

CLAIMS

1. A method for wireless communication by a User Equipment (UE), comprising:
 - transmitting to a base station (BS), feedback indicating an Acknowledgement (ACK) or a Negative Acknowledgement (NACK) corresponding to each of received set of code block groups (CBGs) transmitted by the BS to the UE;
 - receiving an indication including information regarding whether one or more of the CBGs are to be retransmitted by the BS; and
 - processing a retransmission of one or more of the CBGs based on the received indication.
2. The method of claim 1, wherein the feedback comprises a first bitmap of ACKs and NACKs corresponding to the CBGs received by the UE, and the indication comprises a second bitmap of decoding confirmations of the ACKs and the NACKs, the second bitmap corresponding to a result of decoding the first bitmap as received by the BS, and further comprising determining whether the feedback was correctly decoded by the BS based on the second bitmap.
3. The method of claim 2, further comprising determining based on the second bitmap of ACKs or NACKs, ACKs or NACKs corresponding to which CBGs were incorrectly decoded by the BS.
4. The method of claim 2, wherein determining whether the feedback was correctly decoded by the BS based on the second bitmap comprises:
 - comparing the second bitmap with the first bitmap;
 - determining that the feedback was correctly decoded by the BS if the second bitmap is the same as the first bitmap; and
 - determining that the feedback was incorrectly decoded by the BS if the second bitmap is not the same as the first bitmap.
5. The method of claim 1, further comprising receiving the retransmission of the one or more of the CBGs based on the received indication.

6. The method of claim 1, further comprising whether to combine Log Likelihood Ratios (LLRs) of each of the retransmitted CBGs with an LLR of a previously received version of the CBG to decode the CBG based on receiving the indication.
7. The method of claim 1, wherein the indication is received in a Downlink Control Information (DCI) as a retransmission grant.
8. The method of claim 7, wherein a length of the DCI is maintained regardless of whether or not the DCI includes the indication.
9. The method of claim 7, wherein a length of the DCI is different from a default length of the DCI if the DCI includes the indication.
10. The method of claim 1, wherein the indication is received in a companion DCI different from a default DCI that includes a retransmission grant corresponding to the one or more CBGs.
11. The method of claim 10, further comprising receiving an indication of the companion DCI in the default DCI.
12. The method of claim 1, wherein the feedback comprises information regarding a first bitmap of ACKs and NACKs corresponding to the CBGs received by the UE, and the indication comprises a hash of a second bitmap of ACKs and NACKs received by the BS, the second bitmap based on a result of decoding the first bitmap at the BS, and further comprising determining whether the feedback was correctly decoded by the BS based on the hash of the second bitmap.
13. The method of claim 12, wherein the hash of the second bit map comprises a CRC generated by the BS based on the second bitmap.
14. The method of claim 13, wherein determining whether the feedback was correctly decoded by the BS based on the hash of the second bitmap comprises:

generating a second CRC based on the first bitmap using the same CRC generation function used by the BS for generating the CRC;

comparing the generated second CRC with the received CRC;

determining that the feedback was correctly decoded by the BS if the second CRC is same as the received CRC; and

determining that the feedback was incorrectly decoded by the BS if the second CRC is not same as the received CRC.

15. The method of claim 13, further comprising transmitting in the feedback a second CRC generated based on the first bitmap.

16. The method of claim 15, further comprising generating the second CRC using a CRC generation function different from another CRC generation function used by the BS for generating the CRC based on the second bitmap.

17. The method of claim 1, wherein the feedback comprises information regarding a first bitmap of ACKs and NACKs corresponding to the received CBGs, and the indication comprises Downlink Control Information (DCI) and a CRC, the CRC generated based on a concatenated sequence of DCI and a second bitmap of ACKs and NACKs received by the BS and further scrambled using an identity of the UE, the second bitmap based on a result of decoding the first bitmap at the BS, and further comprising determining whether the feedback was correctly decoded by the BS based on the received DCI and the CRC.

18. The method of claim 17, wherein determining whether the feedback was correctly decoded by the BS based on the received DCI and the CRC comprises:

decoding the received DCI and the CRC;

generating a second CRC based on a concatenated sequence of the decoded DCI and the first bitmap and further scrambling the concatenated sequence using the identity of the UE;

comparing the generated second CRC with the received CRC;

determining that the feedback was correctly decoded by the BS and receiving a retransmission grant based on results of the decoding, if the second CRC is same as the received

CRC; and

ignoring the results of the decoding if the second CRC is not same as the received CRC.

19. The method of claim 1, wherein the feedback comprises information regarding a first bitmap of ACKs and NACKs corresponding to the received CBGs, and the indication comprises Downlink Control Information (DCI) and a CRC, the CRC generated based on the DCI and then scrambled with an identity of the UE and a second bitmap of ACKs and NACKs received by the BS, the second bitmap based on a result of decoding the first bitmap at the BS, and further comprising determining whether the feedback was correctly decoded by the BS based on the received DCI and the CRC.

20. The method of claim 19, wherein determining whether the feedback was correctly decoded by the BS based on the received DCI and the CRC comprises:

decoding the received DCI and the CRC;

generating a second CRC based on the decoded DCI;

scrambling the second CRC with the identity of the UE and the first bitmap;

comparing the generated second CRC with the received CRC;

determining that the feedback was correctly decoded by the BS and receiving a retransmission grant based on results of the decoding, if the second CRC is same as the received CRC; and

ignoring the results of the decoding, if the second CRC is not same as the received CRC.

21. The method of claim 1, further comprising receiving another indication from the BS in Downlink Control Information (DCI) to stop soft combining of Log Likelihood Ratios (LLRs) for one or more CBGs from previous transmissions received at the UE, wherein the another indication comprises at least one bit.

22. A method of wireless communication by a Base Station (BS), comprising:

receiving, from a User Equipment (UE), feedback indicating an Acknowledgement (ACK) or a Negative Acknowledgement (NACK) corresponding to each of received set of code block groups (CBGs) transmitted by the BS;

transmitting an indication including information regarding whether one or more of the CBGs are to be retransmitted by the BS; and

retransmitting one or more of the CBGs based on the transmitted indication.

23. The method of claim 22, wherein the feedback comprises a first bitmap of ACKs and NACKs corresponding to the CBGs transmitted to the UE, and the indication comprises a second bitmap of decoding confirmations of the ACKs and the NACKs, the second bitmap corresponding to a result of the first bitmap as received by the BS.

24. The method of claim 22, wherein transmitting the indication comprises transmitting the indication in Downlink Control Information (DCI) as a retransmission grant.

25. The method of claim 24, wherein a length of the DCI is maintained regardless of whether or not the DCI includes the indication.

26. The method of claim 24, wherein a length of the DCI is different from a default length of the DCI, if the DCI includes the indication.

27. The method of claim 22, wherein transmitting the indication comprises transmitting the indication in a companion DCI different from a default DCI that includes a retransmission grant corresponding to the one or more CBGs.

28. The method of claim 27, further comprising transmitting an indication of the companion DCI in the default DCI.

29. The method of claim 22, wherein the feedback comprises information regarding a first bitmap of ACKs and NACKs corresponding to the CBGs transmitted to the UE, and the indication comprises a hash of a second bitmap of ACKs and NACKs received by the BS, the second bitmap based on a result of decoding the first bitmap at the BS.

30. The method of claim 29, further comprising generating a CRC based on the second

bitmap, wherein the hash of the second bit map includes the CRC generated based on the second bitmap.

31. The method of claim 29, further comprising:
receiving in the feedback a CRC generated based on the first bitmap; and
validating the first bitmap based on the received CRC.
32. The method of claim 22, wherein the feedback comprises information regarding a first bitmap of ACKs and NACKs corresponding to the transmitted CBGs, and the indication comprises Downlink Control Information (DCI) and a CRC, further comprising:
generating the CRC based on a concatenated sequence of DCI and a second bitmap of ACKs and NACKs received by the BS, the second bitmap based on a result of decoding the first bitmap at the BS; and
scrambling the CRC using an identity of the UE.
33. The method of claim 32, further comprising:
transmitting a grant for retransmitting the one or more CBGs;
detecting that no ACK or NACK is received from the UE corresponding to the grant; and
in response to the detecting, determining that the BS incorrectly decoded the feedback.
34. The method of claim 22, wherein the feedback comprises information regarding a first bitmap of ACKs and NACKs corresponding to the transmitted CBGs, and the indication comprises Downlink Control Information (DCI) and a CRC, further comprising:
generating the CRC based on a DCI; and
scrambling the generated CRC with an identity of the UE and a second bitmap of ACKs and NACKs received by the BS, the second bitmap based on a result of decoding the first bitmap at the BS.
35. The method of claim 34, further comprising:
transmitting a grant for retransmitting the one or more CBGs;
detecting that no ACK or NACK is received from the UE corresponding to the grant; and

in response to the detecting, determining that the BS incorrectly decoded the feedback.

36. The method of claim 22, further comprising:

determining that data corresponding to one or more of the transmitted CBGs was punctured by other data; and

in response, transmitting a second indication from the BS to stop soft combining Log Likelihood Ratios (LLRs) for the one or more CBGs, wherein the second indication comprises at least one bit.

37. An apparatus for wireless communication by a User Equipment (UE), comprising:

means for transmitting to a base station (BS), feedback indicating an Acknowledgement (ACK) or a Negative Acknowledgement (NACK) corresponding to each of received set of code block groups (CBGs) transmitted by the BS to the UE;

means for receiving an indication including information regarding whether one or more of the CBGs are to be retransmitted by the BS; and

means for processing a retransmission of one or more of the CBGs based on the received indication.

38. An apparatus for wireless communication by a Base Station (BS), comprising:

means for receiving, from a User Equipment (UE), feedback indicating an Acknowledgement (ACK) or a Negative Acknowledgement (NACK) corresponding to each of received set of code block groups (CBGs) transmitted by the BS;

means for transmitting an indication including information regarding whether one or more of the CBGs are to be retransmitted by the BS; and

means for retransmitting one or more of the CBGs based on the transmitted indication.