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(54) **ON-DEMAND SYNCHRONIZATION SIGNALING FOR NETWORK ENERGY SAVINGS SYSTEMS**

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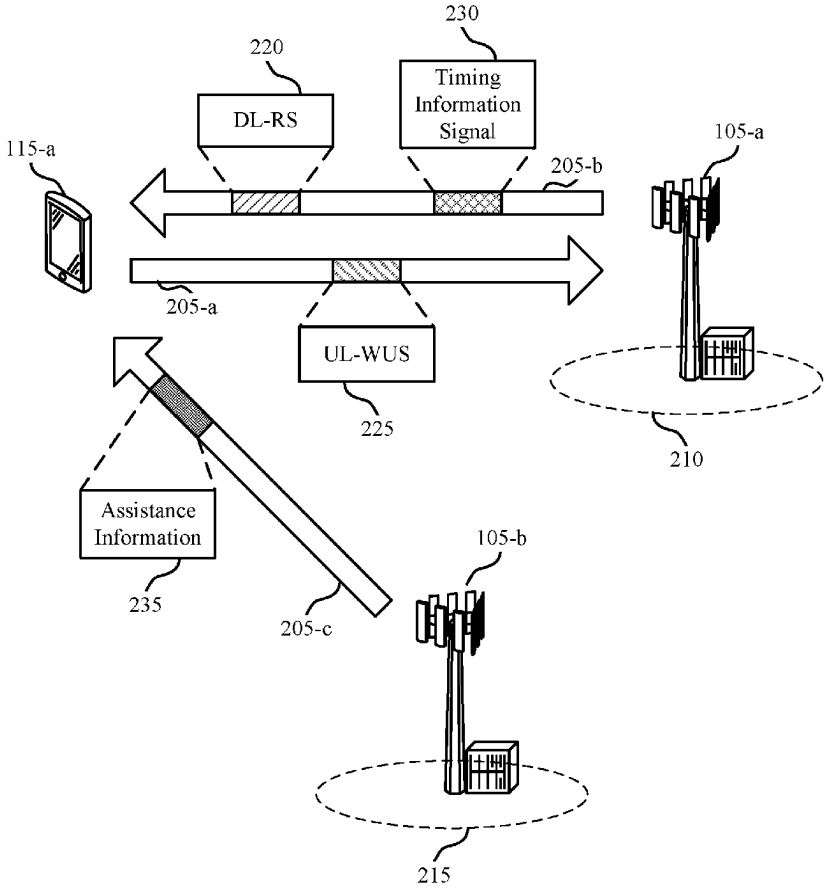
(57) **ABSTRACT**

Methods, systems, and devices for wireless communications are described. A user equipment (UE) may communicate with a first network entity associated with a network energy savings (NES) cell and a second network entity associated with an anchor cell. In some examples, the UE may receive assistance information from the anchor cell including an indication of parameters for establishing communications with the NES cell. The UE may receive a first signal from the NES cell that indicates a first portion of the parameters. The first portion may be based on the assistance information. The UE may transmit a wake up signal (WUS) to the NES cell including an indication of the first portion of the parameters. The NES cell may receive the WUS and transmit a second signal including an indication of the remaining one or more parameters to the UE based on receiving the first signal.



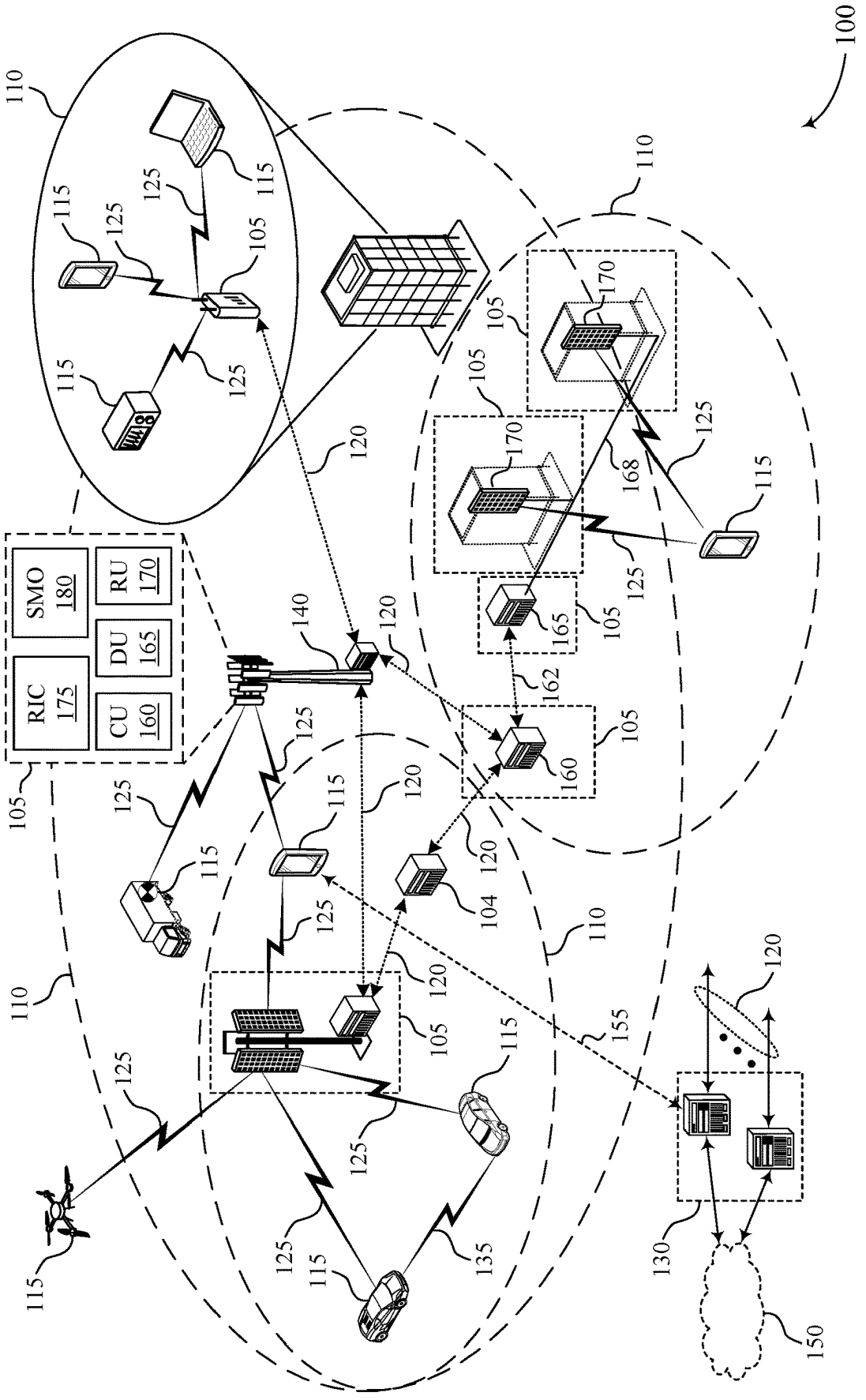

100
110
115
125
105
120
SMO 180
RU 170
RIC 175
DU 165
CU 160
140
170
168
165
162
160
104
155
130
150
135

FIG. 1

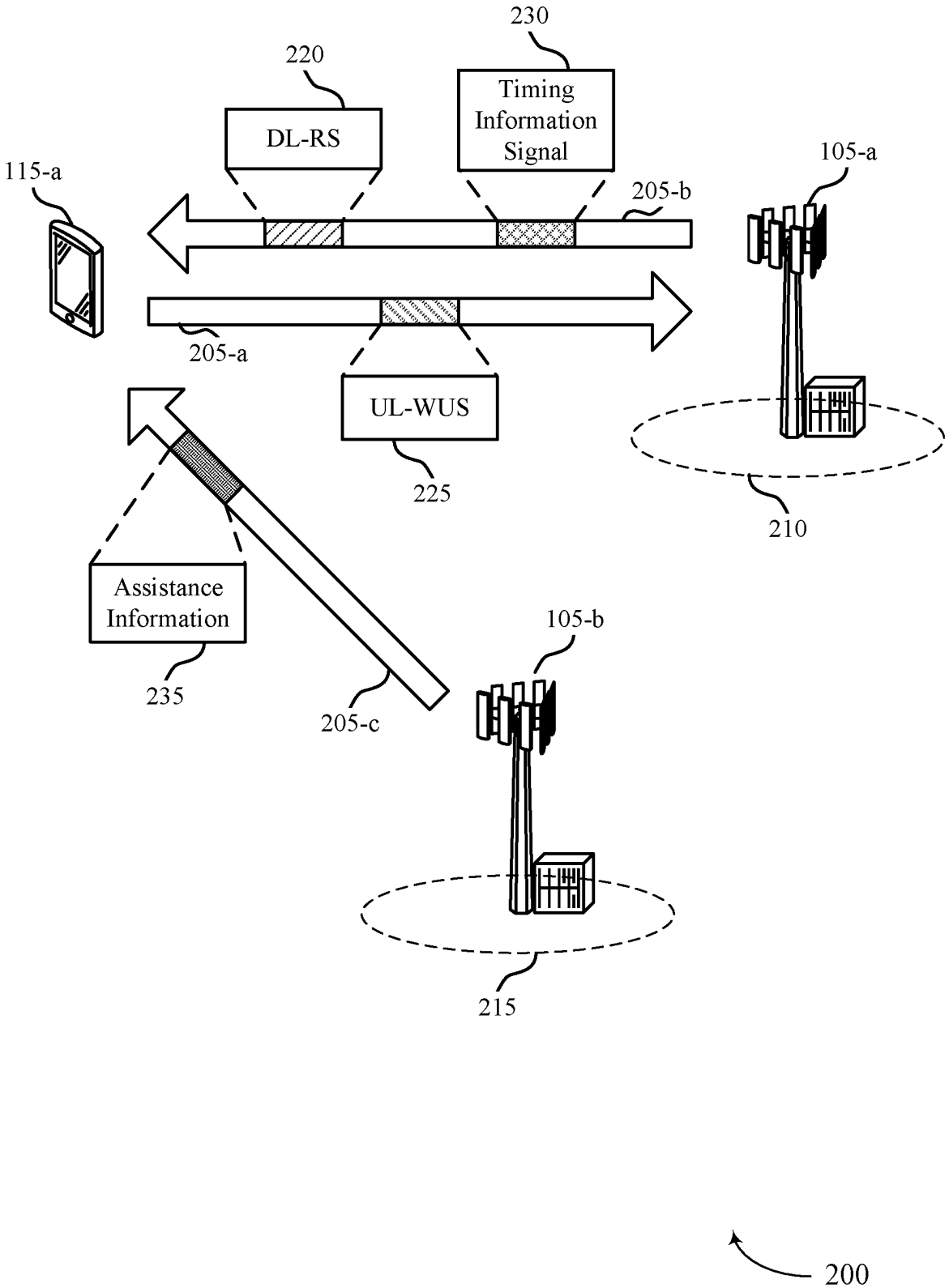

230
220
Timing Information Signal
DL-RS
105-a
115-a
205-b
205-a
UL-WUS
225
210
Assistance Information
105-b
235
205-c
215
200

FIG. 2

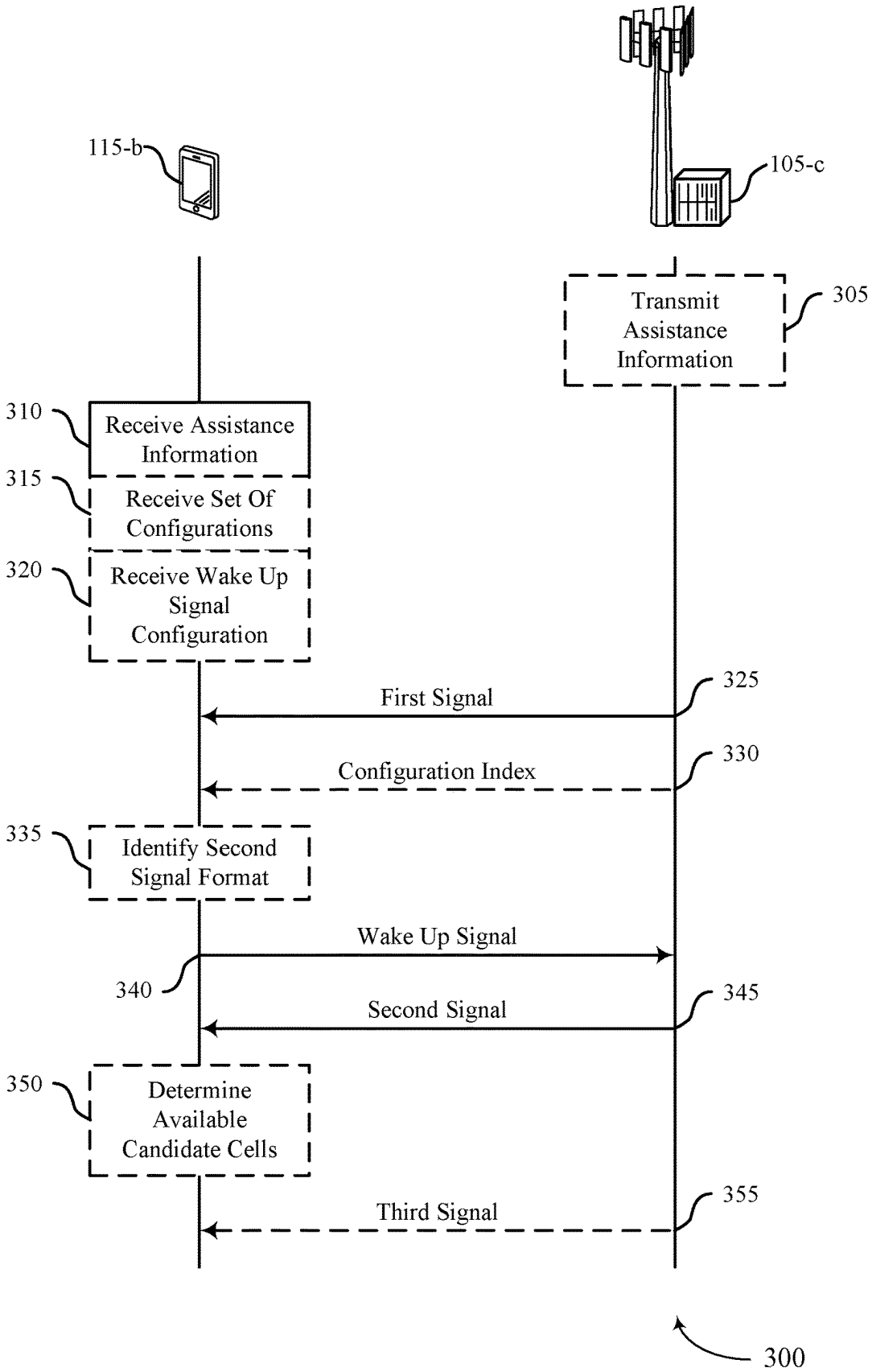

115-b
105-c
Transmit Assistance Information
305
310
Receive Assistance Information
315
Receive Set Of Configurations
320
Receive Wake Up Signal Configuration
First Signal
325
Configuration Index
330
335
Identify Second Signal Format
Wake Up Signal
340
Second Signal
345
350
Determine Available Candidate Cells
Third Signal
355
300

FIG. 3

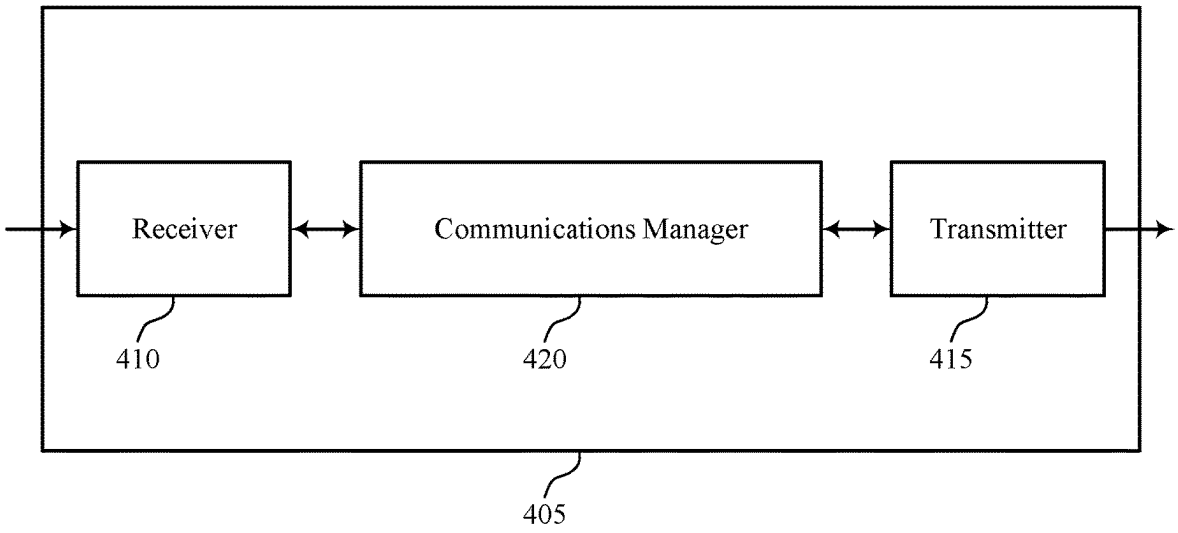

Receiver
Communications Manager
Transmitter
410
420
415
405
400

FIG. 4

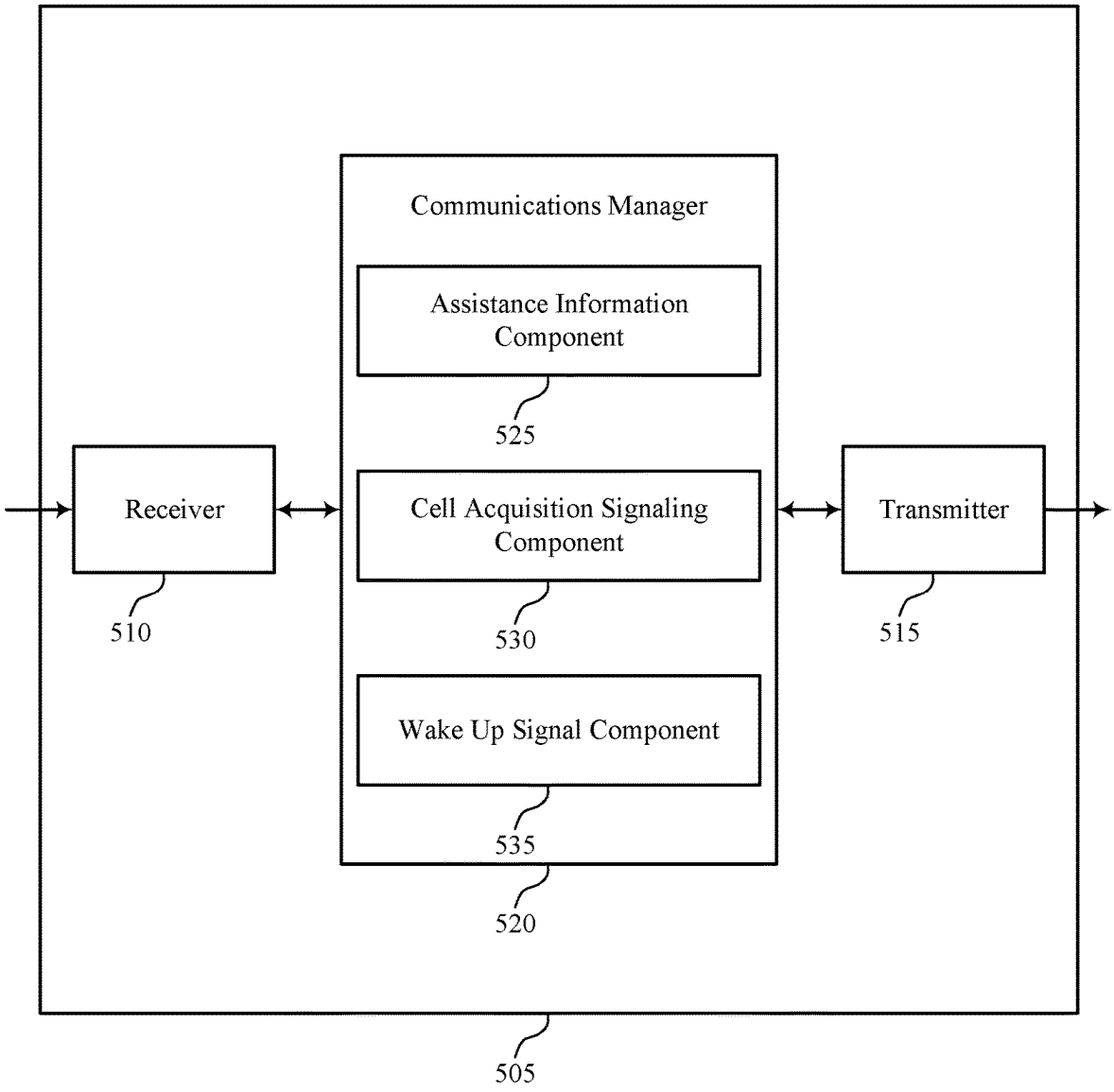

Communications Manager
Assistance Information Component
525
Receiver
Cell Acquisition Signaling Component
Transmitter
510
530
515
Wake Up Signal Component
535
520
505
500

FIG. 5

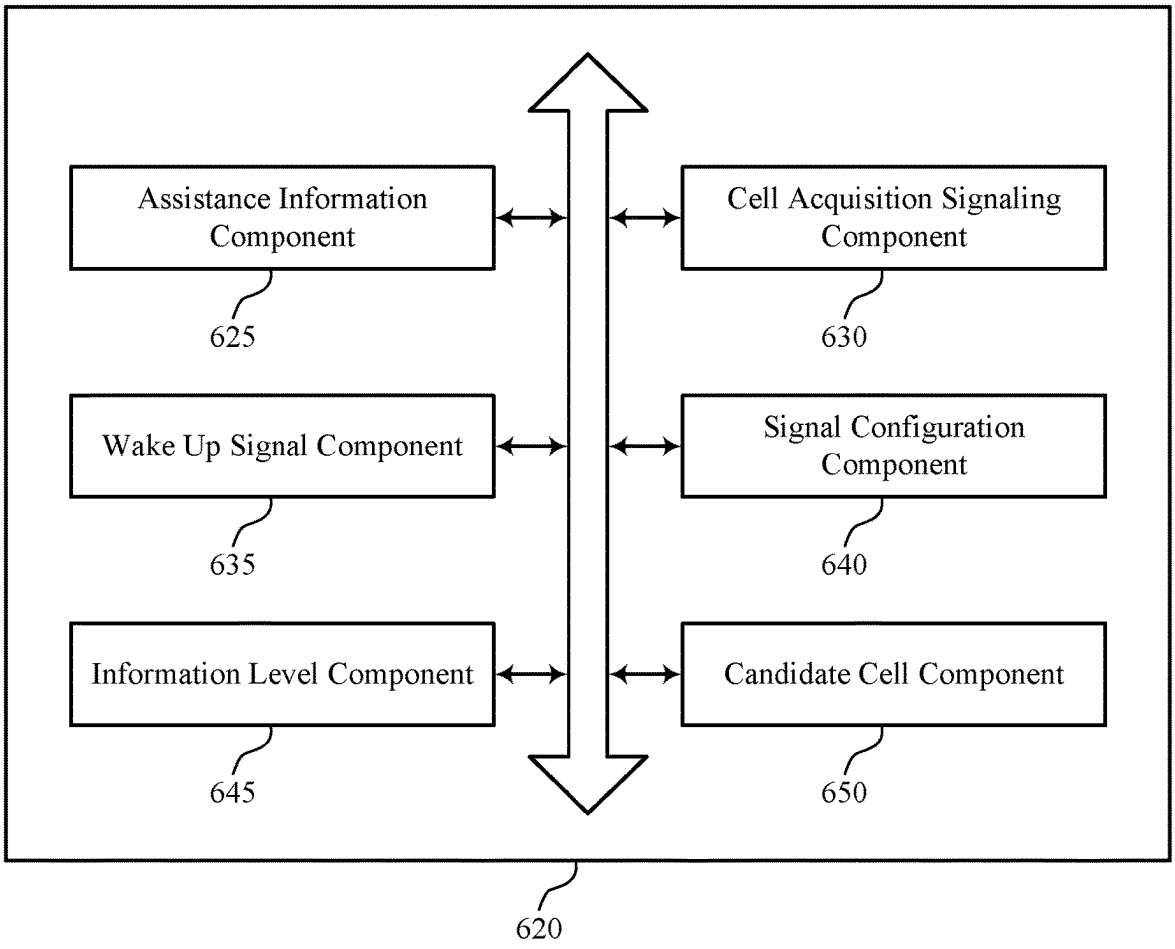

Assistance Information Component
625
Cell Acquisition Signaling Component
630
Wake Up Signal Component
635
Signal Configuration Component
640
Information Level Component
645
Candidate Cell Component
650
620
600

FIG. 6

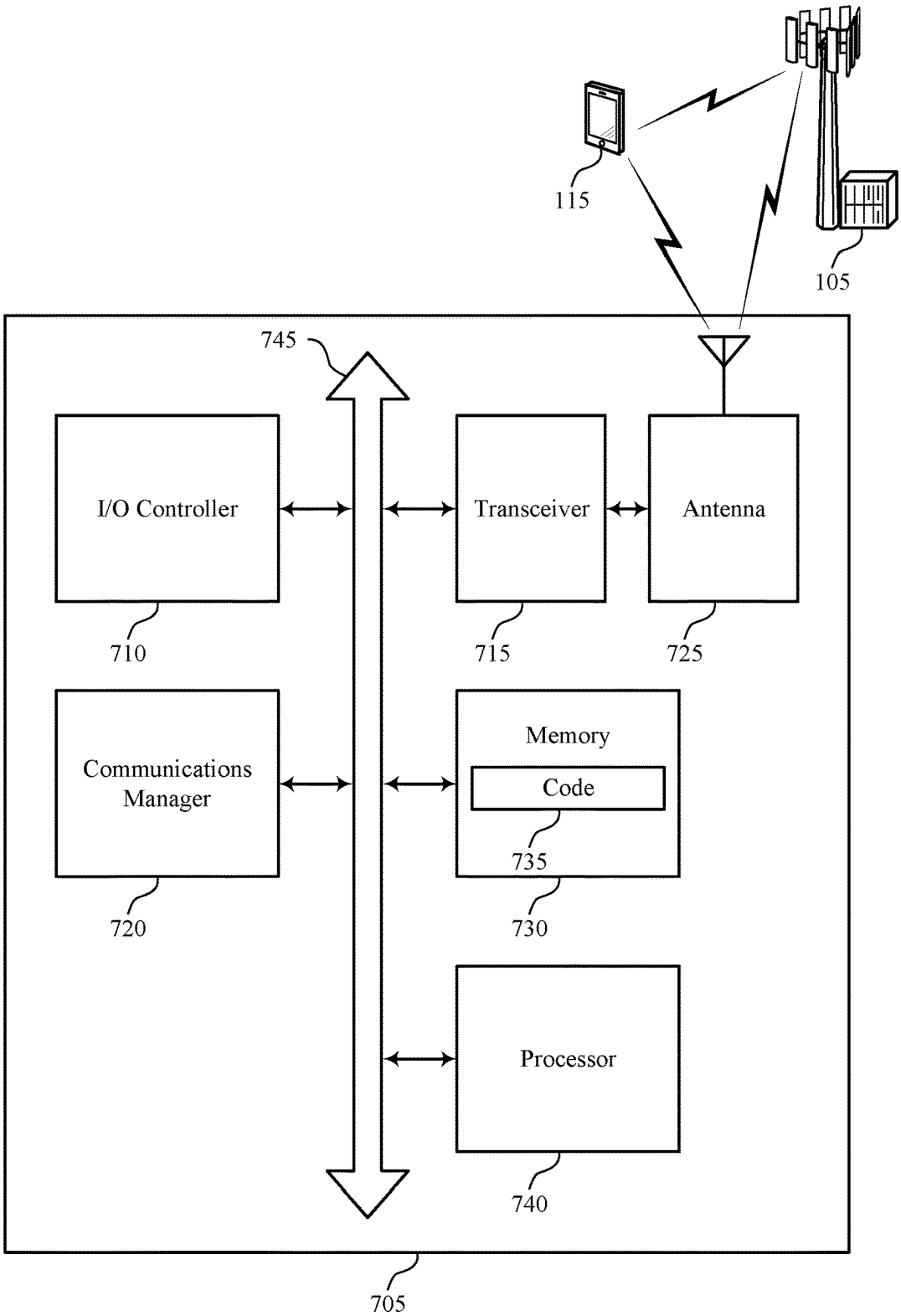

115
105
745
I/O Controller
Transceiver
Antenna
710
715
725
Communications Manager
Memory
Code
735
720
730
Processor
740
705
700

FIG. 7

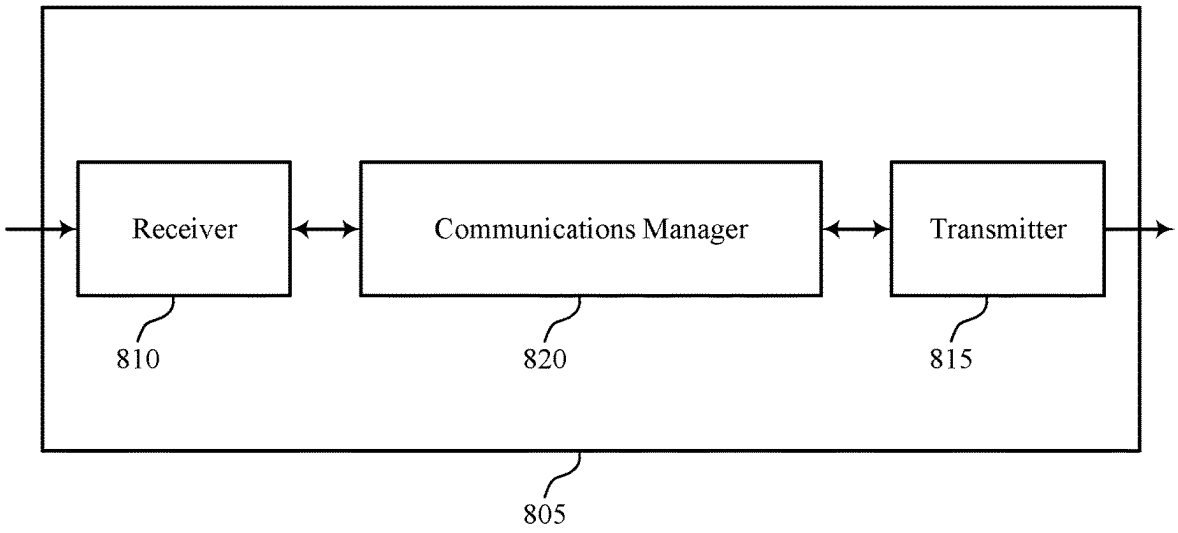

Receiver
Communications Manager
Transmitter
810
820
815
805
800

FIG. 8

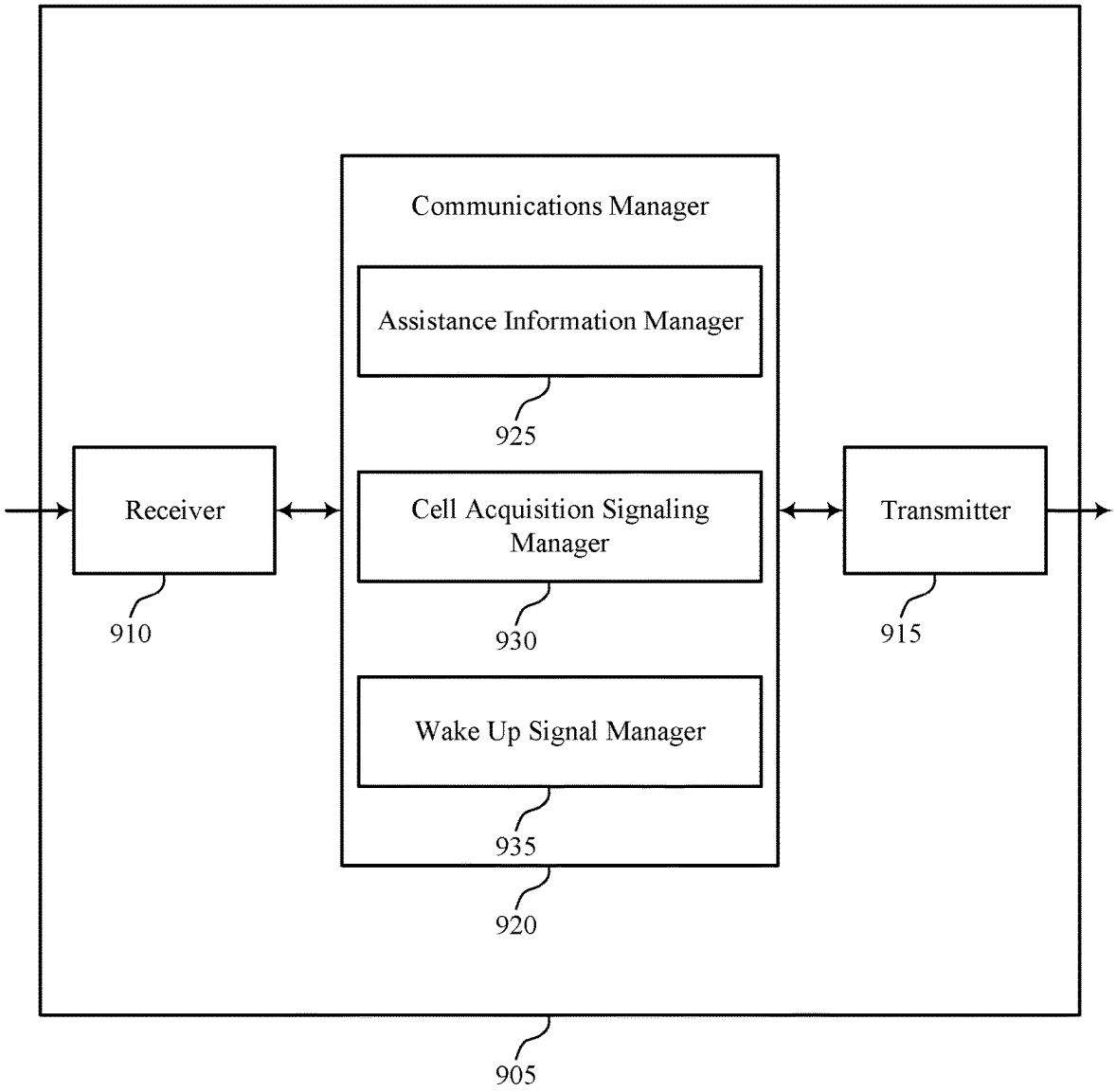

Communications Manager
Assistance Information Manager
925
Receiver
Cell Acquisition Signaling Manager
Transmitter
910
930
915
Wake Up Signal Manager
935
920
905
900

FIG. 9

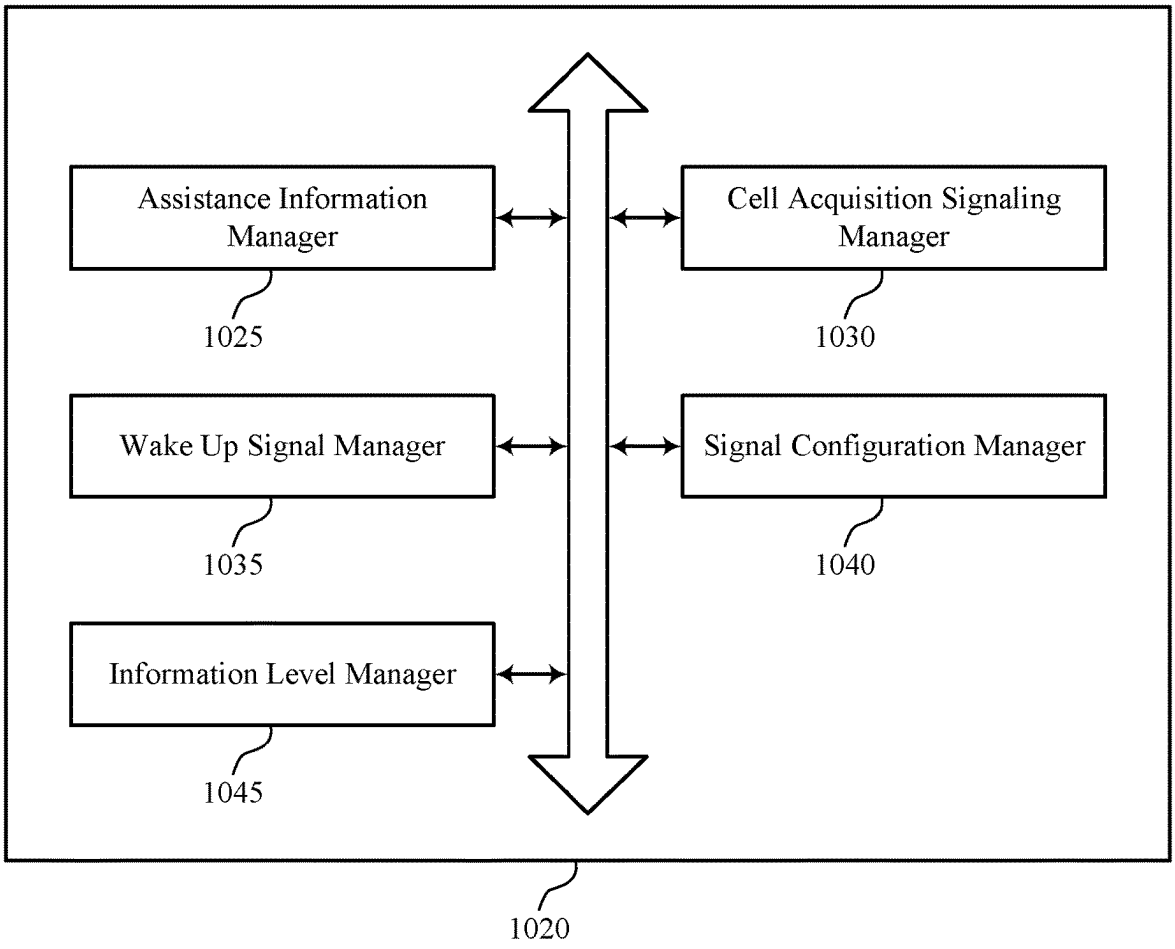

Assistance Information Manager
1025
Cell Acquisition Signaling Manager
1030
Wake Up Signal Manager
1035
Signal Configuration Manager
1040
Information Level Manager
1045
1020
1000

FIG. 10

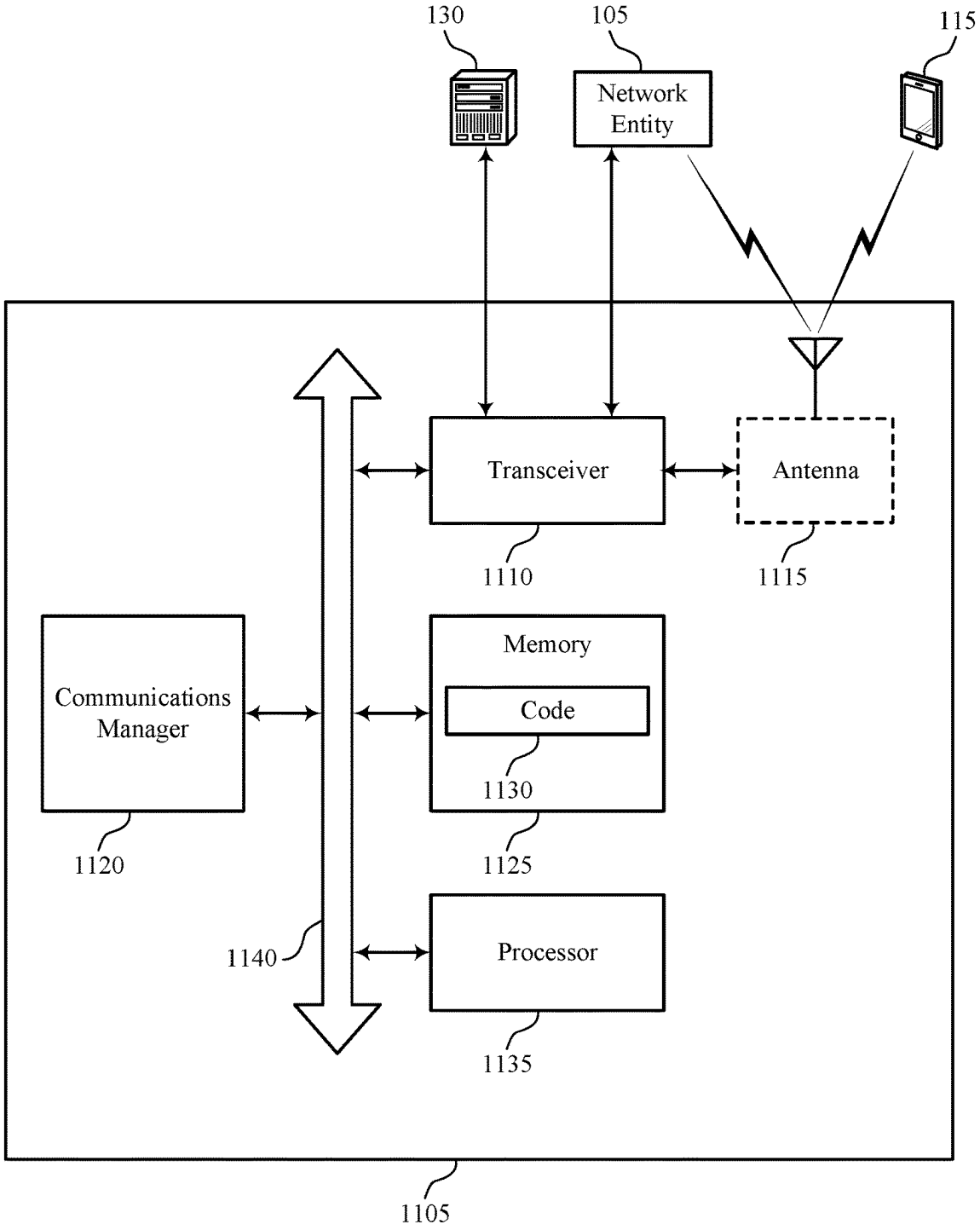

130
105
115
Network Entity
Transceiver
Antenna
1110
1115
Communications Manager
Memory
Code
1130
1120
1125
1140
Processor
1135
1105
1100

FIG. 11

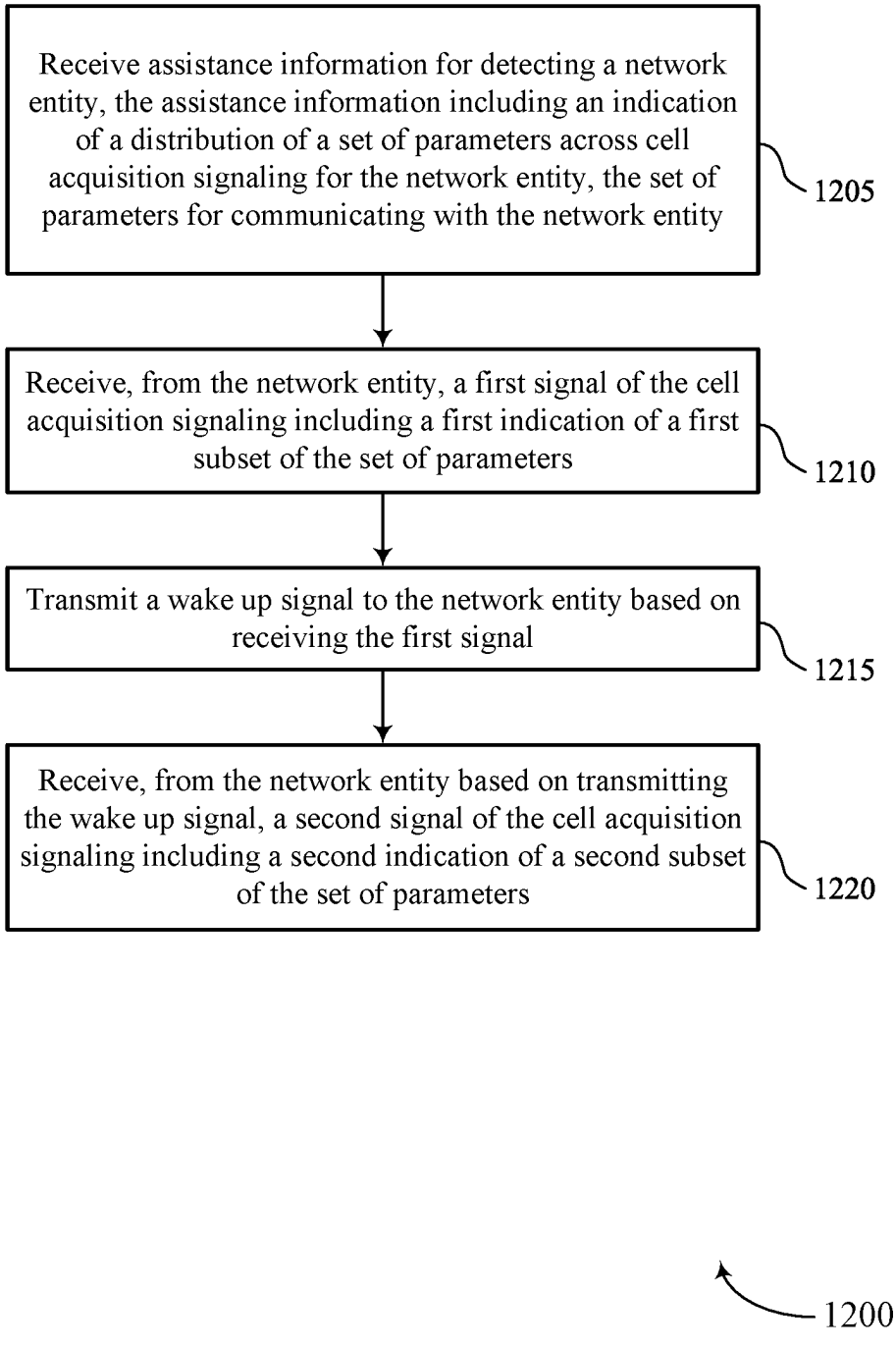

Receive assistance information for detecting a network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling for the network entity, the set of parameters for communicating with the network entity
1205
Receive, from the network entity, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters
1210
Transmit a wake up signal to the network entity based on receiving the first signal
1215
Receive, from the network entity based on transmitting the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters
1220
1200

FIG. 12

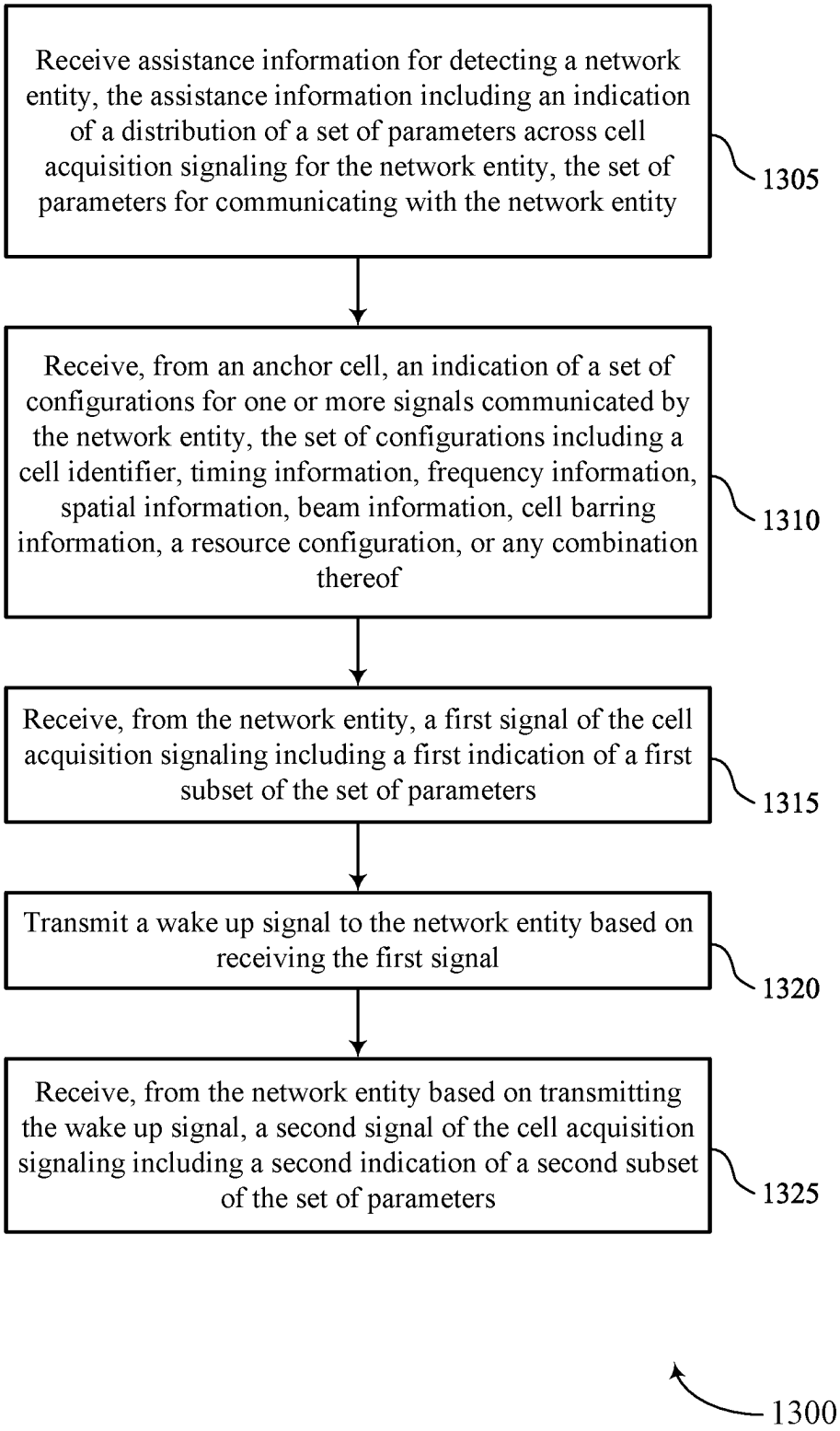

Receive assistance information for detecting a network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling for the network entity, the set of parameters for communicating with the network entity
1305
Receive, from an anchor cell, an indication of a set of configurations for one or more signals communicated by the network entity, the set of configurations including a cell identifier, timing information, frequency information, spatial information, beam information, cell barring information, a resource configuration, or any combination thereof
1310
Receive, from the network entity, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters
1315
Transmit a wake up signal to the network entity based on receiving the first signal
1320
Receive, from the network entity based on transmitting the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters
1325
1300

FIG. 13

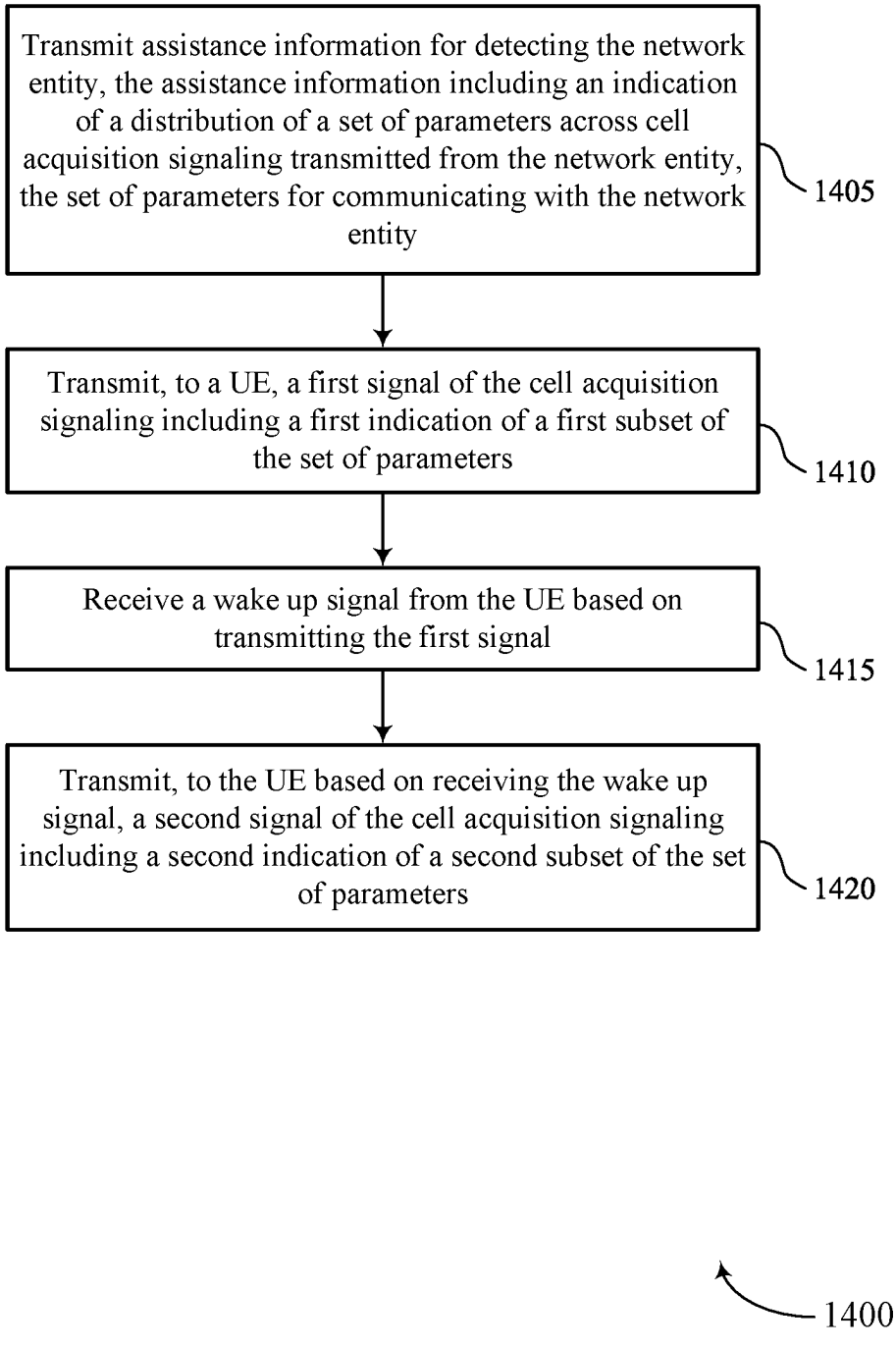

Transmit assistance information for detecting the network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity, the set of parameters for communicating with the network entity
1405
Transmit, to a UE, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters
1410
Receive a wake up signal from the UE based on transmitting the first signal
1415
Transmit, to the UE based on receiving the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters
1420
1400

FIG. 14

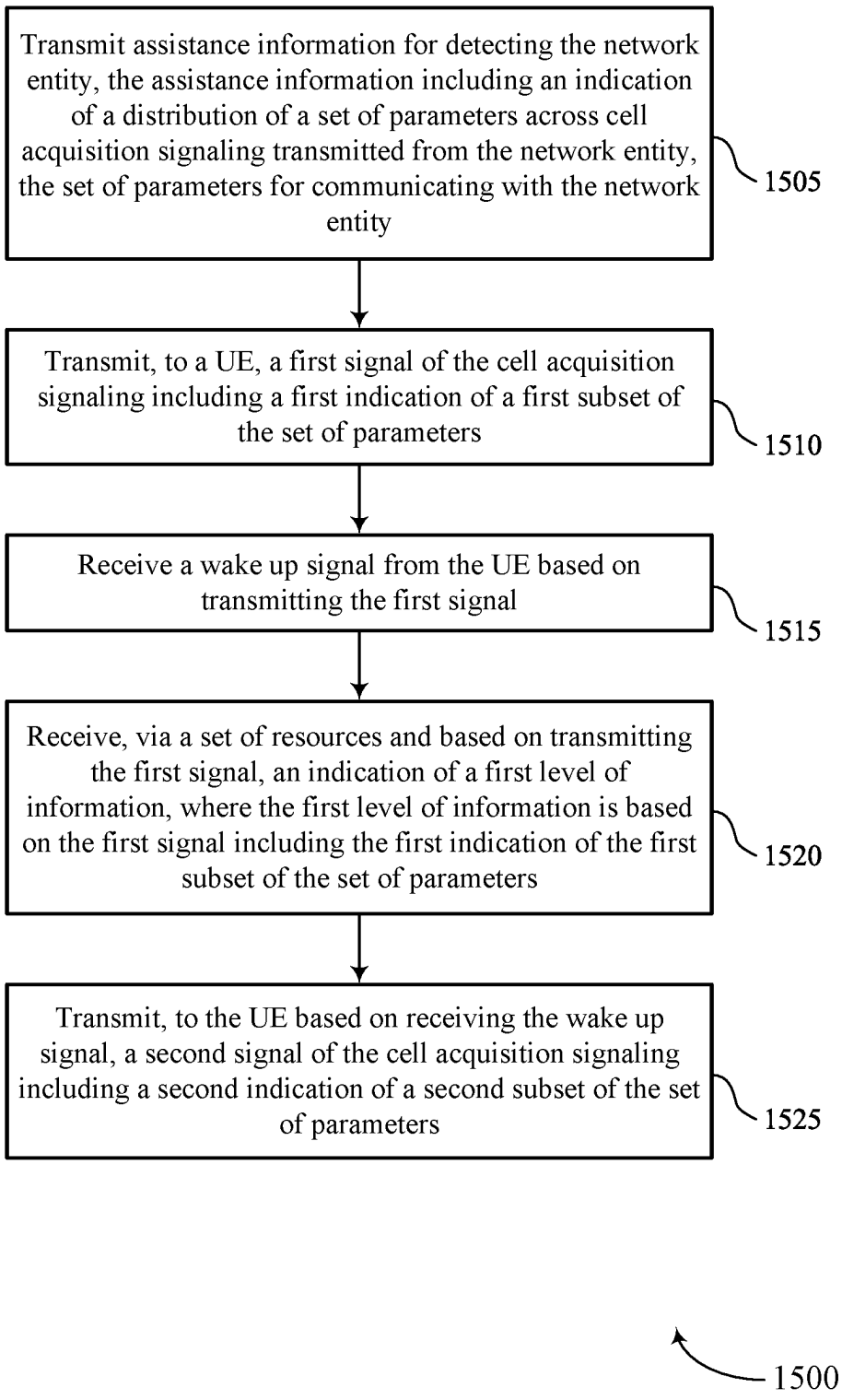

Transmit assistance information for detecting the network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity, the set of parameters for communicating with the network entity
1505
Transmit, to a UE, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters
1510
Receive a wake up signal from the UE based on transmitting the first signal
1515
Receive, via a set of resources and based on transmitting the first signal, an indication of a first level of information, where the first level of information is based on the first signal including the first indication of the first subset of the set of parameters
1520
Transmit, to the UE based on receiving the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters
1525
1500

FIG. 15

ON-DEMAND SYNCHRONIZATION SIGNALING FOR NETWORK ENERGY SAVINGS SYSTEMS

FIELD OF TECHNOLOGY

[0001] The following relates to wireless communications, including on-demand synchronization signaling for network energy savings systems.

BACKGROUND

[0002] 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, each supporting wireless communication for communication devices, which may be known as user equipment (UE).

SUMMARY

[0003] The described techniques relate to improved methods, systems, devices, and apparatuses that support on-demand synchronization signaling for network energy savings systems. For example, the described techniques provide for a user equipment (UE) configured to communicate with a first network entity associated with a network energy savings (NES) cell and a second network entity associated with an anchor cell. In some examples, the UE may receive assistance information from the anchor cell including an indication of one or more parameters for establishing communications with the NES cell. The UE may receive a first signal from the NES cell that indicates first timing information (e.g., a portion of the one or more parameters) for establishing communications with the NES cell. In some cases, the first timing information may be based on the assistance information. Responsive to receiving the first signal, the UE may transmit a wake up signal (WUS) to the NES cell including an indication of the first timing information. The NES cell may receive the WUS and determine second timing information (e.g., the remaining one or more parameters) based on the indication of the first timing information. Accordingly, the NES cell may transmit a second signal including an indication of the second timing information to the UE.

[0004] A method by a UE is described. The method may include receiving assistance information for detecting a network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling for the network entity, the set of parameters for communicating with the network entity, receiving, from the network entity, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters, transmitting a WUS to the network entity based on receiving the first signal, and receiving, from the network entity based on transmitting the WUS, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0005] A UE is described. The UE may include one or more memories storing processor executable code, and one or more processors coupled with the one or more memories. The one or more processors may individually or collectively be operable to execute the code to cause the UE to receive assistance information for detecting a network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling for the network entity, the set of parameters for communicating with the network entity, receive, from the network entity, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters, transmit a WUS to the network entity based on receiving the first signal, and receive, from the network entity based on transmitting the WUS, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0006] Another UE is described. The UE may include means for receiving assistance information for detecting a network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling for the network entity, the set of parameters for communicating with the network entity, means for receiving, from the network entity, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters, means for transmitting a WUS to the network entity based on receiving the first signal, and means for receiving, from the network entity based on transmitting the WUS, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0007] A non-transitory computer-readable medium storing code is described. The code may include instructions executable by one or more processors to receive assistance information for detecting a network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling for the network entity, the set of parameters for communicating with the network entity, receive, from the network entity, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters, transmit a WUS to the network entity based on receiving the first signal, and receive, from the network entity based on transmitting the WUS, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0008] In some examples of the method, user equipment (UEs), and non-transitory computer-readable medium described herein, the first signal includes a primary synchronization signal (PSS) and the second signal includes a secondary synchronization signal (SSS) and a physical broadcast channel (PBCH).

[0009] In some examples of the method, user equipment (UEs), and non-transitory computer-readable medium described herein, the first signal includes an SSS and the second signal includes an PSS and a PBCH.

[0010] In some examples of the method, user equipment (UEs), and non-transitory computer-readable medium described herein, the first signal includes an PSS and an SSS and the second signal includes a standalone PBCH.

[0011] In some examples of the method, user equipment (UEs), and non-transitory computer-readable medium described herein, the first signal includes a channel state information reference signal (CSI-RS) or a tracking reference signal (TRS) and the second signal includes a physical downlink control channel (PDCCH) and a physical downlink shared channel (PDSCH) carrying partial master information block (MIB) and system information block (SIB) information or a non-scheduling PDCCH.

[0012] In some examples of the method, user equipment (UEs), and non-transitory computer-readable medium described herein, the set of parameters include an index for a set of cell identifiers (IDs), one or more least significant bits of a beam index, a half-frame index, one or more least significant bits of a system frame number, a symbol index, or an anchor cell timing delta value, an index for a configuration of a set of configurations, or any combination thereof.

[0013] Some examples of the method, user equipment (UEs), and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for determining, based on the index for the set of cell IDs, one or more candidate cells available for communications with an anchor cell, the UE, or both, where at least one of the one or more candidate cells may be associated with the network entity.

[0014] Some examples of the method, user equipment (UEs), and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for receiving, from an anchor cell, an indication of a set of configurations for one or more signals communicated by the network entity, the set of configurations including a cell identifier, timing information, frequency information, spatial information, beam information, cell barring information, a resource configuration, or any combination thereof.

[0015] Some examples of the method, user equipment (UEs), and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for receiving, from the network entity, an indication of an index for a configuration of the set of configurations and identifying a format of the second signal based on the index, where the UE receives the second signal in accordance with the configuration of the set of configurations and based on identifying the format of the second signal.

[0016] In some examples of the method, user equipment (UEs), and non-transitory computer-readable medium described herein, the one or more signals include the second signal of the cell acquisition signaling.

[0017] Some examples of the method, user equipment (UEs), and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for receiving, from an anchor cell, an indication of a configuration for transmitting the WUS, the configuration indicating resources associated with a first level of information associated with the first subset of the set of parameters and transmitting, via the resources indicated in the configuration, an indication of the first level of information based on receiving the indication, where the first level of information may be based on the first signal of the cell acquisition signaling including the first indication of the first subset of the set of parameters.

[0018] In some examples of the method, user equipment (UEs), and non-transitory computer-readable medium described herein, the UE transmits the indication of the first level of information via the WUS, the indication included in a scrambling identifier of the WUS, a preamble identifier of the WUS, a cyclic shift value of the WUS, a message payload transmitted by the UE, or any combination thereof.

[0019] In some examples of the method, user equipment (UEs), and non-transitory computer-readable medium described herein, transmitting the WUS may include operations, features, means, or instructions for transmitting an indication of an index for a first level of information associated with the first subset of the set of parameters, where the first level of information may be preconfigured at the UE.

[0020] In some examples of the method, user equipment (UEs), and non-transitory computer-readable medium described herein, receiving the second signal may include operations, features, means, or instructions for receiving an indication of a second level of information associated with the second signal and the second subset of the set of parameters based on transmitting the WUS to the network entity.

[0021] In some examples of the method, user equipment (UEs), and non-transitory computer-readable medium described herein, the UE receives the indication via a header in a payload of the second signal, a flag in a physical downlink control channel associated with the second signal, a scrambling identifier, a demodulation reference signal associated with the second signal, time and frequency resources associated with receiving the second signal, or any combination thereof.

[0022] Some examples of the method, user equipment (UEs), and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for receiving, from the network entity and based on receiving the second signal, a third signal of the cell acquisition signaling including a third subset of the set of parameters.

[0023] A method by a network entity is described. The method may include transmitting assistance information for detecting the network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity, the set of parameters for communicating with the network entity, transmitting, to a UE, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters, receiving a WUS from the UE based on transmitting the first signal, and transmitting, to the UE based on receiving the WUS, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0024] A network entity is described. The network entity may include one or more memories storing processor executable code, and one or more processors coupled with the one or more memories. The one or more processors may individually or collectively be operable to execute the code to cause the network entity to transmit assistance information for detecting the network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity, the set of parameters for commu-

nicating with the network entity, transmit, to a UE, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters, receive a WUS from the UE based on transmitting the first signal, and transmit, to the UE based on receiving the WUS, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0025] Another network entity is described. The network entity may include means for transmitting assistance information for detecting the network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity, the set of parameters for communicating with the network entity, means for transmitting, to a UE, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters, means for receiving a WUS from the UE based on transmitting the first signal, and means for transmitting, to the UE based on receiving the WUS, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0026] A non-transitory computer-readable medium storing code is described. The code may include instructions executable by one or more processors to transmit assistance information for detecting the network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity, the set of parameters for communicating with the network entity, transmit, to a UE, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters, receive a WUS from the UE based on transmitting the first signal, and transmit, to the UE based on receiving the WUS, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0027] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, the first signal includes an PSS and the second signal includes an SSS and a PBCH.

[0028] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, the first signal includes an SSS and the second signal includes an PSS and a PBCH.

[0029] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, the first signal includes an PSS and an SSS and the second signal includes a standalone PBCH.

[0030] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, the first signal includes a CSI-RS or a TRS and the second signal includes a PDCCH and an PDSCH carrying partial MIB and SIB information or a non-scheduling PDCCH.

[0031] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, the set of parameters include an index for a set of cell IDs, one or more least significant bits of a beam index, a half-frame index, one or more least significant bits of a system frame number, a symbol index, or an anchor cell timing delta value, an index for a configuration of a set of configurations, or any combination thereof.

[0032] Some examples of the method, network entities, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for transmitting, to the UE, an indication of an index for a configuration of a set of configurations for one or more signals communicated by the network entity, the set of configurations including a cell identifier, timing information, frequency information, spatial information, beam information, cell barring information, a resource configuration, or any combination thereof and transmitting a signal of the one or more signals in accordance with the configuration of the set of configurations.

[0033] Some examples of the method, network entities, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for receiving, via a set of resources and based on transmitting the first signal, an indication of a first level of information, where the first level of information may be based on the first signal including the first indication of the first subset of the set of parameters.

[0034] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, receiving the WUS may include operations, features, means, or instructions for receiving an indication of an index for a first level of information associated with the first subset of the set of parameters, where the first level of information may be preconfigured at the UE.

[0035] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, transmitting the second signal may include operations, features, means, or instructions for transmitting an indication of a second level of information associated with the second signal and the second subset of the set of parameters based on receiving the WUS from the UE.

[0036] Some examples of the method, network entities, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for transmitting, to the UE and based on transmitting the second signal, a third signal of the cell acquisition signaling including a third subset of the set of parameters.

[0037] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, the network entity may be associated with one or more NES cells.

BRIEF DESCRIPTION OF THE DRAWINGS

[0038] FIG. **1** shows an example of a wireless communications system that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure.

[0039] FIG. **2** shows an example of a wireless communications system that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure.

[0040] FIG. **3** shows an example of a process flow that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure.

[0041] FIGS. **4** and **5** show block diagrams of devices that support on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure.

[0042] FIG. **6** shows a block diagram of a communications manager that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure.

[0043] FIG. **7** shows a diagram of a system including a device that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure.

[0044] FIGS. **8** and **9** show block diagrams of devices that support on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure.

[0045] FIG. **10** shows a block diagram of a communications manager that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure.

[0046] FIG. **11** shows a diagram of a system including a device that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure.

[0047] FIGS. **12** through **15** show flowcharts illustrating methods that support on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure.

DETAILED DESCRIPTION

[0048] In some wireless communications systems, a user equipment (UE) may be in communications with an anchor cell. In some examples, the UE may be within a geographical coverage area of one or more serving cells associated with a respective one or more network entities. The UE may communicate with a network entity of the one or more network entities that is associated with a network energy saving (NES) cell. In some examples, the network entity may transmit a downlink reference signal (DL-RS) including information associated with the NES cell to the UE. The DL-RS may include synchronization information associated with the NES cell. For example, the DL-RS may include a portion of a synchronization signal block (SSB), such as a primary synchronization signal (PSS) and a secondary synchronization signal (SSS). However, in some examples, the DL-RS may not include the full synchronization information that is included in a SSB, and accordingly, the UE may not have enough information to establish communications with the network entity.

[0049] Various aspects of the present disclosure are directed to light and on-demand synchronization signaling for network energy savings systems. In some examples, a UE may be in communications with a first network entity associated with an NES cell and a second network entity associated with an anchor cell. In some examples, the UE may receive assistance information from the anchor cell (e.g., the second network entity) including an indication of one or more parameters for establishing communications with the NES cell (e.g., the first network entity). The UE may receive a first signal (e.g., a DL-RS) from the NES cell that indicates first timing information (e.g., a portion of the one or more parameters) for establishing communications with the NES cell. In some cases, the first signal may be based on the assistance information. Responsive to receiving the first signal, the UE may transmit a wake up signal (WUS) to the NES cell including an indication of the first timing information. The NES cell may receive the WUS and determine second timing information (e.g., the remaining one or more parameters) based on the indication of the first timing information. Accordingly, the NES cell may transmit a second signal including an indication of the second timing information to the UE.

[0050] Aspects of the disclosure are initially described in the context of wireless communications systems. Aspects of the disclosure are additionally illustrated by process flows. Aspects of the disclosure are further illustrated by and described with reference to apparatus diagrams, system diagrams, and flowcharts that relate to on-demand synchronization signaling for network energy savings systems.

[0051] FIG. **1** shows an example of a wireless communications system **100** that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure. The wireless communications system **100** may include one or more devices, such as one or more network devices (e.g., 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.

[0052] 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 communication link(s) **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 the communication link(s) **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).

[0053] 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 capable of supporting communications with various types of devices in the wireless communications system **100** (e.g., other wireless communication devices, including UEs **115** or network entities **105**), as shown in FIG. **1**.

[0054] 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.

[0055] In some examples, network entities **105** may communicate with a core network **130**, or with one another, or both. For example, network entities **105** may communicate with the core network **130** via backhaul communication link(s) **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 via backhaul communication link(s) **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 the 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 link(s) **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) or 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** via a communication link **155**.

[0056] One or more of the network entities **105** or network equipment 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 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 one network entity (e.g., a network entity **105** or a single RAN node, such as a base station **140**).

[0057] 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 multiple network entities (e.g., network entities **105**), such as an integrated access and 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), such as a CU **160**, a distributed unit (DU), such as a DU **165**, a radio unit (RU), such as an RU **170**, a RAN Intelligent Controller (RIC), such as an 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) system, such as an SMO system **180**, 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 of the 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)).

[0058] The split of functionality between a CU **160**, a DU **165**, and an RU **170** is flexible and may support different functionalities depending on which functions (e.g., network layer functions, protocol layer functions, baseband functions, RF functions, or any combinations thereof) are performed at a CU **160**, a DU **165**, or an RU **170**. 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** (e.g., one or more CUs) may be connected to a DU **165** (e.g., one or more DUs) or an RU **170** (e.g., one or more RUs), or some combination thereof, and the DUs **165**, RUs **170**, or both 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 multiple different RUs, such as an RU **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 a DU **165** via a midhaul communication link **162** (e.g., F1, F1-c, F1-u), and a DU **165** may be connected to an RU **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 (e.g., one or more of the network entities **105**) that are in communication via such communication links.

[0059] In some wireless communications systems (e.g., the 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 of the network entities **105** (e.g., network entities **105** or IAB node(s) **104**) may be partially controlled by each other. The IAB node(s) **104** may be referred to as a donor entity or an IAB donor. A DU **165** or an RU **170** may be partially controlled by a CU **160** associated with a network entity **105** or base station **140** (such as a donor network entity or a donor base station). The one or more donor entities (e.g., IAB donors) may be in communication with one or more additional devices (e.g., IAB node(s) **104**) via supported access and backhaul links (e.g., backhaul communication link(s) **120**). IAB node(s) **104** may include an IAB mobile termination (IAB-MT) controlled (e.g., scheduled) by one or more DUs (e.g., DUs **165**) of a coupled IAB donor. An IAB-MT may be equipped with 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 IAB node(s) **104** used for access via the DU **165** of the IAB node(s) **104** (e.g., referred to as virtual IAB-MT (vIAB-MT)). In some examples, the IAB node(s) **104** may include one or more DUs (e.g., DUs **165**) that support communication links with additional entities (e.g., IAB node(s) **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., the IAB node(s) **104** or components of the IAB node(s) **104**) may be configured to operate according to the techniques described herein.

[0060] For instance, an access network (AN) or RAN may include communications between access nodes (e.g., an IAB donor), IAB node(s) **104**, and one or more UEs **115**. The IAB donor may facilitate connection between the core network **130** and the AN (e.g., via a wired or wireless connection to the core network **130**). That is, an IAB donor may refer to a RAN node with a wired or wireless connection to the core network **130**. The IAB donor may include one or more of a CU **160**, a DU **165**, and an RU **170**, in which case the CU **160** may communicate with the core network **130** via an interface (e.g., a backhaul link). The IAB donor and IAB node(s) **104** may communicate via an F1 interface according to a protocol that defines signaling messages (e.g., an F1 AP protocol). Additionally, or alternatively, the CU **160** may communicate with the core network **130** via an interface, which may be an example of a portion of a backhaul link, and may communicate with other CUs (e.g., including a CU **160** associated with an alternative IAB donor) via an Xn-C interface, which may be an example of another portion of a backhaul link.

[0061] IAB node(s) **104** may refer to RAN nodes that provide IAB functionality (e.g., access for UEs **115**, wireless self-backhauling capabilities). A DU **165** may act as a distributed scheduling node towards child nodes associated with the IAB node(s) **104**, and the IAB-MT may act as a scheduled node towards parent nodes associated with IAB node(s) **104**. That is, an IAB donor may be referred to as a parent node in communication with one or more child nodes (e.g., an IAB donor may relay transmissions for UEs through other IAB node(s) **104**). Additionally, or alternatively, IAB node(s) **104** may also be referred to as parent nodes or child nodes to other IAB node(s) **104**, depending on the relay chain or configuration of the AN. The IAB-MT entity of IAB node(s) **104** may provide a Uu interface for a child IAB node (e.g., the IAB node(s) **104**) to receive signaling from a parent IAB node (e.g., the IAB node(s) **104**), and a DU interface (e.g., a DU **165**) may provide a Uu interface for a parent IAB node to signal to a child IAB node or UE **115**.

[0062] For example, IAB node(s) **104** may be referred to as parent nodes that support communications for child IAB nodes, or may be referred to as child IAB nodes associated with IAB donors, or both. An IAB donor may include a CU **160** with a wired or wireless connection (e.g., backhaul communication link(s) **120**) to the core network **130** and may act as a parent node to IAB node(s) **104**. For example, the DU **165** of an IAB donor may relay transmissions to UEs **115** through IAB node(s) **104**, or may directly signal transmissions to a UE **115**, or both. The CU **160** of the IAB donor may signal communication link establishment via an F1 interface to IAB node(s) **104**, and the IAB node(s) **104** may schedule transmissions (e.g., transmissions to the UEs **115** relayed from the IAB donor) through one or more DUs (e.g., DUs **165**). That is, data may be relayed to and from IAB node(s) **104** via signaling via an NR Uu interface to MT of IAB node(s) **104** (e.g., other IAB node(s)). Communications with IAB node(s) **104** may be scheduled by a DU **165** of the IAB donor or of IAB node(s) **104**.

[0063] 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 test 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., components such as an IAB node, a DU **165**, a CU **160**, an RU **170**, an RIC **175**, an SMO system **180**).

[0064] 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, vehicles, or meters, among other examples.

[0065] The UEs **115** described herein may be able to communicate with various types of devices, such as UEs **115** that may sometimes operate 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**.

[0066] The UEs **115** and the network entities **105** may wirelessly communicate with one another via the communication link(s) **125** (e.g., one or more access links) using resources associated with one or more carriers. The term "carrier" may refer to a set of RF spectrum resources having a defined PHY layer structure for supporting the communication link(s) **125**. For example, a carrier used for the communication link(s) **125** may include a portion of an RF spectrum band (e.g., a bandwidth part (BWP)) that is operated according to one or more PHY layer channels for a given RAT (e.g., LTE, LTE-A, LTE-A Pro, NR). Each PHY

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, such as one or more of the network entities **105**).

[0067] In some examples, such as in a carrier aggregation configuration, a carrier may have acquisition signaling or control signaling that coordinates operations for other carriers. A carrier may be associated with a frequency channel (e.g., an evolved universal mobile telecommunication system terrestrial radio access (E-UTRA) absolute RF channel number (EARFCN)) and may be identified according to a channel raster for discovery by the UEs **115**. A carrier may be operated in a standalone mode, in which case initial acquisition and connection may be conducted by the UEs **115** via the carrier, or the carrier may be operated in a non-standalone mode, in which case a connection is anchored using a different carrier (e.g., of the same or a different RAT).

[0068] The communication link(s) **125** of the wireless communications system **100** may include downlink transmissions (e.g., forward link transmissions) from a network entity **105** to a UE **115**, uplink transmissions (e.g., return link transmissions) from a UE **115** to a network entity **105**, or both, among other configurations of transmissions. Carriers may carry downlink or uplink communications (e.g., in an FDD mode) or may be configured to carry downlink and uplink communications (e.g., in a TDD mode).

[0069] A carrier may be associated with a particular bandwidth of the RF spectrum and, in some examples, the carrier bandwidth may be referred to as a "system bandwidth" of the carrier or the wireless communications system **100**. For example, the carrier bandwidth may be one of a set of bandwidths for carriers of a particular RAT (e.g., 1.4, 3, 5, 10, 15, 20, 40, or 80 megahertz (MHz)). Devices of the wireless communications system **100** (e.g., the network entities **105**, the UEs **115**, or both) may have hardware configurations that support communications using a particular carrier bandwidth or may be configurable to support communications using one of a set of carrier bandwidths. In some examples, the wireless communications system **100** may include network entities **105** or UEs **115** that support concurrent communications using carriers associated with multiple carrier bandwidths. In some examples, each served UE **115** may be configured for operating using portions (e.g., a sub-band, a BWP) or all of a carrier bandwidth.

[0070] Signal waveforms transmitted via 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 a relatively higher quantity of resource elements (e.g., in a transmission duration) and a relatively higher order of a modulation scheme may correspond to a relatively higher rate of communication. 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**.

[0071] One or more numerologies for a carrier may be supported, and a numerology may include a subcarrier spacing (Δf) and a cyclic prefix. A carrier may be divided into one or more BWPs having the same or different numerologies. In some examples, a UE **115** may be configured with multiple BWPs. In some examples, a single BWP for a carrier may be active at a given time and communications for the UE **115** may be restricted to one or more active BWPs.

[0072] 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 $T_s=1/(\Delta f_{max} \cdot N_f)$ seconds, for which Δf_{max} may represent a supported subcarrier spacing, and N_f may represent a 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).

[0073] 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, such as the wireless communications system **100**, a slot may further be divided into multiple mini-slots associated with one or more symbols. Excluding the cyclic prefix, each symbol period may be associated with one or more (e.g., N_f) sampling periods. The duration of a symbol period may depend on the subcarrier spacing or frequency band of operation.

[0074] 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)).

[0075] Physical channels may be multiplexed for communication using a carrier according to various techniques. A physical control channel and a physical data channel may be multiplexed for signaling via 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 UEs **115** (e.g., one or more UEs) or may include UE-specific search space sets for sending control information to a UE **115** (e.g., a specific UE).

[0076] A network entity **105** may provide communication coverage via one or more cells, for example a macro cell, a small cell, a hot spot, or other types of cells, or any combination thereof. The term "cell" may refer to a logical communication entity used for communication with a network entity **105** (e.g., using a carrier) and may be associated with an identifier for distinguishing neighboring cells (e.g., a physical cell identifier (PCID), a virtual cell identifier (VCID)). In some examples, a cell also may refer to a coverage area **110** or a portion of a coverage area **110** (e.g., a sector) over which the logical communication entity operates. Such cells may range from smaller areas (e.g., a structure, a subset of structure) to larger areas depending on various factors such as the capabilities of the network entity **105**. For example, a cell may be or include a building, a subset of a building, or exterior spaces between or overlapping with coverage areas **110**, among other examples.

[0077] A macro cell generally covers a relatively large geographic area (e.g., several kilometers in radius) and may allow unrestricted access by the UEs **115** with service subscriptions with the network provider supporting the macro cell. A small cell may be associated with a network entity **105** operating with lower power (e.g., a base station **140** operating with lower power) relative to a macro cell, and a small cell may operate using the same or different (e.g., licensed, unlicensed) frequency bands as macro cells. Small cells may provide unrestricted access to the UEs **115** with service subscriptions with the network provider or may provide restricted access to the UEs **115** having an association with the small cell (e.g., the UEs **115** in a closed subscriber group (CSG), the UEs **115** associated with users in a home or office). A network entity **105** may support one or more cells and may also support communications via the one or more cells using one or multiple component carriers.

[0078] In some examples, a carrier may support multiple cells, and different cells may be configured according to different protocol types (e.g., MTC, narrowband IoT (NB-IoT), enhanced mobile broadband (eMBB)) that may provide access for different types of devices.

[0079] 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, such as the coverage area **110**. In some examples, coverage areas **110** (e.g., different coverage areas) associated with different technologies may overlap, but the coverage areas **110** (e.g., different coverage areas) may be supported by the same network entity (e.g., a network entity **105**). In some other examples, overlapping coverage areas, such as a coverage area **110**, associated with different technologies may be supported by different network entities (e.g., the network entities **105**). The wireless communications system **100** may include, for example, a heterogeneous network in which different types of the network entities **105** support communications for coverage areas **110** (e.g., different coverage areas) using the same or different RATs.

[0080] The wireless communications system **100** may support synchronous or asynchronous operation. For synchronous operation, network entities **105** (e.g., base stations **140**) may have similar frame timings, and transmissions from different network entities (e.g., different ones of the network entities **105**) may be approximately aligned in time. For asynchronous operation, network entities **105** may have different frame timings, and transmissions from different network entities (e.g., different ones of network entities **105**) may, in some examples, not be aligned in time. The techniques described herein may be used for either synchronous or asynchronous operations.

[0081] Some UEs **115** may be configured to employ operating modes that reduce power consumption, such as half-duplex communications (e.g., a mode that supports one-way communication via transmission or reception, but not transmission and reception concurrently). In some examples, half-duplex communications may be performed at a reduced peak rate. Other power conservation techniques for the UEs **115** may include entering a power saving deep sleep mode when not engaging in active communications, operating using a limited bandwidth (e.g., according to narrowband communications), or a combination of these techniques. For example, some UEs **115** may be configured for operation using a narrowband protocol type that is associated with a defined portion or range (e.g., set of subcarriers or resource blocks (RBs)) within a carrier, within a guard-band of a carrier, or outside of a carrier.

[0082] 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.

[0083] In some examples, a UE **115** may be configured to support communicating directly with other UEs (e.g., one or more of the UEs **115**) via a device-to-device (D2D) com-

munication link, such as a 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 (e.g., scheduled by) the network entity **105**. In some examples, one or more UEs **115** of 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 one or more of the 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 an involvement of a network entity **105**.

[0084] 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.

[0085] 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. 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. Communications using UHF waves may be associated with smaller antennas and shorter ranges (e.g., less than one hundred kilometers) compared to communications using the smaller frequencies and longer waves of the high frequency (HF) or very high frequency (VHF) portion of the spectrum below 300 MHz.

[0086] The wireless communications system **100** may also operate using a super high frequency (SHF) region, which may be in the range of 3 GHz to 30 GHz, also known as the centimeter band, or using 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, such techniques may facilitate using antenna arrays within a device. The propagation of EHF transmissions, however, may be subject to even greater 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.

[0087] 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) RAT, or NR technology using an unlicensed band such as the 5 GHz industrial, scientific, and medical (ISM) band. While operating using 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 using unlicensed bands may be based on a carrier aggregation configuration in conjunction with component carriers operating using a licensed band (e.g., LAA). Operations using unlicensed spectrum may include downlink transmissions, uplink transmissions, P2P transmissions, or D2D transmissions, among other examples.

[0088] 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 at diverse geographic locations. A network entity **105** may include 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 include 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.

[0089] The network entities **105** or the UEs **115** may use MIMO communications to exploit multipath signal propagation and increase 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), for which multiple spatial layers are transmitted to the same receiving device, and multiple-user MIMO (MU-MIMO), for which multiple spatial layers are transmitted to multiple devices.

[0090] 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 along 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).

[0091] 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**.

[0092] Some signals, such as data signals associated with a particular receiving device, may be transmitted by a transmitting device (e.g., a network entity **105** or a UE **115**) along a single beam direction (e.g., a direction associated with the receiving device, such as another network entity **105** or 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.

[0093] 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 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).

[0094] 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 transmitting 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).

[0095] 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 via logical channels. A MAC layer may perform priority handling and multiplexing of logical channels into transport channels. The MAC layer also may implement error detection techniques, error correction techniques, or both to support retransmissions to improve link efficiency. In the control plane, an RRC 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. A PHY layer may map transport channels to physical channels.

[0096] The UEs **115** and the network entities **105** may support retransmissions of data to increase the likelihood that data is received successfully. Hybrid automatic repeat

request (HARQ) feedback is one technique for increasing the likelihood that data is received correctly via a communication link (e.g., the communication link(s) **125**, a D2D communication link **135**). HARQ may include a combination of error detection (e.g., using a cyclic redundancy check (CRC)), forward error correction (FEC), and retransmission (e.g., automatic repeat request (ARQ)). HARQ may improve throughput at the MAC layer in relatively poor radio conditions (e.g., low signal-to-noise conditions). In some examples, a device may support same-slot HARQ feedback, in which case the device may provide HARQ feedback in a specific slot for data received via a previous symbol in the slot. In some other examples, the device may provide HARQ feedback in a subsequent slot, or according to some other time interval.

[0097] In some examples, a UE **115** may be in communications with a first network entity **105** associated with an NES cell and a second network entity **105** associated with an anchor cell. In some examples, the UE **115** may receive assistance information from the anchor cell (e.g., the second network entity **105**) including an indication of one or more parameters for establishing communications with the NES cell (e.g., the first network entity **105**). The UE **115** may receive a DL-RS from the NES cell that indicates first timing information (e.g., a portion of the one or more parameters) for establishing communications with the NES cell. In some cases, the DL-RS may be based on the assistance information. Responsive to receiving the DL-RS, the UE **115** may transmit a WUS to the NES cell including an indication of the first timing information. For example, the UE **115** may indicate a level associated with the first timing information. The NES cell may receive the WUS and determine second timing information (e.g., the remaining one or more parameters) based on the indication of the first timing information. Accordingly, the NES cell may transmit a timing information signal including an indication of the second timing information and a level associated with the second timing information to the UE **115**.

[0098] FIG. **2** shows an example of a wireless communications system **200** that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure. The wireless communications system **200** may include a UE **115**-*a* in communication with a first network entity **105**-*a* and a second network entity **105**-*b*, which may be examples of corresponding devices as described herein, including with reference to FIG. **1**. The UE may communicate with the first network entity **105**-*a* via wireless communication links **205**-*a* and **205**-*b* (e.g., a Uu link) and with the second network entity **105**-*b* via wireless communication link **205**-*c*. In some examples, wireless communication link **205**-*a* may represent uplink communications between the UE **115**-*a* and the first network entity **105**-*a*, and wireless communication link **205**-*b* may represent downlink communications between the UE **115**-*a* and the first network entity **105**-*a*. In some implementations there may be additional UEs **115** (not shown), additional first network entities **105**-*a* (not shown), and additional second network entities **105**-*b* (not shown) within the wireless communications system **200**.

[0099] In some examples, the first network entity **105**-*a* may transmit a synchronization signal block (SSB) to assist the UE **115**-*a* in detecting and communicating with the first network entity **105**-*a*. The SSB may be comprised of a primary synchronization signal (PSS), a secondary synchronization signal (SSS), and a physical broadcast channel (PBCH). The UE **115**-*a* and the NES cell **210** may use the SSB for communication parameter acquisition (e.g., timing information, frequency, cell identifier (ID), beams), for signal quality measurement, for automatic gain control (AGC), for a time-frequency tracking loop, as a root quasi-colocation (QCL) source for other signals or channels, or any combination thereof.

[0100] Each network entity **105** may provide communication coverage to a coverage area. For example, the first network entity **105**-*a* may be associated with or may represent a network energy savings (NES) cell **210**, and the second network entity **105**-*b* may be associated with or represent an anchor cell **215**. In some examples where the first network entity **105**-*a* represents a NES cell **210**, the NES cell **210** (e.g., the first network entity **105**-*a*) may support communication of light or on-demand SSBs for cell acquisition signaling. For example, the NES cell **210** may transmit an SSB using fewer resources relative to the second network entity **105**-*b* that is not associated with the NES cell **210**. Additionally, the NES cell **210** may transmit an SSB on-demand (e.g., aperiodically), which may support improved flexibility of resource utilization by the NES cell **210**.

[0101] The NES cell **210** may transmit cell acquisition signaling to the UE **115**-*a* to facilitate detection and measurement of the NES cell **210**. In some examples, the cell acquisition signaling may include a downlink reference signal (DL-RS) **220** (e.g., a first signal) that may be lighter (e.g., use fewer resources) than an SSB. The DL-RS **220** may not carry all of the information (e.g., all of the communication parameters) included in an SSB. For example, the DL-RS may include partial information of the SSB. The UE **115**-*a* may use the DL-RS **220** to acquire a symbol boundary, a portion of a cell ID associated with the NES cell **210**, or both. The UE **115**-*a* may acquire remaining information (e.g., remaining communication parameters) through additional cell acquisition signaling from the NES cell **210**, the anchor cell **215**, or both. For example, the UE **115**-*a* may transmit an uplink WUS (UL-WUS) **225** to the NES cell **210** in response to receiving the DL-RS **220**. The NES cell **210** may operate in a low-power state after transmitting the DL-RS **220**, and the UL-WUS **225** may trigger the NES cell **210** to transmit the remaining information to the UE **115**-*a* via a timing information signal **230** (e.g., a second signal of the cell acquisition signaling). The NES cell **210** may exit the low-power state after receiving the UL-WUS **225** to transmit the timing information signal **230**.

[0102] Additionally, or alternatively, the UE **115**-*a* may receive assistance information **235** from the anchor cell **215** including some or all of the remaining information. The UE **115**-*a* may receive the assistance information **235** before receiving the DL-RS **220**. In some examples, the assistance information **235** may indicate a distribution of the timing information (e.g., a set of communication parameters) across the cell acquisition signaling (e.g., the DL-RS **220** and the timing information signal **230**) transmitted by the NES cell **210**. For example, the assistance information may include partial information (e.g., a first subset of the set of communication parameters). Accordingly, the UE **115**-*a* may determine that the remaining information (e.g., a second subset of the set of communication parameters) will be included in the cell acquisition signaling transmitted by the NES cell **210**.

[0103] In some examples, the DL-RS **220** may be a combined PSS and SSS. The remaining information (e.g., the PBCH) may be transmitted without including the PSS or the SSS. For example, the DL-RS may have the combined PSS and SSS without being accompanied by PBCH, and the timing information signal **230** may be a standalone PBCH (e.g., not accompanied by a PSS or an SSS). The NES cell **210** may transmit the timing information signal **230** via preconfigured resources. Alternatively, the anchor cell **215** may indicate a set of resources for the NES cell **210** to use to transmit the timing information signal **230**.

[0104] Alternatively, the DL-RS **220** may be a PSS. The remaining information (e.g., the SSS and PBCH) may be transmitted without including the PSS. For example, the DL-RS **220** may include the PSS without being accompanied by the SSS or PBCH, and the timing information signal **230** may be a combined SSS and PBCH. The NES cell **210** may transmit the timing information signal **230** via preconfigured resources. Alternatively, the anchor cell **215** may indicate a set of resources for the NES cell **210** to use to transmit the timing information signal **230**. From the PSS, the UE **115**-*a* may acquire a symbol boundary to receive the timing information signal **230**.

[0105] Alternatively, the DL-RS **220** may be an SSS. The remaining information (e.g., the PSS and PBCH) may be transmitted without including the SSS. For example, the timing information signal **230** may be a combined SSS and PBCH. Transmitting the timing information signal **230** including a PSS may provide more flexible resource allocation for the timing information signal **230**. For example, the NES cell **210** may transmit the PSS as a preamble of the timing information signal **230**, and the UE **115**-*a* may use the preamble (e.g., the PSS) to search for the timing information signal **230**. The UE **115**-*a* may acquire a symbol boundary to receive the timing information signal **230** from the anchor cell **215**. For example, the UE **115**-*a* may acquire the symbol boundary from the PSS of the anchor cell **215**.

[0106] In some other examples, the DL-RS **220** may be a channel state information reference signal (CSI-RS) or a tracking reference signal (TRS). In some examples, the remaining information (e.g., a portion of a master information block (MIB) and a portion of the system information block (SIB)) may be included in a payload of a physical downlink shared channel (PDSCH). The information included in the PDSCH may be a minimum amount of info used by the UE **115**-*a* to access the NES cell **210** or a minimum amount of information that is not already available at the UE **115**-*a*. The NES cell **210** may transmit the timing information signal **230** including the PDSCH and a corresponding physical downlink control channel (PDCCH). The NES cell **210** may transmit the PDCCH via a preconfigured set of resources or via a set of resources indicated by the anchor cell **215**. The UE **115**-*a* may monitor for the PDCCH to determine communication resources for the PDSCH. In some other examples, the NES cell **210** may include the remaining information (e.g., minimum timing information, barring information, or both) in a short message carried by a PDCCH. In such examples, the NES cell **210** may transmit the timing information signal **230** comprising a PDCCH carrying a short message that includes the remaining information.

[0107] In some cases, the UE **115**-*a* may acquire assistance information **235** from the anchor cell **215**. The assistance information **235** may indicate a mode of operations supported by the NES cell **210**, a set of configurations of the NES cell **210**, or both. For example, the assistance information **235** may indicate one or more combinations of signal types for the cell acquisition signaling (e.g., the DL-RS **220** and the timing information signal **230**) that are supported by the NES cell **210**, as well as a set of configurations and resources corresponding to the one or more combinations of signal types. The set of configurations may comprise full information or partial information about a cell (e.g., ID information, timing information, frequency information, spatial information, cell barring information, a resource configuration, or any combination thereof), for the cell acquisition signaling (e.g., for the DL-RS **220** and the timing information signal **230**).

[0108] The information communicated between the UE **115**-*a*, the NES cell **210**, and the anchor cell **215** may be beam specific. For example, the NES cell **210**, the anchor cell **215**, or both, may perform communications via multiple beams. In such examples, the partial information included in the assistance information **235**, the remaining information included in the DL-RS **220**, the timing information signal **230**, or both, and the UL-WUS **225**, may indicate different configurations for different beams of the NES cell **210**, the anchor cell **215**, or both.

[0109] In some cases where the set of configurations may only comprise partial information, the NES cell **210** may provide the remaining information to the UE **115**-*a*. In some examples, based on the network deployment and the position of the UE **115**-*a* within the wireless communications system **200**, there may be a limited amount of candidate NES cells **210** around the UE **115**-*a*. Accordingly, the DL-RS **220** or the timing information signal **230** may include partial cell ID information. For example, the DL-RS **220** or the timing information signal **230** may not carry all cell IDs (e.g., the 1008 cell IDs that may be indicated in an SSB) but may instead include fewer bits of cell ID information relative to an SSB (e.g., an index to a set of cell IDs that are available to the UE **115**-*a*, the anchor cell **215**, or both).

[0110] In some examples, there may be a level of synchronization between the NES cell **210** and the anchor cell **215**. In such examples, there may be a minimum level of timing information for the UE **115**-*a* to use to resolve ambiguity between signaling from the NES cell **210** and the anchor cell **215**. The DL-RS **220** or the timing information signal **230** may carry this minimum level of timing information (e.g., fewer bits relative to an SSB). For example, the DL-RS **220** or the timing information signal **230** may include one or more least significant bits (LSBs) of a beam index, a half-frame index, or both, one or more LSBs of a system frame number, a symbol index within a slot, or an anchor cell timing delta value.

[0111] In some examples where the assistance information **235** indicates a set of configurations for additional cell acquisition signaling (e.g., the timing information signal **230**, a random access channel, etc.), the DL-RS **220** or the timing information signal **230** may indicate an index to one of the configurations of the set of configurations. The UE **115**-*a* may use the index to determine (e.g., identify) a format for the additional cell acquisition signaling and to receive the additional cell acquisition signaling.

[0112] In some implementations, the NES cell **210** may be in communications with the UE **115**-*a* as well as additional UEs **115** (not shown). Some UEs **115** may receive a different

level of assistance information **235** about the NES cell **210** from the anchor cell **215**. For example, based on a capability of the UE **115**-*a*, a level of coordination between the NES cell **210** and the anchor cell **215** (e.g., whether the NES cell **210** and the anchor cell **215** belong to a same DU/CU or different DUs/CUs), the relative locations of the UE **115**-*a*, the NES cell **210**, and the anchor cell **215** within the wireless communications system **200**, or any combination thereof, the anchor cell **215** may provide no assistance information **235**, a minimum level of assistance information **235**, or a higher level of assistance information **235** to the UE **115**-*a*. In some cases where the level of assistance information **235** provided to the UE **115**-*a* is available to the NES cell **210**, the NES cell **210** may provide more efficient remaining info via the cell acquisition signaling (e.g., may exclude redundant information included in the assistance information **235**). For example, the NES cell **210** may support indicating different levels of the remaining timing information in the timing information signal **230** based on the available information at the UE **115**-*a*.

[0113] The UE **115**-*a* may indicate the information available at the UE **115**-*a*, the remaining information, or both, via the UL-WUS **225**. The UE **115**-*a* may indicate the information explicitly or implicitly. For example, the UE **115**-*a* may be preconfigured with N levels of information, and the UE may explicitly indicate, to the NES cell **210** via the UL-WUS **225**, an index to the relevant (e.g., first) level of information. Alternatively, the anchor cell **215** may indicate the level of information the UE **115**-*a* should request (e.g., explicitly) from the NES cell **210**. The anchor cell may transparently (e.g., implicitly) indicate the level of information by providing the UE **115**-*a* with a configuration and resources for transmitting the UL-WUS **225** that are selected by the anchor cell **215** to represent the level of information. In some other examples, the UE **115**-*a* may implicitly indicate the level of information via the resources over which the UE **115**-*a* transmits the UL-WUS **225**, or via one or more elements of the UL-WUS **225** (e.g., a scrambling ID, a preamble ID, a cyclic shift value, a payload of another message sent by the UE **115**-*a*, including a scheduling request (SR), a physical uplink control channel (PUCCH), or a physical uplink shared channel (PUSCH)).

[0114] In some implementations, the NES cell **210** may be in communications with the UE **115**-*a* as well as additional UEs **115** (not shown). Some UEs **115** may be provided with a different level of assistance information **235** and may wake up the NES cell **210** to request different (e.g., second) levels of remaining timing information. The NES cell **210** may support indicating the level of information included in the timing information signal **230** so the UE **115** receiving the timing information signal **230** understands how to interpret and decode the timing information signal **230**. For example, the NES cell **210** may indicate a second level (e.g., one of N levels) of information provided in the timing information signal **230**. The timing information signal **230** may carry the indication via a header in the payload of the timing information signal **230**, a flag in a PDCCH associated with the timing information signal **230**, a scrambling ID, a demodulation reference signal (DMRS) associated with the timing information signal **230**, or any combination thereof. Alternatively, the timing information signal **230** may implicitly indicate the second level of information via the time-frequency resources used to transmit the timing information signal **230**. In some cases, the NES cell **210** may transmit multiple (e.g., hierarchical) timing information signals **230**. In such cases, the NES cell **210** may transmit a first timing information signal **230** including minimal information, information about a second timing information signal **230** (not shown) that carries additional information, or both.

[0115] FIG. **3** shows an example of a process flow **300** that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure. The process flow **300** may implement or be implemented by aspects of the wireless communications system **100** and the wireless communications system **200**, as described with reference to FIGS. **1** and **2**. For instance, in the example of FIG. **4**, a UE **115**-*b* may be in communication with a network entity **105**-*c*, which may be examples of devices described herein with reference to FIG. **1** or FIG. **2**. In the following description of the process flow **300**, the operations between the UE **115**-*b* and the network entity **105**-*c* may be performed in a different order than the example shown, or the operations between the UE **115**-*b* and the network entity **105**-*c* may be performed in different orders at different times. Some operations may also be omitted from the process flow **300**, and other operations may be added to the process flow **300**.

[0116] At **305**, the network entity **105**-*c* may transmit assistance information for detecting the network entity **105**-*c*. In some examples, the assistance information may include an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity **105**-*c*. Wireless devices (e.g., the UE **115**-*b*) may use the set of parameters for communicating with the network entity **105**-*c*. The set of parameters may include an index for a set of cell IDs, one or more least significant bits of a beam index, a half-frame index, one or more least significant bits of a system frame number, a symbol index, or an anchor cell timing delta value, an index for a configuration of a set of configurations, or any combination thereof. In some examples, the network entity **105**-*c* may share the assistance information with an anchor cell (not shown), which may transmit the assistance information to UE **115**-*b*. The network entity **105**-*c* may be associated with one or more NES cells.

[0117] At **310**, the UE **115**-*b* may receive the assistance information for detecting the network entity **105**-*c*. The assistance information may include the indication of the distribution of the set of parameters across the cell acquisition signaling for the network entity. The UE **115**-*b* may use the set of parameters for communicating with the network entity **105**-*c*. In some examples, the UE **115**-*b* may receive the assistance information from the anchor cell.

[0118] At **315**, the UE **115**-*b* may receive, from the anchor cell, an indication of a set of configurations for one or more signals communicated by the network entity **105**-*c*. The set of configurations may include a cell ID, timing information, frequency information, spatial information, beam information, cell barring information, a resource configuration, or any combination thereof. In some examples, the one or more signals may include the second signal of the cell acquisition signaling. At **320**, the UE **115**-*b* may receive, from the anchor cell, an indication of a configuration for transmitting a wake up signal. The configuration may indicate resources associated with a first level of information associated with a first subset of the set of parameters. In some examples, the anchor cell may include the indication of the set of configurations for the one or more signals communicated by the

network entity **105**-*c* and the indication of the configuration for transmitting the wake up signal in the assistance information.

[0119] At **325**, the network entity **105**-*c* may transmit, to the UE **115**-*b*, a first signal of the cell acquisition signaling including a first indication of the first subset of the set of parameters. In some examples, the first signal may be a primary synchronization signal (PSS), a secondary synchronization signal (SSS), a combined PSS and SSS, a CSI-RS, or a TRS.

[0120] At **330**, the network entity **105**-*c* may transmit, to the UE **115**-*b*, an indication of an index for a configuration of the set of configurations for the one or more signals communicated by the network entity **105**-*c*. In some examples, the network entity **105**-*c* may include the indication in the first signal of the cell acquisition signaling. The set of configurations may include a cell ID, timing information, frequency information, spatial information, beam information, cell barring information, a resource configuration, or any combination thereof. The network entity **105**-*c* may transmit a signal of the one or more signals in accordance with the configuration of the set of configurations. For example, the network entity **105**-*c* may transmit a second signal of the one or more signals in accordance with the configuration.

[0121] At **335**, the UE **115**-*b* may identify a format of the second signal based on the index for the configuration of the set of configurations for the one or more signals communicated by the network entity **105**-*c* (e.g., via the first signal). In some examples, the UE **115**-*b* may receive the second signal in accordance with the configuration of the set of configurations and based on identifying the format of the second signal.

[0122] At **340**, the UE **115**-*b* may transmit a wake up signal to the network entity **105**-*c* based on receiving the first signal. In some examples, the UE **115**-*b* may transmit, via the resources indicated in the configuration for transmitting the wake up signal, an indication of the first level of information based on receiving the indication. For example, the UE **115**-*b* may transmit the indication of the first level of information via a scrambling ID of the wake up signal, a preamble ID of the wake up signal, a cyclic shift value of the wake up signal, a message payload transmitted by the UE **115**-*b* (e.g., of a SR, a PUCCH, or a PUSCH), or any combination thereof. In some examples, the UE **115**-*b* may transmit an indication of an index for the first level of information associated with the first subset of the set of parameters in the wake up signal. In some examples, the first level of information may be preconfigured at the UE **115**-*b*. The first level of information may be based on the first signal of the cell acquisition signaling including the first indication of the first subset of the set of parameters.

[0123] At **345**, the network entity **105**-*c* may transmit, to the UE **115**-*b* based on receiving the wake up signal, the second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters. In some examples where the first signal is a PSS, the second signal may be a combined SSS and PBCH. In some other examples where the first signal is an SSS, the second signal may be a combined PSS and PBCH. In some other examples where the first signal is a combined PSS and SSS, the second signal may be a standalone PBCH. Alternatively, if the first signal is a CSI-RS or a TRS, the second signal may be a combined PDCCH and a PDSCH carrying partial MIB and SIB information or a non-scheduling PDCCH.

[0124] The network entity **105**-*c* may include an indication of a second level of information associated with the second signal and the second subset of the set of parameters in the second signal based on receiving the wake up signal from the UE **115**-*b*. The UE **115**-*b* may receive the indication of the second level of information associated with the second signal and the second subset of the set of parameters based on transmitting the wake up signal to the network entity **105**-*c*. In some examples, the UE **115**-*b* may receive the indication via a header in a payload of the second signal, a flag in a PDCCH associated with the second signal, a scrambling ID, a DMRS associated with the second signal, time and frequency resources associated with receiving the second signal, or any combination thereof.

[0125] At **350**, the UE **115**-*b* may determine, based on the index for the set of cell IDs, one or more candidate cells (e.g., NES cells) available for communications with the anchor cell, the UE **115**-*b*, or both. In some examples, at least one of the one or more candidate cells may be associated with the network entity **105**-*c*.

[0126] At **355**, the network entity **105**-*c* may transmit, to the UE **115**-*b* and based on transmitting the second signal, a third signal of the cell acquisition signaling including a third subset of the set of parameters. In some examples, the second signal may include information associated with the third signal, and the UE **115**-*b* may receive the third signal based on receiving the second signal.

[0127] FIG. **4** shows a block diagram **400** of a device **405** that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure. The device **405** may be an example of aspects of a UE **115** as described herein. The device **405** may include a receiver **410**, a transmitter **415**, and a communications manager **420**. The device **405**, or one or more components of the device **405** (e.g., the receiver **410**, the transmitter **415**, the communications manager **420**), may include at least one processor, which may be coupled with at least one memory, to, individually or collectively, support or enable the described techniques. Each of these components may be in communication with one another (e.g., via one or more buses).

[0128] The receiver **410** 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 on-demand synchronization signaling for network energy savings systems). Information may be passed on to other components of the device **405**. The receiver **410** may utilize a single antenna or a set of multiple antennas.

[0129] The transmitter **415** may provide a means for transmitting signals generated by other components of the device **405**. For example, the transmitter **415** 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 on-demand synchronization signaling for network energy savings systems). In some examples, the transmitter **415** may be co-located with a receiver **410** in a transceiver module. The transmitter **415** may utilize a single antenna or a set of multiple antennas.

[0130] The communications manager **420**, the receiver **410**, the transmitter **415**, or various combinations or components thereof may be examples of means for performing various aspects of on-demand synchronization signaling for network energy savings systems as described herein. For example, the communications manager **420**, the receiver **410**, the transmitter **415**, or various combinations or components thereof may be capable of performing one or more of the functions described herein.

[0131] In some examples, the communications manager **420**, the receiver **410**, the transmitter **415**, or various combinations or components thereof may be implemented in hardware (e.g., in communications management circuitry). The hardware may include at least one of 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, individually or collectively, a means for performing the functions described in the present disclosure. In some examples, at least one processor and at least one memory coupled with the at least one processor may be configured to perform one or more of the functions described herein (e.g., by one or more processors, individually or collectively, executing instructions stored in the at least one memory).

[0132] Additionally, or alternatively, the communications manager **420**, the receiver **410**, the transmitter **415**, or various combinations or components thereof may be implemented in code (e.g., as communications management software or firmware) executed by at least one processor (e.g., referred to as a processor-executable code). If implemented in code executed by at least one processor, the functions of the communications manager **420**, the receiver **410**, the transmitter **415**, 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, individually or collectively, a means for performing the functions described in the present disclosure).

[0133] In some examples, the communications manager **420** may be configured to perform various operations (e.g., receiving, obtaining, monitoring, outputting, transmitting) using or otherwise in cooperation with the receiver **410**, the transmitter **415**, or both. For example, the communications manager **420** may receive information from the receiver **410**, send information to the transmitter **415**, or be integrated in combination with the receiver **410**, the transmitter **415**, or both to obtain information, output information, or perform various other operations as described herein.

[0134] For example, the communications manager **420** is capable of, configured to, or operable to support a means for receiving assistance information for detecting a network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling for the network entity, the set of parameters for communicating with the network entity. The communications manager **420** is capable of, configured to, or operable to support a means for receiving, from the network entity, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters. The communications manager **420** is capable of, configured to, or operable to support a means for transmitting a wake up signal to the network entity based on receiving the first signal. The communications manager **420** is capable of, configured to, or operable to support a means for receiving, from the network entity based on transmitting the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0135] By including or configuring the communications manager **420** in accordance with examples as described herein, the device **405** (e.g., at least one processor controlling or otherwise coupled with the receiver **410**, the transmitter **415**, the communications manager **420**, or a combination thereof) may support techniques for reduced power consumption and more efficient utilization of communication resources.

[0136] FIG. **5** shows a block diagram **500** of a device **505** that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure. The device **505** may be an example of aspects of a device **405** or a UE **115** as described herein. The device **505** may include a receiver **510**, a transmitter **515**, and a communications manager **520**. The device **505**, or one or more components of the device **505** (e.g., the receiver **510**, the transmitter **515**, the communications manager **520**), may include at least one processor, which may be coupled with at least one memory, to support the described techniques. Each of these components may be in communication with one another (e.g., via one or more buses).

[0137] The receiver **510** 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 on-demand synchronization signaling for network energy savings systems). Information may be passed on to other components of the device **505**. The receiver **510** may utilize a single antenna or a set of multiple antennas.

[0138] The transmitter **515** may provide a means for transmitting signals generated by other components of the device **505**. For example, the transmitter **515** 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 on-demand synchronization signaling for network energy savings systems). In some examples, the transmitter **515** may be co-located with a receiver **510** in a transceiver module. The transmitter **515** may utilize a single antenna or a set of multiple antennas.

[0139] The device **505**, or various components thereof, may be an example of means for performing various aspects of on-demand synchronization signaling for network energy savings systems as described herein. For example, the communications manager **520** may include an assistance information component **525**, a cell acquisition signaling component **530**, a wake up signal component **535**, or any combination thereof. The communications manager **520** may be an example of aspects of a communications manager **420** as described herein. In some examples, the communications manager **520**, 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 **510**, the trans-

mitter **515**, or both. For example, the communications manager **520** may receive information from the receiver **510**, send information to the transmitter **515**, or be integrated in combination with the receiver **510**, the transmitter **515**, or both to obtain information, output information, or perform various other operations as described herein.

[0140] The assistance information component **525** is capable of, configured to, or operable to support a means for receiving assistance information for detecting a network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling for the network entity, the set of parameters for communicating with the network entity. The cell acquisition signaling component **530** is capable of, configured to, or operable to support a means for receiving, from the network entity, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters. The wake up signal component **535** is capable of, configured to, or operable to support a means for transmitting a wake up signal to the network entity based on receiving the first signal. The cell acquisition signaling component **530** is capable of, configured to, or operable to support a means for receiving, from the network entity based on transmitting the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0141] FIG. **6** shows a block diagram **600** of a communications manager **620** that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure. The communications manager **620** may be an example of aspects of a communications manager **420**, a communications manager **520**, or both, as described herein. The communications manager **620**, or various components thereof, may be an example of means for performing various aspects of on-demand synchronization signaling for network energy savings systems as described herein. For example, the communications manager **620** may include an assistance information component **625**, a cell acquisition signaling component **630**, a wake up signal component **635**, a signal configuration component **640**, an information level component **645**, a candidate cell component **650**, or any combination thereof. Each of these components, or components or subcomponents thereof (e.g., one or more processors, one or more memories), may communicate, directly or indirectly, with one another (e.g., via one or more buses).

[0142] The assistance information component **625** is capable of, configured to, or operable to support a means for receiving assistance information for detecting a network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling for the network entity, the set of parameters for communicating with the network entity. The cell acquisition signaling component **630** is capable of, configured to, or operable to support a means for receiving, from the network entity, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters. The wake up signal component **635** is capable of, configured to, or operable to support a means for transmitting a wake up signal to the network entity based on receiving the first signal. In some examples, the cell acquisition signaling component **630** is capable of, configured to, or operable to support a means for receiving, from the network entity based on transmitting the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0143] In some examples, the first signal includes an PSS, and the second signal includes an SSS and a physical broadcast channel (PBCH).

[0144] In some examples, the first signal includes an SSS, and the second signal includes an PSS and a physical broadcast channel (PBCH).

[0145] In some examples, the first signal includes an PSS and an SSS and the second signal includes a standalone physical broadcast channel (PBCH).

[0146] In some examples, the first signal includes a channel state information reference signal (CSI-RS) or a tracking reference signal (TRS) and the second signal includes a PDCCH and an PDSCH carrying partial master information block (MIB) and SIB information or a non-scheduling PDCCH.

[0147] In some examples, the set of parameters include an index for a set of cell identifiers (IDs), one or more least significant bits of a beam index, a half-frame index, one or more least significant bits of a system frame number, a symbol index, or an anchor cell timing delta value, an index for a configuration of a set of configurations, or any combination thereof.

[0148] In some examples, the candidate cell component **650** is capable of, configured to, or operable to support a means for determining, based on the index for the set of cell IDs, one or more candidate cells available for communications with an anchor cell, the UE, or both, where at least one of the one or more candidate cells is associated with the network entity.

[0149] In some examples, the signal configuration component **640** is capable of, configured to, or operable to support a means for receiving, from an anchor cell, an indication of a set of configurations for one or more signals communicated by the network entity, the set of configurations including a cell identifier, timing information, frequency information, spatial information, beam information, cell barring information, a resource configuration, or any combination thereof.

[0150] In some examples, the signal configuration component **640** is capable of, configured to, or operable to support a means for receiving, from the network entity, an indication of an index for a configuration of the set of configurations. In some examples, the signal configuration component **640** is capable of, configured to, or operable to support a means for identifying a format of the second signal based on the index, where the UE receives the second signal in accordance with the configuration of the set of configurations and based on identifying the format of the second signal.

[0151] In some examples, the one or more signals include the second signal of the cell acquisition signaling.

[0152] In some examples, the signal configuration component **640** is capable of, configured to, or operable to support a means for receiving, from an anchor cell, an indication of a configuration for transmitting the wake up signal, the configuration indicating resources associated with a first level of information associated with the first subset of the set of parameters. In some examples, the information level component **645** is capable of, configured to, or operable to support a means for transmitting, via the resources indicated in the configuration, an indication of the first level of information based on receiving the indication,

where the first level of information is based on the first signal of the cell acquisition signaling including the first indication of the first subset of the set of parameters.

[0153] In some examples, the UE transmits the indication of the first level of information via the wake up signal, the indication included in a scrambling identifier of the wake up signal, a preamble identifier of the wake up signal, a cyclic shift value of the wake up signal, a message payload transmitted by the UE, or any combination thereof.

[0154] In some examples, to support transmitting the wake up signal, the wake up signal component **635** is capable of, configured to, or operable to support a means for transmitting an indication of an index for a first level of information associated with the first subset of the set of parameters, where the first level of information is preconfigured at the UE.

[0155] In some examples, to support receiving the second signal, the cell acquisition signaling component **630** is capable of, configured to, or operable to support a means for receiving an indication of a second level of information associated with the second signal and the second subset of the set of parameters based on transmitting the wake up signal to the network entity.

[0156] In some examples, the UE receives the indication via a header in a payload of the second signal, a flag in a physical downlink control channel associated with the second signal, a scrambling identifier, a demodulation reference signal associated with the second signal, time and frequency resources associated with receiving the second signal, or any combination thereof.

[0157] In some examples, the cell acquisition signaling component **630** is capable of, configured to, or operable to support a means for receiving, from the network entity and based on receiving the second signal, a third signal of the cell acquisition signaling including a third subset of the set of parameters.

[0158] FIG. **7** shows a diagram of a system **700** including a device **705** that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure. The device **705** may be an example of or include components of a device **405**, a device **505**, or a UE **115** as described herein. The device **705** may communicate (e.g., wirelessly) with one or more other devices (e.g., network entities **105**, UEs **115**, or a combination thereof). The device **705** may include components for bi-directional voice and data communications including components for transmitting and receiving communications, such as a communications manager **720**, an input/output (I/O) controller, such as an I/O controller **710**, a transceiver **715**, one or more antennas **725**, at least one memory **730**, code **735**, and at least one processor **740**. 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 **745**).

[0159] The I/O controller **710** may manage input and output signals for the device **705**. The I/O controller **710** may also manage peripherals not integrated into the device **705**. In some cases, the I/O controller **710** may represent a physical connection or port to an external peripheral. In some cases, the I/O controller **710** 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 **710** may represent or interact with a modem, a keyboard, a mouse, a touchscreen, or a similar device. In some cases, the I/O controller **710** may be implemented as part of one or more processors, such as the at least one processor **740**. In some cases, a user may interact with the device **705** via the I/O controller **710** or via hardware components controlled by the I/O controller **710**.

[0160] In some cases, the device **705** may include a single antenna. However, in some other cases, the device **705** may have more than one antenna, which may be capable of concurrently transmitting or receiving multiple wireless transmissions. The transceiver **715** may communicate bi-directionally via the one or more antennas **725** using wired or wireless links as described herein. For example, the transceiver **715** may represent a wireless transceiver and may communicate bi-directionally with another wireless transceiver. The transceiver **715** may also include a modem to modulate the packets, to provide the modulated packets to one or more antennas **725** for transmission, and to demodulate packets received from the one or more antennas **725**. The transceiver **715**, or the transceiver **715** and one or more antennas **725**, may be an example of a transmitter **415**, a transmitter **515**, a receiver **410**, a receiver **510**, or any combination thereof or component thereof, as described herein.

[0161] The at least one memory **730** may include random access memory (RAM) and read-only memory (ROM). The at least one memory **730** may store computer-readable, computer-executable, or processor-executable code, such as the code **735**. The code **735** may include instructions that, when executed by the at least one processor **740**, cause the device **705** to perform various functions described herein. The code **735** may be stored in a non-transitory computer-readable medium such as system memory or another type of memory. In some cases, the code **735** may not be directly executable by the at least one processor **740** but may cause a computer (e.g., when compiled and executed) to perform functions described herein. In some cases, the at least one memory **730** may include, among other things, a basic I/O system (BIOS) which may control basic hardware or software operation such as the interaction with peripheral components or devices.

[0162] The at least one processor **740** 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 at least one processor **740** may be configured to operate a memory array using a memory controller. In some other cases, a memory controller may be integrated into the at least one processor **740**. The at least one processor **740** may be configured to execute computer-readable instructions stored in a memory (e.g., the at least one memory **730**) to cause the device **705** to perform various functions (e.g., functions or tasks supporting on-demand synchronization signaling for network energy savings systems). For example, the device **705** or a component of the device **705** may include at least one processor **740** and at least one memory **730** coupled with or to the at least one processor **740**, the at least one processor **740** and the at least one memory **730** configured to perform various functions described herein. In some examples, the at least one processor **740** may include multiple processors and the at least one memory **730** may include multiple memo-

ries. One or more of the multiple processors may be coupled with one or more of the multiple memories, which may, individually or collectively, be configured to perform various functions described herein. In some examples, the at least one processor **740** may be a component of a processing system, which may refer to a system (such as a series) of machines, circuitry (including, for example, one or both of processor circuitry (which may include the at least one processor **740**) and memory circuitry (which may include the at least one memory **730**)), or components, that receives or obtains inputs and processes the inputs to produce, generate, or obtain a set of outputs. The processing system may be configured to perform one or more of the functions described herein. For example, the at least one processor **740** or a processing system including the at least one processor **740** may be configured to, configurable to, or operable to cause the device **705** to perform one or more of the functions described herein. Further, as described herein, being "configured to," being "configurable to," and being "operable to" may be used interchangeably and may be associated with a capability, when executing code **735** (e.g., processor-executable code) stored in the at least one memory **730** or otherwise, to perform one or more of the functions described herein.

[0163] For example, the communications manager **720** is capable of, configured to, or operable to support a means for receiving assistance information for detecting a network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling for the network entity, the set of parameters for communicating with the network entity. The communications manager **720** is capable of, configured to, or operable to support a means for receiving, from the network entity, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters. The communications manager **720** is capable of, configured to, or operable to support a means for transmitting a wake up signal to the network entity based on receiving the first signal. The communications manager **720** is capable of, configured to, or operable to support a means for receiving, from the network entity based on transmitting the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0164] By including or configuring the communications manager **720** in accordance with examples as described herein, the device **705** may support techniques for reduced latency and improved user experience related to reduced power consumption and more efficient utilization of communication resources.

[0165] In some examples, the communications manager **720** may be configured to perform various operations (e.g., receiving, monitoring, transmitting) using or otherwise in cooperation with the transceiver **715**, the one or more antennas **725**, or any combination thereof. Although the communications manager **720** is illustrated as a separate component, in some examples, one or more functions described with reference to the communications manager **720** may be supported by or performed by the at least one processor **740**, the at least one memory **730**, the code **735**, or any combination thereof. For example, the code **735** may include instructions executable by the at least one processor **740** to cause the device **705** to perform various aspects of on-demand synchronization signaling for network energy savings systems as described herein, or the at least one processor **740** and the at least one memory **730** may be otherwise configured to, individually or collectively, perform or support such operations.

[0166] FIG. **8** shows a block diagram **800** of a device **805** that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure. The device **805** may be an example of aspects of a network entity **105** as described herein. The device **805** may include a receiver **810**, a transmitter **815**, and a communications manager **820**. The device **805**, or one or more components of the device **805** (e.g., the receiver **810**, the transmitter **815**, the communications manager **820**), may include at least one processor, which may be coupled with at least one memory, to, individually or collectively, support or enable the described techniques. Each of these components may be in communication with one another (e.g., via one or more buses).

[0167] The receiver **810** 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 **805**. In some examples, the receiver **810** may support obtaining information by receiving signals via one or more antennas. Additionally, or alternatively, the receiver **810** may support obtaining information by receiving signals via one or more wired (e.g., electrical, fiber optic) interfaces, wireless interfaces, or any combination thereof.

[0168] The transmitter **815** may provide a means for outputting (e.g., transmitting, providing, conveying, sending) information generated by other components of the device **805**. For example, the transmitter **815** 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 **815** may support outputting information by transmitting signals via one or more antennas. Additionally, or alternatively, the transmitter **815** 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 **815** and the receiver **810** may be co-located in a transceiver, which may include or be coupled with a modem.

[0169] The communications manager **820**, the receiver **810**, the transmitter **815**, or various combinations or components thereof may be examples of means for performing various aspects of on-demand synchronization signaling for network energy savings systems as described herein. For example, the communications manager **820**, the receiver **810**, the transmitter **815**, or various combinations or components thereof may be capable of performing one or more of the functions described herein.

[0170] 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 at least one of 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, individually or collectively, a means for performing the functions described in the present disclosure. In some examples, at least one processor and at least one memory coupled with the at least one processor may be configured to perform one or more of the functions described herein (e.g., by one or more processors, individually or collectively, executing instructions stored in the at least one memory).

[0171] Additionally, or alternatively, 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 at least one processor (e.g., referred to as a processor-executable code). If implemented in code executed by at least one 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, individually or collectively, a means for performing the functions described in the present disclosure).

[0172] 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.

[0173] For example, the communications manager **820** is capable of, configured to, or operable to support a means for transmitting assistance information for detecting the network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity, the set of parameters for communicating with the network entity. The communications manager **820** is capable of, configured to, or operable to support a means for transmitting, to a UE, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters. The communications manager **820** is capable of, configured to, or operable to support a means for receiving a wake up signal from the UE based on transmitting the first signal. The communications manager **820** is capable of, configured to, or operable to support a means for transmitting, to the UE based on receiving the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0174] By including or configuring the communications manager **820** in accordance with examples as described herein, the device **805** (e.g., at least one 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 power consumption and more efficient utilization of communication resources.

[0175] FIG. **9** shows a block diagram **900** of a device **905** that supports on-demand synchronization signaling for network energy savings systems 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 network entity **105** as described herein. The device **905** may include a receiver **910**, a transmitter **915**, and a communications manager **920**. The device **905**, or one or more components of the device **905** (e.g., the receiver **910**, the transmitter **915**, the communications manager **920**), may include at least one processor, which may be coupled with at least one memory, to support the described techniques. Each of these components may be in communication with one another (e.g., via one or more buses).

[0176] The receiver **910** 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 **905**. In some examples, the receiver **910** may support obtaining information by receiving signals via one or more antennas. Additionally, or alternatively, the receiver **910** may support obtaining information by receiving signals via one or more wired (e.g., electrical, fiber optic) interfaces, wireless interfaces, or any combination thereof.

[0177] The transmitter **915** may provide a means for outputting (e.g., transmitting, providing, conveying, sending) information generated by other components of the device **905**. For example, the transmitter **915** 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 **915** may support outputting information by transmitting signals via one or more antennas. Additionally, or alternatively, the transmitter **915** 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 **915** and the receiver **910** may be co-located in a transceiver, which may include or be coupled with a modem.

[0178] The device **905**, or various components thereof, may be an example of means for performing various aspects of on-demand synchronization signaling for network energy savings systems as described herein. For example, the communications manager **920** may include an assistance information manager **925**, a cell acquisition signaling manager **930**, a wake up signal manager **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.

[0179] The assistance information manager **925** is capable of, configured to, or operable to support a means for transmitting assistance information for detecting the network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity, the set of parameters for communicating with the network entity. The cell acquisition signaling manager **930** is capable of, configured to, or operable to support a means for transmitting, to a UE, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters. The wake up signal manager **935** is capable of, configured to, or operable to support a means for receiving a wake up signal from the UE based on transmitting the first signal. The cell acquisition signaling manager **930** is capable of, configured to, or operable to support a means for transmitting, to the UE based on receiving the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0180] FIG. **10** shows a block diagram **1000** of a communications manager **1020** that supports on-demand synchronization signaling for network energy savings systems 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 on-demand synchronization signaling for network energy savings systems as described herein. For example, the communications manager **1020** may include an assistance information manager **1025**, a cell acquisition signaling manager **1030**, a wake up signal manager **1035**, a signal configuration manager **1040**, an information level manager **1045**, or any combination thereof. Each of these components, or components or subcomponents thereof (e.g., one or more processors, one or more memories), may communicate, directly or indirectly, with one another (e.g., via one or more buses). The communications 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.

[0181] The assistance information manager **1025** is capable of, configured to, or operable to support a means for transmitting assistance information for detecting the network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity, the set of parameters for communicating with the network entity. The cell acquisition signaling manager **1030** is capable of, configured to, or operable to support a means for transmitting, to a UE, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters. The wake up signal manager **1035** is capable of, configured to, or operable to support a means for receiving a wake up signal from the UE based on transmitting the first signal. In some examples, the cell acquisition signaling manager **1030** is capable of, configured to, or operable to support a means for transmitting, to the UE based on receiving the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0182] In some examples, the first signal includes an PSS, and the second signal includes an SSS and a physical broadcast channel (PBCH).

[0183] In some examples, the first signal includes an SSS, and the second signal includes an PSS and a physical broadcast channel (PBCH).

[0184] In some examples, the first signal includes an PSS and an SSS and the second signal includes a standalone physical broadcast channel (PBCH).

[0185] In some examples, the first signal includes a channel state information reference signal (CSI-RS) or a tracking reference signal (TRS) and the second signal includes a PDCCH and an PDSCH carrying partial master information block (MIB) and SIB information or a non-scheduling PDCCH.

[0186] In some examples, the set of parameters include an index for a set of cell identifiers (IDs), one or more least significant bits of a beam index, a half-frame index, one or more least significant bits of a system frame number, a symbol index, or an anchor cell timing delta value, an index for a configuration of a set of configurations, or any combination thereof.

[0187] In some examples, the signal configuration manager **1040** is capable of, configured to, or operable to support a means for transmitting, to the UE, an indication of an index for a configuration of a set of configurations for one or more signals communicated by the network entity, the set of configurations including a cell identifier, timing information, frequency information, spatial information, beam information, cell barring information, a resource configuration, or any combination thereof. In some examples, the cell acquisition signaling manager **1030** is capable of, configured to, or operable to support a means for transmitting a signal of the one or more signals in accordance with the configuration of the set of configurations.

[0188] In some examples, the information level manager **1045** is capable of, configured to, or operable to support a means for receiving, via a set of resources and based on transmitting the first signal, an indication of a first level of information, where the first level of information is based on the first signal including the first indication of the first subset of the set of parameters.

[0189] In some examples, to support receiving the wake up signal, the wake up signal manager **1035** is capable of, configured to, or operable to support a means for receiving an indication of an index for a first level of information associated with the first subset of the set of parameters, where the first level of information is preconfigured at the UE.

[0190] In some examples, to support transmitting the second signal, the cell acquisition signaling manager **1030** is capable of, configured to, or operable to support a means for transmitting an indication of a second level of information associated with the second signal and the second subset of the set of parameters based on receiving the wake up signal from the UE.

[0191] In some examples, the cell acquisition signaling manager **1030** is capable of, configured to, or operable to support a means for transmitting, to the UE and based on

transmitting the second signal, a third signal of the cell acquisition signaling including a third subset of the set of parameters.

[0192] In some examples, the network entity is associated with one or more network energy savings (NES) cells.

[0193] FIG. **11** shows a diagram of a system **1100** including a device **1105** that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure. The device **1105** may be an example of or include components of a device **805**, a device **905**, or a network entity **105** as described herein. The device **1105** may communicate with other network devices or network equipment such as one or more of the network entities **105**, UEs **115**, or any combination thereof. The communications may include communications over one or more wired interfaces, over one or more wireless interfaces, or any combination thereof. The device **1105** may include components that support outputting and obtaining communications, such as a communications manager **1120**, a transceiver **1110**, one or more antennas **1115**, at least one memory **1125**, code **1130**, and at least one processor **1135**. 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 **1140**).

[0194] The transceiver **1110** may support bi-directional communications via wired links, wireless links, or both as described herein. In some examples, the transceiver **1110** may include a wired transceiver and may communicate bi-directionally with another wired transceiver. Additionally, or alternatively, in some examples, the transceiver **1110** may include a wireless transceiver and may communicate bi-directionally with another wireless transceiver. In some examples, the device **1105** may include one or more antennas **1115**, which may be capable of transmitting or receiving wireless transmissions (e.g., concurrently). The transceiver **1110** may also include a modem to modulate signals, to provide the modulated signals for transmission (e.g., by one or more antennas **1115**, by a wired transmitter), to receive modulated signals (e.g., from one or more antennas **1115**, from a wired receiver), and to demodulate signals. In some implementations, the transceiver **1110** may include one or more interfaces, such as one or more interfaces coupled with the one or more antennas **1115** that are configured to support various receiving or obtaining operations, or one or more interfaces coupled with the one or more antennas **1115** that are configured to support various transmitting or outputting operations, or a combination thereof. In some implementations, the transceiver **1110** may include or be configured for coupling with one or more processors or one or more memory components that are operable to perform or support operations based on received or obtained information or signals, or to generate information or other signals for transmission or other outputting, or any combination thereof. In some implementations, the transceiver **1110**, or the transceiver **1110** and the one or more antennas **1115**, or the transceiver **1110** and the one or more antennas **1115** and one or more processors or one or more memory components (e.g., the at least one processor **1135**, the at least one memory **1125**, or both), may be included in a chip or chip assembly that is installed in the device **1105**. In some examples, the transceiver **1110** may be operable to support communications via one or more communications links (e.g., communication link(s) **125**, backhaul communication link(s) **120**, a midhaul communication link **162**, a fronthaul communication link **168**).

[0195] The at least one memory **1125** may include RAM, ROM, or any combination thereof. The at least one memory **1125** may store computer-readable, computer-executable, or processor-executable code, such as the code **1130**. The code **1130** may include instructions that, when executed by one or more of the at least one processor **1135**, cause the device **1105** to perform various functions described herein. The code **1130** may be stored in a non-transitory computer-readable medium such as system memory or another type of memory. In some cases, the code **1130** may not be directly executable by a processor of the at least one processor **1135** but may cause a computer (e.g., when compiled and executed) to perform functions described herein. In some cases, the at least one memory **1125** may include, among other things, a BIOS which may control basic hardware or software operation such as the interaction with peripheral components or devices. In some examples, the at least one processor **1135** may include multiple processors and the at least one memory **1125** may include multiple memories. One or more of the multiple processors may be coupled with one or more of the multiple memories which may, individually or collectively, be configured to perform various functions herein (for example, as part of a processing system).

[0196] The at least one processor **1135** 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 at least one processor **1135** may be configured to operate a memory array using a memory controller. In some other cases, a memory controller may be integrated into one or more of the at least one processor **1135**. The at least one processor **1135** may be configured to execute computer-readable instructions stored in a memory (e.g., one or more of the at least one memory **1125**) to cause the device **1105** to perform various functions (e.g., functions or tasks supporting on-demand synchronization signaling for network energy savings systems). For example, the device **1105** or a component of the device **1105** may include at least one processor **1135** and at least one memory **1125** coupled with one or more of the at least one processor **1135**, the at least one processor **1135** and the at least one memory **1125** configured to perform various functions described herein. The at least one processor **1135** 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 **1130**) to perform the functions of the device **1105**. The at least one processor **1135** may be any one or more suitable processors capable of executing scripts or instructions of one or more software programs stored in the device **1105** (such as within one or more of the at least one memory **1125**). In some examples, the at least one processor **1135** may include multiple processors and the at least one memory **1125** may include multiple memories. One or more of the multiple processors may be coupled with one or more of the multiple memories, which may, individually or collectively, be configured to perform various functions herein. In some examples, the at least one processor **1135** may be a component of a processing system, which may refer to a system (such as a series)

of machines, circuitry (including, for example, one or both of processor circuitry (which may include the at least one processor **1135**) and memory circuitry (which may include the at least one memory **1125**)), or components, that receives or obtains inputs and processes the inputs to produce, generate, or obtain a set of outputs. The processing system may be configured to perform one or more of the functions described herein. For example, the at least one processor **1135** or a processing system including the at least one processor **1135** may be configured to, configurable to, or operable to cause the device **1105** to perform one or more of the functions described herein. Further, as described herein, being "configured to," being "configurable to," and being "operable to" may be used interchangeably and may be associated with a capability, when executing code stored in the at least one memory **1125** or otherwise, to perform one or more of the functions described herein.

[0197] In some examples, a bus **1140** may support communications of (e.g., within) a protocol layer of a protocol stack. In some examples, a bus **1140** 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 **1105**, or between different components of the device **1105** that may be co-located or located in different locations (e.g., where the device **1105** may refer to a system in which one or more of the communications manager **1120**, the transceiver **1110**, the at least one memory **1125**, the code **1130**, and the at least one processor **1135** may be located in one of the different components or divided between different components).

[0198] In some examples, the communications manager **1120** 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 **1120** may manage the transfer of data communications for client devices, such as one or more UEs **115**. In some examples, the communications manager **1120** may manage communications with one or more other network entities **105**, and may include a controller or scheduler for controlling communications with UEs **115** (e.g., in cooperation with the one or more other network devices). In some examples, the communications manager **1120** may support an X2 interface within an LTE/LTE-A wireless communications network technology to provide communication between network entities **105**.

[0199] For example, the communications manager **1120** is capable of, configured to, or operable to support a means for transmitting assistance information for detecting the network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity, the set of parameters for communicating with the network entity. The communications manager **1120** is capable of, configured to, or operable to support a means for transmitting, to a UE, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters. The communications manager **1120** is capable of, configured to, or operable to support a means for receiving a wake up signal from the UE based on transmitting the first signal. The communications manager **1120** is capable of, configured to, or operable to support a means for transmitting, to the UE based on receiving the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters.

[0200] By including or configuring the communications manager **1120** in accordance with examples as described herein, the device **1105** may support techniques for reduced latency and improved user experience related to reduced power consumption and more efficient utilization of communication resources.

[0201] In some examples, the communications manager **1120** may be configured to perform various operations (e.g., receiving, obtaining, monitoring, outputting, transmitting) using or otherwise in cooperation with the transceiver **1110**, the one or more antennas **1115** (e.g., where applicable), 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 transceiver **1110**, one or more of the at least one processor **1135**, one or more of the at least one memory **1125**, the code **1130**, or any combination thereof (for example, by a processing system including at least a portion of the at least one processor **1135**, the at least one memory **1125**, the code **1130**, or any combination thereof). For example, the code **1130** may include instructions executable by one or more of the at least one processor **1135** to cause the device **1105** to perform various aspects of on-demand synchronization signaling for network energy savings systems as described herein, or the at least one processor **1135** and the at least one memory **1125** may be otherwise configured to, individually or collectively, perform or support such operations.

[0202] FIG. **12** shows a flowchart illustrating a method **1200** that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure. The operations of the method **1200** may be implemented by a UE or its components as described herein. For example, the operations of the method **1200** may be performed by a UE **115** as described with reference to FIGS. **1** through **7**. 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.

[0203] At **1205**, the method may include receiving assistance information for detecting a network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling for the network entity, the set of parameters for communicating with the network entity. The operations of **1205** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1205** may be performed by an assistance information component **625** as described with reference to FIG. **6**.

[0204] At **1210**, the method may include receiving, from the network entity, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters. The operations of **1210** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1210** may be performed by a cell acquisition signaling component **630** as described with reference to FIG. **6**.

[0205] At **1215**, the method may include transmitting a wake up signal to the network entity based on receiving the first signal. The operations of **1215** may be performed in

accordance with examples as disclosed herein. In some examples, aspects of the operations of **1215** may be performed by a wake up signal component **635** as described with reference to FIG. **6**.

[0206] At **1220**, the method may include receiving, from the network entity based on transmitting the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters. The operations of **1220** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1220** may be performed by a cell acquisition signaling component **630** as described with reference to FIG. **6**.

[0207] FIG. **13** shows a flowchart illustrating a method **1300** that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure. The operations of the method **1300** may be implemented by a UE or its components as described herein. For example, the operations of the method **1300** may be performed by a UE **115** as described with reference to FIGS. **1** through **7**. 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.

[0208] At **1305**, the method may include receiving assistance information for detecting a network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling for the network entity, the set of parameters for communicating with the network entity. The operations of **1305** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1305** may be performed by an assistance information component **625** as described with reference to FIG. **6**.

[0209] At **1310**, the method may include receiving, from an anchor cell, an indication of a set of configurations for one or more signals communicated by the network entity, the set of configurations including a cell identifier, timing information, frequency information, spatial information, beam information, cell barring information, a resource configuration, or any combination thereof. The operations of **1310** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1310** may be performed by a signal configuration component **640** as described with reference to FIG. **6**.

[0210] At **1315**, the method may include receiving, from the network entity, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters. The operations of **1315** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1315** may be performed by a cell acquisition signaling component **630** as described with reference to FIG. **6**.

[0211] At **1320**, the method may include transmitting a wake up signal to the network entity based on receiving the first signal. The operations of **1320** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1320** may be performed by a wake up signal component **635** as described with reference to FIG. **6**.

[0212] At **1325**, the method may include receiving, from the network entity based on transmitting the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters. The operations of **1325** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1325** may be performed by a cell acquisition signaling component **630** as described with reference to FIG. **6**.

[0213] FIG. **14** shows a flowchart illustrating a method **1400** that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure. The operations of the method **1400** may be implemented by a network entity or its components as described herein. For example, the operations of the method **1400** may be performed by a network entity as described with reference to FIGS. **1** through **3** and **8** through **11**. 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.

[0214] At **1405**, the method may include transmitting assistance information for detecting the network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity, the set of parameters for communicating with the network entity. The operations of **1405** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1405** may be performed by an assistance information manager **1025** as described with reference to FIG. **10**.

[0215] At **1410**, the method may include transmitting, to a UE, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters. The operations of **1410** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1410** may be performed by a cell acquisition signaling manager **1030** as described with reference to FIG. **10**.

[0216] At **1415**, the method may include receiving a wake up signal from the UE based on transmitting the first signal. The operations of **1415** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1415** may be performed by a wake up signal manager **1035** as described with reference to FIG. **10**.

[0217] At **1420**, the method may include transmitting, to the UE based on receiving the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters. The operations of **1420** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1420** may be performed by a cell acquisition signaling manager **1030** as described with reference to FIG. **10**.

[0218] FIG. **15** shows a flowchart illustrating a method **1500** that supports on-demand synchronization signaling for network energy savings systems in accordance with one or more aspects of the present disclosure. The operations of the method **1500** may be implemented by a network entity or its components as described herein. For example, the operations of the method **1500** may be performed by a network entity as described with reference to FIGS. **1** through **3** and **8** through **11**. In some examples, a network entity may execute a set of instructions to control the functional ele-

ments 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.

[0219] At **1505**, the method may include transmitting assistance information for detecting the network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity, the set of parameters for communicating with the network entity. The operations of **1505** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1505** may be performed by an assistance information manager **1025** as described with reference to FIG. **10**.

[0220] At **1510**, the method may include transmitting, to a UE, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters. The operations of **1510** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1510** may be performed by a cell acquisition signaling manager **1030** as described with reference to FIG. **10**.

[0221] At **1515**, the method may include receiving a wake up signal from the UE based on transmitting the first signal. The operations of **1515** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1515** may be performed by a wake up signal manager **1035** as described with reference to FIG. **10**.

[0222] At **1520**, the method may include receiving, via a set of resources and based on transmitting the first signal, an indication of a first level of information, where the first level of information is based on the first signal including the first indication of the first subset of the set of parameters. The operations of **1520** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1520** may be performed by an information level manager **1045** as described with reference to FIG. **10**.

[0223] At **1525**, the method may include transmitting, to the UE based on receiving the wake up signal, a second signal of the cell acquisition signaling including a second indication of a second subset of the set of parameters. The operations of **1525** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1525** may be performed by a cell acquisition signaling manager **1030** as described with reference to FIG. **10**.

[0224] The following provides an overview of aspects of the present disclosure:

[0225] Aspect 1: A method for wireless communications at a UE, comprising: receiving assistance information for detecting a network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling for the network entity, the set of parameters for communicating with the network entity; receiving, from the network entity, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters; transmitting a WUS to the network entity based at least in part on receiving the first signal; and receiving, from the network entity based at least in part on transmitting the WUS, a second signal of the cell acquisition signaling comprising a second indication of a second subset of the set of parameters.

[0226] Aspect 2: The method of aspect 1, wherein the first signal comprises an PSS and the second signal comprises an SSS and a PBCH.

[0227] Aspect 3: The method of aspect 1, wherein the first signal comprises an SSS and the second signal comprises an PSS and a PBCH.

[0228] Aspect 4: The method of aspect 1, wherein the first signal comprises an PSS and an SSS and the second signal comprises a standalone PBCH.

[0229] Aspect 5: The method of aspect 1, wherein the first signal comprises a CSI-RS or a TRS and the second signal comprises a PDCCH and an PDSCH carrying partial MIB and SIB information or a non-scheduling PDCCH.

[0230] Aspect 6: The method of any of aspects 1 through 5, wherein the set of parameters comprise an index for a set of cell IDs, one or more least significant bits of a beam index, a half-frame index, one or more least significant bits of a system frame number, a symbol index, or an anchor cell timing delta value, an index for a configuration of a set of configurations, or any combination thereof.

[0231] Aspect 7: The method of aspect 6, further comprising: determining, based at least in part on the index for the set of cell IDs, one or more candidate cells available for communications with an anchor cell, the UE, or both, wherein at least one of the one or more candidate cells is associated with the network entity.

[0232] Aspect 8: The method of any of aspects 1 through 7, further comprising: receiving, from an anchor cell, an indication of a set of configurations for one or more signals communicated by the network entity, the set of configurations including a cell identifier, timing information, frequency information, spatial information, beam information, cell barring information, a resource configuration, or any combination thereof.

[0233] Aspect 9: The method of aspect 8, further comprising: receiving, from the network entity, an indication of an index for a configuration of the set of configurations; and identifying a format of the second signal based at least in part on the index, wherein the UE receives the second signal in accordance with the configuration of the set of configurations and based at least in part on identifying the format of the second signal.

[0234] Aspect 10: The method of any of aspects 8 through 9, wherein the one or more signals include the second signal of the cell acquisition signaling.

[0235] Aspect 11: The method of any of aspects 1 through 10, further comprising: receiving, from an anchor cell, an indication of a configuration for transmitting the WUS, the configuration indicating resources associated with a first level of information associated with the first subset of the set of parameters; and transmitting, via the resources indicated in the configuration, an indication of the first level of information based at least in part on receiving the indication, wherein the first level of information is based at least in

part on the first signal of the cell acquisition signaling including the first indication of the first subset of the set of parameters.

[0236] Aspect 12: The method of aspect 11, wherein the UE transmits the indication of the first level of information via the WUS, the indication included in a scrambling identifier of the WUS, a preamble identifier of the WUS, a cyclic shift value of the WUS, a message payload transmitted by the UE, or any combination thereof.

[0237] Aspect 13: The method of any of aspects 1 through 12, wherein transmitting the WUS further comprises: transmitting an indication of an index for a first level of information associated with the first subset of the set of parameters, wherein the first level of information is preconfigured at the UE.

[0238] Aspect 14: The method of any of aspects 1 through 13, wherein receiving the second signal further comprises: receiving an indication of a second level of information associated with the second signal and the second subset of the set of parameters based at least in part on transmitting the WUS to the network entity.

[0239] Aspect 15: The method of aspect 14, wherein the UE receives the indication via a header in a payload of the second signal, a flag in a physical downlink control channel associated with the second signal, a scrambling identifier, a demodulation reference signal associated with the second signal, time and frequency resources associated with receiving the second signal, or any combination thereof.

[0240] Aspect 16: The method of any of aspects 1 through 15, further comprising: receiving, from the network entity and based at least in part on receiving the second signal, a third signal of the cell acquisition signaling comprising a third subset of the set of parameters.

[0241] Aspect 17: A method for wireless communications at a network entity, comprising: transmitting assistance information for detecting the network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity, the set of parameters for communicating with the network entity; transmitting, to a UE, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters; receiving a WUS from the UE based at least in part on transmitting the first signal; and transmitting, to the UE based at least in part on receiving the WUS, a second signal of the cell acquisition signaling comprising a second indication of a second subset of the set of parameters.

[0242] Aspect 18: The method of aspect 17, wherein the first signal comprises an PSS and the second signal comprises an SSS and a PBCH.

[0243] Aspect 19: The method of aspect 17, wherein the first signal comprises an SSS and the second signal comprises an PSS and a PBCH.

[0244] Aspect 20: The method of aspect 17, wherein the first signal comprises an PSS and an SSS and the second signal comprises a standalone PBCH.

[0245] Aspect 21: The method of aspect 17, wherein the first signal comprises a CSI-RS or a TRS and the second signal comprises a PDCCH and an PDSCH carrying partial MIB and SIB information or a non-scheduling PDCCH.

[0246] Aspect 22: The method of any of aspects 17 through 21, wherein the set of parameters comprise an index for a set of cell IDs, one or more least significant bits of a beam index, a half-frame index, one or more least significant bits of a system frame number, a symbol index, or an anchor cell timing delta value, an index for a configuration of a set of configurations, or any combination thereof.

[0247] Aspect 23: The method of any of aspects 17 through 22, further comprising: transmitting, to the UE, an indication of an index for a configuration of a set of configurations for one or more signals communicated by the network entity, the set of configurations including a cell identifier, timing information, frequency information, spatial information, beam information, cell barring information, a resource configuration, or any combination thereof; and transmitting a signal of the one or more signals in accordance with the configuration of the set of configurations.

[0248] Aspect 24: The method of any of aspects 17 through 23, further comprising: receiving, via a set of resources and based at least in part on transmitting the first signal, an indication of a first level of information, wherein the first level of information is based at least in part on the first signal including the first indication of the first subset of the set of parameters.

[0249] Aspect 25: The method of any of aspects 17 through 24, wherein receiving the WUS further comprises: receiving an indication of an index for a first level of information associated with the first subset of the set of parameters, wherein the first level of information is preconfigured at the UE.

[0250] Aspect 26: The method of any of aspects 17 through 25, wherein transmitting the second signal further comprises: transmitting an indication of a second level of information associated with the second signal and the second subset of the set of parameters based at least in part on receiving the WUS from the UE.

[0251] Aspect 27: The method of any of aspects 17 through 26, further comprising: transmitting, to the UE and based at least in part on transmitting the second signal, a third signal of the cell acquisition signaling comprising a third subset of the set of parameters.

[0252] Aspect 28: The method of any of aspects 17 through 27, wherein the network entity is associated with one or more NES cells.

[0253] Aspect 29: A UE comprising one or more memories storing processor-executable code, and one or more processors coupled with the one or more memories and individually or collectively operable to execute the code to cause the UE to perform a method of any of aspects 1 through 16.

[0254] Aspect 30: A UE comprising at least one means for performing a method of any of aspects 1 through 16.

[0255] Aspect 31: A non-transitory computer-readable medium storing code the code comprising instructions executable by one or more processors to perform a method of any of aspects 1 through 16.

[0256] Aspect 32: A network entity comprising one or more memories storing processor-executable code, and

one or more processors coupled with the one or more memories and individually or collectively operable to execute the code to cause the network entity to perform a method of any of aspects 17 through 28.

[0257] Aspect 33: A network entity comprising at least one means for performing a method of any of aspects 17 through 28.

[0258] Aspect 34: A non-transitory computer-readable medium storing code the code comprising instructions executable by one or more processors to perform a method of any of aspects 17 through 28.

[0259] It should be noted that the methods described herein describe possible implementations. The operations and the steps may be rearranged or otherwise modified and other implementations are possible. Further, aspects from two or more of the methods may be combined.

[0260] 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.

[0261] 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.

[0262] The various illustrative blocks and components described in connection with the disclosure herein may be implemented or performed using 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). Any functions or operations described herein as being capable of being performed by a processor may be performed by multiple processors that, individually or collectively, are capable of performing the described functions or operations.

[0263] The functions described herein may be implemented using hardware, software executed by a processor, firmware, or any combination thereof. If implemented using software executed by a processor, the functions may be stored as or transmitted using one or more instructions or code of 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.

[0264] 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 location 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. Disks may reproduce data magnetically, and discs may reproduce data optically using lasers. Combinations of the above are also included within the scope of computer-readable media. Any functions or operations described herein as being capable of being performed by a memory may be performed by multiple memories that, individually or collectively, are capable of performing the described functions or operations.

[0265] 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."

[0266] As used herein, including in the claims, the article "a" before a noun is open-ended and understood to refer to "at least one" of those nouns or "one or more" of those nouns. Thus, the terms "a," "at least one," "one or more," and "at least one of one or more" may be interchangeable. For example, if a claim recites "a component" that performs one or more functions, each of the individual functions may be performed by a single component or by any combination of multiple components. Thus, the term "a component" having characteristics or performing functions may refer to "at least one of one or more components" having a particular characteristic or performing a particular function. Subsequent reference to a component introduced with the article

"a" using the terms "the" or "said" may refer to any or all of the one or more components. For example, a component introduced with the article "a" may be understood to mean "one or more components," and referring to "the component" subsequently in the claims may be understood to be equivalent to referring to "at least one of the one or more components." Similarly, subsequent reference to a component introduced as "one or more components" using the terms "the" or "said" may refer to any or all of the one or more components. For example, referring to "the one or more components" subsequently in the claims may be understood to be equivalent to referring to "at least one of the one or more components."

[0267] 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 (e.g., receiving information), accessing (e.g., accessing data stored in memory), and the like. Also, "determining" can include resolving, obtaining, selecting, choosing, establishing, and other such similar actions.

[0268] 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.

[0269] 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 figures, known structures and devices are shown in block diagram form in order to avoid obscuring the concepts of the described examples.

[0270] The description herein is provided to enable a person having ordinary skill in the art to make or use the disclosure. Various modifications to the disclosure will be apparent to a person having ordinary skill in the art, and the generic principles defined herein may be applied to other variations without departing from the scope of the disclosure. Thus, the disclosure is not limited to the examples and designs described herein but is to be accorded the broadest scope consistent with the principles and novel features disclosed herein.

What is claimed is:

1. A user equipment (UE), comprising:

one or more memories storing processor-executable code; and

one or more processors coupled with the one or more memories and individually or collectively operable to execute the code to cause the UE to:

receive assistance information for detecting a network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling for the network entity, the set of parameters for communicating with the network entity;

receive, from the network entity, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters;

transmit a wake up signal to the network entity based at least in part on receiving the first signal; and

receive, from the network entity based at least in part on transmitting the wake up signal, a second signal of the cell acquisition signaling comprising a second indication of a second subset of the set of parameters.

2. The UE of claim **1**, wherein the first signal comprises a primary synchronization signal (PSS) and the second signal comprises a secondary synchronization signal (SSS) and a physical broadcast channel (PBCH).

3. The UE of claim **1**, wherein the first signal comprises a secondary synchronization signal (SSS) and the second signal comprises a primary synchronization signal (PSS) and a physical broadcast channel (PBCH).

4. The UE of claim **1**, wherein the first signal comprises a primary synchronization signal (PSS) and a secondary synchronization signal (SSS) and the second signal comprises a standalone physical broadcast channel (PBCH).

5. The UE of claim **1**, wherein the first signal comprises a channel state information reference signal (CSI-RS) or a tracking reference signal (TRS) and the second signal comprises a physical downlink control channel (PDCCH) and a physical downlink shared channel (PDSCH) carrying partial master information block (MIB) and system information block (SIB) information or a non-scheduling PDCCH.

6. The UE of claim **1**, wherein the set of parameters comprise an index for a set of cell identifiers (IDs), one or more least significant bits of a beam index, a half-frame index, one or more least significant bits of a system frame number, a symbol index, or an anchor cell timing delta value, an index for a configuration of a set of configurations, or any combination thereof.

7. The UE of claim **6**, wherein the one or more processors are individually or collectively further operable to execute the code to cause the UE to:

determine, based at least in part on the index for the set of cell IDs, one or more candidate cells available for communications with an anchor cell, the UE, or both, wherein at least one of the one or more candidate cells is associated with the network entity.

8. The UE of claim **1**, wherein the one or more processors are individually or collectively further operable to execute the code to cause the UE to:

receive, from an anchor cell, an indication of a set of configurations for one or more signals communicated by the network entity, the set of configurations including a cell identifier, timing information, frequency information, spatial information, beam information, cell barring information, a resource configuration, or any combination thereof.

9. The UE of claim **8**, wherein the one or more processors are individually or collectively further operable to execute the code to cause the UE to:

receive, from the network entity, an indication of an index for a configuration of the set of configurations; and

identify a format of the second signal based at least in part on the index, wherein the UE receives the second signal

in accordance with the configuration of the set of configurations and based at least in part on identifying the format of the second signal.

10. The UE of claim **8**, wherein the one or more signals include the second signal of the cell acquisition signaling.

11. The UE of claim **1**, wherein the one or more processors are individually or collectively further operable to execute the code to cause the UE to:

receive, from an anchor cell, an indication of a configuration for transmitting the wake up signal, the configuration indicating resources associated with a first level of information associated with the first subset of the set of parameters; and

transmit, via the resources indicated in the configuration, an indication of the first level of information based at least in part on receiving the indication, wherein the first level of information is based at least in part on the first signal of the cell acquisition signaling including the first indication of the first subset of the set of parameters.

12. The UE of claim **11**, wherein the UE transmits the indication of the first level of information via the wake up signal, the indication included in a scrambling identifier of the wake up signal, a preamble identifier of the wake up signal, a cyclic shift value of the wake up signal, a message payload transmitted by the UE, or any combination thereof.

13. The UE of claim **1**, wherein, to transmit the wake up signal, the one or more processors are individually or collectively further operable to execute the code to cause the UE to:

transmit an indication of an index for a first level of information associated with the first subset of the set of parameters, wherein the first level of information is preconfigured at the UE.

14. The UE of claim **1**, wherein, to receive the second signal, the one or more processors are individually or collectively further operable to execute the code to cause the UE to:

receive an indication of a second level of information associated with the second signal and the second subset of the set of parameters based at least in part on transmitting the wake up signal to the network entity.

15. The UE of claim **14**, wherein the UE receives the indication via a header in a payload of the second signal, a flag in a physical downlink control channel associated with the second signal, a scrambling identifier, a demodulation reference signal associated with the second signal, time and frequency resources associated with receiving the second signal, or any combination thereof.

16. The UE of claim **1**, wherein the one or more processors are individually or collectively further operable to execute the code to cause the UE to:

receive, from the network entity and based at least in part on receiving the second signal, a third signal of the cell acquisition signaling comprising a third subset of the set of parameters.

17. A network entity, comprising:

one or more memories storing processor-executable code; and

one or more processors coupled with the one or more memories and individually or collectively operable to execute the code to cause the network entity to:

transmit assistance information for detecting the network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity, the set of parameters for communicating with the network entity;

transmit, to a UE, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters;

receive a wake up signal from the UE based at least in part on transmitting the first signal; and

transmit, to the UE based at least in part on receiving the wake up signal, a second signal of the cell acquisition signaling comprising a second indication of a second subset of the set of parameters.

18. The network entity of claim **17**, wherein the first signal comprises a primary synchronization signal (PSS) and the second signal comprises a secondary synchronization signal (SSS) and a physical broadcast channel (PBCH).

19. The network entity of claim **17**, wherein the first signal comprises a secondary synchronization signal (SSS) and the second signal comprises a primary synchronization signal (PSS) and a physical broadcast channel (PBCH).

20. The network entity of claim **17**, wherein the first signal comprises a primary synchronization signal (PSS) and a secondary synchronization signal (SSS) and the second signal comprises a standalone physical broadcast channel (PBCH).

21. The network entity of claim **17**, wherein the first signal comprises a channel state information reference signal (CSI-RS) or a tracking reference signal (TRS) and the second signal comprises a physical downlink control channel (PDCCH) and a physical downlink shared channel (PDSCH) carrying partial master information block (MIB) and system information block (SIB) information or a non-scheduling PDCCH.

22. The network entity of claim **17**, wherein the set of parameters comprise an index for a set of cell identifiers (IDs), one or more least significant bits of a beam index, a half-frame index, one or more least significant bits of a system frame number, a symbol index, or an anchor cell timing delta value, an index for a configuration of a set of configurations, or any combination thereof.

23. The network entity of claim **17**, wherein the one or more processors are individually or collectively further operable to execute the code to cause the network entity to:

transmit, to the UE, an indication of an index for a configuration of a set of configurations for one or more signals communicated by the network entity, the set of configurations including a cell identifier, timing information, frequency information, spatial information, beam information, cell barring information, a resource configuration, or any combination thereof; and

transmit a signal of the one or more signals in accordance with the configuration of the set of configurations.

24. The network entity of claim **17**, wherein the one or more processors are individually or collectively further operable to execute the code to cause the network entity to:

receive, via a set of resources and based at least in part on transmitting the first signal, an indication of a first level of information, wherein the first level of information is based at least in part on the first signal including the first indication of the first subset of the set of parameters.

25. The network entity of claim **17**, wherein, to receive the wake up signal, the one or more processors are individually or collectively further operable to execute the code to cause the network entity to:

receive an indication of an index for a first level of information associated with the first subset of the set of parameters, wherein the first level of information is preconfigured at the UE.

26. The network entity of claim **17**, wherein, to transmit the second signal, the one or more processors are individually or collectively further operable to execute the code to cause the network entity to:

transmit an indication of a second level of information associated with the second signal and the second subset of the set of parameters based at least in part on receiving the wake up signal from the UE.

27. The network entity of claim **17**, wherein the one or more processors are individually or collectively further operable to execute the code to cause the network entity to:

transmit, to the UE and based at least in part on transmitting the second signal, a third signal of the cell acquisition signaling comprising a third subset of the set of parameters.

28. The network entity of claim **17**, wherein the network entity is associated with one or more network energy savings (NES) cells.

29. A method for wireless communications at a user equipment (UE), comprising:

receiving assistance information for detecting a network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling for the network entity, the set of parameters for communicating with the network entity;

receiving, from the network entity, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters;

transmitting a wake up signal to the network entity based at least in part on receiving the first signal; and

receiving, from the network entity based at least in part on transmitting the wake up signal, a second signal of the cell acquisition signaling comprising a second indication of a second subset of the set of parameters.

30. A method for wireless communications at a network entity, comprising:

transmitting assistance information for detecting the network entity, the assistance information including an indication of a distribution of a set of parameters across cell acquisition signaling transmitted from the network entity, the set of parameters for communicating with the network entity;

transmitting, to a UE, a first signal of the cell acquisition signaling including a first indication of a first subset of the set of parameters;

receiving a wake up signal from the UE based at least in part on transmitting the first signal; and

transmitting, to the UE based at least in part on receiving the wake up signal, a second signal of the cell acquisition signaling comprising a second indication of a second subset of the set of parameters.

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