different ABSs between macro eNodeBs has been discussed. If multiple_ABS is introduced, macro eNodeBs setting the same subframe as the ABS and macro eNodeBs not setting the same subframe as the ABS are mixed among a plurality of neighboring macro eNodeBs. As a result, even in subframes which are set as ABSs by a macro eNodeB, a received signal of a UE belonging to a pico eNodeB may receive interference from neighboring macro eNodeBs.

[0007]

~~Therefore,~~Embodiments of the present ~~disclosure~~invention proposes a new and improved communication control device, communication method, communication terminal and program, which can appropriately determine a protection status from interference of each communication frame. Whether an ABS configuration is well-suited to a particular cell or area may depend on the number of communication terminals in that cell or area. Thus, one advantage of multiple_ABS technology is that it allows macro eNodeBs to use different ABS configurations in different cells or areas, which protects communication terminals from interference without unduly limiting the terminals' communication throughput. However, as described above, the use of multiple_ABS technology gives rise to a scenario in which one or more base stations near a terminal treat a given subframe as an ABS, while one or more other base stations near the terminal do not treat the subframe as an ABS. As a result, the terminal may experience some interference associated with the subframe. Some ~~aspects~~embodiments of the present ~~disclosure~~invention relate to techniques for determining whether the terminal should attempt to communicate when such interference is present.

[0008]

~~According to an embodiment of the present disclosure, there is provided a communication control device including a communication unit and a determination unit. The communication unit is configured to: send configuration information to a terminal device, the configuration information indicating that a first protection status is associated with frames, and receive measurement information from the terminal device, the measurement information indicating a signal quality associated with at least one of the frames. The determination unit configured to determine, based at least in part on the measurement information, whether to associate one or more of the frames with a second protection status. According to another embodiment of the present disclosure, there is provided a communication terminal including: a measurement unit configured to obtain one or more measurement results indicating signal quality associated with one or more frames, the one or more frames being associated with a same protection status; and~~

~~a communication unit configured to send measurement information to a communication control device, wherein the measurement information depends on the one or more measurement results.~~

According to a first aspect of the present invention, there is provided a communication control device comprising: a communication unit configured to: send configuration information to a terminal device, the configuration information indicating that a first protection status is associated with frames, and receive measurement information from the terminal device, the measurement information indicating a signal quality associated with at least one of the frames; and a determination unit configured to determine, based at least in part on the measurement information, whether to associate one or more of the frames with a second protection status.

According to a second aspect of the present invention, there is provided a method comprising: transmitting configuration information to a terminal device, the configuration information indicating that a first protection status is associated with frames; receiving measurement information from the terminal device, the measurement information indicating a signal quality associated with at least one of the frames; and determining, based at least in part on the measurement information, whether to associate one or more of the frames with a second protection status.

According to a third aspect of the present invention, there is provided a computer-readable medium having recorded thereon a computer program which, when executed by at least one processing unit, performs a method comprising: transmitting configuration information to a terminal device, the configuration information indicating that a first protection status is associated with frames; receiving measurement information from the terminal device, the measurement information indicating a signal quality associated with at least one of the frames; and determining, based at least in part on the measurement information, whether to associate one or more of the frames with a second protection status.

[0009]

~~According to another embodiment of the present disclosure, there is provided a~~

~~method including: transmitting configuration information to a terminal device, the configuration information indicating that a first protection status is associated with frames; receiving measurement information from the terminal device, the measurement information indicating a signal quality associated with at least one of the frames; and determining, based at least in part on the measurement information, whether to associate one or more of the frames with a second protection status.~~

~~According to another embodiment of the present disclosure, there is provided a method including: obtaining one or more measurement results indicating signal quality associated with one or more frames; and sending measurement information to a communication control device, wherein the measurement information depends on the one or more measurement results.~~

According to a fourth aspect of the present invention, there is provided a communication terminal comprising: a measurement unit configured to obtain one or more measurement results indicating signal quality associated with one or more frames, the one or more frames being associated with a same protection status; and a communication unit configured to send measurement information to a communication control device, wherein the measurement information depends on the one or more measurement results.

According to a fifth aspect of the present invention, there is provided a method comprising: obtaining one or more measurement results indicating signal quality associated with one or more frames; and sending measurement information to a communication control device, wherein the measurement information depends on the one or more measurement results.

According to a sixth aspect of the present invention, there is provided a computer-readable medium having recorded thereon a computer program which, when executed by at least one processing unit, performs a method comprising: obtaining one or more measurement results indicating signal quality associated with one or more frames; and sending measurement information to a communication control device, wherein the measurement information is depends on the one or more measurement results.

[0010]

~~According to another embodiment of the present disclosure, there is provided a computer-~~

~~readable medium having recorded thereon a computer program which, when executed by at least one processing unit, performs a method including:~~

~~transmitting configuration information to a terminal device, the configuration information indicating that a first protection status is associated with frames; receiving measurement information from the terminal device, the measurement information indicating a signal quality associated with at least one of the frames; and~~

~~determining, based at least in part on the measurement information, whether to associate one or more of the frames with a second protection status.~~

~~According to another embodiment of the present disclosure, there is provided a computer-readable medium having recorded thereon a computer program which, when executed by at least one processing unit, performs a method including: obtaining one or more measurement results indicating signal quality associated with one or more frames; and sending measurement information to a communication control device, wherein the measurement information is depends on the one or more measurement results.~~

~~According to another embodiment of the present disclosure, there is provided a wireless communication system including: a base station, a communication control device, and a terminal. The base station includes a first communication unit. The communication control device includes a second communication unit and determination unit. The terminal includes a measurement unit and a third communication unit. The first communication unit of the base station is configured to send configuration information to the communication control device, the configuration information indicating that a first protection status is associated with frames. The second communication unit of the communication control device is configured to send the configuration information to the terminal device. The measurement unit of the terminal device is configured to obtain one or more measurement results indicating signal~~

~~quality associated with one or more of the frames. The third communication unit of the terminal device is configured to send measurement information to the communication control device, wherein the measurement information depends on the one or more measurement results. The determination unit of the communication control device is configured to determine, based at least in part on the measurement information, whether to associate one or more of the frames with a second protection status.~~

According to a seventh aspect of the present invention, there is provided a wireless communication system comprising: a base station including a first communication unit; a communication control device including a second communication unit and determination unit; and a terminal including a measurement unit and a third communication unit, wherein: the first communication unit of the base station is configured to send configuration information to the communication control device, the configuration information indicating that a first protection status is associated with frames, the second communication unit of the communication control device is configured to send the configuration information to the terminal device, the measurement unit of the terminal device is configured to obtain one or more measurement results indicating signal quality associated with one or more of the frames, the third communication unit of the terminal device is configured to send measurement information to the communication control device, wherein the measurement information depends on the one or more measurement results, and the determination unit of the communication control device is configured to determine, based at least in part on the measurement information, whether to associate one or more of the frames with a second protection status.

[Advantageous Effects of Invention]

[0011]

As described above, according to embodiments of the present ~~disclosure~~ invention, a protection status from interference of each communication frame can be appropriately determined.

[Brief Description of Drawings]

[0012]

[Fig. 1]

Fig. 1 is an explanatory diagram illustrating a configuration of a communication system according to an embodiment of the present disclosure.

[Fig. 2]

Fig. 2 is an explanatory diagram illustrating a 4G frame format.

[Fig. 3]

Fig. 3 is an explanatory diagram illustrating a range expansion area of a pico eNodeB 30.

[Fig. 4]

Fig. 4 is an explanatory diagram illustrating a subframe set as an ABS.

[Fig. 5]

Fig. 5 is an explanatory diagram illustrating a subframe set as an MBSFN type ABS.

[Fig. 6]

Fig. 6 is an explanatory diagram illustrating specific examples of configurations.

[Fig. 7]

Fig. 7 is a functional block diagram illustrating a configuration of an eNodeB according to a first embodiment of the present disclosure.

[Fig. 8]

Fig. 8 is an explanatory diagram illustrating a specific example of a determination by an interference determination unit.

[Fig. 9]

Fig. 9 is a flowchart illustrating an operation of an eNodeB according to a first embodiment of the present disclosure.

[Fig. 10]

Fig. 10 is an explanatory diagram illustrating a modified example of a determination by an interference determination unit.

[Fig. 11]

Fig. 11 is a flowchart illustrating an operation of an eNodeB according to the modified example.

[Fig. 12]

Fig. 12 is an explanatory diagram illustrating an application example of the first embodiment.

[Fig. 13]

Fig. 13 is a functional block diagram illustrating a configuration of an eNodeB according to a second embodiment of the present disclosure.

[Fig. 14]

Fig. 14 is an explanatory diagram illustrating an example of an arrangement of an eNodeB and a pico eNodeB.

[Fig. 15]

Fig. 15 is a flowchart illustrating an operation of an eNodeB according to a second embodiment of the present disclosure.