network entity. The priority may be used to prioritize a transmission to one of the serving sites in case of conflict.

[0010] The WTRU may report power headroom information for each of transmissions associated with the MAC instance and transmissions associated with the second MAC instance to the first serving site. For example, the power headroom information for each of transmissions associated with the MAC instance and transmissions associated with the second MAC instance to the first serving site may be reported based on determining to scale at least one transmission to one or more of the first serving site or the second serving site.

[0010a] According to a first aspect, there is provided a method for providing physical layer resources to a plurality of medium access control (MAC) instances that are associated with different serving sites that are independently scheduled, the method comprising: a wireless transmit receive unit (WTRU) utilizing a first physical layer configuration for transmitting to a first serving site associated with a first MAC instance; the WTRU utilizing a second physical layer configuration for transmitting to a second serving site associated with a second MAC instance; and the WTRU allocating at least a portion of the transmission power between a transmission associated with the first MAC instance and a transmission associated with the second MAC instance based on a priority rule, wherein higher priority is given to a transmission that includes uplink control information (UCI) than is given to a transmission that does not include UCI.

[0010b] According to a second aspect, there is provided a wireless transmit receive unit (WTRU) comprising: a plurality of medium access control (MAC) instances, wherein each MAC instance is associated with transmissions corresponding to a different group of one or more cells; a physical layer entity configured to: operate using a first physical layer configuration for transmitting to a first group of one or more cells associated with a first MAC instance, operate using a second physical layer configuration for transmitting to a second group of one or more cells associated with a second MAC instance, and allocate at least a portion of transmission between a first transmission associated with the first MAC instance and a second transmission associated with the second MAC instance based on one or more priority rules, wherein the one or more priority rules comprise prioritizing transmissions including a first type of uplink control information (UCI) over transmissions including a second type of control information.

[0010c] According to a third aspect, there is provided a method for a wireless transmit receive unit (WTRU) to allocate power among transmissions associated with different medium access control (MAC) instances, the method comprising: the WTRU utilizing a first physical layer configuration for transmitting to a first group of one or more cells associated with a first MAC instance; the WTRU utilizing a second physical layer configuration for transmitting to a second group of one or more cells associated with a second MAC instance; and the WTRU allocating at least a portion of transmission power between a first transmission associated with the first MAC instance and a second transmission associated with the second MAC instance based on tiered priority rules, wherein a primary priority rule of the tiered priority rules corresponds to prioritizing a transmissions that include a first type of uplink control information (UCI) over transmissions including a second type of UCI and a secondary priority rule of the tiered priority rules corresponds to prioritizing a primary MAC instance over a secondary MAC instance on condition that the first transmission associated with the first MAC instance includes the same type of UCI as is included in the second transmission associated with the second MAC instance.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] A more detailed understanding may be had from the following description, given by way of example in conjunction with the accompanying drawings wherein:

[0012] FIG. 1A is a system diagram of an example communications system in which one or more disclosed embodiments may be implemented;

[0013] FIG. 1B is a system diagram of an example wireless transmit/receive unit (WTRU) that may be used within the communications system illustrated in FIG. 1A;

[0014] FIG. 1C is a system diagram of an example radio access network and an example core network that may be used within the communications system illustrated in FIG. 1A;

[0015] FIG. 1D is a system diagram of an another example radio access network and another example core network that may be used within the communications system illustrated in FIG. 1A;

[0016] FIG. 1E is a system diagram of an another example radio access network and another example core network that may be used within the communications system illustrated in FIG. 1A; and

[0017] FIG. 2 is a block diagram conceptually illustrating priority rules that may be used to resolve contention between MAC instances.

DETAILED DESCRIPTION

[0018] A detailed description of illustrative examples will now be described with reference to the various Figures. Although this description provides a detailed example of possible implementations, it should be noted that the details are intended to be exemplary and in no way limit the scope of the application.

What is claimed:

1. A method for providing physical layer resources to a plurality of medium access control (MAC) instances that are independently scheduled, the method comprising:

a wireless transmit/receive unit (WTRU) utilizing a first physical layer configuration for transmissions associated with a first MAC instance;

the WTRU utilizing a second physical layer configuration for transmissions associated with a second MAC instance; and

the WTRU coordinating transmission power to be allocated for a first transmission sent via the first MAC instance and a second transmission sent via the second MAC instance, wherein at least a portion of the transmission power is allocated between the first MAC instance for the first transmission the second MAC instance for the second transmission based on based on a type of uplink control information, if any, that are included in one or more of the first transmission or the second transmission and based on a type of MAC instance corresponding to each of the first and second MAC instances.

2. The method as in claim 1, wherein the WTRU determines that the first transmission includes first uplink control information, the WTRU determines that the that the second transmission does not include uplink control information, and the WTRU determines that the first transmission is prioritized over the second transmission when allocating at least the portion of the transmission power.

3. The method as in claim 1, wherein the WTRU prioritizes a first type of uplink control information over a second type of uplink control information when allocating at least the portion of the transmission power.

4. The method as in claim 1, wherein a first hybrid automatic repeat request (HARQ) feedback timing relationship is applied for transmissions sent using the first MAC instance and a second HARQ timing relationship is applied for transmission sent using the second MAC instance.

5. The method as in claim 1, wherein the WTRU receives a configuration comprising a maximum transmit power level for transmission sent via the first MAC instance and via the second MAC instance.

6. The method as in claim 5, further comprising the WTRU determining that transmitting according to a first received uplink grant associated with the first transmission sent via the first MAC instance and transmitting according to a second uplink grant associated with the second transmission sent via the second MAC instance would result in the WTRU exceeding the maximum transmit power level.

7. The method as in claim 6, wherein the WTRU coordinating transmission power to be allocated for the first transmission sent via the first MAC instance and the second transmission sent via the second MAC instance comprises the WTRU scaling the second transmission based on the second transmission including lower priority uplink control information than is included in the first transmission.

8. The method as in claim 7, further comprising the WTRU including an indication that the second transmission has been scaled due to power constraints in one or more of the first transmission or the second transmission.

9. A wireless transmit receive unit (WTRU) comprising:

a plurality of medium access control (MAC) instances, wherein each MAC instance is associated with independently scheduled transmissions;

a physical layer entity configured to:

operate using a first physical layer configuration for transmitting with a first MAC instance,

operate using a second physical layer configuration for transmitting with a second MAC instance, and

transmission power to be allocated for a first transmission sent via the first MAC instance and a second transmission sent via the second MAC instance, wherein the physical layer entity is

configured to allocate at least a portion of the transmission power between the first MAC instance for the first transmission the second MAC instance for the second transmission based on based on a type of uplink control information, if any, that are present in one or more of the first transmission or the second transmission and based on a type of MAC instance corresponding to each of the first and second MAC instances.

10. The WTRU as in claim 9, wherein the first MAC instance has a higher priority than the second MAC instance for a same type for transmission.

11. The WTRU as in claim 9, wherein the physical layer entity is configured to determine a relative priority between a first uplink grant associated with the first MAC instance and a second uplink grant associated with the second MAC instance based on explicit indications regarding priority received from a network entity.

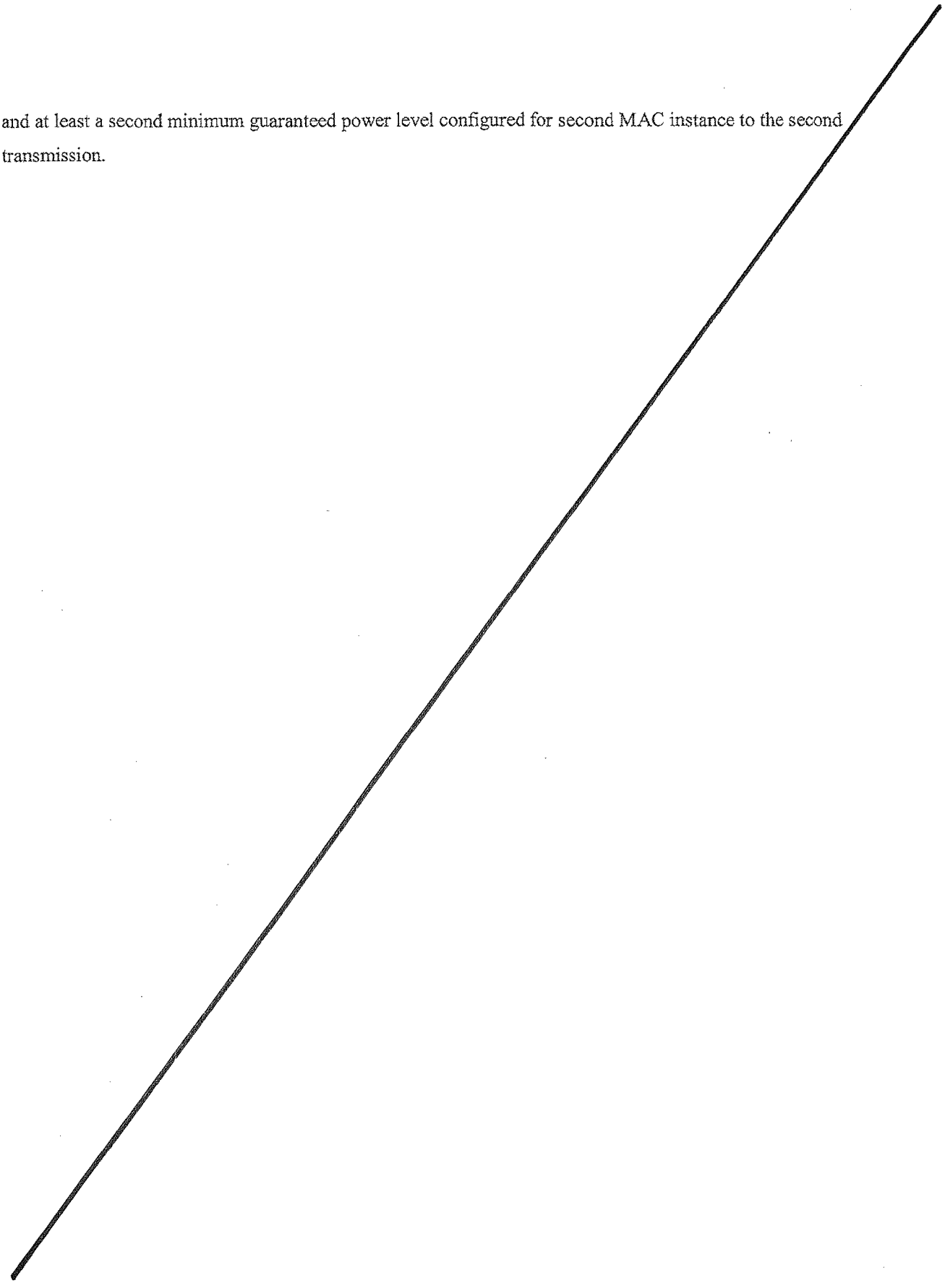
12. The WTRU as in claim 9, wherein the physical layer entity is configured to report power headroom information for each of transmissions associated with the MAC instance and transmissions associated with the second MAC instance via the first MAC instance.

13. The WTRU as in claim 9, wherein the physical layer entity is configured to prioritize a first type of uplink control information over a second type of uplink control information when allocating at least the portion of the transmission power.

14. The WTRU as in claim 13, wherein the first type of uplink control information corresponds to hybrid automatic repeat request (HARQ) feedback and the second type of uplink control information corresponds to channel quality indicator (CQI) feedback.

15. The WTRU as in claim 9, wherein the physical layer entity is configured to allocate at least a first minimum guaranteed power level configured for first MAC instance to the first transmission

and at least a second minimum guaranteed power level configured for second MAC instance to the second transmission.



What is claimed:

1. A method for providing physical layer resources to a plurality of medium access control (MAC) instances that are associated with different serving sites that are independently scheduled, the method comprising:

a wireless transmit receive unit (WTRU) utilizing a first physical layer configuration for transmitting to a first serving site associated with a first MAC instance;

the WTRU utilizing a second physical layer configuration for transmitting to a second serving site associated with a second MAC instance; and

the WTRU allocating at least a portion of the transmission power between a transmission associated with the first MAC instance and a transmission associated with the second MAC instance based on a priority rule, wherein higher priority is given to a transmission that includes uplink control information (UCI) than is given to a transmission that does not include UCI.

2. The method as in claim 1, wherein the transmission associated with the first MAC instance does include UCI, the transmission associated with the second MAC instance does not include UCI, and transmission associated with the first MAC instance is given a higher priority than the transmission associated with the second MAC instance.

3. The method as in claim 2, wherein one or more of the transmission associated with the first MAC instance or the transmission associated with the second MAC instance are scaled based on their respective priority levels.

4. The method as in claim 2, wherein the transmission associated with the first MAC instance and the transmission associated with the second MAC instance are transmitted by the WTRU in overlapping subframes.

5. The method as in claim 4, wherein the WTRU is configured with a maximum transmit power for simultaneous overlapping transmissions associated with the first and second MAC instances.

6. The method as in claim 1, further comprising scaling one or more of a transmission to the first serving site or a transmission to the second serving site based on a first priority level associated with the transmission to the first serving site and a second priority level associated with the transmission to the second serving site, wherein the first priority level is determined based on a type of UCI included in the transmission to the first serving site and the second priority level is determined based on a type of UCI included in the transmission to the second serving site.

7. The method as in claim 6, wherein the first type of UCI corresponds to hybrid automatic repeat request (HARQ) ACK/NACK feedback, the second type of UCI corresponds to channel state information (CSI) feedback, and the transmission including the HARQ ACK/NACK feedback is prioritized over the transmission including the CSI feedback.

8. A wireless transmit receive unit (WTRU) comprising:

a plurality of medium access control (MAC) instances, wherein each MAC instance is associated with transmissions corresponding to a different group of one or more cells;

a physical layer entity configured to:

operate using a first physical layer configuration for transmitting to a first group of one or more cells associated with a first MAC instance,

operate using a second physical layer configuration for transmitting to a second group of one or more cells associated with a second MAC instance, and

allocate at least a portion of transmission between a first transmission associated with the first MAC instance and a second transmission associated with the second MAC instance based on one or more priority rules, wherein the one or more priority rules comprise prioritizing transmissions including a first type of uplink control information (UCI) over transmissions including a second type of control information.

9. The WTRU as in claim 8, wherein the first MAC instance and the second MAC instance utilize non-synchronous subframe timing such that portions of transmissions to the first group of one or more cells associated with the first MAC instance with portions of transmissions to the second group of one or more cells associated with the second MAC instance.

10. The WTRU as in claim 8, wherein the first transmission includes the first type of UCI, the second transmission includes the second type of UCI, and the physical layer entity is configured to prioritize the first transmission including the first type of UCI over the second transmission that including the second type of UCI when allocating power for the first and second transmissions.

11. The WTRU as in claim 10, wherein power allocated for the second transmission is scaled based on the first transmission including the first type of UCI and the second transmission including the second type of UCI.

12. The WTRU as in claim 11, wherein the first type of UCI corresponds to hybrid automatic repeat request (HARQ) ACK/NACK feedback and the second type of UCI corresponds to channel state information (CSI) feedback.

13. The WTRU as in claim 8, wherein the physical layer entity is configured to report power headroom information for each of transmissions associated with the first MAC instance and transmissions associated with the second MAC instance to the one or more cells associated with a first MAC instance.

14. The WTRU as in claim 8, wherein the one or more priority rules correspond to a tiered set of priority rules, and on condition each of first transmission and the second transmission include the same type of UCI, at least the portion of the transmission power is allocated between the first transmission and the second transmission based on a type of MAC instance associated with the first and second MAC instances, wherein a primary MAC instance is prioritized over a secondary MAC instance.

15. A method for a wireless transmit receive unit (WTRU) to allocate power among transmissions associated with different medium access control (MAC) instances, the method comprising:

the WTRU utilizing a first physical layer configuration for transmitting to a first group of

one or more cells associated with a first MAC instance;

the WTRU utilizing a second physical layer configuration for transmitting to a second group of one or more cells associated with a second MAC instance; and

the WTRU allocating at least a portion of transmission power between a first transmission associated with the first MAC instance and a second transmission associated with the second MAC instance based on tiered priority rules, wherein a primary priority rule of the tiered priority rules corresponds to prioritizing a transmissions that include a first type of uplink control information (UCI) over transmissions including a second type of UCI and a secondary priority rule of the tiered priority rules corresponds to prioritizing a primary MAC instance over a secondary MAC instance on condition that the first transmission associated with the first MAC instance includes the same type of UCI as is included in the second transmission associated with the second MAC instance.