**3GPP TSG-RAN WG4 Meeting # 100-e R4-210XXXX**

**Electronic Meeting, 16th – 27th Aug., 2021**

**Agenda item:** 9.24

**Source:** Moderator (OPPO)

**Title:** Email discussion summary for [100-e][240] NR\_SL\_relay\_RRM

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this email discussion (e.g. list of treated agenda items) and provide some guidelines for email discussion if necessary.*

In this email discussion, we focus on work plan and RRM scope of Rel17 NR SL relay WID.

* Topic #1: Work Plan for NR\_SL\_relay\_RRM
* Topic #2: RRM scope of NR\_SL\_relay\_RRM

*List of candidate target of email discussion for 1st round and 2nd round*

* 1st round: Discussion on Work Plan and RRM scope
* 2nd round: Approval of Work Plan and way forward on RRM scope

# Topic #1: Work Plan for NR\_SL\_relay\_RRM

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2113289**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113289.zip) | OPPO | 3 meetings for core part before RANP #95(March, 2022) and,  3 meetings for performance part before RANP #97 (September 2022) |

## Open issues summary

### Sub-topic 1-1

#### Issue 1-1: Work Plan for SL Relay RRM

* Proposals from R4-2113289 by OPPO:

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| --- |
| 1. 3GPP RAN4 #100e meeting (August, 2021, 0.5TU, Core part)  * Discussions on:   + Work plan   + Potential impact on RRM core requirements, e.g., relay discovery and (re)selection * Agreement on:   + Consensus on the work plan   + Identification of RRM core requirements  1. 3GPP RAN4 #101e meeting (November, 2021, 0.5TU, Core part)  * Discussions on:   + Technical aspects of RRM core requirements for relay discovery and (re)selection and others if any * Agreement on:   + RRM requirements for relay discovery and (re)selection   + Work split on draft CR responsible companies  1. 3GPP RAN4 #102(e) meeting (February, 2022, 0.5TU, Core part)  * Discussions on:   + Remaining issues on RRM requirement for relay discovery and (re)selection   + Draft CRs   + List of Test Cases * Agreement on:   + Finalization on RRM core requirements   + **Big CR**   + List of Test Cases  1. 3GPP RAN4 #102bis meeting (April, 2022, 0.25TU, Performance part)  * Discussions on:   + Test cases on RRM requirements for relay discovery and (re)selection   + Potential RRM performance requirements * Agreement on:   + Test cases on RRM requirements for relay discovery and (re)selection   + Work split for draft CR for test cases  1. 3GPP RAN4 #103 meeting (May, 2022, 0.25TU, Performance part)  * Discussions on:   + Remaining issues on test cases   + Draft CRs for test cases * Agreement on:   + Conclusion on the remaining test cases   + Draft CRs and Draft big CR  1. 3GPP RAN4 #104 meeting (August, 2022, 0.25TU, Performance part)  * Discussions on:   + Remaining issues on test cases   + Draft CRs * Agreement on:   + Finalization on RRM performance requirements   + **Big CR** |

* Recommended WF
  + RAN4 to agree on the RRM work plan for Rel-17 NR SL Relay proposed in R4-2113289.

## Companies views’ collection for 1st round

### Open issues

#### Issue 1-1: Work Plan for SL Relay RRM

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| --- | --- |
| **Company** | **Comments** |
| OPPO | Agree with the recommended WF. |
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### CRs/TPs comments collection

*For close-to-finalize WIs and maintenance work, comments collections can be arranged for TPs and CRs. For ongoing WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| XXX | Company A |
| Company B |
|  |
| YYY | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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| --- | --- |
|  | **Status summary** |
| **Sub-topic #1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

*Note: The tdoc decisions shall be provided in Section 3 and this table is optional in case moderators would like to provide additional information.*

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

# Topic #2: RRM scope of NR\_SL\_relay\_RRM

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2113290**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113290.zip) | OPPO | **Observation 1: SL-RSRP and/or SD-RSRP could be considered for relay discovery and (re)selection.**  **Observation 2: DRX could be considered for the delay requirements of relay discovery and (re)selection.**  **Observation 3: Consider the requirements of relay discovery and (re)selection for remote UE out of coverage and in coverage.**  Observation 4: Remote UE is only allowed to select candidate relay UE assuming the same synchronization source.  Observation 5: RAN4 to focus on intra-frequency relay UE in R17 at this stage.  Observation 6: Other potential RRM impact (e.g., interruption) is not precluded considering the discussion in other WGs (e.g., concurrent operation, non-relay-related discovery).  **Proposal 1: RAN4 to consider RRM impact of NR SL relay at least on the following issues:**   * **Specify SL relay selection/reselection requirements, e.g., SL-RSRP or SD-RSRP related accuracy requirements, measurement and evaluation delay requirements;** * **Identify others potential RRM requirements if any.** |
| [**R4-2112258**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112258.zip) | Qualcomm, Inc. | **Proposal 1: RAN4 to study the measurement accuracy requirement of SD-RSRP based on R16 L1-RSRP measurement accuracy and L3 filter defined by RAN2 in performance requirement.**  **Proposal 2: RAN4 to study the measurement and evaluation delay for relay (re)selection based on LTE ProSe requirements.**  **Proposal 3: RAN4 to study connection establishment delay in relay reselection and direct to indirect path switch.** |
| [**R4-2113825**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113825.zip) | Huawei, HiSilicon | ***Proposal 1: RAN4 study whether and how to specify cell reselection requirements for NR sidelink discovery on non-serving carrier.***  ***Proposal 2: RAN4 study how to specify selection/reselection requirements for NR sidelink relay UE, which needs RAN2’s inputs on the definition of RSRP measurements used in NR sidelink relay reselection criterion.*** |
| [**R4-2113881**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113881.zip) | ZTE Corporation | **Observation 1:** RAN4 is only responsible for defining core and performance requirements for relay discovery and selection / reselection procedures.  **Observation 2:** Multi-hop or relay for UE-to-UE sidelink is out of the scope of this WI.  **Proposal 1: RAN4 shall focus on defining core and performance requirements for** **relay discovery and selection / reselection procedures using LTE as baseline without touching other RRM requirements.** |

## Open issues summary

### Sub-topic 2-1: Scope of SL Relay RRM

As agreed in the WID, RAN4 is tasked to specify mechanisms for U2N relay discovery and (re)selection.

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| Work Item objectives on aspects common to both L2 and L3:   1. Specify mechanisms for U2N **relay discovery and (re)selection** for L3 and L2 relaying [RAN2, RAN4]    1. Re-use LTE relay discovery and (re)selection as baseline |

#### Issue 2-1: View collection on general RRM requirements for Rel-17 NR SL relay

[Moderator]: In this issue, companies are invited to bring views on RRM requirement category for R17 SL Relay in the following table, which is based on companies’ input.

* **’YES’:**the requirement is applicable and to be specified for Rel-17 NR SL Relay;
* **’NO’ :** no change on Rel-16 SL requirement is needed, and the same requirement applies to Rel-17 NR SL Relay.
* **’FFS’:** need to discuss whether or not the requirement is applicable to Rel-17 NR SL Relay and/or whether or not Rel-16 SL requirement needs to be changed/enhanced.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **RRM requirement category** | **Whether or not applicable to Rel-17 NR SL Relay RRM** | | | | | | | |
| **[OPPO]** | **QC** | **Huawei** | **Ericsson** |  |  |  |  |
| UE transmit timing | NO | No | No | FFS |  |  |  |  |
| Initiation / Cease of SLSS transmission | NO | No | No | No |  |  |  |  |
| L1-RSRP measurement | NO | No | No |  |  |  |  |  |
| Congestion control measurements | NO | No | No |  |  |  |  |  |
| Scheduling available requirements | NO | No | No |  |  |  |  |  |
| Interruptions to serving cells at discovery configuration | **FFS** | FFS | FFS | FFS |  |  |  |  |
| Interruptions to serving cells during discovery | **FFS** | FFS | FFS | FFS |  |  |  |  |
| Cell reselection for discovery on non-serving frequency | **FFS** | FFS | FFS | FFS |  |  |  |  |
| Selection / reselection of synchronization reference | NO | NO | No |  |  |  |  |  |
| Selection / reselection of relay UE | **YES** | YES | Yes | Yes |  |  |  |  |
| Intra-frequency measurement accuracy requirements | **YES** | YES | Yes |  |  |  |  |  |

Companies can further comment on the scope of RRM requirements:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |

#### Issue 2-2: Whether to specify cell reselection requirements for NR sidelink discovery on non-serving carrier?

* Proposals
  + Option 1: YES
  + Option 2: NO
  + Option 3: Need more RAN2’s inputs
* Recommended WF
  + TBA

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| **Company** | **Comments** |
| OPPO |  |
| Huawei | Option 3 |
| Ericsson | More input/agreements from RAN2 are needed. Thus we support option 3. |

#### Issue 2-3: Any other RRM impact?

* Proposals
  + Option 1(OPPO): Other potential RRM impact (e.g., interruption) is not precluded considering the discussion in other WGs (e.g., concurrent operation, non-relay-related discovery).
  + Option 2(QC): RAN4 to study connection establishment delay in relay reselection and direct to indirect path switch
  + Option 3(ZTE): RAN4 focus on core and performance requirements for relay discovery and selection /reselection procedures using LTE as baseline, without touching other RRM requirements.
    - Multi-hop or relay for UE-to-UE sidelink is out of the scope of this WI.
* Recommended WF
  + TBA.

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| **Company** | **Comments** |
| ZTE | In general we prefer Option 3, which is to focus on the content captured explicitly in the WID. At this stage we don’t need to endorse Option 1 since it is not mentioned in the WID and it would pend on potential future LS from other WGs anyways so no need to capture anything in RAN4. If a LS would come, we can judge further but at this stage we should stick to the WID. |
| OPPO | Ok to start from requirements for relay discovery and selection /reselection. Other potential RRM impact mentioned in option 1 can be FFS. |
| Huawei | We can agree with option 3. |
| Ericsson | We agree with option 1, i.e. given the early phase in the WI and topic is being discussed in other WG, other RRM impact (if identified) should not be precluded. We also agree that the ProSe Relay requirements from LTE should be used as reference and requirements/approach should be reused from LTE whenever possible. We also agree that multi-hop/UE-to-UE sidelink relay is not in the scope of this WI. |

### Sub-topic 2-2: How to specify selection/reselection requirements for NR sidelink relay UE?

[Moderator] In this sub-topic, we focus on how to specify selection/reselection requirements for NR sidelink relay UE. The potential key issues are listed based on companies’ inputs.

#### Issue 2-4: RSRP measurements for NR sidelink relay UE

* Proposals
  + Option 1: SL-RSRP and/or SD-RSRP could be considered
  + Option 2: FFS the definition of RSRP measurements, which needs RAN2’s inputs on NR sidelink relay reselection criterion.
* Recommended WF
  + TBA

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| **Company** | **Comments** |
| QC | This decision has to be consistent with RAN2 procedure. |
| OPPO | According to RAN2’s discussion, it is still open that both discovery and data signal can be considered for RSRP measurement. We are ok to start from SD-RSRP, and update based on RAN2’s further progress. |
| Huawei | In LTE, SD-RSRP is measured over DMRS of PSDCH. However, PDSCH are not defined in RAN1 currently. The definition of RSRP used for NR SL relay UE needs RAN2’s decision. |
| Ericsson | We support option 2. |

#### Issue 2-5: Measurement accuracy requirement

* Proposals
  + Option 1: Measurement accuracy requirement of SD-RSRP based on R16 L1-RSRP measurement accuracy and L3 filter defined by RAN2 in performance requirement.
  + Option 2: FFS
* Recommended WF
  + RAN4 to specify SL-RSRP or SD-RSRP related accuracy requirements, and the RSRP measurement depends on issue 2-4.

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| **Company** | **Comments** |
| QC | The accuracy requirement is based on the measurement procedure, hence whether to agree to our proposal depends on issue 2-4 |
| OPPO | Agree with the recommended WF.  For SD-RSRP, option 1 is generally ok. |
| Huawei | Same comments as issue 2-4. |

#### Issue 2-6: Measurement and evaluation delay requirement

* Proposals
  + Option 1: Measurement and evaluation delay for relay (re)selection based on LTE ProSe requirements.
  + Option 2: Consider the requirements of relay discovery and (re)selection for remote UE out of coverage and in coverage.
  + Option 3: FFS
* Recommended WF
  + RAN4 to study the measurement and evaluation delay for relay (re)selection based on LTE ProSe requirements, including
    - relay discovery and (re)selection for remote UE out of coverage and in coverage.

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| **Company** | **Comments** |
| QC | LTE requirement can be a baseline. However, in NR, we need to revisit the definition of discovery period since NR doesn’t have a dedicated physical discovery signaling. Number of samples also depends on the accuracy requirement of the procedure. |
| OPPO | Both option 1 and 2 are ok. |
| Huawei | Same view as QC. The measurement and evaluation requirements for ProSe relay UE in LTE are defined based on the discovery period which has not been introduced in NR. |
| Ericsson | We support option 1. |

#### Issue 2-7: Whether to use DRX for delay requirements of relay discovery and (re)selection.

* Proposals
  + Option 1: YES, use DRX as time interval for delay requirements.
    - Option 1a: SL relay DRX or SL DRX (further based on RAN2’s conclusion)
  + Option 2: FFS
* Recommended WF
  + TBA.

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| **Company** | **Comments** |
| QC | Is DRx within SL relay WI? Our understanding is that SL relay is based on R16 SL procedure. |
| ZTE | Want to ask a similar question as Qualcomm. Suggest to stick to the WID. |
| OPPO | We see different views of DRX for SL relay in RAN2’s discussion. In principle, R17 NR SL relay WID can follow or reuse both R16 SL and R17 SL’s agreements as baseline.  Also OK to hold this until clear scope after next RAN-P. |
| Huawei | Depend on RAN2’s decision whether to consider DRX. |
| Ericsson | Since SL DRX is currently being introduced in release 17, and SL relay is also a release 17, combination of features should be not discussed at this stage of the WI. Therefore, the relay requirements should be defined without assuming DRX. |

#### Issue 2-8: Synchronization assumption

* Proposals
  + Option 1: Remote UE is only allowed to select candidate relay UE assuming the same synchronization source.
  + Option 2: FFS
* Recommended WF
  + Option 1 is recommended.

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| **Company** | **Comments** |
| QC | R16 unicast doesn’t require the same synchronization source, why do we need this requirement for relay? |
| OPPO | Option 1 is preferred.  To QC: We thought it is RAN1 and RAN2’s common understanding assuming Remote UE and Relay UE with the same sync source for relay discovery and (re)selection. It is a common case. And the remote UE can skip extra sync procedure, and has more opportunities to select one relay UE. From RAN4’s requirements perspective, this assumption could also help. |
| Huawei | How does the synchronization assumption impact the RRM requirements? |
| Ericsson | We support option 2, RAN4 needs more discussions on this topic before reaching conclusion. |

## Companies views’ collection for 1st round

### Open issues

**Example 1**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 1-1:  Sub topic 1-2:  ….  Others: |

**Example 2**

Sub topic 1-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |

Sub topic 1-2

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| XXX | Company A |
| Company B |
|  |
| YYY | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on … | YYY |  |
| LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
|  |  |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
|  |  |  |  |  |
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Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-210xxxx | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-210xxxx | LS on … | ZZZ | Agreeable, Revised, Noted |  |
|  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents

# Annex

Contact information

|  |  |  |
| --- | --- | --- |
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Note:

1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)