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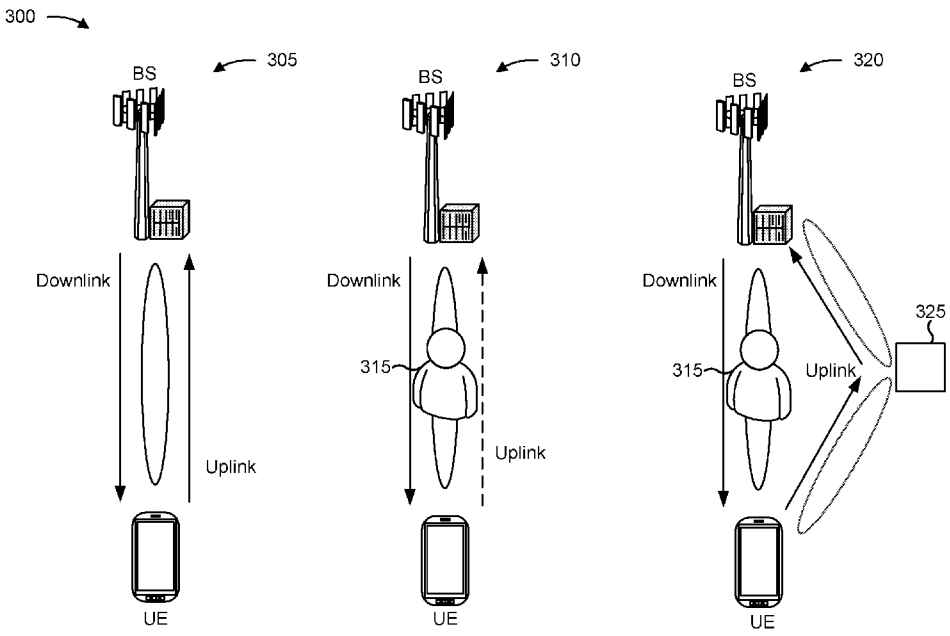

FIG. 3

(57) Abstract: Various aspects of the present disclosure generally relate to wireless communication. In some aspects, a user equipment (UE) may determine a priority that is to be assigned to a maximum permissible exposure (MPE) communication that is to be transmitted on a primary cell or a secondary cell used for carrier aggregation or dual connectivity. The UE may transmit, on the primary cell or the secondary cell, the MPE communication based at least in part on the priority. Numerous other aspects are provided.

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TECHNIQUES FOR MAXIMUM PERMISSIBLE EXPOSURE REPORTING

FIELD OF THE DISCLOSURE

[0001] Aspects of the present disclosure generally relate to wireless communication and to techniques and apparatuses for maximum permissible exposure (MPE) reporting.

DESCRIPTION OF RELATED ART

[0002] Wireless communication systems are widely deployed to provide various telecommunication services such as telephony, video, data, messaging, and broadcasts. Typical wireless communication systems may employ multiple-access technologies capable of supporting communication with multiple users by sharing available system resources (e.g., bandwidth, transmit power, and/or the like). Examples of such multiple-access technologies include code division multiple access (CDMA) systems, time division multiple access (TDMA) systems, frequency-division multiple access (FDMA) systems, orthogonal frequency-division multiple access (OFDMA) systems, single-carrier frequency-division multiple access (SC-FDMA) systems, time division synchronous code division multiple access (TD-SCDMA) systems, and Long Term Evolution (LTE). LTE/LTE-Advanced is a set of enhancements to the Universal Mobile Telecommunications System (UMTS) mobile standard promulgated by the Third Generation Partnership Project (3GPP).

[0003] A wireless communication network may include a number of base stations (BSs) that can support communication for a number of user equipment (UEs). A user equipment (UE) may communicate with a base station (BS) via the downlink and uplink. The downlink (or forward link) refers to the communication link from the BS to the UE, and the uplink (or reverse link) refers to the communication link from the UE to the BS. As will be described in more detail herein, a BS may be referred to as a Node B, a gNB, an access point (AP), a radio head, a transmit receive point (TRP), a New Radio (NR) BS, a 5G Node B, and/or the like.

[0004] The above multiple access technologies have been adopted in various telecommunication standards to provide a common protocol that enables different user equipment to communicate on a municipal, national, regional, and even global level. New Radio (NR), which may also be referred to as 5G, is a set of enhancements to the LTE mobile standard promulgated by the Third Generation Partnership Project (3GPP). NR is designed to better support mobile broadband Internet access by improving

spectral efficiency, lowering costs, improving services, making use of new spectrum, and better integrating with other open standards using orthogonal frequency division multiplexing (OFDM) with a cyclic prefix (CP) (CP-OFDM) on the downlink (DL), using CP-OFDM and/or SC-FDM (e.g., also known as discrete Fourier transform spread OFDM (DFT-s-OFDM)) on the uplink (UL), as well as supporting beamforming, multiple-input multiple-output (MIMO) antenna technology, and carrier aggregation. However, as the demand for mobile broadband access continues to increase, there exists a need for further improvements in LTE and NR technologies. Preferably, these improvements should be applicable to other multiple access technologies and the telecommunication standards that employ these technologies.

SUMMARY

[0005] In some aspects, a method of wireless communication, performed by a UE, may include determining a priority that is to be assigned to an MPE communication that is to be transmitted on a primary cell or a secondary cell used for carrier aggregation or dual connectivity; and transmitting, on the primary cell or the secondary cell, the MPE communication based at least in part on the priority.

[0006] In some aspects, the MPE communication is an MPE report that is to be transmitted in a physical random access channel communication on the primary cell.

[0007] In some aspects, the MPE report is to be assigned a same priority as a configured grant communication.

[0008] In some aspects, the MPE communication is a scheduling request for an MPE report that is to be transmitted on the secondary cell.

[0009] In some aspects, the scheduling request for the MPE report is to be assigned a same priority as another scheduling request.

[0010] In some aspects, the scheduling request for the MPE report is associated with an MPE configuration of a scheduling request configuration.

[0011] In some aspects, the method further includes performing a physical random access channel procedure when a scheduling request configuration does not provide an MPE scheduling request identifier.

[0012] In some aspects, the scheduling request for the MPE report is to be assigned a same priority as a scheduling request for beam failure recovery.

[0013] In some aspects, the scheduling request for the MPE report is to be assigned a lower priority than a scheduling request for beam failure recovery (BFR), and a higher priority than a non-BFR scheduling request.

[0014] In some aspects, the MPE communication is an MPE report that is to be transmitted in a medium access control (MAC) control element on the primary cell or the secondary cell.

[0015] In some aspects, the MPE report is to be assigned a same or a lower priority than a configured grant confirmation communication or a beam failure recovery communication, and a same or a higher priority than a buffer status report.

[0016] In some aspects, the MPE report is to be assigned a same or a lower priority than a beam failure recovery communication, and a same or a higher priority than a power headroom report.

[0017] In some aspects, a UE for wireless communication may include a memory and one or more processors coupled to the memory. The memory and the one or more processors may be configured to determine a priority that is to be assigned to an MPE communication that is to be transmitted on a primary cell or a secondary cell used for carrier aggregation or dual connectivity; and transmit, on the primary cell or the secondary cell, the MPE communication based at least in part on the priority.

[0018] In some aspects, a non-transitory computer-readable medium may store one or more instructions for wireless communication. The one or more instructions, when executed by one or more processors of a UE, may cause the one or more processors to determine a priority that is to be assigned to an MPE communication that is to be transmitted on a primary cell or a secondary cell used for carrier aggregation or dual connectivity; and transmit, on the primary cell or the secondary cell, the MPE communication based at least in part on the priority.

[0019] In some aspects, an apparatus for wireless communication may include means for determining a priority that is to be assigned to an MPE communication that is to be transmitted on a primary cell or a secondary cell used for carrier aggregation or dual connectivity; and means for transmitting, on the primary cell or the secondary cell, the MPE communication based at least in part on the priority.

[0020] Aspects generally include a method, apparatus, system, computer program product, non-transitory computer-readable medium, user equipment, base station, wireless communication device, and/or processing system as substantially described herein with reference to and as illustrated by the drawings and specification.

[0021] The foregoing has outlined rather broadly the features and technical advantages of examples according to the disclosure in order that the detailed description that follows may be better understood. Additional features and advantages will be described hereinafter. The conception and specific examples disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present disclosure. Such equivalent constructions do not depart from the scope of the appended claims. Characteristics of the concepts disclosed herein, both their organization and method of operation, together with associated advantages will be better understood from the following description when considered in connection with the accompanying figures. Each of the figures is provided for the purposes of illustration and description, and not as a definition of the limits of the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] So that the above-recited features of the present disclosure can be understood in detail, a more particular description, briefly summarized above, may be had by reference to aspects, some of which are illustrated in the appended drawings. It is to be noted, however, that the appended drawings illustrate only certain typical aspects of this disclosure and are therefore not to be considered limiting of its scope, for the description may admit to other equally effective aspects. The same reference numbers in different drawings may identify the same or similar elements.

[0023] Fig. 1 is a diagram illustrating an example of a wireless communication network, in accordance with various aspects of the present disclosure.

[0024] Fig. 2 is a diagram illustrating an example of a base station in communication with a UE in a wireless communication network, in accordance with various aspects of the present disclosure.

[0025] Fig. 3 is a diagram illustrating an example of communication involving an MPE event, in accordance with various aspects of the present disclosure.

[0026] Fig. 4 is a diagram illustrating an example of MPE reporting, in accordance with various aspects of the present disclosure.

[0027] Fig. 5 is a diagram illustrating an example process performed, for example, by a UE, in accordance with various aspects of the present disclosure.

[0028] Fig. 6 is a conceptual data flow diagram illustrating a data flow between different components in an example apparatus, in accordance with various aspects of the present disclosure.

DETAILED DESCRIPTION

[0029] Various aspects of the disclosure are described more fully hereinafter with reference to the accompanying drawings. This disclosure may, however, be embodied in many different forms and should not be construed as limited to any specific structure or function presented throughout this disclosure. Rather, these aspects are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the disclosure to those skilled in the art. Based on the teachings herein one skilled in the art should appreciate that the scope of the disclosure is intended to cover any aspect of the disclosure disclosed herein, whether implemented independently of or combined with any other aspect of the disclosure. For example, an apparatus may be implemented or a method may be practiced using any number of the aspects set forth herein. In addition, the scope of the disclosure is intended to cover such an apparatus or method which is practiced using other structure, functionality, or structure and functionality in addition to or other than the various aspects of the disclosure set forth herein. It should be understood that any aspect of the disclosure disclosed herein may be embodied by one or more elements of a claim.

[0030] Several aspects of telecommunication systems will now be presented with reference to various apparatuses and techniques. These apparatuses and techniques will be described in the following detailed description and illustrated in the accompanying drawings by various blocks, modules, components, circuits, steps, processes, algorithms, and/or the like (collectively referred to as "elements"). These elements may be implemented using hardware, software, or combinations thereof. Whether such elements are implemented as hardware or software depends upon the particular application and design constraints imposed on the overall system.

[0031] It should be noted that while aspects may be described herein using terminology commonly associated with 3G and/or 4G wireless technologies, aspects of the present disclosure can be applied in other generation-based communication systems, such as 5G and later, including NR technologies.

[0032] Fig. 1 is a diagram illustrating a wireless network 100 in which aspects of the present disclosure may be practiced. The wireless network 100 may be an LTE

network or some other wireless network, such as a 5G or NR network. The wireless network 100 may include a number of BSs 110 (shown as BS 110a, BS 110b, BS 110c, and BS 110d) and other network entities. A BS is an entity that communicates with user equipment (UEs) and may also be referred to as a base station, a NR BS, a Node B, a gNB, a 5G node B (NB), an access point, a transmit receive point (TRP), and/or the like. Each BS may provide communication coverage for a particular geographic area. In 3GPP, the term "cell" can refer to a coverage area of a BS and/or a BS subsystem serving this coverage area, depending on the context in which the term is used.

[0033] A BS may provide communication coverage for a macro cell, a pico cell, a femto cell, and/or another type of cell. A macro cell may cover a relatively large geographic area (e.g., several kilometers in radius) and may allow unrestricted access by UEs with service subscription. A pico cell may cover a relatively small geographic area and may allow unrestricted access by UEs with service subscription. A femto cell may cover a relatively small geographic area (e.g., a home) and may allow restricted access by UEs having association with the femto cell (e.g., UEs in a closed subscriber group (CSG)). A BS for a macro cell may be referred to as a macro BS. A BS for a pico cell may be referred to as a pico BS. A BS for a femto cell may be referred to as a femto BS or a home BS. In the example shown in Fig. 1, a BS 110a may be a macro BS for a macro cell 102a, a BS 110b may be a pico BS for a pico cell 102b, and a BS 110c may be a femto BS for a femto cell 102c. A BS may support one or multiple (e.g., three) cells. The terms "eNB", "base station", "NR BS", "gNB", "TRP", "AP", "node B", "5G NB", and "cell" may be used interchangeably herein.

[0034] In some aspects, a cell may not necessarily be stationary, and the geographic area of the cell may move according to the location of a mobile BS. In some aspects, the BSs may be interconnected to one another and/or to one or more other BSs or network nodes (not shown) in the wireless network 100 through various types of backhaul interfaces such as a direct physical connection, a virtual network, and/or the like using any suitable transport network.

[0035] Wireless network 100 may also include relay stations. A relay station is an entity that can receive a transmission of data from an upstream station (e.g., a BS or a UE) and send a transmission of the data to a downstream station (e.g., a UE or a BS). A relay station may also be a UE that can relay transmissions for other UEs. In the example shown in Fig. 1, a relay station 110d may communicate with macro BS 110a and a UE 120d in order to facilitate communication between BS 110a and UE 120d. A

relay station may also be referred to as a relay BS, a relay base station, a relay, and/or the like.

[0036] Wireless network 100 may be a heterogeneous network that includes BSs of different types, e.g., macro BSs, pico BSs, femto BSs, relay BSs, and/or the like. These different types of BSs may have different transmit power levels, different coverage areas, and different impacts on interference in wireless network 100. For example, macro BSs may have a high transmit power level (e.g., 5 to 40 Watts) whereas pico BSs, femto BSs, and relay BSs may have lower transmit power levels (e.g., 0.1 to 2 Watts).

[0037] A network controller 130 may couple to a set of BSs and may provide coordination and control for these BSs. Network controller 130 may communicate with the BSs via a backhaul. The BSs may also communicate with one another, e.g., directly or indirectly via a wireless or wireline backhaul.

[0038] UEs 120 (e.g., 120a, 120b, 120c) may be dispersed throughout wireless network 100, and each UE may be stationary or mobile. A UE may also be referred to as an access terminal, a terminal, a mobile station, a subscriber unit, a station, and/or the like. A UE may be a cellular phone (e.g., a smart phone), a personal digital assistant (PDA), a wireless modem, a wireless communication device, a handheld device, a laptop computer, a cordless phone, a wireless local loop (WLL) station, a tablet, a camera, a gaming device, a netbook, a smartbook, an ultrabook, a medical device or equipment, biometric sensors/devices, wearable devices (smart watches, smart clothing, smart glasses, smart wrist bands, smart jewelry (e.g., smart ring, smart bracelet)), an entertainment device (e.g., a music or video device, or a satellite radio), a vehicular component or sensor, smart meters/sensors, industrial manufacturing equipment, a global positioning system device, or any other suitable device that is configured to communicate via a wireless or wired medium.

[0039] Some UEs may be considered machine-type communication (MTC) or evolved or enhanced machine-type communication (eMTC) UEs. MTC and eMTC UEs include, for example, robots, drones, remote devices, sensors, meters, monitors, location tags, and/or the like, that may communicate with a base station, another device (e.g., remote device), or some other entity. A wireless node may provide, for example, connectivity for or to a network (e.g., a wide area network such as Internet or a cellular network) via a wired or wireless communication link. Some UEs may be considered Internet-of-Things (IoT) devices, and/or may be implemented as NB-IoT (narrowband

internet of things) devices. Some UEs may be considered a Customer Premises Equipment (CPE). UE 120 may be included inside a housing that houses components of UE 120, such as processor components, memory components, and/or the like.

[0040] In general, any number of wireless networks may be deployed in a given geographic area. Each wireless network may support a particular radio access technology (RAT) and may operate on one or more frequencies. A RAT may also be referred to as a radio technology, an air interface, and/or the like. A frequency may also be referred to as a carrier, a frequency channel, and/or the like. Each frequency may support a single RAT in a given geographic area in order to avoid interference between wireless networks of different RATs. In some cases, NR or 5G RAT networks may be deployed.

[0041] In some aspects, two or more UEs 120 (e.g., shown as UE 120a and UE 120e) may communicate directly using one or more sidelink channels (e.g., without using a base station 110 as an intermediary to communicate with one another). For example, the UEs 120 may communicate using peer-to-peer (P2P) communications, device-to-device (D2D) communications, a vehicle-to-everything (V2X) protocol (e.g., which may include a vehicle-to-vehicle (V2V) protocol, a vehicle-to-infrastructure (V2I) protocol, and/or the like), a mesh network, and/or the like. In this case, the UE 120 may perform scheduling operations, resource selection operations, and/or other operations described elsewhere herein as being performed by the base station 110.

[0042] As indicated above, Fig. 1 is provided as an example. Other examples may differ from what is described with regard to Fig. 1.

[0043] Fig. 2 shows a block diagram of a design 200 of base station 110 and UE 120, which may be one of the base stations and one of the UEs in Fig. 1. Base station 110 may be equipped with T antennas 234a through 234t, and UE 120 may be equipped with R antennas 252a through 252r, where in general $T \geq 1$ and $R \geq 1$.

[0044] At base station 110, a transmit processor 220 may receive data from a data source 212 for one or more UEs, select one or more modulation and coding schemes (MCS) for each UE based at least in part on channel quality indicators (CQIs) received from the UE, process (e.g., encode and modulate) the data for each UE based at least in part on the MCS(s) selected for the UE, and provide data symbols for all UEs. Transmit processor 220 may also process system information (e.g., for semi-static resource partitioning information (SRPI) and/or the like) and control information (e.g., CQI requests, grants, upper layer signaling, and/or the like) and provide overhead symbols

and control symbols. Transmit processor 220 may also generate reference symbols for reference signals (e.g., the cell-specific reference signal (CRS)) and synchronization signals (e.g., the primary synchronization signal (PSS) and secondary synchronization signal (SSS)). A transmit (TX) multiple-input multiple-output (MIMO) processor 230 may perform spatial processing (e.g., precoding) on the data symbols, the control symbols, the overhead symbols, and/or the reference symbols, if applicable, and may provide T output symbol streams to T modulators (MODs) 232a through 232t. Each modulator 232 may process a respective output symbol stream (e.g., for OFDM and/or the like) to obtain an output sample stream. Each modulator 232 may further process (e.g., convert to analog, amplify, filter, and upconvert) the output sample stream to obtain a downlink signal. T downlink signals from modulators 232a through 232t may be transmitted via T antennas 234a through 234t, respectively. According to various aspects described in more detail below, the synchronization signals can be generated with location encoding to convey additional information.

[0045] At UE 120, antennas 252a through 252r may receive the downlink signals from base station 110 and/or other base stations and may provide received signals to demodulators (DEMODs) 254a through 254r, respectively. Each demodulator 254 may condition (e.g., filter, amplify, downconvert, and digitize) a received signal to obtain input samples. Each demodulator 254 may further process the input samples (e.g., for OFDM and/or the like) to obtain received symbols. A MIMO detector 256 may obtain received symbols from all R demodulators 254a through 254r, perform MIMO detection on the received symbols if applicable, and provide detected symbols. A receive processor 258 may process (e.g., demodulate and decode) the detected symbols, provide decoded data for UE 120 to a data sink 260, and provide decoded control information and system information to a controller/processor 280. A channel processor may determine reference signal received power (RSRP), received signal strength indicator (RSSI), reference signal received quality (RSRQ), channel quality indicator (CQI), and/or the like. In some aspects, one or more components of UE 120 may be included in a housing.

[0046] On the uplink, at UE 120, a transmit processor 264 may receive and process data from a data source 262 and control information (e.g., for reports comprising RSRP, RSSI, RSRQ, CQI, and/or the like) from controller/processor 280. Transmit processor 264 may also generate reference symbols for one or more reference signals. The symbols from transmit processor 264 may be precoded by a TX MIMO processor 266 if

applicable, further processed by modulators 254a through 254r (e.g., for DFT-s-OFDM, CP-OFDM, and/or the like), and transmitted to base station 110. At base station 110, the uplink signals from UE 120 and other UEs may be received by antennas 234, processed by demodulators 232, detected by a MIMO detector 236 if applicable, and further processed by a receive processor 238 to obtain decoded data and control information sent by UE 120. Receive processor 238 may provide the decoded data to a data sink 239 and the decoded control information to controller/processor 240. Base station 110 may include communication unit 244 and communicate to network controller 130 via communication unit 244. Network controller 130 may include communication unit 294, controller/processor 290, and memory 292.

[0047] Controller/processor 240 of base station 110, controller/processor 280 of UE 120, and/or any other component(s) of Fig. 2 may perform one or more techniques associated with MPE reporting, as described in more detail elsewhere herein. For example, controller/processor 240 of base station 110, controller/processor 280 of UE 120, and/or any other component(s) of Fig. 2 may perform or direct operations of, for example, process 500 of Fig. 5, and/or other processes as described herein. Memories 242 and 282 may store data and program codes for base station 110 and UE 120, respectively. In some aspects, memory 242 and/or memory 282 may comprise a non-transitory computer-readable medium storing one or more instructions for wireless communication. For example, the one or more instructions, when executed by one or more processors of the base station 110 and/or the UE 120, may perform or direct operations of, for example, process 500 of Fig. 5, and/or other processes as described herein. A scheduler 246 may schedule UEs for data transmission on the downlink and/or uplink.

[0048] In some aspects, UE 120 may include means for determining a priority that is to be assigned to an MPE communication that is to be transmitted on a primary cell or a secondary cell used for carrier aggregation or dual connectivity, means for transmitting, on the primary cell or the secondary cell, the MPE communication based at least in part on the priority, and/or the like. In some aspects, such means may include one or more components of UE 120 described in connection with Fig. 2, such as controller/processor 280, transmit processor 264, TX MIMO processor 266, MOD 254, antenna 252, DEMOD 254, MIMO detector 256, receive processor 258, and/or the like.

[0049] As indicated above, Fig. 2 is provided as an example. Other examples may differ from what is described with regard to Fig. 2.

[0050] Fig. 3 is a diagram illustrating an example 300 of communication involving an MPE event, in accordance with various aspects of the present disclosure. As shown in Fig. 3, a UE and a base station may communicate via one or more beams, and a communication via a beam may take a plurality of different paths to reach a receiver. In some cases, a beam may be a millimeter wave (mmWave) beam that carries a communication in the mmWave frequency band. When transmitting in the mmWave frequency band, a transmitter may use a higher antenna gain as compared to transmitting in the sub-6 gigahertz (GHz) frequency band. As a result, the effective isotropic radiated power (EIRP), which represents the radiated power in a particular direction (e.g., the direction of the beam), may be higher for mmWave communications as compared to sub-6 GHz communications. To improve safety, some governing bodies have placed restrictions on the peak EIRP that can be directed toward the human body. These restrictions are sometimes referred to as MPE limitations, MPE constraints, and/or the like.

[0051] As shown in Fig. 3, and by reference number 305, the UE may communicate with the base station using an uplink beam and/or a downlink beam. In some cases, the uplink beam used by the UE may not be directed toward a human body, or the like, and therefore may not be subject to an MPE condition.

[0052] As shown by reference number 310, the uplink beam used by the UE to transmit an uplink communication may become subject to an MPE condition. For example, the uplink beam may become subject to the MPE condition upon the occurrence of an MPE event. The MPE event may be a human body 315, or the like, blocking the beam (e.g., the beam used by the UE to transmit the uplink transmission may be directed toward the human body 315). That is, the human body 315 may block or obstruct communications to and/or from an antenna subarray of the UE, or may otherwise be positioned near the antenna subarray. In this case, the downlink beam may be suitable for use by the UE to communicate with the base station, but the uplink beam may not be permitted for use when the uplink beam is subject to the MPE condition.

[0053] As shown by reference number 320, in some aspects, the UE may transmit an uplink transmission using a different beam than the uplink beam that is subject to the MPE condition. For example, the UE may use a beam directed toward an object 325 that provides a path to the base station that is not blocked by the human body 315.

[0054] Accordingly, the UE may determine (e.g., using ultrasound, using wideband and/or narrowband ranging techniques, and/or the like) that the uplink beam is subject

to the MPE condition, and may transmit an MPE communication to the base station that provides an indication of the MPE condition. However, the UE may not be enabled to prioritize the MPE communication and other uplink communications, such as scheduling requests for beam failure recovery (BFR), configurated grant communications, and/or the like. Some techniques and apparatuses described herein provide for prioritization of MPE communications and other uplink communications.

[0055] As indicated above, Fig. 3 is provided as an example. Other examples may differ from what is described with respect to Fig. 3.

[0056] Fig. 4 is a diagram illustrating an example 400 of MPE reporting, in accordance with various aspects of the present disclosure. As shown in Fig. 4, a UE 120 and a BS 110 may communicate with one another.

[0057] In some aspects, the UE 120 and the BS 110 may communicate using carrier aggregation. Using carrier aggregation, the BS 110 and the UE 120 may communicate with one another using a primary cell (PCell) and one or more secondary cells (SCells). In some aspects, the UE 120 may use one or more first uplink beams for communications on the PCell, and one or more second uplink beams for communications on an SCell.

[0058] Carrier aggregation may generally enable two or more component carriers (CCs, sometimes referred to as carriers) to be combined (e.g., into a single channel) for a single UE to enhance data capacity. In general, component carriers can be combined in the same or different frequency bands, the same or different frequency ranges, and/or the like. Additionally, or alternatively, contiguous or non-contiguous component carriers can be combined. In some aspects, the BS 110 may configure carrier aggregation for the UE 120 in an intra-band contiguous mode, where the aggregated component carriers are contiguous to one another and are in the same frequency band. Additionally, or alternatively, carrier aggregation may be configured in an intra-band non-contiguous mode, where the aggregated component carriers are in the same frequency band and are non-contiguous to one another. Additionally, or alternatively, carrier aggregation may be configured in an inter-band non-contiguous mode, where the aggregated component carriers are non-contiguous to one another and are in different frequency bands.

[0059] In carrier aggregation, a UE may be configured with a cell group that includes a plurality (e.g., up to sixteen) of component carriers. The cell group may include one or more physical uplink control channel (PUCCH) cell groups, such as a

primary PUCCH cell group and/or a secondary PUCCH cell group. A PUCCH cell group may include a group of cells that communicate in a PUCCH on a PUCCH SCell or a secondary PUCCH SCell.

[0060] In some aspects, the UE 120 and the BS 110 may communicate using dual connectivity. For example, the UE 120 may communicate with the BS 110 and another base station using dual connectivity. Examples of dual connectivity configurations include multi-RAT dual connectivity (MR-DC), E-UTRA-NR dual connectivity (EN-DC), and NR-NR dual connectivity (NN-DC). The UE 120 may use dual connectivity to connect to multiple cells at once. For example, the UE 120 may select a set of candidate cells, and may select one or more PCells, SCells, primary secondary cells (PSCells), and/or secondary primary cells or special cells (SPCells). The PCell and SCell may be referred to as serving cells. In some aspects, "SPCell" may refer to a PCell of a master cell group or a PSCell of a secondary cell group, or to the PCell. In some aspects, the UE 120 may use different uplink beams for communications on a PCell, SCell, PSCell, and/or SPCell.

[0061] As shown by reference number 405, the UE 120 may determine an occurrence of an MPE event associated with a beam used by the UE 120. As described above, the MPE event may be a human body, or the like, blocking the beam. Thus, the UE 120 may be capable of detecting (e.g., using ultrasound, using wideband and/or narrowband ranging techniques, and/or the like) whether an antenna subarray of the UE 120 is near and/or obstructed by a human body, whether a directional beam of the UE 120 is directed toward and/or obstructed by the human body, and/or the like.

[0062] The UE 120 may determine that the beam, or one or more component carriers associated with the beam, is subject to an MPE condition based at least in part on determining the occurrence of the MPE event. In some aspects, the UE 120 may be subject to a transmission limitation due to the MPE condition (e.g., a limit on an antenna gain, a limit on a transmit power, and/or the like). In some aspects, the UE 120 may determine that the beam (or the one or more component carriers) subject to the MPE condition is not to be used (e.g., is not permitted for use) by the UE 120. In some aspects, in an inter-band carrier aggregation scenario, the UE 120 may determine whether the beam (or the one or more component carriers) is to be subject to the MPE condition based at least in part on a total MPE of aggregated component carriers.

[0063] In some aspects, the UE 120 may determine to transmit an MPE communication based at least in part on the determination that the beam (or the one or

more component carriers) is subject to the MPE condition. In some aspects, the MPE communication may be an MPE report. An MPE report may be transmitted in a MAC control element (MAC-CE) in a physical uplink shared channel (PUSCH). In some aspects, the MPE communication may be a scheduling request for MPE reporting (e.g., a scheduling request to transmit an MPE report).

[0064] As shown by reference number 410, the UE 120 may transmit, and the BS 110 may receive, the MPE communication. In some aspects, the UE 120 may transmit the MPE communication on a PCell, an SCell, an SPCell, a PSCell, a PUCCH SCell, a secondary PUCCH SCell, and/or the like. In some aspects, the UE 120 may determine a priority that is to be assigned to the MPE communication, and may transmit the MPE communication based at least in part on the priority. For example, if the UE 120 has insufficient resources (e.g., network resources, processing resources, and/or the like) to transmit the MPE communication and another uplink communication (e.g., a scheduling request for BFR, a MAC-CE for BFR, and/or the like), the UE may transmit the communication associated with a higher priority and drop the communication associated with a lower priority.

[0065] In some aspects, the UE 120 may transmit the MPE communication as part of a random access channel (RACH) procedure. For example, the MPE communication may be an MPE report that is transmitted in a physical RACH (PRACH) communication on a PCell. As an example, the MPE report may be included in a PUSCH payload of a msgA communication of a RACH procedure.

[0066] In some aspects, the UE 120 may determine whether to transmit the MPE report in the PRACH communication based at least in part on a priority assigned to the MPE report. In some aspects, the UE 120 may assign a same priority to the MPE report as a configured grant communication (e.g., a configured grant for an ultra-reliable low latency communication (URLLC) transmission). For example, channel access priority class (CAPC) selection for transmission of the PUSCH payload of the msgA communication, led by MPE reporting, may be the same as for transmission of a configured grant communication.

[0067] In some aspects, the UE 120 may transmit the MPE communication on an SCell or a secondary PUCCH SCell. In such an example, the MPE communication may be a scheduling request for MPE reporting. The UE 120 may transmit the scheduling request on an SCell when the MPE event relates to the PUCCH cell group for the SCell, or a different PUCCH cell group. For example, a scheduling request transmitted on a

primary PUCCH cell group may be triggered for an SCell, associated with an MPE event, in a secondary PUCCH cell group.

[0068] In some aspects, the UE 120 may be configured with a scheduling request configuration that includes a configuration (e.g., a scheduling request identifier) for scheduling requests triggered by an MPE event. In carrier aggregation, the scheduling request configuration may be configured for each PUCCH cell group. The scheduling request configuration may be shared by one or more other logical channels (e.g., non-MPE logical channels) used by the UE 120. In some aspects, the UE 120 may perform a RACH procedure (e.g., on the SCell or the secondary PUCCH SCell), as described above, when the scheduling request configuration does not include the configuration for scheduling requests triggered by an MPE event.

[0069] In some aspects, the UE 120 may determine whether to transmit the scheduling request for MPE reporting, or another scheduling request, based at least in part on a priority assigned to the scheduling request for MPE reporting. In some aspects, the UE 120 may assign a same priority to the scheduling request for MPE reporting as another scheduling request (e.g., a scheduling request configuration is shared for MPE scheduling requests and one or more other logical channels). Additionally, or alternatively, the UE 120 may assign a lower priority to the scheduling request for MPE reporting than a scheduling request for BFR, and assign a same priority to the scheduling request for MPE reporting as another non-BFR scheduling request.

[0070] In some aspects, the UE 120 may assign a same priority to the scheduling request for MPE reporting as a scheduling request for BFR (e.g., scheduling requests for MPE reporting use a scheduling request configuration for BFR). In such an example, the UE 120 may assign a higher priority to the scheduling request for MPE reporting than another non-BFR scheduling request. In some aspects, the UE 120 may assign a lower priority to the scheduling request for MPE reporting than a scheduling request for BFR, and a higher priority to the scheduling request for MPE reporting than another non-BFR scheduling request.

[0071] In some aspects, the UE 120 may transmit the MPE communication in a MAC-CE. That is, the MPE communication may be an MPE report. In such an example, the UE 120 may transmit the MAC-CE for MPE reporting in a PUSCH on a PCell or an SCell. For example, the UE 120 may transmit the MAC-CE for MPE reporting in a msg3 communication of a RACH procedure on the PCell. As another example, the UE 120 may transmit the MAC-CE for MPE reporting according to a

scheduling provided by the BS 110. For example, the scheduling may be in response to the scheduling request for MPE reporting.

[0072] In some aspects, the UE 120 may determine whether to transmit the MAC-CE for MPE reporting, or another MAC-CE, based at least in part on a priority assigned to the MAC-CE for MPE reporting. In some aspects, the UE 120 may assign a same priority, or a lower priority, to the MAC-CE for MPE reporting as a MAC-CE for a configured grant confirmation communication or a BFR communication. In such an example, the UE 120 may assign a same priority, or a lower priority, to the MAC-CE for MPE reporting as a MAC-CE for a buffer status report (BSR). In some aspects, the UE 120 may assign a same priority, or a lower priority, to the MAC-CE for MPE reporting as a MAC-CE for a BFR communication. In such an example, the UE 120 may assign a same priority, or a lower priority, to the MAC-CE for MPE reporting as a MAC-CE for a power headroom report (PHR).

[0073] As an example of MAC-CE priority order, a first priority may be associated with a cell radio network temporary identifier (C-RNTI) MAC-CE or a MAC-CE for data from an uplink common control channel (CCCH). In some aspects, a second priority may be associated with a MAC-CE for a configured grant confirmation communication, the MAC-CE for MPE reporting, or a MAC-CE for a BFR communication. In some aspects, a third priority may be associated with a MAC-CE for a BSR (unless the BSR is included in the MAC-CE for padding) or the MAC-CE for MPE reporting (e.g., if the MAC-CE for MPE reporting is not associated with the second priority). In some aspects, a fourth priority may be associated with a MAC-CE for a single-entry PHR, a MAC-CE for a multiple-entry PHR, or the MAC-CE for MPE reporting (e.g., if the MAC-CE for MPE reporting is not associated with the second or third priority). In some aspects, a fifth priority may be associated with a MAC-CE for data from a logical channel other than an uplink CCCH. In some aspects, a sixth priority may be associated with a MAC-CE for a recommended bit rate query. In some aspects, a seventh priority may be associated with a MAC-CE for a BSR included in the MAC-CE for padding.

[0074] As indicated above, Fig. 4 is provided as an example. Other examples may differ from what is described with respect to Fig. 4.

[0075] Fig. 5 is a diagram illustrating an example process 500 performed, for example, by a UE, in accordance with various aspects of the present disclosure.

Example process 500 is an example where the UE (e.g., UE 120 and/or the like) performs operations associated with MPE reporting.

[0076] As shown in Fig. 5, in some aspects, process 500 may include determining a priority that is to be assigned to an MPE communication that is to be transmitted on a primary cell or a secondary cell used for carrier aggregation or dual connectivity (block 510). For example, the UE (e.g., using controller/processor 280 and/or the like) may determine a priority that is to be assigned to an MPE communication that is to be transmitted on a primary cell or a secondary cell used for carrier aggregation or dual connectivity, as described above.

[0077] As further shown in Fig. 5, in some aspects, process 500 may include transmitting, on the primary cell or the secondary cell, the MPE communication based at least in part on the priority (block 520). For example, the UE (e.g., using controller/processor 280, transmit processor 264, TX MIMO processor 266, MOD 254, antenna 252, and/or the like) may transmit, on the primary cell or the secondary cell, the MPE communication based at least in part on the priority, as described above.

[0078] Process 500 may include additional aspects, such as any single aspect or any combination of aspects described below and/or in connection with one or more other processes described elsewhere herein.

[0079] In a first aspect, the MPE communication is an MPE report that is to be transmitted in a PRACH communication on the primary cell.

[0080] In a second aspect, alone or in combination with the first aspect, the MPE report is to be assigned a same priority as a configured grant communication.

[0081] In a third aspect, alone or in combination with one or more of the first and second aspects, the MPE communication is a scheduling request for an MPE report that is to be transmitted on the secondary cell.

[0082] In a fourth aspect, alone or in combination with one or more of the first through third aspects, the scheduling request for the MPE report is to be assigned a same priority as another scheduling request.

[0083] In a fifth aspect, alone or in combination with one or more of the first through fourth aspects, the scheduling request for the MPE report is associated with an MPE configuration of a scheduling request configuration.

[0084] In a sixth aspect, alone or in combination with one or more of the first through fifth aspects, process 500 includes performing a PRACH procedure when a scheduling request configuration does not provide an MPE scheduling request identifier.

[0085] In a seventh aspect, alone or in combination with one or more of the first through sixth aspects, the scheduling request for the MPE report is to be assigned a same priority as a scheduling request for beam failure recovery.

[0086] In an eighth aspect, alone or in combination with one or more of the first through seventh aspects, the scheduling request for the MPE report is to be assigned a lower priority than a scheduling request for BFR, and a higher priority than a non-BFR scheduling request.

[0087] In a ninth aspect, alone or in combination with one or more of the first through eighth aspects, the MPE communication is an MPE report that is to be transmitted in a MAC-CE on the primary cell or the secondary cell.

[0088] In a tenth aspect, alone or in combination with one or more of the first through ninth aspects, the MPE report is to be assigned a same or a lower priority than a configured grant confirmation communication or a BFR communication, and a same or a higher priority than a BSR.

[0089] In an eleventh aspect, alone or in combination with one or more of the first through tenth aspects, the MPE report is to be assigned a same or a lower priority than a BFR communication, and a same or a higher priority than a PHR.

[0090] Although Fig. 5 shows example blocks of process 500, in some aspects, process 500 may include additional blocks, fewer blocks, different blocks, or differently arranged blocks than those depicted in Fig. 5. Additionally, or alternatively, two or more of the blocks of process 500 may be performed in parallel.

[0091] Fig. 6 is a conceptual data flow diagram 600 illustrating a data flow between different components in an example apparatus 602. The apparatus 602 may be a UE (e.g., UE 120). In some aspects, the apparatus 602 includes a reception component 604, a determination component 606, and/or a transmission component 608.

[0092] In some aspects, determination component 606 may determine whether a beam is subject to an MPE condition. Additionally, or alternatively, determination component 606 may determine a priority that is to be assigned to an MPE communication. In some aspects, transmission component 608 may transmit the MPE communication based at least in part on the priority. Transmission component 608 may transmit the MPE communication on a primary cell or a secondary cell used for carrier aggregation or dual connectivity. In some aspects, reception component 604 may receive, from an apparatus 650 (e.g., BS 110), scheduling for transmitting an MPE

report, a msg2 communication of a RACH procedure, a msgB communication of a RACH procedure, and/or the like.

[0093] The apparatus 602 may include additional components that perform each of the blocks of the algorithm in the aforementioned process 500 of Fig. 5, and/or the like. Each block in the aforementioned process 500 of Fig. 5, and/or the like, may be performed by a component and the apparatus may include one or more of those components. The components may be one or more hardware components specifically configured to carry out the stated processes/algorithm, implemented by a processor configured to perform the stated processes/algorithm, stored within a computer-readable medium for implementation by a processor, or some combination thereof.

[0094] The number and arrangement of components shown in Fig. 6 are provided as an example. In practice, there may be additional components, fewer components, different components, or differently arranged components than those shown in Fig. 6. Furthermore, two or more components shown in Fig. 6 may be implemented within a single component, or a single component shown in Fig. 6 may be implemented as multiple, distributed components. Additionally, or alternatively, a set of components (e.g., one or more components) shown in Fig. 6 may perform one or more functions described as being performed by another set of components shown in Fig. 6.

[0095] The foregoing disclosure provides illustration and description, but is not intended to be exhaustive or to limit the aspects to the precise form disclosed. Modifications and variations may be made in light of the above disclosure or may be acquired from practice of the aspects.

[0096] As used herein, the term "component" is intended to be broadly construed as hardware, firmware, and/or a combination of hardware and software. As used herein, a processor is implemented in hardware, firmware, and/or a combination of hardware and software.

[0097] As used herein, satisfying a threshold may, depending on the context, refer to a value being greater than the threshold, greater than or equal to the threshold, less than the threshold, less than or equal to the threshold, equal to the threshold, not equal to the threshold, and/or the like.

[0098] It will be apparent that systems and/or methods described herein may be implemented in different forms of hardware, firmware, and/or a combination of hardware and software. The actual specialized control hardware or software code used to implement these systems and/or methods is not limiting of the aspects. Thus, the

operation and behavior of the systems and/or methods were described herein without reference to specific software code—it being understood that software and hardware can be designed to implement the systems and/or methods based, at least in part, on the description herein.

[0099] Even though particular combinations of features are recited in the claims and/or disclosed in the specification, these combinations are not intended to limit the disclosure of various aspects. In fact, many of these features may be combined in ways not specifically recited in the claims and/or disclosed in the specification. Although each dependent claim listed below may directly depend on only one claim, the disclosure of various aspects includes each dependent claim in combination with every other claim in the claim set. A phrase referring to "at least one of" a list of items refers to any combination of those items, including single members. As an example, "at least one of: a, b, or c" is intended to cover a, b, c, a-b, a-c, b-c, and a-b-c, as well as any combination with multiples of the same element (e.g., a-a, a-a-a, a-a-b, a-a-c, a-b-b, a-c-c, b-b, b-b-b, b-b-c, c-c, and c-c-c or any other ordering of a, b, and c).

[00100] No element, act, or instruction used herein should be construed as critical or essential unless explicitly described as such. Also, as used herein, the articles "a" and "an" are intended to include one or more items, and may be used interchangeably with "one or more." Furthermore, as used herein, the terms "set" and "group" are intended to include one or more items (e.g., related items, unrelated items, a combination of related and unrelated items, and/or the like), and may be used interchangeably with "one or more." Where only one item is intended, the phrase "only one" or similar language is used. Also, as used herein, the terms "has," "have," "having," and/or the like are intended to be open-ended terms. Further, the phrase "based on" is intended to mean "based, at least in part, on" unless explicitly stated otherwise.

WHAT IS CLAIMED IS:

1. A method of wireless communication performed by a user equipment (UE), comprising:

determining a priority that is to be assigned to a maximum permissible exposure (MPE) communication that is to be transmitted on a primary cell or a secondary cell used for carrier aggregation or dual connectivity; and

transmitting, on the primary cell or the secondary cell, the MPE communication based at least in part on the priority.

2. The method of claim 1, wherein the MPE communication is an MPE report that is to be transmitted in a physical random access channel (PRACH) communication on the primary cell.

3. The method of claim 2, wherein the MPE report is to be assigned a same priority as a configured grant communication.

4. The method of claim 1, wherein the MPE communication is a scheduling request for an MPE report that is to be transmitted on the secondary cell.

5. The method of claim 4, wherein the scheduling request for the MPE report is to be assigned a same priority as another scheduling request.

6. The method of claim 5, wherein the scheduling request for the MPE report is associated with an MPE configuration of a scheduling request configuration.

7. The method of claim 5, further comprising:

performing a physical random access channel (PRACH) procedure when a scheduling request configuration does not provide an MPE scheduling request identifier.

8. The method of claim 4, wherein the scheduling request for the MPE report is to be assigned a same priority as a scheduling request for beam failure recovery.

9. The method of claim 4, wherein the scheduling request for the MPE report is to be assigned a lower priority than a scheduling request for beam failure recovery (BFR), and a higher priority than a non-BFR scheduling request.

10. The method of claim 1, wherein the MPE communication is an MPE report that is to be transmitted in a medium access control (MAC) control element on the primary cell or the secondary cell.

11. The method of claim 10, wherein the MPE report is to be assigned a same or a lower priority than a configured grant confirmation communication or a beam failure recovery communication, and a same or a higher priority than a buffer status report.

12. The method of claim 10, wherein the MPE report is to be assigned a same or a lower priority than a beam failure recovery communication, and a same or a higher priority than a power headroom report.

13. A user equipment (UE) for wireless communication, comprising:

a memory; and

one or more processors coupled to the memory, the memory and the one or more processors configured to:

determine a priority that is to be assigned to a maximum permissible exposure (MPE) communication that is to be transmitted on a primary cell or a secondary cell used for carrier aggregation or dual connectivity; and

transmit, on the primary cell or the secondary cell, the MPE communication based at least in part on the priority.

14. The UE of claim 13, wherein the MPE communication is an MPE report that is to be transmitted in a physical random access channel (PRACH) communication on the primary cell.

15. The UE of claim 14, wherein the MPE report is to be assigned a same priority as a configured grant communication.

16. The UE of claim 13, wherein the MPE communication is a scheduling request for an MPE report that is to be transmitted on the secondary cell.

17. The UE of claim 16, wherein the scheduling request for the MPE report is to be assigned a same priority as another scheduling request.

18. The UE of claim 17, wherein the scheduling request for the MPE report is associated with an MPE configuration of a scheduling request configuration.

19. The UE of claim 17, wherein the one or more processors are further configured to:

perform a physical random access channel (PRACH) procedure when a scheduling request configuration does not provide an MPE scheduling request identifier.

20. The UE of claim 16, wherein the scheduling request for the MPE report is to be assigned a same priority as a scheduling request for beam failure recovery.

21. The UE of claim 16, wherein the scheduling request for the MPE report is to be assigned a lower priority than a scheduling request for beam failure recovery (BFR), and a higher priority than a non-BFR scheduling request.

22. The UE of claim 13, wherein the MPE communication is an MPE report that is to be transmitted in a medium access control (MAC) control element on the primary cell or the secondary cell.

23. The UE of claim 22, wherein the MPE report is to be assigned a same or a lower priority than a configured grant confirmation communication or a beam failure recovery communication, and a same or a higher priority than a buffer status report.

24. The UE of claim 22, wherein the MPE report is to be assigned a same or a lower priority than a beam failure recovery communication, and a same or a higher priority than a power headroom report.

25. A non-transitory computer-readable medium storing one or more instructions for wireless communication, the one or more instructions comprising:

one or more instructions that, when executed by one or more processors of a user equipment, cause the one or more processors to:

determine a priority that is to be assigned to a maximum permissible exposure (MPE) communication that is to be transmitted on a primary cell or a secondary cell used for carrier aggregation or dual connectivity; and

transmit, on the primary cell or the secondary cell, the MPE communication based at least in part on the priority.

26. The non-transitory computer-readable medium of claim 25, wherein the MPE communication is an MPE report that is to be transmitted in a physical random access channel (PRACH) communication on the primary cell.

27. The non-transitory computer-readable medium of claim 26, wherein the MPE report is to be assigned a same priority as a configured grant communication.

28. The non-transitory computer-readable medium of claim 25, wherein the MPE communication is a scheduling request for an MPE report that is to be transmitted on the secondary cell.

29. The non-transitory computer-readable medium of claim 28, wherein the scheduling request for the MPE report is to be assigned a same priority as another scheduling request.

30. The non-transitory computer-readable medium of claim 29, wherein the scheduling request for the MPE report is associated with an MPE configuration of a scheduling request configuration.

31. The non-transitory computer-readable medium of claim 29, wherein the one or more instructions, when executed by the one or more processors, further cause the one or more processors to:

perform a physical random access channel (PRACH) procedure when a scheduling request configuration does not provide an MPE scheduling request identifier.

32. The non-transitory computer-readable medium of claim 28, wherein the scheduling request for the MPE report is to be assigned a same priority as a scheduling request for beam failure recovery.

33. The non-transitory computer-readable medium of claim 28, wherein the scheduling request for the MPE report is to be assigned a lower priority than a scheduling request for beam failure recovery (BFR), and a higher priority than a non-BFR scheduling request.

34. The non-transitory computer-readable medium of claim 25, wherein the MPE communication is an MPE report that is to be transmitted in a medium access control (MAC) control element on the primary cell or the secondary cell.

35. The non-transitory computer-readable medium of claim 34, wherein the MPE report is to be assigned a same or a lower priority than a configured grant confirmation communication or a beam failure recovery communication, and a same or a higher priority than a buffer status report.

36. The non-transitory computer-readable medium of claim 34, wherein the MPE report is to be assigned a same or a lower priority than a beam failure recovery communication, and a same or a higher priority than a power headroom report.

37. An apparatus for wireless communication, comprising:

means for determining a priority that is to be assigned to a maximum permissible exposure (MPE) communication that is to be transmitted on a primary cell or a secondary cell used for carrier aggregation or dual connectivity; and

means for transmitting, on the primary cell or the secondary cell, the MPE communication based at least in part on the priority.

38. The apparatus of claim 37, wherein the MPE communication is an MPE report that is to be transmitted in a physical random access channel (PRACH) communication on the primary cell.

39. The apparatus of claim 38, wherein the MPE report is to be assigned a same priority as a configured grant communication.

40. The apparatus of claim 37, wherein the MPE communication is a scheduling request for an MPE report that is to be transmitted on the secondary cell.

41. The apparatus of claim 40, wherein the scheduling request for the MPE report is to be assigned a same priority as another scheduling request.

42. The apparatus of claim 41, wherein the scheduling request for the MPE report is associated with an MPE configuration of a scheduling request configuration.

43. The apparatus of claim 41, further comprising:

means for performing a physical random access channel (PRACH) procedure when a scheduling request configuration does not provide an MPE scheduling request identifier.

44. The apparatus of claim 40, wherein the scheduling request for the MPE report is to be assigned a same priority as a scheduling request for beam failure recovery.

45. The apparatus of claim 40, wherein the scheduling request for the MPE report is to be assigned a lower priority than a scheduling request for beam failure recovery (BFR), and a higher priority than a non-BFR scheduling request.

46. The apparatus of claim 37, wherein the MPE communication is an MPE report that is to be transmitted in a medium access control (MAC) control element on the primary cell or the secondary cell.

47. The apparatus of claim 46, wherein the MPE report is to be assigned a same or a lower priority than a configured grant confirmation communication or a beam failure recovery communication, and a same or a higher priority than a buffer status report.

48. The apparatus of claim 46, wherein the MPE report is to be assigned a same or a lower priority than a beam failure recovery communication, and a same or a higher priority than a power headroom report.

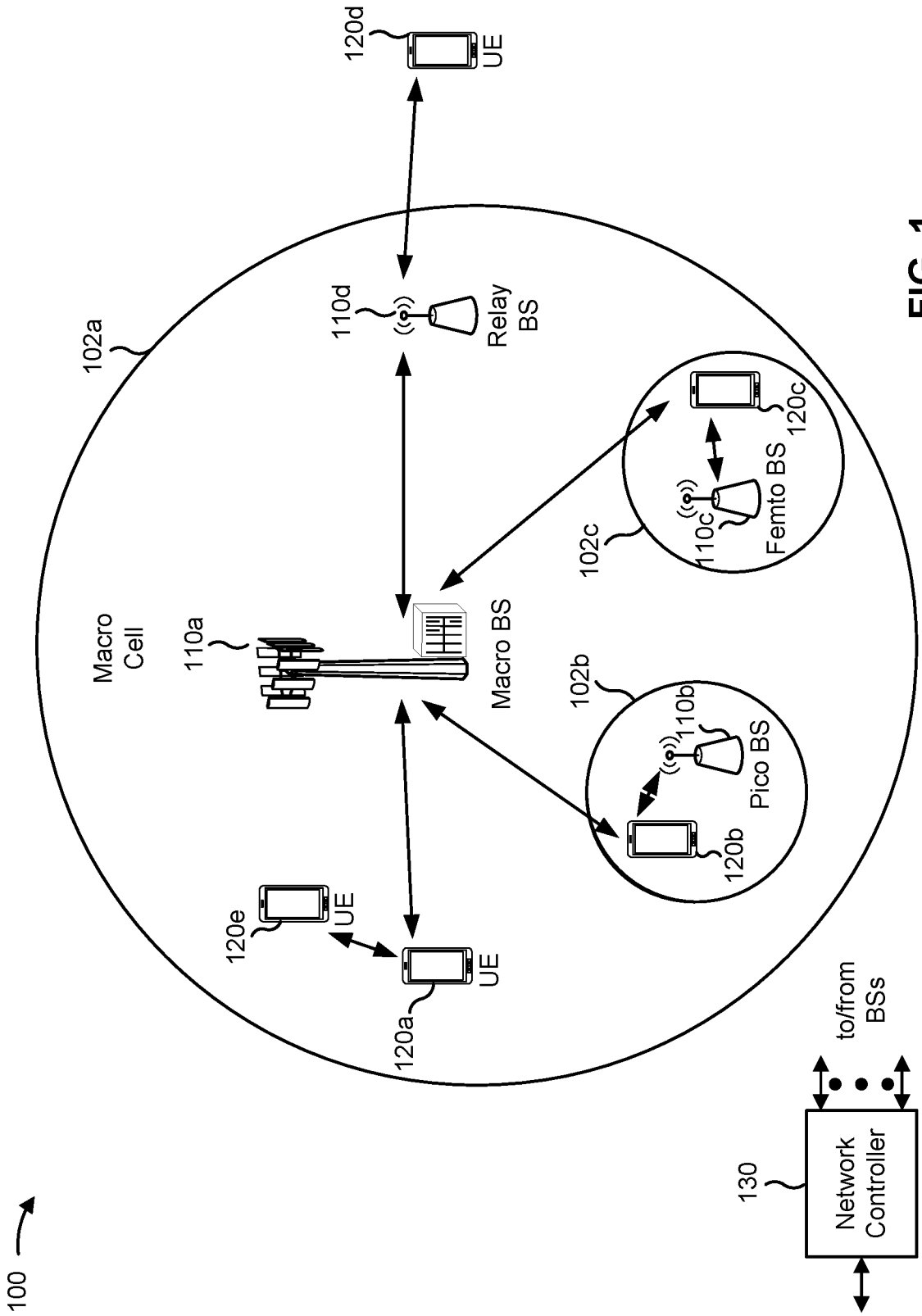
100
102a
Macro Cell
110a
Macro BS
110d
Relay BS
120d
UE
102c
110c
Femto BS
120c
102b
110b
Pico BS
120b
120e
UE
120a
UE
130
Network Controller
to/from BSs

FIG. 1

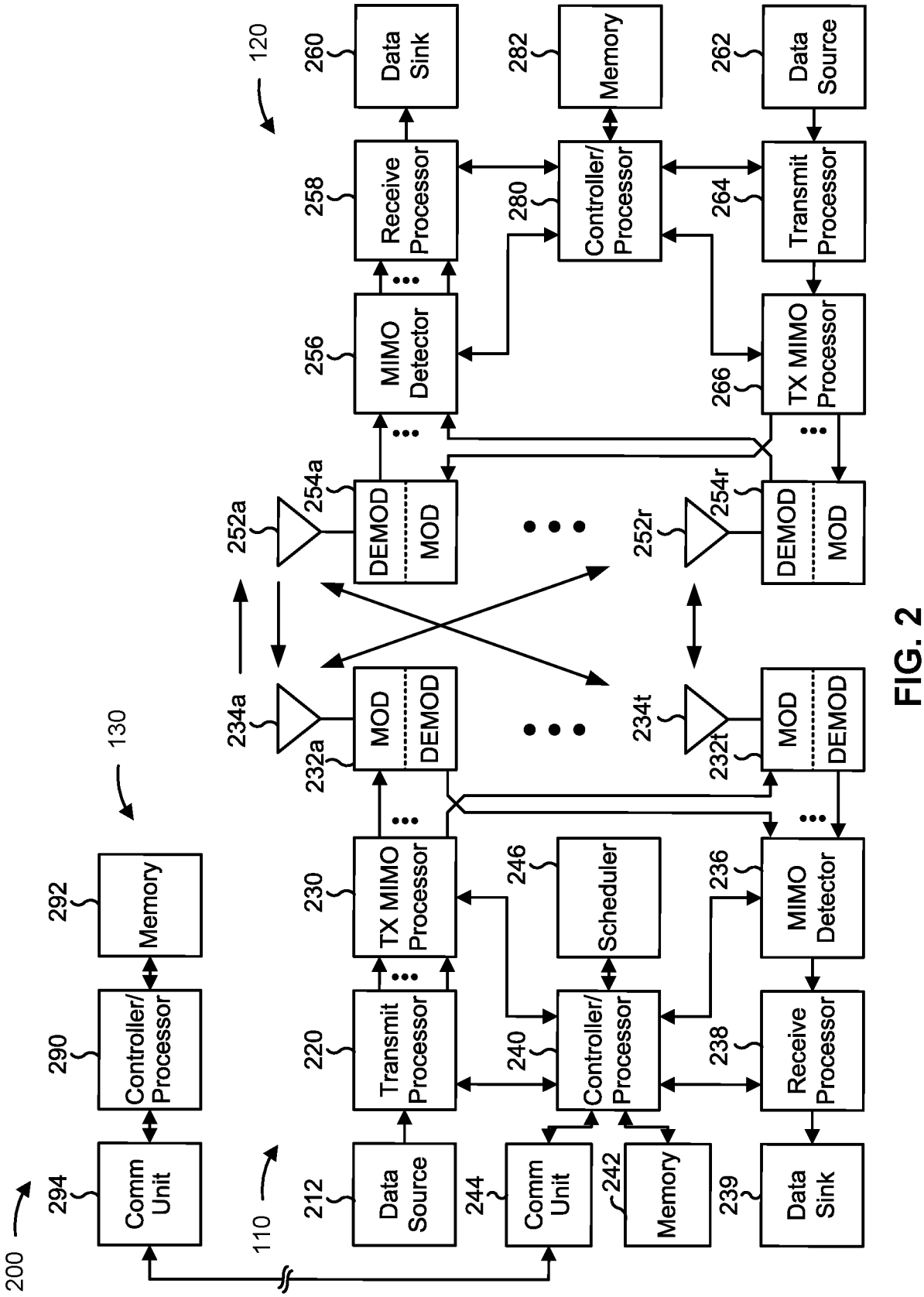
200
294
Comm Unit
290
Controller/ Processor
292
Memory
130
110
212
Data Source
220
Transmit Processor
230
TX MIMO Processor
232a
MOD
DEMOD
234a
252a
254a
DEMOD
MOD
256
MIMO Detector
258
Receive Processor
260
Data Sink
120
240
Controller/ Processor
242
Memory
244
Comm Unit
246
Scheduler
238
Receive Processor
236
MIMO Detector
239
Data Sink
234t
232t
MOD
DEMOD
252r
254r
DEMOD
MOD
266
TX MIMO Processor
264
Transmit Processor
280
Controller/ Processor
282
Memory
262
Data Source

FIG. 2

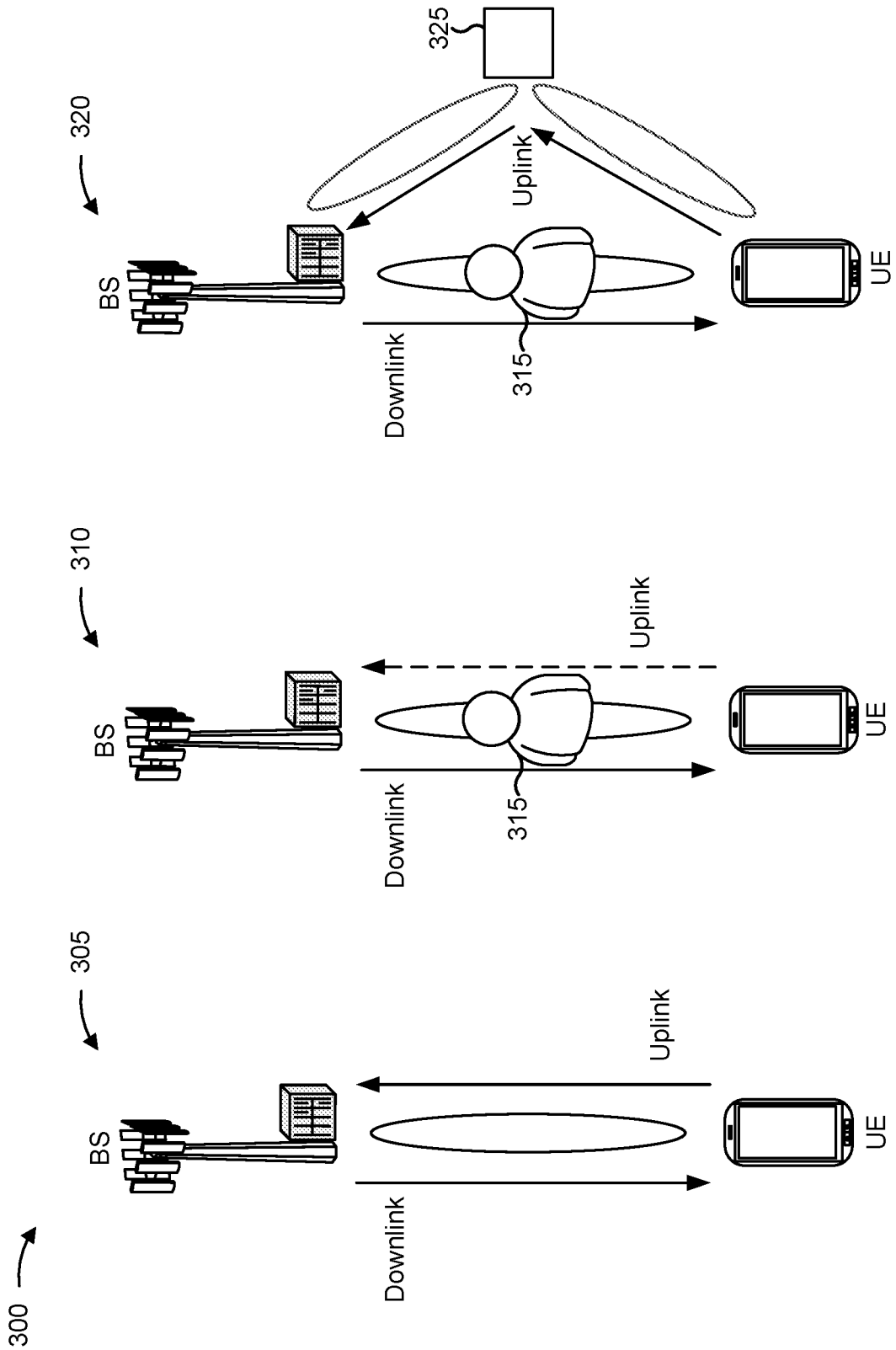
300
305
BS
UE
Downlink
Uplink
310
BS
UE
Downlink
315
Uplink
320
BS
UE
Downlink
315
Uplink
325

FIG. 3

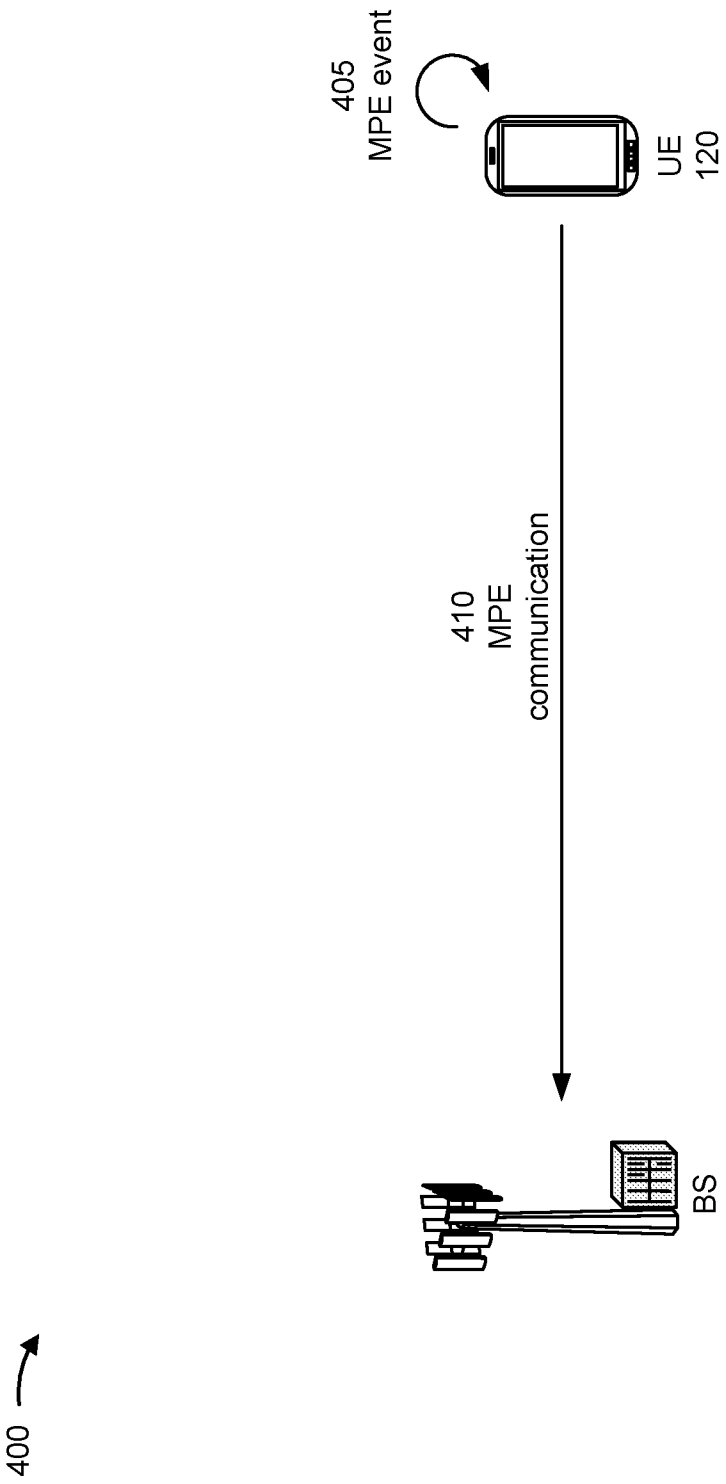

FIG. 4

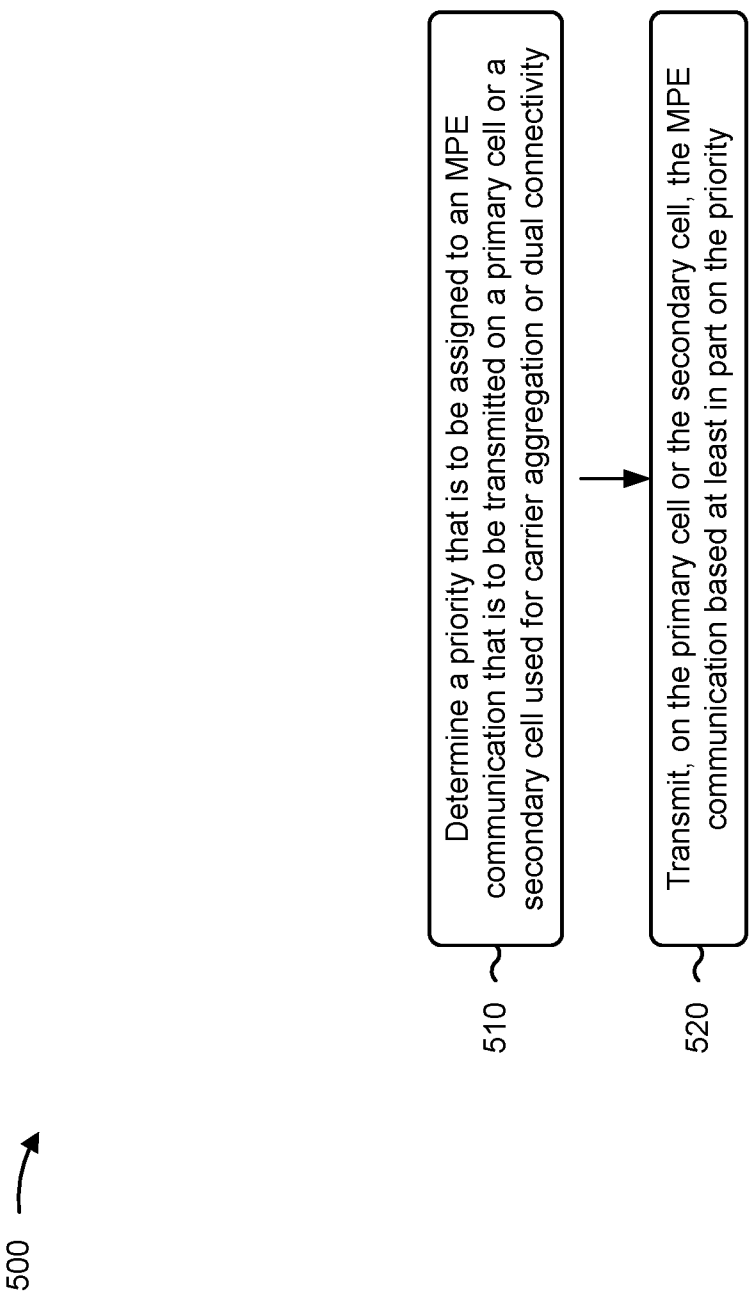
500
Determine a priority that is to be assigned to an MPE communication that is to be transmitted on a primary cell or a secondary cell used for carrier aggregation or dual connectivity
510
Transmit, on the primary cell or the secondary cell, the MPE communication based at least in part on the priority
520

FIG. 5

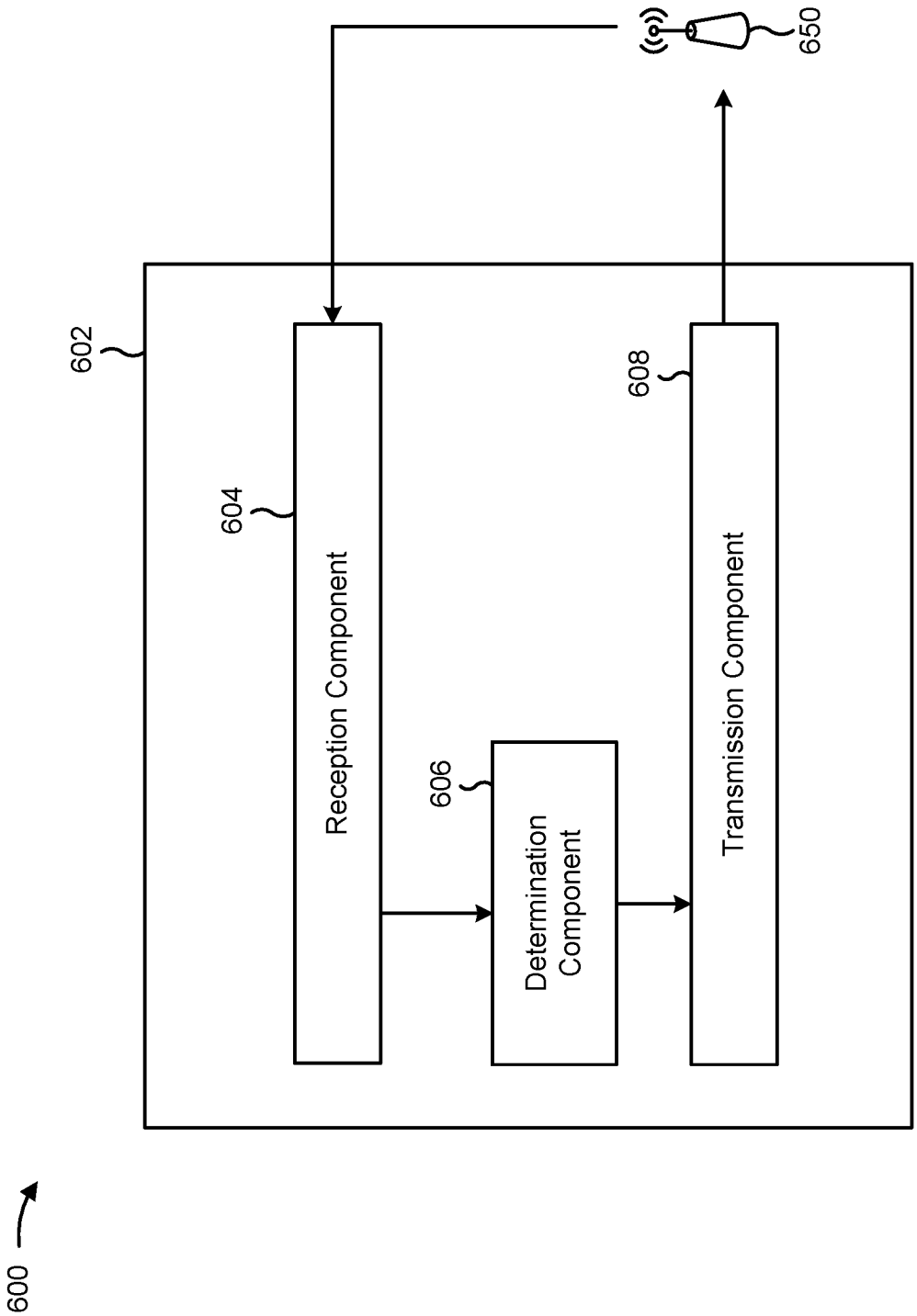
600
602
604
Reception Component
606
Determination Component
608
Transmission Component
650

FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/081029

A. CLASSIFICATION OF SUBJECT MATTER

H04W 72/04(2009.01)i; H04W 52/30(2009.01)i; H04W 52/28(2009.01)i; H04B 7/0408(2017.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04W;H04B;H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS, CNTXT, CNKI, VEN, WOTXT, EPTXT, USTXT, GOOGLE, 3GPP: priorit+, order, MPE, maximum permissible exposure, event, report, scheduling request, MPR, maximum power reduction, SAR, specific absorption ratio, carrier aggregation, dual connectivity, primary cell, Pcell, secondary cell, Scell,BFR, beam failure recovery

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Nokia et al. "UE FR2 MPE enhancements and solutions (R4-1914274)" *3GPP TSG RAN WG4 Meeting #93,* 22 November 2019 (2019-11-22), page 2	1-48
Y	Qualcomm Incorporated. "Remaining Details on UL Reference Signals for NR Positioning (R1-1912974)" *3GPP TSG RAN WG1 #98,* 18 October 2019 (2019-10-18), page 3	1-48
Y	Nokia et al. "UE FR2 MPE enhancements and solutions (R4-2001382)" *3GPP RAN WG4 Meeting #94-e,* 06 March 2020 (2020-03-06), page 2	1-48
A	MediaTek Inc. "Enhancements on multi-beam operations (R1-1908380)" *3GPP TSG RAN WG1 #98,* 30 August 2019 (2019-08-30), the whole document	1-48

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 December 2020	**31 December 2020**
Name and mailing address of the ISA/CN **National Intellectual Property Administration, PRC** **6, Xitucheng Rd., Jimen Bridge, Haidian District, Beijing 100088** **China** Facsimile No. **(86-10)62019451**	Authorized officer **WANG,Wei** Telephone No. **86-10-62089398**

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Apple Inc. et al. "Cross-WG issues related to the development of solutions to mitigate performance under the MPE scenario (RP-190990)" *3GPP TSG-RAN Meeting #84,* 06 June 2019 (2019-06-06), the whole document	1-48
A	US 2019261289 A1 (QUALCOMM INC.) 22 August 2019 (2019-08-22) the whole document	1-48
A	CN 110431755 A (QUALCOMM INC.) 08 November 2019 (2019-11-08) the whole document	1-48
A	CN 110769493 A (HUAWEI TECHNOLOGIES CO., LTD.) 07 February 2020 (2020-02-07) the whole document	1-48

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2020/081029

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
US 2019261289 A1	22 August 2019	WO 2019160669 A1	22 August 2019
		AU 2019220486 A1	06 August 2020
		TW 201935967 A	01 September 2019
CN 110431755 A	08 November 2019	US 10291309 B2	14 May 2019
		US 2018278318 A1	27 September 2018
		WO 2018175002 A1	27 September 2018
		EP 3602810 A1	05 February 2020
CN 110769493 A	07 February 2020	WO 2020020251 A1	30 January 2020