coordinate their transmission power. In C-OFDMA, APs coordinate resource unit (RU) assignment. In coordinated beamforming (BF), APs coordinate BF. In coordinated multi user multiple input multiple output (MU-MIMO) (also known as joint transmission), APs coordinate their MU-MIMO transmissions.

[0005] However, there has been no discussion so far concerning coordinated service periods (SPs).

[0006] There is thus a need for communication apparatuses and methods that can solve the above mentioned issue. Furthermore, other desirable features and characteristics will become apparent from the subsequent detailed description and the appended claims, taken in conjunction with the accompanying drawings and this background of the disclosure.

SUMMARY

[0007] Non-limiting and exemplary examples facilitate providing communication apparatuses and communication methods for Coordinated SPs.

[0008] According to an aspect of the present disclosure, there is provided a second Access Point (AP) comprising: a receiver, which in operation, receives, from a first AP, a first frame initiating negotiation of a first service period (SP); and a transmitter, which in operation, transmits, to the first AP, a second frame in response to the first frame, wherein the transmitter is further configured to transmit, to one or more stations (STAs) associated with the second AP, a third frame notifying information regarding the first SP.

[0009] According to another example of the present disclosure, there is provided a non-AP STA, comprising: a receiver, which in operation, receives one of a Beacon frame or Action frame from its associated AP; circuitry, which in operation, extracts information of SPs for coordinated transmissions from the frame; and a transmitter, which in operation, transmits a request frame to the AP, the request frame indicating a request to join the SPs.

[0010] According to another aspect of the present disclosure, there is provided a method for a second Access Point (AP), comprising: receiving, from a first AP, a first frame initiating negotiation of a first service period (SP); transmitting, to the first AP, a second frame in response to the first frame; ; and transmitting, to one or more stations (STAs) associated with the second AP, a third frame notifying information regarding the first SP.

[0010a] According to an aspect, the present disclosure refers to an integrated circuit for a second Access Point (AP), the integrated circuit being configured to control: receiving, from a first AP, a first frame initiating negotiation of a first service period (SP); transmitting, to the first AP, a second frame in response to the first frame; and transmitting, to one or more stations (STAs) associated with the second AP, a third frame notifying information regarding the first SP.

[0011] It should be noted that general or specific examples may be implemented as a system, a method, an integrated circuit, a computer program, a storage medium, or any selective combination thereof. Additional benefits and advantages of the disclosed examples will become apparent from the specification and drawings. The benefits and/or advantages may be individually obtained by the various examples and features of the specification and drawings, which need not all be provided in order to obtain one or more of such benefits and/or advantages.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The accompanying figures where like reference numerals refer to identical or functionally similar elements throughout the separate views and which together with the detailed description below are incorporated in and form part of the specification, serve to illustrate various embodiments and to explain various principles and advantages in accordance with present embodiments.

[0013] FIG. 1 shows a flow diagram illustrating communications using enhanced service periods for prioritized traffic according to an example.

[0014] FIG. 2 illustrates an example of coordinated service periods for Multi-AP Coordinated transmission.

[0015] FIG. 3 and FIG. 4 show overlapping wireless networks each of which can include at least one access point (AP) and at least one communication apparatus according to an example.

[0016] FIG. 5 illustrates EHT Action frames according to an example.

CLAIMS

1. A second Access Point (AP) comprising:

a receiver, which in operation, receives, from a first AP, a first frame initiating negotiation of a first service period (SP); and

a transmitter, which in operation, transmits, to the first AP, a second frame in response to the first frame;

wherein the transmitter is further configured to transmit, to one or more stations (STAs) associated with the second AP, a third frame notifying information regarding the first SP.

2. The second AP of claim 1, wherein the information includes information of a second SP overlapping the first SP.

3. The second AP of claim 2, wherein the second SP is a Target Wake Time (TWT) SP, and wherein the third frame is a Beacon frame advertising the TWT SP.

4. The second AP of claim 3, wherein the Beacon frame includes a TWT element, and wherein the TWT element indicates a Broadcast TWT, a TWT Wake Interval, and a Minimum TWT Wake Duration.

5. The second AP of claim 3, wherein the first frame, second frame and third frame also carry identity information of one or more other APs that are also members of the Coordinated SPs.

6. The second AP of claim 1, wherein the first frame includes identity information of the second AP.

7. The second AP of claim 1, wherein the first frame and the second frame are new Action frames.

8. The second AP of claim 1, wherein the first SP is a coordinated TWT SP.

9. The second AP of claim 1, wherein the first frame includes one or more first fields, and wherein the one or more first fields include a Target Wake Time field, a TWT Wake Interval Mantissa field, and a Nominal Minimum TWT Wake Duration field associated with the first SP.

10. The second AP of claim 1, wherein the one or more STAs are unaware of the existence of the first SP.

11. The second AP of claim 1, wherein the second frame conveys identity information of one or more APs participating in coordination of the first SP.

12. A method for a second Access Point (AP), comprising:
receiving, from a first AP, a first frame initiating negotiation of a first service period (SP);
transmitting, to the first AP, a second frame in response to the first frame; and
transmitting, to one or more stations (STAs) associated with the second AP, a third frame notifying information regarding the first SP.

13. An integrated circuit for a second Access Point (AP), the integrated circuit being configured to control:
receiving, from a first AP, a first frame initiating negotiation of a first service period (SP);
transmitting, to the first AP, a second frame in response to the first frame; and
transmitting, to one or more stations (STAs) associated with the second AP, a third frame notifying information regarding the first SP.