

Description

Title of Invention: COMMUNICATION DEVICE AND COMMUNICATION METHOD

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of Japanese Priority Patent Application JP 2016-172432 filed September 5, 2016, the entire contents of which are incorporated herein by reference.

Technical Field

[0002] The invention disclosed in the present specification relates to a communication device and a communication method operating in a plurality of communication modes.

Background Art

[0003] In the autonomous distributed wireless system, each communication terminal has a mechanism for avoiding collision in data transmission, achieving communication in the state where a plurality of independent wireless terminals exist. For example, the wireless local area network (LAN) has a collision avoidance mechanism, referred to as enhanced distributed collision avoidance (EDCA), that sets random waiting time for collision avoidance in accordance with a data priority (see PTL 1, for example).

[0004] Meanwhile, in the centralized wireless communication system, a base station collectively controls data transmission of each terminal, achieving communication in the state where a plurality of independent wireless terminals exist. For example, IEEE802.11ax defines a mechanism for centralized communication in which a base station transmits trigger frames containing information such as a transmission resource to a plurality of wireless terminals under control and the wireless terminals perform in response uplink multiplex transmission.

Citation List

Patent Literature

[0005] PTL 1: JP 2006-121561A
PTL 2: JP 5437307B

Summary

Technical Problem

[0006] Embodiments of the present invention provide an excellent communication device and communication method capable of operating preferably in a plurality of communication modes.

Solution to Problem

[0007] According to a first aspect of the present invention, there is provided a

communication device including circuitry configured to communicate with an access point according to a plurality of communication modes including at least a centralized communication mode and an autonomous distributed communication mode; transmit data according to a first mode of the plurality of modes; maintain a counter that indicates a number of times retransmission of the data has been performed according to the first mode; switch from performing communication according to the first mode to performing communication according to the second mode; initialize the counter in response to the switching; and retransmit the data according to the second mode upon initialization of the counter, wherein the centralized communication mode is an uplink multiuser multiplex transmission mode.

[0008] According to a second aspect of the present invention, there is provided a communication device, including circuitry configured to communicate with an access point according to at least a first communication mode and a second communication mode; transmit data according to a first mode of the plurality of modes; maintain a counter that indicates a number of times retransmission of the data has been performed according to the first mode; and modify a field included in the data transmitted according to the first mode based on a value of the counter; and retransmit the data including the modified field.

[0009] According to a third aspect of the present invention, there is provided a communication device, including circuitry configured to communicate with an access point according to a plurality of communication modes including at least a centralized communication mode and an autonomous distributed communication mode; transmit data according to the plurality of modes; and store information indicating a number of times retransmission of data has been performed in each of the plurality of modes, wherein the centralized communication mode is an uplink multiuser multiplex transmission mode.

[0010] According to a fourth aspect of the present invention, there is provided a communication method including communicating with an access point according to a plurality of communication modes including at least a centralized communication mode and an autonomous distributed communication mode; transmitting data according to a first mode of the plurality of modes; maintaining a counter that indicates a number of times retransmission of the data has been performed according to the first mode; switching from performing communication according to the first mode to performing communication according to the second mode; initializing the counter in response to the switching; and retransmitting the data according to the second mode upon initialization of the counter, wherein the centralized communication mode is an uplink multiuser multiplex transmission mode.

[0011] According to a fifth aspect of the present invention, there is provided a communication method including communicating with an access point according to at least a first communication mode and a second communication mode; transmitting data according to a first mode of the plurality of modes; maintaining a counter that indicates a number of times retransmission of the data has been performed according to the first mode; modifying a field included in the data transmitted according to the first mode based on a value of the counter;

and retransmitting the data including the modified field.

[0012] According to a sixth aspect of the present invention, there is provided a communication method including communicating with an access point according to a plurality of communication modes including at least a centralized communication mode and an autonomous distributed communication mode; transmitting data according to the plurality of modes; and storing information indicating a number of times retransmission of data has been performed in each of the plurality of modes wherein the centralized communication mode is an uplink multiuser multiplex transmission mode.

Advantageous Effects of Invention

[0013] Embodiments of the present invention can provide an excellent communication device and communication method capable of operating in a plurality of communication modes and preferably switching the communication modes.

[0014] Note that the effects described in the present specification are only examples, and the effects of the invention are not limited thereto. Moreover, the present invention may exert additional effects other than the above-described effects.

[0015] Other intention, features, and advantages of the invention disclosed in the present specification will become clear by more detailed description based on the later-described embodiments and appended drawings.

Brief Description of Drawings

[0016] [fig. 1]FIG. 1 is an explanatory diagram illustrating a configuration example of a communication system to which the technology disclosed in the present specification can be applied.

[fig. 2]FIG. 2 is an explanatory block diagram illustrating a functional configuration of a communication device 200.

[fig. 3]FIG. 3 is an explanatory diagram illustrating an example of a communication sequence between a base station and a terminal that is performed in a communication system (first embodiment).

[fig. 4]FIG. 4 is an explanatory flowchart illustrating a processing procedure by a communication device for controlling information related to retransmission of data (first embodiment).

[fig. 5]FIG. 5 is an explanatory diagram illustrating an example of a communication sequence between a base station and a terminal that is performed in a communication system (second embodiment).

[fig. 6]FIG. 6 is an explanatory flowchart illustrating a processing procedure by a communication device for controlling information related to retransmission of data (second embodiment).

[fig. 7]FIG. 7 is an explanatory diagram illustrating an example of a communication

CLAIMS

1. A communication device, comprising:
circuitry configured to
communicate with an access point according to a plurality of communication modes including at least a centralized communication mode and an autonomous distributed communication mode;
transmit data according to a first mode of the plurality of modes;
maintain a counter that indicates a number of times retransmission of the data has been performed according to the first mode;
switch from performing communication according to the first mode to performing communication according to the second mode;
initialize the counter in response to the switching; and
retransmit the data according to the second mode upon initialization of the counter,
wherein the centralized communication mode is an uplink multiuser multiplex transmission mode.
2. The communication device of claim 1, wherein
the circuitry is configured to initialize the counter every time the communication mode is switched.
3. The communication device of claim 1, wherein
the circuitry is configured to control initializing information related to retransmission of the data in the second mode based on results of data communication by other communication devices in the first communication mode.
4. The communication device of claim 1, wherein
the circuitry is configured to initialize information within the data each time the communication mode is switched.
5. The communication device of claim 1, wherein
the data includes at least one of a bit that indicates that the data is being retransmitted or a field that indicates a number of times the data is being retransmitted, and
the circuitry is configured to initialize the bit or the field each time the communication mode is switched.

6. A communication device, comprising:
circuitry configured to
 - communicate with an access point according to at least a first communication mode and a second communication mode;
 - transmit data according to a first mode of the plurality of modes;
 - maintain a counter that indicates a number of times retransmission of the data has been performed according to the first mode;
 - modify a field included in the data transmitted according to the first mode based on a value of the counter; and
 - retransmit the data including the modified field.
7. The communication device of claim 6, wherein
the circuitry is configured to control a value of the field based on a switch between the first communication mode and the second communication mode.
8. A communication device, comprising:
circuitry configured to
 - communicate with an access point according to a plurality of communication modes including at least a centralized communication mode and an autonomous distributed communication mode;
 - transmit data according to the plurality of modes; and
 - store information indicating a number of times retransmission of data has been performed in each of the plurality of modes,wherein the centralized communication mode is an uplink multiuser multiplex transmission mode.
9. The communication device of claim 8, wherein
the circuitry is configured to transmit the information to the access point.
10. The communication device of claim 8, wherein
the circuitry is configured to include information related to retransmission of data in a current communication mode in a data frame for transmission.
11. The communication device of claim 8, wherein
the circuitry is configured to maintain a first counter corresponding to a number of times data has been transmitted according to a first mode of the plurality of modes and a second counter corresponding to a number of times data has been transmitted according to a second of the plurality of modes.

12. The communication device of claim 11, wherein
the circuitry is configured to initialize the first counter and the second counter when the number of times of retransmission of data in at least one communication mode reaches a first threshold.
13. The communication device of claim 11, wherein
the circuitry is configured to initialize information related to retransmission of the data in all the communication modes when a total value of the number of times of retransmission of data in the plurality of communication modes reaches a second threshold.
14. The communication device of claim 11, wherein
the circuitry is configured to initialize information related to retransmission of the data in the plurality of communication modes when data retransmitted in any of the plurality of communication modes has been received normally.
15. The communication device of claim 9, wherein
in a first communication mode, the circuitry is configured to control retransmission of data performed temporarily in a second communication mode as information related to retransmission of data in the second communication mode.
16. A communication method, comprising:
communicating with an access point according to a plurality of communication modes including at least a centralized communication mode and an autonomous distributed communication mode;
transmitting data according to a first mode of the plurality of modes;
maintaining a counter that indicates a number of times retransmission of the data has been performed according to the first mode;
switching from performing communication according to the first mode to performing communication according to the second mode;
initializing the counter in response to the switching; and
retransmitting the data according to the second mode upon initialization of the counter, wherein the centralized communication mode is an uplink multiuser multiplex transmission mode.
17. A communication method, comprising:
communicating with an access point according to at least a first communication mode and a second communication mode;
transmitting data according to a first mode of the plurality of modes;

maintaining a counter that indicates a number of times retransmission of the data has been performed according to the first mode;

modifying a field included in the data transmitted according to the first mode based on a value of the counter; and

retransmitting the data including the modified field

18. A communication method, comprising:

communicating with an access point according to a plurality of communication modes including at least a centralized communication mode and an autonomous distributed communication mode;

transmitting data according to the plurality of modes; and

storing information indicating a number of times retransmission of data has been performed in each of the plurality of modes,

wherein the centralized communication mode is an uplink multiuser multiplex transmission mode.

19. The communication method of claim 18, further comprising:

maintaining a first counter corresponding to a number of times data has been transmitted according to a first mode of the plurality of modes and a second counter corresponding to a number of times data has been transmitted according to a second of the plurality of modes.