

interference. Furthermore, Patent Document 2 discloses a technique for determining the transmission power or the like of each of a plurality of terminals on the basis of reports about the measurement of interference that a base station has obtained from the plurality of terminals.

CITATION LIST

PATENT DOCUMENT

[0004]

Patent Document 1: Japanese Patent Application Laid-Open No. 2013-183221

Patent Document 2: Japanese National Publication of International Patent Application No. 2015-534418

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0005]

However, interference with another system has failed to be appropriately prevented in some cases. For example, in the technique of Patent Document 1, a transmission source apparatus that is about to transmit a signal can avoid interference detected by the local apparatus, but fails to grasp an interference state of a transmission destination apparatus. Thus, there is a possibility that the transmission destination apparatus receives an influence of interference and this will result in a failure in communication.

[0006]

Accordingly, embodiments of the present disclosure have been made in view of the foregoing, and provide a communication apparatus and a communication system that are capable of appropriately preventing interference with another system and that are novel and have been improved.

SOLUTIONS TO PROBLEMS

[0007]

~~According to a first aspect of the present disclosure, there is provided a communication apparatus including: a receiver that performs reception of power from another system; a determination unit that determines presence or absence of interference with the other system on a basis of the reception; and a transmitter that transmits first interference information including information relating to the interference~~

~~to another communication apparatus, wherein the transmitter transmits, as the first interference information, at least one of a reception time of the power, an arrival direction of the power, or information relating to an attribute of the other system.~~

According to a first aspect of the present disclosure, there is provided a first communication apparatus including: a receiver configured to receive power from a first system; a controller configured to determine, based on the received power, one of a presence or an absence of first interference with the first system; and a transmitter configured to transmit first interference information associated with the first interference to a second communication apparatus, wherein the first interference information includes information indicating a value of the received power, a reception time of the power, an arrival direction of the power, and information related to an attribute of the first interference, and the attribute of the first interference indicates at least one of a type of the first system, a communication scheme of the first system, or a version of the first system.

[0008]

~~According to a second aspect of the present disclosure, there is provided a communication apparatus including: a receiver that performs reception of power from another system, and receives first interference information including information relating to the interference from another communication apparatus that determines presence or absence of interference with the other system on a basis of the reception; and a controller that controls communication on a basis of the first interference information by changing settings relating to transmission on a basis of the first interference information, wherein the controller changes at least one of a transmission rate or a transmission destination apparatus.~~

According to a second aspect of the present disclosure, there is provided a first communication apparatus including: a receiver configured to: receive power from a first system, and receive first interference information associated with first interference from a second communication apparatus, wherein the second communication apparatus: receives the power from the first system, and determines, based on the received power,

one of a presence or absence of the first interference with the first system, the first interference information includes information indicating a value of the power received by the second communication apparatus, a reception time of the power received by the second communication apparatus, an arrival direction of the power received by the second communication apparatus, and information related to an attribute of the first interference, and the attribute of the first interference indicates at least one of a type of the first system, a communication scheme of the first system, or a version of the first system; and a controller configured to control communication of the first communication apparatus based on the first interference information.

[0009]

~~According to a third aspect of the present disclosure, there is provided a communication apparatus including: communication system comprising a first communication apparatus and a second communication apparatus, wherein the first communication apparatus includes: a first receiver that performs reception of power from another system; a determination unit that determines presence or absence of interference with the other system on a basis of the reception; and a transmitter that transmits first interference information including information relating to the interference to the second communication apparatus, wherein the transmitter transmits, as the first interference information, at least one of a reception time of the power, an arrival direction of the power, or information relating to an attribute of the other system, and the second communication apparatus includes: a second receiver that receives the first interference information from the first communication apparatus; and a controller that controls communication on a basis of the first interference information by changing settings relating to transmission on a basis of the first interference information, wherein the controller changes at least one of a transmission rate or a transmission destination apparatus.~~

According to a third aspect of the present disclosure, there is provided a communication system, including: a first communication apparatus; and a second communication apparatus, wherein the first communication apparatus includes: a first receiver configured to receive power from a first system; a first controller configured to determine, based on the

received power, one of a presence or absence of first interference with the with the first system; and a transmitter configured to transmit first interference information associated with the first interference to the second communication apparatus, wherein the first interference information includes information indicating a value of the received power, a reception time of the power, an arrival direction of the power, and information relating to an attribute of first interference, and the attribute of the first interference indicates at least one of a type of the first system, a communication scheme of the first system, or a version of the first system, and the second communication apparatus includes: a second receiver configured to receive the first interference information from the first communication apparatus; and a controller configured to control communication based on the first interference information.

EFFECTS OF THE INVENTION

[0010]

As described above, according to embodiments of the present disclosure, interference with another system can be appropriately prevented.

[0011]

Note that the effect described above is not necessarily restrictive, and any of the effects described in the description or other effects that can be grasped from the description may be exhibited in addition to the effect described above or instead of the effect described above.

BRIEF DESCRIPTION OF DRAWINGS

[0012]

Fig. 1 is a diagram explaining the background of the present disclosure.

Fig 2 is a diagram illustrating a configuration of a communication system according to the present

CLAIMS

1. A first communication apparatus comprising:
 - a receiver ~~that performs reception of~~configured to
receive power from ~~another~~a first system;
 - a controller configured to determine, based on the
received power, one of a presence or an absence of first
interference with the first system; and
 - ~~a determination unit that determines presence or absence~~
~~of interference with the other system on a basis of the~~
~~reception; and~~
 - a transmitter ~~that~~configured to transmit~~s~~ first
interference information associated with the first
interference to a second communication apparatus, wherein
~~including information relating to the interference to~~
~~another communication apparatus, wherein the transmitter~~
~~transmits, as the first interference information, at least of~~
~~one~~the first interference information includes information
indicating a value of the received power, a reception time of
the power, an arrival direction of the power, ~~or~~and
information ~~relating~~related to an attribute of the ~~other~~
~~system~~first interference, and
the attribute of the first interference indicates at
least one of a type of the first system, a communication
scheme of the first system, or a version of the first system.

2. The first communication apparatus according to claim 1,
wherein the ~~other~~first system includes a wireless
communication system, ~~in which~~
the first communication apparatus and the second
communication apparatus are associated with a second system,
and

~~at~~the communication scheme of the first system is different from a communication scheme of ~~a~~the second system—~~that a local apparatus and the other communication apparatus participate in is used.~~

3. The first communication apparatus according to claim 1, wherein the receiver ~~also~~is further configured to receives second interference information ~~including information relating to~~associated with the second interference ~~that has been~~ detected by the ~~other~~second communication apparatus.

4. The first communication apparatus according to claim 3, wherein the transmitter ~~also~~is further configured to transmits the second interference information to a third communication apparatus ~~other than~~different from the ~~other~~second communication apparatus.

5. The first communication apparatus according to claim 3, ~~further comprising: a~~wherein the controller ~~that is~~ further configured to ~~performs~~ control ~~on~~first communication based on ~~a basis of either one of~~ the first interference information or the second interference information.

6. The first communication apparatus according to claim 5, wherein the transmitter ~~also~~is further configured to transmits, to the ~~other~~second communication apparatus, ~~information relating to whether or not~~at least one of first information related to the transmissions of the first interference information ~~can be transmitted,~~ second information ~~relating~~related to ~~whether or not~~the reception of the second interference information ~~can be received,~~ or third information ~~relating~~related to ~~whether or not~~ the control ~~can be~~

~~performed~~ of the first communication.

7. The first communication apparatus according to claim 5, wherein the receiver ~~also~~also is further configured to receives, from the ~~other~~second communication apparatus, at least one of:

first information ~~relating to whether or not the~~
~~other~~related to capability of the second communication
apparatus ~~can~~to receive the first interference information,
second information ~~relating to whether or not the~~
~~other~~related to capability of the second communication
apparatus ~~can~~to transmit the second interference information,
or

third information ~~relating to whether or not the~~
~~other~~related to capability of the second communication
apparatus ~~can perform the~~to control second communication.

8. The first communication apparatus according to claim 7, wherein in a case where the ~~other~~second communication apparatus ~~can receive~~has the capability to receive the first interference information, in a case where the ~~other~~second communication apparatus ~~can transmit~~has the capability to receive the second interference information, or in a case where the ~~other~~second communication apparatus ~~can perform the~~has the capability to control the second communication, the transmitter ~~transmits~~is further configured to transmit the first interference information to the ~~other~~second communication apparatus.

~~9. The communication apparatus according to claim 1,~~
~~wherein the transmitter also transmits, as the first~~
~~interference information, a reception power value.~~

~~10. The communication apparatus according to claim 1,
 wherein the transmitter transmits, as the first
 interference information, information indicating a combination
 of two or more of a reception power value, a reception time of
 the power, an arrival direction of the power, or information
 relating to an attribute of the other system.~~

~~11~~9. A first communication apparatus comprising:

a receiver configured to:

~~that performs reception of~~receive power from
~~another~~a first system, and

~~receives first interference information including~~
~~information relating to the~~associated with first
 interference from ~~another~~a second communication apparatus,
wherein

the second communication apparatus:

receives the power from the first system, and

~~that~~determines, based on the received power,

one of a presence or absence of the first

interference with the ~~other~~first system,~~on a basis~~
~~of the reception; and~~

~~a controller that controls communication on a basis
 of the first interference information by changing settings
 relating to transmission on a basis of the first interference
 information, wherein the controller changes at least one of a
 transmission rate or a transmission destination apparatus~~

the first interference information includes
information indicating a value of the power received by
the second communication apparatus, a reception time of
the power received by the second communication apparatus,
an arrival direction of the power received by the second

communication apparatus, and information related to an attribute of the first interference, and
the attribute of the first interference indicates at least one of a type of the first system, a communication scheme of the first system, or a version of the first system; and
a controller configured to control communication of the first communication apparatus based on the first interference information.

~~1210.~~ The first communication apparatus according to claim ~~119~~, wherein

the ~~other~~first system includes a wireless communication system,

the first communication apparatus and the second communication apparatus are associated with a second system, and

~~in which a~~the communication scheme of the first system is different from a communication scheme of ~~a~~the second system—
~~that a local apparatus and the other communication apparatus participate in is used.~~

~~1311.~~ The first communication apparatus according to claim ~~119~~, wherein

the controller is further configured to at least one of:
distinguishes, based on the first interference information, a plurality of the otherfirst systems from each other, or
distinguish a plurality of apparatuses from each other based on the first interference information that participate in the other system from each other on a basis of the first interference information, and the plurality of apparatuses is

associated with the first system of the plurality of first systems.

~~1412.~~ The first communication apparatus according to claim ~~119~~, wherein the controller ~~also~~is further configured to ~~changes,~~ based on the first interference information, at least one of settings related to transmission power value or a communication band specific information.

~~1513.~~ The first communication apparatus according to claim ~~119~~, wherein the controller is further configured to ~~changes settings relating to reception on a basis of the first interference information~~at least one of a transmission rate, a transmission power value, a communication band, or a transmission destination apparatus.

~~1614.~~ The first communication apparatus according to claim ~~159~~, wherein the controller is further configured to ~~changes,~~ based on the first interference information, a threshold to be used to detect the powersettings relating to reception of specific information.

~~1715.~~ The first communication apparatus according to claim ~~1614~~, wherein the controller is further configured to ~~reduces the change a power detection threshold to a value by which interference is associated with detected detection of the power, the interference having been detected by the other communication apparatus but not having been detected by a local apparatus.~~

16. The first communication apparatus according to claim 15, wherein the controller is further configured to reduce the

power detection threshold based on:

the determination of the presence of the first interference by the second communication apparatus; and
a local apparatus that fails to detect the first interference.

~~1817.~~ The first communication apparatus according to claim ~~119~~, wherein ~~the receiver also performs the reception of the power from the other system,~~ the controller is further configured to:

~~a determination unit is further included that determines one of a presence or an absence of second interference between a local apparatus and the other first system on a basis of the reception based on the power received by the receiver,~~ and

~~the controller also controls the communication on a basis of based on second interference information including information relating to associated with the second interference between the local apparatus and the other system.~~

~~1918.~~ A communication system, comprising:

a first communication apparatus; and

a second communication apparatus, wherein

the first communication apparatus includes:

a first receiver ~~that performs reception of power from another~~ configured to receive power from a first system;

~~a determination unit that~~ a first controller configured to determines, based on the received power, one of a presence or absence of first interference with the other with the first system on a basis of the reception; and

a transmitter ~~that~~ configured to transmits

first interference information ~~including~~
~~information relating to~~associated with the first
 interference to the second communication apparatus,
 wherein

~~the transmitter transmits, as the first~~
~~interference information, at least one of the first~~
~~interference information includes information~~
~~indicating a value of the received power, a~~
 reception time of the power, an arrival direction
 of the power, ~~or~~and information relating to an
 attribute of ~~the other system~~first interference,
 and

the attribute of the first interference
indicates at least one of a type of the first
system, a communication scheme of the first system,
or a version of the first system, and

the second communication apparatus includes:

a second receiver ~~that~~configured to receives the first
 interference information from the first communication
 apparatus; and

a controller ~~that~~configured to controls communication
based on ~~a basis of~~ the first interference information ~~by~~
~~changing settings relating to transmission on a basis of the~~
~~first interference information, wherein the controller changes~~
~~at least one of a transmission rate or a transmission~~
~~destination apparatus.~~