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(54) RANDOM ACCESS CHANNEL BASED REQUESTS FOR ON-DEMAND SYSTEM INFORMATION BLOCKS

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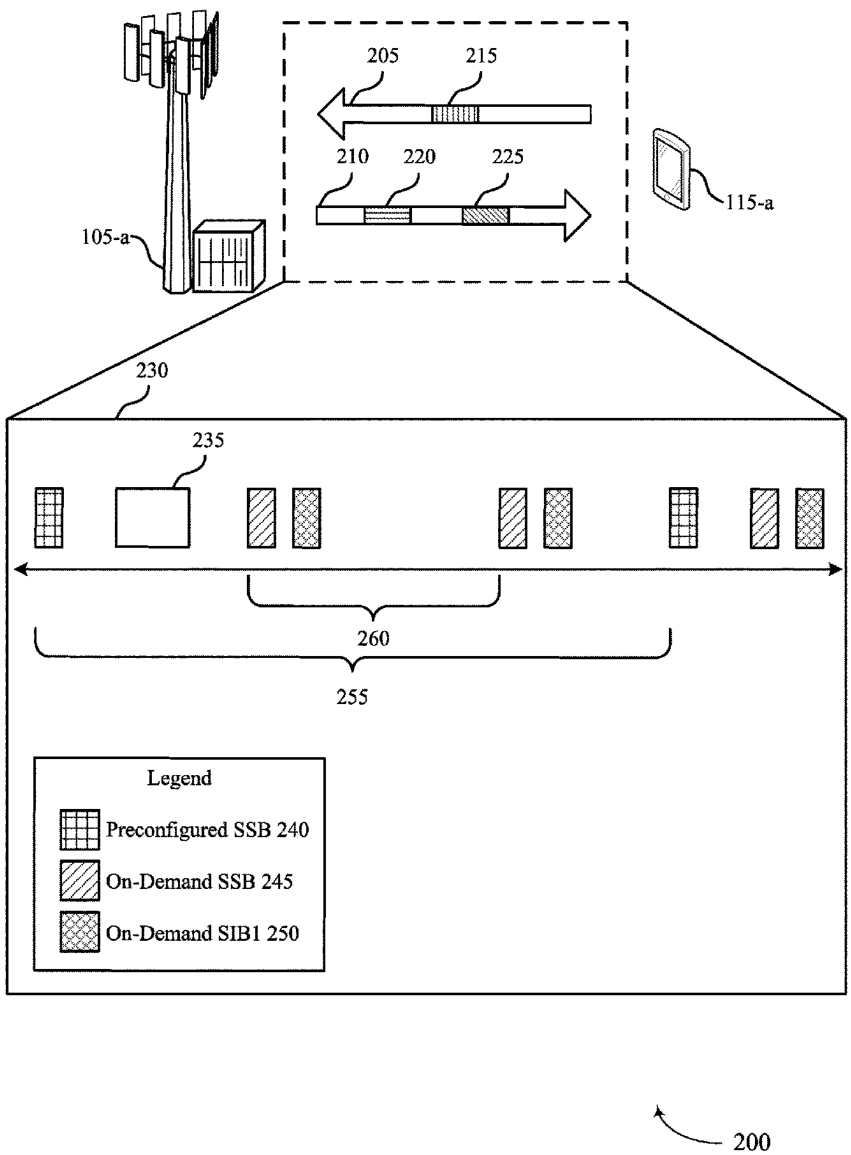
(57) ABSTRACT

Methods, systems, and devices for wireless communications are described. A user equipment (UE) may apply one or more signaling methods to perform on-demand first system information block (SIB1) requests while the UE is in an idle mode. The UE may support an on-demand SIB1 procedure by an uplink wake-up signal using one or more signals. The UE may receive a configuration for performing the on-demand SIB1 requests from a network entity. The UE may transmit a first message to the network entity. The first message may indicate a request for an on-demand SIB1. In response, the UE may receive, from the network entity, a second message indicating for the UE to monitor for the on-demand SIB1. The UE may receive, from the network entity, a third message that includes the on-demand SIB1. The UE may communicate with the network entity based on information indicated in the on-demand SIB1.



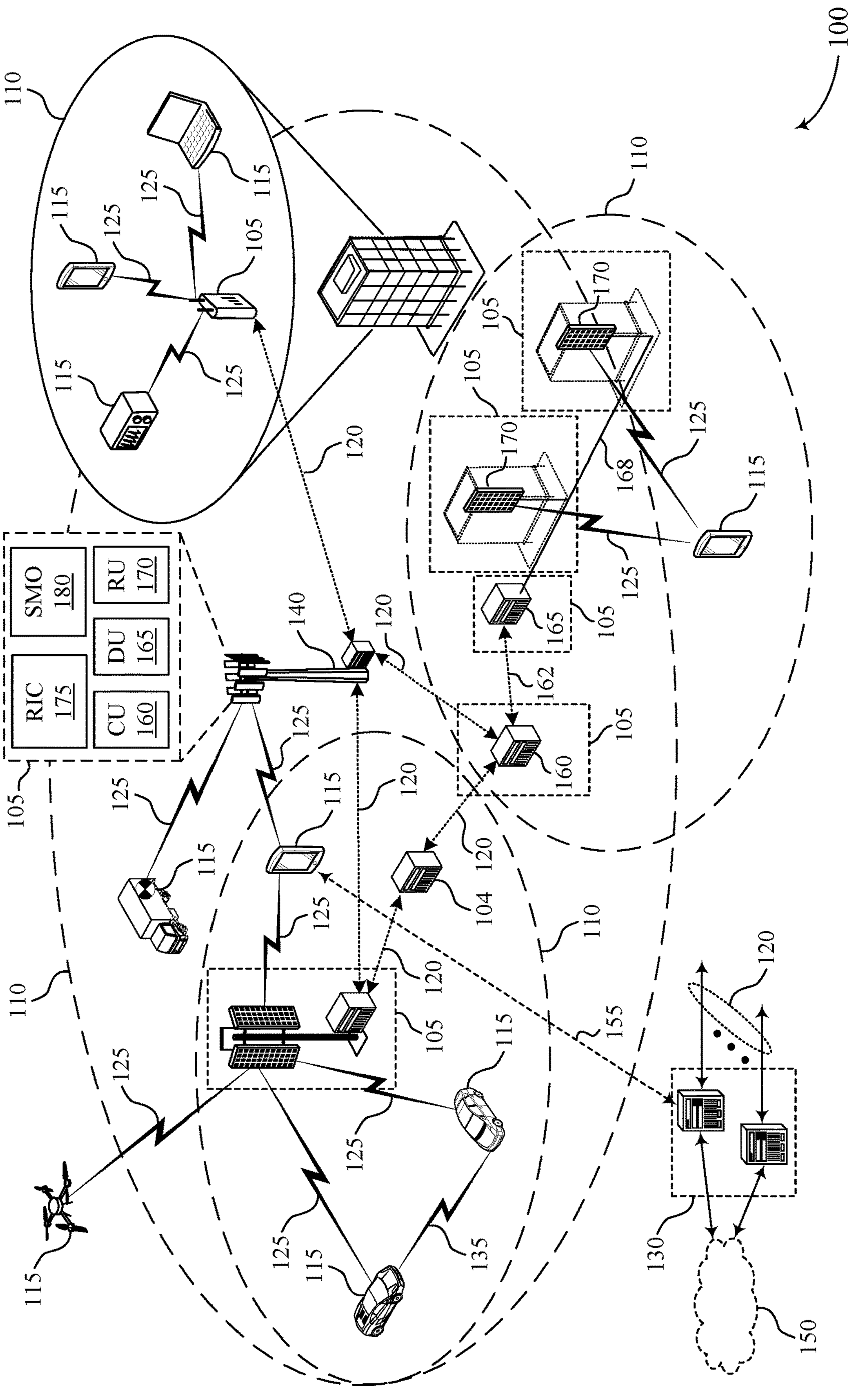


FIG. 1

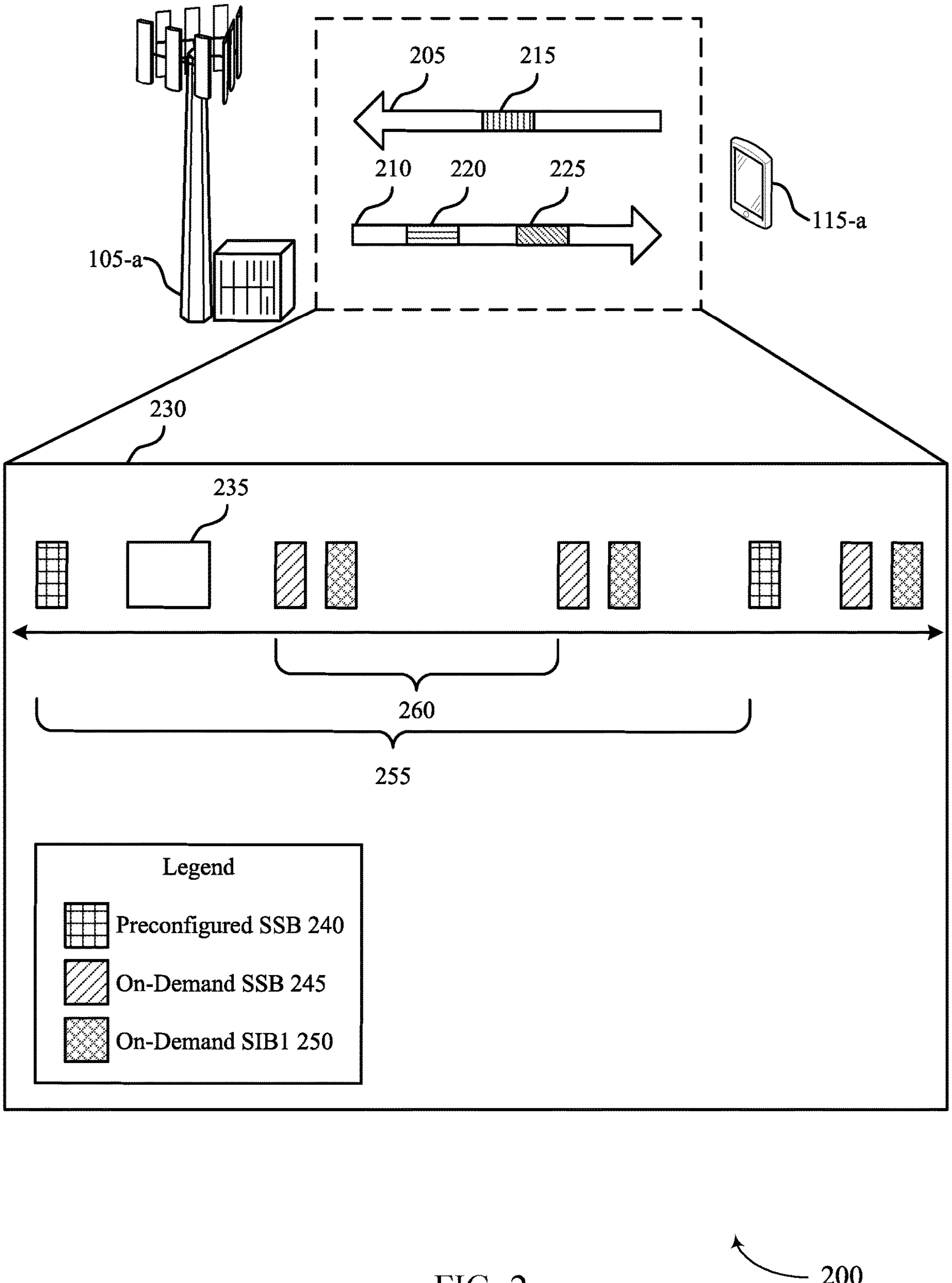

205
215
210
220
225
105-a
115-a
230
235
260
255
Legend
Preconfigured SSB 240
On-Demand SSB 245
On-Demand SIB1 250
200

FIG. 2

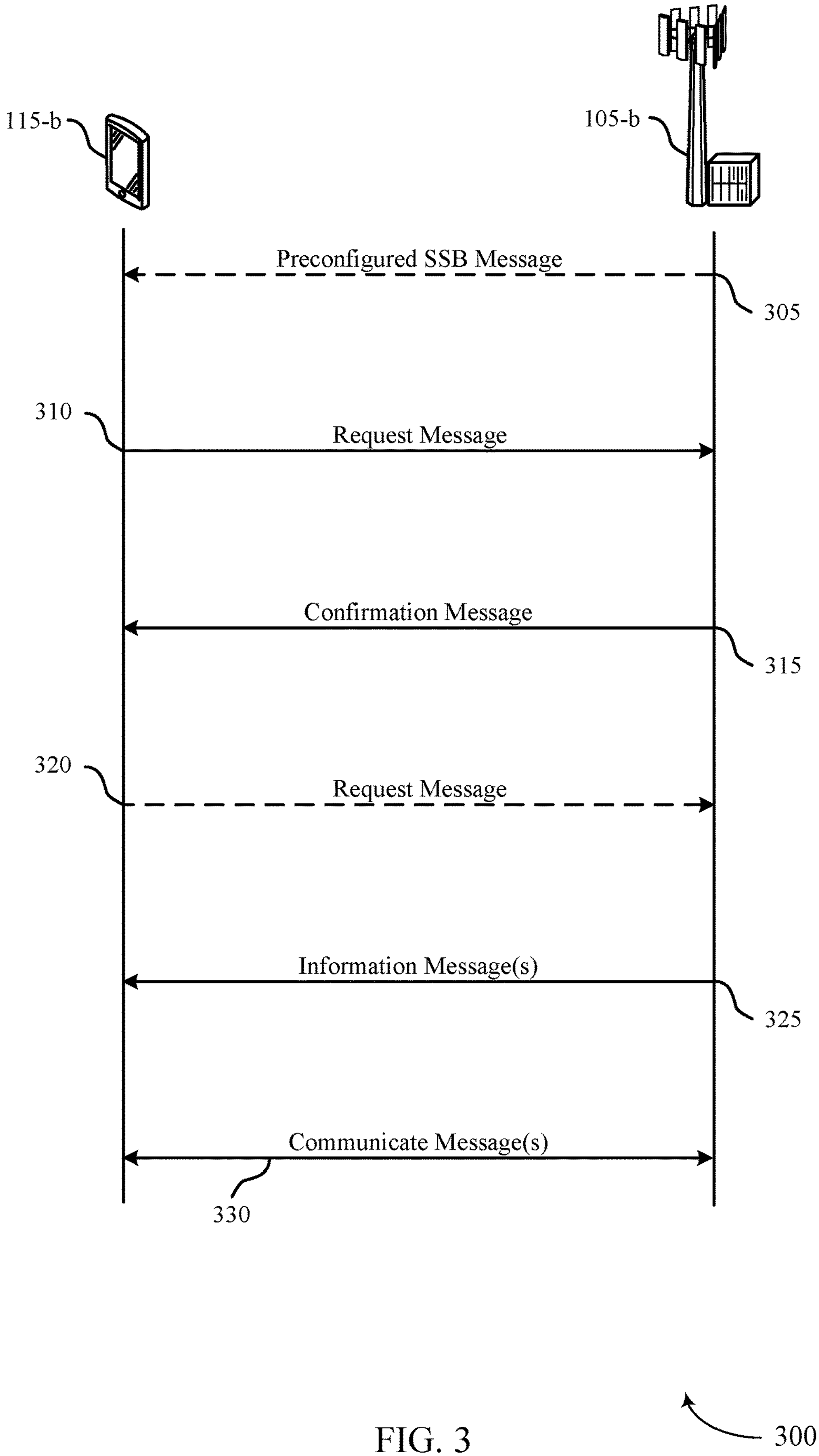

115-b
105-b
Preconfigured SSB Message
305
310
Request Message
Confirmation Message
315
320
Request Message
Information Message(s)
325
Communicate Message(s)
330
300

FIG. 3

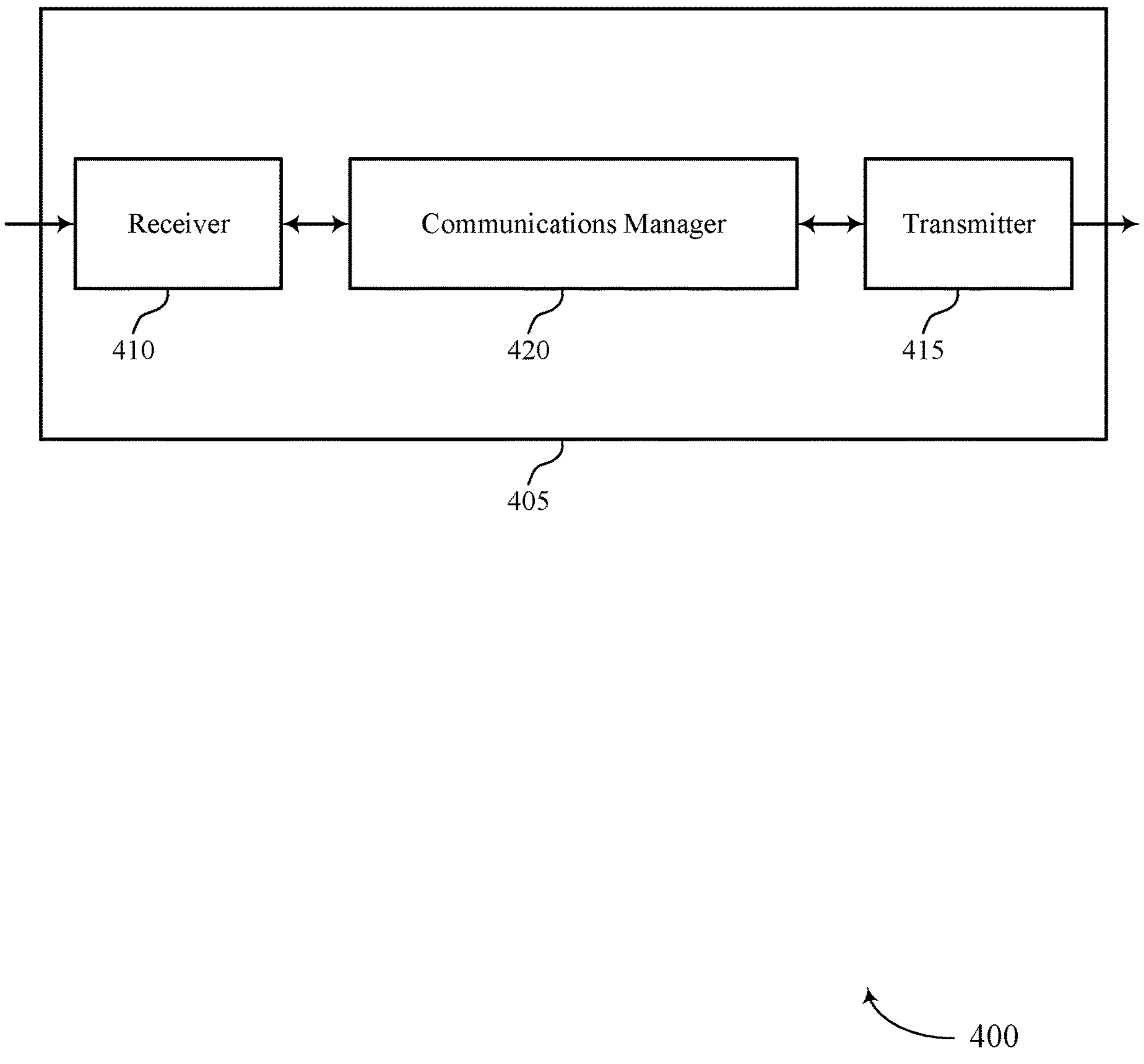

Receiver
Communications Manager
Transmitter
410
420
415
405
400

FIG. 4

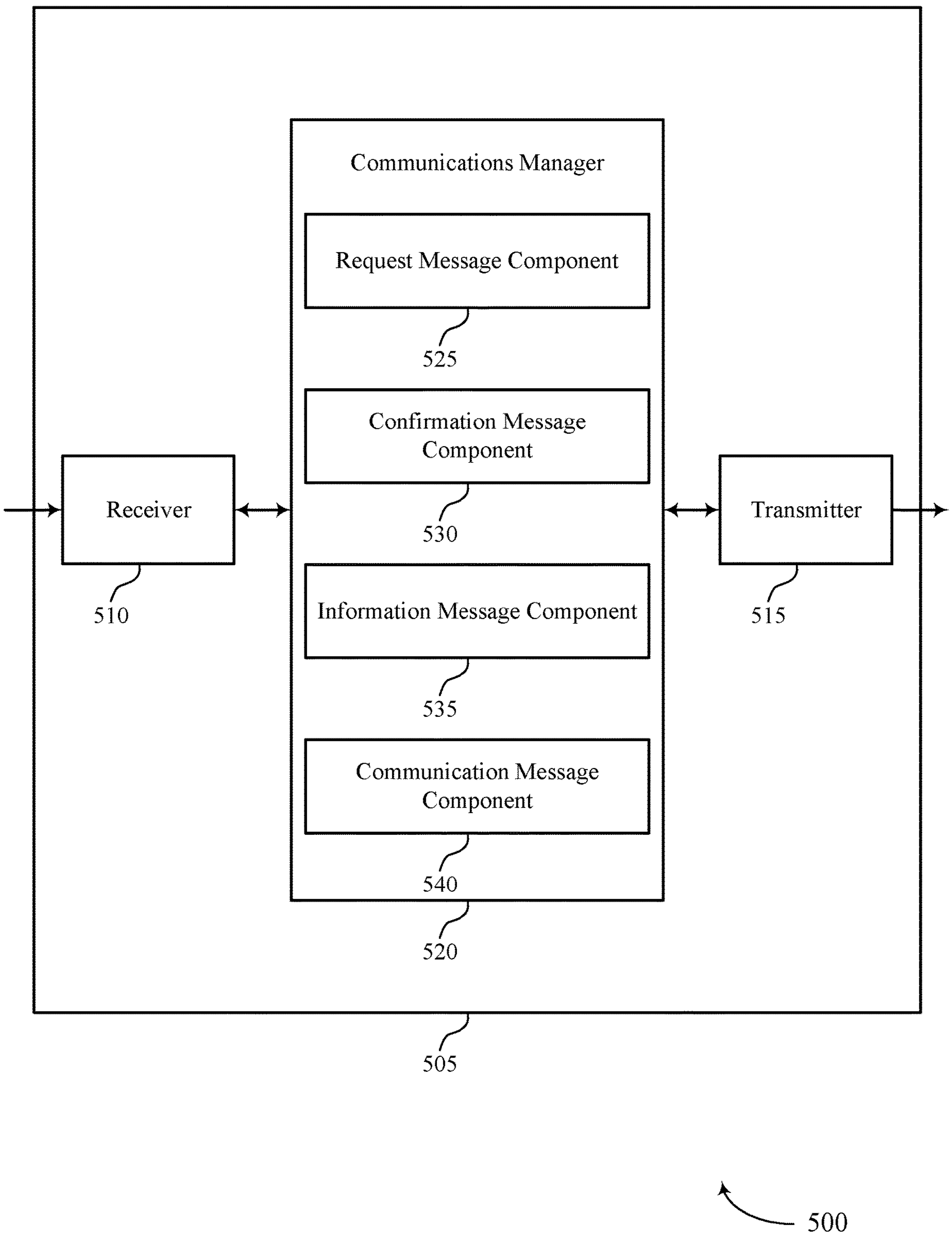

Communications Manager
Request Message Component
525
Confirmation Message Component
530
Receiver
510
Transmitter
515
Information Message Component
535
Communication Message Component
540
520
505
500

FIG. 5

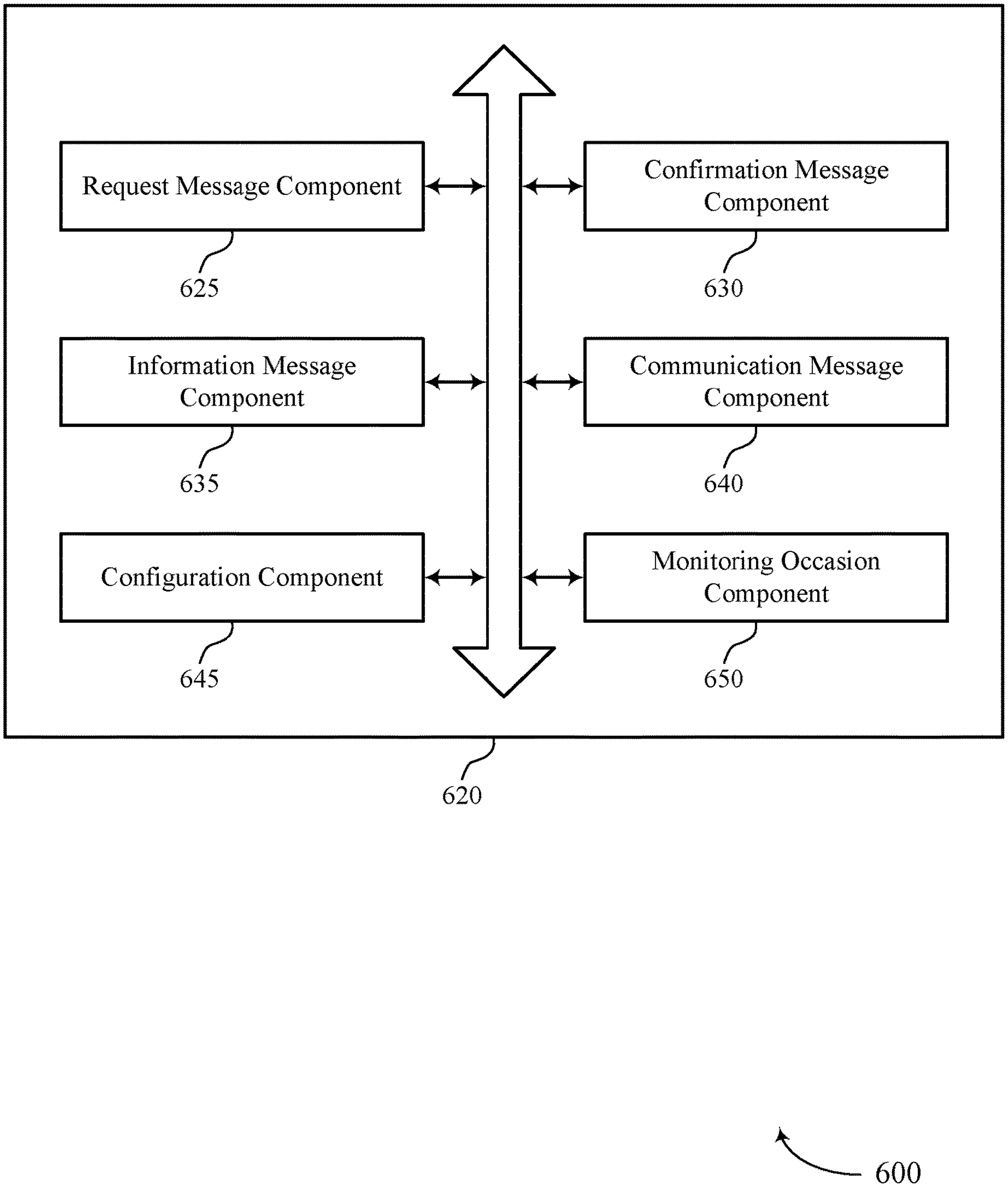

Request Message Component
625
Confirmation Message Component
630
Information Message Component
635
Communication Message Component
640
Configuration Component
645
Monitoring Occasion Component
650
620
600

FIG. 6

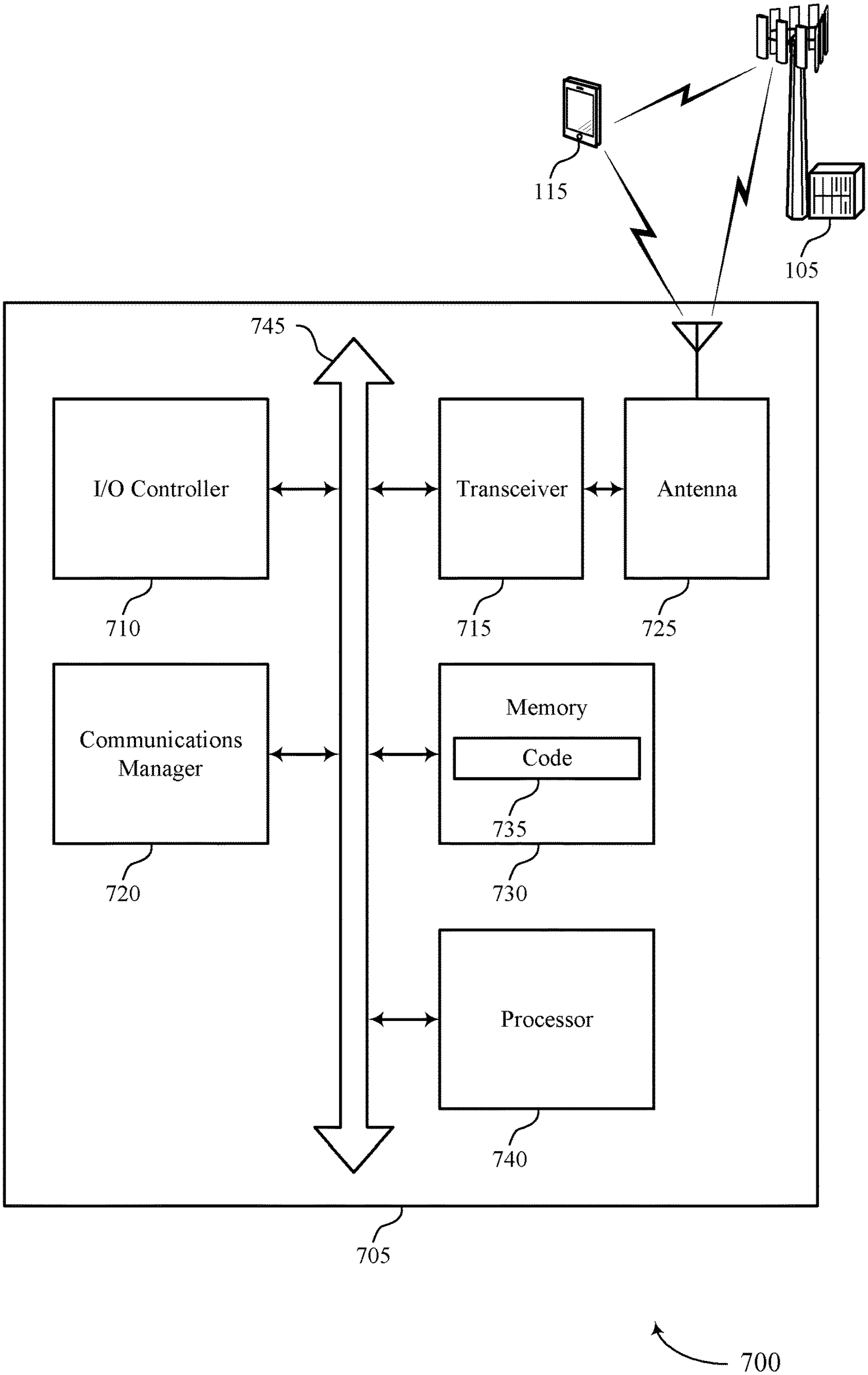

115
105
745
I/O Controller
Transceiver
Antenna
710
715
725
Communications Manager
Memory
Code
735
720
730
Processor
740
705
700

FIG. 7

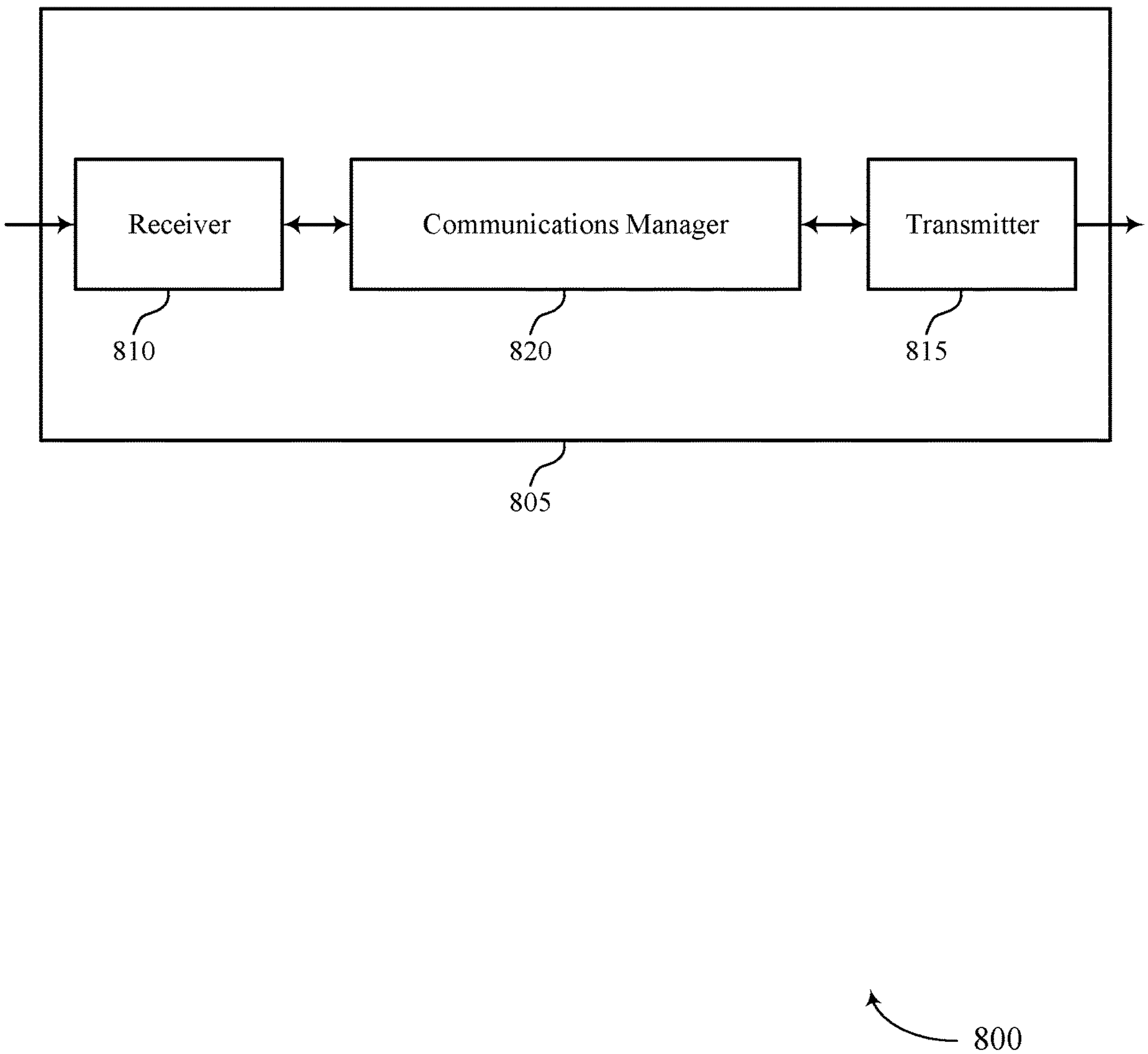

Receiver
Communications Manager
Transmitter
810
820
815
805
800

FIG. 8

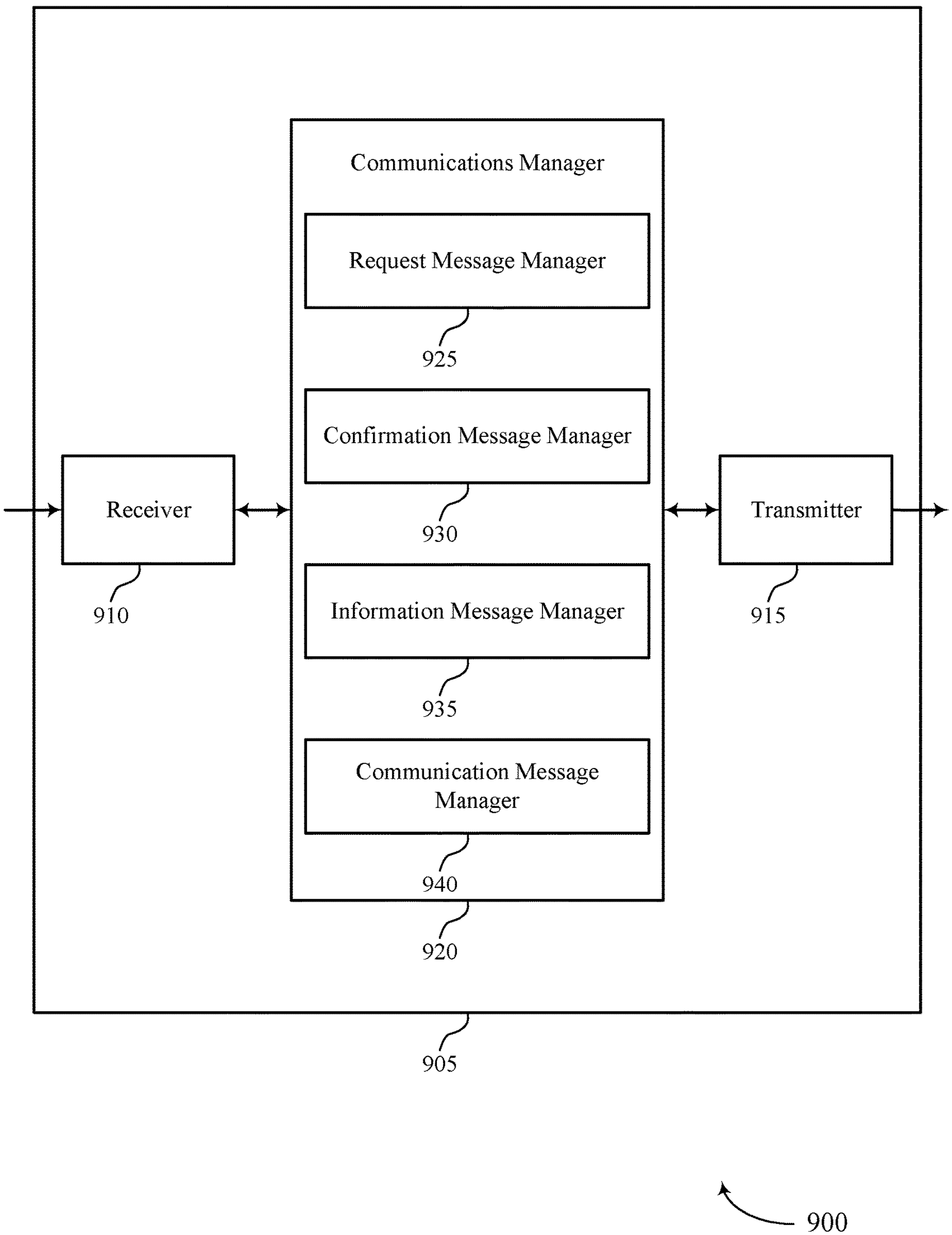

Communications Manager
Request Message Manager
925
Confirmation Message Manager
930
Receiver
Transmitter
Information Message Manager
910
915
935
Communication Message Manager
940
920
905
900

FIG. 9

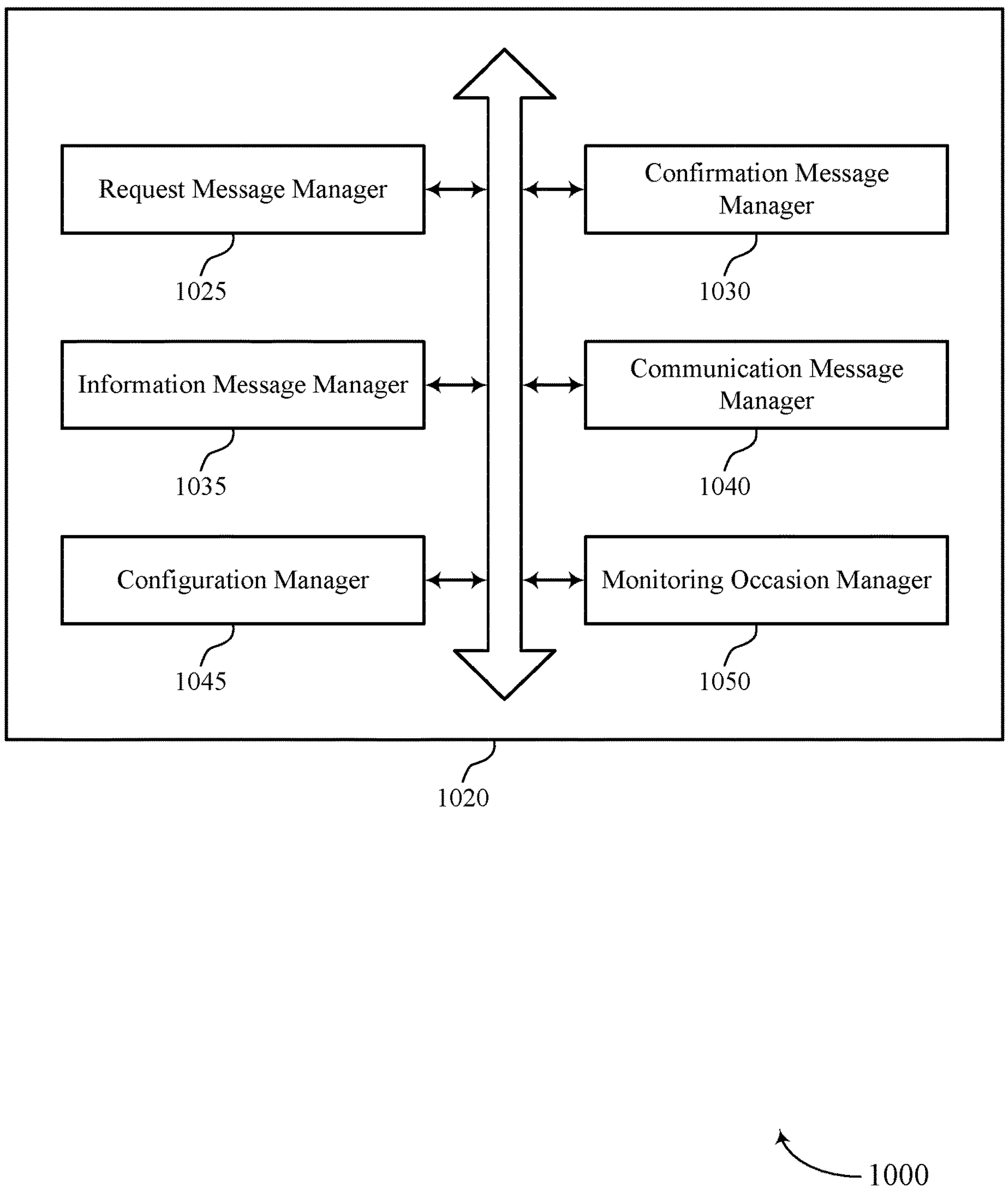

Request Message Manager
1025
Confirmation Message Manager
1030
Information Message Manager
1035
Communication Message Manager
1040
Configuration Manager
1045
Monitoring Occasion Manager
1050
1020
1000

FIG. 10

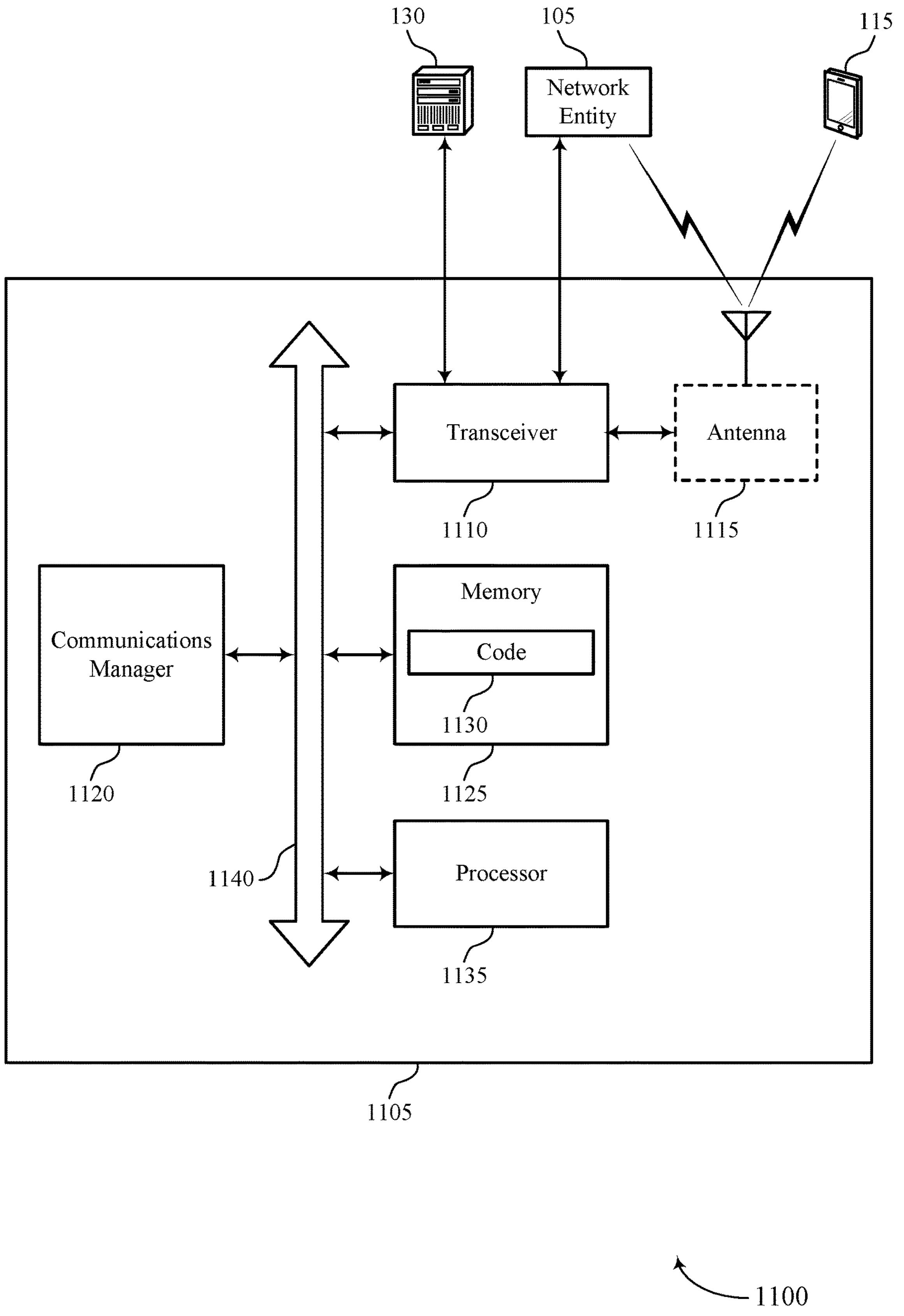

130
105
Network Entity
115
Transceiver
Antenna
1110
1115
Memory
Code
Communications Manager
1130
1120
1125
1140
Processor
1135
1105
1100

FIG. 11

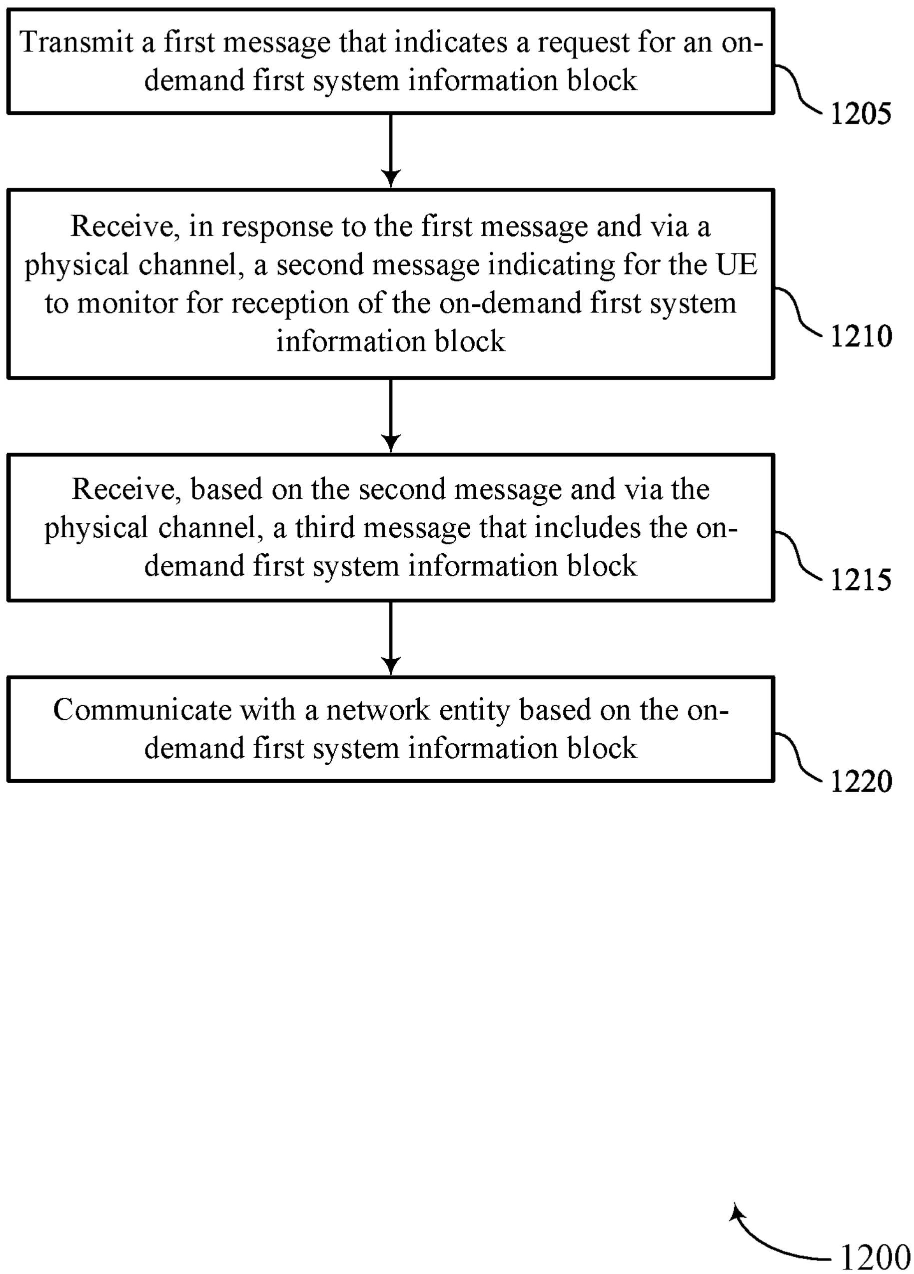

Transmit a first message that indicates a request for an on-demand first system information block
1205
Receive, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block
1210
Receive, based on the second message and via the physical channel, a third message that includes the on-demand first system information block
1215
Communicate with a network entity based on the on-demand first system information block
1220
1200

FIG. 12

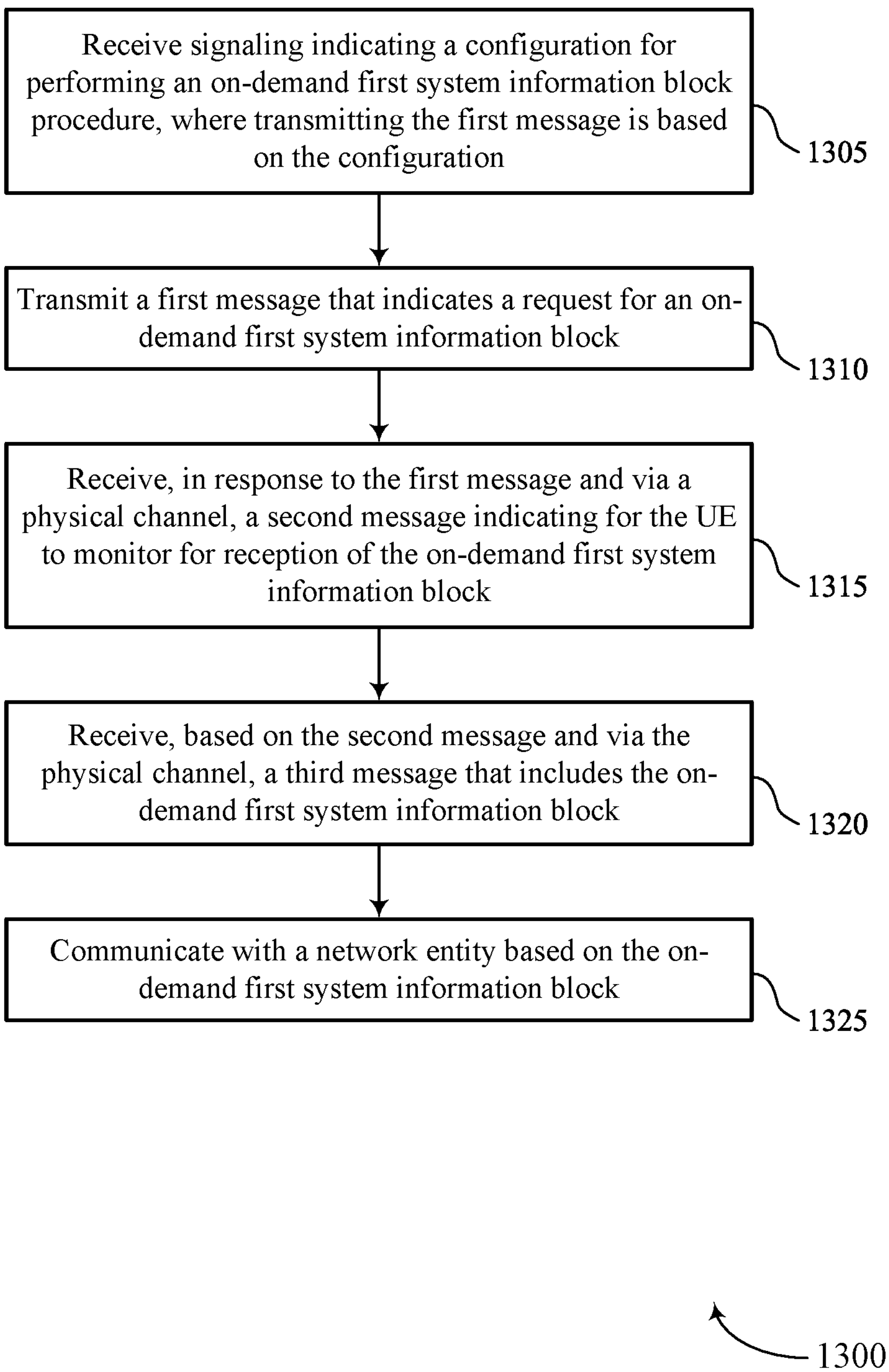

Receive signaling indicating a configuration for performing an on-demand first system information block procedure, where transmitting the first message is based on the configuration
1305
Transmit a first message that indicates a request for an on-demand first system information block
1310
Receive, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block
1315
Receive, based on the second message and via the physical channel, a third message that includes the on-demand first system information block
1320
Communicate with a network entity based on the on-demand first system information block
1325
1300

FIG. 13

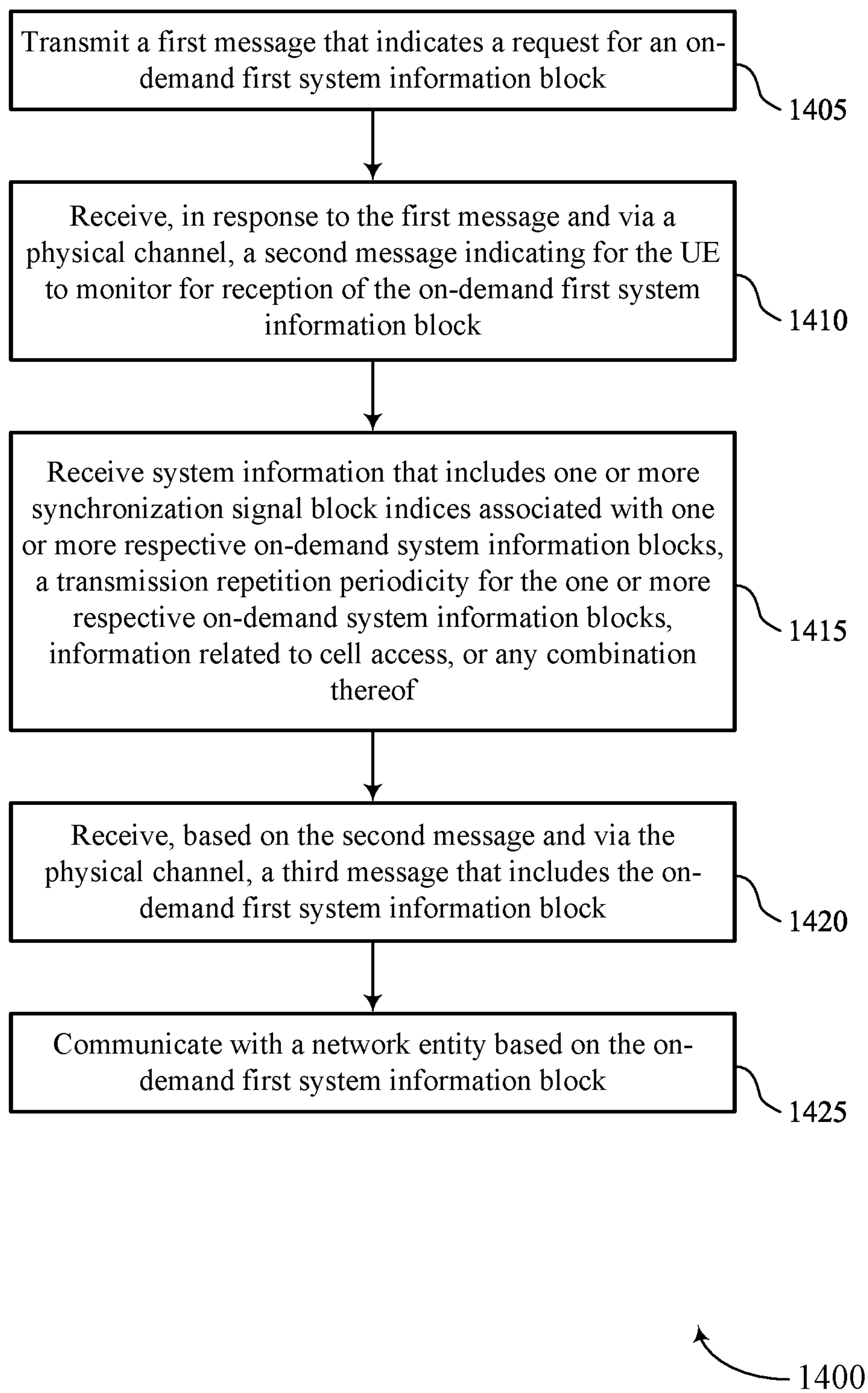

Transmit a first message that indicates a request for an on-demand first system information block
1405
Receive, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block
1410
Receive system information that includes one or more synchronization signal block indices associated with one or more respective on-demand system information blocks, a transmission repetition periodicity for the one or more respective on-demand system information blocks, information related to cell access, or any combination thereof
1415
Receive, based on the second message and via the physical channel, a third message that includes the on-demand first system information block
1420
Communicate with a network entity based on the on-demand first system information block
1425
1400

FIG. 14

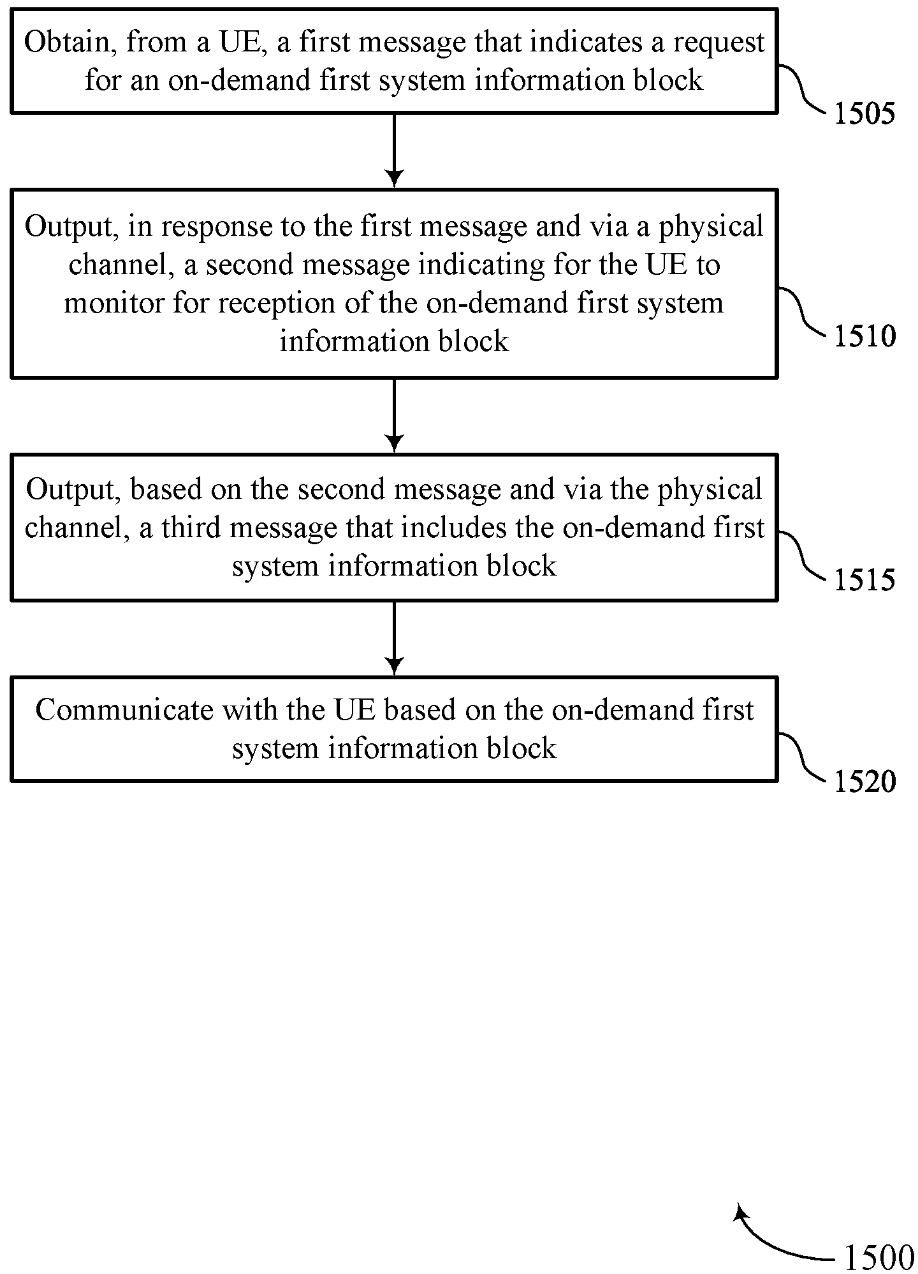

Obtain, from a UE, a first message that indicates a request for an on-demand first system information block
1505
Output, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block
1510
Output, based on the second message and via the physical channel, a third message that includes the on-demand first system information block
1515
Communicate with the UE based on the on-demand first system information block
1520
1500

FIG. 15

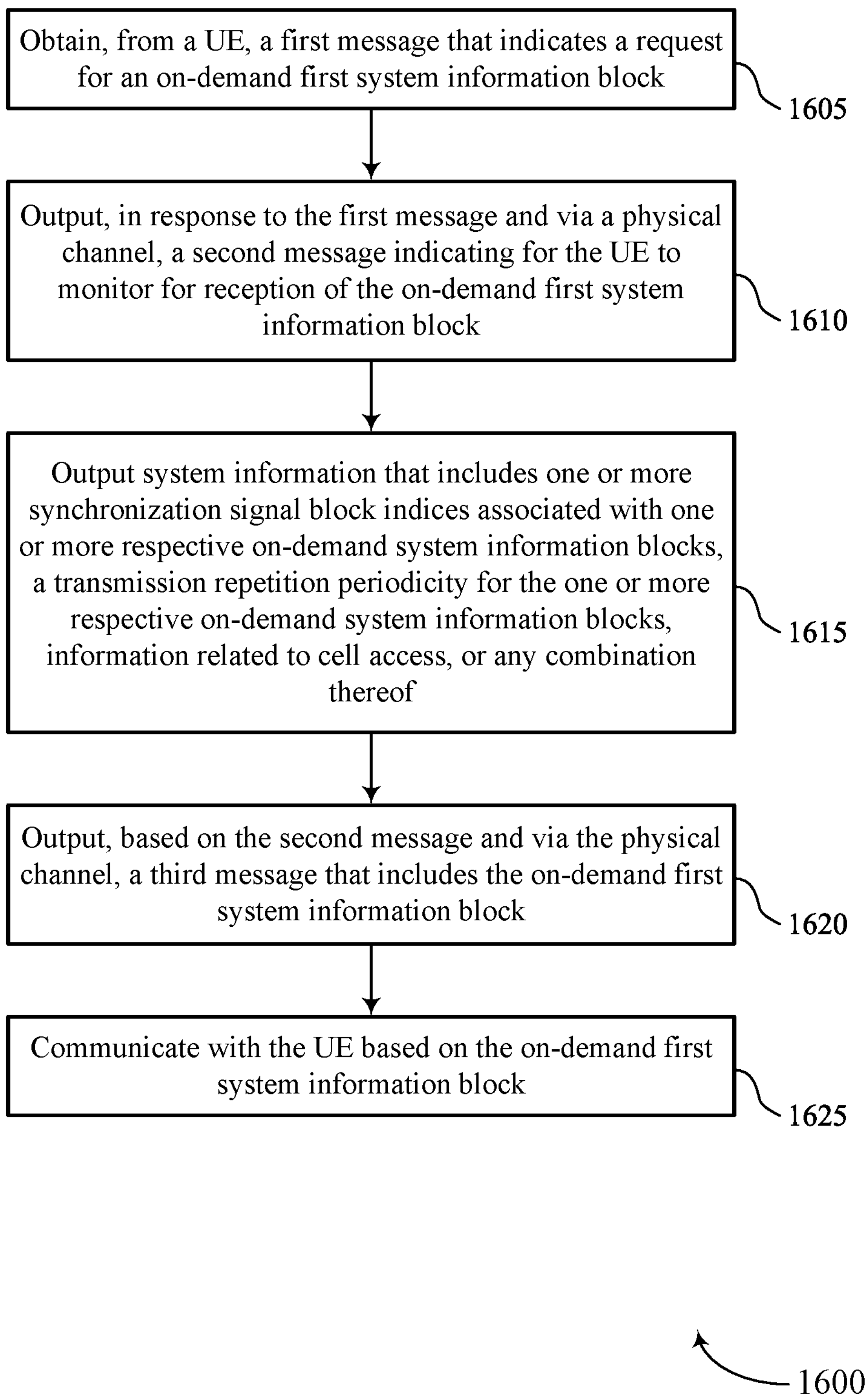

Obtain, from a UE, a first message that indicates a request for an on-demand first system information block
1605
Output, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block
1610
Output system information that includes one or more synchronization signal block indices associated with one or more respective on-demand system information blocks, a transmission repetition periodicity for the one or more respective on-demand system information blocks, information related to cell access, or any combination thereof
1615
Output, based on the second message and via the physical channel, a third message that includes the on-demand first system information block
1620
Communicate with the UE based on the on-demand first system information block
1625
1600

FIG. 16

RANDOM ACCESS CHANNEL BASED REQUESTS FOR ON-DEMAND SYSTEM INFORMATION BLOCKS

FIELD OF TECHNOLOGY

[0001] The following relates to wireless communications, including random access channel based requests for on-demand system information blocks.

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 random access channel based requests for on-demand system information blocks. For example, the described techniques provide for a user equipment (UE) that may apply one or more signaling methods to perform on-demand first system information block (SIB1) requests while the UE is in an idle (or inactive) mode. For example, the UE may support an on-demand SIB1 procedure by an uplink wake-up signal using one or more signals (e.g., using an existing signal, message, or channel). In some cases, the UE may receive a configuration for performing the on-demand SIB1 requests (e.g., via synchronization signal block (SSB) signaling, in a particular physical broadcast channel (PBCH)) from a network entity that supports on-demand SIB1 (e.g., an on-demand SIB1 cell). In some other cases, the UE may receive the configuration for performing the on-demand SIB1 requests (e.g., via SI or RRC) from a network entity that supports preconfigured (e.g., always-on) SSB and SIB1. In some examples, an on-demand SIB1 cell may operate in a same frequency or a different frequency than a network entity with preconfigured SSB and SIB1. The UE may transmit a first message (e.g., a random access channel (RACH) message) to the network entity. The first message may indicate a request for an on-demand SIB1. In response, the UE may receive, from the network entity, a second message (e.g., a second RACH message) indicating for the UE to monitor for the on-demand SIB1. The UE may receive, from the network entity, a third message that includes the on-demand SIB1. The UE may communicate with the network entity based on information indicated in the on-demand SIB1. Thus, the UE may request SIB1 messages from a network entity on demand (e.g., when the UE determines to obtain the SIB1 messages).

[0004] A method for wireless communications by a UE is described. The method may include transmitting a first message that indicates a request for an on-demand first system information block, receiving, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block, receiving, based on the second message and via the physical channel, a third message that includes the on-demand first system information block, and communicating with a network entity based on the on-demand first system information block.

[0005] A UE for wireless communications 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 transmit a first message that indicates a request for an on-demand first system information block, receive, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block, receive, based on the second message and via the physical channel, a third message that includes the on-demand first system information block, and communicate with a network entity based on the on-demand first system information block.

[0006] Another UE for wireless communications is described. The UE may include means for transmitting a first message that indicates a request for an on-demand first system information block, means for receiving, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block, means for receiving, based on the second message and via the physical channel, a third message that includes the on-demand first system information block, and means for communicating with a network entity based on the on-demand first system information block.

[0007] A non-transitory computer-readable medium storing code for wireless communications is described. The code may include instructions executable by one or more processors to transmit a first message that indicates a request for an on-demand first system information block, receive, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block, receive, based on the second message and via the physical channel, a third message that includes the on-demand first system information block, and communicate with a network entity based on the on-demand first system information block.

[0008] Some examples of the method, UEs, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for receiving signaling indicating a configuration for performing an on-demand first system information block procedure, where transmitting the first message may be based on the configuration.

[0009] In some examples of the method, UEs, and non-transitory computer-readable medium described herein, receiving the second message may include operations, features, means, or instructions for receiving a confirmation of successful reception of the request for the on-demand first system information block.

[0010] In some examples of the method, UEs, and non-transitory computer-readable medium described herein, receiving the second message may include operations, features, means, or instructions for receiving signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand system information blocks, a transmission repetition periodicity for the one or more respective on-demand system information blocks, a time duration during which the UE may be to monitor one or more physical channels, information related to cell access, or any combination thereof.

[0011] In some examples of the method, UEs, and non-transitory computer-readable medium described herein, the second message may be a random access response message.

[0012] In some examples of the method, UEs, and non-transitory computer-readable medium described herein, the second message may be a downlink control information message based on a cyclic redundancy check that may be scrambled by a random access radio network temporary identifier.

[0013] In some examples of the method, UEs, and non-transitory computer-readable medium described herein, the signaling may be received in one or more fields of the downlink control information message that may be also used for a second set of signaling information.

[0014] In some examples of the method, UEs, and non-transitory computer-readable medium described herein, the signaling may be received in one or more fields of the downlink control information message that may be reserved for indicating for the UE to monitor for reception of the on-demand first system information block.

[0015] In some examples of the method, UEs, and non-transitory computer-readable medium described herein, receiving the signaling may include operations, features, means, or instructions for receiving the signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand synchronization signal blocks, a transmission repetition periodicity for the one or more respective on-demand synchronization signal blocks, or any combination thereof.

[0016] In some examples of the method, UEs, and non-transitory computer-readable medium described herein, communicating with the network entity may include operations, features, means, or instructions for transitioning from an idle state to a radio resource control connected state.

[0017] In some examples of the method, UEs, and non-transitory computer-readable medium described herein, the first message further indicates a request for an on-demand synchronization signal.

[0018] Some examples of the method, UEs, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for receiving signaling indicating a configuration for a set of multiple monitoring occasions associated with receiving a set of preconfigured synchronization signals, where time resources for receiving the on-demand synchronization signal may be non-overlapping with the set of multiple monitoring occasions.

[0019] In some examples of the method, UEs, and non-transitory computer-readable medium described herein, transmitting the first message may include operations, features, means, or instructions for transmitting the first message via a physical random access channel, a physical uplink shared channel, or a physical uplink control channel.

[0020] In some examples of the method, UEs, and non-transitory computer-readable medium described herein, the first message and the second message may be random access channel messages in a random access channel procedure.

[0021] In some examples of the method, UEs, and non-transitory computer-readable medium described herein, the physical channel may be a physical downlink shared channel or a physical downlink control channel.

[0022] A method for wireless communications by a network entity is described. The method may include obtaining, from a UE, a first message that indicates a request for an on-demand first system information block, outputting, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block, outputting, based on the second message and via the physical channel, a third message that includes the on-demand first system information block, and communicating with the UE based on the on-demand first system information block.

[0023] A network entity for wireless communications 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 obtain, from a UE, a first message that indicates a request for an on-demand first system information block, output, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block, output, based on the second message and via the physical channel, a third message that includes the on-demand first system information block, and communicate with the UE based on the on-demand first system information block.

[0024] Another network entity for wireless communications is described. The network entity may include means for obtaining, from a UE, a first message that indicates a request for an on-demand first system information block, means for outputting, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block, means for outputting, based on the second message and via the physical channel, a third message that includes the on-demand first system information block, and means for communicating with the UE based on the on-demand first system information block.

[0025] A non-transitory computer-readable medium storing code for wireless communications is described. The code may include instructions executable by one or more processors to obtain, from a UE, a first message that indicates a request for an on-demand first system information block, output, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block, output, based on the second message and via the physical channel, a third message that includes the on-demand first system information block, and communicate with the UE based on the on-demand first system information block.

[0026] Some examples of the method, network entities, and non-transitory computer-readable medium described herein may further include operations, features, means, or instructions for outputting signaling indicating a configuration for performing an on-demand first system information block procedure, where obtaining the first message may be based on the configuration.

[0027] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, outputting the second message may include operations, features, means, or instructions for outputting a confirmation of successful reception of the request for the on-demand first system information block.

[0028] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, outputting the second message may include operations, features, means, or instructions for outputting signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand system information blocks, a transmission repetition periodicity for the one or more respective on-demand system information blocks, a time duration during which the UE may be to monitor one or more physical channels, information related to cell access, or any combination thereof.

[0029] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, the second message may be a random access response message.

[0030] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, the second message may be a downlink control information message based on a cyclic redundancy check that may be scrambled by a random access radio network temporary identifier.

[0031] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, the signaling may be output in one or more fields of the downlink control information message that may be also used for a second set of signaling information.

[0032] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, the signaling may be output in one or more fields of the downlink control information message that may be reserved for indicating for the UE to monitor for reception of the on-demand first system information block.

[0033] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, outputting the signaling may include operations, features, means, or instructions for outputting the signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand synchronization signal blocks, a transmission repetition periodicity for the one or more respective on-demand synchronization signal blocks, or any combination thereof.

[0034] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, communicating with the UE may include operations, features, means, or instructions for transitioning from an idle state to a radio resource control connected state.

[0035] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, the first message further indicates a request for an on-demand synchronization signal.

[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 outputting signaling indicating a configuration for a set of multiple monitoring occasions associated with receiving a set of preconfigured synchronization signals, where time resources for receiving the on-demand synchronization signal may be non-overlapping with the set of multiple monitoring occasions.

[0037] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, obtaining the first message may include operations, features, means, or instructions for obtaining the first message via a physical random access channel, a physical uplink shared channel, or a physical uplink control channel.

[0038] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, the first message and the second message may be random access channel messages in a random access channel procedure.

[0039] In some examples of the method, network entities, and non-transitory computer-readable medium described herein, the physical channel may be a physical downlink shared channel or a physical downlink control channel.

BRIEF DESCRIPTION OF THE DRAWINGS

[0040] FIG. **1** shows an example of a wireless communications system that supports random access channel based requests for on-demand system information blocks in accordance with one or more aspects of the present disclosure.

[0041] FIG. **2** shows an example of a wireless communications system that supports random access channel based requests for on-demand system information blocks in accordance with one or more aspects of the present disclosure.

[0042] FIG. **3** shows an example of a process flow that supports random access channel based requests for on-demand system information blocks in accordance with one or more aspects of the present disclosure.

[0043] FIGS. **4** and **5** show block diagrams of devices that support random access channel based requests for on-demand system information blocks in accordance with one or more aspects of the present disclosure.

[0044] FIG. **6** shows a block diagram of a communications manager that supports random access channel based requests for on-demand system information blocks in accordance with one or more aspects of the present disclosure.

[0045] FIG. **7** shows a diagram of a system including a device that supports random access channel based requests for on-demand system information blocks in accordance with one or more aspects of the present disclosure.

[0046] FIGS. **8** and **9** show block diagrams of devices that support random access channel based requests for on-demand system information blocks in accordance with one or more aspects of the present disclosure.

[0047] FIG. **10** shows a block diagram of a communications manager that supports random access channel based requests for on-demand system information blocks in accordance with one or more aspects of the present disclosure.

[0048] FIG. **11** shows a diagram of a system including a device that supports random access channel based requests for on-demand system information blocks in accordance with one or more aspects of the present disclosure.

[0049] FIGS. **12** through **16** show flowcharts illustrating methods that support random access channel based requests for on-demand system information blocks in accordance with one or more aspects of the present disclosure.

DETAILED DESCRIPTION

[0050] In some wireless communications systems, a user equipment (UE) may use information included in a first system information block (SIB1) for communication with a network entity. The network entity may transmit the SIB1 to the UE for identifying one or more cells that the UE may access. Additionally, the network entity may be configured to transmit synchronization signaling or system information signaling within a cell based on a configured periodicity, regardless of if there are any UEs within the cell that are capable of or in need of receiving these signals. This may result in inefficient use of network energy.

[0051] Techniques described herein support a UE that may apply one or more signaling methods to perform on-demand SIB1 requests while the UE is in an idle mode or an inactive mode (e.g., RRC inactive mode). For example, the UE may support an on-demand SIB1 procedure by an uplink wake-up signal using one or more signals. In some cases, the UE may receive a configuration for performing the on-demand SIB1 requests (e.g., via an on-demand synchronization signal block (SSB), an "always on" SSB, or an "always on" SIB1) from a network entity. The UE may transmit a first message (e.g., a random access channel (RACH) message or another message via a physical channel) to the network entity. The first message may indicate a request for an on-demand SIB1. In response, the UE may receive, from the network entity, a second message indicating for the UE to monitor for the on-demand SIB1. The UE may receive, from the network entity, a third message that includes the on-demand SIB1. The UE may communicate with the network entity based on information indicated in the on-demand SIB1. Thus, the UE may request SIB1 messages from a network entity on demand (e.g., when the UE determines to obtain the SIB1 messages), resulting in more efficient use of network energy, reduced latency, among other technical advantages. These and other techniques are described in further detail with respect to the figures.

[0052] Aspects of the disclosure are initially described in the context of wireless communications systems. Aspects of the disclosure are then described in the context of a process flow. Aspects of the disclosure are further illustrated by and described with reference to apparatus diagrams, system diagrams, and flowcharts that relate to random access channel based requests for on-demand system information blocks.

[0053] FIG. **1** shows an example of a wireless communications system **100** that supports random access channel based requests for on-demand system information blocks 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.

[0054] 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).

[0055] 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**.

[0056] 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.

[0057] 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**.

[0058] 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**).

[0059] 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)).

[0060] 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** (L**3**), layer **2** (L**2**)) 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** (L**1**) (e.g., physical (PHY) layer) or L**2** (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., F**1**, F**1**-*c*, F**1**-*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.

[0061] 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.

[0062] 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**).

[0063] 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.

[0064] 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**.

[0065] 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**).

[0066] 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**.

[0067] 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).

[0068] 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.

[0069] 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)).

[0070] 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).

[0071] 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.

[0072] 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.

[0073] 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.

[0074] 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) communication 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**.

[0075] 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.

[0076] 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.

[0077] 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.

[0078] 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.

[0079] 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).

[0080] 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.

[0081] Some wireless communications systems may support signaling using one or more frequency ranges and applying one or more multiplexing patterns. Each multiplexing pattern of the one or more multiplexing patterns may include transmitting, at a network entity, an SSB (or a physical broadcast channel (PBCH) block), a physical downlink control channel (PDCCH) block, a physical downlink shared channel (PDSCH) block, or any combination thereof. In some cases, the network entity may transmit the PDCCH block via a set of time-frequency resources (e.g., a control-resource set, or a CORESET). The network entity may transmit a set of signals using a first frequency range that supports a first multiplexing pattern. For example, the first multiplexing pattern may include transmitting an SSB before transmitting a PDCCH block (e.g., a CORESET block) and a PDSCH block. In some cases, the network entity may transmit a SIB1 via PDSCH (e.g., in at least a portion of the PDSCH block). A given SIB1 (or a remaining minimum system information (RMSI)) may be associated with a respective SSB.

[0082] The network entity may transmit a set of signals using a second frequency range that supports a second multiplexing pattern. The second frequency range may be larger than the first frequency range. In some cases, the second multiplexing pattern may include transmitting an SSB at a transmission occasion which overlaps with a transmission occasion for a PDCCH block and a PDSCH block (e.g., the network entity may transmit the SSB simultaneously with the PDCCH block and the PDSCH block). The second frequency range may be sufficiently large such that the network entity may transmit the SSB over a first subset of frequencies and may transmit the PDCCH block and the PDSCH block over a second subset of frequencies. The network entity may be unable to support the second multiplexing pattern using the first frequency range.

[0083] In some wireless communications systems, a network entity may transmit a SIB1 according to a variable (or a default) transmission repetition periodicity (e.g., every 160 milliseconds or within 160 milliseconds). The first multiplexing pattern may correspond to a SIB1 repetition periodicity (e.g., a default repetition periodicity) at a configured value (e.g., 20 milliseconds). In the second multiplexing pattern, a SIB1 repetition periodicity may have a value equal to an SSB periodicity.

[0084] Techniques described herein support a UE that may apply one or more signaling methods to perform on-demand SIB1 requests while the UE is in an idle (or inactive) mode. For example, the UE may support an on-demand SIB1 procedure by an uplink wake-up signal using one or more signals (e.g., using an existing signal, message, or channel). That is, in some examples, the UE may leverage existing signaling mechanisms (e.g., signaling used for random access procedures) to request on-demand signaling, such as on-demand SIB1 messages and/or on-demand SSB signaling. In some cases, the UE may receive a configuration for performing the on-demand SIB1 requests (e.g., via an on-demand SSB, an "always on" SSB, or an "always on" SIB1) from a network entity. The UE may transmit a first message (e.g., a RACH message) to the network entity. The first message may indicate a request for an on-demand SIB1. In response, the UE may receive, from the network entity, a second message (e.g., a second RACH message) indicating for the UE to monitor for the on-demand SIB1. The UE may receive, from the network entity, a third message that includes the on-demand SIB1. The UE may communicate with the network entity based on information indicated in the on-demand SIB1. Thus, the UE may request SIB1 messages from a network entity on demand (e.g., when the UE determines to obtain the SIB1 messages), resulting in more efficient use of network energy. These and other techniques are described in further detail with respect to the figures.

[0085] FIG. **2** shows an example of a wireless communications system **200** that supports random access channel based requests for on-demand system information blocks in accordance with one or more aspects of the present disclosure. In some cases, the wireless communications system **200** may implement or be implemented by aspects of the wireless communications system **100**. For example, the wireless communications system **200** may include one or more UEs **115** (e.g., a UE **115**-*a*) and one or more network entities **105** (e.g., a network entity **105**-*a*), which may be examples of the corresponding devices as described herein. The UE **115**-*a* may transmit, to the network entity **105**-*a*, one or more messages via an uplink connection **205**. The UE **115**-*a* may receive, from the network entity **105**-*a*, one or more messages via a downlink connection **210**. The uplink connection **205** and the downlink connection **210** may be respective examples of physical channels (e.g., PDCCH, PDSCH, physical uplink control channel (PUCCH), physical uplink shared channel (PUSCH), or the like). In the following description, although procedures may refer to transmitting or receiving an on-demand SIB1 250, the procedures may also be applied for transmitting or receiving an on-demand SSB **245**.

[0086] In some implementations, the UE **115**-*a* may receive a configuration (e.g., a RACH configuration) for performing an on-demand SIB1 procedure. For example, the UE **115**-*a* may receive the configuration from the network entity **105**-*a*, from another cell (e.g., a cell which is separate from the network entity **105**-*a*), or both. The UE **115**-*a* may receive the configuration in an SSB (e.g., a preconfigured SSB **240** from the network entity **105**-*a*).

[0087] In some cases, the UE **115**-*a* may transmit a request message **215** via the uplink connection **205** based on the configuration. The request message **215** may include a request for an on-demand SIB1 250, an on-demand SSB **245**, or both, from a cell that supports on-demand SIB1 250, on-demand SSB **245**, or both. The request message **215** may be an example of a RACH message (e.g., a first message (Msg1), a MsgA, or a third message (Msg3) of a RACH procedure), or may be an example of another type of uplink messaging sent via a physical channel. An occasion for the request message **215** may be a shared occasion (e.g., shared with one or more other RACH messages) or may be a separate occasion (e.g., reserved for the SIB1 or SSB request). For example, the UE **115**-*a* may transmit the request message **215** as part of a RACH procedure (e.g., for initial access of a cell). After transmitting the request message **215**, the UE **115**-*a* may begin monitoring for a confirmation message **220**.

[0088] In some cases, if the request message **215** is an example of or is included in a first message of a RACH procedure (e.g., Msg1), the UE **115**-*a* may transmit the request message **215** via a physical random access channel (PRACH). In some other cases, if the request message **215** is an example of or is included in a third message of a four-step RACH procedure (e.g., Msg3) or a first message of a two-step RACH procedure (MsgA), the UE **115**-*a* may transmit the request message **215** via PRACH, PUSCH, or both.

[0089] In some examples, after successfully receiving the request message **215**, the network entity **105**-*a* may transmit the confirmation message **220** to the UE **115**-*a* via the downlink connection **210** (e.g., a physical channel). The confirmation message **220** may be an example of a physical RACH message (e.g., a second message (Msg2), a MsgB, or a fourth message (Msg4) of a RACH procedure). In some cases, the confirmation message **220** may be an example of a monitoring message. For example, the confirmation message **220** may indicate for the UE **115**-*a* to monitor for an information message **225** (e.g., including an on-demand SIB1 250 or an on-demand SSB **245**). If the network entity **105**-*a* does not receive the request message **215**, the network entity **105**-*a* may refrain from transmitting the confirmation message **220**, the information message **225**, or both. The confirmation message **220** may allow the UE **115**-*a* to monitor for the information message **225** when the network entity **105**-*a* is to transmit the information message **225**, resulting in relatively low access latency and reduced power consumption at the UE **115**-*a*. In some cases, if the confirmation message **220** is an example of or is included in a second message (e.g., Msg2) or a fourth message (e.g., Msg4) of a RACH procedure, the UE **115**-*a* may receive the confirmation message **220** via PDSCH. In some cases, the UE may receive the confirmation message **220** via PDCCH. If the confirmation message **220** is an example of or is included in a second message (e.g., MsgB) of a two-step RACH procedure, the UE **115**-*a* may receive the confirmation message **220** via PDSCH, PDCCH, or both.

[0090] In some cases, after receiving the confirmation message **220**, the UE **115**-*a* may monitor for the information message **225**. The UE **115**-*a* may receive the information message **225** via the downlink connection **210**. The information message **225** may include an on-demand SSB **245**, an on-demand SIB1 250, or both. Thus, the information message **225** may be an example of an on-demand information message.

[0091] The network entity **105**-*a* and the UE **115**-*a* may perform signaling according to a timing diagram **230**. For example, the UE may receive one or more preconfigured SSBs **240** (e.g., sparse "always on" SSBs), one or more on-demand SSBs **245**, and one or more on-demand SIB1s **250**. The UE **115**-*a* may perform a wakeup signal procedure **235**, which may include detecting a wakeup trigger (e.g., a signal from the network entity **105**-*a* or an internal signal) and transmitting one or more signals indicating a transition from an idle state to an active state at the UE **115**-*a*. In some cases, the UE **115**-*a* may receive the one or more preconfigured SSBs **240** in accordance with a first periodicity **255**. Additionally or alternatively, the UE **115**-*a* may receive the one or more on-demand SSBs **245**, the one or more on-demand SIB1s **250**, or both, in accordance with a second periodicity **260**. In some examples, the first periodicity **255** may be greater than or less than the second periodicity **260** (e.g., the UE **115**-*a* may receive the preconfigured SSBs **240** less frequently than the on-demand SSBs **245** and the on-demand SIB1s **250**) according to one or more request messages **215** from the UE **115**-*a*.

[0092] In some implementations, the network entity **105**-*a* and the UE **115**-*a* may individually or collectively perform a signaling procedure using a RACH procedure (e.g., a 4-step RACH procedure). The signaling procedure may be an example of an on-demand SIB1 procedure or an other system information (OSI) procedure. For example, the OSI may include system information other than SIB1 (e.g., SIB2, SIB3, and so on). In some cases, if dedicated RACH occasions of the RACH procedure are configured, the signaling procedure may be based on contention free random access (CFRA). For example, the UE **115**-*a* may transmit, to the network entity **105**-*a*, a first message of the RACH procedure (e.g., The request message **215** may be a Msg1) including a request for an on-demand SIB1. The network entity **105**-*a* may transmit, to the UE **115**-*a*, a second message of the RACH procedure (e.g., the confirmation message **220** may be a Msg2). The second message of the RACH procedure may be an example of a random access response (RAR) and may include at least a random access preamble identifier (RAPID), which may depend on or may be based on an index for a random access preamble (e.g., the Msg1 of the RACH) and time/frequency resources where PRACH (carrying Msg1) is transmitted. The RAR may be included in (e.g., may be a part of) a second message of the RACH procedure (e.g., Msg2).

[0093] In some cases, if dedicated RACH occasions of the RACH procedure are not configured, the signaling procedure may be based on contention based random access (CBRA). For example, the UE **115**-*a* may transmit, to the network entity **105**-*a*, a third message of the RACH procedure (e.g., The request message **215** may be a Msg3) including a request for an on-demand SIB1 (e.g., RRCSib1Request). The network entity **105**-*a* may transmit, to the UE **115**-*a*, a fourth message of the RACH procedure (e.g., the confirmation message **220** may be a Msg4). After receiving the second message of the RACH procedure, the fourth message of the RACH procedure, or any combination thereof, the UE **115**-*a* may receive the information message **225** (e.g., including the on-demand SIB1) from the network entity **105**-*a* and may communicate with the network entity **105**-*a* based on the information message **225**.

[0094] In some implementations, the RACH procedure may be an example of a 2-step RACH procedure (e.g., a type-**2** RACH procedure). For example, the UE **115**-*a* may receive, in an SSB, in an RRC message, or any combination thereof, a RACH configuration from the network entity **105**-*a*. The UE **115**-*a* may transmit a first message of the RACH procedure (e.g., msgA, including a preamble via PRACH and a payload via PUSCH). The first message may include or may be an example of the request message **215** (e.g., the request message **215** may be transmitted in the PRACH or in the PUSCH of msgA). The network entity **105**-*a* may decode the payload of the first message and may transmit, to the UE **115**-*a*, a second message (e.g., msgB). For example, the UE **115**-*a* may receive a first portion of the second message via PDCCH (e.g., a cell radio network temporary identifier (C-RNTI) or a msgB RNTI). The UE **115**-*a* may receive a second portion of the second message via PDSCH (e.g., a success RAR). In some cases, the second message may include or may be an example of the confirmation message **220**. In some implementations, the UE **115**-*a* may verify that the UE **115**-*a* has a valid tracking area, a valid PUCCH resource and timing, or any combination thereof, and may transmit one or more PUCCH messages (e.g., including a hybrid automatic repeat request (HARQ) acknowledgement or negative acknowledgement) to the network entity **105**-*a*. In some cases, the msgB may have an associated window length less than or equal to a configured value (e.g., 40 milliseconds). After receiving the second message, the UE **115**-*a* may receive the information message **225** from the network entity **105**-*a*.

[0095] In some implementations, the network entity **105**-*a* may transmit a set of SSBs (e.g., a set of on-demand SSBs **245**) to the UE **115**-*a*. Each SSB of the set of SSBs may be associated with a SIB1 (e.g., an on-demand SIB1 250). In some cases, a particular SSB of the set of SSBs may not be associated with any SIB1. The network entity **105**-*a* may transmit an SSB and may refrain from transmitting a SIB1 associated with the SSB. For example, the network entity **105**-*a* may transmit the set of SSBs and may transmit a subset of associated SIB1 messages.

[0096] In some cases, the network entity **105**-*a* may transmit, to the UE **115**-*a*, a set of system information in one or more messages (e.g., in the confirmation message **220**, in the information message **225**, or both). The set of system information may include a set of SSB indices (e.g., as a bitmap) that have respective associated on-demand SIB1s **250**. The UE **115**-*a* may monitor PDCCH including DCI with grant that schedules PDSCH carrying SIB1 (e.g., the PDCCH may be referred to as a SIB1 PDCCH) according to the set of SSB indices, reducing the UE's SIB1 PDCCH search and access latency. Additionally or alternatively, the set of system information may include an indication of a duration in which the UE is to monitor SIB1 PDCCH, an indication of a SIB1 transmission repetition periodicity (e.g., the second periodicity **260**), or both. The indicated SIB1 transmission repetition periodicity may override a default SIB1 transmission repetition periodicity. In some examples, the UE **115**-*a* may receive the SIB1 via PDSCH. In some cases, the set of system information may include cell access related information. For example, the cell access related information may include cell barring information (e.g., information indicating that a cell is barred from access), cell reservation information (e.g., information indicating that a cell is reserved for future use), or both. Thus, the network entity **105**-*a* may offload some access related information from a SIB1 to the one or more messages carrying the set of system information. In some examples, the UE **115**-*a* may refrain from monitoring for or receiving a SIB1 PDCCH or PDSCH if a cell is barred or reserved. The UE **115**-*a* may refrain from re-transmitting the request message **215** (e.g., the SIB1 request) if the cell is barred or reserved.

[0097] In some implementations, the network entity **105**-*a* may transmit a downlink control information (DCI) message (e.g., The DCI message may have a DCI format 1_0 with cyclic redundancy check (CRC) scrambled by random access RNTI (RA-RNTI) or msgB RNTI) to the UE **115**-*a*. The network entity **105**-*a* may transmit the DCI message via multiple downlink transmissions. The DCI message may include scheduling information, network information, device information, or any combination thereof. For example, the DCI message may include one or more of a frequency domain resource assignment, a time domain resource assignment, a virtual resource block to physical resource block mapping, a modulation and coding scheme, a transport block scaling, least significant bits of a system frame number, one or more bits reserved for operation in a cell with or without shared spectrum access, or any combination thereof.

[0098] In some implementations, the confirmation message **220** may be a portion of a second message of a RACH (e.g., a Msg2 or a RAR) transmitted via PDCCH in accordance with the scheduling information in the DCI message. However, in some cases, the network entity **105**-*a* may not transmit a RAR. In such cases, the scheduling information in the DCI message may be unused by the UE **115**-*a*. The network entity **105**-*a* may use one or more fields of the DCI message to transmit the set of system information to the UE **115**-*a*. For example, the network entity **105**-*a* may transmit the set of system information by repurposing one or more fields in the DCI message (e.g., having DCI format 1_0 with CRC scrambled by RA-RNTI). Thus, the system information may be carried in fields of the DCI which may also be used for other information. Additionally or alternatively, the network entity **105**-*a* may transmit the set of system information by introducing one or more new fields in the DCI message. Thus, the system information may be carried in fields of the DCI which may be reserved for the system information. Such techniques may be similarly applied if the confirmation message is transmitted as a portion of a fourth message of a RACH procedure (e.g., a Msg4) via PDCCH. For example, the network entity **105**-*a* may transmit the system information in fields of a second DCI message (e.g., having DCI format 1_0 with CRC scrambled by temporary cell RNTI (TC-RNTI)).

[0099] In some implementations, the network entity **105**-*a* may transmit a set of preconfigured SSBs **240** (e.g., "always on" or "sparse" SSBs) to the UE **115**-*a*. Each preconfigured SSB **240** of the set of preconfigured SSBs **240** may be associated with an on-demand SSB **245**, an on-demand SIB1 250, or both. In some cases, a particular preconfigured SSB **240** of the set of preconfigured SSBs **240** may not be associated with any on-demand SSB **245**, on-demand SIB1, or both. The network entity **105**-*a* may transmit a preconfigured SSB **240** and may refrain from transmitting on-demand SIB1s **250** or on-demand SSBs **245** associated with the preconfigured SSB **240**. For example, the network entity **105**-*a* may transmit the set of preconfigured SSBs **240** and may transmit a subset of associated on-demand SIB1s **250**, associated on-demand SSBs **245**, or both.

[0100] In some cases, the network entity **105**-*a* may transmit, to the UE **115**-*a*, a set of system information in one or more messages (e.g., in the confirmation message **220**, in the information message **225**, or both). The set of system information may include a set of SSB indices (e.g., as a bitmap) that have respective associated on-demand SIB1s **250**, associated on-demand SSBs, or both. The UE **115**-*a* may monitor for a set of one or more on-demand SIB1s **250**, a set of one or more on-demand SSBs **245**, or both, based on the set of SSB indices. Additionally or alternatively, the set of system information may include an indication of a SIB1 transmission repetition periodicity, an on-demand SSB transmission periodicity, or both (e.g., the second periodicity **260**). The indicated periodicities may override default SIB1 or SSB transmission periodicity. In some cases, the set of system information may include cell access related information. For example, the cell access related information may include cell barring information, cell reservation information, or both. In some examples, the UE **115**-*a* may refrain from re-transmitting the request message **215** and from monitoring for or receiving a SIB1 PDCCH or PDSCH if a cell is barred or reserved.

[0101] FIG. **3** shows an example of a process flow **300** that supports random access channel based requests for on-demand system information blocks in accordance with one or more aspects of the present disclosure. The process flow **300** includes a UE **115**-*b* and a network entity **105**-*c*, which may be examples of the corresponding devices as described with respect to FIGS. **1** and **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 order shown. Some operations may also be omitted from the process flow **300**, and other operations may be added to the process flow **300**. Further, although some operations or signaling may be shown to occur at different times for discussion purposes, these operations may actually occur at the same time.

[0102] At **305**, the UE **115**-*b* may receive, from the network entity **105**-*b*, a preconfigured SSB message. The preconfigured SSB may be an example of the preconfigured SSB (e.g., an "always on" SSB) as described with reference to FIG. **2**. The preconfigured SSB may include an indication of a configuration for performing an on-demand first system information block procedure (e.g., an on-demand SIB1 procedure). Additionally or alternatively, the UE **115**-*b* may receive the configuration from a cell (e.g., separate from the network entity **105**-*b*). In some cases, the configuration may be preconfigured at the UE **115**-*b*.

[0103] At **310**, the UE **115**-*b* may transmit, to the network entity **105**-*b*, a first message (e.g., a request message) that indicates a request for an on-demand first system information block (e.g., a SIB1). In some cases, transmitting the first message may be based on the configuration for performing the on-demand first system information block procedure. Additionally or alternatively, the first message may indicate a request for an on-demand synchronization signal (e.g., an SSB). The UE **115**-*b* may transmit the first message via a physical channel such as a physical random access channel, a physical uplink shared channel, or a physical uplink control channel, a similar physical channel, or any combination thereof. In some cases, the first message may be a RACH message in a RACH procedure (e.g., Msg1, Msg3, or msgA of a RACH procedure).

[0104] In some cases, the UE **115**-*b* may receive signaling indicating a configuration for multiple monitoring occasions associated with receiving a set of preconfigured synchronization signals (e.g., "always on" SSBs). In such cases, time resources for receiving the on-demand synchronization signal may be non-overlapping with the multiple monitoring occasions. That is, the network entity **105**-*b* may transmit the preconfigured synchronization signals in accordance with a periodicity irrespective of a request from the UE **115**-*b*. In other words, the UE **115**-*b* may receive the preconfigured (or "always on") synchronization signals while the UE **115**-*b* is in an idle mode or an inactive mode (e.g., RRC inactive mode) and may receive on-demand synchronization signals, on-demand first system information blocks, or both, irrespective of the periodicity associated with the preconfigured synchronization signals.

[0105] At **315**, the UE **115**-*b* may receive, from the network entity **105**-*b*, in response to the first message, and via a physical channel (such as a PDSCH or a PDCCH), a second message. The second message may indicate for the UE **115**-*b* to monitor for reception of the on-demand first system information block. In some cases, the second message may indicate a confirmation of successful reception of the request for the on-demand first system information block.

[0106] In some cases, the second message may include signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand system information blocks, a transmission repetition periodicity for the one or more respective on-demand system information blocks, a time duration during which the UE is to monitor one or more physical channels (e.g., PDCCH), information related to cell access, or any combination thereof. The second message may be a RACH message of a RACH procedure (e.g., Msg2, Msg4, or msgB of a RACH procedure). For example, the second message may be an example of a random access response message. Alternatively, the second message may be a DCI message based on a cyclic redundancy check that is scrambled by a random access radio network temporary identifier or a temporary cell radio network temporary identifier. Thus, the UE may be configured with the time duration, during which the UE is to monitor the one or more physical channels, with the DCI message or a second DCI message. The DCI message (or the second DCI message) may schedule a physical channel (e.g., PDSCH) carrying the on-demand first system information block. Additionally or alternatively, the UE may be configured with the time duration with a repetition of a PDSCH message carrying a SIB1 (e.g., in an on-demand system information block). In some examples, the UE **115**-*b* may receive the system information in one or more fields of the downlink control information message that are also used for a second set of signaling information. In some other examples, the UE **115**-*b* may receive the system information in one or more fields of the downlink control information message that are reserved for indicating for the UE to monitor for reception of the on-demand first system information block, for indicating the system information, or both. In some cases, the system information may include one or more synchronization signal block indices associated with one or more respective on-demand synchronization signal blocks, a transmission repetition periodicity for the one or more respective on-demand synchronization signal blocks, or any combination thereof.

[0107] At **320**, if the UE **115**-*b* failed to receive the second message (e.g., the confirmation message, the UE **115**-*b* may retransmit the first message (e.g., the request message). In some cases, the UE **115**-*b* may periodically retransmit the first message until receiving the confirmation message. If the UE **115**-*b* fails to receive the second message after a quantity of retransmissions, the UE may refrain from retransmitting the second message.

[0108] At **325**, the UE **115**-*b* may receive, based on the second message and via the physical channel, a third message that includes the on-demand first system information block. In some cases, receiving the third message may include receiving one or more messages. The one or more messages may include one or more on-demand first system information blocks, one or more synchronization signals (e.g., SSBs) or any combination thereof, based on the first message (e.g., the request message). For example, if the first message includes a request for a first system information block and a request for a synchronization signal, the UE **115**-*b* may receive, from the network entity **105**-*b*, a first system information block and an associated synchronization signal.

[0109] At **330**, the UE **115**-*b* may transition from an idle (or inactive) state to a connected state (e.g., an RRC connected state). In the connected state, the UE **115**-*b* may communicate one or more messages with a network entity **105**-*b* based on the third message. For example, the UE **115**-*b* may communicate the one or more messages with the network entity **105**-*b* based on the one or more on-demand first system information blocks, the one or more synchronization signals, or any combination thereof.

[0110] FIG. **4** shows a block diagram **400** of a device **405** that supports random access channel based requests for on-demand system information blocks 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).

[0111] 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 random access channel based requests for on-demand system information blocks). 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.

[0112] 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 random access channel based requests for on-demand system information blocks). 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.

[0113] 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 random access channel based requests for on-demand system information blocks 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.

[0114] 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).

[0115] 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).

[0116] 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.

[0117] The communications manager **420** may support wireless communications in accordance with examples as disclosed herein. For example, the communications manager **420** is capable of, configured to, or operable to support a means for transmitting a first message that indicates a request for an on-demand first system information block. The communications manager **420** is capable of, configured to, or operable to support a means for receiving, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block. The communications manager **420** is capable of, configured to, or operable to support a means for receiving, based on the second message and via the physical channel, a third message that includes the on-demand first system information block. The communications manager **420** is capable of, configured to, or operable to support a means for communicating with a network entity based on the on-demand first system information block.

[0118] 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 random access channel based requests for on-demand system information blocks, which may result in reduced PDCCH search and access latency, power consumption, more efficient utilization of communication resources, among other advantages.

[0119] FIG. **5** shows a block diagram **500** of a device **505** that supports random access channel based requests for on-demand system information blocks 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).

[0120] 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 random access channel based requests for on-demand system information blocks). 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.

[0121] 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 random access channel based requests for on-demand system information blocks). 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.

[0122] The device **505**, or various components thereof, may be an example of means for performing various aspects of random access channel based requests for on-demand system information blocks as described herein. For example, the communications manager **520** may include a request message component **525**, a confirmation message component **530**, an information message component **535**, a communication message component **540**, 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 transmitter **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.

[0123] The communications manager **520** may support wireless communications in accordance with examples as disclosed herein. The request message component **525** is capable of, configured to, or operable to support a means for transmitting a first message that indicates a request for an on-demand first system information block. The confirmation message component **530** is capable of, configured to, or operable to support a means for receiving, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block. The information message component **535** is capable of, configured to, or operable to support a means for receiving, based on the second message and via the physical channel, a third message that includes the on-demand first system information block. The communication message component **540** is capable of, configured to, or operable to support a means for communicating with a network entity based on the on-demand first system information block.

[0124] FIG. **6** shows a block diagram **600** of a communications manager **620** that supports random access channel based requests for on-demand system information blocks 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 random access channel based requests for on-demand system information blocks as described herein. For example, the communications manager **620** may include a request message component **625**, a confirmation message component **630**, an information message component **635**, a communication message component **640**, a configuration component **645**, a monitoring occasion 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).

[0125] The communications manager **620** may support wireless communications in accordance with examples as disclosed herein. The request message component **625** is capable of, configured to, or operable to support a means for transmitting a first message that indicates a request for an on-demand first system information block. The confirmation message component **630** is capable of, configured to, or operable to support a means for receiving, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block. The information message component **635** is capable of, configured to, or operable to support a means for receiving, based on the second message and via the physical channel, a third message that includes the on-demand first system information block. The communication message component **640** is capable of, configured to, or operable to support a means for communicating with a network entity based on the on-demand first system information block.

[0126] In some examples, the configuration component **645** is capable of, configured to, or operable to support a means for receiving signaling indicating a configuration for performing an on-demand first system information block procedure, where transmitting the first message is based on the configuration.

[0127] In some examples, to support receiving the second message, the confirmation message component **630** is capable of, configured to, or operable to support a means for receiving a confirmation of successful reception of the request for the on-demand first system information block.

[0128] In some examples, to support receiving the second message, the confirmation message component **630** is capable of, configured to, or operable to support a means for receiving signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand system information blocks, a transmission repetition periodicity for the one or more respective on-demand system information blocks, a time duration during which the UE is to monitor one or more physical channels, information related to cell access, or any combination thereof.

[0129] In some examples, the second message is a random access response message.

[0130] In some examples, the second message is a downlink control information message based on a cyclic redundancy check that is scrambled by a random access radio network temporary identifier.

[0131] In some examples, the signaling is received in one or more fields of the downlink control information message that are also used for a second set of signaling information.

[0132] In some examples, the signaling is received in one or more fields of the downlink control information message that are reserved for indicating for the UE to monitor for reception of the on-demand first system information block.

[0133] In some examples, to support receiving the system information, the confirmation message component **630** is capable of, configured to, or operable to support a means for receiving the signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand synchronization signal blocks, a transmission repetition periodicity for the one or more respective on-demand synchronization signal blocks, or any combination thereof.

[0134] In some examples, to support communicating with the network entity, the communication message component **640** is capable of, configured to, or operable to support a means for transitioning from an idle state to a radio resource control connected state.

[0135] In some examples, the first message further indicates a request for an on-demand synchronization signal.

[0136] In some examples, the monitoring occasion component **650** is capable of, configured to, or operable to support a means for receiving signaling indicating a configuration for a set of multiple monitoring occasions associated with receiving a set of preconfigured synchronization signals, where time resources for receiving the on-demand synchronization signal are non-overlapping with the set of multiple monitoring occasions.

[0137] In some examples, to support transmitting the first message, the request message component **625** is capable of, configured to, or operable to support a means for transmitting the first message via a physical random access channel, a physical uplink shared channel, or a physical uplink control channel.

[0138] In some examples, the first message and the second message are random access channel messages in a random access channel procedure.

[0139] In some examples, the physical channel is a physical downlink shared channel or a physical downlink control channel.

[0140] FIG. 7 shows a diagram of a system **700** including a device **705** that supports random access channel based requests for on-demand system information blocks 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**).

[0141] 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**.

[0142] 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.

[0143] 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.

[0144] 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 random access channel based requests for on-demand system information blocks). 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 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 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.

[0145] The communications manager **720** may support wireless communications in accordance with examples as disclosed herein. For example, the communications manager **720** is capable of, configured to, or operable to support a means for transmitting a first message that indicates a request for an on-demand first system information block.

The communications manager **720** is capable of, configured to, or operable to support a means for receiving, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block. The communications manager **720** is capable of, configured to, or operable to support a means for receiving, based on the second message and via the physical channel, a third message that includes the on-demand first system information block. The communications manager **720** is capable of, configured to, or operable to support a means for communicating with a network entity based on the on-demand first system information block.

[0146] By including or configuring the communications manager **720** in accordance with examples as described herein, the device **705** may support techniques for random access channel based requests for on-demand system information blocks, which may result in reduced PDCCH search and access latency, improved communication reliability, reduced power consumption, more efficient utilization of communication resources, improved coordination between devices, longer battery life, improved utilization of processing capability, reduced network energy usage, among other advantages.

[0147] 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 random access channel based requests for on-demand system information blocks 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.

[0148] FIG. **8** shows a block diagram **800** of a device **805** that supports random access channel based requests for on-demand system information blocks 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).

[0149] 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.

[0150] 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.

[0151] 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 random access channel based requests for on-demand system information blocks 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.

[0152] 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).

[0153] 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).

[0154] 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.

[0155] The communications manager **820** may support wireless communications in accordance with examples as disclosed herein. For example, the communications manager **820** is capable of, configured to, or operable to support a means for obtaining, from a UE, a first message that indicates a request for an on-demand first system information block. The communications manager **820** is capable of, configured to, or operable to support a means for outputting, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block. The communications manager **820** is capable of, configured to, or operable to support a means for outputting, based on the second message and via the physical channel, a third message that includes the on-demand first system information block. The communications manager **820** is capable of, configured to, or operable to support a means for communicating with the UE based on the on-demand first system information block.

[0156] 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 random access channel based requests for on-demand system information blocks, which may result in reduced PDCCH search and access latency, power consumption, more efficient utilization of communication resources, among other advantages.

[0157] FIG. **9** shows a block diagram **900** of a device **905** that supports random access channel based requests for on-demand system information blocks 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).

[0158] 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.

[0159] 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.

[0160] The device **905**, or various components thereof, may be an example of means for performing various aspects of random access channel based requests for on-demand system information blocks as described herein. For example, the communications manager **920** may include a request message manager **925**, a confirmation message manager **930**, an information message manager **935**, a communication message manager **940**, 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.

[0161] The communications manager **920** may support wireless communications in accordance with examples as disclosed herein. The request message manager **925** is capable of, configured to, or operable to support a means for obtaining, from a UE, a first message that indicates a request for an on-demand first system information block. The confirmation message manager **930** is capable of, configured to, or operable to support a means for outputting, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block. The information message manager **935** is capable of, configured to, or operable to support a means for outputting, based on the second message and via the physical channel, a third message that includes the on-demand first system information block. The communication message manager **940** is capable of, configured to, or operable to support a means for communicating with the UE based on the on-demand first system information block.

[0162] FIG. **10** shows a block diagram **1000** of a communications manager **1020** that supports random access channel based requests for on-demand system information blocks 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 random access channel based requests for on-demand system information blocks as described herein. For example, the communications manager **1020** may include a request message manager **1025**, a confirmation message manager **1030**, an information message manager **1035**, a communication message manager **1040**, a configuration manager **1045**, a monitoring occasion manager **1050**, 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.

[0163] The communications manager **1020** may support wireless communications in accordance with examples as disclosed herein. The request message manager **1025** is capable of, configured to, or operable to support a means for obtaining, from a UE, a first message that indicates a request for an on-demand first system information block. The confirmation message manager **1030** is capable of, configured to, or operable to support a means for outputting, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block. The information message manager **1035** is capable of, configured to, or operable to support a means for outputting, based on the second message and via the physical channel, a third message that includes the on-demand first system information block. The communication message manager **1040** is capable of, configured to, or operable to support a means for communicating with the UE based on the on-demand first system information block.

[0164] In some examples, the configuration manager **1045** is capable of, configured to, or operable to support a means for outputting signaling indicating a configuration for performing an on-demand first system information block procedure, where obtaining the first message is based on the configuration.

[0165] In some examples, to support outputting the second message, the confirmation message manager **1030** is capable of, configured to, or operable to support a means for outputting a confirmation of successful reception of the request for the on-demand first system information block.

[0166] In some examples, to support outputting the second message, the confirmation message manager **1030** is capable of, configured to, or operable to support a means for outputting signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand system information blocks, a transmission repetition periodicity for the one or more respective on-demand system information blocks, a time duration during which the UE is to monitor one or more physical channels, information related to cell access, or any combination thereof.

[0167] In some examples, the second message is a random access response message.

[0168] In some examples, the second message is a downlink control information message based on a cyclic redundancy check that is scrambled by a random access radio network temporary identifier.

[0169] In some examples, the signaling is output in one or more fields of the downlink control information message that are also used for a second set of signaling information.

[0170] In some examples, the signaling is output in one or more fields of the downlink control information message that are reserved for indicating for the UE to monitor for reception of the on-demand first system information block.

[0171] In some examples, to support outputting the system information, the confirmation message manager **1030** is capable of, configured to, or operable to support a means for outputting the signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand synchronization signal blocks, a transmission repetition periodicity for the one or more respective on-demand synchronization signal blocks, or any combination thereof.

[0172] In some examples, to support communicating with the UE, the communication message manager **1040** is capable of, configured to, or operable to support a means for transitioning from an idle state to a radio resource control connected state.

[0173] In some examples, the first message further indicates a request for an on-demand synchronization signal.

[0174] In some examples, the monitoring occasion manager **1050** is capable of, configured to, or operable to support a means for outputting signaling indicating a configuration for a set of multiple monitoring occasions associated with receiving a set of preconfigured synchronization signals, where time resources for receiving the on-demand synchronization signal are non-overlapping with the set of multiple monitoring occasions.

[0175] In some examples, to support obtaining the first message, the request message manager **1025** is capable of, configured to, or operable to support a means for obtaining the first message via a physical random access channel, a physical uplink shared channel, or a physical uplink control channel.

[0176] In some examples, the first message and the second message are random access channel messages in a random access channel procedure.

[0177] In some examples, the physical channel is a physical downlink shared channel or a physical downlink control channel.

[0178] FIG. **11** shows a diagram of a system **1100** including a device **1105** that supports random access channel based requests for on-demand system information blocks 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**).

[0179] 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**).

[0180] 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).

[0181] 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 random access channel based requests for on-demand system information blocks). 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.

[0182] 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).

[0183] 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 devices **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**.

[0184] The communications manager **1120** may support wireless communications in accordance with examples as disclosed herein. For example, the communications manager **1120** is capable of, configured to, or operable to support a means for obtaining, from a UE, a first message that indicates a request for an on-demand first system information block. The communications manager **1120** is capable of, configured to, or operable to support a means for outputting, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block. The communications manager **1120** is capable of, configured to, or operable to support a means for outputting, based on the second message and via the physical channel, a third message that includes the on-demand first system information block. The communications manager **1120** is capable of, configured to, or operable to support a means for communicating with the UE based on the on-demand first system information block.

[0185] By including or configuring the communications manager **1120** in accordance with examples as described herein, the device **1105** may support techniques for random access channel based requests for on-demand system information blocks, which may result in reduced PDCCH search and access latency, improved communication reliability, reduced power consumption, more efficient utilization of communication resources, improved coordination between devices, longer battery life, improved utilization of processing capability, reduced network energy usage, among other advantages.

[0186] 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 random access channel based requests for on-demand system information blocks 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.

[0187] FIG. **12** shows a flowchart illustrating a method **1200** that supports random access channel based requests for on-demand system information blocks 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.

[0188] At **1205**, the method may include transmitting a first message that indicates a request for an on-demand first system information block. 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 a request message component **625** as described with reference to FIG. **6**.

[0189] At **1210**, the method may include receiving, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block. 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 confirmation message component **630** as described with reference to FIG. **6**.

[0190] At **1215**, the method may include receiving, based on the second message and via the physical channel, a third message that includes the on-demand first system information block. 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 an information message component **635** as described with reference to FIG. **6**.

[0191] At **1220**, the method may include communicating with a network entity based on the on-demand first system information block. 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 communication message component **640** as described with reference to FIG. **6**.

[0192] FIG. **13** shows a flowchart illustrating a method **1300** that supports random access channel based requests for on-demand system information blocks 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.

[0193] At **1305**, the method may include receiving signaling indicating a configuration for performing an on-demand first system information block procedure, where transmitting the first message is based on the configuration. 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 a configuration component **645** as described with reference to FIG. **6**.

[0194] At **1310**, the method may include transmitting a first message that indicates a request for an on-demand first system information block. 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 request message component **625** as described with reference to FIG. **6**.

[0195] At **1315**, the method may include receiving, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block. 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 confirmation message component **630** as described with reference to FIG. **6**.

[0196] At **1320**, the method may include receiving, based on the second message and via the physical channel, a third message that includes the on-demand first system information block. 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 an information message component **635** as described with reference to FIG. **6**.

[0197] At **1325**, the method may include communicating with a network entity based on the on-demand first system information block. 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 communication message component **640** as described with reference to FIG. **6**.

[0198] FIG. **14** shows a flowchart illustrating a method **1400** that supports random access channel based requests for on-demand system information blocks in accordance with one or more aspects of the present disclosure. The operations of the method **1400** may be implemented by a UE or its components as described herein. For example, the operations of the method **1400** 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.

[0199] At **1405**, the method may include transmitting a first message that indicates a request for an on-demand first system information block. 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 a request message component **625** as described with reference to FIG. **6**.

[0200] At **1410**, the method may include receiving, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block. 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 confirmation message component **630** as described with reference to FIG. **6**.

[0201] At **1415**, the method may include receiving signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand system information blocks, a transmission repetition periodicity for the one or more respective on-demand system information blocks, a time duration during which the UE is to monitor one or more physical channels, information related to cell access, or any combination thereof. 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 confirmation message component **630** as described with reference to FIG. **6**.

[0202] At **1420**, the method may include receiving, based on the second message and via the physical channel, a third message that includes the on-demand first system information block. 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 an information message component **635** as described with reference to FIG. **6**.

[0203] At **1425**, the method may include communicating with a network entity based on the on-demand first system information block. The operations of **1425** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1425** may be performed by a communication message component **640** as described with reference to FIG. **6**.

[0204] FIG. **15** shows a flowchart illustrating a method **1500** that supports random access channel based requests for on-demand system information blocks 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 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.

[0205] At **1505**, the method may include obtaining, from a UE, a first message that indicates a request for an on-demand first system information block. 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 a request message manager **1025** as described with reference to FIG. **10**.

[0206] At **1510**, the method may include outputting, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block. 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 confirmation message manager **1030** as described with reference to FIG. **10**.

[0207] At **1515**, the method may include outputting, based on the second message and via the physical channel, a third message that includes the on-demand first system information block. 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 an information message manager **1035** as described with reference to FIG. **10**.

[0208] At **1520**, the method may include communicating with the UE based on the on-demand first system information block. 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 a communication message manager **1040** as described with reference to FIG. **10**.

[0209] FIG. **16** shows a flowchart illustrating a method **1600** that supports random access channel based requests for on-demand system information blocks in accordance with one or more aspects of the present disclosure. The operations of the method **1600** may be implemented by a network entity or its components as described herein. For example, the operations of the method **1600** 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.

[0210] At **1605**, the method may include obtaining, from a UE, a first message that indicates a request for an on-demand first system information block. The operations of **1605** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1605** may be performed by a request message manager **1025** as described with reference to FIG. **10**.

[0211] At **1610**, the method may include outputting, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block. The operations of **1610** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1610** may be performed by a confirmation message manager **1030** as described with reference to FIG. **10**.

[0212] At **1615**, the method may include outputting signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand system information blocks, a transmission repetition periodicity for the one or more respective on-demand system information blocks, a time duration during which the UE is to monitor one or more physical channels, information related to cell access, or any combination thereof. The operations of **1615** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1615** may be performed by a confirmation message manager **1030** as described with reference to FIG. **10**.

[0213] At **1620**, the method may include outputting, based on the second message and via the physical channel, a third message that includes the on-demand first system information block. The operations of **1620** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1620** may be performed by an information message manager **1035** as described with reference to FIG. **10**.

[0214] At **1625**, the method may include communicating with the UE based on the on-demand first system information block. The operations of **1625** may be performed in accordance with examples as disclosed herein. In some examples, aspects of the operations of **1625** may be performed by a communication message manager **1040** as described with reference to FIG. **10**.

[0215] The following provides an overview of aspects of the present disclosure:

[0216] Aspect 1: A method for wireless communications at a UE, comprising: transmitting a first message that indicates a request for an on-demand first system information block; receiving, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block; receiving, based at least in part on the second message and via the physical channel, a third message that includes the on-demand first system information block; and communicating with a network entity based at least in part on the on-demand first system information block.

[0217] Aspect 2: The method of aspect 1, further comprising: receiving signaling indicating a configuration for performing an on-demand first system information block procedure, wherein transmitting the first message is based at least in part on the configuration.

[0218] Aspect 3: The method of any of aspects 1 through 2, wherein receiving the second message comprises: receiving a confirmation of successful reception of the request for the on-demand first system information block.

[0219] Aspect 4: The method of any of aspects 1 through 3, wherein receiving the second message comprises: receiving signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand system information blocks, a transmission repetition periodicity for the one or more respective on-demand system information blocks, a time duration during which the UE is to monitor one or more physical channels, information related to cell access, or any combination thereof.

[0220] Aspect 5: The method of aspect 4, wherein the second message is a random access response message.

[0221] Aspect 6: The method of any of aspects 4 through 5, wherein the second message is a downlink control information message based at least in part on a cyclic redundancy check that is scrambled by a random access radio network temporary identifier.

[0222] Aspect 7: The method of aspect 6, wherein the signaling is received in one or more fields of the downlink control information message that are also used for a second set of signaling information.

[0223] Aspect 8: The method of any of aspects 6 through 7, wherein the signaling is received in one or more fields of the downlink control information message that are reserved for indicating for the UE to monitor for reception of the on-demand first system information block.

[0224] Aspect 9: The method of any of aspects 4 through 8, wherein receiving the signaling further comprises: receiving the signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand synchronization signal blocks, a transmission repetition periodicity for the one or more respective on-demand synchronization signal blocks, or any combination thereof.

[0225] Aspect 10: The method of any of aspects 1 through 9, wherein communicating with the network entity comprises: transitioning from an idle state to a radio resource control connected state.

[0226] Aspect 11: The method of any of aspects 1 through 10, wherein the first message further indicates a request for an on-demand synchronization signal.

[0227] Aspect 12: The method of aspect 11, further comprising: receiving signaling indicating a configuration for a plurality of monitoring occasions associated with receiving a set of preconfigured synchronization signals, wherein time resources for receiving the on-demand synchronization signal are non-overlapping with the plurality of monitoring occasions.

[0228] Aspect 13: The method of any of aspects 1 through 12, wherein transmitting the first message comprises: transmitting the first message via a physical random access channel, a physical uplink shared channel, or a physical uplink control channel.

[0229] Aspect 14: The method of any of aspects 1 through 13, wherein the first message and the second message are random access channel messages in a random access channel procedure.

[0230] Aspect 15: The method of any of aspects 1 through 14, wherein the physical channel is a physical downlink shared channel or a physical downlink control channel.

[0231] Aspect 16: A method for wireless communications at a network entity, comprising: obtaining, from a UE, a first message that indicates a request for an on-demand first system information block; outputting, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block; outputting, based at least in part on the second message and via the physical channel, a third message that includes the on-demand first system information block; and communicating with the UE based at least in part on the on-demand first system information block.

[0232] Aspect 17: The method of aspect 16, further comprising: outputting signaling indicating a configuration for performing an on-demand first system information block procedure, wherein obtaining the first message is based at least in part on the configuration.

[0233] Aspect 18: The method of any of aspects 16 through 17, wherein outputting the second message comprises: outputting a confirmation of successful reception of the request for the on-demand first system information block.

[0234] Aspect 19: The method of any of aspects 16 through 18, wherein outputting the second message comprises: outputting signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand system information blocks, a transmission repetition periodicity for the one or more respective on-demand system information blocks, a time duration during which the UE is to monitor one or more physical channels, information related to cell access, or any combination thereof.

[0235] Aspect 20: The method of aspect 19, wherein the second message is a random access response message.

[0236] Aspect 21: The method of any of aspects 19 through 20, wherein the second message is a downlink control information message based at least in part on a cyclic redundancy check that is scrambled by a random access radio network temporary identifier.

[0237] Aspect 22: The method of aspect 21, wherein the signaling is output in one or more fields of the downlink control information message that are also used for a second set of signaling information.

[0238] Aspect 23: The method of any of aspects 21 through 22, wherein the signaling is output in one or more fields of the downlink control information message that are reserved for indicating for the UE to monitor for reception of the on-demand first system information block.

[0239] Aspect 24: The method of any of aspects 19 through 23, wherein outputting the signaling further comprises: outputting the signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand synchronization signal blocks, a transmission repetition periodicity for the one or more respective on-demand synchronization signal blocks, or any combination thereof.

[0240] Aspect 25: The method of any of aspects 16 through 24, wherein communicating with the UE comprises: transitioning from an idle state to a radio resource control connected state.

[0241] Aspect 26: The method of any of aspects 16 through 25, wherein the first message further indicates a request for an on-demand synchronization signal.

[0242] Aspect 27: The method of aspect 26, further comprising: outputting signaling indicating a configuration for a plurality of monitoring occasions associated with receiving a set of preconfigured synchronization signals, wherein time resources for receiving the on-demand synchronization signal are non-overlapping with the plurality of monitoring occasions.

[0243] Aspect 28: The method of any of aspects 16 through 27, wherein obtaining the first message comprises: obtaining the first message via a physical random access channel, a physical uplink shared channel, or a physical uplink control channel.

[0244] Aspect 29: The method of any of aspects 16 through 28, wherein the first message and the second message are random access channel messages in a random access channel procedure.

[0245] Aspect 30: The method of any of aspects 16 through 29, wherein the physical channel is a physical downlink shared channel or a physical downlink control channel.

[0246] Aspect 31: A UE for wireless communications, 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 15.

[0247] Aspect 32: A UE for wireless communications, comprising at least one means for performing a method of any of aspects 1 through 15.

[0248] Aspect 33: A non-transitory computer-readable medium storing code for wireless communications, the code comprising instructions executable by one or more processors to perform a method of any of aspects 1 through 15.

[0249] Aspect 34: A network entity for wireless communications, 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 16 through 30.

[0250] Aspect 35: A network entity for wireless communications, comprising at least one means for performing a method of any of aspects 16 through 30.

[0251] Aspect 36: A non-transitory computer-readable medium storing code for wireless communications, the code comprising instructions executable by one or more processors to perform a method of any of aspects 16 through 30.

[0252] 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.

[0253] 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.

[0254] 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.

[0255] 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.

[0256] 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.

[0257] 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.

[0258] 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."

[0259] 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."

[0260] 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.

[0261] 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.

[0262] 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.

[0263] 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:
transmit a first message that indicates a request for an on-demand first system information block;
receive, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block;
receive, based at least in part on the second message and via the physical channel, a third message that includes the on-demand first system information block; and
communicate with a network entity based at least in part on the on-demand first system information block.

2. 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 signaling indicating a configuration for performing an on-demand first system information block procedure, wherein transmitting the first message is based at least in part on the configuration.

3. The UE of claim **1**, wherein, to receive the second message, the one or more processors are individually or collectively operable to execute the code to cause the UE to:
receive a confirmation of successful reception of the request for the on-demand first system information block.

4. The UE of claim **1**, wherein, to receive the second message, the one or more processors are individually or collectively operable to execute the code to cause the UE to:
receive signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand system information blocks, a transmission repetition periodicity for the one or more respective on-demand system information blocks, a time duration during which the UE is to monitor one or more physical channels, information related to cell access, or any combination thereof.

5. The UE of claim **4**, wherein the second message is a random access response message.

6. The UE of claim **4**, wherein the second message is a downlink control information message based at least in part on a cyclic redundancy check that is scrambled by a random access radio network temporary identifier.

7. The UE of claim **6**, wherein the signaling is received in one or more fields of the downlink control information message that are also used for a second set of signaling information.

8. The UE of claim **6**, wherein the signaling is received in one or more fields of the downlink control information message that are reserved for indicating for the UE to monitor for reception of the on-demand first system information block.

9. The UE of claim **4**, wherein, to receive the signaling, the one or more processors are individually or collectively further operable to execute the code to cause the UE to:
receive the signaling that includes one or more synchronization signal block indices associated with one or

more respective on-demand synchronization signal blocks, a transmission repetition periodicity for the one or more respective on-demand synchronization signal blocks, or any combination thereof.

10. The UE of claim **1**, wherein, to communicate with the network entity, the one or more processors are individually or collectively operable to execute the code to cause the UE to:

transition from an idle state to a radio resource control connected state.

11. The UE of claim **1**, wherein the first message further indicates a request for an on-demand synchronization signal.

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

receive signaling indicating a configuration for a plurality of monitoring occasions associated with receiving a set of preconfigured synchronization signals, wherein time resources for receiving the on-demand synchronization signal are non-overlapping with the plurality of monitoring occasions.

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

transmit the first message via a physical random access channel, a physical uplink shared channel, or a physical uplink control channel.

14. The UE of claim **1**, wherein the first message and the second message are random access channel messages in a random access channel procedure.

15. The UE of claim **1**, wherein the physical channel is a physical downlink shared channel or a physical downlink control channel.

16. 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:

obtain, from a user equipment (UE), a first message that indicates a request for an on-demand first system information block;

output, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block;

output, based at least in part on the second message and via the physical channel, a third message that includes the on-demand first system information block; and

communicate with the UE based at least in part on the on-demand first system information block.

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

output signaling indicating a configuration for performing an on-demand first system information block procedure, wherein obtaining the first message is based at least in part on the configuration.

18. The network entity of claim **16**, wherein, to output the second message, the one or more processors are individually or collectively operable to execute the code to cause the network entity to:

output a confirmation of successful reception of the request for the on-demand first system information block.

19. The network entity of claim **16**, wherein, to output the second message, the one or more processors are individually or collectively operable to execute the code to cause the network entity to:

output signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand system information blocks, a transmission repetition periodicity for the one or more respective on-demand system information blocks, a time duration during which the UE is to monitor one or more physical channels, information related to cell access, or any combination thereof.

20. The network entity of claim **19**, wherein the second message is a random access response message.

21. The network entity of claim **19**, wherein the second message is a downlink control information message based at least in part on a cyclic redundancy check that is scrambled by a random access radio network temporary identifier.

22. The network entity of claim **19**, wherein, to output the signaling, the one or more processors are individually or collectively further operable to execute the code to cause the network entity to:

output the signaling that includes one or more synchronization signal block indices associated with one or more respective on-demand synchronization signal blocks, a transmission repetition periodicity for the one or more respective on-demand synchronization signal blocks, or any combination thereof.

23. The network entity of claim **16**, wherein, to communicate with the UE, the one or more processors are individually or collectively operable to execute the code to cause the network entity to:

transition from an idle state to a radio resource control connected state.

24. The network entity of claim **16**, wherein the first message further indicates a request for an on-demand synchronization signal.

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

output signaling indicating a configuration for a plurality of monitoring occasions associated with receiving a set of preconfigured synchronization signals, wherein time resources for receiving the on-demand synchronization signal are non-overlapping with the plurality of monitoring occasions.

26. The network entity of claim **16**, wherein, to obtain the first message, the one or more processors are individually or collectively operable to execute the code to cause the network entity to:

obtain the first message via a physical random access channel, a physical uplink shared channel, or a physical uplink control channel.

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

transmitting a first message that indicates a request for an on-demand first system information block;

receiving, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block;

receiving, based at least in part on the second message and via the physical channel, a third message that includes the on-demand first system information block; and

communicating with a network entity based at least in part on the on-demand first system information block.

28. The method of claim **27**, further comprising:

receiving signaling indicating a configuration for performing an on-demand first system information block procedure, wherein transmitting the first message is based at least in part on the configuration.

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

obtaining, from a user equipment (UE), a first message that indicates a request for an on-demand first system information block;

outputting, in response to the first message and via a physical channel, a second message indicating for the UE to monitor for reception of the on-demand first system information block;

outputting, based at least in part on the second message and via the physical channel, a third message that includes the on-demand first system information block; and

communicating with the UE based at least in part on the on-demand first system information block.

30. The method of claim **29**, further comprising:

outputting signaling indicating a configuration for performing an on-demand first system information block procedure, wherein obtaining the first message is based at least in part on the configuration.

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