

What is claimed is:

1. A method for use in a user equipment, the method comprising:
selecting, while the user equipment is in an inactive or idle state, one of mul-
5 tiple uplink transmission schemes to be used to transmit uplink data,
 wherein the multiple uplink transmission schemes comprise an uplink
 transmission scheme performed via a radio resource control, RRC,
 setup or resume procedure, a random access based small data trans-
 mission scheme, and a preconfigured grant based uplink transmis-
10 sion scheme; and
 performing the selected uplink transmission scheme to transmit the uplink
 data.
2. The method according to claim 1, wherein when both the preconfigured
15 grant based uplink transmission scheme and the random access based
 small data transmission scheme are configured for the user equipment,
 selecting further comprises selecting the random access based small data
 transmission scheme in response to a grant occasion for the precon-
 figured grant based uplink transmission scheme is more than a time
20 threshold ahead and performing the selected uplink transmission
 scheme further comprises performing the RRC setup or resume pro-
 cedure to transmit an amount of uplink data; or
 selecting further comprises selecting the preconfigured grant based uplink
 transmission scheme in response to a grant occasion for the precon-
25 figured grant based uplink transmission scheme is less than a time
 threshold ahead and performing the selected uplink transmission
 scheme further comprises performing the preconfigured grant based
 uplink transmission scheme using the grant occasion to transmit the
 amount of uplink data.

3. The method according to claim 1 or 2, wherein one of the preconfigured grant based uplink transmission scheme or the random access based small data transmission scheme is selected and transmission is performed using the selected one of the preconfigured grant based uplink transmission scheme or the random access based small data transmission scheme, and the method further comprises releasing by the user equipment configuration for the one of the preconfigured grant based uplink transmission scheme or the random access based small data transmission scheme that was not selected.
4. The method according to any one of claims 1 to 3, wherein a small data transmission is performed using an early data transmission that uses a random access channel procedure.
5. The method according to any one of claims 1 to 4, wherein the RRC setup or resume procedure comprises one or more of the following: a radio resource control connection setup procedure; a radio resource control connection resume procedure; or a radio resource control connection re-establishment procedure.
6. The method according to any one of claims 1 to 5, wherein the uplink data is an amount of data that is determined to be small based on implementation in the user equipment or a received threshold based on which the user equipment evaluates to determine whether the amount of data is small.
7. The method according to any one of claims 1 to 6, wherein the selecting is based on received information, and the received information comprises one or both of data amount or time thresholds for one or more of the multiple uplink transmission schemes.

8. The method according to claim 7, wherein the method further comprises receiving the received information via one or both of dedicated signaling or broadcast signaling.
- 5 9. The method according to claim 8, wherein the dedicated signaling comprises one or more radio resource control release messages or the broadcast signaling comprises system information block signaling.
10. A method for use in a network node, the method comprising:
10 sending, to a user equipment, information configured to allow the user equipment, while the user equipment is in an inactive or idle state, to select one of multiple uplink transmission schemes to be used to transmit uplink data, wherein the multiple uplink transmission schemes comprise an uplink transmission scheme performed via a radio resource control, RRC, setup or resume procedure, a random
15 access based small data transmission, and a preconfigured grant based uplink transmission scheme; and
receiving by the network the uplink data transmitted by the user equipment using the selected uplink transmission scheme.
- 20 11. The method according to claim 10, wherein receiving comprises receiving a small data transmission that uses an early data transmission that uses a random access channel procedure.
- 25 12. The method according to claim 10 or 11, wherein the RRC setup or resume procedure comprises one or more of the following: a radio resource control connection setup procedure; a radio resource control connection resume procedure; or a radio resource control connection re-establishment procedure.

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13. The method according to any one of claims 10-12, wherein the sent information comprises one or both of data amount or time threshold for one or more of the multiple uplink transmission schemes.
- 5 14. The method according to claim 13, wherein the sending the information further comprises sending the information via one or both of dedicated signaling or broadcast signaling.
- 10 15. The method according to claim 14, wherein the dedicated signaling comprises one or more radio resource control release messages or the broadcast signaling comprises system information block signaling.
16. A user equipment comprising:
means for selecting, while the user equipment is in an inactive or idle state,
15 one of multiple uplink transmission schemes to be used to transmit uplink data, wherein the multiple uplink transmission schemes comprise an uplink transmission scheme performed via a radio resource control, RRC, setup or resume signaling based uplink transmission scheme, a random access based small data transmission scheme,
20 and a preconfigured grant based small data transmission scheme;
and
means for performing the selected uplink transmission scheme to transmit the uplink data.
- 25 17. The user equipment according to claim 16, wherein both the preconfigured grant based uplink transmission scheme and the random access based small data transmission scheme are configured for the user equipment, and wherein:
selecting further comprises selecting the random access based small data
30 transmission scheme in response to a grant occasion for the preconfigured grant based uplink transmission scheme is more than a time

threshold ahead and performing the selected uplink transmission scheme further comprises performing the RRC setup or resume procedure to transmit an amount of the uplink data; or selecting further comprises selecting the preconfigured grant based uplink transmission scheme in response to a grant occasion for the preconfigured grant based uplink transmission scheme is less than a time threshold ahead and performing the selected uplink transmission scheme further comprises performing the preconfigured grant based uplink transmission scheme using the grant occasion to transmit the amount of the uplink data.

18. The user equipment according to claim 16 or 17, wherein one of the preconfigured grant based uplink transmission scheme or the random access based small data transmission scheme is performed using the selected one of the preconfigured grant based uplink transmission scheme or the random access based small data transmission scheme, and the apparatus further comprises means for releasing by the user equipment configuration for the one of the preconfigured grant based uplink transmission scheme or the random access based small data transmission scheme that was not selected.

19. The user equipment according to any one of claims 16-18, wherein a small data transmission is performed using an early data transmission that uses a random access channel procedure.

20. The user equipment according to any one of claims 16-19, wherein the RRC setup or resume procedure comprises one or more of the following: a radio resource control connection setup procedure; a radio resource control connection resume procedure; or a radio resource control connection re-establishment procedure.

21. The user equipment according to claim 16, wherein neither the preconfigured grant based uplink transmission scheme nor the random access based small data transmission scheme is configured for the user equipment, and wherein:
- 5 selecting further comprises selecting the RRC setup or resume procedure and performing the selected uplink transmission scheme further comprises performing the RRC setup or resume procedure to transmit the uplink data.
- 10 22. The user equipment according to claim 16, wherein the preconfigured grant based uplink transmission scheme is configured for the user equipment but the random access based small data transmission scheme is not configured for the user equipment, and wherein:
- 15 selecting further comprises selecting the RRC setup or resume procedure in response to a grant occasion for the preconfigured grant based uplink transmission scheme is more than a time threshold ahead and performing the selected uplink transmission scheme further comprises performing the RRC setup or resume procedure to transmit the amount of the uplink data; or
- 20 selecting further comprises selecting the preconfigured grant based uplink transmission scheme in response to a grant occasion for the preconfigured grant based uplink transmission scheme is less than a time threshold ahead and performing the selected uplink transmission scheme further comprises performing the preconfigured grant based uplink transmission scheme using the grant occasion to transmit the amount of the uplink data.
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23. The user equipment according to any one of claims 16-22, wherein the user equipment further comprises means for receiving the received information
- 30 via one or both of dedicated signaling or broadcast signaling.

24. The user equipment according to claim 23, wherein the dedicated signaling comprises one or more radio resource control release messages or the broadcast signaling comprises system information block signaling.
- 5 25. A network node comprising:
means for sending, to a user equipment, information configured to allow the user equipment to select, while the user equipment is in an inactive or idle state, one of multiple uplink transmission schemes to be used to transmit uplink data, wherein the multiple uplink transmission
10 schemes comprise an uplink transmission scheme performed via a radio resource control, RRC, setup or resume procedure, a random access based small data transmission, and a preconfigured grant based uplink transmission scheme; and
means for receiving by the network the uplink data transmitted by the user
15 equipment using the selected uplink transmission scheme.
26. The network node according to claim 25, wherein receiving comprises receiving a small data transmission that uses an early data transmission that uses a random access channel procedure.
- 20 27. The network node according to claim 25 or 26, wherein the RRC setup or resume procedure comprises one or more of the following: a radio resource control connection setup procedure; a radio resource control connection resume procedure; or a radio resource control connection re-establishment
25 procedure.
28. The network node according to any one of claims 25-27, wherein the sent information comprises one or both of data amount or time thresholds for one or more of the multiple uplink transmission schemes.
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29. The network node according to claim 28, wherein the sending the information further comprises sending the information via one or both of dedicated signaling or broadcast signaling.
- 5 30. The network node according to claim 29, wherein the dedicated signaling comprises one or more radio resource control release messages or the broadcast signaling comprises system information block signaling.