SUMMARY

[0014] One non-limiting example facilitates providing multiple structures and methods to use advance indication of resource selection in DRX configured SL communications. In the present disclosure, the terms “advance indication” and “advanced indication” are used interchangeably, which refer to an advance notice that a Tx UE transmits to a Rx UE with information about an upcoming SL communication.

[0015] In an aspect, the techniques disclosed herein feature a method for wireless communication at a first user equipment (UE) (700). The method comprises: transmitting an advanced indication to a second UE (700) for an upcoming sidelink communication with the second UE over a sidelink communication link, wherein the upcoming sidelink communication is associated with one or more selected resources that include at least one resource falling outside the second UE’s active time in Discontinuous Reception (DRX) configuration, wherein the transmitting of the advanced indication comprises: transmitting sidelink control information, SCI, to the second UE via a Physical Sidelink Control Channel, PSCCH, and/or a Physical Sidelink Shared Channel, PSSCH, wherein the SCI comprises a 1-bit SCI information, a 2-bit SCI information, or a n-bit SCI information, characterized in that when the SCI is a 1-bit SCI information, the 1-bit SCI information indicates whether there is a time window in advance to the at least one resource falling outside the second UE’s active time, wherein the time window has a duration known to the first UE and the second UE.

[0015A] In another aspect, the present disclosure refers to a method for wireless communication at a second user equipment (UE) (700), the method comprising receiving an advanced indication from a first UE (700) for an upcoming sidelink communication with the first UE over a sidelink communication link, wherein the upcoming sidelink communication is associated with the one or more selected resources that include at least

one resource falling outside the second UE's active time in Discontinuous Reception (DRX) configuration, and in response to the receiving of the advanced indication, extending the second UE's active time in accordance with the one or more selected resources, wherein the receiving of the advanced indication comprises: receiving sidelink control information (SCI) from the first UE via a Physical Sidelink Control Channel (PSCCH) and/or a Physical Sidelink Shared Channel (PSSCH), wherein the SCI comprises a 1 -bit SCI information, a 2-bit SCI information, or a n-bit SCI information, and characterized in that when receiving the advanced indication comprises receiving a 1-bit SCI information, the 1-bit SCI information indicates whether there is a time window in advance to the at least one resource falling outside the second UE's active time, wherein the time window has a duration known to the first UE and the second UE.

[0015B] In yet another aspect, the present disclosure refers to a communication apparatus with a sidelink Discontinuous Reception (DRX) configuration, wherein the communication apparatus is a first user equipment (UE) (700), the communication apparatus comprising, a transceiver (714) which is configured to transmit an advanced indication to a second UE (700) for an upcoming sidelink communication with the second UE over a sidelink communication link, wherein the upcoming sidelink communication is associated with one or more selected resources that include at least one resource falling outside the second UE's active time in Discontinuous Reception (DRX) configuration, and circuitry which is configured to control the transceiver, wherein the transmitting of the advanced indication comprises: transmitting sidelink control information, SCI, to the second UE via a Physical Sidelink Control Channel, PSCCH, and/or a Physical Sidelink Shared Channel, PSSCH, wherein the SCI comprises a 1-bit SCI information, a 2-bit SCI information, or a n-bit SCI information, characterized in that when the SCI is a 1-bit SCI information, the 1-bit SCI information indicates whether there is a time window in advance

to the at least one resource falling outside the second UE's active time, wherein the time window has a duration known to the first UE and the second UE.

[0015C] In yet another aspect, the present disclosure refers to a communication apparatus with a sidelink Discontinuous Reception (DRX) configuration, wherein the communication apparatus is a second user equipment (UE) (700), the communication apparatus comprising, a transceiver (714) which is configured to receive an advanced indication from a first UE (700) for an upcoming sidelink communication with the first UE over a sidelink communication link, wherein the upcoming sidelink communication is associated with the one or more selected resources that include at least one resource falling outside the second UE's active time in Discontinuous Reception (DRX) configuration, and circuitry which is configured to extend the second UE's active time in accordance with the one or more selected resources in response to the receiving of the advanced indication, wherein the receiving of the advanced indication comprises: receiving sidelink control information, SCI, from the first UE via a Physical Sidelink Control Channel, PSCCH, and/or a Physical Sidelink Shared Channel, PSSCH, wherein the SCI comprises a 1-bit SCI information, a 2-bit SCI information, or a n-bit SCI information, and characterized in that when receiving the advanced indication comprises receiving a 1-bit SCI information, the 1-bit SCI information indicates whether there is a time window in advance to the at least one resource falling outside the second UE's active time, wherein the time window has a duration known to the first UE and the second UE.

[0015D] In yet another aspect, the present disclosure refers to an integrated circuit for controlling a process of a first user equipment (UE), the process comprising, transmitting an advanced indication to a second UE for an upcoming sidelink communication with the second UE over a sidelink communication link, wherein the upcoming sidelink communication is associated with one or more selected resources that include at least one

resource falling outside the second UE's active time in Discontinuous Reception (DRX) configuration, wherein the transmitting of the advanced indication comprises: transmitting sidelink control information, SCI, to the second UE via a Physical Sidelink Control Channel, PSCCH, and/or a Physical Sidelink Shared Channel, PSSCH, wherein the SCI comprises a 1-bit SCI information, a 2-bit SCI information, or a n-bit SCI information, characterized in that when the SCI is a 1-bit SCI information, the 1-bit SCI information indicates whether there is a time window in advance to the at least one resource falling outside the second UE's active time, wherein the time window has a duration known to the first UE and the second UE.

[0015E] In yet another aspect, the present disclosure refers to an integrated circuit for controlling a process of a second user equipment (UE), the process comprising, receiving an advanced indication from a first UE for an upcoming sidelink communication with the first UE over a sidelink communication link, wherein the upcoming sidelink communication is associated with the one or more selected resources that include at least one resource falling outside the second UE's active time in Discontinuous Reception (DRX) configuration, and in response to the receiving of the advanced indication, extending the second UE's active time in accordance with the one or more selected resources, wherein the receiving of the advanced indication comprises: receiving sidelink control information (SCI) from the first UE via a Physical Sidelink Control Channel (PSCCH) and/or a Physical Sidelink Shared Channel (PSSCH), wherein the SCI comprises a 1 -bit SCI information, a 2-bit SCI information, or a n-bit SCI information, and characterized in that when receiving the advanced indication comprises receiving a 1-bit SCI information, the 1-bit SCI information indicates whether there is a time window in advance to the at least one resource falling outside the second UE's active time, wherein the time window has a duration known to the first UE and the second UE.

[0016] It should be noted that general or specific examples may be implemented as a system, a device, a method, an integrated circuit, a computer program, a storage medium, or any selective combination thereof.

[0017] Additional benefits and advantages of the disclosed examples will become apparent from the specification and drawings. The benefits and/or advantages may be individually obtained by the various examples and features of the specification and drawings, which need not all be provided in order to obtain one or more of such benefits and/or advantages.

BRIEF DESCRIPTION OF THE FIGURES

[0018] In the following, exemplary embodiments are described in more detail with reference to the attached figures and drawings.

CLAIMS

What is claimed is:

1. A method for wireless communication at a first user equipment (UE) (700), the method comprising:

transmitting an advanced indication to a second UE (700) for an upcoming sidelink communication with the second UE over a sidelink communication link,

wherein the upcoming sidelink communication is associated with one or more selected resources that include at least one resource falling outside the second UE's active time in Discontinuous Reception (DRX) configuration,

wherein the transmitting of the advanced indication comprises:

transmitting sidelink control information, SCI, to the second UE via a Physical Sidelink Control Channel, PSCCH, and/or a Physical Sidelink Shared Channel, PSSCH,

wherein the SCI comprises a 1-bit SCI information, a 2-bit SCI information, or a n-bit SCI information,

characterized in that

when the SCI is a 1-bit SCI information, the 1-bit SCI information indicates whether there is a time window in advance to the at least one resource falling outside the second UE's active time, wherein the time window has a duration known to the first UE and the second UE.

2. The method according to claim 1, wherein the transmitting of the advanced indication is in response to the first UE receiving a higher layer signaling.

3. The method according to claim 1, wherein when the SCI information is a 2-bit SCI information, the 2-bit SCI information indicates count, periodicity, duration, carrier, and/or bandwidth part (BWP) of one or more time windows in advance to the at least one resource falling outside the second UE's active time.

4. The method according to any one of the preceding claims, wherein the advanced indication is indicative of a particular resource among the one or more selected resources to start data transmission in the upcoming sidelink communication.

5. The method according to any one of the preceding claims, wherein the second UE's active time comprises resources exclusively used in New Radio (NR) sidelink communications, and wherein the second UE's non-active time comprises resources shared with Long-Term Evolution (LTE) communications or resources used only for LTE communications.

6. The method according to claim 1, wherein the transmitting of the advanced indication is in response to the first UE meeting one or more triggering conditions, the one or more triggering conditions comprising a Channel Busy Ratio (CBR) condition, a Channel Occupation Ratio (CR) condition, a consecutive transmission failure condition, an instruction from a base station, and/or a transmission of high priority data.

7. The method according to claim 6, wherein the one or more triggering conditions are associated with corresponding count, periodicity, duration, carrier, and/or bandwidth part (BWP) of one or more time windows in advance to a first resource of the one or more selected resources.

8. A method for wireless communication at a second user equipment (UE) (700), the method comprising:

receiving an advanced indication from a first UE (700) for an upcoming sidelink communication with the first UE over a sidelink communication link, wherein the upcoming sidelink communication is associated with the one or more selected resources that include at least one resource falling outside the second UE's active time in Discontinuous Reception (DRX) configuration; and

in response to the receiving of the advanced indication, extending the second UE's active time in accordance with the one or more selected resources,

wherein the receiving of the advanced indication comprises: receiving sidelink control information (SCI) from the first UE via a Physical Sidelink Control Channel (PSCCH) and/or a Physical Sidelink Shared Channel (PSSCH), wherein the SCI comprises a 1 -bit SCI information, a 2-bit SCI information, or a n-bit SCI information, and

characterized in that

when receiving the advanced indication comprises receiving a 1-bit SCI information, the 1-bit SCI information indicates whether there is a time window in advance to the at least one resource falling outside the second UE's active time, wherein the time window has a duration known to the first UE and the second UE.

9. The method according to claim 8, wherein when receiving the advanced indication comprises receiving a 2-bit SCI information, the 2-bit SCI information indicates count, periodicity, duration, carrier, and/or bandwidth part (BWP) of one or more time windows in advance to the at least one resource falling outside the second UE's active time.

10. The method according to claims 8 or 9, wherein receiving the advanced indication is indicative of a particular resource among the one or more selected resources to start data transmission in the upcoming sidelink communication.

11. The method according to claim 10, wherein the extending of the second UE's active time in accordance with the one or more selected resources comprises:

triggering a DRX active timer for a predetermined expirable time period;

triggering a DRX active timer until expiration of the one or more selected resources;

triggering a DRX active timer until expiration of the particular resource;

configuring an earlier wake-up for the one or more selected resources or the particular resource;

changing a DRX active timer to an always-on mode and resetting the second UE to its default DRX until expiration of the one or more selected resources or the particular resource;

triggering periodic DRX active timers for periodic transmissions from the first UE; and/or

configuring periodic earlier wake-ups for periodic transmissions from the first UE.

12. The method according to any one of claims 8-11, wherein the second UE's active time comprises resources exclusively used in New Radio (NR) sidelink communications, and wherein the second UE's non-active time comprises one or more selected resources shared with Long-Term Evolution (LTE) communications or one or more selected resources used only for LTE communications.

13. A communication apparatus with a sidelink Discontinuous Reception (DRX) configuration, wherein the communication apparatus is a first user equipment (UE) (700), the communication apparatus comprising:

a transceiver (714) which is configured to transmit an advanced indication to a second UE (700) for an upcoming sidelink communication with the second UE over a sidelink communication link,

wherein the upcoming sidelink communication is associated with one or more selected resources that include at least one resource falling outside the second UE's active time in Discontinuous Reception (DRX) configuration; and

circuitry which is configured to control the transceiver,

wherein the transmitting of the advanced indication comprises:

transmitting sidelink control information, SCI, to the second UE via a Physical Sidelink Control Channel, PSCCH, and/or a Physical Sidelink Shared Channel, PSSCH,

wherein the SCI comprises a 1-bit SCI information, a 2-bit SCI information, or a n-bit SCI information,

characterized in that

when the SCI is a 1-bit SCI information, the 1-bit SCI information indicates whether there is a time window in advance to the at least one resource falling outside the second UE's active time, wherein the time window has a duration known to the first UE and the second UE.

14. A communication apparatus with a sidelink Discontinuous Reception (DRX) configuration, wherein the communication apparatus is a second user equipment (UE) (700), the communication apparatus comprising:

a transceiver (714), which is configured to, receive an advanced indication from a first UE (700) for an upcoming sidelink communication with the first UE over a sidelink communication link, wherein the upcoming sidelink communication is associated with the one or more selected resources that include at least one resource falling outside the second UE's active time in Discontinuous Reception (DRX) configuration; and

circuitry which is configured to extend the second UE's active time in accordance with the one or more selected resources in response to the receiving of the advanced indication,

wherein the receiving of the advanced indication comprises:

receiving sidelink control information, SCI, from the first UE via a Physical Sidelink Control Channel, PSCCH, and/or a Physical Sidelink Shared Channel, PSSCH,

wherein the SCI comprises a 1-bit SCI information, a 2-bit SCI information, or a n-bit SCI information, and

characterized in that

when receiving the advanced indication comprises receiving a 1-bit SCI information, the 1-bit SCI information indicates whether there is a time window in advance to the at least one resource falling outside the second UE's active time, wherein the time window has a duration known to the first UE and the second UE.

15. An integrated circuit for controlling a process of a first user equipment (UE), the process comprising:

transmitting an advanced indication to a second UE for an upcoming sidelink communication with the second UE over a sidelink communication link,

wherein the upcoming sidelink communication is associated with one or more selected resources that include at least one resource falling outside the second UE's active time in Discontinuous Reception (DRX) configuration,

wherein the transmitting of the advanced indication comprises:

transmitting sidelink control information, SCI, to the second UE via a Physical Sidelink Control Channel, PSCCH, and/or a Physical Sidelink Shared Channel, PSSCH,

wherein the SCI comprises a 1-bit SCI information, a 2-bit SCI information, or a n-bit SCI information,

characterized in that

when the SCI is a 1-bit SCI information, the 1-bit SCI information indicates whether there is a time window in advance to the at least one resource falling outside the second UE's active time, wherein the time window has a duration known to the first UE and the second UE.

16. An integrated circuit for controlling a process of a second user equipment (UE), the process comprising:

receiving an advanced indication from a first UE for an upcoming sidelink communication with the first UE over a sidelink communication link, wherein the upcoming sidelink communication is associated with the one or more selected resources that include at least one resource falling outside the second UE's active time in Discontinuous Reception (DRX) configuration; and

in response to the receiving of the advanced indication, extending the second UE's active time in accordance with the one or more selected resources,

wherein the receiving of the advanced indication comprises: receiving sidelink control information (SCI) from the first UE via a Physical Sidelink Control Channel

(PSCCH) and/or a Physical Sidelink Shared Channel (PSSCH), wherein the SCI comprises a 1 -bit SCI information, a 2-bit SCI information, or a n-bit SCI information, and characterized in that

when receiving the advanced indication comprises receiving a 1-bit SCI information, the 1-bit SCI information indicates whether there is a time window in advance to the at least one resource falling outside the second UE’s active time, wherein the time window has a duration known to the first UE and the second UE.