**3GPP TSG-RAN WG2 Meeting #131 R2-250xxxx**

**Bengaluru, India, August 25th – 29th, 2025**

**Agenda Item: 8.13.1**

**Source: Huawei, HiSilicon**

**Title: Comment collection for Merged RRC (TS 38.331) running CR for NR Sidelink Multihop Relay**

**Document for:**

# 1 Introduction

This paper collects any further comments for Merged RRC (TS 38.331) running CR for NR Sidelink Multihop Relay

* [Post130][407][Relay] Rel-19 relay merged CR to 38.331 (Huawei)

 Scope: Merge the draft CRs from [Post130][402] and [Post130][406].

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

 Deadline: Long (late start to allow [Post130][402] and [Post130][406] to conclude)

 Deadline: August 4th

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# 2 Comments for the running CR

This section is used to collect comments for the Merged RRC (TS 38.331) running CR for NR Sidelink Multihop Relay

|  |  |  |
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| **Company** | **Issue** | **Suggestion** |
| Sharp | 3.1Definition of Downstream and Upstream 1. The first characters of definition of “Downstream” and “Upstream” are lowercase.
2. These definitions include IAB WI related changes, but “downstream” and “Upstream” are only used for relay feature in 38.331.
 | 1. Change it to a capital letter
2. Remove IAB related changes. The first reason is that this is a relay WI, and the second reason is that this word is not used for IAB in 38.331. (If this issue is already discussed, please ignore my comment.)
 |
| Sharp | 4.2.1- Network controlled mobility (path switch) between a serving cell and a L2 U2N Relay UE for single hop, or vice versa, or between a serving cell and L2 U2N Relay UEs for multi hop, or vice versa, or between a source L2 U2N Relay UE and a target L2 U2N Relay UE for single hop, or between a source L2 U2N Relay UE and target L2 U2N Relay UEs for multihop, or vice versa;- Network controlled MP operation. | 1. Insert a line break after “vice versa;”
2. Change to “between a source L2 U2N Relay UE for single-hop and target L2 U2N Relay UEs for multihop” since Rel-19 relay WI don’t support multihop-to-multihop path switching.
 |
| Sharp | 5.3.2Current CR has no additional mechanism to avoid duplicated paging delivery though RAN2 agreed with “*Strive to minimize spec impact to support intermediate relay UEs in coverage monitoring paging for a child UE on Uu interface, while avoiding duplicated paging delivery to the remote UE due to double-monitoring by upstream UEs.”* | Discuss how to avoid duplicated paging at next meeting. |
| Sharp | Whole of the CRThere is inconsistency in the use of words, e.g., child UE, connected child UE, connected child U2N Relay UE, child U2N Relay UE, connected downstream child UE, connected downstream L2 child UE, downstream L2 U2N Child Relay UE, L2 U2N child Relay UE, L2 U2N Child Relay UE, U2N Child UE, downstream child UEs, indirect child UEs | Unify synonyms. |
| Sharp | For single-hop scenario, during remote UE addition procedure, RLC channel configuration for SRB1 is handled based on whether *sl-EgressRLC-ChannelPC5* is configured, i.e. associate the PC5 Relay RLC channel as indicated by *sl-EgressRLC-ChannelPC5* with SRB1 or apply the default configuration of SL-RLC1 for SRB1.For multi-hop scenario, *sl-EgressRLC-Channel-UL* and *sl-EgressRLC-Channel-DL* are introduced for intermedia relay UE. The legacy procedure is inapplicable for intermedia relay UE. | For intermedia relay UE, add description on how to handle RLC channel configuration for SRB1. |
| Sharp | To support positioning in SL Relay, both posSIB-ForwardingSupported and SFN-DFN offset are needed. Now only FFS on whether/how passing SFN-DFN offset is added. | Add FFS on whether/how passing *posSIB-ForwardingSupported* in multi-hop scenario. |
| Sharp | SIB12-r16 ::= SEQUENCE {*<Omitted>*sl-L2U2N-MH-Relay-r19 ENUMERATED {enabled} OPTIONAL, -- Need R[Sharp]: A cell supporting multiple hop L2 U2N relay should enable L2 U2N relay firstly. | Change *sl-L2U2N-MH-Relay-r19* to conditional optional field based on *sl-L2U2N-Relay-r17*.  |
| Sharp | ***t300-RemoteUE***Indicates the timer value of T300 used by L2 U2N Remote UE. The effective T300 value for the L2 U2N Remote UE, accounting for both the Uu and PC5 hop components,, is obtained by multiplying the base T300 timer value by the Hop Count. For a single-hop scenario involving one Relay UE, the Hop Count is 1. For multi-hop scenarios involving two or three Relay UEs, the Hop Count is 2 or 3, respectively. If the field is absent, the timer value indicated in t300 applies to L2 U2N Remote UE.[Sharp]: The current description is a bit unclear whether timer value should be multiplied by Hop Count when *t300-RemoteUE* is absent. | Move the highlighted sentence as below:Indicates the timer value of T300 used by L2 U2N Remote UE. If the field is absent, the timer value indicated in t300 applies to L2 U2N Remote UE. The effective T300 value for the L2 U2N Remote UE, accounting for both the Uu and PC5 hop components, is obtained by multiplying the base T300 timer value by the Hop Count. For a single-hop scenario involving one Relay UE, the Hop Count is 1. For multi-hop scenarios involving two or three Relay UEs, the Hop Count is 2 or 3, respectively. |
| Sharp | ***sl-EgressRLC-ChannelPC5***Indicates the egress RLC channel on PC5 Hop for downlink transmissions at the L2 U2N Relay UE and for uplink transmissions at the L2 U2N Remote UE. | “L2 U2N Relay UE” should be “L2 Last U2N Relay UE”. |
| OPPO | In 5.8.13.3, for in coverage case the PC5 threshold condition should be satisfied on top of Uu threshold condition, i.e., the Uu threshold condition should be satisfied in all the cases | 3> if the UE acting as Intermediate U2N Relay UE is sending Discovery Solicitation message with Model B as specified in TS 23.304 [65] and *sl-DiscConfigCommon* is included in *SIB12*, and if both the NR sidelink multi-hop relay threshold conditions as specified in 5.8.x.2 and the NR sidelink U2N Remote UE threshold conditions as specified in 5.8.15.2 are met based on *sl-RelayUE-ConfigCommonMH* and *sl-RemoteUE-ConfigCommon* in SIB12; or[Rapp] If there is no PC5 connection with the parent, the candidate Intermediate Relay UE can still forward the Discovery Solicitation Message without checking the Uu threshold. Checking of the Uu threshold will be done when it connects to the network ie acting as a remote UE. Therefore, duplicating the Uu threshold check is not necessary.[OPPO] Thanks, but still confusing on why checking the Uu condition related to the discovery Model and whether there is PC5 link. We understand the Uu condition is to restrict intermediate relay UE cannot locate at cell-centre which causes severe interference to the NW.  |
| OPPO | In 5.8.15.3, the following NOTE on prioritize the connected relay UE, we understand the NOTE is not needed and this should be fully up to UE implementation based on the agreement in last R2 meeting. This is because it is not appropriate to simply say UE should prioritize RRC connected relay since relay selection is based on multiple parameters, i.e., hop count/accumulated QoS/root relay info..., e.g., remote UE may want to select the RRC idle relay with smaller hop count or better QoSNOTE X: The L2 U2N Remote UE will prioritize the selection or reselection of suitable NR sidelink U2N Relay UE that is in RRC\_CONNECTED state, based on the RRC state information included in the Discovery Message container. | Suggest to remote the NOTE [Rappo] We can soften the wording in the note to say that the UE “may” prioritize the selection or reselection of suitable NR sidelink U2N Relay UE that is in RRC\_CONNECTED. However it is free to choose path trough RRC\_IDLE UE if the service can tolerate the connection setup latency.[OPPO] Thanks, we understand the agreement is to leave how to use the RRC state indication as UE implementation, which is already captured in the legacy NOTE 2 above. So this new NOTE can be saved.Working assumption:The Relay UE includes an indication of whether it is RRC\_CONNECTED in the discovery message RRC container. As a baseline, remote UE relay (re)selection behaviour based on this information is left to implementation, and it can be discussed in spec implementation/maintenance if some guidance is needed. No SA2 spec impact is expected.NOTE 2: A candidate NR sidelink U2N Relay UE which meets all AS layer criteria defined in 5.8.15.3 and higher layer criteria defined in TS 23.304 [65] can be regarded as suitable NR sidelink U2N Relay UE by the NR sidelink U2N Remote UE. If multiple suitable NR sidelink U2N Relay UEs are available, it is up to Remote UE implementation to choose one NR sidelink U2N Relay UE. The details of the interaction with upper layers are up to UE implementation.[vivo] we could also update legacy NOTE2, e.g.:up to remote UE implementation (e.g. prioritize the selection or reselection of suitable NR sidelink U2N Relay UE that is in RRC\_CONNECTED state) …  |
| CATT | In 3.1 DefinitionsFor the “Last U2N Relay UE” part, rapp added “The child UE is the U2N Remote UE in case of single-hop L2 U2N Relay communication.” in the end of the item, deleted the below Editor’s note. | Just want to align the understanding, is there RAN2 agreement made in the previous RAN2 meetings for the deleted FFS part?  |
| CATT | In 3.1 Definitions**UE-to-Network Relay discovery:** A mode of NR sidelink discovery in which a UE disovers other UEs for U2N Relay communication.There is one typo for the yellow marked part. | Fix the typo for the yellow marked part. |
| Apple | In 3.1 DefinitionsFor the “U2N Relay UE” definition modification, the phrases “Last U2N Relay “, “Intermediate U2N Relay “ and “First U2N Relay “ should all be appended with the word “UE” to align with the definitions in this section |  |
| Apple | In 3.1 DefinitionsNot sure we should use “downstream” and “upstream” definitions to cover IAB scenarios. The proper way is to introduce separate R19 IAB CR to modify the definitions so that those parts can be reviewed by IAB experts. |  |
| Apple | In ASN.1 for *SL-L2RelayUE-Config*We do not think there is a need to change this part Logically, the L2 ID of any UE can be used as a index w/o introduceing a new “SL-SRAP-config-ID”.Also, if the gNB really wants to hide the L2 ID of indirect child from the relay UE, it can also just use the local ID as the index, there is no need to introduce a new ““SL-SRAP-config-ID” |  |
| Apple | In ASN.1 for – *SL-SRAP-Config*The condition “L2RelayUE” is outdated and need to be updated to only limit to last U2N relay UE |  |
| Apple | In ASN.1 for - SL-SRAP-configID., wrong name is used “SL-RLC-ChannelID information element”.But we also think this whole new definition of ““SL-SRAP-config-ID” is not needed as commented above |  |
| Apple | In ASN.1 for *SL-ConfigDedicatedNR*The new “SL-DiscConfig-v19xy “ is conditioned on “L2RelayUE”, but this new element is only to be used for intermediate relay UE. So its seems need creating a new condition instead of resuing thte same condition as last relay UE. |  |
| vivo | 3.1 definitionWe are not sure whether ‘upstream’ and ‘downstream’ should cover both IAB and multi-hop U2N relay case, this should be clarified. At least the IAB part may not be agreed directly by the relay session.  |  |
| vivo | 4.4- RRC connection mobility including e.g. intra-frequency and inter-frequency handover, path switch from a PCell to a target L2 U2N Relay UE or from a L2 U2N Relay UE to a target PCell or from a source L2 U2N Relay UE to a target L2 U2N Relay UE in case of single hop or path switch from a PCell to target path via multiple L2 U2N Relay UEs or from source path via multiple L2 U2N Relay UEs to a target PCell or from a source L2 U2N Relay UE to target path via multiple L2 U2N Relay UEs or from source path via multiple L2 U2N Relay UEs to a target L2 U2N Relay UE in case of multi hop, associated AS security handling, i.e. key/algorithm change, specification of RRC context information transferred between network nodes;We agreed ‘The gNB is expected to avoid triggering mobility to a path where the first/intermediate relay UE is the same as the source relay UE.’ Although the 4.4 is a general description, we wonder how to clarify the intention of our agreement that some cases are not supported in the mobility situation.  | Could add a note to clarify exceptional cases. |
| vivo | Whole CRSomewhere ‘multi hop U2N relay operation’ is used, but some other places ‘Layer-2 U2N multi hop relay operation’ is used. It can be unified.  | Align to ‘multi hop U2N operation’ |
| vivo | 5.2 NOTE 2: For an out of coverage L2 U2N Remote UE or L2 Intermediate U2N Relay UE in RRC\_IDLE or RRC\_INACTIVE receiving SIB1 from its connected parent L2 U2N Relay UE, it is up to ~~Remote~~ UE implementation whether to consider and apply the following parameters: *frequencyBandList*, *carrierBandwidth*, *frequencyShift7p5khz*, frequency band, channel bandwidth, the configuration included in the *servingCellConfigCommon*, the specified PCCH configuration, *additionalSpectrumEmission*, *additionalPmax*, and *p-Max*. |  |
| vivo | 5.3.3.21> if the UE is acting as L2 U2N Remote UE or ~~is acting as L2 First U2N Relay UE or~~ is acting as L2 Intermediate U2N Relay UE: |  |
| vivo | 5.3.10.3A L2/L3 U2N Relay UE or the L2 Last U2N Relay UE shall:1> upon detecting radio link failure:2> either indicate to upper layers (to trigger PC5 unicast link release with its connected downstream child UE(s)) or send *NotificationMessageSidelink* to the connected L2/L3 U2N Remote UE(s) or to the connected downstream L2 child UE(s)) in accordance with 5.8.9.10 | Add ‘or’ |
| vivo | 5.8.3.24> if the UE is capable of **U2N Relay UE or Last U2N Relay UE**, and if *SIB12* includes *sl-RelayUE-ConfigCommon*; or4> if the UE is capable of Intermediate U2N Relay UE, and if *SIB12* includes *sl-RelayUE-ConfigCommonMH*; orThe U2N relay UE definition already covers three types of relay UE in multi-hop, so not sure we can parallel ‘U2N relay UE’ with ‘last relay UE’ |  |
| Xiaomi | **In 4.2.2**, the following sentences can be simplified due to **U2N Remote UE** already covers both single-hop and multi-hop remote UEs.- SRB0 is for RRC messages using the CCCH logical channel (except SRB0 of L2 U2N Remote UE in case of single hop; or except SRB0 of L2 U2N Remote UE or of L2 Intermediate U2N Relay UE in case of multi hop);- SRB1 is for RRC messages (which may include a piggybacked NAS message) as well as for NAS messages prior to the establishment of SRB2, all using DCCH logical channel (except SRB1 of L2 U2N Remote UE in case of single hop; or except SRB1 of L2 U2N Remote UE or of L2 Intermediate U2N Relay UE in case of multi hop);- SRB2 is for NAS messages and for RRC messages which include logged measurement information, all using DCCH logical channel (except SRB2 of L2 U2N Remote UE in case of single hop; or except SRB2 of L2 U2N Remote UE or of L2 Intermediate U2N Relay UE in case of multi hop). SRB2 has a lower priority than SRB1 and may be configured by the network after AS security activation; | - SRB0 is for RRC messages using the CCCH logical channel (except SRB0 of L2 U2N Remote UE ~~in case of single hop~~; or except SRB0 ~~of L2 U2N Remote UE or~~ of L2 Intermediate U2N Relay UE in case of multi hop);- SRB1 is for RRC messages (which may include a piggybacked NAS message) as well as for NAS messages prior to the establishment of SRB2, all using DCCH logical channel (except SRB1 of L2 U2N Remote UE ~~in case of single hop~~; or except SRB1 ~~of L2 U2N Remote UE or~~ of L2 Intermediate U2N Relay UE in case of multi hop);- SRB2 is for NAS messages and for RRC messages which include logged measurement information, all using DCCH logical channel (except SRB2 of L2 U2N Remote UE ~~in case of single hop~~; or except SRB2 ~~of L2 U2N Remote UE or~~ of L2 Intermediate U2N Relay UE in case of multi hop). SRB2 has a lower priority than SRB1 and may be configured by the network after AS security activation; |
| Xiaomi | There are two understanding on the L2 U2N Relay UE in single-hop and multi-hop L2 U2N relay cases. The former only means one-hop U2N relay UE, while the latter includes both intermediate relay UE and last Relay UE. Thus, the below sentences (**e.g. clause 5.3.2.3**) can be restricted to single-hop case to avoid misunderstanding. 1> if the UE is acting as a L2 U2N Relay UE or L2 Last U2N Relay UE, for each of the *PagingRecord*, if any, included in the *Paging* message:- the establishment of Uu Relay RLC channels and PC5 Relay RLC channels (other than SL-RLC0 and SL-RLC1) for L2 U2N Relay UE or for L2 Last U2N Relay UE is performed only when AS security has been activated, and the establishment of PC5 Relay RLC channels for L2 U2N Remote UE or for L2 Intermediate U2N Relay UE (other than SL-RLC0 and SL-RLC1) is performed only when AS security has been activated;3> resume SRB2, SRB4, DRBs, multicast MRB, and BH RLC channels for IAB-MT, and Uu Relay RLC channels for L2 U2N Relay UE or for L2 Last U2N Relay UE, that are suspended; | 1. if the UE is acting as a L2 U2N Relay UE in case of single hop or L2 Last U2N Relay UE, for each of the PagingRecord, if any, included in the Paging message:

- the establishment of Uu Relay RLC channels and PC5 Relay RLC channels (other than SL-RLC0 and SL-RLC1) for L2 U2N Relay UE in case of single hop or for L2 Last U2N Relay UE is performed only when AS security has been activated, and the establishment of PC5 Relay RLC channels for L2 U2N Remote UE or for L2 Intermediate U2N Relay UE (other than SL-RLC0 and SL-RLC1) is performed only when AS security has been activated;3> resume SRB2, SRB4, DRBs, multicast MRB, and BH RLC channels for IAB-MT, and Uu Relay RLC channels for L2 U2N Relay UE in case of single hop or for L2 Last U2N Relay UE, that are suspended; |
| Xiaomi | In 5.3.10.3, the following sentences needs to be revised due to:1. “L3 multi-hop relay UE is out of Rel-19 scope”, so there is no definition of L3 last U2N Relay UE
2. A “or” is missed before “to the connected downstream L2 child UE(s))”, same issue also exists in clause 5.3.13.5

A L2/L3 U2N Relay UE or the L2/L3 Last U2N Relay UE shall:1> upon detecting radio link failure:2> either indicate to upper layers (to trigger PC5 unicast link release with its connected downstream child UE(s)) or send *NotificationMessageSidelink* to the connected L2/L3 U2N Remote UE(s) to the connected downstream L2 child UE(s)) in accordance with 5.8.9.10. | A L2/L3 U2N Relay UE in case of single hop or the L2~~/L3~~ U2N Last U2N Relay UE shall:1> upon detecting radio link failure:2> either indicate to upper layers (to trigger PC5 unicast link release with its connected downstream child UE(s)) or send NotificationMessageSidelink to the connected L2/L3 U2N Remote UE(s) or to the connected downstream L2 child UE(s)) in accordance with 5.8.9.10. |
| Lenovo | 5.8.9.10.3 Actions related to transmission of *NotificationMessageSidelink* messageThe Relay UE shall set the indication type as follows:1> if the UE is acting as U2N Relay UE:2> if the UE initiates transmission of the *NotificationMessageSidelink* message due to Uu RLF:3> set the *indicationType* as *relayUE-Uu-RLF*;2> else if the UE initiates transmission of the *NotificationMessageSidelink* message due to reconfiguration with sync:3> set the *indicationType* as *relayUE-HO*;2> else if the UE initiates transmission of the *NotificationMessageSidelink* message due to cell reselection:3> set the *indicationType* as *relayUE-CellReselection*;2> if the UE initiates transmission of the *NotificationMessageSidelink* message due to Uu RRC connection establishment/Resume failure:3> set the *indicationType* as *relayUE-Uu-RRC-Failure*;2> else if the UE initiates transmission of the *NotificationMessageSidelink* message due to Relay reselection: 3> set the indicationType as FFS ;2> submit the *NotificationMessageSidelink* message to lower layers for transmission. | In the legacy single-hop relay operation, the relay UE only performs cell reselection. But in the multi-hop relay operation, the parent relay UE performs both cell selection and relay reselection. Therefore, cell selection should be added as well.the UE initiates transmission of the *NotificationMessageSidelink* message due to Relay reselection or cell (re)selection |
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