**3GPP TSG RAN WG1 Meeting #104-e R1-210xxxx**

**E-meeting, January25 – February 5, 2021**

**Agenda Item: 8.11**

**Source: Moderator (ZTE, Sanechips)**

**Title: Discussion on [104-e-NR-R17-SL-LS-01]**

**Document for: Discussion and Decision**

1. **Introduction**

This contribution provides discussion on reply LS to R1-2100021 within the thread [104-e-NR-R17-SL-LS-01].

1. **Discussions (Phase 1 until 27th Jan)**

RAN2 sent the following LS body:

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| |  | | --- | | Working assumption:  SL DRX should take PSCCH monitoring also for sensing (in addition to data reception) into account if SL DRX is used. |   RAN2 has made the following working assumption on sidelink DRX:  In addition, RAN2 has made the following agreements related to sidelink DRX:   |  | | --- | | Agreements on SL DRX:  1: Sidelink DRX needs to support sidelink communications for both in-coverage and out-of-coverage scenarios.  2: Support SL DRX for all casting types.  3: If a UE is in SL active time, UE should monitor PSCCH. FFS on PSSCH. FFS for sensing impacts.  4: As baseline, for Sidelink DRX for SL unicast, it is proposed to inherit and use timers similar to what are used in Uu DRX. FFS for SL broadcast/groupcast. FFS on detailed timers.  5: Support of long DRX cycle for SL unicast should be assumed as a baseline. FFS on the need of short DRX cycle.  6: Deprioritize SL WUS (Wake-Up Signal) from RAN2 point of view in Rel-17.  7： RAN2 will prioritize normal use case without consideration of relay UE use case in Rel-17.  8： RAN2 is not going to introduce SL paging and SL PO for SL DRX. |   Note: From RAN2 perspective, the partial coverage case has not been precluded by the first agreement in the above box.  To RAN WG1: RAN2 kindly asks RAN1 to provide feedback if there is any concern on the working assumption and take the above information into their future works. |

Therefore, in the following, the interpretation of RAN2’s working assumption, as well as any related details would be discussed in this section.

## Potential interpretation on working assumption

In moderator’s understanding, RAN2’s working assumption can be understood through the following two alternatives:

**Alt1**: When UE is configured with sidelink DRX, UE’s configured sidelink DRX cycle will impact the two mentioned actions, i.e., sidelink data reception and (partial) sensing, i.e. UE should decide whether it can perform (partial) sensing and data reception referring to its configured DRX cycle.

**Alt2**: When whichever entity (network or UE’s upper layer) is performing sidelink DRX configuration, it should take (partial) sensing impact and data reception into account.

Tentative consideration for each understanding alternative:

For Alt1: If the working assumption is understood in alternative 1, that means PSCCH monitoring for (partial) sensing should be limited to the active duration of SL DRX. It will cause impact to RAN1’s (partial) sensing principle, i.e. configured (partial) sensing window will be impacted by sidelink DRX configuration, where the design complexity and spec impact should be considered.

For Alt2: If the working assumption is understood in alternative 2, moderator understands that whichever entity(network or UE’s upper layer) is taking the responsibility of setting up sidelink DRX configuration, it should take (partial) sensing related impact into account by acquiring (partial) sensing related parameters, therefore, it can be assumed that sidelink DRX configuration and (partial) sensing configuration is strived to be aligned by the aforementioned entity. Correspondingly, moderator thinks that PHY layer can follow (partial) sensing mechanism irrespective of sidelink DRX configuration in any case that mis-alignment between sidelink DRX cycle and (partial) sensing window happened, i.e. PSCCH monitoring for (partial) sensing cannot be limited to the active duration of SL DRX.

Q1: Please share your views and whether Alt1 or Alt 2 of the above moderator consideration is agreeable.

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| **Source** | **Alt 1/ Alt 2** | **Comments (if any)** |
| OPPO | Alt1 | For the explanation of the WA from RAN2, we tend to understand it in the way of Alt1. While it does not mean that the sensing is limit within DRX on duration.  The WA just say that the SL DRX should take sensing (in addition to data reception) into account. There is no intension to combine sensing and SL DRX on duration.  SL DRX is designed for data reception. In our view, the DRX pattern of RX UE should be indicated by the TX UE so that it can well align with the traffic pattern of the TX UE. While sensing is the operation for resource selection for data transmission, it depends on the traffic pattern of the RX UE itself. If the sensing is limit within DRX on duration, that will put much limitation to the sensing operation, and will affect the accuracy of sensing operation, and will degrade PRR performance.  Furthermore, if sensing is limit within on duration, that will put limitation for the resource selection range, such as, the UE can only select the resource within on duration so that it can do re-evaluation/pre-emption check(based on sensing) to avoid potential collision . Otherwise, if UE selects resource within OFF duration, it can not do sensing so that it cannot do re-evaluation/pre-emption check. In that case, the traffic pattern of TX UE (which determines the DRX pattern of RX UE), and the traffic pattern of RX UE (which determines the resource selection range), should be well aligned, that is not reasonable |
| Fujitsu | Alt1 with the comments | In general, there are two time windows with different functions. One is defined as DRX On-duration, used for sidelink data reception, and the other is defined as (partial) sensing window, used to deduce the information in terms of periodic/retransmission reservations, resource reselection, and resource preemption, for resource selection. In nature, both should be independently configured/defined. Our interpretation towards Working Assumption is, Tx-UE could monitor PSCCH for sensing (in addition to data reception) in DRX On-duration, and meanwhile, Tx-UE should perform sensing in (partial) sensing window. This is because, performing a sensing in DRX On-duration can acquire more information for resource selection and improve the reliability. |
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## Writing style of the reply LS

As mentioned above, the working assumption in RAN2’s LS can be understood in two different alternatives, thus, in moderator’s understanding, when constructing the reply LS, RAN1 also has three solutions:

**Solution 1**: Explain the two understanding alternatives of RAN2’s working assumption in a detailed way, and ask RAN2 to confirm which alternative is RAN2’s original intention.

**Solution 2**: Explain the two understanding alternatives of RAN2’s working assumption, as well as showing RAN1’s consideration and preference for each of the understanding alternative.

**Solution 3**: If the consequence of Q1 is quite convergent to one understanding alternative, RAN1 can reply the LS based on that understanding alternative directly.

Q2: Please share your views and which solution of the above moderator consideration is agreeable for the way to construct the reply LS.

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| **Source** | **Solution option** | **Comments (if any)** |
| OPPO |  | The WA does not put much limitation to DRX and sensing. RAN1 can discuss the relationship between DRX and sensing firstly. Based on the discussion output, RAN1 can reply to RAN2 about the RAN1’s discussion/agreement. |
| Fujitsu |  | Solution 4: RAN1 understanding towards Working Assumption is as follows. DRX On-duration and (partial)sensing window are (pre)-configured independently. RAN1 will study the Tx-UE behavior, such that Tx-UE should mainly perform sensing in (partial) sensing window, and in addition, Tx-UE could monitor PSCCH for sensing (in addition to data reception) in DRX On-duration, as well. RAN1 will report the relevant RAN1’s agreements to RAN2. |
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1. **Conclusions (Phase 2 until 1st Feb)**
2. **References**

[R1-2100311](./Docs/R1-2100311.zip) Discussion on LS from RAN2 on SL DRX design CATT, GOHIGH

[R1-2100513](./Docs/R1-2100513.zip) Draft reply LS on SL DRX design LG Electronics

[R1-2100923](./Docs/R1-2100923.zip) [draft]Reply LS to RAN2 on sidelink DRX ZTE, Sanechips

[R1-2101429](./Docs/R1-2101429.zip) Reply to RAN2 LS on SL DRX design Qualcomm Incorporated

[R1-2101151](./Docs/R1-2101151.zip) Draft relay LS on SL DRX design vivo

[R1-2101705](./Docs/R1-2101705.zip) [Draft] LS on SL DRX design Ericsson

[R1-2101736](./Docs/R1-2101736.zip) Discussion on RAN2 LS on DRX impact Huawei, HiSilicon