**3GPP TSG-RAN WG2 Meeting #123-bis R2-23xxxxx**

**Xiamen, CN, 9th – 13rd October 2023**

Agenda Item: 7.9.1

Source: LG Electronics (Rapporteur)

Title: [Post123][Relay] Remaining open issues (LG)

Document for: Discussion and Decision

# Introduction

In this document, the remaining open issues that WI/CR rapporteurs provided are captured for SL relay enhancements.

# Common open issues

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| Number | Open issue | WI/CR Rapporteur’s comment |
| - | - | - |

# RRC: MP open issues

## Common MP issues for both scenarios

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| Number | Open issue | WI/CR Rapporteur’s comment |
| **3.1** | Terminologies/definitions of Multi-path, SL indirect path, N3C indirect path. | Continue the discussion during CR update.  After initial offline among WI CR editors and the post email discussion on [Post123][413] RRC CR for MP relay, the following definitions are captured in the endorsed CR R2-2309310:   |  | | --- | | **Multi-path:** Mode of operation of a remote UE in RRC\_CONNECTED configured with one direct path on which the UE connects to gNB using NR Uu, and one indirect path on which the UE connects to the same gNB via a relay UE using L2 U2N relay operation or non-3GPP connectivity.  **N3C indirect path:** In multi-path, the indirect path on which the remote UE connects to network via a relay UE using non-3GPP connectivity.  **SL indirect path:** In Multi-path, the indirect path on which the L2 U2N Remote UE connects to network via a L2 U2N Relay UE. |   It was observed that some companies may still have comments on the wording, and there is misalignment between stage 2 CR and RRC CR. For instance, L2 U2N Relay/relay UE on indirect path is used in RRC CR, but MP relay UE is used instead in stage 2 CR, thus some companies propose to add the definition of MP relay UE in RRC as well. |
| **3.2** | whether additional IE needs to be introduced in the MCGFailureInformation message for Direct path failure. | The issue is not covered by post email discussion, thus further discussion is needed. |
| **3.3** | Which message is used to report indirect path failure | The issue is not covered by any post email discussion now, thus further down-selection is needed.  This issue has been discussed in previous meeting, but no conclusion was achieved, the following options are on table:  1. indirect path failure is reported via the MCGFailureInformation message  2. indirect path failure is reported via the SidelinkUEInformationNR message  3. indirect path failure is reported via a new message |
| **3.4** | other condition for indirect path failure, e.g. indirect path configuration failure | The indirect path configuration failure case is already covered by [Post123][407][Relay] |
| **3.5** | The definition and corresponding operation for the suspending of indirect/direct path for path failure report | The issue is not covered by post email discussion, thus further discussion is needed. |

## Scenario 1 specific MP issues

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| Number | Open issue | WI/CR Rapporteur’s comment |
| **3.6** | the order of RRCReconfiguration of Relay UE and Remote UE for direct path addition/change | This issue is already covered by [Post123][407][Relay] |
| **3.7** | Conditions and UE actions for T304 stop/start | This issue is already covered by [Post123][407][Relay] |
| **3.8** | whether CFRA is supported towards PCell serving the direct path for direct path addition/change | The issue is not covered by post email discussion.  Rapporteur thinks that RRC spec will support CFRA upon direct path addition/change without any impact unless any restriction to CFRA is specified, since rach-ConfigDedicated can be included in ReconfigurationWithSync for direct path addition/change. |
| **3.9** | Which path(s) is(are) used for RRCReconfigurationComplete | This issue is already covered by [Post123][407][Relay] |
| **3.10** | the order of remote UE sending of PC5-RRC trigger (for triggering relay UE enter CONNECTED) and the transmission of RRCReconfigurationComplete in the direct path, for the indirect path addition/change case | This issue is already covered by [Post123][407][Relay]  PC5-RRC is only applicable for Scenario 1 |
| **3.11** | Avoidance/handling for the case when idle/inactive target relay UE establishes an RRC connection with a “wrong” cell | This issue is already covered by [Post123][407][Relay]  This issue is not applicable to Scenario 2 because it is assumed that the remote UE reports the relay UE only when the relay UE is controlled by the same gNB. |
| **3.12** | Which PC5-RRC message and what information in the PC5-RRC message should be used for PC5-RRC triggering relay UE entering CONNECTED state | This issue is already covered by [Post123][407][Relay]  PC5-RRC is only applicable for Scenario 1 |
| **3.13** | When/How to trigger PC5-RRC triggering relay UE entering CONNECTED state | This issue is already covered by [Post123][407][Relay]  PC5-RRC is only applicable for Scenario 1 |
| **3.14** | When PC5-RRC connection between the remote UE and the relay UE is released e.g. it is immediately released after the indirect path release or it can be maintained before buffered data on the indirect path is delivered. | The issue is not covered by post email discussion, thus further discussion is needed.  PC5-RRC is only applicable for Scenario 1 |
| **3.15** | Whether the PC5 unicast link can be maintained during direct path addition/release and direct path change without indirect path change procedures. | The issue is not covered by post email discussion, thus dedicated discussion is needed.  The issue has impact on RRC spec, i.e. when the Remote UE receives the direct path addition/release command or direct path change without indirect path change command, if it maintains the indirect path by default, the SL configurations in source side will be taken as baseline, on top of which the target configuration applied. But this kind of handling may not work in case of security update during the path management procedures.  In email discussion [Post123][407], it is assumed the source PC5 link will be maintained during direct path addition, but whether/how it can be maintained in all cases has not be discussed/confirmed, thus some dedicated discussion is needed. |
| **3.16** | Conditions and UE actions for stop/start of new T420-like timer | This issue is already covered by [Post123][407][Relay] |
| **3.17** | Any need for measurement event from the remote UE for indirect path change. | The issue is not covered by post email discussion, thus further discussion is needed.  Rapporteur thinks that the new event Z1 that RAN2 agreed for U2N service continuity (i.e. Serving L2 U2N Relay UE becomes worse than threshold1 and Candidate L2 U2N Relay UE becomes better than threshold2) can be also applied to MP indirect path change. |
| **3.18** | How to handle relayUE-HO | The issue is not covered by any post email discussion now, thus further down-selection is needed.  The issue has been discussed in previous meeting, but no consensus was achieved. The options on table include:  Option 1: NW ensures that before relay UE’s HO, the indirect path is released at remote UE.  Option 2: relay UE indicates Uu HO in notification message to remote UE in Rel-17 way, and remote UE can suspend indirect path and wait for NW reconfiguration. |

## Scenario 2 specific MP issues

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| Number | Open issue | WI/CR Rapporteur’s comment |
| **3.19** | Which message is used to report the relay UE information for indirect path addition in scenario 2 (and indirect path change, if supported in scenario 2), and whether multiple relay UEs can be reported. | The issue is not covered by any post email discussion now, thus dedicated discussion is needed.  This issue has not been discussed in previous meetings. The candidates may include:  1. relay UE(s) is reported via UE information procedure.  2. relay UE(s) is reported via UE Assistance Information.  3. relay UE(s) is reported via measurement reporting. |
| **3.20** | Whether/how the network or remote UE can trigger the indirect path addition (and indirect path change, if supported in scenario 2) e.g. by reporting of the relay UE’s ID or a separate signaling. | This issue was previously discussed without any agreement. The issue is not covered by post email discussion, thus further discussion is needed. |
| **3.21** | Whether/how idle/inactive relay UE can be reported in scenario 2 and, if supported, which ID can be reported if MP Relay UE using non-3GPP link is in RRC\_IDLE/INACTIVE | The issue is not covered by any post email discussion now, thus further discussion is needed in next meeting.  This issue has been discussed in previous meetings, but no conclusion was achieved. If the reporting of idle/inactive relay UE is allowed, which UE ID to be reported, there are following options:  1. S-TMSI for idle relay UEs, and I-RNTI for inactive relay UEs.  2. new UE IDs. |
| **3.22** | Whether to support indirect path change i.e. case G for scenario 2 | This issue was previously discussed without any agreement. The issue is not covered by post email discussion, thus further discussion is needed. |
| **3.23** | Whether/how to support authorization for MP Scenario 2 | This issue was discussed based on the LS from SA2 (R2-2307057) in RAN2#123 without any agreement. Further discussion is needed.  In RAN2#123, both reusing Scenario 1 authorization for Scenario 2 and leaving it to gNB implementation were briefly mentioned. Rapporteur think that the main motivation of the MP authorization for Scenario 1 is to confirm use of multi-path with sidelink resources in RAN. Since Scenario 2 is use of multi-path with non-3GPP link, it is not clear whether we can reuse the MP authorization for Scenario 1. |
| **3.24** | Whether the following RRC connection re-establishment procedure in CR to 38.300 is also applicable to Scenario 2  *When L2 MP Remote UE using sidelink is configured with multi-path and initiates the RRC connection re-establishment procedure, the L2 MP Remote UE does not perform RRC connection re-establishment directly into a multi-path configuration.* | The issue is not covered by post email discussion, thus further discussion is needed.  Rapporteur thinks that commonality between two scenarios is important. So, the existing text can be also applied to Scenario 2. |

# RRC: U2N SC open issues

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| Number | Open issue | WI/CR Rapporteur’s comment |
| 4.1 | Inter-gNB service continuity cases missing in Stage 2 specification | This will be handled by RAN2/3 CR rapporteurs.  This is related to the following EN in clause 16.12.6 of the endorsed running CR to 38.300 in R2-2309339*.*  *Editor’s Notes: The detail will be added based on the RAN3 input.* |
| 4.2 | The order of RRCReconfiguration of Relay UE and Remote UE and the spec impact on supporting the relay UE being in RRC\_IDLE or RRC\_INACTIVE for switching from indirect to indirect path | The issue is not covered by post email discussion, thus further discussion is needed. It seems beneficial to check on-going email discussion related to the MP issue 3.6.  This is related to the following ENs in clause 16.12.6.x of the endorsed running CR to 38.300 in R2-2309339*.*  *Editor’s Notes: FFS whether the ordering of step 3 and step 4 is changeable.*  *Editor's Notes: FFS spec impact on supporting the relay UE being in RRC\_IDLE or RRC\_INACTIVE"* |

# RRC: U2U open issues

The open issues were summarized for U2U relay in Table 1, 2 and 3. Given that online time may not be enough to resolve all of the open issues, CR rapporteur proposes that open issues in Table 1 can be prioritized because of the ASN.1 impact for the RRC specification freeze.

## ASN.1 impact related issues

**Table 1. ASN.1 impact related issues.**

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| Number | Open issue | WI/CR Rapporteur’s comment |
| 5.1 | 6.3.5 Sidelink information elements  – *SL-RelayUE-ConfigU2U*  The IE *SL-RelayUE-ConfigU2U* specifies the configuration information for NR sidelink U2U Relay UE.  ***SL-RelayUE-ConfigU2U* information element**  -- ASN1START  -- TAG-SL-RELAYUE-CONFIGU2U-START  SL-RelayUE-ConfigU2U-r18::= SEQUENCE {  sl-ThreshIntegratedDiscRelay-r18 SL-RSRP-Range-r16 OPTIONAL, -- Need R  sl-hystMaxRelay-r18 Hysteresis OPTIONAL, -- Cond SL-ThreshIntegratedDiscRelay  sd-ThreshIntegratedDiscRelay-r18 SL-RSRP-Range-r16 OPTIONAL, -- Need R  sd-hystMaxRelay-r18 Hysteresis OPTIONAL, -- Cond SD-ThreshIntegratedDiscRelay  sd-ThreshModelA-DiscRelay-r18 SL-RSRP-Range-r16 OPTIONAL, -- Need R  sd-ThreshModelB-DiscRelay-r18 SL-RSRP-Range-r16 OPTIONAL -- Need R  }  Editor Note: FFS whether speperate thresholds are configured for NR sidelink U2U Relay UE.  -- TAG-SL-RELAYUE-CONFIGU2U-STOP  -- ASN1STOP | Issue 5.1 was proposed in the offline email discussion [AT123][412][Relay] Rel-18 RRC CR on U2U relay (vivo).  RAN2 has made the separate agreements on threshold configuration for U2U Relay UE as following:   * For the integrated-discovery case, the relay UE forwards the discovery message for DCR message with integrated Discovery case only if the PC5 RSRP between the relay UE and the source remote UE is above a threshold. * For Model A discovery, the relay UE should only announce the neighbour UEs for which the SD-RSRP/SL-RSRP between the relay UE and the neighbour UE is above a configured threshold in a discovery announcement message. LS is sent to SA2. * For Model B, the relay UE forwards the solicitation message only if the PC5 RSRP between the relay UE and the source remote UE is above a threshold.   However, RAN2 hasn’t discussed on whether the threshold configuration for the integrated-discovery case, Model A discovery case and Model B discovery case should use common or separate parameter(s) in RRC signaling format design. An EN was added to keep it open and for companies to further express their view in the coming RAN2 meeting. Please note that current RRC use separate parameters but will be updated after RAN2 agreement (if needed). |
| 5.2 | 6.3.5 Sidelink information elements  – *SL-RemoteUE-ConfigU2U*  The IE *SL-RemoteUE-ConfigU2U* specifies the configuration information for NR sidelink U2U Remote UE.  ***SL-RemoteUE-ConfigU2U* information element**  -- ASN1START  -- TAG-SL-REMOTEUE-CONFIGU2U-START  SL-RemoteUE-ConfigU2U-r18::= SEQUENCE {  sl-ThreshHighRemote-r18 SL-RSRP-Range-r16 OPTIONAL, -- Need R  sl-HystMaxRemote-r18 Hysteresis OPTIONAL, -- Cond SL-RSRP-ThreshRemote  sd-ThreshHighRemote-r18 SL-RSRP-Range-r16 OPTIONAL, -- Need R  sd-HystMaxRemote-r18 Hysteresis OPTIONAL, -- Cond SD-RSRP-ThreshRemote  sd-ThreshModelB-DiscRemote-r18 SL-RSRP-Range-r16 OPTIONAL, -- Need R  sl-ReselectionConfigU2U-r18 SL-ReselectionConfigU2U-r18 OPTIONAL -- Need R  }  SL-ReselectionConfigU2U-r18::= SEQUENCE {  sl-RSRP-ThreshU2U-r18 SL-RSRP-Range-r16 OPTIONAL, -- Need R  sl-FilterCoefficientU2U-r18 FilterCoefficient OPTIONAL, -- Need R  sl-HystMinU2U-r18 Hysteresis OPTIONAL, -- Cond SL-RSRP-ThreshU2U  sd-RSRP-ThreshU2U-r18 SL-RSRP-Range-r16 OPTIONAL, -- Need R  sd-FilterCoefficientU2U-r18 FilterCoefficient OPTIONAL, -- Need R  sd-HystMinU2U-r18 Hysteresis OPTIONAL -- Cond SD-RSRP-ThreshU2U  }  Editor Note: FFS whether speperate thresholds are configured for NR sidelink U2U Remote UE.  -- TAG-SL-REMOTEUE-CONFIGU2U-STOP  -- ASN1STOP | Issue 5.2 was proposed in the offline email discussion [AT123][412][Relay] Rel-18 RRC CR on U2U relay (vivo).  RAN2 has made the separate agreements on threshold configuration for U2U Remote UE as following:   * UE-to-UE relay selection can be triggered based on the PC5 RSRP (FFS SL-RSRP or SD-RSRP) of the direct link falling below a threshold. FFS which remote UE (or both) can trigger relay selection. FFS the relationship between selection and discovery. * UE-to-UE relay reselection can be triggered based on the PC5 RSRP (FFS SL-RSRP or SD-RSRP) between a remote UE and the relay UE falling below a threshold. FFS which remote UE (or both) can trigger relay reselection. FFS if/how the second hop between the relay UE and the peer UE is considered.   However, RAN2 hasn’t discussed on whether the above configured threshold for trigger relay selection and for trigger relay reselection should use common or separate parameter(s) in RRC signaling format design. An EN was added to keep it open and for companies to further express their view in the coming RAN2 meeting. Please note that current RRC use separate parameters but will be updated after RAN2 agreement (if needed). |
| 5.3 | 6.6.2 Message definitions  *Editor NOTE: For L2 based U2U relay, FFS if the QoS splitting requires AS signalling or can be done in upper layers.* | Issue 5.3 was captured in accordance with the RAN2#120 agreement as following:   * Same as L3 based U2U relay, the QoS split should be per e2e QoS flow, and RAN2 expect that the source UE will inform the Relay UE QoS flow(s) and corresponding QoS profiles. FFS if this requires AS signalling or can be done in upper layers. |
| 5.4 | 5.8.3.1 General  *Editor Note: FFS whether reporting parameters related to U2U Relay operation is supported.* | Issue 5.4 was proposed by Rapporteur during the RRC running CR drafting.  An EN was added here to remind companies to check whether reporting parameters related to U2U Relay operation is needed for dedicated information from gNB. Please also note that Issue No.2 can be considered together with **Issue** 5**.5 &** 5**.6**. |
| 5.5 | 5.8.9.1.1 General  *Editor NOTE: It is FFS that the two conclusions on TX remote UE derivation for e2e SL-DRB do not exclude the involving information from gNB/preconfiguration/specified configuration.* | Issue 5.5 was captured in accordance with the RAN2#123 agreement as following:   * The TX Remote UE derives the PDCP and SDAP configuration for e2e SL-DRB and provides the portion of the configuration related to RX to the RX Remote UE using E2E PC5-RRC message (similar to legacy PC5 configuration). * he TX Remote UE derives the first hop configuration (e.g. PC5 relay RLC Channel configuration) for SL-DRB and provides to the relay UE the portion of the configuration related to RX on the first hop (i.e., Rx by the relay UE), using per-hop PC5-RRC message (similar to legacy PC5 configuration).   + The two conclusions above do not exclude the derivation involving information from gNB/pre-configuration/specified configuration. |
| 5.6 | 5.8.9.1.1 General  *Editor NOTE: It is FFS how the Relay UE derives second hop configuration for SL-DRB.* | **Issue** 5**.6** was captured in accordance with the RAN2#123 agreement as following:   * It is FFS how the Relay UE derives second hop configuration for SL-DRB. |
| 5.7 | 5.8.13.3 NR sidelink discovery transmission  *Editor NOTE: FFS whether reuse the U2N relay (re)selection parameters to U2U relay (re)selection.* | Issue 5.7 was proposed in the offline email discussion [Post123][411][Relay] RRC CR on U2U relay (vivo).  A question was raised on whether the current U2N relay (re)selection parameters should be reused to the U2U relay (re)selection. If reused, the new U2U relay (re)selection parameters in *SL-ReselectionConfigU2U* would need to be removed from current RRC running CR. Rapporteur suggested to discuss it based on company contribution, and thus an EN was added for further consideration in the coming RAN2 meeting. |
| 5.8 | 9.1.1.4 SCCH configuration *Editor NOTE: FFS how they will be implemented in specs (e.g., if the configurations are identical the tables might be merged for different SL-SRBs).* | Issue 5.8 was captured in accordance with the RAN2#120 agreement as following:   * New specified per-hop configurations are used for E2E SL-SRB 0/1/2/3 respectively. FFS how they will be implemented in specs (e.g., if the configurations are identical the tables might be merged for different SL-SRBs). |

## Table 2. U2U Relay functionality related issues

**Table 2. U2U Relay functionality related issues**

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| Number | Open issue | WI/CR Rapporteur’s comment |
| 5.9 | 5.8.8 Sidelink communication transmission  *Editor NOTE: FFS communication or discovery resource pool for DCR message with integrated discovery.* | Issue 5.9 was proposed in the offline email discussion [AT123][412][Relay] Rel-18 RRC CR on U2U relay (vivo).  Rapporteur observed that some companies have different views on whether the DCR message with integrated discovery can use the dedicated discovery resource pool or not. Given that the dedicated discovery resource pool was initially introduced for discovery message transmission, it remains open that whether the integrated discovery can be handled similar as the legacy discovery message transmission from resource allocation perspective. Therefore, an EN was added for companies to have further consideration in the coming RAN2 meeting. |
| 5.10 | 5.8.9.3 Sidelink radio link failure related actions  *Editor Note: FFS whether additional procedure for L2 U2U PC5 RLF initiation.* | Issue 5.10 was proposed by Rapporteur during the RRC running CR drafting.  An EN was added here to remind companies to check whether/how U2U specific PC5 RLF would impact the Uu procedures e.g., SUI. |
| 5.11 | 5.8.9.10.2 Initiation  *Editor Note: FFS the remote UE in previous agreement “When the remote UE receives PC5-RLF indication from the U2U relay UE, it would inform upper layers and rely on upper layers to trigger relay reselection (or not).” applies to both source and target remote UEs or not, applies to both L2 and L3 U2U relay or not.* | Issue 5.11 was proposed in the offline email discussion [AT123][412][Relay] Rel-18 RRC CR on U2U relay (vivo).  Rapporteur observed that the previous RAN2 agreement “*When the remote UE receives PC5-RLF indication from the U2U relay UE, it would inform upper layers and rely on upper layers to trigger relay reselection (or not).*” may need further clarification on whether it applies to both source and target remote UEs or not, and applies to both L2 and L3 U2U relay or not. Therefore, an EN was added for companies to have further consideration in the coming RAN2 meeting. |
| 5.12 | 5.8.9.10.4 Actions related to reception of *NotificationMessageSidelink* message  *Editor Note: FFS if there would be any constraints on the Remote UE implementation behaviour to keep or release the PC5 link with the relay UE.* | Issue 5.12 was captured in accordance with the RAN2#120 agreement as following:   * When the remote UE receives PC5-RLF indication from the U2U relay UE, it would inform upper layers and rely on upper layers to trigger relay reselection (or not). FFS if there would be any constraints on the remote UE implementation behaviour to keep or release the PC5 link with the relay UE. |
| 5.13 | 5.8.X1.2 NR sidelink U2U Relay UE threshold conditions  *Editor NOTE: FFS whether the above condition to check SD-RSRP /SL-RSRP of the DCR message with integrated Discovery is applicable or not.* | Issue 5.13 was proposed in the offline email discussion [Post123][411][Relay] RRC CR on U2U relay (vivo).  Rapporteur observed that companies’ views are divergent on the applicable PC5 measurement result quantity of the DCR message with integrated Discovery, i.e., SL-RSRP, SD-RSRP, or both. As a consequence, it may need further revision on how the specify U2U Relay UE behavior on performing the PC5 threshold condition checking for forwarding the DCR message with integrated Discovery. An EN was added to keep this issue open and for companies to further discuss in the coming RAN2 meeting. |
| 5.14 | 5.8.X2.2 NR Sidelink U2U Remote UE threshold conditions  *Editor Note: FFS whether/how to capture if the SL-RSRP/SD-RSRP measurement of the peer NR sidelink U2U Remote UE is not available.* | Issue 5.14 was proposed by Rapporteur during the RRC running CR drafting.  Rapporteur noticed that current RAN2 agreements for triggering relay selection were made only for the case when there is a direct link with the peer U2U Remote UE, in which case either SL-RSRP or SD-RSRP measurement can be used for the PC5 threshold condition checking. But for the case when there is no direct link established yet (which means both of the SL-RSRP/SD-RSRP measurement of the peer U2U Remote UE are not available), there is no conclusion whether/how to capture it for triggering relay selection. Therefore, an EN was added for companies to have further consideration in the coming RAN2 meeting. |

## Table 3. Other U2U issues

**Table 3. Other U2U issues**

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| Number | Open issue | WI/CR Rapporteur’s comment |
| 5.15 | 5.5.3.4 Derivation of U2N Relay UE measurement results  *Editor NOTE: FFS whether this section needs to update for U2U relay (re)selection evaluation or not.* | Issue 5.15 was proposed in the offline email discussion [Post123][411][Relay] RRC CR on U2U relay (vivo).  Rapporteur observed that some companies have different views on the need of changes in subclause 5.5.3.4 for U2U Relay UE. Therefore, an EN was added for companies to have further consideration in the coming RAN2 meeting. |
| 5.16 | 5.8.13.3 NR sidelink discovery transmission  *Editor NOTE: For U2U Relay UE and Target Remote UE, it is FFS whether AS layer check discovery transmission condition before delivering discovery message to upper layer or after receiving discovery from upper layer, and FFS whether upper layer needs to know if AS condition is met for each discovery message.* | Issue 5.16 was proposed in the offline email discussion [Post123][411][Relay] RRC CR on U2U relay (vivo).  Rapporteur observed that some companies have different views on how to capture the U2U Relay UE and Target Remote UE behavior in terms of PC5 threshold condition checking for NR sidelink discovery transmission. Currently, there are two alternatives on the table as below:   * Alt1: AS layer checks condition after receiving discovery message from upper layer. In this alternative, upper layer is not informed whether the PC5 threshold condition is met and upper layer just blindly decodes and re-generates discovery message, and forwards to AS layer. And then AS layer will check whether to transmit discovery. * Alt2: AS layer checks condition before delivering discovery message to upper layer. In this alternative, when receiving discovery message, AS layer firstly checks whether the PC5 threshold condition is met and deliver the message to upper layer based on whether the PC5 threshold condition is met.   An EN was added to keep this cross-layer interaction modelling issue open and for companies to further discuss in the coming RAN2 meeting. |

# Idle mobility open issue

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| Number | Open issue | WI/CR Rapporteur’s comment |
| 6.1 | Whether any restrictions specific to UE-to-UE relay are introduced for in-coverage UE in RRC\_CONNECTED | The issue is not covered by post email discussion, thus further discussion is needed.  The related RAN2 agreement in RAN2#119bis-e is as follows:   * *In UE-to-UE relay, the remote/relay UE in RRC\_IDLE/RRC\_INACTIVE or OOC can acquire discovery configuration as in Rel17 (i.e., cell-specific configuration/preconfiguration). FFS if any restrictions specific to UE-to-UE relay are introduced for in-coverage UE in RRC\_CONNECTED.* |

# MAC open issues

## Critical issues

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| Number | Open issue | WI/CR Rapporteur’s comment |
| 7.1 | whether/ how Duplication RLC Activation/Deactivation MAC CE is used for the 2-leg/3-leg MP relay case?. | The issue is not covered by post email discussion, thus further discussion is needed.  This is also related to the proposal 7.1 1) in R2-2308949: “Whether CA duplication is applied to the direct path of the remote UE. If yes, what is the maximum number of RLC entities over the direct path of the remote UE?” |
| 7**.2** | Whether and how to number the PC5 RLC entity with SRAP entity within the ascending order of Uu LCID, if PC5 RLC entity is not in the primary path. | The issue is not covered by post email discussion, thus further discussion is needed. |
| 7**.3** | whether/ how to describe Duplication operation in MAC spec for MP Scenario 2 case when there is no “RLC entity” in the indirect path. | The issue is not covered by post email discussion, thus further discussion is needed. |
| 7**.4** | whether any change/clarification needed for Buffer Size report for UL data via both direct path and indirect path. | The issue is not covered by post email discussion, thus further discussion is needed.  This is also related to Proposal 9 in R2-2308949: “RAN2 discuss if any issue needs to be discussed/resolved for BSR operation by focusing on essential issues from operation perspective than enhancement.” |
| 7**.5** | whether the SL-BSR also reports Uu path traffic buffer. | The issue is not covered by post email discussion, thus further discussion is needed.  This is also related to Proposal 9 in R2-2308949: “RAN2 discuss if any issue needs to be discussed/resolved for BSR operation by focusing on essential issues from operation perspective than enhancement.” |
| 7**.6** | How to add LCID(s) specified for PC5 Relay RLC channel((s) for U2U relay in clause 6.2.4 of TS 38.321. | The issue is not covered by post email discussion, thus further discussion is needed. |
| 7**.7** | How the duplication is activated/deactivated to a certain RLC entity when the remote UE receives the Duplication A/D MAC CE or Duplication RLC A/D MAC CE using a single MAC entity. | The issue is not covered by post email discussion, thus further discussion is needed.  This is related to Proposal 7.2 of R2-2308949. |

## Less critical issues

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| Number | Open issue | WI/CR Rapporteur’s comment |
| 7**.8** | Whether CA duplication is applied to the Uu link of the relay UE. If yes, FFS any impact on the specification. | The issue is not covered by post email discussion, thus further discussion is needed.  This is related to Proposal 7.1 2) of R2-2308949 |
| 7**.9** | Whether CA duplication for MP relay case shall be covered by a new dedicated clause other than clause 5.10 of TS 38.321. | The issue is not covered by post email discussion, thus further discussion is needed. |

# RLC open issues

No open issues have been identified.

# SRAP open issues

## EN that cannot be removed now

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| Number | Open issue | WI/CR Rapporteur’s comment |
| **9.1** | EN at clause 4.5:  Editor’s Notes: FFS on the detailed configurations of the SRAP entity for U2U Remote UE and U2U Relay UE (e.g., how to identify the radio bearer mapping configuration).  EN at clause 5.x.1.2:  Editor’s Notes: FFS on the detailed Egress RLC channel determination at U2U Remote UE.  EN at clause 5.x.3.2:  Editor’s Notes: FFS on the detailed Egress RLC channel determination at U2U Relay UE.  EN at clause 5.x.3.1:  Editor’s Notes: FFS on the detailed Egress link determination at U2U Relay UE. | Depends on the 331 Running CR discussion |
| **9.2** | EN at clause 5.X.1.1:  Editor’s Notes: FFS on the detailed UE ID field and BEARER ID field determination at U2U Remote UE.  EN at clause 6.2.2:  Editor’s Notes: FFS on the SRAP Data PDU format for U2U Remote UE and U2U Relay UE.  EN at clause 6.3.2:  Editor’s Notes: FFS on the UE ID parameter for U2U Remote UE and U2U Relay UE.  EN at clause 6.3.3:  Editor’s Notes: FFS on the BEARER ID field for U2U Remote UE and U2U Relay UE. | Depends on the POST-406 discussion and 331 running CR |
| **9.3** | EN at clause 5.X.3:  Editor’s Notes: FFS on whether “egress RLC channel” or “egress PC5 Relay RLC channel” is to be used. | Terminology alignment. |
| **9.4** | EN in clause 5.x.4:  Editor’s Notes: FFS on the detailed receiving operation of U2U Remote UE. | Can be removed easily after the related text is added. |
| **9.5** | EN in clause 5.4:  Editor’s Notes: FFS on the other error handling for U2U Remote UE and U2U Relay UE. | Depends on whether there is unknown packet to be handled |

## EN can be removed directly

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| Number | Open issue | WI/CR Rapporteur’s comment |
| **9.6** | EN in clause 4.2.2:  Editor’s Notes: FFS on the detailed SRAP entity description for U2U Remote UE and U2U Relay UE.  EN in clause 4.2.2:  Editor’s Notes: FFS on the detailed packet handling at U2U Relay UE SRAP sublayer.  EN in clause 5.x.1:  Editor’s Notes: FFS on the detailed packet handling at U2U Relay UE SRAP sublayer.  EN in clause 5.x.3:  Editor’s Notes: FFS on the detailed transmitting operation of U2U Relay UE. | The ENs can be removed since the related text has been added |

# PDCP open issues

No open issues have been identified. The remaining open issues on PDCP specification can be discussed based on the initial version of the running CR to PDCP in RAN2#123bis.

# Conclusion

In conclusion, RAN2 is requested to take the above open issues into account for SL relay enhancement.