

However, in the conventional art including the technique disclosed in Patent Literature 1 above, when data is transmitted or received by D2D communication without routing via a base station, no nodes on a network can know whether or not data is being transmitted or received and what data is transmitted or received, or the like. Therefore, it may be difficult to manage such data transmission or reception.

[0006]

With the above in mind, it is desirable to provide a scheme of allowing management involved with wireless communication without routing via a base station.

Solution to Problem

[0007]

According to a first aspect of the present invention, there is provided an apparatus including: processing circuitry configured to generate information related to data wirelessly transmitted or received, on a frequency band that is a component carrier used in wireless communication with a base station, without being routed via the base station, the information relating to charging of a device that wirelessly transmits or receives the data; and control transmission of the information to a node which is not involved in the transmission or reception of the data.

[0008]

According to a second aspect of the present invention, there is provided a non-transitory computer readable medium storing computer executable instructions that, when executed by a processor, cause the processor to: generate information related to data wirelessly transmitted or received, on a frequency band that is a component carrier used in wireless communication with a base station, without being routed via the base station, the information relating to charging of a device that wirelessly transmits or receives the data; and control transmission of the information to a node which is not involved in the transmission or reception of the data.

[0009]

According to a third aspect of the present invention, there is provided a method including: generating information related to data wirelessly transmitted or received, on a frequency band that is a component carrier used in wireless communication with a base station, without being routed via the base station, the information relating to charging of a device that wirelessly transmits or receives the data; and controlling transmission of the information to a node which is not involved in the transmission or reception of the data.

Advantageous Effects of Invention

[0010]

As described above, according to embodiments of the present invention, management involved with wireless communication without routing via a base station can be performed. Note that the above advantageous effect is not strictly limiting, and that any advantageous effect indicated in the present disclosure or another advantageous effect that may be reasoned from the present disclosure may also be exhibited in addition to, or instead of, the above advantageous effect.

Brief Description of Drawings

[0011]

[FIG. 1] FIG. 1 is an illustrative diagram illustrating an example of a general configuration of a communication system 1 according to an embodiment of the present disclosure.

[FIG. 2] FIG. 2 is an illustrative diagram for describing a first specific example of a communication apparatus according to the embodiment.

[FIG. 3] FIG. 3 is an illustrative diagram for describing a second specific example of a communication apparatus according to the embodiment.

[FIG. 4] FIG. 4 is an illustrative diagram for describing a third specific example of a communication apparatus according to the embodiment.

[FIG. 5] FIG. 5 is an illustrative diagram for describing a fourth specific example of a communication apparatus according to the embodiment.

[FIG. 6] FIG. 6 is a block diagram illustrating an example of a configuration of the communication apparatus according to the embodiment.

[FIG. 7] FIG. 7 is an illustrative diagram for describing a first example of a transmission path for data-related information.

[FIG. 8] FIG. 8 is an illustrative diagram for describing a second example of a transmission path for data-related information.

[FIG. 9] FIG. 9 is a sequence diagram illustrating a first example of a general flow of an entire process according to the embodiment.

[FIG. 10] FIG. 10 is a sequence diagram illustrating a second example of a general flow of an entire process according to the embodiment.

[FIG. 11] FIG. 11 is a flowchart illustrating an example of a general flow of a first

CLAIMS

1. An apparatus comprising:
processing circuitry configured to
generate information related to data wirelessly transmitted or received, on a frequency band that is a component carrier used in wireless communication with a base station, without being routed via the base station, the information relating to charging of a device that wirelessly transmits or receives the data; and
control transmission of the information to a node which is not involved in the transmission or reception of the data.
2. The apparatus according to claim 1,
wherein the data is data transmitted or received by apparatus-to-apparatus communication.
3. The apparatus according to claim 1,
wherein the data is data transmitted or received in a localized network.
4. The apparatus according to claim 1,
wherein the data is data transmitted or received via a relay node.
5. The apparatus according to claim 1,
wherein the data is data transmitted or received according to a same wireless communication scheme as a wireless communication scheme used by the base station.
6. The apparatus according to claim 1,
wherein the node which is not involved in the transmission or reception of the data, performs management involved with wireless communication.
7. The apparatus according to claim 6,
wherein the node which is not involved in the transmission or reception of the data is in a mobile communication network that includes the base station.

8. The apparatus according to claim 1,
wherein the information includes information indicating the amount of radio resources used in the transmission or reception of the data.
9. The apparatus according to claim 1,
wherein the information includes information indicating the amount of the data.
10. The apparatus according to claim 1,
wherein the node which is not involved in the transmission or reception of the data, performs charging management.
11. The apparatus according to claim 1,
wherein the information is information for lawful interception.
12. The apparatus according to claim 11,
wherein the information includes the data.
13. The apparatus according to claim 11,
wherein the node which is not involved in the transmission or reception of the data, performs a process for the lawful interception.
14. The apparatus according to claim 1,
wherein the information includes information indicating at least one of a source and a destination of the data.
15. The apparatus according to claim 1, wherein the apparatus includes
a memory configured to store a program, and
the circuitry is configured to execute the program.
16. A non-transitory computer readable medium storing computer executable instructions that, when executed by a processor, cause the processor to:

generate information related to data wirelessly transmitted or received, on a frequency band that is a component carrier used in wireless communication with a base station, without being routed via the base station, the information relating to charging of a device that wirelessly transmits or receives the data; and

control transmission of the information to a node which is not involved in the transmission or reception of the data.

17. A method comprising:

generating information related to data wirelessly transmitted or received, on a frequency band that is a component carrier used in wireless communication with a base station, without being routed via the base station, the information relating to charging of a device that wirelessly transmits or receives the data; and

controlling transmission of the information to a node which is not involved in the transmission or reception of the data.

18. The apparatus according to claim 1, wherein the node is configured to receive the information transmitted from the apparatus, update charging information based on the received information, and determine whether to update policy information based on the charging information.

19. The apparatus according to claim 9, wherein the node is configured to receive the information transmitted from the apparatus, and update charging information based on the amount of the data indicated in the received information.

20. The apparatus according to claim 1, wherein the processing circuitry is configured to control the transmission of the information to the node on a second frequency band that is higher than the frequency band.