

In a first aspect, the present disclosure provides a wireless communication method, comprising: receiving, by a wireless communication device from a network via first signaling, Small Data Transmission (SDT) information, wherein the SDT information comprises SDT Configured Grant (CG) configuration and SDT Random Access Channel (RACH) configuration; performing, by the wireless communication device with the network, SDT procedure using the SDT information; receiving, by the wireless communication device from the network via second signaling different from the first signaling, Time Alignment (TA) information for maintaining TA of the SDT CG configuration; in response to receiving the TA information via the second signaling, initiating, by the wireless communication device, a timer; and in response to determining that the timer has expired, releasing, by the wireless communication device, SDT CG resources; determining, during performing the SDT procedure, that Radio Link Failure (RLF) has occurred in response to determining a Random Access (RA) procedure failure.

In a second aspect, the present disclosure provides a wireless communication device, comprising: at least one processor configured to: receive, from a network via first signaling, Small Data Transmission (SDT) information; wherein the SDT information comprises SDT Configured Grant (CG) configuration and SDT Random Access Channel (RACH) configuration; and perform, with a network, SDT procedure using the SDT information, receive, from the network via second signaling different from the first signaling, Time Alignment (TA) information for maintaining TA of the SDT CG configuration; in response to receiving the TA information via the second signaling, initiate a timer; and in response to determining that the timer has expired, release SDT CG resources; determine, during performing the SDT procedure, that Radio Link Failure (RLF) has occurred in response to determining a Random Access (RA) procedure failure.

In some arrangements, User Equipment (UE) performs a method including determining Small Data Transmission (SDT) information and performing, with a network, SDT procedure using the SDT information.

In other arrangements, a BS performs a method including determining SDT information and performing, with a UE, SDT procedure using the SDT information.

In other examples, a wireless communications apparatus comprising a processor and a memory, wherein the processor is configured to read code from the memory and implement a method including determining SDT information and performing, with a network, SDT procedure using the SDT information.

In other examples, a computer program product comprising a computer-readable program medium code stored thereupon, the code, when executed by a processor, causing the processor to implement a method including determining SDT information and performing, with a network, SDT procedure using the SDT information.

The above and other aspects and their implementations are described in greater detail in the drawings, the descriptions, and the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Various example embodiments of the present solution are described in detail below with reference to the following figures or drawings. The drawings are provided for purposes of illustration only and merely depict example embodiments of the present solution to facilitate the reader's understanding of the present solution. Therefore, the drawings should not be considered

limiting of the breadth, scope, or applicability of the present solution. It should be noted that for clarity and ease of illustration, these drawings are not necessarily drawn to scale.

CLAIMS

1. A wireless communication method, comprising:
 - receiving, by a wireless communication device from a network via first signaling, Small Data Transmission (SDT) information, wherein the SDT information comprises SDT Configured Grant (CG) configuration and SDT Random Access Channel (RACH) configuration;
 - performing, by the wireless communication device with the network, SDT procedure using the SDT information;
 - receiving, by the wireless communication device from the network via second signaling different from the first signaling, Time Alignment (TA) information for maintaining TA of the SDT CG configuration;
 - in response to receiving the TA information via the second signaling, initiating, by the wireless communication device, a timer; and
 - in response to determining that the timer has expired, releasing, by the wireless communication device, SDT CG resources;
 - determining, during performing the SDT procedure, that Radio Link Failure (RLF) has occurred in response to determining a Random Access (RA) procedure failure.
2. The wireless communication method of claim 1, wherein the wireless communication method comprises:
 - in response to receiving the TA information and determining that the TA information is maintained:
 - applying the TA information; and
 - starting or restarting a timer.
3. The wireless communication method of claim 1, wherein the wireless communication method comprises:
 - receiving, from the network, the TA information with the SDT RACH configuration.

4. The wireless communication method of claim 1, wherein the wireless communication method comprises:
- in initiating the SDT procedure, applying first TA information and initiating the timer;
 - during performing the SDT procedure, in response to determining that the timer is not running:
 - initiating a Random Access (RA) procedure in which uplink synchronization is obtained in an RRC-Inactive state; and
 - in response to determining that the SDT procedure ends and that the wireless communication device enters into a Radio Resource Control (RRC)-Inactive state, terminating the timer;
 - wherein the timer is reinitiated in response to receiving any TA information.
5. The wireless communication method of claim 1, wherein
- using the SDT RACH configuration for the SDT procedure in response to determining that using the SDT CG configuration has failed.
6. The wireless communication method of claim 5, wherein the timer comprises a first timer corresponding to the SDT CG configuration, and a second timer corresponds to the SDT RACH configuration; and the wireless communication method further comprises:
- in response to determining that the first timer has expired, release SDT CG resources;
 - in response to initiating the SDT procedure using the SDT RACH configuration and receiving from the network, Time Alignment (TA) information:
 - apply the TA information;
 - stop the first timer; and
 - starting the second timer;
 - in response to determining that another cell of the network has been selected:
 - stopping the first timer or the second timer; and

releasing or suspending the SDT CG configurations; and
in response to determining that the SDT procedure has ended and the wireless communication device is set to a Radio Resource Control (RRC)-Inactive state:
maintaining the first timer or the second timer upon determining that CG resources are valid; and
stopping the first timer or the second timer upon determining that the CG resources are invalid.

7. The wireless communication method of claim 1, comprising determining, during performing the SDT procedure, that Radio Link Failure (RLF) has occurred in response to determining

a Radio Link Control (RLC) failure.

8. The wireless communication method of claim 1, comprising:
in response to determining that the RLF has occurred during performing the SDT procedure:

releasing the SDT CG configuration, and setting the wireless communication device to the RRC-Idle state.

9. The wireless communication method of claim 1, comprising: in response to determining that the cell-reselection has occurred during performing the SDT procedure:

releasing SDT Configured Grant (CG) configuration; and

setting the wireless communication device to a Radio Resource Control (RRC)-Idle state.

10. A wireless communication device, comprising:
at least one processor configured to:

receive, from a network via first signaling, Small Data Transmission (SDT) information, wherein the SDT information comprises SDT Configured Grant (CG) configuration and SDT Random Access Channel (RACH) configuration; and

perform, with a network, SDT procedure using the SDT information,
receive, from the network via second signaling different from the first signaling,
Time Alignment (TA) information for maintaining TA of the SDT CG configuration;
in response to receiving the TA information via the second signaling, initiate a
timer; and
in response to determining that the timer has expired, release SDT CG resources;
determine, during performing the SDT procedure, that Radio Link Failure (RLF)
has occurred in response to determining a Random Access (RA) procedure failure.

11. The wireless communication device of claim 10, wherein
the at least one processor is configured to:
in response to receiving the TA information and determining that the TA
information is maintained:
apply the TA information; and
start or restart the timer.
12. The wireless communication device of claim 10, wherein
the at least one processor is configured to:
receive, from the network, Time Alignment (TA) information with the
SDT RACH configuration.
13. The wireless communication device of claim 10, wherein the at least one
processor is configured to:
in initiating the SDT procedure, apply first Time Alignment (TA) information and
initiating a timer;
during performing the SDT procedure, in response to determining that the timer is
not running:
initiate a Random Access (RA) procedure in which uplink synchronization
is obtained in a RRC-Inactive state; and

in response to determining that the SDT procedure ends and that the wireless communication device enters into a Radio Resource Control (RRC)-Inactive state, terminate the timer,
wherein the timer is reinitiated in response to receiving any TA information.