

information requiring the terminal to feed back the HARQ result being the maximum, i.e., 4, as the target time domain units.

In above embodiments, when the target information includes the downlink data information that requires the terminal to feed back the HARQ result, the base station can flexibly determine the reference time domain unit through the above manners, to adjust the value of CWS accurately, to improve the performance of the NR-U system and to achieve high availability.

In an embodiment, if the target information includes the HARQ result information needed to be fed back by the terminal, the block 102 can be implemented in any one of the above three manners, and details are not repeated here.

As an example, the preset threshold is represented by d and d equals to 2. The reference time domain unit is a time-domain unit, within the target COT, that the number of pieces of HARQ result information needed to be fed back by the terminal is greater than 2. When there are multiple reference time domain units that the numbers of pieces of HARQ result information needed to be fed back by the terminal are greater than 2, the base station follows a predefined strategy to determine the first time domain unit that the number of pieces of HARQ result information needed to be fed back by the terminal is greater than 2 as the reference time domain unit.

As another example, the preset threshold is represented by d and d equals to 4. The base station can calculate the number of pieces of HARQ result information needed to be fed back by the terminal in each time domain unit, and the reference time domain unit is a time domain unit, within the target COT, that the number of pieces of HARQ result information needed to be fed back by the terminal is greater than 4. When there are multiple reference time domain units that the numbers of pieces of HARQ result information needed to be fed back by the terminal are greater than 4, the base station follows a predefined strategy to determine all the time domain units that the numbers of pieces of HARQ result information needed to be fed back by the terminal are greater than 4 as the reference time domain units.

As still another example, the base station may calculate the number of pieces of HARQ result information needed to be fed back by the terminal on each time domain unit.
A time

domain unit, within the target COT, that the number of pieces of HARQ result information needed to be fed back by the terminal is the maximum is determined as the reference time domain unit. If there are multiple time domain units that the numbers of pieces of HARQ result information needed to be fed back by the terminal are the same and the maximum, such as the number is 4, the base station can follow a predefined strategy to determine the first one of the time domain units that the numbers of pieces of HARQ result information needed to be fed back by the terminal are 4 as the target time domain unit, or determine all the time domain units that the numbers of pieces of HARQ result information needed to be fed back by the terminal are the maximum (i.e., 4) as the target time domain units. In embodiments of the disclosure, the preset threshold may be a positive integer, which is not limited in the disclosure.

In above embodiments, when the target information includes the HARQ result information needed to be fed back by the terminal, the base station can flexibly determine the reference time domain unit through the above manners, to adjust the value of the CWS accurately, to improve the NR- U system performance, and to achieve high availability.

In an embodiment, if the target information includes the feedback information respectively corresponding to the at least one HARQ process identifier, the base station may directly use all the time domain units including the target information as the reference time domain units, as illustrated in FIG. 4, the high availability is achieved.

For example, the target COT includes the feedback information respectively corresponding to HARQ process identifiers a, b, c, ..., the base station may perform statistics analysis on the feedback information corresponding to the HARQ process identifier on each time domain unit within the target COT, and determine all the time domain units including the target information as the reference time domain units. In an embodiment, as illustrated in FIG. 6, FIG. 6 is a flowchart illustrating another method for transmitting data according to embodiments of FIG. 2, the method further includes the following.

In block 103, indication information is sent to the terminal through a target signaling.

The indication information includes an identifier of the reference time domain unit, for example, a slot number corresponding to the reference time domain unit. Optionally, the target signaling may be a downlink scheduling signaling, a radio resource control (RRC)

WHAT IS CLAIMED IS:

1. A method for determining a reference time domain unit, executed by a device operating on an unlicensed spectrum, comprising:

determining the number of pieces of first information included in each time domain unit within a first channel occupation time (COT), wherein the first COT is a first COT just before the first device initiates channel detection; and

determining the reference time domain unit based on the number of pieces of first information.

2. The method according to claim 1, wherein the first information comprises one of: downlink data information that a base station requires a terminal to feed back a Hybrid Automatic Repeat Request (HARQ) result;

HARQ result information needed to be fed back by the terminal; or feedback information respectively corresponding to at least one HARQ process identifier.

3. The method according to claim 2, wherein determining the reference time domain unit based on the number of pieces of first information comprises:

determining a first time domain unit, within the first COT, that the number of pieces of first information is greater than a preset threshold as the reference time domain unit, in response to the first information comprising the downlink data information that the base station requires the terminal to feed back the HARQ result or the HARQ result information needed to be fed back by the terminal; or

determining each time domain unit, within the COT, that the number of pieces of first information is greater than the preset threshold as the reference time domain unit; or

determining a time domain unit, within the COT, that the number of pieces of first information included is maximum as the reference time domain unit.

4. The method according to claim 2, wherein determining the reference time domain unit based on the number of pieces of first information comprises:

determining each time domain unit comprising the first information as the reference

time domain unit, in response to the first information comprising the feedback information respectively corresponding to the at least one HARQ process identifier.

5. The method according to any one of claims 1 to 4, comprising:

sending indication information to the terminal, wherein the indication information comprises an identifier of the reference time domain unit.

6. The method according to any one of claims 1 to 5, wherein the reference time domain unit comprises a symbol, a slot, a sub-frame, or a radio frame.

7. An apparatus for determining a reference time domain unit, operating on an unlicensed spectrum, comprising:

a processing module, configured to determine the number of pieces of first information included in each time domain unit within a first channel occupation time (COT), wherein the first COT is a first COT just before the apparatus initiates channel detection; and

the processing module, further configured to determine the reference time domain unit based on the number of pieces of first information.

8. The apparatus according to claim 7, wherein the first information comprises one of:

downlink data information that a base station requires a terminal to feed back a Hybrid Automatic Repeat reQuest (HARQ) result;

HARQ result information needed to be fed back by the terminal; or

feedback information respectively corresponding to at least one HARQ process identifier.

9. The apparatus according to claim 8, wherein the processing module further configured to:

determine a first time domain unit, within the first COT, that the number of pieces of first information is greater than a preset threshold as the reference time domain unit, in response to the first information comprising the downlink data information that the base station requires the terminal to feed back the HARQ result or the HARQ result information needed to be fed back by the terminal; or

determine each time domain unit, within the COT, that the number of pieces of first information is greater than the preset threshold as the reference time domain unit; or

determine a time domain unit, within the COT, that the number of pieces of first information is maximum as the reference time domain unit.

10. The apparatus according to claim 8, wherein the processing module further configured to:

determine each time domain unit comprising the first information as the reference time domain unit, in response to the first information comprising the feedback information respectively corresponding to the at least one HARQ process identifier.

11. The apparatus according to any one of claims 7 to 10, comprising:

a sending module, configured to send indication information to the terminal through, wherein the indication information comprises an identifier of the reference time domain unit.

12. The apparatus according to any one of claims 7 to 11, wherein the reference time domain unit comprises a symbol, a slot, a sub-frame, or a radio frame.

13. A non-transitory computer-readable storage medium, wherein the storage medium has a computer program stored thereon, and the computer program is configured to execute a method for determining a reference time domain unit according to any one of claims 1 to 6.

14. An apparatus for determining a reference time domain unit, operating on an unlicensed spectrum, comprising:

a processor;

a memory for storing processor-executable instructions; wherein,

the processor is configured to execute a method for determining a reference time domain unit according to any one of claims 1 to 6.