

spacings and the second downlink bandwidths are a subset of the first downlink subcarrier spacings and first downlink bandwidths.

[0035] In the optional embodiments, sending, by the access network device, the first uplink subcarrier spacings and the first uplink bandwidths and/or first downlink subcarrier spacings and first downlink bandwidths supported by the camped cell to the terminal, includes:

[0036] sending, by the access network device, system information to the terminal, and a predetermined system information block in the system information carries the first uplink subcarrier spacings and the first uplink bandwidths and/or the first downlink subcarrier spacings and the first downlink bandwidths supported by the camped cell.

[0037] In the optional embodiments, before receiving, by the access network device, the UE capability information sent by the terminal, the method further includes:

[0038] sending, by the access network device, a UE capability enquiry to the terminal.

[0039] In the optional embodiments, after receiving, by the access network device, the UE capability information sent by the terminal, the method further includes:

[0040] scheduling, by the access network device, uplink transmission and/or downlink transmission of the terminal according to the UE capability information.

[0041] According to a third aspect of the present disclosure, there is provided an information sending apparatus, including at least one unit, which is configured to implement the information sending method provided by the first aspect described above or any one possible implementation of the first aspect.

[0042] According to a fourth aspect of the present disclosure, there is provided an information receiving apparatus, including at least one unit, which is configured to implement the information sending method provided by the second aspect described above or any one possible implementation of the second aspect.

[0043] According to a fifth aspect of the present disclosure, there is provided a terminal, which includes a processor, a memory, a sender and a receiver; the memory is configured to store one or more instructions, which are executed by the processor as indicated; the processor is configured to implement the information receiving method provided by the

first aspect described above or any one possible implementation of the first aspect; the sender is configured to implement sending of the UE capability information, and the receiver is configured to implement receiving of the UE capability enquiry or the system information.

[0044] According to a sixth aspect of the present disclosure, there is provided an access network device, which includes a processor, a memory, a sender and a receiver; the memory is configured to store one or more instructions, which are executed by the processor as indicated; the processor is configured to implement the signal receiving method provided by the second aspect described above or any one possible implementation of the second aspect; the receiver is configured to implement receiving of the UE capability information, and the sender is configured to implement sending of the UE capability enquiry or the system information.

[0045] According to a seventh aspect of the present disclosure, there is provided a computer readable medium, which stores one or more instructions configured to implement the information sending method provided by the first aspect described above or any one possible implementation of the first aspect.

[0046] According to an eighth aspect of the present disclosure, there is provided a computer readable medium, which stores one or more instructions configured to implement the information receiving method provided by the second aspect described above or any one possible implementation of the second aspect.

[0047] The beneficial effect of the technical proposal provided by the embodiments of the present disclosure is as follows.

[0048] Through reporting the UE capability information to the access network device by the terminal, the access network device is able to know the capability of the terminal for processing the signals sent and/or received in parallel by at least two subcarriers with different subcarrier spacings, and then schedules the uplink/downlink transmission according to the actual processing capability of the terminal, so that the access network device can dynamically schedule the uplink/downlink transmission of the terminal according to different UE capabilities.

BRIEF DESCRIPTION OF THE DRAWINGS

information is generated according to (4, 1024); for another example, two FFT units are set in the terminal, and each FFT unit is used to compute discrete Fourier transform of 2048 points, then the UE capability information is generated according to (2, 2048).

[00103] Optionally, “the number of units and transformation point number of each unit” in the present embodiment refers to the unit number of all the FFT units and transformation point number of each FFT unit in the terminal, and/or the number of all the IFFT units and transformation point number of each IFFT unit in the terminal.

[00104] In step 404, the terminal sends the UE capability information to the access network device.

[00105] Optionally, the terminal sends the UE capability information to the access network device via a RRC signaling or a MAC signaling.

[00106] In step 405, the access network device receives the UE capability information sent by the terminal.

[00107] Optionally, the access network device receives the UE capability information via a RRC signaling or a MAC signaling.

[00108] In step 406, the access network device schedules uplink transmission and/or downlink transmission of the terminal according to the UE capability information.

[00109] For example, the UE capability information is used to indicate that four FFT units are set in the terminal, and each FFT unit is used to compute discrete Fourier transform of 1024 points, then the access network device schedules at most 4 subcarriers with different subcarrier spacings for the terminal to receive downlink data in parallel, and the downlink data carried by each subcarrier does not beyond the computing capability of the FFT unit of 1024 points.

[00110] For another example, the UE capability information is used to indicate that two FFT units are set in the terminal, and each FFT unit is used to compute discrete Fourier transform of 2048 points, then the access network device schedules at most 2 subcarriers with different subcarrier spacings for the terminal to send downlink data in parallel, and the downlink data carried by each subcarrier does not beyond the computing capability of the FFT unit of 2048 points.

[00111] In conclusion, in the information sending method provided by the present

embodiment, through adopting the number of units and transformation point number of each unit of the FFT units and/or IFFT units to represent the capability of the terminal for processing the signals carried by at least two subcarriers with different subcarrier spacings in parallel, the access network device can learn the parallel processing capability of the terminal for signals sent and/or received by the subcarriers having different subcarrier spacings and then schedules the uplink/downlink transmission of the terminal according to the actual processing capability of the terminal, so that the access network device can dynamically schedule the uplink/downlink transmission of the terminal according to different UE capabilities.

[00112] In the optional embodiment based on the Fig. 4, the terminal may be sending uplink data, and a part of the IFFT units are in a state of being occupied; or, the terminal may be receiving downlink data, and a part of the FFT units are in a state of being occupied. At this time, the terminal generates the UE capability information according to the parallel computation capability of the current remaining FFT units and/or IFFT units, and step 403a may be implemented instead of the step 403 described above, which is shown as Fig. 5.

[00113] In step 403a, the terminal generates the UE capability information which includes: the computation capability information of current remaining parallel FFT units and/or IFFT units.

[00114] Optionally, the parallel computation capability of the current remaining FFT units and/or IFFT units may be represented by the number of units and transformation point number of each unit. For example, four FFT units are set in the terminal, each FFT unit is used to compute discrete Fourier transform of 1024 points, and currently two FFT units are in a state of being occupied, then the UE capability information is generated according to $(4-2=2, 1024)$.

[00115] For another example, two FFT units are set in the terminal, each FFT unit is used to compute discrete Fourier transform of 2048 points, and currently one FFT unit is in a state of being occupied, then the UE capability information is generated according to $(1, 2048)$.

[00116] Optionally, the unit number of the current remaining FFT units = the unit number of all FFT units – the number of FFT units in the state of being occupied; and the unit

[00190] The receiving unit 1060 is configured to execute any one receiving step among step 402, step 602, step 902 and step 904 which are mentioned above.

[00191] Fig. 11 illustrates a structure diagram of an information receiving apparatus provided by an embodiment of the present disclosure. As shown in Fig. 11, the information receiving apparatus may be implemented by software, hardware or a combination of them to form the whole access network device or a part of the access network device. The information receiving apparatus includes: a receiving unit 1120.

[00192] The receiving unit 1120 is configured to execute any one receiving step among step 303, step 405, step 605, step 803 and step 807 which are mentioned above.

[00193] Optionally, the information receiving apparatus also includes: a sending unit 1140 and a processing unit 1160.

[00194] The sending unit 1140 is configured to execute any one sending step among step 401, step 601, step 901 and step 903 which are mentioned above.

[00195] The processing unit 1160 is configured to execute any one scheduling step among step 404, step 606 and step 908 which are mentioned above.

[00196] Fig. 12 illustrates a structure diagram of a sending device provided by an exemplary embodiment of the present disclosure. As shown in Fig. 12, the sending device includes: a processor 21, a receiver 22, a sender 23, a memory 24 and a bus 25.

[00197] The processor 21 includes one or more central processing cores. The processor 21 executes various functional applications and information processes by running software programs and modules.

[00198] The receiver 22 and the sender 23 may be implemented as a communication component, which may be a communication chip. The communication chip may include a receiving module, a sending module and a modulating-demodulating module, and is configured to modulate and/or demodulate the information, and receive or send the information via wireless signals.

[00199] The memory 24 is connected to the processor 21 by the bus 25.

[00200] The memory 24 may be configured to store software programs and modules.

[00201] The memory 24 may store an application module 26 with at least one function. The application module 26 may include: a generating module 261, a sending module 262 and

a receiving module 263.

[00202] The processor 21 is configured to execute the generating module 261 to implement the functions related to the generating steps in each method embodiment mentioned above; the processor 21 is configured to execute the sending module 262 to implement the functions related to the sending steps in each method embodiment mentioned above; and the processor 21 is configured to execute the receiving module 263 to implement the functions related to the receiving steps in each method embodiment mentioned above.

[00203] Furthermore, the memory 24 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 disk or a compact disk.

[00204] Fig. 13 illustrates a structure diagram of a receiving device provided by an exemplary embodiment of the present disclosure. As shown in Fig. 13, the receiving device includes: a processor 31, a receiver 32, a sender 33, a memory 34 and a bus 35.

[00205] The processor 31 includes one or more central processing cores. The processor 31 executes various functional applications and information processes by running software programs and modules.

[00206] The receiver 32 and the sender 33 may be implemented as a communication component, which may be a communication chip. The communication chip may include a receiving module, a sending module and a modulating-demodulating module, and is configured to modulate and/or demodulate information, and receive or send the information via wireless signals.

[00207] The memory 34 is connected to the processor 31 by the bus 35.

[00208] The memory 34 may be configured to store software programs and modules.

[00209] The memory 34 may store an application module 36 with at least one function. The application module 36 may include: a generating module 361, a sending module 362 and a scheduling module 363.

[00210] The processor 31 is used to execute the generating module 361 to implement

the functions related to the receiving steps in each method embodiment mentioned above; the processor 31 is used to execute the sending module 362 to implement the functions related to the sending steps in each method embodiment mentioned above; the processor 31 is used to execute the scheduling module 363 to implement the functions related to the scheduling steps in each method embodiment mentioned above.

[00211] Furthermore, the memory 34 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 disk or a compact disk.

[00212] Those skilled in the art should notice that in one or more of the above examples, the functions described in the embodiments of the present disclosure may be implemented by hardware, software, firmware, or any combination thereof. When being implemented by software, the functions may be stored in a computer readable medium or transmitted as one or more instructions or codes on a computer readable medium. The computer readable medium includes both computer storage medium and communication medium, of which the communication medium includes any medium that is convenient for transmitting a computer program from one place to another. A storage medium may be any available medium that can be accessed by a general purpose or special purpose computer.

CLAIMS:

1. An information sending method, comprising:

generating, by a terminal, terminal capability information, the terminal capability information being used for indicating a parallel processing capability of the terminal for signals sent and/or received by at least two subcarriers with different subcarrier spacings, and/or used for indicating a data buffer capability of the terminal; and

sending, by the terminal, the terminal capability information to an access network device.

2. The method according to claim 1, wherein the terminal capability information comprises:

uplink subcarrier spacings and uplink bandwidths supported by the terminal for sending signals in parallel, at least two of the uplink subcarrier spacings being different;

and/or,

downlink subcarrier spacings and downlink bandwidths supported by the terminal for receiving signals in parallel, at least two of the downlink subcarrier spacings being different.

3. The method according to claim 2, wherein before generating, by the terminal, the terminal capability information, the method further comprises:

receiving, by the terminal, first uplink subcarrier spacings and first uplink bandwidths and/or first downlink subcarrier spacings and first downlink bandwidths supported by a camped cell sent by the access network device;

wherein generating, by the terminal, the terminal capability information comprises:

generating, by the terminal, the terminal capability information, the terminal capability information comprising: second uplink subcarrier spacings and second uplink bandwidths, and/or second downlink subcarrier spacings and second downlink bandwidths;

wherein the camped cell is a cell in which the terminal camps currently, the second uplink subcarrier spacings and the second uplink bandwidths are a subset of the first uplink subcarrier spacings and the first uplink bandwidths, and the second downlink subcarrier spacings and the second downlink bandwidths are a subset of the first downlink subcarrier spacings and first downlink bandwidths.

4. The method according to claim 3, wherein receiving, by the terminal, the first uplink

subcarrier spacings and the first uplink bandwidths and/or the first downlink subcarrier spacings and the first downlink bandwidths supported by the camped cell sent by the access network device, comprises:

receiving, by the terminal, system information sent by the access network device; and

retrieving, by the terminal, the first uplink subcarrier spacings and the first uplink bandwidths, and/or the first downlink subcarrier spacings and the first downlink bandwidths supported by the camped cell from a predetermined system information block in the system information.

5. The method according to any one of claims 1 to 4, wherein before sending, by the terminal, the terminal capability information to the access network device, the method further comprises:

receiving, by the terminal, a terminal capability enquiry sent by the access network device.

6. An information receiving method, comprising:

receiving, by an access network device, terminal capability information sent by a terminal, the terminal capability information being used for indicating a parallel processing capability of the terminal for signals sent and/or received by at least two subcarriers with different subcarrier spacings, and/or used for indicating a data buffer capability of the terminal.

7. The method according to claim 6, wherein the terminal capability information comprises:

uplink subcarrier spacings and uplink bandwidths supported by the terminal for sending signals in parallel, at least two of the uplink subcarrier spacings being different;

and/or,

downlink subcarrier spacings and downlink bandwidths supported by the terminal for receiving signals in parallel, at least two of the downlink subcarrier spacings being different.

8. The method according to claim 7, wherein before receiving, by the access network device, the terminal capability information sent by the terminal, the method further comprises:

sending, by the access network device, first uplink subcarrier spacings and first uplink

bandwidths and/or first downlink subcarrier spacings and first downlink bandwidths supported by a camped cell to the terminal;

wherein receiving, by the access network device, the terminal capability information sent by the terminal comprises:

receiving, by the access network device, the terminal capability information sent by the terminal, the terminal capability information comprising: second uplink subcarrier spacings and second uplink bandwidths, and/or second downlink subcarrier spacings and second downlink bandwidths;

wherein the camped cell is a cell in which the terminal camps currently, the second uplink subcarrier spacings and the second uplink bandwidths are a subset of the first uplink subcarrier spacings and the first uplink bandwidths, and the second downlink subcarrier spacings and the second downlink bandwidths are a subset of the first downlink subcarrier spacings and first downlink bandwidths.

9. The method according to claim 8, wherein sending, by the access network device, the first uplink subcarrier spacings and the first uplink bandwidths and/or the first downlink subcarrier spacings and the first downlink bandwidths supported by the camped cell to the terminal, comprises:

sending, by the access network device, system information to the terminal, a predetermined system information block in the system information carrying the first uplink subcarrier spacings and the first uplink bandwidths and/or the first downlink subcarrier spacings and the first downlink bandwidths supported by the camped cell.

10. The method according to any one of claims 6 to 9, wherein before receiving, by the access network device, the terminal capability information sent by the terminal, the method further comprises:

sending, by the access network device, a terminal capability enquiry to the terminal.

11. The method according to any one of claims 6 to 9, wherein after receiving, by the access network device, the terminal capability information sent by the terminal, the method further comprises:

scheduling, by the access network device, uplink transmission and/or downlink transmission of the terminal according to the terminal capability information.

12. A terminal, comprising:

a processor configured to generate terminal capability information, the terminal capability information being used for indicating a parallel processing capability of the terminal for signals sent and/or received by at least two subcarriers with different subcarrier spacings and/or used for indicating a data buffer capability of the terminal; and

a sender configured to send the terminal capability information to an access network device.

13. The terminal according to claim 12, wherein the terminal capability information comprises:

uplink subcarrier spacings and uplink bandwidths supported by the terminal for sending signals in parallel, at least two of the uplink subcarrier spacings are different;

and/or,

downlink subcarrier spacings and downlink bandwidths supported by the terminal for receiving signals in parallel, at least two of the downlink subcarrier spacings are different.

14. The terminal according to claim 12, further comprising: a receiver;

wherein the receiver is configured to receive first uplink subcarrier spacings and first uplink bandwidths and/or first downlink subcarrier spacings and first downlink bandwidths supported by a camped cell sent by the access network device; and

the processor is configured to generate the terminal capability information, the terminal capability information comprising: second uplink subcarrier spacings and second uplink bandwidths, and/or second downlink subcarrier spacings and second downlink bandwidths;

wherein the camped cell is a cell in which the terminal camps currently, the second uplink subcarrier spacings and the second uplink bandwidths are a subset of the first uplink subcarrier spacings and the first uplink bandwidths, and the second downlink subcarrier spacings and the second downlink bandwidths are a subset of the first downlink subcarrier spacings and first downlink bandwidths.

15. The terminal according to claim 14, wherein

the receiver is configured to receive system information sent by the access network device; and

the processor is configured to retrieve the first uplink subcarrier spacings and the first

uplink bandwidths, and/or the first downlink subcarrier spacings and the first downlink bandwidths supported by the camped cell from a predetermined system information block in the system information.

16. The terminal according to any one of claims 12 to 15, further comprising: a receiver; wherein the receiver is configured to receive a terminal capability enquiry sent by the access network device.

17. An access network device, comprising:
a receiver configured to receive terminal capability information sent by a terminal, the terminal capability information being used for indicating a parallel processing capability of the terminal for signals sent and/or received by at least two subcarriers with different subcarrier spacings, and/or used for indicating a data buffer capability of the terminal.

18. The access network device according to claim 17, wherein the terminal capability information comprises:

uplink subcarrier spacings and uplink bandwidths supported by the terminal for sending signals in parallel, at least two of the uplink subcarrier spacings being different;

and/or,

downlink subcarrier spacings and downlink bandwidths supported by the terminal for receiving signals in parallel, at least two of the downlink subcarrier spacings being different.

19. The access network device according to claim 18, further comprising: a sender, wherein the sender is configured to send first uplink subcarrier spacings and first uplink bandwidths and/or first downlink subcarrier spacings and first downlink bandwidths supported by a camped cell to the terminal; and

the receiver is configured to receive the terminal capability information sent by the terminal, the terminal capability information comprising: second uplink subcarrier spacings and second uplink bandwidths, and/or second downlink subcarrier spacings and second downlink bandwidths;

wherein the camped cell is a cell in which the terminal camps currently, the second uplink subcarrier spacings and the second uplink bandwidths are a subset of the first uplink subcarrier spacings and the first uplink bandwidths, and the second downlink subcarrier spacings and the second downlink bandwidths are a subset of the first downlink subcarrier

spacings and first downlink bandwidths.

20. An information sending system, comprising:

the terminal according to any one of claims 12 to 16; and

the access network device according to any one of claims 17 to 19.