CHANNEL STATE INFORMATION (CSI) FOR BEAM REPORTING

RELATED APPLICATION

[0001] This application claims priority to U.S. Provisional Application Serial No. 63/613,581 filed December 21, 2023, entitled "CHANNEL STATE INFORMATION (CSI) FOR BEAM REPORTING," the disclosure of which is incorporated by reference herein in its entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to wireless communications, and more specifically to channel state information (CSI) reporting.

BACKGROUND

[0003] A wireless communications system may include one or multiple network communication devices, such as base stations, which may support wireless communications for one or multiple user communication devices, which may be otherwise known as user equipment (UE), or other suitable terminology. The wireless communications system may support wireless communications with one or multiple user communication devices by utilizing resources of the wireless communication system (e.g., time resources (e.g., symbols, slots, subframes, frames, or the like) or frequency resources (e.g., subcarriers, carriers, or the like)). Additionally, the wireless communications system may support wireless communications across various radio access technologies including third generation (3G) radio access technology, fourth generation (4G) radio access technology, fifth generation (5G) radio access technology, among other suitable radio access technologies beyond 5G (e.g., sixth generation (6G)).

SUMMARY

[0004] An article "a" before an element is unrestricted and understood to refer to "at least one" of those elements or "one or more" of those elements. The terms "a," "at least one," "one or more," and "at least one of one or more" may be interchangeable. As used herein, including in the claims, "or" as used in a list of items (e.g., a list of items prefaced by a phrase such as "at least one of" or "one or more of" or "one or both of") indicates an inclusive list such that, for example, a list of at least one of A, B, or C means A or B or C or AB or AC or BC or ABC (e.g., A and B and C). Also,

as used herein, the phrase “based on” shall not be construed as a reference to a closed set of conditions. For example, an example step that is described as “based on condition A” may be based on both a condition A and a condition B without departing from the scope of the present disclosure. In other words, as used herein, the phrase “based on” shall be construed in the same manner as the phrase “based at least in part on”. Further, as used herein, including in the claims, a “set” may include one or more elements.

[0005] Some implementations of the method and apparatuses described herein may further include a UE for wireless communication, the UE configured to generate one or more CSI reports using event-triggered beam reporting associated with a set of reference signals (RSs) and based at least in part on a CSI reporting setting including two sets of CSI reporting setting parameters including: a first set of CSI reporting setting parameters corresponding to a first period of first CSI measurement and a first CSI report for beam management; and a second set of CSI reporting setting parameters corresponding to a second period of second CSI measurement; monitor a set of one or more events based at least in part on second CSI measurements during the second period; and transmit a second CSI report for the beam management including an updated set of values compared with corresponding values of the first CSI report for the beam management.

[0006] In some implementations of the method and apparatuses described herein, the UE is further configured to receive, from a network entity, the CSI reporting setting including an indication that enables event-triggered beam reporting over an uplink channel; transmit a UE trigger signal if a subset of one or more events in the set of one or more events are satisfied; the UE trigger signal includes a scheduling request signal associated with the event-triggered beam reporting, and where an uplink resource allocation associated with the event-triggered beam reporting is set to null; the scheduling request signal is associated with a scheduling request over one or more of physical uplink control channel (PUCCH) or uplink control information (UCI) of physical uplink shared channel (PUSCH), and where an identifier indicates a configuration of the scheduling request signal; the subset of the one or more events in the set of one or more events are selected by a network; the UE trigger signal as a CSI report and based at least in part on a report quantity associated with event-triggered beam reporting; the second CSI report includes at least one of: one or more of an identification of a new selected beam corresponding to at least one of a CSI-RS resource index (CRI) or a synchronization signal/physical broadcast channel block resource index

(SSBRI); one or more of an updated Layer-1 RS received power (L1-RSRP) value or an updated Layer-1 signal-to-interference-and-noise ratio (L1-SINR) value; a delta change in one of the L1-RSRP value and the L1-SINR value corresponding to the second period of CSI measurement compared with the first period of CSI measurement; an identification of the subset of one or more events in the set of events that are satisfied; or a group of differential values associated with the subset of one or more events in the set of events that are satisfied.

[0007] In some implementations of the method and apparatuses described herein for a UE, the set of RSs correspond to at least one of non-zero power (NZP) CSI-RS resources or synchronization signal/physical broadcast channel (SS/PBCH) resources; the at least one of the NZP CSI-RS resources is configured with a repetition parameter; the two sets of CSI reporting setting parameters correspond to two CSI reporting settings, and where an identifier (ID) of a second CSI reporting setting of the two CSI reporting settings is included within one or more parameters of a first CSI reporting setting of the two CSI reporting settings; the first set of CSI reporting setting parameters includes a report quantity set to at least one of L1-RSRP or L1-SINR reporting, and where the second set of CSI reporting setting parameters includes a report quantity set to null; a beam corresponds to one or more of a NZP CSI-RS resource configured with a repetition parameter or a SS/PBCH resource; the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being greater, at least by a threshold value, than one or more of a second L1-RSRP value or a second L1-SINR value of the first beam corresponding to the second period of the second CSI measurement.

[0008] In some implementations of the method and apparatuses described herein for a UE, the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being less than, at least by a threshold value, one or more of a second L1-RSRP value or a second L1-SINR value of a second beam corresponding to the second period of the second CSI measurement, the second beam being different from the first beam; transmit the second CSI report for the beam management over a contention-based uplink resource grant; the first set of CSI reporting setting parameters is associated with a first CSI resource periodicity, where the second set of CSI reporting setting parameters is

associated with a second CSI resource periodicity, and where a value of the second CSI resource periodicity is greater than or equal to a value of the first CSI resource periodicity.

[0009] Some implementations of the method and apparatuses described herein may further include a method performed by a UE, the method including generating one or more CSI reports using event-triggered beam reporting associated with a set of RSs and based at least in part on a CSI reporting setting including two sets of CSI reporting setting parameters including: a first set of CSI reporting setting parameters corresponding to a first period of first CSI measurement and a first CSI report for beam management; and a second set of CSI reporting setting parameters corresponding to a second period of second CSI measurement; monitoring a set of one or more events based at least in part on second CSI measurements during the second period; and transmitting a second CSI report for the beam management including an updated set of values compared with corresponding values of the first CSI report for the beam management.

[0010] In some implementations of the method and apparatuses described herein, the method performed by the UE includes receiving, from a network entity, the CSI reporting setting including an indication that enables event-triggered beam reporting over an uplink channel; transmitting a UE trigger signal if a subset of one or more events in the set of one or more events are satisfied; the UE trigger signal includes a scheduling request signal associated with the event-triggered beam reporting, and an uplink resource allocation associated with the event-triggered beam reporting is set to null; the scheduling request signal is associated with a scheduling request over one or more of PUCCH or UCI of PUSCH, and an identifier indicates a configuration of the scheduling request signal; the subset of the one or more events in the set of one or more events are selected by a network; further including transmitting the UE trigger signal as a CSI report and based at least in part on a report quantity associated with event-triggered beam reporting.

[0011] In some implementations of the method and apparatuses described herein of a method performed by a UE, the second CSI report includes at least one of: one or more of an identification of a new selected beam corresponding to at least one of a CRI or a SSBRI; one or more of an updated L1-RSRP value or an updated L1-SINR value; a delta change in one of the L1-RSRP value and the L1-SINR value corresponding to the second period of CSI measurement compared with the first period of CSI measurement; an identification of the subset of one or more events in the set of events that are satisfied; or a group of differential values associated with the subset of one or more

events in the set of events that are satisfied; the set of RSs correspond to at least one of NZP CSI-RS resources or SS/PBCH resources; the at least one of the NZP CSI-RS resources is configured with a repetition parameter; the two sets of CSI reporting setting parameters correspond to two CSI reporting settings, and an ID of a second CSI reporting setting of the two CSI reporting settings is included within one or more parameters of a first CSI reporting setting of the two CSI reporting settings; the first set of CSI reporting setting parameters includes a report quantity set to at least one of L1-RSRP or L1-SINR reporting, and the second set of CSI reporting setting parameters includes a report quantity set to null.

[0012] In some implementations of the method and apparatuses described herein of a method performed by a UE, a beam corresponds to one or more of a NZP CSI-RS resource configured with a repetition parameter or a SS/PBCH resource; the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being greater, at least by a threshold value, than one or more of a second L1-RSRP value or a second L1-SINR value of the first beam corresponding to the second period of the second CSI measurement; the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being less than, at least by a threshold value, one or more of a second L1-RSRP value or a second L1-SINR value of a second beam corresponding to the second period of the second CSI measurement, the second beam being different from the first beam; transmitting the second CSI report for the beam management over a contention-based uplink resource grant; the first set of CSI reporting setting parameters is associated with a first CSI resource periodicity, the second set of CSI reporting setting parameters is associated with a second CSI resource periodicity, and a value of the second CSI resource periodicity is greater than or equal to a value of the first CSI resource periodicity.

[0013] Some implementations of the method and apparatuses described herein may further include a processor for wireless communication configured to generate, for a UE, one or more CSI reports using event-triggered beam reporting associated with a set of RSs and based at least in part on a CSI reporting setting including two sets of CSI reporting setting parameters including: a first set of CSI reporting setting parameters corresponding to a first period of first CSI measurement and a first CSI report for beam management; and a second set of CSI reporting setting parameters

corresponding to a second period of second CSI measurement; monitor a set of one or more events based at least in part on second CSI measurements during the second period; and transmit a second CSI report for the beam management including an updated set of values compared with corresponding values of the first CSI report for the beam management.

[0014] In some implementations of the method and apparatuses described herein, the processor is further configured to receive, from a network entity, the CSI reporting setting including an indication that enables event-triggered beam reporting over an uplink channel; transmit a UE trigger signal if a subset of one or more events in the set of one or more events are satisfied; the UE trigger signal includes a scheduling request signal associated with the event-triggered beam reporting, and where an uplink resource allocation associated with the event-triggered beam reporting is set to null; the scheduling request signal is associated with a scheduling request over one or more of PUCCH or UCI of PUSCH, and where an identifier indicates a configuration of the scheduling request signal; the subset of the one or more events in the set of one or more events are selected by a network.

[0015] In some implementations of the method and apparatuses described herein, the processor is further configured to transmit the UE trigger signal as a CSI report and based at least in part on a report quantity associated with event-triggered beam reporting; the second CSI report includes at least one of: one or more of an identification of a new selected beam corresponding to at least one of a CRI or a SSBRI; one or more of an updated L1-RSRP value or an updated L1-SINR value; a delta change in one of the L1-RSRP value and the L1-SINR value corresponding to the second period of CSI measurement compared with the first period of CSI measurement; an identification of the subset of one or more events in the set of events that are satisfied; or a group of differential values associated with the subset of one or more events in the set of events that are satisfied; the set of RSs correspond to at least one of NZP CSI-RS resources or SS/PBCH resources; the at least one of the NZP CSI-RS resources is configured with a repetition parameter.

[0016] In some implementations of the method and apparatuses for a processor described herein the two sets of CSI reporting setting parameters correspond to two CSI reporting settings, and where an ID of a second CSI reporting setting of the two CSI reporting settings is included within one or more parameters of a first CSI reporting setting of the two CSI reporting settings; the first set of CSI reporting setting parameters includes a report quantity set to at least one of L1-RSRP or L1-

SINR reporting, and where the second set of CSI reporting setting parameters includes a report quantity set to null; a beam corresponds to one or more of a NZP CSI-RS resource configured with a repetition parameter or a SS/PBCH resource; the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being greater, at least by a threshold value, than one or more of a second L1-RSRP value or a second L1-SINR value of the first beam corresponding to the second period of the second CSI measurement.

[0017] In some implementations of the method and apparatuses for a processor described herein, the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being less than, at least by a threshold value, one or more of a second L1-RSRP value or a second L1-SINR value of a second beam corresponding to the second period of the second CSI measurement, the second beam being different from the first beam; transmit the second CSI report for the beam management over a contention-based uplink resource grant; the first set of CSI reporting setting parameters is associated with a first CSI resource periodicity, where the second set of CSI reporting setting parameters is associated with a second CSI resource periodicity, and where a value of the second CSI resource periodicity is greater than or equal to a value of the first CSI resource periodicity.

[0018] Some implementations of the method and apparatuses described herein may further include a network element (NE) for wireless communication configured to transmit, to a UE, a CSI reporting setting associated with a set of RSs, the CSI reporting setting including two sets of CSI reporting setting parameters including: a first set of CSI reporting setting parameters corresponding to a first period of first CSI measurement and a first CSI report for beam management; and a second set of CSI reporting setting parameters corresponding to a second period of second CSI measurement; and receive a second CSI report for the beam management including an updated set of values compared with corresponding values of the first CSI report for the beam management.

[0019] In some implementations of the method and apparatuses described herein, the NE for wireless communication is configured to receive, from the UE, a UE trigger signal indicating that a subset of one or more events in a set of one or more events are satisfied; the UE trigger signal includes a scheduling request signal associated with event-triggered beam reporting, and where an

uplink resource allocation associated with the event-triggered beam reporting is set to null; the scheduling request signal is associated with a scheduling request over one or more of PUCCH or UCI of PUSCH, and where an identifier indicates a configuration of the scheduling request signal; the subset of the one or more events in the set of one or more events are selected by a network; receive the UE trigger signal as a CSI report and based at least in part on a report quantity associated with event-triggered beam reporting.

[0020] In some implementations of the method and apparatuses for a NE described herein, the second CSI report includes at least one of: one or more of an identification of a new selected beam corresponding to at least one of a CRI or a SSBRI; one or more of an updated L1-RSRP value or an updated L1-SINR value; a delta change in one of the L1-RSRP value and the L1-SINR value corresponding to the second period of CSI measurement compared with the first period of CSI measurement; an identification of the subset of one or more events in the set of events that are satisfied; or a group of differential values associated with the subset of one or more events in the set of events that are satisfied; the set of RSs correspond to at least one of NZP CSI-RS resources or SS/PBCH resources; the at least one of the NZP CSI-RS resources is configured with a repetition parameter; the two sets of CSI reporting setting parameters correspond to two CSI reporting settings, and where an ID of a second CSI reporting setting of the two CSI reporting settings is included within one or more parameters of a first CSI reporting setting of the two CSI reporting settings.

[0021] In some implementations of the method and apparatuses for a NE described herein, the first set of CSI reporting setting parameters includes a report quantity set to at least one of L1-RSRP or L1-SINR reporting, and where the second set of CSI reporting setting parameters includes a report quantity set to null; receive, from the UE, a UE trigger signal indicating that a subset of one or more events in a set of one or more events are satisfied, and where a beam corresponds to one or more of a NZP CSI-RS resource configured with a repetition parameter or a SS/PBCH resource; the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being greater, at least by a threshold value, than one or more of a second L1-RSRP value or a second L1-SINR value of the first beam corresponding to the second period of the second CSI measurement; the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam

corresponding to the first period of the first CSI measurement being less than, at least by a threshold value, one or more of a second L1-RSRP value or a second L1-SINR value of a second beam corresponding to the second period of the second CSI measurement, the second beam being different from the first beam.

[0022] In some implementations of the method and apparatuses for a NE described herein, the NE for wireless communication is configured to receive the second CSI report for the beam management over a contention-based uplink resource grant; the first set of CSI reporting setting parameters is associated with a first CSI resource periodicity, where the second set of CSI reporting setting parameters is associated with a second CSI resource periodicity, and where a value of the second CSI resource periodicity is greater than or equal to a value of the first CSI resource periodicity.

[0023] Some implementations of the method and apparatuses described herein may further include a method performed by a NE for wireless communication, the method including transmitting, to a UE, a CSI reporting setting associated with a set of RSs, the CSI reporting setting including two sets of CSI reporting setting parameters including: a first set of CSI reporting setting parameters corresponding to a first period of first CSI measurement and a first CSI report for beam management; and a second set of CSI reporting setting parameters corresponding to a second period of second CSI measurement; and receiving a second CSI report for the beam management including an updated set of values compared with corresponding values of the first CSI report for the beam management.

[0024] In some implementations of the method and apparatuses for a method performed by a NE described herein, the method includes receiving, from the UE, a UE trigger signal indicating that a subset of one or more events in a set of one or more events are satisfied; the UE trigger signal includes a scheduling request signal associated with event-triggered beam reporting, and an uplink resource allocation associated with the event-triggered beam reporting is set to null; the scheduling request signal is associated with a scheduling request over one or more of PUCCH or UCI of PUSCH, and an identifier indicates a configuration of the scheduling request signal; the subset of the one or more events in the set of one or more events are selected by a network.

[0025] In some implementations of the method and apparatuses for a method performed by a NE described herein, the method includes receiving the UE trigger signal as a CSI report and based at least in part on a report quantity associated with event-triggered beam reporting; the second CSI report includes at least one of: one or more of an identification of a new selected beam corresponding to at least one of a CRI or a SSBRI; one or more of an updated L1-RSRP value or an updated L1-SINR value; a delta change in one of the L1-RSRP value and the L1-SINR value corresponding to the second period of CSI measurement compared with the first period of CSI measurement; an identification of the subset of one or more events in the set of events that are satisfied; or a group of differential values associated with the subset of one or more events in the set of events that are satisfied.

[0026] In some implementations of the method and apparatuses for a method performed by a NE described herein, the set of RSs correspond to at least one of NZP CSI-RS resources or SS/PBCH resources; the at least one of the NZP CSI-RS resources is configured with a repetition parameter; the two sets of CSI reporting setting parameters correspond to two CSI reporting settings, and an ID of a second CSI reporting setting of the two CSI reporting settings is included within one or more parameters of a first CSI reporting setting of the two CSI reporting settings; the first set of CSI reporting setting parameters includes a report quantity set to at least one of L1-RSRP or L1-SINR reporting, and the second set of CSI reporting setting parameters includes a report quantity set to null; receiving, from the UE, a UE trigger signal indicating that a subset of one or more events in a set of one or more events are satisfied, and a beam corresponds to one or more of a NZP CSI-RS resource configured with a repetition parameter or a SS/PBCH resource.

[0027] In some implementations of the method and apparatuses for a method performed by a NE described herein, the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being greater, at least by a threshold value, than one or more of a second L1-RSRP value or a second L1-SINR value of the first beam corresponding to the second period of the second CSI measurement; the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being less than, at least by a threshold value, one or more of a second L1-RSRP value or a second L1-SINR value of a second beam corresponding to the second period of the second CSI measurement,

the second beam being different from the first beam; receiving the second CSI report for the beam management over a contention-based uplink resource grant; the first set of CSI reporting setting parameters is associated with a first CSI resource periodicity, the second set of CSI reporting setting parameters is associated with a second CSI resource periodicity, and a value of the second CSI resource periodicity is greater than or equal to a value of the first CSI resource periodicity.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] Figure 1 illustrates an example of a wireless communications system in accordance with aspects of the present disclosure.

[0029] Figure 2 illustrates an implementation 200 for aperiodic trigger state defining a list of CSI Report Settings.

[0030] Figure 3 illustrates a radio resource control (RRC) configuration for NZP-CSI-RS/CSI-interference management (IM) resources.

[0031] Figure 4 illustrates at 400 RRC configuration for NZP-CSI-RS Resource.

[0032] Figure 5 illustrates at 500 RRC configuration for CSI-IM-Resource.

[0033] Figure 6 illustrates at 600 partial CSI omission for Rel. 15 PUSCH-Based CSI.

[0034] Figure 7 illustrates an example of a UE 700 in accordance with aspects of the present disclosure.

[0035] Figure 8 illustrates an example of a processor 800 in accordance with aspects of the present disclosure.

[0036] Figure 9 illustrates an example of a NE 900 in accordance with aspects of the present disclosure.

[0037] Figure 10 illustrates a flowchart of a method 1000 in accordance with aspects of the present disclosure.

[0038] Figure 11 illustrates a flowchart of a method 1100 in accordance with aspects of the present disclosure.

[0039] Figure 12 illustrates a flowchart of a method 1200 in accordance with aspects of the present disclosure.

DETAILED DESCRIPTION

[0040] In a network, for example, which supports NR 5G, a UE may transmit a CSI report to the network, such as a base station associated with the network. A CSI report, for instance, can include CSI feedback that describes various CSI. In some implementations, the CSI feedback may include one or multiple forms based on the CSI format, frequency domain CSI reporting granularity (e.g., wideband, subband, etc.), and/or a time-domain behavior, e.g., periodicity of CSI feedback in time domain such as periodic CSI feedback, aperiodic CSI feedback, semi-persistent CSI feedback, etc. For example, variations in channel characteristics due to high UE speed or haphazard interference bursts may result in unequal coherence periods. Periodic CSI reporting may be inefficient due to unequal gaps between consecutive reporting instants. Aperiodic CSI reporting, triggered by network-based events, for example, a negative acknowledgement (NACK) indicating decoding failure, incurs a delay. Note that a UE may also provide a fast update on CSI status due to abrupt channel variations or bursty interference.

[0041] The present disclosure relates to event-triggered CSI reporting based on UE-assisted signaling. For instance, an enhanced beam management (BM) framework is described that supports a multi-stage approach for event-triggered BM, including a beam acquisition phase (e.g., where a UE engages in a beam acquisition process), a UE-assisted beam monitoring phase (e.g., where a UE monitors beam features such as beam CSI), and a beam switching phase, e.g., where a UE acquires a new beam for wireless communication. Further, a set of beam switching conditions is described that corresponds to a UE-triggered beam switching event, where the UE can send an uplink (UL) signal when a subset of the set of beam switching conditions is satisfied. Further, a beam switching framework is described that is triggered by the UL signal that enables a fast update of the beam, such as based on a pre-configured CSI reporting setting.

[0042] By utilizing the described techniques, more efficient and accurate CSI reporting for beams is enabled, which can decrease network overhead and increase signal quality as part of wireless communications.

[0043] Aspects of the present disclosure are described in the context of a wireless communications system.

[0044] **Figure 1** illustrates an example of a wireless communications system 100 in accordance with aspects of the present disclosure. The wireless communications system 100 may include one or more NE 102, one or more UE 104, and a core network (CN) 106. The wireless communications system 100 may support various radio access technologies. In some implementations, the wireless communications system 100 may be a 4G network, such as an LTE network or an LTE-Advanced (LTE-A) network. In some other implementations, the wireless communications system 100 may be a NR network, such as a 5G network, a 5G-Advanced (5G-A) network, or a 5G ultrawideband (5G-UWB) network. In other implementations, the wireless communications system 100 may be a combination of a 4G network and a 5G network, or other suitable radio access technology including Institute of Electrical and Electronics Engineers (IEEE) 802.11 (Wi-Fi), IEEE 802.16 (WiMAX), IEEE 802.20. The wireless communications system 100 may support radio access technologies beyond 5G, for example, 6G. Additionally, the wireless communications system 100 may support technologies, such as time division multiple access (TDMA), frequency division multiple access (FDMA), or code division multiple access (CDMA), etc.

[0045] The one or more NE 102 may be dispersed throughout a geographic region to form the wireless communications system 100. One or more of the NE 102 described herein may be or include or may be referred to as a network node, a base station, a network element, a network function, a network entity, a radio access network (RAN), a NodeB, an eNodeB (eNB), a next-generation NodeB (gNB), or other suitable terminology. An NE 102 and a UE 104 may communicate via a communication link, which may be a wireless or wired connection. For example, an NE 102 and a UE 104 may perform wireless communication (e.g., receive signaling, transmit signaling) over a Uu interface.

[0046] An NE 102 may provide a geographic coverage area for which the NE 102 may support services for one or more UEs 104 within the geographic coverage area. For example, an NE 102 and a UE 104 may support wireless communication of signals related to services (e.g., voice, video, packet data, messaging, broadcast, etc.) according to one or multiple radio access technologies. In some implementations, an NE 102 may be moveable, for example, a satellite associated with a non-terrestrial network (NTN). In some implementations, different geographic coverage areas

associated with the same or different radio access technologies may overlap, but the different geographic coverage areas may be associated with different NE 102.

[0047] The one or more UEs 104 may be dispersed throughout a geographic region of the wireless communications system 100. A UE 104 may include or may be referred to as a remote unit, a mobile device, a wireless device, a remote device, a subscriber device, a transmitter device, a receiver device, or some other suitable terminology. In some implementations, the UE 104 may be referred to as a unit, a station, a terminal, or a client, among other examples. Additionally, or alternatively, the UE 104 may be referred to as an Internet-of-Things (IoT) device, an Internet-of-Everything (IoE) device, or machine-type communication (MTC) device, among other examples.

[0048] A UE 104 may be able to support wireless communication directly with other UEs 104 over a communication link. For example, a UE 104 may support wireless communication directly with another UE 104 over a device-to-device (D2D) communication link. In some implementations, such as vehicle-to-vehicle (V2V) deployments, vehicle-to-everything (V2X) deployments, or cellular-V2X deployments, the communication link may be referred to as a sidelink. For example, a UE 104 may support wireless communication directly with another UE 104 over a PC5 interface.

[0049] An NE 102 may support communications with the CN 106, or with another NE 102, or both. For example, an NE 102 may interface with other NE 102 or the CN 106 through one or more backhaul links (e.g., S1, N2, N6, or other network interface). In some implementations, the NE 102 may communicate with each other directly. In some other implementations, the NE 102 may communicate with each other indirectly (e.g., via the CN 106). In some implementations, one or more NE 102 may include subcomponents, such as an access network entity, which may be an example of an access node controller (ANC). An ANC may communicate with the one or more UEs 104 through one or more other access network transmission entities, which may be referred to as a radio heads, smart radio heads, or transmission-reception points (TRPs).

[0050] The CN 106 may support user authentication, access authorization, tracking, connectivity, and other access, routing, or mobility functions. The CN 106 may be an evolved packet core (EPC), or a 5G core (5GC), which may include a control plane entity that manages access and mobility (e.g., a mobility management entity (MME), an access and mobility management functions (AMF)) and a user plane entity that routes packets or interconnects to

external networks (e.g., a serving gateway (S-GW), a packet data network (PDN) gateway (P-GW), or a user plane function (UPF)). In some implementations, the control plane entity may manage non-access stratum (NAS) functions, such as mobility, authentication, and bearer management (e.g., data bearers, signal bearers, etc.) for the one or more UEs 104 served by the one or more NE 102 associated with the CN 106.

[0051] The CN 106 may communicate with a packet data network over one or more backhaul links (e.g., via an S1, N2, N6, or other network interface). The packet data network may include an application server. In some implementations, one or more UEs 104 may communicate with the application server. A UE 104 may establish a session (e.g., a protocol data unit (PDU) session, or the like) with the CN 106 via an NE 102. The CN 106 may route traffic (e.g., control information, data, and the like) between the UE 104 and the application server using the established session (e.g., the established PDU session). The PDU session may be an example of a logical connection between the UE 104 and the CN 106 (e.g., one or more network functions of the CN 106).

[0052] In the wireless communications system 100, the NEs 102 and the UEs 104 may use resources of the wireless communications system 100 (e.g., time resources (e.g., symbols, slots, subframes, frames, or the like) or frequency resources (e.g., subcarriers, carriers)) to perform various operations (e.g., wireless communications). In some implementations, the NEs 102 and the UEs 104 may support different resource structures. For example, the NEs 102 and the UEs 104 may support different frame structures. In some implementations, such as in 4G, the NEs 102 and the UEs 104 may support a single frame structure. In some other implementations, such as in 5G and among other suitable radio access technologies, the NEs 102 and the UEs 104 may support various frame structures (e.g., multiple frame structures). The NEs 102 and the UEs 104 may support various frame structures based on one or more numerologies.

[0053] One or more numerologies may be supported in the wireless communications system 100, and a numerology may include a subcarrier spacing and a cyclic prefix. A first numerology (e.g., μ=0) may be associated with a first subcarrier spacing (e.g., 15 kHz) and a normal cyclic prefix. In some implementations, the first numerology (e.g., μ=0) associated with the first subcarrier spacing (e.g., 15 kHz) may utilize one slot per subframe. A second numerology (e.g., μ=1) may be associated with a second subcarrier spacing (e.g., 30 kHz) and a normal cyclic prefix. A third numerology (e.g., μ=2) may be associated with a third subcarrier spacing (e.g., 60

kHz) and a normal cyclic prefix or an extended cyclic prefix. A fourth numerology (e.g., μ=3) may be associated with a fourth subcarrier spacing (e.g., 120 kHz) and a normal cyclic prefix. A fifth numerology (e.g., μ=4) may be associated with a fifth subcarrier spacing (e.g., 240 kHz) and a normal cyclic prefix.

[0054] A time interval of a resource (e.g., a communication resource) may be organized according to frames (also referred to as radio frames). Each frame may have a duration, for example, a 10 millisecond (ms) duration. In some implementations, each frame may include multiple subframes. For example, each frame may include 10 subframes, and each subframe may have a duration, for example, a 1 ms duration. In some implementations, each frame may have the same duration. In some implementations, each subframe of a frame may have the same duration.

[0055] Additionally or alternatively, a time interval of a resource (e.g., a communication resource) may be organized according to slots. For example, a subframe may include a number (e.g., quantity) of slots. The number of slots in each subframe may also depend on the one or more numerologies supported in the wireless communications system 100. For instance, the first, second, third, fourth, and fifth numerologies (e.g., μ=0, μ=1, μ=2, μ=3, μ=4) associated with respective subcarrier spacings of 15 kHz, 30 kHz, 60 kHz, 120 kHz, and 240 kHz may utilize a single slot per subframe, two slots per subframe, four slots per subframe, eight slots per subframe, and 16 slots per subframe, respectively. Each slot may include a number (e.g., quantity) of symbols (e.g., orthogonal frequency division multiplexing (OFDM) symbols). In some implementations, the number (e.g., quantity) of slots for a subframe may depend on a numerology. For a normal cyclic prefix, a slot may include 14 symbols. For an extended cyclic prefix (e.g., applicable for 60 kHz subcarrier spacing), a slot may include 12 symbols. The relationship between the number of symbols per slot, the number of slots per subframe, and the number of slots per frame for a normal cyclic prefix and an extended cyclic prefix may depend on a numerology. It should be understood that reference to a first numerology (e.g., μ=0) associated with a first subcarrier spacing (e.g., 15 kHz) may be used interchangeably between subframes and slots.

[0056] In the wireless communications system 100, an electromagnetic (EM) spectrum may be split, based on frequency or wavelength, into various classes, frequency bands, frequency channels, etc. By way of example, the wireless communications system 100 may support one or multiple operating frequency bands, such as frequency range designations FR1 (410 MHz – 7.125 GHz),

FR2 (24.25 GHz – 52.6 GHz), FR3 (7.125 GHz – 24.25 GHz), FR4 (52.6 GHz – 114.25 GHz), FR4a or FR4-1 (52.6 GHz – 71 GHz), and FR5 (114.25 GHz – 300 GHz). In some implementations, the NEs 102 and the UEs 104 may perform wireless communications over one or more of the operating frequency bands. In some implementations, FR1 may be used by the NEs 102 and the UEs 104, among other equipment or devices for cellular communications traffic (e.g., control information, data). In some implementations, FR2 may be used by the NEs 102 and the UEs 104, among other equipment or devices for short-range, high data rate capabilities.

[0057] FR1 may be associated with one or multiple numerologies (e.g., at least three numerologies). For example, FR1 may be associated with a first numerology (e.g., μ=0), which includes 15 kHz subcarrier spacing; a second numerology (e.g., μ=1), which includes 30 kHz subcarrier spacing; and a third numerology (e.g., μ=2), which includes 60 kHz subcarrier spacing. FR2 may be associated with one or multiple numerologies (e.g., at least 2 numerologies). For example, FR2 may be associated with a third numerology (e.g., μ=2), which includes 60 kHz subcarrier spacing; and a fourth numerology (e.g., μ=3), which includes 120 kHz subcarrier spacing.

[0058] According to implementations, a NE 102 transmits to a UE 104 a CSI reporting setting associated with a set of RSs. Further, the CSI reporting setting includes at least two sets of CSI reporting setting parameters including first set of CSI reporting setting parameters corresponding to a first period of first CSI measurement and a first CSI report for BM, and a second set of CSI reporting setting parameters corresponding to a second period of second CSI measurement. The UE 104 generates one or more CSI reports using event-triggered beam reporting associated with the set of RSs and based at least in part on the at least two sets of CSI reporting setting parameters. The UE 104 transmits one or more of the CSI reports to the NE 102. The NE 102 can use the one or more CSI reports for various purposes, such as for optimizing wireless communication with one or more UEs.

[0059] With reference to CSI reporting in some wireless communications systems, a codebook report is partitioned into two parts based on the priority of information reported and each part is encoded. The following is a list of the parameters for NR Rel. 16 Type-II codebook and include content of a CSI report:

[0060] **Part 1**: rank indicator (RI) + channel quality indicator (CQI) + Total number of coefficients

[0061] **Part 2:** spatial domain (SD) basis indicator + Frequency Domain (FD) basis indicator/layer + Bitmap/layer + Coefficient Amplitude info/layer + Coefficient Phase info/layer + Strongest coefficient indicator/layer

[0062] Furthermore, Part 2 CSI can be decomposed into sub-parts each with different priority (e.g., higher priority information listed first). Such partitioning can allow dynamic reporting size for codebook based on available resources in the uplink phase. Also Type-II codebook is based on aperiodic CSI reporting, and only reported in PUSCH via downlink control information (DCI) triggering (one exception). Type-I codebook can be based on periodic CSI reporting (PUCCH) or semi-persistent CSI reporting (PUSCH or PUCCH) or aperiodic reporting (PUSCH).

[0063] For priority reporting for Part 2 CSI, note that multiple CSI reports may be transmitted with different priorities, as shown in Table 1 below:

Table 1: Priority Reporting Levels for Part 2 CSI

Priority 0: For CSI reports 1 to N_{Rep}, Group 0 CSI for CSI reports configured as 'typeII-r16' or 'typeII-PortSelection-r16'; Part 2 wideband CSI for CSI reports configured otherwise
Priority 1: Group 1 CSI for CSI report 1, if configured as 'typeII-r16' or 'typeII-PortSelection-r16'; Part 2 subband CSI of even subbands for CSI report 1, if configured otherwise
Priority 2: Group 2 CSI for CSI report 1, if configured as 'typeII-r16' or 'typeII-PortSelection-r16'; Part 2 subband CSI of odd subbands for CSI report 1, if configured otherwise
Priority 3: Group 1 CSI for CSI report 2, if configured as 'typeII-r16' or 'typeII-PortSelection-r16'; Part 2 subband CSI of even subbands for CSI report 2, if configured otherwise
Priority 4: Group 2 CSI for CSI report 2, if configured as 'typeII-r16' or 'typeII-PortSelection-r16'. Part 2 subband CSI of odd subbands for CSI report 2, if configured otherwise
⋮
Priority $2N_{Rep} - 1$: Group 1 CSI for CSI report N_{Rep}, if configured as 'typeII-r16' or 'typeII-PortSelection-r16'; Part 2 subband CSI of even subbands for CSI report N_{Rep}, if configured otherwise

Priority $2N_{Rep}$:
Group 2 CSI for CSI report N_{Rep}, if configured as 'typeII-r16' or 'typeII-PortSelection-r16'; Part 2 subband CSI of odd subbands for CSI report N_{Rep}, if configured otherwise

[0064] Note that the priority of the N_{Rep} CSI reports can be based on the following:

1. A CSI report corresponding to one CSI reporting setting for one cell may have higher priority compared with another CSI report corresponding to one other CSI reporting setting for the same cell

2. CSI reports intended to one cell may have higher priority compared with other CSI reports intended to another cell

3. CSI reports may have higher priority based on the CSI report content, e.g., CSI reports carrying L1-RSRP information have higher priority

4. CSI reports may have higher priority based on their type, e.g., whether the CSI report is aperiodic, semi-persistent or periodic, and whether the report is sent via PUSCH or PUCCH, may impact the priority of the CSI report
   In light of that, CSI reports may be prioritized as follows, where CSI reports with lower IDs have higher priority

$$\mathrm{Pri}_{iCSI}(y,k,c,s) = 2 \cdot N_{cells} \cdot M_s \cdot y + N_{cells} \cdot M_s \cdot k + M_s \cdot c + s$$

s: CSI reporting setting index, and M_s: Maximum number of CSI reporting settings
c: Cell index, and N_{cells}: Number of serving cells
k: 0 for CSI reports carrying L1-RSRP or L1-SINR, 1 otherwise
y: 0 for aperiodic reports, 1 for semi-persistent reports on PUSCH, 2 for semi-persistent reports on PUCCH, 3 for periodic reports.

[0065] For CSI reporting triggering, a UE can report CSI information for a network using the CSI framework in NR Release 15. The triggering mechanism between a report setting and a resource setting can be summarized in Table 2 below:

Table 2: Triggering mechanism between a report setting and a resource setting

		Periodic CSI reporting	Semi-Periodic (SP) CSI reporting	Access Point (AP) CSI Reporting
Time Domain Behavior of Resource Setting	Periodic CSI-RS	RRC configured	• Medium Access Control (MAC) Control Element (CE) (PUCCH) • DCI (PUSCH)	DCI
	SP CSI-RS	Not Supported	• MAC CE (PUCCH) • DCI (PUSCH)	DCI
	AP CSI-RS	Not Supported	Not Supported	DCI

[0066] Further, associated Resource Settings for a CSI Report Setting are to have same time domain behavior; periodic CSI-RS/interference management (IM) resource and CSI reports can be assumed to be present and active once configured by RRC; aperiodic and semi-persistent CSI-RS/ IM resources and CSI reports can be explicitly triggered or activated; aperiodic CSI-RS/ IM resources and aperiodic CSI reports, the triggering is done jointly by transmitting a DCI Format 0-1; and semi-persistent CSI-RS/ IM resources and semi-persistent CSI reports are independently activated.

[0067] **Figure 2** illustrates an implementation 200 for aperiodic trigger state defining a list of CSI Report Settings. For aperiodic CSI-RS/ IM resources and aperiodic CSI reports, triggering can be done jointly by transmitting a DCI Format 0-1. The DCI Format 0_1 contains a CSI request field (0 to 6 bits). A non-zero request field points to a so-called aperiodic trigger state configured by RRC (see Figure 3). An aperiodic trigger state in turn is defined as a list of up to 16 aperiodic CSI Report Settings, identified by a CSI Report Setting ID for which the UE calculates simultaneously CSI and transmits it on the scheduled PUSCH transmission.

[0068] **Figure 3** illustrates an RRC configuration for NZP-CSI-RS/CSI-IM resources, **Figure 4** illustrates at 400 RRC configuration for NZP-CSI-RS Resource, and **Figure 5** illustrates at 500 RRC configuration for CSI-IM-Resource. For instance, when the CSI Report Setting is linked with aperiodic Resource Setting (can include multiple Resource Sets), the aperiodic NZP CSI-RS Resource Set for channel measurement, the aperiodic CSI-IM Resource Set (if used) and the aperiodic NZP CSI-RS Resource Set for IM (if used) to use for a given CSI Report Setting are also included in the aperiodic trigger state definition. For aperiodic NZP CSI-RS, the Quasi Co-Location

(QCL) source to use is also configured in the aperiodic trigger state. The UE can assume that the resources used for the computation of the channel and interference can be processed with the same spatial filter e.g. quasi-co-located with respect to "QCL-TypeD."

[0069] Table 3 summarizes the type of uplink channels used for CSI reporting as a function of the CSI codebook type.

Table 3: Uplink channels used for CSI reporting as a function of the CSI codebook type

	Periodic CSI reporting	SP CSI reporting	AP CSI reporting
Type I wideband (WB)	PUCCH Format 2,3,4	• PUCCH Format 2 • PUSCH	PUSCH
Type I subband (SB)		• PUCCH Format 3,4 • PUSCH	PUSCH
Type II WB		• PUCCH Format 3,4 • PUSCH	PUSCH
Type II SB		PUSCH	PUSCH
Type II Part 1 only		PUCCH Format 3,4	

[0070] **Figure 6** illustrates at 600 partial CSI omission for Rel. 15 PUSCH-Based CSI. For instance, for aperiodic CSI reporting, PUSCH-based reports are divided into two CSI parts: CSI Part1 and CSI Part 2. This can cause the size of CSI payload to vary significantly and therefore a payload size design can result in large overhead. CSI Part 1 has a fixed payload size (and can be decoded by the gNB without prior information) and contains the following:

- RI (if reported), CRI (if reported) and CQI for the first codeword,
- number of non-zero wideband amplitude coefficients per layer for Type II CSI feedback on PUSCH.

[0071] CSI Part 2 has a variable payload size that can be derived from the CSI parameters in CSI Part 1 and contains PMI and the CQI for the second codeword when RI > 4. For example, if the aperiodic trigger state indicated by DCI format 0_1 defines 3 report settings x, y, and z, then the aperiodic CSI reporting for CSI part 2 can be ordered as indicated at 600.

[0072] CSI reports can be prioritized according to:

1. time-domain behavior and physical channel, where more dynamic reports are given precedence over less dynamic reports and PUSCH has precedence over PUCCH.
2. CSI content, where beam reports (e.g., L1-RSRP reporting) has priority over regular CSI reports.
3. the serving cell to which the CSI corresponds (in case of carrier aggregation (CA) operation). CSI corresponding to the PCell has priority over CSI corresponding to Scells.
4. the reportConfigID.

[0073] In discussing antenna panel, antenna port, quasi-collocation, transmission configuration indication (TCI) state, spatial relation, etc., the terms antenna, panel, and antenna panel can be used interchangeably. An antenna panel may be a hardware that is used for transmitting and/or receiving radio signals at frequencies lower than 6GHz, e.g., frequency range 1 (FR1), or higher than 6GHz, e.g., frequency range 2 (FR2) or millimeter wave (mmWave). In some implementations, an antenna panel may include an array of antenna elements, where each antenna element is connected to hardware such as a phase shifter that allows a control module to apply spatial parameters for transmission and/or reception of signals. The resulting radiation pattern may be called a beam, which may or may not be unimodal and may allow the device to amplify signals that are transmitted or received from spatial directions.

[0074] In some implementations, an antenna panel may or may not be virtualized as an antenna port in the specifications. An antenna panel may be connected to a baseband processing module through a radio frequency (RF) chain for each of transmission (egress) and reception (ingress) directions. A capability of a device in terms of the number of antenna panels, their duplexing capabilities, their beamforming capabilities, and so on, may or may not be transparent to other devices. In some implementations, capability information may be communicated via signaling or, in some implementations, capability information may be provided to devices without signaling. In the case that such information is available to other devices, it can be used for signaling or local decision making.

[0075] In some implementations, a device (e.g., UE, node) antenna panel may be a physical or logical antenna array including a set of antenna elements or antenna ports that share a common or a significant portion of an RF chain (e.g., in-phase/quadrature (I/Q) modulator, analog to digital

(A/D) converter, local oscillator, phase shift network). The device antenna panel or “device panel” may be a logical entity with physical device antennas mapped to the logical entity. The mapping of physical device antennas to the logical entity may be up to device implementation. Communicating (receiving or transmitting) on at least a subset of antenna elements or antenna ports active for radiating energy (also referred to herein as active elements) of an antenna panel can include biasing or powering on of the RF chain which results in current drain or power consumption in the device associated with the antenna panel (including power amplifier/low noise amplifier (LNA) power consumption associated with the antenna elements or antenna ports). The phrase "active for radiating energy," as used herein, is not meant to be limited to a transmit function but also encompasses a receive function. Accordingly, an antenna element that is active for radiating energy may be coupled to a transmitter to transmit radio frequency energy or to a receiver to receive radio frequency energy, either simultaneously or sequentially, or may be coupled to a transceiver in general, for performing its intended functionality. Communicating on the active elements of an antenna panel enables generation of radiation patterns or beams.

[0076] In some implementations, depending on device’s own implementation, a “device panel” can have at least one of the following functionalities as an operational role of Unit of antenna group to control its Tx beam independently, Unit of antenna group to control its transmission power independently, Unit of antenna group to control its transmission timing independently. The “device panel” may be transparent to gNB. For certain condition(s), gNB or network can assume the mapping between device’s physical antennas to the logical entity “device panel” may not be changed. For example, the condition may include until the next update or report from device or include a duration of time over which the gNB assumes there can be no change to the mapping. A Device may report its capability with respect to the “device panel” to the gNB or network. The device capability may include at least the number of “device panels”. In one implementation, the device may support UL transmission from one beam within a panel; with multiple panels, more than one beam (one beam per panel) may be used for UL transmission. In another implementation, more than one beam per panel may be supported/used for UL transmission.

[0077] In some of the implementations described, an antenna port is defined such that the channel over which a symbol on the antenna port is conveyed can be inferred from the channel over which another symbol on the same antenna port is conveyed.

[0078] Two antenna ports are said to be quasi co-located (QCL) if the large-scale properties of the channel over which a symbol on one antenna port is conveyed can be inferred from the channel over which a symbol on the other antenna port is conveyed. The large-scale properties include one or more of delay spread, Doppler spread, Doppler shift, average gain, average delay, and spatial Rx parameters. Two antenna ports may be quasi co-located with respect to a subset of the large-scale properties and different subset of large-scale properties may be indicated by a QCL Type. The QCL Type can indicate which channel properties are the same between the two RSs (e.g., on the two antenna ports). Thus, the RSs can be linked to each other with respect to what the UE can assume about their channel statistics or QCL properties. For example, qcl-Type may take one of the following values:

- 'QCL-TypeA': {Doppler shift, Doppler spread, average delay, delay spread}
- 'QCL-TypeB': {Doppler shift, Doppler spread}
- 'QCL-TypeC': {Doppler shift, average delay}
- 'QCL-TypeD': {Spatial Rx parameter}.

[0079] Spatial Rx parameters may include one or more of: angle of arrival (AoA), Dominant AoA, average AoA, angular spread, Power Angular Spectrum (PAS) of AoA, average AoD (angle of departure), PAS of AoD, transmit/receive channel correlation, transmit/receive beamforming, spatial channel correlation etc.

[0080] QCL-TypeA, QCL-TypeB and QCL-TypeC may be applicable for all carrier frequencies, but the QCL-TypeD may be applicable only in higher carrier frequencies (e.g., mmWave, FR2 and beyond), where the UE may not be able to perform omni-directional transmission, e.g. the UE may form beams for directional transmission. In a QCL-TypeD between two RSs A and B, the RS A is considered to be spatially co-located with RS B and the UE may assume that the RSs A and B can be received with the same spatial filter (e.g., with the same receiver beamforming weights).

[0081] An “antenna port” according to an implementation may be a logical port that may correspond to a beam (resulting from beamforming) or may correspond to a physical antenna on a device. In some implementations, a physical antenna may map directly to a single antenna port, in which an antenna port corresponds to an actual physical antenna. Alternately, a set or subset of physical antennas, or antenna set or antenna array or antenna sub-array, may be mapped to one or

more antenna ports after applying complex weights, a cyclic delay, or both to the signal on each physical antenna. The physical antenna set may have antennas from a single module or panel or from multiple modules or panels. The weights may be fixed as in an antenna virtualization scheme, such as cyclic delay diversity (CDD). The procedure used to derive antenna ports from physical antennas may be specific to a device implementation and transparent to other devices.

[0082] In some of the implementations described, a TCI state associated with a target transmission can indicate parameters for configuring a quasi-collocation relationship between the target transmission (e.g., target RS of Demodulation Reference Signal (DM-RS) ports of the target transmission during a transmission occasion) and a source RS(s) (e.g., Synchronization Signal Block (SSB)/CSI-RS/sounding reference signal (SRS)) with respect to quasi co-location type parameter(s) indicated in the corresponding TCI state. The TCI describes which RSs are used as QCL source, and what QCL properties can be derived from each RS. A device can receive a configuration of a plurality of transmission configuration indicator states for a serving cell for transmissions on the serving cell. In some of the implementations described, a TCI state includes at least one source RS to provide a reference (UE assumption) for determining QCL and/or spatial filter.

[0083] In some of the implementations described, a spatial relation information associated with a target transmission can indicate parameters for configuring a spatial setting between the target transmission and a reference RS (e.g., SSB/CSI-RS/SRS). For example, the device may transmit the target transmission with the same spatial domain filter used for reception of the reference RS (e.g., downlink (DL) RS such as SSB/CSI-RS). In another example, the device may transmit the target transmission with the same spatial domain transmission filter used for the transmission of the reference RS (e.g., UL RS such as SRS). A device can receive a configuration of a plurality of spatial relation information configurations for a serving cell for transmissions on the serving cell.

[0084] In some of the implementations described, a UL TCI state is provided if a device is configured with separate DL/UL TCI by RRC signaling. The UL TCI state may include a source RS which provides a reference for determining UL spatial domain transmission filter for the UL transmission (e.g., dynamic-grant/configured-grant based PUSCH, dedicated PUCCH resources) in a component carrier (CC) or across a set of configured CCs/BWPs.

[0085] In some of the implementations described, a joint DL/UL TCI state is provided if the device is configured with joint DL/UL TCI by RRC signaling (e.g., configuration of joint TCI or separate DL/UL TCI is based on RRC signaling). The joint DL/UL TCI state refers to at least a common source reference RS used for determining both the DL QCL information and the UL spatial transmission filter. The source RS determined from the indicated joint (or common) TCI state provides QCL TypeD indication (e.g., for device-dedicated physical downlink control channel (PDCCH)/physical downlink shared channel (PDSCH)) and is used to determine UL spatial transmission filter (e.g., for UE-dedicated PUSCH/PUCCH) for a CC or across a set of configured CCs/BWPs. In one example, the UL spatial transmission filter is derived from the RS of DL QCL TypeD in the joint TCI state. The spatial setting of the UL transmission may be according to the spatial relation with a reference to the source RS configured with *qcl-Type* set to 'typeD' in the joint TCI state.

[0086] Accordingly, the present disclosure provides solutions for event-triggered CSI feedback based on UE-assisted signaling. In the discussion herein, the following notions interchangeably: network nodes, transmit-receive point (TRP), panel, set of antennas, set of antenna ports, uniform linear array, cell, node, radio head, communication (e.g., signals/channels) associated with a CORESET (control resource set) pool, communication associated with a TCI state from a transmission configuration including at least two TCI states. Hereafter, a Tracking Reference Signal (TRS) can correspond to an NZP CSI-RS resource set with a parameter *'trs-info'* being configured. A CSI-RS for beam management can correspond to CSI-RS associated with an NZP CSI-RS resource set with a parameter *'repetition'* being configured. A CSI-RS for CSI corresponds to an NZP CSI-RS resource set with neither parameters *'trs-info'* nor *'repetition'* being configured. A matrix can imply a sequence of fields of an arbitrary dimension, including an array (vector) of values, a standard 2D matrix and more generally a Q-dimensional matrix (tensor) where $Q \geq 2$ is an integer value. The terms "partial CSI update" and "event-triggered CSI report" can be used interchangeably. The terms "full CSI report" and "network-triggered CSI report" can be used interchangeably. The terms "event triggered" and "UE-assisted" can be used interchangeably. For instance, UE-assisted may refer to aspects pertaining to a UE monitoring different defined events and triggering CSI reporting based at least in part on occurrence of one or more of the events. A CSI framework and/or procedure associated with up to 3GPP Rel-18 can be referred to as legacy

behavior. Further, the described implementations and elements of the implementations can be combined in various ways.

[0087] Implementations include aspects for Period 1 event-triggered CSI reporting. For instance, in a first period of the CSI measurement and reporting framework, the network can configure a UE with CSI measurement and reporting corresponding to beam management parameters, and one or more CSI reports are transmitted by the UE to the network. Several implementations are described below. According to a possible implementation, one or more elements or features from one or more of the described implementations may be combined.

[0088] In a first implementation, the UE is configured with a CSI Reporting Setting, where the CSI Reporting Setting is associated with a CSI Resource Setting including a set of NZP CSI-RS resources for BM, SS/PBCH, or a combination thereof. In a first example, the CSI reporting setting is associated with a report quantity including at least one of 'CRI', 'SSBRI', 'L1-RSRP' and 'L1-SINR.' In a second example, the CSI reporting setting is associated with a CSI resource setting whose time-domain behavior, e.g., resource type, set to one of periodic or semi-persistent, where the CSI resource setting is associated with a first CSI resource periodicity. In a third example, the CSI reporting setting is associated with a time-domain behavior (e.g., reporting configuration type) set to one of periodic or semi-persistent reporting, where the CSI reporting setting is associated with a first CSI reporting periodicity.

[0089] In a second implementation, the UE is configured with at least one CSI reporting Setting including two sets of CSI reporting Setting parameters corresponding to CSI measurement and reporting for beam management. In a first example, the two sets of CSI reporting setting parameters correspond to two CSI reporting settings, where a first CSI reporting setting includes two CSI reporting setting IDs, a first CSI reporting setting ID corresponding to an identification of the first CSI reporting setting, and a second CSI reporting setting ID corresponding to an identification of a second CSI reporting setting associated with event-triggered CSI reporting for beam management. In a second example, the two sets of CSI reporting setting parameters correspond to two CSI reporting sub-configurations, a first CSI reporting sub-configuration corresponding to legacy CSI reporting setting, and a second CSI reporting sub-configuration corresponding to a second CSI reporting setting associated with event-triggered CSI reporting for beam management.

[0090] Implementations include aspects for Period 2 event-triggered CSI reporting. For instance, in a second period of the CSI measurement and reporting framework, the network can configure a UE with CSI measurement and reporting corresponding to beam management parameters, and a transmission of one or more CSI reports by the UE can be conditioned on an occurrence of an event monitored at the UE. Several implementations are described below. According to implementations, one or more elements and/or features from one or more of the described implementations may be combined.

[0091] In a first implementation, the second set of CSI Reporting Setting parameters can correspond to a second period of CSI measurement and reporting, where the second period of CSI measurement and reporting succeeds the first period of CSI measurement and reporting for BM. In a first example, the second set of CSI reporting setting parameters is associated with a report quantity set to 'none.' In a second example, the second set of CSI Reporting setting parameters is associated with a second CSI reporting periodicity, where a value of the second CSI reporting periodicity is higher than a value of the first CSI reporting periodicity associated with the first set of CSI reporting parameters. In a third example, a reporting configuration type of the CSI reporting associated with the second set of CSI reporting setting parameters is the same as the reporting configuration type of the CSI reporting associated with the second set of CSI reporting setting parameters.

[0092] In a fourth example, a value of a report quantity associated with the second set of CSI reporting setting parameters is the same as a value of the report quantity associated with the first set of CSI reporting setting parameters. In a fifth example, the second set of CSI reporting setting parameters is associated with a second CSI resource periodicity, and a value of the second CSI resource periodicity is greater than or equal to a value of the first CSI resource periodicity associated with the first set of CSI reporting parameters. In a sixth example, a resource type of a second CSI resource setting associated with the second set of CSI reporting setting parameters is the same as the resource type of the first CSI resource setting associated with the first set of CSI reporting setting parameters.

[0093] Implementations include aspects for UE-monitored events for UE-assisted CSI reporting for BM. For instance, where a UE is configured with event-triggered CSI measurement and reporting for BM, and where the UE is within the second period of the CSI measurement and

reporting framework, the UE can monitor a set of events defined by the network. The monitoring of the set of events, for example, is based on at least CSI measurements during the second period of the CSI measurement and reporting framework. Several implementations are described below. According to implementations, one or more elements or features from one or more of the described implementations may be combined.

[0094] In a first implementation, at least one event in the set of events is based on a first L1-RSRP value of a selected beam measured (and reported) during the first period of the CSI measurement and reporting framework being greater than a second L1-RSRP value of the selected beam measured during the second period of the CSI measurement and reporting framework at least by a threshold value. In a first example, the selected beam corresponds to a NZP CSI-RS resource with an ID that is reported as a CRI value of a CSI report corresponding to the first period of the CSI measurement and reporting framework. In a second example, the selected beam corresponds to an SS/PBCH resource with an ID that is reported as an SSBRI value of a CSI report corresponding to the first period of the CSI measurement and reporting framework. In a third example, the threshold value is configured by the network as part of the second set of the CSI reporting Setting parameters, e.g., from a set of pre-configured threshold values.

[0095] In a second implementation, at least one event in the set of events is based on a first L1-SINR value of a selected beam measured (and reported) during the first period of the CSI measurement and reporting framework being greater than a second L1-SINR value of the selected beam measured during the second period of the CSI measurement and reporting framework at least by a threshold value. In a first example, the selected beam corresponds to a NZP CSI-RS resource with an ID that is reported as a CRI value of a CSI report corresponding to the first period of the CSI measurement and reporting framework. In a second example, the selected beam corresponds to an SS/PBCH resource with an ID that is reported as an SBRI value of a CSI report corresponding to the first period of the CSI measurement and reporting framework. In a third example, the threshold value is configured by the network as part of the second set of the CSI reporting Setting parameters, e.g., from a set of pre-configured threshold values.

[0096] In a third implementation, at least one event in the set of events is based on a first L1-RSRP value of a first beam measured (and reported) during the first period of the CSI measurement and reporting framework being less than a second L1-RSRP value of a second beam measured

during the second period of the CSI measurement and reporting framework at least by a threshold value. In a first example, the first beam corresponds to a first NZP CSI-RS resource with an ID that is reported as a first CRI value of a CSI report corresponding to the first period of the CSI measurement and reporting framework. In a second example, the second beam corresponds to a second NZP CSI-RS resource with an ID that is reported as a second CRI value of a CSI report corresponding to the first period of the CSI measurement and reporting framework. In a third example, the second beam corresponds to a second NZP CSI-RS resource with an ID that is not reported in the CSI report corresponding to the first period of the CSI measurement and reporting framework.

[0097] In a fourth example, the first beam corresponds to a first SS/PBCH resource with an ID that is reported as a first SSBRI value of a CSI report corresponding to the first period of the CSI measurement and reporting framework. In a fifth example, the second beam corresponds to a second SS/PBCH resource with an ID that is reported as a second SSBRI value of a CSI report corresponding to the first period of the CSI measurement and reporting framework. In a sixth example, the second beam corresponds to a second SS/PBCH resource with an ID that is not reported in the CSI report corresponding to the first period of the CSI measurement and reporting framework. In a seventh example, the threshold value is configured by the network as part of the second set of the CSI reporting Setting parameters, e.g., from a set of pre-configured threshold values.

[0098] In a fourth implementation, at least one event in the set of events is based on a first L1-SINR value of a first beam measured (and reported) during the first period of the CSI measurement and reporting framework being less than a second L1-SINR value of a second beam measured during the second period of the CSI measurement and reporting framework at least by a threshold value. In a first example, the first beam corresponds to a first NZP CSI-RS resource with an ID that is reported as a first CRI value of a CSI report corresponding to the first period of the CSI measurement and reporting framework. In a second example, the second beam corresponds to a second NZP CSI-RS resource with an ID that is reported as a second CRI value of a CSI report corresponding to the first period of the CSI measurement and reporting framework. In a third example, the second beam corresponds to a second NZP CSI-RS resource with an ID that is not

reported in the CSI report corresponding to the first period of the CSI measurement and reporting framework.

[0099] In a fourth example, the first beam corresponds to a first SS/PBCH resource with an ID that is reported as a first SSBRI value of a CSI report corresponding to the first period of the CSI measurement and reporting framework. In a fifth example, the second beam corresponds to a second SS/PBCH resource with an ID that is reported as a second SSBRI value of a CSI report corresponding to the first period of the CSI measurement and reporting framework. In a sixth example, the second beam corresponds to a second SS/PBCH resource with an ID that is not reported in the CSI report corresponding to the first period of the CSI measurement and reporting framework. In a seventh example, the threshold value is configured by the network as part of the second set of the CSI reporting Setting parameters, e.g., from a set of pre-configured threshold values.

[0100] In a fifth implementation, a monitoring of at least one event in the set of events can be based on a time restriction parameter. In a first example, the monitoring of the at least one event is configured with a time restriction for channel measurement, where the event is measured based on only the most recent, no later than a CSI reference resource, occasion of SS/PBCH, NZP CSI-RS, or a combination thereof, associated with the CSI resource setting. In a second example, the monitoring of the at least one event is not configured with a time restriction for channel measurement, where the event is measured based on only the SS/PBCH, NZP CSI-RS, or a combination thereof, no later than a CSI reference resource associated with the CSI resource setting.

[0101] In a third example, if the monitoring of the at least one event is not configured with a time restriction for channel measurement, a number of occasions of SS/PBCH, NZP CSI-RS, or a combination thereof corresponding to the channel measurements are configured by the network. In a fourth example, if the monitoring of the at least one event is not configured with a time restriction for channel measurement, a time duration including at least one transmission occasions of SS/PBCH, NZP CSI-RS, or a combination thereof, is configured by the network, where the time duration is identified in a unit of at least one of millisecond, a slot, or a periodicity value of the SS/PBCH or the NZP CSI-RS.

[0102] Implementations include aspects for UE trigger signal corresponding to event-triggered CSI reporting for BM. For instance, a UE configured with event-triggered CSI measurement and reporting for BM can transmit an uplink (UL) UE trigger signal to the network in case of an occurrence of a subset of events of the set of events defined by the network. Several implementations of the UE trigger signal are described below. According to implementations, one or more elements or features from one or more of the described implementations may be combined.

[0103] In a first implementation, the UL UE trigger signal is in a form of a Scheduling Request (SR) signal. In a first example, the SR signal is transmitted over PUCCH. In a second example, the SR signal is transmitted over UCI of PUSCH. In a third example, the SR signal cannot be multiplexed with CSI report, nor hybrid automatic repeat-request acknowledgement (HARQ-ACK) signals. In a fourth example, the SR signal is associated with event-triggered beam reporting, e.g., SR over PUCCH or UCI of PUSCH, where an identifier, e.g., *SchedulingRequestID-EventTriggered-BM*, indicates a configuration of the scheduling request, where an uplink resource allocation associated with the event-triggered BM-related SR is set to "null." In a fifth example, the UE cancels the SR associated with event-triggered BM after receiving a first signal from the network, the first signal corresponding to a new CSI reporting setting, e.g., a DCI scheduling PUSCH corresponding to an aperiodic CSI reporting setting triggering.

[0104] In a second implementation, the UL UE trigger signal is in a form of a CSI report. In a first example, the CSI report is transmitted over PUCCH. In a second example, the CSI report is based on a report quantity associated with event-triggered BM reporting. In a third example, the report quantity associated with event-triggered BM reporting is a standalone report quantity, e.g., no other report quantities are included in the CSI report. In a fourth example, the CSI report includes only one CSI report part.

[0105] In a sixth example, the indication of the occurrence of the subset of events of the set of events associated with event-triggered BM further includes an identification of the subset of events of the set of events associated with event-triggered BM. In a seventh example, the indication of the occurrence of the subset of events in the set of events associated with event-triggered BM further includes an identification of an NZP CSI-RS resource, e.g., CRI, an identification of an SS/PBCH resource, e.g., SSBRI, or a combination thereof, where the CRI or SSBRI or the combination thereof corresponds to a UE-recommended beam based on measurements during the second period

of the CSI measurement and reporting framework. In an eighth example, the CSI report is transmitted over a configured resource, e.g., based on a configured grant.

[0106] In a third implementation, the UL UE trigger signal is in a form of an UL report. In a first example, the UL report is transmitted over PUCCH. In a second example, the UL report is based on a report quantity associated with event-triggered BM reporting. In a third example, the UL report is associated with event-triggered BM reporting. In a fourth example, the indication of the occurrence of the subset of events in the set of events associated with event-triggered BM further includes an identification of the subset of events in the set of events associated with event-triggered BM. In a fifth example, the indication of the occurrence of the subset of events in the set of events associated with event-triggered BM further includes an identification of an NZP CSI-RS resource (e.g., CRI), an identification of an SS/PBCH resource (e.g., SSBRI), and/or a combination thereof. Further, the CRI and/or SSBRI or the combination thereof can correspond to a UE-recommended beam based on measurements during the second period of the CSI measurement and reporting framework. In a sixth example, the UL report is transmitted over a configured resource, e.g., based on a configured grant.

[0107] Implementations also include updated BM reporting based on UE trigger signal values. For instance, a UE transmitting a UE trigger signal corresponding to event-triggered CSI measurement and reporting for BM can further transmit a second UL signal including additional BM reporting parameters, compared with the UE trigger signal. Several implementations of the second UL signal are described below. According to implementations, one or more elements or features from one or more of the described implementations may be combined.

[0108] In a first implementation, the second UL signal corresponds to a CSI report. In a first example, the CSI report is based on at least the first set of CSI reporting setting parameters. In a second example, the CSI report is based on a second CSI reporting setting that is triggered after a reception of the UE trigger signal.

[0109] In a second implementation, the second UL signal is a second CSI report that includes differential parameter values based on corresponding parameter values in a first CSI report that is transmitted prior to transmitting the UL trigger signal. In a first example, the second CSI report corresponds to a report quantity associated with at least one of ‘L1-RSRP’ and ‘L1-SINR’, where

values of the at least one of L1-RSRP or L1-SINR are computed differentially based on corresponding values in the first CSI report. In a second example, the second CSI report includes an identification of the subset of events in the set of events associated with event-triggered BM. In a third example, the second CSI report includes values associated with measurements corresponding to the subset of events in the set of events associated with event-triggered BM, e.g., a value of a reduction of an L1-RSRP value corresponding to an identified beam.

[0110] In a fourth example, the second CSI report includes an identification of an NZP CSI-RS resource, e.g., CRI, an identification of an SS/PBCH resource, e.g., SSBRI, or a combination thereof, where the CRI or SSBRI or the combination thereof corresponds to a UE-recommended beam based on measurements during the second period of the CSI measurement and reporting framework. In a fifth example, the second CSI report is based on aperiodic CSI reporting over PUSCH.

[0111] In a third implementation, the second UL signal is reported over a contention-based UL resource from a set of contention-based UL resource pools. In a first example, the second UL signal is transmitted after at least a period of time that is known to both the UE and the network, e.g., a configured value of the period of time. In a second example, each UL resource pool of the set of contention-based UL resource pools is identified by an index. In a third example, the set of contention-based UL resource pools is based on a contention-based resource allocation (CBRA) grant.

[0112] **Figure 7** illustrates an example of a UE 700 in accordance with aspects of the present disclosure. The UE 700 may include a processor 702, a memory 704, a controller 706, and a transceiver 708. The processor 702, the memory 704, the controller 706, or the transceiver 708, or various combinations thereof or various components thereof may be examples of means for performing various aspects of the present disclosure as described herein. These components may be coupled (e.g., operatively, communicatively, functionally, electronically, electrically) via one or more interfaces.

[0113] The processor 702, the memory 704, the controller 706, or the transceiver 708, or various combinations or components thereof may be implemented in hardware (e.g., circuitry). The hardware may include a processor, a digital signal processor (DSP), an application-specific

integrated circuit (ASIC), or other programmable logic device, or any combination thereof configured as or otherwise supporting a means for performing the functions described in the present disclosure.

[0114] The processor 702 may include an intelligent hardware device (e.g., a general-purpose processor, a DSP, a CPU, an ASIC, an FPGA, or any combination thereof). In some implementations, the processor 702 may be configured to operate the memory 704. In some other implementations, the memory 704 may be integrated into the processor 702. The processor 702 may be configured to execute computer-readable instructions stored in the memory 704 to cause the UE 700 to perform various functions of the present disclosure.

[0115] The memory 704 may include volatile or non-volatile memory. The memory 704 may store computer-readable, computer-executable code including instructions when executed by the processor 702 cause the UE 700 to perform various functions described herein. The code may be stored in a non-transitory computer-readable medium such as the memory 704 or another type of memory. Computer-readable media includes both non-transitory computer storage media and communication media including any medium that facilitates transfer of a computer program from one place to another. A non-transitory storage medium may be any available medium that may be accessed by a general-purpose or special-purpose computer.

[0116] In some implementations, the processor 702 and the memory 704 coupled with the processor 702 may be configured to cause the UE 700 to perform one or more of the functions described herein (e.g., executing, by the processor 702, instructions stored in the memory 704). For example, the processor 702 may support wireless communication at the UE 700 in accordance with examples as disclosed herein. The UE 700 may be configured to or operable to support a means for generating one or more CSI reports using event-triggered beam reporting associated with a set of RSs and based at least in part on a CSI reporting setting including two sets of CSI reporting setting parameters including: a first set of CSI reporting setting parameters corresponding to a first period of first CSI measurement and a first CSI report for beam management; and a second set of CSI reporting setting parameters corresponding to a second period of second CSI measurement; monitoring a set of one or more events based at least in part on second CSI measurements during the second period; and transmitting a second CSI report for the beam management including an

updated set of values compared with corresponding values of the first CSI report for the beam management.

[0117] Additionally, the UE 700 may be configured to support any one or combination of receiving, from a network entity, the CSI reporting setting including an indication that enables event-triggered beam reporting over an uplink channel; transmitting a UE trigger signal if a subset of one or more events in the set of one or more events are satisfied; the UE trigger signal includes a scheduling request signal associated with the event-triggered beam reporting, and an uplink resource allocation associated with the event-triggered beam reporting is set to null; the scheduling request signal is associated with a scheduling request over one or more of PUCCH or UCI of PUSCH, and an identifier indicates a configuration of the scheduling request signal; the subset of the one or more events in the set of one or more events are selected by a network; further including transmitting the UE trigger signal as a CSI report and based at least in part on a report quantity associated with event-triggered beam reporting; the second CSI report includes at least one of: one or more of an identification of a new selected beam corresponding to at least one of a CRI or a SSBRI; one or more of an updated L1-RSRP value or an updated L1-SINR value.

[0118] Additionally, the UE 700 may be configured to support any one or combination of where a delta change in one of the L1-RSRP value and the L1-SINR value corresponding to the second period of CSI measurement compared with the first period of CSI measurement; an identification of the subset of one or more events in the set of events that are satisfied; or a group of differential values associated with the subset of one or more events in the set of events that are satisfied; the set of RSs correspond to at least one of NZP CSI-RS resources or SS/PBCH resources; the at least one of the NZP CSI-RS resources is configured with a repetition parameter; the two sets of CSI reporting setting parameters correspond to two CSI reporting settings, and an ID of a second CSI reporting setting of the two CSI reporting settings is included within one or more parameters of a first CSI reporting setting of the two CSI reporting settings; the first set of CSI reporting setting parameters includes a report quantity set to at least one of L1-RSRP or L1-SINR reporting, and the second set of CSI reporting setting parameters includes a report quantity set to null; a beam corresponds to one or more of a NZP CSI-RS resource configured with a repetition parameter or a SS/PBCH resource.

[0119] Additionally, the UE 700 may be configured to support any one or combination of where the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being greater, at least by a threshold value, than one or more of a second L1-RSRP value or a second L1-SINR value of the first beam corresponding to the second period of the second CSI measurement; the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being less than, at least by a threshold value, one or more of a second L1-RSRP value or a second L1-SINR value of a second beam corresponding to the second period of the second CSI measurement, the second beam being different from the first beam; transmitting the second CSI report for the beam management over a contention-based uplink resource grant; the first set of CSI reporting setting parameters is associated with a first CSI resource periodicity, the second set of CSI reporting setting parameters is associated with a second CSI resource periodicity, and a value of the second CSI resource periodicity is greater than or equal to a value of the first CSI resource periodicity.

[0120] Additionally, or alternatively, the UE 700 may support means to generate one or more CSI reports using event-triggered beam reporting associated with a set of RSs and based at least in part on a CSI reporting setting including two sets of CSI reporting setting parameters including: a first set of CSI reporting setting parameters corresponding to a first period of first CSI measurement and a first CSI report for beam management; and a second set of CSI reporting setting parameters corresponding to a second period of second CSI measurement; monitor a set of one or more events based at least in part on second CSI measurements during the second period; and transmit a second CSI report for the beam management including an updated set of values compared with corresponding values of the first CSI report for the beam management.

[0121] Additionally, the UE 700 may be configured to support any one or combination of to receive, from a network entity, the CSI reporting setting including an indication that enables event-triggered beam reporting over an uplink channel; transmit a UE trigger signal if a subset of one or more events in the set of one or more events are satisfied; the UE trigger signal includes a scheduling request signal associated with the event-triggered beam reporting, and where an uplink resource allocation associated with the event-triggered beam reporting is set to null; the scheduling request signal is associated with a scheduling request over one or more of PUCCH or UCI of

PUSCH, and where an identifier indicates a configuration of the scheduling request signal; the subset of the one or more events in the set of one or more events are selected by a network.

[0122] Additionally, the UE 700 may be configured to support any one or combination of where the UE trigger signal is a CSI report and based at least in part on a report quantity associated with event-triggered beam reporting; the second CSI report includes at least one of: one or more of an identification of a new selected beam corresponding to at least one of a CRI or a SSBRI; one or more of an updated L1-RSRP value or an updated L1-SINR value; a delta change in one of the L1-RSRP value and the L1-SINR value corresponding to the second period of CSI measurement compared with the first period of CSI measurement; an identification of the subset of one or more events in the set of events that are satisfied; or a group of differential values associated with the subset of one or more events in the set of events that are satisfied; the set of RSs correspond to at least one of NZP CSI-RS resources or SS/PBCH resources.

[0123] Additionally, the UE 700 may be configured to support any one or combination of where the at least one of the NZP CSI-RS resources is configured with a repetition parameter; the two sets of CSI reporting setting parameters correspond to two CSI reporting settings, and where an ID of a second CSI reporting setting of the two CSI reporting settings is included within one or more parameters of a first CSI reporting setting of the two CSI reporting settings; the first set of CSI reporting setting parameters includes a report quantity set to at least one of L1-RSRP or L1-SINR reporting, and where the second set of CSI reporting setting parameters includes a report quantity set to null; a beam corresponds to one or more of a NZP CSI-RS resource configured with a repetition parameter or a SS/PBCH resource; the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being greater, at least by a threshold value, than one or more of a second L1-RSRP value or a second L1-SINR value of the first beam corresponding to the second period of the second CSI measurement.

[0124] Additionally, the UE 700 may be configured to support any one or combination of where the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being less than, at least by a threshold value, one or more of a second L1-RSRP value or a second L1-SINR value of a second beam corresponding to the second period of the second CSI measurement, the second

beam being different from the first beam; transmit the second CSI report for the beam management over a contention-based uplink resource grant; the first set of CSI reporting setting parameters is associated with a first CSI resource periodicity, where the second set of CSI reporting setting parameters is associated with a second CSI resource periodicity, and where a value of the second CSI resource periodicity is greater than or equal to a value of the first CSI resource periodicity.

[0125] The controller 706 may manage input and output signals for the UE 700. The controller 706 may also manage peripherals not integrated into the UE 700. In some implementations, the controller 706 may utilize an operating system such as iOS®, ANDROID®, WINDOWS®, or other operating systems. In some implementations, the controller 706 may be implemented as part of the processor 702.

[0126] In some implementations, the UE 700 may include at least one transceiver 708. In some other implementations, the UE 700 may have more than one transceiver 708. The transceiver 708 may represent a wireless transceiver. The transceiver 708 may include one or more receiver chains 710, one or more transmitter chains 712, or a combination thereof.

[0127] A receiver chain 710 may be configured to receive signals (e.g., control information, data, packets) over a wireless medium. For example, the receiver chain 710 may include one or more antennas to receive a signal over the air or wireless medium. The receiver chain 710 may include at least one amplifier (e.g., a low-noise amplifier (LNA)) configured to amplify the received signal. The receiver chain 710 may include at least one demodulator configured to demodulate the received signal and obtain the transmitted data by reversing the modulation technique applied during transmission of the signal. The receiver chain 710 may include at least one decoder for decoding the demodulated signal to receive the transmitted data.

[0128] A transmitter chain 712 may be configured to generate and transmit signals (e.g., control information, data, packets). The transmitter chain 712 may include at least one modulator for modulating data onto a carrier signal, preparing the signal for transmission over a wireless medium. The at least one modulator may be configured to support one or more techniques such as amplitude modulation (AM), frequency modulation (FM), or digital modulation schemes like phase-shift keying (PSK) or quadrature amplitude modulation (QAM). The transmitter chain 712 may also include at least one power amplifier configured to amplify the modulated signal to an appropriate

power level suitable for transmission over the wireless medium. The transmitter chain 712 may also include one or more antennas for transmitting the amplified signal into the air or wireless medium.

[0129] **Figure 8** illustrates an example of a processor 800 in accordance with aspects of the present disclosure. The processor 800 may be an example of a processor configured to perform various operations in accordance with examples as described herein. The processor 800 may include a controller 802 configured to perform various operations in accordance with examples as described herein. The processor 800 may optionally include at least one memory 804, which may be, for example, an L1/L2/L3 cache. Additionally, or alternatively, the processor 800 may optionally include one or more arithmetic-logic units (ALUs) 806. One or more of these components may be in electronic communication or otherwise coupled (e.g., operatively, communicatively, functionally, electronically, electrically) via one or more interfaces (e.g., buses).

[0130] The processor 800 may be a processor chipset and include a protocol stack (e.g., a software stack) executed by the processor chipset to perform various operations (e.g., receiving, obtaining, retrieving, transmitting, outputting, forwarding, storing, determining, identifying, accessing, writing, reading) in accordance with examples as described herein. The processor chipset may include one or more cores, one or more caches (e.g., memory local to or included in the processor chipset (e.g., the processor 800)) or other memory (e.g., random access memory (RAM), read-only memory (ROM), dynamic RAM (DRAM), synchronous dynamic RAM (SDRAM), static RAM (SRAM), ferroelectric RAM (FeRAM), magnetic RAM (MRAM), resistive RAM (RRAM), flash memory, phase change memory (PCM), and others).

[0131] The controller 802 may be configured to manage and coordinate various operations (e.g., signaling, receiving, obtaining, retrieving, transmitting, outputting, forwarding, storing, determining, identifying, accessing, writing, reading) of the processor 800 to cause the processor 800 to support various operations in accordance with examples as described herein. For example, the controller 802 may operate as a control unit of the processor 800, generating control signals that manage the operation of various components of the processor 800. These control signals include enabling or disabling functional units, selecting data paths, initiating memory access, and coordinating timing of operations.

[0132] The controller 802 may be configured to fetch (e.g., obtain, retrieve, receive) instructions from the memory 804 and determine subsequent instruction(s) to be executed to cause the processor 800 to support various operations in accordance with examples as described herein. The controller 802 may be configured to track memory addresses of instructions associated with the memory 804. The controller 802 may be configured to decode instructions to determine the operation to be performed and the operands involved. For example, the controller 802 may be configured to interpret the instruction and determine control signals to be output to other components of the processor 800 to cause the processor 800 to support various operations in accordance with examples as described herein. Additionally, or alternatively, the controller 802 may be configured to manage flow of data within the processor 800. The controller 802 may be configured to control transfer of data between registers, ALUs 806, and other functional units of the processor 800.

[0133] The memory 804 may include one or more caches (e.g., memory local to or included in the processor 800) or other memory, such as RAM, ROM, DRAM, SDRAM, SRAM, MRAM, flash memory, etc. In some implementations, the memory 804 may reside within or on a processor chipset (e.g., local to the processor 800). In some other implementations, the memory 804 may reside external to the processor chipset (e.g., remote to the processor 800).

[0134] The memory 804 may store computer-readable, computer-executable code including instructions that, when executed by the processor 800, cause the processor 800 to perform various functions described herein. The code may be stored in a non-transitory computer-readable medium such as system memory or another type of memory. The controller 802 and/or the processor 800 may be configured to execute computer-readable instructions stored in the memory 804 to cause the processor 800 to perform various functions. For example, the processor 800 and/or the controller 802 may be coupled with or to the memory 804, the processor 800, and the controller 802, and memory 806 may be configured to perform various functions described herein. In some examples, the processor 800 may include multiple processors and the memory 804 may include multiple memories. One or more of the multiple processors may be coupled with one or more of the multiple memories, which may, individually or collectively, be configured to perform various functions herein.

[0135] The one or more ALUs 806 may be configured to support various operations in accordance with examples as described herein. In some implementations, the one or more

ALUs 806 may reside within or on a processor chipset (e.g., the processor 800). In some other implementations, the one or more ALUs 806 may reside external to the processor chipset (e.g., the processor 800). One or more ALUs 806 may perform one or more computations such as addition, subtraction, multiplication, and division on data. For example, one or more ALUs 806 may receive input operands and an operation code, which determines an operation to be executed. One or more ALUs 806 may be configured with a variety of logical and arithmetic circuits, including adders, subtractors, shifters, and logic gates, to process and manipulate the data according to the operation. Additionally, or alternatively, the one or more ALUs 806 may support logical operations such as AND, OR, exclusive-OR (XOR), not-OR (NOR), and not-AND (NAND), enabling the one or more ALUs 806 to handle conditional operations, comparisons, and bitwise operations.

[0136] The processor 800 may support wireless communication in accordance with examples as disclosed herein. The processor 800 may be configured to or operable to generate, for a UE, one or more CSI reports using event-triggered beam reporting associated with a set of RSs and based at least in part on a CSI reporting setting including two sets of CSI reporting setting parameters including: a first set of CSI reporting setting parameters corresponding to a first period of first CSI measurement and a first CSI report for beam management; and a second set of CSI reporting setting parameters corresponding to a second period of second CSI measurement; monitor a set of one or more events based at least in part on second CSI measurements during the second period; and transmit a second CSI report for the beam management including an updated set of values compared with corresponding values of the first CSI report for the beam management.

[0137] Additionally, the processor 800 may be configured to support any one or combination of to receive, from a network entity, the CSI reporting setting including an indication that enables event-triggered beam reporting over an uplink channel; transmit a UE trigger signal if a subset of one or more events in the set of one or more events are satisfied; the UE trigger signal includes a scheduling request signal associated with the event-triggered beam reporting, and where an uplink resource allocation associated with the event-triggered beam reporting is set to null; the scheduling request signal is associated with a scheduling request over one or more of PUCCH or UCI of PUSCH, and where an identifier indicates a configuration of the scheduling request signal; the subset of the one or more events in the set of one or more events are selected by a network; transmit the UE trigger signal as a CSI report and based at least in part on a report quantity associated with

event-triggered beam reporting; the second CSI report includes at least one of: one or more of an identification of a new selected beam corresponding to at least one of a CRI or a SSBRI; one or more of an updated L1-RSRP value or an updated L1-SINR value; a delta change in one of the L1-RSRP value and the L1-SINR value corresponding to the second period of CSI measurement compared with the first period of CSI measurement; an identification of the subset of one or more events in the set of events that are satisfied; or a group of differential values associated with the subset of one or more events in the set of events that are satisfied.

[0138] Additionally, the processor 800 may be configured to support any one or combination of where the set of RSs correspond to at least one of NZP CSI-RS resources or SS/PBCH resources; the at least one of the NZP CSI-RS resources is configured with a repetition parameter; the two sets of CSI reporting setting parameters correspond to two CSI reporting settings, and where an ID of a second CSI reporting setting of the two CSI reporting settings is included within one or more parameters of a first CSI reporting setting of the two CSI reporting settings; the first set of CSI reporting setting parameters includes a report quantity set to at least one of L1-RSRP or L1-SINR reporting, and where the second set of CSI reporting setting parameters includes a report quantity set to null; a beam corresponds to one or more of a NZP CSI-RS resource configured with a repetition parameter or a SS/PBCH resource; the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being greater, at least by a threshold value, than one or more of a second L1-RSRP value or a second L1-SINR value of the first beam corresponding to the second period of the second CSI measurement.

[0139] Additionally, the processor 800 may be configured to support any one or combination of where the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being less than, at least by a threshold value, one or more of a second L1-RSRP value or a second L1-SINR value of a second beam corresponding to the second period of the second CSI measurement, the second beam being different from the first beam; transmit the second CSI report for the beam management over a contention-based uplink resource grant; the first set of CSI reporting setting parameters is associated with a first CSI resource periodicity, where the second set of CSI reporting setting parameters is associated with a second CSI resource periodicity, and where a value of the

second CSI resource periodicity is greater than or equal to a value of the first CSI resource periodicity.

[0140] **Figure 9** illustrates an example of a NE 900 in accordance with aspects of the present disclosure. The NE 900 may include a processor 902, a memory 904, a controller 906, and a transceiver 908. The processor 902, the memory 904, the controller 906, or the transceiver 908, or various combinations thereof or various components thereof may be examples of means for performing various aspects of the present disclosure as described herein. These components may be coupled (e.g., operatively, communicatively, functionally, electronically, electrically) via one or more interfaces.

[0141] The processor 902, the memory 904, the controller 906, or the transceiver 908, or various combinations or components thereof may be implemented in hardware (e.g., circuitry). The hardware may include a processor, a digital signal processor (DSP), an application-specific integrated circuit (ASIC), or other programmable logic device, or any combination thereof configured as or otherwise supporting a means for performing the functions described in the present disclosure.

[0142] The processor 902 may include an intelligent hardware device (e.g., a general-purpose processor, a DSP, a CPU, an ASIC, an FPGA, or any combination thereof). In some implementations, the processor 902 may be configured to operate the memory 904. In some other implementations, the memory 904 may be integrated into the processor 902. The processor 902 may be configured to execute computer-readable instructions stored in the memory 904 to cause the NE 900 to perform various functions of the present disclosure.

[0143] The memory 904 may include volatile or non-volatile memory. The memory 904 may store computer-readable, computer-executable code including instructions when executed by the processor 902 cause the NE 900 to perform various functions described herein. The code may be stored in a non-transitory computer-readable medium such as the memory 904 or another type of memory. Computer-readable media includes both non-transitory computer storage media and communication media including any medium that facilitates transfer of a computer program from one place to another. A non-transitory storage medium may be any available medium that may be accessed by a general-purpose or special-purpose computer.

[0144] In some implementations, the processor 902 and the memory 904 coupled with the processor 902 may be configured to cause the NE 900 to perform one or more of the functions described herein (e.g., executing, by the processor 902, instructions stored in the memory 904). For example, the processor 902 may support wireless communication at the NE 900 in accordance with examples as disclosed herein. The NE 900 may be configured to or operable to support a means for transmitting, to a UE, a CSI reporting setting associated with a set of RSs, the CSI reporting setting including two sets of CSI reporting setting parameters including: a first set of CSI reporting setting parameters corresponding to a first period of first CSI measurement and a first CSI report for beam management; and a second set of CSI reporting setting parameters corresponding to a second period of second CSI measurement; and receiving a second CSI report for the beam management including an updated set of values compared with corresponding values of the first CSI report for the beam management.

[0145] Additionally, or alternatively, the NE 900 may support receiving, from the UE, a UE trigger signal indicating that a subset of one or more events in a set of one or more events are satisfied; the UE trigger signal includes a scheduling request signal associated with event-triggered beam reporting, and an uplink resource allocation associated with the event-triggered beam reporting is set to null; the scheduling request signal is associated with a scheduling request over one or more of PUCCH or UCI of PUSCH, and an identifier indicates a configuration of the scheduling request signal; the subset of the one or more events in the set of one or more events are selected by a network; receiving the UE trigger signal as a CSI report and based at least in part on a report quantity associated with event-triggered beam reporting; the second CSI report includes at least one of: one or more of an identification of a new selected beam corresponding to at least one of a CRI or a SSBRI; one or more of an updated L1-RSRP value or an updated L1-SINR value; a delta change in one of the L1-RSRP value and the L1-SINR value corresponding to the second period of CSI measurement compared with the first period of CSI measurement; an identification of the subset of one or more events in the set of events that are satisfied; or a group of differential values associated with the subset of one or more events in the set of events that are satisfied.

[0146] Additionally, or alternatively, the NE 900 may support where the set of RSs correspond to at least one of NZP CSI-RS resources or SS/PBCH resources; the at least one of the NZP CSI-RS resources is configured with a repetition parameter; the two sets of CSI reporting setting parameters

correspond to two CSI reporting settings, and an ID of a second CSI reporting setting of the two CSI reporting settings is included within one or more parameters of a first CSI reporting setting of the two CSI reporting settings; the first set of CSI reporting setting parameters includes a report quantity set to at least one of L1-RSRP or L1-SINR reporting, and the second set of CSI reporting setting parameters includes a report quantity set to null; receiving, from the UE, a UE trigger signal indicating that a subset of one or more events in a set of one or more events are satisfied, and a beam corresponds to one or more of a NZP CSI-RS resource configured with a repetition parameter or a SS/PBCH resource.

[0147] Additionally, or alternatively, the NE 900 may support where the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being greater, at least by a threshold value, than one or more of a second L1-RSRP value or a second L1-SINR value of the first beam corresponding to the second period of the second CSI measurement; the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being less than, at least by a threshold value, one or more of a second L1-RSRP value or a second L1-SINR value of a second beam corresponding to the second period of the second CSI measurement, the second beam being different from the first beam; receiving the second CSI report for the beam management over a contention-based uplink resource grant; the first set of CSI reporting setting parameters is associated with a first CSI resource periodicity, the second set of CSI reporting setting parameters is associated with a second CSI resource periodicity, and a value of the second CSI resource periodicity is greater than or equal to a value of the first CSI resource periodicity.

[0148] Additionally, the NE 900 may be configured to support means to transmit, to a UE, a CSI reporting setting associated with a set of RSs, the CSI reporting setting including two sets of CSI reporting setting parameters including: a first set of CSI reporting setting parameters corresponding to a first period of first CSI measurement and a first CSI report for beam management; and a second set of CSI reporting setting parameters corresponding to a second period of second CSI measurement; and receive a second CSI report for the beam management including an updated set of values compared with corresponding values of the first CSI report for the beam management.

[0149] Additionally, the NE 900 may be configured to support any one or combination of means to receive, from the UE, a UE trigger signal indicating that a subset of one or more events in a set of one or more events are satisfied; the UE trigger signal includes a scheduling request signal associated with event-triggered beam reporting, and where an uplink resource allocation associated with the event-triggered beam reporting is set to null; the scheduling request signal is associated with a scheduling request over one or more of PUCCH or UCI of PUSCH, and where an identifier indicates a configuration of the scheduling request signal; the subset of the one or more events in the set of one or more events are selected by a network; receive the UE trigger signal as a CSI report and based at least in part on a report quantity associated with event-triggered beam reporting; the second CSI report includes at least one of: one or more of an identification of a new selected beam corresponding to at least one of a CRI or a SSBRI; one or more of an updated L1-RSRP value or an updated L1-SINR value; a delta change in one of the L1-RSRP value and the L1-SINR value corresponding to the second period of CSI measurement compared with the first period of CSI measurement; an identification of the subset of one or more events in the set of events that are satisfied; or a group of differential values associated with the subset of one or more events in the set of events that are satisfied.

[0150] Additionally, the NE 900 may be configured to support any one or combination of where the set of RSs correspond to at least one of NZP CSI-RS resources or SS/PBCH resources; the at least one of the NZP CSI-RS resources is configured with a repetition parameter; the two sets of CSI reporting setting parameters correspond to two CSI reporting settings, and where an ID of a second CSI reporting setting of the two CSI reporting settings is included within one or more parameters of a first CSI reporting setting of the two CSI reporting settings; the first set of CSI reporting setting parameters includes a report quantity set to at least one of L1-RSRP or L1-SINR reporting, and where the second set of CSI reporting setting parameters includes a report quantity set to null; receive, from the UE, a UE trigger signal indicating that a subset of one or more events in a set of one or more events are satisfied, and where a beam corresponds to one or more of a NZP CSI-RS resource configured with a repetition parameter or a SS/PBCH resource; the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being greater, at least by a threshold

value, than one or more of a second L1-RSRP value or a second L1-SINR value of the first beam corresponding to the second period of the second CSI measurement.

[0151] Additionally, the NE 900 may be configured to support any one or combination of where the set of one or more events includes one or more of a first L1-RSRP value or a first L1-SINR value of a first beam corresponding to the first period of the first CSI measurement being less than, at least by a threshold value, one or more of a second L1-RSRP value or a second L1-SINR value of a second beam corresponding to the second period of the second CSI measurement, the second beam being different from the first beam; receive the second CSI report for the beam management over a contention-based uplink resource grant; the first set of CSI reporting setting parameters is associated with a first CSI resource periodicity, where the second set of CSI reporting setting parameters is associated with a second CSI resource periodicity, and where a value of the second CSI resource periodicity is greater than or equal to a value of the first CSI resource periodicity.

[0152] The controller 906 may manage input and output signals for the NE 900. The controller 906 may also manage peripherals not integrated into the NE 900. In some implementations, the controller 906 may utilize an operating system such as iOS®, ANDROID®, WINDOWS®, or other operating systems. In some implementations, the controller 906 may be implemented as part of the processor 902.

[0153] In some implementations, the NE 900 may include at least one transceiver 908. In some other implementations, the NE 900 may have more than one transceiver 908. The transceiver 908 may represent a wireless transceiver. The transceiver 908 may include one or more receiver chains 910, one or more transmitter chains 912, or a combination thereof.

[0154] A receiver chain 910 may be configured to receive signals (e.g., control information, data, packets) over a wireless medium. For example, the receiver chain 910 may include one or more antennas to receive a signal over the air or wireless medium. The receiver chain 910 may include at least one amplifier (e.g., a low-noise amplifier (LNA)) configured to amplify the received signal. The receiver chain 910 may include at least one demodulator configured to demodulate the received signal and obtain the transmitted data by reversing the modulation technique applied during transmission of the signal. The receiver chain 910 may include at least one decoder for decoding the demodulated signal to receive the transmitted data.

[0155] A transmitter chain 912 may be configured to generate and transmit signals (e.g., control information, data, packets). The transmitter chain 912 may include at least one modulator for modulating data onto a carrier signal, preparing the signal for transmission over a wireless medium. The at least one modulator may be configured to support one or more techniques such as amplitude modulation (AM), frequency modulation (FM), or digital modulation schemes like phase-shift keying (PSK) or quadrature amplitude modulation (QAM). The transmitter chain 912 may also include at least one power amplifier configured to amplify the modulated signal to an appropriate power level suitable for transmission over the wireless medium. The transmitter chain 912 may also include one or more antennas for transmitting the amplified signal into the air or wireless medium.

[0156] **Figure 10** illustrates a flowchart of a method 1000 in accordance with aspects of the present disclosure. The operations of the method may be implemented by a UE as described herein. In some implementations, the UE may execute a set of instructions to control the function elements of the UE to perform the described functions. It should be noted that the method described herein describes a possible implementation, and that the operations and the steps may be rearranged or otherwise modified and that other implementations are possible.

[0157] At 1002, the method may include receiving configuration for a first set of CSI reporting setting parameters corresponding to a first period of first CSI measurement and corresponding to a first CSI report for beam management, and transmitting one or more first CSI reports. The operations of 1002 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1002 may be performed by a UE as described with reference to Figure 7.

[0158] At 1004, the method may include receiving configuration for a second set of CSI reporting setting parameters corresponding to a second period of second CSI measurement and transmitting one or more second CSI reports. The operations of 1004 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1004 may be performed by a UE as described with reference to Figure 7.

[0159] At 1006, the method may include receiving configuration for event-triggered CSI measurement and reporting for BM and monitoring a set of events. The operations of 1006 may be

performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1006 may be performed by a UE as described with reference to Figure 7.

[0160] At 1008, the method may include transmitting an UL UE trigger signal to a network based at least in part on an occurrence of a subset of events of the set of events. The operations of 1008 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1008 may be performed by a UE as described with reference to Figure 7.

[0161] At 1010, the method may include transmitting to the network a second UL signal comprising additional BM reporting parameters compared with the UL UE trigger signal. The operations of 1010 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1010 may be performed by a UE as described with reference to Figure 7.

[0162] **Figure 11** illustrates a flowchart of a method 1100 in accordance with aspects of the present disclosure. The operations of the method may be implemented by a UE as described herein. In some implementations, the UE may execute a set of instructions to control the function elements of the UE to perform the described functions. It should be noted that the method described herein describes a possible implementation, and that the operations and the steps may be rearranged or otherwise modified and that other implementations are possible.

[0163] At 1102, the method may include generating one or more CSI reports using event-triggered beam reporting associated with a set of RSs and based at least in part on a CSI reporting setting including two sets of CSI reporting setting parameters including a first set of CSI reporting setting parameters corresponding to a first period of first CSI measurement and a first CSI report for beam management and a second set of CSI reporting setting parameters corresponding to a second period of second CSI measurement. The operations of 1102 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1102 may be performed by a UE as described with reference to Figure 7.

[0164] At 1104, the method may include monitoring a set of one or more events based at least in part on second CSI measurements during the second period. The operations of 1104 may be

performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1104 may be performed by a UE as described with reference to Figure 7.

[0165] At 1106, the method may include transmitting a second CSI report for the beam management comprising an updated set of values compared with corresponding values of the first CSI report for the beam management. The operations of 1106 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1106 may be performed by a UE as described with reference to Figure 7.

[0166] **Figure 12** illustrates a flowchart of a method 1200 in accordance with aspects of the present disclosure. The operations of the method may be implemented by a NE as described herein. In some implementations, the NE may execute a set of instructions to control the function elements of the NE to perform the described functions. It should be noted that the method described herein describes a possible implementation, and that the operations and the steps may be rearranged or otherwise modified and that other implementations are possible.

[0167] At 1202, the method may include transmitting, to UE, a CSI reporting setting associated with a set of RSs, the CSI reporting setting including two sets of CSI reporting setting parameters comprising a first set of CSI reporting setting parameters corresponding to a first period of first CSI measurement and a first CSI report for beam management and a second set of CSI reporting setting parameters corresponding to a second period of second CSI measurement. The operations of 1202 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1202 may be performed by a NE as described with reference to Figure 9.

[0168] At 1204, the method may include receiving a second CSI report for the beam management comprising an updated set of values compared with corresponding values of the first CSI report for the beam management. The operations of 1204 may be performed in accordance with examples as described herein. In some implementations, aspects of the operations of 1204 may be performed by a NE as described with reference to Figure 9.

[0169] The description herein is provided to enable a person having ordinary skill in the art to make or use the disclosure. Various modifications to the disclosure can be apparent to a person having ordinary skill in the art, and the generic principles defined herein may be applied to other

variations without departing from the scope of the disclosure. Thus, the disclosure is not limited to the examples and designs described herein but is to be accorded the broadest scope consistent with the principles and novel features disclosed herein.