**[90E][25][R17\_sidelink\_scope]**

**Goal: Generate an agreeable way forward and potential revised WID.**

**Issue 1: Mode 2 enhancement for enhanced reliability and reduced latency**

The current objective for Mode 2 enhancement for enhanced reliability and reduced latency is as follows:

|  |
| --- |
| * Study the feasibility and benefit of the enhancement(s) in mode 2 for enhanced reliability and reduced latency in consideration of both PRR and PIR defined in TR37.885 (by RAN#91), and specify the identified solution if deemed feasible and beneficial [RAN1, RAN2]   + Inter-UE coordination with the following until RAN#90.     - A set of resources is determined at UE-A. This set is sent to UE-B in mode 2, and UE-B takes this into account in the resource selection for its own transmission.   + Note: The study scope after RAN#90 is to be decided in RAN#90.   + Note: The solution should be able to operate in-coverage, partial coverage, and out-of-coverage and to address consecutive packet loss in all coverage scenarios.   + Note: RAN2 work will start after RAN#89. |

The moderator observed that many companies proposed to extend the study on the inter-UE coordination while there are also proposals to start normative work on this topic or defer this study to a future release.

Q1: Do you agree that the study on the inter-UE coordination is extended to RAN#91?

|  |  |  |
| --- | --- | --- |
| Company | Answer | Comment |
| LGE | Yes | On top of the progress made in the last WG meetings, we expect RAN1 can draw meaningful conclusion on the feasibility and benefit of the inter-UE coordination so that normative work scope can be decided in RAN#91. |
| vivo | Yes | We expect that RAN1 can achieve a conclusion in the next quarter, so that the normative work (including RAN2) can start properly. |
| Xiaomi | Yes | We also expect that RAN1 can achieve conclusion on feasibility and benefit of inter-UE coordination until next RAN meeting. |
| OPPO | Yes | As it is already RAN1’s conclusion indicated in the received LS (RP-202153), “*further study for this WI objective topic on the feasibility/benefit of inter-UE coordination is required*”, the RAN plenary should take this conclusion into account and extend this study accordingly as recommended by RAN1. Based on our observation of work progress so far in RAN1, one more quarter of study until RAN#91 should be sufficient to reach a final conclusion. |
| Huawei, HiSilicon | Objective is study&specify, so allow RAN1 to continue. | There may be some misunderstandings in the moderator analysis compared to the existing WID:   1. The objective already leads to normative work where it says “…and specify the identified solution…”, subject to feasibility/benefit. 2. The current wording of the second sub-bullet is only to decide the “***study*** scope after RAN#90”, and not to decide whether there is normative work (it is already agreed to follow). 3. The timeline of the study is *already* RAN#91 (main bullet). RAN#90 is only to consider the scope of what is studied between RAN#90 and RAN#91.   Based on the RAN1 conclusions, there were a number of schemes categorized for inter-UE coordination, in addition, a number of companies provided simulation results to show that there are benefits and feasibility. Since RAN1 now understands how to discuss and analyze the schemes, there is no need for further checkpoints in RAN, and the references to RAN#90 and RAN#91 can be simply deleted, allowing RAN1 to complete the work until the ‘RAN1 freeze’. |
| Ericsson | Yes | Study continues for one more meeting without changing the scope |
| Qualcomm | Yes |  |
| Nokia, NSB | Yes | Current WID states “Inter-UE coordination with the following until RAN#90 … study scope after RAN#90 is to be decided in RAN#90”. So the WID needs to be updated to make it clear that inter-UE coordination continues until RAN1#91. |
| InterDigital | Yes | We also think that RAN1 can a meaningful conclusion in the next quarter. Fine either update the WID accordingly or continue study one more meeting without change WID as mentioned by Ericsson |
| Futurewei | Yes | The study can continue for one quarter, based on the agreements reached so far in the WGs. The focus should be on feasibility since the benefits of UE coordination are clear (cf. our contribution RP-202217) |
| Fujitsu | Yes | We agree that the related study for one more quarter. |
| Panasonic | Yes | Some more mutual understanding is necessary. |
| Apple | Yes | We expect that RAN1 can achieve conclusion on feasibility and benefit of inter-UE coordination until RAN #91. |
| Lenovo, Motorola Mobility | Yes | We are fine with the extending the scope of the study phase until next quarter and then in the next quarter normative objective scope can be defined. |
| ZTE, Sanechips | Yes | As in RAN1 #103 meeting RAN1 has concluded 3 potential schemes to implement inter-UE coordination. From our understanding, down-selection should be made since the scope of some of the schemes are partially overlapped. Also the work load is too heavy if to study all of the schemes. |
| CATT | Yes | The study on the inter-UE coordination is extended to RAN#91. The discussion in RAN1 by now is not reached clear consensus on the feasibility and especially benefit of inter-UE coordination. The current simulation results provided by several companies are not observed with convincing performance gain, which may need extended time and further evaluation on it. |
| Samsung | Yes | It is clear from the RAN1 LS that more time is needed by RAN1 to determine the benefit and feasibility of inter-UE coordination. |
| MediaTek | Yes | The RAN1 indication from the LS is pretty clear, and we think it makes sense to extend the study on this objective for an additional quarter. |
| Intel | No. Revision is proposed | We are OK to keep main bullet but suggest removing inter-UE coordination aspect since RAN1 was not able to conclude in time and one more meeting does not seem to be sufficient to study in details inter-UE coordination solutions |
| NTT DOCOMO | Yes | At the RAN1 meeting, we completed to list up possible mechanisms, while we did not have enough time to discuss their performance and whether work is needed. At the next RAN1 meeting, we should have further study and then, WID can be updated as a part of this work item (or removing) based on that. |
| Fraunhofer | Yes | RAN1 has progressed well in identifying different schemes for inter-UE coordination. Since the WID already states that the study for enhanced reliability and reduced latency is until RAN#91, we support to continue the study until RAN#91, after which we can move to the normative work phase. |
| Sony | Yes | We also expect that RAN1 can achieve a conclusion in the next quarter. |
| Mitsubishi | Yes | Continue study until RAN#91, then specify the identified solutions |
| Volkswagen AG | Yes | Hopefully RAN1 can conclude in the next meetings to enter the normative phase. |
| Bosch | Yes | It is clear from the WID that the study needs to be continued after RAN#90, i.e., until RAN#91. However, it is also expected to decide the study scope for Q1 during RAN#90. |

Q2: If you answered yes in Q1, what is your preference to update the objective?

Option 1: Keep the current wording on the scope of inter-UE coordination and just update the study timeline (an example is in [9]).

Option 2: List the schemes in the RAN1 LS [1] as the candidates of the study (an example is in [7]). In this case, please indicate whether to list all the schemes or down select some schemes.

Option 3: Others (please specify).

|  |  |  |
| --- | --- | --- |
| Company | Answer | Comment |
| LGE | Option 1 | As RAN1 progress in Q1/2021 will be made on the basis of the conclusion made so far, no further wording is necessary to refine the scope of the inter-UE coordination. We think the change in [9] is enough. |
| vivo | Option 2 | Listing the schemes identified by RAN1 helps to eliminate some unnecessary arguments in the WG discussions. Nevertheless, it is not necessary to down scope in RAN – that can be handled by RAN1. |
| Xiaomi | Option 1 | The current wording on scope of inter-UE coordination is enough. |
| OPPO | Option 1 or 2 (down scope) | The categories of schemes so far reached in RAN1 need some down selection in our understanding, as it is impractical to specify all of them in R17. In our understanding, RAN1 should do this down selection in the next quarter or at RAN#91e when converting into normative work. While we think it is sufficient to just update the study timeline as in [9], we are open to do this down selection in this RAN#90e meeting. Having said this, therefore, it is not preferred and not necessary to list all of the identified categories of schemes (without down selection) in the WID, since this may give an impression that all of these should be included/specified in the end. |
| Huawei, Hisilicon | Option 1 | The study scope should be based on RAN1’s agreements, and there is no need for RAN to restrict at WID level what particular detailed techniques can be discussed for feasibility, benefits, and specification.  The objective is already study & specify, so the timeline can be the ‘RAN1 Rel-17 freeze’. |
| Ericsson | Option 1 | RAN1 can continue working based on existing agreements/conclusions. There is no need to update the WID regarding this. |
| Qualcomm | Option 2 | The RAN1 agreements were made in accordance with the existing wording of the WID. While Option 1 is consistent with and wouldn’t affect RAN1 agreements or next steps, we think that limiting the options in the WID to those identified in the RAN1 agreements per Option 2 would help focus the RAN1 efforts. |
| Nokia, NSB | Option 1 | The proposed update in [9] is fine |
| InterDigital | Option 1 | Update the timeline would be good enough |
| Futurewei | Option 1 | The current wording is fine. Work in the WGs can proceed based on the previous agreements reached so far |
| Fujitsu | Option 1 | We can keep the current WID, and the working scope can be based on RAN1’s agreements. |
| Panasonic | Option 1 | As some conclusions were reached described in RAN1 LS, it can be used for further discussion. No need of the update of WID. |
| Apple | Option 1 | We only need to update the timeline. The study scope can be based on RAN1’s agreements. |
| Lenovo, Motorola Mobility | Option 1 | The current wording is fine. |
| ZTE, Sanechips | Option 1 | We agree that timeline should be mainly updated, but the in the note, “study scope” should be changed to “specify scope”. |
| CATT | Option 1 | No further wording change is needed except changing the checking point from “RAN#90” to “RAN#91”. One quarter extension is enough for companies to evaluate and discuss the feasibility/benefit about it.  There is also no necessity to list all schemes in the scope, because there are still quite lot uncertain technical aspects of inter-UE coordination, list all the schemes may lead to unexpected working/discussion direction. |
| Samsung | Option 1 | Just updating the timeline in the WID. |
| MediaTek | Option 1 | We don’t really see a benefit from listing the schemes in the WID. The current scope is clear and RAN1 can continue work on this basis. |
| Intel | Option 1 | More time is needed to complete the study and have solid conclusions |
| NTT DOCOMO | Option 2  (Option 1 is second preference) | Clear capture in WID is preferable, to avoid further discussion for mechanism other than listed in the last RAN1 meeting.  Basically, RAN1 will study the mechanisms at the next meeting, which were listed at the last RAN1 meeting. In that sense, updating the WID to capture the mechanisms might be unnecessary. On the other hand, it seems that the agreement did not preclude other mechanism. Therefore, update of the WID is beneficial from this perspective. |
| Fraunhofer | Option 1 | We are fine with the current wording for the scope of inter-UE coordination. The study timeline needs to be updated. |
| Sony | Option 1 | We could make a conclusion on feasibility and benefit of inter-UE coordination based on the RAN1 progress. But we don’t have to update the current wording on the scope. |
| Mitsubishi | Option 1 | The conclusions of RAN1 allow to pursue the study as is until the next meeting. Option 2 is also OK. |
| Volkswagen AG | Option 1 | Continue with the scope as agreed on when the WID was drafted. |
| Bosch | Option 2 | We support limiting the scope in the WID, during this meeting, to only what have been agreed in the last RAN1 meeting. This will help RAN1 to focus and avoid extending discussions about the initial wording of the second sub-bullet. |

**Issue 2: Sidelink DRX**

The current objective for sidelink DRX is as follows:

|  |
| --- |
| . Sidelink DRX for broadcast, groupcast, and unicast [RAN2]   * Define on- and off-durations in sidelink and specify the corresponding UE procedure * Specify mechanism aiming to align sidelink DRX wake-up time among the UEs communicating with each other * Specify mechanism aiming to align sidelink DRX wake-up time with Uu DRX wake-up time in an in-coverage UE |

The moderator observed that there are proposals to add RAN1 as a secondary WG for this objective.

Q3: Do you agree that RAN1 is added as a secondary WG for the objective of sidelink DRX?

|  |  |  |
| --- | --- | --- |
| Company | Answer | Comment |
| LGE | No | We agree that there can be some issues for RAN1 to look into pertaining to sidelink DRX. However, in our view, so far the potential issue is limited to the resource allocation aspect which is already covered in another objective of the approved SID, and having a separate agenda/objective may lead to undesirable parallel discussion on the same topic in RAN1. We think sidelink DRX impact on the resource allocation needs to be treated under the agenda of the power efficient resource allocation considering other RAN1-origniated topics, and if necessary, we can clarify that the existing objective of the resource allocation enhancement also needs to consider impact from other functionalities including sidelink DRX. |
| vivo | Yes | We think it is better to add RAN1 as a secondary WG.  Firstly, DRX may affect not only the resource allocation, but also others such as measurement (CBR/CR, etc.). Putting the RAN1 as a secondary WG encourage RAN1 to check further potential issues. Otherwise, it is risk of potential critical issues being found at a very last stage or even after the stage-2 frozen of RAN1, especially considering that RAN2 has a three-month shift after RAN1 frozen.  Secondly, it helps RAN1 to better manage the work load (e.g., mail threads, etc.), compared with the case of handling the per-meeting LS from RAN2. |
| Xiaomi | Yes | There are already many contributions discussing DRX impact in the last two RAN1 meeting, but not treated. Setting RAN1 as 2nd WG helps RAN1 to manage the workload and arrange the discussion. |
| OPPO | No | We tend to have the same view as LGE that RAN1 aspect and impact of SL DRX design on resource allocation can be handled directly under the relevant agenda item(s). Otherwise, we may artificially create another AI in RAN1 with overlapping scope. Furthermore, since RAN2 has agreed to send an LS to RAN1 regarding the impact of SL DRX on sensing, in our view this coordination between RAN1/2 is established. And we can utilize this for further communication regarding SL DRX between WGs. I think at most we are OK with suggestion from LGE that “we can clarify that the existing objective of the resource allocation enhancement also needs to consider impact from other functionalities including sidelink DRX”. |
| Huawei, Hisilicon | Not essential | It is necessary to allow RAN1 to discuss impacts from SL DRX on the physical layer, whereas there seems to be some confusion over this at present. Based on the RAN2 LS that SL DRX should take PSCCH monitoring also for sensing (in addition to data reception) into account, it is already clear that this has RAN1 impact, particularly on sensing and resource selection, which can be handled in the agenda item on power saving. Given the LS, it is not critical to add RAN1 as a secondary WG for the objective of sidelink DRX, as it can rely on coordination between RAN1 and RAN2. |
| Ericsson | Yes |  |
| Qualcomm | No | RAN1 can address the LS from RAN2 and take it into account as it would any other LS. There’s no need to add RAN1 as a working group for DRX. |
| Nokia, NSB |  | It is important that RAN1 aspects of SL DRX don’t fall through the cracks. Either of the following options could work:   * Update objective on “resource allocation to reduce power consumption” to include RAN1 aspects of DRX * Update SL DRX objective to add RAN1 as a secondary WG |
| InterDigital | Yes | We think sidelink DRX has be considered for resource allocation as resource allocation has to be aligned with the DRX period. As long as the sidelink DRX is considered in RAN1 for resource allocation, we are fine with either clarifying the resource allocation enhancement objective to include sidelink DRX or adding RAN1 as seconding WG for the sidelink DRX. |
| Futurewei | Yes | While we agree with LGE that this is not an absolutely needed clarification, this will make it clear that RAN1 has to discuss DRX on the sidelink. Given that the WID will be modified anyway (cf Q1 and Q2), we do not see any harm in adding RAN1 as secondary WG |
| Fujitsu | Yes | Adding RAN1 as a secondary WG can make the DRX work more efficient. We already know the strong relation in between, especially for the resource selection in/out DRX On-Duration after sensing procedure, that needs some interwork between RAN1 and RAN2. |
| Panasonic | Yes | To add secondary WG or to clarify that the existing objective of the resource allocation enhancement also needs to consider impact from other functionalities including sidelink DRX is necessary to clarify RAN1 scope. |
| Apple | Yes | We support to have RAN1 as a secondary WG to make this point clear to RAN1. RAN1 needs to discuss how to enhance sensing and resource allocation when SL-DRX is configured. |
| Lenovo, Motorola Mobility | Yes | We support to have RAN1 as a secondary WG to manage the workload and arrange the related discussion. |
| ZTE, Sanechips | No | As we all know, RAN2 has already sent one LS towards RAN1 to mention some SL DRX related agreement and conclusion. But RAN1 has not handled this LS and reached any formal discussion. So whether and how SL DRX will truly impact RAN1 design is not clear. In that case, we propose RAN1 firstly to handle RAN2 LS to find whether there is any RAN1 impact. In addition, considering the work load, it is not reasonable to make RAN1 consider additional sidelink DRX enhancement. |
| CATT | No | By now, it is not clear on how RAN1 should be involved in the work of SL DRX including physical design update and other detailed aspects. We prefer to keep the current objectives unchanged and restricted to RAN WG2 by avoiding parallel discussion by both WGs. RAN1 can be triggered of discussion on SL DRX by LS from RAN2 when there is clear results after discussion on how RAN1 can be involved. |
| Samsung | No | We think that it is not an urgent issue to decide at this meeting. Without the change of current objective, we can discuss SL DRX issue in the next RAN1 meeting based on RAN2 LS. |
| MediaTek | No | We think the DRX impact can be handled in the existing scope, with coordination by LSs as usual. We don’t see a big need for any impact on the WID, but LG’s suggestion above to clarify the potential impact to the resource allocation objective would be acceptable for us. |
| Intel | No | In our view it can be decided/revised at a later stage if necessary. Given that details of partial sensing operation are not agreed yet, there is no need strong motivation for upcoming meeting. |
| NTT DOCOMO | Yes | DRX is related to resource allocation mechanism, which was designed mainly in RAN1. In that sense, it can be said that RAN1 is one of the related working groups. |
| Fraunhofer | Yes | We are supportive of adding RAN1 as a secondary WG. There are certain aspects of SL DRX related to power saving that should be treated in RAN1, such as the relationship between SL DRX and partial sensing, as well as the impact on measurements (e.g. CR, CBR). |
| Sony | Yes | We have discussed impacts on RAN1 resource allocation from sidelink DRX. We prefer to add RAN1 as a secondary WG for sidelink DRX to avoid non-compatible operations. |
| Volkswagen AG |  | All resource allocation impacts of power saving mechanisms need to be considered. We support Nokia’s proposal. |
| Bosch | Yes | When we initially discussed RAN1 objective “resource allocation to reduce power consumption”, we only had in mind TX-only LTE VRU. Therefore, we considered only specifying mechanisms for partial sensing. However, having a sidelink power saving UE being capable of TX/RX may need to consider the impact of DRX on TX resource allocation (e.g., from other Rel-16 and Rel-17 UEs) and the impact of DRX onto the partial sensing mechanism itself. Therefore, we support introducing DRX to objective 2 (“resource allocation to reduce power consumption”) and objective 3 as a second working group. |

Q4: If RAN1 is added, do you think the objective content also needs to be updated (an example is in [5])?

|  |  |  |
| --- | --- | --- |
| Company | Answer | Comment |
| vivo | No |  |
| Xiaomi | Yes |  |
| Huawei, HiSilicon | No | The objective is fine. RAN1 can determine the necessary work, aided by RAN2 agreements as necessary. |
| Ericsson | Limit scope in RAN1 | For SL DRX, RAN1 should only address the topics of sensing and resource allocation, reusing the functionality introduced for reducing power consumption |
| InterDigital | Yes |  |
| Futurewei | No |  |
| Fujitsu | No |  |
| Panasonic | Yes | To add secondary WG or to clarify that the existing objective of the resource allocation enhancement also needs to consider impact from other functionalities including sidelink DRX is necessary to clarify RAN1 scope. |
| Apple | Yes | RAN1 need only address “Sensing and resource allocation issue when SL-DRX is configured”. |
| Lenovo, Motorola Mobility | Yes | The update in [5] is fine to us.  • Specify mechanism aiming to enhance sensing and resource allocation when sidelink DRX is configured [RAN1, RAN2] |
| Intel | No | Can be decided later |
| NTT DOCOMO | Yes | Resource allocation (including sensing, resource selection, etc.) should be captured for RAN1 work. |
| Fraunhofer | No |  |
| Sony | No |  |
| Volkswagen AG | Yes | Same comment than Ericsson |
| Bosch | Yes | RAN1 should address SL DRX mechanisms (for RX UEs) in addition to sensing and resource allocation (for TX UEs) in the resource allocation objective.  RAN1 should also consider necessary work for aligning DRX and sensing for power saving. |

**Others**

Q5: If there are any other aspects that need to be considered in the scope of this email discussion, please specify them.

|  |  |
| --- | --- |
| Company | Comment |
| LGE | The target completion of the impacted TR/TS needs to be updated in accordance with Rel-17 timeline which is expected to be updated in this meeting. But this is not an urgent issue in our view and update in the next meeting might be okay as well. |
| vivo | Regarding the fifth objective of WID (i.e., to ensure sidelink operation to be confined in a predetermined geographic area), RAN2 confirms that no extra standard efforts need to be done in RAN towards this objective, as stated in the LS to SA2.  Consequently, the objective can be deleted so that RAN2 can release the related TUs for other objectives. |
| Huawei, Hisilicon | Given that the WGs have progressed substantially, there is no need for scope changes nor timeline extension. Administrative points are fine to update.  On vivo’s suggestion relating to geo-area restriction, in a procedural sense it may not be necessary to remove the objective, because all that has happened is the work has been completed, rather than that the objective has been cancelled. The TUs are already released, thanks to the clear RAN2 agreement on no further work. |
| Apple | We agree with Huawei that there is no need to remove objective 5 from WID. RAN2 has completed the objective based on company contributions, so those efforts cannot be ignored. We do not foresee any TU will be wasted by not deleting the objective. |
| Samsung | We also think that objective 5 in WID does not need to be removed. We suggest focusing on the objective for Mode 2 enhancement for enhanced reliability and reduced latency in this meeting. |
| Fraunhofer | Considering that inter-UE coordination contributes to power saving for P-UEs, we see it is a possible new solution to reduce power consumption. Since both power saving and inter-UE coordination topics are discussed individually, the combination thereof should also be considered. |
| Volkswagen AG | The paramount of REL-17 sidelink work needs to be the compatibility with the REL-16 sidelink. There is no use of REL-17 VRU’s which can’t communicate with vehicles using REL-16 sidelink. |
| Bosch | Considering communication between Rel-16 and Rel-17 is a resource pool:  In our understanding, coexistence between Rel-16 and Rel-17 in the same resource pool also need to allow for communicating safety messages between the two releases (e.g., a Rel-17 VRU-UE and a Rel-16 vehicle UE). This was not mentioned in the WID. Currently, we see the need to identify this clearly in addition to coexistence. |

**References**

[1] RP‑202153 LS on Mode 2 enhancements in NR sidelink RAN1

[2] RP‑202217 Scope update for R17 Sidelink Enhancements Futurewei

[3] RP‑202354 Discussion on inter-UE coordination for Rel-17 SL enhancement Intel Corporation

[4] RP‑202378 Views on the WI on NR sidelink enhancement Ericsson

[5] RP‑202562 Discussion of Sidelink DRX on Rel-17 NR Sidelink Enhancements Apple Inc.

[6] RP‑202571 Scope of Rel-17 WI on sidelink enhancement Huawei, HiSilicon

[7] RP‑202644 Discusison on Rel-17 SL enhancememt WID scope vivo

[8] RP‑202673 Views on work scope of Rel-17 NR sidelink enhancement ZTE, Sanechips

[9] RP‑202253 Revised WID on NR Sidelink enhancement LG Electronics