CLAIMS

1. A user equipment (10) for use in a wireless communication network, the user equipment comprising:

a processor and means configured to transmit a control signal (40) to an enhanced node B 'ENB' in the network during an unscheduled on-duration, while the user equipment is using discontinuous reception including scheduled on-durations (210) configured by the ENB,

wherein the user equipment is configured to remain awake for a period of time (240) after the control signal is transmitted in the unscheduled on-duration, characterized by said period of time (240) being based on a known length of time for the user equipment to receive a response signal (50) or other control signal from the ENB.

2. The user equipment of claim 1, wherein the means is further configured to transmit data during at least one of the scheduled on-durations (210) configured by the ENB.

3. The user equipment of claim 2, wherein the data comprises application layer data, and/or data packets containing information related to web browsing, emailing, and other user applications.

4. The user equipment of any one of claims 1 to 3, wherein the processor and means are configured to transmit the control signal using Layer 1 signaling or Layer 2 signaling.

5. The user equipment of any one of the preceding claims, wherein the processor is further configured to set a response timer (60) configured to keep the user equipment awake for said period of time (240).

6. The user equipment of claim 5, wherein the user equipment is configured to receive information on the response timer (60) from the ENB.

7. The user equipment of any one of the preceding claims, further comprising a timing alignment timer (70) configured to promote uplink synchronization between the user equipment and the ENB, the timing alignment timer (70) configured to measure a predefined time and to promote release of channel resources upon expiration of the timing alignment timer, and wherein the user equipment is configured to release the channel resources when the user equipment does not receive a timing alignment signal from the ENB for the predefined time.

8. The user equipment of any one of the preceding claims, wherein the control signal comprises a mobility measurement message, and wherein the response signal comprises an acknowledgment of the mobility measurement message.

9. A method of operating a user equipment 'UE' (10) in a wireless communication network, the method comprising:

transmitting, by the UE, a control signal to an enhanced node B 'ENB' in the network during an unscheduled on-duration while the user equipment is using discontinuous reception including scheduled on-durations configured by the ENB,

waking up, by the UE, and remaining awake for a period of time after transmitting the control signal in the unscheduled on-duration, said period of time based on a known length of time for the UE to receive a response signal or other control signal from the ENB.

10. The method of claim 9, further comprising transmitting, by the UE, data during the scheduled on-durations configured by the ENB.

11. The method of claim 10, wherein the data comprises application layer data, and/or data packets containing information related to web browsing, emailing, and other user applications.

12. The method of any one of claims 9 to 11, wherein transmitting the control signal comprises using Layer 1 signaling or Layer 2 signaling.

13. The method of any one of claims 9 to 12, further comprising, by the user equipment, setting a response timer configured to keep the UE awake for said period of time.

14. The method of claim 13, further comprising receiving, by the user equipment, information on the response timer from the ENB.

15. The method of any one of claims 9 to 14, further comprising measuring a predefined time and promoting release of channel resources upon expiration of a timing alignment timer, and releasing the channel resources when the UE does not receive a timing alignment signal from an ENB for the predefined time.

CLAIMS

1. An enhanced Node B (eNB), comprising:

a processor configured to:

receive control plane data from a user equipment (UE) during an unscheduled on-duration associated with a discontinuous reception (DRX) mode of operation; and

specify a run time of a timer that starts subsequent to the UE transmitting the control plane data during the unscheduled on-duration, the run time defining a period of time for which the UE is to remain awake after the control plane data is transmitted in the unscheduled on-duration, wherein the UE is configured to transition to a scheduled off-duration when the period of time expires,

wherein scheduled on-durations and scheduled off-durations of the UE are not changed by the unscheduled on-duration,

wherein the DRX mode of operation defines a scheduled on-duration followed by a scheduled off-duration.

2. The eNB of claim 1, wherein the eNB is configured to receive user plane data from the UE only during the scheduled on-durations.

3. The eNB of claim 2, wherein the user plane data includes application layer data including Voice over Internet Protocol (VoIP) data packets, and data packets containing information related to web browsing, emailing, and other user applications.

4. The eNB of claim 1, wherein the control plane data includes control signaling including at least one of:

a Layer 1 scheduling request;

a Layer 2 radio resource control (RRC) message; or

a mobility measurement message.

5. The eNB of claim 1, wherein the timer is a response timer configured to keep the UE awake for a period of time sufficient for the UE to receive a response signal or other control signal from the eNB.

6. The eNB, of claim 1, wherein a timing alignment timer is configured to promote uplink synchronization between the UE and the eNB, the timing alignment timer further configured to measure a predefined time and promote release of channel resources upon expiration of the timing alignment timer.

7. The eNB of claim 6, wherein the UE releases the channel resources when the UE does not receive a timing alignment signal from the eNB for the predefined time.

8. A method of receiving control plane data at an enhanced node B (eNB), the method comprising:

receiving control plane data from a user equipment (UE) during an unscheduled on-duration associated with a discontinuous reception (DRX) mode of operation; and

specifying a run time of a timer that starts subsequent to the UE transmitting the control plane data during the unscheduled on-duration, the run time defining a period of time for which the UE is to remain awake after the control plane data is transmitted in the unscheduled on-duration, wherein the UE is configured to transition to a scheduled off-duration when the period of time expires,

wherein scheduled on-durations and scheduled off-durations of the UE are not changed by the unscheduled on-duration,

wherein the DRX mode of operation defines a scheduled on-duration followed by a scheduled off-duration.

9. The method of claim 8, further comprising receiving user plane data from the UE only during the scheduled on-durations.

10. The method of claim 9, wherein the user plane data comprises application layer data comprising Voice over Internet Protocol (VoIP) data packets, and data packets containing information related to web browsing, emailing, and other user applications.

11. The method of claim 8, wherein the control plane data comprises control signaling comprising at least one of:

a Layer 1 scheduling request;

a Layer 2 radio resource control (RRC) message; or

a mobility measurement message.

12. The method of claim 8, wherein the timer is a response timer configured to keep the UE awake for a period of time sufficient for the UE to receive a response signal or other control signal from the eNB.

13. The method of claim 8, wherein a timing alignment timer is configured to promote uplink synchronization between the UE and the eNB, the timing alignment timer further configured to measure a predefined time and promote release of channel resources upon expiration of the timing alignment timer.

14. The method of claim 13, wherein the UE releases the channel resources when the UE does not receive a timing alignment signal from the eNB for the predefined time.

15. A non-transitory computer readable medium storing instructions that when executed by one or more processors cause the one or more processors to implement a method in an enhanced Node B (eNB), the method comprising:

receiving control plane data from a user equipment (UE) during an unscheduled on-duration associated with a discontinuous reception (DRX) mode of operation; and

specifying a run time of a timer that starts subsequent to the UE transmitting the control plane data during the unscheduled on-duration, the run time defining a period of time for which the UE is to remain awake after the control plane data is transmitted in the unscheduled on-duration, wherein the UE is configured to transition to a scheduled off-duration when the period of time expires,

wherein scheduled on-durations and scheduled off-durations of the UE are not changed by the unscheduled on-duration,

wherein the DRX mode of operation defines a scheduled on-duration followed by a scheduled off-duration.

16. The non-transitory computer readable medium of claim 15, wherein the method further comprises receiving user plane data from the UE only during the scheduled on-durations.

17. The non-transitory computer readable medium of claim 15, wherein a timing alignment timer is configured to promote uplink synchronization between the UE and the eNB, the timing alignment timer further configured to measure a predefined time and promote release of channel resources upon expiration of the timing alignment timer.

18. The non-transitory computer readable medium of claim 17, wherein the UE releases the channel resources when the UE does not receive a timing alignment signal from the eNB for the predefined time.