**3GPP TSG-RAN WG2 #122 *R2-230xxxx***

**Incheon, Korea, May 2023**

Agenda Item: 7.9.4

Source: OPPO

Title: Discussion on multi-path SL relay

Document for: Discussion, Decision

# Introduction

This paper will discuss left issues for the multi-path relay.

# Discussion on aspects applicable to both Scenario-1/2

## Modelling

|  |  |  |
| --- | --- | --- |
| [**R2-2306355**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306355.zip) | Proposal 2: If different paths are served by a same gNB-DU, both paths of MP relaying are always on MCG of the remote UE for scenario 1. A same MAC entity of MCG supports both NR SL of the indirect path and Uu link of the direct path for scenario 1, as currently specified for NR SL. | LG Electronics France |
| [**R2-2306355**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306355.zip) | Proposal 3: RAN2 is requested to discuss whether to confirm the RAN3’s agreement that different paths can be served by different gNB-DUs considering that only MCG of a UE configuring MR-DC can currently support NR sidelink. | LG Electronics France |
| [**R2-2306355**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306355.zip) | Proposal 4: If different paths can be served by different gNB-DUs as agreed in RAN3, direct path of MP relaying is always on MCG of the remote UE. RAN2 is requested to further discuss one of the following alternatives for indirect path of MP relaying:  Alt 1: NR sidelink needs to be supported for SCG of the remote UE.  - SCG of the remote UE only serving indirect path is configured without PSCell.  Alt 2: different gNB-DUs serving different paths can be configured as a same MCG of the remote UE  - The MCG of the remote UE has different MAC entities i.e. one MAC entity for direct path and the other MAC entity for indirect path for different gNB-DUs. | LG Electronics France |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 2: The indirect path of the multi-path is configured in MCG of the remote UE when both indirect path and direct path are in same gNB-DU. | CATT |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 3: The indirect path of the multi-path can be configured in SCG of the remote UE when indirect path and direct path are in different gNB-DUs. | CATT |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 4: One MAC entity is used for both indirect path and direct path when both paths are in same gNB-DU. | CATT |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 5: Two MAC entities are used for indirect path and direct path when the paths are in different gNB-DU, i.e., one MAC entity for direct path and the other MAC entity for indirect path. | CATT |
| **R2-2305045** | Proposal 1: Multi-path remote UE can be configured with only one cell group for inter-DU scenario. | ZTE, OPPO |

There seems convergence for intra-DU case, while different views on inter-DU case. The issue of the number of MAC entity(ies), as a modelling issue, seems not very urgent.

1. For Scenario-1/2, for intra-DU, MP remote UE is configured with a single cell group, i.e., MCG. R2 further discuss, for inter-DU, MP remote UE is configured with MCG only, or both MCG and SCG (which is for the indirect path).

## UP

|  |  |  |
| --- | --- | --- |
| [**R2-2305008**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305008.zip) | Dynamic duplication (de)activation of a DRB is supported based on the existing Duplication Activation/Deactivation MAC CE and Duplication RLC Activation/Deactivation MAC CE on the direct path for MP split bearer with duplication | Samsung |
| [**R2-2305945**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305945.zip) | Proposal 7: The Duplication Activation/Deactivation MAC CE can be reused. | Lenovo |
| [**R2-2305553**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305553.zip) | Proposal 7: For duplication, Duplication Activetion/Deactivetion MAC CE and Duplication RLC Activation/Deactivation MAC CE over direct path to control the duplication activation/deactivation of DRBs. | Spreadtrum Communications |
| [**R2-2304664**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2304664.zip) | Proposal 10 For scenario-1 of multi-path Relay, for PDCP duplication, allows dynamic duplication (de)activation controlled by MAC-CE delivery via direct link. | OPPO |
| [**R2-2304664**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2304664.zip) | Proposal 11 For scenario-1 of multi-path Relay, for PDCP duplication, the legacy “Duplication Activation/Deactivation MAC CE” and “Duplication RLC Activation/Deactivation MAC CE” can be adopted. | OPPO |
| [**R2-2306382**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306382.zip) | Proposal 11. Dynamic duplication (de)activation of a DRB is supported based on legacy MAC CE on the direct path for MP split bearer. | Sharp |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 19: Reuse Duplication Activation/Deactivation MAC CE or Duplication RLC Activation/Deactivation MAC CE over direct path to control the duplication activation/deactivation of DRBs. | CATT |
| [**R2-2305282**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305282.zip) | Proposal 9: The legacy Duplication Activation/Deactivation MAC CE and Duplication RLC Activation/Deactivation MAC CE can be reused as baseline for multi-path scenario 2. | CATT |
| [**R2-2305282**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305282.zip) | Proposal 10: The current Duplication Activation/Deactivation MAC CE and Duplication RLC Activation/Deactivation MAC CE can only be transmitted on the direct path. | CATT |
| R2-2305046 | The PDCP duplication (de)activation for remote UE’s multi-path split RB can be supported via the MAC CE transmitted on the direct path. | ZTE, Sanechips |
| [R2-2305008](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305008.zip) | Dynamic duplication is always activated for SRB once duplication is configured | Samsung |
| [R2-2305248](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305248.zip) | For Scenario 1 and Scenario 2, duplication is activated by default for a split SRB, i.e. not support dynamic duplication (de)activation for split SRB. | vivo |

The views seem quite aligned for DRB, while some different views on SRB.

1. For Scenario-1/2, PDCP duplication of DRB is controlled by legacy Duplication Activation/Deactivation MAC CE and Duplication RLC Activation/Deactivation MAC CE delivered via direct path. FFS on whether to introduce dynamic duplication (de)activation for SRB.

|  |  |  |
| --- | --- | --- |
| [**R2-2305183**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305183.zip) | Proposal 4: Split bearer threshold-like mechanism is supported for a split DRB without duplication in multipath for determining when a UE can transmit data to either path. FFS on the differences with legacy DC split bearer threshold. | InterDigital |
| [**R2-2305183**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305183.zip) | Proposal 5: For a split bearer without duplication, the network can control the amount of data routed by the UE to each of the paths when the split bearer threshold is exceeded. | InterDigital |
| [**R2-2305008**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305008.zip) | The existing data volume threshold (i.e. ul-DataSplitThreshold) can be reused for MP split bearer. | Samsung |
| [**R2-2306445**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306445.zip) | Proposal 1: The existing data volume threshold (i.e. ul-DataSplitThreshold) can be reused both for MP split bearer scenario 1 and 2. | MediaTek Inc. |
| [**R2-2305945**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305945.zip) | Proposal 8: Both legacy data volume threshold for split bearer and some enhancements can be considered to support MP split bearer in multi-path relaying case. | Lenovo |
| [**R2-2305553**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305553.zip) | Proposal 6: For split DRB, introduce the data split threshold for packet split. | Spreadtrum Communications |
| [**R2-2304664**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2304664.zip) | Proposal 9 For scenario-1 of multi-path Relay, for PDCP duplication, RAN2 follows legacy design as a baseline, including at least 1) all RLC entities have the same RLC mode, 2) RRC can set the duplication state (but always activated for SRB, if configured), 3) data volume threshold can be optionally configured for DRB. | OPPO |
| [**R2-2306382**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306382.zip) | Proposal 13. The existing data volume threshold (i.e. ul-DataSplitThreshold) can be reused for MP split bearer. | Sharp |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 22. For split DRB configuration and transmission, legacy mechanism in DC can be reused, i.e., introduce the data split threshold for data split. | Huawei, HiSilicon |
| R2-2305046 | Uu split threshold can be re-used to trigger remote UE’s UL packet split. | ZTE, Sanechips |

The common view is that the UL data split threshold value is needed, while there are some different views on whether some enhancement is needed.

1. For Scenario-1/2, optionally configure UL data split threshold for split DRB. FFS the usage of the threshold follows legacy behavior or not.

|  |  |  |
| --- | --- | --- |
| [**R2-2305008**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305008.zip) | When configuring duplication for a MP split bearer, RRC can set the state of PDCP duplication (either activated or deactivated) at the time of (re-)configuration. | Samsung |
| [**R2-2306382**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306382.zip) | Proposal 12. When configuring duplication for a MP split bearer, RRC can set the state of PDCP duplication (either activated or deactivated) at the time of (re-)configuration. | Sharp |
| R2-2305046 | When configuring MP split bearer with duplication for remote UE, gNB can set the state of PDCP duplication (either activated or deactivated) at the time of (re-)configuration. | ZTE, Sanechips |

No one talks about enhancement, so assume legacy behavior is sufficient.

1. For Scenario-1/2, RRC sets the initial state of PDCP duplication for split SRB/DRB as in legacy.

## CP

|  |  |  |
| --- | --- | --- |
| [**R2-2305765**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305765.zip) | Proposal 2: In case of Uu-RLF, the existing message i.e MCGFailureInformation is used to report direct path failure over indirect path. | Qualcomm Incorporated |
| [**R2-2305248**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305248.zip) | For both Scenario 1&2, MCGFailureInformation should be reused to report the direct path failure information. | vivo |
| [**R2-2305235**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305235.zip) | - MCGFailureInformation message can be used to report the direct path failure to the gNB via the indirect path if available. | China Telecom |
| [**R2-2306382**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306382.zip) | Proposal 4. For reporting Uu-RLF of remote UE, MCGFailureInformation should be used. | Sharp |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 15: For Rel-18 multi-path, remote UE reports direct path failure via MCGFailureInformation message and reports indirect path failure via MCGFailureInformation or SCGFailureInformation message based on the serving cell of relay UE is in MCG or SCG of remote UE. | CATT |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 16: Introducing new failure types (SL RLF, Uu RLF of relay UE, Uu RRC failure of relay UE) in MCGFailureInformation and SCGFailureInformation message. | CATT |
| R2-2305046 | Re-use MCGFailureInformation to report the Uu-RLF. | ZTE, Sanechips |
| [**R2-2305183**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305183.zip) | Proposal 8: A new RRC messages is defined for 1) direct path failure (which the UE reports on the indirect path) and 2) indirect path failure (which the UE reports on the direct path). The message contain at least a path-dependant failure type and measurement results. | InterDigital |

Most companies would like to go for MFI information.

1. For Scenario-1/2, when reporting direct-path failure via indirect-path, use MCGFailureInformation message. FFS on whether additional IE needs to be introduced.

|  |  |  |
| --- | --- | --- |
| [**R2-2305248**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305248.zip) | For both Scenario 1&2, MCGFailureInformation is reused to report the indirect path failure information without starting fast recovery timer and new failure types are introduced, e.g. relay UE Uu failure, SL failure and inter-UE failure. | vivo |
| **R2-2305046** | Re-use MCGFailureInformation to report the PC5-RLF. | ZTE, Sanechips |
| [**R2-2305765**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305765.zip) | Proposal 3: In case indirect path failure, including PC5-RLF or Relay UE Uu failure, the existing message i.e. SCGFailureInformation is used to report indirect path failure over direct path with adding indirect path failure as a new failure type. | Qualcomm Incorporated |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 15: For Rel-18 multi-path, remote UE reports direct path failure via MCGFailureInformation message and reports indirect path failure via MCGFailureInformation or SCGFailureInformation message based on the serving cell of relay UE is in MCG or SCG of remote UE. | CATT |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 16: Introducing new failure types (SL RLF, Uu RLF of relay UE, Uu RRC failure of relay UE) in MCGFailureInformation and SCGFailureInformation message. | CATT |
| [**R2-2305235**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305235.zip) | Proposal 5: For multi-path relaying in Scenario 1, upon detection of PC5-RLF on the indirect path or upon reception of Uu RLF indication from the relay UE, SidelinkUEInformationNR message can be used to report the indirect path failure to the gNB via direct path if available. | China Telecom |
| [**R2-2306382**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306382.zip) | Proposal 5. For reporting PC5-RLF of remote UE or Uu-RLF of relay UE, new message should be used. | Sharp |
| [**R2-2305183**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305183.zip) | Proposal 8: A new RRC messages is defined for 1) direct path failure (which the UE reports on the indirect path) and 2) indirect path failure (which the UE reports on the direct path). The message contain at least a path-dependant failure type and measurement results. | InterDigital |

The view is quite diverse..

1. For Scenario-1/2, when reporting indirect-path failure via direct-path, R2 discuss which message to use, e.g., MCGFailureInformation, SCGFailureInformation, SidelinkUEInformationNR, or a new message. FFS on whether additional IE needs to be introduced if legacy message is adopted.

|  |  |  |
| --- | --- | --- |
| [**R2-2305183**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305183.zip) | Proposal 10: The UE starts a T316-like timer when the failure occurs in the primary path configured for SRB1 and the UE is configured to start T316-like timer. | InterDigital |
| [**R2-2305008**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305008.zip) | T316-like timer is introduced for direct path failure recovery | Samsung |
| [**R2-2305248**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305248.zip) | Introduce a timer (i.e., T316-like) to control the duration of fast recovery procedure for direct path failure. | vivo |
| [**R2-2305235**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305235.zip) | The timer T316 can be reused. No need to introduce new timer. | China Telecom |
| [**R2-2304664**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2304664.zip) | Proposal 7 RAN2 not pursue a new timer for the MP-relay RLF handling, and further discuss whether to reuse T316 or not. | OPPO |

1. For Scenario-1/2, if MCGFailureInformation is agreed for direct path failure recovery in P5, reuse T316 timer for the direct path failure recovery.

|  |  |  |
| --- | --- | --- |
| [**R2-2305183**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305183.zip) | Proposal 15: The remote UE may suspend/release the indirect path of the multipath configuration when the relay UE is moved to RRC\_IDLE/RRC\_INACTIVE by the network. | InterDigital |
| [**R2-2305550**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305550.zip) | Confirm the WA that for a remote UE and relay UE in RRC\_CONNECTED, the network is expected to release the multipath configuration related to this relay at the remote UE before it releases the relay UE to RRC\_IDLE/INACTIVE. No spec impact is foreseen. | Ericsson España S.A. |
| [**R2-2306313**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306313.zip) | Proposal 4: RAN2 consider agreeing on the modified WA that For a remote UE and a relay UE in RRC\_CONNECTED, if the network releases the relay UE to RRC\_IDLE or RRC\_INACTIVE, the relay UE does not need to inform the remote UE of its explicit release of RRC connection. It is up to network to release the multipath configuration related to this relay UE at the remote UE. | Nokia, Nokia Shanghai Bell |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 11: RAN2 confirms the working assumption:  WA: For a remote UE and relay UE in RRC\_CONNECTED, the network is expected to release the multipath configuration related to this relay at the remote UE before it releases the relay UE to RRC\_IDLE/RRC\_INACTIVE. | CATT |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 5. RAN2 to confirm the WA as agreement that for a remote UE and relay UE in RRC\_CONNECTED, the network is expected to release the multipath configuration related to this relay at the remote UE before it releases the relay UE to RRC\_IDLE/RRC\_INACTIVE. | Huawei, HiSilicon |

Adopt the wording in 5550 as a start point for companies to check.

1. For Scenario-1/2, confirm the WA that: for a remote UE and relay UE in RRC\_CONNECTED, the network is expected to release the multipath configuration related to this relay at the remote UE before it releases the relay UE to RRC\_IDLE/INACTIVE. No spec impact is foreseen.

|  |  |  |
| --- | --- | --- |
| [**R2-2305183**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305183.zip) | Proposal 14: The remote UE releases the indirect path upon the relay UE informing the remote UE that it has moved to RRC\_IDLE due to expiry of the data inactivity timer. | InterDigital |
| [**R2-2305064**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305064.zip) | Proposal 2 For Scenario 1, it is up to NW implementation to avoid a MP remote UE to encounter the following case: 1) when the relay UE informs the remote UE of HO; 2) When the relay UE moves to IDLE following expiry of dataInactivityTimer, if the timer is supported for the relay UE. | Apple |
| [**R2-2306313**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306313.zip) | Proposal 6: For a remote UE and a relay UE in RRC\_CONNECTED, the relay UE does not inform the remote UE of its expiry of dataInactivityTimer, if configured. It is up to network to release the multipath configuration related to this relay UE at the remote UE. | Nokia, Nokia Shanghai Bell |
| [**R2-2305586**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305586.zip) | Proposal 6: If configured with dataInactivityTimer, Relay UE should ignore this configuration and do not start this timer. | NEC Corporation |
| [**R2-2305248**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305248.zip) | The remote UE does not need to inform the network when either the relay UE informs the remote UE of HO or the relay UE moves to IDLE following expiry of dataInactivityTimer. | vivo |
| [**R2-2305235**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305235.zip) | Proposal 6: For the cases other than Uu-RLF of the relay UE (such as when the relay UE informs the remote UE of HO or when the relay UE moves to IDLE following expiry of dataInactivityTimer, if the timer is supported for the relay UE), there is no need for the remote UE to inform the network. | China Telecom |
| [**R2-2304664**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2304664.zip) | Proposal 8 R2 not pursue remote UE RLF handling upon relay UE’s handover or expiry of dataInactivityTimer. | OPPO |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 6: No specification effort to handle the case when the relay UE moves to IDLE following expiry of dataInactivityTimer, assuming the nework is expected to release the multipath configuration related to this relay at the remote UE before expiry of dataInactivityTimer. | Huawei, HiSilicon |
| R2-2305046 | RAN2 not further discuss the following two cases:1) when the relay UE informs the remote UE of HO; 2) When the relay UE moves to IDLE following expiry of dataInactivityTimer, if the timer is supported for the relay UE. | ZTE, Sanechips |

Most companies do not want to further explore the case for dataInactivityTimer (either it is not applicable to the scenario, or the network would handle it properly). Adopt the wording in 6192 for companies to check.

1. For Scenario-1/2, no specification effort to handle the case when the relay UE moves to RRC\_IDLE following expiry of dataInactivityTimer, i.e., not pursue relay UE notifying remote UE, and remote UE notifying network.

|  |  |  |
| --- | --- | --- |
| [**R2-2305218**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305218.zip) | Proposal 3: Relay UE reuse NotificationMessageSidelink in MP to notify its handover, RLF and Uu access failure. | Xiaomi |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 12: For Rel-18 multi-path, the gNB is expected to release the multipath configuration related to this relay at the remote UE before it reconfigures the relay UE to perform inter-gNB handover. | CATT |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 13: For Rel-18 multi-path, the gNB is expected to reconfigure or release the multipath configuration related to this relay at the remote UE before it reconfigures the relay UE to perform intra-gNB handover. | CATT |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 4. When the remote UE receives the notification from relay UE with the handover indication type, remote UE does not need to inform the gNB. | Huawei, HiSilicon |
| [**R2-2305183**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305183.zip) | Proposal 13: The remote UE suspends transmissions on the indirect path upon reception of a notification of HO by the relay UE. | InterDigital |
| [**R2-2305586**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305586.zip) | Proposal 5: Remote UE will not inform the network with the HO of Relay UE if it determines that it is configured with intra-gNB MP, even if it has received the notification of HO from Relay UE. | NEC Corporation |
| [**R2-2305064**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305064.zip) | Proposal 2 For Scenario 1, it is up to NW implementation to avoid a MP remote UE to encounter the following case: 1) when the relay UE informs the remote UE of HO; 2) When the relay UE moves to IDLE following expiry of dataInactivityTimer, if the timer is supported for the relay UE. | Apple |
| [**R2-2305248**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305248.zip) | The remote UE does not need to inform the network when either the relay UE informs the remote UE of HO or the relay UE moves to IDLE following expiry of dataInactivityTimer. | vivo |
| [**R2-2305235**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305235.zip) | Proposal 6: For the cases other than Uu-RLF of the relay UE (such as when the relay UE informs the remote UE of HO or when the relay UE moves to IDLE following expiry of dataInactivityTimer, if the timer is supported for the relay UE), there is no need for the remote UE to inform the network. | China Telecom |
| **[R2-2304664](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2304664.zip)** | Proposal 8 R2 not pursue remote UE RLF handling upon relay UE’s handover or expiry of dataInactivityTimer. | OPPO |
| **[R2-2306313](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306313.zip)** | Proposal 5: For a remote UE and a relay UE in RRC\_CONNECTED, the relay UE does not inform the remote UE of its reception of an RRCReconfiguration including the reconfigurationWithSync. It is up to network to release the multipath configuration related to this relay UE at the remote UE. | Nokia, Nokia Shanghai Bell |

Most companies do not want to further explore the case for relay UE handover. Considering the HO has been included in the notification message on PC5 (different from the proposal above), the saved effort is just on remote UE notifying network.

1. For Scenario-1/2, not pursue remote UE notifying network upon reception of notification message indicating relay UE handover. FFS whether rely on network to release configuration of relay UE at remote UE before relay UE handover, or rely on remote UE to suspend the indirect path upon reception of notification message indicating relay UE handover.

# Discussion on aspects applicable to Scenario-1 only

|  |  |  |
| --- | --- | --- |
| [**R2-2305008**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305008.zip) | For SRB, the primary RLC entity is located at direct path. | Samsung |
| [**R2-2305008**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305008.zip) | For DRB, the location of primary RLC entity is configurable. | Samsung |
| [**R2-2305218**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305218.zip) | Proposal 2: Primary RLC entity of the MP split bearer could be configured on either direct path or indirect path. | Xiaomi |
| [**R2-2305620**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305620.zip) | Proposal 2: The primary path and primary RLC entity of split SRB1 are always on direct path for multi-path SL Relay. | CMCC |
| [**R2-2305586**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305586.zip) | Proposal 11: For Scenario 2, if the indirect path is set as the primary path, how to perform the date split is up to UE implementation and Remote UE should ignore the configured threshold of data split. | NEC Corporation |
| [**R2-2305248**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305248.zip) | For Scenario 1, the split SRB1’s primary path of the remote UE in multipath is by default on the direct path. | vivo |
| [**R2-2305248**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305248.zip) | For Scenario 1, the primary path of split SRB2 for the remote UE is always by default on the direct path. | vivo |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 3: For split SRB1/SRB2, legacy mechanism in DC can be reused in scenario 1, i.e. network sets primary path to direct path and UE shall send RRC messages via configured primary path. | Huawei, HiSilicon |

Given the following agreement for Scenario-2, and the proposals above, seems straightforward to restrict P-path of split SRB to direct path as well.

Split SRB1 and 2 are supported in Scenario 2 and primary path of the split SRB 1 and 2 is always on direct path.

1. For Scenario-1, R2 discuss whether to limit primary path of the split SRB1 and SRB2 always on direct path.

|  |  |  |
| --- | --- | --- |
| [**R2-2305183**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305183.zip) | Proposal 1: RAN2 confirms previous assumptions that non-split SRB1/SRB2 can be configured on either direct or indirect path (up to network choice). | InterDigital |
| [**R2-2305550**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305550.zip) | Non-split SRB1/2 can only be configured over the direct path. | Ericsson España S.A. |
| [**R2-2305064**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305064.zip) | Proposal 1 For Scenario 1, it is up to NW configuration to decide whether to configure non-split SRB in an indirect path or not. No restriction needed in the RAN2 specification. | Apple |
| [**R2-2305008**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305008.zip) | The non-split SRB1 over indirect path is not allowed, while the non-split SRB2 over indirect path can be configured up to gNB implementation. | Samsung |
| [**R2-2305218**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305218.zip) | Proposal 1: Non-split SRB on indirect path is supported. | Xiaomi |
| [**R2-2306313**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306313.zip) | Proposal 3: RAN2 confirm the agreement on the support of non-split SRB on the indirect path. | Nokia, Nokia Shanghai Bell |
| [**R2-2305553**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305553.zip) | Proposal 4: Non-split SRB1 and SRB 2 over indirect path is not supported in Scenario 1. | Spreadtrum Communications |
| [**R2-2305586**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305586.zip) | Proposal 4: For Scenario 1, RAN2 to support the configuration of non-split SRBs over indirect path. | NEC Corporation |
| [**R2-2305248**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305248.zip) | For Scenario 1, non-split SRB1 for the remote UE in multipath is always configured on the direct path. | vivo |
| [**R2-2305248**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305248.zip) | For Scenario 1, non-split SRB2 for the remote UE is always configured on the direct path. | vivo |
| [**R2-2305235**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305235.zip) | Proposal 2: For Scenario 1, non-split SRB1 and 2 over indirect path is not supported. When split SRBs is configured, primary path of the split SRB1 and 2 is always on direct path in Scenario 1. | China Telecom |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 20: For multi-path scenario 1, non-split SRBs can be configured on the indirect path. | CATT |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 1: Non-split SRB1 configured only on the indirect path is not supported in scenario 1. | Huawei, HiSilicon |
| [**R2-2305765**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305765.zip) | Proposal 1: SRB1 and SRB2 are configured on direct path. | Qualcomm Incorporated |
| [**R2-2304664**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2304664.zip) | Proposal 6 To align Scenario-1 with Scenario-2, RAN2 revert the agreement on allowing indirect-path-only SRB1 and SRB2 configuration, i.e., they can be configured either on direct-path-only, or on both paths. | OPPO |

Given the diverse view, some discussion is needed – which is a Scenario-1 only issue given the following agreement for Scenario-2.

Non-split SRB1 and 2 over indirect path is not supported in Scenario 2.

1. For Scenario-1, R2 further discuss whether non-split SRB1/2 on indirect path is supported.

|  |  |  |
| --- | --- | --- |
| [**R2-2305232**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305232.zip) | Proposal 1: To simplify the issue to support mode 1 RA for U2N remote UE under MP scenario, RAN2 has the following understanding: - It applies at least for intra-DU case - How/whether to implement inter-DU case is up to RAN3 decision, yet does not expect RAN2-related enhancement to enable it. | NEC, Nokia,OPPO,ZTE,Huawei, HiSilicon, Sharp, Samsung, Philips, MediaTek |
| [**R2-2306127**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306127.zip) | In MP Scenario 1, remote UE can be configured to use resource allocation mode 1 (i.e. scheduled mode) for sidelink transmission in the indirect path. | ASUSTeK |
| [**R2-2306127**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306127.zip) | In MP Scenario 1, gNB provides sidelink grant to remote UE via the direct path. | ASUSTeK |
| [**R2-2306127**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306127.zip) | In MP Scenario 1, remote UE reports SL-BSR for indirect bearers to gNB via the direct path. | ASUSTeK |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 6: The remote UE configured with multi-path requests Mode 1 RA via direct path, DU of direct path schedules the SL mode 1 grant to the remote UE for both intra-DU and inter-DU multi path cases. From RAN2’s perspective, no enhancement is needed. | CATT |

1. For Scneario-1, support mode-1 of remote UE by reporting SR/BSR and receiving SL DG via direct-path. And mode-1 is supported at least for intra-DU case, while whether it applies to inter-DU case is up to R3 but R2 does not expect R2 impact. LS to R3 to notify this conclusion.

|  |  |  |
| --- | --- | --- |
| [**R2-2305550**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305550.zip) | For the FFS on if a Rel-17 relay UE is supported for use in a multipath connection, RAN2 should wait for SA2’s reply to the LS. | Ericsson España S.A. |
| [**R2-2305064**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305064.zip) | Proposal 7 A mechanism is introduced to distinguish Rel-17 IDLE/INCTIVE relay UE from Rel-18 Relay UE. | Apple |
| [**R2-2305064**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305064.zip) | Proposal 8 Either not support R17 IDLE/INACTIVE relay UE or restrict the gNB to only configure split SRB1 if an IDLE/INACTIVE R17 relay UE is chosen as the target for indirect path addition. | Apple |
| [**R2-2305248**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305248.zip) | It is totally up to gNB implementation on how to configure the path of SRB1 of remote UE when Rel-17 relay UE is used, i.e. no specific enhancement for the serving gNB of remote UE to differentiate Rel-17 relay UE in both RAN2 and SA2. | vivo |
| [**R2-2304664**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2304664.zip) | Proposal 5 For bringing the idle/inactive relay UE to RRC\_CONNECTED, RAN2 not pursue a solution where candidate relay UE indicates its release-version or capability to remote UE before PC5 link establishment. | OPPO |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 9: A Rel-18 relay UE can indicate whether it supports the Rel-18 new solution of bringing IDLE/INACTIVE relay UE to CONNECTED state in discovery message, and a Rel-18 remote UE indicates the candidate relay UE supporting the Rel-18 new method in measurement results. RAN2 sends LS to SA2 for this requirement. | Huawei, HiSilicon |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 10: If a discovery message from a relay UE indicates the relay UE supports Rel-18 new solution, upon receiving a DCR message of which the used destination L2 ID is equals to the relay UE’s source L2 ID used for the discovery message, the RRC\_IDLE/INACTIVE relay UE enters RRC\_CONNECTED state. | Huawei, HiSilicon |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 11: There are two options to be considered for Rel-18 measurement configuration and reporting for MP support:  Option 1: Remote UE reports the candidate relay UE(s) of the type requested by the gNB, e.g. only the UEs supporting Rel-18 new solution  Option 2: Remote UE reports the discovered relay UE(s) with an capability indication (i.e. support Rel-18 new solution or not) | Huawei, HiSilicon |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 12: RAN2 assumes that Rel-17 L2 U2N Relay can be used in Rel-18 MP operation unless any essential new behaviour for MP operation compared with Rel-17 L2 U2N relay operation is identified. | Huawei, HiSilicon |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 22: RAN2 discuss the following enhancements for triggering the idle/inactive relay UE to RRC\_CONNECTED via PC5-RRC message:  Remote UE should acquire the release of the relay UE and indicate it to gNB; | CATT |

There seems some coupled issues:

1. Whether a mixed R17 relay and R18 relay UE scenario needs to be considered
2. If yes to 1), whether the release / capability of relay UE needs to be awared by remote UE, and whether the remote UE needs to behave upon the release / capability of relay UE (either filtering the candidate relay UE, or report the release / capabilty information to network).

So some discussion is needed.

1. For Scenario-1, R2 discuss whether to consider the MP scenario where there are both R17 relay-UE(s) and R18 relay-UE(s). If yes, R2 further discuss whether remote UE needs to be aware of the release / capability of relay UE supporting PC5-RRC based method to enter into RRC\_CONNECTED state. If yes, R2 further discuss how for remote UE to report candidate relay UE based on the release / capability information.

|  |  |  |
| --- | --- | --- |
| [**R2-2305064**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305064.zip) | Proposal 9 PC5-RRC trigger is applicable for all cases, including split SRB1 case. | Apple |
| [**R2-2306382**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306382.zip) | Proposal 6. Remote UE sends PC5-RRC message to relay UE if RRCReconfigurationComplete message is sent only via direct path. | Sharp |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 7: RAN2 confirm the legacy Rel-17 method and PC5-RRC based method should be used to bring IDLE/INACTIVE Relay UE to CONNECTED state as following:  If split SRB1 with duplication is configured, Legacy Rel-17 method should be used.  If split SRB1 without duplication is configured, and primary RLC entity is on direct path, PC5-RRC based method should be used.  If non-split SRB1 is configured on direct path, PC5-RRC based method should be used.  If other configurations are to be supported:  If non-split SRB1 over indirect link is configured, legacy Rel-17 method should be used.  If Split SRB1 without duplication is configured and primary RLC entity is on indirect link, legacy Rel-17 method should be used. | Huawei, HiSilicon |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 8: For the PC5-RRC based solution, a new PC5-RRC message from relay UE to remote UE can be considered. RAN2 can also consider using Discovery/PC5-S message with specific SRC or L2 ID as the Rel-18 new solution. | Huawei, HiSilicon |
| R2-2305046 | It is suggested to revert previous RAN2 agreement and not support PC5 RRC triggers for RRC\_IDLE/INACTIVE relay UE. | ZTE, Sanechips |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 21: When one of the following conditions is met, the remote UE sends the RRCReconfigurationComplete message to gNB via the indirect path for Scenario 1.  - when primary RLC entity of split SRB1 is on indirect path;  - when non-split SRB1 is configured on indirect path. | CATT |

The views are diverse, from using PC5-RRC for all cases, to step back to use legacy R17 method for all cases.

Logically, it seems solvable after the issue above is handled, so maybe no need to have a proposal now, but can wait till the conclusion of the issue above.

|  |  |  |
| --- | --- | --- |
| [**R2-2305064**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305064.zip) | Proposal 12 RAN2 discuss whether to reuse T304/T402 timer for MP configuration procedure or to introduce new timer(s). | Apple |
| [**R2-2305064**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305064.zip) | Proposal 13 When T304-like or T420-like timer for MP configuration procedure expired, remote UE fall back to its prior configuration. | Apple |
| [**R2-2305698**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305698.zip) | Proposal 5: T304 can be reused for the direct path addition procedure. | Lenovo |
| [**R2-2305698**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305698.zip) | Proposal 6: Once the timer for the second direct path addition (e.g T304) expires, the remote UE reports the failure information to the network via the available indirect path. | Lenovo |
| [**R2-2304958**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2304958.zip) | Proposal 5: The remote UE sends a failure indication to the gNB via the indirect path when the T304-like timer expires. | Fujitsu |
| [**R2-2304958**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2304958.zip) | Proposal 6: The remote UE falls back to the original single path configuration when the T304-like timer expires. | Fujitsu |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 26: Reuse T304 timer for MP direct path addition or indirect path modification configuration procedure. | CATT |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 27: For Rel-18 multi path, the remote UE shall stop T304 upon successful completion of random access on the corresponding SpCell. | CATT |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 28: For Rel-18 multi path, the remote UE shall fallback to continue using the indirect path configuration used prior to the reception of RRCReconfiguration message and inform network about the reconfiguration with sync failure when T304 is expired. | CATT |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 15: For indirect path to MP, T304 and the existing stop condition is reused, assuming reconfigurationWithSync is to be used. | Huawei, HiSilicon |

There seems converged view on reuse T304, while some voices on enhancing the expiry behavior.

1. For Scenario-1, reuse T304 for direct path addition and change. FFS on expiry behavior.

|  |  |  |
| --- | --- | --- |
| [**R2-2305064**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305064.zip) | Proposal 13 When T304-like or T420-like timer for MP configuration procedure expired, remote UE fall back to its prior configuration. | Apple |
| [**R2-2305064**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305064.zip) | Proposal 14 RAN2 discuss the stop condition of T420-like timer for the case when RRCReconfigurationComplete message is not delivered via indirect path. | Apple |
| [**R2-2305698**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305698.zip) | Proposal 1: T420 can be reused for the indirect path addition procedure. | Lenovo |
| [**R2-2305698**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305698.zip) | Proposal 2: Once the timer for the second indirect path addition (e.g T420) expires, the remote reports the failure information to the network via the available direct path. | Lenovo |
| [**R2-2305945**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305945.zip) | Proposal 1: Legacy timer T420 can be reused in the case of relay change. | Lenovo |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 23: Reuse T420 timer for MP indirect path addition or indirect path modification configuration procedure. | CATT |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 24: For Rel-18 multi path, the remote UE shall stop T420 upon successfully receiving RRCReconfigurationCompleteSidelink message. | CATT |
| [**R2-2305281**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305281.zip) | Proposal 25: For Rel-18 multi path, the remote UE shall fallback to continue using the direct path configuration used prior to the reception of RRCReconfiguration message and inform network about the reconfiguration with sync failure when T420 expired. | CATT |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 13: T420 can be reused to determine indirect path addition failure in MP operation. | Huawei, HiSilicon |

There seems converged view on reuse T304, while some voices on enhancing the stop condition and expiry behavior.

1. For Scenario-1, reuse T420 for indirect path addition and change. FFS on stop condition and expiry behavior.

# Discussion on aspects applicable to Scenario-2 only

|  |  |  |
| --- | --- | --- |
| [**R2-2305064**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305064.zip) | Proposal 5 The “relay UE ID” reported to the gNB is based on C-RNTI. | Apple |
| [**R2-2305765**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305765.zip) | If the Relay UE is in CONNECTED state, Remote UE reports candidate Relay UE’s C-RNTI to identify the Relay UE. | Qualcomm Incorporated |
| [**R2-2305218**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305218.zip) | Proposal 16: Relay UE’s C-RNTI and serving cell identify can be reported by remote UE. | Xiaomi |
| [**R2-2306313**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306313.zip) | Proposal 10: In scenario 2, the remote UE reports target relay UE’s C-RNTI to the gNB. How to make the target relay UE’s RRC connection (before the reporting the target relay UE’s C-RNTI) is up to implementation, as already agreed. | Nokia, Nokia Shanghai Bell |
| **R2-2306445** | Proposal 4: The UE ID reported to gNB for indirect path addition is C-RNTI. | MediaTek Inc. |
| [**R2-2306355**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306355.zip) | Proposal 11: Based on clear majority’s view in [1], RAN2 assumes that the UE ID reported to gNB for indirect path addition is C-RNTI [21/24]. | LG Electronics France |
| [**R2-2305621**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305621.zip) | Proposal 3 : For associated UEs in RRC\_CONNECTED, C-RNTI can be used as associated UE identification. | CMCC |
| [**R2-2305553**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305553.zip) | Proposal 2: The relay UE ID can be C-RNTI. | Spreadtrum Communications |
| [**R2-2305248**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305248.zip) | For Scenario 2, NW controlled solution under UE specific permission, remote UE can report relay UE’s ID, i.e. C-RNTI and serving cell ID, after it triggers the relay UE entering RRC\_CONNECTED. | vivo |
| [**R2-2305282**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305282.zip) | Proposal 6: For scenario 2, remote UE should report the relay UE’s C-RNTI to gNB for indirect path addition. | CATT |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 17. If there is no security risk, C-RNTI is used as the UE ID reported to gNB for indirect path addition when relay UE is in RRC\_CONNECTED; otherwise, an index assigned by the remote UE can be used. | Huawei, HiSilicon |

Seems the view converges for RRC\_CONNECTED relay-UE, i.e., use C-RNTI. Plus two companies raise cell-ID as well.

1. For Scenario-2, remote-UE reports the RRC\_CONNECTED relay-UE C-RNTI and cell-ID for indirect path addition.

|  |  |  |
| --- | --- | --- |
| [**R2-2305064**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305064.zip) | Proposal 3 Remote UE report relay UE ID while relay UE is in IDLE/INACTIVE state is not supported. | Apple |
| [**R2-2305064**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305064.zip) | Proposal 4 How remote UE triggers an IDLE/INACTIVE relay UE entering RRC\_CONNECTED in Scenario 2 is out of 3GPP scope. | Apple |
| [**R2-2305765**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305765.zip) | Proposal 4: RAN2 confirms target Relay UE can be in IDLE and Inactive state. | Qualcomm Incorporated |
| [**R2-2305765**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305765.zip) | If the Relay UE is in Inactive state, Remote UE reports candidate Relay UE’s I-RNTI to identify the Relay UE; | Qualcomm Incorporated |
| [**R2-2305765**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305765.zip) | If the Relay UE in IDLE state, Remote UE reports candidate Relay UE’s 5G-GUTI to identify the Relay UE; | Qualcomm Incorporated |
| [**R2-2305621**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305621.zip) | Proposal 4 : For associated UEs in RRC\_IDLE/RRC\_INACTIVE, temporary or local ID can be used as UE identification. | CMCC |
| [**R2-2305248**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305248.zip) | For Scenario 2, RAN2 to confirm the WA into agreement, i.e., leave it to relay and remote UE implementation on how to trigger the RRC\_IDLE/RRC\_INACTIVE target relay UE to initiate RRC connection establishment procedure. | vivo |
| [**R2-2306382**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306382.zip) | Proposal 19. In scenario2, it is up to UE implementation when IDLE/INNACTIVE relay UE enters RRC\_CONNECTED state. | Sharp |
| [**R2-2305282**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305282.zip) | Proposal 5: For scenario 2, enhancements for relay UE in RRC\_IDLE/INACTIVE state is not considered. | CATT |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 19: In scenario 2, remote UE triggers the RRC\_IDLE/RRC\_INACTIVE relay UE into RRC\_CONNECTED state before reporting relay UE’s information to network. How to trigger this is left to remote/relay UE implementation. | Huawei, HiSilicon |
| R2-2305046 | Remote UE may report relay UE ID of RRC IDLE and INACTIVE Relay UE to gNB for scenario 2. | ZTE, Sanechips |
| R2-2305046 | In addition to C-RNTI, S-TMSI can be used as relay UE ID for RRC\_IDLE/INACTIVE relay UE. | ZTE, Sanechips |
| **[R2-2306313](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306313.zip)** | we see no need for reporting the ID of relay UE in RRC\_IDLE or RRC\_INACTIVE, and C-RNTI can be reported to the gNB. | Nokia, Nokia Shanghai Bell |

There seem different views on whether to support ID reporting for RRC\_IDLE / RRC\_INACTIVE Relay UE. And if Yes, which ID to use.

1. For Scenario-2, R2 discuss whether remote-UE reports the RRC\_IDLE / RRC\_INACTIVE relay-UE ID for indirect path addition. And if Yes, which ID to report.

|  |  |  |
| --- | --- | --- |
| [**R2-2305064**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305064.zip) | Proposal 6 RAN2 send a LS to SA3 to check if there is any security concern regarding sharing C-RNTI via non-3GPP D2D link. | Apple |
| **R2-2306445** | Proposal 5: Send LS to SA3 to confirm whether there is any concern on C-RNTI transmission or not. | MediaTek Inc. |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 16. RAN2 can ask SA3 whether there is security risk to report RRC\_CONNECTED relay UE’s C-RNTI. | Huawei, HiSilicon |

There seems a view to rely on S3 confirmation on security for ID reporting.

1. For Scenario-2, R2 sends LS to S3 to check if any security concern for relay-UE sharing the ID (pending R2 conclusion on what ID to use) towards remote-UE.

|  |  |  |
| --- | --- | --- |
| [**R2-2305064**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305064.zip) | Proposal 10 Case G is not supported for Scenario 2. | Apple |
| [**R2-2305235**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305235.zip) | Proposal 1: For Scenario 2, the indirect path change case (i.e. case G) is not supported in this release. | China Telecom |
| [**R2-2305282**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305282.zip) | Proposal 2: For scenario 2, Case G (The remote UE configured with multi-path changes to a new relay UE for the indirect path while keeping the direct path under the same gNB) is not supported. | CATT |
| [**R2-2306192**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306192.zip) | Proposal 21: Case G is supported in scenario 2, i.e. relay UE change without HO. | Huawei, HiSilicon |
| [**R2-2306355**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2306355.zip) | Proposal 13: Based on majority’s view in [1], RAN2 de-prioritizes support of indirect path change for scenario 2 in Rel-18 [15/24] | LG Electronics France |
| [**R2-2305218**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305218.zip) | Proposal 14: Following case is not supported, | Xiaomi |
| [**R2-2305218**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_122/Docs/R2-2305218.zip) | G. The remote UE configured with multi-path changes to a new relay UE for the indirect path while keeping the direct path under the same gNB. | Xiaomi |

Seems the majority view is not support Case-G.

1. For Scenario 2, R2 discuss to de-prioritize the indirect path change case (i.e. case G) in this release.

# Conclusion

We have the following proposals:

[Proposal 1 For Scenario-1/2, for intra-DU, MP remote UE is configured with a single cell group, i.e., MCG. R2 further discuss, for inter-DU, MP remote UE is configured with MCG only, or both MCG and SCG (which is for the indirect path).](#_Toc134905959)

[Proposal 2 For Scenario-1/2, PDCP duplication of DRB is controlled by legacy Duplication Activation/Deactivation MAC CE and Duplication RLC Activation/Deactivation MAC CE delivered via direct path. FFS on whether to introduce dynamic duplication (de)activation for SRB.](#_Toc134905960)

[Proposal 3 For Scenario-1/2, optionally configure UL data split threshold for split DRB. FFS the usage of the threshold follows legacy behavior or not.](#_Toc134905961)

[Proposal 4 For Scenario-1/2, RRC sets the initial state of PDCP duplication for split SRB/DRB as in legacy.](#_Toc134905962)

[Proposal 5 For Scenario-1/2, when reporting direct-path failure via indirect-path, use MCGFailureInformation message. FFS on whether additional IE needs to be introduced.](#_Toc134905963)

[Proposal 6 For Scenario-1/2, when reporting indirect-path failure via direct-path, R2 discuss which message to use, e.g., MCGFailureInformation, SCGFailureInformation, SidelinkUEInformationNR, or a new message. FFS on whether additional IE needs to be introduced if legacy message is adopted.](#_Toc134905964)

[Proposal 7 For Scenario-1/2, reuse T316 timer for the direct path failure recovery.](#_Toc134905965)

[Proposal 8 For Scenario-1/2, confirm the WA that: for a remote UE and relay UE in RRC\_CONNECTED, the network is expected to release the multipath configuration related to this relay at the remote UE before it releases the relay UE to RRC\_IDLE/INACTIVE. No spec impact is foreseen.](#_Toc134905966)

[Proposal 9 For Scenario-1/2, no specification effort to handle the case when the relay UE moves to RRC\_IDLE following expiry of dataInactivityTimer, i.e., not pursue relay UE notifying remote UE, and remote UE notifying network.](#_Toc134905967)

[Proposal 10 For Scenario-1/2, no specification effort to handle the case of relay UE handover, i.e., not pursue remote UE notifying network.](#_Toc134905968)

[Proposal 11 For Scenario-1, primary path of the split SRB1 and SRB2 is always on direct path.](#_Toc134905969)

[Proposal 12 For Scenario-1, R2 further discuss whether non-split SRB1/2 on indirect path is supported.](#_Toc134905970)

[Proposal 13 For Scneario-1, support mode-1 of remote UE by reporting SR/BSR and receiving SL DG via direct-path D-path. And mode-1 is supported at least for intra-DU case, while whether it applies to inter-DU case is up to R3 but R2 does not expect R2 impact. LS to R3 to notify this conclusion.](#_Toc134905971)

[Proposal 14 For Scenario-1, R2 discuss whether to consider the MP scenario where there are both R17 relay-UE(s) and R18 relay-UE(s). If yes, R2 further discuss whether remote UE needs to be aware of the release / capability of relay UE supporting PC5-RRC based method to enter into RRC\_CONNECTED state. If yes, R2 further discuss how for remote UE to report candidate relay UE based on the release / capability information.](#_Toc134905972)

[Proposal 15 For Scenario-1, reuse T304 for direct path addition and change. FFS on expiry behavior.](#_Toc134905973)

[Proposal 16 For Scenario-1, reuse T420 for indirect path addition and change. FFS on stop condition and expiry behavior.](#_Toc134905974)

[Proposal 17 For Scenario-2, remote-UE reports the RRC\_CONNECTED relay-UE C-RNTI for indirect path addition.](#_Toc134905975)

[Proposal 18 For Scenario-2, R2 discuss whether remote-UE reports the RRC\_IDLE / RRC\_INACTIVE relay-UE ID for indirect path addition. And if Yes, which ID to report.](#_Toc134905976)

[Proposal 19 For Scenario-2, R2 sends LS to S3 to check if any security concern for relay-UE sharing the ID (pending R2 conclusion on what ID to use) towards remote-UE.](#_Toc134905977)

[Proposal 20 For Scenario 2, the indirect path change case (i.e. case G) is not supported in this release.](#_Toc134905978)

# Comments Collection

If any comment on any proposals, please insert into the table below

|  |  |  |  |
| --- | --- | --- | --- |
| **Which company** | **Which proposal** | **What is the comment?** | **Moderator Response** |
| Xiaomi | P10 | We observe the companies, not support remote UE reporting relay UE handover, believes gNB can be aware of relay UE’s handover and relase the multipath at remote UE in advance. However, if CHO is configured to relay UE, gNB can’t acknowledge relay UE’s handover in time and remote UE may need to report the handover to gNB. Therefore, we understand the proposal is only agreeable assuming CHO is not configured to relay UE. So suggest to make it clear,  Proposal 10: For Scenario-1/2, no specification effort to handle the case of relay UE handover, i.e., not pursue remote UE notifying network, with the assumption that CHO is not configured to relay UE.  Furthermore, it’s necessary to clarify the NW behavior in case of relay UE handover, similar to P8 as following.  Proposal X: For a remote UE and relay UE in RRC\_CONNECTED, the network is expected to release the multipath configuration related to this relay at the remote UE before relay UE’s handover. | For revision of P10, can you remind me that, besides Xiaomi, any other company(ies) considered CHO? (although there were some discussion in AI 7.9.3 on CHO, I thought that is not for MP relay here).. Let’s wait a bit more on whether we need to explicitly couple with CHO.  For the addition of P-X, will wait for more comment, e.g., by network vendors, to see if this proposal is acceptable. (I thought the current P10, which rules out the potential spec impact, is sufficient, even without further clarification on expected network implementation,, but I am neutral on that)  See the reply to Lenovo below. |
| Xiaomi | P11 | We observe there is no majority view on whether primary path is always on indirect path. In scenario 2, the primary path is always on direct path because indirect path is invisible to 3GPP standard. But in scenario 1, both direct and indirect path are defined within 3GPP. Therefore, we suggest to change this proposal to discuss whether primary path can be configured on indirect path. | OK, revised it to be a R2-discuss one. |
| Xiaomi | P17 | Misalignment between section 4 and 5. In section 4, P17 includes C-RNTI and cell ID. However, in section 5, P17 only includes C-RNTI. | Oh, sorry for the typo, will update section-5 before submission. |
| Nokia | P11 | Agree with Xiaomi that there is no majority for restricting the primary path to direct path. For SRB, only four companies (Samsung, CMCC, vivo, Huawei) proposed to restrict the primary path to the direct path. The argument that for scenario 2 primary path is restricted to the direct path seems not valid for scenario 1 because the PC5 link and Uu link of the indirect path are under control of gNB in scenario 1 while it is not for scenario 2.  We also suggest to to discusss further. | As replied to Xiaomi |
| Nokia | P10, P18 | For P10 and P18, Nokia contribution is added to the table. | Oh, sorry for missing that! |
| Nokia | P13 | For P13, D-path needs to be removed. | Thanks for catching it, revised. |
| Lenovo | P7 | Assumption of P7 is ‘If MCGfailureinformation is agreed for direct path failure recovery’. Therefore, we suggest the following change.  *Proposal 7 If MCGfailureinformation is agreed for direct path failure recovery in P5, reuse T316 timer for the direct path failure recovery for Scenario-1/2.* | OK (although currently only the start condition relates to the MCGFailureInformation message). |
| Lenovo | P10 | After remote UE receives notification message due to relay HO, remote UE should at suspend the indirect path even notifying network is not needed. Therefore, we can change P10 as follows.  *Proposal 10: For Scenario-1/2, not pursue remote UE notifying network upon reception of notification message due to the HO of relay UE.* | Not sure if it is the correct understanding – my observation is:  1/ companies tend to believe network will handle remote UE before HO of relay UE (see the comment above by Xiaomi as well)  2/ so logically the notification message is not needed. But the reason we did not mention that (as in P9) is there is already a code-point for relay-UE-handover in the legacy notification message for R17 reason, so no need to disable that.  3/ yet when it comes to the suspend operation, I do not think that is needed, given the assumption that network would handle it, i.e., network will already release the indirect path configuration before relay UE handover, so no need for (remote) UE to handle that.  **[Lenovo]**  After a quick look at the contributions listed for P10, the view is listed as follows.  **View#1**: network will release indirect path for remote UE when configuring handover to relay UE. (CATT, Apple)  **View#2**: Notification message due to HO of relay UE is allowed. [But remote UE will not notify it to network upon reception of notification.] (Xiaomi, Huawei, InterDigital, NEC, Vivo, China Telecom)  Based on the above, Majority view is that remote UE does not notify it to network if receiving notification message due to HO of relay UE. Only two companies propose to restrice the network behavior. Most of them think the notification message due to relay HO from relay UE is possible. Therefore, ‘no specification effort to handle the case of relay UE handover’ is not aligned with most companies’ view based on the proposals.  [Rapp]  Combine comment from Xiaomi and Lenovo, it seems there is a need to discuss whether it  1/ relies on network to release the configuration of relay UE at remote UE, before handover of relay UE  2/ relies on remote UE to suspend the transmission of indirect path, considering it is possible that the configuration of relay UE has not been released by network before handover of relay UE. |
| Huawei, HiSilicon | P1 | P1 seems to discuss detailed RRC siganling design? One comment is that at this stage we could more focus on functional design instead of stage 3 signalling. Another comment is that we should try to have a unified siganling design for intra-CU case and inter-DU case, because network deployment should not be exposed to UE, but P1 seems to allow different design for the two cases.  To sum up, we undertand P1 is not urgent, thus suggest to postpone the discussion. | The proposal did not try to further down-select for inter-DU case give the proposals in companies paper.  For the postpone or not, if it is controversial, it should be de-prioritized compared to the others which have common view. Let’s wait for more voices on that. |
| Huawei, HiSilicon | P9 | We observe R2-2305621/ R2-2306313 also support case G. Then the number seems to be:  R2-2305621/ R2-2306313/R2-2306192 support the case,  R2-2306355/ R2-234664 propose to depriotize case G,  R2-2305064/R2-2305235/R2-2305282/R2-2305218 do not support case G.  We did not see clear majority view here, thus suggest to change the proposal to further discuss whether to support case G. | Rapp assume this comment is for P20 instead of P9?  Based on this assumption, P20 is revised. |