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METHOD AND APPARATUS FOR TRANSMITTING PAGING DOWNLINK CONTROL INFORMATION AND STORAGE MEDIUM

Abstract

A method for monitoring paging downlink control information (DCI) is performed by a user equipment. The method includes: receiving a wake-up signal corresponding to the user equipment; determining a time domain position of a monitoring occasion for monitoring paging DCI according to a time domain position for receiving the wake-up signal; and monitoring paging DCI corresponding to the user equipment at the time domain position of the monitoring occasion for monitoring the paging DCI.

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Background/Summary

CROSS REFERENCE TO RELATED APPLICATIONS [0001] The present application is a U.S. National Stage of International Application No. PCT/CN2022/083193, filed on Mar. 25, 2022, the content of which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to wireless communication technologies, and in particular, to a method and apparatus for transmitting and monitoring paging downlink control information, and a storage medium.

BACKGROUND

[0003] In some wireless communication technologies, a wake-up signal (WUS) may be used to indicate to wake up a user equipment (UE) to transition from a sleep state to a working state.

[0004] In a scenario of using the WUS, a new paging mechanism may be introduced. In the new paging mechanism, the concept of the paging period is not emphasized, and it is not limited to that paging downlink control information (DCI) is sent on a corresponding paging frame (PF)/paging occasion (PO) of the user equipment, but the paging DCI may be sent by the network device according to the use requirements of the user equipment.

SUMMARY

[0005] According to a first aspect, there is provided a method for monitoring paging downlink control information (DCI), performed by a user equipment, where the method includes:

[0006] receiving a wake-up signal corresponding to the user equipment;

[0007] determining a time domain position of a monitoring occasion for monitoring paging DCI according to a time domain position for receiving the wake-up signal; and

[0008] monitoring paging DCI corresponding to the user equipment at the time domain position of the monitoring occasion for monitoring the paging DCI.

[0009] According to a second aspect, there is provided a method for monitoring paging downlink control information, performed by a network device, where the method includes: [0010] sending a wake-up signal corresponding to a user equipment to the user equipment; determining a time domain position of a monitoring occasion for sending paging DCI according to a time domain position for sending the wake-up signal; and [0011] sending paging DCI corresponding to the user equipment at the time domain position of the monitoring occasion for sending the paging DCI.

[0012] According to a third aspect, there is provided a communication apparatus, including a processor and a memory, where the memory is configured to store a computer program, and the processor is configured to perform the method according to the first aspect.

[0013] According to a fourth aspect, there is provided a communication apparatus, including a processor and a memory, where the memory is configured to store a computer program, and the processor is configured to perform the method according to the second aspect.

[0014] According to a fifth aspect, there is provided a computer-readable storage medium, where the computer-readable storage medium stores an instruction (or referred to as a computer program, a program), and when the instruction is executed by a processor, the processor is causedto perform the method according to the first aspect.

[0015] According to an sixth aspect, there is provided a non-transitory computer-readable storage medium, where the non-transitory computer-readable storage medium stores an instruction (or referred to as a computer program, a program), and when the instruction is executed by a processor, the processor is caused to perform the method according to the second aspect.

[0016] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the disclosure.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The accompanying drawings described here are used to provide a further understanding of the embodiments of the present disclosure and constitute a part of the present disclosure. The illustrative embodiments of the embodiments of the present disclosure and the description of them are used to explain the embodiments of the present disclosure, and do not constitute an improper limitation on the embodiments of the present disclosure.

[0018] The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate embodiments consistent with the embodiments of the present disclosure and, together with the description, serve to explain the principles of the embodiments of the present disclosure.

[0019] FIG. **1** is a schematic architectural diagram of a wireless communication system according to some embodiments of the present disclosure;

[0020] FIG. **2** is a schematic diagram of a method for transmitting paging downlink control information according to some embodiments of the present disclosure;

[0021] FIG. **3** is a flowchart of a method for transmitting paging downlink control information according to some embodiments of the present disclosure;

[0022] FIG. **4** is a flowchart of a method for monitoring paging downlink control information according to some embodiments of the present disclosure;

[0023] FIG. **5** is a flowchart of a method for sending paging downlink control information according to some embodiments of the present disclosure;

[0024] FIG. **6** is a structural diagram of a communication apparatus for monitoring paging downlink control information according to some embodiments of the present disclosure;

[0025] FIG. **7** is a structural diagram of a communication apparatus for monitoring paging downlink control information according to some embodiments of the present disclosure;

[0026] FIG. **8** is a structural diagram of a communication apparatus for sending paging downlink control information according to some embodiments of the present disclosure;

[0027] FIG. **9** is a structural diagram of a communication apparatus for sending paging downlink control information according to some embodiments of the present disclosure.

DETAILED DESCRIPTION

[0028] The embodiments of the present disclosure are further described with reference to the accompanying drawings and specific embodiments.

[0029] Example embodiments will be described in detail here, examples of which are illustrated in the accompanying drawings. The following description refers to the accompanying drawings in which the same numbers in different drawings represent the same or similar elements unless otherwise represented. The implementations described in the following example embodiments do not represent all implementations consistent with the embodiments of the present disclosure. By contrast, they are merely examples of apparatuses and methods consistent with some aspects of the present disclosure as detailed in the appended claims.

[0030] Terms used in the embodiments of the present disclosure are merely for the purpose of describing particular embodiments, and are not intended to limit the embodiments of the present disclosure. The singular forms “a” and “the” used in the embodiments of the present disclosure and the appended claims are also intended to include plural forms, unless the context clearly indicates other meanings. It should also be understood that the term “and/or” as used here refers to and includes any or all possible combinations of one or more associated listed items.

[0031] It should be understood that although the terms first, second, third, or the like, may be used in the embodiments of the present disclosure to describe various information, these information should not be limited to these terms. These terms are only used to distinguish the same type of information from each other. For example, without departing from the scope of the embodiments of the present disclosure, the first information may also be referred to as second information, and

similarly, the second information may also be referred to as first information. Depending on the context, the words “if” and “in case” as used here may be interpreted as “at the time” or “when” or “in response to determining”.

[0032] Embodiments of the present disclosure are described in detail below, and examples of the embodiments are shown in the accompanying drawings, in which the same or similar reference numerals refer to the same or similar elements throughout. The embodiments described below with reference to the drawings are exemplary and are intended to explain the present disclosure and are not to be construed as limitations of the present disclosure.

[0033] In related art, how to determine the monitoring occasion of the paging DCI is a problem to be solved.

[0034] As shown in FIG. **1**, the method for transmitting paging downlink control information provided by some embodiments of the present disclosure may be applied to a wireless communication system **100**, where the wireless communication system may include, but is not limited to, a network device **101** and a user equipment **102**. The user equipment **102** is configured to support carrier aggregation, and the user equipment **102** may be connected to a plurality of carrier units of the network device **101**, including a primary carrier unit and one or more secondary carrier units.

[0035] It should be understood that the foregoing wireless communication system **100** may be applied to a low-frequency scenario or a high-frequency scenario. The application scenario of the wireless communication system **100** includes but is not limited to a long term evolution (LTE) system, an LTE frequency division duplex (FDD) system, an LTE time division duplex (TDD) system, a worldwide interoperability for micro wave access (WiMAX) communication system, a cloud radio access network (CRAN) system, a future 5-th generation (5G) system, a new radio (NR) communication system, or a future evolved public land mobile network (PLMN) system, or the like.

[0036] The user equipment **102** shown above may be a user equipment (UE), a terminal, an access terminal, a terminal unit, a terminal station, a mobile station (MS), a remote station, a remote terminal, a mobile terminal, a wireless communication device, a terminal agent, a user equipment, or the like. The user equipment **102** may have a wireless transceiving function, and may perform communication (for example, wireless communication) with one or more network devices **101** of one or more communication systems, and accept a network service provided by the network device **101**, where the network device **101** includes but is not limited to the illustrated base station.

[0037] Among them, the user equipment **102** may be a cellular telephone, a cordless telephone, a session initiation protocol (SIP) phone, a wireless local loop (WLL) station, a personal digital assistant (PDA) device, a handheld device having a wireless communication function, a computing device, or another processing device connected to a wireless modem, a vehicle-mounted device, a wearable device, a user equipment in a future 5G network, or a user equipment in a future evolved PLMN network, etc.

[0038] The network device **101** may be an access network device (or referred to as an access network station). Among them, the access network device refers to a device that provides a network access function, for example, a radio access network (RAN) base station, etc. The network device may specifically include a base station (BS) device, or include a base station device and a radio resource management device configured to control the base station device, etc. The network device may further include a relay station (a relay device), an access point, a base station in a future 5G network, a base station in a future evolved PLMN network, an NR base station, etc. The network device may be a wearable device or a vehicle-mounted device. The network device may also be a communication chip having a communication module.

[0039] For example, the network device **101** includes but is not limited to: a gnodeB (gNB) in a 5G, an evolved node B (eNB) in a LTE system, a radio network controller (RNC), a node B (NB) in a WCDMA system, a wireless controller in a CRAN system, a base station controller (BSC), a

base transceiver station (BTS) in a GSM system or a CDMA system, a home base station, such as a home evolved nodeB, or a home node B (HNB), a baseband unit (BBU), a transmitting and receiving point (TRP), a transmitting point (TP), or mobile switching center, etc.

[0040] The wake-up signal in the present disclosure may be a normal wake-up signal or a low-power-consumption wake-up signal. In some examples, the full name of the low-power-consumption wake-up signal may be referred to as low-power WUS.

[0041] The low-power-consumption wake-up signal is different from the normal wake-up signal in R 17. The low-power-consumption wake-up signal may correspond to a separate receiver, which may be referred to as a secondary transceiver, and the power consumption of the secondary receiver is much lower than the power consumption of a main receiver. The user equipment receives the low-power-consumption wake-up signal by using the low-power-consumption secondary receiver, and processes the uplink data and the downlink data by using the main transceiver. The normal wake-up signal needs to be received by the main transceiver.

[0042] According to some embodiments of the present disclosure, there is provided a method for transmitting paging downlink control information. FIG. **2** is a flowchart of a method for transmitting paging downlink control information according to some embodiments of the present disclosure. As shown in FIG. **2**, the method includes following steps.

[0043] In step S**201**, the network device sends a wake-up signal corresponding to the user equipment to the user equipment.

[0044] In step S**202**, the user equipment determines a time domain position of a monitoring occasion for monitoring the paging DCI according to a time domain position for receiving the wake-up signal.

[0045] In step S**203**, the network device sends the paging DCI corresponding to the user equipment at the time domain position of the monitoring occasion for sending the paging DCI.

[0046] In some embodiments, the monitoring occasion of the wake-up signal corresponding to the user equipment is periodically distributed in the time domain, so that the user equipment periodically detects the monitoring occasion of the corresponding wake-up signal.

[0047] In some embodiments, the time domain position of the monitoring occasion for monitoring the paging DCI is after the first moment t**1**. The first moment t**1** is a moment corresponding to a first time interval T**1** behind the end position of the time domain position for receiving the wake-up signal.

[0048] Alternatively, the time domain position of the monitoring occasion for monitoring the paging DCI is after a third moment t**3**. The third moment t**3** is a moment corresponding to the first time interval T**1** behind the start position of the time domain position for receiving the wake-up signal. Among them, the duration of the interval between the third moment t**3** and the first moment t**1** is the length of the monitoring occasion of the wake-up signal corresponding to the user equipment.

[0049] Among them, the first time interval T**1** is determined by a protocol, or the first time interval T**1** may be determined according to a protocol agreement.

[0050] By setting the first time interval T**1**, a processing time is reserved for the user equipment to switch from receiving the wake-up signal to receiving the paging DCI.

[0051] In some embodiments, the time domain position of the monitoring occasion for monitoring the paging DCI is before the second moment t**2**. The second moment t**2** is a moment corresponding to a second time interval T**2** behind the end position of the time domain position for receiving the wake-up signal.

[0052] Alternatively, the time domain position of the monitoring occasion for monitoring the paging DCI is before a fourth moment t**4**. The fourth moment t**4** is a moment corresponding to the second time interval T**2** behind the start position of the time domain position for receiving the wake-up signal. Among them, the duration of the interval between the fourth moment t**4** and the second moment t**2** is the length of the monitoring occasion of the wake-up signal corresponding to

the user equipment.
[0053] Among them, the second time interval T**2** is determined by a protocol, or the second time interval T**2** may be determined according to a protocol agreement.
[0054] By setting the second time interval T**2**, the user equipment is prevented from monitoring for a long time when the monitoring occasion for monitoring the paging DCI is not detected, so as to save the power consumption of the user equipment.
[0055] In some embodiments, the time domain position of the monitoring occasion for monitoring the paging DCI is after the first moment t**1** and before the second moment t**2**. The first moment t**1** is a moment corresponding to the first time interval T**1** behind the end position of the time domain position for receiving the wake-up signal, and the second moment t**2** is a moment corresponding to the second time interval T**2** behind the end position of the time domain position for receiving the wake-up signal.
[0056] By setting the first time interval T**1** and the second time interval T**2**, a processing time may be reserved for the user equipment to switch from receiving the wake-up signal to receiving the paging DCI. In addition, the user equipment may be prevented from monitoring for a long time when the monitoring occasion for monitoring the paging DCI is not detected, so as to save the power consumption of the user equipment.
[0057] In some embodiments, the monitoring occasion for monitoring the paging DCI satisfies one of the following manners.
[0058] In manner 1, the monitoring occasion for monitoring the paging DCI at least includes M * H monitoring occasions after the first moment and closest to the first moment in the paging search space for transmitting the paging DCI, where M is the quantity of synchronization signal block (SSBs) actually sent by the network device, and H is an integer greater than zero.
[0059] In an example, the monitoring occasion for monitoring the paging DCI only includes M * H monitoring occasions after the first moment and closest to the first moment in the paging search space for transmitting the paging DCI, so as to ensure that the operation of starting to monitor the paging DCI is later than the first moment.
[0060] In manner 2, the monitoring occasion for monitoring the paging DCI at least includes M * H monitoring occasions in one or more paging search space periods after the first moment and closest to the first moment in the paging search space for transmitting the paging DCI, where the start time of the paging search space period is later than the first moment, M is the quantity of SSBs actually sent by the network device, and H is an integer greater than zero. Among them, the paging search space period is a period corresponding to the paging search space for transmitting the paging DCI. Among them, the period of the paging search space may refer to a search space periodicity, which indicates a time interval between two adjacent paging search spaces.
[0061] In an example, when M * N monitoring occasions are included in a period of the paging search space, N is an integer greater than zero, and the value of His the same as a value of N.
[0062] In an example, the monitoring occasion for monitoring the paging DCI only includes M * H monitoring occasions in a paging search space period after the first moment and closest to the first moment in the paging search space for transmitting the paging DCI, so as to ensure that the operation of starting to monitor the paging DCI is later than the first moment.
[0063] In manner 3, the monitoring occasion for monitoring the paging DCI at least includes all paging occasions in a paging search space period after the first moment and closest to the first moment in the paging search space for transmitting the paging DCI, and the start time of the paging search space period is later than the first moment.
[0064] In an example, the monitoring occasion for monitoring the paging DCI only includes all paging occasions in a paging search space period after the first moment and closest to the first moment in the paging search space for transmitting the paging DCI, and the start time of the paging search space period is later than the first moment.
[0065] In some embodiments, the monitoring occasion for monitoring the paging DCI satisfies one

of the following manners.
[0066] In manner 1, the monitoring occasion for monitoring the paging DCI at least includes M * H monitoring occasions before the second moment and closest to the second moment in the paging search space for transmitting the paging DCI, where M is the quantity of SSBs actually sent by the network device, and H is an integer greater than zero.
[0067] In an example, the monitoring occasion for monitoring the paging DCI only includes M * H monitoring occasions before the second moment and closest to the second moment in the paging search space for transmitting the paging DCI.
[0068] In manner 2, the monitoring occasion for monitoring the paging DCI at least includes M * H monitoring occasions in one or more paging search space periods before the second moment and closest to the second moment in the paging search space for transmitting the paging DCI, where the end time of the paging search space period is earlier than the second moment, M is the quantity of SSBs actually sent by the network device, and H is an integer greater than zero. Among them, the paging search space period is a period corresponding to the paging search space for transmitting the paging DCI.
[0069] In an example, when M * N monitoring occasions are included in a period of the paging search space, N is an integer greater than zero, and the value of H is the same as the value of N.
[0070] In an example, the monitoring occasion for monitoring the paging DCI only includes M * H monitoring occasions in a paging search space period before the second moment and closest to the second moment in the paging search space for transmitting the paging DCI.
[0071] In manner 3, the monitoring occasion for monitoring the paging DCI at least includes all paging occasions in a paging search space period before the second moment and closest to the second moment in the paging search space for transmitting the paging DCI, and the end time of the paging search space period is earlier than the second moment.
[0072] In an example, the monitoring occasion for monitoring the paging DCI only includes all paging occasions in a paging search space period before the second moment and closest to the second moment in the paging search space for transmitting the paging DCI, and the end time of the paging search space period is earlier than the second moment.
[0073] In some embodiments, a period of the paging search space for transmitting the paging DCI includes M * N monitoring occasions, where M is the quantity of SSBs actually sent by the network device, and N is an integer greater than zero.
[0074] In some embodiments, a manner of obtaining the paging search space for transmitting the paging DCI is: receiving configuration information sent by the network device, where the configuration information indicates the paging search space for transmitting the paging DCI.
[0075] In some embodiments, at least M monitoring occasions for monitoring the paging DCI are provided between the first moment t**1** and the second moment t**2**, where M is the quantity of SSBs actually sent by the network device, so as to ensure that the user equipment can cover each SSB beam actually sent by the network device in a set time period for monitoring the paging DCI.
[0076] In some embodiments, the interval between the first moment t**1** and the second moment t**2** is greater than or equal to a duration of a paging search space period, where the paging search space period is a period corresponding to the paging search space for transmitting the paging DCI, so as to ensure that the user equipment can cover each SSB beam actually sent by the network device in a set time period for monitoring the paging DCI.
[0077] In some embodiments, the monitoring occasion for monitoring the paging DCI includes at least one monitoring occasion in S paging search space periods after the first moment, where S is an integer greater than or equal to 1.
[0078] In some embodiments, the monitoring occasion for monitoring the paging DCI includes at least one monitoring occasion in S paging search space periods before the second moment, where S is an integer greater than or equal to 1.
[0079] In an example, the value of S may be determined according to a protocol agreement.

[0080] In some embodiments, as shown in FIG. **3**, the method further includes step S**204**, in which the user equipment reports capability information to the network device, where the capability information is used to indicate at least one of the first time interval T**1** or the second time interval T**2**.

[0081] According to some embodiments of the present disclosure, there is provided a method for monitoring paging downlink control information, performed by the user equipment **102**. FIG. **4** is a flowchart of a method for monitoring paging downlink control information according to some embodiments of the present disclosure. As shown in FIG. **4**, the method includes following steps.

[0082] In step S**401**, a wake-up signal corresponding to the user equipment is received.

[0083] In step S**402**, a time domain position of a monitoring occasion for monitoring the paging DCI is determined according to a time domain position for receiving the wake-up signal.

[0084] In step S**403**, the paging DCI corresponding to the user equipment is monitored at the time domain position of the monitoring occasion for monitoring the paging DCI.

[0085] In some embodiments, the monitoring occasion of the wake-up signal corresponding to the user equipment is periodically distributed in the time domain, so that the network device periodically sends the monitoring occasion of the corresponding wake-up signal.

[0086] In some embodiments, the time domain position of the monitoring occasion for monitoring the paging DCI is after the first moment t**1**, the first moment t**1** is a moment corresponding to the first time interval T**1** behind the end position of the time domain position for receiving the wake-up signal.

[0087] Alternatively, the time domain position of the monitoring occasion for monitoring the paging DCI is after the third moment t**3**, and the third moment t**3** is a moment corresponding to the first time interval T**1** behind the start position of the time domain position for receiving the wake-up signal. Among them, the duration of the interval between the third moment t**3** and the first moment t**1** is the length of the monitoring occasion of the wake-up signal corresponding to the user equipment.

[0088] Among them, the first time interval T**1** is determined by a protocol, or the first time interval T**1** may be determined according to a protocol agreement.

[0089] By setting the first time interval T**1**, a processing time is reserved for the user equipment to switch from receiving the wake-up signal to receiving the paging DCI.

[0090] In some embodiments, the time domain position of the monitoring occasion for monitoring the paging DCI is before the second moment t**2**. The second moment t**2** is a moment corresponding to the second time interval T**2** behind the end position of the time domain position for receiving the wake-up signal.

[0091] Alternatively, the time domain position of the monitoring occasion for monitoring the paging DCI is before a fourth moment t**4**. The fourth moment t**4** is a moment corresponding to the second time interval T**2** behind the start position of the time domain position for receiving the wake-up signal. Among them, the duration of the interval between the fourth moment t**4** and the second moment t**2** is the length of the monitoring occasion of the wake-up signal corresponding to the user equipment.

[0092] Among them, the second time interval T**2** is determined by a protocol, or the second time interval T**2** may be determined according to a protocol agreement.

[0093] By setting the second time interval T**2**, the user equipment is prevented from monitoring for a long time when the monitoring occasion for monitoring the paging DCI is not detected, so as to save the power consumption of the user equipment.

[0094] In some embodiments, the time domain position of the monitoring occasion for monitoring the paging DCI is after the first moment t**1** and before the second moment t**2**. The first moment t**1** is a moment corresponding to the first time interval T**1** behind the end position of the time domain position for receiving the wake-up signal, and the second moment t**2** is a moment corresponding to the second time interval T**2** behind the end position of the time domain position for receiving the

wake-up signal.
[0095] By setting the first time interval T**1** and the second time interval T**2**, a processing time may be reserved for the user equipment to switch from receiving the wake-up signal to receiving the paging DCI. In addition, the user equipment may be prevented from monitoring for a long time when the monitoring occasion for monitoring the paging DCI is not detected, so as to save the power consumption of the user equipment.
[0096] In some embodiments, the monitoring occasion for monitoring the paging DCI satisfies one of the following manners.
[0097] In manner 1, the monitoring occasion for monitoring the paging DCI at least includes M * H monitoring occasions after the first moment and closest to the first moment in the paging search space for transmitting the paging DCI, where M is the quantity of SSBs actually sent by the network device, and H is an integer greater than zero.
[0098] In an example, the monitoring occasion for monitoring the paging DCI only includes M * H monitoring occasions after the first moment and closest to the first moment in the paging search space for transmitting the paging DCI, so as to ensure that the operation of starting to monitor the paging DCI is later than the first moment.
[0099] In manner 2, the monitoring occasion for monitoring the paging DCI at least includes M * H monitoring occasions in one or more paging search space periods after the first moment and closest to the first moment in the paging search space for transmitting the paging DCI, where the start time of the paging search space period is later than the first moment, M is the quantity of SSBs actually sent by the network device, and H is an integer greater than zero. Among them, the paging search space period is a period corresponding to the paging search space for transmitting the paging DCI.
[0100] In an example, when M * N monitoring occasions are included in a period of the paging search space, N is an integer greater than zero, and the value of H is the same as the value of N.
[0101] In an example, the monitoring occasion for monitoring the paging DCI only includes M * H monitoring occasions in a paging search space period after the first moment and closest to the first moment in the paging search space for transmitting the paging DCI, so as to ensure that the operation of starting to monitor the paging DCI is later than the first moment.
[0102] In manner 3, the monitoring occasion for monitoring the paging DCI at least includes all paging occasions in a paging search space period after the first moment and closest to the first moment in the paging search space for transmitting the paging DCI, and the start time of the paging search space period is later than the first moment.
[0103] In some embodiments, the monitoring occasion for monitoring the paging DCI satisfies one of the following manners.
[0104] In manner 1, the monitoring occasion for monitoring the paging DCI at least includes M * H monitoring occasions before the second moment and closest to the second moment in the paging search space for transmitting the paging DCI, where M is the quantity of SSBs actually sent by the network device, and His an integer greater than zero.
[0105] In an example, the monitoring occasion for monitoring the paging DCI only includes M * H monitoring occasions before the second moment and closest to the second moment in the paging search space for transmitting the paging DCI.
[0106] In manner 2, the monitoring occasion for monitoring the paging DCI at least includes M * H monitoring occasions in one or more paging search space periods before the second moment and closest to the second moment in the paging search space for transmitting the paging DCI, where the end time of the paging search space period is earlier than the second moment, M is the quantity of SSBs actually sent by the network device, and H is an integer greater than zero. Among them, the paging search space period is a period corresponding to the paging search space for transmitting the paging DCI.
[0107] In an example, when M * N monitoring occasions are included in a period of the paging

search space, N is an integer greater than zero, and the value of H is the same as the value of N.
[0108] In an example, the monitoring occasion for monitoring the paging DCI only includes M * H monitoring occasions in a paging search space period before the second moment and closest to the second moment in the paging search space for transmitting the paging DCI.
[0109] In manner 3, the monitoring occasion for monitoring the paging DCI at least includes all paging occasions in a paging search space period before the second moment and closest to the second moment in the paging search space for transmitting the paging DCI, and the end time of the paging search space period is earlier than the second moment.
[0110] In an example, the monitoring occasion for monitoring the paging DCI only includes all paging occasions in a paging search space period before the second moment and closest to the second moment in the paging search space for transmitting the paging DCI, and the end time of the paging search space period is earlier than the second moment.
[0111] In an example, the monitoring occasion for monitoring the paging DCI only includes all paging occasions in a paging search space period after the first moment and closest to the first moment in the paging search space for transmitting the paging DCI.
[0112] In some embodiments, a period of the paging search space for transmitting the paging DCI includes M * N monitoring occasions, where M is the quantity of SSBs actually sent by the network device, and N is an integer greater than zero.
[0113] In some embodiments, a manner of obtaining the paging search space for transmitting the paging DCI is: receiving configuration information sent by the network device, where the configuration information indicates the paging search space for transmitting the paging DCI.
[0114] In some embodiments, at least M monitoring occasions for monitoring the paging DCI are provided between the first moment t**1** and the second moment t**2**, where M is the quantity of SSBs actually sent by the network device, so as to ensure that the user equipment can cover each SSB beam actually sent by the network device in a set time period for monitoring the paging DCI.
[0115] In some embodiments, the interval between the first moment t**1** and the second moment t**2** is greater than or equal to the duration of a paging search space period, where the paging search space period is a period corresponding to the paging search space for transmitting the paging DCI, so as to ensure that the user equipment can cover each SSB beam actually sent by the network device in a set time period for monitoring the paging DCI.
[0116] In some embodiments, the monitoring occasion for monitoring the paging DCI includes at least one monitoring occasion in S paging search space periods after the first moment, where S is an integer greater than or equal to 1.
[0117] In some embodiments, the monitoring occasion for monitoring the paging DCI includes at least one monitoring occasion in S paging search space periods before the second moment, where S is an integer greater than or equal to 1.
[0118] In an example, the value of S may be determined according to a protocol agreement.
[0119] In some embodiments, the user equipment reports capability information to the network device, where the capability information is used to indicate at least one of the first time interval T**1** or the second time interval T**2**, so that the network device sends the paging DCI based on the obtained first time interval T**1** and/or the second time interval T**2**.
[0120] In the embodiments of the present disclosure, the time domain position of the monitoring occasion for monitoring the paging DCI is determined according to the time domain position for receiving the wake-up signal. In a case that the paging DCI is not periodically sent due to use of the wake-up signal, the time domain position of the monitoring occasion for monitoring the paging DCI may be accurately determined, and the paging DCI may be received in time.
[0121] According to some embodiments of the present disclosure, there is provided a method for sending paging downlink control information, performed by the network device **101**. FIG. **5** is a flowchart of a method for sending paging downlink control information according to some embodiments of the present disclosure. As shown in FIG. **5**, the method includes following steps.

[0122] In step S**501**, a wake-up signal corresponding to a user equipment is sent to the user equipment.
[0123] In step S**502**, a time domain position of a monitoring occasion for sending paging DCI is determined according to a time domain position for sending the wake-up signal;
[0124] In step S**503**, the paging DCI corresponding to the user equipment is sent at the time domain position of the monitoring occasion for sending the paging DCI.
[0125] In some embodiments, the monitoring occasion of the wake-up signal corresponding to the user equipment is periodically distributed in the time domain, so that the network device may periodically send the monitoring occasion of the corresponding wake-up signal.
[0126] In some embodiments, the time domain position of the monitoring occasion for sending the paging DCI is after the first moment, and the first moment is a moment corresponding to a first time interval behind the end position of the time domain position for sending the wake-up signal.
[0127] In some embodiments, the time domain position of the monitoring occasion for sending the paging DCI is after the first moment t**1**, and the first moment t**1** is a moment corresponding to the first time interval T**1** behind the end position of the time domain position for sending the wake-up signal.
[0128] Alternatively, the time domain position of the monitoring occasion for sending the paging DCI is after the third moment t**3**, and the third moment t**3** is a moment corresponding to the first time interval T**1** behind the start position of the time domain position for sending the wake-up signal. Among them, the duration of the interval between the third moment t**3** and the first moment t**1** is the length of the monitoring occasion of the wake-up signal corresponding to the user equipment.
[0129] Among them, the first time interval T**1** is determined by a protocol, or the first time interval T**1** may be determined according to a protocol agreement.
[0130] By setting the first time interval T**1**, a processing time is reserved for the user equipment to switch from receiving the wake-up signal to receiving the paging DCI.
[0131] In some embodiments, the time domain position of the monitoring occasion for sending the paging DCI is before the second moment t**2**. The second moment t**2** is a moment corresponding to the second time interval T**2** behind the end position of the time domain position for sending the wake-up signal.
[0132] Alternatively, the time domain position of the monitoring occasion for sending the paging DCI is before a fourth moment t**4**. The fourth moment t**4** is a moment corresponding to the second time interval T**2** behind the start position of the time domain position for sending the wake-up signal. Among them, the duration of the interval between the fourth moment t**4** and the second moment t**2** is the length of the monitoring occasion of the wake-up signal corresponding to the user equipment.
[0133] Among them, the second time interval T**2** is determined by a protocol, or the second time interval T**2** may be determined according to a protocol agreement.
[0134] By setting the second time interval T**2**, the user equipment is prevented from monitoring for a long time when the monitoring occasion for sending the paging DCI is not detected, so as to save the power consumption of the user equipment.
[0135] In some embodiments, the time domain position of the monitoring occasion for sending the paging DCI is after the first moment t**1** and before the second moment t**2**. The first moment tl is a moment corresponding to the first time interval T**1** behind the end position of the time domain position for sending the wake-up signal, and the second moment t**2** is a moment corresponding to the second time interval T**2** behind the end position of the time domain position for sending the wake-up signal.
[0136] By setting the first time interval T**1** and the second time interval T**2**, a processing time may be reserved for the user equipment to switch from receiving the wake-up signal to receiving the paging DCI. In addition, the user equipment may be prevented from monitoring for a long time

when the monitoring occasion for sending the paging DCI is not detected, so as to save the power consumption of the user equipment.

[0137] In some embodiments, the monitoring occasion for sending the paging DCI at least includes M * H monitoring occasions after the first moment and closest to the first moment in the paging search space for transmitting the paging DCI, where H is an integer greater than zero.

[0138] In some embodiments, the monitoring occasion for sending the paging DCI at least includes M * H monitoring occasions in one or more paging search space periods after the first moment and closest to the first moment in the paging search space for transmitting the paging DCI, where the start time of the paging search space period is later than the first moment, M is the quantity of SSBs actually sent by the network device, and H is an integer greater than zero. The paging search space period is a period corresponding to the paging search space.

[0139] In an example, in response to M * N monitoring occasions being included in a period of the paging search space for transmitting the paging DCI, H is equal to N.

[0140] In some embodiments, the monitoring occasion for sending the paging DCI at least includes all paging occasions in a paging search space period after the first moment and closest to the first moment in the paging search space for transmitting the paging DCI, and the start time of the paging search space period is later than the first moment.

[0141] In some embodiments, a manner of notifying the user equipment of the paging search space is: sending configuration information to the user equipment, where the configuration information indicates the paging search space for transmitting the paging DCI.

[0142] In some embodiments, at least M monitoring occasions for sending the paging DCI are provided between the first moment and the second moment, where M is the quantity of SSBs actually sent by the network device.

[0143] In some embodiments, the interval between the first moment and the second moment is greater than or equal to the duration of a paging search space period, where the paging search space period is a period corresponding to the paging search space for transmitting the paging DCI.

[0144] In some embodiments, the monitoring occasion for monitoring the paging DCI includes at least one monitoring occasion in S paging search space periods after the first moment, where S is an integer greater than or equal to 1, and the paging search space period is a period corresponding to the paging search space for transmitting the paging DCI.

[0145] In some embodiments, the monitoring occasion for sending the paging DCI includes at least one monitoring occasion in S paging search space periods before the second moment, where S is an integer greater than or equal to 1, and the paging search space period is a period corresponding to the paging search space for transmitting the paging DCI.

[0146] In some embodiments, capability information reported by the user equipment is received, where the capability information is used to indicate at least one of the first time interval or the second time interval.

[0147] Based on the same concept as the foregoing method embodiments, according to some embodiments of the present disclosure, there is further provided a communication apparatus. The communication apparatus may have the functions of the user equipment **102** in the foregoing method embodiments, and is configured to perform the steps performed by the user equipment **102** provided in the foregoing embodiments. The function may be implemented by hardware, or by software, or by hardware executing corresponding software. The hardware or the software includes one or more modules corresponding to the foregoing functions.

[0148] In some embodiments, the communication apparatus **600** shown in FIG. **6** may be used as the user equipment **102** in the foregoing method embodiments, and perform the steps performed by the user equipment **102** in the foregoing method embodiments.

[0149] The communication apparatus **600** includes a transceiving module **601** and a processing module **602**.

[0150] The transceiving module **601** is configured to receive a wake-up signal corresponding to the

user equipment.
[0151] The processing module **602** is configured to determine a time domain position of a monitoring occasion for monitoring the paging DCI according to a time domain position for receiving the wake-up signal.
[0152] The transceiving module **601** is further configured to monitor the paging DCI corresponding to the user equipment at the time domain position of the monitoring occasion for monitoring the paging DCI.
[0153] In some embodiments, a monitoring occasion of the wake-up signal corresponding to the user equipment is periodically distributed in the time domain.
[0154] In some embodiments, the time domain position of the monitoring occasion for monitoring the paging DCI is after a first moment, and the first moment is a moment corresponding to a first time interval behind an end position of the time domain position for receiving the wake-up signal.
[0155] In some embodiments, the time domain position of the monitoring occasion for monitoring the paging DCI is before a second moment, and the second moment is a moment corresponding to a second time interval behind an end position of the time domain position for receiving the wake-up signal.
[0156] In some embodiments, a paging search space period for transmitting the paging DCI includes M * N monitoring occasions, where M is a quantity of SSBs actually sent by a network device, and N is an integer greater than zero.
[0157] In some embodiments, the monitoring occasion for monitoring the paging DCI at least includes M * H monitoring occasions after the first moment and closest to the first moment in a paging search space for transmitting the paging DCI, where M is a quantity of SSBs actually sent by a network device, and H is an integer greater than zero.
[0158] In some embodiments, the monitoring occasion for monitoring the paging DCI at least includes M * H monitoring occasions in one or more paging search space periods after the first moment and closest to the first moment in a paging search space for transmitting the paging DCI, where a start time of the paging search space period is later than the first moment, M is a quantity of SSBs actually sent by a network device, H is an integer greater than zero, and the paging search space period is a period corresponding to a paging search space for transmitting paging DCI.
[0159] In some embodiments, in response to a paging search space period including M * N monitoring occasions, H is equal to N.
[0160] In some embodiments, the monitoring occasion for monitoring the paging DCI at least includes all paging occasions in a paging search space period after the first moment and closest to the first moment in a paging search space for transmitting the paging DCI, where a start time of the paging search space period is later than the first moment, and the paging search space period is a period corresponding to the paging search space.
[0161] In some embodiments, the transceiving module **601** is further configured to receive configuration information sent by a network device, where the configuration information indicates a paging search space for transmitting the paging DCI.
[0162] In some embodiments, at least M monitoring occasions for monitoring the paging DCI are provided between the first moment and the second moment, where M is a quantity of SSBs actually sent by a network device.
[0163] In some embodiments, an interval between the first moment and the second moment is greater than or equal to a duration of a paging search space period, where the paging search space period is a period corresponding to a paging search space for transmitting the paging DCI.
[0164] In some embodiments, the monitoring occasion for monitoring the paging DCI includes at least one monitoring occasion in S paging search space periods after the first moment, where S is an integer greater than or equal to 1, and the paging search space period is a period corresponding to a paging search space for transmitting the paging DCI.
[0165] In some embodiments, the monitoring occasion for monitoring the paging DCI includes at

least one monitoring occasion in S paging search space periods before the second moment, where S is an integer greater than or equal to 1, and the paging search space period is a period corresponding to a paging search space for transmitting the paging DCI.

[0166] In some embodiments, the transceiving module **601** is further configured to report capability information to a network device, where the capability information is used to indicate at least one of the first time interval or the second time interval.

[0167] When the communication apparatus is the user equipment **102**, the structure of the communication apparatus may also be as shown in FIG. **7**.

[0168] FIG. **7** is a block diagram of a communication apparatus **700** for monitoring paging downlink control information according to some embodiments of the present disclosure. For example, the apparatus **700** may be a mobile phone, a computer, a digital broadcast terminal, a message transceiving device, a game console, a tablet device, a medical device, a fitness device, a personal digital assistant, or the like.

[0169] Referring to FIG. **7**, the apparatus **700** may include one or more of the following components: a processing component **702**, a memory **704**, a power component **706**, a multimedia component **708**, an audio component **710**, an input/output (I/O) interface **712**, a sensor component **714**, and a communication component **716**.

[0170] The processing component **702** typically controls overall operations of the apparatus **700**, such as operations associated with display, telephone calls, data communications, camera operations, and recording operations. The processing component **702** may include one or more processors **720** to execute instructions to perform all or part of the steps of the above method. In addition, the processing component **702** may include one or more modules to facilitate interaction between the processing component **702** and other components. For example, the processing component **702** may include a multimedia module to facilitate interaction between the multimedia component **708** and the processing component **702**.

[0171] The memory **704** is configured to store various types of data to support the operations of the apparatus **700**. Examples of such data include instructions for any application or method operated on the apparatus **700**, contact data, phonebook data, messages, pictures, videos, etc. The memory **704** may be implemented by any type of volatile or non-volatile storage device or a combination of them, such as a static random access memory (SRAM), an electrically erasable programmable read-only memory (EEPROM), an erasable programmable read-only memory (EPROM), a programmable read-only memory (PROM), a read-only memory (ROM), a magnetic memory, a flash memory, a magnetic disk, or an optical disk.

[0172] The power component **706** provides power to various components of the apparatus **700**. The power component **706** may include a power management system, one or more power sources, and other components associated with generating, managing, and distributing power for the apparatus **700**.

[0173] The multimedia component **708** includes a screen providing an output interface between the apparatus **700** and the user. In some embodiments, the screen may include a liquid crystal display (LCD) and a touch panel (TP). If the screen includes the touch panel, the screen may be implemented as a touch screen to receive input signals from the user. The touch panel includes one or more touch sensors to sense touching, sliding, and gestures on the touch panel. The touch sensor may not only sense a boundary of a touching or sliding action, but also detect a duration and pressure associated with the touching or sliding action. In some embodiments, the multimedia component **708** includes a front camera and/or a rear camera. The front camera and/or the rear camera may receive external multimedia data when the apparatus **700** is in an operation mode, such as a photographing mode or a video mode. Each of the front camera and the rear camera may be a fixed optical lens system or have a focal length and optical zoom capability.

[0174] The audio component **710** is configured to output and/or input audio signals. For example, the audio component **710** includes a microphone (MIC) configured to receive an external audio

signal when the apparatus **700** is in an operation mode, such as a call mode, a recording mode, and a voice recognition mode. The received audio signal may be further stored in the memory **704** or transmitted via the communication component **716**. In some embodiments, the audio component **710** further includes a speaker to output audio signals.

[0175] The I/O interface **712** provides an interface between the processing component **702** and a peripheral interface module, and the peripheral interface module may be a keyboard, a click wheel, a button, or the like. The button may include, but are not limited to, a home button, a volume button, a starting button, and a locking button.

[0176] The sensor component **714** includes one or more sensors to provide status assessments of various aspects of the apparatus **700**. For example, the sensor component **714** may detect the on/off state of the apparatus **700**, and the relative positioning of the components, such as the display and keypad of the apparatus **700**. The sensor component **714** may also detect the position change of the apparatus **700** or one component of the apparatus **700**, the presence or absence of contact by the user with the apparatus **700**, the orientation or acceleration/deceleration of the apparatus **700**, and the temperature change of the apparatus **700**. The sensor component **714** may include a proximity sensor configured to detect the presence of nearby objects without any physical contact. The sensor component **714** may also include an optical sensor, such as a CMOS or CCD image sensor, for use in imaging applications. In some embodiments, the sensor component **714** may further include an acceleration sensor, a gyroscope sensor, a magnetic sensor, a pressure sensor, or a temperature sensor.

[0177] The communication component **716** is configured to facilitate wired or wireless communication between the apparatus **700** and other devices. The apparatus **700** may access a wireless network based on a communication standard, such as WiFi, 4G or 5G, or a combination of them. In some embodiments, the communication component **716** receives a broadcast signal or broadcast associated information from an external broadcast management system via a broadcast channel. In some embodiments, the communication component **716** further includes a near field communication (NFC) module to facilitate short-range communications. For example, the NFC module may be implemented based on a radio frequency identification (RFID) technology, an infrared data association (IrDA) technology, an ultra-wideband (UWB) technology, a Bluetooth (BT) technology, and other technologies.

[0178] In some embodiments, the apparatus **700** may be implemented by one or more application specific integrated circuits (ASICs), digital signal processors (DSPs), digital signal processing devices (DSPDs), programmable logic devices (PLDs), field programmable gate arrays (FPGAs), controllers, microcontrollers, microprocessors, or other electronic components for performing the methods described above.

[0179] In some embodiments, there is further provided a non-transitory computer-readable storage medium including an instruction, for example, the memory **704** including an instruction. The instruction may be executed by the processor **720** of the apparatus **700** to perform and complete the foregoing method. For example, the non-transitory computer-readable storage medium may be a ROM, a random access memory (RAM), a CD-ROM, a magnetic tape, a floppy disk, an optical data storage device, or the like.

[0180] Based on the same concept as the foregoing method embodiments, according to some embodiments of the present disclosure, there is further provided a communication apparatus. The communication apparatus may have functions of the network device **101** in the foregoing method embodiments, and is configured to perform the steps performed by the network device **101** provided in the foregoing embodiments. The function may be implemented by hardware, or by software, or by hardware executing corresponding software. The hardware or the software includes one or more modules corresponding to the foregoing functions.

[0181] In some embodiments, the communication apparatus **800** shown in FIG. **8** may be used as the network device **101** in the foregoing method embodiments, and perform the steps performed by

the network device **101** in the foregoing method embodiments.
[0182] The communication apparatus **800** shown in FIG. **8** includes a transceiving module **801** and a processing module **802**.
[0183] The transceiving module **801** is configured to send a wake-up signal corresponding to a user equipment to the user equipment.
[0184] The processing module **802** is configured to determine a time domain position of a monitoring occasion for sending the paging DCI according to a time domain position for sending the wake-up signal.
[0185] The transceiving module **801** is configured to send the paging DCI corresponding to the user equipment at the time domain position of the monitoring occasion for sending the paging DCI.
[0186] In some embodiments, a monitoring occasion of a wake-up signal corresponding to the user equipment is periodically distributed in a time domain.
[0187] In some embodiments, the time domain position of the monitoring occasion for sending the paging DCI is after a first moment, and the first moment is a moment corresponding to a first time interval behind an end position of the time domain position for sending the wake- up signal.
[0188] In some embodiments, the time domain position of the monitoring occasion for sending the paging DCI is before a second moment, and the second moment is a moment corresponding to a second time interval behind an end position of the time domain position for sending the wake-up signal.
[0189] In some embodiments, a paging search space period for transmitting the paging DCI includes M * N monitoring occasions, where M is a quantity of SSBs actually sent by the network device, and N is an integer greater than zero.
[0190] In some embodiments, the monitoring occasion for sending the paging DCI at least includes M * H monitoring occasions after the first moment and closest to the first moment in a paging search space for transmitting the paging DCI, where H is an integer greater than zero.
[0191] In some embodiments, the monitoring occasion for sending the paging DCI at least includes M * H monitoring occasions in one or more paging search space periods after the first moment and closest to the first moment in a paging search space for transmitting the paging DCI, where a start time of the paging search space period is later than the first moment, M is a quantity of SSBs actually sent by the network device, H is an integer greater than zero, and the paging search space period is a period corresponding to the paging search space.
[0192] In some embodiments, in response to a paging search space period for transmitting the paging DCI includes M * N monitoring occasions, H is equal to N.
[0193] In some embodiments, the monitoring occasion for sending the paging DCI at least includes all paging occasions in a paging search space period after the first moment and closest to the first moment in a paging search space for transmitting the paging DCI, and a start time of the paging search space period is later than the first moment.
[0194] In some embodiments, the transceiving module **801** is further configured to send configuration information to the user equipment, where the configuration information indicates a paging search space for transmitting the paging DCI.
[0195] In some embodiments, at least M monitoring occasions for sending the paging DCI are provided between the first moment and the second moment, where M is a quantity of SSBs actually sent by the network device.
[0196] In some embodiments, an interval between the first moment and the second moment is greater than or equal to a duration of a paging search space period, where the paging search space period is a period corresponding to a paging search space for transmitting the paging DCI.
[0197] In some embodiments, the monitoring occasion for sending the paging DCI includes at least one monitoring occasion in S paging search space periods after the first moment, where S is an integer greater than or equal to 1, and the paging search space period is a period corresponding to a paging search space for transmitting the paging DCI.

[0198] In some embodiments, the monitoring occasion for sending the paging DCI includes at least one monitoring occasion in S paging search space periods before the second moment, where S is an integer greater than or equal to 1, and the paging search space period is a period corresponding to a paging search space for transmitting the paging DCI.
[0199] In some embodiments, the transceiving module **801** is further configured to receive capability information reported by the user equipment, where the capability information is used to indicate at least one of the first time interval or the second time interval.
[0200] When the communication apparatus is the network device **101**, the structure of the communication apparatus may also be as shown in FIG. **9**. As shown in FIG. **9**, the communication apparatus **900** includes a memory **901**, a processor **902**, a transceiving component **903**, and a power component **906**; where the memory **901** is coupled to the processor **902**, and may be configured to store a program and data necessary for implementing each function by the communication apparatus **900**. The processor **902** is configured to support the communication apparatus **900** in performing corresponding functions in the foregoing methods, and such functions may be implemented by invoking a program stored in the memory **901**. The transceiving component **903** may be a wireless transceiver, and may be configured to support the communication apparatus **900** in receiving signaling and/or data and sending signaling and/or data through a wireless air interface. The transceiving component **903** may also be referred to as a transceiving unit or a communication unit. The transceiving component **903** may include a radio frequency component **904** and one or more antennas **905**, where the radio frequency component **904** may be a remote radio unit (RRU), and may be specifically configured for transmission of radio frequency signals and conversion between a radio frequency signal and a baseband signal. The one or more antennas **905** may be specifically configured to radiate and receive radio frequency signals.
[0201] When the communication apparatus **900** needs to send data, the processor **902** may perform baseband processing on the data to be sent, and then output a baseband signal to the radio frequency unit. The radio frequency unit performs radio frequency processing on the baseband signal and then sends the radio frequency signal in the form of an electromagnetic wave through the antenna. When data is sent to the communication apparatus **900**, the radio frequency unit receives the radio frequency signal through the antenna, converts the radio frequency signal into a baseband signal, and outputs the baseband signal to the processor **902**. The processor **902** converts the baseband signal into data, and performs processing on the data.
[0202] Other embodiments of the embodiments of the present disclosure will be apparent to those skilled in the art from consideration of the specification and practice of the present disclosure. The present disclosure is intended to cover any variations, uses, or adaptations of the present disclosure following the general principles of the present disclosure and including common general knowledge and conventional technical means in the art not disclosed in the present disclosure. It is intended that the specification and embodiments are considered as examples only, with a true scope and spirit of the embodiments of the present disclosure being indicated by the following claims.
[0203] It should be understood that the embodiments of the present disclosure are not limited to the precise structures that have been described above and shown in the accompanying drawings, and various modifications and changes may be made without departing from the scope of the present disclosure. The scope of the embodiments of the present disclosure is limited only by the appended claims.

INDUSTRIAL APPLICABILITY

[0204] The user equipment determines the time domain position of the monitoring occasion for monitoring the paging DCI according to the time domain position for receiving the wake- up signal. In a case that the paging DCI is not periodically sent due to use of the wake-up signal, the user equipment may accurately determine the time domain position of the monitoring occasion for monitoring the paging DCI, and receive the paging DCI in time.

Claims

1. A method for monitoring paging downlink control information (DCI), performed by a user equipment, and comprising: receiving a wake-up signal corresponding to the user equipment; determining a time domain position of a monitoring occasion for monitoring paging DCI according to a time domain position for receiving the wake-up signal; and monitoring paging DCI corresponding to the user equipment at the time domain position of the monitoring occasion for monitoring the paging DCI.
2. The method according to claim 1, wherein, a monitoring occasion of the wake-up signal corresponding to the user equipment is periodically distributed in a time domain.
3. The method according to claim 1, wherein the time domain position of the monitoring occasion for monitoring the paging DCI is at least one of: after a first moment, wherein the first moment is a moment corresponding to a first time interval behind an end position of the time domain position for receiving the wake-up signal; or before a second moment, wherein the second moment is a moment corresponding to a second time interval behind an end position of the time domain position for receiving the wake-up signal.
4. (canceled)
5. The method according to claim 3, wherein, a paging search space period for transmitting the paging DCI comprises M * N monitoring occasions, wherein M is a quantity of synchronization signal blocks (SSBs) actually sent by a network device, and N is an integer greater than zero.
6. The method according to claim 3, wherein the monitoring occasion for monitoring the paging DCI comprises one of: M * H monitoring occasions after the first moment and closest to the first moment in a paging search space for transmitting the paging DCI, wherein M is a quantity of SSBs actually sent by a network device, and H is an integer greater than zero; M * H monitoring occasions in one or more paging search space periods after the first moment and closest to the first moment in a paging search space for transmitting the paging DCI, a start time of the paging search space period is later than the first moment, M is a quantity of SSBs actually sent by the network device, and H is an integer greater than zero; or all paging occasions in a paging search space period after the first moment and closest to the first moment in a paging search space for transmitting the paging DCI, and a start time of the paging search space period is later than the first moment.
7. (canceled)
8. The method according to claim 6, wherein, in response to a paging search space period comprising M * N monitoring occasions, H is equal to N.
9. (canceled)
10. The method according to claim 5, further comprising at least one of: receiving configuration information sent by the network device, wherein the configuration information indicates a paging search space for transmitting the paging DCI; or reporting capability information to the network device, wherein the capability information indicates at least one of the first time interval or the second time interval.
11. The method according to claim 3, wherein, at least M monitoring occasions for monitoring the paging DCI are provided between the first moment and the second moment, wherein M is a quantity of SSBs actually sent by a network device.
12. The method according to claim 3, wherein, an interval between the first moment and the second moment is greater than or equal to a duration of a paging search space period.
13. The method according to claim 3, wherein the monitoring occasion for monitoring the paging DCI comprises at least one of: at least one monitoring occasion in S paging search space periods after the first moment, wherein S is an integer greater than or equal to 1; or at least one monitoring occasion in S paging search space periods before the second moment, wherein S is an integer

greater than or equal to 1.

14. (canceled)

15. (canceled)

16. A method for sending paging downlink control information (DCI), performed by a network device, and comprising: sending a wake-up signal corresponding to a user equipment to the user equipment; determining a time domain position of a monitoring occasion for sending paging DCI according to a time domain position for sending the wake-up signal; and sending paging DCI corresponding to the user equipment at the time domain position of the monitoring occasion for monitoring sending the paging DCI.

17. (canceled)

18. The method according to claim 16, wherein the time domain position of the monitoring occasion for sending the paging DCI is at least one of: the time domain position of the monitoring occasion for monitoring the paging DCI after a first moment, wherein the first moment is a moment corresponding to a first time interval behind an end position of the time domain position for sending the wake-up signal; or before a second moment, wherein the second moment is a moment corresponding to a second time interval behind an end position of the time domain position for sending the wake-up signal.

19. (canceled)

20. (canceled)

21. The method according to claim 18, wherein the monitoring occasion for sending the paging DCI comprises one of: M * H monitoring occasions after the first moment and closest to the first moment in a paging search space for transmitting the paging DCI, wherein H is an integer greater than zero; M * H monitoring occasions in one or more paging search space periods after the first moment and closest to the first moment in a paging search space for transmitting the paging DCI, a start time of the paging search space period is later than the first moment, M is a quantity of SSBs actually sent by the network device, and H is an integer greater than zero; or all paging occasions in a paging search space period after the first moment and closest to the first moment in a paging search space for transmitting the paging DCI, and a start time of the paging search space period is later than the first moment.

22.-**24**. (Canceled)

25. The method according to claim 16, further comprising at least one of: sending configuration information to the user equipment, wherein the configuration information indicates a paging search space for transmitting the paging DCI; or receiving capability information reported by the user equipment, wherein the capability information indicates at least one of the first time interval and the second time interval.

26. The method according to claim **19**, wherein, at least M monitoring occasions for sending the paging DCI are provided between the first moment and the second moment, wherein M is a quantity of SSBs actually sent by the network device.

27. (canceled)

28. The method according to claim 18, wherein the monitoring occasion for sending the paging DCI comprises at least one of: at least one monitoring occasion in S paging search space periods after the first moment, wherein S is an integer greater than or equal to 1; or at least one monitoring occasion in S paging search space periods before the second moment, wherein S is an integer greater than or equal to 1.

29.-**32**. (canceled)

33. A communication apparatus, comprising: a processor; and a memory storing a computer program; wherein the processor is configured to: receive a wake-up signal corresponding to a user equipment; determine a time domain position of a monitoring occasion for monitoring paging downlink control information (DCI) according to a time domain position for receiving the wake-up signal; and monitor paging DCI corresponding to the user equipment at the time domain position of

the monitoring occasion for monitoring the paging DCI.

34. A communication apparatus, comprising: a processor; and a memory storing a computer program; wherein the processor is configured to perform the method according to any one of claims **16** to **30** claim 16.

35. A non-transitory computer-readable storage medium, storing an instruction that, when executed by a processor, causes the processor to perform the method according to claim 1.

36. A non-transitory computer-readable storage medium, storing an instruction that, when executed by a processor, causes the processor to perform the method according to claim 16.