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(54) **Title:** METHOD, DEVICE AND COMPUTER STORAGE MEDIUM OF COMMUNICATION

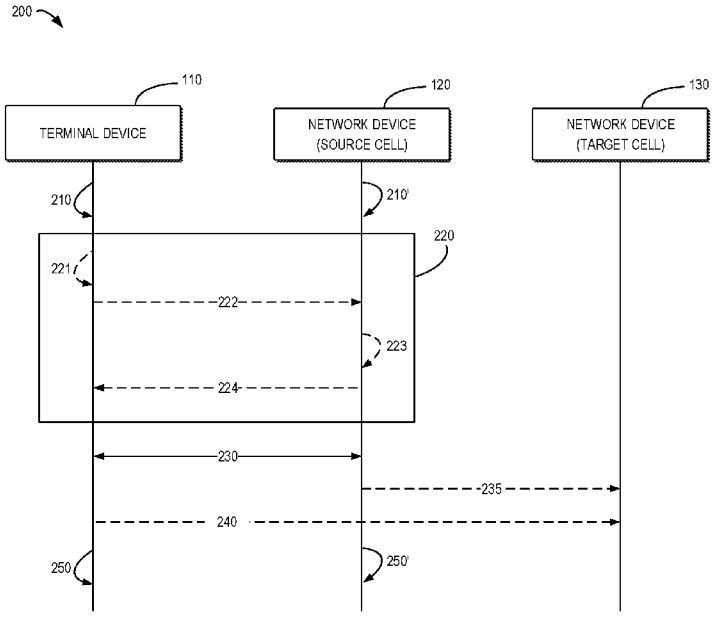

Fig. 2

(57) **Abstract:** Embodiments of the present disclosure relate to methods, devices and computer readable media for communication. If a cell change is performed during a repetition transmission for a physical channel transmission, a terminal device determines whether a remaining portion of the repetition transmission is to be continued or stopped. If the remaining portion is to be continued, the terminal device continues the remaining portion of the repetition transmission. If the remaining portion is to be stopped, the terminal device stops the remaining portion of the repetition transmission. In this way, HARQ process continuity may be maintained in a cell change, and an improved transmission performance may be obtained.

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METHOD, DEVICE AND COMPUTER STORAGE MEDIUM OF COMMUNICATION

FIELD

[0001] Embodiments of the present disclosure generally relate to the field of telecommunication, and in particular, to methods, devices and computer storage media of communication for repetition transmission.

BACKGROUND

[0002] Currently, a non-terrestrial network (NTN) is proposed to provide wide area coverage. A NTN refers to networks or segments of networks using an airborne or space-borne vehicle to embark a transmission equipment relay node or base station or using radio frequency (RF) resources on board a satellite or unmanned aerial system (UAS) platform.

[0003] In NTN, a repetition transmission for a physical channel transmission between a terminal device and a network device is supported. When a terminal device goes out of service coverage of a source cell, it may experience a radio link failure (RLF) and may perform a cell change from the source cell to a target cell. In some scenarios, a repetition transmission may be not completed before a cell change. As a cell change in NTN may happen more frequently, a hybrid automatic repeat request (HARQ) continuity in the cell change in NTN should be considered. However, a solution for a repetition transmission during a cell change is still incomplete and to be developed.

SUMMARY

[0004] In general, embodiments of the present disclosure provide methods, devices and computer storage media of communication for repetition transmission.

[0005] In a first aspect, there is provided a method of communication. The method comprises: in accordance with a determination that a cell change is performed during a repetition transmission for a physical channel transmission, determining, at a terminal device, whether a remaining portion of the repetition transmission is to be continued or stopped; in accordance with a determination that the remaining portion is to be continued, continuing the

remaining portion of the repetition transmission; and in accordance with a determination that the remaining portion is to be stopped, stopping the remaining portion of the repetition transmission.

[0006] In a second aspect, there is provided a method of communication. The method comprises: in accordance with a determination that a cell change is performed during a repetition transmission for a physical channel transmission, determining, at a network device, whether a remaining portion of the repetition transmission is to be continued or stopped; in accordance with a determination that the remaining portion is to be continued, continuing the remaining portion of the repetition transmission; and in accordance with a determination that the remaining portion is to be stopped, stopping the remaining portion of the repetition transmission.

[0007] In a third aspect, there is provided a device of communication. The device comprises a processor configured to perform the method according to the first aspect of the present disclosure.

[0008] In a fourth aspect, there is provided a device of communication. The device comprises a processor configured to perform the method according to the second aspect of the present disclosure.

[0009] In a fifth aspect, there is provided a computer readable medium having instructions stored thereon. The instructions, when executed on at least one processor, cause the at least one processor to perform the method according to the first aspect of the present disclosure.

[0010] In a sixth aspect, there is provided a computer readable medium having instructions stored thereon. The instructions, when executed on at least one processor, cause the at least one processor to perform the method according to the second aspect of the present disclosure.

[0011] Other features of the present disclosure will become easily comprehensible through the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Through the more detailed description of some example embodiments of the present disclosure in the accompanying drawings, the above and other objects, features and advantages of the present disclosure will become more apparent, wherein:

[0013] Through the more detailed description of some embodiments of the present

disclosure in the accompanying drawings, the above and other objects, features and advantages of the present disclosure will become more apparent, wherein:

[0014] Fig. 1 illustrates an example communication environment in which some embodiments of the present disclosure can be implemented;

[0015] Fig. 2 illustrates a schematic diagram illustrating a process for communication according to embodiments of the present disclosure;

[0016] Fig. 3 illustrates a schematic diagram illustrating an example scenario of a cell change during a repetition transmission according to embodiments of the present disclosure;

[0017] Fig. 4 illustrates a schematic diagram illustrating an example timing for a transmission of a scheduling request (SR) according to embodiments of the present disclosure;

[0018] Fig. 5 illustrates an example method of communication implemented at a terminal device in accordance with some embodiments of the present disclosure;

[0019] Fig. 6 illustrates an example method of communication implemented at a network device in accordance with some embodiments of the present disclosure; and

[0020] Fig. 7 is a simplified block diagram of a device that is suitable for implementing embodiments of the present disclosure.

[0021] Throughout the drawings, the same or similar reference numerals represent the same or similar element.

DETAILED DESCRIPTION

[0022] Principle of the present disclosure will now be described with reference to some example embodiments. It is to be understood that these embodiments are described only for the purpose of illustration and help those skilled in the art to understand and implement the present disclosure, without suggesting any limitation as to the scope of the disclosure. Embodiments described herein can be implemented in various manners other than the ones described below.

[0023] In the following description and claims, unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skills in the art to which this disclosure belongs.

[0024] References in the present disclosure to "one embodiment," "an embodiment," "an

example embodiment," and the like indicate that the embodiment described may include a particular feature, structure, or characteristic, but it is not necessary that every embodiment includes the particular feature, structure, or characteristic. Moreover, such phrases are not necessarily referring to the same embodiment. Further, when a particular feature, structure, or characteristic is described in connection with an embodiment, it is submitted that it is within the knowledge of one skilled in the art to affect such feature, structure, or characteristic in connection with other embodiments whether or not explicitly described.

[0025] It shall be understood that although the terms "first" and "second" etc. may be used herein to describe various elements, these elements should not be limited by these terms. These terms are only used to distinguish one element from another. For example, a first element could be termed a second element, and similarly, a second element could be termed a first element, without departing from the scope of example embodiments. As used herein, the term "and/or" includes any and all combinations of one or more of the listed terms.

[0026] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of example embodiments. As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises", "comprising", "has", "having", "includes" and/or "including", when used herein, specify the presence of stated features, elements, and/or components etc., but do not preclude the presence or addition of one or more other features, elements, components and/ or combinations thereof.

[0027] In some examples, values, procedures, or apparatus are referred to as "best," "lowest," "highest," "minimum," "maximum," or the like. It will be appreciated that such descriptions are intended to indicate that a selection among many used functional alternatives can be made, and such selections need not be better, smaller, higher, or otherwise preferable to other selections.

[0028] As used herein, the term "communication network" refers to a network following any suitable communication standards, such as New Radio (NR), Long Term Evolution (LTE), LTE-Advanced (LTE-A), Wideband Code Division Multiple Access (WCDMA), High-Speed Packet Access (HSPA), Narrow Band Internet of Things (NB-IoT) and so on. Furthermore, the communications between a terminal device and a network device in the communication network may be performed according to any suitable generation

communication protocols, including, but not limited to, the first generation (1G), the second generation (2G), 2.5G, 2.75G, the third generation (3G), the fourth generation (4G), 4.5G, the fifth generation (5G), 5.5G, 5G-Advanced networks, or the sixth generation (6G) communication protocols, and/or any other protocols either currently known or to be developed in the future. Embodiments of the present disclosure may be applied in various communication systems. Given the rapid development in communications, there will of course also be future type communication technologies and systems with which the present disclosure may be embodied. It should not be seen as limiting the scope of the present disclosure to only the aforementioned system.

[0029] As used herein, the term 'terminal device' refers to any device having wireless or wired communication capabilities. Examples of the terminal device include, but not limited to, user equipment (UE), personal computers, desktops, mobile phones, cellular phones, smart phones, personal digital assistants (PDAs), portable computers, tablets, wearable devices, internet of things (IoT) devices, Ultra-reliable and Low Latency Communications (URLLC) devices, Internet of Everything (IoE) devices, machine type communication (MTC) devices, device on vehicle for V2X communication where X means pedestrian, vehicle, or infrastructure/network, devices for Integrated Access and Backhaul (IAB), Space borne vehicles or Air borne vehicles in Non-terrestrial networks (NTN) including Satellites and High Altitude Platforms (HAPs) encompassing Unmanned Aircraft Systems (UAS), eXtended Reality (XR) devices including different types of realities such as Augmented Reality (AR), Mixed Reality (MR) and Virtual Reality (VR), the unmanned aerial vehicle (UAV) commonly known as a drone which is an aircraft without any human pilot, devices on high speed train (HST), or image capture devices such as digital cameras, sensors, gaming devices, music storage and playback appliances, or Internet appliances enabling wireless or wired Internet access and browsing and the like. The 'terminal device' can further has 'multicast/broadcast' feature, to support public safety and mission critical, V2X applications, transparent IPv4/IPv6 multicast delivery, IPTV, smart TV, radio services, software delivery over wireless, group communications and IoT applications. It may also incorporated one or multiple Subscriber Identity Module (SIM) as known as Multi-SIM. The term "terminal device" can be used interchangeably with a UE, a mobile station, a subscriber station, a mobile terminal, a user terminal or a wireless device.

[0030] As used herein, the term "network device" refers to a device which is capable of providing or hosting a cell or coverage where terminal devices can communicate. Examples

of a network device include, but not limited to, a satellite, a unmanned aerial systems (UAS) platform, a Node B (NodeB or NB), an evolved NodeB (eNodeB or eNB), a next generation NodeB (gNB), a transmission reception point (TRP), a remote radio unit (RRU), a radio head (RH), a remote radio head (RRH), an IAB node, a low power node such as a femto node, a pico node, a reconfigurable intelligent surface (RIS), and the like.

[0031] The terminal device or the network device may have Artificial intelligence (AI) or Machine learning capability. It generally includes a model which has been trained from numerous collected data for a specific function, and can be used to predict some information.

[0032] The terminal or the network device may work on several frequency ranges, e.g. FR1 (410 MHz to 7125 MHz), FR2 (24.25GHz to 71GHz), frequency band larger than 100GHz as well as Tera Hertz (THz). It can further work on licensed/unlicensed/shared spectrum. The terminal device may have more than one connections with the network devices under Multi-Radio Dual Connectivity (MR-DC) application scenario. The terminal device or the network device can work on full duplex, flexible duplex and cross division duplex modes.

[0033] Embodiments of the present disclosure may be performed in test equipment, e.g. signal generator, signal analyzer, spectrum analyzer, network analyzer, test terminal device, test network device, channel emulator.

[0034] Embodiments of the present disclosure may be performed according to any generation communication protocols either currently known or to be developed in the future. Examples of the communication protocols include, but not limited to, the first generation (1G), the second generation (2G), 2.5G, 2.75G, the third generation (3G), the fourth generation (4G), 4.5G, the fifth generation (5G) communication protocols, 5.5G, 5G-Advanced networks, or the sixth generation (6G) networks.

[0035] In the context of the present disclosure, the term "a repetition transmission" may refer to one or multiple repetitions for the same physical channel transmission. Further, the term "a physical channel transmission" may refer to any of a downlink channel transmission, an uplink channel transmission, data channel transmission, control channel transmission and so on. In addition, the term "a repetition unit" may be used interchangeably with a repetition segment. A repetition transmission may be divided into one or multiple repetition segments or units.

[0036] In the context of the present disclosure, the term "a cell change" may refer to any of the following: a beam switching, a cell selection, a cell reselection, or a cell handover

(CHO). Further, the term "a cell" may be used interchangeably with a satellite beam or a serving cell.

[0037] Embodiments of the present disclosure may support scenarios of Internet of things (IoT) and enhanced machine type communication (eMTC). For example, IoT may be a narrow band-IoT (NB-IoT). Of course, any other suitable scenarios are also feasible.

[0038] For example, for each HARQ process in NB-IoT, a transmission time may be decided by equation (1) below.

$$T_t = T_r * N_{ru} * N_s \quad (1)$$

where T_t denotes the transmission time, T_r denotes a repetition time for a resource unit (RU), N_{ru} denotes the number of RUs, and N_s denotes the number of slots in a RU.

[0039] Assuming that T_r, N_{ru}, and N_s take the maximum values. For a subcarrier spacing (SCS) of 15kHz, the maximum value of the transmission time T_t may be 0.5 ms * 128 * 10 * 16 = 10240 ms=10.24s. For SCS of 3.75kHz, the maximum value of the transmission time T_t may be 2 ms * 128 * 10 * 16 = 40960ms=40.96s. A length of the transmission time T_t may be greater than a time before a cell change for a high speed satellite, where the coverage of one cell may be 50/7.56=6.61s based on assumption of 50km satellite beam diameter, or an available serving duration for each beam will be less than 3s for some low-earth orbit (LEO) case.

[0040] It can be seen that a repetition transmission may be not completed before a cell change. HARQ continuity in a cell change should be considered since the cell change may happen more frequently.

[0041] In view of the above, embodiments of the present disclosure provide improved solutions for communication so as to solve the above and other potential problems. In one aspect, if a cell change is performed during a repetition transmission for a physical channel transmission, a terminal device determines whether a remaining portion of the repetition transmission is to be continued or stopped. Based on a result of the determination, the terminal device continues or stops the remaining portion of the repetition transmission. In other words, when a repetition transmission does not completely end and a transport block associated with the repetition transmission has not been successfully detected while a terminal device moves out of coverage of a source cell, repetition continuation for a HARQ process may be considered after a cell change, instead of re-scheduling. In this way, HARQ process continuity may be maintained in a cell change, and an improved

transmission performance may be obtained.

[0042] In another aspect, a terminal device does not expect that a cell change is performed during a repetition transmission for a physical channel transmission. In this way, HARQ process continuity may be not affected by a cell change, and an efficient transmission performance may be ensured.

[0043] Embodiments of the present disclosure may be applied into the following scenarios: 1) IoT repetition or segment transmission; 2) NR physical downlink shared channel (PDSCH) or physical uplink shared channel (PUSCH) aggregation or repetition transmission; or 3) Semi-persistent (SPS) PDSCH or configured grant (CG) PUSCH.

[0044] Principle and example embodiments of the present disclosure will be described in detail below with reference to the accompanying drawings.

[0045] In the following, a satellite will be used as an example of a network device for describing some specific example embodiments of the present disclosure. It is noted that example embodiments described with regard to the satellite are equally applicable to any other suitable types of a network device.

EXAMPLE OF COMMUNICATION ENVIRONMENT

[0046] Fig. 1 shows an example communication environment 100 in which example embodiments of the present disclosure can be implemented. The network environment 100 includes a terminal device 110, a network device 120, and another network device 130. One or more inter-switch links (ISLs) may be established between the network device 120 and the network device 130. Any of the network devices 120 and 130 may provide one or more serving cells to the terminal device 110. In the example of Fig. 1, the network device 120 provides a serving cell 121 and the network device 130 provides a serving cell 131. For convenience, the following description will be given by assuming that the terminal device 110 is initially within the serving cell 121 of the network device 120.

[0047] In case that the terminal device 110 is within the serving cell 121 of the network device 120, the terminal device 110 may communicate with the network device 120 via such as a service link or radio link. Communication in a direction from a terminal device 110 towards the network device 120 is referred to as uplink communication, while communication in a reverse direction from the network device 120 towards the terminal device 110 is referred to as downlink communication.

[0048] The communications in the communication environment 100 may conform to any suitable standards including, but not limited to, Long Term Evolution (LTE), LTE-Evolution, LTE-Advanced (LTE-A), Wideband Code Division Multiple Access (WCDMA), Code Division Multiple Access (CDMA) and Global System for Mobile Communications (GSM) and the like. Furthermore, the communications may be performed according to any generation communication protocols either currently known or to be developed in the future. Examples of the communication protocols include, but not limited to, the first generation (1G), the second generation (2G), 2.5G, 2.75G, the third generation (3G), the fourth generation (4G), 4.5G, the fifth generation (5G), 5.5G, 5G-Advanced networks, or the sixth generation (6G) communication protocols.

[0049] It is to be understood that the numbers and their connections of network device, terminal device, and serving cell are only for the purpose of illustration without suggesting any limitations. The communication environment 100 may include any suitable network device, terminal device and serving cell adapted for implementing embodiments of the present disclosure. Although not shown, it is to be understood that one or more additional network devices may comprised in communication environment 100, such as, a terrestrial station, a gateway and so on.

[0050] In some scenarios, the terminal device 110 may perform a repetition transmission for a physical channel transmission with the network device 120. As the terminal device 110 and the network device 120 may move over time, the terminal device 110 may be out of the coverage of the cell 121 and enter into the cell 131. The terminal device 110 may perform a cell change from the cell 121 to the cell 131. In this case, the repetition transmission may be not completed before the cell change, i.e., the cell change may be performed during the repetition transmission.

[0051] Embodiments of the present disclosure provide solutions of a repetition transmission for these scenarios.

EXAMPLE IMPLEMENTATION OF REPETITION TRANSMISSION WITH CELL CHANGE

[0052] In this solution, it is assumed that a cell change may be performed during a repetition transmission. The detailed description will be given in connection with Fig. 2.

[0053] Fig. 2 illustrates a schematic diagram illustrating a process 200 for communication according to embodiments of the present disclosure. For the purpose of discussion, the process 200 will be described with reference to Fig. 1. The process 200 may involve the

terminal device 110 and the network device 120 and 130 as illustrated in Fig. 1. Assuming that the network device 120 provides a source cell (for convenience, also referred to as a first cell herein), and the network device 130 provides a target cell (for convenience, also referred to as a second cell herein). A repetition transmission for a physical channel transmission is being performed between the terminal device 110 and the network device 120.

[0054] As shown in Fig. 2, the terminal device 110 determines 210 that a cell change occurs during a repetition transmission for a physical channel transmission. Accordingly, the network device 120 also determines 210' that the cell change occurs during the repetition transmission for the physical channel transmission.

[0055] For example, the cell change is performed from the source cell of the network device 120 to the target cell of the network device 130. In some embodiments, the network device 120 and the network device 130 may be the same one device. In some embodiments, the network device 120 and the network device 130 may be different devices. In some embodiments, the cell change may be a cell reselection. In some embodiments, the source cell may be a beam, and the target cell may be another beam. In some embodiments, the cell change may be a beam switching, a cell reselection or a cell selection.

[0056] In some embodiments, the physical channel transmission may be a physical uplink shared channel (PUSCH) transmission, a physical downlink shared channel (PDSCH) transmission, a physical uplink control channel (PUCCH) transmission, a physical downlink control channel (PDCCH) transmission, an enhanced physical downlink control channel (ePDCCH) transmission, or a physical random access channel (PRACH) transmission. It is to be understood that any other suitable types of physical channel transmissions are also feasible.

[0057] In response to the cell change during the repetition transmission, the terminal device 110 determines 220 whether a remaining portion of the repetition transmission (i.e., the remaining repetition transmission) is to be continued. In other words, the terminal device 110 determines whether the remaining portion is to be continued or stopped. Accordingly, the network device 120 also determines whether the remaining portion is to be continued or stopped.

[0058] Fig. 3 illustrates a schematic diagram 300 illustrating an example scenario of a cell

change during a repetition transmission according to embodiments of the present disclosure. As shown in Fig. 3, a repetition transmission may be divided into repetition units 1 to 8. A cell change occurs at time t1. At time t1, the repetition units 1 to 4 have been transmitted but the repetition units 5 to 8 have not been transmitted. In this case, whether to continue the transmission of the repetition units 5 to 8 needs to be determined.

[0059] In some embodiments, the continuity of the repetition transmission may be determined by the terminal device 110 and notified to the network device 120. In this case, the terminal device 110 may determine the continuity of the repetition transmission locally. In some embodiments, the continuity of the repetition transmission may be determined at the network device 120 and notified to the terminal device 110. In this case, the terminal device 110 may determine the continuity of the repetition transmission based on the notification from the network device 120. For illustration, some example embodiments will be described in connection with Embodiments 1 to 2.

Embodiment 1

[0060] In this embodiment, the continuity of the repetition transmission may be determined by the terminal device 110 and notified to the network device 120. In this case, the terminal device 110 may determine the continuity of the repetition transmission locally.

[0061] Still with reference to Fig. 2, if the cell change is performed during the repetition transmission, the terminal device 110 may determine 221 whether the remaining portion of the repetition transmission is continued or stopped. Accordingly, the network device 120 may also determine 221' whether the remaining portion of the repetition transmission is continued or stopped.

[0062] In some embodiments, the terminal device 110 may perform the determination 221 based on at least one of a priority associated with the physical channel transmission or a ratio between a transmitted time of the repetition transmission and a total time of the repetition transmission.

1. Priority Based Determination

[0063] In some embodiments, the terminal device 110 may determine a priority associated with the physical channel transmission. If the priority is equal to or higher than a threshold priority, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be continued. If the priority is lower than the threshold priority, the terminal device 110 may determine that the remaining portion of the repetition

transmission is to be stopped.

[0064] In some embodiments, the priority may be associated with a traffic type of the physical channel transmission. For example, if a traffic priority is high, the remaining portion of the repetition transmission may be continued and a resource for the remaining portion of the repetition transmission may be reserved. If a traffic priority is low, the remaining portion of the repetition transmission may be stopped if a cell change happens.

[0065] In some embodiments, for PUSCH or PDSCH in NR NTN, via a priority indication (PI) field in DCI scheduling the physical channel transmission, the terminal device 110 may implicitly know whether the remaining portion of the repetition transmission is to be continued or stopped. For example, if PI=0, the remaining portion of the repetition transmission is to be stopped. If PI=1, the remaining portion of the repetition transmission is to be continued. For IoT NTN, one bit may be defined in the DCI to indicate the priority of the scheduled PUSCH or PDSCH.

[0066] In some embodiments, the priority may be associated with a physical channel type of the physical channel transmission. Different physical channels may have different priorities. For example, PUCCH may have a higher priority and may always be going on transmission if a cell change happens.

2. Ratio Based Determination

[0067] In some embodiments, the terminal device 110 may determine a ratio between a transmitted time of the repetition transmission and a total time of the repetition transmission. If the ratio is equal to or higher than a threshold ratio, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be continued. If the ratio is lower than the threshold ratio, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be stopped.

[0068] In some embodiments, the threshold ratio may be predefined. In some embodiments, the threshold ratio may be preconfigured. For example, a set of threshold ratios may be preconfigured for the terminal device 110, as shown in Table 1.

Table 1 An example Relationship of Bit Values in DCI and Threshold Ratios

Bit Value in DCI	Threshold Ratio
00	100%
01	80%
10	60%

11	40%

[0069] In some embodiments, the terminal device 110 may receive an indication (for convenience, also referred to as a third indication herein) indicating a threshold ratio and determine the threshold ratio based on the indication. The third indication may be one or multiple bits in DCI. For example, the third indication may be 01. It can be determined from Table 1 that the threshold ratio is 80%. As an example, for one transport block (TB), the total transmission time is 5s, and 4s has been transmitted in one cell when the cell change happens. As the transmitted time meet the threshold ratio 80%, the remaining transmission time 1s is unnecessary to transmit anymore after the cell change.

[0070] This embodiment may be used for a repetition transmission of PUSCH, PDSCH, (e)PDCCH, PUCCH or PRACH transmission.

[0071] It is to be understood that the above embodiments are merely examples, and the terminal device 110 may determine the continuity of the repetition transmission based on any other suitable ways.

[0072] Continue to with reference to Fig. 3, upon determination of the continuity of the repetition transmission, the terminal device 110 may notify 222 the network device 120 of the continuity of the repetition transmission. In some embodiments, the terminal device 110 may indicate the continuity of the repetition transmission in an explicit way or in an implicit way.

1. Explicit Indication to Network Device

[0073] In some embodiments where the physical channel transmission is a downlink transmission, if the remaining portion of the repetition transmission for the physical channel transmission is to be continued, the terminal device 110 may transmit an indication (for convenience, also referred to as a first indication herein) indicating the continuing of the remaining portion of the repetition transmission. If the remaining portion of the repetition transmission is to be stopped, the terminal device 110 may transmit another indication (for convenience, also referred to as a second indication herein) indicating the stopping of the remaining portion of the repetition transmission.

[0074] In some embodiments, the first or second indication may be one bit. For example, the first indication may be 1 and the second indication may be 0. As another example, the first indication may be 0 and the second indication may be 1. Of course, the first or second indication may be multiple bits. In some embodiments, the first or second

indication may be in form of a sequence or any other suitable forms.

[0075] Accordingly, if the network device 120 receives the first indication, the network device 120 may determine that the remaining portion of the repetition transmission is to be continued. If the network device 120 receives the second indication, the network device 120 may determine that the remaining portion of the repetition transmission is to be stopped.

2. Implicit Indication to Network Device

[0076] In some embodiments where the physical channel transmission is a downlink transmission, if the remaining portion of the repetition transmission for the physical channel transmission is to be continued, the terminal device 110 may transmit a SR within a time period starting from a time at which the cell change is performed. If the remaining portion of the repetition transmission is to be stopped, the terminal device 110 may not transmit a SR within the time period.

[0077] Fig. 4 a schematic diagram 400 illustrating an example timing for a transmission of a SR according to embodiments of the present disclosure. As shown in Fig. 4, a cell change occurs at time t1. If the repetition transmission is to be continued, the terminal device 110 may transmit a SR within time period T after the time t1. If the repetition transmission is to be stopped, the terminal device 110 may not transmit a SR within the time period T. If the terminal device 110 transmits a SR outside of the time period T, it means that the terminal device 110 require a resource for new TB transmission.

[0078] It is to be understood that any other suitable ways are also feasible for notification of the continuity of the repetition transmission. Of course, the terminal device 110 may also not notify the network device 120 of the continuity of the repetition transmission. For example, the network device 120 may determine the continuity of the repetition transmission locally.

[0079] Accordingly, if the network device 120 receives the SR within the time period, the network device 120 may determine that the remaining portion of the repetition transmission is to be continued. If the network device 120 does not receive a SR within the time period, the network device 120 may determine that the remaining portion of the repetition transmission is to be stopped.

Embodiment 2

[0080] In this embodiment, the continuity of the repetition transmission may be determined at the network device 120 and notified to the terminal device 110. In this case, the terminal device 110 may determine the continuity of the repetition transmission based on the notification from the network device 120.

[0081] Still with reference to Fig. 2, if the cell change is performed during the repetition transmission, the network device 120 may determine 223 whether the remaining portion of the repetition transmission is continued or stopped. In some embodiments, the network device 120 may perform the determination based on at least one of a priority associated with the physical channel transmission or a ratio between a transmitted time of the repetition transmission and a total time of the repetition transmission. The operation of the determination 223 at the network device 120 is similar with that of the determination 221 at the terminal device 110, and thus is not repeated here for concise.

[0082] Upon determination of the continuity of the repetition transmission, the network device 120 may notify 224 the terminal device 110 of the continuity of the repetition transmission. In some embodiments, the network device 110 may indicate the continuity of the repetition transmission in an explicit way or in an implicit way.

1. Explicit Indication to Terminal Device

[0083] In some embodiments where the remaining portion of the repetition transmission for the physical channel transmission is to be stopped, the network device 120 may transmit an indication (for convenience, also referred to as a fourth indication herein) indicating the stopping of the remaining portion of the repetition transmission. For example, for uplink configured grant or dynamic grant PUSCH, if the network device 120 has successfully decoded the scheduled data before the cell change, the network device 120 may transmit the fourth indication to the terminal device 110.

[0084] Upon reception of the fourth indication, the terminal device 110 may determine that the remaining portion of the repetition transmission for the physical channel transmission is to be stopped. In some embodiments where the repetition transmission is an uplink transmission scheduled by an uplink grant before the cell change, the terminal device 110 may receive the fourth indication in a downlink grant after the cell change. For example, in some embodiments where the repetition transmission is the last uplink transmission scheduled by the last uplink grant before the cell change, the terminal device 110 may receive the fourth indication in the first downlink grant after the cell change. Of

course, any other suitable ways are also feasible for transmission of the fourth indication.

[0085] In some embodiments, the fourth indication may be one bit. For example, the one bit may have a value of 1. As another example, the one bit may have a value of 0. Of course, the fourth indication may be in form of multiple bits or a bit sequence.

[0086] In some embodiments where the remaining portion of the repetition transmission for the physical channel transmission is to be continued, the network device 120 may transmit an indication (for convenience, also referred to as a fifth indication herein) indicating the continuing of the remaining portion of the repetition transmission. Upon reception of the fifth indication, the terminal device 110 may determine that the remaining portion of the repetition transmission for the physical channel transmission is to be continued. In some embodiments, the fifth indication may be one bit. For example, the one bit may have a value of 1. As another example, the one bit may have a value of 0. Of course, the fifth indication may be in form of multiple bits or a bit sequence.

[0087] In some embodiments, the network device 120 may transmit DCI comprising a bit that indicates whether scheduled data is the remaining repetition transmission. For example, if the bit is 1, the scheduled data is the remaining repetition transmission. If the bit is 0, the scheduled data is not the remaining repetition transmission. As another example, if the bit is 0, the scheduled data is the remaining repetition transmission. If the bit is 1, the scheduled data is not the remaining repetition transmission.

[0088] In some embodiments, the network device 120 may transmit DCI comprising a bit that indicates whether scheduled data is the remaining repetition transmission or a retransmission. For example, if the bit is 1, the scheduled data is the remaining repetition transmission. If the bit is 0, the scheduled data is the retransmission. As another example, if the bit is 0, the scheduled data is the remaining repetition transmission. If the bit is 1, the scheduled data is the retransmission.

[0089] With these information and new data indication (NDI) information for the same HARQ process information, the terminal device 110 may differentiate a new scheduling or the retransmission or the remaining repetition transmission.

2. Implicit Indication to Terminal Device

[0090] In some embodiments where the cell change is performed from a first cell (i.e., source cell) of the network device 120 to a second cell (i.e., target cell) of a further network device (for example, the network device 130 in Fig. 1), if the remaining portion of the

repetition transmission is to be continued, the network device 120 may transmit a base sequence with a first cyclic shift. The first cyclic shift indicates the continuing of the remaining portion of the repetition transmission. If the remaining portion of the repetition transmission is to be stopped, the network device 120 may transmit the base sequence with a second cyclic shift. The second cyclic shift indicates the stopping of the remaining portion of the repetition transmission. The base sequence indicates the cell change from the first cell to the second cell. In some embodiments, the base sequence may be a pseudo-noise (PN) sequence. In some embodiments, the base sequence may be a Zadoff Chu (ZC) sequence.

[0091] In this way, different base sequences may be defined for different cell or satellite switching, and different cyclic shifts may present the continuing or stopping. For example, for the terminal device 110, base sequence s_1 presents cell 1 switching to cell 2, base sequence s_2 presents cell 2 switching to cell 3, ..., and base sequence s_n presents cell n-1 switching to cell n. For example, two cyclic shifts may be assigned to the terminal device 120. Cyclic shift a_1 presents stopping the remaining portion of the repetition transmission and cyclic shift a_2 presents continuing the remaining portion of the repetition transmission. For example, once the cell change occurs, the network device 120 may transmit the base sequence s_1 with the cyclic shift a_1 to notify the terminal device 110 that the remaining portion of the repetition transmission is to be stopped when cell 1 switches to cell 2.

[0092] Accordingly, if the terminal device 110 receives the base sequence with the first cyclic shift, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be continued. If the terminal device 110 receives the base sequence with the second cyclic shift, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be stopped.

[0093] In some embodiments, only one cyclic shift may be assigned to the terminal device 110. If the remaining portion of the repetition transmission is to be continued, the network device 120 may transmit a base sequence with a cyclic shift. If the remaining portion of the repetition transmission is to be stopped, the network device 120 may not transmit the base sequence. Accordingly, if the terminal device 110 receives or detects the base sequence with the cyclic shift, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be continued. If the terminal device 110 does not receive or detect the base sequence, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be stopped.

[0094] In some embodiments where the remaining portion of the repetition transmission is to be stopped, the network device 120 may transmit DCI indicating that a NDI is toggled for a HARQ process for the physical channel transmission. The DCI may be used for scheduling the physical channel transmission. Accordingly, if the terminal device 110 receives or detect the DCI, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be stopped. In this case, the terminal device 110 may drop the remaining portion of the repetition transmission. For example, the terminal device 110 may drop buffered data for the repetition transmission.

[0095] In some embodiments where the remaining portion of the repetition transmission is to be continued, the network device 120 may transmit DCI scheduling the physical channel transmission by scrambling the DCI with a predetermined radio network temporary identity (RNTI). Based on the predetermined RNTI, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be continued.

[0096] So far, the determination of the continuity of the repetition transmission is done. Continue to with reference to Fig. 2, if the remaining portion of the repetition transmission is to be continued, the terminal device 110 continues 230 the remaining portion of the repetition transmission. For example, if the repetition transmission is for uplink transmission, the terminal device 110 may continue to transmit the remaining portion of the repetition transmission. If the repetition transmission is for downlink transmission, the terminal device 110 may continue to receive the remaining portion of the repetition transmission.

[0097] Assuming that the cell change is performed from a first cell (i.e., source cell, for example, the cell 121 of the network device 120) to a second cell (i.e., target cell, for example, the cell 131 of the network device 130). In some embodiments where the remaining portion of the repetition transmission is to be continued, the network device 120 may transmit 235 information of the repetition transmission to the second cell (i.e., the network device 130). In some embodiments, the information of the repetition transmission may comprise at least one of the following: the number of times of transmitted repetitions; the number of times of repetitions to be transmitted; the number of transmitted repetition units; the number of repetition units to be transmitted; or the number of resource units to be reserved for the remaining portion of the repetition transmission. In this way, the remaining portion of the repetition transmission may be continued with coordination between network devices.

[0098] In some embodiments where the remaining portion of the repetition transmission is to be continued, the terminal device 110 may transmit 240 information of the repetition transmission to the second cell. In some embodiments, the information of the repetition transmission may comprise at least one of the following: the number of times of transmitted repetitions; the number of times of repetitions to be transmitted; the number of transmitted repetition units; the number of repetition units to be transmitted; or the number of resource units to be reserved for the remaining portion of the repetition transmission. In this way, the remaining portion of the repetition transmission may be continued without coordination between network devices.

[0099] With reference to Fig. 2, if the remaining portion of the repetition transmission is to be stopped, the terminal device 110 stops 250 the remaining portion of the repetition transmission. For example, if the repetition transmission is for uplink transmission, the terminal device 110 may stop transmitting the remaining portion of the repetition transmission. If the repetition transmission is for downlink transmission, the terminal device 110 may stop receiving the remaining portion of the repetition transmission.

[00100] In some embodiments where the remaining portion of the repetition transmission is to be stopped, if measured reference signal receive quality (RSRQ) is lower than threshold quality during the repetition transmission, the terminal device 110 may stop the remaining portion of the repetition transmission. In some embodiments where the repetition transmission is to be stopped, if measured reference signal receive power (RSRP) is lower than threshold power during the repetition transmission, the terminal device 110 may stop the remaining portion of the repetition transmission.

[00101] In some embodiments where the remaining portion of the repetition transmission is to be stopped, if a timer configured for the cell change expires, the terminal device 110 may stop the remaining portion of the repetition transmission.

[00102] In some embodiments where the remaining portion of the repetition transmission is to be stopped, if the terminal device 110 receives DCI indicating the cell change, the terminal device 110 may stop the remaining portion of the repetition transmission. In some embodiments, the DCI indicating the cell change may be DCI scheduling the physical channel transmission. In some embodiments, the DCI indicating the cell change may be different from the DCI scheduling the physical channel transmission.

[00103] Accordingly, the network device 120 also stops 250' the remaining portion of the

repetition transmission. Operations of the stopping 250' may be similar with that of the stopping 250 at the terminal device 110, and thus are not repeated here for concise.

[00104] In this way, the terminal device 110 or the network device 120 may implicitly know when to stop the repetition transmission.

[00105] With the process of Fig. 2, a remaining portion of a repetition transmission may be continued or stopped after a cell change. Thereby, HARQ process continuity may be maintained in a cell change, and an improved transmission performance may be obtained.

EXAMPLE IMPLEMENTATION OF REPETITION TRANSMISSION WITHOUT CELL CHANGE

[00106] In this solution, a terminal device (for example, the terminal device 110 in Fig. 1) does not expect that a cell change is performed during a repetition transmission for a physical channel transmission.

[00107] In some embodiments, the terminal device 110 may be not expected to receive DCI that assigned repetition transmission time exceeds the beam or cell covered time for the repetition transmission for the terminal device 110.

[00108] In some embodiments, the network device 120 should not schedule the terminal device 110 for a repetition transmission if the remaining served time for the terminal device 110 is not enough for the repetition transmission.

[00109] In some embodiments, if the terminal device 110 receives DCI that assigned repetition transmission time exceeds the beam or cell covered time for the repetition transmission, then the terminal device 110 discards the DCI and does not receive or transmit the physical channel transmission.

[00110] In this way, HARQ process continuity may be not affected by a cell change, and an efficient transmission performance may be ensured.

EXAMPLE IMPLEMENTATION OF METHODS

[00111] Accordingly, embodiments of the present disclosure provide methods of communication implemented at a terminal device and a network device. These methods will be described below with reference to Figs. 5 to 6.

[00112] Fig. 5 illustrates an example method 500 of communication implemented at a terminal device in accordance with some embodiments of the present disclosure. For example, the method 500 may be performed at the terminal device 110 as shown in Fig. 1. For the purpose of discussion, in the following, the method 500 will be described with

reference to Fig. 1. It is to be understood that the method 500 may include additional blocks not shown and/or may omit some blocks as shown, and the scope of the present disclosure is not limited in this regard.

[00113] At block 510, the terminal device 110 determines whether a cell change is performed during a repetition transmission for a physical channel transmission. In some embodiments, the cell change comprises at least one of a beam switching, a cell reselection, a cell selection, or cell handover.

[00114] If the cell change is performed during the repetition transmission, the process 500 proceeds to block 520. At block 520, the terminal device 110 determines whether a remaining portion of the repetition transmission is to be continued or stopped.

[00115] In some embodiments, the terminal device 110 may determine a priority associated with the physical channel transmission. If the priority is equal to or higher than a threshold priority, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be continued. If the priority is lower than the threshold priority, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be stopped.

[00116] In some embodiments, the terminal device 110 may determine a ratio between a transmitted time of the repetition transmission and a total time of the repetition transmission. If the ratio is equal to or higher than a threshold ratio, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be continued. If the ratio is lower than the threshold ratio, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be stopped. In some embodiments, the terminal device 110 may receive a third indication indicating the threshold ratio, and determine the threshold ratio based on the third indication.

[00117] In some embodiments where the cell change is performed from a first cell to a second cell, in response to receiving a base sequence with a first cyclic shift, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be continued, the first cyclic shift indicating the continuing of the remaining portion of the repetition transmission. In response to receiving the base sequence with a second cyclic shift, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be stopped, the second cyclic shift indicating the stopping of the remaining portion of the repetition transmission, wherein the base sequence indicates the

cell change from the first cell to the second cell.

[00118] In some embodiments, the terminal device 110 may receive a fourth indication indicating the stopping of the remaining portion of the repetition transmission, and determine, based on the fourth indication, that the remaining portion of the repetition transmission is to be stopped. In some embodiments where the repetition transmission is an uplink transmission scheduled by an uplink grant before the cell change, the terminal device 110 may receive the fourth indication in a downlink grant after the cell change.

[00119] In some embodiments, if DCI scheduling the physical channel transmission is scrambled with a predetermined RNTI, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be continued.

[00120] In some embodiments, if DCI scheduling the physical channel transmission comprises a fifth indication indicating the remaining portion of the repetition transmission, the terminal device 110 may determine that the remaining portion of the repetition transmission is to be continued.

[00121] If the remaining portion of the repetition transmission is to be continued, the process 500 proceeds to block 530. At block 530, the terminal device 110 continues the remaining portion of the repetition transmission.

[00122] If the remaining portion of the repetition transmission is to be stopped, the process 500 proceeds to block 540. At block 540, the terminal device 110 stops the remaining portion of the repetition transmission.

[00123] In some embodiments where the physical channel transmission is a downlink transmission, if the remaining portion of the repetition transmission is to be continued, the terminal device 110 may further transmit a first indication indicating the continuing of the remaining portion of the repetition transmission. If the remaining portion of the repetition transmission is to be stopped, the terminal device 110 may further transmit a second indication indicating the stopping of the remaining portion of the repetition transmission.

[00124] In some embodiments where the physical channel transmission is a downlink transmission, if the remaining portion of the repetition transmission is to be continued, the terminal device 110 may further transmit a SR within a time period starting from a time at which the cell change is performed. If the remaining portion of the repetition transmission is to be stopped, the terminal device 110 may transmit no scheduling request within the time period.

[00125] In some embodiments where the cell change is performed from a first cell to a second cell and the remaining portion of the repetition transmission is to be continued, the terminal device 110 may transmit information of the repetition transmission to the second cell. In some embodiments, the information of the repetition transmission may comprise at least of the following: the number of times of transmitted repetitions; the number of times of repetitions to be transmitted; the number of transmitted repetition units; the number of repetition units to be transmitted; or the number of resource units to be reserved for the remaining portion of the repetition transmission.

[00126] In some embodiments where the remaining portion of the repetition transmission is to be stopped, if measured reference signal quality is lower than threshold quality or that measured reference signal power is lower than threshold power during the repetition transmission, the terminal device 110 may stop the remaining portion of the repetition transmission. In some embodiments where the remaining portion of the repetition transmission is to be stopped, if a timer configured for the cell change expires, the terminal device 110 may stop the remaining portion of the repetition transmission. In some embodiments where the remaining portion of the repetition transmission is to be stopped, in response to receiving DCI indicating the cell change, the terminal device 110 may stop the remaining portion of the repetition transmission.

[00127] With the method of Fig. 5, a remaining portion of a repetition transmission may be continued or stopped after a cell change. Thereby, HARQ process continuity may be maintained in a cell change, and an improved transmission performance may be obtained.

[00128] Fig. 6 illustrates an example method 600 of communication implemented at a network device in accordance with some embodiments of the present disclosure. For example, the method 600 may be performed at the network device 120 as shown in Fig. 1. For the purpose of discussion, in the following, the method 600 will be described with reference to Fig. 1. It is to be understood that the method 600 may include additional blocks not shown and/or may omit some blocks as shown, and the scope of the present disclosure is not limited in this regard.

[00129] At block 610, the network device 120 determines whether a cell change is performed during a repetition transmission for a physical channel transmission. In some embodiments, the cell change comprises at least one of a beam switching, a cell reselection, a cell selection, or cell handover.

[00130] If the cell change is performed during the repetition transmission, the process 600 proceeds to block 620. At block 620, the network device 120 determines whether a remaining portion of the repetition transmission is to be continued or stopped.

[00131] In some embodiments, the network device 120 may determine a priority associated with the physical channel transmission. If the priority is equal to or higher than a threshold priority, the network device 120 may determine that the remaining portion of the repetition transmission is to be continued. If the priority is lower than the threshold priority, the network device 120 may determine that the remaining portion of the repetition transmission is to be stopped.

[00132] In some embodiments, the network device 120 may determine a ratio between a transmitted time of the repetition transmission and a total time of the repetition transmission. If the ratio is equal to or higher than a threshold ratio, the network device 120 may determine that the remaining portion of the repetition transmission is to be continued. If the ratio is lower than the threshold ratio, the network device 120 may determine that the remaining portion of the repetition transmission is to be stopped. In some embodiments, the network device 120 may transmit a third indication indicating the threshold ratio, and determine the threshold ratio based on the third indication.

[00133] In some embodiments, in response to receiving a first indication indicating the continuing of the remaining portion of the repetition transmission, the network device 120 may determine that the remaining portion of the repetition transmission is to be continued. In response to receiving a second indication indicating the stopping of the remaining portion of the repetition transmission, the network device 120 may determine that the remaining portion of the repetition transmission is to be stopped.

[00134] In some embodiments, in response to receiving a scheduling request within a time period starting from a time at which the cell change is performed, the network device 120 may determine that the remaining portion of the repetition transmission is to be continued. In response to receiving no scheduling request within the time period, the network device 120 may determine that the remaining portion of the repetition transmission is to be stopped.

[00135] If the remaining portion of the repetition transmission is to be continued, the process 600 proceeds to block 630. At block 630, the network device 120 continues the remaining portion of the repetition transmission.

[00136] If the remaining portion of the repetition transmission is to be stopped, the process 600 proceeds to block 540. At block 640, the network device 120 stops the remaining portion of the repetition transmission.

[00137] In some embodiments where the cell change is performed from a first cell to a second cell, if the remaining portion of the repetition transmission is to be continued, the network device 120 may transmit a base sequence with a first cyclic shift, the first cyclic shift indicating the continuing of the remaining portion of the repetition transmission. If the remaining portion of the repetition transmission is to be stopped, the network device 120 may transmit the base sequence with a second cyclic shift, the second cyclic shift indicating the stopping of the remaining portion of the repetition transmission. The base sequence indicates the cell change from the first cell to the second cell.

[00138] In some embodiments, if the physical channel transmission has been successfully decoded before the cell change, the network device 120 may determine that the remaining portion of the repetition transmission is to be stopped, and transmit a fourth indication indicating the stopping of the remaining portion of the repetition transmission. In some embodiments where the repetition transmission is an uplink transmission scheduled by an uplink grant before the cell change, the network device 120 may transmit the fourth indication in a downlink grant after the cell change.

[00139] In some embodiments where the remaining portion of the repetition transmission is to be continued, the network device 120 may transmit DCI scheduling the physical channel transmission by scrambling the DCI with a predetermined RNTI.

[00140] In some embodiments where the remaining portion of the repetition transmission is to be stopped, the network device 120 may transmit DCI indicating that a NDI is toggled for a HARQ process for the physical channel transmission.

[00141] In some embodiments where the remaining portion of the repetition transmission is to be continued, the network device 120 may transmit DCI scheduling the physical channel transmission, the DCI comprising a fifth indication indicating the remaining portion of the repetition transmission.

[00142] In some embodiments where the cell change is performed from a first cell to a second cell and the remaining portion of the repetition transmission is to be continued, the network device 120 may transmit information of the repetition transmission to the second cell. In some embodiments, the information of the repetition transmission may comprise

at least of the following: the number of times of transmitted repetitions; the number of times of repetitions to be transmitted; the number of transmitted repetition units; the number of repetition units to be transmitted; or the number of resource units to be reserved for the remaining portion of the repetition transmission.

[00143] In some embodiments where the remaining portion of the repetition transmission is to be stopped, if measured reference signal quality is lower than threshold quality or that measured reference signal power is lower than threshold power during the repetition transmission, the network device 120 may stop the remaining portion of the repetition transmission. In some embodiments where the remaining portion of the repetition transmission is to be stopped, if a timer configured for the cell change expires, the network device 120 may stop the remaining portion of the repetition transmission. In some embodiments where the remaining portion of the repetition transmission is to be stopped, in response to receiving DCI indicating the cell change, the network device 120 may stop the remaining portion of the repetition transmission.

[00144] With the method of Fig. 6, a remaining portion of a repetition transmission may be continued or stopped after a cell change. Thereby, HARQ process continuity may be maintained in a cell change, and an improved transmission performance may be obtained.

EXAMPLE IMPLEMENTATION OF DEVICE AND APPARATUS

[00145] Fig. 7 is a simplified block diagram of a device 700 that is suitable for implementing embodiments of the present disclosure. The device 700 can be considered as a further example implementation of the terminal device 110 or the network device 120 or 130 as shown in Fig. 1. Accordingly, the device 700 can be implemented at or as at least a part of the terminal device 110 or the network device 120 or 130.

[00146] As shown, the device 700 includes a processor 710, a memory 720 coupled to the processor 710, a suitable transmitter (TX) and receiver (RX) 740 coupled to the processor 710, and a communication interface coupled to the TX/RX 740. The memory 710 stores at least a part of a program 730. The TX/RX 740 is for bidirectional communications. The TX/RX 740 has at least one antenna to facilitate communication, though in practice an Access Node mentioned in this application may have several ones. The communication interface may represent any interface that is necessary for communication with other network elements, such as X2/Xn interface for bidirectional communications between eNBs/gNBs, S1/NG interface for communication between a Mobility Management Entity (MME)/Access

and Mobility Management Function (AMF)/SGW/UPF and the eNB/gNB, Un interface for communication between the eNB/gNB and a relay node (RN), or Uu interface for communication between the eNB/gNB and a terminal device.

[00147] The program 730 is assumed to include program instructions that, when executed by the associated processor 710, enable the device 700 to operate in accordance with the embodiments of the present disclosure, as discussed herein with reference to Figs. 1 to 6. The embodiments herein may be implemented by computer software executable by the processor 710 of the device 700, or by hardware, or by a combination of software and hardware. The processor 710 may be configured to implement various embodiments of the present disclosure. Furthermore, a combination of the processor 710 and memory 720 may form processing means 750 adapted to implement various embodiments of the present disclosure.

[00148] The memory 720 may be of any type suitable to the local technical network and may be implemented using any suitable data storage technology, such as a non-transitory computer readable storage medium, semiconductor based memory devices, magnetic memory devices and systems, optical memory devices and systems, fixed memory and removable memory, as non-limiting examples. While only one memory 720 is shown in the device 700, there may be several physically distinct memory modules in the device 700. The processor 710 may be of any type suitable to the local technical network, and may include one or more of general purpose computers, special purpose computers, microprocessors, digital signal processors (DSPs) and processors based on multicore processor architecture, as non-limiting examples. The device 700 may have multiple processors, such as an application specific integrated circuit chip that is slaved in time to a clock which synchronizes the main processor.

[00149] In some embodiments, a terminal device comprises a circuitry configured to: in accordance with a determination that a cell change is performed during a repetition transmission for a physical channel transmission, determine whether a remaining portion of the repetition transmission is to be continued or stopped; in accordance with a determination that the remaining portion of the repetition transmission is to be continued, continue the remaining portion of the repetition transmission; and in accordance with a determination that the remaining portion of the repetition transmission is to be stopped, stop the remaining portion of the repetition transmission.

[00150] In some embodiments where the physical channel transmission is a downlink transmission, the circuitry may be further configured to: in accordance with a determination that the remaining portion of the repetition transmission is to be continued, transmit a first indication indicating the continuing of the remaining portion of the repetition transmission; and in accordance with a determination that the remaining portion of the repetition transmission is to be stopped, transmit a second indication indicating the stopping of the remaining portion of the repetition transmission.

[00151] In some embodiments where the physical channel transmission is a downlink transmission, the circuitry may be further configured to: in accordance with a determination that the remaining portion of the repetition transmission is to be continued, transmit a scheduling request within a time period starting from a time at which the cell change is performed; and in accordance with a determination that the remaining portion of the repetition transmission is to be stopped, transmit no scheduling request within the time period.

[00152] In some embodiments where the cell change is performed from a first cell to a second cell, the circuitry may be configured to determine whether the remaining portion of the repetition transmission is to be continued or stopped by: in response to receiving a base sequence with a first cyclic shift, determining that the remaining portion of the repetition transmission is to be continued, the first cyclic shift indicating the continuing of the remaining portion of the repetition transmission; and in response to receiving the base sequence with a second cyclic shift, determining that the remaining portion of the repetition transmission is to be stopped, the second cyclic shift indicating the stopping of the remaining portion of the repetition transmission, wherein the base sequence indicates the cell change from the first cell to the second cell.

[00153] In some embodiments, the circuitry may be configured to determine whether the remaining portion of the repetition transmission is to be continued or stopped by: determining a priority associated with the physical channel transmission; in accordance with a determination that the priority is equal to or higher than a threshold priority, determining that the remaining portion of the repetition transmission is to be continued; and in accordance with a determination that the priority is lower than the threshold priority, determining that the remaining portion of the repetition transmission is to be stopped.

[00154] In some embodiments, the circuitry may be configured to determine whether the

remaining portion of the repetition transmission is to be continued or stopped by: determining a ratio between a transmitted time of the repetition transmission and a total time of the repetition transmission; in accordance with a determination that the ratio is equal to or higher than a threshold ratio, determining that the remaining portion of the repetition transmission is to be continued; and in accordance with a determination that the ratio is lower than the threshold ratio, determining that the remaining portion of the repetition transmission is to be stopped. In some embodiments, the circuitry may be further configured to: receive a third indication indicating the threshold ratio; and determine the threshold ratio based on the third indication.

[00155] In some embodiments, the circuitry may be configured to determine whether the remaining portion of the repetition transmission is to be continued or stopped by: receiving a fourth indication indicating the stopping of the remaining portion of the repetition transmission; and determining, based on the fourth indication, that the remaining portion of the repetition transmission is to be stopped. In some embodiments where the repetition transmission is an uplink transmission scheduled by an uplink grant before the cell change, the circuitry may be configured to receive the fourth indication by receiving the fourth indication in a downlink grant after the cell change.

[00156] In some embodiments, the circuitry may be configured to determine whether the remaining portion of the repetition transmission is to be continued or stopped by: in response to receiving DCI indicating that a NDI is toggled for a HARQ process for the physical channel transmission, determining that the remaining portion of the repetition transmission is to be stopped.

[00157] In some embodiments, the circuitry may be configured to determine whether the remaining portion of the repetition transmission is to be continued or stopped by: in accordance with a determination that DCI scheduling the physical channel transmission is scrambled with a predetermined RNTI, determining that the remaining portion of the repetition transmission is to be continued.

[00158] In some embodiments, the circuitry may be configured to determine whether the remaining portion of the repetition transmission is to be continued or stopped by: in accordance with a determination that DCI scheduling the physical channel transmission comprises a fifth indication indicating the remaining portion of the repetition transmission, determining that the remaining portion of the repetition transmission is to be continued.

[00159] In some embodiments where the cell change is performed from a first cell to a second cell, the circuitry may be configured to continue the remaining portion of the repetition transmission by transmitting information of the repetition transmission to the second cell. In some embodiments, the information of the repetition transmission may comprise at least of the following: the number of times of transmitted repetitions; the number of times of repetitions to be transmitted; the number of transmitted repetition units; the number of repetition units to be transmitted; or the number of resource units to be reserved for the remaining portion of the repetition transmission.

[00160] In some embodiments, the circuitry may be configured to stop the remaining portion of the repetition transmission by at least one of the following: in accordance with a determination that measured reference signal quality is lower than threshold quality or that measured reference signal power is lower than threshold power during the repetition transmission, stopping the remaining portion of the repetition transmission; in accordance with a determination that a timer configured for the cell change expires, stopping the remaining portion of the repetition transmission; or in response to receiving DCI indicating the cell change, stopping the remaining portion of the repetition transmission.

[00161] In some embodiments, a network device comprises a circuitry configured to: in accordance with a determination that a cell change is performed during a repetition transmission for a physical channel transmission, determine whether a remaining portion of the repetition transmission is to be continued or stopped; in accordance with a determination that the remaining portion of the repetition transmission is to be continued, continue the remaining portion of the repetition transmission; and in accordance with a determination that the remaining portion of the repetition transmission is to be stopped, stop the remaining portion of the repetition transmission.

[00162] In some embodiments where the physical channel transmission is a downlink transmission, the circuitry may be configured to determine whether the remaining portion of the repetition transmission is to be continued or stopped by: in response to receiving a first indication indicating the continuing of the remaining portion of the repetition transmission, determining that the remaining portion of the repetition transmission is to be continued; and in response to receiving a second indication indicating the stopping of the remaining portion of the repetition transmission, determining that the remaining portion of the repetition transmission is to be stopped.

[00163] In some embodiments where the physical channel transmission is a downlink transmission, the circuitry may be configured to determine whether the remaining portion of the repetition transmission is to be continued or stopped by: in response to receiving a scheduling request within a time period starting from a time at which the cell change is performed, determining that the remaining portion of the repetition transmission is to be continued; and in response to receiving no scheduling request within the time period, determining that the remaining portion of the repetition transmission is to be stopped.

[00164] In some embodiments where the cell change is performed from a first cell of the network device to a second cell of a further network device, the circuitry may be further configured to: transmit a base sequence with a first cyclic shift, the first cyclic shift indicating the continuing of the remaining portion of the repetition transmission; or transmit the base sequence with a second cyclic shift, the second cyclic shift indicating the stopping of the remaining portion of the repetition transmission, wherein the base sequence indicates the cell change from the first cell to the second cell.

[00165] In some embodiments, the circuitry may be configured to determine whether the remaining portion of the repetition transmission is to be continued or stopped by: determining a priority associated with the physical channel transmission; in accordance with a determination that the priority is equal to or higher than a threshold priority, determining that the remaining portion of the repetition transmission is to be continued; and in accordance with a determination that the priority is lower than the threshold priority, determining that the remaining portion of the repetition transmission is to be stopped.

[00166] In some embodiments, the circuitry may be configured to determine whether the remaining portion of the repetition transmission is to be continued or stopped by: determining a ratio between a transmitted time of the repetition transmission and a total time of the repetition transmission; in accordance with a determination that the ratio is equal to or higher than a threshold ratio, determining that the remaining portion of the repetition transmission is to be continued; and in accordance with a determination that the ratio is lower than the threshold ratio, determining that the remaining portion of the repetition transmission is to be stopped. In some embodiments, the circuitry may be further configured to transmit a third indication indicating the threshold ratio.

[00167] In some embodiments, the circuitry may be configured to determine whether the remaining portion of the repetition transmission is to be continued or stopped by: in

accordance with a determination that the physical channel transmission has been successfully decoded before the cell change, determining that the remaining portion of the repetition transmission is to be stopped; and transmitting a fourth indication indicating the stopping of the remaining portion of the repetition transmission. In some embodiments where the repetition transmission is an uplink transmission scheduled by an uplink grant before the cell change, the circuitry may be configured to transmit the fourth indication by transmitting the fourth indication in a downlink grant after the cell change.

[00168] In some embodiments, the circuitry may be further configured to: in accordance with a determination that the remaining portion of the repetition transmission is to be stopped, transmit DCI indicating that a NDI is toggled for a HARQ process for the physical channel transmission.

[00169] In some embodiments, the circuitry may be further configured to: in accordance with a determination that the remaining portion of the repetition transmission is to be continued, transmit DCI scheduling the physical channel transmission by scrambling the DCI with a predetermined RNTI.

[00170] In some embodiments, the circuitry may be further configured to: in accordance with a determination that the remaining portion of the repetition transmission is to be continued, transmit DCI scheduling the physical channel transmission, the DCI comprising a fifth indication indicating the remaining portion of the repetition transmission.

[00171] In some embodiments where the cell change is performed from a first cell of the network device to a second cell of a further network device, the circuitry may be configured to continue the remaining portion of the repetition transmission by transmitting information of the repetition transmission to the second cell. In some embodiments, the information of the repetition transmission may comprise at least of the following: the number of times of transmitted repetitions; the number of times of repetitions to be transmitted; the number of transmitted repetition units; the number of repetition units to be transmitted; or the number of resource units to be reserved for the remaining portion of the repetition transmission.

[00172] In some embodiments, the circuitry may be configured to stop the remaining portion of the repetition transmission by at least one of the following: in accordance with a determination that measured reference signal quality is lower than threshold quality or that measured reference signal power is lower than threshold power during the repetition transmission, stopping the remaining portion of the repetition transmission; in accordance

with a determination that a timer configured for the cell change expires, stopping the remaining portion of the repetition transmission; or in response to transmitting DCI indicating the cell change, stopping the remaining portion of the repetition transmission.

[00173] The term "circuitry" used herein may refer to hardware circuits and/or combinations of hardware circuits and software. For example, the circuitry may be a combination of analog and/or digital hardware circuits with software/firmware. As a further example, the circuitry may be any portions of hardware processors with software including digital signal processor(s), software, and memory(ies) that work together to cause an apparatus, such as a terminal device or a network device, to perform various functions. In a still further example, the circuitry may be hardware circuits and or processors, such as a microprocessor or a portion of a microprocessor, that requires software/firmware for operation, but the software may not be present when it is not needed for operation. As used herein, the term circuitry also covers an implementation of merely a hardware circuit or processor(s) or a portion of a hardware circuit or processor(s) and its (or their) accompanying software and/or firmware.

[00174] Generally, various embodiments of the present disclosure may be implemented in hardware or special purpose circuits, software, logic or any combination thereof. Some aspects may be implemented in hardware, while other aspects may be implemented in firmware or software which may be executed by a controller, microprocessor or other computing device. While various aspects of embodiments of the present disclosure are illustrated and described as block diagrams, flowcharts, or using some other pictorial representation, it will be appreciated that the blocks, apparatus, systems, techniques or methods described herein may be implemented in, as non-limiting examples, hardware, software, firmware, special purpose circuits or logic, general purpose hardware or controller or other computing devices, or some combination thereof.

[00175] The present disclosure also provides at least one computer program product tangibly stored on a non-transitory computer readable storage medium. The computer program product includes computer-executable instructions, such as those included in program modules, being executed in a device on a target real or virtual processor, to carry out the process or method as described above with reference to Figs. 1 to 6. Generally, program modules include routines, programs, libraries, objects, classes, components, data structures, or the like that perform particular tasks or implement particular abstract data types. The functionality of the program modules may be combined or split between program modules as desired in various embodiments. Machine-executable instructions for program modules

may be executed within a local or distributed device. In a distributed device, program modules may be located in both local and remote storage media.

[00176] Program code for carrying out methods of the present disclosure may be written in any combination of one or more programming languages. These program codes may be provided to a processor or controller of a general purpose computer, special purpose computer, or other programmable data processing apparatus, such that the program codes, when executed by the processor or controller, cause the functions/operations specified in the flowcharts and/or block diagrams to be implemented. The program code may execute entirely on a machine, partly on the machine, as a stand-alone software package, partly on the machine and partly on a remote machine or entirely on the remote machine or server.

[00177] The above program code may be embodied on a machine readable medium, which may be any tangible medium that may contain, or store a program for use by or in connection with an instruction execution system, apparatus, or device. The machine readable medium may be a machine readable signal medium or a machine readable storage medium. A machine readable medium may include but not limited to an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system, apparatus, or device, or any suitable combination of the foregoing. More specific examples of the machine readable storage medium would include an electrical connection having one or more wires, a portable computer diskette, a hard disk, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory (EPROM or Flash memory), an optical fiber, a portable compact disc read-only memory (CD-ROM), an optical storage device, a magnetic storage device, or any suitable combination of the foregoing.

[00178] Further, while operations are depicted in a particular order, this should not be understood as requiring that such operations be performed in the particular order shown or in sequential order, or that all illustrated operations be performed, to achieve desirable results. In certain circumstances, multitasking and parallel processing may be advantageous. Likewise, while several specific implementation details are contained in the above discussions, these should not be construed as limitations on the scope of the present disclosure, but rather as descriptions of features that may be specific to particular embodiments. Certain features that are described in the context of separate embodiments may also be implemented in combination in a single embodiment. Conversely, various features that are described in the context of a single embodiment may also be implemented in multiple embodiments separately or in any suitable sub-combination.

[00179] Although the present disclosure has been described in language specific to structural features and/or methodological acts, it is to be understood that the present disclosure defined in the appended claims is not necessarily limited to the specific features or acts described above. Rather, the specific features and acts described above are disclosed as example forms of implementing the claims.

WHAT IS CLAIMED IS:

1. A method of communication, comprising:

in accordance with a determination that a cell change is performed during a repetition transmission for a physical channel transmission, determining, at a terminal device, whether a remaining portion of the repetition transmission is to be continued or stopped;

in accordance with a determination that the remaining portion is to be continued, continuing the remaining portion of the repetition transmission; and

in accordance with a determination that the remaining portion is to be stopped, stopping the remaining portion of the repetition transmission.

2. The method of claim 1, wherein the physical channel transmission is a downlink transmission, and the method further comprises:

in accordance with a determination that the remaining portion is to be continued, transmitting a first indication indicating the continuing of the remaining portion; and

in accordance with a determination that the remaining portion is to be stopped, transmitting a second indication indicating the stopping of the remaining portion.

3. The method of claim 1, wherein the physical channel transmission is a downlink transmission, and the method further comprises:

in accordance with a determination that the remaining portion is to be continued, transmitting a scheduling request within a time period starting from a time at which the cell change is performed; and

in accordance with a determination that the remaining portion is to be stopped, transmitting no scheduling request within the time period.

4. The method of claim 1, wherein the cell change is performed from a first cell to a second cell, and wherein determining whether the remaining portion is to be continued or stopped comprises:

in response to receiving a base sequence with a first cyclic shift, determining that the remaining portion is to be continued, the first cyclic shift indicating the continuing of the remaining portion; and

in response to receiving the base sequence with a second cyclic shift, determining

that the remaining portion is to be stopped, the second cyclic shift indicating the stopping of the remaining portion, wherein the base sequence indicates the cell change from the first cell to the second cell.

5. The method of claim 1, wherein determining whether the remaining portion is to be continued or stopped comprises:

determining a priority associated with the physical channel transmission;

in accordance with a determination that the priority is equal to or higher than a threshold priority, determining that the remaining portion is to be continued; and

in accordance with a determination that the priority is lower than the threshold priority, determining that the remaining portion is to be stopped.

6. The method of claim 1, wherein determining whether the remaining portion is to be continued or stopped comprises:

determining a ratio between a transmitted time of the repetition transmission and a total time of the repetition transmission;

in accordance with a determination that the ratio is equal to or higher than a threshold ratio, determining that the remaining portion is to be continued; and

in accordance with a determination that the ratio is lower than the threshold ratio, determining that the remaining portion is to be stopped.

7. The method of claim 6, further comprising:

receiving a third indication indicating the threshold ratio; and

determining the threshold ratio based on the third indication.

8. The method of claim 1, wherein determining whether the remaining portion is to be continued or stopped comprises:

receiving a fourth indication indicating the stopping of the remaining portion; and

determining, based on the fourth indication, that the remaining portion is to be stopped.

9. The method of claim 8, wherein the repetition transmission is an uplink transmission scheduled by an uplink grant before the cell change, and wherein receiving the fourth indication comprises:

receiving the fourth indication in a downlink grant after the cell change.

10. The method of claim 1, wherein determining whether the remaining portion is to be continued or stopped comprises:

in response to receiving downlink control information (DCI) indicating that a new data indication (NDI) is toggled for a hybrid automatic repeat request (HARQ) process for the physical channel transmission, determining that the remaining portion is to be stopped.

11. The method of claim 1, wherein determining whether the remaining portion is to be continued or stopped comprises:

in accordance with a determination that downlink control information (DCI) scheduling the physical channel transmission is scrambled with a predetermined radio network temporary identity (RNTI), determining that the remaining portion is to be continued.

12. The method of claim 1, wherein determining whether the remaining portion is to be continued or stopped comprises:

in accordance with a determination that downlink control information (DCI) scheduling the physical channel transmission comprises a fifth indication indicating the repetition transmission, determining that the remaining portion is to be continued.

13. The method of claim 1, wherein the cell change is performed from a first cell to a second cell, and wherein continuing the remaining portion comprises:

transmitting information of the repetition transmission to the second cell.

14. The method of claim 13, wherein the information of the repetition transmission comprises at least of the following:

the number of times of transmitted repetitions;

the number of times of repetitions to be transmitted;

the number of transmitted repetition units;

the number of repetition units to be transmitted; or

the number of resource units to be reserved for the remaining portion.

15. The method of claim 1, wherein stopping the remaining portion comprises at least one of the following:

in accordance with a determination that measured reference signal quality is lower than threshold quality or that measured reference signal power is lower than threshold power during the repetition transmission, stopping the remaining portion of the repetition transmission;

in accordance with a determination that a timer configured for the cell change expires, stopping the remaining portion of the repetition transmission; or

in response to receiving downlink control information (DCI) indicating the cell change, stopping the remaining portion of the repetition transmission.

16. A method of communication, comprising:

in accordance with a determination that a cell change is performed during a repetition transmission for a physical channel transmission, determining, at a network device, whether a remaining portion of the repetition transmission is to be continued or stopped;

in accordance with a determination that the remaining portion is to be continued, continuing the remaining portion of the repetition transmission; and

in accordance with a determination that the remaining portion is to be stopped, stopping the remaining portion of the repetition transmission.

17. The method of claim 16, wherein the physical channel transmission is a downlink transmission, and wherein determining whether the remaining portion is to be continued or stopped comprises:

in response to receiving a first indication indicating the continuing of the remaining portion, determining that the remaining portion is to be continued; and

in response to receiving a second indication indicating the stopping of the remaining portion, determining that the remaining portion is to be stopped.

18. The method of claim 16, wherein the physical channel transmission is a downlink transmission, and wherein determining whether the remaining portion is to be continued or stopped comprises:

in response to receiving a scheduling request within a time period starting from a time at which the cell change is performed, determining that the remaining portion is to be continued; and

in response to receiving no scheduling request within the time period, determining

that the remaining portion is to be stopped.

19. The method of claim 16, wherein the cell change is performed from a first cell of the network device to a second cell of a further network device, and wherein the method further comprises:

transmitting a base sequence with a first cyclic shift, the first cyclic shift indicating the continuing of the remaining portion; or

transmitting the base sequence with a second cyclic shift, the second cyclic shift indicating the stopping of the remaining portion, wherein the base sequence indicates the cell change from the first cell to the second cell.

20. The method of claim 16, wherein determining whether the remaining portion is to be continued or stopped comprises:

determining a priority associated with the physical channel transmission;

in accordance with a determination that the priority is equal to or higher than a threshold priority, determining that the remaining portion is to be continued; and

in accordance with a determination that the priority is lower than the threshold priority, determining that the remaining portion is to be stopped.

21. The method of claim 16, wherein determining whether the remaining portion is to be continued or stopped comprises:

determining a ratio between a transmitted time of the repetition transmission and a total time of the repetition transmission;

in accordance with a determination that the ratio is equal to or higher than a threshold ratio, determining that the remaining portion is to be continued; and

in accordance with a determination that the ratio is lower than the threshold ratio, determining that the remaining portion is to be stopped.

22. The method of claim 21, further comprising:

transmitting a third indication indicating the threshold ratio.

23. The method of claim 16, wherein determining whether the remaining portion is to be continued or stopped comprises:

in accordance with a determination that the physical channel transmission has been

successfully decoded before the cell change, determining that the remaining portion is to be stopped; and

transmitting a fourth indication indicating the stopping of the remaining portion.

24. The method of claim 23, wherein the repetition transmission is an uplink transmission scheduled by an uplink grant before the cell change, and wherein transmitting the fourth indication comprises:

transmitting the fourth indication in a downlink grant after the cell change.

25. The method of claim 16, further comprises:

in accordance with a determination that the remaining portion is to be stopped, transmitting downlink control information (DCI) indicating that a new data indication (NDI) is toggled for a hybrid automatic repeat request (HARQ) process for the physical channel transmission.

26. The method of claim 16, further comprises:

in accordance with a determination that the remaining portion is to be continued, transmitting downlink control information (DCI) scheduling the physical channel transmission by scrambling the DCI with a predetermined radio network temporary identity (RNTI).

27. The method of claim 16, further comprises:

in accordance with a determination that the remaining portion is to be continued, transmitting downlink control information (DCI) scheduling the physical channel transmission, the DCI comprising a fifth indication indicating the repetition transmission.

28. The method of claim 16, wherein the cell change is performed from a first cell of the network device to a second cell of a further network device, and wherein continuing the remaining portion comprises:

transmitting information of the repetition transmission to the second cell.

29. The method of claim 28, wherein the information of the repetition transmission comprises at least of the following:

the number of times of transmitted repetitions;

the number of times of repetitions to be transmitted;

the number of transmitted repetition units;

the number of repetition units to be transmitted; or

the number of resource units to be reserved for the remaining portion.

30. The method of claim 16, wherein stopping the remaining portion comprises at least one of the following:

in accordance with a determination that measured reference signal quality is lower than threshold quality or that measured reference signal power is lower than threshold power during the repetition transmission, stopping the remaining portion of the repetition transmission;

in accordance with a determination that a timer configured for the cell change expires, stopping the remaining portion of the repetition transmission; or

in response to transmitting downlink control information (DCI) indicating the cell change, stopping the remaining portion of the repetition transmission.

31. A terminal device comprising:

a processor configured to perform the method according to any of claims 1-15.

32. A network device comprising:

a processor configured to perform the method according to any of claims 16-30.

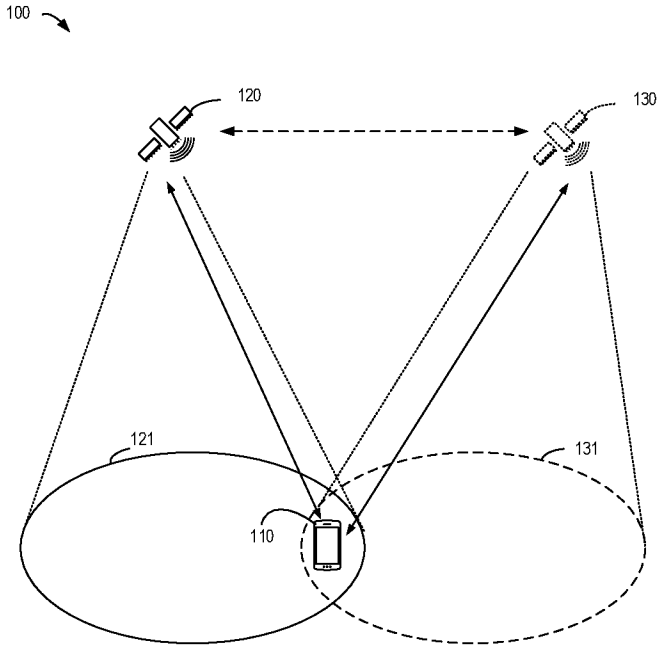


Fig. 1

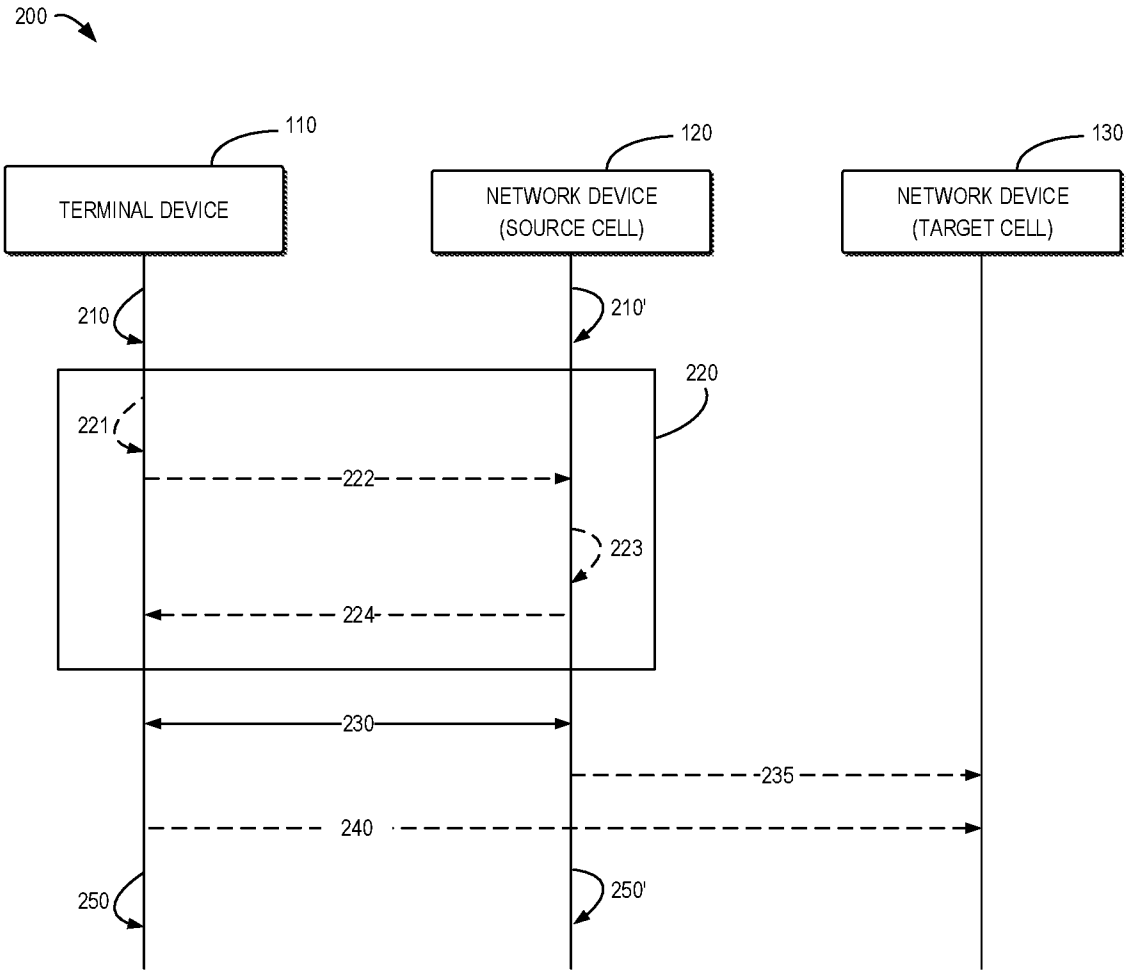
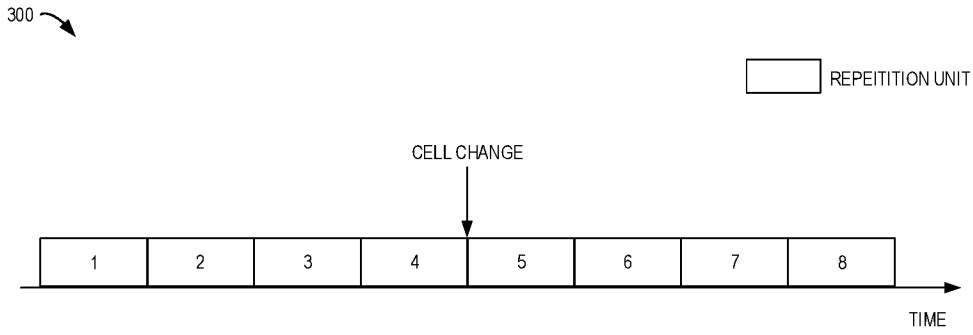

200
110
TERMINAL DEVICE
120
NETWORK DEVICE
(SOURCE CELL)
130
NETWORK DEVICE
(TARGET CELL)
210
210'
220
221
222
223
224
230
235
240
250
250'

Fig. 2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REPEITITION UNIT
CELL CHANGE
1
2
3
4
5
6
7
8
TIME

Fig. 3

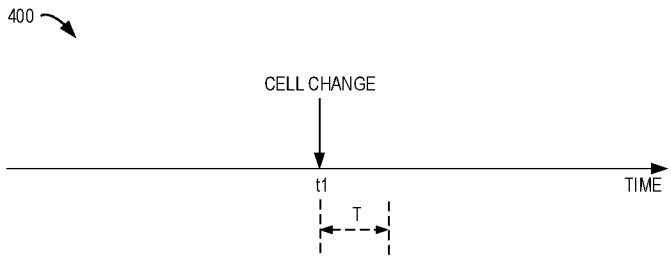
400
CELL CHANGE
t1
TIME
T

Fig. 4

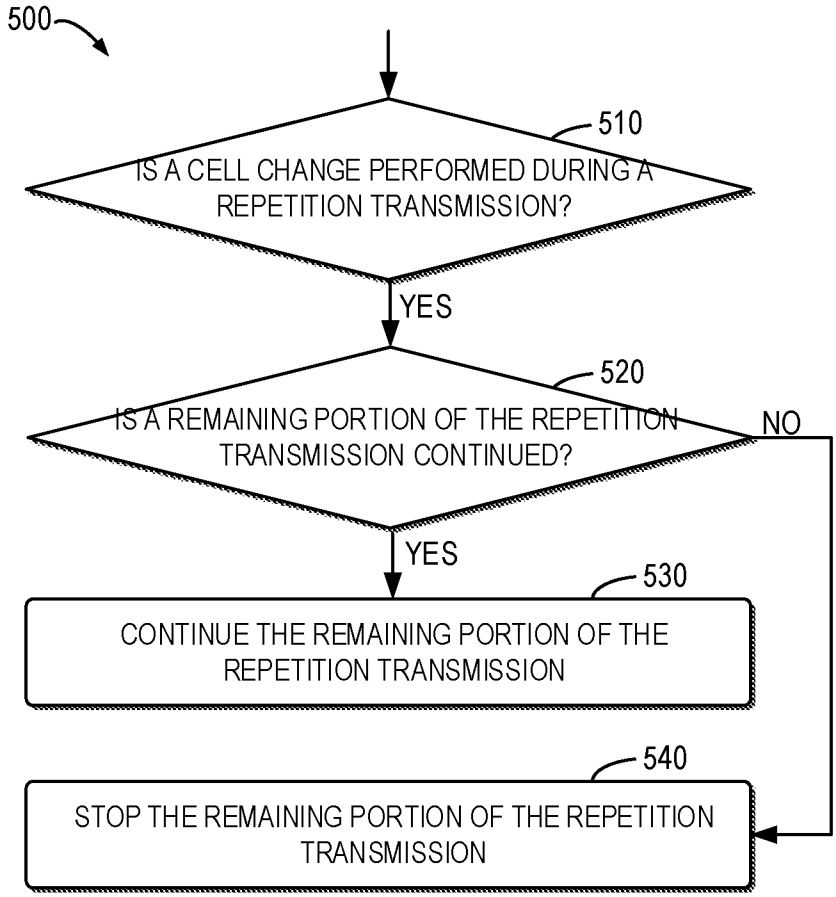
500
510
IS A CELL CHANGE PERFORMED DURING A REPETITION TRANSMISSION?
YES
520
IS A REMAINING PORTION OF THE REPETITION TRANSMISSION CONTINUED?
NO
YES
530
CONTINUE THE REMAINING PORTION OF THE REPETITION TRANSMISSION
540
STOP THE REMAINING PORTION OF THE REPETITION TRANSMISSION

Fig. 5

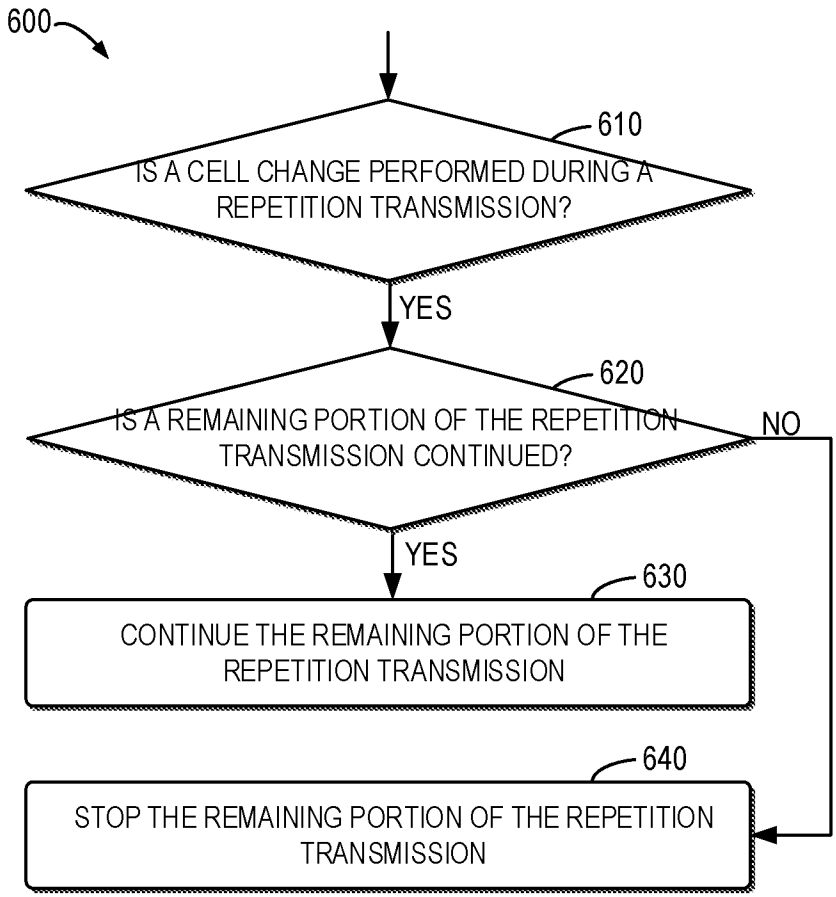
600
610
IS A CELL CHANGE PERFORMED DURING A REPETITION TRANSMISSION?
YES
620
IS A REMAINING PORTION OF THE REPETITION TRANSMISSION CONTINUED?
NO
YES
630
CONTINUE THE REMAINING PORTION OF THE REPETITION TRANSMISSION
640
STOP THE REMAINING PORTION OF THE REPETITION TRANSMISSION

Fig. 6

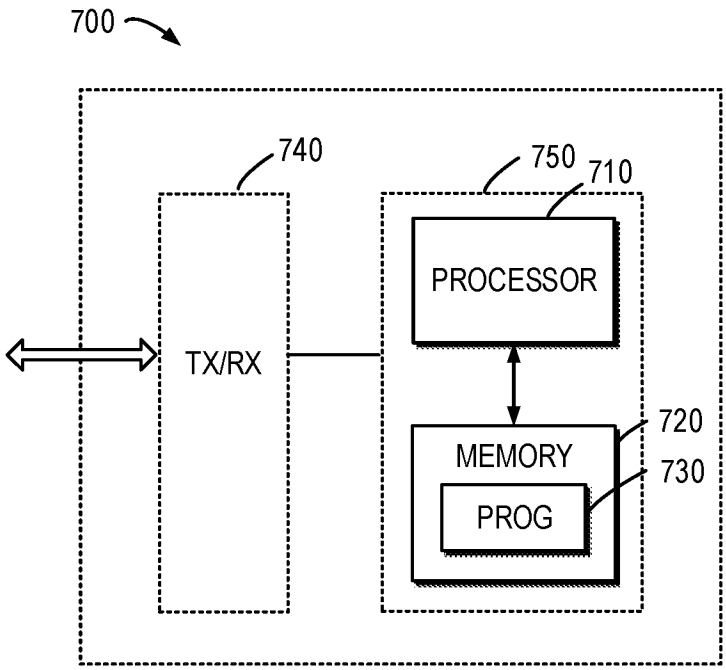
700
740
750
710
PROCESSOR
TX/RX
720
MEMORY
730
PROG

Fig. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2021/143289

A. CLASSIFICATION OF SUBJECT MATTER

H04W 36/00(2009.01)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, H04Q

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)

WPI,EPODOC,CNKI,CNPAT,3GPP:handover, switch, priority, threshold, continue, maintain, stop, retransmi+, cancel, HARQ, time

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2021219194 A1 (QUALCOMM INCORPORATED) 15 July 2021 (2021-07-15) claims 1, 19-20, 29-30; description, paragraph 89	1-32
A	US 2021136635 A1 (SAMSUNG ELECTRONICS CO., LTD.) 06 May 2021 (2021-05-06) the whole document	1-32
A	WO 2021254335 A1 (HUAWEI TECHNOLOGIES CO., LTD.) 23 December 2021 (2021-12-23) the whole document	1-32
A	JP 11284657 A (CHOKOSOKU NETWORK COMPUTER) 15 October 1999 (1999-10-15) the whole document	1-32

☐ 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
19 September 2022	**29 September 2022**
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 **LI,Ping** Telephone No. **53961602**

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2021/143289

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
US	2021219194	A1	15 July 2021	WO	2021141756	A1	15 July 2021
				TW	202133650	A	01 September 2021
				IN	202247033668	A	24 June 2022
US	2021136635	A1	06 May 2021	WO	2021091224	A1	14 May 2021
				CN	113396607	A	14 September 2021
				KR	20210054969	A	14 May 2021
				EP	3878212	A1	15 September 2021
				IN	202137031857	A	06 May 2022
				KR	20210054974	A	14 May 2021
WO	2021254335	A1	23 December 2021	CN	113825189	A	21 December 2021
JP	11284657	A	15 October 1999	JP	H11284657	A	15 October 1999