(54) Titre : PROCÉDE ET DISPOSITIF DE COMMUNICATION SANS FIL POUR TRANSFÉRER DES DONNÉES SORTANTES AMÉLIORÉES EN MEMOIRE-TAMPON D'UNE STATION MOBILE À UN NOEUD B

(55) Title: WIRELESS COMMUNICATION METHOD AND APPARATUS FOR TRANSFERRING BUFFERED ENHANCED UPLINK DATA FROM A MOBILE STATION TO A NODE-B

(57) Abrégé/Abstract:
A wireless communication method and apparatus for transferring buffered enhanced uplink (EU) data from a wireless transmit/receive unit (WTRU), i.e., a mobile station, to a Node-B. The EU data is generated and stored in a buffer of the WTRU. The WTRU transmits a message to the Node-B including a request for a desired transport format combination (TFC) or data traffic indicator. The Node-B schedules one or more allowed EU data transmissions between the WTRU and the Node-B by transmitting an EU data scheduling message to the WTRU. The WTRU transmits all of the EU data stored in the buffer to the Node-B if the allowed EU data transmissions are sufficient to support transmission of all of the EU data stored in the buffer. Otherwise, the WTRU transmits a portion of the EU data along with the desired TFC or detailed traffic volume measurement (TVM) information to the Node-B.
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WIRELESS COMMUNICATION METHOD AND APPARATUS FOR TRANSFERRING BUFFERED ENHANCED UPLINK DATA FROM A MOBILE STATION TO A NODE-B

FIELD OF INVENTION

The present invention is related to a wireless communication system including a wireless transmit/receive unit (WTRU) and a Node-B. More particularly, the present invention is related to providing WTRU uplink (UL) traffic information to the Node-B for scheduling enhanced uplink (EU) transmissions.

BACKGROUND

Methods for enhancing UL coverage, throughput and transmission latency in a wireless communication system, such as a frequency division duplex (FDD) system, are currently being investigated in release 6 (R6) of the third generation partnership project (3GPP). Instead of scheduling and assigning UL physical channels in a radio network controller (RNC), a Node-B (i.e., a base station controller) is used to communicate with a plurality of WTRUs such that more efficient decisions can be made and UL radio resources can be managed on a short-term basis better than the RNC, even if the RNC retains overall control of the system. A similar approach has already been adopted in the downlink for release 5 (R5) of high speed data packet access (HSDPA) in a universal mobile telecommunications system (UMTS) for both an FDD mode and a time division duplex (TDD) mode.

In order for the Node-B to make efficient allocation decisions and prioritize between different data flows, the Node-B requires knowledge of UL data buffered in the WTRU for individual data channels along with their associated priority. However, conventional UL signaling methods have limited capacity, and thus may not be able to accommodate the reporting of detailed traffic volume measurement (TVM) information from the WTRU.
[0009] SUMMARY

[0010] The present invention is a wireless communication method and apparatus for transferring buffered EU data from a WTRU, (i.e., a mobile station), to a Node-B. The apparatus may be a wireless communication system, a WTRU and/or an integrated circuit (IC). The EU data is generated and stored in a buffer of the WTRU. The WTRU transmits an initial EU data transmission request message to the Node-B indicating that the WTRU has EU data to transfer to the Node-B. The initial EU data transmission request message includes a request for a desired transport format combination (TFC) or data traffic indicator. In response to receiving the initial EU data transmission request message, the Node-B schedules one or more allowed EU data transmissions between the WTRU and the Node-B by transmitting an EU data scheduling message to the WTRU. The WTRU transfers all of the EU data stored in the buffer to the Node-B if the allowed EU data transmissions are sufficient to support transmission of all of the EU data stored in the buffer. Otherwise, the WTRU transmits a portion of the EU data along with the desired TFC or detailed TVM information to the Node-B.

[0011] The procedure used to transfer EU data stored in the buffer of the WTRU may be dependent upon whether or not the quantity of the EU data exceeds an established threshold. The initial EU data transmission request message may be transmitted to the Node-B only after the quantity of the stored EU data exceeds the established threshold. When the established threshold is not exceeded, the WTRU may transfer all of the EU data from the buffer of the WTRU to the Node-B without requiring scheduling information from the Node-B. If the established threshold is set to zero, the WTRU may transfer the stored EU data from the buffer of the WTRU to the Node-B only after receiving scheduling information from the Node-B.

[0012] The EU data transmission request message may be identified in at least one layer 1 physical control field or layer 2 medium access control (MAC) header.

[0013] The desired TFC or data traffic indicator may be signaled in at least
one physical control field on an EU dedicated physical control channel (EU-DPCCH). Another field on the EU-DPCCH may include other EU related messages. If there is no EU data for the WTRU to transfer to the Node-B that requires further scheduling, the physical control field is empty or not included.

In an alternate embodiment, the EU data transmission message may include a MAC header with a field including the desired TFC or detailed TVM information. The MAC header may further include one or more other EU MAC fields. When the MAC header is empty or not included, there is no EU data for the WTRU to transfer to the Node-B.

According to an embodiment of the present disclosure there is provided a method for transmitting enhanced uplink (EU) data implemented by a wireless transmit/receive unit (WTRU). The method comprises: storing EU data in a buffer of the WTRU, wherein the EU data is associated with a plurality of data flows, wherein the plurality of data flows are associated with a plurality of priority classes; transmitting an EU data transmission request message over an EU channel including traffic volume measurement (TVM) information, wherein the TVM information includes an indication of an amount of EU data stored in the buffer and an indication of an amount of EU data stored in the buffer associated with one of the plurality of data flows, and wherein the EU data transmission request message is multiplexed with EU data into a same EU medium access control (MAC) protocol data unit (PDU); receiving an EU data scheduling message; and determining whether the EU data scheduling message allows for the amount of EU data stored in the buffer to be transmitted.

According to another embodiment of the present disclosure there is provided a wireless transmit/receive unit (WTRU) comprising: a buffer; means for storing enhanced uplink (EU) data in the buffer, wherein the EU data is associated with a plurality of data flows, wherein the plurality of data flows are associated with a plurality of priority classes; means for transmitting an EU data transmission request message over an EU channel including traffic volume measurement (TVM) information, wherein the TVM information includes an indication of an amount of EU data stored in the buffer and an indication of an
amount of EU data stored in the buffer associated with one of the plurality of data flows, and wherein the EU data transmission request message is multiplexed with EU data into a same EU medium access control (MAC) protocol data unit (PDU); means for receiving an EU data scheduling message; and means for determining whether the EU data scheduling message allows for the amount of EU data stored in the buffer to be transmitted.

BRIEF DESCRIPTION OF THE DRAWING(S)

A more detailed understanding of the invention may be had from the following description of a preferred example, given by way of example and to be understood in conjunction with the accompanying drawing wherein:

Figure 1 shows a wireless communication system operating in accordance with the present invention;

Figure 2 is a signal flow diagram for the system of Figure 1 when the EU data transmissions allowed by an EU data scheduling message are not sufficient to transmit all of the EU data buffered in the WTRU;

Figure 3 is a signal flow diagram for the system of Figure 1 when the EU data transmissions allowed by an EU data scheduling message are sufficient to transmit all of the EU data buffered in the WTRU;

Figure 4 shows a frame structure used for requesting EU data scheduling information via an EU channel in accordance with one embodiment of the present invention;

Figure 5 shows a MAC PDU format used to indicate a desired TFC or detailed TVM information in accordance with an alternate embodiment of the present invention; and

Figure 6 is a flowchart of a process including method steps for transferring buffered EU data in accordance with the present invention.
DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

Hereafter, the terminology "WTRU" includes but is not limited to a user equipment (UE), mobile station, fixed or mobile subscriber unit, pager, or any other type of device capable of operating in a wireless environment.

When referred to hereafter, the terminology "Node-B" includes but is not limited to a base station, site controller, access point or any other type of interfacing device in a wireless environment.

The present invention may be further applicable to TDD, FDD, and time division synchronous code division multiple access (TD-SCDMA), as applied to Universal Mobile Telecommunications System (UMTS), CDMA 2000 and CDMA in general, but is envisaged to be applicable to other wireless systems as well.

The features of the present invention may be incorporated into an IC or be configured in a circuit comprising a multitude of interconnecting components.

Figure 1 shows a wireless communication system 100 operating in accordance with the present invention. The system 100 includes a WTRU 105 and a Node-B 110 which communicate with each other via wireless signals 115. The WTRU 105 includes at least one buffer 120.

Figure 2 is a signal flow diagram for the wireless communication system 100 when one or more EU data transmissions allowed by a first EU data scheduling message are not sufficient to transmit all of the EU data stored in the buffer 120 of the WTRU 105. EU data 205 is generated at the WTRU 105 and is stored in the buffer 120 of the WTRU 105. When the quantity of the EU data in the buffer 120 exceeds an established EU data buffer threshold, the WTRU 105 sends an initial request message 210 to the Node-B 110 via an EU signaling channel. EU data transmissions sent by the WTRU 105 are not required to be scheduled by the Node-B 110 when the established threshold is not exceeded.

The initial request message 210 may include a desired TFC or a data traffic indicator. If the limited payload capacity of the EU control channel cannot accommodate the signaling of a desired TFC, the WTRU 105 may send a
message to the Node-B 110 indicating that the WTRU 105 has EU data to transmit to the Node-B 110 via an EU control channel. The desired TFC may be an index to a preconfigured list of possible uplink transport formats (or TFCs).

[0031] Referring still to Figure 2, upon receiving the initial request message 210, the Node-B 110 schedules one or more EU data transmissions between the WTRU 105 and the Node-B 110 via a first EU data scheduling message 215. In response to receiving the first EU data scheduling message 215, the WTRU 105 sends one or more EU data transmissions 220 to the Node-B 110 allowed by the first EU data scheduling message 215. If the EU data transmissions allowed by the first EU data scheduling message 215 are not sufficient to transmit all of the EU data buffered in the WTRU 105, the WTRU 105 sends EU data transmissions 220 including desired TFC information to the Node-B 110. The desired TFC information included in messages 210 and 220 may either be signaled in at least one physical control field or MAC header along with the EU data transmissions 220. The desired TFC may be reflected by an index into a list of predetermined TFCs. The desired TFC is used by the Node-B 110 to determine and generate subsequent scheduling messages 225a - 225n.

[0032] Alternatively, in lieu of the desired TFC information, detailed TVM information may be provided with the EU data transmissions 220. The detailed TVM information may indicate the amount of buffered data associated with individual traffic flows (channels) that can be associated with priority classes mapped to the EU dedicated channel (EU-DCH). Node-B 110 can utilize the comprehensive knowledge of the desired TFC or detailed TVM information and potentially associated priorities reported via the EU transmissions 220 to determine subsequent uplink scheduling. When the WTRU 105 obtains additional EU data later on, the WTRU 105 may choose to report updated desired TFC or detailed TVM information to the Node-B 110. The Node-B 110 then schedules subsequent EU data transmissions from the WTRU 105 to the Node-B 110 via subsequent EU data scheduling messages 225a - 225n.

[0033] Figure 3 is a signal flow diagram for the wireless communication system 100 when one or more EU data transmissions allowed by an EU data
scheduling message are sufficient to transmit all of the EU data stored in the buffer 120 of the WTRU 105. EU data 305 is generated at the WTRU 105 and is stored in the buffer 120 of the WTRU 105. When the quantity of the EU data in the buffer 120 exceeds an established EU data buffer threshold, the WTRU 105 sends an initial request message 310 to the Node-B 110 via an EU signaling channel. The initial request message 310 may include a desired TFC or a data traffic indicator. If the limited payload capacity of the EU control channel cannot accommodate the signaling of a desired TFC, the WTRU 105 may send a message to the Node-B 110 indicating that the WTRU 105 has EU data to transmit to the Node-B 110 via an EU control channel. The desired TFC may be an index to a preconfigured list of possible uplink transmission formats (or TFCs).

EU data transmissions sent by the WTRU 105 are not required to be scheduled by the Node-B 110 when the established EU data buffer threshold is not exceeded.

Still referring to Figure 3, upon receiving the initial request message 310, the Node-B 110 schedules one or more EU data transmissions between the WTRU 105 and the Node-B 110 via an EU data scheduling message 315. In response to receiving the EU data scheduling message 315, the WTRU 105 sends one or more EU data transmissions 320 allowed by the EU data scheduling message 315. If the EU data transmissions allowed by the EU data scheduling message 315 are sufficient to transmit all of the EU data 305 buffered in the WTRU 105, all of the EU data stored in the buffer 120 of the WTRU 105 is sent to the Node-B 110. In this case, UL signaling information indicating the desired TFC or detailed TVM information is either not included or an associated message field is left empty, indicating that the WTRU 105 does not require further scheduling allocations.

Figure 4 shows a frame structure 400 used for requesting EU data scheduling information via an EU channel in accordance with one embodiment of the present invention. The frame structure 400 may be incorporated into the initial request message 210 and, potentially, the EU data transmissions 220 previously described in conjunction with Figure 2.
The frame structure 400 includes a "requested TFC information / EU data indication" field 405 and an "other EU related messages" field 410. The requested TFC information / EU data indication field 405 is signaled in at least one physical control field on the EU-DPCCH. An empty requested TFC information / EU data indication field 405 indicates that there is no more buffered EU data for the WTRU 105 to send to the Node-B 110, and thus, no further scheduling allocations from the Node-B 110 are required. The EU-DPCCH may be code or time-multiplexed with an EU-DCH and/or a high speed dedicated physical control channel (HS-DPCCH).

Figure 5 shows a MAC protocol data unit (PDU) format 500 used to indicate a desired TFC or detailed TVM information in accordance with an alternate embodiment of the present invention. The MAC PDU format 500 may be incorporated into the EU data transmissions 220 and, potentially, the initial request message 210 previously described in conjunction with Figure 2.

The MAC PDU format 500 includes a "requested TFC/TVM information field" 505, one or more "other EU MAC header fields" 510, and a MAC SDU field 515. The requested TFC/TVM information field 505 is signaled within the MAC header of EU data transmissions. An empty requested TFC/TVM information field 505 indicates that there is no more buffered EU data for the WTRU 105 to send to the Node-B 110, and thus, no further scheduling allocations from the Node-B 110 are required.

Figure 6 is a flowchart of a process 600 including method steps for transferring user data from the WTRU 105 to the Node-B 110 in accordance with the present invention. In step 605, EU data is generated and stored in the buffer 120 of the WTRU 105. In optional step 610, a determination is made as to whether or not the quantity of EU data stored in the buffer 120 of the WTRU 105 exceeds an established threshold. When the quantity of the stored EU data in the buffer 120 of the WTRU 105 does not exceed the established threshold, EU transmissions are allowed without Node-B scheduling, and all of the stored EU data is transmitted to the Node-B 110 (step 630). If the quantity of the stored EU data exceeds the established threshold, the WTRU 105 sends an initial EU
data transmission request message including desired TFC information or just a traffic indicator (i.e., an EU data indication) to the Node-B 110 indicating that the WTRU 105 has EU data to send to the Node-B 110 (step 615).

[0041] It should be noted that the established EU data buffer threshold may be set to zero. In this case, the storage of any amount of EU data in the buffer 120 of the WTRU 105 will always trigger the transmission of an initial request message 210.

[0042] Still referring to Figure 6, in step 620, the Node-B 110 sends an EU data scheduling message, including information on one or more allowed EU data transmissions, to the WTRU 105 to schedule transmission of the EU data buffered in the WTRU 105 to the Node-B 110. In step 625, the WTRU 105 determines if the allowed EU data transmissions are sufficient to transmit all of the buffered EU data. If the EU data transmissions allowed by the current scheduling information are sufficient to support transmission of all of the EU data stored in the buffer 120, all of the EU data buffered in the WTRU 105 is transmitted to the Node-B 110 in the allowed EU data transmissions (step 630).

[0043] If the EU data transmissions allowed by the current scheduling information are not sufficient to transmit all of the EU data buffered in the WTRU 105, the WTRU 105 transmits one or more EU data transmissions including the desired TFC or detailed TVM information to the Node-B 110 (step 635). In step 640, the Node-B 110 determines priorities associated with the EU data. Node-B 110 utilizes the knowledge of the requested TFC or detailed TVM information, and associated priorities for determining the EU physical channel, and scheduling and transmitting one or more additional EU data transmissions until there is no more EU data buffered in the WTRU 105.

[0044] While this invention has been particularly shown and described with reference to preferred embodiments, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the scope of the invention described hereinabove.

* * *
What is claimed is:

1. A method for transmitting enhanced uplink (EU) data implemented by a wireless transmit/receive unit (WTRU), the method comprising:
   storing EU data in a buffer of the WTRU, wherein the EU data is associated with a plurality of data flows, wherein the plurality of data flows are associated with a plurality of priority classes;
   transmitting an EU data transmission request message over an EU channel including traffic volume measurement (TVM) information, wherein the TVM information includes an indication of an amount of EU data stored in the buffer and an indication of an amount of EU data stored in the buffer associated with one of the plurality of data flows, wherein the EU data transmission request message is multiplexed with EU data into a same EU medium access control (MAC) protocol data unit (PDU);
   receiving an EU data scheduling message; and
   determining whether the EU data scheduling message allows for the amount of EU data stored in the buffer to be transmitted.

2. The method of claim 1 further comprising transmitting all of the EU data stored in the buffer on a condition that the EU data scheduling message allows all the EU data stored in the buffer to be transmitted.

3. The method of claim 1 further comprising transmitting a portion of the EU data stored in the buffer along with TVM information on a condition that the EU data scheduling message does not allow all of the EU data stored in the buffer to be transmitted.

4. The method of claim 3 wherein the portion of the EU data and TVM information are transmitted in a same EU MAC PDU.

5. The method of claim 4 wherein the EU MAC PDU further comprises one or more other EU MAC fields.
6. The method of claim 4 wherein an empty or not included MAC field used for indicating the TVM information indicates that there is no EU data for the WTRU to transmit.

7. The method of claim 1 wherein the EU data transmission request message is transmitted only after the amount of the stored EU data exceeds an established threshold.

8. The method of claim 1 further comprising on a condition that an established threshold for the amount of the stored EU data is not exceeded, transmitting all of the stored EU data from the buffer of the WTRU without receiving an EU data scheduling message from a Node-B.

9. The method of claim 7 wherein the established threshold has a value of zero.

10. A wireless transmit/receive unit (WTRU) comprising:
    a buffer;
    means for storing enhanced uplink (EU) data in the buffer, wherein the EU data is associated with a plurality of data flows, wherein the plurality of data flows are associated with a plurality of priority classes;
    means for transmitting an EU data transmission request message over an EU channel including traffic volume measurement (TVM) information, wherein the TVM information includes an indication of an amount of EU data stored in the buffer and an indication of an amount of EU data stored in the buffer associated with one of the plurality of data flows, wherein the EU data transmission request message is multiplexed with EU data into a same EU medium access control (MAC) protocol data unit (PDU);
    means for receiving an EU data scheduling message; and
    means for determining whether the EU data scheduling message allows for the amount of EU data stored in the buffer to be transmitted.
11. The WTRU of claim 10 further comprising means for transmitting all of the EU data stored in the buffer on a condition that the EU data scheduling message allows all of the EU data stored in the buffer to be transmitted.

12. The WTRU of claim 10 further comprising means for transmitting a portion of the EU data stored in the buffer along with TVM information on a condition that the EU data scheduling message does not allow all of the EU data stored in the buffer to be transmitted.

13. The WTRU of claim 12 wherein the portion of the EU data and the TVM information are transmitted in a same EU MAC PDU.

14. The WTRU of claim 13 wherein the EU MAC PDU further comprises one or more other EU MAC fields.

15. The WTRU of claim 13 wherein an empty or not included MAC field used for indicating TVM information indicates that there is no EU data for the WTRU to transmit.

16. The WTRU of claim 10 wherein the EU data transmission request message is transmitted only after the amount of the stored EU data exceeds an established threshold.

17. The WTRU of claim 10 further comprising:
   means for transmitting all of the stored EU data from the buffer of the WTRU without receiving an EU data scheduling message from a Node-B on a condition that an established threshold for the amount of the stored EU data is not exceeded.

18. The WTRU of claim 16 wherein the established threshold has a value of zero.
19. A method for transferring enhanced uplink (EU) data implemented by a wireless transmit/receive unit (WTRU) comprising:

storing EU data in a buffer of the WTRU, wherein the EU data is associated with a plurality of data flows, wherein the plurality of data flows are associated with a plurality of priority classes;

transmitting an EU data transmission request message over an EU channel including traffic volume measurement (TVM) information, wherein the TVM information includes both an indication of an amount of EU data stored in the buffer and an indication of an amount of EU data stored in the buffer associated with one of the plurality of data flows, wherein the EU data transmission request message is transmitted in an EU medium access control (MAC) protocol data unit (PDU) along with allowed EU data in a same EU MAC PDU;

receiving an EU data scheduling message;

determining whether the EU data scheduling message allows for the amount of EU data stored in the buffer to be transmitted; and

transmitting a portion of the EU data stored in the buffer on a condition that the EU data scheduling message does not allow all of the EU data stored in the buffer to be transmitted, wherein a portion of the EU data is transmitted with TVM information in a same EU MAC PDU.

20. The method of claim 19 further comprising transmitting all of the EU data stored in the buffer on a condition that the EU data scheduling message allows all the EU data stored in the buffer to be transmitted.

21. The method of claim 19 wherein an EU MAC PDU further comprises one or more other EU MAC fields.

22. The method of claim 21 wherein an empty or not included EU MAC field of an EU MAC PDU used to indicate the TVM information indicates that there is no EU data for the WTRU to transfer.
23. A wireless transmit/receive unit (WTRU) comprising:

- circuitry configured to store enhanced uplink (EU) data in the buffer, wherein the EU data is associated with a plurality of data flows, wherein the plurality of data flows are associated with a plurality of priority classes;

- circuitry configured to transmit an EU data transmission request message over an EU channel including traffic volume measurement (TVM) information, wherein the TVM information includes both an indication of an amount of EU data stored in the buffer and an indication of an amount of EU data stored in the buffer associated with one of the plurality of data flows, wherein the EU data transmission request message is transmitted in an EU medium access control (MAC) protocol data unit (PDU) along with allowed EU data in a same EU MAC PDU;

- circuitry configured to receive an EU data scheduling message;

- circuitry configured to determine whether the EU data scheduling message allows for the amount of EU data stored in the buffer to be transmitted; and

- circuitry configured to transmit a portion of the EU data stored in the buffer on a condition that the EU data scheduling message does not allow all of the EU data stored in the buffer to be transmitted, wherein a portion of the EU data is transmitted with TVM information in a same EU MAC PDU.

24. The WTRU of claim 23 further comprising:

- circuitry configured to transmit all of the EU data stored in the buffer on a condition that the EU data scheduling message allows all of the EU data stored in the buffer to be transmitted.

25. The WTRU of claim 23 wherein an EU MAC PDU further comprises one or more other EU MAC fields.

26. The WTRU of claim 25 wherein an empty or not included EU MAC field of an EU MAC PDU used to indicate TVM information indicates that there is no EU data for the WTRU to transfer.
27. A method for transferring enhanced uplink (EU) data implemented by a wireless transmit/receive unit (WTRU), comprising:

storing EU data in a buffer of the WTRU, wherein the EU data is associated with a plurality of data flows, wherein the plurality of data flows are associated with a plurality of priority classes;

transmitting an EU data transmission request message over an EU channel including an indication of an amount of EU data stored in the buffer and an indication of an amount of EU data stored in the buffer associated with one of the plurality of data flows;

receiving an EU data scheduling message;

determining, based on the EU data scheduling message, whether granted resources allow for the amount of EU data stored in the buffer to be transmitted; and

transmitting a portion of the EU data stored in the buffer along with an indication indicating whether the granted resources allow the amount of EU data stored in the buffer to be transmitted.

28. The method of claim 27 wherein the EU data transmission request message is transmitted in an EU medium access control (MAC) protocol data unit (PDU) along with EU data in a same EU MAC PDU.

29. The method of claim 28 wherein the EU MAC PDU further comprises one or more other EU MAC fields.

30. The method of claim 27 wherein the indication indicating whether the granted resources allow the amount of EU data stored in the buffer to be transmitted is transmitted on an EU channel.

31. A method of claim 27 wherein the indication indicating whether the granted resources allow the amount of EU data stored in the buffer to be transmitted is code multiplexed with the portion of the EU data.
32. A wireless transmit/receive unit (WTRU) comprising:

   circuitry configured to store enhanced uplink (EU) data in a buffer, wherein the EU data is associated with a plurality of data flows, wherein the plurality of data flows are associated with a plurality of priority classes;

   circuitry configured to transmit an EU data transmission request message over an EU channel including an indication of an amount of EU data stored in the buffer and an indication of an amount of EU data stored in the buffer associated with one of the plurality of data flows;

   circuitry configured to receive an EU data scheduling message;

   circuitry configured to determine, based on the EU data scheduling message, whether granted resources allow for the amount of EU data stored in the buffer to be transmitted; and

   circuitry configured to transmit a portion of the EU data stored in the buffer along with an indication indicating whether the granted resources allow the amount of EU data stored in the buffer to be transmitted.

33. The WTRU of claim 32 wherein the EU data transmission request message is transmitted in an EU medium access control (MAC) protocol data unit (PDU) along with EU data in a same EU MAC PDU.

34. The WTRU of claim 33 wherein the EU MAC PDU further comprises one or more other EU MAC fields.

35. The WTRU of claim 32 wherein the indication indicating whether the granted resources allow the amount of EU data stored in the buffer to be transmitted is transmitted on an EU channel.

36. The WTRU of claim 32 wherein the indication indicating whether the granted resources allow the amount of EU data stored in the buffer to be transmitted is code multiplexed with the portion of the EU data.
37. A method for transferring enhanced uplink (EU) data implemented by a wireless transmit/receive unit (WTRU) comprising:

storing EU data in a buffer of the WTRU, wherein the EU data is associated with a plurality of data flows, wherein the plurality of data flows are associated with a plurality of priority classes;

transmitting an EU data transmission request message including traffic volume measurement (TVM) information, wherein the TVM information includes an indication of an amount of EU data stored in the buffer and an indication of an amount of EU data in the buffer associated with an individual data flow;

receiving an EU data scheduling message;

generating a medium access control (MAC) protocol data unit (PDU) for transmitting the EU data, wherein an amount of the EU data in the MAC PDU is based on the received EU data scheduling message, and wherein on a condition that all of the EU data stored in the buffer is not in the MAC PDU, transmitting another EU data transmission request message for EU data that is not in the MAC PDU, wherein the another EU data transmission request message is multiplexed into the MAC PDU with the EU data; and

transmitting the MAC PDU.

38. The method of claim 37 wherein the EU data scheduling message is received from a Node-B.

39. The method of claim 37 wherein the TVM information includes an indication of a priority associated with the individual data flow.

40. The method of claim 37 wherein the EU data transmission request message is transmitted to a Node-B.

41. A wireless transmit/receive unit (WTRU) comprising:

means for storing enhanced uplink (EU) data in a buffer of the WTRU, wherein the EU data is associated with a plurality of data flows,
wherein the plurality of data flows are associated with a plurality of priority classes;

means for transmitting an EU data transmission request message including traffic volume measurement (TVM) information, wherein the TVM information includes an indication of an amount of EU data stored in the buffer and an indication of an amount of EU data in the buffer associated with an individual data flow;

means for receiving an EU data scheduling message;

means for generating a medium access control (MAC) protocol data unit (PDU) for transmitting the EU data, wherein an amount of the EU data in the MAC PDU is based on the received EU data scheduling message, and wherein on a condition that all of the EU data stored in the buffer is not in the MAC PDU, means for transmitting another EU data transmission request message for EU data that is not in the MAC PDU, wherein the another EU data transmission request message is multiplexed into the MAC PDU with the EU data; and

means for transmitting the MAC PDU.

42. The WTRU of claim 41 wherein the EU data scheduling message is received from a Node-B.

43. The WTRU of claim 41 wherein the TVM information includes an indication of a priority associated with the individual data flow.

44. The WTRU of claim 41 wherein the EU data transmission request message is transmitted to a Node-B.
**FIG. 1**

100.

105.

115.

110.

**FIG. 2**

205.

EU DATA.

210.

EU DATA TRANSMISSION(S).

220.

EU DATA TRANSMISSION(S).

225a.

SUBSEQUENT EU DATA SCHEDULING MESSAGE.

225n.

**FIG. 3**

305.

EU DATA.

310.

INITIAL REQUEST MESSAGE.

315.

ENHANCED UPLINK (EU) DATA SCHEDULING MESSAGE.

320.

EU DATA TRANSMISSION(S).

(ALL BUFFERED EU DATA)
FIG. 4

REQUESTED TFC/UE INFORMATION
DATA INDICATION

OTHER EU RELATED MESSAGES

FIG. 5

REQUESTED TFC/TVM INFORMATION

OTHER EU MAC HEADER FIELDS
MAC SDU

400
405
410
500
505
510
515
START

ENHANCED UPLINK (EU) DATA IS GENERATED AND STORED IN THE BUFFER OF A WTRU.

DOES THE QUANTITY OF THE EU DATA IN THE WTRU BUFFER EXCEED AN ESTABLISHED THRESHOLD?

NO

THE WTRU SENDS AN INITIAL EU DATA TRANSMISSION REQUEST MESSAGE INCLUDING DESIRED TFC INFORMATION OR A DATA TRAFFIC INDICATOR TO NODE-B.

YES

THE NODE-B SENDS AN EU DATA SCHEDULING MESSAGE INCLUDING INFORMATION ON ONE OR MORE ALLOWED EU DATA TRANSMISSIONS TO THE WTRU.

ARE THE ALLOWED EU DATA TRANSMISSION(S) SUFFICIENT TO TRANSMIT ALL OF THE EU DATA?

YES

TRANSMIT ALL EU DATA BUFFERED IN THE WTRU TO THE NODE B.

END

NO

THE WTRU TRANSMITS ONE OR MORE EU DATA TRANSMISSIONS INCLUDING THE DESIRED TFC OR DETAILED TVM INFORMATION TO THE NODE-B.

THE NODE-B DETERMINES PRIORITIES ASSOCIATED WITH THE EU DATA, SCHEDULE AND TRANSMIT ONE OR MORE ADDITIONAL EU DATA TRANSMISSIONS UNTIL THERE IS NO MORE EU DATA BUFFERED IN THE WTRU.

END

FIG. 6
INITIAL REQUEST MESSAGE
(INCLUDING A DESIRED TFC OR A DATA TRAFFIC INDICATOR)
FIRST ENHANCED UPLINK (EU) DATA SCHEDULING MESSAGE
EU DATA TRANSMISSION(S)
(INCLUDING DESIRED TFC OR DETAILED TVM INFORMATION)
SUBSEQUENT EU DATA SCHEDULING MESSAGE