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(54) Title: METHOD AND DEVICE FOR EXCHANGING AND MAPPING SIGNALING INFORMATION

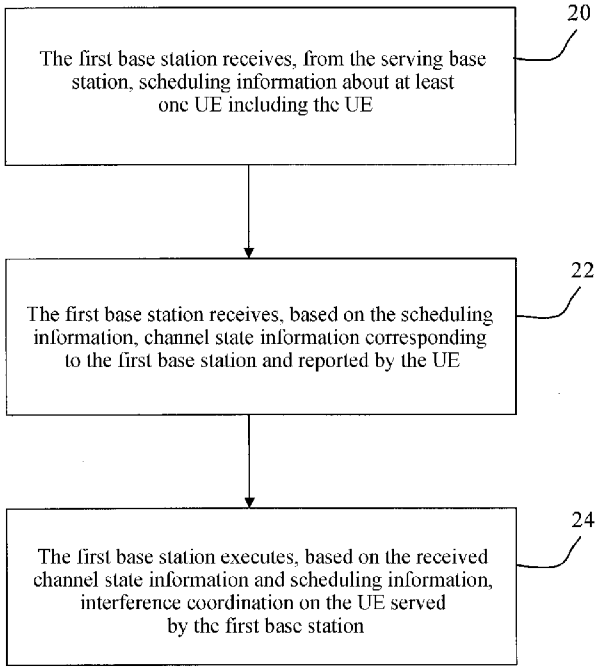

FIG. 2

(57) Abstract: The present invention relates to a method and a device for exchanging and mapping X2 signaling information, and supports dynamic interference coordination between multiple base stations based on an X2 interface. An embodiment of the present invention provides a method for exchanging and/or mapping X2 signaling information, and the method includes: receiving, by a neighboring base station from a serving base station of a user equipment (UE), scheduling information about at least one UE including the UE; receiving, by the neighboring base station based on the scheduling information, channel state information corresponding to the neighboring base station and reported by the UE; and executing, by the neighboring base station, interference coordination on the UE based on the received channel state information and scheduling information. The present invention solves the problem in the prior art that X2 does not support dynamic interference coordination, so that X2 signaling is improved and the development and application of new technologies are further promoted.

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METHOD AND DEVICE FOR EXCHANGING AND MAPPING SIGNALING INFORMATION

Background of the Invention

Field of the Invention

The present invention relates to signaling technologies in wireless communications, and in particular, to a method and a device for exchanging and mapping signaling information.

Description of the Prior Art

Coordinated multi-point transmission is a promising technology in the Long Term Evolution-Advanced (LTE-Advanced) project, and can effectively reduce inter-cell interference (ICI) and improve the high data speed coverage, cell edge throughput and/or system throughput. Specific implementation of multi-point coordination has different types of technical solutions, for example, coordinated scheduling/beamforming (CS/CB), dynamic point selection (DPS), and joint transmission (JT). The CS/CB does not require data sharing between multiple transmission points (TPs), and is considered as the most feasible technical solution in X2-based multi-base station coordination.

However, the current X2 signaling for downlink interference coordination only supports semi-static coordination, which fails to meet requirements of dynamic coordination. To achieve comprehensive downlink interference coordination between multiple base stations at an X2 interface, it is obviously necessary to make further improvements to the X2 signaling.

Summary of the Invention

An objective of the present invention is to provide a method and a device for exchanging and mapping X2 signaling information, and the method and device support dynamic interference coordination between multiple base stations based on an X2 interface.

An embodiment of the present invention provides a method for exchanging and/or mapping X2 signaling information. The method includes: receiving, by a neighboring base station from a serving base station of a user equipment (UE), scheduling information about at least one UE including the UE; receiving, by the neighboring base station based on the

scheduling information, channel state information corresponding to the neighboring base station and reported by the UE; and executing, by the neighboring base station, interference coordination on the UE based on the received channel state information and scheduling information.

In an embodiment, the scheduling information includes at least one of identification information of the UE, identification information of a target cell, subframe information and frequency information. The identification information of the UE includes a set of UE identifiers. The identification information of a target cell is a value of a cell identifier or a value of a virtual cell identifier. When the scheduling information includes the subframe information, the interference coordination is linked to the corresponding subframe information; when the scheduling information includes the frequency information, the interference coordination is linked to the corresponding frequency information; and when the scheduling information includes both the subframe information and the frequency information, the interference coordination is linked to the corresponding subframe information and frequency information. The interference coordination is executed in a manner that the neighboring base station reduces interference to the UE by using one or more methods including user scheduling, beamforming and power distribution. In an embodiment, the method further includes: receiving by the neighboring base station interference information from the serving base station, the interference information including interference threshold information. The interference threshold information indicates a maximum recommended interference value of a particular cell for a particular UE. The interference threshold information indicates interference threshold information of each UE indicated in the scheduling information, and interference information for each UE is maximum interference to the UE by each cell of the neighboring base station indicated in the scheduling information. In another embodiment, the interference threshold information indicates interference threshold information of each UE indicated in the scheduling information, and interference information for each UE is maximum interference to the UE by the neighboring base station. In an embodiment, the interference threshold information indicates the same interference threshold used by the neighboring base station for all the UEs indicated in the scheduling information. In another embodiment, the interference threshold information indicates the same interference

threshold used by each cell of the neighboring base station indicated in the scheduling information for all the UEs. In addition, each interference threshold indicated in the interference threshold information corresponds to a particular subframe, a particular frequency resource, a particular time-frequency resource or an entire time-frequency resource. The identification information of the UE in the scheduling information indicates configuration information required by the neighboring base station to receive the channel state information corresponding to the neighboring base station and reported by the UE; the configuration information includes cell identification for physical uplink control channel scramble, subframe configuration, and resource configuration; and the cell identification is a cell identifier or a virtual cell identifier. In another embodiment, the channel state information includes part of or all channel state information corresponding to the neighboring base station and reported by the UE indicated by the identification information of the UE in the scheduling information. In addition, in mapping, the interference threshold information further includes interference restriction mapping information, and each position in a bitmap indicates starting or canceling the interference coordination in a corresponding subframe, frequency or subframe-frequency resource.

An embodiment of the present invention further provides a neighboring base station, including a scheduling information receiving device, for receiving, from a serving base station of a UE, scheduling information about at least one UE including the UE; a channel state information receiving device, for receiving, based on the scheduling information, channel state information corresponding to the base station and reported by the UE; and an interference coordination executing device, for executing interference coordination on the UE based on the received channel state information and scheduling information.

An embodiment of the present invention further provides a serving base station, including a scheduling information sending device, for sending scheduling information including at least one UE to a neighboring base station.

The X2 signaling proposed in the present invention solves the problem in the prior art that X2 does not support dynamic interference coordination, so that the X2 signaling is improved and the development and application of new technologies are further promoted.

Brief description of the drawings

FIG. 1 is a schematic structural view of an interference coordination network based on an X2 interface;

FIG. 2 is a flow chart of a method for exchanging and/or mapping X2 signaling information according to an embodiment of the present invention; and

FIG. 3 is a schematic structural view of a base station 12 according to an embodiment of the present invention.

Detailed Description

For better comprehension of the spirit of the present invention, a further description is provided in the following with reference to some exemplary embodiments of the present invention.

According to the current LTE/LTE-A protocol, X2 signaling for downlink interference coordination is designed for supporting inter-cell interference coordination (ICIC), and only includes relative narrowband transmission power (RNTP) and almost blank subframe (ABS) mode information. The RNTP indicates downlink power limit of one cell of a sending base station in each physical resource block, and the ABS mode information instructs the sending base station to set a cell subframe as an ABS. Such two pieces of signaling only support semi-static resource coordination, which obviously cannot meet the situation where dynamic coordination is required, for example, CS/CB, so as to implement dynamic coordination in frequency, time, scheduling, beamforming and the like in a coordination set.

The X2 signaling according to the embodiment of the present invention solves the above problem.

FIG. 1 is a schematic structural view of an interference coordination network 10 based on an X2 interface. As shown in FIG. 1, the interference coordination network 10 includes two (or more) base stations 12, that is, eNB1 and eNB2, and the two base stations 12 are logically connected through an X2 interface. Each of the base stations 12 includes one or more TPs 14, for example, eNB1 has three TPs: radio resource head (RRH)1-1, RRH1-2, and RRH1-3, while eNB2 has one TP: RRH2-1. According to different application scenarios, the same base station 12, for example, the multiple TPs 14 of eNB1, may have the same cell

identifier or different cell identifiers.

FIG. 2 is a flow chart of a method for exchanging and/or mapping X2 signaling information according to an embodiment of the present invention, and the method can support dynamic interference coordination between the multiple base stations 12 in FIG. 1. As shown in FIG. 2, for a UE supporting interference coordination, a serving base station of the UE, for example, a base station eNB2, finds that it is under interference from another base station (a neighboring base station, which may be a neighboring base station in general sense or another serving base station other than the above-mentioned serving base station), for example, a first base station eNB1, and decides to implement interference coordination on the UE; and therefore, sends scheduling information, corresponding to the first base station, of the UE, so that the first base station can directly detect channel state information corresponding to the base station and reported by the UE. In fact, in many embodiments, such UEs managed by the serving base station are multiple, and they are sent together. In Step 20, the first base station receives, from the serving base station, scheduling information about at least one UE including the UE. In Step 22, the first base station receives, based on the scheduling information, channel state information corresponding to the first base station and reported by the UE. Then, in Step 24, the first base station executes interference coordination on the UE based on the received channel state information and scheduling information, for example, executes scheduling and beamforming to reduce interference on the UE in a latent subframe and/or frequency.

In an embodiment, the scheduling information includes at least one of identification information of the UE, identification information of a target cell, subframe information and frequency information. The identification information of the UE includes a set of UE identifiers, and each UE indicated in the set of UE identifiers is served by a serving base station of the UE. In addition, the identification information of the UE is a real UE identification value or a UE identification indicator. According to different application scenarios, the identification information of a target cell may be a value of a cell identifier for channel state information-reference signal (CSI-RS) scramble initialization or a value of a virtual cell identifier, for example, it is a virtual cell identifier in Scenario 4. The subframe information and the frequency information are non-mandatory, and both can be exchanged or

only one is exchanged. When the scheduling information includes the subframe information, the interference coordination is linked to the corresponding subframe information, and when the scheduling information includes the frequency information, the interference coordination is linked to the corresponding frequency information. Evidently, when the scheduling information includes both the subframe information and the frequency information, the interference coordination is linked to the corresponding subframe information and frequency information.

In addition, according to an embodiment of the present invention, a serving base station may send interference information for another interference coordination base station to make reference when performing scheduling and beamforming. A first base station may receive the interference information from the serving base station, and in an embodiment, the interference information includes interference threshold information. Table 1 shows setting of interference threshold information in X2 signaling according to an embodiment of the present invention.

Table 1 Interference information setting

Scheduling information		Interference information
Identification information of target cell	Identification information of UE	
Target cell #1	UE identifier #1	Interference threshold #1
	UE identifier #2	Interference threshold #2
Target cell #2	UE identifier #2	Interference threshold #3
	UE identifier #3	Interference threshold #4
	UE identifier #4	Interference threshold #5

As shown in Table 1, the interference threshold information indicates a maximum recommended interference value of a particular cell for a particular UE. For example, for a target cell identifier #1, scheduling information received by the target cell specifies that interference information of the target cell for UE #1 and UE #2 is interference threshold #1 and interference threshold #2, respectively. Similarly, for a target cell identifier #2, scheduling information received by the target cell specifies that interference information of the target cell for UE #2, UE #3 and UE #4 is interference threshold #3, interference threshold #4 and interference threshold #5, respectively. In other words, for the same UE, in the scheduling information sent by the serving base station to another base station, for example,

the first base station, interference thresholds set for different cells may not be the same.

Table 2 shows setting of interference threshold information in X2 signaling according to another embodiment of the present invention.

Table 2 Interference information setting

Identification information of UE	Interference information
UE identifier #1	Interference threshold #1
UE identifier #2	Interference threshold #2
UE identifier #3	Interference threshold #3
UE identifier #4	Interference threshold #4

As shown in Table 2, the interference threshold information indicates interference threshold information of each UE indicated in the scheduling information regardless of its target cell, and specifically, interference information for each UE may be maximum interference to the same UE by each cell of a base station indicated in the scheduling information, for example, the first base station. Moreover, in an embodiment, the serving base station may set the same interference threshold for all the UEs, that is, the interference threshold information indicates the same interference threshold used by each cell of the first base station for all the UEs indicated in the scheduling information.

In another embodiment, the interference threshold information indicates interference threshold information of each UE indicated in the scheduling information, and it is slightly different from the embodiment shown in Table 2 in that, interference information for each UE may be maximum interference to the UE by the first base station, that is, a total sum of interference to the same UE by the indicated cells that are managed by the first base station cannot exceed the interference threshold. Similarly, in an embodiment, the serving base station may set the same interference threshold for all the UEs, that is, the interference threshold information indicates the same interference threshold used by the first base station indicated in the scheduling information for all the UEs.

In addition, in some embodiments, the interference threshold information further indicates a particular subframe, a particular frequency resource, a particular time-frequency resource or an entire time-frequency resource corresponding to each interference threshold.

To enable the first base station to detect uplink information of a UE indicated by service

identification information of the UE and receive channel state information, reported by the UE, about a cell indicated by the identification information of a target cell, the identification information of the UE in the scheduling information indicates configuration information required by the base station to receive the channel state information corresponding to the base station and reported by the UE. The configuration information may include cell identification for physical uplink control channel scramble, subframe configuration, and resource configuration; and the cell identification information is a value of a cell identifier or a value of a virtual cell identifier.

In some embodiments, the channel state information includes part of or all channel state information corresponding to the first base station and reported by the UE indicated by the identification information of the UE in the scheduling information. That is, the scheduling information may directly include the channel state information.

The signaling information, that is, the basic scheduling information, interference information, channel state information and the like can be designed into different combinations in mapping. Table 3 is a mapping scheme of X2 signaling information according to an embodiment of the present invention. The mapping scheme is set based on the scheduling information including the interference thresholds shown in Table 1, that is, indicates a maximum recommended interference value of each cell for a particular UE. For brevity, Table 3 only shows mapping for Target cell #1 and for UE #1, and other mapping may be deduced by analogy. The interference threshold information in the mapping scheme further indicates a particular subframe, a particular frequency resource, a particular time-frequency resource or an entire time-frequency resource corresponding to each interference threshold. The channel state information corresponding to the UE identifier indicates configuration information required by the base station to receive the channel state information corresponding to the base station and reported by the UE. The configuration information may include cell identification for physical uplink control channel scramble, subframe configuration, and resource configuration. It should be noted that, in mapping, the interference threshold information further includes interference restriction mapping information, and each position in a bitmap indicates starting or canceling the interference coordination in a corresponding subframe, frequency or subframe-frequency resource.

Whether interference setting is adopted can be indicated with different values, for example, 0 indicates that an indicated UE has no interference restriction, and 1 indicates that an indicated UE has interference restriction.

Table 3 Mapping of scheduling information, interference information and channel state information

Name		Description
>Target cell identifier #1		Cell identifier or virtual cell identifier of Target cell identifier #1
>>	UE identifier #1	Include the following information corresponding to UE #1: Cell identification for PUCCH scramble Subframe configuration Resource configuration
	Interference threshold #1	Interference threshold value corresponding to UE #1
	Interference restriction mapping #1	Each position in a bitmap indicates starting or canceling the interference coordination in a corresponding subframe, frequency or subframe-frequency resource, 0 indicates that an indicated UE has no interference restriction, and 1 indicates that an indicated UE has interference restriction.
>>	UE identifier #2	…
	Interference threshold #2	…
	Interference restriction mapping #2	…
>>	…	
>Target cell identifier #2		Cell identifier or virtual cell identifier of Target cell identifier #2
>>	…	
>…		

In another embodiment, the channel state information may be sent separately from the identification information of the UE. For example, the embodiment shown in Table 3 can be divided into Table 4 in which only scheduling information and interference threshold information are sent and Table 5 in which channel state information is sent additionally.

Table 4 Mapping of scheduling information and interference threshold information

Name		Description
>Target cell identifier #1		Cell identifier or virtual cell identifier of Target cell identifier #1
>>	UE identifier #1	UE identifier #1

	Interference threshold #1	Interference threshold value corresponding to UE #1
	Interference restriction mapping #1	Each position in a bitmap indicates starting or canceling the interference coordination in a corresponding subframe, frequency or subframe-frequency resource, 0 indicates that an indicated UE has no interference restriction, and 1 indicates that an indicated UE has interference restriction.
>>	UE identifier #2	…
	Interference threshold #2	…
	Interference restriction mapping #2	…
>>	…	
>Target cell identifier #2		Cell identifier or virtual cell identifier of Target cell identifier #2
>>	…	
>…		

Table 5 Mapping of channel state information

Name		Description
>Target cell identifier #1		Cell identifier or virtual cell identifier of Target cell identifier #1
>>	UE identifier #1	Include the following information corresponding to UE #1: Cell identification for PUCCH scramble Subframe configuration •Resource configuration
>>	UE identifier #2	…
>>	…	
>Target cell identifier #2		Cell identifier or virtual cell identifier of Target cell identifier #2
>>	…	
>…		

Definitely, Table 5 also can be simplified into Table 6, that is, only channel state information of each UE is listed.

Table 6 Channel state information

Name	Description
UE identifier #1	Include the following information corresponding to UE #1: Cell identification for PUCCH scramble Subframe configuration •Resource configuration
UE identifier #2	…

When the scheduling information directly includes channel state information corresponding to a cell of the base station and reported by each UE, the identification information of the UE may include a sequence number of the channel state information, the sequence number can be used for identifying channel state information fed back by the serving base station in different information or processes, and the channel state information includes, for example, one or more of a precoding matrix indicator (PMI), a channel quality indicator (CQI), and a rank indicator (RI). The embodiment shown in Table 3 can be evolved into that shown in Table 7, and the corresponding channel state information that is fed back is shown in Table 8.

Table 7

Name		Description
>Target cell identifier #1		Cell identifier or virtual cell identifier of Target cell identifier #1
>>	UE identifier #1	CSI#1
	Interference threshold #1	Interference threshold value corresponding to UE #1
	Interference restriction mapping #1	Each position in a bitmap indicates starting or canceling the interference coordination in a corresponding subframe, frequency or subframe-frequency resource, 0 indicates that an indicated UE has no interference restriction, and 1 indicates that an indicated UE has interference restriction.
>>	UE identifier #2	…
	Interference threshold #2	…
	Interference restriction mapping #2	…
>>	…	
>Target cell identifier #2		Cell identifier or virtual cell identifier of Target cell identifier #2
>>	…	
>…		

Table 8

Name		Description
>Target cell identifier #1		Cell identifier or virtual cell identifier of Target cell identifier #1
>>	CSI#1	•Include one or more of PMI, CQI and RI
>>	CSI#2	…
>>	…	
>Target cell identifier #2		Cell identifier or virtual cell identifier of Target cell identifier # 2

>>	…
>…	

Similarly, in another embodiment, the identification information of the UE may further include long-term channel information in addition to the channel state information. In other words, the item corresponding to the UE identifier #1 in Table 7 may be CSI#1 and/or long-term channel information #1, and correspondingly, Table 8 may include the long-term channel information #1.

Table 9 shows an embodiment that multiple UE identifiers share some interference restriction mapping.

Table 9

Information		
>Target cell #1		
>>	>>>	UE identifier #1
	>>>	Interference threshold #1
	>>>	UE identifier #2
	>>>	Interference threshold #2
	>>>	…
	Interference restriction mapping #1	
>>	…	
>Target cell identifier #2		
>>		
>…		

When all the indicated UEs share the same interference threshold for the same cell, Table 9 can be evolved into the mapping embodiment shown in Table 10.

Table 10

Information	
>Target cell identifier #1	
>>	{UE identifier #1, UE identifier #2, …}
	Interference threshold #1
	Interference restriction mapping #1
>>	…
>Target cell identifier #2	
>>	
>…	

The above mapping embodiment demonstrates mapping from a target cell identifier to a

UE cell identifier, and in some embodiments, a manner of mapping from a UE cell identifier to a target cell identifier can be adopted, as shown in Table 11.

Table 11

Identification information of UE	Identification information of target cell
UE identifier #1	Target cell identifier #1
UE identifier #2	Target cell identifier #1, Target cell identifier #2
UE identifier #3	Target cell identifier #2, Target cell identifier #3

Persons skilled in the art should understand that, the method for exchanging and mapping X2 signaling according to the present invention is not limited to the above embodiment, but should include combinations of any changes made on the basis of essence of the X2 signaling demonstrated.

Besides, corresponding to the method for exchanging and mapping X2 signaling information according to the present invention, the present invention further provides a communication system including corresponding base stations, for example, a serving base station and a neighboring base station. FIG. 3 is a schematic structural view of a communication system 11 according to an embodiment of the present invention. As shown in FIG. 3, a neighboring base station 110, for example, a first base station eNB1, in the communication system 11 includes a scheduling information receiving device 120, for receiving, from a serving base station 112 of a UE (not shown), for example, a scheduling information sending device 126 of eNB2, scheduling information about at least one UE including the UE; a channel state information receiving device 122, for receiving, based on the scheduling information, channel state information corresponding to the base station 12 and reported by the UE; and an interference coordination executing device 124, for executing, based on the received channel state information, interference coordination on the UE served by the base station 12.

It should be noted that with the development of the technology and update of the standard, components with the same function generally have different names. The technical terms in the specification of the present invention patent application are used to explain and demonstrate the technical solutions of the present invention, and shall be subject to common functions in the technical field rather than being randomly understood merely according to the

names thereof.

The technical content and technical features of the present invention are disclosed above, and persons skilled in the art may still make various replacements and modifications without departing from the spirit of the present invention on the basis of the teaching and disclosure of the present invention. Hence, the protection scope of the present invention shall not be limited to the content disclosed by the embodiments, but shall cover all replacements and modifications not departing from the present invention and shall subject to the claims of the present patent application.

We Claim:

1. A method for exchanging or mapping X2 signaling information, comprising:

receiving, by a neighboring base station from a serving base station of a user equipment (UE), scheduling information about at least one UE comprising the UE;

receiving, by the neighboring base station based on the scheduling information, channel state information corresponding to the neighboring base station and reported by the UE; and

executing, by the neighboring base station, interference coordination on the UE based on the received channel state information and scheduling information.

2. The method according to claim 1, wherein the scheduling information comprises at least one of identification information of the UE, identification information of a target cell, subframe information and frequency information.

3. The method according to claim 2, wherein the identification information of the UE comprises a set of UE identifiers.

4. The method according to claim 2, wherein the identification information of a target cell is a value of a cell identifier or a value of a virtual cell identifier.

5. The method according to claim 2, wherein when the scheduling information comprises the subframe information, the interference coordination is linked to the corresponding subframe information; when the scheduling information comprises the frequency information, the interference coordination is linked to the corresponding frequency information; and when the scheduling information comprises both the subframe information and the frequency information, the interference coordination is linked to the corresponding subframe information and frequency information.

6. The method according to claim 1, wherein the interference coordination is executed in a manner that the neighboring base station reduces interference to the UE by using one or more methods comprising user scheduling, beamforming and power distribution.

7. The method according to claim 1, further comprising: receiving by the neighboring base station interference information from the serving base station, the interference information comprising interference threshold information.

8. The method according to claim 7, wherein the interference threshold information

indicates a maximum recommended interference value of a particular cell for a particular UE.

9. The method according to claim 7, wherein the interference threshold information indicates interference threshold information of each UE indicated in the scheduling information, and interference information for each UE is maximum interference to the UE by each cell of the neighboring base station indicated in the scheduling information.

10. The method according to claim 7, wherein the interference threshold information indicates interference threshold information of each UE indicated in the scheduling information, and interference information for each UE is maximum interference to the UE by the neighboring base station.

11. The method according to claim 7, wherein the interference threshold information indicates the same interference threshold used by the neighboring base station for all the UEs indicated in the scheduling information.

12. The method according to claim 7, wherein the interference threshold information indicates the same interference threshold used by each cell of the neighboring base station indicated in the scheduling information for all the UEs.

13. The method according to any one of claims 7-12, wherein each interference threshold indicated in the interference threshold information corresponds to a particular subframe, a particular frequency resource, a particular time-frequency resource or an entire time-frequency resource.

14. The method according to claim 1 or 7, wherein the scheduling information indicates configuration information required by the neighboring base station to receive the channel state information corresponding to the neighboring base station and reported by the UE; the configuration information comprises cell identification for physical uplink control channel scramble, subframe configuration, and resource configuration; and the cell identification is a cell identifier or a virtual cell identifier.

15. The method according to claim 1 or 7, wherein the channel state information comprises part of or all channel state information corresponding to the neighboring base station and reported by the UE indicated by the identification information of the UE in the scheduling information, and the identification information of the UE is a real UE identification value or a UE identification indicator.

16. The method according to claim 7, wherein the interference threshold information further comprises interference restriction mapping information, and each position in a bitmap indicates starting or canceling the interference coordination in a corresponding subframe, frequency or subframe-frequency resource.

17. A base station, comprising:

a scheduling information receiving device, for receiving, from a serving base station of a user equipment (UE), scheduling information about at least one UE comprising the UE;

a channel state information receiving device, for receiving, based on the scheduling information, channel state information corresponding to the base station and reported by the UE; and

an interference coordination executing device, for executing interference coordination on the UE based on the received channel state information and scheduling information.

18. The base station according to claim 17, wherein the scheduling information comprises at least one of identification information of the UE, identification information of a target cell, subframe information and frequency information.

19. The base station according to claim 18, wherein the identification information of the UE comprises a set of UE identifiers.

20. The base station according to claim 18, wherein the identification information of a target cell is a value of a cell identifier or a value of a virtual cell identifier.

21. The base station according to claim 18, wherein when the scheduling information comprises the subframe information, the interference coordination is linked to the corresponding subframe information; when the scheduling information comprises the frequency information, the interference coordination is linked to the corresponding frequency information; and when the scheduling information comprises both the subframe information and the frequency information, the interference coordination is linked to the corresponding subframe information and frequency information.

22. The base station according to claim 17, wherein the interference coordination is executed in a manner that the base station reduces interference to the UE by using one or

more methods comprising user scheduling, beamforming and power distribution.

23. The base station according to claim 17, wherein the base station further receives interference information from the serving base station, the interference information comprising interference threshold information.

24. The base station according to claim 23, wherein the interference threshold information indicates a maximum recommended interference value of a particular cell for a particular UE.

25. The base station according to claim 23, wherein the interference threshold information indicates interference threshold information of each UE indicated in the scheduling information, and interference information for each UE is maximum interference to the UE by each cell of the base station indicated in the scheduling information.

26. The base station according to claim 23, wherein the interference threshold information indicates interference threshold information of each UE indicated in the scheduling information, and interference information for each UE is maximum interference to the UE by the base station.

27. The base station according to claim 23, wherein the interference threshold information indicates the same interference threshold used by the base station for all the UEs indicated in the scheduling information.

28. The base station according to claim 23, wherein the interference threshold information indicates the same interference threshold used by each cell of the base station indicated in the scheduling information for all the UEs.

29. The base station according to any one of claims 23-28, wherein each interference threshold indicated in the interference threshold information corresponds to a particular subframe, a particular frequency resource, a particular time-frequency resource or an entire time-frequency resource.

30. The base station according to claim 23, wherein the interference threshold information further comprises interference restriction mapping information, and each position in a bitmap indicates starting or canceling the interference coordination in a corresponding subframe, frequency or subframe-frequency resource.

31. The base station according to claim 17 or 23, wherein the scheduling information

indicates configuration information required by the base station to receive the channel state information corresponding to the base station and reported by the UE; the configuration information comprises cell identification for physical uplink control channel scramble, subframe configuration, and resource configuration; and the cell identification is a cell identifier or a virtual cell identifier.

32. The base station according to claim 17 or 23, wherein the channel state information comprises part of or all channel state information corresponding to the base station and reported by the UE indicated by the identification information of the UE in the scheduling information, and the identification information of the UE is a real UE identification value or a UE identification indicator.

33. A base station, comprising:

a scheduling information sending device, for sending scheduling information of at least one user equipment (UE) to a neighboring base station.

34. The base station according to claim 33, wherein the scheduling information comprises at least one of identification information of the UE, identification information of a target cell, subframe information and frequency information.

35. The base station according to claim 34, wherein the identification information of the UE comprises a set of UE identifiers.

36. The base station according to claim 34, wherein the identification information of a target cell is a value of a cell identifier or a value of a virtual cell identifier.

37. The base station according to claim 34, wherein when the scheduling information comprises the subframe information, the interference coordination of the neighboring base station is linked to the corresponding subframe information; when the scheduling information comprises the frequency information, the interference coordination is linked to the corresponding frequency information; and when the scheduling information comprises both the subframe information and the frequency information, the interference coordination is linked to the corresponding subframe information and frequency information.

38. The base station according to claim 33, wherein the base station further sends interference information, the interference information comprising interference threshold information.

39. The base station according to claim 38, wherein the interference threshold information indicates a maximum recommended interference value of a particular cell for a particular UE.

40. The base station according to claim 38, wherein the interference threshold information indicates interference threshold information of each UE indicated in the scheduling information, and interference information for each UE is maximum interference to the UE by each cell of the neighboring base station indicated in the scheduling information.

41. The base station according to claim 38, wherein the interference threshold information indicates interference threshold information of each UE indicated in the scheduling information, and interference information for each UE is maximum interference to the UE by the neighboring base station.

42. The base station according to claim 38, wherein the interference threshold information indicates the same interference threshold used by the neighboring base station for all the UEs indicated in the scheduling information.

43. The base station according to claim 38, wherein the interference threshold information indicates the same interference threshold used by each cell of the neighboring base station indicated in the scheduling information for all the UEs.

44. The base station according to any one of claims 38-43, wherein each interference threshold indicated in the interference threshold information corresponds to a particular subframe, a particular frequency resource, a particular time-frequency resource or an entire time-frequency resource.

45. The base station according to claim 38, wherein the interference threshold information further comprises interference restriction mapping information, and each position in a bitmap indicates starting or canceling the interference coordination in a corresponding subframe, frequency or subframe-frequency resource.

46. The base station according to claim 33 or 38, wherein the scheduling information indicates configuration information required by the neighboring base station to receive the channel state information corresponding to the neighboring base station and reported by the UE; the configuration information comprises cell identification for physical uplink control channel scramble, subframe configuration, and resource configuration; and the cell

identification is a cell identifier or a virtual cell identifier.

47. The base station according to claim 33 or 38, wherein the channel state information comprises part of or all channel state information corresponding to the neighboring base station and reported by the UE indicated by the identification information of the UE in the scheduling information, and the identification information of the UE is a real UE identification value or a UE identification indicator.

48. A communication system, comprising:

a user equipment (UE);

a serving base station of the UE, comprising a scheduling information sending device; and

a neighboring base station, comprising:

a scheduling information receiving device, for receiving, from the scheduling information sending device of the serving base station, scheduling information about at least one UE comprising the UE;

a channel state information receiving device, for receiving, based on the scheduling information, channel state information corresponding to the base station and reported by the UE; and

an interference coordination executing device, for executing interference coordination on the UE based on the received channel state information and scheduling information.

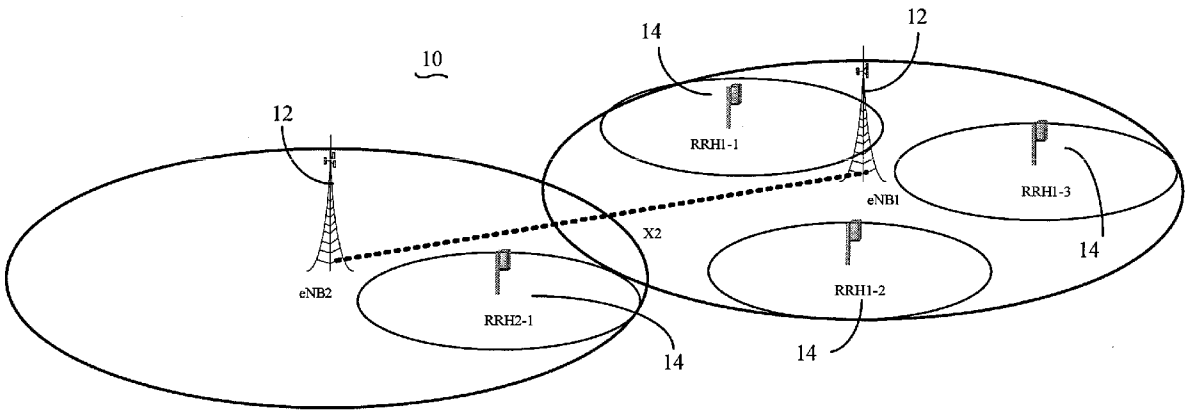

FIG. 1

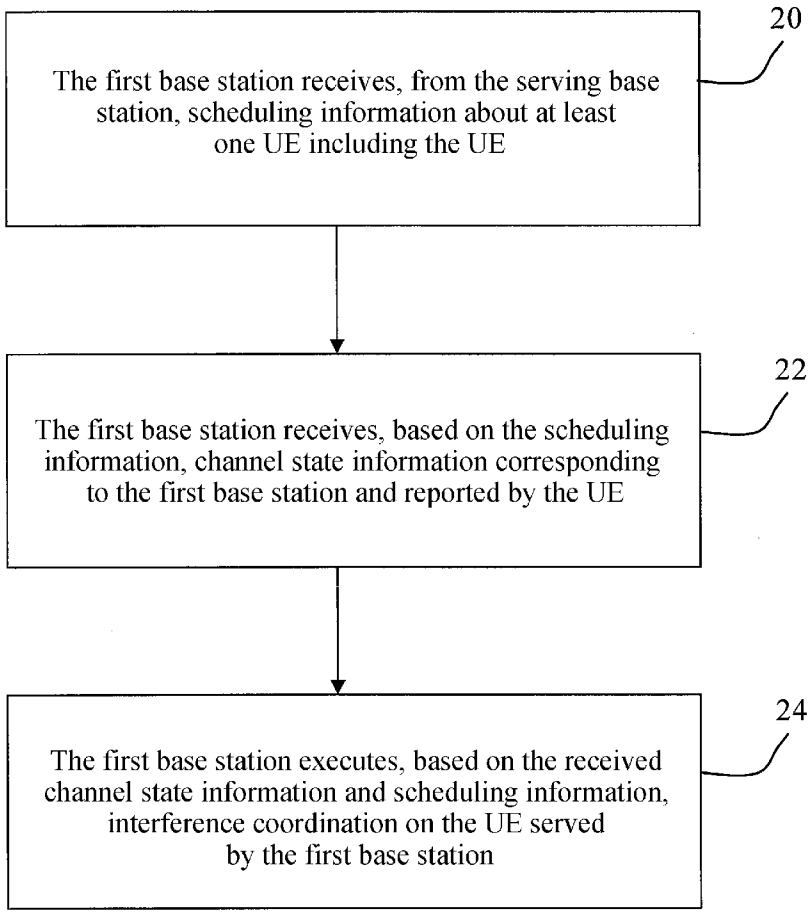
20
The first base station receives, from the serving base station, scheduling information about at least one UE including the UE
22
The first base station receives, based on the scheduling information, channel state information corresponding to the first base station and reported by the UE
24
The first base station executes, based on the received channel state information and scheduling information, interference coordination on the UE served by the first base station

FIG. 2

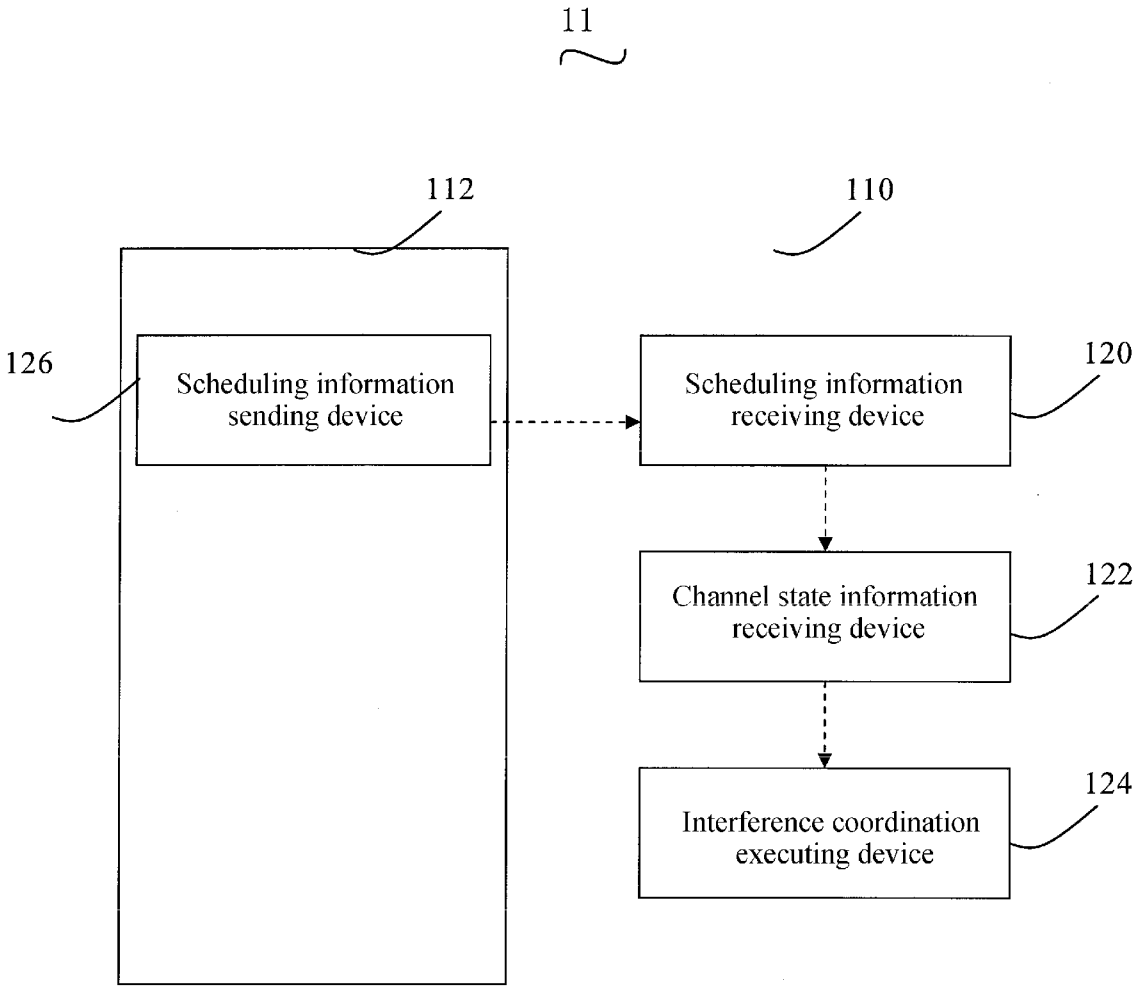
11
112
110
126
Scheduling information sending device
Scheduling information receiving device
120
Channel state information receiving device
122
Interference coordination executing device
124

FIG. 3