3GPP TSG-RAN WG2 Meeting #122 R2-2xxxxxx

Incheon, Korea, May 22-26, 2023

Source: ZTE (Rapporteur)

Title: Summary of AI 7.9.2 on UE-to-UE relay

Agenda Item: 7.9.2

Document for: Discussion and Decision

# Introduction

This contribution is to summarize all contributions from agenda item 7.9.2 on UE-to-UE relay.

# Discussion

Note 1: ‘source remote UE’ and ‘target remote UE’ would be used in following proposals only for discussion purpose.

## 2.1 Authorization (SA2 LS)

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2304754**OPPO | Proposal 21: RAN2 confirms L3 U2U remote/end-UE can derive SLRB configuration as non-relay UEs.Proposal 23: Introduce indication(s) in SIB message for the network capability on U2U service.Proposal 24: RAN2 to discuss L2 U2U relay and remote UE reports the UE role to network. |
| **R2-2305043**ZTE, Sanechips | Proposal 18: In U2U relay, gNB controls RRC\_CONNECTED UEs via dedicated signalling at least in the following procedures: mode1 and mode2 RA, discovery configuration, SLRB/PC5 RLC channel configuration.Proposal 19: From RAN2’s perspective, authorization for L2 U2U relay/remote UE is needed. While authorization for L3 U2U relay/remote UE is not needed. |
| **R2-2305062**Apple | Proposal 16: RAN2 reply to SA2 that ProSe authorization for U2U relay is still needed between AMF and NG-RAN.Proposal 17: No need to differentiation Layer 2 and Layer 3 in U2U relay authorization. |
| **R2-2305245**vivo | Proposal 1: RAN2 to prioritize the discussions for following issues related to gNB involvement and authorization for U2U relay:- Configuration for SL-SRBs for U2U relay (for L2 U2U relay)- Configuration for SL-DRBs for U2U relay (for L2 U2U relay)- QoS split (for L2 U2U relay)- Configuration for U2U discovery pool (for both L2 and L3 U2U relay)Proposal 2: If it is agreed that no U2U relay specific configuration is needed in the dedicated signalling to RRC\_CONNECTED remote/relay UEs for the issues in Proposal 1, RAN2 confirm that there is no need to provide the authorization information for UE-to-UE Relay operation to the NG-RAN.Proposal 3: If Proposal 2 is agreed, send a reply LS to SA2 on authorization. |
| **R2-2305547**Ericsson | [Proposal 12 RAN2 to reply to that the “5G ProSe Authorized” needs to be enhanced to include the authorization for the UE-to-UE relay i.e., should provide authorization information for the UE-to-UE relay operation to the NG-RAN.](#_Toc134743807) |
| **R2-2305763**Qualcomm | Proposal 1: Existing gNB involvement defined for non-Relay discovery is reused for U2U relay discovery, including,- Reuse the non-relay discovery support indication in SIB12- Reuse existing resource allocation mode, 1) Reuse existing discovery resource configuration in SIB12 2) For dedicated resource allocation and mode 1 resource allocation, Remote UE or Relay UE indicate non-Relay discovery in SUI message.Proposal 5: For L3 based U2U relay, authorization information for Relay UE and Remote UE is not needed to be provided to gNB. The existing authorization for discovery and ProSe Direct Communication can be reused for U2U relay discovery and communication on each hop.Proposal 8: For L2 based U2U relay, authorization information for Relay UE and Remote UE is not needed to be provided to gNB. The existing authorization for discovery and ProSe Direct Communication can be reused for U2U relay discovery and communication on each hop.Proposal 9: Send LS to SA2 and RAN3 that no authorization is needed for both L3 based and L2 based U2U relay UE and Remote UE. Proposal 5: No additional gNB capability is introduced for U2U relay. |
| **R2-2306191**Huawei, HiSilicon | Proposal 16: Reply to SA2/RAN3 that the authorization info is needed for U2U relay operation. |
| **R2-2306378**MediaTek | Proposal 4: Legacy authorization mechanim can be reused.Proposal 5: If proposal 4 is agreed, send reply LS back to SA2 and Cc RAN3. |

**Summary:**

The U2U relay authorization has been discussed several meetings and no consensus is reached until now. It is time for RAN2 to make decision during this meeting and send reply LS to SA2 on the U2U relay authorization. Looking back to the origins of sidelink authorization in AS layer, it is used by the gNB for sidelink validation for RRC\_Connected UE and the sidelink authorization IE has been supported for V2X service, ProSe discovery, ProSe communication and U2N relay. With regard to the U2U relay, 2 companies (Qualcomm, MediaTek) suggest to reuse the legacy ProSe direct discovery and ProSe Direct Communication authorization for U2U relay operation. 4 companies (ZTE, Apple, Huawei, Ericsson) think that it is better to keep gNB informed of the U2U relay authorization for remote UE/relay UE so that gNB may configure the UE appropriately. One company (OPPO) think that L2 U2U relay and remote UE need to report the UE role to network. One company (vivo) think that if it is agreed that no U2U relay specific configuration is needed in the dedicated signalling to RRC\_CONNECTED remote/relay UEs, there is no need to provide the authorization information for UE-to-UE Relay operation to the NG-RAN.

Actually, it has been agreed that both mode-1 and mode-2 resource allocation can be supported on both remote UE and relay UE in U2U relay case. Suppose the gNB configures the U2U remote UE with mode-1 resource allocation, it means that the gNB should be able to identify the priority associated with the reported LCG ID and buffer size for a given destination ID within the SL-BSR. As we know, for the SIB/preconfiguration based SL RLC bearer configuration, the LCG ID does not need to be configured. In this case, it is better for the gNB to be aware of the role of U2U remote UE and then provide the E2D SL-DRB and first hop PC5 relay RLC channel configuration to U2U remote UE via dedicated signalling. By doing so, the gNB have the knowledge of the association between the LCGID and the priority of relevant SL logical channel so as to schedule the mode 1 remote UE appropriately. Similarly, for U2U relay UE with mode-1 resource allocation, gNB should be aware it is for U2U relay UE and only provide the RLC/MAC/PHY configuration for the PC5 Relay RLC channel to U2U relay UE.

Based on the above observation, it is necessary for gNB to be aware of the role of L2 U2U remote/relay UE and then provide dedicated configuration based on the authorization for L2 U2U relay operation. With regard to L3 U2U relay, only SL bearer with full SDAP/PDCP/RLC/MAC configuration need to be provided to U2U relay/remote UE. It is not necessary to separate the configuration of E2E SL-DRB and HbH PC5 Relay RLC channel. In this sense, it is equivalent to ProSe direct communication. However, several companies would like to align the authorization for both L2 and L3 U2U authorization. Therefore the following proposal is made:

**[ToDis] Proposal 1: Authorization information is needed for L2 U2U relay operation. FFS for L3 U2U relay operation.**

## 2.2 Relay Discovery

### 2.2.1 Conditions for discovery message transmission

* Model A discovery

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2304754**OPPO | Proposal 3: For model-A discovery, R2 relies on S2 to decide whether an AS-layer criterion is needed for a relay UE to decide whether a remote UE should be included in the announced neighbour list. If Yes, R2 can further work on it. Proposal 2: For model-A discovery, source remote UE, upon model-A message reception, select suitable relay candidates only if the PC5 SL-RSRP towards the relay UEs is above a configured threshold. |
| **R2-2305043**ZTE, Sanechips | Proposal 2: For Model A discovery, the relay UE should only announce the neighbour UEs that the PC5 link quality between the relay UE and the neighbour UE is above a threshold in the discovery announcement message. |
| **R2-2305180**InterDigital | Proposal 2: In model A discovery, a relay UE includes, in its discovery message, the identity of remote UE’s it has discovered that have RSRP above a threshold. RAN2 informs SA2.  |
| **R2-2305551**Spreadtrum | Proposal 2: In Model A, Relay UE decides the list of "End User Info" by comparing the signal quality between itself and the neighboring UE with one configured lower threshold and/or one configured upper threshold.Proposal 3: In Model A, Relay UE is allowed to transmit the Announcement message if there is at least one End UE included in the End UE list. |
| **R2-2305618**CMCC | Proposal 3: For model A, neighbourlist can be used for relay (re)selection procedure by having following two functions:1) To let the remote UE know all attachable ProSe UEs around the candidate relay UE2) To let the remote UE know the second hop channel quality between candidate relay UE and the peer remote UE |
| **R2-2305697**Lenovo | Proposal 2: In Model A, the UE list in a discovery message announced by the relay UE contains UEs for which the quality of PC5 link between the relay UE and the UE is above a configured threshold. |
| **R2-2305874**Kyocera | Proposal 1: The conditions for U2U relay UE to transmit Model A discovery should include a list of reachable target remote UEs (i.e., neighbour list) along with the channel conditions between the relay UE and each of the target remote UEs.Proposal 2: Send LS to SA2 for the inclusion of channel conditions of reachable target remote UEs as part of the neighbour list in Model A discovery. |
| **R2-2306191**Huawei, HiSilicon | Proposal 11: In Model A, only when PC5 signal strength between the relay UE and an remote UE is better than a threshold, the relay UE can include User Info ID of this remote UE in the discovery announcement. |
| **R2-2306427**Xiaomi | Proposal 6: For Model A, a UE can act as candidate relay UE when the SL-RSRP/SD-RSPR between this UE and a configured number of remote UEs is above the minimum threshold.Proposal 8: Candidate U2U Relay UE is considered to meet the AS criteria for selection if its PC5 link quality measurement is above a configured threshold. FFS regarding how to set the Threshold e.g. signalled or preconfigured.Proposal 12: For Model A, source Remote UE selects a Relay UE for which the SL-RSRP/SD-RSRP is above the minimum threshold. |
| **R2-2306380**Sharp | Proposal 13. For discovery Model B, RAN2 does not specify the behaviour related to neighbour list unless SA2 asks it.Proposal 14. For discovery Model A, RAN2 should discuss how to consider the quality of both hops for U2U Relay (re)selection. |

**Summary:**

For Model A discovery, whether/how the link quality between the relay UE and its neighbour UE should be considered when relay UE transmits discovery announcement message was discussed. Actually this is somewhat similar to R17 U2N relay that the link quality between the relay UE and the network(destination) is considered when determine to transmit relay discovery message. Based on the contributions, 8 companies (InterDigital, ZTE, Huawei, Spreadtrum, Lenovo, Kyocera, CMCC, Xiaomi) support that the link quality between the relay UE and its neighbour UE should be considered, but various in how to consider it,

- Alt 1: relay UE should only announce the neighbour UEs that the PC5 link quality between the relay UE and the neighbour UE is above a threshold. 7 companies support this (InterDigital, ZTE, Huawei, Spreadtrum, Lenovo, Kyocera, CMCC).

- Alt 2: relay UE includes the PC5 RSRP between the relay UE and each neighbour UE in the announcement message; (InterDigital)

- Alt 3: relay UE transmits announcement message when the SL-RSRP/SD-RSPR between the relay UE and a configured number of remote UEs is above the minimum threshold. (Xiaomi)

While OPPO and Sharp think it is up to SA2 discussion, rapporteur understands how to consider the link quality of the second hop is in the scope of RAN2 and suggests to follow the majority, i.e. adopt Alt 1 in a first stage.

**[Easy] Proposal 2a: For Model A discovery, the relay UE should only announce the neighbour UEs for which the PC5 link quality between the relay UE and the neighbour UE is above a certain threshold in a discovery announcement message. If agreed, LS is sent to SA2.**

**Relay selection based on discovery:**

If remote UE receives Model A discovery announcement messages including the peer remote UE info from multiple relay UEs, the remote UE can check the PC5 RSRP of the current hop between remote UE and the relay UE and filter out the relay UEs with low PC5 RSRP.

**[Easy] Proposal 2b: For Model A discovery, upon discovery message reception, remote UE considers a relay UE as a candidate relay UE only if the PC5 RSRP towards the relay UE is above a configured threshold.**

* Model B discovery

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2304754**OPPO | [Proposal 4: For model-B discovery, R2 not pursue AS-layer criterion for relay-UE to decide on whether to relay the solicitation/response message.](#_Toc134794149)[Proposal 5: For model-B discovery, source remote UE, upon discovery response message reception, select suitable relay candidates only if the PC5 RSRP towards the relay UEs is above a configured threshold.](#_Toc134794150) |
| **R2-2305043**ZTE, Sanechips | Proposal 3: For Model B discovery, the source remote UE transmits discovery solicitation message if the PC5 signal strength (SL-RSRP or SD-RSRP) of the target remote UE is below a threshold.Proposal 4a: For Model B discovery, the relay UE transmits discovery solicitation message to target remote UE only if the PC5 link quality between the relay UE and the source remote UE is above a threshold.Proposal 4b: For Model B discovery, the relay UE transmits discovery response message to source remote UE only if the PC5 link quality between the relay UE and the target remote UE is above a threshold.Proposal 5: For Model B discovery, upon discovery response message reception, source remote UE considers a relay UE as a candidate relay UE only if the PC5 RSRP towards the relay UE is above a configured threshold. |
| **R2-2305062**Apple | Proposal 11 When “SL-RSRP measurements towards peer remote UE is below a threshold”, the remote UE triggers one of the following:1) “5G ProSe UE-to-UE Relay Discovery with Model B procedure” and the remote UE will then select a relay UE among the U2U relay candidate(s) discovered via Model B procedure; or2) “5G ProSe Discovery integrated into PC5 unicast link establishment procedure” and the relay selection is to be done by the peer remote UE. Proposal 12 RAN2 recognize that the remote UE transmission of “Model B U2U relay discovery response” is the result of target remote UE’s relay selection process. “PC5 RSRP between the target remote UE and the relay UE is above a configured threshold” is regarded as one of the criteria for target remote UE’s relay selection, not an independent trigger of U2U relay discovery message transmission. |
| **R2-2305180**InterDigital | Proposal 3: In model B discovery, a relay UE forwards only discovery messages received having RSRP above a threshold. RAN2 informs SA2. Proposal 4: Discovery message transmitted by the relay UE should carry the RSRP measurement(s) of the link to each remote UE. |
| **R2-2305233**China Telecom | Proposal 4: For model-B discovery, source remote UE after receiving the response message reception would select suitable relay candidates based on its implementation only if the PC5 RSRP towards the relay UEs is above a configured threshold. |
| **R2-2305245**vivo | Proposal 4: For Model-B discovery case, the relay UE forwards the discovery solicitation message only if the PC5 RSRP between the relay UE and the source remote UE is above a threshold.Proposal 11: For target remote UE in discovery mode-B, the relationship between discovery transmission and relay selection can be postponed until more SA2 progress. |
| **R2-2305279**CATT | Proposal 1: Remote UE can trigger U2U relay discovery message transmission when SL-RSRP/SD-RSRP of the current direct PC5 link is below a threshold. |
| **R2-2305551**Spreadtrum | Proposal 4: In Model B, the discoverer End UE is allowed to transmit Solicitation message with relay indication enabled if the link quality between itself and the discoveree End UE is below one configured threshold (including the case where the discoverer End UE cannot discover the discoveree End UE) when the link quality results are available.Proposal 5: In Model B, candidate Relay UE decides whether it is allowed to send Solicitation message to by comparing the link quality between itself and the discoverer End UE with one configured lower threshold and/or one configured upper threshold. |
| **R2-2306191**Huawei, HiSilicon | Proposal 12: In Model B, only when PC5 signal strength between the source remote UE and the relay UE is better than a threshold, the relay UE can send discovery message to the target remote UE. |
| **R2-2306380**Sharp | Proposal 13. For discovery Model B, RAN2 does not specify the behaviour related to neighbour list unless SA2 asks it.Proposal 14. For discovery Model A, RAN2 should discuss how to consider the quality of both hops for U2U Relay (re)selection. |
| **R2-2306427**Xiaomi | Proposal 7: For Model-B discovery, on receiving a discovery response message from a relay UE, a source Remote UE considers only Relay UE(s) with a PC5 RSRP above a minimum threshold can act as candidate U2U Relay UE. FFS regarding how to set the minimum threshold e.g. signalled or preconfigured.Proposal 9: For Model B discovery the target Remote UE receiving one or more U2U Relay Discovery Solicitation messages from one or more candidate U2U Relay UEs, considers these Relay UEs have met the AS criteria for selection when the PC5 RSRP between the candidate Relay UE(s) and the target Remote UE is above a configured threshold. FFS regarding how to set the configured threshold e.g. signalled or preconfigured.Proposal 10: For Model B discovery, the target Remote UE receiving one or more U2U Relay Discovery Solicitation messages from candidate U2U Relay UE(s) with a PC5 RSRP above a minimum threshold selects candidate Relay UEs via UE implementation in order to send a discovery response message(s) to. The UE implementation may consider assistance information provided via AS or NAS during the selection process. Proposal 11: For Model B discovery for a source Remote UE receiving one or more 5G ProSe UE-to-UE Relay Discovery Response messages from one or more candidate U2U Relay UEs, for which the PC5 RSRP between the candidate Relay UE(s) and the source Remote UE is above a configured threshold. The U2U Relay UE selection is left to source Remote UE implementation, although the UE may consider assistance information provided via AS or NAS during the selection process.  |

**Summary**:

**Discovery message transmission at source remote UE**

Based on contributions, 4 companies (ZTE, CATT, Spreadtrum, Apple) think Remote UE can trigger U2U relay discovery message transmission when the PC5 link quality (SL-RSRP/SD-RSRP) between the remote UE and the peer remote UE is below a configured threshold.

**[ToDis] Proposal 3a: For Model B discovery, the source remote UE transmits discovery solicitation message when the PC5 link quality (SL-RSRP or SD-RSRP) between the source remote UE and the target remote UE (if available) is below a configured threshold.**

**Discovery message transmission at relay UE**

In the last meeting, RAN2 agreed that 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. Some companies think the Model B discovery is similar to the integrated case. 5 companies (InterDigital, ZTE, vivo, Spreadtrum, Huawei) propose that the relay UE sends the discovery solicitation message to target remote UE only if the PC5 RSRP between the relay UE and the source remote UE is above a threshold. In addition, ZTE think the relay UE should transmit discovery response message to source remote UE only if the PC5 link quality between the relay UE and the target remote UE is above a configured threshold.

**[ToDis] Proposal 3b: For Model B discovery, the relay UE transmits discovery solicitation message to target remote UE only if the PC5 link quality between the relay UE and the source remote UE is above a configured threshold.**

**Discovery message transmission/relay selection at target remote UE**

RAN2 agreed that the target remote UE transmits discovery response message only if the PC5 RSRP between the target remote UE and the relay UE is above a threshold. 2 companies raised the issue on whether the target remote UE may responds all relay UEs for which the PC5 RSRP is above a threshold or selects some candidate relay UEs (for which the PC5 RSRP is above a threshold) based on its implementation to send discovery response message. Since there are no enough companies views on this, no proposal is made here.

**Relay selection based on discovery**

Some companies (OPPO, ZTE, China Telecom, Xiaomi) further discussed if source remote UE receives responses from multiple relay UEs, the source remote UE should consider a relay UE as a candidate relay UE only if the PC5 RSRP towards the relay UE is above a configured threshold and should select a relay UE among these candidate relay UEs.

**[Easy] Proposal 3c: For Model B discovery, upon discovery response messages reception, the source remote UE considers a relay UE as a candidate relay UE only if the PC5 RSRP towards the relay UE is above a configured threshold.**

* Integrated discovery

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2304754**OPPO | [Proposal 6: For integrated discovery, target remote UE, upon DCR message reception, select suitable relay candidates only if the PC5 SL-RSRP towards the relay UEs is above a configured threshold.](#_Toc134794151) |
| R2-2305043ZTE, Sanechips | Proposal 6a: For integrated-discovery, when receiving DCR message from one or multiple relay UEs, the target remote UE should select a relay UE to respond towards which the PC5 RSRP is above a threshold.Proposal 6b: For integrated-discovery, the relay UE forwards the discovery message for DCA message with integrated discovery case only if the PC5 RSRP between the relay UE and the target remote UE is above a threshold. |
| **R2-2305062**Apple | Proposal 11: When “SL-RSRP measurements towards peer remote UE is below a threshold”, the remote UE triggers one of the following:1) “5G ProSe UE-to-UE Relay Discovery with Model B procedure” and the remote UE will then select a relay UE among the U2U relay candidate(s) discovered via Model B procedure; or2) “5G ProSe Discovery integrated into PC5 unicast link establishment procedure” and the relay selection is to be done by the peer remote UE.  |
| **R2-2306380**Sharp | Proposal 2: To distinguish DCR/A message from other PC5 message, RAN2 to select one option from the following options.- UE measures RSRP of all PC5 message. AS layer can understand type of the PC5 message when upper layer notifies it- RAN2 to use dedicated SRB and/or LCID for transmission of DCR/A messages for U2U relay. (if dedicated SRB is used, RAN2 reverts back the related agreement)Proposal 5: For integrated discovery procedure, one threshold for each RSRPs is enough to filter candidate relay UE if the threshold is configured based on SL-RSRP. |

**Summary**:

According to SA2 [TS 23.304, 6.7.3.2], for integrated discovery, when target remote UE receives DCR message from one or multiple relay UEs, it should select a relay UE to respond. The target remote UE may select the relay UE based on the PC5 RSRP between the relay UE and the target remote UE. It means that the target remote UE is responsible for the relay UE selection. As to the issue on distinguishing DCR/A message from other PC5 messages raised by Sharp, which can be discussed later if more companies identify the issue.

**[Easy] Proposal 4: For integrated-discovery, when receiving DCR message from one or multiple relay UEs, the target remote UE should select a relay UE towards which the PC5 RSRP is above a configured threshold to respond.**

### 2.2.2 Discovery transmission v.s. relay (re)selection

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2304754**OPPO | [Proposal 1: As in R17 U2N, RAN2 not differentiate AS-layer criterion for discovery / DCR message transmission/reception procedure and relay (re)selection.](#_Toc134794146) |
| **R2-2305043**ZTE, Sanechips | Proposal 1: RAN2 considers the conditions for discovery message transmission for remote UE and relay UE. |
| **R2-2305062**Apple | Proposal 11: When “SL-RSRP measurements towards peer remote UE is below a threshold”, the remote UE triggers one of the following:1) “5G ProSe UE-to-UE Relay Discovery with Model B procedure” and the remote UE will then select a relay UE among the U2U relay candidate(s) discovered via Model B procedure; or2) “5G ProSe Discovery integrated into PC5 unicast link establishment procedure” and the relay selection is to be done by the peer remote UE. Proposal 12 RAN2 recognize that the remote UE transmission of “Model B U2U relay discovery response” is the result of target remote UE’s relay selection process. “PC5 RSRP between the target remote UE and the relay UE is above a configured threshold” is regarded as one of the criteria for target remote UE’s relay selection, not an independent trigger of U2U relay discovery message transmission. |
| **R2-2305180**InterDigital | Proposal 8: Different thresholds are used for triggering discovery procedure and (re)selection.  |
| **R2-2305233**China Telecom | Proposal 2: It’s better to set a new condition for triggering the discovery message transmission different from the condition for relay (re)selection, details are FFS. |
| **R2-2305245**vivo | Proposal 10: For source remote UE in discovery mode-B, the condition for triggering discovery transmission and relay selection is the same, but can be specified separately as in U2N relay. FFS whether same or different threshold configuration.Proposal 11: For target remote UE in discovery mode-B, the relationship between discovery transmission and relay selection can be postponed until more SA2 progress. |
| **R2-2305279**CATT | Proposal 2: U2U relay discovery can be triggered when the SL-RSRP/SD-RSRP between a remote UE and the current serving relay UE is below a threshold.Proposal 3: Two different thresholds can be configured for triggering U2U relay discovery message transmission and U2U relay (re-)selection. The threshold used for triggering the U2U relay discovery message transmission can be higher than the threshold used for triggering the U2U relay (re)selection. |
| **R2-2305547**Ericsson | [Proposal 6: It is mandatory that the discovery procedure is triggered with relay selection/reselection is triggered.](#_Toc134743795)[Proposal 7: Standalone discovery procedure can also be triggered based on triggers in the AS-layer](#_Toc134743797) |
| **R2-2305618**CMCC | Proposal 1: In Model A and Model B, source remote UE is responsible for selecting a relay UE based on source remote UE implementation.Proposal 2: In Model B, target UE transmitting discovery response message according to PC5 RSRP has no separate impact on relay selection functionality |
| **R2-2305763**Qualcomm | Proposal 4: The discovery transmission SL threshold for Relay UE or Remote UE is set same as Relay (re)selection threshold, and if existing parameters (i.e., SL-ReselectionConfig-r17) in broadcasted in SIB12, use the configuration SIB12; otherwise, use preconfiguration. |
| **R2-2306191**Huawei, HiSilicon | Proposal 14: When U2U relay selection/reselection is triggered or indicated by upper layer, the remote UE can perform discovery procedure, and the relay selection/reselection is triggered by AS threshold conditions, as following:1> Condition 1: If indicated by upper layer;1> Condition 2: the RSRP measurement of the direct link quality between two remote UEs is below a threshold (i.e. the remote UE does not have a selected U2U relay UE, and relay selection is triggered);1> Condition 3: the UE has a selected U2U relay UE, and the SL-RSRP or the SD-RSRP of the currently selected U2U relay UE is below a threshold (i.e. relay reselection is triggered).2> perform discovery procedure. |
| **R2-2306380**Sharp | Proposal 6: RAN2 reuse U2N Relay (re)selection procedure and introduce new condition and criterion for U2U Relay (re)selection. |
| **R2-2306427**Xiaomi | Proposal 2: When Relay UE selection is triggered and no Relay UE candidate exists the Remote UE AS indicates the Relay UE selection trigger to the upper layer, and the upper layer may trigger Relay UE Discovery. (Whether discovery is triggered if the Remote UE has one or more Relay UE candidates at the AS trigger of selection is a matter for UE implementation.) |

**Summary**:

About the relationship between discovery transmission and relay (re)selection, 4 companies (ZTE, InterDigital, China Telecom, CATT) think the conditions for discovery transmission can be discussed separately from relay (re)selection. 6 companies (OPPO, Apple, vivo, Ericsson, Qualcomm, Huawei) think the conditions for discovery transmission and relay (re)selection are the same, i.e. when relay (re)selection is triggered, the discovery is also triggered, but can be specified separately (vivo). Xiaomi thinks when Relay UE selection is triggered and no Relay UE candidate exists, the Remote UE upper layer can trigger discovery.

As we know, in R17 U2N relay, the discovery transmission and relay (re)selection are specified separately. When relay (re)selection is triggered, the discovery is triggered at the same time to search for candidate relay UEs. Rapporteur thinks the same principle can be followed. And RAN2 can further discuss whether remote UE can perform Model B discovery message transmission while relay (re)selection is not triggered, i.e. different conditions for discovery and relay (re)selection.

**[Easy] Proposal 5a: For U2U relay, when relay (re)selection is triggered, the discovery procedure is triggered at the same time to search for candidate relay UEs.**

**[ToDis] Proposal 5b: RAN2 to discuss whether remote UE can perform Model B discovery while relay (re)selection is not triggered.**

### 2.2.3 Discovery configuration for Connected UE

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2305043**ZTE, Sanechips | Proposal 7: In U2U relay, RRC\_CONNECTED remote/relay UEs acquire discovery resource configuration from dedicated signalling as legacy.  |
| **R2-2305180**InterDigital | Proposal 1: RRC\_CONNECTED remote/relay UEs can obtain discovery configuration via dedicated RRC signalling.  |
| **R2-2305233**China Telecom | Proposal 1: For the U2U relay, RRC\_CONNECTED UEs may obtain discovery configuration from dedicated signalling. |
| **R2-2305245**vivo | Proposal 5: RAN2 to agree that the same dedicated discovery resource pool (defined in Rel-17), if configured, can be used for non-relay discovery, U2N relay discovery and/or U2U relay discovery as baseline. Can be revisited if any impact on co-existence between U2N/U2U is identified. |
| **R2-2305547**Ericsson | Proposal 11: In UE-to-UE relaying, the gNB does not provide a dedicated discovery configuration for an in-coverage UE in RRC\_CONNECTED and can rely on cell-specific configuration/preconfiguration.  |
| **R2-2305551**Spreadtrum | Proposal 1: RRC\_CONNECTED UE in UE-to-UE relay should acquire discovery configuration via dedicated signalling. |
| **R2-2305697**Lenovo | Proposal 1: In U2U relay, the remote/relay UE in RRC\_CONNECTED can acquire discovery configuration via dedicated signaling. |
| **R2-2306191**Huawei, HiSilicon | Proposal 15: Following Rel-16/Rel-17 mechanism, if SIB12 does not provide discovery Tx resource pool, the remote UEs or relay UEs in RRC\_IDLE/RRC\_INACTIVE should enter RRC\_CONNECTED state and obtain discovery resource configuration from dedicated signalling. |

**Summary**:

In the last meeting, RAN2 agreed that both mode 1 and mode 2 resource allocation are supported for both remote UE and relay UE in U2U relay and no impact to legacy resource allocation procedure is expected. At least, dedicated signalling needs to be used to schedule mode 1 resources for RRC\_CONNECTED UEs in U2U relay. So it is natural to follow legacy resource allocation procedure that RRC\_CONNECTED UEs obtain discovery configuration via dedicated signalling. Based on the contributions, 6 companies (ZTE, InterDigital, China Telecom, Spreadtrum, Lenovo, Huawei) support dedicated signalling to acquire discovery configuration while 1 company (Ericsson ) think that RRC\_Connected UE can rely on cell-specific configuration/preconfiguration for U2U relay operation.

In addition, one company propose that the same dedicated discovery resource pool can be used for non-relay discovery, U2N relay discovery and/or U2U relay discovery. One company thinks remote/relay UEs in idle/inactive should enter connected state to obtain discovery configuration from dedicated signalling if SIB12 does not provide discovery Tx resource pool. Since no other company discuss these issues, rapporteur suggests to discuss them later.

**[ToDis] Proposal 6: For RRC\_CONNECTED U2U relay/remote UE, U2U relay, dedicated signalling is used for the discovery configuration.**

### 2.2.4 Co-existence

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2305233**China Telecom | Proposal 5: In this release, RAN2 does not need to achieve the coexistence between the U2N relay and the U2U relay. |
| **R2-2305547**Ericsson | [Proposal 10: RAN2 does not pursue the co-existence between U2N relays and U2U relays in this release as it is not scope of the work item.](#_Toc134743803) |
| **R2-2305874**Kyocera | Proposal 3: RAN2 should consider if there are AS layer impacts when both U2N and U2U discovery types operate simultaneously.  |

**Summary:**

The LS reply (R2-2301933) from SA2 on co-existence and L2 ID issue was received, the co-existence between U2N relays and U2U relays can be supported. Based on the contributions, 3 companies suggested not to consider the co-existence but without clear identified issues for the co-existence. Therefore, rapporteur suggests to de-prioritize this discussion.

**[LowPriority] Proposal 7: RAN2 deprioritize the discussion of U2N relay and U2U relay co-existence.**

## 2.3 Relay (re)selection

### 2.3.1 Thresholds for SL-RSRP and SD-RSRP

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2305043**ZTE, Sanechips | Proposal 11: Different thresholds for SL-RSRP and SD-RSRP are configured for relay (re)selection trigger evaluation. |
| **R2-2305062**Apple | Proposal 13: Different thresholds configured for SL-RSRP and SD-RSRP are used to trigger U2U relay (re)selection. |
| **R2-2305180**InterDigital | Proposal 7: Different thresholds are used for triggering (re)selection based on either SL-RSRP or SD-RSRP.  |
| **R2-2305245**vivo | Proposal 7: Different threshold configuration for SL-RSRP and SD-RSRP are used by UE respectively when triggering relay (re)selection.  |
| **R2-2305419**Nokia | Proposal 2: RAN2 agrees that the comparison of SL-RSRP and SD-RSRP measurements without handling the differences coming from the different transmission power should not be used during the UE-to-UE relay selection and reselection. |
| **R2-2305547**Ericsson | Proposal 1: For relay selection and reselection, a remote UE measures only the SD-RSRP of the candidate U2U relay UEsProposal 2: Different thresholds will need to be configured for SD-RSRP and SL-RSRP |
| **R2-2305618**CMCC | Proposal 4: Different thresholds for SD-RSRP and SL-RSRP are needed. |
| **R2-2306378**MediaTek | Proposal 1: Support different configured thresholds for SL-RSRP and SD-RSRP. |
| **R2-2306380**Sharp | Proposal 1: To trigger relay (re)selection, one threshold is enough.Proposal 3: RAN2 should specify definition of SD-RSRP and SL-RSRP on consideration of backward compatibility.Proposal 4: RAN2 should specify definition of SD-RSRP and SL-RSRP in terms of cast type.- SD-RSRP is RSRP measured by sidelink transmission which cast type is broadcast or groupcast- SL-RSRP is RSRP measured by sidelink transmission which cast type is unicast |
| **R2-2306427**Xiaomi | Proposal 3: RAN2 uses different thresholds for SL-RSRP and SD-RSRP measurements. If the UE uses both RSRP measurement types then it is left to UE implementation to select between them.Proposal 4: RAN2 consider the threshold(s) for SL-RSRP and SD-RSRP measurements are set different for triggering of Relay UE selection compared to the SL-RSRP and SD-RSRP measurements to trigger Relay UE reselection. |

**Summary:**

For both relay selection and relay reselection, it is FFS if different thresholds for SL-RSRP and SD-RSRP are needed or not. At RAN2#121 meeting, RAN2 sent an LS to RAN1/4 about the comparison of SL-RSRP and SD-RSRP measurements. RAN1 and RAN4 discussed the issue and replied that there are some issues for comparison of SL-RSRP and SD-RSRP. Based on the contributions listed above, majority companies think that SL-RSRP and SD-RSRP measurements can not be directly compared and suggest to use different thresholds for SL-RSRP and SD-RSRP. In addition, Xiaomi thinks the threshold(s) for SL-RSRP and SD-RSRP measurements should be set differently for triggering of Relay UE selection and reselection.

**[Easy] Proposal 8: Different thresholds for SL-RSRP and SD-RSRP are configured for the trigger of U2U relay (re)selection.**

### 2.3.2 Threshold configuration for relay (re)selection

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2305547**Ericsson | [Proposal 8: For in-coverage scenarios, the U2U relay relay (re-)selection procedure are purely UE-based procedures with no gNB assistance/involvement required.](#_Toc134743800)[Proposal 9: For in-coverage UEs in RRC\_CONNECTED state, the gNB does not provide a dedicated configuration for relay (re-)selection. Such configurations can be acquired from the cell-specific configuration or preconfiguration.](#_Toc134743802) |
| **R2-2305763**Qualcomm | Proposal 2: For U2U Relay (re)selection threshold configuration to in-coverage Remote UE, if existing parameters (i.e., SL-ReselectionConfig-r17) in broadcasted in SIB12, use the configuration SIB12; otherwise, use preconfiguration.Proposal 3: No dedicated U2U Relay (re)selection threshold is configured to the Remote UE. |
| **R2-2306427**Xiaomi | Proposal 5: RSRP Thresholds to trigger Relay UE selection and Relay UE reselection are preconfigured. The additional need for configurable thresholds is FFS. |
| **R2-2305874**Kyocera  | Proposal 5: For the case of multiplexing data from different source remote UEs RAN2 should consider whether the SL-RSRP thresholds used by the remote UEs and relay UE should be applied consistently, and how to handle the case when the SL-RSRP threshold configured by the gNB is different from the pre-configured threshold(s). |

**Summary:**

For the threshold configuration for relay (re)selection, this actually can follow similar design for the discovery configuration. Considering only a few companies discussed this issue, Rapporteur suggests to postpone the discussion to next meetings.

### 2.3.3 Relay selection specific

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2305043**ZTE, Sanechips | Proposal 8: U2U relay selection can be triggered when the SD-RSRP (e.g. ProSe direct discovery message is monitored from the peer remote UE) towards the peer remote UE is below a threshold when there is no direct link between the two remote UEs.  |
| **R2-2305551**Spreadtrum | Proposal 6: End UE triggers relay selection when: RLF of PC5 link with peer End UE is detected. |
| **R2-2305697**Lenovo | Proposal 3: RLF on the direct PC5 link between two remote UEs can be used to trigger relay selection. |
| **R2-2306427**Xiaomi | Proposal 1: The Remote UE triggers Relay UE selection on detection of PC5-RLF or when the PC5 RSRP falls below a threshold.  |

**Summary:**

RAN2 has agreed that UE-to-UE relay selection can be triggered based on the PC5 RSRP of the direct link falling below a threshold. Besides, 3 companies (Spreadtrum, Lenovo, Xiaomi) think remote UE can trigger relay selection when PC5 RLF is detected with the peer remote UE. ZTE thinks relay selection can be triggered when the SD-RSRP (e.g. ProSe direct discovery message is monitored from the peer remote UE) towards the peer remote UE is below a threshold when there is no direct link between the two remote UEs.

**[ToDis] Proposal 9: Remote UE can trigger U2U relay selection when PC5 RLF of the direct link between the remote UE and the peer remote UE is detected.**

### 2.3.4 Relay reselection specific

#### 2.3.4.1 Source remote UE and second hop

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2304754**OPPO | Proposal 8: Relay UE does not forward AS link quality degradation of one hop to the peer remote UE of the other hop.  |
| **R2-2305043**ZTE, Sanechips | Proposal 9a: The PC5 link quality of the second hop between the relay UE and the target remote UE may be used for triggering relay re-selection by the source remote UE, when there is only uni-directional data from the target remote UE to the source remote UE.Proposal 9b: Relay UE sends indication to the remote UE upon detecting the PC5 link quality of the second hop is below a configured threshold. When receiving the indication, the remote UE may trigger relay re-selection even the PC5 link quality of the first hop is good. |
| **R2-2305062**Apple | Proposal 14: Relay (re-)selection triggers in remote UE need consider the PC5 signal strengths of both hops, if applicable. |
| **R2-2305180**InterDigital | Proposal 4: Discovery message transmitted by the relay UE should carry the RSRP measurement(s) of the link to each remote UE. Proposal 5: When including measurements in the discovery message, the relay UE includes SD-RSRP of a remote UE when SL-RSRP is unavailable and includes both SD-RSRP and SL-RSRP when SL-RSRP is available. Proposal 6: The condition for relay reselection should consider the same measurement (SL-RSRP or SD-RSRP) on each hop.  |
| **R2-2305551**Spreadtrum | Proposal 7: End UE triggers relay reselection when an indication is received from relay which indicates that the PC5 link quality between relay UE and the peer End UE is below a configured threshold. |
| **R2-2305697**Lenovo | Proposal 4: Once the second (receiving) remote UE detects the PC5 link between the relay UE and the second(receiving) remote UE is less than the threshold associated with relay reselection, the second(receiving) remote UE indicates to the relay UE. Then, the relay UE transmits the indication to the first (transmitting) remote UE. Proposal 5: A threshold of triggering relay reselection can be configured to the relay UE.Proposal 6: If the threshold for triggering relay reselection can be (pre)configured to the relay UE, the relay UE can transmit the indication of relay reselection to the first (transmitting) remote UE once the relay UE detects the PC5 link between the relay UE and the second (receiving) remote UE is less than the threshold.  |
| **R2-2305874**Kyocera | Proposal 6: RAN2 should consider which metric should be used by the relay UE to inform the source remote UE/target remote due to drop in quality on the second hop.  |
| **R2-2306380**Sharp | Proposal 9: For triggering condition of U2U relay UE reselection, UE should consider channel quality of second hop.Proposal 10. Relay UE can transmit an information related PC5 RSRP between Relay UE and peer UE. |
| **R2-2306427**Xiaomi | Proposal 16: The Relay UE sends an explicit indication to trigger the Relay UE reselection by the Remote UE. In one example the indication may include an indication regarding the status of the second hop. Additionally or differently the indication may enable the Remote UE to continue with the existing sidelink service until Relay UE reselection is completed. |

**Summary:**

RAN2 has agreed that each Remote UE can trigger Relay reselection based at least on current hop quality. However, it is still not clear if/how the second hop between the relay UE and the peer UE can be considered for relay re-selection. To be specific, whether remote UE can trigger relay reselection based on the link quality of the second hop is not yet determined. Some companies think the PC5 link quality of the second hop can be used for relay reselection trigger but various views in what information of the 2nd hop is indicated to source remote UE. 1 company prefers Relay UE does not forward AS link quality degradation of one hop to the peer remote UE.

**[ToDis] Proposal 10: Remote UE can trigger relay reselection if the link quality of the second hop between the relay UE and peer remote UE is blow a threshold even the link quality of the first hop is good. FFS for the content of the link quality indication of the second hop.**

#### 2.3.4.2 Switch back to direct link

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2304754**OPPO | [Proposal 9 R2 not pursue an AS-layer criterion to judge a direct link availability.](#_Toc134794154) |
| **R2-2305043**ZTE, Sanechips | Proposal 10: It’s up to remote UE implementation whether to switch back from indirect link to direct link. |
| **R2-2305180**InterDigital | Proposal 9: (Re)selection should prioritize a direct link over a relayed link. FFS on details. |
| **R2-2305233**China Telecom | Proposal 6-a: The direct link between the two remote UEs is prioritized over any indirect link. |
| **R2-2305245**vivo | Proposal 8: RAN2 to discuss which interpretation is the correct understanding and send a LS to SA2 to confirm:- Interpretation 1: UE can compare or select from direct link and indirect link based on two PC5-RSRPs even the two links are using different L2 ID pair;- Interpretation 2: UE cannot compare or select from direct link and indirect link based on two PC5-RSRPs because the two links are using different L2 ID pair.Proposal 9: If it is confirmed that reselection towards direct link is supported during relay reselection, the following AS criterion for that can be discussed:- When the PC5 RSRP on indirect link is below a configured threshold and when the PC5 RSRP on the direct link is above a configured threshold, the UE may switch from the indirect to direct link. |
| **R2-2305547**Ericsson | Proposal 5: During relay reselection, it is left to source remote UE’s implementation to choose either the direct link or an indirect link.  |
| **R2-2305590**Nokia | Proposal 5: RAN2 considers specifying triggers at least for indirect-to-direct path switch related to U2U relay. |
| **R2-2305697**Lenovo | Proposal 7: Remote UE can switch back from the U2U relay operation to direct PC5 link if PC5 signal strength condition of direct PC5 link between two remote UEs is better than a threshold. |
| **R2-2306380**Sharp | Proposal 7: Source UE should prior direct communication instead of U2U relaying when source UE performs (re)selection of U2U Relay UE. Proposal 8: RAN2 considers the scenario that Remote UE changes from U2U relaying to direct communication based on AS criteria, because RAN2 supports the scenario that potentially Remote UE changes from direct communication to U2U relaying based on AS criteria. |

**Summary:**

The reselection from relay link to direct link is discussed in 9 contributions. 5 companies (InterDigital, China Telecom, Nokia, Lenovo, Sharp) think that the direct link is prioritized over indirect link and the switching from relay link to direct link is based on AS criteria. However, 3 companies (OPPO, ZTE, Ericssion) think it is up to UE implementation and no AS criteria is needed. In addition, vivo points out that the Layer2 IDs of the remote UE is different for U2U Relay service and Non-relay service. Therefore, source remote UE cannot determine two different L2 IDs for U2U Relay service and Non-relay service are belonging to the same UE. So RAN2 needs to consult with SA2. Rapporteur understands the remote UE can identify the peer remote UE by the upper layer info (e.g. user info ID) included in discovery message.

**[ToDis] Proposal 11: RAN2 to discuss whether AS criterion is needed for switching back from indirect to direct link.**

### 2.3.5 Criterion for relay (re)selection

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2304754**OPPO | [Proposal 7: R2 not pursue U2U relay selection criterion based on relay-load/PLMN/gNB/Cell ID.](#_Toc134794152)Proposal 25: Besides the AS layer criterion for U2U relay reselection, R2 not pursue further AS-layer spec impact for relay reselection, but just rely on the higher layer procedure defined by SA2. |
| **R2-2305180**InterDigital | Proposal 4: Discovery message transmitted by the relay UE should carry the RSRP measurement(s) of the link to each remote UE.Proposal 10: (Re)selection should prioritize a relay with the next hop already established via an existing PC5-RRC connection. FFS on details.Proposal 11: Aside from prioritization of direct link and existing PC5-RRC connection, a UE can select any relay (up to UE implementation) having RSRPs in both hops above a threshold. |
| **R2-2305062**Apple | Proposal 15: “whether the PC5 link of the 2nd PC5 hop is already established or not” is considered as one of the criteria for relay (re-)selection. |
| **R2-2305233**China Telecom | Proposal 3: For the U2U relay (re)selection, the remote UE may select a relay UE from multiple suitable UEs based on its implementation. FFS on the detailed process.Proposal 6-b: Relay UE with the established unicast link is prioritized over other Relay UEs in the candidate list. |
| **R2-2305279**CATT | Proposal 4: If multiple suitable candidates U2U relay UEs which meet both the AS-layer and higher layer criteria are available, it is up to remote UE implementation to choose which U2U relay UE. |
| **R2-2305547**Ericsson | Proposal 3: During relay selection, it is left to source remote UE’s implementation to choose a U2U relay UE to perform PC5 connection establishment when more than one suitable candidate U2U relay UEs meet the AS-layer and higher layer criterion.  |
| **R2-2305551**Spreadtrum | Proposal 8: No additional AS criteria for UE-to-UE relay (re)selection are considered in this release. |
| **R2-2305519**Sony | Proposal 1: The source UE will send an ordered candidate relay list, according to the preference from source UE’s point of view, to destination UE. Proposal 2: A U2U relay UE is considered suitable if the PC5 link quality between source UE and U2U relay UE as well as PC5 link quality between U2U relay UE and destination UE exceeds a (pre)configured threshold.Proposal 3: PLMN ID and cell ID should be considered as the criteria on the selection of U2U relay.  |
| **R2-2305590**Nokia, Nokia Shanghai Bell | Proposal 2: As when triggering the relay selection, any of the UEs may provide a list of U2U Relay UE candidates for the other UE to perform the U2U relay selection for a direct-to-indirect path switch.Proposal 4: One of the UEs (either the source End UE or the target End UE) may provide a list of U2U Relay UE candidates for the other UE to perform the U2U relay reselection for an indirect-to-indirect path switch. |
| **R2-2305874**Kyocera | Proposal 7: The remote UE is allowed to be support make-before-break relay reselection (i.e., release the existing relay UE after PC5 connection is established with the candidate relay UE). |
| **R2-2306380**Sharp | Proposal 11: RAN2 to discuss whether to support the negotiated relay reselection procedure.Proposal 12: remote UE should choose the U2U relay UE considering the quality of both hops. |
| **R2-2306427**Xiaomi | Proposal 13: A source Remote UE receiving multiple discovery messages from multiple Relay UEs with a PC5 link quality measurement above the PC5 link quality threshold, may rank these Relay UEs. The Relay UE ranking may be according to their respective PC5 link quality measurement, and forwarded to the source Remote UE higher layer for Relay UE selection.Proposal 14: If multiple U2U Relay UEs fulfil the AS and NAS selection requirement, the Remote UE selects the U2U relay UE with the lowest load.Proposal 15: Relay UE triggers an indication to the Remote UE when it’s loading reaches a threshold. The Indication includes information relating to the relative loading of the Relay UE. FFS how to measure the actual load and the corresponding load indication. The remote UE performs relay UE reselection following receipt of the load indication from the Relay UE.Proposal 17: Load information of U2U relay UE can be included in or with the discovery message for example in the AS information transmitted with the U2U relay discovery message, FFS on how to determine the load information. |

**Summary:**

Some contributions discuss the criterion for relay (re)selection and the issue how to select a relay UE if multiple candidate relay UEs which meet both the AS-layer and higher layer criteria are available. 3 companies (InterDigital, Sony, Sharp) think the remote UE should choose relay UE considering the PC5 link quality of both hops. Rapporteur understands the link quality of the two hops has already been considered during the discovery procedure for relay (re)selection as discussed in previous sections.

6 contributions (China Telecom, CATT, Ericsson, InterDigital) propose that it is up to source remote UE implementation to choose one U2U relay UE and no additional criteria is considered (OPPO, Spreadtrum). 3 companies (Apple, InterDigital, China Telecom) think Relay UE with the established unicast link of the 2nd hop should be prioritized in relay (re)selection. Xiaomi prefers to select a relay based on a criteria e.g RSRP based ranking or load information. 1 company (Sony) thinks PLMN ID and cell ID should be considered as the criteria on the selection of U2U relay.

**[Easy] Proposal 12a: Besides the PC5 link quality, RAN2 does not pursue other criteria for relay (re)selection.**

**[Easy] Proposal 12b: If multiple suitable U2U relay candidates which meet both the AS-layer and higher layer criteria are available, it is up to remote UE implementation to choose a U2U relay UE.**

3 companies (Sony, Nokia, Sharp) discussed that remote UE may provide a list of candidate relay UEs to the peer remote UE for relay (re)selection. Rapporteur understands it relates to negotiated relay (re)selection being discussed in SA2. RAN2 can revisit this issue if SA2 asks or RAN2 impacts are identified.

### 2.3.6 Different relay UEs are selected by two remote UEs.

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2305043**ZTE, Sanechips | Proposal 12: RAN2 send LS to SA2 to ask for the issue that two relay UEs are selected and initiated for relay link establishment simultaneously. |
| **R2-2305233**China Telecom | Proposal 7 Two remote UE may select two different relay UEs simultaneously for communicating with each other, so RAN2 should send LS to inform SA2.  |
| **R2-2305245**vivo | Proposal 6: Leave the decision to SA2 of whether/how to handle the case that relay reselection is triggered simultaneously at both remote UE1 and remote UE2. Send a LS to SA2 to inform this if agreed. |

**Summary:**

RAN2 has agreed that each remote UE can trigger relay (re)selection based on the current hop/direct link quality. 3 companies think since each remote UE can trigger relay (re)selection, two different relay UEs may be selected by the two remote UEs individually. If the two remote UEs initiate hop-by-hop/E2E PC5 unicast link simultaneously, they may connect to each other with two relay UEs, which is not aligned with the WID that a remote UE is connected to only a single relay UE at a given time for a given destination UE. Rapporteur thinks this issue is related to upper layer procedures and it is better to inform SA2. Considering the related WI in SA2 will be completed soon, it is suggested RAN2 to discuss this issue and send LS to SA2 timely.

**[ToDis] Proposal 13: RAN2 to discuss whether/how to handle the case that remote UE and its peer remote UE may select two different relay UEs simultaneously for communicating with each other. Send LS to SA2 if necessary .**

## 2.4 SRAP design

### 2.4.1 Remote UE ID

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2304680**NEC | Proposal-2: The identity information of source U2U Remote UE end-to-end Radio Bearer and a local Remote UE ID are included in the SRAP header in order for the target Remote UE to correlate the received packets for the specific PDCP entity associated with the right end-to-end Radio Bearer. Proposal-3:Destination Remote UE ID or a local ID is included at SRAP data header to support bearer mapping for end-to-end UE-to-UE traffic for first hop. Proposal-4: The identity information of source Remote UE is not included in the adaptation layer header of first hop assuming there is mapping at Relay UE.Proposal-5: The U2U Relay UE configures source and target Remote UEs with the local UE identities.  |
| **R2-2304754**OPPO | Proposal 10: R2 discusses using 24-bit L2 ID as the UE ID (Option-3 in R2-2304304) to be included in SRAP header. Proposal 11: If short ID is agreed, relay UE is responsible for ID assignment.Proposal 12: If short ID is agreed, including IDs of both end-UEs (Option-4 in [R2-2304304](file:///C%3A%5C%5CUsers%5C%5Cmtk16923%5C%5CDocuments%5C%5C3GPP%20Meetings%5C%5C202304%20-%20RAN2_121bis-e%2C%20Online%5C%5CExtracts%5C%5CR2-2304304%20%5BAT121bis-e%5D%5B431%5D%5BRelay%5DSRAP%20proposals%20on%20U2U%20relay%20%28Lenovo%29.docx%22%20%5Co%20%22C%3AUsersmtk16923Documents3GPP%20Meetings202304%20-%20RAN2_121bis-e%2C%20OnlineExtractsR2-2304304%20%5BAT121bis-e%5D%5B431%5D%5BRelay%5DSRAP%20proposals%20on%20U2U%20relay%20%28Lenovo%29.docx)) in the adaptation layer. |
| **R2-2304957**Fujitsu | Proposal 1: The egress PC5-RLC channel in Relay UE is differentiated for each Destination remote UE. Proposal 2: The mapping of E2E bearer ID and egress RLC Channel in Relay UE ensures that the bearers for different Destination remote UEs are mapped to different egress PC5-RLC channels.Proposal 3: Target Remote UE ID (local ID) is included in SRAP header in the first hop and Source Remote UE ID (local ID) is included in SRAP header in the second hop. Proposal 4: The Source Remote UE’s local ID and the Destination Remote UE’s local ID are allocated by Relay UE. |
| **R2-2305043**ZTE, Sanechips | Proposal 13: It is suggested that both source UE L2 ID and destination UE L2 ID are included in the adaptation header of each hop. |
| **R2-2305062**Apple | Proposal 3: SRAP header including both Source L2 address and Destination L2 address is used in U2U Relay adaptation layer.Proposal 4: If local ID is to be used in SRAP, L2 U2U relay UE is responsible for local ID assignment.Proposal 5: If local ID is to be used in SRAP, RAN2 choose either Option 2 or Option 4. |
| **R2-2305181**Interdigital | Proposal 11: Include both source L2 ID and destination L2 ID in the adaptation layer header on both hops.  |
| **R2-2305210**LG | Proposal 13: After local ID assignment from the relay UE, the messages from the source remote UE to the target remote UE can use the following one short ID to reduce SRAP header size.- (Option 1) Target remote UE ID (local ID) in the first hop and source remote UE ID (local ID) in the second hop.- (Option 2) A local ID for a pair between source UE and target remote UE. |
| **R2-2305233**China Telecom | Proposal 8 RAN2 to discuss which ID (24-bit layer-2 ID or local ID) can be used in the SRAP header. We prefer to use local ID.Proposal 9 For the U2U relay, the local IDs for each hop are needed to distinguish the S-Remote-UE and D-Remote-UE.Proposal 10 For the U2U relay, the local IDs should be assigned by the relay UE, details are FFS. |
| **R2-2305246**vivo | Proposal 4: Option 1 (Target remote UE ID (layer-2 ID) in first hop and source remote UE ID (layer-2 ID) in second hop) is excluded.Proposal 5: If signalling overhead is the most import metric in Rel-18 single-hop scenario, adopt Option 2/5 (i.e., one local UE ID over first and second hop) in the adaptation layer header. Otherwise, adopt Option 3 (i.e., two L2 IDs over first and second hop).Proposal 6: If local UE ID is agreed in the PC5 adaption layer header, the Relay UE is responsible to allocate the local UE ID for the remote UE. FFS detailed signalling procedure.Proposal 7: If local UE ID is agreed in the PC5 adaption layer header, the local UE ID to be included over the first and second hop can be different, i.e.:-The Relay UE allocates a local UE ID based on the numbering of Target Remote UE(s) and include it over the first hop-The Relay UE allocates a local UE ID based on the numbering of Source Remote UE(s) and include it over the second hop |
| **R2-2305279**CATT | Proposal 5: For U2U relay, PC5 adaptation layer header should include: source remote UE L2 ID, target remote UE L2 ID and BEARER ID. Considering the overhead, a mapping from the pair of source remote UE L2 ID and target remote UE L2 ID to a local shorter link identifier is needed in Rel-18 U2U relay. Proposal 6: For Rel-18 U2U relay, relay UE is responsible for assignment of the local shorter link identifier. |
| **R2-2305548**Ericsson | Proposal 1: Local ID is to be included in the SRAP header for source remote UE identificationProposal 2: The following options should be excluded from consideration:- Option 1: Target remote UE ID (layer-2 ID) in first hop and source remote UE ID (layer-2 ID) in second hop- Option 2: Target remote UE ID (local ID) in first hop and source remote UE ID (local ID) in second hop.- Option 3: Both source remote UE ID (layer-2 ID) and target remote UE ID (layer-2 ID) included in each hopProposal 3: Down select between Option 4, where both source remote UE (local ID) and target remote UE (local ID) and Option 5, where a common ID for a pair between source and target remote UE is included in each hop. FFS if this common ID is different from the local ID.Proposal 4: Different local IDs are assigned to the SRC and DST UEs.Proposal 5: The U2U relay assigns the local ID for the SRC and DST UEs. |
| **R2-2305551**Spreadtrum | Proposal 10: For UE-to-UE relay, adaptation layer header should include local UE ID of the source End UE and local UE ID of the target End UE.Proposal 11: Relay UE is responsible for local UE ID assignment. |
| **R2-2305590**Nokia | Proposal 6: The Local ID identifies a pair of the source and target End UEs on SRAP level over each hop in the L2 U2U relay connection.Proposal 7: The Local ID is unique per hop and specific to each hop.Proposal 8: RAN2 adopts a single 8-bit Local ID that is included in the SRAP header.Proposal 9: The assignment of the Local ID is hop-by-hop.Proposal 10: The assignment of the local ID is initiated by either the source End UE or the target End UE whichever performs the U2U relay (re)selection. |
| **R2-2305618**CMCC | Proposal 5: Local UE ID should be used in SRAP header. Proposal 6: Both source remote UE local ID and target remote UE local ID should be included in the adaptation layer header. FFS on how to reduce UE ID collision impact.Proposal 7: Considering multi hop compatibility, source remote UE is slightly preferred for UE ID assignment. |
| **R2-2305762**Qualcomm | Proposal 1: RAN2 takes single-hop U2U relay as high priority in Rel-18.Proposal 2: If only single-hop U2U relay is considered, then existing SRAP layer format (same local on both hops) are reused, UE behavior can be clarified for U2U relay.Proposal 2: RAN2 does not pursue the Layer-2 ID as ID format in adaptation layer.Proposal 3: If multi-hop relay is considered, per-hop local ID is used to identify Remote UE(s), and the Relay UE replaces the ingress per-hop local ID with egress per-hop local ID.Proposal 4: If multi-hop relay is considered, only one per-hop local ID is included in SRAP header on each hop to identify the S-UE and D-UE pair. |
| **R2-2306191**Huawei, HiSilicon | Proposal 1: For the UE ID in AL header in U2U relay case, RAN2 agree to use local ID instead of L2 ID.Proposal 2: For L2 U2U relay, the adaptation layer header includes local ID of target remote UE in first hop and local ID of source remote UE in second hop. |
| **R2-2306378**MediaTek | Proposal 3: Support Option 3 (Both source remote UE ID (layer-2 ID) and target remote UE ID (layer-2 ID)) included in each hop. |
| **R2-2306380**Sharp | Proposal 15. Layer-2 ID should not be used as UE ID for including in SRAP header.Proposal 16. UE ID changing per hop should not be introduced because relay UE needs to perform header modification and store additional mapping between 1st hop ID and 2nd hop ID. Proposal 17. Both local UE ID (source and destination) should be included in SRAP header. |
| **R2-2306427**Xiaomi | Proposal 18: The IDs mappable to the source and destination remote UE are different IDs. Proposal 19: Include both source and destination UE IDs in the SRAP header.  |

**Summary:**

During RAN2 #121bis-e meeting, 5 options for SRAP layer design are provided as follows:

* Option 1: Target remote UE ID (layer-2 ID) in first hop and source remote UE ID (layer-2 ID) in second hop.
* Option 2: Target remote UE ID (local ID) in first hop and source remote UE ID (local ID) in second hop.
* Option 3: Both source remote UE ID (layer-2 ID) and target remote UE ID (layer-2 ID) included in each hop.
* Option 4: Both source remote UE ID (local ID) and target remote UE ID (local ID) included in each hop.
* Option 5: A common ID for a pair between source remote UE and target remote UE included in each hop.

Based on the summary report of the SRAP email discussion (RP-2304304) in RAN2#121bis meeting and the proposals submitted for RAN2#122 meeting, it is still divergent on whether the layer-2 ID or local ID or common ID for a pair should be included in the SRAP header as shown below.

* Layer-2 ID: OPPO, ZTE, Apple, Interdigital, vivo, MediaTek,
* Local ID: NEC, Fujitsu, LG, China Telecom, vivo, Ericsson, Spreadtrum, CMCC, Huawei, Sharp
* Common ID for a pair: vivo, CATT, Ericsson, Nokia, Qualcomm,

Based on the papers, the pros and cons for the Layer-2 ID and short ID (i.e. local ID or common ID for a pair) is summarized as follows:

|  |  |  |
| --- | --- | --- |
|  | Pros | Cons |
| Layer-2 ID | No spec impact for L2 ID allocationReuse the NAS mechanism for L2 ID collision resolution | 1. bit L2 ID with higher overhead

Handle L2 ID update impacts  |
| Short ID | <24 bit short ID with lower overhead, align with U2N design | Design short ID allocation mechanismDesign AS mechanism for short ID collision resolutionNot sure whether short ID will be updated similar to U2N relay |

From rapporteur’s point of view, the primary difference between L2 ID and short ID lies in the specification impact and the header overhead. Considering there is no clear majority view on this, it is suggested to further discuss this online.

**[ToDis] Proposal 14: RAN2 to discuss which ID (24-bit L2 ID or short ID) can be used in SRAP header.**

Suppose the L2 ID is adopted, majority companies (OPPO, ZTE, Apple, Interdigital, vivo, MediaTek) who support L2 ID also support to include both source remote UE ID (layer-2 ID) and target remote UE ID (layer-2 ID) in each hop (i.e. Option 3).

**[Easy] Proposal 15: If 24-bit L2 ID is agreed, Option 3 (both source remote UE 24-bit layer-2 ID and target remote UE 24-bit layer-2 ID included in each hop) should be supported.**

On the other hand, suppose short ID is used, the following three options and companies’ opinions are listed as follows:

* Option 2: target remote UE ID (local ID) in first hop and source remote UE ID (local ID) in second hop,

Support company: NEC, Fujitsu, Apple, LG, vivo, Huawei, Xiaomi

* Option 4: both source remote UE ID (local ID) and target remote UE ID (local ID) in each hop,

Support company: OPPO, Apple, Ericsson, Spreadtrum, CMCC, Sharp

* Option 5: a local pair ID for a pair between source UE and target remote UE in each hop,

Support company: LG, vivo, CATT, Ericsson, Nokia, Qualcomm,

Among the three options for short ID, Option 4 is forward compatible for multi-hop while Option 2 and Option 5 require lower signalling overhead. For Option 2 and 5, it may further requires the change of SRAP header at relay UE for each hop.

**[ToDis] Proposal 16a: If short ID is agreed, RAN2 to discuss which option should be supported.**

**Option 2: Target remote UE ID (local ID) in first hop and source remote UE ID (local ID) in second hop.**

**Option 4: Both source remote UE ID (local ID) and target remote UE ID (local ID) included in each hop.**

**Option 5: A local pair ID for a pair between source remote UE and target remote UE included in each hop.**

Moreover, suppose short ID is adopted, the subsequent issue is who is responsible for the ID assignment. Based on the submitted papers, majority companies who support short ID also support that relay UE is responsible for the ID assignment.

**[Easy] Proposal 16b: If short ID is agreed, relay UE is responsible for ID assignment.**

### 2.4.2 Bearer ID

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2304680**NEC | Proposal-2: The identity information of source U2U Remote UE end-to-end Radio Bearer and a local Remote UE ID are included in the SRAP header in order for the target Remote UE to correlate the received packets for the specific PDCP entity associated with the right end-to-end Radio Bearer.  |
| **R2-2304754**OPPO | Proposal 22: RAN2 to discuss to obtain the BEARER used for PDCP ciphering/deciphering via: 1) specified values for SL-SRBs, and 2) slrb-PC5-ConfigIndex for DRB (excluding the specified values for SL-SRBs). |
| **R2-2305062**Apple | Proposal 1: Sidelink SRB/DRB differentiation is included in the SRAP header for U2U Relay.Proposal 2: RAN2 consider one of the following options for BEARER ID field for U2U SRAP: 1) one extra bit in BEARR ID field to distinguish SRB and DRB; 2) Reserved numerical space from 0 to N-1 to represent N SL-SRBs, while SL-DRB numbering starts from N. |
| **R2-2305246**vivo | Proposal 1: For E2E SL-DRBs, RAN2 to confirm that the BEARER ID in the adaptation layer header format is set to the configuration index in the list of SLRB configurations (i.e., indicated by SLRB-PC5-ConfigIndex in TS 38.331).Proposal 2: For E2E SL-SRBs, RAN2 to confirm that the BEARER ID in the adaptation layer header format is set to a fixed value for each SL-SRB type, e.g., 0/1/2/3 are specified for SL-SRB 0/1/2/3 respectively.Proposal 3: Similar to U2N relay, for the BEARER ID shared by both E2E SL-SRB and E2E SL-DRB, separate PC5 RLC channel is used to differentiate SL-SRB and SL-DRB of remote UE. |
| **R2-2305618**CMCC | Proposal 10: Rx remote UE’s PDCP entity get E2E bearer ID from lower SRAP layer header through E2E data transmission. |
| **R2-2306191**Huawei, HiSilicon | Proposal 3: The E2E bearer identification should be able to identify E2E SL-DRBs and E2E SL-SRBs which carry E2E PC5-S messages and E2E PC5-RRC messages.Proposal 10: The config index of SLRB is taken as the E2E bearer ID for SL-DRB, and the E2E bearer ID of SL-SRB should be specified. |

**Summary:**

During last meeting, the following working assumption has been reached:

|  |
| --- |
| WA: E2E bearer ID (i.e., configuration index in the list of SLRB configurations) is used as input for the L2 U2U relay ciphering and deciphering at PDCP. |

However, it is not clear whether the configuration index in the list of SLRB configuration denotes the *slrb-Uu-ConfigIndex in* in Uu interface or the *slrb-PC5-ConfigIndex* in PC5 interface. There are proposals to clarify this issue and it is proposed to use slrb-PC5-ConfigIndex for SL-DRB. With regard to the bearer ID of SL-SRB, 4 companies (OPPO, Apple, vivo, Huawei) suggest to use specified values for SL-SRBs, e.g. 0/1/2/3 for SL-SRB 0/1/2/3 respectively. Considering that SL-SRB4 is for discovery message transmission which does not need to be relayed, so it is not necessary to consider the bearer ID of SL-SRB4 for the SRAP header design.

**[Easy] Proposal 17a: Confirm the WA with following change: E2E bearer ID (i.e., *slrb-PC5-ConfigIndex* in the list of SLRB configurations for SL-DRBs, and specified values 0/1/2/3 for SL-SRB0/1/2/3) is used as input for the L2 U2U relay ciphering and deciphering at PDCP.**

On the other hand, 3 companies (OPPO, Apple, vivo) raise the overlapping issue of bearer ID between SL-SRBs and SL-DRBs. For example, “bearer ID =1” can mean either SL SRB1 or SL DRB1. As far as we know, similar issue also exist for L2 U2N relay and implicit method is adopted, i.e., separate RLC channels are configured for the relaying of SL-SRB and SL-DRB and the relay UE need to recognize the SRB vs. DRB based on ingress RLC channel. However some companies suggest other approaches to solve the overlapping issue for L2 U2U relay. It is suggested to further discuss this.

**[ToDis] Proposal 17b: RAN2 to discuss how to identify the E2E bearer ID(e.g. 0/1/2/3) included in SRAP header is for SL-SRB or SL-DRB.**

## 2.5 PC5-RRC procedure

### 2.5.1 SL-SRB relevant configuration

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2304754**OPPO | Proposal 13: Rely on specified configuration for E2E SRB in L2 U2U Relay, including PDCP/SRAP/RLC/MAC configuration of end-UE, and SRAP/RLC/MAC configuration of relay-UE. |
| **R2-2305043**ZTE, Sanechips | Proposal 14a: The configurations for E2E SL-SRB0/1/2/3 are considered. Since discovery message does not need to be relayed, the relaying of SL-SRB4 is not considered.Proposal 14b: The PDCP configuration specified for SL-SRBs could be reused for E2E SL-SRBs.Proposal 14c: Default SRAP configuration and default PC5 relay RLC channel are defined and used for E2E SL-SRBs.Proposal 14d: A single PC5 Relay RLC channel is used to transmit all E2E SL-SRBs. |
| **R2-2305062**Apple | Proposal 8:PC5 Relay RLC channel(s) to support SL-SRB(s) are to be configured by Relay UE via PC5-RRC before the establishment of end-to-end PC5 link.Proposal 9:Only RLC AM mode should be used for PC5 Relay RLC channel(s) mapped to support SL-SRB 0/1/2/3. |
| **R2-2305246**vivo | Proposal 8: Specified SL SRAP configuration on top of the legacy specified SCCH configuration is introduced per E2E SL-SRB0/1/2/3.Proposal 9: Discuss whether specified or default PC5 RLC channel configuration(s) is introduced for E2E SL-SRBs. FFS one common configuration or separate configuration for each SL-SRB type. |
| **R2-2305279**CATT | Proposal 9: Using the specified configuration for E2E SL-SRBs.Proposal 10: In order to support the specified configuration for E2E SL-SRBs, the mapping between the two PC5 RLC channels used for the E2E SL-SRBs should be specified.Proposal 11: In order to support the specified configuration for E2E SL-SRBs, new per-hop SL-RLCs (e.g. SL-RLC3/4/5/6) should be introduced. |
| **R2-2305551**Spreadtrum | Proposal 12a: For E2E SL-SRB, specified configuration is used for the configuration of E2E PDCP configuration and per-hop SRAP/RLC/MAC configuration. |
| **R2-2305743**Samsung | Proposal 3: Specified Layer-2 bearer configuration can be used for PC5 Relay RLC channel for E2E SL-SRBs.Proposal 4: RAN2 is kindly asked to discuss whether to define multiple or one specified Layer-2 configuration for E2E SL-SRBs. |
| **R2-2305762**Qualcomm | Proposal 5: Taking the default configuration as baseline for E2E SL-SRB, i.e. use default E2E PC5 PDCP configuration, use default per-hop RLC Channel configuration and SRAP configuration (if needed).Proposal 6: It is FFS whether to reuse the existing default configuration specified for SL-SRBs or introduce new default configuration for E2E SL-SRBs via U2U relay.Rapporteur: Legacy SL-SRBs use specified configuration instead of default configuration. So here the proposed default configuration is regarded as specified configuration.  |
| **R2-2306125**ASUSTeK | Proposal 1: In L2 UE-to-UE Relay, separate PC5 RLC channels are used for transmitting (1) per-hop PC5-S messages between ProSe end UE and U2U Relay UE and (2) E2E PC5-S messages between ProSe end UEs via U2U Relay UE. |

**Summary:**

6 companies (OPPO, ZTE, vivo, CATT, Spreadtrum, Qualcomm) suggest to use specified configuration for the PDCP configuration of E2E SL-SRBs of L2 U2U relay. With regard to the SRAP configuration, 5 companies (OPPO, vivo, CATT, Spreadtrum, Qualcomm) suggest to also use specified configuration. For the RLC/MAC configuration of PC5 RLC channel for SL-SRB, 5 companies (OPPO, CATT, Spreadtrum, Samsung, Qualcomm) suggest to use specified configuration. 2 companies (ZTE, vivo) suggest to also consider default configuration for the PC5 RLC channel configuration. One company (Apple) suggest to configure PC5 RLC channel for SL-SRbs via PC5- RRC before the establishment of end-to-end PC5 link.

Considering that specified configuration of SL-SRB is used for sidelink direct communication and U2N relay, it is no harm to reuse it for the U2U relay. For the SRAP configuration, it actually depends on whether specified or default configuration is used for PC5 RLC channel. Actually, specified PC5 RLC channel configuration is the simplest. While default PC5 RLC channel configuration is more flexible because the PC5-RRC message can be utilized to (re)configurate it. Based on the above analysis, the following proposal is given.

**[Easy] Proposal 18: For the E2E SL-SRB configuration of U2U relay, specified PDCP configuration is used. FFS for the SRAP and PC5 RLC channel configuration for SL-SRB.**

### 2.5.2 SL-DRB relevant configuration

#### 2.5.2.1 QoS split

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2304754**OPPO | Proposal 14: Rely on SA2 developed PC5-S procedure for the QoS split decision of L2 U2U relay. Proposal 15: If RAN2 agrees to adopt AS layer procedure for QoS split in L2 U2U relay, take the SA2 designed procedure (solution-4 of TR23.700) as reference for AS-layer signaling design. |
| **R2-2305043**ZTE, Sanechips | Proposal 16: Source remote UE performs QoS split. It can be extended to multi-hop scenario, that each UE involved in U2U relay communication decides the PC5 QoS split of its next hop (i.e. the hop between the UE and the next UE). |
| **R2-2305062**Apple | Proposal 7: Relay UE use a unified PC5-RRC procedure (e.g., RRCReconfigurationSidelink) to configure both remote UEs with QoS Split parameters, PC5 Relay RLC channel configuration, SRAP mapping and Local ID(s) for SRAP. |
| **R2-2305181**Interdigital | Proposal 5: If the source UE or the relay UE are in RRC\_CONNECTED, the gNB of this UE is responsible for determining the QoS split. FFS on the case where both UEs are RRC\_CONNECTED.Proposal 6: The relay UE determines the QoS split when neither gNB is involved. FFS on the criteria used (e.g., SL RSRP) and on whether assistance from the source UE is needed. |
| **R2-2305210**LG | Proposal 3: When relay UE sends *RRCReconfigurationCompleteSidelink* message to the source remote UE, that completion message can include local ID and split QoS information (e.g., PQI).Proposal 5: When relay UE sends *RRCReconfigurationSidelink* message to the target remote UE, that configuration message can include local ID and split QoS information (e.g., PQI).Proposal 11: If the source remote UE is in RRC\_CONNECTED, the remote UE reports the split QoS information and the relay UE ID as a destination to the serving gNB.Proposal 12: If the relay UE is in RRC\_CONNECTED, the relay UE performs QoS split for itself and then reports the split QoS information and the target remote UE ID as a destination to its serving gNB. |
| **R2-2305233**China Telecom | Proposal 11 RAN2 to confirm that AS layer is responsible for E2E QoS split in the L2 U2U relay.Proposal 12 It’s more efficient for the relay UE to split the QoS profiles.Proposal 13 The source remote UE can negotiate with the relay UE to decide the two hops QoS split. |
| **R2-2305246**vivo | Proposal 14: RAN2 to confirm that AS layer is responsible for QoS split in L2 U2U relay.Proposal 15: If AS layer is agreed to perform QoS split, relay UE is responsible for QoS split in L2 U2U relay.Proposal 16: Using Hop-by-Hop PC5 RRC procedure in L2 U2U relay scenario to perform the E2E QoS (e.g., for PC5 PDB parameter) splitting over the two hops. |
| **R2-2305279**CATT | Proposal 7: The end-to-end PDB and PER parameters needs to be split between two PC5 links.Proposal 8: The remote UE is in charge of splitting the end-to-end QoS to hop-by-hop QoS for U2U relay. |
| **R2-2305548**Ericsson | Proposal 7: The U2U relay configures the QoS split for the end-to-end unicast link.Proposal 8: SRC UE can provide the U2U relay with assistance info to assist in splitting the QoS. |
| **R2-2305551**Spreadtrum | Proposal 9: source End UE or source End UE’s serving gNB perform QoS split. |
| **R2-2305618**CMCC | Proposal 8: AS layer (e.g. PC5-RRC message) is responsible for QoS split in L2 U2U relay.Proposal 9: Relay UE is responsible for QoS split in L2 U2U relay. |
| **R2-2305697**Lenovo | Proposal 11: RAN2 confirms that splitting end-to-end QoS should be handled by RAN.Proposal 12: Relay UE is responsible for QoS splitting in L2 U2U relay. Proposal 13: Remote UE transmits the QoS information to relay UE for QoS splitting purpose. |
| **R2-2305743**Samsung | Proposal 1. L2 U2U Relay UE can take the role of splitting E2E QoS parameters into per-hop QoS parameters: 1st QoS parameter between Source remote UE and Relay UE, 2nd hop QoS parameter between Relay UE and Target remote UE.Proposal 2. E2E QoS parameters including PQI can be provided from Source remote UE to L2 Relay UE via PC5 RRC message. |
| **R2-2305762**Qualcomm | Proposal 7: The Remote UE sends E2E PC5 QoS profiles to the Relay UE using per-hop PC5-S message, and the Relay UE splits the E2E QoS profiles into per-hop QoS profiles and sends to the two Remote UEs using per-hop PC5-S message.  |
| **R2-2306191**Huawei, HiSilicon | Proposal 4: In L2 U2U relay operation, the E2E QoS requirement is to be divided into per-hop QoS requirement in AS layer via PC5-RRC messages.Proposal 6: QoS split is for transmission, thus it is performed per direction from Tx remote UE to Rx remote UE.Proposal 7: The QoS split is performed by Tx remote UE in the following way:‐If the Tx remote UE is OoC, the QoS split is based on pre-config.‐If the network provides QoS split information in SIB12, the idle/inactive UE can use the info in SIB12 to perform QoS split, otherwise the idle/inactive UE should enter RRC connected state.‐If the Tx remote UE is in connected state, it reports QoS parameters to the network, and network can provide per-hop QoS parameters via Uu RRC message.Proposal 8: The existing RSRP measurement report and CBR measurement report can be used to assist Tx remote UE or its gNB on QoS split. |
| **R2-2306378**MediaTek | Proposal 2: Relay UE is responsible for QoS split in L2 U2U relay. |
| **R2-2306427**Xiaomi | Proposal 20: Rely on the UE itself to perform QoS split. FFS source remote UE or relay UE. |

**Summary:**

According to the LS R2-2304652 from SA2, SA2 asks RAN2 to define the AS solution/signalling to address QoS splitting for L2 U2U relay. As we can see from the above proposals, 15 companies (ZTE, Apple, Interdigital, LG, China Telecom, vivo, CATT, Ericsson, Spreadtrum, CMCC, Lenovo, Samsung, Huawei, MediaTek and Xiaomi) propose that AS layer (e.g. PC5-RRC message) should be responsible for QoS split in L2 U2U relay.

**[Easy] Proposal 19a: AS layer is responsible for QoS split in L2 U2U relay.**

The follow-up issue is which node can perform QoS split. Based on the contribution, the following three options are proposed:

* Relay UE: OPPO, Apple, Interdigital, LG, ChinaTelecom, vivo, CMCC, Lenovo, Samsung, QC, MediaTek, xiaomi
* Remote UE: ZTE, CATT, Spreadtrum, Huawei, xiaomi
* gNB: Interdigital, Huawei

As we can see, majority companies propose that relay UE should be responsible for the QoS split. Therefore, the following proposal is made:

**[Easy] Proposal 19b: Relay UE is responsible for AS layer QoS split in L2 U2U relay.**

#### 2.5.2.2 E2E SL-DRB and PC5 RLC channel configuration

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2304754**OPPO | Proposal 16: For PDCP/SDAP configuration for E2E DRB in L2 U2U Relay, as in legacy, Tx end-UE (or its serving gNB) decides on the Tx side related parameters, and Tx end-UE sends the parameters (that are related to both Tx side and Rx side) to Rx end-UE via E2E PC5-RRC signaling. Rx end-UE decides on the parameters only related to Rx side by implementation.Proposal 17: For OOC/IDLE/INACTIVE L2 U2U End-UE, PDCP/SDAP setting is obtained via Pre-configuration/SIB by referring to end-to-end QoS as in legacy. FFS whether the legacy SLRB configuration IE is reused or a new SLRB configuration IE is necessary.Proposal 18: For SRAP/RLC/MAC/PHY configuration for E2E DRB in L2 U2U Relay, for source end-UE, as in legacy, Tx side related parameters are decided by Tx-UE its (or its serving gNB), and source end-UE (as Tx) sends the parameters (that related to both Tx side and Rx side) to Relay-UE (as Rx-UE), and parameters only related to Relay UE (as Rx UE) side is decided by Relay UE by implementation.Proposal 19: For OOC/IDLE/INACTIVE L2 U2U End-UE, SRAP/RLC/MAC setting is obtained via Pre-configuration/SIB by referring to end-to-end QoS as input at least. RAN2 further discusses whether per-hop QoS needs to be taken into account.Proposal 20: For L2 U2U relay UE as Tx-UE of the second hop, R2 discusses whether rely on relay UE itself (or the serving gNB) or the Tx end-UE (or the serving gNB) to decide on the Tx side related parameters. |
| **R2-2305043**ZTE, Sanechips | Proposal 15a: In U2U relay, the remote/relay UEs in RRC\_IDLE/RRC\_INACTIVE acquire SLRB/RLC channel configuration in the SIB. The UEs in OOC acquire SLRB/RLC channel configuration in pre-configuration.Proposal 15b: In U2U relay, the remote/relay UEs in RRC\_CONNECTED acquire SLRB/RLC channel configuration via dedicated signalling. |
| **R2-2305181**Interdigital | Proposal 1: The TX remote UE receives end-to-end SDAP and PDCP configuration parameters associated with the QoS profile from (pre)configuration. Proposal 2: The TX remote UE sends the RX-related configuration parameters to the RX UE via end-to-end PC5-RRC signalling. Proposal 3: The TX remote UE determines the first hop RLC, MAC, and PHY configuration parameters associated to the QoS profile from (pre)configuration. FFS how to distinguish parameters associated with relaying compared to parameters associated with a direct link.Proposal 4: RAN2 decides which of the following options are used to configure lower layers of the second hop: 1) TX remote UE determines the allowable RLC channel configurations for the second hop, associated to the QoS profile from (pre)configuration, and sends them to the relay, or 2) Relay UE determines the allowable RLC channel configurations, associated to the QoS information provided by the TX remote UE, from (pre)configuration.Proposal 7: A joint success/failure procedure is performed at the lower layers, that is, the success/failure in configuring one hop (e.g., the first hop) depends on the success failure in configuring the other hop (e.g., the second hop).Proposal 8: Upper layer (SDAP, PDCP) and lower layers (RLC, MAC, PHY) are configured using SRBs associated with different unicast links.Proposal 9: RAN2 discusses two options for sequencing of configuration of upper and lower layers: 1) Remote UEs initiate/completes end-to-end configuration of upper layers before hop-by-hop configuration of lower layers, or 2) remote UEs initiates/completes hop-by-hop configuration of lower layers before end-to-end configuration of upper layers.Proposal 10: RAN2 can work on optimizing end-to-end latency in the presence of a relay once basic configuration procedures are completed and service interruption issue is addressed. |
| **R2-2305210**LG | Proposal 2: When source remote UE sends RRCReconfigurationSidelink message to the relay UE, that configuration message can include QoS-related information (e.g., PQI)Proposal 6: After each hop SL connection establishment completion, source remote UE sends RRCReconfigurationSidelink message to the target remote UE via relay UE for configuring end-to-end bearer (This includes end-to-end bearer and not-split PQI mapping information).Proposal 7: The specified SL-RLC3 can be configured for the initial RRCReconfigurationSidelink message transmission from the source remote UE to the target remote UE via relay UE.Proposal 9: Each (source/target) remote UE having the end-to-end bearer configuration and split QoS information can reconfigure the sidelink between each remote UE and the relay UE. In this reconfiguration message includes bearer mapping configuration between the end-to-end bearer and 1st-hop/2nd-hop RLC channel.Proposal 10: When relay UE receives each hop reconfiguration message including mapping information between the end-to-end bearer and 1st-hop/2nd-hop RLC channel from each remote UE, the remote UE can configure the mapping between the 1st-hop RLC channel and the 2nd-hop RLC channel. |
| **R2-2305246**vivo | Proposal 10: RAN2 to discuss the following options for configuring E2E SL-DRBs for L2 U2U relay:Option 1: Centralized controlOption 1a: Source remote UE (or its serving gNB if RRC CONNECTED) decides E2E configurations (ie.PC5-SDAP, PC5-PDCP) and HbH configurations (i.e., PC5-SRAP, PC5-MAC, PC5-PHY) of both hopsOption 1b: L2 U2U Relay UE (or its serving gNB if RRC CONNECTED) decides E2E configurations (i.e., PC5-SDAP, PC5-PDCP) and HbH configurations (i.e., PC5-SRAP, PC5-MAC, PC5-PHY) of both hopsOption 2: Distributed controli.e., Source remote UE (or its serving gNB if RRC CONNECTED) decides E2E configurations and HbH configurations for first hop, and L2 U2U Relay UE (or its serving gNB if RRC CONNECTED) decides HbH configurations for second hopProposal 11: If less gNB involvement is pursued by RAN2, RRC\_CONNECTED UE can follow its serving gNB’s SIB12 to decide E2E/HbH configurations as in RRC\_IDLE/ RRC\_INACTIVE. |
| **R2-2305551**Spreadtrum | Proposal 12b: For E2E SL-DRB, dedicated configuration/SIB/pre-configuration is used for the configuration of E2E SDAP/PDCP configuration and per-hop SRAP/RLC/MAC configuration.Proposal 13a: For E2E SDAP/PDCP configuration and SRAP/RLC/MAC configuration on the first hop for E2E SL-DRB, the Tx End UE or its serving gNB decide the Tx and Rx related parameters.Proposal 13b: For SRAP/RLC/MAC configuration on the second hop for E2E SL-DRB, the Relay UE or its serving gNB decide the Tx and Rx related parameters. |
| **R2-2305762**Qualcomm | Proposal 8: Per-hop RLC Channel is configured based on the per-hop QoS profiles using per-hop RRC message, E2E SL SDAP and PDCP is configured based on the E2E QoS profiles using E2E RRC message.Proposal 9: It leaves to Remote UE and Relay UE implementation based on e.g. per-hop QoS profile to configure the mapping between E2E bearer and egress RLC channel configuration in SRAP layer.Proposal 10: gNB is not involved in aspects of SL-DRB configuration and QoS split.Proposal 11: UE can use preconfiguration for E2E SL DRB and per-hop configuration(s) and communication. |
| **R2-2306125**ASUSTeK | Proposal 1: The E2E sidelink RRC reconfiguration procedure and the E2E sidelink UE capability transfer procedure are needed to support sidelink DRB configuration (including at least PC5-SDAP configuration and PC5-PDCP configuration) between Source UE and Target UE for L2 U2U Relay.Proposal 3: In addition to destination ID of the U2U Relay UE, Source remote UE in RRC\_CONNECTED includes an ID of Target remote UE in a SidelinkUEInformation message sent to gNB for providing SDAP configuration, PDCP configuration and 1st hop PC5 RLC channel configuration for establishing a new E2E SL DRB for a new PC5 QoS flow. The Target remote UE ID is FFS.Proposal 4: Source remote UE transmits an E2E RRCReconfigurationSidelink message to Target remote UE to provide the SDAP configuration and the PDCP configuration for establishing the new E2E SL DRB for a new PC5 QoS flow. Proposal 5: Source remote UE includes an ID of Target remote UE in a RRCReconfigurationSidelink message sent to U2U Relay UE to provide the 1st hop PC5 RLC channel configuration for establishing 1st hop PC5 RLC channel(s) in L2 U2U Relay for a new PC5 QoS flow. The Target remote UE ID is FFS.Proposal 6: U2U Relay UE in RRC\_CONNECTED includes an ID of Source remote UE in a SidelinkUEInformation message so that gNB can provide the 2nd hop PC5 RLC channel configuration for a new PC5 QoS flow. The Source remote UE ID is FFS.Proposal 7: Source remote UE includes E2E bearer ID(s) (i.e. configuration index of the SLRB configuration) for the mapped PC5 QoS flow(s) in a RRCReconfigurationSidelink message sent to U2U Relay UE. Proposal 8: U2U Relay UE in RRC\_CONNECTED includes E2E bearer ID associated with a PC5 QoS flow in a SidelinkUEInformation message sent to gNB so that gNB can provide the 2nd hop PC5 RLC channel configuration and E2E RB-to-egress PC5 RLC channel mapping for the L2 U2U Relay.  |
| **R2-2306191**Huawei, HiSilicon | Proposal 5: Following Rel-16 sidelink communication principle of Tx UE configuring Rx UE, in L2 U2U relay operation: ‐Tx remote UE provides E2E SDAP/PDCP configuration to the Rx remote UE, meanwhile provide first hop RLC bearer configuration to the relay UE, ‐The relay UE provides the second hop RLC bearer configuration to the Rx remote UE, Proposal 9: The E2E SDAP/PDCP configuration is based on E2E QoS parameter, and the per-hop RLC bearer configuration is based on per-hop QoS info, i.e. ‐The Tx remote UE obtains the E2E SDAP/PDCP configuration based on E2E QoS parameter and obtains the first hop RLC bearer configuration based on per-hop QoS info.‐The Tx remote UE informs the second hop QoS info to the relay UE via PC5-RRC, so that relay UE can obtain the second hop RLC bearer based on second hop QoS.‐The Rx UE deliveries the packet, received from the second hop RLC channel, to corresponding PDCP entity based on the E2E bearer ID included in adaptation layer. |

**Summary:**

For the E2E SL-DRB and the PC5 RLC channel configuration, whether the pre-configuration/SIB/dedicated signalling should be used, company’s views are collected as follows:

* For OOC U2U relay UE or remote UE:

 - pre-configuration: OPPO, ZTE, vivo, Spreadtrum, Qualcomm, Huawei

* For RRC\_IDLE/INACTIVE U2U relay UE or remote UE:

 - SIB: OPPO, ZTE, vivo, Spreadtrum, Huawei

 - pre-configuration: Qualcomm,

* For RRC\_CONNECTED U2U relay UE or remote UE:

 - dedicated configuration: OPPO(?), ZTE, vivo, Spreadtrum, ASUSTeK, Huawei

 - SIB: OPPO(?), vivo

 - pre-configuration: Qualcomm,

As we can see, all the companies support pre-configuration for OOC U2U relay/remote UE. For the RRC\_IDLE/INACTIVE U2U relay/remote UE, 5 companies (OPPO, ZTE, vivo, Spreadtrum, Huawei) support SIB based configuration while 1 company support pre-configuration. For the RRC\_CONNECTED U2U relay/remote UE, 6 companies support dedicated configuration, 2 companies support SIB based configuration, and 1 company support pre-configuration.

As discussed in Section 2.1, since the mode-1 resource allocation has been agreed for both remote UE and relay UE in U2U relay case, it is better for the gNB to configures the E2D SL-DRB and per hop PC5 relay RLC channel. By doing so, the gNB is aware of the association between the LCGID and the priority of relevant SL logical channel. Then gNB can assign the SL grant to remote or relay UE based on the reported SL-BSR. The following proposals are made and we can further discuss this.

**[Easy] Proposal 20a: For OOC U2U relay/remote UE, pre-configuration is used for the SL-DRB and PC5 RLC channel configuration.**

**[Easy] Proposal 20b: For RRC\_IDLE/INACTIVE U2U relay/remote UE, SIB is used for the SL-DRB and PC5 RLC channel configuration.**

**[ToDis] Proposal 20c: For RRC\_CONNECTED U2U relay/remote UE, dedicated signalling is used for the SL-DRB and PC5 RLC channel configuration.**

For the other issues mentioned for the SL-DRB and PC5 RLC channel configuration, we can discuss it until other aspects have more progress. There is no proposal for now.

### 2.5.3 PC5 RRC connection maintenance

|  |  |
| --- | --- |
| Tdoc Number | Proposals |
| **R2-2304680**NEC | Proposal-6: PC5-RRC connection state management is not needed for UE-to-UE Relay.Proposal-7: End-to-end PC5 RRC connection establishment can be only established after the hop-by-hop PC5 RRC connections are established for UE-to-UE Relay. |
| **R2-2305062**Apple | Proposal 6: PC5-RRC procedures are triggered after per-hop PC5 link is established to prepare the AS layer configurations for end-to-end PC5 unicast link setup.  |
| **R2-2305210**LG | Proposal 1: After relay selection for U2U, source remote UE performs SL connection establishment with the selected Relay UE.Proposal 4: After the 1st-hop SL connection establishment, relay UE is triggered to the SL connection establishment with the target remote UE. Proposal 8: For the end-to-end SL connection establishment, a new T400-like timer (e.g., longer than the legacy T400 timer) should be configured. |
| **R2-2305246**vivo | Proposal 12: When Source Remote UE detects PC5 RLF on the first hop or receive PC5 RLF indication on the second hop from the L2 U2U Relay UE, it would:- perform per-hop PC5 RRC connection release and inform upper layers about the per-hop PC5 RLF as legacy; and,- perform E2E PC5 RRC connection release (e.g., for E2E SL-RBs) and inform upper layers about the E2E PC5 RLF. |
| **R2-2305548**Ericsson | Proposal 9: RAN2 to consider Figure 1. as the baseline for L2 U2U relaying in PC5 end-to-end link establishment for cases (a) and (b). |
| **R2-2305697**Lenovo | Proposal 8: Legacy RRCReconfigurationSidelink message is used for end-to-end PC5 RRC connection.Proposal 9: Maintenance for end-to-end PC5 RRC connection should be supported.Proposal 10: The remote UE declares failure for end-to-end PC5 RRC connection upon detection of sidelink RLF on the first, reception of sidelink RLF on the second hop from relay UE, timer for end-to-end sidelink RRC reconfiguration for expiry. |
| **R2-2305762**Qualcomm | Proposal 12: When per-hop RLF is detected on one hop, E2E PC5 connection can be kept during Relay reselection and per-hop PC5 connection recovery.Proposal 13: When per-hop RLF is detected on one hop, per-hop PC5 connection on another hop can be kept if the old Relay UE is reselected; if a new Relay UE is reselected, the destination Remote UE release the old per-hop PC5 connection.Proposal 14: If E2E PC5 RLF is detected, the Remote UE should release the E2E link connection. |
| **R2-2305874**Kyocera | Proposal 4: After E2E PC5-RRC connection establishment, the SLRB and SL-RLC channel configurations and mappings should be handled by the source remote UE during OOC scenario. It should be further discussed whether gNB is responsible for the configurations when one or more UEs are in-coverage.Proposal 8: In case of SL-RLF, the source remote UE should inform the target remote UE via the candidate relay UE of the new path.Proposal 9: RAN2 should consider whether SL reestablishment of the E2E PC5 link should be supported for U2U relay.  |
| **R2-2306427**Xiaomi | Proposal 21: RAN2 consider how to handle T400, when RRCReconfigurationSidelink is sent over a U2U Relay between peer End Remote UEs. |

**Summary:** We can discuss it until other aspects have more progress. There is no proposal for now.

# Conclusion

**[Easy proposal]**

**Discovery**

**[Easy] Proposal 2a: For Model A discovery, the relay UE should only announce the neighbour UEs for which the PC5 link quality between the relay UE and the neighbour UE is above a certain threshold in a discovery announcement message. If agreed, LS is sent to SA2.**

**[Easy] Proposal 2b: For Model A discovery, upon discovery message reception, remote UE considers a relay UE as a candidate relay UE only if the PC5 RSRP towards the relay UE is above a configured threshold.**

**[Easy] Proposal 3c: For Model B discovery, upon discovery response messages reception, the source remote UE considers a relay UE as a candidate relay UE only if the PC5 RSRP towards the relay UE is above a configured threshold.**

**[Easy] Proposal 4: For integrated-discovery, when receiving DCR message from one or multiple relay UEs, the target remote UE should select a relay UE towards which the PC5 RSRP is above a configured threshold to respond.**

**[Easy] Proposal 5a: For U2U relay, when relay (re)selection is triggered, the discovery procedure is triggered at the same time to search for candidate relay UEs.**

**Relay (re)selection**

**[Easy] Proposal 8: Different thresholds for SL-RSRP and SD-RSRP are configured for the trigger of U2U relay (re)selection.**

**[Easy] Proposal 12a: Besides the PC5 link quality, RAN2 does not pursue other criteria for relay (re)selection.**

**[Easy] Proposal 12b: If multiple suitable U2U relay candidates which meet both the AS-layer and higher layer criteria are available, it is up to remote UE implementation to choose a U2U relay UE.**

**SRAP design**

**[Easy] Proposal 15: If 24-bit L2 ID is agreed, Option 3 (both source remote UE 24-bit layer-2 ID and target remote UE 24-bit layer-2 ID included in each hop) should be supported.**

**[Easy] Proposal 16b: If short ID is agreed, relay UE is responsible for ID assignment.**

**[Easy] Proposal 17a: Confirm the WA with following change: E2E bearer ID (i.e., *slrb-PC5-ConfigIndex* in the list of SLRB configurations for SL-DRBs, and specified values 0/1/2/3 for SL-SRB0/1/2/3) is used as input for the L2 U2U relay ciphering and deciphering at PDCP.**

**SL-SRB/DRB and PC5 RLC channel configuration**

**[Easy] Proposal 18: For the E2E SL-SRB configuration of U2U relay, specified PDCP configuration is used. FFS for the SRAP and PC5 RLC channel configuration for SL-SRB.**

**[Easy] Proposal 19a: AS layer is responsible for QoS split in L2 U2U relay.**

**[Easy] Proposal 19b: Relay UE is responsible for AS layer QoS split in L2 U2U relay.**

**[Easy] Proposal 20a: For OOC U2U relay/remote UE, pre-configuration is used for the SL-DRB and PC5 RLC channel configuration.**

**[Easy] Proposal 20b: For RRC\_IDLE/INACTIVE U2U relay/remote UE, SIB is used for the SL-DRB and PC5 RLC channel configuration.**

**[To Discuss]**

**Authorization**

**[ToDis] Proposal 1: Authorization information is needed for L2 U2U relay operation. RAN2 to discuss whether it is needed for L3 U2U relay operation. Send reply LS to inform SA2.**

**Discovery**

**[ToDis] Proposal 3a: For Model B discovery, the source remote UE transmits discovery solicitation message when the PC5 link quality (SL-RSRP or SD-RSRP) between the source remote UE and the target remote UE (if available) is below a configured threshold.**

**[ToDis] Proposal 3b: For Model B discovery, the relay UE transmits discovery solicitation message to target remote UE only if the PC5 link quality between the relay UE and the source remote UE is above a configured threshold.**

**[ToDis] Proposal 6: For RRC\_CONNECTED U2U relay/remote UE, U2U relay, dedicated signalling is used for the discovery configuration.**

**Relay (re)selection**

**[ToDis] Proposal 9: Remote UE can trigger U2U relay selection when PC5 RLF of the direct link between the remote UE and the peer remote UE is detected.**

**[ToDis] Proposal 10: Remote UE can trigger relay reselection if the link quality of the second hop between the relay UE and peer remote UE is blow a threshold even the link quality of the first hop is good. FFS for the content of the link quality indication of the second hop.**

**[ToDis] Proposal 11: RAN2 to discuss whether AS criterion is needed for switching back from indirect to direct link.**

**[ToDis] Proposal 13: RAN2 to discuss whether/how to handle the case that remote UE and its peer remote UE may select two different relay UEs simultaneously for communicating with each other. Send LS to SA2 if necessary .**

**SRAP design**

**[ToDis] Proposal 14: RAN2 to discuss which ID (24-bit L2 ID or short ID) can be used in SRAP header.**

**[ToDis] Proposal 16a: If short ID is agreed, RAN2 to discuss which option should be supported.**

**Option 2: Target remote UE ID (local ID) in first hop and source remote UE ID (local ID) in second hop.**

**Option 4: Both source remote UE ID (local ID) and target remote UE ID (local ID) included in each hop, the local ID is same on each hop and relay UE does not replace the local ID on each hop.**

**Option 5: A local pair ID for a pair between source remote UE and target remote UE included in each hop, the local ID is unique within one PC5 hop and relay UE needs to replace the local ID on each hop.**

**Option 6: A local pair ID for a pair between source remote UE and target remote UE included in each hop, the local ID is same on each hop and relay UE does not replace the local ID on each hop.**

**[ToDis] Proposal 17b: RAN2 to discuss how to identify the E2E bearer ID(e.g. 0/1/2/3) included in SRAP header is for SL-SRB or SL-DRB.**

**SL-SRB/DRB and PC5 RLC channel configuration**

**[ToDis] Proposal 20c: For RRC\_CONNECTED U2U relay/remote UE, dedicated signalling is used for the SL-DRB and PC5 RLC channel configuration.**

**[Low priority]**

**[LowPriority] Proposal 7: RAN2 deprioritize the discussion of U2N relay and U2U relay co-existence.**

**[LowPriority] Proposal 5b: RAN2 to discuss whether remote UE can perform Model B discovery while relay (re)selection is not triggered.**

Reference

1. R2-2304680 SRAP design and Connection establishment NEC
2. R2-2304754 Discussion on U2U relay OPPO
3. R2-2304957 Discussion on the adaptation layer Fujitsu
4. R2-2305043 Further discussion on U2U Relay ZTE, Sanechips
5. R2-2305062 Discussion on UE-to-UE Relay Apple
6. R2-2305180 Discovery and Relay Selection for UE-to-UE Relays InterDigital
7. R2-2305181 QoS and Adaptation Layer for UE-to-UE Relays InterDigital discussion
8. R2-2305210 Control plane procedure and adaptaion layer for U2U relay LG Electronics France
9. R2-2305233 Discussion on U2U sidelink relay China Telecom
10. R2-2305245 Discussion on the common L2 L3 parts for U2U relaying vivo
11. R2-2305246 Discussion on the L2 specific parts for U2U relaying vivo
12. R2-2305279 Discussion on U2U Relay CATT
13. R2-2305419 Discussion on reply LSs on RSRP issues Nokia, Nokia Shanghai Bell
14. R2-2305519 UE-to-UE relay (re)selection Sony
15. R2-2305520 Discussion on DRX for Sidelink UE to UE Relay Sony
16. R2-2305547 Discussion on Relay (re)selection and Discovery Ericsson España S.A.
17. R2-2305548 Control Plane Procedures for Layer 2 UE-to-UE Relays Ericsson España S.A.
18. R2-2305551 Discussion on UE-to-UE relay Spreadtrum Communications
19. R2-2305590 Considerations on U2U relay (re)selection and Local ID assignment
20. R2-2305618 Discussion on U2U relay CMCC
21. R2-2305697 Discussion on L2 U2U relay Lenovo
22. R2-2305743 QoS split and Bearer configuration Samsung discussion
23. R2-2305762 Layer-2 specific part on U2U Relay Qualcomm Incorporated
24. R2-2305763 gNB involvement on U2U relay Qualcomm Incorporated
25. R2-2305802 SRAP design for U2U Sidelink Relay Samsung R&D Institute UK
26. R2-2305874 Considerations for U2U L2 relay operations Kyocera
27. R2-2306125 Discussion on aspects of AS layer configuration for L2 U2U Relay ASUSTeK
28. R2-2306126 Discussion on E2E PC5-RRC configurations ASUSTeK
29. R2-2306191 Discussion on UE-to-UE relay Huawei, HiSilicon discussion
30. R2-2306378 Discussion on L2 U2U Relay MediaTek Inc.
31. R2-2306380 Remaining issues for U2U relay Sharp
32. R2-2306427 U2U Relay UE discovery / (re)selection, SRAP, QoS Handling Beijing Xiaomi Mobile Software