COMMUNICATION APPARATUS AND COMMUNICATION METHOD FOR MULTI-AP JOINT RE-TRANSMISSION

BACKGROUND

1. TECHNICAL FIELD

[0001] The present disclosure generally relates to communication apparatus and methods for electronic devices and systems, and more particularly relates to joint re-transmission in multi-AP networks.

2. DESCRIPTION OF RELATED ART

[0002] Wireless networks that communicate via multi-AP joint transmission enable electronic devices to communication in networks with joint transmissions sent to multiple electronic devices. Such networks have advantages over other wireless networks in which wireless communication is limited to a single transmission to one electronic device.

SUMMARY

[0003] One non-limiting and exemplary example facilitates providing joint transmission and re-transmission communication in multi-AP networks. By way of example, this communication includes joint re-transmission between two or more access points (APs) and one or more wireless stations (STAs).

One example is an access point (AP) that includes a receiver, which, in operation, receives a Joint Transmission (JT) Trigger frame from another AP that indicates MAC protocol data units (MPDUs) to be jointly transmitted to a communication apparatus; and a local memory that stores one or more MPDUs previously transmitted to the communication apparatus.

[0003a] In an aspect, there is access point, AP, (270) comprising:

circuitry configured to encapsulate Joint Transmission, JT, data and to generate a data frame including the encapsulated JT data and a JT Packet ID assigned to the encapsulated JT data wherein a Packet ID field containing the JT Packet ID is located out of the encapsulated JT data; and a transmitter configured to transmit the data frame to a slave AP (280, 282), and to transmit a first JT Trigger frame including the assigned JT Packet ID to initiate a JT transmission, characterized by

the circuitry configured to determine that a communication apparatus (284) failed to receive one or more MAC protocol data units, MPDUs, of the data frame that were jointly transmitted by the AP and the slave AP to the communication apparatus in the JT transmission, the transmitter configured to transmit a second JT Trigger frame including the assigned JT Packet ID to the slave AP without re-distributing the failed MPDUs to the slave AP, and.the second JT Trigger frame indicates the MPDUs to be jointly transmitted again to the communication apparatus.

[0003b] In an aspect, there is a method comprising: encapsulating, at an access point, AP, (270) Joint Transmission, JT, data; generating, at the AP, a data frame including the encapsulated JT data and a JT Packet ID assigned to the encapsulated JT data wherein a Packet ID field containing the JT Packet ID is located out of the encapsulated JT data;

transmitting, at the AP, the data frame to a slave AP (280, 282); transmitting, at the AP a first JT Trigger frame including the assigned JT Packet ID to initiate a JT transmission, characterized by determining, at the AP, that a communication apparatus (284) failed to receive one or more MAC protocol data units, MPDUs, , including the data frame that were jointly transmitted by the AP and the slave AP to the communication apparatus in the JT transmission; and transmitting, by the AP, a second JT Trigger frame including the assigned JT Packet ID to the slave AP without re-distributing the failed MPDUs to the slave AP, and the second JT Trigger frame indicates the MPDUs to be jointly transmitted again to the communication apparatus.

Claims

What is claimed is:

1. An access point, AP, (270) comprising:

circuitry configured to encapsulate Joint Transmission, JT, data and to generate a data frame including the encapsulated JT data and a JT Packet ID assigned to the encapsulated JT data wherein a Packet ID field containing the JT Packet ID is located out of the encapsulated JT data; and

a transmitter configured to transmit the data frame to a slave AP (280, 282), and to transmit a first JT Trigger frame including the assigned JT Packet ID to initiate a JT transmission,

characterized by

the circuitry configured to determine that a communication apparatus (284) failed to receive one or more MAC protocol data units, MPDUs, of the data frame that were jointly transmitted by the AP and the slave AP to the communication apparatus in the JT transmission,

the transmitter configured to transmit a second JT Trigger frame including the assigned JT Packet ID to the slave AP without re-distributing the failed MPDUs to the slave AP, and the second JT Trigger frame indicates the MPDUs to be jointly transmitted again to the communication apparatus.

2. A method comprising:

encapsulating, at an access point, AP, (270) Joint Transmission, JT, data;

generating, at the AP, a data frame including the encapsulated JT data and a JT Packet ID assigned to the encapsulated JT data wherein a Packet ID field containing the JT Packet ID is located out of the encapsulated JT data;

transmitting, at the AP, the data frame to a slave AP (280, 282);

transmitting, at the AP a first JT Trigger frame including the assigned JT Packet ID to initiate a JT transmission,

characterized by

determining, at the AP, that a communication apparatus (284) failed to receive one or more MAC protocol data units, MPDUs, including the data frame that were jointly transmitted by the AP and the slave AP to the communication apparatus in the JT transmission;

transmitting, by the AP, a second JT Trigger frame including the assigned JT Packet ID to the slave AP without re-distributing the failed MPDUs to the slave AP, and

the second JT Trigger frame indicates the MPDUs to be jointly transmitted again to the

communication apparatus.