**3GPP TSG-RAN WG2 Meeting #119e R2-220xxxx**

**E-Meeting, August 2022**

**Source: Lenovo**

**Title:****[AT119-e][418][Relay] Remaining proposals on discovery and (re)selection (Lenovo)**

**Agenda Item:** **6.7.2.4**

**Document for:** **Discussion and Decision**

# Introduction

The following email discussion was triggered at RAN2#119-e:

* [AT119-e][418][Relay] Remaining proposals on discovery and (re)selection (Lenovo)

Scope: Discuss P3a/P3b/P4/P5a/P5b of [R2-2208796](file:///D:\\OneDrive%20-%20Lenovo\\3GPP\\RAN2\\TSGR2_119e\\Docs\\R2-2208796.zip) and attempt to reach agreements.

Intended outcome: Report to CB session.

Deadline: Tuesday 2022-08-23 1200 UTC

The following phase approach is suggested:

* Phase 1 – Initial inputs to questions in the drafts folder
  + Deadline: Monday 2022-08-22 1000 UTC
* Phase 2 – Finalization of proposals and agreeable specification changes
  + Deadline: Tuesday 2022-08-23, 1200 UTC

# Contact Information

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| --- | --- |
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# Discussion

### 3.1 Mode-1 dedicated discovery TX pool

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| 1 | **[R2-2207765](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207765.zip)** | On the problem for mode-1 dedicated discovery TX pool | vivo |
| 2 | **[R2-2207766](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207766.zip)** | [Draft] LS on mode-1 dedicated discovery transmission pool | vivo |

[1] observed that Mode-1 dedicated discovery TX pool(s) are specified in *sl-DiscTxPoolScheduling* which was introduced for the gNB to schedule dedicated resources to a mode-1 UE for both relay-related and non-relay related SL discovery transmission. However, as per the current specification (TS38.212), the gNB is unable to schedule any resource in the pool(s) configured by *sl-DiscTxPoolScheduling*, since the “Resource pool index” field in DCI format 3\_0 is currently unable to refer to *sl-DiscTxPoolScheduling*.

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| --- |
| 7.3.1.4.1 Format 3\_0  DCI format 3\_0 is used for scheduling of NR PSCCH and NR PSSCH in one cell.  The following information is transmitted by means of the DCI format 3\_0 with CRC scrambled by SL-RNTI or SL-CS-RNTI:  - Resource pool index – bits, where *I* is the number of resource pools for transmission configured by the higher layer parameter *sl-TxPoolScheduling*.  - Time gap – 3 bits determined by higher layer parameter *sl-DCI-ToSL-Trans,* as defined in clause 8.1.2.1 of [6, TS 38.214]  - HARQ process number – 4 bits.  - New data indicator – 1 bit.  - Lowest index of the subchannel allocation to the initial transmission – bits as defined in clause 8.1.2.2 of [6, TS 38.214]  - SCI format 1-A fields according to clause 8.3.1.1:  - Frequency resource assignment.  - Time resource assignment.  […] |

[1] understands that sl-*DiscTxPoolScheduling* also should be considered in “Resource pool index” field besides *sl-TxPoolScheduling.* It is RAN2’s responsibility to inform RAN1 of the introduction of such *sl-DiscTxPoolScheduling* since the introduction of *sl-DiscTxPoolScheduling* was completely decided by RAN2 (**w/o** consulting RAN1’s views).

The online discussion for Proposal 3a is as follows.

*OPPO agree in P1 that waiting for SA2 is right, but think we could face some unsolvable problems if we do not address the possibility now. On P2b, OPPO think there is overlap with the language from relay reselection triggers; and on P3a, they think we should look into the details in RAN2 first.*

*MediaTek think that from RAN2 perspective, we cannot say there is a problem with the DCI scheduling; if we want to refine P3a, we can “inquire” rather than “inform”.*

*LG think in P3a, RAN1 may not be able to change the DCI format now, and we should see if there is a RAN2 solution. Lenovo indicate that the resource pool is in RAN2 spec, but the RAN1 spec does not take account of it in the DCI format. Apple agree with LG.*

*vivo think P3a is an issue RAN2 caused for RAN1, and since RAN1 have no TUs for this WI, it is not realistic to originate a solution in RAN1; they think RAN2 cannot solve the problem except by disabling the dedicated scheduled pool. They think we could take MediaTek’s suggestion and inquire for a solution from RAN1 rather than try to dictate what they do. vivo think RAN1 will change something about the field description in the DCI format, not the bits on the air.*

*Ericsson agree with OPPO that RAN2 caused a problem for RAN1, and they think RAN2 should investigate the problem more deeply before updating RAN1.*

Based on the above discussion, some companies e.g Oppo, LG, Apple, Ericsson think RAN2 should investigate the details first. In addition, no company has doubt about the mismatching between RAN1 specification and RAN2 specification mentioned in [1] during online discussion. Rapporteur thinks we still need to check if all companies agree with the mismatch. Then, we check if RAN2 can address it first.

**Q1-1: Do Company confirm that the gNB is unable to schedule any resource in the resource pool(s) configured by sl-DiscTxPoolScheduling via the current DCI format 3\_0 since Resource pool index only refers to sl-TxPoolScheduling.**

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| --- | --- | --- |
| Company | Yes/ No | Comments |
| OPPO | Yes |  |
| vivo | Yes | Proponent. The problem itself is obvious. |
| Ericsson | Yes |  |
| Qualcomm | Yes |  |
| Apple | Yes |  |
| CATT | Yes |  |
| Lenovo | Yes |  |
| Kyocera | Yes |  |
| ZTE | Yes |  |
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**Q1-2: If the company confirms the mismatching in Q1-1, do companies agree that RAN2 investigates the problem first before sending LS to RAN1? If yes, please provide the potential RAN2 solution if any.**

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| Company | Yes/ No | Comments |
| OPPO | Yes | In case-1, since only discovery message is transmitted, then only dedicated discovery resource pool might be configured, then DCI can directly refer to discovery pool.  In case-2, both dedicated discovery pool and shared SL communication pool should be configured, then the reference is a joint one for both discovery pool and communication pool.  Combine the two, the suggested change can be for example  - Resource pool index – bits, where *I* is the number of resource pools for transmission configured by the higher layer parameter *sl-TxPoolScheduling*, if configured, and *sl-DiscTxPoolScheduling*, if configured.  and R2 can send this conclusion to R1, |
| vivo |  | **Necessity of RAN1 Spec change**  Fine for RAN2 to first attempt to find a solution, if companies want. But we would like to emphasize again that except for dummifying this IE, no matter what solution RAN2 finally chooses, some changes on RAN1 Spec are inevitable, because even as the minimum RAN1 Spec change, at least the field “*sl-DiscTxPoolScheduling”* needs to be mentioned in the “Resource Pool Index” field in the DCI Format 3\_0 (or even more straightforward, at least the name of this field has to appear in the RAN1 Spec where this field never appears for the time being).  For example, even if one intends to use the RRC field description to describe when DCI Format 3\_0 refers to *sl-DiscTxPoolScheduling*, when it refers to *sl-TxPoolScheduling* or when it jointly refers to both (as somebody commented during Monday session), it is still necessary to make adaptive changes to the descriptions of “Resource Pool Index” field **in** DCI Format 3\_0. Otherwise, if not any change were to be done to DCI Format 3\_0 fields, there would be mismatch between RRC field description and DCI field description (where *sl-DiscTxPoolScheduling* remains not mentioned at all), which remains unacceptable.  Also, as to some companies’ concern on changing DCI “Format” or introducing new DCI “Format”, it is not needed at all — only some more clarification texts need to be added, mentioning the *sl-DiscTxPoolScheduling* in the “Resource Pool Index” as shown above. On the other hand, if really this issue were to be as severe as requiring new DCI “Format” or revision of the existing DCI Format, e.g. using reserved bits, designing a new format with a different length, etc., we would even more need to enquire RAN1’s views and if they can’t accept such big change, we would really need to contemplate seriously to dummify this IE completely.  **Solution-wise**  We are generally Ok with the solution proposed by OPPO above. In addition, we think there is another detail that needs to be resolved, regarding the indexing order between *sl-DiscTxPoolScheduling* and *sl-TxPoolScheduling* in case both of them are configured. So we’d like to attempt one step forward on top of OPPO’s proposal:  - Resource pool index – bits, where *I* is the number of resource pools for transmission configured by the higher layer parameter *sl-TxPoolScheduling*, if configured, and *sl-DiscTxPoolScheduling*, if configured. If both *sl-DiscTxPoolScheduling* and *sl-TxPoolScheduling* are configured, the resource pool(s) in *sl-TxPoolScheduling* are indexed first, and then the resource pool(s) in sl-DiscTxPoolScheduling.  Again, there’s no RAN1 scope/TU for this WI. No matter what solution RAN2 finally decides to adopt, we cannot expect RAN1 to read RAN2 progress and discuss the adaptive change needed in RAN1 Spec spontaneously. Informing them with LS is anyway needed. If we can converge to a solution from a RAN2 perspective as shown above, it is OK to inform RAN1 of the RAN2 suggested solution; otherwise, we leave this issue to RAN1 and ask them for help. |
| Ericsson | Yes | Perhaps it is sufficient to have OPPO suggested solution. the additional changes suggested by VIVO can be decided by RAN1. |
| Qualcomm | Yes | RAN2 can at least discuss which cases to be addressed and send an LS to RAN1 on the suggested solution. OPPO’s solution above seems reasonable and the additional details suggested by vivo can be addressed by RAN1. |
| Apple | Yes | We also think OPPO's suggestion solution is sufficient, and the additional details can be discussed in RAN1. |
| CATT | No | In our understanding, no matter which solution RAN2 proposed, it cannot avoid the impact on RAN1. Hence, we had better inform this issue to RAN1 to let RAN1 decide how to solve it. |
| Lenovo | Yes | In general, we are fine with the suggestion from Oppo.  Regarding the further suggestion of the index order from Vivo, we don’t understand the reason to change it. Both *sl-TxPoolScheduling* and *sl-DiscTxPoolScheduling* are described via the single SL-ResourcePoolConfig IE. One Resource Pool ID will be configured for each TX pool. Then, resource pool index can refer to the configured pool ID. The details can be discussed in RAN1.  [vivo] Clarification: RAN1 Spec is using “Resource pool **Index**” instead of “Resource pool **ID**” in DCI Format 3\_0. Using Index typically means indexing the position of an entry in a list, but not an ID value. If RAN1 spec had used “ID” at the very beginning, things would have been much easier. But as commented earlier, fine to leave it to RAN1 to further look into such details.  In addition, the following description in RAN1 specification should be updated as well. Also, the details should be discussed in RAN1.  *If multiple transmit resource pools are provided in sl-TxPoolScheduling, zeros shall be appended to the DCI format 3\_0 until the payload size is equal to the size of a DCI format 3\_0 given by a configuration of the transmit resource pool resulting in the largest number of information bits for DCI format 3\_0.* |
| Kyocera | Yes | We have the same view as Ericsson. |
| ZTE | Yes | RAN1 impact is inevitable no matter which solution RAN2 concludes. Based on the proposed solution by OPPO and vivo, to minimize RAN1 impact, e.g. to avoid the change on DCI format 3\_0 (which limits to 3 bits), the sum number of resource pools for *sl-TxPoolScheduling* and *sl-DiscTxPoolScheduling* should be no larger than *maxNrofTXPool-r16* (8)whenboth are configured. So such a NOTE in RAN2 is needed. |
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**Q1-3: If the company confirms the mismatching in Q1-1, do companies agree to send a LS to RAN1 in this meeting? If yes, whether the LS includes the following two cases in which sl-DiscTxPoolScheduling is configured.**

* **Case 1: UE is configured to transmit only NR SL discovery;**
* **Case 2: UE is configured to transmit both NR SL discovery and NR SL communication.**

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| Company | Yes/ No for sending LS | Comments |
| OPPO | No | We prefer to firstly reach a solution and send the LS towards RAN1 for their confirmation on the solution, instead of simply kick off the issue towards RAN1.  So no need to include the two cases as a question to R1. |
| vivo | Yes | As clarified in above Q1-2, informing them with LS is anyway needed. If we can converge to a solution from a RAN2 perspective as shown above, it is OK to inform RAN1 of the RAN2 suggested solution w/o this information on upper layer configuration; otherwise, if we ask RAN1 for help, such information should be included in the LS, as such upper layer configuration is usually assumed to be agnostic to RAN1 which may wonder whether both of the two cases exist.. |
| Ericsson | Yes | This can help RAN1 understand the issue. |
| Qualcomm | Yes | As commented above, RAN2 has to discuss first which cases need to be addressed and send a confirmed agreement to RAN1. |
| Apple | No (OK to send LS to RAN1, but no need to educate which cases RAN1 should consider) | We have similar view as OPPO. |
| CATT | Yes |  |
| Lenovo | See comments | After RAN2 solution is available, LS is needed for RAN1 discussion. |
| Kyocera | Yes | Providing the two cases will assist with RAN1’s understanding of the issue. |
| ZTE | Yes | It can help RAN1 understand the issue and confirm the final solution. |
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### 3.2 Clarification of SD-RSRP and SL-RSRP

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| 3 | **[R2-2207967](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207967.zip)** | Clarification of SD-RSRP and SL-RSRP in TS 38.331 | NEC Corporation |

This contribution thinks SD-RSRP is defined in section 5.1.22 of TS 36.214, which is RSRP measured on DMRS of PSDCH. However, there is no PSDCH in NR sidelink. Consequently, SD-RSRP based on PSDCH DMRS cannot be applicable for NR sidelink. It was agreed in RAN2#113bis that in SD-RSRP measurement for relay (re)selection trigger and candidate relay evaluation, L3 filtering is applied across measurements on the DMRS of PSSCH transmission which carries discovery message from the concerned relay. [3] thinks the above agreements are not clearly reflected in current specification. Therefore, [3] proposes to clarify in RRC specification that SD-RSRP is PSSCH-RSRP where PSSCH carries discovery message as follows.

3.2 Abbreviations (TS38.331)

*---Omitted---*

SCell Secondary Cell

SCG Secondary Cell Group

SCS Subcarrier Spacing

SD-RSRP PSSCH-RSRP where the PSSCH carries discovery message

SDT Small Data Transmission

SFN System Frame Number

*---Omitted---*

**Rapporteur thinks** there are two points included in proposal from [3]. One point is that the definition of SD-RSRP is missing in ‘Abbreviations’ section of RRC specification. The other one is how to define SD-RSRP. Therefore, two questions are listed below.

**Q2-1: Do companies agree that the definition of SD-RSRP is missing in ‘Abbreviations’ section of RRC specification?**

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| --- | --- | --- |
| Company | Yes/ No | Comments |
| OPPO | Yes |  |
| vivo | Yes |  |
| Ericsson | Yes |  |
| Qualcomm | See comments | We agree that SD-RSRP is missing in abbreviation. But, it is not clear to us why do we need to define it instead of abbreviating it as “Sidelink Discover RSRP”. Also, we observe that there is no abbreviation or definition for SL-RSRP either in the RRC spec. Hence, we do not see an issue and think it is sufficient for RAN4 specs to define it. |
| Apple |  | Same view as Qualcomm. We think SD-RSRP is clear enough, and LTE also used this terminology in TS 36.331. |
| CATT | See comments | Same view as QC. |
| Lenovo | See comments | In general, we agree with QC.  In abbreviation of TS38.331, we can use the same description as TS36.331 (see below).  *SD-RSRP Sidelink Discovery Reference Signal Received Power* |
| Kyocera | Yes |  |
| ZTE | Yes |  |
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**Q2-2: If yes for Q2-1, do companies agree that SD-RSRP is defined as ‘PSSCH-RSRP where PSSCH carries discovery message’?**

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| Company | Yes/ No | Comments |
| OPPO |  | Our R4 colleague understands that the current R4 spec implies that it can be up to UE implementation to use PSCCH-RSRP and/or PSSCH-RSRP, for both SD-RSRP and SL-RSRP, so we do not see a strong need to restrict that from R2 perspective. |
| vivo | Yes with comments | As there are SD-RSRP defined in LTE specification, we think anyway a new definition should be in NR spec.  According to OPPO’s comment, we can first agree with PSSCH-RSRP and further check with RAN4 whether PSCCH-RSRP should also be included. |
| Ericsson | No strong view |  |
| Qualcomm | No | Please see comments for Q2-1 |
| Apple | No | We don't see any strong reason for the change, especially considering LTE has used SD-RSRP already. |
| CATT | No | In section 3.2, it is just to describe the abbreviation, why we need to specify whether PSCCH-RSRP or PSSCH-RSRP is used. May be this which RSRP can be captured in section 3.1. |
| Lenovo | No | In section 12.10.2 of TS38.133, there is a note as follow.  *Note 2: SL-RSRP or SD-RSRP can be derived from PSCCH-DMRS and/or PSSCH-DMRS.*  The above description implies that it is UE implementation to get SD-RSRP based on PSCCH-DMRS and/or PSSCH-DMRS. Although RAN2 agreed that *in SD-RSRP measurement for relay (re)selection trigger and candidate relay evaluation, L3 filtering is applied across measurements on the DMRS of PSSCH transmission which carries discovery message from the concerned relay*, we still think that RAN2 can follow RAN4 decision in this issue. Otherwise, we need to inform RAN4 if RAN2 agree with this proposal different from RAN4 specification. |
| Kyocera | No | We think SD-RSRP should be just Sidelink Discovery – RSRP. Then we can further discuss if we need to include in RAN2 specification whether the measurements are associated with PSCCH and/or PSSCH. |
| ZTE | No | Form RAN2 perspective, a simple and clear definition like ‘Sidelink discovery RSRP’ is enough. |
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### 3.3 SL CG for discovery message

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| 4 | **[R2-2208228](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208228.zip)** | Support of SL CG for discovery message | Huawei, HiSilicon |

In Rel-17, SL CG type-1 (if configured) can be used for discovery transmission. In Rel-16 NR sidelink, the UE is able to report one or more traffic pattern information per sidelink QoS flow to assist gNB to provide SL CG. [4] thinks the existing UEAssistanceInformation message is not able to inform gNB whether it requires SL CG in dedicated resource pool for discovery. And the existing SL-TrafficPatternInfo cannot be applied for discovery message since there is no flow identity for discovery message as a PC5-S signal.

**Q3-1: Do companies agree that the existing UEAssistanceInformation message is not able to inform gNB whether it requires SL CG in discovery dedicated resource pool?**

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| --- | --- | --- |
| Company | Yes/ No | Comments |
| OPPO | Yes |  |
| vivo | See comments | The use of mode-1 discovery dedicated resource pool is under ongoing discussion in section 3.1 and we should wait for that discussion completed. The reason is that if the dynamic mode-1 discovery dedicated pool cannot work it would be questionable whether this CG-based mode-1 operation in discovery dedicated pool is still needed. |
| Ericsson | comments | In our mind, this issue is rather minor, since discovery message has no traffic pattern, the enhancement is not necessary. |
| Qualcomm | See comments | Similar views as Ericsson. There is no discovery message traffic pattern defined, so it is not suitable for UE to provide this info to gNB.  Additionally, we think that how gNB configures CG type 1 for discovery dedicated pool can be upto NW implementation based on some pre-configured information/authorization information regarding the discovery. |
| Apple | No | Same view as Ericsson and Qualcomm. As discovery message has no traffic pattern, isn't it an over-optimization? |
| CATT | Yes |  |
| Lenovo | See comments | We are not sure if there is traffic pattern for discovery, which could be confirmed by SA2 first. |
| Kyocera | Yes | We think the information can be helpful to the gNB. |
| ZTE | No | We prefer it’s up to NW implementation because there is no discovery message traffic pattern has been defined. |
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**Q3-2: If yes for Q3-1, do companies agree with option 1?**

* **Option 1: new assistance information similar to SL-TrafficPatternInfo should be introduced in UEAssistanceInformation message to assist gNB to configure SL CG type 1 for discovery.**
* **Option 2:….(any other solution?)**
* **Option 3: do nothing**

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| Company | Option1/2 | Comments |
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| vivo |  |  |
| Ericsson | Option 3 | In our mind, this issue is rather minor, since discovery message has no traffic pattern, the enhancement is not necessary. |
| Qualcomm | Option 3 | See comments to Q3-1 |
| Apple | Option 3 | Same view as Ericsson and Qualcomm. |
| CATT | See comment | We are doubt how UE know the SL-TrafficPatternInfo and whether upper layer can provide this information to AS? |
| Lenovo | Option 3 | See comments for Q3-1 |
| Kyocera | Option 1 |  |
| ZTE | Option 3 | See comments for Q3-1. |
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There are four IEs included in legacy SL-TrafficPatternInfo. The existing SL-TrafficPatternInfo cannot be applied for discovery message since there is no flow identity for discovery message [4]. Compared to legacy, the QoS flow id is removed for discovery message in [4].

**Q3-3: If selecting option 1 in Q3-2, do companies agree on that new assistance information can include Discovery message periodicity, Timing offset and the message size information?**

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| Company | Yes/ No | Comments |
| Kyocera | Yes |  |
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# Conclusion

Following proposals are made,

**[easy decision]**

**[to be discussed]**

# Reference

[1] **[R2-2207765](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207765.zip)** On the problem for mode-1 dedicated discovery TX pool vivo

[2] **[R2-2207766](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207766.zip)** [Draft] LS on mode-1 dedicated discovery transmission pool vivo

[3] **[R2-2207967](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207967.zip)** Clarification of SD-RSRP and SL-RSRP in TS 38.331 NEC Corporation

[4] **[R2-2208228](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208228.zip)** Support of SL CG for discovery message Huawei, HiSilicon