SYSTEMS AND METHODS FOR DEVICE-TO-DEVICE COMMUNICATIONS

TECHNICAL FIELD

[0001] The disclosure relates generally to wireless communications and, more particularly, to power management in device-to-device communications.

BACKGROUND

[0002] Sidelink (SL) communication refers to wireless radio communication between two or more User Equipments (UEs). In this type of communications, two or more UEs that are geographically proximate to each other can communicate without being routed to a Base Station (BS) or a core network. Data transmissions in SL communications are thus different from typical cellular network communications, which include transmitting data to a BS (e.g., uplink transmissions) and receiving data from a BS (e.g., downlink transmissions). In SL communications, data is transmitted directly from a source UE to a target UE through, for example the Unified Air Interface (e.g., PC5 interface) without passing through a BS.

SUMMARY

[0003] The example arrangements disclosed herein are directed to solving the issues relating to one or more of the problems presented in the prior art, as well as providing additional features that will become readily apparent by reference to the following detailed description when taken in conjunction with the accompany drawings. In accordance with various arrangements, example systems, methods, devices and computer program products are disclosed herein. It is understood, however, that these arrangements are presented by way of example and are not limiting, and it will be apparent to those of ordinary skill in the art who read the present disclosure that various modifications to the disclosed arrangements can be made while remaining within the scope of this disclosure.

[0004] In some arrangements, wireless communication methods for managing communications between a first wireless communication device and a second wireless communication device includes receiving, by the second wireless communication device from the first wireless communication device, Quality of Service (QoS) related information, where the QoS related information is received by the first wireless communication device from a network, and receiving, by the second wireless communication device from the network, at least one configuration.

[0004a] In some arrangements, wireless communication methods for managing communications between a first wireless communication device and a second wireless communication device includes sending, by the first wireless communication device to the second wireless communication device, Quality of Service (QoS) related information, where the QoS related information is received by the first wireless communication device from a network, where the second wireless communication device receives from the network at least one configuration.

[0004b] In some arrangements, a first wireless communication device includes at least one processor configured to send, via a transmitter to a second wireless communication device, Quality of Service (QoS) related information, where the QoS related information is received by the first wireless communication device from a network.

[0004c] In some arrangements, a second wireless communication device includes at least one processor configured to receive, via a receiver from a first wireless communication device, Quality of Service (QoS) related information, where the QoS related information is received by the first wireless communication device from a network, and receive, via the receiver from the network, at least one configuration.

[0005] There is disclosed wireless communication methods for managing communications between a first wireless communication device and a second communication device includes receiving, by the second wireless communication device from a network, Radio Link Control (RLC) channel configuration, the RLC channel configuration includes at least one of QoS information or an RLC channel identifier (ID) identifying an RLC channel received by the second wireless communication device from the first wireless communication device. The

second wireless communication device reports to the network at least one of the RLC channel ID or an RLC channel mode.

[0006] There is disclosed wireless communication methods for managing communications between a first wireless communication device and a second communication device includes receiving, by the first wireless communication device from the second wireless communication device, at least one of carrier switch duration, carrier activation duration, and carrier deactivation duration, and refraining, by the first wireless communication device, from sending data to the second wireless communication device during at least one of the carrier switch duration, the carrier activation duration, the carrier deactivation duration, or a duration when a timer is running.

[0007] 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

[0008] Various example arrangements 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 arrangements 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.

[0009] FIG. 1A is a diagram illustrating an example wireless communication network, according to various arrangements.

[0010] FIG. 1B is a diagram illustrating a block diagram of an example wireless communication system for transmitting and receiving downlink, uplink, and/or SL communication signals, according to various arrangements.

[0011] FIG. 2 illustrates an example scenario for SL communication, according to various arrangements.

[0012] FIG. 3 is a flow diagram illustrating an example method for managing SL communications, according to various arrangements.

[0013] FIG. 4 is a flow diagram illustrating an example method for managing SL communications, according to various arrangements.

[0014] FIG. 5A is a flow diagram illustrating an example method for managing SL communications, according to various arrangements.

[0015] FIG. 5B is a flow diagram illustrating an example method for managing SL communications, according to various arrangements.

[0016] FIG. 5C is a flow diagram illustrating an example method for managing SL communications, according to various arrangements.

[0017] FIG. 5D is a flow diagram illustrating an example method for managing SL communications, according to various arrangements.

CLAIMS

1. A wireless communication method for managing communications between a first wireless communication device and a second wireless communication device, comprising:

receiving, by the second wireless communication device from the first wireless communication device, Quality of Service (QoS) related information, wherein the QoS related information is received by the first wireless communication device from a network; and

receiving, by the second wireless communication device from the network, at least one configuration.

2. The wireless communication method of claim 1, wherein the QoS-related information comprises at least one of:

QoS information;

at least one Radio Link Control (RLC) channel for which the QoS information applies; or

at least one Radio Bearer (RB) for which the QoS information applies.

3. The wireless communication method of claim 2, wherein the QoS information comprises at least one of a QoS Flow Identifier (QFI), a Protocol Data Unit (PDU) session identifier (ID), a PC5 QFI, a Uu QFI, a QoS profile, a Uu QoS profile, or a PC5 QoS profile.

4. The wireless communication method of claim 2, wherein each of the at least one RLC channel is identified by at least one of a channel identifier (ID) or a channel index.

5. The wireless communication method of claim 1, wherein the least one configuration comprises at least one of:

a first configuration comprising a mapping of at least one QoS Flow Identifier (QFI) to at least one Radio Bearer (RB); or

a second configuration comprising a mapping of the at least one RB to at least one Radio Link Control (RLC) channel.

6. The wireless communication method of claim 5, wherein

the QoS related information received from the first wireless communication device comprises a QFI that is the same as one of the at least one QFI in the first configuration; and

the wireless communication method further comprises determining, by the second wireless communication device, an RLC channel associated with each RB of the second wireless communication device based on the first configuration, the second configuration, and the QoS related information.

7. The wireless communication method of claim 5, further comprising sending, by the second wireless communication device to the network, at least one of an RLC mode, the QoS information, or a channel ID of the at least one RLC channel.

8. The wireless communication method of claim 1, wherein

the QoS-related information comprises a first Radio Link Control (RLC) channel identifier (ID);

the at least one configuration comprises a second RLC channel ID;

the first RLC channel ID and the second RLC channel ID identify a same RLC channel; and

the first wireless communication device identifies the RLC channel in a first signaling and a second signaling for a same RLC channel configuration.

9. The wireless communication method of claim 1, further comprising reporting, by the second wireless communication device to the network, a Radio Link Control (RLC) mode, wherein the RLC mode is identified based at least on one of an RLC channel identifier (ID) received from a first signaling or an RLC channel ID received from a second signaling.

10. A wireless communication method for managing communications between a first wireless communication device and a second wireless communication device, comprising:

sending, by the first wireless communication device to the second wireless communication device, Quality of Service (QoS) related information, wherein the QoS related information is received by the first wireless communication device from a network,

wherein the second wireless communication device receives from the network at least one configuration.

11. A first wireless communication device, comprising:

at least one processor configured to:

send, via a transmitter to a second wireless communication device, Quality of Service (QoS) related information, wherein the QoS related information is received by the first wireless communication device from a network.

12. A second wireless communication device, comprising:

at least one processor configured to:

receive, via a receiver from a first wireless communication device, Quality of Service (QoS) related information, wherein the QoS related information is received by the first wireless communication device from a network; and

receive, via the receiver from the network, at least one configuration.

13. The second wireless communication device of claim 12, wherein the QoS-related information comprises at least one of:

QoS information;

at least one Radio Link Control (RLC) channel for which the QoS information applies; or

at least one Radio Bearer (RB) for which the QoS information applies.

14. The second wireless communication device of claim 13, wherein the QoS information comprises at least one of a QoS Flow Identifier (QFI), a Protocol Data Unit (PDU) session identifier (ID), a PC5 QFI, a Uu QFI, a QoS profile, a Uu QoS profile, or a PC5 QoS profile.

15. The second wireless communication device of claim 13, wherein each of the at least one RLC channel is identified by at least one of a channel identifier (ID) or a channel index.

16. The second wireless communication device of claim 12, wherein the least one configuration comprises at least one of:

a first configuration comprising a mapping of at least one QoS Flow Identifier (QFI) to at least one Radio Bearer (RB); or

a second configuration comprising a mapping of the at least one RB to at least one Radio Link Control (RLC) channel.

17. The second wireless communication device of claim 16, wherein

the QoS related information received from the first wireless communication device comprises a QFI that is the same as one of the at least one QFI in the first configuration; and

the wireless communication method further comprises determining, by the second wireless communication device, an RLC channel associated with each RB of the second wireless communication device based on the first configuration, the second configuration, and the QoS related information.

18. The second wireless communication device of claim 16, wherein the at least one processor is configured to send, via a transmitter to the network, at least one of an RLC mode, the QoS information, or a channel ID of the at least one RLC channel.

19. The second wireless communication device of claim 12, wherein

the QoS-related information comprises a first Radio Link Control (RLC) channel identifier (ID);

the at least one configuration comprises a second RLC channel ID;

the first RLC channel ID and the second RLC channel ID identify a same RLC channel; and

the first wireless communication device identifies the RLC channel in a first signaling and a second signaling for a same RLC channel configuration.

20. The second wireless communication device of claim 12, wherein the at least one processor is configured to report, via a transmitter to the network, a Radio Link Control (RLC) mode, wherein the RLC mode is identified based at least on one of an RLC channel identifier (ID) received from a first signaling or an RLC channel ID received from a second signaling.