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Inventor(s)	Chen; Yitao et al.

Downlink control information activation for semi-persistent sounding reference signal resource sets

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Abstract

Methods, systems, and devices for wireless communications are described. In some aspects, a user equipment (UE) and a network entity may support one or more signaling- or configuration-based mechanisms according to which the UE and the network entity may dynamically control a type of semi-persistent SRS resource set associated with activation and deactivation by downlink control information (DCI). The network entity may transmit an indication of a set of semi-persistent SRS resource sets associated with DCI activation to the UE via radio resource control (RRC) signaling and may activate one or more semi-persistent SRS resource sets from the set of semi-persistent SRS resource sets via a DCI message. To facilitate activation by DCI, the UE and the network entity may support a mapping between a set of DCI codepoints and multiple sets of one or more semi-persistent SRS resource sets.

Inventors: **Chen; Yitao (San Diego, CA), Khoshnevisan; Mostafa (San Diego, CA), Sun; Jing (San Diego, CA), Zhang; Xiaoxia (San Diego, CA)**

Applicant: **QUALCOMM Incorporated** (San Diego, CA)

Family ID: **1000008747908**

Assignee: **QUALCOMM Incorporated (San Diego, CA)**

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Background/Summary

FIELD OF TECHNOLOGY
(1) The following relates to wireless communications, including downlink control information (DCI) activation for semi-persistent sounding reference signal (SRS) resource sets.
BACKGROUND

(2) Wireless communications systems are widely deployed to provide various types of communication content such as voice, video, packet data, messaging, broadcast, and so on. These systems may be capable of supporting communication with multiple users by sharing the available system resources (e.g., time, frequency, and power). Examples of such multiple-access systems include fourth generation (4G) systems such as Long Term Evolution (LTE) systems, LTE-Advanced (LTE-A) systems, or LTE-A Pro systems, and fifth generation (5G) systems which may be referred to as New Radio (NR) systems. These systems may employ technologies such as code division multiple access (CDMA), time division multiple access (TDMA), frequency division multiple access (FDMA), orthogonal FDMA (OFDMA), or discrete Fourier transform spread orthogonal frequency division multiplexing (DFT-S-OFDM). A wireless multiple-access communications system may include one or more base stations or network entities, each supporting wireless communication for communication devices, which may be known as user equipment (UE).

(3) In some systems, a UE may transmit a sounding reference signal (SRS) and a network entity may use the SRS for estimation of a channel between the UE and the network entity.

SUMMARY

(4) The described techniques relate to improved methods, systems, devices, and apparatuses that support downlink control information (DCI) activation for semi-persistent sounding reference signal (SRS) resource sets. For example, the described techniques provide for one or more signaling- or configuration-based mechanisms according to which a user equipment (UE) and a network entity may dynamically control a type of semi-persistent SRS resource set associated with activation and deactivation by DCI. For example, the network entity may transmit an indication of a set of semi-persistent SRS resource sets associated with DCI activation to the UE via radio resource control (RRC) signaling and may activate one or more semi-persistent SRS resource sets from the set of semi-persistent SRS resource sets via a DCI message. To facilitate activation by DCI, the UE and the network entity may support a mapping between a set of codepoints and multiple sets of one or more semi-persistent SRS resource sets such that each codepoint corresponds to (and indicates an activation for) a unique set of one or more semi-persistent SRS resource sets.

(5) A method for wireless communication at a UE is described. The method may include receiving control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation, receiving a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets, and transmitting an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(6) An apparatus for wireless communication at a UE is described. The apparatus may include a processor, memory coupled with the processor, and instructions stored in the memory. The instructions may be executable by the processor to cause the apparatus to receive control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation, receive a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets, and transmit an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(7) Another apparatus for wireless communication at a UE is described. The apparatus may include means for receiving control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation, means for receiving a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets, and means for transmitting an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation

of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(8) A non-transitory computer-readable medium storing code for wireless communication at a UE is described. The code may include instructions executable by a processor to receive control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation, receive a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets, and transmit an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(9) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, receiving the first DCI message indicating the activation of the one or more SRS resource sets may include operations, features, means, or instructions for receiving, in the first DCI message, a codepoint of the set of multiple codepoints corresponding to the one or more SRS resource sets in accordance with the mapping.

(10) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the control signaling indicates a radio network temporary identifier (RNTI) associated with a scrambling of activation DCI messages for SRS resource sets having the resource type of semi-persistent and the method, apparatuses, and non-transitory computer-readable medium may include further operations, features, means, or instructions for performing an error check on the first DCI message using a scrambling sequence associated with the RNTI, where a successful error check using the scrambling sequence associated with the RNTI indicates that the first DCI message may be an activation DCI message for the one or more SRS resource sets.

(11) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, receiving the first DCI message indicating the activation of the one or more SRS resource sets may include operations, features, means, or instructions for receiving, in the one or more fields of the first DCI message, a set of bits that may be set to the set of multiple specific values.

(12) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, receiving the first DCI message indicating the activation of the one or more SRS resource sets may include operations, features, means, or instructions for receiving, in the first DCI message, an indication of an update for one or more parameters associated with the one or more SRS resource sets, where transmitting the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets may be based on receiving the indication of the update for the one or more parameters.

(13) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the control signaling indicates a value for each of the one or more parameters and the method, apparatuses, and non-transitory computer-readable medium may include further operations, features, means, or instructions for updating the value stored at the UE for each of the one or more parameters based on the indication of the update for the one or more parameters in the first DCI message, where transmitting the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets may be based on updating the value for each of the one or more parameters.

(14) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the first DCI message indicates the update for the one or more parameters in accordance with explicitly indicating a value for each of the one or more parameters.

(15) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the control signaling indicates a correspondence between a set of configuration profiles and a set of parameter updates and the first DCI message indicates the update for the one or more parameters in accordance with indicating a configuration profile of the set of configuration

profiles.

(16) Some examples of the method, apparatuses, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for receiving a second DCI message indicating an activation of at least one SRS resource set of the one or more SRS resource sets and discarding the second DCI message in accordance with the second DCI message indicating the activation of the at least one SRS resource set, where receiving the second DCI message indicating the activation of the at least one SRS resource set of the one or more SRS resource sets may be associated with an error case.

(17) Some examples of the method, apparatuses, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for receiving a second DCI message indicating an activation of at least one SRS resource set of the one or more SRS resource sets, where the second DCI message includes an indication of an update for one or more parameters associated with the at least one SRS resource set and updating a value of the one or more parameters associated with the at least one SRS resource set based on the indication of the update for the one or more parameters and in accordance with the second DCI message indicating the activation of the at least one SRS resource set.

(18) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the control signaling indicates a defined slot number, and indicates that occasions of the one or more SRS resource sets may be defined relative to the defined slot number, and where transmitting the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets may include operations, features, means, or instructions for transmitting a first SRS in a first occasion of the one or more SRS resource sets after a time gap associated with a processing capability of the UE and an additional offset relative to a slot in which the first DCI message may be received.

(19) Some examples of the method, apparatuses, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for transmitting, to a network entity, an indication of the time gap associated with the processing capability of the UE.

(20) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, transmitting the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets may include operations, features, means, or instructions for transmitting a first SRS in a first occasion of the one or more SRS resource sets after an offset value relative to the slot in which the first DCI message may be received.

(21) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the offset value may be received via at least one of the control signaling or the first DCI message.

(22) Some examples of the method, apparatuses, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for receiving a second DCI message indicating a deactivation of the one or more SRS resource sets, where the second DCI message indicates the deactivation of the one or more SRS resource sets based on at least one of being scrambled in accordance with an RNTI associated with deactivation DCI messages for SRS resource sets having the resource type of semi-persistent or one or more fields of the second DCI message having a set of multiple specific values.

(23) A method for wireless communication at a network entity is described. The method may include outputting control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation, outputting a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets, and obtaining an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(24) An apparatus for wireless communication at a network entity is described. The apparatus may include a processor, memory coupled with the processor, and instructions stored in the memory. The instructions may be executable by the processor to cause the apparatus to output control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation, output a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets, and obtain an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(25) Another apparatus for wireless communication at a network entity is described. The apparatus may include means for outputting control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation, means for outputting a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets, and means for obtaining an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(26) A non-transitory computer-readable medium storing code for wireless communication at a network entity is described. The code may include instructions executable by a processor to output control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation, output a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets, and obtain an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(27) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, outputting the first DCI message indicating the activation of the one or more SRS resource sets may include operations, features, means, or instructions for outputting, in the first DCI message, a codepoint of the set of multiple codepoints corresponding to the one or more SRS resource sets in accordance with the mapping.

(28) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the control signaling indicates an RNTI associated with a scrambling of activation DCI messages for SRS resource sets having the resource type of semi-persistent and the method, apparatuses, and non-transitory computer-readable medium may include further operations, features, means, or instructions for scrambling the first DCI message using a scrambling sequence associated with the RNTI in accordance with the first DCI message being an activation DCI message for the one or more SRS resource sets.

(29) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, outputting the first DCI message indicating the activation of the one or more SRS resource sets may include operations, features, means, or instructions for outputting, in the one or more fields of the first DCI message, a set of bits that may be set to the set of multiple specific values.

(30) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, outputting the first DCI message indicating the activation of the one or more SRS resource sets may include operations, features, means, or instructions for outputting, in the first DCI message, an indication of an update for one or more parameters associated with the one or more SRS resource sets, where obtaining the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets may be based on transmitting the indication of the update for the one or more parameters.

(31) In some examples of the method, apparatuses, and non-transitory computer-readable medium

described herein, the control signaling indicates a value for each of the one or more parameters and the method, apparatuses, and non-transitory computer-readable medium may include further operations, features, means, or instructions for updating the value stored at the network entity for each of the one or more parameters based on the indication of the update for the one or more parameters in the first DCI message, where obtaining the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets may be based on updating the value for each of the one or more parameters.

(32) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the first DCI message indicates the update for the one or more parameters in accordance with explicitly indicating a value for each of the one or more parameters.

(33) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the control signaling indicates a correspondence between a set of configuration profiles and a set of parameter updates and the first DCI message indicates the update for the one or more parameters in accordance with indicating a configuration profile of the set of configuration profiles.

(34) Some examples of the method, apparatuses, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for generating a second DCI message indicating an activation of at least one SRS resource set of the one or more SRS resource sets and discarding the second DCI message in accordance with the second DCI message indicating the activation of the at least one SRS resource set, where generating the second DCI message indicating the activation of the at least one SRS resource set of the one or more SRS resource sets may be associated with an error case.

(35) Some examples of the method, apparatuses, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for outputting a second DCI message indicating an activation of at least one SRS resource set of the one or more SRS resource sets, where the second DCI message includes an indication of an update for one or more parameters associated with the at least one SRS resource set and updating a value of the one or more parameters associated with the at least one SRS resource set based on the indication of the update for the one or more parameters and in accordance with the second DCI message indicating the activation of the at least one SRS resource set.

(36) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the control signaling indicates a defined slot number, and indicates that occasions of the one or more SRS resource sets may be defined relative to the defined slot number, and where obtaining the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets may include operations, features, means, or instructions for obtaining a first SRS in a first occasion of the one or more SRS resource sets after a time gap associated with a processing capability of a UE and an additional offset relative to a slot in which the first DCI message may be output.

(37) Some examples of the method, apparatuses, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for obtaining an indication of the time gap associated with the processing capability of the UE.

(38) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, obtaining the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets may include operations, features, means, or instructions for obtaining a first SRS in a first occasion of the one or more SRS resource sets after an offset value relative to the slot in which the first DCI message may be output.

(39) In some examples of the method, apparatuses, and non-transitory computer-readable medium described herein, the offset value may be received via at least one of the control signaling or the first DCI message.

(40) Some examples of the method, apparatuses, and non-transitory computer-readable medium

described herein may further include operations, features, means, or instructions for outputting a second DCI message indicating a deactivation of the one or more SRS resource sets, where the second DCI message indicates the deactivation of the one or more SRS resource sets based on at least one of being scrambled in accordance with an RNTI associated with deactivation DCI messages for SRS resource sets having the resource type of semi-persistent or one or more fields of the second DCI message having a set of multiple specific values.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) FIGS. **1** and **2** show examples of wireless communications systems that supports downlink control information (DCI) activation for semi-persistent sounding reference signal (SRS) resource sets in accordance with one or more aspects of the present disclosure.
(2) FIGS. **3** through **5** show examples of communication timelines that support DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure.
(3) FIG. **6** shows an example of a control element that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure.
(4) FIG. **7** shows an example of a process flow that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure.
(5) FIGS. **8** and **9** show block diagrams of devices that support DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure.
(6) FIG. **10** shows a block diagram of a communications manager that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure.
(7) FIG. **11** shows a diagram of a system including a device that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure.
(8) FIGS. **12** and **13** show block diagrams of devices that support DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure.
(9) FIG. **14** shows a block diagram of a communications manager that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure.
(10) FIG. **15** shows a diagram of a system including a device that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure.
(11) FIGS. **16** and **17** show flowcharts illustrating methods that support DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure.

DETAILED DESCRIPTION

(12) In some wireless communications systems, a network entity may configure time or frequency resources that a user equipment (UE) may use for transmitting a sounding reference signal (SRS) using one or more SRS resources within an SRS resource set. The network entity may configure a resource type of an SRS resource set as aperiodic, semi-persistent, or periodic and the SRS resource set may be associated with a specific activation mechanism depending on whether the resource type is configured as aperiodic, semi-persistent, or periodic. Some activation mechanisms, however, may introduce relatively high latency and may be inefficient in terms of configurability or flexibility associated with an activated SRS resource set. For example, an activation mechanism for a semi-persistent SRS resource set may involve a transmission and reception of one or more medium access control (MAC) control elements (MAC-CEs), which may be associated with relatively high latency as compared to some other signaling types and which may be unable to support dynamic updates for configured parameters. In some cases, for example, a network entity may transmit a MAC-CE to a UE relatively more infrequently or in accordance with a relatively stricter or less flexible schedule as compared to some other signaling types, which may result in such relatively high latency and inability to support dynamic updates. Such a high latency and lack

of support for dynamic updates may hinder performance in some deployment scenarios, such as in deployment scenarios associated with rapidly changing channel conditions or a high susceptibility to SRS transmission-based interference.

(13) In some implementations of the present disclosure, a UE and a network entity may support one or more signaling- or configuration-based mechanisms according to which the UE and the network entity may dynamically control a type of semi-persistent SRS resource set associated with activation and deactivation by downlink control information (DCI). For example, the network entity may transmit an indication of a set of semi-persistent SRS resource sets associated with DCI activation to the UE via radio resource control (RRC) signaling and may activate one or more semi-persistent SRS resource sets from the set of semi-persistent SRS resource sets via a DCI message. In accordance with supporting a type of semi-persistent SRS resource set associated with DCI activation and deactivation, a network entity may activate or deactivate a semi-persistent SRS resource set with relatively lower latency and more dynamically (as compared to other activation mechanisms, such as those discussed above and in more detail throughout the application, including activation mechanisms based on MAC-CE transmission and reception), which may facilitate greater adaptability to changing channel conditions and more effective interference avoidance. In other words, the UE and the network entity may establish a capability for greater adaptability in accordance with control signaling (e.g., RRC signaling) that indicates a resource type of a set of SRS resource sets as semi-persistent and indicates that the set of SRS resource sets are associated with DCI activation. The UE and the network entity may realize or achieve that greater adaptability in accordance with a DCI message that indicates an activation of one or more SRS resource sets of the set of SRS resource sets and transmission and reception of SRSs during each of multiple periodic occasions associated with the one or more SRS resource sets. Such lower latency and greater adaptability may further support higher data rates, greater system capacity, and greater spectral efficiency, among other benefits.

(14) Further, to facilitate activation by DCI, the UE and the network entity may support a mapping (e.g., an RRC configured mapping) between a set of DCI codepoints and multiple sets of one or more semi-persistent SRS resource sets such that each DCI codepoint corresponds to (and indicates an activation for) a unique set of one or more semi-persistent SRS resource sets. In some examples, the network entity may use the activating DCI message or another DCI message to indicate an update for one or more parameters (e.g., one or more RRC configured parameters) associated with an activated semi-persistent SRS resource set and the UE may update the one or more parameters associated with the activated semi-persistent SRS resource set accordingly.

(15) Such implementations of the subject matter described in this disclosure also can be implemented to realize one or more of the following potential advantages. For example, in accordance with supporting a configured mapping between DCI codepoints and multiple sets of one or more semi-persistent SRS resource sets, the UE and the network entity may reduce or eliminate activation or deactivation ambiguity while maintaining the relatively lower latency provided by DCI activation and deactivation. Moreover, in scenarios in which the network entity dynamically updates one or more parameters via a DCI message (e.g., the DCI message activating the semi-persistent SRS resource set or another DCI message), the UE and the network entity may have greater flexibility (as compared to an activation mechanism for semi-persistent SRS resource sets based on MAC-CE transmission and reception) in how the UE transmits an SRS over resources of the semi-persistent SRS resource set. For example, an activation mechanism for semi-persistent SRS resource sets based on MAC-CE transmission and reception may be unable to provide parameter updates (and the corresponding flexibility) due to the stricter or less flexible transmission schedule of a MAC-CE. Such flexibility for parameter updates may be beneficial in various deployment scenarios, including in multi-transmission and reception point (TRP) scenarios in which the UE may transmit SRSs toward multiple TRPs. Such lower latency, reduced ambiguity, and dynamic parameter updates may further support higher data rates, greater system capacity, and

greater spectral efficiency, among other benefits.

(16) Aspects of the disclosure are initially described in the context of wireless communications systems. Aspects of the disclosure are additionally illustrated by and described with reference to communication timelines, a control element, and a process flow. Aspects of the disclosure are further illustrated by and described with reference to apparatus diagrams, system diagrams, and flowcharts that relate to DCI activation for semi-persistent SRS resource sets.

(17) FIG. **1** shows an example of a wireless communications system **100** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The wireless communications system **100** may include one or more network entities **105**, one or more UEs **115**, and a core network **130**. In some examples, the wireless communications system **100** may be a Long Term Evolution (LTE) network, an LTE-Advanced (LTE-A) network, an LTE-A Pro network, a New Radio (NR) network, or a network operating in accordance with other systems and radio technologies, including future systems and radio technologies not explicitly mentioned herein.

(18) The network entities **105** may be dispersed throughout a geographic area to form the wireless communications system **100** and may include devices in different forms or having different capabilities. In various examples, a network entity **105** may be referred to as a network element, a mobility element, a radio access network (RAN) node, or network equipment, among other nomenclature. In some examples, network entities **105** and UEs **115** may wirelessly communicate via one or more communication links **125** (e.g., a radio frequency (RF) access link). For example, a network entity **105** may support a coverage area **110** (e.g., a geographic coverage area) over which the UEs **115** and the network entity **105** may establish one or more communication links **125**. The coverage area **110** may be an example of a geographic area over which a network entity **105** and a UE **115** may support the communication of signals according to one or more radio access technologies (RATs).

(19) The UEs **115** may be dispersed throughout a coverage area **110** of the wireless communications system **100**, and each UE **115** may be stationary, or mobile, or both at different times. The UEs **115** may be devices in different forms or having different capabilities. Some example UEs **115** are illustrated in FIG. **1**. The UEs **115** described herein may be able to communicate with various types of devices, such as other UEs **115** or network entities **105**, as shown in FIG. **1**.

(20) As described herein, a node of the wireless communications system **100**, which may be referred to as a network node, or a wireless node, may be a network entity **105** (e.g., any network entity described herein), a UE **115** (e.g., any UE described herein), a network controller, an apparatus, a device, a computing system, one or more components, or another suitable processing entity configured to perform any of the techniques described herein. For example, a node may be a UE **115**. As another example, a node may be a network entity **105**. As another example, a first node may be configured to communicate with a second node or a third node. In one aspect of this example, the first node may be a UE **115**, the second node may be a network entity **105**, and the third node may be a UE **115**. In another aspect of this example, the first node may be a UE **115**, the second node may be a network entity **105**, and the third node may be a network entity **105**. In yet other aspects of this example, the first, second, and third nodes may be different relative to these examples. Similarly, reference to a UE **115**, network entity **105**, apparatus, device, computing system, or the like may include disclosure of the UE **115**, network entity **105**, apparatus, device, computing system, or the like being a node. For example, disclosure that a UE **115** is configured to receive information from a network entity **105** also discloses that a first node is configured to receive information from a second node.

(21) In some examples, network entities **105** may communicate with the core network **130**, or with one another, or both. For example, network entities **105** may communicate with the core network **130** via one or more backhaul communication links **120** (e.g., in accordance with an S1, N2, N3, or

other interface protocol). In some examples, network entities **105** may communicate with one another over a backhaul communication link **120** (e.g., in accordance with an X2, Xn, or other interface protocol) either directly (e.g., directly between network entities **105**) or indirectly (e.g., via a core network **130**). In some examples, network entities **105** may communicate with one another via a midhaul communication link **162** (e.g., in accordance with a midhaul interface protocol) or a fronthaul communication link **168** (e.g., in accordance with a fronthaul interface protocol), or any combination thereof. The backhaul communication links **120**, midhaul communication links **162**, or fronthaul communication links **168** may be or include one or more wired links (e.g., an electrical link, an optical fiber link), one or more wireless links (e.g., a radio link, a wireless optical link), among other examples or various combinations thereof. A UE **115** may communicate with the core network **130** through a communication link **155**.

(22) One or more of the network entities **105** described herein may include or may be referred to as a base station **140** (e.g., a base transceiver station, a radio base station, an NR base station, an access point, a radio transceiver, a NodeB, an eNodeB (eNB), a next-generation NodeB or a giga-NodeB (either of which may be referred to as a gNB), a 5G NB, a next-generation eNB (ng-eNB), a Home NodeB, a Home eNodeB, or other suitable terminology). In some examples, a network entity **105** (e.g., a base station **140**) may be implemented in an aggregated (e.g., monolithic, standalone) base station architecture, which may be configured to utilize a protocol stack that is physically or logically integrated within a single network entity **105** (e.g., a single RAN node, such as a base station **140**).

(23) In some examples, a network entity **105** may be implemented in a disaggregated architecture (e.g., a disaggregated base station architecture, a disaggregated RAN architecture), which may be configured to utilize a protocol stack that is physically or logically distributed among two or more network entities **105**, such as an integrated access backhaul (IAB) network, an open RAN (O-RAN) (e.g., a network configuration sponsored by the O-RAN Alliance), or a virtualized RAN (vRAN) (e.g., a cloud RAN (C-RAN)). For example, a network entity **105** may include one or more of a central unit (CU) **160**, a distributed unit (DU) **165**, a radio unit (RU) **170**, a RAN Intelligent Controller (RIC) **175** (e.g., a Near-Real Time RIC (Near-RT RIC), a Non-Real Time RIC (Non-RT RIC)), a Service Management and Orchestration (SMO) **180** system, or any combination thereof. An RU **170** may also be referred to as a radio head, a smart radio head, a remote radio head (RRH), a remote radio unit (RRU), or a transmission reception point (TRP). One or more components of the network entities **105** in a disaggregated RAN architecture may be co-located, or one or more components of the network entities **105** may be located in distributed locations (e.g., separate physical locations). In some examples, one or more network entities **105** of a disaggregated RAN architecture may be implemented as virtual units (e.g., a virtual CU (VCU), a virtual DU (VDU), a virtual RU (VRU)).

(24) The split of functionality between a CU **160**, a DU **165**, and an RU **175** is flexible and may support different functionalities depending upon which functions (e.g., network layer functions, protocol layer functions, baseband functions, RF functions, and any combinations thereof) are performed at a CU **160**, a DU **165**, or an RU **175**. For example, a functional split of a protocol stack may be employed between a CU **160** and a DU **165** such that the CU **160** may support one or more layers of the protocol stack and the DU **165** may support one or more different layers of the protocol stack. In some examples, the CU **160** may host upper protocol layer (e.g., layer 3 (L3), layer 2 (L2)) functionality and signaling (e.g., Radio Resource Control (RRC), service data adaption protocol (SDAP), Packet Data Convergence Protocol (PDCP)). The CU **160** may be connected to one or more DUs **165** or RUs **170**, and the one or more DUs **165** or RUs **170** may host lower protocol layers, such as layer 1 (L1) (e.g., physical (PHY) layer) or L2 (e.g., radio link control (RLC) layer, medium access control (MAC) layer) functionality and signaling, and may each be at least partially controlled by the CU **160**. Additionally, or alternatively, a functional split of the protocol stack may be employed between a DU **165** and an RU **170** such that the DU **165**

may support one or more layers of the protocol stack and the RU **170** may support one or more different layers of the protocol stack. The DU **165** may support one or multiple different cells (e.g., via one or more RUs **170**). In some cases, a functional split between a CU **160** and a DU **165**, or between a DU **165** and an RU **170** may be within a protocol layer (e.g., some functions for a protocol layer may be performed by one of a CU **160**, a DU **165**, or an RU **170**, while other functions of the protocol layer are performed by a different one of the CU **160**, the DU **165**, or the RU **170**). A CU **160** may be functionally split further into CU control plane (CU-CP) and CU user plane (CU-UP) functions. A CU **160** may be connected to one or more DUs **165** via a midhaul communication link **162** (e.g., F1, F1-c, F1-u), and a DU **165** may be connected to one or more RUs **170** via a fronthaul communication link **168** (e.g., open fronthaul (FH) interface). In some examples, a midhaul communication link **162** or a fronthaul communication link **168** may be implemented in accordance with an interface (e.g., a channel) between layers of a protocol stack supported by respective network entities **105** that are in communication over such communication links.

(25) In wireless communications systems (e.g., wireless communications system **100**), infrastructure and spectral resources for radio access may support wireless backhaul link capabilities to supplement wired backhaul connections, providing an IAB network architecture (e.g., to a core network **130**). In some cases, in an IAB network, one or more network entities **105** (e.g., IAB nodes **104**) may be partially controlled by each other. One or more IAB nodes **104** may be referred to as a donor entity or an IAB donor. One or more DUs **165** or one or more RUs **170** may be partially controlled by one or more CUs **160** associated with a donor network entity **105** (e.g., a donor base station **140**). The one or more donor network entities **105** (e.g., IAB donors) may be in communication with one or more additional network entities **105** (e.g., IAB nodes **104**) via supported access and backhaul links (e.g., backhaul communication links **120**). IAB nodes **104** may include an IAB mobile termination (IAB-MT) controlled (e.g., scheduled) by DUs **165** of a coupled IAB donor. An IAB-MT may include an independent set of antennas for relay of communications with UEs **115**, or may share the same antennas (e.g., of an RU **170**) of an IAB node **104** used for access via the DU **165** of the IAB node **104** (e.g., referred to as virtual IAB-MT (vIAB-MT)). In some examples, the IAB nodes **104** may include DUs **165** that support communication links with additional entities (e.g., IAB nodes **104**, UEs **115**) within the relay chain or configuration of the access network (e.g., downstream). In such cases, one or more components of the disaggregated RAN architecture (e.g., one or more IAB nodes **104** or components of IAB nodes **104**) may be configured to operate according to the techniques described herein.

(26) In the case of the techniques described herein applied in the context of a disaggregated RAN architecture, one or more components of the disaggregated RAN architecture may be configured to support downlink control information activation for semi-persistent sounding reference signal resource sets as described herein. For example, some operations described as being performed by a UE **115** or a network entity **105** (e.g., a base station **140**) may additionally, or alternatively, be performed by one or more components of the disaggregated RAN architecture (e.g., IAB nodes **104**, DUs **165**, CUs **160**, RUs **170**, RIC **175**, SMO **180**).

(27) A UE **115** may include or may be referred to as a mobile device, a wireless device, a remote device, a handheld device, or a subscriber device, or some other suitable terminology, where the "device" may also be referred to as a unit, a station, a terminal, or a client, among other examples. A UE **115** may also include or may be referred to as a personal electronic device such as a cellular phone, a personal digital assistant (PDA), a tablet computer, a laptop computer, or a personal computer. In some examples, a UE **115** may include or be referred to as a wireless local loop (WLL) station, an Internet of Things (IoT) device, an Internet of Everything (IoE) device, or a machine type communications (MTC) device, among other examples, which may be implemented in various objects such as appliances, or vehicles, meters, among other examples.

(28) The UEs **115** described herein may be able to communicate with various types of devices,

such as other UEs **115** that may sometimes act as relays as well as the network entities **105** and the network equipment including macro eNBs or gNBs, small cell eNBs or gNBs, or relay base stations, among other examples, as shown in FIG. **1**.

(29) The UEs **115** and the network entities **105** may wirelessly communicate with one another via one or more communication links **125** (e.g., an access link) over one or more carriers. The term "carrier" may refer to a set of RF spectrum resources having a defined physical layer structure for supporting the communication links **125**. For example, a carrier used for a communication link **125** may include a portion of a RF spectrum band (e.g., a bandwidth part (BWP)) that is operated according to one or more physical layer channels for a given radio access technology (e.g., LTE, LTE-A, LTE-A Pro, NR). Each physical layer channel may carry acquisition signaling (e.g., synchronization signals, system information), control signaling that coordinates operation for the carrier, user data, or other signaling. The wireless communications system **100** may support communication with a UE **115** using carrier aggregation or multi-carrier operation. A UE **115** may be configured with multiple downlink component carriers and one or more uplink component carriers according to a carrier aggregation configuration. Carrier aggregation may be used with both frequency division duplexing (FDD) and time division duplexing (TDD) component carriers. Communication between a network entity **105** and other devices may refer to communication between the devices and any portion (e.g., entity, sub-entity) of a network entity **105**. For example, the terms "transmitting," "receiving," or "communicating," when referring to a network entity **105**, may refer to any portion of a network entity **105** (e.g., a base station **140**, a CU **160**, a DU **165**, a RU **170**) of a RAN communicating with another device (e.g., directly or via one or more other network entities **105**).

(30) Signal waveforms transmitted over a carrier may be made up of multiple subcarriers (e.g., using multi-carrier modulation (MCM) techniques such as orthogonal frequency division multiplexing (OFDM) or discrete Fourier transform spread OFDM (DFT-S-OFDM)). In a system employing MCM techniques, a resource element may refer to resources of one symbol period (e.g., a duration of one modulation symbol) and one subcarrier, in which case the symbol period and subcarrier spacing may be inversely related. The quantity of bits carried by each resource element may depend on the modulation scheme (e.g., the order of the modulation scheme, the coding rate of the modulation scheme, or both) such that the more resource elements that a device receives and the higher the order of the modulation scheme, the higher the data rate may be for the device. A wireless communications resource may refer to a combination of an RF spectrum resource, a time resource, and a spatial resource (e.g., a spatial layer, a beam), and the use of multiple spatial resources may increase the data rate or data integrity for communications with a UE **115**.

(31) The time intervals for the network entities **105** or the UEs **115** may be expressed in multiples of a basic time unit which may, for example, refer to a sampling period of $T.sub.s=1/(\Delta f.sub.max.Math.N.sub.f)$ seconds, where $\Delta f.sub.max$ may represent the maximum supported subcarrier spacing, and N.sub.f may represent the maximum supported discrete Fourier transform (DFT) size. Time intervals of a communications resource may be organized according to radio frames each having a specified duration (e.g., 10 milliseconds (ms)). Each radio frame may be identified by a system frame number (SFN) (e.g., ranging from 0 to 1023).

(32) Each frame may include multiple consecutively numbered subframes or slots, and each subframe or slot may have the same duration. In some examples, a frame may be divided (e.g., in the time domain) into subframes, and each subframe may be further divided into a quantity of slots. Alternatively, each frame may include a variable quantity of slots, and the quantity of slots may depend on subcarrier spacing. Each slot may include a quantity of symbol periods (e.g., depending on the length of the cyclic prefix prepended to each symbol period). In some wireless communications systems **100**, a slot may further be divided into multiple mini-slots containing one or more symbols. Excluding the cyclic prefix, each symbol period may contain one or more (e.g., N.sub.f) sampling periods. The duration of a symbol period may depend on the subcarrier spacing

or frequency band of operation.

(33) A subframe, a slot, a mini-slot, or a symbol may be the smallest scheduling unit (e.g., in the time domain) of the wireless communications system **100** and may be referred to as a transmission time interval (TTI). In some examples, the TTI duration (e.g., a quantity of symbol periods in a TTI) may be variable. Additionally, or alternatively, the smallest scheduling unit of the wireless communications system **100** may be dynamically selected (e.g., in bursts of shortened TTIs (sTTIs)).

(34) Physical channels may be multiplexed on a carrier according to various techniques. A physical control channel and a physical data channel may be multiplexed on a downlink carrier, for example, using one or more of time division multiplexing (TDM) techniques, frequency division multiplexing (FDM) techniques, or hybrid TDM-FDM techniques. A control region (e.g., a control resource set (CORESET)) for a physical control channel may be defined by a set of symbol periods and may extend across the system bandwidth or a subset of the system bandwidth of the carrier. One or more control regions (e.g., CORESETs) may be configured for a set of the UEs **115**. For example, one or more of the UEs **115** may monitor or search control regions for control information according to one or more search space sets, and each search space set may include one or multiple control channel candidates in one or more aggregation levels arranged in a cascaded manner. An aggregation level for a control channel candidate may refer to an amount of control channel resources (e.g., control channel elements (CCEs)) associated with encoded information for a control information format having a given payload size. Search space sets may include common search space sets configured for sending control information to multiple UEs **115** and UE-specific search space sets for sending control information to a specific UE **115**.

(35) In some examples, a network entity **105** (e.g., a base station **140**, an RU **170**) may be movable and therefore provide communication coverage for a moving coverage area **110**. In some examples, different coverage areas **110** associated with different technologies may overlap, but the different coverage areas **110** may be supported by the same network entity **105**. In some other examples, the overlapping coverage areas **110** associated with different technologies may be supported by different network entities **105**. The wireless communications system **100** may include, for example, a heterogeneous network in which different types of the network entities **105** provide coverage for various coverage areas **110** using the same or different radio access technologies.

(36) The wireless communications system **100** may be configured to support ultra-reliable communications or low-latency communications, or various combinations thereof. For example, the wireless communications system **100** may be configured to support ultra-reliable low-latency communications (URLLC). The UEs **115** may be designed to support ultra-reliable, low-latency, or critical functions. Ultra-reliable communications may include private communication or group communication and may be supported by one or more services such as push-to-talk, video, or data. Support for ultra-reliable, low-latency functions may include prioritization of services, and such services may be used for public safety or general commercial applications. The terms ultra-reliable, low-latency, and ultra-reliable low-latency may be used interchangeably herein.

(37) In some examples, a UE **115** may be able to communicate directly with other UEs **115** over a device-to-device (D2D) communication link **135** (e.g., in accordance with a peer-to-peer (P2P), D2D, or sidelink protocol). In some examples, one or more UEs **115** of a group that are performing D2D communications may be within the coverage area **110** of a network entity **105** (e.g., a base station **140**, an RU **170**), which may support aspects of such D2D communications being configured by or scheduled by the network entity **105**. In some examples, one or more UEs **115** in such a group may be outside the coverage area **110** of a network entity **105** or may be otherwise unable to or not configured to receive transmissions from a network entity **105**. In some examples, groups of the UEs **115** communicating via D2D communications may support a one-to-many (1:M) system in which each UE **115** transmits to each of the other UEs **115** in the group. In some examples, a network entity **105** may facilitate the scheduling of resources for D2D

communications. In some other examples, D2D communications may be carried out between the UEs **115** without the involvement of a network entity **105**.

(38) The core network **130** may provide user authentication, access authorization, tracking, Internet Protocol (IP) connectivity, and other access, routing, or mobility functions. The core network **130** may be an evolved packet core (EPC) or 5G core (5GC), which may include at least one control plane entity that manages access and mobility (e.g., a mobility management entity (MME), an access and mobility management function (AMF)) and at least one 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)). The control plane entity may manage non-access stratum (NAS) functions such as mobility, authentication, and bearer management for the UEs **115** served by the network entities **105** (e.g., base stations **140**) associated with the core network **130**. User IP packets may be transferred through the user plane entity, which may provide IP address allocation as well as other functions. The user plane entity may be connected to IP services **150** for one or more network operators. The IP services **150** may include access to the Internet, Intranet(s), an IP Multimedia Subsystem (IMS), or a Packet-Switched Streaming Service.

(39) The wireless communications system **100** may operate using one or more frequency bands, which may be in the range of 300 megahertz (MHz) to 300 gigahertz (GHz). Generally, the region from 300 MHz to 3 GHz is known as the ultra-high frequency (UHF) region or decimeter band because the wavelengths range from approximately one decimeter to one meter in length. The UHF waves may be blocked or redirected by buildings and environmental features, which may be referred to as clusters, but the waves may penetrate structures sufficiently for a macro cell to provide service to the UEs **115** located indoors. The transmission of UHF waves may be associated with smaller antennas and shorter ranges (e.g., less than 100 kilometers) compared to transmission using the smaller frequencies and longer waves of the high frequency (HF) or very high frequency (VHF) portion of the spectrum below 300 MHz.

(40) The wireless communications system **100** may also operate in a super high frequency (SHF) region using frequency bands from 3 GHz to 30 GHz, also known as the centimeter band, or in an extremely high frequency (EHF) region of the spectrum (e.g., from 30 GHz to 300 GHz), also known as the millimeter band. In some examples, the wireless communications system **100** may support millimeter wave (mmW) communications between the UEs **115** and the network entities **105** (e.g., base stations **140**, RUs **170**), and EHF antennas of the respective devices may be smaller and more closely spaced than UHF antennas. In some examples, this may facilitate use of antenna arrays within a device. The propagation of EHF transmissions, however, may be subject to even greater atmospheric attenuation and shorter range than SHF or UHF transmissions. The techniques disclosed herein may be employed across transmissions that use one or more different frequency regions, and designated use of bands across these frequency regions may differ by country or regulating body.

(41) The wireless communications system **100** may utilize both licensed and unlicensed RF spectrum bands. For example, the wireless communications system **100** may employ License Assisted Access (LAA), LTE-Unlicensed (LTE-U) radio access technology, or NR technology in an unlicensed band such as the 5 GHz industrial, scientific, and medical (ISM) band. While operating in unlicensed RF spectrum bands, devices such as the network entities **105** and the UEs **115** may employ carrier sensing for collision detection and avoidance. In some examples, operations in unlicensed bands may be based on a carrier aggregation configuration in conjunction with component carriers operating in a licensed band (e.g., LAA). Operations in unlicensed spectrum may include downlink transmissions, uplink transmissions, P2P transmissions, or D2D transmissions, among other examples.

(42) A network entity **105** (e.g., a base station **140**, an RU **170**) or a UE **115** may be equipped with multiple antennas, which may be used to employ techniques such as transmit diversity, receive

diversity, multiple-input multiple-output (MIMO) communications, or beamforming. The antennas of a network entity **105** or a UE **115** may be located within one or more antenna arrays or antenna panels, which may support MIMO operations or transmit or receive beamforming. For example, one or more base station antennas or antenna arrays may be co-located at an antenna assembly, such as an antenna tower. In some examples, antennas or antenna arrays associated with a network entity **105** may be located in diverse geographic locations. A network entity **105** may have an antenna array with a set of rows and columns of antenna ports that the network entity **105** may use to support beamforming of communications with a UE **115**. Likewise, a UE **115** may have one or more antenna arrays that may support various MIMO or beamforming operations. Additionally, or alternatively, an antenna panel may support RF beamforming for a signal transmitted via an antenna port.

(43) The network entities **105** or the UEs **115** may use MIMO communications to exploit multipath signal propagation and increase the spectral efficiency by transmitting or receiving multiple signals via different spatial layers. Such techniques may be referred to as spatial multiplexing. The multiple signals may, for example, be transmitted by the transmitting device via different antennas or different combinations of antennas. Likewise, the multiple signals may be received by the receiving device via different antennas or different combinations of antennas. Each of the multiple signals may be referred to as a separate spatial stream and may carry information associated with the same data stream (e.g., the same codeword) or different data streams (e.g., different codewords). Different spatial layers may be associated with different antenna ports used for channel measurement and reporting. MIMO techniques include single-user MIMO (SU-MIMO), where multiple spatial layers are transmitted to the same receiving device, and multiple-user MIMO (MU-MIMO), where multiple spatial layers are transmitted to multiple devices.

(44) Beamforming, which may also be referred to as spatial filtering, directional transmission, or directional reception, is a signal processing technique that may be used at a transmitting device or a receiving device (e.g., a network entity **105**, a UE **115**) to shape or steer an antenna beam (e.g., a transmit beam, a receive beam) along a spatial path between the transmitting device and the receiving device. Beamforming may be achieved by combining the signals communicated via antenna elements of an antenna array such that some signals propagating at particular orientations with respect to an antenna array experience constructive interference while others experience destructive interference. The adjustment of signals communicated via the antenna elements may include a transmitting device or a receiving device applying amplitude offsets, phase offsets, or both to signals carried via the antenna elements associated with the device. The adjustments associated with each of the antenna elements may be defined by a beamforming weight set associated with a particular orientation (e.g., with respect to the antenna array of the transmitting device or receiving device, or with respect to some other orientation).

(45) A network entity **105** or a UE **115** may use beam sweeping techniques as part of beamforming operations. For example, a network entity **105** (e.g., a base station **140**, an RU **170**) may use multiple antennas or antenna arrays (e.g., antenna panels) to conduct beamforming operations for directional communications with a UE **115**. Some signals (e.g., synchronization signals, reference signals, beam selection signals, or other control signals) may be transmitted by a network entity **105** multiple times along different directions. For example, the network entity **105** may transmit a signal according to different beamforming weight sets associated with different directions of transmission. Transmissions along different beam directions may be used to identify (e.g., by a transmitting device, such as a network entity **105**, or by a receiving device, such as a UE **115**) a beam direction for later transmission or reception by the network entity **105**.

(46) Some signals, such as data signals associated with a particular receiving device, may be transmitted by transmitting device (e.g., a transmitting network entity **105**, a transmitting UE **115**) along a single beam direction (e.g., a direction associated with the receiving device, such as a receiving network entity **105** or a receiving UE **115**). In some examples, the beam direction

associated with transmissions along a single beam direction may be determined based on a signal that was transmitted along one or more beam directions. For example, a UE **115** may receive one or more of the signals transmitted by the network entity **105** along different directions and may report to the network entity **105** an indication of the signal that the UE **115** received with a highest signal quality or an otherwise acceptable signal quality.

(47) In some examples, transmissions by a device (e.g., by a network entity **105** or a UE **115**) may be performed using multiple beam directions, and the device may use a combination of digital precoding or beamforming to generate a combined beam for transmission (e.g., from a network entity **105** to a UE **115**). The UE **115** may report feedback that indicates precoding weights for one or more beam directions, and the feedback may correspond to a configured set of beams across a system bandwidth or one or more sub-bands. The network entity **105** may transmit a reference signal (e.g., a cell-specific reference signal (CRS), a channel state information (CSI) reference signal (CSI-RS)), which may be precoded or unprecoded. The UE **115** may provide feedback for beam selection, which may be a precoding matrix indicator (PMI) or codebook-based feedback (e.g., a multi-panel type codebook, a linear combination type codebook, a port selection type codebook). Although these techniques are described with reference to signals transmitted along one or more directions by a network entity **105** (e.g., a base station **140**, an RU **170**), a UE **115** may employ similar techniques for transmitting signals multiple times along different directions (e.g., for identifying a beam direction for subsequent transmission or reception by the UE **115**) or for transmitting a signal along a single direction (e.g., for transmitting data to a receiving device).

(48) A receiving device (e.g., a UE **115**) may perform reception operations in accordance with multiple receive configurations (e.g., directional listening) when receiving various signals from a receiving device (e.g., a network entity **105**), such as synchronization signals, reference signals, beam selection signals, or other control signals. For example, a receiving device may perform reception in accordance with multiple receive directions by receiving via different antenna subarrays, by processing received signals according to different antenna subarrays, by receiving according to different receive beamforming weight sets (e.g., different directional listening weight sets) applied to signals received at multiple antenna elements of an antenna array, or by processing received signals according to different receive beamforming weight sets applied to signals received at multiple antenna elements of an antenna array, any of which may be referred to as "listening" according to different receive configurations or receive directions. In some examples, a receiving device may use a single receive configuration to receive along a single beam direction (e.g., when receiving a data signal). The single receive configuration may be aligned along a beam direction determined based on listening according to different receive configuration directions (e.g., a beam direction determined to have a highest signal strength, highest signal-to-noise ratio (SNR), or otherwise acceptable signal quality based on listening according to multiple beam directions).

(49) The wireless communications system **100** may be a packet-based network that operates according to a layered protocol stack. In the user plane, communications at the bearer or PDCP layer may be IP-based. An RLC layer may perform packet segmentation and reassembly to communicate over logical channels. A MAC layer may perform priority handling and multiplexing of logical channels into transport channels. The MAC layer may also use error detection techniques, error correction techniques, or both to support retransmissions at the MAC layer to improve link efficiency. In the control plane, the RRC protocol layer may provide establishment, configuration, and maintenance of an RRC connection between a UE **115** and a network entity **105** or a core network **130** supporting radio bearers for user plane data. At the PHY layer, transport channels may be mapped to physical channels.

(50) In the wireless communications system **100**, a network entity **105** may configure time or frequency resources that a UE **115** may use for transmitting an SRS using one or more SRS resources within an SRS resource set. The network entity **105** may configure a resource type of an SRS resource set as aperiodic, semi-persistent, or periodic and the SRS resource set may be

associated with a specific or unique activation mechanism depending on whether the resource type is configured as aperiodic, semi-persistent, or periodic. Some activation mechanisms, however, may introduce relatively high latency and may be inefficient in terms of configurability or flexibility associated with an SRS resource set. For example, an activation mechanism for a semi-persistent SRS resource set may be associated with relatively high latency signaling and may be unable to support dynamic updates for configured parameters. Such a high latency and lack of support for dynamic updates for configured parameters may hinder performance in some deployment scenarios, such as in deployment scenarios associated with rapidly changing channel conditions or a high susceptibility to SRS transmission-based interference.

(51) In some implementations, a UE **115** and a network entity **105** may support one or more signaling- or configuration-based mechanisms according to which the UE **115** and the network entity **105** may dynamically activate and update a type of semi-persistent SRS resource set associated with activation and deactivation by DCI. For example, the network entity **105** may transmit an indication of a set of semi-persistent SRS resource sets associated with DCI activation to the UE **115** via RRC signaling and may activate one or more semi-persistent SRS resource sets from the set of semi-persistent SRS resource sets via a DCI message. To facilitate activation by DCI, the UE **115** and the network entity **105** may support a mapping between a set of DCI codepoints and multiple sets of one or more semi-persistent SRS resource sets such that each DCI codepoint corresponds to (and indicates an activation for) a unique set of one or more semi-persistent SRS resource sets. In some examples, the network entity **105** may use the activating DCI message or another DCI message to indicate an update for one or more parameters or resources (e.g., one or more RRC configured parameters or resources) associated with an activated semi-persistent SRS resource set and the UE **115** may update the one or more parameters or resources associated with the activated semi-persistent SRS resource set accordingly.

(52) FIG. **2** shows an example of a wireless communications system **200** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The wireless communications system **200** may implement or be implemented to realize aspects of the wireless communications system **100**. For example, the wireless communications system **200** may illustrate communication between a UE **115**-*a* and a network entity **105**-*a* via a TRP **205** and a TRP **210**. The UE **115**-*a*, the network entity **105**-*a*, the TRP **205**, and the TRP **210** may be examples of corresponding devices illustrated by and described with reference to FIG. **1**. In some examples, the UE **115**-*a*, the network entity **105**-*a*, the TRP **205**, and the TRP **210** may support one or more types of SRS resource sets and the UE **115**-*a* may transmit an SRS to one or both of the TRP **205** or the TRP **210** using resources of one or more of the various types of SRS resource sets.

(53) For example, SRS resources may be configured within an SRS resource set including one or more SRS resources. In other words, the network entity **105**-*a*, directly or via one or both of the TRP **205** or the TRP **210**, may configure the UE **115**-*a* with an SRS resource set including or otherwise associated with one or more SRS resources over which the UE **115**-*a* may transmit an SRS (if the SRS resource set is activated). In some aspects, such a configuration mechanism may simplify activation (e.g., for a semi-persistent SRS resource set) or DCI triggering (e.g., for an aperiodic SRS resource set) as multiple SRS resources or multiple SRS resource sets may be activated or triggered simultaneously.

(54) The network entity **105**-*a* may configure a resource type (e.g., via a resource Type parameter) for an SRS resource set as aperiodic, semi-persistent, or periodic. For example, an RRC configuration per SRS resource set may configure or indicate a resource Type parameter as aperiodic, semi-persistent, or periodic. The network entity **105**-*a* and the UE **115**-*a* may use different signaling mechanisms to activate or trigger SRS resource sets associated with different resource types. For example, the network entity **105**-*a* and the UE **115**-*a* may use a first signaling mechanism to activate or trigger an aperiodic SRS resource set, may use a second signaling

mechanism to activate or trigger a periodic SRS resource set, and may use a third signaling mechanism to activate or trigger a semi-persistent SRS resource set.

(55) The network entity **105**-*a* may trigger an aperiodic SRS resource set (which may be equivalently referred to as an AP SRS resource set) with a downlink DCI (e.g., a downlink DCI format 1_1 or 1_2) or a group-common DCI (e.g., a DCI format 2_3). Additionally, or alternatively, the UE **115**-*a* may trigger, or request the network entity **105**-*a* to trigger, an aperiodic SRS resource with an uplink DCI (e.g., an uplink DCI format 0_1 or 0_2) or a group-common DCI (e.g., a DCI format 2_3). In some implementations, an SRS request field of a triggering DCI may indicate one or more aperiodic SRS resource sets and the UE **115**-*a* and the network entity **105**-*a* may support a mapping between SRS resource sets and SRS request codepoints. For example, the mapping may indicate a correspondence between codepoints of "01," "10," and "11" and different sets of one or more aperiodic SRS resource sets, as illustrated by Table 1 below. In some aspects, the network entity **105**-*a* may indicate the mapping to the UE **115**-*a* by a configuration (e.g., an RRC configuration, such as via an aperiodicSRS-Resource Trigger parameter or an aperiodicSRS-ResourceTriggerList parameter).

(56) TABLE-US-00001 TABLE 1 Mapping between codepoints and sets of one or more SRS resource sets Codepoint (Value of SRS Request Field) Triggered Aperiodic SRS Resource Set(s) 00 No aperiodic SRS resource set triggered 01 SRS resource set(s) configured with higher layer parameter aperiodicSRS-ResourceTrigger set to 1 or an entry in aperiodicSRS-ResourceTriggerList set to 1 10 SRS resource set(s) configured with higher layer parameter aperiodicSRS-ResourceTrigger set to 2 or an entry in aperiodicSRS- ResourceTriggerList set to 2 11 SRS resource set(s) configured with higher layer parameter aperiodicSRS-ResourceTrigger set to 3 or an entry in aperiodicSRS- ResourceTriggerList set to 3

(57) Additionally, or alternatively, a one-time transmission of an SRS (from an aperiodic, not periodic, SRS resource set) may be based on a slot offset. In other words, an aperiodic SRS resource set may be triggered by a slot offset. For example, the network entity **105**-*a* may configure a slot offset per aperiodic SRS resource set via control signaling **215** (e.g., RRC signaling, such that slot offset may be configured per SRS resource set) and the UE **115**-*a* or the network entity **105**-*a* may include or add one or more slot offset indicator fields to DCI. Such an inclusion of one or more slot offset indicator fields may support a more flexible or dynamic indication of slot offset and function as a dynamic trigger for a corresponding SRS resource set (e.g., an SRS resource set for which the slot offset is configured or mapped to via the RRC signaling).

(58) The network entity **105**-*a* may configure (and activate) a periodic SRS resource set (which may be equivalently referred to as a P SRS resource set) by control signaling **215** (e.g., RRC signaling). Once configured, the UE **115**-*a* may transmit an SRS using SRS resources within the periodic SRS resource set periodically. For example, the network entity may indicate or configure (e.g., via RRC signaling) a set of parameters (e.g., RRC parameters) associated with the periodic SRS resource set and the set of parameters may include a periodicity parameter and an offset parameter. As such, the UE **115**-*a* may transmit an SRS using SRS resources within the periodic SRS resource set based on the periodicity and offset RRC parameters.

(59) Some activation signaling mechanisms for a semi-persistent SRS resource set (which may be equivalently referred to as an SP SRS resource set) may have high latency. For example, some activation signaling mechanisms for a semi-persistent SRS resource set may rely on a signaling type associated with relatively higher latency, such as a MAC-CE, as compared to other signaling types (such as DCI). The network entity **105**-*a* and the UE **115**-*a* may use a DCI-based activation design for various other cases in some deployments (e.g., in NR), such as for SPS physical downlink shared channel (PDSCH) transmissions, configured grant (CG) physical uplink shared channel (PUSCH) transmissions, semi-persistent CSI reporting on a PUSCH. Semi-persistent SRS resource sets, however, may lack such a DCI-based activation design or functionality.

(60) Further, and based on such a reliance on a signaling type associated with relatively higher

latency and in view of a messaging content of such a signaling type, the network entity **105**-*a* and the UE **115**-*a* may be unable to adapt a set of parameters associated with a semi-persistent SRS resource set to changing channel conditions or changing deployment constraints or considerations. For example, some signaling mechanisms that support semi-persistent SRS resource sets may lack adaptability or flexibility to changing channel conditions or changing deployment constraints or considerations, which may be useful in some deployment scenarios.

(61) In multi-TRP deployments, for example, an SRS transmission from one UE **115** (e.g., the UE **115**-*a*) may be received by multiple TRPs (e.g., the TRP **205** and the TRP **210**) and the multiple TRPs may use the SRS transmission to acquire a downlink channel for coherent joint transmission. In such multi-TRP deployments, a relatively more dynamic indication of SRS triggering and SRS parameters may facilitate more accurate downlink channel estimation depending on multi-user (MU) pairing on downlink and on scheduling decisions between multiple users and the multiple TRPs. Otherwise, if a relatively less dynamic indication of SRS triggering and SRS parameters is relied upon, a set of (e.g., multiple) UEs **115** may transmit SRS simultaneously (and each SRS transmission may be targeted toward multiple TRPs) and the network entity **105**-*a* may be unable to manage any resulting interference properly.

(62) To allow for or support more flexibility for SRS triggering or activating with a relatively small latency, the UE **115**-*a* and the network entity **105**-*a* may support a DCI-based trigger or activation (e.g., as opposed to triggering or activation by a MAC-CE or RRC signaling). The UE **115**-*a* and the network entity **105**-*a* may leverage such a DCI-based trigger for aperiodic SRS triggering, but, for each instance of SRS transmission, the network entity **105**-*a* may transmit one DCI to trigger the transmission (e.g., the trigger is a one-time request by DCI). Such a one-to-one correspondence between DCI trigger and SRS transmission may be associated with or otherwise lead to DCI overhead. The DCI overhead for aperiodic SRS transmission may become prohibitively large in scenarios in which the network entity **105**-*a* requests frequent SRS transmissions from the UE **115**-*a*. As such, the UE **115**-*a* and the network entity **105**-*a* may achieve greater spectral efficiency and lower overhead if the network entity **105**-*a* is able to request the UE **115**-*a* to transmit an SRS periodically once triggered or activated by DCI and until another DCI releases or deactivates the transmission of the SRS.

(63) Accordingly, in some implementations, the UE **115**-*a* and the network entity **105**-*a* may support a semi-persistent SRS resource set based on DCI activation and DCI release, where periodic SRS transmission is activated by a DCI and the periodic SRS transmission continues until another DCI releases the semi-persistent SRS resource set. Such a DCI-based activation may reduce DCI overhead and reduce latency as compared to other signaling mechanisms associated with activating a semi-persistent SRS resource set and, in addition, may allow for or support a dynamic updating of one or more parameters of a semi-persistent SRS transmission by sending another DCI triggering a same semi-persistent SRS resource set (e.g., a semi-persistent SRS resource set that is already activated by a previous DCI) with a different set of parameters. Such a DCI may be referred to herein as a reactivation DCI.

(64) In accordance with the techniques described herein, the network entity **105**-*a* may transmit control signaling **215** (e.g., RRC signaling) to the UE **115**-*a* indicating resource type of a set of SRS resource sets as semi-persistent and indicating that the set of semi-persistent SRS resource sets are associated with DCI activation. For example, the network entity **105**-*a* may configure a type of semi-persistent SRS resource sets that is associated with DCI-based activation and release for lower latency and reduced DCI overhead. As such, the network entity **105**-*a* may define, indicate, or configure a type of semi-persistent SRS associated with DCI activation and release per SRS resource set.

(65) The network entity **105**-*a* may transmit an activation DCI message **220** to the UE **115**-*a* to activate one or more of the set of semi-persistent SRS resource sets over which the UE **115**-*a* may transmit a semi-persistent SRS **225**. The UE **115**-*a* may receive the activation DCI **220** from the

network entity **105**-*a* directly or via the TRP **205** on a downlink **230**. Upon reception of the activation DCI message **220**, the UE **115**-*a* may transmit a semi-persistent SRS **225** over each of multiple periodic resources or occasions associated with the one or more activated semi-persistent SRS resource sets until the one or more semi-persistent SRS resource sets are released or deactivated (e.g., by another DCI). For example, once a semi-persistent SRS resource set is activated by the activation DCI message **220**, the UE **115**-*a* may transmit a semi-persistent SRS **225** using the SRS resources within the activated semi-persistent SRS resource set periodically (e.g., based on a configured, such as RRC configured, periodicity) until another DCI releases the semi-persistent SRS resource set. In some implementations, the UE **115**-*a* may transmit a semi-persistent SRS **225** to the TRP **205** on an uplink **235**-*a* and to the TRP **210** on an uplink **235**-*b*.

(66) The UE **115**-*a* and the network entity may additionally support one or more signaling- or configuration-based mechanisms for supporting various other aspects that may facilitate or improve DCI-based activation for semi-persistent SRS resources. For example, the UE **115**-*a* and the network entity **105**-*a* may support one or more signaling- or configuration-based mechanisms according to which the UE **115**-*a* is able to identify a DCI for activation or for release and able to distinguish such a DCI for activation or release from other semi-persistent SRS triggering mechanisms. Additionally, or alternatively, the UE **115**-*a* and the network entity **105**-*a* may support one or more signaling- or configuration-based mechanisms according to which the UE **115**-*a* and the network entity **105**-*a* may leverage DCI-based activation for updating one or more parameters (e.g., in addition to activation). Additional details relating to such an identification of a DCI for activation or release of a semi-persistent SRS resource set and such a parameter update for semi-persistent SRS resource sets associated with DCI activation are described with reference to FIG. **3**. Further, the UE **115**-*a* and the network entity **105**-*a* may support one or more signaling- or configuration-based mechanisms according to which the UE **115**-*a* and the network entity **105**-*a* may determine, identify, or otherwise ascertain a first instance or occasion of SRS transmission after activation, as illustrated by and described in more detail with reference to FIGS. **4** and **5**.

(67) Further, although illustrated by the wireless communications system **200** in a context of a multi-TRP deployment involving the TRP **205** and the TRP **210**, the UE **115**-*a* may additionally, or alternatively, transmit a semi-persistent SRS **225** to the network entity **105**-*a* directly. In the multi-TRP deployment involving the TRP **205** and the TRP **210**, the TRP **205** and the TRP **210** may be collocated with the network entity **105**-*a* (e.g., located at a same geographic location) or may be located at different locations than the network entity **105**-*a*, or any combination thereof. The TRP **205** and the TRP **210** may communicate via a link **240** (which may be an example of a sidelink or a backhaul link), the TRP **205** and the network entity **105**-*a* may communicate via a link **245** (which may be an example of an access link or a backhaul link), and the TRP **210** and the network entity **105**-*a* may communicate via a link **250** (which may be an example of an access link or a backhaul link).

(68) FIG. **3** shows an example of a communication timeline **300** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The communication timeline **300** may implement or be implemented to realize aspects of the wireless communications system **100** or the wireless communications system **200**. For example, the communication timeline **300** may illustrate communication between a UE **115** and a network entity **105** across a number of slots **305**. The UE **115** and the network entity **105** may be examples of UEs **115** or the UE **115**-*a* and network entities **105** or the network entity **105**-*a*, respectively, as illustrated by and described with reference to FIGS. **1** and **2**. In some implementations, the UE **115** and the network entity **105** may support DCI activation for one or more semi-persistent SRS resource sets.

(69) For example, the network entity **105** may transmit a DCI **310**-*a* to the UE **115** indicating an activation for one or more semi-persistent SRS resource sets via an SRS request field **315**-*a*. The DCI **310**-*a* may be an example of a DCI format 0_1, a DCI format 0_2, a DCI format 1_1, a DCI

format 1_2, or any combination thereof and the network entity **105** may use the SRS request field **315**-*a* in the DCI **310**-*a* to activate an SRS resource set **320** and an SRS resource set **325**. In some implementations, the network entity **105** may include a codepoint in the SRS request field **315**-*a* and may indicate an activation for the SRS resource set **320** and the SRS resource set **325** via the codepoint. For example, one codepoint of the SRS request field **315**-*a* may be mapped to one or multiple SRS resource sets. The network entity **105** may signal or configure the mapping between codepoints and sets of one or multiple SRS resource to the UE **115** via control signaling (e.g., RRC signaling). As such, the mapping may be RRC configured per SRS resource set by configuring a trigger list, which may refer to a set of different activating or triggering codepoints, per SRS resource set (if that SRS resource set is configured with a resource type of semi-persistent SRS associated with DCI activation).

(70) An example mapping between codepoints and SRS resource sets is illustrated by Table 2 below. In the example mapping illustrated by Table 2, SRS resource sets A, B, C, and D may be configured with "SP-SRS with DCI activation" and a trigger list (e.g., which sets of codepoints activate a given SRS resource set) may be defined in accordance with a correspondence between codepoints and numeric values (e.g., a codepoint of "00" may correspond to an entry of "0" in a trigger list, a codepoint of "01" may correspond to an entry of "1" in a trigger list, and so on). Accordingly, and as illustrated by Table 2, a trigger list for the SRS resource set A may be "0, 3," a trigger list for the SRS resource set B may be "0, 1, 3," a trigger list for the SRS resource set C may be "1," and a trigger list for the SRS resource set D may be "2, 3." Thus, unlike some semi-persistent SRS activation mechanisms, an SRS request field **315**-*a* value of "00" may be used in a trigger list (e.g., can activate one or more SRS resource sets).

(71) TABLE-US-00002 TABLE 2 Mapping between codepoints and sets of one or more SRS resource sets Codepoint (Value of SRS Triggered Semi-Persistent Request Field) SRS Resource Set(s) 00 A, B 01 B, C 10 D 11 A, B, D

(72) As such, in the example of the communication timeline **300**, the network entity **105** may include a codepoint in the SRS request field **315**-*a* corresponding to the SRS resource set **320** and the SRS resource set **325** based on the mapping. In an example, the network entity **105** may include a codepoint of "01" in the SRS request field **315**-*a* (such that the SRS resource set **320** and the SRS resource set **325** may be examples of SRS resource sets B and C in the example of Table 2). The UE **115** may accordingly transmit an SRS over each of multiple periodic occasions or resources associated with the SRS resource set **320** and the SRS resource set **325**. The SRS resource set **320** may be associated with a periodicity **330** of four slots (e.g., in accordance with an RRC configured periodicity) and the SRS resource set **325** may be associated with a periodicity **335** of three slots (e.g., in accordance with an RRC configured periodicity).

(73) In some implementations, the UE **115** may validate a DCI (e.g., the DCI **310**-*a*), for semi-persistent SRS activation or release, based on an error check of the DCI based on (e.g., assuming or expecting) a scrambling of the DCI with a specific radio network temporary identifier (RNTI). For example, the UE **115** may expect that the DCI **310**-*a* is for activation or release of one or more semi-persistent SRS resource sets if the DCI **310**-*a* is scrambled with an RNTI associated with activation DCI messages. Such an RNTI associated with activation DCI messages (or deactivation DCI messages) may be referred to herein as an "SP-SRS-RNTI" and the network entity **105** may indicate or configure the SP-SRS-RNTI at the UE via control signaling (e.g., via RRC signaling). As such, the UE **115** may perform an error check, such as a cyclic redundancy check (CRC), of the DCI **310**-*a* and a success of the error check may depend on whether the DCI **310**-*a* was scrambled by the network entity **105** using the SP-SRS-RNTI.

(74) Additionally, or alternatively, some specific fields of the DCI **310**-*a* may be set to reserved values for validation of the DCI **310**-*a* as being a DCI for semi-persistent SRS activation or release (e.g., such as may similarly be performed for semi-persistent CSI reporting on a PUSCH). For example, to indicate that a DCI message is for semi-persistent SRS activation, the network entity

105 may set or configure a number of (e.g., all) bits in a hybrid automatic repeat request (HARD) process number field to be equal to zero values and may set or configure a number of (e.g., all) bits in a redundancy version (RV) field to be equal to zero values. To indicate that a DCI message is for semi-persistent SRS release, the network entity **105** may set or configure a number of (e.g., all) bits in a HARQ process number field to be equal to zero values, may set or configure a number of (e.g., all) bits in an RV field to be equal to zero values, may set a number of (e.g., all) bits in a modulation and coding scheme (MCS) field to one values, and may set a number of (e.g., all) bits in a frequency domain resource assignment (FDRA) field to either zero values or one values depending on a resource allocation type for the relevant one or more SRS resource sets. Such bit values to indicate a DCI as being a DCI for semi-persistent SRS activation are illustrated by Table 3 and such bit values to indicate a DCI as being a DCI for semi-persistent SRS release are illustrated by Table 4. In some aspects, Tables 3 and 4 may apply for DCI formats 0_1 or 0_2.

(75) TABLE-US-00003 TABLE 3 Bit Values for Semi-Persistent SRS Resource Set Activation DCI DCI Field DCI Field Bit Values HARQ Process Number Set to all '0's Redundancy Version Set to all '0's

(76) TABLE-US-00004 TABLE 4 Bit Values for Semi-Persistent SRS Resource Set Deactivation or Release DCI DCI Field DCI Field Bit Values HARQ Process Number Set to all '0's Modulation and Coding Scheme Set to all '1's Resource Block Assignment Set to all '0's or all '1's Redundancy Version Set to all '0's

(77) For the resource block assignment field for indicating a semi-persistent SRS resource set release DCI of Table 4, the included bits may be set to zero values if a higher layer configures a resource assignment (RA) type 0 or may be set to one values if a higher layer configures an RA type 1. If a higher layer configures a dynamic switch between an RA type 0 and an RA type 1, and if a most significant bit (MSB) is set to a zero value, the bits included in the resource block assignment field may be set to zero values; otherwise, the bits included in the resource block assignment field may be set to one values. For DCI format 0_1, if a higher layer configures an RA type 2, the bits included in the resource block assignment field may be set to one values if a numerology $\mu=0$ or may be set to zero values if a numerology $\mu=1$.

(78) Alternatively, for one or more of such DCI fields, different reserved values may be specified to differentiate activation versus release for semi-persistent SRS resource sets. For example, for one or both of an RV field or a HARQ process number field, bit values of (e.g., all) zero values may indicate or correspond to activation and bit values of (e.g., all) one values may indicate or correspond to release. Alternatively, for one or both of an RV field or a HARQ process number field, bit values of (e.g., all) zero values may indicate or correspond to release and otherwise (e.g., any other bit values outside of all zeros) may indicate or correspond to activation.

(79) In some systems, the network entity **105** and the UE **115** may not use such a design in the case of semi-persistent CSI reporting because FDRA or MCS fields, or both, may be used to indicate a PUSCH resource block allocation and an MCS in case of activation. Thus, if FDRA or MCS fields, or both, are set to reserved values (which may correspond to an invalid resource block allocation or an invalid MCS, or both) the network entity **105** and the UE **115** may expect or determine release. Otherwise, different values may result in the UE **115** and the network entity **105** determining or expecting activation (which may further be subject to other validation values). In the case of semi-persistent SRS, however, and even for activation, FDRA or MCS fields, or both, may be unused (e.g., there may be no PUSCH or PDSCH scheduled with an SP-SRS-RNTI) and available for use as a validation criteria for an activation or release DCI.

(80) In some examples, some fields in the DCI **310**-*a* may be unused if activating the SRS resource set **320** and the SRS resource set **325** (e.g., not used for indicating either activation or release or for indicating which SRS resource sets for which the DCI is relevant). Such fields in the DCI **310**-*a* that may go unused may include a new data indicator (NDI) field, a time domain resource assignment (TDRA) field, an antenna port(s) field, and a demodulation reference signal (DMRS)

sequence initialization field, among other examples. Further, a HARQ process number field, an RV field, an FDRA field, and an MCS field also may be unused if the network entity **105** and the UE **115** do not use them for validation purposes. Even for fields that the network entity **105** and the UE **115** use for validation purposes, not all bits or codepoints may be used. For instance, in examples in which any value outside of all zero values for an RV field or a HARQ process number field corresponds to activation, any of such values may be used for one or more additional purposes.

(81) Accordingly, in implementations in which the DCI **310**-*a* is an activation DCI, one or more of the unused fields, codepoints, or bits may be used for one or more other purposes. In other words, an activation DCI may repurpose pre-configured or pre-assigned fields, codepoints, or bits to increase the number of bits for an SRS request filed and/or indicate a parameter(s) associated with one or more activated SRS resources or SRS resource sets. In some implementations, the network entity **105** may use all or a subset of the available bits in the DCI **310**-*a* to increase a quantity of bits used for the SRS request field **315**-*a*. For example, the SRS request field **315**-*a* may sometimes include two bits (which may be capable of conveying four codepoints) and, for more flexibility, the network entity **105** may increase the size of the SRS request field **315**-*a* to include a larger quantity of bits. As such, the SRS request field **315**-*a* may include two bits, three bits, four bits, five bits, six bits, or more. Due to such a greater number of bits that may be used for the SRS request field **315**-*a*, the network entity **105** and the UE **115** may support a more flexible, detailed, precise, or granular mapping between codepoints and different sets of one or more semi-persistent SRS resource sets (as there may potentially be many used bits to build a robust mapping).

(82) Additionally, or alternatively, the network entity **105** may use all or a subset of the available bits in the DCI **310**-*a* to indicate one or more parameters associated with one or more of the to be activated SRS resources or SRS resource sets (e.g., one or more parameters associated with one or both of the SRS resource set **320** or the SRS resource set **325**). As such, the network entity **105** may indicate one or more updated values for the indicated parameters via the DCI **310**-*a* and the UE **115** may update values for the indicated parameters accordingly. In some implementations, the network entity **105** may indicate a new value for each indicated parameter directly in the DCI **310**-*a*. Additionally, or alternatively, the network entity **105** may indicate or configure a set of profiles (e.g., configuration profiles) to the UE **115** via control signaling (e.g., via RRC signaling) and may use the DCI **310**-*a* to indicate an index associated with one of the profiles. For example, each profile may be RRC configured with a value for each of a set of parameters and may be associated with or identified by a profile index (which the network entity **105** may convey to the UE **115** via the DCI **310**-*a*). The network entity **105** may configure a number of the profiles to control or with consideration to a flexibility-overhead tradeoff, as a greater number of profiles may provide greater flexibility at a cost of increased overhead. In some implementations, the network entity **105** may indicate updated values for a first set of one or more parameters via the DCI **310**-*a* directly and may indicate updated values for a second set of one or more parameters via a profile index also included in the DCI **310**-*a*.

(83) Such parameters for which the network entity **105** may indicate updated values via the DCI **310**-*a* may include time domain parameters, frequency domain parameters, spatial- or power-related parameters, parameters related to an SRS sequence, or any combination thereof. Time domain parameters may include a number of symbols and a position within a slot, a slot offset, or a number of repetitions in an SRS resource. Frequency domain parameters may include an SRS bandwidth or a frequency hopping configuration. Spatial- or power-related parameters may include a number of SRS ports, power control parameters such as a transmit power control (TPC) command, open loop parameters such as PO and alpha, or spatial relation information such as an indication of a beam or transmission configuration indicator (TCI) state. Parameters related to an SRS sequence may include a comb spacing, a comb offset (e.g., a combOffset parameter), a cyclic shift, an SRS sequence identity n.sub.ID.sup.SRS (which may determine or correspond to a sequence group u) or the value of u (e.g., n.sub.ID.sup.SRS mod 30), or a sequence or group

hopping configuration.

(84) In some scenarios, the network entity **105** may transmit a DCI **310**-*b* to the UE **115** after the SRS resource set **320** and the SRS resource set **325** are activated. The UE **115** may perform an error check on the DCI **310**-*b* or check to see if the DCI **310**-*b* includes one or more fields set to specific values, or both, to determine whether the DCI **310**-*b* is an activation DCI for semi-persistent SRS resource sets, a release DCI for semi-persistent SRS resource sets, or another type of DCI. In some aspects, the DCI **310**-*b* may be a DCI format 0_1, a DCI format 0_2, a DCI format 1_1, or a DCI format 1_2 (as such DCI formats may be used for either activating or releasing one or more semi-persistent SRS resource sets). In some examples, the UE **115** may determine that the DCI **310**-*b* is an activation DCI for semi-persistent SRS resource sets and may determine that the DCI **310**-*b* indicates an activation for at least one semi-persistent SRS resource set that is already activated (e.g., already activated by the previously received DCI **310**-*a*). For example, the UE **115** may determine that the DCI **310**-*b* indicates an activation for one or both of the SRS resource set **320** or the SRS resource set **325** (e.g., via a specific codepoint in an SRS request field **315**-*b* and in accordance with the configured mapping).

(85) In some implementations, the UE **115** may not expect to receive such another DCI scrambled with SP-SRS-RNTI activating a same semi-persistent SRS resource set and may assume an error case in accordance with receiving the DCI **310**-*b* indicating an activation for one or both of the SRS resource set **320** or the SRS resource set **325**. In such implementations, the UE **115** may discard (e.g., ignore) the DCI **310**-*b* in accordance with the DCI **310**-*b* activating one or both of the SRS resource set **320** or the SRS resource set **325** (which are already activated) based on assuming an error case. In other words, reactivation of a semi-persistent SRS resource set may not be allowed before first releasing the semi-persistent SRS resource set.

(86) In some aspects, the UE **115** and the network entity **105** may employ a restriction on reactivation for semi-persistent CSI reporting on a PUSCH. For example, for semi-persistent reporting on a PUSCH, a set of trigger states may be higher layer configured by CSI-SemiPersistentOnPUSCH-TriggerStateList, where a CSI request field in DCI scrambled with SP-CSI-RNTI activates one of the trigger states. In terms of the restriction on reactivation, the UE **115** may not be expected to receive a DCI scrambled with SP-CSI-RNTI activating one semi-persistent CSI report with a same CSI-ReportConfigId as in a semi-persistent CSI report which is activated by a previously received DCI scrambled with SP-CSI-RNTI.

(87) In some implementations, the UE **115** may similarly not expect to receive such another DCI scrambled with SP-SRS-RNTI activating a same semi-persistent SRS resource set and may assume an error case in accordance with receiving the DCI **310**-*b* indicating an activation for one or both of the SRS resource set **320** or the SRS resource set **325**. In such implementations, the UE **115** may discard (e.g., ignore) the DCI **310**-*b* in accordance with the DCI **310**-*b* activating one or both of the SRS resource set **320** or the SRS resource set **325** (which are already activated) based on assuming an error case. In other words, reactivation of a semi-persistent SRS resource set may not be allowed before first releasing the semi-persistent SRS resource set.

(88) In some aspects, the UE **115** and the network entity **105** may employ an update procedure using a reactivation DCI for SPS PDSCH or CG-PUSCH transmissions to update one or more parameters of an already activated SPS PDSCH or CG-PUSCH. In some implementations, the UE **115** may similarly assume that the DCI **310**-*b* indicating an activation for a currently activated semi-persistent SRS resource set (e.g., such that the DCI **310**-*b* may be a reactivation DCI) is for an update to one or more parameters or resources associated with the currently activated semi-persistent SRS resource set. In other words, if the UE **115** receives another DCI scrambled with SP-SRS-RNTI indicating an activation for a currently active semi-persistent SRS resource set, the UE **115** may update one or more parameters or resources associated with that currently active semi-persistent SRS resource set based on the new DCI.

(89) For example, the DCI **310**-*b* may include an indication of an update for one or more

parameters or resources associated with the indicated semi-persistent SRS resource set, the UE **115** may update the parameters or resources accordingly, and the UE **115** may continue to transmit an SRS on SRS resources within that SRS resource set periodically using the updated parameters or resources. The network entity **105** may indicate such an update via the DCI **310**-*b* via an explicit indication of a new value for one or more parameters in the DCI **310**-*b* or via a profile index.

(90) In some other examples, the UE **115** may determine that the DCI **310**-*b* is a release DCI for semi-persistent SRS resource sets and indicates a release of previously activated semi-persistent SRS resource sets. For example, the UE **115** may determine that the DCI **310**-*b* indicates a release for one or both of the SRS resource set **320** or the SRS resource set **325** (e.g., via a specific codepoint in the SRS request field **315**-*b* and in accordance with the configured mapping). The UE **115** may release the SRS resource set **320** or the SRS resource set **325**, or both, accordingly and may refrain from transmitting an SRS using SRS resources within the SRS resource set **320** or the SRS resource set **325**, or both, after reception of the DCI **310**-*b*. In some aspects, the network entity **105** and the UE **115** may leverage such a DCI-based release to achieve greater interference avoidance with relatively low latency, which may increase a likelihood for successful communication and improve system efficiency.

(91) FIG. **4** shows an example of a communication timeline **400** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The communication timeline **400** may implement or be implemented to realize aspects of the wireless communications system **100** or the wireless communications system **200**. For example, the communication timeline **400** may illustrate communication between a UE **115** and a network entity **105** across a number of slots **405**. The UE **115** and the network entity **105** may be examples of UEs **115** or the UE **115**-*a* and network entities **105** or the network entity **105**-*a*, respectively, as illustrated by and described with reference to FIGS. **1** and **2**. In some implementations, the UE **115** and the network entity **105** may use the communication timeline **400** to select a first instance or occasion for an SRS transmission after DCI activation of a semi-persistent SRS resource set.

(92) The network entity **105** may indicate a periodicity for a semi-persistent SRS resource set to the UE **115** via control signaling (e.g., RRC signaling) and may use a DCI to activate the semi-persistent SRS resource set. For example, the network entity **105** may transmit a DCI **410** to the UE **115** indicating an activation of an SRS resource set **415** associated with a periodicity of three slots and the UE **115** and the network entity **105** may support a mechanism for determining a first instance of SRS transmission using the activated SRS resource set **415** (e.g., a first slot of the SRS resource set **415** during which the UE **115** may perform an SRS transmission).

(93) Once the first instance is known or determined by the UE **115** and the network entity **105**, the UE **115** and the network entity **105** may know or determine all (e.g., a remainder of) instances based on a configured (e.g., an RRC configured) periodicity. For example, in cases in which a semi-persistent SRS resource set is activated by a MAC-CE, the network entity **105** may configure a slot offset and periodicity via an RRC parameter "periodicityAndOffset-sp" per SRS resource set, which the UE **115** and the network entity **105** may use to determine the slots in which the UE **115** transmits SRS in terms of an absolute (e.g., a defined) slot number. For further example, in cases in which an aperiodic SRS resource set is triggered by DCI (e.g., via a one-time triggering, not periodic), the network entity **105** may configure a slot offset with respect to a slot in which the DCI is received via control signaling (e.g., RRC signaling) for each SRS resource set (such that the slot offset is RRC configured per SRS resource set) or via a field of the triggering DCI. In some aspects, the UE **115** may use some amount of time to decode an activation DCI and prepare for a first instance of semi-persistent SRS transmission.

(94) In some implementations, if a semi-persistent SRS resource set is activated by DCI (e.g., if the SRS resource set **415** is activated by the DCI **410**), the UE **115** and the network entity **105** may expect or determine that a first or initial slot of a transmission by the UE **115** of SRS resources within the semi-persistent SRS resource set is the first instance of SRS transmission according to a

configured (e.g., an RRC configured) periodicityAndOffset parameter (which may be configured per SRS resource) which is at least a time gap associated with a processing capability of the UE **115** and an additional offset after a last symbol of the activating DCI.

(95) For example, and as illustrated by the communication timeline **400**, the SRS resource set **415** may be associated with an occasion **420**-*a*, an occasion **420**-*b*, an occasion **420**-*c*, an occasion **420**-*d*, and an occasion **420**-*e* in accordance with a configured periodicityAndOffset parameter for the SRS resource set **415**. In other words, all occasions **420** (e.g., slots) of the SRS resource set **415** may be based on the RRC parameter periodicityAndOffset and may be based on an absolute slot number (e.g., a defined slot number) irrespective of the slot in which the DCI **410** is received.

(96) The UE **115** may determine a first occasion of SRS transmission per SRS resource (of the activated SRS resource set **415**) and may transmit a first SRS in the occasion **420**-*c* in accordance with the occasion **420**-*c* being a first occasion after the time gap associated with the processing capability of the UE **115** and the additional offset after the last symbol of the DCI **410**. In some aspects, the time gap associated with the processing capability of the UE **115** may be referred to as N.sub.2 and the UE **115** may transmit an indication of N.sub.2 to the network entity **105** to ensure mutual awareness of the processing capability of the UE **115**. In some aspects, N.sub.2 may be based on a UE processing capability timeline for uplink. As such, and as illustrated by the communication timeline **400**, the time gap associated with the processing capability of the UE **115** and the additional offset may be equivalently referred to herein as N.sub.2+ additional offset **425**.

(97) FIG. **5** shows an example of a communication timeline **500** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The communication timeline **500** may implement or be implemented to realize aspects of the wireless communications system **100** or the wireless communications system **200**. For example, the communication timeline **500** may illustrate communication between a UE **115** and a network entity **105** across a number of slots **505**. The UE **115** and the network entity **105** may be examples of UEs **115** or the UE **115**-*a* and network entities **105** or the network entity **105**-*a*, respectively, as illustrated by and described with reference to FIGS. **1** and **2**. In some implementations, the UE **115** and the network entity **105** may use the communication timeline **500** to select a first instance or occasion for an SRS transmission after DCI activation of a semi-persistent SRS resource set.

(98) The network entity **105** may indicate a periodicity for a semi-persistent SRS resource set to the UE **115** via control signaling (e.g., RRC signaling) and may use a DCI to activate the semi-persistent SRS resource set. For example, the network entity **105** may transmit a DCI **510** to the UE **115** indicating an activation of an SRS resource set **515** associated with a periodicity **525** of three slots and the UE **115** and the network entity **105** may support a mechanism for determining a first instance of SRS transmission using the activated SRS resource set **515** (e.g., a first slot of the SRS resource set **515** during which the UE **115** may perform an SRS transmission).

(99) In implementations in which the SRS resource set **515** is activated by the DCI **510**, the UE **115** and the network entity **105** may expect or determine that a first or initial slot for transmission of the SRS resource set **515** is based on a value of a slot offset **520** with respect to a slot in which the activating DCI **510** is received. As illustrated by the communication timeline **500**, the slot offset **520** may be equal to four slots. As such, the UE **115** may transmit a first SRS during an SRS resource of the SRS resource set **515** that is four slots after the DCI **510** (e.g., after a last symbol of the DCI **510**) and may subsequently transmit an SRS during each SRS resource of the SRS resource set **515** in accordance with the configured periodicity **525** (which the network entity **105** may indicate to the UE **115** via an RRC parameter periodicityAndOffset). Further, the network entity **105** may indicate or configure the slot offset **520** via control signaling (e.g., RRC signaling, such that the slot offset **520** is RRC configured for the SRS resource set **515**) or may indicate the slot offset **520** via field in the DCI **510**. The UE **115** and the network entity **105** may make the determination of the first occasion of SRS transmission per SRS resource set.

(100) FIG. **6** shows an example of a control element **600** that supports DCI activation for semi-

persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The control element **600** may implement or be implemented to realize aspects of the wireless communications system **100** or the wireless communications system **200**. For example, a network entity **105** may transmit the control element **600** to a UE **115** to activate a semi-persistent SRS resource set. The UE **115** and the network entity **105** may be examples of UEs **115** or the UE **115**-*a* and network entities **105** or the network entity **105**-*a*, respectively, as illustrated by and described with reference to FIGS. **1** and **2**.

(101) In some implementations, the UE **115** or the network entity **105** may activate or deactivate a semi-persistent SRS resource set using the control element **600**, which may be an example of a MAC-CE. For example, the UE **115**-*a* or the network entity **105**-*a* may transmit the control element **600** indicating an activation or deactivation for one or more semi-persistent SRS resource sets. Once activated, the UE **115** may transmit an SRS over SRS resources within the SRS resource set periodically (e.g., based on a periodicity and offset as configured or indicated by the network entity **105** via control signaling, such as RRC signaling) until another control element **600** deactivates the SRS resource set.

(102) The control element **600** may include a number of octets, of which two are shown, and each octet may convey eight bits and a number of different fields. For example, the control element **600** may include an activation or deactivation (A/D) field **605** indicating whether to activate or deactivate the indicated semi-persistent SRS resource set. The control element **600** also may include an SRS resource set cell ID **610** (e.g., indicating a cell ID, such as a serving cell ID, of the indicated semi-persistent SRS resource set), an SRS resource set BWP ID **615** (e.g., indicating a BWP ID of the SRS resource set), a reserved bit **620**, a reserved bit **625**, and a C field **630** that indicates whether octets containing resource serving cell ID field(s) and resource BWP ID field(s) are present. The control element **600** also may include an SUL field **635** indicating whether the control element **600** (e.g., a MAC-CE) applies to the NUL carrier or the SUL carrier configuration. The control element **600** also may include an SP SRS resource set ID field **640** that indicates the semi-persistent SRS resource set identified by SRS-ResourceSetId which is to be activated or deactivated.

(103) In some aspects, use of a MAC-CE, such as the control element **600**, to activate or deactivate one or more semi-persistent SRS resource sets may introduce higher latency and less flexibility as compared to DCI-based activation or deactivation of one or more semi-persistent SRS resource sets. For example, the network entity **105** may be able to transmit a DCI message more frequently and more dynamically than a MAC-CE, which may enable the network entity **105** to more dynamically activate or release semi-persistent SRS resource sets or to dynamically update one or more parameters associated with activated semi-persistent SRS resources. Such dynamic capability may support greater spectral efficiency and lower signaling overhead and may facilitate or enable more efficient or better performing interference management, especially in scenarios in which multiple UEs **115** may transmit multiple SRSs toward multiple TRPs. As such, in some implementations, the network entity **105** and the UE **115** may support a set of one or more semi-persistent SRS resources associated with MAC-CE activation and deactivation or a set of one or more semi-persistent SRS resources associated with DCI activation and deactivation, or both, based on a deployment scenario or channel conditions between the network entity **105** and the UE **115**.

(104) FIG. **7** shows an example of a process flow **700** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The process flow **700** may implement or be implemented to realize aspects of the wireless communications system **100**, the wireless communications system **200**, the communication timeline **300**, the communication timeline **400**, the communication timeline **500**, or the control element **600**. For example, the process flow **700** illustrates communication between a UE **115**-*b* and a network entity **105**-*b*, which may be examples of UEs **115** or the UE **115**-*a* and network

entities **105** or the network entity **105**-*a*, respectively, as illustrated by and described with reference to FIGS. **1** and **2**.

(105) In the following description of the process flow **700**, the operations may be performed (such as reported or provided) in a different order than the order shown, or the operations performed by the example devices may be performed in different orders or at different times. Some operations also may be omitted from the process flow **700**, or other operations may be added to the process flow **700**. Further, although some operations or signaling may be shown to occur at different times for discussion purposes, these operations may actually occur at the same time or otherwise concurrently.

(106) At **705**, the UE **115**-*b* may receive, from the network entity **105**-*b*, control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation. For example, the UE **115**-*b* may receive RRC signaling from the network entity **105**-*b* indicating or configuring a type of semi-persistent SRS resource sets associated with DCI activation and release. In some implementations, the UE **115**-*b* may receive, via the control signaling, an indication of a mapping between codepoints (e.g., DCI codepoints included in an SRS request field of DCI) and multiple sets of one or more SRS resource sets.

(107) Additionally, or alternatively, the UE **115**-*b* may receive, via the control signaling, an indication of an RNTI associated with a scrambling of activation DCI messages (e.g., an SP-SRS-RNTI). Additionally, or alternatively, the UE **115**-*b* may receive, via the control signaling, an indication of an association between one or more specific fields of a DCI message having a set of specific values (e.g., all one values, all zero values, or values different from all one or zero values) and the DCI message being for activation or release of semi-persistent SRS resource sets. Additionally, or alternatively, the UE **115**-*b* may receive, via the control signaling, an indication of a correspondence between a set of configuration profiles and a set of parameter updates associated with one or more semi-persistent SRS resource sets.

(108) Further, in some implementations, the UE **115**-*b* may receive, via the control signaling, an indication of how time domain occasions associated with semi-persistent SRS resource sets are defined. In some implementations, for example, the control signaling may indicate a defined slot number (e.g., an absolute slot number) and may indicate that occasions of one or more semi-persistent SRS resource sets are defined relative to the defined slot number. In some other implementations, the control signaling may indicate that occasions of one or more semi-persistent SRS resource sets are defined relative to a slot in which an activating DCI is received.

(109) At **710**, the UE **115**-*b* may receive, from the network entity **105**-*b*, a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets having the resource type of semi-persistent. In some implementations, the first DCI message may include a codepoint, of a set of multiple codepoints, corresponding to the one or more SRS resource sets in accordance with the mapping (e.g., the mapping received by the UE **115**-*b* via the control signaling). Such use of a codepoint of a set of multiple codepoints may provide the UE **115**-*b* and the network entity **105**-*b* with greater configurability of activating one or multiple SRS resource sets simultaneously (e.g., with low latency).

(110) In some implementations, the UE **115**-*b* may perform an error check (e.g., a CRC) on the first DCI message using a scrambling sequence associated with the RNTI associated with the scrambling of activation DCI messages (e.g., the SP-SRS-RNTI) received via the control signaling. As such, if the UE **115**-*b* successfully performs the error check on the first DCI message, the UE **115**-*b* may identify or determine that the first DCI message is an activation DCI message for semi-persistent SRS resource sets. Accordingly, the UE **115**-*b* and the network entity **105**-*b* may reduce ambiguity as to what a purpose of the first DCI message is, which may increase decoding efficiency at the UE **115**-*b* and increase a likelihood for successful communication between the UE **115**-*b* and the network entity **105**-*b*.

(111) Additionally, or alternatively, the UE **115**-*b* may receive, in one or more specific fields of the first DCI message, a set of bits that are set to a set of specific values that indicate that the first DCI message is an activation DCI message. For example, the UE **115**-*b* may use the association (as received via the control signaling) between a set of specific values of one or more specific DCI fields and that DCI message being an activation DCI or a release DCI to validate the first DCI message as an activation DCI message for the one or more SRS resource sets. Accordingly, the UE **115**-*b* and the network entity **105**-*b* may reduce ambiguity as to what a purpose of the first DCI message is, which may increase decoding efficiency at the UE **115**-*b* and increase a likelihood for successful communication between the UE **115**-*b* and the network entity **105**-*b*.

(112) In some implementations, the UE **115**-*b* may receive an indication of an update for one or more parameters via the first DCI message. The UE **115**-*b* may receive the indication of the update directly via the first DCI message or the first DCI message may include a configuration profile corresponding to a configured update for the one or more parameters (e.g., based on the correspondence between the set of configuration profiles and a set of parameter updates as received via the control signaling). The UE **115**-*b* may update a memory of the UE **115**-*b* based on the update and the update may be valid permanently, until a next update is received, or for an indicted duration. In accordance with supporting such a dynamic parameter update via an activation DCI message, the UE **115**-*b* and the network entity **105**-*b* may have greater control or management capability over interference associated with SRS transmissions.

(113) At **715**, the UE **115**-*b* may transmit, to the network entity **105**-*b*, an SRS during each of a set of periodic occasions associated with the one or more SRS resource sets based on the DCI activation and in accordance with the resource type of the one or more SRS resource sets being semi-persistent. In some implementations, such as in implementations in which the first DCI message indicates an update for one or more parameters associated with the one or more SRS resource sets, the UE **115**-*b* may transmit the SRSs using the updated parameters. In some aspects, the UE **115**-*b* may transmit the SRSs to the network entity **105**-*b* directly. Additionally, or alternatively, the UE **115**-*b* may transmit the SRSs to one or multiple TRPs associated with the network entity **105**-*b*, such as the TRP **205** and the TRP **210** as illustrated and described with reference to FIG. **2**.

(114) In some implementations, the UE **115**-*b* may select a first occasion of the one or more SRS resource sets for transmitting an SRS after an offset value relative to a slot in which the first DCI message is received at **710**. In such implementations, the UE **115**-*b* may receive an indication of the slot offset value via the control signaling or the first DCI message, or both, and occasions of the one or more SRS resources sets may be defined relative to the slot in which the first DCI message is received. In some other implementations, the UE **115**-*b* may select a first occasion of the one or more SRS resource sets for transmitting an SRS after a time gap associated with a processing capability of the UE **115**-*b* (e.g., N2) and an additional offset relative to a slot in which the first DCI message is received at **710**. In such implementations, the UE **115**-*b* may receive an indication of the additional offset from the network entity **105**-*b*, transmit an indication of the time gap associated with the processing capability of the UE **115**-*b* to the network entity **105**-*b*, and occasions of the one or more SRS resource sets may be defined relative to a defined or absolute slot number indicated by the control signaling at **705**.

(115) In some implementations, at **720**, the UE **115** may receive, from the network entity **105**-*b*, a DCI message (e.g., a second DCI message) indicating an activation of at least one SRS resource set of the one or more SRS resource sets already activated by the first DCI message received at **710**. In some implementations, the UE **115**-*b* may discard the DCI message in accordance with the second DCI message indicating the activation for an already activated SRS resource set based on assuming such a reactivation DCI for an SRS resource activated by a previously received DCI is an error case. In such implementations, the UE **115**-*b* may maintain synchronization on expectations for how the UE **115**-*b* handles such reactivation DCI and the discarding of the DCI message may

reduce a processing burden at the UE **115**-*b*, which may improve battery life. Further, in some aspects, the network entity **105**-*b* may discard the DCI message prior to sending the DCI message to the UE **115**-*b* in accordance with identifying the error case, which may reduce signaling overhead and also reduce a processing burden at the UE **115**-*b*.

(116) In some other implementations, the UE **115**-*b* may use the DCI message to update one or more parameters associated with the at least one SRS resource set. For example, the DCI message may indicate an update for one or more parameters associated with the at least one SRS resource set and the UE **115**-*b* may update a value of each of the one or more parameters accordingly. In such implementations, the UE **115**-*b* may maintain synchronization on expectations for how the UE **115**-*b* handles such reactivation DCI and the use of the DCI (e.g., a reactivation DCI) for conveying a parameter update may further support greater control or management capability over interference associated with SRS transmissions.

(117) In some implementations, at **725**, the UE **115**-*b* may transmit, to the network entity **105**-*b* or one or more TRPs associated with the network entity **105**-*b*, an SRS during each of a next set of periodic occasions associated with the one or more SRS resource sets based on the DCI activation and the parameter update received at **720**. In such implementations, the UE **115**-*b* may transmit an SRS over the next set of periodic occasions using different time domain resources, different frequency domain resources, different power control parameters, or different spatial parameters to reduce system interference or to increase a likelihood for accurate channel estimation.

(118) At **730**, the UE **115**-*b* may receive, from the network entity **105**-*b*, a DCI message (e.g., a second DCI message) indicating a deactivation of the one or more SRS resource sets. In some implementations, the DCI message may indicate the deactivation for the one or more SRS resource sets via a codepoint in an SRS request field and based on being scrambled in accordance with an RNTI associated with deactivation DCI messages for semi-persistent SRS resource sets (e.g., an SP-SRS-RNTI). Additionally, or alternatively, the DCI message may indicate the deactivation for the one or more SRS resource sets based on one or more fields of the DCI message including a set of specific values that correspond to a deactivation DCI message for semi-persistent SRS resource sets. In accordance with such a dynamic (e.g., DCI-based) deactivation of the one or more SRS resource sets, the UE **115**-*b* and the network entity **105**-*b* may experience lower latency and lower signaling overhead as compared to other activation mechanisms.

(119) At **735**, the UE **115**-*b* and the network entity **105**-*b* may communicate based on the SRS transmissions from the UE **115**-*b*. For example, the network entity **105**-*b*, or one or more TRPs associated with the network entity **105**-*b*, may perform a channel estimation using the SRS transmissions from the UE **115**-*b* and may use the channel estimation for a coherent joint transmission from the one or more TRPs.

(120) FIG. **8** shows a block diagram **800** of a device **805** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The device **805** may be an example of aspects of a UE **115** as described herein. The device **805** may include a receiver **810**, a transmitter **815**, and a communications manager **820**. The device **805** may also include a processor. Each of these components may be in communication with one another (e.g., via one or more buses).

(121) The receiver **810** may provide a means for receiving information such as packets, user data, control information, or any combination thereof associated with various information channels (e.g., control channels, data channels, information channels related to DCI activation for semi-persistent SRS resource sets). Information may be passed on to other components of the device **805**. The receiver **810** may utilize a single antenna or a set of multiple antennas.

(122) The transmitter **815** may provide a means for transmitting signals generated by other components of the device **805**. For example, the transmitter **815** may transmit information such as packets, user data, control information, or any combination thereof associated with various information channels (e.g., control channels, data channels, information channels related to DCI

activation for semi-persistent SRS resource sets). In some examples, the transmitter **815** may be co-located with a receiver **810** in a transceiver module. The transmitter **815** may utilize a single antenna or a set of multiple antennas.

(123) The communications manager **820**, the receiver **810**, the transmitter **815**, or various combinations thereof or various components thereof may be examples of means for performing various aspects of DCI activation for semi-persistent SRS resource sets as described herein. For example, the communications manager **820**, the receiver **810**, the transmitter **815**, or various combinations or components thereof may support a method for performing one or more of the functions described herein.

(124) In some examples, the communications manager **820**, the receiver **810**, the transmitter **815**, or various combinations or components thereof may be implemented in hardware (e.g., in communications management circuitry). The hardware may include a processor, a digital signal processor (DSP), a central processing unit (CPU), an application-specific integrated circuit (ASIC), a field-programmable gate array (FPGA) or other programmable logic device, a microcontroller, discrete gate or transistor logic, discrete hardware components, or any combination thereof configured as or otherwise supporting a means for performing the functions described in the present disclosure. In some examples, a processor and memory coupled with the processor may be configured to perform one or more of the functions described herein (e.g., by executing, by the processor, instructions stored in the memory).

(125) Additionally, or alternatively, in some examples, the communications manager **820**, the receiver **810**, the transmitter **815**, or various combinations or components thereof may be implemented in code (e.g., as communications management software or firmware) executed by a processor. If implemented in code executed by a processor, the functions of the communications manager **820**, the receiver **810**, the transmitter **815**, or various combinations or components thereof may be performed by a general-purpose processor, a DSP, a CPU, an ASIC, an FPGA, a microcontroller, or any combination of these or other programmable logic devices (e.g., configured as or otherwise supporting a means for performing the functions described in the present disclosure).

(126) In some examples, the communications manager **820** may be configured to perform various operations (e.g., receiving, obtaining, monitoring, outputting, transmitting) using or otherwise in cooperation with the receiver **810**, the transmitter **815**, or both. For example, the communications manager **820** may receive information from the receiver **810**, send information to the transmitter **815**, or be integrated in combination with the receiver **810**, the transmitter **815**, or both to obtain information, output information, or perform various other operations as described herein.

(127) The communications manager **820** may support wireless communication at a UE in accordance with examples as disclosed herein. For example, the communications manager **820** may be configured as or otherwise support a means for receiving control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation. The communications manager **820** may be configured as or otherwise support a means for receiving a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets. The communications manager **820** may be configured as or otherwise support a means for transmitting an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(128) By including or configuring the communications manager **820** in accordance with examples as described herein, the device **805** (e.g., a processor controlling or otherwise coupled with the receiver **810**, the transmitter **815**, the communications manager **820**, or a combination thereof) may support techniques for reduced processing, reduced power consumption, and more efficient utilization of communication resources.

(129) FIG. **9** shows a block diagram **900** of a device **905** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The device **905** may be an example of aspects of a device **805** or a UE **115** as described herein. The device **905** may include a receiver **910**, a transmitter **915**, and a communications manager **920**. The device **905** may also include a processor. Each of these components may be in communication with one another (e.g., via one or more buses).

(130) The receiver **910** may provide a means for receiving information such as packets, user data, control information, or any combination thereof associated with various information channels (e.g., control channels, data channels, information channels related to DCI activation for semi-persistent SRS resource sets). Information may be passed on to other components of the device **905**. The receiver **910** may utilize a single antenna or a set of multiple antennas.

(131) The transmitter **915** may provide a means for transmitting signals generated by other components of the device **905**. For example, the transmitter **915** may transmit information such as packets, user data, control information, or any combination thereof associated with various information channels (e.g., control channels, data channels, information channels related to DCI activation for semi-persistent SRS resource sets). In some examples, the transmitter **915** may be co-located with a receiver **910** in a transceiver module. The transmitter **915** may utilize a single antenna or a set of multiple antennas.

(132) The device **905**, or various components thereof, may be an example of means for performing various aspects of DCI activation for semi-persistent SRS resource sets as described herein. For example, the communications manager **920** may include a control signaling component **925**, a DCI component **930**, an SRS component **935**, or any combination thereof. The communications manager **920** may be an example of aspects of a communications manager **820** as described herein. In some examples, the communications manager **920**, or various components thereof, may be configured to perform various operations (e.g., receiving, obtaining, monitoring, outputting, transmitting) using or otherwise in cooperation with the receiver **910**, the transmitter **915**, or both. For example, the communications manager **920** may receive information from the receiver **910**, send information to the transmitter **915**, or be integrated in combination with the receiver **910**, the transmitter **915**, or both to obtain information, output information, or perform various other operations as described herein.

(133) The communications manager **920** may support wireless communication at a UE in accordance with examples as disclosed herein. The control signaling component **925** may be configured as or otherwise support a means for receiving control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation. The DCI component **930** may be configured as or otherwise support a means for receiving a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets. The SRS component **935** may be configured as or otherwise support a means for transmitting an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(134) FIG. **10** shows a block diagram **1000** of a communications manager **1020** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The communications manager **1020** may be an example of aspects of a communications manager **820**, a communications manager **920**, or both, as described herein. The communications manager **1020**, or various components thereof, may be an example of means for performing various aspects of DCI activation for semi-persistent SRS resource sets as described herein. For example, the communications manager **1020** may include a control signaling component **1025**, a DCI component **1030**, an SRS component **1035**, an error check component **1040**, a parameter update component **1045**, a capability component **1050**, or any combination

thereof. Each of these components may communicate, directly or indirectly, with one another (e.g., via one or more buses).

(135) The communications manager **1020** may support wireless communication at a UE in accordance with examples as disclosed herein. The control signaling component **1025** may be configured as or otherwise support a means for receiving control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation. The DCI component **1030** may be configured as or otherwise support a means for receiving a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets. The SRS component **1035** may be configured as or otherwise support a means for transmitting an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(136) In some examples, to support receiving the first DCI message indicating the activation of the one or more SRS resource sets, the DCI component **1030** may be configured as or otherwise support a means for receiving, in the first DCI message, a codepoint of the set of multiple codepoints corresponding to the one or more SRS resource sets in accordance with the mapping.

(137) In some examples, the control signaling indicates a RNTI associated with a scrambling of activation DCI messages for SRS resource sets having the resource type of semi-persistent, and the error check component **1040** may be configured as or otherwise support a means for performing an error check on the first DCI message using a scrambling sequence associated with the RNTI, where a successful error check using the scrambling sequence associated with the RNTI indicates that the first DCI message is an activation DCI message for the one or more SRS resource sets.

(138) In some examples, to support receiving the first DCI message indicating the activation of the one or more SRS resource sets, the DCI component **1030** may be configured as or otherwise support a means for receiving, in the one or more fields of the first DCI message, a set of bits that are set to the set of multiple specific values.

(139) In some examples, to support receiving the first DCI message indicating the activation of the one or more SRS resource sets, the DCI component **1030** may be configured as or otherwise support a means for receiving, in the first DCI message, an indication of an update for one or more parameters associated with the one or more SRS resource sets, where transmitting the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets is based on receiving the indication of the update for the one or more parameters.

(140) In some examples, the control signaling indicates a value for each of the one or more parameters, and the parameter update component **1045** may be configured as or otherwise support a means for updating the value stored at the UE for each of the one or more parameters based on the indication of the update for the one or more parameters in the first DCI message, where transmitting the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets is based on updating the value for each of the one or more parameters.

(141) In some examples, the first DCI message indicates the update for the one or more parameters in accordance with explicitly indicating a value for each of the one or more parameters.

(142) In some examples, the control signaling indicates a correspondence between a set of configuration profiles and a set of parameter updates. In some examples, the first DCI message indicates the update for the one or more parameters in accordance with indicating a configuration profile of the set of configuration profiles.

(143) In some examples, the DCI component **1030** may be configured as or otherwise support a means for receiving a second DCI message indicating an activation of at least one SRS resource set of the one or more SRS resource sets. In some examples, the DCI component **1030** may be configured as or otherwise support a means for discarding the second DCI message in accordance with the second DCI message indicating the activation of the at least one SRS resource set, where

receiving the second DCI message indicating the activation of the at least one SRS resource set of the one or more SRS resource sets is associated with an error case.

(144) In some examples, the DCI component **1030** may be configured as or otherwise support a means for receiving a second DCI message indicating an activation of at least one SRS resource set of the one or more SRS resource sets, where the second DCI message includes an indication of an update for one or more parameters associated with the at least one SRS resource set. In some examples, the parameter update component **1045** may be configured as or otherwise support a means for updating a value of the one or more parameters associated with the at least one SRS resource set based on the indication of the update for the one or more parameters and in accordance with the second DCI message indicating the activation of the at least one SRS resource set.

(145) In some examples, the control signaling indicates a defined slot number and, to support indicates that occasions of the one or more SRS resource sets are defined relative to the defined slot number, and where transmitting the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets, the SRS component **1035** may be configured as or otherwise support a means for transmitting a first SRS in a first occasion of the one or more SRS resource sets after a time gap associated with a processing capability of the UE and an additional offset relative to a slot in which the first DCI message is received.

(146) In some examples, the capability component **1050** may be configured as or otherwise support a means for transmitting, to a network entity, an indication of the time gap associated with the processing capability of the UE.

(147) In some examples, to support transmitting the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets, the SRS component **1035** may be configured as or otherwise support a means for transmitting a first SRS in a first occasion of the one or more SRS resource sets after an offset value relative to the slot in which the first DCI message is received.

(148) In some examples, the offset value is received via at least one of the control signaling or the first DCI message.

(149) In some examples, the DCI component **1030** may be configured as or otherwise support a means for receiving a second DCI message indicating a deactivation of the one or more SRS resource sets, where the second DCI message indicates the deactivation of the one or more SRS resource sets based on at least one of being scrambled in accordance with a RNTI associated with deactivation DCI messages for SRS resource sets having the resource type of semi-persistent or one or more fields of the second DCI message having a set of multiple specific values.

(150) FIG. **11** shows a diagram of a system **1100** including a device **1105** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The device **1105** may be an example of or include the components of a device **805**, a device **905**, or a UE **115** as described herein. The device **1105** may communicate (e.g., wirelessly) with one or more network entities **105**, one or more UEs **115**, or any combination thereof. The device **1105** may include components for bi-directional voice and data communications including components for transmitting and receiving communications, such as a communications manager **1120**, an input/output (I/O) controller **1110**, a transceiver **1115**, an antenna **1125**, a memory **1130**, code **1135**, and a processor **1140**. These components may be in electronic communication or otherwise coupled (e.g., operatively, communicatively, functionally, electronically, electrically) via one or more buses (e.g., a bus **1145**).

(151) The I/O controller **1110** may manage input and output signals for the device **1105**. The I/O controller **1110** may also manage peripherals not integrated into the device **1105**. In some cases, the I/O controller **1110** may represent a physical connection or port to an external peripheral. In some cases, the I/O controller **1110** may utilize an operating system such as iOS®, ANDROID®, MS-DOS®, MS-WINDOWS®, OS/2®, UNIX®, LINUX®, or another known operating system. Additionally, or alternatively, the I/O controller **1110** may represent or interact with a modem, a

keyboard, a mouse, a touchscreen, or a similar device. In some cases, the I/O controller **1110** may be implemented as part of a processor, such as the processor **1140**. In some cases, a user may interact with the device **1105** via the I/O controller **1110** or via hardware components controlled by the I/O controller **1110**.

(152) In some cases, the device **1105** may include a single antenna **1125**. However, in some other cases, the device **1105** may have more than one antenna **1125**, which may be capable of concurrently transmitting or receiving multiple wireless transmissions. The transceiver **1115** may communicate bi-directionally, via the one or more antennas **1125**, wired, or wireless links as described herein. For example, the transceiver **1115** may represent a wireless transceiver and may communicate bi-directionally with another wireless transceiver. The transceiver **1115** may also include a modem to modulate the packets, to provide the modulated packets to one or more antennas **1125** for transmission, and to demodulate packets received from the one or more antennas **1125**. The transceiver **1115**, or the transceiver **1115** and one or more antennas **1125**, may be an example of a transmitter **815**, a transmitter **915**, a receiver **810**, a receiver **910**, or any combination thereof or component thereof, as described herein.

(153) The memory **1130** may include random access memory (RAM) and read-only memory (ROM). The memory **1130** may store computer-readable, computer-executable code **1135** including instructions that, when executed by the processor **1140**, cause the device **1105** to perform various functions described herein. The code **1135** may be stored in a non-transitory computer-readable medium such as system memory or another type of memory. In some cases, the code **1135** may not be directly executable by the processor **1140** but may cause a computer (e.g., when compiled and executed) to perform functions described herein. In some cases, the memory **1130** may contain, among other things, a basic I/O system (BIOS) which may control basic hardware or software operation such as the interaction with peripheral components or devices.

(154) The processor **1140** may include an intelligent hardware device (e.g., a general-purpose processor, a DSP, a CPU, a microcontroller, an ASIC, an FPGA, a programmable logic device, a discrete gate or transistor logic component, a discrete hardware component, or any combination thereof). In some cases, the processor **1140** may be configured to operate a memory array using a memory controller. In some other cases, a memory controller may be integrated into the processor **1140**. The processor **1140** may be configured to execute computer-readable instructions stored in a memory (e.g., the memory **1130**) to cause the device **1105** to perform various functions (e.g., functions or tasks supporting DCI activation for semi-persistent SRS resource sets). For example, the device **1105** or a component of the device **1105** may include a processor **1140** and memory **1130** coupled with or to the processor **1140**, the processor **1140** and memory **1130** configured to perform various functions described herein.

(155) The communications manager **1120** may support wireless communication at a UE in accordance with examples as disclosed herein. For example, the communications manager **1120** may be configured as or otherwise support a means for receiving control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation. The communications manager **1120** may be configured as or otherwise support a means for receiving a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets. The communications manager **1120** may be configured as or otherwise support a means for transmitting an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(156) By including or configuring the communications manager **1120** in accordance with examples as described herein, the device **1105** may support techniques for improved communication reliability, reduced latency, improved user experience related to reduced processing, reduced power consumption, more efficient utilization of communication resources, improved coordination

between devices, longer battery life, and improved utilization of processing capability.

(157) In some examples, the communications manager **1120** may be configured to perform various operations (e.g., receiving, monitoring, transmitting) using or otherwise in cooperation with the transceiver **1115**, the one or more antennas **1125**, or any combination thereof. Although the communications manager **1120** is illustrated as a separate component, in some examples, one or more functions described with reference to the communications manager **1120** may be supported by or performed by the processor **1140**, the memory **1130**, the code **1135**, or any combination thereof. For example, the code **1135** may include instructions executable by the processor **1140** to cause the device **1105** to perform various aspects of DCI activation for semi-persistent SRS resource sets as described herein, or the processor **1140** and the memory **1130** may be otherwise configured to perform or support such operations.

(158) FIG. **12** shows a block diagram **1200** of a device **1205** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The device **1205** may be an example of aspects of a network entity **105** as described herein. The device **1205** may include a receiver **1210**, a transmitter **1215**, and a communications manager **1220**. The device **1205** may also include a processor. Each of these components may be in communication with one another (e.g., via one or more buses).

(159) The receiver **1210** may provide a means for obtaining (e.g., receiving, determining, identifying) information such as user data, control information, or any combination thereof (e.g., I/Q samples, symbols, packets, protocol data units, service data units) associated with various channels (e.g., control channels, data channels, information channels, channels associated with a protocol stack). Information may be passed on to other components of the device **1205**. In some examples, the receiver **1210** may support obtaining information by receiving signals via one or more antennas. Additionally, or alternatively, the receiver **1210** may support obtaining information by receiving signals via one or more wired (e.g., electrical, fiber optic) interfaces, wireless interfaces, or any combination thereof.

(160) The transmitter **1215** may provide a means for outputting (e.g., transmitting, providing, conveying, sending) information generated by other components of the device **1205**. For example, the transmitter **1215** may output information such as user data, control information, or any combination thereof (e.g., I/Q samples, symbols, packets, protocol data units, service data units) associated with various channels (e.g., control channels, data channels, information channels, channels associated with a protocol stack). In some examples, the transmitter **1215** may support outputting information by transmitting signals via one or more antennas. Additionally, or alternatively, the transmitter **1215** may support outputting information by transmitting signals via one or more wired (e.g., electrical, fiber optic) interfaces, wireless interfaces, or any combination thereof. In some examples, the transmitter **1215** and the receiver **1210** may be co-located in a transceiver, which may include or be coupled with a modem.

(161) The communications manager **1220**, the receiver **1210**, the transmitter **1215**, or various combinations thereof or various components thereof may be examples of means for performing various aspects of DCI activation for semi-persistent SRS resource sets as described herein. For example, the communications manager **1220**, the receiver **1210**, the transmitter **1215**, or various combinations or components thereof may support a method for performing one or more of the functions described herein.

(162) In some examples, the communications manager **1220**, the receiver **1210**, the transmitter **1215**, or various combinations or components thereof may be implemented in hardware (e.g., in communications management circuitry). The hardware may include a processor, a DSP, a CPU, an ASIC, an FPGA or other programmable logic device, a microcontroller, discrete gate or transistor logic, discrete hardware components, or any combination thereof configured as or otherwise supporting a means for performing the functions described in the present disclosure. In some examples, a processor and memory coupled with the processor may be configured to perform one

or more of the functions described herein (e.g., by executing, by the processor, instructions stored in the memory).

(163) Additionally, or alternatively, in some examples, the communications manager **1220**, the receiver **1210**, the transmitter **1215**, or various combinations or components thereof may be implemented in code (e.g., as communications management software or firmware) executed by a processor. If implemented in code executed by a processor, the functions of the communications manager **1220**, the receiver **1210**, the transmitter **1215**, or various combinations or components thereof may be performed by a general-purpose processor, a DSP, a CPU, an ASIC, an FPGA, a microcontroller, or any combination of these or other programmable logic devices (e.g., configured as or otherwise supporting a means for performing the functions described in the present disclosure).

(164) In some examples, the communications manager **1220** may be configured to perform various operations (e.g., receiving, obtaining, monitoring, outputting, transmitting) using or otherwise in cooperation with the receiver **1210**, the transmitter **1215**, or both. For example, the communications manager **1220** may receive information from the receiver **1210**, send information to the transmitter **1215**, or be integrated in combination with the receiver **1210**, the transmitter **1215**, or both to obtain information, output information, or perform various other operations as described herein.

(165) The communications manager **1220** may support wireless communication at a network entity in accordance with examples as disclosed herein. For example, the communications manager **1220** may be configured as or otherwise support a means for outputting control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation. The communications manager **1220** may be configured as or otherwise support a means for outputting a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets. The communications manager **1220** may be configured as or otherwise support a means for obtaining an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(166) By including or configuring the communications manager **1220** in accordance with examples as described herein, the device **1205** (e.g., a processor controlling or otherwise coupled with the receiver **1210**, the transmitter **1215**, the communications manager **1220**, or a combination thereof) may support techniques for reduced processing, reduced power consumption, and more efficient utilization of communication resources.

(167) FIG. **13** shows a block diagram **1300** of a device **1305** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The device **1305** may be an example of aspects of a device **1205** or a network entity **105** as described herein. The device **1305** may include a receiver **1310**, a transmitter **1315**, and a communications manager **1320**. The device **1305** may also include a processor. Each of these components may be in communication with one another (e.g., via one or more buses).

(168) The receiver **1310** may provide a means for obtaining (e.g., receiving, determining, identifying) information such as user data, control information, or any combination thereof (e.g., I/Q samples, symbols, packets, protocol data units, service data units) associated with various channels (e.g., control channels, data channels, information channels, channels associated with a protocol stack). Information may be passed on to other components of the device **1305**. In some examples, the receiver **1310** may support obtaining information by receiving signals via one or more antennas. Additionally, or alternatively, the receiver **1310** may support obtaining information by receiving signals via one or more wired (e.g., electrical, fiber optic) interfaces, wireless interfaces, or any combination thereof.

(169) The transmitter **1315** may provide a means for outputting (e.g., transmitting, providing,

conveying, sending) information generated by other components of the device **1305**. For example, the transmitter **1315** may output information such as user data, control information, or any combination thereof (e.g., I/Q samples, symbols, packets, protocol data units, service data units) associated with various channels (e.g., control channels, data channels, information channels, channels associated with a protocol stack). In some examples, the transmitter **1315** may support outputting information by transmitting signals via one or more antennas. Additionally, or alternatively, the transmitter **1315** may support outputting information by transmitting signals via one or more wired (e.g., electrical, fiber optic) interfaces, wireless interfaces, or any combination thereof. In some examples, the transmitter **1315** and the receiver **1310** may be co-located in a transceiver, which may include or be coupled with a modem.

(170) The device **1305**, or various components thereof, may be an example of means for performing various aspects of DCI activation for semi-persistent SRS resource sets as described herein. For example, the communications manager **1320** may include a control signaling component **1325**, a DCI component **1330**, an SRS component **1335**, or any combination thereof. The communications manager **1320** may be an example of aspects of a communications manager **1220** as described herein. In some examples, the communications manager **1320**, or various components thereof, may be configured to perform various operations (e.g., receiving, obtaining, monitoring, outputting, transmitting) using or otherwise in cooperation with the receiver **1310**, the transmitter **1315**, or both. For example, the communications manager **1320** may receive information from the receiver **1310**, send information to the transmitter **1315**, or be integrated in combination with the receiver **1310**, the transmitter **1315**, or both to obtain information, output information, or perform various other operations as described herein.

(171) The communications manager **1320** may support wireless communication at a network entity in accordance with examples as disclosed herein. The control signaling component **1325** may be configured as or otherwise support a means for outputting control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation. The DCI component **1330** may be configured as or otherwise support a means for outputting a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets. The SRS component **1335** may be configured as or otherwise support a means for obtaining an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(172) FIG. **14** shows a block diagram **1400** of a communications manager **1420** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The communications manager **1420** may be an example of aspects of a communications manager **1220**, a communications manager **1320**, or both, as described herein. The communications manager **1420**, or various components thereof, may be an example of means for performing various aspects of DCI activation for semi-persistent SRS resource sets as described herein. For example, the communications manager **1420** may include a control signaling component **1425**, a DCI component **1430**, an SRS component **1435**, a scrambling component **1440**, a parameter update component **1445**, a capability component **1450**, or any combination thereof. Each of these components may communicate, directly or indirectly, with one another (e.g., via one or more buses) which may include communications within a protocol layer of a protocol stack, communications associated with a logical channel of a protocol stack (e.g., between protocol layers of a protocol stack, within a device, component, or virtualized component associated with a network entity **105**, between devices, components, or virtualized components associated with a network entity **105**), or any combination thereof.

(173) The communications manager **1420** may support wireless communication at a network entity in accordance with examples as disclosed herein. The control signaling component **1425** may be

configured as or otherwise support a means for outputting control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation. The DCI component **1430** may be configured as or otherwise support a means for outputting a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets. The SRS component **1435** may be configured as or otherwise support a means for obtaining an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(174) In some examples, to support outputting the first DCI message indicating the activation of the one or more SRS resource sets, the DCI component **1430** may be configured as or otherwise support a means for outputting, in the first DCI message, a codepoint of the set of multiple codepoints corresponding to the one or more SRS resource sets in accordance with the mapping.

(175) In some examples, the control signaling indicates a RNTI associated with a scrambling of activation DCI messages for SRS resource sets having the resource type of semi-persistent, and the scrambling component **1440** may be configured as or otherwise support a means for scrambling the first DCI message using a scrambling sequence associated with the RNTI in accordance with the first DCI message being an activation DCI message for the one or more SRS resource sets.

(176) In some examples, to support outputting the first DCI message indicating the activation of the one or more SRS resource sets, the DCI component **1430** may be configured as or otherwise support a means for outputting, in the one or more fields of the first DCI message, a set of bits that are set to the set of multiple specific values.

(177) In some examples, to support outputting the first DCI message indicating the activation of the one or more SRS resource sets, the DCI component **1430** may be configured as or otherwise support a means for outputting, in the first DCI message, an indication of an update for one or more parameters associated with the one or more SRS resource sets, where obtaining the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets is based on transmitting the indication of the update for the one or more parameters.

(178) In some examples, the control signaling indicates a value for each of the one or more parameters, and the parameter update component **1445** may be configured as or otherwise support a means for updating the value stored at the network entity for each of the one or more parameters based on the indication of the update for the one or more parameters in the first DCI message, where obtaining the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets is based on updating the value for each of the one or more parameters.

(179) In some examples, the first DCI message indicates the update for the one or more parameters in accordance with explicitly indicating a value for each of the one or more parameters.

(180) In some examples, the control signaling indicates a correspondence between a set of configuration profiles and a set of parameter updates. In some examples, the first DCI message indicates the update for the one or more parameters in accordance with indicating a configuration profile of the set of configuration profiles.

(181) In some examples, the DCI component **1430** may be configured as or otherwise support a means for generating a second DCI message indicating an activation of at least one SRS resource set of the one or more SRS resource sets. In some examples, the DCI component **1430** may be configured as or otherwise support a means for discarding the second DCI message in accordance with the second DCI message indicating the activation of the at least one SRS resource set, where generating the second DCI message indicating the activation of the at least one SRS resource set of the one or more SRS resource sets is associated with an error case.

(182) In some examples, the DCI component **1430** may be configured as or otherwise support a means for outputting a second DCI message indicating an activation of at least one SRS resource

set of the one or more SRS resource sets, where the second DCI message includes an indication of an update for one or more parameters associated with the at least one SRS resource set. In some examples, the parameter update component **1445** may be configured as or otherwise support a means for updating a value of the one or more parameters associated with the at least one SRS resource set based on the indication of the update for the one or more parameters and in accordance with the second DCI message indicating the activation of the at least one SRS resource set.

(183) In some examples, the control signaling indicates a defined slot number and, to support indicates that occasions of the one or more SRS resource sets are defined relative to the defined slot number, and where obtaining the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets, the SRS component **1435** may be configured as or otherwise support a means for obtaining a first SRS in a first occasion of the one or more SRS resource sets after a time gap associated with a processing capability of a UE and an additional offset relative to a slot in which the first DCI message is output.

(184) In some examples, the capability component **1450** may be configured as or otherwise support a means for obtaining an indication of the time gap associated with the processing capability of the UE.

(185) In some examples, to support obtaining the SRS during each of the set of multiple periodic occasions associated with the one or more SRS resource sets, the SRS component **1435** may be configured as or otherwise support a means for obtaining a first SRS in a first occasion of the one or more SRS resource sets after an offset value relative to the slot in which the first DCI message is output.

(186) In some examples, the offset value is received via at least one of the control signaling or the first DCI message.

(187) In some examples, the DCI component **1430** may be configured as or otherwise support a means for outputting a second DCI message indicating a deactivation of the one or more SRS resource sets, where the second DCI message indicates the deactivation of the one or more SRS resource sets based on at least one of being scrambled in accordance with a RNTI associated with deactivation DCI messages for SRS resource sets having the resource type of semi-persistent or one or more fields of the second DCI message having a set of multiple specific values.

(188) FIG. **15** shows a diagram of a system **1500** including a device **1505** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The device **1505** may be an example of or include the components of a device **1205**, a device **1305**, or a network entity **105** as described herein. The device **1505** may communicate with one or more network entities **105**, one or more UEs **115**, or any combination thereof, which may include communications over one or more wired interfaces, over one or more wireless interfaces, or any combination thereof. The device **1505** may include components that support outputting and obtaining communications, such as a communications manager **1520**, a transceiver **1510**, an antenna **1515**, a memory **1525**, code **1530**, and a processor **1535**. These components may be in electronic communication or otherwise coupled (e.g., operatively, communicatively, functionally, electronically, electrically) via one or more buses (e.g., a bus **1540**).

(189) The transceiver **1510** may support bi-directional communications via wired links, wireless links, or both as described herein. In some examples, the transceiver **1510** may include a wired transceiver and may communicate bi-directionally with another wired transceiver. Additionally, or alternatively, in some examples, the transceiver **1510** may include a wireless transceiver and may communicate bi-directionally with another wireless transceiver. In some examples, the device **1505** may include one or more antennas **1515**, which may be capable of transmitting or receiving wireless transmissions (e.g., concurrently). The transceiver **1510** may also include a modem to modulate signals, to provide the modulated signals for transmission (e.g., by one or more antennas **1515**, by a wired transmitter), to receive modulated signals (e.g., from one or more antennas **1515**, from a wired receiver), and to demodulate signals. The transceiver **1510**, or the transceiver **1510**

and one or more antennas **1515** or wired interfaces, where applicable, may be an example of a transmitter **1215**, a transmitter **1315**, a receiver **1210**, a receiver **1310**, or any combination thereof or component thereof, as described herein. In some examples, the transceiver may be operable to support communications via one or more communications links (e.g., a communication link **125**, a backhaul communication link **120**, a midhaul communication link **162**, a fronthaul communication link **168**).

(190) The memory **1525** may include RAM and ROM. The memory **1525** may store computer-readable, computer-executable code **1530** including instructions that, when executed by the processor **1535**, cause the device **1505** to perform various functions described herein. The code **1530** may be stored in a non-transitory computer-readable medium such as system memory or another type of memory. In some cases, the code **1530** may not be directly executable by the processor **1535** but may cause a computer (e.g., when compiled and executed) to perform functions described herein. In some cases, the memory **1525** may contain, among other things, a BIOS which may control basic hardware or software operation such as the interaction with peripheral components or devices.

(191) The processor **1535** may include an intelligent hardware device (e.g., a general-purpose processor, a DSP, an ASIC, a CPU, an FPGA, a microcontroller, a programmable logic device, discrete gate or transistor logic, a discrete hardware component, or any combination thereof). In some cases, the processor **1535** may be configured to operate a memory array using a memory controller. In some other cases, a memory controller may be integrated into the processor **1535**. The processor **1535** may be configured to execute computer-readable instructions stored in a memory (e.g., the memory **1525**) to cause the device **1505** to perform various functions (e.g., functions or tasks supporting DCI activation for semi-persistent SRS resource sets). For example, the device **1505** or a component of the device **1505** may include a processor **1535** and memory **1525** coupled with the processor **1535**, the processor **1535** and memory **1525** configured to perform various functions described herein. The processor **1535** may be an example of a cloud-computing platform (e.g., one or more physical nodes and supporting software such as operating systems, virtual machines, or container instances) that may host the functions (e.g., by executing code **1530**) to perform the functions of the device **1505**.

(192) In some examples, a bus **1540** may support communications of (e.g., within) a protocol layer of a protocol stack. In some examples, a bus **1540** may support communications associated with a logical channel of a protocol stack (e.g., between protocol layers of a protocol stack), which may include communications performed within a component of the device **1505**, or between different components of the device **1505** that may be co-located or located in different locations (e.g., where the device **1505** may refer to a system in which one or more of the communications manager **1520**, the transceiver **1510**, the memory **1525**, the code **1530**, and the processor **1535** may be located in one of the different components or divided between different components).

(193) In some examples, the communications manager **1520** may manage aspects of communications with a core network **130** (e.g., via one or more wired or wireless backhaul links). For example, the communications manager **1520** may manage the transfer of data communications for client devices, such as one or more UEs **115**. In some examples, the communications manager **1520** may manage communications with other network entities **105**, and may include a controller or scheduler for controlling communications with UEs **115** in cooperation with other network entities **105**. In some examples, the communications manager **1520** may support an X2 interface within an LTE/LTE-A wireless communications network technology to provide communication between network entities **105**.

(194) The communications manager **1520** may support wireless communication at a network entity in accordance with examples as disclosed herein. For example, the communications manager **1520** may be configured as or otherwise support a means for outputting control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS

resource sets are associated with DCI activation. The communications manager **1520** may be configured as or otherwise support a means for outputting a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets. The communications manager **1520** may be configured as or otherwise support a means for obtaining an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(195) By including or configuring the communications manager **1520** in accordance with examples as described herein, the device **1505** may support techniques for improved communication reliability, reduced latency, improved user experience related to reduced processing, reduced power consumption, more efficient utilization of communication resources, improved coordination between devices, longer battery life, and improved utilization of processing capability.

(196) In some examples, the communications manager **1520** may be configured to perform various operations (e.g., receiving, obtaining, monitoring, outputting, transmitting) using or otherwise in cooperation with the transceiver **1510**, the one or more antennas **1515** (e.g., where applicable), or any combination thereof. Although the communications manager **1520** is illustrated as a separate component, in some examples, one or more functions described with reference to the communications manager **1520** may be supported by or performed by the processor **1535**, the memory **1525**, the code **1530**, the transceiver **1510**, or any combination thereof. For example, the code **1530** may include instructions executable by the processor **1535** to cause the device **1505** to perform various aspects of DCI activation for semi-persistent SRS resource sets as described herein, or the processor **1535** and the memory **1525** may be otherwise configured to perform or support such operations.

(197) FIG. **16** shows a flowchart illustrating a method **1600** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The operations of the method **1600** may be implemented by a UE or its components as described herein. For example, the operations of the method **1600** may be performed by a UE **115** as described with reference to FIGS. **1** through **11**. In some examples, a UE may execute a set of instructions to control the functional elements of the UE to perform the described functions. Additionally, or alternatively, the UE may perform aspects of the described functions using special-purpose hardware.

(198) At **1605**, the method may include receiving control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation. The operations of **1605** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1605** may be performed by a control signaling component **1025** as described with reference to FIG. **10**.

(199) At **1610**, the method may include receiving a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets. The operations of **1610** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1610** may be performed by a DCI component **1030** as described with reference to FIG. **10**.

(200) At **1615**, the method may include transmitting an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent. The operations of **1615** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1615** may be performed by an SRS component **1035** as described with reference to FIG. **10**.

(201) FIG. **17** shows a flowchart illustrating a method **1700** that supports DCI activation for semi-persistent SRS resource sets in accordance with one or more aspects of the present disclosure. The operations of the method **1700** may be implemented by a network entity or its components as

described herein. For example, the operations of the method **1700** may be performed by a network entity as described with reference to FIGS. **1** through **7** and **12** through **15**. In some examples, a network entity may execute a set of instructions to control the functional elements of the network entity to perform the described functions. Additionally, or alternatively, the network entity may perform aspects of the described functions using special-purpose hardware.

(202) At **1705**, the method may include outputting control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation. The operations of **1705** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1705** may be performed by a control signaling component **1425** as described with reference to FIG. **14**.

(203) At **1710**, the method may include outputting a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets. The operations of **1710** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1710** may be performed by a DCI component **1430** as described with reference to FIG. **14**.

(204) At **1715**, the method may include obtaining an SRS during each of a set of multiple periodic occasions associated with the one or more SRS resource sets based on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent. The operations of **1715** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1715** may be performed by an SRS component **1435** as described with reference to FIG. **14**.

(205) The following provides an overview of aspects of the present disclosure:

(206) Aspect 1: A method for wireless communication at a UE, comprising: receiving control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation; receiving a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets; and transmitting an SRS during each of a plurality of periodic occasions associated with the one or more SRS resource sets based at least in part on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(207) Aspect 2: The method of aspect 1, wherein the control signaling indicates a mapping between a plurality of codepoints and a plurality of sets of one or more SRS resource sets, and wherein receiving the first DCI message indicating the activation of the one or more SRS resource sets comprises: receiving, in the first DCI message, a codepoint of the plurality of codepoints corresponding to the one or more SRS resource sets in accordance with the mapping.

(208) Aspect 3: The method of any of aspects 1 or 2, wherein the control signaling indicates an RNTI associated with a scrambling of activation DCI messages for SRS resource sets having the resource type of semi-persistent, the method further comprising: performing an error check on the first DCI message using a scrambling sequence associated with the RNTI, wherein a successful error check using the scrambling sequence associated with the RNTI indicates that the first DCI message is an activation DCI message for the one or more SRS resource sets.

(209) Aspect 4: The method of any of aspects 1 through 3, wherein the control signaling indicates an association between one or more fields of a DCI message having a plurality of specific values and the DCI message being for activation of SRS resource sets having the resource type of semi-persistent, and wherein receiving the first DCI message indicating the activation of the one or more SRS resource sets comprises: receiving, in the one or more fields of the first DCI message, a set of bits that are set to the plurality of specific values.

(210) Aspect 5: The method of any of aspects 1 through 4, wherein receiving the first DCI message indicating the activation of the one or more SRS resource sets comprises: receiving, in the first DCI message, an indication of an update for one or more parameters associated with the one or more

SRS resource sets, wherein transmitting the SRS during each of the plurality of periodic occasions associated with the one or more SRS resource sets is based at least in part on receiving the indication of the update for the one or more parameters.

(211) Aspect 6: The method of aspect 5, wherein the control signaling indicates a value for each of the one or more parameters, the method further comprising: updating the value stored at the UE for each of the one or more parameters based at least in part on the indication of the update for the one or more parameters in the first DCI message, wherein transmitting the SRS during each of the plurality of periodic occasions associated with the one or more SRS resource sets is based at least in part on updating the value for each of the one or more parameters.

(212) Aspect 7: The method of any of aspects 5 or 6, wherein the first DCI message indicates the update for the one or more parameters in accordance with explicitly indicating a value for each of the one or more parameters.

(213) Aspect 8: The method of any of aspects 5 through 7, wherein the control signaling indicates a correspondence between a set of configuration profiles and a set of parameter updates, and the first DCI message indicates the update for the one or more parameters in accordance with indicating a configuration profile of the set of configuration profiles.

(214) Aspect 9: The method of any of aspects 1 through 8, further comprising: receiving a second DCI message indicating an activation of at least one SRS resource set of the one or more SRS resource sets; and discarding the second DCI message in accordance with the second DCI message indicating the activation of the at least one SRS resource set, wherein receiving the second DCI message indicating the activation of the at least one SRS resource set of the one or more SRS resource sets is associated with an error case.

(215) Aspect 10: The method of any of aspects 1 through 8, further comprising: receiving a second DCI message indicating an activation of at least one SRS resource set of the one or more SRS resource sets, wherein the second DCI message includes an indication of an update for one or more parameters associated with the at least one SRS resource set; and updating a value of the one or more parameters associated with the at least one SRS resource set based at least in part on the indication of the update for the one or more parameters and in accordance with the second DCI message indicating the activation of the at least one SRS resource set.

(216) Aspect 11: The method of any of aspects 1 through 10, wherein the control signaling indicates a defined slot number and indicates that occasions of the one or more SRS resource sets are defined relative to the defined slot number, and wherein transmitting the SRS during each of the plurality of periodic occasions associated with the one or more SRS resource sets comprises: transmitting a first SRS in a first occasion of the one or more SRS resource sets after a time gap associated with a processing capability of the UE and an additional offset relative to a slot in which the first DCI message is received.

(217) Aspect 12: The method of aspect 11, further comprising: transmitting, to a network entity, an indication of the time gap associated with the processing capability of the UE.

(218) Aspect 13: The method of any of aspects 1 through 10, wherein the control signaling indicates that occasions of the one or more SRS resource sets are defined relative to a slot in which the first DCI message is received, and wherein transmitting the SRS during each of the plurality of periodic occasions associated with the one or more SRS resource sets comprises: transmitting a first SRS in a first occasion of the one or more SRS resource sets after an offset value relative to the slot in which the first DCI message is received.

(219) Aspect 14: The method of aspect 13, wherein the offset value is received via at least one of the control signaling or the first DCI message.

(220) Aspect 15: The method of any of aspects 1 through 14, further comprising: receiving a second DCI message indicating a deactivation of the one or more SRS resource sets, wherein the second DCI message indicates the deactivation of the one or more SRS resource sets based at least in part on at least one of being scrambled in accordance with an RNTI associated with deactivation

DCI messages for SRS resource sets having the resource type of semi-persistent or one or more fields of the second DCI message having a plurality of specific values.

(221) Aspect 16: A method for wireless communication at a network entity, comprising: outputting control signaling indicating a resource type of a set of SRS resource sets as semi-persistent and indicating that the set of SRS resource sets are associated with DCI activation; outputting a first DCI message indicating an activation of one or more SRS resource sets of the set of SRS resource sets; and obtaining an SRS during each of a plurality of periodic occasions associated with the one or more SRS resource sets based at least in part on the DCI activation of the one or more SRS resource sets and in accordance with the resource type of the one or more SRS resource sets being semi-persistent.

(222) Aspect 17: The method of aspect 16, wherein the control signaling indicates a mapping between a plurality of codepoints and a plurality of sets of one or more SRS resource sets, and wherein outputting the first DCI message indicating the activation of the one or more SRS resource sets comprises: outputting, in the first DCI message, a codepoint of the plurality of codepoints corresponding to the one or more SRS resource sets in accordance with the mapping.

(223) Aspect 18: The method of any of aspects 16 or 17, wherein the control signaling indicates an RNTI associated with a scrambling of activation DCI messages for SRS resource sets having the resource type of semi-persistent, the method further comprising: scrambling the first DCI message using a scrambling sequence associated with the RNTI in accordance with the first DCI message being an activation DCI message for the one or more SRS resource sets.

(224) Aspect 19: The method of any of aspects 16 through 18, wherein the control signaling indicates an association between one or more fields of a DCI message having a plurality of specific values and the DCI message being for activation of SRS resource sets having the resource type of semi-persistent, and wherein outputting the first DCI message indicating the activation of the one or more SRS resource sets comprises: outputting, in the one or more fields of the first DCI message, a set of bits that are set to the plurality of specific values.

(225) Aspect 20: The method of any of aspects 16 through 19, wherein outputting the first DCI message indicating the activation of the one or more SRS resource sets comprises: outputting, in the first DCI message, an indication of an update for one or more parameters associated with the one or more SRS resource sets, wherein obtaining the SRS during each of the plurality of periodic occasions associated with the one or more SRS resource sets is based at least in part on transmitting the indication of the update for the one or more parameters.

(226) Aspect 21: The method of aspect 20, wherein the control signaling indicates a value for each of the one or more parameters, the method further comprising: updating the value stored at the network entity for each of the one or more parameters based at least in part on the indication of the update for the one or more parameters in the first DCI message, wherein obtaining the SRS during each of the plurality of periodic occasions associated with the one or more SRS resource sets is based at least in part on updating the value for each of the one or more parameters.

(227) Aspect 22: The method of any of aspects 20 or 21, wherein the first DCI message indicates the update for the one or more parameters in accordance with explicitly indicating a value for each of the one or more parameters.

(228) Aspect 23: The method of any of aspects 20 through 22, wherein the control signaling indicates a correspondence between a set of configuration profiles and a set of parameter updates, and the first DCI message indicates the update for the one or more parameters in accordance with indicating a configuration profile of the set of configuration profiles.

(229) Aspect 24: The method of any of aspects 16 through 23, further comprising: generating a second DCI message indicating an activation of at least one SRS resource set of the one or more SRS resource sets; and discarding the second DCI message in accordance with the second DCI message indicating the activation of the at least one SRS resource set, wherein generating the second DCI message indicating the activation of the at least one SRS resource set of the one or

more SRS resource sets is associated with an error case.

(230) Aspect 25: The method of any of aspects 16 through 23, further comprising: outputting a second DCI message indicating an activation of at least one SRS resource set of the one or more SRS resource sets, wherein the second DCI message includes an indication of an update for one or more parameters associated with the at least one SRS resource set; and updating a value of the one or more parameters associated with the at least one SRS resource set based at least in part on the indication of the update for the one or more parameters and in accordance with the second DCI message indicating the activation of the at least one SRS resource set.

(231) Aspect 26: The method of any of aspects 16 through 25, wherein the control signaling indicates a defined slot number and indicates that occasions of the one or more SRS resource sets are defined relative to the defined slot number, and wherein obtaining the SRS during each of the plurality of periodic occasions associated with the one or more SRS resource sets comprises: obtaining a first SRS in a first occasion of the one or more SRS resource sets after a time gap associated with a processing capability of a UE and an additional offset relative to a slot in which the first DCI message is output.

(232) Aspect 27: The method of aspect 26, further comprising: obtaining an indication of the time gap associated with the processing capability of the UE.

(233) Aspect 28: The method of any of aspects 16 through 25, wherein the control signaling indicates that occasions of the one or more SRS resource sets are defined relative to a slot in which the first DCI message is output, and wherein obtaining the SRS during each of the plurality of periodic occasions associated with the one or more SRS resource sets comprises: obtaining a first SRS in a first occasion of the one or more SRS resource sets after an offset value relative to the slot in which the first DCI message is output.

(234) Aspect 29: The method of aspect 28, wherein the offset value is received via at least one of the control signaling or the first DCI message.

(235) Aspect 30: The method of any of aspects 16 through 29, further comprising: outputting a second DCI message indicating a deactivation of the one or more SRS resource sets, wherein the second DCI message indicates the deactivation of the one or more SRS resource sets based at least in part on at least one of being scrambled in accordance with an RNTI associated with deactivation DCI messages for SRS resource sets having the resource type of semi-persistent or one or more fields of the second DCI message having a plurality of specific values.

(236) Aspect 31: An apparatus for wireless communication at a UE, comprising a processor; memory coupled with the processor; and instructions stored in the memory and executable by the processor to cause the apparatus to perform a method of any of aspects 1 through 15.

(237) Aspect 32: An apparatus for wireless communication at a UE, comprising at least one means for performing a method of any of aspects 1 through 15.

(238) Aspect 33: A non-transitory computer-readable medium storing code for wireless communication at a UE, the code comprising instructions executable by a processor to perform a method of any of aspects 1 through 15.

(239) Aspect 34: An apparatus for wireless communication at a network entity, comprising a processor; memory coupled with the processor; and instructions stored in the memory and executable by the processor to cause the apparatus to perform a method of any of aspects 16 through 30.

(240) Aspect 35: An apparatus for wireless communication at a network entity, comprising at least one means for performing a method of any of aspects 16 through 30.

(241) Aspect 36: A non-transitory computer-readable medium storing code for wireless communication at a network entity, the code comprising instructions executable by a processor to perform a method of any of aspects 16 through 30.

(242) It should be noted that the methods described herein describe possible implementations, and that the operations and the steps may be rearranged or otherwise modified and that other

implementations are possible. Further, aspects from two or more of the methods may be combined.

(243) Although aspects of an LTE, LTE-A, LTE-A Pro, or NR system may be described for purposes of example, and LTE, LTE-A, LTE-A Pro, or NR terminology may be used in much of the description, the techniques described herein are applicable beyond LTE, LTE-A, LTE-A Pro, or NR networks. For example, the described techniques may be applicable to various other wireless communications systems such as Ultra Mobile Broadband (UMB), Institute of Electrical and Electronics Engineers (IEEE) 802.11 (Wi-Fi), IEEE 802.16 (WiMAX), IEEE 802.20, Flash-OFDM, as well as other systems and radio technologies not explicitly mentioned herein.

(244) Information and signals described herein may be represented using any of a variety of different technologies and techniques. For example, data, instructions, commands, information, signals, bits, symbols, and chips that may be referenced throughout the description may be represented by voltages, currents, electromagnetic waves, magnetic fields or particles, optical fields or particles, or any combination thereof.

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

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

(247) 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. By way of example, and not limitation, non-transitory computer-readable media may include RAM, ROM, electrically erasable programmable ROM (EEPROM), flash memory, compact disk (CD) ROM or other optical disk storage, magnetic disk storage or other magnetic storage devices, or any other non-transitory medium that may be used to carry or store desired program code means in the form of instructions or data structures and that may be accessed by a general-purpose or special-purpose computer, or a general-purpose or special-purpose processor. Also, any connection is properly termed a computer-readable medium. For example, if the software is transmitted from a website, server, or other remote source using a coaxial cable, fiber optic cable, twisted pair, digital subscriber line (DSL), or wireless technologies such as infrared, radio, and microwave, then the coaxial cable, fiber optic cable, twisted pair, DSL, or wireless technologies such as infrared, radio, and microwave are included in the definition of computer-readable medium. Disk and disc, as used herein, include CD, laser disc, optical disc, digital versatile disc (DVD), floppy disk and Blu-ray disc where disks usually reproduce data magnetically, while discs reproduce data optically with lasers. Combinations of the above are also included within the scope of computer-readable media.

(248) 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") indicates an inclusive list such that, for example, a list of at least one of A, B, or C means A or B or C or AB or AC or BC or ABC (i.e., A and B and C). Also, as used herein, the phrase "based on" shall not be construed as a reference to a closed set of conditions. For example, an example step that is described as "based on condition A" may be based on both a condition A and a condition B without departing from the scope of the present disclosure. In other words, as used herein, the phrase "based on" shall be construed in the same manner as the phrase "based at least in part on."

(249) The term "determine" or "determining" encompasses a variety of actions and, therefore, "determining" can include calculating, computing, processing, deriving, investigating, looking up (such as via looking up in a table, a database or another data structure), ascertaining and the like. Also, "determining" can include receiving (such as receiving information), accessing (such as accessing data in a memory) and the like. Also, "determining" can include resolving, obtaining, selecting, choosing, establishing and other such similar actions.

(250) In the appended figures, similar components or features may have the same reference label. Further, various components of the same type may be distinguished by following the reference label by a dash and a second label that distinguishes among the similar components. If just the first reference label is used in the specification, the description is applicable to any one of the similar components having the same first reference label irrespective of the second reference label, or other subsequent reference label.

(251) The description set forth herein, in connection with the appended drawings, describes example configurations and does not represent all the examples that may be implemented or that are within the scope of the claims. The term "example" used herein means "serving as an example, instance, or illustration," and not "preferred" or "advantageous over other examples." The detailed description includes specific details for the purpose of providing an understanding of the described techniques. These techniques, however, may be practiced without these specific details. In some instances, known structures and devices are shown in block diagram form in order to avoid obscuring the concepts of the described examples.

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

Claims

1. An apparatus for wireless communication at a user equipment (UE), comprising: one or more processors; and one or more memories coupled with the one or more processors and storing instructions executable by the one or more processors to cause the apparatus to: receive control signaling indicating a resource type of a plurality of sounding reference signal resource sets as semi-persistent and indicating that the plurality of sounding reference signal resource sets is associated with downlink control information activation; receive a first downlink control information message indicating an activation of one or more sounding reference signal resource sets of the plurality of sounding reference signal resource sets; and transmit a sounding reference signal during each of a plurality of periodic occasions associated with the one or more sounding reference signal resource sets based at least in part on the activation of the one or more sounding reference signal resource sets indicated by the first downlink control information message and in accordance with the resource type of the one or more sounding reference signal resource sets being semi-persistent.

2. The apparatus of claim 1, wherein the control signaling indicates a mapping between a plurality

of codepoints and the plurality of sounding reference signal resource sets, and wherein the instructions to receive the first downlink control information message indicating the activation of the one or more sounding reference signal resource sets are executable by the one or more processors to cause the apparatus to: receive, in the first downlink control information message, a codepoint of the plurality of codepoints corresponding to the one or more sounding reference signal resource sets in accordance with the mapping.

3. The apparatus of claim 1, wherein the control signaling indicates a radio network temporary identifier associated with a scrambling of activation downlink control information messages for sounding reference signal resource sets having the resource type of semi-persistent, and the instructions are further executable by the one or more processors to cause the apparatus to: perform an error check on the first downlink control information message using a scrambling sequence associated with the radio network temporary identifier, wherein a successful error check using the scrambling sequence associated with the radio network temporary identifier indicates that the first downlink control information message is an activation downlink control information message for the one or more sounding reference signal resource sets.

4. The apparatus of claim 1, wherein the control signaling indicates an association between one or more fields of a downlink control information message having a plurality of specific values and the downlink control information message being for activation of sounding reference signal resource sets having the resource type of semi-persistent, and wherein the instructions to receive the first downlink control information message indicating the activation of the one or more sounding reference signal resource sets are executable by the one or more processors to cause the apparatus to: receive, in the one or more fields of the first downlink control information message, a set of bits that are equal to the plurality of specific values.

5. The apparatus of claim 1, wherein the instructions to receive the first downlink control information message indicating the activation of the one or more sounding reference signal resource sets are executable by the one or more processors to cause the apparatus to: receive, in the first downlink control information message, an indication of an update for one or more parameters associated with the one or more sounding reference signal resource sets, wherein transmission of the sounding reference signal during each of the plurality of periodic occasions associated with the one or more sounding reference signal resource sets is based at least in part on receiving the indication of the update for the one or more parameters.

6. The apparatus of claim 5, wherein the control signaling indicates a value for each of the one or more parameters, and the instructions are further executable by the one or more processors to cause the apparatus to: update the value stored at the UE for each of the one or more parameters based at least in part on the indication of the update for the one or more parameters in the first downlink control information message, wherein transmission of the sounding reference signal during each of the plurality of periodic occasions associated with the one or more sounding reference signal resource sets is based at least in part on the update to the value for each of the one or more parameters.

7. The apparatus of claim 5, wherein the first downlink control information message indicates the update for the one or more parameters in accordance with explicitly indicating a value for each of the one or more parameters.

8. The apparatus of claim 5, wherein: the control signaling indicates a correspondence between a set of configuration profiles and a set of parameter updates; and the first downlink control information message indicates the update for the one or more parameters in accordance with indicating a configuration profile of the set of configuration profiles.

9. The apparatus of claim 1, wherein the instructions are further executable by the one or more processors to cause the apparatus to: receive a second downlink control information message indicating an activation of at least one sounding reference signal resource set of the one or more sounding reference signal resource sets; and discard the second downlink control information

message in accordance with the second downlink control information message indicating the activation of the at least one sounding reference signal resource set, wherein reception of the second downlink control information message indicating the activation of the at least one sounding reference signal resource set of the one or more sounding reference signal resource sets is associated with an error case.

10. The apparatus of claim 1, wherein the instructions are further executable by the one or more processors to cause the apparatus to: receive a second downlink control information message indicating an activation of at least one sounding reference signal resource set of the one or more sounding reference signal resource sets, wherein the second downlink control information message includes an indication of an update for one or more parameters associated with the at least one sounding reference signal resource set; and update a value of the one or more parameters associated with the at least one sounding reference signal resource set based at least in part on the indication of the update for the one or more parameters and in accordance with the second downlink control information message indicating the activation of the at least one sounding reference signal resource set.

11. The apparatus of claim 1, wherein the control signaling indicates a defined slot number, wherein occasions of the one or more sounding reference signal resource sets are defined relative to the defined slot number, and wherein the instructions to transmit the sounding reference signal during each of the plurality of periodic occasions associated with the one or more sounding reference signal resource sets are executable by the one or more processors to cause the apparatus to: transmit a first sounding reference signal in a first occasion of the one or more sounding reference signal resource sets after a time gap associated with a processing capability of the UE and an additional offset relative to a slot in which the first downlink control information message is received.

12. The apparatus of claim 11, wherein the instructions are further executable by the one or more processors to cause the apparatus to: transmit, to a network entity, an indication of the time gap associated with the processing capability of the UE.

13. The apparatus of claim 1, wherein the control signaling indicates that occasions of the one or more sounding reference signal resource sets are defined relative to a slot in which the first downlink control information message is received, and wherein the instructions to transmit the sounding reference signal during each of the plurality of periodic occasions associated with the one or more sounding reference signal resource sets are executable by the one or more processors to cause the apparatus to: transmit a first sounding reference signal in a first occasion of the one or more sounding reference signal resource sets after an offset value relative to the slot in which the first downlink control information message is received.

14. The apparatus of claim 13, wherein the offset value is received via at least one of the control signaling or the first downlink control information message.

15. The apparatus of claim 1, wherein the instructions are further executable by the one or more processors to cause the apparatus to: receive a second downlink control information message indicating a deactivation of the one or more sounding reference signal resource sets.

16. The apparatus of claim 15, wherein the second downlink control information message indicates the deactivation of the one or more sounding reference signal resource sets based at least in part on at least one of: being scrambled in accordance with a radio network temporary identifier associated with deactivation downlink control information messages for sounding reference signal resource sets having the resource type of semi-persistent; or one or more fields of the second downlink control information message having a plurality of specific values.

17. An apparatus for wireless communication at a network entity, comprising: one or more processors; and one or more memories coupled with the one or more processors and storing instructions executable by the one or more processors to cause the apparatus to: transmit output control signaling indicating a resource type of a plurality of sounding reference signal resource sets

as semi-persistent and indicating that the plurality of sounding reference signal resource sets is associated with downlink control information activation; transmit output a first downlink control information message indicating an activation of one or more sounding reference signal resource sets of the plurality of sounding reference signal resource sets; and receive obtain a sounding reference signal during each of a plurality of periodic occasions associated with the one or more sounding reference signal resource sets based at least in part on the activation of the one or more sounding reference signal resource sets indicated by the first downlink control information message and in accordance with the resource type of the one or more sounding reference signal resource sets being semi-persistent.

18. The apparatus of claim 17, wherein the control signaling indicates a mapping between a plurality of codepoints and the plurality of sounding reference signal resource sets, and wherein the instructions to transmit the first downlink control information message indicating the activation of the one or more sounding reference signal resource sets are executable by the one or more processors to cause the apparatus to: transmit, in the first downlink control information message, a codepoint of the plurality of codepoints corresponding to the one or more sounding reference signal resource sets in accordance with the mapping.

19. The apparatus of claim 17, wherein the control signaling indicates a radio network temporary identifier associated with a scrambling of activation downlink control information messages for sounding reference signal resource sets having the resource type of semi-persistent, and the instructions are further executable by the one or more processors to cause the apparatus to: scramble the first downlink control information message using a scrambling sequence associated with the radio network temporary identifier in accordance with the first downlink control information message being an activation downlink control information message for the one or more sounding reference signal resource sets.

20. The apparatus of claim 17, wherein the control signaling indicates an association between one or more fields of a downlink control information message having a plurality of specific values and the downlink control information message being for activation of sounding reference signal resource sets having the resource type of semi-persistent, and wherein the instructions to transmit the first downlink control information message indicating the activation of the one or more sounding reference signal resource sets are executable by the one or more processors to cause the apparatus to: transmit, in the one or more fields of the first downlink control information message, a set of bits that are equal to the plurality of specific values.

21. The apparatus of claim 17, wherein the instructions to transmit the first downlink control information message indicating the activation of the one or more sounding reference signal resource sets are executable by the one or more processors to cause the apparatus to: transmit, in the first downlink control information message, an indication of an update for one or more parameters associated with the one or more sounding reference signal resource sets, wherein reception of the sounding reference signal during each of the plurality of periodic occasions associated with the one or more sounding reference signal resource sets is based at least in part on transmitting the indication of the update for the one or more parameters.

22. The apparatus of claim 21, wherein the control signaling indicates a value for each of the one or more parameters, and the instructions are further executable by the one or more processors to cause the apparatus to: update the value stored at the network entity for each of the one or more parameters based at least in part on the indication of the update for the one or more parameters in the first downlink control information message, wherein reception of the sounding reference signal during each of the plurality of periodic occasions associated with the one or more sounding reference signal resource sets is based at least in part on the update to the value for each of the one or more parameters.

23. The apparatus of claim 17, wherein the instructions are further executable by the one or more processors to cause the apparatus to: generate a second downlink control information message

indicating an activation of at least one sounding reference signal resource set of the one or more sounding reference signal resource sets; and discard the second downlink control information message in accordance with the second downlink control information message indicating the activation of the at least one sounding reference signal resource set, wherein generation of the second downlink control information message indicating the activation of the at least one sounding reference signal resource set of the one or more sounding reference signal resource sets is associated with an error case.

24. The apparatus of claim 17, wherein the instructions are further executable by the one or more processors to cause the apparatus to: transmit a second downlink control information message indicating an activation of at least one sounding reference signal resource set of the one or more sounding reference signal resource sets, wherein the second downlink control information message includes an indication of an update for one or more parameters associated with the at least one sounding reference signal resource set; and update a value of the one or more parameters associated with the at least one sounding reference signal resource set based at least in part on the indication of the update for the one or more parameters and in accordance with the second downlink control information message indicating the activation of the at least one sounding reference signal resource set.

25. The apparatus of claim 17, wherein the instructions are further executable by the one or more processors to cause the apparatus to: transmit a second downlink control information message indicating a deactivation of the one or more sounding reference signal resource sets, wherein the second downlink control information message indicates the deactivation of the one or more sounding reference signal resource sets based at least in part on at least one of: being scrambled in accordance with a radio network temporary identifier associated with deactivation downlink control information messages for sounding reference signal resource sets having the resource type of semi-persistent; or one or more fields of the second downlink control information message having a plurality of specific values.

26. A method for wireless communication at a user equipment (UE), comprising: receiving control signaling indicating a resource type of a plurality of sounding reference signal resource sets as semi-persistent and indicating that the plurality of sounding reference signal resource sets is associated with downlink control information activation; receiving a first downlink control information message indicating an activation of one or more sounding reference signal resource sets of the plurality of sounding reference signal resource sets; and transmitting a sounding reference signal during each of a plurality of periodic occasions associated with the one or more sounding reference signal resource sets based at least in part on the activation of the one or more sounding reference signal resource sets indicated by the first downlink control information message and in accordance with the resource type of the one or more sounding reference signal resource sets being semi-persistent.

27. The method of claim 26, wherein the control signaling indicates a mapping between a plurality of codepoints and the plurality of sounding reference signal resource sets, and wherein receiving the first downlink control information message indicating the activation of the one or more sounding reference signal resource sets comprises: receiving, in the first downlink control information message, a codepoint of the plurality of codepoints corresponding to the one or more sounding reference signal resource sets in accordance with the mapping.

28. The method of claim 26, wherein the control signaling indicates a radio network temporary identifier associated with a scrambling of activation downlink control information messages for sounding reference signal resource sets having the resource type of semi-persistent, the method further comprising: performing an error check on the first downlink control information message using a scrambling sequence associated with the radio network temporary identifier, wherein a successful error check using the scrambling sequence associated with the radio network temporary identifier indicates that the first downlink control information message is an activation downlink

control information message for the one or more sounding reference signal resource sets.

29. A method for wireless communication at a network entity, comprising: transmitting control signaling indicating a resource type of a plurality of sounding reference signal resource sets as semi-persistent and indicating that the plurality of sounding reference signal resource sets is associated with downlink control information activation; transmitting a first downlink control information message indicating an activation of one or more sounding reference signal resource sets of the plurality of sounding reference signal resource sets; and receiving a sounding reference signal during each of a plurality of periodic occasions associated with the one or more sounding reference signal resource sets based at least in part on the activation of the one or more sounding reference signal resource sets indicated by the first downlink control information message and in accordance with the resource type of the one or more sounding reference signal resource sets being semi-persistent.

30. The method of claim 29, wherein the control signaling indicates a mapping between a plurality of codepoints and the plurality of sounding reference signal resource sets, and wherein transmitting the first downlink control information message indicating the activation of the one or more sounding reference signal resource sets comprises: transmitting, in the first downlink control information message, a codepoint of the plurality of codepoints corresponding to the one or more sounding reference signal resource sets in accordance with the mapping.