(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 188 009 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
31.05.2023 Bulletin 2023/22

(21) Application number: **21845521.0**

(22) Date of filing: **23.07.2021**

(51) International Patent Classification (IPC):
H04W 72/04 *(2023.01)* ***H04W 72/12*** *(2023.01)*
H04W 52/00 *(2009.01)*

(52) Cooperative Patent Classification (CPC):
H04W 52/00; H04W 52/22; H04W 72/04; H04W 72/12

(86) International application number:
PCT/CN2021/108078

(87) International publication number:
WO 2022/017488 (27.01.2022 Gazette 2022/04)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **24.07.2020 CN 202010724914**

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(54) **POWER DISTRIBUTION AND ACQUISITION METHOD, APPARATUS, AND NODE DEVICE**

(57) The present invention relates to the technical field of communications. Disclosed are a power distribution and acquisition method, an apparatus, and a node device. A power acquisition method of the present invention comprises: acquiring transmit power information of a distribution unit (DU) and transmit power information of a mobile termination (MT), wherein the transmit power information of the DU comprises a transmit power or a maximum transmit power of the DU, and a transmit power of the MT comprises a transmit power of at least one cell group of the MT.

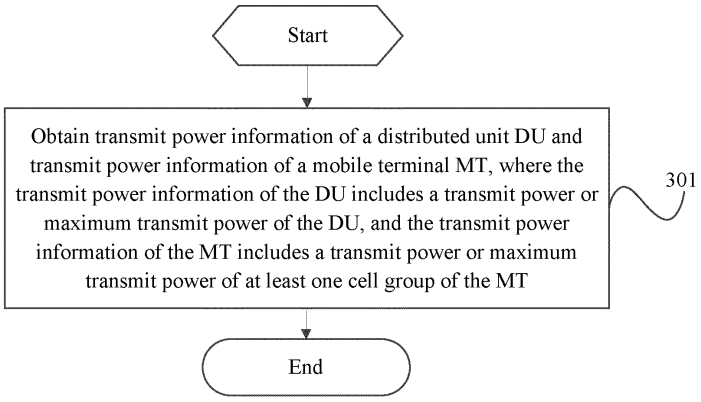

FIG. 3

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Chinese Patent Application No. 202010724914.8 filed in China on July 24, 2020, which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present invention relates to the field of communications technologies, and in particular, to a power allocation or obtaining method and apparatus, and a node device.

BACKGROUND

[0003] In the integrated access backhaul (Integrated Access Backhaul, IAB) technology, a distributed unit (Distributed Unit, DU) and a mobile Termination (Mobile Termination, MT) of an IAB node may perform transmission simultaneously. In addition, the IAB node may be connected to multiple parent IAB (parent IAB) nodes and transmit information to the multiple parent IAB nodes simultaneously (for example, dual connectivity for IAB MT). In consideration with hardware limitation on the IAB node, when the DU, an MT's master cell group (Master Cell Group, MCG), and an MT's secondary cell group (Secondary Cell Group, SCG) of the IAB node perform transmission simultaneously, a total transmit power needs to be shared among the DU, MT MCG, and MT SCG, but multi-connection in the MT is not considered in a power sharing solution in the related art. Therefore, there is no solution for power sharing among an MT MCG link, an MT SCG link, and the DU in the related art.

SUMMARY

[0004] Embodiments of this application are intended to provide a power allocation or obtaining method and apparatus, and a node device, which can resolve a problem that how power sharing is performed between a DU and at least one cell group of an MT.

[0005] To resolve the foregoing technical problem, this application is implemented as follows:

According to a first aspect, a power obtaining method is provided, applied to a first node device and including:

obtaining transmit power information of a distributed unit DU and transmit power information of a mobile Termination MT,

where the transmit power information of the DU includes a transmit power or maximum transmit power of the DU, and the transmit power information of the MT includes a transmit power or maximum transmit power of at least one cell group of the MT.

[0006] According to a second aspect, a power allocation method is provided, applied to a second node device and including:

configuring transmit power information of a distributed unit DU and transmit power information of an MT,

where the transmit power information of the DU includes a transmit power or maximum transmit power of the DU, and the transmit power information of the MT includes a transmit power or maximum transmit power of at least one cell group of the MT.

[0007] According to a third aspect, a power obtaining apparatus is provided, applied to a first node device and including:

a first obtaining module, configured to obtain transmit power information of a distributed unit DU and transmit power information of a mobile Termination MT,

where the transmit power information of the DU includes a transmit power or maximum transmit power of the DU, and the transmit power information of the MT includes a transmit power or maximum transmit power of at least one cell group of the MT.

[0008] According to a fourth aspect, a power allocation apparatus is provided, applied to a second node device and including:

a configuring module, configured to configure transmit power information of a distributed unit DU and transmit power information of an MT,

where the transmit power information of the DU includes a transmit power or maximum transmit power of the DU, and the transmit power information of the MT includes a transmit power or maximum transmit power of at least one cell group of the MT.

[0009] According to a fifth aspect, a node device is provided, where the terminal includes a processor, a memory, and a program or an instruction stored in the memory and capable of running on the processor, and when the program or the instruction is executed by the processor, the steps of the method described in the first aspect or the second aspect are implemented.

[0010] According to a sixth aspect, a readable storage medium is provided, where the readable storage medium stores a program or an instruction, and when the program or the instruction is executed by a processor, the steps of the method described in the first aspect or the steps of the method described in the second aspect are implemented.

[0011] According to a seventh aspect, a chip is provided, where the chip includes a processor and a communication interface, the communication interface is coupled to the processor, and the processor is configured to run a program or an instruction of a network side device,

to implement the method described in the first aspect or the method described in the second aspect.

[0012] In the embodiments of this application, by obtaining the transmit power information of the distributed unit DU and the transmit power information of the mobile Termination MT, where the transmit power information of the MT includes the transmit power of the at least one cell group of the MT, power sharing between the DU and the at least one cell group of the MT can be implemented, so that power efficiency for IAB transmission can be improved.

BRIEF DESCRIPTION OF DRAWINGS

[0013]

FIG. 1 is a schematic structural diagram of an IAB system;

FIG. 2 is a schematic structural diagram of a CU-DU of the IAB system;

FIG. 3 is a schematic flowchart of a power obtaining method according to an embodiment of this application;

FIG. 4 is a schematic flowchart of a power allocation method according to an embodiment of this application;

FIG. 5 is a schematic module diagram of a power obtaining apparatus according to an embodiment of this application;

FIG. 6 is a first structural block diagram of a node device according to an embodiment of this application;

FIG. 7 is a schematic block diagram of a power allocation apparatus according to an embodiment of this application; and

FIG. 8 is a second structural block diagram of a node device according to an embodiment of this application.

DESCRIPTION OF EMBODIMENTS

[0014] The following clearly and completely describes the technical solutions in the embodiments of this application with reference to the accompanying drawings in the embodiments of this application. Apparently, the described embodiments are some but not all of the embodiments of this application. All other embodiments obtained by a person of ordinary skill in the art based on the embodiments of this application without creative efforts shall fall within the protection scope of this application.

[0015] The terms "first", "second", and the like in the specification and claims of this application are used to distinguish between similar objects instead of describing a specific order or sequence. It should be understood that, data used in this way is interchangeable in proper circumstances, so that the embodiments of this application can be implemented in an order other than the order illustrated or described herein. Objects classified by "first" and "second" are usually of a same type, and the number of objects is not limited. For example, there may be one or more first objects. In addition, in the specification and the claims, "and/or" represents at least one of connected objects, and a character "/" generally represents an "or" relationship between associated objects.

[0016] It should be noted that the technology described in this application is not limited to a Long Term Evolution (Long Time Evolution, LTE)/LTE-advanced (LTE-Advanced, LTE-A) system, and may also be used in other wireless communication systems, for example, Code Division Multiple Access (Code Division Multiple Access, CDMA), Time Division Multiple Access (Time Division Multiple Access, TDMA), Frequency Division Multiple Access (Frequency Division Multiple Access, FDMA), Orthogonal Frequency Division Multiple Access (Orthogonal Frequency Division Multiple Access, OFDMA), and Single-carrier Frequency-Division Multiple Access (Single-carrier Frequency-Division Multiple Access, SC-FDMA). The terms "system" and "network" in the embodiments of this application may be used interchangeably. The described technologies can be applied to both the systems and the radio technologies mentioned above as well as to other systems and radio technologies. However, a new radio (New Radio, NR) system is described below as an example, and the term NR is used in most of the descriptions, although these technologies can also be used in an application other than an application of the NR system, for example, a sixth (6^{th} Generation, 6G) communications system.

[0017] To enable those skilled in the art to better understand the present invention, an IAB system will be described below.

[0018] The integrated access backhaul (Integrated access backhaul, IAB) system is a technology for developing the NR Rel-16 standard. FIG. 1 is a schematic diagram of an IAB system. One IAB node includes a distributed unit (Distributed Unit, DU) functional part and a mobile Termination (Mobile Termination, MT) functional part. Based on the MT, an access point (namely, an IAB node) 11 may find an upstream access point (parent IAB node, parent node) 12 and establish a wireless connection with a DU of the upstream access point, and the wireless connection is called a backhaul link (backhaul link). After an IAB node establishes a complete backhaul link, the IAB node enables a DU function of the backhaul link, and the DU may provide a cell service, that is, the DU may provide an access service for a UE. One IAB loop includes a donor (donor) IAB node 13, and the donor IAB node has a directly connected wired transmission network.

[0019] FIG. 2 is a structural diagram of a centralized unit-distributed unit (Centralized Unit-Distributed Unit, CU-DU) of the IAB system. ACU may also be called a control unit. In one IAB loop, all DUs of an IAB node are connected to one CU node, and this CU node configures the DUs through an F1-AP protocol. MTs are configured

by the CU through an RRC protocol. The donor IAB node is not provided with an MT functional part.

[0020] The IAB system is introduced to resolve a problem that a wired transmission network is not deployed in place when access points are densely deployed. That is, when there is no wired transmission network, the access points may rely on wireless backhaul.

[0021] With reference to the accompanying drawings, the following describes the power obtaining method provided in the embodiments of this application in detail based on specific embodiments and application scenarios thereof.

[0022] As shown in FIG. 3, an embodiment of this application provides a power obtaining method, applied to a first node device, where the first node device is specifically an IAB node. The method includes:

[0023] Step 301: Obtain transmit power information of a distributed unit DU and transmit power information of a mobile Termination MT,
where the transmit power information of the DU includes a transmit power or maximum transmit power of the DU, and the transmit power information of the MT includes a transmit power or maximum transmit power of at least one cell group of the MT.

[0024] Obtaining the transmit power of the at least one cell group of the MT may be obtaining a transmit power of an MT's master cell group and a transmit power of an MT's secondary cell group, or obtaining a transmit power of n cell groups of the MT, where n is less than or equal to N, and N is the number of cell groups of the MT.

[0025] Optionally, the transmit power information of the MT further includes a transmit power of the MT.

[0026] At least one of the transmit power information of the DU and the transmit power information of the MT is obtained in at least one of the following manners:

a specification in a protocol;
configuration or indication by a centralized unit CU; or
configuration or indication by a parent node.

[0027] The parent node is a parent node of the IAB node.

[0028] Optionally, the transmit power of the DU is static or semi-static, and the transmit power of the at least one cell of the MT is determined in a static, semi-static, or dynamic manner.

[0029] In the power obtaining method in this embodiment of this application, the transmit power information of the distributed unit DU and the transmit power information of the mobile Termination MT are obtained, where the transmit power information of the DU includes a transmit power or maximum transmit power of the DU, and the transmit power information of the MT includes the transmit power or maximum transmit power of the at least one cell group of the MT. Therefore, power sharing between the DU and the at least one cell group of the MT can be implemented, and power efficiency for IAB transmission can be improved.

[0030] Optionally, the transmit power information of the DU and the transmit power information of the MT are valid at a first moment, and a maximum transmit power information of the DU at another moment is not limited thereto. For example, at another moment, a power of the DU may be P_{total} or a preset value P_x ($P_x \leq P_{total}$), where P_{total} is a supported total transmit power of the DU and MT.

[0031] The first moment is a moment when the DU and the at least one cell group of the MT transmit information simultaneously.

[0032] Further, optionally, the first moment is a moment when the DU and the at least one cell group of the MT actually transmit information simultaneously,
or the first moment is a moment when the DU and the at least one cell group of the MT are configured to transmit information simultaneously.

[0033] Further, optionally, the first moment is determined based on at least one of the following:

configuration of time division duplex TDD for the DU and MT; and
configuration of a resource type of the DU.

[0034] For example, for a same time-frequency resource block, if the DU is configured with a DL-hard type or DL-soft type, while the MT is configured (or scheduled) with an uplink UL type, it is determined that the DU and MT are configured to transmit information simultaneously.

[0035] The foregoing DL-hard and DL-soft are resource types of the DU. To support time division multiplexing TDM between an access link (access link) and a backhaul link (backhaul link), Rel-16 defines three resource types of IAB DU, namely, hard, soft, and not available (NA).

[0036] Hard type: a corresponding time domain resource is always available for the access link of the IAB DU.

[0037] Soft type: whether the corresponding time domain resource is available or not is controlled by the parent node for the access link of the IAB DU.

[0038] NA type: the corresponding time domain resource is always unavailable for the access link of the IAB DU.

[0039] Optionally, the obtaining transmit power information of a distributed unit DU and transmit power information of a mobile Termination MT includes:

respectively obtaining at least one of the transmit power information of the DU and the transmit power information of the MT at different first moments,
where the first moments include at least one of the following:

a moment when the DU and n cell groups of the MT perform transmission simultaneously;

a moment when the DU and an MT's master cell group perform transmission simultaneously;
a moment when the DU and an MT's secondary cell group perform transmission simultaneously; or
a moment when n cell groups of the MT perform transmission simultaneously,
where $0 \le n \le N$, n is an integer, and N is the number of MT's cell groups.

[0040] It should be noted that in a case that the DU and the n cell groups of the MT perform transmission simultaneously, different values of n correspond to different first moments. For example, when n is 2, it corresponds to one first moment, and when n is 3, it corresponds to another first moment. Similarly, in a case that the n cell groups of the MT perform transmission simultaneously, different values of n correspond to different first moments. In particular, in a case that the DU, the MT, or a cell group of the MT does not perform transmission, a transmit power of the DU, MT, or a cell group of the MT that does not perform transmission is 0. Optionally, obtaining the transmit power information of the MT includes:

respectively obtaining a transmit power of a physical random access channel PRACH and a transmit power of another uplink physical channel,
where the another uplink physical channel includes at least one of the following:

a transmit power of a physical uplink control channel;
a transmit power of a physical uplink shared channel; or
a transmit power of a sounding reference signal.

[0041] That is, in this embodiment of this application, obtaining of the transmit power of the PRACH is independent of obtaining of the transmit power of the another uplink physical channel, that is, the transmit power of the PRACH and the transmit power of the another uplink physical channel are respectively obtained through different signalings or manners.

[0042] In addition, different transmit power values may be defined on an MT-specific RACH occasion (MT-specific RACH occasion) and a common RACH occasion (common RACH occasion).

[0043] Optionally, after obtaining the transmit power information of the distributed unit DU and the transmit power information of the MT, the method further includes:

notifying at least one of a sum of the transmit power of the DU and a transmit power of the MT, the transmit power information of the DU, or the transmit power information of the MT to a target node,
where the target node is a parent node of an integrated access backhaul IAB node, a child node of the IAB node, or a centralized unit CU connected to the DU, and the IAB node is an IAB node to which the DU and the MT belong.

[0044] Specifically, a capability of the IAB MT or IAB may be reported, to notify at least one of the sum of the transmit power of the DU and the transmit power of the MT, the transmit power of the DU, or the transmit power of the MT to the target node.

[0045] Optionally, the maximum transmit power of the at least one cell group of the MT includes a maximum transmit power Q_{MCG} of the MT's master cell group and a maximum transmit power Q_{SCG} of the MT's secondary cell group; and
after obtaining the transmit power information of the distributed unit DU and the transmit power information of the MT, the method further includes:
obtaining an actually maximum transmit power of the MT's master cell group and an actually maximum transmit power of the MT's secondary cell group based on Q_{MCG} and Q_{SCG} and according to a preset power sharing rule.

[0046] The preset power sharing rule includes a first power sharing rule or a second power sharing rule,

where the first power sharing rule means that dynamic power sharing is implemented when a sum of Q_{MCG} and Q_{SCG} is greater than a first power; and
the second power sharing rule means that semi-static power sharing is implemented when the sum of Q_{MCG} and Q_{SCG} is less than or equal to the first power,
where the first power is the maximum transmit power of the MT or a preset fixed power value.

[0047] The following describes power sharing between the MCG and SCG under dual connectivity (Dual Connectivity, DC).

[0048] If a UE is in a dual connectivity state, a transmit power of the UE may be shared between an MCG link and an SCG link. Power sharing between the MCG link and the SCG link may be classified into semi-static power sharing and dynamic power sharing.

[0049] For the semi-static power sharing, a sum of a maximum uplink transmit power configured for the MCG link and a maximum uplink transmit power configured for the SCG link is less than or equal to a total transmit power of the UE, and power control for the MCG and SCG is respectively limited by the maximum transmit power respectively configured for the MCG and SCG. For NR-NR dual connectivity, the maximum transmit power configured for the MCG link and the maximum transmit power configured for the SCG link only applies to a moment when simultaneous transmission exists in the MCG link and SCG link.

[0050] For dynamic power sharing, a principle of a minimum guaranteed power is used for LTE DC, the MCG link and SCG link are separately configured with a min-

imum guaranteed transmit power, and a sum of the minimum guaranteed transmit power is less than or equal to a maximum transmit power of the UE, while the MCG link and SCG link may share a remaining power (that is, a remaining power obtained by subtracting the sum of the minimum guaranteed transmit power for the MCG link and SCG link from the total power). A principle of a maximum power is used for NR-NR DC, and the MCG link and SCG link are separately configured with a maximum transmit power, and a sum of the maximum transmit power may be greater than the maximum transmit power of the UE. When the sum of the power required for the MCG link and SCG link for simultaneous transmission is greater than the maximum transmit power of the UE, the UE needs to preferentially allocate a transmit power to the MCG link, to ensure transmission over the MCG link. However, the transmit power for the MCG link is still limited by the configured maximum transmit power, and the transmit power for the SCG link is limited by a smaller one of the configured maximum transmit power and the remaining transmit power (that is, a remaining transmit power obtained by subtracting the transmit power for the MCG link from the total power).

[0051] Optionally, before obtaining an actually maximum transmit power of the MT's master cell group and an actually maximum transmit power of the MT's secondary cell group, the method further includes:

adjusting at least one of Q_{MCG} and Q_{SCG} according to a difference between the preset fixed power value and the maximum transmit power of the MT in a case that the preset fixed power value is different from the maximum transmit power of the MT.

[0052] In this embodiment of this application, total transmit power $Q_{MCG}+Q_{SCG}$ among the MT's cell groups is limited by the maximum transmit power (P_{cmax} or Q_{MT}) of the MT or the preset fixed power value P_{fixed} ($P_{fixed}=P_{cmax}$ or P_{total}) that is agreed in a protocol or configured. P_{cmax} is the maximum transmit power of the MT agreed in a protocol, and P_{total} is the configured maximum transmit power of the MT.

[0053] In a case that the preset fixed power value is different from the maximum transmit power of the MT, as an alternative implementation manner, Q_{MCG} or Q_{SCG} is adjusted. For example, if a difference between the preset fixed power value and the maximum transmit power of the MT is 10 watts, that is, if the preset fixed power value is 10 watts greater than the maximum transmit power of the MT, Q_{MCG} will be reduced by 10 watts, or Q_{SCG} will be reduced by 10 watts. For another example, the difference between the preset fixed power value and the maximum transmit power of the MT is -10 watts, that is, if the preset fixed power value is 10 watts less than the maximum transmit power value of the MT, the Q_{MCG} will be increased by 10 watts, or the Q_{SCG} will be increased by 10 watts, that is, an adjusted value of Q_{MCG} or Q_{SCG} is the same as the foregoing difference.

[0054] In a case that the preset fixed power value is different from the maximum transmit power of the MT, as another alternative implementation manner, both Q_{MCG} and Q_{SCG} are adjusted. Specifically, according to the difference between the preset fixed power value and the maximum transmit power of the MT, Q_{MCG} is adjusted according to a first adjustment ratio, and Q_{SCG} is adjusted according to a second adjustment ratio. The first adjustment ratio and the second adjustment ratio may be the same or different. Optionally, a sum of the first adjustment ratio and the second adjustment ratio is 1. For example, the two adjustment ratios are 0.5 respectively, that is, Q_{MCG} and Q_{SCG} divide the difference equally. Optionally, the first adjustment ratio and the second adjustment ratio are determined according to the difference. For example, if the preset fixed power value is increased by 10% relative to the maximum transmit power of the MT, it is determined that the foregoing first adjustment ratio and second adjustment ratio are respectively 10%, that is, Q_{MCG} and Q_{SCG} are respectively increased by 10%.

[0055] In addition, in a case that the MCG and SCG do not perform transmission simultaneously, a maximum power of the MCG and a maximum power of the SCG are limited by the maximum transmit power of the MT.

[0056] Optionally, the power obtaining method in this embodiment of this application further includes:

reporting at least one power headroom report PHR, where an upper power limit calculated through the PHR is assumed as at least one of the following:

a power in the transmit power information; and
an actually maximum transmit power.

[0057] It is assumed that the maximum transmit power of the MT MCG/MT SCG is a theoretically achievable maximum transmit power (such as P_{total}, P_{cmax}, Q_{MT}, Q_{MCG}, Q_{SCG}, a value adjusted from Q_{MCG}, a value adjusted from Q_{SCG}, $Q_{1,}$ or Q_2), and/or the actually maximum transmit power (such as a power obtained by dividing a transmit power occupied by a highly preferentially cell group from the maximum transmit power of the MT). Q_1 is a maximum transmit power configured for the master cell group, and Q_2 is a maximum transmit power configured for the secondary cell group.

[0058] In this embodiment of this application, multiple PHRs may be reported simultaneously, or different PHRs may be reported according to different transmission conditions.

[0059] In the power obtaining method in this embodiment of this application, the transmit power information of the distributed unit DU and the transmit power information of the mobile Termination MT are obtained, where the transmit power information of the DU includes a transmit power or maximum transmit power of the DU, and the transmit power information of the MT includes the transmit power or maximum transmit power of the at least one cell group of the MT. Therefore, power sharing be-

tween the DU and the at least one cell group of the MT can be implemented, and power efficiency for IAB transmission can be improved.

[0060] As shown in FIG. 4, an embodiment of this application also provides a power allocation method, applied to a second node device, where the second node device is a CU or a parent node of the IAB node, and the method includes:

Step 401: Configure transmit power information of a distributed unit DU and transmit power information of an MT, where the transmit power information of the DU includes a transmit power or maximum transmit power of the DU, and the transmit power information of the MT includes a transmit power or maximum transmit power of at least one cell group of the MT.

[0061] Optionally, the transmit power of the DU is static or semi-static, and the transmit power of the at least one cell of the MT is allocated in a static, semi-static, or dynamic manner.

[0062] Optionally, the transmit power information of the MT further includes a transmit power of the MT.

[0063] Configuring the transmit power or maximum transmit power of the at least one cell group of the MT may be configuring a transmit power or maximum transmit power of an MT's master cell group and configuring a transmit power or maximum transmit power of an MT's secondary cell group, or may be configuring a transmit power or maximum transmit power of n cell groups of the MT, where n is less than or equal to N, and N is the number of cell groups of the MT.

[0064] In the power allocation method in this embodiment of this application, the transmit power information of the distributed unit DU and the transmit power information of the MT are configured, where the transmit power information of the DU includes a transmit power or maximum transmit power of the DU, and the transmit power information of the MT includes the transmit power or maximum transmit power of the at least one cell group of the MT. Therefore, power sharing between the DU and the at least one cell group of the MT can be implemented, and power efficiency for IAB transmission can be improved.

[0065] In this embodiment of this application, the transmit power of the DU and the transmit power of the MT may be configured first, and then the transmit power of the at least one cell group of the MT may be configured; or the transmit power of the DU and the transmit power of the at least one cell group of the MT may be allocated directly and separately. For example, the transmit power of the DU, the transmit power of the MT's master cell group, and the transmit power of the MT's secondary cell group are allocated separately.

[0066] Optionally, allocating the transmit power of the distributed unit DU and the transmit power of the MT includes:

respectively configuring at least one of the transmit power information of the DU and the transmit power information of the MT at different first moments,

where the first moments include at least one of the following:

a moment when the DU and n cell groups of the MT perform transmission simultaneously;

a moment when the DU and an MT's master cell group perform transmission simultaneously;

a moment when the DU and an MT's secondary cell group perform transmission simultaneously; or

a moment when n cell groups of the MT perform transmission simultaneously,

where $0 \le n \le N$, n is an integer, and N is the number of MT's cell groups.

[0067] It should be noted that in a case that the DU and the n cell groups of the MT perform transmission simultaneously, different values of n correspond to different first moments. For example, when n is 2, it corresponds to one first moment, and when n is 3, it corresponds to another first moment, similarly, in a case that the n cell groups of the MT perform transmission simultaneously, different values of n correspond to different first moments. In particular, in a case that the DU, the MT, or a cell group of the MT does not perform transmission, a transmit power of the DU, MT, or a cell group of the MT that does not perform transmission is 0. Optionally, configuring the transmit power information of the MT includes:

respectively configuring a transmit power of a physical random access channel and a transmit power of another uplink physical channel,

where the another uplink physical channel includes at least one of the following:

a transmit power of a physical uplink control channel;

a transmit power of a physical uplink shared channel; or

a transmit power of a sounding reference signal.

[0068] That is, in this embodiment of this application, obtaining of the transmit power of the PRACH is independent of obtaining of the transmit power of the another uplink physical channel, that is, the transmit power of the PRACH and the transmit power of the another uplink physical channel are respectively obtained through different signalings or manners.

[0069] In addition, different transmit power values may be defined on an MT-specific RACH occasion (MT-specific RACH occasion) and a common RACH occasion (common RACH occasion).

[0070] The power allocation method in this embodiment of this application will be described below with reference to specific allocation manners.

[0071] Allocation manner 1: first, a power between the

DU and MT is allocated, second a power among multiple cell groups of the MT is allocated.

[0072] First, a static power is allocated between the DU and MT, or a semi-static power is allocated between the DU and MT; second, a transmit power is allocated for at least one cell group of the MT.

[0073] The static power allocated between the DU and MT may be a transmit power P_0/P_{total} of the DU and a transmit power P_{cmax} of the MT that are allocated as agreed in an agreement. The semi-static power configured between the DU and MT may be a maximum transmit power Q_{DU} of the DU and a maximum transmit power Q_{MT} of the MT that are configured through signaling, and different Q_{DU} and Q_{MT} may be configured according to the foregoing different transmission situations. Allocating the transmit power of at least one cell group of the MT may include allocating a maximum transmit power Q_{MCG} of the MT's master cell group and a maximum transmit power Q_{SCG} of the MT's secondary cell group.

[0074] Allocation manner 2: a power between the DU and at least one cell group of the MT is allocated separately.

[0075] The semi-static power is configured between the DU and multiple cell groups of the MT. For example, the maximum transmit power Q_{DU} of the DU, a maximum transmit power Q_1 of the MT's master cell group, and a maximum transmit power Q_2 of the MT's secondary cell group are configured, $Q_{DU} + Q_1 + Q_2 \leq P_{total}$, where P_{total} is a supported total transmit power of the DU and MT.

[0076] Optionally, in a case that the DU and the multiple cell groups of the MT do not actually perform transmission simultaneously or are not configured to perform transmission simultaneously at a moment, the maximum transmit power of the DU is P_{total} or P_0, and a maximum transmit power of each cell group of the MT is P_{total} or P_{cmax}.

[0077] In addition, for configuration of the semi-static power between the DU and multiple cell groups of the MT, if $Q_1 + Q_2 > P_{cmax}$, traditional dynamic power sharing is used among cell groups of the MT. Alternatively, limitation $Q_1 + Q_2 \leq P_{cmax}$ may be stipulated.

[0078] In the power allocation method according to this embodiment of this application, by allocation of the transmit power of the distributed unit DU and the transmit power of the at least one cell group of the MT, power sharing between the DU and the at least one cell group of the MT can be implemented, so that power efficiency for IAB transmission can be improved, and a manner for determining a transmit power of the IAB can be simplified.

[0079] It should be noted that the power obtaining method provided in this of this application may be performed by a power obtaining apparatus, or a control module that is in the power obtaining apparatus and that is configured to perform the power obtaining method. In an embodiment of this application, that the power obtaining apparatus performs the power obtaining method is used as an example to describe the power obtaining apparatus provided in this embodiment of this application.

[0080] As shown in FIG. 5, this embodiment of this application provides a power obtaining apparatus 500, applied to a first node device and including:

a first obtaining module 501, configured to obtain transmit power information of a distributed unit DU and transmit power information of a mobile Termination MT,

where the transmit power information of the DU includes a transmit power or maximum transmit power of the DU, and the transmit power information of the MT includes a transmit power or maximum transmit power of at least one cell group of the MT.

[0081] For the power obtaining apparatus in this embodiment of this application, by obtaining the transmit power of the distributed unit DU and the transmit power of the at least one cell group of the MT, power sharing between the DU and the at least one cell group of the MT can be implemented, so that power efficiency for IAB transmission can be improved.

[0082] For the power obtaining apparatus in this embodiment of this application, the transmit power information of the MT further includes a transmit power of the MT. For the power obtaining apparatus in this embodiment of this application, the transmit power information of the DU and the transmit power information of the MT are valid at a first moment.

[0083] The first moment is a moment when the DU and the at least one cell group of the MT transmit information simultaneously.

[0084] For the power obtaining apparatus in this embodiment of this application, the first moment is a moment when the DU and the at least one cell group of the MT actually transmit information simultaneously,

or the first moment is a moment when the DU and the at least one cell group of the MT are configured to transmit information simultaneously.

[0085] For the power obtaining apparatus in this embodiment of this application, the first moment is determined based on at least one of the following:

configuration of time division duplex TDD for the DU and MT; and

configuration of a resource type of the DU.

[0086] For the power obtaining apparatus in this embodiment of this application, the first obtaining module obtains at least one of the transmit power of the DU and the transmit power of the MT in at least one of the following manners:

a specification in a protocol;

configuration or indication by a centralized unit CU; or

configuration or indication by a parent node.

[0087] For the power obtaining apparatus in this em-

bodiment of this application, the first obtaining module is configured to respectively obtain at least one of the transmit power information of the DU and the transmit power information of the MT at different first moments,
where the first moments include at least one of the following:

a moment when the DU and n cell groups of the MT perform transmission simultaneously;
a moment when the DU and an MT's master cell group perform transmission simultaneously;
a moment when the DU and an MT's secondary cell group perform transmission simultaneously; or
a moment when n cell groups of the MT perform transmission simultaneously,
where $0 \leq n \leq N$, n is an integer, and N is the number of MT's cell groups.

[0088] For the power obtaining apparatus in this embodiment of this application, the first obtaining module is configured to respectively obtain a transmit power of a physical random access channel and a transmit power of another uplink physical channel,
where a transmit power of the another uplink physical channel includes at least one of the following:

a transmit power of a physical uplink control channel;
a transmit power of a physical uplink shared channel; or
a transmit power of a sounding reference signal.

[0089] The power obtaining apparatus in this embodiment of this application further includes:

a notifying module, configured to notify, after the first obtaining module obtains the transmit power information of the distributed unit DU and the transmit power information of the MT, at least one of a sum of the transmit power of the DU and the transmit power of the MT, the transmit power information of the DU, or the transmit power information of the MT to a target node,
where the target node is a parent node of an integrated access backhaul IAB node, a child node of the IAB node, or a centralized unit CU connected to the DU, and the IAB node is an IAB node to which the DU and the MT belong.

[0090] For the power obtaining apparatus in this embodiment of this application, the maximum transmit power of the at least one cell group of the MT includes a maximum transmit power Q_{MCG} of the MT's master cell group and a maximum transmit power Q_{SCG} of the MT's secondary cell group.

[0091] The power obtaining apparatus further includes:
a second obtaining module, configured to obtain, after the first obtaining module obtains the transmit power information of the distributed unit DU and the transmit power information of the MT, an actually maximum transmit power of the MT's master cell group and an actually maximum transmit power of the MT's secondary cell group based on QMCG and QSCG and according to a preset power sharing rule.

[0092] The preset power sharing rule includes a first power sharing rule or a second power sharing rule,

where the first power sharing rule means that dynamic power sharing is implemented when a sum of Q_{MCG} and Q_{SCG} is greater than a first power; and
the second power sharing rule means that semi-static power sharing is implemented when the sum of Q_{MCG} and Q_{SCG} is less than or equal to the first power,
where the first power is the maximum transmit power of the MT or a preset fixed power value.

[0093] The power obtaining apparatus in this embodiment of this application further includes:
an adjusting module, configured to adjust, before the second obtaining module obtains the actually maximum transmit power of the MT's master cell group and the actually maximum transmit power of the MT's secondary cell group and in a case that the preset fixed power value is different from the maximum transmit power of the MT, at least one of Q_{MCG} and Q_{SCG} according to a difference between the preset fixed power value and the maximum transmit power of the MT.

[0094] The power obtaining apparatus in this embodiment of this application further includes:

a reporting module, configured to report at least one power headroom report PHR,
where an upper power limit calculated through the PHR is assumed as at least one of the following:

a power in the transmit power information; and
an actually maximum transmit power.

[0095] For the power obtaining apparatus in this embodiment of this application, by obtaining the transmit power of the distributed unit DU and the transmit power of the at least one cell group of the MT, power sharing between the DU and the at least one cell group of the MT can be implemented, so that power efficiency for IAB transmission can be improved.

[0096] The power obtaining apparatus in this embodiment of this application may be an apparatus, or may be a component, an integrated circuit, or a chip in a first node device.

[0097] The power obtaining apparatus provided in this embodiment of this application can implement the processes implemented in the method embodiments in FIG. 1 to FIG. 3, and a same technical effect can be achieved. To avoid repetition, details are not described herein again.

[0098] Optionally, as shown in FIG. 6, an embodiment of this application also provides a node device 600, where the node device is specifically a first node device or a second node device, and the node device includes a processor 601, a memory 602, and a program or an instruction stored in the memory 602 and capable of running on the processor 601. For example, in a case that the node device 600 is the first node device, the program or instruction, when executed by the processor 601, implements the processes of the embodiments of the foregoing power obtaining method, and a same technical effect can be achieved. In a case that the node device 600 is the second node device, when the program or the instruction is executed by the processor 601, the processes of the embodiments of the foregoing power allocation method are implemented, and a same technical effect can be achieved. To avoid repetition, details are not described herein again.

[0099] It should be noted that the power allocation method provided in this of this application may be performed by a power allocation apparatus, or a control module that is in the power allocation apparatus and that is configured to perform the power allocation method. In an embodiment of this application, that the power allocation apparatus performs the power allocation method is used as an example to describe the power allocation apparatus provided in this embodiment of this application.

[0100] As shown in FIG. 7, an embodiment of this application also provides a power allocation apparatus 700, applied to a second node device and including:

a configuring module 701, configured to configure transmit power information of a distributed unit DU and transmit power information of an MT,
where the transmit power information of the DU includes a transmit power or maximum transmit power of the DU, and the transmit power information of the MT includes a transmit power or maximum transmit power of at least one cell group of the MT.

[0101] For the power allocation apparatus in this embodiment of this application, by configuration of the transmit power of the distributed unit DU and the transmit power of the at least one cell group of the MT, power sharing between the DU and the at least one cell group of the MT can be implemented, so that power efficiency for IAB transmission can be improved, and a manner for determining a transmit power of IAB can be simplified.

[0102] For the power allocation apparatus in this embodiment of this application, the transmit power information of the MT further includes a transmit power of the MT.

[0103] For the power allocation apparatus in this embodiment of this application, the configuring module is configured to respectively configure at least one of the transmit power information of the DU and the transmit power information of the MT at different first moments,
where the first moments include at least one of the following:

a moment when the DU and n cell groups of the MT perform transmission simultaneously;
a moment when the DU and an MT's master cell group perform transmission simultaneously;
a moment when the DU and an MT's secondary cell group perform transmission simultaneously; or
a moment when n cell groups of the MT perform transmission simultaneously,
where $0 \leq n \leq N$, n is an integer, and N is the number of MT's cell groups.

[0104] For the power allocation apparatus in this embodiment of this application, the allocation module is configured to respectively configure a transmit power of a physical random access channel and a transmit power of another uplink physical channel,
where the another uplink physical channel includes at least one of the following:

a transmit power of a physical uplink control channel;
a transmit power of a physical uplink shared channel; or
a transmit power of a sounding reference signal.

[0105] For the power allocation apparatus in this embodiment of this application, by configuration of the transmit power of the distributed unit DU and the transmit power of the at least one cell group of the MT, power sharing between the DU and the at least one cell group of the MT can be implemented, so that power efficiency for IAB transmission can be improved, and a manner for determining a transmit power of IAB can be simplified.

[0106] As shown in FIG. 8, an embodiment of this application also provides a node device, where the node device is the foregoing first node device or second node device, and the node device 800 includes an antenna 801, a radio frequency apparatus 802, and a baseband apparatus 803. The antenna 801 is connected to the radio frequency apparatus 802. In an uplink direction, the radio frequency apparatus 802 receives information by using the antenna 801, and transmits the received information to the baseband apparatus 803 for processing. In a downlink direction, the baseband apparatus 803 processes to-be-transmitted information, and transmits the to-be-transmitted information to the radio frequency apparatus 802. After processing the received information, the radio frequency apparatus 802 transmits the information by using the antenna 801.

[0107] A frequency band processing apparatus may be located in the baseband apparatus 803. The method performed by the first node device or second node device in the foregoing embodiment may be implemented in the baseband apparatus 803. The baseband apparatus 803 includes a processor 804 and a memory 805.

[0108] The baseband apparatus 803 may include, for example, at least one baseband board, where multiple chips are disposed on the baseband board. As shown in FIG. 8, one chip is, for example, the processor 804, which

is connected to the memory 805, so as to invoke a program in the memory 805 to perform operations shown in the foregoing method embodiment.

[0109] The baseband apparatus 803 may further include a network interface 806, configured to exchange information with the radio frequency apparatus 802. For example, the interface is a common public radio interface (common public radio interface, CPRI).

[0110] Specifically, the node device in this embodiment of the present invention further includes an instruction or a program stored in the memory 805 and capable of running on the processor 804. The processor 804 invokes the instruction or the program in the memory 805 to perform the method performed by the modules shown in FIG. 6 or FIG. 7, and a same technical effect is achieved. To avoid repetition, details are not described herein again.

[0111] An embodiment of this application further provides a readable storage medium, where the readable storage medium stores a program or an instruction, and when the program or the instruction is executed by a processor, the processes of the foregoing embodiments of the power obtaining method or the foregoing embodiments of the power allocation method are implemented, and a same technical effect can be achieved. To avoid repetition, details are not described herein again.

[0112] The processor is a processor in the node device in the foregoing embodiment. The readable storage medium includes a computer-readable storage medium such as a read-only memory (Read-Only Memory, ROM), a random access memory (Random Access Memory, RAM), a magnetic disk, an optical disc, or the like.

[0113] An embodiment of this application also provides a chip, where the chip includes a processor and a communication interface, the communication interface is coupled to the processor, and the processor is configured to run the program or instruction of the node device, so that the processes of the foregoing embodiments of the power obtaining method or the foregoing embodiments of the power allocation method can be implemented, and a same technical effect can be achieved. To avoid repetition, details are not repeated herein again.

[0114] It should be understood that the chip mentioned in this embodiment of this application may also be referred to as a system-level chip, a system chip, a chip system, or an on-chip system chip.

[0115] It should be noted that, in this specification, the terms "include", "comprise", or their any other variant is intended to cover a non-exclusive inclusion, so that a process, a method, an article, or an apparatus that includes a list of elements not only includes those elements, but also includes other elements which are not expressly listed, or further includes elements inherent to such process, method, article, or apparatus. An element limited by "includes a ..." does not, without more constraints, preclude the presence of additional identical elements in the process, method, article, or apparatus that includes the element. In addition, it should be noted that the scope of the method and the apparatus in the embodiments of this application is not limited to performing functions in an illustrated or discussed sequence, and may further include performing functions in a basically simultaneous manner or in a reverse sequence according to the functions concerned. For example, the described method may be performed in an order different from that described, and the steps may be added, omitted, or combined. In addition, features described with reference to some examples may be combined in other examples.

[0116] Based on the descriptions of the foregoing implementation manners, a person skilled in the art may clearly understand that the methods in the foregoing embodiments may be implemented by software in addition to a necessary universal hardware platform or by hardware only. In most circumstances, the former is a preferred implementation manner. Based on such understanding, the technical solutions of this application essentially, or the part contributing to the prior art may be implemented in a form of a software product. The computer software product is stored in a storage medium (for example, a ROM/RAM, a magnetic disk, or a compact disc), and includes several instructions for instructing a terminal (which may be a mobile phone, a computer, a server, an air conditioner, a network device, or the like) to perform the method described in the embodiments of this application.

[0117] The embodiments of this application are described above with reference to the accompanying drawings, but this application is not limited to the foregoing specific implementation manners. The foregoing specific implementation manners are merely schematic instead of restrictive. Under enlightenment of this application, a person of ordinary skills in the art may make many forms without departing from aims and the protection scope of claims of this application, all of which fall within the protection scope of this application.

Claims

1. A power obtaining method, applied to a first node device and comprising:

   obtaining transmit power information of a distributed unit DU and transmit power information of a mobile Termination MT,
   wherein the transmit power information of the DU comprises a transmit power or maximum transmit power of the DU, and the transmit power information of the MT comprises a transmit power or maximum transmit power of at least one cell group of the MT.

2. The power obtaining method according to claim 1, wherein the transmit power information of the MT further comprises a transmit power of the MT.

3. The power obtaining method according to claim 1, wherein the transmit power information of the DU and the transmit power information of the MT are valid at a first moment,
wherein the first moment is a moment when the DU and the at least one cell group of the MT transmit information simultaneously.

4. The power obtaining method according to claim 3, wherein the first moment is a moment when the DU and the at least one cell group of the MT actually transmit information simultaneously,
or the first moment is a moment when the DU and the at least one cell group of the MT are configured to transmit information simultaneously.

5. The power obtaining method according to claim 4, wherein the first moment is determined based on at least one of the following:

configuration of time division duplex TDD for the DU and MT; and
configuration of a resource type of the DU.

6. The power obtaining method according to claim 1, wherein at least one of the transmit power information of the DU and the transmit power information of the MT is obtained in at least one of the following manners:

a specification in a protocol;
configuration or indication by a centralized unit CU; or
configuration or indication by a parent node.

7. The power obtaining method according to claim 3, wherein the obtaining transmit power information of a distributed unit DU and transmit power information of a mobile Termination MT comprises:

respectively obtaining at least one of the transmit power information of the DU and the transmit power information of the MT at different first moments,
wherein the first moments comprise at least one of the following:

a moment when the DU and n cell groups of the MT perform transmission simultaneously;
a moment when the DU and an MT's master cell group perform transmission simultaneously;
a moment when the DU and an MT's secondary cell group perform transmission simultaneously; or
a moment when n cell groups of the MT perform transmission simultaneously,

wherein $0 \le n \le N$, n is an integer, and N is the number of MT's cell groups.

8. The power obtaining method according to claim 1, wherein obtaining the transmit power information of the MT comprises:

respectively obtaining a transmit power of a physical random access channel and a transmit power of another uplink physical channel,
wherein the another uplink physical channel comprises at least one of the following:

a transmit power of a physical uplink control channel;
a transmit power of a physical uplink shared channel; or
a transmit power of a sounding reference signal.

9. The power obtaining method according to claim 1, wherein after obtaining the transmit power information of the distributed unit DU and the transmit power information of the MT, the method further comprises:

notifying at least one of a sum of the transmit power of the DU and a transmit power of the MT, the transmit power information of the DU, or the transmit power information of the MT to a target node,
wherein the target node is a parent node of an integrated access backhaul IAB node, a child node of the IAB node, or a centralized unit CU connected to the DU, and the IAB node is an IAB node to which the DU and the MT belong.

10. The power obtaining method according to claim 1, wherein the maximum transmit power of the at least one cell group of the MT comprises a maximum transmit power Q_{MCG} of an MT's master cell group and a maximum transmit power Q_{SCG} of an MT's secondary cell group; and
after obtaining the transmit power information of the distributed unit DU and the transmit power information of the MT, the method further comprises:

obtaining an actually maximum transmit power of the MT's master cell group and an actually maximum transmit power of the MT's secondary cell group based on Q_{MCG} and Q_{SCG} and according to a preset power sharing rule.
wherein the preset power sharing rule comprises a first power sharing rule or a second power sharing rule,
wherein the first power sharing rule means that dynamic power sharing is implemented when a sum of Q_{MCG} and Q_{SCG} is greater than a first power; and

the second power sharing rule means that semi-static power sharing is implemented when the sum of Q_{MCG} and Q_{SCG} is less than or equal to the first power,
wherein the first power is the maximum transmit power of the MT or a preset fixed power value.

11. The power obtaining method according to claim 10, wherein before the obtaining an actually maximum transmit power of the MT's master cell group and an actually maximum transmit power of the MT's secondary cell group, the method further comprises:
adjusting at least one of Q_{MCG} and Q_{SCG} according to a difference between the preset fixed power value and the maximum transmit power of the MT in a case that the preset fixed power value is different from the maximum transmit power of the MT.

12. The power obtaining method according to claim 1, further comprising:

reporting at least one power headroom report PHR,
wherein an upper power limit calculated through the PHR is assumed as at least one of the following:
a power in the transmit power information; and an actually maximum transmit power.

13. A power allocation method, applied to a second node device and comprising:

configuring transmit power information of a distributed unit DU and transmit power information of an MT,
wherein the transmit power information of the DU comprises a transmit power or maximum transmit power of the DU, and the transmit power information of the MT comprises a transmit power or maximum transmit power of at least one cell group of the MT.

14. The power allocation method according to claim 13, wherein the transmit power information of the MT further comprises a transmit power of the MT.

15. The power allocation method according to claim 14, wherein the configuring transmit power information of a distributed unit DU and transmit power information of an MT comprises:

respectively configuring at least one of the transmit power information of the DU and the transmit power information of the MT at different first moments,
wherein the first moments comprise at least one of the following:
a moment when the DU and n cell groups of the MT perform transmission simultaneously;
a moment when the DU and an MT's master cell group perform transmission simultaneously;
a moment when the DU and an MT's secondary cell group perform transmission simultaneously; or
a moment when n cell groups of the MT perform transmission simultaneously,
wherein $0 \le n \le N$, n is an integer, and N is the number of MT's cell groups.

16. The power allocation method according to claim 13, wherein configuring the transmit power information of the MT comprises:

respectively configuring a transmit power of a physical random access channel and a transmit power of another uplink physical channel,
wherein the another uplink physical channel comprises at least one of the following:

a transmit power of a physical uplink control channel;
a transmit power of a physical uplink shared channel; or
a transmit power of a sounding reference signal.

17. A power obtaining apparatus, applied to a first node device and comprising:

a first obtaining module, configured to obtain transmit power information of a distributed unit DU and transmit power information of a mobile Termination MT,
wherein the transmit power information of the DU comprises a transmit power or maximum transmit power of the DU, and the transmit power information of the MT comprises a transmit power or maximum transmit power of at least one cell group of the MT.

18. The power obtaining apparatus according to claim 17, wherein the transmit power information of the MT further comprises a transmit power of the MT.

19. The power obtaining apparatus according to claim 17, wherein the transmit power information of the DU and the transmit power information of the MT are valid at a first moment,
wherein the first moment is a moment when the DU and the at least one cell group of the MT transmit information simultaneously.

20. The power obtaining apparatus according to claim

19, wherein the first moment is a moment when the DU and the at least one cell group of the MT actually transmit information simultaneously,
or the first moment is a moment when the DU and the at least one cell group of the MT are configured to transmit information simultaneously.

21. The power obtaining apparatus according to claim 20, wherein the first moment is determined based on at least one of the following:

configuration of time division duplex TDD for the DU and MT; and
configuration of a resource type of the DU.

22. The power obtaining apparatus according to claim 17, wherein the first obtaining module obtains at least one of the transmit power of the DU and the transmit power of the MT in at least one of the following manners:

a specification in a protocol;
configuration or indication by a centralized unit CU; or
configuration or indication by a parent node.

23. The power obtaining apparatus according to claim 19, wherein the first obtaining module is configured to respectively obtain at least one of the transmit power information of the DU and the transmit power information of the MT at different first moments,
wherein the first moments comprise at least one of the following:

a moment when the DU and n cell groups of the MT perform transmission simultaneously;
a moment when the DU and an MT's master cell group perform transmission simultaneously;
a moment when the DU and an MT's secondary cell group perform transmission simultaneously; or
a moment when n cell groups of the MT perform transmission simultaneously,
wherein $0 \le n \le N$, n is an integer, and N is the number of MT's cell groups.

24. The power obtaining apparatus according to claim 17, wherein the first obtaining module is configured to respectively obtain a transmit power of a physical random access channel and a transmit power of another uplink physical channel,
wherein the another uplink physical channel comprises at least one of the following:

a transmit power of a physical uplink control channel;
a transmit power of a physical uplink shared channel; or
a transmit power of a sounding reference signal.

25. The power obtaining apparatus according to claim 17, further comprising:

a notifying module, configured to notify, after the first obtaining module obtains the transmit power information of the distributed unit DU and the transmit power information of the MT, at least one of a sum of the transmit power of the DU and the transmit power of the MT, the transmit power information of the DU, or the transmit power information of the MT to a target node,
wherein the target node is a parent node of an integrated access backhaul IAB node, a child node of the IAB node, or a centralized unit CU connected to the DU, and the IAB node is an IAB node to which the DU and the MT belong.

26. The power obtaining apparatus according to claim 17, wherein the maximum transmit power of the at least one cell group of the MT comprises a maximum transmit power Q_{MCG} of an MT's master cell group and a maximum transmit power Q_{SCG} of an MT's secondary cell group; and
the power obtaining apparatus further comprises:

a second obtaining module, configured to obtain, after the first obtaining module obtains the transmit power information of the distributed unit DU and the transmit power information of the MT, an actually maximum transmit power of the MT's master cell group and an actually maximum transmit power of the MT's secondary cell group based on Q_{MCG} and Q_{SCG} and according to a preset power sharing rule.
wherein the preset power sharing rule comprises a first power sharing rule or a second power sharing rule,
wherein the first power sharing rule means that dynamic power sharing is implemented when a sum of Q_{MCG} and Q_{SCG} is greater than a first power; and
the second power sharing rule means that semi-static power sharing is implemented when the sum of Q_{MCG} and Q_{SCG} is less than or equal to the first power,
wherein the first power is the maximum transmit power of the MT or a preset fixed power value.

27. The power obtaining apparatus according to claim 26, further comprising:
an adjusting module, configured to adjust, before the second obtaining module obtains the actually maximum transmit power of the MT's master cell group and the actually maximum transmit power of the MT's secondary cell group and in a case that the preset fixed power value is different from the maxi-

mum transmit power of the MT, at least one of Q_{MCG} and Q_{SCG} according to a difference between the preset fixed power value and the maximum transmit power of the MT.

28. The power obtaining apparatus according to claim 17, further comprising:

a reporting module, configured to report at least one power headroom report PHR,
wherein an upper power limit calculated through the PHR is assumed as at least one of the following:

a power in the transmit power information; and
an actually maximum transmit power.

29. A power allocation apparatus, applied to a second node device and comprising:

a configuring module, configured to configure transmit power information of a distributed unit DU and transmit power information of an MT,
wherein the transmit power information of the DU comprises a transmit power or maximum transmit power of the DU, and the transmit power information of the MT comprises a transmit power or maximum transmit power of at least one cell group of the MT.

30. The power allocation apparatus according to claim 29, wherein the transmit power information of the MT further comprises a transmit power of the MT.

31. The power allocation apparatus according to claim 30, wherein the configuring module is configured to respectively configure at least one of the transmit power information of the DU and the transmit power information of the MT at different first moments,
wherein the first moments comprise at least one of the following:

a moment when the DU and n cell groups of the MT perform transmission simultaneously;
a moment when the DU and an MT's master cell group perform transmission simultaneously;
a moment when the DU and an MT's secondary cell group perform transmission simultaneously; or
a moment when n cell groups of the MT perform transmission simultaneously,
wherein $0 \le n \le N$, n is an integer, and N is the number of MT's cell groups.

32. The power allocation apparatus according to claim 29, wherein the configuring module is configured to respectively configure a transmit power of a physical random access channel and a transmit power of another uplink physical channel,
wherein the another uplink physical channel comprises at least one of the following:

a transmit power of a physical uplink control channel;
a transmit power of a physical uplink shared channel; or
a transmit power of a sounding reference signal.

33. A node device, comprising a processor, a memory, and a program or an instruction stored in the memory and capable of running on the processor, wherein when the program or instruction is executed by the processor, the steps of the power obtaining method according to any one of claims 1 to 12 or the steps of the power allocation method according to any one of claims 13 to 16 are implemented.

34. A readable storage medium, wherein the readable storage medium stores a program or an instruction, when the program or instruction is executed by a processor, the steps of the power obtaining method according to any one of claims 1 to 12 or the steps of the power allocation method according to any one of claims 13 to 16 are implemented.

35. A chip, comprising a processor and a communication interface, wherein the communication interface is coupled to the processor, and the processor is configured to run a program or an instruction, to implement the steps of the power obtaining method according to any one of claims 1 to 12 or the steps of the power allocation method according to any one of claims 13 to 16.

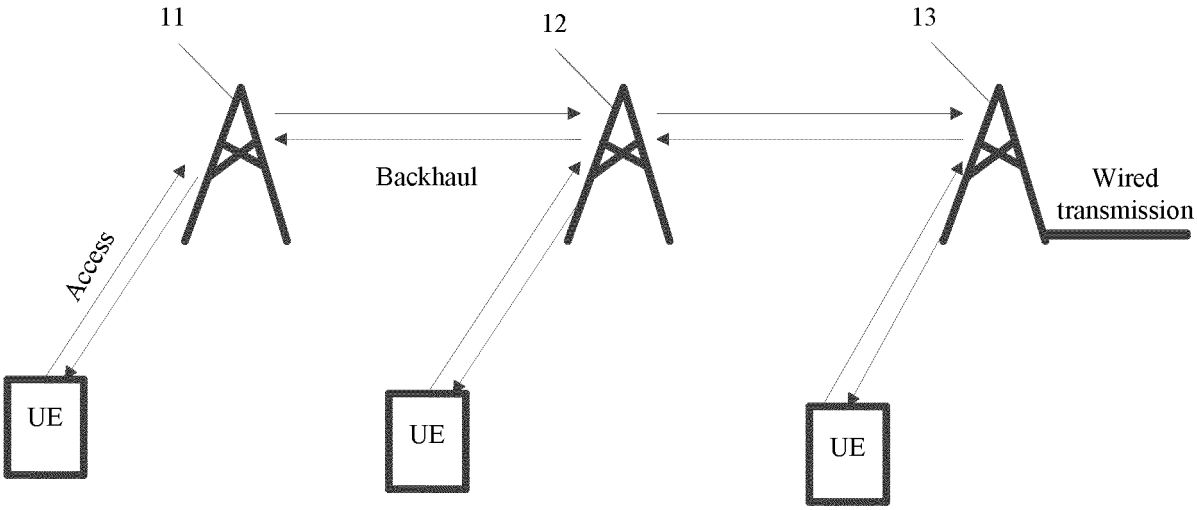
11
12
13
Backhaul
Wired
transmission
Access
UE
UE
UE

FIG. 1

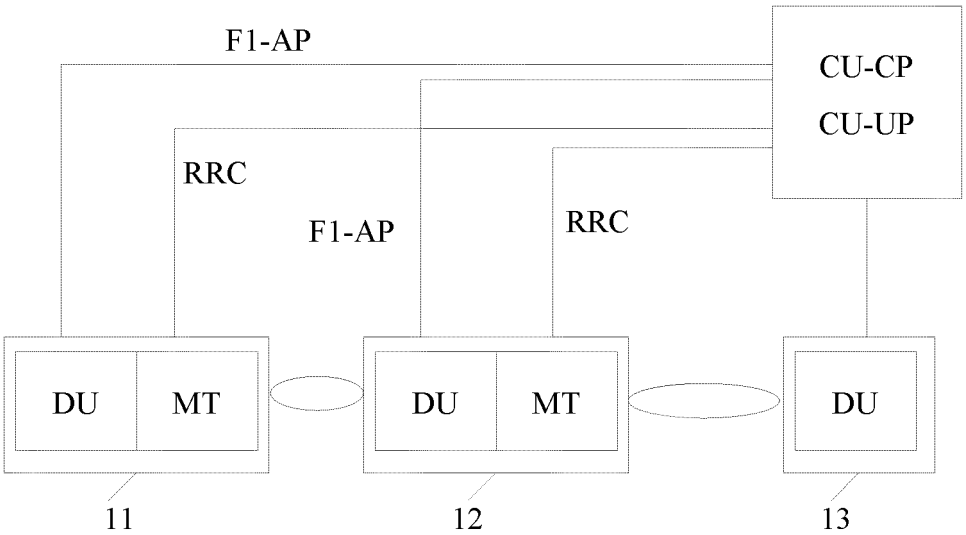
F1-AP
CU-CP
CU-UP
RRC
F1-AP
RRC
DU
MT
DU
MT
DU
11
12
13

FIG. 2

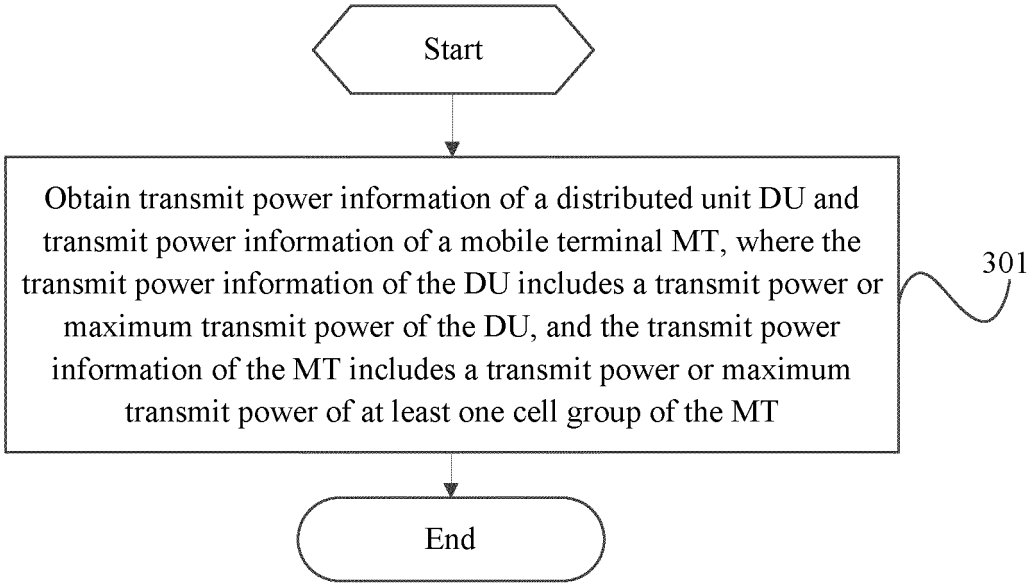

FIG. 3

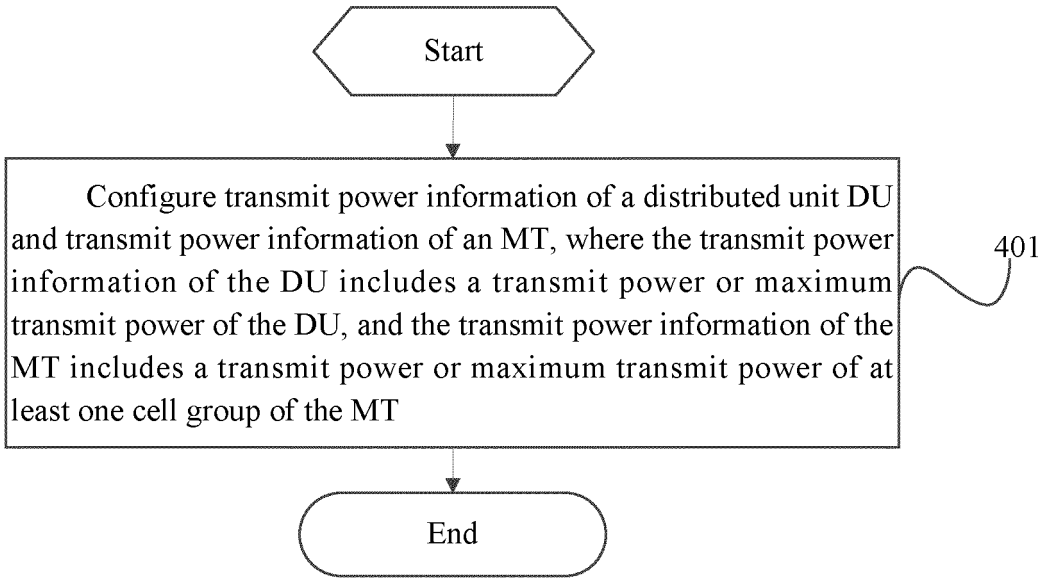

FIG. 4

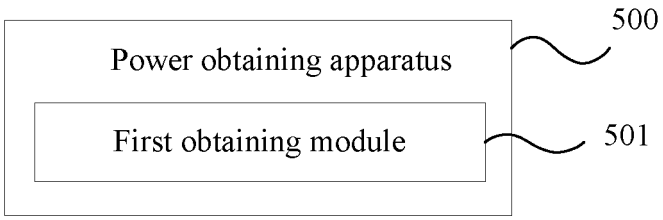

FIG. 5

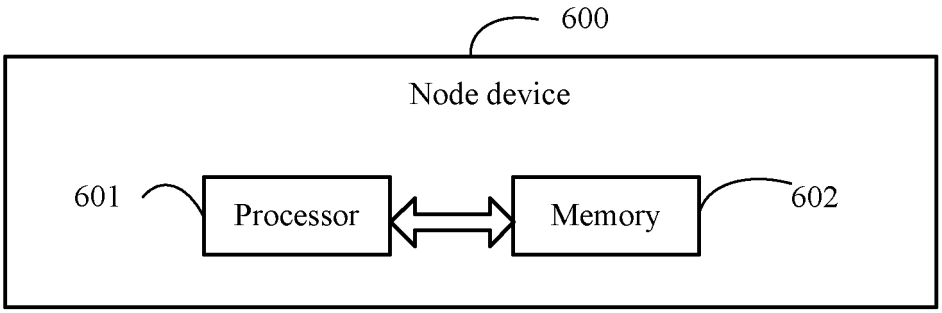

FIG. 6

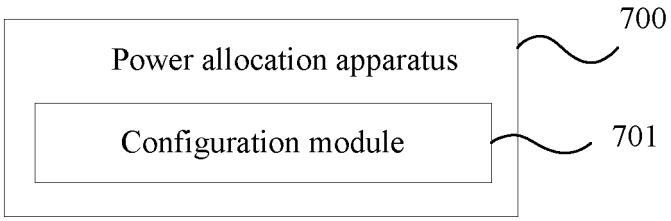

FIG. 7

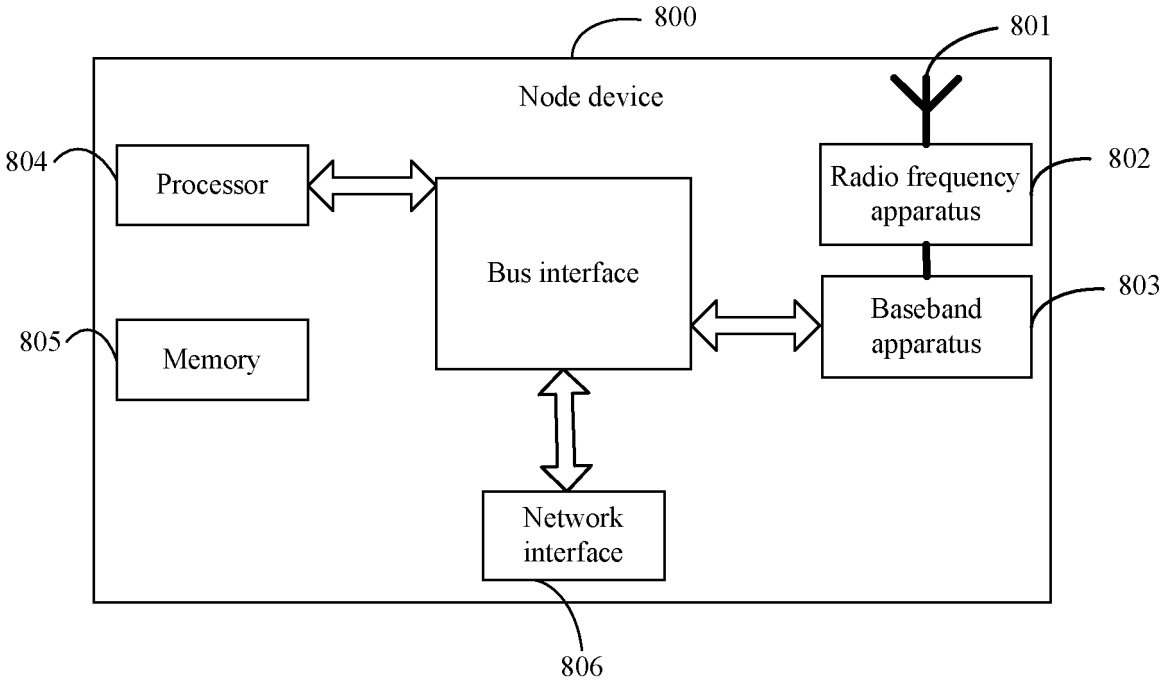

FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2021/108078

A. CLASSIFICATION OF SUBJECT MATTER

H04W 72/04(2009.01)i; H04W 72/12(2009.01)i; H04W 52/00(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

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

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

CNABS; CNTXT; VEN; EPTXT; USTXT; WOTXT; CNKI; Baidu; 3GPP: DU, (分布 1w 单元), (Distributed 1w Unit); 小区组, 小区群, (Cell 1w Group), MCG, SCG; 发送功率, 发射功率, 上行功率, 传输功率; 输出功率; (Sending 1w power), (transmi + 1w power); 功率 4d (or 共享, 分配, 共用, 分享); IAB, 回传, Backhaul

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 110972156 A (HUAWEI TECHNOLOGIES CO., LTD.) 07 April 2020 (2020-04-07) description, paragraphs 52-433, and figures 1-20	1-2, 6, 8-9, 12-14, 16-18, 22, 24-25, 28-30, 32-35
Y	CN 110166273 A (HUAWEI TECHNOLOGIES CO., LTD.) 23 August 2019 (2019-08-23) claims 17-18	1-2, 6, 8-9, 12-14, 16-18, 22, 24-25, 28-30, 32-35
A	CN 111148151 A (YULONG COMPUTER TELECOMMUNICATION SCIENTIFIC (SHENZHEN) CO., LTD.) 12 May 2020 (2020-05-12) entire document	1-35
A	US 2019373627 A1 (QUALCOMM INCORPORATED) 05 December 2019 (2019-12-05) entire document	1-35
A	US 2019208478 A1 (PARK KYUNGMIN et al.) 04 July 2019 (2019-07-04) entire document	1-35

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

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"P" document published prior to the international filing date but later than the priority date claimed
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31 August 2021	**27 September 2021**

Name and mailing address of the ISA/CN	Authorized officer
China National Intellectual Property Administration (ISA/CN) **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088** **China**	
Facsimile No. **(86-10)62019451**	Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2021/108078

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
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CN 110166273 A	23 August 2019	BR 112020016532 A2	15 December 2020
		WO 2019158100 A1	22 August 2019
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		IN 202047036239 A	11 September 2020
		VN 74921 A	25 December 2020
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		CN 112166641 A	01 January 2021
		WO 2019231797 A1	05 December 2019
		EP 3804439 A1	14 April 2021
US 2019208478 A1	04 July 2019	US 2021112504 A1	15 April 2021
		US 10873916 B2	22 December 2020

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REFERENCES CITED IN THE DESCRIPTION

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- CN 202010724914 **[0001]**