3GPP RAN WG2 Meeting #130 R2-25xxxxx

Malta, Malta May 19th – 23rd, 2025

Agenda Item: 8.13.1

Source: Huawei, HiSilicon

Title: Open issues for Main RRC 38.331 CR for MH Sidelink Relay

Document for: Discussion, Decision

# Introduction

The following document includes a list of open issues according to the following email discussion:

* [Post129bis][405][Relay] Rel-19 relay main CR to 38.331 (Huawei)

 Scope: Update the 38.331 running CR from the baseline of R2-2503075 to take into account decisions of RAN2#129bis.

 Intended outcome: Updated CR for RAN2#130

 Deadline: Long

Companies are invited to provide feedback on open issue list by: **02 May 2025**

**Open Issue RRC-1 to RRC-3 are discussed in the Open issues list for MH Service Continuity CR**

# Remaining open issues for specification 38.331

**Open issue RRC-4: Extending T300, T301 and T319**

The T300, T301 and T319 are relevant Multi hop U2N Relays and their handling is shown below

| Timer | Start | Stop | At expiry |
| --- | --- | --- | --- |
| T300 | Upon transmission of *RRCSetupRequest.* | Upon reception of *RRCSetup* or *RRCReject* message, cell re-selection, relay (re)selection or cell selection by a L2 U2N Remote UE, and upon abortion of connection establishment by upper layers. | Perform the actions as specified in 5.3.3.7.  |
| T301 | Upon transmission of *RRCReestabilshmentRequest* | Upon reception of *RRCReestablishment* or *RRCSetup* message as well as when the selected cell becomes unsuitable or the (re)selected L2 U2N Relay UE becomes unsuitable, upon reception of *NotificationMessageSidelink* indicating *relayUE-HO* or *relayUE-CellReselection*. | Go to RRC\_IDLE |
| T319 | Upon transmission of *RRCResumeRequest* or *RRCResumeRequest1 when the resume procedure is not initiated for SDT.* | Upon reception of *RRCResume,* *RRCSetup, RRCRelease, RRCRelease* with *suspendConfig* or *RRCReject* message, upon cell re-selection or upon relay (re)selection. | Perform the actions as specified in 5.3.13.5. |

Rapporteur recommend further discussion on whether these timers should be extended to reduce the risk of failures, considering they were originally designed for the Uu hop and we will now also be supporting three additional SL hops.

**Open issue RRC-5: NotificationMessageSidelink message handling**

In the previous meeting, there was considerable discussion about sending the NotificationMessageSidelink to child UEs. However, we were still unable to reach a conclusion on whether this message can be sent in all scenarios, and whether it should be a forwarded copy of the original notification (with the same cause) or a regenerated message from the intermediate relay, reflecting its own cause based on its reaction.

 The relevant agreements from the previous meeting are listed below.

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* When the intermediate relay UE receives a notification message from the last relay UE indicating a failure on Uu, the intermediate relay UE may transmit a notification message downstream (towards the remote UE). FFS if the notification message is a forwarded copy of the original notification (same cause) or a regenerated message from the intermediate relay (cause might reflect its own reaction such as relay reselection or re-establishment). This does not change the agreement that it is up to relay implementation whether to release the downstream link, and if the link is released there is no downstream notification message.
* FFS detailed information in the indication and child UE handling.
* FFS if there are exceptional cases where the indication can be suppressed, e.g., reselection under the same serving cell without changing the hop count.
* FFS if the notification message is used or we rely on upper layer signalling (e.g., discovery).

In the current specification, for example, when an L2 U2N Relay UE receives a reconfigurationWithSync, it either notifies the upper layers (to trigger the release of the PC5 unicast link) or sends a NotificationMessageSidelink message to the connected L2 U2N Remote UE(s). It is then up to the remote UE to take appropriate action to recover from the situation.

Upon L2 U2N Relay UE receiving *reconfigurationWithSync*, it either indicates to upper layers (to trigger PC5 unicast link release) or sends *NotificationMessageSidelink* message to the connected L2 U2N Remote UE(s) in accordance with 5.8.9.10.

The rapporteur's view is that, first and foremost, the same principle should be extended to the multi-hop scenario as outlined below.

Upon L2 U2N Relay UE receiving *reconfigurationWithSync*, it either indicates to upper layers (to trigger PC5 unicast link release with its connected downstream child UE(s)) or sends *NotificationMessageSidelink* message to the connected L2 U2N Remote UE(s) or to the connected downstream child UE(s) in accordance with 5.8.9.10.

When an intermediate relay UE receives a *NotificationMessageSidelink* message from the parent, it has two options

**Option 1** – Forward a copy of the original notification (with the same cause) to its child UEs.
**Option 2** – Generate a new notification message and send it to the child UEs, with an updated cause that reflects its own response, such as relay reselection or re-establishment.

The issue with Option 1 is that it will lead to **duplicate notifications** being sent by the intermediate relay UE: first, a forwarded copy of the parent’s original notification, and then a second notification reflecting the intermediate relay’s own actions. This redundancy is clearly undesirable as it does not provide the child UE with any additional information.

To avoid this, the **Rapporteur suggests adopting Option 2**, where the intermediate relay UE generates a new notification message. This message would reflect the relay's own status or reaction (e.g., relay reselection or re-establishment) and is always sent, allowing the Remote UE to take appropriate action based on the most relevant and current context of its parent UE.

In **Rapporteur view t**his approach also aligns with the principles established in Rel-17 and helps minimize the impact on the specifications. The current CR is drafted based on this baseline approach to support the essential handling. If any enhancements are deemed necessary beyond the baseline, companies are encouraged to discuss them further **along with text proposal for the enhancements at the next meeting**

**Open issue RRC-6: Discovery Model B with no PC5 Link in multi hop scenario**

In the previous meeting were discussions on Discovery Model B with no PC5 Link established with the parent Relay UE. The relevant agreements from the previous meeting are listed below.

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* If the candidate intermediate relay UE is out of coverage without a PC5 connection to a parent relay UE, it can forward discovery messages based on preconfiguration. If it is in (direct) coverage, or out of coverage but PC5 connected to a parent relay UE (and thus indirectly to the network), it needs SIB12 or dedicated configuration to forward discovery messages.
* For discovery model B when there is no established PC5 link between the remote UE and the intermediate relay UE, the intermediate Relay UE forwards the solicitation message only if the PC5 RSRP between the Remote UE (or intermediate Relay UE) and the intermediate Relay UE is above a threshold.
* For discovery model B when there is no established PC5 link between the last relay UE and the intermediate relay UE, the last Relay UE needs to check the PC5 AS condition before sending discovery response message to the intermediate Relay UE. FFS if this case can occur or if the intermediate relay UE always establishes itself as a remote UE first.
* For discovery model B, the quality of the PC5 links is assumed already to have been checked when the solicitation messages were forwarded, and no AS criterion is needed for the intermediate Relay UE(s) to forward the response message towards the Remote UE.
* For discovery model B, upon discovery response messages reception, the Remote UE considers an intermediate Relay UE(s) as a candidate first relay UE(s) along the path to the last Relay UE if the SD-RSRP towards the first intermediate Relay UE is above a configured threshold.FFS if the notification message is used or we rely on upper layer signalling (e.g., discovery).

It was agreed that in Discovery Model B, when there is no established PC5 link between the Remote UE and the Intermediate Relay UE, the Intermediate Relay UE should forward the solicitation message only if the PC5 RSRP between the Remote UE (or an Intermediate Relay UE) and the Intermediate Relay UE is above a defined threshold. This has been implemented in the current running CR.

However further discussion is needed regarding the scenario where there is no established PC5 link between the last relay UE and the intermediate relay UE, the last Relay UE needs to check the PC5 AS condition before sending discovery response message to the intermediate Relay UE.

First, we need to discuss whether this scenario can actually occur, or if the Intermediate Relay UE always establishes itself as a Remote UE beforehand. If this scenario is indeed possible, the next question is whether the same SD-RSRP threshold—used by the Intermediate Relay UE to decide whether to forward the solicitation message—can also be applied by the Last Relay UE when deciding whether to send the discovery response message to the Intermediate Relay UE.

Rapporteur recommends further discussion on this in the next meeting with contributions on these aspects.

**Open issue RRC-7: Introduce a new field sl-L2U2N-MH-Relay in SIB 12**

In R17 we had introduced new field *sl-L2U2N-Relay-r17* indicating the support for NR sidelink Layer-2 U2N relay operation in SIB 12. Similarly, in R18 we had introduced new field *sl-L2-U2U-Relay* indicating the support for NR sidelink Layer-2 U2U relay operation.

In rapporteur’s view it is straight forward to add similar field *sl-L2U2N-MH-Relay* for indicating the support of NR sidelink Layer-2 U2N multi hop relay operation in SIB 12.

Companies can look at the running CR that proposes adding *sl-L2U2N-MH-Relay*  in the running CR and provide any comments.

**Proposal 1: Introduce *sl-L2U2N-MH-Relay* for indicating the support of NR sidelink Layer-2 U2N multi hop relay operation in SIB 12.**

**Open issue RRC-8: introduce a new field *relayUE-Operation-L2-r17* and *remoteUE-Operation-L2-r17* in *SidelinkParameters***

In R17 we had introduced new field *relayUE-Operation-L2-r17* and *remoteUE-Operation-L2-r17* in *SidelinkParameters* which is used to convey capabilities related to NR and V2X sidelink communications/ positioning.

In rapporteur’s view it is straight forward to add similar capabilities for R19 e.g. *relayUE-MH-Operation-L2-r19* and *remoteUE-MH-Operation-L2-r19* in *SidelinkParameters* IE.

**Proposal 2: Introduce capabilities for R19 e.g*. relayUE-MH-Operation-L2-r19 and remoteUE-MH-Operation-L2-r19* in *SidelinkParameters* IE.**

# Other identified open issues

Companies are invited to describe any other identified open issues not currently included within this document

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| --- | --- |
| **Company** | **Other identified open issues? (please describe)** |
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# Conclusions

*<To be filled after companies have provided feedback to the proposed resolutions for simple issues only. Please include the number of supporting companies (e.g., 18/20]) in brackets within the proposal>*

The following proposals have been provided based on feedback to the above document:

[Proposals for easy agreement]

*<List all proposals with consensus and/or may be easily agreed based on Rapporteur’s opinion>*

[Proposals for discussion]

*<List all proposals which will likely require further online/offline discussion to resolve>*

# References

1. R2\_129b\_Positioning\_Relay\_2025-0410-1040
2. R2\_129\_Positioning\_Relay\_2025-02-21-0845\_eom