**3GPP TSG-RAN WG2 Meeting #130 R2-250xxxx**

**St.Julians, Malta, May 19th – 23rd, 2025**

Agenda Item: 8.13.1

Source: OPPO

Title: Remaining SRAP open issues in R19 L2 Multi-hop U2N sidelink Relay

Document for: Discussion, Decision

# Introduction

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

* **[Post130][408][Relay] Rel-19 relay CR to 38.351 (OPPO)**

 Scope: Update the CR in R2-2504504 to take into account agreements of RAN2#130.

 Intended outcome: Endorsed CR as a baseline for RAN2#131 and open issues list

 Deadline: Long

Companies are invited to provide feedback on open issue list by: **August 6th 10:00 UTC**

# Remaining open issues for specification TS 38.351

**Open issue SRAP-1:** SRAP configuration of indirectly connected Remote UE

**Issue description:**

Relevant agreement:

SRAP configuration including remote UE ID and BEARER ID is configured by the network via dedicated RRC signalling as in R17.

For the SRAP configuration at the relay UE (both last relay and intermediate relay UE), rely on network to provide SRAP configuration for at least the directly connected child UEs, based on the L2 IDs of the direct connected child UEs.

For CR drafting, assume as a baseline that the child UE’s SRAP configuration can include entries for indirect child UE with associated local ID for next-hop determination. We will review next meeting if this explicit mapping functionality is needed.

FFS whether to introduce reflective bearer mapping as an optional feature.

Status in running CR：

Based on the above RAN2 agreements, the running CR is drafted according to the baseline solution that the child UE’s SRAP configuration can include entries for indirect child UE with associated local ID. And related Editor’s Notes are added in clause 4.5 and 5.2.2.1 as follows:

EN at clause 4.5:

Editor’s Notes: FFS whether the UE ID for indirectly connected U2N Remote UE is needed.

EN at clause 5.2.2.1:

Editor’s Notes: FFS whether the SRAP configuration list for the indirectly connected Remote UE is needed.

Main points of contention:

whether to introduce reflective bearer mapping. And if so, how does the reflective bearer mapping mechanism work needs to be further clarified.

Possible options:

Option-1: Besides the baseline mechanism specified in the running CR, additionally support the reflective bearer mapping as optional feature. For this option, how does the reflective bearer mapping work needs to be clarified.

Option-2: Not to additionally support the reflective bearer mapping.

**[Closed] Open issue SRAP-2:** SRAP configuration parameter name

**Issue description:**

Relevant agreement:

SRAP configuration including remote UE ID and BEARER ID is configured by the network via dedicated RRC signalling as in R17.

For the SRAP configuration at the relay UE (both last relay and intermediate relay UE), rely on network to provide SRAP configuration for at least the directly connected child UEs, based on the L2 IDs of the direct connected child UEs.

For CR drafting, assume as a baseline that the child UE’s SRAP configuration can include entries for indirect child UE with associated local ID for next-hop determination. We will review next meeting if this explicit mapping functionality is needed.

FFS whether to introduce reflective bearer mapping as an optional feature.

Status in running CR：

Editor’s Notes is added in clause 5.2.2.2 as follows:

EN at clause 5.2.2.2:

Editor’s Notes: The IE name e.g., sl-SRAP-ConfigRelayList, sl-EgressRLC-Channel-DL, sl-EgressRLC-Channel-UL, local ID of the directly connected remote UE will be updated to align with RRC specification.

Main points of contention:

Parameter name.

Possible options:

Parameter name will be aligned with RRC specification.

[Rapp after R2 #130 meeting] The IE names in RRC and SRAP are aligned, SRAP-2 is closed

**[Closed] Open issue SRAP-3:** Error handling in multi-hop U2N Relay

**Issue description:**

Relevant agreement:

Agreements:

In multi-hop L2 U2N relay, besides the agreed remote UE ID and BEARER ID, in addition, at least include D/C field in the SRAP PDU header.

In multi-hop L2 U2N relay, for SRAP header, at least support the legacy single-hop U2N SRAP header, i.e., the agreed UE ID field is used for the remote UE local ID (including the case of an intermediate relay UE acting as a remote UE). FFS on whether to have one additional format to include remote UE L2 ID and what use case it is applied for.

Status in running CR：

In R17/18 Relay, the UE identify SRAP data PDU based on the SRAP header and SRAP configuration, the UE will discard the unknown data PDU with unknown UE ID and/or BEARER ID. The current running CR is drafted by following legacy principle. An Editor’s Note is added in clause 5.4 as follows to see whether additional/other error handling cases needed.

EN in clause 5.4:

Editor’s Notes: Handling of unknown, unforeseen, and erroneous protocol data of L2 intermediate U2N Relay (if any delta issue) is to be added.

Main points of contention:

In the baseline procedure, seems the legacy principle can be reused and no delta issue identified. The possible uncertainty is about if parallel RRC setup procedure is supported, the intermediate relay UE may need to handle the unknown SRAP data PDU (e.g., DL SRB0 or UL SRB1) before acquire the SRAP configuration.

Possible options:

Option-1: Don’t support parallel RRC setup procedure with additional SRAP header format at least for DL, so no additional issues for error handling.

Option-2: If parallel RRC setup procedure with additional SRAP header format is supported for DL, the UE will not process error handling until SRAP configuration from the network is obtained.

[Rapp after R2 #130 meeting] Parallel RRC setup is not supported, SRAP-3 is closed

**[Closed] Open issue SRAP-4:** parallel RRC setup procedure with additional SRAP header format

**Issue description:**

Relevant agreement:

Agreements:

Continue to consider forwarding of SRB0 messages by relay UEs not in RRC\_CONNECTED with respect to control plane approach 1.

TPs showing the two approaches for fast forwarding of SRB0 (SRAP header and local ID assignment by RRC signalling) are invited for next meeting (co-sourcing strongly encouraged).

Other approaches are not precluded (contribution-driven) but should be shown at a mature stage considering the time left.

Strive to avoid additional RAN3 impact specific to fast forwarding.

FFS if applicable to DL.

FFS what level of gNB awareness of the path information would be needed.

FFS if fast forwarding is optional/mandatory for UEs to support.

Status in running CR：

The baseline SRAP header format is reused, an Editor’s Note is added in clause 6.2.2 as follows.

EN in clause 5.4:

Editor’s Notes: FFS on whether the SRAP Data PDU format for single-hop U2N relay can already cover multi-hop U2N Relay.

Main points of contention:

Whether/how to support the parallel RRC setup procedure with additional SRAP header format as optional feature. And whether to support only UL or both UL and DL.

Possible options:

Option-1: Don’t support parallel RRC setup procedure.

Option-2: Support parallel RRC setup procedure for UL only.

Option-3: Support parallel RRC setup procedure for both UL and DL.

[Rapp after R2 #130 meeting] Parallel RRC setup is not supported, SRAP-4 is closed

# 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)** |
| Samsung | In the downstream direction, we could have multiple child Relays/UEs, and therefore SRAP packet should be discarded by the U2N Relay UE if the next-hop ID configured for the UE identity matching that of the UE ID field of the received SRAP packet does not match any of the L2 IDs of any of the egress links configured for the U2N Relay UE. Additionally, In legacy specs (single-hop U2N Relaying), the ingress link connects directly to source UE on the upstream, and therefore it makes sense (as done currently) to check at the Relay whether the UE ID in the packet matches sl-LocalIdentity corresponding to L2 ID of the ingress link (as per current draft CR). For MH however, the source UE could be several hops away and this check is potentially incorrect/needs enhancing.[Rapp] Thanks, based on the current 38.331 and 38.351, the SRAP configuration (e.g., sl-LocalIdentity) of the indirectly connected remote UE is configured associated with the L2 ID of the directly connected child, which can identify the ingress link. So there will be no problem for error handling. |
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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

[3] R2\_130\_Positioning\_Relay\_2025-05-22-1040

# Appendix (Optional)

Agreements in RAN2 #129:

In multi-hop L2 U2N relay, besides the agreed remote UE ID and BEARER ID, in addition, at least include D/C field in the SRAP PDU header.

In multi-hop L2 U2N relay, for SRAP header, at least support the legacy single-hop U2N SRAP header, i.e., the agreed UE ID field is used for the remote UE local ID (including the case of an intermediate relay UE acting as a remote UE). FFS on whether to have one additional format to include remote UE L2 ID and what use case it is applied for.

Agreements in RAN2 #129bis:

The term “U2N relay UE” can include first/intermediate/last relay UEs in multihop, if not otherwise qualified. We can distinguish explicitly when a requirement applies only to single-hop or only to certain multihop roles.

The term “U2N remote UE” can include multihop remote UEs, if not otherwise qualified. We can distinguish explicitly when a requirement applies only to single-hop or only to multihop.

Expand the definitions of “U2N relay UE” and “U2N remote UE” in the CR definition sections to include multihop. This drafting can be done initially in the 38.300 running CR and migrated later into the other CRs.

The existing multihop definitions, e.g., first/intermediate/last relay UE, are kept. FFS if they need debugging (business as usual). The intention is that the first relay UE is an intermediate relay UE, as originally agreed.

The terms “parent” and “child” UE can be used in CR drafting. FFS if they need to be defined, based on how we end up using them.

Continue to consider forwarding of SRB0 messages by relay UEs not in RRC\_CONNECTED with respect to control plane approach 1.

TPs showing the two approaches for fast forwarding of SRB0 (SRAP header and local ID assignment by RRC signalling) are invited for next meeting (co-sourcing strongly encouraged).

Other approaches are not precluded (contribution-driven) but should be shown at a mature stage considering the time left.

Strive to avoid additional RAN3 impact specific to fast forwarding.

FFS if applicable to DL.

FFS what level of gNB awareness of the path information would be needed.

FFS if fast forwarding is optional/mandatory for UEs to support.

Reuse the single-hop relay mechanism to support the Local ID allocation for multi-hop relay:

• First relay UE reports the L2 ID of the remote UE to the gNB to request the local ID allocation, the uniqueness of the local ID within the cell is assumed to be guaranteed by the gNB by implementation.

• The remote UE local ID is 8 bits.

As in single-hop U2N Relay mechanism, R2 confirm, for the DL and UL SRB0 of remote UE in multi-hop U2N Relay, SRAP header is present over each hop except the PC5 hop between the remote UE and first relay UE.

As in single-hop U2N Relay mechanism, R2 confirm, for the DL and UL SRB0 of remote UE in multi-hop U2N Relay:

- At the link between remote UE and the first relay UE, reuse the specified PC5 RLC channel (i.e., SL-RLC0);

- At the link between intermediate relay UEs or the link between intermediate relay and the last relay, or the link between the last relay and the network, the RLC channel is configured by the network via dedicated RRC message.

SRAP configuration including remote UE ID and BEARER ID is configured by the network via dedicated RRC signalling as in R17.

For the SRAP configuration at the relay UE (both last relay and intermediate relay UE), rely on network to provide SRAP configuration for at least the directly connected child UEs, based on the L2 IDs of the direct connected child UEs.

For CR drafting, assume as a baseline that the child UE’s SRAP configuration can include entries for indirect child UE with associated local ID for next-hop determination. We will review next meeting if this explicit mapping functionality is needed.

FFS whether to introduce reflective bearer mapping as an optional feature.

From a Remote UE perspective, the dedicated Uu radio bearer mapping configuration at least includes the following information:

• Local identity of the Remote UE

• The Remote UE’s Uu SRB/DRB identity to Egress PC5 RLC channel mapping

From a relay UE perspective (including first/intermediate/last relay UEs), the legacy contents of the SRAP configuration are applied for at least the directly connected child UEs. FFS (depending on outcome of the reflective mapping) if they are also applied for indirectly connected child UEs.

Agreements in RAN2 #130:

Do not pursue fast forwarding.

Do not implement reflective bearer mapping in the running CR(s) now; interested companies are asked to converge a single detailed TP for final go/no-go decision next meeting.

The intermediate relay UE can have its own traffic acting as a remote UE simultaneously. Running CRs will be checked to make sure this functionality is supported.

Clarify in the normative text that the UE can be a relay and remote UE simultaneously (to be determined case by case where it needs to be documented).