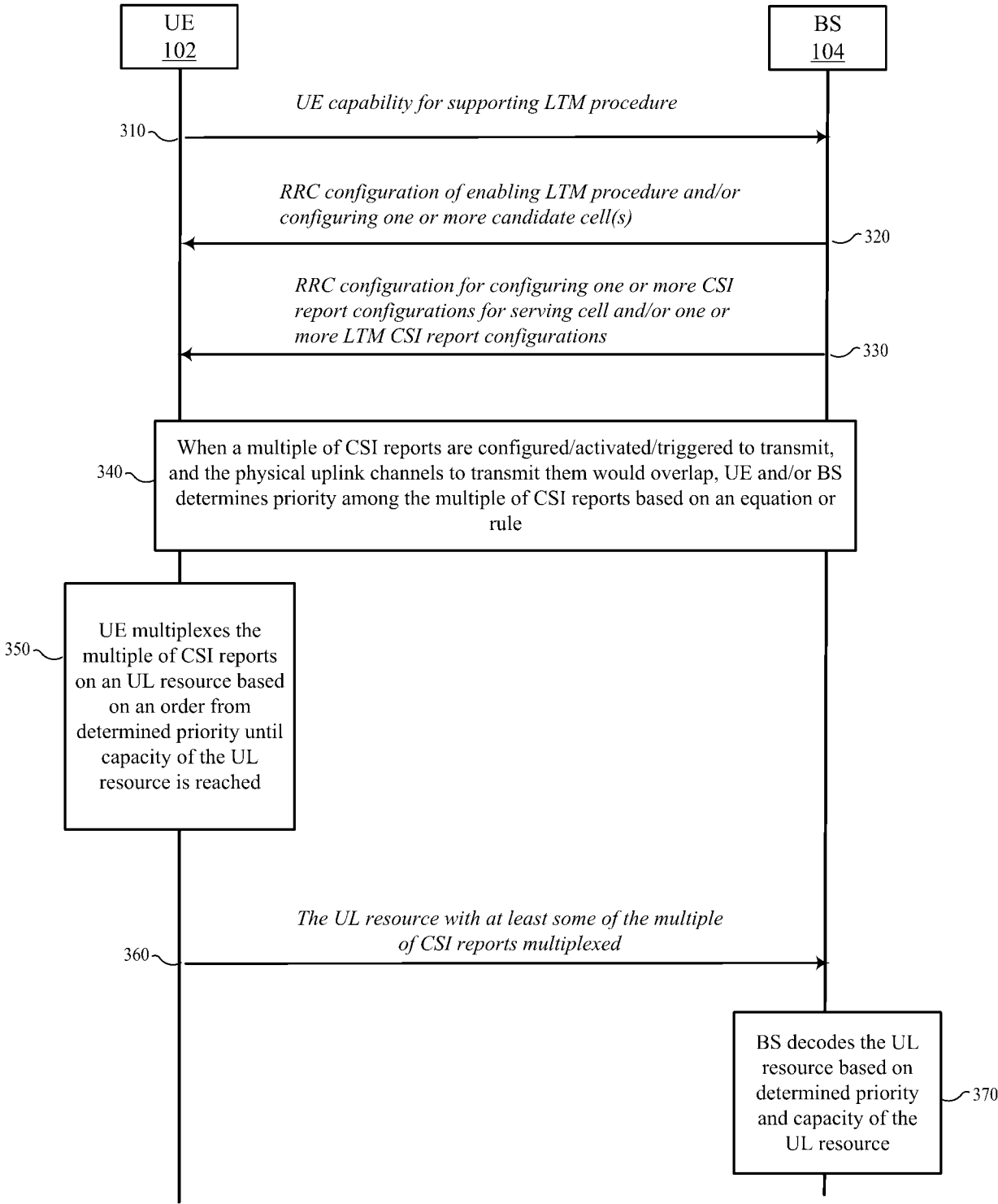


FIG. 3A

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300B

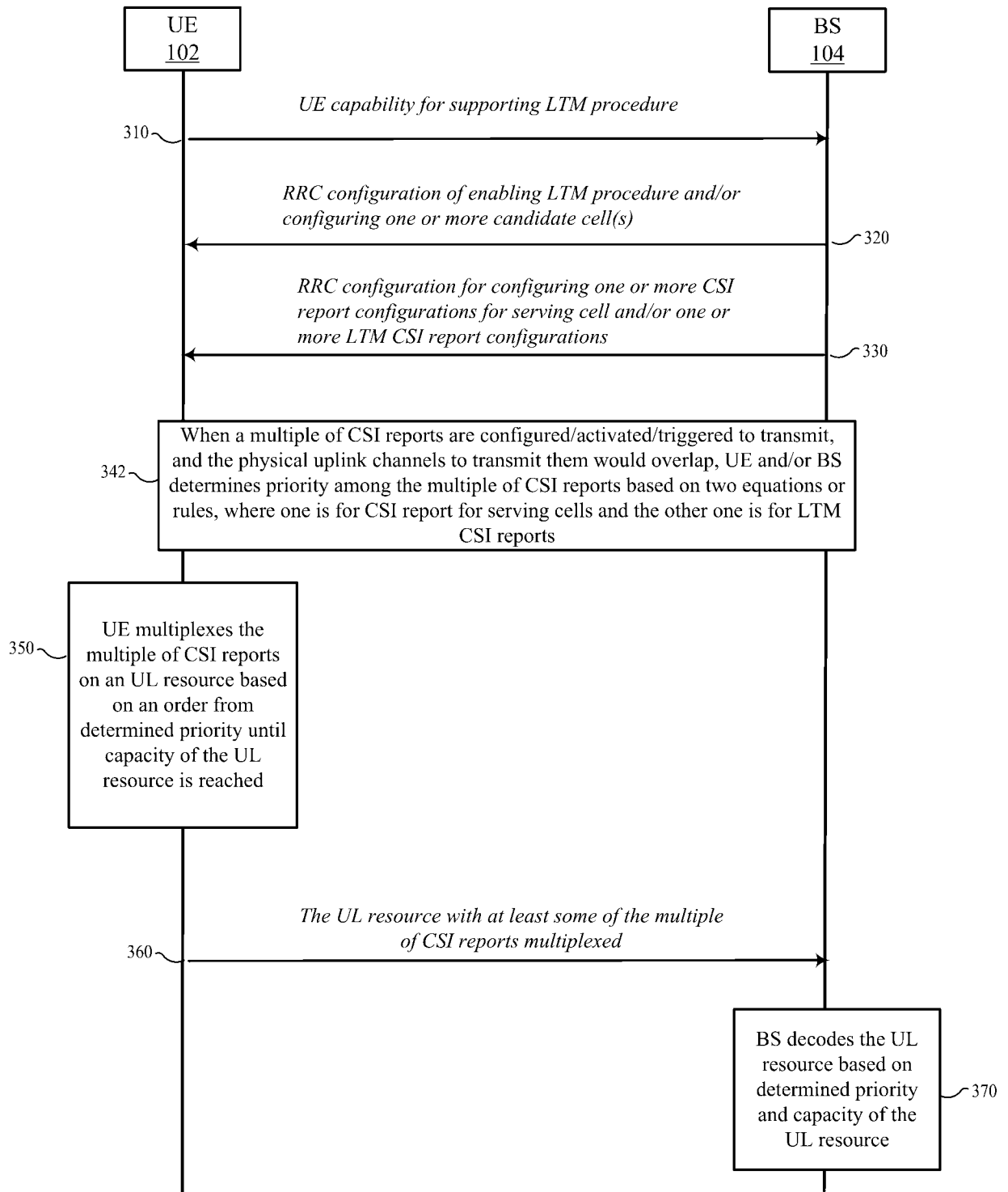


FIG. 3B

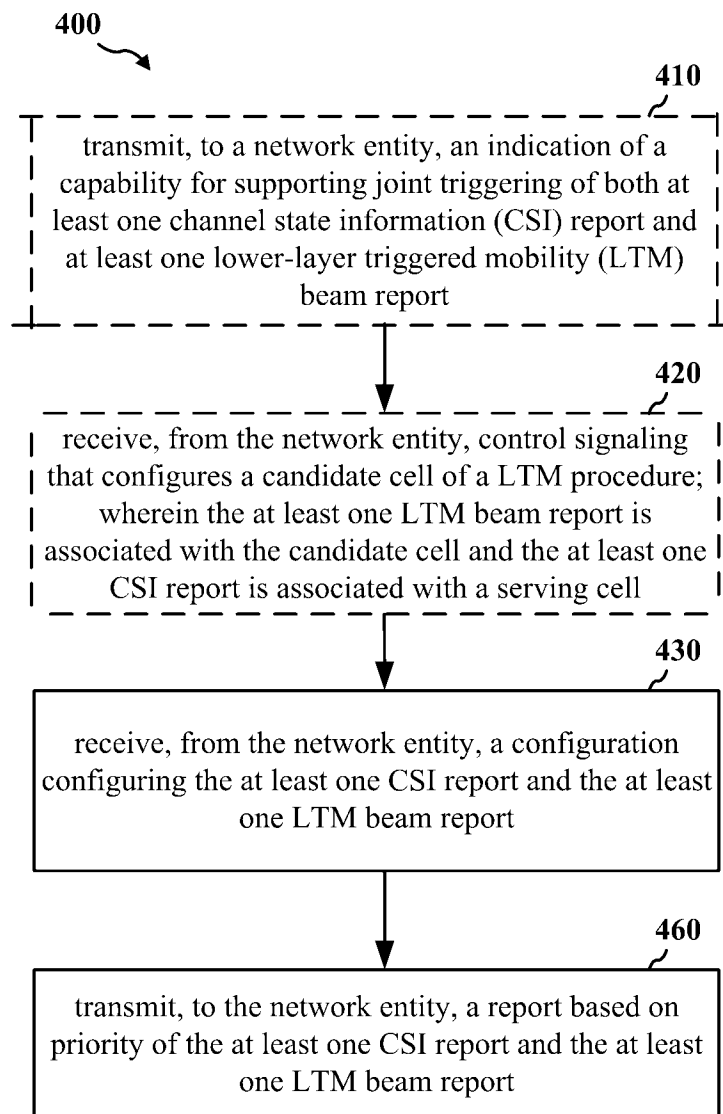


FIG. 4

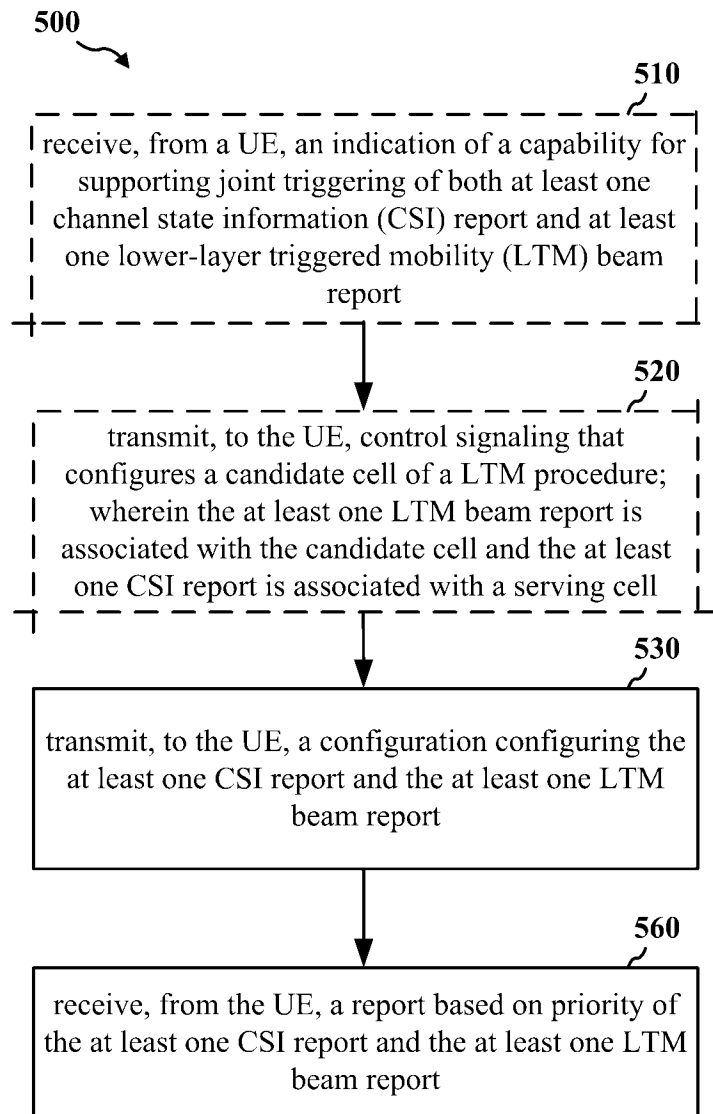


FIG. 5

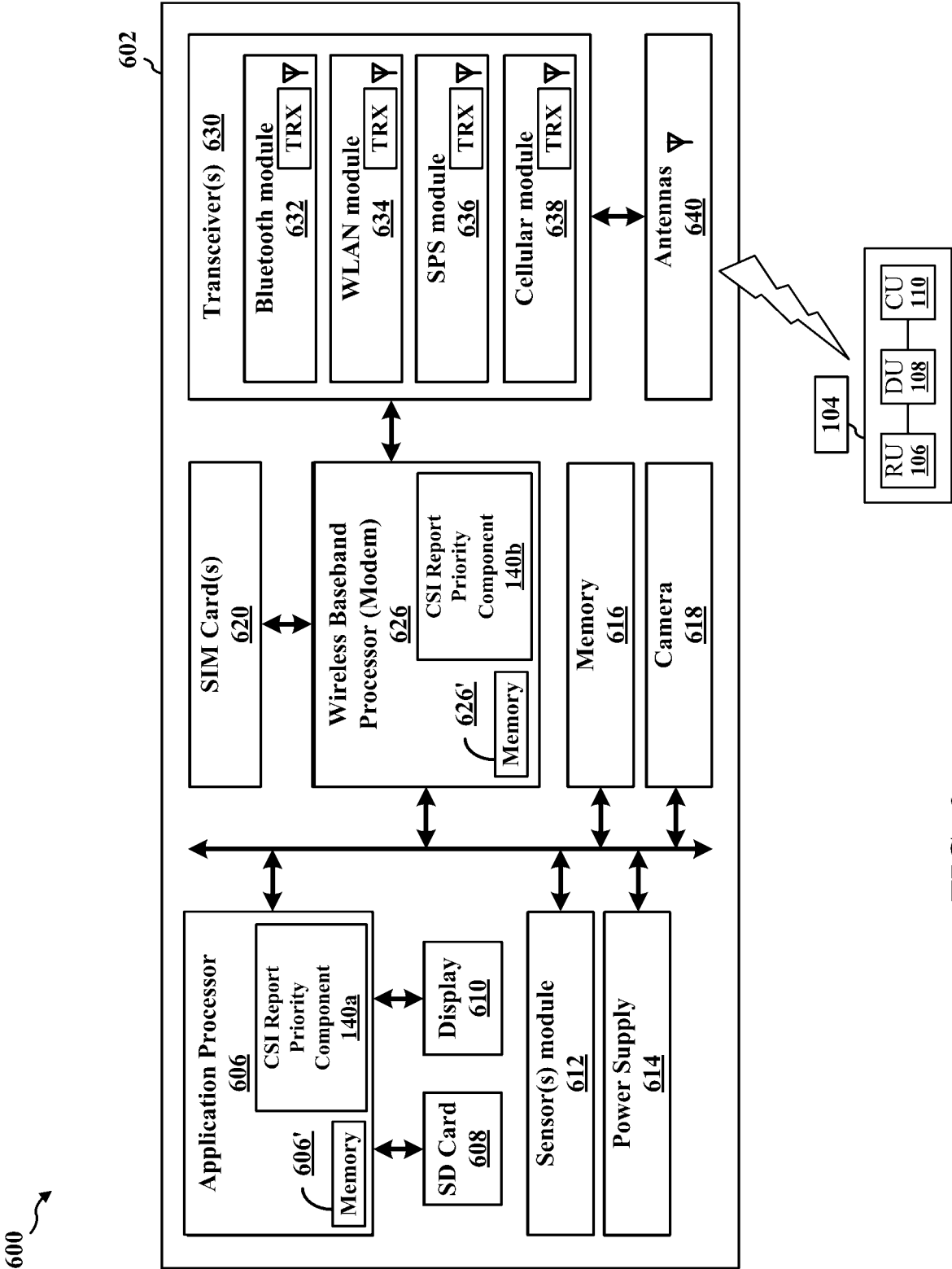


FIG. 6

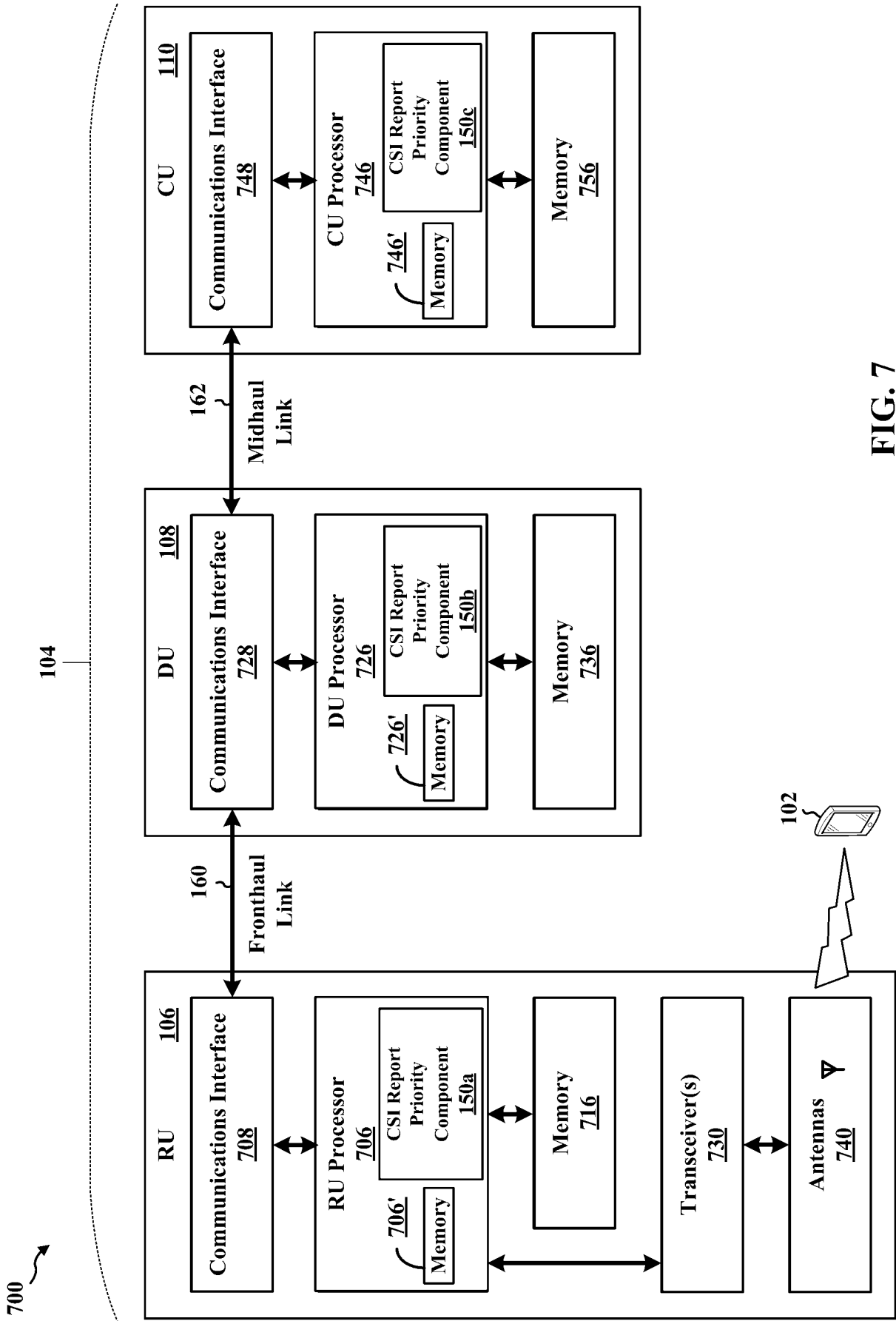


FIG. 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/CN2023/112516

A. CLASSIFICATION OF SUBJECT MATTER INV. H04W36/00 ADD. H04W36/08 H04W8/24		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) H04W		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SANJAY GOYAL ET AL: "Discussion on L1 enhancements for L1/L2-triggered mobility", 3GPP DRAFT; R1-2211306; TYPE DISCUSSION; NR_MOB_ENH2-CORE, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE / vol. 3GPP RAN 1, no. Toulouse, FR; 20221114 - 20221118 7 November 2022 (2022-11-07), XP052221870, Retrieved from the Internet: URL:https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_111/Docs/R1-2211306.zip R1-2211306_On L1 enhancements for LTM.docx [retrieved on 2022-11-07] paragraphs [0221] - [0002] --/--	1-18
☒ Further documents are listed in the continuation of Box C.	☒ See patent family annex.	
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 30 January 2024	Date of mailing of the international search report 12/02/2024	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Pasini, Enrico	

INTERNATIONAL SEARCH REPORT

International application No

PCT/CN2023/112516

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	----- US 2013/021980 A1 (YANG SUCKCHEL [KR] ET AL) 24 January 2013 (2013-01-24) paragraphs [0207] - [0212]	1-18
A	----- WO 2023/108375 A1 (NEC CORP [JP]; GAO YUKAI [CN]) 22 June 2023 (2023-06-22) paragraphs [0149] - [0155] -----	1-18

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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